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Journey
First Printing
Quick Reference Guide

This guide has been prepared to help you get quickly acquainted with your new Dodge and to provide a convenient reference source for common questions. However, it is not a substitute for your Owner's Manual.

For complete operational instructions, maintenance procedures and important safety messages, please consult your Owner's Manual, Navigation Radio User Manual, Multimedia User Manual and other Warning Labels in your vehicle.

Not all features shown in this guide may apply to your vehicle. For additional information on accessories to help personalize your vehicle, visit www.mopar.com or your local Dodge dealer.

www.DODGE.com

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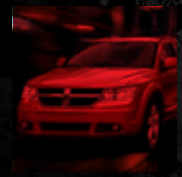
2009
QUICK REFERENCE GUIDE



JOURNEY

DODGE

INSTRUMENT PANEL

- Turn Signal/Lights Lever (Behind Steering Wheel)
- Electronic Vehicle Information Center (EVIC) Display
- Electronic Vehicle Information Center (EVIC) Controls
- Speed Control Lever
- Wiper/Washer Lever
- Audio System (Navigation Radio Shown)
- Climate Controls
- Upper Switch Panel
  - Heated Seats
  - Electronic Stability Program
  - Hazard Warning Flasher
  - Power Inverter

VEHICLE FEATURES

KEY FOB WITH INTEGRATED KEY

LOCKING AND UNLOCKING THE DOORS/LIFTGATE

- Press the LOCK button once to lock all doors and liftgate.
- Press the UNLOCK button once to unlock the driver's door only and twice within five seconds to unlock all the doors and liftgate.
- All doors can be programmed to unlock on the first press of the UNLOCK button.
- Refer to the Owner's Manual for programming.

REMOTE START

- Press the REMOTE START button (x2) twice within five seconds.
- To drive the vehicle, press the UNLOCK button, insert the key in the ignition and turn to the ON/RUN position.
- With remote start, the engine will only run for 15 minutes (timeout) unless the ignition key is placed in the RUN position.
- The vehicle must be started with the key after two consecutive timeouts.

PANIC ALARM

- Press the PANIC button once to turn the panic alarm on.
- Wait approximately three seconds and press the button a second time to turn the panic alarm off.

UNIVERSAL CONSUMER INTERFACE – iPod®

- An iPod® can be plugged into the vehicle's audio system, using the provided cable, through a connector located in the glove box. Refer to Owner's Manual for operation.

TURN SIGNAL/LIGHTS LEVER

HEADLIGHTS/PARKING LIGHTS/AUTOMATIC HEADLIGHTS

- Rotate the end of the lever to the first detent for parking lights, the second detent for headlights, and the third detent for AUTO.
- When set to AUTO, the system automatically turns the headlights on or off based on ambient light levels.

INSTRUMENT PANEL DIMMER

- Rotate the center portion of the lever to the extreme bottom position to turn off the interior lighting. In this position, the interior lights will not turn on when a door is opened.
- Rotate the center portion of the lever up to brighten the instrument panel lights when the parking lights and headlights are on.
- Rotate the center portion of the lever upward to the next detent position to fully brighten the odometer and radio displays when the parking lights or headlights are on.
- Rotate the center portion of the lever upward to the last detent to turn on the interior lighting.

FOG LIGHTS

- Pull out the end of the lever.
- Fog lights only operate with parking lights or low beam headlights on.

TURN SIGNALS/LANE CHANGE ASSIST

- Tap the lever up or down once and the turn signal (right or left) will flash three times then automatically turn off.

SPEED CONTROL LEVER

CRUISE ON/OFF

- Push the ON/OFF button to activate the Speed Control.
- CRUISE will appear on the instrument cluster to indicate the Speed Control is on.
- Push the ON/OFF button a second time to turn the system off.

SET

- With Speed Control on, press down and release the lever to set a desired speed.

ACCEL/DECEL

- Press and hold the lever up to accelerate or down to decelerate the vehicle; release the lever to save the new set speed.
- Once a speed is set, tapping the lever up or down will increase or decrease the set speed approximately 1 mph (2 km/h).

CANCEL

- Pull the lever toward you, or apply the brakes to cancel the set speed and maintain the set speed memory.
- Press the ON/OFF button to turn the system off and erase the set speed memory.

RESUME

- To resume a previously selected set speed in memory, push the lever up and release.

WIPERS

INTERMITTENT, LOW, AND HIGH OPERATION

- Rotate the end of the lever to the first detent position for one of five intermittent settings, the second detent for low wiper operation and the third detent for high wiper operation.

MIST

- Pull down on the lever and release when a single wipe is desired.

WASHER OPERATION

- Pull the lever towards you and hold for as long as spray is desired.

REAR WIPER OPERATION

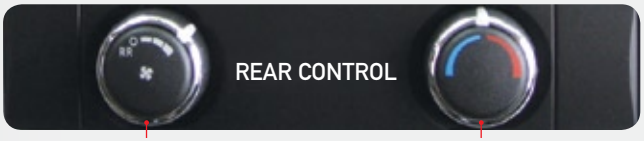
- Rotate the center portion of the lever forward to the first detent for rear wiper operation.

REAR WASHER OPERATION

- Rotate the center portion of the lever past the first detent to activate the rear washer.

EVIC CONTROLS

- The EVIC features a driver interactive display that is located in the instrument cluster. Pressing the controls on the steering wheel allows the driver to select vehicle information and Personal Settings. Refer to Owner's Manual for further details.



MANUAL TWO AND THREE ZONE CLIMATE CONTROL

AIR RECIRCULATION

- Use recirculation for maximum A/C operation.
- For window defogging, turn recirculation off.
- Recirculation is not allowed in defrost, floor or defrost/floor (mix) modes.

ACTIVATING REAR PASSENGER CLIMATE CONTROLS

- Rotate the rear blower control, located on the instrument panel, to the **"RR"** position. This enables the rear passenger climate controls located in the headliner above the second row seats.

uconnect® phone

- uconnect® phone requires a cellular phone equipped with the Bluetooth® Hands-Free Profile, Version 0.96 or higher. See the www.dodge.com/uconnect website for supported phones. Refer to your Owner's Manual for further information.

TWO AND THREE ZONE AUTOMATIC TEMPERATURE CONTROL (ATC) (THREE ZONE SHOWN)

AUTOMATIC OPERATION

- Press the AUTO button.
- Select the desired temperature by rotating the Temperature Controls for the driver or passenger.
- The system will maintain the set temperature automatically.

AIR CONDITIONING (A/C)

- If the A/C button is pressed while in the AUTO mode, the indicator light may flash three times to indicate the air conditioning is being controlled automatically.

SYNC TEMPERATURE BUTTON

- Push the SYNC button once to control driver and passenger temperatures simultaneously. Push the SYNC button a second time to control the temperatures individually.

AIR RECIRCULATION

- Use recirculation for maximum A/C operation.
- For window defogging, turn recirculation off.
- If the Recirculation button is pressed while in the AUTO mode, the indicator light may flash three times to indicate the cabin air is being controlled automatically.

VEHICLE FEATURES

FUEL CAP

LOOSE GAS CAP MESSAGE

- If a "gas cap" message (shown as gASCAP) appears, tighten the gas cap until a clicking sound is heard.
- Press the odometer reset button to turn the message off.
- If the message continues to appear for more than three days after tightening the gas cap, see your dealer.

TIRE PRESSURE MONITORING SYSTEM (TPMS)

- If one or more of the four road tire pressures are low, the Tire Pressure Monitoring Light will illuminate and an audible chime will sound.
- Check the inflation pressure of each road tire on your vehicle and inflate to the recommended cold pressure value, shown on the placard located in the driver's door opening. The TPMS light should not be used as a tire pressure gauge when adjusting your tire pressure.
- The light will turn off once the updated tire pressure has been recognized. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) before the light will turn off.
- **Temperature changes can affect tire pressures causing the TPMS light to turn on.** Colder temperatures will decrease tire pressure and warmer temperatures will increase tire pressure.
- If your spare tire is in use on the vehicle the TPMS light may turn on. Refer to your Owner's Manual.

OIL CHANGE INDICATOR

MESSAGE

- If an "Oil Change" message (shown as "CHAngE Oil" or "Oil Change Required") appears and a single chime sounds, it is time for your next required oil change.

RESETTING LIGHT AFTER SERVICING

- Turn the ignition switch to the ON/RUN position (do not start engine).
- Fully depress the accelerator pedal three times within 10 seconds.
- Turn the ignition switch to the OFF/LOCK position.

CLOCK SETTING

NON-TOUCH SCREEN RADIO

- Press and hold the TIME button until the hours blink; turn the TUNE/SCROLL control knob to set the hours.
- Press the TUNE/SCROLL control knob until the minutes begin to blink; turn the TUNE/SCROLL control knob to set the minutes.
- Press the TUNE/SCROLL control knob to save the time change.

TOUCH SCREEN RADIO

- Turn the radio ON.
- Touch the screen where the time is displayed.
- To adjust the hours, touch either the hour forward button or the hour backward button.
- To adjust the minutes, touch either the minute forward button or the minute backward button.
- To save the new time setting, touch the screen where the word "Save" is displayed.

NAVIGATION RADIO

- The navigation radio automatically updates clock time using Global Positioning Satellite (GPS).

THIRD ROW SEAT ENTRY

TIP 'n SLIDE

- Move the seatback lever located on the upper outboard side of the seat, forward. In one motion the seat cushion flips upward and the seat will slide forward on its tracks.

2009 DTC INDEX

Journey

ABS - ELECTRICAL DIAGNOSTICS

DTC	Description
C100A	LEFT FRONT WHEEL SPEED SENSOR CIRCUIT
C1011	LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C1014	LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE
C1015	RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT
C101C	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C101F	RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE
C1020	LEFT REAR WHEEL SPEED SENSOR CIRCUIT
C1027	LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C102A	LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE
C102B	RIGHT REAR WHEEL SPEED SENSOR CIRCUIT
C102C	RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE
C1032	RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C1035	RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE
C1041	LEFT FRONT TONE WHEEL PERFORMANCE
C1042	RIGHT FRONT TONE WHEEL PERFORMANCE
C1043	LEFT REAR TONE WHEEL PERFORMANCE
C1044	RIGHT REAR TONE WHEEL PERFORMANCE
C1046	LEFT FRONT WHEEL PRESSURE PHASE MONITORING
C1047	RIGHT FRONT WHEEL PRESSURE PHASE MONITORING
C1048	LEFT REAR WHEEL PRESSURE PHASE MONITORING
C1049	RIGHT REAR WHEEL PRESSURE PHASE MONITORING
C1073	ABS PUMP MOTOR CONTROL CIRCUIT
C1078	TIRE REVOLUTIONS RANGE PERFORMANCE
C107C	BRAKE PEDAL SWITCH 1/2 STUCK
C107D	BRAKE PEDAL SWITCH 1/2 CORRELATION
C1090	ABS BRAKE LAMP CONTROL CIRCUIT LOW
C1091	ABS BRAKE LAMP CONTROL CIRCUIT HIGH
C1210	G SENSOR INPUT CIRCUIT PERFORMANCE
C1219	STEERING ANGLE SENSOR ERRATIC PERFORMANCE
C121A	STEERING ANGLE SENSOR NOT INITIALIZED
C121C	TORQUE REQUEST SIGNAL DENIED
C121D	BRAKE PRESSURE SENSOR CIRCUIT
C121E	BRAKE PRESSURE SENSOR COMPARATIVE PERFORMANCE
C1231	DRIVE TEST: STEERING ANGLE SENSOR

C1232	DRIVE TEST: PRESSURE SENSOR
C1234	DRIVE TEST: SENSOR CLUSTER INSTALLATION
C1238	DRIVE TEST: UNSUCCESSFUL
C1239	EMISSIONS ROLLS TEST ACTIVE
C123A	ESP SYSTEM SENSORS CALIBRATION
C123B	ESP SYSTEM CONTROL TOO LONG
C123C	DYNAMICS SENSOR MOUNTING/INSTALLATION PERFORMANCE
C123F	STEERING ANGLE SENSOR COMPARATIVE PERFORMANCE
C1240	STEERING ANGLE SENSOR OVERTRAVEL PERFORMANCE
C1243	G SENSOR NOT INITIALIZED
C2100	BATTERY VOLTAGE LOW
C2101	BATTERY VOLTAGE HIGH
C2111	ANTI-LOCK BRAKE MODULE INTERNAL
C2114	DYNAMICS SENSOR SUPPLY VOLTAGE LOW
C2115	DYNAMICS SENSOR SUPPLY VOLTAGE HIGH
C2116	ABS PUMP MOTOR SUPPLY LOW VOLTAGE
C2202	ORIGINAL VIN MISMATCH/MISSING
C2205	STEERING ANGLE SENSOR INTERNAL
C2206	VEHICLE CONFIGURATION MISMATCH
U0100	LOST COMMUNICATION WITH ECM/PCM
U0101	LOST COMMUNICATION WITH TCM
U0125	LOST COMMUNICATION WITH DYNAMICS SENSOR
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE (TIPM)
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0429	IMPLAUSIBLE DATA RECEIVED FROM SCM
U1003	ESP CAN C BUS PERFORMANCE
U1004	CAN C BUS TRANSMIT PERFORMANCE
U1104	CAN C BUS CRC PERFORMANCE
U140E	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED
U1501	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM PCM
U1502	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TCM
U1503	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TIPM

ALL WHEEL DRIVE (AWD) MODULE - ELECTRICAL DIAGNOSTICS

DTC	Description
C1078	TIRE REVOLUTIONS RANGE PERFORMANCE
C1456	AWD CLUTCH POWER CONTROL CIRCUIT LOW
C145D	AWD CLUTCH POWER/RETURN CONTROL CIRCUIT OPEN

C145F	AWD SYSTEM TEMPORARILY DISABLED - OVERTEMPERATURE
C2100	BATTERY VOLTAGE LOW
C2101	BATTERY VOLTAGE HIGH
C211C	IGNITION RUN/START INPUT CIRCUIT LOW
C211D	IGNITION RUN/START INPUT CIRCUIT HIGH
C2206	VEHICLE CONFIGURATION MISMATCH
C2208	AWD ECU INTERNAL
U0001	CAN C BUS
U0100	LOST COMMUNICATION WITH ECM/PCM
U0121	LOST COMMUNICATION WITH ABS
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U113C	LOST WHEEL SPEED MESSAGES

AUDIO (AMPLIFIER) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1460	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B1461	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1462	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1463	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1464	CHANNEL 1 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1465	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B1466	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1467	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1468	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1469	CHANNEL 2 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146A	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B146B	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B146C	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B146D	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B146E	CHANNEL 3 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B146F	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B1470	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1471	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1472	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1473	CHANNEL 4 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1474	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B1475	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1476	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT HIGH

B1477	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1478	CHANNEL 5 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1479	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B147A	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B147B	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B147C	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B147D	CHANNEL 6 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B147E	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B147F	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1480	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1481	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1482	CHANNEL 7 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
B1483	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT PERFORMANCE
B1484	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1485	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1486	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1487	CHANNEL 8 AUDIO SPEAKER OUTPUT CIRCUIT SHORTED TOGETHER
U0019	CAN INTERIOR BUS
U0020	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER
U0154	LOST COMMUNICATION WITH OCCUPANT CLASSIFICATION MODULE
U0184	LOST COMMUNICATION WITH RADIO
U0197	LOST COMMUNICATION WITH HANDS FREE MODULE
U0199	LOST COMMUNICATION WITH DRIVERS DOOR MODULE
U0200	LOST COMMUNICATION WITH PASSENGER DOOR MODULE

AUDIO (RADIO) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1401	FRONT LEFT AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1402	FRONT LEFT AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1403	FRONT LEFT AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1405	FRONT RIGHT AUDIO SPEAKER OUTPUT CIRCUIT LOW
B1406	FRONT RIGHT AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B1407	FRONT RIGHT AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1409	REAR LEFT AUDIO SPEAKER OUTPUT CIRCUIT LOW
B140A	REAR LEFT AUDIO SPEAKER OUTPUT CIRCUIT HIGH
B140B	REAR LEFT AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B140D	REAR RIGHT AUDIO SPEAKER OUTPUT CIRCUIT LOW
B140E	REAR RIGHT AUDIO SPEAKER OUTPUT CIRCUIT HIGH

B140F	REAR RIGHT AUDIO SPEAKER OUTPUT CIRCUIT OPEN
B1421	AUDIO CD READ ERROR/INOPERABLE DISC
B1422	AUDIO DVD READ ERROR/INOPERABLE DISC
B1424	IMPROPER DVD-WRONG REGION
B1429	RADIO DISPLAY HIGH TEMPERATURE
B142A	RADIO UNIT HIGH TEMPERATURE
B142D	AUDIO ANTENNA NOT CONNECTED
B142E	GPS ANTENNA NOT CONNECTED
B142F	SATELLITE RADIO ANTENNA NOT CONNECTED
B1430 (2.5)	SATELLITE RADIO ANTENNA INTERNAL PERFORMANCE
B1430 (4.0)	SATELLITE RADIO ANTENNA INTERNAL PERFORMANCE
B143B	MICROPHONE 1 CIRCUIT LOW
B143C	MICROPHONE 1 CIRCUIT HIGH
B143E	MICROPHONE 2 CIRCUIT LOW
B143F	MICROPHONE 2 CIRCUIT HIGH
B1492	GENERAL MICROPHONE PERFORMANCE
B14B7	MICROPHONE 1 CIRCUIT OPEN
B14B8	MICROPHONE 2 CIRCUIT OPEN
B156B	SATELLITE RADIO ANTENNA CIRCUIT
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B221E	RADIO INTERNAL
U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH FCM (TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIRELESS IGNITION NODE OR WIN)
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0204	LOST COMMUNICATION WITH DOOR MODULE FRONT RIGHT

CABIN COMPARTMENT NODE (CCN) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1092	FRONT LEFT SEAT HEATER CONTROL CIRCUIT LOW (LHD)
B1092	FRONT LEFT SEAT HEATER CONTROL CIRCUIT LOW (RHD)
B1094	FRONT LEFT SEAT HEATER CONTROL CIRCUIT OPEN (LHD)
B1094	FRONT LEFT SEAT HEATER CONTROL CIRCUIT OPEN (RHD)
B1096	FRONT RIGHT SEAT HEATER CONTROL CIRCUIT LOW (LHD)

B1096	FRONT RIGHT SEAT HEATER CONTROL CIRCUIT LOW (RHD)
B1098	FRONT RIGHT SEAT HEATER CONTROL CIRCUIT OPEN (LHD)
B1098	FRONT RIGHT SEAT HEATER CONTROL CIRCUIT OPEN (RHD)
B10BB	LEFT HEATED SEAT SWITCH INPUT CIRCUIT STUCK
B10BC	RIGHT HEATED SEAT SWITCH INPUT CIRCUIT STUCK
B123F	MENU SWITCH STUCK
B127A	COMPASS PERFORMANCE
B1286	COMPASS/TEMP BUTTON PERFORMANCE
B1287	RESET SWITCH PERFORMANCE
B1288	TRIP/TOGGLE SWITCH PERFORMANCE
B1427	REMOTE RADIO SWITCH INPUT CIRCUIT HIGH (WITHOUT EVIC)
B1427	REMOTE RADIO SWITCH INPUT CIRCUIT HIGH (WITH EVIC)
B1428	REMOTE RADIO SWITCH INPUT CIRCUIT STUCK (WITHOUT EVIC)
B1428	REMOTE RADIO SWITCH INPUT CIRCUIT STUCK (WITH EVIC)
B1502	STEERING WHEEL CONTROL DOWN SWITCH PERFORMANCE
B1503	STEERING WHEEL CONTROL RIGHT SWITCH PERFORMANCE
B1613	PANEL ILLUMINATION CONTROL CIRCUIT LOW
B1615	PANEL ILLUMINATION CONTROL CIRCUIT OPEN
B168F	FRONT FOG LAMP SWITCH CIRCUIT STUCK
B17E3	TURN SIGNAL SWITCH PERFORMANCE
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B2181	HEATED SEAT MODULE POWER SUPPLY LOW
B2182	HEATED SEAT MODULE POWER SUPPLY HIGH
B2301	WIPER MODE SWITCH INPUT CIRCUIT LOW
B2307	WASHER SWITCH INPUT CIRCUIT LOW
B2339	HORN SWITCH STUCK - WITH EVIC
B2339	HORN SWITCH STUCK - WITHOUT EVIC
B238E	HI BEAM SWITCH CIRCUIT LOW
B2390	MIST SWITCH CIRCUIT LOW
B2394	FLASH TO PASS/OPTICAL HORN SWITCH CIRCUIT STUCK
C2312	TRAC/ESP OFF SWITCH STUCK
P1103	DC TO AC CONVERTER SWITCH STUCK
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE (TOTALLY INTEGRATED POWER MODULE)
U0161	LOST COMMUNICATION WITH COMPASS MODULE
U0184	LOST COMMUNICATION WITH RADIO
U0208	LOST COMMUNICATION WITH HEATED SEATS CONTROL MODULE
U1008	LIN 1 BUS
U1109	LOST COMMUNICATION WITH LIN STEERING WHEEL CONTROLS
U113B	LOST COMMUNICATION WITH SWITCH BANK MODULE

U1149	LOST COMMUNICATION WITH MULTIFUNCTION SWITCH

DRIVER DOOR MODULE (DDM) (DMFL/R) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1803	DRIVER DOOR LOCK/UNLOCK SWITCH INPUT CIRCUIT STUCK LOCK
B1854	DRIVER WINDOW MOTOR CONTROL CIRCUIT LOW
B1855	DRIVER WINDOW MOTOR CONTROL CIRCUIT HIGH
B1856	DRIVER WINDOW MOTOR CONTROL CIRCUIT OPEN
B1858	DRIVER WINDOW POSITION SENSOR POWER SUPPLY LOW
B1859	DRIVER WINDOW POSITION SENSOR POWER SUPPLY HIGH
B1868	DRIVER SIDE PASSENGER WINDOW SWITCH STUCK
B18B5	MASTER SWITCH - FRONT LEFT WINDOW SWITCH STUCK
B18B6	MASTER SWITCH - FRONT RIGHT WINDOW SWITCH STUCK
B18B8	MASTER SWITCH - REAR RIGHT WINDOW SWITCH STUCK
B18B7	MASTER SWITCH - REAR LEFT WINDOW SWITCH STUCK
B1D07	MIRROR ADJUST SWITCH INPUT CIRCUIT STUCK
B1D1F	DRIVER MIRROR VERTICAL MOTOR CONTROL CIRCUIT LOW
B1D20	DRIVER MIRROR VERTICAL MOTOR CONTROL CIRCUIT HIGH
B1D21	DRIVER MIRROR VERTICAL MOTOR CONTROL CIRCUIT OPEN
B1D23	DRIVER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT LOW
B1D24	DRIVER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT HIGH
B1D25	DRIVER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT OPEN
B1D33	DRIVER MIRROR HEATER CONTROL CIRCUIT LOW
B1D34	DRIVER MIRROR HEATER CONTROL CIRCUIT HIGH
B1DF2	MIRROR FOLD SWITCH STUCK
B1E64	LEFT MIRROR SELECT SWITCH STUCK
B1E65	RIGHT MIRROR SELECT SWITCH STUCK
B1E67	DRIVER MIRROR FOLD CONTROL CIRCUIT LOW
B1E68	DRIVER MIRROR FOLD CONTROL CIRCUIT HIGH
B1E69	DRIVER MIRROR FOLD CONTROL CIRCUIT OPEN
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B21A1	ECU RESET/RECOVERY OCCURRED
B225D	DOOR MODULE FRONT LEFT INTERNAL
B226E	MASTER POWER WINDOW SWITCH INTERNAL
B2578	DRIVER WINDOW NOT CALIBRATED/LOST CALIBRATION
B2580	DRIVER WINDOW POSITION SENSOR(S) NO SIGNAL
U0010	CAN INTERIOR BUS

U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH FCM (TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0204	LOST COMMUNICATION WITH DOOR MODULE FRONT RIGHT
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW
U113D	LOST COMMUNICATION WITH MASTER POWER WINDOW SWITCH

ENGINE CONTROL MODULE (ECM) - ELECTRICAL DIAGNOSTICS

DTC	Description
B10B3	CABIN HEATER 1 CONTROL CIRCUIT
B10B7	CABIN HEATER 2 CONTROL CIRCUIT
B1C32	AIRBAG DEPLOYMENT DETECTED
B2188	IGNITION START CONTROL CIRCUIT LOW
B2189	IGNITION START CONTROL CIRCUIT HIGH
P0016	CRANKSHAFT/CAMSHAFT TIMING MISALIGNMENT
P0030	O2 SENSOR 1/1 HEATER CIRCUIT
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0045	TURBOCHARGER BOOST CONTROL CIRCUIT/OPEN
P0046	TURBOCHARGER BOOST CONTROL CIRCUIT/EXCESSIVE CURRENT
P0047	TURBOCHARGER BOOST CONTROL CIRCUIT LOW
P0048	TURBOCHARGER BOOST CONTROL CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW
P0073	AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH
P0101	MASS AIR FLOW SENSOR PERFORMANCE
P0102	MASS AIR FLOW SENSOR CIRCUIT LOW
P0103	MASS AIR FLOW SENSOR CIRCUIT HIGH
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH

P0128	THERMOSTAT RATIONALITY
P0130	O2 SENSOR 1/1 CIRCUIT OPEN
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0181	FUEL TEMPERATURE SENSOR PERFORMANCE
P0182	FUEL TEMPERATURE SENSOR CIRCUIT LOW
P0183	FUEL TEMPERATURE SENSOR CIRCUIT HIGH
P0196	ENGINE OIL TEMPERATURE SENSOR CIRCUIT PLAUSIBILITY AFTER COOLDOWN
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0234	TURBOCHARGER OVERBOOST CONDITION
P0236	BOOST PRESSURE SENSOR PERFORMANCE
P0237	TURBO BOOST PRESSURE SENSOR CIRCUIT LOW
P0238	TURBO BOOST PRESSURE SENSOR CIRCUIT HIGH
P0263	CYLINDER 1 CONTRIBUTION/BALANCE
P0266	CYLINDER 2 CONTRIBUTION/BALANCE
P0269	CYLINDER 3 CONTRIBUTION/BALANCE
P0272	CYLINDER 4 CONTRIBUTION/BALANCE
P0299	TURBOCHARGER UNDERBOOST CONDITION
P0300	MISFIRE DETECTED
P0301	MISFIRE DETECTED CYLINDER 1
P0302	MISFIRE DETECTED CYLINDER 2
P0303	MISFIRE DETECTED CYLINDER 3
P0304	MISFIRE DETECTED CYLINDER 4
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0336	CRANKSHAFT POSITION SENSOR PERFORMANCE
P0340	CAMSHAFT POSITION SENSOR CIRCUIT
P0341	CAMSHAFT POSITION SENSOR PERFORMANCE - BANK 1 SENSOR 1
P0383	GLOW PLUG CONTROL MODULE CONTROL CIRCUIT LOW
P0401	EGR SYSTEM PERFORMANCE
P0402	EGR EXCESSIVE FLOW DETECTED
P0403	EGR CONTROL CIRCUIT OPEN
P0404	EGR POSITION SENSOR PERFORMANCE
P0405	EGR POSITION SENSOR CIRCUIT LOW
P0406	EGR POSITION SENSOR CIRCUIT HIGH

P0407	EGR AIR FLOW THROTTLE POSITION SENSOR CIRCUIT LOW
P0408	EGR AIR FLOW THROTTLE POSITION SENSOR CIRCUIT HIGH
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT
P0487	EGR AIRFLOW THROTTLE CONTROL CIRCUIT A OPEN
P0488	EGR AIRFLOW THROTTLE CONTROL CIRCUIT PERFORMANCE
P0489	EGR CONTROL CIRCUIT(S) LOW
P0490	EGR CONTROL CIRCUIT HIGH
P0500	VEHICLE SPEED SENSOR 1 CIRCUIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0504	BRAKE SWITCH SIGNAL CIRCUITS PLAUSIBILITY WITH REDUNDANT CONTACT
P0513	INVALID SKIM KEY
P0521	ENGINE OIL PRESSURE SENSOR PERFORMANCE
P0524	ENGINE OIL PRESSURE IS TOO LOW
P0545	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW - BANK 1 SENSOR 1
P0546	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH - BANK 1 SENSOR 1
P0562	ECM VOLTAGE TOO LOW
P0563	ECM VOLTAGE TOO HIGH
P0574	CRUISE CONTROL SYSTEM-VEHICLE SPEED TOO HIGH
P0578	SPEED CONTROL SWITCH 1 STUCK
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0590	SPEED CONTROL SWITCH 2 STUCK
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0602	CONTROL MODULE PROGRAM ERROR
P0605	INTERNAL CONTROL MODULE ROM
P0606	INTERNAL ECM PROCESSOR
P0607	ECU INTERNAL PERFORMANCE
P0610	ECU VEHICLE OPTIONS MISMATCH
P0615	STARTER CONTROL CIRCUIT OPEN
P0616	STARTER CONTROL CIRCUIT LOW
P0617	STARTER CONTROL CIRCUIT HIGH
P0621	GENERATOR LAMP/L-TERMINAL CONTROL CIRCUIT OPEN
P0627	FUEL PUMP CONTROL CIRCUIT OPEN

P0628	FUEL PUMP CONTROL CIRCUIT LOW
P0629	FUEL PUMP CONTROL CIRCUIT HIGH
P062F	INTERNAL CONTROL MODULE EEPROM ERROR
P0630	VIN NOT PROGRAMMED INTO PCM
P0638	ELECTRONIC THROTTLE CONTROL PERFORMANCE-BANK 1
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 TOO HIGH
P0645	A/C CLUTCH CONTROL CIRCUIT OPEN
P0646	A/C CLUTCH CONTROL CIRCUIT LOW
P0647	A/C CLUTCH CONTROL CIRCUIT HIGH
P0652	SENSOR REFERENCE VOLTAGE 2 TOO LOW
P0653	SENSOR REFERENCE VOLTAGE 2 TOO HIGH
P065A	GENERATOR PERFORMANCE
P066A	CYLINDER 1 GLOW PLUG CIRCUIT LOW
P066C	CYLINDER 2 GLOW PLUG CIRCUIT LOW
P066E	CYLINDER 3 GLOW PLUG CIRCUIT LOW
P0670	GLOW PLUG CONTROL MODULE CONTROL CIRCUIT OPEN
P0671	CYLINDER 1 GLOW PLUG CIRCUIT
P0672	CYLINDER 2 GLOW PLUG CIRCUIT
P0673	CYLINDER 3 GLOW PLUG CIRCUIT
P0674	CYLINDER 4 GLOW PLUG CIRCUIT
P067A	CYLINDER 4 GLOW PLUG CIRCUIT LOW
P0683	GLOW PLUG CONTROL MODULE TO PCM COMMUNICATION
P068A	ASD/MAIN RELAY OFF TOO EARLY
P068B	ASD/MAIN RELAY OFF TOO LATE
P0698	SENSOR REFERENCE VOLTAGE 3 CIRCUIT LOW
P0699	SENSOR REFERENCE VOLTAGE 3 TOO HIGH
P0830	CLUTCH PEDAL SWITCH CIRCUIT
P1452	DIFFERENTIAL PRESSURE SENSOR HOSE PERFORMANCE
P1453	DIFFERENTIAL PRESSURE SENSOR HOSE BLOCKED
P1649	GLOW PLUG MODULE POWER SUPPLY CIRCUIT
P1670	TORQUE CURVE CALIBRATION
P1685	SKIM SYSTEM
P2002	DIESEL PARTICULATE FILTER EFFICIENCY BELOW THRESHOLD
P2008	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT OPEN
P2009	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT LOW
P2010	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT HIGH
P2032	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW - BANK 1 SENSOR 2
P2033	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH - BANK 1 SENSOR 2

P2080	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT PERFORMANCE - BANK 1 SENSOR 1
P2084	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT PERFORMANCE - BANK 1 SENSOR 2
P2121	ACCELERATOR PEDAL POSITION SENSOR 1 PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2147	FUEL INJECTOR GROUP 1 SUPPLY VOLTAGE CIRCUIT LOW
P2148	FUEL INJECTOR GROUP 1 SUPPLY VOLTAGE CIRCUIT HIGH
P2231	O2 SENSOR 1/1 SIGNAL CIRCUIT SHORTED TO HEATER CIRCUIT
P2237	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT OPEN
P2238	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT LOW
P2239	O2 SENSOR 1/1 PUMP CELL CURRENT CIRCUIT HIGH
P2243	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT OPEN
P2244	O2 SENSOR 1/1 REFERENCE VOLTAGE PERFORMANCE
P2245	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT LOW
P2246	O2 SENSOR 1/1 REFERENCE VOLTAGE CIRCUIT HIGH
P2413	EGR SYSTEM PERFORMANCE
P2425	EGR COOLING VALVE CONTROL CIRCUIT OPEN
P2426	EGR COOLING VALVE CONTROL CIRCUIT LOW
P2427	EGR COOLING VALVE CONTROL CIRCUIT HIGH
P242B	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT PERFORMANCE - BANK 1 SENSOR 3
P242C	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT LOW - BANK 1 SENSOR 3
P242D	EXHAUST GAS TEMPERATURE SENSOR CIRCUIT HIGH - BANK 1 SENSOR 3
P244B	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE TOO HIGH
P2453	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE SENSOR CIRCUIT PERFORMANCE
P2454	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE SENSOR CIRCUIT LOW
P2455	DIESEL PARTICULATE FILTER DIFFERENTIAL PRESSURE SENSOR CIRCUIT HIGH
P2500	GENERATOR LAMP/L-TERMINAL CONTROL CIRCUIT LOW
P2501	GENERATOR LAMP/L-TERMINAL CONTROL CIRCUIT HIGH
P2533	IGNITION SWITCH RUN/START POSITION CIRCUIT
P2534	IGNITION SWITCH RUN/START POSITION CIRCUIT LOW
P2535	IGNITION SWITCH RUN/START POSITION CIRCUIT HIGH

P2563	TURBOCHARGER POSITION SENSOR CIRCUIT PERFORMANCE
P2564	TURBOCHARGER POSITION SENSOR CIRCUIT LOW
P2565	TURBOCHARGER POSITION SENSOR CIRCUIT HIGH
P2627	O2 SENSOR 1/1 PUMP CELL CURRENT TRIM CIRCUIT LOW
P2628	O2 SENSOR 1/1 PUMP CELL CURRENT TRIM CIRCUIT HIGH
P2A00	O2 SENSOR 1/1 CIRCUIT PERFORMANCE
U0002	CAN C BUS OFF PERFORMANCE
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE (TIPM)
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0431	IMPLAUSIBLE DATA RECEIVED FROM TIPM
U0102	LOST COMMUNICATION WITH TRANSFER CASE CONTROL MODULE
U0403	IMPLAUSIBLE DATA RECEIVED FROM T-CASE
U0431	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM FCM (TIPM)
U1506	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM ABS

HANDS FREE MODULE (HFM) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1438	VOICE RECOGNITION SWITCH STUCK
B1439	PHONE SWITCH STUCK
B143B	MICROPHONE 1 CIRCUIT LOW
B143C	MICROPHONE 1 CIRCUIT HIGH
B143E	MICROPHONE 2 CIRCUIT LOW
B143F	MICROPHONE 2 CIRCUIT HIGH
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0184	LOST COMMUNICATION WITH RADIO

HEATING & AIR CONDITIONING (ATC) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1000	A/C SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1009	RECIRCULATION SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1012	DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE (ATC)
B1015	REAR DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B101E	POWER ON/OFF SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1021	BLOWER SPEED UP SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1024	BLOWER SPEED DOWN SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1028	REAR BLOWER CONTROL REQUEST INPUT CIRCUIT LOW
B1029	REAR BLOWER CONTROL REQUEST INPUT CIRCUIT HIGH

B102E	REAR BLEND REQUEST INPUT CIRCUIT LOW
B102F	REAR BLEND REQUEST INPUT CIRCUIT HIGH
B1031	EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW
B1032	EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH
B1034	INFRARED TEMPERATURE SENSOR INPUT CIRCUIT LOW
B1035	INFRARED TEMPERATURE SENSOR INPUT CIRCUIT HIGH
B1037	AUTO SWITCH REQUEST INPUT CIRCUIT PERFORMANCE
B103A	REAR MODE DOOR CONTROL CIRCUIT/PERFORMANCE
B103E	REAR MODE DOOR TRAVEL RANGE TOO SMALL
B103F	REAR MODE DOOR TRAVEL RANGE TOO LARGE
B1040	PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B1044	PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL
B1045	PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE
B1052	REAR BLEND DOOR CONTROL CIRCUIT/PERFORMANCE
B1056	REAR BLEND DOOR TRAVEL RANGE TOO SMALL
B1057	REAR BLEND DOOR TRAVEL RANGE TOO LARGE
B1058	RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE
B105C	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10A6	LEFT BLEND DOOR 1 TRAVEL TOO SMALL
B10A7	LEFT BLEND DOOR TRAVEL TOO LARGE
B10A8	LEFT BLEND DOOR ACTUATOR PERFORMANCE
B10AD	RIGHT BLEND DOOR TRAVEL TOO SMALL
B10AE	RIGHT BLEND DOOR TRAVEL TOO LARGE
B10AF	RIGHT BLEND DOOR ACTUATOR PERFORMANCE
B10B2	A/C COOL DOWN TEST PERFORMANCE
B113D	REAR MODE REQUEST LOW
B113E	REAR MODE REQUEST HIGH
B113F	REAR POWER ON/OFF SWITCH PERFORMANCE
B1140	REAR POWER LOCK OUT SWITCH PERFORMANCE
B1141	CLIMATE SYNC SWITCH PERFORMANCE
B1142	MODE UP SWITCH PERFORMANCE
B1143	MODE DOWN SWITCH PERFORMANCE
B1144	REAR MODE UP PERFORMANCE
B1145	REAR MODE DOWN SWITCH PERFORMANCE
B1146	REAR BLOWER UP SWITCH PERFORMANCE
B1147	REAR BLOWER DOWN SWITCH PERFORMANCE
B1601	LEFT SOLAR SENSOR CIRCUIT LOW
B1602	LEFT SOLAR SENSOR CIRCUIT HIGH
B1604	RIGHT SOLAR SENSOR CIRCUIT LOW
B1605	RIGHT SOLAR SENSOR CIRCUIT HIGH

	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT LOW
B1611	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT HIGH
B2214	(HVAC) CLIMATE CONTROL INTERNAL
B222A	VEHICLE LINE MISMATCH
U0010	CAN INTERIOR BUS
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN

HEATING & AIR CONDITIONING (MTC) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1000	A/C SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1009	RECIRCULATION SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1015	REAR DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1031	EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW
B1032	EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH
B1040	PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B1043	PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN
B1044	PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL
B1045	PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE
B1058	RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE
B105B	RECIRCULATION DOOR CONTROL CIRCUIT OPEN
B105C	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10A2	LEFT BLEND DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B10A5	LEFT BLEND DOOR CONTROL CIRCUIT OPEN
B10A6	LEFT BLEND DOOR 1 TRAVEL TOO SMALL
B10A7	LEFT BLEND DOOR TRAVEL TOO LARGE
B10B2	A/C COOL DOWN TEST PERFORMANCE
B160F	TWILIGHT/AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT/PERFORMANCE
B1610	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT LOW
B1611	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT HIGH
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B2214	(HVAC) CLIMATE CONTROL INTERNAL
U0010	CAN INTERIOR BUS
U0019	CAN B BUS
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN

U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIN)
U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW
B1000-92	A/C SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1009-92	RECIRCULATION SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1015-92	EBL/REAR DEFROST SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1030-11	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO GROUND
B1030-12	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO BATTERY
B1058-11	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO GROUND
B1058-12	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B1058-13	RECIRCULATION DOOR CONTROL - CIRCUIT OPEN
B1058-92	RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B105C-00	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D-00	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10B2-00	A/C COOL DOWN TEST PERFORMANCE
B11C2-11	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO GROUND
B11C2-12	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO BATTERY
B11C2-13	FRONT MODE DOOR 1 CONTROL - CIRCUIT OPEN
B11C2-92	FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C3-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL
B11C4-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE
B11CB-11	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO GROUND
B11CB-12	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B11CB-13	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11CB-92	MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11CC-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CD-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE

B11D9-92	BLOWER SPEED KNOB REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B160F-11	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND
B160F-12	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B160F-92	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - PERFORMANCE OR INCORRECT OPERATION
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-84	BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210E-85	BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B2214-00	(HVAC) CLIMATE CONTROL INTERNAL
B222A-00	VEHICLE LINE MISMATCH
U0010-00	CAN INTERIOR BUS
U0141-00	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN

HEATING & AIR CONDITIONING (MTC THREE ZONE) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1000	A/C SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1003	PANEL MODE SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1006	BI-LEVEL SWITCH REQUEST INPUT CIRCUIT LOW
B1009	RECIRCULATION SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B100C	FLOOR MODE SWITCH REQUEST INPUT CIRCUIT PERFORMANCE
B100F	MIX SWITCH REQUEST INPUT CIRCUIT PERFORMANCE
B1012	DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1015	REAR DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1028	REAR BLOWER CONTROL REQUEST INPUT CIRCUIT LOW
B1029	REAR BLOWER CONTROL REQUEST INPUT CIRCUIT HIGH
B102E	REAR BLEND REQUEST INPUT CIRCUIT LOW
B102F	REAR BLEND REQUEST INPUT CIRCUIT HIGH
B1031	EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW
B1032	EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH
B103A	REAR MODE DOOR CONTROL CIRCUIT/PERFORMANCE
B103D	REAR MODE DOOR CONTROL CIRCUIT OPEN
B103E	REAR MODE DOOR TRAVEL RANGE TOO SMALL
B103F	REAR MODE DOOR TRAVEL RANGE TOO LARGE
B1040	PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE

B1043	PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN
B1044	PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL
B1045	PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE
B1052	REAR BLEND DOOR CONTROL CIRCUIT/PERFORMANCE
B1055	REAR BLEND DOOR CONTROL CIRCUIT OPEN
B1056	REAR BLEND DOOR TRAVEL RANGE TOO SMALL
B1057	REAR BLEND DOOR TRAVEL RANGE TOO LARGE
B1058	RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE
B105B	RECIRCULATION DOOR CONTROL CIRCUIT OPEN
B105C	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B1084	LEFT HEATED SEAT SWITCH INPUT CIRCUIT PERFORMANCE
B1087	RIGHT HEATED SEAT SWITCH INPUT CIRCUIT PERFORMANCE
B10A2	LEFT BLEND DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B10A5	LEFT BLEND DOOR CONTROL CIRCUIT OPEN
B10A6	LEFT BLEND DOOR 1 TRAVEL TOO SMALL
B10A7	LEFT BLEND DOOR TRAVEL TOO LARGE
B10A9	RIGHT BLEND DOOR CONTROL CIRCUIT/PERFORMANCE
B10AC	RIGHT BLEND DOOR CONTROL CIRCUIT OPEN
B10AD	RIGHT BLEND DOOR TRAVEL TOO SMALL
B10AE	RIGHT BLEND DOOR TRAVEL TOO LARGE
B10B2	A/C COOL DOWN TEST PERFORMANCE
B113D	REAR MODE REQUEST LOW
B113E	REAR MODE REQUEST HIGH
B1172	REAR CONTROL POWER SUPPLY CIRCUIT LOW
B113E	REAR MODE REQUEST HIGH
B160F	TWILIGHT/AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT/PERFORMANCE
B1610	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT LOW
B1611	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT HIGH
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B2214	(HVAC) CLIMATE CONTROL INTERNAL
U0010	CAN INTERIOR BUS
U0019	CAN B BUS
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE

	(WIN)
U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW

INTRUSION TRANSCEIVER MODULE (ITM) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1A20	PRE-ARM TIMEOUT
B1A37	SECURITY TRANSMITTER SENSOR CIRCUIT LOW
B1A3C	INTERNAL SIREN BATTERY
B1A3D	SIREN BATTERY TAMPER/LOSS OF POWER SUPPLY
B1A3E	SIREN/ITM MISMATCH
B1A3F	ITM ARMING SEQUENCE PERFORMANCE
B2206	CURRENT VIN MISSING/MISMATCH
B222A	VEHICLE LINE MISMATCH
B223C	INTRUSION TRANSCEIVER MODULE INTERNAL
U0010	CAN INTERIOR BUS
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0169	LOST COMMUNICATION WITH SUNROOF CONTROL MODULE
U0187	LOST COMMUNICATION WITH DVD PLAYER
U110D	LOST COMMUNICATION WITH SECURITY SIREN
U1416	IMPLAUSIBLE SECURITY SIREN SIGNAL RECEIVED

PASSENGER DOOR MODULE (PDM) (DMFL/R) - ELECTRICAL DIAGNOSTICS

DTC	Description
B16A4	PASSENGER WINDOW SWITCH BACKLIGHTING CIRCUIT LOW
B16A5	PASSENGER WINDOW SWITCH BACKLIGHTING CIRCUIT HIGH
B1808	PASSENGER DOOR LOCK/UNLOCK SWITCH CIRCUIT STUCK LOCK
B185D	PASSENGER WINDOW SWITCH CIRCUIT STUCK
B185F	PASSENGER WINDOW MOTOR CONTROL CIRCUIT LOW
B1860	PASSENGER WINDOW MOTOR CONTROL CIRCUIT HIGH
B1861	PASSENGER WINDOW MOTOR CONTROL CIRCUIT OPEN
B1863	PASSENGER WINDOW POSITION SENSOR POWER SUPPLY LOW - RHD ONLY

B1864	PASSENGER WINDOW POSITION SENSOR POWER SUPPLY HIGH - RHD ONLY
B1D2B	PASSENGER MIRROR VERTICAL MOTOR CONTROL CIRCUIT LOW
B1D2C	PASSENGER MIRROR VERTICAL MOTOR CONTROL CIRCUIT HIGH
B1D2D	PASSENGER MIRROR VERTICAL MOTOR CONTROL CIRCUIT OPEN
B1D2F	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT LOW
B1D30	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT HIGH
B1D31	PASSENGER MIRROR HORIZONTAL MOTOR CONTROL CIRCUIT OPEN
B1D37	PASSENGER MIRROR HEATER CONTROL CIRCUIT LOW
B1D38	PASSENGER MIRROR HEATER CONTROL CIRCUIT HIGH
B1E6B	PASSENGER MIRROR FOLD CONTROL CIRCUIT LOW
B1E6C	PASSENGER MIRROR FOLD CONTROL CIRCUIT HIGH
B1E6D	PASSENGER MIRROR FOLD CONTROL CIRCUIT OPEN
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B21A1	ECU RESET/RECOVERY OCCURRED
B225D	DOOR MODULE FRONT LEFT INTERNAL
B2577	PASSENGER WINDOW NOT CALIBRATED/LOST CALIBRATION - RHD ONLY
B2581	PASSENGER WINDOW POSITION SENSOR(S) NO SIGNAL - RHD ONLY
U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH FCM (TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0204	LOST COMMUNICATION WITH DOOR MODULE FRONT RIGHT
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW

POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 41TE - GPEC

DTC	Description

P0122	TPS/APP CIRCUIT LOW
P0123	TPS/APP CIRCUIT HIGH
P0124	TPS/APP INTERMITTENT
P0218	HIGH TEMPERATURE OPERATION ACTIVATED
P0602	CONTROL MODULE PROGRAMMING ERROR/NOT PROGRAMMED
P0604	INTERNAL CONTROL MODULE RAM
P0605	INTERNAL CONTROL MODULE ROM
P0613	INTERNAL TRANSMISSION PROCESSOR
P0706	TRANSMISSION RANGE SENSOR RATIONALITY
P0711	TRANSMISSION TEMPERATURE SENSOR PERFORMANCE
P0712	TRANSMISSION TEMPERATURE SENSOR LOW
P0713	TRANSMISSION TEMPERATURE SENSOR HIGH
P0714	TRANSMISSION TEMPERATURE SENSOR INTERMITTENT
P0715	INPUT SPEED SENSOR 1 CIRCUIT
P0720	OUTPUT SPEED SENSOR CIRCUIT
P0725	ENGINE SPEED SENSOR CIRCUIT
P0731	GEAR RATIO ERROR IN 1ST
P0732	GEAR RATIO ERROR IN 2ND
P0733	GEAR RATIO ERROR IN 3RD
P0734	GEAR RATIO ERROR IN 4TH
P0736	GEAR RATIO ERROR IN REVERSE
P0740	TCC OUT OF RANGE
P0750	LR SOLENOID CIRCUIT
P0755	2/4 SOLENOID CIRCUIT
P0760	OD SOLENOID CIRCUIT
P0765	UD SOLENOID CIRCUIT
P0841	LR PRESSURE SWITCH RATIONALITY
P0845	2/4 HYDRAULIC PRESSURE TEST
P0846	2/4 PRESSURE SWITCH RATIONALITY
P0868	LINE PRESSURE LOW
P0869	LINE PRESSURE HIGH
P0870	OD HYDRAULIC PRESSURE TEST
P0871	OD PRESSURE SWITCH RATIONALITY
P0882	TCM POWER INPUT LOW
P0883	TCM POWER INPUT HIGH
P0884	POWER UP AT SPEED
P0890	SWITCHED BATTERY
P0897	TRANSMISSION FLUID DETERIORATED
P0932	LINE PRESSURE SENSOR CIRCUIT
P0934	LINE PRESSURE SENSOR CIRCUIT LOW
P0935	LINE PRESSURE SENSOR CIRCUIT HIGH

	LOSS OF HYDRAULIC PUMP PRIME
P0952	AUTOSTICK INPUT CIRCUIT LOW
P0957	ERS CIRCUIT LOW
P0992	2/4/OD HYDRAULIC PRESSURE TEST
P1684	BATTERY WAS DISCONNECTED
P1713	RESTRICTED MANUAL VALVE IN T2 RANGE
P1745	TRANSMISSION LINE PRESSURE TOO HIGH FOR TOO LONG
P1775	SOLENOID SWITCH VALVE LATCHED IN TCC POSITION
P1776	SOLENOID SWITCH VALVE LATCHED IN LR POSITION
P1790	FAULT IMMEDIATELY AFTER SHIFT
P1794	SPEED SENSOR GROUND ERROR
P1797	MANUAL SHIFT OVERHEAT

POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 41TE - NGC

DTC	Description
P0122	TPS/APP CIRCUIT LOW
P0123	TPS/APP CIRCUIT HIGH
P0124	TPS/APP INTERMITTENT
P0218	HIGH TEMPERATURE OPERATION ACTIVATED
P0602	CONTROL MODULE PROGRAMMING ERROR/NOT PROGRAMMED
P0604	INTERNAL CONTROL MODULE RAM
P0605	INTERNAL CONTROL MODULE ROM
P0613	INTERNAL TRANSMISSION PROCESSOR
P0706	TRANSMISSION RANGE SENSOR RATIONALITY
P0711	TRANSMISSION TEMPERATURE SENSOR PERFORMANCE
P0712	TRANSMISSION TEMPERATURE SENSOR LOW
P0713	TRANSMISSION TEMPERATURE SENSOR HIGH
P0714	TRANSMISSION TEMPERATURE SENSOR INTERMITTENT
P0716	INPUT SPEED SENSOR 1 CIRCUIT PERFORMANCE
P0721	OUTPUT SPEED SENSOR CIRCUIT PERFORMANCE
P0726	ENGINE SPEED INPUT CIRCUIT RANGE/PERFORMANCE
P0731	GEAR RATIO ERROR IN 1ST
P0732	GEAR RATIO ERROR IN 2ND
P0733	GEAR RATIO ERROR IN 3RD
P0734	GEAR RATIO ERROR IN 4TH
P0736	GEAR RATIO ERROR IN REVERSE
P0740	TCC OUT OF RANGE
P0750	LR SOLENOID CIRCUIT
P0755	2/4 SOLENOID CIRCUIT

P0760	OD SOLENOID CIRCUIT
P0765	UD SOLENOID CIRCUIT
P0841	LR PRESSURE SWITCH RATIONALITY
P0845	2/4 HYDRAULIC PRESSURE TEST
P0846	2/4 PRESSURE SWITCH RATIONALITY
P0868	LINE PRESSURE LOW
P0869	LINE PRESSURE HIGH
P0870	OD HYDRAULIC PRESSURE TEST
P0871	OD PRESSURE SWITCH RATIONALITY
P0882	TCM POWER INPUT LOW
P0883	TCM POWER INPUT HIGH
P0884	POWER UP AT SPEED
P0890	SWITCHED BATTERY
P0897	TRANSMISSION FLUID DETERIORATED
P0933	HYDRAULIC PRESSURE SENSOR RANGE/PERFORMANCE
P0934	LINE PRESSURE SENSOR CIRCUIT LOW
P0935	LINE PRESSURE SENSOR CIRCUIT HIGH
P0944	LOSS OF HYDRAULIC PUMP PRIME
P0957	AUTOSTICK CIRCUIT LOW
P0992	2/4/OD HYDRAULIC PRESSURE TEST
P1684	BATTERY WAS DISCONNECTED
P1713	RESTRICTED MANUAL VALVE IN T2 RANGE
P1745	TRANSMISSION LINE PRESSURE TOO HIGH FOR TOO LONG
P1775	SOLENOID SWITCH VALVE LATCHED IN TCC POSITION
P1776	SOLENOID SWITCH VALVE LATCHED IN LR POSITION
P1790	FAULT IMMEDIATELY AFTER SHIFT
P1794	SPEED SENSOR GROUND ERROR
P1797	MANUAL SHIFT OVERHEAT

POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 62TE

DTC	Description
P0122	TPS/APP CIRCUIT LOW
P0123	TPS/APP CIRCUIT HIGH
P0124	TPS/APP INTERMITTENT
P0218	HIGH TEMPERATURE OPERATION ACTIVATED
P0562	BATTERY VOLTAGE LOW
P0602	CONTROL MODULE PROGRAMMING ERROR/NOT PROGRAMMED
P0604	INTERNAL CONTROL MODULE RAM
P0605	INTERNAL CONTROL MODULE ROM

P0613	INTERNAL TRANSMISSION PROCESSOR
P0706	TRANSMISSION RANGE SENSOR RATIONALITY
P0711	TRANSMISSION TEMPERATURE SENSOR PERFORMANCE
P0712	TRANSMISSION TEMPERATURE SENSOR LOW
P0713	TRANSMISSION TEMPERATURE SENSOR HIGH
P0714	TRANSMISSION TEMPERATURE SENSOR INTERMITTENT
P0716	INPUT SPEED SENSOR 1 CIRCUIT PERFORMANCE
P0721	OUTPUT SPEED SENSOR CIRCUIT PERFORMANCE
P0726	ENGINE SPEED INPUT CIRCUIT RANGE/PERFORMANCE
P0729	GEAR RATIO ERROR IN 6TH
P0731	GEAR RATIO ERROR IN 1ST
P0732	GEAR RATIO ERROR IN 2ND
P0733	GEAR RATIO ERROR IN 3RD
P0734	GEAR RATIO ERROR IN 4TH
P0735	GEAR RATIO ERROR IN 5TH
P0736	GEAR RATIO ERROR IN REVERSE
P0740	TCC OUT OF RANGE
P0750	L/R SOLENOID CIRCUIT
P0755	2/4 SOLENOID CIRCUIT
P075A	LC SOLENOID CIRCUIT
P0760	OD SOLENOID CIRCUIT
P0765	UD SOLENOID CIRCUIT
P076A	DC SOLENOID CIRCUIT
P0791	TRANSFER SPEED SENSOR CIRCUIT
P0792	COMPOUNDER SPEED RATIO ERROR
P083A	LC HYDRAULIC PRESSURE TEST
P083B	LC PRESSURE SWITCH RATIONALITY
P0841	L/R PRESSURE SWITCH RATIONALITY
P0845	2/4 HYDRAULIC PRESSURE TEST
P0846	2/4 PRESSURE SWITCH RATIONALITY
P084A	DC HYDRAULIC PRESSURE TEST
P084B	DC PRESSURE SWITCH RATIONALITY
P0868	LINE PRESSURE LOW
P0869	LINE PRESSURE HIGH
P0870	OD HYDRAULIC PRESSURE TEST
P0871	OD PRESSURE SWITCH RATIONALITY
P0882	TCM POWER INPUT LOW
P0883	TCM POWER INPUT HIGH
P0884	POWER UP AT SPEED
P0888	TRANSMISSION RELAY ALWAYS OFF
P0890	SWITCHED BATTERY

	TRANSMISSION RELAY ALWAYS ON
P0897	TRANSMISSION FLUID DETERIORATED
P0932	LINE PRESSURE SENSOR CIRCUIT
P0934	LINE PRESSURE SENSOR CIRCUIT LOW
P0935	LINE PRESSURE SENSOR CIRCUIT HIGH
P0944	LOSS OF HYDRAULIC PUMP PRIME
P0957	AUTOSTICK CIRCUIT LOW
P0992	2/4/OD HYDRAULIC PRESSURE TEST
P1684	BATTERY WAS DISCONNECTED
P1713	RESTRICTED MANUAL VALVE IN T2 RANGE
P1741	GEAR RATIO ERROR IN 4 PRIME
P1745	TRANSMISSION LINE PRESSURE TOO HIGH FOR TOO LONG
P1770	INADEQUATE ELEMENT VOLUME LR
P1771	INADEQUATE ELEMENT VOLUME 2/4
P1772	INADEQUATE ELEMENT VOLUME OD
P1775	SOLENOID SWITCH VALVE LATCHED IN TCC POSITION
P1776	SOLENOID SWITCH VALVE LATCHED IN LR POSITION
P1790	FAULT IMMEDIATELY AFTER SHIFT
P1794	SPEED SENSOR GROUND ERROR
P1797	MANUAL SHIFT OVERHEAT
P273A	INADEQUATE ELEMENT VOLUME LC
P273B	INADEQUATE ELEMENT VOLUME DC
P2763	TORQUE CONVERTER CLUTCH PRESSURE CONTROL CIRCUIT HIGH
P2764	TORQUE CONVERTER CLUTCH PRESSURE CONTROL CIRCUIT LOW

POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - GPEC

DTC	Description
P000A	BANK 1 CAMSHAFT 1 POSITION SLOW RESPONSE
P000B	BANK 1 CAMSHAFT 2 POSITION SLOW RESPONSE
P0010	BANK 1 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT OPEN
P0011	BANK 1 CAMSHAFT 1 POSITION TARGET PERFORMANCE
P0013	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT OPEN
P0014	BANK 1 CAMSHAFT 2 POSITION TARGET PERFORMANCE
P0016	CRANKSHAFT-CAMSHAFT TIMING MISALIGNMENT-BANK 1 SENSOR 1
P0017	CRANKSHAFT-CAMSHAFT TIMING MISALIGNMENT-BANK 1 SENSOR 2
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2 SENSOR 1/2 HEATER CIRCUIT HIGH

P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW - GPEC
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH - GPEC
P0105	ATMOSPHERIC PRESSURE/BAROMETRIC PRESSURE SENSOR
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P0140	O2 SENSOR 1/2 SIGNAL INACTIVE
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0196	ENGINE OIL TEMPERATURE SENSOR PERFORMANCE
P0197	ENGINE OIL TEMPERATURE SENSOR CIRCUIT LOW
P0198	ENGINE OIL TEMPERATURE SENSOR CIRCUIT HIGH
P0201	FUEL INJECTOR 1 CIRCUIT/OPEN
P0202	FUEL INJECTOR 2 CIRCUIT/OPEN
P0203	FUEL INJECTOR 3 CIRCUIT/OPEN
P0204	FUEL INJECTOR 4 CIRCUIT/OPEN
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0261	FUEL INJECTOR 1 CIRCUIT LOW
P0262	FUEL INJECTOR 1 CIRCUIT HIGH
P0264	FUEL INJECTOR 2 CIRCUIT LOW

	FUEL INJECTOR 2 CIRCUIT HIGH
P0267	FUEL INJECTOR 3 CIRCUIT LOW
P0268	FUEL INJECTOR 3 CIRCUIT HIGH
P0270	FUEL INJECTOR 4 CIRCUIT LOW
P0271	FUEL INJECTOR 4 CIRCUIT HIGH
P0298	ENGINE OIL TEMPERATURE TOO HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0315	NO CRANK SENSOR LEARNED
P0325	KNOCK SENSOR 1 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0336	CRANKSHAFT POSITION SENSOR PERFORMANCE
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT-BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT-BANK 1 SENSOR 1
P0346	CAMSHAFT POSITION SENSOR CIRCUIT PERFORMANCE-BANK 1 SENSOR 1
P0365	CAMSHAFT POSITION SENSOR CIRCUIT-BANK 1 SENSOR 2
P0366	CAMSHAFT POSITION SENSOR PERFORMANCE-BANK 1 SENSOR 2
P0369	CAMSHAFT POSITION SENSOR INTERMITTENT-BANK 1 SENSOR 2
P0418	SECONDARY AIR INJECTION SYSTEM CONTROL CIRCUIT
P0420	CATALYST EFFICIENCY (BANK 1)
P0440	GENERAL EVAP SYSTEM FAILURE
P0441	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE SOLENOID CIRCUIT
P0444	EVAP PURGE SOLENOID CIRCUIT OPEN
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	LOOSE FUEL CAP
P0458	EVAP PURGE SOLENOID CIRCUIT LOW
P0459	EVAP PURGE SOLENOID CIRCUIT HIGH
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE - AWD
P0462	FUEL LEVEL SENSOR 1 LOW CIRCUIT - GPEC
P0463	FUEL LEVEL SENSOR 1 HIGH CIRCUIT - GPEC
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT

P0491	SECONDARY AIR INJECTION SYSTEM INSUFFICIENT FLOW
P050B	COLD START IGNITION TIMING PERFORMANCE
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXPECTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXPECTED
P0513	INVALID SKIM KEY
P0522	ENGINE OIL PRESSURE SWITCH CIRCUIT LOW
P0523	ENGINE OIL PRESSURE SWITCH CIRCUIT HIGH
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL ECM PROCESSOR
P060B	ETC A/D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE
P0615	STARTER CONTROL CIRCUIT-OPEN
P0616	STARTER CONTROL CIRCUIT LOW
P0617	STARTER CONTROL CIRCUIT HIGH
P061A	ETC LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0625	GENERATOR FIELD CONTROL CIRCUIT LOW
P0626	GENERATOR FIELD CONTROL CIRCUIT HIGH
P0627	FUEL PUMP CONTROL CIRCUIT/OPEN
P0628	FUEL PUMP CONTROL CIRCUIT LOW
P0629	FUEL PUMP CONTROL CIRCUIT HIGH

	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0633	SKIM SECRET KEY NOT STORED IN PCM
P063A	GENERATOR VOLTAGE SENSE CIRCUIT
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CONTROL CIRCUIT/OPEN
P0646	A/C CONTROL CIRCUIT LOW
P0647	A/C CONTROL CIRCUIT HIGH
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)
P0703	BRAKE SWITCH 2 PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1
P1212	ENGINE OIL TEMPERATURE HIGH - RPM LIMITED
P1239	ENGINE OIL TEMPERATURE TOO LOW
P1501	VEHICLE SPEED SENSOR 1/2 CORRELATION - DRIVE WHEELS
P1502	VEHICLE SPEED SENSOR 1/2 CORRELATION - NON-DRIVE WHEELS
P1513	STARTER REQUEST SWITCH STUCK
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER SLOW RATIONALITY
P1618	SENSOR REFERENCE VOLTAGE 1 CIRCUIT ERRATIC
P1628	SENSOR REFERENCE VOLTAGE CIRCUIT ERRATIC
P1696	EEPROM MEMORY WRITE DENIED/INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1897	LVL2 RPM FAIL - NO POST
P2004	INTAKE MANIFOLD RUNNER CONTROL STUCK OPEN
P2006	INTAKE MANIFOLD RUNNER CONTROL STUCK CLOSED
P2008	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT/OPEN
P2009	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT LOW
P2010	INTAKE MANIFOLD RUNNER (SWIRL) CONTROL CIRCUIT HIGH
P2015	INTAKE MANIFOLD RUNNER POSITION SENSOR PERFORMANCE
P2016	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT LOW
P2017	INTAKE MANIFOLD RUNNER POSITION SENSOR CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2088	BANK 1 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT LOW

	BANK 1 CAMSHAFT 1 POSITION ACTUATOR CIRCUIT HIGH
P2090	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT LOW
P2091	BANK 1 CAMSHAFT 2 POSITION ACTUATOR CIRCUIT HIGH
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE
P2106	ELECTRONIC THROTTLE CONTROL - FORCED LIMITED POWER
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2108	ELECTRONIC THROTTLE CONTROL MODULE PERFORMANCE
P2110	ELECTRONIC THROTTLE CONTROL - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2119	THROTTLE ACTUATOR CONTROL THROTTLE BODY PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2161	VEHICLE SPEED SENSOR 2 ERRATIC
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW/VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW/RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2175	LOW AIRFLOW/RESTRICTION DETECTED (SLOW ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P2183	ENGINE COOLANT TEMPERATURE SENSOR 2 CIRCUIT PERFORMANCE
P2184	ENGINE COOLANT TEMPERATURE SENSOR 2 CIRCUIT LOW
P2185	ENGINE COOLANT TEMPERATURE SENSOR 2 CIRCUIT HIGH
P2257	SECONDARY AIR INJECTION SYSTEM CONTROL 1 CIRCUIT LOW

P2258	SECONDARY AIR INJECTION SYSTEM CONTROL 1 CIRCUIT HIGH
P2270	O2 SENSOR 1/2 SIGNAL BIASED LEAN
P2271	O2 SENSOR 1/2 SIGNAL BIASED RICH
P2299	BRAKE PEDAL POSITION/ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT-INSUFFICIENT IONIZATION
P2305	IGNITION COIL 2 SECONDARY CIRCUIT-INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT-INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT-INSUFFICIENT IONIZATION
P2431	SECONDARY AIR INJECTION SYSTEM AIR FLOW SENSOR CIRCUIT PERFORMANCE
P2432	SECONDARY AIR INJECTION SYSTEM AIR FLOW SENSOR CIRCUIT LOW
P2433	SECONDARY AIR INJECTION SYSTEM AIR FLOW SENSOR CIRCUIT HIGH
P2440	AIR PUMP SWITCH VALVE STUCK OPEN
P2441	AIR PUMP SWITCH VALVE STUCK CLOSED
P2445	AIR PUMP SWITCH VALVE STUCK OFF
P2448	SECONDARY AIR INJECTION SYSTEM HIGH AIRFLOW - BANK 1
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2610	PCM INTERNAL SHUTDOWN TIMER FAST RATIONALITY
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0140	LOST COMMUNICATION WITH BODY CONTROL MODULE (TIPM)
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIRELESS IGNITION NODE OR WIN)
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0416	IMPLAUSIBLE DATA RECEIVED FROM ESP
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1113	LOST A/C PRESSURE MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED

POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS -

NGC

DTC	Description
P0016	CRANKSHAFT-CAMSHAFT TIMING MISALIGNMENT - BANK 1 SENSOR 1
P0031	O2 SENSOR 1/1 HEATER CIRCUIT LOW
P0032	O2 SENSOR 1/1 HEATER CIRCUIT HIGH
P0037	O2 SENSOR 1/2 HEATER CIRCUIT LOW
P0038	O2 SENSOR 1/2 HEATER CIRCUIT HIGH
P0051	O2 SENSOR 2/1 HEATER CIRCUIT LOW
P0052	O2 SENSOR 2/1 HEATER CIRCUIT HIGH
P0057	O2 SENSOR 2/2 HEATER CIRCUIT LOW
P0058	O2 SENSOR 2/2 HEATER CIRCUIT HIGH
P0071	AMBIENT AIR TEMPERATURE SENSOR PERFORMANCE
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW - NGC
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH - NGC
P0107	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT LOW
P0108	MANIFOLD ABSOLUTE PRESSURE SENSOR CIRCUIT HIGH
P0111	INTAKE AIR TEMPERATURE SENSOR 1 PERFORMANCE
P0112	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT LOW
P0113	INTAKE AIR TEMPERATURE SENSOR 1 CIRCUIT HIGH
P0116	ENGINE COOLANT TEMPERATURE SENSOR PERFORMANCE
P0117	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT LOW
P0118	ENGINE COOLANT TEMPERATURE SENSOR CIRCUIT HIGH
P0121	THROTTLE POSITION SENSOR 1 PERFORMANCE
P0122	THROTTLE POSITION SENSOR 1 CIRCUIT LOW
P0123	THROTTLE POSITION SENSOR 1 CIRCUIT HIGH
P0125	INSUFFICIENT COOLANT TEMP FOR CLOSED-LOOP FUEL CONTROL
P0128	THERMOSTAT RATIONALITY
P0129	BAROMETRIC PRESSURE OUT-OF-RANGE LOW
P0131	O2 SENSOR 1/1 CIRCUIT LOW
P0132	O2 SENSOR 1/1 CIRCUIT HIGH
P0133	O2 SENSOR 1/1 SLOW RESPONSE
P0135	O2 SENSOR 1/1 HEATER PERFORMANCE
P0137	O2 SENSOR 1/2 CIRCUIT LOW
P0138	O2 SENSOR 1/2 CIRCUIT HIGH
P0139	O2 SENSOR 1/2 SLOW RESPONSE
P013A	O2 SENSOR 1/2 SLOW RESPONSE - RICH TO LEAN
P013C	O2 SENSOR 2/2 SLOW RESPONSE - RICH TO LEAN
P0141	O2 SENSOR 1/2 HEATER PERFORMANCE
P0151	O2 SENSOR 2/1 CIRCUIT LOW
P0152	O2 SENSOR 2/1 CIRCUIT HIGH

P0153	O2 SENSOR 2/1 SLOW RESPONSE
P0155	O2 SENSOR 2/1 HEATER PERFORMANCE
P0157	O2 SENSOR 2/2 CIRCUIT LOW
P0158	O2 SENSOR 2/2 CIRCUIT HIGH
P0159	O2 SENSOR 2/2 SLOW RESPONSE
P0161	O2 SENSOR 2/2 HEATER PERFORMANCE
P0171	FUEL SYSTEM 1/1 LEAN
P0172	FUEL SYSTEM 1/1 RICH
P0174	FUEL SYSTEM 2/1 LEAN
P0175	FUEL SYSTEM 2/1 RICH
P0201	FUEL INJECTOR 1 CIRCUIT
P0202	FUEL INJECTOR 2 CIRCUIT
P0203	FUEL INJECTOR 3 CIRCUIT
P0204	FUEL INJECTOR 4 CIRCUIT
P0205	FUEL INJECTOR 5 CIRCUIT
P0206	FUEL INJECTOR 6 CIRCUIT
P0218	HIGH TEMPERATURE OPERATION ACTIVATED
P0221	THROTTLE POSITION SENSOR 2 CIRCUIT PERFORMANCE
P0222	THROTTLE POSITION SENSOR 2 CIRCUIT LOW
P0223	THROTTLE POSITION SENSOR 2 CIRCUIT HIGH
P0300	MULTIPLE CYLINDER MISFIRE
P0301	CYLINDER 1 MISFIRE
P0302	CYLINDER 2 MISFIRE
P0303	CYLINDER 3 MISFIRE
P0304	CYLINDER 4 MISFIRE
P0305	CYLINDER 5 MISFIRE
P0306	CYLINDER 6 MISFIRE
P0315	NO CRANK SENSOR LEARNED
P0325	KNOCK SENSOR 1 CIRCUIT
P0335	CRANKSHAFT POSITION SENSOR CIRCUIT
P0339	CRANKSHAFT POSITION SENSOR INTERMITTENT
P0340	CAMSHAFT POSITION SENSOR CIRCUIT - BANK 1 SENSOR 1
P0344	CAMSHAFT POSITION SENSOR INTERMITTENT - BANK 1 SENSOR 1
P0401	EGR SYSTEM PERFORMANCE
P0403	EGR CONTROL CIRCUIT
P0404	EGR POSITION SENSOR PERFORMANCE
P0405	EGR POSITION SENSOR CIRCUIT LOW
P0406	EGR POSITION SENSOR CIRCUIT HIGH
P0420	CATALYST EFFICIENCY (BANK 1)
P0430	CATALYST EFFICIENCY (BANK 2)
P0440	GENERAL EVAP SYSTEM FAILURE

	EVAP PURGE SYSTEM PERFORMANCE
P0443	EVAP PURGE CONTROL CIRCUIT
P0452	EVAP PRESSURE SWITCH STUCK CLOSED
P0455	EVAP SYSTEM LARGE LEAK
P0456	EVAP SYSTEM SMALL LEAK
P0457	LOOSE FUEL CAP
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE
P0461	FUEL LEVEL SENSOR 1 PERFORMANCE - AWD
P0462	FUEL LEVEL SENSOR 1 LOW CIRCUIT - NGC
P0463	FUEL LEVEL SENSOR 1 HIGH CIRCUIT - NGC
P0480	COOLING FAN 1 CONTROL CIRCUIT
P0481	COOLING FAN 2 CONTROL CIRCUIT
P0501	VEHICLE SPEED SENSOR 1 PERFORMANCE
P0503	VEHICLE SPEED SENSOR 1 ERRATIC (with ABS)
P0506	IDLE SPEED PERFORMANCE LOWER THAN EXPECTED
P0507	IDLE SPEED PERFORMANCE HIGHER THAN EXPECTED
P050B	COLD START IGNITION TIMING PERFORMANCE
P050D	COLD START ROUGH IDLE
P0513	INVALID SKIM KEY
P0522	ENGINE OIL PRESSURE TOO LOW
P0532	A/C PRESSURE SENSOR CIRCUIT LOW
P0533	A/C PRESSURE SENSOR CIRCUIT HIGH
P0562	BATTERY VOLTAGE LOW
P0563	BATTERY VOLTAGE HIGH
P0571	BRAKE SWITCH 1 PERFORMANCE
P0572	BRAKE SWITCH 1 STUCK ON
P0573	BRAKE SWITCH 1 STUCK OFF
P0579	SPEED CONTROL SWITCH 1 PERFORMANCE
P0580	SPEED CONTROL SWITCH 1 CIRCUIT LOW
P0581	SPEED CONTROL SWITCH 1 CIRCUIT HIGH
P0585	SPEED CONTROL SWITCH 1/2 CORRELATION
P0591	SPEED CONTROL SWITCH 2 PERFORMANCE
P0592	SPEED CONTROL SWITCH 2 CIRCUIT LOW
P0593	SPEED CONTROL SWITCH 2 CIRCUIT HIGH
P0600	SERIAL COMMUNICATION LINK
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR
P060B	ETC A-D GROUND PERFORMANCE
P060D	ETC LEVEL 2 APP PERFORMANCE
P060E	ETC LEVEL 2 TPS PERFORMANCE
P060F	ETC LEVEL 2 ECT PERFORMANCE

	ETC LEVEL 2 TORQUE PERFORMANCE
P061C	ETC LEVEL 2 RPM PERFORMANCE
P0622	GENERATOR FIELD CONTROL CIRCUIT
P0627	FUEL PUMP CONTROL CIRCUIT
P062C	ETC LEVEL 2 MPH PERFORMANCE
P0630	VIN NOT PROGRAMMED IN PCM
P0632	ODOMETER NOT PROGRAMMED IN PCM
P0633	SKIM SECRET KEY NOT STORED IN PCM
P063A	GENERATOR VOLTAGE SENSE CIRCUIT
P0642	SENSOR REFERENCE VOLTAGE 1 CIRCUIT LOW
P0643	SENSOR REFERENCE VOLTAGE 1 CIRCUIT HIGH
P0645	A/C CLUTCH CONTROL CIRCUIT
P0652	SENSOR REFERENCE VOLTAGE 2 CIRCUIT LOW
P0653	SENSOR REFERENCE VOLTAGE 2 CIRCUIT HIGH
P0660	MANIFOLD TUNING VALVE (MTV) CONTROL CIRCUIT
P0685	ASD/MAIN CONTROL CIRCUIT
P0688	ASD/MAIN SENSE CIRCUIT
P0700	TRANSMISSION CONTROL SYSTEM (MIL REQUEST)
P0703	BRAKE SWITCH 2 PERFORMANCE
P0850	PARK/NEUTRAL SWITCH PERFORMANCE
P1004	SHORT RUNNER VALVE CONTROL PERFORMANCE
P1005	MANIFOLD TUNING VALVE CONTROL PERFORMANCE
P1115	GENERAL TEMPERATURE RATIONALITY
P1128	CLOSED LOOP FUELING NOT ACHIEVED - BANK 1
P1129	CLOSED LOOP FUELING NOT ACHIEVED - BANK 2
P1404	EGR CLOSE POSITION PERFORMANCE
P150D	COLD START ROUGH IDLE - OPEN THROTTLE START
P1572	BRAKE PEDAL STUCK ON
P1573	BRAKE PEDAL STUCK OFF
P1593	SPEED CONTROL SWITCH 1/2 STUCK
P1607	PCM INTERNAL SHUTDOWN TIMER SLOW RATIONALITY
P1618	SENSOR REFERENCE VOLTAGE 1 ERRATIC
P1628	SENSOR REFERENCE VOLTAGE 2 ERRATIC
P1696	EEPROM MEMORY WRITE DENIED - INVALID
P1697	EMR (SRI) MILEAGE NOT STORED
P1897	LVL2 RPM FAIL - NO POST
P2008	SHORT RUNNER VALVE (SRV) CONTROL CIRCUIT
P2016	SHORT RUNNER VALVE (SRV) POSITION SENSOR CIRCUIT LOW
P2017	SHORT RUNNER VALVE (SRV) POSITION SENSOR CIRCUIT HIGH
P2066	FUEL LEVEL SENSOR 2 PERFORMANCE
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW

	FUEL LEVEL SENSOR 2 CIRCUIT HIGH
P2072	ELECTRONIC THROTTLE CONTROL SYSTEM - ICE BLOCKAGE
P2077	INTAKE MANIFOLD TUNING VALVE POSITION SENSOR CIRCUIT LOW
P2078	INTAKE MANIFOLD TUNING VALVE POSITION SENSOR CIRCUIT HIGH
P2096	DOWNSTREAM FUEL TRIM SYSTEM 1 LEAN
P2097	DOWNSTREAM FUEL TRIM SYSTEM 1 RICH
P2098	DOWNSTREAM FUEL TRIM SYSTEM 2 LEAN
P2099	DOWNSTREAM FUEL TRIM SYSTEM 2 RICH
P2100	ELECTRONIC THROTTLE CONTROL MOTOR CIRCUIT
P2101	ELECTRONIC THROTTLE CONTROL MOTOR PERFORMANCE
P2107	ELECTRONIC THROTTLE CONTROL MODULE PROCESSOR
P2110	ELECTRONIC THROTTLE CONTROL SYSTEM - FORCED LIMITED RPM
P2111	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO CLOSE
P2112	ELECTRONIC THROTTLE CONTROL SYSTEM - UNABLE TO OPEN
P2115	ACCELERATOR PEDAL POSITION SENSOR 1 MINIMUM STOP PERFORMANCE
P2116	ACCELERATOR PEDAL POSITION SENSOR 2 MINIMUM STOP PERFORMANCE
P2118	ELECTRONIC THROTTLE CONTROL MOTOR CURRENT PERFORMANCE
P2122	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT LOW
P2123	ACCELERATOR PEDAL POSITION SENSOR 1 CIRCUIT HIGH
P2127	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT LOW
P2128	ACCELERATOR PEDAL POSITION SENSOR 2 CIRCUIT HIGH
P2135	THROTTLE POSITION SENSOR 1/2 CORRELATION
P2138	ACCELERATOR PEDAL POSITION SENSOR 1/2 CORRELATION
P2161	VEHICLE SPEED SENSOR 2 ERRATIC (with ABS)
P2166	ACCELERATOR PEDAL POSITION SENSOR 1 MAXIMUM STOP PERFORMANCE
P2167	ACCELERATOR PEDAL POSITION SENSOR 2 MAXIMUM STOP PERFORMANCE
P2172	HIGH AIRFLOW-VACUUM LEAK DETECTED (INSTANTANEOUS ACCUMULATION)
P2173	HIGH AIRFLOW/VACUUM LEAK DETECTED (SLOW ACCUMULATION)
P2174	LOW AIRFLOW-RESTRICTION DETECTED (INSTANTANEOUS ACCUMULATION)
P2175	LOW AIRFLOW-RESTRICTION DETECTED (SLOW ACCUMULATION)
P2181	COOLING SYSTEM PERFORMANCE
P2271	O2 SENSOR 1/2 SIGNAL STUCK RICH
P2273	O2 SENSOR 2/2 SIGNAL STUCK RICH
P2299	BRAKE PEDAL POSITION - ACCELERATOR PEDAL POSITION INCOMPATIBLE
P2302	IGNITION COIL 1 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION

P2305	IGNITION COIL 2 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2308	IGNITION COIL 3 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2311	IGNITION COIL 4 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2314	IGNITION COIL 5 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2317	IGNITION COIL 6 SECONDARY CIRCUIT - INSUFFICIENT IONIZATION
P2503	CHARGING SYSTEM OUTPUT LOW
P2504	CHARGING SYSTEM OUTPUT HIGH
P2533	IGNITION SWITCH RUN/START POSITION CIRCUIT
P2610	PCM INTERNAL SHUTDOWN TIMER FAST RATIONALITY
U0001	CAN C BUS
U0101	LOST COMMUNICATION WITH TCM
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH FCM (TIPM)
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIRELESS IGNITION NODE OR WIN)
U110A	LOST COMMUNICATION WITH SCM (SAS)
U110C	LOST FUEL LEVEL MESSAGE
U110E	LOST AMBIENT TEMPERATURE MESSAGE
U110F	LOST FUEL VOLUME MESSAGE
U1110	LOST VEHICLE SPEED MESSAGE
U1113	LOST A/C PRESSURE MESSAGE
U1120	LOST WHEEL DISTANCE MESSAGE
U1403	IMPLAUSIBLE FUEL LEVEL SIGNAL RECEIVED
U1411	IMPLAUSIBLE FUEL VOLUME SIGNAL RECEIVED
U1412	IMPLAUSIBLE VEHICLE SPEED SIGNAL RECEIVED
U1417	IMPLAUSIBLE LEFT WHEEL DISTANCE SIGNAL RECEIVED
U1418	IMPLAUSIBLE RIGHT WHEEL DISTANCE SIGNAL RECEIVED

RADIO DISPLAY MODULE (DISP) - ELECTRICAL DIAGNOSTICS

DTC	Description
B14FF	REMOTE DISPLAY (DISP) HIGH TEMPERATURE OPERATION
B1500	REMOTE DISPLAY (DISP) LOW TEMPERATURE OPERATION
B1501	REMOTE DISPLAY (DISP) HIGH HUMIDITY OPERATION
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B21A1	ECU RESET/RECOVERY OCCURRED
B222C	VEHICLE CONFIGURATION NOT PERFORMED
B227F	REMOTE DISPLAY (DISP) INTERNAL

U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0184	LOST COMMUNICATION WITH RADIO

RESTRAINTS - ELECTRICAL DIAGNOSTICS

DTC	Description
B1B00	DRIVER AIRBAG SQUIB 1 CIRCUIT LOW
B1B01	DRIVER AIRBAG SQUIB 1 CIRCUIT HIGH
B1B02	DRIVER AIRBAG SQUIB 1 CIRCUIT OPEN
B1B03	DRIVER AIRBAG SQUIB 1 CIRCUIT SHORTED TOGETHER
B1B04	DRIVER AIRBAG SQUIB 2 CIRCUIT LOW
B1B05	DRIVER AIRBAG SQUIB 2 CIRCUIT HIGH
B1B06	DRIVER AIRBAG SQUIB 2 CIRCUIT OPEN
B1B07	DRIVER AIRBAG SQUIB 2 CIRCUIT SHORTED TOGETHER
B1B08	PASSENGER AIRBAG SQUIB 1 CIRCUIT LOW
B1B09	PASSENGER AIRBAG SQUIB 1 CIRCUIT HIGH
B1B0A	PASSENGER AIRBAG SQUIB 1 CIRCUIT OPEN
B1B0B	PASSENGER AIRBAG SQUIB 1 CIRCUIT SHORTED TOGETHER
B1B0C	PASSENGER AIRBAG SQUIB 2 CIRCUIT LOW
B1B0D	PASSENGER AIRBAG SQUIB 2 CIRCUIT HIGH
B1B0E	PASSENGER AIRBAG SQUIB 2 CIRCUIT OPEN
B1B0F	PASSENGER AIRBAG SQUIB 2 CIRCUIT SHORTED TOGETHER
B1B18	LEFT SIDE CURTAIN SQUIB 1 CIRCUIT LOW
B1B19	LEFT SIDE CURTAIN SQUIB 1 CIRCUIT HIGH
B1B1A	LEFT SIDE CURTAIN SQUIB 1 CIRCUIT OPEN
B1B1B	LEFT SIDE CURTAIN SQUIB 1 CIRCUIT SHORTED TOGETHER
B1B20	RIGHT SIDE CURTAIN SQUIB 1 CIRCUIT LOW
B1B21	RIGHT SIDE CURTAIN SQUIB 1 CIRCUIT HIGH
B1B22	RIGHT SIDE CURTAIN SQUIB 1 CIRCUIT OPEN
B1B23	RIGHT SIDE CURTAIN SQUIB 1 CIRCUIT SHORTED TOGETHER
B1B70	UP-FRONT LEFT SATELLITE ACCELERATION SENSOR INTERNAL
B1B71	UP-FRONT RIGHT SATELLITE ACCELERATION SENSOR INTERNAL
B1B72	LEFT SIDE SATELLITE ACCELERATION SENSOR 1 INTERNAL
B1B73	LEFT SIDE SATELLITE ACCELERATION SENSOR 2 INTERNAL
B1B74	LEFT SIDE SATELLITE ACCELERATION SENSOR 3 INTERNAL
B1B75	RIGHT SIDE SATELLITE ACCELERATION SENSOR 1 INTERNAL
B1B76	RIGHT SIDE SATELLITE ACCELERATION SENSOR 2 INTERNAL
B1B77	RIGHT SIDE SATELLITE ACCELERATION SENSOR 3 INTERNAL

B1B8E	DRIVER SEAT TRACK POSITION SENSOR CIRCUIT HIGH
B1B90	DRIVER SEAT TRACK POSITION SENSOR CIRCUIT SHORTED TOGETHER
B1B91	DRIVER SEAT TRACK POSITION SENSOR CONFIGURATION MISMATCH
B1B94	PASSENGER SEAT TRACK POSITION SENSOR CIRCUIT HIGH
B1B96	PASSENGER SEAT TRACK POSITION SENSOR CIRCUIT SHORTED TOGETHER
B1B97	PASSENGER SEAT TRACK POSITION SENSOR CONFIGURATION MISMATCH
B1BA5	AIRBAG SQUIB CONFIGURATION MISMATCH
B1BAB	UP-FRONT LEFT SATELLITE ACCELERATION SENSOR CONFIGURATION MISMATCH
B1BAC	UP-FRONT RIGHT SATELLITE ACCELERATION SENSOR CONFIGURATION MISMATCH
B1BAD	LEFT SIDE SATELLITE ACCELERATION SENSOR 1 CONFIGURATION MISMATCH
B1BAE	LEFT SIDE SATELLITE ACCELERATION SENSOR 2 CONFIGURATION MISMATCH
B1BAF	LEFT SIDE SATELLITE ACCELERATION SENSOR 3 CONFIGURATION MISMATCH
B1BB0	RIGHT SIDE SATELLITE ACCELERATION SENSOR 1 CONFIGURATION MISMATCH
B1BB1	RIGHT SIDE SATELLITE ACCELERATION SENSOR 2 CONFIGURATION MISMATCH
B1BB2	RIGHT SIDE SATELLITE ACCELERATION SENSOR 3 CONFIGURATION MISMATCH
B1BB9	AIRBAG SQUIB CIRCUIT COUPLING
B1BC7	DEPLOYMENT DATA RECORD FULL
B1BD0	ROLL OVER INTERNAL
B1BD1	ROLL OVER SENSOR CONFIGURATION MISMATCH
B1C27	LEFT SIDE SEAT THORAX SQUIB 1 LOW
B1C28	LEFT SIDE SEAT THORAX SQUIB 1 HIGH
B1C29	LEFT SIDE SEAT THORAX SQUIB 1 OPEN
B1C2A	LEFT SIDE SEAT THORAX SQUIB 1 SHORTED TOGETHER
B1C2B	RIGHT SIDE SEAT THORAX SQUIB 1 LOW
B1C2C	RIGHT SIDE SEAT THORAX SQUIB 1 HIGH
B1C2D	RIGHT SIDE SEAT THORAX SQUIB 1 OPEN
B1C2E	RIGHT SIDE SEAT THORAX SQUIB 1 SHORTED TOGETHER
B1C38	1st ROW DRIVER RETRACTOR TENSIONER CIRCUIT LOW
B1C39	1ST ROW DRIVER RETRACTOR TENSIONER CIRCUIT HIGH
B1C3A	1st ROW DRIVER RETRACTOR TENSIONER CIRCUIT OPEN
B1C3B	1st ROW DRIVER RETRACTOR TENSIONER CIRCUIT SHORTED TOGETHER

B1C47	1st ROW PASSENGER RETRACTOR TENSIONER CIRCUIT LOW
B1C48	1ST ROW PASSENGER RETRACTOR TENSIONER CIRCUIT HIGH
B1C49	1st ROW PASSENGER RETRACTOR TENSIONER CIRCUIT OPEN
B1C4A	1st ROW PASSENGER RETRACTOR TENSIONER CIRCUIT SHORTED TOGETHER
B1CFB	SEAT BELT SENSORS CONFIGURATION FAULT
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B210F	ORC BATTERY VOLTAGE CIRCUIT OPEN
B212C	IGNITION RUN/START INPUT CIRCUIT OPEN
B2207	OCCUPANT RESTRAINT CONTROLLER INTERNAL 1
B2208	OCCUPANT RESTRAINT CONTROLLER INTERNAL 2
B220B	OCCUPANT RESTRAINT CONTROLLER FIRING STORED ENERGY
B222A	VEHICLE LINE MISMATCH
B223B	VEHICLE CONFIGURATION MISMATCH
B2255	OCCUPANT RESTRAINT CONTROLLER ROLL OVER FEATURE DISABLE
B2722	ORC UNLOCKED-ALL DEPLOYMENT DISABLED
U0002	CAN C BUS OFF PERFORMANCE
U0170	LOST COMMUNICATION W/UP-FRONT LEFT SATELLITE ACCELERATION SENSOR
U0171	LOST COMMUNICATION W/UP-FRONT RIGHT SATELLITE ACCELERATION SENSOR
U0172	LOST COMMUNICATION W/LEFT SIDE SATELLITE ACCELERATION SENSOR 1
U0173	LOST COMMUNICATION W/LEFT SIDE SATELLITE ACCELERATION SENSOR 2
U0174	LOST COMMUNICATION W/LEFT SIDE SATELLITE ACCELERATION SENSOR 3
U0175	LOST COMMUNICATION W/RIGHT SIDE SATELLITE ACCELERATION SENSOR 1
U0176	LOST COMMUNICATION W/RIGHT SIDE SATELLITE ACCELERATION SENSOR 2
U0177	LOST COMMUNICATION W/RIGHT SIDE SATELLITE ACCELERATION SENSOR 3
U1414	IMPLAUSIBLE/MISSING ECU CONFIGURATION DATA
U1415	IMPLAUSIBLE/MISSING VEHICLE CONFIGURATION DATA

TRANSMISSION CONTROL MODULE (TCM) - ELECTRICAL DIAGNOSTICS

DTC	Description
P0601	INTERNAL MEMORY CHECKSUM INVALID
P0606	INTERNAL CONTROL PROCESSOR

P0607	ECU INTERNAL PERFORMANCE
P06B4	SENSOR POWER SUPPLY B CIRCUIT LOW
P06B5	SENSOR POWER SUPPLY B CIRCUIT HIGH
P0705	TRANSMISSION RANGE SENSOR CIRCUIT
P0715	INPUT SPEED SENSOR 1 CIRCUIT
P0716	INPUT SPEED SENSOR 1 CIRCUIT PERFORMANCE
P0725	ENGINE SPEED SENSOR CIRCUIT PERFORMANCE
P0726	ENGINE SPEED INPUT CIRCUIT RANGE/PERFORMANCE
P0730	INCORRECT GEAR RATIO
P073F	UNABLE TO ENGAGE GEAR 1
P0748	PRESSURE CONTROL SOLENOID 1 CIRCUIT - OVERCURRENT
P074A	UNABLE TO ENGAGE GEAR 2
P074B	UNABLE TO ENGAGE GEAR 3
P074C	UNABLE TO ENGAGE GEAR 4
P074D	UNABLE TO ENGAGE GEAR 5
P074E	UNABLE TO ENGAGE GEAR 6
P074F	UNABLE TO ENGAGE GEAR R
P0750	SHIFT SOLENOID A CONTROL CIRCUIT/OPEN
P0755	SHIFT SOLENOID B CONTROL CIRCUIT/OPEN
P0775	PRESSURE CONTROL SOLENOID 2
P0776	SECONDARY PRESSURE SOLENOID STUCK OFF
P0777	SECONDARY PRESSURE SOLENOID STUCK ON
P0798	PRESSURE CONTROL SOLENOID 3 CIRCUIT OVERCURRENT
P0841	TRANSMISSION FLUID PRESSURE SENSOR 1 CIRCUIT RANGE/PERFORMANCE
P0842	TRANSMISSION FLUID PRESSURE SENSOR 1 CIRCUIT LOW
P0843	TRANSMISSION FLUID PRESSURE SENSOR 1 CIRCUIT HIGH
P0846	TRANSMISSION FLUID PRESSURE SENSOR 2 CIRCUIT RANGE/PERFORMANCE
P0847	TRANSMISSION FLUID PRESSURE SENSOR 2 CIRCUIT LOW
P0848	TRANSMISSION FLUID PRESSURE SENSOR 2 CIRCUIT HIGH
P0893	MULTIPLE GEARS ENGAGED
P0960	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT/OPEN
P0961	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT RANGE/PERFORMANCE
P0962	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT LOW
P0963	PRESSURE CONTROL SOLENOID 1 CONTROL CIRCUIT HIGH
P0964	PRESSURE CONTROL SOLENOID 2 CONTROL CIRCUIT OPEN
P0965	PRESSURE CONTROL SOLENOID 2 CONTROL CIRCUIT RANGE/PERFORMANCE
P0966	PRESSURE CONTROL SOLENOID 2 CONTROL CIRCUIT LOW

P0967	PRESSURE CONTROL SOLENOID 2 CONTROL CIRCUIT HIGH
P0968	PRESSURE CONTROL SOLENOID 3 CONTROL CIRCUIT OPEN
P0969	PRESSURE CONTROL SOLENOID 3 CONTROL CIRCUIT RANGE/PERFORMANCE
P0970	PRESSURE CONTROL SOLENOID 3 CONTROL CIRCUIT LOW
P0971	PRESSURE CONTROL SOLENOID 3 CONTROL CIRCUIT HIGH
P0973	SHIFT SOLENOID A CONTROL CIRCUIT LOW
P0974	SHIFT SOLENOID A CONTROL CIRCUIT HIGH
P0976	SHIFT SOLENOID B CONTROL CIRCUIT LOW
P0977	SHIFT SOLENOID B CONTROL CIRCUIT HIGH
P161A	ECU IN - PLANT MODE ACTIVE
P170F	TRANSMISSION FLUID TEMPERATURE SENSOR 1/SENSOR 2 CORRELATION
P171A	REQUESTED SHIFT FORK 1/DETECTED SHIFT FORK 2 MOVEMENT
P171B	REQUESTED SHIFT FORK 1/DETECTED SHIFT FORK 3 MOVEMENT
P171C	REQUESTED SHIFT FORK 2/DETECTED SHIFT FORK 1 MOVEMENT
P171D	REQUESTED SHIFT FORK 2/DETECTED SHIFT FORK 4 MOVEMENT
P171E	REQUESTED SHIFT FORK 3/DETECTED SHIFT FORK 1 MOVEMENT
P171F	REQUESTED SHIFT FORK 3/DETECTED SHIFT FORK 4 MOVEMENT
P172C	REQUESTED SHIFT FORK 4/DETECTED SHIFT FORK 3 MOVEMENT
P172E	SHIFT FORK 3/4 OPPOSITE MOVEMENT DETECTED
P172F	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 1 - GEAR 5
P173A	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 1 - GEAR R
P173B	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 2 - GEAR 3
P173C	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 2 - GEAR 1
P173D	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 3 - GEAR 2
P173E	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 3 - GEAR 4
P173F	UNEXPECTED MECHANICAL DISENGAGEMENT - SHIFT FORK 4 - GEAR 6
P174B	FUNCTION SELECT SOLENOID 1 CONTROL CIRCUIT/OPEN
P174D	FUNCTION SELECT SOLENOID 1 CONTROL CIRCUIT LOW
P174E	FUNCTION SELECT SOLENOID 1 CONTROL CIRCUIT HIGH
P174F	FUNCTION SELECT SOLENOID 2 CONTROL CIRCUIT/OPEN
P1759	FUNCTION SELECT SOLENOID 2 CONTROL CIRCUIT RANGE/PERFORMANCE
P175A	FUNCTION SELECT SOLENOID 2 CONTROL CIRCUIT LOW
P175B	FUNCTION SELECT SOLENOID 2 CONTROL CIRCUIT HIGH
P175C	FUNCTION SELECT SOLENOID 3 CONTROL CIRCUIT/OPEN
P175D	FUNCTION SELECT SOLENOID 3 CONTROL CIRCUIT RANGE/PERFORMANCE
P175E	FUNCTION SELECT SOLENOID 3 CONTROL CIRCUIT LOW

P175F	FUNCTION SELECT SOLENOID 3 CONTROL CIRCUIT HIGH
P1760	ENGINE SPEED INPUT SENSOR - OVER SPEED
P1769	CLUTCH 2 ADAPTIVE LEARNING AT LIMIT
P176A	REQUESTED SHIFT FORK 4/DETECTED SHIFT FORK 2 MOVEMENT
P176C	SHIFT FORK 1/2 OPPOSITE MOVEMENT DETECTED
P176D	TRANSMISSION FLUID TEMPERATURE TOO HIGH
P176E	TRANSMISSION FLUID TEMPERATURE TOO LOW
P2716	PRESSURE CONTROL SOLENOID 4 CIRCUIT OVERCURRENT
P2718	PRESSURE CONTROL SOLENOID 4 CONTROL CIRCUIT OPEN
P2719	PRESSURE CONTROL SOLENOID 4 CONTROL CIRCUIT RANGE/PERFORMANCE
P2720	PRESSURE CONTROL SOLENOID 4 CONTROL CIRCUIT LOW
P2721	PRESSURE CONTROL SOLENOID 4 CONTROL CIRCUIT HIGH
P2741	TRANSMISSION FLUID TEMPERATURE SENSOR 2 PERFORMANCE
P2765	INPUT/TURBINE SPEED SENSOR 2 CIRCUIT
P2789	CLUTCH 1 ADAPTIVE LEARNING AT LIMIT
P2832	SHIFT FORK 1 POSITION CIRCUIT RANGE/PERFORMANCE
P2833	SHIFT FORK 1 POSITION CIRCUIT LOW
P2834	SHIFT FORK 1 POSITION CIRCUIT HIGH
P2837	SHIFT FORK 2 POSITION CIRCUIT RANGE/PERFORMANCE
P2838	SHIFT FORK 2 POSITION CIRCUIT LOW
P2839	SHIFT FORK 2 POSITION CIRCUIT HIGH
P283C	SHIFT FORK 3 POSITION CIRCUIT RANGE/PERFORMANCE
P283D	SHIFT FORK 3 POSITION CIRCUIT LOW
P283E	SHIFT FORK 3 POSITION CIRCUIT HIGH
P2841	SHIFT FORK 4 POSITION CIRCUIT RANGE/PERFORMANCE
P2842	SHIFT FORK 4 POSITION CIRCUIT LOW
P2843	SHIFT FORK 4 POSITION CIRCUIT HIGH
P2849	SHIFT FORK 1 POSITION STUCK
P284A	SHIFT FORK 2 POSITION STUCK
P284B	SHIFT FORK 3 POSITION STUCK
P284C	SHIFT FORK 4 POSITION STUCK
P284D	SHIFT FORK 1 UNREQUESTED MOVEMENT
P284E	SHIFT FORK 2 UNREQUESTED MOVEMENT
P284F	SHIFT FORK 3 UNREQUESTED MOVEMENT
P2850	SHIFT FORK 4 UNREQUESTED MOVEMENT
P2855	CLUTCH 1 PRESSURE CHARGE PERFORMANCE
P2856	CLUTCH 2 PRESSURE CHARGE PERFORMANCE
P2859	CLUTCH 1 PRESSURE DISENGAGEMENT PERFORMANCE
P285A	CLUTCH 2 PRESSURE DISENGAGEMENT PERFORMANCE
U0002	CAN C BUS OFF PERFORMANCE

U0100	LOST COMMUNICATION WITH ECM/PCM
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0415	IMPLAUSIBLE DATA RECEIVED FROM ABS
U0447	IMPLAUSIBLE DATA RECEIVED FROM CENTRAL GATEWAY

TOTALLY INTEGRATED POWER MODULE (TIPM) - ELECTRICAL DIAGNOSTICS

DTC	Description
B10E9	BLOWER MOTOR CONTROL CIRCUIT LOW
B10EA	BLOWER MOTOR CONTROL CIRCUIT HIGH
B10EC	BLOWER MOTOR CONTROL CIRCUIT OVERCURRENT
B106F	BLOWER MOTOR CONTROL CIRCUIT LOW (TIPM)
B1070	BLOWER MOTOR CONTROL CIRCUIT HIGH (TIPM)
B16B1	LEFT STOP LAMP CONTROL CIRCUIT HIGH
B16B5	RIGHT STOP LAMP CONTROL CIRCUIT HIGH
B16F8	FRONT LEFT FOG LAMP CONTROL CIRCUIT LOW
B16F9	FRONT LEFT FOG LAMP CONTROL CIRCUIT HIGH
B16FC	FRONT RIGHT FOG LAMP CONTROL CIRCUIT LOW
B16FD	FRONT RIGHT FOG LAMP CONTROL CIRCUIT HIGH
B162B	LEFT LOW BEAM CONTROL CIRCUIT LOW
B162C	LEFT LOW BEAM CONTROL CIRCUIT HIGH
B162F	RIGHT LOW BEAM CONTROL CIRCUIT LOW
B1630	RIGHT LOW BEAM CONTROL CIRCUIT HIGH
B1633	LEFT HI BEAM CONTROL CIRCUIT LOW
B1634	LEFT HI BEAM CONTROL CIRCUIT HIGH
B1637	RIGHT HIGH BEAM CONTROL CIRCUIT LOW
B1638	RIGHT HIGH BEAM CONTROL CIRCUIT HIGH
B163B	FRONT LEFT TURN LAMP CONTROL CIRCUIT LOW
B163C	FRONT LEFT TURN LAMP CONTROL CIRCUIT HIGH
B163F	FRONT RIGHT TURN LAMP CONTROL CIRCUIT LOW
B1640	FRONT RIGHT TURN LAMP CONTROL CIRCUIT HIGH
B1643	REAR LEFT TURN LAMP CONTROL CIRCUIT LOW
B1644	REAR LEFT TURN LAMP CONTROL CIRCUIT HIGH
B1647	REAR RIGHT TURN LAMP CONTROL CIRCUIT LOW
B1648	REAR RIGHT TURN LAMP CONTROL CIRCUIT HIGH
B165C	PARK LAMP CONTROL CIRCUIT LOW
B165D	PARK LAMP CONTROL CIRCUIT HIGH
B1663	REAR FOG LAMP CONTROL CIRCUIT LOW

B1664	REAR FOG LAMP CONTROL CIRCUIT HIGH
B166B	LEFT TRAILER TOW LAMP CONTROL CIRCUIT LOW
B166C	LEFT TRAILER TOW LAMP CONTROL CIRCUIT HIGH
B166F	RIGHT TRAILER TOW LAMP CONTROL CIRCUIT LOW
B1670	RIGHT TRAILER TOW LAMP CONTROL CIRCUIT HIGH
B17B8	LEFT STOP LAMP CONTROL CIRCUIT OVERCURRENT
B17B9	RIGHT STOP LAMP CONTROL CIRCUIT OVERCURRENT
B17BA	HEADLAMP LEVELING MOTOR CONTROL CIRCUIT OVERCURRENT
B17BD	LEFT SIDEMARKER LAMP CONTROL CIRCUIT HIGH
B17BF	LEFT SIDEMARKER LAMP CONTROL CIRCUIT OVERCURRENT
B17C2	RIGHT SIDEMARKER LAMP CONTROL CIRCUIT HIGH
B17C4	RIGHT SIDEMARKER LAMP CONTROL CIRCUIT OVERCURRENT
B1789	HEADLAMP LEVELING MOTOR CONTROL CIRCUIT HIGH
B1801	DRIVER DOOR LOCK/UNLOCK SWITCH CIRCUIT LOW
B1806	PASSENGER DOOR LOCK/UNLOCK SWITCH CIRCUIT LOW
B1820	HOOD AJAR INPUT CIRCUIT HIGH
B186F	ALL DOOR SECONDARY LOCK CONTROL CIRCUIT LOW
B1870	ALL DOOR SECONDARY LOCK CONTROL CIRCUIT HIGH
B1934	DRIVER DOOR LOCK/UNLOCK SWITCH CIRCUIT STUCK
B1935	PASSENGER DOOR LOCK/UNLOCK SWITCH CIRCUIT STUCK
B198A	ALL DOOR SECONDARY UNLOCK CONTROL CIRCUIT LOW
B198B	ALL DOOR SECONDARY UNLOCK CONTROL CIRCUIT HIGH
B2101	IGNITION RUN/START INPUT LOW
B2102	IGNITION RUN/START INPUT HIGH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B219A	IGNITION UNLOCK RUN/START CONTROL CIRCUIT OVERCURRENT
B222C	VEHICLE CONFIGURATION NOT PROGRAMMED
B2206	CURRENT VIN MISSING/MISMATCH
B2215	FRONT CONTROL MODULE INTERNAL (TOTALLY INTEGRATED POWER MODULE)
B230D	REAR WIPER PARK SWITCH INPUT CIRCUIT LOW (STUCK LOW)
B230E	REAR WIPER PARK SWITCH INPUT CIRCUIT HIGH (STUCK HIGH)
B2304	WIPER PARK SWITCH INPUT CIRCUIT LOW (STUCK LOW)
B2305	WIPER PARK SWITCH INPUT CIRCUIT HIGH (STUCK HIGH)
B2307	WASHER SWITCH INPUT CIRCUIT LOW
B2323	HEADLAMP WASHER MOTOR CONTROL CIRCUIT LOW
B2324	HEADLAMP WASHER MOTOR CONTROL CIRCUIT HIGH
B2328	WASHER FLUID LEVEL SENSOR CIRCUIT HIGH
C1008	BRAKE FLUID LEVEL CIRCUIT HIGH
P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW - NGC

P0072	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT LOW - GPEC
P0072	AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO LOW
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH - NGC
P0073	AMBIENT AIR TEMPERATURE SENSOR CIRCUIT HIGH - GPEC
P0073	AMBIENT AIR TEMPERATURE SIGNAL VOLTAGE TOO HIGH
P0462	FUEL LEVEL SENSOR 1 LOW CIRCUIT - NGC
P0462	FUEL LEVEL SENSOR 1 LOW CIRCUIT - GPEC
P0463	FUEL LEVEL SENSOR 1 HIGH CIRCUIT - NGC
P0463	FUEL LEVEL SENSOR 1 HIGH CIRCUIT - GPEC
P0691	COOLING FAN 1 CONTROL CIRCUIT LOW
P0692	COOLING FAN 1 CONTROL CIRCUIT HIGH
P0693	COOLING FAN 2 CONTROL CIRCUIT LOW
P0694	COOLING FAN 2 CONTROL CIRCUIT HIGH
P1273	A/C CLUTCH CONTROL CIRCUIT 2 HIGH - GPEC
P1273	A/C CLUTCH CONTROL CIRCUIT 2 HIGH - NGC
P1275	A/C CLUTCH CONTROL CIRCUIT 2 OVERCURRENT - GPEC
P1275	A/C CLUTCH CONTROL CIRCUIT 2 OVERCURRENT - NGC
P1277	STARTER CONTROL CIRCUIT 2 LOW (TIPM)
P1278	STARTER CONTROL CIRCUIT 2 HIGH (TIPM)
P1279	STARTER CONTROL CIRCUIT 2 OPEN (TIPM)
P127A	STARTER CONTROL CIRCUIT 2 OVERCURRENT (TIPM)
P127C	FUEL PUMP CONTROL CIRCUIT 2 LOW (TIPM)
P127D	FUEL PUMP CONTROL CIRCUIT 2 HIGH (TIPM)
P127E	FUEL PUMP CONTROL CIRCUIT 2 OPEN (TIPM)
P127F	FUEL PUMP CONTROL CIRCUIT 2 OVERCURRENT (TIPM)
P128B	TCM POWER CONTROL CIRCUIT 2 LOW - 41TE - GPEC
P128C	TCM POWER CONTROL CIRCUIT 2 HIGH - 41TE - GPEC
P128D	TCM POWER CONTROL CIRCUIT 2 OPEN - 41TE - GPEC
P128E	TCM POWER CONTROL CIRCUIT 2 OVERCURRENT - 41TE - GPEC
P128B	TCM POWER CONTROL CIRCUIT 2 LOW - 41TE - NGC
P128C	TCM POWER CONTROL CIRCUIT 2 HIGH - 41TE - NGC
P128D	TCM POWER CONTROL CIRCUIT 2 OPEN - 41TE - NGC
P128E	TCM POWER CONTROL CIRCUIT 2 OVERCURRENT - 41TE - NGC
P128B	TCM POWER CONTROL CIRCUIT 2 LOW - NGC
P128C	TCM POWER CONTROL CIRCUIT 2 HIGH - NGC
P128D	TCM POWER CONTROL CIRCUIT 2 OPEN - NGC
P128E	TCM POWER CONTROL CIRCUIT 2 OVERCURRENT - NGC
P129C	INVERTER CONTROL CIRCUIT HIGH
P129E	INVERTER CONTROL CIRCUIT OVERCURRENT
P2067	FUEL LEVEL SENSOR 2 CIRCUIT LOW
P2068	FUEL LEVEL SENSOR 2 CIRCUIT HIGH

	CAN C BUS
U0002	CAN C BUS OFF PERFORMANCE
U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0100	LOST COMMUNICATION WITH ECM/PCM
U0101	LOST COMMUNICATION WITH TCM
U0114	LOST COMMUNICATION WITH FINAL DRIVE CONTROL MODULE (ALL WHEEL DRIVE CONTROL MODULE-AWD)
U0121	LOST COMMUNICATION WITH ABS
U0126	LOST COMMUNICATION WITH SAS
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE (TOTALLY INTEGRATED POWER MODULE) (TIPM)
U0151	LOST COMMUNICATION WITH ORC
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0164	LOST COMMUNICATION WITH HVAC CONTROL MODULE
U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE (ITM)
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIRELESS IGNITION NODE OR WIN)
U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER (AMP)
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE (HFM)
U0203	LOST COMMUNICATION WITH LEFT FRONT DOOR MODULE (DMFL) (DRIVER DOOR MODULE)
U0203	LOST COMMUNICATION WITH RIGHT FRONT DOOR MODULE (DMFR) (PASSENGER DOOR MODULE)
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW (VES3)
U0255	LOST COMMUNICATION WITH DISPLAY
U1147	ADDITIONAL CAN INTERIOR BUS ECU DETECTED
U1148	ADDITIONAL CAN C BUS ECU DETECTED

VIDEO ENTERTAINMENT SYSTEM (VES3) - ELECTRICAL DIAGNOSTICS

DTC	Description
B142B	VES UNIT HIGH TEMPERATURE
B14CE	VES BRIGHTNESS UP INPUT BUTTON STUCK
B14CF	VES BRIGHTNESS DOWN INPUT BUTTON STUCK
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH

B21A1	ECU RESET/RECOVERY OCCURRED
B222B	VEHICLE ENTERTAINMENT SYSTEM INTERNAL
B222C	VEHICLE CONFIGURATION NOT PROGRAMMED
U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0184	LOST COMMUNICATION WITH RADIO

VIDEO SATELLITE (SDARV) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1539	SATELLITE VIDEO ANTENNA PERFORMANCE (NOT CONNECTED)
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH
B2287	SATELLITE VIDEO RECEIVER INTERNAL
U0010	CAN INTERIOR BUS
U0011	CAN INTERIOR BUS OFF PERFORMANCE
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0184	LOST COMMUNICATION WITH RADIO

WIRELESS IGNITION MODULE (WIN) - ELECTRICAL DIAGNOSTICS

DTC	Description
B1A08	RKE FOB 1 PERFORMANCE (WIN)
B1A09	RKE FOB 2 PERFORMANCE (WIN)
B1A0A	RKE FOB 3 PERFORMANCE (WIN)
B1A0B	RKE FOB 4 PERFORMANCE (WIN)
B1A0C	RKE FOB 5 PERFORMANCE (WIN)
B1A0D	RKE FOB 6 PERFORMANCE (WIN)
B1A0E	RKE FOB 7 PERFORMANCE (WIN)
B1A0F	RKE FOB 8 PERFORMANCE (WIN)
B1A10	RKE FOB 1 BATTERY LOW (WIN)
B1A11	RKE FOB 2 BATTERY LOW (WIN)
B1A12	RKE FOB 3 BATTERY LOW (WIN)
B1A13	RKE FOB 4 BATTERY LOW (WIN)
B1A14	RKE FOB 5 BATTERY LOW (WIN)
B1A15	RKE FOB 6 BATTERY LOW (WIN)
B1A16	RKE FOB 7 BATTERY LOW (WIN)
B1A17	RKE FOB 8 BATTERY LOW (WIN)

B1A20	PRE-ARM TIMEOUT
B1A25	INVALID KEY
B1A26	MAXIMUM NUMBER OF KEYS PROGRAMMED
B1A27	SKREEM PROGRAMMING PERFORMANCE
B1A28	ECM MISMATCH WITH SKIM
B1A29	SKIM BASESTATION MISMATCH
B1A35	UNIDENTIFIED KEY COMMUNICATION ERROR
B1A3C	INTERNAL SIREN BATTERY
B1A3D	SIREN BATTERY TAMPER/LOSS OF POWER SUPPLY
B1A3E	SIREN/ITM MISMATCH
B1A3F	ITM ARMING SEQUENCE PERFORMANCE
B1A6C	SECRET KEY MISMATCH
B210D	BATTERY VOLTAGE LOW
B210E	BATTERY VOLTAGE HIGH (WIN)
B2204	ECU CONFIGURATION MISMATCH
B2205	ORIGINAL VIN MISSING/MISMATCH
B2224	(SKREEM) SENTRY KEY REMOTE ENTRY MODULE INTERNAL
B2229	SKREEM INTERNAL - SKIM IMMOBILIZER
B223C	INTRUSION TRANSCEIVER MODULE INTERNAL
C0077	LOW TIRE PRESSURE
C1501	TIRE PRESSURE SENSOR 1 INTERNAL
C1502	TIRE PRESSURE SENSOR 2 INTERNAL
C1503	TIRE PRESSURE SENSOR 3 INTERNAL
C1504	TIRE PRESSURE SENSOR 4 INTERNAL
C151C	TIRE PRESSURE MONITORING (TPM) SENSORS MISSING
P0928	BTSI CONTROL CIRCUIT
U0100	LOST COMMUNICATION WITH ECM/PCM
U0121	LOST COMMUNICATION WITH ANTI-LOCK BRAKE MODULE
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE
U0236	LOST COMMUNICATION WITH COLUMN LOCK MODULE
U110D	LOST COMMUNICATION WITH SECURITY SIREN
U1197	SECURITY SEED RESPONSE NOT RECEIVED FROM ECM/PCM
U1416	IMPLAUSIBLE SECURITY SIREN SIGNAL RECEIVED

2009 ENGINE

2.0L Diesel - Service Information - Journey

DESCRIPTION

DESCRIPTION

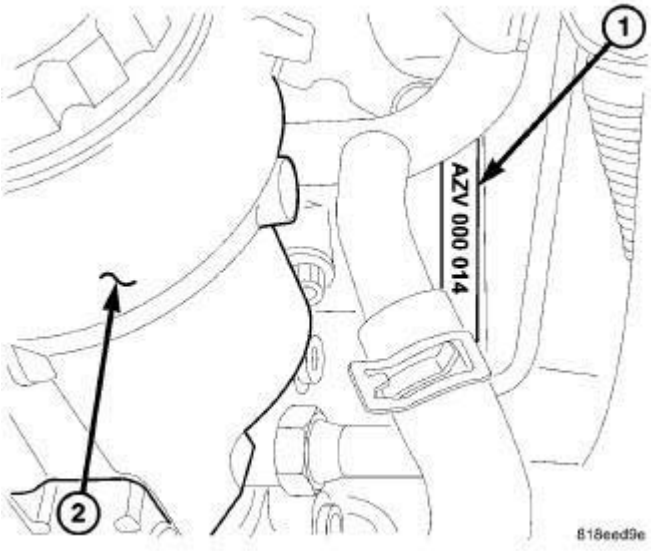


Fig. 1: Serial Number
Courtesy of CHRYSLER LLC

This is an 2.0L electronic unit injector turbo diesel engine. The engine serial number is located on the rear flange of the engine block behind the oil filter housing (2).

STANDARD PROCEDURE

COMPRESSION TESTING ENGINE

CAUTION: Injector retaining bolts must be replaced after performing compression test.

1. Warm up engine to operating temperature (approximately 80 °C, 176°F).
2. Shut off engine.
3. Remove engine cover. See **Removal** .
4. Disconnect fuel feed and return lines from the fuel filter.
5. Operate a vacuum pump connected to the return line until no more fuel comes out.
6. Remove injectors. Refer to **Fuel System/Fuel Injection/INJECTOR(S), Fuel - Removal** .

7. Crank engine several times with the starter to eliminate combustion residues in the cylinders.
8. Insert compression adapter 9889 into injector hole of cylinder to be tested. Install injector retainer bolts and tighten.
9. Test compression pressure by cranking engine with starter for at least 8 revolutions.
10. Carry out test procedure at the remaining cylinders in the same way.
11. Compare pressure readings obtained with the specified pressures. If the pressure reading is below the minimum compression pressure or if the permissible difference between the individual cylinders is exceeded. See **Standard Procedure** .

COMPRESSION SPECIFICATION - 2.0L

COMPRESSION SPECIFICATION	
Minimum Allowable	18 bar (261 psi.)
Maximum Allowable Difference Between Cylinders	3 bar (44 psi.)
Average Compression	24 - 30 bar (348 - 435 psi)

12. Remove adapter from cylinder head.

NOTE: Injector retaining bolts must be replaced when installing injectors.

13. Install injectors with new bolts. Refer to **Fuel System/Fuel Injection/INJECTOR(S), Fuel - Installation** .
14. Install engine cover. See **Installation** .

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All sealants mentioned below are not used on every engine, they are listed as general reference guide. See Service Information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin of a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers must be free of grease or oil. Clean surfaces with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, assemble the parts within 10 minutes.

Numerous types of form-in-place gasket materials are used in the engine area. Mopar® Sealant RTV Silicone Rubber Adhesive, MOPAR® Silicone Rubber RTV, Mopar® ATF-RTV and Mopar® Gasket Maker gasket materials, each have different properties and cannot be used in place of the other.

MOPAR® SEALANT RTV SILICONE RUBBER ADHESIVE is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available

in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® SILICONE RUBBER RTV is used to seal components exposed to engine oil, gear lubricant, and coolant. This material is a specially designed gray silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil, gear lubricant and coolant. Excellent adhesion even on oily surfaces, withstands temperatures to 330° C (626° F). Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF-RTV is a specially designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. It can be used on threaded and machined parts under all temperatures. This material also prevents corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or in a 4 oz. or 6 oz. can with applicator.

SEALER APPLICATION

Apply 1 mm (0.040 in.) diameter or less of Mopar® Gasket Maker material to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Tighten the components in place within 15 minutes. Use a locating dowel during assembly to prevent smearing material off the location.

Apply Mopar® RTV or ATF-RTV gasket material in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T-Joint" locations and waffle pad area, a 0.635 mm (0.025 in.) drop is placed in the center of the gasket contact area. Remove uncured sealant with a shop towel. Tighten the components in place while the sealant is still wet to the touch (within 10 minutes). Use a locating dowel during assembly to prevent smearing material off the location.

CYLINDER LEAK DOWN TEST

1. Warm engine to operating temperature.

WARNING: Do not open cooling system unless coolant temperature is below 90° C (194°F). Risk of injury to skin and eyes as a result of scalding with hot coolant which splashes out. Risk of poisoning from swallowing coolant. Open cap slowly and release pressure. Store coolant in proper containers only. Wear protective gloves, clothing and eye protection.

NOTE: Turn cap carefully as far as first detent, release pressure, then unscrew cap.

2. Open cooling system cap at coolant recover pressure container.
3. Remove engine cover. See **Removal** .
4. Unscrew oil filler cap.
5. Remove glow plugs. Refer to **Electrical - Ignition Control/Ignition Control/PLUG, Glow - Removal** .

NOTE: Crank engine at crankshaft in direction of rotation of the engine (clockwise).

6. Position cylinder to be tested to ignition Top Dead Center (TDC).

NOTE: Calibrate cylinder leak down tester and remove check valve in screw-in fitting.

7. Connect cylinder leak down tester and refer to **INSPECTING**.

INSPECTING

NOTE: If crankshaft rotates, install retaining lock for crankshaft/ring gear.

1. Pressurize cylinder with compressed air and read off pressure loss at cylinder leak tester. If excessive pressure loss exists, refer to **DETERMINING PRESSURE LOSS**.

NOTE: If the retaining lock is installed, remove it, rotate engine and install lock once again.

2. Carry out test of other cylinders in the firing order of engine.

DETERMINING PRESSURE LOSS

If a great pressure loss was detected, listen using a stethoscope around suspected areas, such as the cylinder head gasket through the air suction area, the exhaust system, the oil filler neck, the pre-chamber, the bore wholes of the cylinder effected or neighboring cylinders. Observe the coolant in the expansion tank, looking for traces of bubbles.

The possible causes of pressure loss are:

- If air leak is detected through the prechamber, cylinder bore hole, from a neighboring cylinder or air bubbles in the coolant expansion tank, pressure loss may be caused by the cylinder head gasket.
- If the air leak occurs in the air suction area, the pressure loss may be caused by the intake valve(s).
- Air leak through the exhaust system, may be caused by the exhaust valve(s).

- Air leak through the oil filler neck, may be caused by piston, ring, or cylinder sleeve.

If none of the above evidence supports a failure, the engine may be assembled and run until operating temperature is reached. Reconnect engine leak down tester on a warm engine with a few drops of clean engine oil in the cylinder being tested. Engine oil seals the clearance between the piston and cylinder for a short length of time. If under this condition a smaller pressure loss occurs for a shorter length of time, it is possible that the cause is piston, ring or cylinder sleeve related.

ENGINE GASKET SURFACE PREPARATION

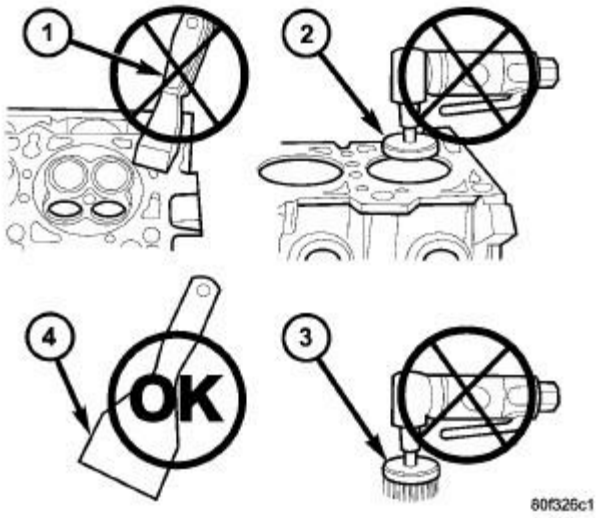


Fig. 2: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- High speed power tool with an abrasive pad or paper to clean cylinder block and head (2).
- High speed power tool with 3M Roloc™ Bristle Disc (white or yellow) (3).

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover.
- Plastic or wood scraper (4).

REMOVAL

ENGINE COVER

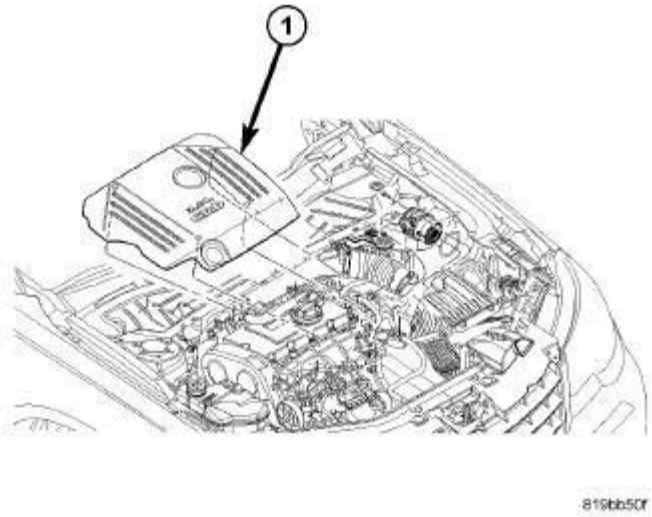


Fig. 3: Engine Cover Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by lifting upwards.

ENGINE

CAUTION: When removing or disconnecting components, plug all inlet/outlet and fluid lines to prevent residual leakage and contamination.

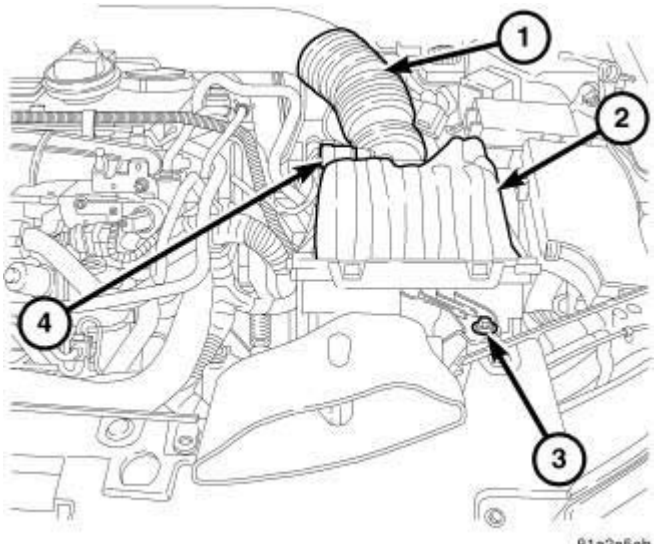


Fig. 4: Air Cleaner Housing
Courtesy of CHRYSLER LLC

1. Remove air cleaner assembly (2).

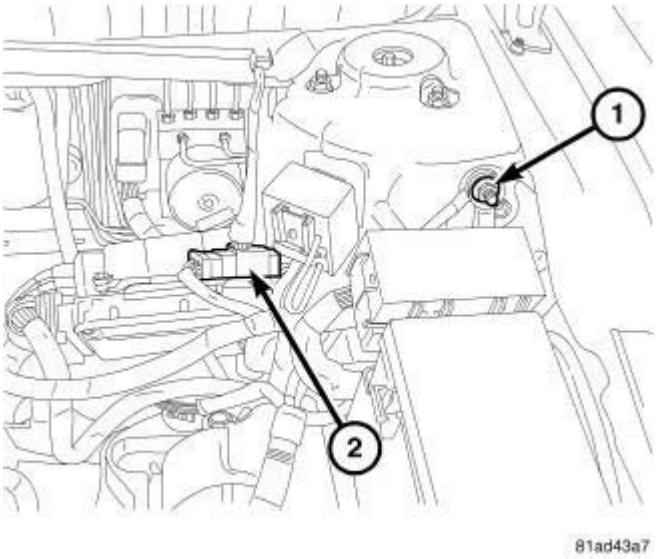


Fig. 5: Battery Cable
Courtesy of CHRYSLER LLC

2. Disconnect negative battery cable (1).

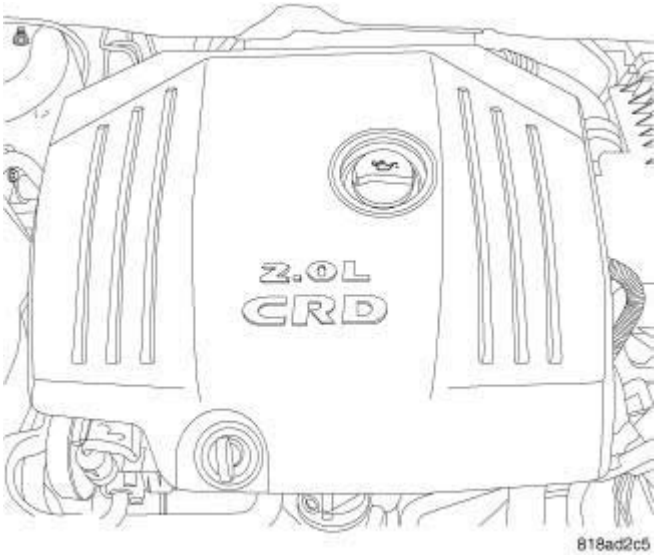


Fig. 6: Engine Cover
Courtesy of CHRYSLER LLC

3. Remove engine cover. See **Removal** .
4. Remove body ground.

5. Disconnect the EGR cooler vacuum line.
6. Disconnect the swirl valve vacuum line.
7. Disconnect the turbocharger vacuum line.
8. Disconnect ECM connector.

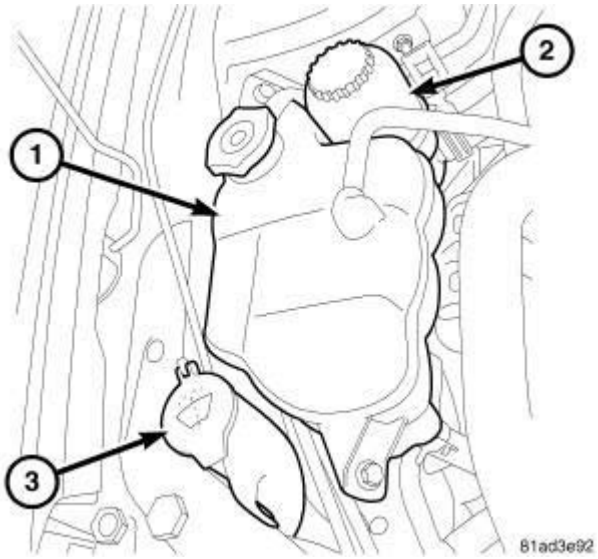


Fig. 7: Coolant Reservoir
Courtesy of CHRYSLER LLC

9. Drain cooling system. Refer to **Cooling - Standard Procedure** .
10. Discharge air conditioning. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
11. Remove cooling module assembly. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
12. Remove coolant recovery reservoir (2).
13. Remove power steering reservoir (3) and reposition.

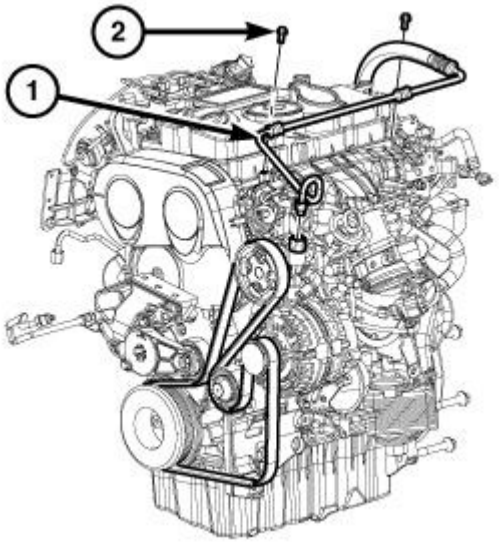


Fig. 8: Pressure Line
Courtesy of CHRYSLER LLC

14. Remove accessory drive belt (5).
15. Remove power steering line support bracket retaining bolt (2).
16. Remove power steering pump (6) and set aside.

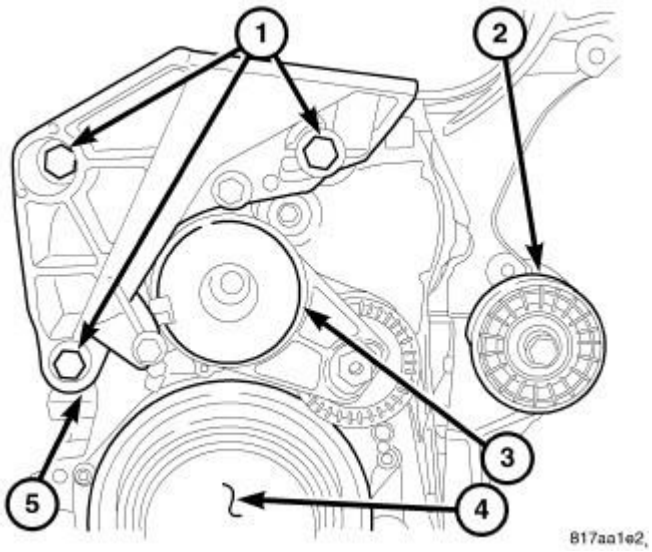


Fig. 9: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

17. Remove accessory drive idler pulley (2).
18. Disconnect electrical connectors at generator.
19. Remove generator.

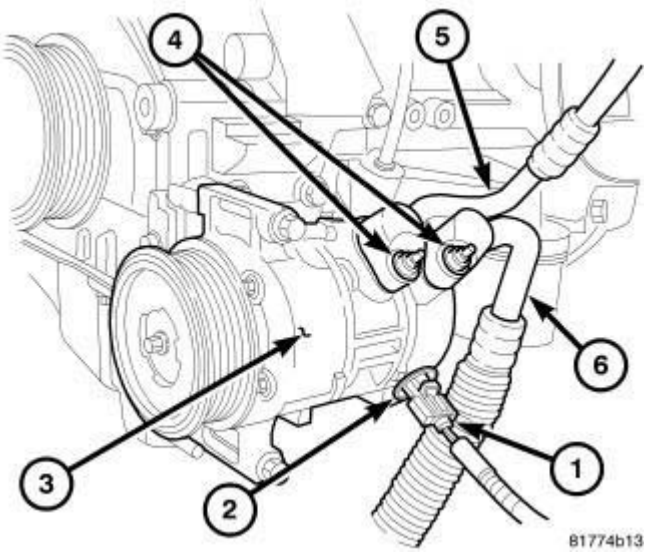


Fig. 10: A/C Compressor-Refrigerant Lines

Courtesy of CHRYSLER LLC

20. Disconnect A/C compressor electrical connector (2).
21. Disconnect A/C lines (4) at the compressor.
22. Remove A/C compressor (3).

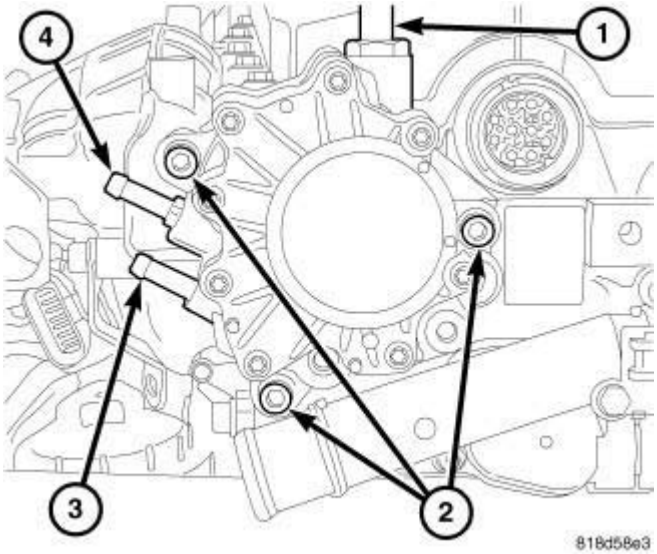


Fig. 11: Tandem Pump
Courtesy of CHRYSLER LLC

23. Disconnect vacuum hose at tandem pump (1).
24. Disconnect heater hoses at engine.
25. Remove air inlet tube from intake manifold.

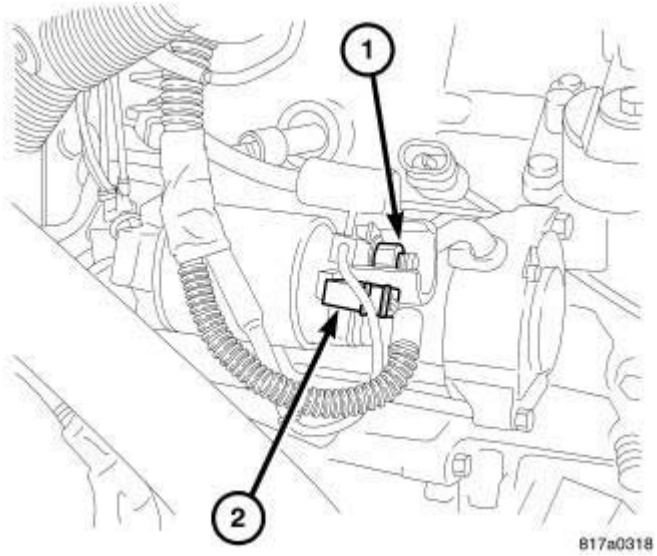


Fig. 12: Starter Electrical
Courtesy of CHRYSLER LLC

26. Disconnect starter electrical connections (1, 2) and remove starter.

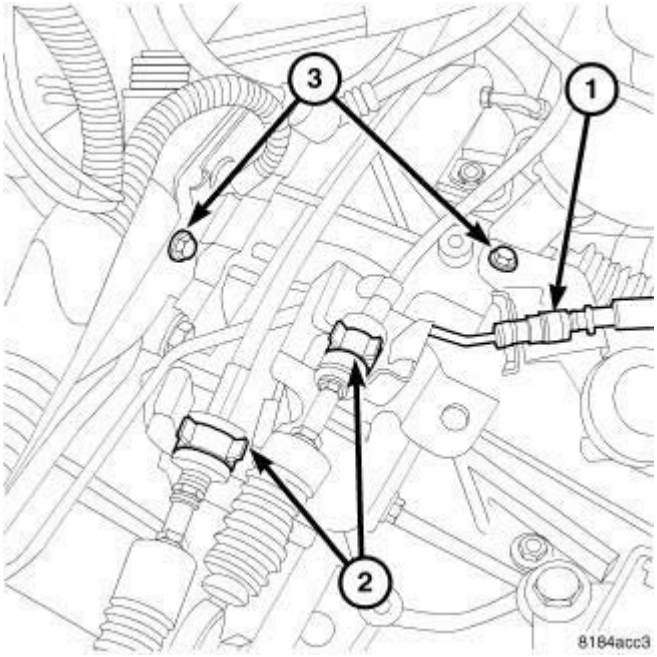


Fig. 13: Hydraulic Line
Courtesy of CHRYSLER LLC

27. Remove shift cables (2) from transaxle.
28. Remove shift cable retaining bracket from transaxle.
29. Disconnect hydraulic clutch line (1).

NOTE: When removing tripod joint, DO NOT let spline or snap ring drag across transaxle oil seal lip.

30. Remove left and right axle shafts. Refer to **Differential and Driveline/Half Shaft - Removal** .

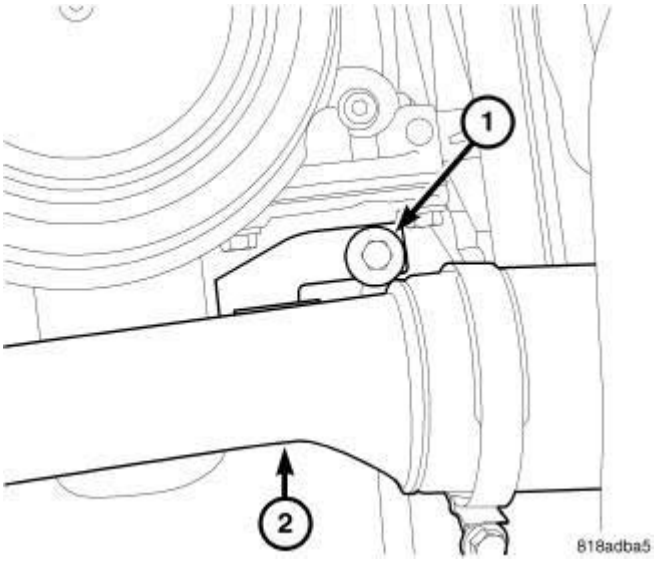


Fig. 14: Air Inlet Tube
Courtesy of CHRYSLER LLC

31. Remove turbocharger inlet and outlet tubes.
32. Remove air tube retaining bolt (1) and remove air inlet tube (2).

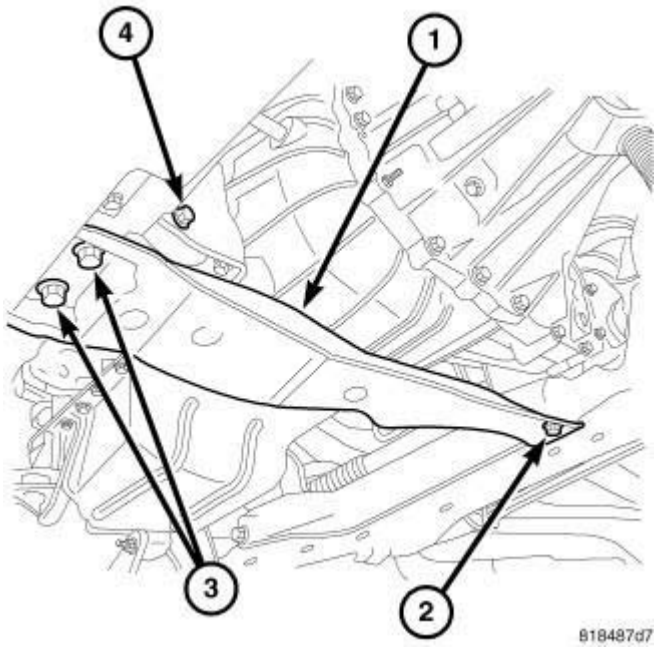


Fig. 15: Transmission Crossmember
Courtesy of CHRYSLER LLC

33. Remove front transaxle mount through bolt (4).
34. Remove fore/aft member retaining bolts (2,3) and remove fore/aft member (1).

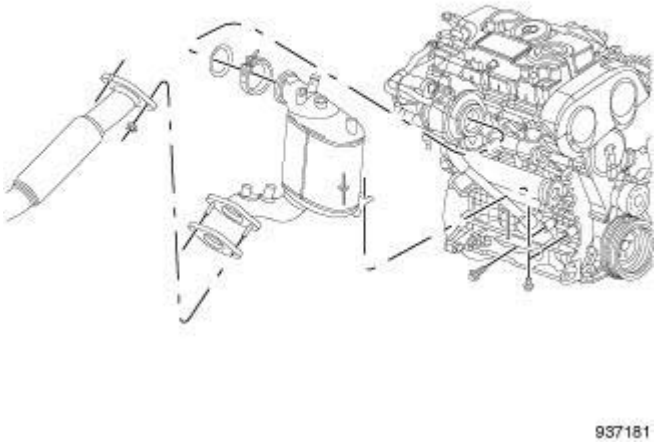


Fig. 16: Catalytic Converter - Diesel
Courtesy of CHRYSLER LLC

35. Disconnect catalytic converter (1) from exhaust pipe.
36. Loosen catalytic converter clamp (2) and remove catalytic converter (1) and gasket (3) from turbocharger.
37. Remove catalytic converter assembly (1).
38. Remove PTU assembly (if equipped).

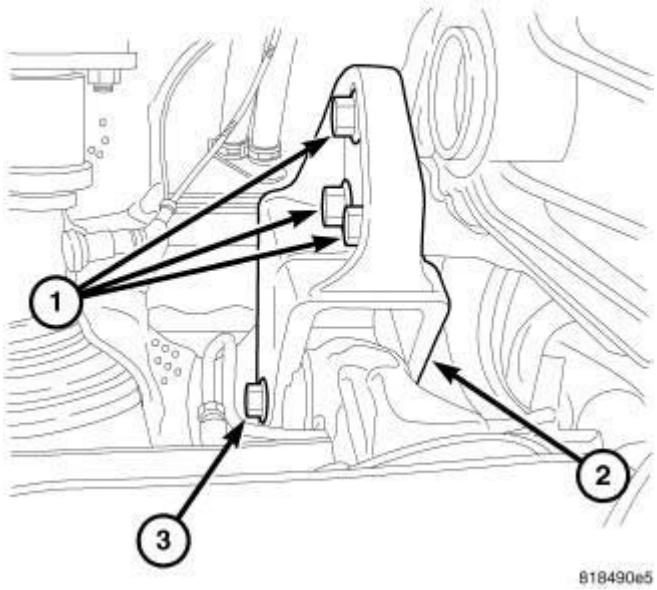


Fig. 17: Rear Mount
Courtesy of CHRYSLER LLC

39. Remove rear engine mount through bolt (3).

40. Remove rear engine mount bracket retaining bolts (1) and remove engine mount bracket (2).
41. Remove rear engine mount.

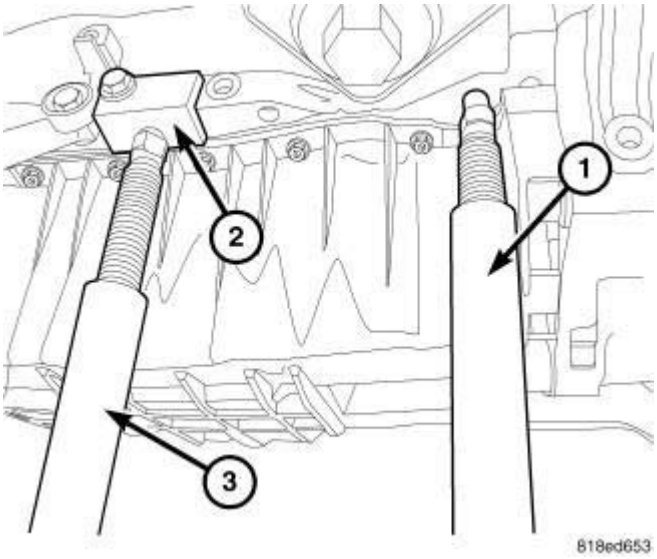


Fig. 18: Engine Cradle Bracket 6973
Courtesy of CHRYSLER LLC

42. Install engine cradle bracket 6973 (2) to engine block.

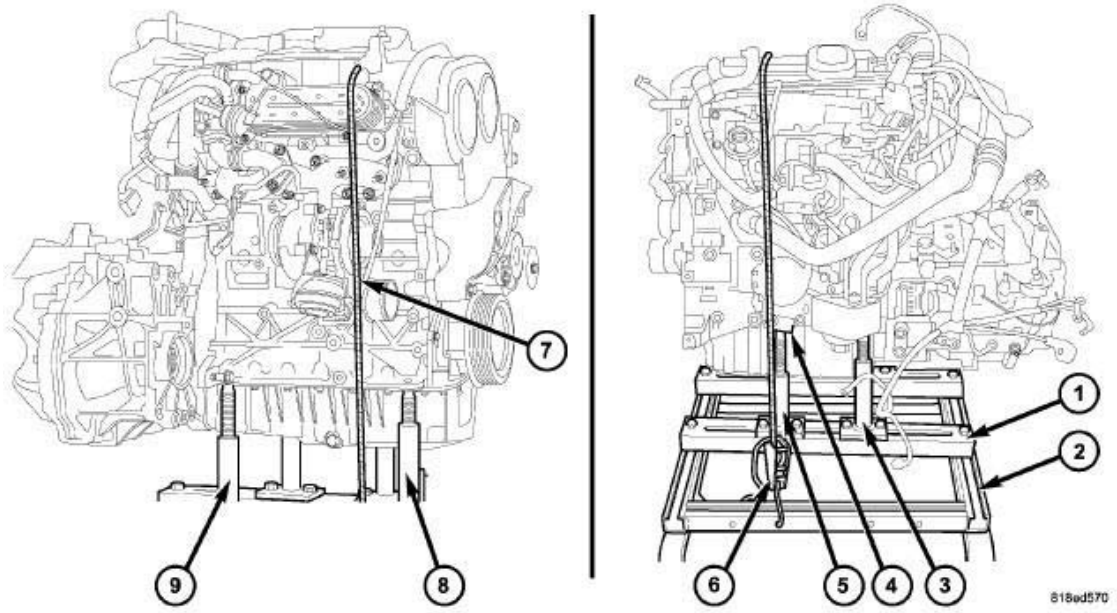


Fig. 19: Engine Dolly
Courtesy of CHRYSLER LLC

43. Lower vehicle and position power train dolly 6135 (2) and engine support cradle 6710A (1) under engine.
44. Position the engine cradle support and dolly with the support posts 6710A (3,5,8,9) underneath the

engine.

45. Carefully lower the vehicle enough to position the engine above the support posts.
46. Adjust the height of each support post as necessary and tighten the support posts and cradle fasteners.

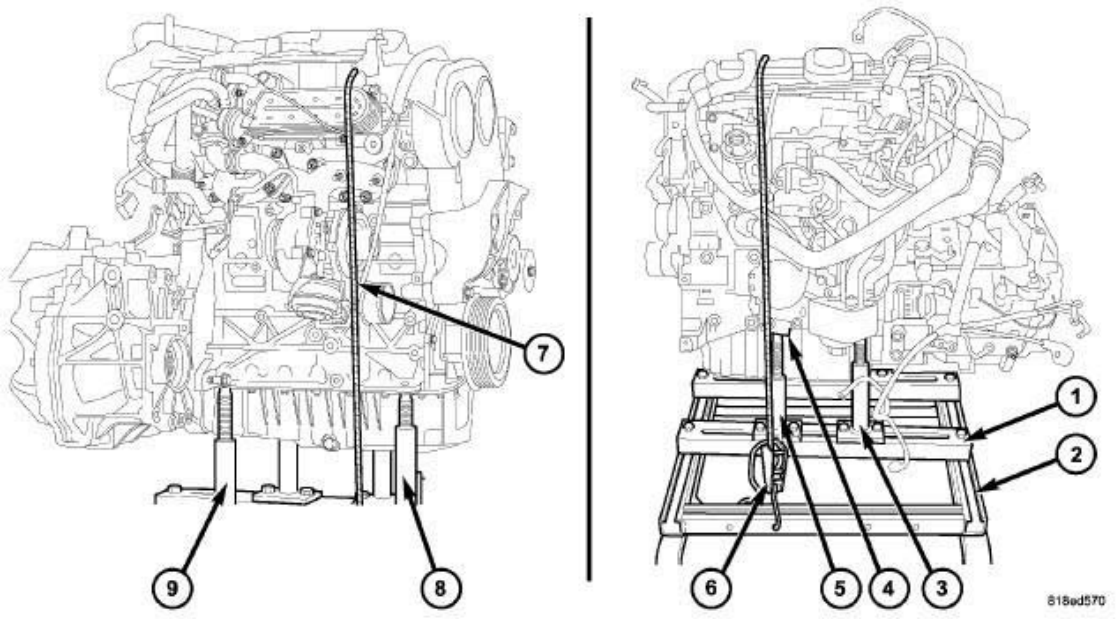


Fig. 20: Engine Dolly
Courtesy of CHRYSLER LLC

47. Carefully lower vehicle enough to seat engine onto support posts.

WARNING: Safety straps must be used to secure engine to the dolly fixture.

48. Install, tighten and lock safety straps (6,7) around engine and attach them to the cradle.
49. Lower vehicle so that only the weight of the engine and transmission assembly is on dolly fixture.

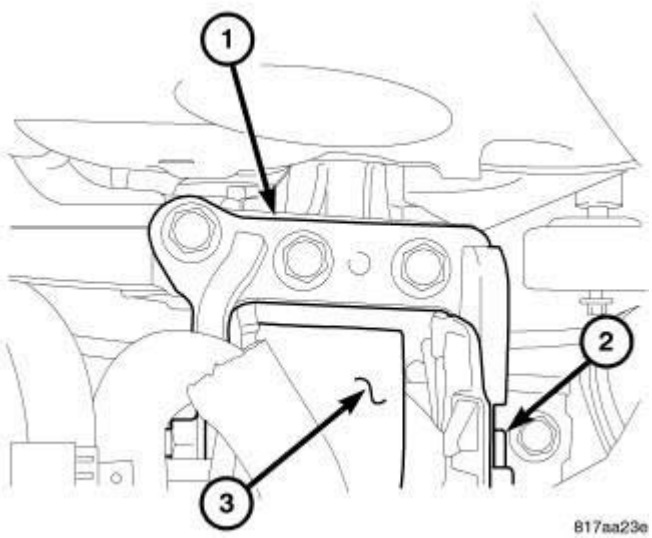


Fig. 21: Right Engine Mount
Courtesy of CHRYSLER LLC

50. Remove right mount (1) to engine bracket retaining bolts.

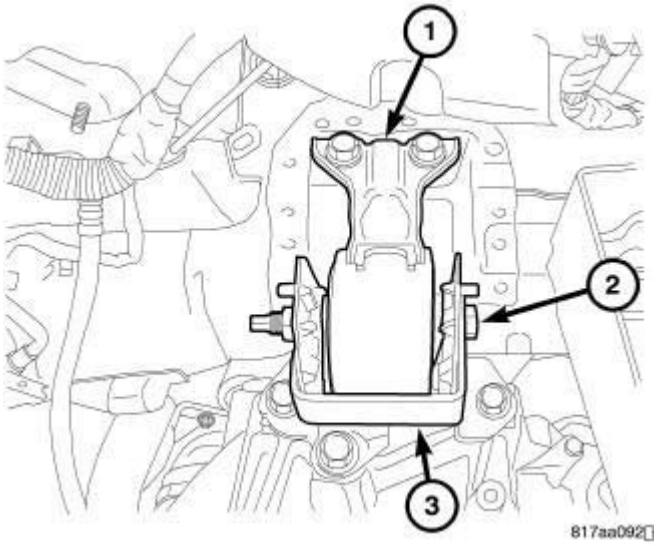


Fig. 22: Left Engine Mount
Courtesy of CHRYSLER LLC

51. Remove left mount (3) to transaxle retaining bolts.

CAUTION: It may be necessary to adjust the engine and transmission assembly, with the dolly fixture attached, to successfully clear the engine compartment.

52. While watching for obstructions, slowly raise the vehicle until the engine and transmission assembly clear

the engine compartment.

53. Separate engine and transmission.

INSTALLATION

ENGINE COVER

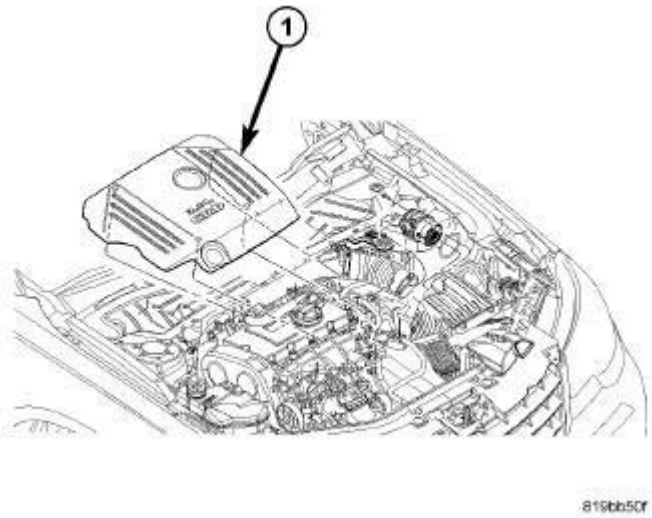


Fig. 23: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

1. Align engine cover (1) with mounting retainers.
2. Firmly press cover onto mounting studs.

ENGINE

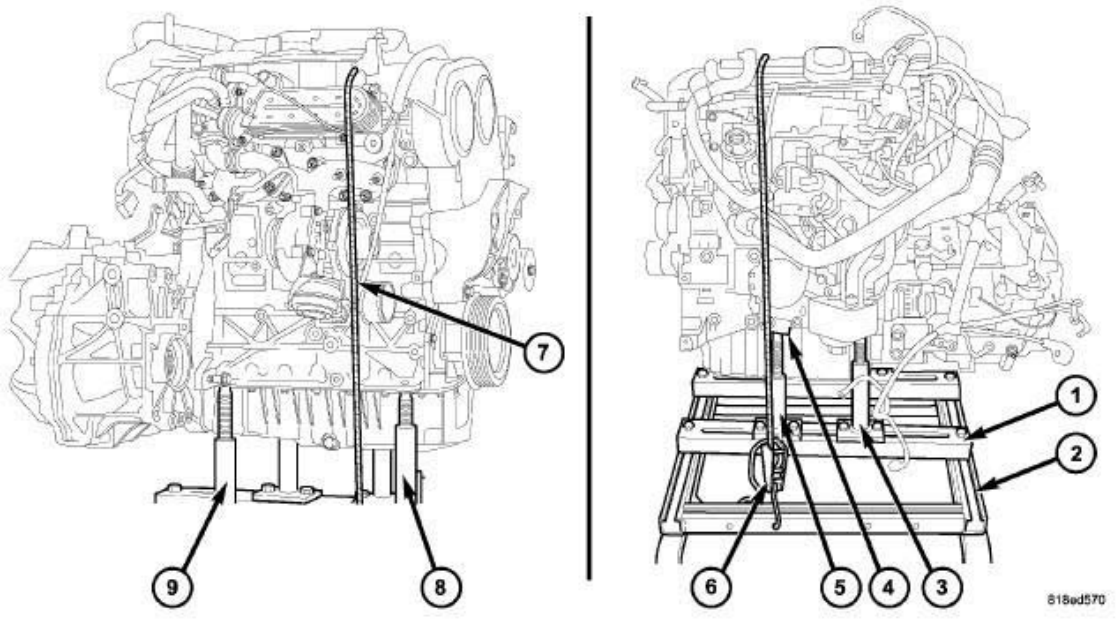


Fig. 24: Engine Dolly
Courtesy of CHRYSLER LLC

WARNING: Safety straps must be used to secure engine to the dolly fixture.

1. Seat engine onto fixture support posts then install safety straps (6,7) around engine, securing it to the cradle.
2. Position the engine and transmission assemblies below vehicle engine compartment.

CAUTION: It may be necessary to adjust the engine and transmission assembly, with the dolly fixture attached, to successfully clear the engine compartment.

3. While watching for obstructions, slowly lower the vehicle until the engine and transmission assembly clearly fit the engine compartment.

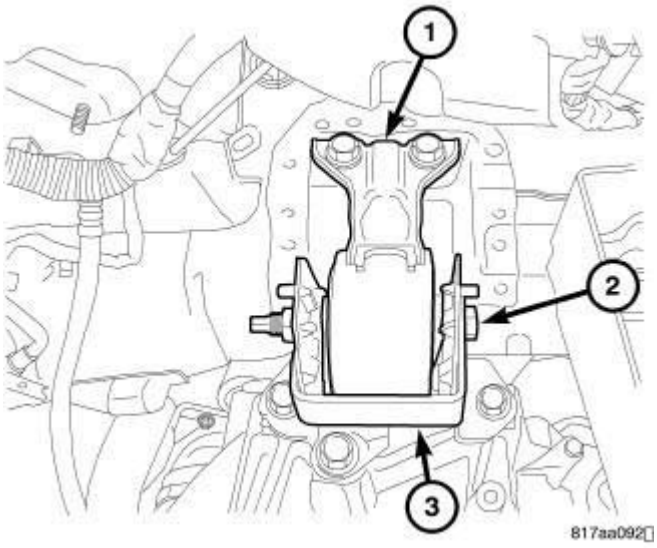


Fig. 25: Left Engine Mount
Courtesy of CHRYSLER LLC

4. Install left mount bracket (3) to transaxle retaining bolts and tighten to 65 N.m (50 ft. lbs.).

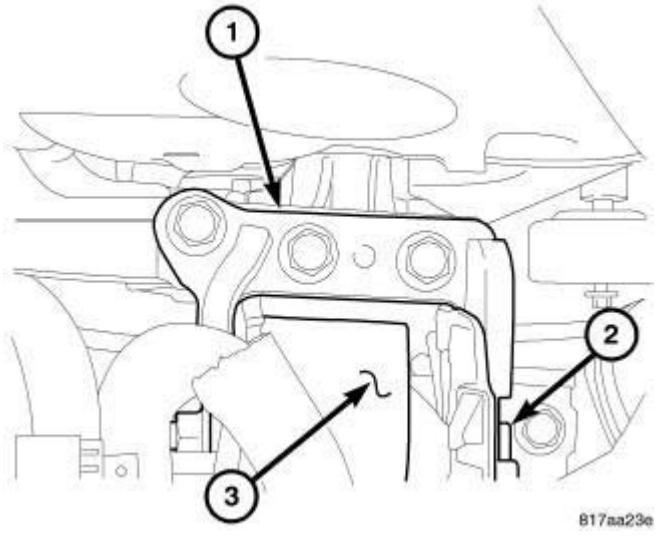


Fig. 26: Right Engine Mount
Courtesy of CHRYSLER LLC

5. Install right mount bracket (1) to frame rail retaining bolts and tighten to 65 N.m (50 ft. lbs.).

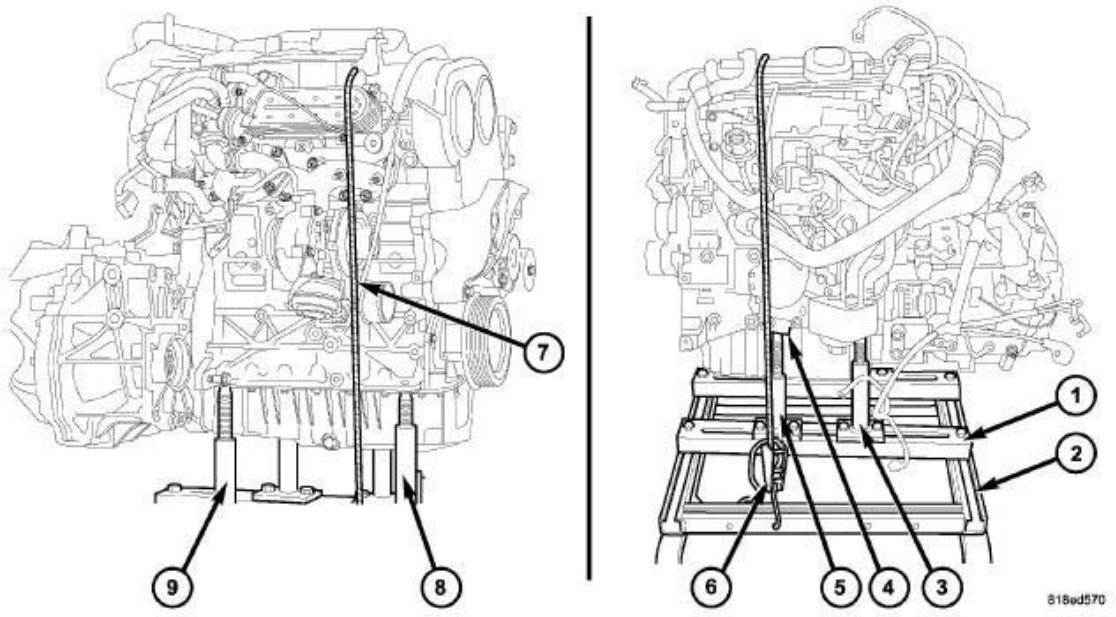


Fig. 27: Engine Dolly
Courtesy of CHRYSLER LLC

6. Remove safety straps (6,7) and remove dolly fixture
7. Carefully raise the vehicle enough to clear the cradle and support post.
8. Install catalytic converter loosely with new seal.
9. If equipped, install PTU.
10. Place a suitable jack under transaxle and raise engine/trans assembly.
11. Install exhaust to PTU mount.

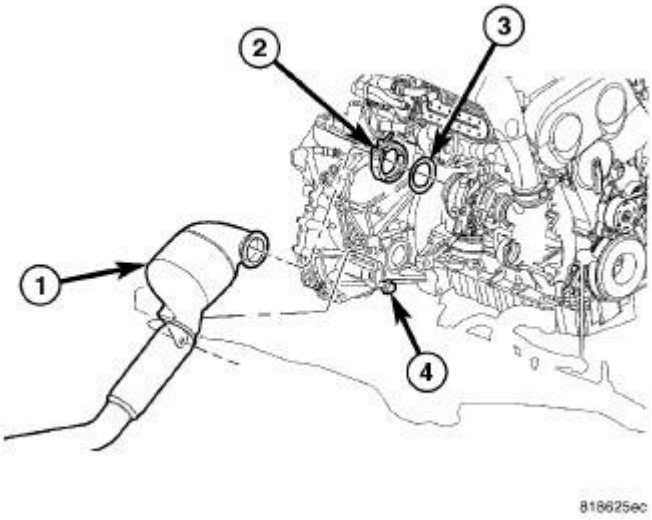


Fig. 28: Catalytic Converter - Diesel

Courtesy of CHRYSLER LLC

12. Install catalytic converter band clamp (2) and tighten.
13. Install power steering hose clamp to exhaust manifold.
14. Install PTU to block support bracket.

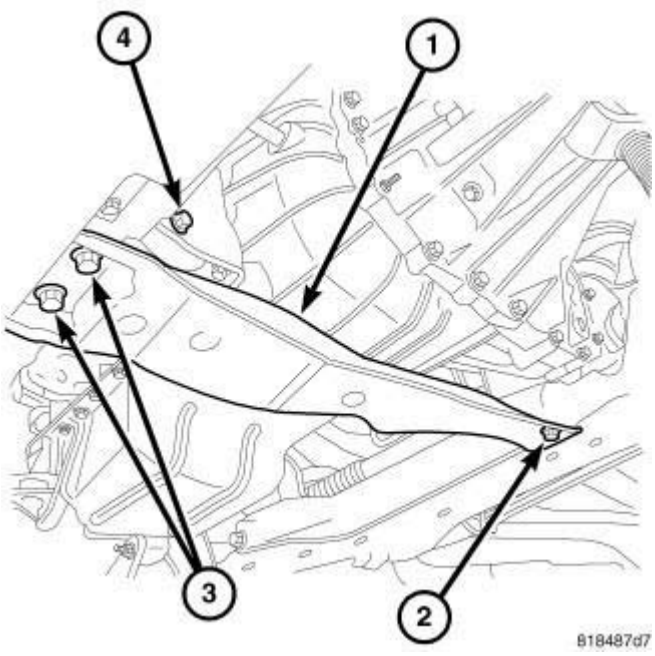


Fig. 29: Transmission Crossmember
Courtesy of CHRYSLER LLC

15. Install rear mount bracket to cradle.
16. Install front transaxle mount bracket to transaxle.
17. Install fore/aft member (1).

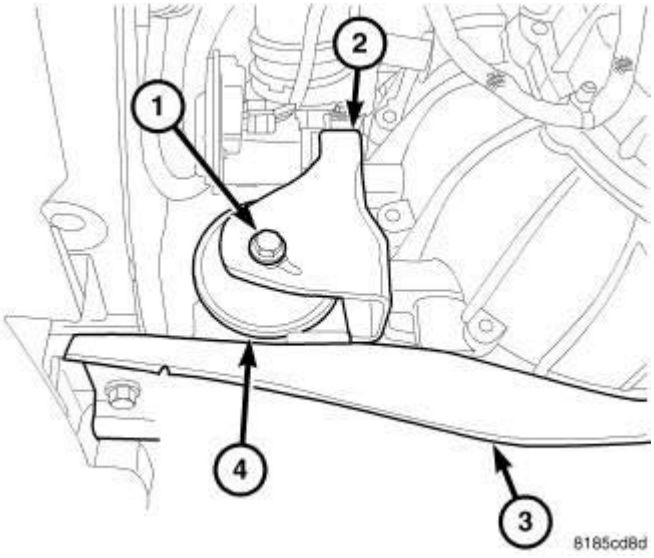


Fig. 30: Front Mount Through Bolt
Courtesy of CHRYSLER LLC

18. Install front mount through bolt (1) and tighten.
19. Install turbo outlet pipe.
20. Install axle shafts. Refer to **Differential and Driveline/Half Shaft - Installation** .
21. Install turbo inlet pipe from air cleaner to turbocharger.
22. Install charge air hose from inter cooler to throttle body.
23. Install shift cables.

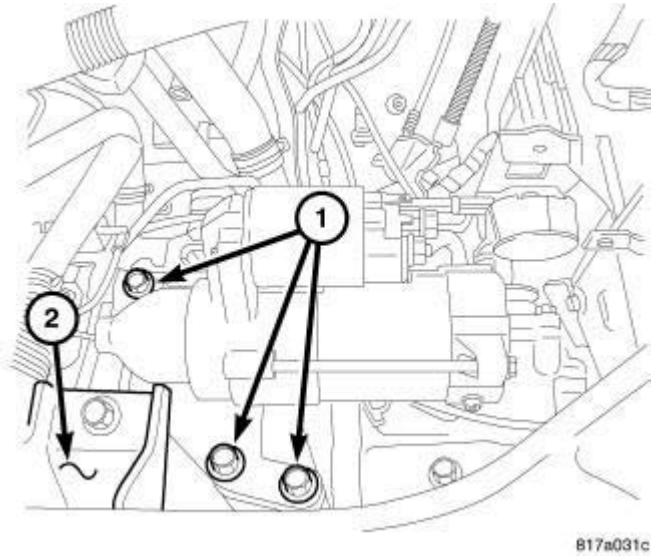


Fig. 31: Starter Bolts
Courtesy of CHRYSLER LLC

24. Position starter and install starter mounting bolts (1).

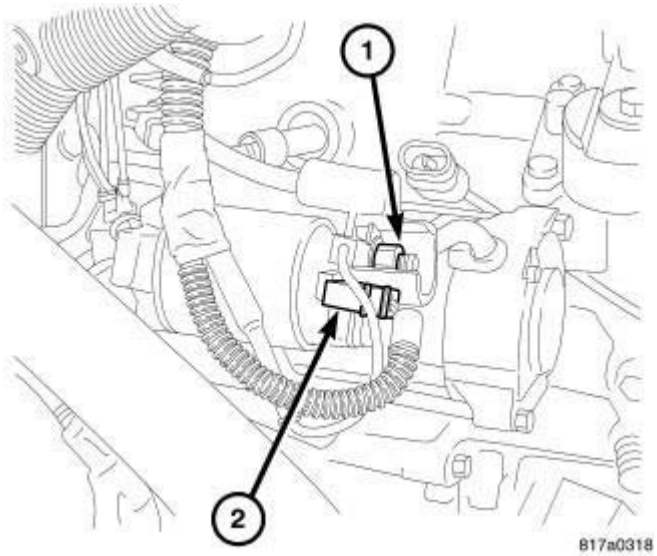


Fig. 32: Starter Electrical
Courtesy of CHRYSLER LLC

25. Connect starter electrical connectors.
26. Install vacuum harness and coolant tube.
27. Connect fuel lines near head.
28. Connect vacuum hose to brake booster.

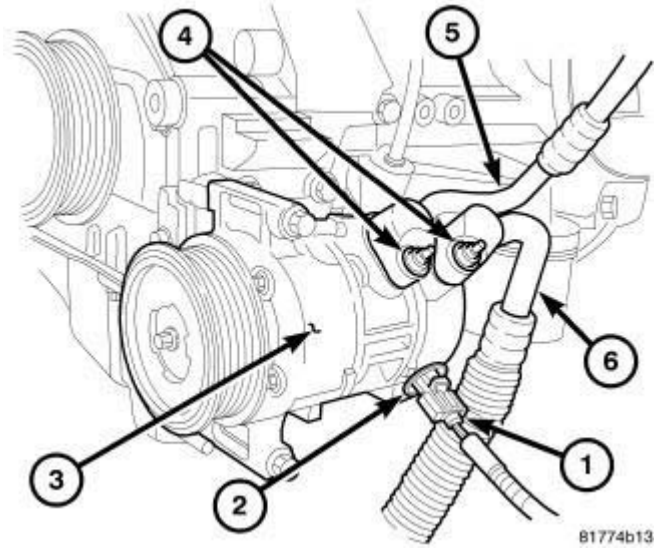


Fig. 33: A/C Compressor-Refrigerant Lines
Courtesy of CHRYSLER LLC

29. Install A/C compressor (3) and connect A/C lines (4).
30. Connect engine wiring harness connectors.
31. Install generator and connect electrical connectors.

32. Install serpentine belt tensioner and install serpentine belt.

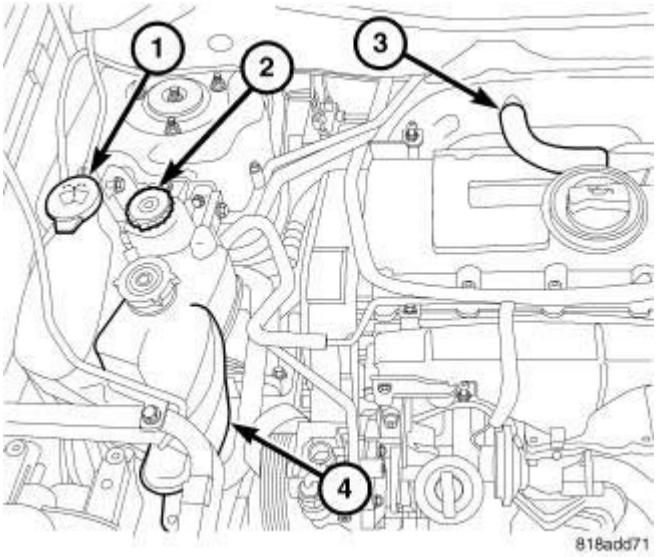


Fig. 34: Coolant Reservoir
Courtesy of CHRYSLER LLC

33. Install coolant reservoir (4).
34. Install coolant module, connect cooling fan connectors.
35. Connect upper and lower radiator hoses.
36. Connect charge air hoses to intercooler.
37. Connect A/C lines to condenser and connect electrical connectors.
38. Fill engine with coolant. Refer to **Cooling - Standard Procedure** .

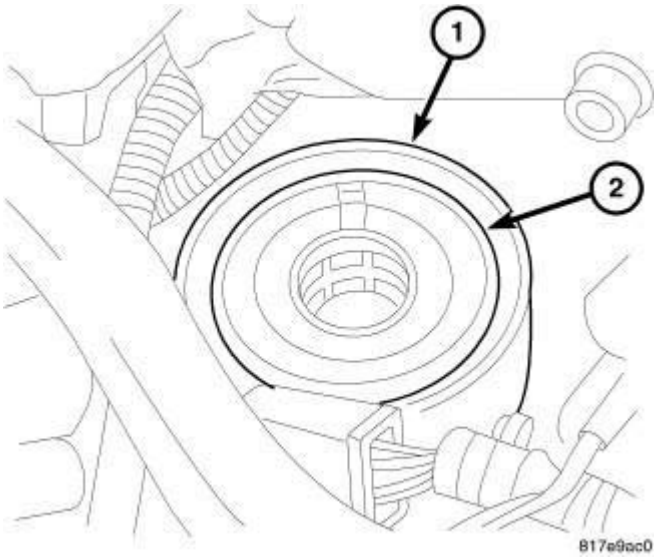


Fig. 35: Filter In Housing
Courtesy of CHRYSLER LLC

39. Install new oil filter (2) and fill engine with oil.

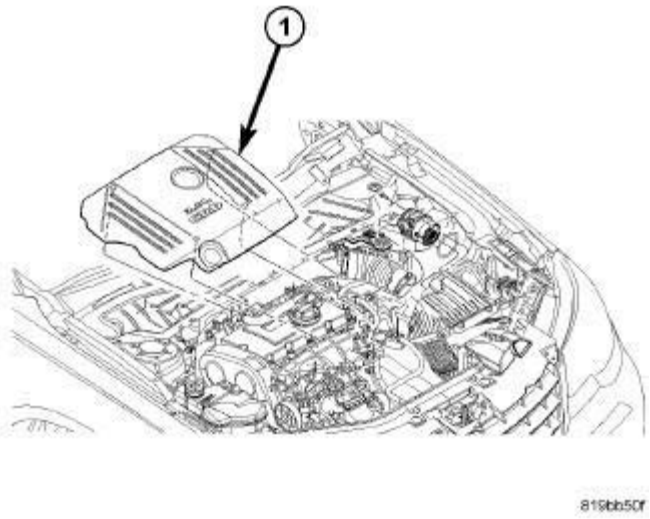


Fig. 36: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system. Failure to follow this caution will result in serious A/C compressor damage.

40. Evacuate the refrigerant system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
41. Charge the refrigerant system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
42. Install engine cover (1).
43. Start engine and check for leaks.

SPECIFICATIONS

2.0L DIESEL ENGINE

GENERAL

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Type	In-Line OHV, DOHC	
Number of Cylinders	4	
Firing Order	1 - 3 - 4 - 2	
Compression Ratio	18.5:1	

Max. Variation Between Cylinders	25%	
Displacement	2.0 L	122 CID
Bore	81.0 mm	3.188 in
Stroke	95.5 mm	3.759 in.

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Material	Cast Iron	
Cylinder Bore Diameter	81.01 mm	3.189 in.
Cylinder Bore Diameter Out-of-Round (Max.)	0.10 mm	0.003 in.
Cylinder Bore Diameter Taper (Max.)	0.10 mm	0.003 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Piston Diameter	80.96 mm	3.187 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Ring Gap-Top Compression Ring	0.20 - 0.40 mm	0.007 - 0.015 in.
Wear Limit	1.0 mm	0.039 in.
Ring Gap - 2nd Compression Ring	0.20 - 0.40 mm	0.007 - 0.015 in.
Wear Limit	1.0 mm	0.039 in.
Ring Gap - Oil Scraper	0.20 - 0.50 mm	0.007 - 0.019 in.
Wear Limit	1.0 mm	0.039 in.
Ring Side Clearance-Top Compression	0.06 - 0.09 mm	0.002 - 0.003 in.
Wear Limit	0.25 mm	0.009 in.
Ring Side Clearance -2nd Compression Ring	0.05 - 0.08 mm	0.001 - 0.003 in.
Wear Limit	0.25 mm	0.009 in.
Ring Side Clearance - Oil Scraper	0.03 - 0.06 mm	0.001 - 0.002 in.
Wear Limit	0.15 mm	0.005 in.

CONNECTING ROD

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Bearing Clearance	0.03 - 0.08 mm	0.001 - 0.003 in.

Side Clearance	0.37 mm	0.014 in.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Connecting Rod Journal Diameter	50.878 - 50.942 mm	2.003 - 2.005 in.
Main Bearing Journal Diameter	53.978 - 54.042 mm	2.125 - 2.127 in.
End Play	0.07 - 0.17 mm	0.002 - 0.006 in.
Wear Limit	0.37 mm	0.014 in.
Main Bearing Clearance	0.03 - 0.08 mm	0.001 - 0.003 in.
Wear Limit	0.17 mm	0.006 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
End Play - Max	0.15 mm	0.005 in.

VALVE GUIDE

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Stem to Guide Clearance - Max	1.3 mm	0.051 in.

NOTE:

Insert new valve into guide. The end of the valve stem must be flush with guide. Use only inlet valve in inlet guide and exhaust valve in exhaust guide. Determine rock. Cylinder head must be renewed if rock exceeds wear limit.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Face Angle - Intake and Exhaust	45°	45°
Head Diameter - Intake	29.40 mm	1.157 in.
Head Diameter - Exhaust	25.50 mm	1.003 in.
Valve Length (Overall)	-	-
Intake	88.50 mm	3.484 in.
Exhaust	88.20 mm	3.472 in.
Valve Stem Diameter	-	-
Intake	5.980 mm	0.235 in.
Exhaust	5.965 mm	0.234 in.

VALVE STEM TO GUIDE CLEARANCE

DESCRIPTION	SPECIFICATION	
	Metric	Standard

Intake Max. Allowable	- 1.3 mm	- 0.051 in.
Exhaust Max. Allowable	- 1.3 mm	- 0.051 in.

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
At Curb Idle Speed*	0.55 bar	8 psi
At 2000 RPM	2.0 bar	29 psi
Max Oil Pressure	7.0 bar	101 psi

CAUTION:
***If pressure is ZERO at curb idle, DO NOT run engine at 2000 RPM.**

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Accessory Bracket-Bolts	45	33	-
Accessory Drive Belt Tensioner-Bolt	25	-	221
Bearing Frame-Bolts	20	-	177
Cable Retainer-Bolts	10	-	89
Camshaft Hub-Bolt	100	74	-
Camshaft Position Sensor-Bolt	10	-	89
Camshaft Sprocket-Bolt	25	-	221
Connecting Rod Cap-Bolts	30 + 90°	22 + 90°	-
Crankshaft Main Bearing Cap-Bolts	65 + 90°	48 + 90°	-
Crankshaft Damper-Bolt	10 + 90°	-	89 + 90°
Crankshaft Position Sensor-Bolt	5	-	44
Crankshaft Front Sealing Flange-Bolts	15	-	133
Crankshaft Rear Sealing Flange-Bolts	15	-	133
Crankshaft Sprocket	120 + 90°	89 + 90°	-
Cylinder Head-Bolts	Refer to Procedure		
Cylinder Head Cover-Bolts	10	-	89
Engine Support Bracket-Bolts	45	33	-
Exhaust Gas Recirculation Valve-Bolts	10	-	89
Exhaust Gas Recirculation Valve Tube-Bolts	20	-	177
Exhaust Manifold-Nuts	25	-	221
Exhaust Manifold Heat Shield-Bolts	25	-	221
Flywheel-Bolts	60 + 90°	44 + 90°	-
Fuel Pump-Bolts	20	-	177
Glow Plugs	10	-	89

Injector-Bolts	3 + 90° +180°	-	27 + 90° +180°
Intake Manifold-Bolts	20	-	177
Intake Manifold Flap-Bolts	10	-	89
Oil Cooler Connector Bolt	25	-	221
Oil Filter Cover	25	-	221
Oil Filter Housing-Bolts	15 + 90°	-	133 + 90°
Oil Pan-Bolts	15	-	133
Oil Pan Drain-Plug	30	22	-
Oil Pump-Bolts	15	-	133
Oil Pump Drive Chain Tensioner-Bolt	15	-	133
Oil Pump Pick-up Tube-Bolts	15	-	133
Oil Pump Sprocket-Bolt	22 + 90°	-	195 + 90°
Oil Spray Jet-Bolt	25	-	221
Rocker Arm Shaft-Bolts	20 + 90°	-	177 + 90°
Thermostat Housing-Bolts	15	-	133
Timing Belt Covers	10	-	89
Timing Belt Tensioner Assembly-Nut	20 + 45°	-	177 + 45°
Timing Belt Idler Upper Pulley-Bolt	40 + 90°	30 + 90°	-
Timing Belt Idler Lower Pulley-Nut	20	-	177

SPECIAL TOOLS

2.0L DIESEL

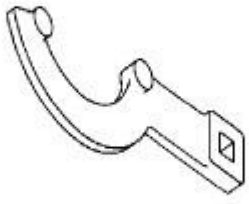


Fig. 37: Camshaft Hub Holder 9880
Courtesy of CHRYSLER LLC

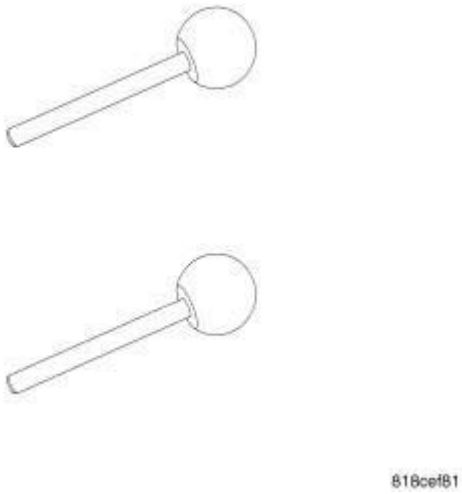


Fig. 38: Camshaft Locking Pins 9882
Courtesy of CHRYSLER LLC

Fig. 39: Cam Seal Installer 9884
Courtesy of CHRYSLER LLC

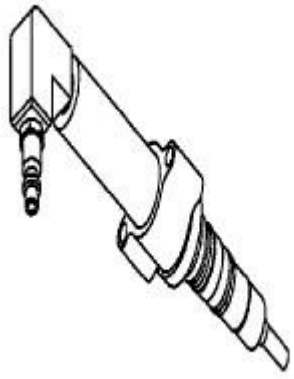


Fig. 40: Compression Adapter 9889
Courtesy of CHRYSLER LLC

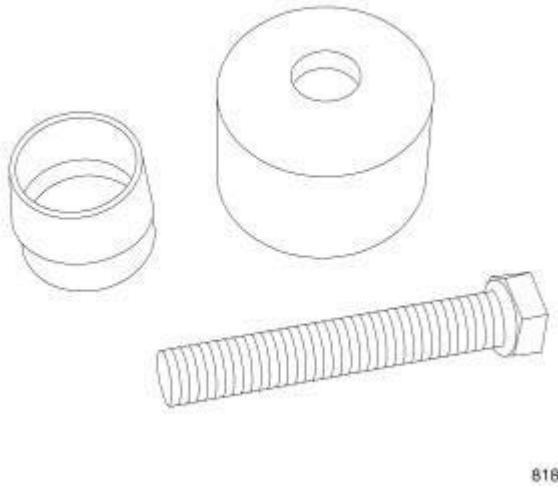


Fig. 41: Crankshaft Front Oil Seal Installer 9884
Courtesy of CHRYSLER LLC

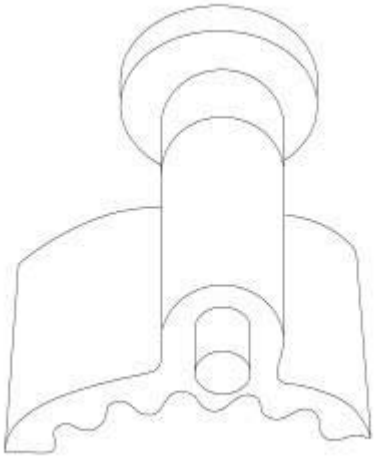


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Fig. 42: Crankshaft Lock 9883
Courtesy of CHRYSLER LLC

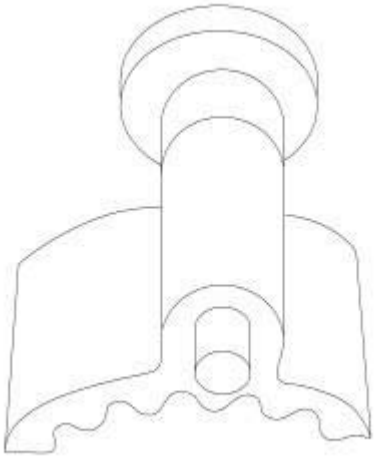

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Fig. 43: Crankshaft Lock 10122
Courtesy of CHRYSLER LLC

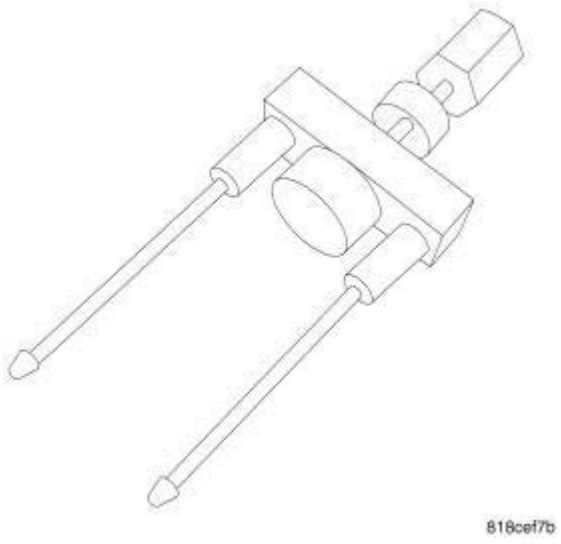

Fig. 44: Injector Remover 9887
Courtesy of CHRYSLER LLC

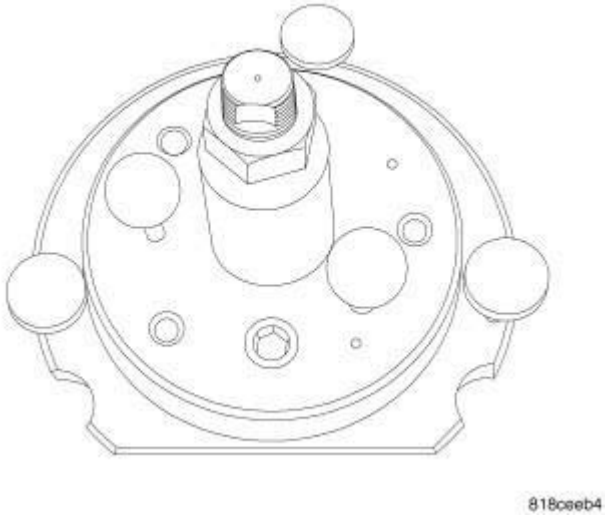

Fig. 45: Rear Main Seal Installer 9888
Courtesy of CHRYSLER LLC

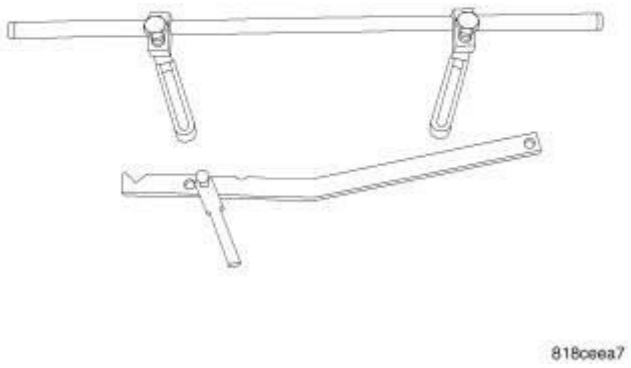

Fig. 46: Valve Spring Remover Installer 9916
Courtesy of CHRYSLER LLC

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

The aluminum cylinder head is a two piece design. It consists of the cylinder head and a bearing frame.

The cylinder head is a cross flow type design with 4 valves per cylinder. The valves are installed vertically.

The bearing frame is used to mount the camshafts and provides mounting of the central power supply connector. It also provides mounting for the injector rocker shaft.

REMOVAL

REMOVAL

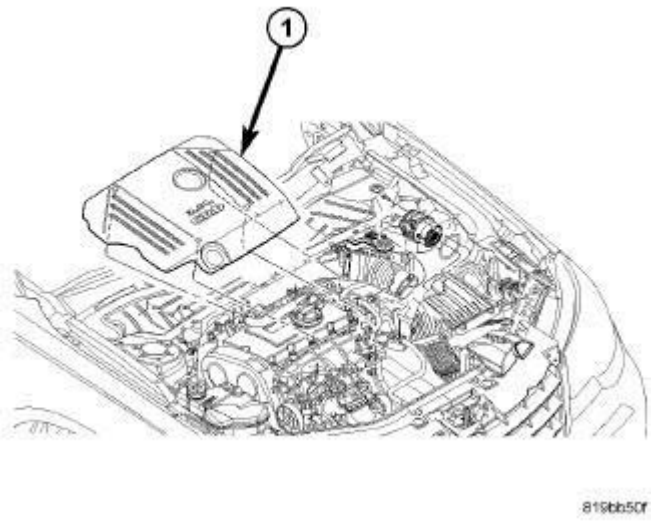

Fig. 47: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove engine cover (1).

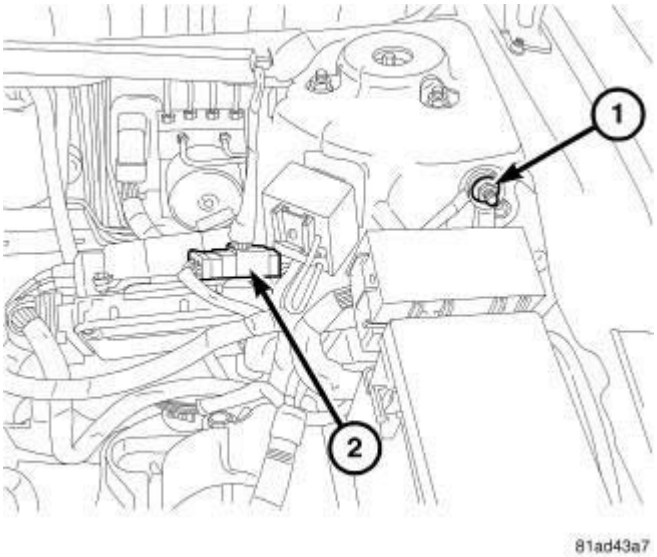

Fig. 48: Battery Cable
Courtesy of CHRYSLER LLC

2. Disconnect negative battery cable (1).

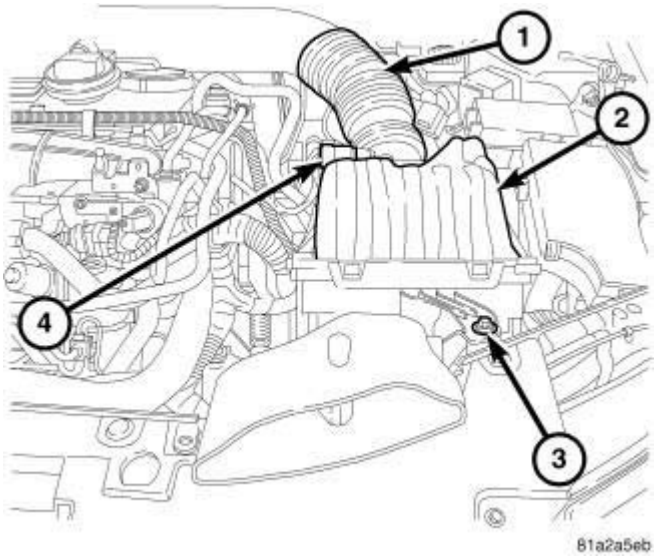

Fig. 49: Air Cleaner Housing
Courtesy of CHRYSLER LLC

3. Disconnect MAF sensor electrical connector (4).
4. Remove clean air tube (1).
5. Remove air cleaner housing (2).

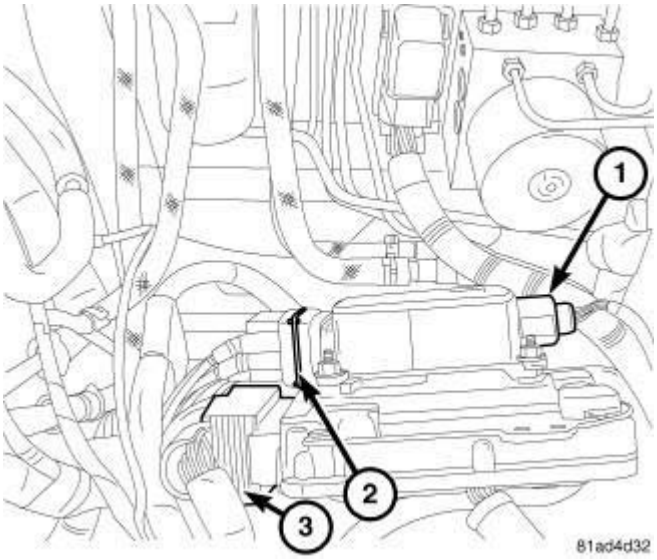

Fig. 50: Vacuum Solenoid Connectors
Courtesy of CHRYSLER LLC

6. Remove electrical connector (1) and set aside.
7. Remove vacuum harness (3) and set aside.
8. Disconnect brake booster vacuum line.

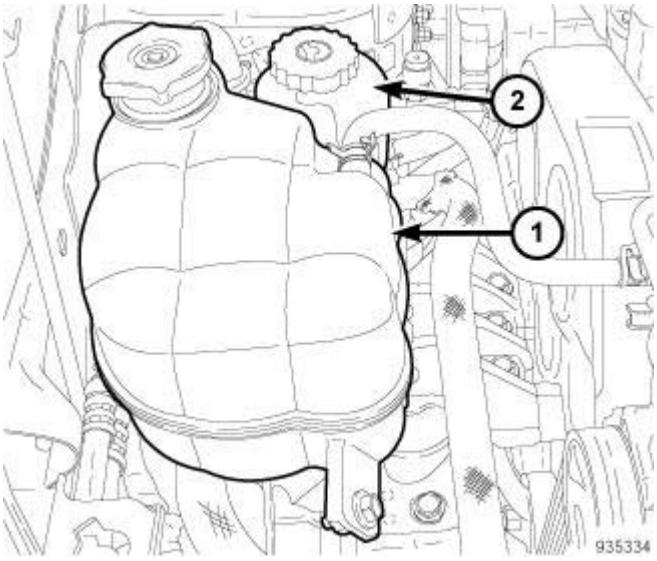

Fig. 51: Coolant Reservoir
Courtesy of CHRYSLER LLC

WARNING: Risk of injury to skin and eyes from scalding coolant. Do not open cooling system unless temperature is below 90°c (194°F). Open cap slowly to release pressure. Store coolant in approved container only. Wear protective gloves, clothing and eye wear.

9. Drain coolant.
10. Remove coolant tube from reservoir (1).
11. Remove coolant reservoir (4).

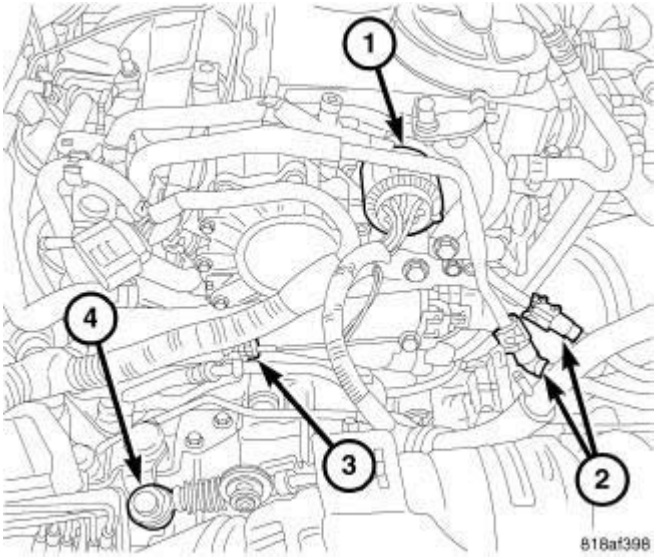

Fig. 52: Fuel Pump-High Pressure
Courtesy of CHRYSLER LLC

12. Disconnect injector harness connector (1) at cylinder head.
13. Remove fuel line retaining bracket.

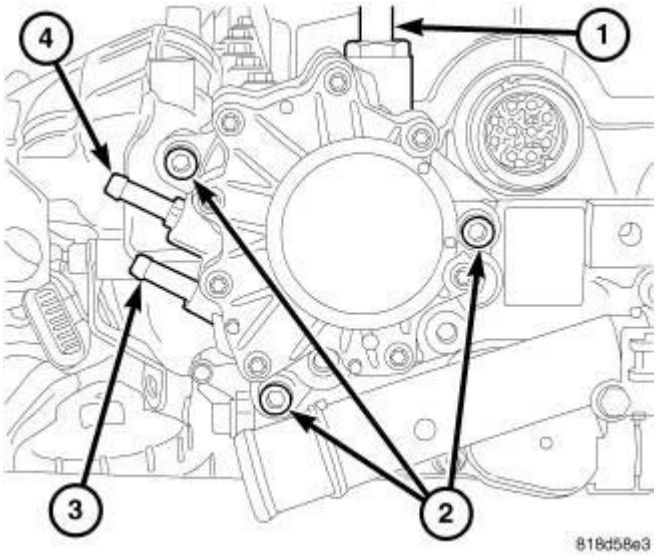

Fig. 53: Tandem Pump
Courtesy of CHRYSLER LLC

NOTE: Place rags below pump to catch fuel spillage.

14. Drain fuel from the injection system prior to removing fuel pump. Refer to **Fuel System/Fuel Injection - Standard Procedure** .
15. Disconnect vacuum line (1) from pump.
16. Disconnect fuel lines (3,4) from pump.
17. Remove fuel pump retaining bolts (2) and remove pump.
18. Disconnect coolant hose near fuel pump.
19. Remove upper radiator hose at cylinder head.
20. Disconnect engine electrical connectors.
21. Remove air inlet hose from throttle body.
22. Raise vehicle.
23. Remove right splash shield.
24. Remove turbo outlet pipe retaining bolt (1) and remove pipe (2).
25. Remove turbo inlet pipe.
26. Remove power steering hose support bracket at exhaust manifold. Refer to **Steering/Pump/HOSE, Power Steering - Removal** .
27. Remove EGR cooler.

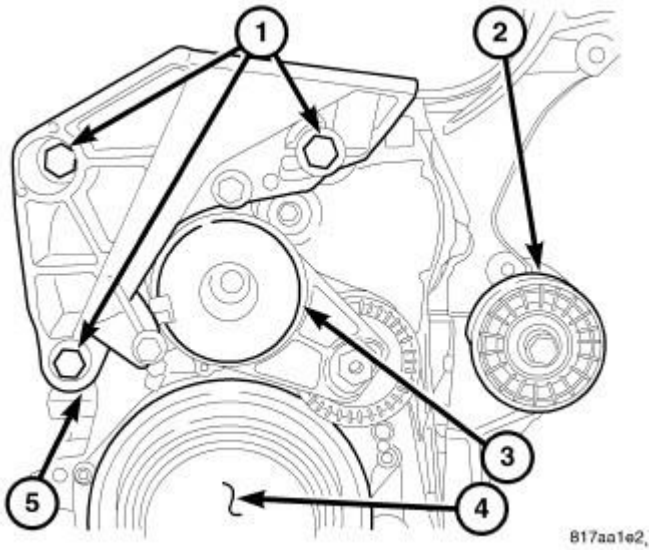

Fig. 54: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

28. Remove accessory drive belt.
29. Remove balancer (4).

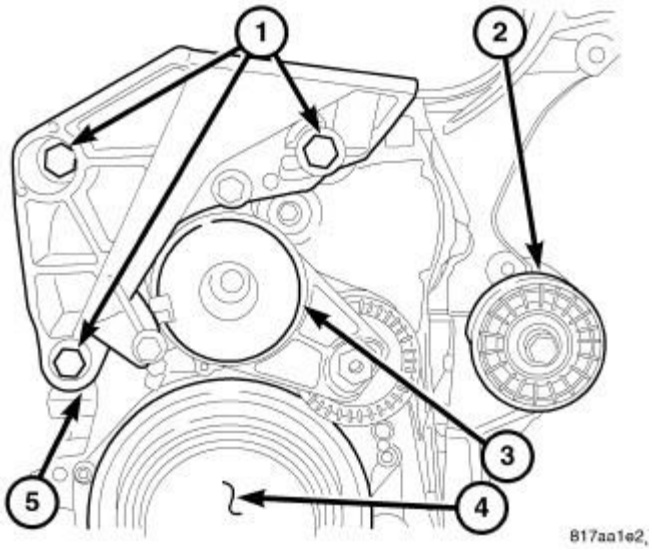

Fig. 55: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

30. Remove right engine mount bracket (5) lower bolt.
31. Lower vehicle.

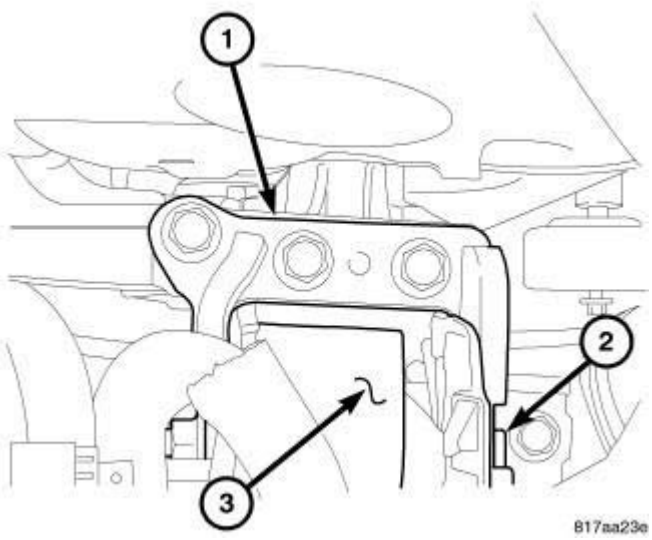

Fig. 56: Right Engine Mount
Courtesy of CHRYSLER LLC

32. Support oil pan with a suitable jack.
33. Remove right engine mount through bolt (2).
34. Remove right engine mount bracket (1).
35. Remove right engine mount (3).

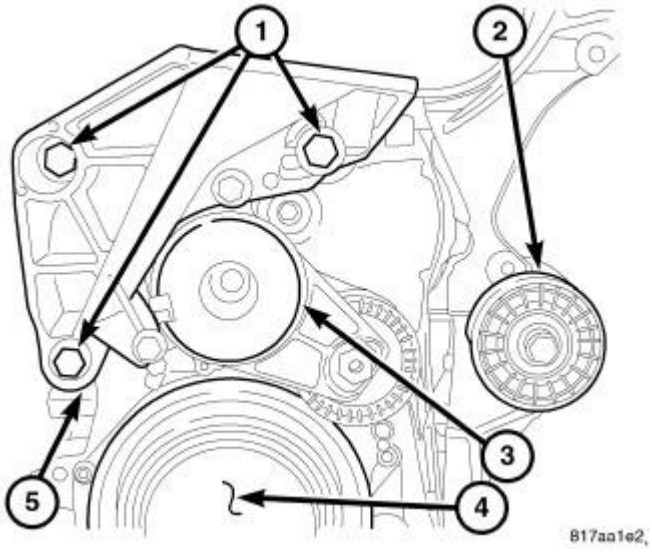

Fig. 57: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

36. Remove accessory drive belt tensioner (3).
37. Remove the remaining engine mounting bracket retaining bolts (1).
38. Remove right engine mounting bracket (5).

39. Remove harmonic balancer (4).
40. Remove timing belt. See **Removal** .
41. Remove oil feed pipe from turbo and remove pipe retainers.
42. Remove exhaust manifold.

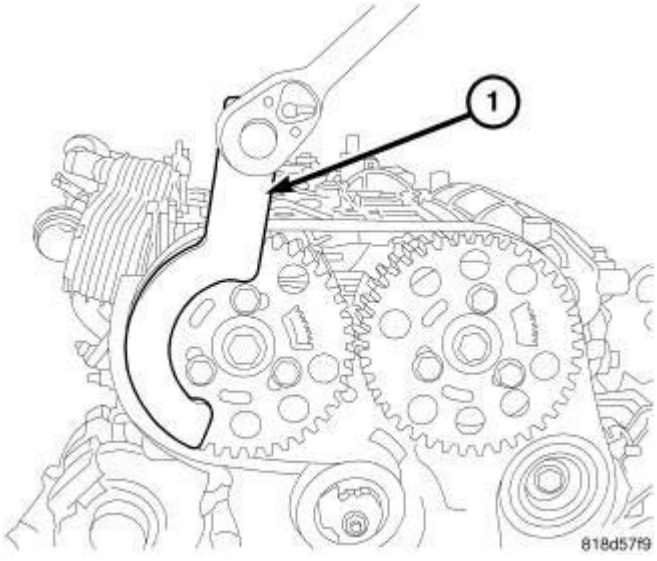

Fig. 58: Cam Holder
Courtesy of CHRYSLER LLC

43. Remove camshaft sprockets.
44. Remove camshaft sprocket hubs.
45. Remove injector rocker arm shaft.
46. Remove bearing frame.
47. Remove camshafts.

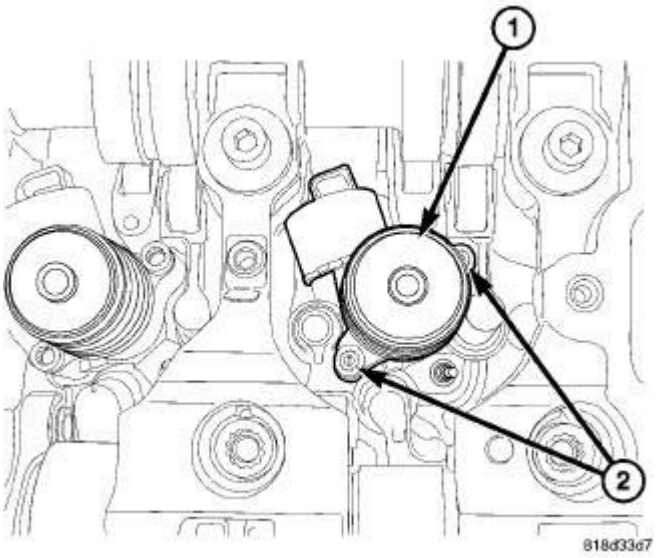

Fig. 59: Injector
Courtesy of CHRYSLER LLC

48. Remove injector retaining bolts (2) and discard.

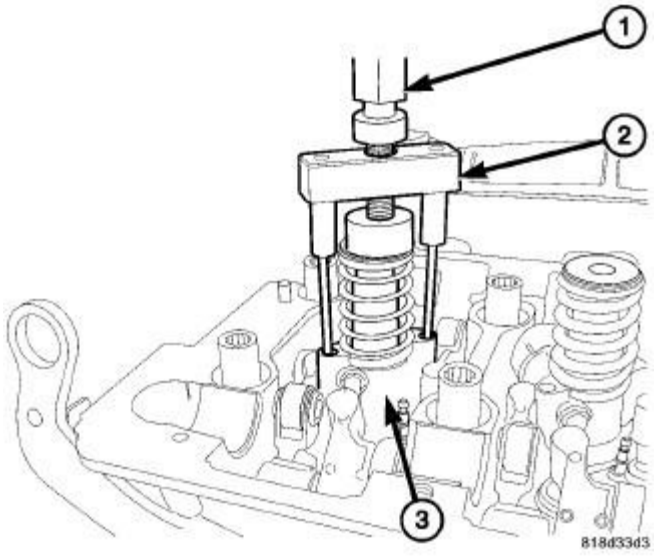

Fig. 60: Injector Removal
Courtesy of CHRYSLER LLC

49. Remove injectors (3) using injector remover 9887 (2) and a slide hammer (1). Refer to **Fuel System/Fuel Injection/INJECTOR(S), Fuel - Removal** .

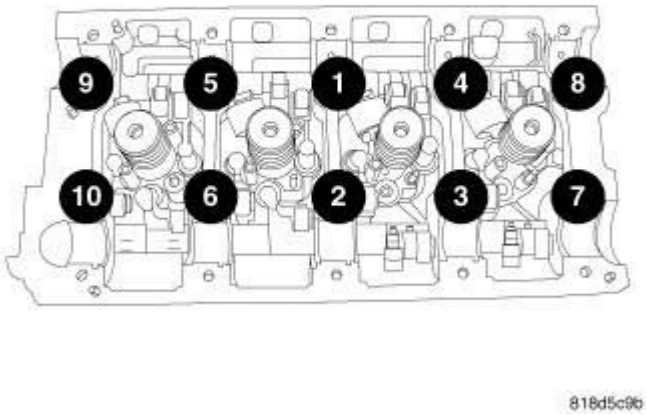

Fig. 61: Cylinder Head Bolt Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: Loosen cylinder head bolts in the reverse order of the tightening sequence.

50. Remove cylinder head bolts and discard.
51. Remove cylinder head.

WARNING: No fire, open flames or smoking. Risk of poisoning from inhaling and swallowing fuel. Risk of injury from skin and eye contact with fuel. Pour fuels only into suitable and appropriately marked containers. Wear protective clothing when handling fuel.

CLEANING

CLEANING

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Remove all gasket material from cylinder head and block. See **Standard Procedure** . Be careful not to gouge or scratch the aluminum head sealing surface.

Clean all engine oil passages.

INSPECTION

INSPECTION

NOTE: Cylinder head cannot be resurfaced.

NOTE: Replacement cylinder heads will come complete with valves, seals, springs, retainers, keepers.

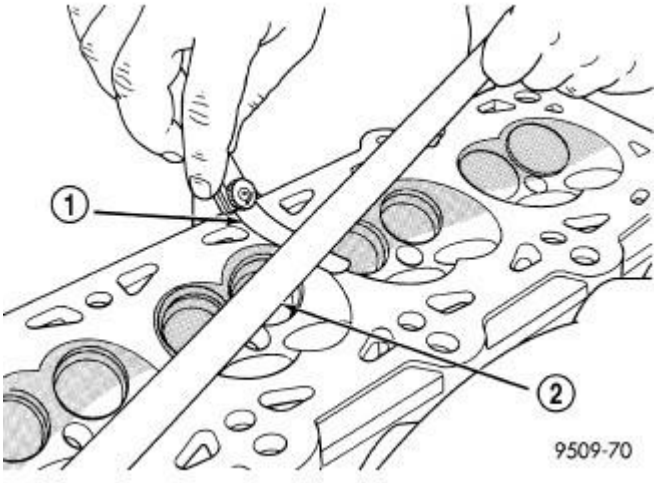

Fig. 62: Checking Cylinder Head Flatness
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE 2 - STRAIGHT EDGE

1. Cylinder head must be flat within 0.1 mm (0.004 in.) .

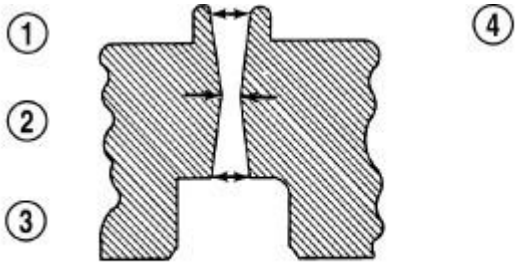

Fig. 63: Checking Wear on Valve Guide-Typical
Courtesy of CHRYSLER LLC

1 - TOP 2 - MIDDLE 3 - BOTTOM 4 - CUT AWAY VIEW OF VALVE GUIDE

MEASUREMENT LOCATIONS

2. Inspect camshaft bearing journals for scoring.
3. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
4. Using a small hole gauge and a micrometer, measure valve guides in 3 places top (1), middle (2), and bottom (3). See **Specifications**. Replace guides if they are not within specification.
5. Check valve guide height.
6. Prior to installing cylinder head, the cylinder block should be checked for flatness.

INSTALLATION

INSTALLATION

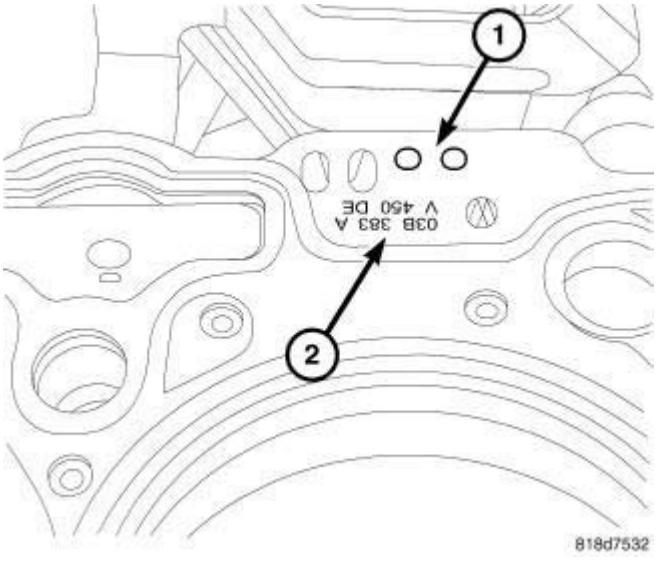

Fig. 64: Gasket Identification
Courtesy of CHRYSLER LLC

WARNING: No fire, open flames or smoking. Service vehicles in well ventilated areas. Risk of poisoning from inhaling or swallowing fuel. Risk of injury from skin and eye contact with fuel. Wear protective clothing.

NOTE: Thoroughly clean all mating surfaces with appropriate solvents and blow out bolt holes, to assure that no grease or oil is present during reassembly.

NOTE: If piston or connecting rods have been replaced, measure piston projection to ensure proper head gasket selection. See Standard Procedure .

NOTE: Check facing cylinder head contact surface.

1. Remove crankshaft lock 9883.

2. Rotate crankshaft counterclockwise until all pistons are in the middle of the bore.

NOTE: Ensure that the gasket is correct before installing. Gasket is identified by holes stamped in the gasket (1).

3. Position the cylinder head gasket with writing (2) facing upwards on engine using the dowel pins as guide.

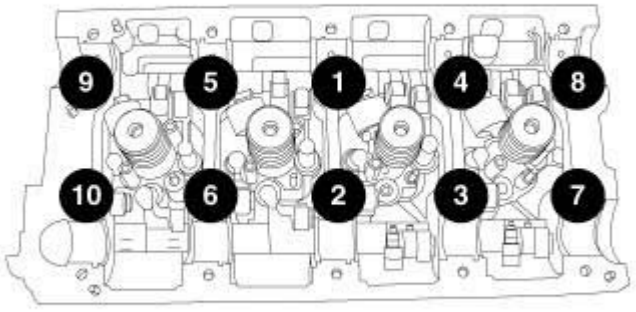

Fig. 65: Cylinder Head Bolt Torque Sequence
Courtesy of CHRYSLER LLC

4. Position the cylinder head on the engine and install **new** cylinder head bolts.
   a. Tighten cylinder head bolts to 35 N.m (26 ft. lbs.) in the sequence shown in illustration.
   b. Tighten cylinder head bolts to 60 N.m (44 ft. lbs.) in the sequence shown in illustration.
   c. Rotate each bolt in the sequence above 90°.
   d. Rotate each bolt in the sequence above an additional 90°.

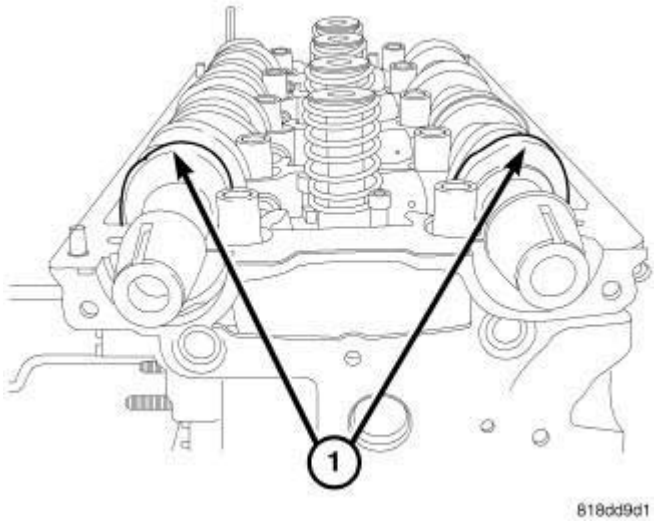

Fig. 66: CAM REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

5. Install camshafts (1). See **Installation** ,
6. Install camshaft oil seals. See **Installation** .

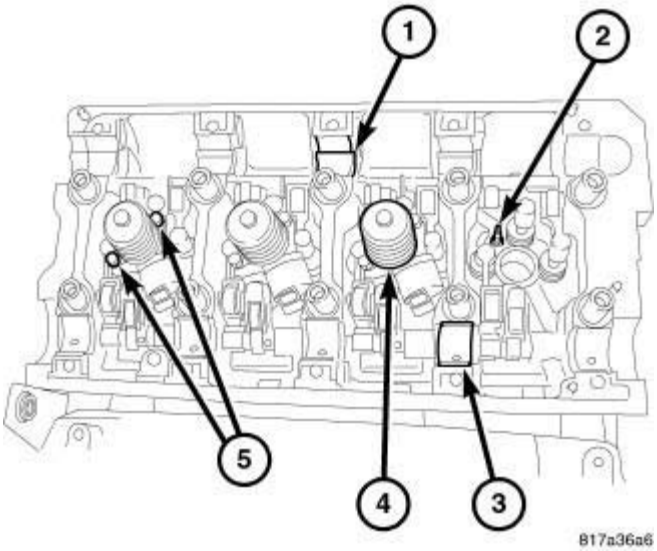

Fig. 67: Injectors
Courtesy of CHRYSLER LLC

CAUTION: When installing unit injectors, new bolts (5) must be used.

NOTE: When installing used unit injector, new o-rings must be used.

7. Install unit injectors (4). Refer to **Fuel System/Fuel Injection/INJECTOR(S), Fuel - Installation** .

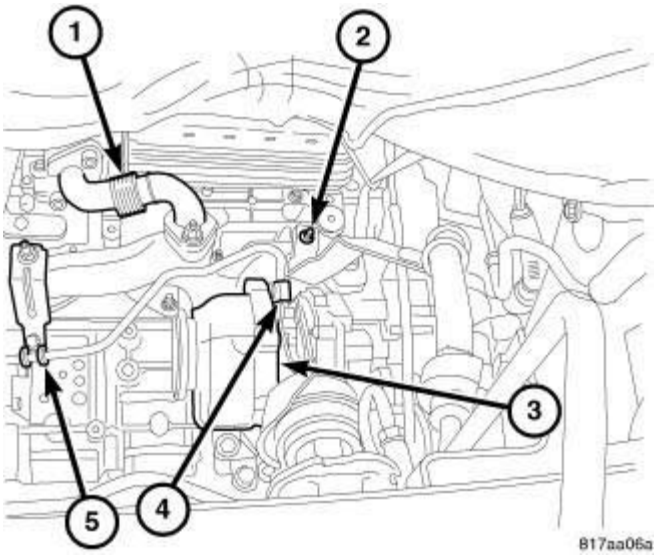

Fig. 68: Power Steering Line Support
Courtesy of CHRYSLER LLC

8. Install exhaust manifold gasket and manifold.
9. Install oil feed pipe (4) to turbo and install pipe hold down clamp (5).
10. Install exhaust manifold heat shields.

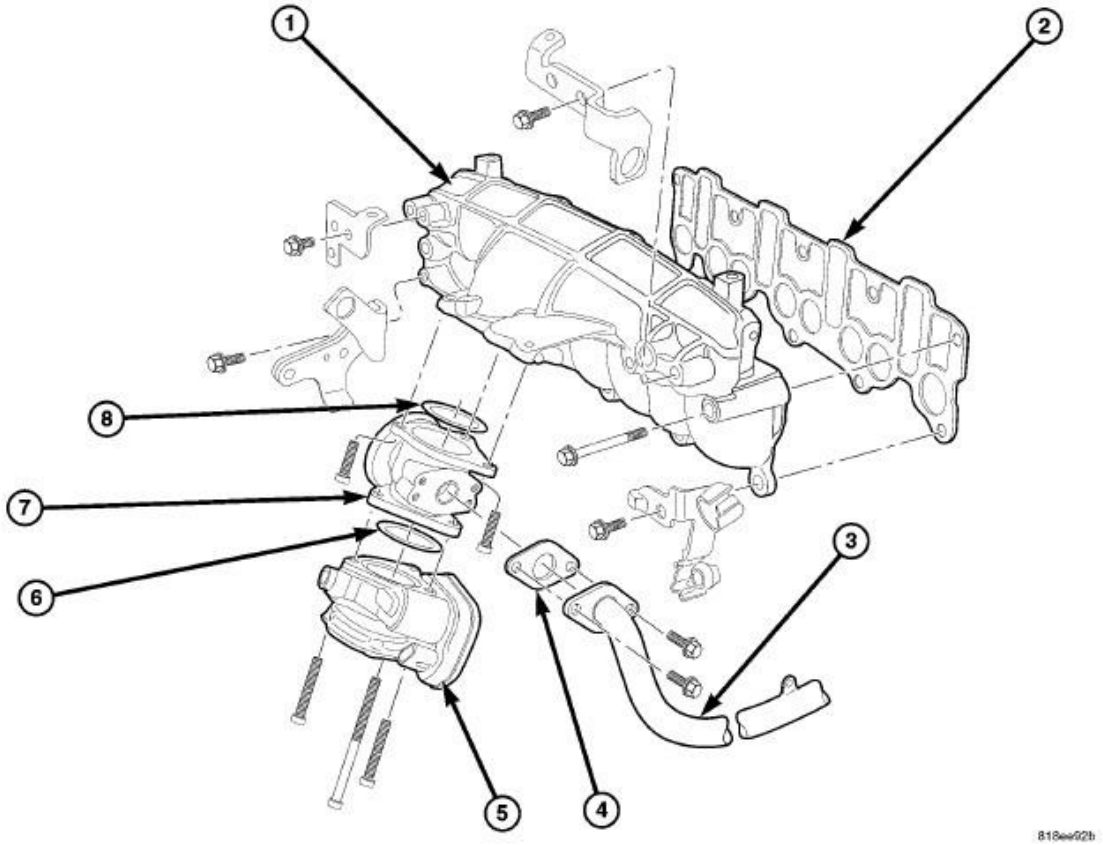

Fig. 69: Intake Manifold
Courtesy of CHRYSLER LLC

11. Install intake manifold gasket (2) and manifold (1). See **Installation** .
12. Install EGR assembly (7).
13. Install throttle plate assembly (5).
14. Install exhaust manifold to EGR tube (3).
15. Install coolant hose to EGR cooler assembly.
16. Install timing belt cover.

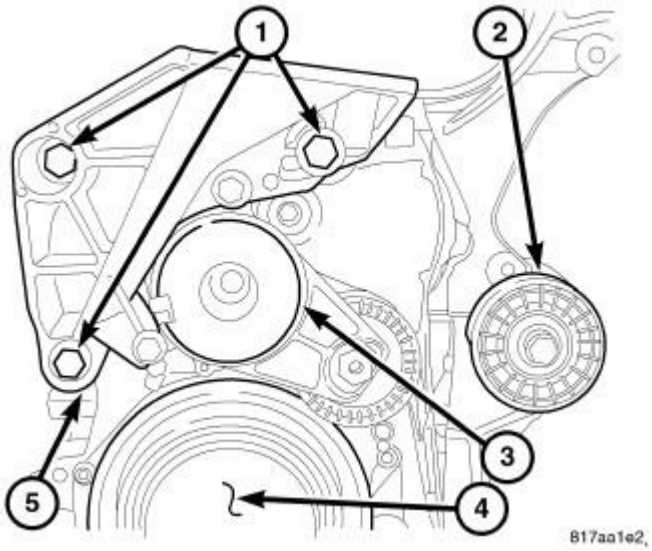

Fig. 70: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

17. Install right engine mount bracket (5).
18. Install accessory drive belt tensioner.

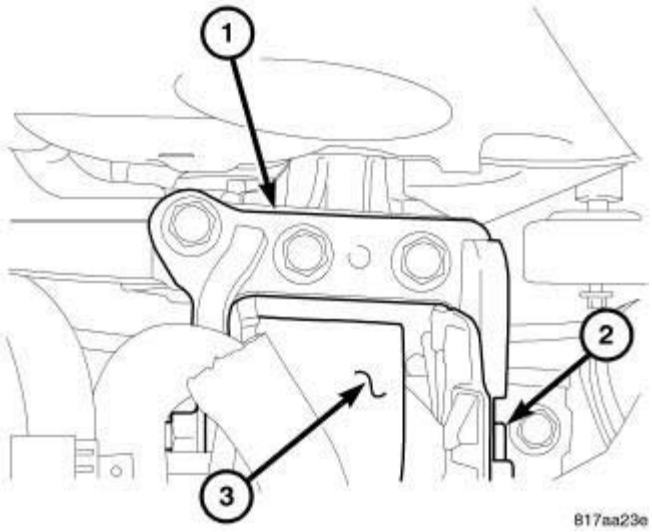

Fig. 71: Right Engine Mount
Courtesy of CHRYSLER LLC

19. Install right engine mount (3).
20. Remove jack.
21. Raise vehicle.
22. Install right engine mount lower bolt.

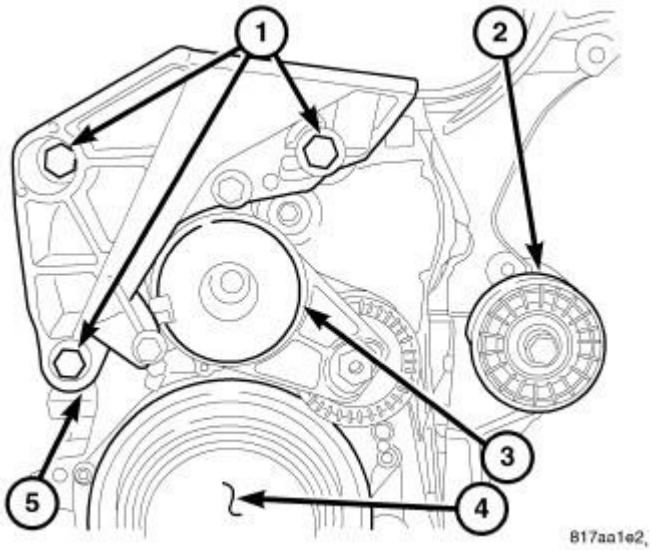

Fig. 72: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

23. Install balancer (4).
24. Install accessory drive belt.

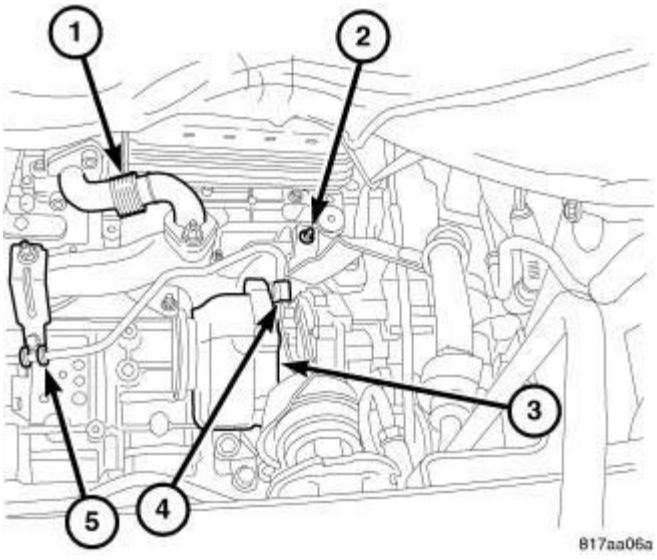

Fig. 73: Power Steering Line Support
Courtesy of CHRYSLER LLC

25. Install power steering hose support bracket at exhaust manifold (2).
26. Install turbo outlet pipe.
27. Install turbo inlet pipe.
28. Install right splash shield.
29. Lower vehicle.

30. Install coolant recovery bottle.
31. Install air inlet hose to throttle body.
32. Connect engine electrical connectors.
33. Install upper radiator hose at cylinder head.
34. Connect coolant hoses near fuel pump.

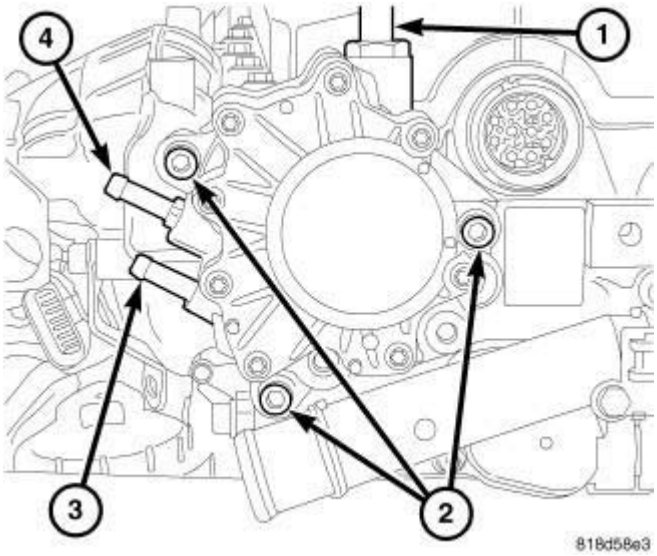

Fig. 74: Tandem Pump
Courtesy of CHRYSLER LLC

35. Install fuel pump. Refer to **Fuel System/Fuel Delivery/PUMP, Tandem Fuel - Installation** .
36. Install fuel line retaining bracket.
37. Connect injector harness at cylinder head.
38. Connect brake booster vacuum hose (1).
39. Connect coolant tube at reservoir.
40. Install vacuum harness.
41. Fill with coolant.
42. Install new oil filter and fill with oil.

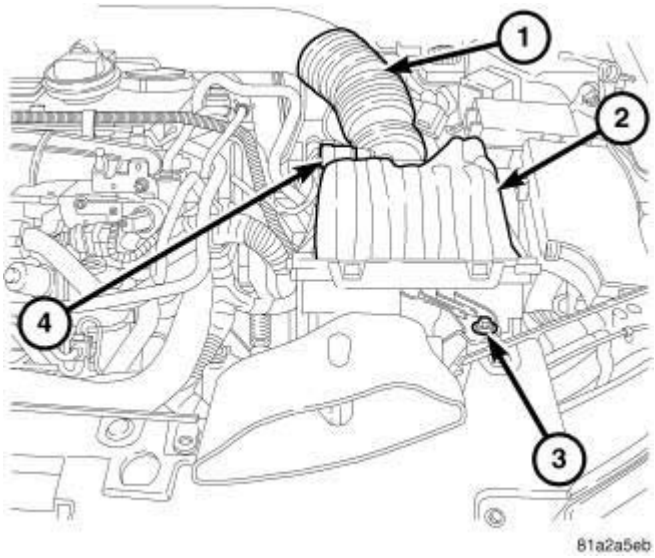

Fig. 75: Air Cleaner Housing
Courtesy of CHRYSLER LLC

43. Install air cleaner assembly (2).

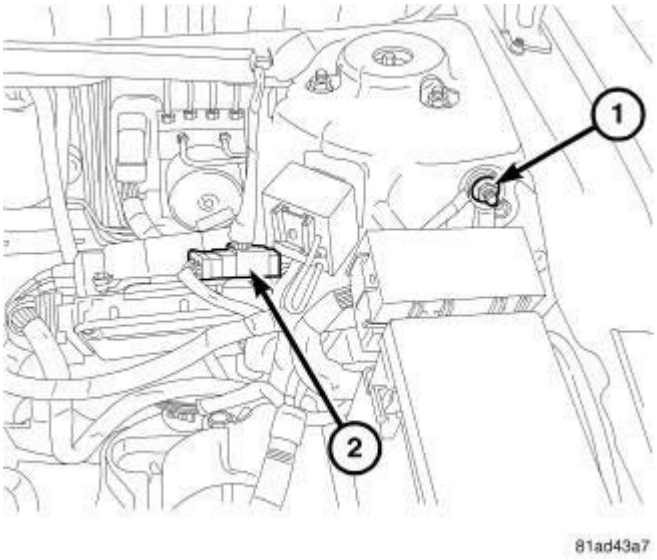

Fig. 76: Battery Cable
Courtesy of CHRYSLER LLC

44. Connect negative battery cable (1).
45. Start engine and check for leaks.

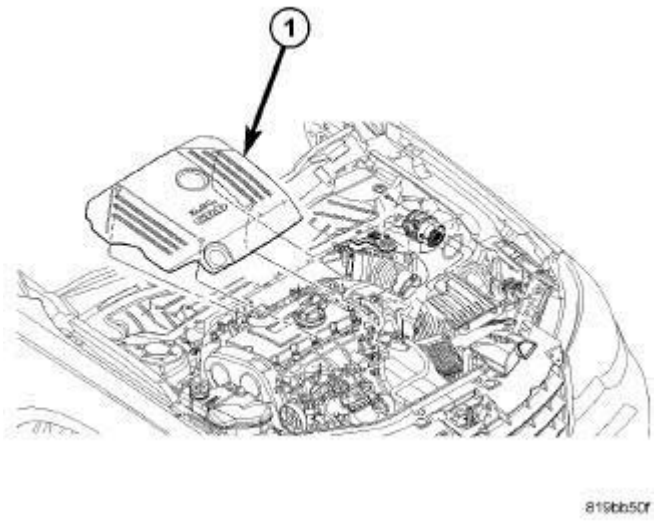

Fig. 77: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

46. Install engine cover (1).

CAMSHAFT, ENGINE

Removal

REMOVAL

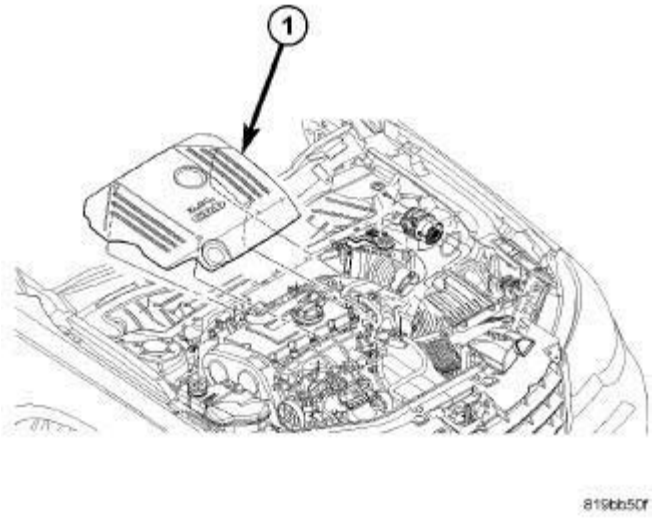

Fig. 78: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Remove engine cover. See **Removal** .

WARNING: No fire, open flames or smoking. Risk of poisoning from inhaling or swallowing fuel. Risk of injury from skin and eye contact with fuel. Wear protective clothing. Store fuel only in suitable and appropriately marked containers.

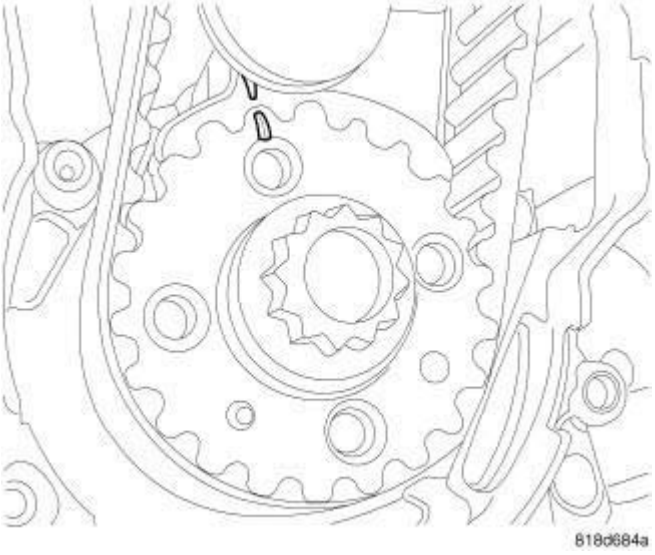

Fig. 79: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

NOTE: Engine equipped with a balance shaft module use an oval toothed belt, and crankshaft holding tool 10122 must be used

3. Place engine at TDC.
4. Install crankshaft lock 9883 or 10122.
5. Remove timing belt. See **Removal** .

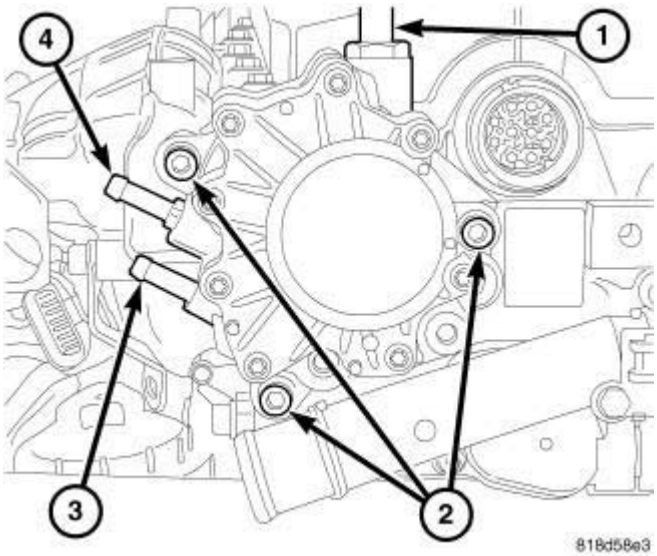

Fig. 80: Tandem Pump
Courtesy of CHRYSLER LLC

6. Remove tandem pump (refer to tandem pump **REMOVAL**).

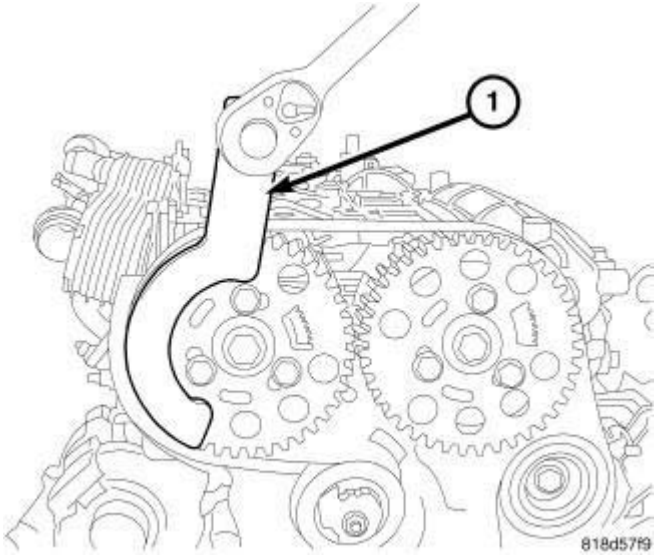

Fig. 81: Cam Holder
Courtesy of CHRYSLER LLC

7. Loosen camshaft hub retaining bolt using camshaft sprocket/hub holder 9880 (1).
8. Remove camshaft sprocket retaining bolts using camshaft sprocket/hub holder 9880 (1) and remove sprockets.
9. Remove camshaft hub retaining bolt and remove hubs with puller.
10. Loosen injector adjusting lock nut and back off injector adjuster.

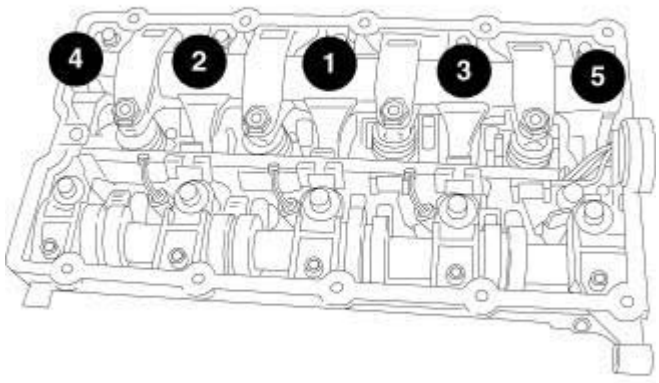

Fig. 82: Rocker Arm Shaft Bolt Removal/Installation Sequence
Courtesy of CHRYSLER LLC

11. Remove rocker arm shaft and bearing frame retaining bolts.
12. Remove rocker arm shaft.

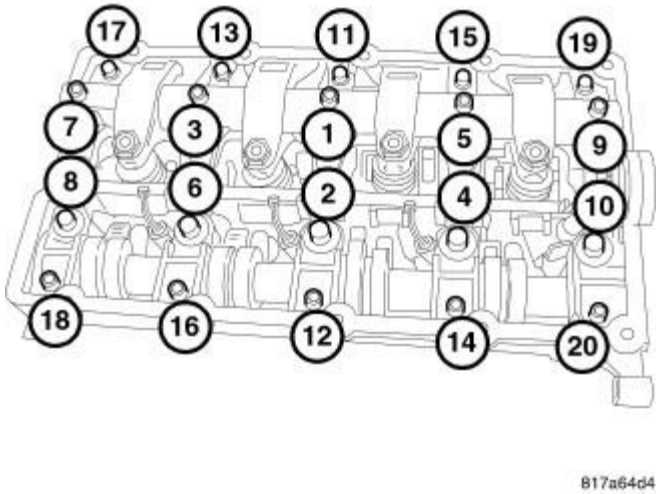

Fig. 83: Cam Bearing Frame Torque
Courtesy of CHRYSLER LLC

13. Remove bearing frame.

NOTE: If bearing shells are to be reused, clean them and identify location with a marker.

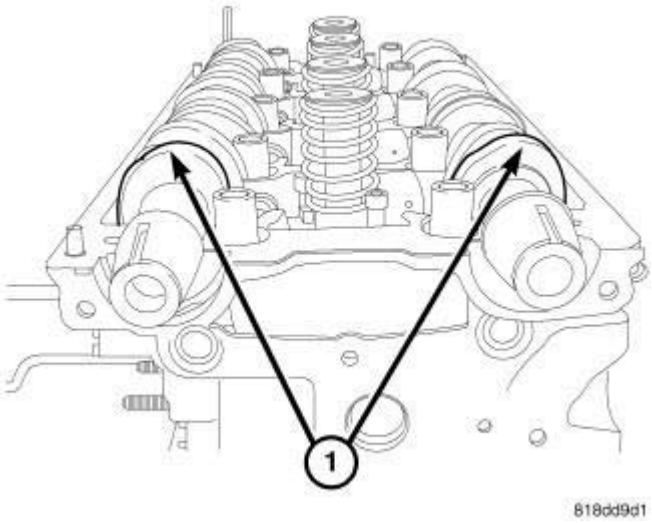

Fig. 84: CAM REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

14. Remove camshafts (1).

Installation

INSTALLATION

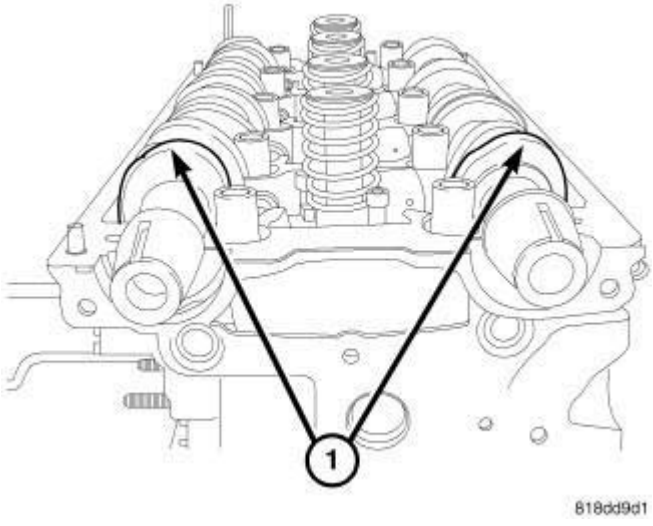

Fig. 85: CAM REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

1. Install new bearing shells in cylinder head.
2. Lubricate bearings with clean engine oil.
3. Install camshafts with cylinder #1 lobes pointing upwards.

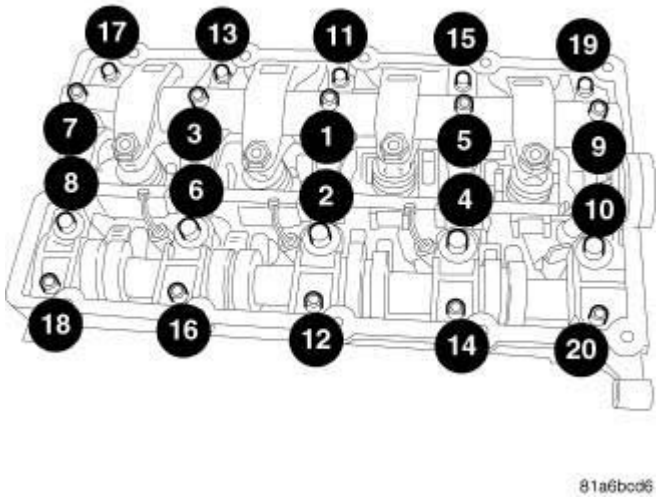

Fig. 86: Cam Bearing Frame Torque
Courtesy of CHRYSLER LLC

4. Apply a bead of RTV to cylinder head.
5. Install bearing frame and tighten bolts as shown in illustration.

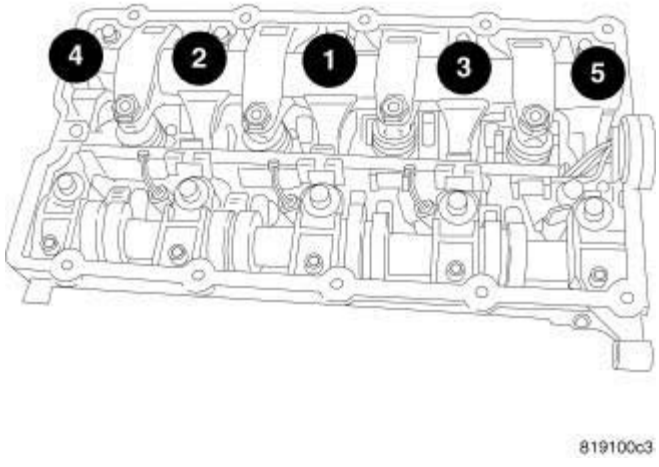

Fig. 87: Rocker Arm Shaft Bolt Removal/Installation Sequence
Courtesy of CHRYSLER LLC

6. Install injector rocker arm shaft.
7. Tighten bolts to 20 N.m (15 in. lbs.) in the sequence shown in illustration.
8. Tighten rocker arm shaft bolts an additional 90° as shown in illustration.
9. Install camshaft oil seals using. See **Installation** .
10. Install camshafts hubs onto camshafts and install bolts.

11. Install sprockets on camshaft hubs with the toothed segment facing upward.
12. Install retaining bolts finger tight.

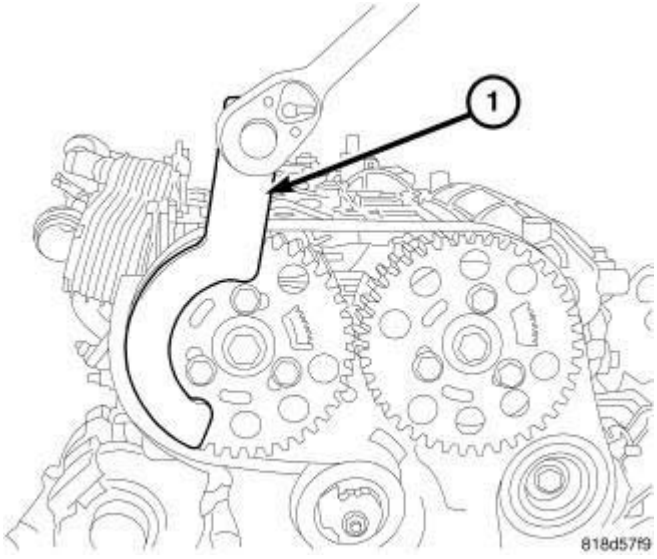

Fig. 88: Cam Holder
Courtesy of CHRYSLER LLC

13. Tighten camshaft hub bolts to 100 N.m (74 ft. lbs.) using hub/sprocket holder 9880 (1).
14. Install camshaft locking pins 9882.
15. Install timing belt. See **Installation** .
16. Perform injector adjustment. Refer to **Fuel System/Fuel Injection/INJECTOR(S), Fuel - Standard Procedure** .

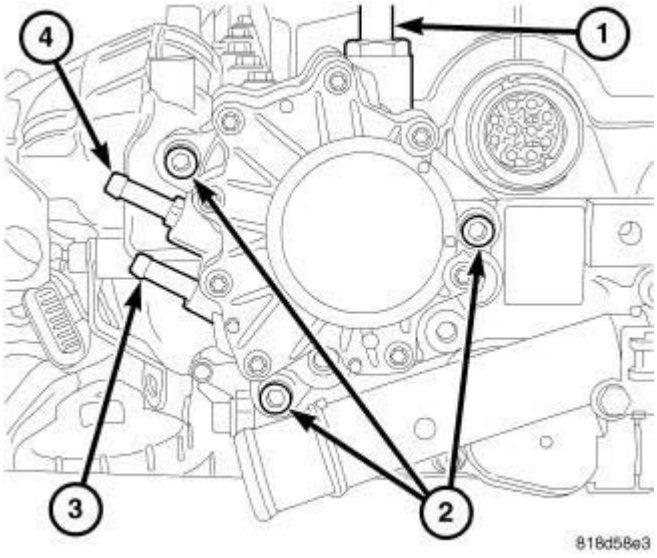

Fig. 89: Tandem Pump
Courtesy of CHRYSLER LLC

17. Install fuel pump. Refer to **Fuel System/Fuel Delivery/PUMP, Tandem Fuel - Installation** .
18. Install cylinder head cover. See **Installation** .

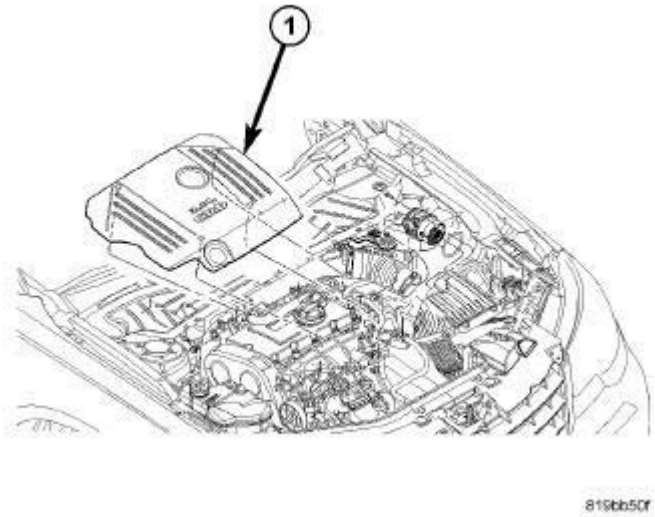

Fig. 90: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

19. Reconnect negative battery cable.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.

CAUTION: When new rocker fingers have been installed, engine must not be started for 30 minutes. The hydraulic compensation elements must settle or the pistons will contact the valves.

20. Start engine and inspect for leaks.
21. Install engine cover (1). See **Installation** .

COVER(S), CYLINDER HEAD

Removal

REMOVAL

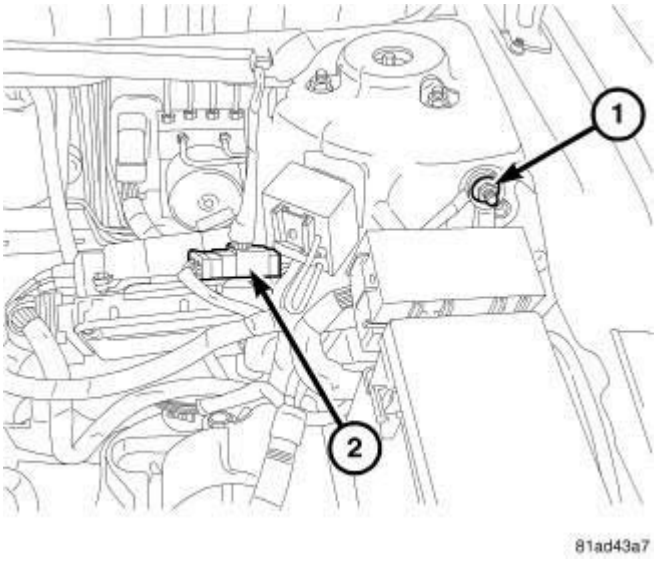

Fig. 91: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).

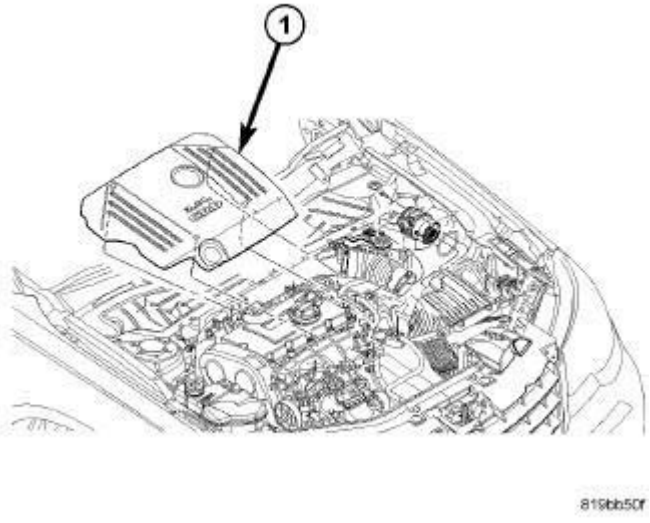

Fig. 92: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover. See **Removal** .

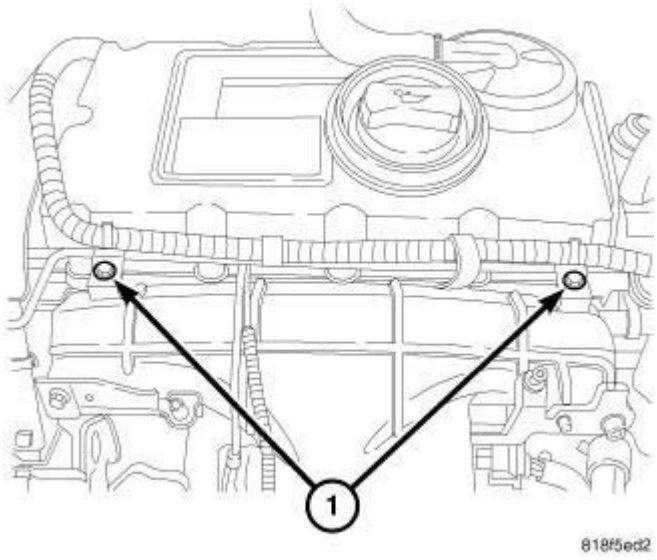

Fig. 93: Coolant Tube
Courtesy of CHRYSLER LLC

3. Remove coolant tube retaining bolts (1) and reposition coolant tubes.

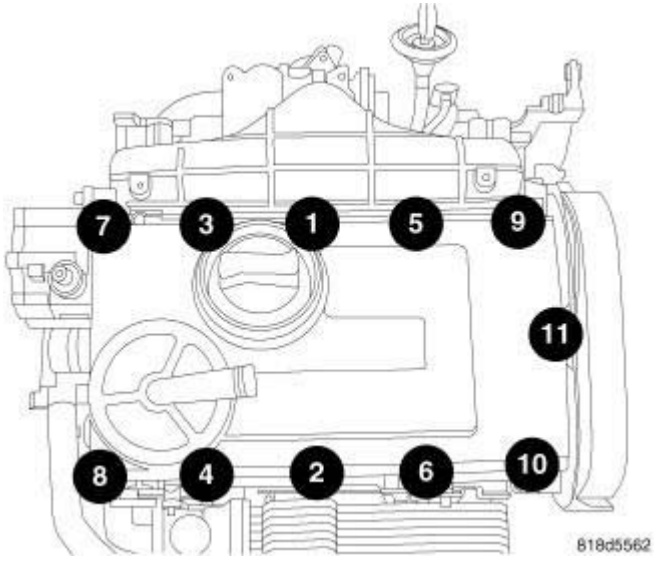

Fig. 94: Removing/Installing Cylinder Head Cover
Courtesy of CHRYSLER LLC

4. Remove cylinder head cover retaining bolts and remove cover.

Installation

INSTALLATION

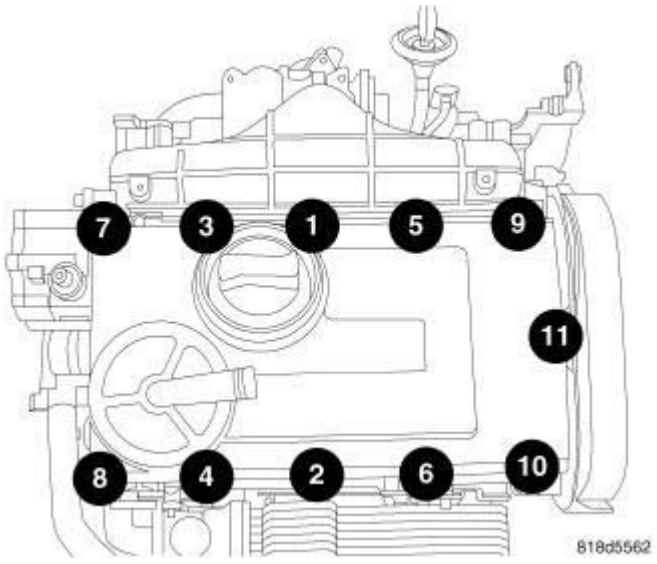

Fig. 95: Cylinder Head Cover Installation
Courtesy of CHRYSLER LLC

1. Clean sealing surfaces.
2. Install new cylinder head cover gasket.
3. Install cylinder head cover.
4. Tighten cylinder head cover bolts in the sequence shown in illustration to 10 N.m (89 in. lbs.).

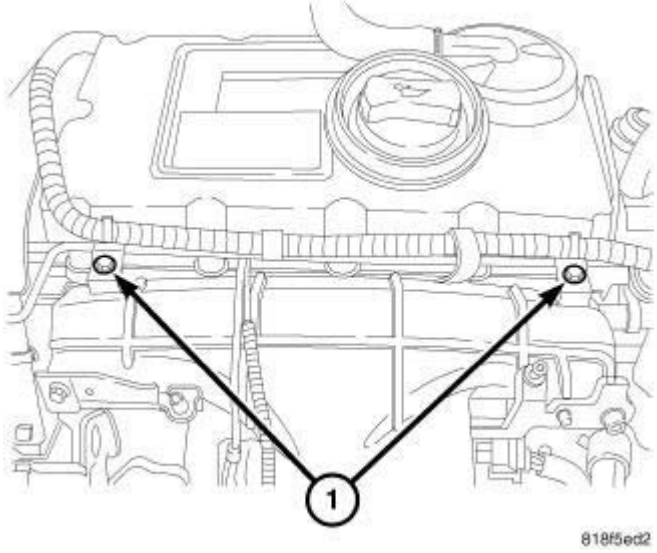

Fig. 96: Coolant Tube
Courtesy of CHRYSLER LLC

5. Install coolant tubes retaining bolts (1) and tighten.

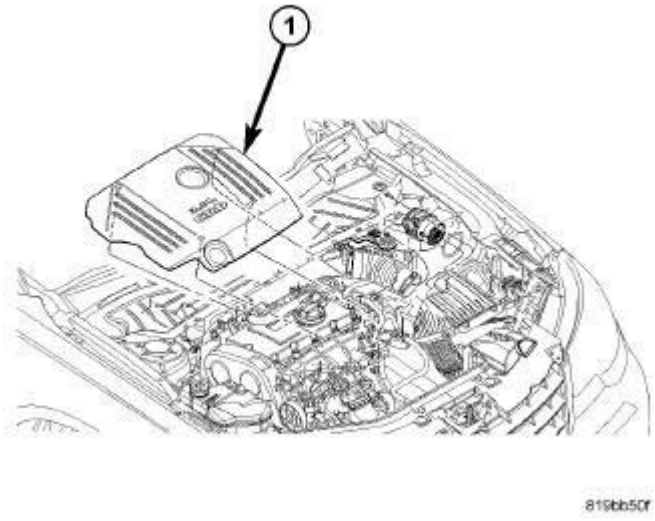

Fig. 97: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

6. Install engine cover.

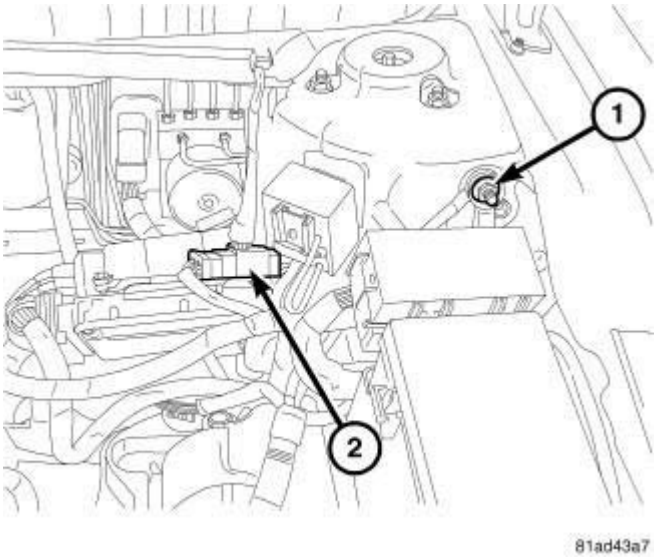

Fig. 98: Battery Cable
Courtesy of CHRYSLER LLC

7. Connect negative battery cable (1).

SEAL(S), CAMSHAFT

Removal

REMOVAL

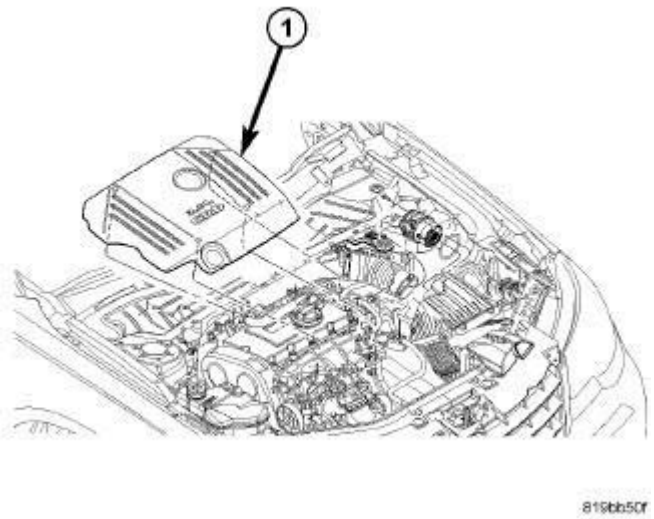

Fig. 99: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove engine cover (1).
2. Remove upper timing belt cover. See **Removal** .

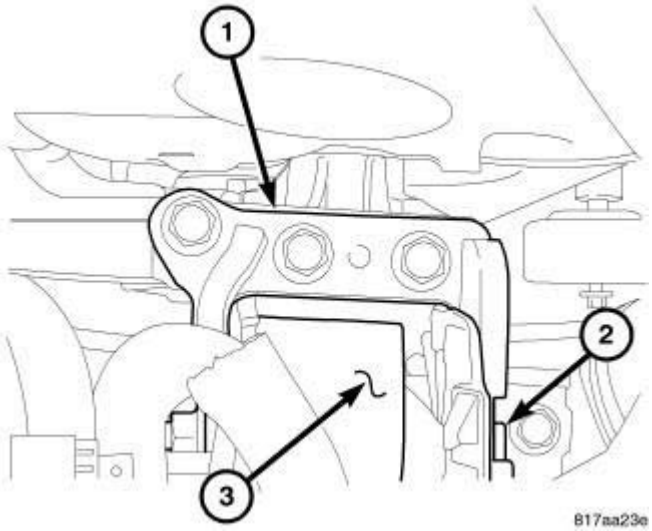

Fig. 100: Right Engine Mount
Courtesy of CHRYSLER LLC

3. Support engine and remove right engine mount through bolt (2).
4. Remove right engine mount bracket.
5. Remove timing belt. See **Removal** .
6. Remove timing belt rear cover.

7. Remove camshaft sprockets.
8. Remove camshaft hubs.

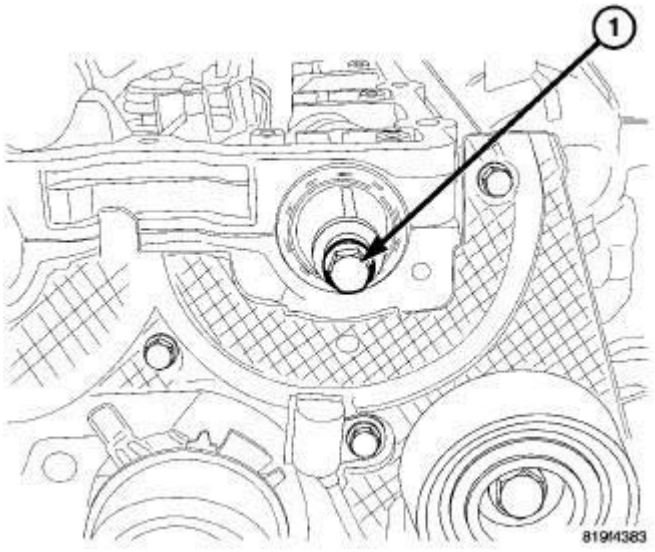

Fig. 101: Installing Bolt Into Camshaft
Courtesy of CHRYSLER LLC

9. Insert a bolt (1) in the camshaft.

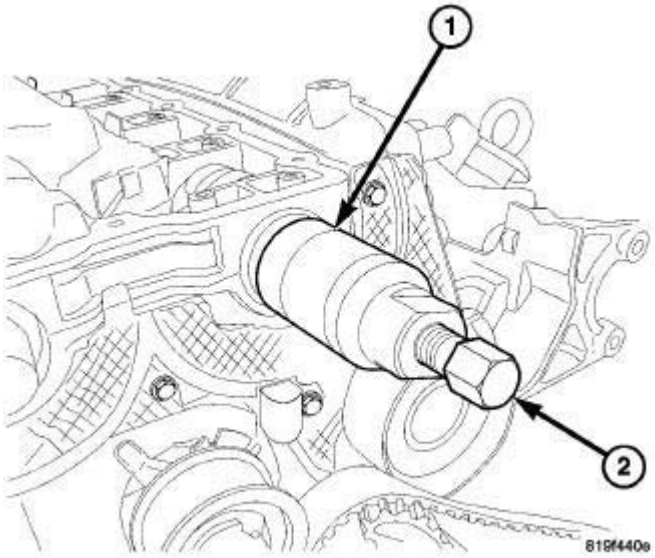

Fig. 102: Cam Seal Remover
Courtesy of CHRYSLER LLC

10. Screw seal remover 6771 (1) into camshaft seal.

11. Tighten force screw (2) to remove camshaft oil seals.

Installation

INSTALLATION

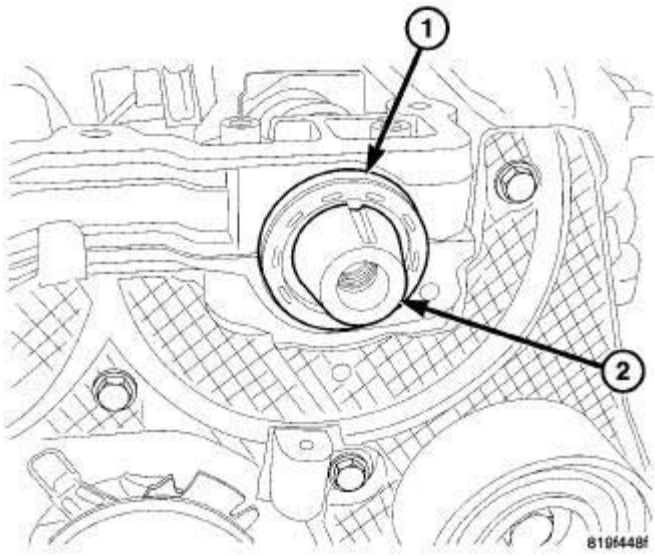

Fig. 103: Cam Seal
Courtesy of CHRYSLER LLC

1. Position new cam seal (1) on camshaft (2) as shown in illustration.

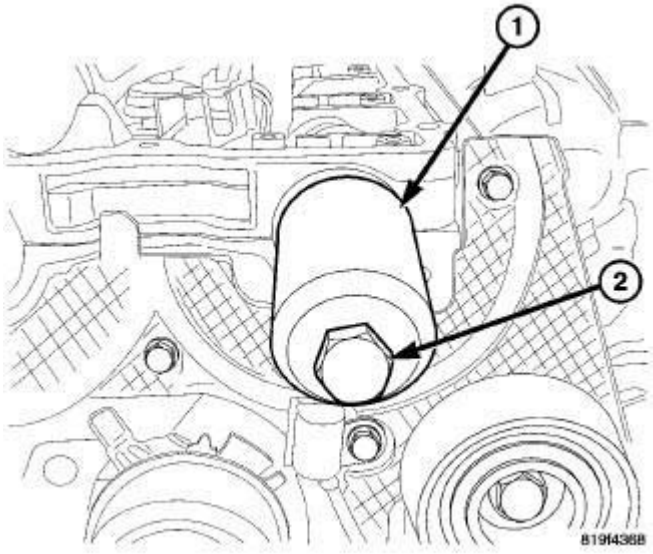

Fig. 104: Cam Seal Installer
Courtesy of CHRYSLER LLC

2. Position cam seal installer 9884 (1) over camshaft and insert bolt (2).

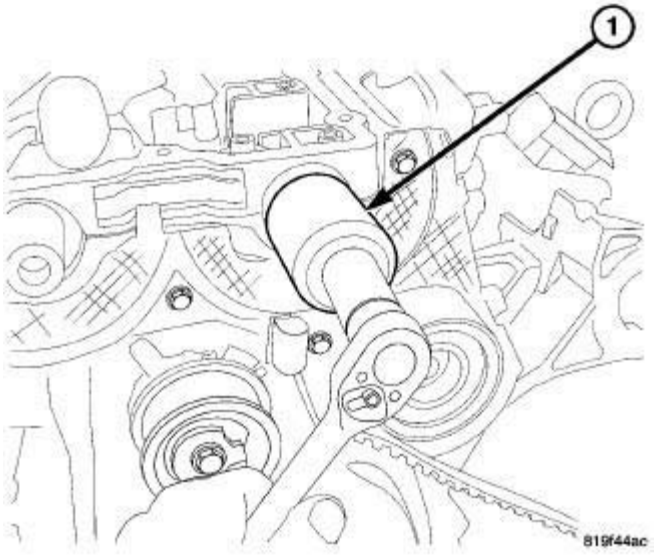

Fig. 105: Cam Seal Installation
Courtesy of CHRYSLER LLC

3. Tighten bolt until seal bottoms out.
4. Install timing belt hubs.
5. Install timing belt sprockets.
6. Install timing belt. See **Installation** .
7. Install lower timing belt cover. See **Installation** .

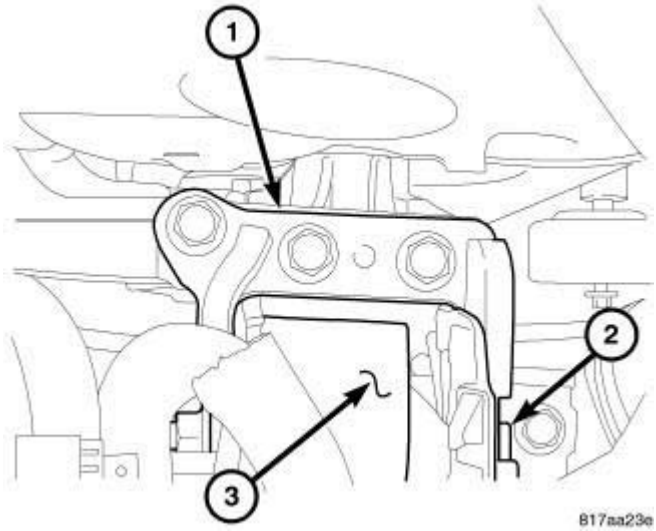

Fig. 106: Right Engine Mount
Courtesy of CHRYSLER LLC

8. Install right engine mount bracket.
9. Install damper.
10. Install right engine mount.

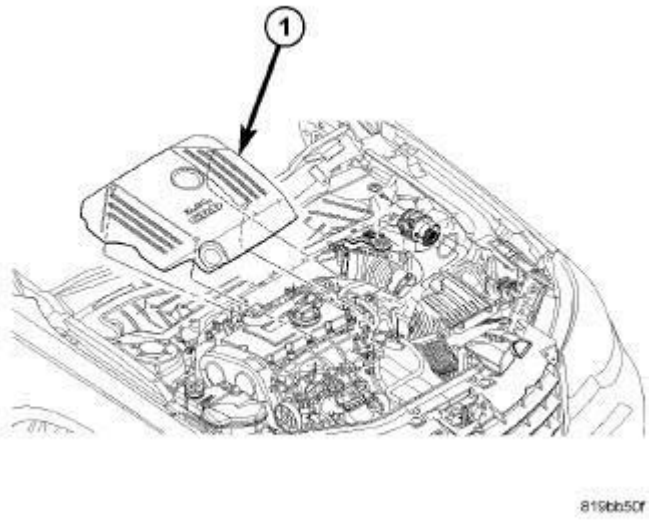

Fig. 107: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

11. Install upper timing belt cover. See **Installation** .
12. Install engine cover (1).

SPRING(S), VALVE

Removal

REMOVAL

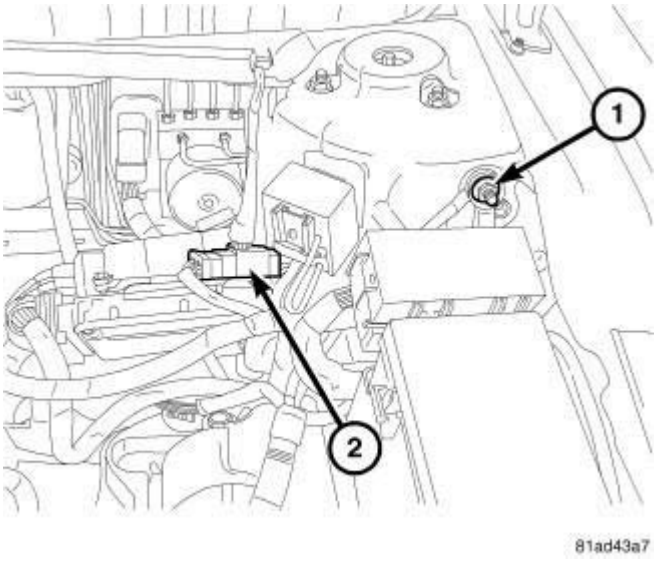

Fig. 108: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).

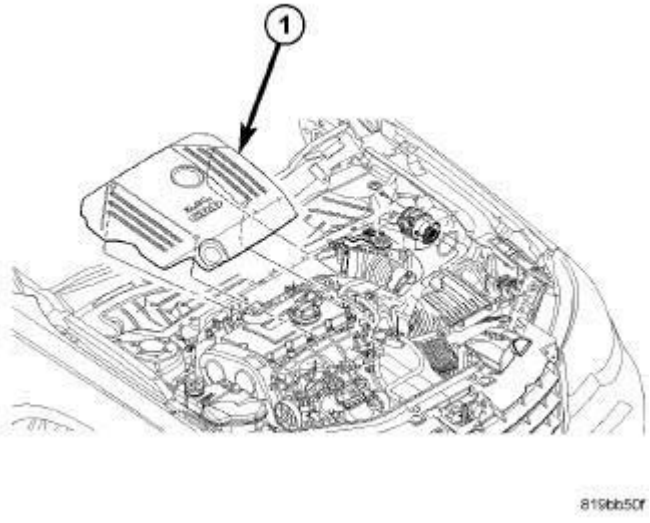

Fig. 109: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover (1). See **Removal** .
3. Remove camshafts. See **Removal** .
4. Position piston of cylinder to be processed to TDC by rotating the crankshaft clockwise. **DO NOT crank engine. DO NOT rotate engine backward.**

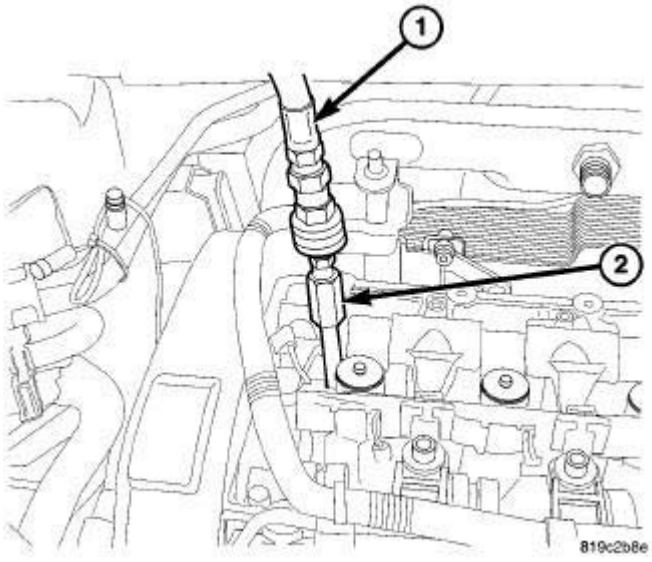

Fig. 110: Compression Adapter 9939
Courtesy of CHRYSLER LLC

5. Remove glow plugs. Refer to **Electrical - Ignition Control/Ignition Control/PLUG, Glow - Removal** .
6. Install glow plug adapter 9939 (2).
7. Connect air supply (1) to glow plug adapter 9939 (2) and pressurize the cylinder to 5 bar (73 psi.).

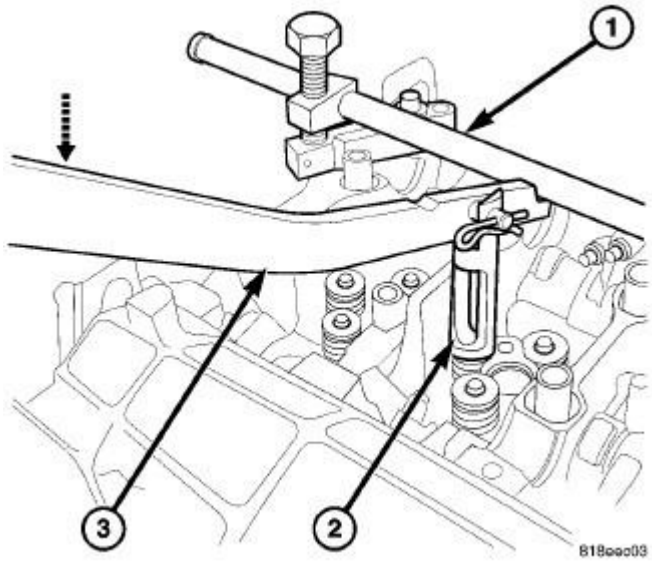

Fig. 111: Valve Spring Compressor 9916
Courtesy of CHRYSLER LLC

CAUTION: Valve springs and retainers must be kept in order of the cylinder they were removed.

8. Install valve spring compressor 9916 (1,2,3).

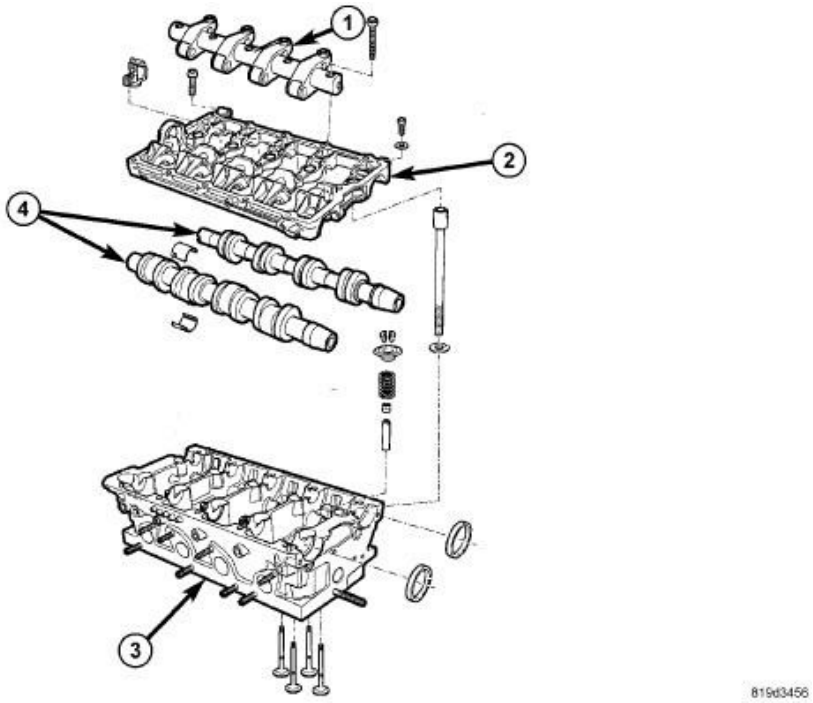

Fig. 112: Exploded View Of Cylinder Head Components
Courtesy of CHRYSLER LLC

9. Compress valve spring.
10. Remove valve keepers.
11. Remove top valve spring retainer and valve spring.
12. Remove valve stem seals.
13. Remove bottom valve spring retainer.

NOTE: Inspect all cylinder head components for wear or damage.

14. Repeat procedure for each cylinder as necessary.

Installation

INSTALLATION

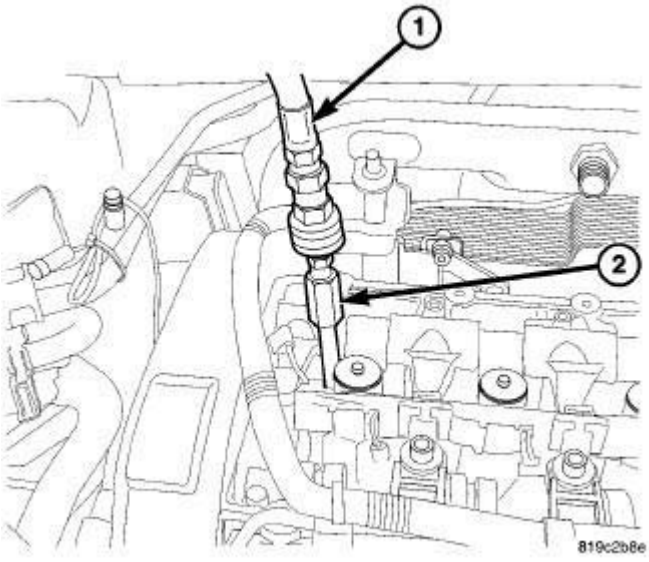

Fig. 113: Compression Adapter 9939
Courtesy of CHRYSLER LLC

NOTE: Inspect all valve springs and retainers for wear or damage. Replace as necessary.

1. Position piston of cylinder to be processed to TDC by rotating the crankshaft clockwise. **DO NOT crank engine or rotate engine counter clockwise.**
2. Install glow plug adapter 9939 (2).
3. Connect air supply (1) to #9939 glow plug adaptor and pressurize the cylinder to 5 bar (73 psi).

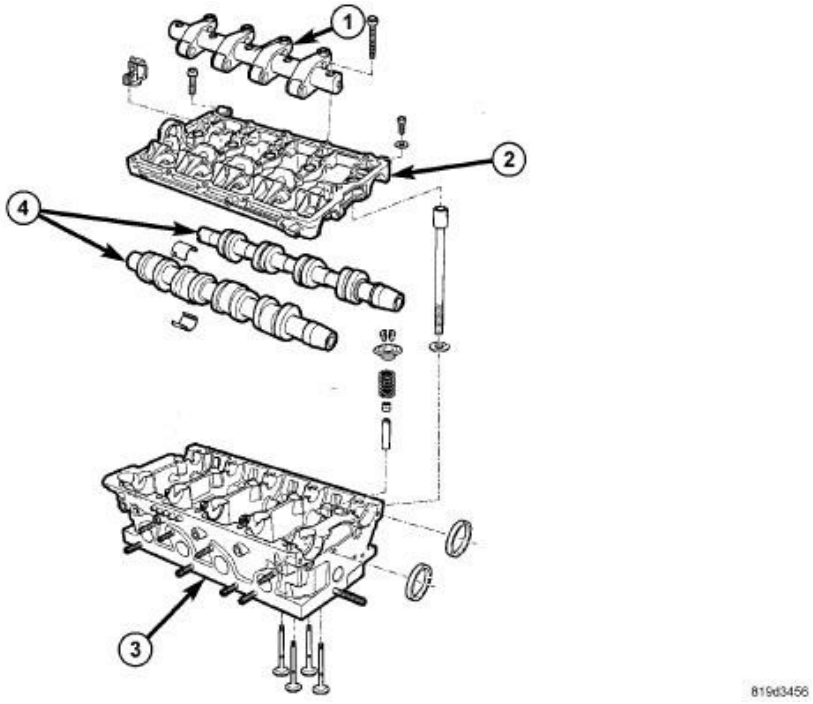

Fig. 114: Exploded View Of Cylinder Head Components
Courtesy of CHRYSLER LLC

4. Install lower valve spring retainer.
5. Install valve stem seal.
6. Install valve spring.
7. Install valve spring retainer.

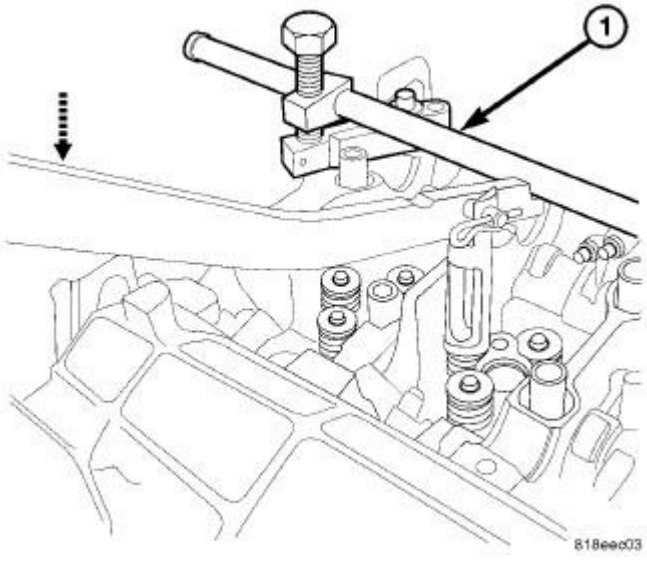

Fig. 115: Valve Spring Installer 9916
Courtesy of CHRYSLER LLC

8. Install valve spring installer 9916.
9. Compress valve and install valve keepers.

NOTE: Ensure that the valve keepers are seated properly.

10. Repeat procedure for each cylinder as necessary.
11. Remove special tooling from cylinder head.
12. Position piston of #1 cylinder to ignition TDC.
13. Install camshafts and check basic position. See **Installation** .

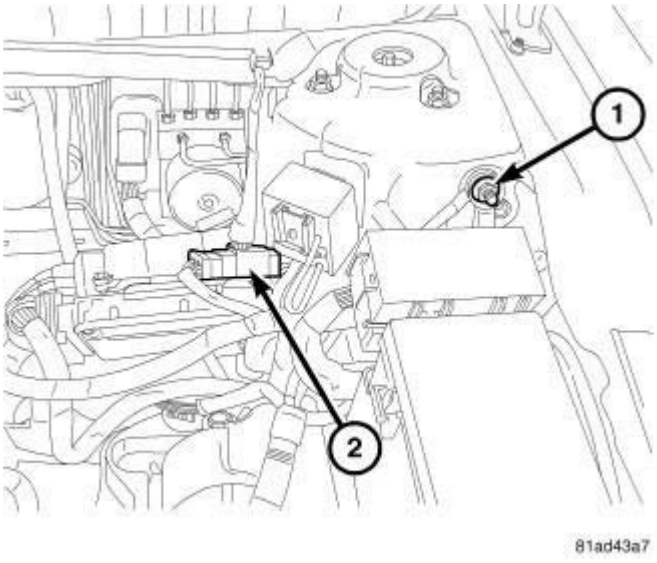

Fig. 116: Battery Cable
Courtesy of CHRYSLER LLC

14. Reconnect negative battery cable (1).

CAUTION: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.

15. Start the engine and inspect for leaks.

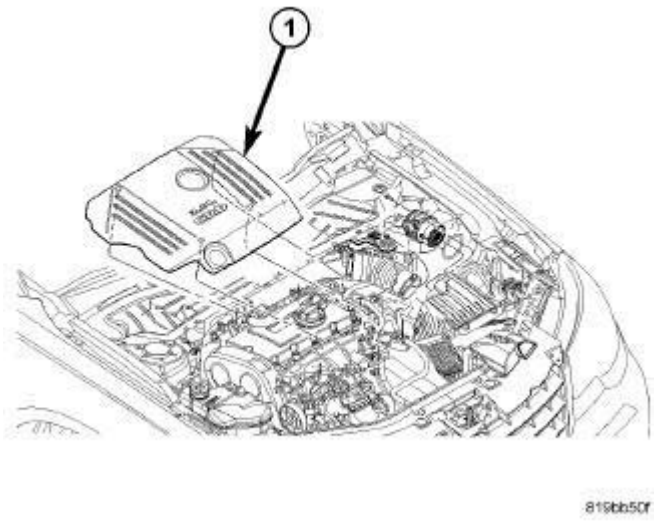

Fig. 117: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

16. Install engine cover (1). See **Installation** .

VALVES, INTAKE AND EXHAUST

Removal

REMOVAL

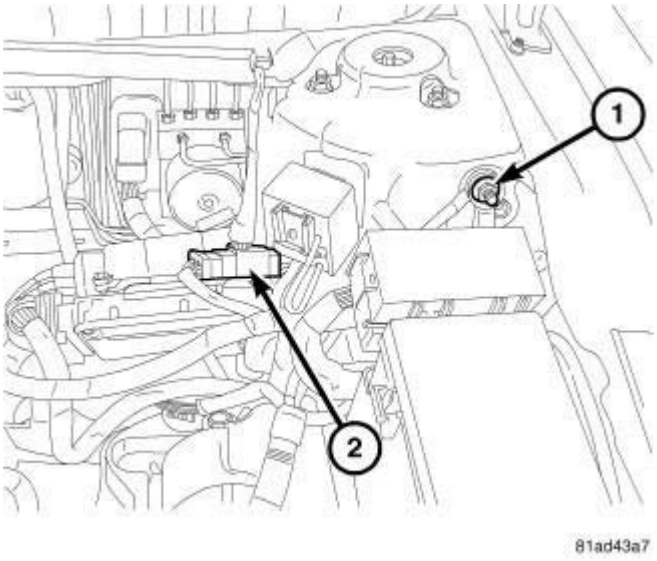

Fig. 118: Battery Cable
Courtesy of CHRYSLER LLC

NOTE: Valves can not be ground, only lapping is permitted.

1. Disconnect negative battery cable (1).

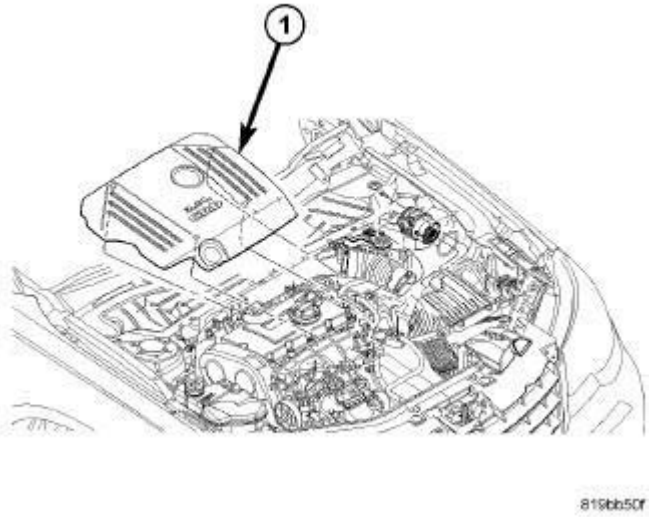

Fig. 119: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover (1). See **Removal** .
3. Remove cylinder head. See **Removal** .

CAUTION: Suitably mark the valve and the position in the cylinder head before removal. Failure to do so will result in improperly seated valves and possible engine damage after reassembly.

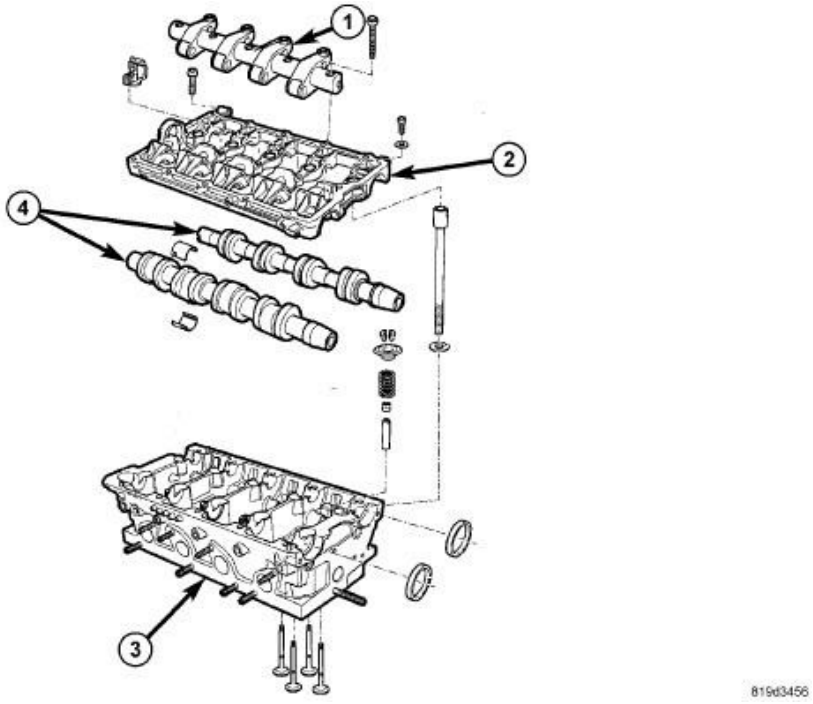

Fig. 120: Exploded View Of Cylinder Head Components
Courtesy of CHRYSLER LLC

4. Using a suitable valve spring compressor, compress valve spring.
5. Remove valve keepers.
6. Remove top valve spring retainer and valve spring.
7. Remove valve stem seals.
8. Repeat steps 5 through 9 for each valve as necessary.
9. Remove any burrs with a file prior to pulling valves through the guide.

CAUTION: Valves, springs and retainers must be kept in order of the cylinder they were removed.

10. Remove valves.

Installation

INSTALLATION

WARNING: Valves must be kept in their original positions in cylinder head. Failure to do so will result in engine damage.

NOTE: Inspect all valves, springs and retainers for wear or damage. Replace as necessary.

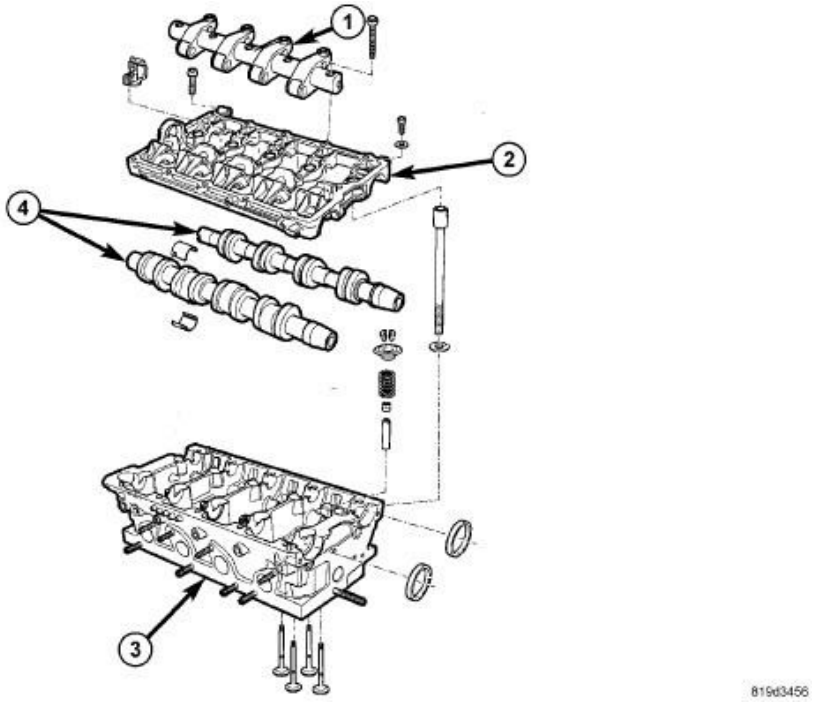

Fig. 121: Exploded View Of Cylinder Head Components
Courtesy of CHRYSLER LLC

1. Install valves in their original position in the cylinder head.
2. Install lower valve spring retainer.
3. Install valve stem seal.
4. Install valve spring.
5. Install valve spring retainer.

NOTE: Ensure that the valve keepers are seated properly.

6. Using a suitable valve spring compressor, compress valve spring and install valve keepers.
7. Repeat steps 3 through 7 for each valve as necessary.

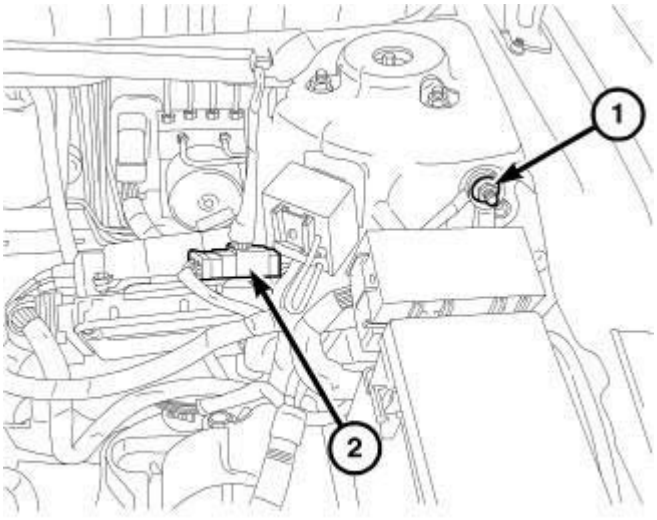

Fig. 122: Battery Cable
Courtesy of CHRYSLER LLC

8. Install cylinder head on engine block. See **Installation** .
9. Install glow plugs. Refer to **Electrical - Ignition Control/Ignition Control/PLUG, Glow - Installation** .
10. Connect negative battery cable (1).

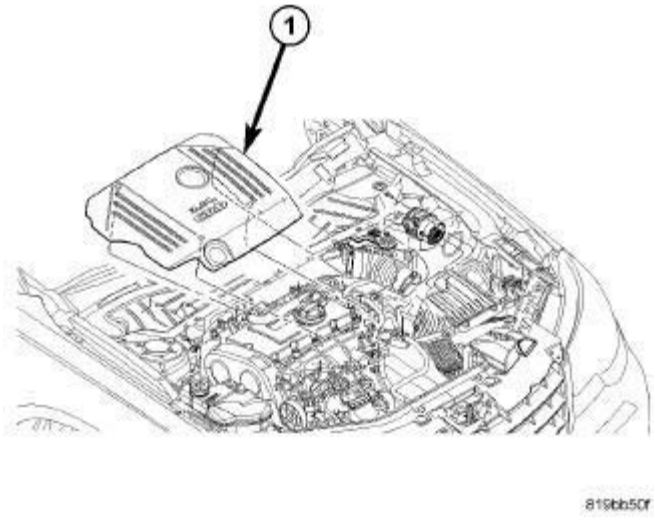

Fig. 123: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

WARNING: Us extreme caution when the engine is in operation. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing.

11. Start engine and check for leaks.
12. Install engine cover. See **Installation** .

ENGINE BLOCK

STANDARD PROCEDURE

REPLACING ENGINE CORE AND OIL GALLERY PLUGS

Using a blunt tool such as a drift and a hammer, strike the bottom edge of the cup plug. With the cup plug rotated, grasp firmly with pliers or other suitable tool and remove plug .

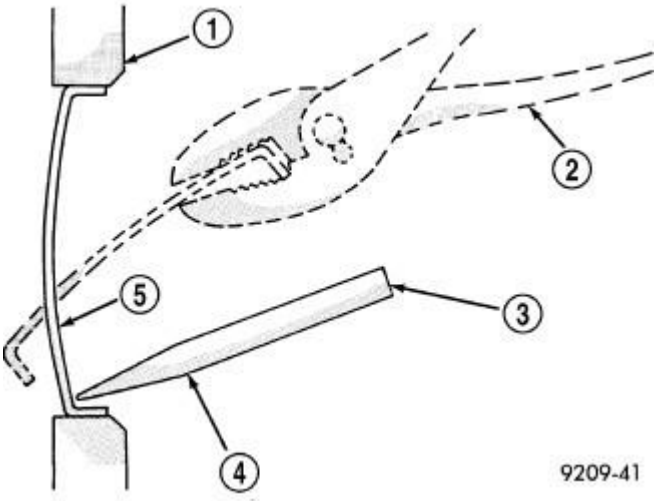

Fig. 124: Core Hole Plug Removal
Courtesy of CHRYSLER LLC

1 - CYLINDER BLOCK
2 - REMOVE PLUG WITH PLIERS
3 - STRIKE HERE WITH HAMMER
4 - DRIFT PUNCH
5 - CUP PLUG

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

Thoroughly clean inside of cup plug hole in cylinder block or head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount. Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in

service immediately.

MEASURING CYLINDER BORES

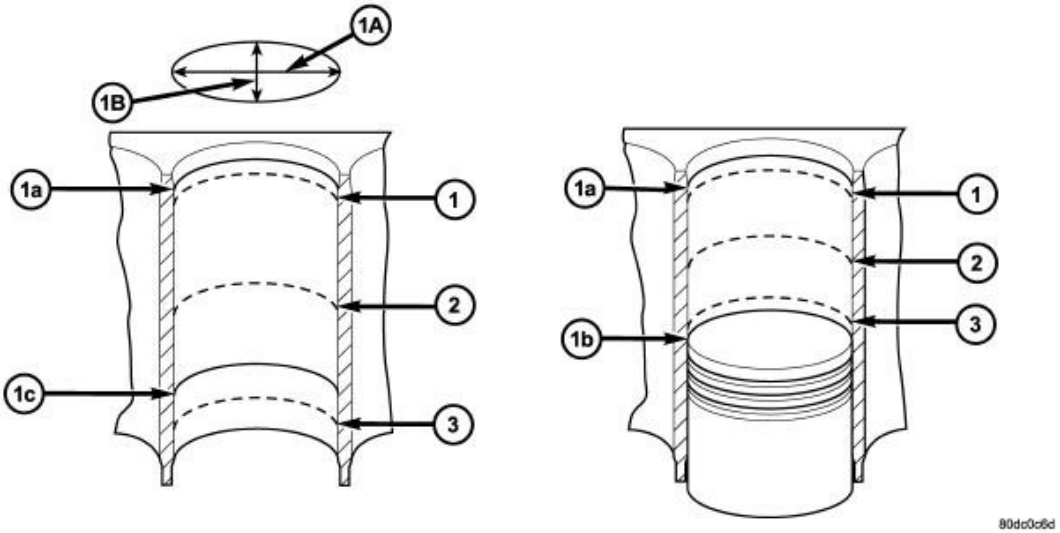

Fig. 125: Measuring Cylinder Bores
Courtesy of CHRYSLER LLC

1 - MEASURING POINT OF CYLINDER BORE
2 - MEASURING POINT OF CYLINDER BORE
3 - MEASURING POINT OF CYLINDER BORE
1a - UPPER REVERSAL POINT OF #1 PISTON RING
1b - BOTTOM DEAD CENTER OF PISTON
1c - BOTTOM REVERSAL POINT OF OIL SCRAPER RING
1A - LONGITUDINAL DIRECTION
1B - TRANSVERSE DIRECTION

NOTE: This must be done with engine completely disassembled.

1. Thoroughly clean all cylinder bores with appropriate cleaning solvent.
2. Measure each cylinder at the three measuring points shown in illustration .
3. Using the three measurement points, measure cylinder in the longitudinal and in the transverse direction .

PISTON PROTRUSION

NOTE: Any time a rod or piston is replaced, the piston protrusion must be checked.

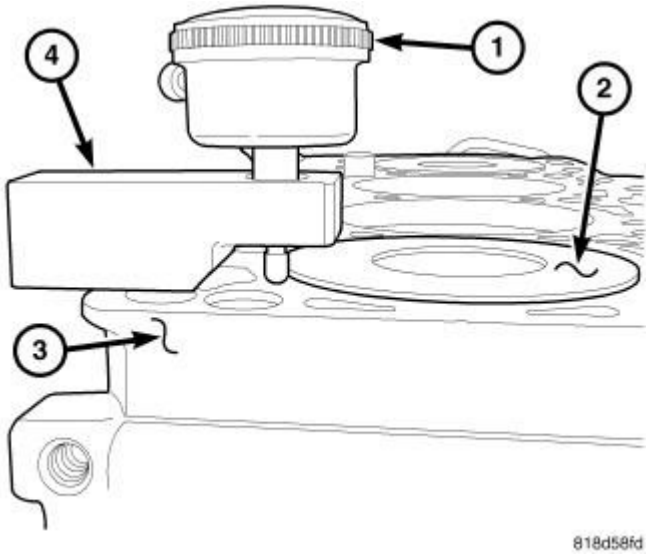

Fig. 126: Zero Dial Indicator
Courtesy of CHRYSLER LLC

1. Position scooter block D-115-2A (4) and a dial indicator flat on the cylinder block (3) head surface and zero the dial indicator.

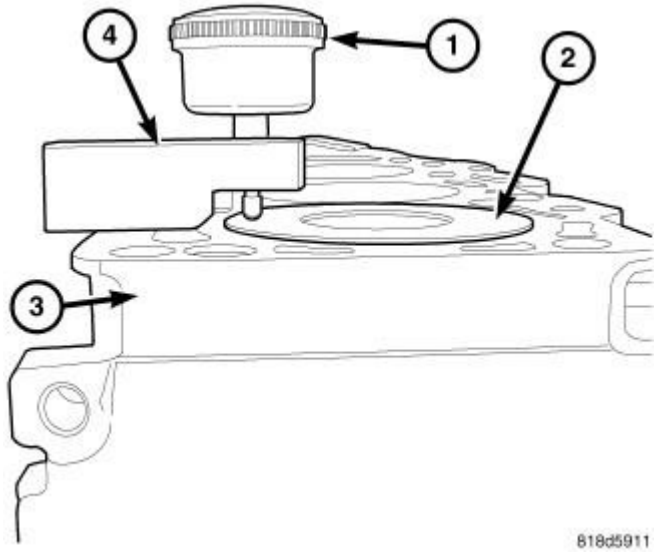

Fig. 127: Piston Height
Courtesy of CHRYSLER LLC

2. Slide Scooter block D-155-2A (4) so that the dial indicator (1) is now on the piston (2).
3. Read measurement and refer to the HEAD GASKET SELECTION table for the correct head gasket.

HEAD GASKET SELECTION

Piston Protrusion		Head Gasket Identification Notches
0.91 - 1.00 mm	0.035 - 0.039 in.	1

1.01 - 1.10 mm	0.040 - 0.043 in.	2
1.11 - 1.20 mm	0.044 - 0.047 in.	3

4. Look up piston protrusion measurement in the table to find the correct head gasket. The head gasket is marked round holes (1).

CRANKSHAFT

Standard Procedure

MEASURE CRANKSHAFT AND BLOCK JOURNALS

NOTE: After bearing damage has occurred, remove all debris which is present in the main oil gallery, connecting rod bores, and in the crankshaft and oil galleries. Include removal of the inserting steel ball of the main oil gallery before cleaning.

1. Remove crankshaft. See **Removal** .
2. Clean all engine parts thoroughly.

CAUTION: After bearing damage has occurred, replace connecting rods which have suffered overheating because of bearing damage. The connecting rod must not have any cross scores and notches.

3. Inspect connecting rod. If damage is present, inspect crankshaft, replace as necessary.
4. Inspect crankcase.
5. Inspect standard size of crankshaft bearing shells.
6. Inspect crankshaft bearing cap.
7. Mount crankshaft radially.
8. Inspect crankshaft bearing play.

NOTE: Radial mounting of the main bearings of standard size crankshaft is possible by assigning the color-coded bearing shells.

ASSIGN CRANKSHAFT BEARING SHELLS

The oil pan rail of the cylinder block is marked with chisel punches indicating which bearing shells are used.

9. Assign crankshaft bearing shells.
10. Mount crankshaft axially.
11. Inspect crankshaft bearing play.

Removal

REMOVAL

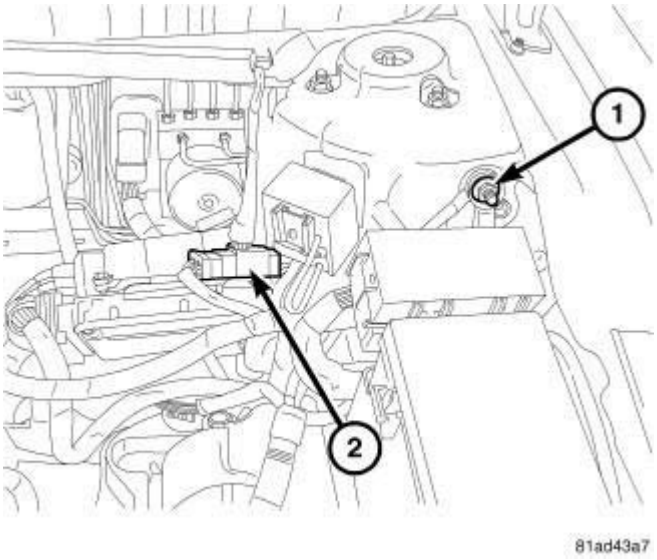

Fig. 128: Battery Cable
Courtesy of CHRYSLER LLC

NOTE: The engine must be removed from the vehicle to service crankshaft.

1. Disconnect negative battery cable (1).

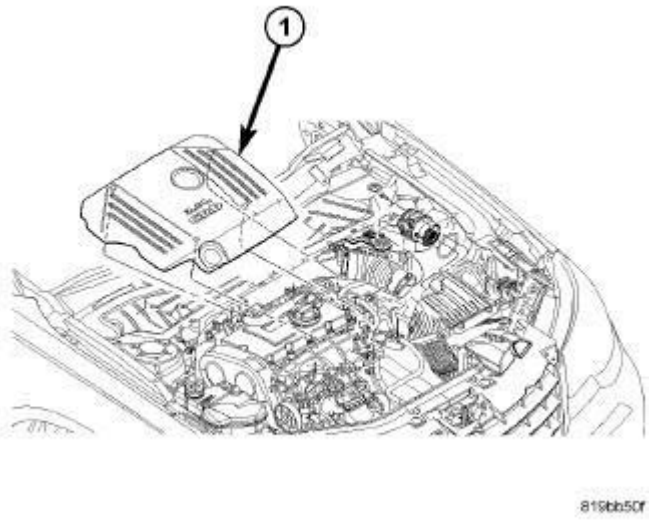

Fig. 129: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover (1).
3. Remove engine. See **Removal** .

4. Remove cylinder head. See **Removal** .
5. Remove rear crankshaft seal adapter. See **Removal** .

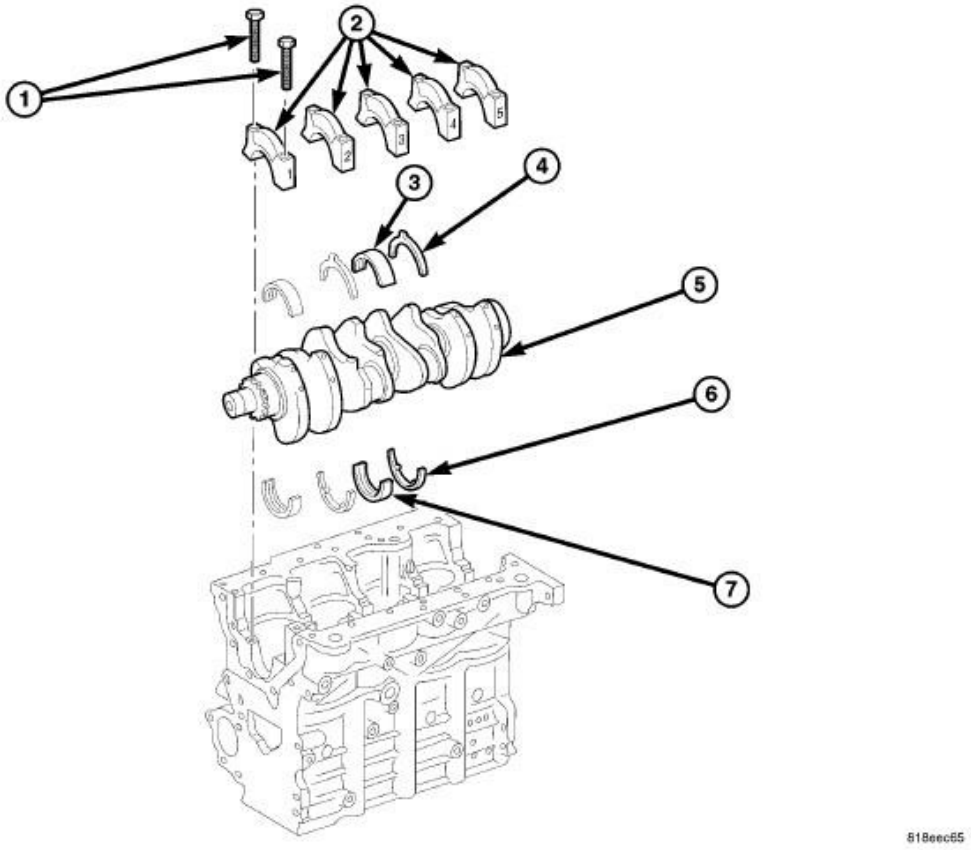

Fig. 130: Crank And Bearings
Courtesy of CHRYSLER LLC

6. Remove front crankshaft seal retainer.

NOTE: Mark piston and rod location prior to removal with paint pen. Do not use a punch.

7. Remove piston and connecting rod assemblies. See **Removal** .

CAUTION: The crankshaft bearing caps are numbered consecutively, beginning with the first crankshaft bearing cap at the front of engine. Attention must be paid to the way crankshaft bearing caps fit.

8. Unbolt crankshaft bearing caps (2).
9. Inspect crankshaft bearing caps (2) and bolts (1) for wear and stretching.
10. Remove crankshaft (5) from engine block.

Installation

INSTALLATION

CAUTION: Oil bearing shells before inserting crankshaft.

CAUTION: Oil thread and head contact surfaces of bolts that retain crankshaft bearing caps; tighten bolts from inside to outside, beginning at fit bearing. Rotate crankshaft to check clearance.

NOTE: The crankshaft bearing caps are numbered consecutively, beginning with the first crankshaft bearing cap at the front of engine. Attention must be paid to the way crankshaft bearing caps fit.

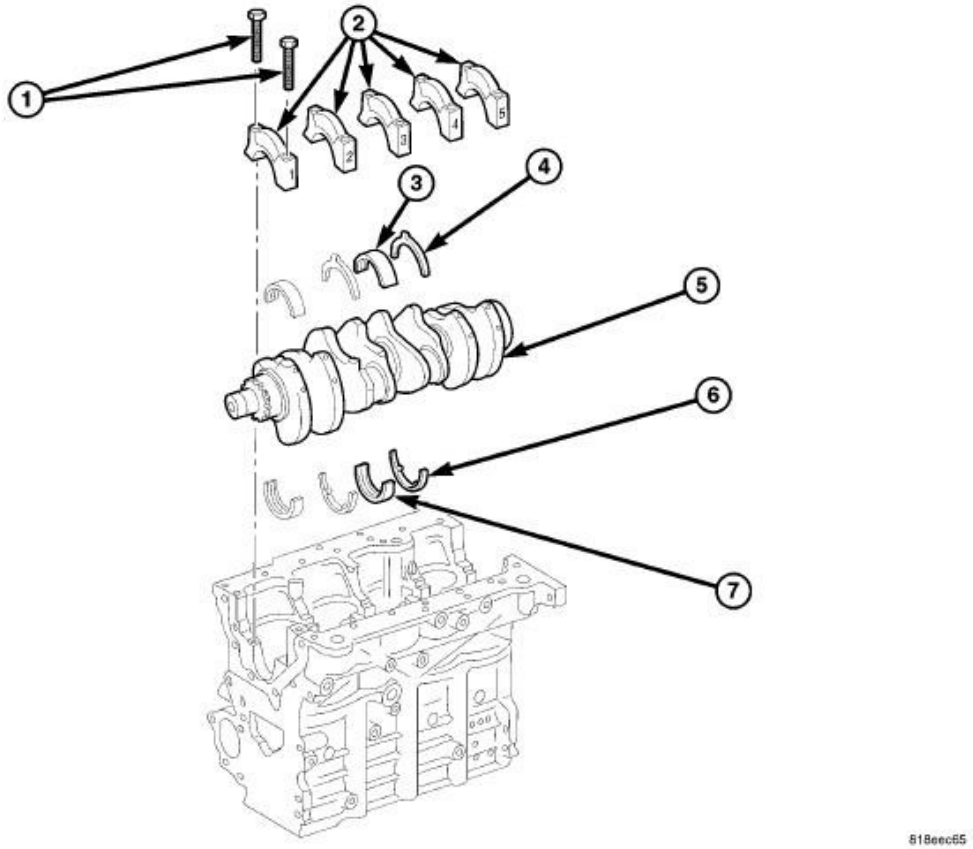

Fig. 131: Crank And Bearings
Courtesy of CHRYSLER LLC

1. Install bearing shells into engine block (7).
2. Oil bearing shells.
3. Install upper thrust bearings in block (6).

4. Install crankshaft into engine block (5).
5. Install bearing shells (3) into bearing caps (2).
6. Install lower thrust bearings (4).
7. Install crankshaft bearing caps (2). Tighten bolts in two stages. 65 N.m (48 lbs ft), then 90°.
8. Install piston and connecting rod assemblies. See **Installation** .

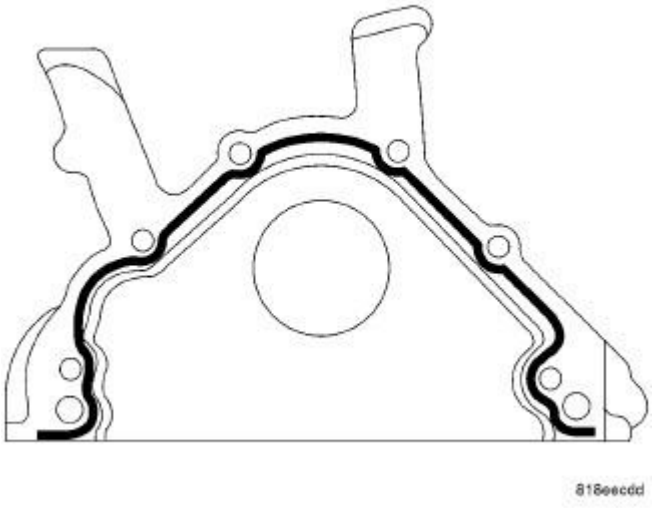

Fig. 132: Front Seal Flange RTV Path
Courtesy of CHRYSLER LLC

9. Apply RTV to front sealing flange as shown in illustration.
10. Install front crankshaft sealing flange.

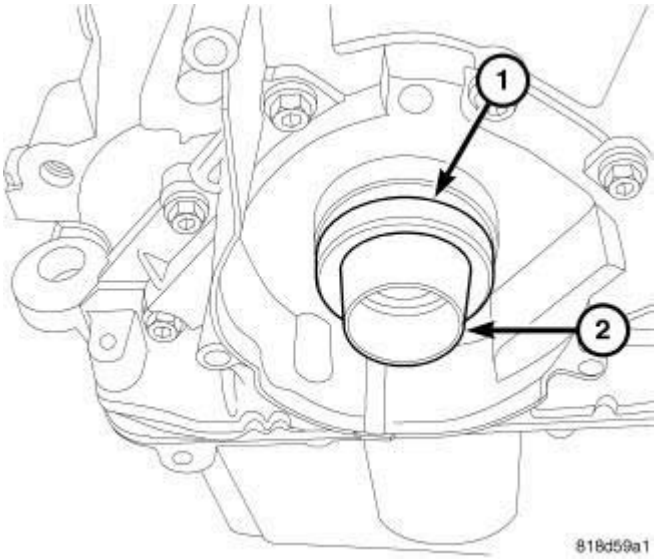

Fig. 133: Front Crank Seal Sleeve

Courtesy of CHRYSLER LLC

11. Install front seal (1) and seal installation guide (2).

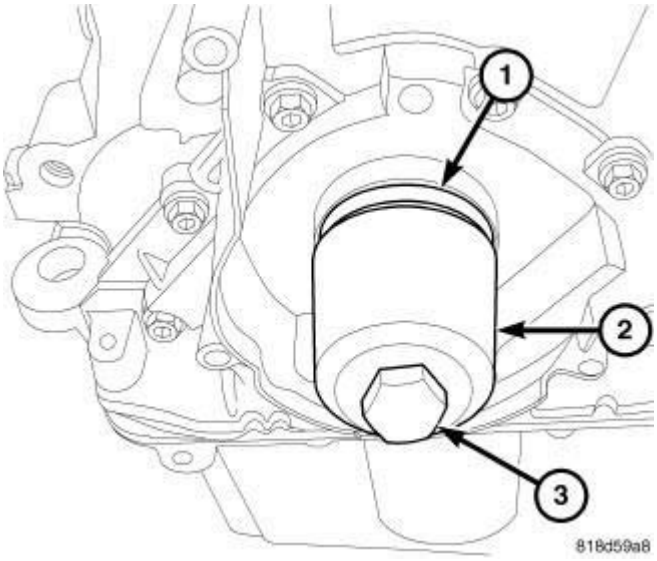

Fig. 134: Front Crank Seal Installation
Courtesy of CHRYSLER LLC

12. Install front crankshaft oil seal (1) using installer (2) and bolt (3).
13. Install rear timing belt cover.
14. Install rear crankshaft oil seal. See **Installation** .
15. Install timing belt cover. See **Installation** .
16. Install the engine. See **Installation** .
17. Fill crankcase with the correct engine oil, to the proper level.
18. Fill cooling system with the proper coolant, to the proper level. Refer to **Cooling - Standard Procedure** .

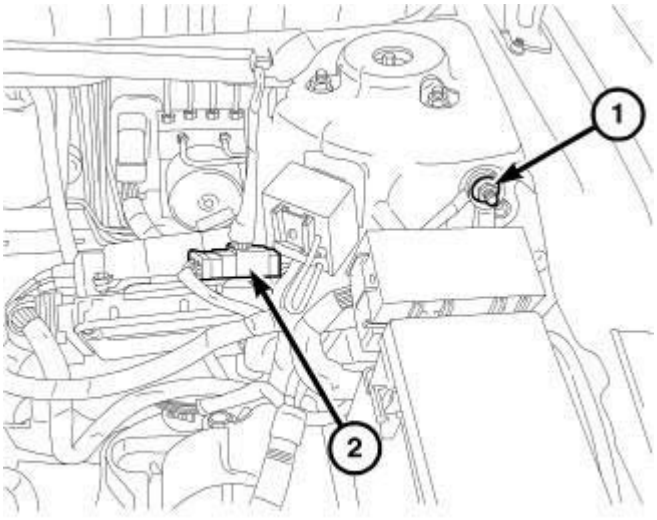

Fig. 135: Battery Cable
Courtesy of CHRYSLER LLC

19. Connect negative battery cable (1).

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothes.

20. Start engine and inspect for leaks.

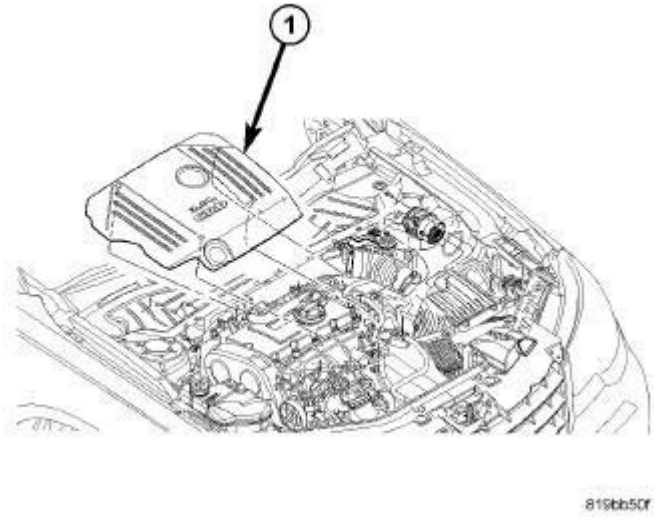

Fig. 136: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

21. Install engine cover (1). See **Installation** .

MODULE, BALANCE SHAFT

Description

DESCRIPTION

The balance shaft module bolts to the bottom of the engine. The oil pump is an integral part of the balance shaft module and cannot be serviced separately.

Operation

OPERATION

The balance shaft module is gear driven off the crankshaft. The oil pump is housed in the front portion of the module. The oil pump supplies the engines oil requirements. The balance shaft portion is for NVH reduction.

Removal

REMOVAL

NOTE: When Balance Shaft Module (BSM) is removed, a new BSM MUST be installed.

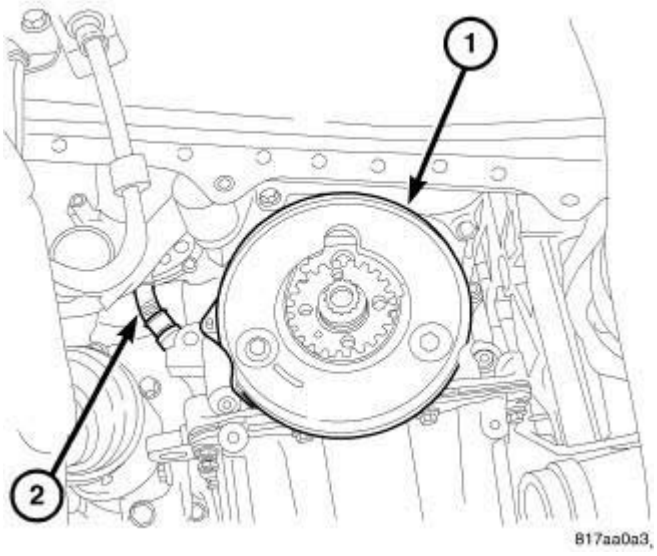

Fig. 137: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

1. Remove oil pan. See **Removal** .
2. Remove lower timing belt cover (1).

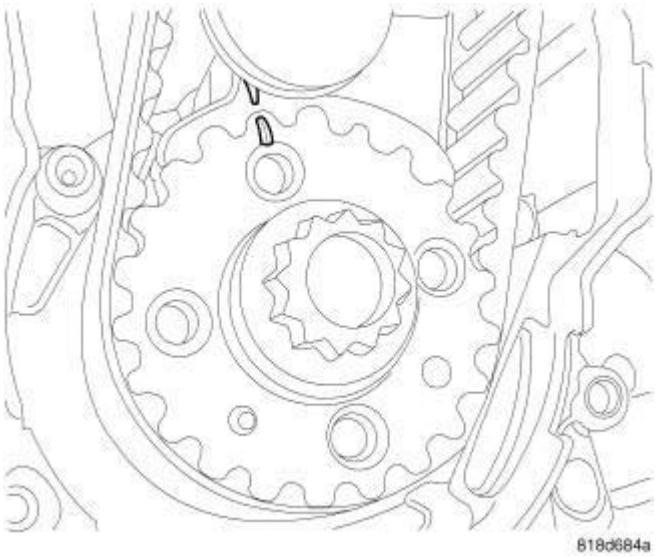

Fig. 138: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

3. Rotate engine to TDC and insert crankshaft timing lock 9883.

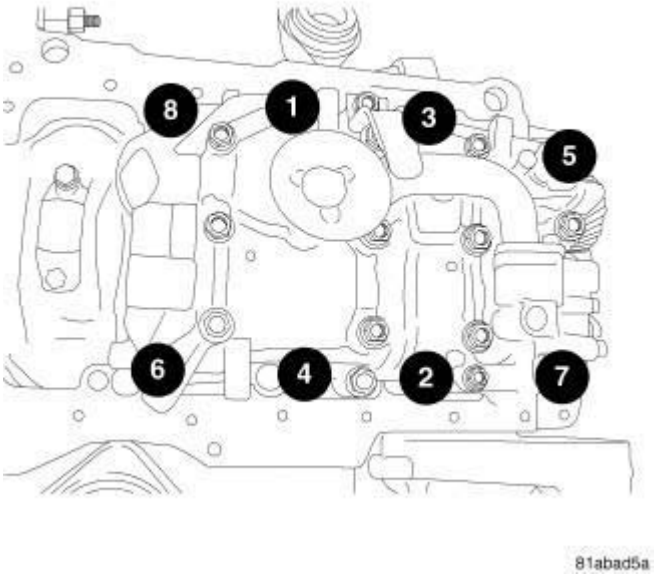

Fig. 139: Balance Shaft Retaining Bolt Torque Sequence
Courtesy of CHRYSLER LLC

4. Remove balance shaft retaining bolts.
5. Remove balance shaft.

Installation

INSTALLATION

NOTE: When installing a new balance shaft module, the oil pick-up and dip stick guide must be removed.

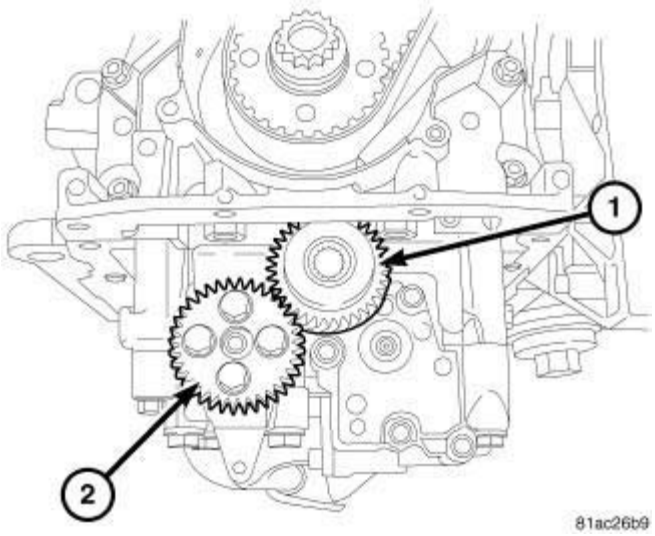

Fig. 140: BSM Timing Marks
Courtesy of CHRYSLER LLC

1. Remove dipstick guide from new BSM and discard.
2. Remove pick-up tube from BSM and discard.
3. Pour 15 ml (0.5 oz.) of oil into oil pump and turn balance shaft gear (2) a minimum of 3 revolutions.
4. Install new pick-up tube and new o-ring.
5. Tighten pick-up tube retaining bolt to 10 N.m (89 in. lbs.).
6. Tighten pick-up tube support bracket to 22 N.m (195 in. lbs.).

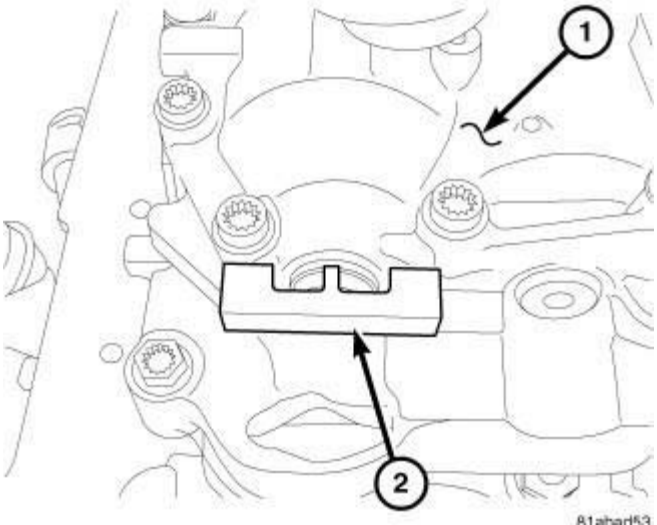

Fig. 141: BSM Timing Lock
Courtesy of CHRYSLER LLC

7. Install BSM lock 9991-2 (2).
8. Install 2 new locating sleeves.

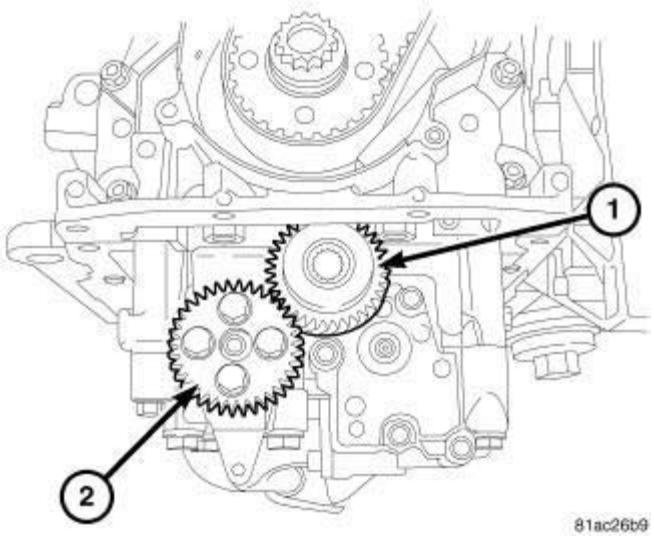

Fig. 142: BSM Timing Marks
Courtesy of CHRYSLER LLC

9. Loosen intermediate gear (1) retaining bolt 90°.
10. Install BSM with white dot on intermediate gear pointing towards the crankshaft.

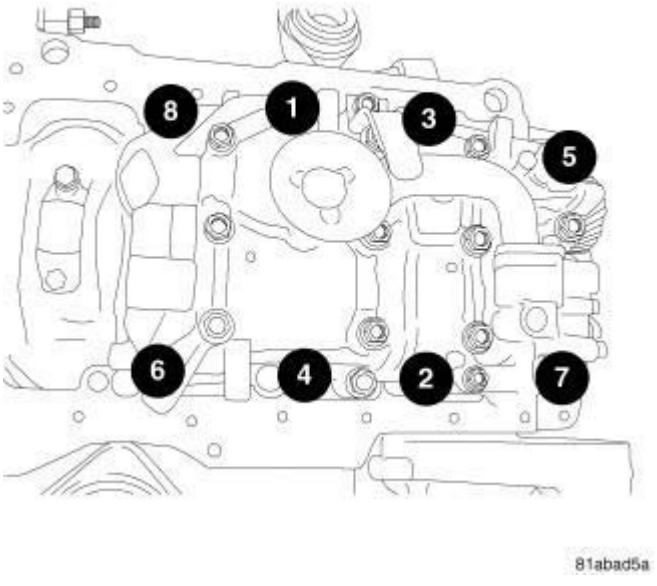

Fig. 143: Balance Shaft Retaining Bolt Torque Sequence

Courtesy of CHRYSLER LLC

11. Tighten all bolts to 6 N.m (53 in. lbs.) in the sequence shown in illustration.
12. Tighten bolts 1,2,3,4,6,8 to 20 N.m (177 in. lbs.).
13. Tighten bolts 5 and 7 to 15 N.m (133 in. lbs.).
14. Tighten all bolts an additional 90°.

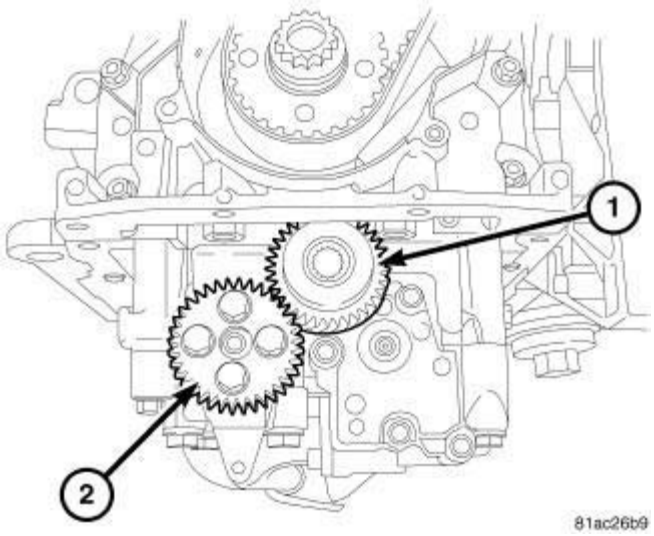

Fig. 144: BSM Timing Marks
Courtesy of CHRYSLER LLC

15. Install balance shaft gear (2) and tighten bolts to 20 N.m (177 in. lbs.).
16. Tighten bolts an additional 90°.

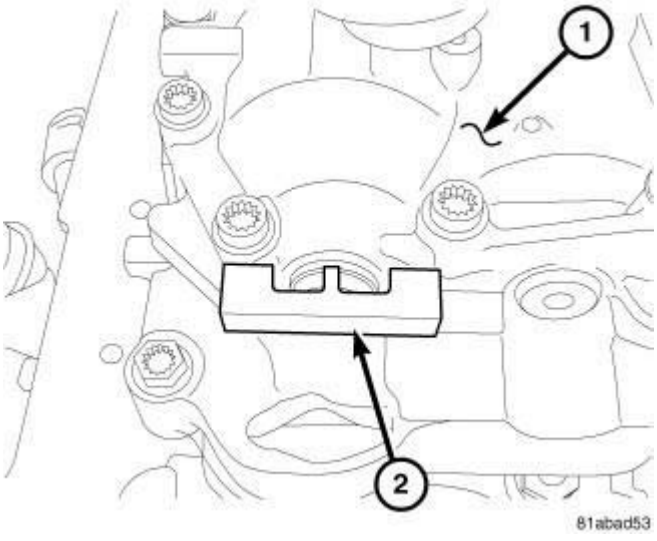

Fig. 145: BSM Timing Lock
Courtesy of CHRYSLER LLC

17. Remove BSM timing lock 9991-2 (2).

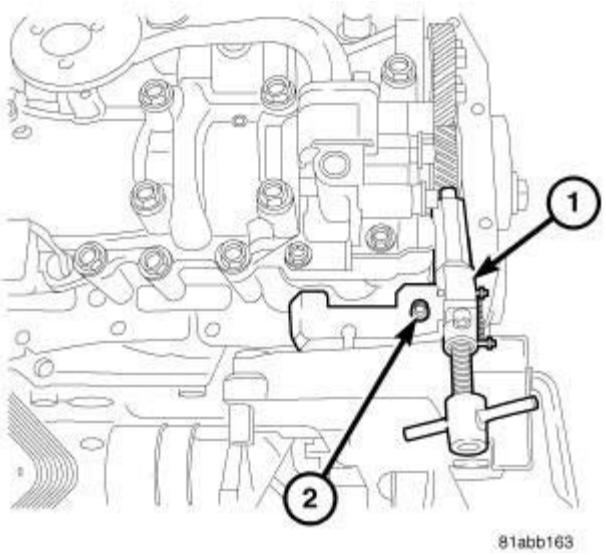

Fig. 146: Securing Bolt
Courtesy of CHRYSLER LLC

18. Secure gear lash adjuster 9991-1 (1) to engine block and install securing bolt (2).

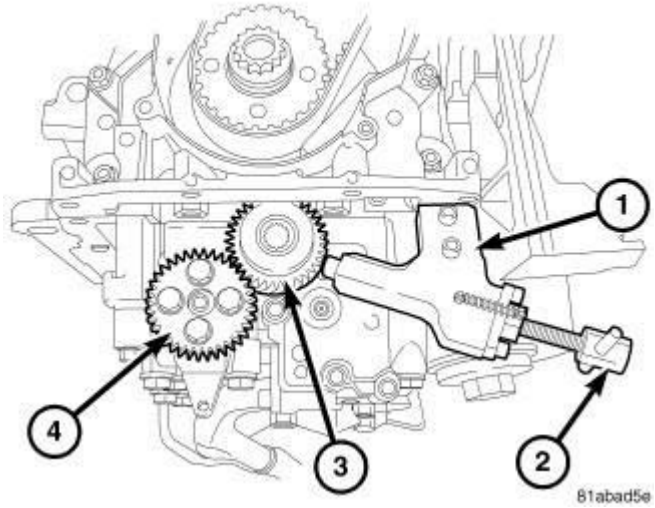

Fig. 147: Gear Lash Adjuster
Courtesy of CHRYSLER LLC

19. Tighten tensioner screw (2) to 2-4 N.m (18-35 in. lbs.).
20. Tighten intermediate gear (3) bolt to 90 N.m (66 ft. lbs.).
21. Loosen tension screw (2).
22. Check for zero backlash between gears.

23. If backlash is present, loosen intermediate gear (3) bolt 90° and repeat steps 19 through 22.
24. If no backlash was present, tighten intermediate gear an additional 90°.

CAUTION: If you have backlash after the intermediate bolt has been tightened the additional 90°, the BSM MUST be replaced.

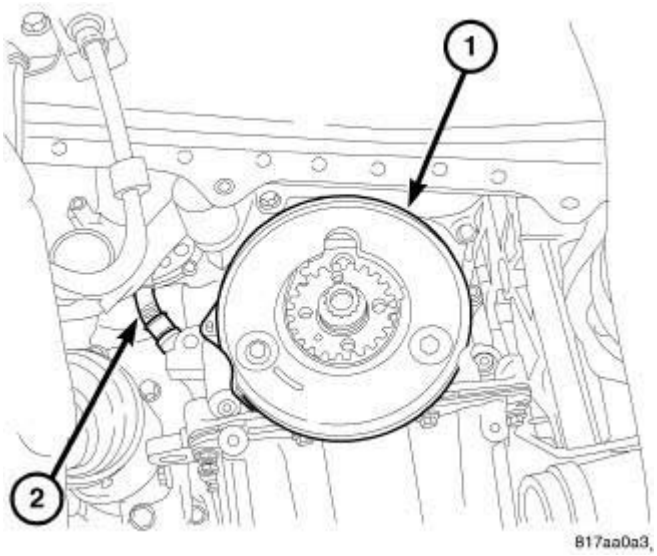

Fig. 148: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

25. Install the lower timing belt cover (1).
26. Install the crankshaft damper.
27. Install the oil pan. See **Installation** .
28. Fill with oil.
29. Start engine and check for leaks.

PUMP, TANDEM VACUUM

Description

DESCRIPTION

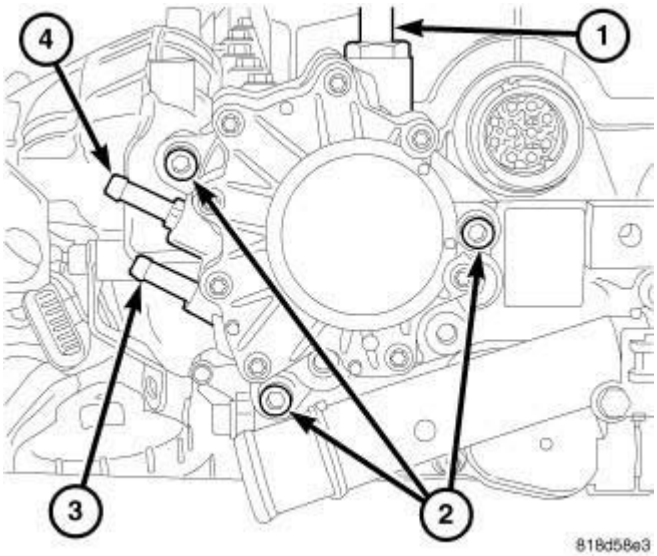

Fig. 149: Tandem Pump
Courtesy of CHRYSLER LLC

This pump is a tandem pump design. It contains a fuel pump and a vacuum pump in 1 housing. If either pump fails, the tandem pump assembly must be replaced.

Removal

REMOVAL

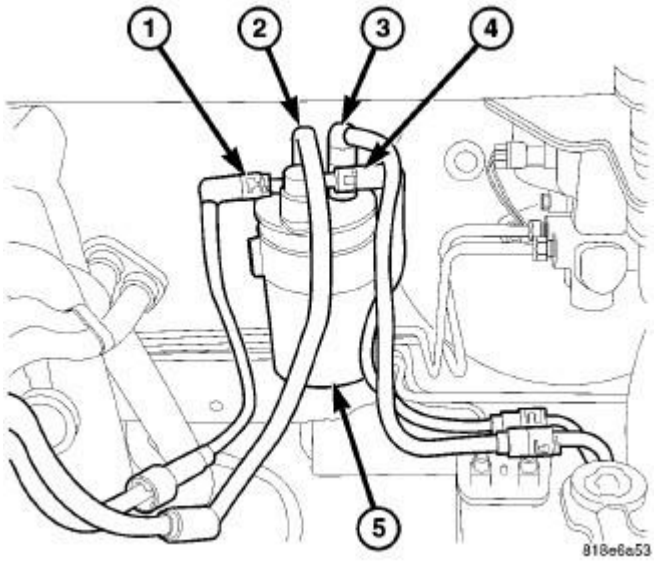

Fig. 150: Fuel Filter
Courtesy of CHRYSLER LLC

1. Remove Fuel feed line at filter (2).
2. Remove fuel return line at filter (1).

3. Connect vacuum pump to line and operate pump until no more fuel comes out.

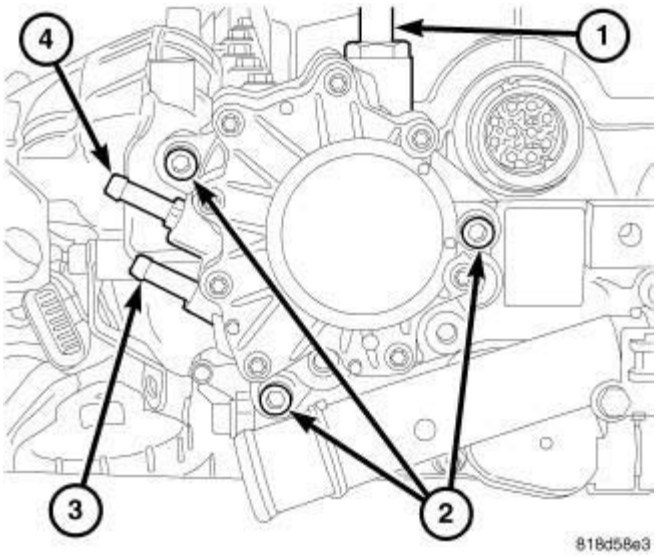

Fig. 151: Tandem Pump
Courtesy of CHRYSLER LLC

4. Remove fuel feed line (4).
5. Remove fuel return line (3).
6. Remove retaining bolts (2) and remove pump.

Installation

INSTALLATION

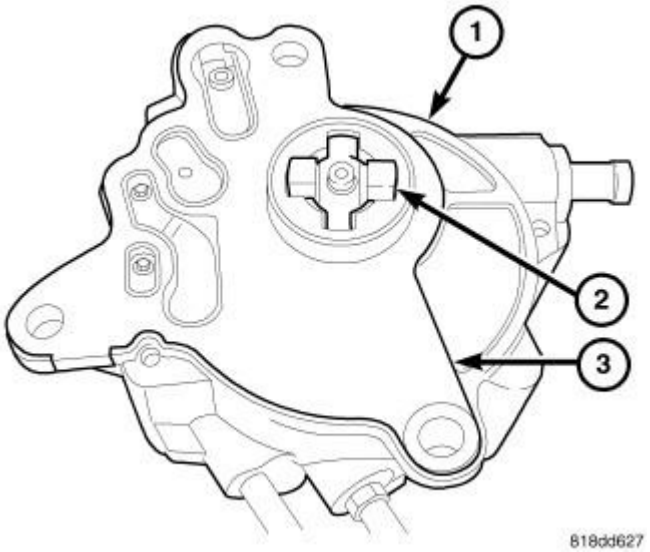

Fig. 152: Pump And Gasket
Courtesy of CHRYSLER LLC

1. Place new gasket (3) on pump (1).
2. Align pump drive (2) on pump.

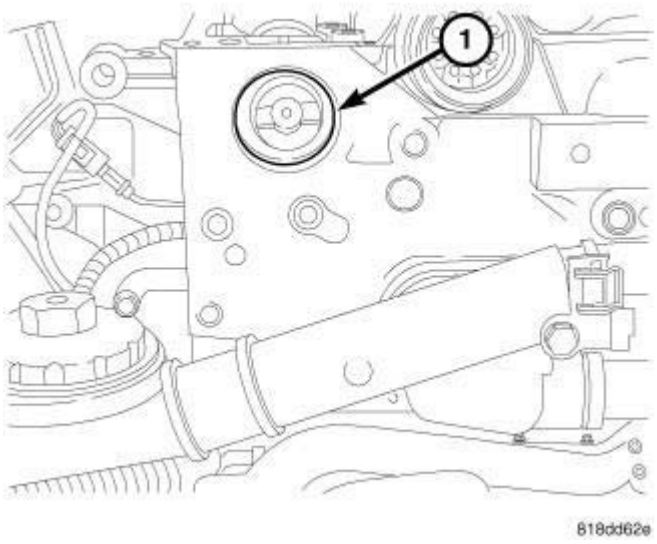

Fig. 153: Fuel Pump Drive
Courtesy of CHRYSLER LLC

3. Insert pump drive into slot on camshaft (1).

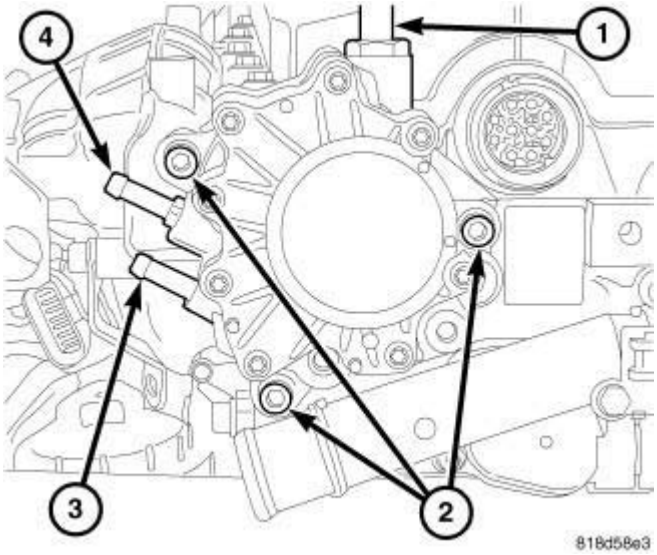

Fig. 154: Tandem Pump
Courtesy of CHRYSLER LLC

4. install pump retaining bolts (2) and tighten.
5. Install fuel feed line (4).
6. Install fuel return line (3).

ROD, PISTON AND CONNECTING

Removal

REMOVAL

1. Remove cylinder head.
2. Remove oil pan.

NOTE: It may be necessary to remove the oil pump to gain access to all of the rods.

3. Remove oil pump if necessary.

NOTE: Do not use a punch to mark connecting rods.

4. Mark connecting rods with paint marker.
5. Remove connecting rod bolts and discard.
6. Push piston and rod assembly out of the engine block.
7. Repeat as needed.

Installation

INSTALLATION

1. Make sure the ring end gaps are properly staggered.
2. Lubricate the piston and rings with clean engine oil.
3. Compress piston rings with a ring compressor.
4. Install upper rod bearing shell in to connecting rod and oil bearing shell.
5. Push piston into cylinder.

NOTE: Be careful when guiding rod into place not to nick the crankshaft journals.

6. Install lower bearing shell into connecting rod cap.
7. Lubricate lower bearing shell and position rod cap.
8. Install new rod bolts and tighten to 30 N.m + 90° (22 ft. lbs. + 90°).
9. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation** .
10. Install cylinder head. See **Installation** .
11. Replace oil filter and fill with oil. See **Installation** .
12. Fill cooling system. Refer to **Cooling - Standard Procedure** .
13. Start engine and check for leaks.

SEAL, CRANKSHAFT OIL, REAR

Removal

REMOVAL

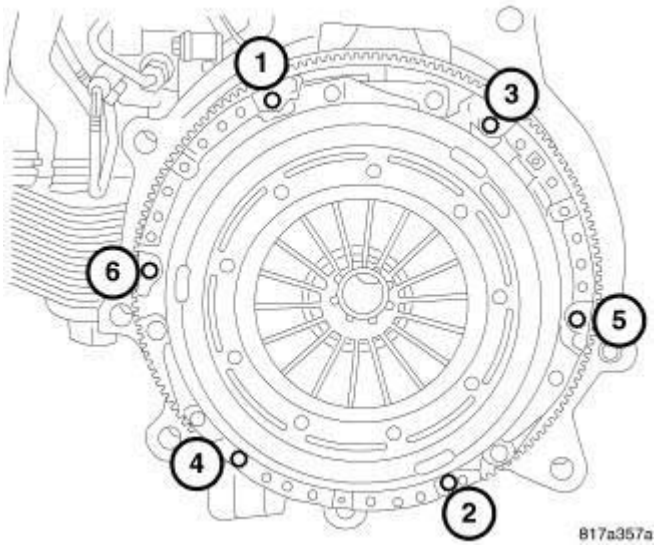

Fig. 155: Pressure Plate
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the flywheel. Refer to **Clutch/FLYWHEEL - Removal** .

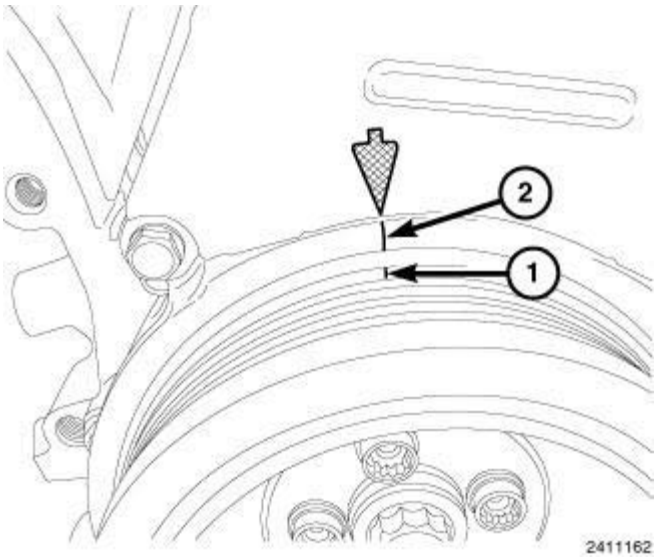

Fig. 156: Vibration Damper Dust Cover
Courtesy of CHRYSLER LLC

3. I equipped, remove the vibration damper dust cover.

4. Rotate the crankshaft to align the timing mark (1) with mark (2) to set cylinder No. 1 at Top Dead Center (TDC).

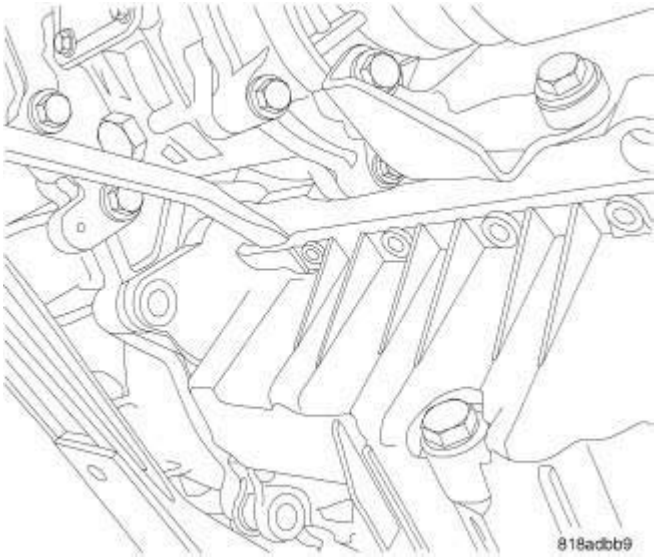

Fig. 157: Oil Pan-Removal
Courtesy of CHRYSLER LLC

5. Drain the engine oil.
6. Remove the oil pan bolts.
7. Using a suitable pry bar, remove the oil pan.

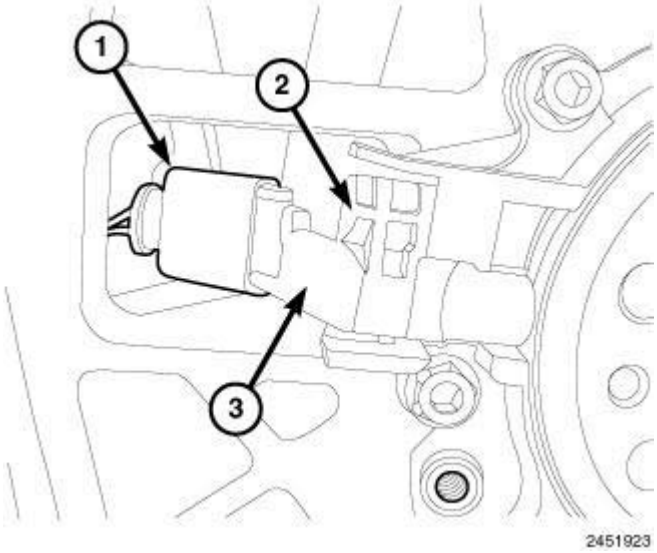

Fig. 158: Crankshaft Position Sensor
Courtesy of CHRYSLER LLC

8. Disconnect the crankshaft position sensor harness connector (1).
9. Remove the bolt (2) and the Crankshaft Position Sensor (CKP) (3).

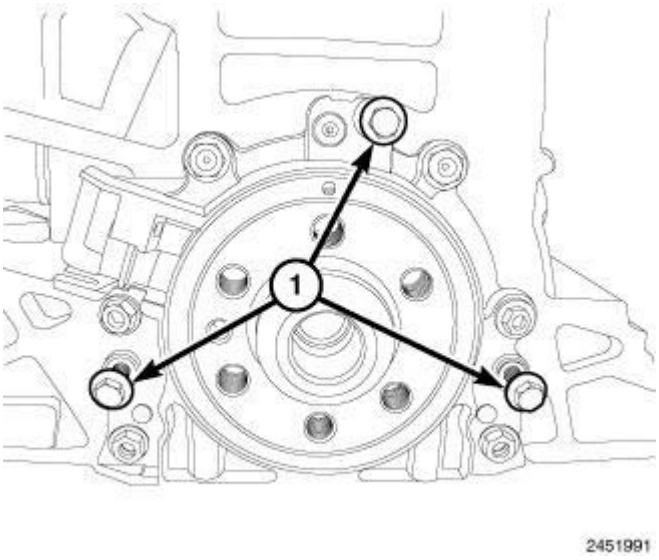

Fig. 159: Rear Crankshaft Seal Assembly Removal
Courtesy of CHRYSLER LLC

10. Install the three M6 x 35 bolts into the rear crankshaft seal assembly as illustrated.
11. Alternately screw in bolts 1/2 turn at a time to pull seal assembly off.
12. Wipe excess oil off the crankshaft.

Installation

INSTALLATION

NOTE: The rear crankshaft seal comes with and installation sleeve that must not be removed prior to installation.

NOTE: The sealing flange and sender wheel must not be separated or rotated after removing from package.

NOTE: The sealing flange and seal are one unit that must be replaced together with the sender wheel only.

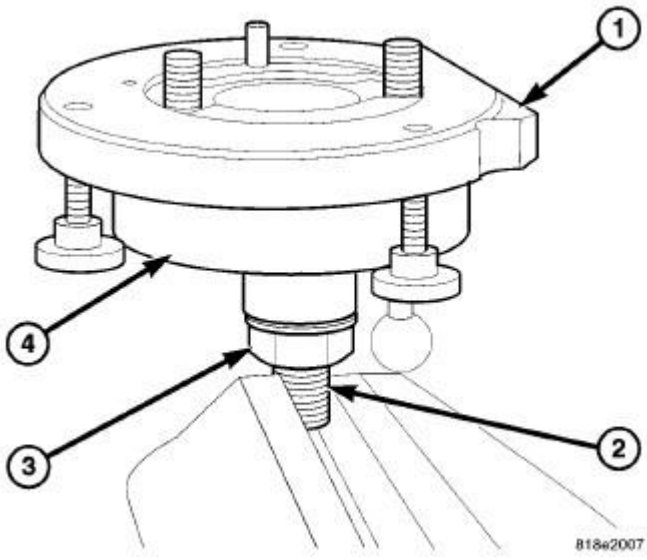

Fig. 160: Rear Main Installer 9888
Courtesy of CHRYSLER LLC

1. Screw in nut (3) to the edge of the clamping surface (2) of threaded spindle.
2. Clamp rear main seal installer 9888 in a vice on the clamping surface of threaded spindle (2).
3. Press assembly bell housing (4) down so it lies on nut (3).
4. Screw nut (3) onto threaded spindle (1) until inner part of assembly device and assembly are bell housing are level.

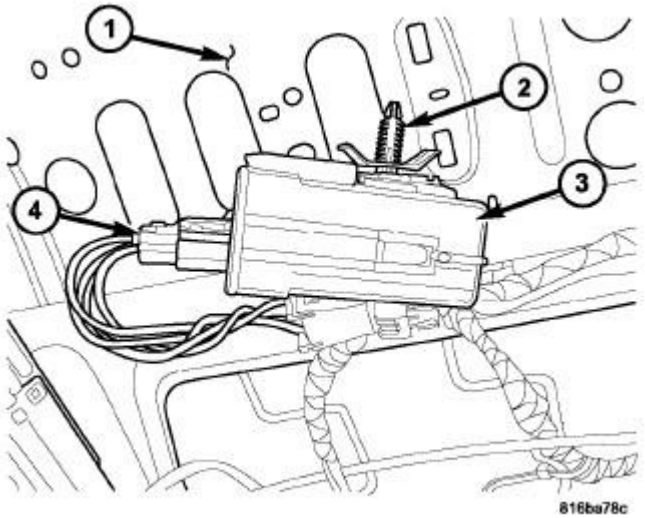

Fig. 161: Securing Clip
Courtesy of CHRYSLER LLC

5. Remove securing clip (1) from rear crankshaft sealing flange (2).

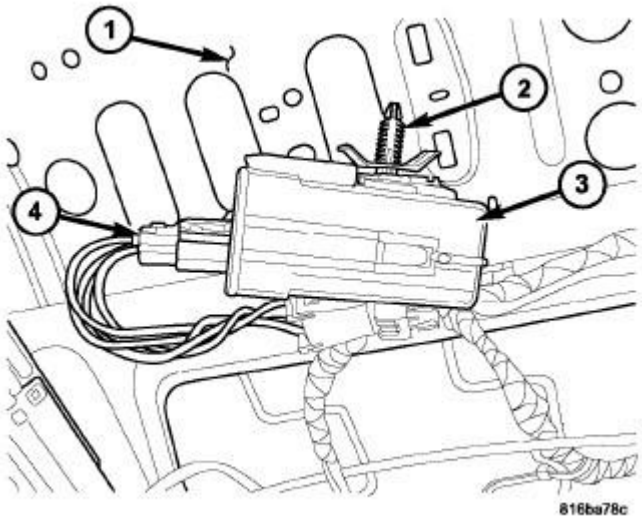

Fig. 162: Locating Hole
Courtesy of CHRYSLER LLC

NOTE: The sender wheel must not be taken out of the sealing flange or turned.

6. Locating hole (1) on sender wheel (3) must align with marking (2) on rear main seal.

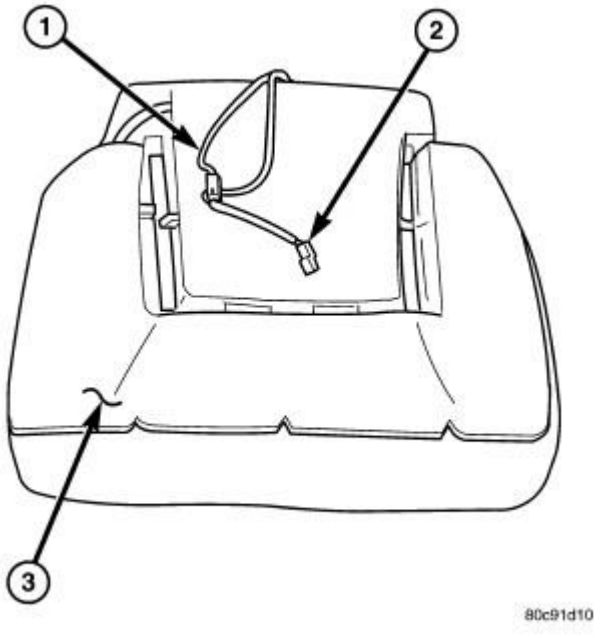

Fig. 163: Sealing Lip Support
Courtesy of CHRYSLER LLC

7. Place seal on clean flat surface with the outer edge facing down.
8. Push sealing lip support ring (1) downward until it lies on flat surface.

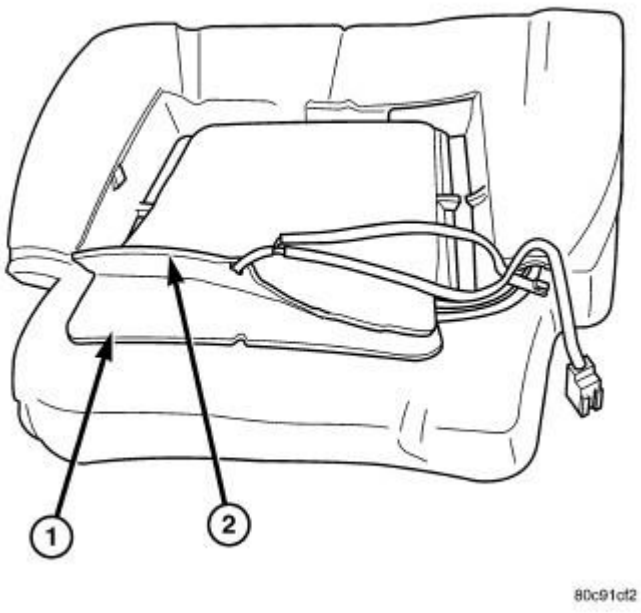

Fig. 164: Sender Wheel Alignment
Courtesy of CHRYSLER LLC

9. Upper edge of sender wheel and front edge of rear main seal must align.

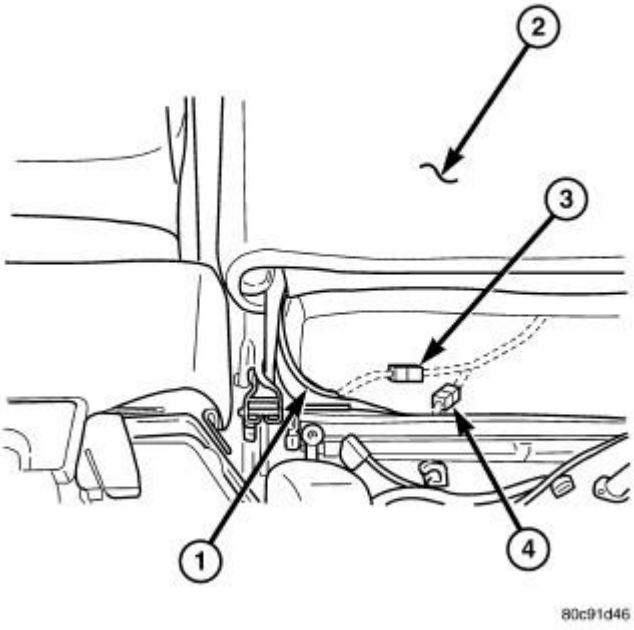

Fig. 165: Locating Pin
Courtesy of CHRYSLER LLC

10. Place rear main seal with outer edge on rear main seal installer 9888 (1) so that locating pin (2) can be inserted into hole (3).

NOTE: Ensure that the rear main seal lies flat on the installer.

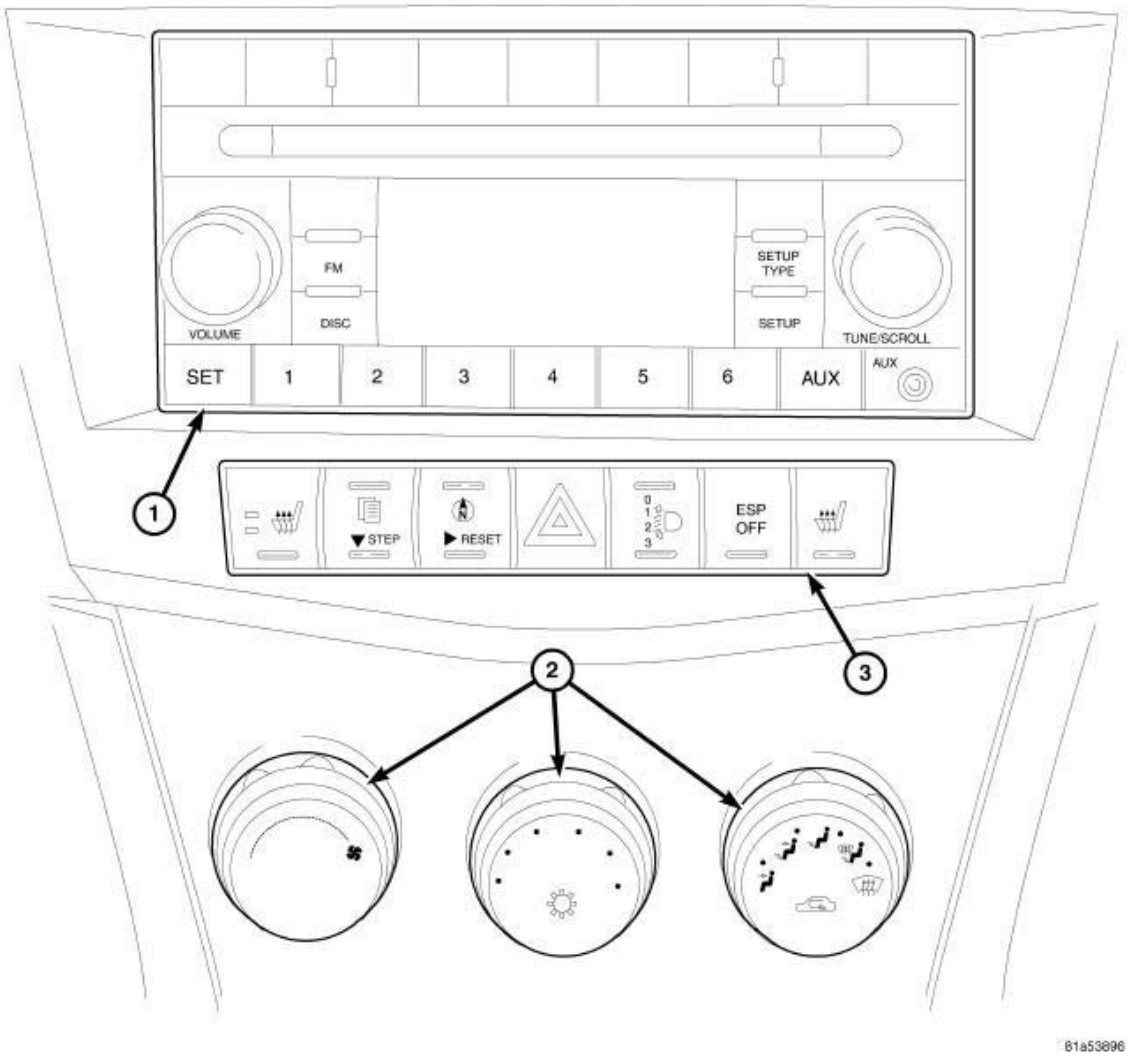

Fig. 166: Seal and Installer
Courtesy of CHRYSLER LLC

11. Push the flange and support ring for the sealing lip (1) against the installer (2) while tightening the three knurled knobs (3) so the locating pin cannot slide out of the sender wheel hole.

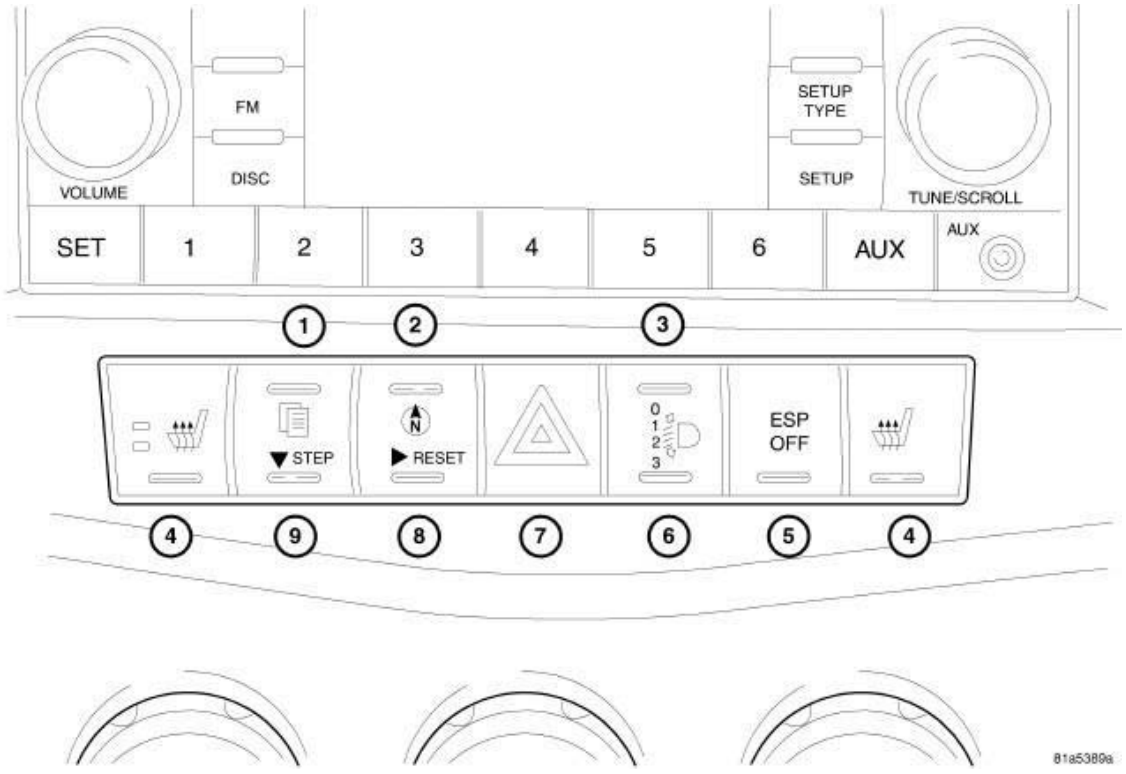

Fig. 167: Attaching Seal to Installer
Courtesy of CHRYSLER LLC

NOTE: When installing rear main seal, the sender wheel must remain fixed in assembly tool.

NOTE: The crankshaft flange must be free from oil and grease.

NOTE: The engine must be at TDC on the #1 cylinder.

12. Screw nut (3) to the end of the spindle.
13. Press threaded spindle of seal installer (1) until nut (3) lies against assembly bell housing (2).
14. Align flat side of assembly bell housing on sump side of crankcase sealing surface.

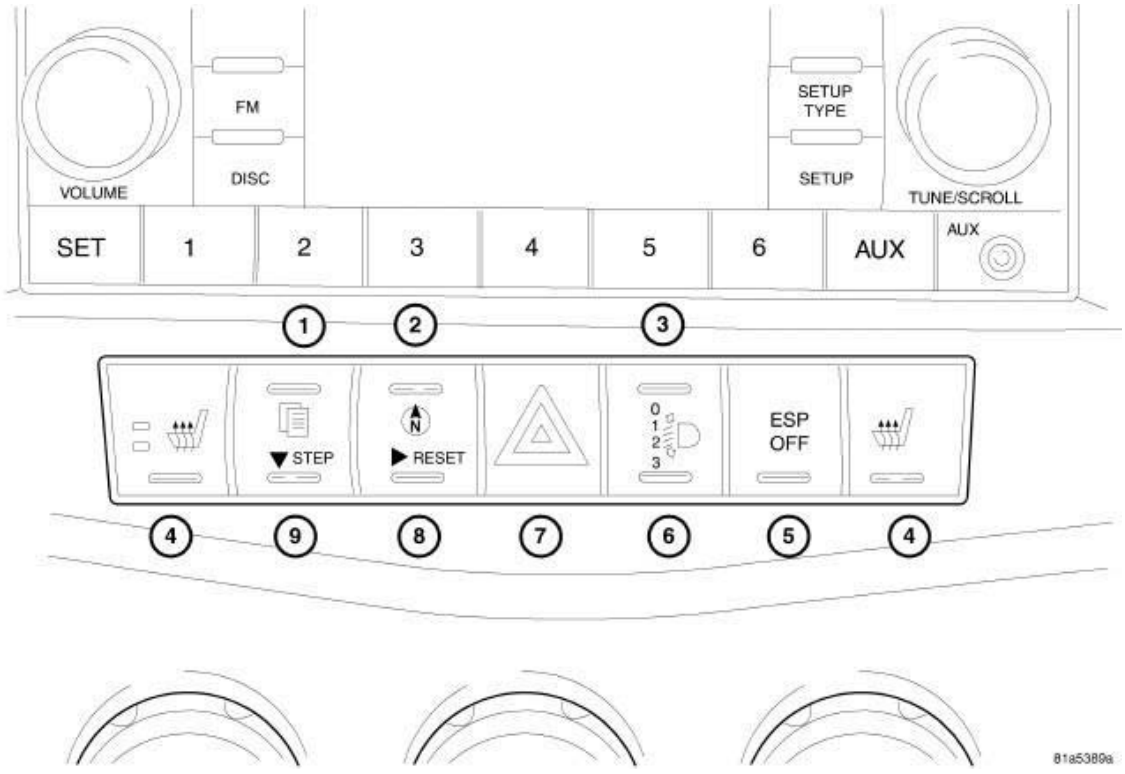

Fig. 168: Secure Installer to Crankshaft
Courtesy of CHRYSLER LLC

15. Secure assembly tool (2) to crankshaft using Allen head bolts (3).

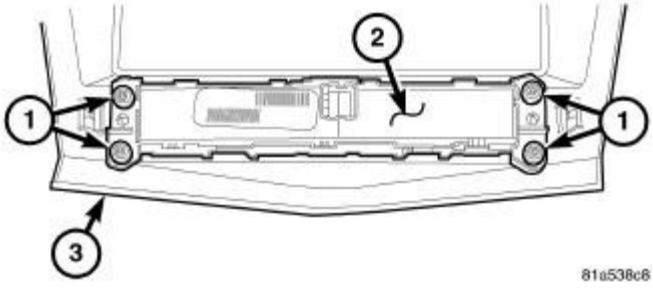

Fig. 169: Guide Bolts
Courtesy of CHRYSLER LLC

16. To guide sealing flange, screw two M7 x 35 mm bolts (1) into cylinder block.

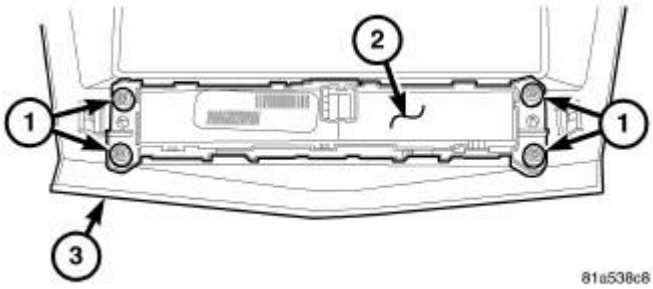

Fig. 170: Seal to Crankshaft Alignment
Courtesy of CHRYSLER LLC

17. Push assembly bell housing (3) by hand in the direction shown in illustration until sealing lip support ring (2) contacts the crankshaft (1).
18. Push guide pin with black knob (5), into hole in crankshaft. This is done to ensure the sender wheel reaches its final installation position.
19. Hand tighten both hexagon socket head bolts of assembly tool.
20. Screw hexagon nut (4) onto threaded spindle by hand until it lies against assembly bell housing (3).

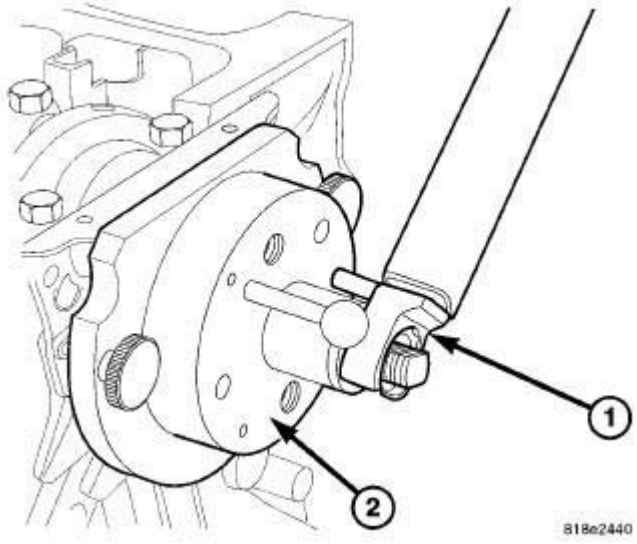

Fig. 171: Pressing Seal in Place
Courtesy of CHRYSLER LLC

NOTE: After nut is tightened, a small air gap must be present between cylinder block and sealing flange.

21. Torque hexagon nut to 35 N.m (26 ft. lbs.).

Checking sender wheel installation position

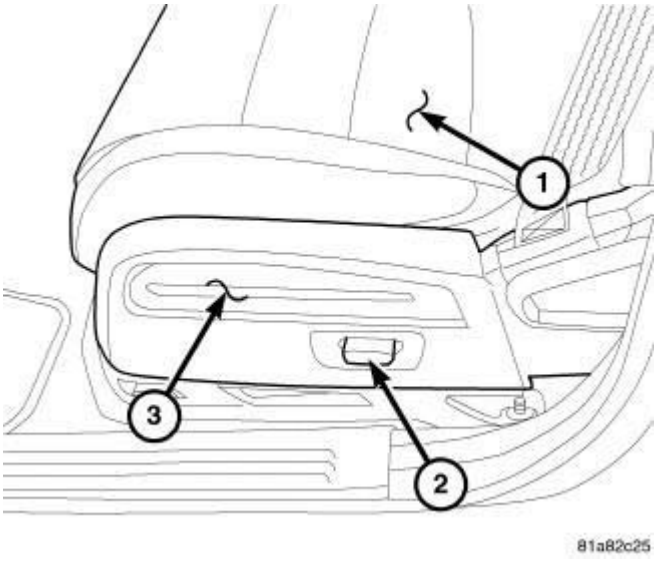

Fig. 172: Hexagon Nut, Bolts, Cylinder Block And Knurled Screws
Courtesy of CHRYSLER LLC

1. Remove hexagon nut (5) to the end of the threaded spindle.
2. Remove the two bolts (1) from cylinder block.
3. Loosen the three knurled screws (2).
4. Remove rear main installer 9888.
5. Remove sealing lip support ring.

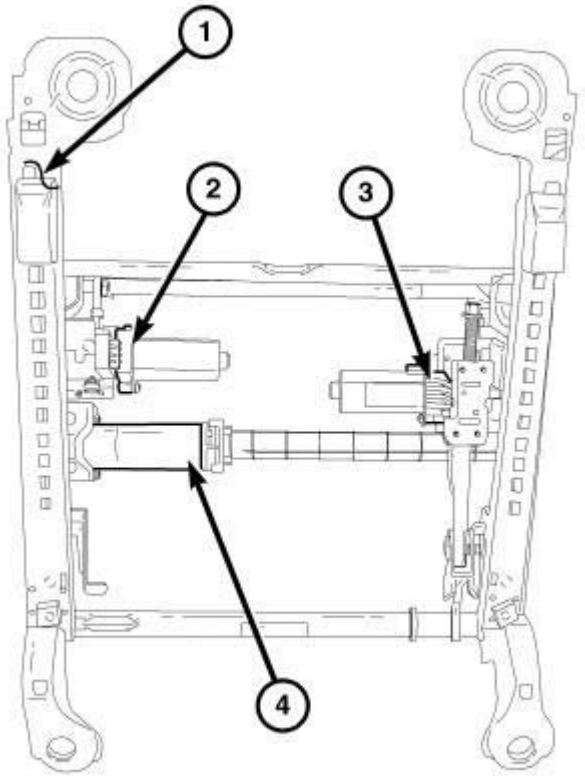

Fig. 173: Crankshaft Flange & Sender Wheel
Courtesy of CHRYSLER LLC

6. The sender wheel is in the correct position if a gap of 0.5 mm (0.019 in.) exists between the crankshaft flange (1) and the sender wheel (2). Measure the distance -a- between the crankshaft flange and the sender wheel.

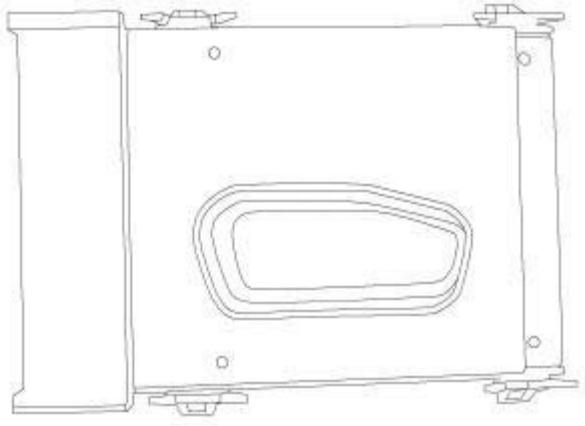

Fig. 174: Measuring Distance Between Crankshaft Flange & Sender Wheel
Courtesy of CHRYSLER LLC

7. Set vernier gauge on crankshaft flange.
8. Measure the distance between the crankshaft flange and the sender wheel.
9. If the measurement is too small, press sender wheel further.

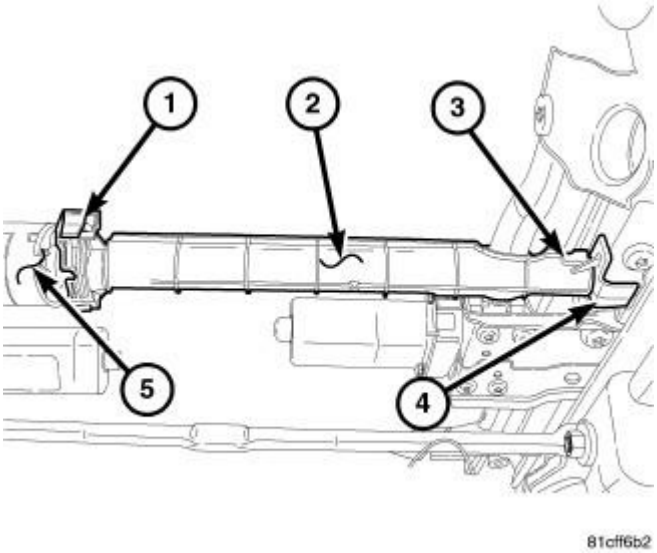

Fig. 175: Hexagon Nut, Bolts, Cylinder Block And Knurled Screws
Courtesy of CHRYSLER LLC

NOTE: Re-pressing sender wheel.

a. Secure assembly rear main installer 9888 to crankshaft flange using Allen head bolts.
b. Hand tighten both hexagon socket head bolts.
c. Push assembly tool by hand to sealing flange.
d. Screw hexagon nut (5) onto threaded spindle by hand until it lies against assembly bell housing (3).
e. Tighten nut to 40 N.m (30 ft. lbs.).
f. Check installation position again.
g. If dimension is too small, repeat steps a through d again and torque to 45 N.m (33 ft. lbs.).
h. Check installation position again.

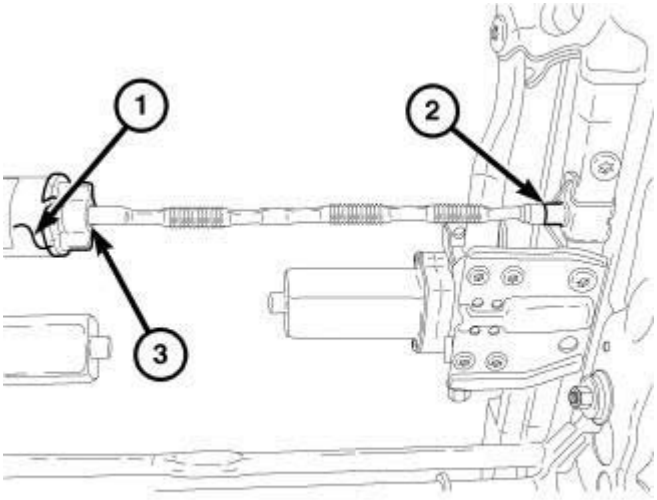

Fig. 176: Tighten Rear Main Bolts In Sequence
Courtesy of CHRYSLER LLC

10. If dimension is attained, tighten rear sealing flange bolts to 15 N.m (133 in. lbs.) in the sequence shown in illustration.

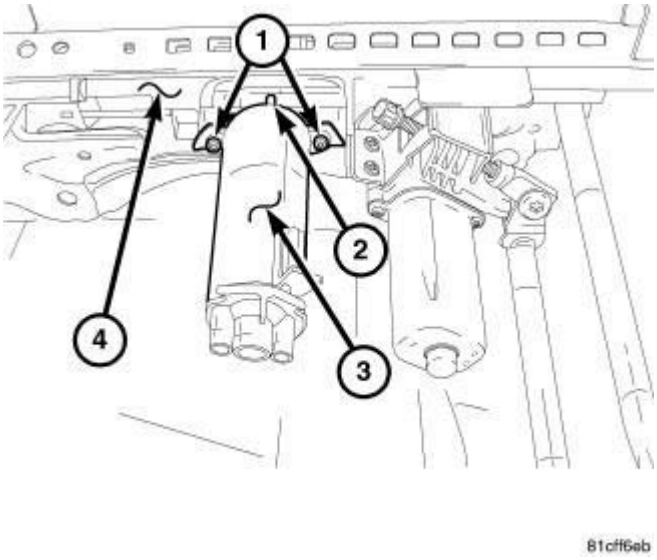

Fig. 177: Crankshaft Position Sensor
Courtesy of CHRYSLER LLC

11. Install crankshaft position sensor (3). Tighten bolt (2) to 5 N.m (44 in. lbs.).
12. Connect the crankshaft position sensor harness connector (1).

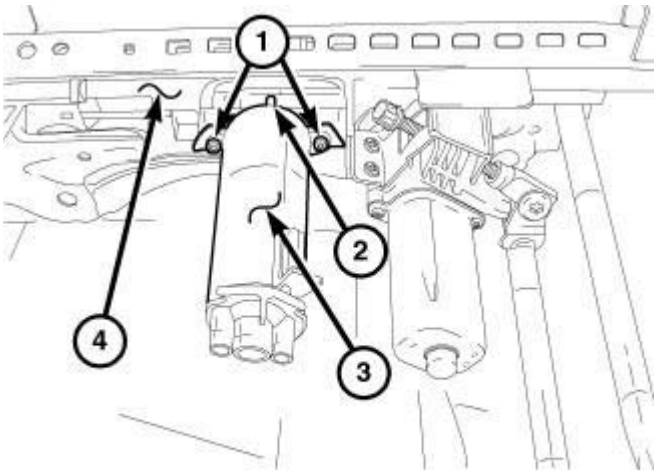

Fig. 178: Applying Engine Sealant RTV
Courtesy of CHRYSLER LLC

13. Clean the oil gasket surfaces.
14. Apply a 3 mm bead of engine sealant RTV (1).

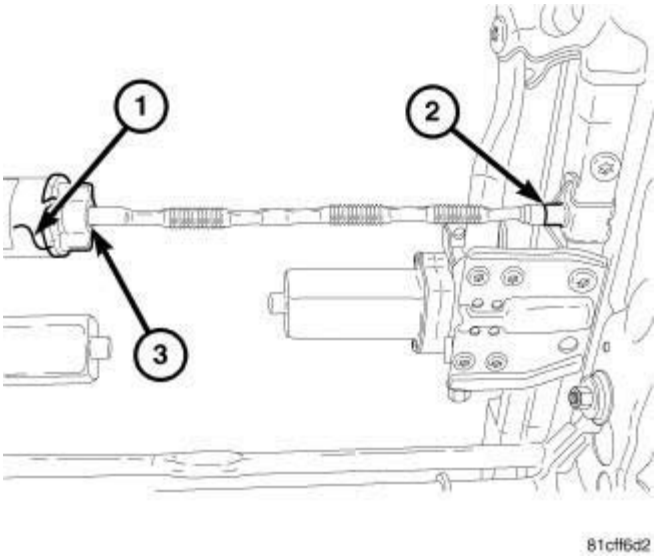

Fig. 179: Identifying Oil Pan Bolts
Courtesy of CHRYSLER LLC

15. Install oil pan.
    - Tighten bolts (A) to 15 N.m (133 in. lbs).
    - Tighten bolts (B) to 45 N.m (33 ft. lbs).
    - Tighten bolts (C) to 40 N.m (30 ft. lbs).

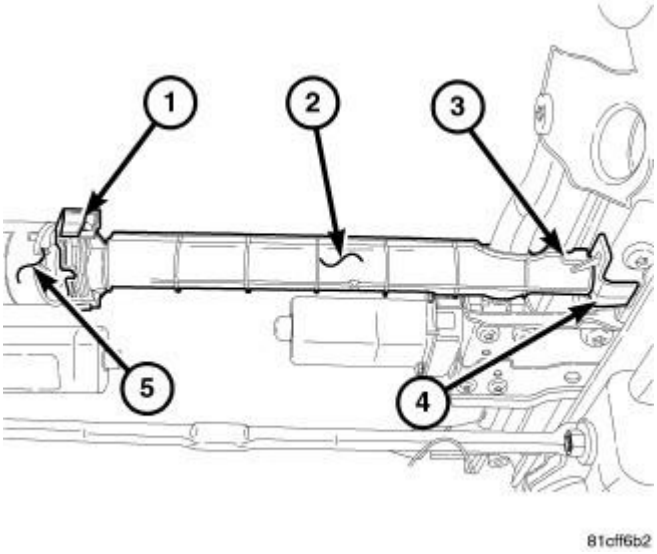

Fig. 180: Flywheel Assembly
Courtesy of CHRYSLER LLC

16. Install the flywheel. Refer to **Clutch/FLYWHEEL - Installation** .
17. If equipped, install the vibration damper dust cover.

WARNING: Use extreme caution when the engine is operating. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothes.

18. Fill engine with the recommended engine oil.
19. Start engine and inspect for leaks.
20. Connect the negative battery cable.

LUBRICATION

DESCRIPTION

DESCRIPTION

The lubrication system is a full-flow filtration, pressure feed type. The balance shaft module (BSM) is mounted below the ladder frame and chain driven by the crankshaft. The BSM consists of a non-serviceable pump, oil pressure relief valve, and a non-serviceable balance assembly.

OPERATION

OPERATION

Engine oil is drawn up through the pickup tube and is pressurized by the oil pump and routed through the full-flow filter to the main oil gallery running the length of the cylinder block. A diagonal hole in each bulkhead feeds oil to each main bearing. Drilled passages within the crankshaft route oil from main bearing journals to

connecting rod journals. Balance shaft lubrication is provided through an internal oil passage at the #3 bearing location around the BSM mounting bolt. A vertical hole at the number one bulkhead routes pressurized oil through a filter screen and head gasket up to the cylinder head. The oil then divides into three passages; one to the intake cam phaser, one to the exhaust cam phaser and one to the camshafts. The passage to the camshafts divides to feed both of the hollow camshafts at the second cam journal. The rest of cam journals are feed oil through the hollow camshafts. The #1 cam journals are fed oil through the VVT oil passages. Oil passages to the phasers are directed through the OCV (oil control valves) to the #1 journals. The oil then flows through the camshafts then to the cam phasers. Oil returning to the pan from pressurized components supplies lubrication to the valve stems, cam lobes, and tappets. Cylinder bores and wrist pins are splash lubricated from directed slots on the connecting rod thrust collars.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

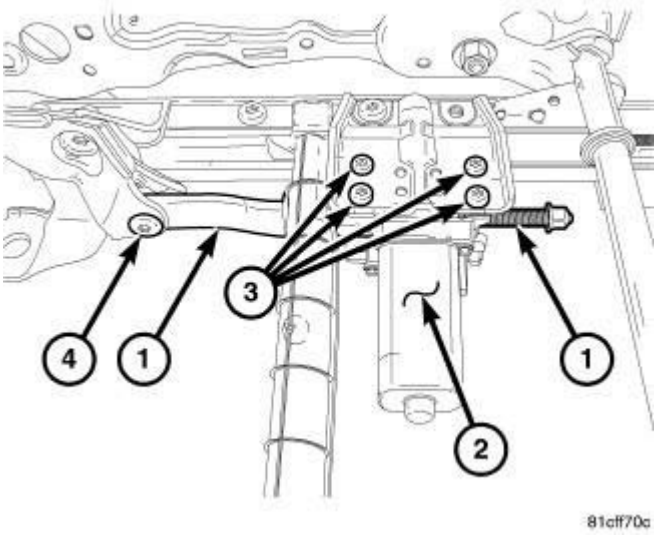

Fig. 181: Oil Pressure Sender
Courtesy of CHRYSLER LLC

1. Disconnect and remove oil pressure switch (1). See **Removal** .

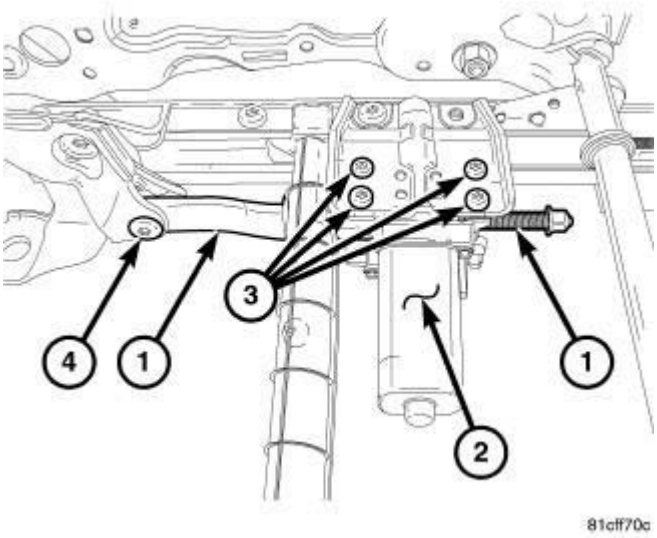

Fig. 182: Oil Pressure Gauge
Courtesy of CHRYSLER LLC

2. Install oil pressure gauge (1).
3. Start engine and record oil pressure. Refer to Specifications for correct oil pressure requirements. See **Specifications** .

CAUTION: If oil pressure is 0 at idle, do not perform the 3000 RPM test.

4. If oil pressure is 0 at idle, shut off engine. Check for pressure relief valve stuck open, a clogged oil pick-up screen or a damaged oil pick-up tube O-ring.
5. Remove oil pan and inspect for debris. See **Removal** .
6. Remove pressure relief valve and inspect. If damaged replace pressure relief valve.
7. If pressure relief valve is OK, replace balance shaft module assembly.
8. After test is complete, remove test gauge and fitting (1).

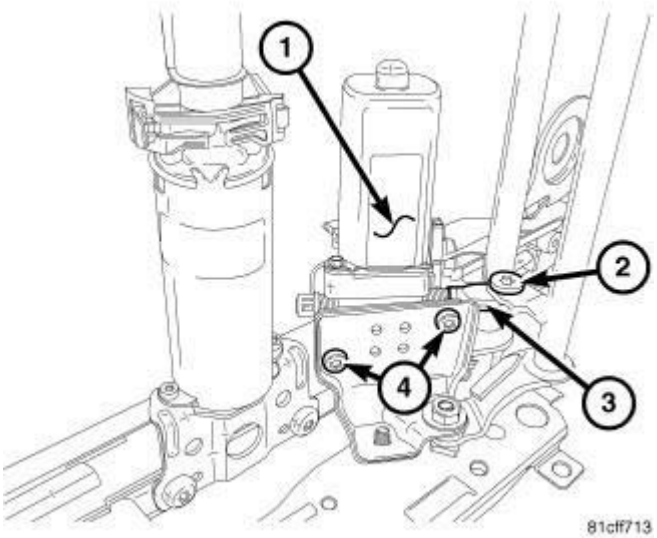

Fig. 183: Oil Pressure Sender
Courtesy of CHRYSLER LLC

9. Install oil pressure switch (1) and connector. See **Installation** .

FILTER, ENGINE OIL

Removal

REMOVAL

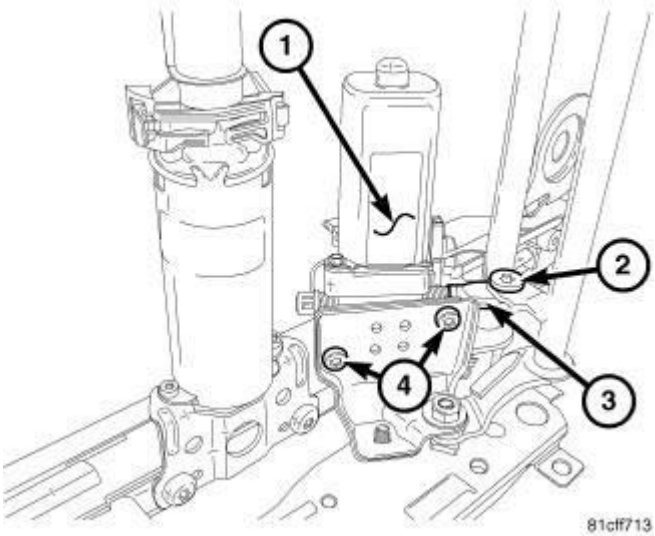

Fig. 184: Filter In Housing
Courtesy of CHRYSLER LLC

1. Remove oil filter housing cover.
2. Pull filter cartridge (2) out of the filter housing (1) and discard.

Installation

INSTALLATION

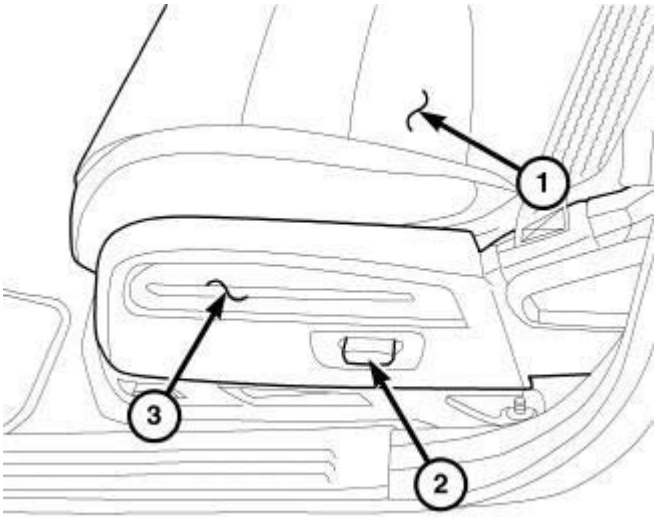

Fig. 185: Filter In Housing
Courtesy of CHRYSLER LLC

1. Install oil filter cartridge (2) into housing (1).

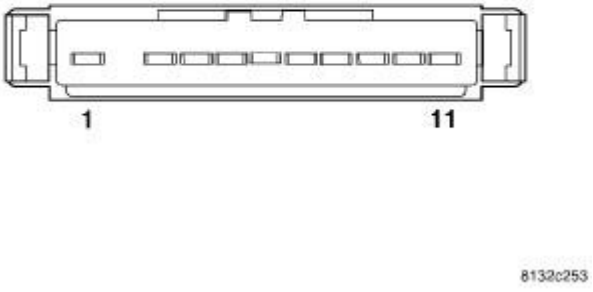

Fig. 186: Oil Filter
Courtesy of CHRYSLER LLC

2. Install new O-ring (2) onto cover (1).
3. Install cover.

OIL

Standard Procedure

ENGINE OIL LEVEL CHECK

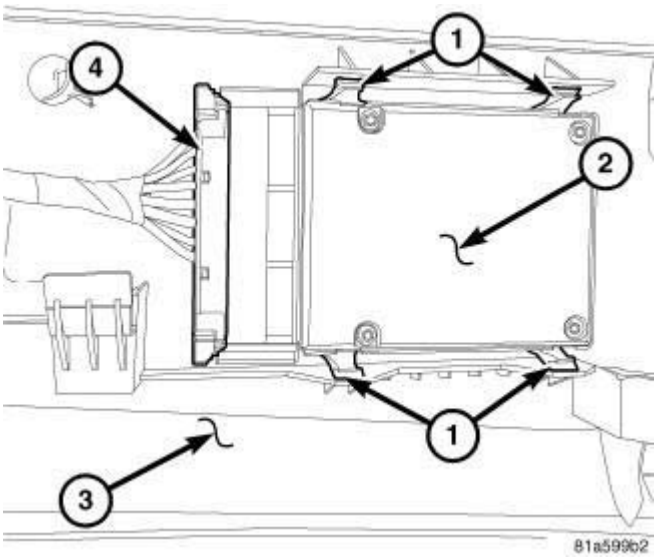

Fig. 187: Oil Level Indicator
Courtesy of CHRYSLER LLC

The best time to check engine oil level is after the vehicle has sat overnight, or if the engine has been running, allow the engine to be shut off for at least 5 minutes before checking oil level.

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading. Remove dipstick and observe oil level. Add oil only when the level is at or below the MIN mark (3).

CAUTION: Do not operate engine if the oil level is above the MAX (2) mark on the dipstick. Excessive oil volume can cause oil aeration which can lead to engine failure due to loss of oil pressure or increase in oil temperature.

ENGINE OIL AND FILTER CHANGE

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

Change engine oil at mileage and time intervals described in the Maintenance Schedule. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

1. Run engine until achieving normal operating temperature.

2. Position the vehicle on a level surface and turn engine off.
3. Remove oil fill cap.
4. Raise vehicle on hoist.
5. Place a suitable oil collecting container under oil pan drain plug.
6. Remove oil pan drain plug or and allow oil to drain into collecting container. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.
7. Remove oil filter. See **Removal** .
8. Install oil pan drain plug. Tighten drain plug to 28 N.m (20 ft. lbs.).
9. Install new oil filter. See **Installation** .
10. Lower vehicle and fill crankcase with specified type and amount of engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** and refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .
11. Install oil fill cap.
12. Start engine and inspect for leaks.
13. Stop engine and inspect oil level.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. Replace oil filter with a Mopar® oil filter or the equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

PAN, OIL

Removal

REMOVAL

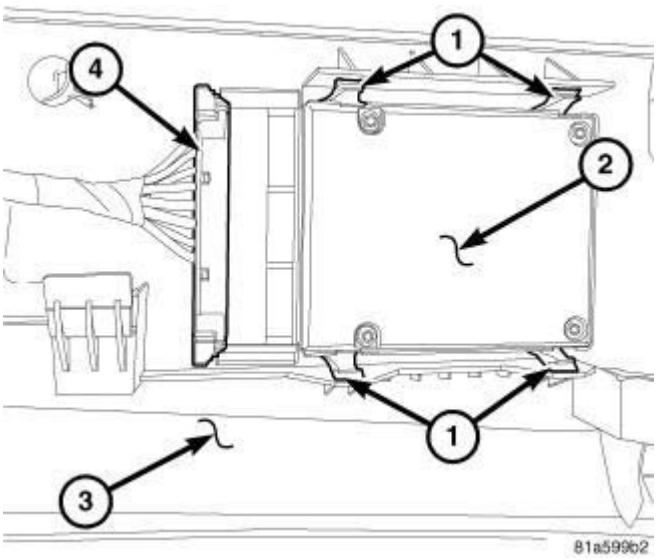

Fig. 188: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).
2. Raise vehicle on hoist.
3. Remove engine compartment lower silencer and accessory drive belt splash shield.

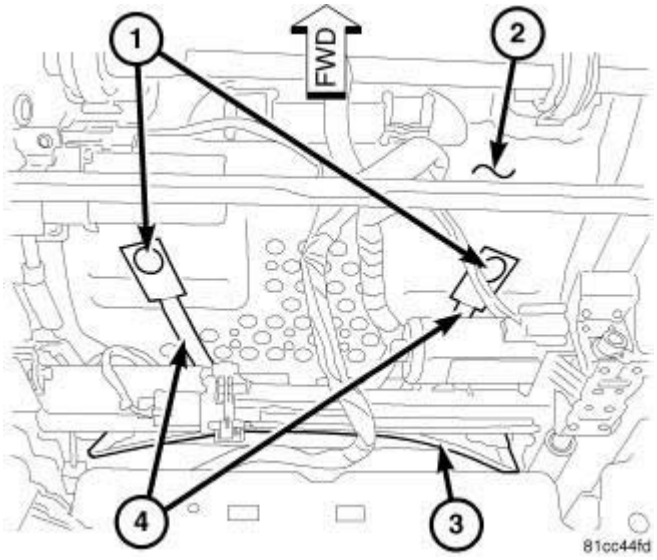

Fig. 189: Oil Pan-Removal
Courtesy of CHRYSLER LLC

4. Drain engine oil.

NOTE: It may be necessary to rotate crankshaft to gain access to the rear oil pan bolts.

5. Remove oil pan fasteners.
6. Remove oil pan by prying off with suitable pry bar.
7. Clean oil pan and engine block sealing surfaces.

Installation

INSTALLATION

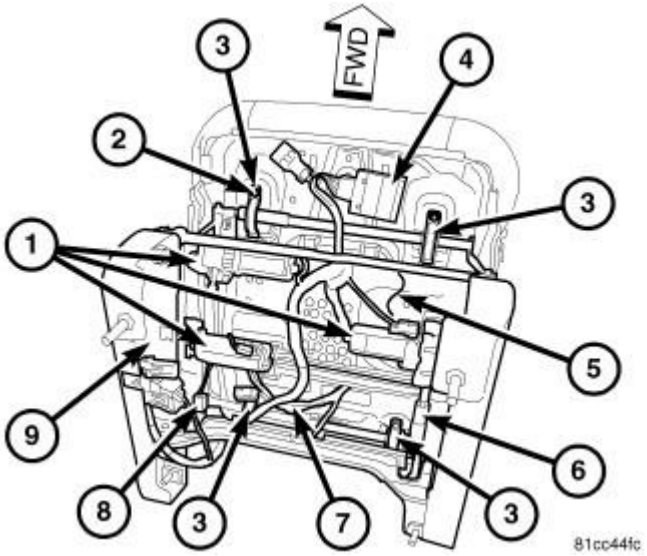

Fig. 190: Oil Pan RTV Path
Courtesy of CHRYSLER LLC

1. Clean oil pan and all sealing surfaces.
2. Apply a 2-3 mm bead of RTV to oil pan as shown in illustration.
3. Position oil pan and install bolts.
4. Hand tighten oil pan bolts.
5. Install oil pan to bell housing bolts and hand tighten.
6. Tighten oil pan bolts to 15 N.m (133 in. lbs.).
7. Tighten oil pan to bell housing bolts to 40 N.m (30 ft. lbs.).

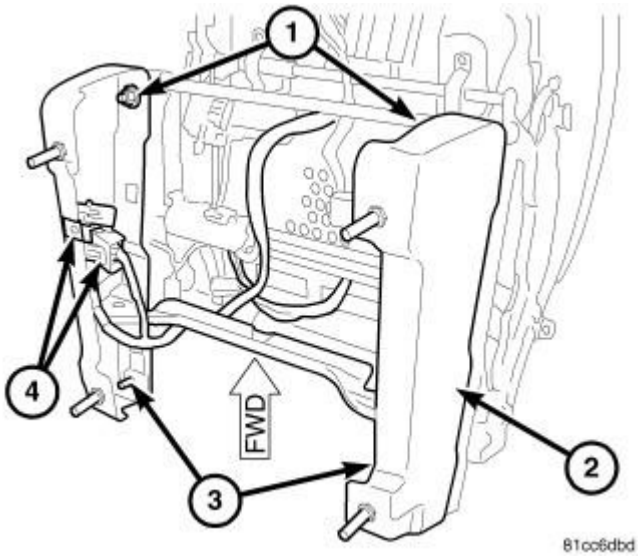

Fig. 191: Battery Cable
Courtesy of CHRYSLER LLC

8. Install accessory drive belt splash shield and engine compartment lower silencer.
9. Lower vehicle.

NOTE: Sealer must cure for a minimum of 30 minutes prior to filling with oil.

10. Refill engine oil.
11. Connect negative battery cable (1).
12. Start engine and check for leaks.

SENSOR, OIL PRESSURE

Description

DESCRIPTION

The oil pressure switch is located on the right front side of the engine block. The oil pressure switch is a pressure sensitive switch that is activated by the engine's oil pressure (in the main oil gallery). The switch is a single terminal device.

Operation

OPERATION

The oil pressure switch is normally "Closed." The switch changes from a "Closed" circuit to an "Open" circuit, on increasing pressure of 7 psig. The oil pressure switch changes from an "Open" circuit to a "Closed" circuit, on decreasing pressure, between 2 psig and 4 psig.

Removal

REMOVAL

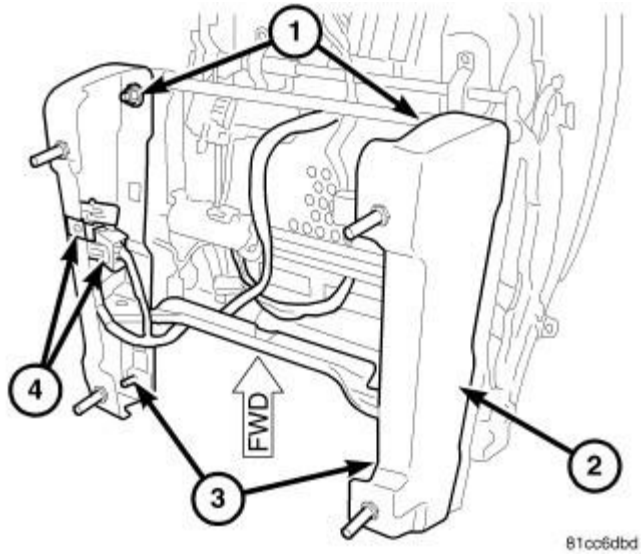

Fig. 192: Oil Pressure Sender
Courtesy of CHRYSLER LLC

1. Disconnect oil pressure sensor electrical connector.
2. Remove oil pressure sensor (1).

Installation

INSTALLATION

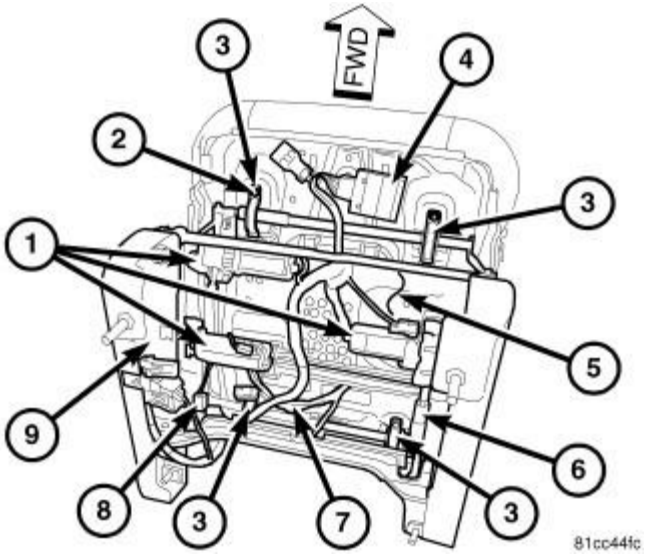

Fig. 193: Oil Pressure Sender
Courtesy of CHRYSLER LLC

1. Install oil pressure sensor (1) and tighten to 20 N.m (177 in. lbs.).

2. Connect oil pressure sensor electrical connector.

VALVE TIMING

BELT, TIMING

Removal

REMOVAL - TIMING BELT

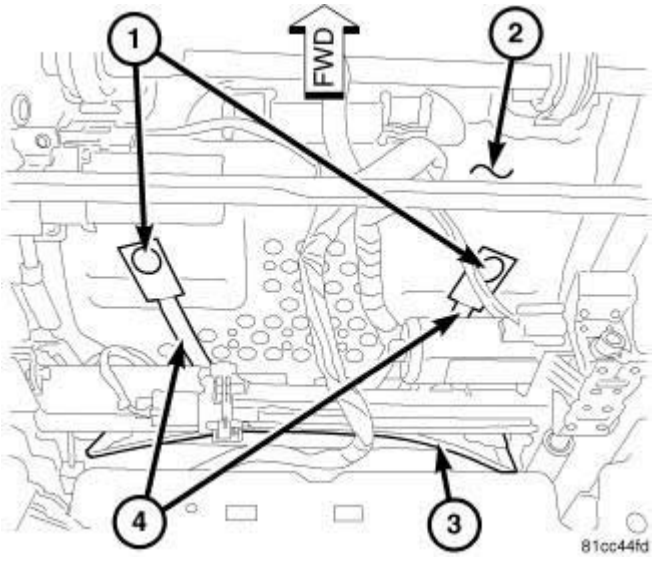

Fig. 194: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.

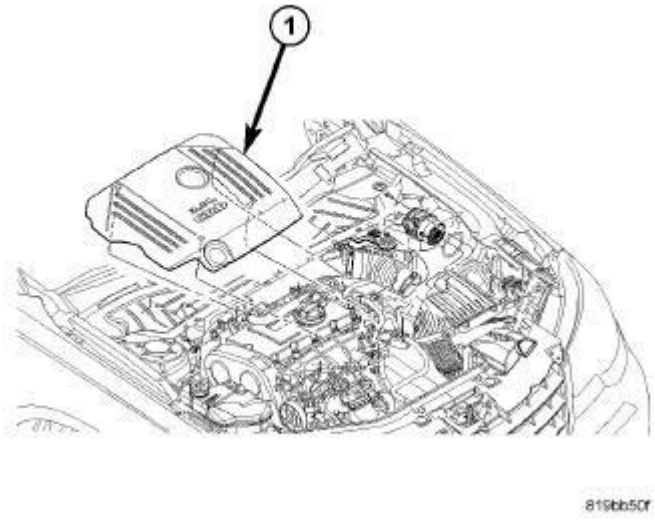

Fig. 195: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover. See **Removal** .
3. Remove cylinder head cover.

NOTE: When rotating engine to TDC, verify that cylinder #1 is on the compression stroke. The camshaft lobes for cylinder #1 should be pointing upward.

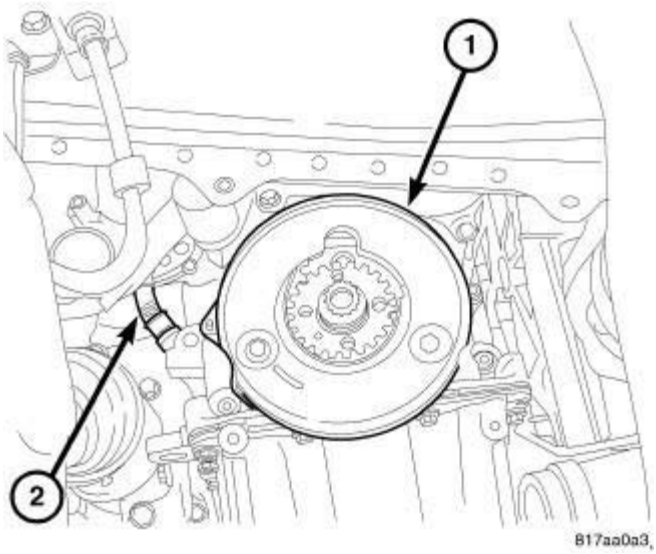

Fig. 196: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

4. Remove lower timing belt cover (1).

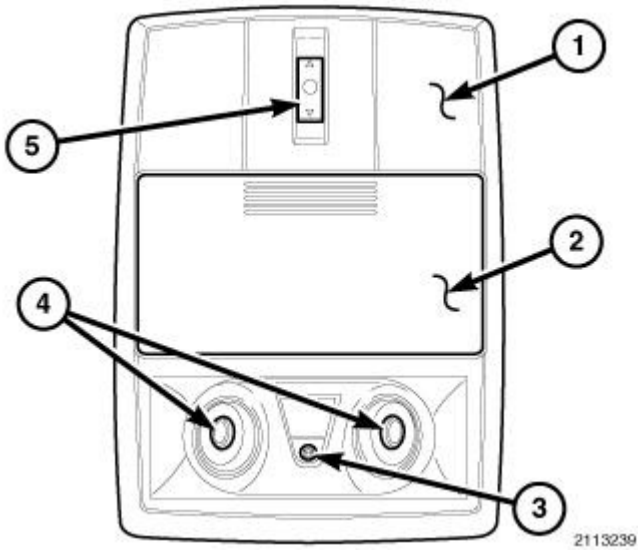

Fig. 197: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

NOTE: Engine equipped with a balance shaft module use an oval toothed belt, and crankshaft holding tool 10122 must be used

5. Rotate engine to TDC and insert crankshaft lock 10122.
6. Insert camshaft locking pins 9882.
7. Loosen tensioner retaining nut.
8. Rotate tensioner counterclockwise to release tension.
9. Remove timing belt.

Installation

TIMING BELT

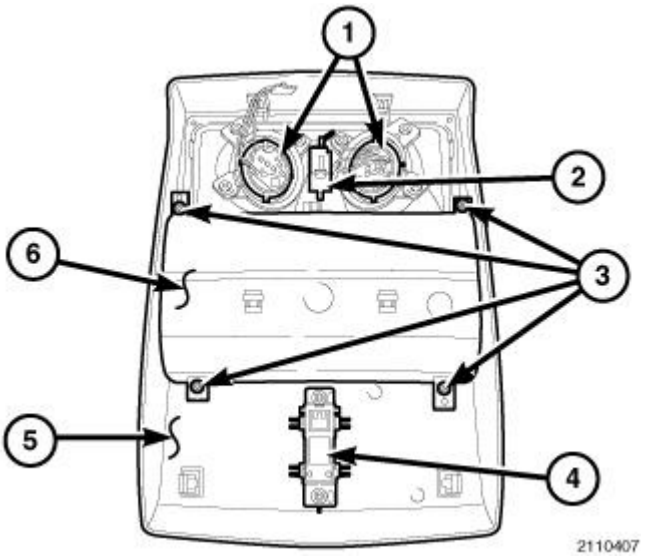

Fig. 198: Cam Holder
Courtesy of CHRYSLER LLC

CAUTION: IT IS ESSENTIAL that the installation procedure is followed exactly. Failure to do so will result in severe engine damage.

1. Loosen camshaft sprocket bolt using sprocket/hub holder 9880.
2. Start the timing belt around the crankshaft sprocket.
3. Wrap belt around water pump pulley, idler pulley, and tensioner.
4. Position belt over camshaft sprockets.
5. Tighten tensioner until marks are aligned.
6. Tighten tensioner nut to 20 N.m + 45° (177 in. lbs. + 45°).

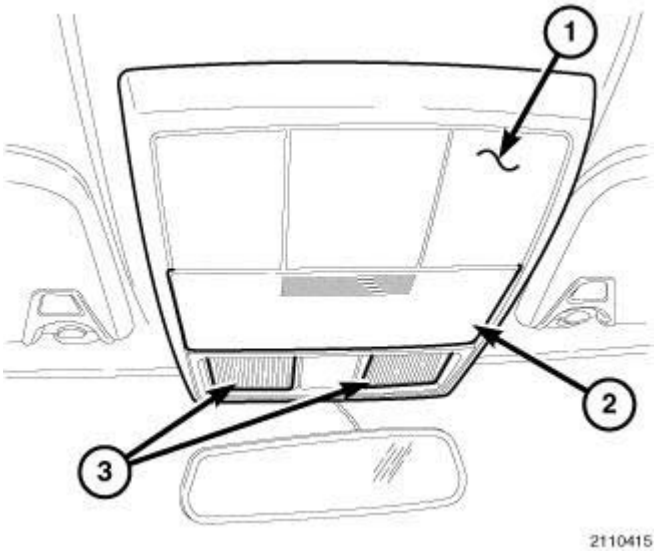

Fig. 199: Crankshaft Timing Marks

Courtesy of CHRYSLER LLC

7. Tighten camshaft sprocket bolts using sprocket/hub holder 9880 to 25 N.m (221 in. lbs.).
8. Remove camshaft locking pins 9882.
9. Remove crankshaft lock 10122.

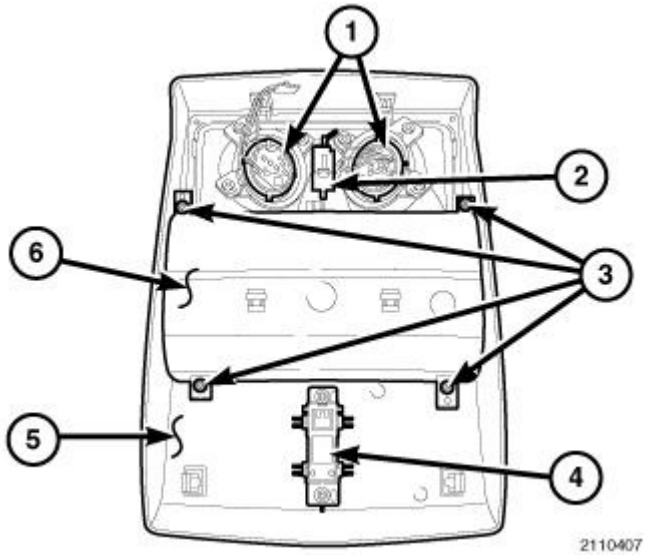

Fig. 200: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

10. Install lower timing belt cover (1).
11. Install balancer.
12. Install accessory drive belt.
13. Install upper timing belt cover.

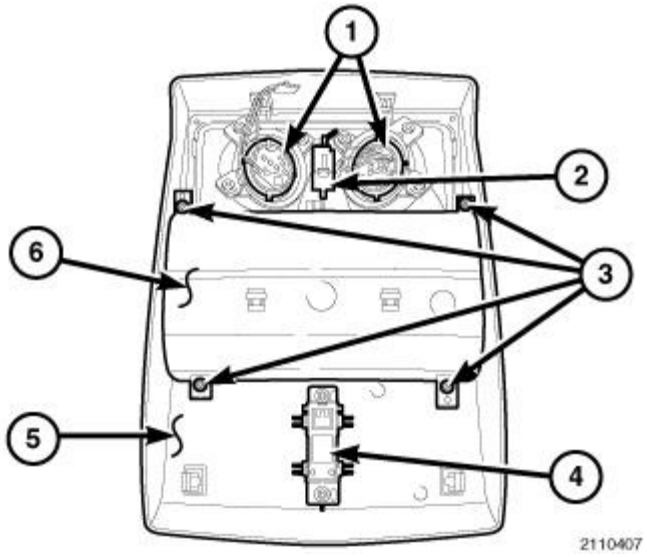

Fig. 201: Engine Cover
Courtesy of CHRYSLER LLC

14. Install engine cover. See **Installation** .

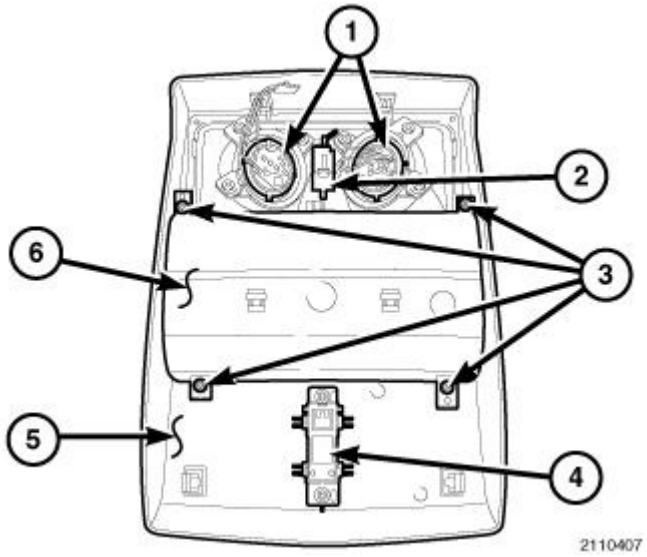

Fig. 202: Battery Cable
Courtesy of CHRYSLER LLC

15. Connect negative battery cable (1).

WARNING: Use extreme caution when the engine is operating. Do not put your hands near the pulleys belts or fan. Do not wear loose clothes.

COVER(S), ENGINE TIMING, LOWER

Removal

REMOVAL

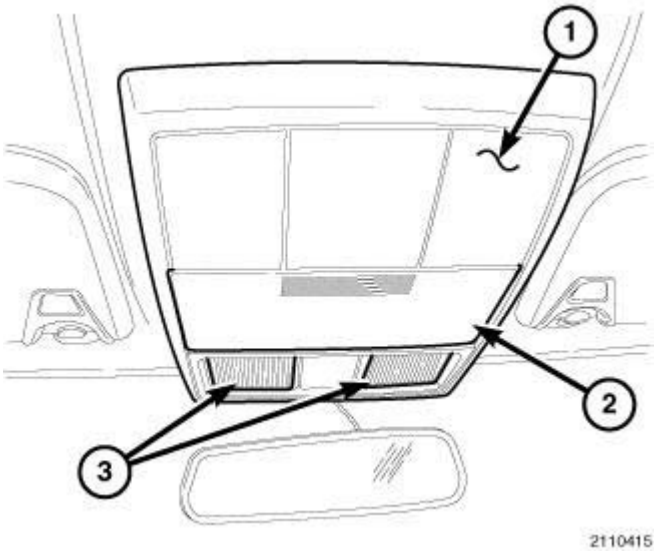

Fig. 203: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

1. Remove right splash shield.
2. Remove accessory drive belt.
3. Remove crankshaft damper.
4. Remove lower timing belt cover (1).

Installation

INSTALLATION

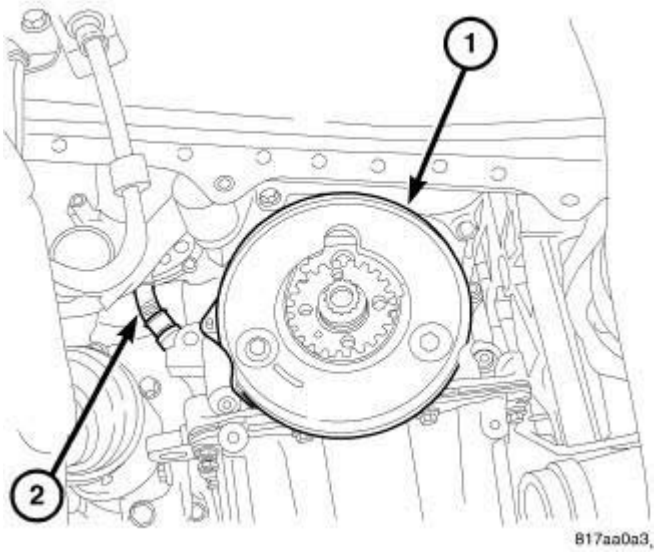

Fig. 204: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

1. Position lower timing belt cover.
2. Install lower timing belt cover retaining bolts and tighten.
3. Install crankshaft balancer and tighten to 10 N.m + 90° (89 lbs. in. + 90°).
4. Install accessory drive belt.
5. Install splash shield.

COVER(S), ENGINE TIMING, UPPER

Removal

REMOVAL

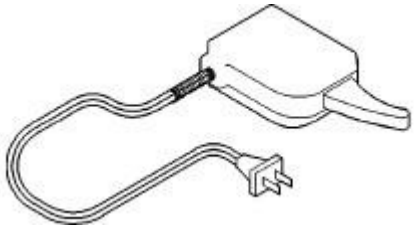

Fig. 205: Timing Belt Cover
Courtesy of CHRYSLER LLC

1. Remove upper timing belt cover (1) by releasing clasps and pull upward.

Installation

INSTALLATION

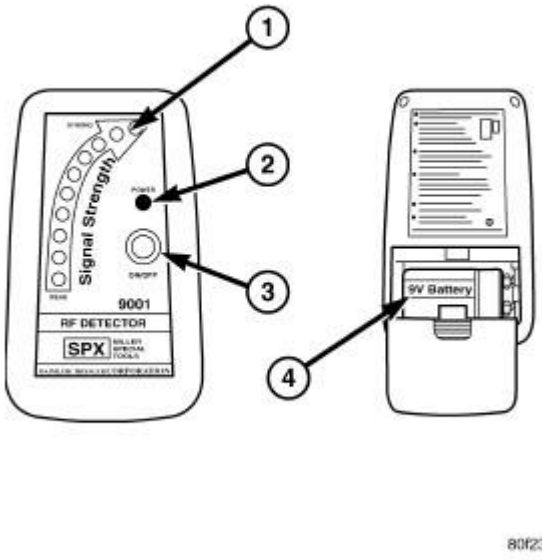

Fig. 206: Timing Belt Cover
Courtesy of CHRYSLER LLC

1. Position upper timing belt cover (1) in place and snap clasps in place.

TENSIONER, ENGINE TIMING

Removal

REMOVAL

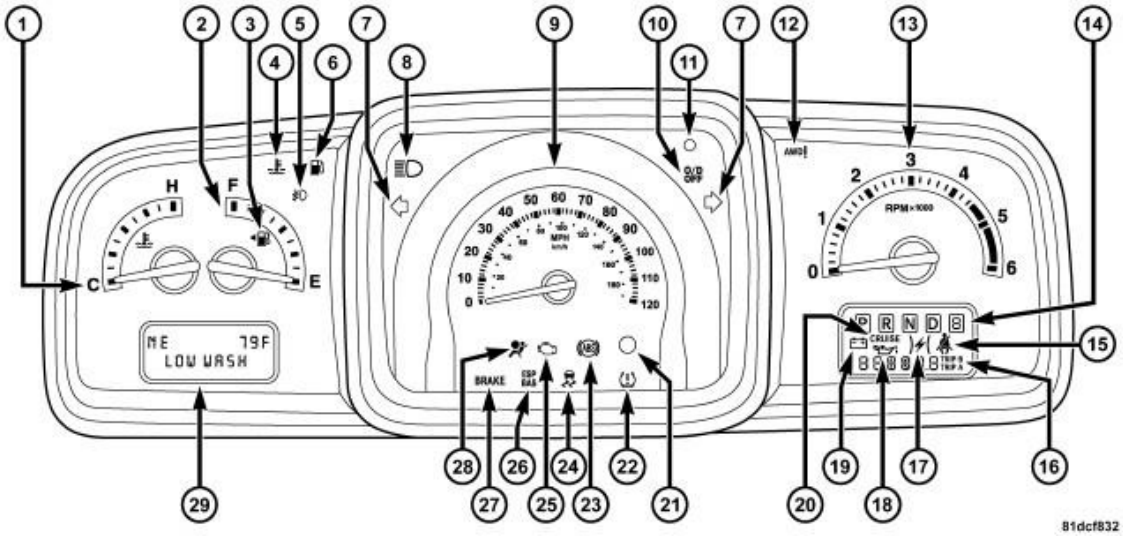

Fig. 207: Battery Cable

Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).

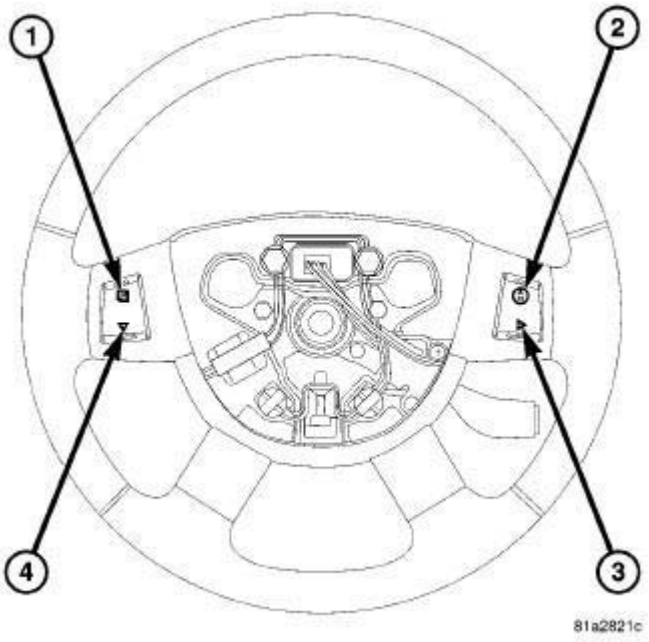

Fig. 208: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

2. Remove lower timing belt cover (1).
3. Position piston of number #1 cylinder to ignition TDC.

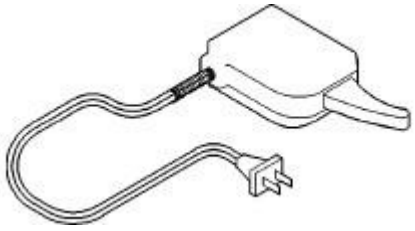

Fig. 209: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

4. Install crankshaft lock 9883.

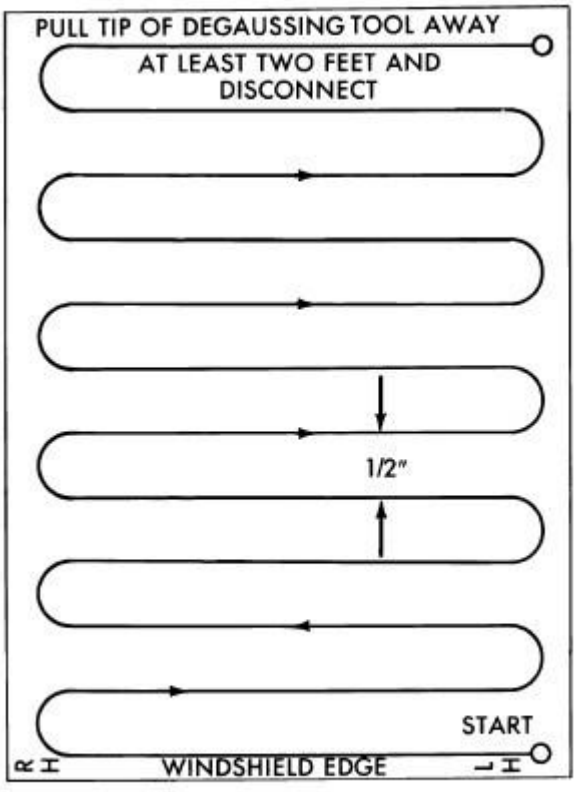

Fig. 210: Timing Belt Cover
Courtesy of CHRYSLER LLC

5. Remove upper timing belt cover (1).
6. Install camshaft lock pins 9882.
7. Install engine support fixture.

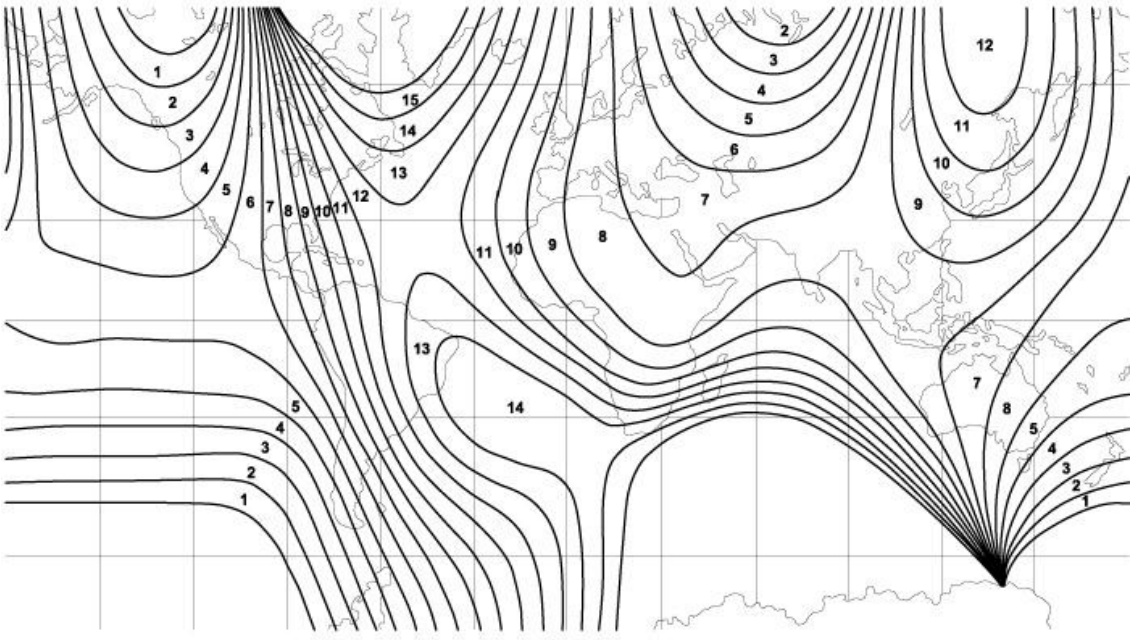

Fig. 211: Right Engine Mount
Courtesy of CHRYSLER LLC

8. Remove right engine mount through bolt (2).
9. Remove frame mount (1) and isolator (3).

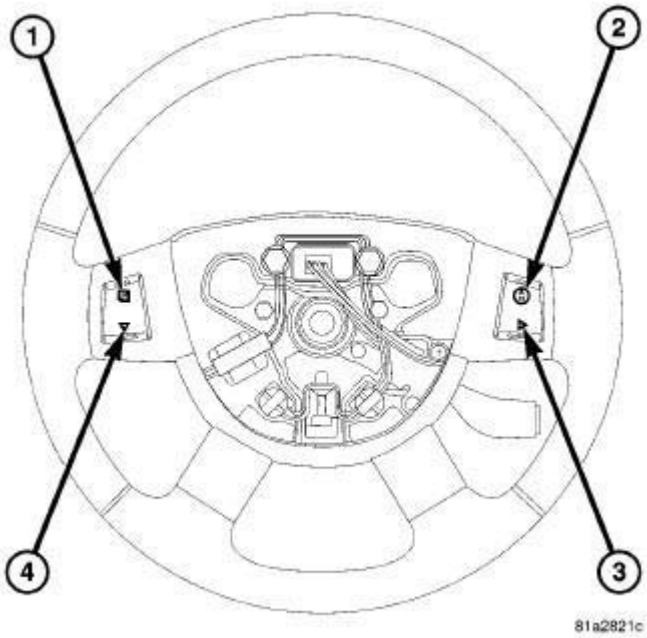

Fig. 212: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

10. Remove right engine mount bracket (5).
11. Raise vehicle on hoist.
12. Remove balancer (4).

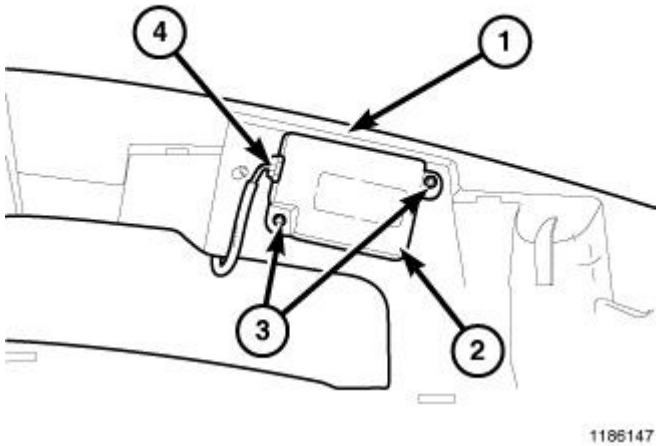

Fig. 213: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

13. Remove splash shield.
14. Remove lower timing belt cover (1).

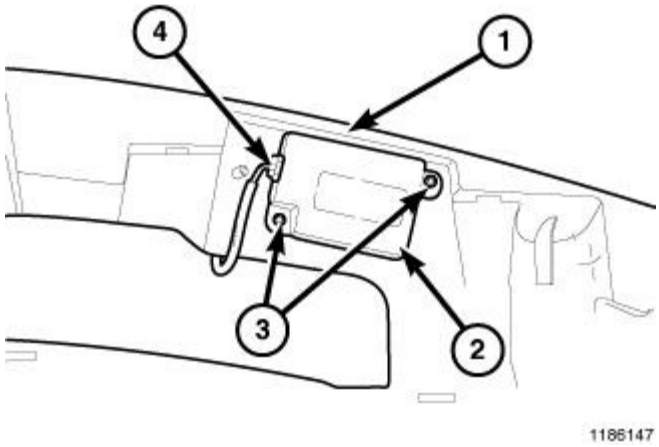

Fig. 214: Timing Belt Tensioner & Retaining Nut
Courtesy of CHRYSLER LLC

15. Remove tensioner retaining nut (2).
16. Remove timing belt tensioner.

Installation

INSTALLATION

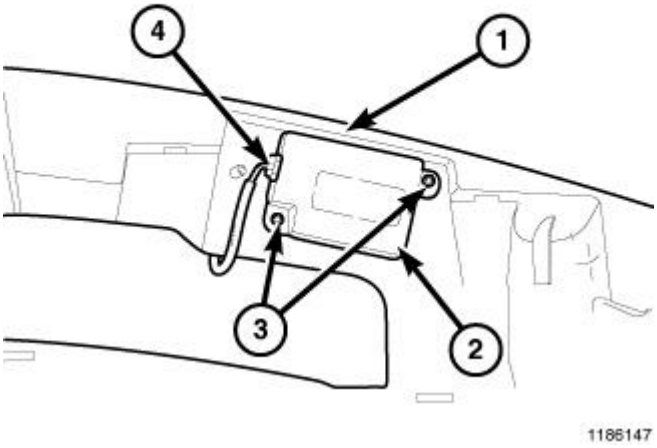

Fig. 215: Installing Tensioner
Courtesy of CHRYSLER LLC

1. Position timing belt tensioner so finger (2) is in slot (1) and hand tighten nut.

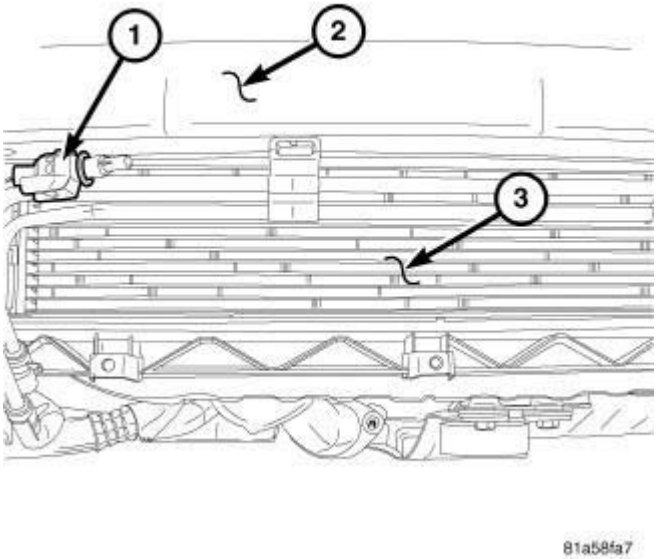

Fig. 216: Tensioner Adjustment

Courtesy of CHRYSLER LLC

2. Insert Allen wrench into tensioner (3) and rotate tensioner until indicator (1) is in the middle of the slot.

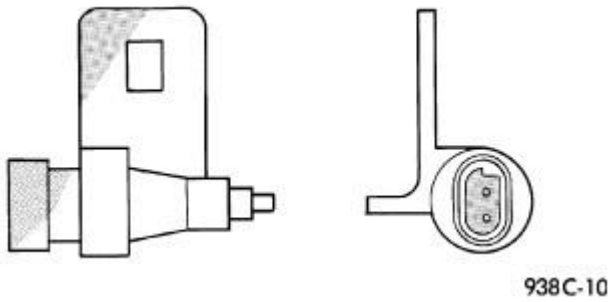

Fig. 217: Timing Belt Tensioner & Retaining Nut
Courtesy of CHRYSLER LLC

3. Tighten nut (2) to 20 N.m + 45° (177 in. lbs. +45°).

NOTE: Tensioner indicator (1) will move out of the slot when nut (2) is tightened. This is normal, do not reposition tensioner.

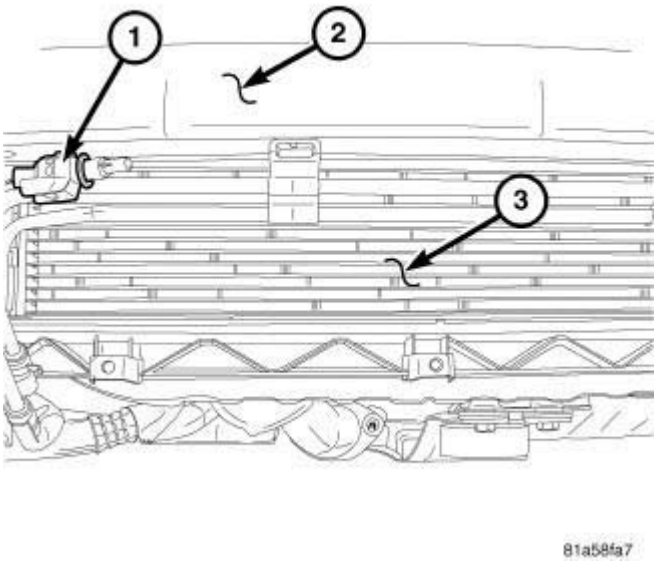

Fig. 218: Timing Belt Cover
Courtesy of CHRYSLER LLC

4. Remove camshaft locking pins 9882.
5. Install upper timing belt cover (1).

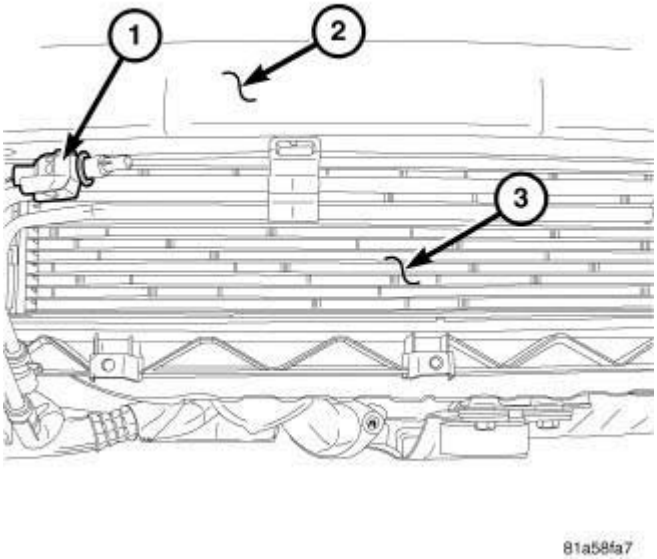

Fig. 219: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

6. Remove crankshaft lock 9883.

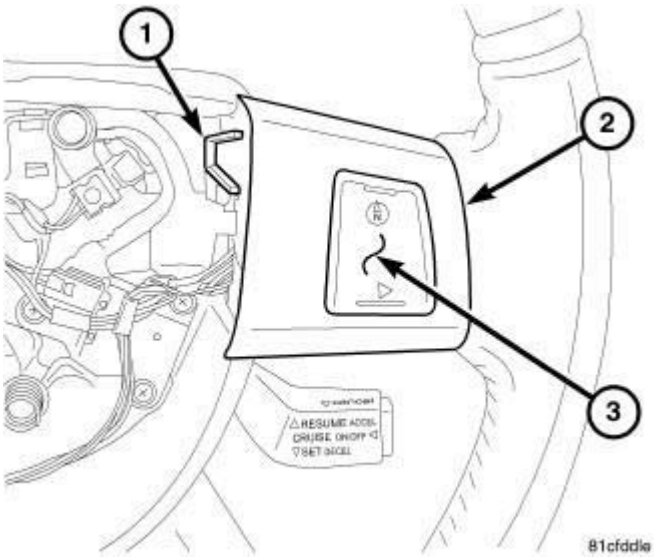

Fig. 220: Lower Timing Belt Cover
Courtesy of CHRYSLER LLC

7. Install lower timing belt covers (1).
8. Install balancer and tighten to 10 N.m + 90° (89 in. lbs. + 90°).

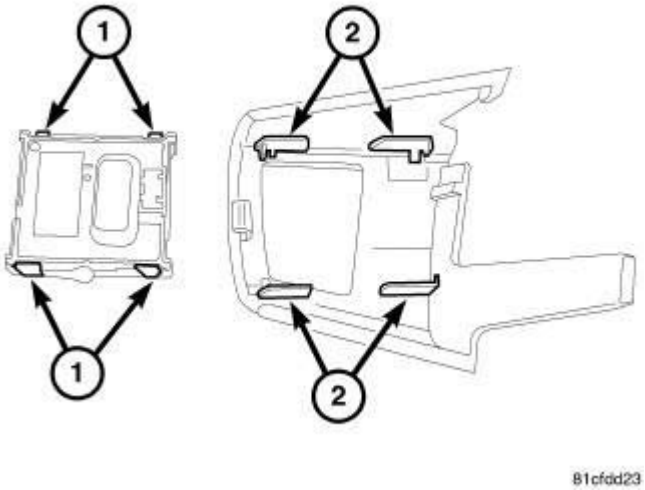

Fig. 221: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

9. Install engine mount bracket (5).

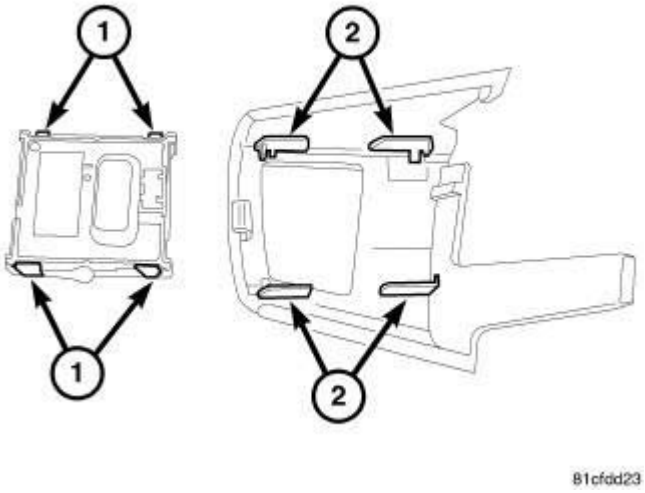

Fig. 222: Right Engine Mount
Courtesy of CHRYSLER LLC

10. Install isolator (3).
11. Install engine mount (1).
12. Install engine mount through bolt (2).
13. Remove engine support fixture.

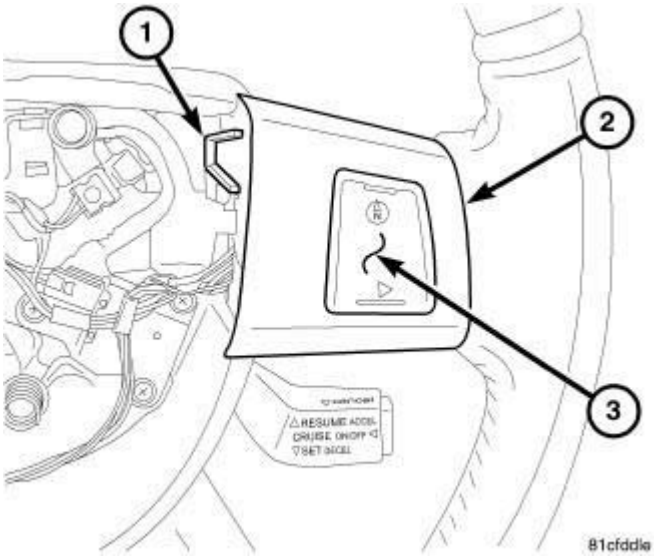

Fig. 223: Battery Cable
Courtesy of CHRYSLER LLC

14. Install accessory drive belt.
15. Install splash shield.
16. Lower vehicle.
17. Connect negative battery cable (1).

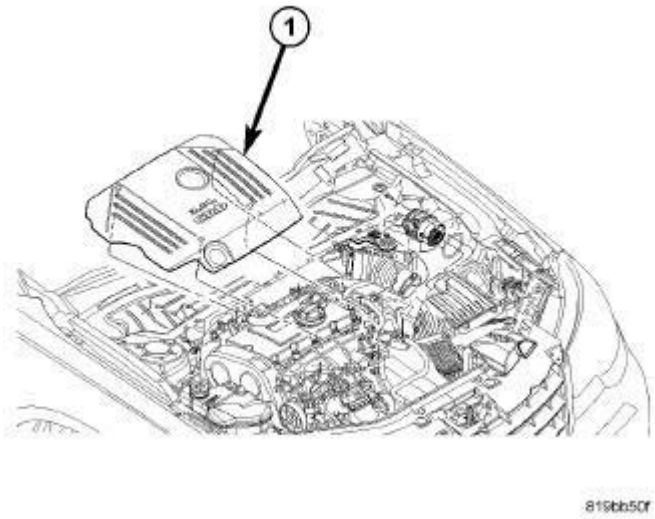

Fig. 224: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

18. Install engine cover (1).

MANIFOLDS

MANIFOLD, EXHAUST

Removal

EXHAUST MANIFOLD/TURBOCHARGER

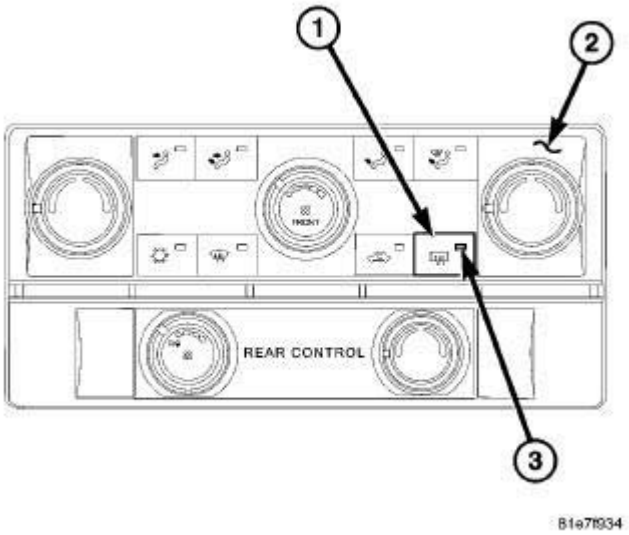

Fig. 225: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable (1).

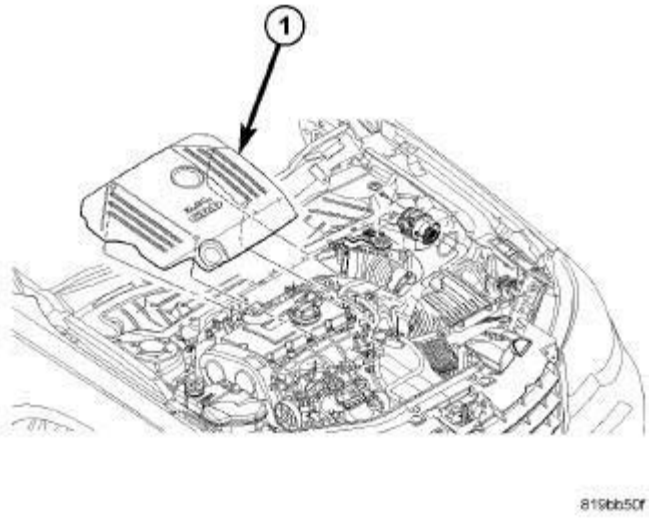

Fig. 226: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove the engine cover (1). See **Installation**
3. Remove the turbo air inlet hose at the air cleaner.
4. Remove the PCV air makeup hose.
5. Remove the air inlet hose at the turbocharger.
6. Remove the oil feed line at the turbocharger.
7. Remove the diesel particulate filter (DPF). Refer to **Exhaust System/FILTER, Diesel Particulate - Removal**
8. Raise and support the vehicle.

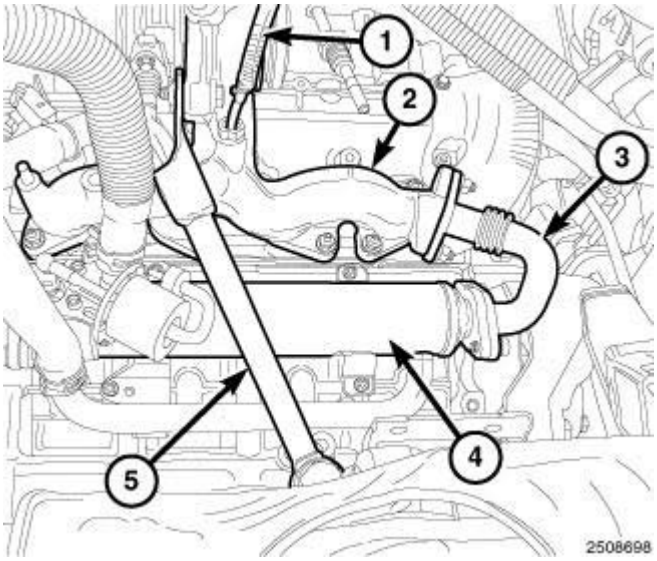

Fig. 227: EGR Tube , Exhaust Manifold & EGR Cooler
Courtesy of CHRYSLER LLC

9. Remove the charge air cooler outlet hose from the turbocharger.
10. Remove the charge air cooler outlet hose from the intermediate tube.
11. Remove the EGR tube (3) from the exhaust manifold (2) and the EGR cooler (4).
12. Remove the turbocharger oil return bolts at the turbocharger flange.
13. Remove the exhaust heat shield.
14. Remove the eight nuts from the exhaust manifold (2).
15. Lower the vehicle.
16. Remove the exhaust manifold/turbocharger assembly (2) from the vehicle.

Installation

EXHAUST MANIFOLD/TURBOCHARGER

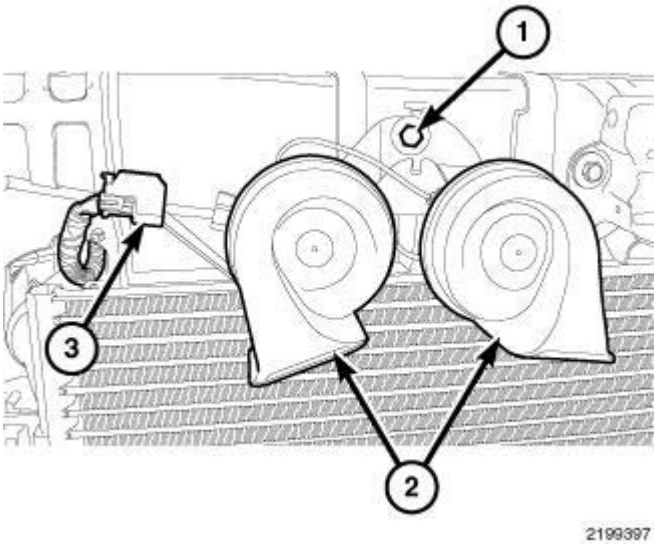

Fig. 228: EGR Tube , Exhaust Manifold & EGR Cooler
Courtesy of CHRYSLER LLC

1. Install the exhaust manifold gasket.
2. Position the exhaust manifold/turbo assembly (3) in place.
3. Install the eight exhaust manifold nuts. Tighten the nuts to 25 N.m (18 ft. lbs.).
4. Install the turbocharger oil return tube/support (5) at the engine block.
5. Install the exhaust heat shield. Tighten the fasteners to 5 N.m (44 in. lbs.).
6. Install the turbocharger oil return tube bolts at the turbocharger flange.
7. Install the EGR tube (3) to the exhaust manifold (2) and the EGR cooler (4). Tighten the bolts to 20 N.m (15 ft. lbs.).
8. Install the charge air cooler outlet hose to the intermediate tube.
9. Install the charge air cooler outlet hose to the turbocharger.
10. Lower the vehicle.
11. Install the diesel particulate filter (DPF). Refer to **Exhaust System/FILTER, Diesel Particulate - Installation** .
12. Install turbo oil feed line at oil filter housing. Tighten the fitting to 22 N.m (16 ft. lbs.).
13. Install the air inlet tube at the turbocharger.
14. Install the PCV air makeup hose.
15. Install the air inlet tube at the air cleaner.

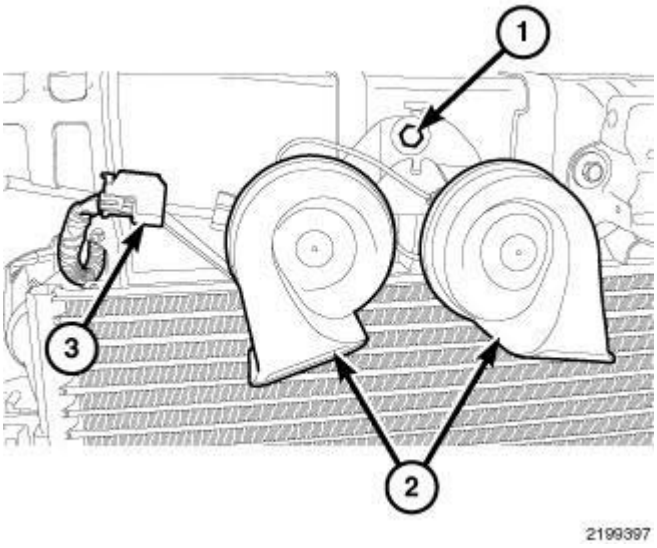

Fig. 229: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

16. Install the engine cover by pushing downward. See **Installation**.

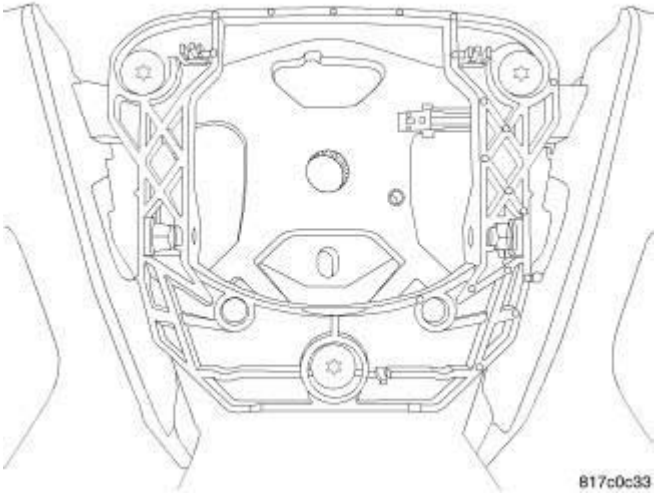

Fig. 230: Battery Cable
Courtesy of CHRYSLER LLC

17. Connect the negative battery cable (1).

MANIFOLD, INTAKE

Description

DESCRIPTION

The intake manifold is one-piece design and is made from aluminum.

Removal

REMOVAL

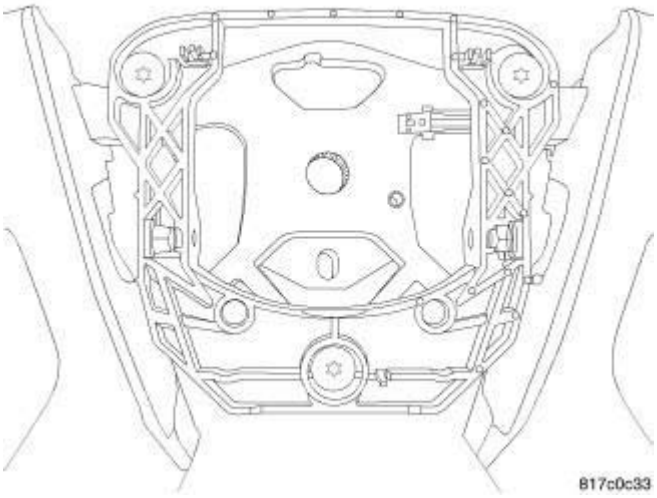

Fig. 231: Battery Cable
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).

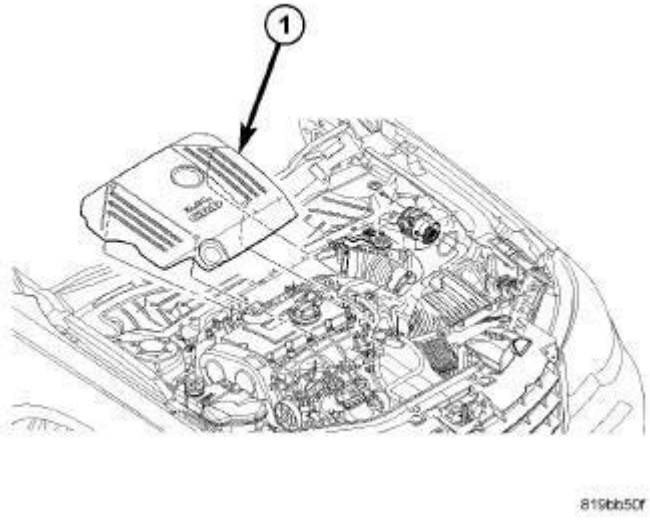

Fig. 232: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

2. Remove engine cover by pulling upward.

3. Partially drain cooling system. Refer to **Cooling - Standard Procedure** .

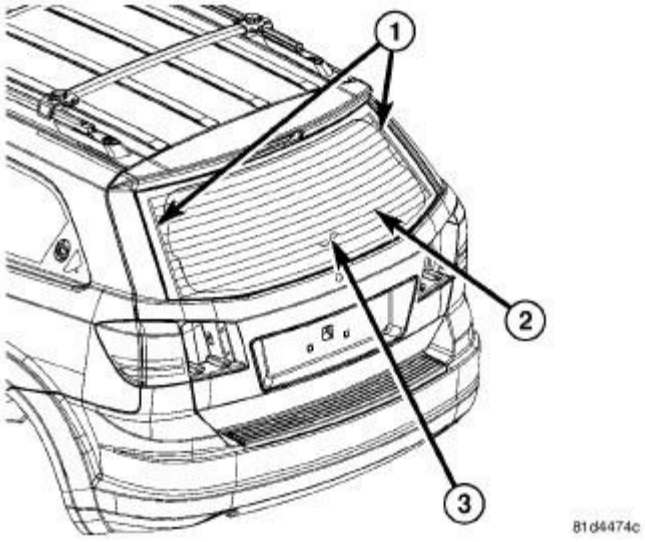

Fig. 233: EGR Valve
Courtesy of CHRYSLER LLC

4. Remove vacuum harness (1).

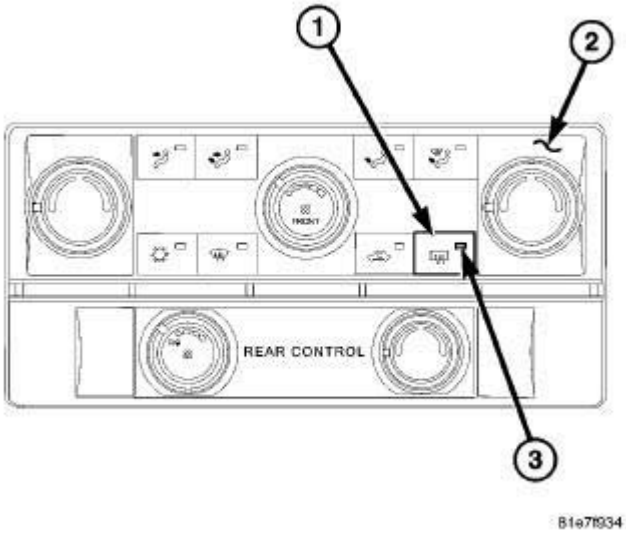

Fig. 234: Coolant Tube
Courtesy of CHRYSLER LLC

5. Remove coolant bypass tube retaining bolts (1) and reposition tube.
6. Remove fuel hose from lift bracket.

7. Remove upper radiator hose from cylinder head and reposition.

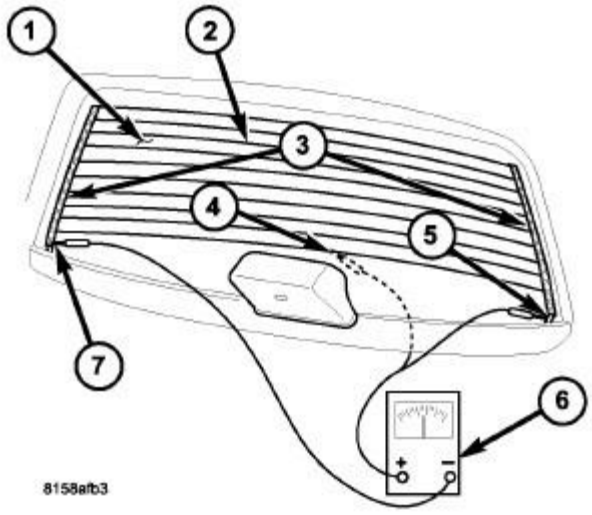

Fig. 235: Intake Manifold
Courtesy of CHRYSLER LLC

8. Release air inlet pipe from throttle body.
9. Remove EGR pipe (3).

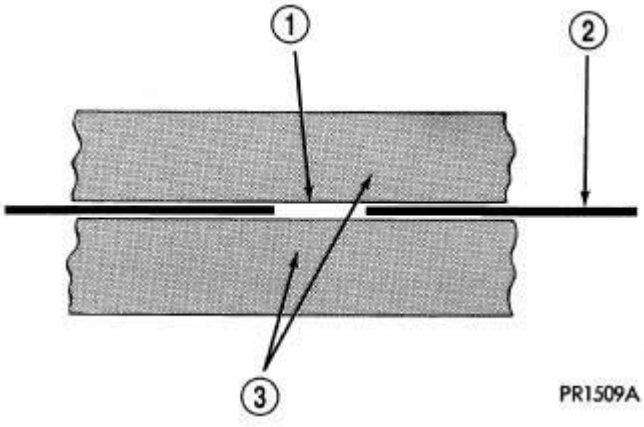

Fig. 236: Dipstick Support Retaining Bolt
Courtesy of CHRYSLER LLC

10. Remove dip stick support bracket retaining bolt (1).
11. Remove left and right engine cover brackets.

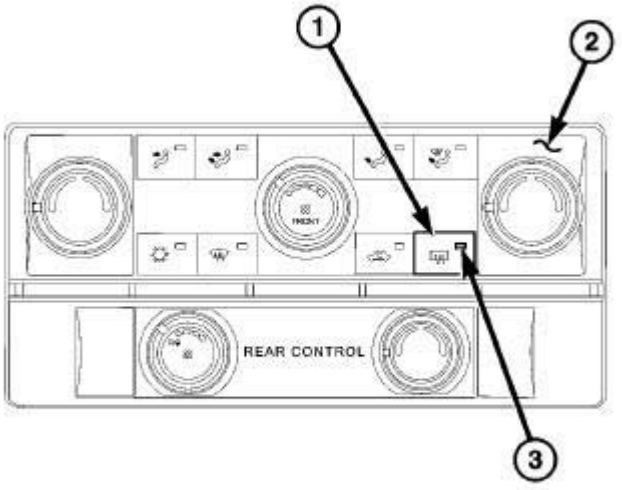

Fig. 237: Intake Manifold
Courtesy of CHRYSLER LLC

12. Disconnect throttle body connectors.
13. Remove throttle body assembly (5).
14. Remove EGR valve (7).
15. Remove electrical connector from intake bracket.

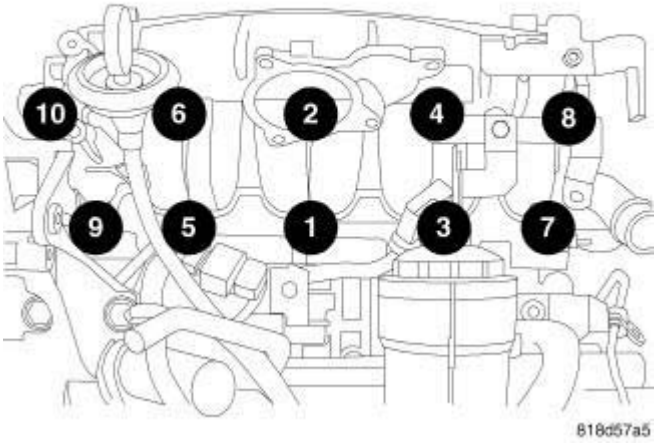

Fig. 238: Intake Manifold Bolt Torque Sequence
Courtesy of CHRYSLER LLC

16. Remove intake manifold bolts.
17. Remove intake manifold.

Cleaning

CLEANING

1. Discard gasket(s).
2. Clean all sealing surfaces.

Inspection

INSPECTION

1. Inspect manifold for cracks or distortion. Replace manifold if necessary.
2. Inspect manifold for gasket surface damage or warpage. Replace manifold if necessary.

Installation

INSTALLATION

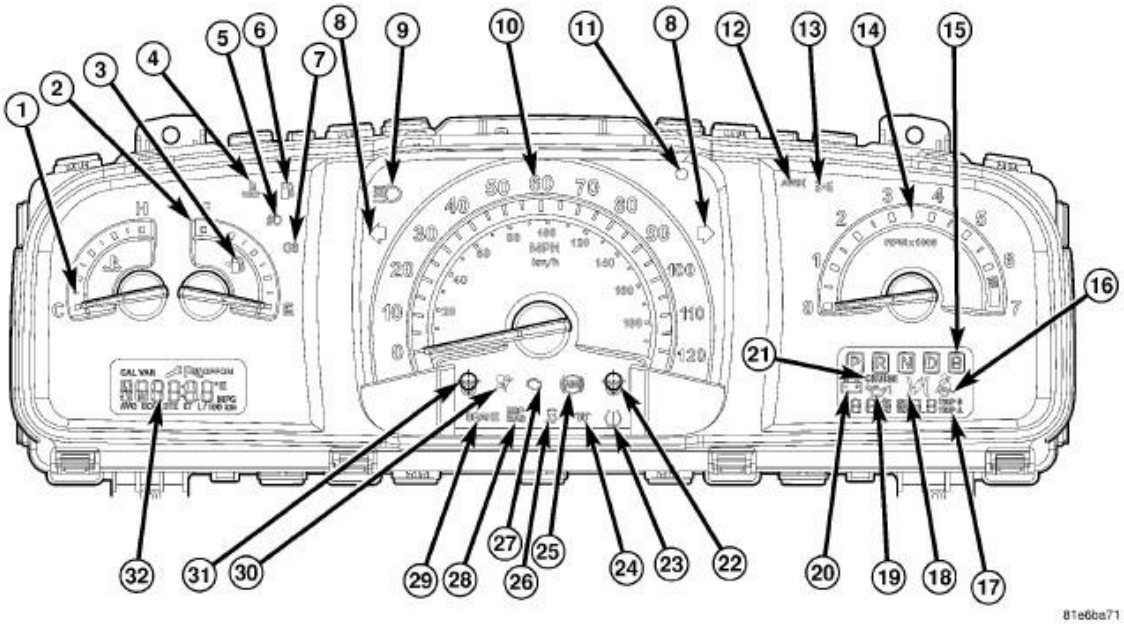

Fig. 239: Intake Manifold Bolt Torque Sequence
Courtesy of CHRYSLER LLC

1. Clean gaskets/seals mating surfaces.
2. Install new gasket.
3. Place intake on cylinder head and install retaining bolts. Tighten bolts to 20 N.m (14.7 lbs. ft.) as shown in illustration.

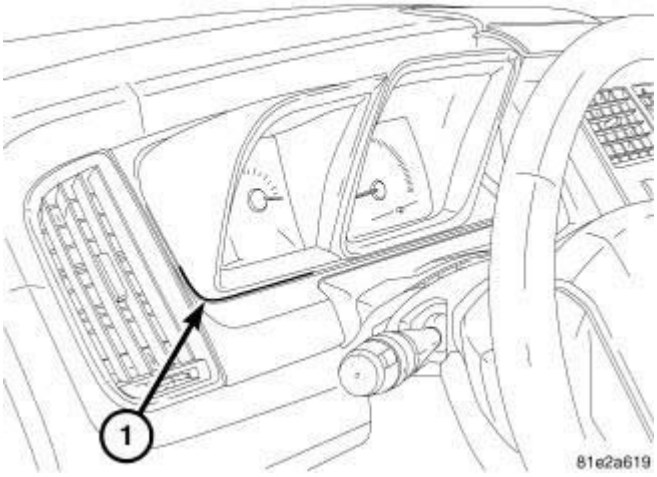

Fig. 240: Intake Manifold
Courtesy of CHRYSLER LLC

4. Install electrical connector to intake bracket.
5. Install new EGR gasket (8) and EGR valve (7).
6. Install throttle plate assembly (5).
7. Connect throttle body electrical connector.
8. Install right and left engine cover brackets.
9. Install EGR pipe.
10. Install EGR pipe support bracket.

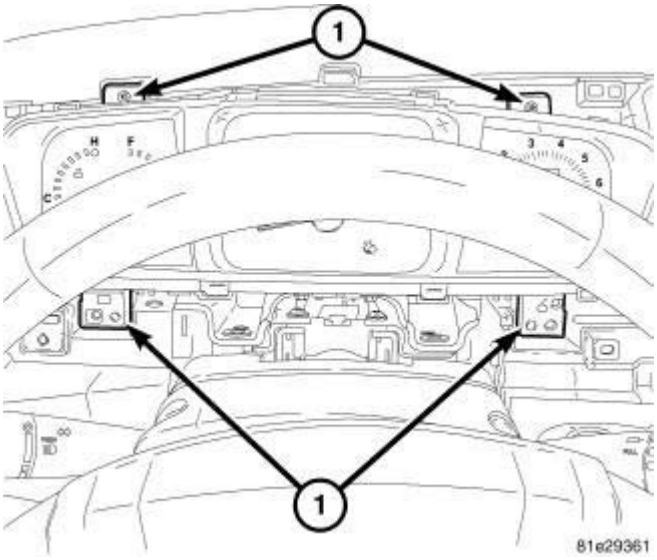

Fig. 241: Dipstick Support Retaining Bolt
Courtesy of CHRYSLER LLC

11. Install dipstick support retaining bolt (1).
12. Connect air inlet pipe to throttle body.
13. Install upper radiator hose to cylinder head.
14. Install fuel hose retainer to engine lift bracket.

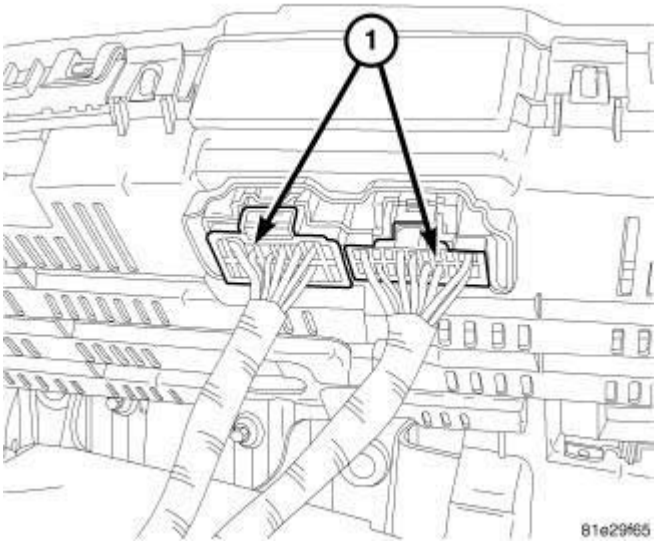

Fig. 242: Coolant Tube
Courtesy of CHRYSLER LLC

15. Position coolant tube in place and install fasteners (1).

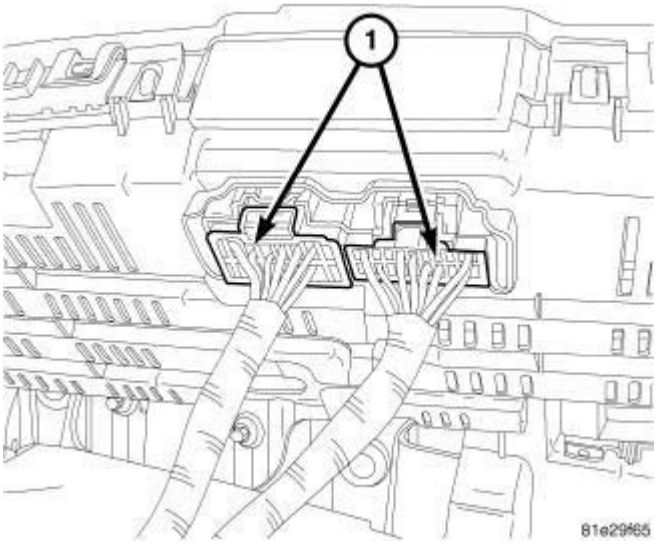

Fig. 243: EGR Valve
Courtesy of CHRYSLER LLC

16. Install vacuum harness (1).

17. Fill cooling system.
18. Change oil and filter.

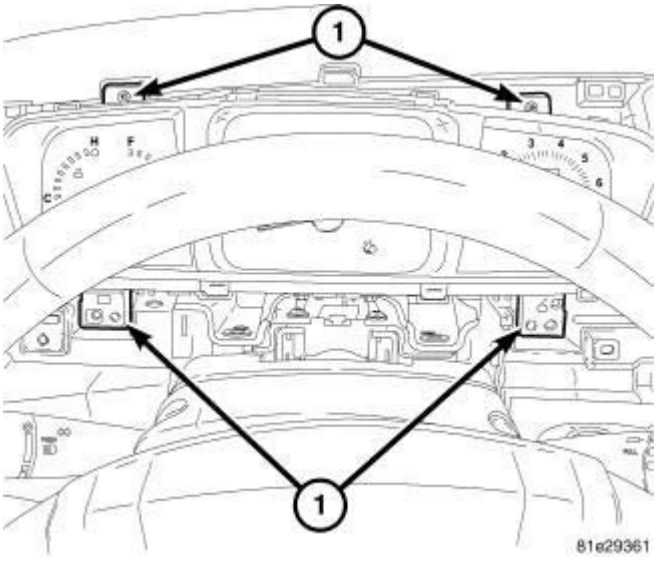

Fig. 244: Battery Cable
Courtesy of CHRYSLER LLC

19. Connect negative battery cable (1).
20. Start engine and check for leaks.

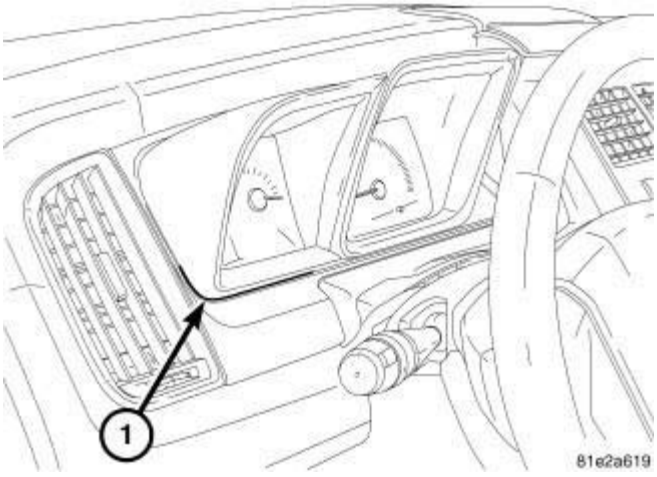

Fig. 245: Engine Cover-Removal/Installation
Courtesy of CHRYSLER LLC

21. Install engine cover (1).

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

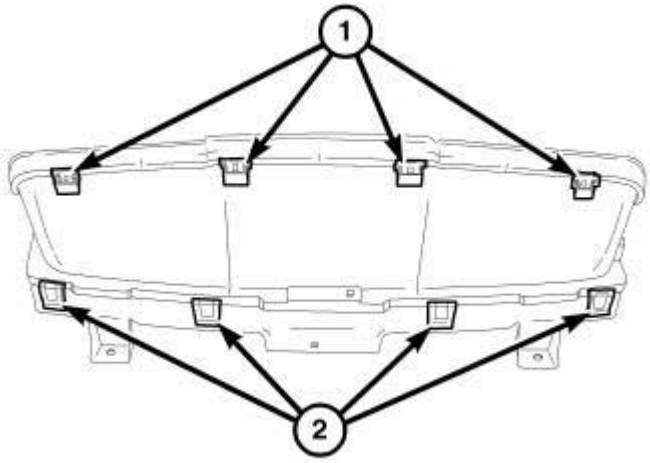

Fig. 246: Air Filter Element
Courtesy of CHRYSLER LLC

1. Unfasten clasps on front of air cleaner housing.
2. Move cover (1) aside.
3. Remove filter element (2).
4. If necessary, clean the inside of the air cleaner housing.

Installation

INSTALLATION

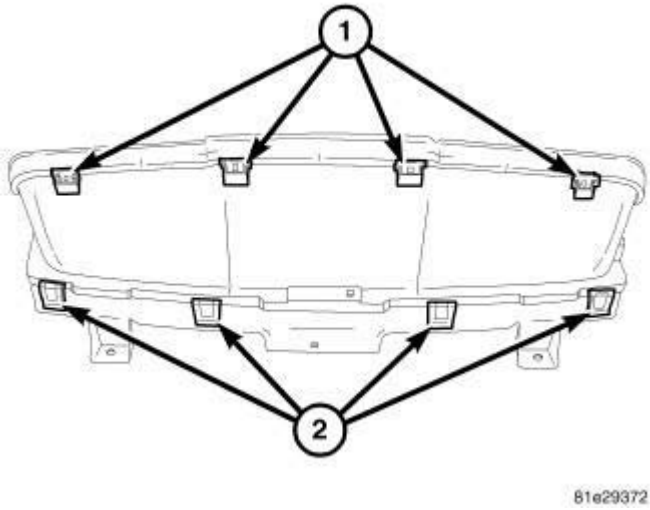

Fig. 247: Air Filter Element
Courtesy of CHRYSLER LLC

1. Install new filter element (2).
2. Replace air cleaner cover (1).
3. Snap clasps in place.

BODY, AIR CLEANER

Description

DESCRIPTION

The air cleaner housing attaches to the inner fender in front of the left side strut tower. An ambient air duct supplies underhood air for the engine. It attaches to the lower air cleaner box.

Removal

REMOVAL

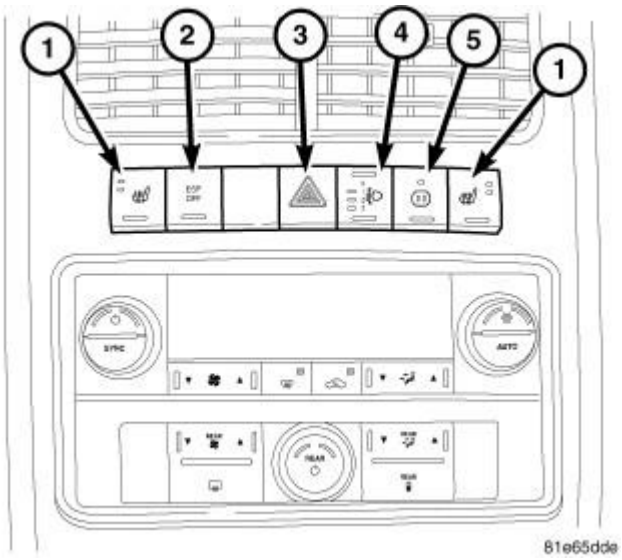

Fig. 248: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

1. Remove the hold down screw (3) from the air cleaner housing (2).
2. Disconnect turbocharger inlet hose (1) from air cleaner housing (2).
3. Disconnect mass air flow sensor electrical connector (4).
4. Pull air cleaner housing straight up to remove.

Installation

INSTALLATION

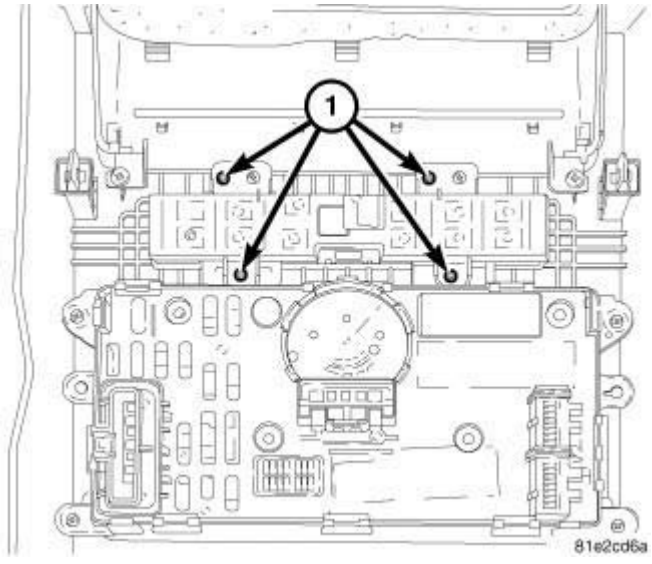

Fig. 249: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

1. Lower air cleaner housing assembly into engine compartment and align studs at bottom of housing with bracket. Push housing assembly (2) down until fully seated in bracket.
2. Connect turbocharger inlet hose (1) to air cleaner housing (2).
3. Connect mass air flow sensor connector (4).
4. Install hold down screw (3) and tighten.

ENGINE MOUNTING

DESCRIPTION

DESCRIPTION

The engine mounting system consists of a four-point system utilizing two load-carrying mounts and two torque controlling mounts. The load-carrying mounts are located on each frame rail. The right and left mounts are hydro-elastic mounts. The two torque controlling mounts are attached to a fore/aft member and the front and rear of the engine.

OPERATION

OPERATION

The four-point engine mounting system minimizes the transmission of structure-borne engine noise to the passenger compartment. The load-carrying right and left mounts dampen and isolate vertical motion and vibration. The front and rear mounts absorb torque reaction forces and torsional vibrations.

BRACKET, ENGINE MOUNT, RIGHT

Removal

REMOVAL

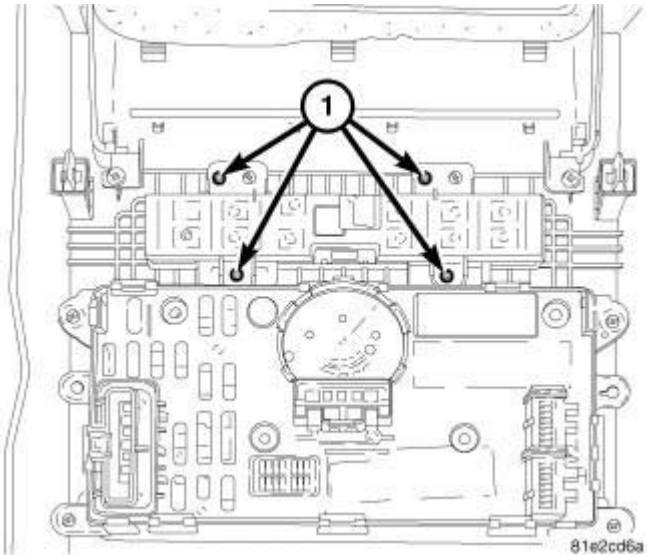

Fig. 250: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

1. Remove right engine mount. See **Removal** .
2. Remove accessory drive belt.
3. Remove bracket retaining bolts (1).
4. Remove bracket (5) through bottom rear.

Installation

INSTALLATION

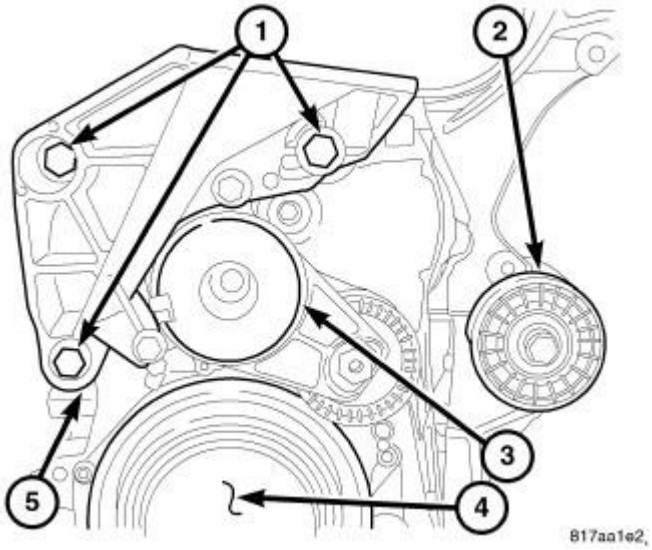

Fig. 251: Right Engine Mount Bracket
Courtesy of CHRYSLER LLC

1. Position right engine mount bracket (5).
2. Install bracket retaining (1) bolts and tighten to 50 N.m (37 ft. lbs.).
3. Install accessory drive belt.

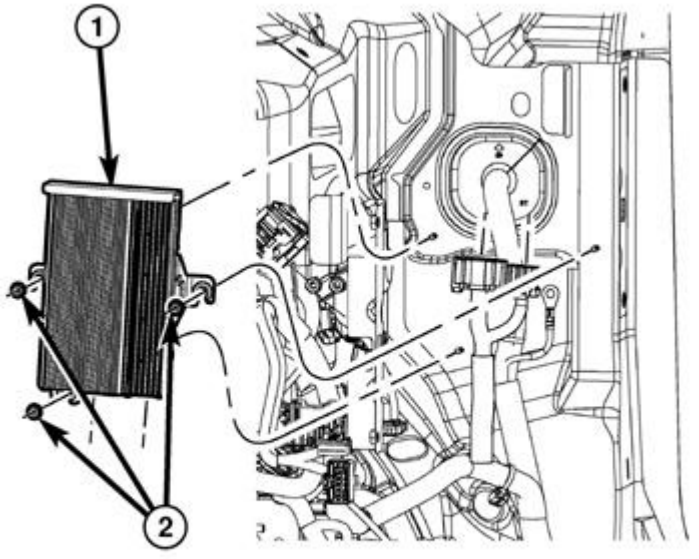

Fig. 252: Right Engine Mount
Courtesy of CHRYSLER LLC

4. Install mount (3). See **Installation** .

INSULATOR, ENGINE MOUNT, LEFT

Removal

REMOVAL

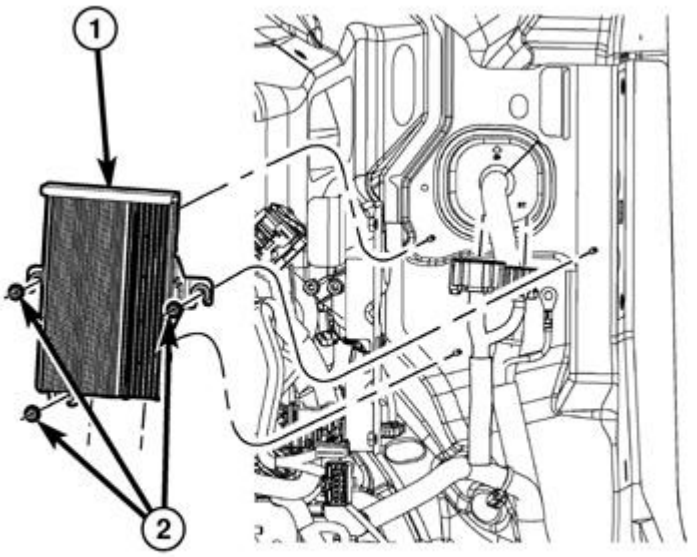

Fig. 253: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

1. Remove air cleaner assembly (2).

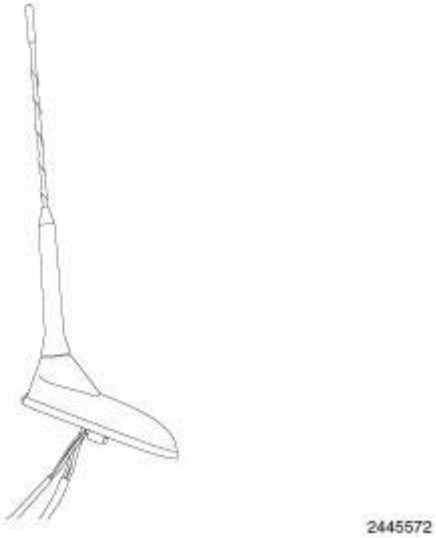

Fig. 254: Battery Cable
Courtesy of CHRYSLER LLC

2. Disconnect battery negative cable (1).

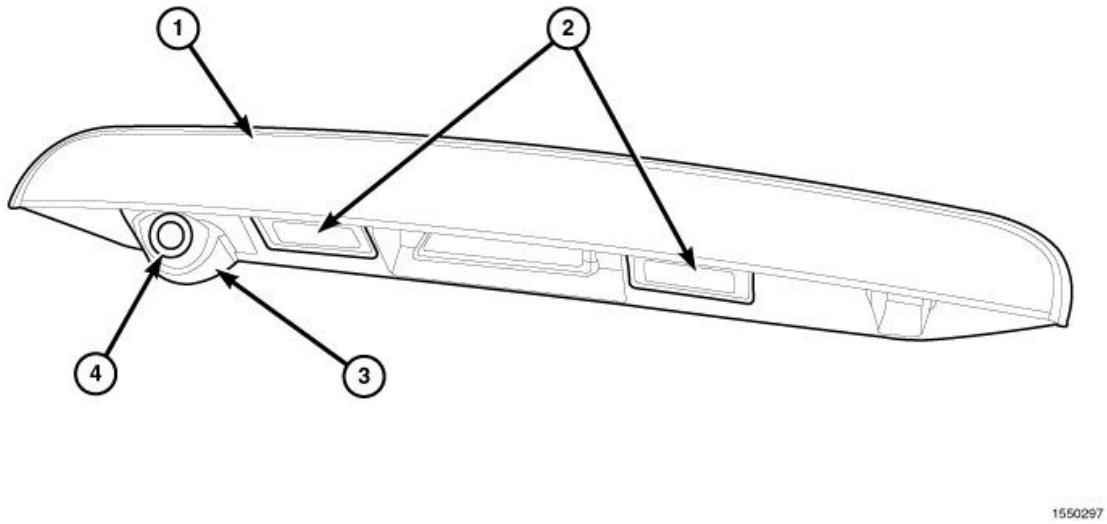

Fig. 255: ECM Bracket
Courtesy of CHRYSLER LLC

3. Disconnect ECM connectors and reposition harness.
4. Disconnect vacuum solenoid vacuum and electrical connectors.
5. Remove ECM mounting bracket retaining bolts (1).
6. Support engine with a suitable jack.

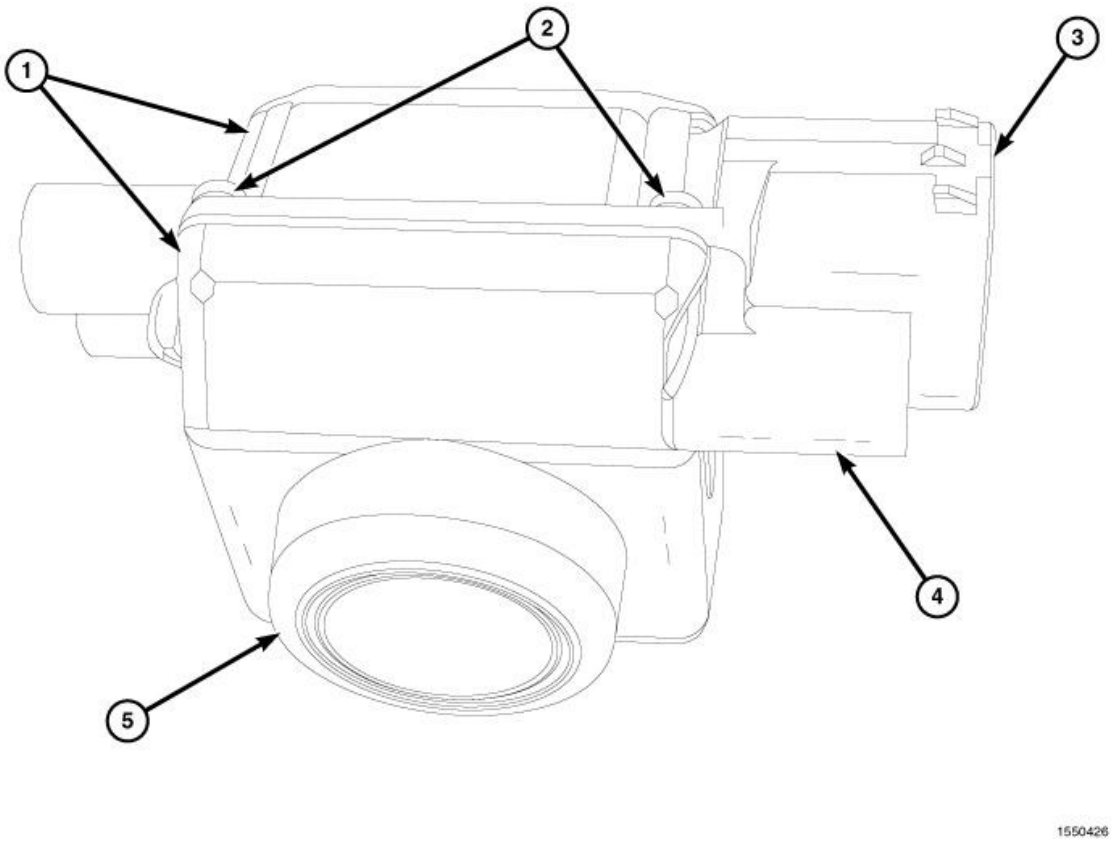

Fig. 256: Left Engine Mount
Courtesy of CHRYSLER LLC

7. Remove mount through bolt (2).
8. Remove mount bracket (3) from transaxle.
9. Remove mount to frame rail retaining bolts.
10. Remove engine mount (1).

Installation

INSTALLATION

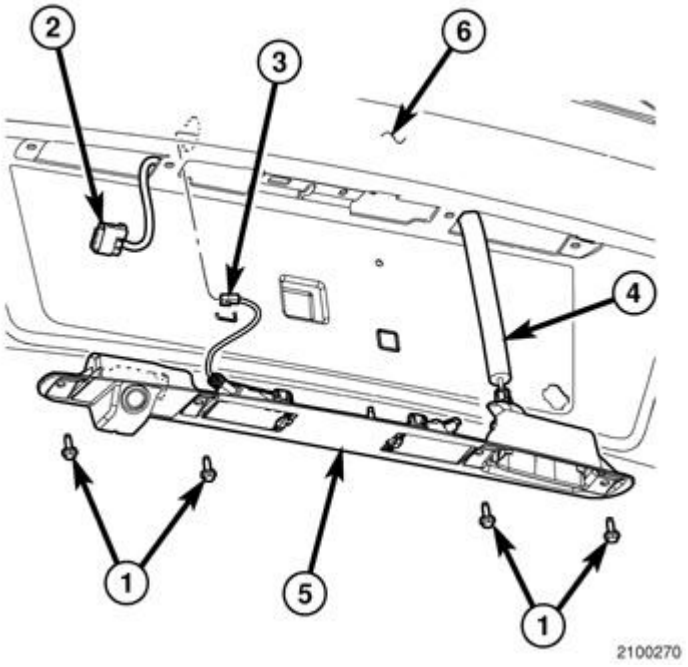

Fig. 257: Left Engine Mount
Courtesy of CHRYSLER LLC

1. Position mount (1) on frame rail.
2. Install mount retaining bolts and tighten to 75 N.m (55 ft. lbs.).
3. Install mount bracket (3) to transaxle and tighten bolts to 61 N.m (45 ft. lbs.).
4. Install mount through bolt (2) and tighten to 100 N.m (74 ft. lbs.).
5. Remove jack.

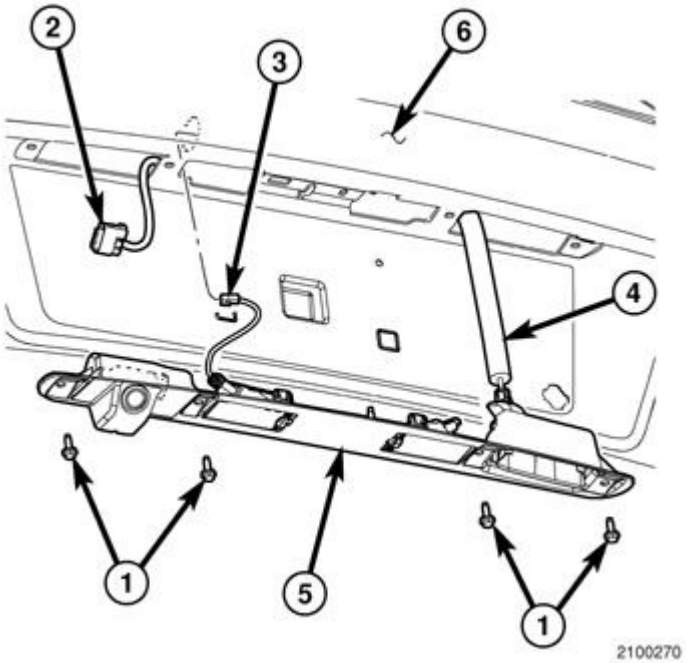

Fig. 258: ECM Bracket
Courtesy of CHRYSLER LLC

6. Install ECM mounting bracket retaining bolts (1).
7. Connect vacuum solenoid vacuum and electrical connectors.
8. Connect ECM electrical connectors.

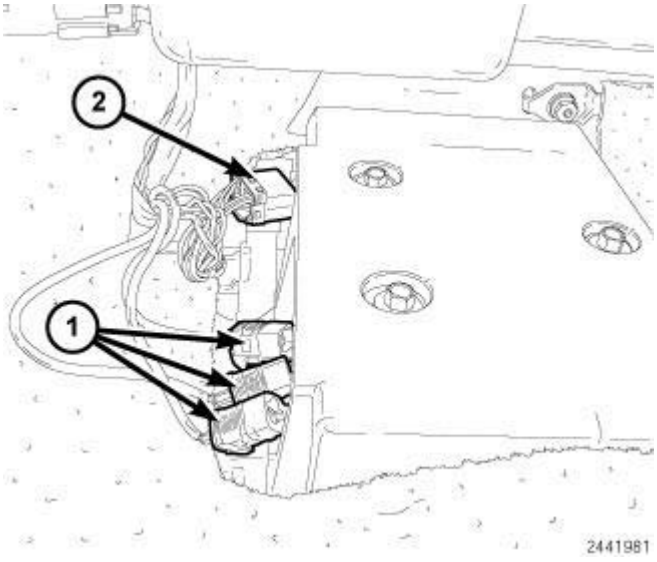

Fig. 259: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

9. Install air cleaner assembly (2).

INSULATOR, ENGINE MOUNT, RIGHT

Removal

REMOVAL

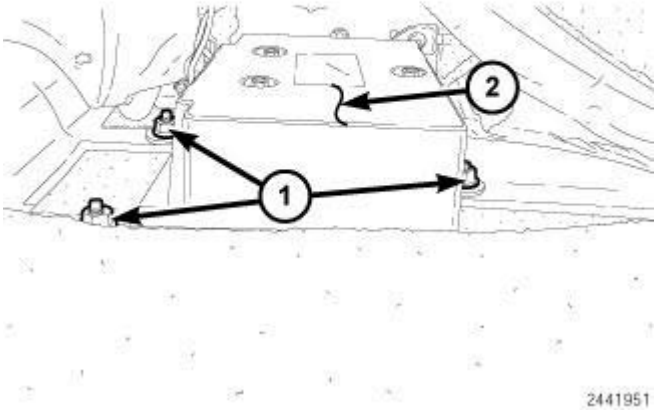

Fig. 260: Coolant Reservoir
Courtesy of CHRYSLER LLC

1. Remove right splash shield.
2. Remove accessory drive belt.
3. Lower vehicle.
4. Support engine with suitable jack.
5. Remove coolant reservoir (1).

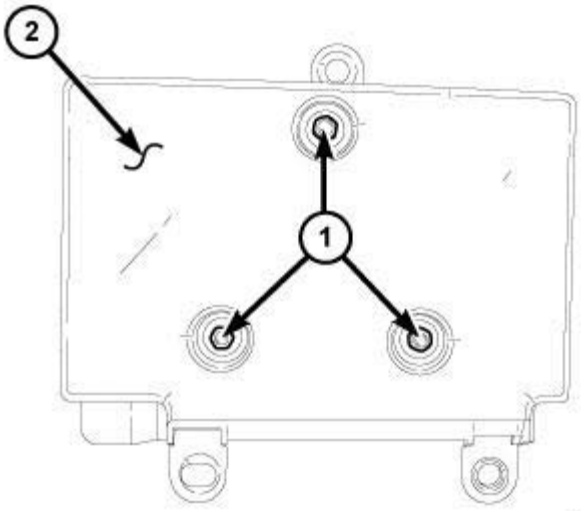

Fig. 261: Right Engine Mount
Courtesy of CHRYSLER LLC

6. Remove upper mount bolts.
7. Remove through bolt (2).
8. Remove mount (3).

Installation

INSTALLATION

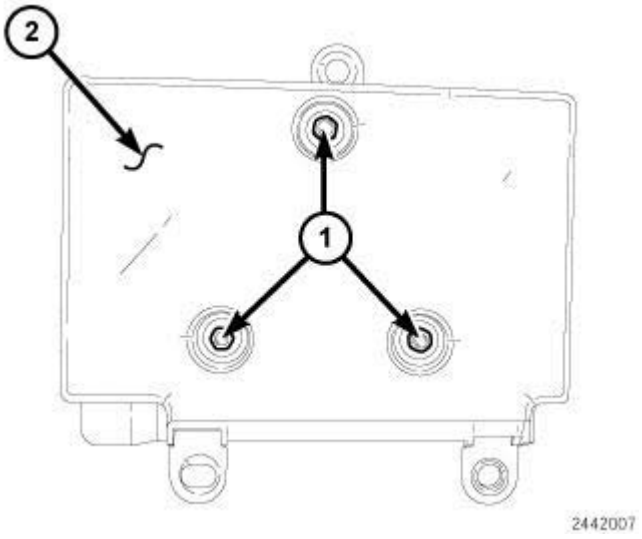

Fig. 262: Right Engine Mount
Courtesy of CHRYSLER LLC

1. Position mount (3) in place.
2. Install mount retaining bolts and tighten to 75 N.m (55 ft. lbs.).
3. Install mount through bolt (2) and tighten to 88 N.m (65 ft. lbs.).

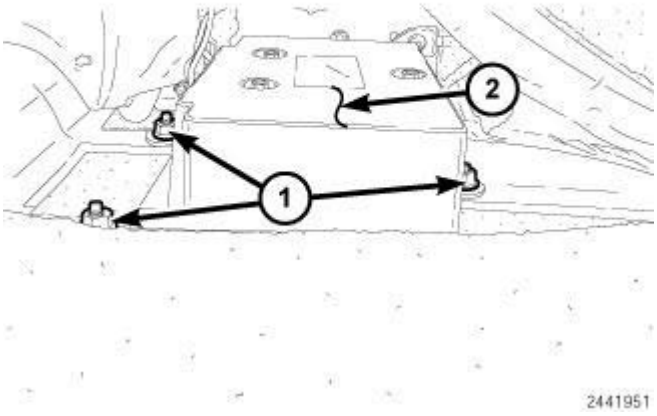

Fig. 263: Coolant Reservoir
Courtesy of CHRYSLER LLC

4. Install coolant reservoir (1).
5. Remove jack.
6. Raise vehicle.
7. Install lower mount bracket bolt and tighten to 68 N.m (50 ft. lbs.).
8. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
9. Install splash shield.

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

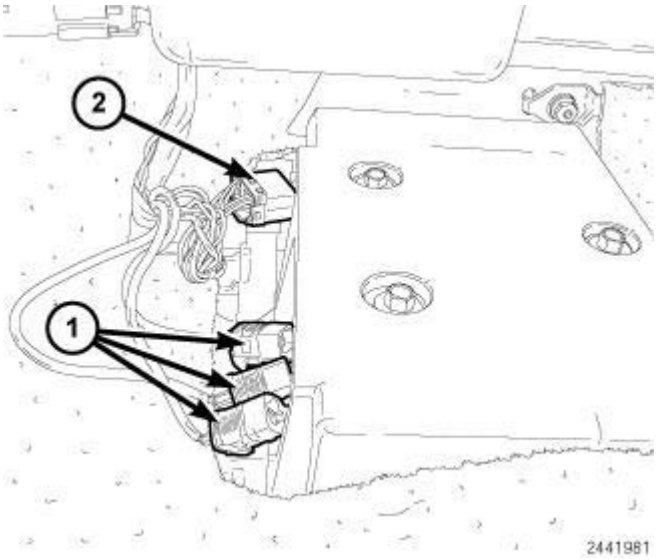

Fig. 264: Front Mount Through Bolt
Courtesy of CHRYSLER LLC

1. Raise vehicle.
2. Remove fore aft member (3) to mount (4) bolts.
3. Remove mount through bolt (1).
4. Remove fore aft member (3) mounting bolts and remove.
5. Remove front mount (4).

Installation

INSTALLATION

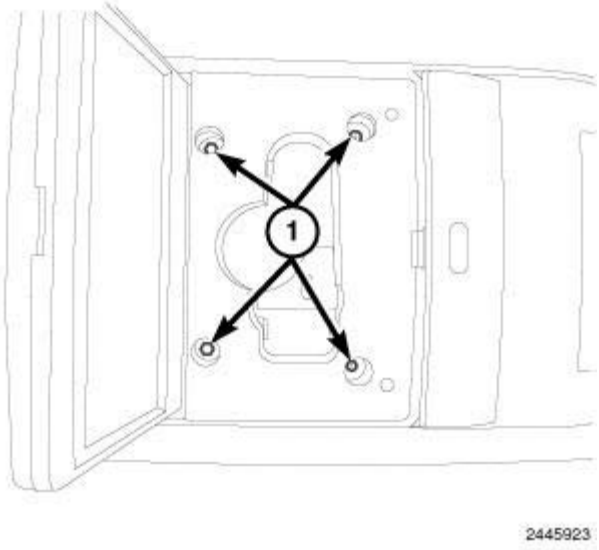

Fig. 265: Front Mount Through Bolt
Courtesy of CHRYSLER LLC

1. Position mount (4) and tighten bolts to 47 N.m (35 ft. lbs.).
2. Install fore aft member (3) and tighten bolts to 100 N.m (74 ft. lbs.).
3. Install mount through bolt (1) and tighten to 47 N.m (35 ft. lbs.).
4. Lower vehicle.

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

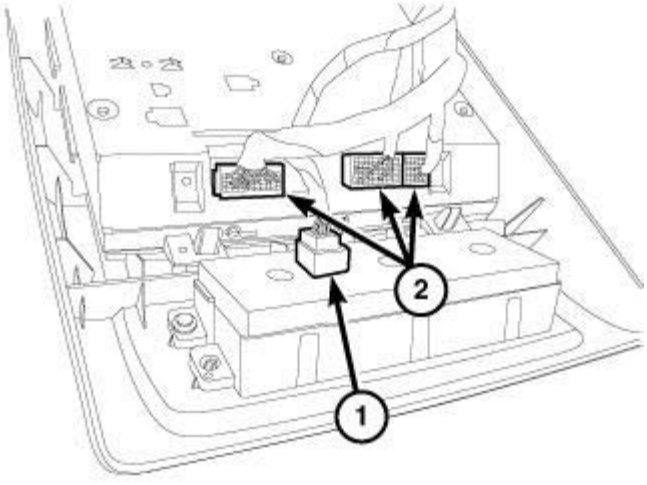

Fig. 266: Rear Mount - A/T
Courtesy of CHRYSLER LLC

1. Remove rear mount retaining bolts (4).
2. Remove rear mount through bolt (1).
3. Remove oxygen sensor connector (2) from mount.
4. Remove rear mount (3).

Installation

INSTALLATION

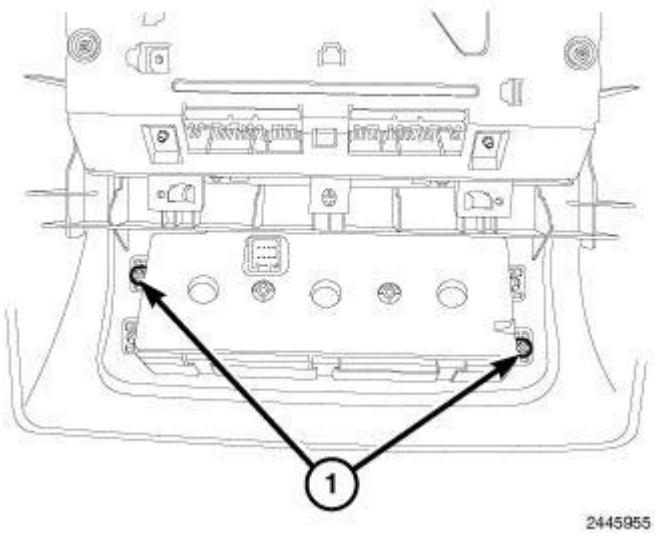

Fig. 267: Rear Mount - A/T
Courtesy of CHRYSLER LLC

1. Position rear mount (3).
2. Install rear mount retaining bolts (4) and tighten to 50 N.m (37 ft. lbs.).
3. Install rear mount through bolt (1) and tighten to 75 N.m (55 ft. lbs.).
4. Install oxygen sensor connector (2) retainer to mount (3).

TURBOCHARGER SYSTEM

COOLER AND HOSES, CHARGE AIR

Removal

CHARGE AIR COOLER

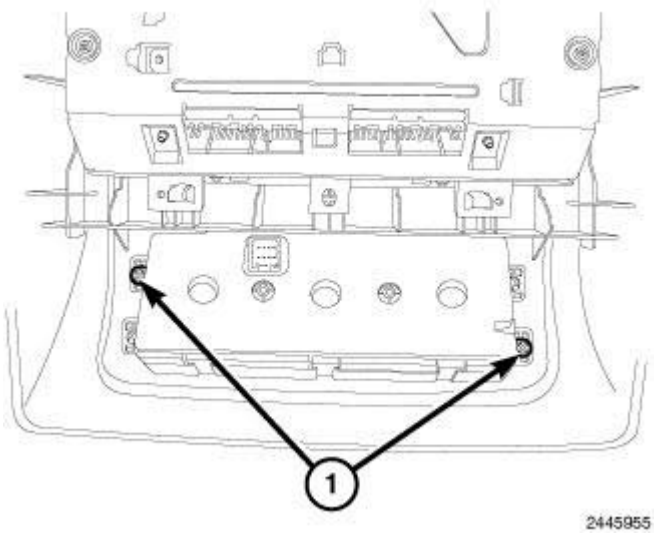

Fig. 268: Charge Air Cooler LH Clamp
Courtesy of CHRYSLER LLC

1 - CHARGE AIR COOLER 2 - LH CLAMP
3 - TUBING

CAUTION: Do not use any tools to remove the rubber isolators-remove by hand only. Soapy water or silicone based lubricant spray may be used to assist removal/installation of isolators. DO NOT use a petroleum based lubricant on the isolators, as damage to the rubber material can occur.

NOTE: Band clamps are spot welded to exhaust system. If a band clamp must be replaced, the spot weld must be ground off the exhaust pipe.

1. Raise and support vehicle.
2. Remove belly pan (if equipped).
3. Remove front fascia lower closeout panel. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front Lower - Removal** .
4. Remove front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .
5. Remove RH tubing clamp (2) and tubing (1) at charge air cooler (3).

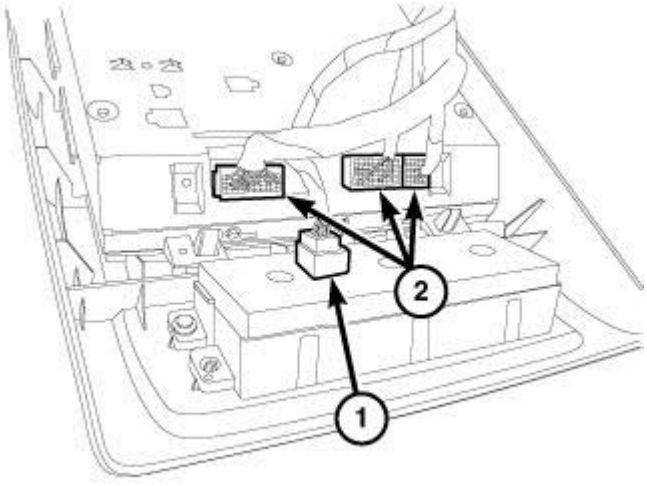

Fig. 269: Charge Air Cooler RH Clamp
Courtesy of CHRYSLER LLC

1 - TUBING
2 - CLAMP
3 - CHARGE AIR COOLER

6. Remove LH tubing clamp (2) and tubing (1) at charge air cooler (3).
7. Remove charge air cooler mounting bolts and charge air cooler (3).

Installation

CHARGE AIR COOLER

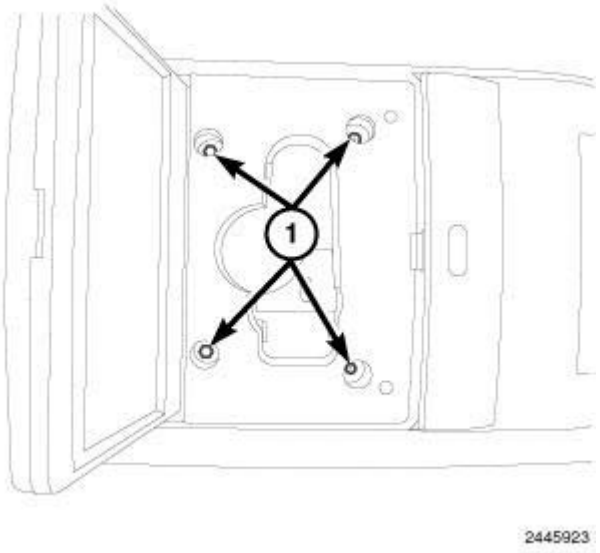

Fig. 270: Charge Air Cooler LH Clamp

Courtesy of CHRYSLER LLC

1 - CHARGE AIR COOLER 2 - LH CLAMP
3 - TUBING

1. Position charge air cooler (3) and install mounting bolts. Tighten bolts to 35 N.m (25 ft. lbs.).
2. Install LH tubing (3) and clamp (2) at charge air cooler (1). Tighten clamp to 10 N.m (89 in. lbs.).

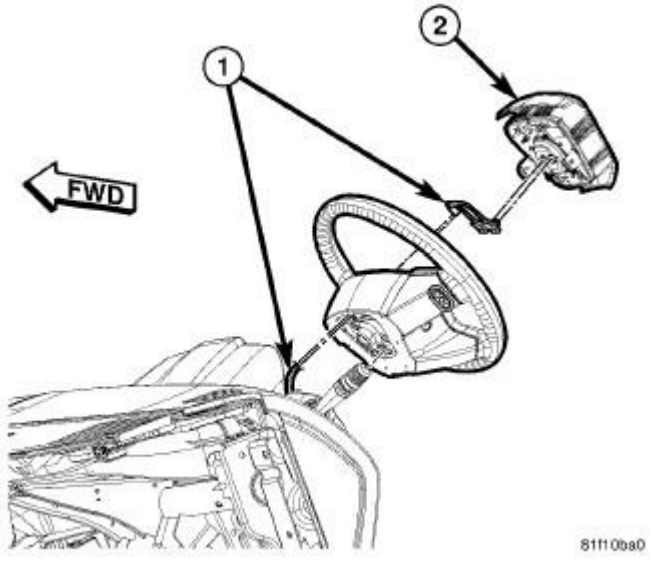

Fig. 271: Charge Air Cooler RH Clamp
Courtesy of CHRYSLER LLC

1 - TUBING 2 - CLAMP
3 - CHARGE AIR COOLER

3. Install RH tubing (1) and clamp (2) at charge air cooler (3). Tighten clamp to 10 N.m (89 in. lbs.).
4. Install front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation** .
5. Install front fascia lower closeout panel. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front Lower - Installation** .
6. Lower vehicle.

TURBOCHARGER

Removal

DIESEL ENGINE

1. For turbocharger removal, see **Removal** .

Installation

DIESEL ENGINE

1. For turbocharger installation, see **Installation** .

2009 ENGINE

2.4L Gas - Service Information - Journey

DESCRIPTION

DESCRIPTION

The 2.4 Liter (148 cu. in.) inline four cylinder engine is a double over head camshaft design with mechanical lash tappets and four valves per cylinder design. This engine is NOT free-wheeling; meaning that the pistons will contact the valves in the event of a timing chain failure.

The cylinders are numbered from front of the engine to the rear. The firing order is 1-3-4-2.

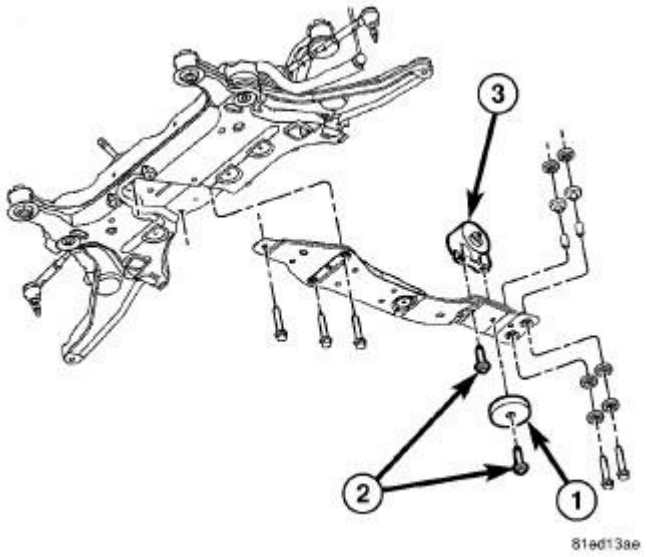

Fig. 1: Serial Number
Courtesy of CHRYSLER LLC

The engine serial number (1) is located on the rear of the cylinder block behind the oil pan. The serial number is visible with the oil pan in place. The serial number contains engine build date information.

DIAGNOSIS AND TESTING

INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

Refer to **MECHANICAL** and **PERFORMANCE** diagnostic charts, for possible causes and corrections of malfunctions.

For fuel system diagnosis, see **FUEL SYSTEM** .

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that cannot be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following:

- Cylinder Compression Pressure Test: Refer to **CYLINDER COMPRESSION PRESSURE TEST**.
- Cylinder Combustion Pressure Leakage Test: Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE TEST**.
- Engine Cylinder Head Gasket Failure Diagnosis: Refer to **CYLINDER HEAD GASKET**.
- Intake Manifold Leakage Diagnosis: Refer to **INTAKE MANIFOLD LEAKS**.
- Mechanical Valve Tappet Noise Diagnosis: Refer to **MECHANICAL VALVE TAPPET NOISE DIAGNOSIS**.
- Engine Oil Leak Inspection: Refer to **ENGINE OIL LEAK INSPECTION**.

PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test battery. Charge or replace as necessary. Refer to **Electrical - Engine Systems/Battery System - Diagnosis and Testing** .
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to terminals.
	3. Faulty starter.	3. Test starting system. Check for codes. (Refer to Appropriate Diagnostic Information)
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. (Refer to Appropriate Diagnostic Information)
	5. Incorrect spark plug gap.	5. Set gap. Refer to **Electrical - Ignition Control/Ignition Control - Specifications** .
	6. Contamination in fuel system.	6. Clean system and replace fuel filter.
	7. Faulty fuel pump.	7. Test fuel pump and replace as needed. (Refer to Appropriate Diagnostic Information)
	8. Incorrect engine timing.	8. Check for a skipped timing belt/chain.
ENGINE STALLS OR IDLES	1. Idle speed too low.	1. Test minimum air flow. (Refer

ROUGH		to Appropriate Diagnostic Information)
	2. Incorrect fuel mixture.	2. (Refer to Appropriate Diagnostic Information)
	3. Intake manifold leakage.	3. Inspect intake manifold, manifold gasket, and vacuum hoses.
	4. Faulty ignition coil(s).	4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	5. Contamination in Oil Control Valve (OCV).	5. Remove OCV and inspect for contamination. Replace OCV if contaminated.
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped plugs.	1. Clean plugs and set gap.
	2. Contamination in fuel system.	2. Clean system and replace fuel filter.
	3. Faulty fuel pump.	3. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	4. Incorrect valve timing.	4. Correct valve timing.
	5. Leaking cylinder head gasket.	5. Replace cylinder head gasket.
	6. Low compression.	6. Test compression of each cylinder.
	7. Burned, warped, or pitted valves.	7. Replace valves.
	8. Plugged or restricted exhaust system.	8. Perform exhaust restriction test. Install new parts. Refer to **Exhaust System - Diagnosis and Testing** , as necessary.
	9. Faulty ignition coil(s).	9. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Clean spark plugs and set gap.
	2. Contamination in Fuel System.	2. Clean fuel system and replace fuel filter.
	3. Burned, warped, or pitted valves.	3. Replace valves.
	4. Faulty ignition coil(s).	4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap.	1. Clean spark plugs and set gap.
	2. Faulty ignition coil(s).	2. Test and replace as necessary.

		(Refer to Appropriate Diagnostic Information)
	3. Dirty fuel injector(s).	3. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	4. Contamination in fuel system.	4. Clean system and replace fuel filter.

MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
VALVETRAIN NOISE	1. High or low oil level in crankcase.	1. Check and correct engine oil level.
	2. Thin or diluted oil.	2. Change oil to correct viscosity.
	3. Thick oil	3. (a) Change engine oil and filter.
	-	(b) Run engine to operating temperature.
	-	(c) Change engine oil and filter again.
	4. Low oil pressure.	4. (a) Check and correct engine oil level.
	-	(b) Check pressure regulating valve.
	5. Worn cam lobe.	5. Install new camshaft.
	6. Worn tappet bucket.	6. Install new select fit tappet bucket.
	7. Worn valve guides.	7. Replace cylinder head.
	8. Excessive runout of valve seats on valve faces.	8. Grind valve seats and replace valves.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Thick oil	4. (a) Change engine oil and filter.
	-	(b) Run engine to operating temperature.
	-	(c) Change engine oil and filter again.
	5. Excessive bearing clearance.	5. Measure bearings for correct clearance. Repair as necessary.
	6. Connecting rod journal out-of-round.	6. Replace crankshaft or grind surface.
	7. Connecting rod out-of-round.	7. Replace connecting rod.
	8. Misaligned connecting rods.	8. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.

	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thin or diluted oil.	3. Change oil to correct viscosity.
	4. Thick oil	4. (a) Change engine oil and filter.
	-	(b) Run engine to operating temperature.
	-	(c) Change engine oil and filter again.
	5. Excessive bearing clearance.	5. Measure bearings for correct clearance. Repair as necessary.
	6. Excessive end play.	6. Check thrust bearing for wear on flanges.
	7. Crankshaft journal out-of-round or worn.	7. Replace crankshaft or grind journals.
	8. Loose flywheel or torque converter.	8. Tighten to correct torque.
OIL PRESSURE DROP	1. Low oil level.	1. Check engine oil level.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Low oil pressure.	3. Check sending unit and main bearing oil clearance.
	4. Clogged oil filter.	4. Install new oil filter.
	5. Worn parts in oil pump.	5. Replace balance shaft module.
	6. Thin or diluted oil.	6. Change oil to correct viscosity.
	7. Oil pump relief valve stuck.	7. Remove valve and inspect, clean, or replace.
	8. Excessive bearing clearance.	8. Measure bearings for correct clearance.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket(s).
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Misaligned or deteriorated cup or threaded plug.	3. Replace as necessary.
OIL CONSUMPTION OR SPARK PLUGS FOULED	1. PCV system malfunction.	1. Check system and repair as necessary. Refer to **Emissions Control/Evaporative Emissions/VALVE, Positive Crankcase Ventilation (PCV) - Diagnosis and Testing** .
	2. Worn, scuffed or broken rings.	2. Hone cylinder bores. Install new rings.
	3. Carbon in oil ring slots.	3. Install new rings.
	4. Rings fitted too tightly in grooves.	4. Remove rings and check grooves. If groove is not proper width,

	5. Worn valve guide(s). 6. Valve stem seal(s) worn or damaged.	replace piston. 5. Replace cylinder head. 6. Replace seal(s).

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

WARNING: Do not remove the pressure cap with the system hot and under pressure because serious burns from coolant can occur.

1. Check the coolant level and fill as required. DO NOT install the pressure cap.
2. Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.
3. Clean spark plug recesses with compressed air.
4. Remove the spark plugs.
5. Remove the oil filler cap.
6. Remove the air cleaner.
7. Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum, with 552 kPa (80 psi) recommended.
8. Perform the test procedures on each cylinder according to the tester manufacturer's instructions. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the coolant.
9. All gauge pressure indications should be equal, with no more than 25% leakage per cylinder.
10. **FOR EXAMPLE:** At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

CYLINDER COMPRESSION PRESSURE TEST

The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Check engine oil level and add oil if necessary.
2. Drive the vehicle until engine reaches normal operating temperature. Select a route free from traffic and

other forms of congestion, observe all traffic laws, and accelerate through the gears several times briskly.

3. Remove engine cover.
4. Disconnect coil electrical connectors and remove coils.
5. Remove all spark plugs from engine. As spark plugs are being removed, check electrodes for abnormal firing indicators such as fouled, hot, oily, etc. Record cylinder number of spark plug for future reference.
6. Disconnect injector electrical connectors.
7. Install a suitable compression test gauge into the #1 spark plug hole in cylinder head.
8. Crank engine until maximum pressure is reached on gauge. Record this pressure as #1 cylinder pressure.
9. Repeat the previous step for all remaining cylinders.
10. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
11. If one or more cylinders have abnormally low compression pressures, repeat the compression test.
12. If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question. **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

ENGINE OIL LEAK INSPECTION

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair as necessary.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.
5. **If the oil leak source is not positively identified at this time** , proceed with the AIR LEAK DETECTION TEST METHOD as follows:
    - Disconnect the fresh air hose (make-up air) at the cylinder head cover and plug or cap the nipple on the cover.
    - Remove the PCV valve hose from the cylinder head cover. Cap or plug the PCV valve nipple on the cover.
    - Attach an air hose with pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 psi) of test pressure.

- Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provides the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service information procedures.
- If the leakage occurs at the crankshaft rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS**.

6. If no leaks are detected, turn off the air supply. Remove the air hose, all plugs, and caps. Install the PCV valve and fresh air hose (make-up air). Proceed to next step.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

NOTE: If oil leakage is observed at the dipstick tube to block location; remove the tube, clean and reseal using Mopar® Stud AND Bearing Mount (press fit tube applications only), and for O-ring style tubes, remove tube and replace the O-ring seal.

CAUTION: Do not exceed 20.6 kPa (3 psi).

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak. If a leak is present in this area, remove transmission for further inspection.
   a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
   b. Where leakage tends to run straight down, possible causes are a porous block, oil gallery cup plug, bed plate to cylinder block mating surfaces and seal bore. See proper repair procedures for these items.
4. If no leaks are detected, pressurize the crankcase as previously described in step 5 under ENGINE OIL LEAK INSPECTION.

CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.
7. After the oil leak root cause and appropriate corrective action have been identified, replace component(s) as necessary.

STANDARD PROCEDURE

REPAIR OF DAMAGED OR WORN THREADS

Damaged or worn threads (excluding spark plug and camshaft bearing cap attaching threads) can be repaired. Essentially, this repair consists of drilling out worn or damaged threads, tapping the hole with a special Heli-Coil Tap, (or equivalent) and installing an insert into the tapped hole. This brings the hole back to its original thread size.

CAUTION: Be sure that the tapped holes maintain the original center line.

Heli-Coil tools and inserts are readily available from automotive parts jobbers.

HYDROSTATIC LOCKED ENGINE

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

CAUTION: DO NOT use starter motor to rotate the engine, severe damage may occur.

1. Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.
2. Remove negative battery cable.
3. Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.
4. With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.

5. Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).
6. Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.)
7. Repair engine or components as necessary to prevent this problem from reoccurring.

CAUTION: Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

8. Install new spark plugs.
9. Drain engine oil and remove oil filter.
10. Install a new oil filter.
11. Fill engine with specified amount of approved oil.
12. Connect negative battery cable.
13. Start engine and check for any leaks.

FORM-IN-PLACE GASKETS AND SEALERS

NOTE: All of the sealants mentioned below are not used on every engine, they are listed as general reference guide. See service information for specific sealer usage.

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results.**Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. All sealing surfaces that use form-in-place gaskets and sealers **must** free of grease or oil. Surfaces should be cleaned with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, the parts should be assembled in no more than 10 minutes.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Sealant RTV Silicone Rubber Adhesive, MOPAR® Silicone Rubber RTV Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® SEALANT RTV SILICONE RUBBER ADHESIVE is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® SILICONE RUBBER RTV is used to seal components exposed to engine oil, gear lubricant, and coolant. This material is a specially designed gray silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil gear lubricant and coolant. Excellent adhesion , even on oily surfaces. Withstands temperatures to 330°C (650°F). Moisture in the air causes the material to cure. This material is

available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can w/applicator.

SEALER APPLICATION

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® RTV or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. For corner sealing and "T" joint locations and waffle pad area, a mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

ENGINE GASKET SURFACE PREPARATION

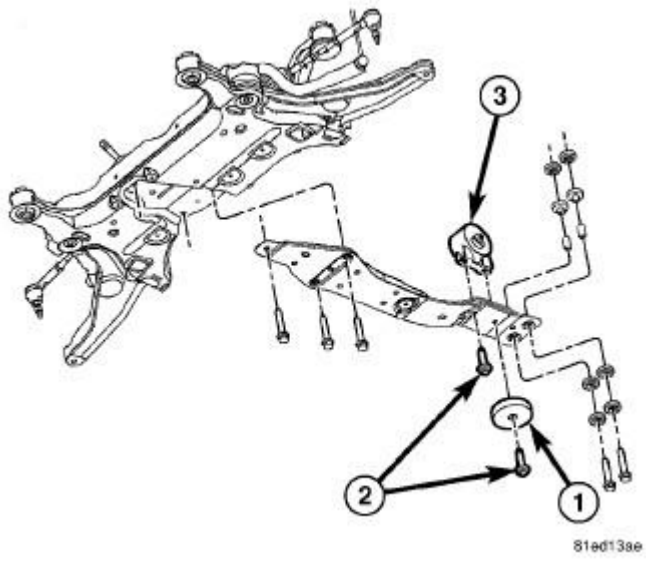

Fig. 2: PROPER TOOL USAGE FOR SURFACE PREPARATION
Courtesy of CHRYSLER LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2,3).

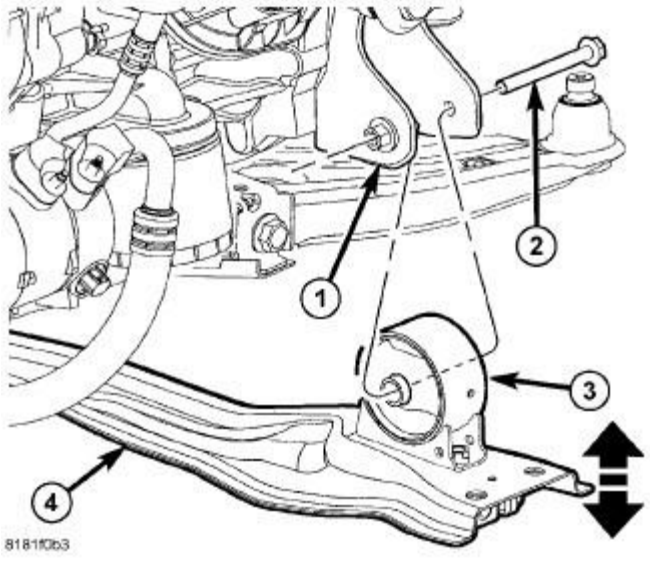

Fig. 3: PROPER TOOL USAGE FOR SURFACE PREPARATION

Courtesy of CHRYSLER LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

CORE/GALLERY PLUGS

CYLINDER HEAD CORE PLUGS

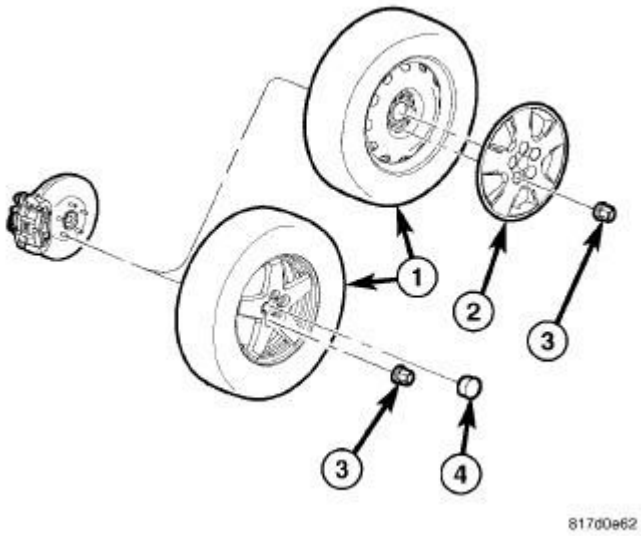

Fig. 4: CORE HOLE PLUG REMOVAL
Courtesy of CHRYSLER LLC

Using a blunt tool (3) such as a drift and a hammer, strike the bottom edge of the cup plug (5). With the cup plug rotated, grasp firmly with pliers or other suitable tool (2) and remove plug (5).

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

Thoroughly clean inside of cup plug hole in cylinder head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount (or equivalent). Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

CYLINDER BLOCK MAIN OIL GALLERY PLUGS

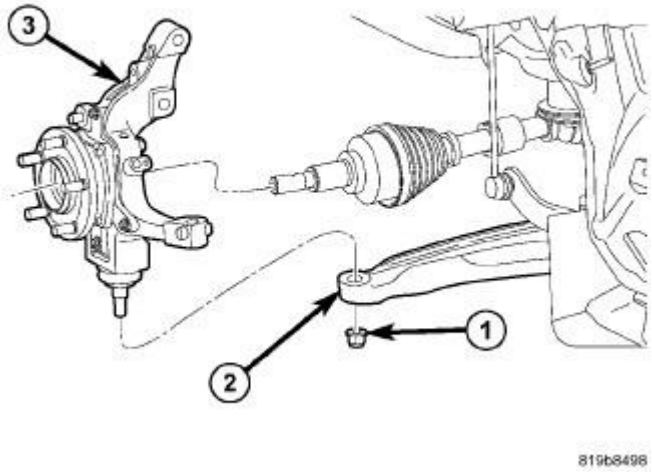

Fig. 5: GALLERY PLUG
Courtesy of CHRYSLER LLC

CAUTION: Excessive use of brake parts cleaner to clean threads in block could cause #5 main bearing failure.

1. Use Mopar® Brake Parts Cleaner (or equivalent) sparingly to clean plug and block.
2. Coat plug threads with Mopar® Thread Sealant (or equivalent).
3. Install plug (2). The plug (2) is correctly installed when it is protruding 1 mm to flush with the block boss face (1).

MEASURING BEARING CLEARANCE USING PLASTIGAGE

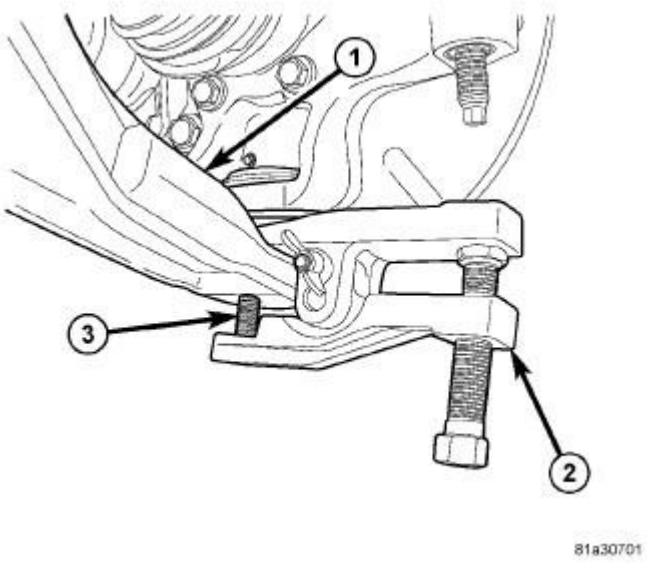

Fig. 6: Plastigage Placed in Lower Shell-Typical
Courtesy of CHRYSLER LLC

Engine crankshaft bearing clearances can be determined by use of Plastigage or equivalent. The following is the recommended procedure for the use of Plastigage:

1. Remove oil film from surface to be checked. Plastigage is soluble in oil.
2. Place a piece of Plastigage (1) across the entire width of the journal. (In addition, suspected areas can be checked by placing the Plastigage in the suspected area). Torque the bearing cap bolts of the bearing being checked to the proper specifications.
3. Remove the bearing cap and compare the width of the flattened Plastigage with the scale provided on the package. Locate the band closest to the same width. This band shows the amount of clearance. Differences in readings between the ends indicate the amount of taper present. Record all readings taken. Compare clearance measurements to specs found in **Engine - Specifications**. **Plastigage generally is accompanied by two scales. One scale is in inches, the other is a metric scale.**

   NOTE: Plastigage is available in a variety of clearance ranges. Use the most appropriate range for the specifications you are checking.

4. Install the proper crankshaft bearings to achieve the specified bearing clearances.

REMOVAL

ENGINE COVER

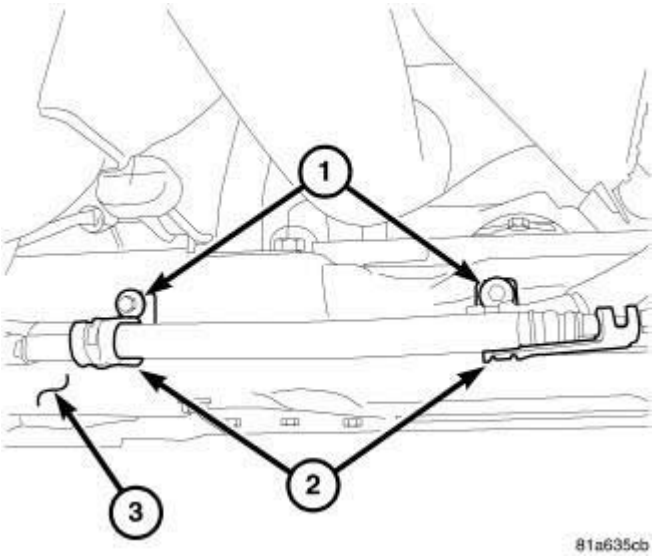

Fig. 7: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by pulling upwards.

ENGINE ASSEMBLY

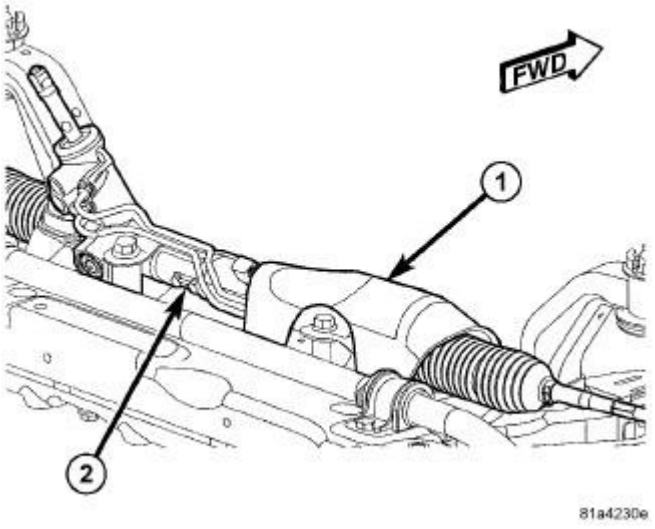

Fig. 8: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1).

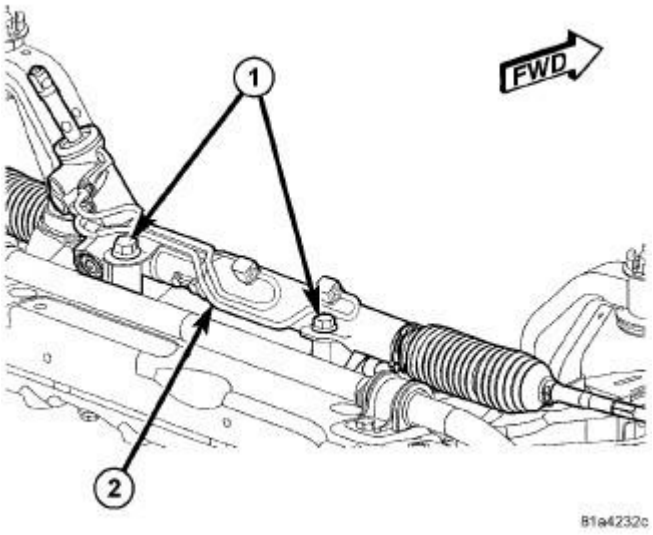

Fig. 9: Coil Connector
Courtesy of CHRYSLER LLC

2. Perform fuel pressure release procedure, then disconnect and remove fuel line (3). Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Remove make-up air hose (2).

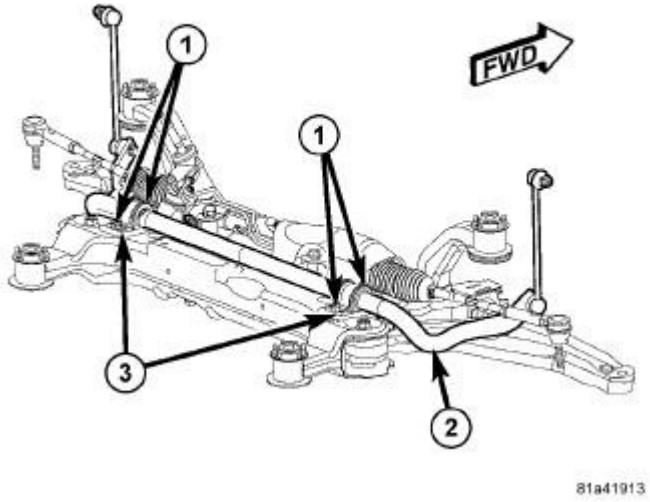

Fig. 10: Air Cleaner Housing Assembly
Courtesy of CHRYSLER LLC

4. Remove air cleaner housing assembly (1). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

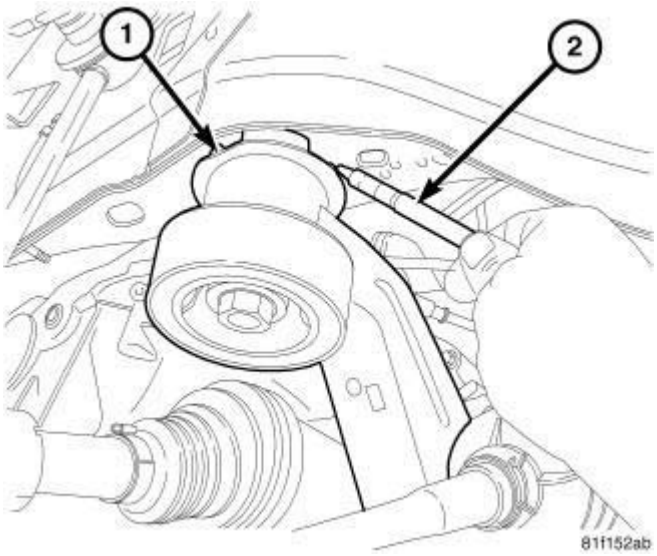

Fig. 11: BATTERY CABLE
Courtesy of CHRYSLER LLC

5. Disconnect negative battery cable (1).
6. Discharge air conditioning system, if equipped.
7. Drain cooling system.

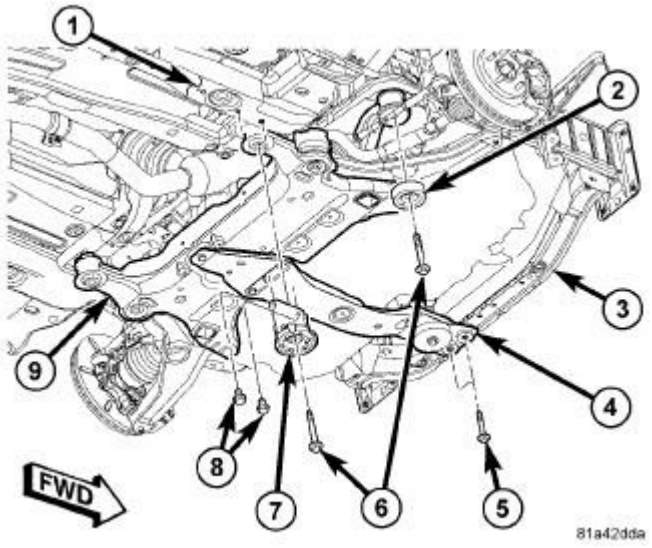

Fig. 12: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

8. Remove coolant reservoir (1).
9. Remove power steering reservoir (2).

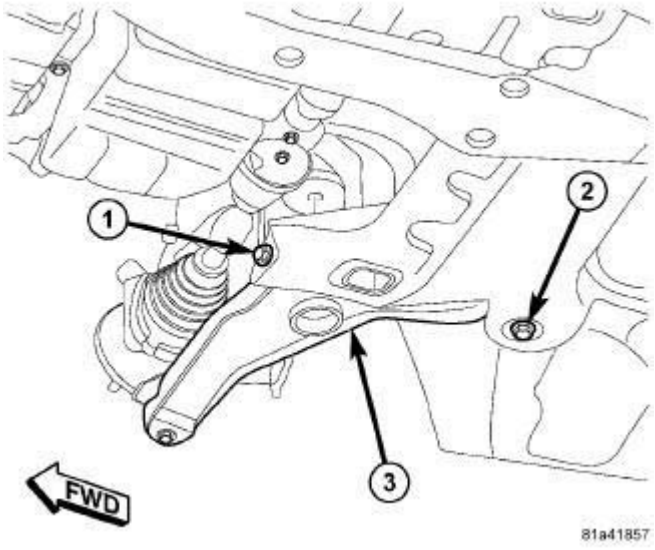

Fig. 13: Power Steering Line Support
Courtesy of CHRYSLER LLC

10. Remove power steering line support at engine mount (1).
11. Remove power steering pump and set aside.

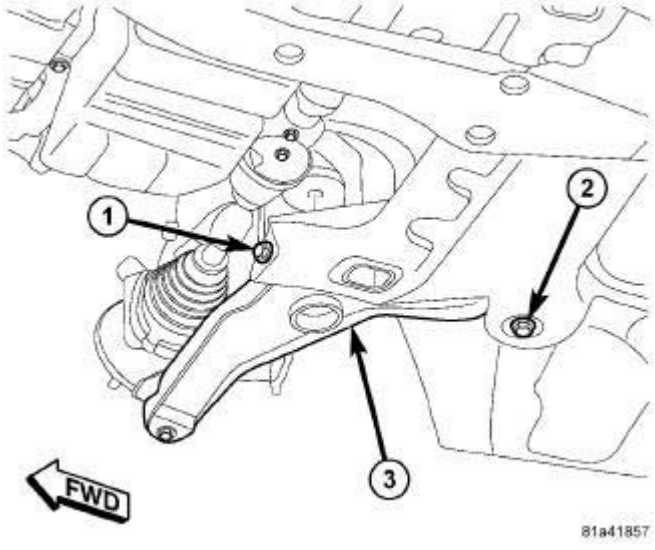

Fig. 14: Coolant Adapter
Courtesy of CHRYSLER LLC

12. Remove coolant hoses from coolant adapter (3).
13. Disconnect coolant temperature sensor connector (1) and capacitor connector (2).

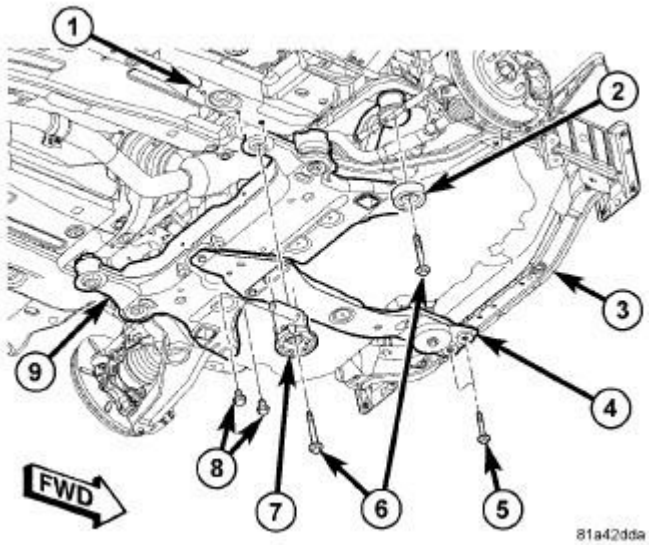

Fig. 15: Coil Connector
Courtesy of CHRYSLER LLC

14. Disconnect coils (1), injectors (4), cam sensors, oil temperature sensor, and oil control valve electrical connectors and reposition harness.
15. Remove PCV hose (5) from valve cover.
16. Remove harness from intake (2).
17. Remove throttle body support bracket (1).
18. Remove vacuum lines from throttle body and intake manifold.
19. Disconnect electronic throttle control and manifold flow control valve electrical connectors.

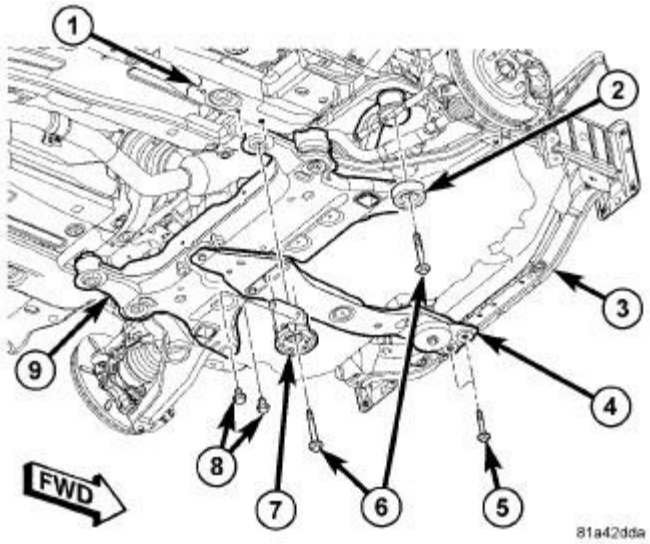

Fig. 16: INTAKE TORQUE SEQUENCE

Courtesy of CHRYSLER LLC

20. Remove dipstick.
21. Remove intake bolts and remove intake.
22. Disconnect coolant temperature sensor at block, knock sensor, oil pressure sensor, generator, starter, block heater (if equipped), A/C compressor (if equipped), and block ground.
23. Remove accessory drive belt.

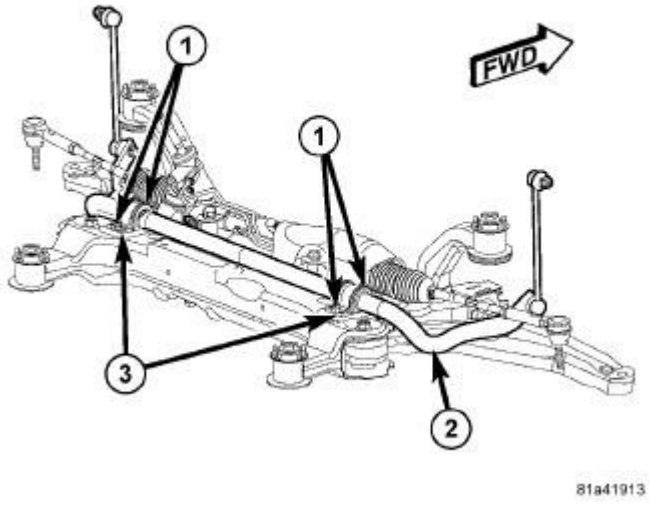

Fig. 17: Oil Drain Plug
Courtesy of CHRYSLER LLC

24. Raise vehicle.
25. Remove front splash shield.
26. Drain oil (2).

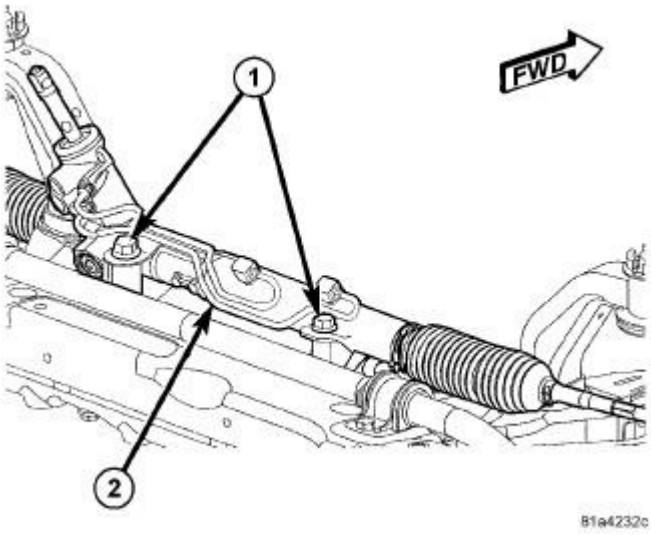

Fig. 18: Exhaust Manifold Bolts, Heat Shield & Oxygen Sensor Connector
Courtesy of CHRYSLER LLC

27. Remove exhaust pipe to exhaust manifold bolts (1).
28. Disconnect oxygen sensor connector (3).
29. Remove exhaust manifold heat shield (2).
30. Remove exhaust manifold.

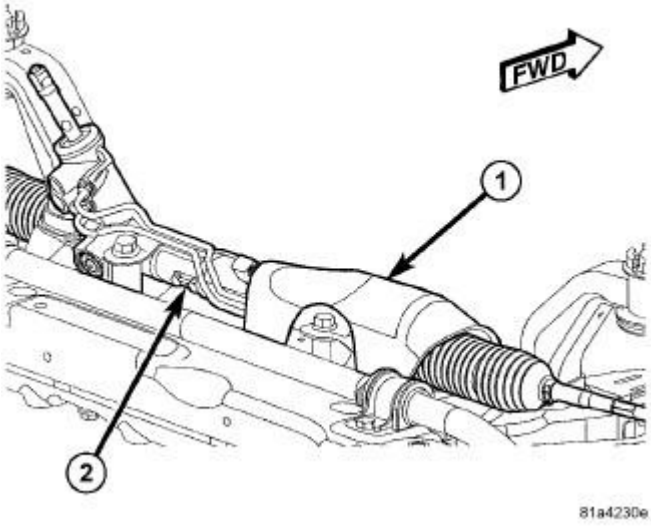

Fig. 19: INSPECTION COVER
Courtesy of CHRYSLER LLC

31. Remove inspection cover (1) and mark torque converter to flywheel.

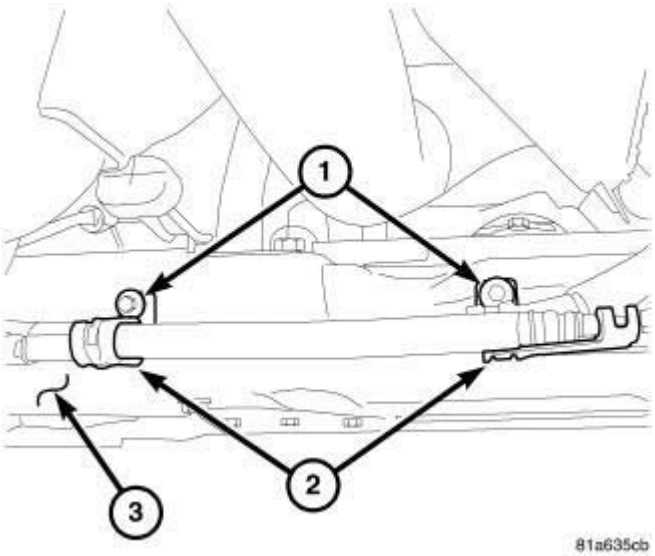

Fig. 20: MODULAR CLUTCH TO FLEX PLATE BOLTS
Courtesy of CHRYSLER LLC

32. On vehicles equipped with an automatic transaxle, remove torque converter bolts (1).
33. On vehicles equipped with an manual transaxle, remove modular clutch bolts (1).
34. Remove lower bellhousing bolts (2).

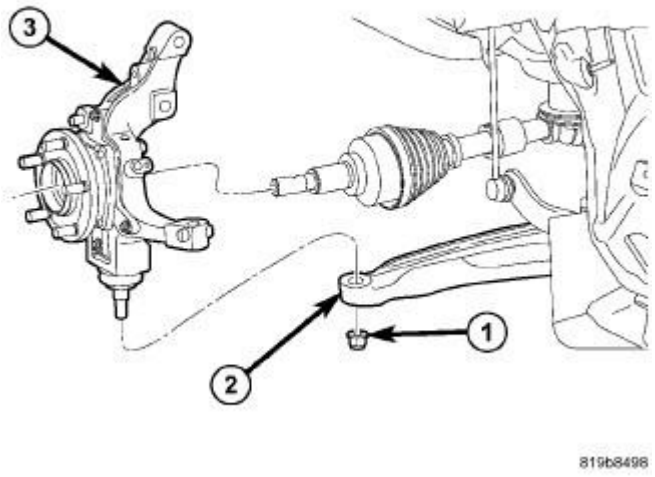

Fig. 21: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

35. Remove A/C compressor (1) from engine and set aside.
36. Remove generator and lower idler pulley.

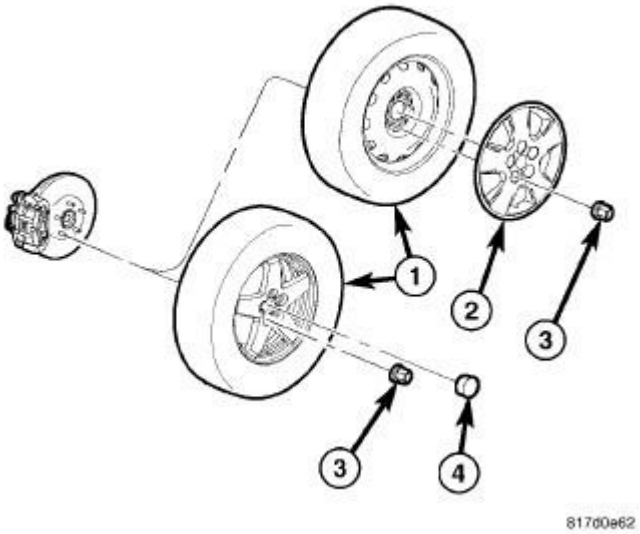

Fig. 22: CRANKSHAFT POSITION SENSOR
Courtesy of CHRYSLER LLC

37. Disconnect CKP sensor (2) electrical connector.

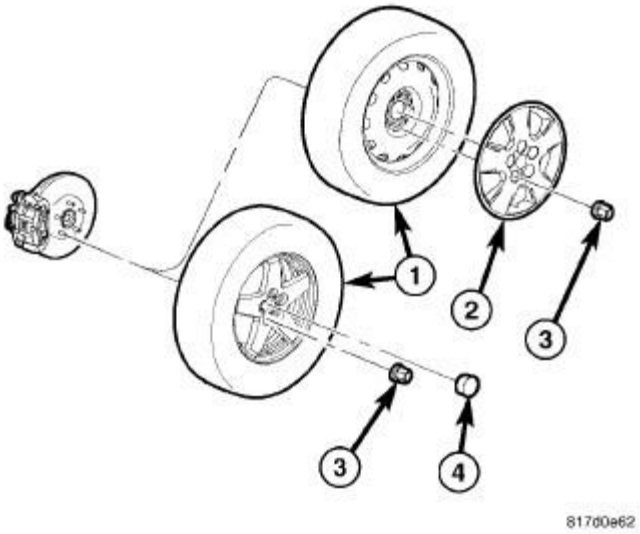

Fig. 23: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

38. Remove right engine mount bracket retaining bolts (4).
39. Remove power steering hose hold down (3).
40. Remove retaining nuts (2) and position mount bracket (1) aside.

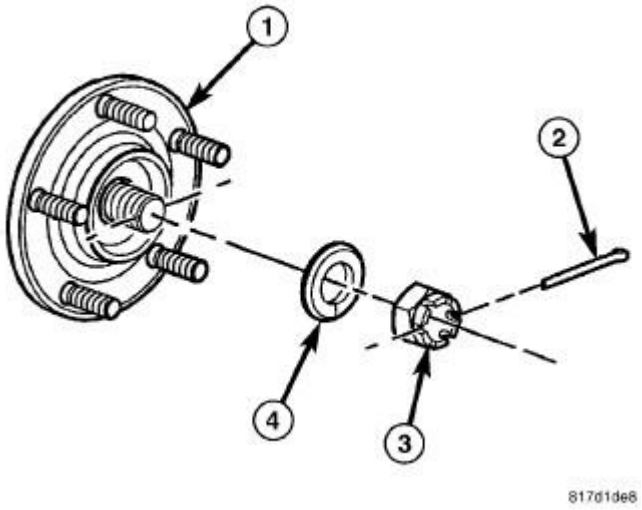

Fig. 24: LIFT CHAIN
Courtesy of CHRYSLER LLC

41. Remove intake oil control valve to prevent damage.
42. Install engine lift chain to rear lift bracket and bolt to cylinder head (1) in the front.
43. Hoist engine from vehicle.
44. Separate engine and transmission.

INSTALLATION

ENGINE COVER

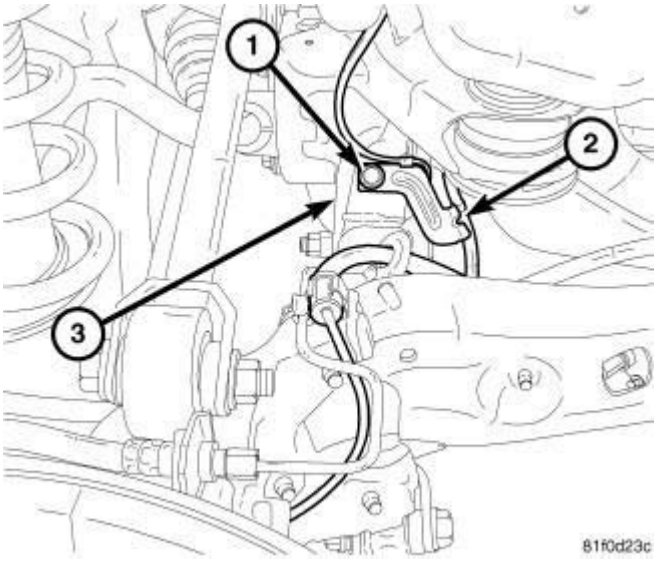

Fig. 25: Engine Cover

Courtesy of CHRYSLER LLC

1. Position engine cover (1) over mounting studs.
2. Seat the cover on the rear studs by pushing downwards.
3. Push downward on the front of the cover to seat the front studs.

ENGINE ASSEMBLY

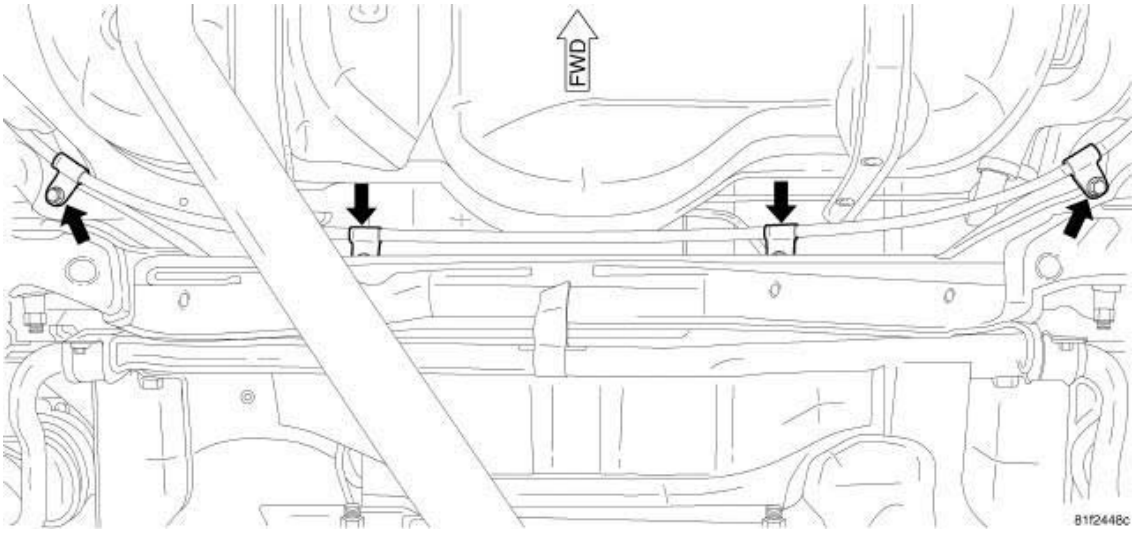

Fig. 26: LIFT CHAIN
Courtesy of CHRYSLER LLC

1. Connect engine lift chain (1) to engine.
2. Slowly lower engine assembly in to position.

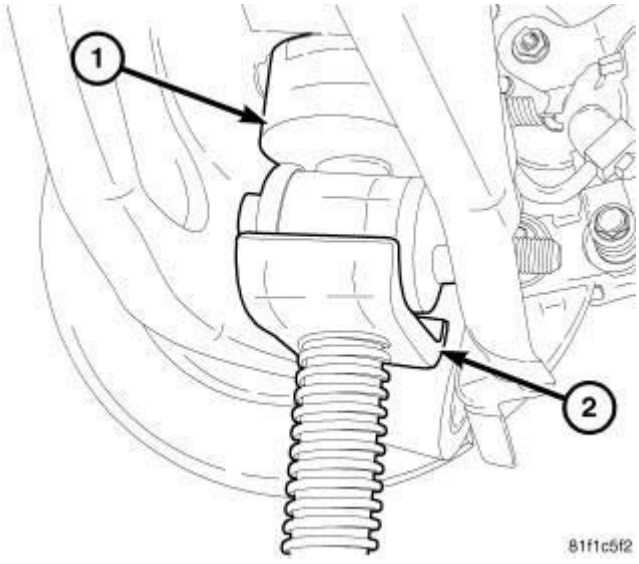

Fig. 27: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

3. Position right mount bracket (1) and install bolts (4).
4. Install retaining nuts (2) and tighten nuts (2) to 30 N.m (22 ft. lbs.).
5. Tighten bolts (4) to 50 N.m (37 ft. lbs.).

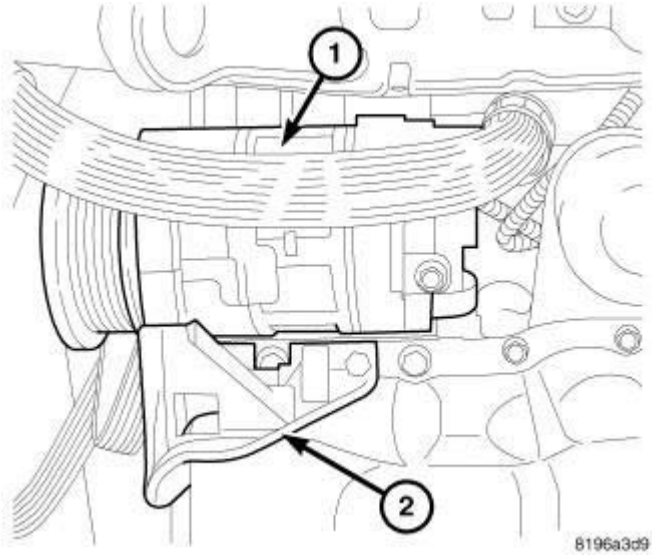

Fig. 28: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

6. Install A/C compressor mounting bracket (2).
7. Install A/C compressor (1) and connect lines.
8. Install exhaust manifold and upper lower heat shields (Refer to **Manifolds**).
9. Install oxygen sensor and connect electrical connector.

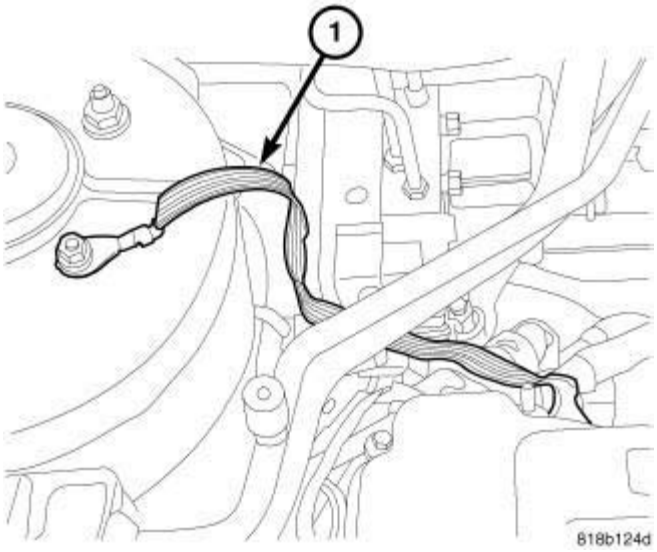

Fig. 29: GROUND STRAP
Courtesy of CHRYSLER LLC

10. Install Ground strap (1) near right strut tower.
11. Raise vehicle.

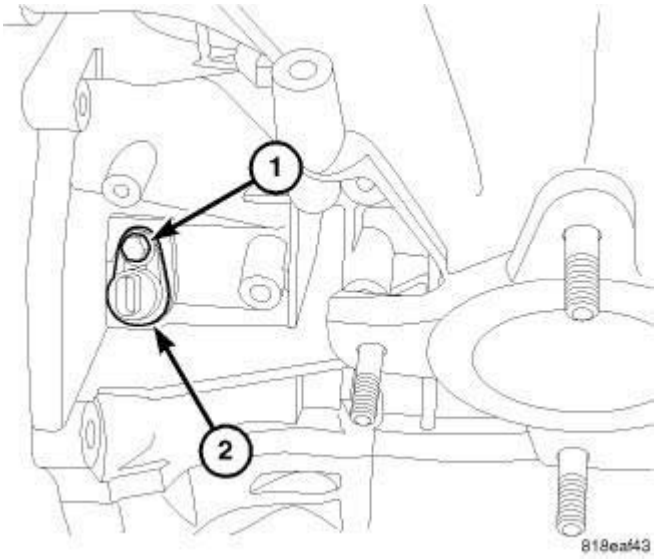

Fig. 30: CRANKSHAFT POSITION SENSOR
Courtesy of CHRYSLER LLC

12. Install crankshaft position sensor (CKP) (2).
13. Connect CKP electrical connector (2).

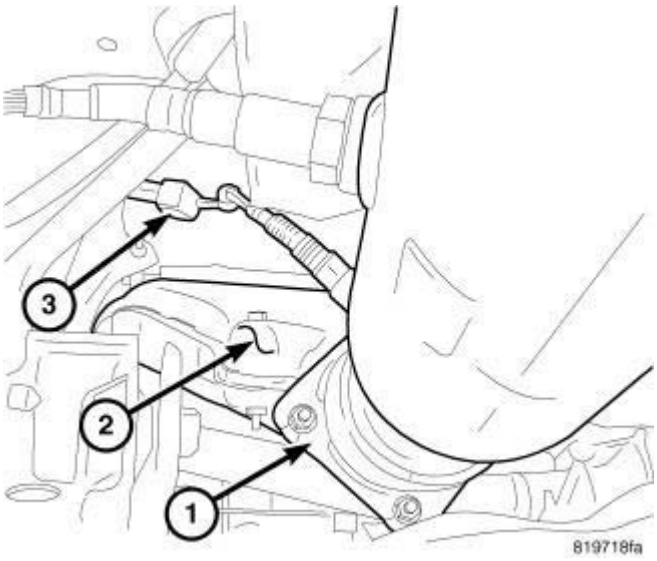

Fig. 31: Exhaust Pipe Bolts
Courtesy of CHRYSLER LLC

14. Install manifold to exhaust pipe bolts (1) and tighten bolts.
15. Install generator.

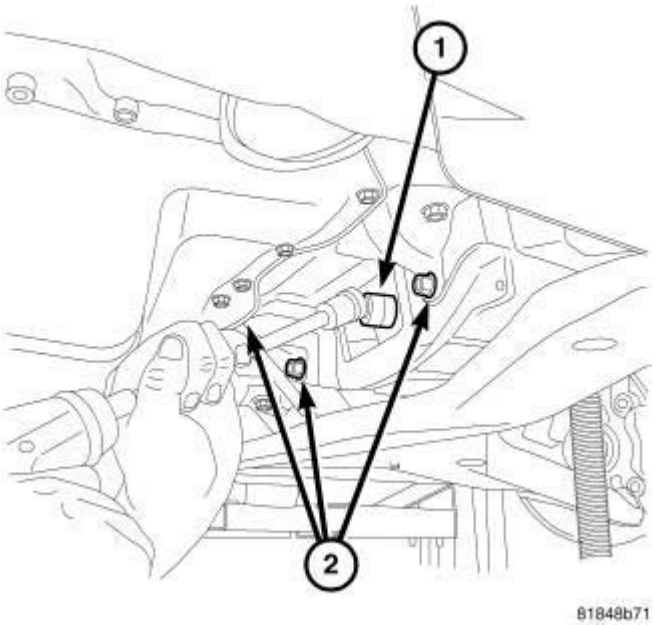

Fig. 32: MODULAR CLUTCH TO FLEX PLATE BOLTS
Courtesy of CHRYSLER LLC

16. Install lower bell housing bolts (2) and tighten.
17. Align torque converter and flex plate mark. Install torque converter bolts (1) and tighten.

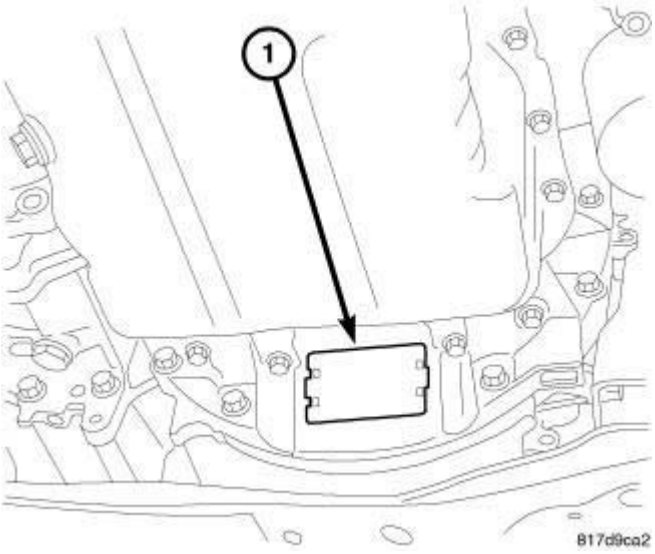

Fig. 33: INSPECTION COVER
Courtesy of CHRYSLER LLC

18. Install inspection cover (1).

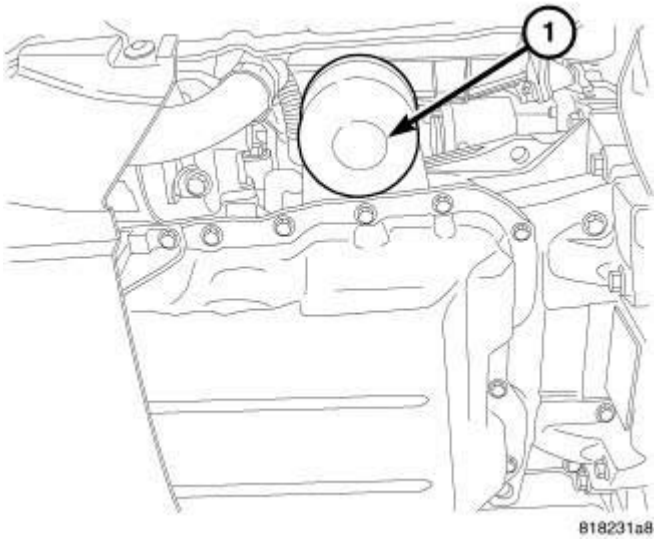

Fig. 34: OIL FILTER
Courtesy of CHRYSLER LLC

19. Install new oil filter (1).
20. Lower vehicle.
21. Install upper idler pulley.
22. Install power steering pump.

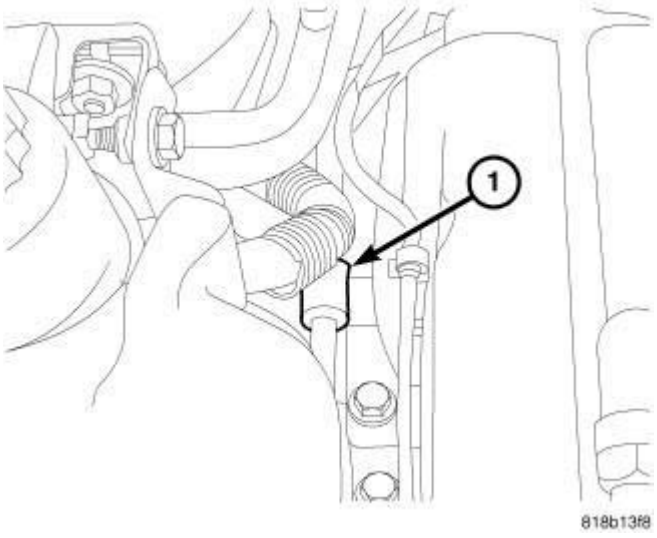

Fig. 35: POWER STEERING LINE SUPPORT
Courtesy of CHRYSLER LLC

23. Install power steering line support bracket (1).
24. Install power steering pump.
25. Install accessory drive belt.

26. Connect electrical connectors at block ground, starter, A/C compressor, knock sensor, oil pressure sensor, generator, coolant temperature sensor at block, and block heater.

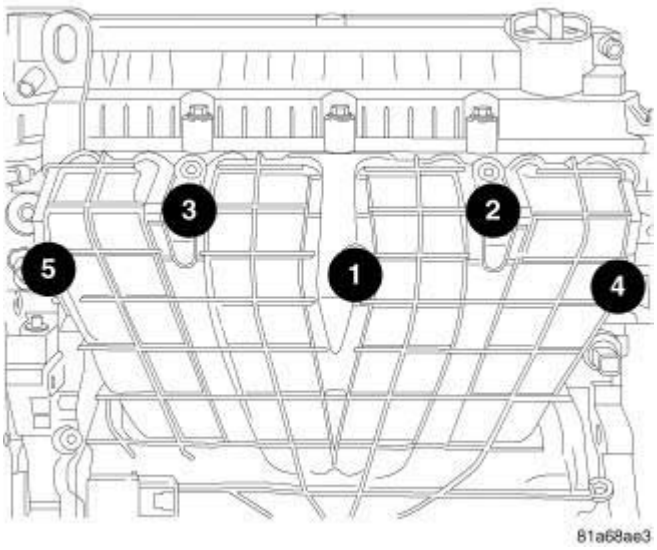

Fig. 36: INTAKE TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

27. Install intake manifold and tighten bolts to 24 N.m (18 ft. lbs.) as shown in illustration.

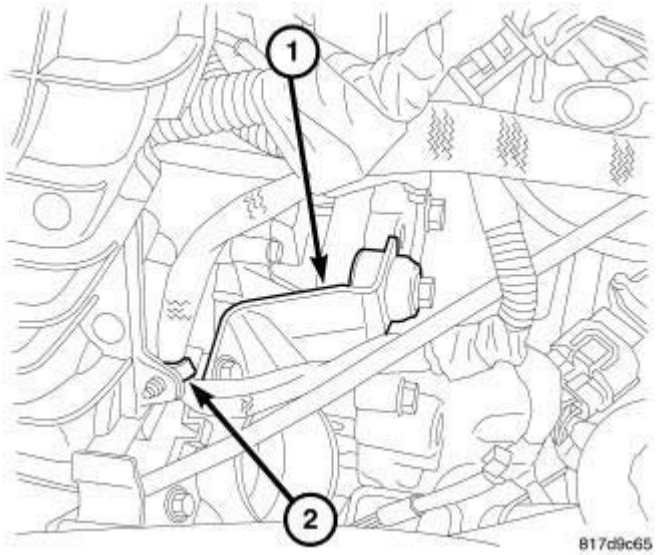

Fig. 37: THROTTLE BODY SUPPORT
Courtesy of CHRYSLER LLC

28. Install throttle body support bracket (1).
29. Connect manifold flow control valve and electronic throttle control electrical connectors.
30. Insert wiring harness retainer into intake manifold (2).
31. Install engine oil dip stick.

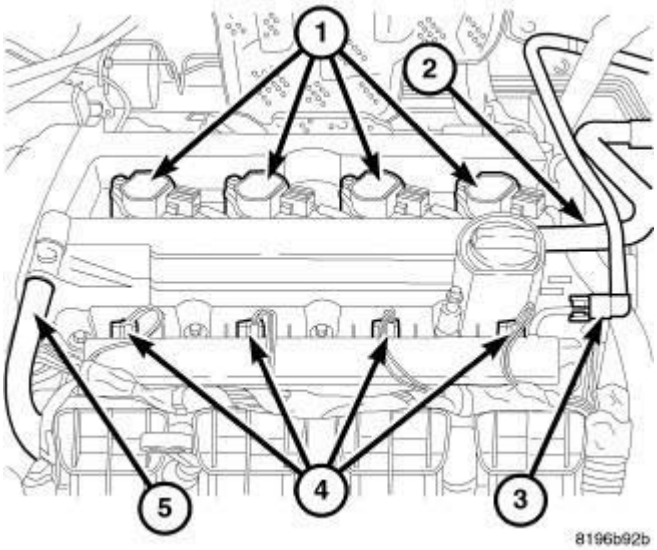

Fig. 38: COIL CONNECTOR
Courtesy of CHRYSLER LLC

32. Install PCV hose (5).
33. Install vacuum lines at throttle body and intake manifold.
34. Install intake air tube on throttle body.
35. Connect engine harness electrical connectors.

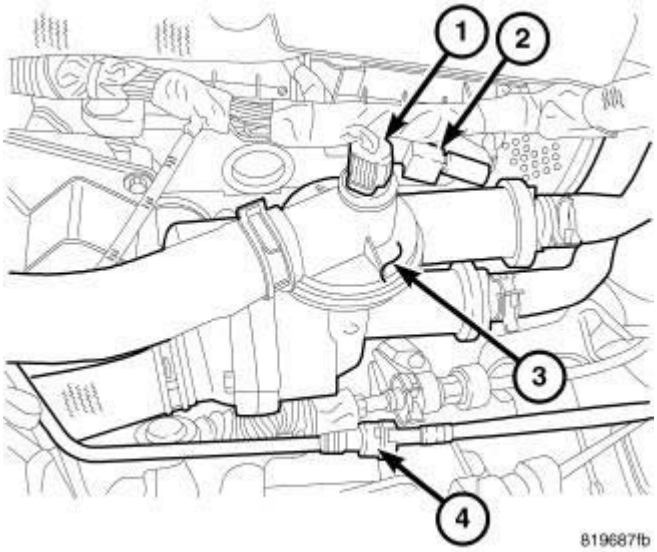

Fig. 39: COOLANT ADAPTER
Courtesy of CHRYSLER LLC

36. Install coolant hoses at coolant adapter (3).

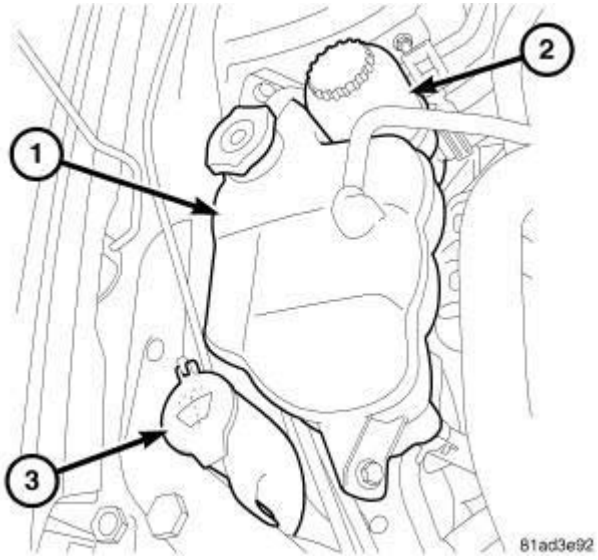

Fig. 40: Coolant Reservoir
Courtesy of CHRYSLER LLC

37. Install coolant reservoir (1) and connect hose.

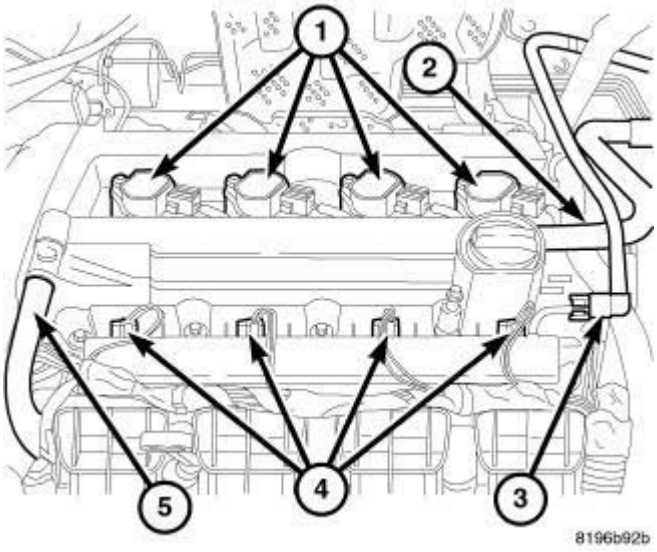

Fig. 41: COIL CONNECTOR
Courtesy of CHRYSLER LLC

38. Connect fuel line to fuel rail (3).

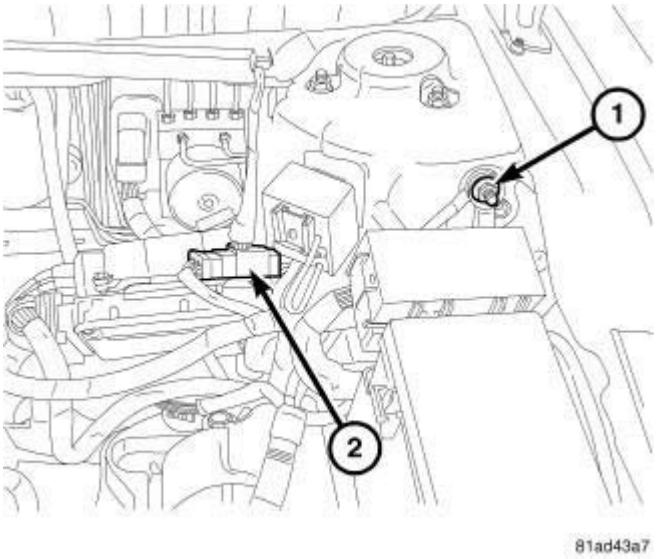

Fig. 42: BATTERY CABLE
Courtesy of CHRYSLER LLC

39. Connect negative battery cable (1).

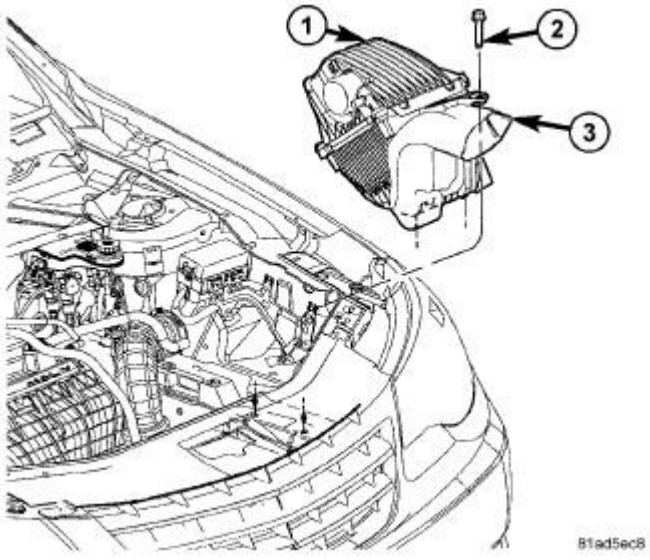

Fig. 43: Air Cleaner Housing
Courtesy of CHRYSLER LLC

40. Install air cleaner housing (1) and connect inlet air hose (Refer to **Air Intake System**).
41. Fill with coolant.
42. Fill with oil.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system. Failure to follow this caution

will result in serious A/C compressor damage.

43. Evacuate the refrigerant system (refer to appropriate HVAC article).
44. Charge the refrigerant system (refer to appropriate HVAC article).

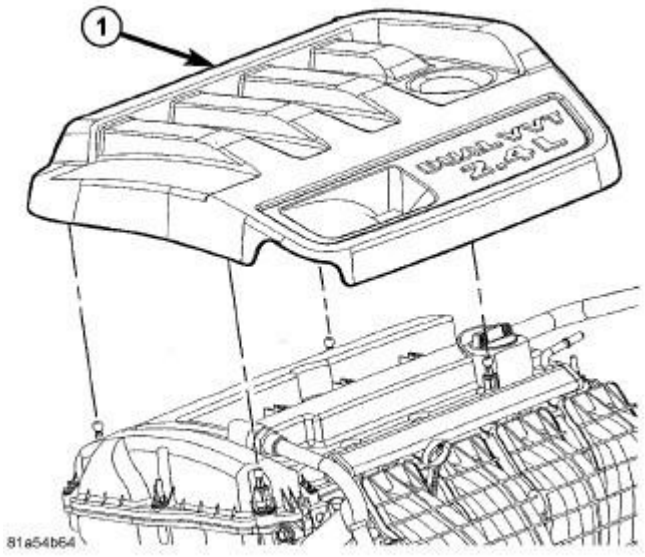

Fig. 44: Engine Cover
Courtesy of CHRYSLER LLC

45. Start engine and check for leaks.
46. Install engine cover (1).

SPECIFICATIONS

2.4L ENGINE

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Type	In-Line OHV, DOHC	
Number of Cylinders	4	
Firing Order	1-3-4-2	
Compression Ratio	10.5:1	
Displacement	2.4 Liters	146.5 cu. in.
Bore	88 mm	3.465 in.
Stroke	97 mm	3.819 in.
Compression Pressure	1172 - 1551 kPa	170 - 225 psi
Max. Variation Between Cylinders	25%	

CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Material	Cast Aluminum	
Cylinder Bore Diameter		
A	88.000 - 88.010 mm	3.4645 - 3.4649 in.
B	88.010 - 88.020 mm	3.4649 - 3.4653 in.
C	88.020 - 88.030 mm	3.4653 - 3.4657 in.
Cylinder Bore Out-of-Round (Max.)	0.020 mm	0.0008 in.
Cylinder Bore Diameter Taper (Max.)	0.028 mm	0.001 in.
Main Bearing Bore Diameter		
1	56.000 - 56.006 mm	2.2047 - 2.2049 in.
2	56.006 - 56.012 mm	2.2049 - 2.2051 in.
3	56.012 - 56.018 mm	2.2051 - 2.2054 in.
Main Bearing Bore Diameter Taper (Max.)	0.0082 mm	0.0003 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Piston Diameter		
A	87.995 - 88.015 mm	3.4644 - 3.4652 in.
B	88.005 - 88.025 mm	3.4648 - 3.4656 in.
C	88.015 - 88.035 mm	3.4652 - 3.4659 in.
Clearance to Bore	(-0.015) - 0.015 mm	(-0.0006) - 0.0006 in.
Weight	302 - 312 grams	10.65 - 11.00 oz.
Land Clearance (Diametrical)	0.60 - 0.73 mm	0.0236 - 0.0287 in.
Piston Length	51.5 mm	2.028 in.
Piston Ring Groove Depth No. 1	3.51 - 3.68 mm	0.1382 - 0.0256 in.
Piston Ring Groove Depth No. 2	4.05 - 4.25 mm	0.1594 - 0.1673 in.
Piston Ring Groove Depth No. 3	2.70 - 2.90 mm	0.1063 - 0.1142 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Ring Gap-Top Compression Ring	0.15 - 0.30 mm	0.0059 - 0.0118 in.
Wear Limit	0.8 mm	0.031 in.
Ring Gap-2nd Compression Ring	0.30 - 0.45 mm	0.0118 - 0.0177 in.
Wear Limit	0.8 mm	0.031 in.

Ring Gap-Oil Control Steel Rails	0.20 - 0.70 mm	0.0079 - 0.0276 in.
Wear Limit	1.0 mm	0.039 in.
Ring Side Clearance-Compression Rings	0.03 - 0.07 mm	0.1182 - 0.0028 in.
Wear Limit	0.10 mm	0.004 in.
Ring Side Clearance-Oil Ring Pack	0.06 - 0.15 mm	0.0024 - 0.0059 in.
Ring Width-Top Compression Ring	2.95 - 3.25 mm	0.1161 - 0.1280 in.
Ring Width-2nd Compression Ring	3.45 - 3.75 mm	0.1358 - 0.1476 in.
Ring Width-Oil Ring Pack	2.30 - 2.60 mm	0.0906 - 0.1024 in.
Ring Thickness-Top Compression Ring	1.17 - 1.19 mm	0.0461 - 0.0469 in.
Ring Thickness-2nd Compression Ring	1.17 - 1.19 mm	0.0461 - 0.0469 in.
Ring Thickness-Oil Ring Pack	1.88 - 1.95 mm	0.0740 - 0.0768 in.

CONNECTING ROD

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Bearing Clearance	0.032 - 0.060 mm	0.0012 - 0.0023 in.
Wear Limit	0.070 mm	0.0027 in.
Bore Diameter-Piston Pin	20.974 - 20.985 mm	0.8257 - 0.8261 in.
Bore Diameter-Crankshaft End	51 - 51.015 mm	2.0078 - 2.0084 in.
Side Clearance	0.1 - 0.25 mm	0.0039 - 0.00098 in.
Wear Limit	0.27 mm	0.0106 in.
Weight-Total (Less Bearing)	484 grams	17.07 oz.

CRANKSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Connecting Rod Journal Diameter		
Journal Grade		
1	47.966 - 47.972 mm	1.8884 - 1.8886 in.
2	47.960 - 47.966 mm	1.8884 - 1.8881 in.
3	47.954 - 47.960 mm	1.8879 - 1.8881 in.
Rod Journal- Taper (Max)	0.005 mm	0.0001 in.
Main Bearing Journal Diameter		
Journal Grade		
0	51.985 - 51.988 mm	2.0466 - 2.0467 in.
1	51.982 - 51.985 mm	2.0465 - 2.0466 in.

2	51.979 - 51.982 mm	2.0464 - 2.0465 in.
3	51.976 - 51.979 mm	2.0462 - 2.0464 in.
4	51.973 - 51.976 mm	2.0461 - 2.0462 in.
Journal Out-of-Round (Max.)	0.005 mm	0.0001 in.
Journal Taper (Max.)	0.006 mm	0.0002 in.
End Play	0.05 - 0.25 mm	0.0019 - 0.0098 in.
Wear Limit	0.30 mm	0.0118 in.
Main Bearing Diametrical Clearance	0.028 - 0.048 mm	0.0011 - 0.0018 in.
Main Bearing Diametrical Clearance (Max)	0.058 mm	0.0022 in.

CYLINDER HEAD CAMSHAFT BEARING BORE DIAMETER

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cam Bearing Bore		
Front Intake	30.000 - 30.021 mm	1.1810 - 1.1819 in.
Front Exhaust	40.000 - 40.024 mm	1.5747 - 1.5756 in.
Cam Bearing Bore No. 1-4	24.000 - 24.021 mm	0.9448 - 0.9457 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cam Journal Diameter		
Front Intake Cam	29.964 - 29.980 mm	1.1797 - 1.1803 in.
Front Exhaust Cam	35.984 - 36.000 mm	1.4166 - 1.4173 in.
Cam Journal Diameter No. 1-4	23.954 - 23.970 mm	0.943 - 0.944 in.
Bearing Clearance - Diametrical		
Front Intake Journal	0.020 - 0.057 mm	0.0008 - 0.0022 in.
Front Exhaust Journal	0.019 - 0.051 mm	0.0007 - 0.0020 in.
All Others	0.020 - 0.067 mm	0.0008 - 0.0026 in.
End Play	0.11 - 0.25 mm	0.004 - 0.009 in.
Max Lift @ 0.2 mm (0.007 in.) lash		
Intake	9.2 mm	0.362 in.
Max Lift @ 0.28 mm (0.011 in.) lash		
Exhaust	8.42 mm	0.331 in.
Intake Valve Timing w/VVT in lock-pin position*		
Closes (ABDC)	49.3°	
Opens (ATDC)	10.3°	
Duration	219°	
Exhaust Valve Timing w/VVT in lock-pin position*		

Closes (BTDC)	8.45°
Opens (BBDC)	45°
Duration	216.55°
Valve Overlap @ 0.5 mm (0.019 in.) w/ VVT in lock-pin position	18.75°
* All reading in crankshaft degrees at 0.5 mm (0.019 in.) valve lift.	

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Material	Cast Aluminum - Heat treated	
Gasket Thickness (Compressed)	0.54 mm	0.021 in.
Valve Tappet Bore I.D.	32.000 - 32.025 mm	1.2598 - 1.2608 in.
Valve Tappet O.D.	31.964 - 31.980 mm	1.2584 - 1.2590 in.

VALVE SEAT

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Angle	44.75° - 45.10°	
Seat Outer Diameter - Intake	34.45 - 34.61 mm	1.3562 - 1.3625 in.
Seat Outer Diameter - Exhaust	28.04 - 28.20 mm	1.1039 - 1.1102 in.
Runout (Max.)	0.05 mm	0.002 in.
Valve Seat Width		
Intake	1.16 - 1.46 mm	0.0456 - 0.0574 in.
Service Limit	2.0 mm	0.079 in.
Exhaust	1.35 - 1.65 mm	0.0531 - 0.0649 in.
Service Limit	2.5 mm	0.098 in.

VALVE GUIDE

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Diameter I.D.	5.500 - 5.518 mm	0.2165 - 0.2172 in.
Guide Bore Diameter	10.983 - 11.001 mm	0.432 - 0.4331 in.
Guide Height (spring seat to guide tip)	14.6 - 15.2 mm	0.5748 - 0.5984 in.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Face Angle - Intake and Exhaust	45.25° - 45.75°	
Head Diameter - Intake	34.9 - 35.1 mm	1.374 - 1.3818 in.

Head Diameter - Exhaust	28.9 - 29.1 mm	1.1377 - 1.1456 in.
Valve Lash		
Intake	0.17 - 0.23 mm	0.006 - 0.009 in.
Exhaust	0.27 - 0.33 mm	0.010 - 0.012 in.
Valve Length (Overall)		
Intake	113.18 mm	4.455 in.
Exhaust	105.887 mm	4.168 in.
Valve Stem Diameter		
Intake	5.465 - 5.480 mm	0.2151 - 0.2157 in.
Exhaust	5.458 - 5.470 mm	0.2148 - 0.2153 in.

VALVE MARGIN

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Intake	0.672 mm	0.0264 in.
Exhaust	0.744 mm	0.02929 in.

VALVE STEM TIP

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Intake	48.04 mm	1.891 in.
Exhaust	47.99 mm	1.889 in.

VALVE STEM TO GUIDE CLEARANCE

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Intake	0.020 - 0.053 mm	0.0008 - 0.0021 in.
Max. Allowable	0.076 mm	0.003 in.
Exhaust	0.030 - 0.060 mm	0.0012 - 0.0024 in.
Max. Allowable	0.101 mm	0.004 in.

VALVE SPRINGS

DESCRIPTION	SPECIFICATION	
	Metric	**Standard**
Free Length (Approx.)	47.0 mm	1.850 in.
Nominal Force (Valve Closed)	179.5 N ± 9 @ 35.0 mm	40.35 lbs. @ 1.38 in.
Nominal Force (Valve Open)	364.8 N ± 17 N @ 29.25 mm	82.01 lbs. ± 3.82 lbs. @ 1.152 in.
Installed Height	35.00 mm	1.378 in.
Number of Coils	8.5 ± 0.1	
Wire Diameter	2.90 mm ± 0.03	0.114 in ± 0.001 in.

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
	Metric	Standard
At Curb Idle Speed*	25 kPa	4 psi min.
At 3000 RPM	170 - 550 kPa	25 - 80 psi

CAUTION:
***If pressure is ZERO at curb idle, DO NOT run engine at 3000 RPM.**

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Balance Shaft Module	Refer to Procedure		
Bell Housing-Bolts	48	35	-
Camshaft Bearing Cap-Bolts	-	-	-
M6 Bolts	12	-	106
M8 Bolts	30	22	-
Coils	8	-	71
Connecting Rod Cap-Bolts	20 + 90°	15 + 90°	-
Coolant Temperature Sender	18	13	-
Crankshaft Main Bearing Cap-Bolts	Refer to Procedure		
Crankshaft Damper-Bolt	210	155	-
Cylinder Head-Bolts	Refer to Procedure		
Cylinder Head Cover-Bolts	Refer to Procedure		
Engine Support Bracket-Bolts	40	30	-
Exhaust Manifold-Bolts	34	25	-
Exhaust Manifold Heat Shield-Bolts	-	-	-
M6x25mm Bolts	7	-	62
M6x70mm Bolts	9	-	80
Flex Plate to Crankshaft-Bolts	29 + 51°	22 + 51°	-
Intake Manifold-Bolts	24	18	-
Ladder Frame	22	16	-
Oil Cooler Connector Bolt	49	36	-
Oil Filter	14	10	-
Oil Filter Nipple	49	36	-
Oil Jet Fastener	12	-	106
Oil Pan-Bolts	-	-	-
M6 Bolts	9	-	80
M8 Bolts	24	18	-
Oil Pan Drain-Plug	40	30	-
Oil Pressure Switch	8	-	71
PCV Valve	5	-	44

Phaser to Camshaft-Bolt	59	44	-
Spark Plugs	27	20	239
Timing Chain Cover	-	-	-
M6 Bolts	9	-	80
M8 Bolts	26	19	-
Timing Chain Tensioner Assembly-Bolts	12	-	106
Timing Chain Guides	12	-	106

SPECIAL TOOLS

SPECIAL TOOLS

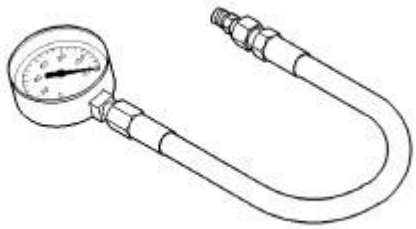

Fig. 45: GAUGE, PRESSURE - C-3292A
Courtesy of CHRYSLER LLC

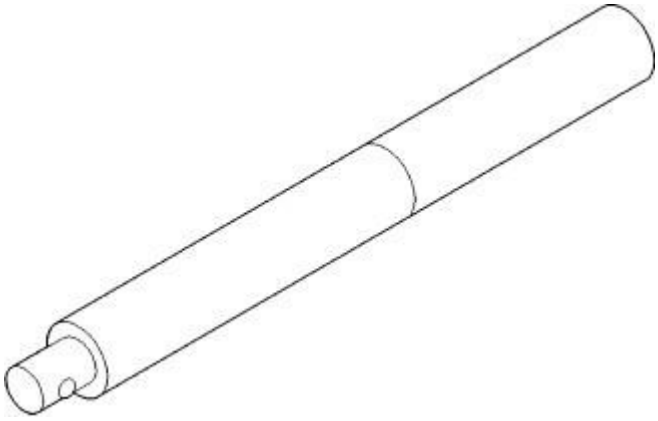

Fig. 46: DRIVER HANDLE, UNIVERSAL - C-4171
Courtesy of CHRYSLER LLC

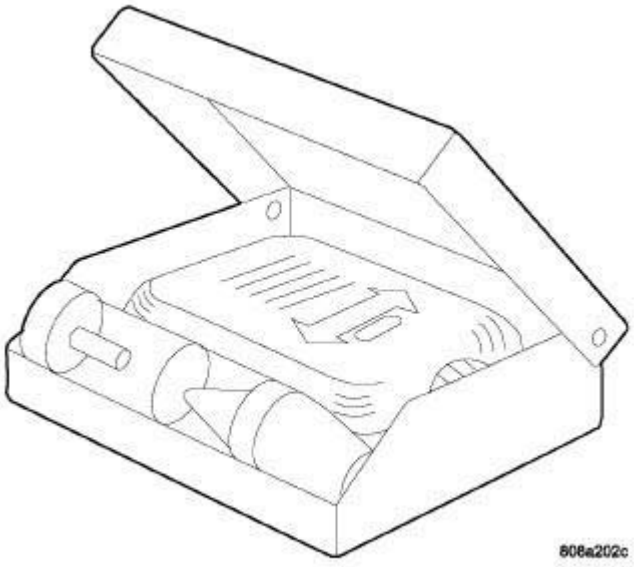

Fig. 47: BLOC-CHEK-KIT - C-3685-A
Courtesy of CHRYSLER LLC

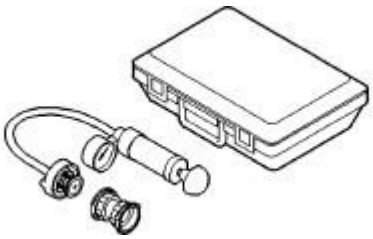

Fig. 48: TESTER, COOLING SYSTEM - 7700-A
Courtesy of CHRYSLER LLC

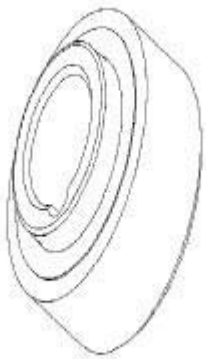

Fig. 49: INSTALLER, OIL SEAL - 9506

Courtesy of CHRYSLER LLC

Fig. 50: HOLDER, VIBRATION DAMPER - 9707
Courtesy of CHRYSLER LLC

Fig. 51: WEDGE, LOCKING - 9701
Courtesy of CHRYSLER LLC

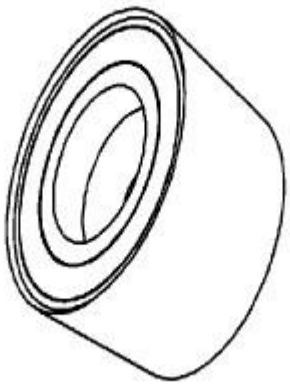

Fig. 52: INSTALLER, OIL SEAL - 9509
Courtesy of CHRYSLER LLC

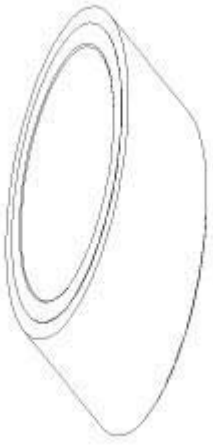

Fig. 53: INSTALLER, REAR MAIN SEAL - 9706
Courtesy of CHRYSLER LLC

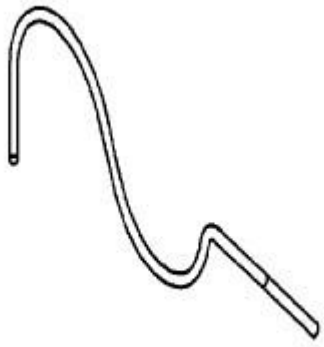

Fig. 54: PIN, TENSIONER - 9703
Courtesy of CHRYSLER LLC

PLATE, IDENTIFICATION

DESCRIPTION

DESCRIPTION

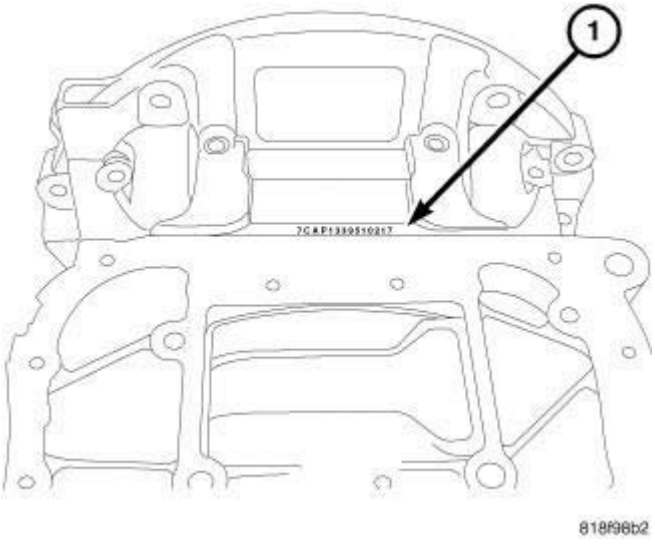

Fig. 55: Serial Number
Courtesy of CHRYSLER LLC

The engine serial number (1) is located between the oil pan and the bellhousing. The serial number contains engine build date, build location, and displacement.

Example: 8CAP1339710217

GAS ENGINE							
8	**C**	**A**	**P1**	**339**	**7**	**1**	**0217**
Model Year	Engine Displacement	Engine Build Variation (with oil cooler, turbo, for MMNA)	Engine Plant	Julian Day of Year	Julian Year 2007	Shift	Build Sequence Number
2008	A = 1.8L		P1 = GEMA North				
	B = 2.0L		P2 = GEMA South				
	C = 2.4L		-				

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

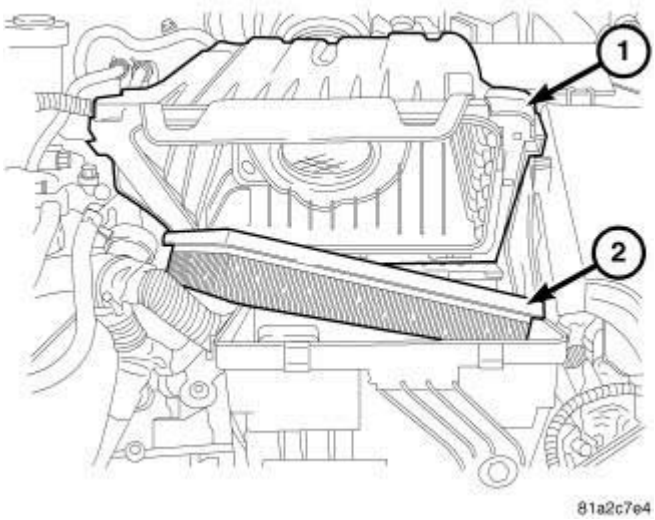

Fig. 56: AIR FILTER ELEMENT
Courtesy of CHRYSLER LLC

1. Lift air cleaner housing cover (1).
2. Remove filter element (2).
3. If necessary, clean the inside of the air cleaner housing.

Installation

INSTALLATION

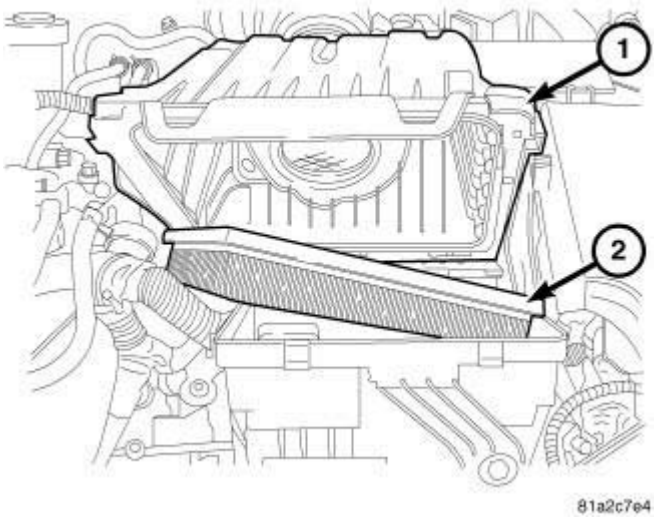

Fig. 57: AIR FILTER ELEMENT
Courtesy of CHRYSLER LLC

1. Install new filter element (2).
2. Lower cover (1) and snap in place.

BODY, AIR CLEANER

Removal

REMOVAL

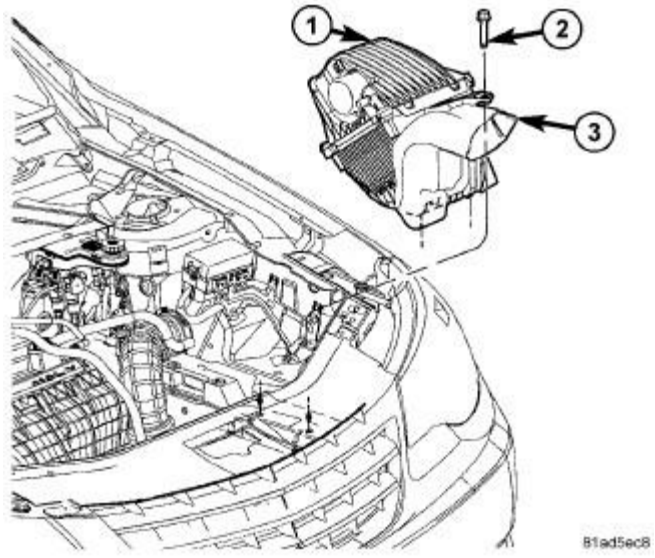

Fig. 58: Air Cleaner Housing Retaining Bolt
Courtesy of CHRYSLER LLC

1. Remove air cleaner housing retaining bolt (2).
2. Remove clean air hose from air cleaner housing.
3. Lift air cleaner housing (1) upwards and remove.

Installation

INSTALLATION

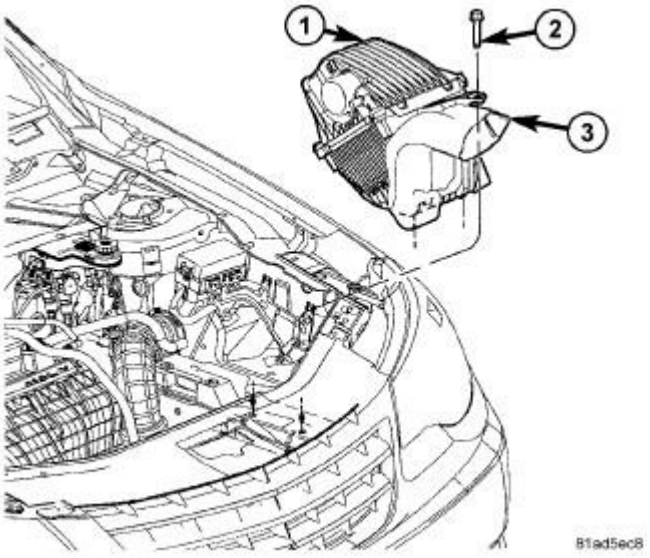

Fig. 59: Air Cleaner Housing
Courtesy of CHRYSLER LLC

1. Position air cleaner housing (1) in place.
2. Install retaining bolt (2).
3. Install clean air hose.

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

The cross flow designed, aluminum cylinder head contains dual over-head camshafts with four valves per cylinder. The valves are arranged in two inline banks. The intake valves face toward the front of the vehicle. The exhaust valves face the dash panel. The cylinder head incorporates powdered metal valve guides and seats. The cylinder head is sealed to the block using a multi-layer steel head gasket and retaining bolts.

Integral oil galleries provide lubrication passages to the variable camshaft timing phasers, camshafts, and valve mechanisms.

NOTE: Replacement cylinder heads will come complete with valves, seals, springs, retainers, keepers, lash buckets, and camshafts.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET

A cylinder head gasket leak can be located between adjacent cylinders, between a cylinder and the adjacent water jacket or from an oil passage to the exterior of the engine.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test. See **CYLINDER COMPRESSION PRESSURE TEST**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP

FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using combustion leak tester C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

REMOVAL

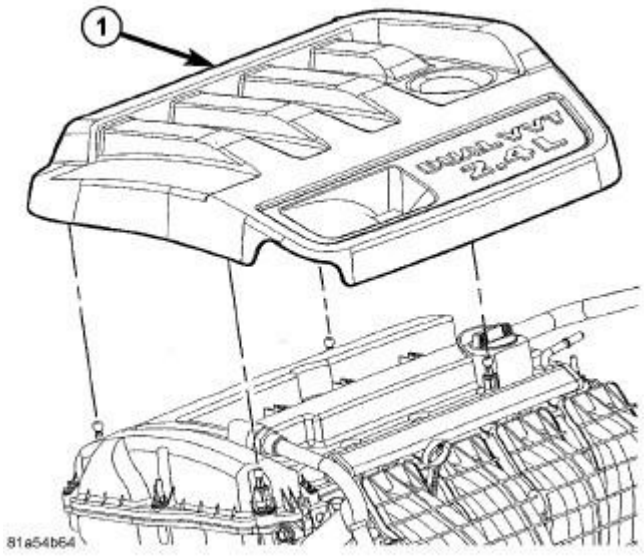

Fig. 60: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by pulling upward.
2. Perform fuel system pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Disconnect and isolate the negative battery cable.

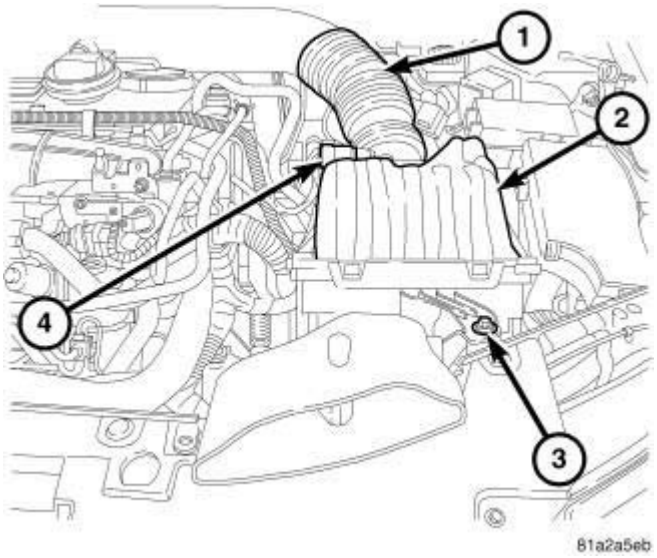

Fig. 61: Air Cleaner Housing
Courtesy of CHRYSLER LLC

4. Drain cooling system. Refer to **Cooling - Standard Procedure** .
5. Remove clean air hose and air cleaner housing (2). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

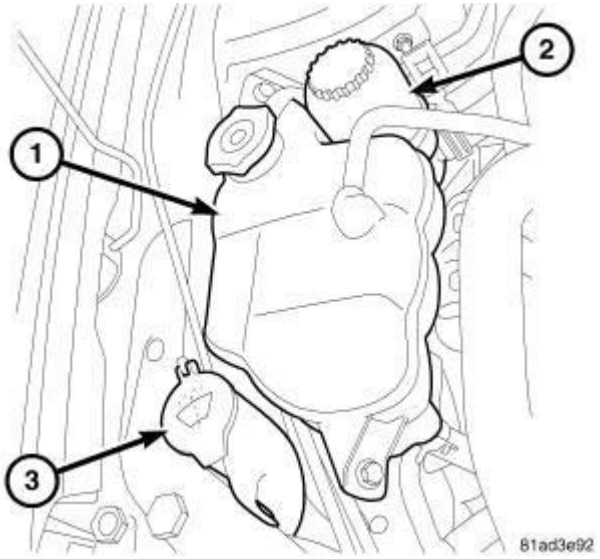

Fig. 62: Coolant Reservoir
Courtesy of CHRYSLER LLC

6. Remove coolant recovery bottle (1). Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .
7. Remove and reposition power steering reservoir (2).
8. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

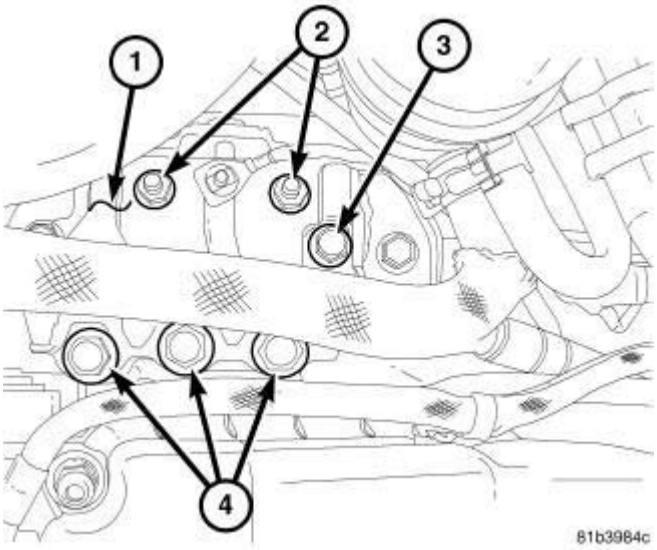

Fig. 63: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

9. Remove power steering hose hold down (3).

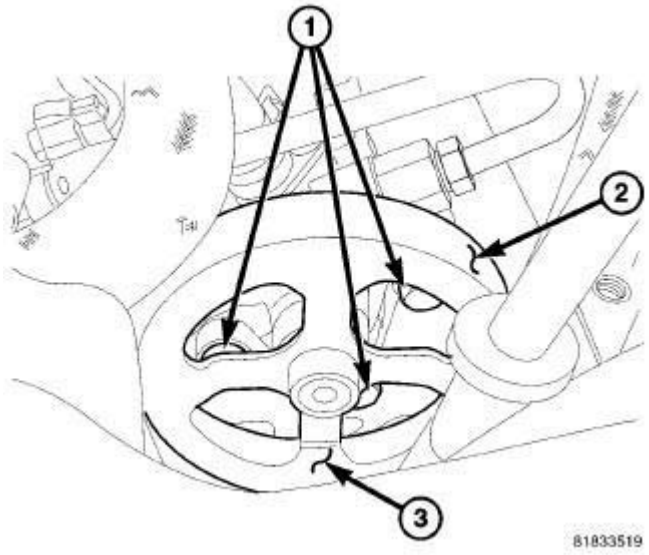

Fig. 64: POWER STEERING PUMP - GAS
Courtesy of CHRYSLER LLC

10. Remove the three power steering pump mounting bolts (1) through the openings in the pulley (3) and reposition the pump.

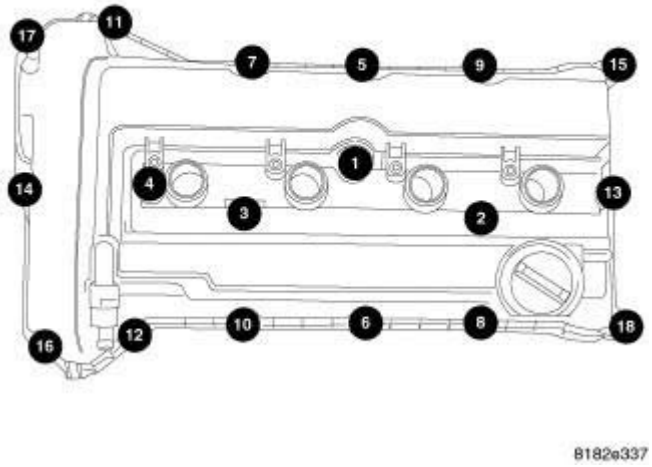

Fig. 65: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

11. Remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
12. Remove ignition coils from the cylinder head cover.

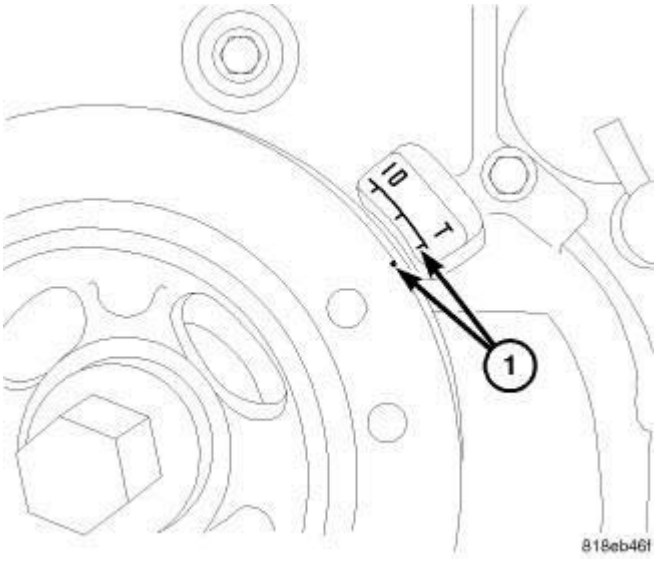

Fig. 66: Top Dead Center
Courtesy of CHRYSLER LLC

13. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
14. Remove the frame cover portion of the right splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
15. Set engine to TDC (1).

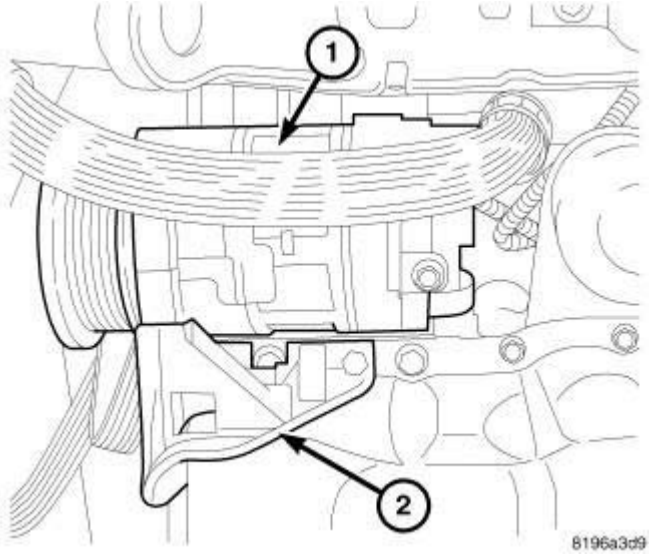

Fig. 67: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

16. Remove lower A/C compressor bolts if equipped.
17. Remove lower A/C compressor mount (2) if equipped.

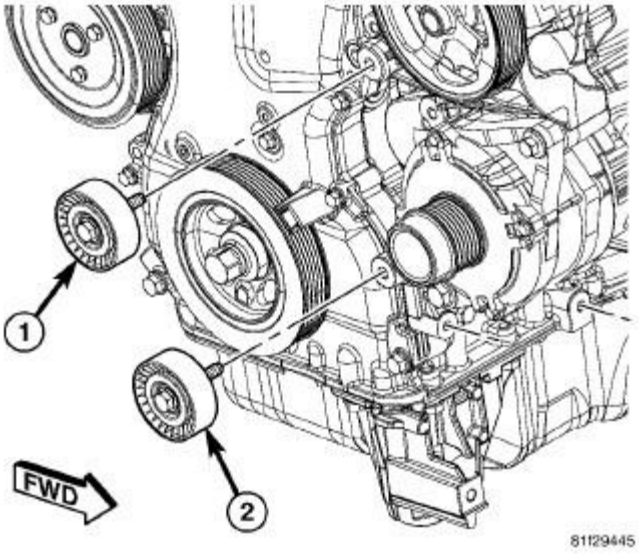

Fig. 68: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

18. Remove accessory drive belt lower idler pulley (2).

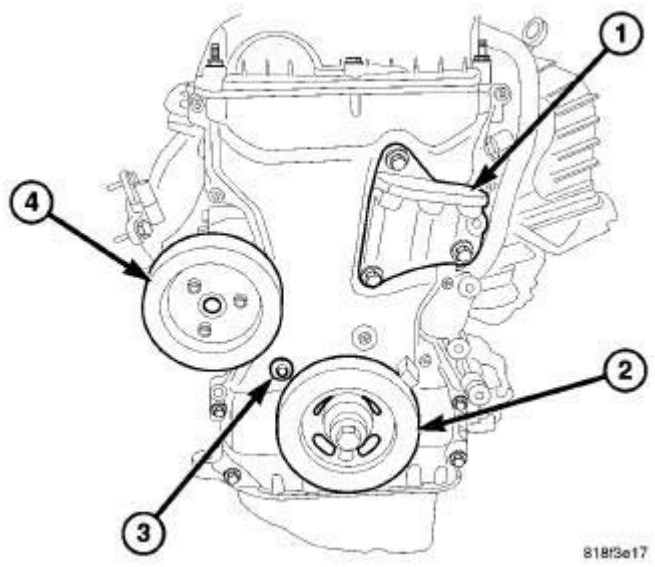

Fig. 69: Right Side Engine Mount Bracket Bolt
Courtesy of CHRYSLER LLC

19. Remove crankshaft damper (2). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
20. Remove three bolts and water pump pulley (4) from water pump.
21. Remove lower bolt from right side engine mount bracket (1).

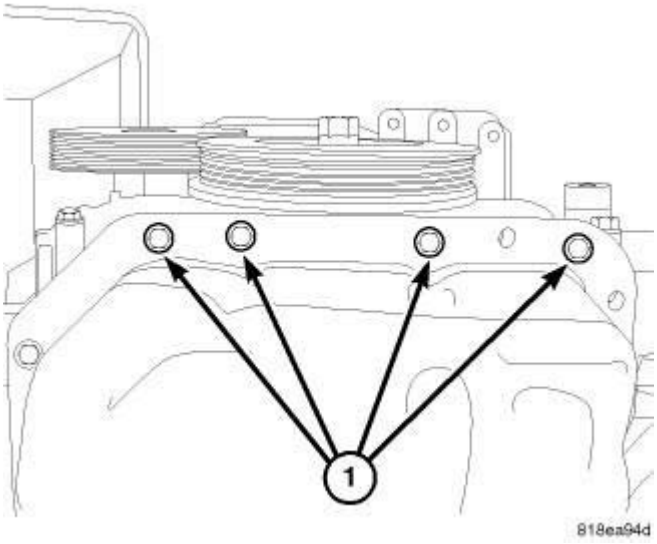

Fig. 70: TIMING CHAIN COVER LOWER BOLTS
Courtesy of CHRYSLER LLC

22. Remove timing chain cover lower bolts (1).

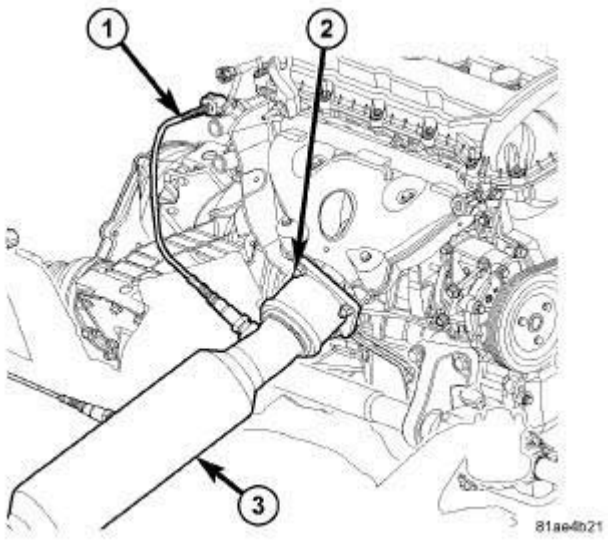

Fig. 71: Catalytic Converter
Courtesy of CHRYSLER LLC

23. Remove exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
24. Lower vehicle.
25. Support engine with suitable jack.

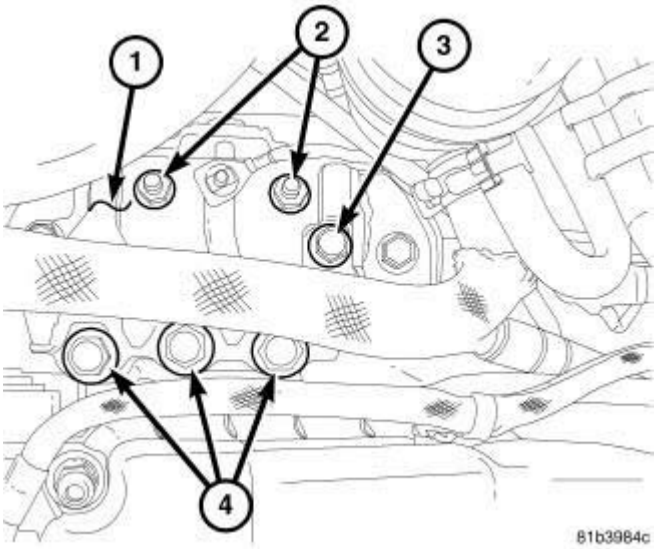

Fig. 72: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

26. Remove right engine mount bracket retaining bolts (4).
27. Remove retaining nuts (2) and reposition mount bracket (1).

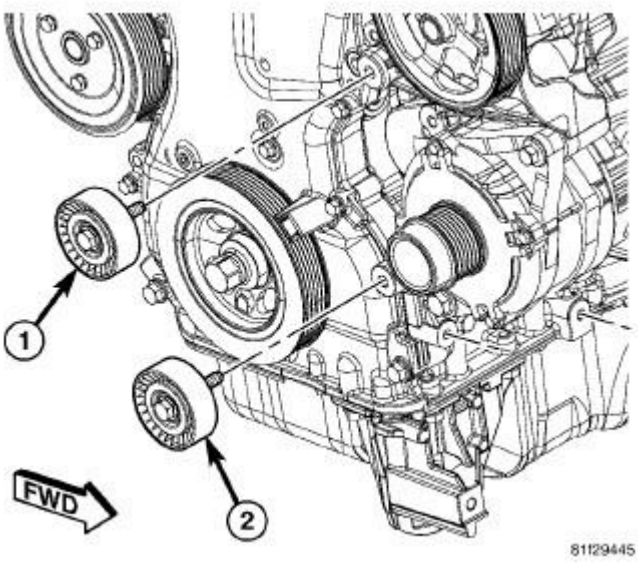

Fig. 73: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

28. Remove accessory drive upper idler pulley (1).

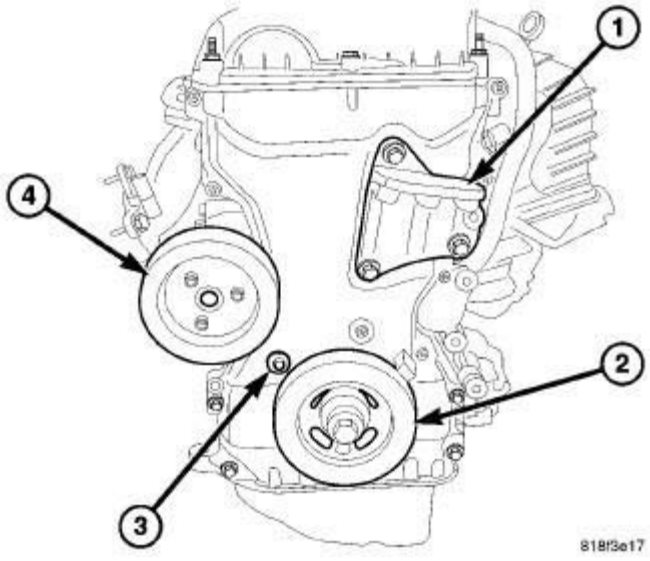

Fig. 74: Right Side Engine Mount Bracket Bolt
Courtesy of CHRYSLER LLC

29. Remove right upper engine mount bracket (1).
30. Remove accessory drive belt tensioner.
31. Remove upper timing chain cover retaining bolts.

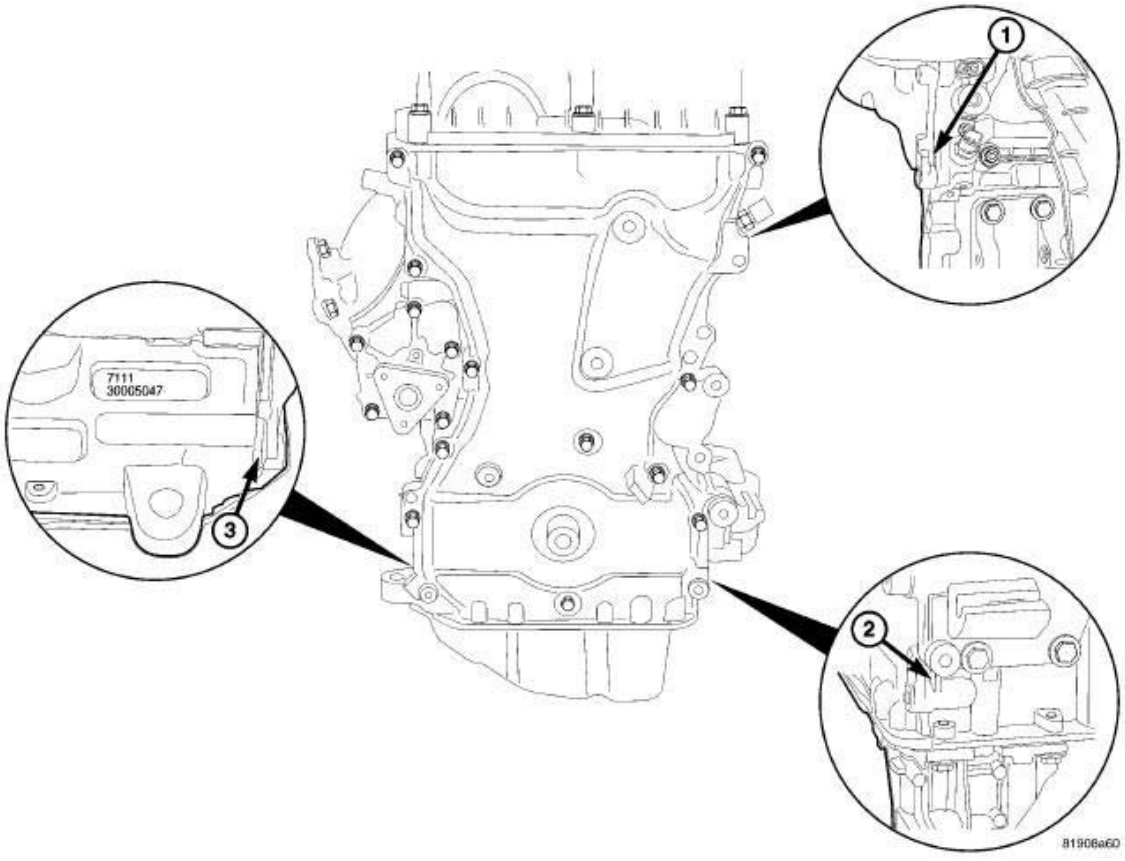

Fig. 75: TIMING CHAIN COVER PRY POINTS
Courtesy of CHRYSLER LLC

32. Remove timing chain cover using pry points (1,2,3).

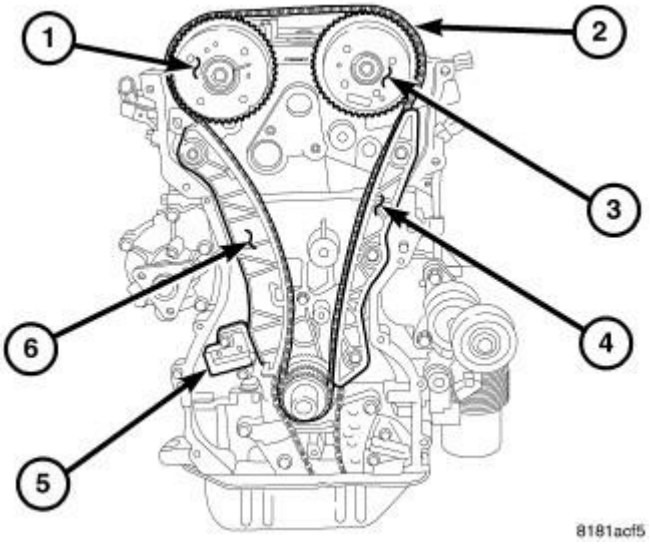

Fig. 76: TIMING DRIVE
Courtesy of CHRYSLER LLC

33. Remove tensioner (5) and timing chain (2). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
34. Remove timing chain guide (4) and timing chain pivot guide (6).

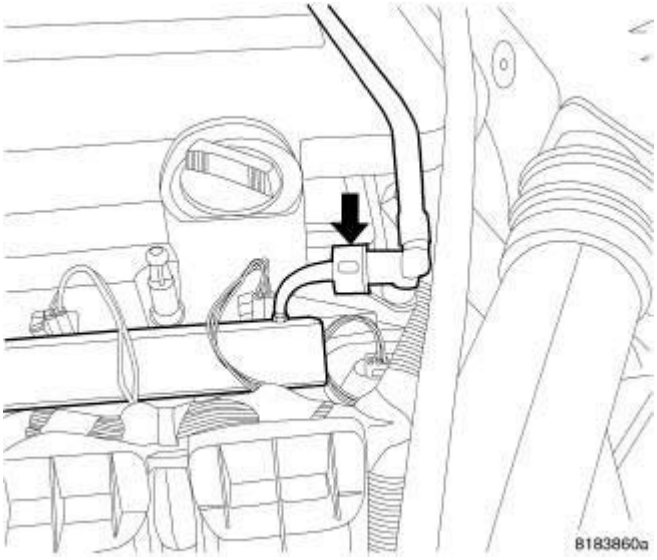

Fig. 77: FUEL LINE AT RAIL
Courtesy of CHRYSLER LLC

35. Disconnect the fuel line from the fuel rail. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .

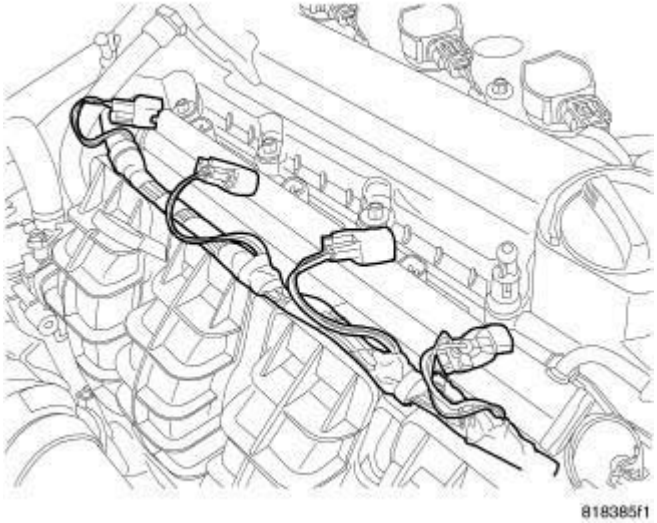

Fig. 78: Electrical Connectors From Fuel Injectors
Courtesy of CHRYSLER LLC

36. Unlock and disconnect the electrical connectors from the fuel injectors.

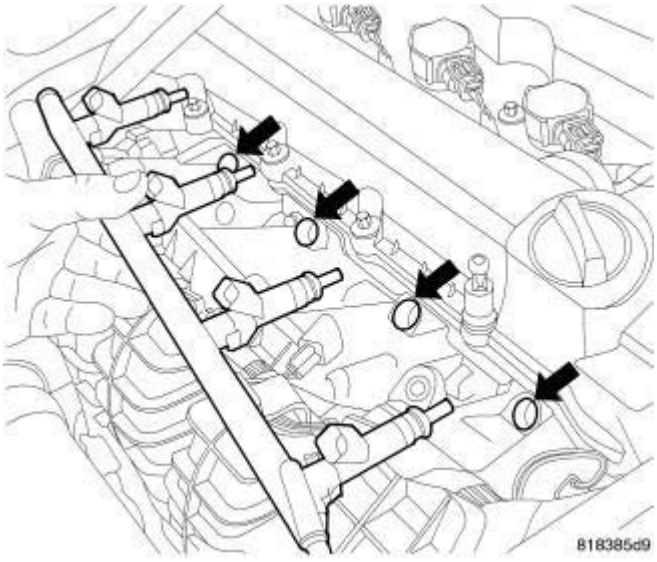

Fig. 79: RAIL REMOVAL/INSTALL
Courtesy of CHRYSLER LLC

37. Remove two fuel rail retaining bolts and remove fuel rail.

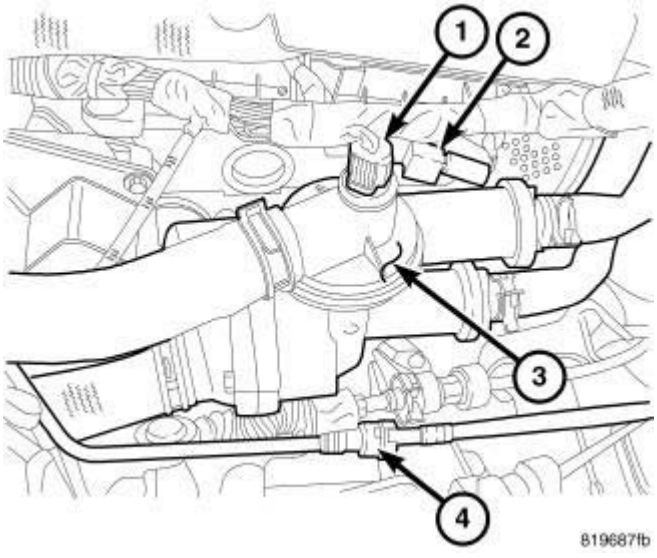

Fig. 80: COOLANT ADAPTER
Courtesy of CHRYSLER LLC

38. Disconnect electrical connectors from coolant temperature sensor (1), oil temperature sensor, variable valve timing solenoids, camshaft position sensors, MAP sensor, manifold tuning valve, ignition interference suppressor (2) and electronic throttle control.

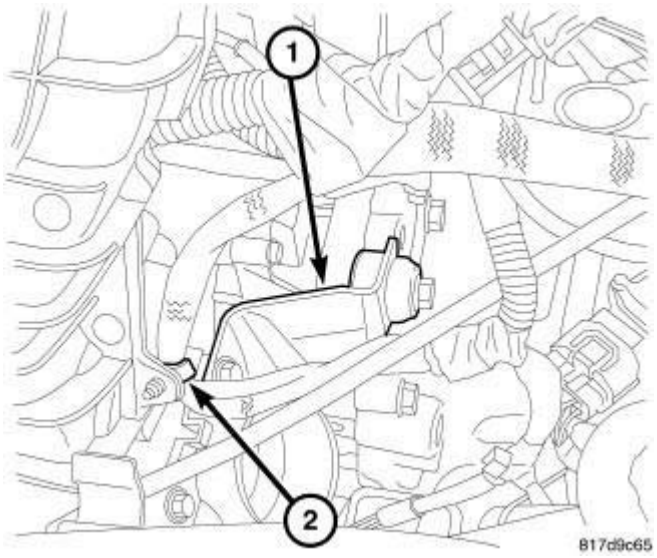

Fig. 81: Throttle Body Support Bracket
Courtesy of CHRYSLER LLC

39. Remove wiring harness retainer from intake manifold (2) and reposition harness.
40. Remove throttle body support bracket (1).
41. Disconnect vacuum lines at intake.

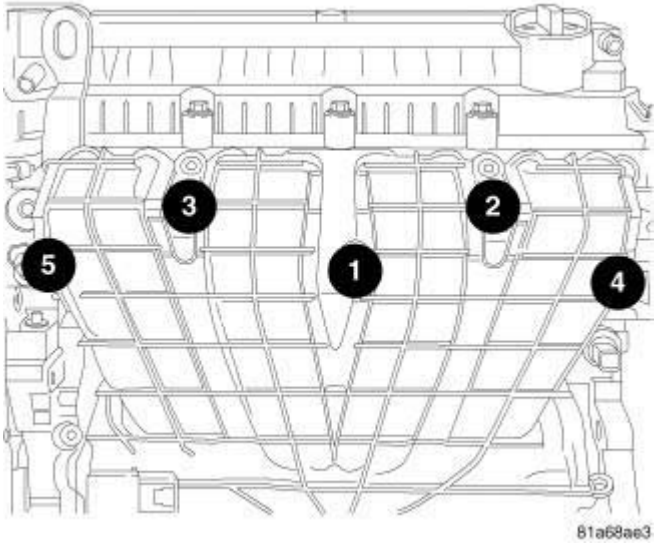

Fig. 82: Intake Manifold Retaining Bolts Torque Sequence
Courtesy of CHRYSLER LLC

42. Remove intake manifold retaining bolts and remove intake manifold.

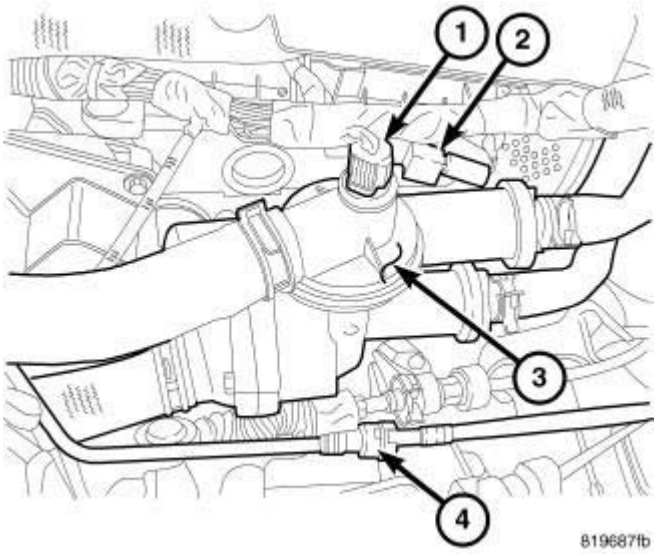

Fig. 83: COOLANT ADAPTER
Courtesy of CHRYSLER LLC

43. Remove four bolts and reposition coolant adapter (3).

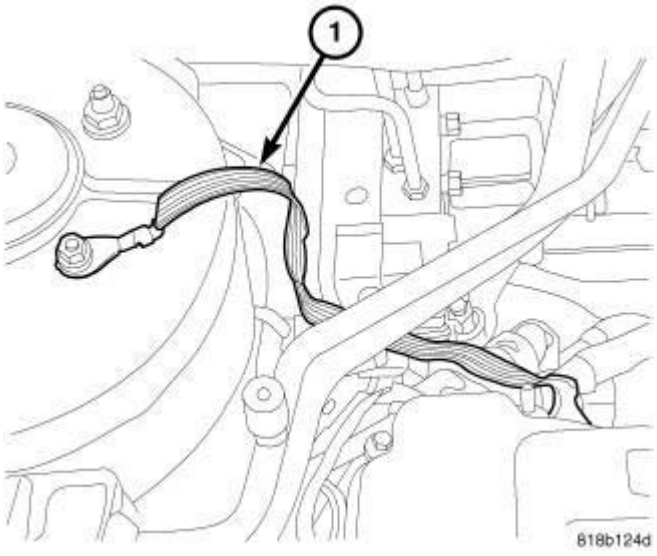

Fig. 84: GROUND STRAP
Courtesy of CHRYSLER LLC

44. Remove ground strap (1) at right rear of cylinder head if equipped.

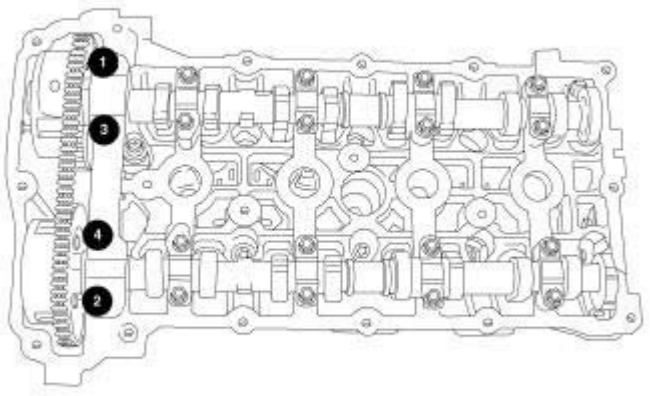

Fig. 85: Front Camshaft Cap Removal Sequence
Courtesy of CHRYSLER LLC

NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, number one exhaust camshaft bearing is marked "E1>".

CAUTION: DO NOT use a number stamp or a punch to mark camshaft bearing caps. Damage to bearing caps could occur.

45. Using a permanent ink or paint marker, identify location and position on each camshaft bearing cap.
46. Remove the front camshaft bearing cap.
47. Slowly remove the remaining intake and exhaust camshaft bearing cap bolts one turn at a time.
48. Remove the camshafts.

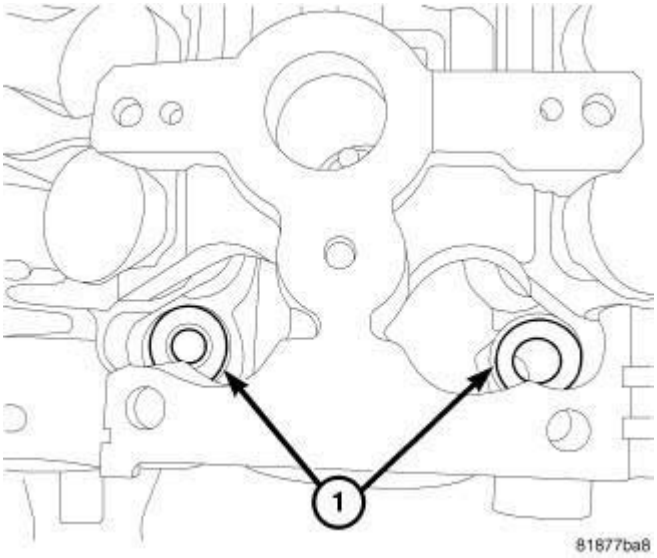

Fig. 86: FRONT HEAD BOLT WASHERS
Courtesy of CHRYSLER LLC

NOTE: All of the cylinder head bolts have captured washers EXCEPT the front two (1).

49. Remove cylinder head bolts and two uncaptured washers.
50. Remove cylinder head from engine block.
51. Inspect and clean cylinder head and block sealing surfaces. See **Engine/Cylinder Head - Inspection**. See **Engine/Cylinder Head - Cleaning**.

NOTE: Ensure cylinder head bolt holes in the block are clean, dry (free of residual oil or coolant), and threads are not damaged.

CLEANING

CLEANING

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Remove all gasket material from cylinder head and block. See **Engine - Standard Procedure**. Be careful not to gouge or scratch the aluminum head sealing surface.

Clean all engine oil passages.

INSPECTION

INSPECTION

NOTE: Replacement cylinder heads will come complete with valves, seals, springs, retainers, keepers, tappets, and camshafts.

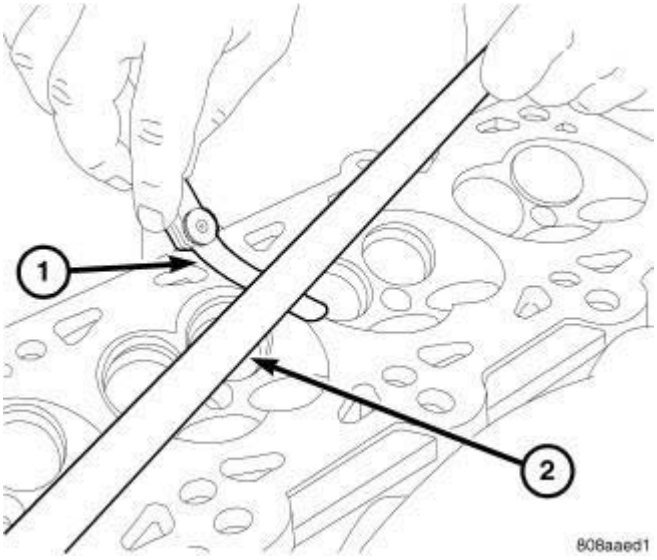

Fig. 87: Checking Cylinder Head Flatness
Courtesy of CHRYSLER LLC

1. Check cylinder head warpage with a straight edge (2) and feeler gauge (1).
2. Cylinder head must be flat within 0.1 mm (0.004 in.).
3. Verify that the valve tappets move freely in theirs bores and that they have been rotating.
4. Inspect camshaft bearing journals for scoring.
5. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
6. Inspect the following components and verify that they are within specification. See **Engine - Specifications**:
   - Camshafts
   - Valve Tappets
   - Springs
   - Valve Seats
   - Valve Guides
   - Valves
7. Prior to installing cylinder head, the cylinder block should be checked for flatness. See **Engine/Engine Block - Inspection**.

INSTALLATION

INSTALLATION

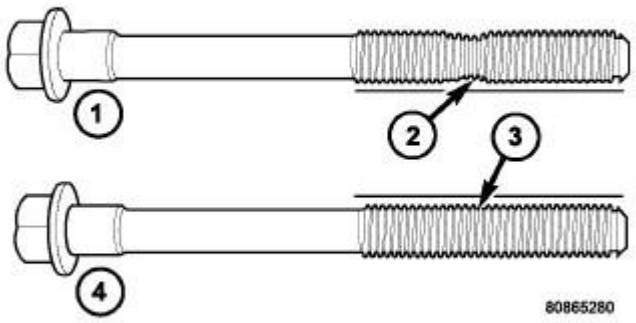

Fig. 88: Checking Cylinder Head Bolts for Stretching (Necking)
Courtesy of CHRYSLER LLC

CAUTION: The cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced.

1. Check cylinder head bolts for necking by holding a scale or straight edge against the threads. If all the threads do not contact the scale (2) the bolt must be replaced.

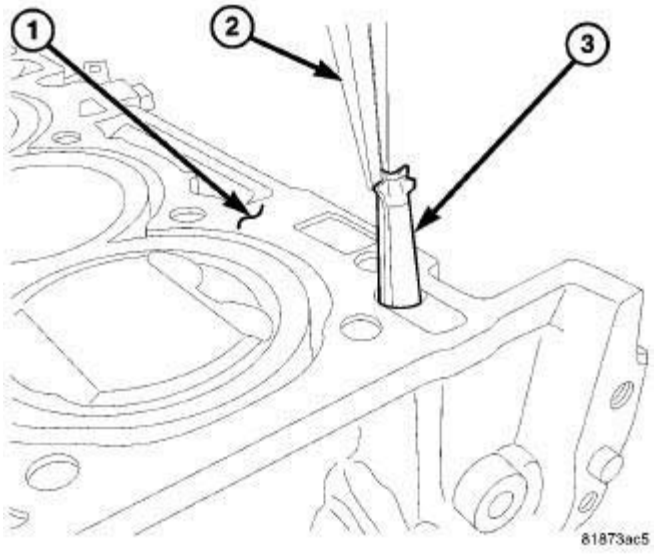

Fig. 89: Variable Valve Timing Filter Screen
Courtesy of CHRYSLER LLC

NOTE: Ensure cylinder head bolt holes in the block are clean, dry (free of residual oil or coolant), and threads are not damaged.

CAUTION: Always replace the variable valve timing filter screen (3) when servicing the head gasket or engine damage could result.

2. Replace the variable valve timing filter screen (3).

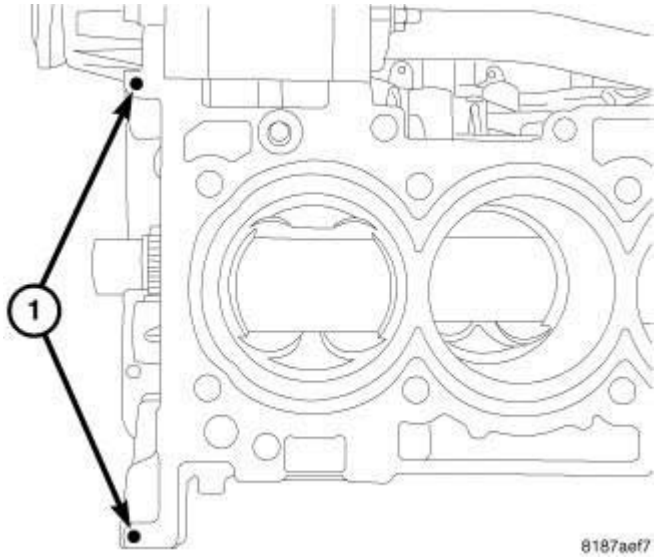

Fig. 90: Two Dots Of Mopar® Engine Sealant RTV On Cylinder Block
Courtesy of CHRYSLER LLC

NOTE: When using RTV, the sealing surfaces must be clean and free from grease and oil.

NOTE: When using RTV, parts should be assembled in 10 minutes and tighten to final torque within 45 minutes.

3. Place two pea size dots of Mopar® engine sealant RTV or equivalent (1) on cylinder block as shown in illustration.

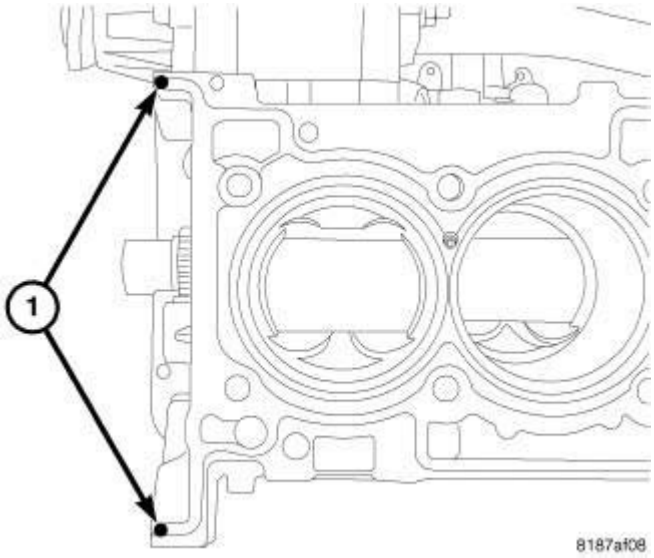

Fig. 91: Two Dots Of Mopar® Engine Sealant RTV On Cylinder Head Gasket
Courtesy of CHRYSLER LLC

4. Position the new cylinder head gasket on engine block with the part number facing up. Ensure gasket is seated over the locating dowels in block.
5. Place two pea size dots of Mopar® engine sealant RTV or equivalent (1) on cylinder head gasket as shown in illustration.

NOTE: The head must be installed within 15 minutes before the RTV skins.

6. Position cylinder head onto engine block.

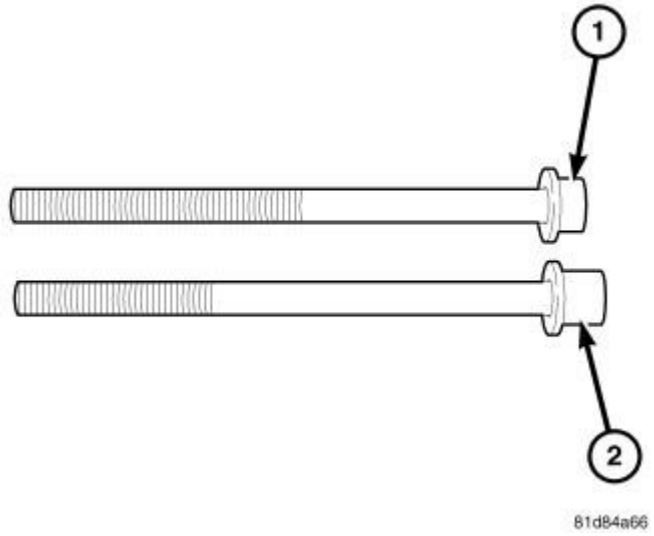

Fig. 92: CYLINDER HEAD BOLT IDENTIFICATION
Courtesy of CHRYSLER LLC

CAUTION: This engine was built with 2 different style cylinder head bolts. Each style bolt requires a different torque value. The bolts can be identified by the short bolt head (1) and the long bolt head (2).

7. Measure the bolt head from the washer to the top of the bolt head. The short bolt head (1) measures 8 mm (5/16") and the long bolt head (2) measures 13 mm (1/2").
8. Identify whether your engine has the short head design (1) or the long head design (2).

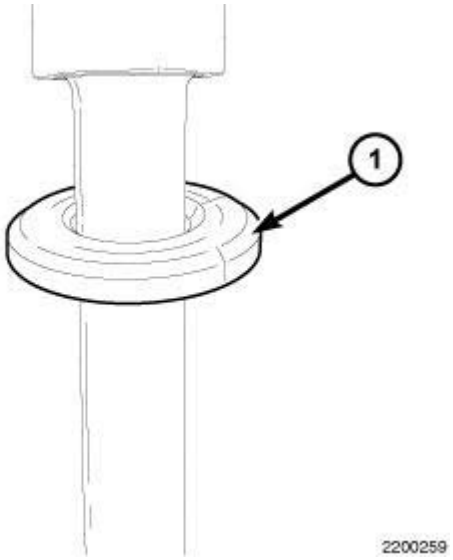

Fig. 93: Washer
Courtesy of CHRYSLER LLC

NOTE: The front two cylinder head bolts do not have captured washers. The washers must be installed with the bevel edge (1) up towards the bolt head.

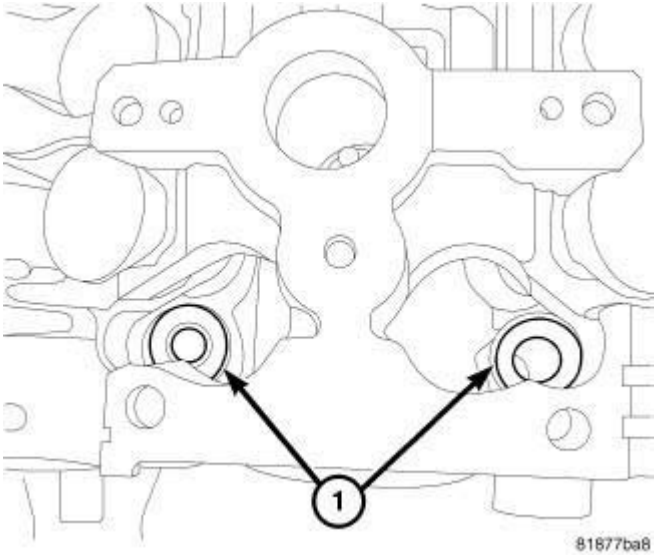

Fig. 94: FRONT HEAD BOLT WASHERS
Courtesy of CHRYSLER LLC

9. Install washers (1) for the front two cylinder head bolts with the beveled edge facing up.

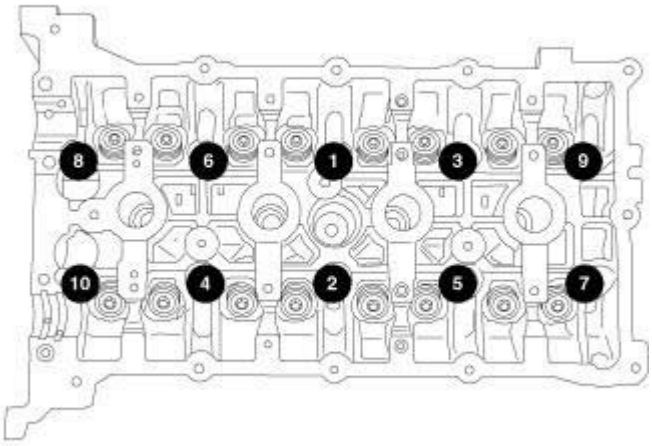

Fig. 95: CYLINDER HEAD TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

NOTE: Before installing the cylinder head bolts, lubricate the threads with clean engine oil.

10. Install the cylinder head bolts and tighten in the sequence shown in illustration.

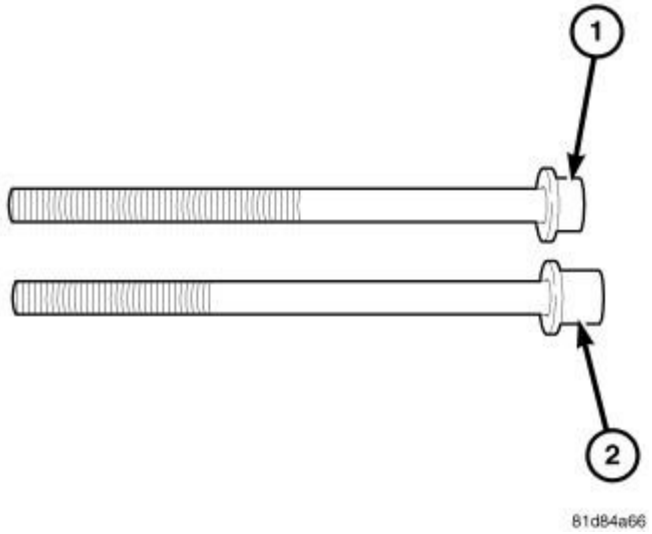

Fig. 96: CYLINDER HEAD BOLT IDENTIFICATION
Courtesy of CHRYSLER LLC

11. If your bolt has the short head (1), use the following torque specifications:
    - First: All to 30 N.m (25 ft. lbs.)
    - Second: All to 61 N.m (45 ft. lbs.)
    - Third: All to 61 N.m (45 ft. lbs.)
    - Fourth: All an additional 90°

CAUTION: Do not use a torque wrench for the Fourth step.

12. If your bolt has the long head (2), use the following torque specifications:
    - First: All to 30 N.m (25 ft. lbs.)
    - Second: All to 73 N.m (54 ft. lbs.)
    - Third: All to 73 N.m (54 ft. lbs.)
    - Fourth: All an additional 90°

CAUTION: Do not use a torque wrench for the Fourth step.

13. Clean excess RTV from the timing chain cover sealing surface.

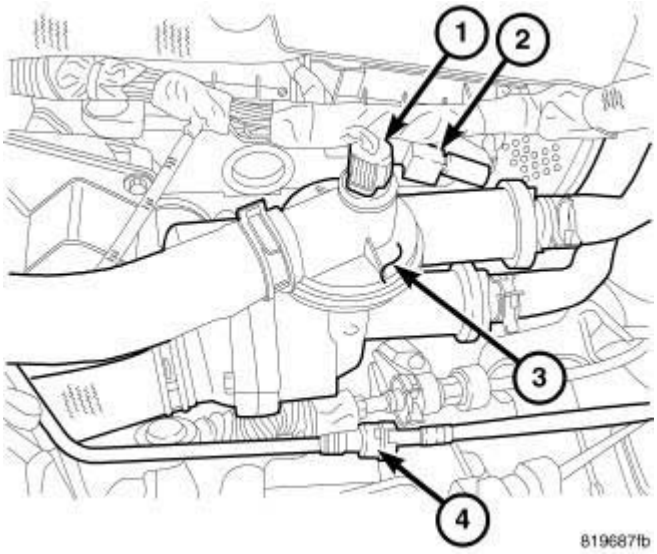

Fig. 97: COOLANT ADAPTER
Courtesy of CHRYSLER LLC

14. Install coolant adapter (3) with new seals. Tighten bolts to 18.1 N.m (159 in. lbs.).

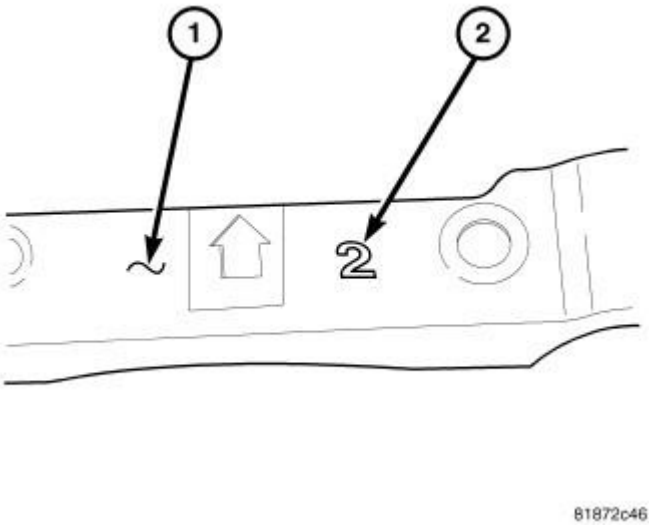

Fig. 98: Camshaft Cap Bearing Identification
Courtesy of CHRYSLER LLC

15. The front camshaft bearing cap (1) is numbered (2) either one, two, or three, this corresponds to the select fit front exhaust camshaft bearing to use.

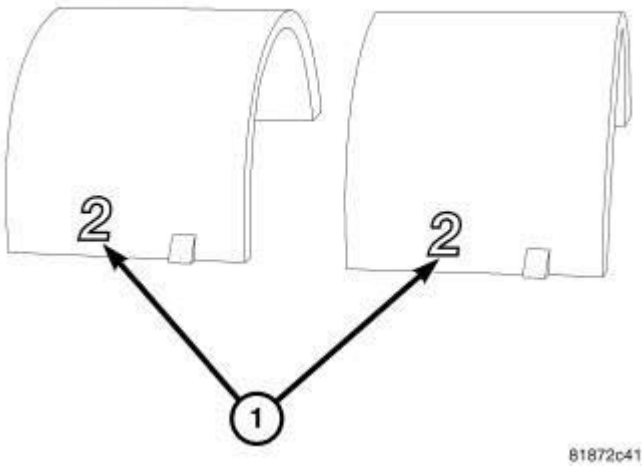

Fig. 99: Camshaft Bearing Identification
Courtesy of CHRYSLER LLC

16. Install the corresponding select fit front exhaust camshaft bearing (1).
17. Oil all of the camshaft journals with clean engine oil.

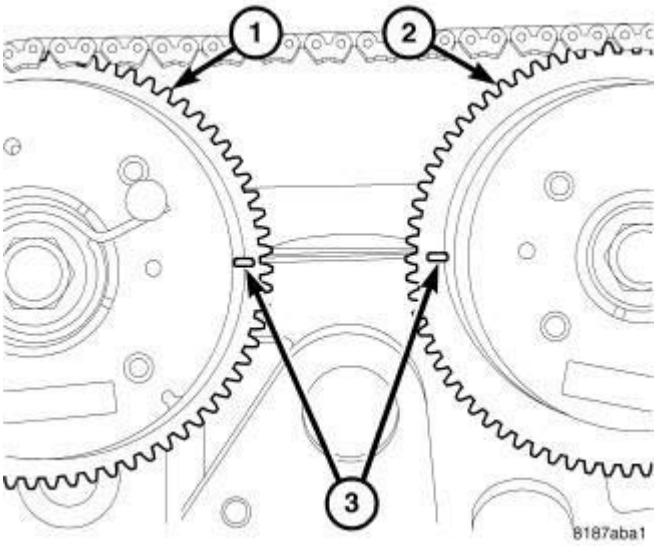

Fig. 100: Camshaft Timing
Courtesy of CHRYSLER LLC

18. Position exhaust camshaft (1) and intake camshaft (2) on bearing journals in the cylinder head.
19. Align camshaft timing marks (3) so that they are facing each other and are in line with the cylinder head cover sealing surface.

CAUTION: Install the front intake and exhaust camshaft bearing cap last. Ensure that the dowels are seated and follow torque sequence or damage to engine could result.

NOTE: If the front camshaft bearing cap is broken, the cylinder head MUST be replaced.

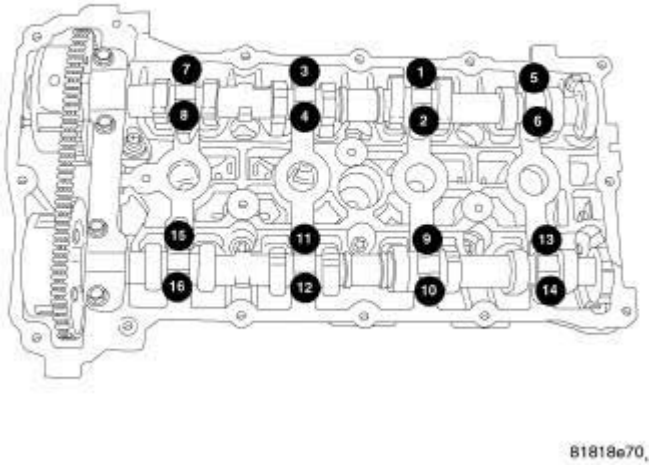

Fig. 101: Camshaft Cap Torque Sequence

Courtesy of CHRYSLER LLC

20. Install intake and exhaust camshaft bearing caps and slowly tighten bolts to 9.5 N.m (85 in. lbs.) in the sequence shown in illustration.

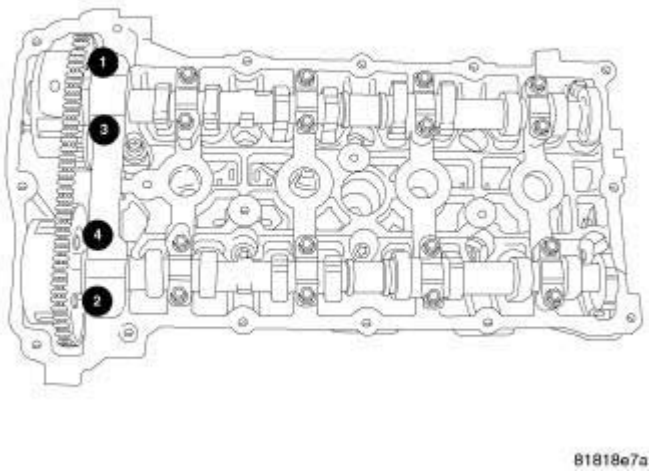

Fig. 102: Front Camshaft Cap Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: Verify that the exhaust bearing shells are correctly installed, and the dowels are seated in the head, prior to torquing bolts.

21. Install the front intake and exhaust bearing cap and tighten bolts to 25 N.m (18 ft. lbs.) in the sequence shown in illustration.

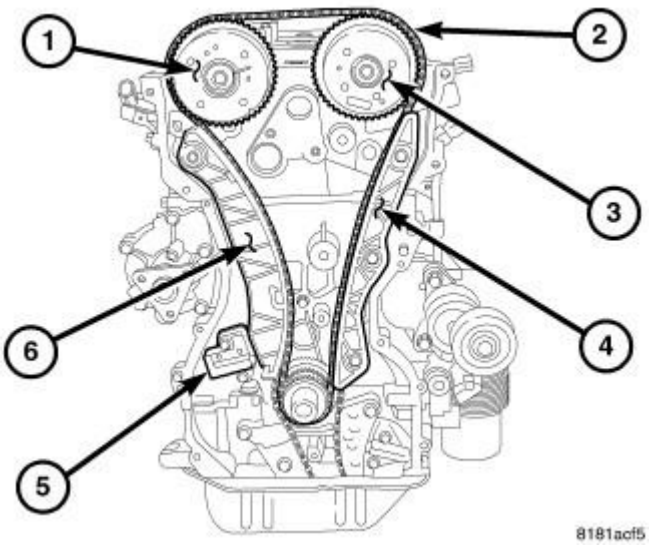

Fig. 103: TIMING DRIVE

Courtesy of CHRYSLER LLC

22. Install timing chain guide (4) and tighten bolts to 12 N.m (105 in. lbs.).
23. Install the moveable timing chain pivot guide (6) and tighten bolt to 12 N.m (105 in. lbs.).
24. Install timing chain (2) and tensioner (5). See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
25. Install timing chain cover, engine mount, pulleys and accessory drive belt. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

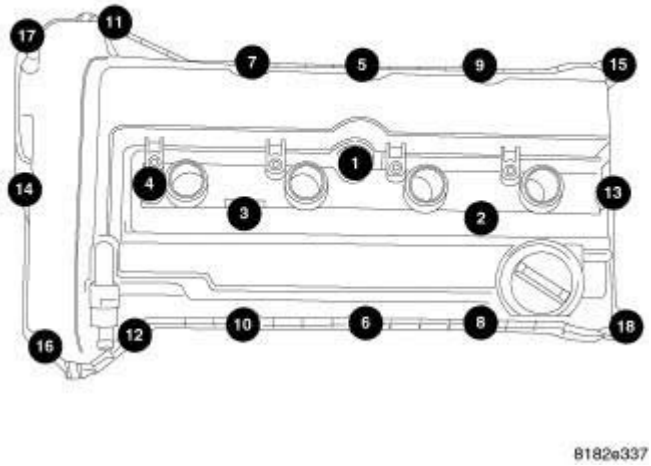

Fig. 104: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

26. Install cylinder head cover and ignition coils. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

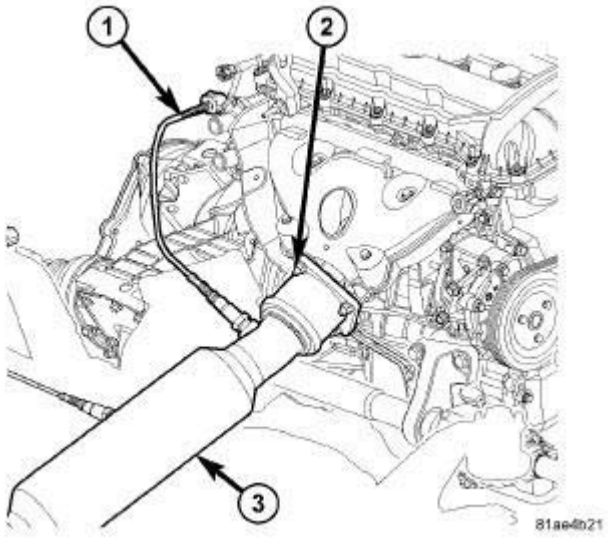

Fig. 105: Catalytic Converter
Courtesy of CHRYSLER LLC

27. Install exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

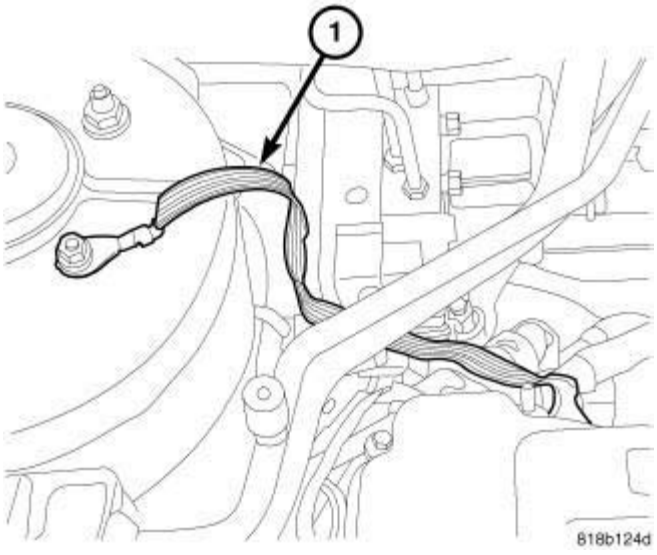

Fig. 106: GROUND STRAP
Courtesy of CHRYSLER LLC

28. Install ground strap (1) at right rear of cylinder head if equipped.

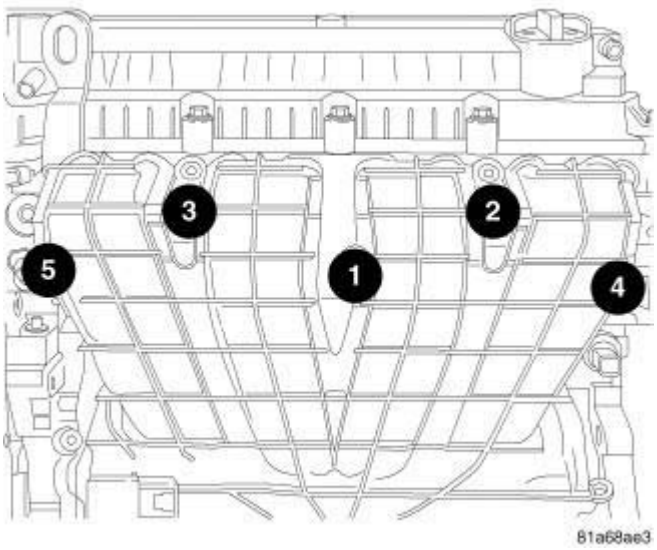

Fig. 107: INTAKE TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

29. Install intake manifold, vacuum lines and fuel rail. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

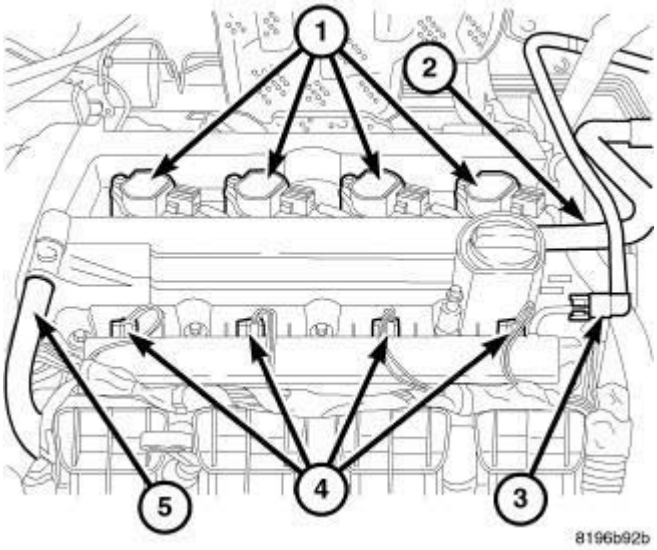

Fig. 108: COIL CONNECTOR
Courtesy of CHRYSLER LLC

30. Connect coil (1) and injector (4) electrical connectors.

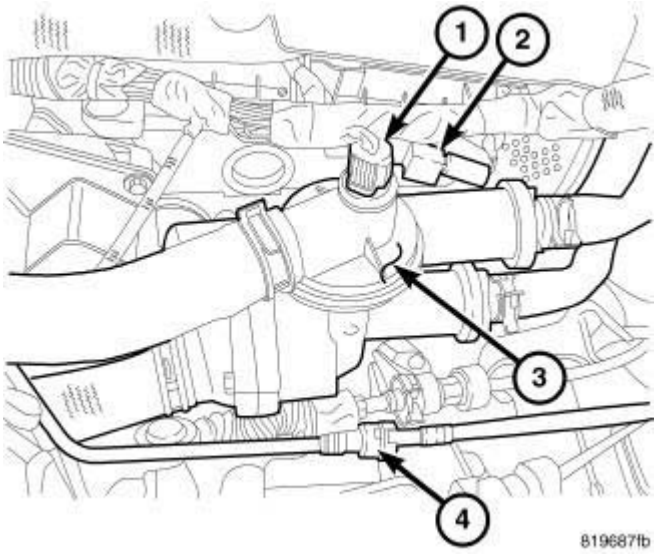

Fig. 109: COOLANT ADAPTER
Courtesy of CHRYSLER LLC

31. Connect electrical connectors to coolant temperature sensor (1), camshaft position sensors, oil temperature sensor, variable valve timing solenoids, MAP sensor, manifold tuning valve, ignition interference suppressor (2) and electronic throttle control.

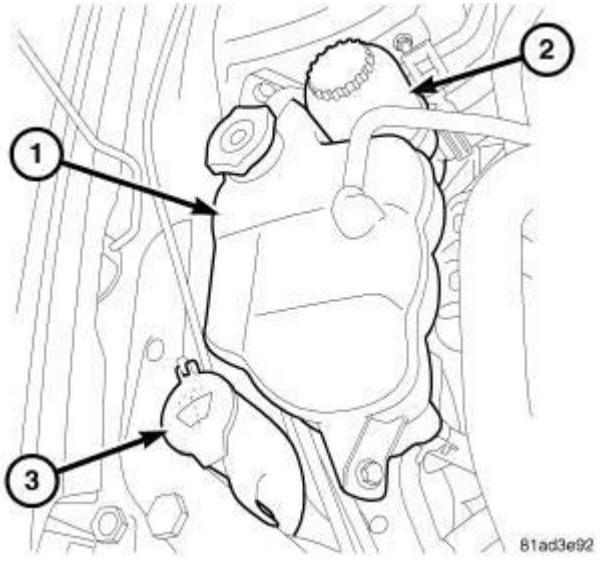

Fig. 110: Coolant Reservoir
Courtesy of CHRYSLER LLC

32. Install power steering pump reservoir (2). Tighten mounting screw to 12 N.m (106 in. lbs.).
33. Install coolant recovery reservoir (1). Tighten mounting bolts to 10 N.m (89 in. lbs.).

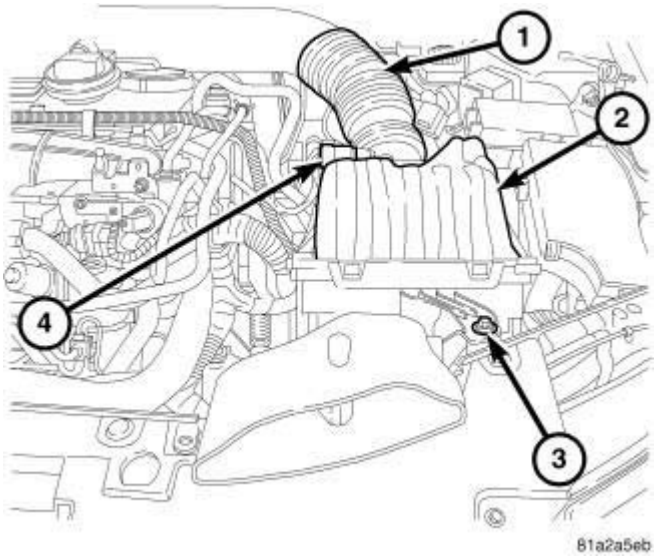

Fig. 111: Air Cleaner Housing
Courtesy of CHRYSLER LLC

34. Install clean air hose (1) and air cleaner housing (2). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
35. Fill cooling system. Refer to **Cooling - Standard Procedure** .
36. Install new oil filter and fill engine with oil.
37. Connect negative battery cable.

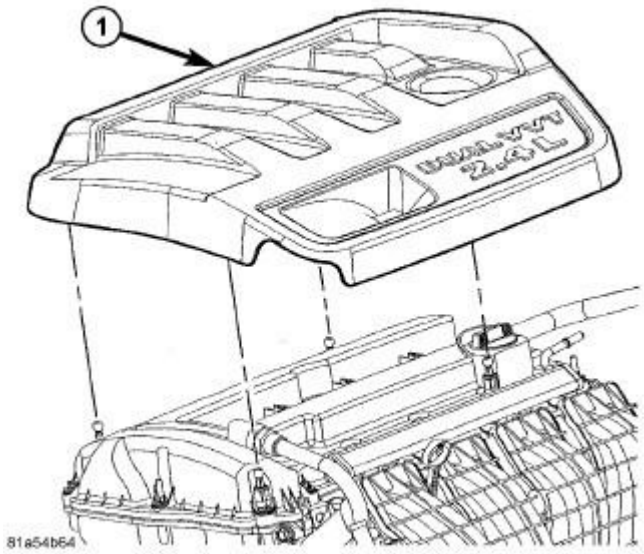

Fig. 112: Engine Cover
Courtesy of CHRYSLER LLC

38. Operate engine until it reaches normal operating temperature. Check oil and cooling systems for leaks and correct fluid levels.

39. Install engine cover (1).

ASSEMBLY, VARIABLE VALVE TIMING

Description

DESCRIPTION

The Gas engine is equipped with Variable Valve Timing (VVT). This system advances and/or retards intake and/or exhaust camshaft timing to improve engine performance, mid-range torque, idle quality, fuel economy, and reduce emissions. The camshaft sprockets are integrated with the VVT assemblies and are serviced as an assembly. VVT assemblies are sometimes referred to as camshaft phasers.

Operation

OPERATION

The Variable Valve Timing (VVT) assemblies are actuated with engine oil pressure. The oil flow to the VVT assemblies are controlled by two Oil Control Valves (OCV). There is an OCV and Camshaft Position Sensor (CMP) for each camshaft. The OCV's consist of a Pulse Width Modulated (PWM) solenoid and a spool valve. The PCM actuates the OCV to control oil flow through the spool valve into the VVT assemblies. The VVT assembly consists of a rotor, stator, and sprocket. The stator is connected to the timing chain through the sprocket. The rotor is connected to the camshaft. Oil flow in to the VVT assembly rotates the rotor with respect to the stator, thus rotating the camshaft with respect to the timing chain. Thus, the VVT assemblies change valve timing by changing the relationship between the camshaft and the timing chain. An integral oil pressure activated pin is used to lock base camshaft timing for engine start up. Oil pressure releases the pin and allows the PCM to control cam timing once the engine is running. An infinitely variable valve timing position can be achieved within the limits of the hardware. The CMP monitors the position of the camshaft with respect to the crankshaft and provides feedback to the PCM.

Removal

REMOVAL

NOTE: Camshaft phaser and camshaft sprocket are supplied as an assembly, do not attempt to disassemble.

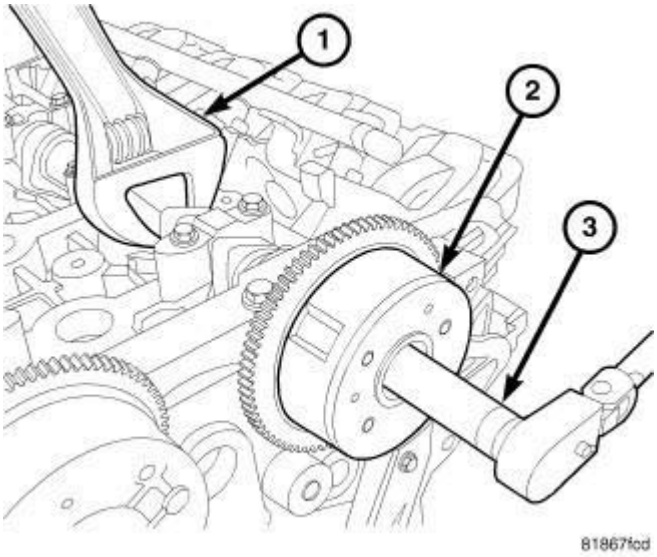

Fig. 113: Camshafts Phaser Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.
2. Remove camshaft phaser (2) retaining bolt while holding the camshaft in place with a wrench (1) on the camshaft flats.
3. Remove phaser (2) assembly from camshaft.

Installation

INSTALLATION

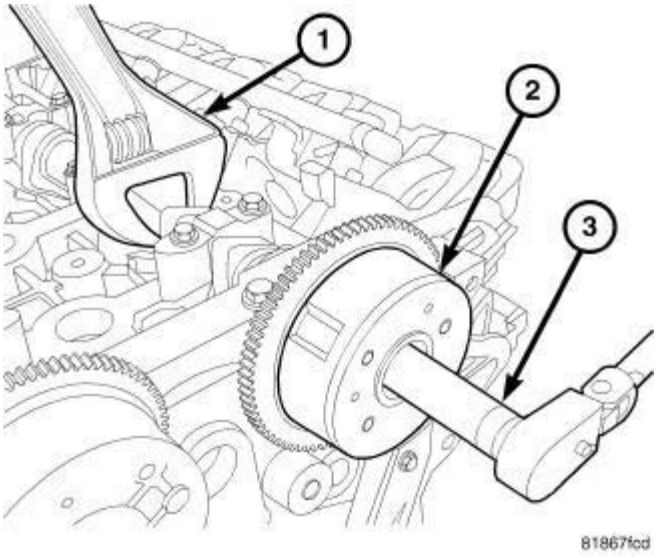

Fig. 114: Camshafts Phaser Removal/Installation
Courtesy of CHRYSLER LLC

CAUTION: Do not use an impact wrench to tighten camshaft sprocket bolts. Damage to the camshaft-to-sprocket locating dowel pin and camshaft phaser may occur.

1. Install phaser (2) assembly on camshaft.

NOTE: Make sure the dowel is seated in the dowel hole and not in a oil feed hole. The dowel hole is larger than the 4 oil feed holes.

2. Install phaser retaining bolt. Hold camshaft in place with a wrench (1) and tighten bolt to 59 N.m (44 ft. lbs.).
3. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.

BUCKET, TAPPET

Diagnosis and Testing

MECHANICAL VALVE TAPPET NOISE DIAGNOSIS

A tappet-like noise may be produced from incorrect valve lash. See **Engine/Cylinder Head/BUCKET, Tappet - Standard Procedure**.

Standard Procedure

MEASURING VALVE LASH

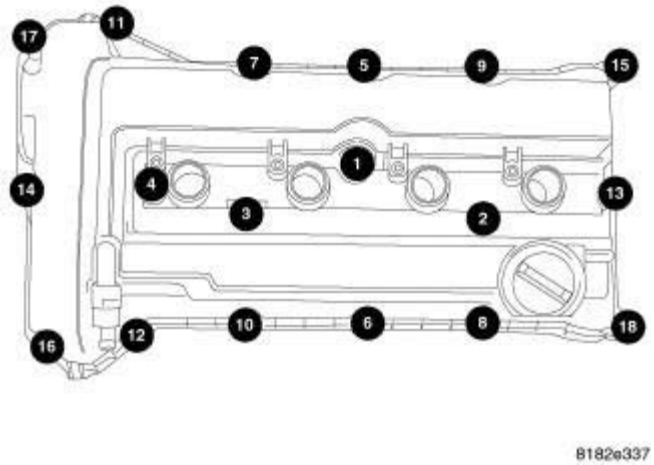

Fig. 115: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: The engine must be cold to measure valve lash.

1. Remove engine cover.
2. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

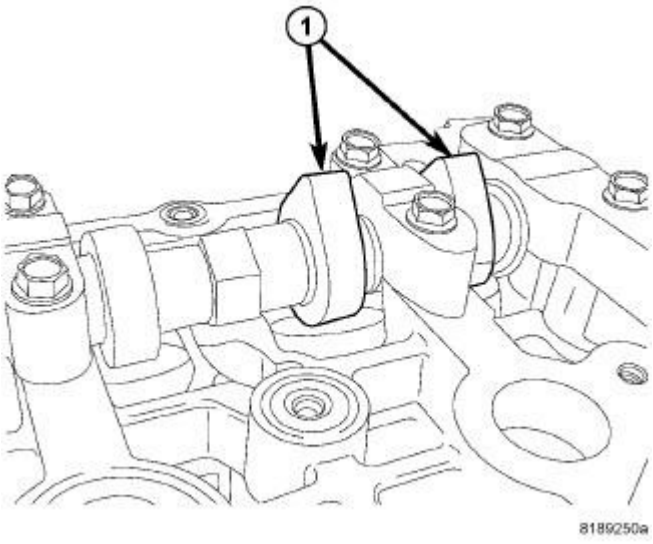

Fig. 116: LOBES VERTICAL
Courtesy of CHRYSLER LLC

3. Rotate camshaft so lobes are vertical (1).
4. Check clearance using feeler gauges.
5. Repeat for all tappets and record readings.
6. If clearance was too small, refer to **Clearance too Small**.
7. If clearance was too large, refer to **Clearance too Large**.

Clearance too Small

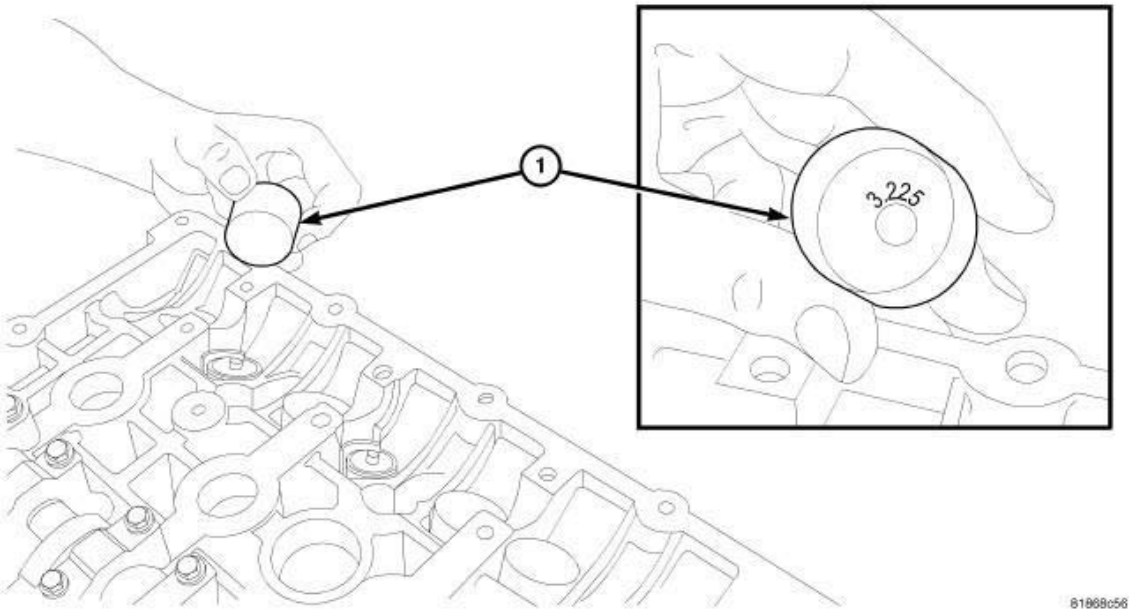

Fig. 117: TAPPET IDENTIFICATION
Courtesy of CHRYSLER LLC

1. Remove camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.
2. Specification - clearance = change.
3. Decrease tappet thickness by change figure.
4. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.
5. Verify that valve lash is correct.

Clearance too Large

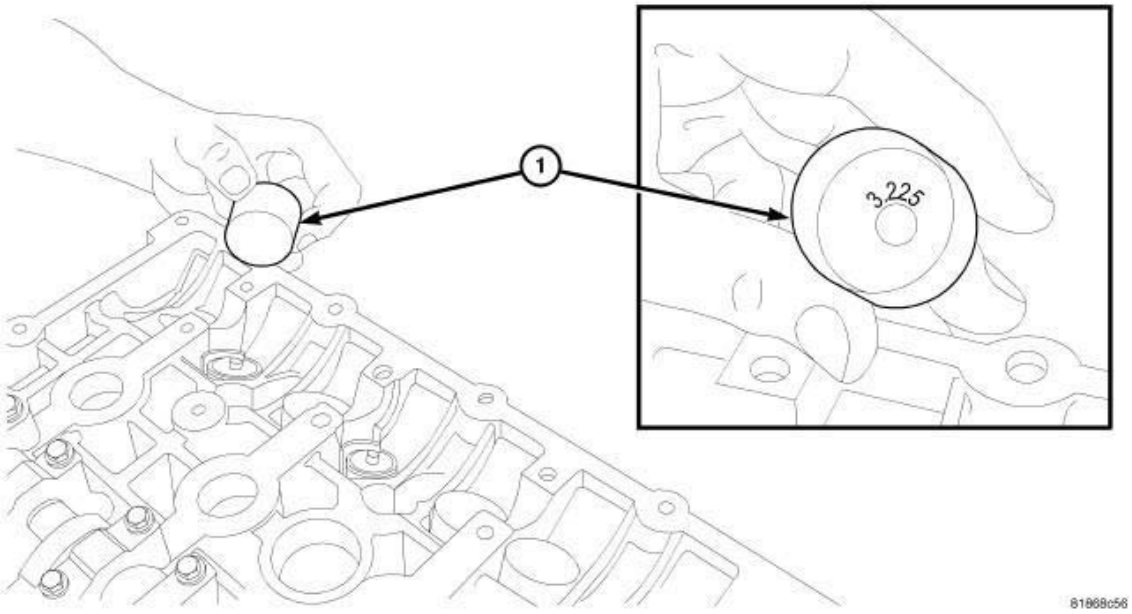

Fig. 118: TAPPET IDENTIFICATION
Courtesy of CHRYSLER LLC

1. Remove camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.
2. Clearance - specification = change.
3. Increase tappet thickness by change figure.
4. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.
5. Verify that valve lash is correct.

Removal

REMOVAL

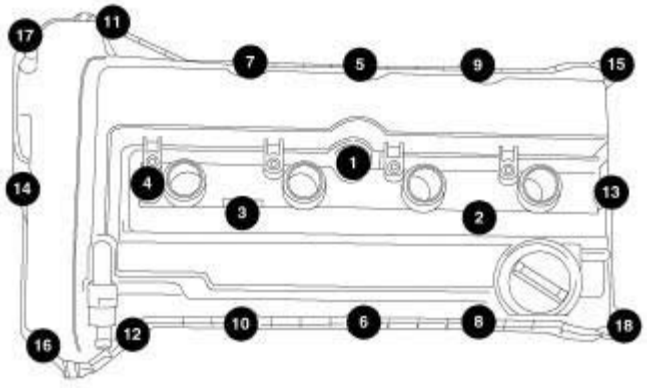

Fig. 119: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: This procedure is for in-vehicle service with camshafts installed.

NOTE: Camshaft tappets must be replaced if cylinder head or camshafts are replaced.

1. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
2. Remove camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.

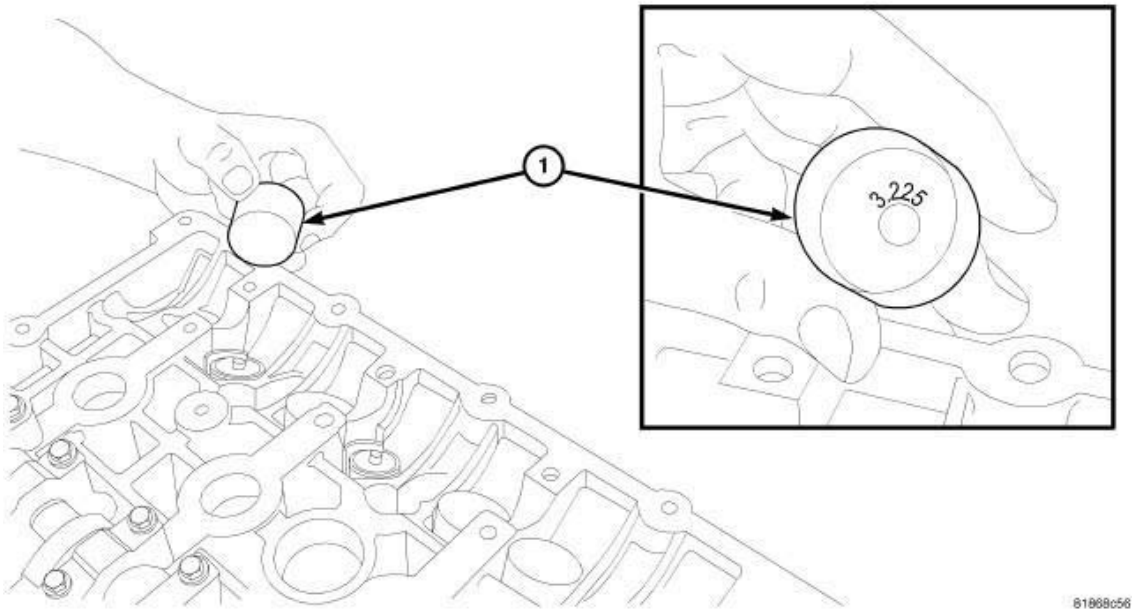

Fig. 120: TAPPET IDENTIFICATION
Courtesy of CHRYSLER LLC

3. Remove camshaft tappets (1).
4. Repeat removal procedure for each camshaft tappet (1).
5. If reusing, mark each tappet for reassembly in original position.

Installation

INSTALLATION

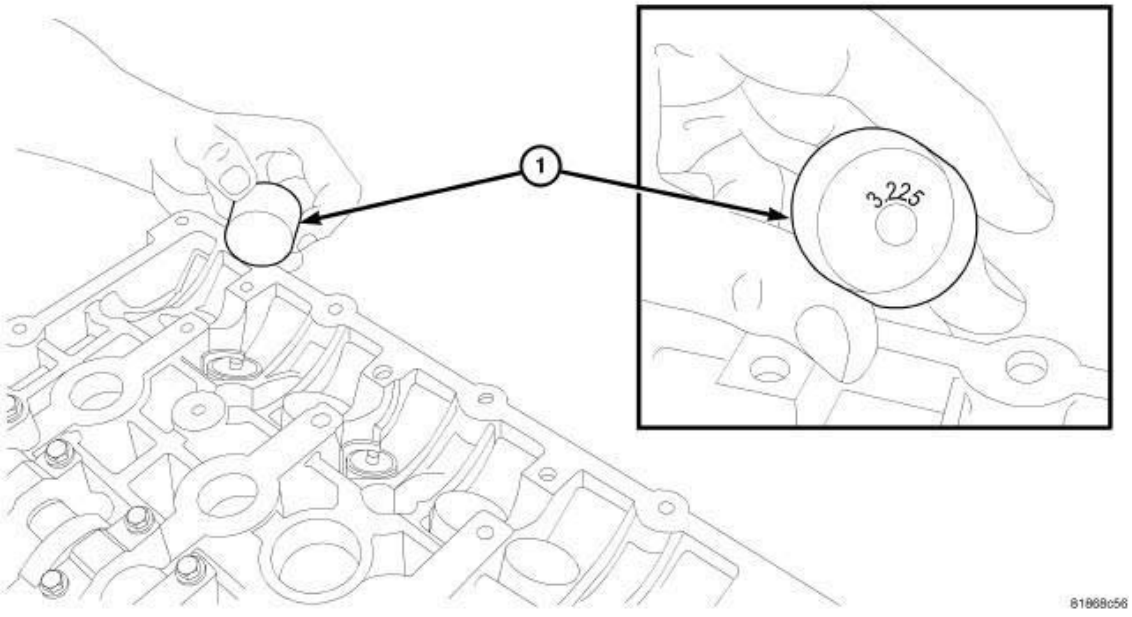

Fig. 121: TAPPET IDENTIFICATION

Courtesy of CHRYSLER LLC

NOTE: If reinstalling original tappets they must go back in their original location or engine damage could result.

1. Apply a light coat of clean engine oil to camshafts tappets (1) prior to assembly.
2. Install camshaft tappets (1) into cylinder head.
3. Repeat installation procedure for each camshaft tappet.
4. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.

NOTE: If installing new tappets, the valve lash procedure must be performed.

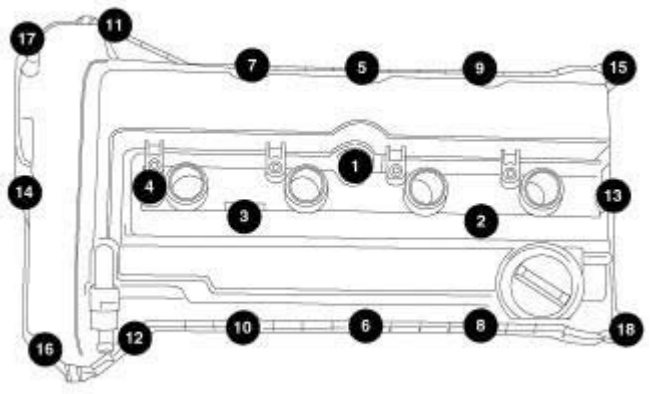

Fig. 122: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

5. Install cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

CAMSHAFT, ENGINE

Description

DESCRIPTIONS

Both camshafts have five bearing journal surfaces and two cam lobes per cylinder. The two front journals are larger to allow for feeding oil to the variable valve timing (VVT) camshaft phasers. Flanges on the third smaller journal control camshaft end play. At the rear of each camshaft is an integral cam sensor target.

CAMSHAFT BEARING CAPS

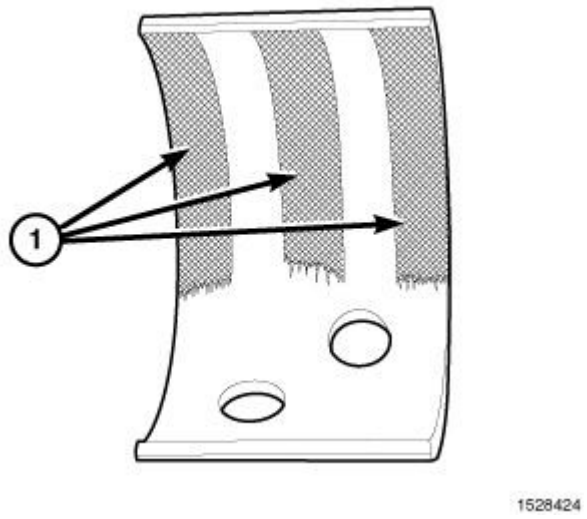

Fig. 123: Camshaft Bearing Caps
Courtesy of CHRYSLER LLC

The front cam bearing cap spans both camshafts, and includes dowels for precise alignment. The front exhaust camshaft journal has a select fit bearing insert. This bearing is required to seal the oil passage to the camshaft phaser, because a portion of the lower bearing saddle is machined away for head bolt access. The select fit is required to minimize bearing clearance and oil leakage. An exhaust bearing grade (1, 2 or 3) is stamped into the front bearing cap adjacent to the exhaust cam journal. The bearings are also marked with the corresponding grade markings. If the bearing is replaced, the same grade must be used. Due to the unique purpose of this bearing, it may appear to have uneven wear patterns (1). Maximum wear of 0.05 mm (.002 in.) is acceptable. Unless the wear is excessive it is no cause for concern and the bearing should not be replaced. Cam bearing inspection should not be the sole reason for removal of the exhaust camshaft. The upper cam bearing may be replaced if the front bearing cap is removed. The lower cam bearing should be replaced if the camshaft is removed due to a failure of a component within the cylinder head.

The front intake cam journal has a full lower bearing saddle, and therefore, no bearing insert is required.

All small bearing caps have a formed-in arrow to assist in assembly. All small bearing cap arrows must point towards the center of the cylinder head. The small bearing caps are marked for position during the manufacturing process, and must be reinstalled in their original position.

The #1 small cap includes a passage to direct oil from the cylinder head oil gallery to the #1 small bearing journal, and into the camshaft as well. The hollow camshaft then distributes oil to the remainder of the small journals. Oil flowing out of each cam journal lubricates the valve tappets.

The #3 small cap is machined at the front and rear face to control camshaft end-play. This cap has dowels for precise alignment.

Operation

OPERATION

The camshaft is driven by the crankshaft via drive sprockets and a chain. The camshaft has precisely machined lobes to provide accurate valve timing and duration.

Standard Procedure

MEASURING CAMSHAFT END PLAY

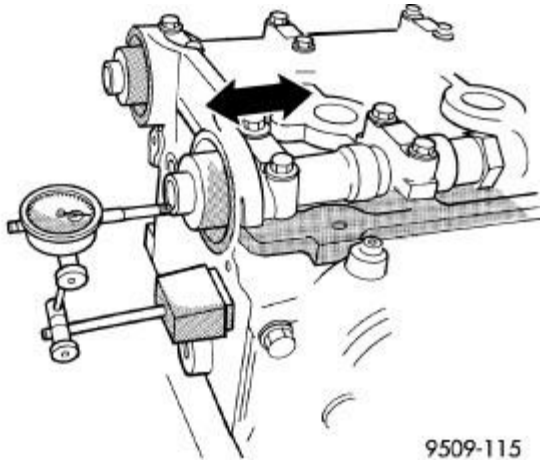

Fig. 124: Camshaft End Play
Courtesy of CHRYSLER LLC

1. Using a suitable tool, move camshaft as far rearward as it will go.
2. Zero dial indicator.
3. Move camshaft as far forward as it will go.
4. Record reading on dial indicator. For end play specification, see **Engine - Specifications**.
5. If end play is excessive, check cylinder head and camshaft for wear; replace as necessary.

Removal

REMOVAL

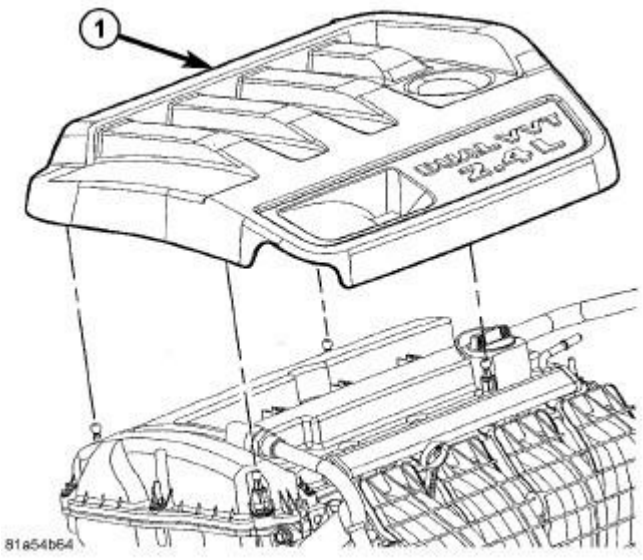

Fig. 125: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by pulling upward.
2. Disconnect and isolate the negative battery cable.
3. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

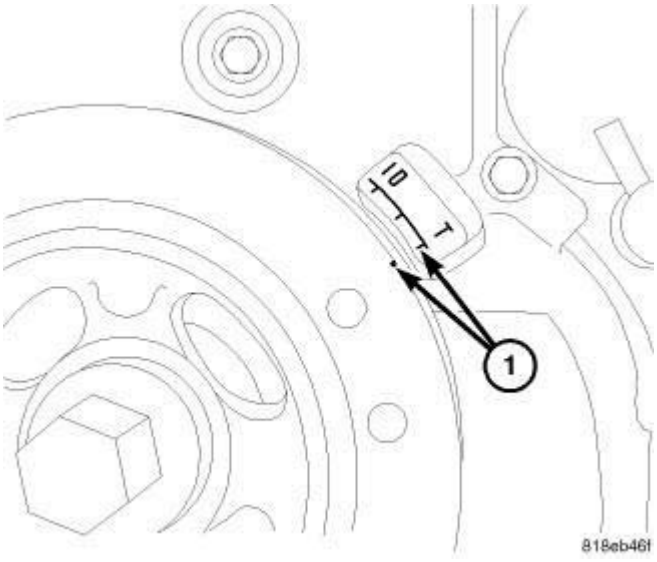

Fig. 126: Top Dead Center
Courtesy of CHRYSLER LLC

4. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
5. Remove the frame cover portion of the right splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .

6. Rotate engine to TDC (1).

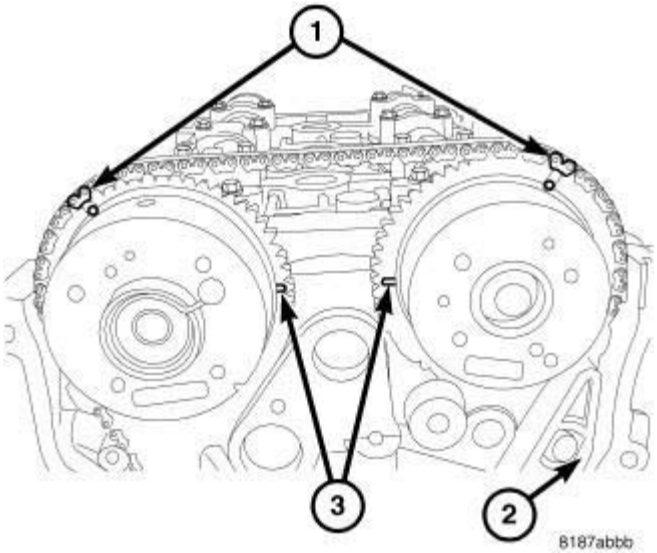

Fig. 127: TIMING CHAIN TIMING MARKS
Courtesy of CHRYSLER LLC

7. Make sure camshaft timing marks (3) are in line with the cylinder head cover sealing surface.
8. Mark the chain link corresponding to timing marks (1) with a paint marker.

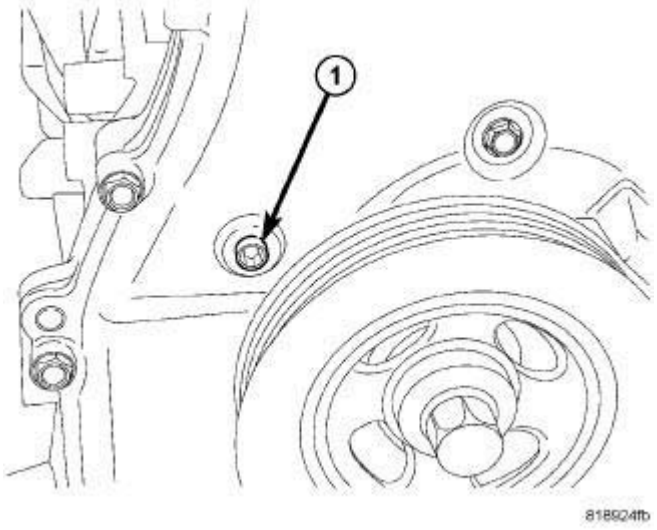

Fig. 128: TENSIONER ACCESS PLUG
Courtesy of CHRYSLER LLC

9. Remove timing tensioner plug (1) from front cover.

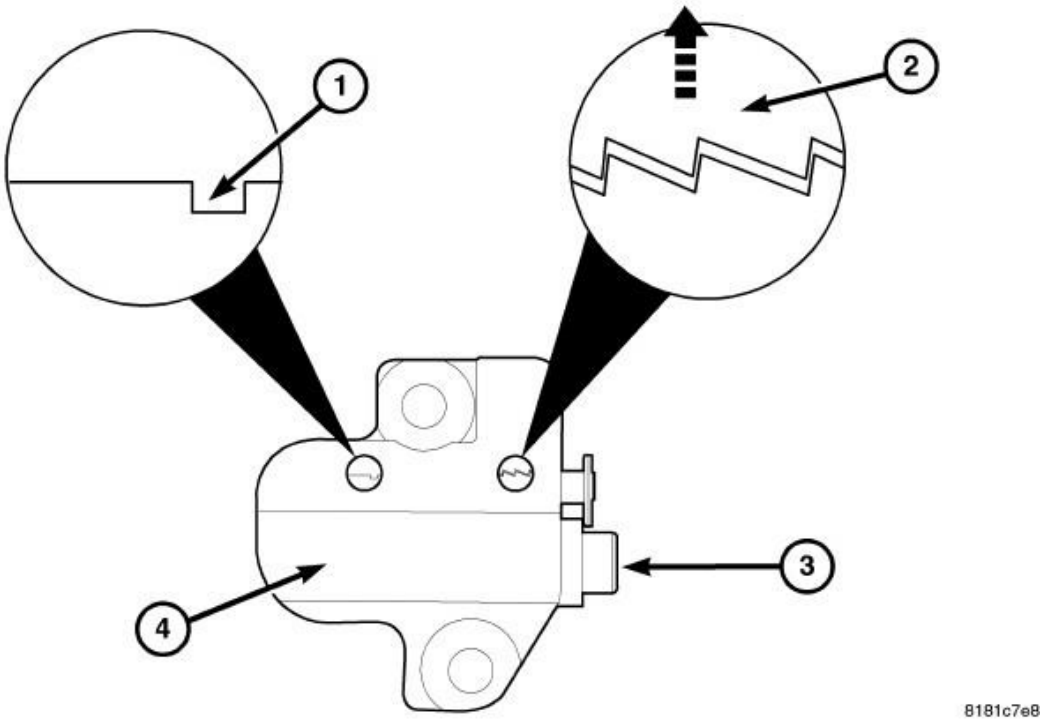

Fig. 129: TENSIONER RESET
Courtesy of CHRYSLER LLC

10. Insert small Allen wrench through timing tensioner plug hole and lift ratchet (2) upward to release the tensioner and push Allen wrench inward. Leave the Allen wrench installed during the remainder of this procedure.

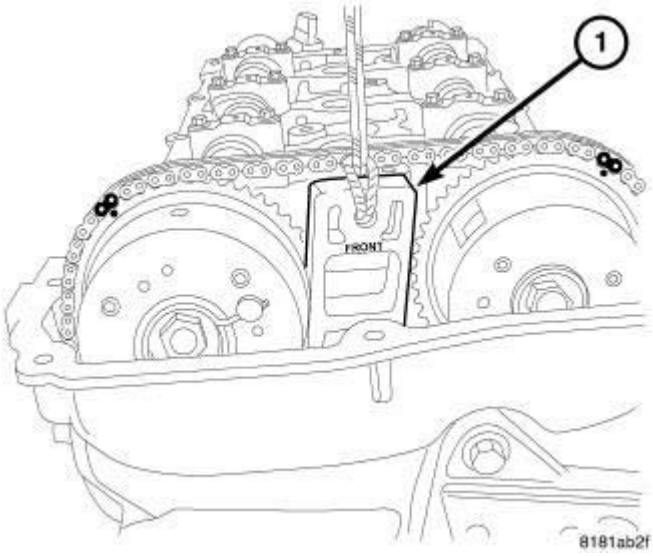

Fig. 130: WEDGE TOOL
Courtesy of CHRYSLER LLC

11. Insert Locking Wedge 9701 (1) between camshaft phasers.

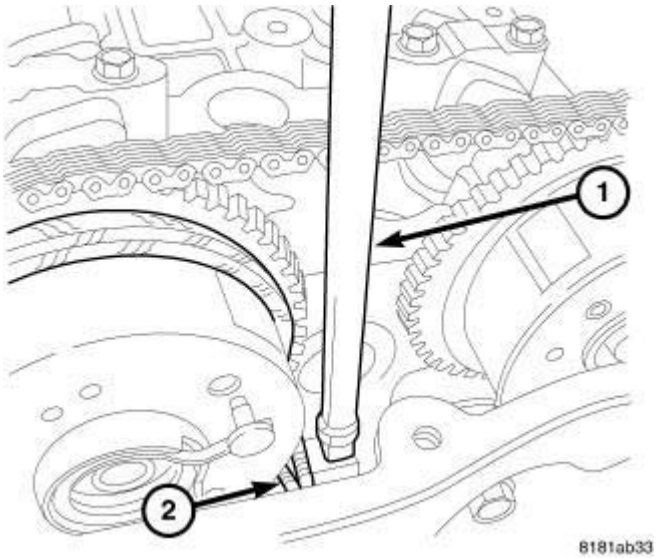

Fig. 131: SEATING WEDGE TOOL
Courtesy of CHRYSLER LLC

12. Lightly tap Locking Wedge 9701 (2) into place until it will no longer sink down.

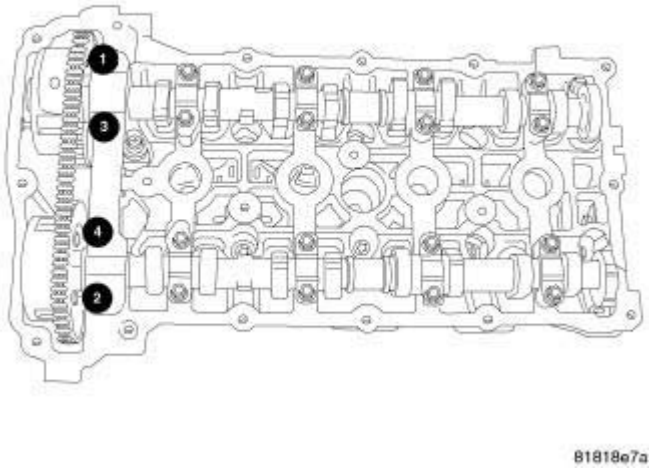

Fig. 132: Front Camshaft Cap Removal Sequence
Courtesy of CHRYSLER LLC

NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, number one exhaust camshaft bearing is marked "E1>".

CAUTION: DO NOT use a number stamp or a punch to mark camshaft bearing caps. Damage to bearing caps could occur.

13. Using a permanent ink or paint marker, identify location and position on each camshaft bearing cap.
14. Remove the front camshaft bearing cap.
15. Slowly remove the remaining intake and exhaust camshaft bearing cap bolts one turn at a time.

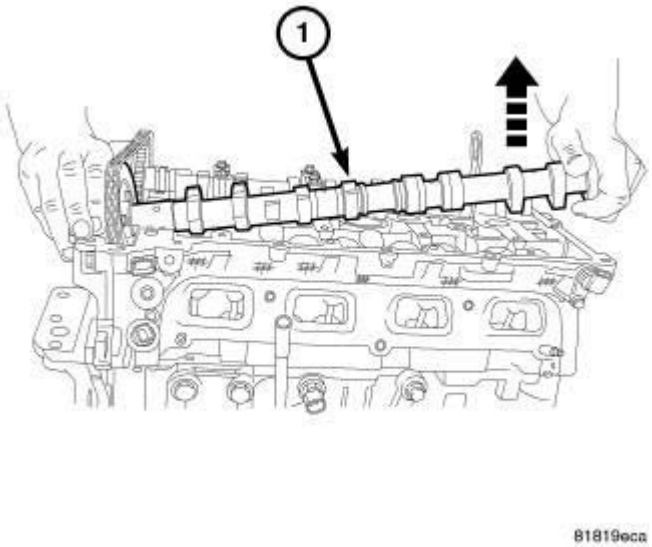

Fig. 133: Raise Intake Camshaft
Courtesy of CHRYSLER LLC

16. Remove intake camshaft (1) by lifting the rear of the camshaft upward.

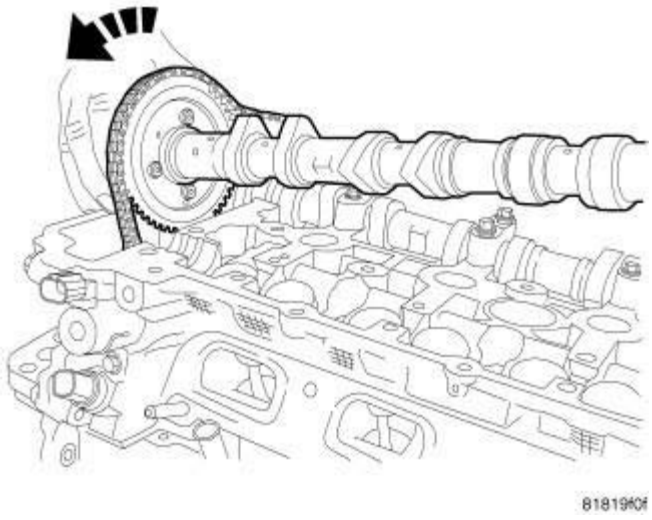

Fig. 134: ROLL CAMSHAFT
Courtesy of CHRYSLER LLC

17. Rotate the camshaft while lifting out of the front bearing cradle.

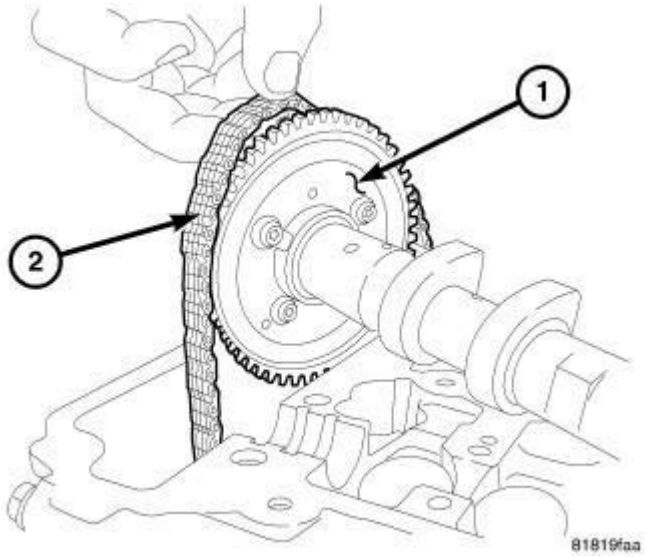

Fig. 135: CHAIN REMOVAL
Courtesy of CHRYSLER LLC

18. Lift the timing chain (2) off the sprocket (1).
19. Remove exhaust camshaft.
20. Secure timing chain with wire so that it does fall into the timing chain cover.

Cleaning

CLEANING

Clean camshafts with a suitable solvent.

Inspection

INSPECTION

1. Inspect camshaft bearing journals for damage. If journals are damaged, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
2. Check the cam lobe and bearing surfaces for abnormal wear and damage. Replace camshaft if defective.

NOTE: If camshaft is replaced due to lobe wear or damage, always replace the lash buckets.

Installation

INSTALLATION

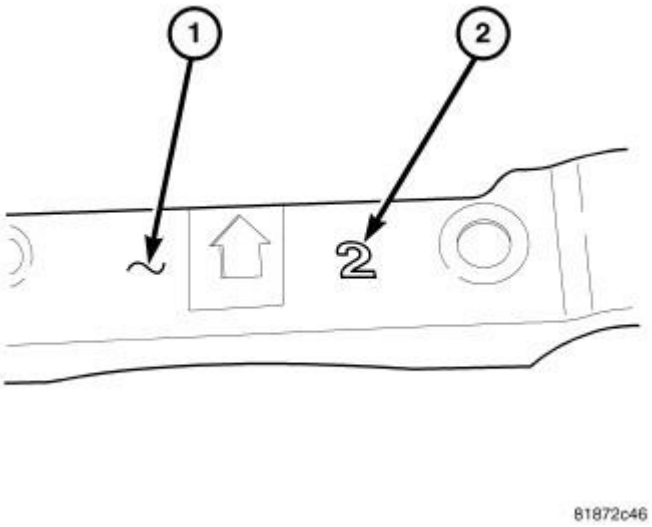

Fig. 136: Camshaft Cap Bearing Identification
Courtesy of CHRYSLER LLC

1. The front camshaft bearing cap (1) is numbered (2) either one, two, or three, this corresponds to the select fit front exhaust camshaft bearing to use.

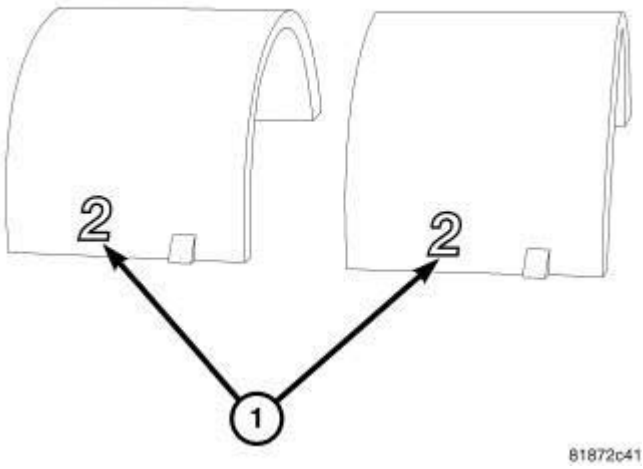

Fig. 137: Camshaft Bearing Identification
Courtesy of CHRYSLER LLC

2. Install the corresponding select fit front exhaust camshaft bearing (1).
3. Oil all of the camshaft journals with clean engine oil.
4. Install camshaft phasers on camshafts if removed. See **Engine/Cylinder Head/ASSEMBLY, Variable Valve Timing - Installation**.

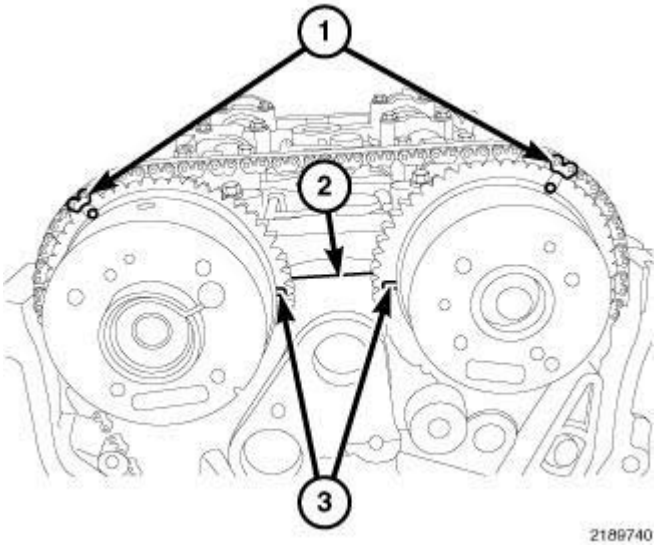

Fig. 138: Timing Chain Timing Marks
Courtesy of CHRYSLER LLC

5. Install timing chain onto exhaust cam sprocket making sure that the timing marks (1) on the sprocket and the painted chain link are aligned.
6. Position exhaust camshaft and on bearing journals in the cylinder head.
7. Align exhaust cam timing mark (3) so it is in line with the cylinder head cover sealing surface (2).

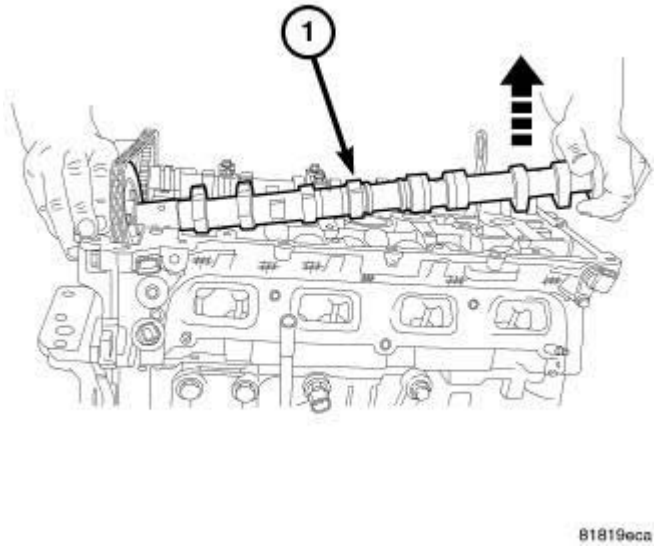

Fig. 139: Raise Intake Camshaft
Courtesy of CHRYSLER LLC

8. Install intake camshaft by raising the rear of the camshaft upward and roll the sprocket into the chain.

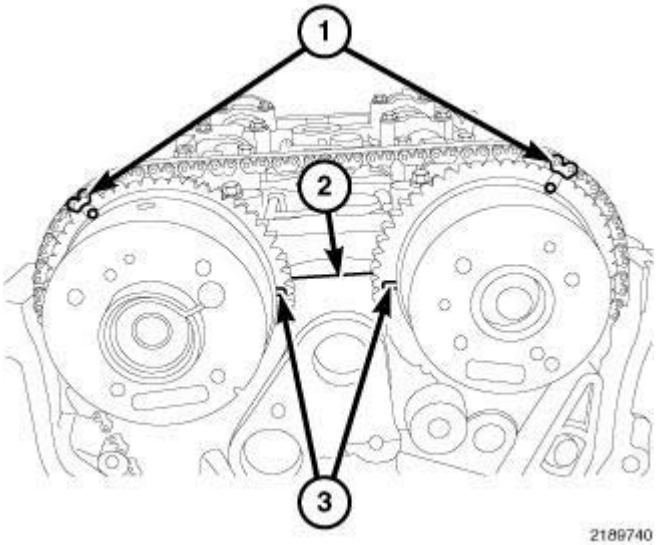

Fig. 140: Timing Chain Timing Marks
Courtesy of CHRYSLER LLC

9. Align the timing marks (1) on the intake cam sprocket with the painted chain link.
10. Position the intake camshaft into the bearing journals in the cylinder head.
11. Verify that the timing marks (1) are aligned on both camshafts and that the timing marks (3) are facing each other and are in line with the cylinder head cover sealing surface (2).

CAUTION: Install the front intake and exhaust camshaft bearing cap last. Ensure that the dowels are seated and follow torque sequence or damage to engine could result.

NOTE: If the front camshaft bearing cap is broken, the cylinder head MUST be replaced.

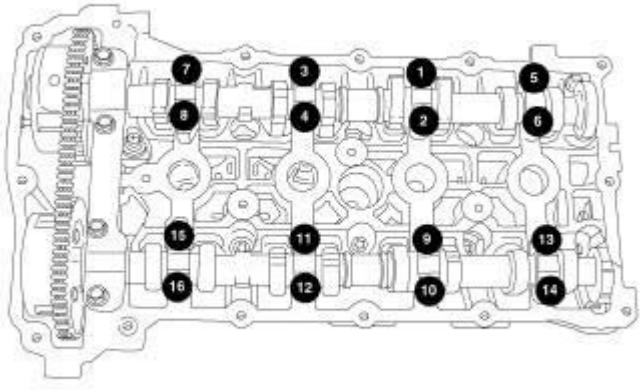

Fig. 141: Camshaft Cap Torque Sequence
Courtesy of CHRYSLER LLC

12. Install intake and exhaust camshaft bearing caps and slowly tighten bolts to 9.5 N.m (85 in. lbs.) in the sequence shown in illustration.

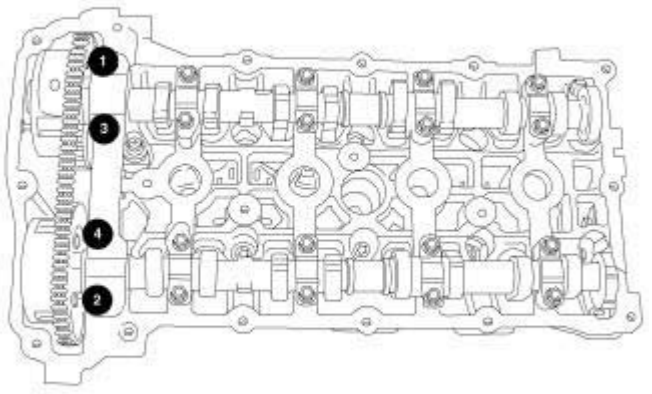

Fig. 142: Front Camshaft Cap Torque Sequence
Courtesy of CHRYSLER LLC

NOTE: Verify that the exhaust bearing shells are correctly installed, and the dowels are seated in the head, prior to torquing bolts.

13. Install the front intake and exhaust bearing cap and tighten bolts to 25 N.m (18 ft. lbs.) in the sequence shown in illustration.

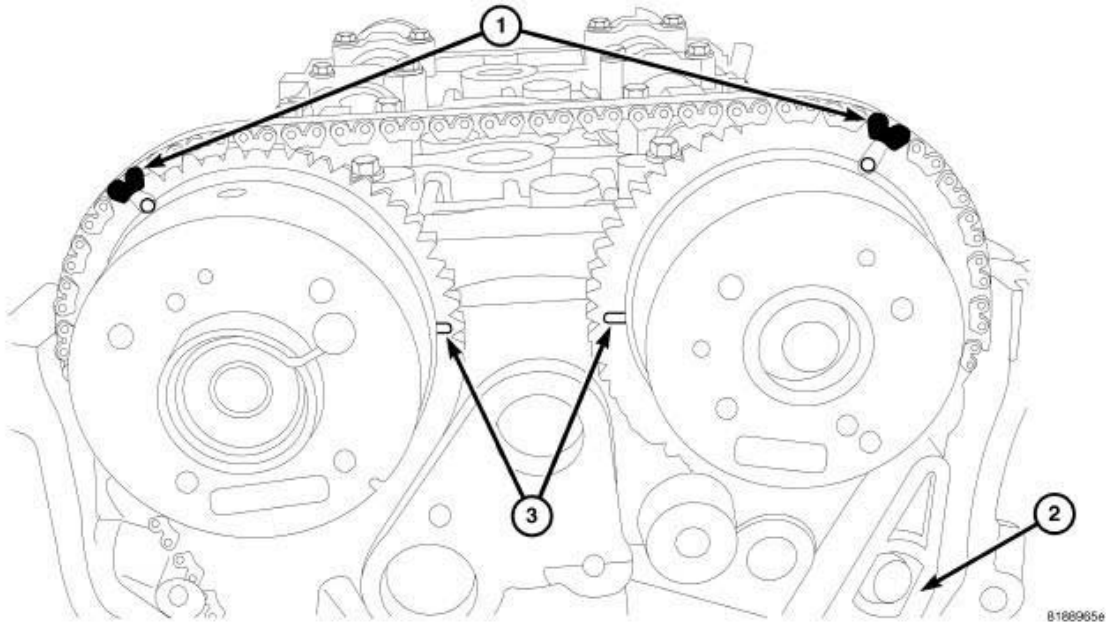

Fig. 143: TIMING CHAIN TIMING MARKS
Courtesy of CHRYSLER LLC

14. Verify that all timing marks (1,3) are aligned.
15. Remove Allen wrench from timing chain tensioner.

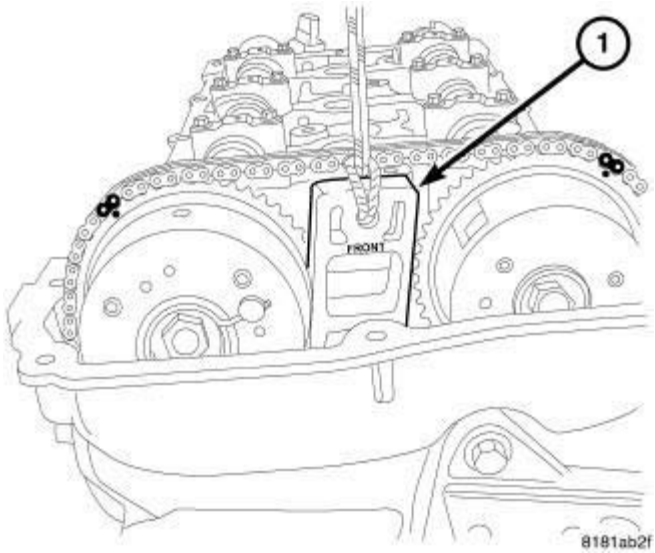

Fig. 144: WEDGE TOOL
Courtesy of CHRYSLER LLC

16. Remove Locking Wedge 9701 (1) by pulling straight upward on pull rope.

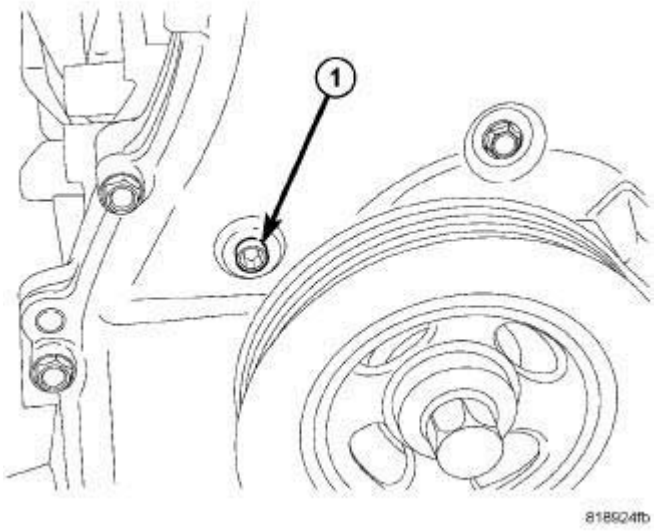

Fig. 145: TENSIONER ACCESS PLUG
Courtesy of CHRYSLER LLC

17. Apply MOPAR® thread sealant to timing tensioner plug (1) and Install.
18. Rotate the crankshaft CLOCKWISE two complete revolutions until the crankshaft is repositioned at the TDC position.

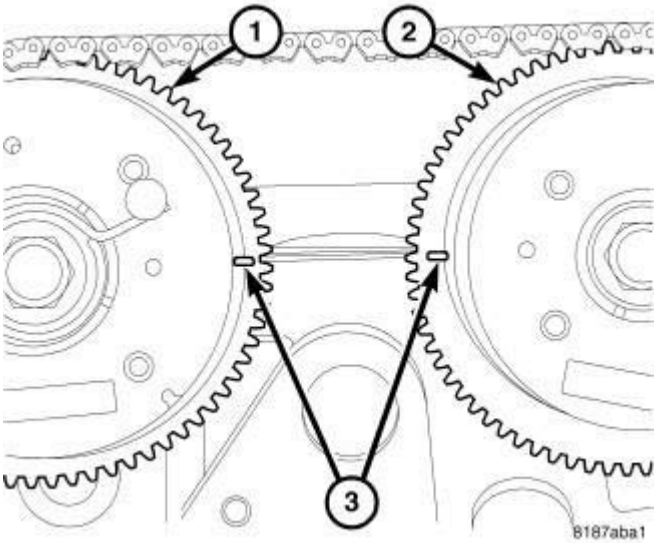

Fig. 146: Camshaft Timing
Courtesy of CHRYSLER LLC

19. Verify that the camshafts timing marks (3) are in the proper position and in line with the cylinder head cover sealing surface. If the marks do not line up, the timing chain is not correctly installed.
20. Install right splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .

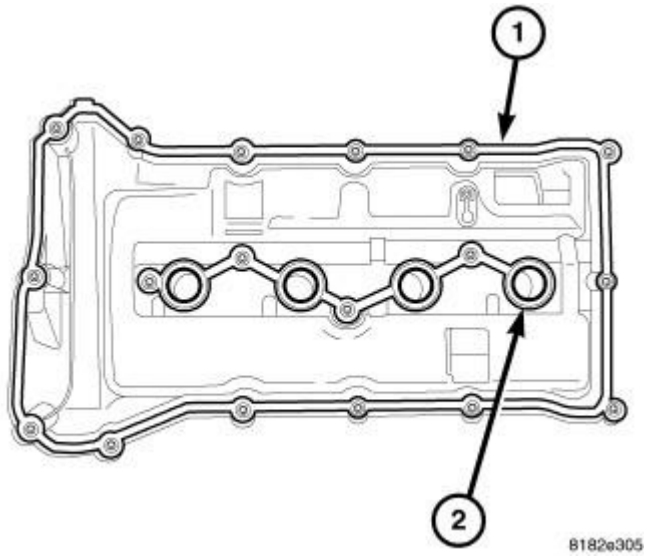

Fig. 147: GASKET LOCATION
Courtesy of CHRYSLER LLC

21. Remove RTV from gasket (1).
22. Inspect cylinder head cover gaskets (1,2) for damage. If no damage is present, gaskets can be reinstalled.

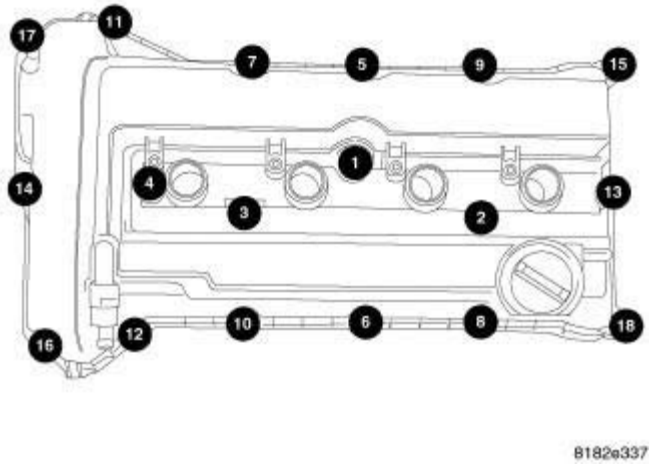

Fig. 148: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

23. Install cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
24. Connect negative battery cable.
25. Fill cooling system. Refer to **Cooling - Standard Procedure** .
26. Fill with oil.

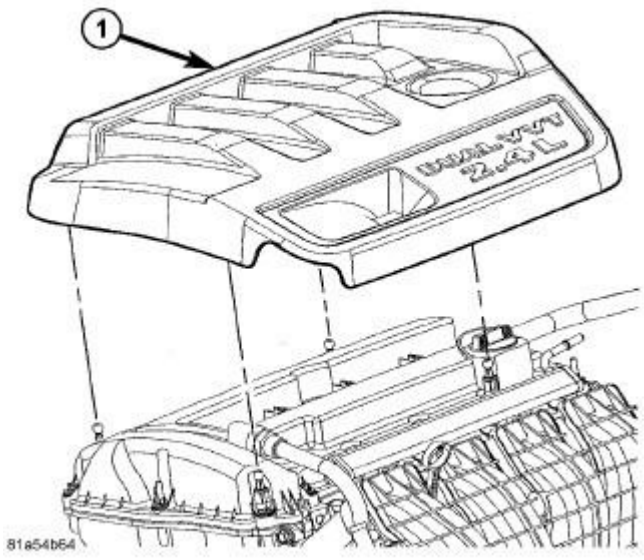

Fig. 149: Engine Cover
Courtesy of CHRYSLER LLC

27. Operate engine until it reaches normal operating temperature. Check oil and cooling systems for correct fluid levels.
28. Install engine cover (1).

COVER(S), CYLINDER HEAD

Removal

REMOVAL

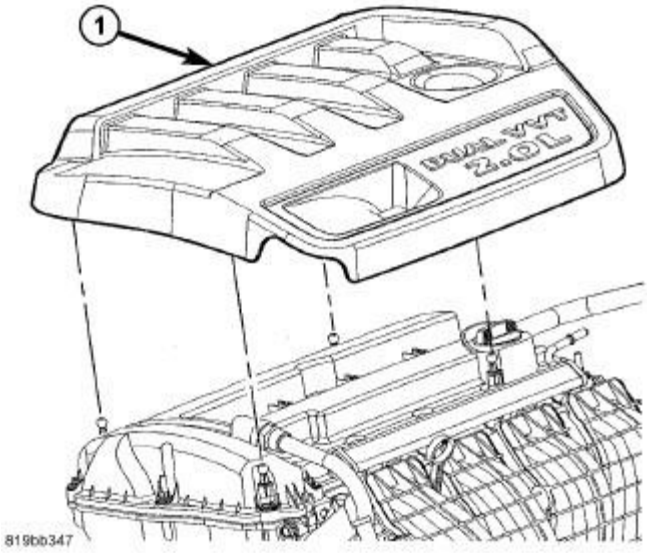

Fig. 150: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by pulling upward.
2. Disconnect and isolate the negative battery cable.

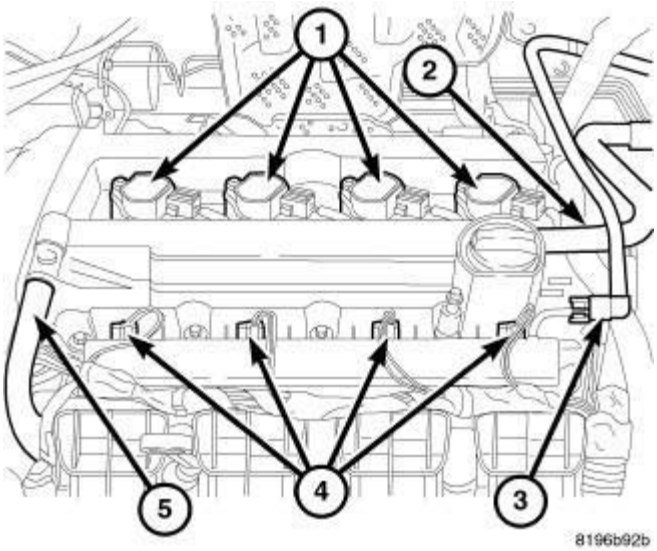

Fig. 151: COIL CONNECTOR
Courtesy of CHRYSLER LLC

3. Remove make up air hose (2).
4. Remove PCV hose (5).
5. Disconnect ignition coil electrical connectors (1).

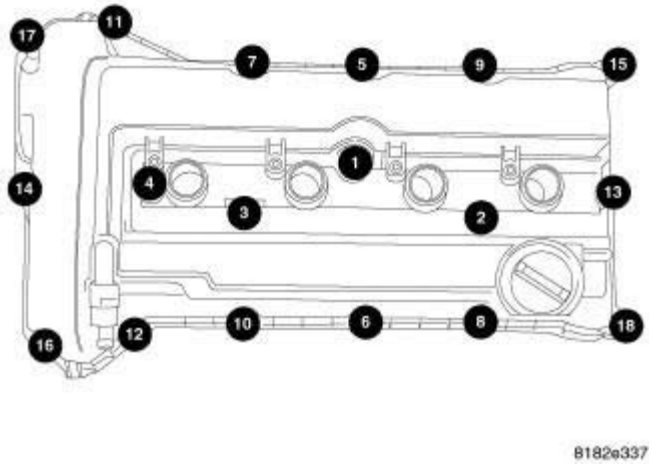

Fig. 152: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

6. Use compressed air to blow dirt and debris off the cylinder head cover prior to removal.
7. Remove cylinder head cover bolts.
8. Remove cylinder head cover from cylinder head.

Installation

INSTALLATION

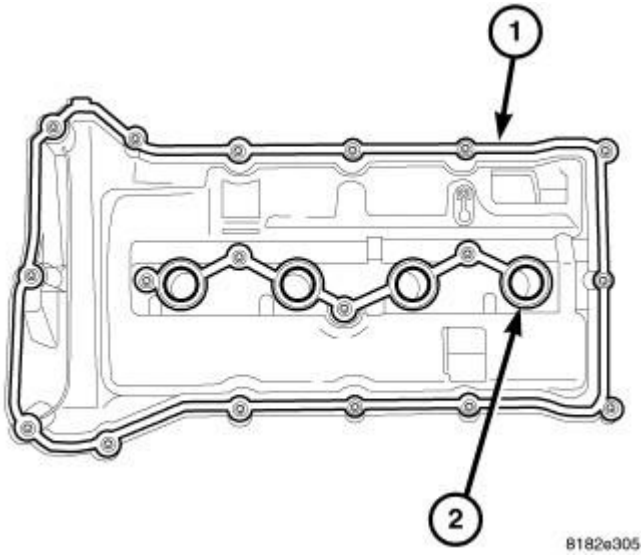

Fig. 153: GASKET LOCATION
Courtesy of CHRYSLER LLC

1. Install new cylinder head cover gaskets (1,2).

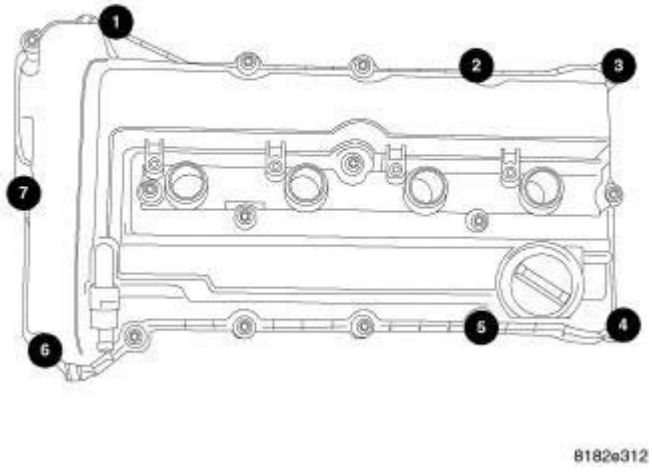

Fig. 154: STUD LOCATION
Courtesy of CHRYSLER LLC

2. Install studs in cover as shown in illustration.

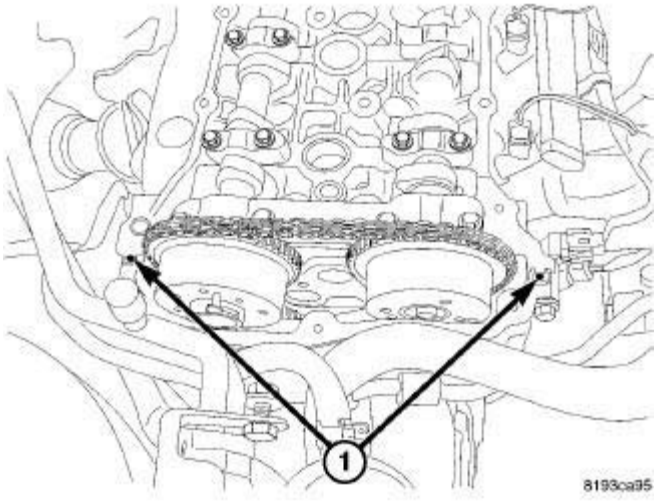

Fig. 155: Cylinder Head/Front Cover T-Joint
Courtesy of CHRYSLER LLC

3. Clean all RTV from cylinder head. See **Engine - Standard Procedure**.

NOTE: When using RTV, the sealing surfaces must be clean and free from grease and oil.

NOTE: When using RTV, parts should be assembled in 10 minutes and tighten to final torque within 45 minutes.

4. Apply a dot of Mopar® engine sealant RTV or equivalent to cylinder head/front cover T-joint (1).

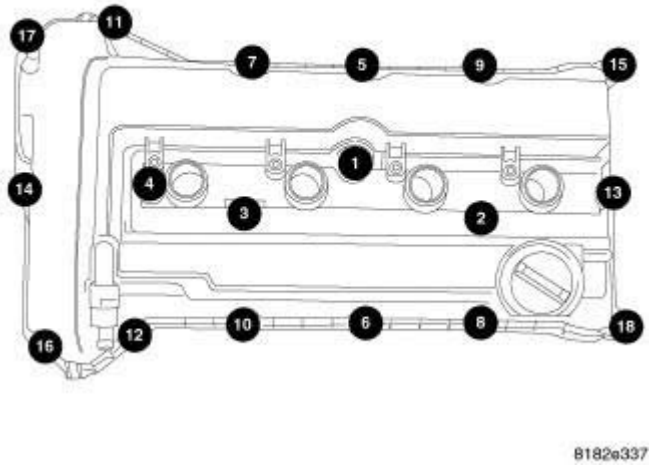

Fig. 156: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

5. Install cylinder head cover assembly to cylinder head and install all bolts, ensuring the studs are located as shown in illustration.
6. Tighten bolts in sequence shown in illustration using a 2 step torque method as follows:
   a. Tighten all bolts to 5 N.m (44 in. lbs.).
   b. Tighten all bolts to 10 N.m (90 in. lbs.).

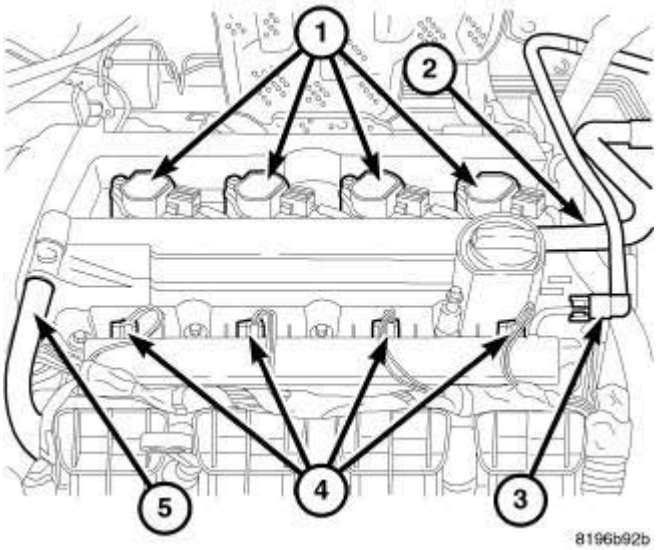

Fig. 157: Coil Connector
Courtesy of CHRYSLER LLC

7. Install ignition coils. Tighten fasteners to 8 N.m (70 in. lbs.).
8. If the PCV valve was removed, tighten PCV valve to 5 N.m (44 in. lbs.).
9. Connect coil electrical connectors (1).

10. Connect PCV hose (5) to PCV valve.
11. Connect make up air hose (2).

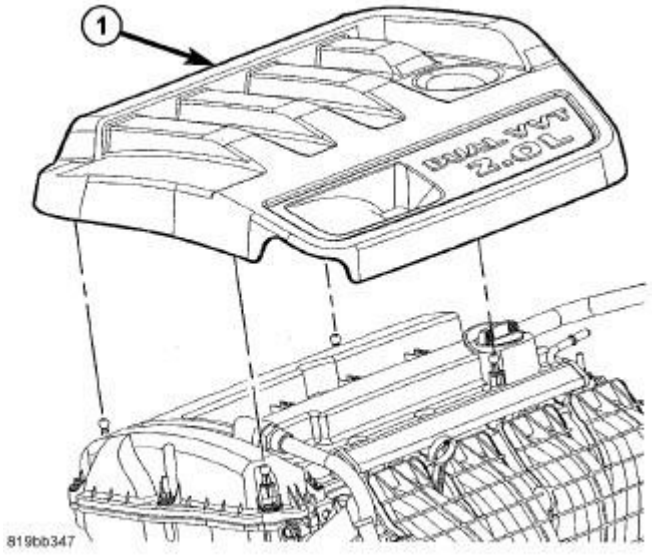

Fig. 158: Engine Cover
Courtesy of CHRYSLER LLC

12. Connect negative battery cable.
13. Install engine cover (1) by pressing the rear of the cover down first.

SPRING(S), VALVE

Removal

CYLINDER HEAD ON

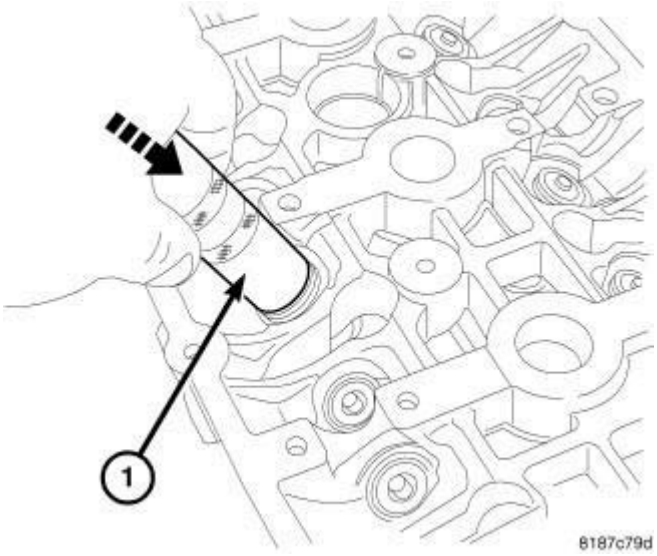

Fig. 159: VALVE REMOVAL
Courtesy of CHRYSLER LLC

1. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
2. Remove camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.
3. Mark valve tappet location for assembly.
4. Remove valve tappets.
5. Rotate crankshaft until piston is at TDC on compression.
6. With air hose attached to adapter tool installed in spark plug hole, apply 90-120 psi air pressure.

CAUTION: Care must be taken not to damage the tappet bore or engine damage may result.

7. Using metric valve keeper tool (1) such as Snap-on® GA317 (or equivalent), and remove valve spring keepers and retainer.
8. Remove valve spring(s).
9. Remove valve stem seal(s) by a using valve stem seal tool.

CYLINDER HEAD OFF

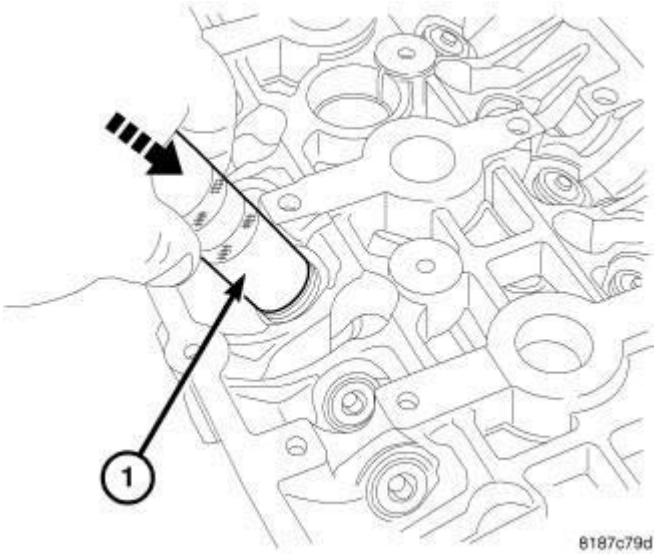

Fig. 160: VALVE REMOVAL
Courtesy of CHRYSLER LLC

1. With cylinder head removed from cylinder block, place a ball of rags in the combustion chamber.

CAUTION: Care must be taken not to damage the tappet bore or engine damage may result.

2. Mark valve tappet location for assembly.
3. Remove valve tappets.
4. Using metric valve keeper tool such as Snap-on® GA317 (or equivalent) remover (1) , remove valve keepers with a downward push.
5. Remove retainer and springs.
6. Before removing valves, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.** Identify valves, locks and retainers to insure installation in original location.
7. Inspect the valves. See **Engine/Cylinder Head/SPRING(S), Valve - Inspection**.

Inspection

INSPECTION

1. Whenever valves have been removed for inspection, reconditioning or replacement, valve springs should be tested for correct load. Discard the springs that do not meet specifications. The following specifications apply to both intake and exhaust valves springs:
   - Valve closed nominal load - 179.5 N ± 9 N @ 35.0 mm (40.35 lbs. ± 2 lbs. @ 1.38 in.).
   - Valve open nominal load - 364.8 N ± 17 N @ 29.25 mm (82 lbs. ± 3.8 lbs. @ 1.152 in.).
2. Inspect each valve spring for squareness with a steel square and surface plate, test springs from both ends. If the spring is more than 1.5 mm (1/16 inch) out of square, install a new spring.

Installation

CYLINDER HEAD ON

CAUTION: Care must be taken not to damage the tappet bore or engine damage may result.

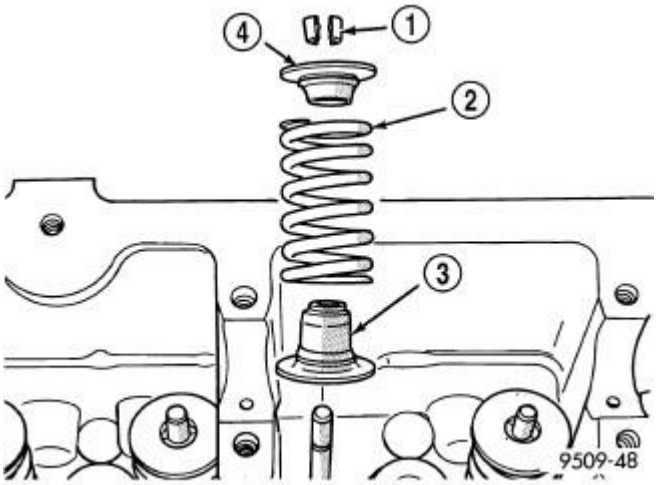

Fig. 161: Valve Spring Assembly
Courtesy of CHRYSLER LLC

1. Install valve seal/valve spring seat (3) assembly. Push the assembly down with appropriate size socket to seat it onto the valve guide.
2. Install valve spring (2) and retainer (4) with keepers (1).

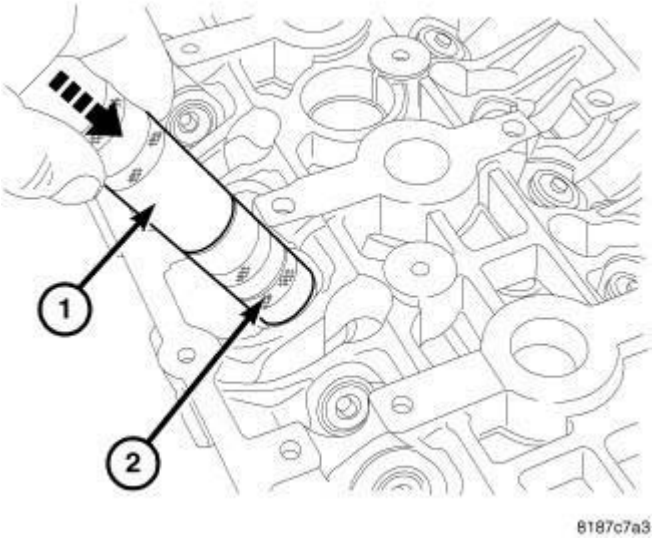

Fig. 162: VALVE INSTALLATION
Courtesy of CHRYSLER LLC

3. Place the valve keepers in the retainer. Using metric valve keeper tool such as Snap-on® GA317 (or equivalent) installer (2) and remover (1) as a handle, install valve keepers with a downward push.
4. Remove air hose and install spark plugs.
5. Install valve tappets.
6. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.
7. Install cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

CYLINDER HEAD OFF

CAUTION: Care must be taken not to damage the tappet bore or engine damage may result.

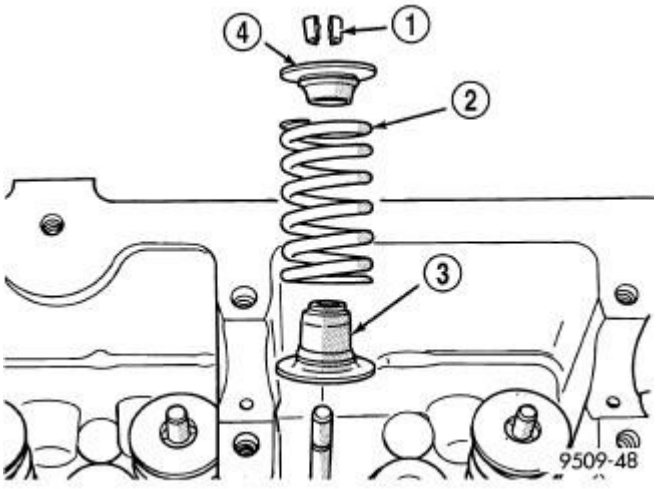

Fig. 163: Valve Spring Assembly
Courtesy of CHRYSLER LLC

1. Coat valve stems with clean engine oil and insert in cylinder head.
2. Install new valve stem seals (3) on all valves using an appropriate sized socket to seat the seal/spring seat. The valve stem seals should be pushed firmly and squarely over valve guide.
3. Install valve springs (2).
4. Install keepers in retainer and place on valve spring.

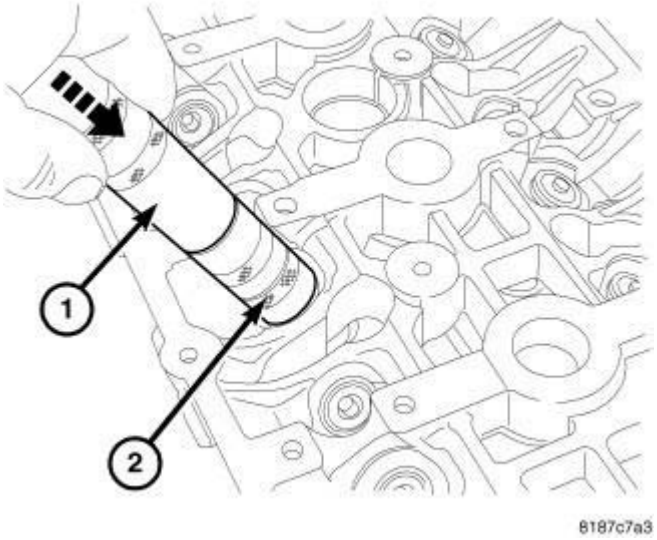

Fig. 164: VALVE INSTALLATION
Courtesy of CHRYSLER LLC

5. Using metric valve keeper tool such as Snap-on® GA317 (or equivalent) installer (2) and remover (1) as a handle, push downward to install keepers.

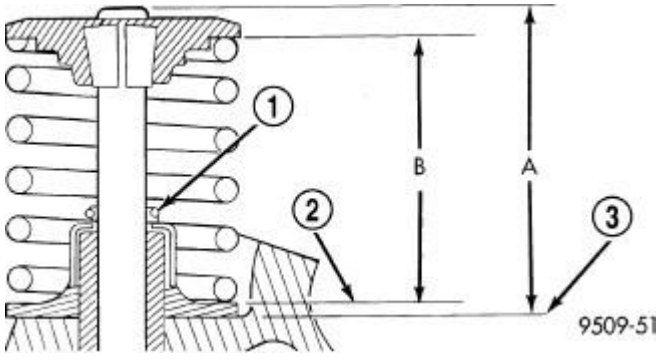

Fig. 165: Spring Installed Height and Valve Tip to Spring Seat Dimensions
Courtesy of CHRYSLER LLC

6. Check the valve spring installed height B after refacing the valve and seat. Make sure measurements are taken from top of spring seat to the bottom surface of spring retainer. If height is greater than 38.75 mm (1.525 in.), install a 0.762 mm (0.030 in.) spacer under the valve spring seat to bring spring height back within specification.
7. Install valve tappets.

VALVES, INTAKE AND EXHAUST

Description

DESCRIPTION

The valves are made of heat resistant steel. They have nitrated stems to prevent scuffing. Viton rubber valve

stem seals are integral with the spring seats. The valves have a single bead lock keepers to retain the springs.

Operation

OPERATION

The four valves per cylinder (two intake and two exhaust) are opened by using direct acting tappets which are actuated by the camshaft.

Cleaning

CLEANING

Clean all valves thoroughly and discard burned, warped and cracked valves.

CAUTION: Due to the small margin on the valves, grinding is not recommended.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

The die cast aluminum cylinder block is a two-piece assembly, consisting of the cylinder block and ladder frame. The block is an open deck design with cast in place cast iron cylinder liners. The cast iron cylinder liners are recessed below the aluminum deck surface. The ladder frame bolts to the cylinder block and does not incorporate the main bearing caps. This design offers a much stronger lower end and increased cylinder block and transaxle rigidity. The rear oil seal retainer is integral with the block and ladder frame. The ladder frame and block are serviced as an assembly.

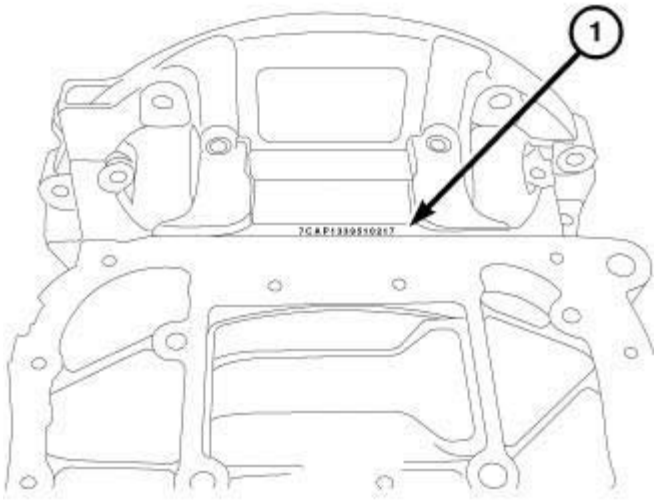

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Fig. 166: Serial Number
Courtesy of CHRYSLER LLC

The engine serial number (1) is located on the bottom of the ladder frame just behind the oil pan. The serial number can be seen with the oil pan in place.

STANDARD PROCEDURE

CYLINDER BORE HONING

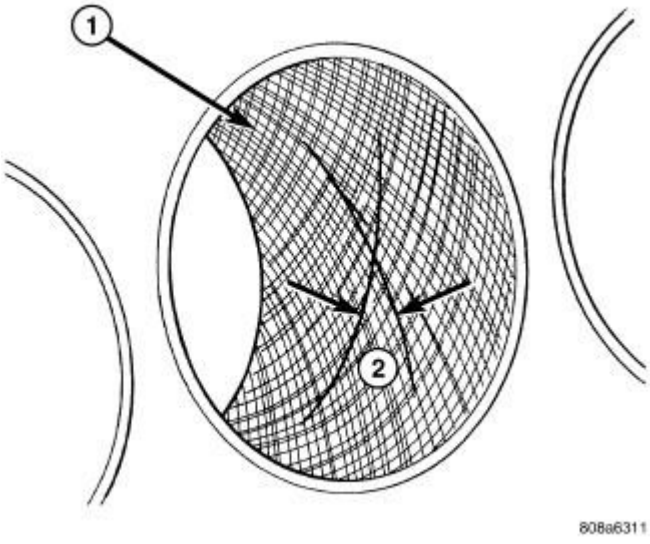

Fig. 167: Cylinder Bore Cross-Hatch Pattern
Courtesy of CHRYSLER LLC

1 - CROSS-HATCH PATTERN 2 - 40°-60°

1. Deglazing of the cylinder walls may be done using a quality commercially available flex hone, if the cylinder bore is straight and round. 20-60 strokes depending on the bore condition, will be sufficient to provide a satisfactory surface. Use a light honing oil. **Do not use engine or transmission oil, mineral spirits or kerosene.** Inspect cylinder walls after each 20 strokes.
2. Honing should be done by moving the hone up and down fast enough to get a cross-hatch pattern. When hone marks **intersect** at 30-50 degrees, the cross hatch angle is most satisfactory for proper seating of rings .
3. A controlled hone motor speed between 200-300 RPM is necessary to obtain the proper cross-hatch angle. The number of up and down strokes per minute can be regulated to get the desired 30-50 degree angle. Faster up and down strokes increase the cross-hatch angle.
4. After honing, it is necessary that the block be cleaned again to remove all traces of abrasive.

CAUTION: Ensure all abrasives are removed from engine parts after honing. It is

recommended that a solution of soap and hot water be used with a brush and the parts then thoroughly dried. The bore can be considered clean when it can be wiped clean with a white cloth and cloth remains clean. Oil the bores after cleaning to prevent rusting.

CLEANING

CLEANING

Clean cylinder block thoroughly using a suitable cleaning solvent.

INSPECTION

INSPECTION

ENGINE BLOCK

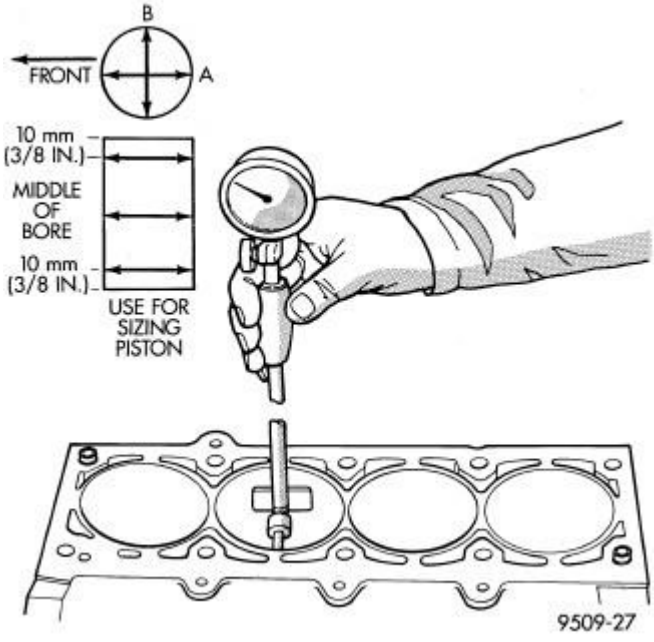

Fig. 168: Checking Cylinder Bore Size
Courtesy of CHRYSLER LLC

1. Clean cylinder block thoroughly and check all core hole plugs for evidence of leaking.
2. Examine block and cylinder bores for cracks or fractures.
3. Check block deck surfaces for flatness. Deck surface must be within service limit of 0.050 mm (0.002 in.).

CYLINDER BORE

NOTE: The cylinder bores should be measured at normal room temperature, 21°C (70° F).

The cylinder walls should be checked for out-of-round and taper with Tool C119 or equivalent . See **Engine - Specifications**. If the cylinder walls are badly scuffed or scored, the cylinder block should be replaced, and new pistons and rings fitted.

Measure the cylinder bore at three levels in directions A and B . Top measurement should be 10 mm (3/8 in.) down and bottom measurement should be 10 mm (3/8 in.) up from bottom of bore. See **Engine - Specifications**.

BEARING(S), CONNECTING ROD

Standard Procedure

CONNECTING ROD - FITTING

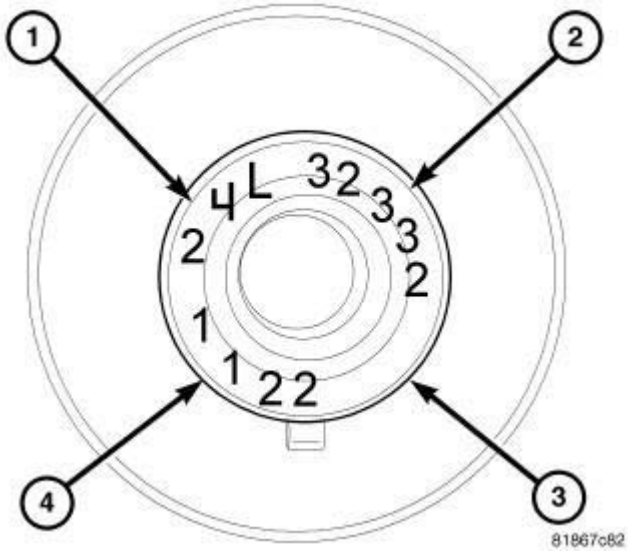

Fig. 169: BEARING SELECTION
Courtesy of CHRYSLER LLC

There are three different sizes of rod bearings available. Connecting rod bearing identification (4) can be found on the nose of the crankshaft (3). Use the CONNECTING ROD BEARING SELECTION table for proper bearing selection.

CONNECTING ROD BEARING SELECTION

CRANKSHAFT PIN DIAMETER GRADE	DIMENSION	CONNECTING ROD BEARING CLASSIFICATION	CONNECTING ROD BEARING DIMENSION
1	48 mm	1 (Black)	1.5 mm
2	48 mm	2 (No Color)	1.5 mm
3	48 mm	3 (Green)	1.5 mm

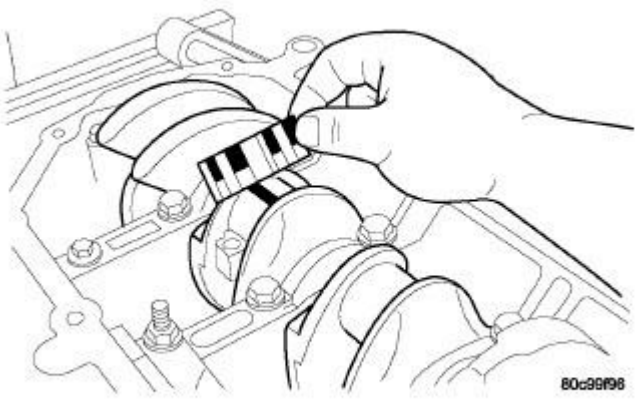

Fig. 170: Connecting Rod Bearing Clearance - Typical
Courtesy of CHRYSLER LLC

1. For measuring connecting rod bearing clearance procedure and use of Plastigage, see **Engine - Standard Procedure**. For bearing clearance, refer to **Engine - Specifications**.

NOTE: The rod bolts should not be reused.

2. Before installing the **NEW** rod bolts the threads and under the bolt head should be oiled with clean engine oil.
3. Install each bolt finger tight then alternately torque each bolt to assemble the cap properly.
4. Tighten the connecting rod bolts using the 2 step torque-turn method. Tighten according to the following values:

CAUTION: Do not use a torque wrench for the second step.

1. Tighten the bolts to 20 N.m (15 ft. lbs.).
2. Tighten the connecting rod bolts an additional 90°.

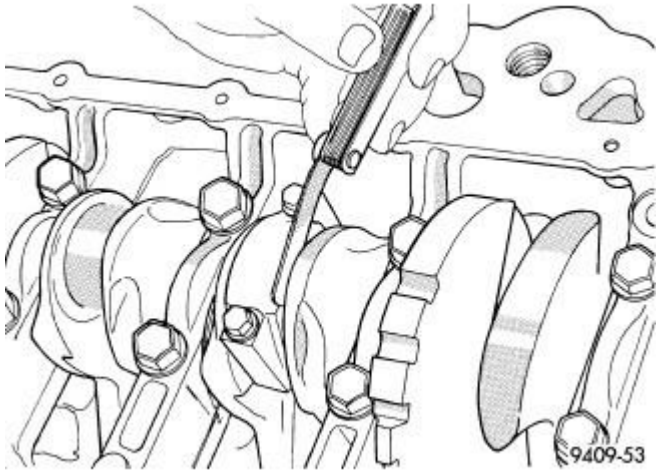

Fig. 171: Connecting Rod Side Clearance
Courtesy of CHRYSLER LLC

5. Using a feeler gauge, check connecting rod side clearance. Refer to **Engine - Specifications**.

BEARING(S), CRANKSHAFT, MAIN

Standard Procedure

MAIN BEARING SELECTION

NOTE: There are three different possibilities for the upper main bearings and five different lower main bearings. The upper and lower bearing shells are not interchangeable.

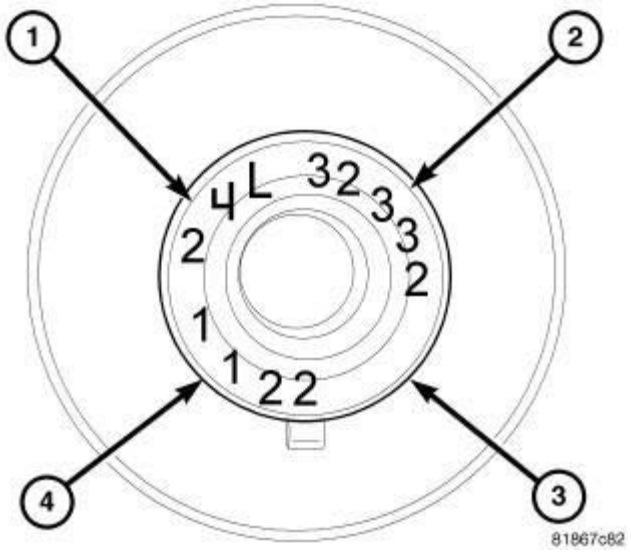

Fig. 172: BEARING SELECTION
Courtesy of CHRYSLER LLC

The lower main bearing identification (2) is stamped in the nose of the crankshaft (3). There are 5 different bearing sizes available 0 through 4.

CRANKSHAFT IDENTIFICATION		LOWER CRANKSHAFT BEARING SELECTION	
JOURNAL DIAMETER GRADE	DIMENSION	LOWER MAIN BEARING SIZE CLASSIFICATION	LOWER MAIN BEARING DIMENSION
0	52 mm, -0.012 to -0.015 mm	0 (Pink or Red)	2 mm, 0 to -0.003 mm
1	52 mm, -0.015 to -0.018 mm	1 (Black)	2 mm, +0.003 to 0 mm
2	52 mm, -0.018 to -0.021 mm	2 (No Color)	2 mm, +0.006 to +0.003 mm
3	52 mm, -0.021 to -0.024 mm	3 (Green)	2 mm, +0.009 to +0.006 mm
4	52 mm, -0.024 to -0.027 mm	4 (Blue)	2 mm, +0.012 to +0.009 mm

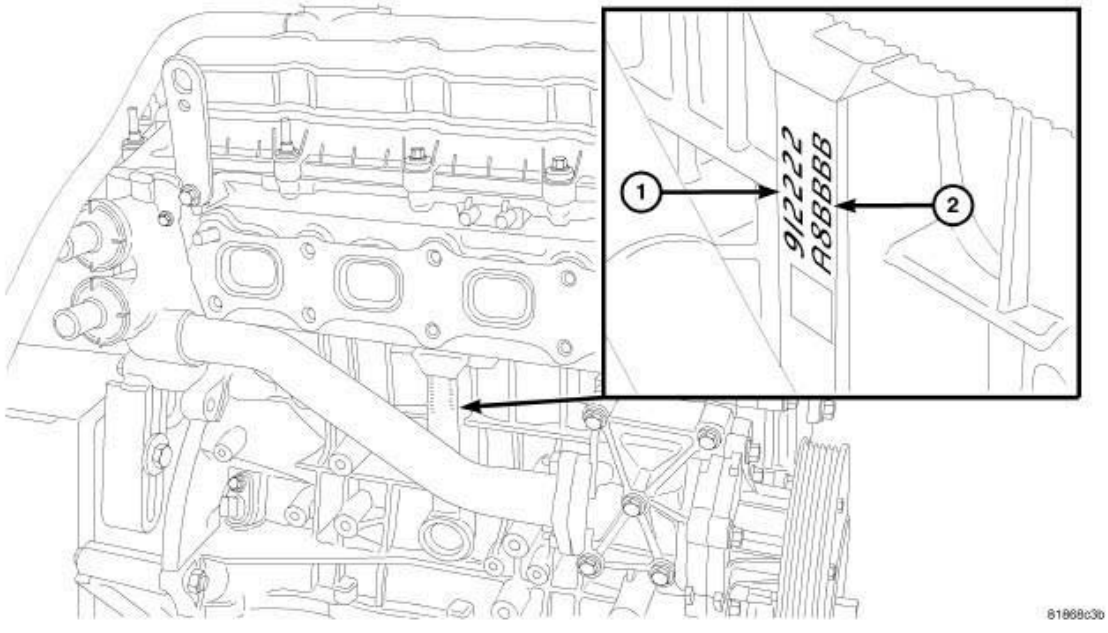

Fig. 173: MAIN BEARING SELECTION CHART
Courtesy of CHRYSLER LLC

The upper main bearing shell identification (1) is located in the middle of cylinder block on the right side of the engine. There are three different size bearings available. The bearing class is read downward from top and corresponds to the front journal to the rear journal on the bottom.

UPPER MAIN BEARING SELECTION

CYLINDER BLOCK IDENTIFICATION	UPPER CRANKSHAFT BEARING SELECTION	

MAIN BEARING GRADE	DIMENSION	UPPER MAIN BEARING SIZE CLASSIFICATION	UPPER MAIN BEARING DIMENSION
1	56.000<56.006 mm	1 (Black)	2 mm, 0 to -0.006 mm
2	56.006<56.012 mm	2 (No Color)	2 mm, +0.006 to 0 mm
3	56.012<56.018 mm	3 (Green)	2 mm, +0.012 to +0.006 mm

CRANKSHAFT

Standard Procedure

MEASURING CRANKSHAFT END PLAY

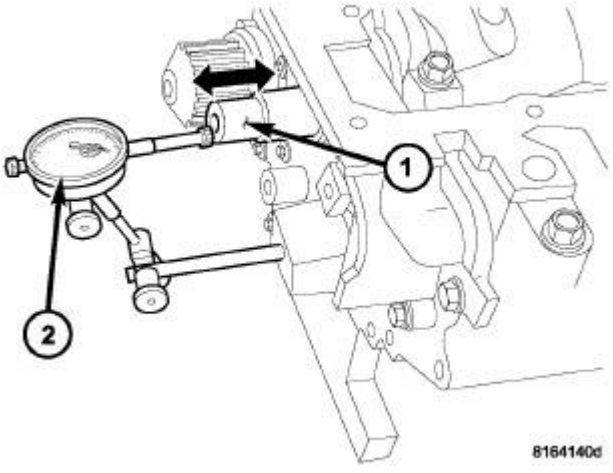

Fig. 174: Checking Crankshaft End Play - Dial Indicator
Courtesy of CHRYSLER LLC

1 - Crankshaft 2 - DIAL INDICATOR

1. Mount a dial indicator (2) to front of engine with the locating probe on nose of crankshaft (1) .
2. Move crankshaft all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move crankshaft all the way to the front and read the dial indicator. See **Engine - Specifications** for end play specification.

Removal

REMOVAL

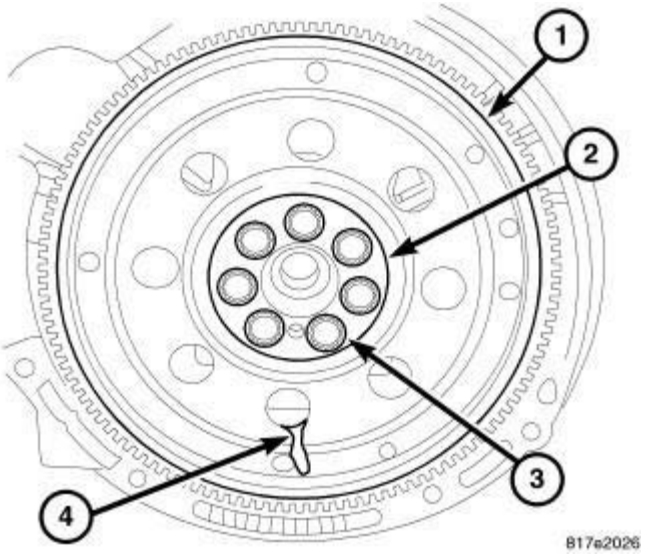

Fig. 175: FLEX PLATE
Courtesy of CHRYSLER LLC

NOTE: Crankshaft can not be removed when engine is in vehicle.

1. Remove engine assembly from vehicle. See **Engine - Removal**.
2. Separate transaxle from engine.
3. Remove flex plate/flywheel (1).
4. Remove crankshaft rear oil seal. See **Engine/Engine Block/SEAL, Crankshaft Oil - Removal**.
5. Mount engine on a suitable repair stand.

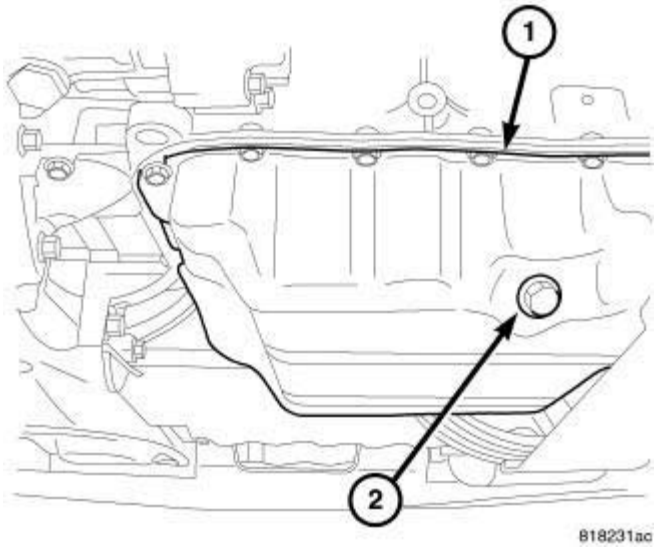

Fig. 176: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

6. Drain engine oil (2).

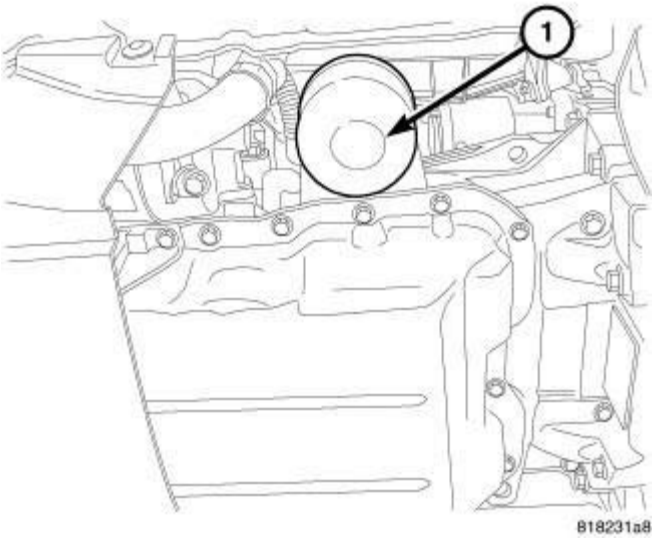

Fig. 177: OIL FILTER
Courtesy of CHRYSLER LLC

7. Remove oil filter (1).

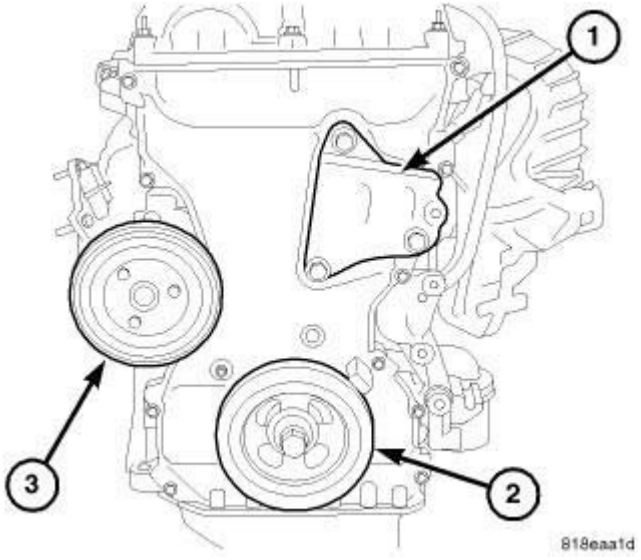

Fig. 178: RIGHT ENGINE MOUNT BRACKET
Courtesy of CHRYSLER LLC

8. Remove crankshaft vibration damper (2). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
9. Remove water pump pulley (3).
10. Remove engine mount support bracket (1).

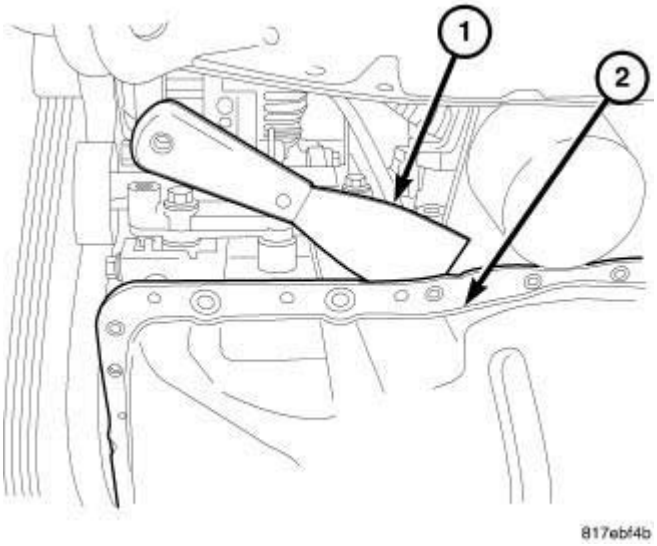

Fig. 179: OIL PAN REMOVAL
Courtesy of CHRYSLER LLC

11. Remove the oil pan (2). See **Engine/Lubrication/PAN, Oil - Removal**.
12. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
13. Remove the timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
14. Remove balance shaft module.

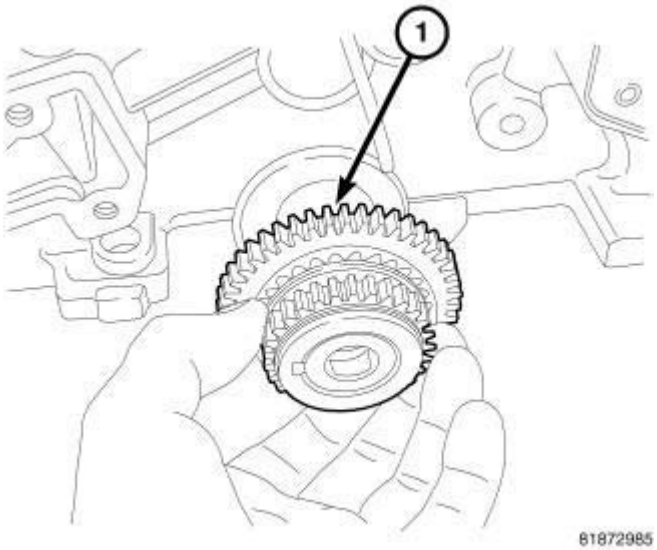

Fig. 180: CRANKSHAFT SPROCKET
Courtesy of CHRYSLER LLC

15. Remove the crankshaft sprocket (1).

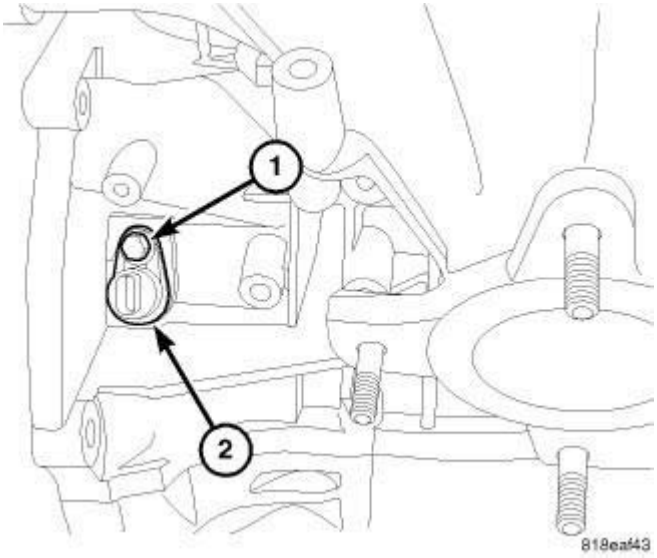

Fig. 181: CRANKSHAFT POSITION SENSOR
Courtesy of CHRYSLER LLC

16. Remove crankshaft position sensor retaining bolt (1) and remove sensor (2).
17. Remove ladder frame. See **Engine/Engine Block/FRAME, Ladder - Removal**.

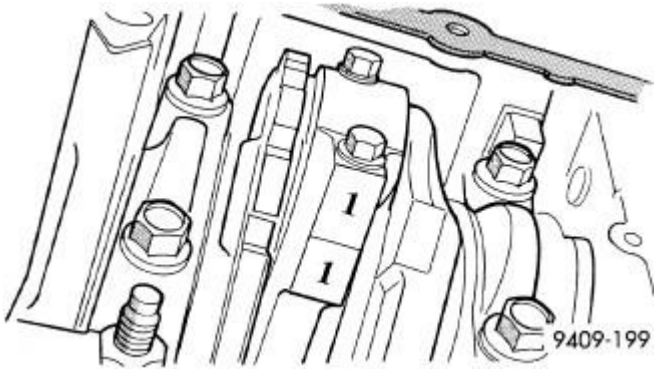

Fig. 182: Identify Connecting Rod to Cylinder-Typical
Courtesy of CHRYSLER LLC

NOTE: If piston/connecting rod replacement is necessary, remove cylinder head. See Engine/Cylinder Head - Removal.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods. Damage to connecting rod could occur.

18. Using a permanent ink or paint marker, identify cylinder number on each connecting rod and cap.
19. Remove all connecting rod bolts and caps. Care should be taken not to damage the fracture rod and cap surfaces.

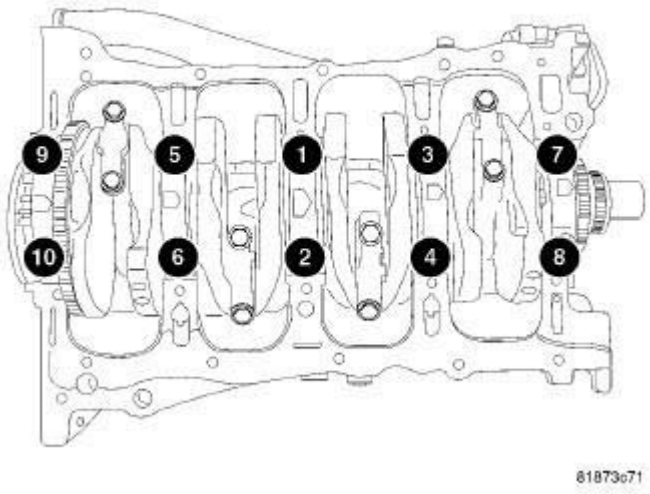

Fig. 183: MAIN BEARING CAP TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

NOTE: Do not reuse connecting rod bolts.

20. Remove main bearing caps.

CAUTION: Use extreme care when handling crankshaft. Tone wheel damage can occur if crankshaft is mishandled.

21. Lift out crankshaft from cylinder block. Do not damage the main bearings or journals when removing the crankshaft.

Inspection

INSPECTION

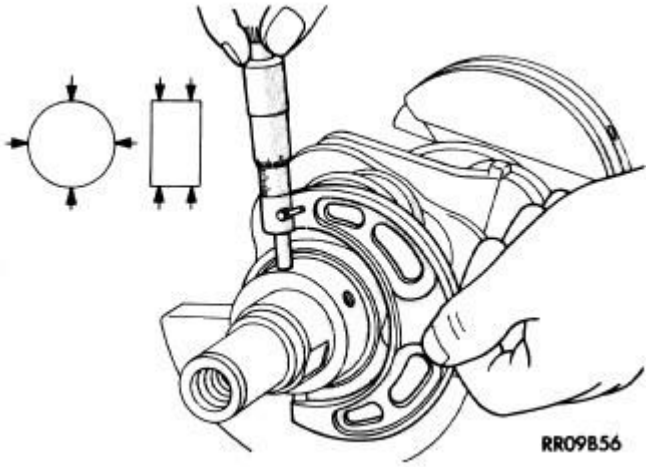

Fig. 184: Crankshaft Journal Measurements - Typical
Courtesy of CHRYSLER LLC

The crankshaft main journals should be checked for excessive wear, taper and scoring. Limits of taper on any crankshaft main journals should be held to 0.006 mm (0.00024 in.). Limits of taper on any crankshaft rod journals should be held to 0.005 mm (0.0002 in.). DO NOT nick crank pin or bearing fillets. Limits of out of round on any crankshaft journals should be held to 0.005 mm (0.0002 in). DO NOT nick crank pin or bearing fillets.

Installation

INSTALLATION

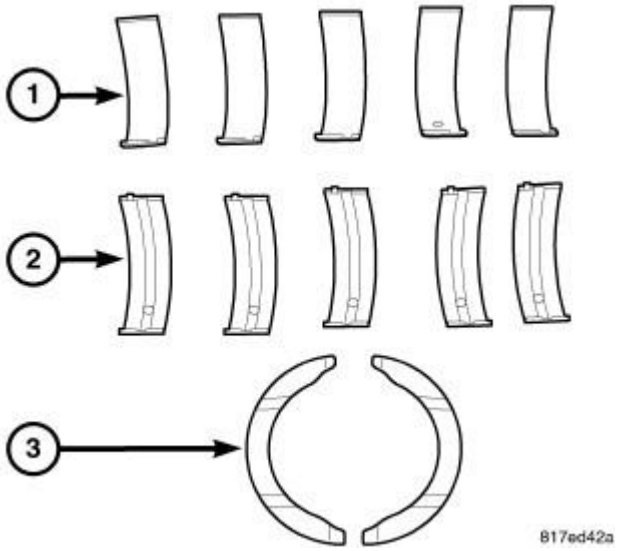

Fig. 185: BEARING IDENTIFICATION
Courtesy of CHRYSLER LLC

The crankshaft is supported in five main bearings. All upper bearing shells (2) in the crankcase have oil grooves and holes. All lower bearing shells (1) are smooth. Crankshaft end play is controlled by a two piece thrust

bearing (3) on the number three main bearing journal.

1. Clean main bearing cap bolt holes with Mopar® brake parts cleaner or equivalent and blow out with compressed air.
2. Install the main bearing upper (2) shells with the lubrication groove and oil hole in the engine block.
3. Make certain oil holes in block line up with oil hole in bearings and bearing tabs seat in the block tab slots.

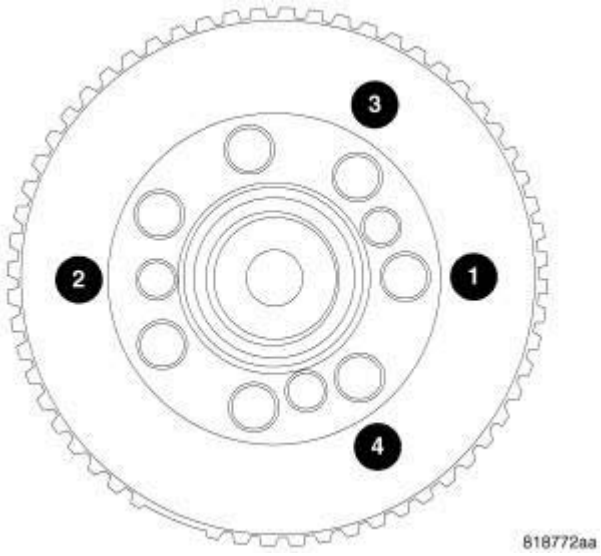

Fig. 186: TARGET WHEEL
Courtesy of CHRYSLER LLC

NOTE: If the crankshaft is sent out for machine work, it must be balanced as an assembly with the target ring installed.

4. Clean crankshaft and target ring with MOPAR® Brake Parts cleaner and dry with compressed air to ensure that the crankshaft mating surface and target ring mounting holes are free from oil and lock patch debris.

NOTE: Always use NEW mounting screws whether installing original or new target ring.

5. Install **NEW** mounting screws finger tight starting with the #1 location. Make sure engagement occurs with the shoulder of the screws and mounting hole before starting all other screws.
6. Tighten all mounting screws to 13 N.m (110 in-lbs) in the sequence shown in illustration.

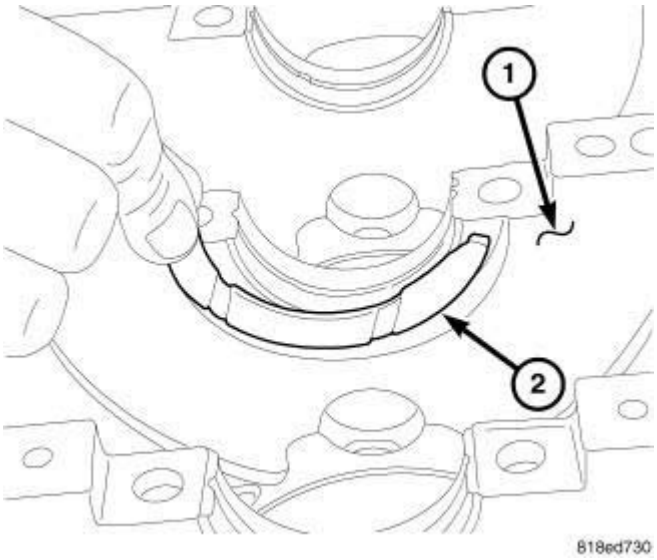

Fig. 187: INSTALLING THRUST BEARING
Courtesy of CHRYSLER LLC

NOTE: Lightly apply trans gel to thrust bearings to hold bearings in block.

NOTE: The thrust bearings must be installed the notches facing the crankshaft.

7. Install thrust bearings (2) in block (1).

CAUTION: Do not get oil on the ladder frame mating surface. It will affect the ability of the RTV to seal the ladder frame to cylinder block.

NOTE: Ensure main bearing cap bolt holes in the block are clean, dry (free of residual oil or coolant), and threads are not damaged.

8. Oil the bearings and journals. Install crankshaft in engine block.

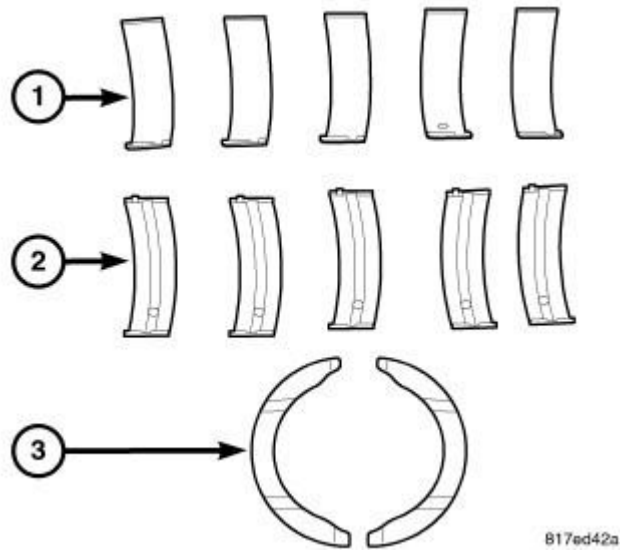

Fig. 188: BEARING IDENTIFICATION
Courtesy of CHRYSLER LLC

9. Install lower main bearings (1) into main bearing cap. Make certain the bearing tabs are seated into the bearing cap slots.

NOTE: Main bearing caps are stamped 1 - 5 front to rear. Arrows on the caps must point towards the front of the engine.

10. Install main bearing caps to engine block.
11. Before installing the bolts the threads should be clean and dry.
12. Loosely install main bearing cap bolts.
13. To ensure correct thrust bearing alignment, perform the following steps:

CAUTION: There are different sets main bolts supplied with this engine. Each bolt set has a different torque value and engine damage could result if bolts are not torqued correctly. The bolts are not interchangeable.

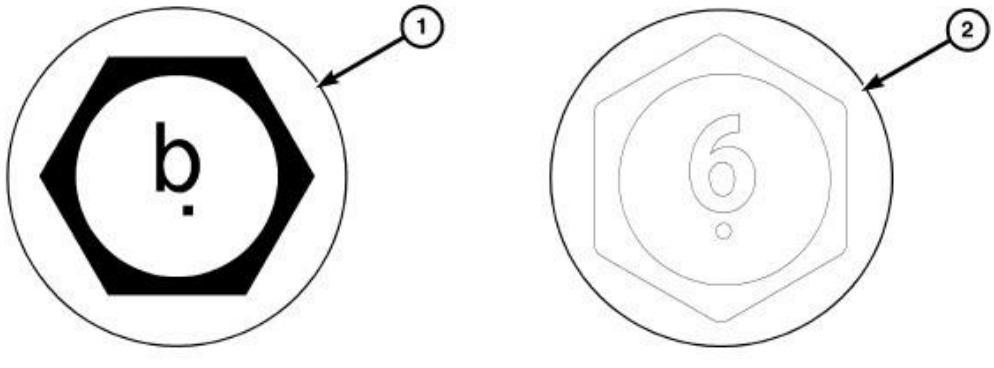

Fig. 189: MAIN BOLT IDENTIFICATION
Courtesy of CHRYSLER LLC

- Step 1: Rotate crankshaft until number 4 piston is at TDC.
- Step 2: Move crankshaft rearward to limits of travel.
- Step 3: Then, move crankshaft forward to limits of travel.
- Step 4: Wedge an appropriate tool between the rear of the cylinder block and the rear crankshaft counterweight. This will hold the crankshaft in its furthest forward position.

14. If your bolt heads look like this (1,2), go to step 15. If your bolt heads do not look like this (1,2), go to step 16.

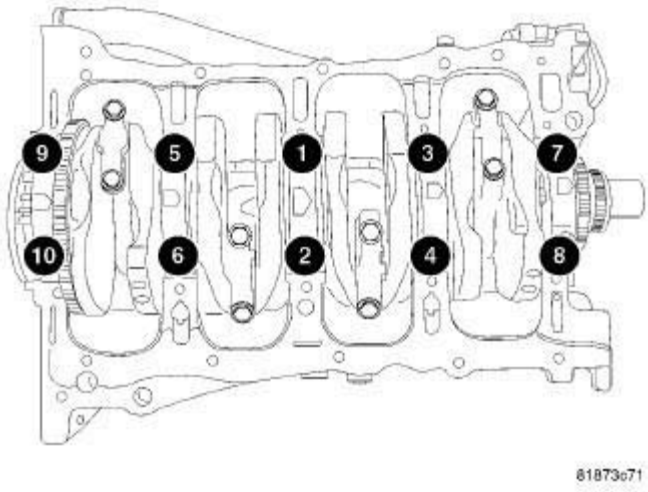

Fig. 190: MAIN BEARING CAP TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

CAUTION: Before tightening bolts, you must identify the bolt head to obtain the correct torque value. Failure to identify the bolts correctly, could result in improperly tightened bolts which could result in engine damage.

15. Tighten bolts using a three step method, in the sequence shown in illustration.
    - Tighten bolts to 15 N.m (11 ft. lbs.)
    - Tighten bolts to 27 N.m (20 ft. lbs.)
    - Rotate an additional 45°.
16. Tighten bolts using a three step method, in the sequence shown in illustration.
    - Tighten bolts to 15 N.m (11 ft. lbs.)
    - Tighten bolts to 45 N.m (33 ft. lbs.)
    - Rotate an additional 45°.

17. Remove wedge tool used to hold crankshaft.
18. Check the crankshaft turning torque, it should not exceed 5.6 N.m (50 in. lbs.).
19. Check crankshaft end play. See **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.
20. Install connecting rod bearings and caps. **Do Not Reuse Connecting Rod Bolts.** Tighten connecting rod bolts to 20 N.m + 90° (15 ft. lbs.) + 90°. See **Engine/Engine Block/ROD, Piston and Connecting - Installation**.
21. Install the ladder frame assembly. See **Engine/Engine Block/FRAME, Ladder - Installation**.
22. Install the balance shaft module. See **Engine/Lubrication/PUMP, Engine Oil - Installation**.

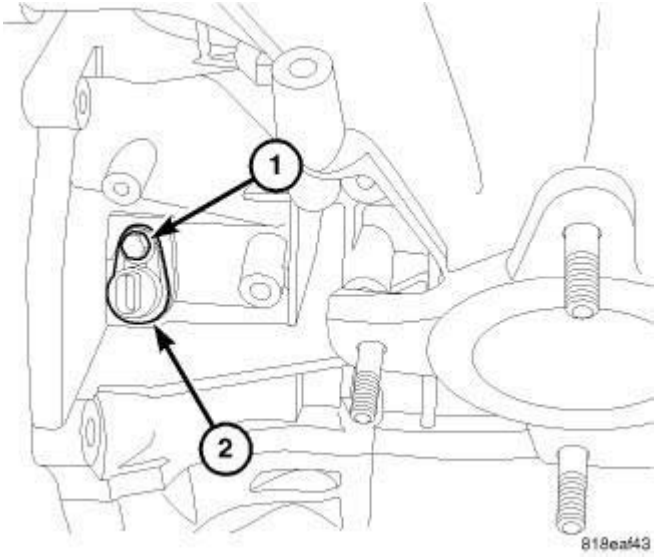

Fig. 191: CRANKSHAFT POSITION SENSOR
Courtesy of CHRYSLER LLC

23. Install crankshaft position sensor (2) and tighten bolt (1).
24. Install cylinder head if it was removed. See **Engine/Cylinder Head - Installation**.

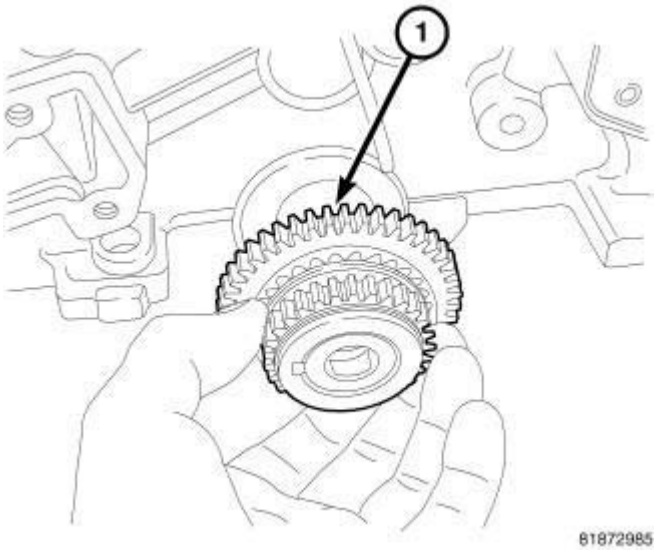

Fig. 192: CRANKSHAFT SPROCKET
Courtesy of CHRYSLER LLC

25. Install front crankshaft sprocket (1).
26. Install the timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
27. Install the timing chain front cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
28. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
29. Install rear crankshaft oil seal. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.
30. Install front crankshaft oil seal. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.

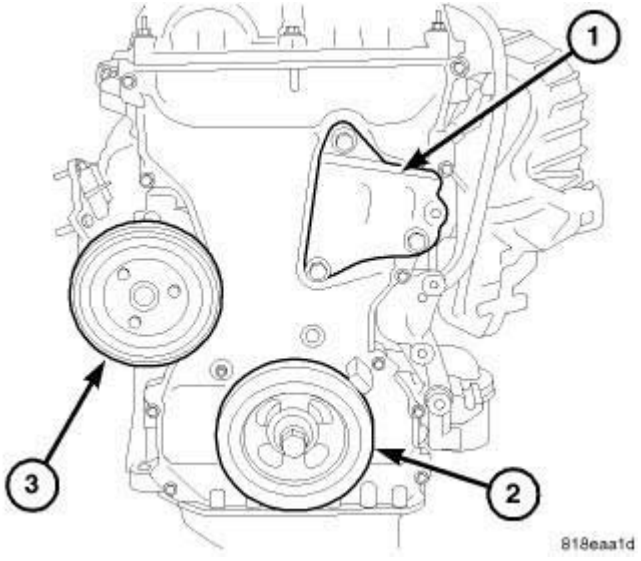

Fig. 193: RIGHT ENGINE MOUNT BRACKET
Courtesy of CHRYSLER LLC

31. Install engine mount support bracket (1).
32. Install crankshaft vibration damper (2). See **Engine/Engine Block/DAMPER, Vibration - Installation**.
33. Install water pump pulley (3).

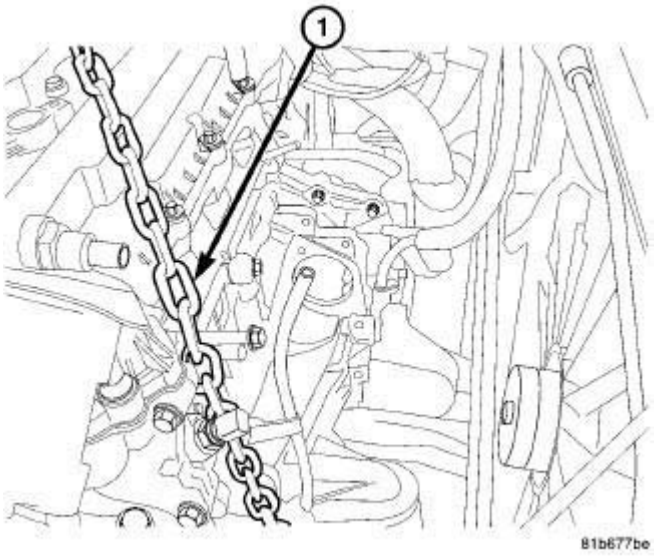

Fig. 194: LIFT CHAIN
Courtesy of CHRYSLER LLC

34. Remove engine from repair stand and install engine lift chain (1).
35. Install crankshaft rear oil seal. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.
36. Install drive plate/flex plate using **new** bolts. Tighten bolts to 95 N.m (70 ft. lbs.).
37. Attach transaxle to engine. Tighten bellhousing bolts to 101 N.m (75 ft. lbs.).
38. Install the engine assembly. See **Engine - Installation**.

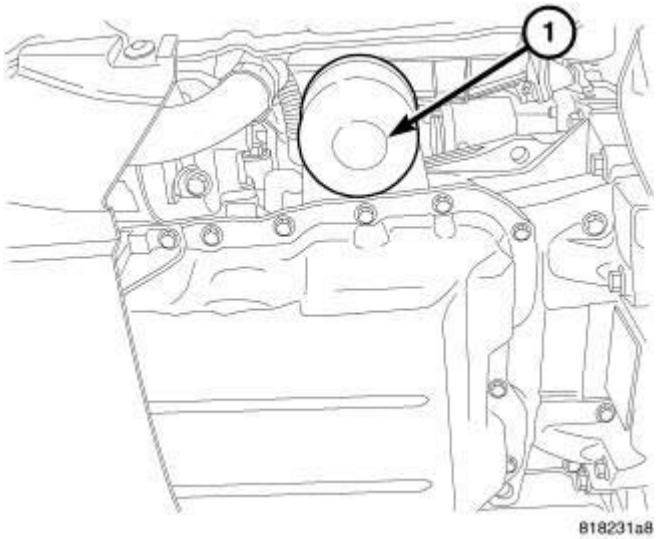

Fig. 195: OIL FILTER
Courtesy of CHRYSLER LLC

39. Install new oil filter (1) and fill with oil.
40. Fill with coolant. Refer to **Cooling - Standard Procedure** .
41. Start engine and check for leaks.
42. Install engine cover.

DAMPER, VIBRATION

Removal

REMOVAL

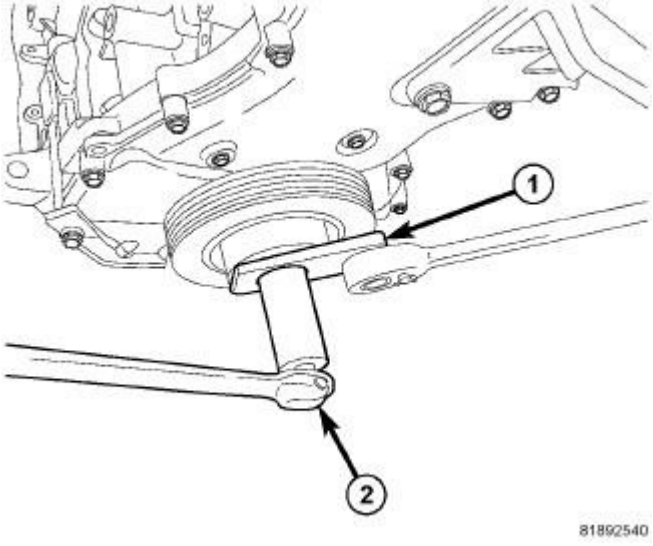

Fig. 196: DAMPER REMOVAL
Courtesy of CHRYSLER LLC

1. Remove accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
2. Install Damper holder 9707 (1).
3. Remove crankshaft damper bolt.
4. Pull damper off crankshaft.

Installation

INSTALLATION

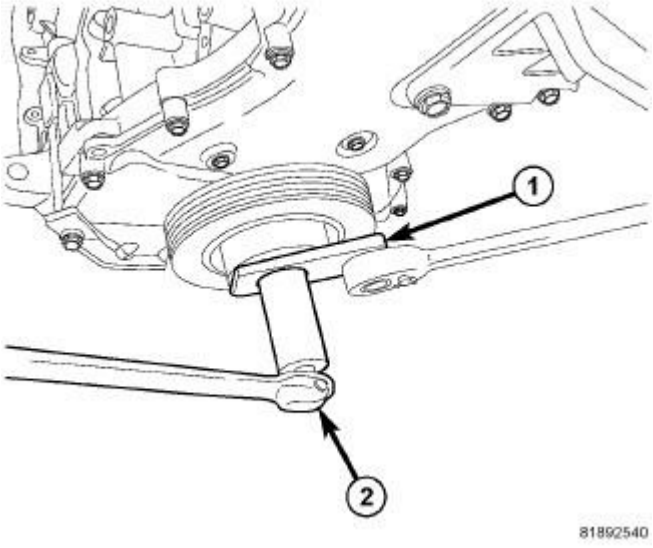

Fig. 197: DAMPER REMOVAL
Courtesy of CHRYSLER LLC

1. Install crankshaft damper.
2. Apply clean engine oil crankshaft damper bolt threads and between bolt head and washer. Tighten bolt to 210 N.m (155 ft. lbs.).
3. Install accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

FLEXPLATE

Removal

REMOVAL

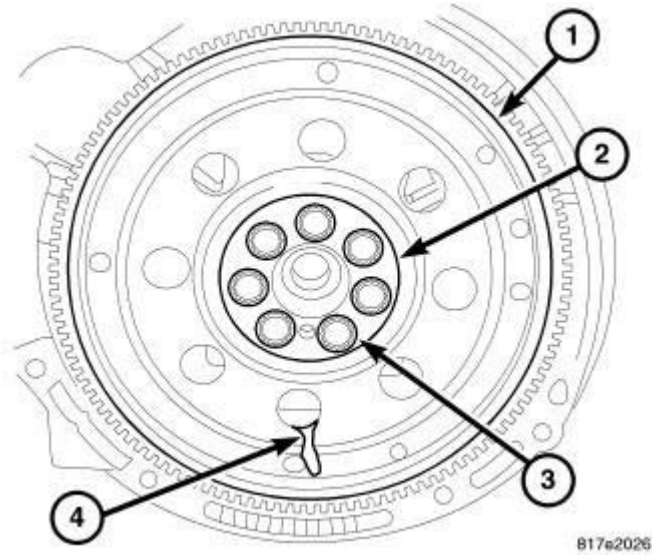

Fig. 198: FLEX PLATE
Courtesy of CHRYSLER LLC

1. Remove transmission. Refer to **Transmission and Transfer Case/Manual - Removal** or **Transmission and Transfer Case/Automatic - 41TE - Removal** .
2. Remove flex plate bolts (3) and discard.
3. Remove washer (2).
4. Remove flex plate (1).

Installation

INSTALLATION

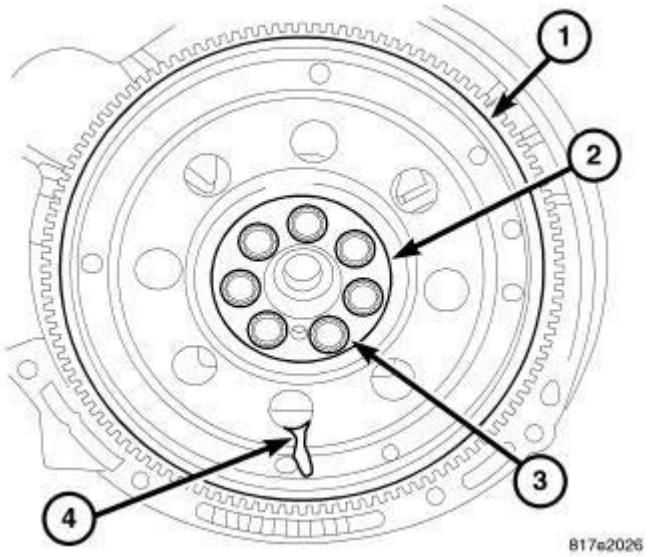

Fig. 199: FLEX PLATE
Courtesy of CHRYSLER LLC

1. Install flex plate (1).
2. Install washer (2).
3. Install **new** flex plate bolts (3) and tighten in a crisscross pattern to 29 N.m (22 ft. lbs.) plus 51° rotation.
4. Install transaxle. Refer to **Transmission and Transfer Case/Manual - Installation** or **Transmission and Transfer Case/Automatic - 41TE - Installation** .

FRAME, LADDER

Removal

REMOVAL

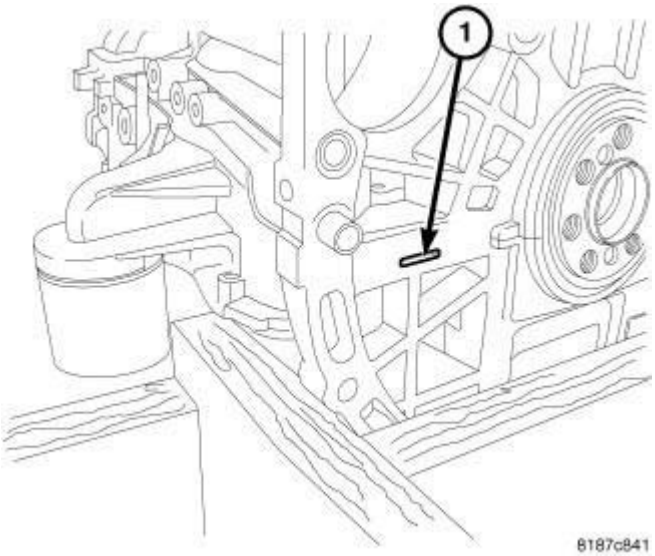

Fig. 200: PRY POINT 1
Courtesy of CHRYSLER LLC

1. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
2. Remove balance shaft assembly. See **Engine/Lubrication/PUMP, Engine Oil - Removal**.
3. Remove ladder frame retaining bolts.
4. Remove ladder frame using pry point cast in the rear of the block (1).

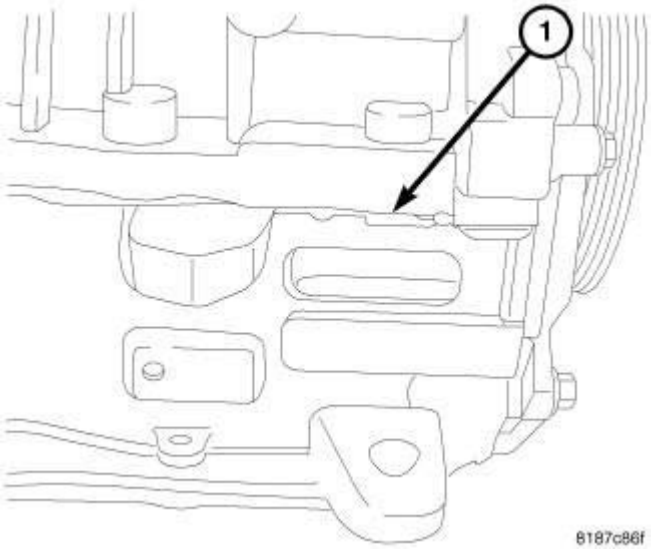

Fig. 201: PRY POINT 2
Courtesy of CHRYSLER LLC

5. To assist in removing the ladder frame another (1) pry point cast in the right side of the block.

Cleaning

CLEANING

Clean ladder frame with a plastic or wooden scraper and a suitable solvent. See **Engine - Standard Procedure**.

Installation

INSTALLATION

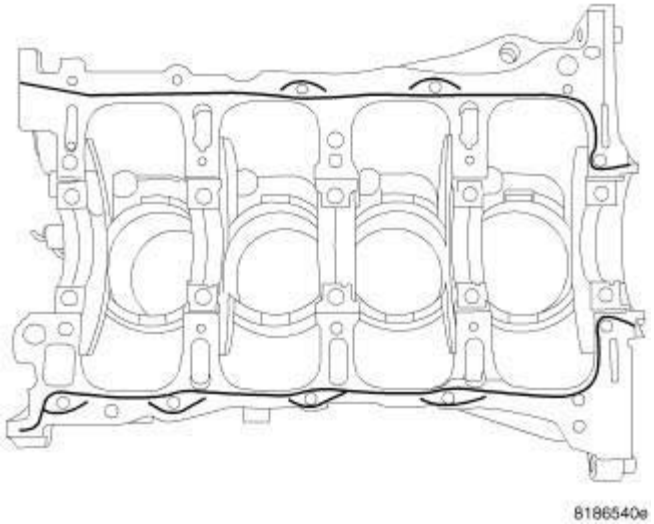

Fig. 202: SEALING LADDER FRAME
Courtesy of CHRYSLER LLC

NOTE: When using RTV, the sealing surfaces must be clean and free from grease and oil.

NOTE: When using RTV, parts should be assembled in 10 minutes and tighten to final torque within 45 minutes.

1. Apply a 2 mm bead of Mopar® engine sealant RTV or equivalent as shown in illustration.

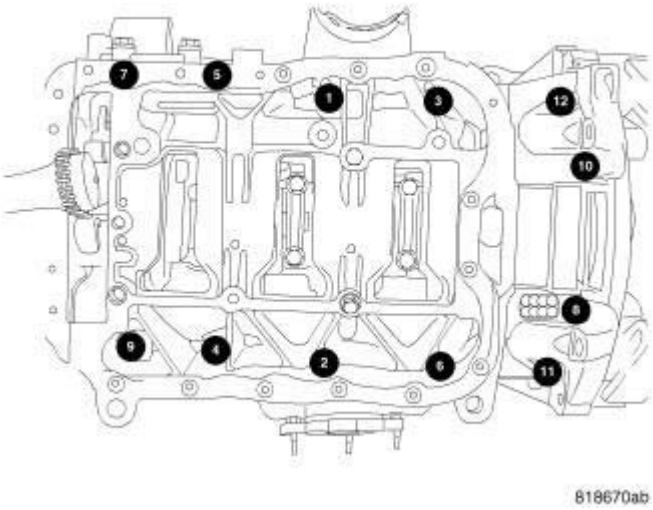

Fig. 203: LADDER FRAME TORQUE
Courtesy of CHRYSLER LLC

2. Install bolts and tighten as shown in illustration following a two step method.
   - First: All to 10 N.m (89 in. lbs.).
   - Second: All to 26 N.m (19 ft. lbs.).
3. Install balance shaft module. See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
4. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

RING(S), PISTON

Standard Procedure

PISTON RING - FITTING

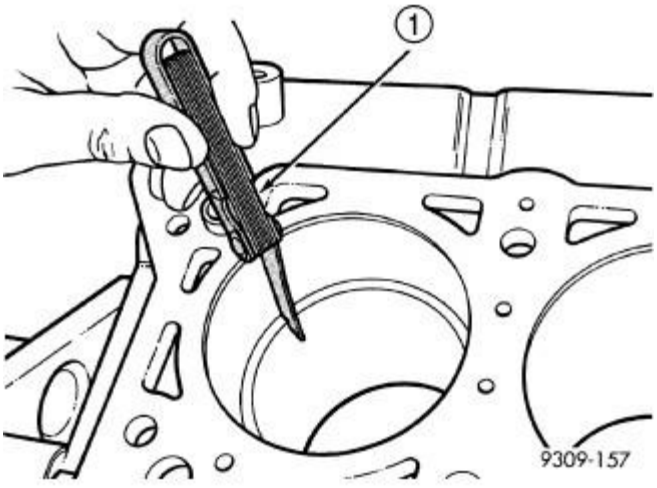

Fig. 204: Check Gap on Piston Rings

Courtesy of CHRYSLER LLC

1. Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 13 mm (0.50 inch) from bottom of cylinder bore and below the bottom of the oil ring travel where cylinder bore has minimal wear. Check gap with feeler gauge. Refer to **Engine - Specifications**.

NOTE: Ring end gap measurements are sensitive to the ring being square in the bore. Care must be used to avoid tilting the rings in cylinder bores when taking measurements.

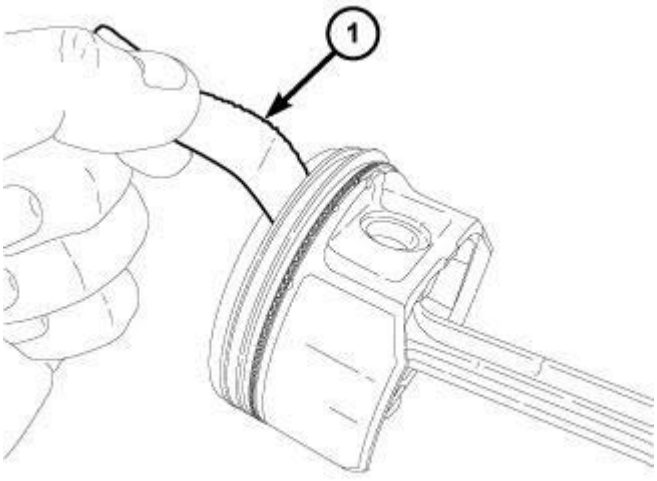

Fig. 205: Checking Piston Ring To Groove Side Clearance
Courtesy of CHRYSLER LLC

2. Check piston ring to groove side clearance. Refer to **Engine - Specifications**.

CAUTION: Exercise care when using tools on piston. Do not scratch or gouge piston surface or ring grooves as this may cause engine damage.

Removal

REMOVAL

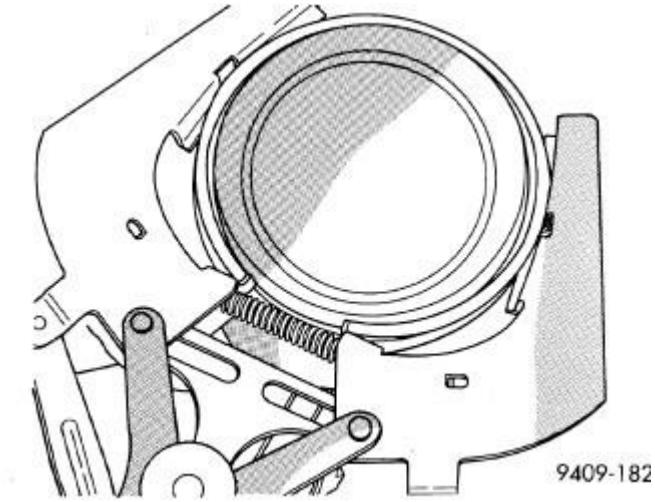

Fig. 206: Piston Rings-Removing and Installing
Courtesy of CHRYSLER LLC

1. Using a suitable ring expander, remove upper and intermediate piston rings.
2. Remove the upper oil ring side rail, lower oil ring side rail and then oil ring expander from piston.
3. Clean ring grooves of any carbon deposits.

Installation

INSTALLATION

Fig. 207: Installing Side Rail
Courtesy of CHRYSLER LLC

NOTE: The identification mark on face of upper and intermediate piston rings must point toward top of piston.

CAUTION: Install piston rings in the following order:

A. **Oil ring expander.**
B. **Upper oil ring side rail.**
C. **Lower oil ring side rail.**
D. **No. 2 Intermediate piston ring.**
E. **No. 1 Upper piston ring.**

1. Install oil ring expander.
2. Install upper side rail first and then the lower side rail. Install the side rails by placing one end between the piston ring groove and the oil ring expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander.**

NOTE: The compression rings are marked Y1 for the upper compression ring and Y2 for the second compression ring. These markings must face upward.

3. Install No. 2 piston ring and then No. 1 piston ring.

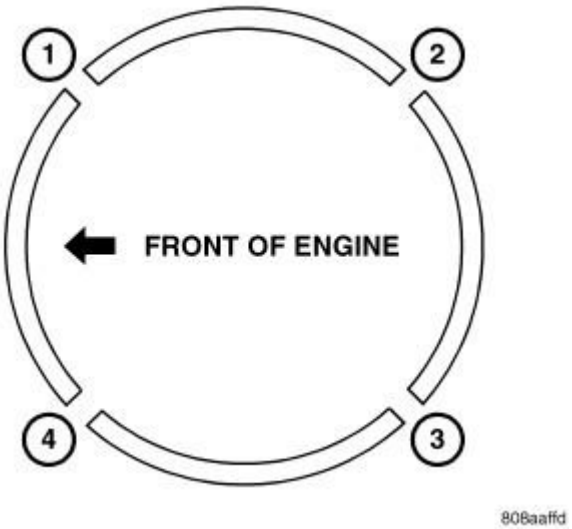

Fig. 208: Piston Ring End Gap Position
Courtesy of CHRYSLER LLC

4. Position piston ring end gaps as shown in illustration.
5. Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

ROD, PISTON AND CONNECTING

Description

DESCRIPTION

The pistons are made of a cast aluminum alloy. The pistons have pressed-in pins attached to forged connecting rods. The piston pin is offset 0.8 mm (0.0314 in.) towards the thrust side of the piston. The connecting rods are a cracked cap design and are not repairable. The piston with rings, connecting rod and piston pin are serviced as an assembly.

Standard Procedure

PISTON and BORE MEASUREMENT

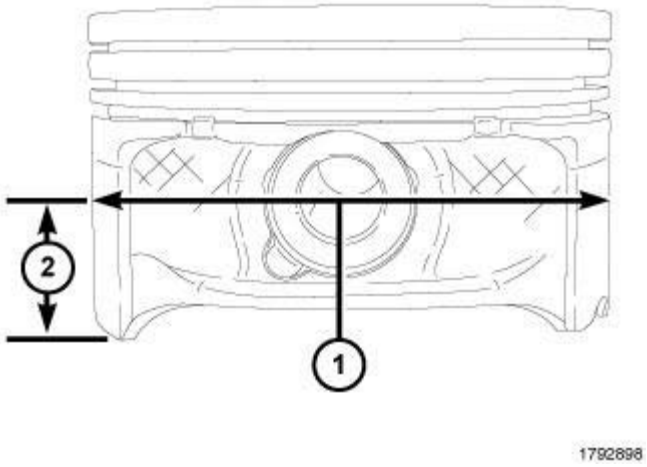

Fig. 209: Measuring Pistons & Cylinder Bores
Courtesy of CHRYSLER LLC

NOTE: Pistons and cylinder bores should be measured at normal room temperature, 21°C (70°F).

Piston and cylinder wall must be clean and dry. Piston diameter should be measured 90 degrees to piston pin (1).

1. Measurement should be taken approximately 17 mm (0.669 in.) from the bottom of the skirt (2) as shown in illustration.

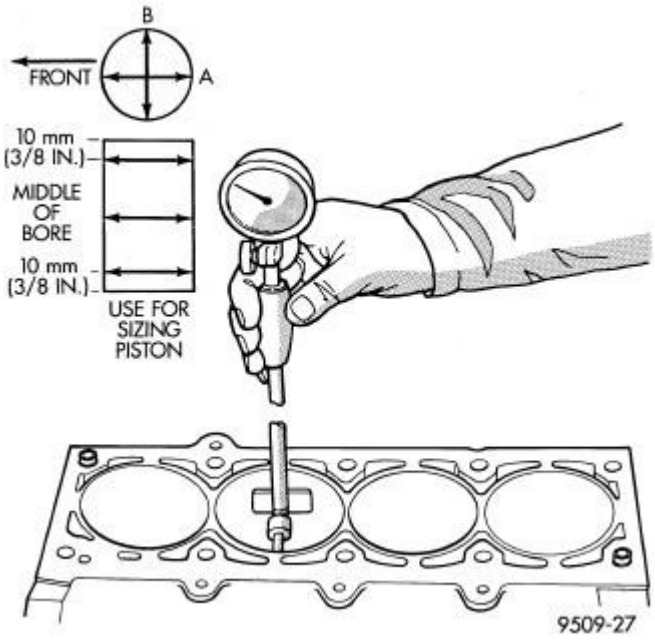

Fig. 210: Checking Cylinder Bore Size
Courtesy of CHRYSLER LLC

NOTE: Correct piston to bore clearance must be established in order to assure quiet and economical operation.

2. Cylinder bores should be measured halfway down the cylinder bore and transverse (measurement location B) to the engine crankshaft center line shown in illustration. See **Engine - Specifications**.

PISTON SELECTION

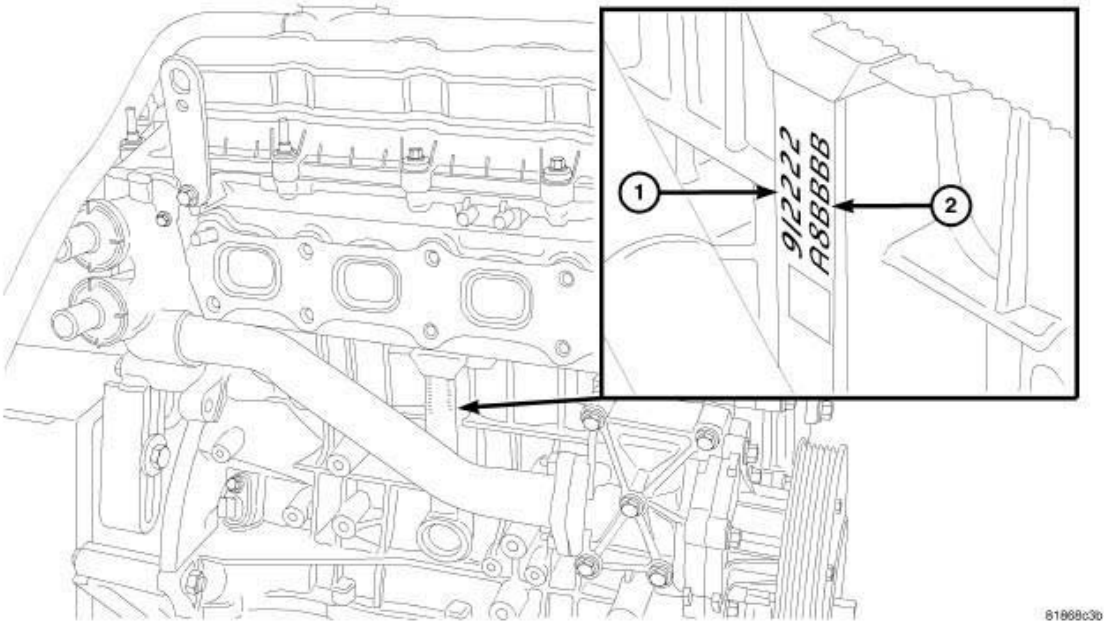

Fig. 211: Main Bearing Selection Chart
Courtesy of CHRYSLER LLC

The pistons are select fit to each bore. There are three different grades of pistons available; A, B, and C. The piston identification (2) is located in the middle of the block on the right side of the engine. The bore identification starts at the top and reads downward. Bore #1 is at the top and bore #4 is at the bottom.

The piston, rings and rod are serviced as an assembly. After determining what size piston is needed, refer to **Engine/Engine Block/BEARING(S), Connecting Rod - Standard Procedure** to determine correct rod bearing size.

Removal

REMOVAL

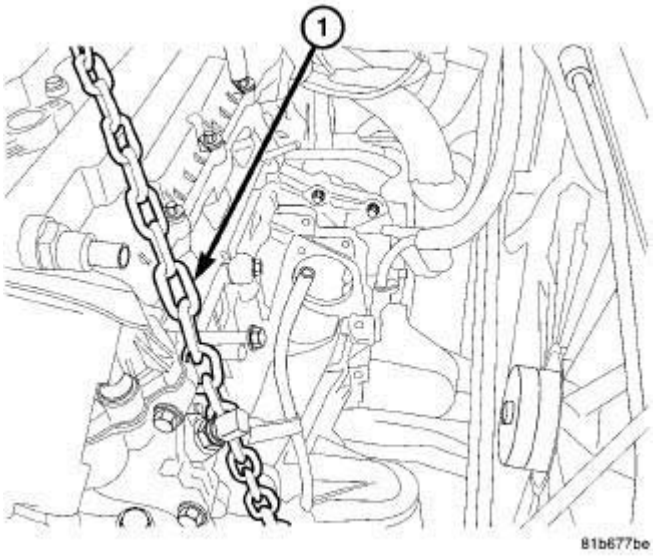

Fig. 212: LIFT CHAIN
Courtesy of CHRYSLER LLC

NOTE: Pistons, rings, and rods are serviced as an assembly.

CAUTION: To maintain engine balance, 1, 3, or 4 pistons can be replaced. If 2 pistons are replaced, engine will be out of balance.

1. Remove engine. See **Engine - Removal**.
2. Separate engine from transaxle.
3. Mount engine on a suitable engine stand and remove engine lift chain (1).
4. Remove cylinder head. See **Engine/Cylinder Head - Removal**.

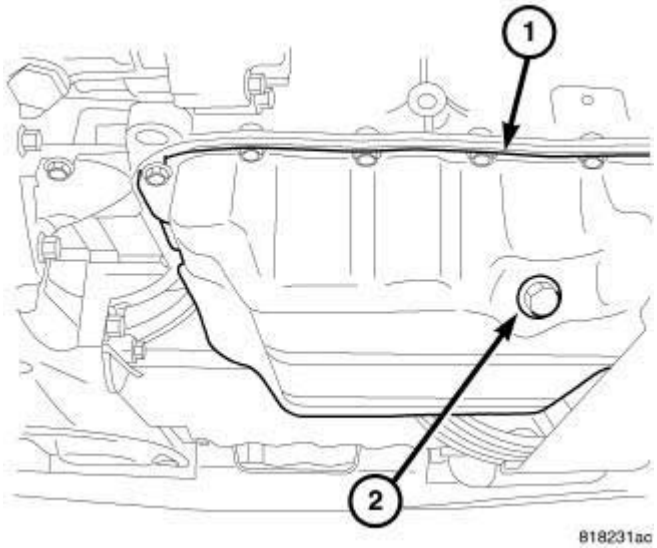

Fig. 213: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

5. Drain engine oil (2).
6. Remove oil pan (1). See **Engine/Lubrication/PAN, Oil - Removal**.

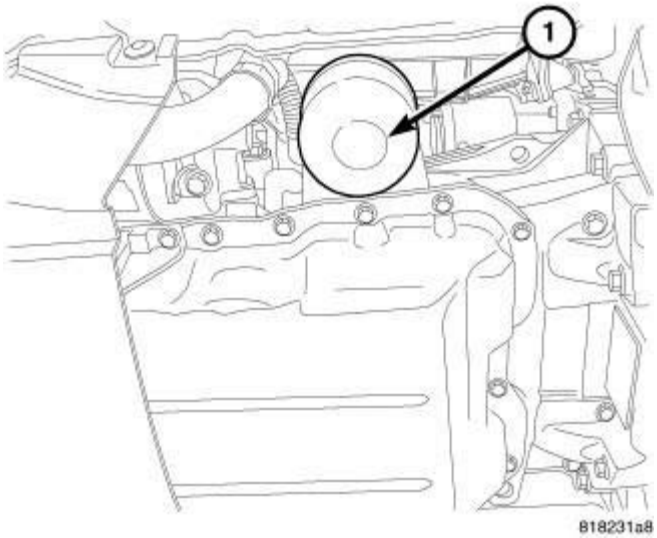

Fig. 214: OIL FILTER
Courtesy of CHRYSLER LLC

7. Remove oil filter (1).
8. Remove balance shaft assembly.
9. Remove ladder frame.

NOTE: Remove any carbon build up and clean debris from cylinder prior to piston removal to avoid scratching piston skirts.

10. Remove top ridge of cylinder bores with a reliable ridge reamer before removing pistons from cylinder block. **Be sure to keep tops of pistons covered during this operation** .

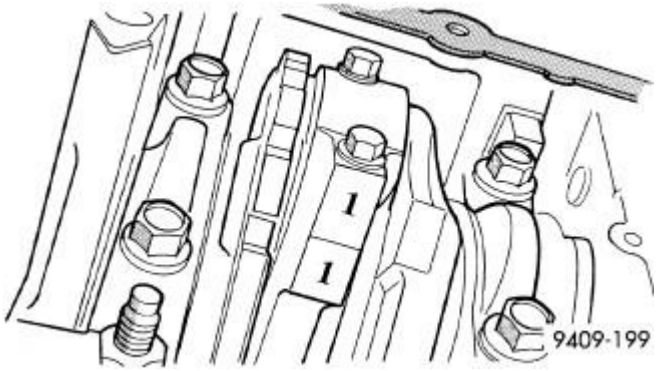

Fig. 215: Identify Connecting Rod to Cylinder-Typical

Courtesy of CHRYSLER LLC

11. Rotate crankshaft so that each connecting rod is centered in cylinder bore.
12. Using a permanent ink or paint marker, identify cylinder number on each connecting rod cap.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods, as damage to connecting rod could occur.

CAUTION: Care must be taken not to damage the fractured rod and cap joint surfaces, as engine damage may occur.

13. Remove connecting rod bolts and cap.

CAUTION: Do not reuse connecting rod bolts. These are one-time-use bolts and reuse could result in engine failure.

14. Carefully push each piston and rod assembly out of cylinder bore. Reinstall bearing cap on the mating rod.
15. Repeat procedure for each piston and connecting rod assembly.

Installation

INSTALLATION

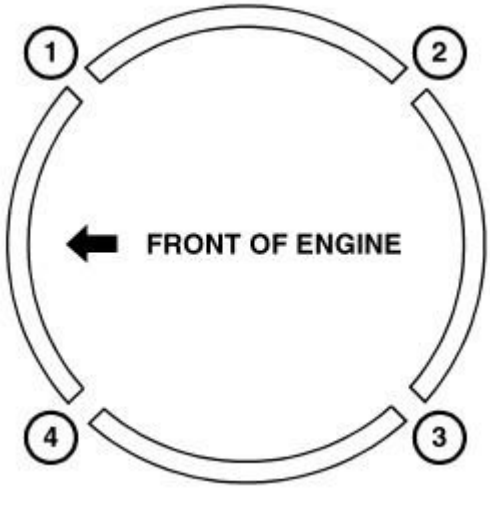

Fig. 216: Piston Ring End Gap Position
Courtesy of CHRYSLER LLC

1. Install piston rings on piston. See **Engine/Engine Block/RING(S), Piston - Installation**.
2. Before installing pistons and connecting rod assemblies into the bore, be sure that top compression ring

gap (1) and the second compression ring gap (3) are staggered so that neither is in line with oil ring rail gap.

3. Before installing the ring compressor, make sure the oil ring expander ends are butted (1) and the rail gaps (2,4) located as shown in illustration above. As viewed from the top of the piston.

NOTE: Be sure the position of piston rings on the piston does not change during the following step.

4. Immerse the piston head and rings in clean engine oil, slide the ring compressor, over the piston.

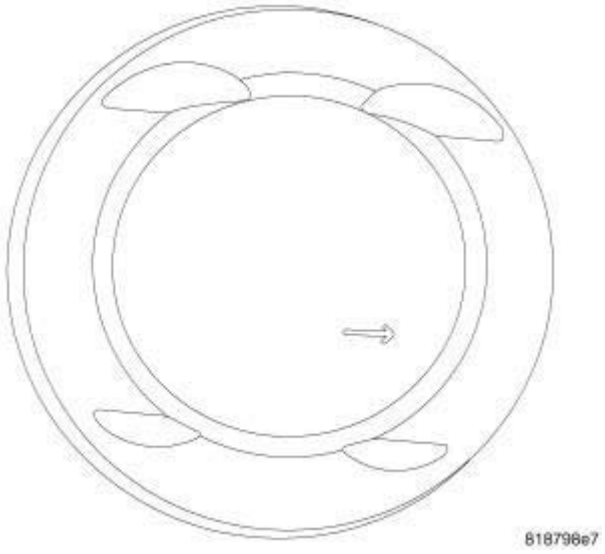

Fig. 217: PISTON INSTALLATION
Courtesy of CHRYSLER LLC

5. The directional arrow stamped on the piston should face toward the front of the engine.
6. Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Lubricate connecting rod journal with clean engine oil.

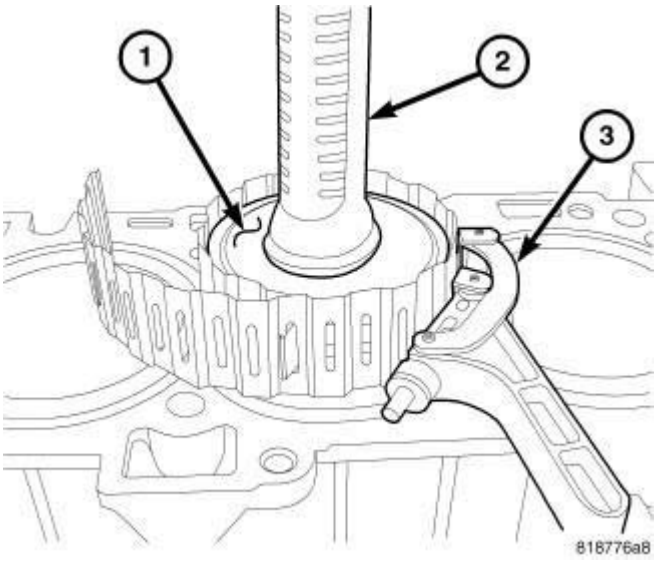

Fig. 218: RING COMPRESSOR
Courtesy of CHRYSLER LLC

NOTE: Rod bearing sizes are indicated on the nose of the crankshaft. There are three different size rod bearings. Perform rod bearing selection procedure.

7. Install connecting rod upper bearing half into connecting rod.
8. Install ring compressor (3).
9. Tap the piston (1) down in cylinder bore, using a hammer handle (2). At the same time, guide connecting rod into position on connecting rod journal.

NOTE: The connecting rod cap bolts should NOT be reused.

10. Before installing the **NEW** bolts, the threads should be coated with clean engine oil.
11. Install connecting rod lower bearing half into connecting rod cap. Install connecting rod cap.
12. Install each bolt finger tight then alternately torque each bolt to assemble the cap properly.

CAUTION: Do not use a torque wrench for the second step.

13. Tighten the connecting rod bolts using the 2 step torque-turn method. Tighten the bolts to 20 N.m (15 ft. lbs.), then an additional 90°.

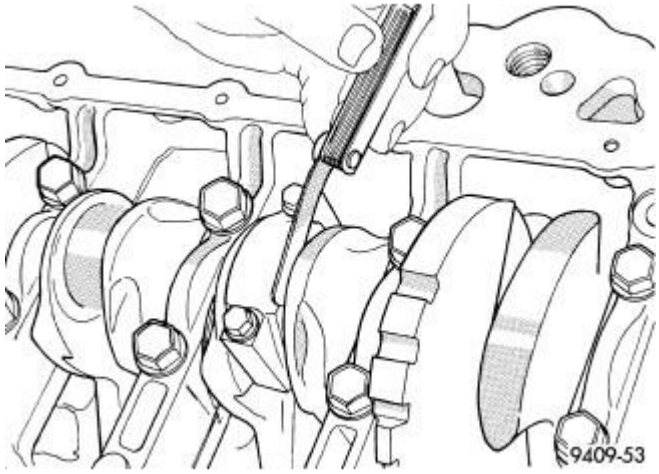

Fig. 219: Connecting Rod Side Clearance
Courtesy of CHRYSLER LLC

14. Using a feeler gauge, check connecting rod side clearance. See **Engine - Specifications** for connecting rod side clearance.
15. Install the ladder frame. See **Engine/Engine Block/FRAME, Ladder - Installation**.
16. Install oil pump/balance shaft carrier assembly. See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
17. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
18. Install cylinder head. See **Engine/Cylinder Head - Installation**.

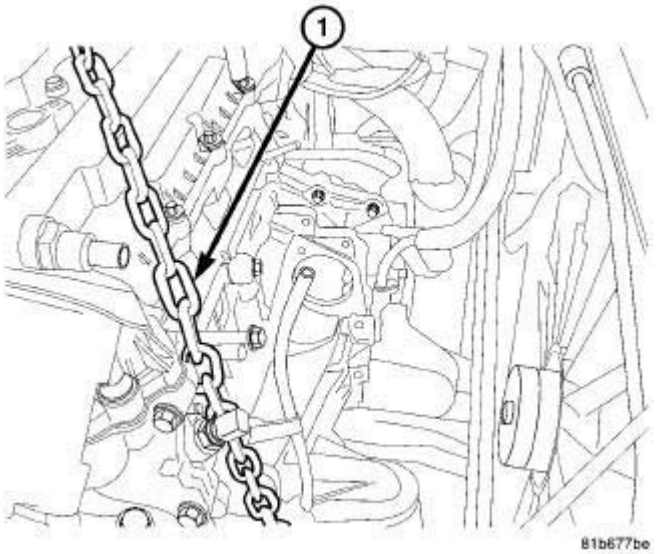

Fig. 220: LIFT CHAIN
Courtesy of CHRYSLER LLC

19. Install engine lift chain (1).

20. Connect transaxle assembly to engine.
21. Install engine. See **Engine - Installation**.

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

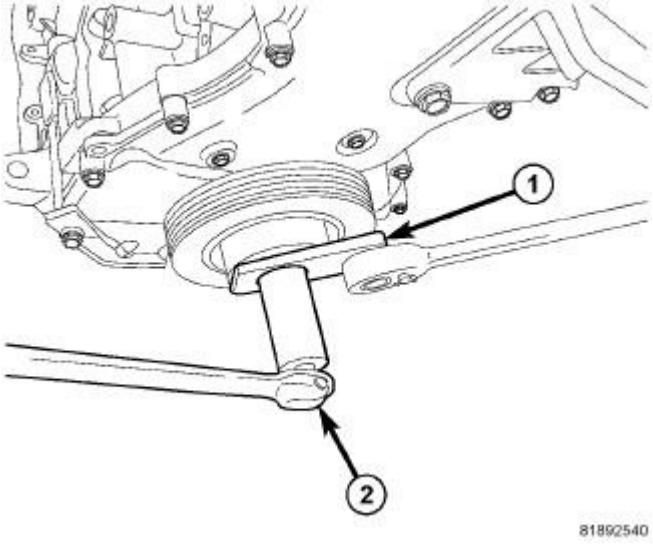

Fig. 221: Damper Removal
Courtesy of CHRYSLER LLC

1. Remove accessory drive belt.
2. Install damper holder 9707 (1) and remove damper retaining bolt.
3. Pull damper off crankshaft.

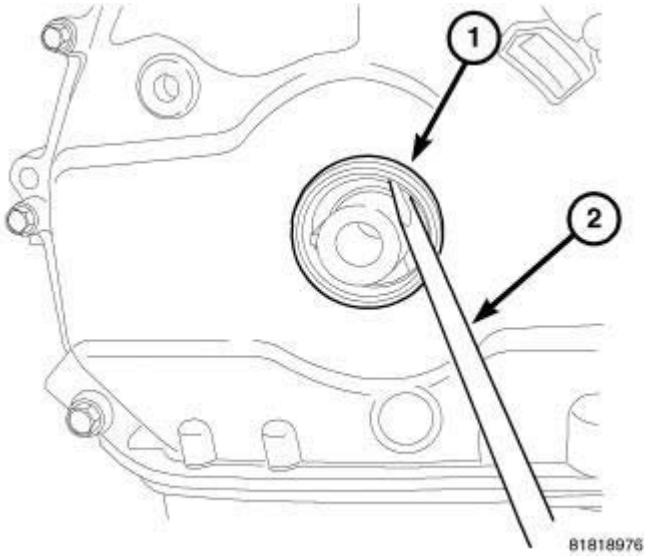

Fig. 222: FRONT CRANKSHAFT SEAL REMOVAL
Courtesy of CHRYSLER LLC

4. Remove front crankshaft oil seal (1) by prying out with a screw driver (2). Be careful not to damage the cover seal surface.

Installation

INSTALLATION

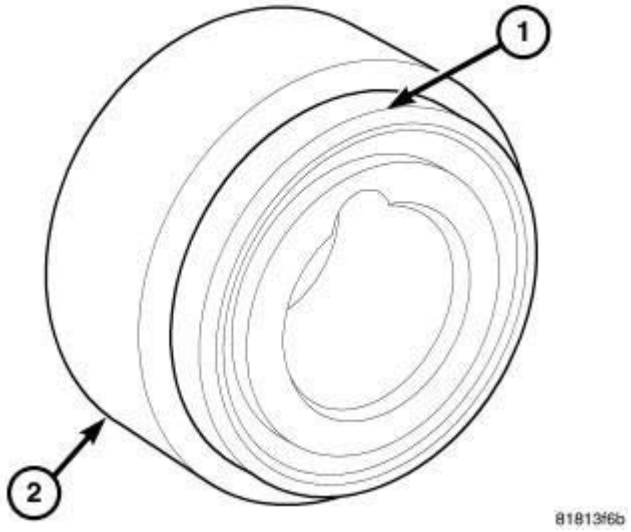

Fig. 223: FRONT CRANKSHAFT SEAL INSTALLER
Courtesy of CHRYSLER LLC

1. Place seal (1) onto Seal installer 9506 (2) with seal spring towards the inside of engine.

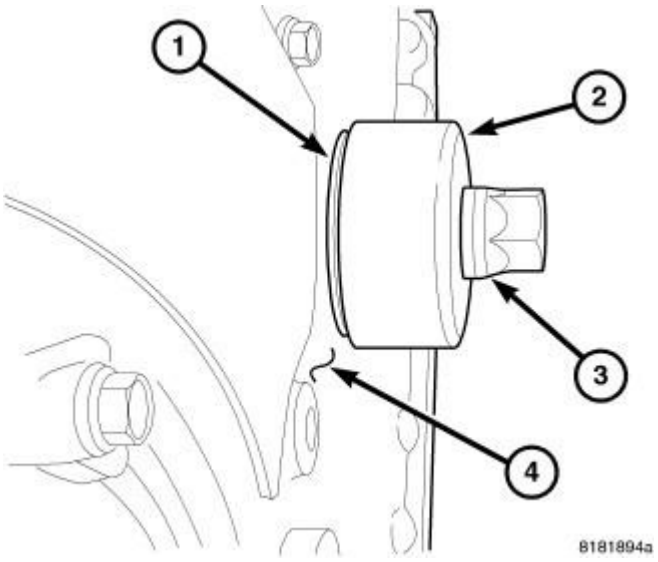

Fig. 224: INSTALLING FRONT SEAL
Courtesy of CHRYSLER LLC

2. Install new seal (1) by using Seal installer 9506 (2) and crankshaft damper bolt (3).

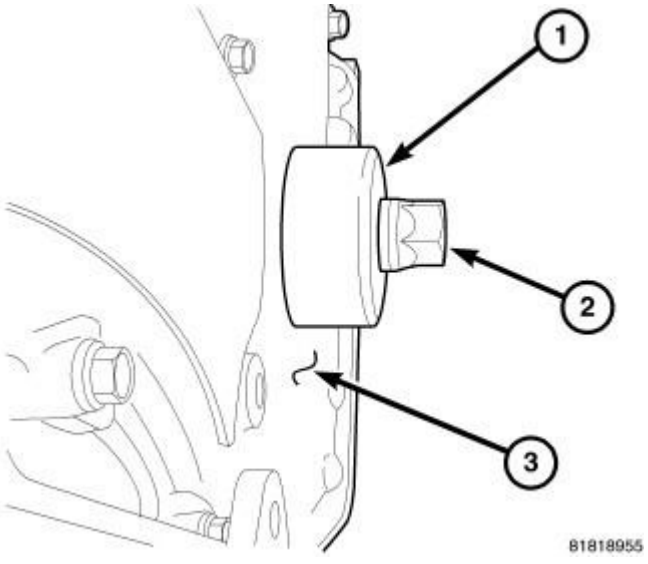

Fig. 225: FRONT SEAL INSTALLED
Courtesy of CHRYSLER LLC

3. Press seal into front cover until Seal Installer 9506 (1) seats against timing chain cover (3).
4. Remove seal installer 9506 (1).

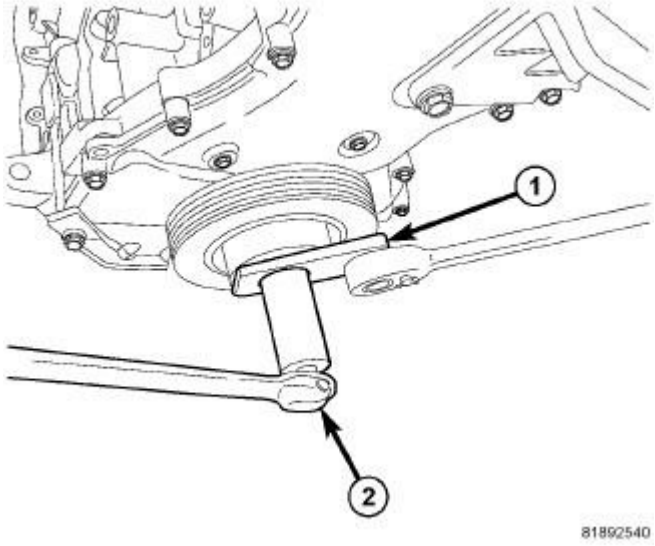

Fig. 226: Damper Removal
Courtesy of CHRYSLER LLC

5. Install crankshaft vibration damper.
6. Oil the bolt threads and between the bolt head and washer.
7. Install damper retaining bolt and damper holder 9707 (1). Tighten bolt to 210 N.m (155 ft. lbs.).

SEAL, CRANKSHAFT OIL, REAR

Removal

REMOVAL

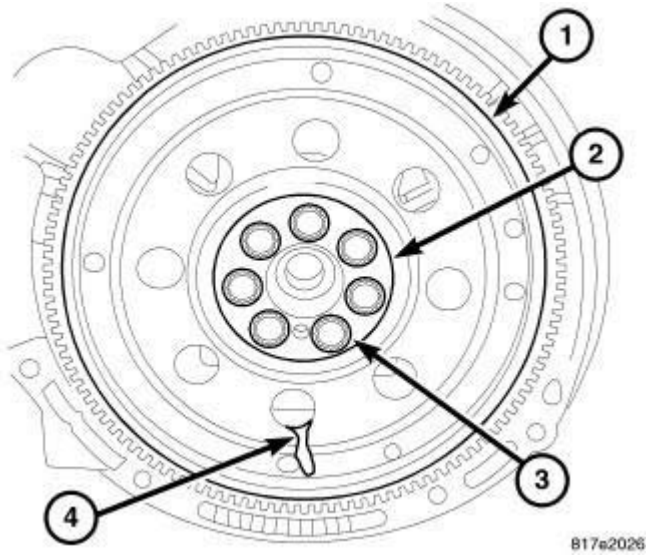

Fig. 227: FLEX PLATE

Courtesy of CHRYSLER LLC

1. Remove transmission and flexplate (1). See **Engine/Engine Block/FLEXPLATE - Removal**.

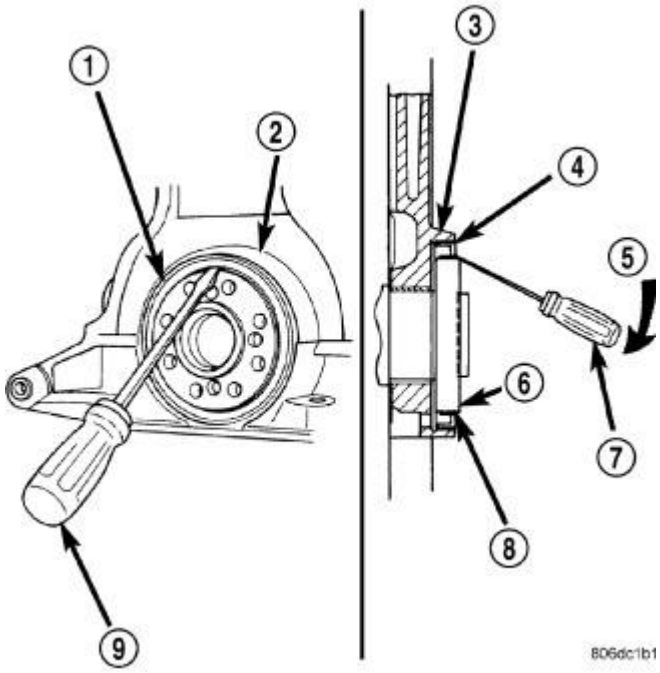

Fig. 228: Rear Crankshaft Oil Seal - Removal
Courtesy of CHRYSLER LLC

2. Insert a 3/16 flat bladed screwdriver (7) between the dust lip (8) and the metal case (4) of the crankshaft seal (1). Angle the screwdriver through the dust lip against metal case of the seal. Pry out seal.

CAUTION: Do not permit the screwdriver blade to contact crankshaft seal surface. Contact of the screwdriver blade against crankshaft edge (chamfer) is permitted.

3. Check to make sure the seals garter spring is not on the crankshaft.

Installation

INSTALLATION

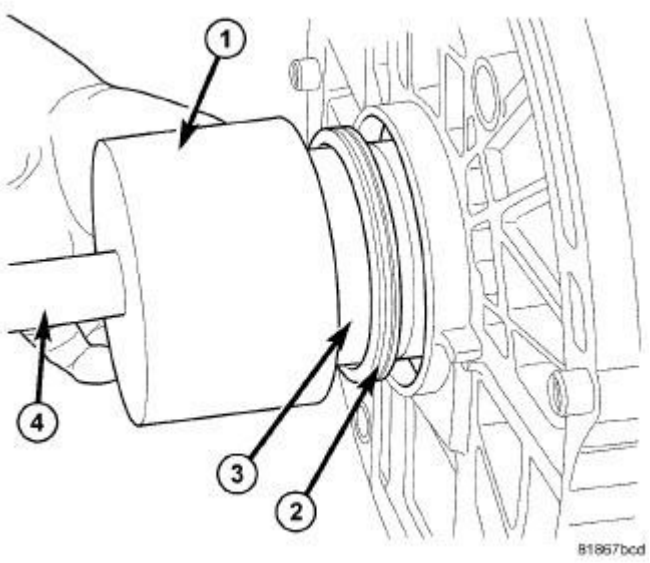

Fig. 229: REAR MAIN INSTALLATION
Courtesy of CHRYSLER LLC

CAUTION: If a burr or scratch is present on the crankshaft edge (chamfer), cleanup with 800 emery cloth to prevent seal damage during installation of new seal. If emery cloth is used, the crankshaft must be cleaned off Mopar® brake parts cleaner.

NOTE: When installing seal, lubricate Seal Guide 9509 with clean engine oil.

1. Place Seal Guide 9509 (3) on crankshaft.
2. Position seal (2) over guide tool. Guide tool should remain on crankshaft during installation of seal. Ensure that the lip of the seal is facing towards the crankcase during installation.
3. Drive the seal into the block using Seal Driver 9706 (1) and Driver Handle C-4171 (4) until Seal Driver 9706 bottoms out against the block.

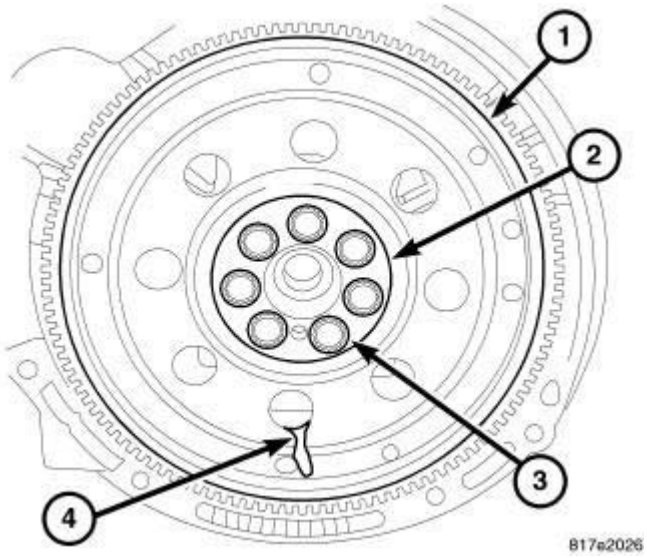

Fig. 230: FLEX PLATE
Courtesy of CHRYSLER LLC

4. Install the flexplate (1) and transmission. See **Engine/Engine Block/FLEXPLATE - Installation**.

ENGINE MOUNTING

DESCRIPTION

DESCRIPTION

The engine mounting system consists of a four-point system utilizing two load-carrying mounts and two torque controlling mounts. The load-carrying mounts are located on each frame rail. The right and left mounts are hydro-elastic mounts. The two torque controlling mounts are attached to a fore/aft member and the front and rear of the engine.

OPERATION

OPERATION

The four-point engine mounting system minimizes the transmission of structure-borne engine noise to the passenger compartment. The load-carrying right and left mounts dampen and isolate vertical motion and vibration. The front and rear mount absorb torque reaction forces and torsional vibrations.

INSULATOR, ENGINE MOUNT, LEFT

Removal

REMOVAL

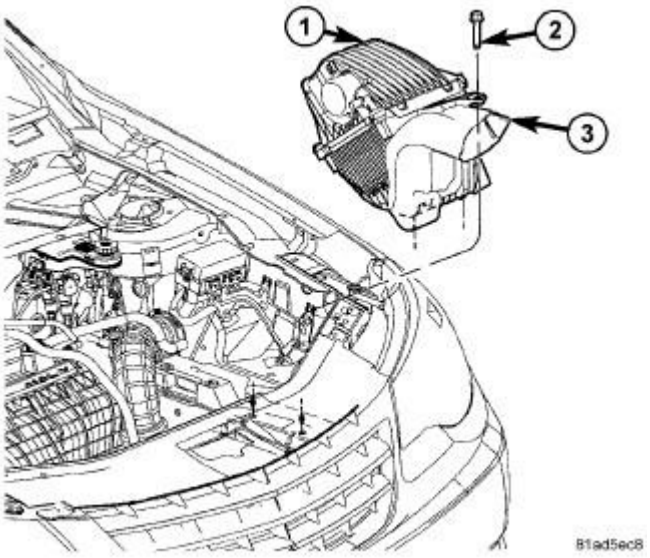

Fig. 231: Air Cleaner Assembly
Courtesy of CHRYSLER LLC

1. Remove air cleaner assembly (1).
2. Disconnect negative cable from battery.
3. Remove PCM.
4. Remove PCM mounting bracket.

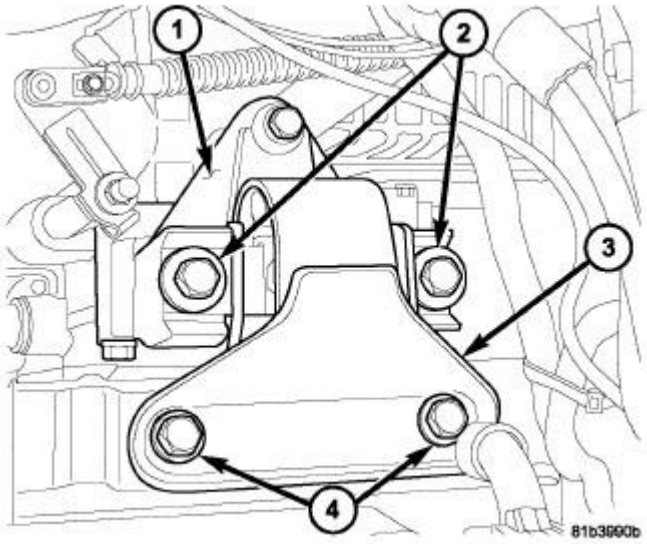

Fig. 232: LEFT MOUNT
Courtesy of CHRYSLER LLC

5. Support transaxle with a suitable jack.

6. Remove mount to transaxle bolts (2).
7. Remove left mount to frame rail fasteners (4).

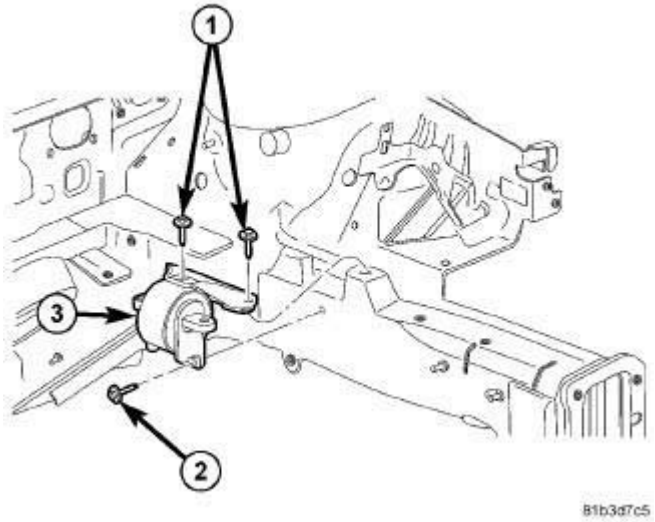

Fig. 233: Frame Rail Fastener
Courtesy of CHRYSLER LLC

8. Lower transaxle to gain access to mount to frame rail fastener (2).
9. Remove mount isolator (3).

Installation

INSTALLATION

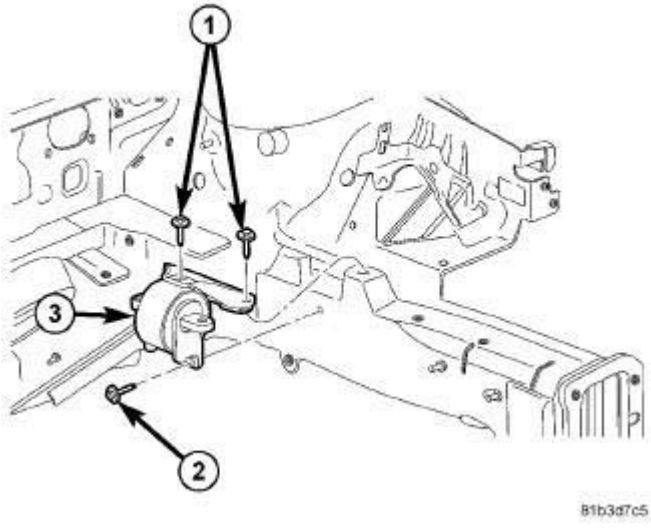

Fig. 234: Frame Rail Fastener
Courtesy of CHRYSLER LLC

1. Position mount isolator (3) in place, install bolts (1,2) and tighten to 55 N.m (40 ft. lbs.).

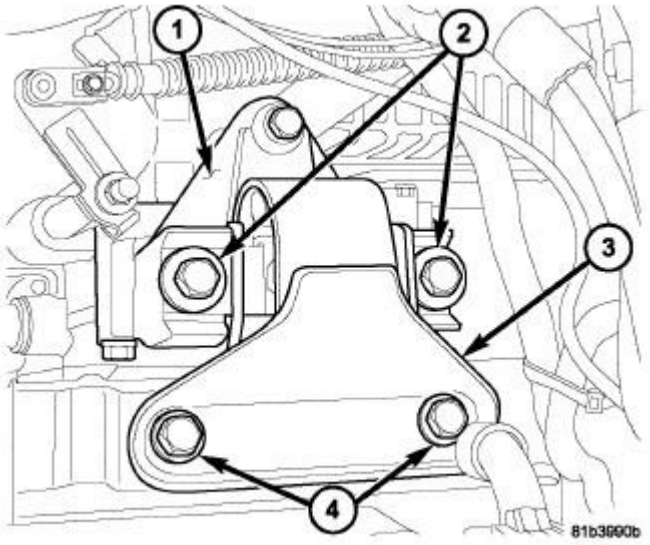

Fig. 235: LEFT MOUNT
Courtesy of CHRYSLER LLC

2. Raise transaxle into position, install bolts (2) and tighten to 98 N.m (72 ft. lbs.).
3. Remove jack.

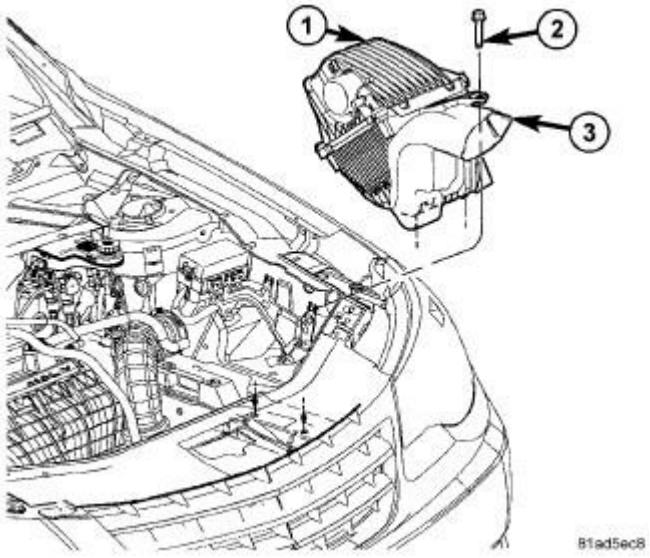

Fig. 236: Air Cleaner Assembly
Courtesy of CHRYSLER LLC

4. Install PCM mounting bracket.
5. Install PCM. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Engine Control - Installation** .
6. Connect negative battery cable.
7. Install air cleaner assembly (1). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.

INSULATOR, ENGINE MOUNT, RIGHT

Removal

REMOVAL

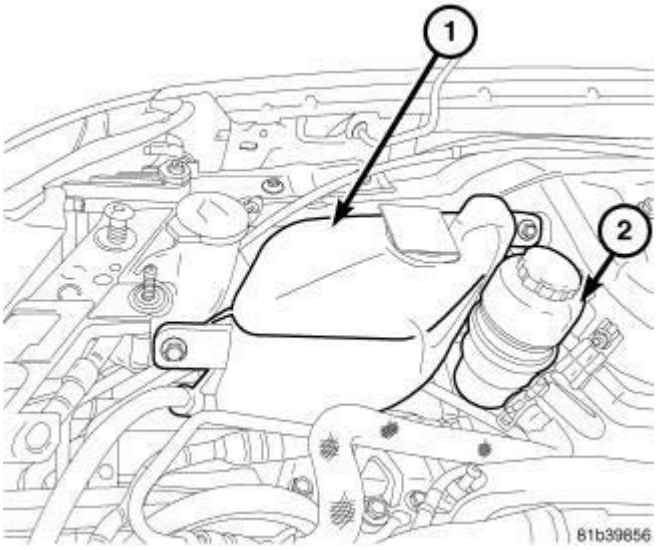

Fig. 237: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

1. Remove coolant reservoir (1) and set aside.

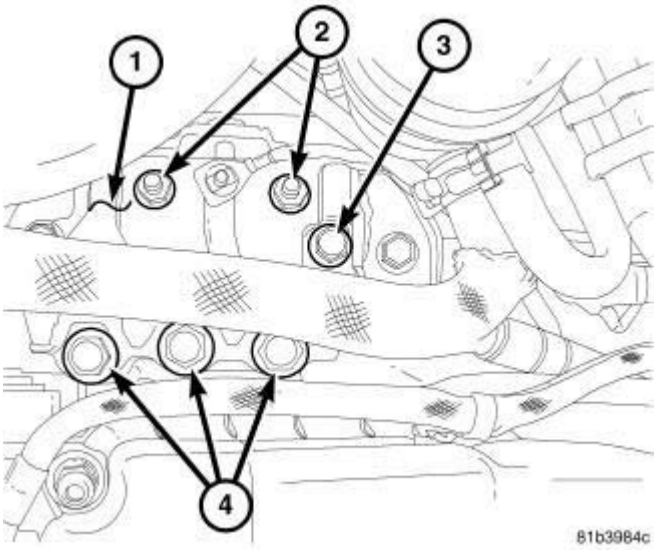

Fig. 238: Power Steering Line Support Bracket
Courtesy of CHRYSLER LLC

2. Remove power steering line support bracket (3) from engine mount.
3. Support transaxle with a block of wood and a suitable jack.

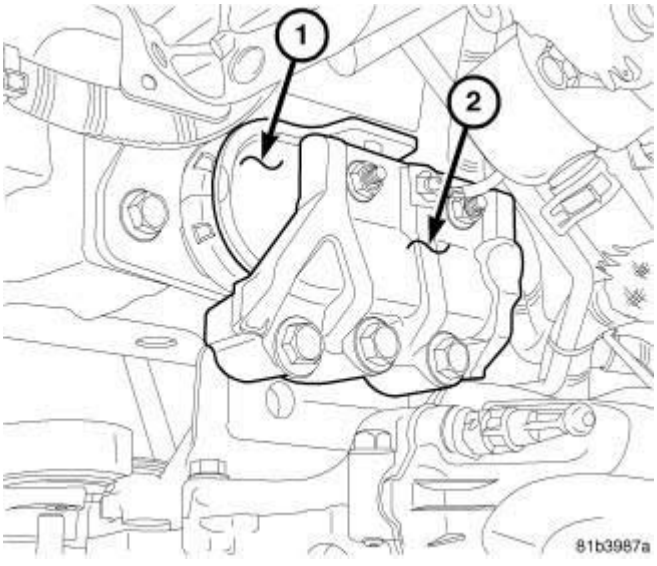

Fig. 239: Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

4. Remove engine mount bracket (2) retaining bolts.
5. Remove engine mount isolator bolts.
6. Remove engine mount isolator (1).

Installation

INSTALLATION

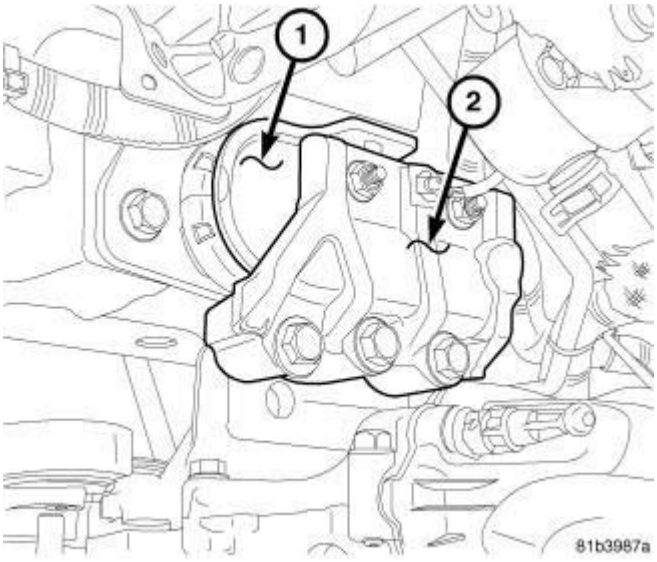

Fig. 240: Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

1. Position right engine mount isolator (1).
2. Install engine mount isolator retaining bolts and tighten to 55 N.m (41 ft. lbs.).

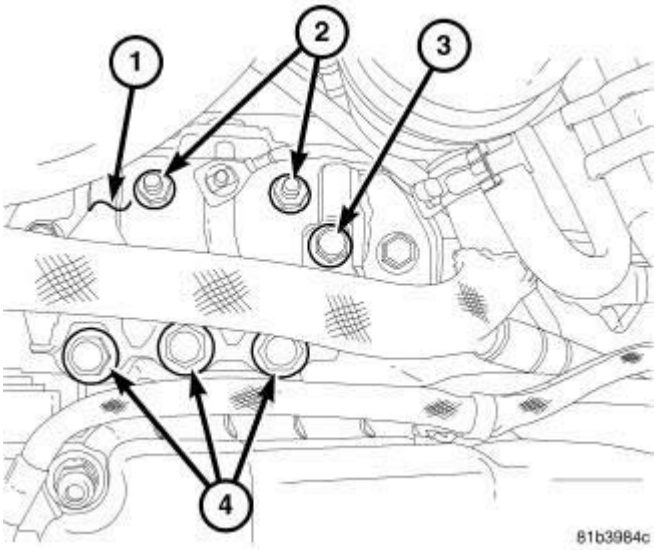

Fig. 241: Power Steering Line Support Bracket
Courtesy of CHRYSLER LLC

3. Position right mount bracket (1) and install bolts (4).
4. Install retaining nuts (2) and tighten nuts (2) to 30 N.m (22 ft. lbs.).
5. Tighten bolts (4) to 50 N.m (37 ft. lbs.).
6. Remove jack.

7. Install power steering line support (3) at engine mount.

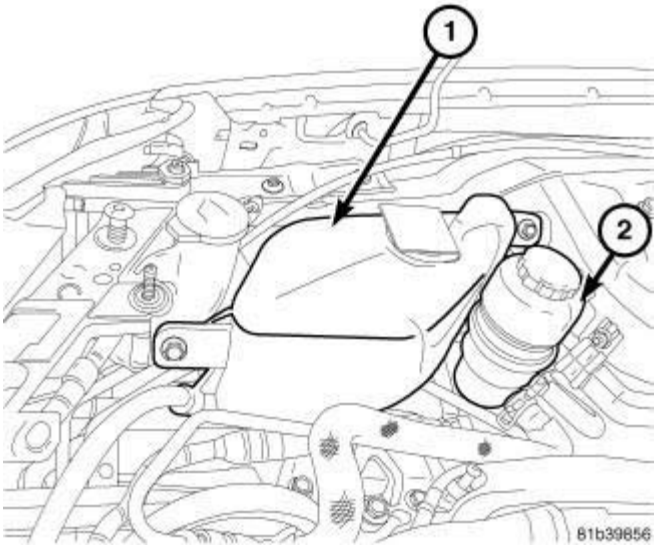

Fig. 242: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

8. Install coolant reservoir (1).

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

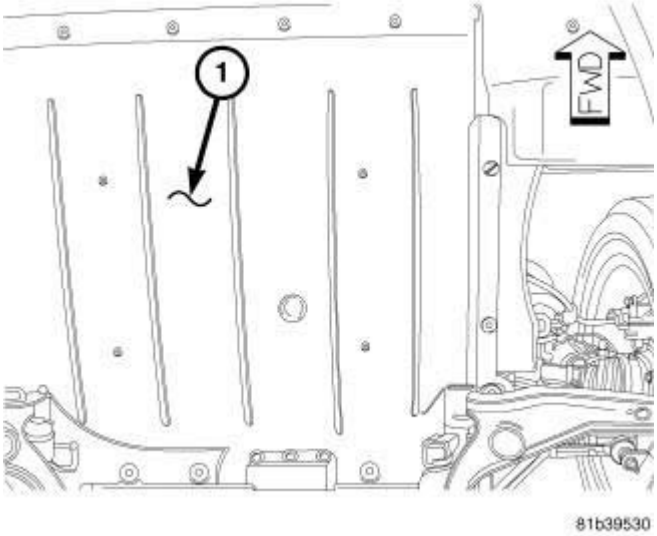

Fig. 243: LOWER SILENCER
Courtesy of CHRYSLER LLC

1. Raise vehicle.
2. Remove lower silencer (1).

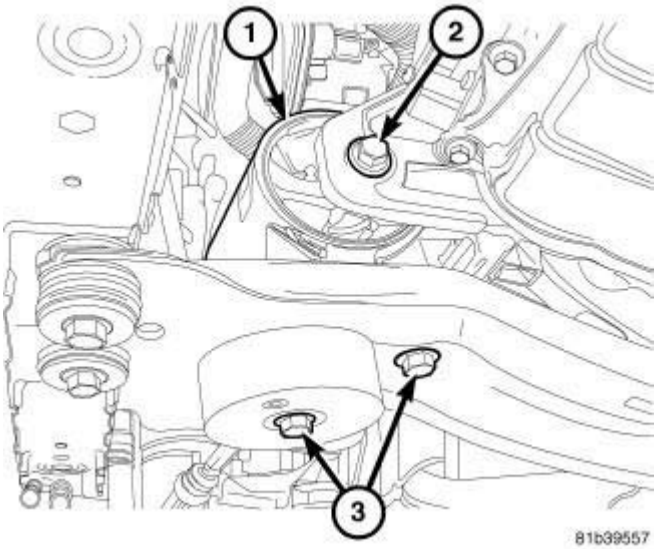

Fig. 244: FRONT MOUNT
Courtesy of CHRYSLER LLC

3. Remove mount through bolt (2).
4. Remove front mount retaining bolts (3).
5. Remove front mount (1).

Installation

INSTALLATION

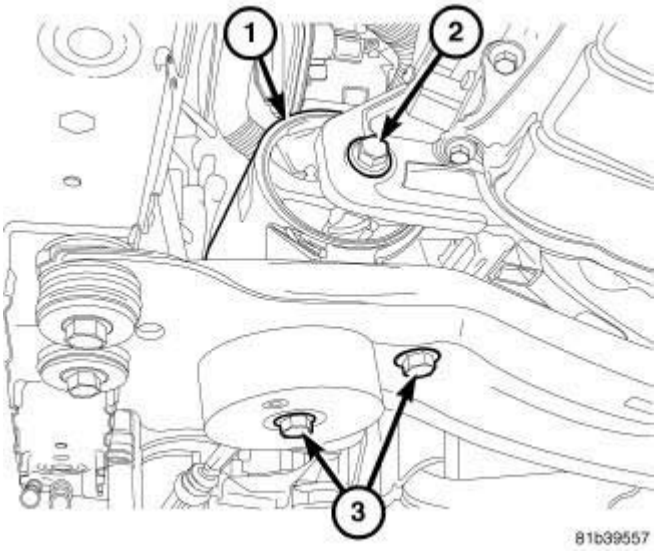

Fig. 245: FRONT MOUNT

Courtesy of CHRYSLER LLC

1. Position mount (1) and
2. Install retaining bolts (3) and torque to 47 N.m (35 ft. lbs.).
3. Install mount through bolt (2) and torque to 47 N.m (35 ft. lbs.).

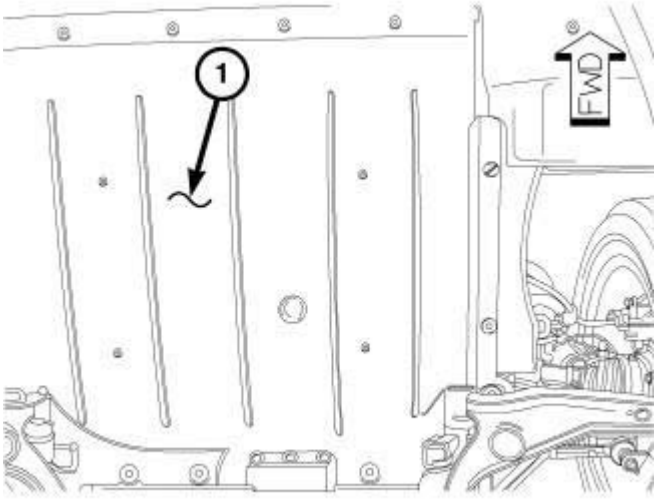

Fig. 246: LOWER SILENCER
Courtesy of CHRYSLER LLC

4. Install lower silencer (1).
5. Lower vehicle.

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

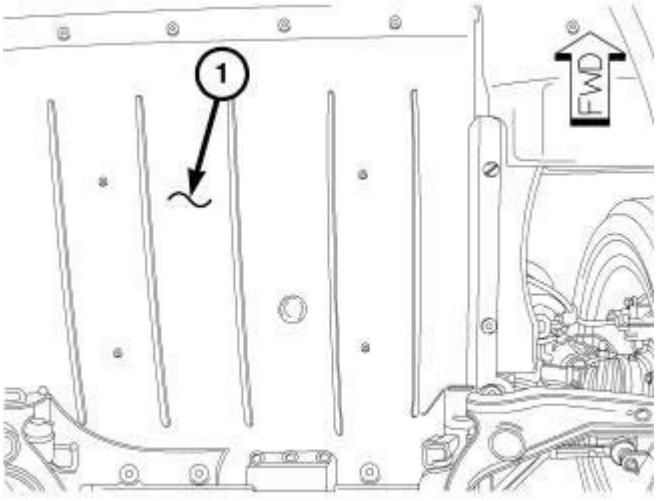

Fig. 247: LOWER SILENCER
Courtesy of CHRYSLER LLC

1. Raise vehicle.
2. Remove lower silencer (1).

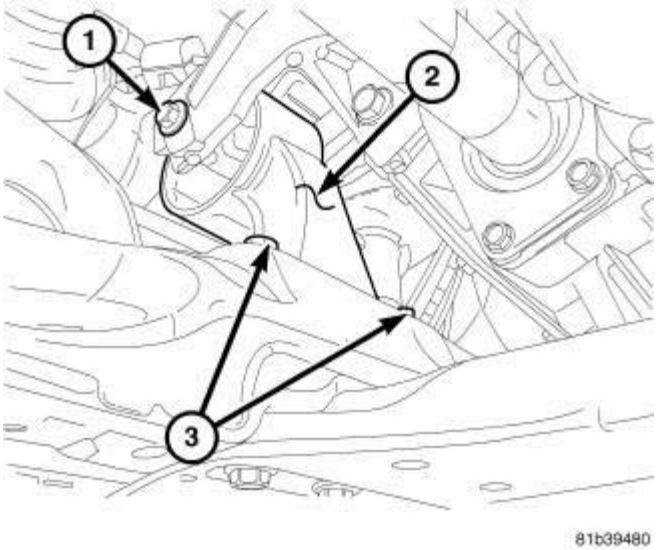

Fig. 248: Rear Mount Retaining Bolts
Courtesy of CHRYSLER LLC

3. Remove rear mount retaining bolts (3).
4. Remove rear mount through bolt (1).

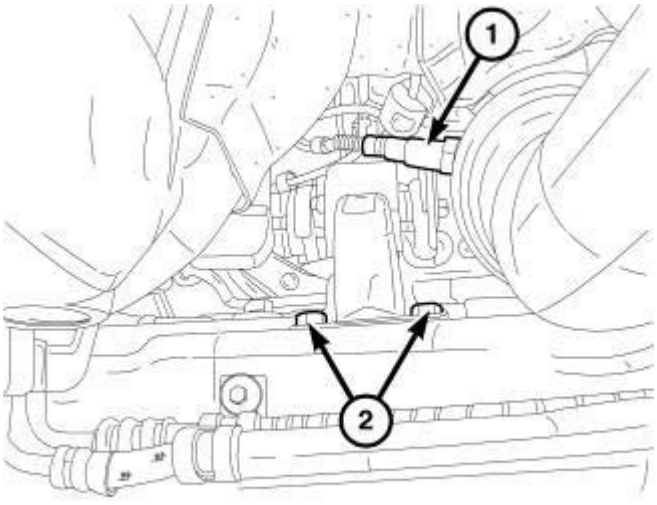

Fig. 249: Rear Mount Retaining Bolts & Oxygen Sensor
Courtesy of CHRYSLER LLC

5. Remove oxygen sensor (1).
6. Remove rear mount retaining bolts (2).

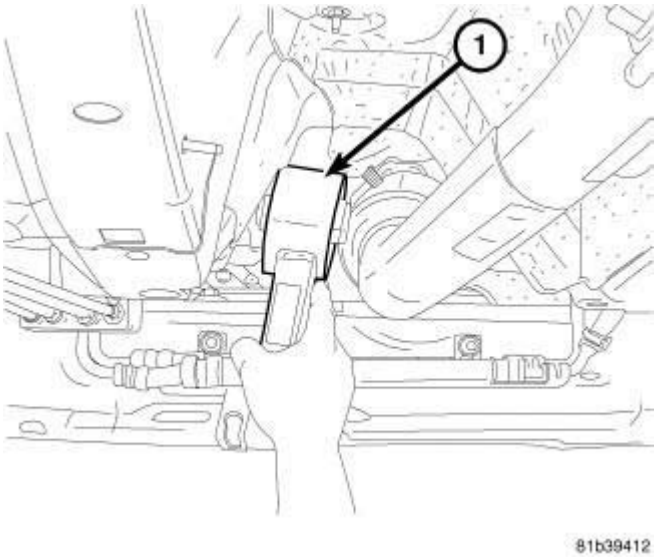

Fig. 250: Removing/Installing Rear Mount Towards Rear Of Vehicle
Courtesy of CHRYSLER LLC

7. Remove rear mount (1) towards the rear of the vehicle.

Installation

INSTALLATION

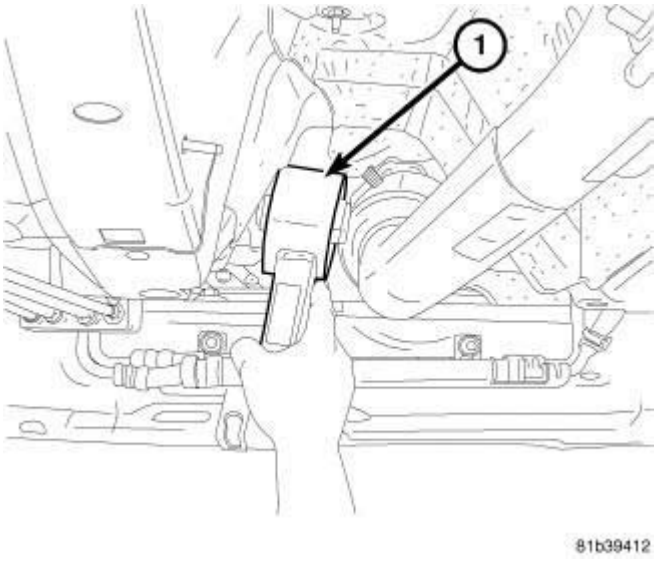

Fig. 251: Removing/Installing Rear Mount Towards Rear Of Vehicle
Courtesy of CHRYSLER LLC

1. Position rear mount (1) in place from the rear of the vehicle.

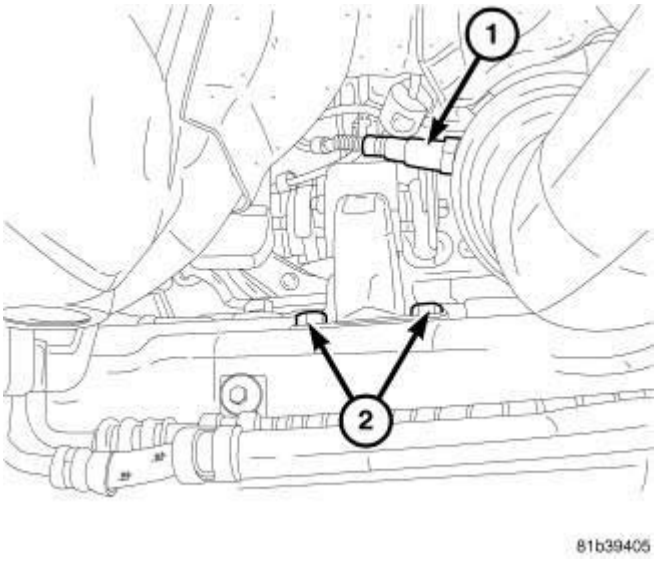

Fig. 252: Rear Mount Retaining Bolts & Oxygen Sensor
Courtesy of CHRYSLER LLC

2. Install rear mount retaining bolts (2) and torque to 50 N.m (37 ft. lbs.).
3. Install oxygen sensor (1).

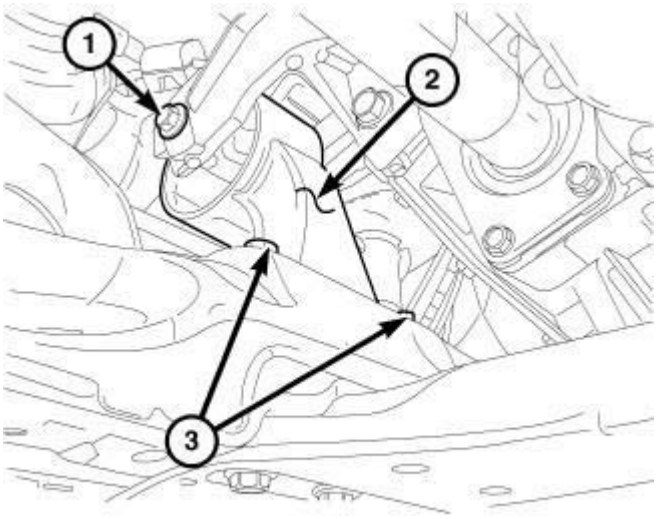

Fig. 253: Rear Mount Retaining Bolts
Courtesy of CHRYSLER LLC

4. Install rear mount retaining bolts (3) and torque to 50 N.m (37 ft. lbs.).
5. Install rear mount through bolt (1) and torque to 47 N.m (35 ft. lbs.).

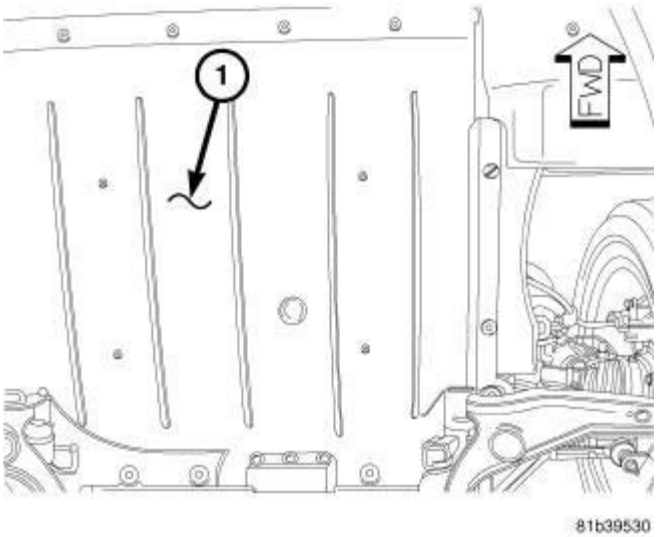

Fig. 254: LOWER SILENCER
Courtesy of CHRYSLER LLC

6. install lower silencer (1).

LUBRICATION

DESCRIPTION

DESCRIPTION

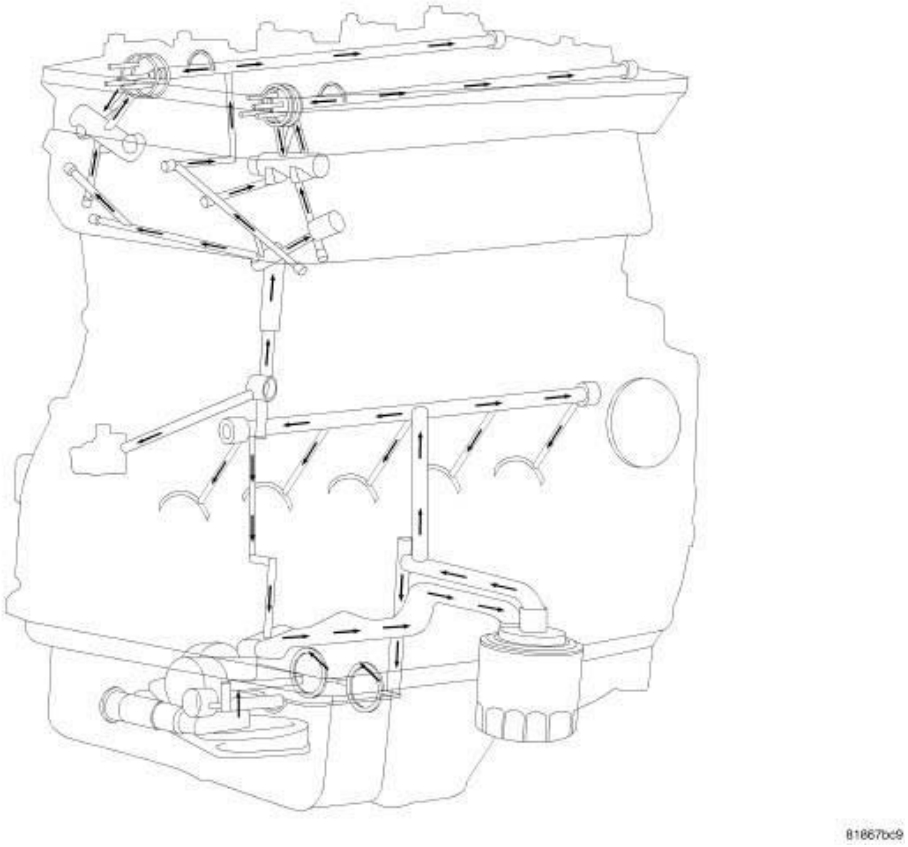

Fig. 255: OIL FLOW DIAGRAM
Courtesy of CHRYSLER LLC

The lubrication system is a full-flow filtration, pressure feed type. The balance shaft module (BSM) is mounted below the ladder frame and chain driven by the crankshaft. The BSM consists of a non-serviceable pump, oil pressure relief valve, and a non-serviceable balance assembly.

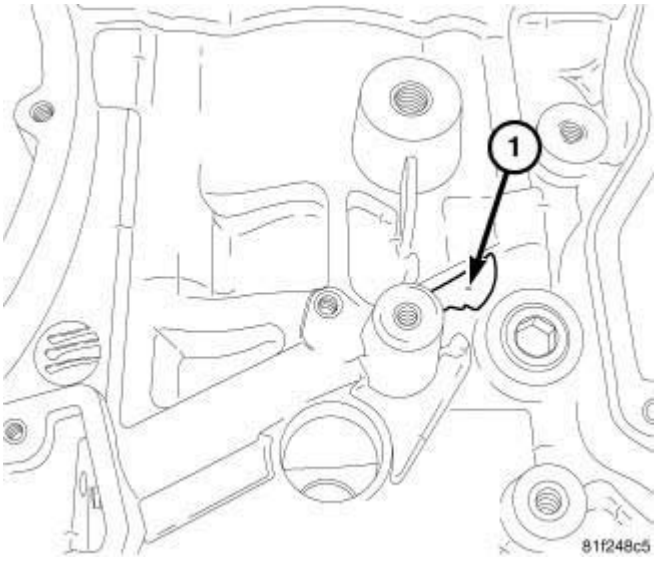

Fig. 256: OIL HOLE
Courtesy of CHRYSLER LLC

NOTE: Not all blocks have the bolt on timing chain oil squirter. Engine blocks either have a bolt-on oil squirter or a 1.0 mm hole (1) drilled into the oil gallery passage. Engine blocks with the 1.0 mm hole no longer use an oil squirter even though the threaded mounting hole may still be present.

OPERATION

OPERATION

Engine oil is drawn up through the pickup tube and is pressurized by the oil pump and routed through the full-flow filter to the main oil gallery running the length of the cylinder block. A diagonal hole in each bulkhead feeds oil to each main bearing. Drilled passages within the crankshaft route oil from main bearing journals to connecting rod journals. Balance shaft lubrication is provided through an internal oil passage at the #3 bearing location around the BSM mounting bolt. A vertical hole at the number one bulkhead routes pressurized oil through a filter screen and head gasket up to the cylinder head. The oil then divides into three passages; one to the intake cam phaser, one to the exhaust cam phaser and one to the camshafts. The passage to the camshafts divides to feed both of the hollow camshafts at the second cam journal. The rest of cam journals are feed oil through the hollow camshafts. The #1 cam journals are fed oil through the VVT oil passages. Oil passages to the phasers are directed through the OCV (oil control valves) to the #1 journals. The oil then flows through the camshafts then to the cam phasers. Oil returning to the pan from pressurized components supplies lubrication to the valve stems, cam lobes, and tappets. Cylinder bores and wrist pins are splash lubricated from directed slots on the connecting rod thrust collars.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

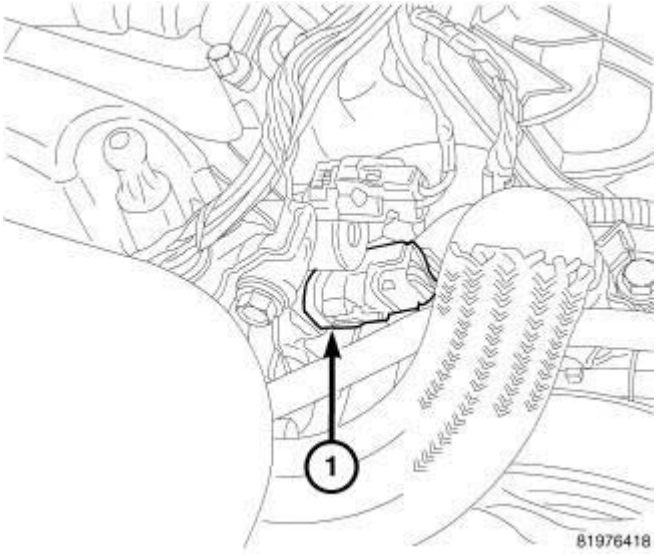

Fig. 257: OIL TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

NOTE: Anytime the oil temperature sensor is removed, it should be replaced with a new sensor.

1. Disconnect and remove oil temperature sensor (1).

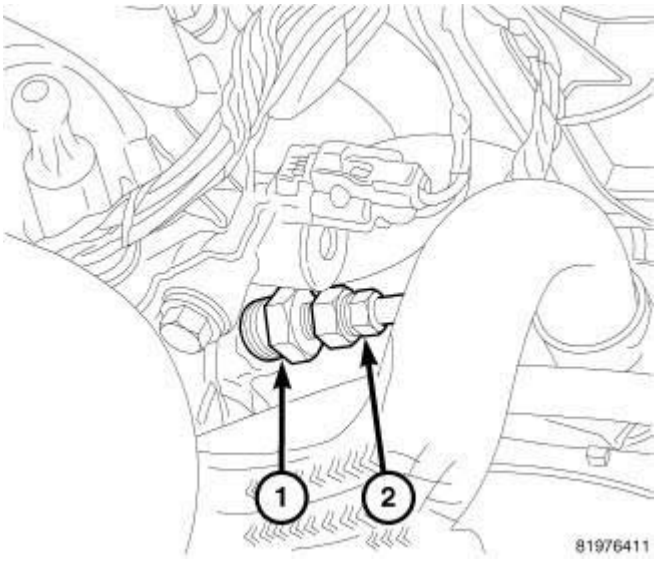

Fig. 258: OIL PRESSURE ADAPTER 9879
Courtesy of CHRYSLER LLC

CAUTION: Threads in cylinder head are British Standard Pipe (BSP). Do not install a NPT threaded adapter, this could crack the cylinder head.

2. Install threaded adapter 9879 (1).

3. Install oil pressure gauge (2).

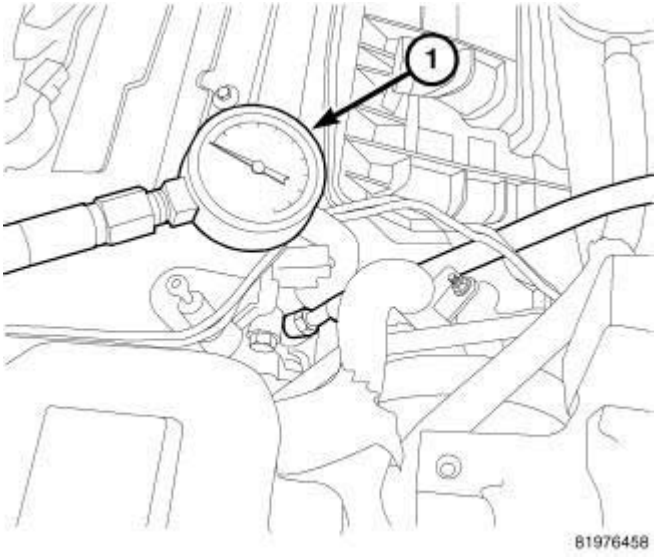

Fig. 259: OIL PSI GAUGE
Courtesy of CHRYSLER LLC

4. Start engine and record reading on oil pressure gauge (1).

CAUTION: If oil pressure is 0 at idle, do not perform the 3000 RPM test

5. If oil pressure is 0 at idle, shut off engine. Check for pressure relief valve stuck open, a clogged oil pick-up screen.
6. Remove oil pan and inspect for debris. See **Engine/Lubrication/PAN, Oil - Removal**.
7. Remove oil pressure relief valve. See **Engine/Lubrication/VALVE, Oil Pressure Relief - Removal**.
8. Inspect oil pressure relief valve and replace if damaged. See **Engine/Lubrication/VALVE, Oil Pressure Relief - Inspection**.
9. If pressure relief valve is OK, replace balance shaft module assembly. See **Engine/Lubrication/PUMP, Engine Oil - Removal**.

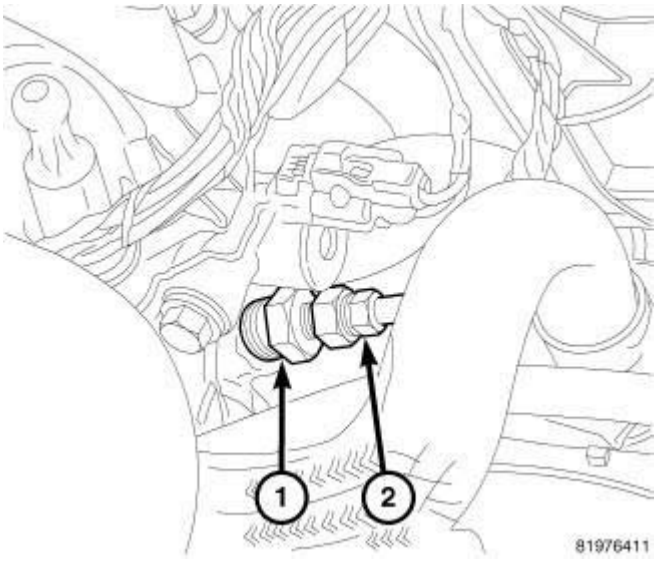

Fig. 260: OIL PRESSURE ADAPTER 9879
Courtesy of CHRYSLER LLC

10. After test is complete, remove oil pressure gauge (2) and adapter 9879 (1).

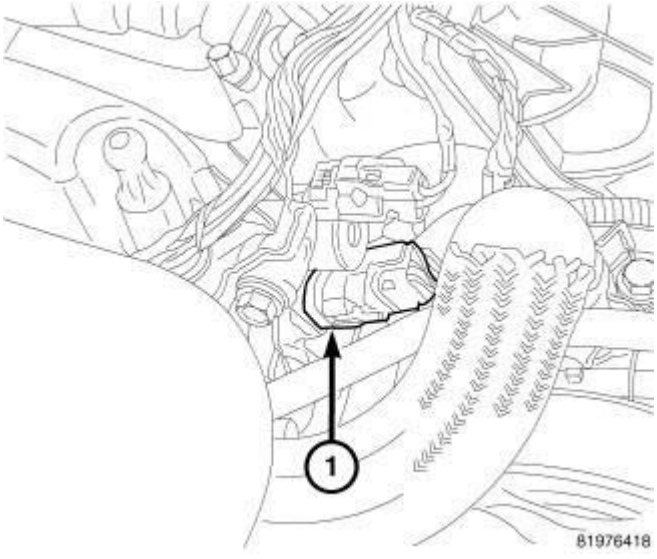

Fig. 261: OIL TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

11. Install a new oil pressure temperature sensor (1) and connect electrical connector.

CHECKING VVT OIL PRESSURE

This test can be used to help diagnose VVT faults.

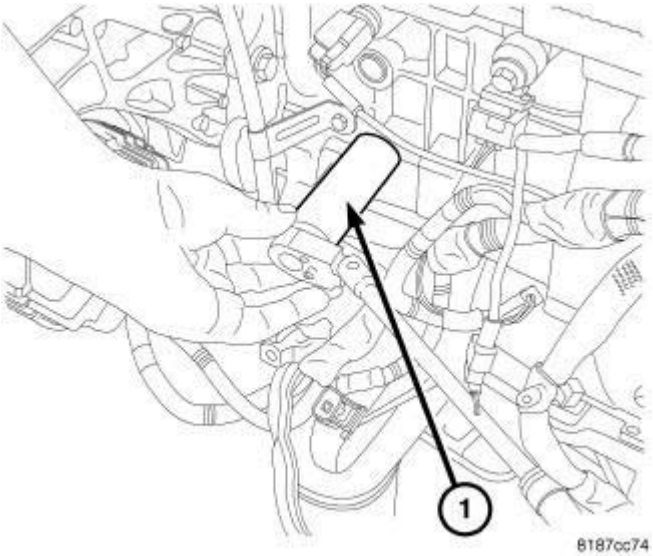

Fig. 262: OIL SENDER
Courtesy of CHRYSLER LLC

1. Disconnect and remove oil pressure sensor (1).

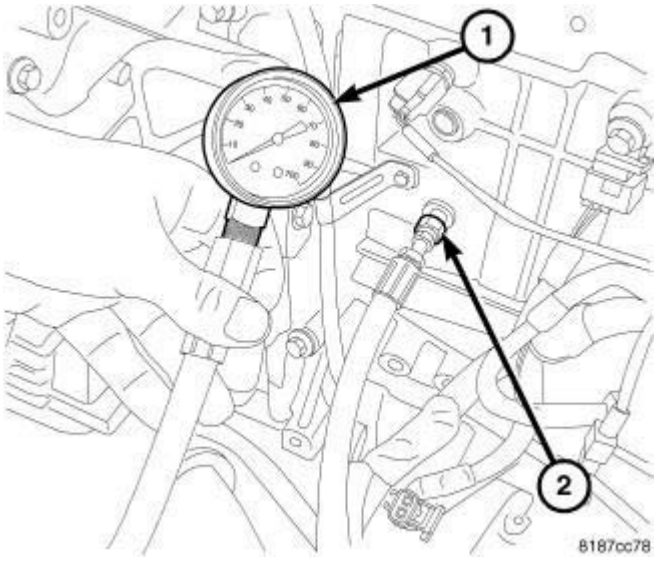

Fig. 263: OIL PRESSURE GAUGE
Courtesy of CHRYSLER LLC

CAUTION: Threads in block are 1/8"-28 British Standard Pipe (BSP). Do not install a National Pipe Thread (NPT) threaded adapter, this could crack the cylinder block.

2. Install an 1/8-28 BSP male to 1/8-27 female threaded adapter (2).
3. Install oil pressure gauge (1).
4. Start engine and record oil pressure.

CAUTION: If oil pressure is 0 at idle, do not perform the 3000 RPM test

5. If oil pressure is 0 at idle, shut off engine. check for pressure relief valve stuck open, a clogged oil pick-up screen.
6. Remove oil pan and inspect for debris. See **Engine/Lubrication/PAN, Oil - Removal**.
7. Remove oil pressure relief valve and inspect. If damaged replace pressure relief valve. See **Engine/Lubrication/VALVE, Oil Pressure Relief - Removal**.
8. If pressure relief valve is OK, replace balance shaft module assembly. See **Engine/Lubrication/PUMP, Engine Oil - Removal**.

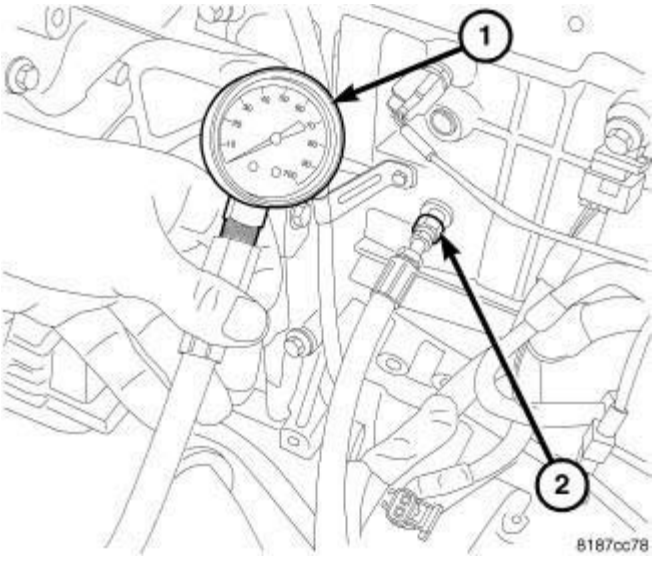

Fig. 264: OIL PRESSURE GAUGE
Courtesy of CHRYSLER LLC

9. After test is complete, remove test gauge (1) and fitting (2).

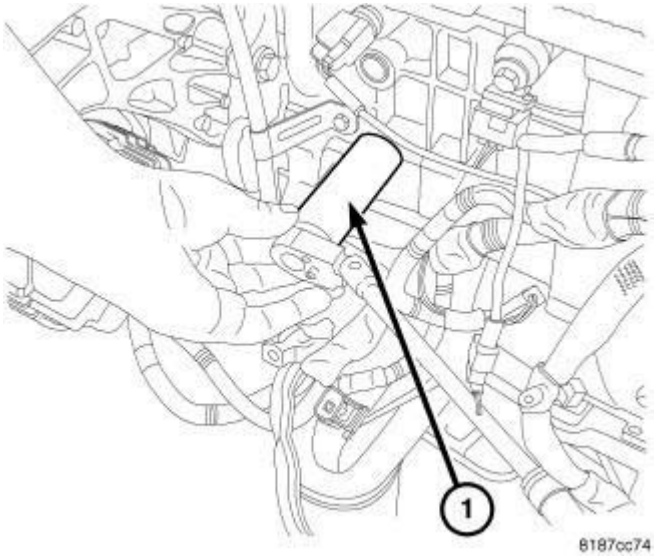

Fig. 265: OIL SENDER
Courtesy of CHRYSLER LLC

10. Install oil pressure sensor and electrical connector.

CONTROL VALVE, OIL INTAKE

Description

DESCRIPTION

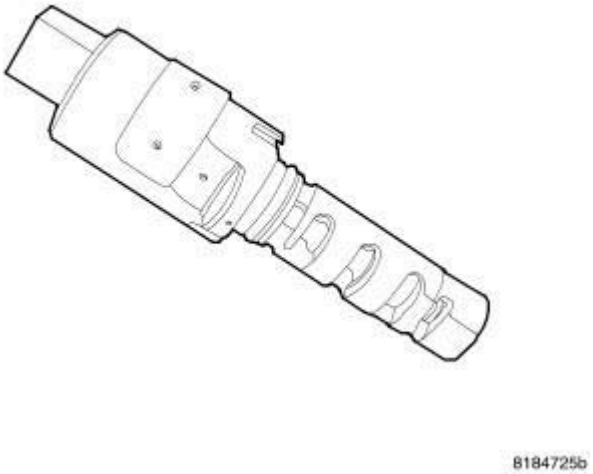

Fig. 266: SOLENOID ASSEMBLY
Courtesy of CHRYSLER LLC

Variable valve timing solenoid assembly. The solenoid receives pulse width modulation signal and the current is controlled within 0 ma to 1000 ma. The spool position is controllable at any position to control supply of oil

between the advance and retard ports.

Operation

OPERATION

There is both an Intake and an exhaust camshaft sensor on vehicles equipped with a Gas Engine. The variable valve timing system used on Gas Engines requires the exact position of both the intake and exhaust camshaft. The GPEC1 uses camshaft sensor data along with crankshaft data to determine the actual position of the camshafts. Intake and exhaust phaser oil control valves are required on Gas Engine vehicles using variable valve timing. The oil valves direct oil to the Intake and exhaust phasers. Oil pressure in the phasers moves the camshafts to an advanced or retarded position.

To resolve this inherent conflict between optimum high and low speed valve timing, the GPEC1 controlled engine uses a variable valve timing system. The variable valve timing system advances and retards valve timing by rotating the position of both the intake and exhaust camshafts. With this system, the intake valve opening can range from 80 to 120 crankshaft degrees after Top Dead Center. Likewise, the exhaust valve opening can range from 85 to 120 crankshaft degrees before Top Dead Center. This degree of flexibility provides many benefits, including: Improved Engine Performance, Increased Fuel Economy, Improved Idle Stability and Decreased Engine Emissions. In non operating condition, the camshaft stays in lock pin position of cam phases. This is 120 degrees ATDC for intake camshaft and 120 degrees BTDC for exhaust camshaft.

The variable valve timing system is electronically controlled and hydraulically operated. The GPEC1 receives information from many sensors to determine the optimum valve timing. It then pulse-width modulates oil control valves which direct oil to the cam phasers. The cam phasers use oil pressure to rotate the intake and exhaust camshafts. The rotation of the camshafts is referred to as cam phasing. Before the GPEC1 can begin commanding the camshaft phasing, several enabling conditions must be met:

- The engine oil temperature must be at least -6.6°C (20°F)
- The oil control valve coil temperature must be less than 140°C (284°F)
- Engine speed must be at least 600 to 1000 RPM to achieve minimum oil pressure.
- Battery voltage must be at least 10 volts
- And there must be no camshaft or crankshaft sensor faults, engine timing faults, or oil control valve faults

First we will examine variable valve timing enabling conditions, and then we will take a closer look at the inputs and outputs of the system:

- Accelerator pedal position sensor
- Oil temperature sensor
- Map sensor
- Intake cam sensor
- Exhaust cam sensor
- Crankshaft sensor
- GPEC1
- Exhaust phaser oil control valve

- Intake phaser oil control valve
- Inputs
- Engine control module
- Outputs
- Sensed battery voltage

A minimum oil temperature is required to enable variable valve timing operation. Oil temperature and viscosity also have an impact on the operation of variable valve timing after start-up. Oil is used to control the movement of the camshafts. An incorrect oil viscosity could adversely affect the operation of the system or even render the system inoperative. It may even set a fault code.

The accelerator pedal position sensor indicates how far the driver wants to open the throttle plate. The GPEC1 calculates an initial camshaft set point based on whether the accelerator pedal is at part throttle or wide open throttle.

The MAP sensor provides information regarding engine load.

Sensed battery voltage provides information regarding current system voltage. Sensed battery voltage must be at least 10 volts in order for the oil control valves to function properly.

This information allows the GPEC1 to adjust camshaft timing to achieve the best fuel economy, the best engine performance or a combination of both. The hall-effect crankshaft sensor provides RPM information and determines when the number one piston is approaching Top Dead Center. The sensor generates a signal as the tone wheel, attached to the crankshaft, rotates. The tone wheel has 60 teeth minus two. When the gap, created by the missing teeth passes by the sensor, a signal is produced that indicates the number one piston is at Top Dead Center. The GPEC1 uses crankshaft sensor data along with camshaft data to determine the actual position of the camshaft. There are two hall-effect camshaft sensors on engines equipped with variable valve timing. The GPEC1 uses camshaft sensor data along with crankshaft data to determine the actual position of the camshaft.

The GPEC1 individually controls each valve. It sends a pulse width modulated signal to move a spool within the outer casing of the valve. Depending upon spool movement, oil is directed through the passages to advance or retard cam timing. The oil control valve also has a special cleaning strategy at key-on. The cleaning strategy is known as "debris crush mode". At key-on the GPEC1 cycles the oil control valve on and off several (5) times to crush any debris in the oil control valve and prevent the spool valve from sticking. In non operating condition, the camshaft stays in lock pin position of cam phases. This is 120 degrees ATDC for intake camshaft and 120 degrees BTDC for exhaust camshaft.

There are two oil control valves. One valve directs oil to the intake cam phaser, the other valve directs oil to the exhaust cam phaser. The valves are designed and function in the same manner. The outer casing of each oil valve has five oil passages. A passage for pressurized supply oil. A passage to the advance chamber of the cam phaser. A passage to the retard chamber of the cam phaser. A passage for oil return from the advance chamber of the cam phaser. A passage for oil return from the retard chamber of the cam phaser. Oil flows through the passages and applies pressure to the cam phasers to change cam timing.

There are two cam phasers. One phaser controls the position of the intake camshaft. The other phaser controls the position of the exhaust camshaft. The phasers consist of a sprocket, a rotor vane, and a housing or stator.

The exhaust cam phaser also consists of a front bushing and spring. We will discuss the purpose and function of the bushing and spring later. The housing is bolted and permanently fixed to the camshaft sprocket, while the rotor vane is bolted and permanently fixed to the camshaft. With this design, any movement of the rotor vane in relation to the housing will also move the camshaft. The phaser and sprocket are serviced as an assembly.

Camshaft and crankshaft sensors provide feedback to the GPEC1 regarding the actual position of the camshafts. The GPEC1 then compares the actual camshaft positioning with desired positioning. If the desired positioning is not achieved within a specified time, during the second key cycle a trouble code is set.

There are six new diagnostic trouble codes available to help you determine if the control circuit from the GPEC1 to the oil control valve is intact and operating properly. The codes identify whether the control circuit is open, shorted to ground, or shorted to power. Three trouble codes are related to intake camshaft positioning, the other three codes are specific to exhaust camshaft positioning.

The oil control valve contains both electrical and mechanical components. It is electrically controlled by the GPEC1. The electrical current that energizes the coil results in mechanical motion of the spool valve. It is possible to verify both the electrical and mechanical operation of the valve. The oil control valve consists of a coil that is energized to move a spool within an outer casing. The condition of the coil can be tested with a Digital Volt Ohmmeter or DVOM. With the DVOM set to measure resistance, check the coil for an open, a short to ground, or excessive resistance. The correct resistance value of the coil is between 6 and 8 ohms. The mechanical operation of the oil control valve can be tested using actuator commands on the scan tool. Remove the oil control valve, then navigate to the actuator menu and select the oil control valve. Use commands to activate the valve and watch as the spool valve moves back and forth inside the casing.

Because the cam phasers are hydraulically operated by engine oil, the condition of the oil is very important. The oil must be of the correct viscosity, not obstructed by debris, to maintain correct pressure. Maintaining the correct oil viscosity is critical to the operation of the variable valve timing system. The wrong oil viscosity may cause the variable valve timing to malfunction and trouble codes to set. The correct oil viscosity for this system is 5W20. Oil must be clean, unobstructed and free to flow through the variable valve timing system. Oil could become obstructed in oil passages located in the cylinder head, cylinder block, or even in the oil screen. In the event oil flow is obstructed, further diagnosis or disassembly may be required to pin point the source of the obstruction. The variable valve timing system relies on oil pressure to advance or retard the position of the camshaft. Insufficient oil pressure will adversely affect the operation of variable valve timing. The minimum oil pressure for this system is 15 psi at normal operating temperature.

Though not directly used to change camshaft positioning, the oil screen is an important component of the variable valve timing system. It helps to remove debris going to the variable valve timing components. The oil screen is located in the cylinder block, immediately below the cylinder head. Oil must pass through the oil screen before entering the oil control valve. The cylinder head must be removed to service the oil screen. The intention is not to service the oil screen during vehicle life.

How the cam phaser works. The cam phaser assembly has eight separate chambers; four advance chambers and four retard chambers. When camshaft advance is requested, oil enters all four advance chambers and exerts force on the rotor vane. Because the rotor vane is bolted to the camshaft, the entire camshaft profile moves along with the rotor vane. At the same time, oil is forced out of the retard chambers. When camshaft retard is requested oil enters the retard chambers to move the camshaft in the opposite direction. There is a lock pin on one side of the rotor vane that fits inside a recessed area in the housing. The lock pin ensures that the default

position of the intake cam phaser is 120 crankshaft degrees full retard and the default position of the exhaust cam phaser is 120 crankshaft degrees full advance. When the engine is turned off, rotational force and inertia move the intake camshaft and rotor vane toward the retard position. The exhaust cam phaser includes a spring and bushing to work against the rotational force of the engine, allowing the exhaust cam phaser to lock in the fully advanced position. Under most conditions the cam phasers are returned to lock pin position when the engine is turned off. In the unique condition of an engine stall, which abruptly shuts off the engine, the cam phasers may not return to the lock pin position. In this case, the phasers will return to the lock pin position at the next start-up. Lock pin position is the most ideal cam timing for idle stability. When engine RPM exceeds approximately 600 to 1000 RPM, oil pressure unlocks the pins and variable valve timing resumes. Once enabling conditions are met, the GPEC1 uses input from sensors to calculate optimum valve timing.

There are four preprogrammed modes from which the GPEC1 bases initial valve timing.

- Starting
- Idle or Part throttle
- Wide open throttle
- Limp-in or Default

From each preprogrammed mode, the GPEC1 adjusts valve timing based on operating conditions.

GPEC1 has calculated optimum intake valve timing of 112 degrees after Top Dead Center and optimum exhaust valve timing of 97 degrees before Top Dead Center. The GPEC1 pulse width modulates the oil control valves to advance or retard the camshaft to their desired location. The spool valve inside the intake oil control valve is energized and moves to allow pressurized oil into the advance chambers of the intake cam phaser. At the same time, the spool valve inside the exhaust oil control valve is energized and moves to allow pressurized oil into the retard chambers of the exhaust cam phaser. Oil enters the advance chambers of the intake phaser and the retard chambers of the exhaust phaser. Oil pressure releases the lock pin from its locked position and pushes against the rotor vane. Both the rotor vanes are moved, advancing the intake camshaft and retarding the exhaust camshaft.

Removal

FRONT SOLENOID 1/1

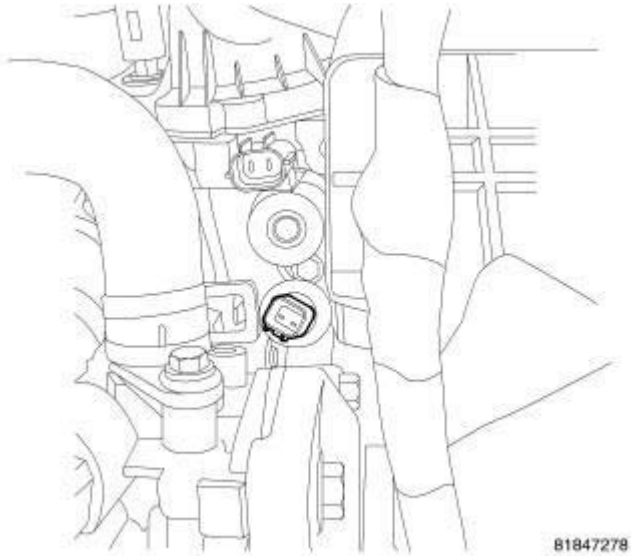

Fig. 267: OIL PRESSURE SENSOR
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Remove engine cover.
3. Rotate hose clamp out of way.
4. Disconnect oil pressure sensor electrical connector.
5. Remove oil pressure sensor.
6. Disconnect variable valve timing solenoid electrical connector.

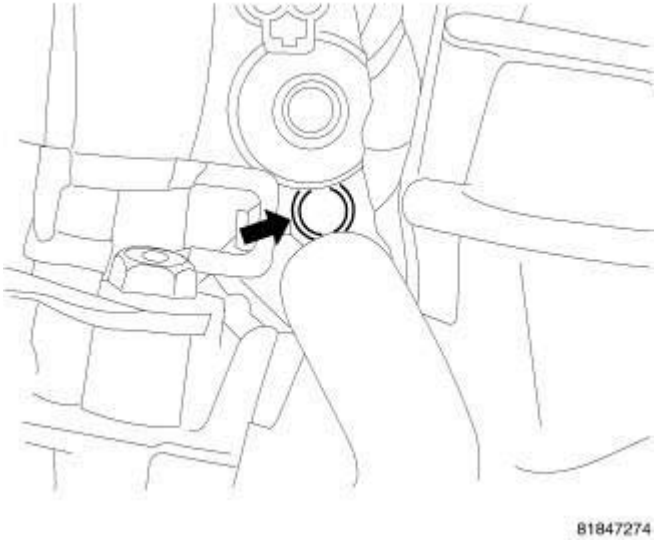

Fig. 268: SOLENOID MOUNTING BOLT
Courtesy of CHRYSLER LLC

7. Remove variable valve timing solenoid mounting bolt.

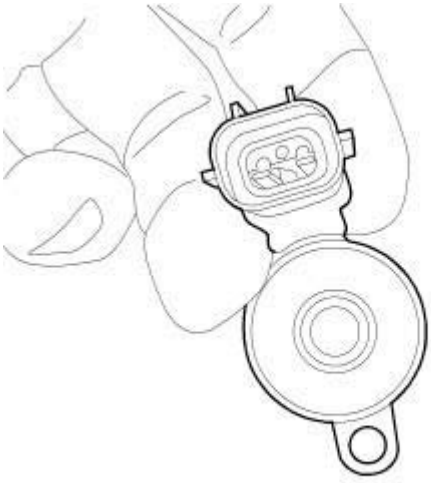

Fig. 269: SOLENOID MOUNTING TAB 1/1
Courtesy of CHRYSLER LLC

8. Pull solenoid straight out of cylinder head.

REAR SOLENOID 1/2

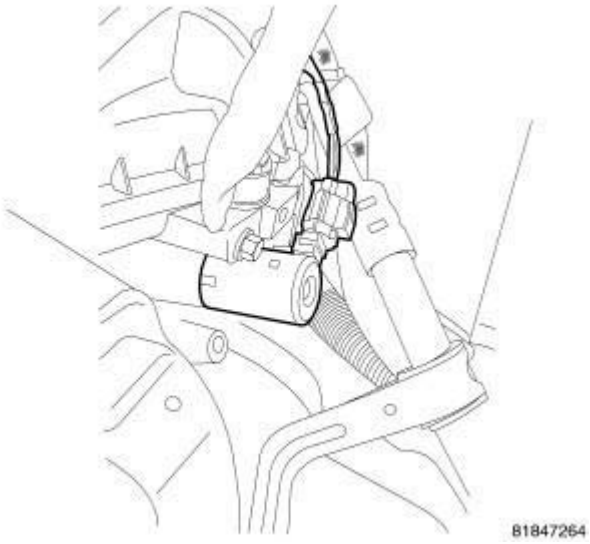

Fig. 270: SOLENOID LOCATION 1/2
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Remove engine cover.
3. Disconnect variable valve timing solenoid electrical connector.
4. Remove variable valve timing solenoid mounting bolt.

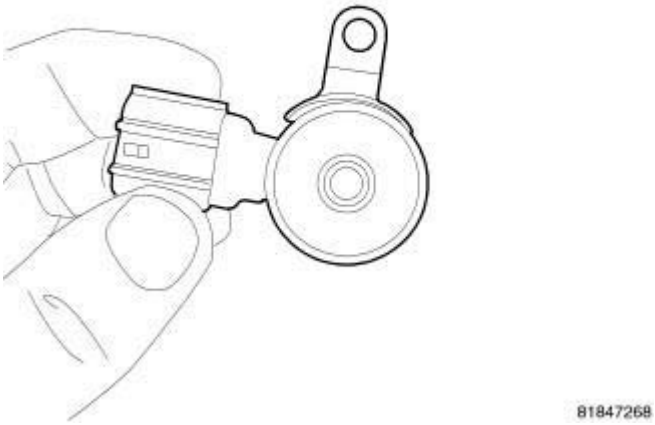

Fig. 271: SOLENOID MOUNTING TAB 1/2
Courtesy of CHRYSLER LLC

5. Pull solenoid straight out of cylinder head.

Installation

FRONT SOLENOID 1/1

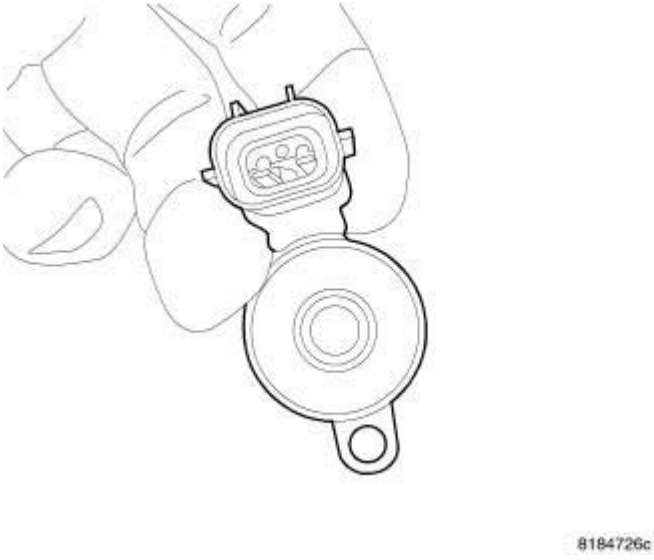

Fig. 272: SOLENOID MOUNTING TAB 1/1
Courtesy of CHRYSLER LLC

1. Solenoid for front location 1/1. Note mounting tab location is different between front and rear solenoids.

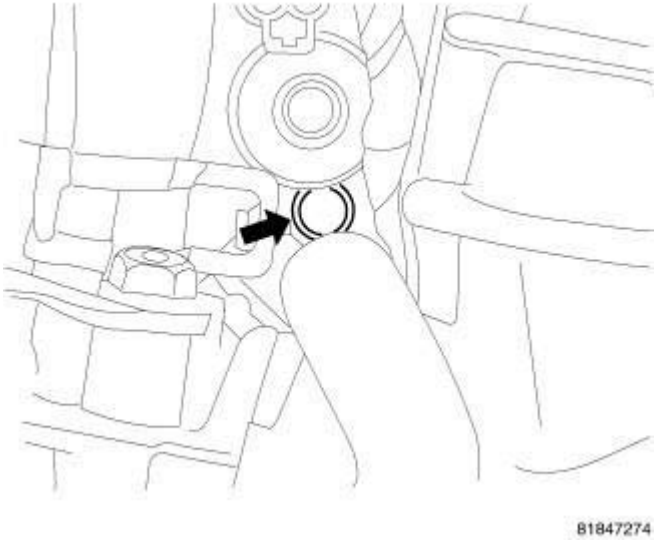

Fig. 273: SOLENOID MOUNTING BOLT
Courtesy of CHRYSLER LLC

2. Install solenoid into cylinder head.
3. Install mounting bolt and tighten to 12 N.m (9 ft. lbs.).

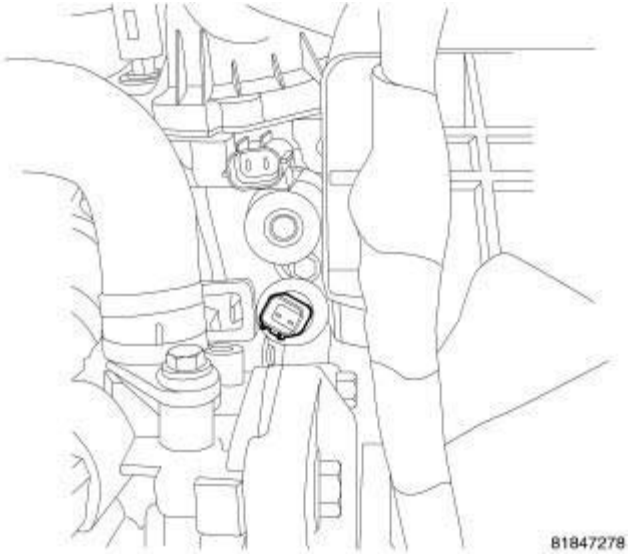

Fig. 274: OIL PRESSURE SENSOR
Courtesy of CHRYSLER LLC

4. Install oil pressure sensor.
5. Connect electrical connector to oil pressure sensor.
6. Connect electrical connector to Variable valve timing solenoid.
7. Connect negative battery cable.
8. Install engine cover.

REAR SOLENOID 1/2

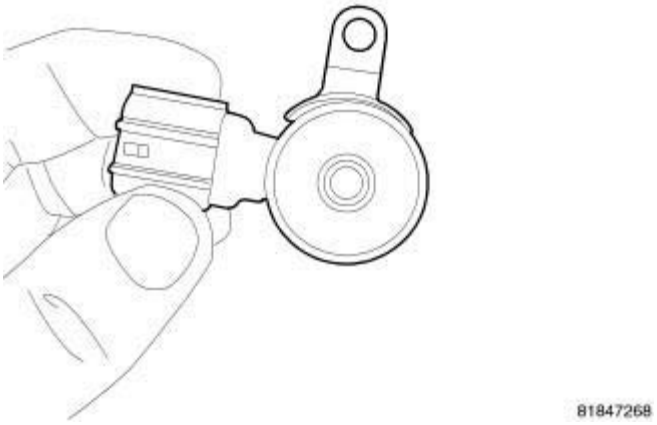

Fig. 275: SOLENOID MOUNTING TAB 1/2
Courtesy of CHRYSLER LLC

1. Rear variable valve timing solenoid. Note mounting tab location is different between front and rear solenoids.
2. Install solenoid into cylinder head.
3. Install mounting bolt and tighten to 12 N.m (9 ft. lbs.).
4. Connect electrical connector to Variable valve timing solenoid.

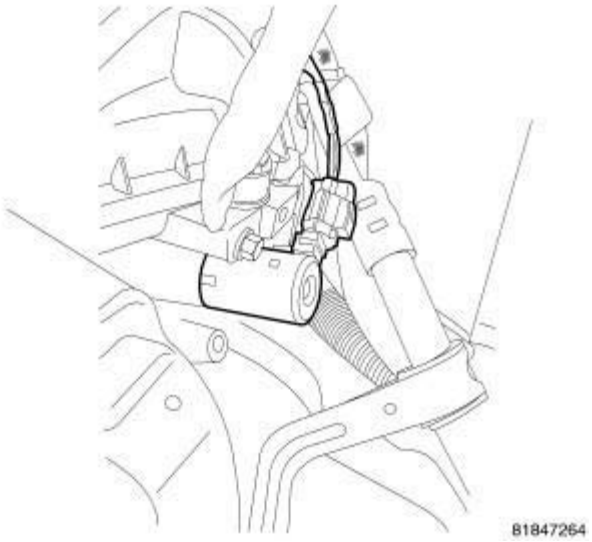

Fig. 276: SOLENOID LOCATION 1/2
Courtesy of CHRYSLER LLC

5. Connect negative battery cable.

6. Install engine cover.

COOLER, OIL

Description

DESCRIPTION

An engine oil cooler is used on some engine packages. The cooler is a coolant-to-oil type and mounted between the oil filter and oil filter adapter.

Removal

REMOVAL

NOTE: The oil cooler can not be cleaned out. In the event that the engine requires rebuilding or replacement, the oil cooler should be replaced.

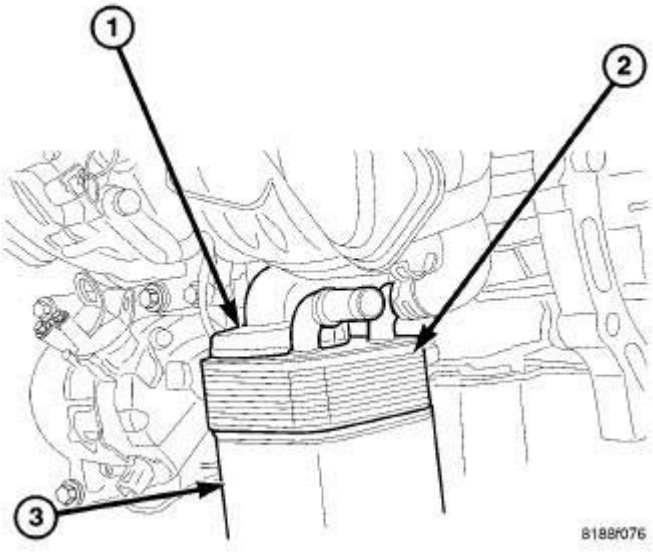

Fig. 277: OIL COOLER
Courtesy of CHRYSLER LLC

1. Raise vehicle on hoist.
2. Drain cooling system. Refer to **Cooling - Standard Procedure** .
3. Disconnect oil cooler coolant hoses.
4. Remove oil filter (3).

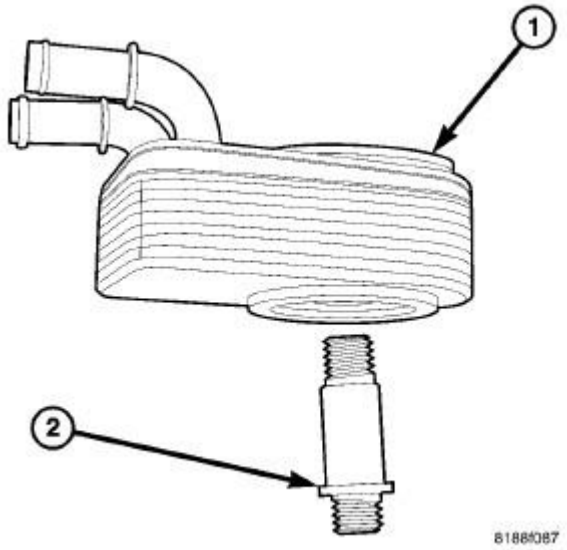

Fig. 278: OIL COOLER MOUNTING
Courtesy of CHRYSLER LLC

5. Remove oil cooler connector bolt (2).
6. Remove oil cooler (1).

Installation

INSTALLATION

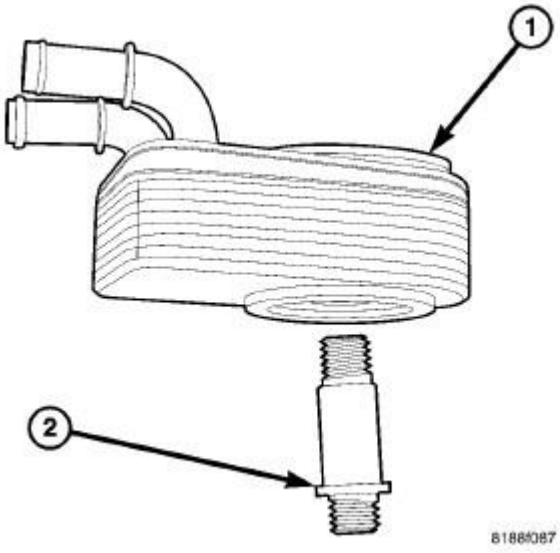

Fig. 279: OIL COOLER MOUNTING
Courtesy of CHRYSLER LLC

1. Replace oil cooler seal (1).
2. Lubricate seal and position oil cooler to oil filter adapter, aligning notch to tab.
3. Install oil cooler connector bolt (2). Tighten connector bolt to 49 N.m (36 ft. lbs.).

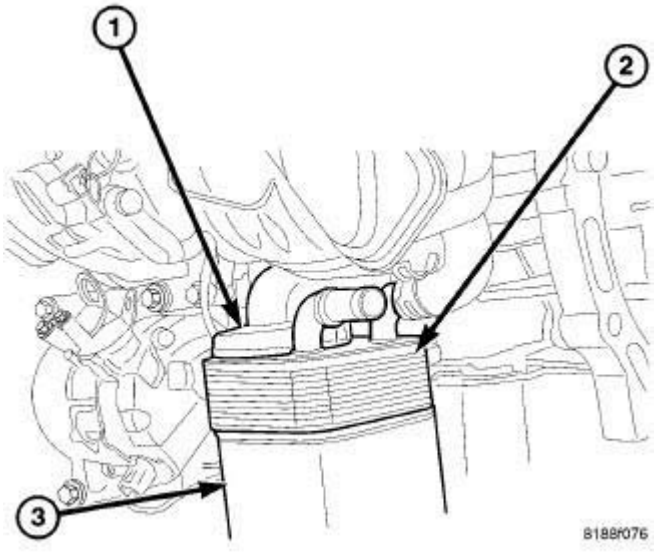

Fig. 280: OIL COOLER
Courtesy of CHRYSLER LLC

4. Install oil filter (3).
5. Connect oil cooler coolant hose.
6. Lower vehicle.
7. Fill cooling system. Refer to **Cooling - Standard Procedure** .

FILTER, ENGINE OIL

Removal

REMOVAL

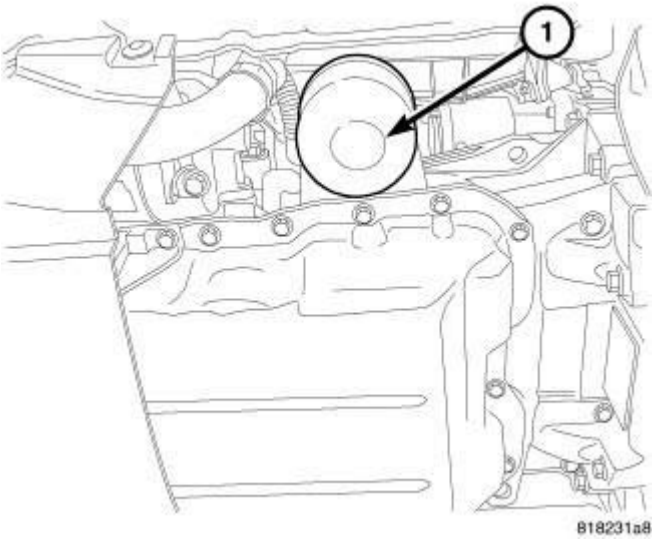

Fig. 281: Oil Filter
Courtesy of CHRYSLER LLC

CAUTION: When servicing the oil filter, avoid deforming the filter can by installing the remove/install tool band strap against the can to base lock seam. The lock seam joining the can to the base is reinforced by the base plate.

1. Using a suitable filter wrench, turn oil filter (1) counterclockwise to remove.

Installation

INSTALLATION

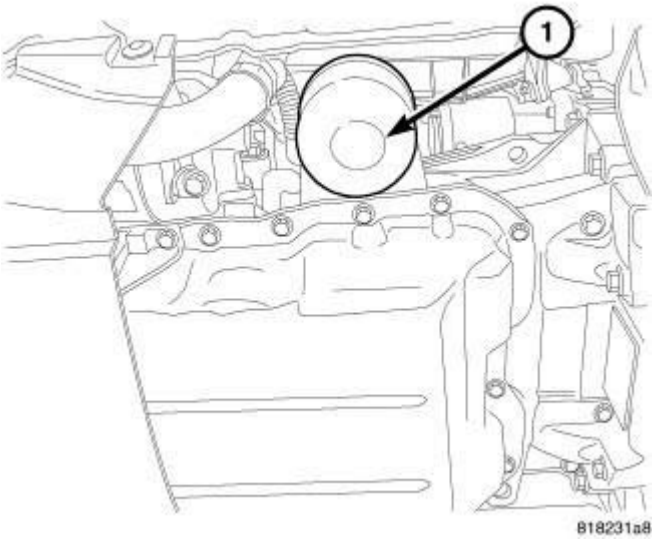

Fig. 282: OIL FILTER
Courtesy of CHRYSLER LLC

1. Clean and check filter mounting surface. The surface must be smooth, flat and free of debris or pieces of gasket.
2. Lubricate new oil filter gasket.
3. Screw oil filter (1) on until the gasket contacts base. Tighten to 14 N.m (10 ft. lbs.).

OIL

Standard Procedure

ENGINE OIL LEVEL CHECK

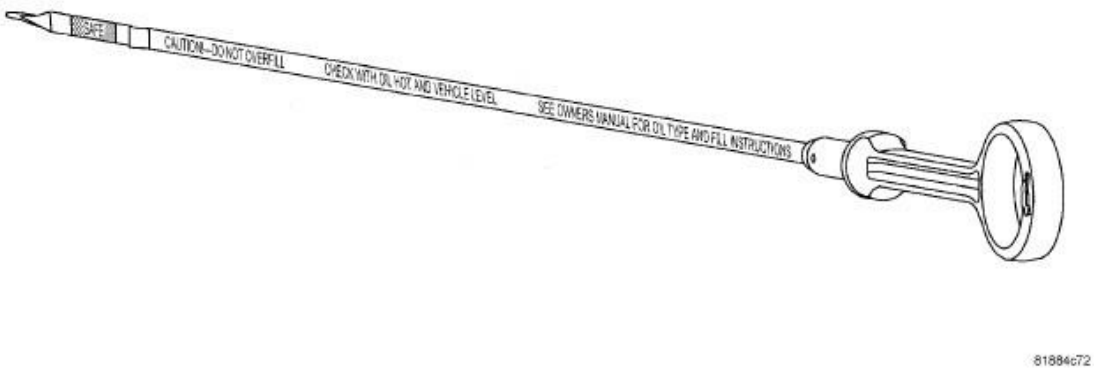

Fig. 283: OIL LEVEL INDICATOR
Courtesy of CHRYSLER LLC

NOTE: The engine must be HOT when checking oil level.

The best time to check engine oil level is after the engine is at operating temperature. Allow the engine to be shut off for at least 5 minutes before checking oil level.

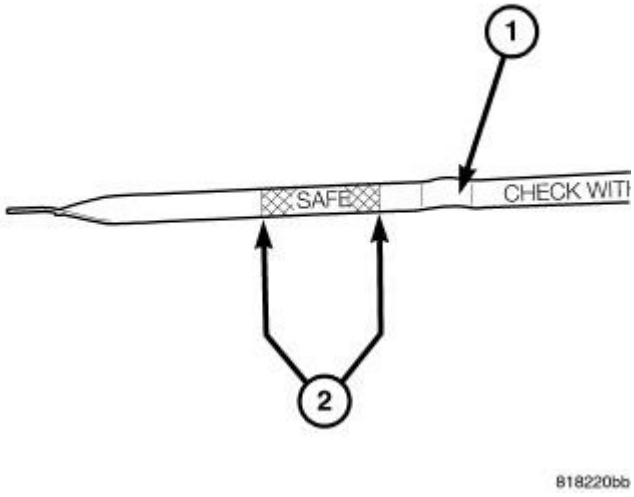

Fig. 284: DIP STICK
Courtesy of CHRYSLER LLC

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading. Remove dipstick (1), and observe oil level. Add oil only when the level is at or below the SAFE mark. If the oil level is in the safe (2) range, do not add oil.

CAUTION: Do not operate engine if the oil level is above the MAX mark on the dipstick. Excessive oil volume can cause oil aeration which can lead to engine failure due to loss of oil pressure or increase in oil temperature.

ENGINE OIL AND FILTER CHANGE

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

CAUTION: On export vehicles, refer to the owners manual for the correct grade of oil.

Change engine oil at mileage and time intervals described in the Maintenance Schedule. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

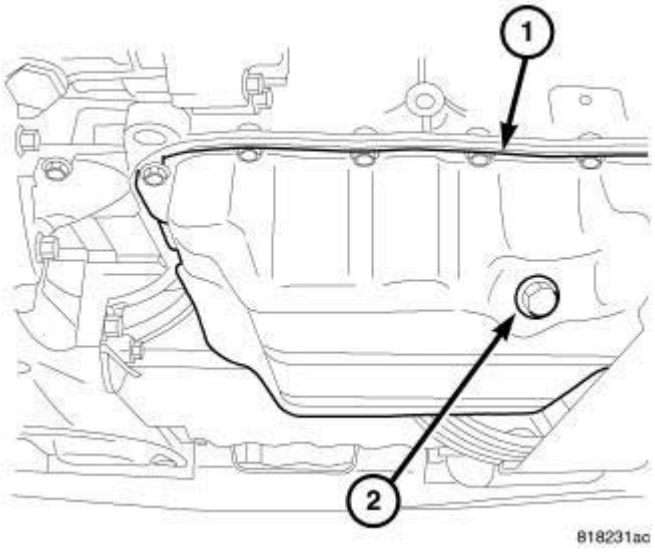

Fig. 285: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

1. Run engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn engine off.
3. Remove oil fill cap.
4. Raise vehicle on hoist.
5. Place a suitable oil collecting container under oil pan drain plug (2).
6. Remove oil pan drain plug (2) or and allow oil to drain into collecting container. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.

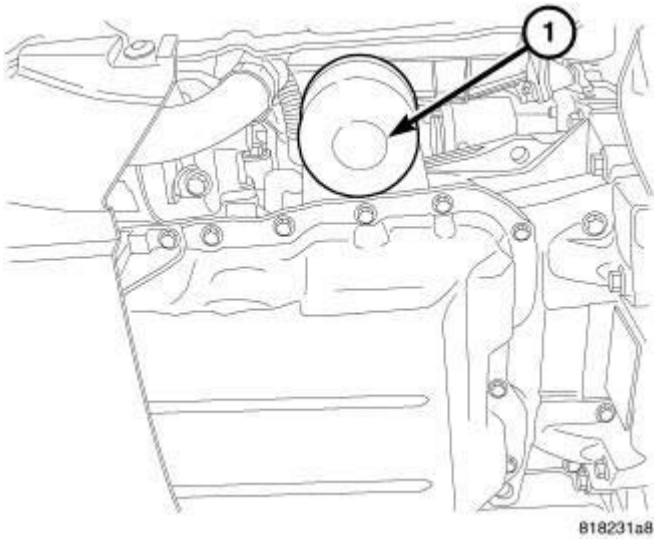

Fig. 286: OIL FILTER
Courtesy of CHRYSLER LLC

7. Remove oil filter (1). See **Engine/Lubrication/FILTER, Engine Oil - Removal**

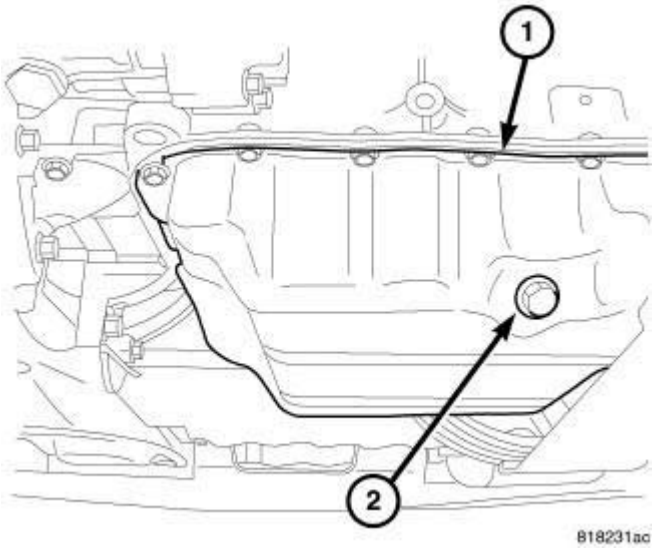

Fig. 287: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

8. Install oil pan drain plug (2) and tighten drain plug to 40 N.m (30 ft. lbs.).

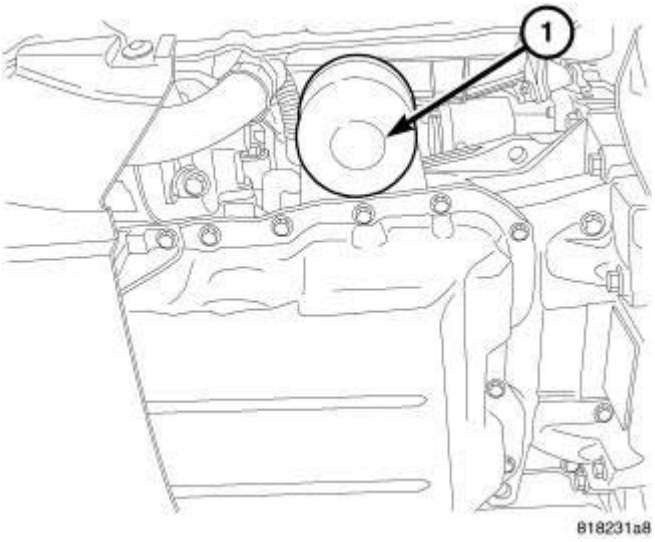

Fig. 288: OIL FILTER
Courtesy of CHRYSLER LLC

9. Install new oil filter (1), tighten to 14 Nm (10 ft. lbs.). See **Engine/Lubrication/FILTER, Engine Oil - Installation**.
10. Lower vehicle and fill crankcase with specified type and amount of engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** and **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .
11. Install oil fill cap.
12. Start engine and inspect for leaks.

13. Stop engine and inspect oil level.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. Replace oil filter with a Mopar® or the equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

PAN, OIL

Removal

REMOVAL

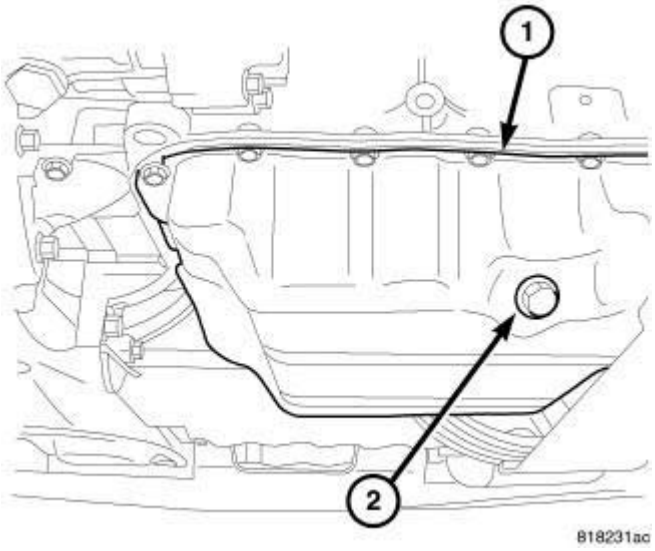

Fig. 289: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

1. Raise vehicle on hoist.
2. Remove oil drain plug (2) and drain the engine oil.
3. Remove accessory drive belt splash shield.

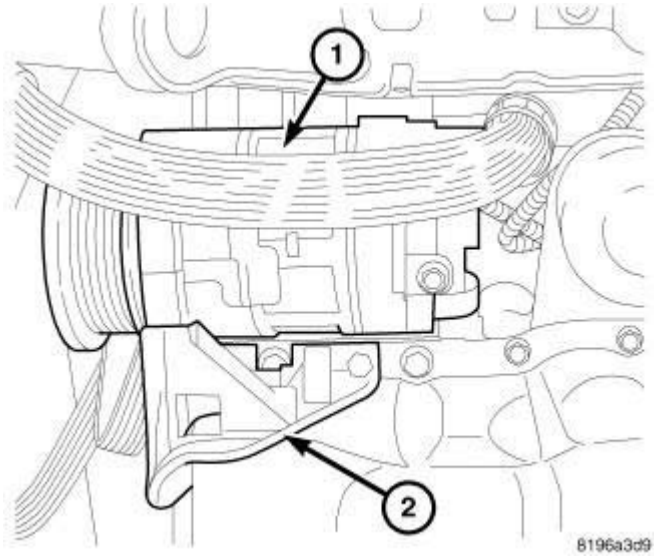

Fig. 290: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

4. Remove lower A/C compressor mounting bolt (if equipped).
5. Remove A/C mounting bracket (2).

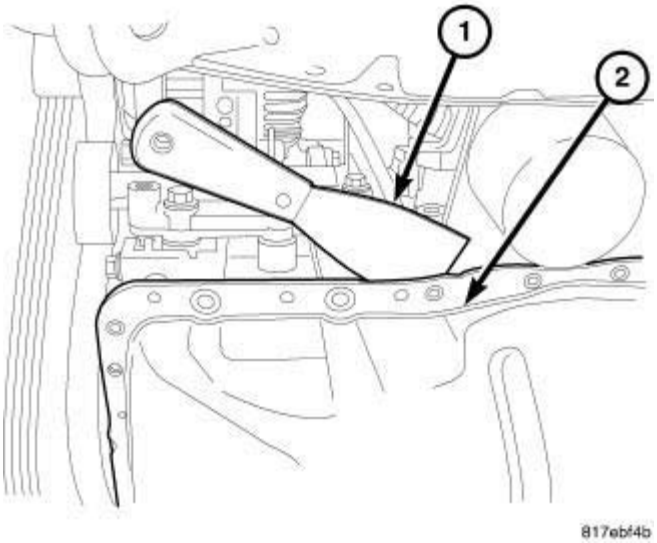

Fig. 291: OIL PAN REMOVAL
Courtesy of CHRYSLER LLC

NOTE: Do not use pry points in block to remove oil pan.

6. Remove oil pan retaining bolts.
7. Using a putty knife (1), loosen seal around oil pan (2).
8. Remove oil pan (2).

Installation

INSTALLATION

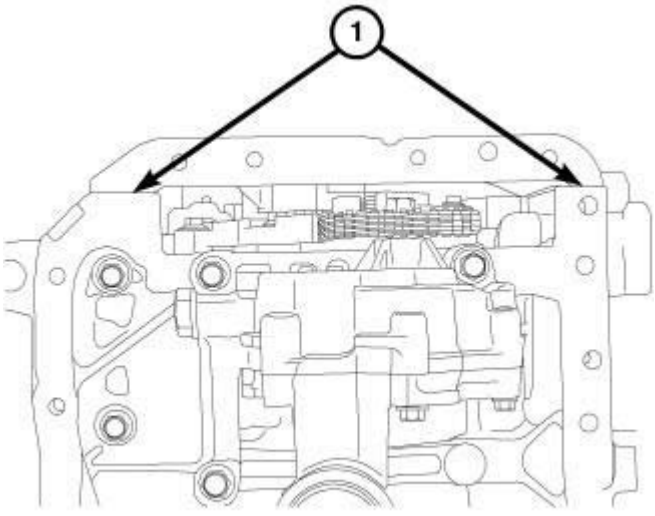

Fig. 292: SEALER LOCATION
Courtesy of CHRYSLER LLC

NOTE: Oil pan sealing surfaces must be free of grease or oil.

NOTE: Parts must be assembled within 10 minutes of applying RTV.

1. Apply Mopar® Engine RTV GEN II at the front cover to engine block parting lines (1).

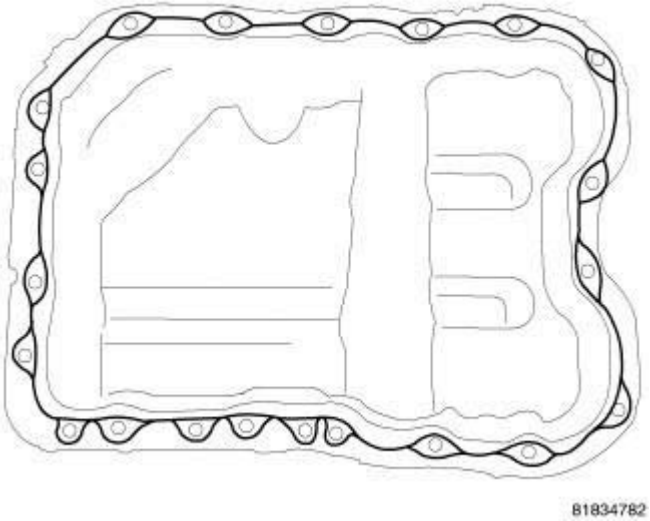

Fig. 293: SEALING OIL PAN
Courtesy of CHRYSLER LLC

2. Apply a 2 mm bead of Mopar® Engine RTV GEN II around the oil pan as shown in illustration.
3. Position oil pan and install bolts. Tighten bolts to 12 N.m (105 in. lbs.).

NOTE: The 2 long bolts must be tightened to 22 N.m (195 in. lbs.).

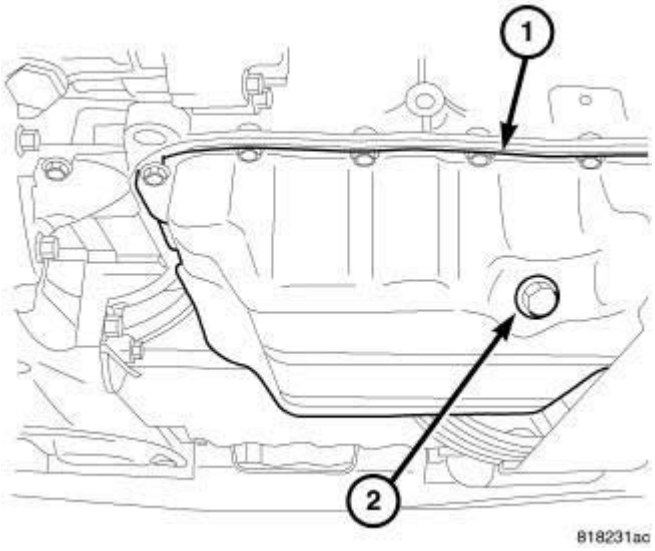

Fig. 294: OIL DRAIN PLUG
Courtesy of CHRYSLER LLC

4. Install oil drain plug (2).
5. Lower vehicle and fill engine crankcase with proper oil to correct level.
6. Start engine and check for leaks.

PLUG, OIL

Description

DESCRIPTION

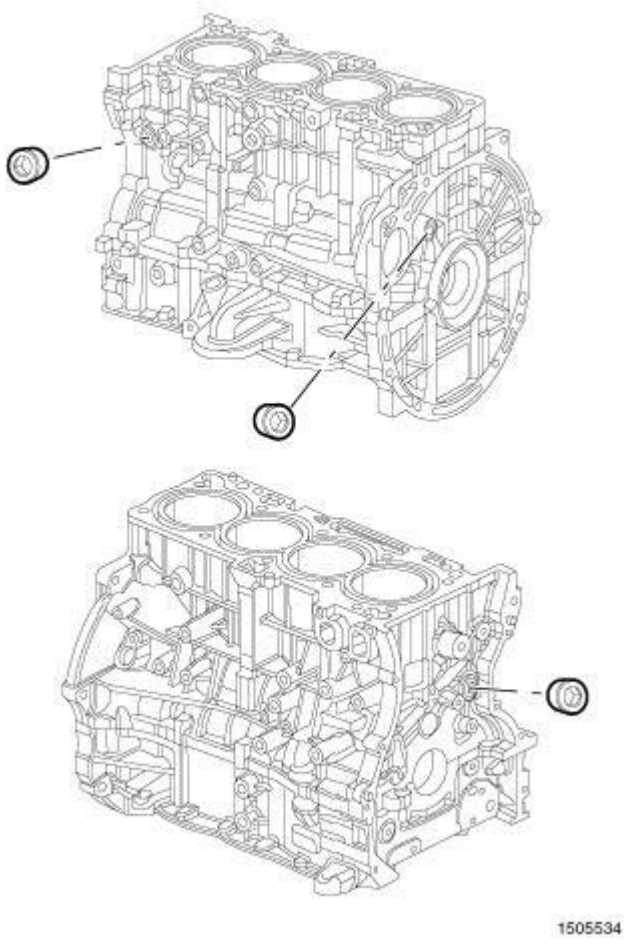

Fig. 295: Engine Block Tapered Plugs
Courtesy of CHRYSLER LLC

The engine block has three tapered plugs sealing the high pressure oil gallery. These threaded plugs do not have a torque specification but instead are installed to a specific depth. Do not attempt to further tighten these plugs, damage to the engine block could result. Whenever these plugs are removed they must be replaced. Service plugs have a lock patch and do not require the application of additional sealant.

Removal

REMOVAL

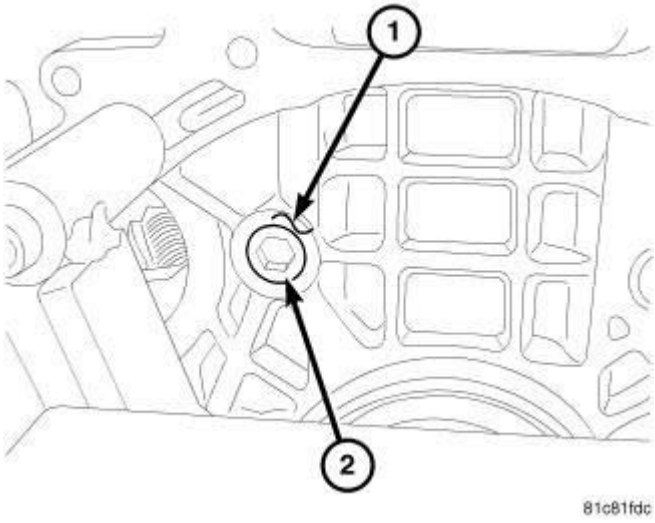

Fig. 296: GALLERY PLUG
Courtesy of CHRYSLER LLC

CAUTION: Excessive use of brake parts cleaner to clean threads in block could cause #5 main bearing failure.

NOTE: Rear plug shown in illustration, other plugs are similar.

1. Remove the plug (2) from the engine block.
2. Use Mopar® Brake Parts Cleaner (or equivalent) sparingly to clean the block.

Installation

INSTALLATION

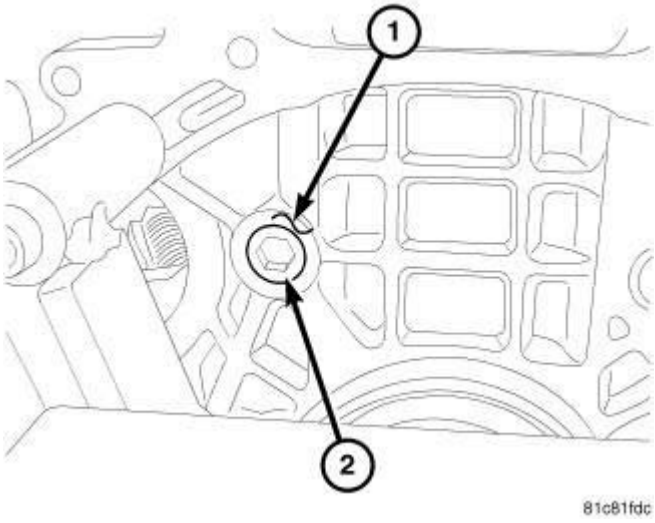

Fig. 297: GALLERY PLUG
Courtesy of CHRYSLER LLC

CAUTION: Excessive use of brake parts cleaner to clean threads in block could cause #5 main bearing failure.

NOTE: Rear plug shown in illustration, other plugs are similar.

1. Use Mopar® Brake Parts Cleaner (or equivalent) sparingly to clean the block.
2. Install the plug (2) flush with the block boss face (1). The plug (2) is correctly installed when it is flush or protruding no more than 1 mm from the block boss face (1).

PUMP, ENGINE OIL

Description

DESCRIPTION

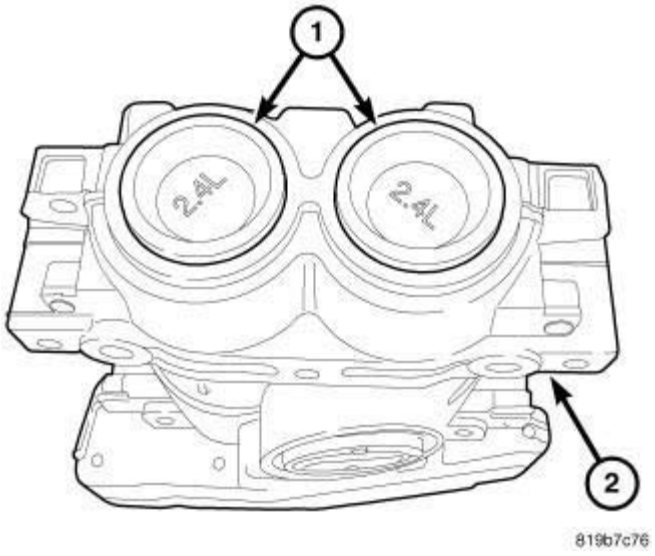

Fig. 298: Balance Shaft Module Identification
Courtesy of CHRYSLER LLC

The oil pump is integral to the balance shaft module (BSM) (2). The oil pump cannot be disassembled for inspection. The pressure relief valve is serviceable and can be removed and inspected. The BSM can be identified by the plastic end caps (1).

Removal

REMOVAL

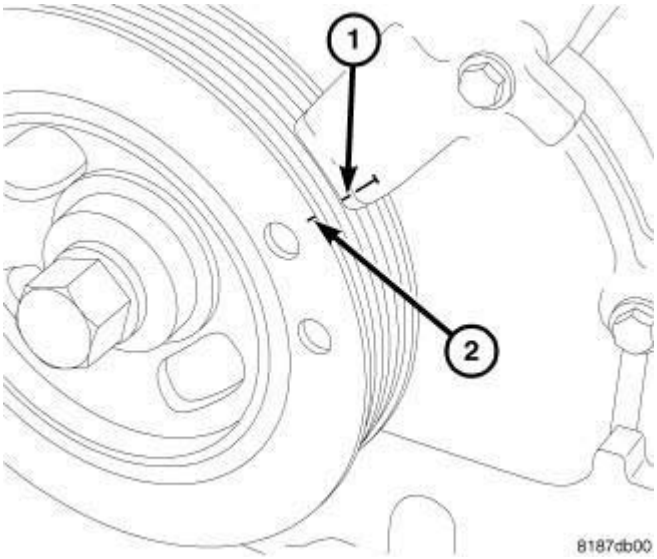

Fig. 299: Top Dead Center
Courtesy of CHRYSLER LLC

1. Rotate engine to TDC (1,2) on #1 compression stroke.

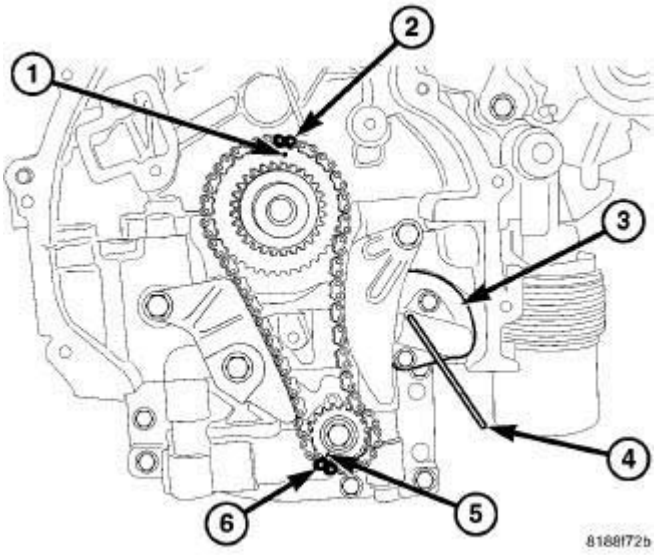

Fig. 300: Balance Shaft Module Tensioner
Courtesy of CHRYSLER LLC

2. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
3. Mark the chain (6) and the sprocket (5) for reassembly.

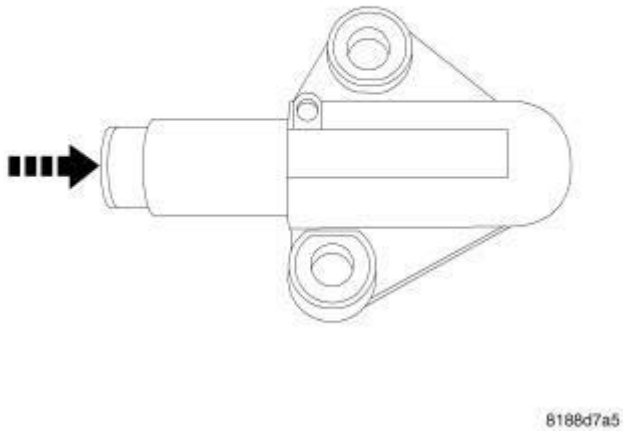

Fig. 301: OIL PUMP TENSIONER RESET
Courtesy of CHRYSLER LLC

4. Push tensioner piston back into the tensioner body.

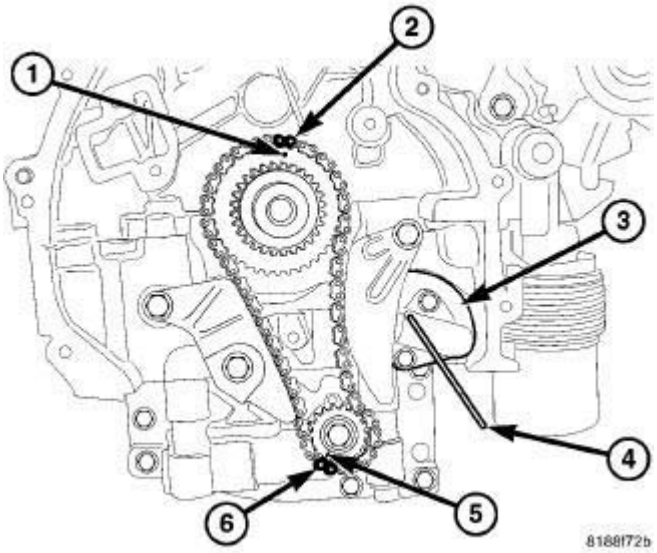

Fig. 302: Balance Shaft Module Tensioner
Courtesy of CHRYSLER LLC

5. With piston held back insert tensioner pin 9703 (4) into the tensioner body to hold the piston in the retracted position.

NOTE: Do not remove sprocket from BSM.

6. Remove BSM mounting bolts. Discard 180 mm bolts, 185 mm bolts can be reused.

7. Lower the back of the BSM and remove the chain (6) from the sprocket (5).
8. Remove BSM from the engine.

Inspection

INSPECTION

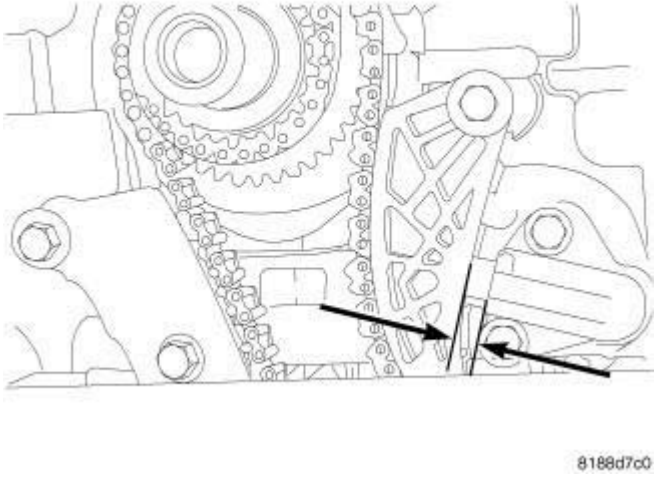

Fig. 303: OIL PUMP CHAIN STRETCH
Courtesy of CHRYSLER LLC

1. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
2. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
3. Measure the distance between the tensioner body and the guide shoe as shown in illustration.
4. If the distance is 10.1 mm (0.397 in.) or greater, replace the chain.

Installation

INSTALLATION

CAUTION: There are two different Balance Shaft Module (BSM) to engine block bolts used. 180 mm bolts with a lock-patch on the threads or 185 mm bolts without lock-patch. Do not reuse the 180 mm bolts. Always discard 180 mm bolts after removing. Failure to replace these bolts can result in engine damage. The 185 mm bolts are reusable. Install the same length bolts that were removed and use either four new 180 mm bolts or four 185 mm bolts.

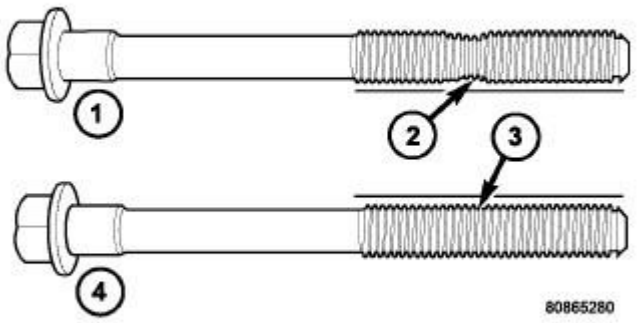

Fig. 304: Checking Cylinder Head Bolts for Stretching (Necking)
Courtesy of CHRYSLER LLC

1. The 185 mm (7.283 in.) length bolts must be checked for stretching. Check the bolts with a straight edge for necking (2). If the bolts are necked down, they must be replaced.

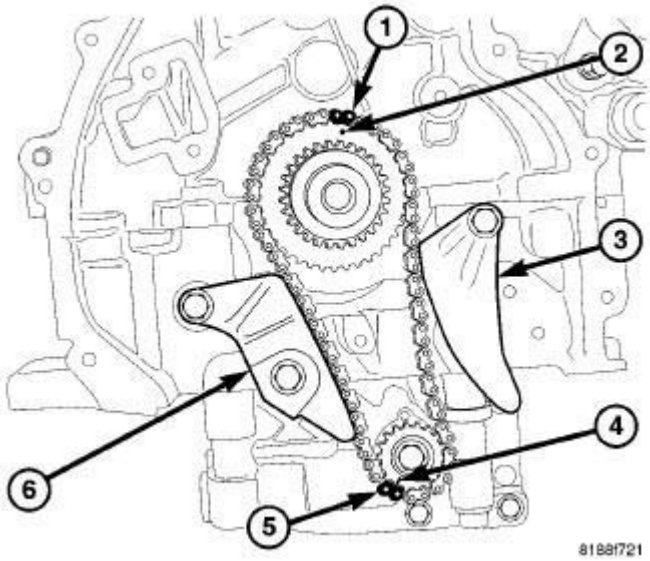

Fig. 305: Balance Shaft Module Timing
Courtesy of CHRYSLER LLC

2. Clean BSM mounting holes with Mopar® brake parts cleaner.
3. If chain was removed, align marks on crankshaft sprocket (2) and chain (1).
4. Align marks on oil pump sprocket (5) and chain (4).
5. Install chain on sprocket.

6. Pivot BSM assembly upwards and position on ladder frame.

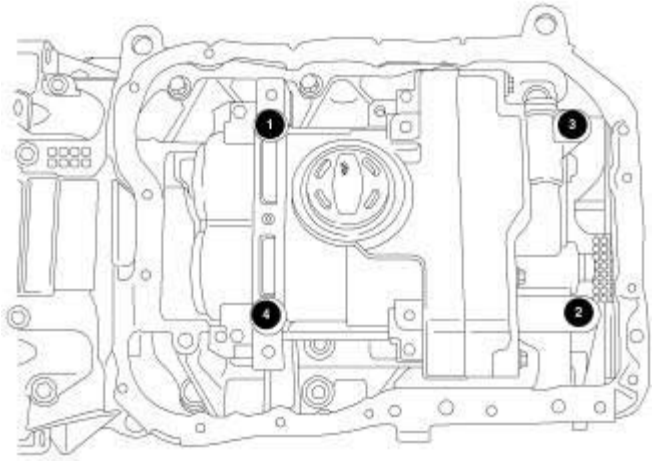

Fig. 306: Balance Shaft Module Torque Sequence
Courtesy of CHRYSLER LLC

7. Start BSM mounting bolts by hand.

NOTE: Use a three step procedure when tightening BSM mounting bolts. For new 180 mm bolts, go to step 8. For 185 mm bolts, go to step 9.

8. Tighten new 180 mm BSM mounting bolts as follows:
   a. Tighten to 15 N.m (11 ft. lbs.) in the sequence shown in illustration.
   b. Tighten to 33 N.m (24 ft. lbs.) in the sequence shown in illustration.
   c. Rotate bolts an additional 90° in the sequence shown in illustration.
9. Tighten 185 mm BSM mounting bolts as follows:
   a. Tighten to 15 N.m (11 ft. lbs.) in the sequence shown in illustration.
   b. Tighten to 29 N.m (22 ft. lbs.) in the sequence shown in illustration.
   c. Rotate bolts an additional 90° in the sequence shown in illustration.

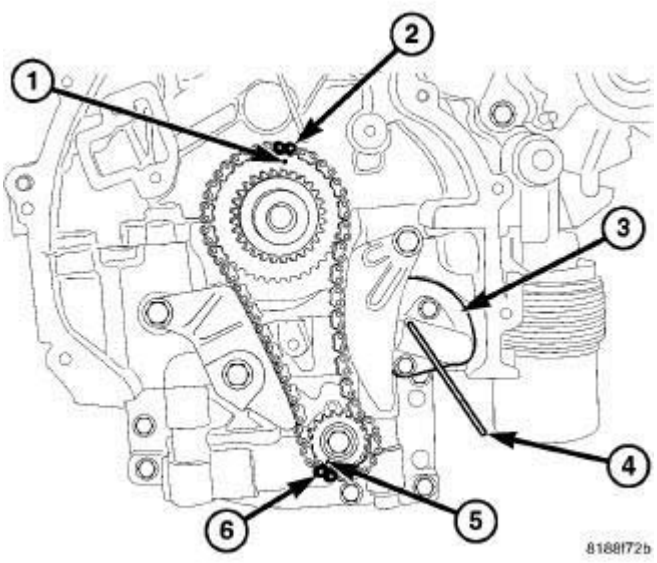

Fig. 307: Balance Shaft Module Tensioner
Courtesy of CHRYSLER LLC

10. Remove tensioner pin 9703 (4).
11. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
12. Fill with oil.
13. Start engine and check for leaks.

SENSOR, OIL TEMPERATURE

Removal

REMOVAL

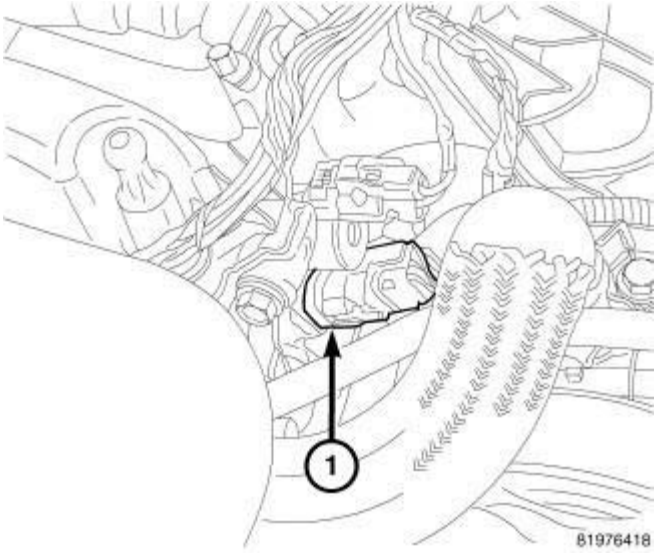

Fig. 308: OIL TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

1. Disconnect oil temperature sensor (1) electrical connector.
2. Remove sensor (1).

Installation

INSTALLATION

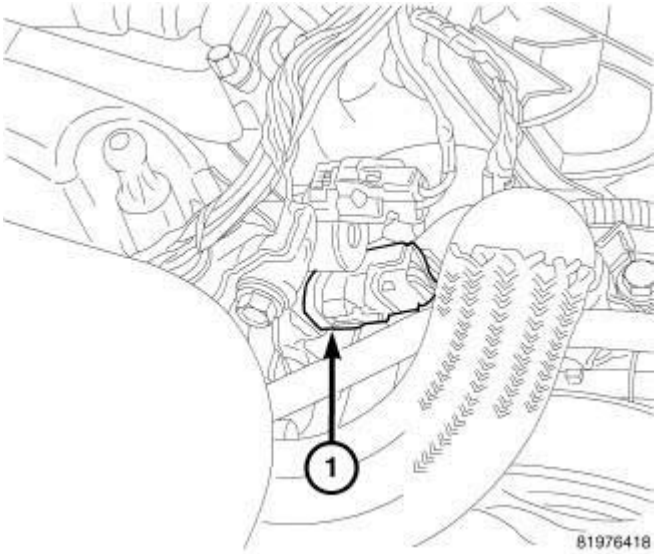

Fig. 309: OIL TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

1. If reusing the oil temperature sensor, coat the threads with Mopar® thread sealant.
2. Install oil temperature sensor (1). Tighten to 18 N.m (160 in. lbs.).
3. Connect electrical connector.

SWITCH, OIL PRESSURE

Description

DESCRIPTION

The oil pressure switch is located on the left front side of the engine block. The oil pressure switch is a pressure sensitive switch that is activated by the engine's oil pressure (in the main oil gallery). The switch is a two terminal device (one terminal is provided to the wiring harness and the other terminal is the switch's metal housing that screws into the engine block).

Operation

OPERATION

The oil pressure switch is normally "Closed." The switch changes from a "Closed" circuit to an "Open" circuit, on increasing pressure of 7 psig. The oil pressure switch changes from an "Open" circuit to a "Closed" circuit, on decreasing pressure, between 2 psig and 4 psig.

Removal

REMOVAL

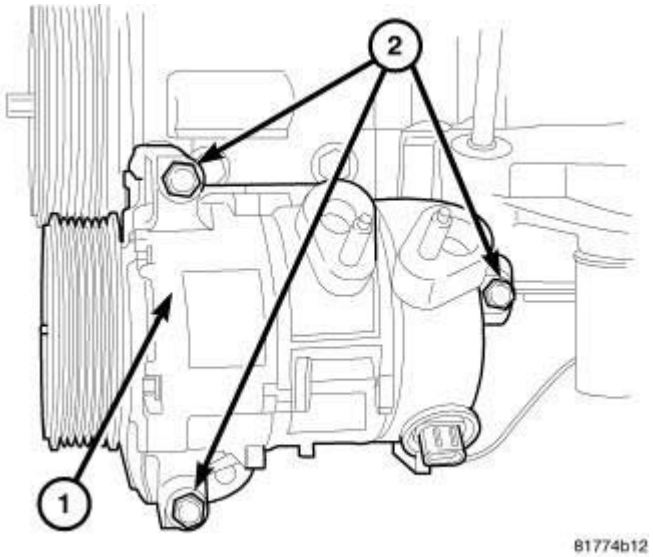

Fig. 310: A/C Compressor Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
3. Remove the splash shield from the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Remove the three bolts (2) and reposition the A/C compressor (1).

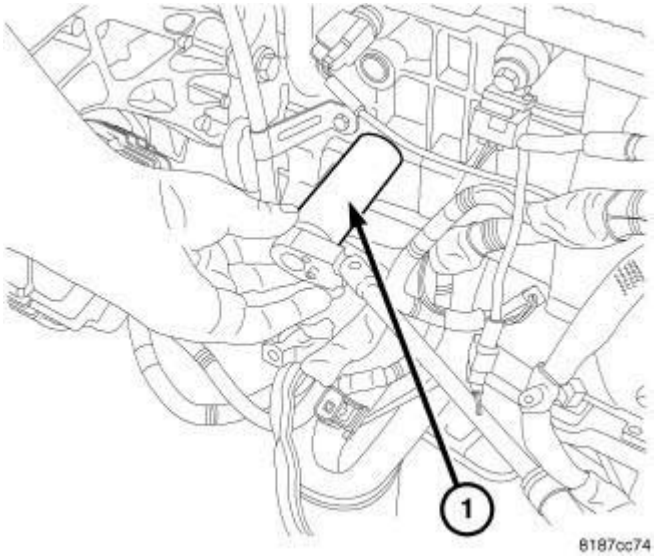

Fig. 311: OIL SENDER
Courtesy of CHRYSLER LLC

6. Disconnect the oil pressure switch electrical connector.
7. Remove the oil pressure switch using oil pressure socket C-4597 (1) or equivalent.

Installation

INSTALLATION

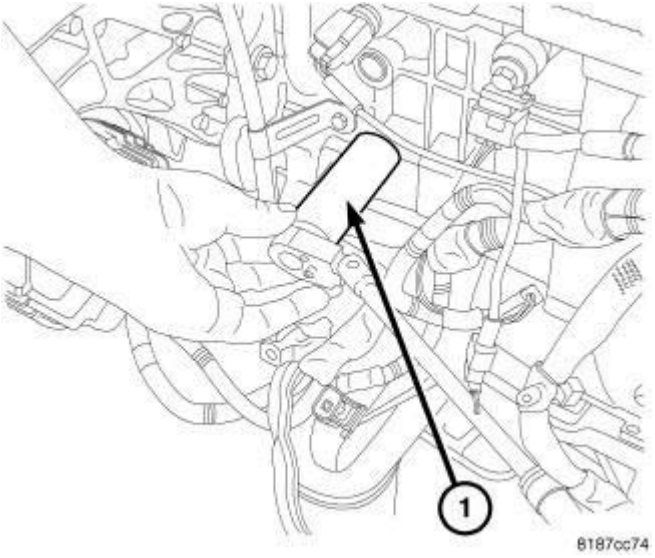

Fig. 312: OIL SENDER
Courtesy of CHRYSLER LLC

NOTE: If the oil pressure switch is removed, it must be replaced with a new switch.

CAUTION: The oil pressure switch has tapered threads, over tightening could crack the engine block.

1. Install the oil pressure switch using oil pressure socket C-4597 (1) or equivalent. Tighten switch to 8 N.m (71 in. lbs.).
2. Connect the oil pressure switch electrical connector.

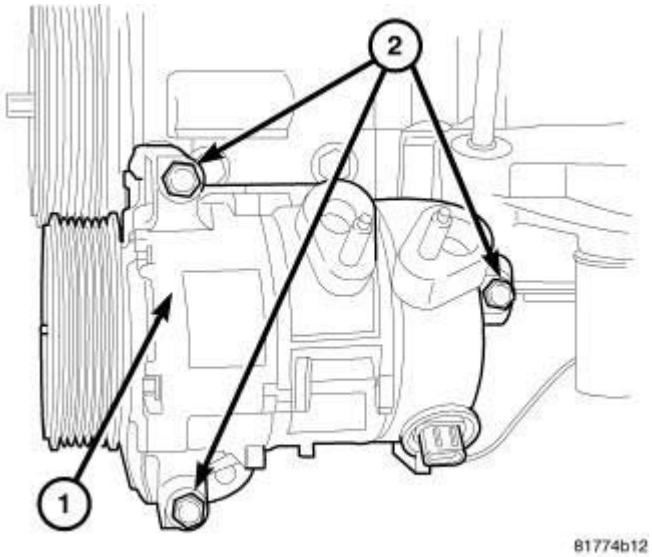

Fig. 313: A/C Compressor Removal/Installation
Courtesy of CHRYSLER LLC

3. Position the A/C compressor (1) and install three mounting bolts (2). Tighten bolts to 25 N.m (18 ft. lbs.).
4. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
5. Install the splash shield to the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
6. Reconnect the negative battery cable.

VALVE, OIL PRESSURE RELIEF

Removal

REMOVAL

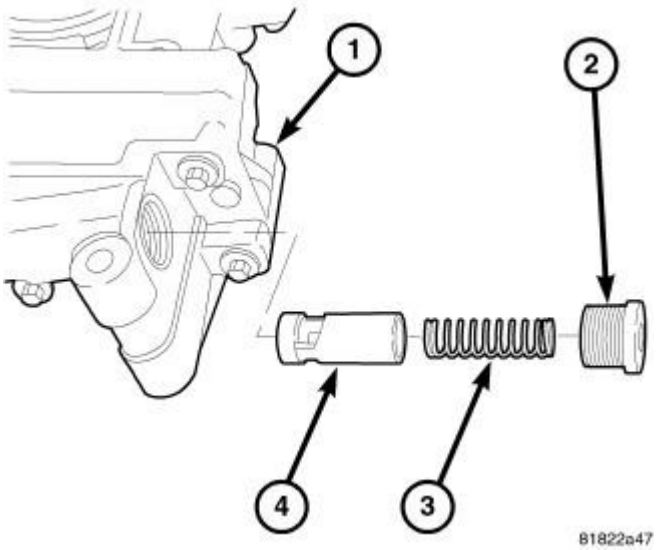

Fig. 314: OIL PRESSURE RELIEF VALVE
Courtesy of CHRYSLER LLC

1. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**
2. Remove pressure regulating valve cap (2).
3. Remove pressure regulating valve spring (3) and valve (4).

Inspection

INSPECTION

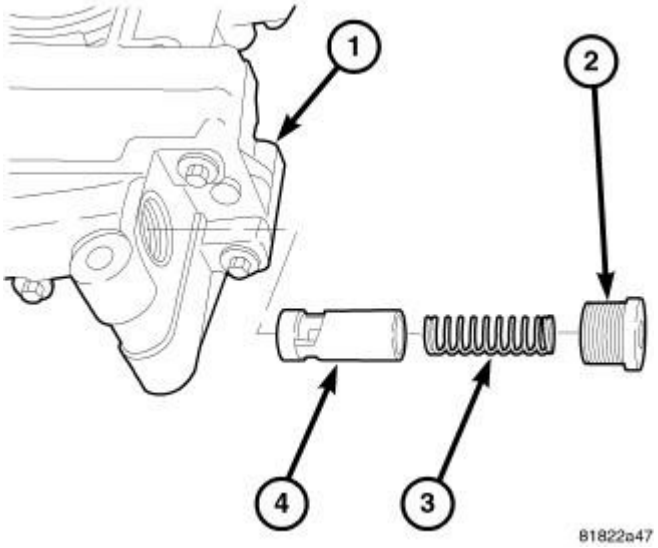

Fig. 315: OIL PRESSURE RELIEF VALVE
Courtesy of CHRYSLER LLC

NOTE: Pressure regulating valve (4) can be service separately from the oil pump

assembly.

1. Inspect pressure relief valve (4) scoring, gouging, or debris. Replace as needed.
2. Inspect the pressure relief valve bore in the pump for scoring, gouging, or debris.
3. If pump bore is damaged, replace balance shaft module.

Installation

INSTALLATION

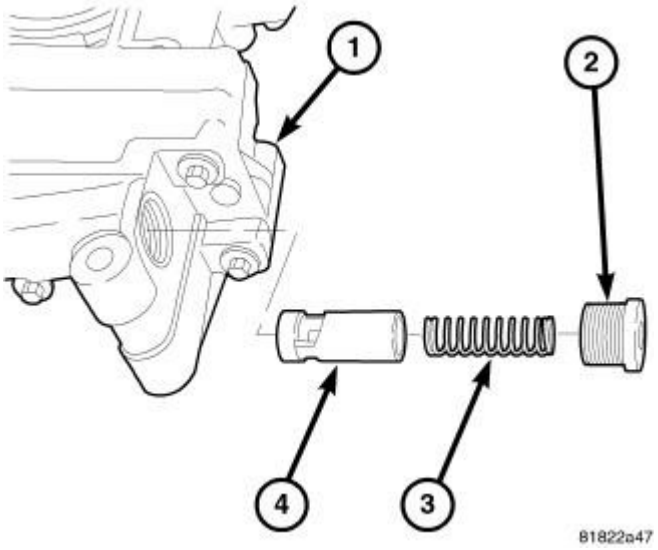

Fig. 316: OIL PRESSURE RELIEF VALVE
Courtesy of CHRYSLER LLC

1. Lightly coat pressure regulating valve with clean engine oil and install valve (4).
2. Install spring (3) and cap (2).
3. Tighten cap to 44 N.m (32 lbs. ft.).

MANIFOLDS

MANIFOLD, EXHAUST

Description

DESCRIPTION

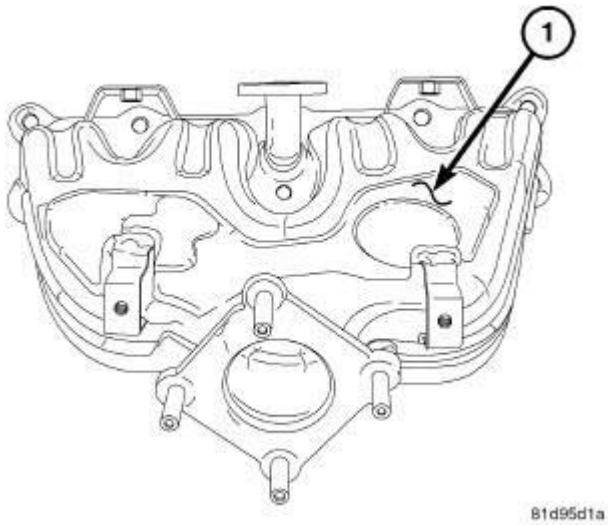

Fig. 317: Partially Zero Emission Vehicle Manifold
Courtesy of CHRYSLER LLC

The 2.4L engine can be equipped with a Partially Zero Emission Vehicle (PZEV) package. The PZEV package has a specific manifold and gasket that can not be interchanged with non-PZEV engines.

Operation

OPERATION

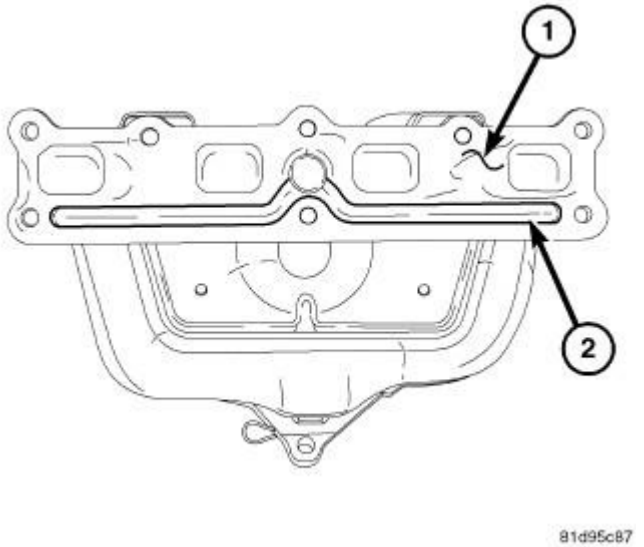

Fig. 318: Manifold
Courtesy of CHRYSLER LLC

Air is pump into the manifold (1) through a check valve and is distributed to the cylinders through a passage (2) machined in the manifold.

Removal

REMOVAL

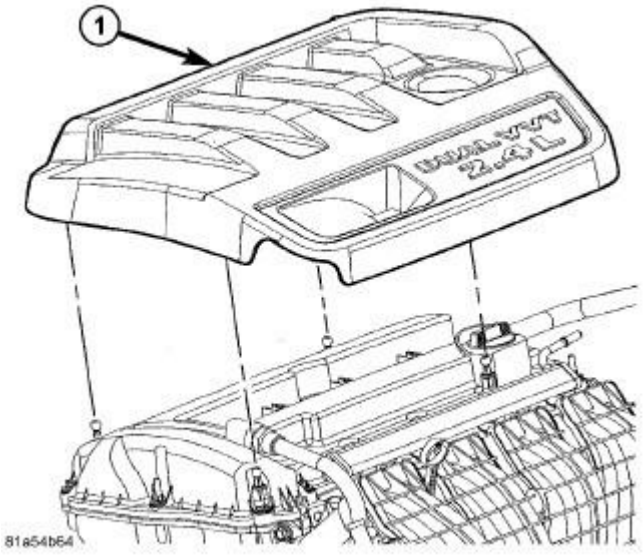

Fig. 319: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1).
2. Disconnect negative cable from battery.

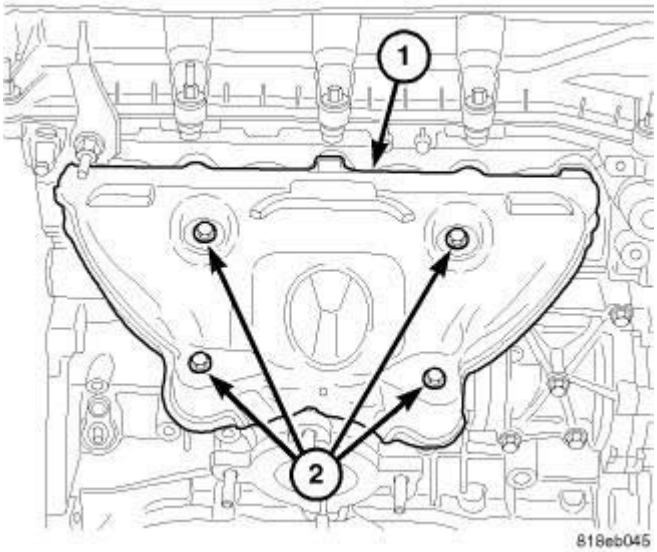

Fig. 320: EXHAUST MANIFOLD HEAT SHIELD
Courtesy of CHRYSLER LLC

3. Remove bolts (2) attaching upper heat shield.

4. Remove upper heat shield (1).

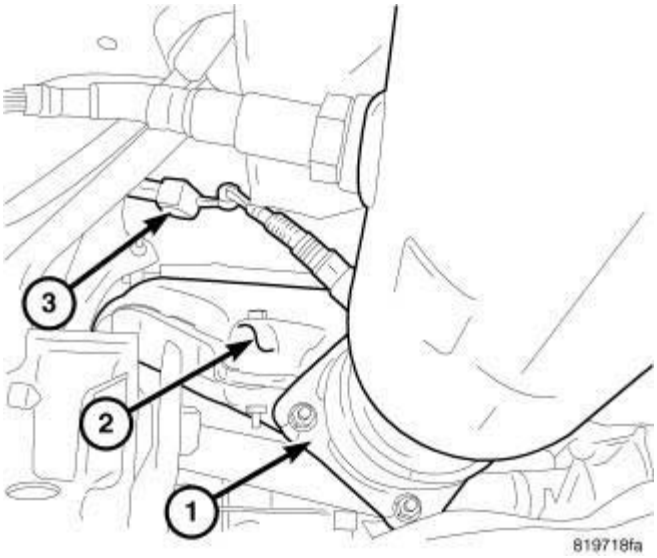

Fig. 321: Catalytic Converter At Exhaust Manifold
Courtesy of CHRYSLER LLC

5. Disconnect exhaust pipe (1) from manifold.
6. Disconnect oxygen sensor electrical connector (3).

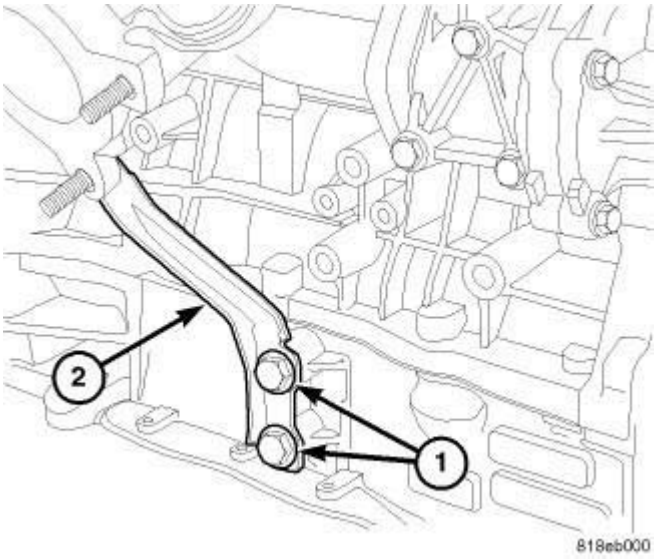

Fig. 322: EXHAUST MANIFOLD SUPPORT BRACKET
Courtesy of CHRYSLER LLC

7. Remove manifold support bracket (2).
8. Remove lower exhaust manifold heat shield.

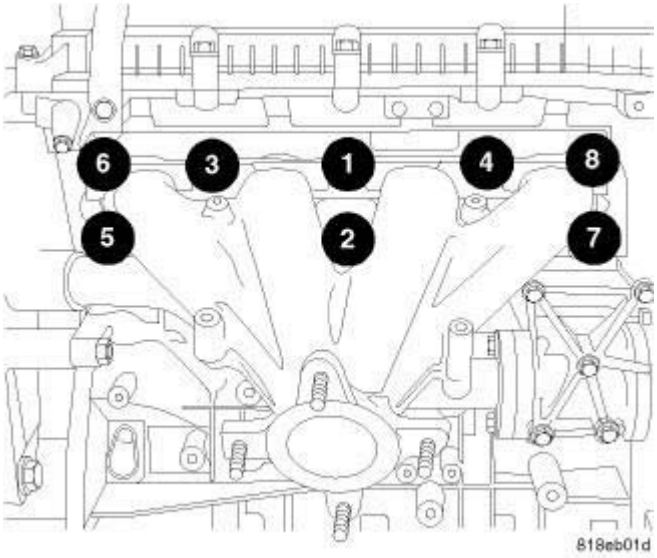

Fig. 323: Exhaust Manifold Retaining Fasteners Torque Sequence
Courtesy of CHRYSLER LLC

9. Remove exhaust manifold retaining fasteners.
10. Remove and discard manifold gasket.

Cleaning

CLEANING

1. Discard gasket (if equipped) and clean all surfaces of manifold and cylinder head.

Inspection

INSPECTION

1. Inspect manifold gasket surfaces for flatness with straight edge. Surface must be flat within 0.15 mm per 300 mm (0.006 in. per foot) of manifold length.
2. Inspect manifolds for cracks or distortion. Replace manifold as necessary.

Installation

INSTALLATION

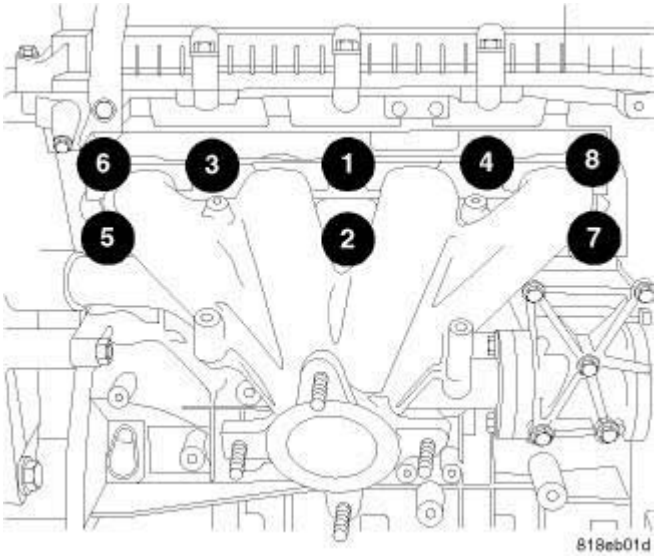

Fig. 324: Exhaust Manifold Retaining Fasteners Torque Sequence
Courtesy of CHRYSLER LLC

1. Install a new exhaust manifold gasket **DO NOT APPLY SEALER** .
2. Position exhaust manifold in place.
3. Tighten the exhaust manifold bolts to 34 N.m (25 ft. lbs.).

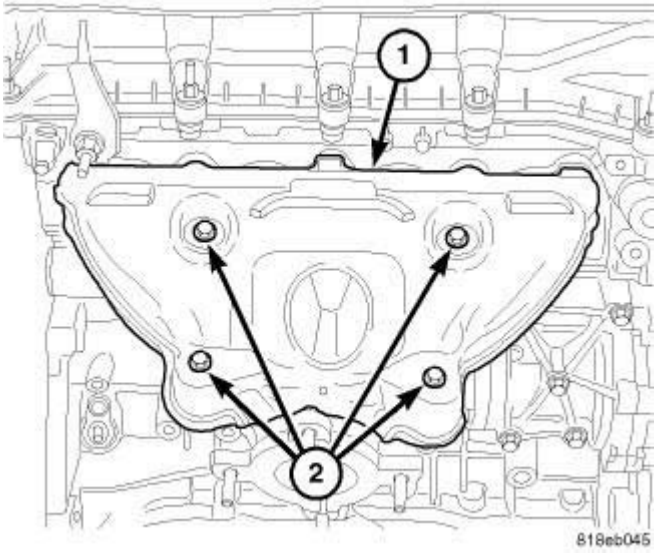

Fig. 325: EXHAUST MANIFOLD HEAT SHIELD
Courtesy of CHRYSLER LLC

4. Install exhaust manifold heat shields (1). Tighten bolts (2) to 12 N.m (105 in. lbs.).

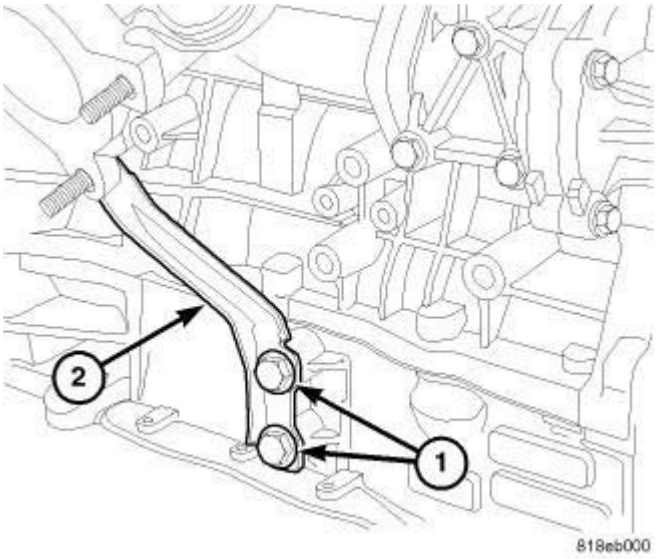

Fig. 326: EXHAUST MANIFOLD SUPPORT BRACKET
Courtesy of CHRYSLER LLC

5. Install exhaust manifold support bracket (2).

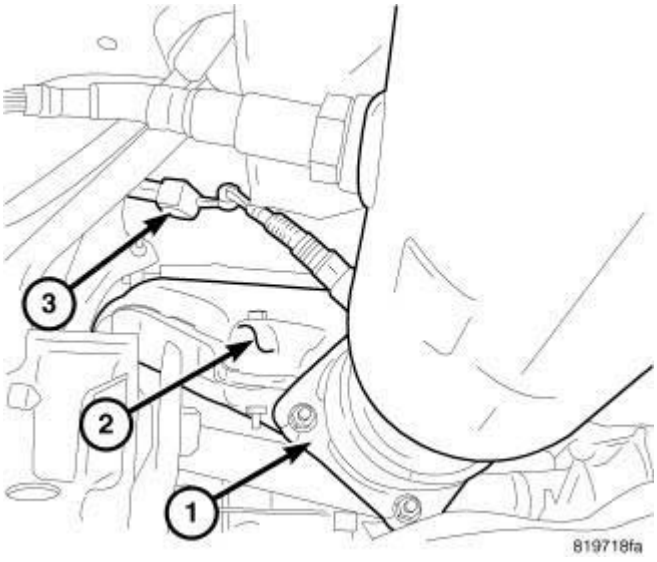

Fig. 327: Catalytic Converter At Exhaust Manifold
Courtesy of CHRYSLER LLC

6. Install new catalytic converter gasket.
7. Install exhaust pipe to manifold (1). Tighten fasteners to 28 N.m (250 in. lbs.).
8. Connect oxygen sensor electrical connector (3).

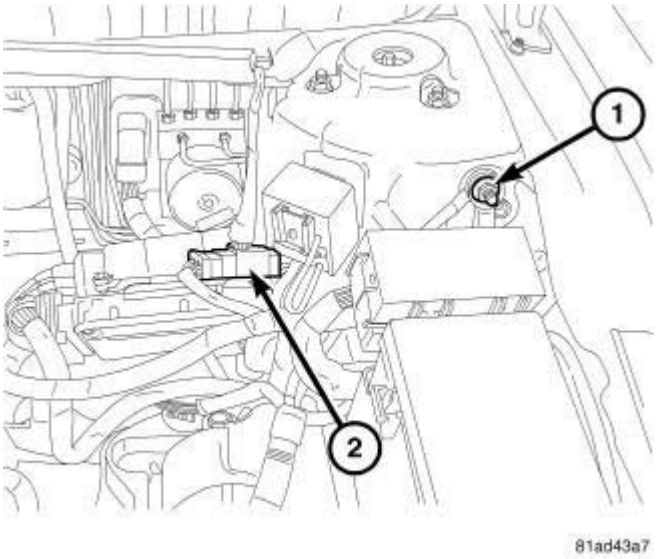

Fig. 328: BATTERY CABLE
Courtesy of CHRYSLER LLC

9. Connect negative battery cable (1).

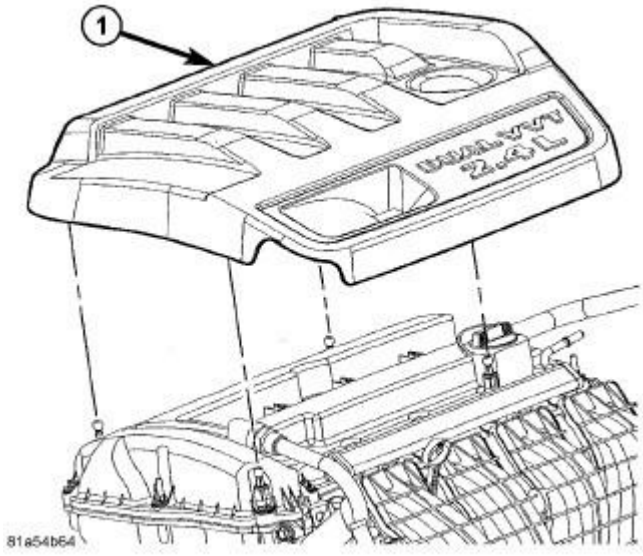

Fig. 329: ENGINE COVER
Courtesy of CHRYSLER LLC

10. Install engine cover (1).

MANIFOLD, INTAKE

Diagnosis and Testing

INTAKE MANIFOLD LEAKS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing.

1. Start the engine.
2. Spray a small stream of water (Spray Bottle) at the suspected leak area.
3. If engine RPM'S change, the area of the suspected leak has been found.
4. Repair as required.

Removal

REMOVAL

WARNING: Release fuel system pressure before servicing system components. Service vehicles in well ventilated areas and avoid ignition sources. Never smoke while servicing the vehicle.

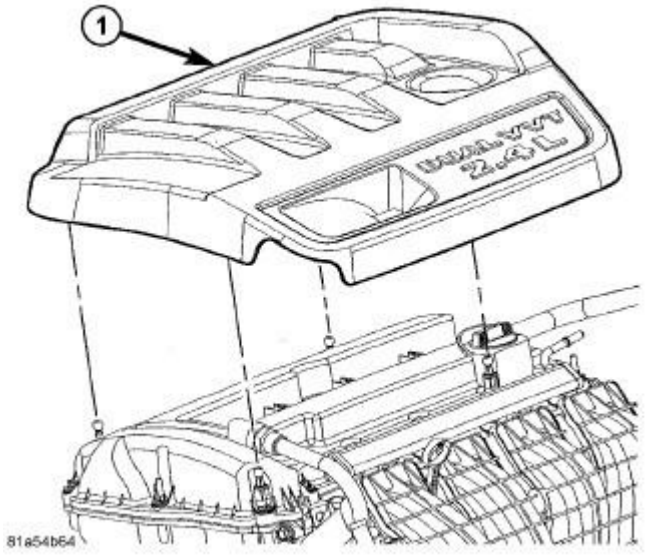

Fig. 330: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1).
2. Perform fuel system pressure release procedure before attempting any repairs. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

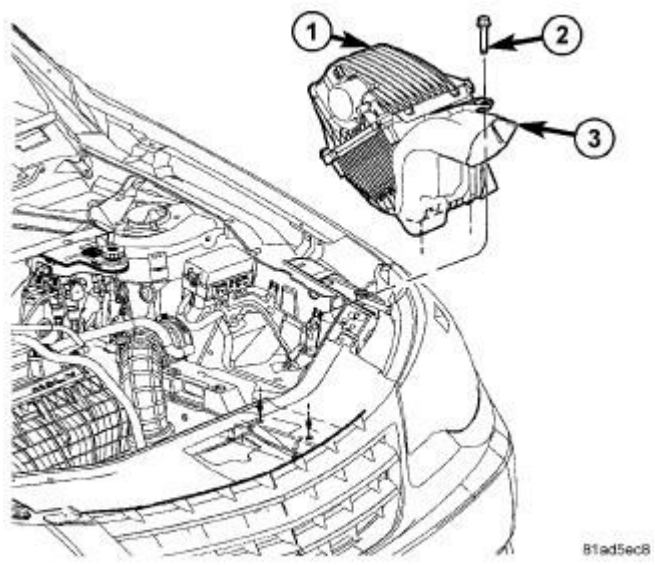

Fig. 331: Air Cleaner Housing
Courtesy of CHRYSLER LLC

3. Remove air cleaner housing (1).

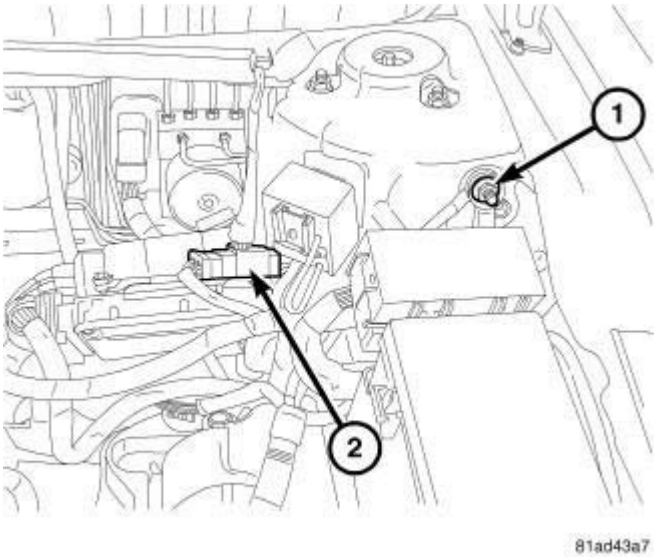

Fig. 332: BATTERY CABLE
Courtesy of CHRYSLER LLC

4. Disconnect negative battery cable (1).

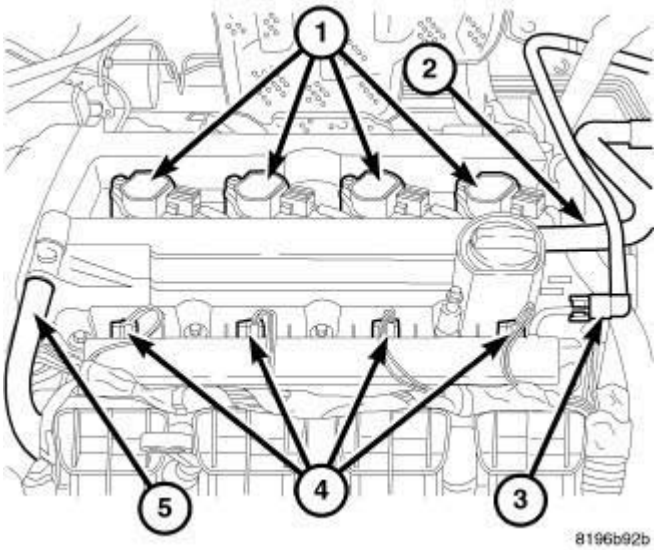

Fig. 333: COIL CONNECTOR
Courtesy of CHRYSLER LLC

5. Disconnect fuel line at rail (3).
6. Remove fuel injector electrical connectors (4).
7. Remove fuel rail retaining bolts and remove fuel rail.

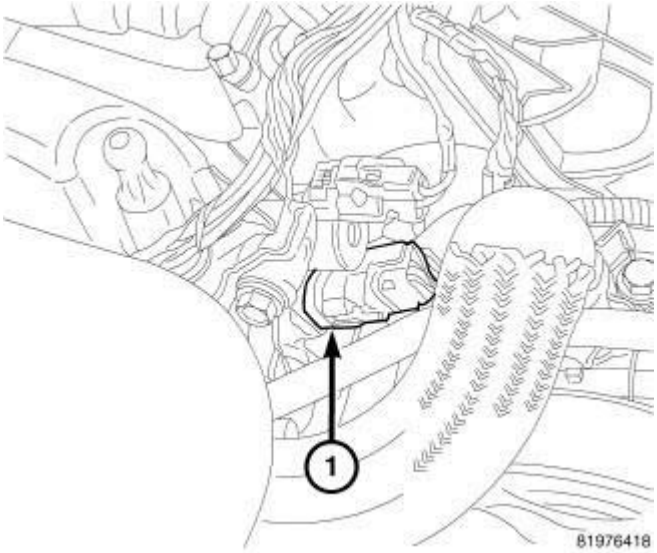

Fig. 334: OIL TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

8. Disconnect oil temperature sensor (1).
9. Disconnect variable valve timing solenoid electrical connector.
10. Disconnect intake camshaft position sensor electrical connector.
11. Position harness out of the way.

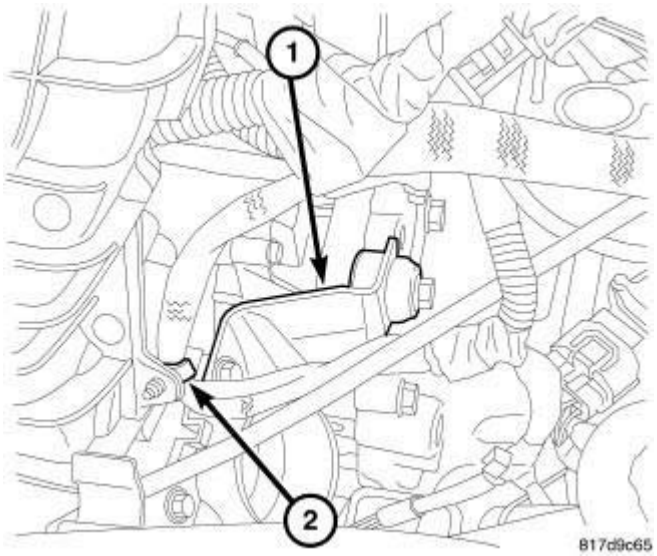

Fig. 335: THROTTLE BODY SUPPORT
Courtesy of CHRYSLER LLC

12. Remove throttle body support bracket (1).
13. Disconnect electronic throttle control electrical connector.
14. Remove wiring harness retainer from the intake manifold (2).
15. Disconnect MAP sensor electrical connector.
16. Disconnect vacuum lines at intake.

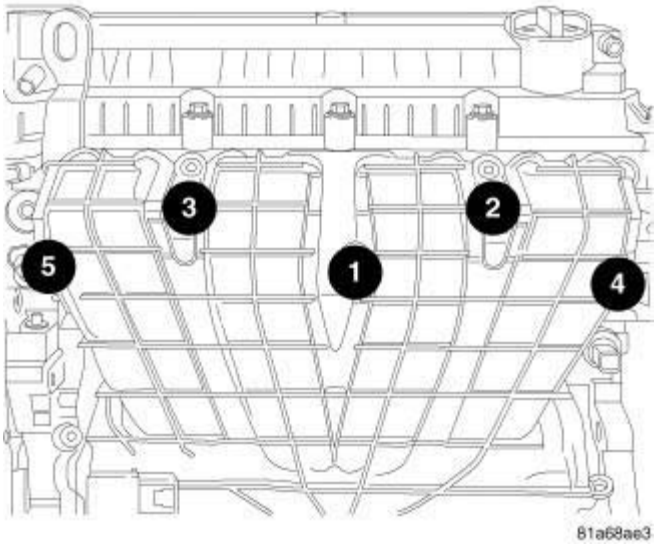

Fig. 336: Intake Manifold Retaining Bolts Torque Sequence
Courtesy of CHRYSLER LLC

17. Remove intake manifold retaining bolts.
18. Remove intake manifold.

Cleaning

CLEANING

1. Discard gasket(s).
2. Clean all sealing surfaces.

Inspection

INSPECTION

1. Inspect manifold for cracks, distortion, or mounting surface warpage. Replace manifold if necessary.
2. Inspect manifold gasket for surface damage or excessive swelling. Replace gaskets as necessary.

Installation

INSTALLATION

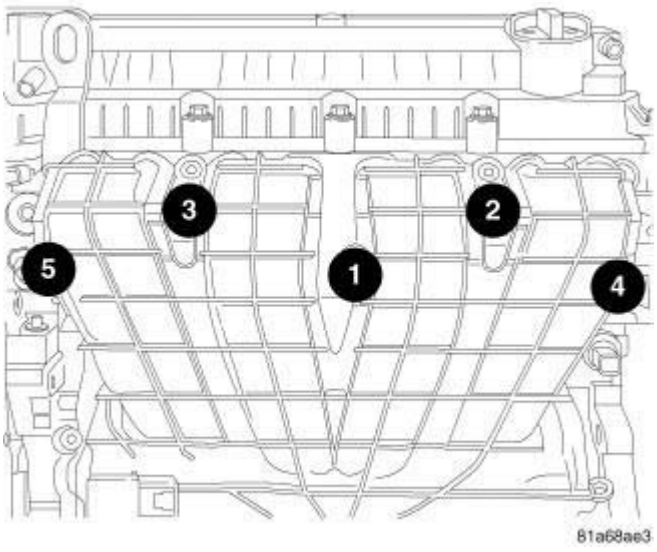

Fig. 337: Intake Manifold Retaining Bolts Torque Sequence
Courtesy of CHRYSLER LLC

1. Clean all gasket surfaces.
2. Replace intake manifold gasket.
3. Install intake manifold, tighten bolts to 25 N.m (220 in. lbs.).
4. Install the fuel rail assembly to intake manifold. Tighten bolts to 23 N.m (200 in. lbs.).

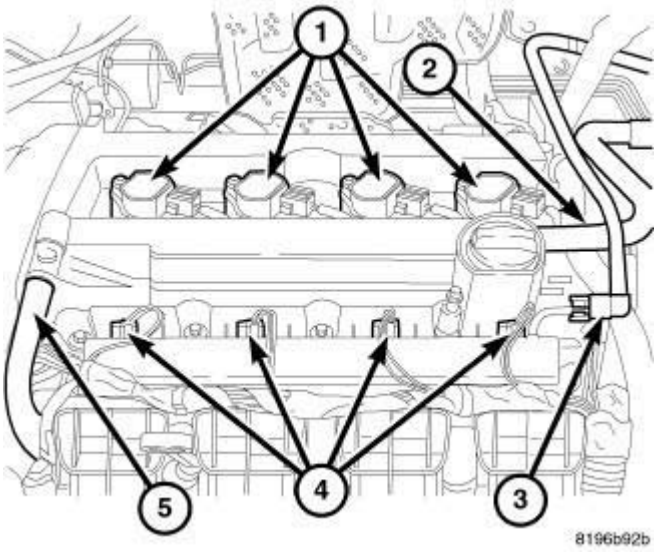

Fig. 338: COIL CONNECTOR
Courtesy of CHRYSLER LLC

5. Connect fuel injector electrical connectors (4).
6. Inspect quick connect fittings for damage, replace if necessary. Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
7. Connect fuel supply hose (3) to fuel rail assembly. Check connection by pulling on connector to make sure it is locked into position.

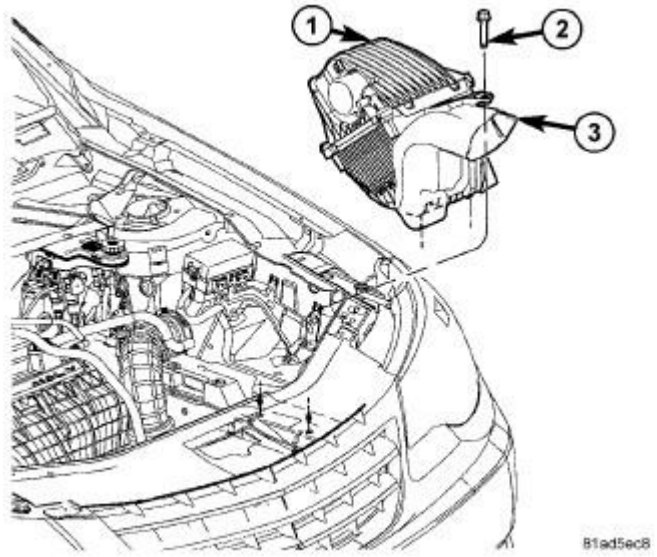

Fig. 339: Air Cleaner Housing
Courtesy of CHRYSLER LLC

8. Install air cleaner housing (1).

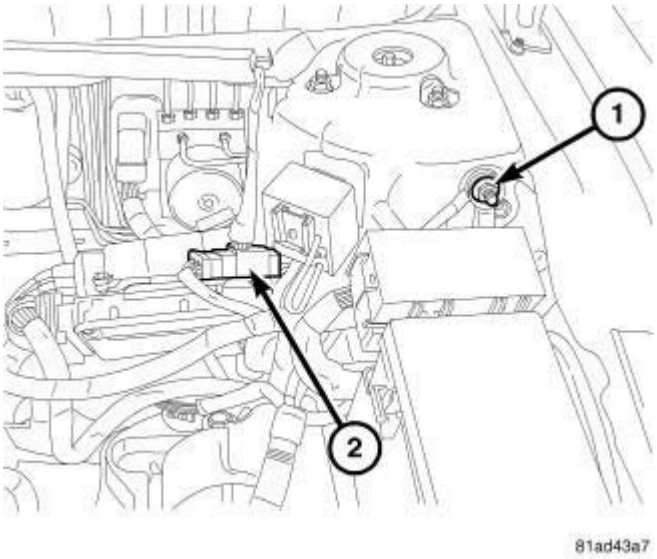

Fig. 340: BATTERY CABLE
Courtesy of CHRYSLER LLC

9. Connect negative battery cable (1).
10. Fill the cooling system. Refer to **Cooling - Standard Procedure** .

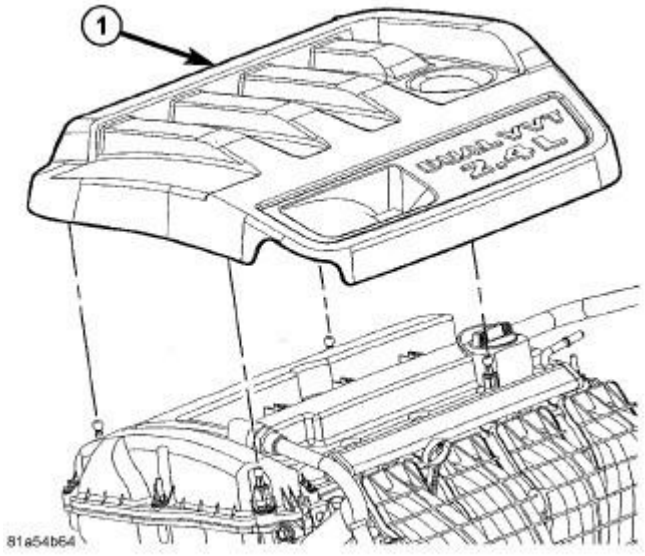

Fig. 341: Engine Cover
Courtesy of CHRYSLER LLC

11. Start engine and check for leaks.
12. Install engine cover.

VALVE TIMING

DESCRIPTION

DESCRIPTION

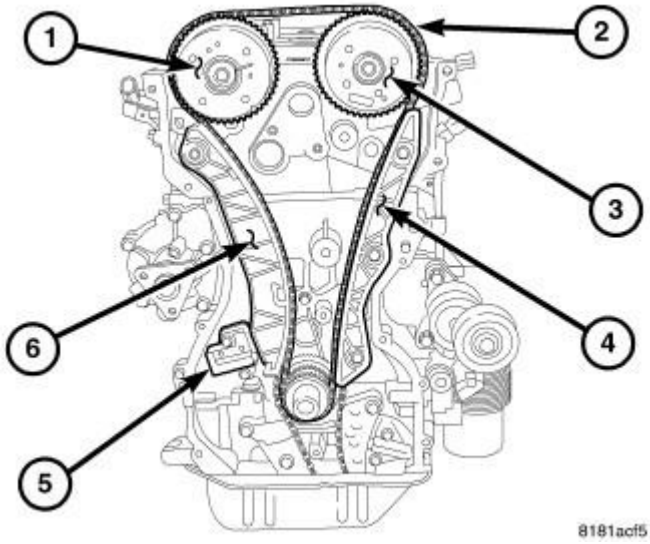

Fig. 342: TIMING DRIVE
Courtesy of CHRYSLER LLC

The timing drive system consists of the following:

- Timing Chain (2)
- Camshaft Sprockets (1,3)
- Crankshaft Sprocket
- Right Timing Chain Guide (Moveable) (6)
- Left Timing Chain Guide (Fixed) (4)
- Timing Chain Tensioner (5)

The camshaft sprockets are attached to the cam phasers which are attached to the front of the camshafts and are used with the timing chain and crankshaft sprocket to turn the camshafts. The camshaft position sensors target is part of the camshafts and is used with the camshaft position sensors to provide the PCM with valvetrain position information.

The timing chain tensioner is installed in the right side of the engine block. Using engine oil pressure, the tensioner applies constant pressure to the right side (movable) timing chain guide, which in turn applies pressure to the timing chain. Also as the tensioner extends, it's ratchet locks in position to provide constant timing chain tension.

STANDARD PROCEDURE

VALVE TIMING VERIFICATION

CAUTION: Painted or colored chain links are used during initial engine assembly and can not be relied upon for valve timing verification. These markings are in different locations for early production, late production and service parts. Only use TDC marks, cylinder head cover sealing surface and camshaft sprocket marks to verify valve timing or engine damage may result.

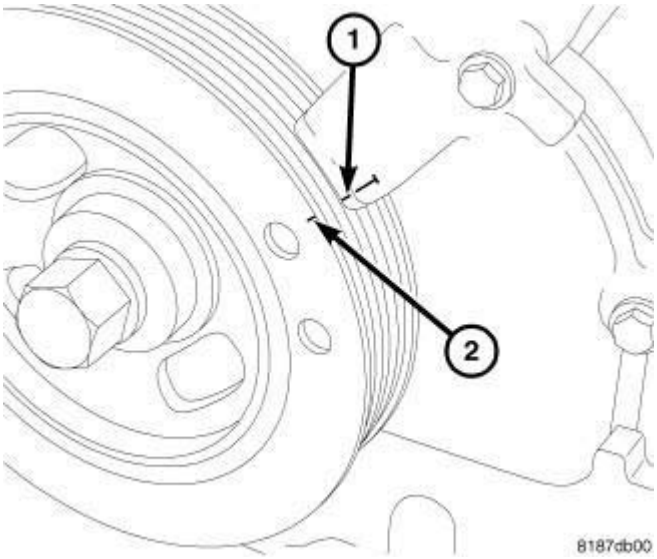

Fig. 343: Top Dead Center
Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Remove cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
3. Set engine to TDC (1,2).

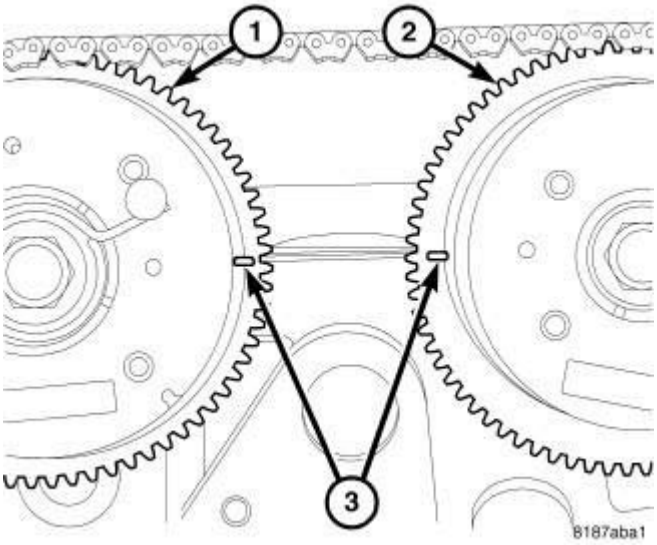

Fig. 344: Camshaft Timing
Courtesy of CHRYSLER LLC

4. The marks on the camshaft sprockets (3) should be in line with the cylinder head cover sealing surface.
5. Install cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
6. Install the engine cover.

CHAIN AND SPROCKETS, TIMING

Removal

TIMING CHAIN

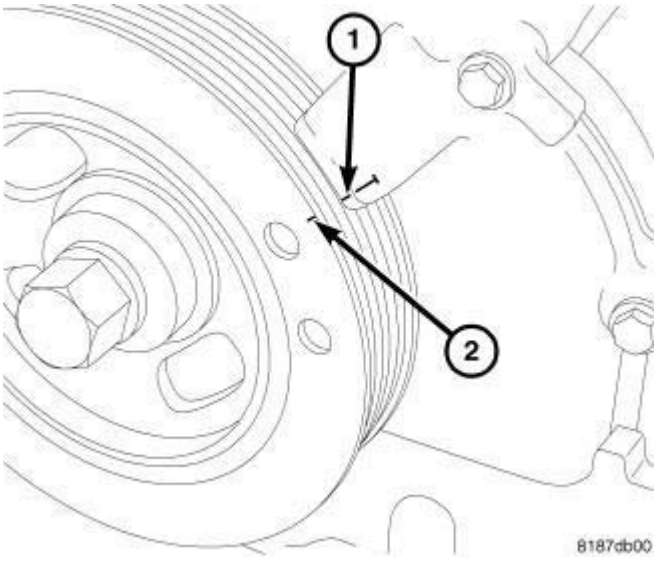

Fig. 345: Top Dead Center
Courtesy of CHRYSLER LLC

1. Set engine to TDC.
2. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

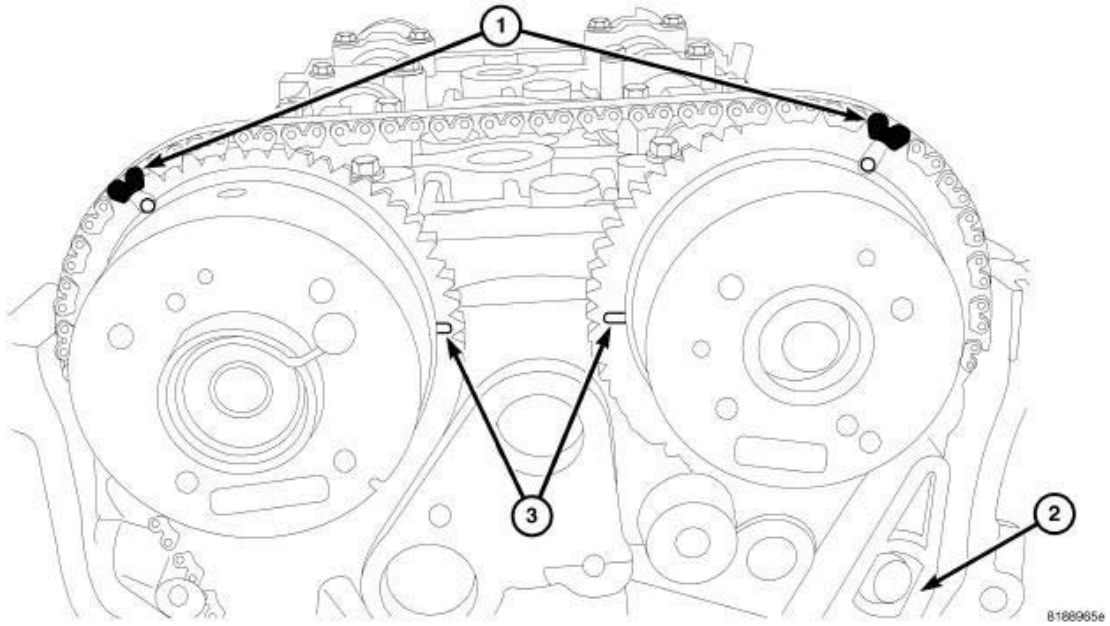

Fig. 346: Timing Chain Timing Marks
Courtesy of CHRYSLER LLC

NOTE: If the timing chain plated links can no longer be seen, the timing chain links corresponding to the timing marks must be marked prior to removal if the chain is to be reused.

3. Mark chain link (1) corresponding to camshaft timing mark.

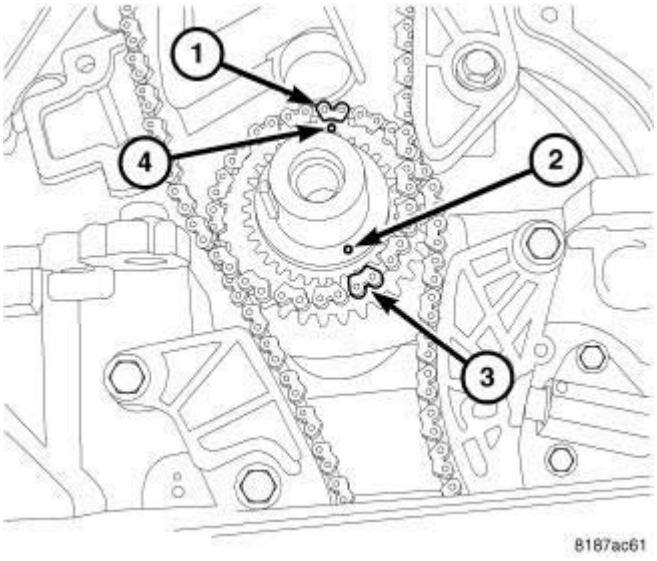

Fig. 347: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

4. Mark chain link (3) corresponding to crankshaft timing mark (2).

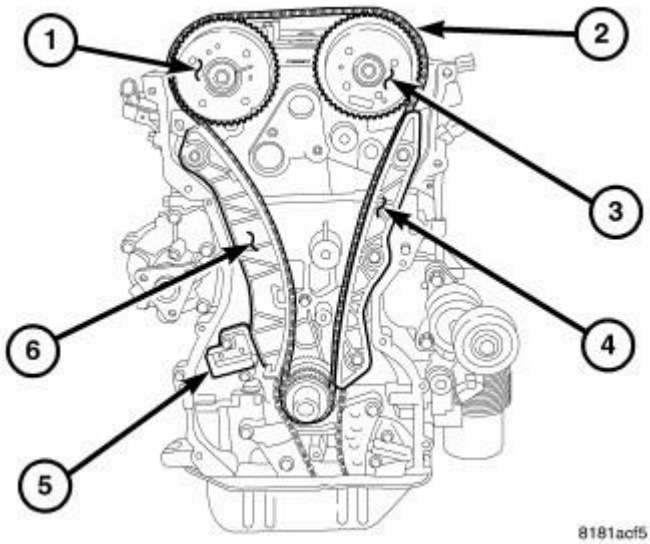

Fig. 348: Timing Drive
Courtesy of CHRYSLER LLC

5. Remove timing chain tensioner (5). See **Engine/Valve Timing/TENSIONER, Engine Timing - Removal**.
6. Remove timing chain (2).

CAMSHAFT SPROCKET(S)

NOTE: Camshaft phasers and camshaft sprockets are supplied as an assembly, do not attempt to disassemble.

Refer to camshaft phaser removal. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.

CRANKSHAFT SPROCKET

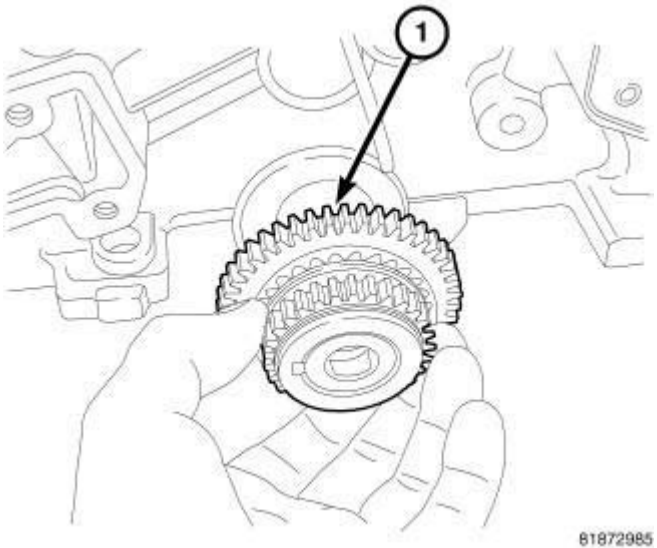

Fig. 349: CRANKSHAFT SPROCKET
Courtesy of CHRYSLER LLC

1. Remove timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
2. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
3. Remove oil pump drive chain tensioner.
4. Remove oil pump drive chain.
5. Remove crankshaft sprocket (1).

Inspection

INSPECTION

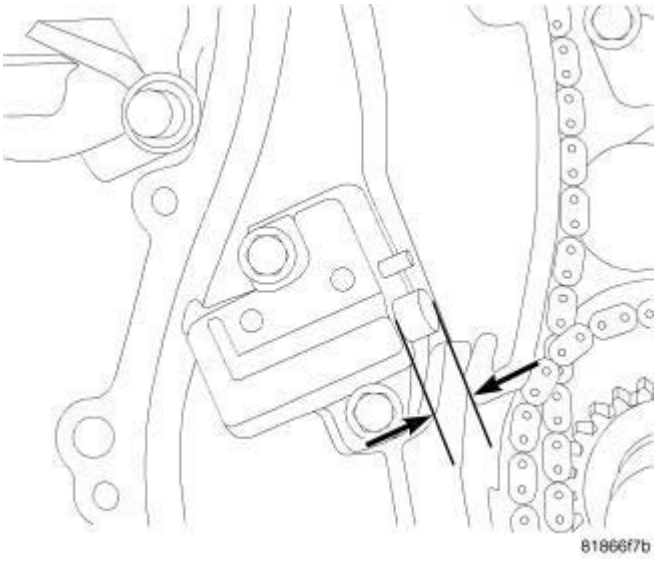

Fig. 350: Measuring Distance From Tensioner Body & Edge Of Chain Guide
Courtesy of CHRYSLER LLC

Inspect timing chain for stretching prior to removal.

1. Rotate engine while watching timing chain tensioner plunger. When the plunger reaches its maximum travel stop rotating engine.
2. Measure the distance from the tensioner body and the edge of the chain guide as shown in illustration.
3. If the distance is greater than 20.5 mm (0.81 in.) inspect guide shoes for excessive wear.
4. If guides are okay, replace timing chain.

Installation

CRANKSHAFT SPROCKET

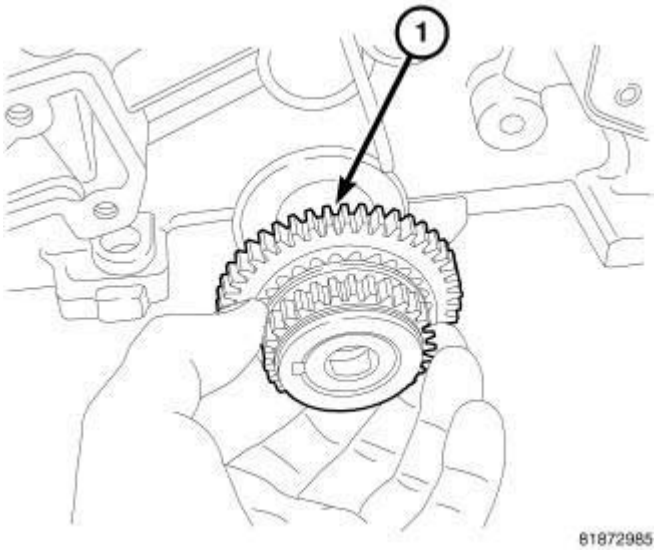

Fig. 351: CRANKSHAFT SPROCKET
Courtesy of CHRYSLER LLC

1. Install crankshaft sprocket (1) onto crankshaft.

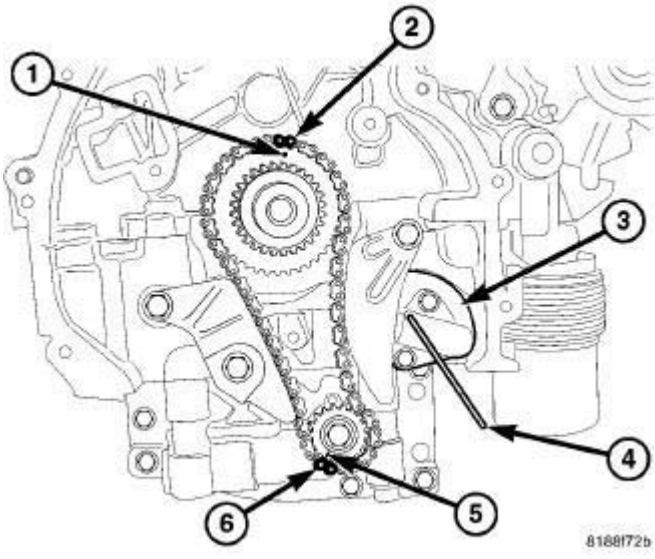

Fig. 352: Balance Shaft Module Tensioner
Courtesy of CHRYSLER LLC

2. Install oil pump drive chain. Verify that Oil pump is correctly timed (1,2,5,6).

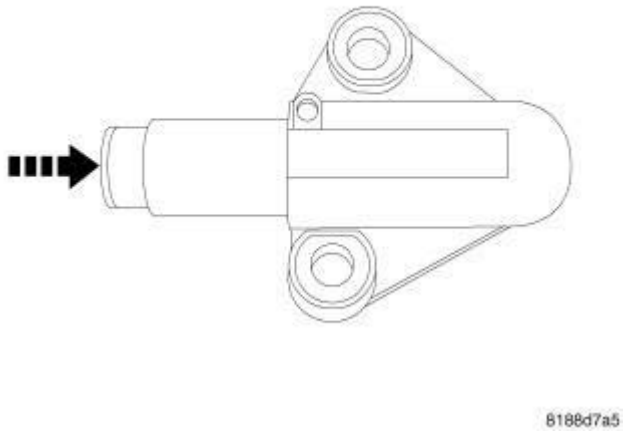

Fig. 353: OIL PUMP TENSIONER RESET
Courtesy of CHRYSLER LLC

3. Reset oil pump drive chain tensioner by pushing plunger inward and install tensioner pin 8514.

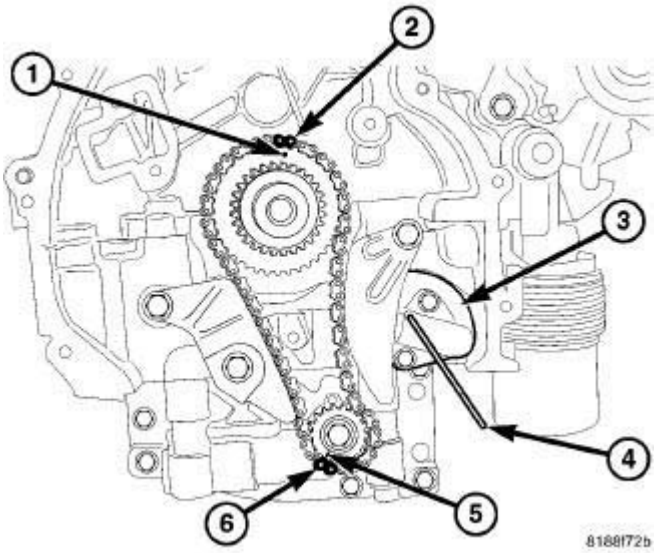

Fig. 354: Balance Shaft Module Tensioner
Courtesy of CHRYSLER LLC

4. Install oil pump drive chain tensioner (3) and remove Tensioner Pin 8514 (4).
5. Install timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
6. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
7. Fill engine with oil. See **Engine/Lubrication/OIL - Standard Procedure**.
8. Start engine and check for leaks.

CAMSHAFT SPROCKET(S)

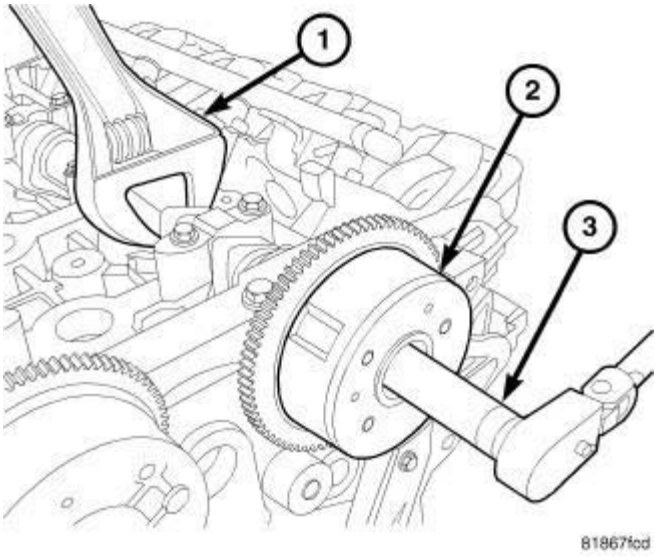

Fig. 355: Camshaft Phaser Installation
Courtesy of CHRYSLER LLC

NOTE: The camshaft sprockets and the camshaft phasers are an assembly and cannot be serviced separately.

CAUTION: Do not use an impact wrench to tighten camshaft sprocket bolts. Damage to the camshaft-to-sprocket locating dowel pin and camshaft phaser may occur.

1. Refer to Camshaft phaser (2) installation. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**.

TIMING CHAIN

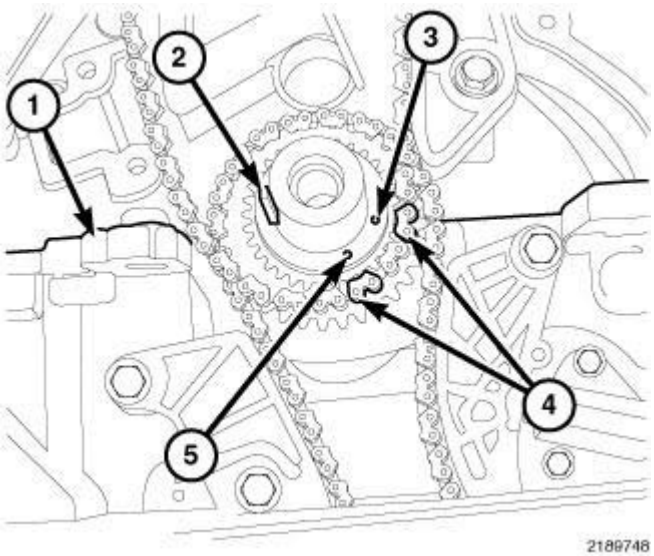

Fig. 356: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

NOTE: The crankshaft timing mark (3) or (5) can be in one of two locations depending on whether the engine is early production (5), late production (3) or assembled with service parts (3). In all cases the keyway (2) will always be in the 9:00 position, in line with the ladder frame mounting surface (1) when the engine is at TDC.

1. Verify that the engine is still set to TDC.

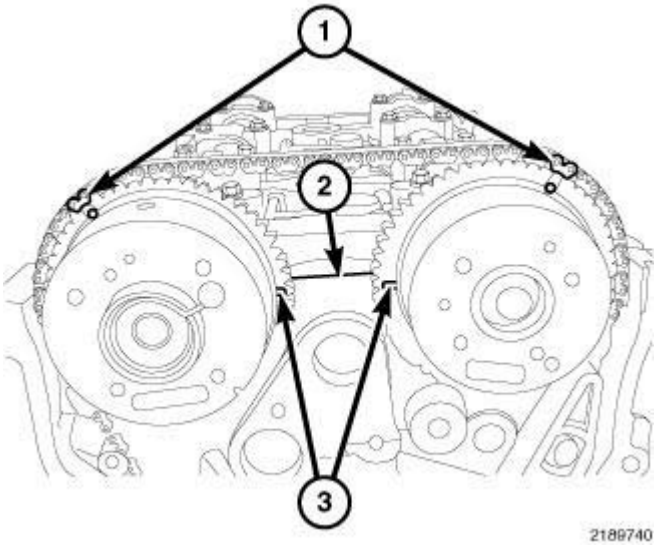

Fig. 357: Timing Chain Timing Marks
Courtesy of CHRYSLER LLC

2. Align camshaft timing marks (3) so they are facing each other and in line with the cylinder head cover sealing surface (2).

3. Install timing chain so plated (or marked) links on chain align with timing marks on camshaft sprockets (1).

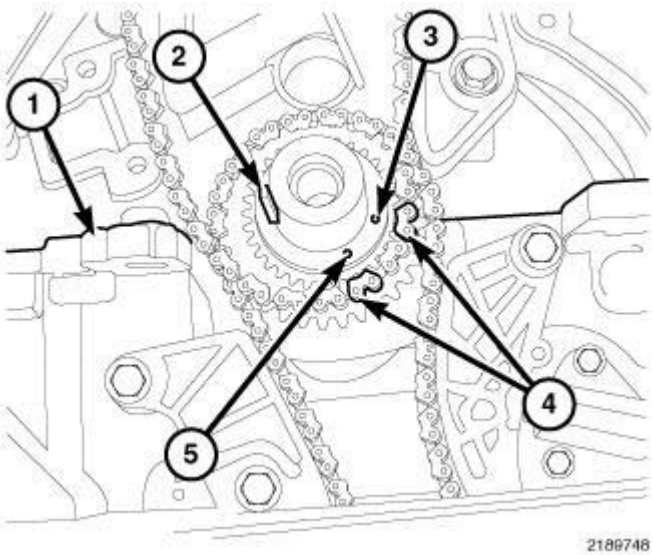

Fig. 358: Crankshaft Timing Marks
Courtesy of CHRYSLER LLC

4. Align timing mark on the crankshaft sprocket (3) or (5) with the plated (or marked) link (4) on the timing chain. Position chain so slack will be on the tensioner side.

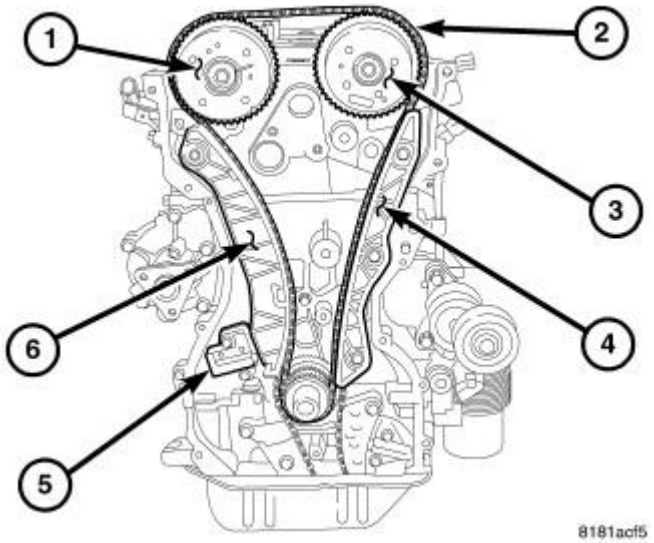

Fig. 359: TIMING DRIVE
Courtesy of CHRYSLER LLC

NOTE: Keep the slack in the timing chain on the tensioner side.

5. Install the timing chain tensioner (5). See **Engine/Valve Timing/TENSIONER, Engine Timing -**

Installation.

Rotate the crankshaft CLOCKWISE two complete revolutions until the crankshaft is repositioned at the TDC position with the key way at the 9 o'clock position.

6. Verify that the camshafts timing marks (3) are in the proper position and in line with the cylinder head cover sealing surface. If the marks do not line up, the timing chain is not correctly installed.
7. Install front timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
8. Connect negative battery cable.
9. Operate engine until it reaches normal operating temperature. Check oil and cooling systems for correct fluid levels.

COVER(S), ENGINE TIMING

Removal

REMOVAL

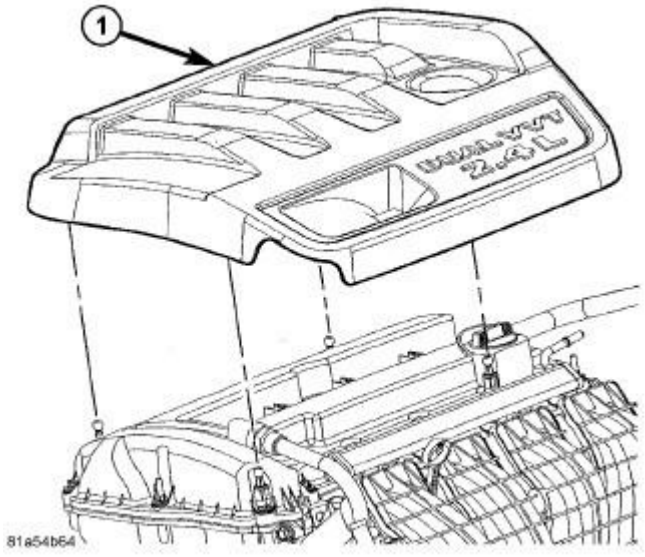

Fig. 360: Engine Cover
Courtesy of CHRYSLER LLC

1. Remove engine cover (1) by pulling upward.
2. Perform fuel pressure bleed procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Disconnect and isolate the negative battery cable.

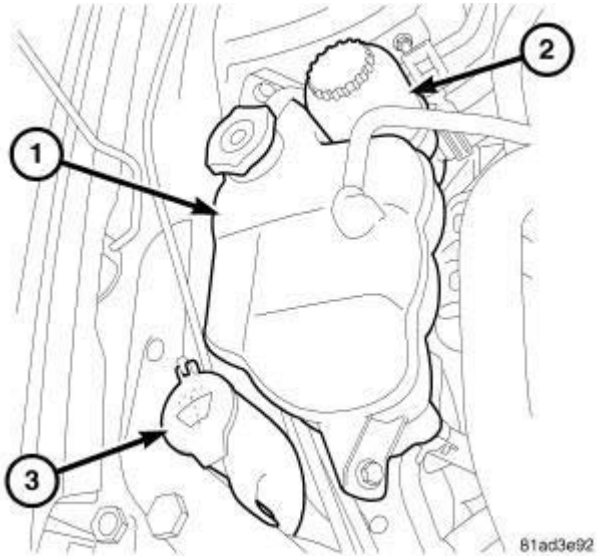

Fig. 361: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

4. Remove coolant recovery bottle (1). Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .
5. Remove and reposition power steering reservoir (2).
6. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

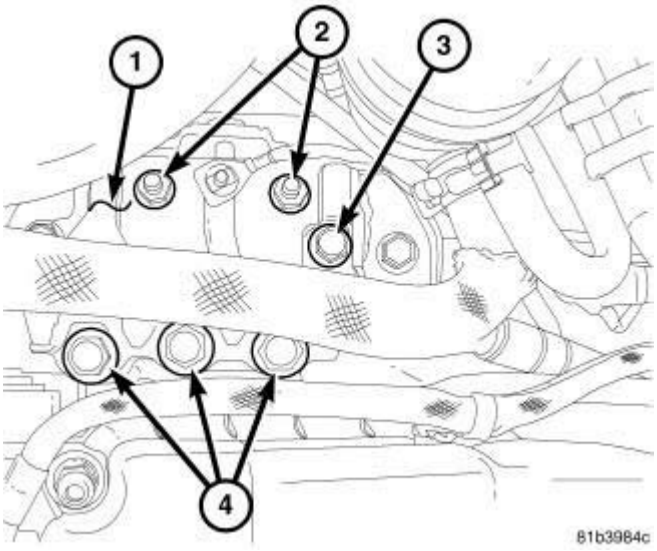

Fig. 362: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

7. Remove power steering hose hold down (3).

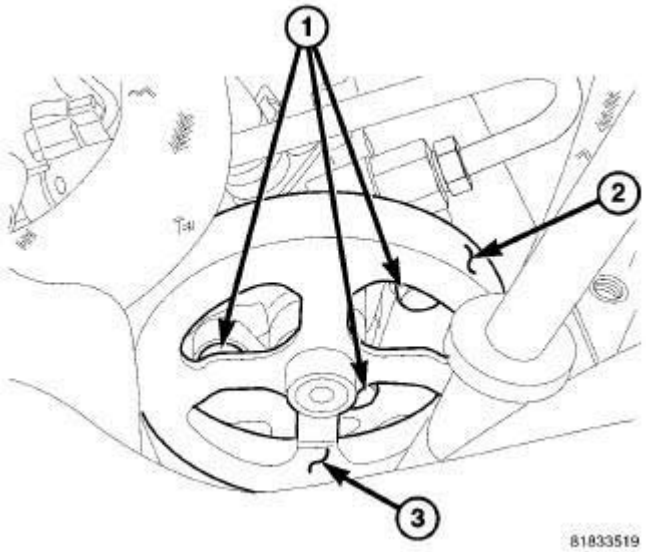

Fig. 363: POWER STEERING PUMP - GAS
Courtesy of CHRYSLER LLC

8. Remove the three power steering pump mounting bolts (1) through the openings in the pulley (3) and reposition the pump.

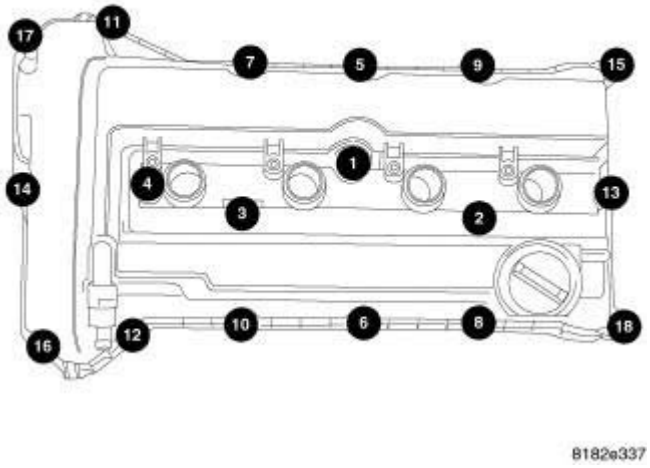

Fig. 364: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

9. Remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
10. Remove ignition coils from the cylinder head cover.

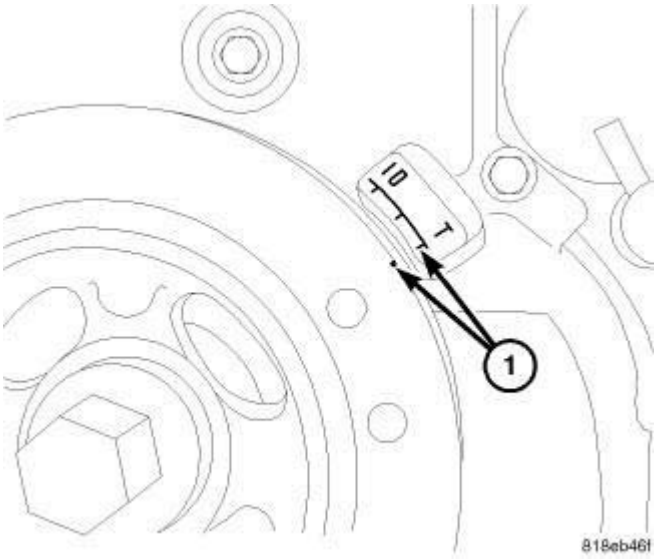

Fig. 365: Top Dead Center
Courtesy of CHRYSLER LLC

11. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
12. Remove the frame cover portion of the right splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
13. Set engine to TDC (1).

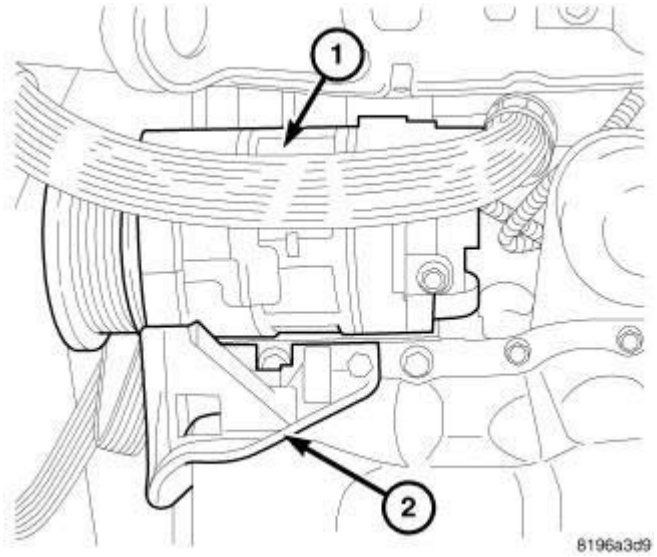

Fig. 366: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

14. Remove lower A/C compressor bolts if equipped.
15. Remove lower A/C compressor mount (2) if equipped.

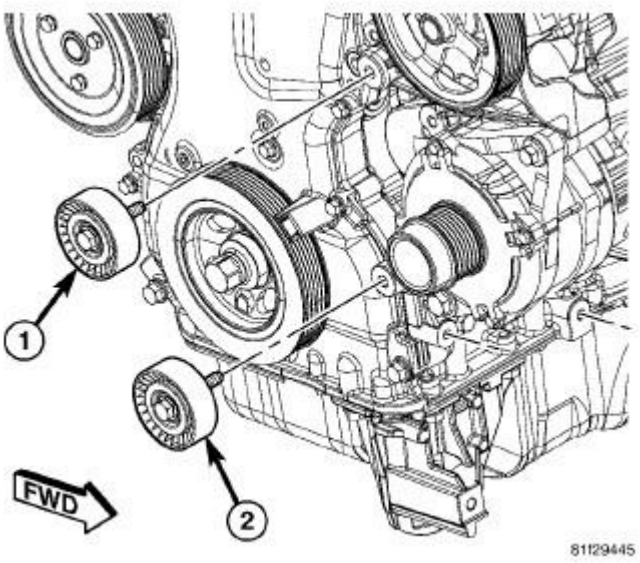

Fig. 367: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

16. Remove accessory drive belt lower idler pulley (2).

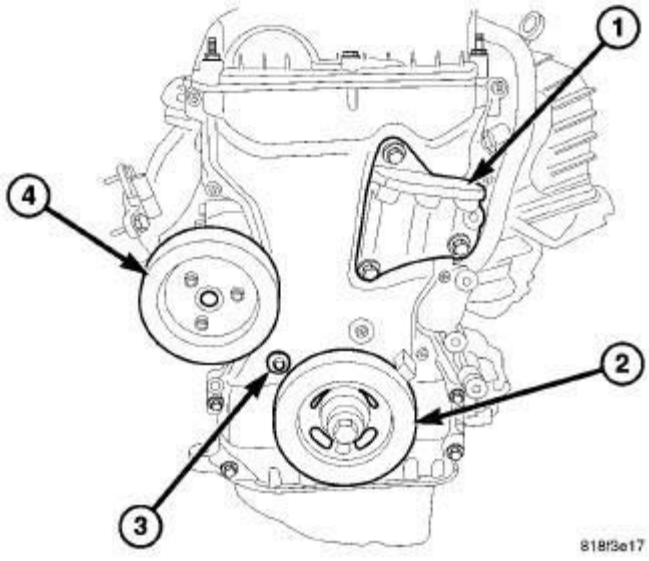

Fig. 368: Right Side Engine Mount Bracket Bolt
Courtesy of CHRYSLER LLC

17. Remove crankshaft damper (2). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
18. Remove three bolts and water pump pulley (4) from water pump.
19. Remove lower bolt from right side engine mount bracket (1).

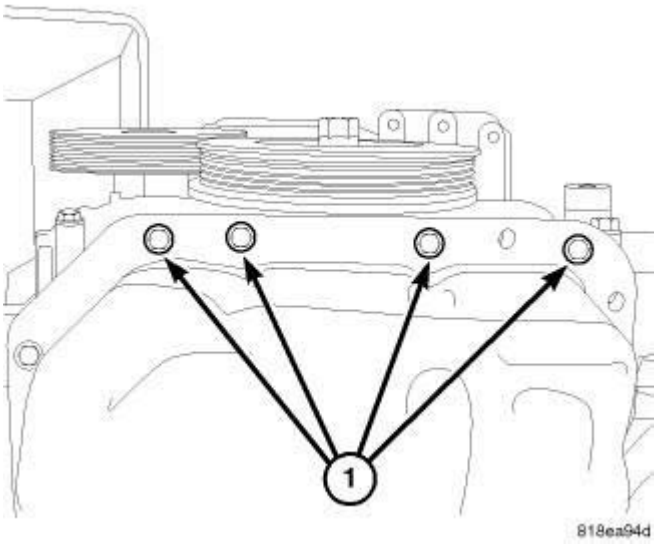

Fig. 369: TIMING CHAIN COVER LOWER BOLTS
Courtesy of CHRYSLER LLC

20. Remove timing chain cover lower bolts (1).
21. Lower vehicle.
22. Support engine with suitable jack.

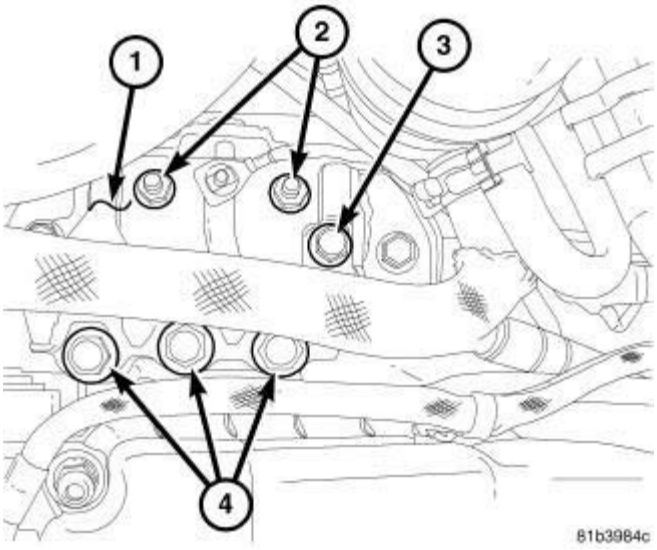

Fig. 370: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

23. Remove right engine mount bracket retaining bolts (4).
24. Remove retaining nuts (2) and reposition mount bracket (1).

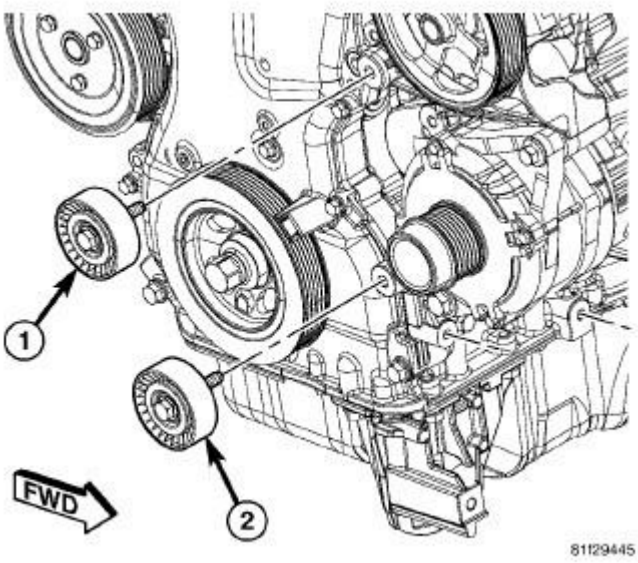

Fig. 371: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

25. Remove accessory drive upper idler pulley (1).

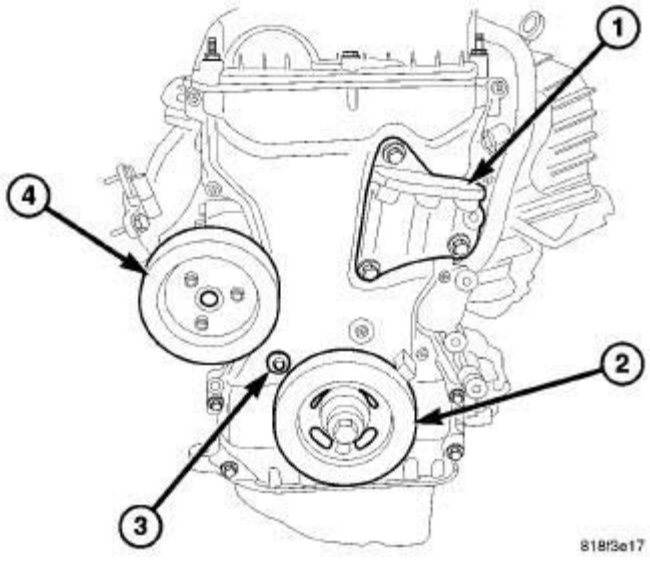

Fig. 372: ENGINE FRONT
Courtesy of CHRYSLER LLC

26. Remove right upper engine mount bracket (1).
27. Remove accessory drive belt tensioner.
28. Remove upper timing chain cover retaining bolts.

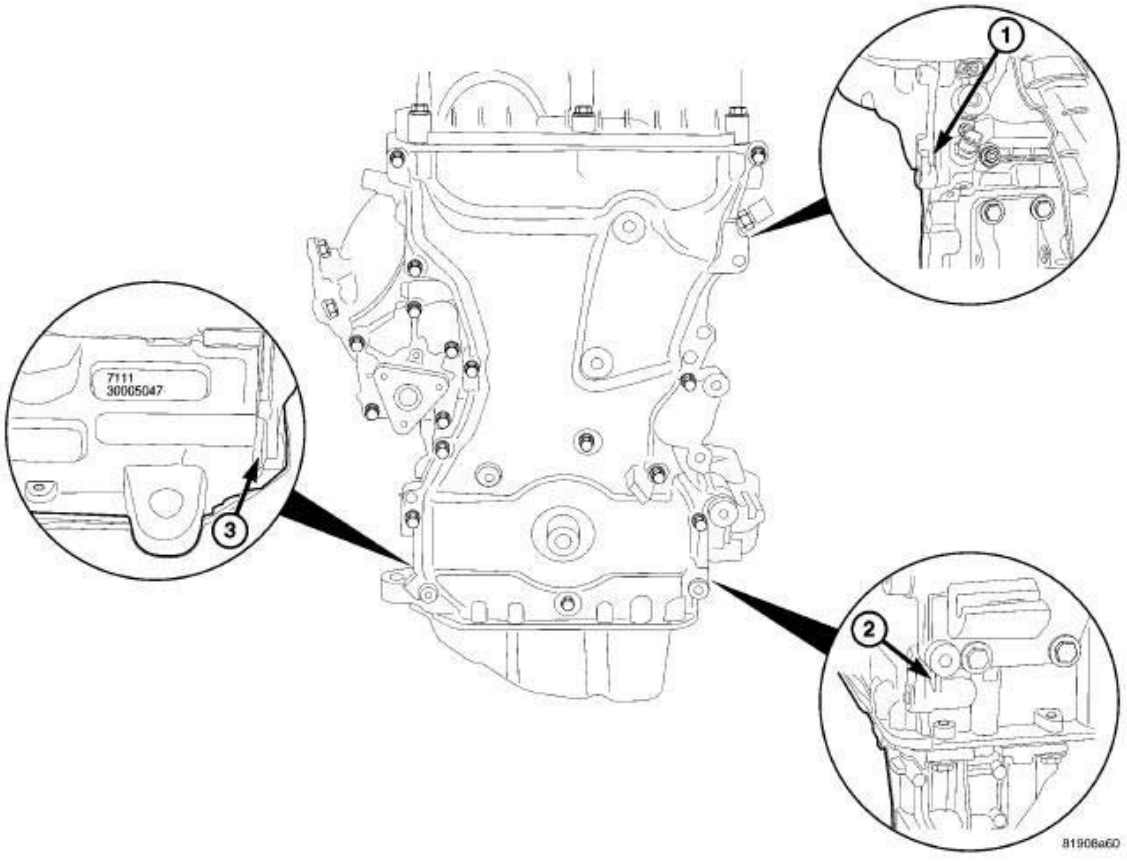

Fig. 373: TIMING CHAIN COVER PRY POINTS
Courtesy of CHRYSLER LLC

29. Remove timing chain cover using pry points (1,2,3).

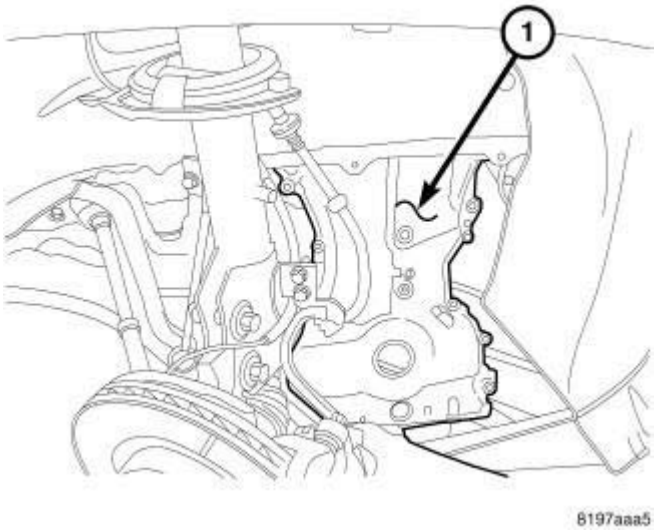

Fig. 374: TIMING CHAIN COVER REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

30. Remove timing chain cover (1) out through the bottom of the vehicle.

Installation

INSTALLATION

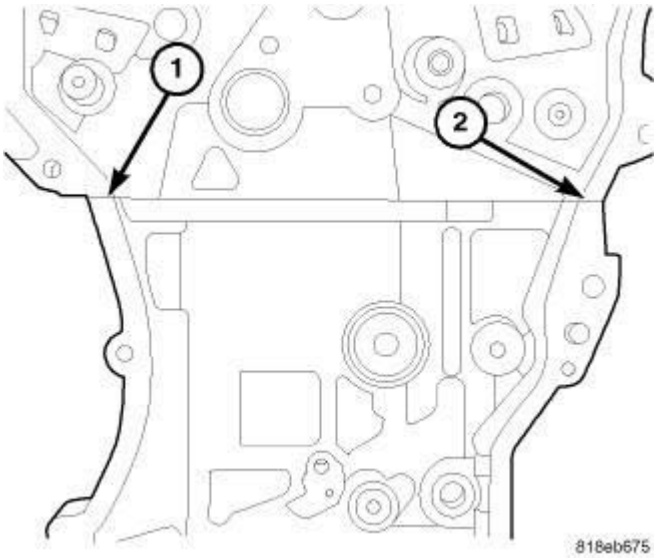

Fig. 375: FRONT COVER UPPER T-JOINT
Courtesy of CHRYSLER LLC

NOTE: When using RTV, the sealing surfaces must be clean and free from grease and oil.

NOTE: When using RTV, parts should be assembled in 10 minutes and tighten to final torque within 45 minutes.

1. Clean all sealing surfaces. See **Engine - Standard Procedure**.
2. Apply Mopar® engine sealant RTV (or equivalent) as shown in illustration at the cylinder head to block parting line (1,2).

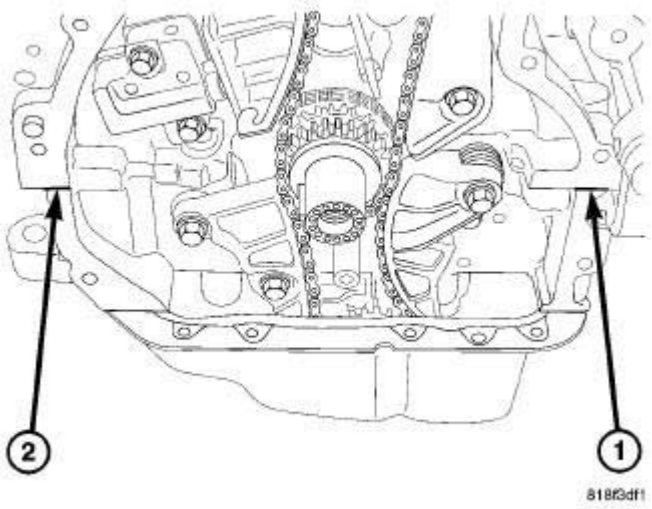

Fig. 376: LOWER T-JOINTS
Courtesy of CHRYSLER LLC

3. Apply Mopar® engine sealant RTV (or equivalent) as shown in illustration at the ladder frame to block parting line (1,2).

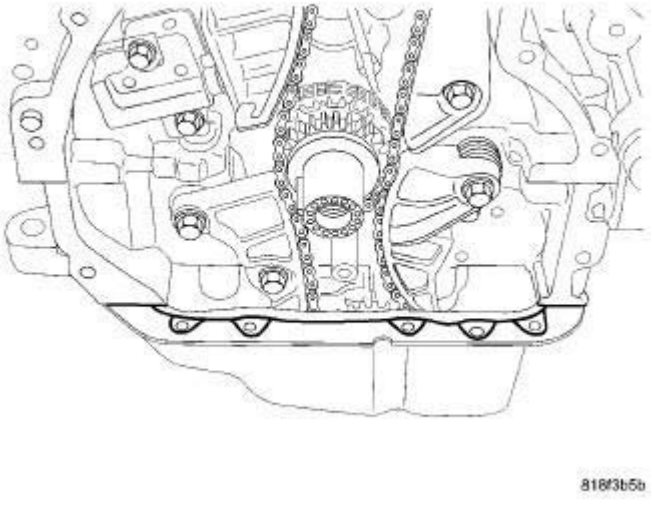

Fig. 377: SEALING OIL PAN
Courtesy of CHRYSLER LLC

4. Apply Mopar® engine sealant RTV (or equivalent) as shown in illustration in the corner of the oil pan and block.
5. Apply 2 mm bead of Mopar® engine sealant RTV (or equivalent) to the oil pan as shown in illustration.

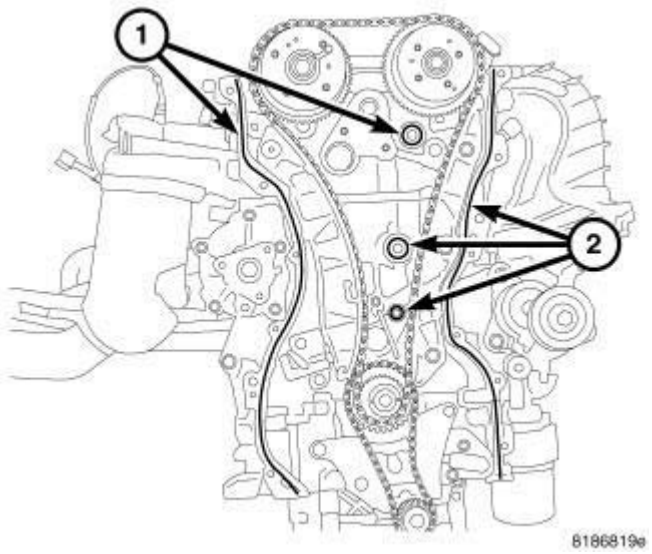

Fig. 378: TIMING CHAIN COVER SEALING
Courtesy of CHRYSLER LLC

6. Apply 2 mm bead of Mopar® engine sealant RTV (or equivalent) to the engine block (1,2) as shown in illustration.

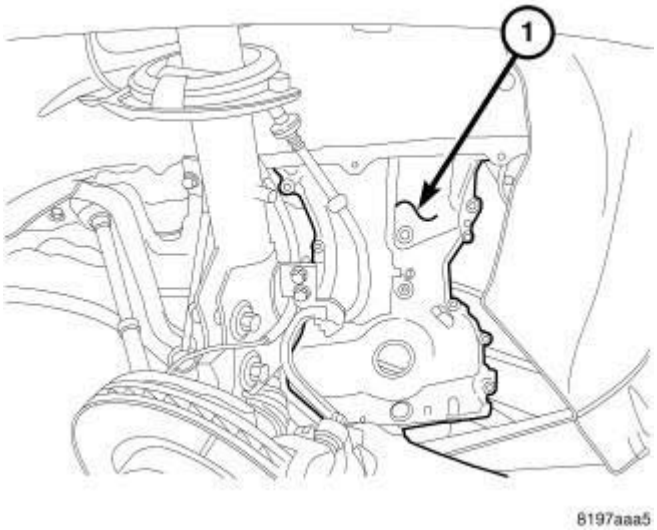

Fig. 379: TIMING CHAIN COVER REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

7. Install timing chain cover (1) upwards from under the vehicle.
8. Install timing chain cover upper retaining bolts and tighten M6 bolts to 9 N.m (80 in. lbs.) and M8 bolts to 26 N.m (230 in. lbs.).
9. Install accessory drive belt tensioner. Tighten bolt to 24 N.m (212 in. lbs.).

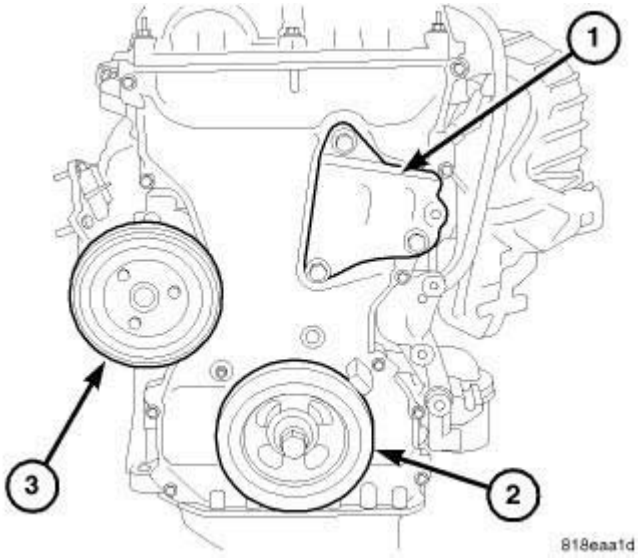

Fig. 380: RIGHT ENGINE MOUNT BRACKET
Courtesy of CHRYSLER LLC

10. Install right engine mount bracket (1). Tighten bolts to 50 N.m (37 ft. lbs.).

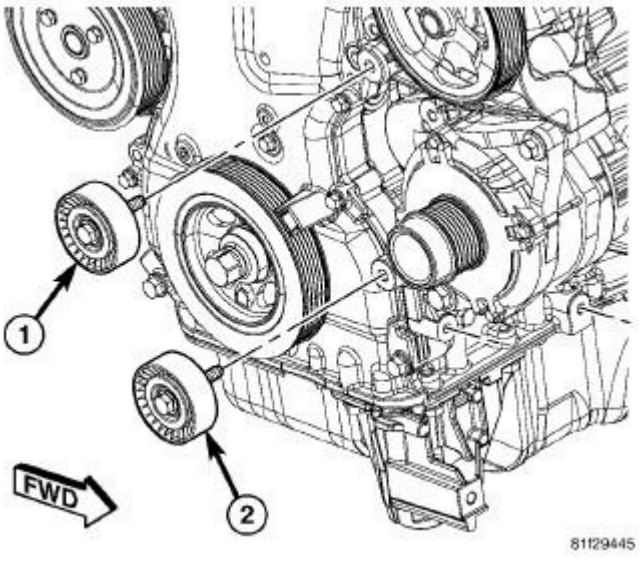

Fig. 381: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

11. Install accessory drive belt upper idler pulley (1). Tighten bolt to 48 N.m (35 ft. lbs.).

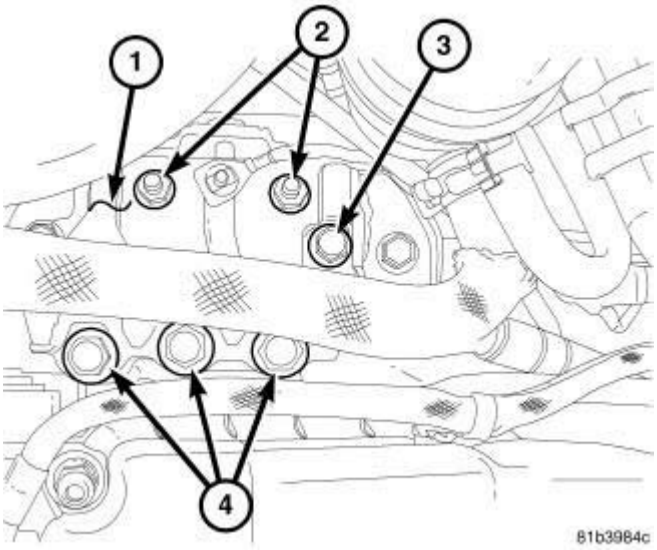

Fig. 382: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

12. Position engine mount adapter (1) and install bolts (4).
13. Install retaining nuts (2) and tighten nuts (2) to 30 N.m (22 ft. lbs.).
14. Tighten bolts (4) to 50 N.m (37 ft. lbs.).
15. Remove jack from under engine.

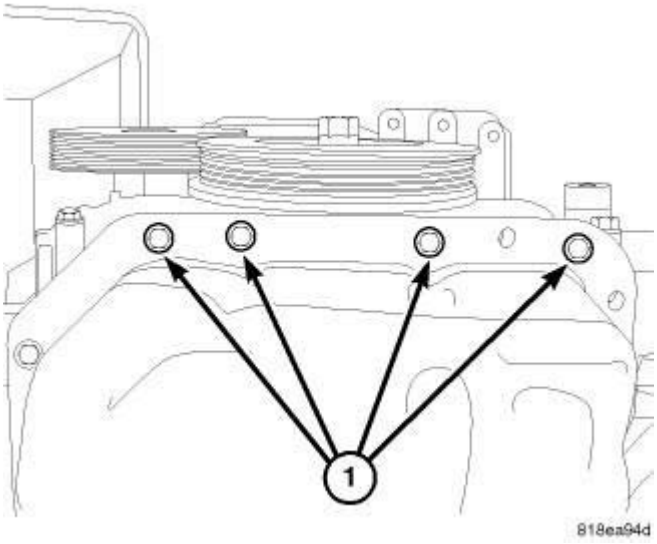

Fig. 383: TIMING CHAIN COVER LOWER BOLTS
Courtesy of CHRYSLER LLC

16. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
17. Install oil pan to timing chain cover lower retaining bolts (1) and tighten M6 bolts to 9 N.m (80 in. lbs.).

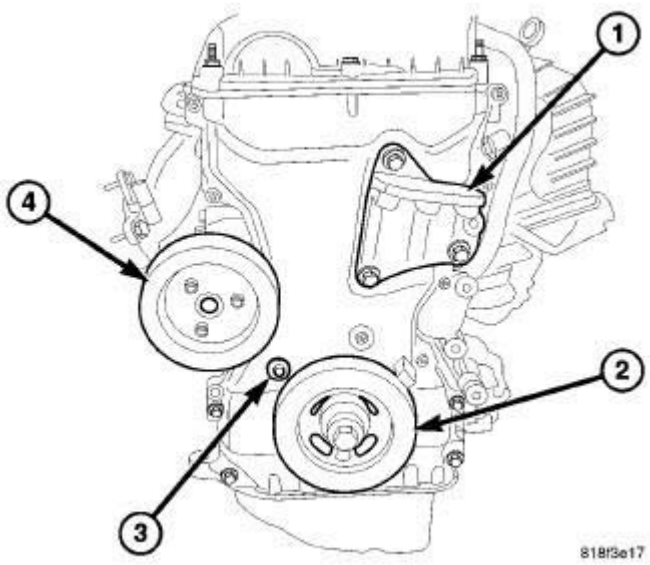

Fig. 384: ENGINE FRONT
Courtesy of CHRYSLER LLC

18. Install water pump pulley (4) and tighten three bolts to 9 N.m (80 in. lbs.).
19. Install crankshaft damper (2). See **Engine/Engine Block/DAMPER, Vibration - Installation**.

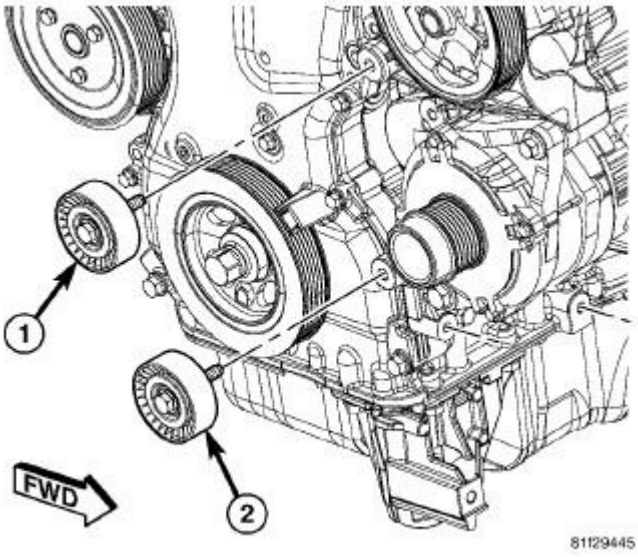

Fig. 385: Accessory Drive Belt Idler Pulley
Courtesy of CHRYSLER LLC

20. Install accessory drive belt lower idler pulley (2). Tighten bolt to 48 N.m (35 ft. lbs.).

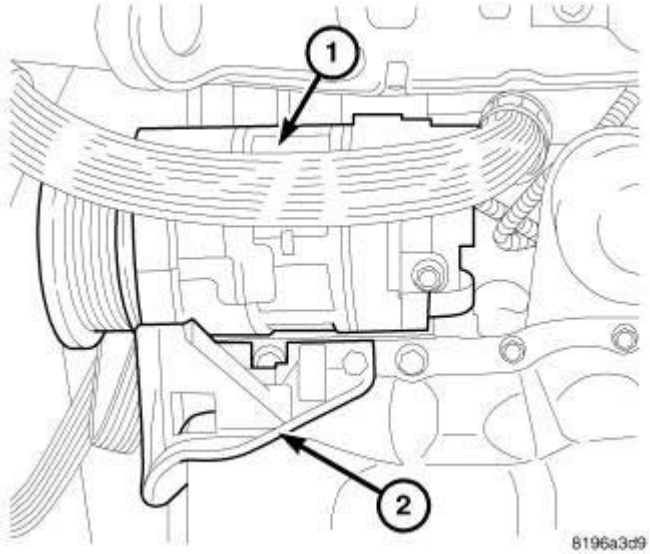

Fig. 386: A/C COMPRESSOR
Courtesy of CHRYSLER LLC

21. Install lower A/C compressor mounting bracket (2). Tighten the bolts to 24 N.m (18 ft. lbs.).
22. Install A/C compressor (1). Tighten the bolts to 25 N.m (18 ft. lbs.).
23. Install right lower splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
24. Lower vehicle.

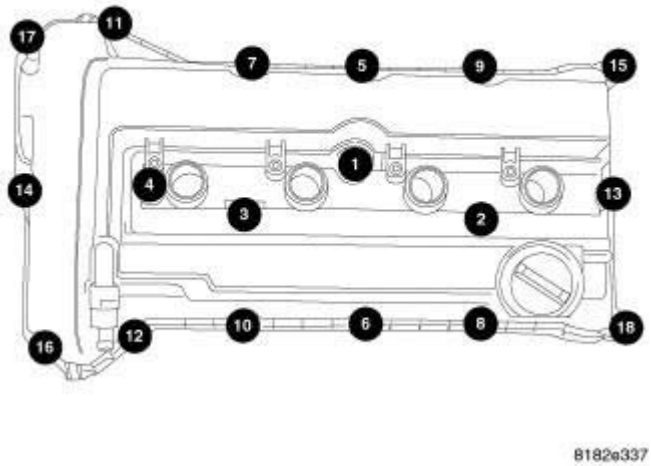

Fig. 387: Cylinder Head Cover Torque Sequence
Courtesy of CHRYSLER LLC

25. Install cylinder head cover and ignition coils. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

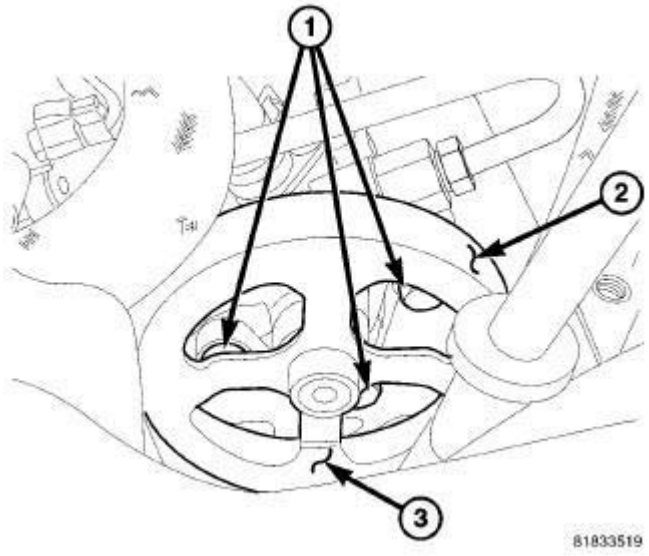

Fig. 388: POWER STEERING PUMP - GAS
Courtesy of CHRYSLER LLC

26. Place the power steering pump in mounting position. Install the three bolts (1) through openings in the pulley (3). Tighten the mounting bolts (1) to 26 N.m (19 ft. lbs.).

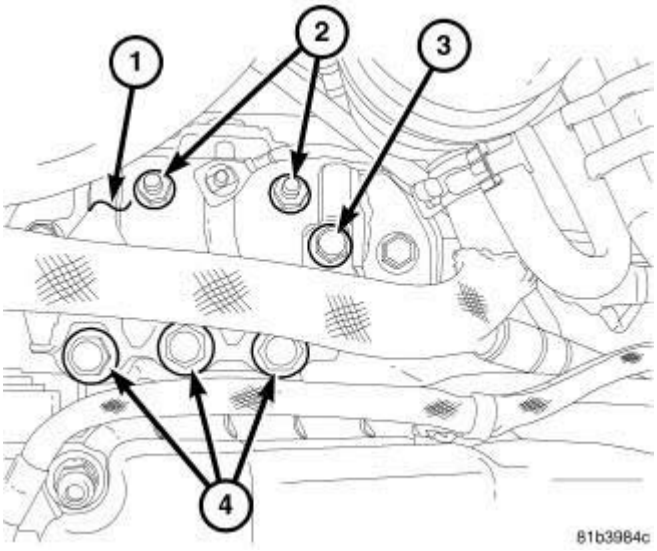

Fig. 389: Right Engine Mount Bracket Retaining Bolts
Courtesy of CHRYSLER LLC

27. Install the power steering hose hold down (3).
28. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

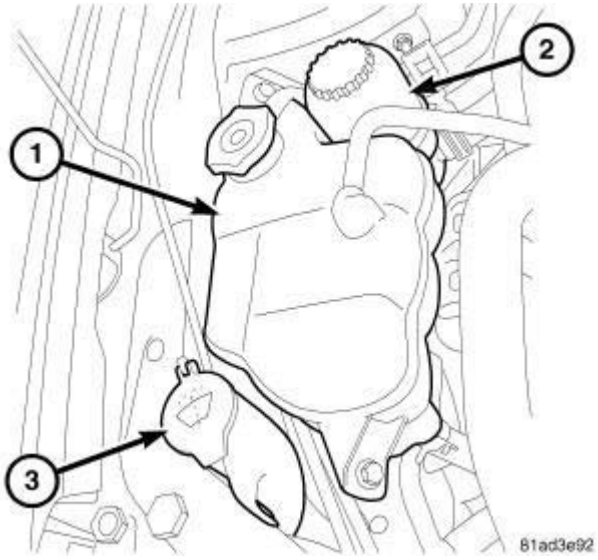

Fig. 390: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

29. Install power steering pump reservoir (2). Tighten mounting screw to 12 N.m (106 in. lbs.).
30. Install coolant recovery reservoir (1). Tighten mounting bolts to 10 N.m (89 in. lbs.).

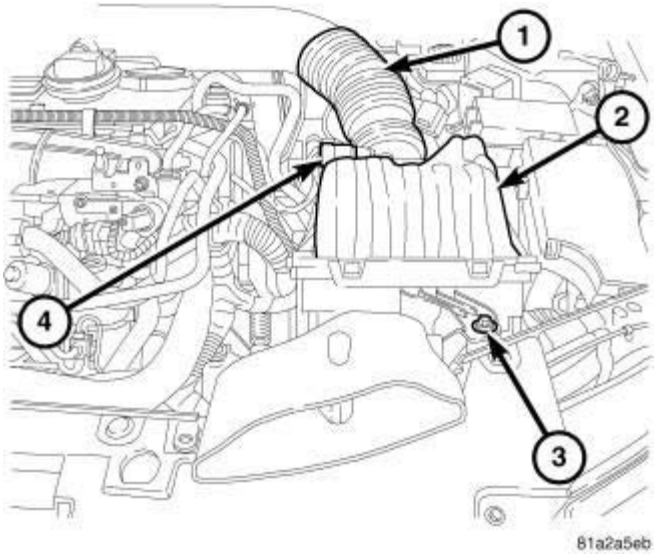

Fig. 391: Air Cleaner Housing
Courtesy of CHRYSLER LLC

31. Install clean air hose (1) and air cleaner housing (2). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
32. Connect negative battery cable.

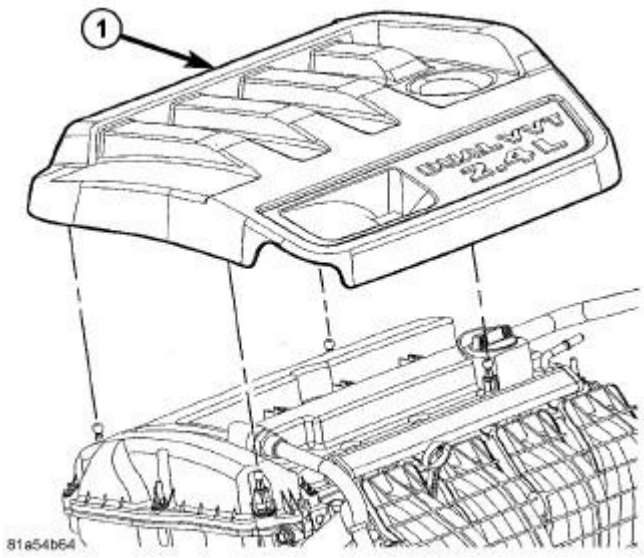

Fig. 392: Engine Cover
Courtesy of CHRYSLER LLC

33. Operate engine until it reaches normal operating temperature. Check oil system for leaks and correct fluid level.
34. Install engine cover (1).

TENSIONER, ENGINE TIMING

Removal

REMOVAL

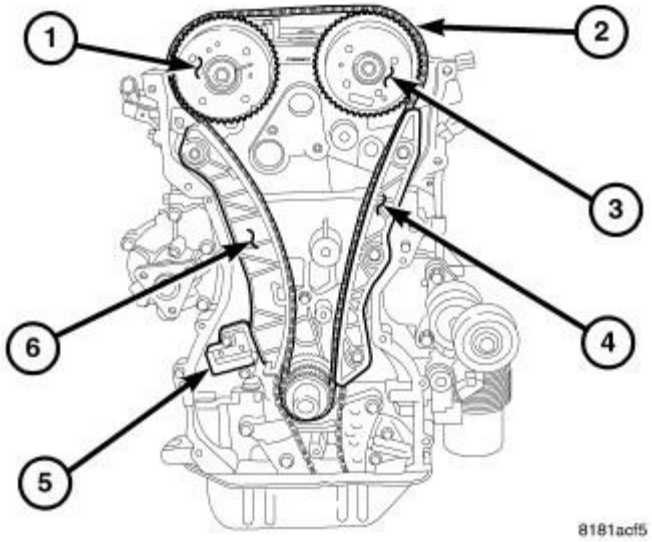

Fig. 393: TIMING DRIVE
Courtesy of CHRYSLER LLC

1. Remove the engine timing cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

NOTE: Tensioner will not come apart during removal.

2. Remove timing chain tensioner retaining bolts and remove tensioner (5).

Installation

INSTALLATION

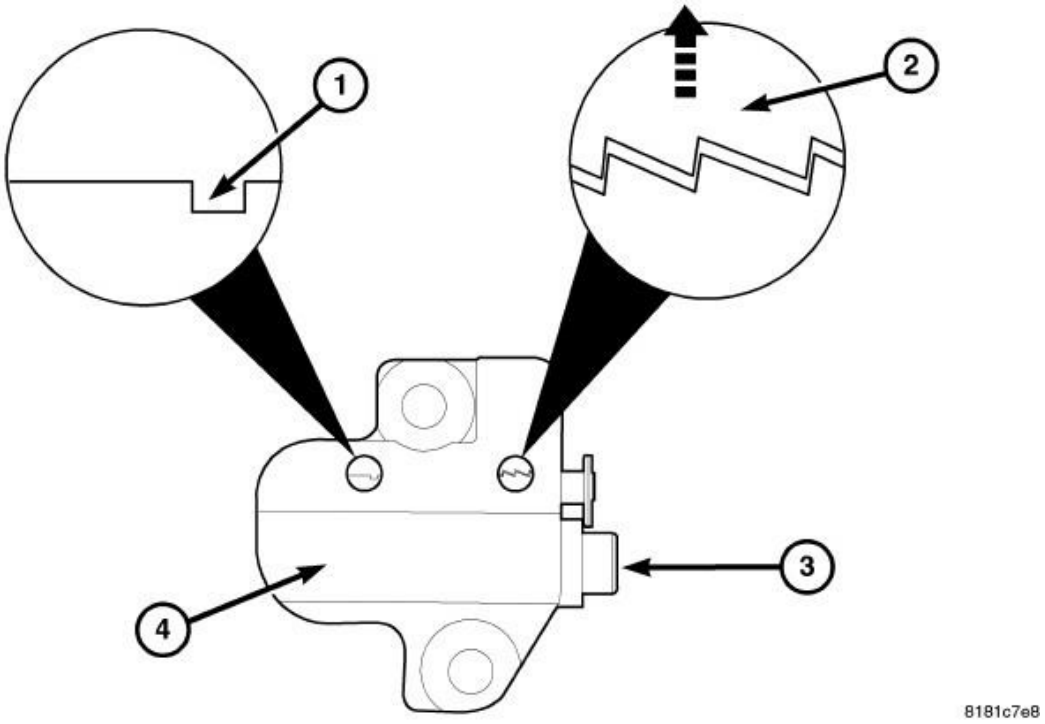

Fig. 394: TENSIONER RESET
Courtesy of CHRYSLER LLC

1. Reset timing chain tensioner (4) by lifting up on ratchet (2) and pushing plunger (3) inward towards the tensioner body (4). Insert Tensioner Pin 8514 into slot (1) to hold tensioner plunger in the retracted position.

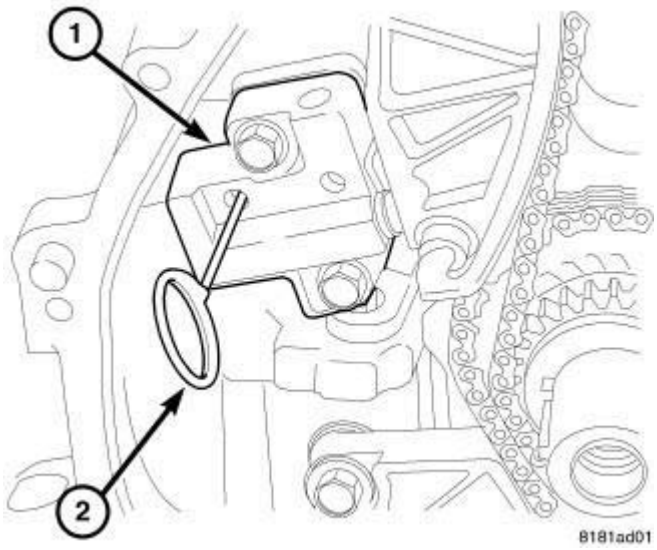

Fig. 395: TIMING CHAIN TENSIONER
Courtesy of CHRYSLER LLC

NOTE: Keep the slack in the timing chain on the tensioner side.

2. Install timing chain tensioner (1) and tighten bolts to 12 N.m (105 in. lbs.).
3. Remove timing Tensioner Pin 8514 (2).
4. Install the engine timing cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

2009 ENGINE

2.7L DOHC - Service Information - Journey

DESCRIPTION

DESCRIPTION

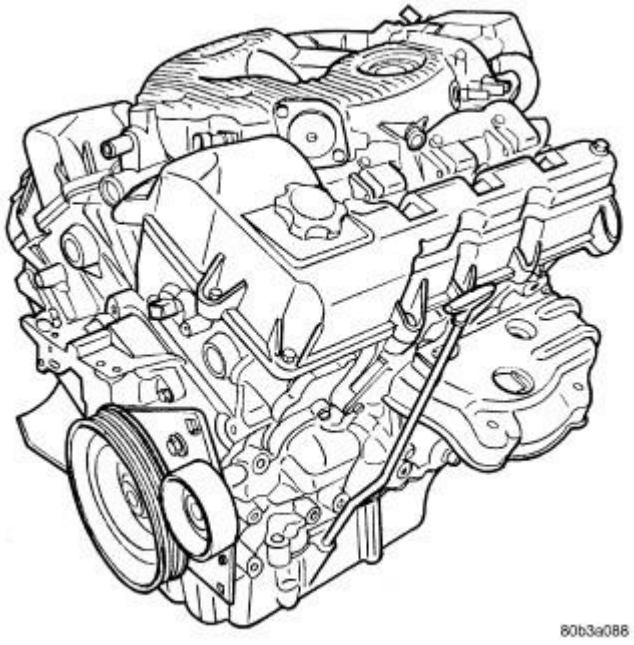

Fig. 1: 2.7 Liter Engine
Courtesy of CHRYSLER LLC

The 2.7 Liter (167 Cubic Inches) 60 degree V6 engine is a double overhead camshaft design with hydraulic lifters and four valves per cylinder. The engine does not have provisions for a free wheeling valve train.

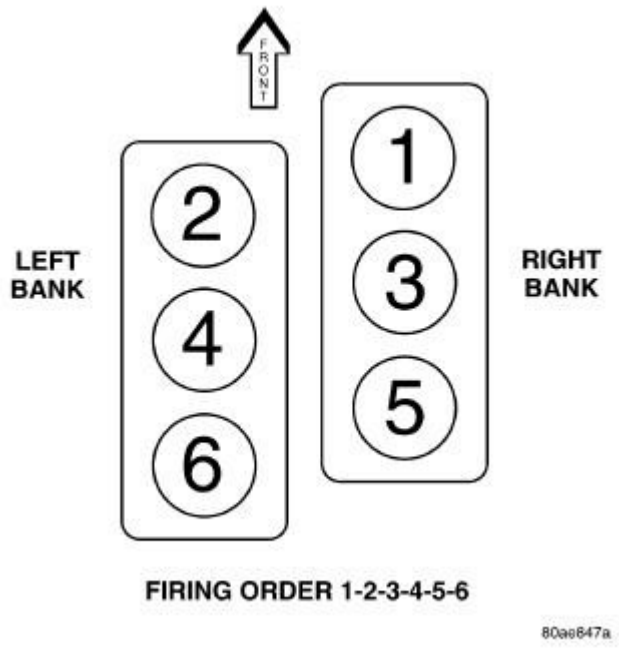

Fig. 2: Cylinder Numbering & Firing Order
Courtesy of CHRYSLER LLC

The cylinders are numbered from front to rear, with the right bank odd numbered, and the left bank even numbered. The firing order is 1-2-3-4-5-6.

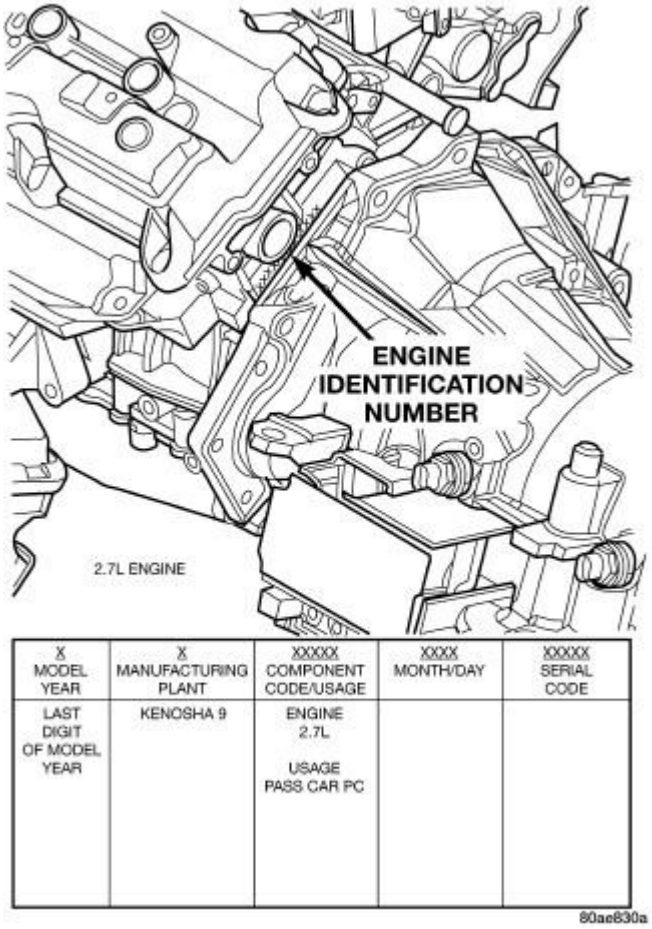

Fig. 3: Engine Identification
Courtesy of CHRYSLER LLC

The engine identification number is located on the rear of the cylinder block just below the left cylinder head.

DIAGNOSIS AND TESTING

ENGINE DIAGNOSIS - INTRODUCTION

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

See **ENGINE DIAGNOSIS - PERFORMANCE** and **ENGINE DIAGNOSIS - MECHANICAL** for possible causes and corrections of malfunctions.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that cannot be

isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following:

- Cylinder Compression Pressure Test: Refer to **CYLINDER COMPRESSION PRESSURE TEST**.
- Cylinder Combustion Pressure Leakage Test: Refer to **CYLINDER COMBUSTION PRESSURE LEAKAGE TEST**.
- Cylinder Head Gasket Failure Diagnosis: Refer to **CYLINDER HEAD GASKET**.
- Intake Manifold Leakage Diagnosis: Refer to .**INTAKE MANIFOLD LEAKS**
- Lash Adjuster (Tappet) Noise Diagnosis: Refer to **DIAGNOSIS AND TESTING - HYDRAULIC LASH ADJUSTER NOISE DIAGNOSIS**.
- Engine Oil Leak Inspection: Refer to **ENGINE OIL LEAK INSPECTION**.

ENGINE DIAGNOSIS - PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test battery. Charge or replace as necessary. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Description** .
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to terminals.
	3. Faulty starter.	3. Test starting system. Refer to **Electrical - Engine Systems/Starting - Diagnosis and Testing** .
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. (Refer to Appropriate Diagnostic Information)
	5. Incorrect spark plug gap.	5. Check and adjust gap as needed.
	6. Contamination in fuel system.	6. Clean system and replace fuel filter.
	7. Faulty fuel pump.	7. Test fuel pump and replace as needed. (Refer to Appropriate Diagnostic Information)
	8. Incorrect engine timing.	8. Check for a skipped timing chain.
ENGINE STALLS OR IDLES ROUGH	1. Idle speed too low.	1. Test minimum air flow. (Refer to Appropriate Diagnostic Information)
	2. Incorrect fuel mixture.	2. (Refer to Appropriate Diagnostic Information)
	3. Intake manifold leakage.	3. Inspect intake manifold gasket, manifold, and vacuum hoses.

	4. Faulty coil(s).	4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped plugs. 2. Contamination in fuel system. 3. Faulty fuel pump. 4. Incorrect valve timing. 5. Leaking cylinder head gasket. 6. Low compression. 7. Burned, warped, or pitted valves. 8. Plugged or restricted exhaust system. 9. Faulty coil(s).	1. Set gap as needed or replace plug(s). 2. Clean system and replace fuel filter. 3. Test and replace as necessary. (Refer to Appropriate Diagnostic Information) 4. Correct valve timing as needed. 5. Replace cylinder head gasket. 6. Test compression of each cylinder. 7. Replace valves. 8. Check exhaust system restriction. Replace parts, as necessary. 9. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs. 2. Contamination in Fuel System. 3. Burned, warped, or pitted valves. 4. Faulty coil(s).	1. Set gap as needed or replace plug(s). 2. Clean fuel system and replace fuel filter. 3. Replace valves. 4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap. 2. Faulty coil(s). 3. Dirty fuel injector(s). 4. Contamination in fuel system.	1. Set gap as needed or replace plug(s). 2. Test and replace as necessary. (Refer to Appropriate Diagnostic Information) Test and replace as necessary. (Refer to Appropriate Diagnostic Information) 4. Clean system and replace fuel filter.

ENGINE DIAGNOSIS - MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION

VALVETRAIN NOISE	1. High or low oil level in crankcase. 2. Thin or diluted oil. 3. Thick oil 4. Low oil pressure. 5. Dirt in tappets/lash adjusters. 6. Worn rocker arms. 7. Worn tappets/lash adjusters. 8. Worn valve guides. 9. Excessive runout of valve seats on valve faces. 10. Missing adjuster pivot.	1. Check and correct engine oil level. 2. Change oil to correct viscosity. 3. (a.) Change oil and filter. (b.) Run engine to operating temperature. (c.) Change oil and filter again. 4. Check and correct engine oil level. 5. Replace rocker arm/hydraulic lash adjuster assembly. 6. Inspect oil supply to rocker arms. 7. Install new rocker arm/hydraulic lash adjuster assembly. 8. Ream guides and install new valves with oversize stems. 9. Grind valve seats and valves. 10. Replace rocker arm/hydraulic lash adjuster assembly.
CONNECTING ROD NOISE	1. Insufficient oil supply. 2. Low oil pressure. 3. Thin or diluted oil. 4. Thick oil (b.) Run engine to operating temperature. (c.) Change oil and filter again. 5. Excessive bearing clearance. 6. Connecting rod journal out-of-round. 7. Misaligned connecting rods.	1. Check engine oil level. 2. Check engine oil level. Inspect oil pump relief valve and spring. 3. Change oil to correct viscosity. 3. (a.) Change oil and filter. 5. Measure bearings for correct clearance. Repair as necessary. 6. Replace crankshaft or grind surface. 7. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply. 2. Low oil pressure. 3. Thin or diluted oil. 4. Thick oil (b.) Run engine to operating temperature. (c.) Change oil and filter again. 4. Excessive bearing clearance.	1. Check engine oil level. 2. Check engine oil level. Inspect oil pump relief valve and spring. 3. Change oil to correct viscosity. 3. (a.) Change oil and filter. 4. Measure bearings for correct

		clearance. Repair as necessary.
	5. Excessive end play.	5. Check thrust bearing for wear on flanges.
	6. Crankshaft journal out-of-round or worn.	6. Replace crankshaft or grind journals.
	7. Loose flywheel or torque converter.	7. Tighten to correct torque.
OIL PRESSURE DROP	1. Low oil level.	1. Check engine oil level.
	2. Faulty oil pressure sending unit.	2. Install new sending unit.
	3. Low oil pressure.	3. Check sending unit and main bearing oil clearance.
	4. Clogged oil filter.	4. Install new oil filter.
	5. Worn parts in oil pump.	5. Replace worn parts or pump.
	6. Thin or diluted oil.	6. Change oil to correct viscosity.
	7. Oil pump relief valve stuck.	7. Remove valve and inspect, clean, or replace.
	8. Oil pump suction tube loose.	8. Remove oil pan and install new tube or clean, if necessary.
	9. Oil pump cover warped or cracked.	9. Install new oil pump.
	10. Excessive bearing clearance.	10. Measure bearings for correct clearance.
OIL LEAKS	1. Misaligned or deteriorated gaskets.	1. Replace gasket(s).
	2. Loose fastener, broken or porous metal part.	2. Tighten, repair or replace the part.
	3. Misaligned or deteriorated cup or threaded plug.	3. Replace as necessary.
OIL CONSUMPTION OR SPARK PLUGS FOULED	1. PCV system malfunction.	1. Check system and repair as necessary. (Refer to Appropriate Diagnostic Information)
	2. Worn, scuffed or broken rings.	2. Hone cylinder bores. Install new rings.
	3. Carbon in oil ring slots.	3. Clean pistons and install new rings.
	4. Rings fitted too tightly in grooves.	4. Remove rings and check grooves. If groove is not proper width, replace piston.
	5. Worn valve guide(s).	5. Replace cylinder head(s).
	6. Valve stem seal(s) worn or damaged.	6. Replace seal(s).

CYLINDER COMPRESSION PRESSURE TEST

The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Check engine oil level and add oil if necessary.
2. Drive the vehicle until engine reaches normal operating temperature. Select a route free from traffic and other forms of congestion, observe all traffic laws, and accelerate through the gears several times briskly.
3. Remove all spark plugs from engine. As spark plugs are being removed, check electrodes for abnormal firing indicators such as fouled, hot, oily, etc. Record cylinder number of spark plug for future reference.
4. Remove the Auto Shutdown (ASD) relay from the Totally Integrated Power Module (TIPM).
5. Install a suitable compression test gauge into the #1 spark plug hole in cylinder head.
6. Crank engine until maximum pressure is reached on gauge. Record this pressure as #1 cylinder pressure.
7. Repeat the previous step for all remaining cylinders.
8. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
9. If one or more cylinders have abnormally low compression pressures, repeat the compression test.
10. If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question. **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

WARNING: DO NOT REMOVE THE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

Check the coolant level and fill as required. DO NOT install the pressure cap.

Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.

Clean spark plug recesses with compressed air.

Remove the spark plugs.

Remove the oil filler cap.

Remove the air cleaner.

Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum, with 552 kPa (80 psi) recommended.

Perform the test procedures on each cylinder according to the tester manufacturer's instructions. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the coolant.

All gauge pressure indications should be equal, with no more than 25% leakage per cylinder.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

ENGINE OIL LEAK INSPECTION

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair as necessary.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.
5. **If the oil leak source is not positively identified at this time** , proceed with the AIR LEAK DETECTION TEST METHOD as follows:
    - Disconnect the fresh air hose (make-up air) at the cylinder head cover and plug or cap the nipple on the cover.
    - Remove the PCV valve hose from the cylinder head cover. Cap or plug the PCV valve nipple on the cover.
    - Attach an air hose with pressure gauge and regulator to the dipstick tube.

      CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

    - Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provides the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service Information procedures.
    - If the leakage occurs at the crankshaft rear oil seal area, refer to **INSPECTION FOR REAR**

SEAL AREA LEAKS.

6. If no leaks are detected, turn off the air supply. Remove the air hose, all plugs, and caps. Install the PCV valve and fresh air hose (make-up air). Proceed to next step.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

NOTE: If oil leakage is observed at the dipstick tube to block location; remove the tube, clean and reseal using Mopar® Stud AND Bearing Mount (press fit tube applications only), and for O-ring style tubes, remove tube and replace the O-ring seal.

CAUTION: Do not exceed 20.6 kPa (3 psi).

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

INSPECTION FOR REAR SEAL AREA LEAKS

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak. If a leak is present in this area, remove transmission for further inspection.
    a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    b. Where leakage tends to run straight down, possible causes are a porous block, oil gallery cup plug, bed plate to cylinder block mating surfaces and seal bore. See proper repair procedures for these items.
4. If no leaks are detected, pressurize the crankcase as previously described in step 5 under ENGINE OIL LEAK INSPECTION.

CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be

polished out with emery cloth.

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.
7. After the oil leak root cause and appropriate corrective action have been identified, replace component(s) as necessary.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

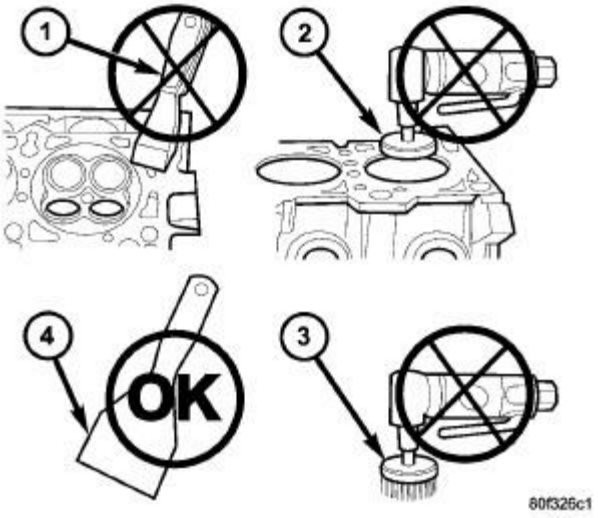

Fig. 4: PROPER TOOL USAGE FOR SURFACE PREPARATION
Courtesy of CHRYSLER LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2,3).

Fig. 5: PROPER TOOL USAGE FOR SURFACE PREPARATION
Courtesy of CHRYSLER LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

REPAIR OF DAMAGED OR WORN THREADS

Damaged or worn threads (excluding spark plug and camshaft bearing cap attaching threads) can be repaired. Essentially, this repair consists of drilling out worn or damaged threads, tapping the hole with a special Heli-Coil Tap, (or equivalent) and installing an insert into the tapped hole. This brings the hole back to its original thread size.

CAUTION: Be sure that the tapped holes maintain the original center line.

Heli-Coil tools and inserts are readily available from automotive parts jobbers.

HYDROSTATIC LOCKED ENGINE

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

CAUTION: DO NOT use starter motor to rotate the engine, severe damage may occur.

1. Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.
2. Remove negative battery cable.
3. Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.
4. With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.
5. Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).
6. Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.)
7. Repair engine or components as necessary to prevent this problem from reoccurring.

CAUTION: Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

8. Install new spark plugs.
9. Drain engine oil and remove oil filter.
10. Install a new oil filter.
11. Fill engine with specified amount of approved oil.
12. Connect negative battery cable.
13. Start engine and check for any leaks.

FORM-IN-PLACE GASKETS AND SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing

properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® BED PLATE SEALANT is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bed plate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can w/applicator.

SEALER APPLICATION

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can w/applicator can be brushed on evenly over the sealing surfaces.

ENGINE CORE AND OIL GALLERY PLUGS

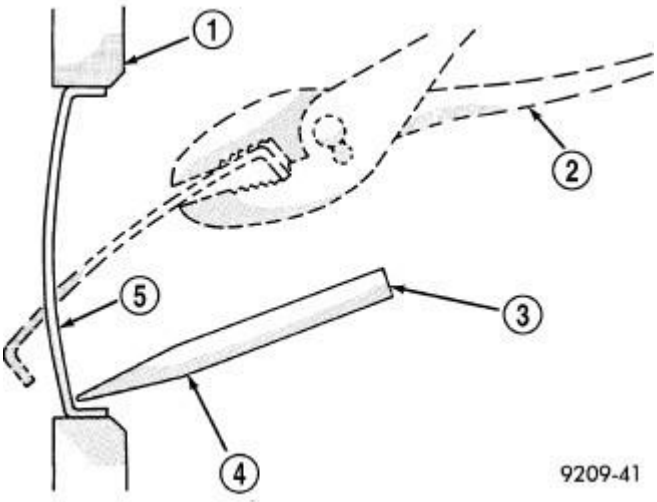

Fig. 6: Core Hole Plug Removal
Courtesy of CHRYSLER LLC

1 - CYLINDER BLOCK
2 - REMOVE PLUG WITH PLIERS
3 - STRIKE HERE WITH HAMMER
4 - DRIFT PUNCH
5 - CUP PLUG

Using a blunt tool such as a drift and a hammer, strike the bottom edge of the cup plug. With the cup plug rotated, grasp firmly with pliers or other suitable tool and remove plug.

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

Thoroughly clean inside of cup plug hole in cylinder block or head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount. Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

REMOVAL

REMOVAL

1. Remove the engine cover.
2. Release fuel pressure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Disconnect negative battery cable.

4. Drain cooling system. Refer to **Cooling - Standard Procedure** .
5. Evacuate the A/C system using a suitable refrigerant recovery machine. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
6. Remove throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
7. Raise vehicle on hoist.
8. Remove both front wheels.

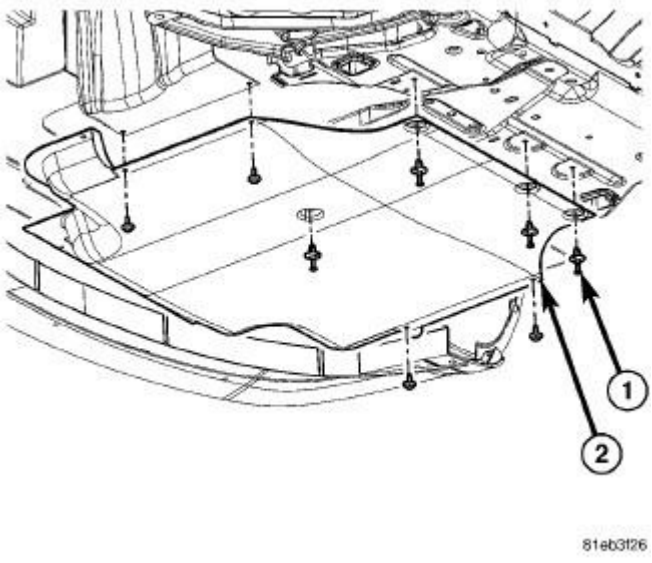

Fig. 7: Belly Pan
Courtesy of CHRYSLER LLC

1 - Belly Pan Fasteners
2 - Belly Pan

9. Remove fasteners (1), and remove the belly pan (2).

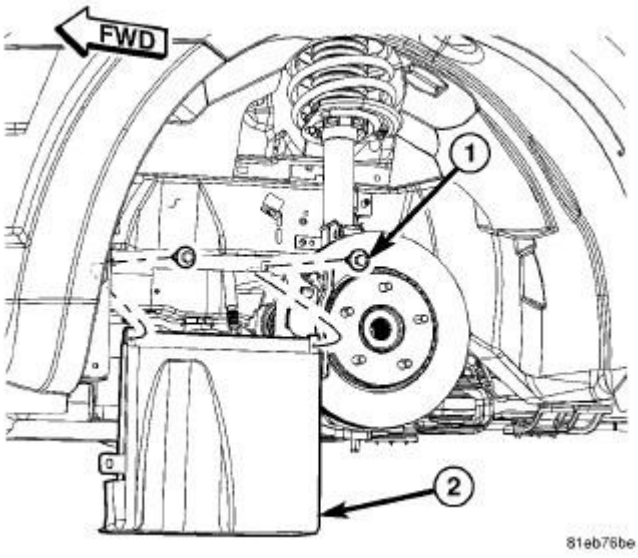

Fig. 8: Left Lower Splash Shield
Courtesy of CHRYSLER LLC

10. Remove the left lower splash shield (2).

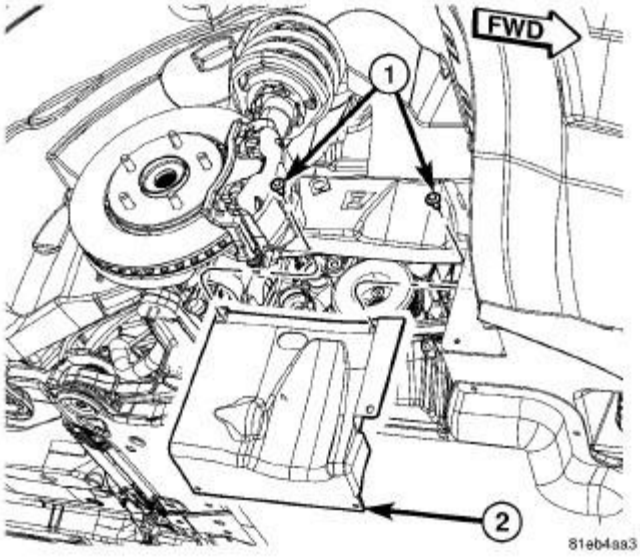

Fig. 9: Right Lower Splash Shield
Courtesy of CHRYSLER LLC

11. Remove the right lower splash shield (2).

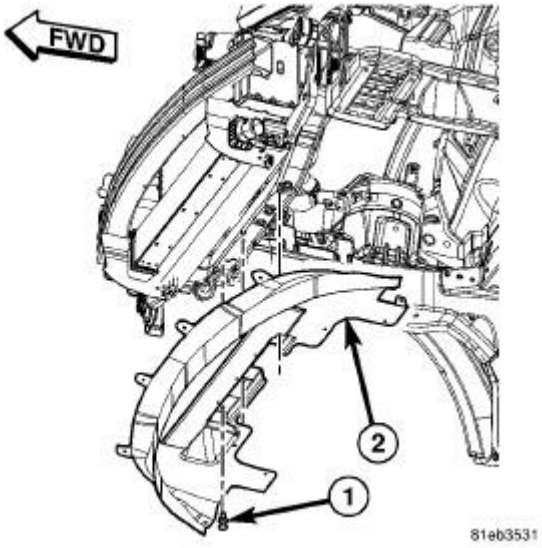

Fig. 10: Lower Fascia Closeout Panel
Courtesy of CHRYSLER LLC

12. Remove the lower fascia closeout panel (2).
13. Lower vehicle.

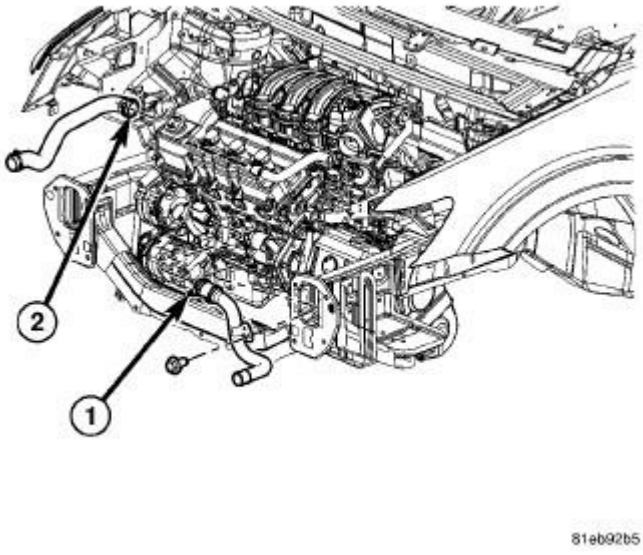

Fig. 11: Upper/Lower Radiator Hoses
Courtesy of CHRYSLER LLC

14. Disconnect upper (2) and lower (1) radiator hoses at the thermostat housing and at the water pump fitting.

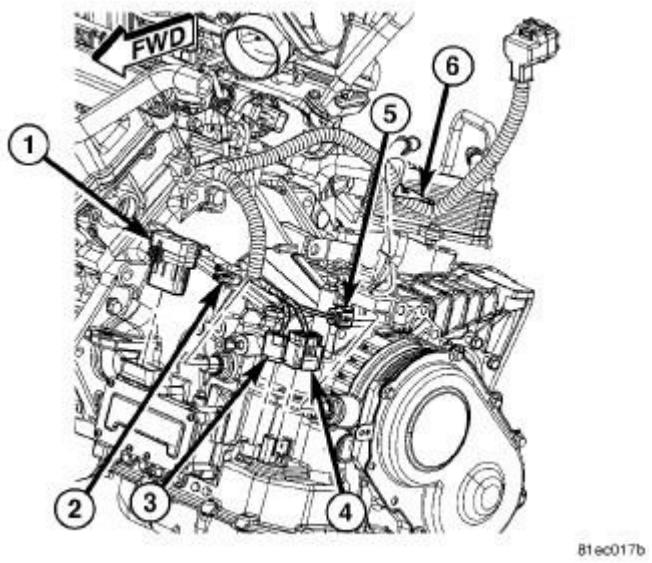

Fig. 12: Transmission Control Module Harness Connector
Courtesy of CHRYSLER LLC

15. Disconnect transmission control module harness connector (1).
16. Disconnect transmission solenoid harness connectors (3) and (4).
17. Disconnect transmission input shaft speed sensor (2) and the output shaft speed sensor (5).
18. Disconnect transmission shift cable.
19. Disconnect the transaxle oil cooler lines at the transaxle.

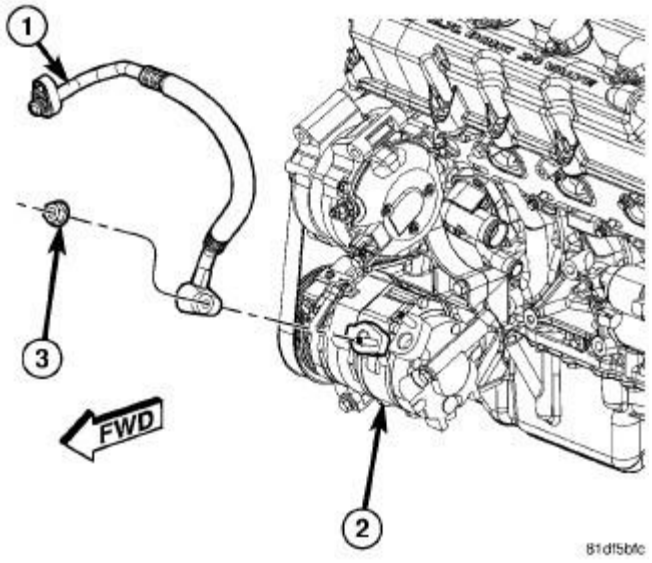

Fig. 13: A/C Discharge Line At Compressor
Courtesy of CHRYSLER LLC

20. Disconnect A/C discharge line (1) at compressor (2).

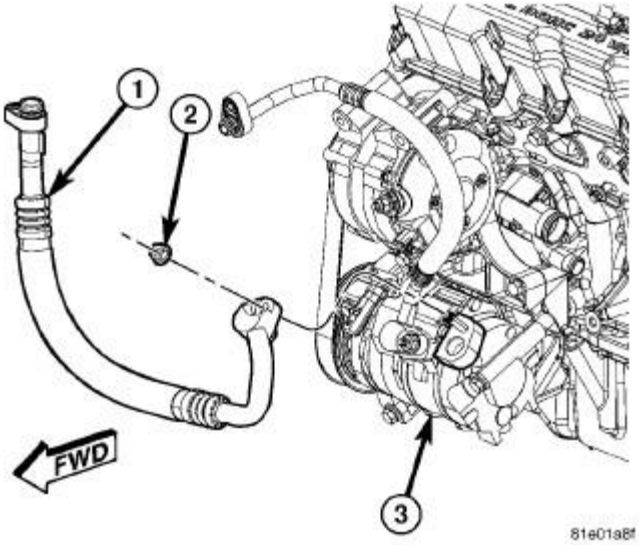

Fig. 14: A/C Compressor To Bracket
Courtesy of CHRYSLER LLC

21. Disconnect A/C suction line (1) at compressor (2).
22. Remove the A/C compressor (3). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .
23. Remove cooling fan assembly. Refer to **Cooling/Engine/FAN, Cooling - Removal** .

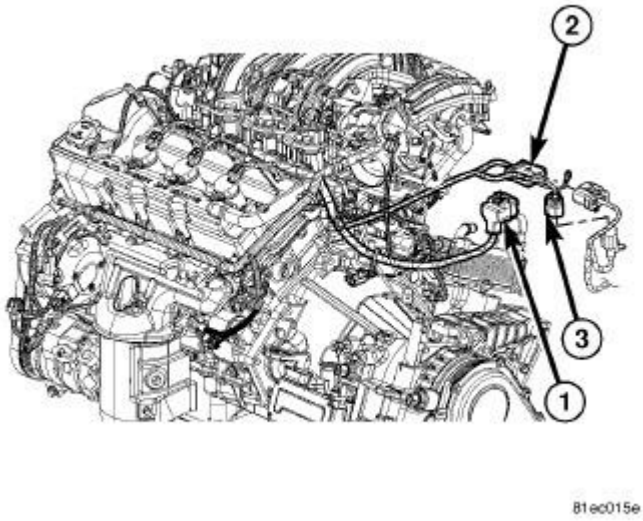

Fig. 15: Engine Electrical Harnesses Connectors
Courtesy of CHRYSLER LLC

24. Disconnect engine electrical harnesses connectors (1), (2) and (3).
25. Raise vehicle.

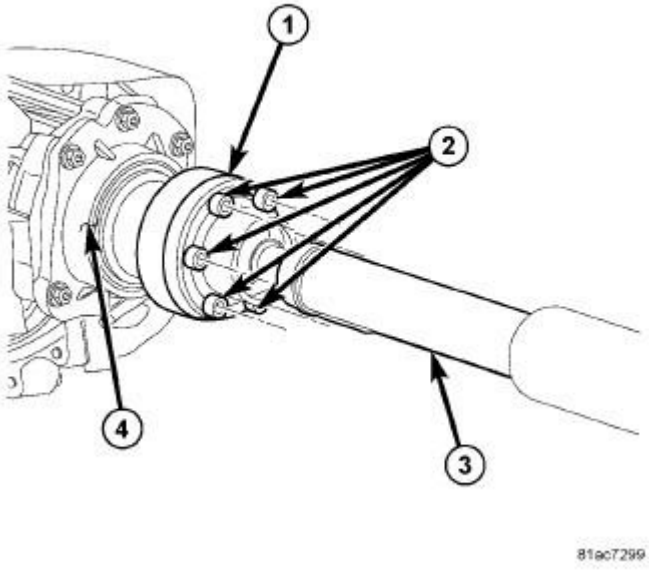

Fig. 16: Propeller Shaft To PTU Fasteners
Courtesy of CHRYSLER LLC

26. If equipped with AWD, remove the propeller shaft to PTU fasteners (2). Refer to **Differential and Driveline/Propeller Shaft - Removal** .

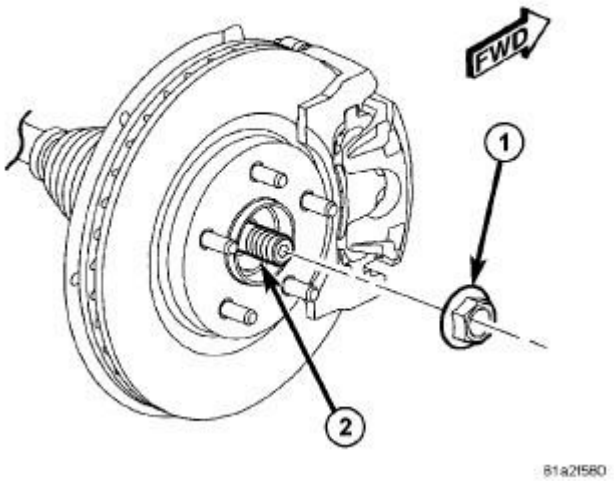

Fig. 17: Axle Shafts Hub Nut

Courtesy of CHRYSLER LLC

27. Remove both axle shafts (2). Refer to **Differential and Driveline/Half Shaft - Removal** .

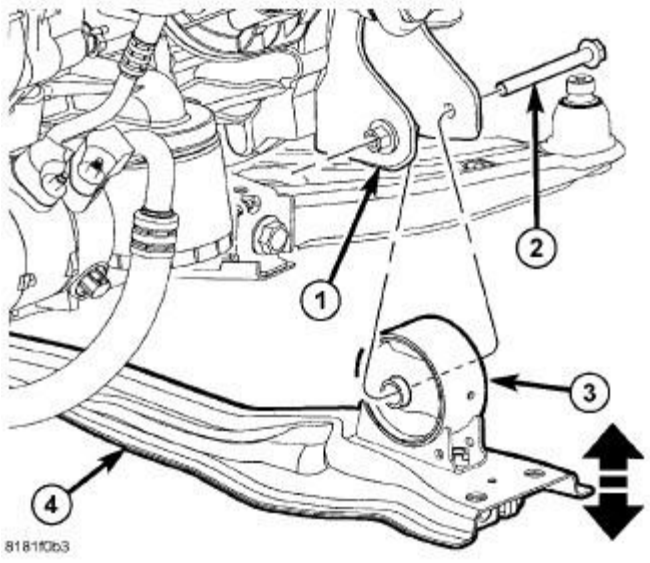

Fig. 18: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

28. Remove front engine mount through bolt (2).

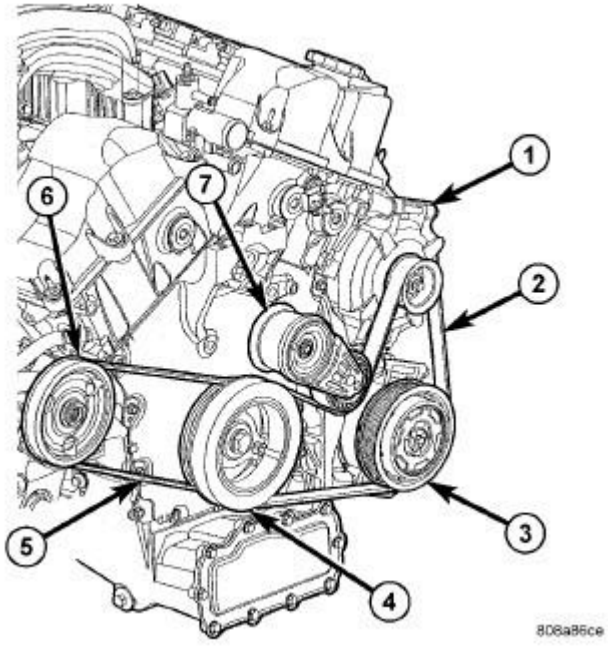

Fig. 19: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER/TENSIONER

29. Remove accessory drive belts (2) and (5). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
30. Remove power steering pump and bracket as an assembly. **Do not** disconnect power steering lines from pump. Reposition pump and support with suitable retaining strap.

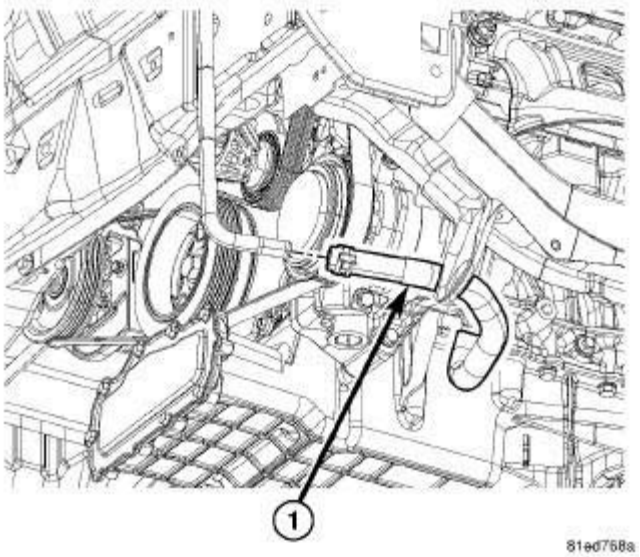

Fig. 20: Heater Return Hose
Courtesy of CHRYSLER LLC

31. Disconnect heater return hose (1) from pipe connection at right front frame rail area.

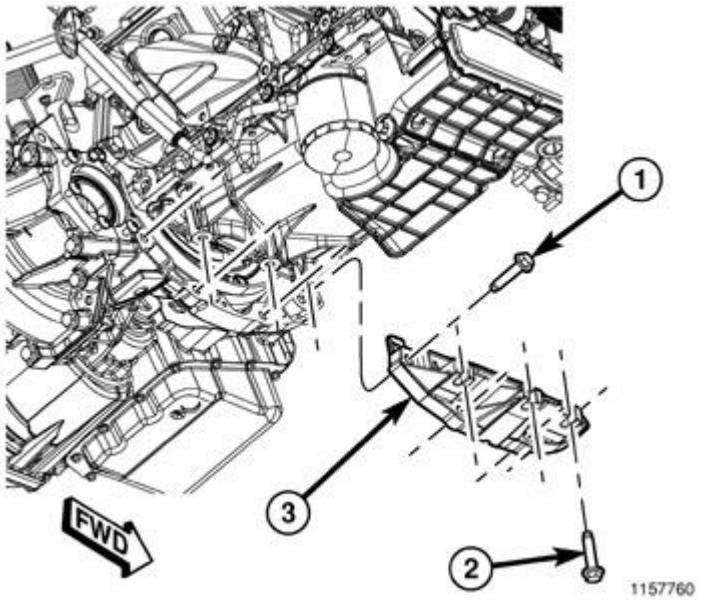

Fig. 21: Structural Collar
Courtesy of CHRYSLER LLC

32. Remove structural collar (3). See **Engine/Engine Block/COVER, Structural Dust - Removal**.

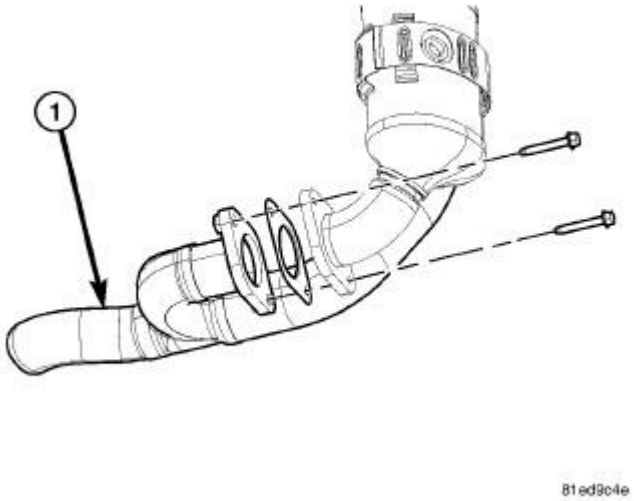

Fig. 22: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

33. Remove the exhaust cross-under pipe (1). See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

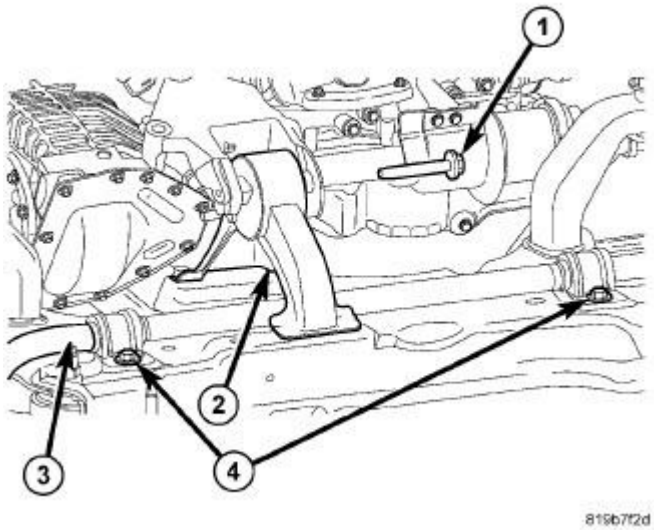

Fig. 23: Rear Engine Mount & Transaxle Bracket
Courtesy of CHRYSLER LLC

34. Remove rear engine mount and transaxle bracket (2).
35. Drain engine oil.
36. Remove transaxle torque converter housing cover.
37. Mark flex plate to torque converter position. Remove torque converter bolts.
38. Lower vehicle.
39. Disconnect positive cable from battery and TIPM.
40. Disconnect ground cable from left side transaxle mount bracket.

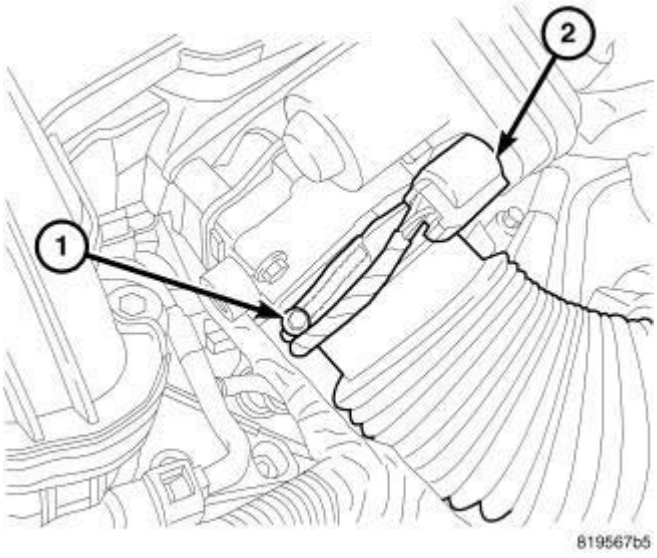

Fig. 24: Electronic Throttle Control Harness Connector
Courtesy of CHRYSLER LLC

41. Disconnect ETC harness connector (1) from throttle body.

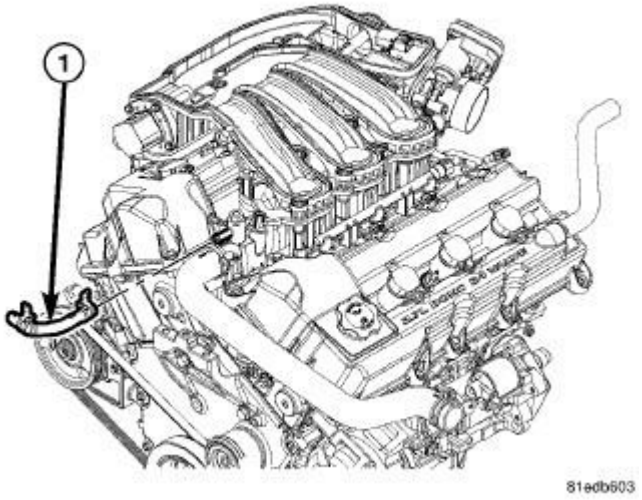

Fig. 25: Coolant Pressure Bottle Coolant Hose
Courtesy of CHRYSLER LLC

42. Disconnect coolant pressure bottle coolant hose (1) from engine coolant outlet connector.

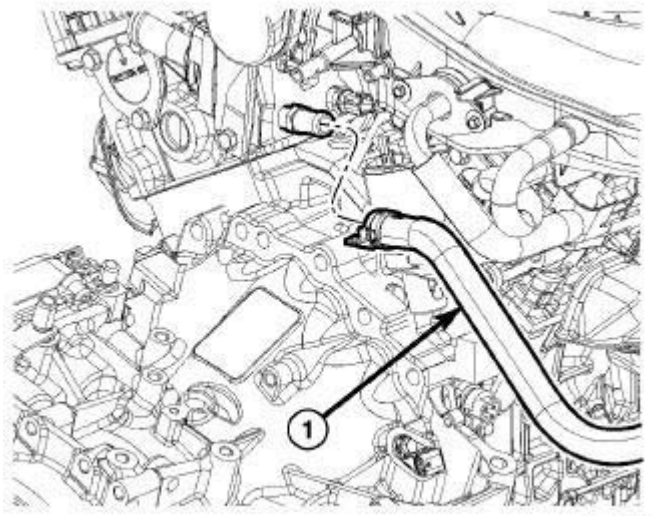

Fig. 26: Heater Hose From Engine Coolant Outlet
Courtesy of CHRYSLER LLC

43. Disconnect heater hose (1) from engine coolant outlet below the ETC.

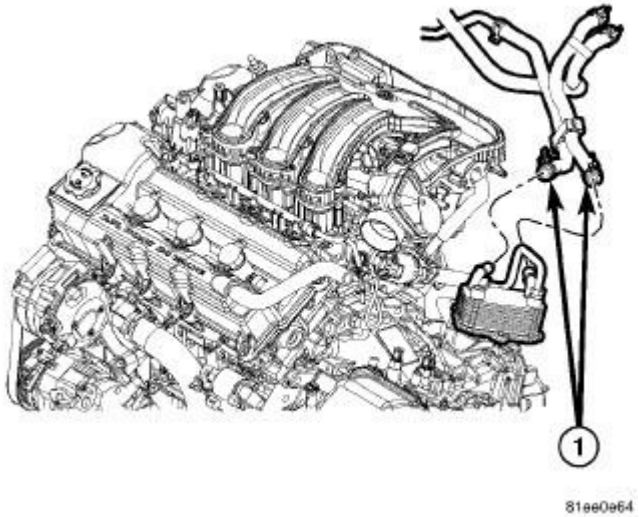

Fig. 27: Oil Cooler Lines
Courtesy of CHRYSLER LLC

44. If equipped, disconnect the oil cooler lines (1) from the engine oil cooler.
45. Disconnect ground strap at right shock tower.

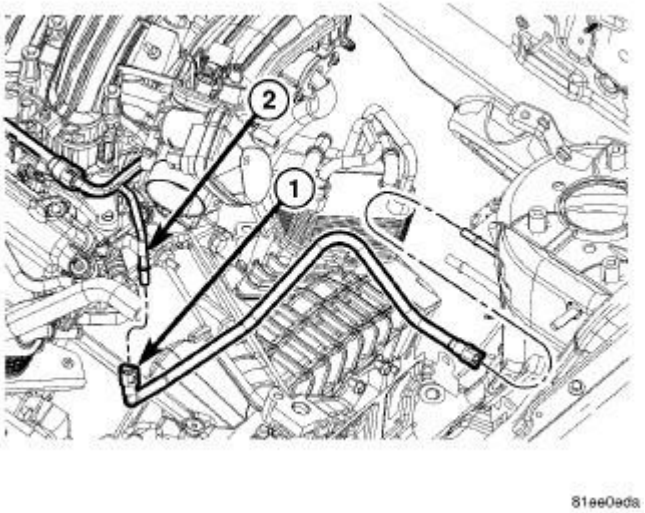

Fig. 28: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

46. Disconnect fuel line (1) from fuel rail inlet (2).

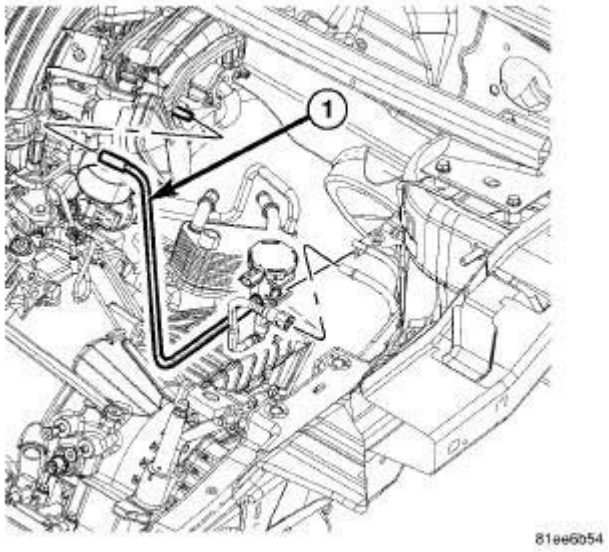

Fig. 29: Vapor Purge Vacuum Hose
Courtesy of CHRYSLER LLC

47. Disconnect vapor purge vacuum hose (1).

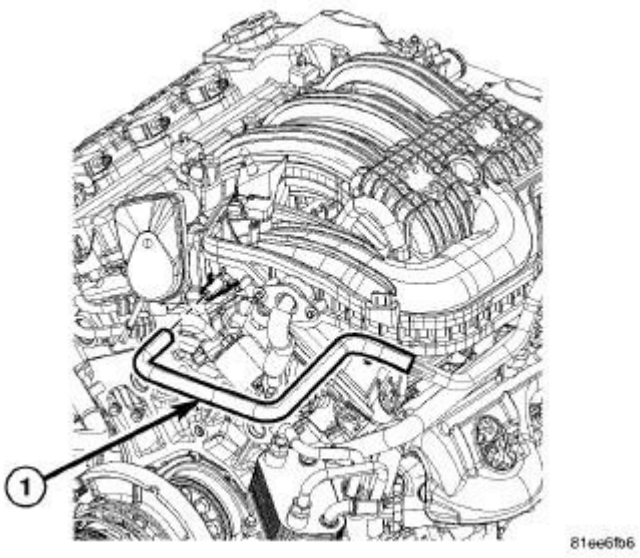

Fig. 30: Brake Booster Vacuum Hose
Courtesy of CHRYSLER LLC

48. Disconnect brake booster vacuum hose (1).
49. Disconnect all ground straps attaching to engine.
50. Position vehicle height to allow engine dolly 6135 and cradle 6710A with posts 6848 to be installed under vehicle.
51. Loosen cradle engine mounts to allow movement for positioning onto engine locating holes on the engine block, compressor mount bracket and oil pan rail. Lower vehicle and position cradle until the engine is resting on posts. Tighten post mounts to cradle frame to prevent movement when removing or installing engine/transaxle assembly. Secure engine/transaxle assembly to dolly/cradle with safety straps.
52. Lower vehicle so weight of the engine and transmission ONLY is on the cradle.
53. Remove right and left side engine mount bolts.
54. Slowly raise vehicle in short length spans. Inspect at each interval for potential engine or transaxle contact to vehicle components. Move the cradle/dolly fixture as necessary to allow for removal clearance.

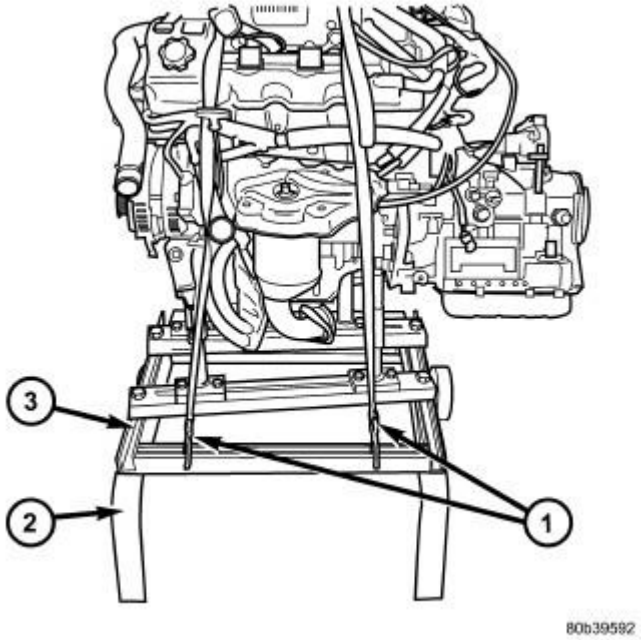

Fig. 31: ENGINE REMOVAL CRADLE
Courtesy of CHRYSLER LLC

1 - SAFETY STRAPS
2 - SPECIAL TOOL 6135
3 - SPECIAL TOOL 6710

INSTALLATION

INSTALLATION

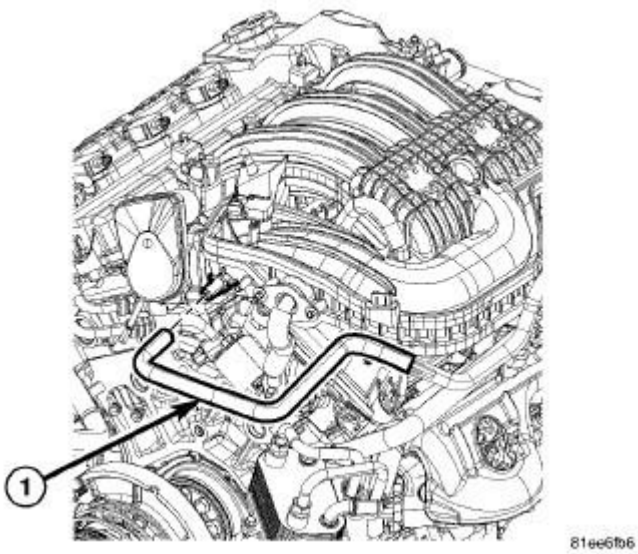

Fig. 32: Brake Booster Vacuum Hose
Courtesy of CHRYSLER LLC

1. Position engine/transaxle assembly under vehicle and slowly lower vehicle in short length spans. Inspect at each interval for potential engine or transaxle contact to vehicle components. Move the cradle/dolly fixture as necessary to allow for installation clearance.
2. Continue lowering vehicle until right side engine mount and left side transaxle mount align to their mounting locations. Install mounting bolts and torque to 61 N.m (45 ft. lbs.).
3. Remove safety straps from engine/transaxle assembly. Slowly raise vehicle enough to remove the engine dolly and cradle.
4. Reattach all ground straps to engine.
5. Connect brake booster vacuum hose (1).

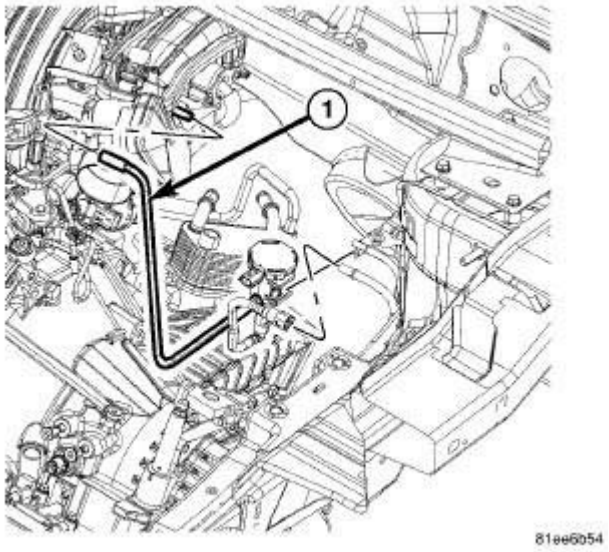

Fig. 33: Vapor Purge Vacuum Hose
Courtesy of CHRYSLER LLC

6. Connect vapor purge vacuum hose (1).

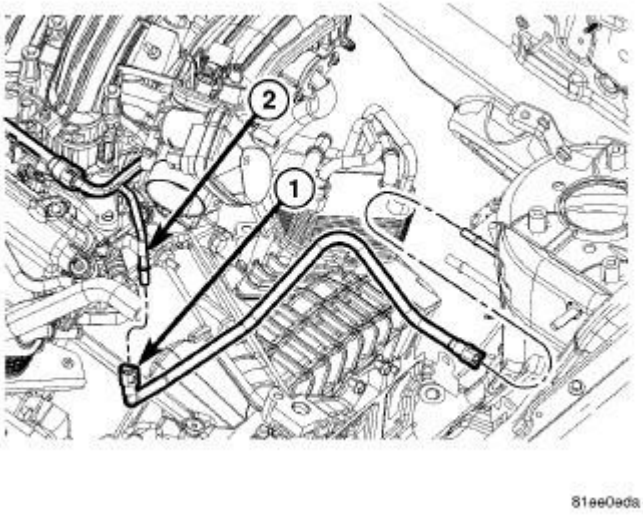

Fig. 34: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

7. Connect fuel line (1).
8. Connect ground strap to right shock tower.

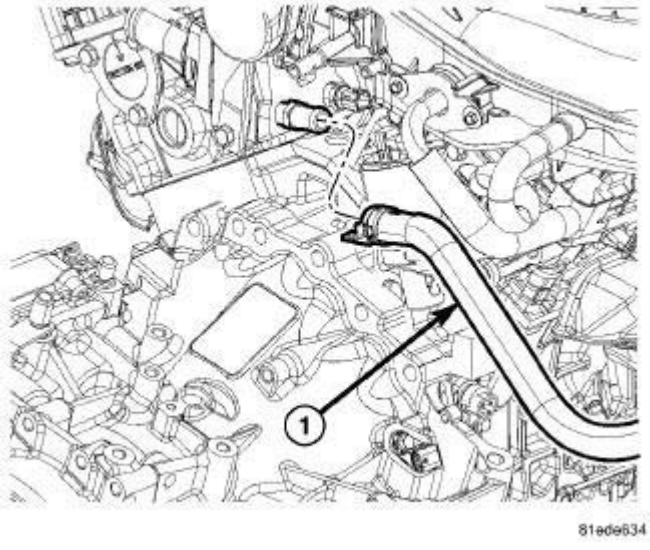

Fig. 35: Heater Hose From Engine Coolant Outlet
Courtesy of CHRYSLER LLC

9. Connect the heater hose (1) to the engine coolant outlet below the ETC.

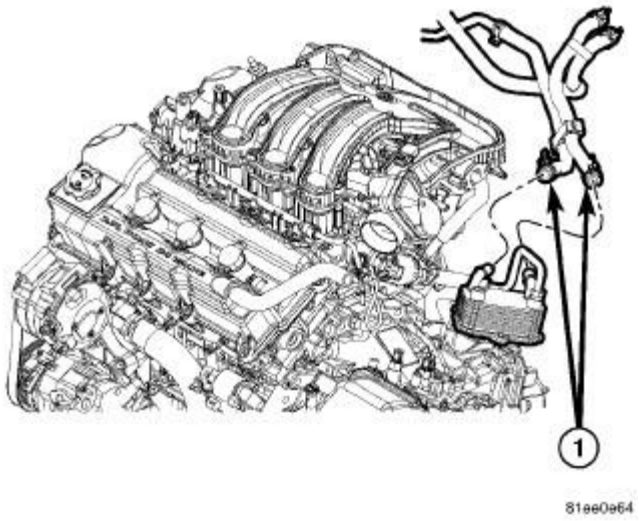

Fig. 36: Oil Cooler Lines
Courtesy of CHRYSLER LLC

10. If equipped, reconnect the oil cooler lines (1) from the engine oil cooler.

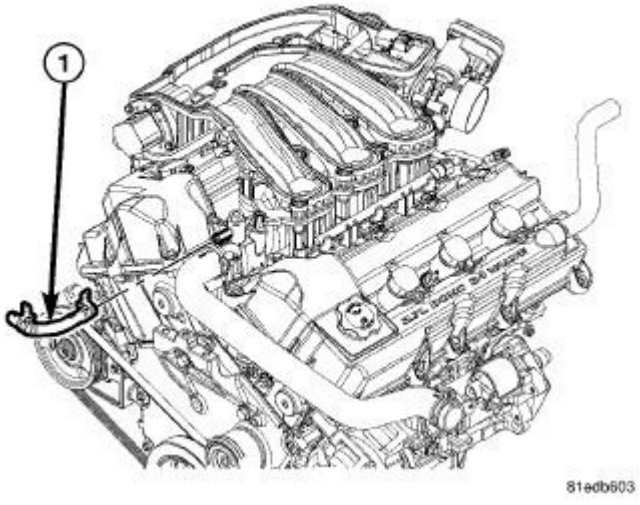

Fig. 37: Coolant Pressure Bottle Coolant Hose
Courtesy of CHRYSLER LLC

11. Connect coolant pressure bottle coolant hose (1) to coolant outlet connector.

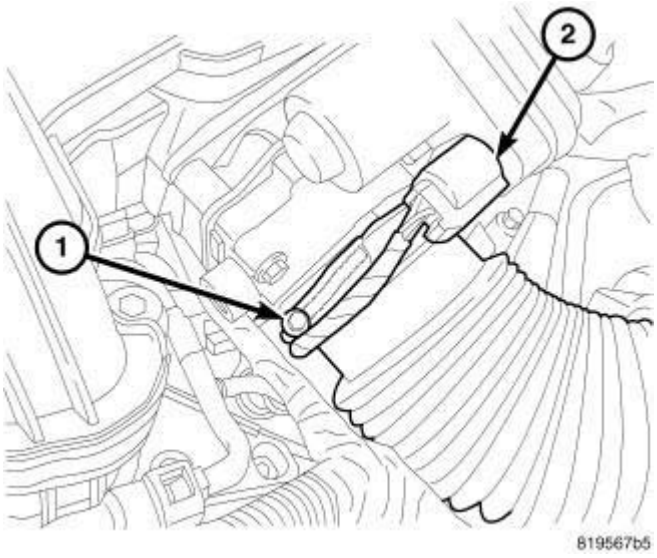

Fig. 38: Electronic Throttle Control Harness Connector
Courtesy of CHRYSLER LLC

12. Connect ETC harness connector (2).
13. Connect ground cable to right engine mount bracket.
14. Connect positive cable to battery and TIPM.
15. Raise vehicle.
16. **Automatic Transmission Equipped Vehicles:**
    - Install torque converter bolts.
    - Install torque converter housing cover.
17. **Manual Transmission Equipped Vehicles:**

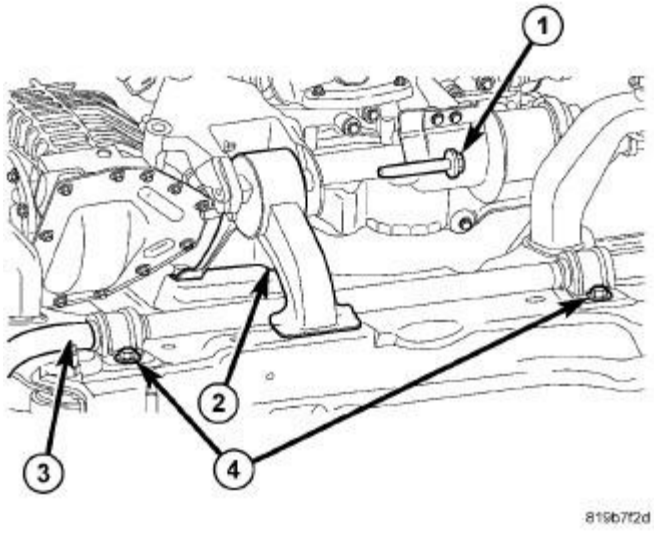

Fig. 39: Rear Engine Mount & Transaxle Bracket

Courtesy of CHRYSLER LLC

- Install modular clutch assembly-to-drive plate bolts.
- Install clutch/drive plate inspection cover.
- Connect clutch hydraulic circuit quick connect fitting.

18. Install rear engine mount (2) and transaxle bracket.

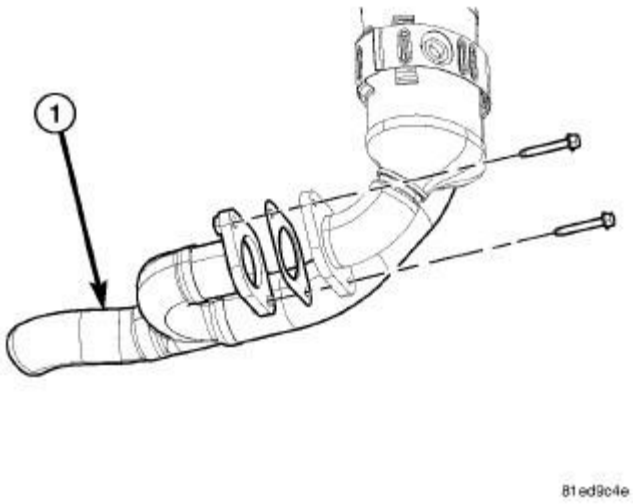

Fig. 40: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

19. Install exhaust cross-under pipe (1). See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

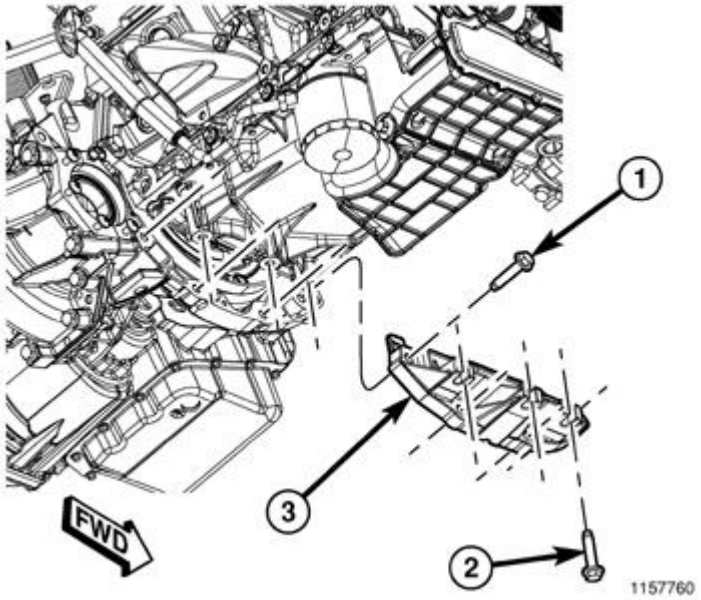

Fig. 41: Structural Collar
Courtesy of CHRYSLER LLC

20. Install structural collar (3). See **Engine/Engine Block/COVER, Structural Dust - Installation**.

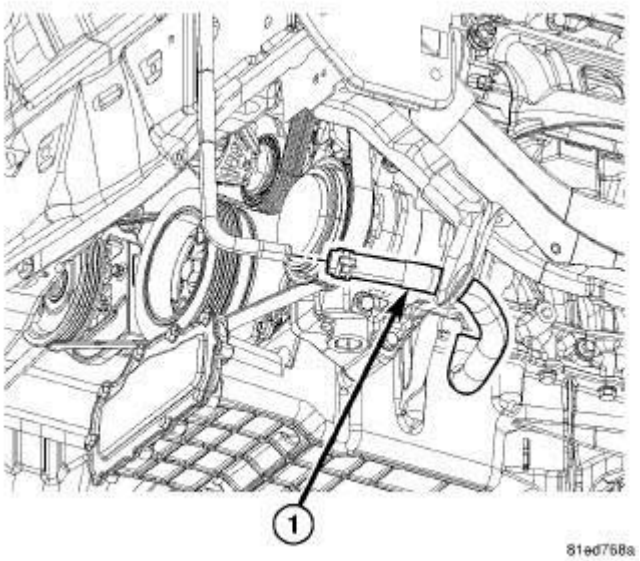

Fig. 42: Heater Return Hose
Courtesy of CHRYSLER LLC

21. Reconnect the heater return hose (1) from the pipe connection at the right front frame rail area.

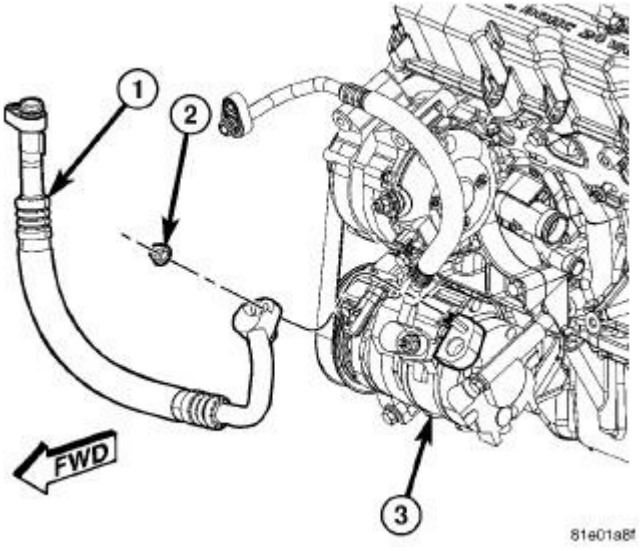

Fig. 43: A/C Compressor To Bracket
Courtesy of CHRYSLER LLC

22. Install A/C compressor (3) to bracket.
23. Connect A/C compressor clutch electrical connector.
24. Install power steering pump and bracket assembly. Refer to **Steering/Pump - Installation** .

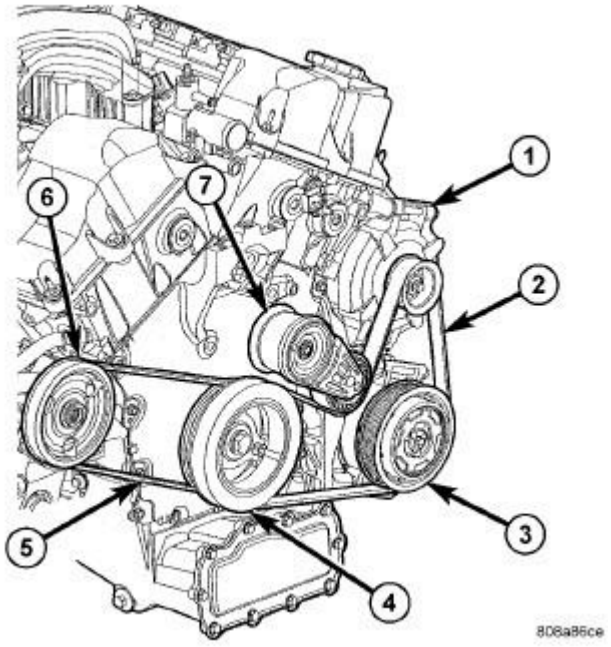

Fig. 44: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR
2 - IDLER/TENSIONER

25. Install accessory drive belts (2) and (5). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

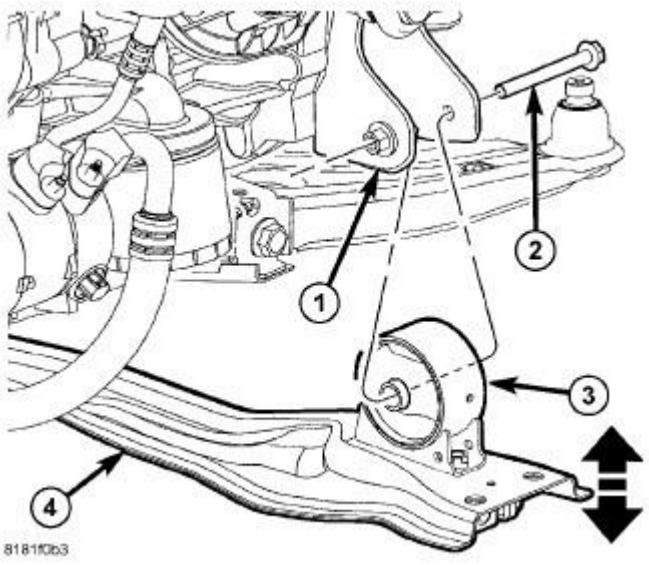

Fig. 45: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

26. Install the fore-aft crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
27. Install front engine mount through bolt (2).

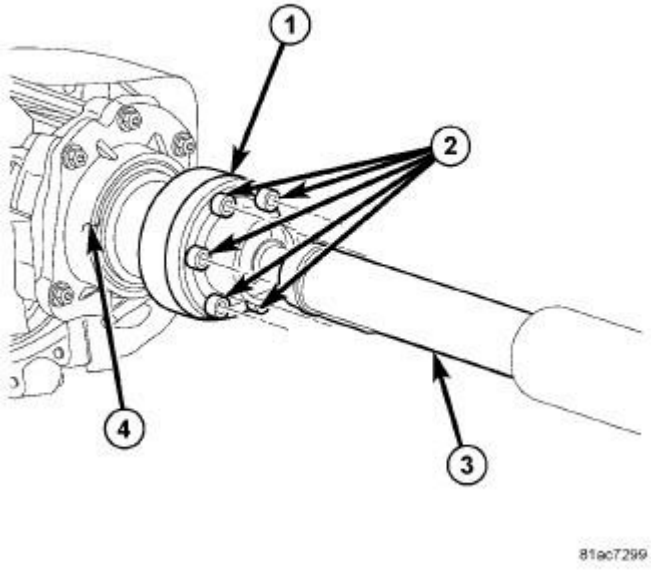

Fig. 46: Propeller Shaft To PTU
Courtesy of CHRYSLER LLC

28. Connect the propeller shaft (3) to the PTU. Refer to **Differential and Driveline/Propeller Shaft - Installation** .

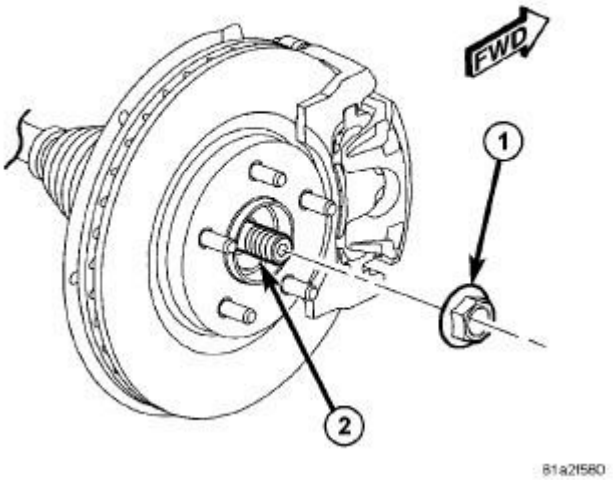

Fig. 47: Axle Shafts Hub Nut
Courtesy of CHRYSLER LLC

29. Install both axle shafts (2). Refer to **Differential and Driveline/Half Shaft - Installation** .
30. Lower vehicle.
31. Install the cooling fan assembly. Refer to **Cooling/Engine/FAN, Cooling - Installation** .

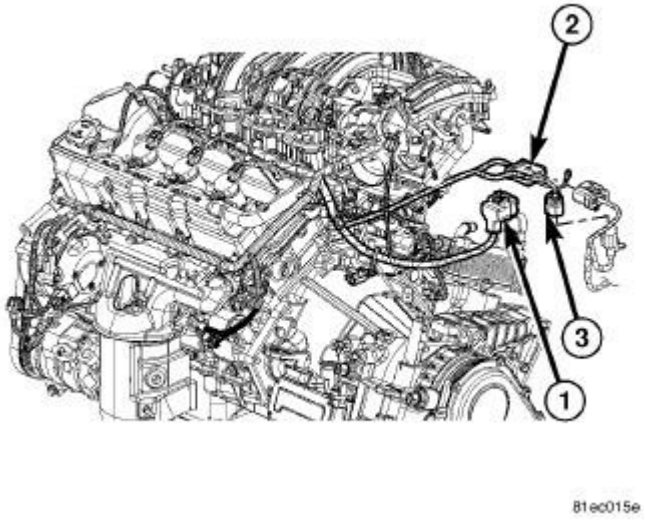

Fig. 48: Engine Electrical Harnesses Connectors
Courtesy of CHRYSLER LLC

32. Connect engine electrical harness connectors (1), (2), and (3) to PCM and bulkhead connectors.

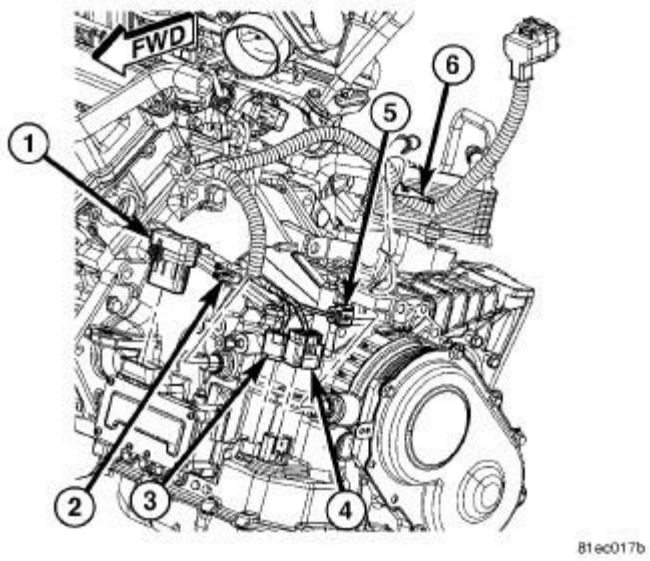

Fig. 49: Transmission Control Module Harness Connector
Courtesy of CHRYSLER LLC

33. **Automatic Transmission Equipped Vehicles:**
    - Connect transmission shift cable.
    - Connect transmission electrical harness connectors (1), (2), (3), (4) and (5).
    - Connect transmission oil cooler lines.
34. **Manual Transmission Equipped Vehicles:**

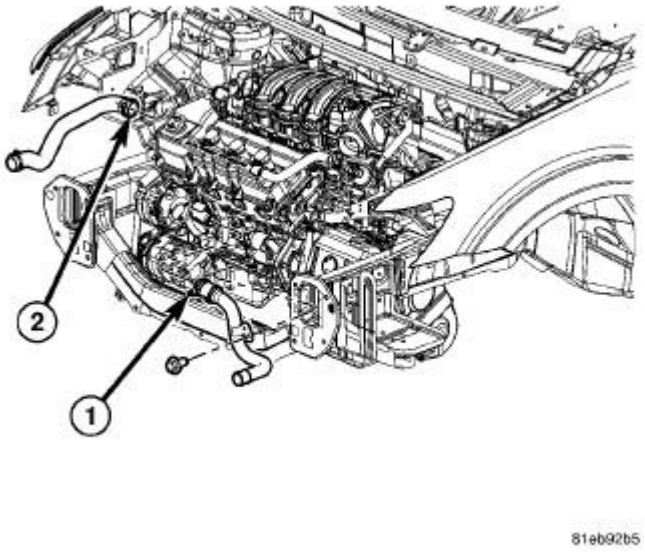

Fig. 50: Upper/Lower Radiator Hoses

Courtesy of CHRYSLER LLC

- Connect transmission shift cables. Refer to **Transmission and Transfer Case/Manual/CABLE, Gearshift Control - Installation** .
- Connect back up lamp switch connector.

35. Connect upper (2) and lower (1) radiator hoses.
36. Raise vehicle.
37. Ensure oil pan drain plug is installed. Install new oil filter.

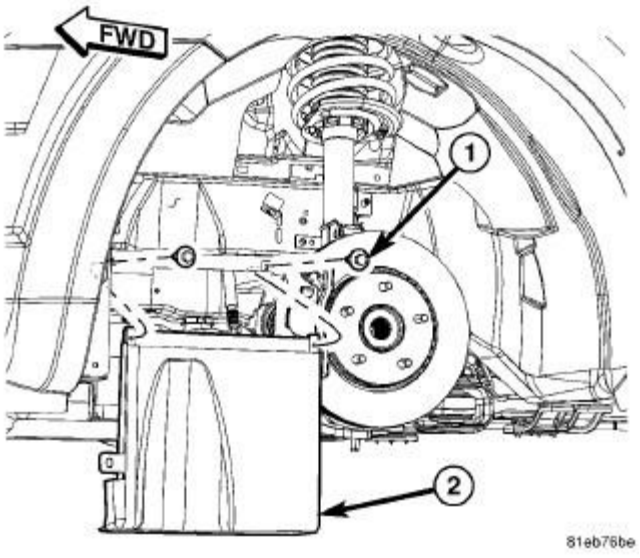

Fig. 51: Left Lower Splash Shield
Courtesy of CHRYSLER LLC

38. Install left lower splash shield (2).

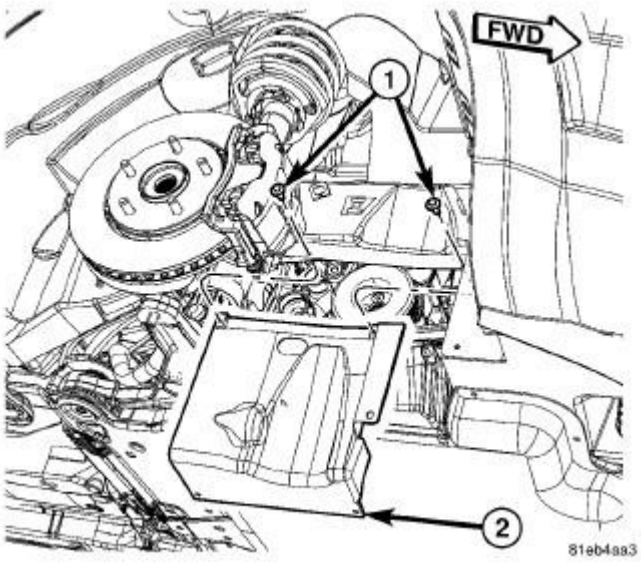

Fig. 52: Right Lower Splash Shield
Courtesy of CHRYSLER LLC

39. Install the right splash shield (2).
40. Install both front wheels (1).
41. Lower vehicle.
42. Install throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
43. Fill engine crankcase with proper oil to correct level.
44. Evacuate and recharge Air Conditioning system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
45. Fill cooling system. Refer to **Cooling - Standard Procedure** .
46. Connect negative battery cable.
47. Start engine and run until operating temperature is reached. Inspect for leaks, and verify normal operation.

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

SPECIFICATIONS

2.7L ENGINE

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION	
Type	60° DOHC V6 24-Valve	
Compression Ratio	9.67:1	
Lead Cylinder	#1 Right Bank	
Firing Order	1-2-3-4-5-6	
-	**Metric**	**Standard**
Displacement	2.7 Liters	167 Cubic Inches
Bore AND Stroke	86.0 x 78.5 mm	3.386 in. x 3.091 in.

CYLINDER BLOCK

Description	Specification	
	Metric	**Standard**
Cylinder Bore Diameter	86.0 mm ±0.0076	3.3859 in. ±0.0003
Out of Round (Max.)	0.076 mm	0.003 in.
Taper (Max.)	0.051 mm	0.002 in.

PISTONS

Description	Specification	
	Metric	**Standard**
Material	Aluminum Alloy	
Piston Diameter	85.983 mm ±0.019	3.3851 in. ±0.0017
Clearance at Size Location	- 0.0096 to +0.0436 mm	- 0.0003 to +0.0016 in.
Piston Weight	316-326 grams	11.1466-11.4994 oz.
Piston Ring Groove Diameter-No. 1	77.8-78 mm	3.063-3.070 in.
Piston Ring Groove Diameter-No. 2	75.9-76.1 mm	2.988-2.996 in.
Piston Ring Groove Diameter-No. 3	76.5-76.7 mm	3.011-3.019 in.

PISTON PINS

Description	Specification	
	Metric	**Standard**
Type	Full Floating	
Pin Diameter	21.997-22.000 mm	0.8661-0.8662 in.
Clearance in Piston	0.005-0.013 mm	0.0002-0.0005 in.
Clearance in Rod	0.007-0.018 mm	0.0003-0.0008 in.

PISTON RINGS

Description	Specification	
	Metric	**Standard**

Ring Gap-Top Compression Ring	0.20-0.36 mm	0.008-0.014 in.
Ring Gap-2nd Compression Ring	0.37-0.63 mm	0.0146-0.0249 in.
Ring Gap-Oil Control (Steel Rails)	0.25-0.76 mm	0.010-0.030 in.

PISTON RING SIDE CLEARANCE

Description	Specification	
	Metric	Standard
Compression Ring-Top	0.035-0.083 mm	0.0013-0.0032 in.
Compression Ring-Second	0.040-0.080 mm	0.0016-0.0031 in.
Oil Ring (Steel Rails)	0.058-0.204 mm	0.0022-0.0080 in.

PISTON RING WIDTH

Description	Specification	
	Metric	Standard
Compression Rings-Top and Second	1.47-1.49 mm	0.0579-0.0587 in.
Oil Ring (Steel Rails	0.445-0.470 mm	0.0176-0.0186 in.

CONNECTING RODS

Description	Specification	
	Metric	Standard
Bearing Clearance	0.024-0.064 mm	0.001-0.0026 in.
Side Clearance	0.13-0.38 mm	0.0052-0.015 in.
Side Clearance (Max.)	0.4318 mm	0.017 in.
Piston Pin Bore Diameter	22.007-22.015 mm	0.8665-0.8668 in.
Bearing Bore Out of Round (Max.)	0.004 mm	0.0002 in.
Total Weight (Less Bearing)	529.9 ±7 grams	18.6917 ±0.247 oz.

CRANKSHAFT MAIN BEARING JOURNALS

Description	Specification	
	Metric	Standard
Diameter	63.49-63.51 mm	2.4997-2.5004 in.
Bearing Clearance	0.035-0.053 mm	0.0014-0.0021 in.
Bearing Clearance (Max.)	0.087 mm	0.0034 in.
Out of Round (Max.)	0.015 mm	0.0006 in.
Taper (Max.)	0.015 mm	0.0006 in.
End Play	0.0475-0.2725 mm	0.0019-0.0108 in.
End Play (Max.)	0.43 mm	0.017 in.

CONNECTING ROD JOURNALS

Description	Specification	
	Metric	Standard
Diameter	53.51-53.49 mm	2.1067-2.106 in.
Bearing Clearance	0.024-0.064 mm	0.001-0.0026 in.
Out of Round (Max.)	0.015 mm	0.0006 in.
Taper (Max.)	0.015 mm	0.0006 in.

CAMSHAFT

Description	Specification	
	Metric	Standard
Bore Diameter	24.050-24.071 mm	0.9469-0.09476 in.
Bearing Journal Diameter	24.000-23.981	0.9449-0.9441 in.
Bearing Clearance	0.05-0.09 mm	0.0020-0.0035 in.
Bearing Clearance (Max.)	0.13 mm	0.0051 in.
End Play	0.13 mm	0.0051-0.0110 in.

VALVE TIMING-INTAKE VALVES

Description	Specification
Opens (ATDC)	2°
Closes (ABDC)	44°
Duration	222°

VALVE TIMING-EXHAUST VALVES

Description	Specification
Opens (BBDC)	36°
Closes (ATDC)	4°
Duration	220°
Valve Overlap	2°

CYLINDER HEAD

Description	Specification	
	metric	Standard
Gasket Thickness (Compressed)	1.50 mm ±0.05	0.0591 in. ±0.002 in.
Valve Seat Angle	45°-45.5°	
Valve Seat Runout (Max.)	0.05 mm	0.002 in.
Intake Valve Seat Width	1.00-1.5 mm	0.0394-0.0591 in.
Exhaust Valve Seat Width	1.25-1.75 mm	0.0492-0.0689 in.
Guide Bore Diameter (Std.)	5.975-6.00 mm	0.2353-0.2363 in.
Valve Guide Height*-Intake AND Exhaust	13.25-13.75 mm	0.5217-0.5414 in.
*Measured from cylinder head surface to top of guide		

VALVES

Description	Specification	
	Metric	Standard
Face Angle	44.5°-45.5°	
Head Diameter-Intake	33.67-33.93	1.3256-1.3358 in.
Head Diameter-Exhaust	27.67-27.93 mm	1.0894-1.1000 in.
Length-Intake (Overall)	107.89-108.39 mm	4.2476-4.2673 in.
Length-Exhaust (Overall)	105.88-106.38 mm	4.1685-4.1882 in.
Stem Diameter-Intake	5.934-5.952 mm	0.2337-0.2344 in.
Stem Diameter-Exhaust	5.906-5.924 mm	0.2326-0.2333 in.
Stem-to-Guide Clearance-Intake (New)	0.023-0.066 mm	0.0009-0.0026 in.
Stem-to-Guide Clearance-Exhaust (New)	0.051-0.094 mm	0.002-0.0037 in.
Stem-to-Guide Clearance-Intake (Max., Rocking Method)	0.29 mm	0.0114 in.
Stem-to-Guide Clearance-Exhaust (Max., Rocking Method)	0.370 mm	0.0146 in.
Valve Lift-Intake (Zero Lash)	9.0 mm	0.3543 in.
Valve Lift-Exhaust (Zero Lash)	8.0 mm	0.3150 in.
Valve Stem Tip Height-Intake	47.120 ±0.467 mm	1.8551 ±0.00184 in.
Valve Stem Tip Height-Exhaust	48.672 ±0.467 mm	1.9162 ±0.00184 in.

VALVE SPRING

Description	Specification	
	Metric	Standard
Free Length-Intake AND Exhaust (Approx.)	45.63 mm	1.7965 in.
Spring Force-Intake AND Exhaust (Valve Closed)	249-284 N @ 38.0 mm	56.0-64.0 lbs. @ 1.4961 in.
Spring Force-Intake (Valve Open)	658-721 N @ 29.0 mm	147.9-162.1 lbs. @ 1.1417 in.
Spring Force-Exhaust (Valve Open)	614-671 N @ 30.0 mm	138.0-150.8 lbs. @ 1.1811 in.
Number of Coils-Intake AND Exhaust	7.35	
Wire Diameter-Intake AND Exhaust	3.861 mm	0.1520 in.
Installed Height-Intake AND Exhaust (Spring seat to bottom of retainer)	38.0 mm	1.4961 in.

OIL PUMP

	Specification

Description	Metric	Standard
Clearance Over Rotors (Max.)	0.077 mm	0.003 in.
Cover-Out-of-Flat (Max.)	0.025 mm	0.001 in.
Inner AND Outer Rotor Thickness	9.475-9.500 mm	0.3731-0.3741 in.
Outer Rotor Clearance (Max.)	0.39 mm	0.015 in.
Outer Rotor Diameter (Min.)	89.175 mm	3.5109 in.
Tip Clearance Between Rotors (Max.)	0.20 mm	0.008 in.

OIL PRESSURE

Description	Specification	
	Metric	Standard
(NOTE: At Normal Operating Temperatures)		
Pressure @ Curb Idle Speed*	34.7 kPa Min.	5 psi Min.
Pressure @ 3000 RPM	300-724 kPa	45-105 psi
*CAUTION: If oil pressure is zero at idle, DO NOT run engine at 3000 RPM.		

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
A/C Compressor to Engine - Bolts	28	21	-
Camshaft Sprocket - Bolts	28	-	250
Camshaft Chain Tensioner (Secondary) - Bolts	12	-	105
Camshaft Bearing Cap - Bolts	12	-	105
Connecting Rod Cap - Bolts	27 +1/4 Turn	20 +1/4 Turn	-
Crankshaft Main Bearing Cap - Tie Bolts	28	-	250
Crankshaft Main Bearing Cap - Outer Cap Bolts	27 +1/4 Turn	20 +1/4 Turn	-
Crankshaft Main Bearing Cap - Inner Cap Bolts	20 +1/4 Turn	15 +1/4 Turn	-
Crankshaft Damper - Bolt	170	125	-
Cylinder Head - Bolts	See **Engine/Cylinder Head - Installation**.		
Cylinder Head Cover - Bolts	12	-	105
Exhaust Manifold - Bolts	23	-	200
Exhaust Manifold Heat Shield - Bolts	12	-	105
Exhaust Manifold to Catalytic Converter V-Band Clamp	11	-	100
Engine Mount Bracket to Block	61	45	-

- Bolts			
Engine Mount Isolator - Nuts	61	45	-
Flex Plate Bolts	95	70	-
Intake Manifold (Upper and Lower) - Bolts	12	-	105
Generator Bracket-Bolts	41	30	-
Oil Pan - Bolts	28	-	250
Oil Pan - Nuts	12	-	105
Oil Pan Drain - Plug	27	20	-
Oil Filter	16	12	-
Oil Pump to Block - Bolts	28	-	250
Oil Pump Cover - Bolts	12	-	105
Oil Pump Pick Up Tube - Bolt	28	-	250
PCV Valve	7	-	60
Crankshaft Rear Seal Retainer - Bolts	12	-	105
Spark Plugs	20	15	-
Starter Mounting - Bolts	41	30	-
Structural Collar	See **Engine/Engine Block/COVER, Structural Dust - Installation**.		
Thermostat Housing/Water Inlet Connector - Bolts	12	-	105
Throttle Body - Bolts	12	-	105
Timing Chain Cover - M6 Bolts	12	-	105
Timing Chain Cover - M10 Bolts	54	40	-
Timing Chain Tensioner (Primary)	12	-	105
Timing Chain Guide Access Plug	20	15	-
Water Pump - Bolts	12	-	105
Cooling System Bleed Screw	12	-	110
Water Outlet Housing - Bolts	12	-	105

SPECIAL TOOLS

2.7L ENGINE

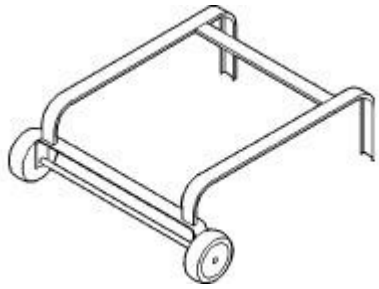

Fig. 53: Dolly 6135
Courtesy of CHRYSLER LLC

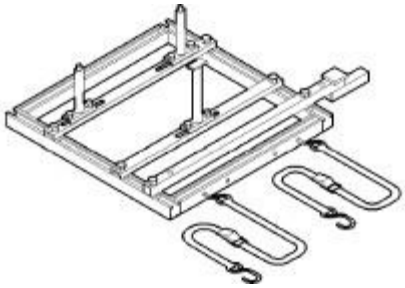

Fig. 54: Cradle 6710
Courtesy of CHRYSLER LLC

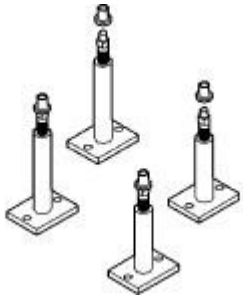

Fig. 55: Post Kit Engine Cradle 6848
Courtesy of CHRYSLER LLC

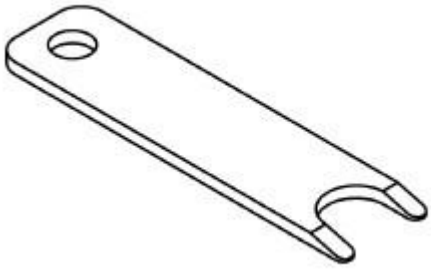

Fig. 56: Disconnect Tool, 6638A
Courtesy of CHRYSLER LLC

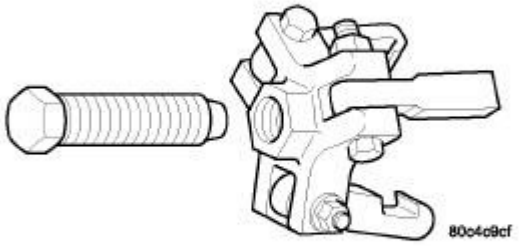

Fig. 57: Puller 8454
Courtesy of CHRYSLER LLC

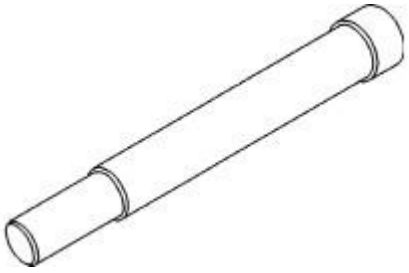

Fig. 58: Crankshaft Damper Remover Insert 8194
Courtesy of CHRYSLER LLC

Fig. 59: Crankshaft Damper Installer Screw 8179
Courtesy of CHRYSLER LLC

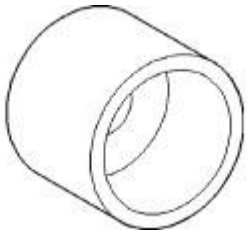

Fig. 60: Crankshaft Damper Installer 6792-1
Courtesy of CHRYSLER LLC

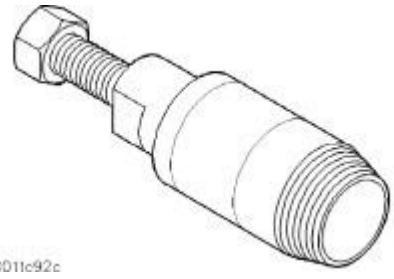

Fig. 61: Crankshaft Seal Remover 6771
Courtesy of CHRYSLER LLC

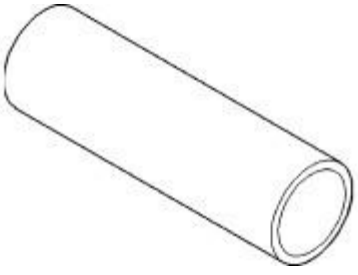

Fig. 62: Crankshaft Seal & Sprocket Installer 6780-1
Courtesy of CHRYSLER LLC

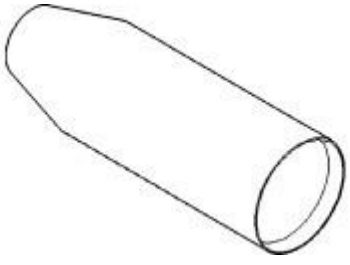

Fig. 63: Crankshaft Seal Protector 6780-2
Courtesy of CHRYSLER LLC

Fig. 64: Puller 5048
Courtesy of CHRYSLER LLC

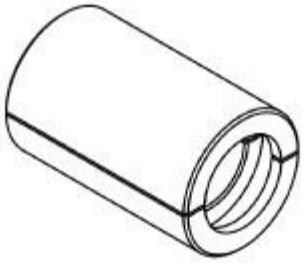

Fig. 65: Puller Adaptor 8539
Courtesy of CHRYSLER LLC

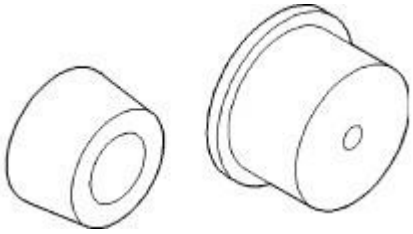

Fig. 66: Crankshaft Rear Seal Guide 6926-1 & Installer 6926-2
Courtesy of CHRYSLER LLC

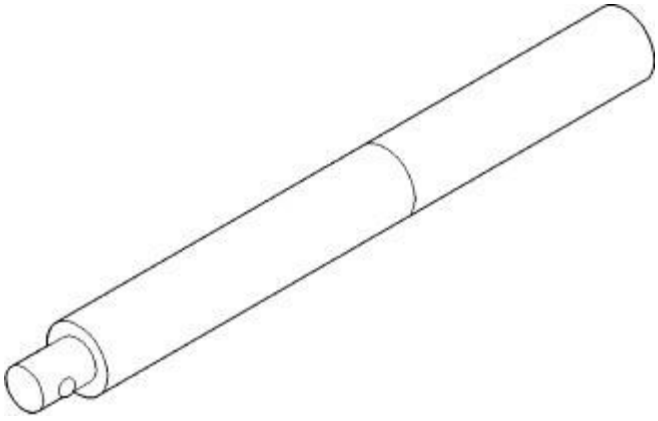

Fig. 67: Driver Handle C-4171
Courtesy of CHRYSLER LLC

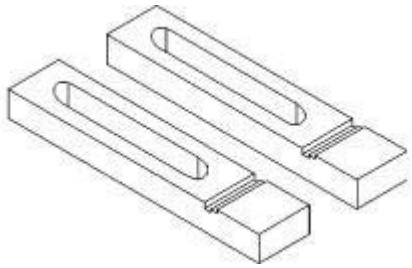

Fig. 68: Crankshaft Real Seal Retainer Alignment Fixture 8225
Courtesy of CHRYSLER LLC

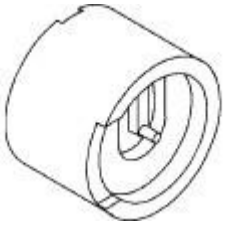

Fig. 69: Timing Chain Tensioner Resetting Gauge 8186
Courtesy of CHRYSLER LLC

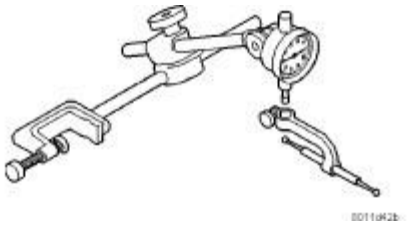

Fig. 70: Dial Indicator C-3339
Courtesy of CHRYSLER LLC

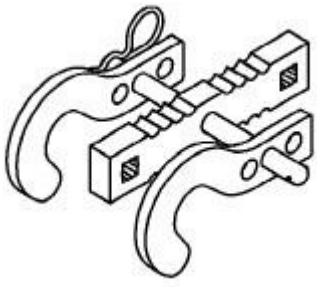

Fig. 71: Valve Spring Compressor 8215-A
Courtesy of CHRYSLER LLC

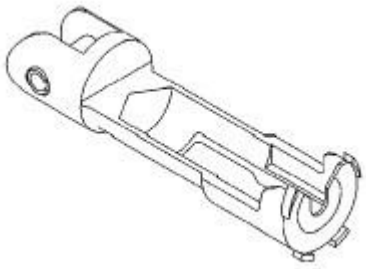

Fig. 72: Adaptor 8216-A
Courtesy of CHRYSLER LLC

Fig. 73: Valve Spring Compressor C-3422-D
Courtesy of CHRYSLER LLC

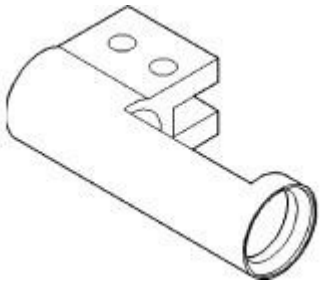

Fig. 74: Valve Spring Adapter 6526
Courtesy of CHRYSLER LLC

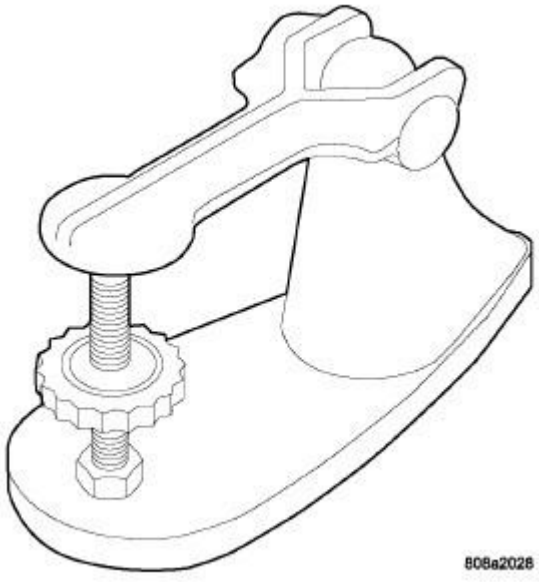

Fig. 75: Valve Spring Tester C-647
Courtesy of CHRYSLER LLC

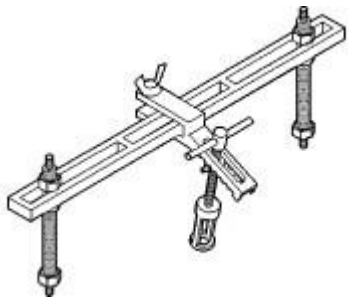

Fig. 76: Valve Spring Compressor MD-998772-A
Courtesy of CHRYSLER LLC

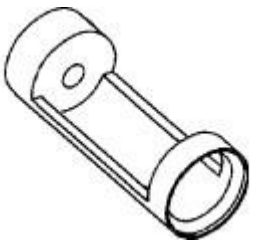

Fig. 77: Valve Spring Adapter 6527
Courtesy of CHRYSLER LLC

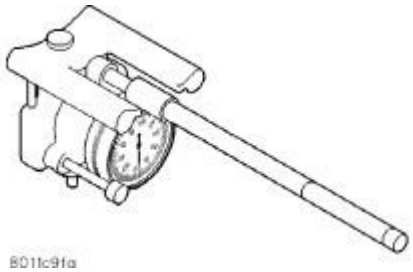

Fig. 78: Indicator Bore Size C-119
Courtesy of CHRYSLER LLC

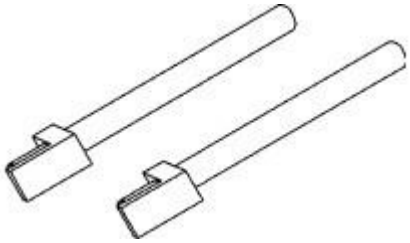

Fig. 79: Connecting Rod Installation Guides 8189
Courtesy of CHRYSLER LLC

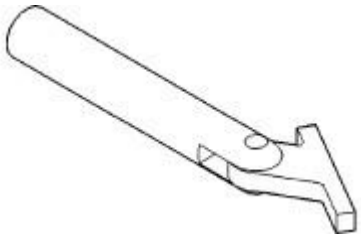

Fig. 80: Main Bearing Remover/Installer C-3059
Courtesy of CHRYSLER LLC

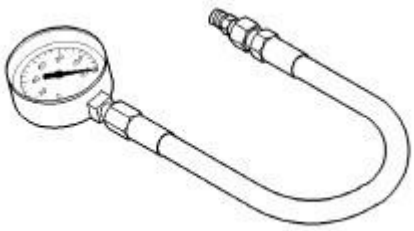

Fig. 81: Pressure Gauge C-3292
Courtesy of CHRYSLER LLC

Fig. 82: Adapter 8406
Courtesy of CHRYSLER LLC

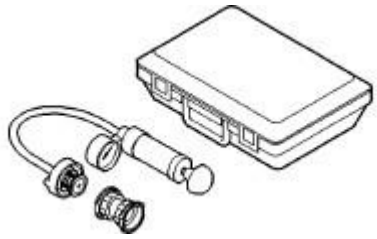

Fig. 83: Cooling System Tester 7700
Courtesy of CHRYSLER LLC

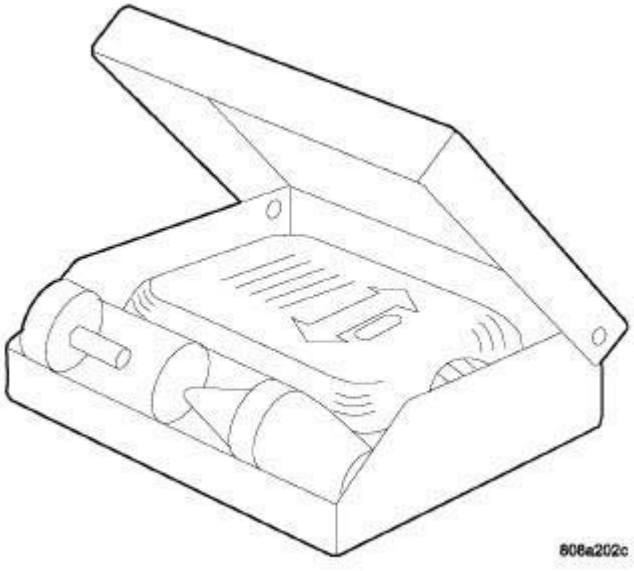

Fig. 84: Combustion Leak Tester C-3685-A
Courtesy of CHRYSLER LLC

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

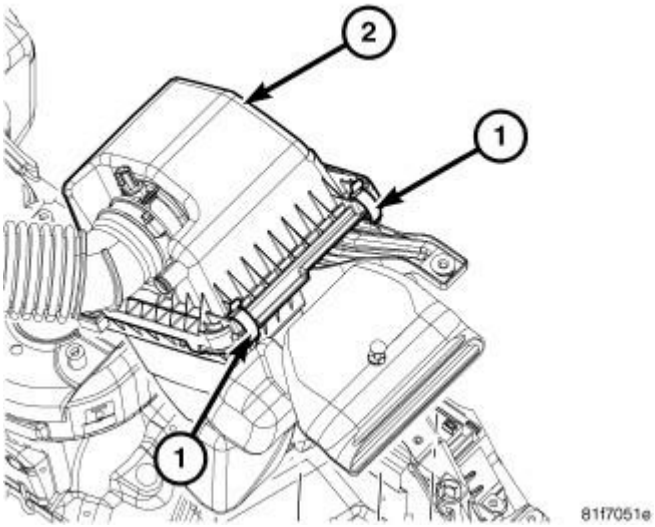

Fig. 85: Air Filter Housing Clips
Courtesy of CHRYSLER LLC

1. Disengage the air filter housing clips (1).
2. Slide the air filter housing cover (2) forward slightly to disengage tabs from the bottom of the air filter housing.
3. Remove air cleaner element from air cleaner housing.

Installation

INSTALLATION

1. Install air filter element into the bottom half of the air filter housing.

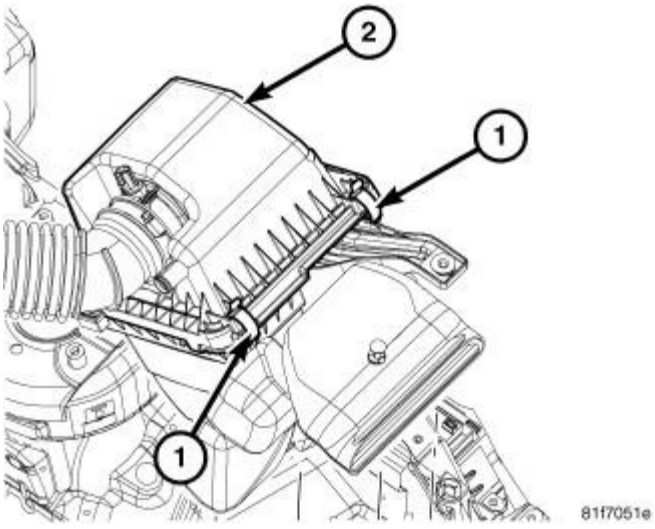

Fig. 86: Air Filter Housing Clips
Courtesy of CHRYSLER LLC

2. Slide the air filter housing cover (2) rearward to engage the tabs into the bottom half of the air filter housing.
3. Reengage the air filter housing clips (1).

BODY, AIR CLEANER

Removal

REMOVAL

1. Disconnect negative battery cable.

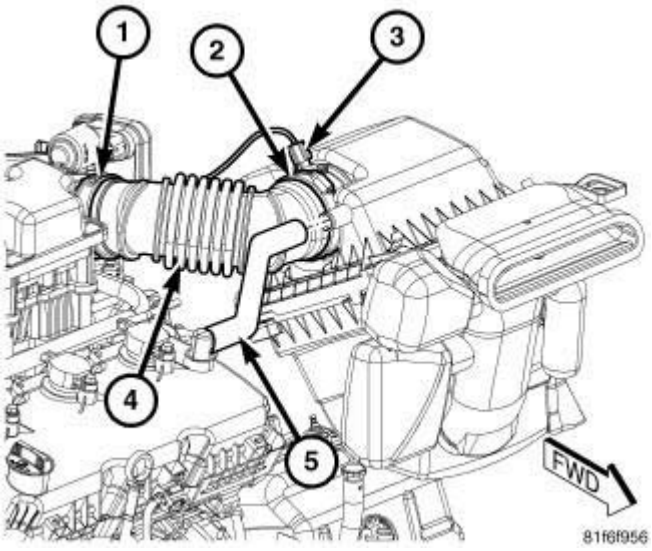

Fig. 87: Inlet Air Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

2. Disconnect inlet air temperature sensor electrical connector (3).
3. Disconnect fresh air makeup hose (5) from the air filter box.
4. Loosen the clamp (1) from at the throttle body.
5. Remove the air inlet tube (4) from the throttle body.

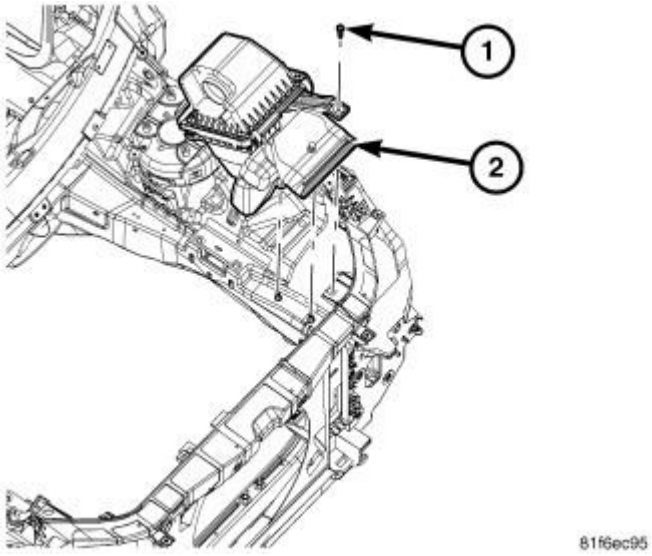

Fig. 88: Retainer From Bracket
Courtesy of CHRYSLER LLC

6. Remove retainer (1) from bracket.
7. Remove the retainer that secures the air scoop to the top of the radiator core support.
8. Pull air cleaner housing (2) straight up off of locating pins.

Installation

INSTALLATION

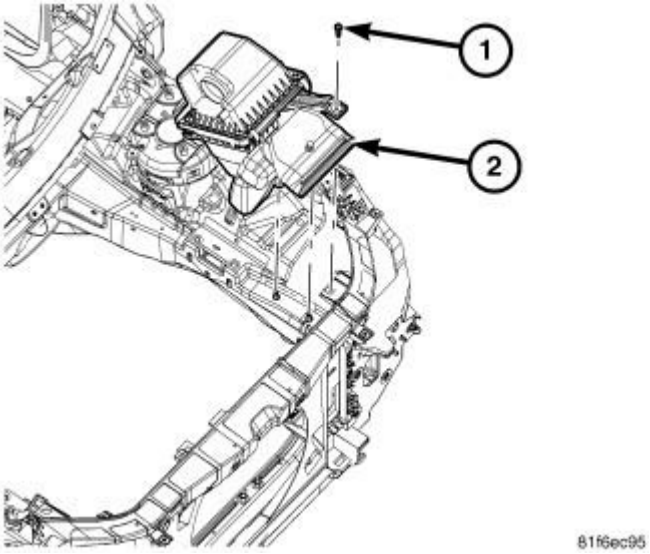

Fig. 89: Retainer From Bracket
Courtesy of CHRYSLER LLC

1. Install air filter housing (2) straight down on locating pins.

2. Reposition the bracket and install the retainer (1). Tighten the retainer to 5 N.m (44 in. lbs.).
3. Install the push pin that secures the air scoop to the top of the radiator core support.

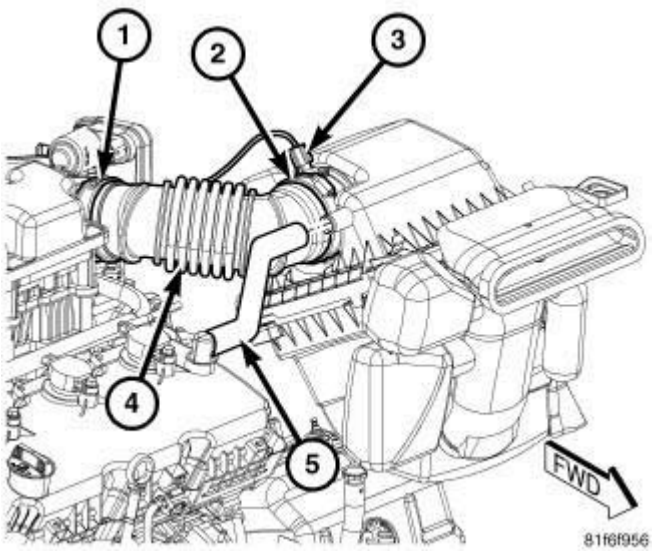

Fig. 90: Inlet Air Temperature Sensor Electrical Connector
Courtesy of CHRYSLER LLC

4. Install throttle body air inlet tube (4) to the throttle body. Tighten the clamp (1).
5. Connect fresh air makeup hose (5) to the air filter housing
6. Connect inlet air temperature sensor harness connector (3).
7. Connect negative battery cable.

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

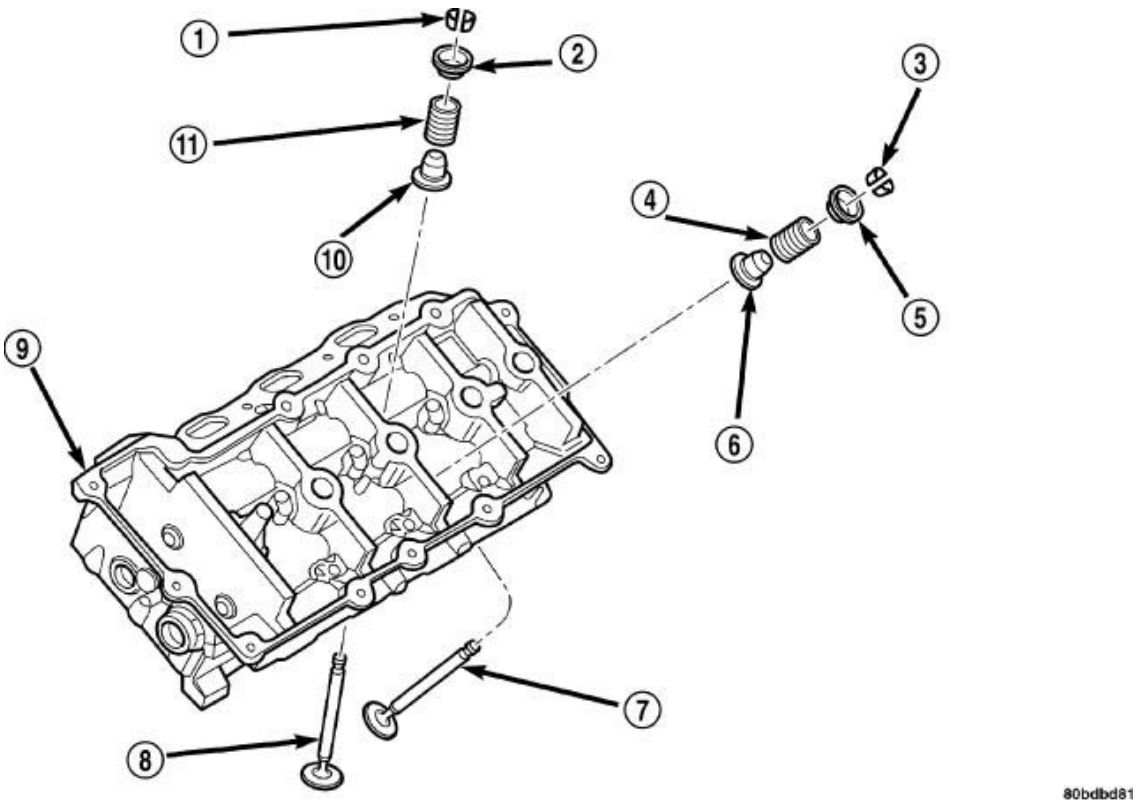

Fig. 91: Cylinder Head, Valves & Springs
Courtesy of CHRYSLER LLC

1 - VALVE KEEPER	7 - VALVE-EXHAUST
2 - SPRING RETAINER	8 - VALVE-INTAKE
3 - VALVE KEEPER	9 - CYLINDER HEAD
4 - VALVE SPRING-EXHAUST	10 - VALVE STEM SEAL
5 - SPRING RETAINER	11 - VALVE SPRING-INTAKE
6 - VALVE STEM SEAL	-

The cylinder heads are made of an aluminum alloy. The cylinder head features four valves (8) per cylinder with pressed in powdered metal valve guides. The cylinder heads provide enclosures for the timing chain drive, necessitating a unique right and left cylinder head.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power

- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test. See **CYLINDER COMPRESSION PRESSURE TEST**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester 7700 or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

STANDARD PROCEDURE

CYLINDER HEAD OIL GALLERY CUP PLUG SERVICE

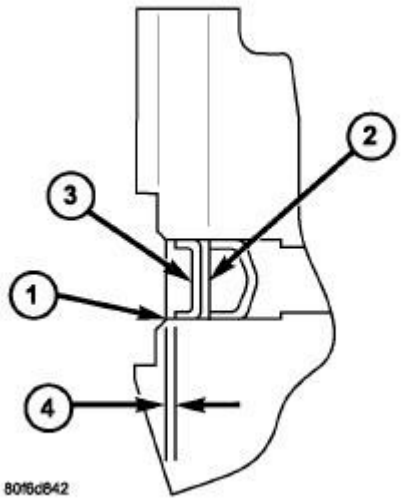

Fig. 92: Oil Gallery Cup Plug
Courtesy of CHRYSLER LLC

1 - CUP PLUG BORE CHAMFER
2 - ORIGINAL CUP PLUG
3 - NEW CUP PLUG
4 - 1-2 mm

NOTE: DETERMINE WHICH CUP PLUG IS LEAKING BEFORE PERFORMING THIS PROCEDURE. IF NECESSARY, PERFORM AN ENGINE OIL LEAK INSPECTION.

Each cylinder head on a 2.7L engine has 6 external oil gallery cup plugs. It is not necessary to remove the original cup plug to install a new cup plug (3). The cup plug bore is deep enough to allow for two plugs. If it becomes necessary to service an oil gallery cup plug, perform the Repair Procedure.

NOTE: INSPECT THE CUP PLUG BORE IN QUESTION FOR THE PRESENCE OF TWO CUP PLUGS. IF THE CUP PLUG FLANGE IS JUST INSIDE (1-2 MM) THE CHAMFERED EDGE OF THE BORE TWO CUP PLUGS ARE ALREADY IN PLACE AND THE CYLINDER HEAD CANNOT BE REPAIRED.

Repair Procedure

1. Remove component(s) necessary to gain access to the oil gallery cup plug requiring service.

NOTE: SOME OF THE OIL GALLERY CUP PLUGS ARE SERVICEABLE WITH THE HEAD INSTALLED ON THE ENGINE AND THE ENGINE IN THE VEHICLE, WHILE OTHERS REQUIRE REMOVING THE AFFECTED CYLINDER HEAD

FROM THE ENGINE. IN EITHER CASE ONLY REPLACE THE CUP PLUG REQUIRING SERVICE.

2. Clean the cup plug bore with brake cleaner and compressed air. It is not necessary to remove the existing cup plug.
3. Lightly coat the new cup plug with sealer; p/n 04318083.
4. Using an appropriate installation tool drive the new cup plug into the bore until the flanged edge of the plug is just inside (1-2 mm) the chamfered edge of the bore.
5. Allow the sealant to cure for at least 20 minutes.
6. Assemble any components removed in step # 1 as necessary.

REMOVAL

REMOVAL

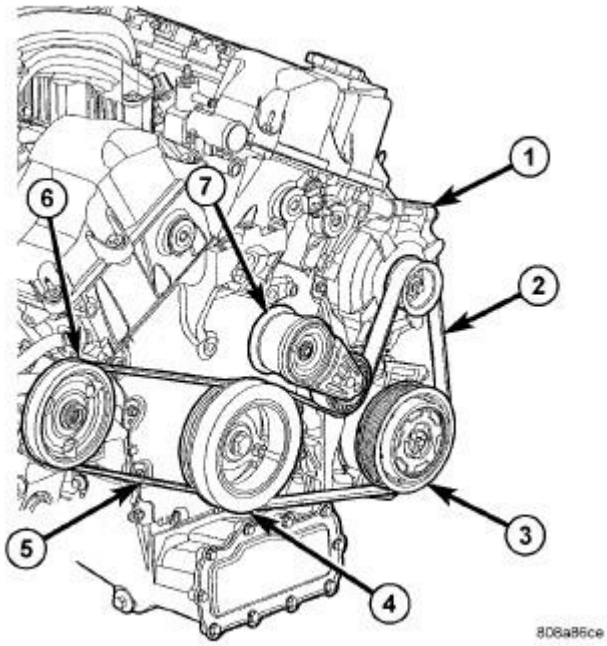

Fig. 93: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR
2 - IDLER/TENSIONER

1. Perform fuel pressure release procedure **before attempting any repairs.** . Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect negative cable from remote jumper terminal.
3. Drain cooling system.

4. Remove accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Remove the vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.
6. Remove exhaust cross-under pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
7. Remove the maniverter. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

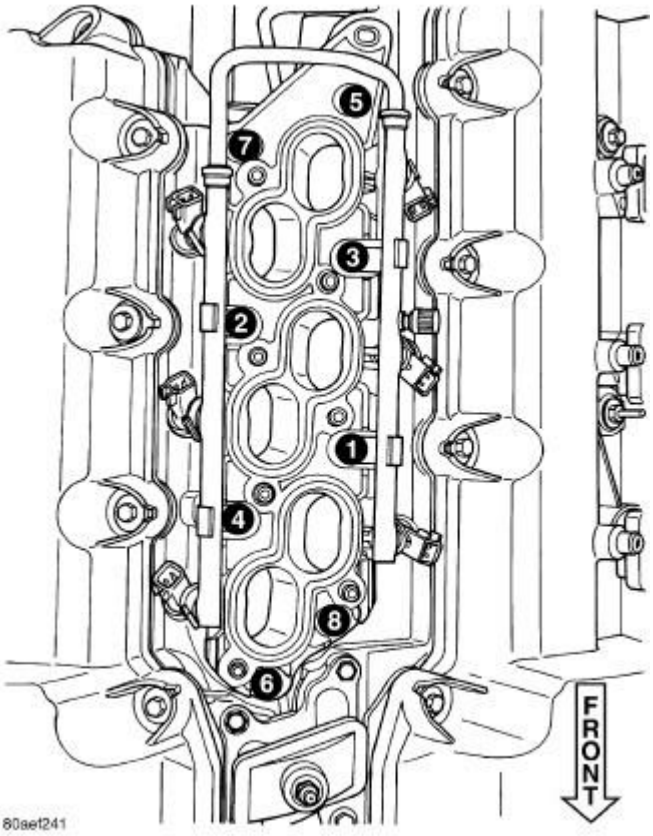

Fig. 94: Lower Intake Manifold Tightening Sequence
Courtesy of CHRYSLER LLC

8. Remove oil pressure sensor heat shield. Disconnect oil pressure sensor connector.
9. Remove upper and lower intake manifolds. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

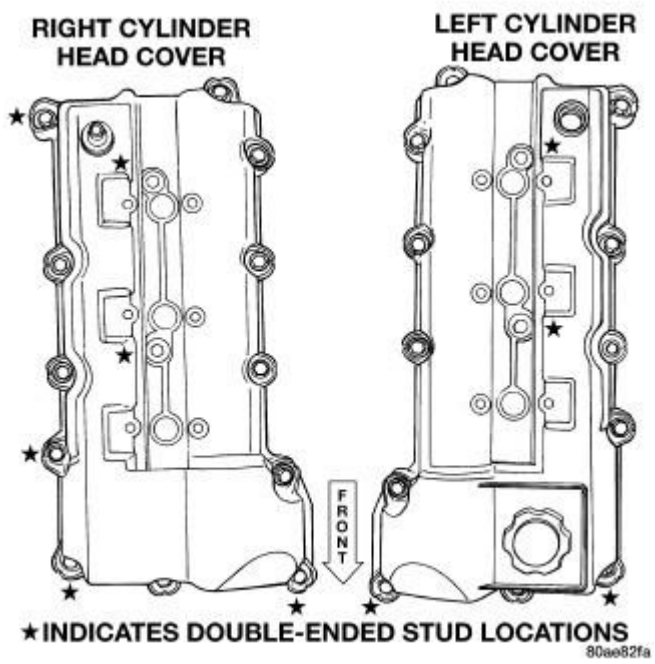

Fig. 95: Cylinder Head Covers
Courtesy of CHRYSLER LLC

10. Remove cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
11. Disconnect camshaft position sensor and crankshaft position sensor connectors.
12. Reposition engine wiring harness to left side of vehicle.

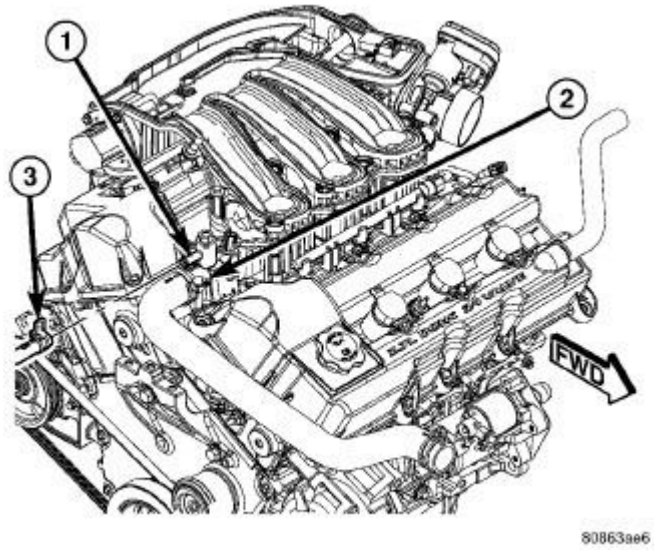

Fig. 96: Coolant Outlet Connector - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT (2)
2 - BOLT (2)
3 - COOLANT OUTLET CONNECTOR

13. Remove coolant outlet connector (3). Refer to **Cooling/Engine/HOUSING, Coolant Outlet - Removal** .

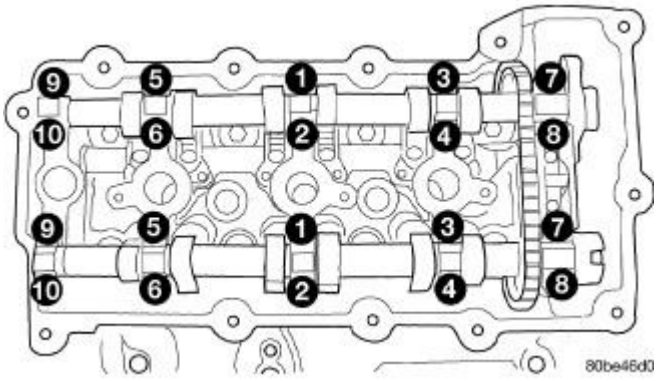

Fig. 97: Camshaft Bearing Cap Tightening Sequence
Courtesy of CHRYSLER LLC

14. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
15. Rotate crankshaft until crankshaft sprocket timing mark aligns with timing mark on oil pump housing.
16. Remove primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
17. Remove upper primary timing chain guides.
18. Remove camshaft bearing caps **gradually** in REVERSE sequence of installation (10-1).

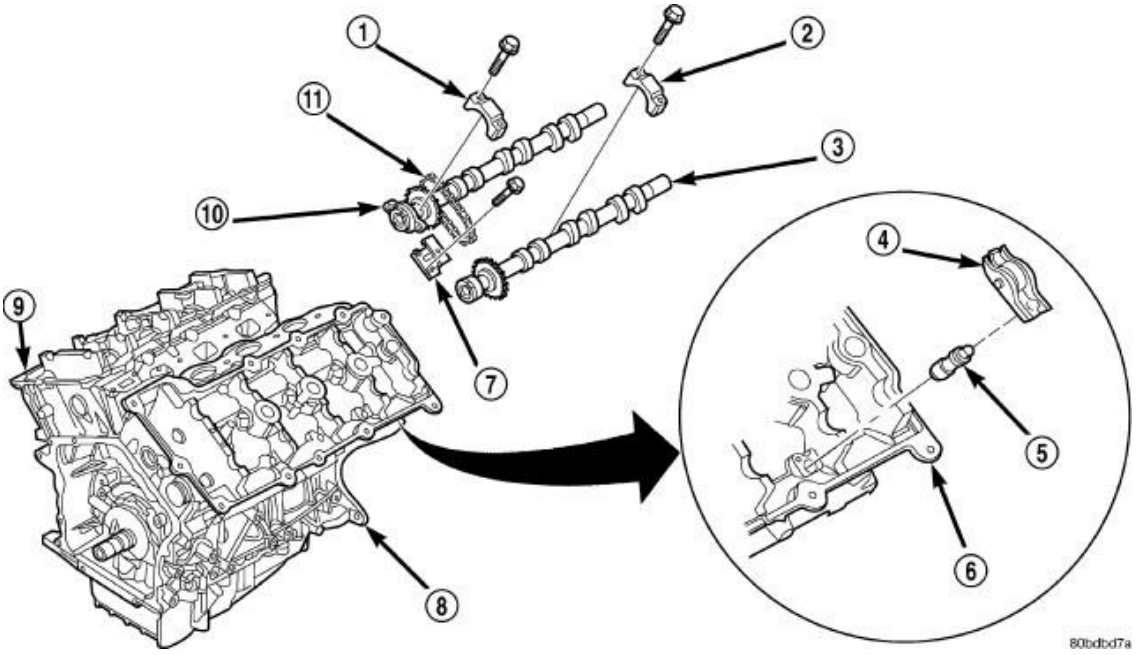

Fig. 98: Camshaft & Valvetrain Components
Courtesy of CHRYSLER LLC

1 - CAMSHAFT BEARING CAP - INTAKE	7 - CAMSHAFT (SECONDARY) CHAIN TENSIONER
2 - CAMSHAFT BEARING CAP - EXHAUST	8 - CYLINDER BLOCK
3 - CAMSHAFT - EXHAUST	9 - CYLINDER HEAD
4 - ROCKER ARM	10 - CAMSHAFT - INTAKE
5 - HYDRAULIC LIFTER	11 - CAMSHAFT (SECONDARY) TIMING CHAIN
6 - CYLINDER HEAD	

19. Remove camshafts (10) and valvetrain components from cylinder head. Note component locations for reinstallation in original locations.
20. For left cylinder head removal:
    - Remove fastener securing engine oil dipstick tube to cylinder head. Remove engine oil dipstick tube.
    - Remove generator.
21. For right cylinder head removal:
    - Remove cylinder head ground strap.
    - Disconnect EGR valve electrical connector (if equipped).

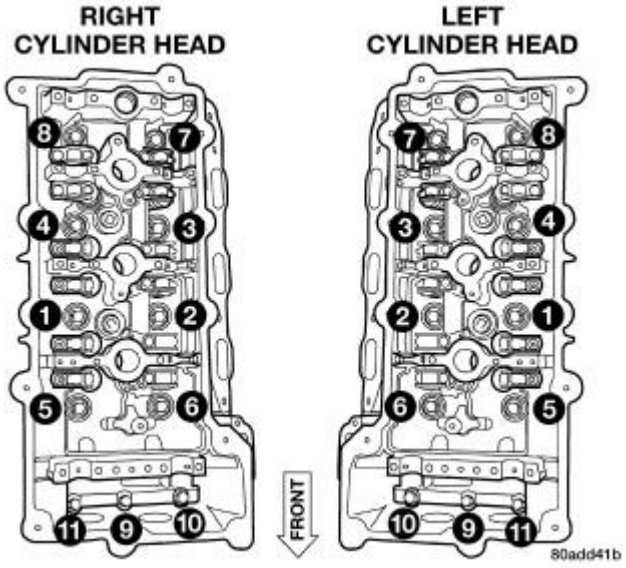

Fig. 99: Cylinder Head Tightening Sequence
Courtesy of CHRYSLER LLC

CAUTION: Ensure cylinder head bolts 11-9 are removed before attempting the removal of cylinder head, as damage to cylinder head and/or block may occur.

22. Remove cylinder head bolts in reverse sequence of installation starting with bolts 11-9, then bolts 8-1.
23. Remove cylinder head(s).
24. Remove and discard cylinder head gasket.
25. Clean cylinder head and block sealing surfaces. See **Engine/Cylinder Head - Cleaning**.

CLEANING

CLEANING

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Remove all gasket material from cylinder head and block. See **Engine - Standard Procedure**. Be careful not to gouge or scratch the aluminum head sealing surface.

Clean all engine oil passages.

INSPECTION

INSPECTION

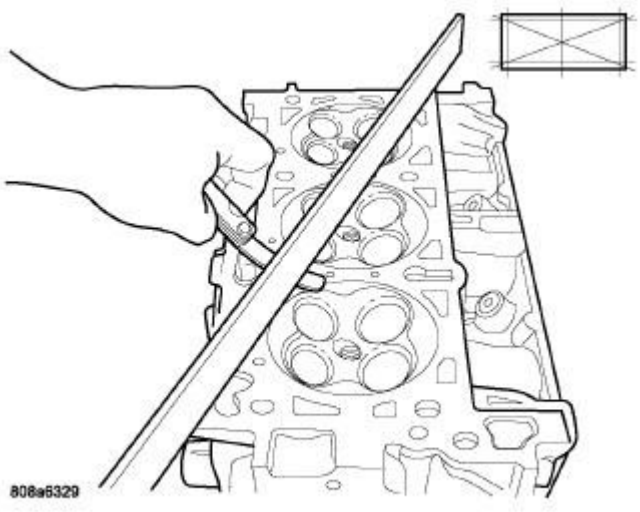

Fig. 100: Checking Cylinder Head Flatness-Typical
Courtesy of CHRYSLER LLC

1. Before cleaning, check for leaks, damage and cracks.
2. Clean cylinder head and oil passages. See **Engine/Cylinder Head - Cleaning**.
3. Check cylinder head for flatness.
4. Cylinder head must be flat within:

CAUTION: 0.20 mm (0.008 in.) MAX is a combined total dimension of the stock removal limit from cylinder head and block top surface (Deck) together.

- Standard dimension = less than 0.05 mm (0.002 inch.)
- Service Limit = 0.2 mm (0.008 inch.)
- Grinding Limit = Maximum of 0.2 mm (0.008 inch.) is permitted.

INSTALLATION

INSTALLATION

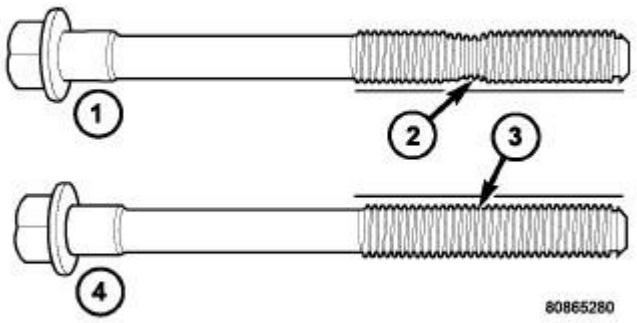

Fig. 101: Check For Stretched Bolts
Courtesy of CHRYSLER LLC

1 - STRETCHED BOLT
2 - THREADS ARE NOT STRAIGHT ON LINE
3 - THREADS ARE STRAIGHT ON LINE
4 - UNSTRETCHED BOLT

NOTE: The cylinder head bolts (4) are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the

bolts must be replaced

Necking can be checked by holding a straight edge against the threads. If all the threads do not contact the scale, the bolt must be replaced.

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

1. Clean sealing surfaces of cylinder head and block. See **Engine - Standard Procedure**.
2. Lubricate bolt threads with clean engine oil and install bolts.
3. Install new head gasket over locating dowels.

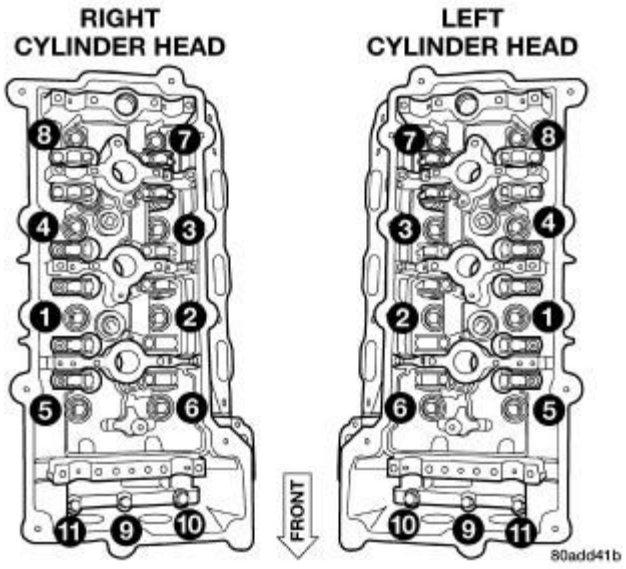

Fig. 102: Cylinder Head Tightening Sequence
Courtesy of CHRYSLER LLC

4. Install cylinder head to block, assuring head is properly positioned over locating dowels.
5. Tighten bolts in sequence shown in illustration, using the following steps and torque values:
   - Step 1: Bolts 1-8 to 48 N.m (35 ft. lbs.)
   - Step 2: Bolts 1-8 to 75 N.m (55 ft. lbs.)
   - Step 3: Bolts 1-8 to 75 N.m (55 ft. lbs.)
   - Step 4: Bolts 1-8 to +90° Turn **Do not use a torque wrench for this step.**
   - Step 5: Bolts 9-11 to 28 N.m (250 in. lbs.)
6. For left cylinder head installation:
   - Install engine oil dipstick tube.
   - Install generator.

7. For right cylinder head installation:
   - Install cylinder head ground strap.
   - Connect EGR valve electrical connector (if equipped).

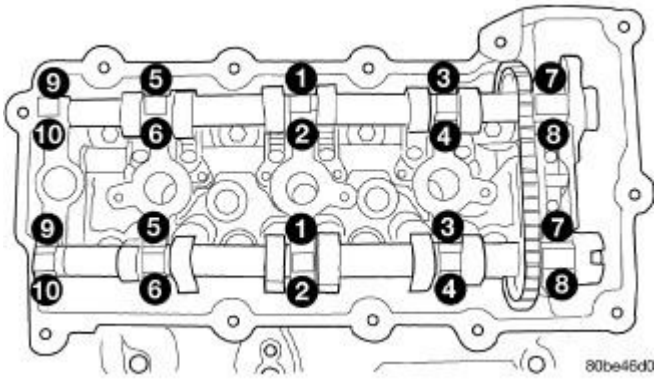

Fig. 103: Camshaft Bearing Cap Tightening Sequence
Courtesy of CHRYSLER LLC

8. Install all valvetrain components and camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**. Tighten camshaft bearing caps in sequence shown in illustration to 12 N.m (105 in. lbs.).
9. Install primary timing chain, guides and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.

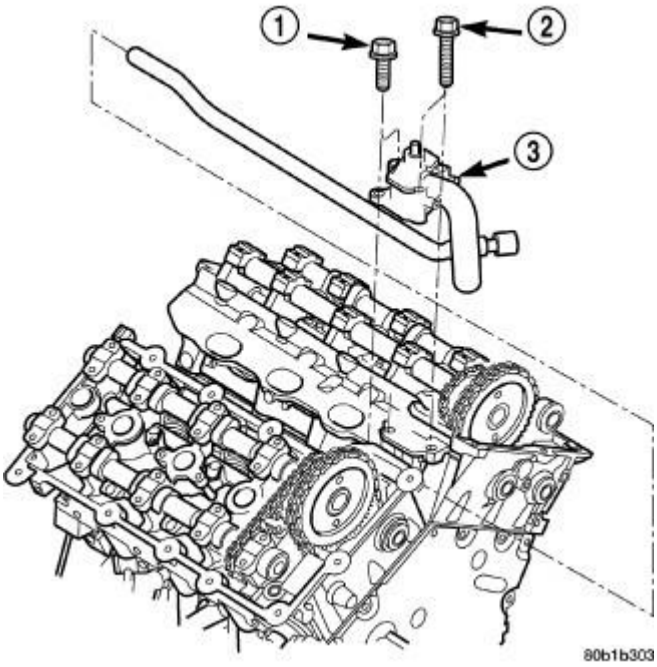

Fig. 104: WATER OUTLET CONNECTOR
Courtesy of CHRYSLER LLC

1 - BOLT (2) 2 - BOLT (2) 3 - WATER OUTLET CONNECTOR

10. Install coolant outlet connector (3). Refer to **Cooling/Engine/HOUSING, Coolant Outlet - Installation** .

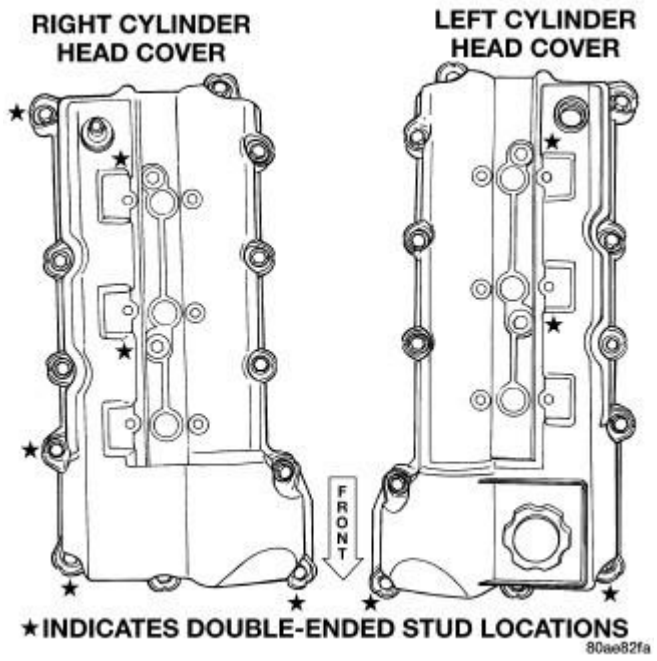

Fig. 105: Cylinder Head Covers
Courtesy of CHRYSLER LLC

11. Install cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
12. Connect camshaft position sensor and crankshaft position sensor connectors.
13. Install timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
14. Install crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.

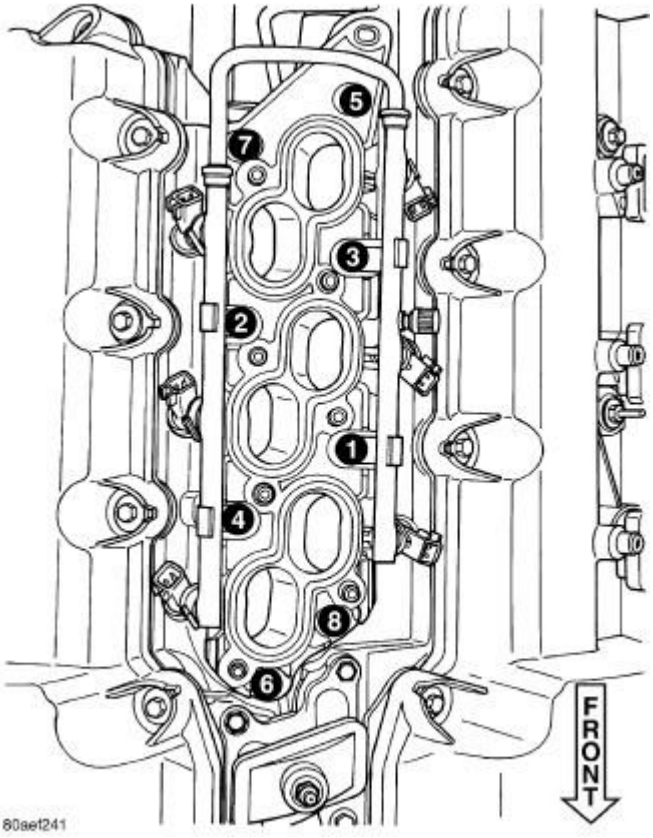

Fig. 106: Lower Intake Manifold Tightening Sequence
Courtesy of CHRYSLER LLC

15. Install lower and upper intake manifolds. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
16. Connect oil pressure sensor connector. Install oil pressure sensor heat shield.
17. Install the maniverter. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.
18. Install exhaust cross-under pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

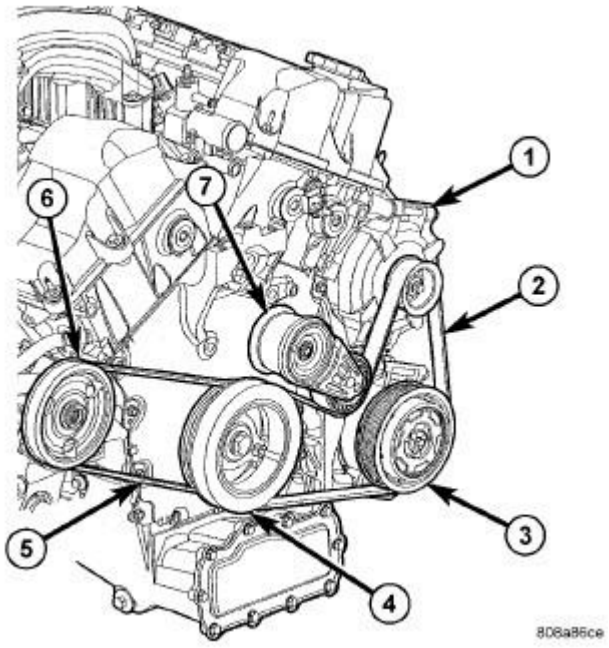

Fig. 107: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR
2 - IDLER/TENSIONER

19. Install accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
20. Fill cooling system.
21. Connect negative cable to remote jumper terminal.

CAMSHAFT, ENGINE

Description

DESCRIPTION

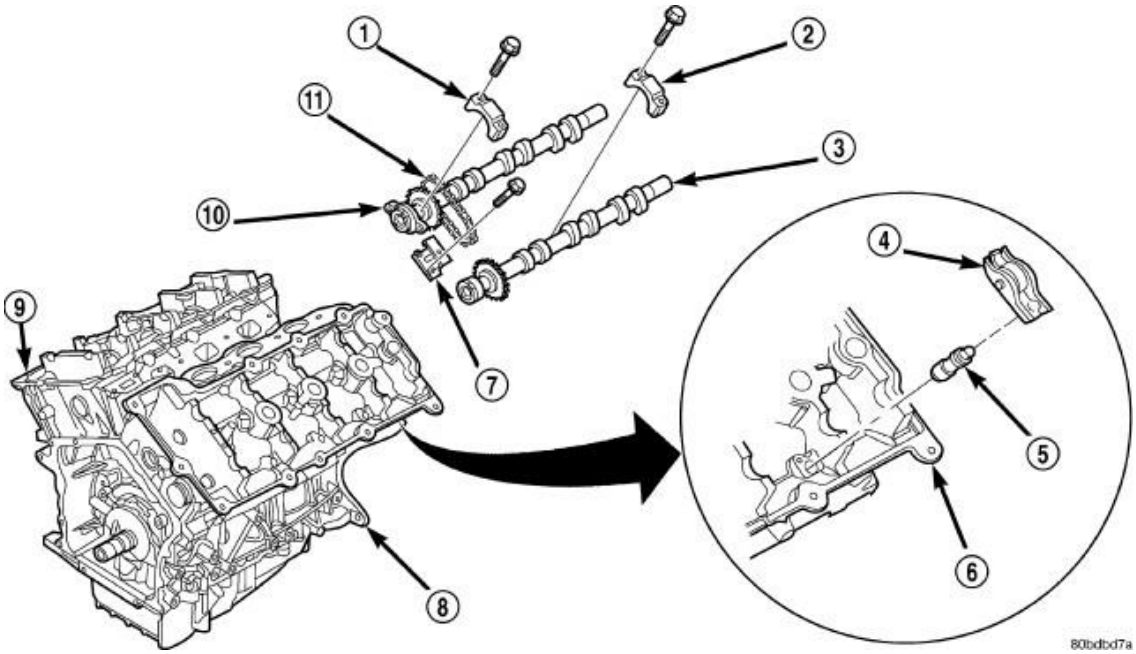

Fig. 108: Camshaft & Valvetrain Components
Courtesy of CHRYSLER LLC

1 - CAMSHAFT BEARING CAP - INTAKE	7 - CAMSHAFT (SECONDARY) CHAIN TENSIONER
2 - CAMSHAFT BEARING CAP - EXHAUST	8 - CYLINDER BLOCK
3 - CAMSHAFT - EXHAUST	9 - CYLINDER HEAD
4 - ROCKER ARM	10 - CAMSHAFT - INTAKE
5 - HYDRAULIC LIFTER	11 - CAMSHAFT (SECONDARY) TIMING CHAIN
6 - CYLINDER HEAD	

The assembled fabricated camshafts (3,10) are composed of five bearing journals machined into a hollow steel tube. Six steel lobes, a secondary timing drive sprocket, and a primary sprocket/thrust flange are pressed onto the camshaft tube using a unique assembly process. Camshaft end play is controlled by the primary camshaft sprocket attachment flange on the intake camshafts (10) and by a thrust flange on the exhaust camshafts.

Operation

OPERATION

The camshaft has precisely machined (egg shaped) lobes to provide accurate valve timing and duration. The camshaft is driven by the crankshaft via drive sprockets and chains.

Removal

REMOVAL

NOTE: The engine can be equipped with either conventional roller-type (early production) or silent type (late production) secondary timing chains.

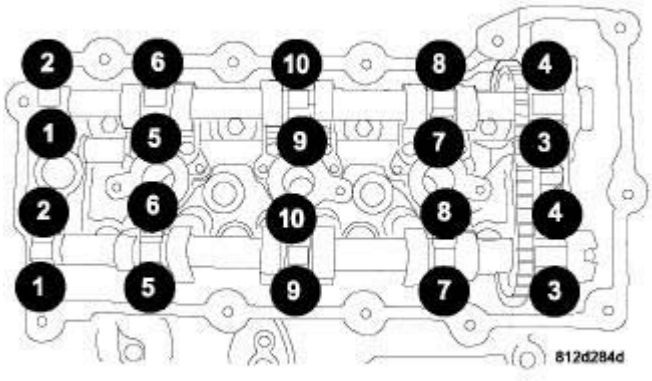

Fig. 109: Camshaft Bearing Cap Removal
Courtesy of CHRYSLER LLC

1. Remove the primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
2. Remove secondary chain tensioner mounting bolts.

NOTE: Camshaft bearing caps should have been marked during engine manufacturing. For example, number one exhaust camshaft bearing is marked "1E & gt;"

3. Slowly loosen camshaft bearing cap bolts in the sequence shown in illustration.

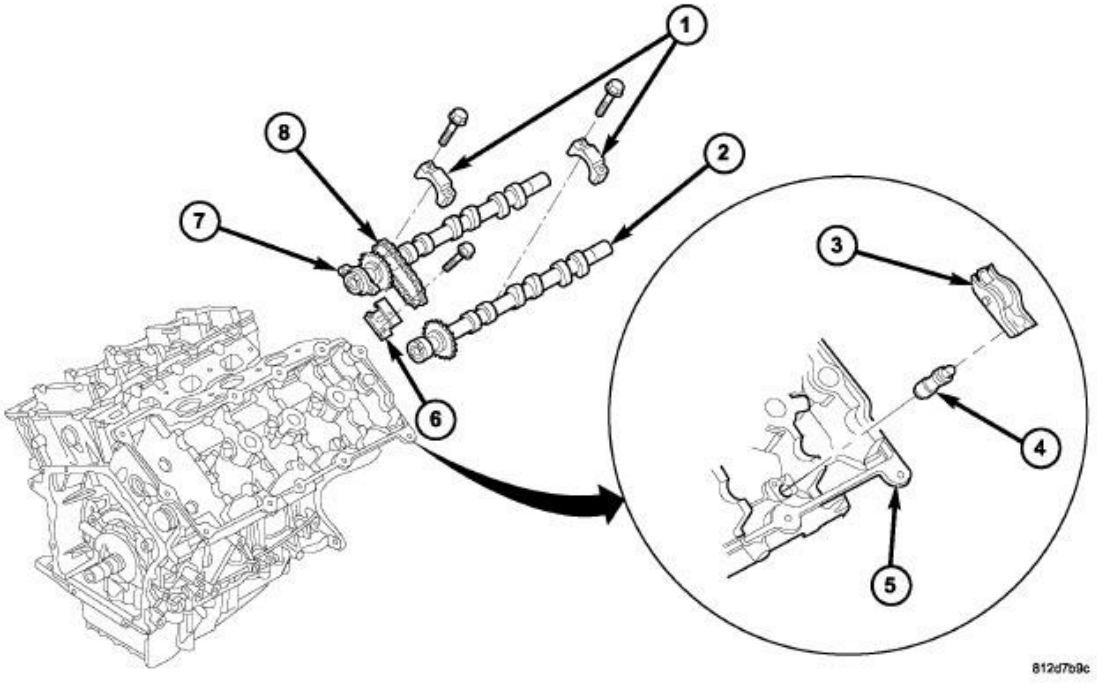

Fig. 110: Camshaft & Valvetrain Components
Courtesy of CHRYSLER LLC

4. Remove camshaft bearing caps (1).
5. Remove intake camshaft (7), exhaust camshaft (2), secondary timing chain (8), and secondary timing chain tensioner (6) together as an assembly.
6. Remove secondary timing chain tensioner (6) and secondary timing chain (8) from camshafts (2) and (7).
7. Inspect camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Inspection**.

Inspection

INSPECTION

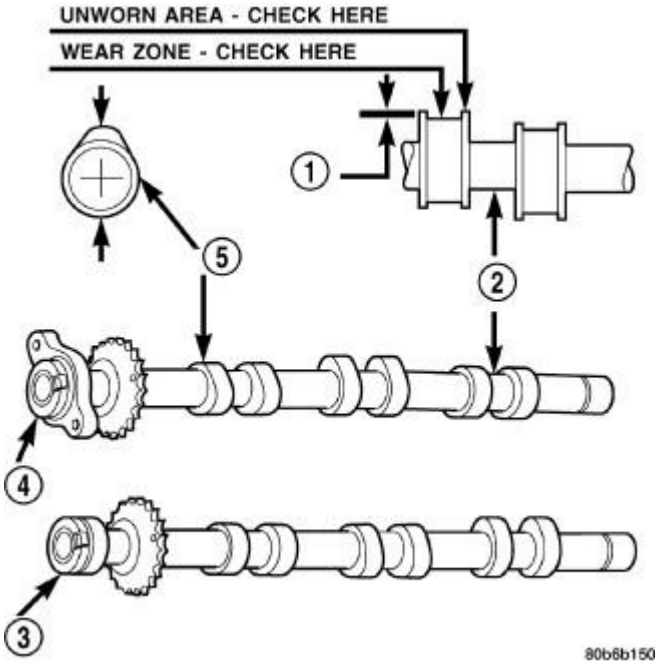

Fig. 111: Camshaft Inspection
Courtesy of CHRYSLER LLC

1 - ACTUAL WEAR
2 - BEARING JOURNAL
3 - EXHAUST CAMSHAFT
4 - INTAKE CAMSHAFT
5 - LOBE

1. Inspect camshaft bearing journals (2) for damage and binding. If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
2. Inspect camshaft sprockets for excessive wear. Replace camshafts if necessary.
3. Check the cam lobe surfaces for abnormal wear and damage. Replace camshaft if defective. Measure the actual wear and replace, if out of limits-standard value is 0.0254 mm (0.001 in.); wear **limit** is 0.254 mm (0.010 in.).

Installation

INSTALLATION

CAUTION: When the timing chain is removed and the cylinder heads are installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

NOTE: The engine can be equipped with either conventional roller-type (early

production) or silent type (late production) secondary timing chains.

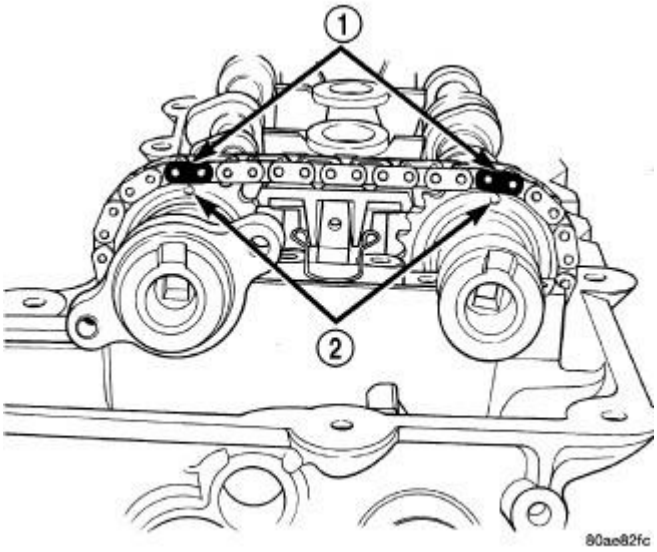

Fig. 112: Camshaft Chain Timing
Courtesy of CHRYSLER LLC

1 - PLATED CHAIN LINKS 2 - CAMSHAFT TIMING MARKS (DOTS)

1. For engines equipped with roller chains (early production), assemble camshaft chain on the cams ensuring that the plated links (1) are aligned with the timing dot (2) on the camshaft sprockets.

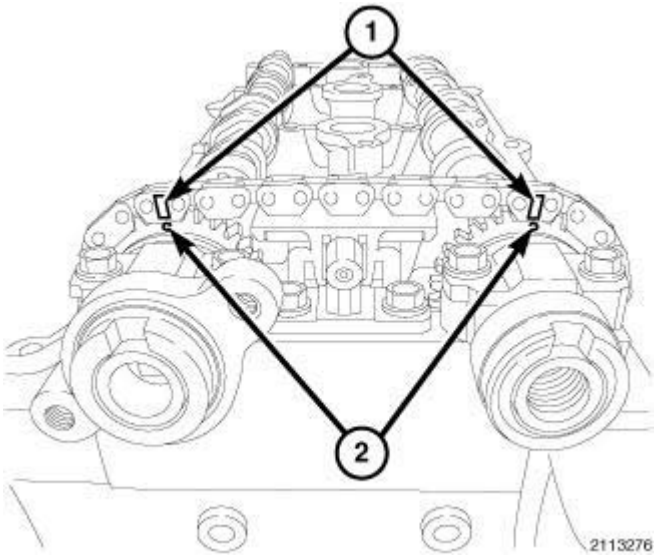

Fig. 113: Identifying Marked Links & Timing Dot On Camshaft Sprockets
Courtesy of CHRYSLER LLC

2. For engines equipped with silent chains (late production) assemble camshaft chain on the cams ensuring that the marked links (1) are aligned with the timing dot (2) on the camshaft sprockets.

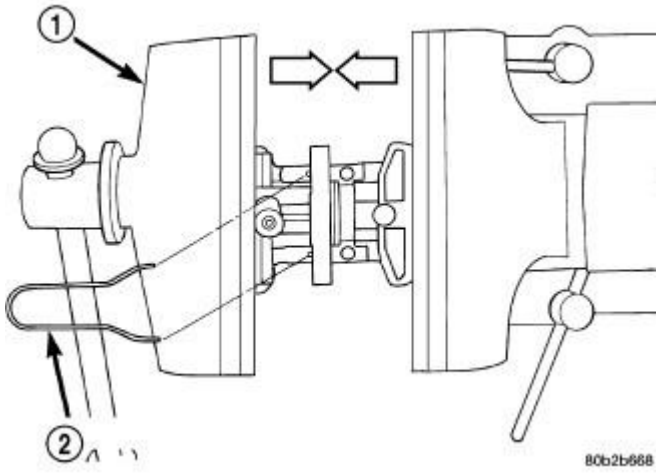

Fig. 114: Locking Camshaft (Secondary) Chain Tensioner
Courtesy of CHRYSLER LLC

1 - VISE
2 - LOCK PIN

3. If camshaft chain tensioner is already in the compressed and locked position, proceed to step four.
4. When the camshaft chain tensioner is removed, it is necessary to compress and lock the tensioner using the following procedures:
   a. Place tensioner (1) into a soft jaw vise.
   b. SLOWLY compress tensioner until fabricated lock pin (2) or the equivalent can be inserted into the locking holes.
   c. Remove compressed and locked tensioner from the vise.
5. Insert the compressed and locked camshaft chain tensioner in-between the camshafts and chain.

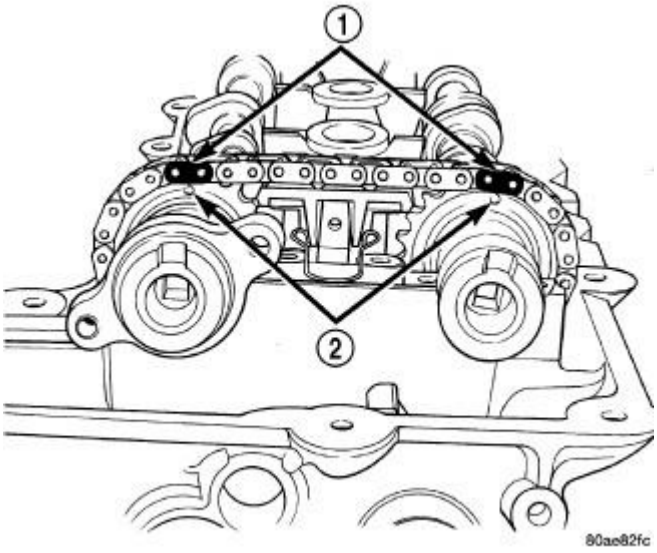

Fig. 115: Camshaft Chain Timing
Courtesy of CHRYSLER LLC

1 - PLATED CHAIN LINKS 2 - CAMSHAFT TIMING MARKS (DOTS)

6. For engines equipped with roller chains (early production), rotate the cams so that the plated links (1) and dots (2) are facing the 12:00 O'clock position.

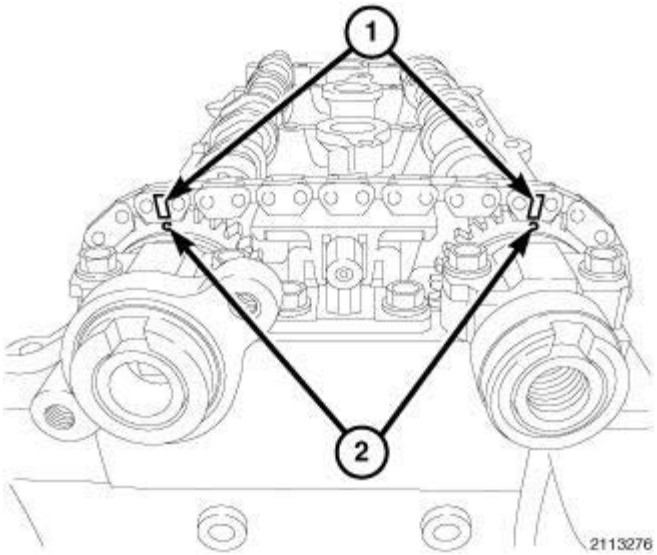

Fig. 116: Identifying Marked Links & Timing Dot On Camshaft Sprockets
Courtesy of CHRYSLER LLC

7. For engines equipped with silent chains (late production), rotate the cams so that the marked links (1) and dots (2) are facing the 12:00 O'clock position.

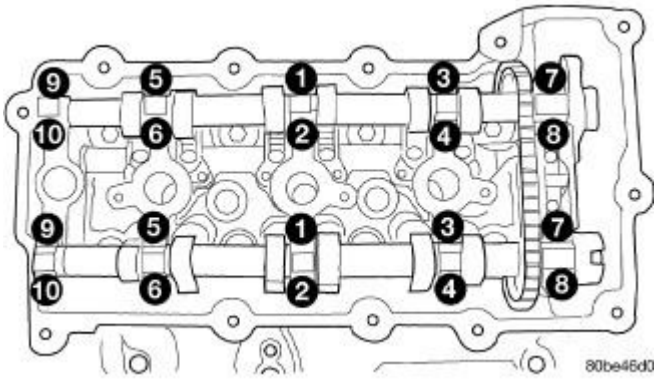

Fig. 117: Camshaft Bearing Cap Tightening Sequence
Courtesy of CHRYSLER LLC

8. Install cams to cylinder head. Verify that rocker arms are correctly seated and in proper positions.
9. Install camshaft bearing caps. Verify that bearing caps are installed in same position as removed.
10. Tighten cam bearing cap bolts gradually in sequence shown in illustration to 12 N.m (105 in. lbs.).
11. Install secondary chain tensioner bolts and tighten to 12 N.m (105 in. lbs.).
12. Remove locking pin from secondary tensioners.
13. Verify end play of camshafts are within specification. See **Engine - Specifications**.
14. Install the primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.

COVER(S), CYLINDER HEAD, LEFT

Removal

REMOVAL

1. Disconnect negative battery cable.
2. Disconnect electrical connectors from ignition coils and capacitor. Reposition electrical harness.
3. Remove ground strap from cylinder head cover stud.

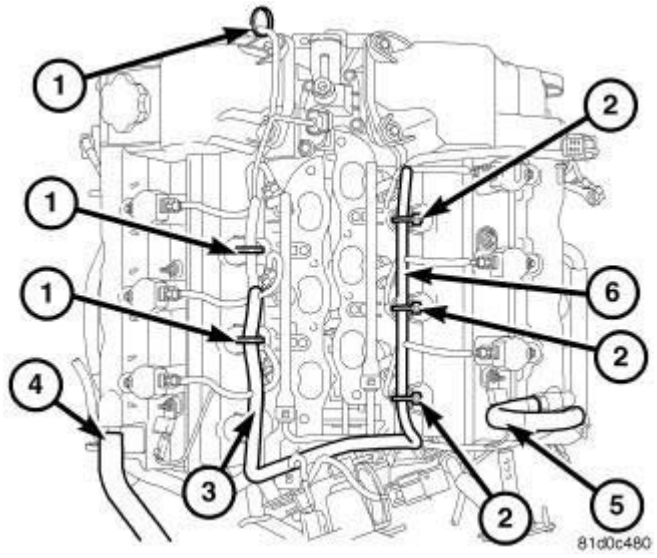

Fig. 118: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers 2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose
5 - PCV Hose
6 - Right engine harness

4. Disconnect engine harness retaining clips (1) from cylinder head cover studs. Position the engine harness (3) aside.
5. Remove fastener attaching ignition coil capacitor.
6. Remove ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Removal** .

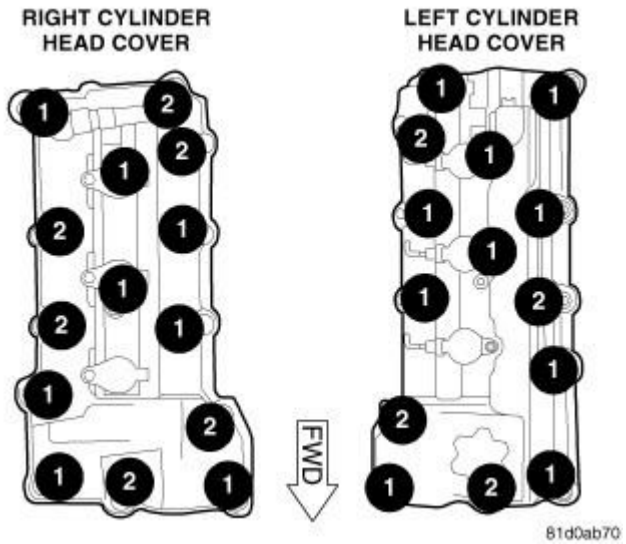

Fig. 119: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS
2 - BOLTS

7. Loosen all left cylinder head cover fasteners.

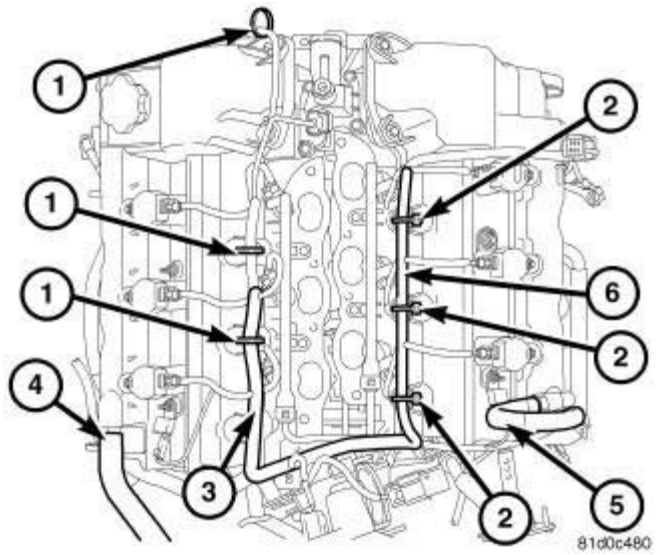

Fig. 120: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers
2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose

5 - PCV Hose
6 - Right engine harness

8. Disconnect the makeup air hose (4).

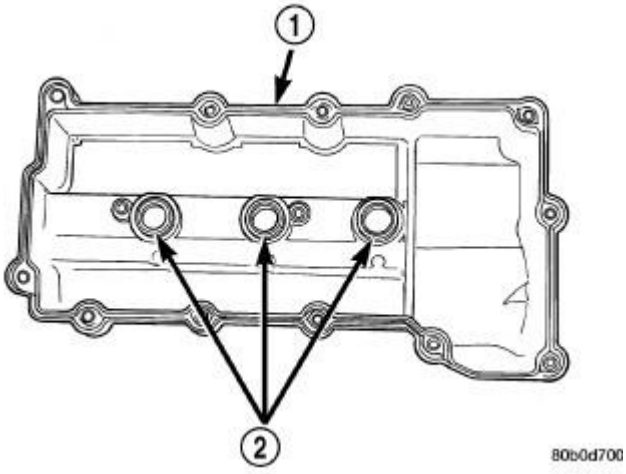

Fig. 121: Cylinder Head Cover Gasket & Spark Plug Seals
Courtesy of CHRYSLER LLC

1 - ONE PIECE GASKET
2 - SPARK PLUG WELL SEALS

NOTE: Cylinder head cover attaching bolts are captured to the cover.

CAUTION: Make certain the double ended studs in the center of the cylinder head cover are loose before attempting to remove cover.

9. Remove the left cylinder head cover (1).

Installation

INSTALLATION

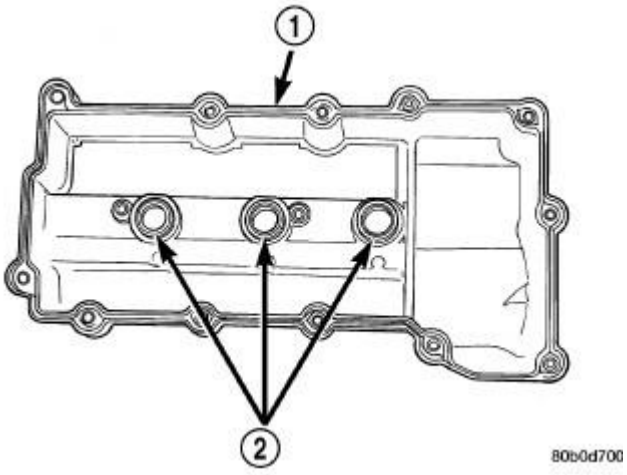

Fig. 122: Cylinder Head Cover Gasket & Spark Plug Seals
Courtesy of CHRYSLER LLC

1 - ONE PIECE GASKET 2 - SPARK PLUG WELL SEALS

1. Clean cylinder head cover and both sealing surfaces. Inspect and replace gaskets (1) as necessary.

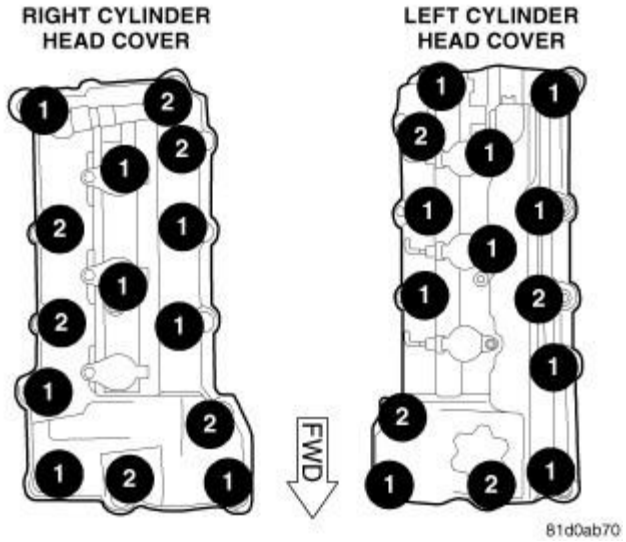

Fig. 123: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

2. Install cylinder head cover and hand start all fasteners. Verify that all double-ended studs are in the correct locations (1).
3. Tighten cylinder head cover attaching bolts and double-ended studs to 12 N.m (105 in. lbs.).

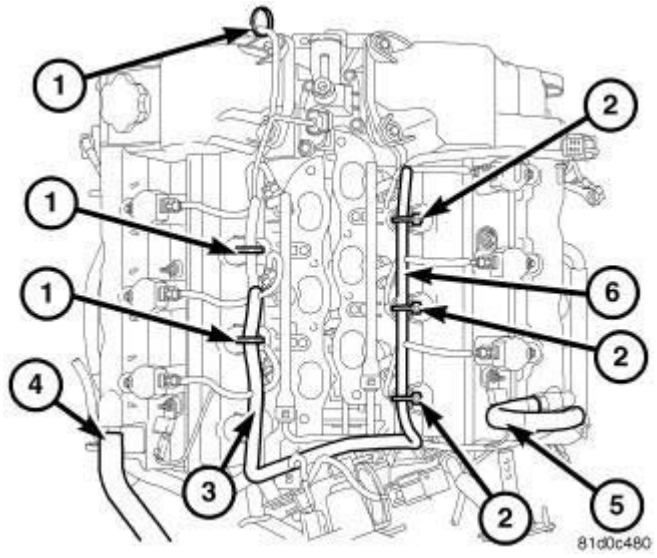

Fig. 124: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers 2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose
5 - PCV Hose
6 - Right engine harness

4. Reposition the left engine harness (3), and install the left engine harness retainers (1) to the double-ended studs.
5. Install the ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Installation** .
6. Install ignition coil capacitor and fastener.
7. Reconnect all electrical connectors.
8. Install ground strap to cylinder head cover stud.

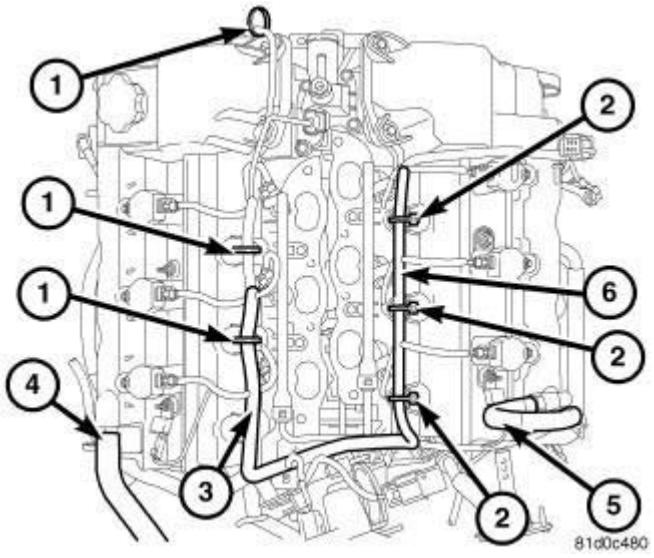

Fig. 125: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers 2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose
5 - PCV Hose
6 - Right engine harness

9. Install the makeup air hose.
10. Connect negative battery cable.

COVER(S), CYLINDER HEAD, RIGHT

Removal

REMOVAL

1. Disconnect negative battery cable.

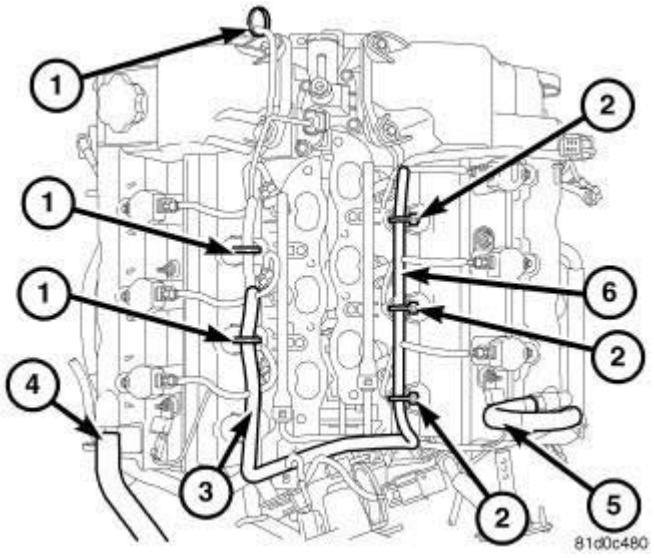

Fig. 126: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers 2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose
5 - PCV Hose
6 - Right engine harness

2. Disconnect electrical connectors from ignition coils and capacitor.
3. Disconnect right engine harness retaining clips (2) from cylinder head cover studs. Position the engine harness (6) aside.
4. Disconnect the PCV hose (5) from the upper intake manifold.
5. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

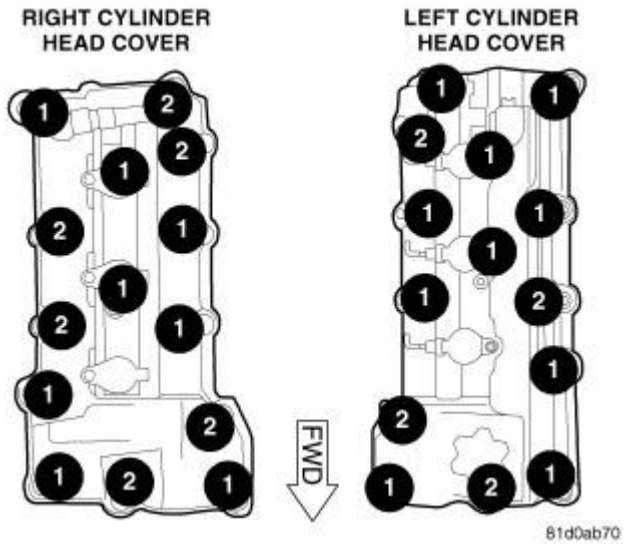

Fig. 127: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

6. Remove ground strap from cylinder head cover stud.
7. Disconnect electrical harness retaining clips from cylinder head cover studs. Reposition electrical harness.
8. Remove fastener attaching ignition coil capacitor.
9. Remove ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Removal** .
10. Loosen all cylinder head cover fasteners.

NOTE: Cylinder head cover attaching bolts are captured to the cover.

CAUTION: Make certain the double ended studs in the center of the cylinder head cover are loose before attempting to remove cover.

11. Remove cylinder head cover.

Installation

INSTALLATION

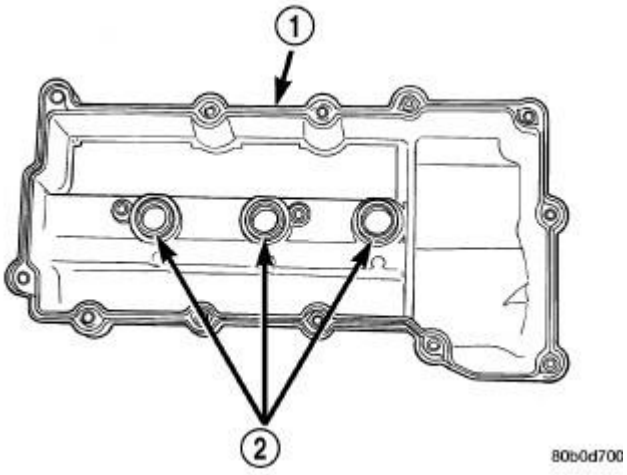

Fig. 128: Cylinder Head Cover Gasket & Spark Plug Seals
Courtesy of CHRYSLER LLC

1 - ONE PIECE GASKET 2 - SPARK PLUG WELL SEALS

1. Clean cylinder head cover and both sealing surfaces. Inspect and replace gaskets (1) as necessary.

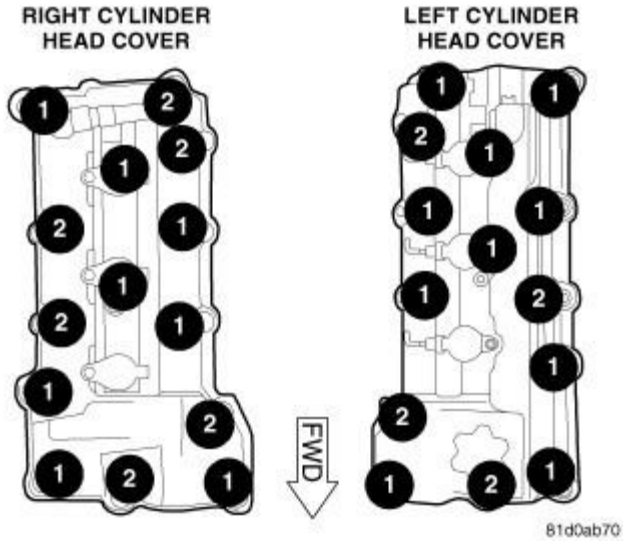

Fig. 129: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

2. Install cylinder head cover and hand start all fasteners. Verify that all double-ended studs are in the correct locations.
3. Tighten cylinder head cover attaching bolts and double-ended studs (1) to 12 N.m (105 in. lbs.).

4. Install ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Installation** .
5. Install ignition coil capacitor and fastener.
6. Connect ground strap to cylinder head cover stud.

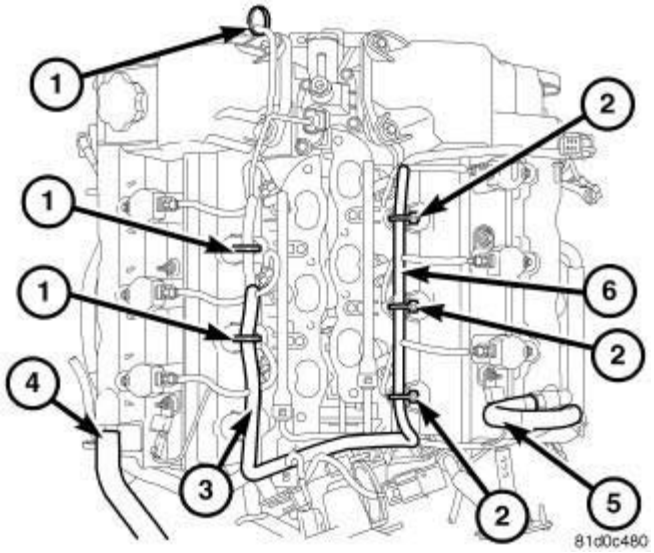

Fig. 130: Engine Harness Retaining Clips
Courtesy of CHRYSLER LLC

1 - Left cylinder head cover engine harness retainers 2 - Right cylinder head cover engine harness retainers
3 - Left engine harness
4 - Makeup air hose
5 - PCV Hose
6 - Right engine harness

7. Reposition the right engine harness (6), and install the right engine harness retainers (2) to the double-ended studs.
8. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
9. Reconnect the PCV to the upper intake manifold.

LIFTER(S), HYDRAULIC

Diagnosis and Testing

DIAGNOSIS AND TESTING - HYDRAULIC LASH ADJUSTER NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of a NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to **LASH ADJUSTER (TAPPET) NOISE CHART** indicating possible lash adjuster (tappet) noise sources and possible sources that could lead to a misdiagnosis.

Refer to **LASH ADJUSTER (TAPPET) NOISE CHART** for possible causes and correction of a lash adjuster (tappet) type noise.

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level-too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct engine oil level.
2. Insufficient running time after rebuilding cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in lash adjuster (after 1 hour run time).	3. See below: (a) Check lash adjusters for sponginess while installed in cylinder head. Depress part of rocker arm over adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) If lash adjuster(s) are still spongy, replace with new adjuster/rocker arm assembly.
4. Low oil pressure	4. See below: (a) Check and correct engine oil level. (b) Check engine oil pressure. (c) Check for excessive bearing clearance and correct. (d) Check for worn oil pump.
5. Oil passage to cylinder head(s) plugged with debris.	5. Check cylinder head oil passages and cylinder head gasket restrictor for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Ream guide(s) and replace valve(s) with oversize valves and seal(s).
7. Air injested into oil due to broken or cracked oil pump pickup tube.	7. Inspect pickup tube and replace as necessary.
8. Collapsed lash adjuster due to debris injestion.	8. Clean debris from engine and replace lash adjuster(s).

Removal

REMOVAL

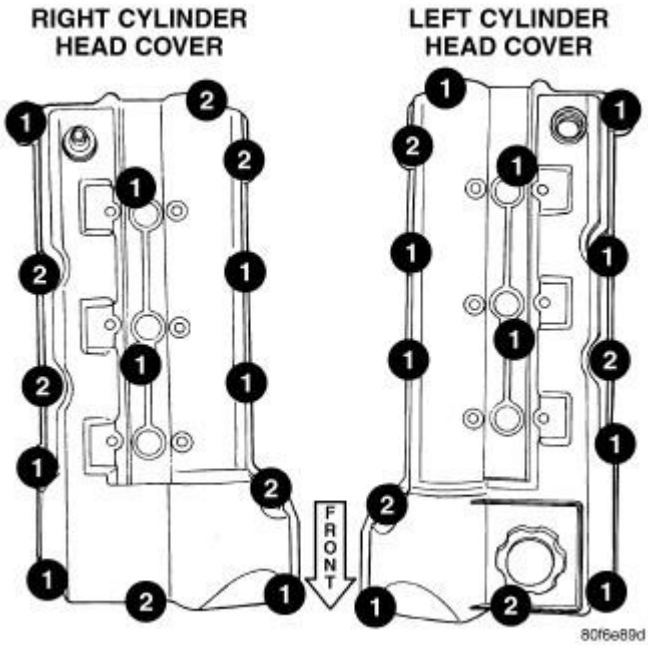

Fig. 131: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

1. Remove cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

CAUTION: If lash adjusters and rocker arms are to be reused, always mark position for reassembly in their original positions.

2. Remove rocker arm(s). See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**.
3. Remove lash adjuster(s).

Installation

INSTALLATION

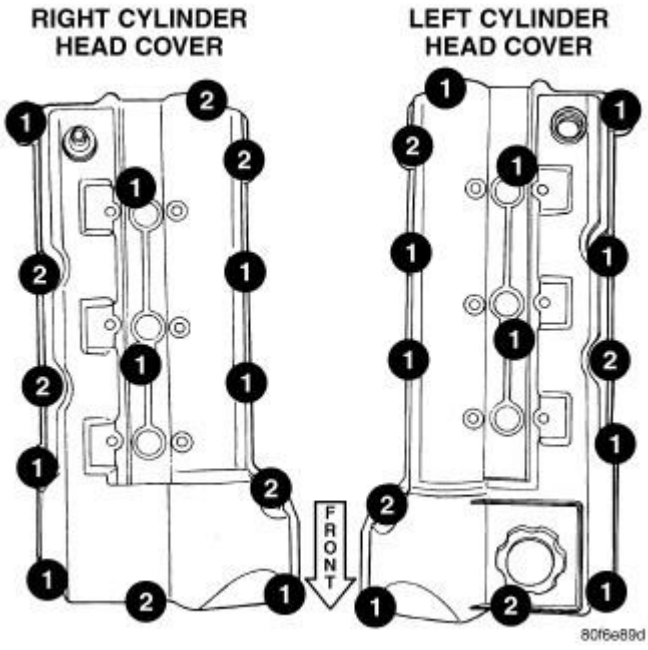

Fig. 132: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

1. Install hydraulic lash adjuster making sure adjusters are at least partially full of oil. This can be verified by little or no plunger travel when lash adjuster is depressed.
2. Install the rocker arm(s). See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**.
3. Install the cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

ROCKER ARM, VALVE

Description

DESCRIPTION

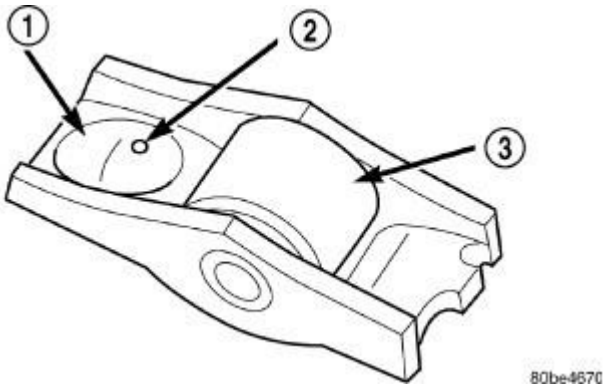

Fig. 133: Rocker Arm
Courtesy of CHRYSLER LLC

1 - LASH ADJUSTER POCKET 2 - OIL SQUIRT HOLE 3 - ROLLER

The rocker arms are composed of steel stamping with an integral roller bearing. The rocker arms incorporate a 0.5 mm (0.0197 in.) oil hole in the lash adjuster socket for roller/camshaft lobe lubrication.

Removal

REMOVAL

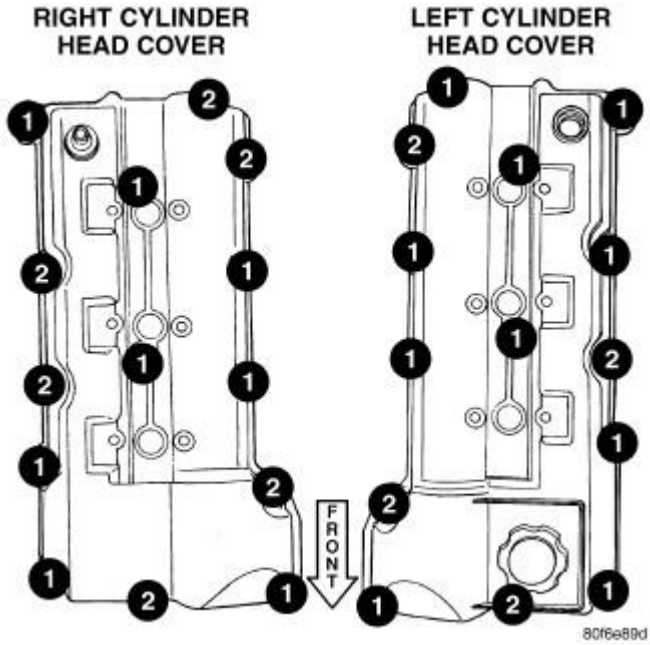

Fig. 134: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

1. Remove cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

CAUTION: Always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

2. Rotate engine until the cam lobe is on its base circle (heel), on the rocker arm being removed.

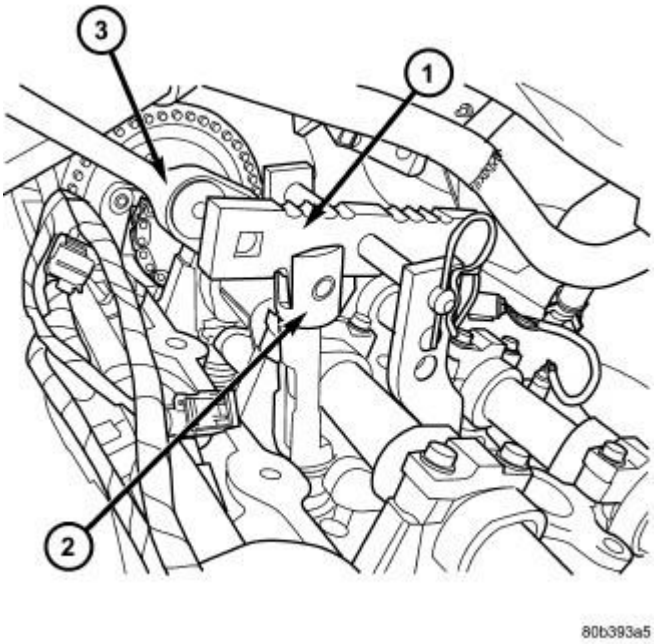

Fig. 135: Rocker Arm - Removal/Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8215A 2 - SPECIAL TOOL 8216A 3 - 3/8" DRIVE RATCHET

CAUTION: Depress valve spring only enough to remove rocker arm.

3. Using Special Tools 8215A (1) and 8216A (2) Adaptor, depress valve spring only enough to release tension on rocker arm.
4. Remove rocker arm from cylinder head.

CAUTION: If rocker arms are to be reused, identify position of rocker arms for reassembly in their original positions.

5. Repeat procedure for each rocker arm removed.
6. Inspect the rocker arm for wear or damage. See **Engine/Cylinder Head/ROCKER ARM, Valve - Inspection**.

Inspection

INSPECTION

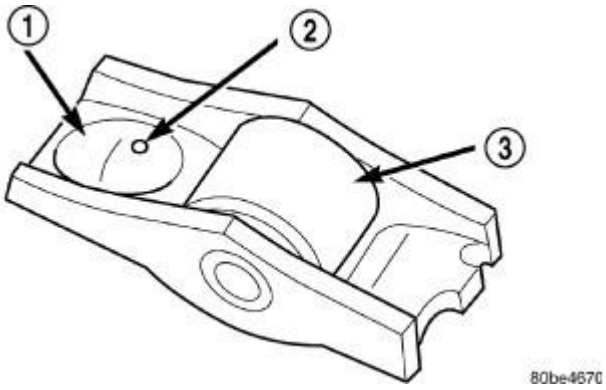

Fig. 136: Rocker Arm
Courtesy of CHRYSLER LLC

1 - LASH ADJUSTER POCKET
2 - OIL SQUIRT HOLE
3 - ROLLER

Inspect the cam follower assembly for wear or damage. Replace as necessary.

Installation

INSTALLATION

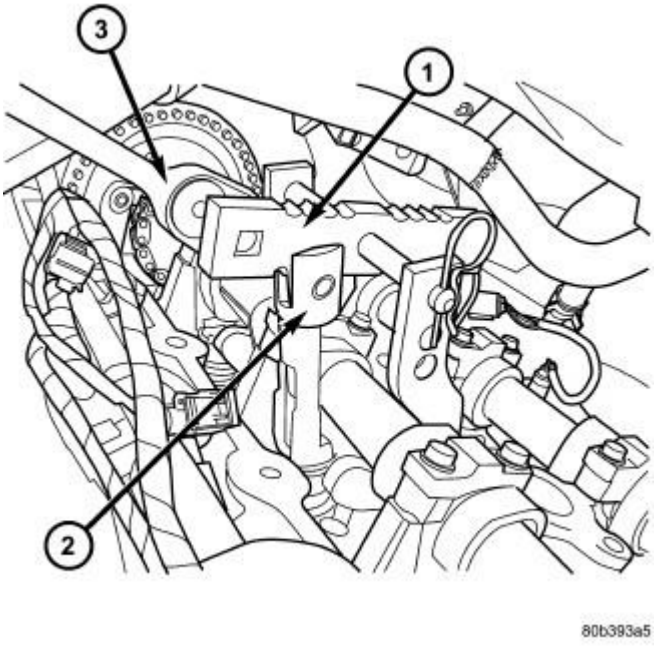

Fig. 137: Rocker Arm - Removal/Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8215A
2 - SPECIAL TOOL 8216A
3 - 3/8" DRIVE RATCHET

1. Lubricate rocker arms with clean engine oil before installation.
2. Rotate engine until cam lobe is on its base circle (heel) of rocker arm being installed.
3. Using Special Tools 8215A (1) and 8216A Adaptor, depress valve spring only enough to install rocker arm.
4. Install rocker arm in original position (if reused) over valve and lash adjuster. Release tension on valve spring.

NOTE: Inspect rocker arm for proper engagement into lash adjuster and valve tip.

5. Repeat procedure for each rocker arm being installed.

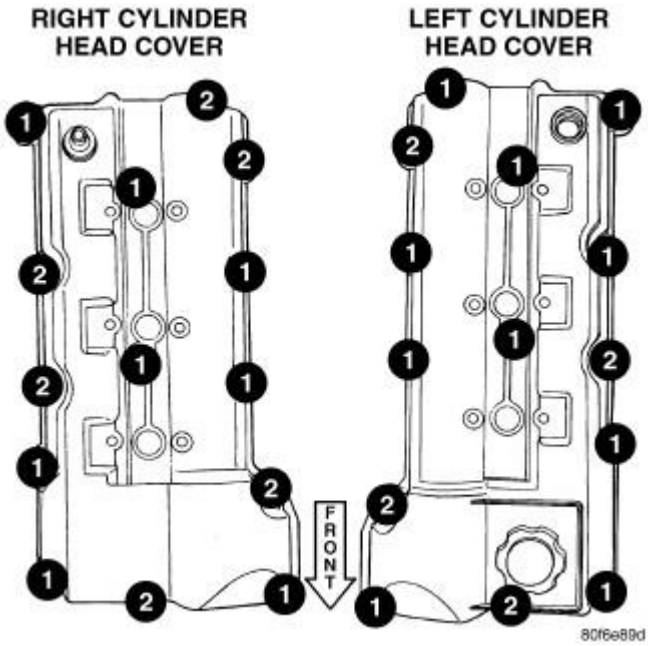

Fig. 138: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

6. Install cylinder head cover(s).

SEAL(S), VALVE GUIDE

Removal

REMOVAL

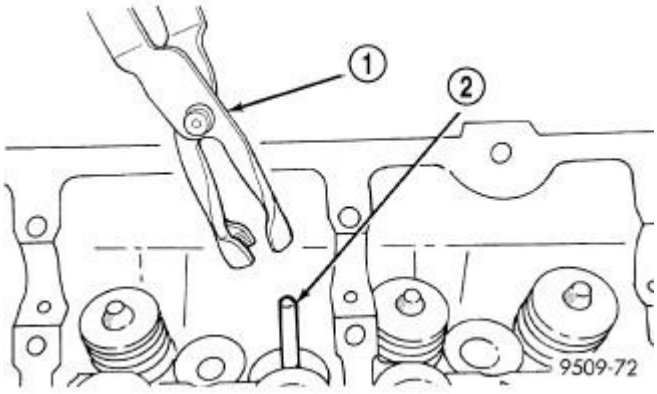

Fig. 139: Valve Stem Seal-Removal/Installation

Courtesy of CHRYSLER LLC

1 - VALVE SEAL TOOL 2 - VALVE STEM

1. Remove valve spring. See **Engine/Cylinder Head/SPRING(S), Valve - Removal**.
2. Remove valve stem seal by using a valve seal tool.

Installation

INSTALLATION

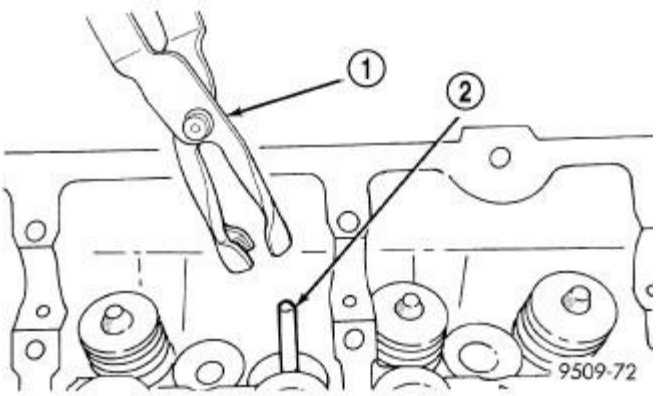

Fig. 140: Valve Stem Seal-Removal/Installation
Courtesy of CHRYSLER LLC

1 - VALVE SEAL TOOL 2 - VALVE STEM

1. The valve stem seal/valve spring seat should be pushed firmly and squarely over the valve guide using the valve stem as guide. **Do Not Force** seal against top of guide.
2. Install valve spring. See **Engine/Cylinder Head/SPRING(S), Valve - Installation**.

SPRING(S), VALVE

Description

DESCRIPTION

The valve springs are made from high strength, chrome-silicon steel. The springs are common for intake and exhaust applications. The valve spring seat is integral with the valve stem seal, which incorporates a garter spring to maintain consistent lubrication control to the valve stem.

Removal

IN VEHICLE

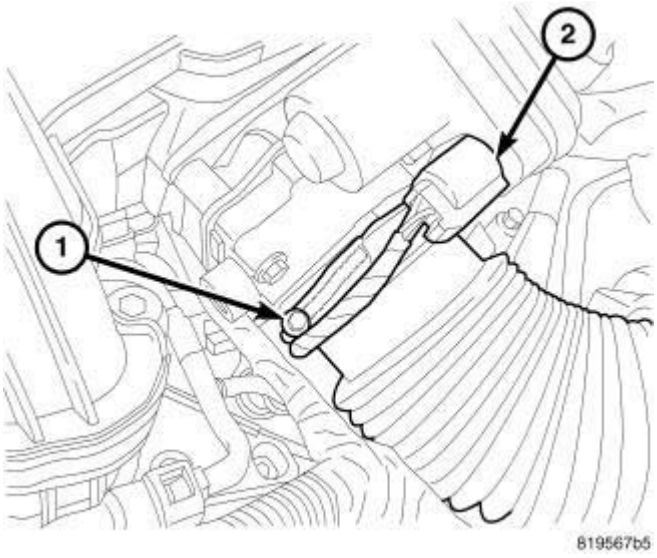

Fig. 141: Air Cleaner Housing & Inlet Hose
Courtesy of CHRYSLER LLC

1. Perform fuel system pressure release procedure before attempting any repairs. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect negative cable from remote jumper terminal.
3. Remove air cleaner housing and inlet hose (1).

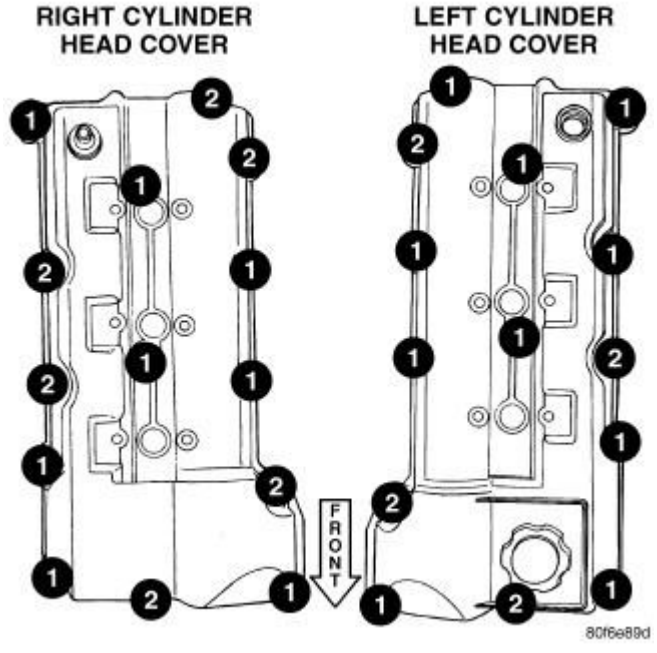

Fig. 142: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

4. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
5. Remove cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
6. Remove crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.

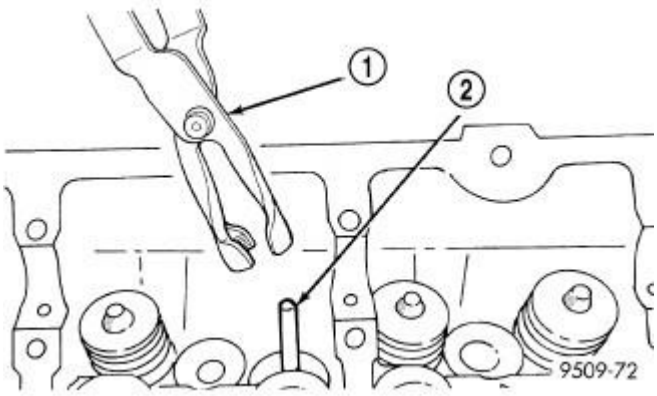

Fig. 143: Valve Stem Seal-Removal/Installation
Courtesy of CHRYSLER LLC

1 - VALVE SEAL TOOL 2 - VALVE STEM

7. Remove camshafts and rocker arms. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.
8. With air hose attached to spark plug adapter installed in the cylinder being serviced, apply 620.5-689 kPa (90-100 psi) air pressure. This is to hold valves in place while servicing components.
9. Using Special Tool MD 998772A with adapter 6779, compress valve spring and remove valve locks, retainer, and valve spring.
10. Remove valve stem seal. See **Engine/Cylinder Head/SEAL(S), Valve Guide - Removal**.

OFF VEHICLE

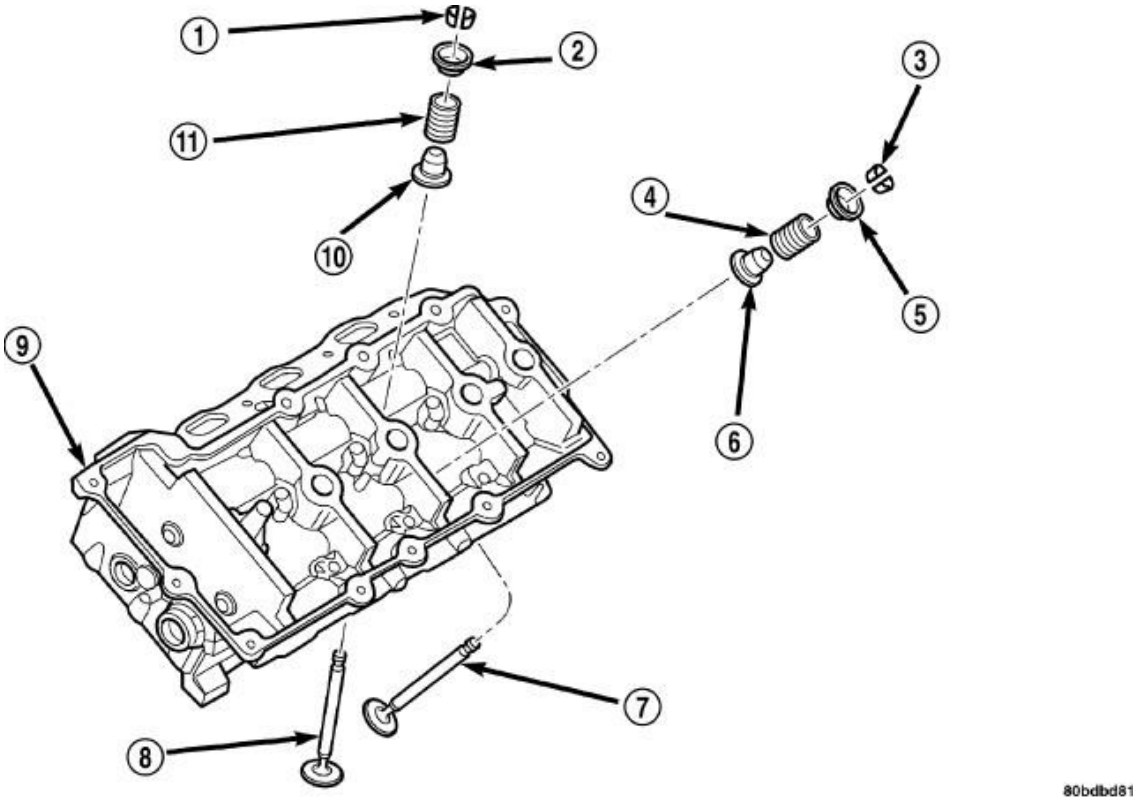

Fig. 144: Cylinder Head, Valves & Springs
Courtesy of CHRYSLER LLC

1 - VALVE KEEPER	7 - VALVE-EXHAUST
2 - SPRING RETAINER	8 - VALVE-INTAKE
3 - VALVE KEEPER	9 - CYLINDER HEAD
4 - VALVE SPRING-EXHAUST	10 - VALVE STEM SEAL
5 - SPRING RETAINER	11 - VALVE SPRING-INTAKE
6 - VALVE STEM SEAL	-

1. With cylinder head removed, compress valve springs using a Special Tool C-3422-D, Valve Spring Compressor.
2. Remove valve retaining locks, valve spring retainers, valve springs and valve spring seat/stem seal assembly.

Inspection

INSPECTION

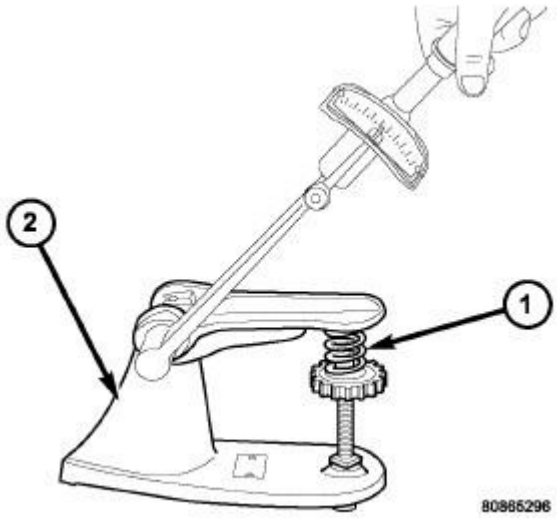

Fig. 145: TESTING VALVE SPRING
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL C-647

Whenever valves have been removed for inspection, reconditioning or replacement, valve springs should be tested. **As an example;** the compression length of a spring to be tested is 38.00 mm (1.496 in.). Turn the table of Tool C-647 until surface is in line with the 38.00 mm (1.496 in.) mark on the threaded stud and the zero mark on the front. Place spring over stud on the table and lift compressing lever to set tone device. Pull on torque wrench until ping is heard. Take reading on torque wrench at this instant. Multiply this reading by two. This will give the spring load at test length. Fractional measurements are indicated on the table for finer adjustments. Refer to **Engine - Specifications** to obtain specified height and allowable tensions. Replace any springs that do not meet specifications.

Installation

IN VEHICLE

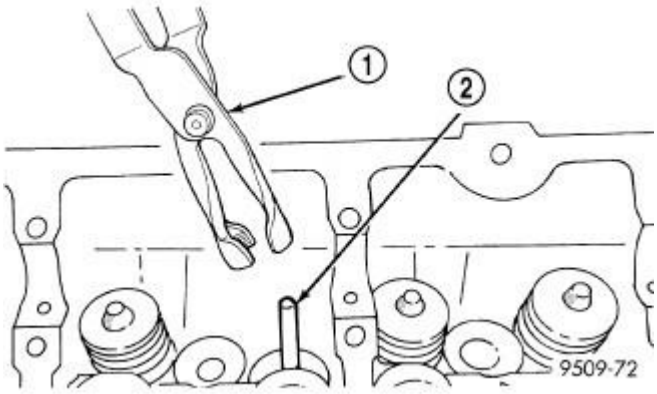

Fig. 146: Valve Stem Seal-Removal/Installation

Courtesy of CHRYSLER LLC

1 - VALVE SEAL TOOL 2 - VALVE STEM

1. The valve stem seal/valve spring seat should be pushed firmly and squarely over the valve guide using the valve stem as guide. **Do Not Force** seal against top of guide. When installing the valve retainer locks, compress the spring **only enough** to install locks
2. Follow the same procedure on the remaining cylinders using the firing sequence 1-2-3-4-5-6. **Make sure piston is at TDC on the cylinder that the valve spring is to be removed.**
3. Remove spark plug adapter tool and Special Tool MD 998772A.
4. Install rocker arm(s).

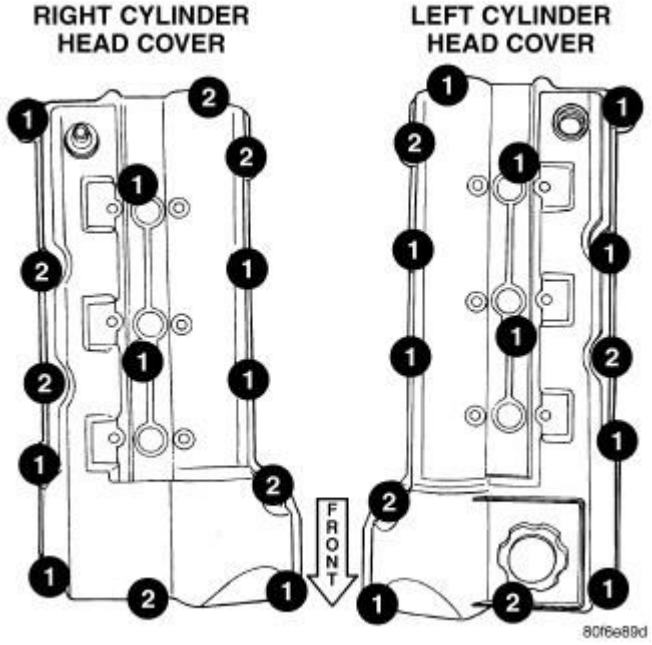

Fig. 147: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

5. Install camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation**, **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation** and **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
6. Install cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
7. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

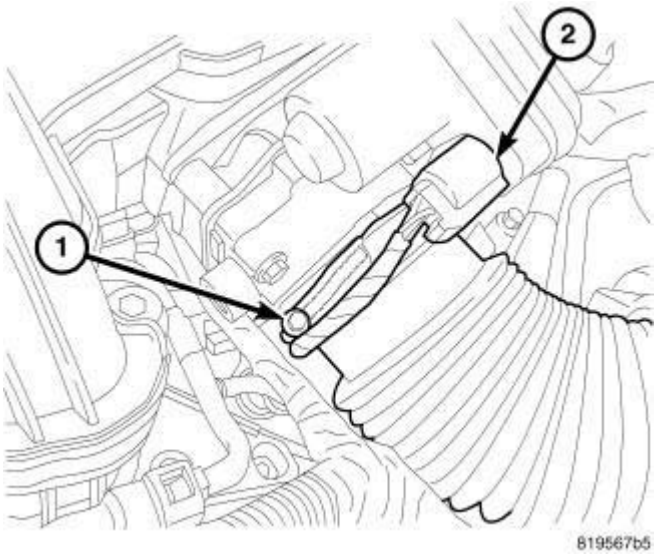

Fig. 148: Air Cleaner Housing & Inlet Hose
Courtesy of CHRYSLER LLC

8. Install air cleaner housing and inlet hose (1).
9. Connect negative cable.

OFF VEHICLE

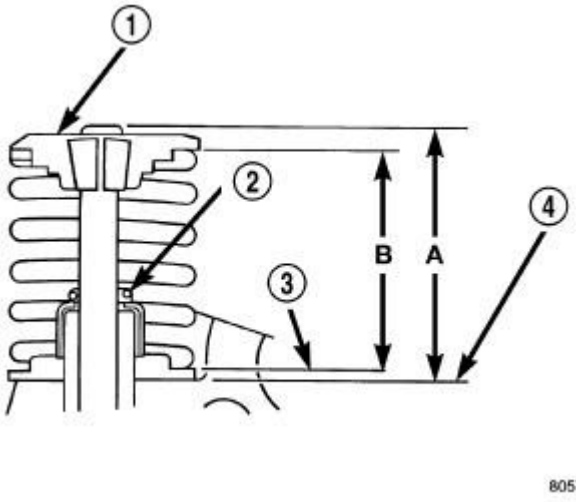

Fig. 149: Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

1. If removed, install the valve(s). See **Engine/Cylinder Head/VALVES, Intake and Exhaust - Installation**.
2. If valves or seats have been re-ground, check valve tip height (A). If valve tip height for intake valve is greater than 47.59 mm (1.8737 in.) or 49.14 mm (1.9347 in.) for exhaust valve, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

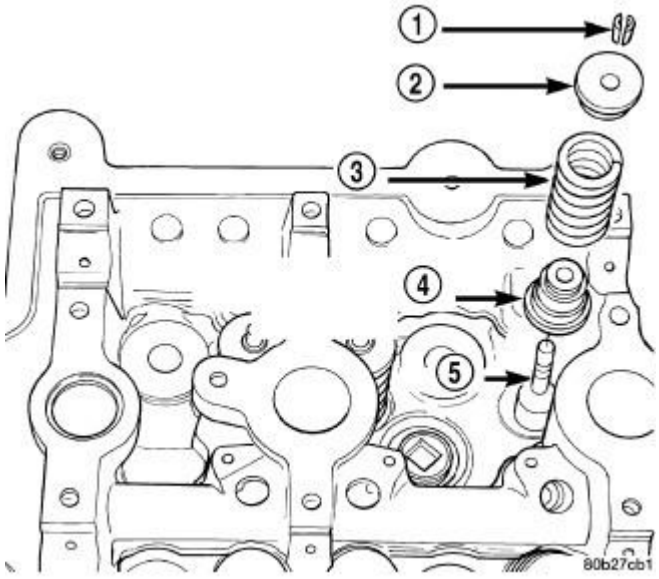

Fig. 150: Valve Seal & Spring
Courtesy of CHRYSLER LLC

1 - VALVE RETAINING LOCKS
2 - VALVE SPRING RETAINER
3 - VALVE SPRING
4 - VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY
5 - VALVE

3. Install valve seal/spring seat assembly over valve guides on all valve stems. Ensure that the garter spring is intact around the top of the rubber seal. Install valve springs, valve retainers.

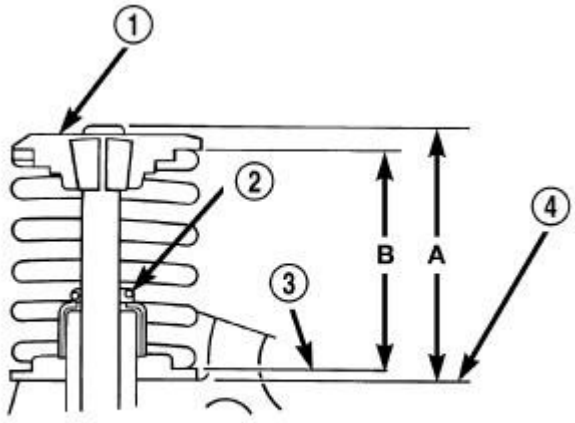

Fig. 151: Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

4. Compress valve springs with a valve spring compressor install locks and release tool. **If valves and/or seats are re-ground, measure the installed height of springs (B) , make sure measurements are taken from top of spring seat to the bottom surface of spring retainer.** If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

VALVES, INTAKE AND EXHAUST

Description

DESCRIPTION

The valves are made of heat resistant steel, and have chrome plated stems to prevent scuffing. The four valves per cylinder (two intake and two exhaust) are actuated by roller rocker arms, which pivot on stationary lash adjusters. All valves use three bead lock keepers to retain springs and to promote valve rotation.

Standard Procedure

VALVE AND VALVE SEAT REFACING

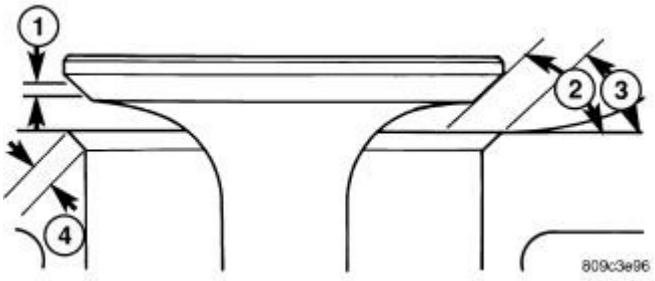

Fig. 152: Valve Face & Seat
Courtesy of CHRYSLER LLC

1 - SEAT WIDTH 2 - FACE ANGLE 3 - SEAT ANGLE 4 - SEAT CONTACT AREA

The intake and exhaust valves have a 44.5 to 45 degree face angle (2). The valve seats have a 45 to 45.5 degree face angle (3).

VALVES

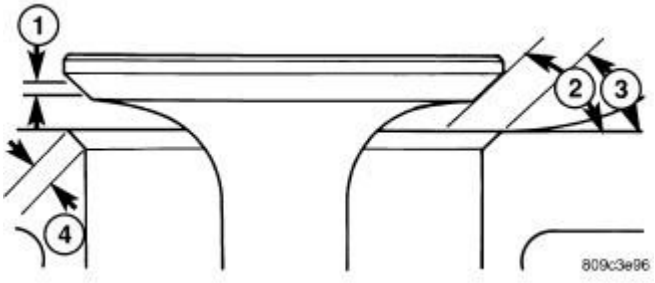

Fig. 153: Valve Face & Seat
Courtesy of CHRYSLER LLC

1 - SEAT WIDTH 2 - FACE ANGLE 3 - SEAT ANGLE 4 - SEAT CONTACT AREA

Inspect the remaining margin after the valves are refaced. See **Engine - Specifications**.

VALVE SEATS

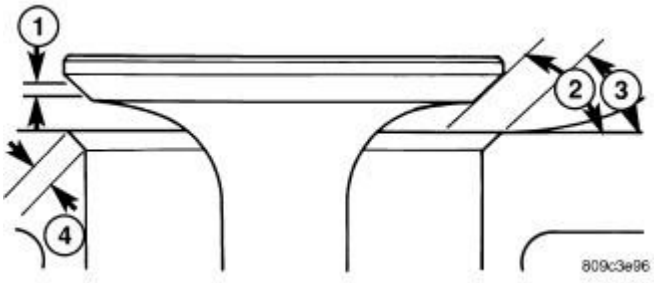

Fig. 154: Valve Face & Seat
Courtesy of CHRYSLER LLC

1 - SEAT WIDTH
2 - FACE ANGLE
3 - SEAT ANGLE
4 - SEAT CONTACT AREA

1. When refacing valve seats, it is important that the correct size valve guide pilot be used for reseating stones. A true and complete surface must be obtained.
2. Measure the concentricity of valve seat using dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.
3. Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat valve seat **LIGHTLY** with Prussian blue then set valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of valve face, contact is satisfactory. If the blue is transferred to top edge of valve face, then lower valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of valve face, then raise valve seat with a 65 degree stone.

   NOTE: Valve seats which are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise cylinder head must be replaced.

4. When seat is properly positioned the width of the intake 1.00 to 1.50 mm (0.0394 to 0.0591 in.) and exhaust seats should be 1.25 to 1.75 mm (0.049 to 0.069 in.).

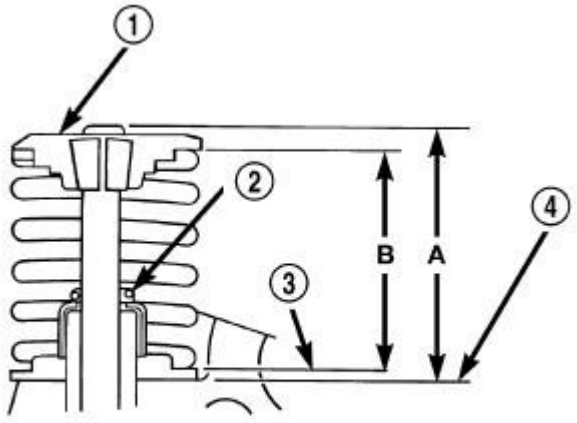

Fig. 155: Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

5. Check the valve spring installed height after refacing the valve and seat.

VALVE AND SPRING INSTALLED HEIGHT

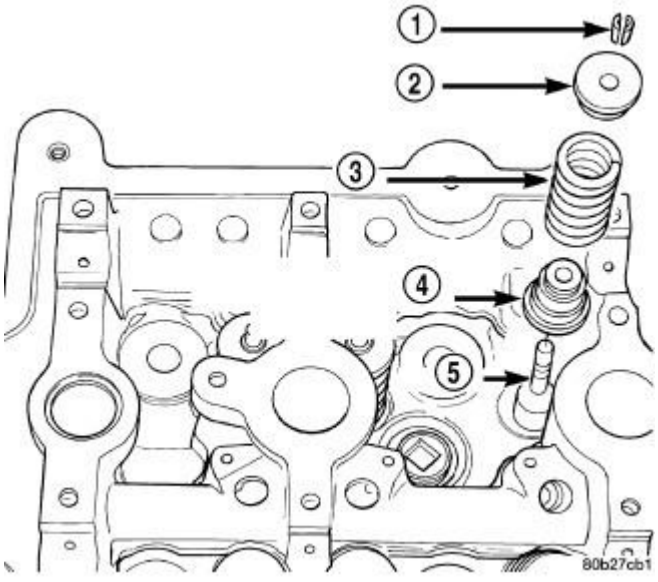

Fig. 156: Valve Seal & Spring
Courtesy of CHRYSLER LLC

1 - VALVE RETAINING LOCKS
2 - VALVE SPRING RETAINER
3 - VALVE SPRING
4 - VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY
5 - VALVE

1. Coat valve stems with clean engine oil and insert them in cylinder head.
2. If valves (5) or seats have been refaced, check valve tip height (A). If valve tip height for intake valve is greater than 47.59 (1.8737 in.) or 49.14 (1.9347 in.) for exhaust valve, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.
3. Install valve seal/spring seat assembly over valve guides on all valve stems. Ensure that the garter spring is intact around the top of the rubber seal.

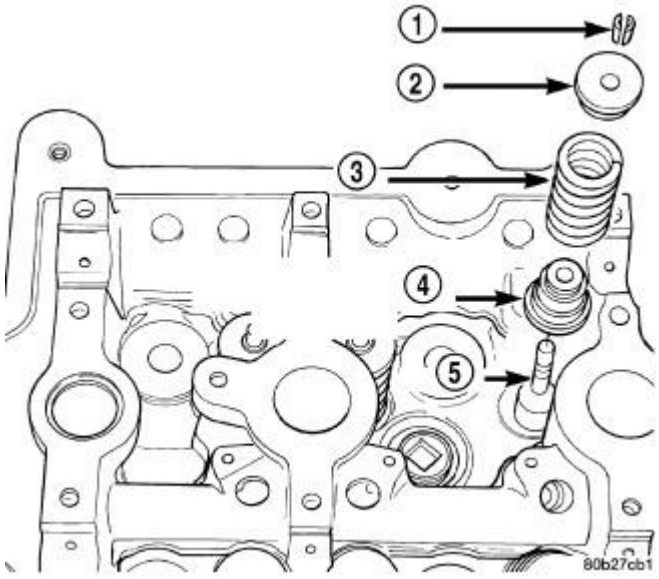

Fig. 157: Valve Seal & Spring
Courtesy of CHRYSLER LLC

1 - VALVE RETAINING LOCKS
2 - VALVE SPRING RETAINER
3 - VALVE SPRING
4 - VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY
5 - VALVE

4. Position valve springs (3) and retainer on spring seat.
5. Compress valve spring with a valve spring compressor.
6. Install retainer locks and release tool.
7. If valves and/or seats are refaced, measure the installed height of springs (B). Measurement is taken from

top of spring seat to the bottom surface of spring retainer. If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

Removal

REMOVAL

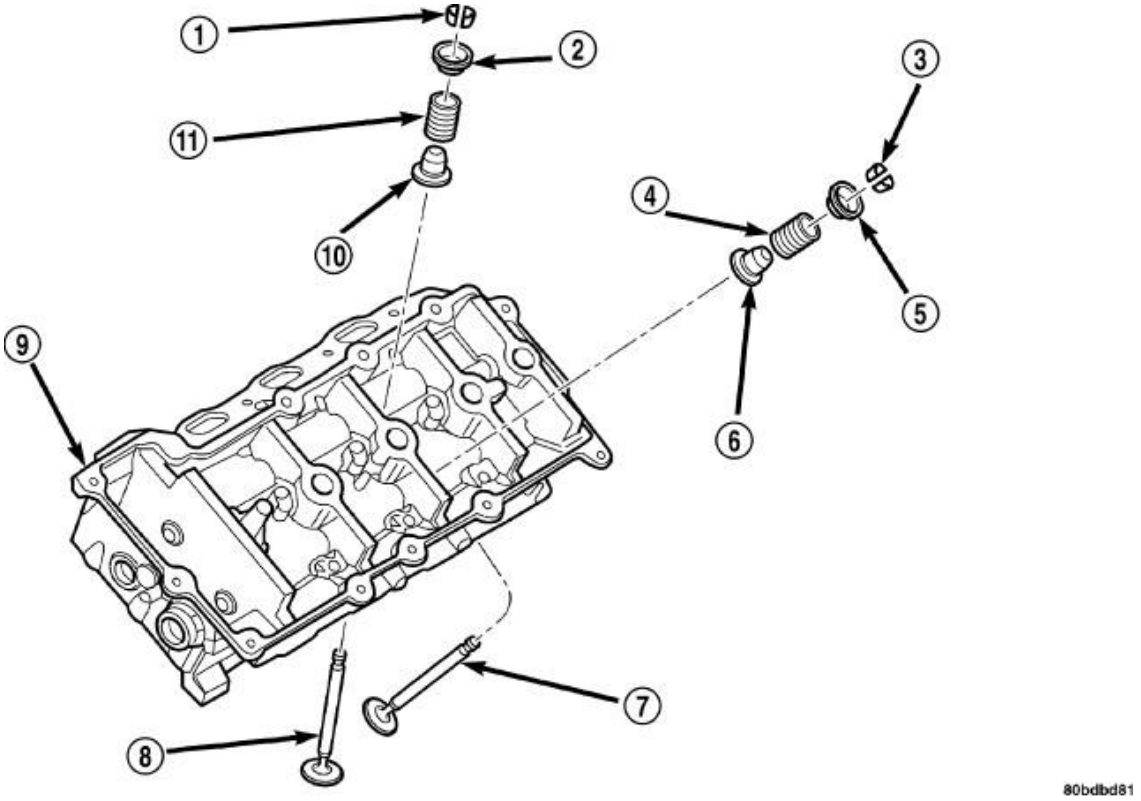

Fig. 158: Cylinder Head, Valves & Springs
Courtesy of CHRYSLER LLC

1 - VALVE KEEPER	7 - VALVE-EXHAUST
2 - SPRING RETAINER	8 - VALVE-INTAKE
3 - VALVE KEEPER	9 - CYLINDER HEAD
4 - VALVE SPRING-EXHAUST	10 - VALVE STEM SEAL
5 - SPRING RETAINER	11 - VALVE SPRING-INTAKE
6 - VALVE STEM SEAL	-

1. Remove cylinder head(s). See **Engine/Cylinder Head - Removal**.
2. Remove valve spring. See **Engine/Cylinder Head/SPRING(S), Valve - Removal**.
3. Before removing valves, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.**
4. Remove valve (7). Identify each valve to ensure installation in original location.

Inspection

INSPECTION

VALVES

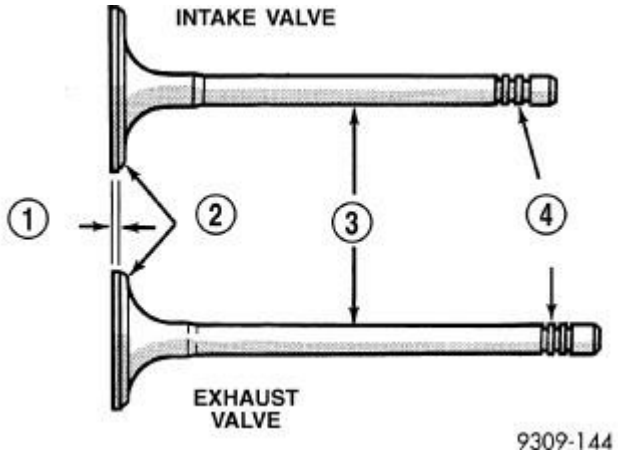

Fig. 159: Intake & Exhaust Valves
Courtesy of CHRYSLER LLC

1 - MARGIN
2 - FACE
3 - STEM
4 - VALVE SPRING RETAINER LOCK GROOVES

1. Clean and inspect valves thoroughly. Replace burned, warped and cracked valves.
2. Measure valve stems for wear (3). For valve specifications, see **Engine - Specifications**.

NOTE: Valve stems are chrome plated and should not be polished.

VALVE GUIDES

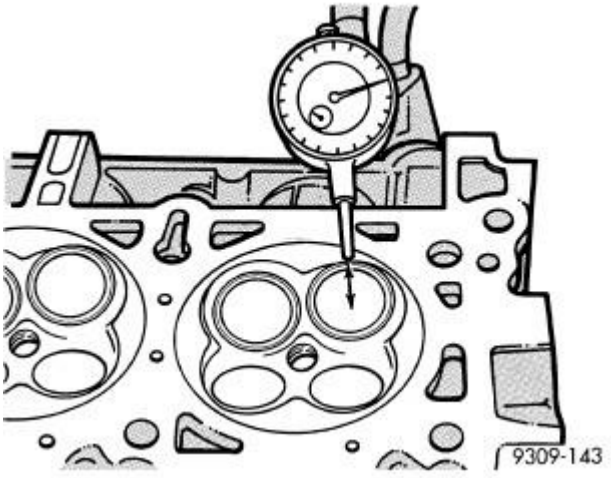

Fig. 160: Measuring Valve Guide Wear - Typical
Courtesy of CHRYSLER LLC

1. Remove carbon and varnish deposits from inside of valve guides with a reliable guide cleaner.
2. Measure valve stem-to-guide clearance as follows:
3. Install valve into cylinder head so it is 15 mm (0.590 inch.) off the valve seat. A small piece of hose may be used to hold valve in place.
4. Attach dial indicator Tool C-3339A to cylinder head and set it at right angle of valve stem being measured.
5. Move valve to and from the indicator. For clearance specifications, see **Engine - Specifications**.

NOTE: Replace cylinder head if stem-to-guide clearance exceeds specifications, or if guide is loose in cylinder head.

Installation

INSTALLATION

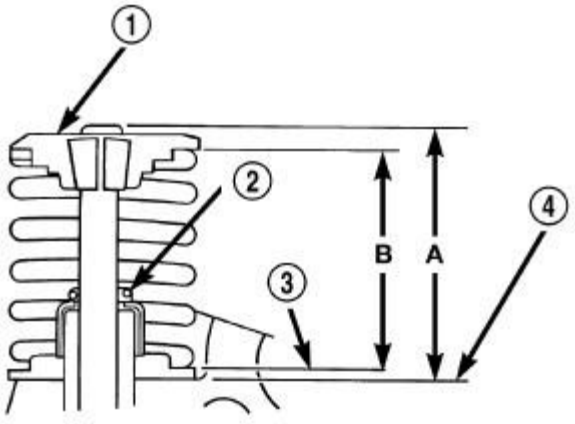

Fig. 161: Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

1. Coat valve stems with clean engine oil and insert them in cylinder head.
2. If valves or seats have been re-ground, check valve tip height (A). If valve tip height for intake valve is greater than 47.59 mm (1.8737 in.) or 49.14 mm (1.9347 in.) for exhaust valve, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

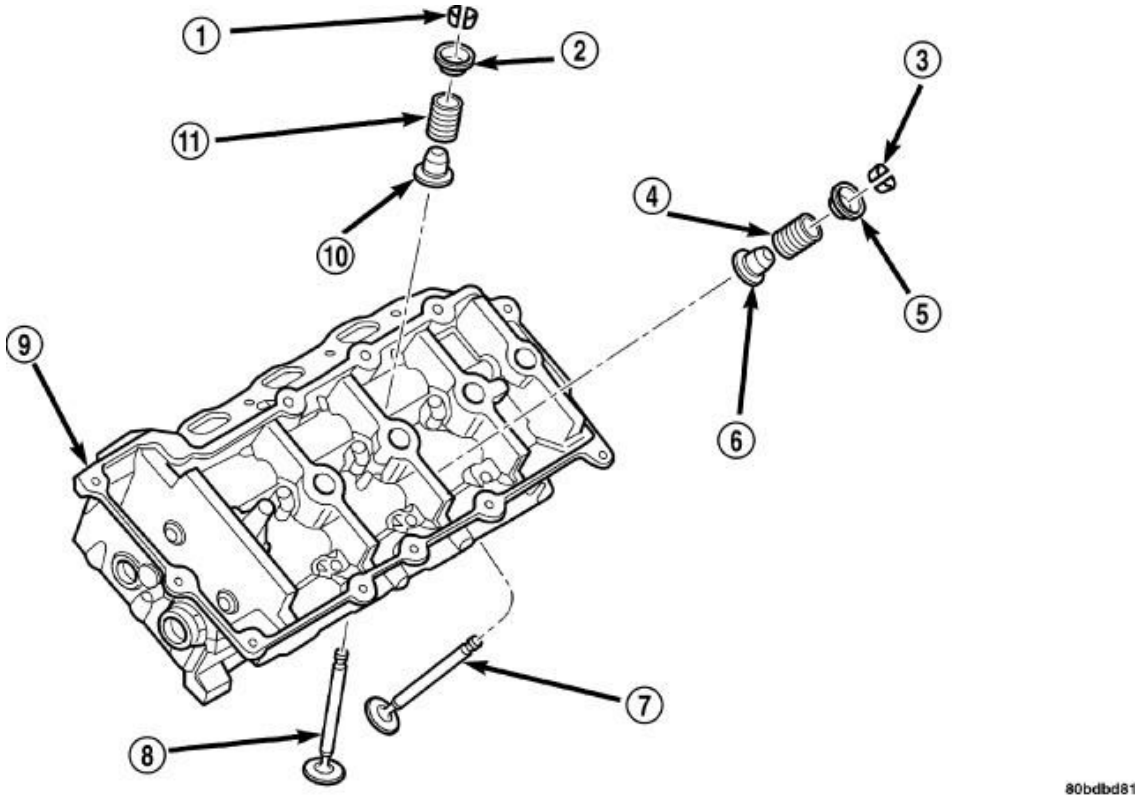

Fig. 162: Cylinder Head, Valves & Springs
Courtesy of CHRYSLER LLC

1 - VALVE KEEPER	7 - VALVE-EXHAUST
2 - SPRING RETAINER	8 - VALVE-INTAKE
3 - VALVE KEEPER	9 - CYLINDER HEAD
4 - VALVE SPRING-EXHAUST	10 - VALVE STEM SEAL
5 - SPRING RETAINER	11 - VALVE SPRING-

	INTAKE
6 - VALVE STEM SEAL	-

3. Install valve spring (4). See **Engine/Cylinder Head/SPRING(S), Valve - Installation**.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

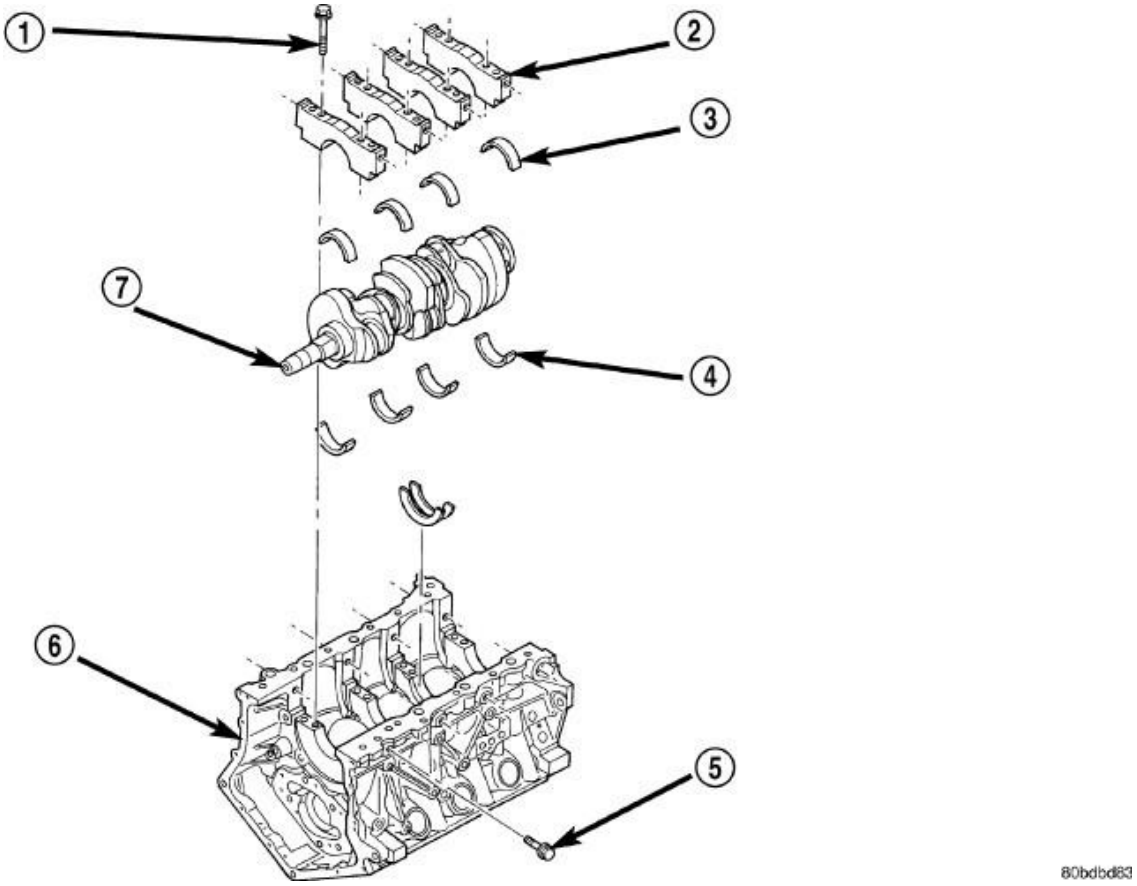

Fig. 163: Engine Block & Crankshaft
Courtesy of CHRYSLER LLC

1 - MAIN CAP BOLT-VERTICAL
2 - MAIN CAP
3 - MAIN BEARING-LOWER
4 - MAIN BEARING-UPPER
5 - MAIN CAP BOLT - HORIZONTAL
6 - CYLINDER BLOCK
7 - CRANKSHAFT

The cylinder block (6) is made of heat treated aluminum with cast-in-place iron liners. The block is a closed deck design with the right bank forward. To provide high rigidity and improved NVH, the block has cast-in contours and ribs, along with powdered metal main caps (2) each with 6 bolts, 4 vertical (1) and 2 horizontal (5). The engine is equipped with a windage tray mounted to the main caps.

The block design allows coolant flow between the cylinder bores and an internal coolant by-pass to the thermostat.

STANDARD PROCEDURE

CYLINDER BORE HONING

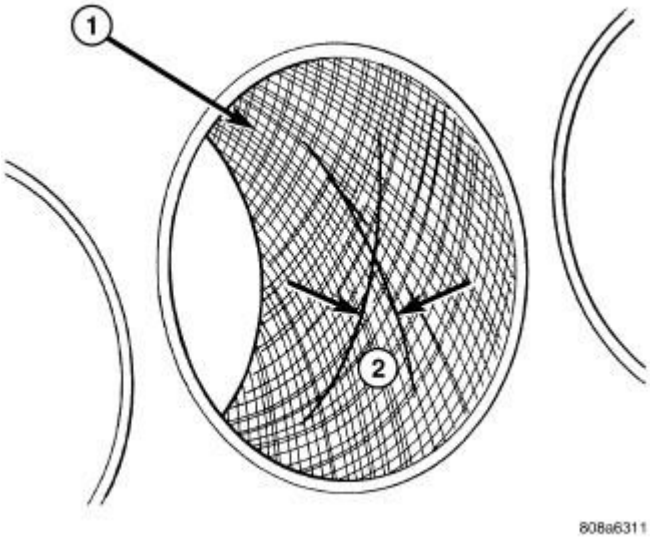

Fig. 164: Cylinder Bore Cross-Hatch Pattern
Courtesy of CHRYSLER LLC

1 - CROSS-HATCH PATTERN 2 - 40°-60°

1. Used carefully, a quality commercially available cylinder bore resizing hone equipped with 220 grit stones, is the best tool for this honing procedure. In addition to deglazing, it will reduce taper and out-of-round as well as removing light scuffing, scoring or scratches. Usually a few strokes will clean up a bore and maintain the required limits.
2. Deglazing of the cylinder walls may be done using a quality commercially available cylinder surfacing hone, recommended tool C-3501 or equivalent, equipped with 280 grit stones, if the cylinder bore is straight and round. 20-60 strokes depending on the bore condition, will be sufficient to provide a satisfactory surface. Use a light honing oil. **Do not use engine or transmission oil, mineral spirits or kerosene.** Inspect cylinder walls after each 20 strokes.
3. Honing should be done by moving the hone up and down fast enough to get a cross-hatch pattern. When hone marks **intersect** at 40-60 degrees, the cross hatch angle is most satisfactory for proper seating of

rings.

4. A controlled hone motor speed between 200-300 RPM is necessary to obtain the proper cross-hatch angle. The number of up and down strokes per minute can be regulated to get the desired 40-60 degree angle. Faster up and down strokes increase the cross-hatch angle.
5. After honing, it is necessary that the block be cleaned again to remove all traces of abrasive.

CAUTION: Ensure all abrasives are removed from engine parts after honing. It is recommended that a solution of soap and hot water be used with a brush and the parts then thoroughly dried. The bore can be considered clean when it can be wiped clean with a white cloth and cloth remains clean. Oil the bores after cleaning to prevent rusting.

CLEANING

CLEANING

Clean cylinder block thoroughly using a suitable cleaning solvent.

INSPECTION

INSPECTION

ENGINE BLOCK

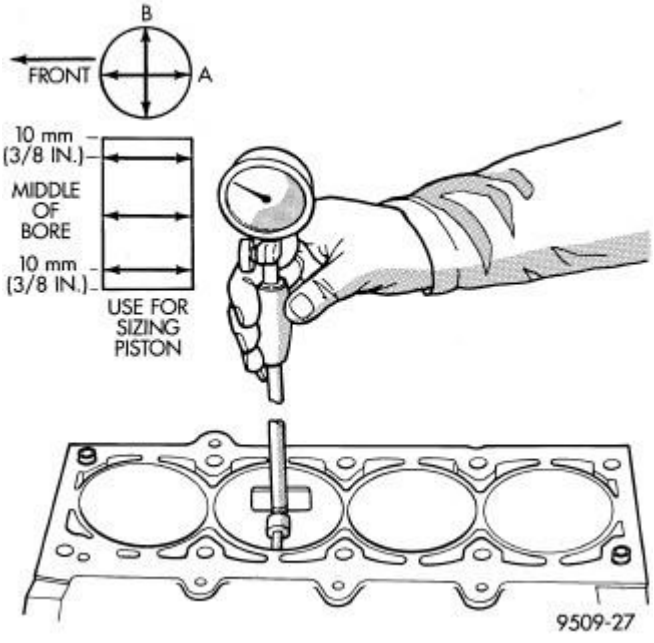

Fig. 165: Checking Cylinder Bore Size
Courtesy of CHRYSLER LLC

1. Clean cylinder block thoroughly and check all core hole plugs for evidence of leaking.
2. If new core plugs are to be installed, see **Engine - Standard Procedure**.
3. Examine block and cylinder bores for cracks or fractures.
4. Check block deck surfaces for flatness. Deck surface must be within service limit of 0.1 mm (0.004 in.).

CYLINDER BORE

NOTE: The cylinder bores should be measured at normal room temperature, 21°C (70° F).

The cylinder walls should be checked for out-of-round and taper with Tool C119 or equivalent. See **Engine - Specifications**. If the cylinder walls are badly scuffed or scored, the cylinder block should be replaced, and new pistons and rings fitted.

Measure the cylinder bore at three levels in directions A and B. Top measurement should be 10 mm (3/8 in.) down and bottom measurement should be 10 mm (3/8 in.) up from bottom of bore. See **Engine - Specifications**.

BEARING(S), CONNECTING ROD

Standard Procedure

CONNECTING ROD AND BEARING FITTING

CONNECTING ROD BEARING

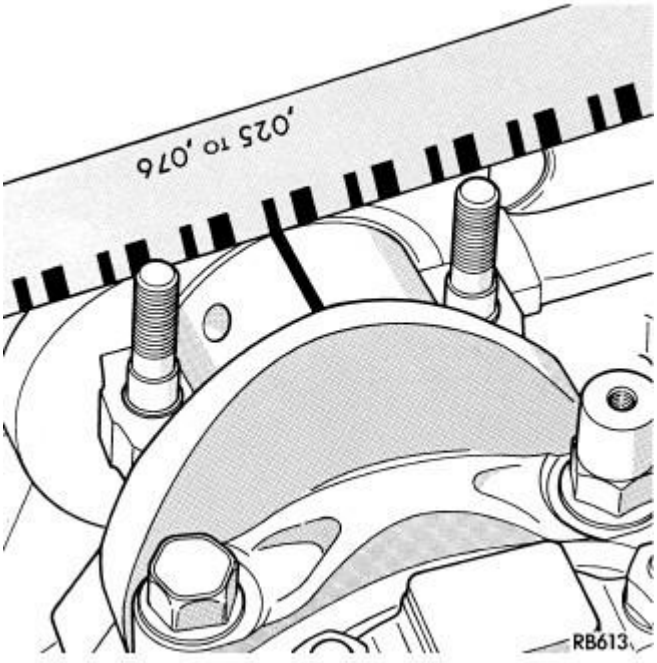

Fig. 166: Checking Connecting Rod Bearing Clearance-Typical

Courtesy of CHRYSLER LLC

Fit all connecting rods on one bank until complete.

The bearing caps are not interchangeable and should be marked at removal to ensure correct assembly.

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces as engine damage may occur.

The bearing shells must be installed with the tangs inserted into the machined grooves in the rods and caps. Also, assure that the hole in upper bearing half aligns with oil squirt hole in rod. Install cap with the tangs on the same side as the rod.

CAUTION: Assure that hole in upper bearing half aligns with hole in connecting rod as engine damage may occur.

Limits of taper or out-of-round on any crankshaft journals should be held to 0.015 mm (0.0006 in.). Bearings are available 0.025 mm (0.001 in.) and 0.250 mm (0.010 in.) undersize. **Install the bearings in pairs. Do not use a new bearing half with an old bearing half. Do not file the rods or bearing caps.**

1. For measuring Main Bearing Clearance and Connecting Rod Bearing Clearance use plastigage. For more information on using plastigage, see **Engine - Standard Procedure**. Refer to **Engine - Specifications** for bearing clearance specifications.

CONNECTING ROD BOLTS

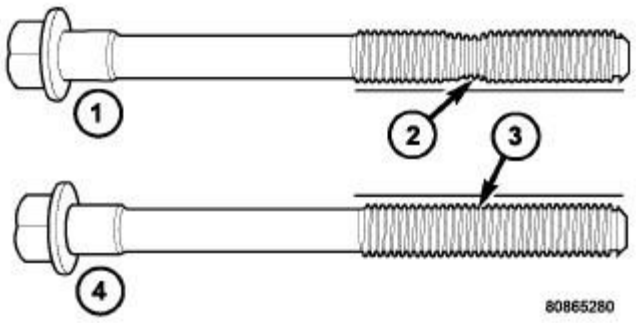

Fig. 167: Check For Stretched Bolts
Courtesy of CHRYSLER LLC

1 - STRETCHED BOLT
2 - THREADS ARE NOT STRAIGHT ON LINE
3 - THREADS ARE STRAIGHT ON LINE
4 - UNSTRETCHED BOLT

NOTE: The connecting rod bearing cap bolts must be examined before reuse. If the threads are necked down (2) due to stretching, the bolt(s) must be replaced.

NOTE: Connecting rod bolts are retained in the rod cap with a light press fit. If bolts are to be removed, use a hammer and punch to drive bolts from connecting rod cap using care not to damage fractured cap surface.

1. Examine connecting rod bolt for stretching. Stretching can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt should be replaced.
2. Before installing the bolts, lubricate the threads with engine oil.
3. Install bolts finger tight. Then alternately torque each nut to assemble the cap properly.
4. Tighten the nuts to specification. See **Engine - Specifications**.

CONNECTING ROD SIDE CLEARANCE

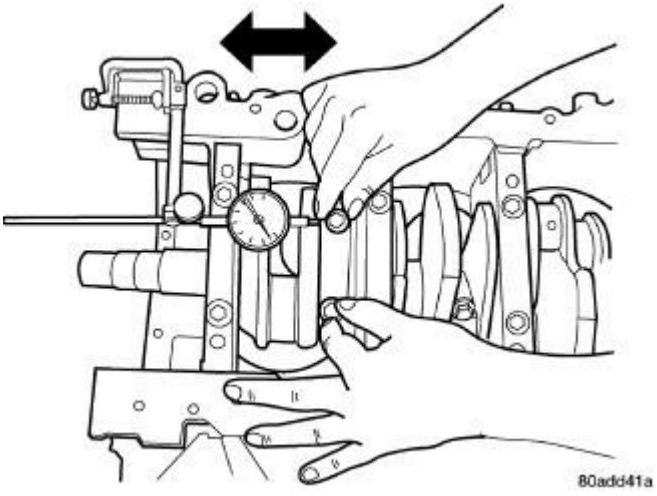

Fig. 168: Connecting Rod Side Clearance Measuring
Courtesy of CHRYSLER LLC

1. Mount a dial indicator to a stationary point on engine. Locate probe perpendicular to and resting against the connecting rod cap being checked. Move connecting rod all the way to rear of its travel. Zero the dial indicator. Move connecting rod forward to limit of travel and read the dial indicator. Compare measurement to specification listed in engine specifications. See **Engine - Specifications**. Repeat procedure for each connecting rod. Turn crankshaft for connecting rod accessibility.

BEARING(S), CRANKSHAFT, MAIN

Standard Procedure

CRANKSHAFT MAIN BEARING FITTING

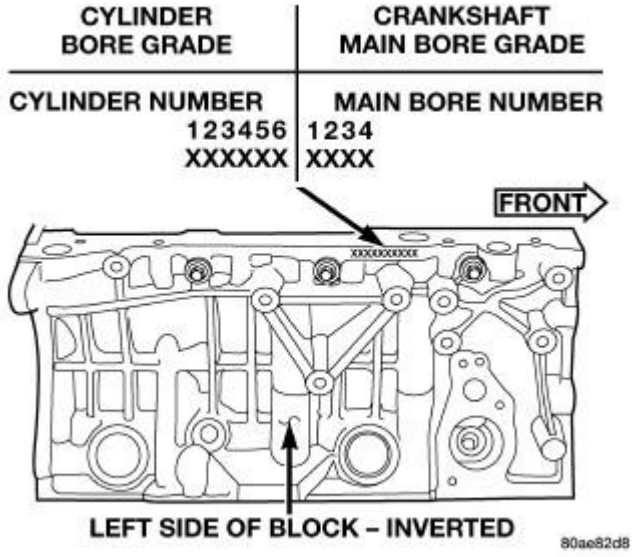

Fig. 169: Cylinder Block Main Bore Grade Marking
Courtesy of CHRYSLER LLC

The grade marks for the cylinder block main bearing bore grade is located on the pan rail just below the left side engine mount bracket. These marks are read left to right, corresponding to main bore 1, 2, 3, 4.

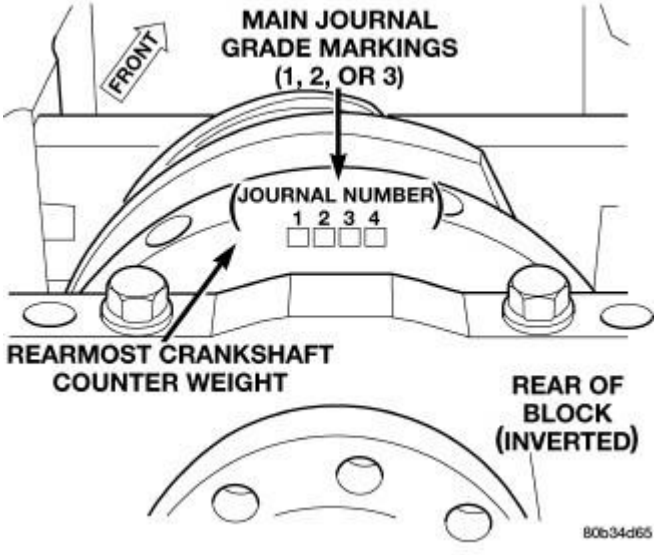

Fig. 170: Crankshaft Main Journal Grade Marking Location
Courtesy of CHRYSLER LLC

The main bearings are "select fit" to achieve proper oil clearances. For main bearing selection, the block and

crankshaft have grade identification marks.

The grade marks for the crankshaft are located on the rearmost crankshaft counter weight as shown in illustration. The crankshaft journal grade marks are read left to right, corresponding with journal number 1, 2, 3, 4.

MAIN BEARING SELECTION CHART-2.7L

Main Bearing Bore Grade Mark				
-	-	1	2	3
Crankshaft Main Journal Grade Mark	1	(3) standard	(2) +0.003 mm (+0.0002 in.)	(1) +0.006 mm (+0.0003 in.)
	2	(4) -0.003 mm (-0.0002)	(3) standard	(2) +0.003 mm (+0.0002 in.)
	3	(5) -0.006 mm (-0.0003 in.)	(4) -0.003 mm (-0.0002 in.)	(3) standard

Refer to the selection chart to properly select the main bearings. For an example, if the main bore grade is 3 and the journal grade is 2, the proper select fit bearing would be (2) +0.003 mm (+0.0002 in.).

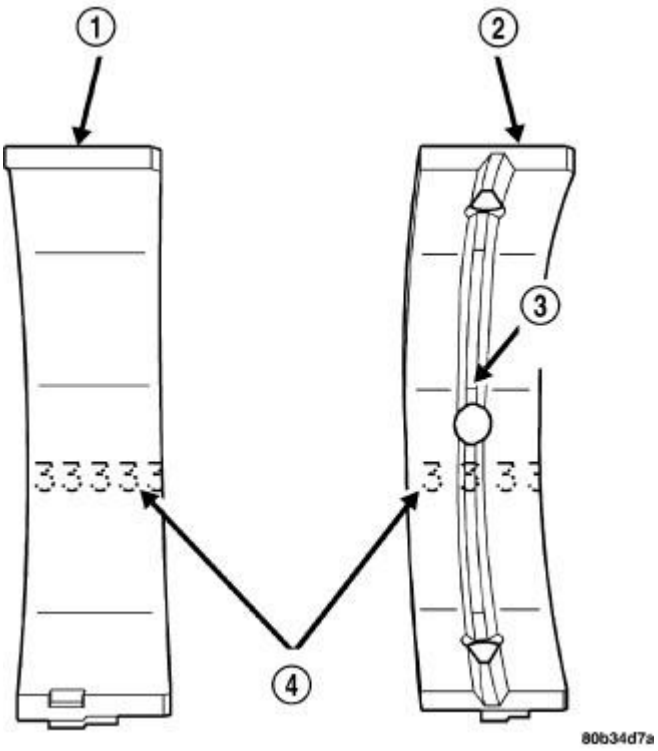

Fig. 171: Main Bearing Grade Marks
Courtesy of CHRYSLER LLC

1 - LOWER MAIN BEARING
2 - UPPER MAIN BEARING

3 - OIL FEED HOLE AND GROOVE
4 - GRADE SELECTION INK MARKS

NOTE: Service main bearings have a number from 1-5 marked in ink on the bearing surface. For verification, use the MAIN BEARING SELECTION CHART-2.7L for number to size identification.

The upper main bearing has a oil feed hole and a center groove to allow lubrication of the main journal and must be properly positioned in the block.

NOTE: Although cylinder bores are graded for size, there is only one piston size.

COVER, STRUCTURAL DUST

Removal

REMOVAL

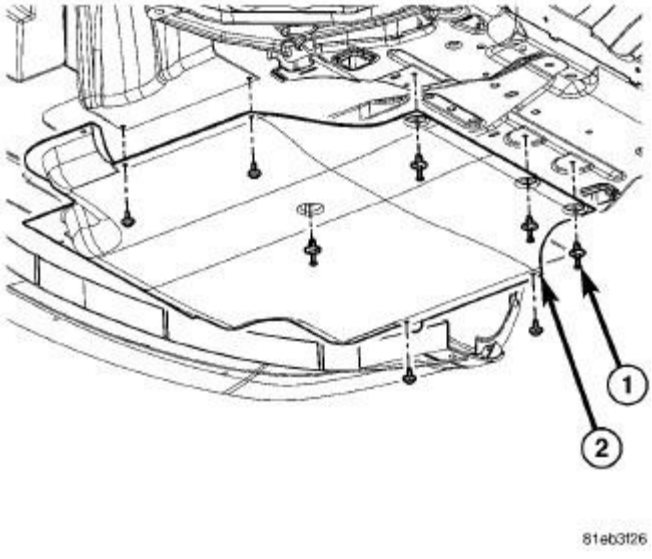

Fig. 172: Belly Pan
Courtesy of CHRYSLER LLC

1. Raise and secure the vehicle on a hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
2. Remove the belly pan (2), if equipped.

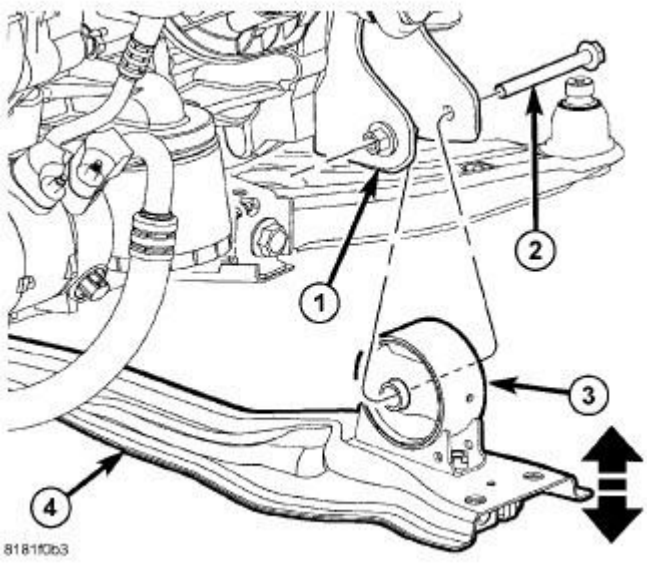

Fig. 173: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

3. Remove the fore/aft crossmember (4). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

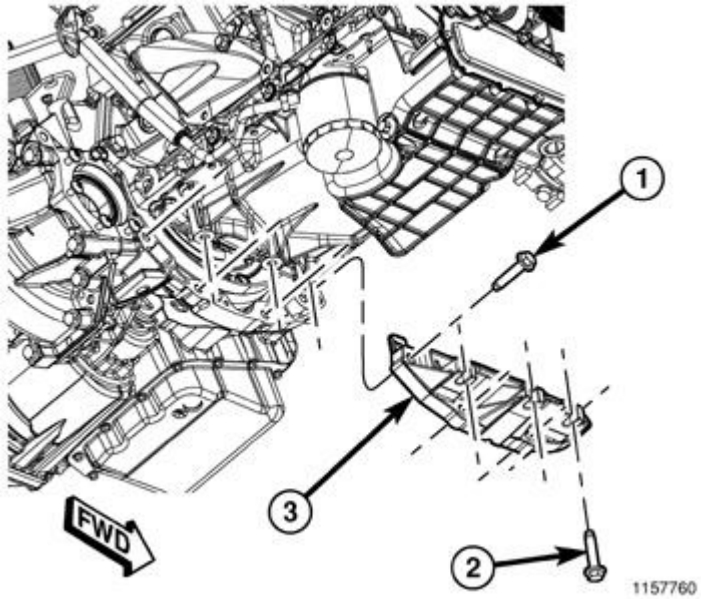

Fig. 174: Structural Collar
Courtesy of CHRYSLER LLC

4. Remove three bolts (2) attaching the structural collar (3) to the oil pan.
5. Remove four bolts (1) and the structural collar (3) from the transmission.

Installation

INSTALLATION

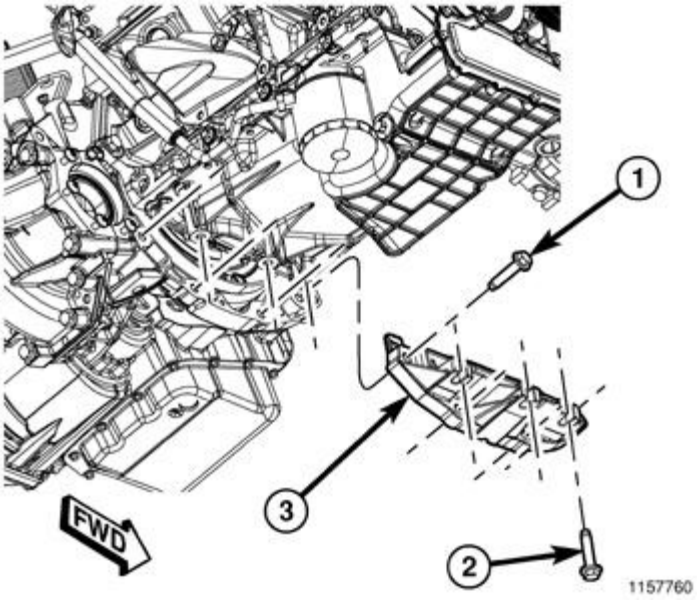

Fig. 175: Structural Collar
Courtesy of CHRYSLER LLC

CAUTION: The collar must be tightened using this service procedure, as damage to transaxle case and/or oil pan may occur.

1. Position the structural collar (3) on the engine and transaxle.
2. Finger tighten all bolts (1) and (2).

NOTE: Make sure that structural collar (3) is flush with the oil pan and the transmission bell housing.

3. Install the vertical collar bolts (2) to the oil pan, pre-torque bolts to 1.1 N.m (10 in. lbs.).
4. Install the horizontal collar bolts (1) to the transmission and tighten to 55 N.m (40 ft. lbs.).
5. Starting with the center vertical bolts and working outward, final torque all bolts to 55 N.m (40 ft. lbs.).

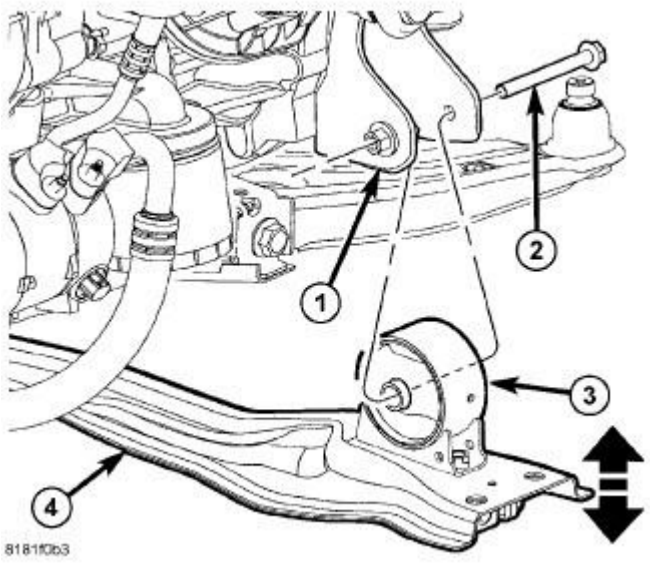

Fig. 176: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

6. Install the fore/aft crossmember (4). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .

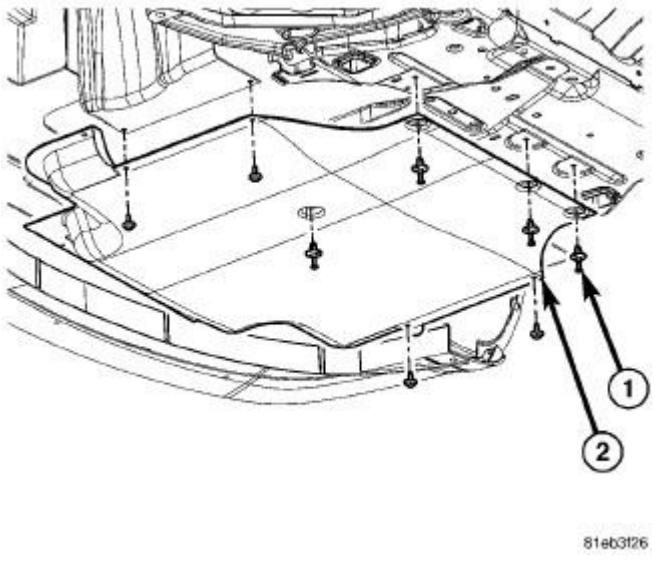

Fig. 177: Belly Pan
Courtesy of CHRYSLER LLC

7. Install the belly pan (2), if equipped.
8. Lower the vehicle.

CRANKSHAFT

Description

DESCRIPTION

The crankshaft is constructed of a forged micro alloy steel. The six throw, nine counterweight crankshaft is supported by four select fit main bearings with the number three serving as the thrust washer location. The select fit identification markings will be on the rear side of the number nine (rearmost) counterweight. The six separate connecting rod throws are an even-firing design which reduces torque fluctuations while a vibration damper is used to control torsional vibration.

The crankshaft oil seals are a one piece design. The front seal is retained by the timing chain cover, and the rear seal in a housing that attaches to the cylinder block.

Standard Procedure

CRANKSHAFT END PLAY

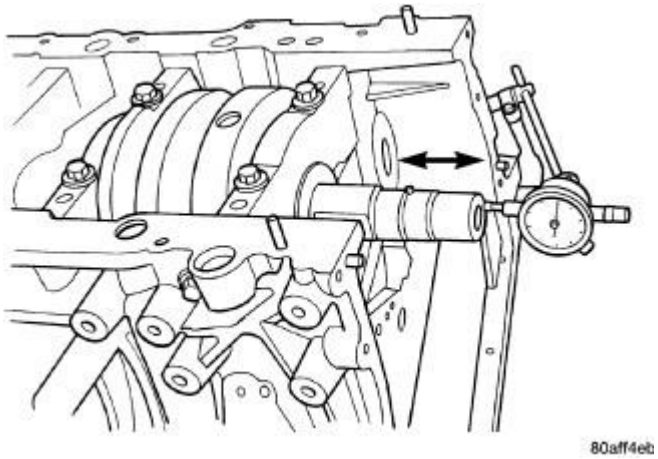

Fig. 178: CHECKING CRANKSHAFT END PLAY
Courtesy of CHRYSLER LLC

1. Mount a dial indicator to a stationary point at front of engine. Locate the probe perpendicular against nose of crankshaft.
2. Move crankshaft all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move crankshaft all the way to the front and read the dial indicator. For crankshaft end play clearances, see **Engine - Specifications**.

Removal

REMOVAL

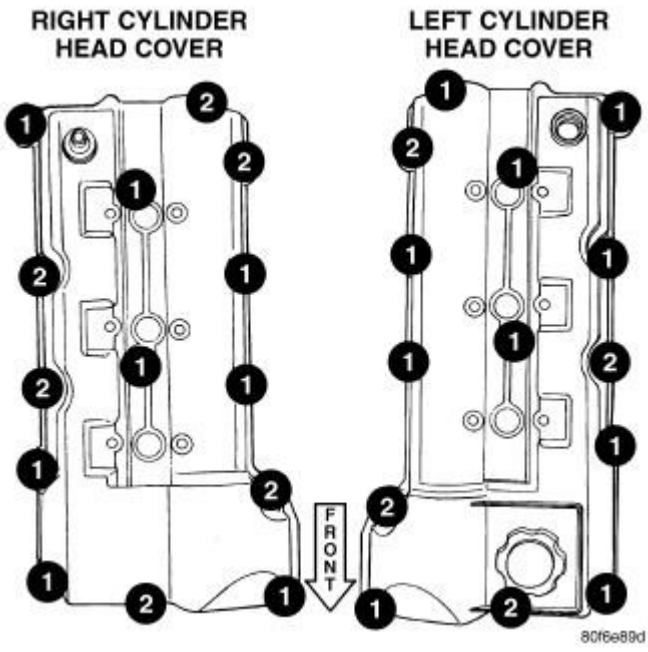

Fig. 179: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

1. Drain engine oil and remove oil filter. See **Engine/Lubrication/OIL - Standard Procedure**
2. Remove engine from vehicle. See **Engine - Removal**.
3. Mount engine on an engine stand.
4. Remove oil pan and oil pick-up tube. See **Engine/Lubrication/PAN, Oil - Removal**.
5. Remove idler pulley bracket for accessory drive belt.
6. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
7. Remove cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

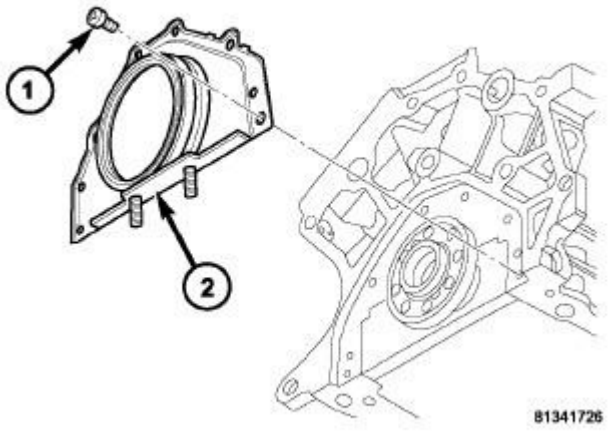

Fig. 180: Oil Seal Retainer
Courtesy of CHRYSLER LLC

8. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
9. Remove primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
10. Remove crankshaft sprocket. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
11. Remove oil pump. See **Engine/Lubrication/PUMP, Engine Oil - Removal**.
12. Remove crankshaft rear oil seal retainer (2). See **Engine/Engine Block/SEAL, Crankshaft Oil - Removal**.

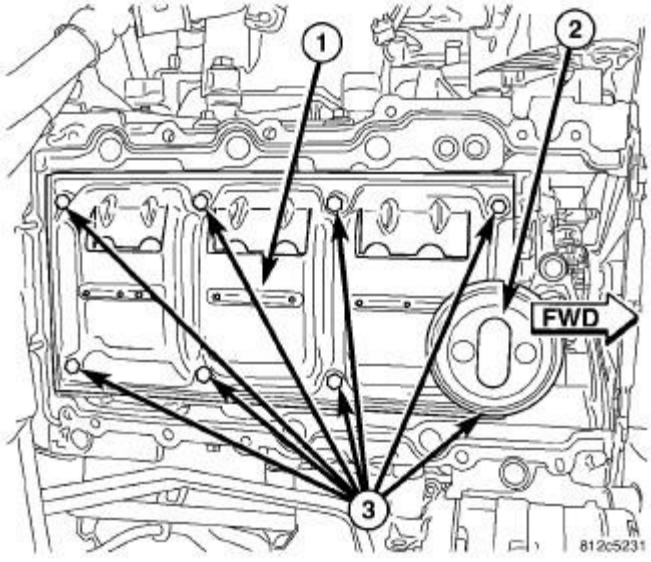

Fig. 181: Windage Tray
Courtesy of CHRYSLER LLC

13. Remove windage tray (1).

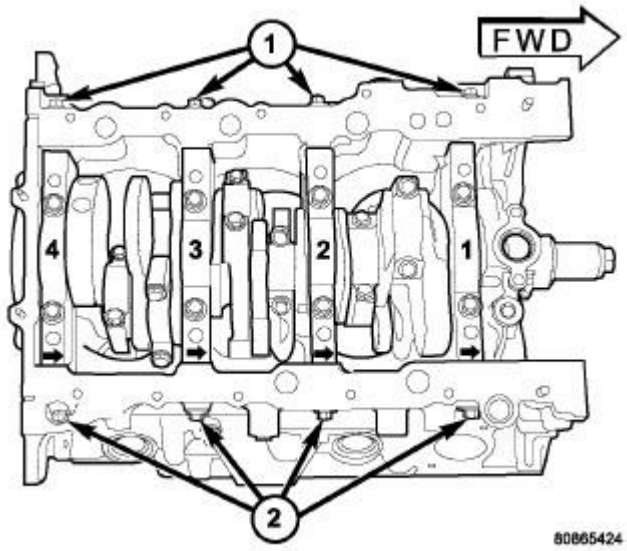

Fig. 182: Main Bearing Cap Identification
Courtesy of CHRYSLER LLC

14. Turn crankshaft until connecting rod cap to be removed is accessible.

NOTE: Connecting rod bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods. Damage to connecting rod could occur.

15. Mark connecting rod bearing cap positions using a permanent ink marker or scribe tool. Also scribe a location reference mark from the #3 main bearing cap to the engine block to use as a guide during reassembly.
16. Remove connecting rod bearing caps. Use care to prevent damage to the crankshaft bearing surfaces.

CAUTION: Care should be taken not to damage the fractured rod and cap joint face surfaces or damage to the engine may occur.

17. Remove main bearing tie bolts (1) and (2).

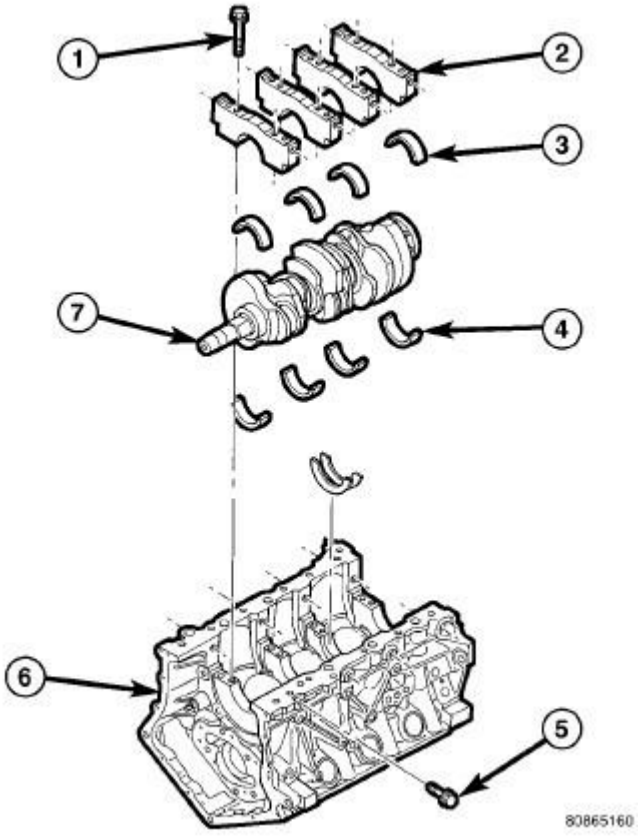

Fig. 183: Cylinder Block & Crankshaft
Courtesy of CHRYSLER LLC

18. Remove main bearing cap bolts (1) and main bearing caps (2).

CAUTION: When removing crankshaft, use care not to damage bearing surfaces on the crankshaft.

19. Remove crankshaft (7) from cylinder block (6).

Installation

INSTALLATION

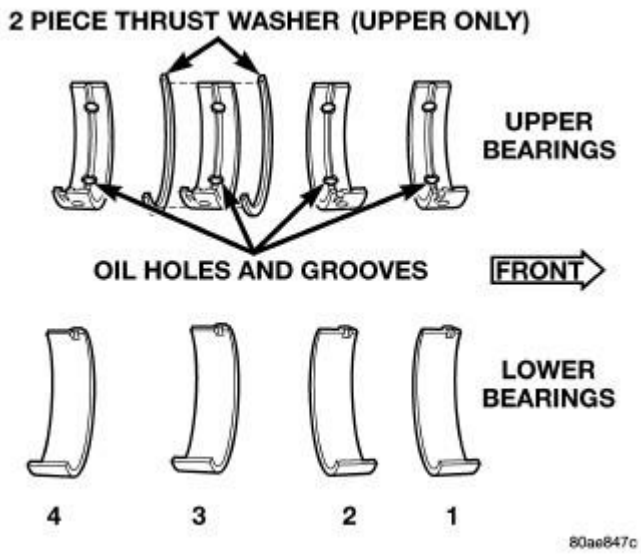

Fig. 184: Main Bearing Identification
Courtesy of CHRYSLER LLC

NOTE: Upper and lower bearing halves are NOT interchangeable.

CAUTION: Main bearings are select fit. See Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure.

1. Install crankshaft upper main bearings in cylinder block. Ensure the tangs engage the slots in the block and oil holes in bearings line up with oil holes in cylinder block. See **Engine/Engine Block/BEARING (S), Crankshaft - Standard Procedure**.
2. Lubricate upper main bearing halves with engine oil.

CAUTION: When installing crankshaft, use care not to damage bearing surfaces on the crankshaft.

3. Install crankshaft.

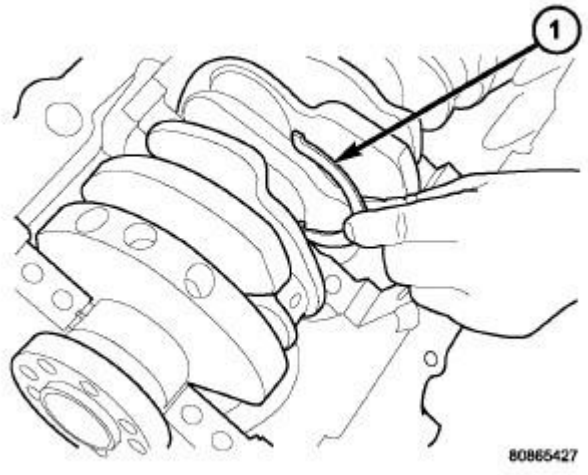

Fig. 185: Thrust Washer - Installation
Courtesy of CHRYSLER LLC

NOTE: Make sure that the coated and oil groove side of crankshaft thrust washer faces the crankshaft thrust surface.

4. Push crankshaft forward. Lubricate and install the front thrust washer (1) by rolling the thrust washer onto the machined shelf between the No. 3 upper main bulk head and crankshaft thrust surface.
5. Move crankshaft rearward. Lubricate and install the rear thrust washer by rolling the thrust washer onto the machined shelf between the No. 3 upper main bulk head and crankshaft thrust surface.

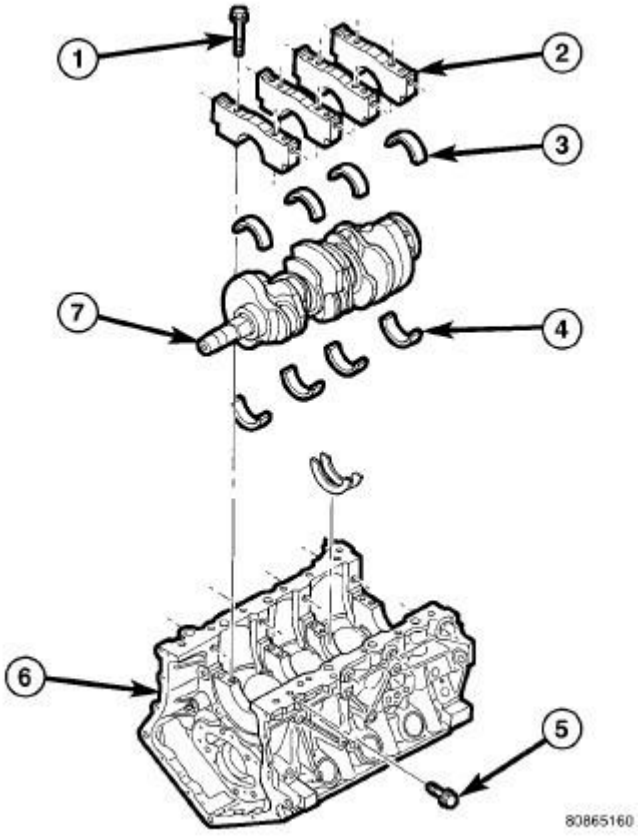

Fig. 186: Cylinder Block & Crankshaft
Courtesy of CHRYSLER LLC

6. Install lower main bearings (3) into main bearing caps (2).
7. Lubricate lower main bearings (3) with clean engine oil.

NOTE: Lubricate main bearing cap bolts with engine oil before installation.

8. Install each main cap (2) and tighten inner bolts (1) finger tight. Align the location reference mark scribed on the #3 main bearing cap during disassembly.

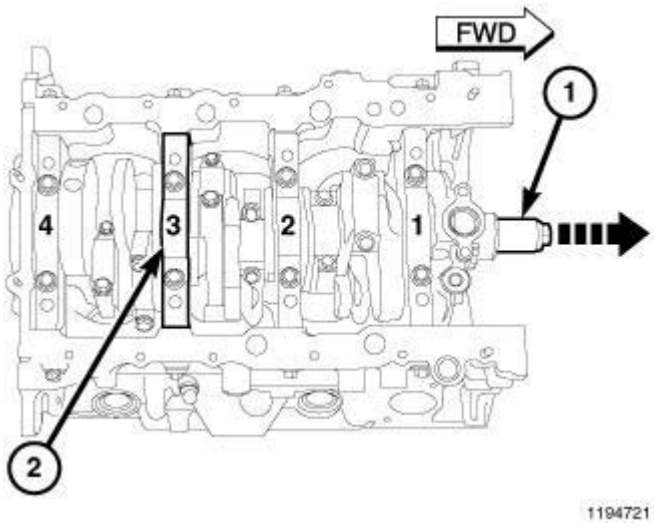

Fig. 187: Moving Crankshaft Forward So Crankshaft Face Is Tight Against Thrust Bearing
Courtesy of CHRYSLER LLC

CAUTION: The #3 main bearing cap must be centered over the inner bolt holes located on the block. Failure to center the bearing cap can result in contact with the crankshaft counterweights and thrust bearing failure.

9. Verify that the #3 main bearing cap is properly centered over the inner bolt holes located in the block:
   a. Tighten main bearing cap inner bolts to 20 N.m (15 ft. lbs.).
   b. Move crankshaft (1) forward to limit of travel so that crankshaft thrust face (2) is tight against thrust bearing.

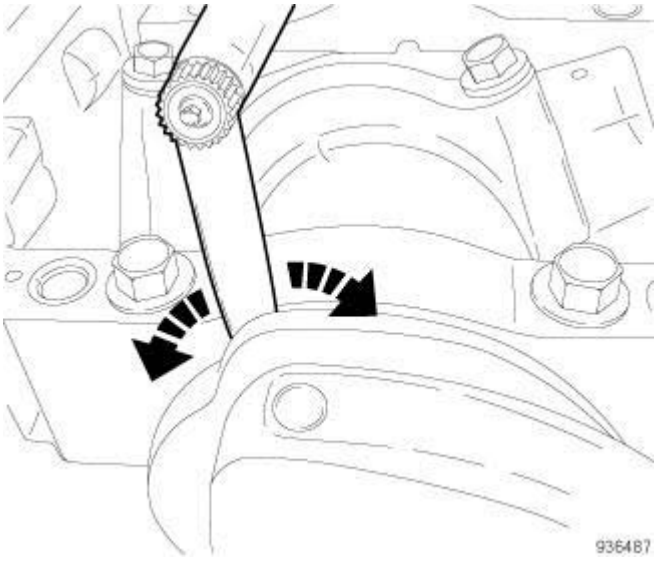

Fig. 188: Sliding Feeler Gauge Side-To-Side Across Bearing Cap
Courtesy of CHRYSLER LLC

c. Verify that a 0.25 mm (0.010 inch) shim or feeler gage will fit between the #3 main cap (rear face) and the crankshaft thrust face. Slide the gage side-to-side all of the way across the cap making sure that the clearance at all areas exceeds 0.25 mm (0.010 inch). The feeler gage should slide all the way down to the #3 main journal.

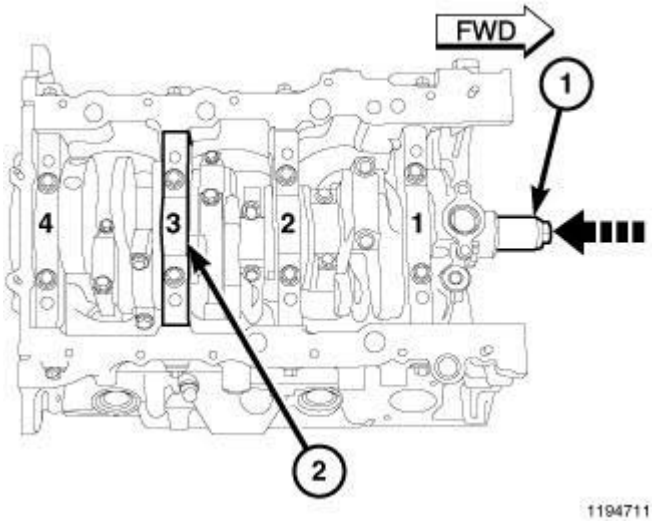

Fig. 189: Moving Crankshaft Rearward So Crankshaft Face Is Tight Against Thrust Bearing
Courtesy of CHRYSLER LLC

d. Move crankshaft (1) rearward to limit of travel so that crankshaft thrust face (2) is tight against thrust bearing.
e. Verify that a 0.25 mm (0.010 inch) shim or feeler gage will fit between the #3 main cap (front face) and the crankshaft thrust face. Slide the gage side-to-side all of the way across the cap making sure that the clearance at all areas exceeds 0.25 mm (0.010 inch). The feeler gage should slide all the way down to the #3 main journal.
f. A properly centered #3 main bearing cap has a minimum of 0.25 mm (0.010 inch) clearance in both the forward and rearward crankshaft positions. If measured clearance is less than 0.25 mm (0.010 inch), loosen and reposition #3 main bearing cap until this minimum clearance can be verified by repeating this procedure.

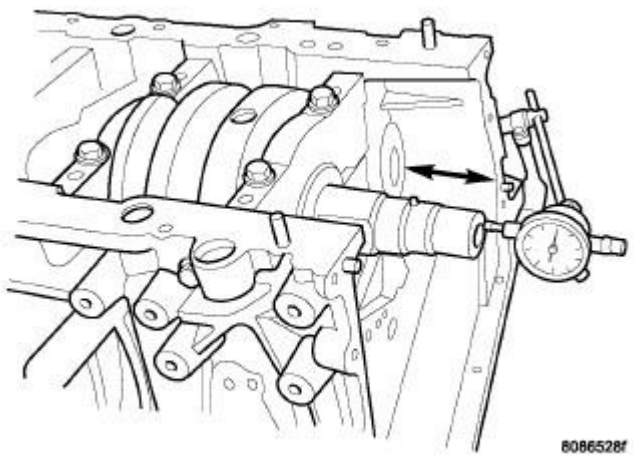

Fig. 190: CHECKING CRANKSHAFT END PLAY
Courtesy of CHRYSLER LLC

10. Following verification of proper #3 bearing cap centering, finish tightening the main bearing cap inner bolts an additional 90° turn.
11. Measure crankshaft end play. See **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

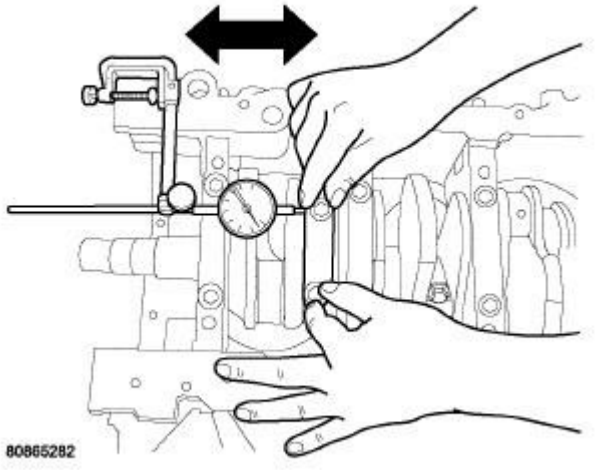

Fig. 191: Measuring Connecting Rod Side Clearance
Courtesy of CHRYSLER LLC

12. Install connecting rods and measure side clearance. See **Engine/Engine Block/BEARING(S), Connecting Rod - Standard Procedure**.

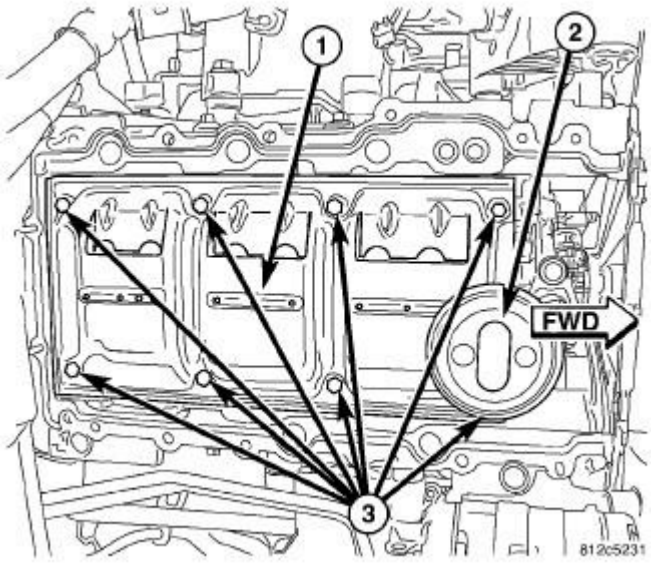

Fig. 192: Windage Tray
Courtesy of CHRYSLER LLC

NOTE: The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, and lastly the main cap tie (horizontal) bolts.

13. Install windage tray (1) with the slots to right side of engine. Lubricate bolts (3) with engine oil and tighten to 27 N.m + 90° Turn (20 ft. lbs. + 90° turn).

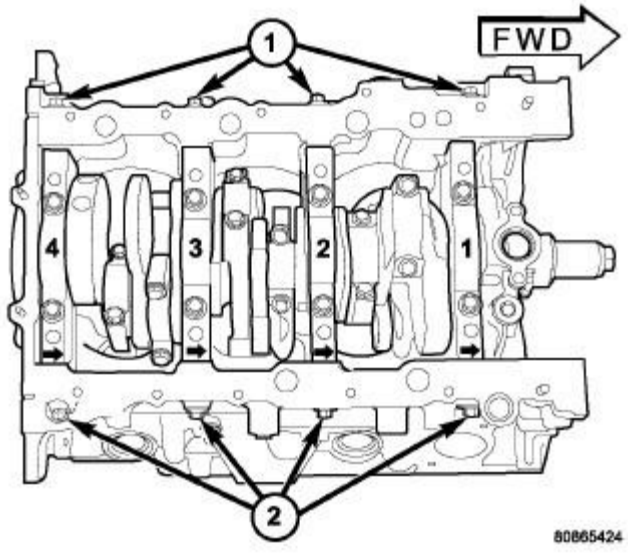

Fig. 193: Main Bearing Cap Identification
Courtesy of CHRYSLER LLC

14. Install the main cap tie (horizontal) bolts (1) and (2) and tighten to 28 N.m (250 in. lbs.).
15. Install rear crankshaft oil seal retainer and oil seal assembly. Refer to **Engine/Engine Block/RETAINER, Crankshaft Rear Oil Seal - Installation** .

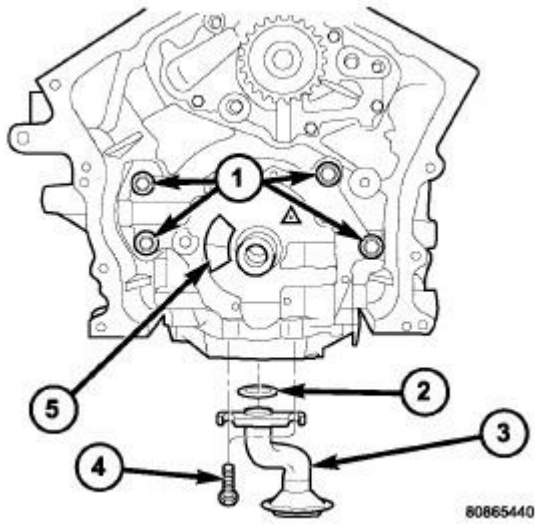

Fig. 194: Oil Pump & Pick-up Tube
Courtesy of CHRYSLER LLC

16. Install oil pump assembly (5). See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
17. Install oil pick-up tube (3) and O-ring (2). Tighten bolts (4) to 28 N.m (250 in. lbs.).
18. Install oil pan gasket, oil pan, and oil filter. See **Engine/Lubrication/PAN, Oil - Installation**.
19. Install crankshaft sprocket. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
20. Install timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
21. Install timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

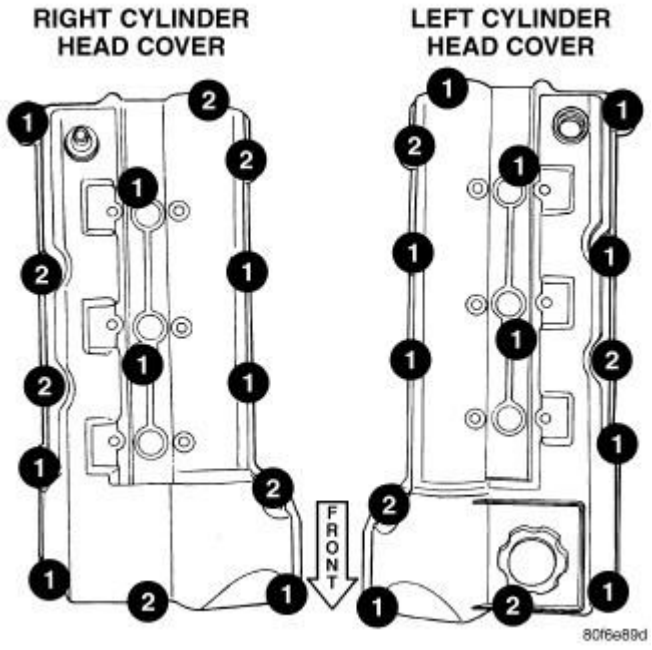

Fig. 195: Cylinder Head Cover Fasteners
Courtesy of CHRYSLER LLC

22. Install cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
23. Install oil dipstick tube.
24. Install engine assembly. See **Engine - Installation**.
25. Fill engine crankcase with proper oil to correct level. See **Engine/Lubrication/OIL - Standard Procedure**.
26. Fill with coolant. Refer to **Cooling - Standard Procedure** .
27. Start engine and check for leaks.

DAMPER, VIBRATION

Removal

REMOVAL

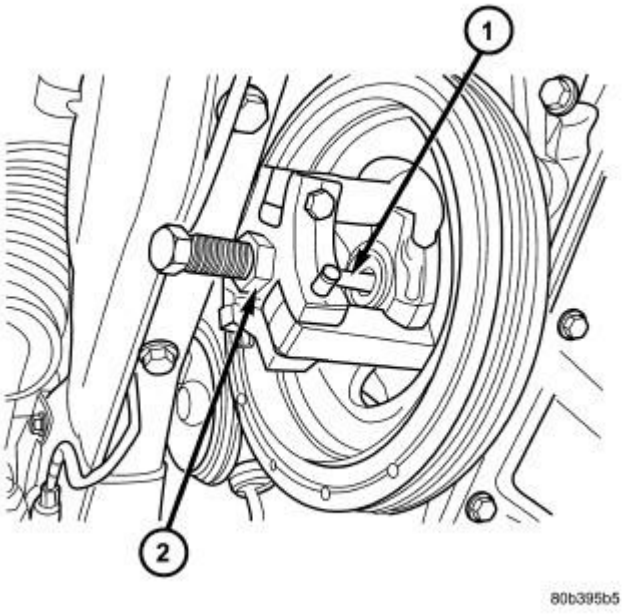

Fig. 196: Vibration Damper - Removal
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8454 PULLER 2 - SPECIAL TOOL 8194 INSERT

1. Disconnect negative battery cable.
2. Remove right front wheel and belt splash shield.
3. Remove accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
4. Remove damper bolt.
5. Remove damper by using Special Tools 8194 Insert and 8454 Puller (1).

Installation

INSTALLATION

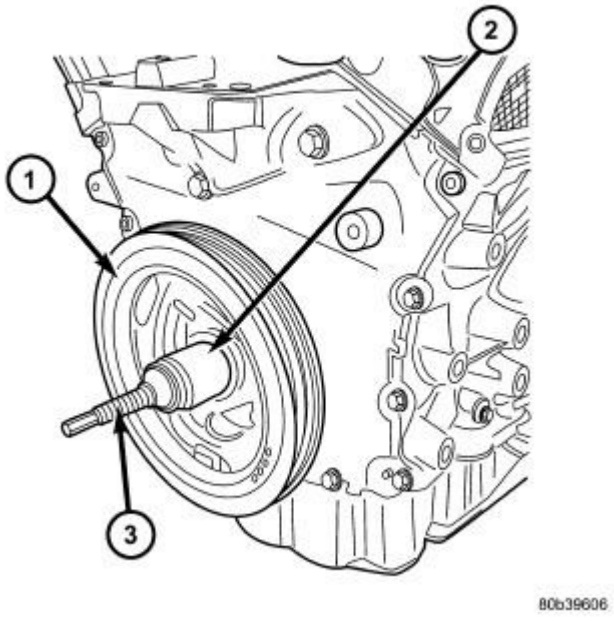

Fig. 197: Vibration Damper - Installation
Courtesy of CHRYSLER LLC

1 - VIBRATION DAMPER 2 - SPECIAL TOOL 6792-1 3 - SPECIAL TOOL 8179

1. Install damper using Special Tools 8179 (3) Screw, with Nut and Thrust Bearing from 6792, and 6792-1 Installer (2).
2. Install damper center bolt. Tighten center bolt to 170 N.m (125 ft. lbs.).
3. Install accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
4. Install belt splash shield and right front wheel.
5. Lower vehicle.
6. Connect negative battery cable.

FLEXPLATE

Removal

REMOVAL

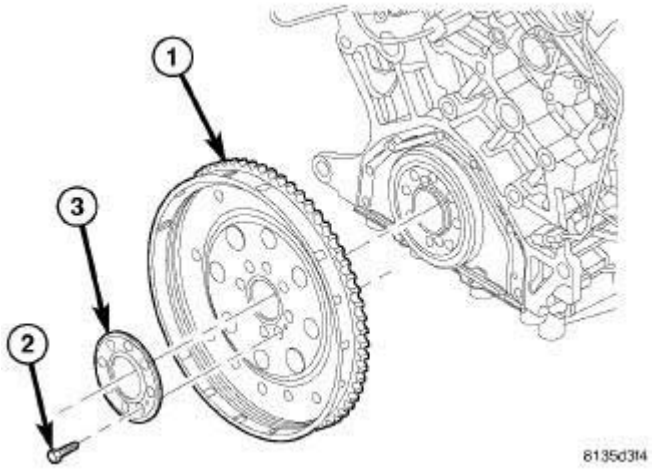

Fig. 198: Flex Plate
Courtesy of CHRYSLER LLC

1. Remove transmission.
2. Remove flex plate attaching bolts (2).
3. Remove backing plate (3) and flex plate (1).

Installation

INSTALLATION

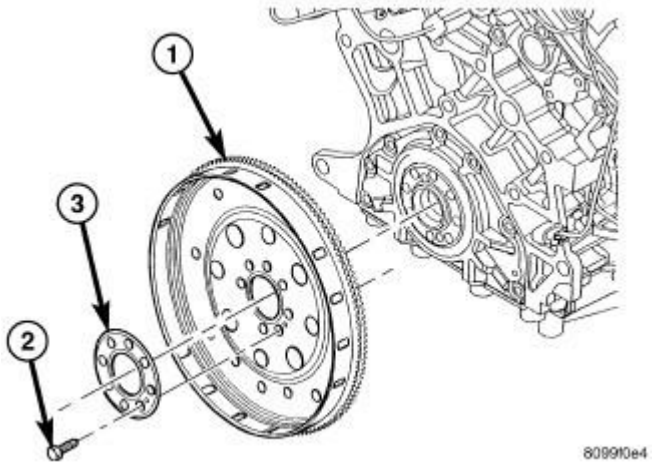

Fig. 199: FLEX PLATE
Courtesy of CHRYSLER LLC

1. Position the flex plate (1) with backing plate (3) on the crankshaft.
2. Apply Mopar® Lock AND Seal Adhesive to the eight flex plate bolts (2).
3. Install the flex plate bolts (2). Tighten the bolts to 95 N.m (70 ft. lbs.).
4. Install the transaxle. Refer to **Transmission and Transfer Case/Automatic - 62TE - Installation**

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

RING(S), PISTON

Standard Procedure

PISTON RING FITTING

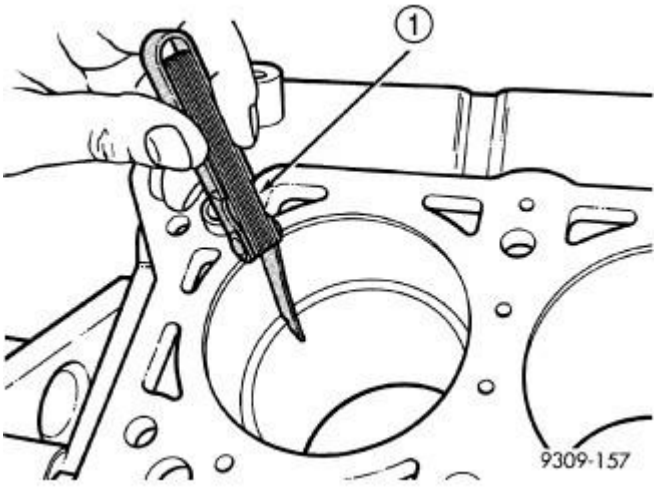

Fig. 200: CHECK GAP ON PISTON RINGS
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE

1. Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 12 mm (0.50 inch.) from bottom of cylinder bore. Check gap with feeler gauge (1). Refer to **Engine - Specifications** for clearance measurements.

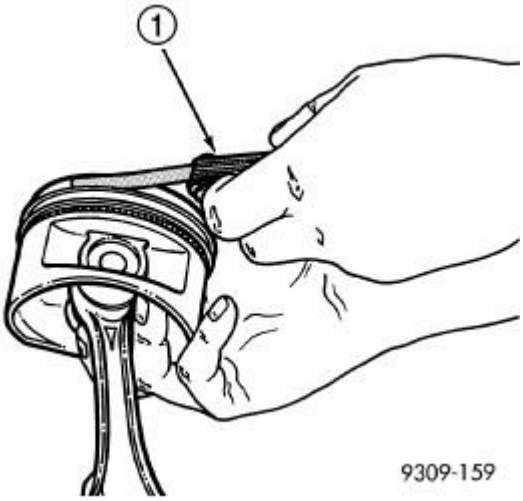

Fig. 201: Measuring Piston Ring Side Clearance
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE

2. Check piston ring to groove clearance (1). For clearance specifications, see **Engine - Specifications**.

Removal

REMOVAL

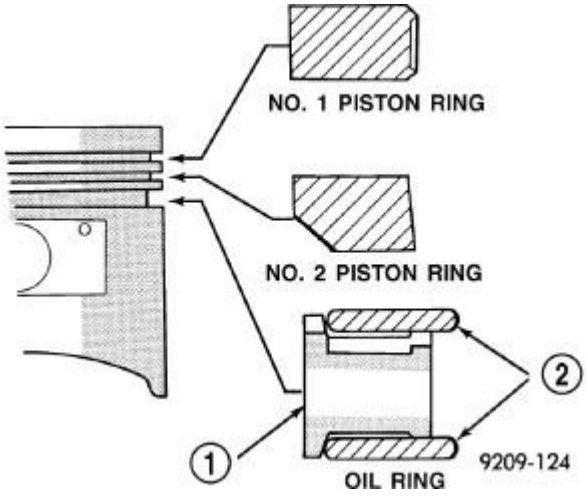

Fig. 202: PISTON RING - INSTALLATION
Courtesy of CHRYSLER LLC

1 - SPACER EXPANDER 2 - SIDE RAIL

1. Remove piston and connecting rod. See **Engine/Engine Block/ROD, Piston and Connecting - Removal**

2. Remove No. 1 and No. 2 piston rings from piston using a ring expander tool.
3. Remove upper oil ring side rail.
4. Remove lower oil ring side rail.
5. Remove oil ring expander.

Installation

INSTALLATION

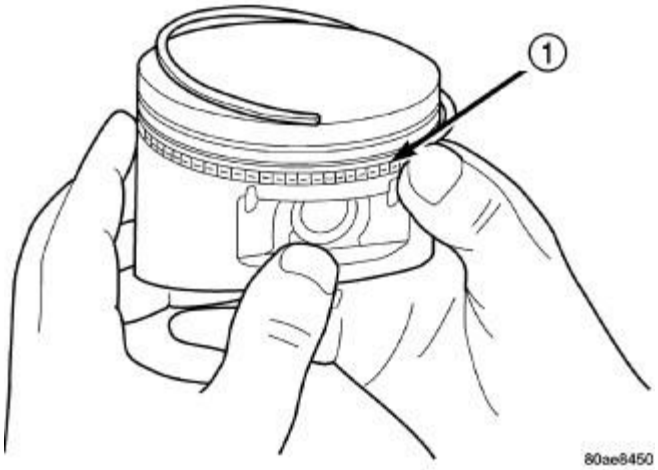

Fig. 203: SIDE RAIL - INSTALLATION
Courtesy of CHRYSLER LLC

1 - SIDE RAIL END

1. Measure clearance of piston rings to the cylinder bore and piston. See **Engine/Engine Block/RING(S), Piston - Standard Procedure**.

CAUTION: Install piston rings in the following order:

- Oil ring expander.
- Upper oil ring side rail.
- Lower oil ring side rail.
- No. 2 Intermediate piston ring.
- No. 1 Upper piston ring.

2. Install oil ring expander.

   Install the side rail (1) by placing one end between the piston ring groove and the oil ring expander. Hold end firmly and press down the portion to be installed until side rail is in position. **Do not use a piston ring expander during this step.**

3. Install upper side rail first and then the lower side rail.

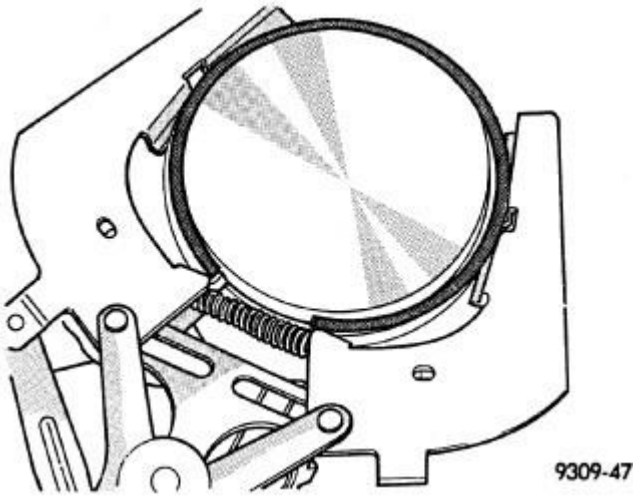

Fig. 204: Upper and Intermediate Rings - Installation
Courtesy of CHRYSLER LLC

NOTE: The No. 1 and No. 2 piston rings have a different cross section. Ensure No. 2 ring is installed with manufacturers I.D. mark (dot) facing up, towards top of the piston.

4. Install No. 2 piston ring and then No. 1 piston ring.

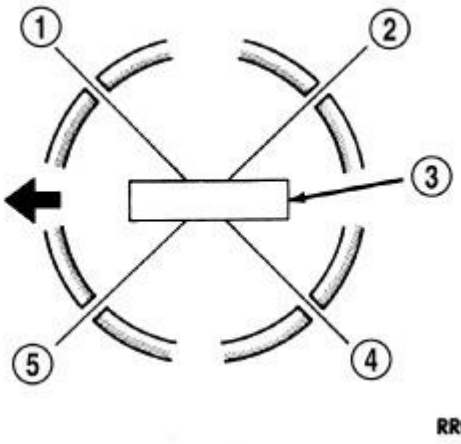

Fig. 205: PISTON RING END GAP POSITION
Courtesy of CHRYSLER LLC

1 - SIDE RAIL UPPER
2 - NO. 1 RING GAP
3 - PISTON PIN
4 - SIDE RAIL LOWER

5 - NO. 2 RING GAP AND SPACER EXPANDER GAP

5. Position piston ring end gaps as shown in illustration.
6. Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

ROD, PISTON AND CONNECTING

Description

DESCRIPTION

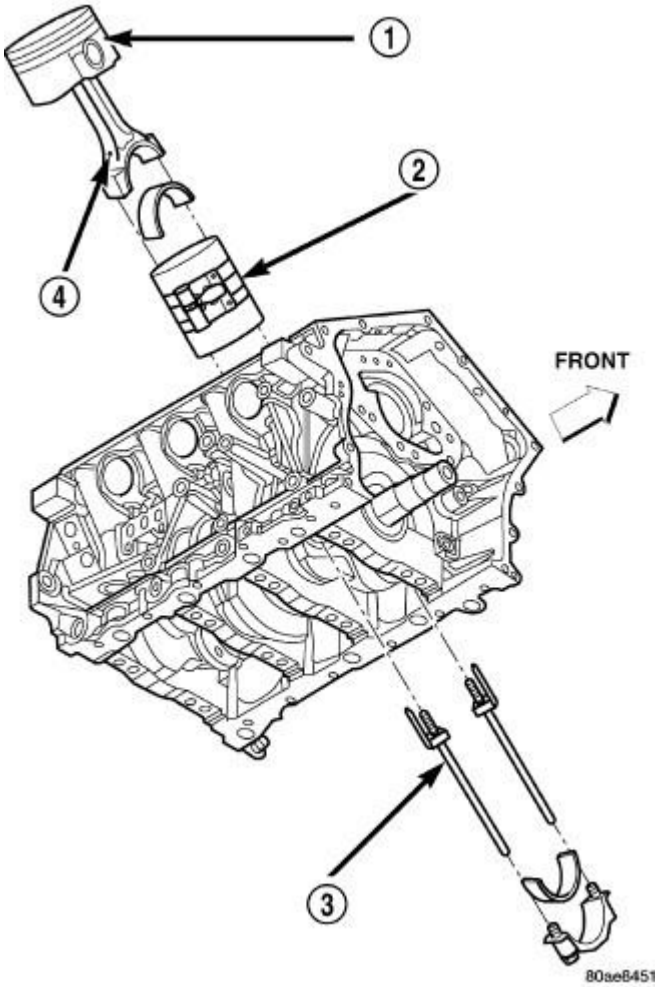

Fig. 206: Piston & Connecting Rod
Courtesy of CHRYSLER LLC

1 - "F" TOWARD FRONT OF ENGINE
2 - RING COMPRESSOR
3 - SPECIAL TOOL 8189

4 - OIL SQUIRT HOLE

The pistons (1) are made of a high strength aluminum alloy with an anodized top ring groove. Piston skirts are coated with a solid lubricant for scuff resistance. The connecting rods are made of powdered metal with a "fractured cap" design. The connecting rod attaches to the piston with a full floating pin retained by lock rings. The piston and connecting rod are serviced as an assembly.

Standard Procedure

FITTING PISTONS

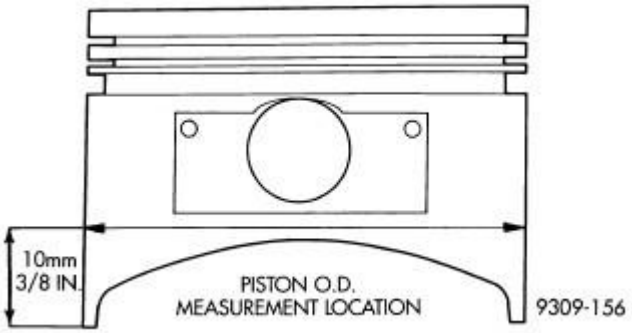

Fig. 207: Piston Measurements
Courtesy of CHRYSLER LLC

The pistons have been cast and machined to one size and weight. The piston and rod assemblies are matched to weigh the same for engine balance.

Piston and cylinder wall must be clean and dry. Piston diameter should be measured 90 degrees to piston pin. Cylinder bores should be measured halfway down the cylinder bore and transverse to the engine crankshaft center line. Refer to **Engine - Specifications**. Pistons and cylinder bores should be measured at normal room temperature, 70°F (21°C).

PISTON PINS

The pistons have been cast and machined to one size and weight. The piston and rod assemblies are matched to weigh the same for engine balance.

The piston pin is full floating and is held in place by lock rings. **Do Not switch pistons with other rods** . Pistons and connecting rods are serviced as an assembly for balance.

Removal

REMOVAL

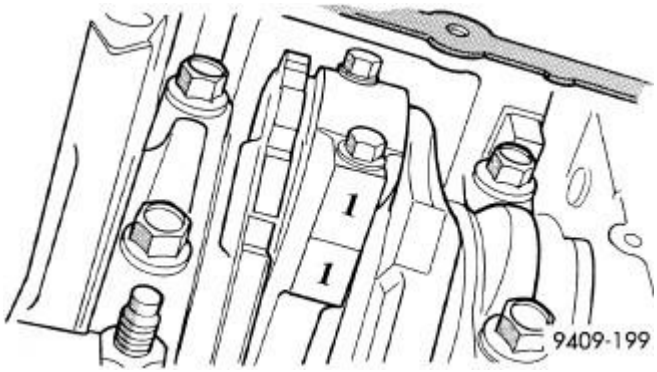

Fig. 208: Identify Connecting Rod to Cylinder
Courtesy of CHRYSLER LLC

1. Remove top ridge of cylinder bores with a reliable ridge reamer before removing pistons from cylinder block. **Be sure to keep tops of pistons covered during this operation. Pistons and connecting rods must be removed from top of cylinder block. When removing piston and connecting rod assemblies from the engine, rotate crankshaft so that each connecting rod is centered in cylinder bore.**

NOTE: Connecting rod bearing caps are not interchangeable and should be marked before removing to ensure correct reassembly.

CAUTION: DO NOT use a number stamp or a punch to mark connecting rods. Damage to connecting rod could occur.

2. Mark connecting rod and bearing cap positions using a permanent ink marker or scribe tool.

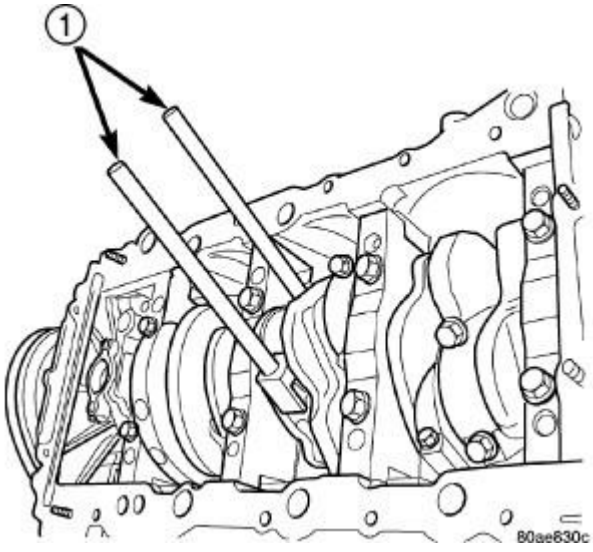

Fig. 209: Connecting Rod Guides
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8189 CONNECTING ROD GUIDES

CAUTION: Care must be taken not to damage the fractured rod and cap joint face surfaces, as engine damage may occur.

3. Remove connecting rod cap. Install Special Tool 8189 Connecting Rod Guides into the connecting rod being removed. Remove each piston and rod assembly out of cylinder bore.

NOTE: Be careful not to nick crankshaft journals.

4. After removal, install bearing cap on the mating rod to prevent damage to the fractured cap to rod surfaces.

Installation

INSTALLATION

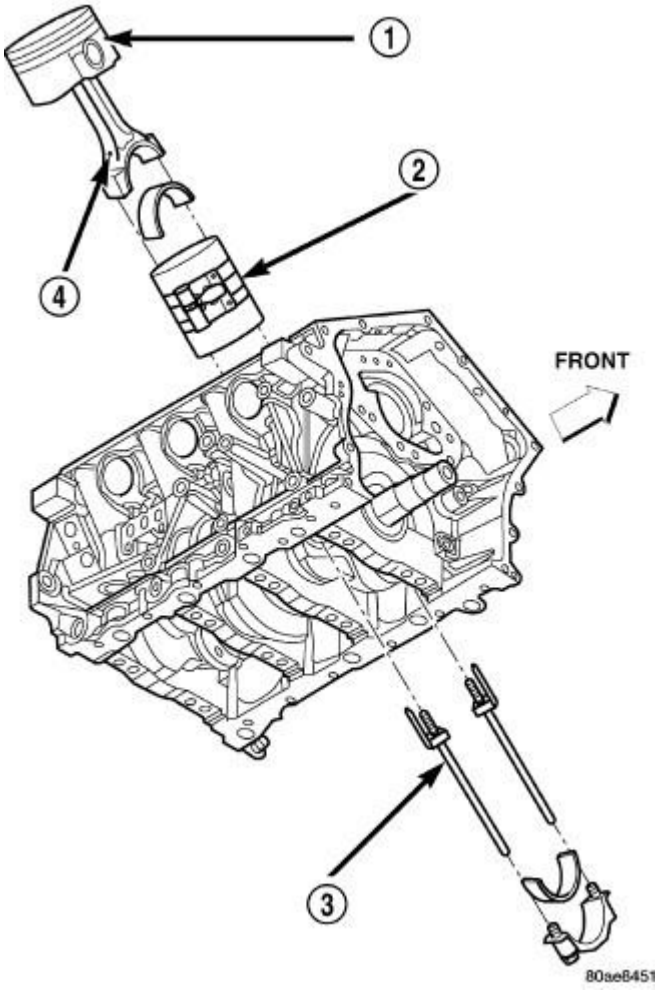

Fig. 210: Piston & Connecting Rod
Courtesy of CHRYSLER LLC

1 - "F" TOWARD FRONT OF ENGINE
2 - RING COMPRESSOR
3 - SPECIAL TOOL 8189
4 - OIL SQUIRT HOLE

1. Install the piston rings. See **Engine/Engine Block/RING(S), Piston - Installation**.
2. Before installing piston and connecting rod assemblies into the bore, ensure that compression ring gaps are staggered so that neither is in line with oil ring rail gap.
3. Before installing the ring compressor, make sure the oil ring expander ends are butted and the rail gaps are located properly.
4. Immerse the piston head and rings in clean engine oil, slide the ring compressor over the piston and tighten with the special wrench. **Ensure position of rings does not change during this operation.**

CAUTION: Ensure the hole in bearing half aligns with hole in connecting rod, as damage to engine may occur.

5. Position bearing onto connecting rod. Ensure that hole in bearing half is aligned to hole in connecting rod. Lubricate bearing surface with clean engine oil.
6. Install Special Tools 8189 Connecting Rod Guides into connecting rod.

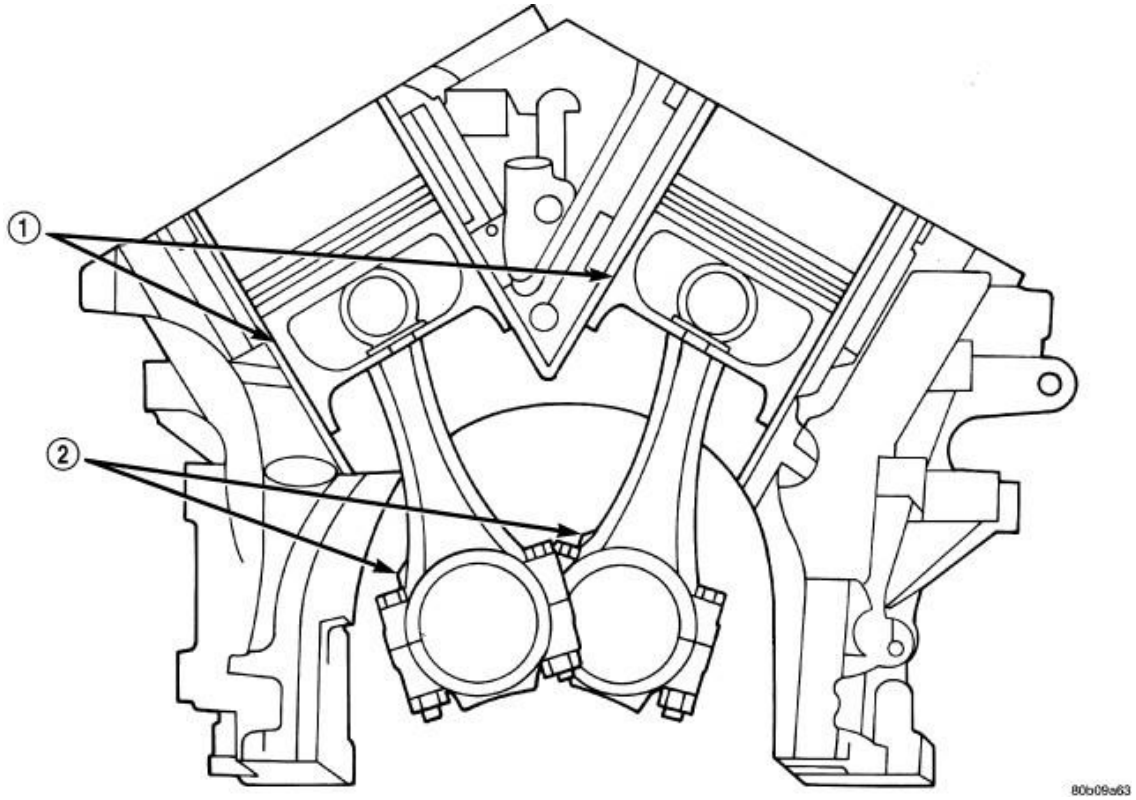

Fig. 211: Piston & Connecting Rod Positioning (Front View of Engine)
Courtesy of CHRYSLER LLC

1 - MAJOR THRUST SIDE OF PISTON 2 - OIL SQUIRT HOLE

7. The pistons are marked on top with an arrow and with an "F" (Front) above the pin boss. These marks must be pointing toward the front of engine on both cylinder banks. The connecting rod oil squirt hole (2) faces the major thrust (right) side of the block.
8. Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and piston into cylinder bore and guide rod over the crankshaft journal.

CAUTION: Do Not interchange piston assemblies bank to bank, as engine damage may occur.

9. Tap the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.
10. Lubricate rod bolts and bearing surface with engine oil. Install connecting rod cap and bearing. Tighten bolts to 27 N.m (20 ft. lbs.) Plus 1/4 turn.

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

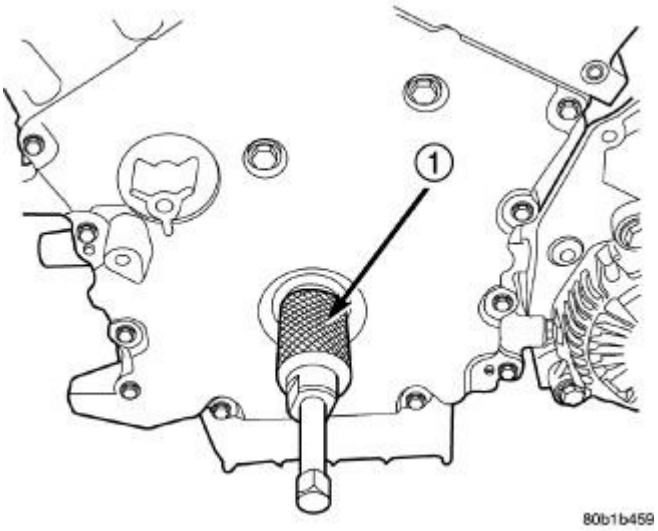

Fig. 212: Crankshaft Front Oil Seal - Removal
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 6771

1. Remove crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.
2. Install Special Tool 8194. Insert into crankshaft nose. Remove seal using Special Tool 6771. Remover

(1).

Installation

INSTALLATION

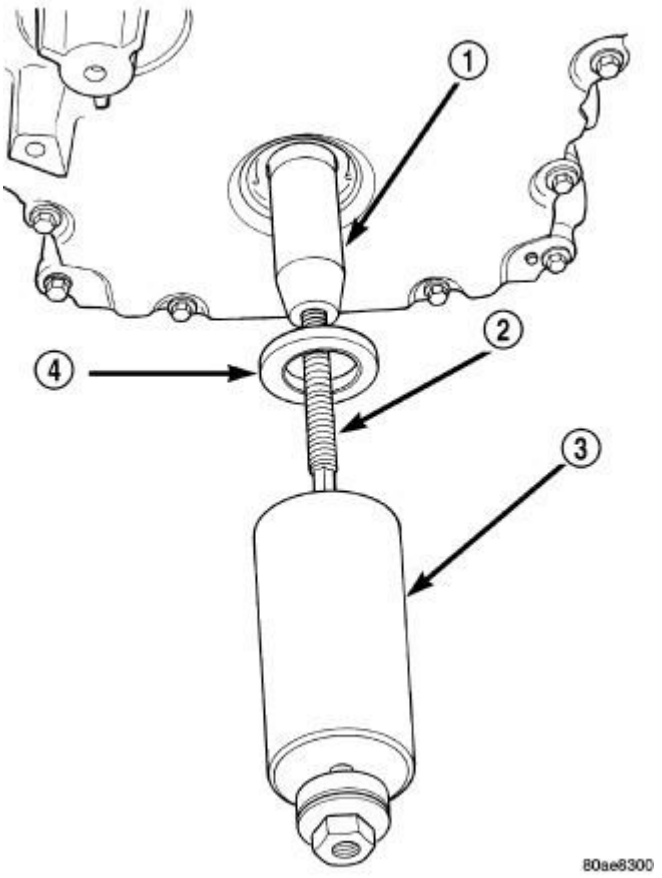

Fig. 213: Crankshaft Front Oil Seal - Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 6780-2
2 - SPECIAL TOOL 8179
3 - SPECIAL TOOL 6780-1
4 - SEAL

1. Install new seal using Special Tools 6780-2 Sleeve, 6780-1 Installer, and 8179 Stud (2).
2. Install crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.

SEAL, CRANKSHAFT OIL, REAR

Removal

REMOVAL

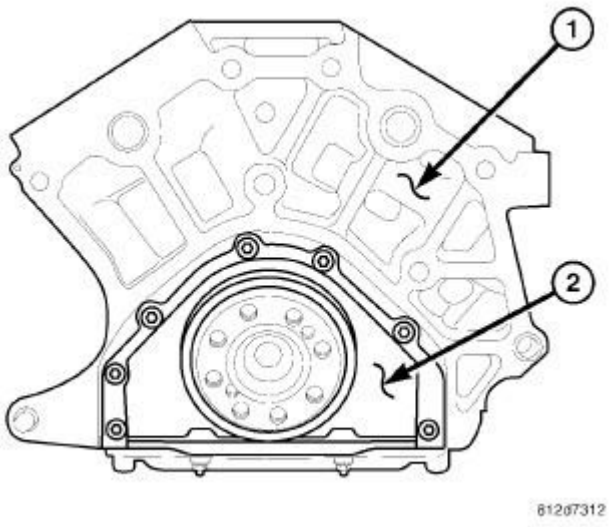

Fig. 214: REAR MAIN SEAL-INSTALLED
Courtesy of CHRYSLER LLC

The crankshaft rear oil seal is incorporated in the seal adapter (2) and can not be removed from the adapter. The crankshaft rear oil seal/seal adapter (2) are serviced as an assembly.

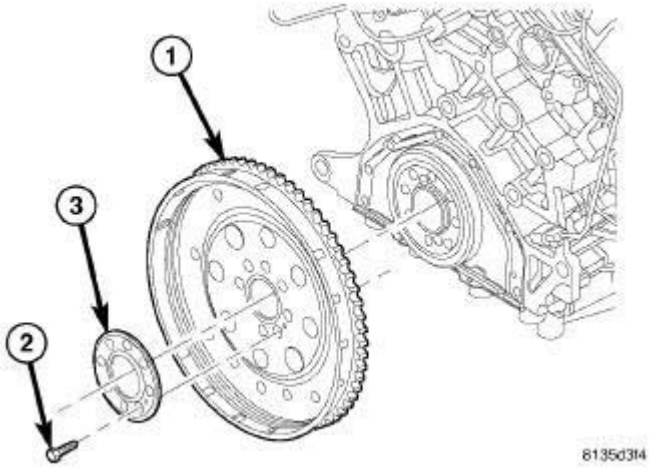

Fig. 215: Flex Plate
Courtesy of CHRYSLER LLC

1. Remove transmission. Refer to **Transmission and Transfer Case/Automatic - 41TE - Removal** .
2. Remove flex plate attaching bolts (2), backing plate (3), and flex plate (1).
3. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.

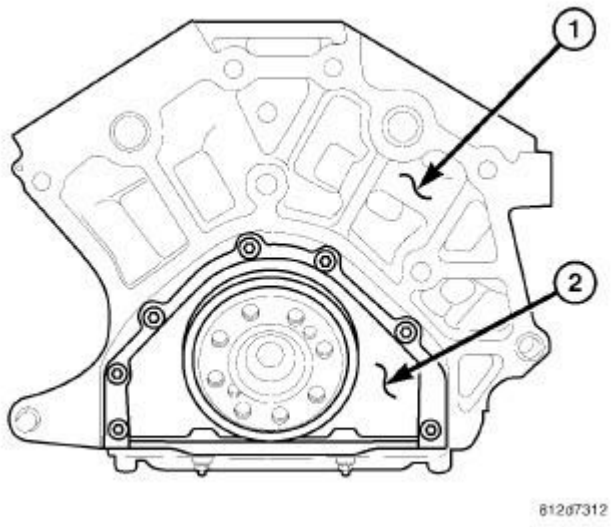

Fig. 216: REAR MAIN SEAL-INSTALLED
Courtesy of CHRYSLER LLC

4. Remove seal retainer attaching screws.
5. Remove crankshaft rear oil seal/adapter (2).

Installation

INSTALLATION

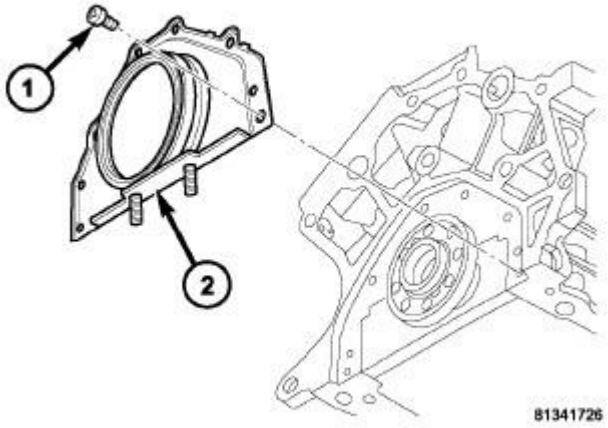

Fig. 217: Oil Seal Retainer
Courtesy of CHRYSLER LLC

NOTE: Inspect the crankshaft to make sure no nicks or burrs are on the seal surface.

1. Clean sealing surfaces thoroughly.
2. Apply engine oil to the seal lip inside diameter.

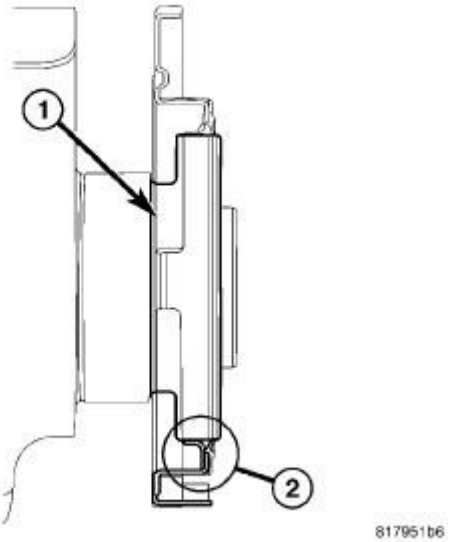

Fig. 218: REAR SEAL INSTALLED
Courtesy of CHRYSLER LLC

NOTE: The seal lip (2) on the retainer must always uniformly curl inward toward the engine on the crankshaft (1).

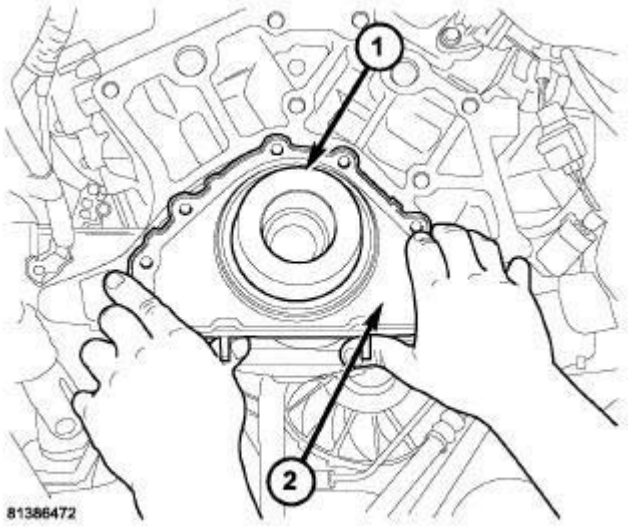

Fig. 219: REAR MAIN INSTALLATION

Courtesy of CHRYSLER LLC

3. Position the special tool 6926 (1) onto the crankshaft and gently slide the seal (2) over the crankshaft.
4. Install seal retaining bolts finger tight.

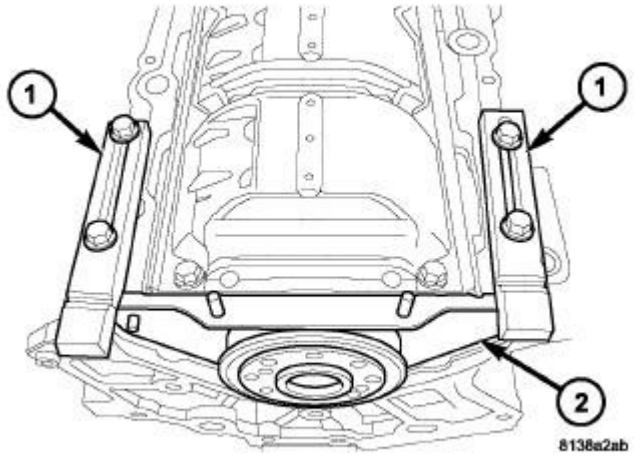

Fig. 220: REAR MAIN - SPECIAL TOOL 8225
Courtesy of CHRYSLER LLC

NOTE: The following steps must be performed to prevent oil leaks at sealing joints.

5. Attach Special Tools 8225 (1) to pan rail using the oil pan fasteners.

NOTE: Make sure that the "2.7L" stamped on the special tool is facing the cylinder block (flat side of tools against pan rail).

NOTE: Make sure that the seal flange is flush with the block oil pan sealing surface.

6. While applying firm pressure to the seal assembly (2) against Special Tools 8225 (1), tighten seal assembly screws to 12 N.m (105 in. lbs.).
7. Remove special tool 8225.
8. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

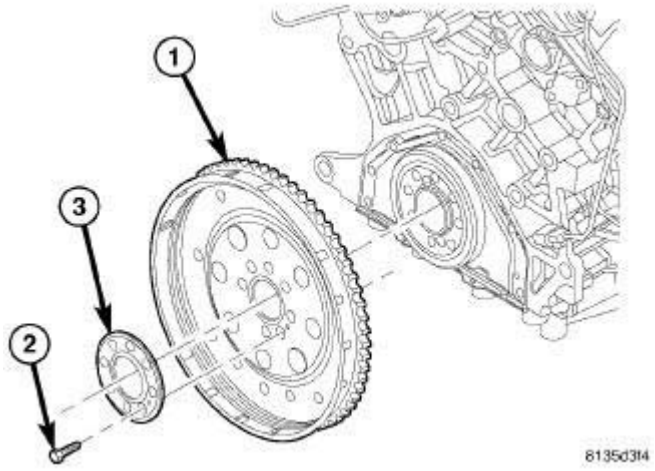

Fig. 221: Flex Plate
Courtesy of CHRYSLER LLC

9. Install flex plate (1), backing plate (3), and attaching bolts (2). See **Engine/Engine Block/FLEXPLATE - Installation**.
10. Install transmission. Refer to **Transmission and Transfer Case/Automatic - 41TE - Installation** .
11. Fill with oil (5).
12. Start engine and check for leaks.

ENGINE MOUNTING

ADJUSTMENTS

ADJUSTMENT

The right and left support assemblies are slotted to allow for right/left drive train adjustment in relation to drive shaft assembly length.

Check and reposition right and left engine support assemblies as required. Adjust drive train position, if required, for the following conditions:

- Drive shaft distress: See **FRONT SUSPENSION** , **REAR SUSPENSION** and **DIFFERENTIAL AND DRIVELINE** .
- Any front end structural damage (after repair).
- Support Assembly replacement.

ENGINE SUPPORT ADJUSTMENT

1. Remove the load on the engine motor mounts by carefully supporting the engine and transmission assembly with a floor jack.
2. Loosen the right engine support assembly vertical fasteners.

3. Loosen the left engine support assembly vertical bolts.
4. Pry the engine right or left as required to achieve the proper drive shaft assembly length. Refer to **FRONT SUSPENSION** , **REAR SUSPENSION** and **DIFFERENTIAL AND DRIVELINE** for driveshaft identification and related assembly length measuring.
5. Tighten right engine support assembly vertical bolts to 61 N.m (45 ft. lbs.). and tighten left engine support assembly bolts to 61 N.m (45 ft. lbs.).
6. Recheck drive shaft length.

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

1. Raise vehicle.

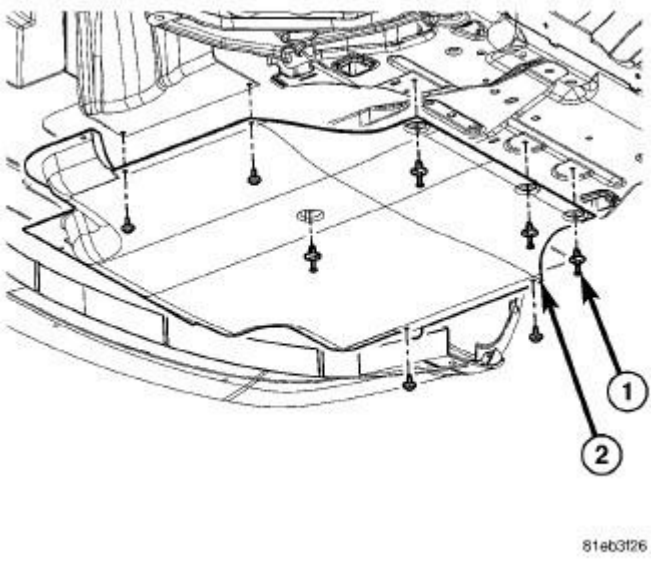

Fig. 222: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

2. Remove the belly pan (2).

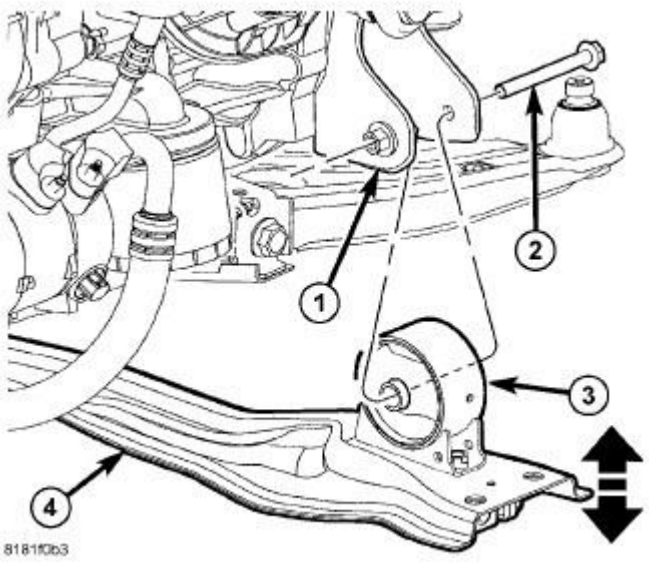

Fig. 223: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

3. Remove front mount to bracket horizontal through bolt (2).

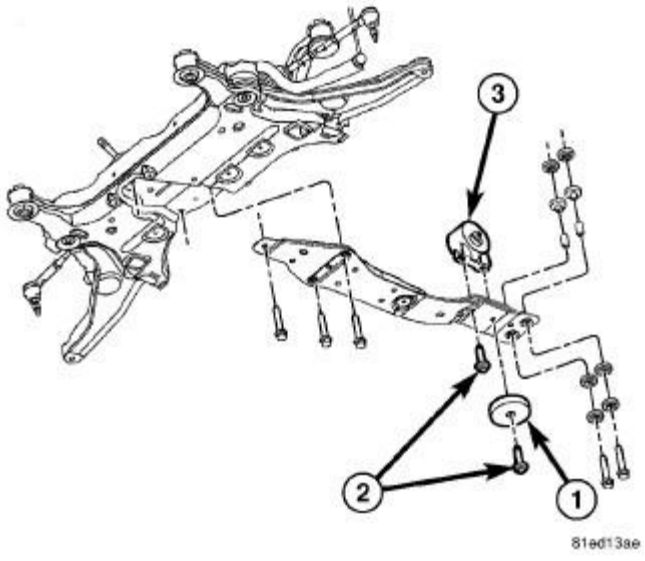

Fig. 224: Front Mount Vertical Bolts
Courtesy of CHRYSLER LLC

4. Remove front mount vertical bolts (2).
5. Remove front mount (3).

Installation

INSTALLATION

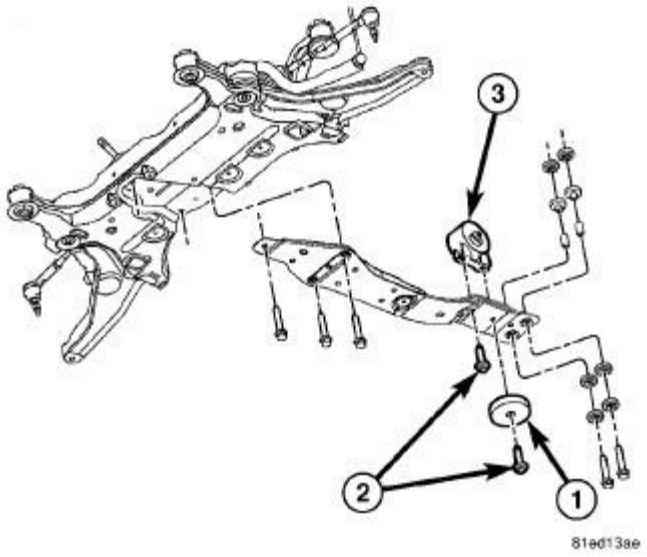

Fig. 225: Front Mount Vertical Bolts
Courtesy of CHRYSLER LLC

1. Install the front mount (3).
2. Install the front mount vertical bolts (2).

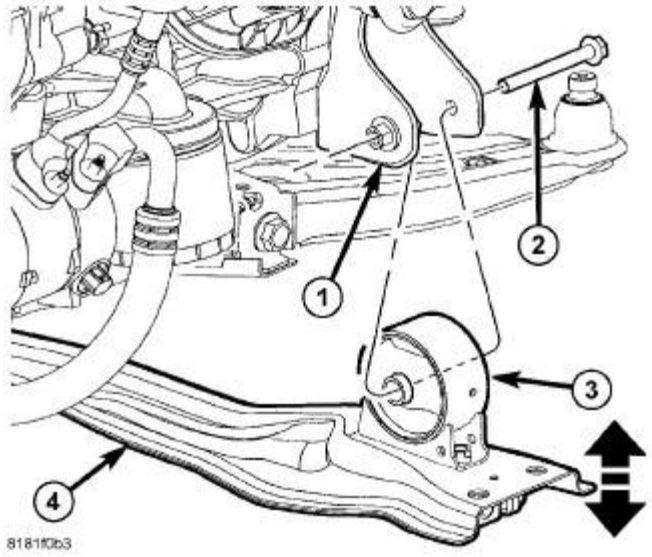

Fig. 226: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

3. Install the front mount to bracket horizontal through bolt (2).

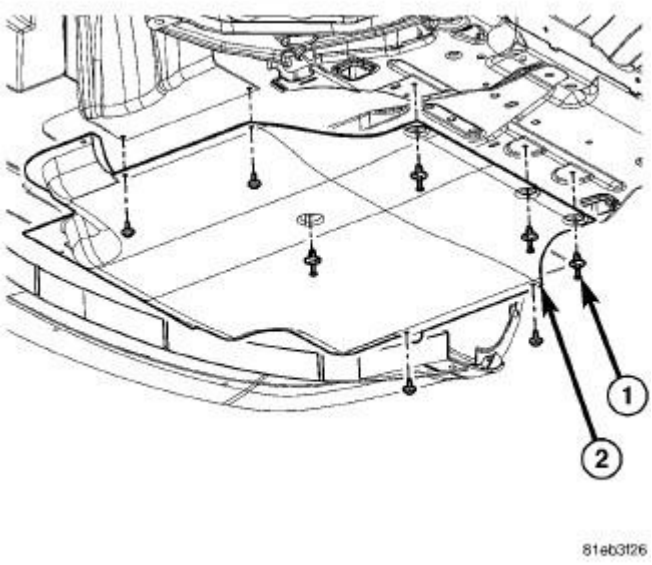

Fig. 227: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

4. Install the belly pan (2).

INSULATOR, ENGINE MOUNT, LEFT

Removal

REMOVAL

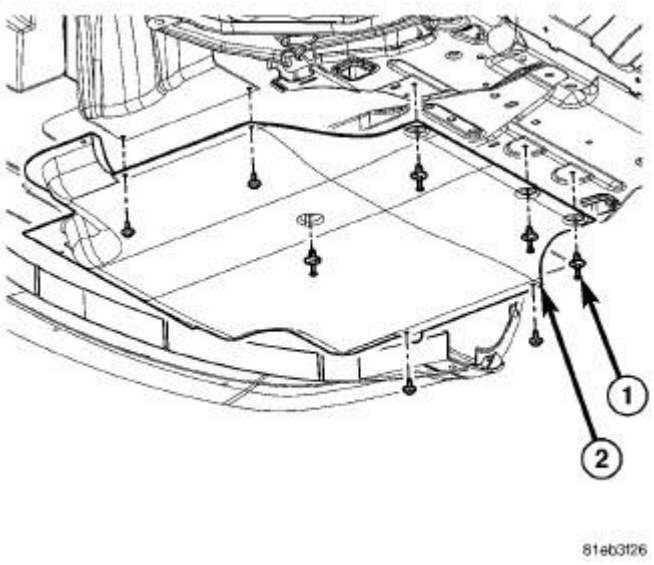

Fig. 228: Belly Pan
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
3. Remove the belly pan (2).

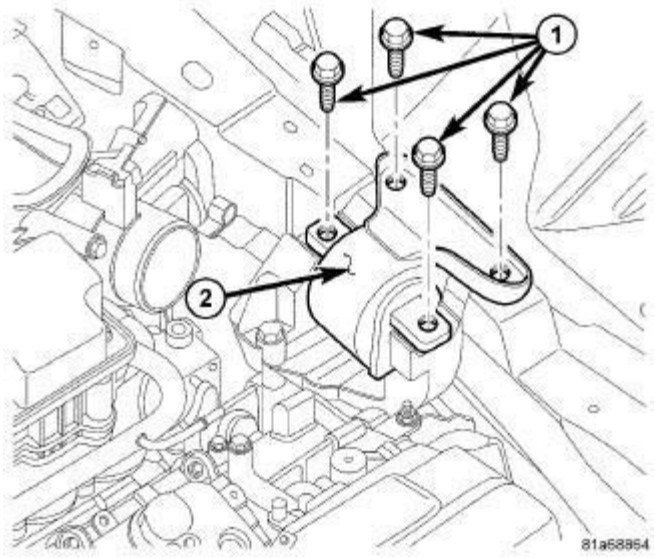

Fig. 229: Left Mount Vertical Bolts
Courtesy of CHRYSLER LLC

4. Support transmission with floor jack and wooden block.
5. Remove the vertical bolts (1) from the left mount (2) to transmission bracket.

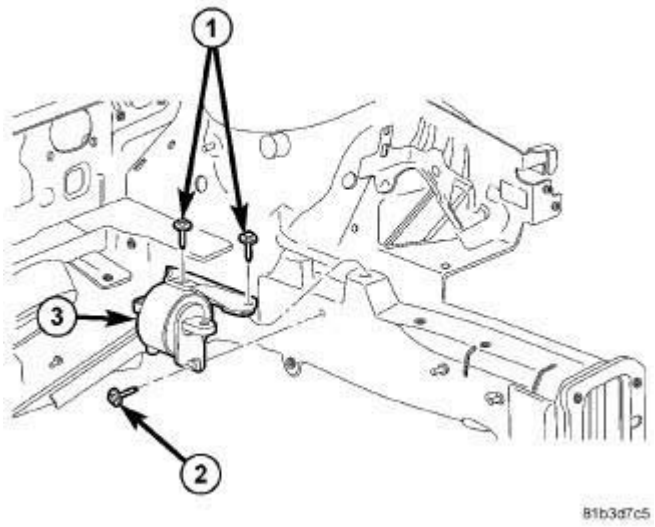

Fig. 230: Mount Isolator Bolts
Courtesy of CHRYSLER LLC

6. Slightly lower transmission with floor jack to gain access to mount to frame rail fastener (2).
7. Remove mount isolator (3).

Installation

INSTALLATION

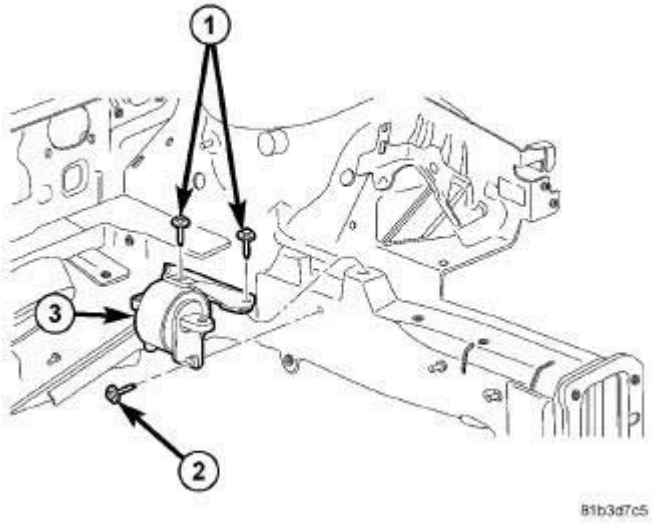

Fig. 231: Mount Isolator Bolts
Courtesy of CHRYSLER LLC

1. Position mount isolator (3) in place, install bolts (1, 2) and tighten to 50 N.m (37 ft. lbs.).

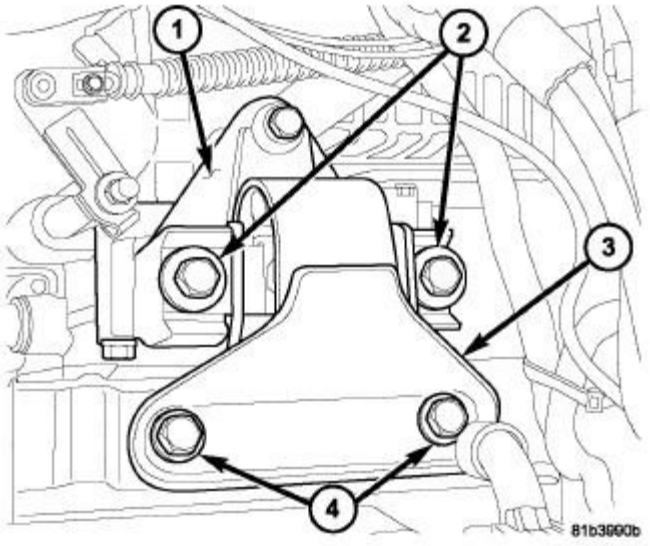

Fig. 232: Identifying Left Engine Mount
Courtesy of CHRYSLER LLC

2. Raise transaxle into position, install bolts (2) and tighten to 98 N.m (72 ft. lbs.).
3. Remove floor jack and wooden block.

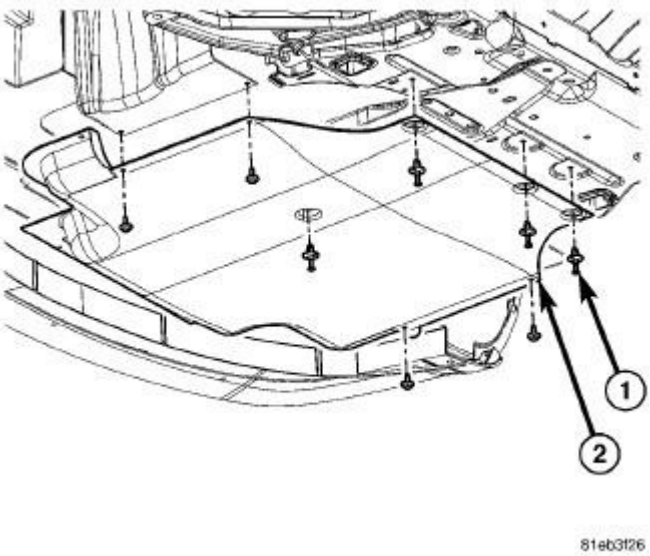

Fig. 233: Belly Pan
Courtesy of CHRYSLER LLC

4. Install belly pan (2).

5. Install throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
6. Connect negative battery cable.

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

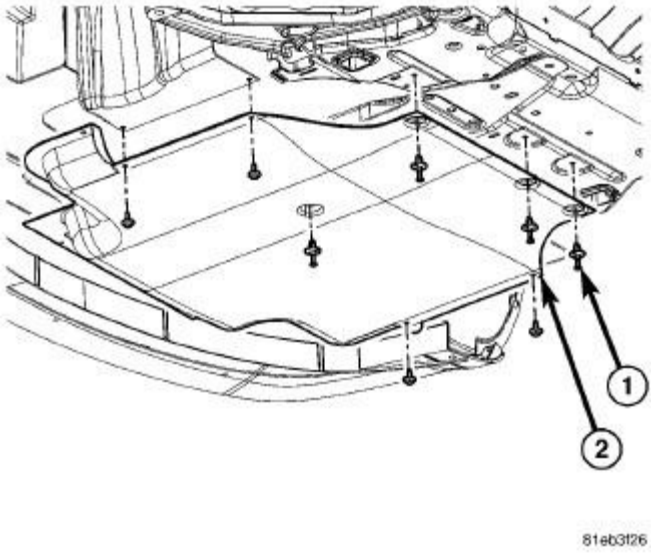

Fig. 234: Belly Pan
Courtesy of CHRYSLER LLC

1. Remove throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
2. Raise the vehicle.
3. Remove the belly pan (2).

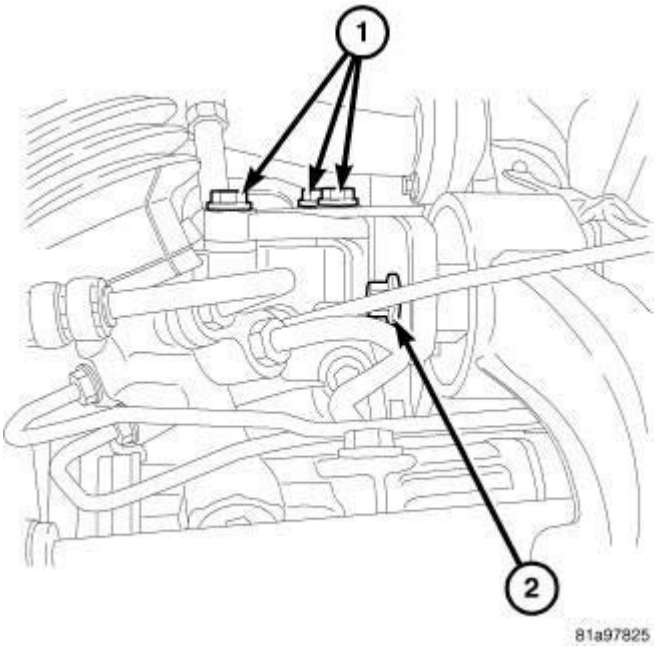

Fig. 235: Identifying Rear Mount Bracket-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

4. Remove three vertical bolts (1) attaching rear mount bracket to transaxle case.

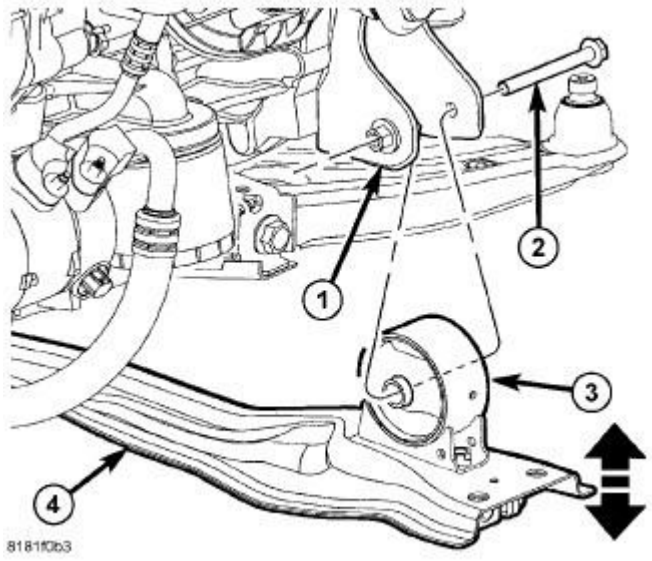

Fig. 236: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

5. Loosen the front mount through bolt (2).

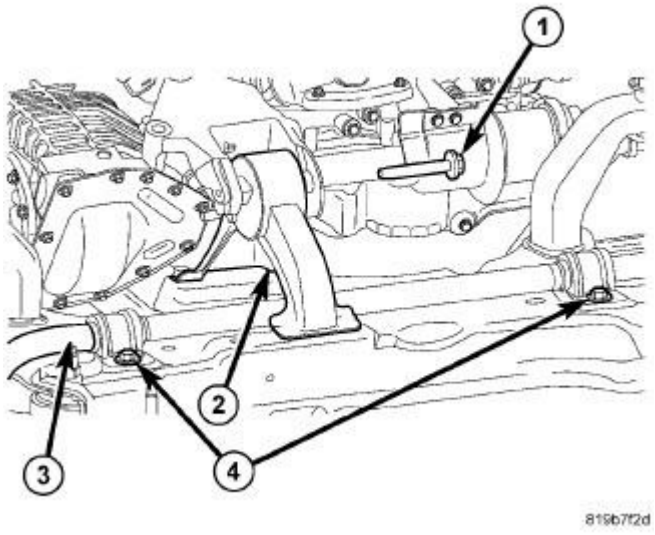

Fig. 237: Rear Engine Mount & Transaxle Bracket
Courtesy of CHRYSLER LLC

6. Remove rear mount bracket through bolt (1).
7. Remove rear mount bracket from transaxle case.
8. Remove rear isolator to suspension crossmember attaching bolts.
9. Remove rear isolator (2).

Installation

INSTALLATION

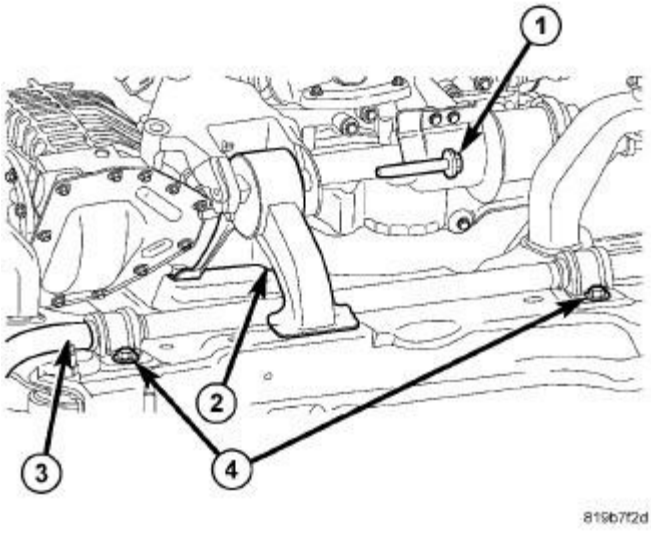

Fig. 238: Rear Isolator On Suspension Crossmember

Courtesy of CHRYSLER LLC

1. Position rear isolator (2) on suspension crossmember and loosely install bolts.

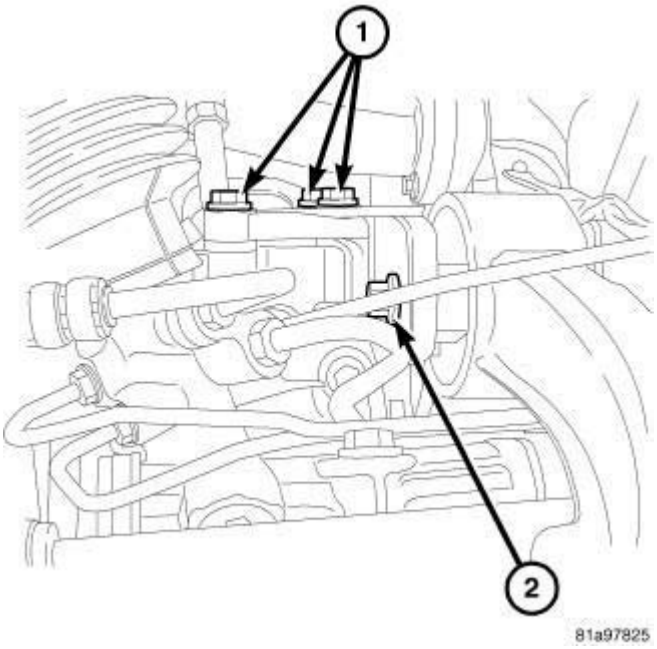

Fig. 239: Identifying Rear Mount Bracket-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

2. Position rear mount bracket on transaxle and install bolts (1). Tighten bolts to 95 N.m (70 ft. lbs.).
3. Tighten rear isolator to suspension crossmember bolts to 61 N.m (45 ft. lbs.).

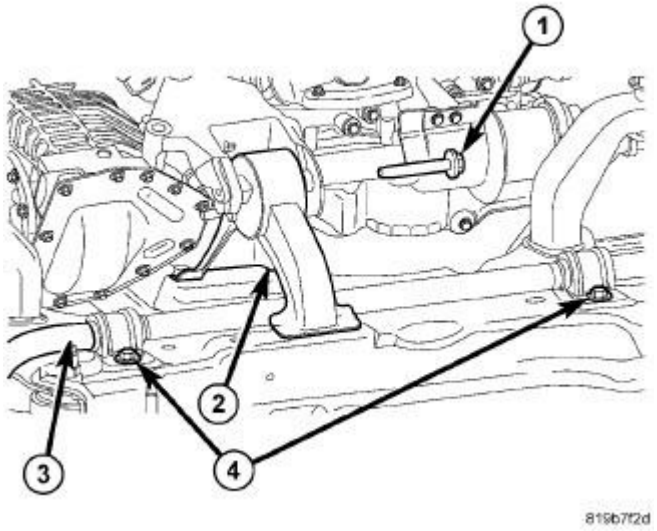

Fig. 240: Rear Isolator On Suspension Crossmember
Courtesy of CHRYSLER LLC

NOTE: Be sure the weight of the engine is static and in rest position.

4. Install rear mount bracket to rear isolator through bolt (1) and tighten to 75 N.m (55 ft. lbs.).

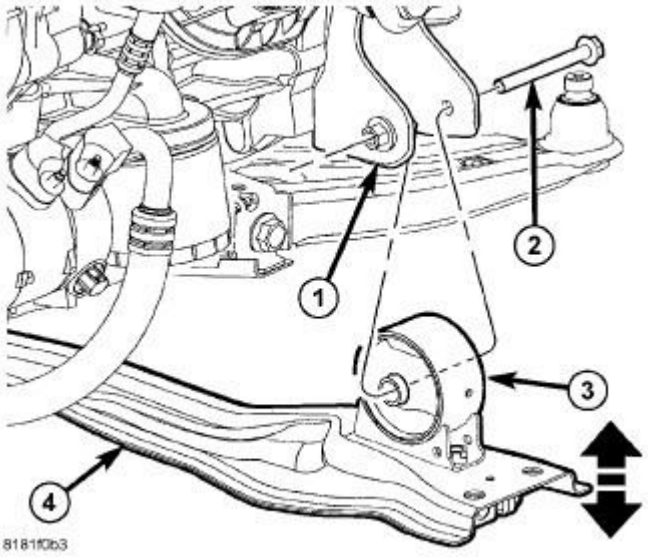

Fig. 241: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

5. Tighten front mount through bolt (2) to 75 N.m (55 ft. lbs.).

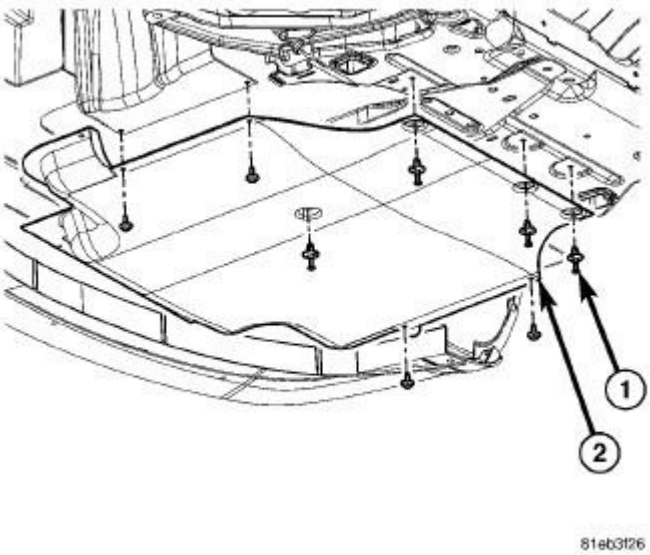

Fig. 242: Belly Pan
Courtesy of CHRYSLER LLC

6. Install the belly pan (2).

7. Install throttle body air inlet hose and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.

INSULATOR, ENGINE MOUNT, RIGHT

Removal

REMOVAL

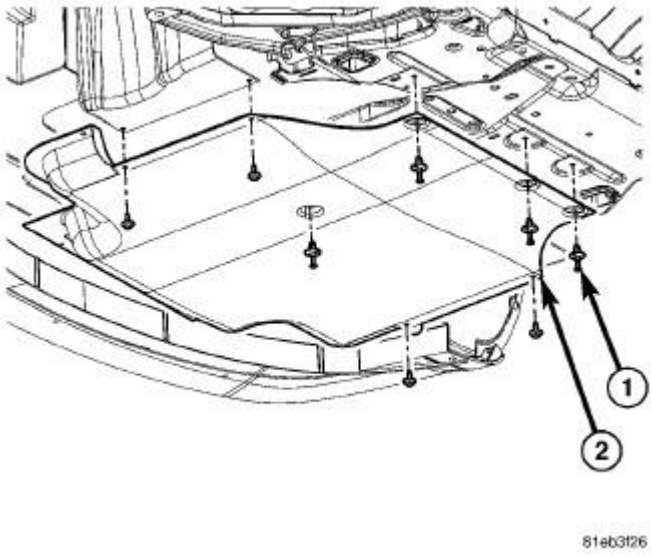

Fig. 243: Belly Pan
Courtesy of CHRYSLER LLC

1. Remove the belly pan (2).

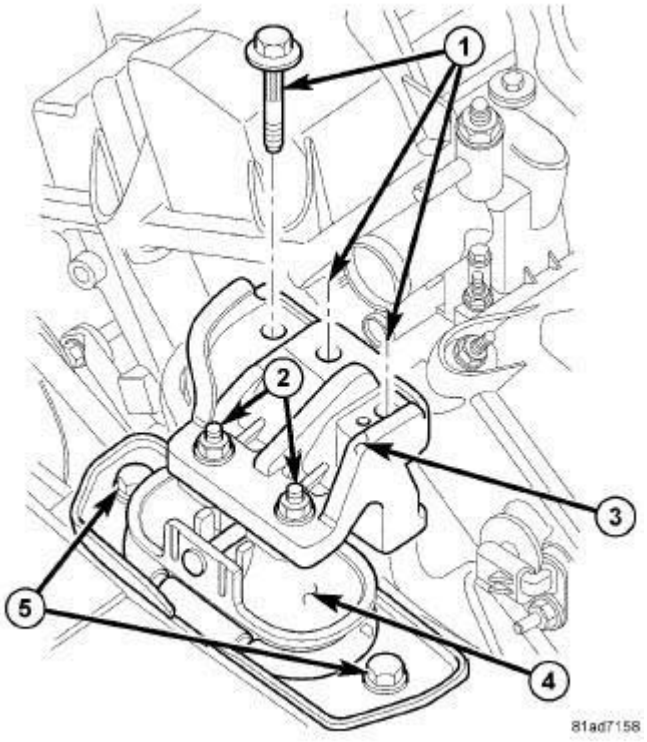

Fig. 244: Right Engine Mount
Courtesy of CHRYSLER LLC

2. Lower vehicle. Remove the load on the engine motor mounts by carefully supporting the engine assembly from below.
3. Remove coolant recovery container. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .
4. Disconnect the ground strap.
5. Remove the right engine support bracket vertical fasteners (1) and (2) and remove support bracket (3).
6. Remove the bolts (5) attaching the right isolator (4) to the frame rail.
7. Remove right isolator (4).

Installation

INSTALLATION

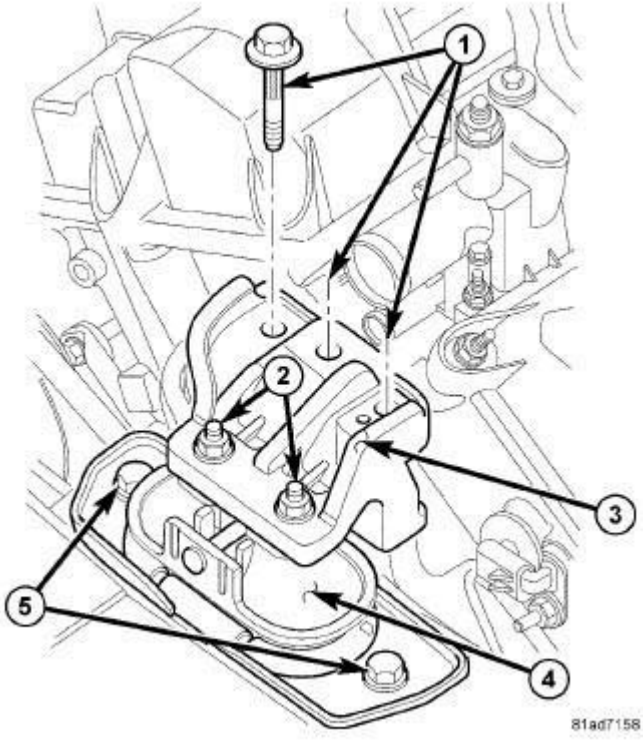

Fig. 245: Right Engine Mount
Courtesy of CHRYSLER LLC

1. Position right isolator (4) and install the isolator to frame rail bolts (5). Tighten bolts to 55 N.m (40 ft. lbs.).
2. Install the engine support bracket (3) and bolts (1). Tighten bolts to 50 N.m (37 ft. lbs).
3. Install the support bracket to isolator nuts (2) and tighten to 30 N.m (22 ft. lbs).
4. Reconnect the ground strap.

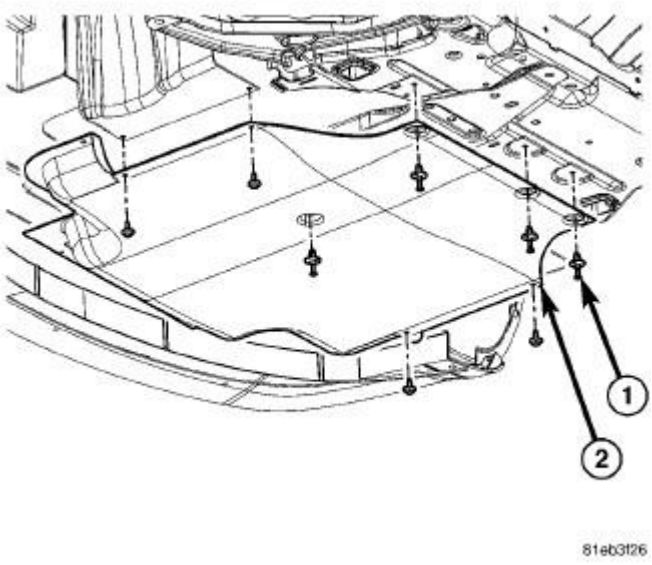

Fig. 246: Belly Pan
Courtesy of CHRYSLER LLC

5. Raise vehicle on a hoist.
6. Install the belly pan (2).
7. Install coolant recovery container. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Installation** .

LUBRICATION

DESCRIPTION

DESCRIPTION

The lubrication system is a full-flow filtration, pressure feed type. The oil pump body is mounted to the engine block. The pump inner rotor is driven by the crankshaft. A structural windage tray is used to increase power by minimizing oil windage at high engine RPM. An engine oil cooler is used on some models.

OPERATION

OPERATION

Oil from the oil pan is pumped by a gerotor type oil pump (3) directly coupled to the crankshaft. Oil pressure is controlled by a relief valve mounted inside the oil pump housing.

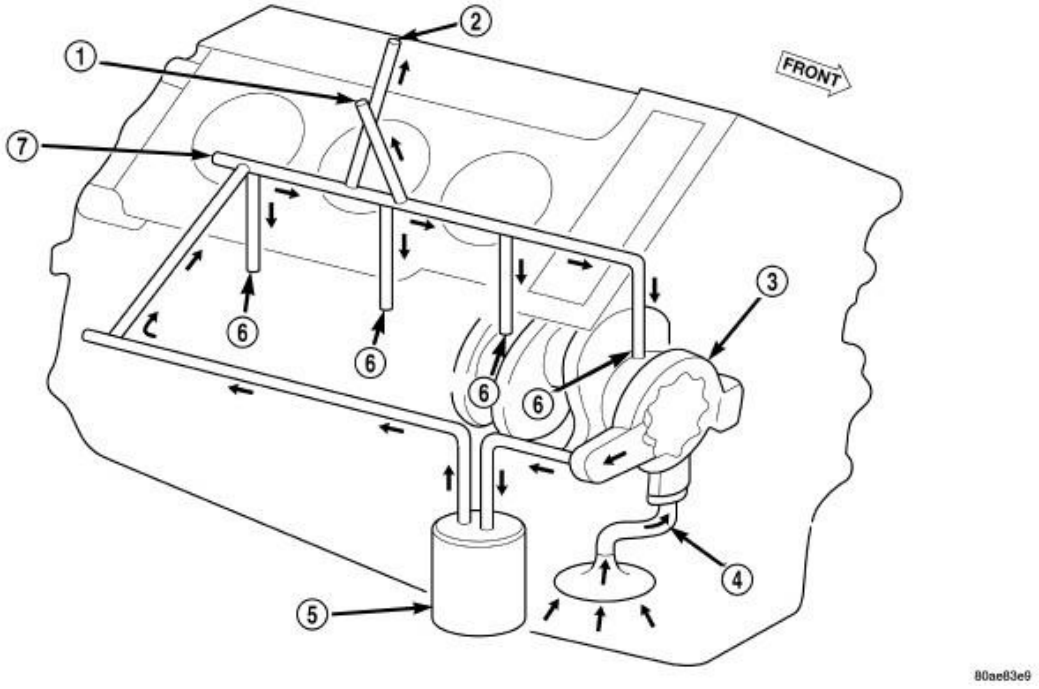

Fig. 247: Cylinder Block Oil Lubrication System
Courtesy of CHRYSLER LLC

1 - TO RIGHT CYLINDER HEAD	5 - OIL FILTER
2 - TO LEFT CYLINDER HEAD	6 - TO CRANKSHAFT MAIN JOURNALS
3 - OIL PUMP	7 - MAIN OIL GALLERY
4 - OIL PICKUP TUBE	-

FROM:	TO:	FROM:	TO:
Oil Pump	Oil Filter Mounting (inlet)	Main Oil Gallery - Center of Block	1. Crankshaft Main Bearings
Oil Filter Mounting (inlet)	Oil Filter		2. Left Cylinder Head*
Oil Filter	Oil Filter Mounting (outlet)		3. Right Cylinder Head*
Oil Filter Mounting (outlet)	Oil Gallery - Right side of Block	Crankshaft Main Bearings	Connecting Rod Bearings
Oil Gallery - Right side of Block	Oil Gallery - Rear of Block and to Oil Cooler (some models)	Left Cylinder Head	Accumulator
Oil Gallery - Rear of Block	Main Oil Gallery - Center of Block	Right Cylinder Head	Accumulator
*The cylinder head gaskets have an oil restrictor to control oil flow to the cylinder heads.			

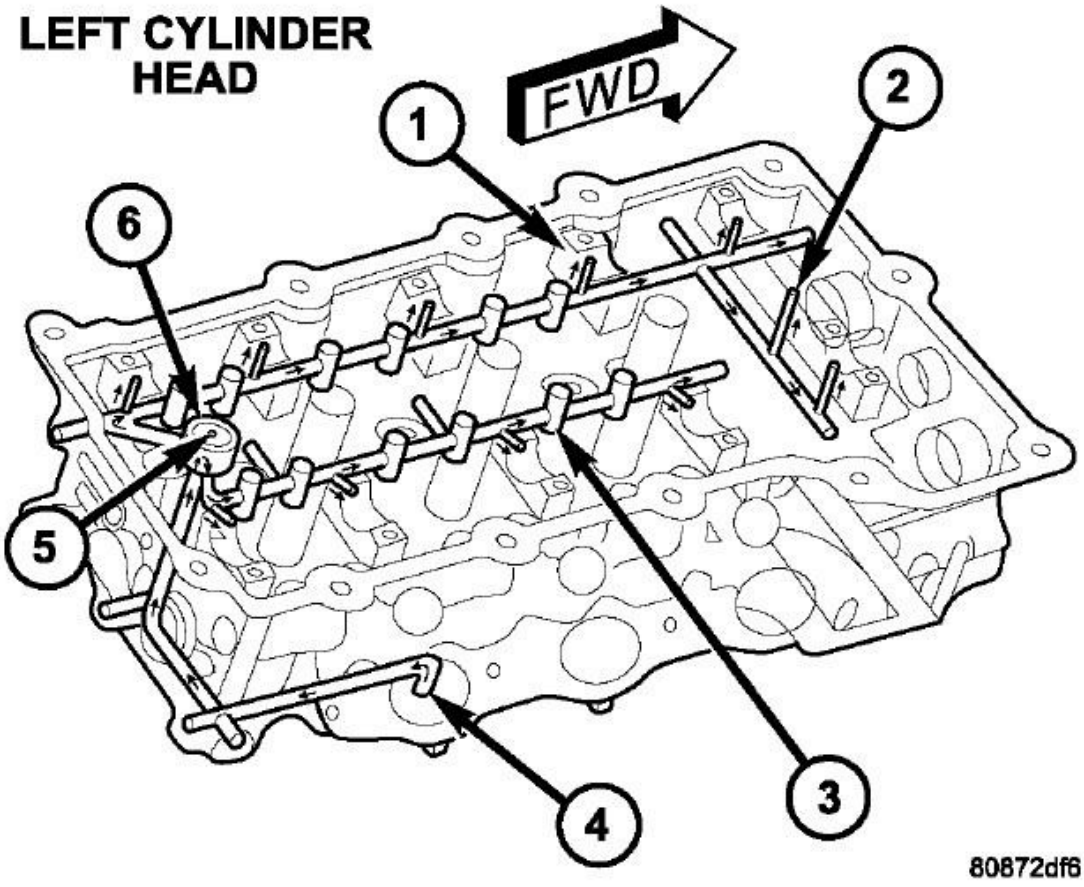

Fig. 248: Cylinder Head Oil Lubrication System - Left Side
Courtesy of CHRYSLER LLC

1 - CAM JOURNALS	4 - OIL FEED FROM BLOCK
2 - OIL FEED TO CAMSHAFT (SECONDARY) CHAIN TENSIONER	5 - VENT HOLE
3 - LASH ADJUSTER BORES	6 - ACCUMULATOR

FROM:	TO:
Left Cylinder Head Oil Inlet Gallery (intake side of head)	Oil Gallery and Accumulator - Rear of Head*
Oil Gallery and Accumulator - Rear of Head*	1. Exhaust Camshaft Oil Passage 2. Intake Camshaft Oil Passage
Left Exhaust Camshaft Oil Passage	1. Left Exhaust Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms 3. Left Camshaft (Secondary) Chain Tensioner**
Left Intake Camshaft Oil Passage	1. Left Intake Camshaft Journals

	2. Hydraulic Valve Lash Adjusters and Rocker Arms
* When oil reaches the back of the cylinder head, the oil gallery feeds oil into an accumulator chamber that is located towards center of the head. The accumulator chamber is closed off with a pressed in core plug that has a small orifice to act as a vent. Oil then travels down at a 45 degree angle from the accumulator into two passages, one for the intake and one for the exhaust side of the cylinder head.	
** The secondary camshaft chain tensioner is the last component to receive oil on the left cylinder head.	

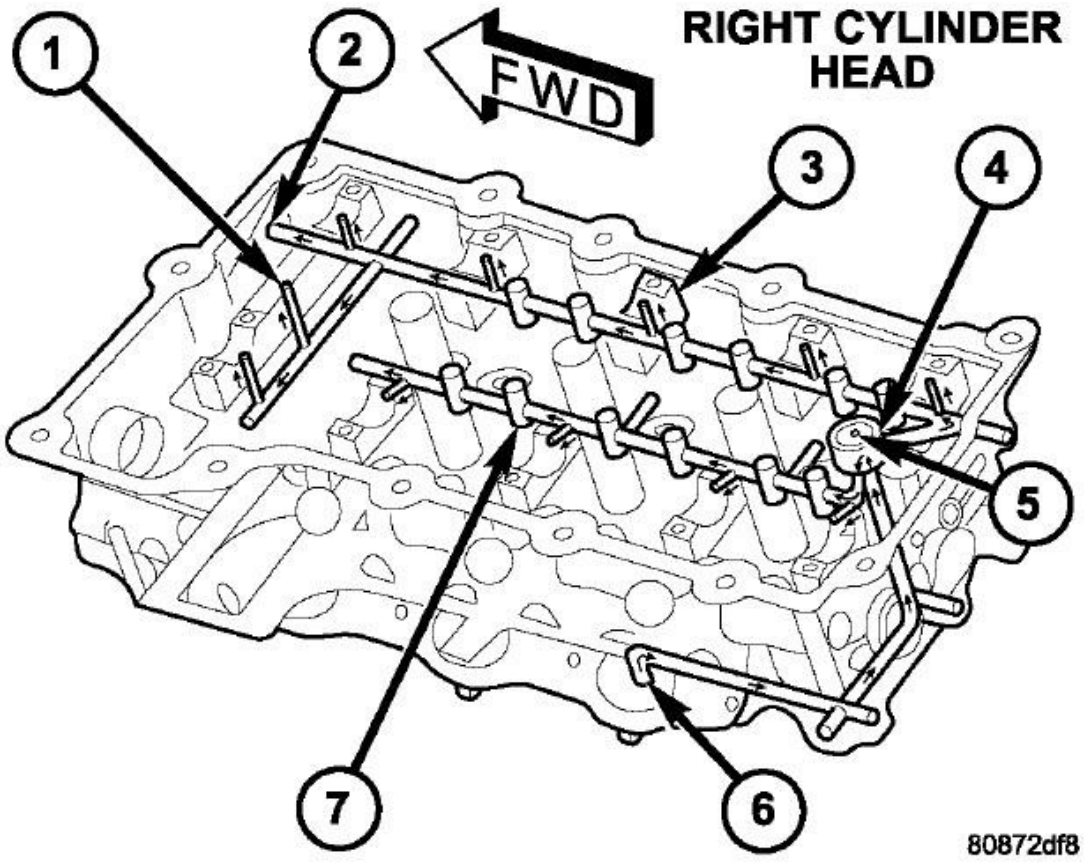

Fig. 249: Cylinder Head Oil Lubrication System - Right Side
Courtesy of CHRYSLER LLC

1 - OIL FEED TO CAMSHAFT (SECONDARY) CHAIN TENSIONER	5 - VENT HOLE
2 - OIL FEED TO TIMING CHAIN (PRIMARY) TENSIONER	6 - OIL FEED FROM BLOCK
3 - CAM JOURNALS	7 - LASH ADJUSTOR BORES
4 - ACCUMULATOR	-

FROM:	TO:
Right Cylinder Head Oil Inlet Gallery (intake side of head)	Oil Gallery and Accumulator - Rear of Head*
Oil Gallery and Accumulator - Rear of Head*	1. Exhaust Camshaft Oil Passage 2. Intake Camshaft Oil Passage
Right Exhaust Camshaft Oil Passage	1. Right Exhaust Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms 3. Right Camshaft (Secondary) Chain Tensioner 4. Primary Timing Chain Tensioner - Right Head**
Right Intake Camshaft Oil Passage	1. Right Intake Camshaft Journals 2. Hydraulic Valve Lash Adjusters and Rocker Arms
* When oil reaches the back of the cylinder head, the oil gallery feeds oil into an accumulator chamber that is located towards center of the head. The accumulator chamber is closed off with a pressed in core plug that has a small orifice to act as a vent. Oil then travels down at a 45 degree angle from the accumulator into two passages, one for the intake and one for the exhaust side of the cylinder head.	
** The timing (primary) chain tensioner is the last component to receive oil on the right cylinder head.	

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

1. Remove the oil pressure switch. Refer to **Engine/Lubrication/SENSOR, Oil Pressure - Removal** .
2. Install oil pressure test gauge assembly, Special Tools C-3292A with 8406 adaptor.
3. Start engine and monitor gauge readings.

CAUTION: If oil pressure is 0 at idle, Do Not Run engine at 3000 RPM

4. Oil Pressure (engine at operating temperature): **Curb Idle** 34.5 kPa (5 psi) minimum **3000 RPM** 300-724 kPa (45-105 psi).
5. If oil pressure is 0 at idle. Shut off engine, check for pressure relief valve stuck open or a clogged oil pickup screen.
6. Install oil pressure switch after testing is completed. Refer to **Engine/Lubrication/SENSOR, Oil Pressure - Installation** .

COOLER AND LINES, OIL

Description

DESCRIPTION

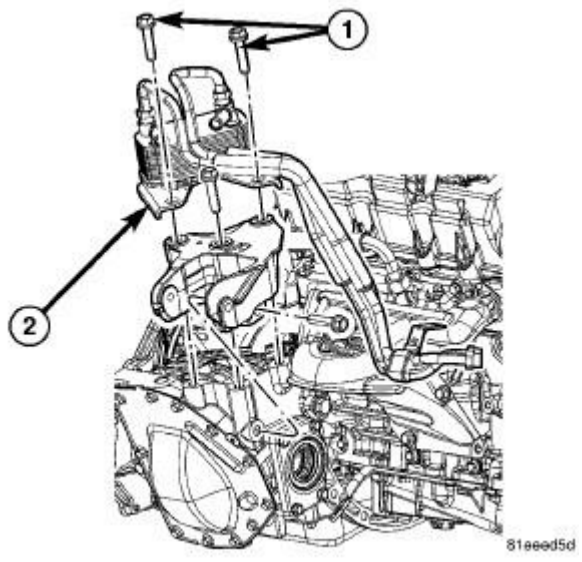

Fig. 250: Oil Cooler Fasteners
Courtesy of CHRYSLER LLC

Some 2.7L engines may be equipped with an engine oil cooler (2) that is mounted to the rear transmission mount bracket. Oil lines route oil from the engine block to the cooler, which is connected to the engine cooling system.

Removal

REMOVAL

WARNING: If the engine is at or near normal operating temperature, the coolant is hot enough to cause severe burns. Always allow the engine to cool down before removing any cooling system hoses.

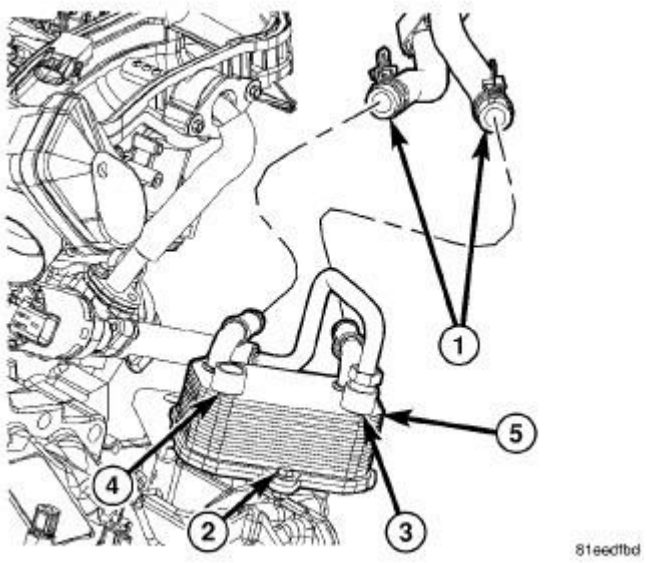

Fig. 251: Heater Hoses From Oil Cooler
Courtesy of CHRYSLER LLC

1. Disconnect the heater hoses (1) from the oil cooler (5) and clamp them off.

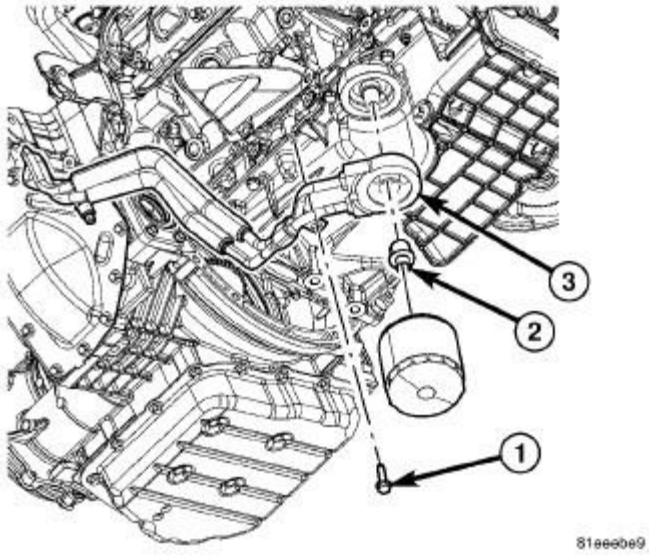

Fig. 252: Cooler Line Retaining Bracket Fastener
Courtesy of CHRYSLER LLC

2. Remove the oil filter.
3. Remove the oil filter adapter (2).
4. Remove the cooler line retaining bracket fastener (1).

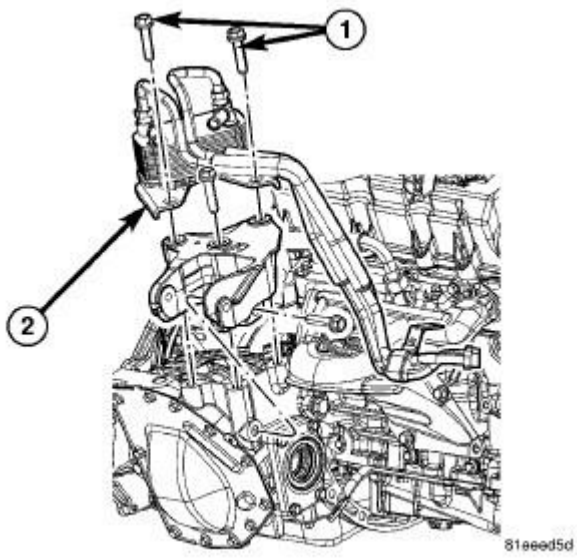

Fig. 253: Oil Cooler Fasteners
Courtesy of CHRYSLER LLC

5. Remove the oil cooler fasteners (1) and remove the oil cooler assembly (2).

Installation

INSTALLATION

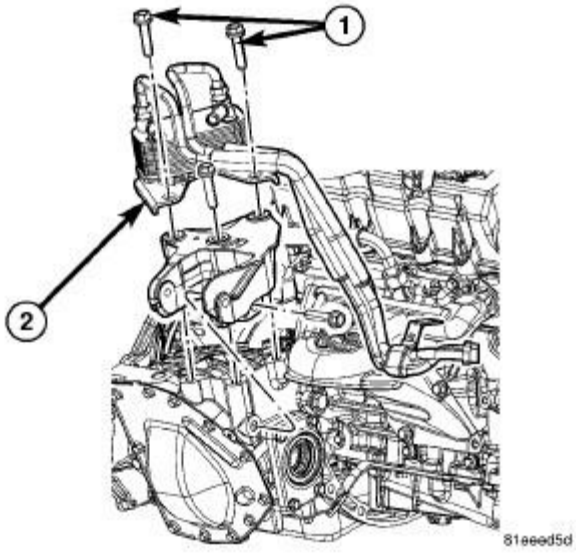

Fig. 254: Oil Cooler Fasteners
Courtesy of CHRYSLER LLC

1. Install the oil cooler (2) and install the fasteners (1). Tighten to 65 Nm (48 ft. lbs).

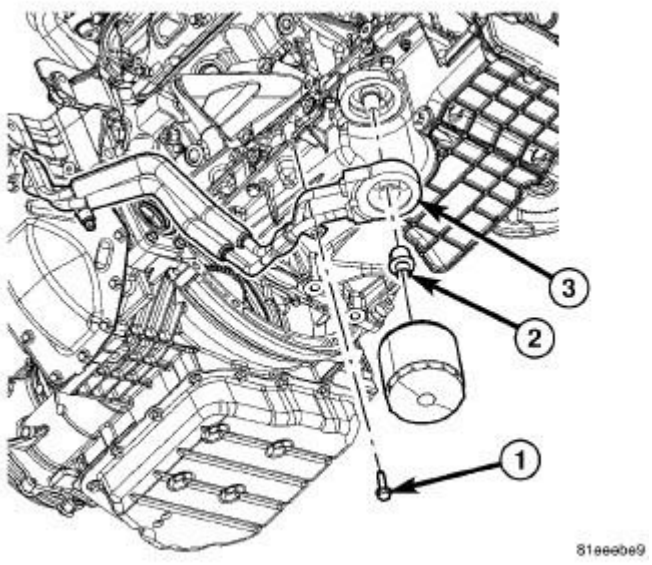

Fig. 255: Cooler Line Retaining Bracket Fastener
Courtesy of CHRYSLER LLC

2. Install the oil cooler diverter (3) and install the oil filter adapter (2).
3. Reposition the oil line retaining bracket, and install the fastener (1). Tighten to 23 Nm (17 ft. lbs.).
4. Install the oil filter.
5. Top off the cooling system as necessary. Refer to **Cooling - Standard Procedure** .

FILTER, ENGINE OIL

Removal

REMOVAL

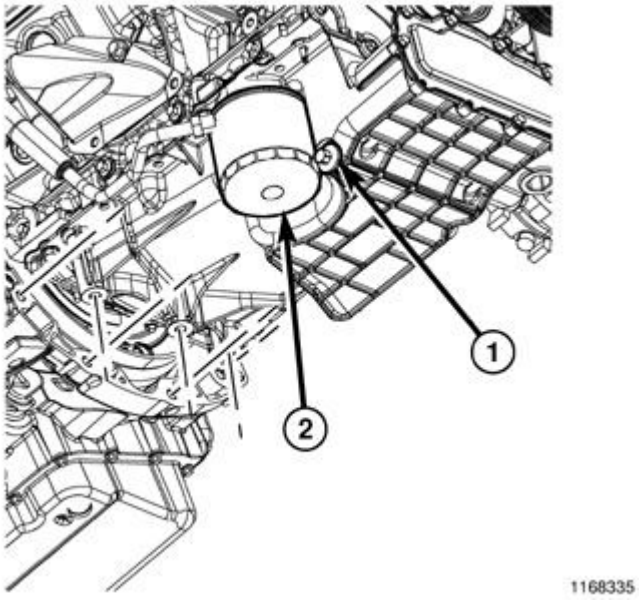

Fig. 256: Oil Filter & Drain Plug
Courtesy of CHRYSLER LLC

1. Raise vehicle on hoist.
2. Position a suitable collecting container under oil filter location.
3. Remove oil filter (2) using a suitable oil filter wrench. Dispose of oil filter following environmental guidelines.

Installation

INSTALLATION

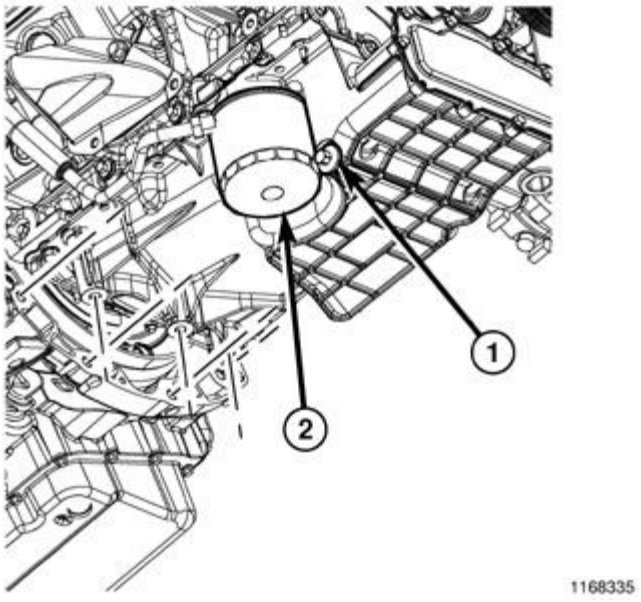

Fig. 257: Oil Filter & Drain Plug

Courtesy of CHRYSLER LLC

1. Wipe filter base clean, then inspect gasket sealing surface.
2. Lubricate gasket of new filter with clean engine oil.
3. Install oil filter (2) and tighten to 16 N.m (12 ft. lbs.) after gasket contacts base. Use filter wrench if necessary.
4. Fill crankcase with proper engine oil to correct level if drained. Start engine and check for leaks.

OIL

Description

DESCRIPTION

For engine oil type and capacity, refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

Standard Procedure

STANDARD PROCEDURE - ENGINE OIL AND FILTER CHANGE

WARNING: NEW OR USED ENGINE OIL CAN BE IRRITATING TO THE SKIN. AVOID PROLONGED OR REPEATED SKIN CONTACT WITH ENGINE OIL. CONTAMINANTS IN USED ENGINE OIL, CAUSED BY INTERNAL COMBUSTION, CAN BE HAZARDOUS TO YOUR HEALTH. THOROUGHLY WASH EXPOSED SKIN WITH SOAP AND WATER. DO NOT WASH SKIN WITH GASOLINE, DIESEL FUEL, THINNER, OR SOLVENTS, HEALTH PROBLEMS CAN RESULT. DO NOT POLLUTE, DISPOSE OF USED ENGINE OIL PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA.

Change engine oil and filter at mileage and time intervals described in the Maintenance Schedule. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

TO CHANGE ENGINE OIL

1. Run engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn engine off.
3. Hoist and support vehicle on safety stands. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
4. Remove oil fill cap.
5. Place a suitable drain pan under crankcase drain.
6. Remove drain plug from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.
7. Remove oil filter. Refer to **Engine/Lubrication/FILTER, Engine Oil - Removal**.

8. Install drain plug in crankcase.
9. Install new oil filter. Refer to **Engine/Lubrication/FILTER, Engine Oil - Installation**.
10. Lower vehicle and fill crankcase with specified type and amount of engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .
11. Install oil fill cap.
12. Start engine and inspect for leaks.
13. Stop engine and inspect oil level.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING listed above.

ENGINE OIL LEVEL CHECK

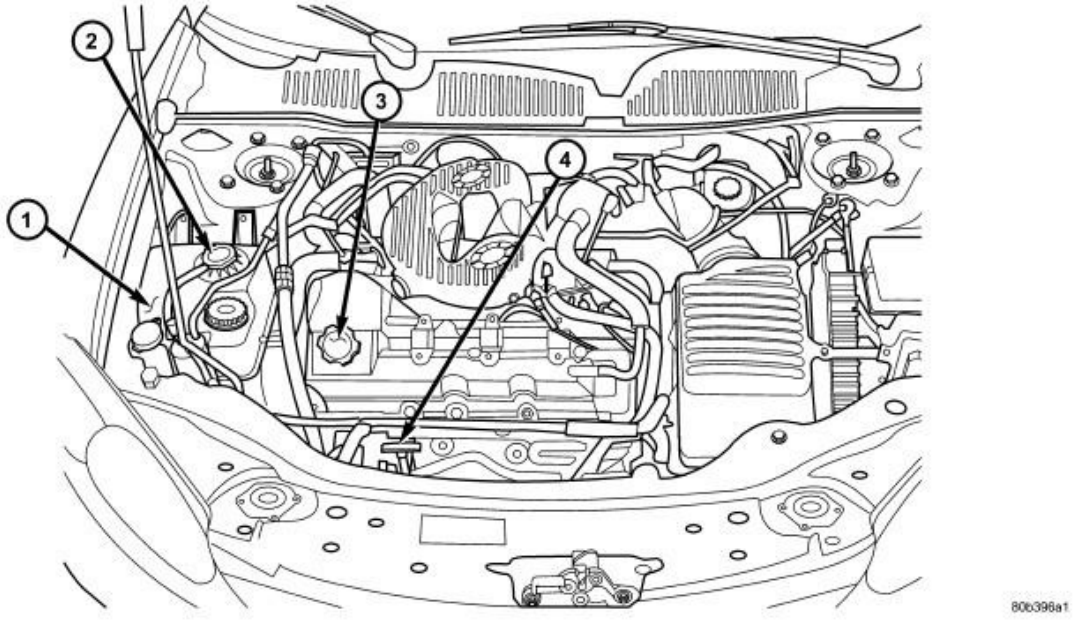

Fig. 258: Identifying Oil Dipstick, Fill Cap, Coolant Pressure Cap & Coolant Pressure Container
Courtesy of CHRYSLER LLC

1 - COOLANT PRESSURE CONTAINER
2 - COOLANT PRESSURE CAP
3 - ENGINE OIL FILL
4 - ENGINE OIL DIPSTICK

The best time to check engine oil level is after it has sat overnight, or if the engine has been running, allow the engine to be shut off for at least 5 minutes before checking oil level.

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading (4). Add only when the level is at or below the ADD mark.

PAN, OIL

Removal

REMOVAL

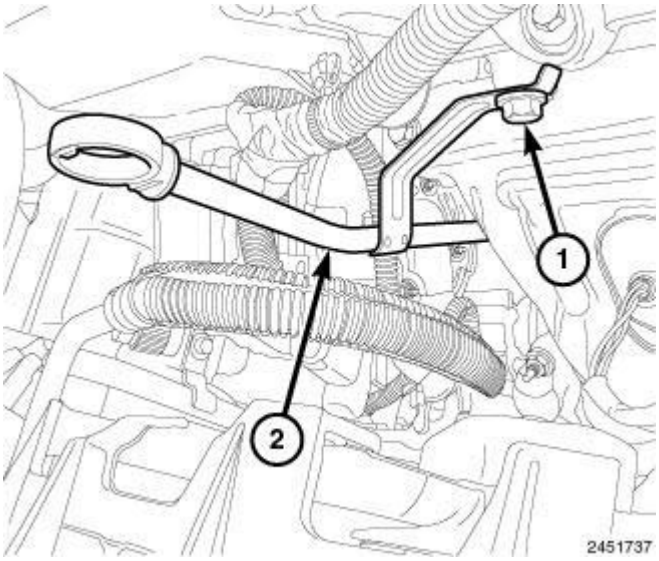

Fig. 259: Identifying Oil Dipstick Tube & Bolt
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the bolt (1) and the engine oil dipstick tube (2).

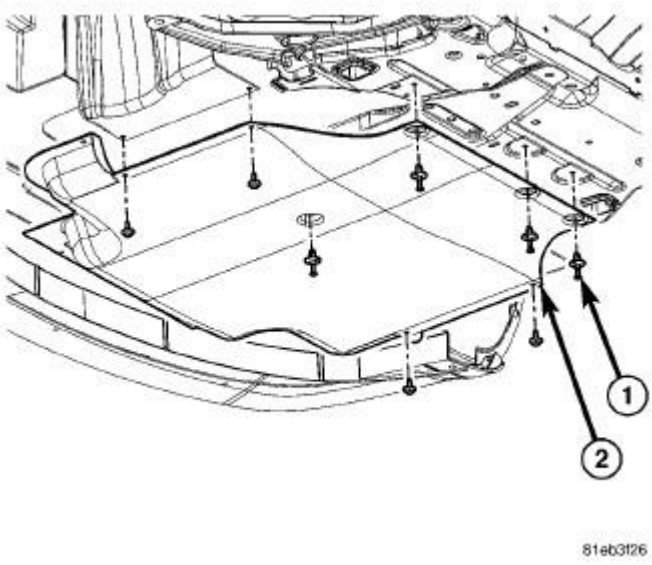

Fig. 260: Belly Pan
Courtesy of CHRYSLER LLC

3. Raise and secure the vehicle on a hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
4. Remove the belly pan (2), if equipped.

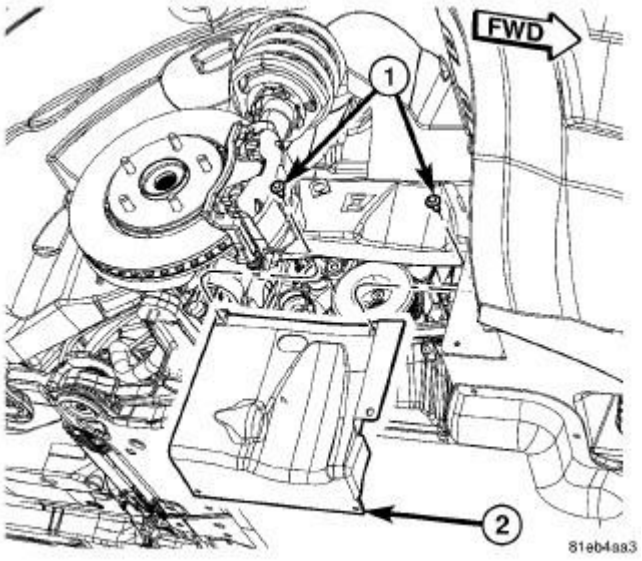

Fig. 261: Right Lower Splash Shield
Courtesy of CHRYSLER LLC

5. Remove the right lower splash shield (2).

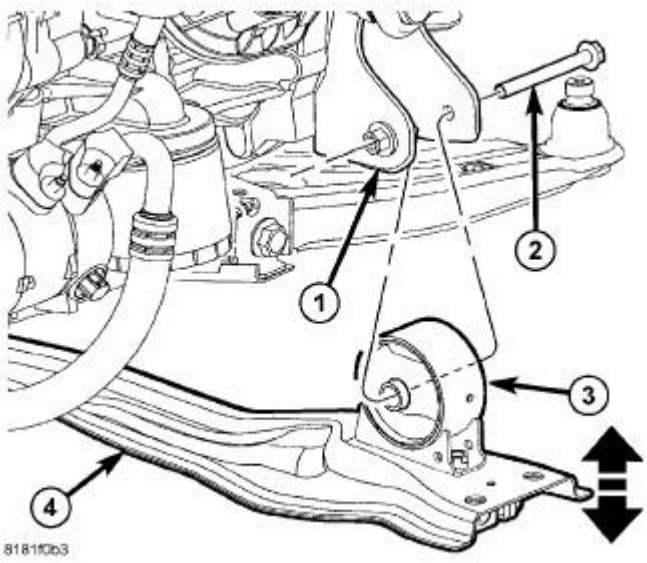

Fig. 262: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

6. Drain the engine oil and remove the oil filter. See **Engine/Lubrication/FILTER, Engine Oil - Removal**.
7. Remove the fore/aft crossmember (4). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

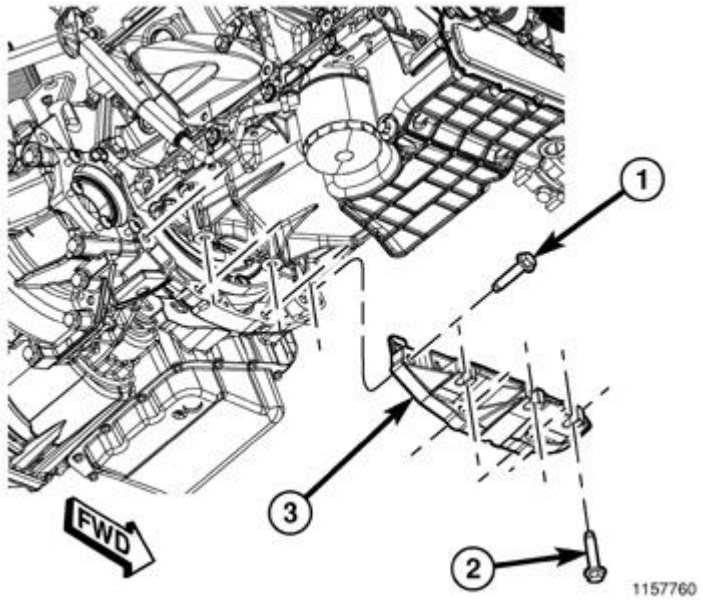

Fig. 263: Structural Collar
Courtesy of CHRYSLER LLC

8. Remove the structural collar (3). See **Engine/Engine Block/COVER, Structural Dust - Removal**.

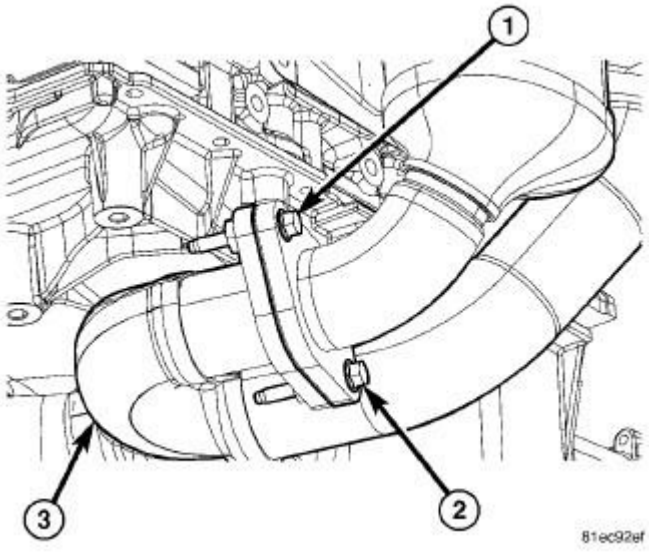

Fig. 264: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

9. Remove the exhaust cross-under pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Removal** .

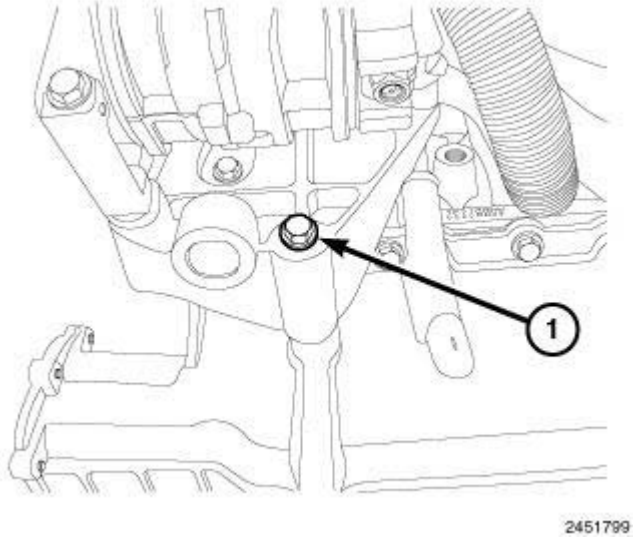

Fig. 265: A/C Compressor Mounting Bracket Lower Bolt
Courtesy of CHRYSLER LLC

10. Remove the lower bolt (1) attaching the A/C compressor mounting bracket to the oil pan.

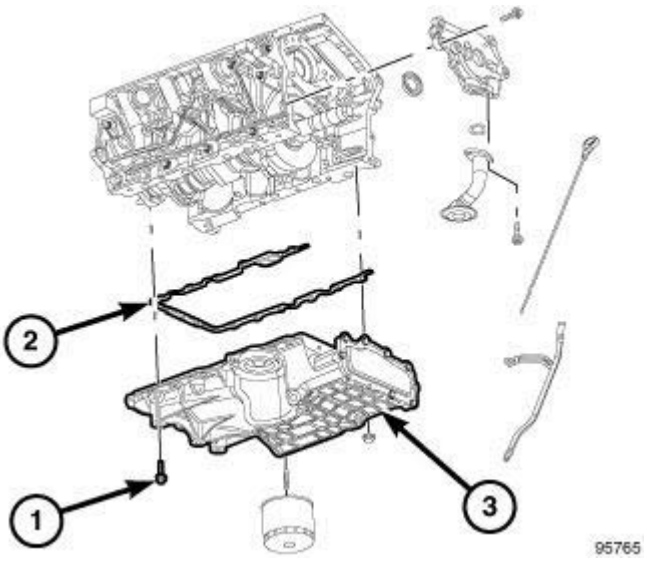

Fig. 266: Oil Pan Attaching Fasteners
Courtesy of CHRYSLER LLC

CAUTION: Assure removal of the two bolts attaching the timing cover to the oil pan, as damage to the timing cover and/or oil pan may occur.

11. Remove the oil pan attaching fasteners (1). Remove the oil pan (3) and gasket (2).

Installation

INSTALLATION

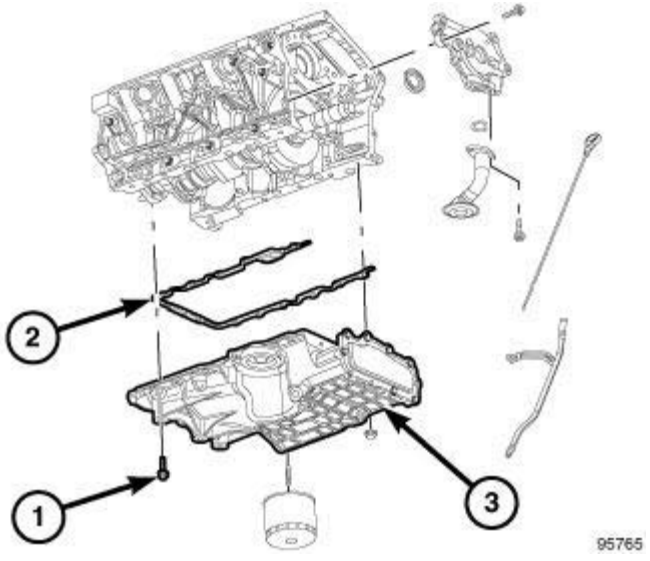

Fig. 267: Oil Pan Attaching Fasteners
Courtesy of CHRYSLER LLC

1. Clean the oil pan and oil pan sealing surfaces. Inspect the oil pan and timing chain cover gaskets. Replace as necessary.
2. Apply an 1/8 inch bead of Mopar® Engine RTV GEN II to the front T-joints (oil pan gasket to timing cover gasket interface) and the rear T-joints (oil pan gasket to crankshaft rear oil seal retainer gasket interface).
3. Install the oil pan gasket (2) to the engine block.

NOTE: To prevent oil leaks at oil pan to timing chain cover, the following tightening sequence procedure must be performed.

4. Install the oil pan (3) and fasteners (1) using the following tightening sequence:
   a. Install the oil pan bolts and nuts **finger tight only-just tight enough to compress the gasket's rubber seal** .
   b. Install the timing chain cover to oil pan bolts and tighten to 12 N.m (105 in. lbs.).
   c. Tighten the oil pan bolts to 28 N.m (250 in. lbs.).
   d. Tighten the oil pan nuts to 12 N.m (105 in. lbs.).

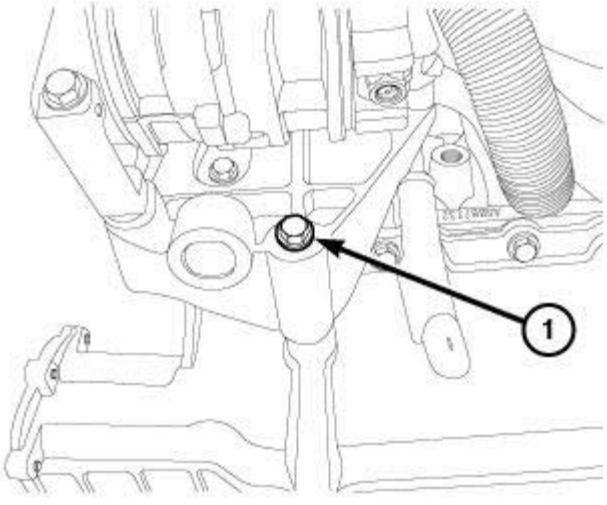

Fig. 268: A/C Compressor Mounting Bracket Lower Bolt
Courtesy of CHRYSLER LLC

5. Install the lower bolt (1) attaching the A/C compressor mounting bracket to the oil pan. Tighten bolt to 28 N.m (21 ft. lbs.).

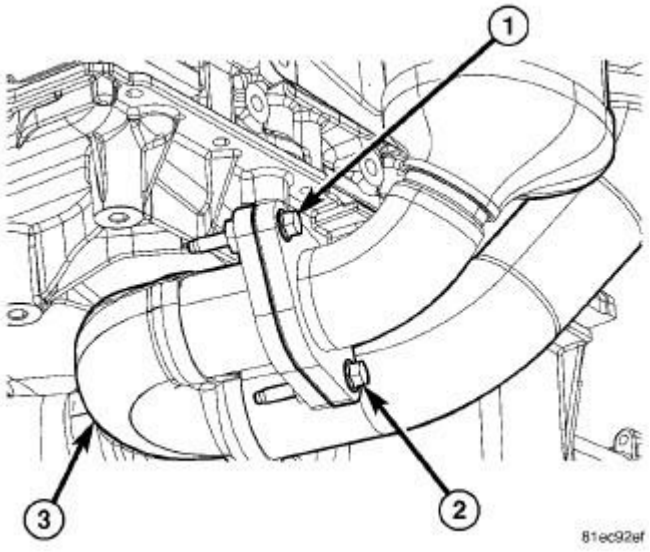

Fig. 269: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

6. Install the oil filter and drain plug. See **Engine/Lubrication/FILTER, Engine Oil - Installation**.
7. Install exhaust cross-under pipe. Refer to **Exhaust System/PIPE, Exhaust Crossunder - Installation** .

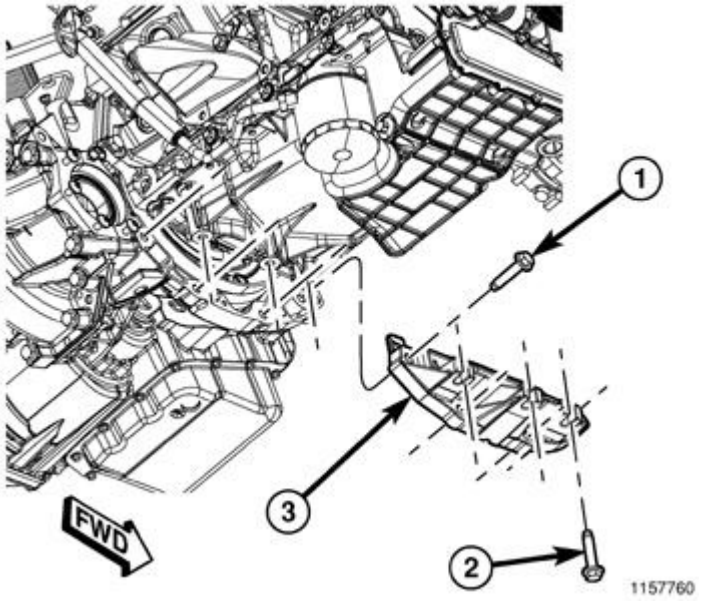

Fig. 270: Structural Collar
Courtesy of CHRYSLER LLC

8. Install structural collar (3). See **Engine/Engine Block/COVER, Structural Dust - Installation**.

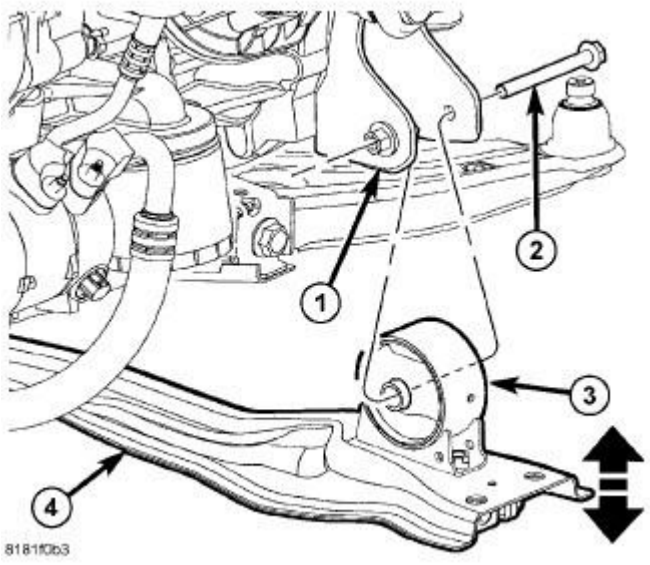

Fig. 271: Front Engine Mount Through Bolt
Courtesy of CHRYSLER LLC

9. Install the fore/aft crossmember (4). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .

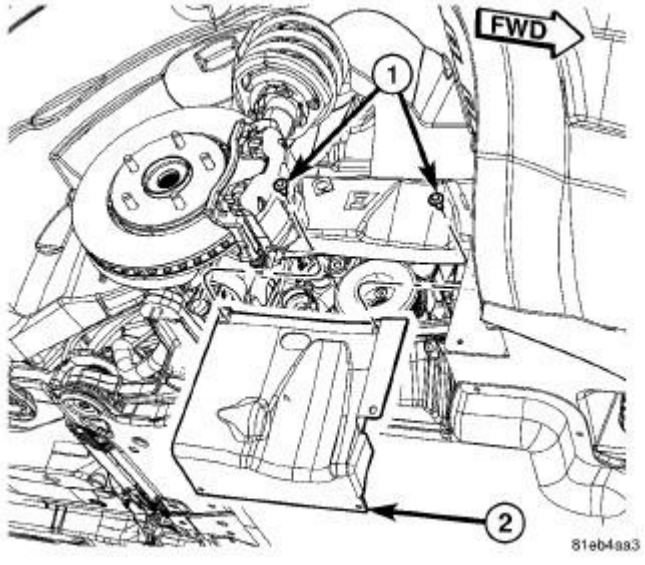

Fig. 272: Right Lower Splash Shield
Courtesy of CHRYSLER LLC

10. Install the right lower splash shield (2).

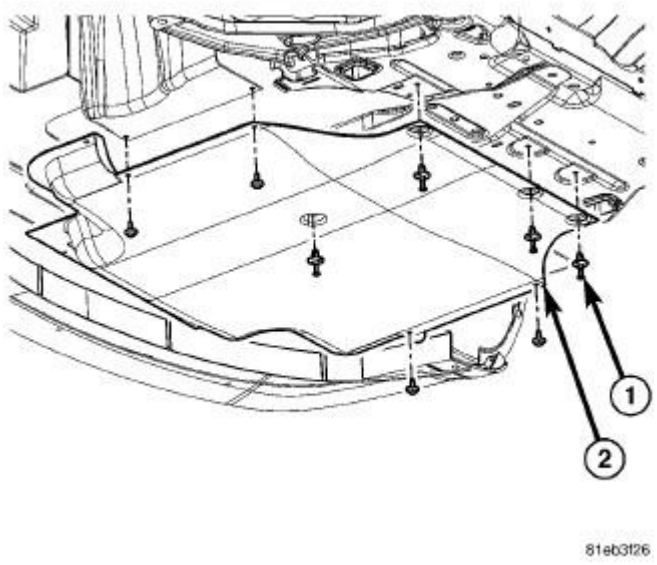

Fig. 273: Belly Pan
Courtesy of CHRYSLER LLC

11. Install the belly pan (2), if equipped.

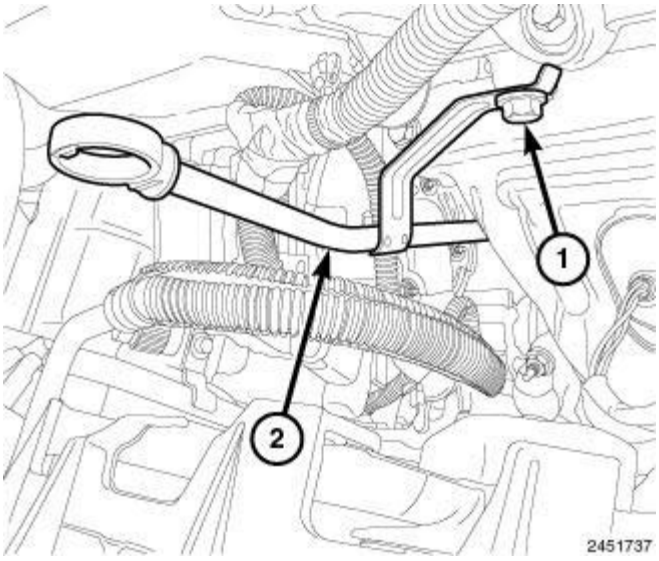

Fig. 274: Identifying Oil Dipstick Tube & Bolt
Courtesy of CHRYSLER LLC

12. Install the engine oil dipstick and tube (2). Tighten bolt to 20 N.m (15 ft. lbs.).
13. Fill the engine crankcase with the proper oil to the correct level. See **Engine/Lubrication/OIL - Standard Procedure**.
14. Connect the negative battery cable.

PUMP, ENGINE OIL

Removal

REMOVAL

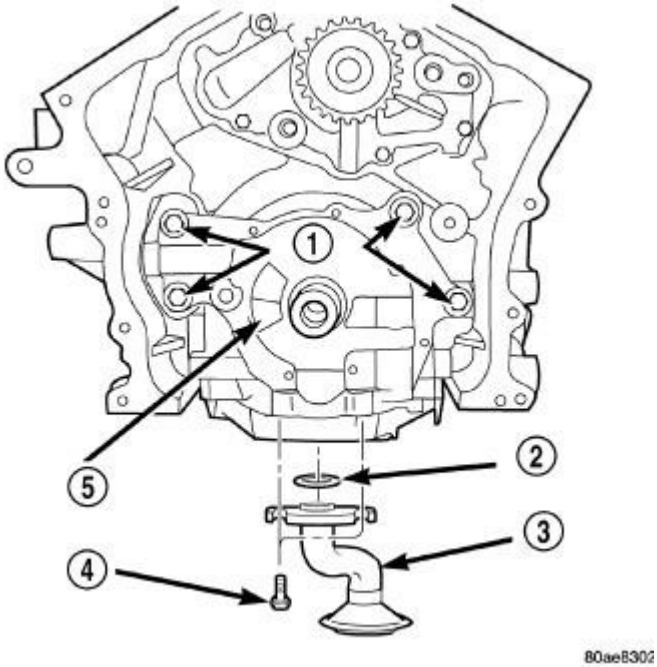

Fig. 275: Oil Pump & Pick-up Tube
Courtesy of CHRYSLER LLC

1 - BOLTS
2 - O-RING
3 - PICK-UP TUBE
4 - BOLT
5 - OIL PUMP

NOTE: The oil pump pressure relief valve can be serviced by removing the oil pan.

1. Remove crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.
2. Remove timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
3. Remove timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.
4. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
5. Remove oil pick-up tube (3) and O-ring (2).
6. Ensure that crankshaft is positioned so that the oil pump drive flats are parallel to the oil pan mounting surface This position will properly locate oil pump upon installation.
7. Remove oil pump attaching bolts (1).
8. Remove oil pump (5).

Disassembly

DISASSEMBLY

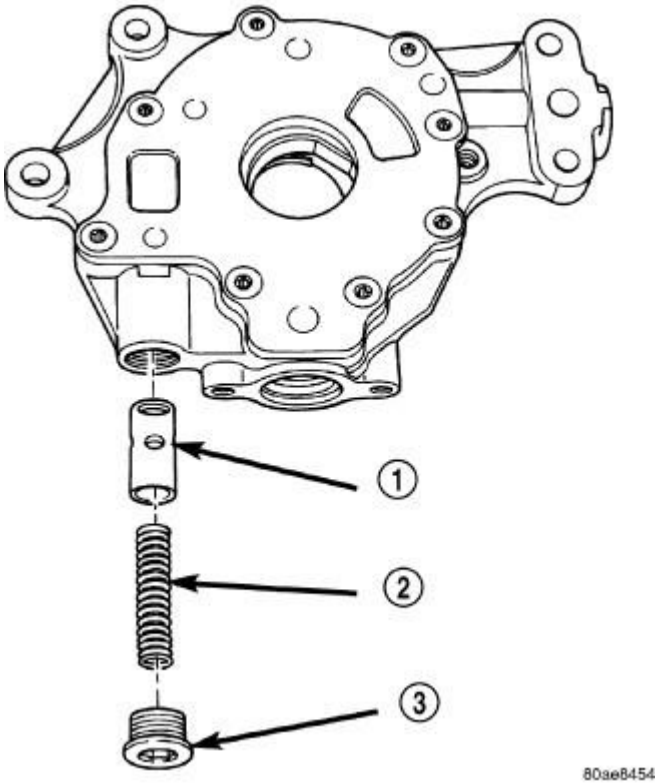

Fig. 276: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE 2 - SPRING 3 - RETAINER CAP

1. Remove the pressure relief valve (1) by remove the threaded retaining cap from the oil pump housing.

CAUTION: Oil pump pressure relief valve must be installed as shown in illustration or engine damage may occur.

2. Remove spring and relief valve.

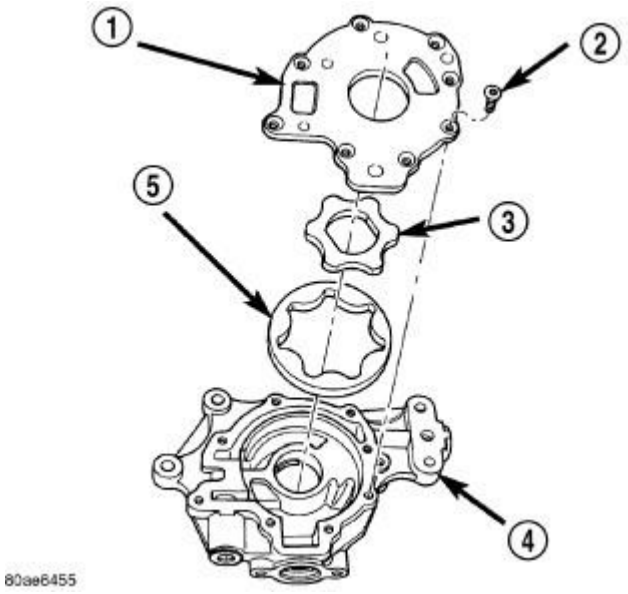

Fig. 277: Oil Pump
Courtesy of CHRYSLER LLC

1 - OIL PUMP COVER
2 - SCREWS (8)
3 - OIL PUMP INNER ROTOR
4 - OIL PUMP HOUSING
5 - OIL PUMP OUTER ROTOR

3. Remove oil pump cover screws (2) and lift off cover plate.
4. Remove pump rotors.
5. Wash all parts in a suitable solvent.
6. Inspect components carefully for damage or wear. See **Engine/Lubrication/PUMP, Engine Oil - Inspection**.

Cleaning

CLEANING

1. Clean all parts thoroughly in a suitable solvent.

Inspection

INSPECTION

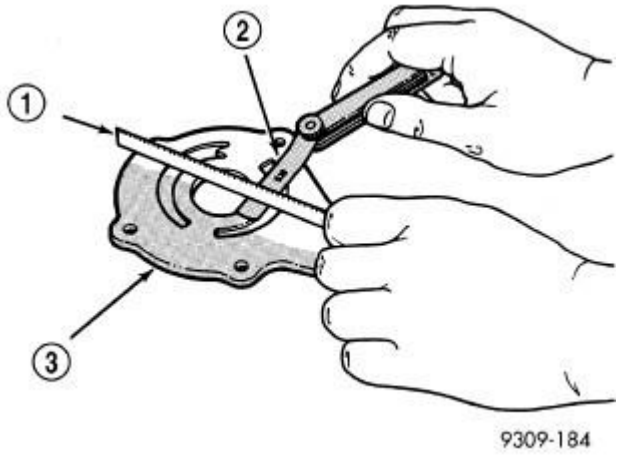

Fig. 278: CHECKING OIL PUMP COVER FLATNESS - TYPICAL
Courtesy of CHRYSLER LLC

1 - STRAIGHT EDGE 2 - FEELER GAUGE 3 - OIL PUMP COVER

1. Disassemble the oil pump. See **Engine/Lubrication/PUMP, Engine Oil - Disassembly**.
2. Clean all oil pump components. See **Engine/Lubrication/PUMP, Engine Oil - Cleaning**.
3. Inspect mating surface of the oil pump housing and cover. Replace oil pump if deeply scratched or grooved (minor surface scratches and polishing is normal).
4. Lay a straightedge across the pump cover surface (3). If a 0.025 mm (0.001 in.) feeler gauge can be inserted between cover and straight edge, cover should be replaced.

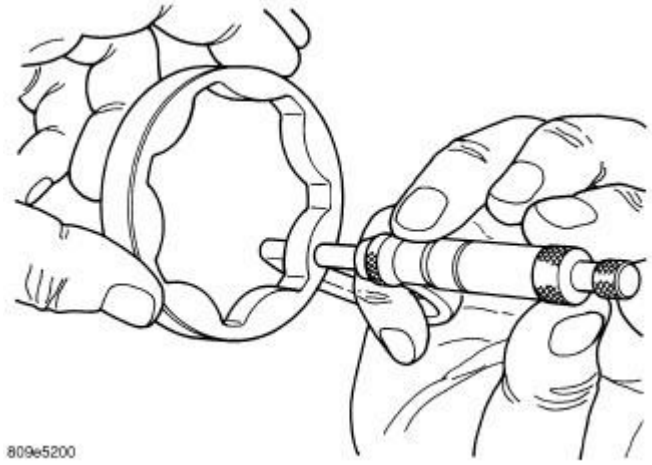

Fig. 279: MEASURING OUTER ROTOR THICKNESS
Courtesy of CHRYSLER LLC

5. Measure thickness and diameter of outer rotor. If outer rotor thickness measures 9.474 mm (0.373 in.) or

less, or if the diameter is 89.174 mm (3.5108 in.) or less, replace outer rotor.

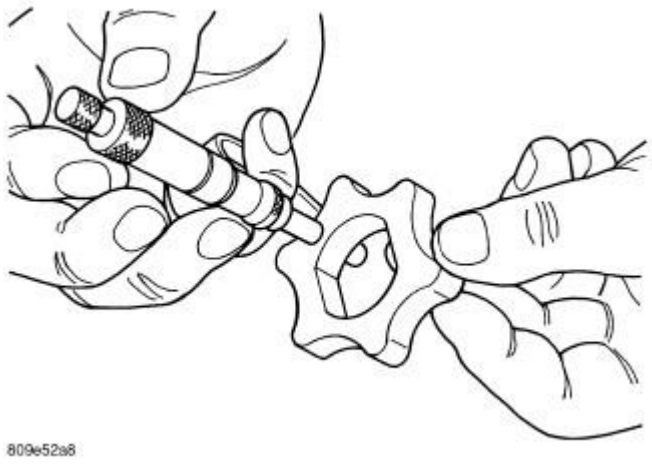

Fig. 280: MEASURING INNER ROTOR THICKNESS
Courtesy of CHRYSLER LLC

6. If inner rotor measures 9.474 mm (0.373 in.) or less replace inner rotor.

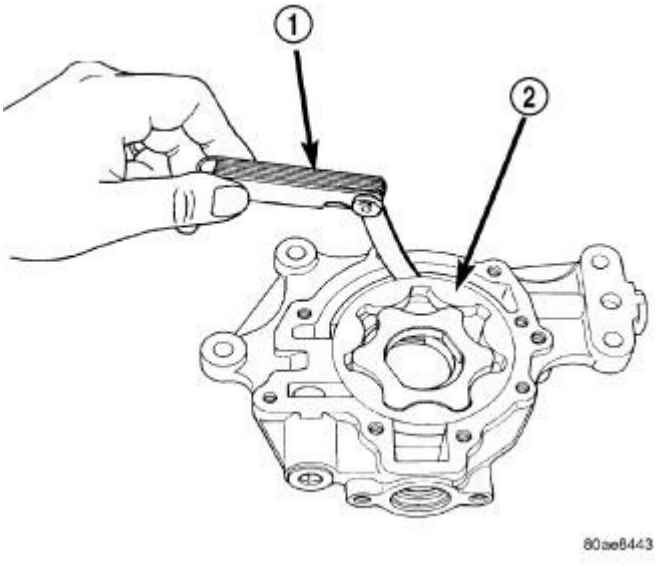

Fig. 281: MEASURING OUTER ROTOR CLEARANCE IN HOUSING
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE
2 - OUTER ROTOR

7. Slide outer rotor into body, press to one side with fingers and measure clearance between rotor and body. If measurement is 0.39 mm (0.015 in.) or more, replace body only if outer rotor is in specifications.

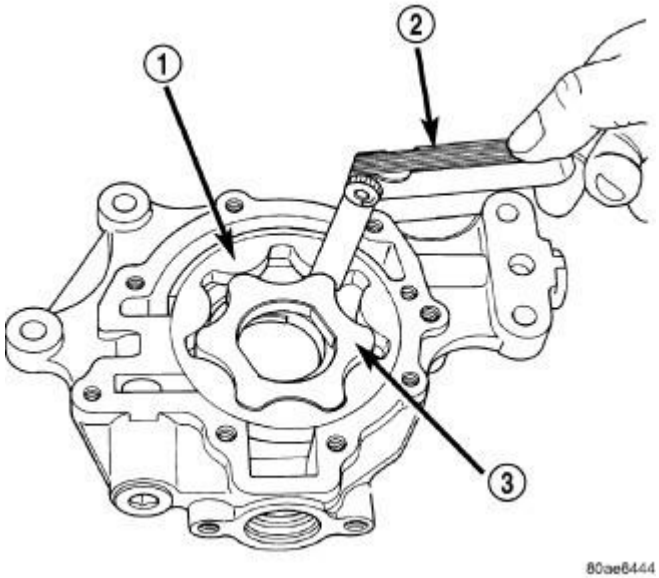

Fig. 282: MEASURING CLEARANCE BETWEEN ROTORS
Courtesy of CHRYSLER LLC

1 - OUTER ROTOR
2 - FEELER GAUGE
3 - INNER ROTOR

8. Install inner rotor into body. If clearance between inner and outer rotors is 0.20 mm (0.008 in.) or more, replace both rotors.

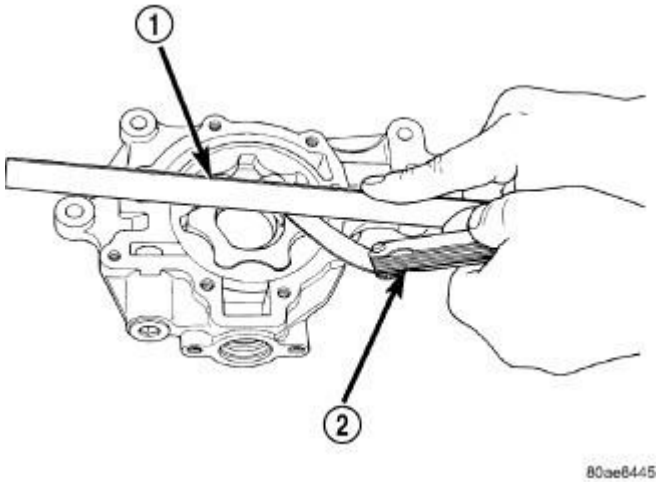

Fig. 283: MEASURING CLEARANCE OVER ROTORS
Courtesy of CHRYSLER LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGE

9. Place a straightedge across the face of the body, between bolt holes. If a feeler gauge of 0.077 mm (0.003 in.) or more can be inserted between rotors and the straightedge, replace pump assembly **ONLY** if rotors are in specification.
10. Inspect oil pressure relief valve plunger for scoring and free operation in its bore. Small marks may be removed with 400-grit wet or dry sandpaper.
11. The relief valve spring has a free length of approximately 49.5 mm (1.95 in.) it should test between 23 - 25 pounds when compressed to 34 mm (1.34 in.). Replace spring that fails to meet specifications.
12. Assemble oil pump.

Assembly

ASSEMBLY

1. Assemble pump using new parts as required.
2. Tighten cover screws to 12 N.m (105 in. lbs.).
3. Tighten oil pressure relief valve retaining cap to 12 N.m (105 in. lbs.).
4. Prime oil pump before installation by filling rotor cavity with engine oil.

Installation

INSTALLATION

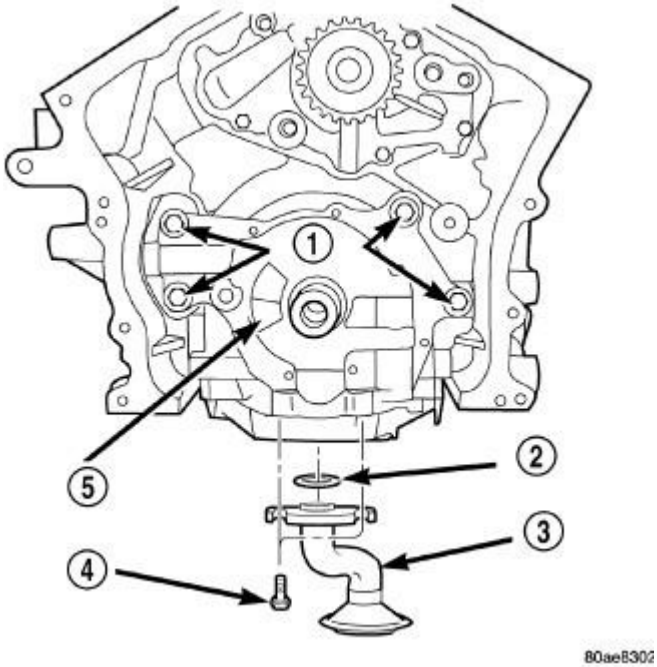

Fig. 284: Oil Pump & Pick-up Tube
Courtesy of CHRYSLER LLC

1 - BOLTS

2 - O-RING
3 - PICK-UP TUBE
4 - BOLT
5 - OIL PUMP

CAUTION: The crankshaft oil pump drive flats must be parallel to the oil pan mounting surface before installing the oil pump. This position will properly locate the oil pump. If not properly located, severe damage to the oil pump can occur.

1. Prime the oil pump before installation by filling rotor cavity with engine oil.
2. If the crankshaft has been rotated, it must be repositioned so that the oil pump drive flats are parallel to the oil pan mounting surface prior to oil pump installation.
3. Install oil pump (5) carefully over crankshaft and into position.
4. Install oil pump attaching bolts (1). Tighten bolts to 28 N.m (250 in. lbs.).
5. Install oil pick-up tube (3) with new O-ring (2). Lubricate O-ring (2) with clean engine oil before installation. Tighten attaching bolts to 28 N.m (250 in. lbs.).
6. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
7. Install timing chain and sprockets. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.
8. Install timing chain cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
9. Install crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
10. Fill crankcase with engine oil to correct level.

SWITCH, OIL PRESSURE

Description

DESCRIPTION

The engine oil pressure switch is located on the right side of the engine block. The switch screws into the engine main oil gallery. The normally closed switch provides an input through a single wire to the low pressure indicator light on the instrument cluster.

Removal

REMOVAL

1. Raise vehicle on hoist.
2. Remove heat shield that covers oil pressure switch.
3. Disconnect oil pressure switch electrical connector.
4. Position an oil collecting container under switch location.
5. Remove switch by unscrewing from the engine block.

Installation

INSTALLATION

1. Apply Mopar® Thread Sealant to the switch threads.
2. Install oil pressure switch.
3. Connect electrical connector.
4. Install oil pressure switch heat shield.
5. Lower vehicle.
6. Start engine and check for leaks.
7. Check engine oil level and adjust as necessary.

VALVE, OIL PRESSURE RELIEF

Removal

REMOVAL

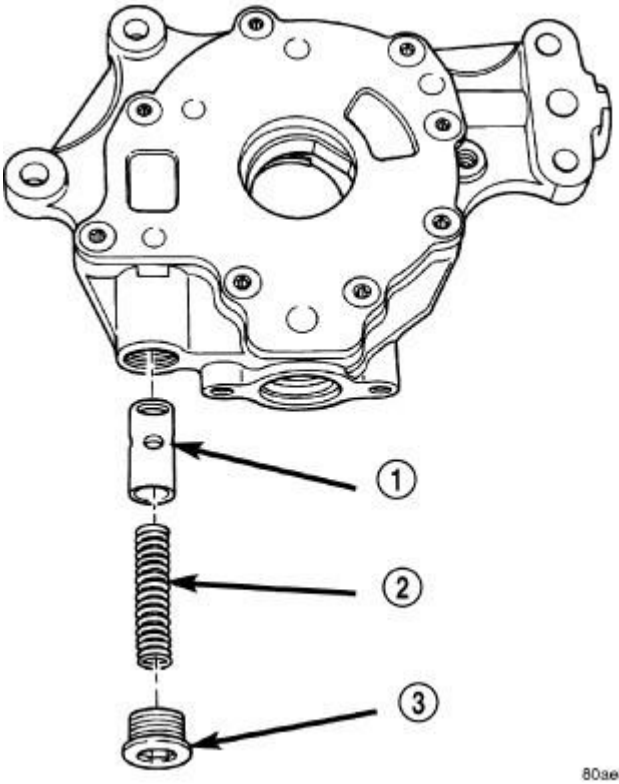

Fig. 285: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE 2 - SPRING

3 - RETAINER CAP

1. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
2. Remove the pressure relief valve (1) by remove the threaded retaining cap from the oil pump housing.

CAUTION: Oil pump pressure relief valve must be installed as shown in illustration or engine damage may occur.

3. Remove spring and relief valve.

Installation

INSTALLATION

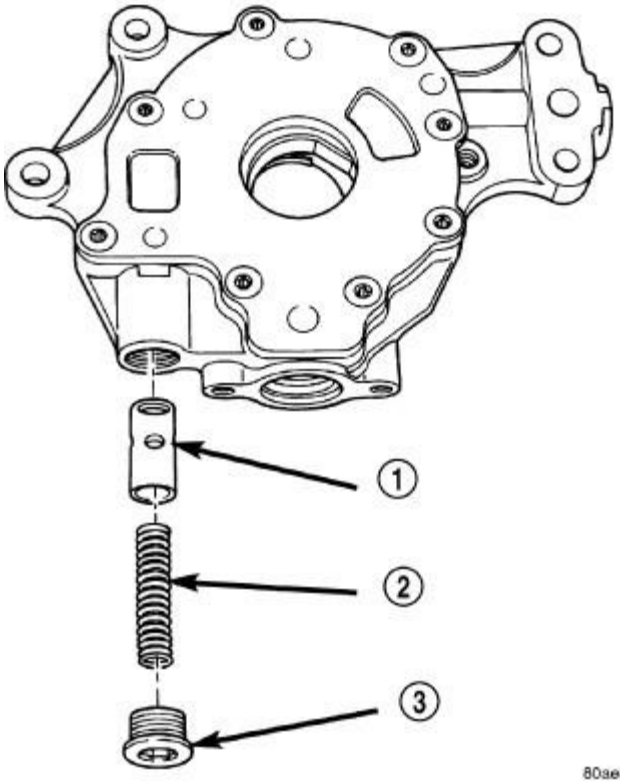

Fig. 286: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE 2 - SPRING 3 - RETAINER CAP

1. Lubricate relief valve with oil.

CAUTION: The pressure relief valve must be installed as shown in illustration or engine damage may occur.

2. Install relief valve (1) , spring and retainer cap. Tighten cap to 12 N.m (105 in. lbs.).
3. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

MANIFOLDS

MANIFOLD, EXHAUST, CROSSOVER

Removal

REMOVAL

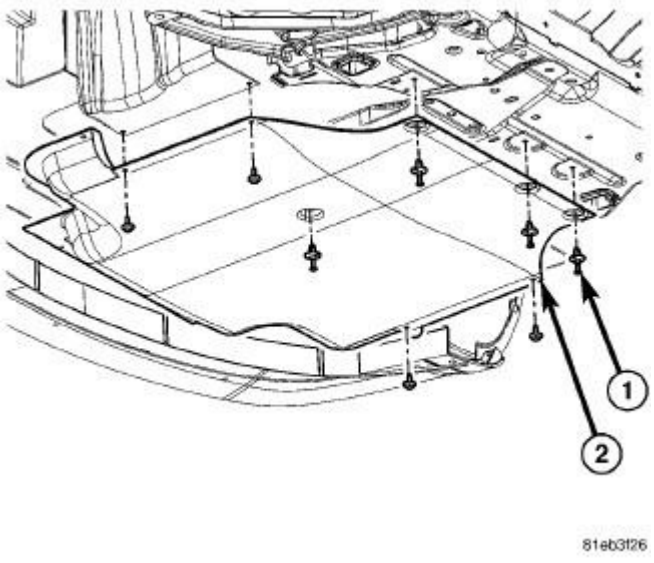

Fig. 287: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

1. Remove the belly pan (2).

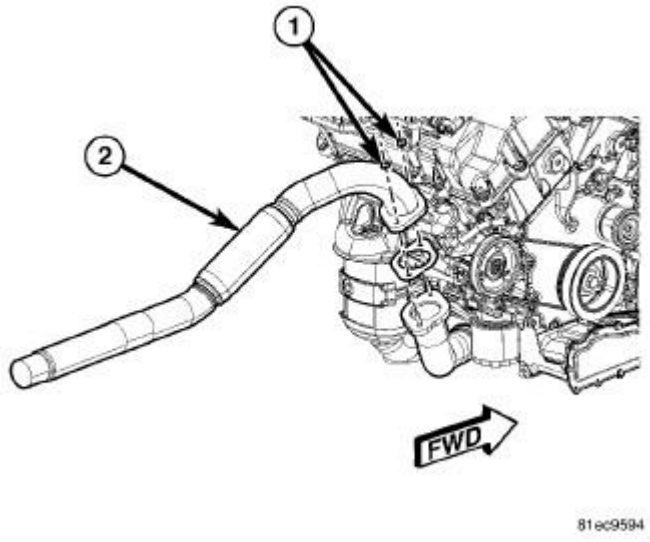

Fig. 288: Exhaust Extension Pipe
Courtesy of CHRYSLER LLC

2. Remove the fasteners (1), and remove the exhaust extension pipe (2) from the cross under pipe.

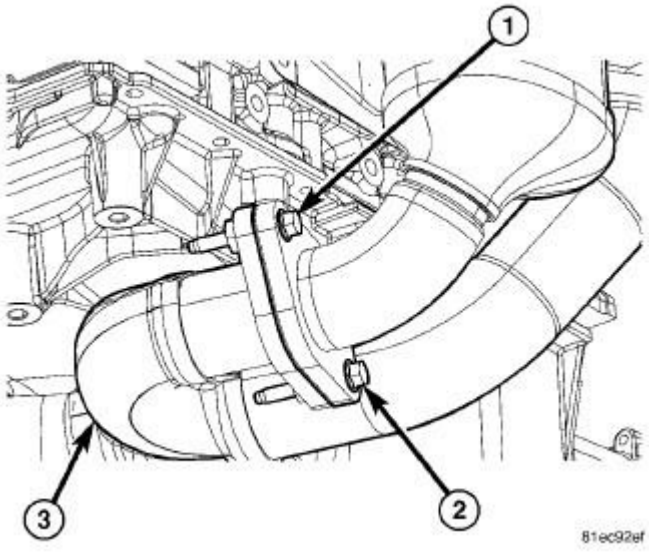

Fig. 289: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

3. Remove the rear maniverter-to-cross under pipe fasteners (1) and (2).

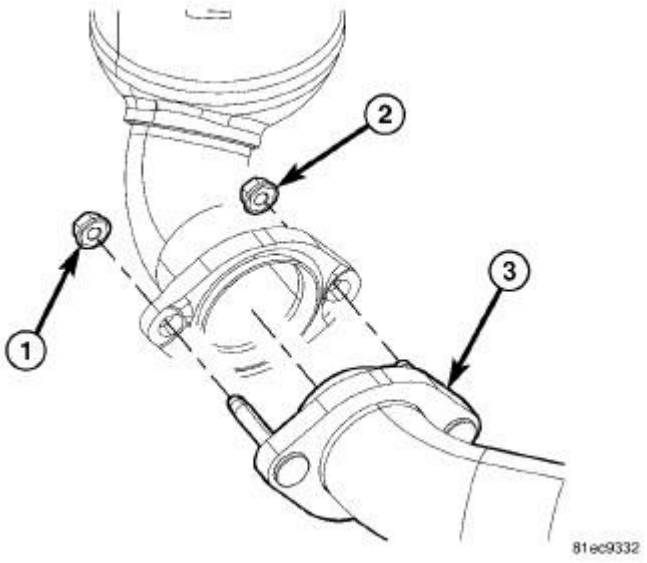

Fig. 290: Front Maniverter-To-Cross Under Fasteners
Courtesy of CHRYSLER LLC

4. Remove the front maniverter-to-cross under fasteners (1) and (2), and remove the cross under pipe (3).

Installation

INSTALLATION

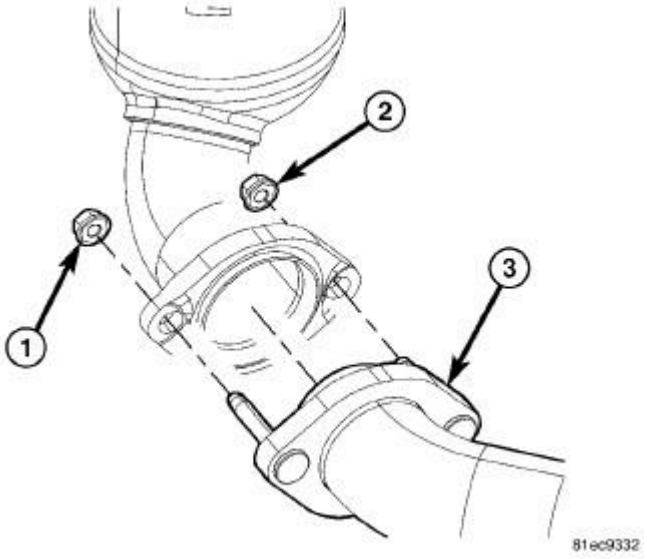

Fig. 291: Front Maniverter-To-Cross Under Fasteners
Courtesy of CHRYSLER LLC

1. Install the cross under pipe (3). and the front maniverter-to-cross under fasteners (1) and (2). Tighten to 27 Nm (20 ft. lb.).

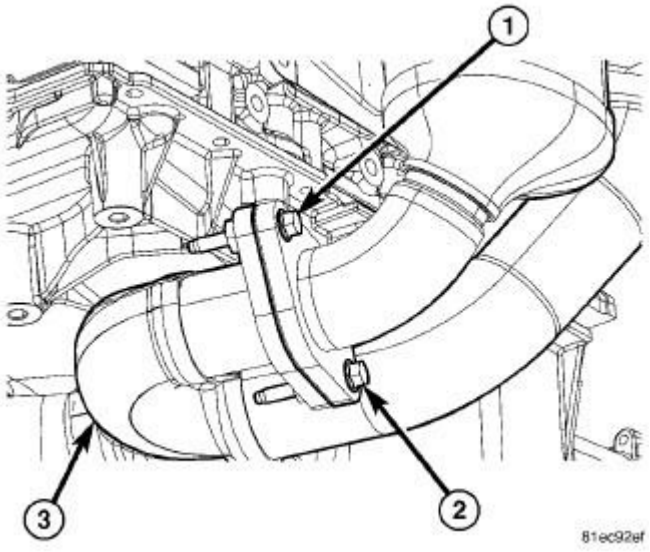

Fig. 292: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

2. Install the rear maniverter-to-cross under pipe fasteners (1) and (2). Tighten to 29 Nm (21 ft. lb.).

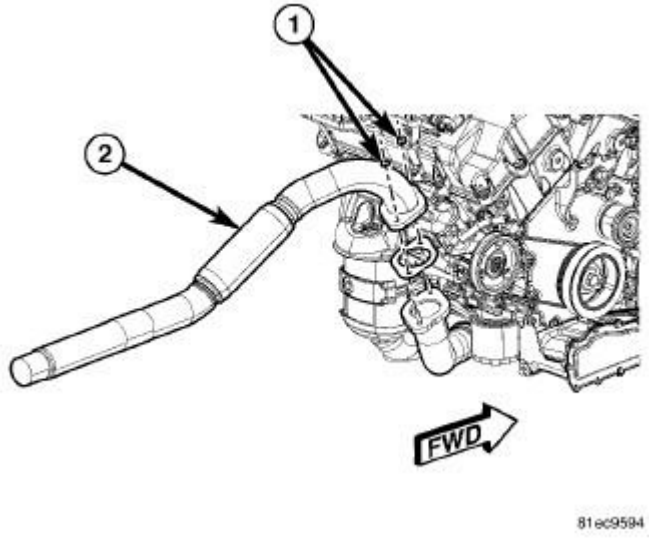

Fig. 293: Exhaust Extension Pipe
Courtesy of CHRYSLER LLC

3. Install the exhaust extension pipe (2) to the cross under pipe, and install the fasteners (1). Tighten to 27 Nm (20 ft. lb.)

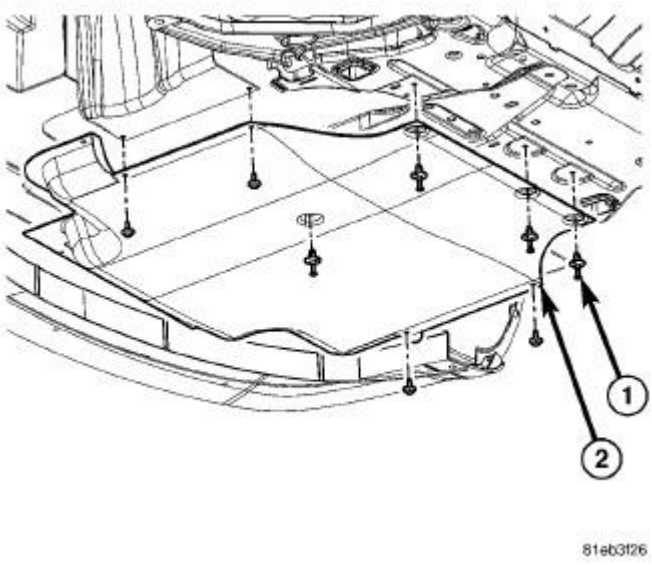

Fig. 294: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

4. Install the belly pan (2).

MANIFOLD, EXHAUST, FRONT

Removal

REMOVAL

1. Disconnect negative battery cable.
2. Remove the engine cover.

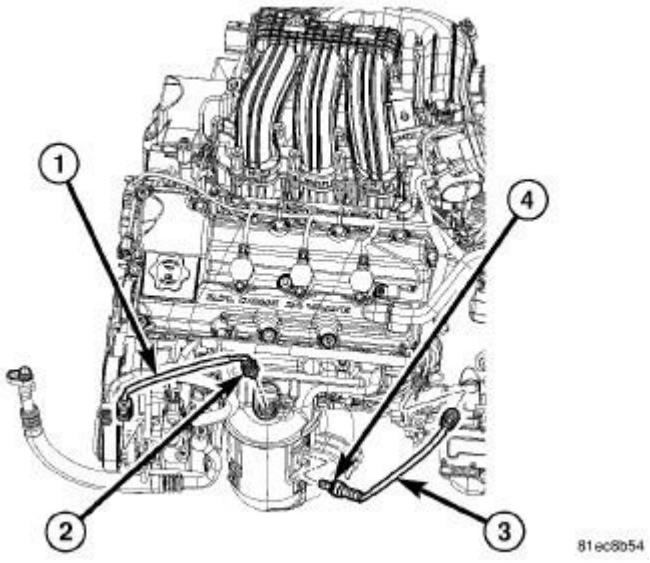

Fig. 295: Oxygen Sensors
Courtesy of CHRYSLER LLC

3. Disconnect and remove oxygen sensors (2) and (4).

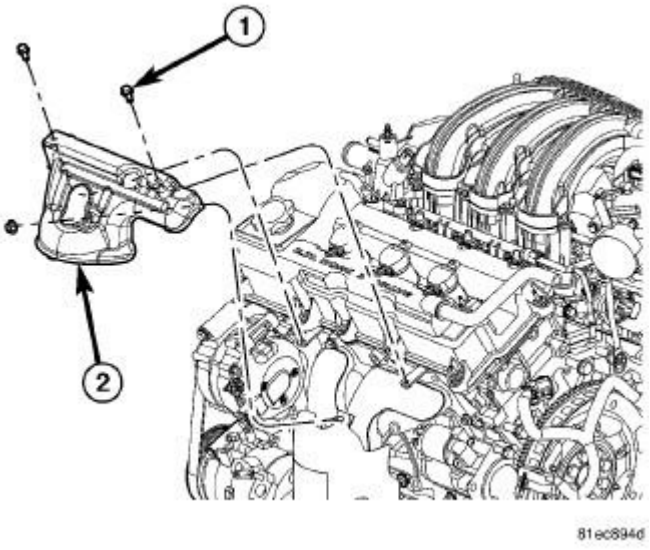

Fig. 296: Upper Maniverter Heat Shield
Courtesy of CHRYSLER LLC

4. Remove the upper maniverter heat shield (2).

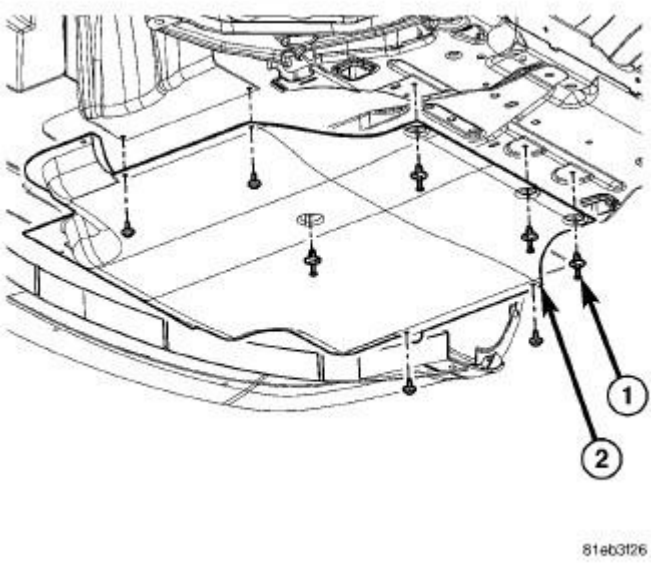

Fig. 297: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

5. Remove the belly pan (2).

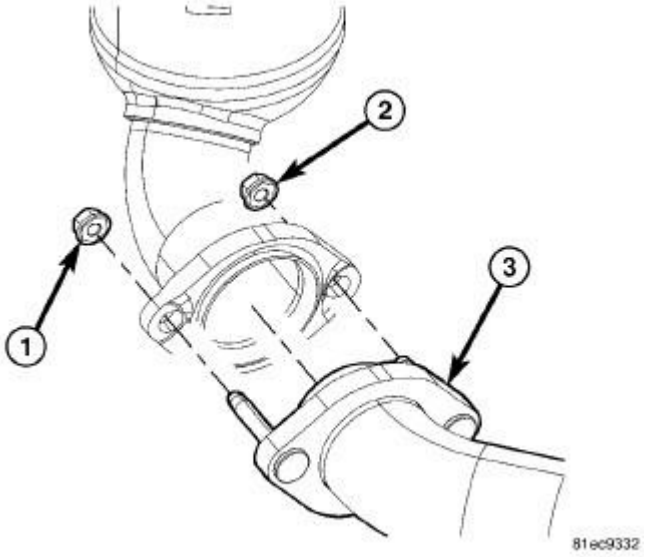

Fig. 298: Front Maniverter-To-Cross Under Fasteners
Courtesy of CHRYSLER LLC

6. Remove the front maniverter-to-crossunder fasteners (1) and (2).

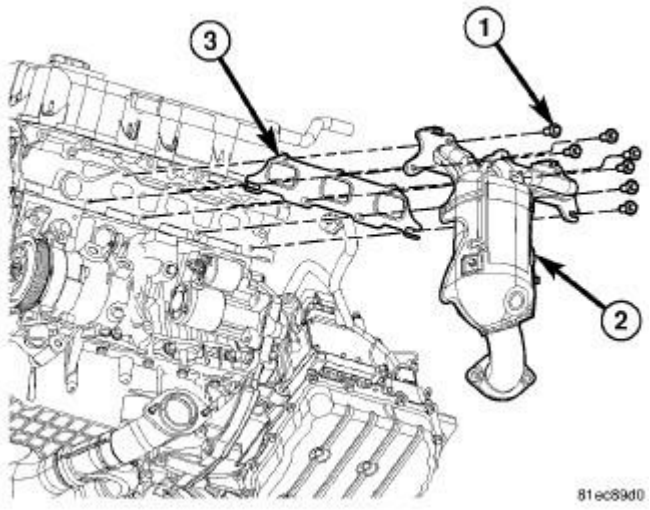

Fig. 299: Front Exhaust Maniverter Attaching Bolts
Courtesy of CHRYSLER LLC

7. Remove front exhaust maniverter attaching bolts (1) and remove the front maniverter (2).

Inspection

INSPECTION

1. Inspect exhaust manifolds for damage or cracks.
2. Check manifold flatness.
3. Inspect the exhaust manifold gasket for obvious discoloration or distortion.
4. Check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

Installation

INSTALLATION

1. Clean gasket mounting surfaces. See **Engine - Standard Procedure**.

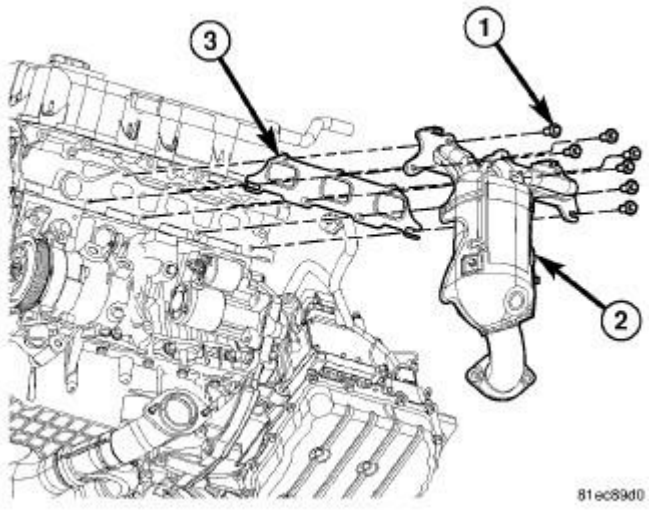

Fig. 300: Front Exhaust Maniverter Attaching Bolts
Courtesy of CHRYSLER LLC

2. Install a new gasket (3), the front maniverter (2), and the front exhaust maniverter attaching bolts (1). Tighten bolts to 23 Nm (17 ft. lb).

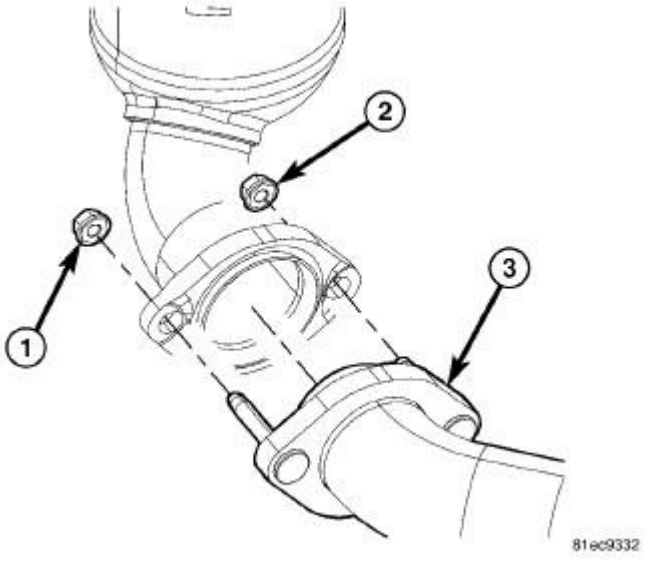

Fig. 301: Front Maniverter-To-Cross Under Fasteners
Courtesy of CHRYSLER LLC

3. Install the front maniverter-to-crossunder fasteners (1) and (2). Tighten to 27 Nm (20 ft. lb.).

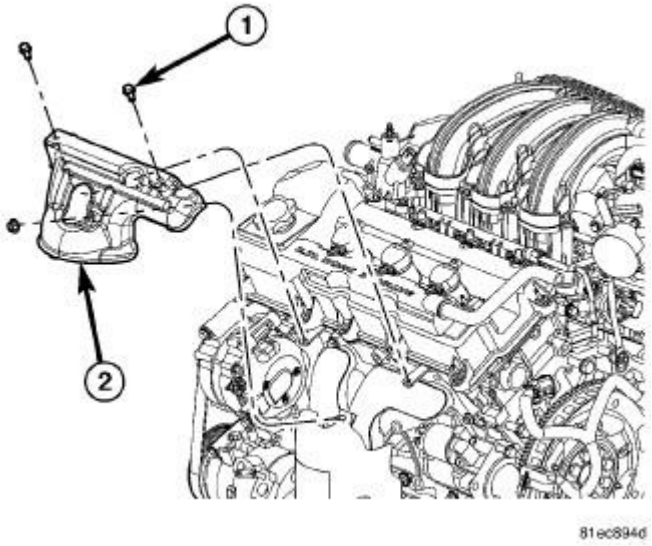

Fig. 302: Upper Maniverter Heat Shield
Courtesy of CHRYSLER LLC

4. Install the upper maniverter heat shield (3) and the heat shield fasteners (1) and (2). Tighten fasteners to 12 Nm (106 in. lb.).

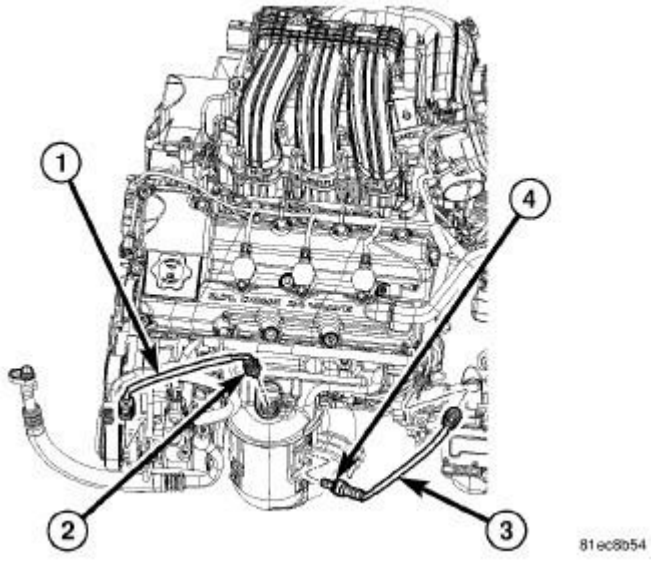

Fig. 303: Oxygen Sensors
Courtesy of CHRYSLER LLC

5. Install the oxygen sensors (2) and (4). 41 Nm (30 ft. lbs.)

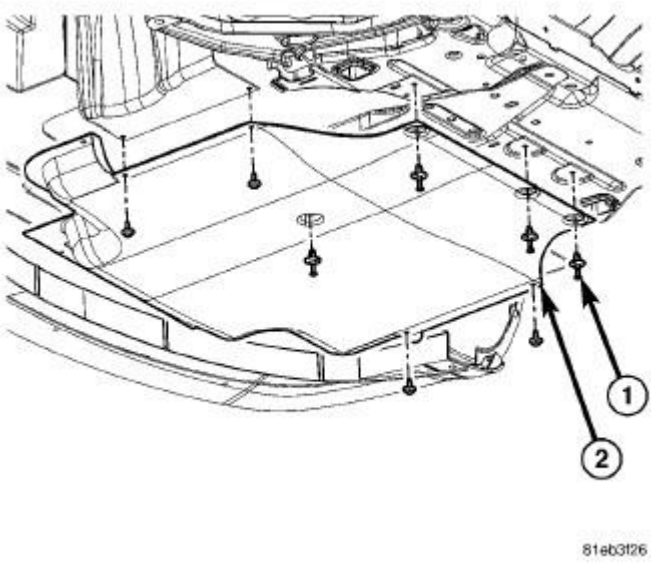

Fig. 304: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

6. Install the belly pan (2).
7. Install the negative battery cable.
8. Install the engine cover.

MANIFOLD, EXHAUST, REAR

Removal

REMOVAL

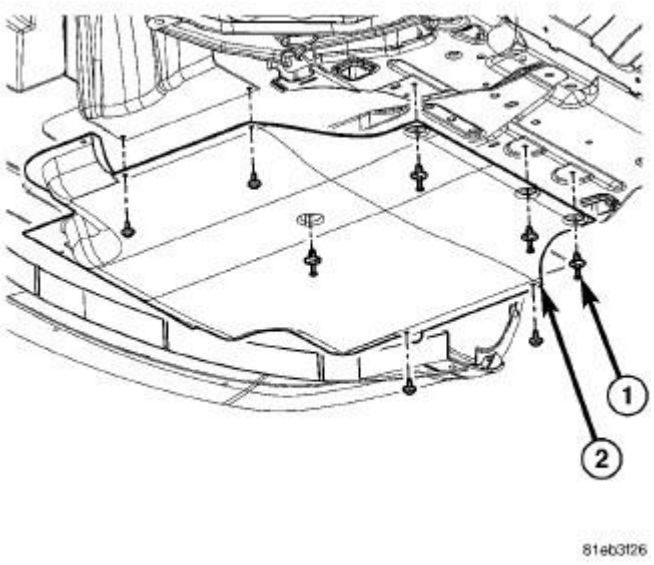

Fig. 305: Belly Pan
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

1. Remove the belly pan (2).

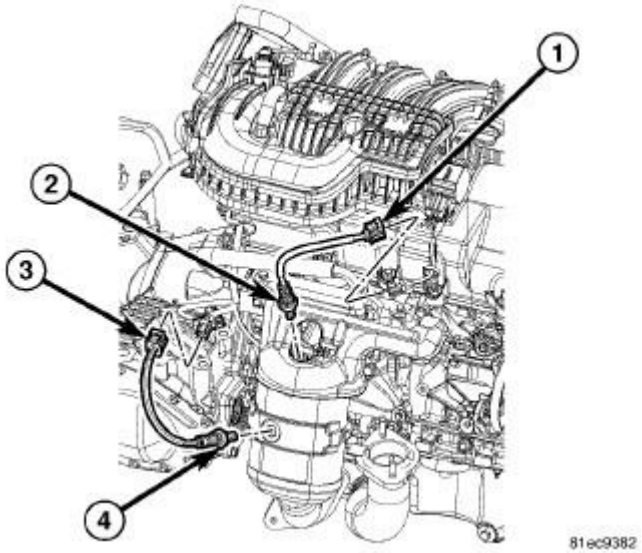

Fig. 306: Oxygen Sensors
Courtesy of CHRYSLER LLC

2. Remove the oxygen sensors (2) and (4).

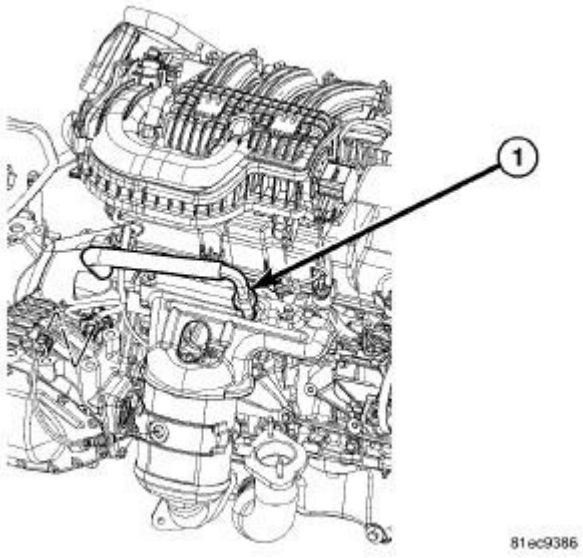

Fig. 307: Exhaust Gas Recirculation Tube
Courtesy of CHRYSLER LLC

3. Remove the EGR tube (1).

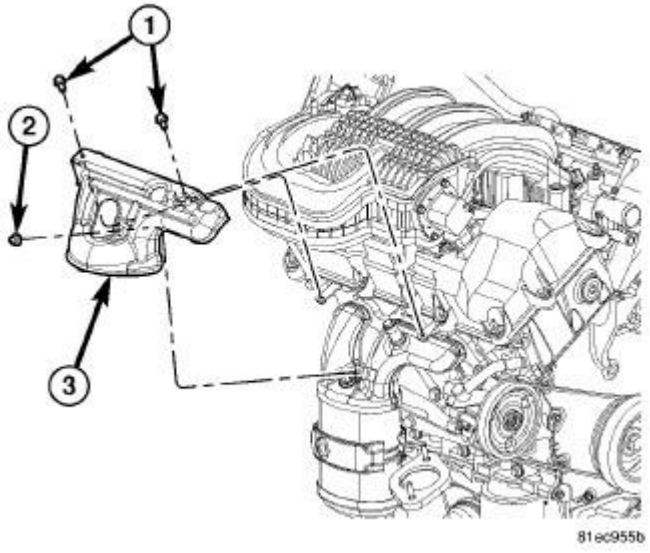

Fig. 308: Rear Maniverter Heat Shield
Courtesy of CHRYSLER LLC

4. Remove the rear maniverter heat shield (3).

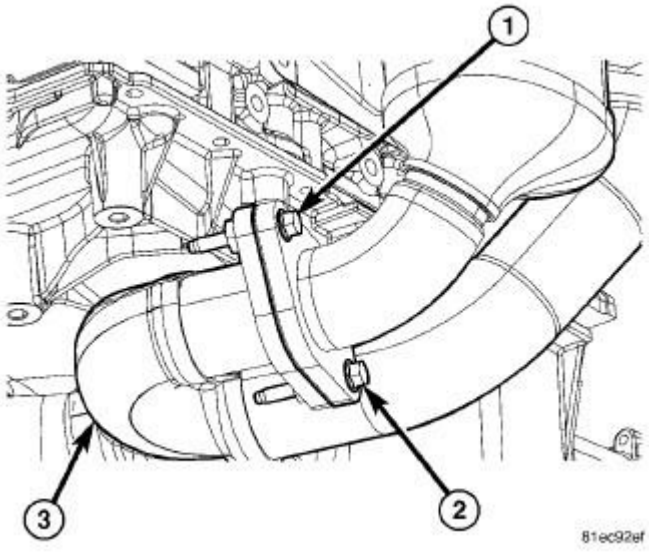

Fig. 309: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

5. Remove the rear maniverter-to-crossunder fasteners (1) and (2).

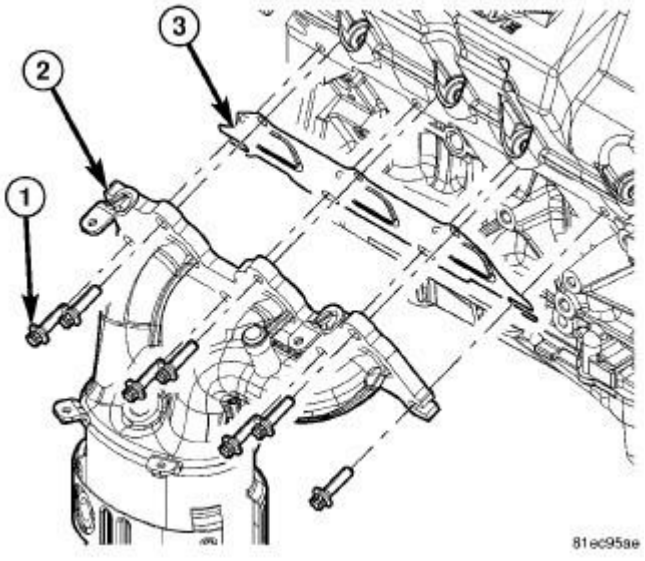

Fig. 310: Rear Maniverter Fasteners
Courtesy of CHRYSLER LLC

6. Remove the rear maniverter fasteners (1), and the rear maniverter (2).

Inspection

INSPECTION

1. Inspect exhaust manifolds for damage or cracks.
2. Check manifold flatness.
3. Inspect the exhaust manifold gasket for obvious discoloration or distortion.
4. Check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

Installation

INSTALLATION

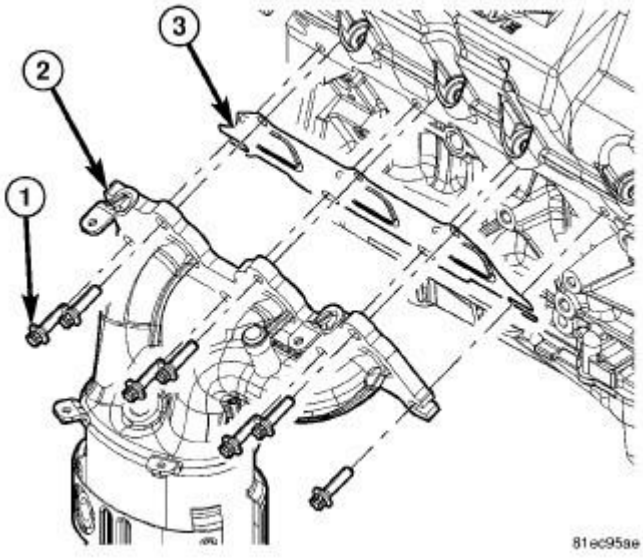

Fig. 311: Rear Maniverter Fasteners
Courtesy of CHRYSLER LLC

1. Install the rear maniverter gasket (3), the rear maniverter (2), and the rear maniverter fasteners (1). Tighten the rear maniverter fasteners to 23 Nm (17 ft. lb)

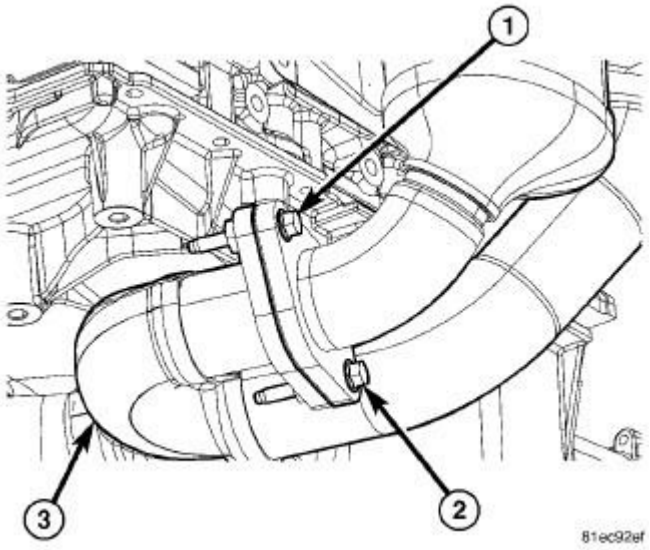

Fig. 312: Exhaust Cross-Under Pipe
Courtesy of CHRYSLER LLC

2. Install the rear maniverter-to-crossunder fasteners (1) and (2). Tighten to 29 Nm (21 ft. lb.).

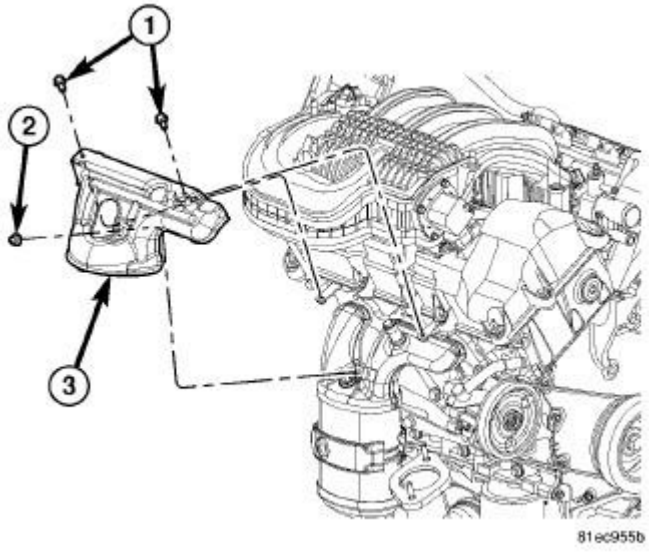

Fig. 313: Rear Maniverter Heat Shield
Courtesy of CHRYSLER LLC

3. Install the rear maniverter heat shield (3). Tighten fasteners to 12 Nm (106 in. lb.).

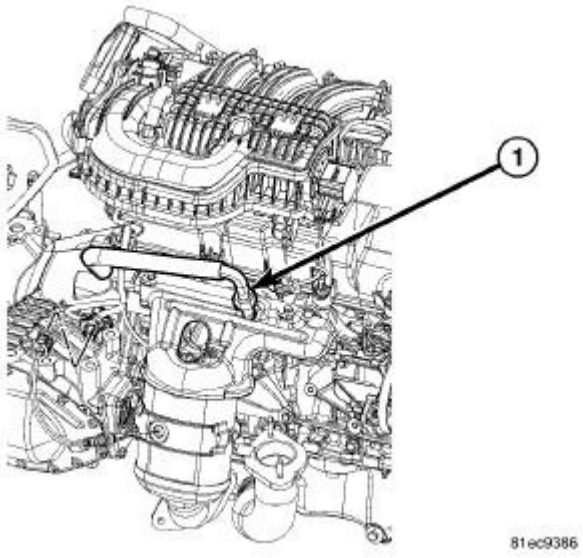

Fig. 314: Exhaust Gas Recirculation Tube
Courtesy of CHRYSLER LLC

4. Install the EGR tube (1). Refer to **Emissions Control/Exhaust Gas Recirculation/TUBE, Exhaust Gas Recirculation (EGR) - Installation** .

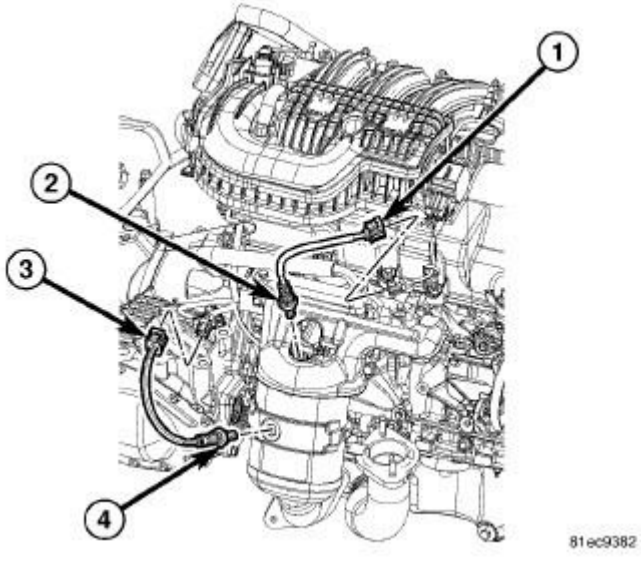

Fig. 315: Oxygen Sensors
Courtesy of CHRYSLER LLC

5. Install the oxygen sensors (2) and (4). Tighten to 41 Nm (30 ft. lbs.).

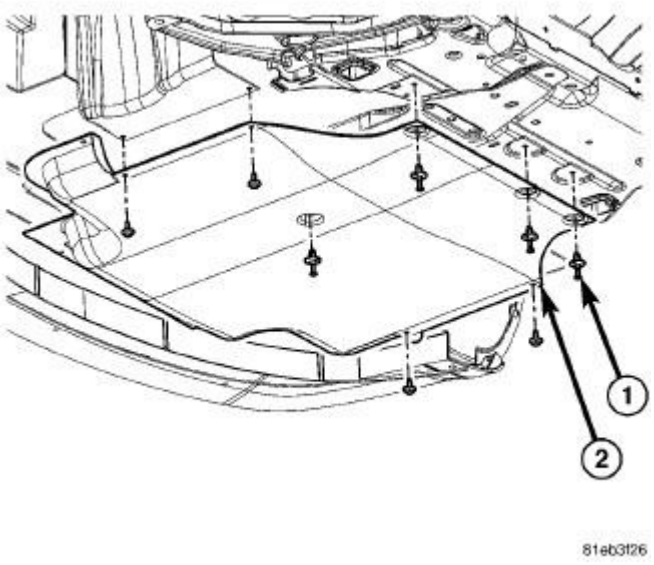

Fig. 316: Belly Pan
Courtesy of CHRYSLER LLC

1 - Belly Pan Fasteners 2 - Belly Pan

6. Install the belly pan (2).

MANIFOLD, INTAKE

Diagnosis and Testing

INTAKE MANIFOLD LEAKS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

WARNING: Use extreme caution when the engine is operating. Do not stand in a direct line with the fan. Do not put your hands near the pulleys, belts or the fan. Do not wear loose clothing.

1. Start the engine.
2. Spray a small stream of water (Spray Bottle) at the suspected leak area.
3. If engine RPM'S change, the area of the suspected leak has been found.
4. Repair as required.

Standard Procedure

INTAKE MANIFOLD VACUUM PORT REPAIR

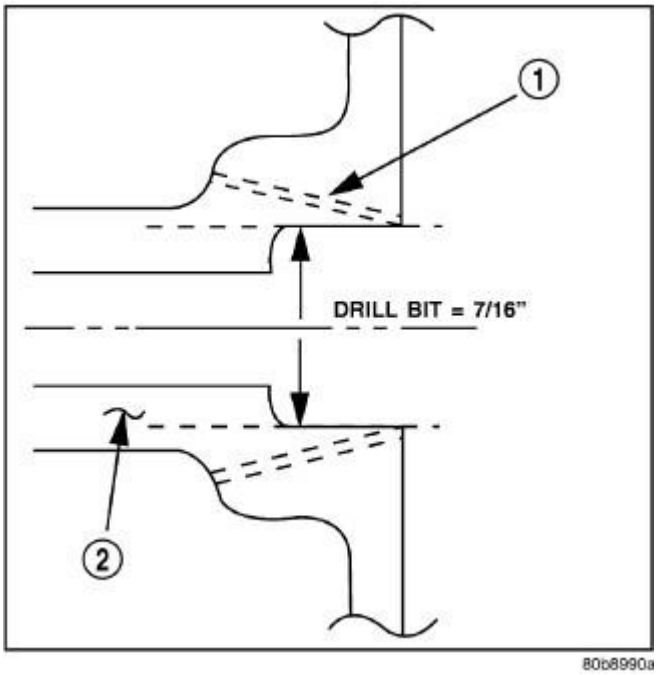

Fig. 317: MANIFOLD PORT (NIPPLE) REPAIR
Courtesy of CHRYSLER LLC

1 - 1/4" - 18 NPT PIPE TAP 2 - NIPPLE (PORT)

The composite intake manifold vacuum ports can be repaired. Although, if the manifold plenum chamber is damaged or cracked, the manifold must be replaced.

To repair a broken or damaged vacuum nipple (port) on the composite intake manifold, perform the following procedure:

PARTS REQUIRED	TOOLS REQUIRED
Brass Nipple - 3/8" O.D. x 1/4" pipe thread (Speed Control Port)	Pipe Tap - 1/4" - 18 NPT
Brass Nibble - 1/2" O.D. x 1/4" pipe thread (Brake Booster Port)	Drill Bit - 7/16"
	File/Sand Paper

NOTE: While performing this procedure, avoid getting the manifold material residue into the plenum chamber.

1. File or sand the remaining port back until a flat surface is obtained (plane normal to nipple (port) axis).
2. Drill out the nipple (port) base using a 7/16" drill bit.
3. Using a 1/4"-18 NPT pipe tap, cut internal threads. Use caution to start tap in a axis same as original nipple.
4. Apply Mopar® Thread Sealant to threads of repair nipple(s).

5. Install repair nipple(s). Do not over torque repair nipple(s).

Removal

UPPER

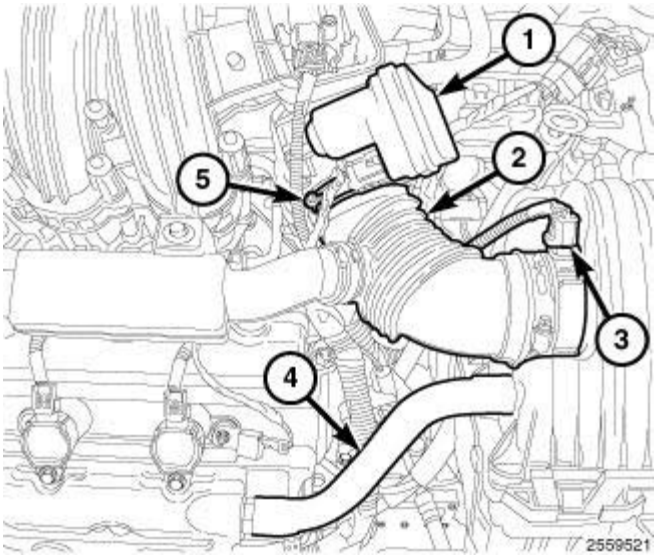

Fig. 318: Identifying Air Makeup Hose, Throttle Body & Air Inlet Hose
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the throttle body air inlet hose (2) and air cleaner housing assembly. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

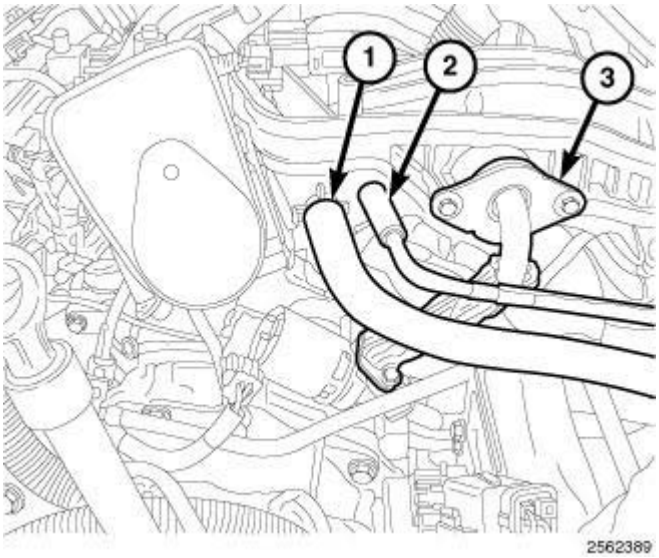

Fig. 319: Locating Upper Exhaust Gas Recirculation Tube, Brake Booster Hose & Vapor Purge Hose
Courtesy of CHRYSLER LLC

3. Remove the upper EGR tube (3). Refer to **Emissions Control/Exhaust Gas Recirculation/TUBE, Exhaust Gas Recirculation (EGR) - Removal** .
4. Disconnect the brake booster hose (1) and the vapor purge hose (2) from the upper intake manifold.

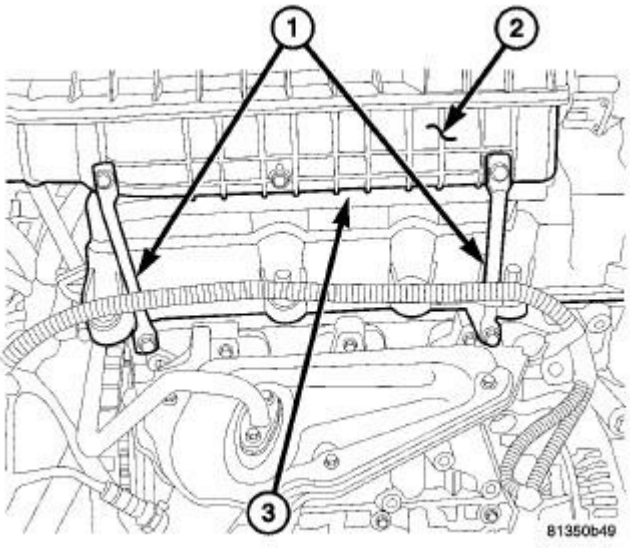

Fig. 320: Intake Brackets
Courtesy of CHRYSLER LLC

5. Remove the two intake manifold support brackets (1).

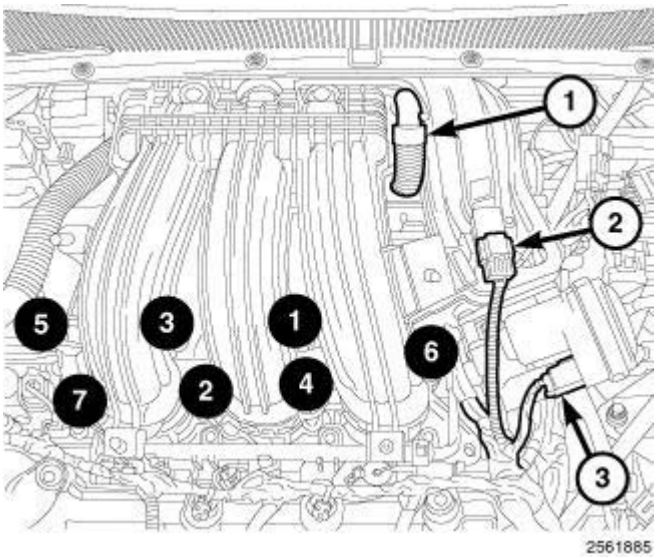

Fig. 321: Locating Manifold Bolts, Manifold Absolute Pressure Sensor & Electronic Throttle Control Electrical Connectors
Courtesy of CHRYSLER LLC

6. Disconnect the electrical connectors from the Manifold Absolute Pressure (MAP) sensor (2) and the

Electronic Throttle Control (ETC) (3).

7. Disconnect the Positive Crankcase Ventilation (PCV) hose (1).
8. Remove the seven manifold attaching bolts in reverse of the tightening sequence shown in illustration.
9. Remove the upper intake manifold.

LOWER

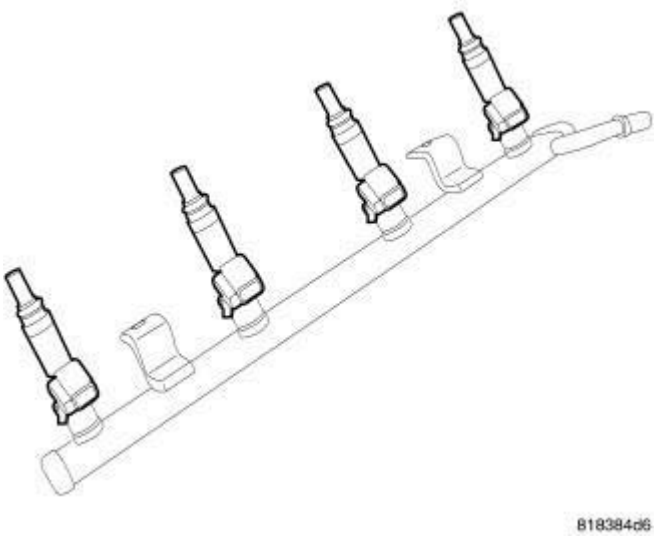

Fig. 322: Fuel Injector Location - Typical
Courtesy of CHRYSLER LLC

1. Release fuel system pressure.
2. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Disconnect electrical connectors from the fuel injectors.
4. Remove fuel supply hose from fuel rail
5. Remove screw attaching fuel rail support bracket to the throttle body support bracket.
6. Remove bolts attaching fuel rail.

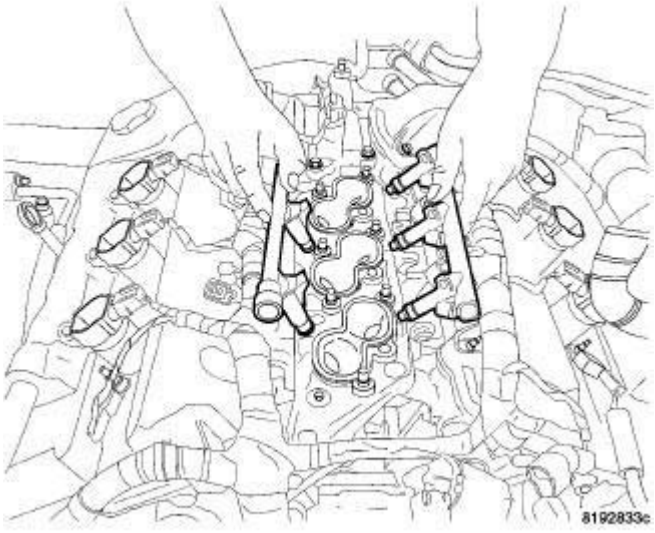

Fig. 323: FUEL RAIL REMOVE/INSTALL
Courtesy of CHRYSLER LLC

7. Remove fuel rail and injectors as an assembly.

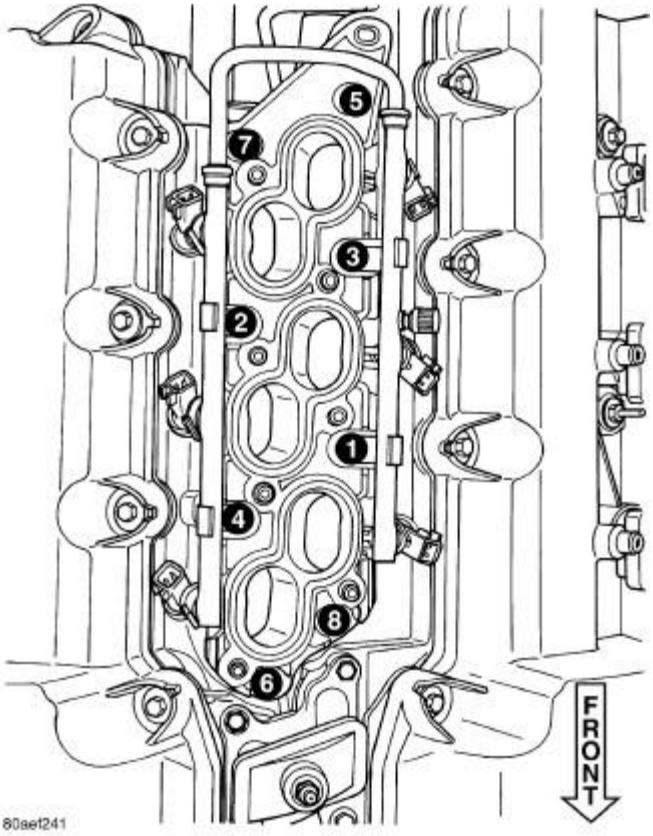

Fig. 324: Lower Intake Manifold Tightening Sequence
Courtesy of CHRYSLER LLC

8. Remove manifold attaching bolts.
9. Remove lower manifold.
10. Inspect manifold. See **Engine/Manifolds/MANIFOLD, Intake - Inspection**.

Inspection

INTAKE MANIFOLD UPPER

Check manifold for:

- Damage and cracks
- Gasket surface damage or warpage
- Damaged or clogged EGR ports

If the manifold exhibits any damaged or warped conditions, replace the manifold. Clean EGR ports as necessary.

If a vacuum port is damaged, a repair procedure can be performed. See **Engine/Manifolds/MANIFOLD, Intake - Standard Procedure**.

INTAKE MANIFOLD LOWER

Check manifold for:

- Damage and cracks
- Gasket surface damage or warpage
- Damaged fuel injector ports

If the manifold exhibits any of these conditions, replace the manifold.

Installation

UPPER

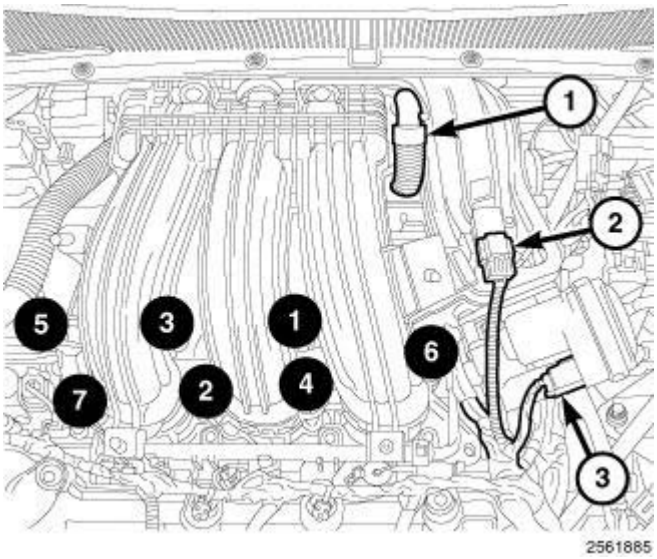

Fig. 325: Locating Manifold Bolts, Manifold Absolute Pressure Sensor & Electronic Throttle Control Electrical Connectors
Courtesy of CHRYSLER LLC

1. Clean and inspect the gasket sealing surfaces. Gaskets can be reused if free of cuts or tears.

NOTE: Make sure the fuel injectors and wiring harnesses are positioned to not interfere with upper manifold installation.

2. Position the upper intake manifold onto the lower intake manifold.
3. Install the manifold attaching bolts and tighten in the sequence shown in illustration to 12 N.m (105 in. lbs.).
4. Connect the Positive Crankcase Ventilation (PCV) hose (1).
5. Connect the electrical connectors to the Manifold Absolute Pressure (MAP) sensor (2) and the Electronic Throttle Control (ETC) (3).

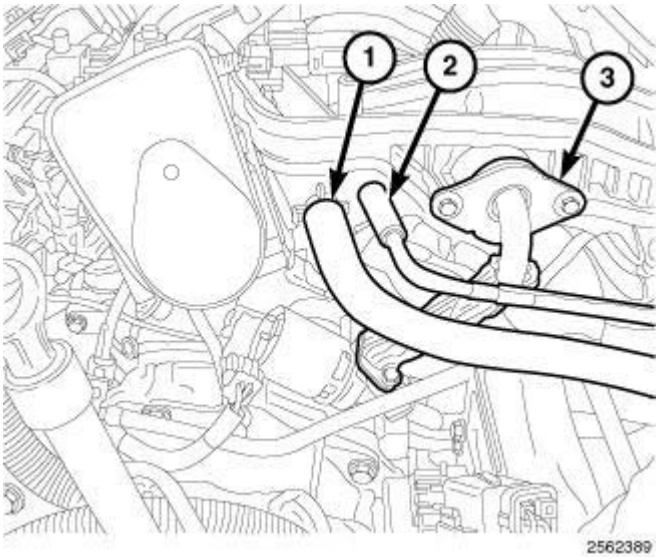

Fig. 326: Locating Upper Exhaust Gas Recirculation Tube, Brake Booster Hose & Vapor Purge Hose
Courtesy of CHRYSLER LLC

6. Connect the brake booster hose (1) and the vapor purge hose (2) to the upper intake manifold.
7. Install the upper EGR tube (3). Refer to **Emissions Control/Exhaust Gas Recirculation/TUBE, Exhaust Gas Recirculation (EGR) - Installation** .

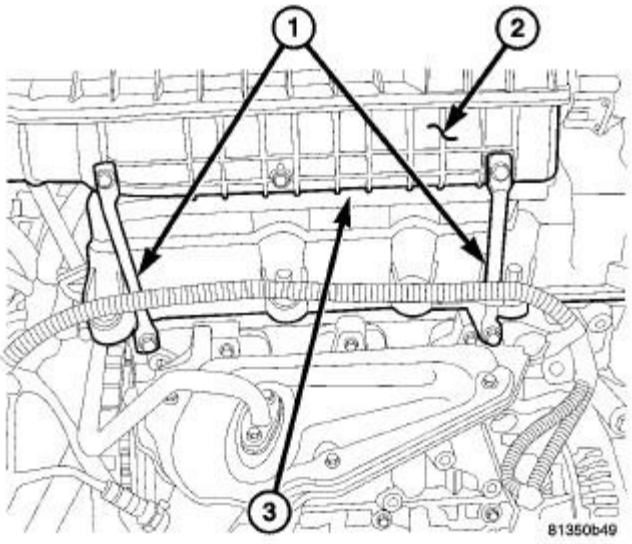

Fig. 327: Intake Brackets
Courtesy of CHRYSLER LLC

8. Install the two intake manifold support brackets (1). Tighten the fasteners to 12 N.m (105 in. lbs.).

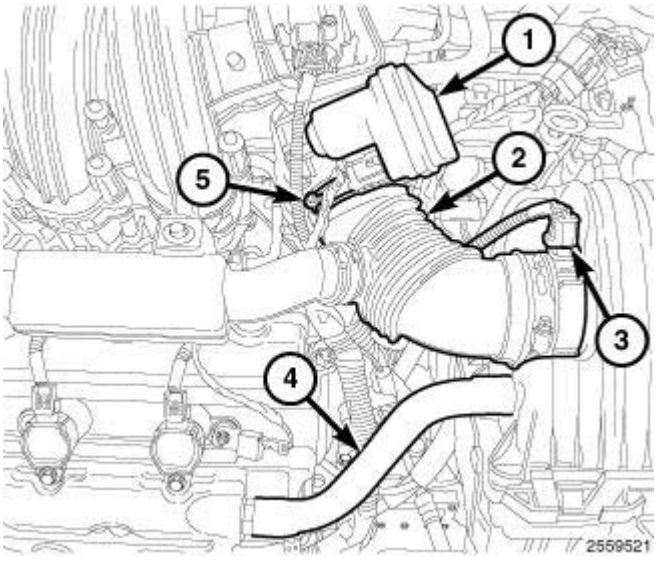

Fig. 328: Identifying Air Makeup Hose, Throttle Body & Air Inlet Hose
Courtesy of CHRYSLER LLC

9. Install the air cleaner housing assembly and connect the throttle body air inlet hose (2). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
10. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

LOWER

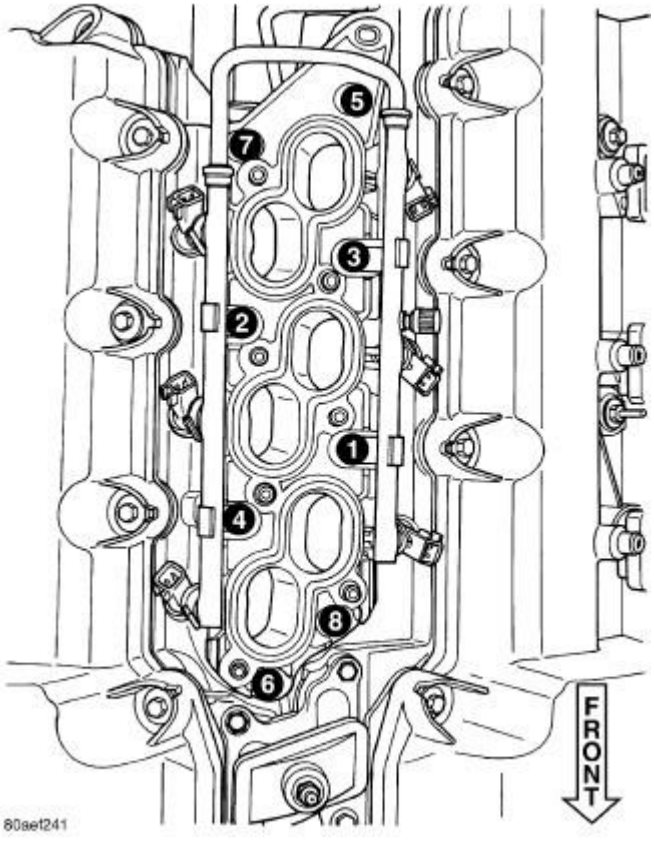

Fig. 329: Lower Intake Manifold Tightening Sequence
Courtesy of CHRYSLER LLC

1. Clean and inspect sealing surfaces of cylinder head and manifold. Gaskets can be reused provided they are free of cuts or tears.
2. Position manifold on cylinder head surfaces.

NOTE: For ease of installing upper intake manifold, install a bolt 2 - 3 turns to the rearmost attaching hole of intake. This will properly position lower manifold.

3. Install manifold attaching bolts and tighten in sequence shown in illustration, to 12 N.m (105 in. lbs.). Remove bolt used for aligning manifold.

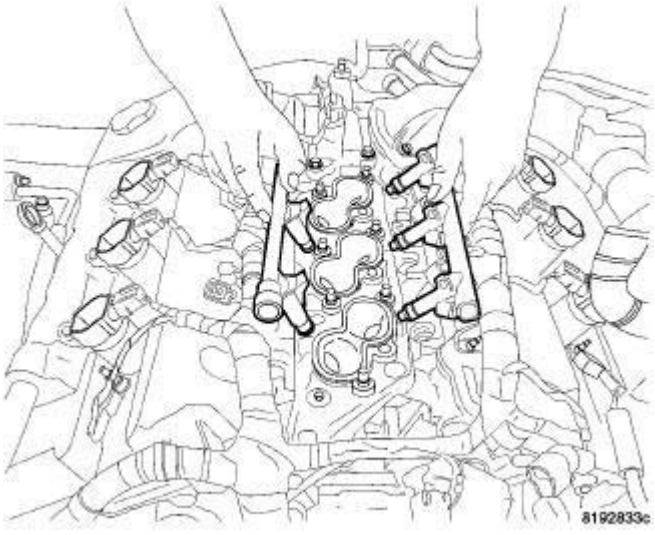

Fig. 330: FUEL RAIL REMOVE/INSTALL
Courtesy of CHRYSLER LLC

4. Install fuel rail with injectors.
5. Connect the fuel injector electrical connectors.

NOTE: Make sure fuel injectors are located in the correct location and position, as upper intake manifold interference could occur.

6. Install screw attaching fuel rail support bracket to the throttle body support bracket.
7. Connect fuel supply hose to fuel rail.
8. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

VALVE TIMING

DESCRIPTION

DESCRIPTION

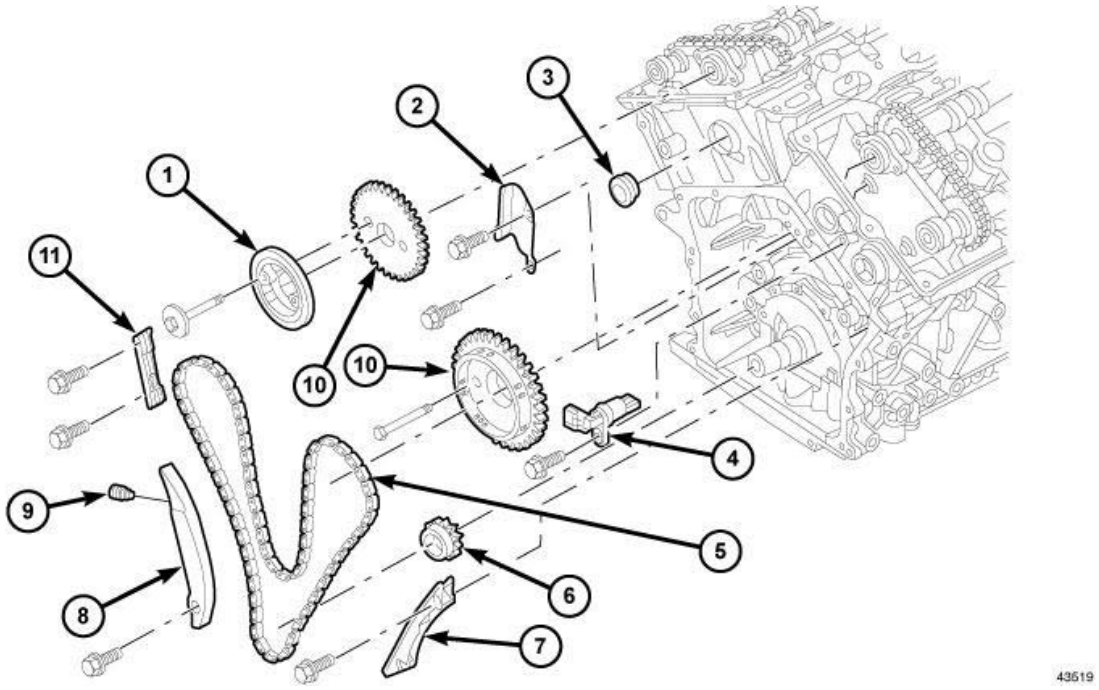

Fig. 331: Identifying Timing Drive System Components
Courtesy of CHRYSLER LLC

The timing drive system has been designed to provide quiet performance and reliability to support a **NON** free-wheeling engine. The system consists of a primary (5) drive chain and a secondary chain drive.

The **primary** timing chain (5) is a double-flexure, inverted tooth type chain. The primary chain drives both of the intake camshafts directly from a sprocket mounted on the crankshaft. In addition, the water pump is driven by the "back side" of the primary chain, necessitating the double-flexure type chain.

The chain is controlled by three fixed chain guides (2), (7), (11) and a pivoting tensioner arm (8). These guides utilize low-friction and long wearing nylon plastic wear faces. To tension the primary chain, a fully automatic spring-loaded, engine oil-fed, hydraulic tensioner (9) is used. The tensioner (9) is mounted in the right cylinder head with the plunger contacting the pivoting tensioner arm (8). A mechanical ratchet mechanism inside the tensioner prevents excessive chain slack upon engine start-up as the chain wears. The tensioner is designed with an internal oil reservoir to assure noise-free performance, even during engine start-up before oil pressure reaches the tensioner.

For lubrication the primary chain utilizes oil leakage from the front of the oil pump. This oil spills on the crankshaft sprocket, which is then carried by the chain throughout the primary drive.

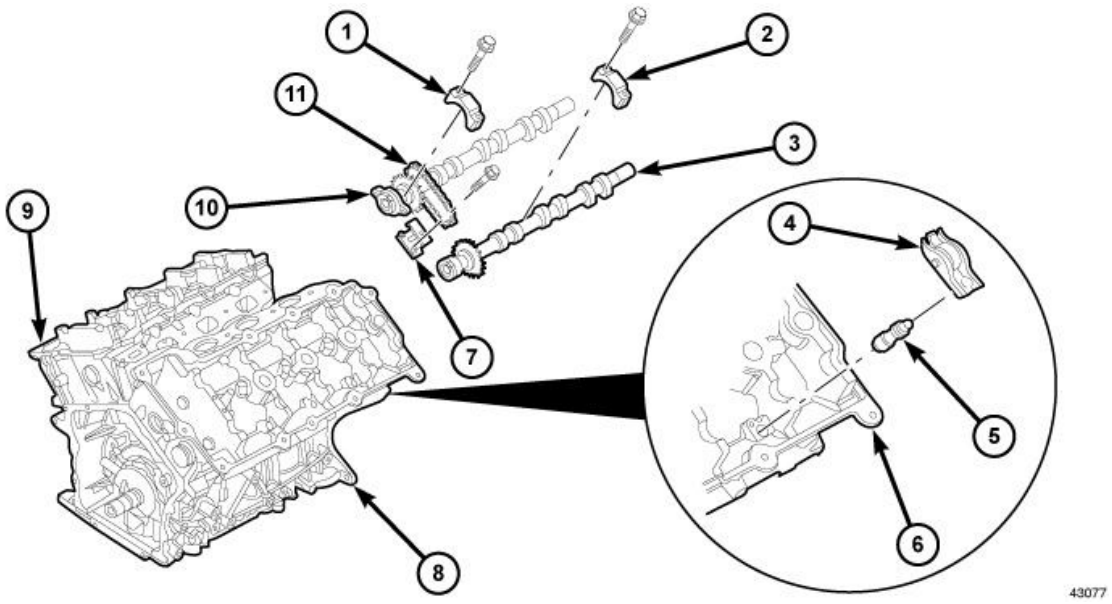

Fig. 332: Camshaft & Valvetrain Components
Courtesy of CHRYSLER LLC

The **secondary** timing chain (11) drive system uses either two conventional roller-type chains (early production) or two silent type chains (late production), one at each cylinder bank. The purpose of the secondary chain (11) is to provide a mechanical driven connection between the intake and exhaust camshafts. The intake camshafts drive the exhaust camshafts. The sprockets for both intake and exhaust camshafts are a press-fit and are only serviced as an assembly with the camshafts.

To tension the secondary chain, spring-loaded, hydraulic tensioners (7) are used at each bank and attach to each cylinder head between the intake and exhaust camshafts. The tensioner (7) incorporates upper and lower chain guide faces. The lower guide face is attached directly to the tensioner's hydraulic plunger. Also, the tensioner uses an internal oil reservoir design to prevent engine start-up noise. The secondary chains are lubricated via an oil passage through the upper guide face on each tensioner.

STANDARD PROCEDURE

ENGINE TIMING - VERIFICATION

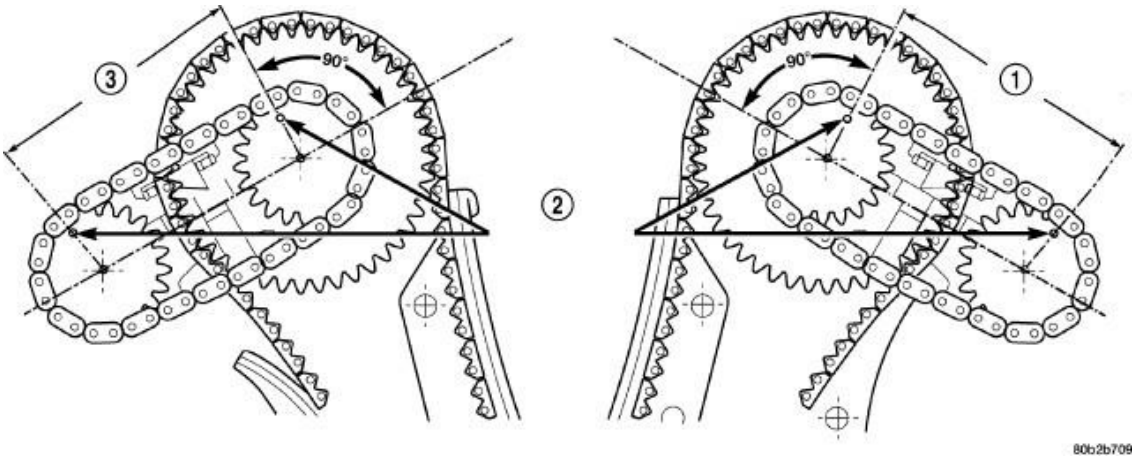

Fig. 333: ENGINE TIMING
Courtesy of CHRYSLER LLC

1 - 12 PINS	3 - 12 PINS
2 - CAMSHAFT TIMING MARKS	

NOTE: Note: The engine timing verification procedure is the same for both conventional roller-type (early production) or silent type (late production) secondary timing chains.

Correct timing is critical for the NON free-wheeling designed, 2.7L engine. Engine timing can be verified by using the following procedures:

1. Remove cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
2. Rotate engine until number one cylinder is at TDC on the EXHAUST stroke.
3. View the intake camshaft sprocket timing mark. The mark should be 90° from the cylinder head cover sealing surface on both right and left cylinder banks.
4. Count the chain pins between the timing marks (2) on the intake camshaft and the exhaust camshaft. Engine is timed correctly when there are 12 chain pins between the timing marks (2) on the intake camshaft and exhaust camshaft.
5. If marks are not correctly aligned, proceed to **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.

CHAIN AND SPROCKETS, TIMING

Removal

TIMING CHAIN AND CAM SPROCKETS

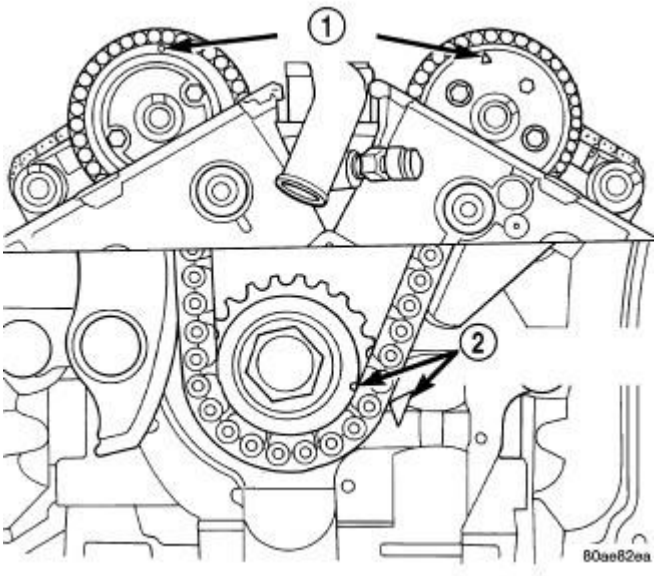

Fig. 334: TIMING MARK ALIGNMENT
Courtesy of CHRYSLER LLC

1 - CAMSHAFT TIMING MARKS 2 - CRANKSHAFT TIMING MARKS

1. Disconnect negative battery cable.
2. Drain cooling system.
3. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
4. Remove cylinder head covers, crankshaft vibration damper, and timing chain cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**, **Engine/Engine Block/DAMPER, Vibration - Removal** or **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

5. Align crankshaft sprocket timing mark to mark on oil pump housing (2). The mark on oil pump housing is 60° ATDC of #1 cylinder.

CAUTION: When the timing chain is removed and the cylinder heads are still installed, DO NOT rotate the camshafts or crankshaft without first locating the proper crankshaft position. Failure to do so will result in valve and/or piston damage.

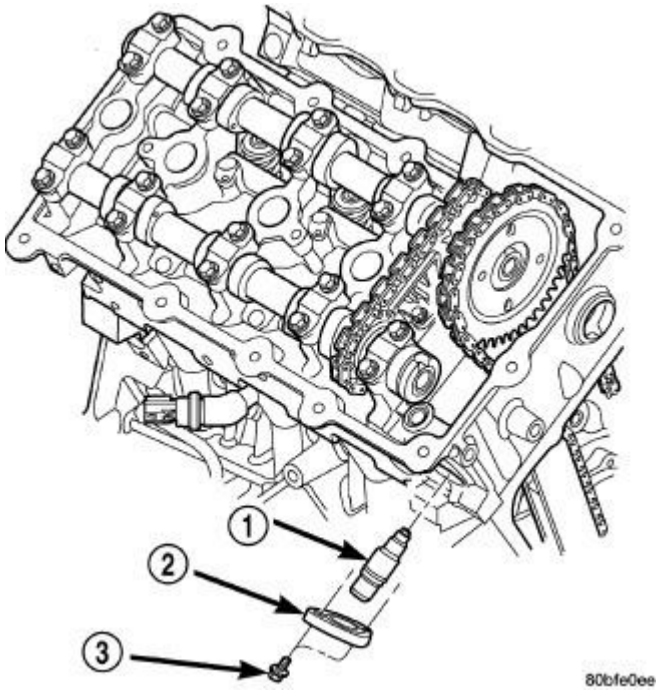

Fig. 335: PRIMARY TIMING CHAIN TENSIONER
Courtesy of CHRYSLER LLC

1 - TENSIONER
2 - RETAINER CAP
3 - BOLT

6. Remove power steering pump and bracket as an assembly. **Do not** disconnect power steering lines from pump. Reposition pump and support with suitable retaining strap.
7. Remove primary timing chain tensioner retainer cap (2) and tensioner (1) from right cylinder head.
8. Disconnect and remove camshaft position sensor from left cylinder head.
9. Remove timing chain guide access plugs from cylinder heads.

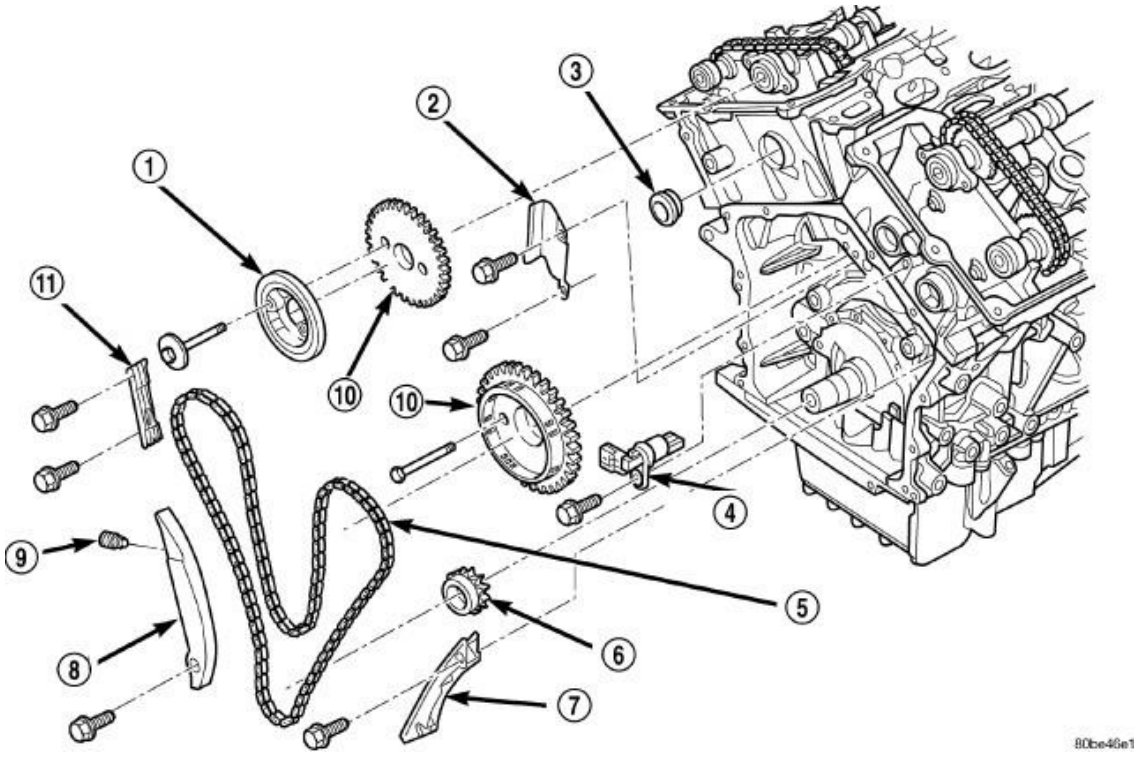

Fig. 336: TIMING DRIVE SYSTEM - PRIMARY
Courtesy of CHRYSLER LLC

1 - CAMSHAFT DAMPER (IF EQUIPPED)	7 - CHAIN GUIDE
2 - CHAIN GUIDE	8 - CHAIN TENSIONER ARM
3 - ACCESS PLUG	9 - CHAIN TENSIONER
4 - CAMSHAFT POSITION SENSOR	10 - CAMSHAFT SPROCKETS
5 - PRIMARY TIMING CHAIN	11 - CHAIN GUIDE
6 - CRANKSHAFT SPROCKET	

NOTE: When camshaft sprocket bolts are removed, the camshafts will rotate in a clockwise direction.

10. Starting with the right camshaft sprocket, remove the sprocket attaching bolts. Remove camshaft damper (if equipped) and sprocket.
11. Remove left side camshaft sprocket attaching bolts and remove sprocket.
12. Remove lower chain guide (7) and tensioner arm (8).
13. Remove the primary timing chain.
14. For removal of crankshaft sprocket, see **Engine/Engine Block/CRANKSHAFT - Removal**.

CRANKSHAFT SPROCKET

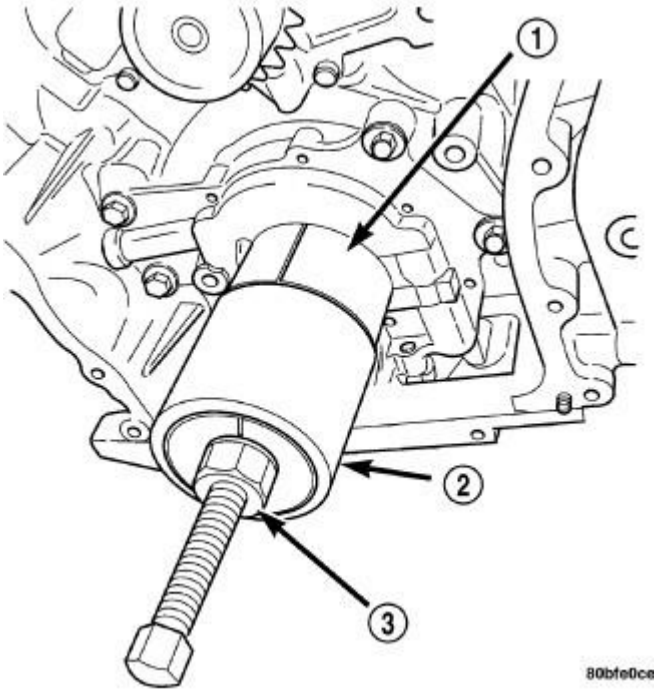

Fig. 337: Crankshaft Sprocket - Removal
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8539
2 - SPECIAL TOOL 5048-6
3 - SPECIAL TOOL 5048-1

1. Remove primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal**.

CAUTION: Use care not to turn crankshaft while removing crankshaft sprocket, as damage to valves and or pistons could occur.

2. Remove crankshaft sprocket by first installing the crankshaft damper bolt. Apply grease or equivalent to damper bolt head and position Special Tools 5048-1, 5048-6, and 8539 (1) on sprocket and crankshaft nose. Remove sprocket using care not to rotate the crankshaft.

Installation

TIMING CHAIN AND CAM SPROCKETS

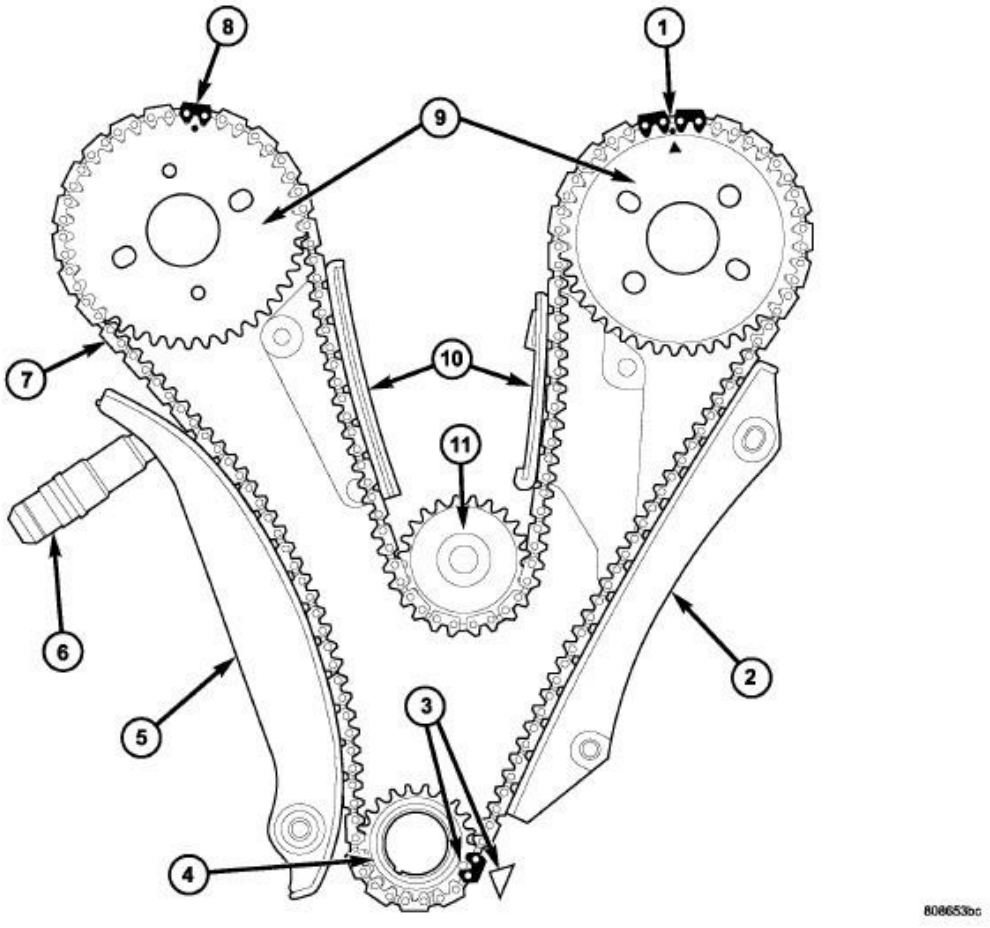

Fig. 338: TIMING CHAIN ALIGNMENT MARKS - PRIMARY
Courtesy of CHRYSLER LLC

1. Inspect all sprockets (4),(9),(11) and chain guides (2),(5),(10). Replace if worn.
2. For crankshaft sprocket installation procedures, see **Engine/Engine Block/CRANKSHAFT - Installation**.
3. If removed, install the right and left side short chain guides (10). Tighten attaching bolts to 28 N.m (250 in. lbs.).
4. Align the crankshaft sprocket timing mark to the mark on the oil pump housing (3).

NOTE: Lubricate timing chain and guides with engine oil before installation.

5. Place the left side primary chain sprocket onto the chain so that the timing mark is located in between the two (plated) timing links (1).

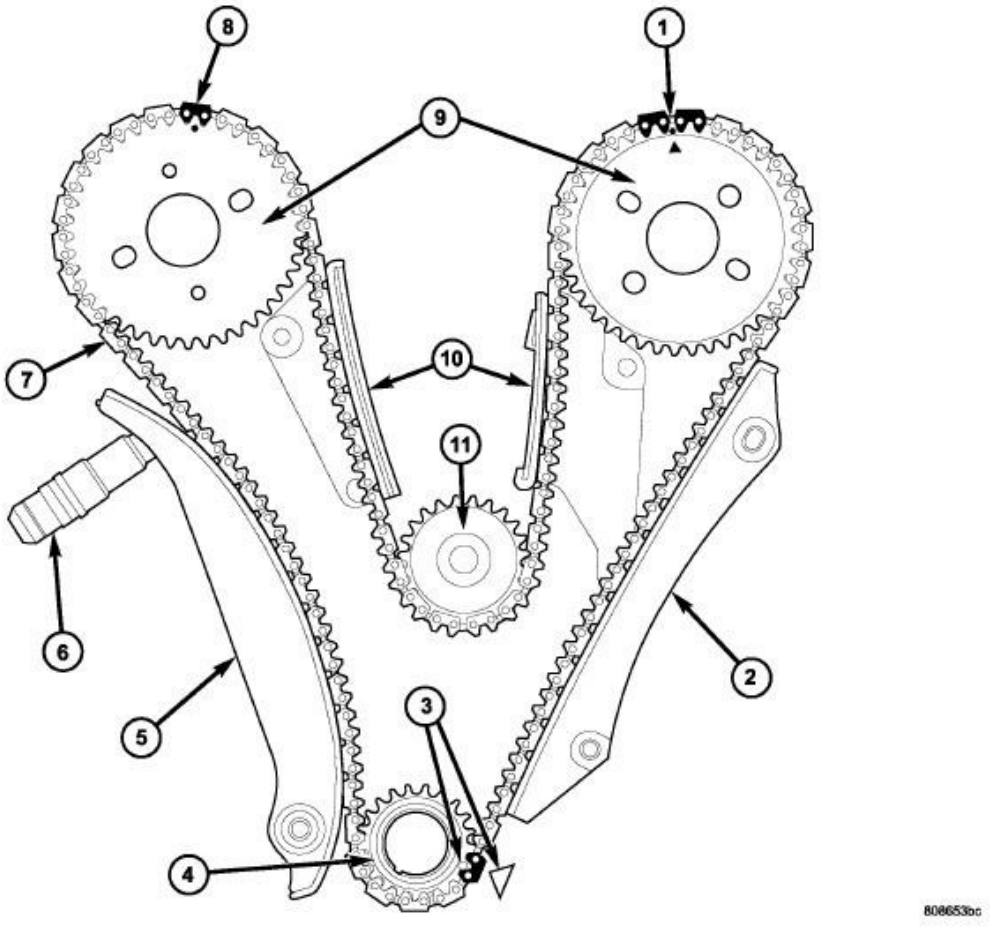

Fig. 339: TIMING CHAIN ALIGNMENT MARKS - PRIMARY
Courtesy of CHRYSLER LLC

6. Lower the primary chain with the left side sprocket through the left cylinder head opening.

NOTE: The camshaft sprockets can be allowed to float on the camshaft hub during installation.

7. Loosely position the left side camshaft sprocket over the camshaft hub.
8. Align the timing (plated) link to the crankshaft sprocket timing mark (3).
9. Position the primary chain onto the water pump drive sprocket (11).
10. Align the right camshaft sprocket timing mark to the timing (plated) link on the timing chain (8) and loosely position over the camshaft hub.
11. Verify that all chain timing (plated) links are properly aligned to the timing marks on all sprockets.
12. Install the left side lower chain guide (2) and tensioner arm (5). Tighten attaching bolts to 28 N.m (250 in. lbs.).

NOTE: Inspect the O-ring on the chain guide access plugs before installing. Replace the O-ring as necessary.

13. Install the chain guide access plugs to the cylinder heads. Tighten plugs to 20 N.m (15 ft. lbs.).

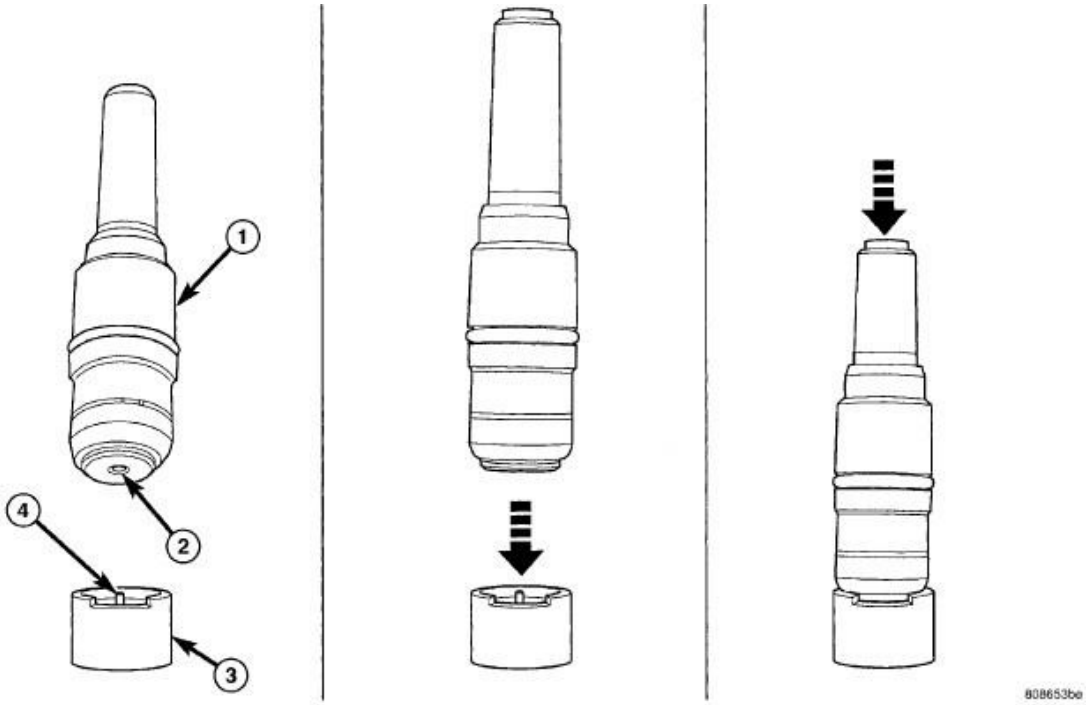

Fig. 340: TIMING CHAIN TENSIONER - OIL PURGING
Courtesy of CHRYSLER LLC

NOTE: To reset the primary timing chain tensioner, engine oil will first need to be purged from the tensioner.

14. Purge oil from the timing chain tensioner using the following procedure:
    a. Place the check ball (2) end of the tensioner into the shallow end of Chain Tensioner Gauge 8186 (3).
    b. Using hand pressure, slowly depress the tensioner until oil is purged from the tensioner.
15. Reset the timing chain tensioner using the following procedure:
    a. Position the cylinder plunger (4) into the deeper end of Chain Tensioner Gauge 8186 (3).
    b. Apply a downward force until tensioner is reset.

NOTE: If oil was not first purged from the tensioner, use slight finger pressure to assist the center arm pin of Chain Tensioner Gauge 8186 to unseat the tensioner's check ball.

CAUTION: Ensure the tensioner is properly reset. The tensioner body (4) must bottom against the top edge of Chain Tensioner Gauge 8186 (3). Failure to properly perform the resetting procedure may cause tensioner jamming.

NOTE: Inspect the tensioner O-ring (2) for nicks or cuts and make sure the snap ring (1) is correctly installed, replace as necessary.

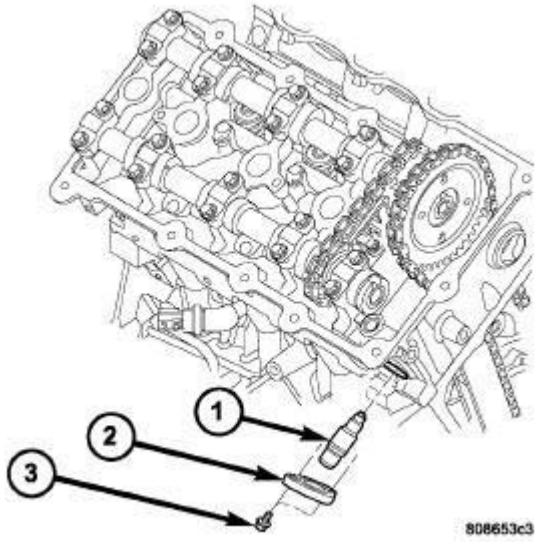

Fig. 341: PRIMARY TIMING CHAIN TENSIONER
Courtesy of CHRYSLER LLC

16. Install the reset chain tensioner (1) into the right cylinder head.
17. Position tensioner retaining plate (2) and tighten bolts (3) to 12 N.m (105 in. lbs.).

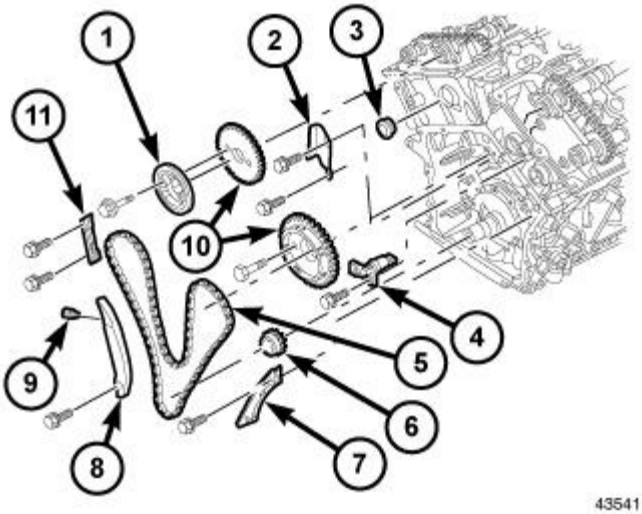

Fig. 342: TIMING DRIVE SYSTEM - PRIMARY
Courtesy of CHRYSLER LLC

18. Starting at the right cylinder bank, first position the camshaft damper (1) (if equipped) on the camshaft hub, then insert a 3/8" square drive extension with a breaker bar into the intake camshaft drive hub.

Rotate the camshaft until the camshaft hub aligns to the camshaft sprocket and damper attaching holes. Install the sprocket attaching bolts and tighten to 28 N.m (250 in. lbs.).

19. Insert a 3/8" square drive extension with a breaker bar into the intake camshaft drive hub and rotate the camshaft until the sprocket attaching bolts can be installed. Tighten the sprocket bolts to 28 N.m (250 in. lbs.).
20. Rotate the crankshaft slightly clockwise to remove timing chain slack, if necessary.

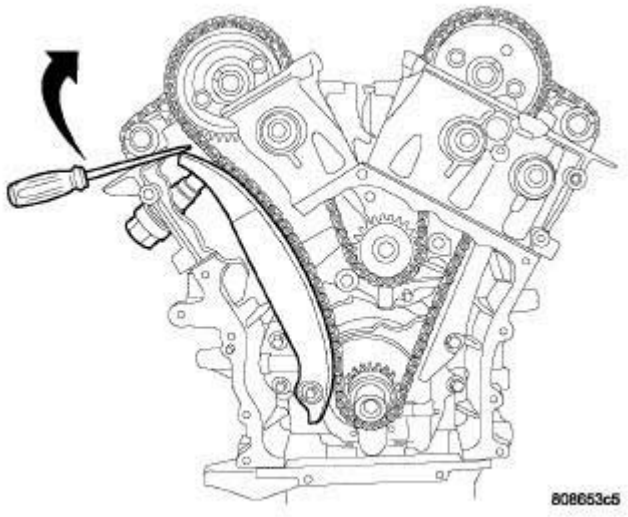

Fig. 343: TIMING CHAIN TENSIONER ACTIVATING
Courtesy of CHRYSLER LLC

21. Activate the timing chain tensioner by using a flat bladed pry tool to gently pry tensioner arm towards the tensioner slightly. Then release the tensioner arm. Verify the tensioner is activated (extends).

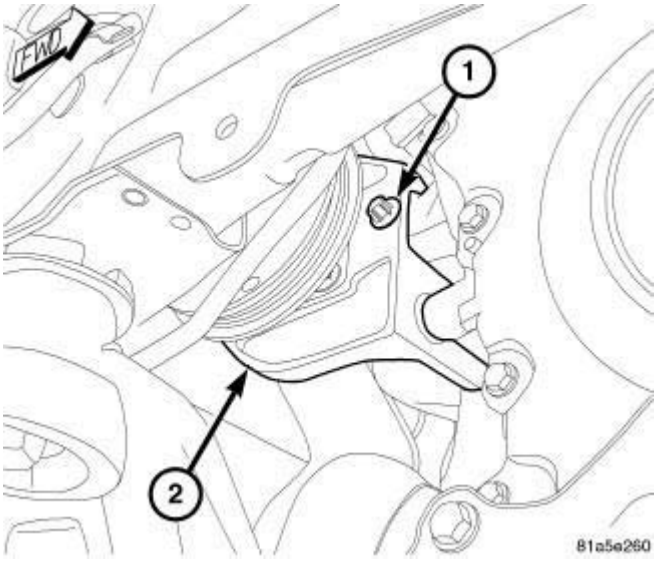

Fig. 344: FRONT PUMP MOUNTING BRACKET BOLTS - 2.7L

Courtesy of CHRYSLER LLC

22. Install the power steering pump and bracket assembly. Refer to **Steering/Pump - Installation** .

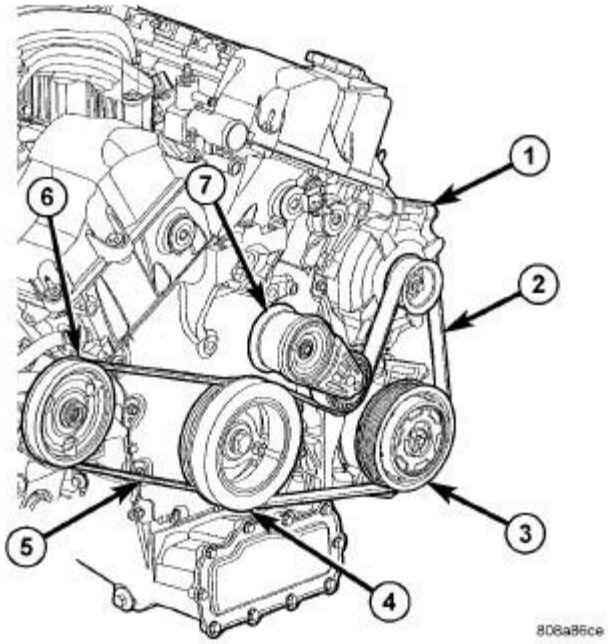

Fig. 345: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

23. Install the camshaft position sensor and connect the electrical connector.
24. Install the timing chain cover, crankshaft vibration damper, and accessory drive belts. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

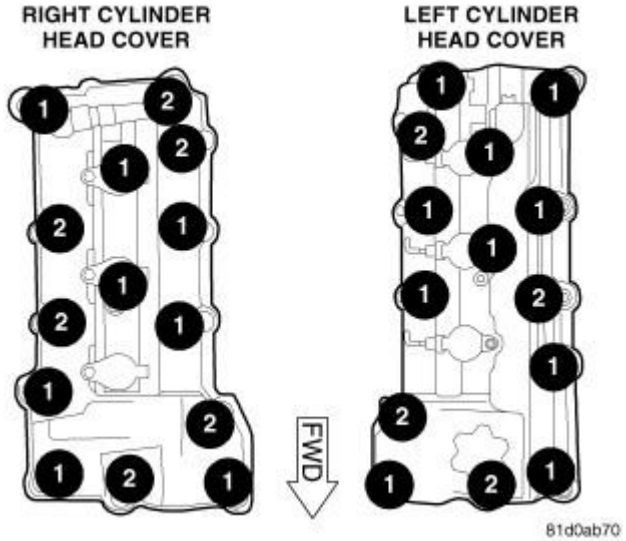

Fig. 346: Cylinder Head Cover Fasteners

Courtesy of CHRYSLER LLC

1 - DOUBLE ENDED STUDS 2 - BOLTS

25. Install the cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
26. Install the upper intake manifold and air cleaner housing assembly. See **Engine/Manifolds/MANIFOLD, Intake - Installation**
27. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
28. Fill the cooling system. Refer to **Cooling - Standard Procedure** .

NOTE: After installation of a reset tensioner, engine noise will occur after initial start-up. This noise will normally disappear within 5-10 seconds.

29. Operate the engine until it reaches normal operating temperature. Check cooling system for correct fluid level. Refer to **Cooling - Standard Procedure** .

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

CRANKSHAFT SPROCKET

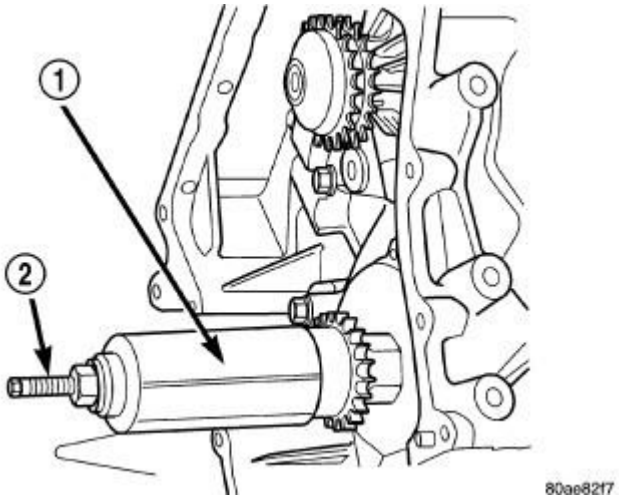

Fig. 347: Crankshaft Sprocket - Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 6780-1 2 - SPECIAL TOOL 8179

1. Install crankshaft sprocket using Special Tools 6780-1 and 8179 (2) until sprocket bottoms against crankshaft step flange. Use care not to rotate crankshaft.

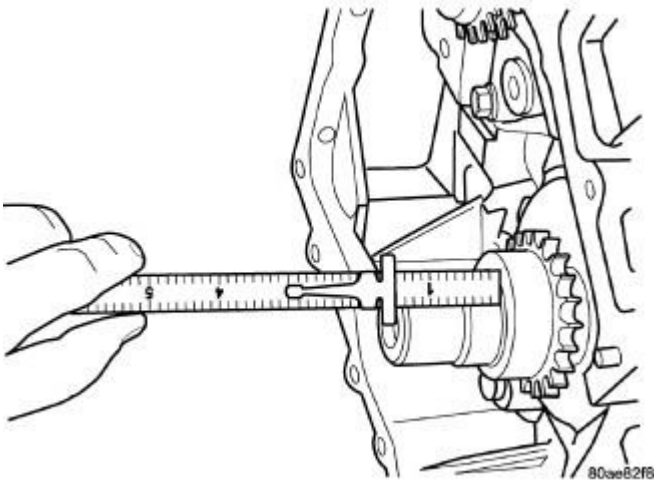

Fig. 348: Crankshaft Sprocket Depth Measurement
Courtesy of CHRYSLER LLC

2. Verify that crankshaft sprocket is installed to proper depth by measuring from sprocket outer face to end of crankshaft. Measurement should read: 39.05 ±0.50 mm (1.5374 ±0.020 in.).
3. Install primary timing chain. See **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation**.

COVER(S), ENGINE TIMING

Removal

REMOVAL

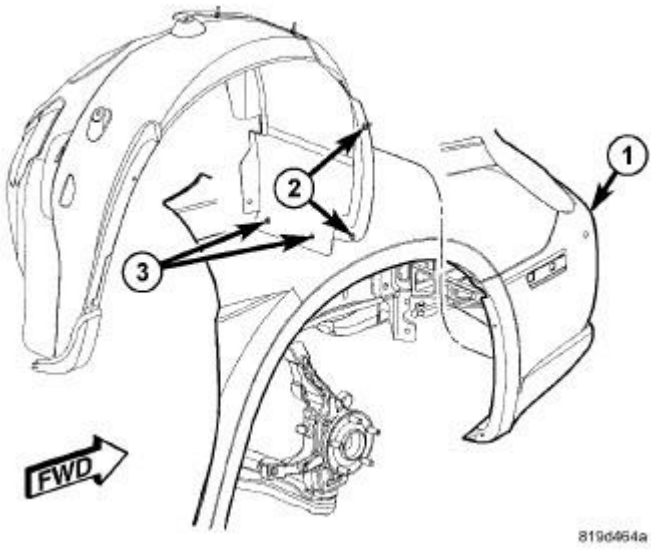

Fig. 349: FRONT SPLASH SHIELDS
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Drain cooling system.
3. Remove coolant pressure container.
4. Remove right front wheel and belt splash shield (2).

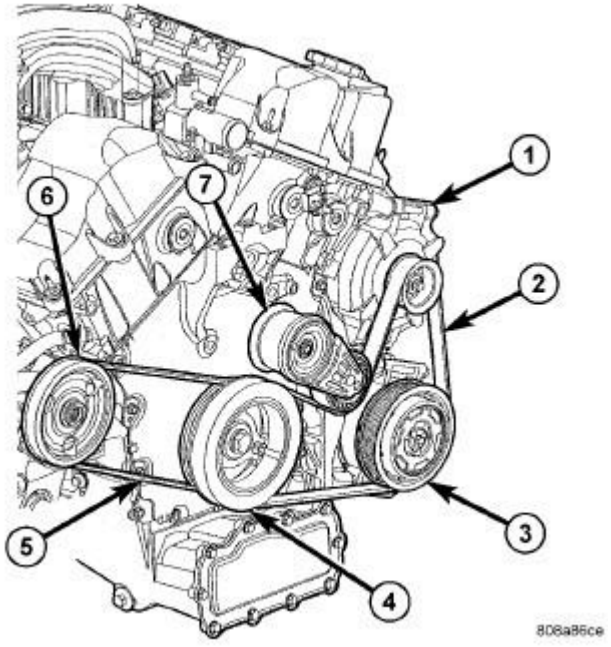

Fig. 350: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER/TENSIONER

5. Remove accessory drive belts (2). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
6. Remove crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.
7. Remove AC/Generator belt tensioner/bracket assembly.
8. Disconnect heater hose from tube at right front frame rail area.
9. Remove screws securing heater supply tube to right frame rail. Reposition heater supply tube.

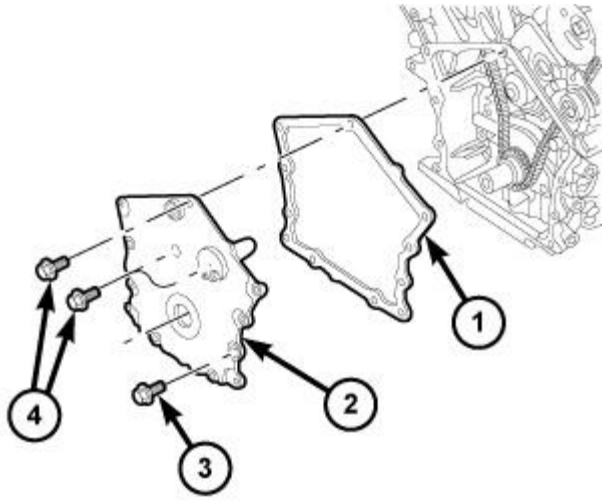

Fig. 351: TIMING CHAIN COVER
Courtesy of CHRYSLER LLC

10. Place a floor jack with wooden block under oil pan to support engine.
11. Remove right engine mount.
12. Remove upper timing chain cover bolts.
13. Remove remaining bolts securing timing chain cover to engine.
14. Remove timing chain cover (2).
15. Discard timing chain cover gasket (1). Remove front crankshaft oil seal from cover.

Installation

INSTALLATION

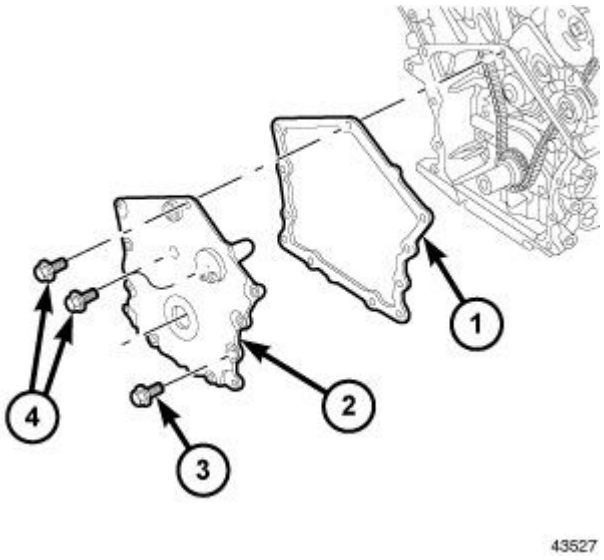

Fig. 352: TIMING CHAIN COVER
Courtesy of CHRYSLER LLC

1. Inspect and clean timing chain cover sealing surfaces.
2. Before installing timing cover gasket apply a 1/8 inch bead of Mopar® Engine RTV GEN II to the parting lines between the oil pan and cylinder block.
3. Install timing cover (2) and gasket (1). Tighten M10 cover bolts to 54 N.m (40 ft. lbs.) and M6 bolts to 12 N.m (105 in. lbs.).
4. Install front crankshaft oil seal using Special Tool 6780-2 sleeve and 6780-1 installer.
5. Lower vehicle.

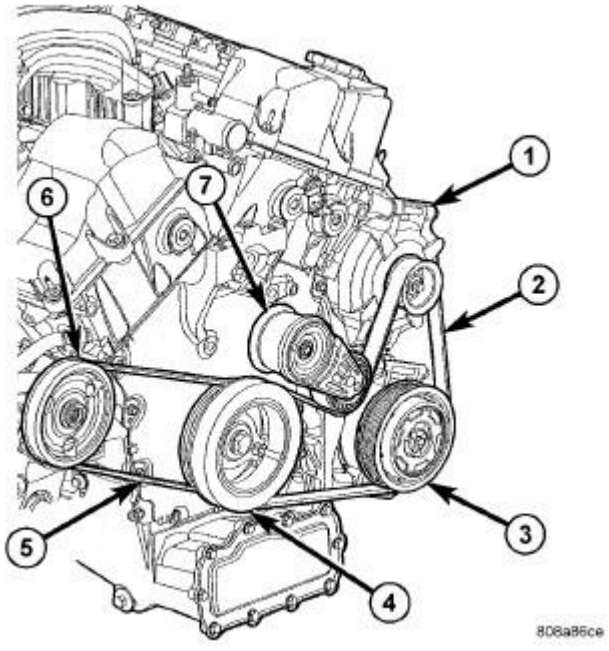

Fig. 353: Accessory Drive Belt System - 2.7L
Courtesy of CHRYSLER LLC

6. Install right engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.
7. Install screws attaching heater supply tube to right front frame rail area.
8. Raise vehicle on hoist.
9. Connect heater hose to supply tube at right front frame rail area.
10. Install AC/Generator belt tensioner/bracket assembly.
11. Install crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
12. Install accessory drive belts (2). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

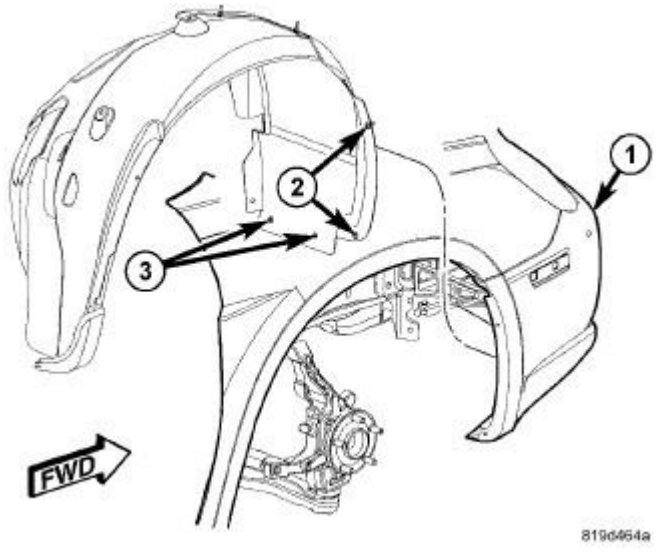

Fig. 354: Removing/Installing Front Splash Shields
Courtesy of CHRYSLER LLC

13. Install belt splash shield and right front wheel.
14. Lower vehicle.
15. Install coolant pressure container. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Installation** .
16. Fill cooling system. Refer to **Cooling - Standard Procedure** .
17. Connect negative battery cable.

2009 ENGINE

3.5L - Service Information - Journey

DESCRIPTION

DESCRIPTION

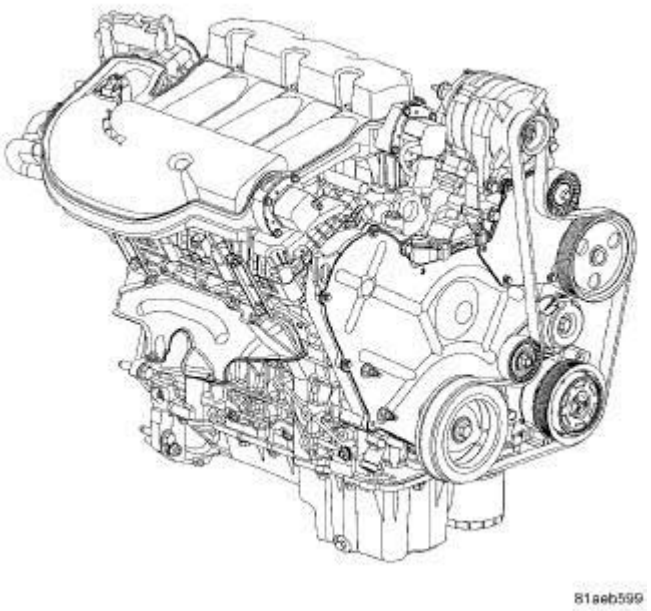

Fig. 1: View Of 3.5L Engine
Courtesy of CHRYSLER LLC

The 3.5 Liter 60 degree V-6 engine is a single overhead camshaft design with hydraulic lifters and four valves per cylinder. The engine does not have provisions for a free wheeling valve train.

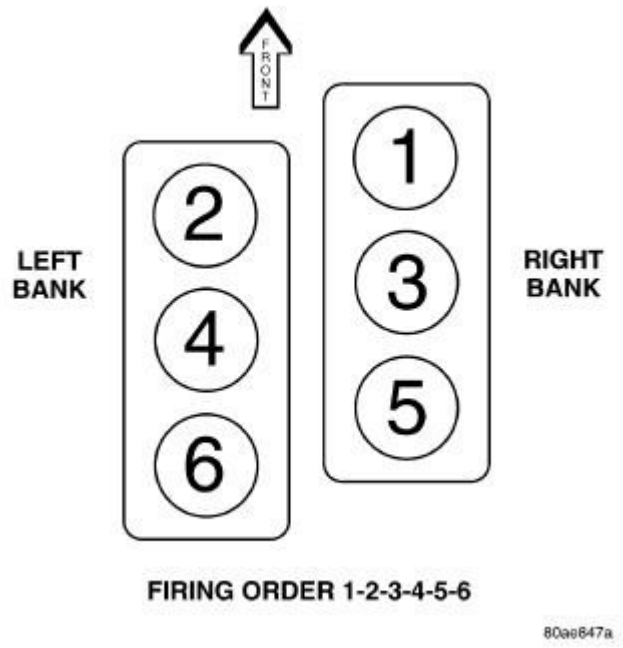

Fig. 2: Cylinder Numbering & Firing Order
Courtesy of CHRYSLER LLC

The cylinders are numbered from front to rear, with the right bank odd numbered, and the left bank even numbered. The firing order is 1-2-3-4-5-6.

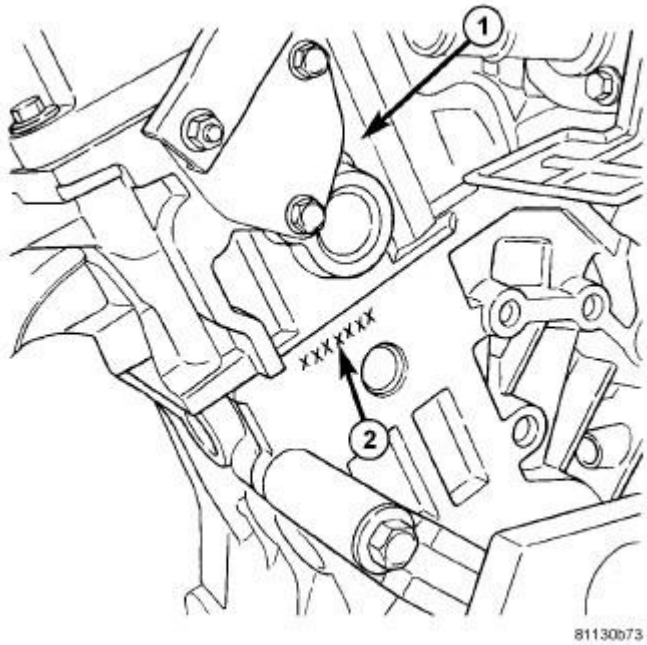

Fig. 3: ENGINE IDENTIFICATION
Courtesy of CHRYSLER LLC

1 - REAR OF LEFT CYLINDER HEAD 2 - ENGINE IDENTIFICATION NUMBER

The engine identification number is located on the rear of engine block just below the left cylinder head.

DIAGNOSIS AND TESTING

INTRODUCTION

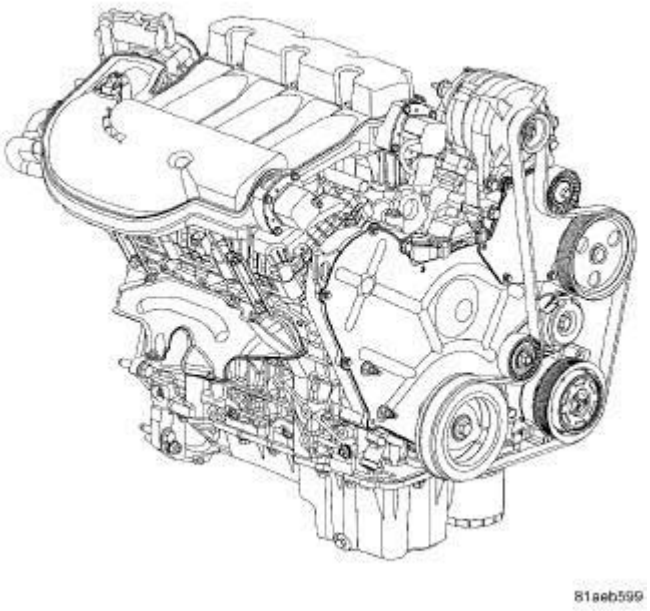

Fig. 4: View Of 3.5L Engine
Courtesy of CHRYSLER LLC

Engine diagnosis is helpful in determining the causes of malfunctions not detected and remedied by routine maintenance.

These malfunctions may be classified as either mechanical (e.g., a strange noise), or performance (e.g., engine idles rough and stalls).

See **ENGINE PERFORMANCE** and **MECHANICAL** for possible causes and corrections of malfunctions.

Additional tests and diagnostic procedures may be necessary for specific engine malfunctions that cannot be isolated with the Service Diagnosis charts. Information concerning additional tests and diagnosis is provided within the following:

- Cylinder Compression Pressure Test: Refer to **CYLINDER COMPRESSION PRESSURE TEST**.
- Cylinder Combustion Pressure Leakage Test: Refer to **CYLINDER COMBUSTION PRESSURE**

LEAKAGE TEST.

- Cylinder Head Gasket Failure Diagnosis: Refer to **CYLINDER HEAD GASKET**.
- Intake Manifold Leakage Diagnosis: Refer to **MANIFOLD, Intake**.
- Lash Adjuster (Tappet) Noise Diagnosis: Refer to **LASH ADJUSTER (TAPPET) NOISE DIAGNOSIS**.
- Engine Oil Leak Inspection: Refer to **ENGINE OIL LEAK INSPECTION**.

ENGINE PERFORMANCE

CONDITION	POSSIBLE CAUSE	CORRECTION
ENGINE WILL NOT START	1. Weak battery.	1. Test battery. Charge or replace as necessary. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Description** .
	2. Corroded or loose battery connections.	2. Clean and tighten battery connections. Apply a coat of light mineral grease to terminals.
	3. Faulty starter.	3. Test starting system. Refer to **Electrical - Engine Systems/Starting - Diagnosis and Testing** .
	4. Faulty coil(s) or control unit.	4. Test and replace as needed. (Refer to Appropriate Diagnostic Information)
	5. Incorrect spark plug gap.	5. Check and adjust gap as needed.
	6. Contamination in fuel system.	6. Clean system and replace fuel filter.
	7. Faulty fuel pump.	7. Test fuel pump and replace as needed. (Refer to Appropriate Diagnostic Information)
	8. Incorrect engine timing.	8. Check for a skipped timing belt or a loose camshaft sprocket.
ENGINE STALLS OR IDLES ROUGH	1. Idle speed too low.	1. Test minimum air flow. (Refer to Appropriate Diagnostic Information)
	2. Incorrect fuel mixture.	2. (Refer to Appropriate Diagnostic Information)
	3. Intake manifold leakage.	3. Inspect intake manifold gasket, manifold, and vacuum hoses.
	4. Faulty coil(s).	4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE LOSS OF POWER	1. Dirty or incorrectly gapped plugs.	1. Set gap as needed or replace plug(s).

	2. Contamination in fuel system.	2. Clean system and replace fuel filter.
	3. Faulty fuel pump.	3. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	4. Incorrect valve timing.	4. Correct valve timing as needed.
	5. Leaking cylinder head gasket.	5. Replace cylinder head gasket.
	6. Low compression.	6. Test compression of each cylinder.
	7. Burned, warped, or pitted valves.	7. Replace valves.
	8. Plugged or restricted exhaust system.	8. Check exhaust system restriction. Replace parts, as necessary.
	9. Faulty coil(s).	9. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES ON ACCELERATION	1. Dirty or incorrectly gapped spark plugs.	1. Set gap as needed or replace plug(s).
	2. Contamination in Fuel System.	2. Clean fuel system and replace fuel filter.
	3. Burned, warped, or pitted valves.	3. Replace valves.
	4. Faulty coil(s).	4. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
ENGINE MISSES AT HIGH SPEED	1. Dirty or incorrect spark plug gap.	1. Set gap as needed or replace plug(s).
	2. Faulty coil(s).	2. Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	3. Dirty fuel injector(s).	Test and replace as necessary. (Refer to Appropriate Diagnostic Information)
	4. Contamination in fuel system.	4. Clean system and replace fuel filter.

MECHANICAL

CONDITION	POSSIBLE CAUSES	CORRECTION
NOISY VALVES	1. High or low oil level in crankcase.	1. Check and correct engine oil level.
	2. Thin or diluted oil.	2. Change oil to correct viscosity.
	3. Thick oil	3. (a.) Change oil and filter. (b.) Run engine to operating

		temperature. (c.) Change oil and filter again.
	4. Low oil pressure.	4. Check and correct engine oil level.
	5. Dirt in tappets/lash adjusters.	5. Replace rocker arm/hydraulic lash adjuster assembly.
	6. Worn rocker arms.	6. Inspect oil supply to rocker arms.
	7. Worn tappets/lash adjusters.	7. Install new rocker arm/hydraulic lash adjuster assembly.
	8. Worn valve guides.	8. Replace cylinder head(s).
	9. Excessive runout of valve seats on valve faces.	9. Grind valve seats and valves.
	10. Missing adjuster pivot.	10. Replace rocker arm/hydraulic lash adjuster assembly.
CONNECTING ROD NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thick/Thin or diluted oil.	3. Change oil to correct viscosity. (a.) Change oil and filter. (b.) Run engine to operating temperature. (c.) Change oil and filter again.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Connecting rod journal out-of-round.	5. Replace crankshaft or grind surface.
	6. Misaligned connecting rods.	6. Replace bent connecting rods.
MAIN BEARING NOISE	1. Insufficient oil supply.	1. Check engine oil level.
	2. Low oil pressure.	2. Check engine oil level. Inspect oil pump relief valve and spring.
	3. Thick/Thin or diluted oil.	3. Change oil to correct viscosity. (a.) Change oil and filter. (b.) Run engine to operating temperature. (c.) Change oil and filter again.
	4. Excessive bearing clearance.	4. Measure bearings for correct clearance. Repair as necessary.
	5. Excessive end play.	5. Check thrust bearing for wear on flanges.
	6. Crankshaft journal out-of-round or worn.	6. Replace crankshaft or grind journals.
	7. Loose flywheel or torque	7. Tighten to correct torque.

	converter.	
OIL PRESSURE DROP	1. Low oil level. 2. Faulty oil pressure sending unit. 3. Low oil pressure. 4. Clogged oil filter. 5. Worn parts in oil pump. 6. Thin or diluted oil. 7. Oil pump relief valve stuck. 8. Oil pump suction tube loose. 9. Oil pump cover warped or cracked. 10. Excessive bearing clearance.	1. Check engine oil level. 2. Install new sending unit. 3. Check sending unit and main bearing oil clearance. 4. Install new oil filter. 5. Replace worn parts or pump. 6. Change oil to correct viscosity. 7. Remove valve and inspect, clean, or replace. 8. Remove oil pan and install new tube or clean, if necessary. 9. Install new oil pump. 10. Measure bearings for correct clearance.
OIL LEAKS	1. Misaligned or deteriorated gaskets. 2. Loose fastener, broken or porous metal part. 3. Misaligned or deteriorated cup or threaded plug.	1. Replace gasket(s). 2. Tighten, repair or replace the part. 3. Replace as necessary.
OIL CONSUMPTION OR SPARK PLUGS FOULED	1. PCV system malfunction. 2. Worn, scuffed or broken rings. 3. Carbon in oil ring slots. 4. Rings fitted too tightly in grooves. 5. Worn valve guide(s). 6. Valve stem seal(s) worn or damaged.	1. Check system and repair as necessary. (Refer to Appropriate Diagnostic Information) 2. Hone cylinder bores. Install new rings. 3. Clean pistons and install new rings. 4. Remove rings and check grooves. If groove is not proper width, replace piston. 5. Replace cylinder head(s). 6. Replace seal(s).

CYLINDER COMPRESSION PRESSURE TEST

The results of a cylinder compression pressure test can be utilized to diagnose several engine malfunctions.

Ensure the battery is completely charged and the engine starter motor is in good operating condition. Otherwise the indicated compression pressures may not be valid for diagnosis purposes.

1. Check engine oil level and add oil if necessary.
2. Drive the vehicle until engine reaches normal operating temperature. Select a route free from traffic and

other forms of congestion, observe all traffic laws, and accelerate through the gears several times briskly.

3. Remove all spark plugs from engine. As spark plugs are being removed, check electrodes for abnormal firing indicators such as fouled, hot, oily, etc. Record cylinder number of spark plug for future reference.
4. Remove the Auto Shutdown (ASD) relay from the TIPM.
5. Install a suitable compression test gauge into the number 1 spark plug hole in cylinder head.
6. Crank engine until maximum pressure is reached on gauge. Record this pressure as #1 cylinder pressure.
7. Repeat the previous step for all remaining cylinders.
8. Compression should not be less than 689 kPa (100 psi) and not vary more than 25 percent from cylinder to cylinder.
9. If one or more cylinders have abnormally low compression pressures, repeat the compression test.
10. If the same cylinder or cylinders repeat an abnormally low reading on the second compression test, it could indicate the existence of a problem in the cylinder in question. **The recommended compression pressures are to be used only as a guide to diagnosing engine problems. An engine should not be disassembled to determine the cause of low compression unless some malfunction is present.**

CYLINDER COMBUSTION PRESSURE LEAKAGE TEST

The combustion pressure leakage test provides an accurate means for determining engine condition.

Combustion pressure leakage testing will detect:

- Exhaust and intake valve leaks (improper seating).
- Leaks between adjacent cylinders or into water jacket.
- Any causes for combustion/compression pressure loss.

WARNING: DO NOT REMOVE THE PRESSURE CAP WITH THE SYSTEM HOT AND UNDER PRESSURE BECAUSE SERIOUS BURNS FROM COOLANT CAN OCCUR.

Check the coolant level and fill as required. DO NOT install the pressure cap.

Start and operate the engine until it attains normal operating temperature, then turn the engine OFF.

Clean spark plug recesses with compressed air.

Remove the spark plugs.

Remove the oil filler cap.

Remove the air cleaner.

Calibrate the tester according to the manufacturer's instructions. The shop air source for testing should maintain 483 kPa (70 psi) minimum, 1,379 kPa (200 psi) maximum, with 552 kPa (80 psi) recommended.

Perform the test procedures on each cylinder according to the tester manufacturer's instructions. While testing, listen for pressurized air escaping through the throttle body, tailpipe and oil filler cap opening. Check for bubbles in the coolant.

All gauge pressure indications should be equal, with no more than 25% leakage per cylinder.

FOR EXAMPLE: At 552 kPa (80 psi) input pressure, a minimum of 414 kPa (60 psi) should be maintained in the cylinder.

ENGINE OIL LEAK INSPECTION

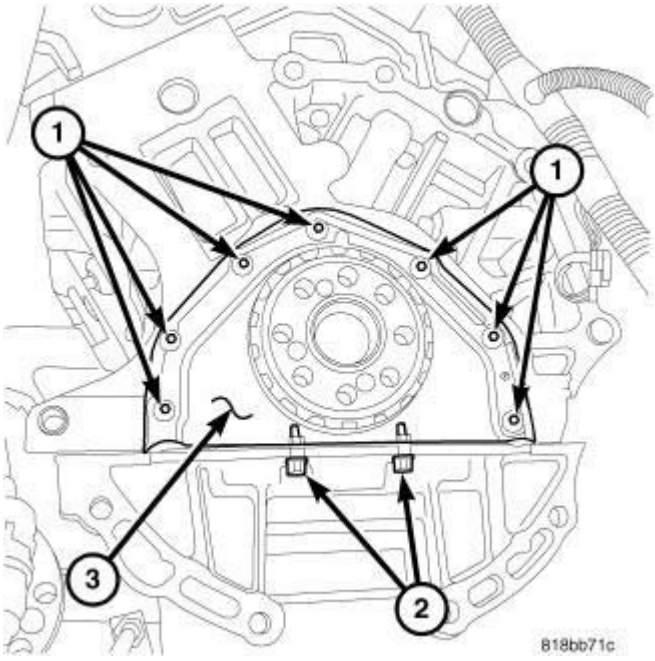

Fig. 5: REAR MAIN
Courtesy of CHRYSLER LLC

Begin with a thorough visual inspection of the engine, particularly at the area of the suspected leak. If an oil leak source is not readily identifiable, the following steps should be followed:

1. Do not clean or degrease the engine at this time because some solvents may cause rubber to swell, temporarily stopping the leak.
2. Add an oil soluble dye (use as recommended by manufacturer). Start the engine and let idle for approximately 15 minutes. Check the oil dipstick to make sure the dye is thoroughly mixed as indicated with a bright yellow color under a black light.
3. Using a black light, inspect the entire engine for fluorescent dye, particularly at the suspected area of oil leak. If the oil leak is found and identified, repair as necessary.
4. If dye is not observed, drive the vehicle at various speeds for approximately 24 km (15 miles), and repeat inspection.
5. **If the oil leak source is not positively identified at this time** , proceed with the AIR LEAK DETECTION TEST METHOD as follows:

- Disconnect the fresh air hose (make-up air) at the cylinder head cover and plug or cap the nipple on the cover.
- Remove the PCV valve hose from the cylinder head cover. Cap or plug the PCV valve nipple on the cover.
- Attach an air hose with pressure gauge and regulator to the dipstick tube.

CAUTION: Do not subject the engine assembly to more than 20.6 kPa (3 PSI) of test pressure.

- Gradually apply air pressure from 1 psi to 2.5 psi maximum while applying soapy water at the suspected source. Adjust the regulator to the suitable test pressure that provides the best bubbles which will pinpoint the leak source. If the oil leak is detected and identified, repair per service Information procedures.
- If the leakage occurs at the crankshaft rear oil seal area, refer to **INSPECTION FOR REAR SEAL AREA LEAKS**.

6. If no leaks are detected, turn off the air supply. Remove the air hose, all plugs, and caps. Install the PCV valve and fresh air hose (make-up air). Proceed to next step.
7. Clean the oil off the suspect oil leak area using a suitable solvent. Drive the vehicle at various speeds approximately 24 km (15 miles). Inspect the engine for signs of an oil leak by using a black light.

NOTE: If oil leakage is observed at the dipstick tube to block location; remove the tube, clean and reseal using Mopar® Stud AND Bearing Mount (press fit tube applications only), and for O-ring style tubes, remove tube and replace the O-ring seal.

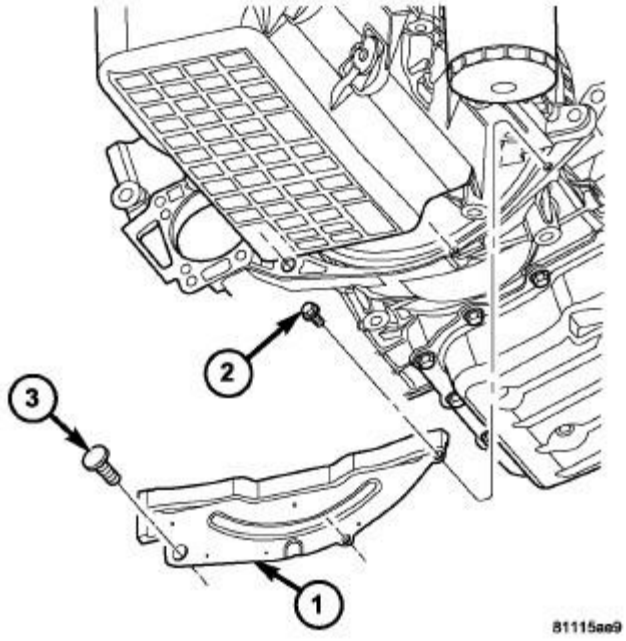

Fig. 6: Torque Converter Dust Shield
Courtesy of CHRYSLER LLC

1 - DUST SHIELD 2 - BOLT (2) 3 - RETAINER

CAUTION: Do not exceed 20.6 kPa (3 psi).

CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

INSPECTION FOR REAR SEAL AREA LEAKS

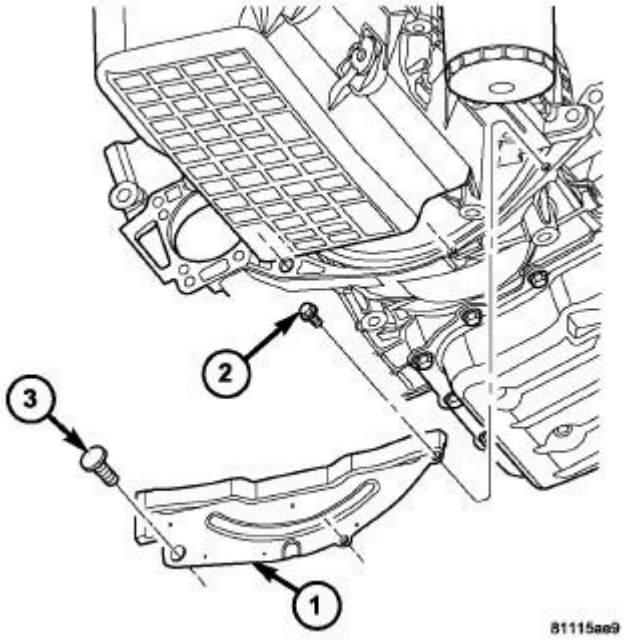

Fig. 7: Torque Converter Dust Shield
Courtesy of CHRYSLER LLC

1 - DUST SHIELD 2 - BOLT (2) 3 - RETAINER

Since it is sometimes difficult to determine the source of an oil leak in the rear seal area of the engine, a more involved inspection is necessary. The following steps should be followed to help pinpoint the source of the leak.

If the leakage occurs at the crankshaft rear oil seal area:

1. Disconnect the battery.
2. Raise the vehicle.
3. Remove torque converter or clutch housing cover and inspect rear of block for evidence of oil. Use a black light to check for the oil leak. If a leak is present in this area, remove transmission for further inspection.
    a. Circular spray pattern generally indicates seal leakage or crankshaft damage.
    b. Where leakage tends to run straight down, possible causes are a porous block, oil gallery cup plug, bedplate to cylinder block mating surfaces and seal bore. See proper repair procedures for these items.
4. If no leaks are detected, pressurize the crankcase as previously described in step 5 under ENGINE OIL LEAK INSPECTION.

    CAUTION: Do not exceed 20.6 kPa (3 psi).

5. If the leak is not detected, very slowly turn the crankshaft and watch for leakage. If a leak is detected between the crankshaft and seal while slowly turning the crankshaft, it is possible the crankshaft seal surface is damaged. The seal area on the crankshaft could have minor nicks or scratches that can be polished out with emery cloth.

    CAUTION: Use extreme caution when crankshaft polishing is necessary to remove minor nicks and scratches. The crankshaft seal flange is especially machined to complement the function of the rear oil seal.

6. For bubbles that remain steady with shaft rotation, no further inspection can be done until disassembled.
7. After the oil leak root cause and appropriate corrective action have been identified, replace component(s) as necessary.

STANDARD PROCEDURE

ENGINE GASKET SURFACE PREPARATION

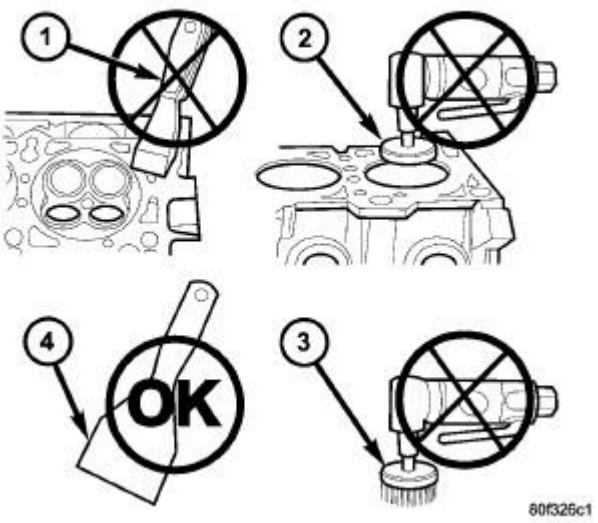

Fig. 8: PROPER TOOL USAGE FOR SURFACE PREPARATION
Courtesy of CHRYSLER LLC

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

Never use the following to clean gasket surfaces:

- Metal scraper (1).
- Abrasive pad or paper to clean cylinder block and head.
- High speed power tool with an abrasive pad or a wire brush (2,3).

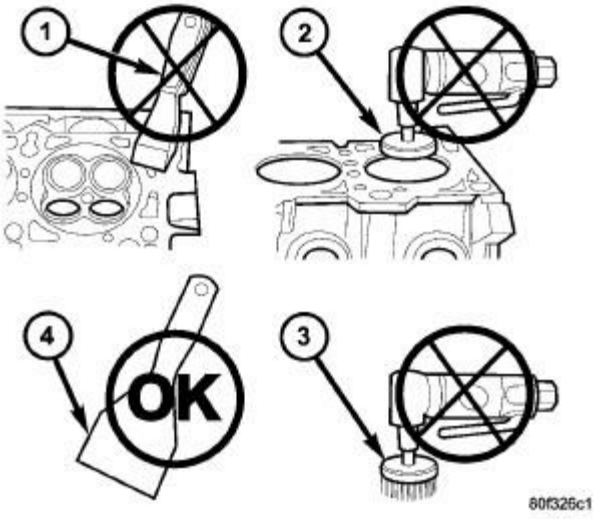

Fig. 9: PROPER TOOL USAGE FOR SURFACE PREPARATION

Courtesy of CHRYSLER LLC

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic or wood scraper (4).

Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent).

FORM-IN-PLACE GASKETS AND SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket. **All sealing surfaces that use form-in-place gaskets must be free of grease or oil.** Surfaces should be cleaned with Mopar® brake parts cleaner prior to sealer application. After the sealer is applied, the parts should be assembled within 10 minutes.

There are numerous types of form-in-place gasket materials that are used in the engine area. Mopar® Engine RTV GEN II, Mopar® ATF-RTV, and Mopar® Gasket Maker gasket materials, each have different properties and can not be used in place of the other.

MOPAR® ENGINE RTV GEN II is used to seal components exposed to engine oil. This material is a specially designed black silicone rubber RTV that retains adhesion and sealing properties when exposed to engine oil. Moisture in the air causes the material to cure. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER is an anaerobic type gasket material. The material cures in the absence of air when squeezed between two metallic surfaces. It will not cure if left in the uncovered tube. The anaerobic material is for use between two machined surfaces. Do not use on flexible metal flanges.

MOPAR® BED PLATE SEALANT is a unique (green-in-color) anaerobic type gasket material that is specially made to seal the area between the bedplate and cylinder block without disturbing the bearing clearance or alignment of these components. The material cures slowly in the absence of air when torqued between two metallic surfaces, and will rapidly cure when heat is applied.

MOPAR® GASKET SEALANT is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can w/applicator.

SEALER APPLICATION

Mopar® Gasket Maker material should be applied sparingly 1 mm (0.040 in.) diameter or less of sealant to one gasket surface. Be certain the material surrounds each mounting hole. Excess material can easily be wiped off. Components should be torqued in place within 15 minutes. The use of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can w/applicator can be brushed on evenly over the sealing surfaces.

REPAIR OF DAMAGED OR WORN THREADS

Damaged or worn threads (excluding spark plug and camshaft bearing cap attaching threads) can be repaired. Essentially, this repair consists of drilling out worn or damaged threads, tapping the hole with a special Heli-Coil Tap, (or equivalent) and installing an insert into the tapped hole. This brings the hole back to its original thread size.

CAUTION: Be sure that the tapped holes maintain the original center line.

Heli-Coil tools and inserts are readily available from automotive parts jobbers.

HYDROSTATIC LOCKED ENGINE

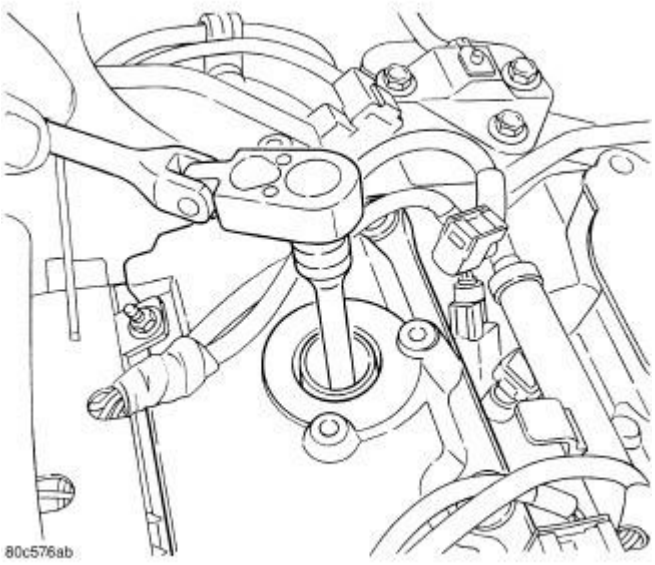

Fig. 10: SPARK PLUG REMOVAL/INSTALLATION
Courtesy of CHRYSLER LLC

When an engine is suspected to be hydrostatically locked, regardless of what caused the problem, the following steps should be used.

CAUTION: DO NOT use starter motor to rotate the engine, severe damage may occur.

1. Inspect air cleaner, induction system and intake manifold to insure system is dry and clear of foreign material.
2. Remove negative battery cable.
3. Place a shop towel around the spark plugs when removing them from the engine. This will catch any fluid that may possibly be in the cylinder under pressure.
4. With all spark plugs removed, rotate engine crankshaft using a breaker bar and socket.
5. Identify the fluid in the cylinder(s) (i.e., coolant, fuel, oil or other).
6. Make sure all fluid has been removed from the cylinders. Inspect engine for damage (i.e., connecting rods, pistons, valves, etc.)
7. Repair engine or components as necessary to prevent this problem from reoccurring.

CAUTION: Squirt approximately one teaspoon of oil into the cylinders, rotate engine to lubricate the cylinder walls to prevent damage on restart.

8. Install new spark plugs.
9. Drain engine oil and remove oil filter.
10. Install a new oil filter.

11. Fill engine with specified amount of approved oil.
12. Connect negative battery cable.
13. Start engine and check for any leaks.

ENGINE CORE AND OIL GALLERY PLUGS

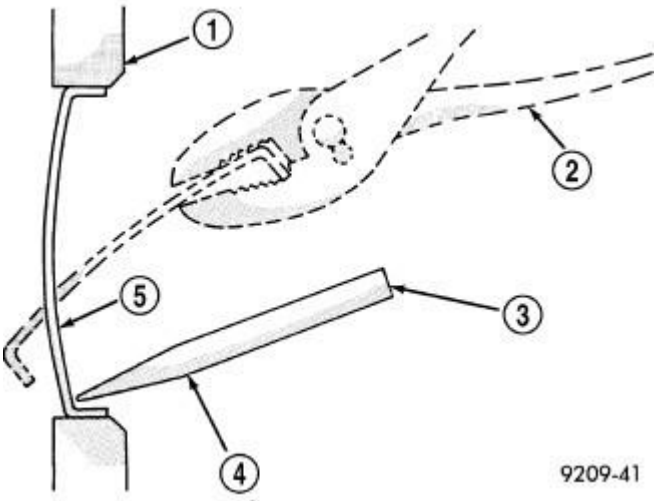

Fig. 11: Core Hole Plug Removal
Courtesy of CHRYSLER LLC

1 - CYLINDER BLOCK
2 - REMOVE PLUG WITH PLIERS
3 - STRIKE HERE WITH HAMMER
4 - DRIFT PUNCH
5 - CUP PLUG

Using a blunt tool such as a drift and a hammer, strike the bottom edge of the cup plug. With the cup plug rotated, grasp firmly with pliers or other suitable tool and remove plug .

CAUTION: Do not drive cup plug into the casting as restricted cooling can result and cause serious engine problems.

Thoroughly clean inside of cup plug hole in cylinder block or head. Be sure to remove old sealer. Lightly coat inside of cup plug hole with Mopar® Stud and Bearing Mount. Make certain the new plug is cleaned of all oil or grease. Using proper drive plug, drive plug into hole so that the sharp edge of the plug is at least 0.5 mm (0.020 in.) inside the lead-in chamfer.

It is not necessary to wait for curing of the sealant. The cooling system can be refilled and the vehicle placed in service immediately.

REMOVAL

REMOVAL

NOTE: Capture and store any residual fluid drainage, or leakage from disconnected components or systems in appropriately marked containers. Dispose of residual fluid in accordance with all applicable environmental regulations.

1. Remove the engine cover.

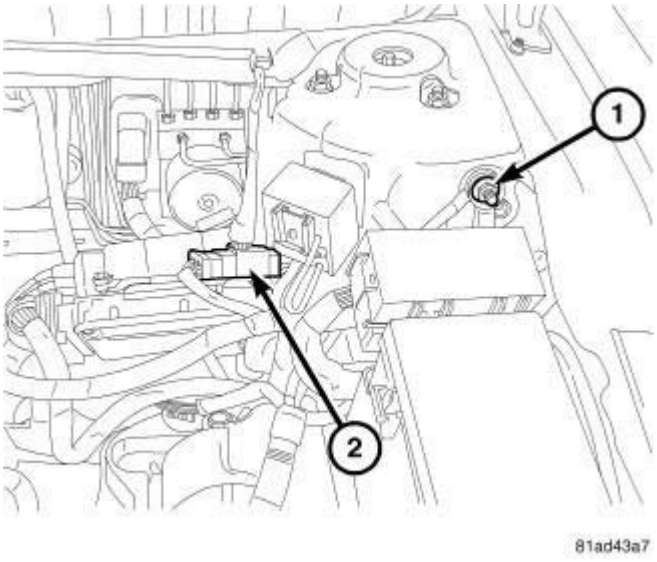

Fig. 12: BATTERY CABLE
Courtesy of CHRYSLER LLC

2. Disconnect and isolate the negative battery cable (1).
3. Drain the cooling system. Refer to **Cooling - Standard Procedure** .
4. Evacuate and recover the air conditioning system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
5. Perform the fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

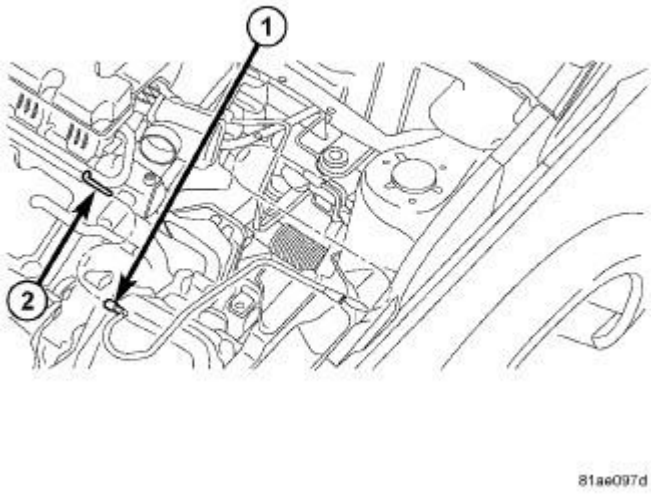

Fig. 13: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

6. Disconnect fuel line (1) from the fuel rail inlet (2) and position aside.

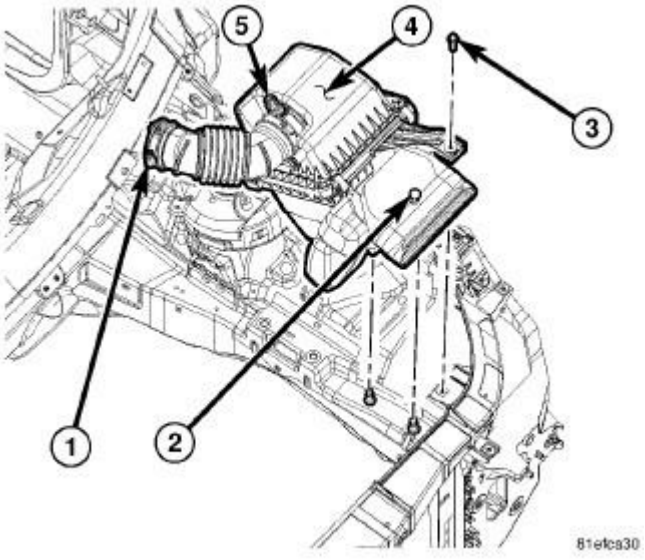

Fig. 14: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

7. Remove the Air Cleaner Housing (4). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

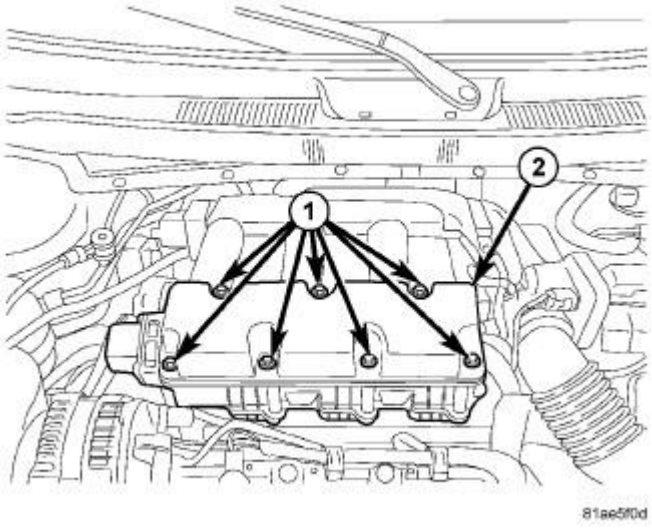

Fig. 15: Upper Intake Manifold
Courtesy of CHRYSLER LLC

8. Remove the Upper Intake Manifold (2). See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

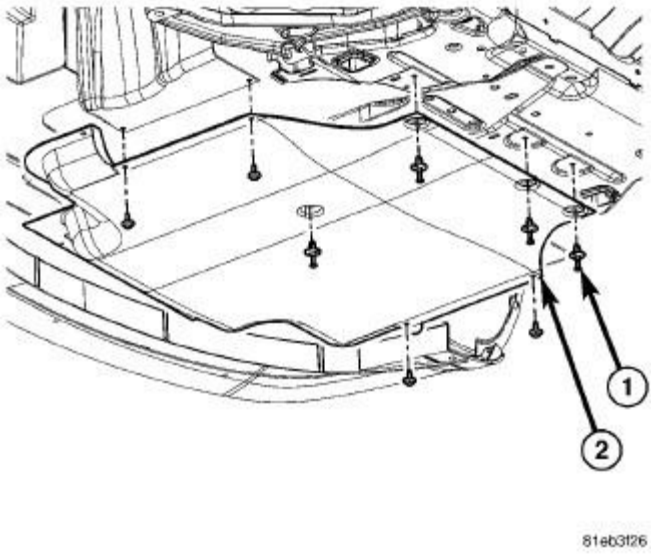

Fig. 16: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

9. Raise the vehicle.
10. Remove the 12 belly pan fasteners (1) and remove the belly pan (2).

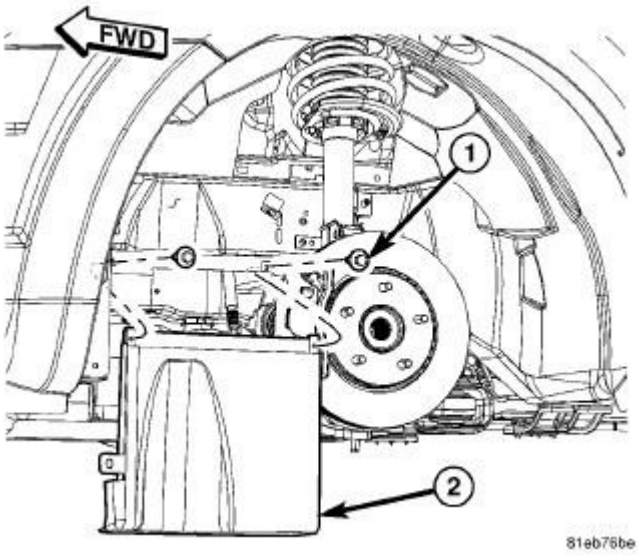

Fig. 17: Right Forward Splash Shield
Courtesy of CHRYSLER LLC

11. Remove the Right Forward Splash Shield (2). Refer to **Body/Exterior/SHIELD, Splash - Removal** .

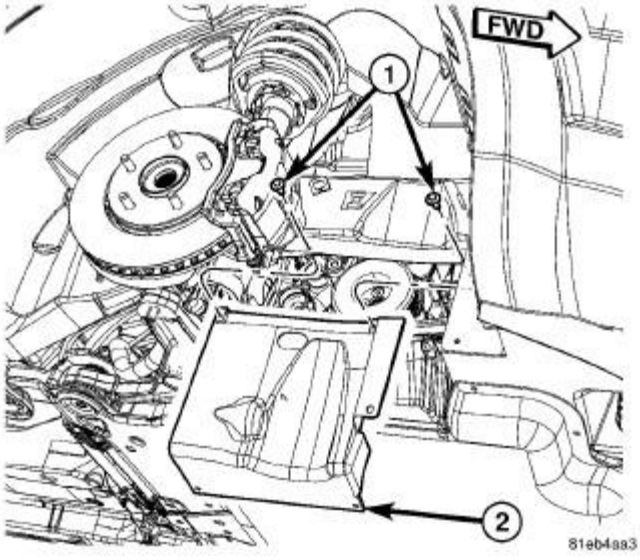

Fig. 18: Left Forward Splash Shield
Courtesy of CHRYSLER LLC

12. Remove the Left Forward Splash Shield (2). Refer to **Body/Exterior/SHIELD, Splash - Removal** .

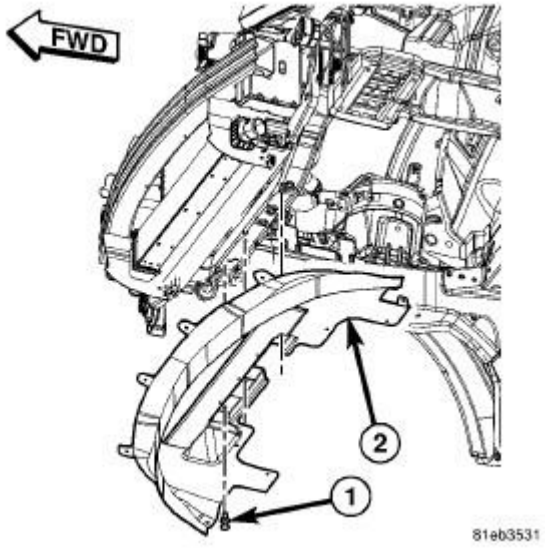

Fig. 19: Front Closeout Panel
Courtesy of CHRYSLER LLC

13. Remove the Front Closeout Panel (2). Refer to **Frame and Bumpers/Bumpers/FASCIA, Front Lower - Removal** .

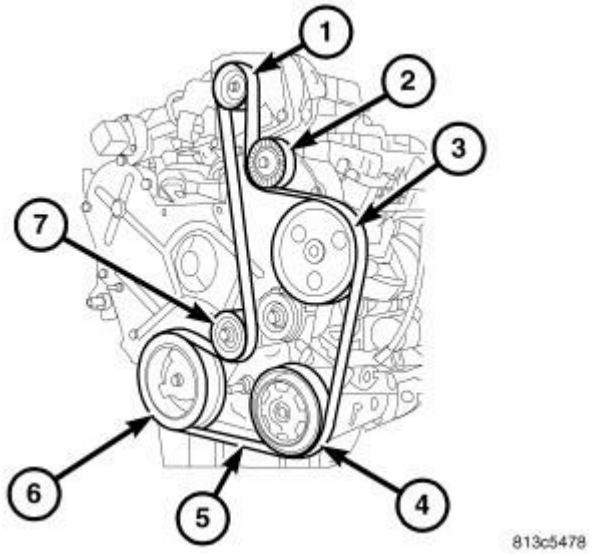

Fig. 20: 3.5L ENGINE ACCESSORY DRIVE BELT INSTALLATION
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY
2 - P/S PUMP
3 - A/C COMPRESSOR
4 - CRANKSHAFT
5 - TENSIONER

6 - GENERATOR

14. Remove the accessory drive belt (6). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

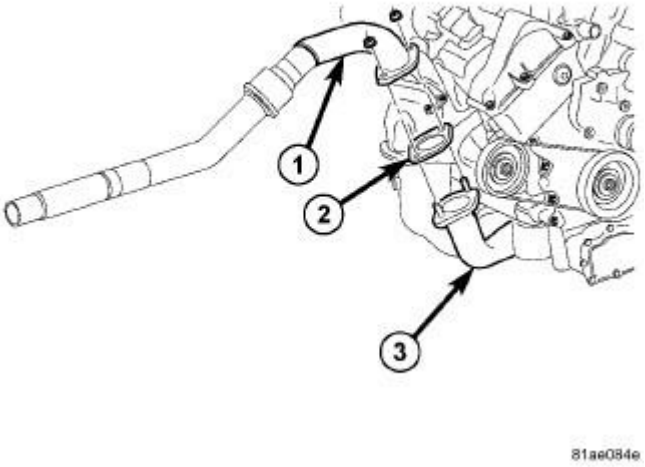

Fig. 21: Exhaust Extension Pipe & Gasket
Courtesy of CHRYSLER LLC

15. Disconnect the Exhaust Extension Pipe (1) and gasket (2) from the Crossunder pipe (3).
16. Remove the Cross Under Pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Removal** .

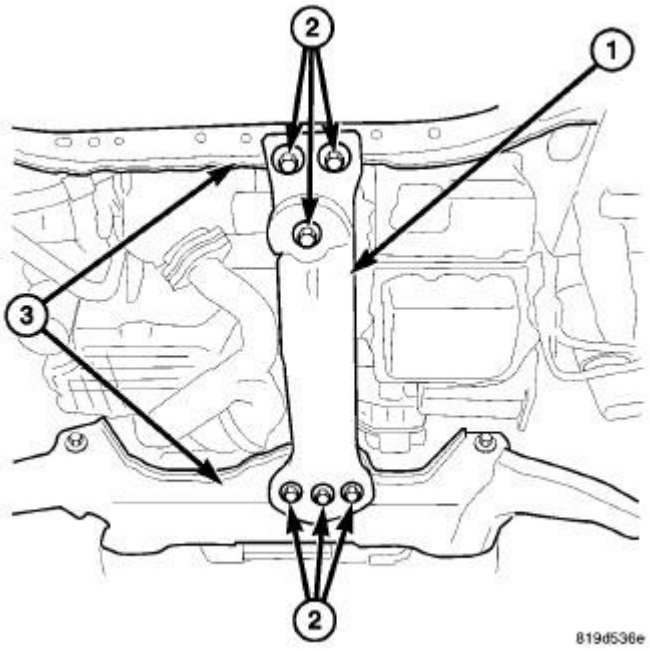

Fig. 22: FORE-AFT Crossmember
Courtesy of CHRYSLER LLC

17. Remove the fore-aft crossmember (1). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

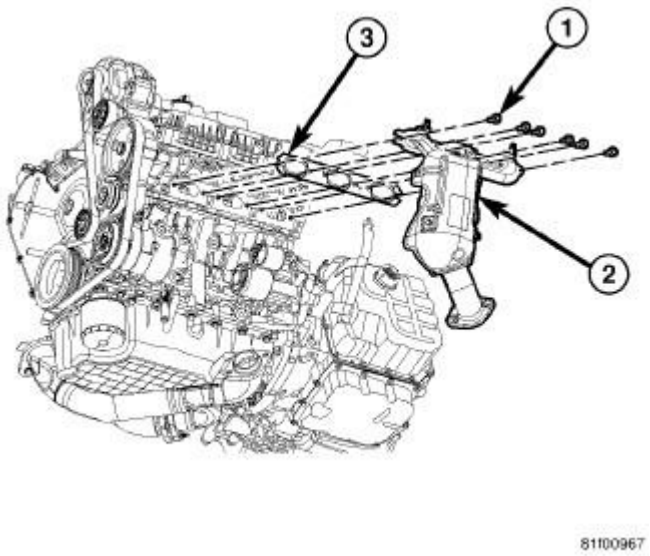

Fig. 23: Right Front Half Shaft Assembly
Courtesy of CHRYSLER LLC

18. Remove the Right Front Half Shaft assembly. Refer to **Differential and Driveline/Half Shaft - Removal** .
19. Remove the Right Maniverter. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

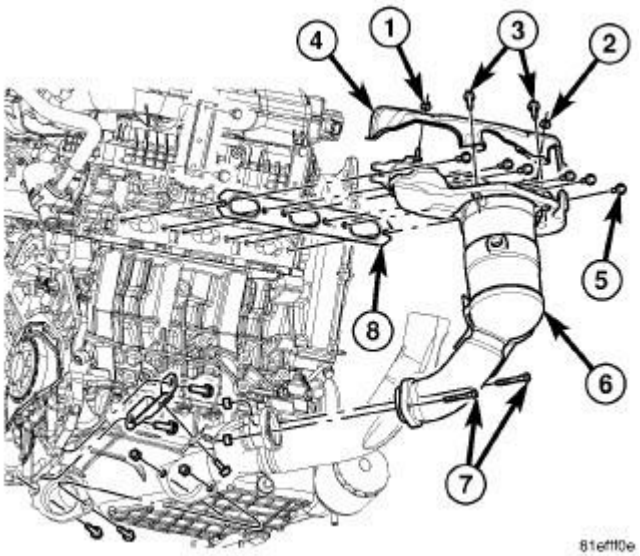

Fig. 24: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

20. Remove the Left Maniverter (6). See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

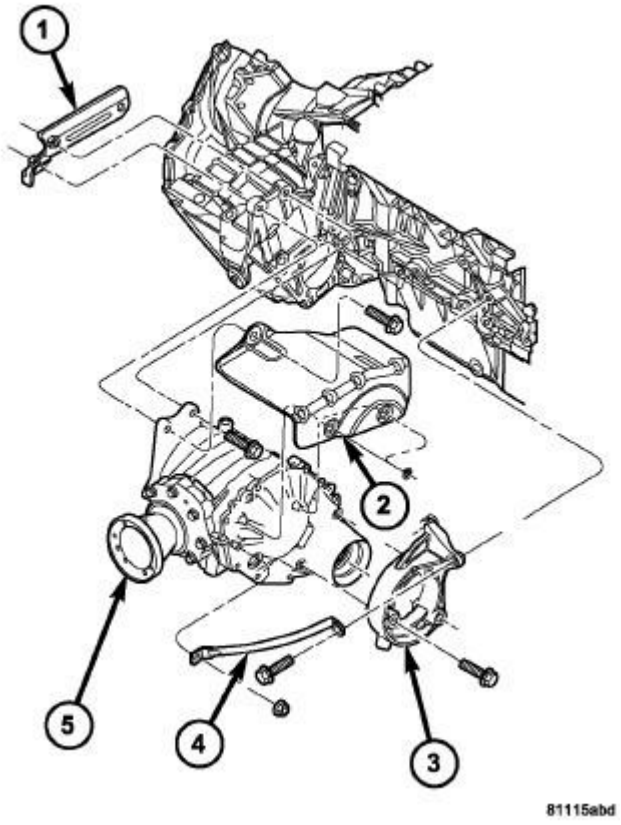

Fig. 25: Power Transfer Unit Mounting
Courtesy of CHRYSLER LLC

1 - BRACKET
2 - HEAT SHIELD
3 - BRACKET
4 - BRACE
5 - POWER TRANSFER UNIT

21. If equipped, remove the PTU (5). Refer to **Transmission and Transfer Case/Power Transfer Unit - Removal** .

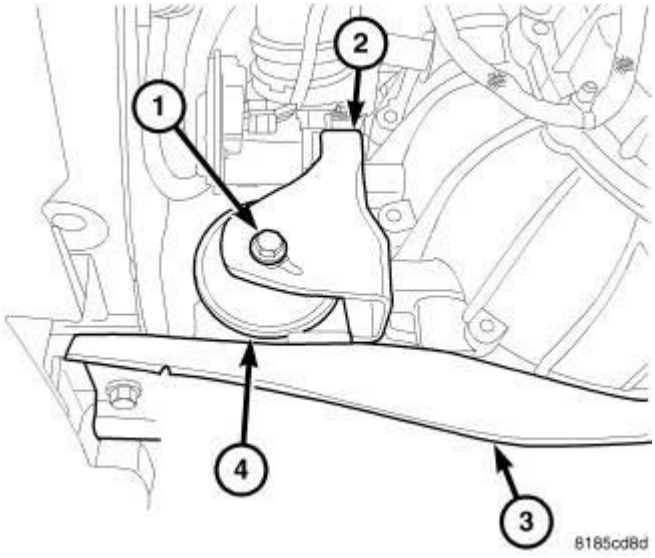

Fig. 26: Removing/Installing Front Mount
Courtesy of CHRYSLER LLC

22. Remove the Front Engine Mount Bracket (2). See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.

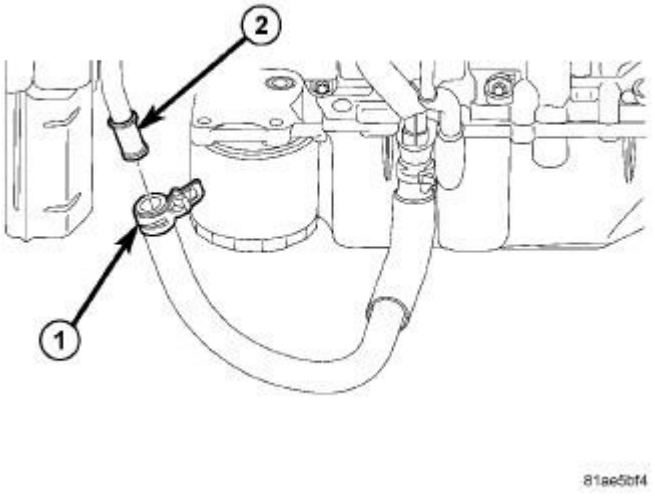

Fig. 27: Lower Coolant Hose From Return Tube
Courtesy of CHRYSLER LLC

23. Disconnect the Lower Coolant Hose (1) from the return tube (2).
24. Remove the Left Front Half Shaft. Refer to **Differential and Driveline/Half Shaft - Removal** .
25. Lower Vehicle.

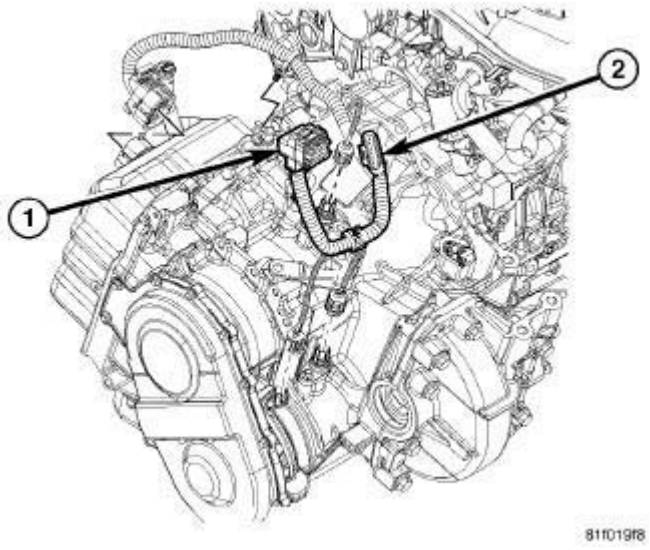

Fig. 28: Engine Harness Connectors
Courtesy of CHRYSLER LLC

26. Disconnect the engine harness PCM (1), 12-way (2), ground (3), 8-way (4) connectors.

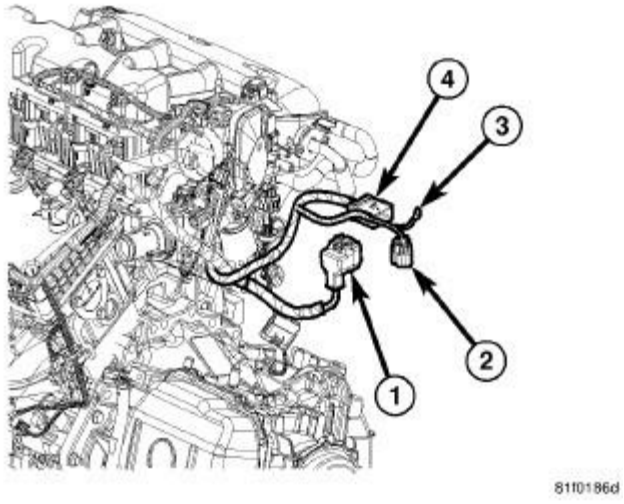

Fig. 29: Transaxle Harness Connectors
Courtesy of CHRYSLER LLC

27. Disconnect the transaxle harness PCM (1), and 6-way (2) connectors.

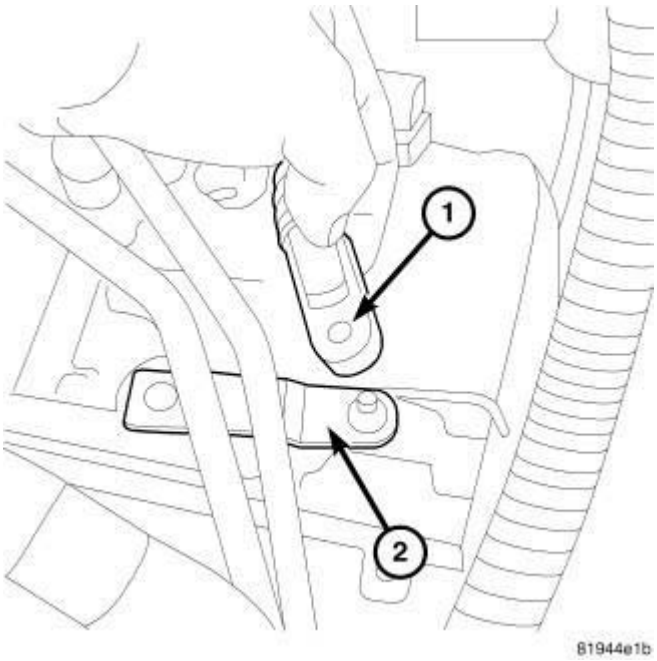

Fig. 30: Transaxle Shifter Cable
Courtesy of CHRYSLER LLC

28. Disconnect the transaxle shifter cable (1).

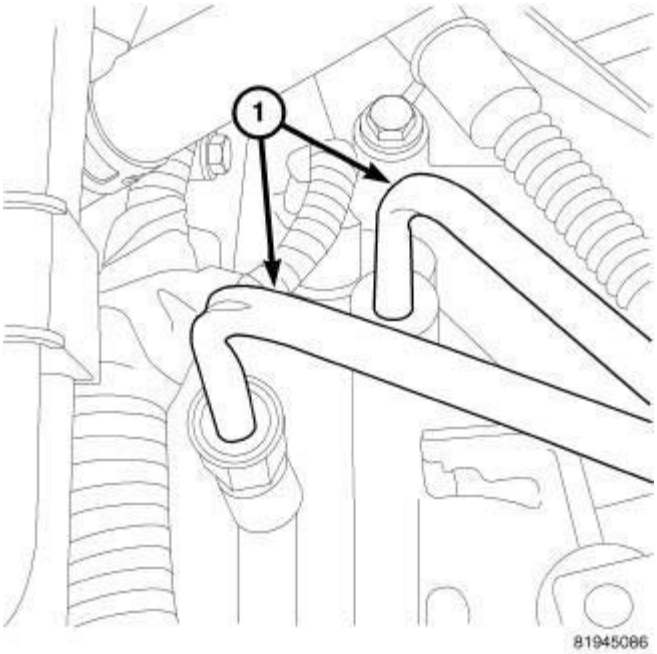

Fig. 31: Transaxle Cooler Lines
Courtesy of CHRYSLER LLC

29. Disconnect the transaxle cooler lines (1).

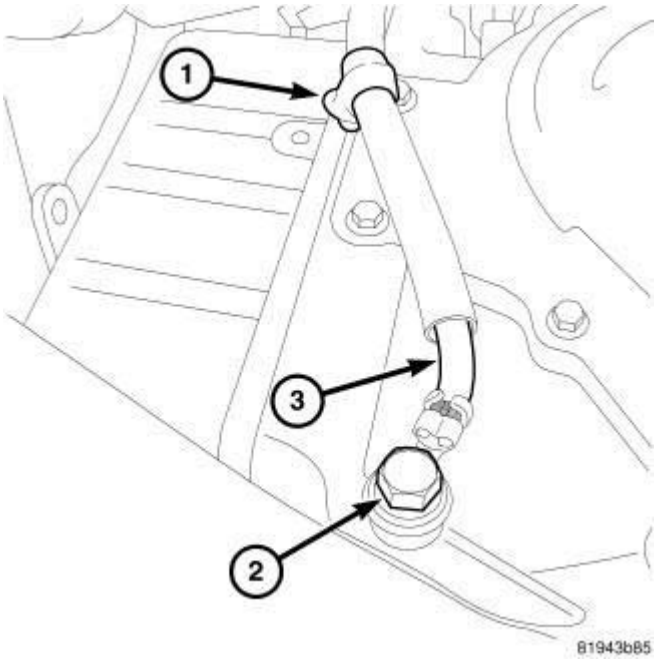

Fig. 32: GROUND CABLE
Courtesy of CHRYSLER LLC

30. Disconnect the ground (3) from the side of the transaxle.

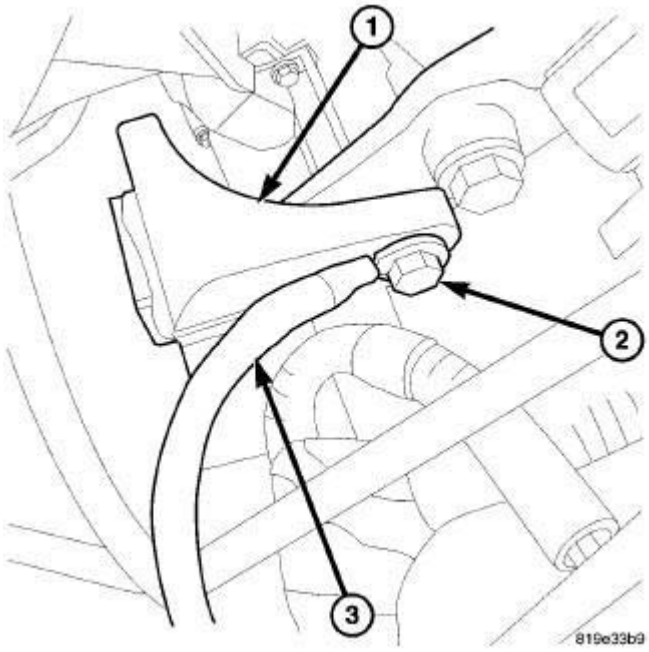

Fig. 33: GROUND CABLE AT FRONT MOUNT
Courtesy of CHRYSLER LLC

31. Disconnect the ground (3) from the front of the transaxle.

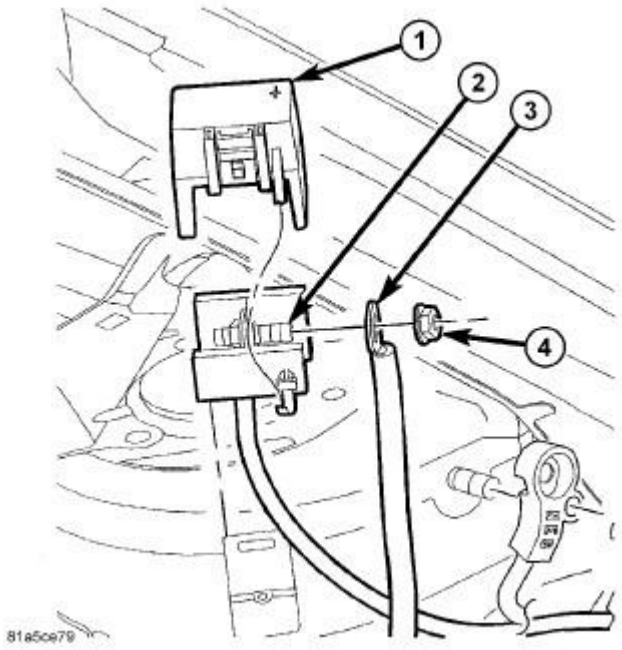

Fig. 34: Positive Auxiliary Battery Post Cable
Courtesy of CHRYSLER LLC

32. Disconnect the positive auxiliary battery post cable (2) and the negative battery cable from the left shock tower and position aside.

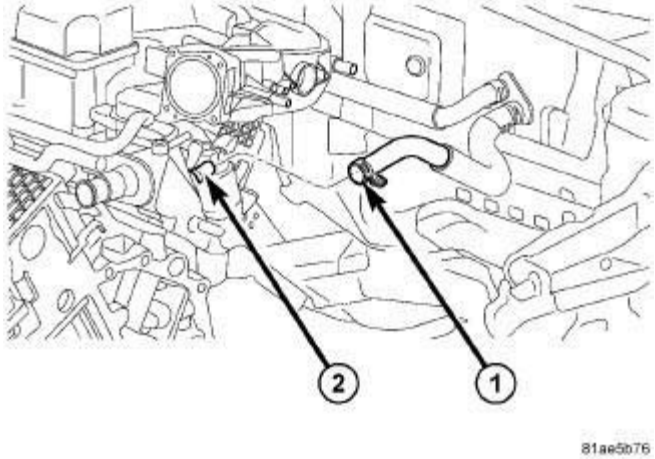

Fig. 35: Heater Core Supply Hose
Courtesy of CHRYSLER LLC

33. Disconnect the heater core supply hose (1) from the intake manifold outlet (2).

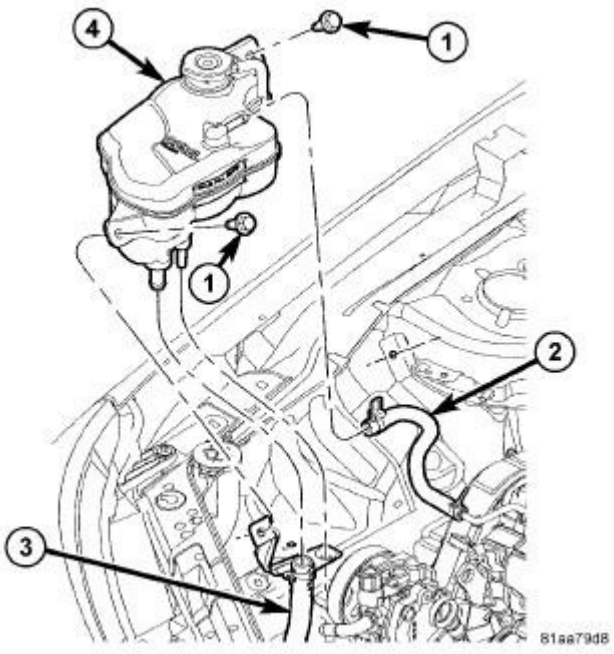

Fig. 36: COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

34. Disconnect the coolant reservoir overflow hose (2) from the coolant bottle (4) and position aside.

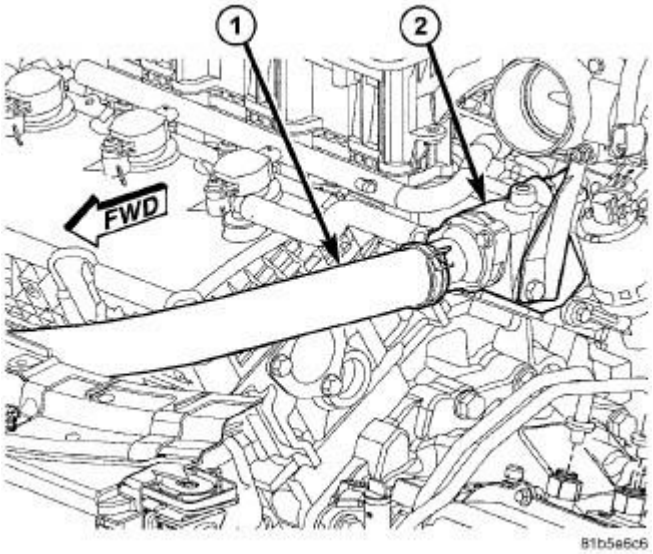

Fig. 37: Upper Radiator Hose From Thermostat Housing
Courtesy of CHRYSLER LLC

35. Disconnect the Upper Radiator hose (1) from the thermostat housing (2) and position aside.

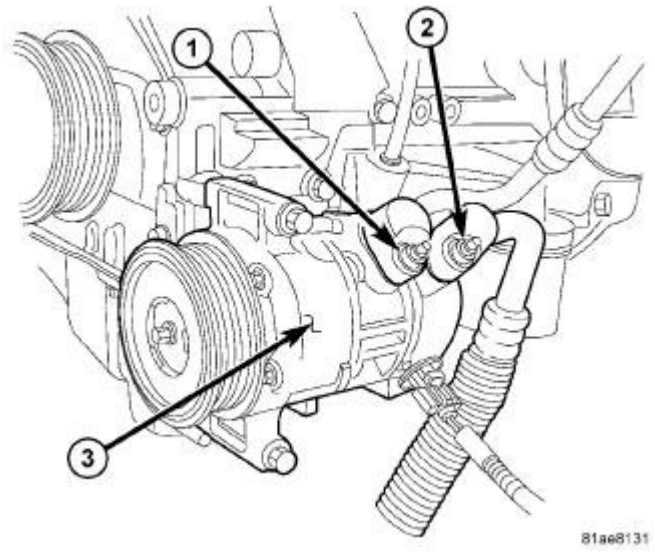

Fig. 38: A/C Discharge Line-Compressor
Courtesy of CHRYSLER LLC

36. Disconnect both A/C lines (1) and (2) and the harness connector from the A/C compressor (3).
37. Remove the A/C compressor (3). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .

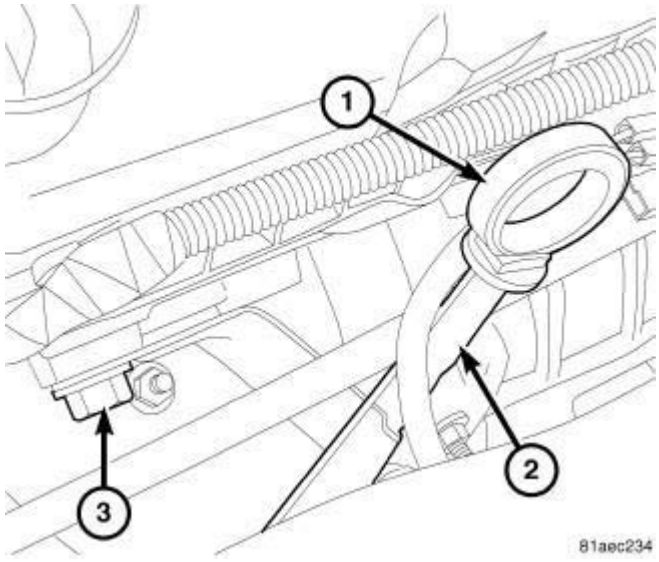

Fig. 39: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

38. Remove the Fan Module. Refer to **Cooling/Engine/FAN, Cooling - Removal** .
39. Remove the bolt, and the engine oil dipstick tube (2).

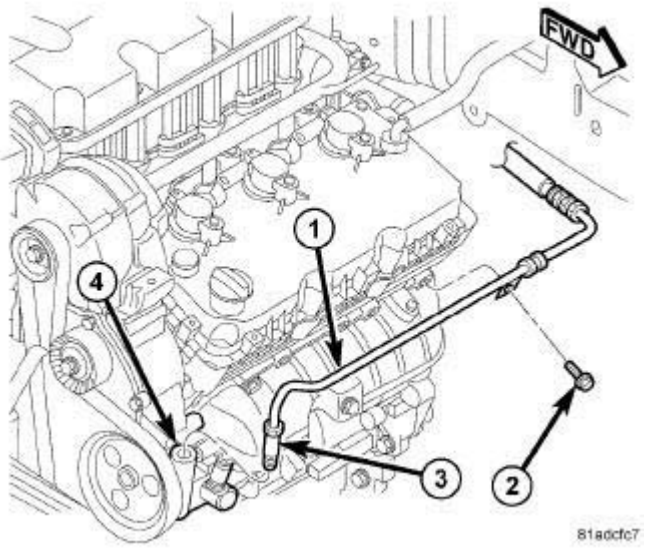

Fig. 40: Power Steering Line Retainer Bolt
Courtesy of CHRYSLER LLC

40. Remove the power steering line retainer bolt (2).

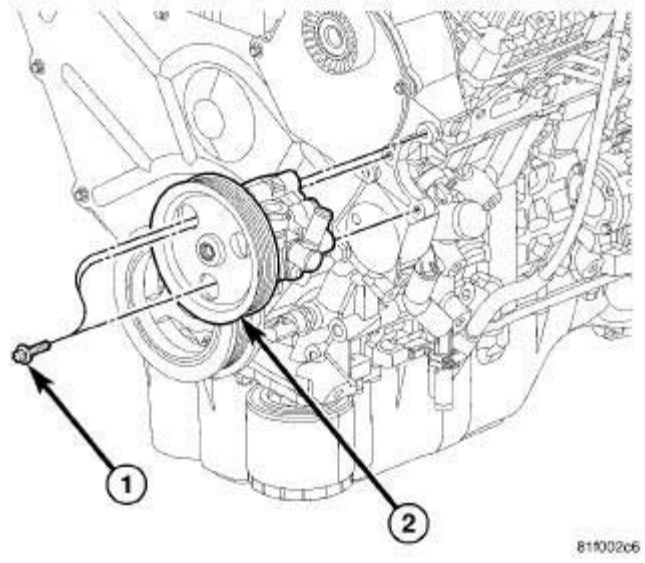

Fig. 41: Power Steering Pump & Reservoir
Courtesy of CHRYSLER LLC

41. Position the power steering pump (2) and reservoir aside in the engine compartment. Avoid opening the power steering system by leaving the power steering lines connected.

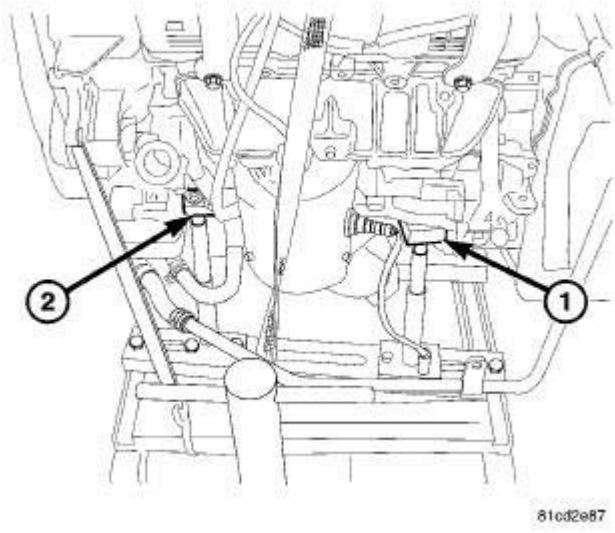

Fig. 42: Front Engine Fixture Brackets
Courtesy of CHRYSLER LLC

1 - 8130 ADAPTER 2 - ENGINE CRADLE POST

42. Position vehicle height to allow engine dolly 6135 and cradle 6710A with posts 6848 to be installed under vehicle.
43. Align the front right engine cradle post (2) with the Lift Point Hole in the Engine Block.
44. Align the front left engine cradle post and 8130 support bracket (1) with the lift point hole in the engine block.

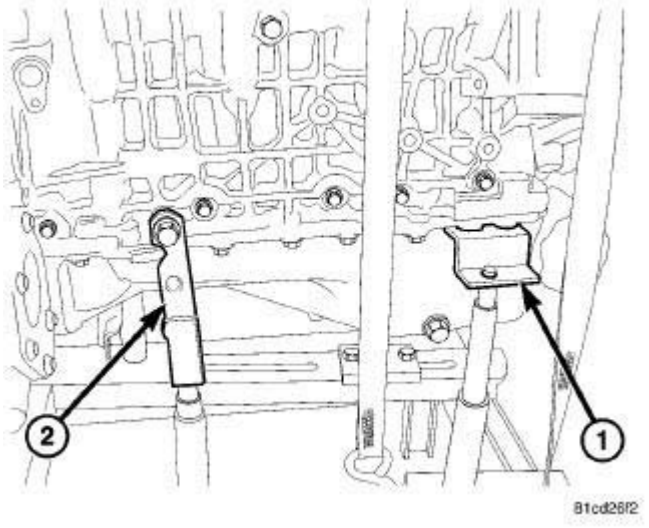

Fig. 43: Rear Engine Fixture Brackets
Courtesy of CHRYSLER LLC

1 - 10107-2 ADAPTER
2 - 10107-1 ADAPTER

45. Install 10107-1 Support Bracket (2) in the engine block, and align the left rear engine cradle post with the hole in the support bracket.
46. Install 10107-2 Support Bracket (1) in the engine block, and align the right rear engine cradle post with the hole in the support bracket.

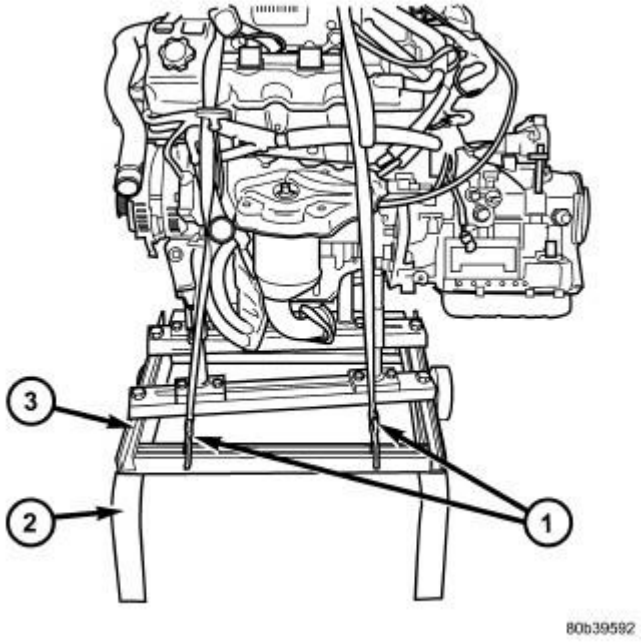

Fig. 44: ENGINE REMOVAL CRADLE
Courtesy of CHRYSLER LLC

1 - SAFETY STRAPS
2 - SPECIAL TOOL 6135
3 - SPECIAL TOOL 6710

47. Install safety straps (1) so that they securely hold the powertrain assembly in the engine cradle. Tighten the fasteners at the base of each engine cradle post, and verify that the engine cradle posts are fully engaged in the lifting points.
48. Lower vehicle so weight of the engine and transmission ONLY is on the cradle.

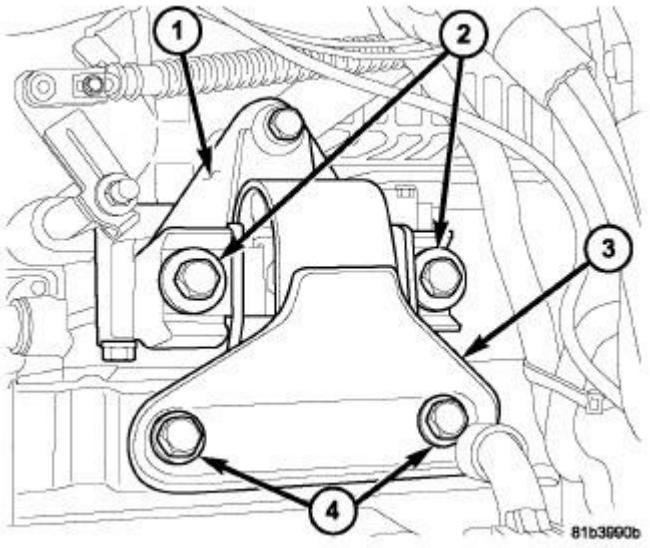

Fig. 45: Identifying Left Engine Mount
Courtesy of CHRYSLER LLC

49. Remove the left side engine mount bolts (2).

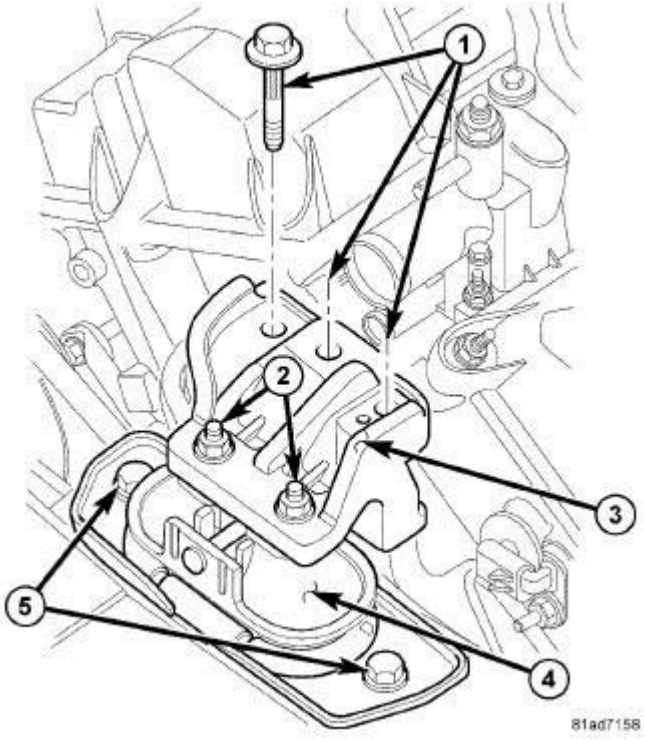

Fig. 46: Right Side Engine Mount Bolts
Courtesy of CHRYSLER LLC

50. Remove the right side engine mount bolts (1).
51. Slowly raise vehicle in short length spans. Inspect at each interval for potential engine or transaxle contact to vehicle components. Move the cradle/dolly fixture as necessary to allow for removal clearance.

INSTALLATION

INSTALL

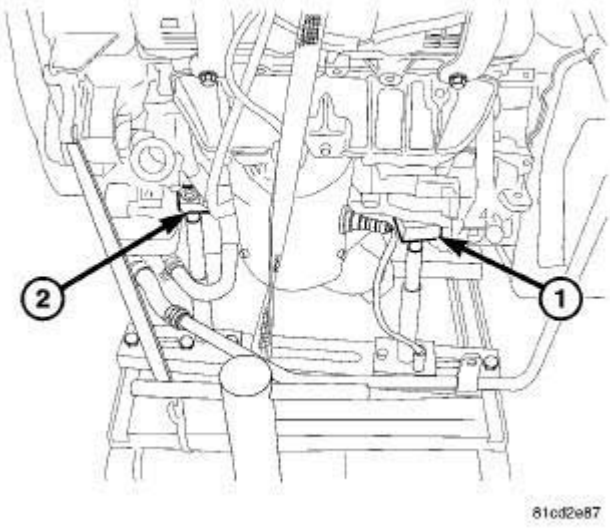

Fig. 47: Front Engine Fixture Brackets
Courtesy of CHRYSLER LLC

1 - 8130 ADAPTER
2 - ENGINE CRADLE POST

1. Align the front right engine cradle post (2) with the Lift Point Hole in the Engine Block.
2. Align the front left engine cradle post and 8130 support bracket (1) with the lift point hole in the engine block.

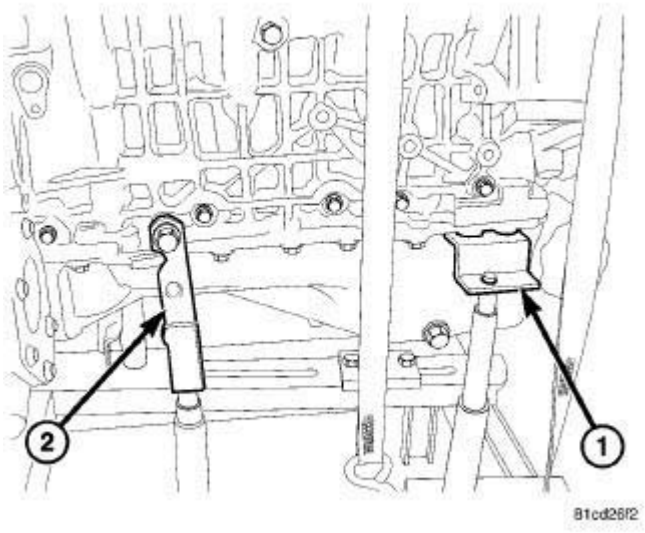

Fig. 48: Rear Engine Fixture Brackets
Courtesy of CHRYSLER LLC

1 - 10107-2 ADAPTER
2 - 10107-1 ADAPTER

3. Install 10107-1 Support Bracket (2) in the engine block, and align the left rear engine cradle post with the hole in the support bracket.
4. Install 10107-2 Support Bracket (1) in the engine block, and align the right rear engine cradle post with the hole in the support bracket.

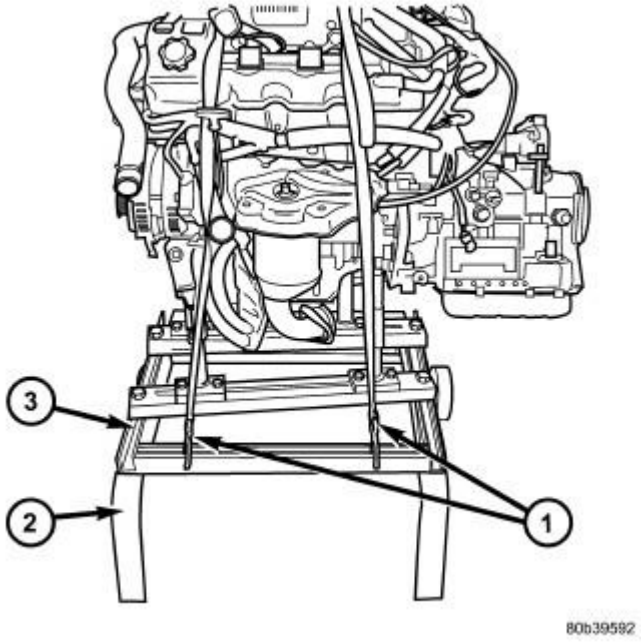

Fig. 49: ENGINE REMOVAL CRADLE
Courtesy of CHRYSLER LLC

1 - SAFETY STRAPS
2 - SPECIAL TOOL 6135
3 - SPECIAL TOOL 6710

5. Install safety straps (1) so that they securely hold the powertrain assembly in the engine cradle. Tighten the fasteners at the base of each engine cradle post, and verify that the engine cradle posts are fully engaged in the lifting points.
6. Raise the vehicle body on a hoist.
7. Position the engine cradle and powertrain beneath the vehicle.
8. Slowly lower the vehicle body in short length spans. Inspect at each interval for potential engine or transaxle contact to body or suspension components. Move the cradle/dolly fixture as necessary.
9. Install ground strap to the hood and position the hood back.

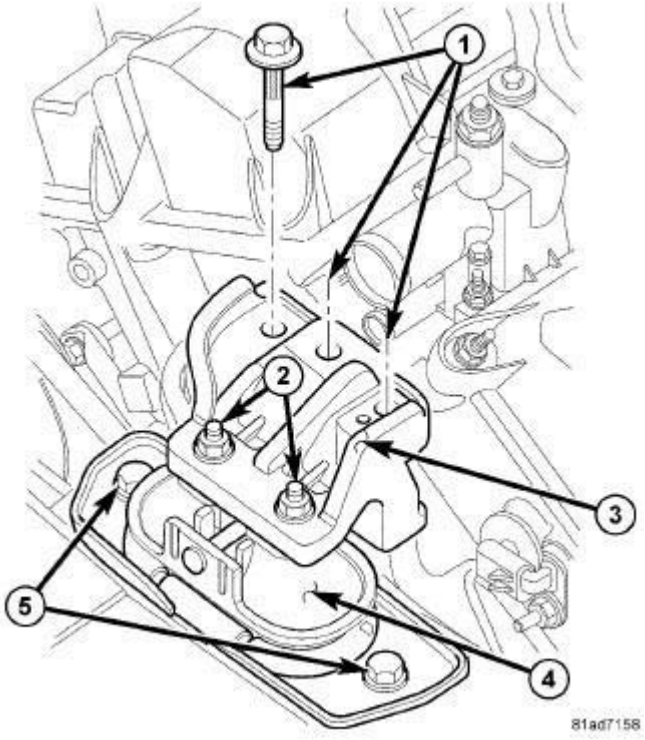

Fig. 50: Right Side Engine Mount Bolts
Courtesy of CHRYSLER LLC

10. Install 3 right engine mount bolts (1). Tighten bolts to 50 N.m (37 ft. lbs.).

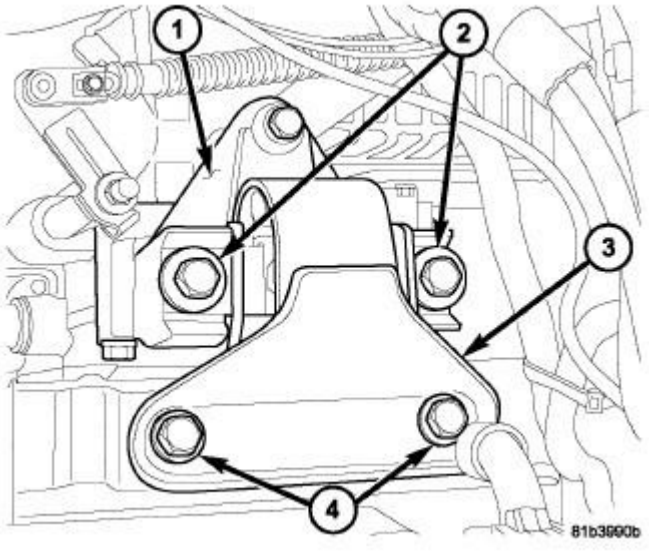

Fig. 51: Identifying Left Engine Mount
Courtesy of CHRYSLER LLC

11. Install the left side engine mount bolts (2). Tighten bolts to 98 N.m (72 ft. lbs.).

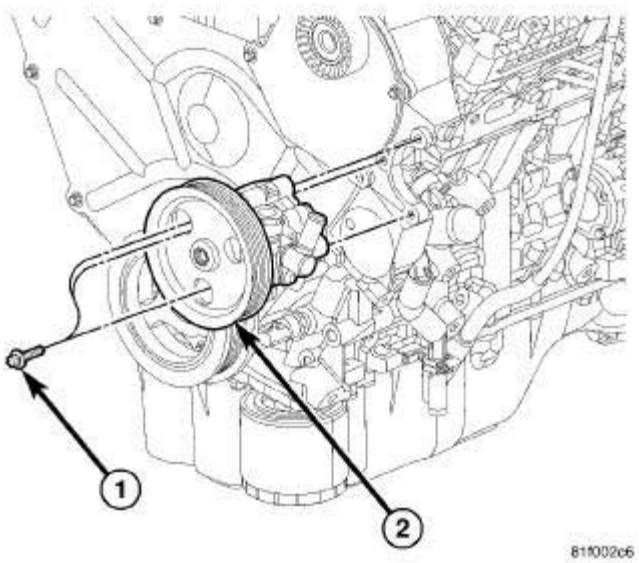

Fig. 52: Power Steering Pump & Reservoir
Courtesy of CHRYSLER LLC

12. Install the power steering pump (2). Refer to **Steering/Pump - Installation** .

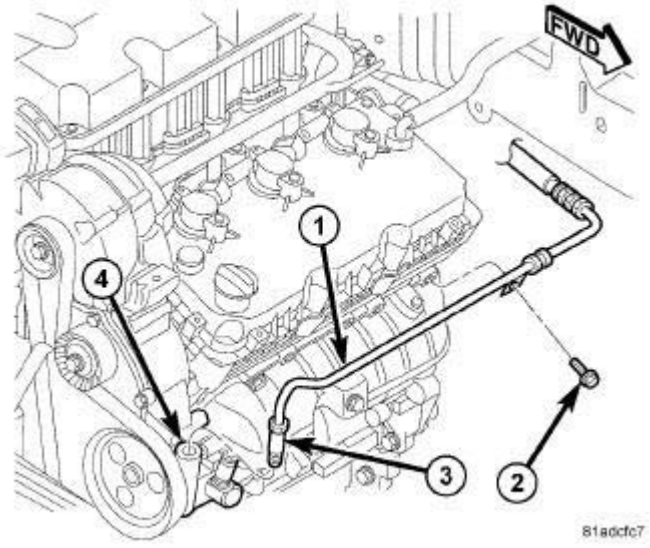

Fig. 53: Power Steering Line Retainer Bolt
Courtesy of CHRYSLER LLC

13. Install the power steering line retainer bolt (2).

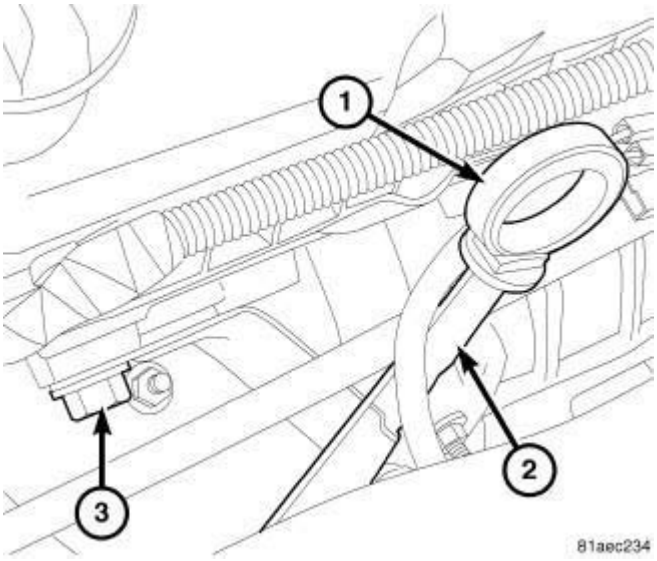

Fig. 54: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

14. Install the fan module. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
15. Install the engine oil dipstick tube (2) and the bolt (3).

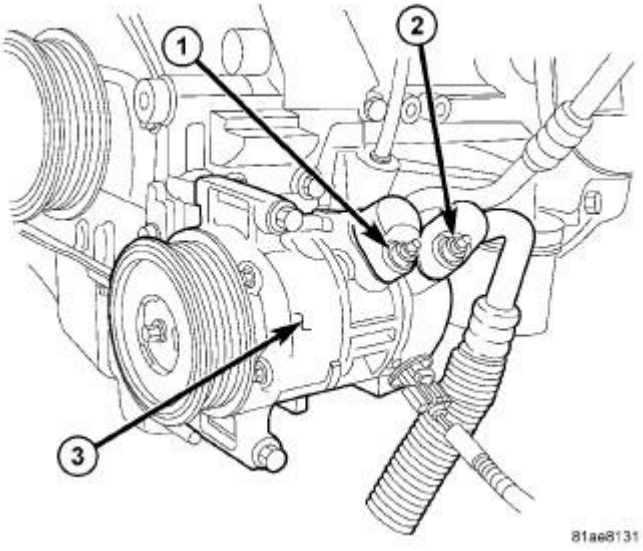

Fig. 55: A/C Discharge Line-Compressor
Courtesy of CHRYSLER LLC

16. Install the A/C compressor (3). Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .
17. Reconnect both A/C lines (1) and (2) and the harness connector to the A/C compressor (3).

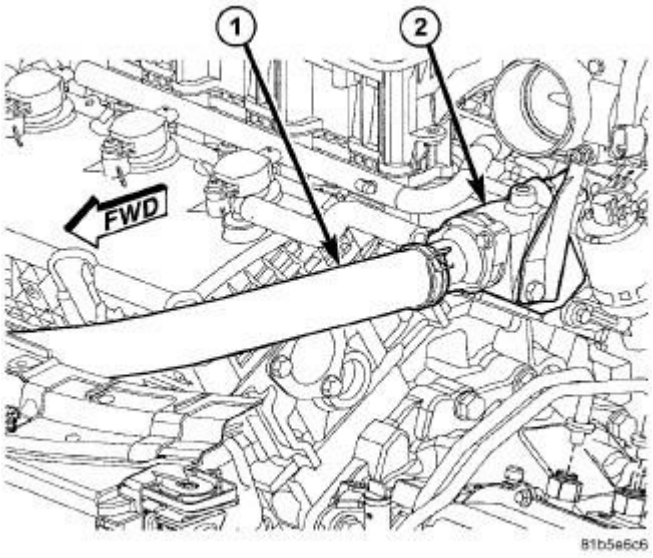

Fig. 56: Upper Radiator Hose From Thermostat Housing
Courtesy of CHRYSLER LLC

18. Reconnect the Upper Radiator hose (1) to the thermostat housing (2) and position aside.

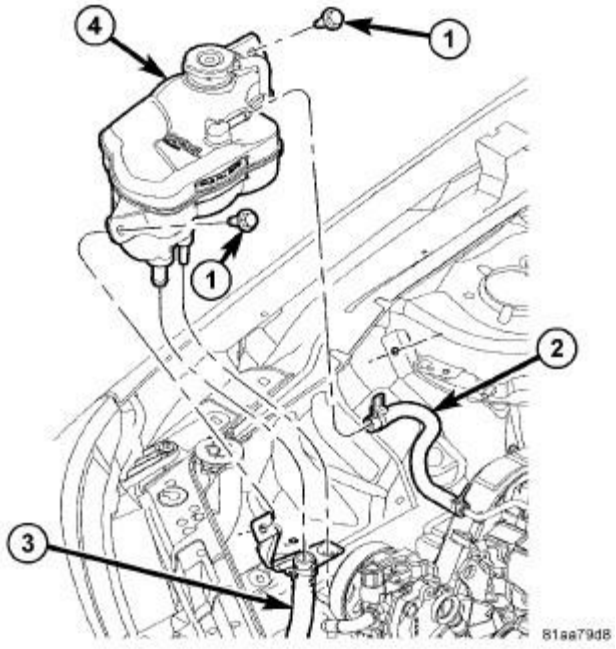

Fig. 57: COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

19. Reconnect the coolant reservoir overflow hose (2) to the coolant bottle (4) and position aside.

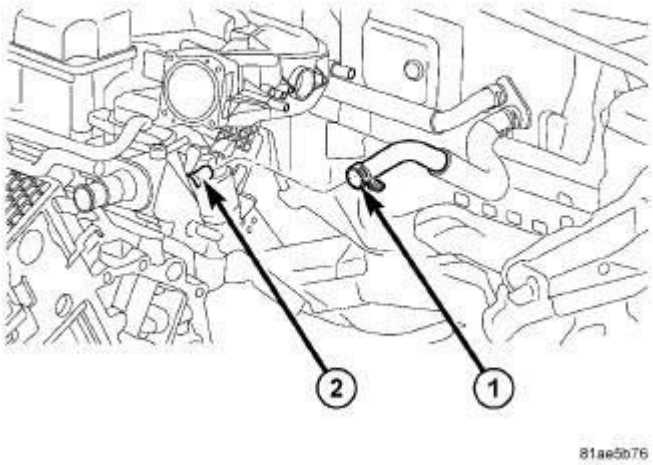

Fig. 58: Heater Core Supply Hose
Courtesy of CHRYSLER LLC

20. Reconnect the heater core supply hose (1) to the intake manifold outlet (2).

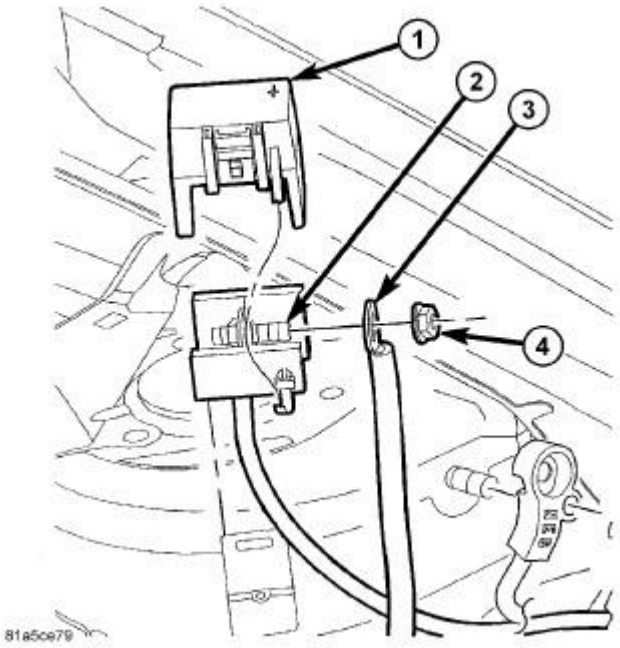

Fig. 59: Positive Auxiliary Battery Post Cable
Courtesy of CHRYSLER LLC

21. Reconnect the positive auxiliary battery post cable (2) and the negative battery cable to the left shock tower and position aside.

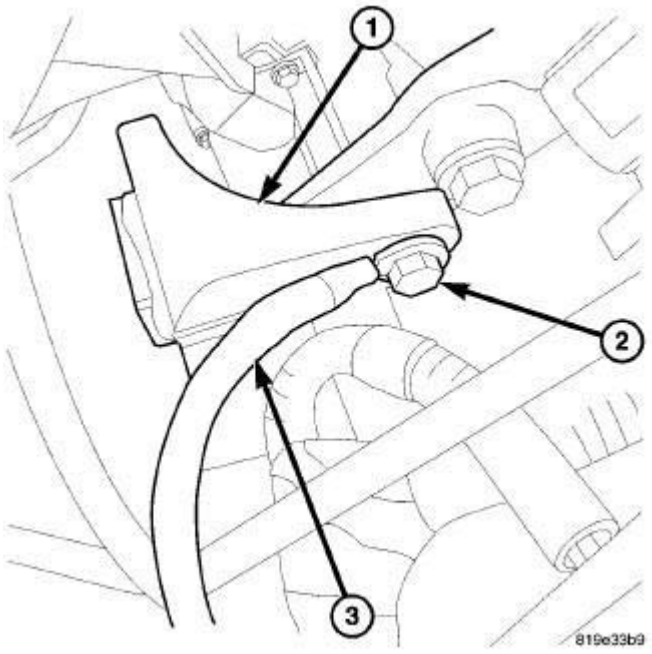

Fig. 60: GROUND CABLE AT FRONT MOUNT
Courtesy of CHRYSLER LLC

22. Reconnect the ground (3) to the front of the transaxle.

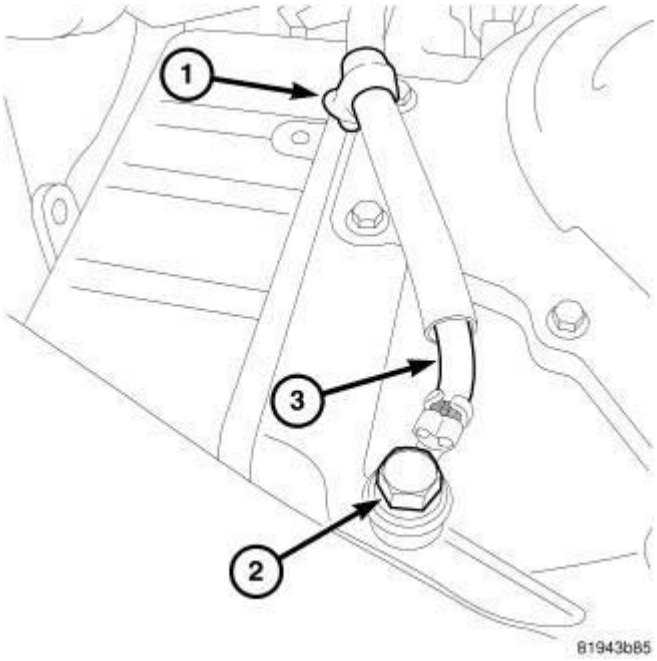

Fig. 61: GROUND CABLE
Courtesy of CHRYSLER LLC

23. Reconnect the ground (3) to the side of the transaxle.

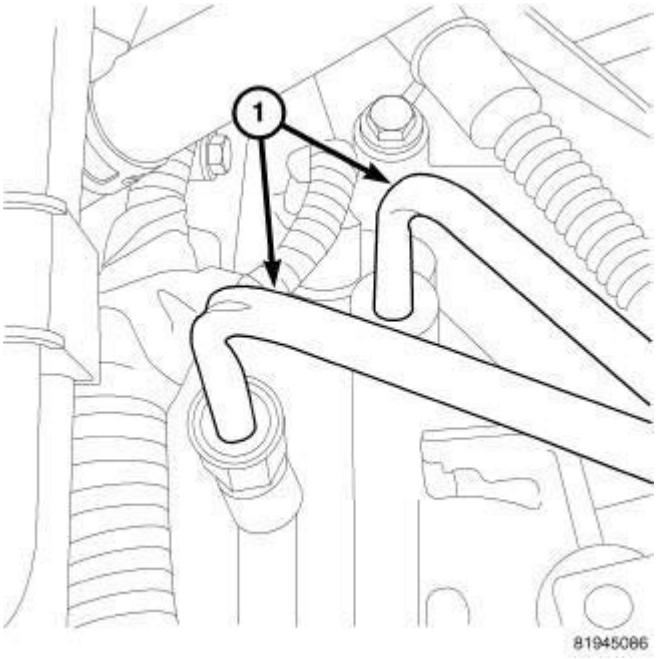

Fig. 62: Transaxle Cooler Lines
Courtesy of CHRYSLER LLC

24. Reconnect the transaxle cooler lines (1).

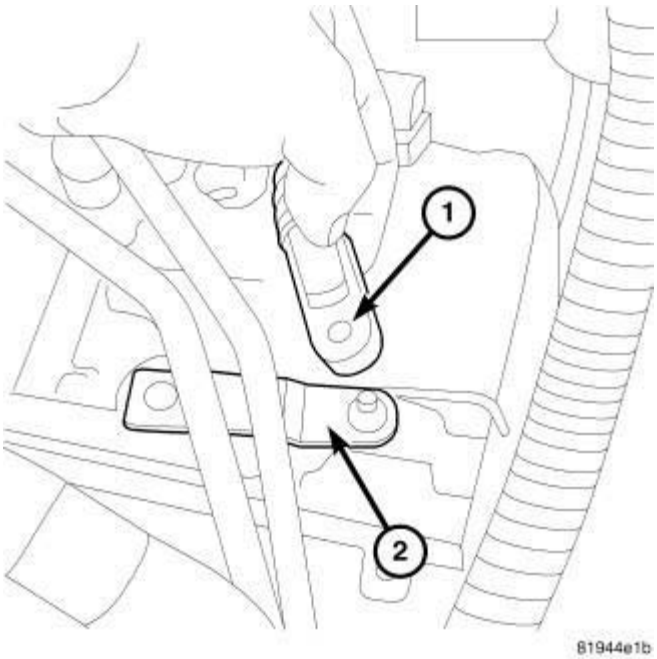

Fig. 63: Transaxle Shifter Cable
Courtesy of CHRYSLER LLC

25. Reconnect the transaxle shifter cable (1).

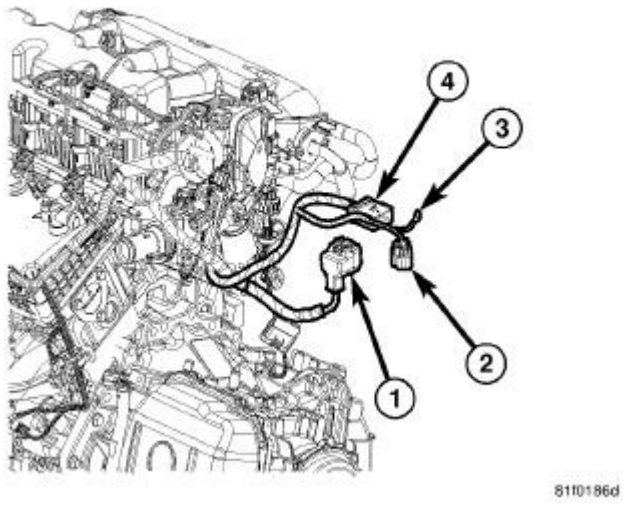

Fig. 64: Transaxle Harness Connectors
Courtesy of CHRYSLER LLC

26. Reconnect the transaxle harness PCM (1), and 6-way (2) connectors.

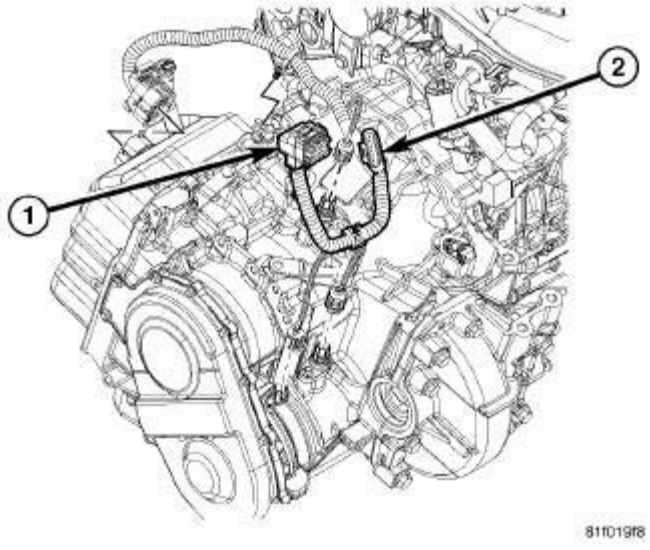

Fig. 65: Engine Harness Connectors
Courtesy of CHRYSLER LLC

27. Reconnect the engine harness PCM (1), 12-way (2), ground (3), 8-way (4) connectors.

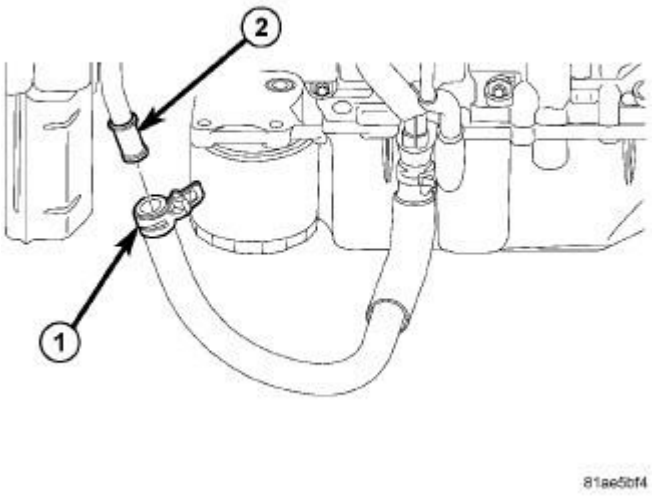

Fig. 66: Lower Coolant Hose From Return Tube
Courtesy of CHRYSLER LLC

28. Raise Vehicle.
29. Install the Left Front Half Shaft. Refer to **Differential and Driveline/Half Shaft - Installation** .
30. Reconnect the Lower Coolant Hose (1) from the return tube (2).

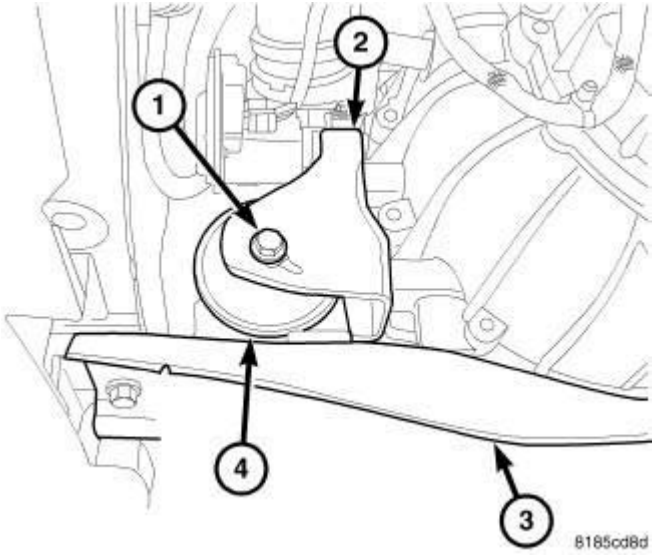

Fig. 67: Removing/Installing Front Mount
Courtesy of CHRYSLER LLC

31. Install the Front Engine Mount Bracket (2). See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.

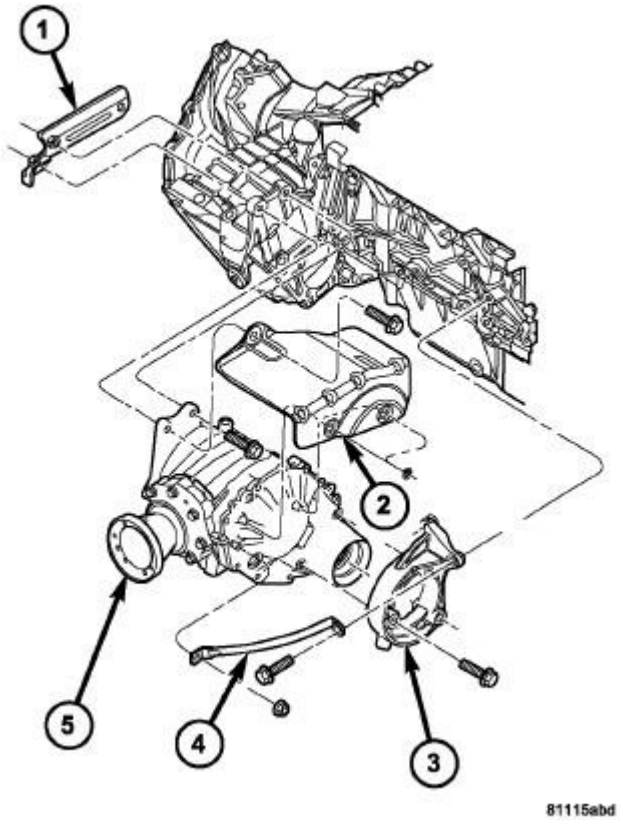

Fig. 68: Power Transfer Unit Mounting
Courtesy of CHRYSLER LLC

1 - BRACKET
2 - HEAT SHIELD
3 - BRACKET
4 - BRACE
5 - POWER TRANSFER UNIT

32. If equipped, install the PTU (5). Refer to **Transmission and Transfer Case/Power Transfer Unit - Installation** .

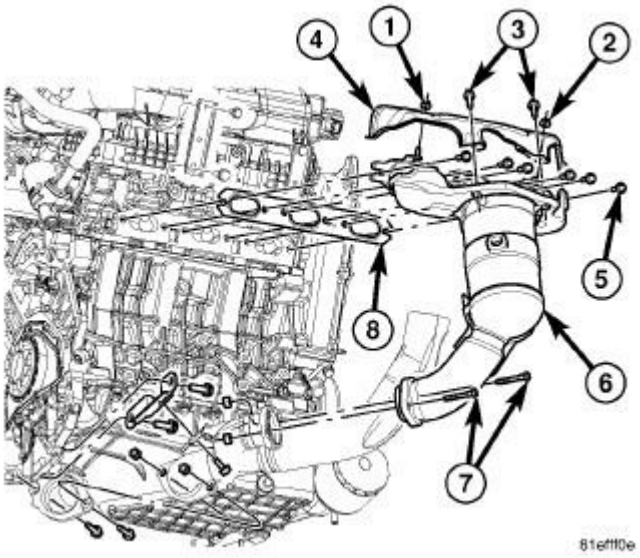

Fig. 69: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

33. Install the Left Maniverter (6). See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

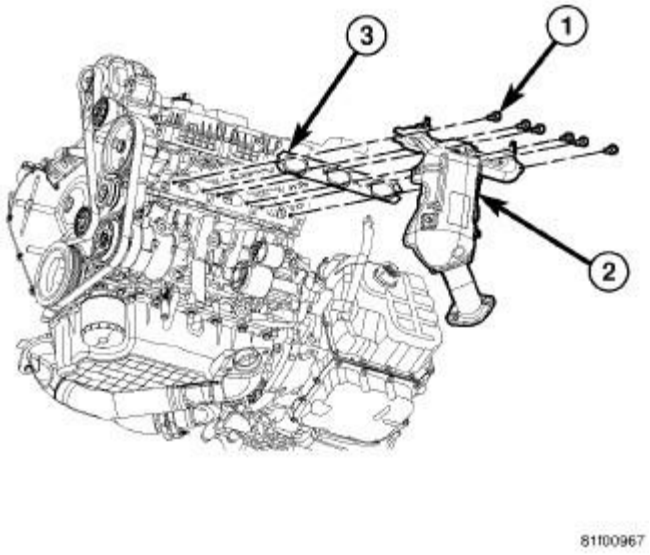

Fig. 70: Right Front Half Shaft Assembly
Courtesy of CHRYSLER LLC

34. Install the Right Maniverter. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

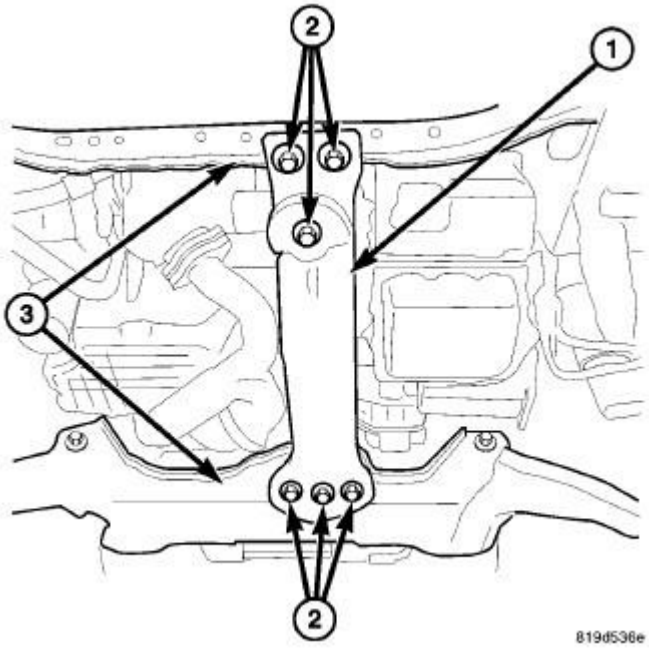

Fig. 71: FORE-AFT Crossmember
Courtesy of CHRYSLER LLC

35. Install the Right Front Half Shaft assembly. Refer to **Differential and Driveline/Half Shaft - Installation** .
36. Install the fore-aft crossmember (1). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .

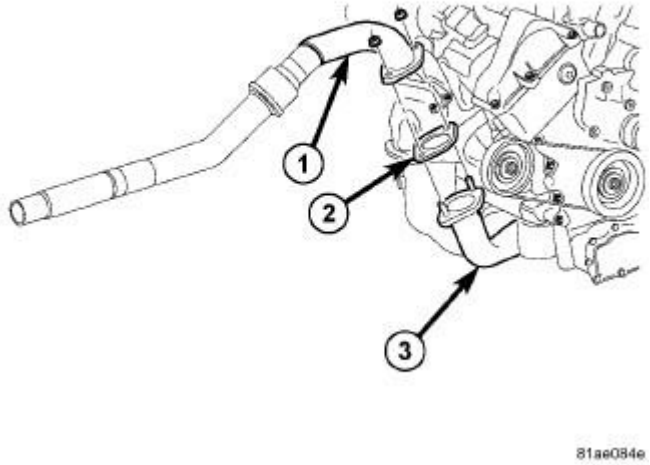

Fig. 72: Exhaust Extension Pipe & Gasket
Courtesy of CHRYSLER LLC

37. Install the Cross Under Pipe (3). See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.
38. Install the Exhaust Extension Pipe (1) and gasket (2) to the Crossunder pipe (3).

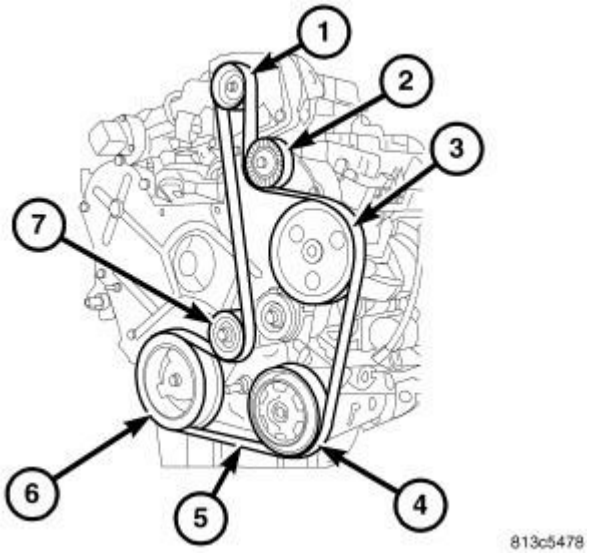

Fig. 73: 3.5L ENGINE ACCESSORY DRIVE BELT INSTALLATION
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY
2 - P/S PUMP
3 - A/C COMPRESSOR
4 - CRANKSHAFT
5 - TENSIONER
6 - GENERATOR

39. Install the accessory drive belt (6). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

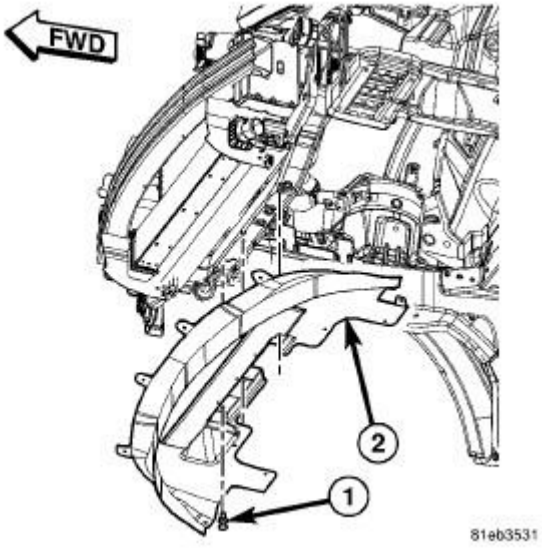

Fig. 74: Front Closeout Panel
Courtesy of CHRYSLER LLC

40. Install the Front Closeout Panel (2). Refer to **Frame and Bumpers/Bumpers/FASCIA, Front Lower - Installation** .

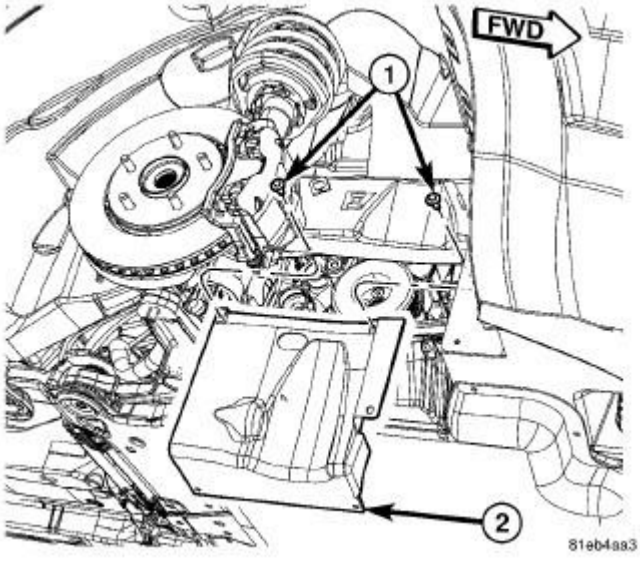

Fig. 75: Left Forward Splash Shield
Courtesy of CHRYSLER LLC

41. Install the Left Forward Splash Shield (2).

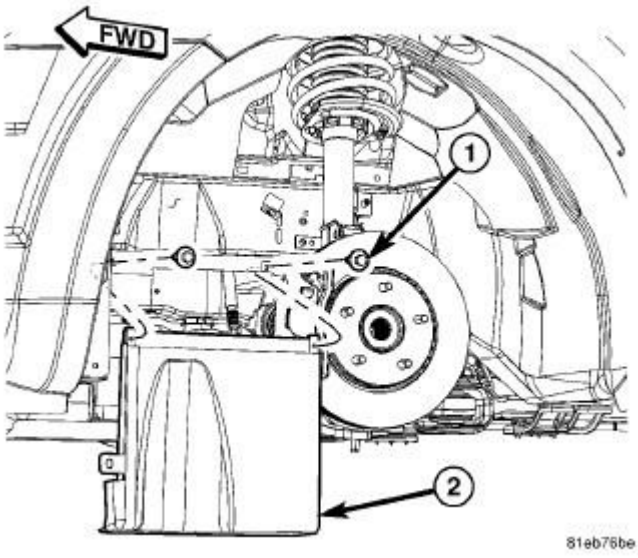

Fig. 76: Right Forward Splash Shield
Courtesy of CHRYSLER LLC

42. Install the Right Forward Splash Shield (2).

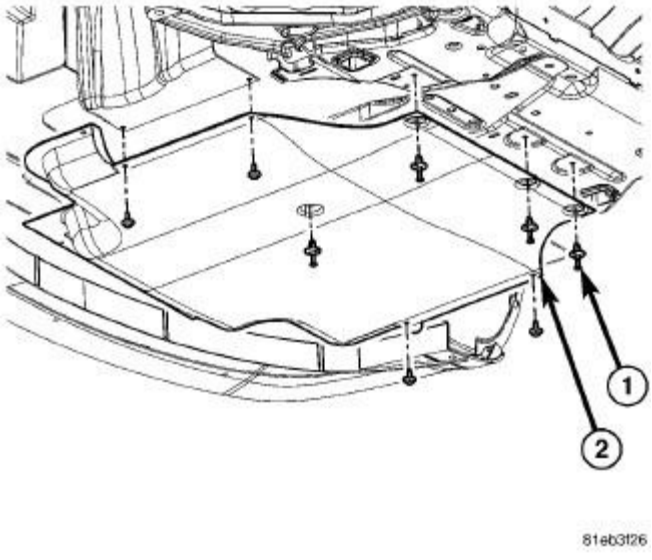

Fig. 77: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - Belly Pan Fasteners
2 - Belly Pan

43. Install the belly pan (2) and install the 12 belly pan fasteners (1).

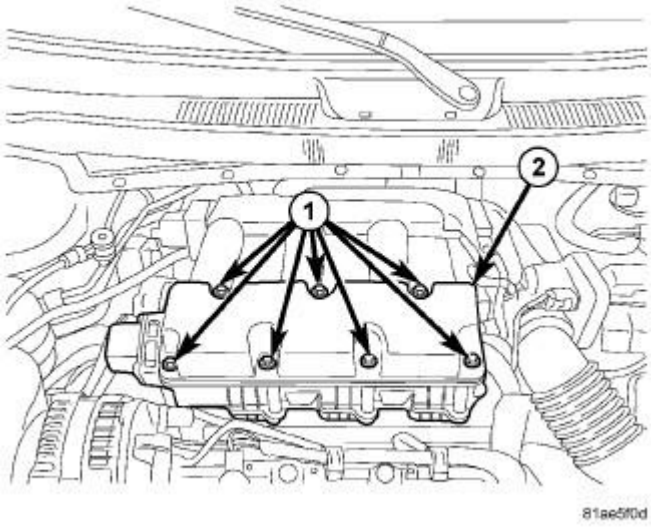

Fig. 78: Upper Intake Manifold
Courtesy of CHRYSLER LLC

44. Install the Upper Intake Manifold (2). See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

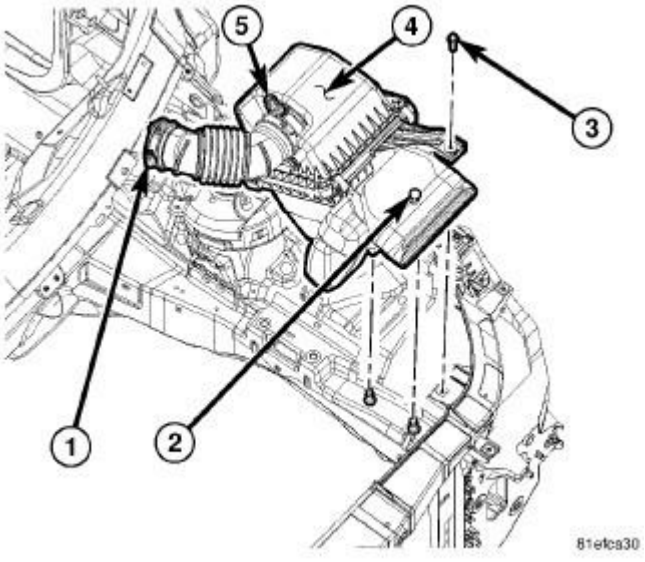

Fig. 79: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

45. Install the Air Cleaner Housing (4). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.

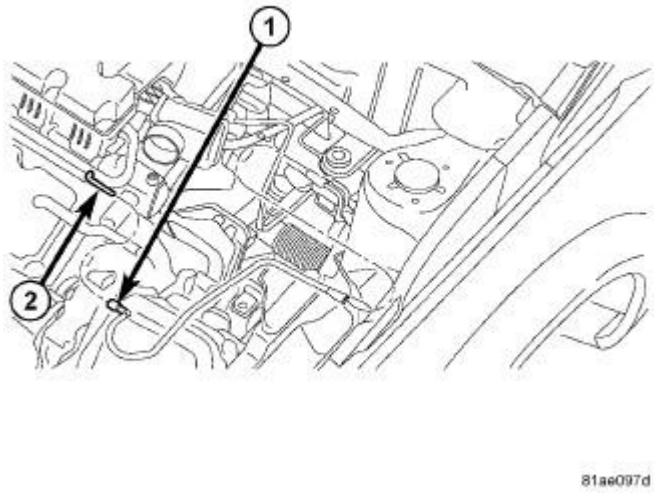

Fig. 80: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

46. Reconnect the fuel line (1) to the fuel rail inlet (2).
47. Recharge the air conditioning system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
48. Fill the cooling system. Refer to **Cooling - Standard Procedure** .

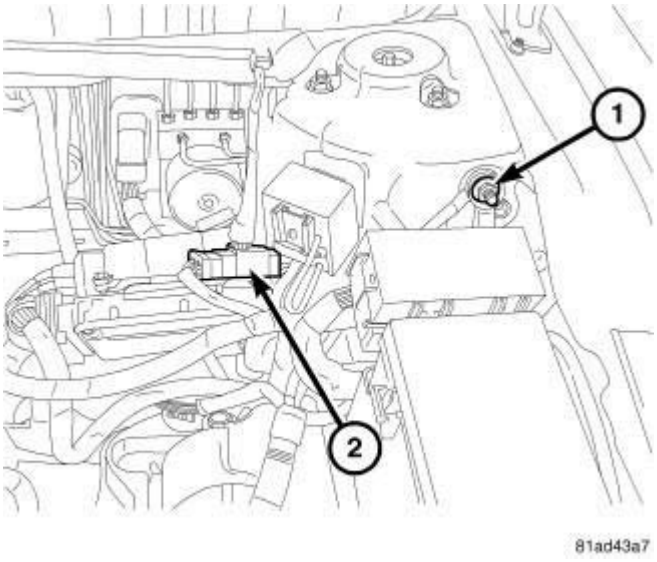

Fig. 81: BATTERY CABLE
Courtesy of CHRYSLER LLC

49. Reconnect the negative battery cable (1).
50. Start the engine and allow it to reach normal operating temperature. Inspect for leaks, and verify normal operation.

51. Install the engine cover.

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

SPECIFICATIONS

3.5L ENGINE

GENERAL

DESCRIPTION	SPECIFICATION	
Type	60° SOHC V6 24-Valve	
Displacement	3.5L	
Firing Order	1-2-3-4-5-6	
Compression Ratio	10:1	
Lead Cylinder	#1 Right Bank	
-	**Metric**	**Standard**
Displacement	3.5L Liters	214 cu. in.
Bore	96.0 mm	3.780 in.
Stroke	81.0 mm	3.189 in.

CYLINDER BLOCK

DESCRIPTION	SPECIFICATIONS	
	Metric	**Standard**
Cylinder Bore Diameter	96.0 mm ± 0.0076	3.780 in. ± 0.0003 in.
Out-of-Round (Max.)	0.076 mm	0.003 in.
Taper (Max.)	0.051 mm	0.002 in.

PISTONS

DESCRIPTION	SPECIFICATIONS	
	Metric	**Standard**
Material Type	Aluminum (Full Floating Pins)	
Piston Diameter	95.98 mm ± 0.019 mm	3.7788 in. ± 0.0008 in.
Clearance at Size Location	-0.007 to +0.047 mm	-0.003 to +0.0018 in.
Piston Pin Bore Diameter	22.005-22.012 mm	0.8663-0.8666 in.
Piston Weight - A	404.5-409.5 grams	14.27-14.44 oz.
Piston Weight - B	399.5-404.5 grams	14.09-14.27 oz.
Piston Ring Groove Diameter #1	87.4-87.6 mm	3.441-3.449 in.
Piston Ring Groove Diameter #2	86.3-86.5 mm	3.397-3.4055 in.

Piston Ring Groove Diameter #3	85.8-86.0 mm	3.378-3.385 in.

PISTON PINS

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Type	Full Floating	
Clearance in Piston	0.005-0.015 mm	0.002-0.0006 in.
Clearance in Rod	0.010-0.023 mm	0.0004-0.0009 in.
Diameter	21.997-22.000 mm	0.8660-0.86614 in.

PISTON RINGS

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Ring Gap-Top Compression Ring	0.20-0.36 mm	0.008-0.014 in.
Ring Gap-2nd Compression Ring (Micro-Napier	0.20-0.40 mm	0.0078-0.0157 in.
Ring Gap-Oil Control (Steel Rails)	0.25-0.76 mm	0.010-0.030 in.

PISTON RING SIDE CLEARANCE

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Top and Second Compression Ring	0.04-0.08 mm	0.0016-0.0031 in.
Oil Ring (Steel Rails	0.038-0.184 mm	0.0015-0.0073 in.

PISTON RING WIDTH

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Top Compression Ring	1.17-1.19 mm	0.0461-0.0469 in.
2nd Compression Ring (Micro-Napier	1.47-1.49 mm	0.058-0.059 in.
Oil Control (Steel Rails)	0.445-0.470 mm	0.0176-0.0186 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Rod Pin Bore Diameter	22.010-22.020 mm	0.8665-0.8669 in.
Side Clearance (MAX)	0.39 mm	0.0153 in.
Total Weight (Less Bearing)	693 grams	24.445 oz.

CRANKSHAFT MAIN BEARING JOURNALS

DESCRIPTION	SPECIFICATIONS

	Metric	Standard
Main Journal Diameter	63.987-64.013 mm	2.5192-2.5202 in.
Main Bearing Diametrical Clearance	0.032-0.062 mm	0.0013-0.0024 in.
Bearing Clearance (Wear Limit)	0.070 mm	0.0027 in.
DIA Out-of-Round (MAX)	0.007 mm	0.0003 in.
Diametrical Taper (MAX)	0.006 mm	0.00025 in.
End Play	0.048-0.260 mm	0.002-0.010 in.
End Play (MAX)	0.330 mm	0.013 in.

CONNECTING ROD JOURNALS

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Diameter	57.982-58.002 mm	2.282-2.283 in.
Bearing Diametrical Clearance	0.024-0.054 mm	0.0009-0.0021 in.
Bearing Clearance (Wear Limit)	0.062 mm	0.0024 in.
Out-of-Round (MAX)	0.007 mm	0.0003 in.
Diametrical Taper (MAX)	0.006 mm	0.00025 in.

CAMSHAFT

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Bore Diameter	43.038-43.059 mm	1.6944-1.6953 in.
Diametrical Clearance	0.078-0.12 mm	0.003-0.0047 in.
Diametrical Clearance (MAX)	0.15 mm	0.0059 in.
Bearing Journal Diameter	42.939-42.960 mm	1.6905-1.6913 in.
End Play	0.03-0.035 mm	0.001-0.014 in.

VALVE TIMING-INTAKE VALVE

DESCRIPTION	SPECIFICATIONS (CRANKSHAFT DEGREES)
Opens (ATDC)	3°
Closes (ABDC)	61°
Duration	238°
Centerline	122°

VALVE TIMING-EXHAUST VALVE

DESCRIPTION	SPECIFICATIONS (CRANKSHAFT DEGREES)
Opens (BBDC)	56°
Closes (ATDC)	16°

Duration	252°
Centerline	110°

CYLINDER HEAD

DESCRIPTION	SPECIFICATIONS	
	Metric	**Standard**
Gasket Thickness (Compressed)	1.78 mm	0.059 in.
Valve Seat Angle (From Horizontal)	45-45.5°	
Valve Seat Runout (MAX)	0.051 mm	0.002 in.
Valve Seat Width-Intake	0.8-1.2 mm	0.031-0.067 in.
Valve Seat Width-Exhaust	1.3-1.7 mm	0.05-0.067 in.
Guide Bore Diameter (Std.)	6.975-7.00 mm	0.2746-0.2756 in.
Valve Guide Height *	9.5-10.5 mm	0.3740-0.4134 in.
* Measured from cylinder head surface		

VALVES

DESCRIPTION	SPECIFICATIONS	
	Metric	**Standard**
Face Angle (From Horizontal)	44.5°-45°	
Head Diameter-Intake	36.37-36.63 mm	1.4319-14421 in.
Head Diameter-Exhaust	28.87-29.13 mm	1.1366-1.1469 in.
Length-Intake (Overall)	114.41-114.99 mm	4.5043-4.5272 in.
Length-Exhaust (Overall)	126.17-126.75 mm	4.9673-4.9902 in.
Stem Diameter-Intake	6.935-6.953 mm	0.2730-0.2737 in.
Stem Diameter-Exhaust	6.906-6.924 mm	0.2719-0.2726 in.
Stem-to-Guide Clearance-Intake	0.022-0.065 mm	0.0009-0.0026 in.
Stem-to-Guide Clearance-Intake (MAX.) Rocking Method	0.29 mm	0.0114 in.
Stem-to-Guide Clearance-Exhaust	0.051-0.094 mm	0.002-0.0037 in.
Stem-to-Guide Clearance-Intake (MAX.) Rocking Method	0.370 mm	0.0146 in.
Valve Lift-Intake (Zero Lash)	8.55 mm	0.3367 in.
Valve Lift-Exhaust (Zero Lash)	6.53 mm	0.2571 in.
Valve Margin-Intake	0.835-1.165 mm	0.0329-0.0459 in.
Valve Margin-Exhaust	1.44-1.77 mm	0.0567-0.0697 in.
Valve Stem Tip Height-Intake	42.366-43.665 mm	1.6680-1.7187 in.
Valve Stem Tip Height-Exhaust	45.205-46.486 mm	1.780-1.8305 in.

VALVE SPRINGS

DESCRIPTION	SPECIFICATIONS

	Metric	Standard
Free Length-Intake (Approx.)	43.675 mm	1.7195 in.
Free Length-Exhaust- Yellow (Approx.)	47.1 mm	1.8543 in.
Free Length-Exhaust- White (Approx.)	48.3 mm	1.9015 in.
Spring Force-Intake (Valve Closed)	309-358 N @ 38.0 mm	69.5-80.5 lbs. @ 1.4961 in.
Spring Force-Exhaust- Yellow- (Valve Closed)	314-354 N @ 38.0 mm	70.5-79.5 lbs. @ 1.496 in.
Spring Force-Exhaust- White- (Valve Closed)	355-401 N @ 38.0 mm	80-90 lbs. @ 1.496 in.
Spring Force-Exhaust- Yellow- (Valve Open)	579-640 N @ 31.47 mm	130-144 lbs. @ 1.239 in.
Spring Force-Exhaust- White- (Valve Open)	621-687 N @ 31.47 mm	139.5-154.5 lbs. @ 1.239 in.
Spring Force-Intake (Valve Open)	836-907 N @ 29.45 mm	188-204 lbs. @ 1.1594 in.
Number of Coils-Intake	6.86	
Number of Coils-Exhaust	7.66	
Color of Spring (Top of Coils)- Intake-Right Hand Coil Direction	Orange	
Color of Spring (Top of Coils)- Exhaust-Left Hand Coil Direction	Yellow or White	
Wire Diameter-Intake	4.29-4.35 mm	0.1547-0.1570 in.
Wire Diameter-Exhaust	3.93-3.99 mm	0.1547-0.1570 in.
Spring Installed Height *	38.0 mm	1.4961 in.
* Spring Seat to Bottom Retainer-Intake and Exhaust		

OIL PUMP

DESCRIPTION	SPECIFICATIONS	
	Metric	Standard
Clearance Over Rotors	0.077 mm	0.003 in.
Cover-Out-of-Flat (MAX.)	0.025 mm	0.001 in.
Inner and Outer Rotor Thickness (MIN.)	14.229 mm	0.563 in.
Outer Rotor Thickness (MAX.)	0.39 mm	0.015 in.
Outer Rotor Diameter (MIN.)	79.997 mm	3.149 in.
Tip Clearance Between Rotors (MAX.)	0.20 mm	0.008 in.

OIL PRESSURE

DESCRIPTION	SPECIFICATIONS

NOTE: At Normal Operating Temperatures	
Pressure @ Curb Idle Speed *	34.47 kPa Min. (5 PSI MIN.)
Pressure @ 3000 RPM	300-724 kPa (45-105 PSI.)
*CAUTION: If pressure is zero at curb idle, DO NOT run engine at 3000 RPM.	

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Camshaft Sprocket Bolt-Right Side	102 +1/4 Turn	75 +1/4 Turn	-
Camshaft Sprocket Bolt-Left Side	102 +1/4 Turn	75 +1/4 Turn	-
Camshaft Thrust Plate-Bolts	28	-	250
Connecting Rod Cap-Bolts	27 +1/4 Turn	20 +1/4 Turn	-
Crankshaft Main Bearing Cap	-	-	-
-Inner Main Cap Bolts	20 +1/4 Turn	15 +1/4 Turn	-
-Outer Main Cap Bolts	27 +1/4 Turn	20 +1/4 Turn	-
-Tie Bolts (Horizontal)	28	-	250
Crankshaft Damper-Bolt	95	70	-
Cylinder Head Bolts*	-	-	-
-Step 1	61	45	-
-Step 2	88	65	-
-Step 3	88	65	-
-Step 4	+1/4 Turn	+1/4 Turn	-
*Refer to procedure for tightening sequence. See **Engine/Cylinder Head - Installation**.			
Cylinder Head Cover-Bolts	10	-	90
Exhaust Manifold to Cylinder Head-Bolts	23	-	200
Exhaust Manifold Heat Shield-Bolts	12	-	105
Flex plate to Crankshaft	95	70	-
Flex plate to Torque Converter	75	55	-
Intake Manifold - Lower	28	-	250
Intake Manifold - Upper	12	-	105
Left Engine Mount to Body Frame Rail	50	37	-
Oil Pan	27	20	-
-M6 Bolts	12	-	105
-M8 Bolts	28	-	250
Oil Pan Drain Plug	27	20	-
Oil Filter	12	9	-
M8 Oil Pump to Block-Bolts	28	-	250

M10 Oil Pump to Block-Bolt	54	40	-
M6 Oil Pump Cover-Bolts	12	-	105
Oil Pump Pick Up Tube-Bolt	28	-	250
Windage Tray	28 + 90°	20 + 90°	-
Crankshaft Rear Seal Retainer	12	-	105
Right Engine Mount to Body Frame Rail	50	37	-
Rocker Shaft Pedestal Retaining-Bolts	31	-	275
Spark Plugs	28	20	-
Timing Belt Tensioner-Bolts	28	-	250
Timing Belt Tensioner Pulley Assembly-Bolt	61	45	-
Timing Belt Cover	-	-	-
-M6 Bolts	12	-	105
-M8 Bolts	28	-	250
-M10 Bolts	54	40	-
Left Engine Mount to Transmission Bracket	98	72	-
Right Engine Mount to Timing Cover/Support Bracket	98	72	-

SPECIAL TOOLS

SPECIAL TOOLS

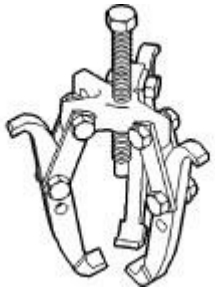

Fig. 82: Puller 1023
Courtesy of CHRYSLER LLC

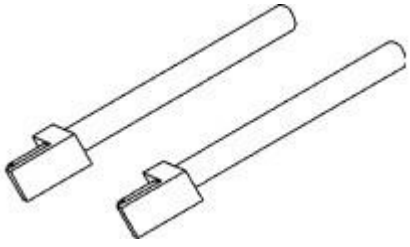

Fig. 83: Connecting Rod Installation Guides 8189
Courtesy of CHRYSLER LLC

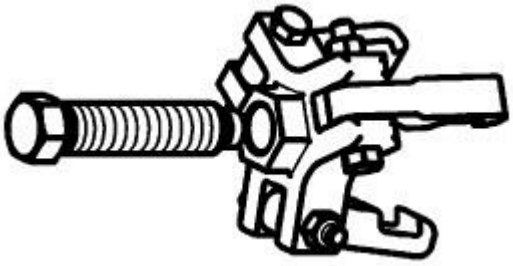

Fig. 84: Puller 8454
Courtesy of CHRYSLER LLC

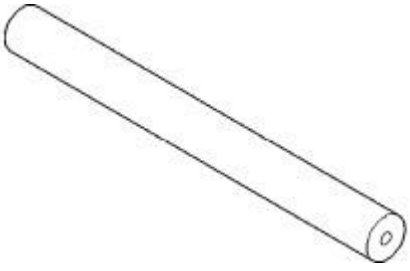

Fig. 85: Vibration Damper Remover Insert 9020 - Crank Sprocket Remover Insert C4685-C2
Courtesy of CHRYSLER LLC

Fig. 86: Camshaft Seal Installer MD-998306
Courtesy of CHRYSLER LLC

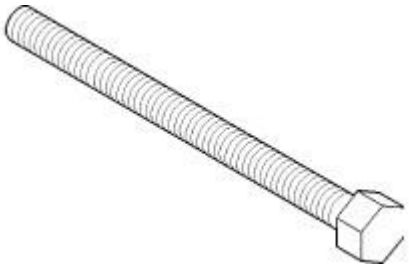

Fig. 87: Crankshaft Damper Installer Bolt C-4685-C1
Courtesy of CHRYSLER LLC

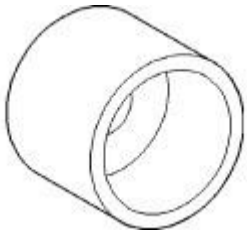

Fig. 88: Crankshaft Damper Installer 6792-1
Courtesy of CHRYSLER LLC

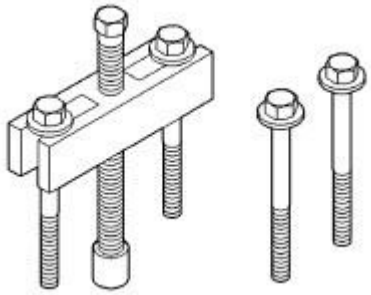

Fig. 89: Gear Puller L-4407A
Courtesy of CHRYSLER LLC

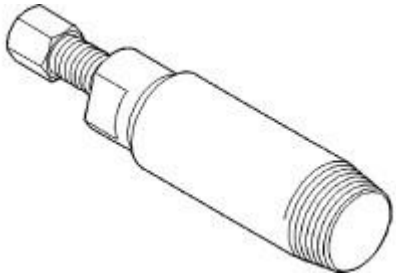

Fig. 90: Front Crankshaft Seal Remover 6341A
Courtesy of CHRYSLER LLC

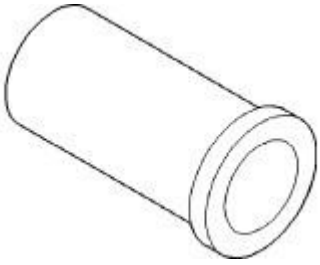

Fig. 91: Driver 6342
Courtesy of CHRYSLER LLC

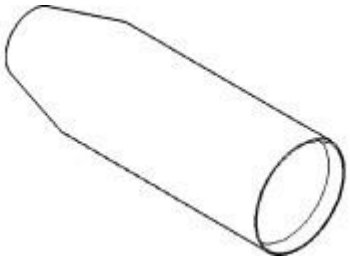

Fig. 92: Crankshaft Seal Protector 6780-2
Courtesy of CHRYSLER LLC

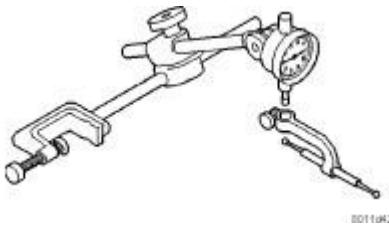

Fig. 93: DIAL INDICATOR C-3339
Courtesy of CHRYSLER LLC

Fig. 94: Valve Spring Compressor C-3422-D
Courtesy of CHRYSLER LLC

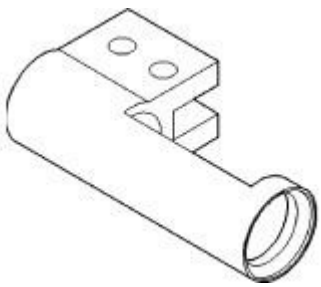

Fig. 95: Spring Compressor Adapter 6526
Courtesy of CHRYSLER LLC

Fig. 96: Valve Spring Tester C-647

Courtesy of CHRYSLER LLC

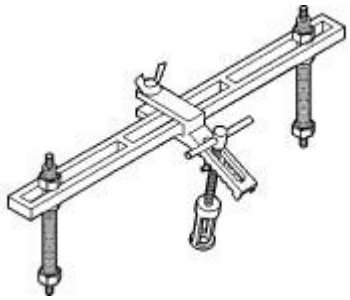

Fig. 97: Valve Spring Compressor MD998772A
Courtesy of CHRYSLER LLC

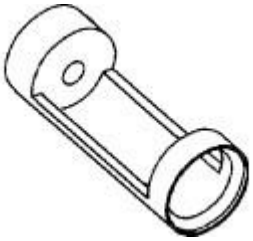

Fig. 98: Valve Spring Adapter 6527
Courtesy of CHRYSLER LLC

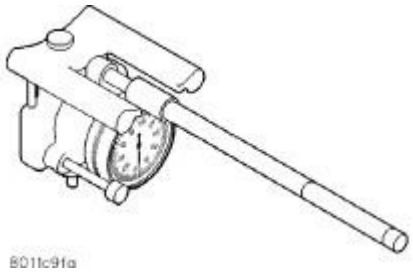

Fig. 99: Indicator, Cylinder Bore C-119
Courtesy of CHRYSLER LLC

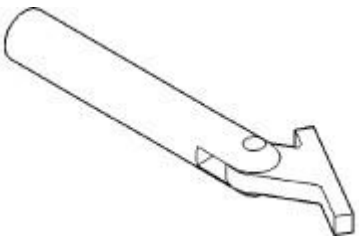

Fig. 100: Crankshaft Main Bearing Remover C-3059
Courtesy of CHRYSLER LLC

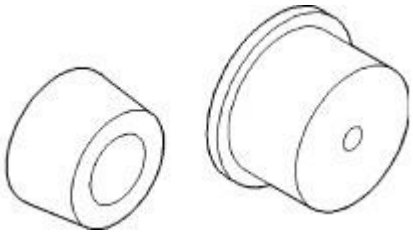

Fig. 101: Rear Crankshaft Oil Seal Installer 6926
Courtesy of CHRYSLER LLC

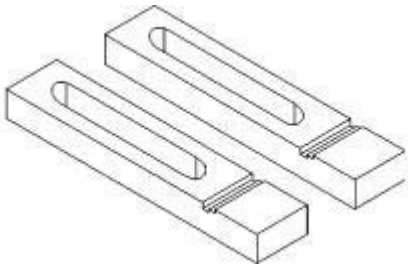

Fig. 102: Crankshaft Real Seal Retainer Alignment Fixture 8225
Courtesy of CHRYSLER LLC

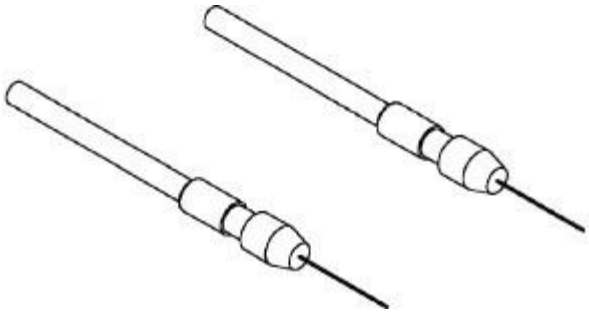

Fig. 103: Release Probe 8351
Courtesy of CHRYSLER LLC

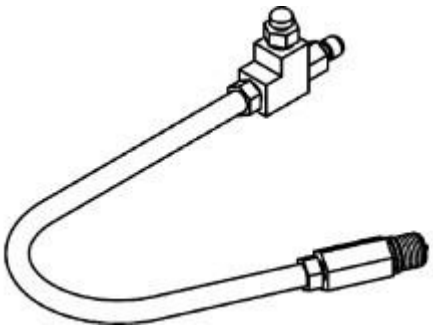

Fig. 104: Cylinder Compression Pressure Adaptor 8116
Courtesy of CHRYSLER LLC

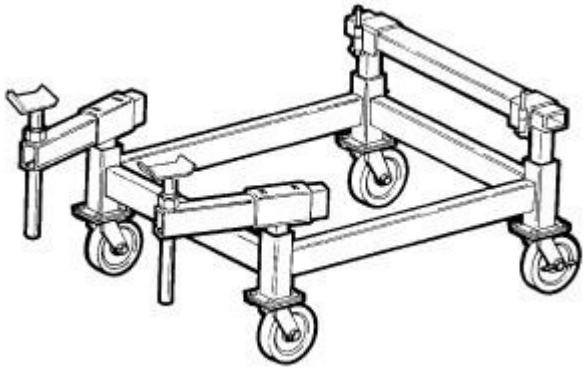

Fig. 105: Driveline Support Table 8874
Courtesy of CHRYSLER LLC

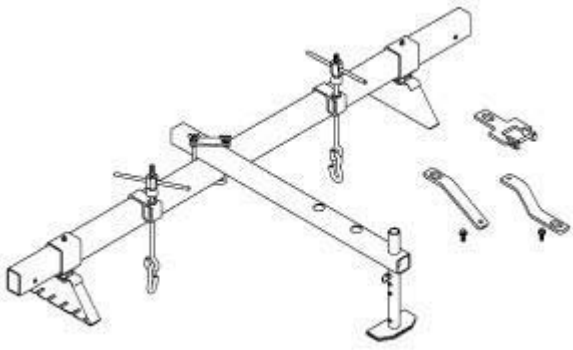

Fig. 106: Driveline Support Fixture 8534B
Courtesy of CHRYSLER LLC

AIR INTAKE SYSTEM

AIR CLEANER

Removal

REMOVAL

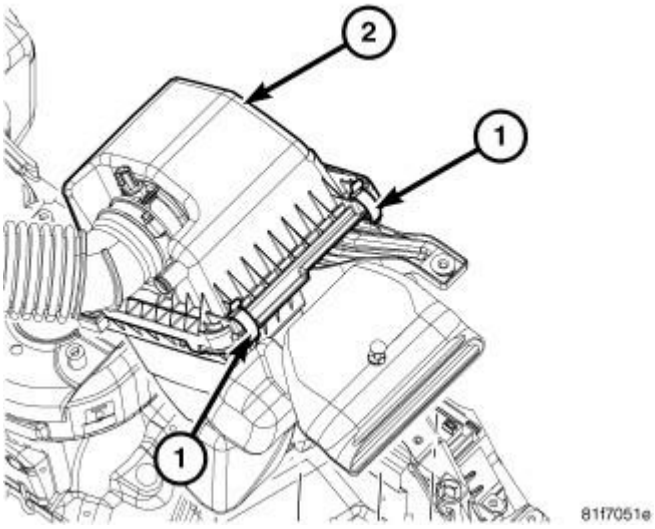

Fig. 107: Air Filter Housing Clips
Courtesy of CHRYSLER LLC

1. Disengage the air filter housing clips (1).
2. Slide the air filter housing cover (2) forward slightly to disengage tabs from the bottom of the air filter housing.
3. Remove air cleaner element from air cleaner housing.

Installation

INSTALLATION

1. Install air filter element into the bottom half of the air filter housing.

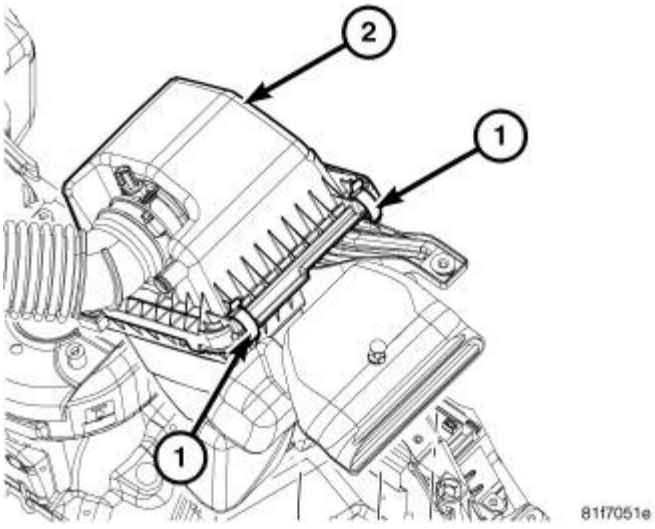

Fig. 108: Air Filter Housing Clips
Courtesy of CHRYSLER LLC

2. Slide the air filter housing cover (2) rearward to engage the tabs into the bottom half of the air filter housing.
3. Reengage the air filter housing clips (1).

BODY, AIR CLEANER

Removal

REMOVAL

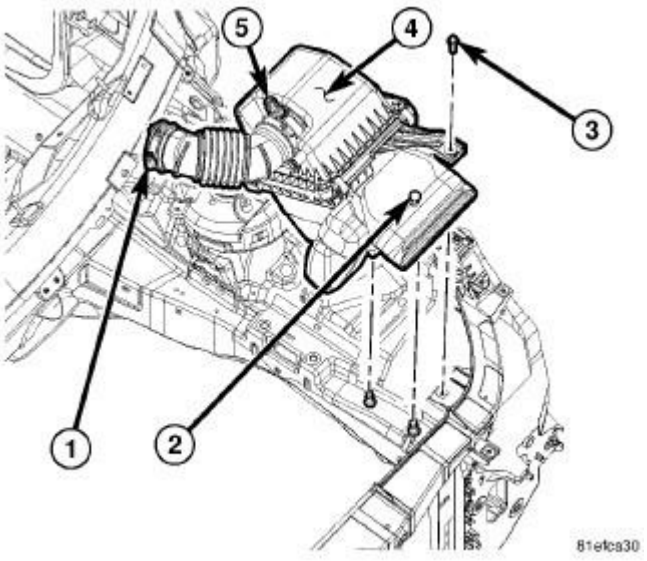

Fig. 109: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

1. Disconnect the Intake Air Temperature (IAT) sensor wiring harness connector from the IAT (5).
2. Loosen the clamp (1) and disconnect the air inlet hose from the throttle body.
3. Disconnect the makeup air hose from the top half of the air filter housing.
4. Remove the air filter housing retaining bolt (3) and the push pin (2) that secures the air scoop to the top of the radiator core support.
5. Pull the air filter housing up and off of the locating pins.

Installation

INSTALLATION

1. Push the air filter housing onto the locating pins.

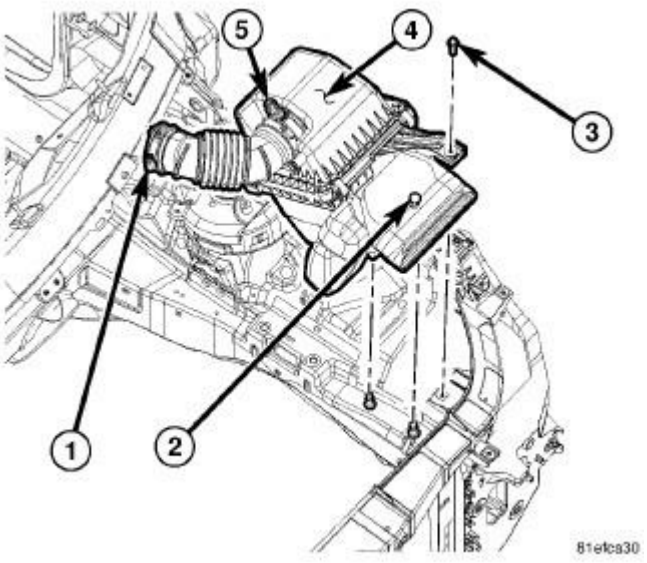

Fig. 110: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

2. Install air filter housing (2) straight down on locating pins.
3. Reposition the bracket and install the retainer (1). Tighten the retainer to 5 Nm (44 in. lbs.).
4. Install the push pin that secures the air scoop to the top of the radiator core support.
5. Connect inlet air temperature sensor harness connector (3).
6. Reconnect the air inlet hose to the throttle body, and tighten the clamp (1).
7. Connect negative battery cable.

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

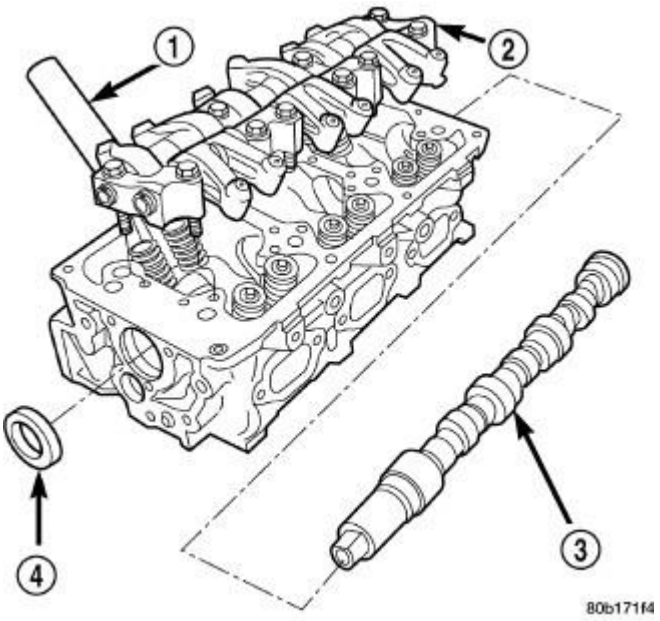

Fig. 111: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

The aluminum alloy cylinder heads feature cross- flow type intake and exhaust ports. Valve guides and seat inserts are powdered metal. Valves are arranged in a "V", with each camshaft on center. To improve combustion speed the chambers are a compact spherical design with a squish area of approximately 30 percent of the piston top area. The cylinder heads are common to either cylinder bank by reversing the direction of installation.

DIAGNOSIS AND TESTING

CYLINDER HEAD GASKET

A cylinder head gasket leak can be located between adjacent cylinders or between a cylinder and the adjacent water jacket.

Possible indications of the cylinder head gasket leaking between adjacent cylinders are:

- Loss of engine power
- Engine misfiring
- Poor fuel economy

Possible indications of the cylinder head gasket leaking between a cylinder and an adjacent water jacket are:

- Engine overheating
- Loss of coolant
- Excessive steam (white smoke) emitting from exhaust
- Coolant foaming

CYLINDER-TO-CYLINDER LEAKAGE TEST

To determine if an engine cylinder head gasket is leaking between adjacent cylinders, follow the procedures in Cylinder Compression Pressure Test. See **CYLINDER COMPRESSION PRESSURE TEST**. An engine cylinder head gasket leaking between adjacent cylinders will result in approximately a 50-70% reduction in compression pressure.

CYLINDER-TO-WATER JACKET LEAKAGE TEST

WARNING: USE EXTREME CAUTION WHEN THE ENGINE IS OPERATING WITH COOLANT PRESSURE CAP REMOVED.

VISUAL TEST METHOD

With the engine cool, remove the coolant pressure cap. Start the engine and allow it to warm up until thermostat opens.

If a large combustion/compression pressure leak exists, bubbles will be visible in the coolant.

COOLING SYSTEM TESTER METHOD

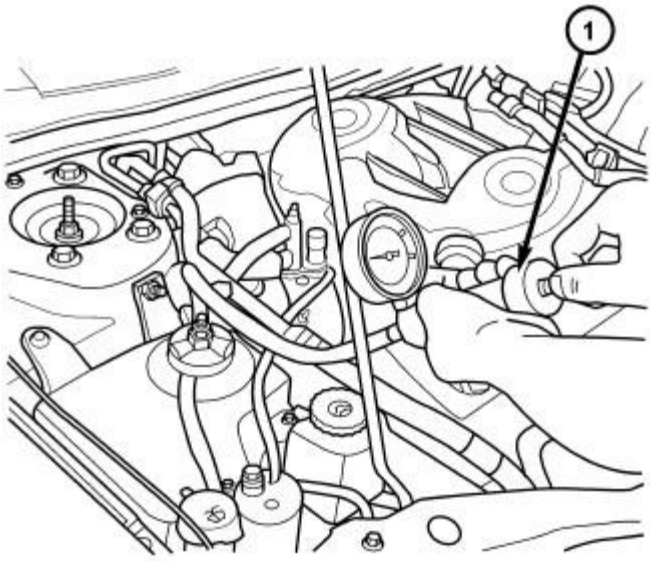

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Fig. 112: PRESSURE TESTING COOLING SYSTEM - 2.7L
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 7700

WARNING: WITH COOLING SYSTEM TESTER IN PLACE, PRESSURE WILL BUILD UP FAST. EXCESSIVE PRESSURE BUILT UP, BY CONTINUOUS ENGINE OPERATION, MUST BE RELEASED TO A SAFE PRESSURE POINT. NEVER PERMIT PRESSURE TO EXCEED 138 kPa (20 psi).

Install Cooling System Tester 7700 (1) or equivalent to pressure cap neck. Start the engine and observe the tester's pressure gauge. If gauge pulsates with every power stroke of a cylinder a combustion pressure leak is evident.

CHEMICAL TEST METHOD

Combustion leaks into the cooling system can also be checked by using Bloc-Chek Kit C-3685-A or equivalent. Perform test following the procedures supplied with the tool kit.

REMOVAL

RIGHT CYLINDER HEAD

1. Remove the engine cover.
2. Perform the fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

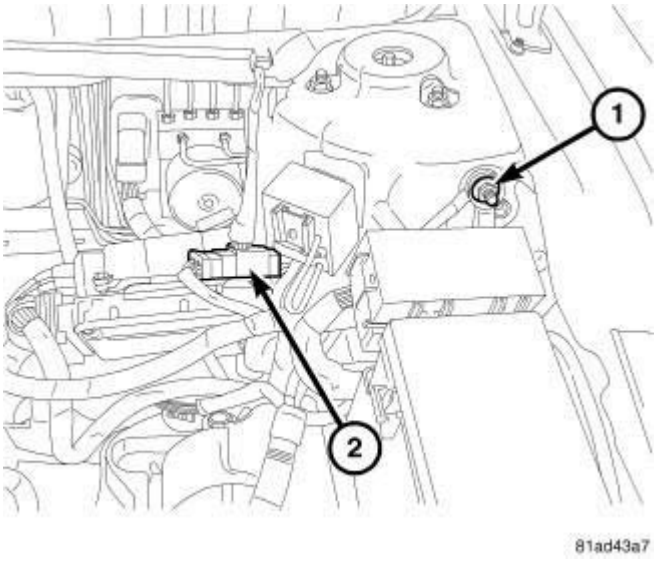

Fig. 113: BATTERY CABLE
Courtesy of CHRYSLER LLC

3. Disconnect the negative battery cable (1).

4. Drain cooling system. Refer to **Cooling - Standard Procedure** .

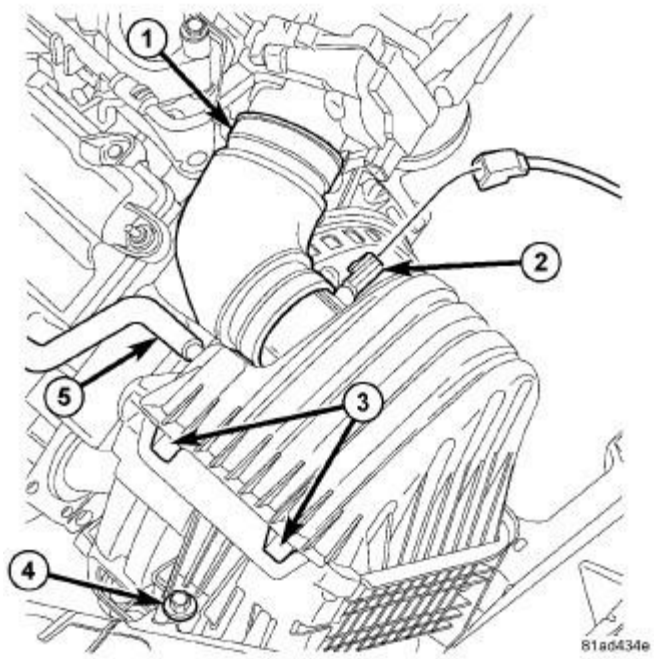

Fig. 114: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

5. Remove air cleaner element housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

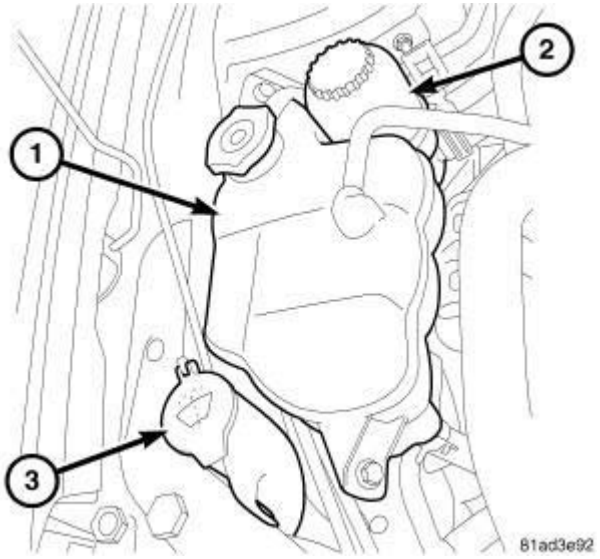

Fig. 115: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

6. Remove the coolant recovery container (1). Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal**

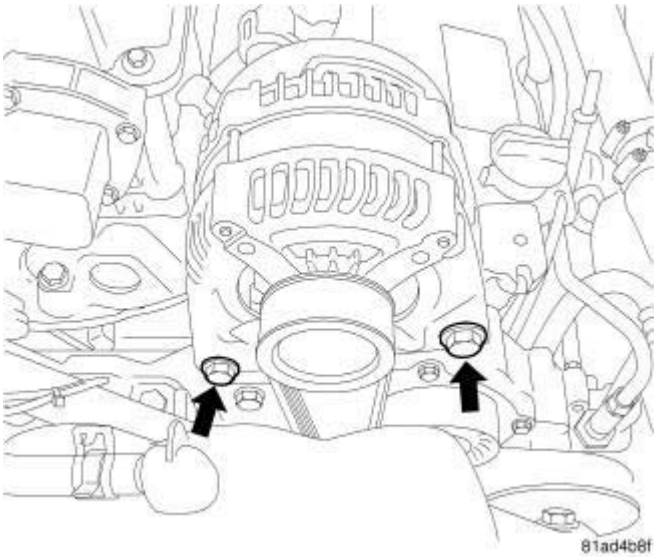

Fig. 116: Identifying Generator Bolts
Courtesy of CHRYSLER LLC

7. Remove the generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal** .

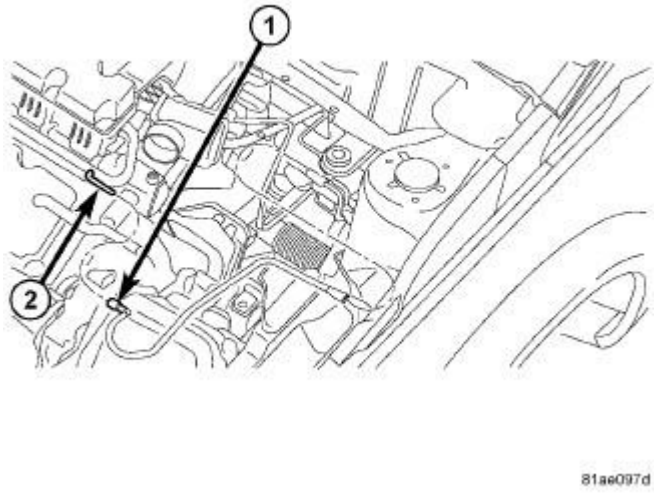

Fig. 117: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

8. Disconnect the fuel line (1) at the fuel rail (2).

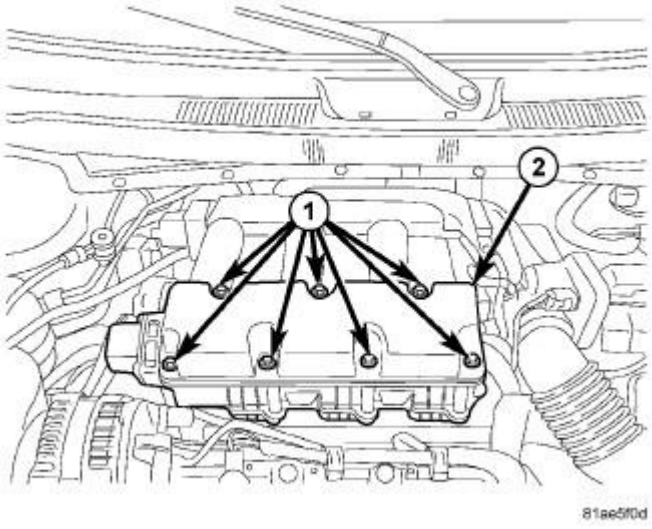

Fig. 118: Upper Intake Manifold
Courtesy of CHRYSLER LLC

9. Remove the upper intake manifold (2). See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

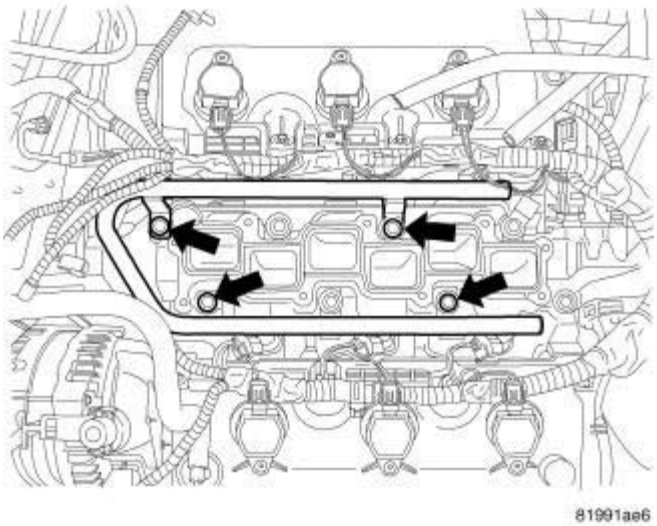

Fig. 119: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

10. Remove the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Removal** .

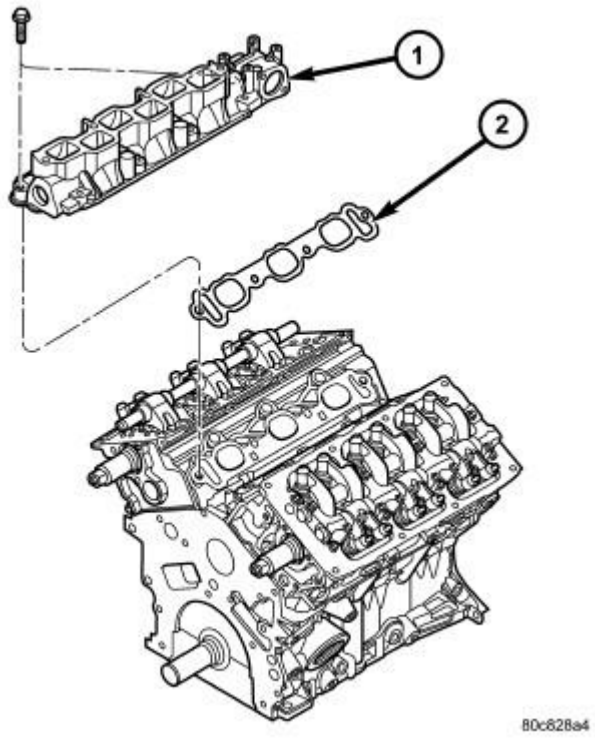

Fig. 120: Lower Intake Manifold
Courtesy of CHRYSLER LLC

1 - LOWER INTAKE MANIFOLD
2 - GASKET

11. Remove the lower intake manifold (1). See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
12. Raise and support the vehicle.
13. Remove right exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
14. Remove right front tire.
15. Remove right inner splash shield.

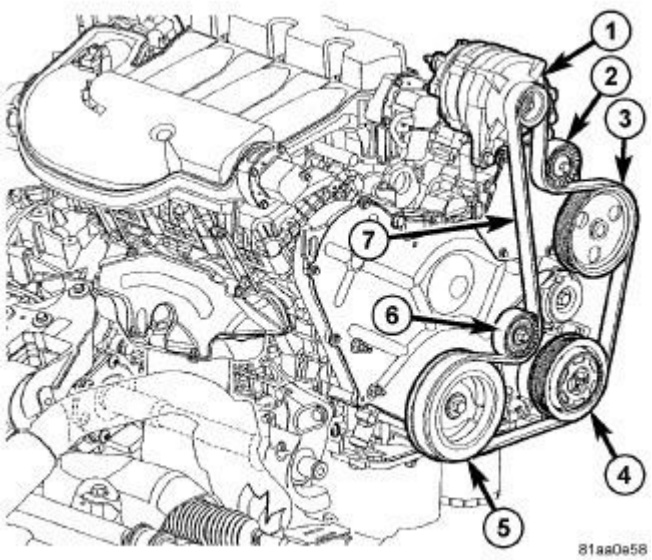

Fig. 121: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

16. Remove vibration damper (5). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
17. Remove lower accessory drive belt idler pulley (6).

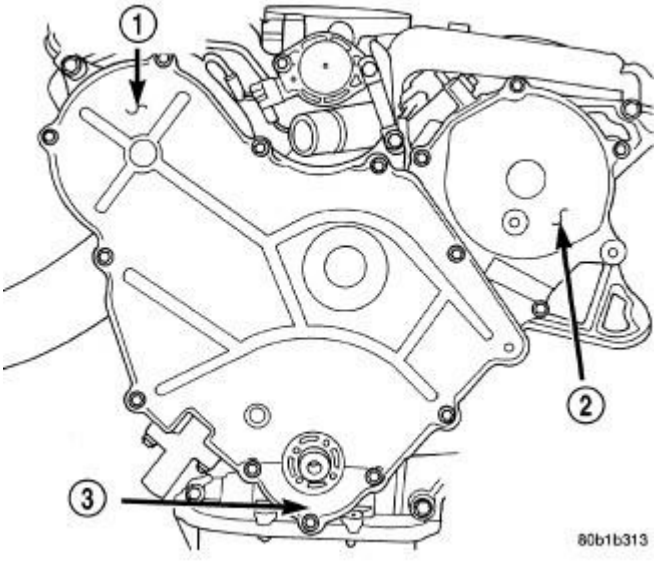

Fig. 122: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED)
2 - LEFT SIDE COVER (CAST)
3 - LOWER COVER

18. Remove lower outer timing belt cover bolts.
19. Remove the supports and lower the vehicle.

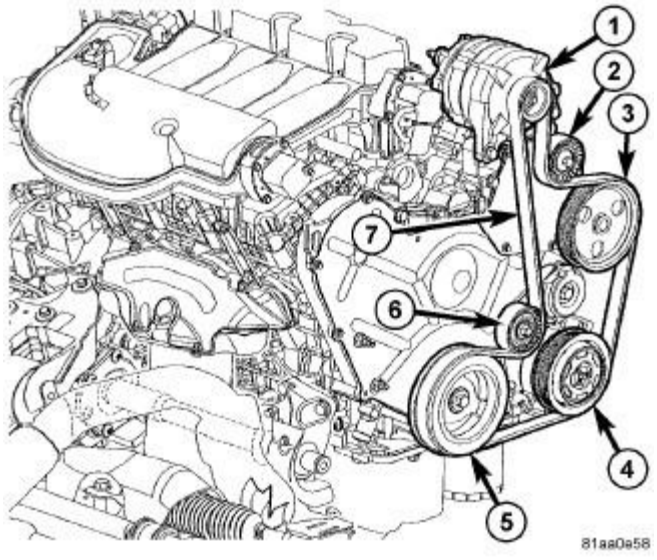

Fig. 123: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

20. Remove the upper accessory drive belt idler pulley (2).
21. Remove the belt tensioner.
22. Support the engine with a block of wood and a floor jack.
23. Remove the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.

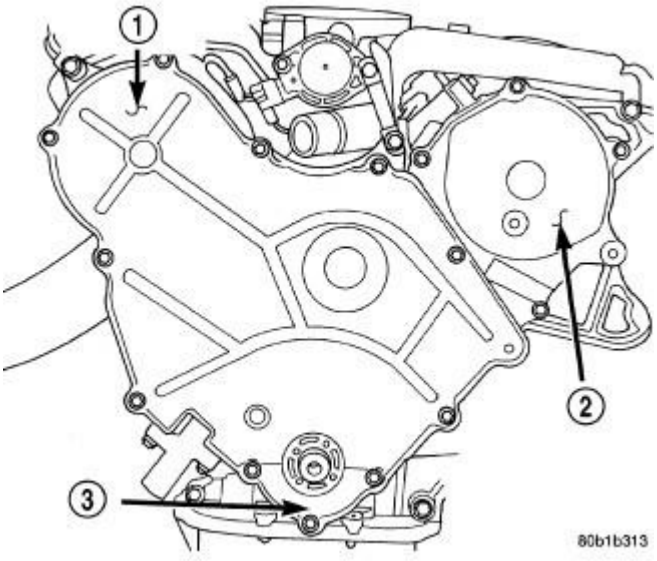

Fig. 124: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED) 2 - LEFT SIDE COVER (CAST) 3 - LOWER COVER

24. Remove the power steering reservoir bolts and set reservoir aside.
25. Remove the remaining outer timing belt cover bolts and cover.
26. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
27. Remove the right valve cover to cylinder head ground strap.

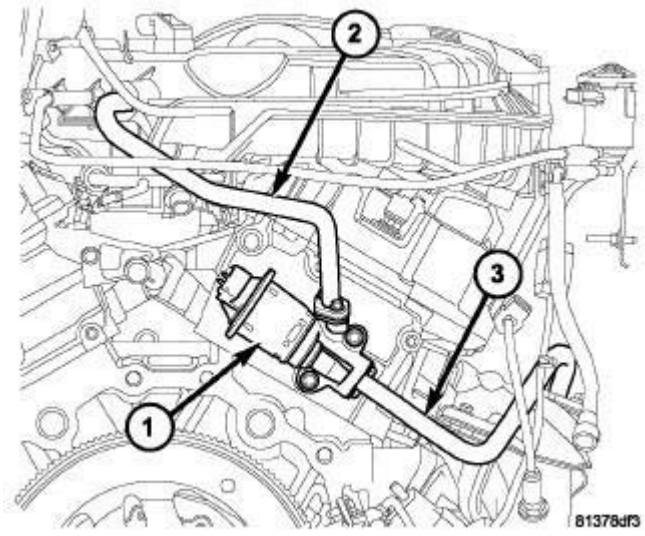

Fig. 125: Exhaust Gas Recirculation System
Courtesy of CHRYSLER LLC

28. Remove the EGR valve (1) and tube assembly (2). Refer to **Emissions Control/Exhaust Gas Recirculation/VALVE, Exhaust Gas Recirculation (EGR) - Removal** .
29. Remove the right cylinder head cover.

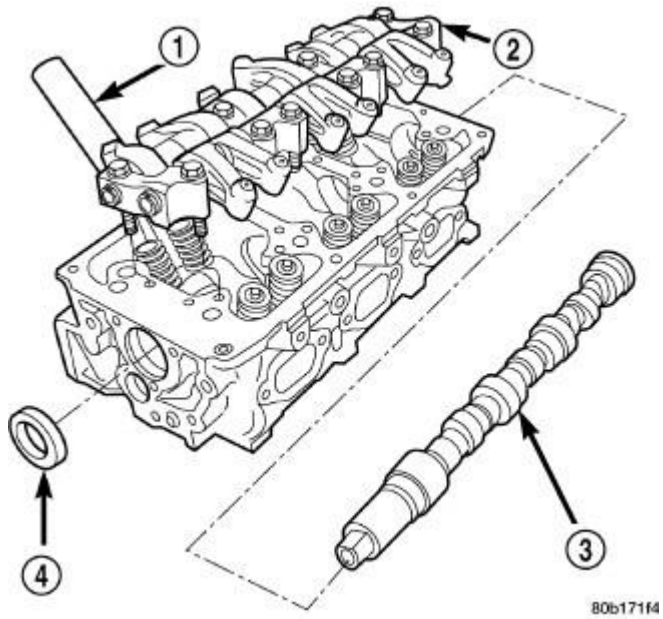

Fig. 126: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY

3 - CAMSHAFT 4 - SEAL

30. Remove the right rocker arm and shaft assembly (2). See **Engine/Cylinder Head/ROCKER ARM, Valve - Disassembly**.

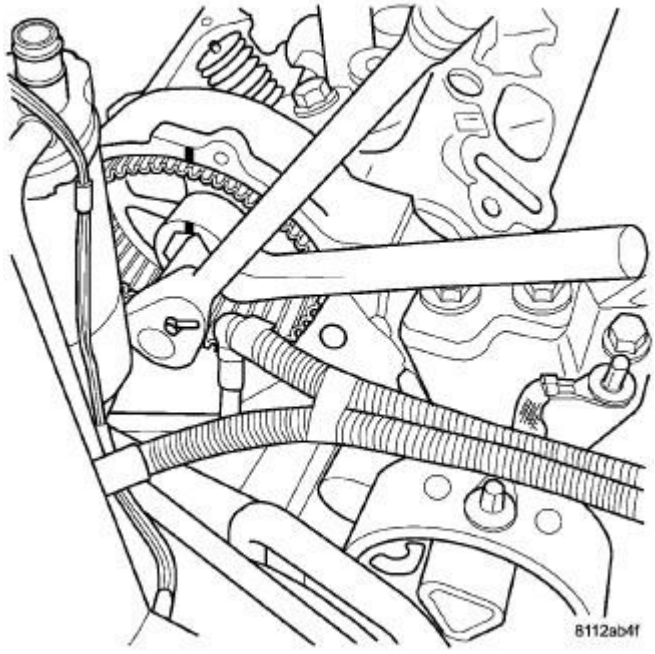

Fig. 127: RIGHT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

31. Hold the cam gear and loosen the right cam gear retaining bolt.

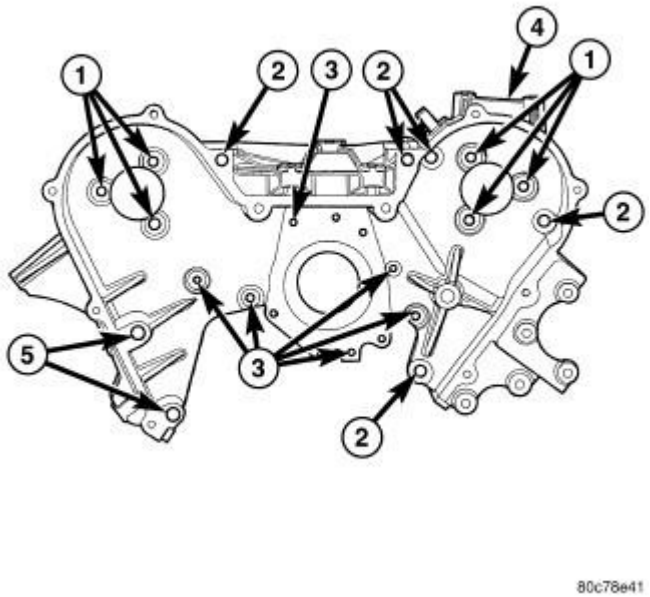

Fig. 128: REAR TIMING BELT COVER FASTENERS
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

32. Remove the inner timing cover to right cylinder head retaining bolts.

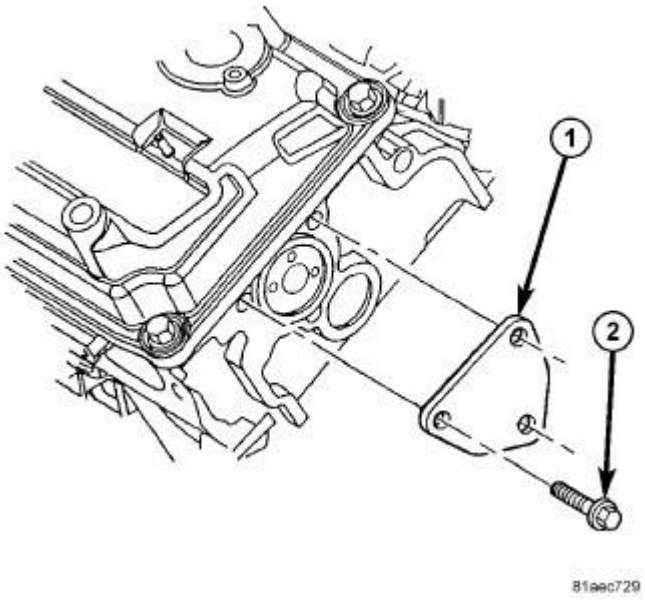

Fig. 129: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

33. Remove the right rear camshaft thrust plate (1).
34. Carefully push the camshaft out of the back of the cylinder head approximately 3.5 inches. Remove the camshaft sprocket and bolt.
35. **NOTE: It may be necessary to raise the engine slightly in order to remove the camshaft sprocket bolt.**

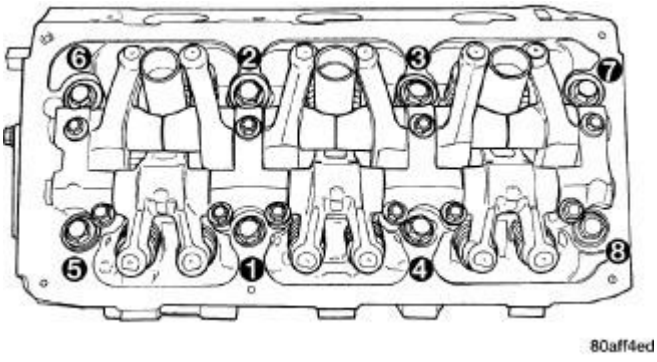

Fig. 130: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

36. Remove the cylinder head bolts in REVERSE of tightening sequence.

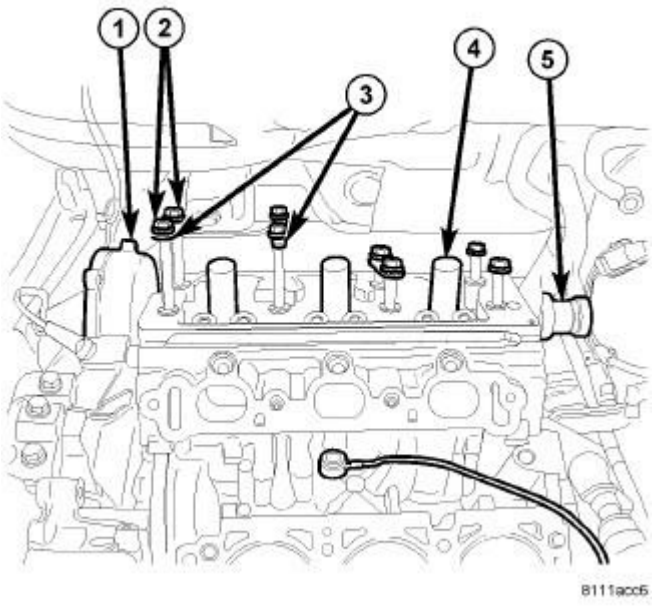

Fig. 131: RIGHT CYLINDER HEAD
Courtesy of CHRYSLER LLC

1 - INNER TIMING BELT COVER
2 - CYLINDER HEAD BOLTS
3 - RUBBER BANDS
4 - SPARK PLUG TUBE
5 - CAMSHAFT

NOTE: Because of clearance restrictions when removing the right cylinder head, the front four cylinder head bolts must be loosened, raised and supported with rubber bands before the cylinder head can be removed.

37. Remove the cylinder head.
38. Clean and inspect all mating surfaces.

LEFT CYLINDER HEAD

1. Remove the engine cover.
2. Perform the fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

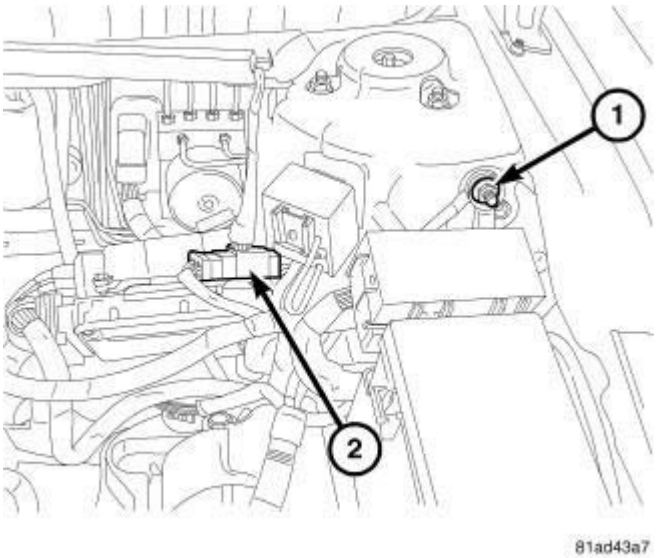

Fig. 132: BATTERY CABLE
Courtesy of CHRYSLER LLC

3. Disconnect the negative battery cable.
4. Drain cooling system. Refer to **Cooling - Standard Procedure** .

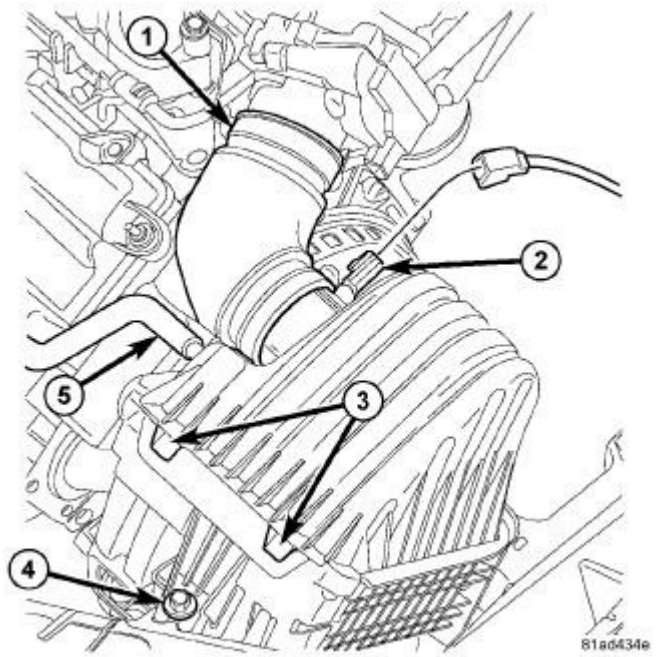

Fig. 133: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

5. Remove air cleaner element housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
6. Remove radiator fan assembly. Refer to **Cooling/Engine/FAN, Cooling - Removal** .

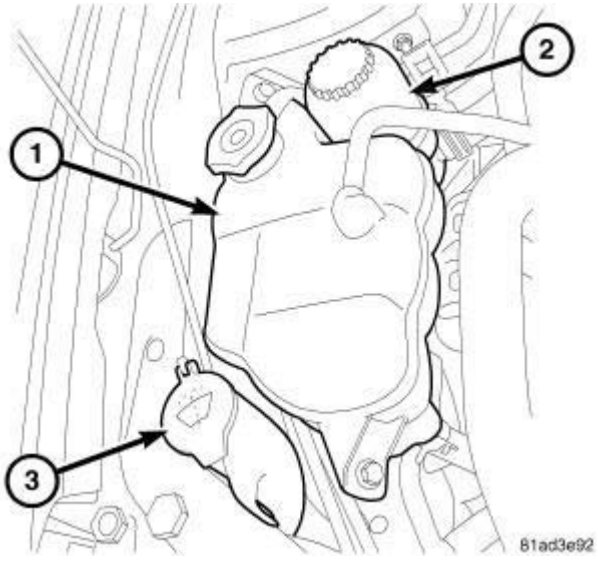

Fig. 134: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

7. Remove the coolant recovery container. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .

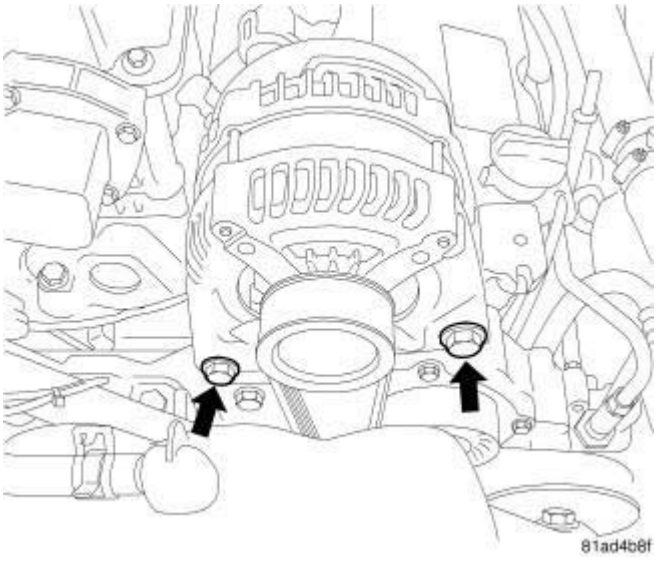

Fig. 135: Identifying Generator Bolts
Courtesy of CHRYSLER LLC

8. Remove the generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal** .

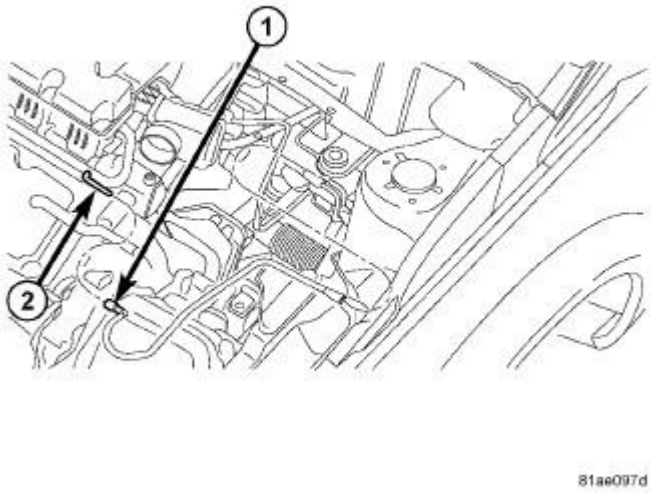

Fig. 136: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

9. Disconnect the fuel line (1) at the fuel rail (2).

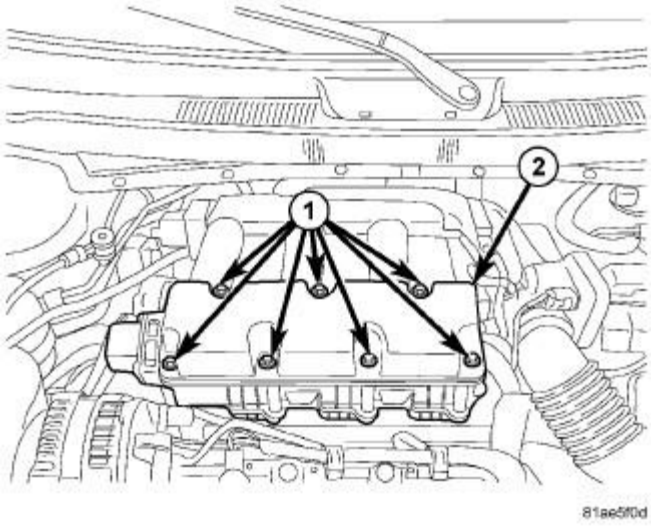

Fig. 137: Upper Intake Manifold
Courtesy of CHRYSLER LLC

10. Remove the upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

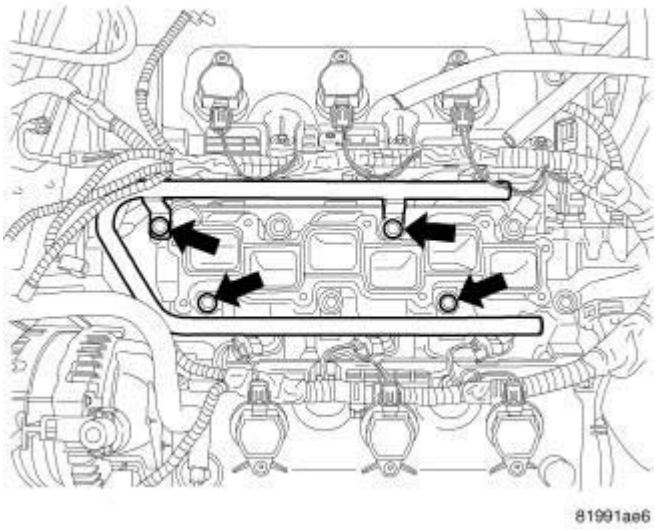

Fig. 138: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

11. Remove the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Removal** .

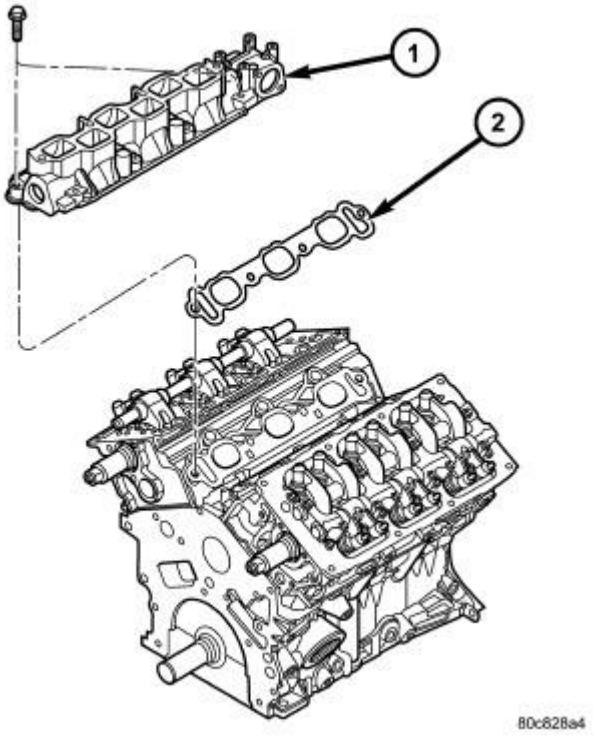

Fig. 139: Lower Intake Manifold
Courtesy of CHRYSLER LLC

1 - LOWER INTAKE MANIFOLD

2 - GASKET

12. Remove the lower intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
13. Raise and support the vehicle.

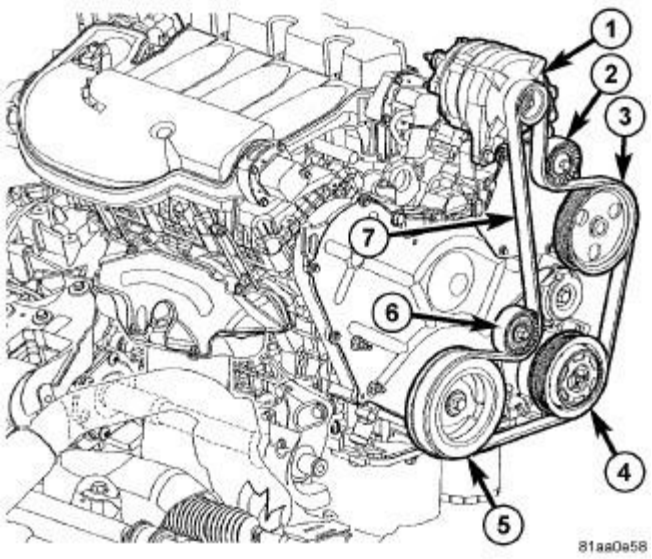

Fig. 140: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

14. Remove the left exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
15. Remove right front tire.
16. Remove right inner splash shield.

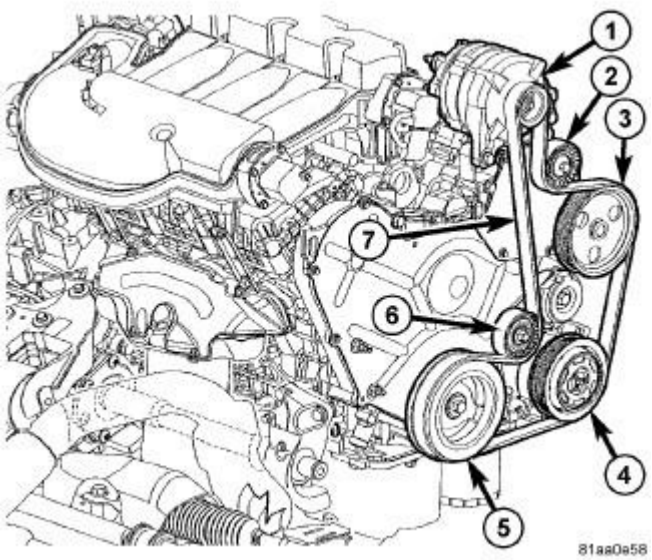

Fig. 141: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

17. Remove vibration damper (5). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
18. Remove lower accessory drive belt idler pulley (6).

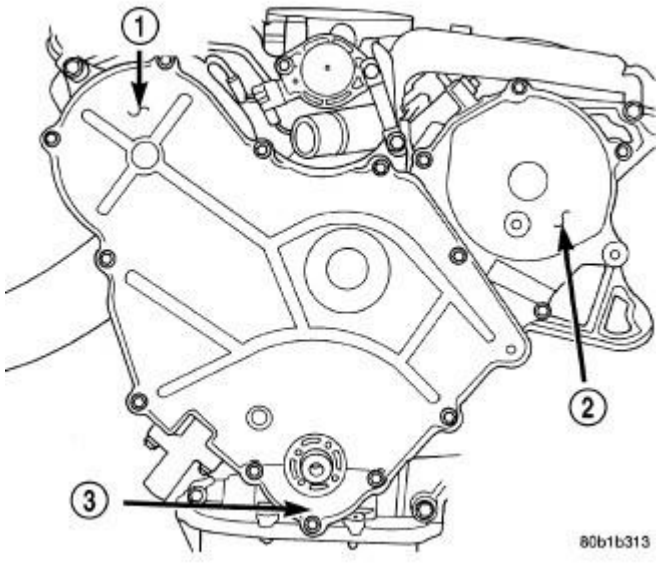

Fig. 142: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED)
2 - LEFT SIDE COVER (CAST)
3 - LOWER COVER

19. Remove the power steering mounting bolts and set the pump aside. Refer to **Steering/Pump - Removal** .
20. Remove lower outer timing belt cover bolts.
21. Remove the support and lower vehicle.

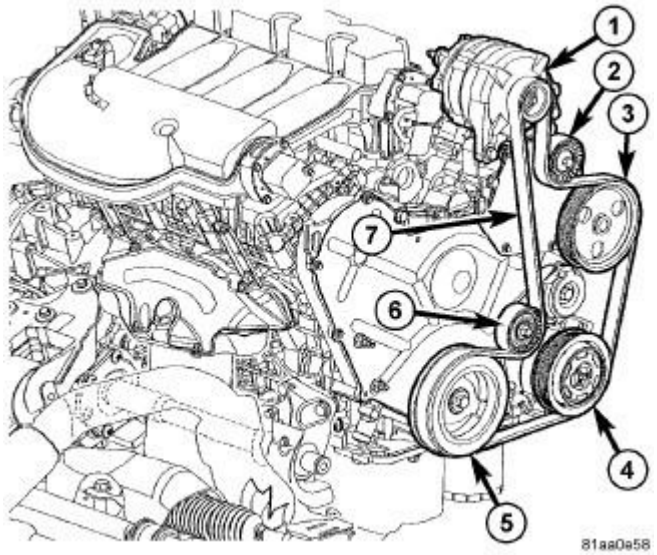

Fig. 143: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

22. Remove the upper accessory drive belt idler pulley (2).
23. Remove the belt tensioner.
24. Support the engine with a block of wood and a floor jack.
25. Remove the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.
26. Remove the power steering reservoir bolts and set reservoir aside.

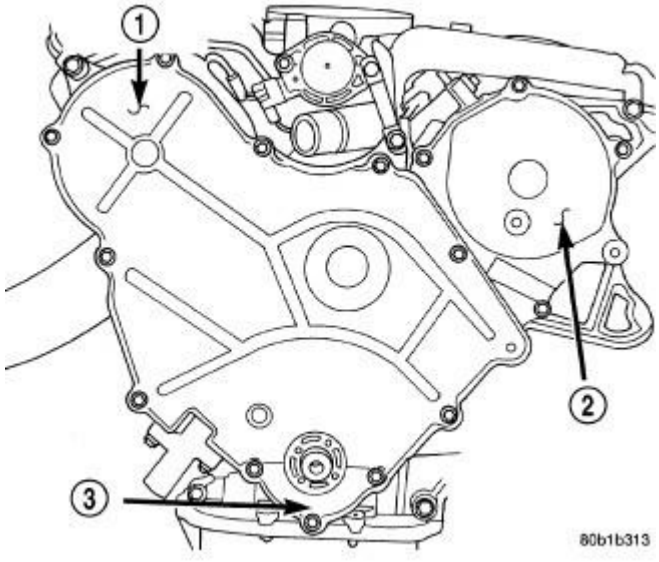

Fig. 144: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED) 2 - LEFT SIDE COVER (CAST) 3 - LOWER COVER

27. Remove the remaining outer timing belt cover bolts and remove cover.
28. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
29. Remove the left cylinder head cover to cylinder head ground strap.
30. Remove the left cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

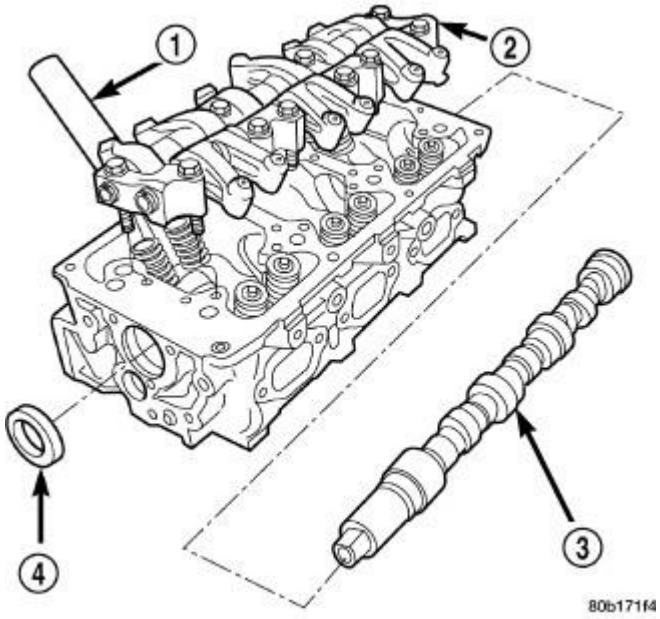

Fig. 145: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

31. Remove the left rocker arm assembly (2). See **Engine/Cylinder Head/ROCKER ARM, Valve - Disassembly**.

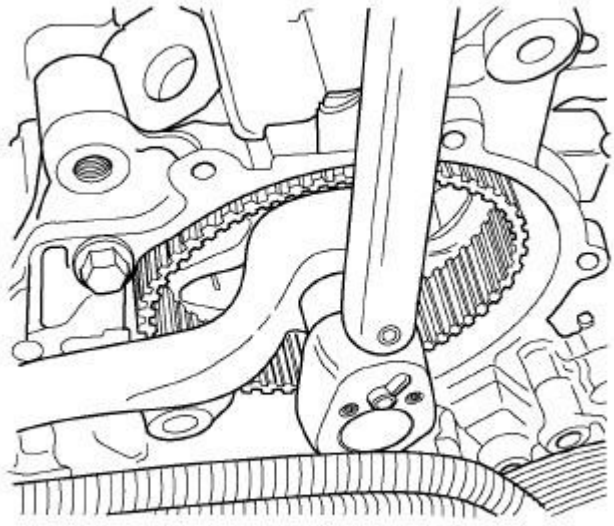

Fig. 146: LEFT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

32. Hold the left cam gear and loosen the cam gear retaining bolt.

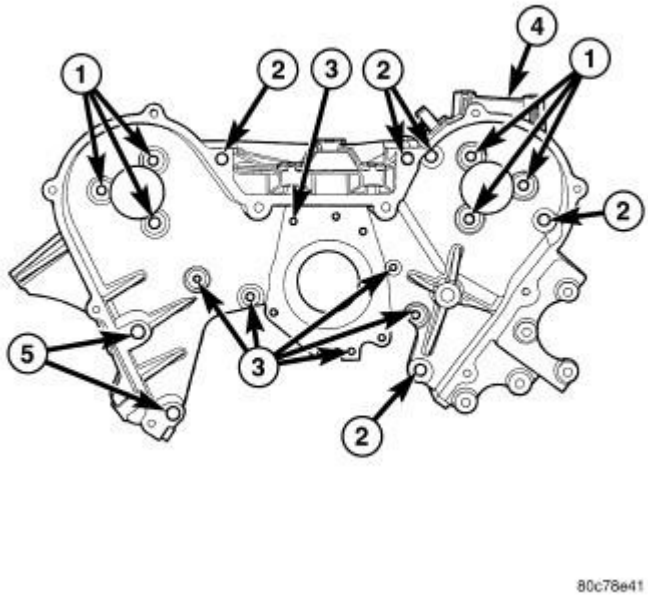

Fig. 147: REAR TIMING BELT COVER FASTENERS
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

33. Remove the front timing belt housing to cylinder head bolts.

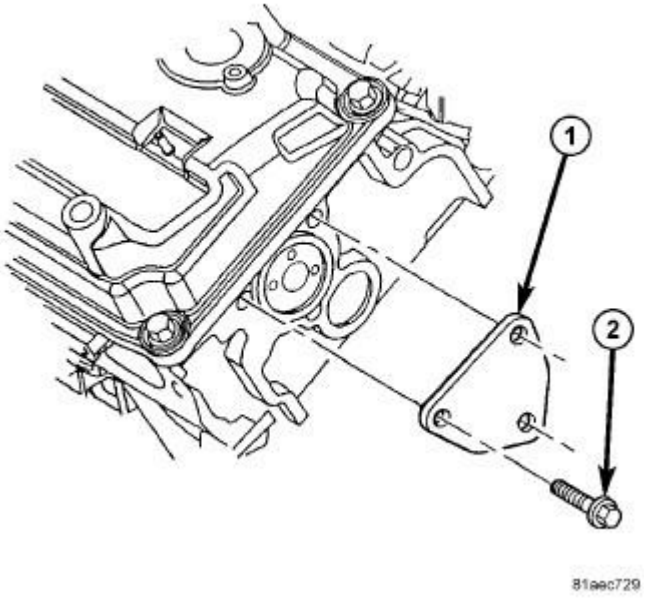

Fig. 148: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

34. Remove the left camshaft thrust plate.
35. Carefully push the camshaft out of the back of the cylinder head approximately 3.5 inches. Remove the camshaft sprocket and bolt.
36. **NOTE: It may be necessary to raise the engine slightly in order to remove the camshaft sprocket bolt.**

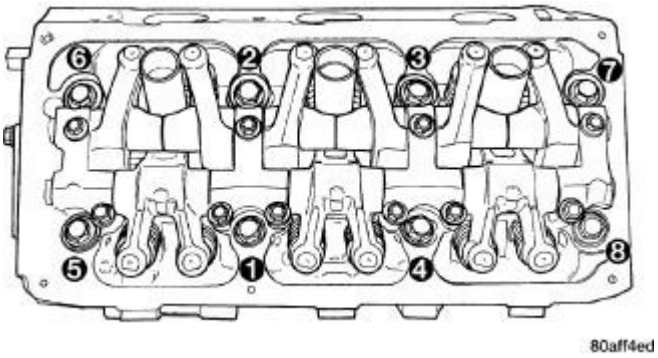

Fig. 149: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

37. Remove the cylinder head bolts in REVERSE of tightening sequence.
38. Remove the cylinder head.
39. Clean and inspect all mating surfaces.

CLEANING

CLEANING

To ensure engine gasket sealing, proper surface preparation must be performed, especially with the use of aluminum engine components and multi-layer steel cylinder head gaskets.

NOTE: Multi-Layer Steel (MLS) head gaskets require a scratch free sealing surface.

Remove all gasket material from cylinder head and block. See **Engine - Standard Procedure**. Be careful not to gouge or scratch the aluminum head sealing surface.

Clean all engine oil passages.

INSPECTION

INSPECTION

1. Before cleaning, check for leaks, damage and cracks.
2. Clean cylinder head and oil passages.

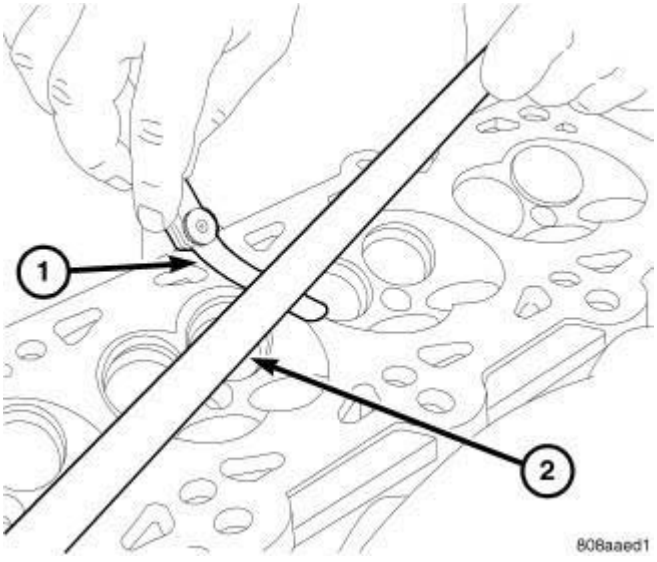

Fig. 150: Checking Cylinder Head Flatness
Courtesy of CHRYSLER LLC

3. Check cylinder head for flatness (1).
4. Cylinder head must be flat within:

CAUTION: 0.20 mm (0.008 in.) MAX is a combined total dimension of the stock removal limit from cylinder head and block top surface (Deck) together.

- Standard dimension = less than 0.05 mm (0.002 inch.)
- Service Limit = 0.2 mm (0.008 inch.)
- Grinding Limit = Maximum of 0.2 mm (0.008 inch.) is permitted.

INSTALLATION

RIGHT CYLINDER HEAD

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper

1. Clean sealing surfaces of cylinder head and block. See **Engine - Standard Procedure**.

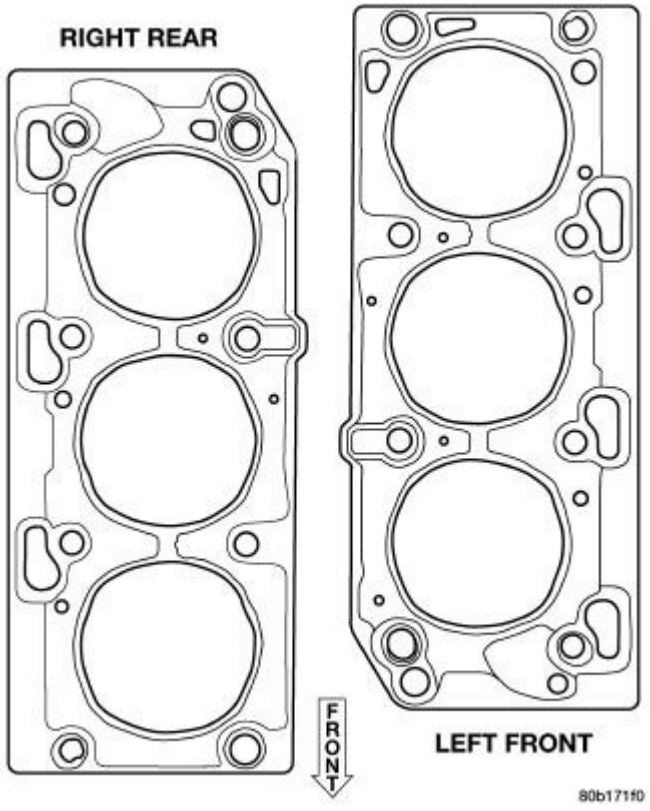

Fig. 151: Cylinder Head Gasket Identification
Courtesy of CHRYSLER LLC

CAUTION: The cylinder head gaskets are not interchangeable between cylinder heads and are clearly marked right or left.

2. Install head gasket over locating dowels. Ensure the gasket is installed on the correct side of engine.

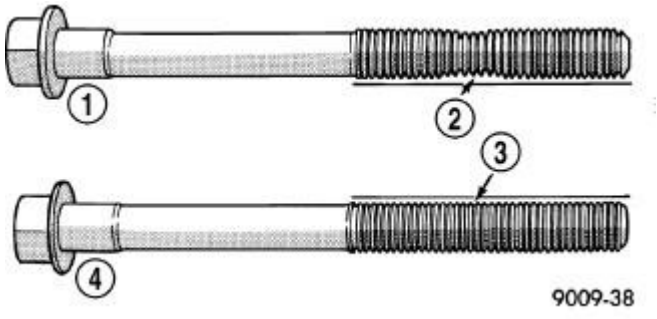

Fig. 152: Check for Stretched Bolts
Courtesy of CHRYSLER LLC

1 - STRETCHED BOLT
2 - THREADS ARE NOT STRAIGHT ON LINE
3 - THREADS ARE STRAIGHT ON LINE
4 - UNSTRETCHED BOLT

CAUTION: Cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced. Failure to replace a damaged bolt may lead to possible engine damage.

3. Inspect the cylinder head bolts (1 and 4) for straightness, head damage, thread damage and necking. Necking can be checked by holding a scale or straight edge against the threads (3). If all the threads do not contact the scale evenly (2) the bolt must be replaced.

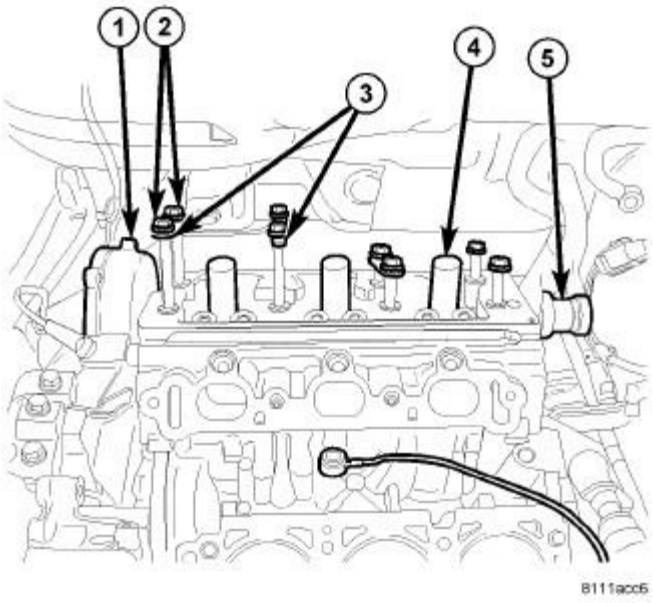

Fig. 153: RIGHT CYLINDER HEAD
Courtesy of CHRYSLER LLC

1 - INNER TIMING BELT COVER
2 - CYLINDER HEAD BOLTS
3 - RUBBER BANDS
4 - SPARK PLUG TUBE
5 - CAMSHAFT

NOTE: Before installing the cylinder head bolts, lubricate the threads with engine oil.

4. Insert the front four cylinder head bolts into the cylinder head. Pull the bolts up to the top of their travel and retain with rubber bands.
5. Install the cylinder head over locating dowels and finger tighten the head bolts.

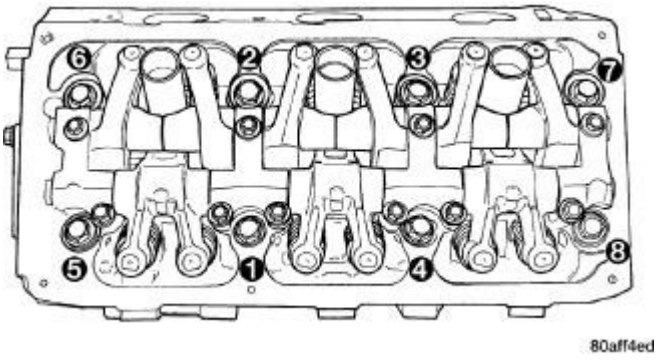

Fig. 154: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

6. Tighten the cylinder head bolts in the sequence shown in illustration using the following four step torque-turn method:
   - Step 1: All to 61 N.m (45 ft. lbs.)
   - Step 2: All to 88 N.m (65 ft. lbs.)
   - Step 3: All (again) to 88 N.m (65 ft. lbs.)
   - Step 4: + 90° Turn **Do not use a torque wrench for this step.**
7. Bolt torque after 90° turn should be over 122 N.m (90 ft. lbs.) in the tightening direction. If not, replace the bolt.

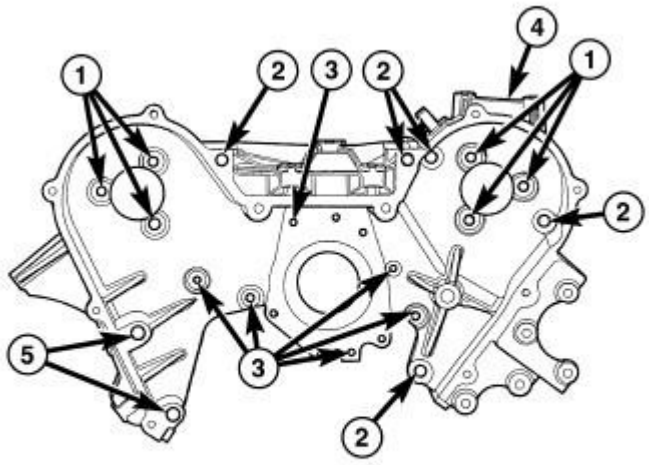

Fig. 155: REAR TIMING BELT COVER FASTENERS
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

8. Install the inner timing cover to cylinder head bolts. Tighten bolts to 54 N.m (40 lbs. ft.).

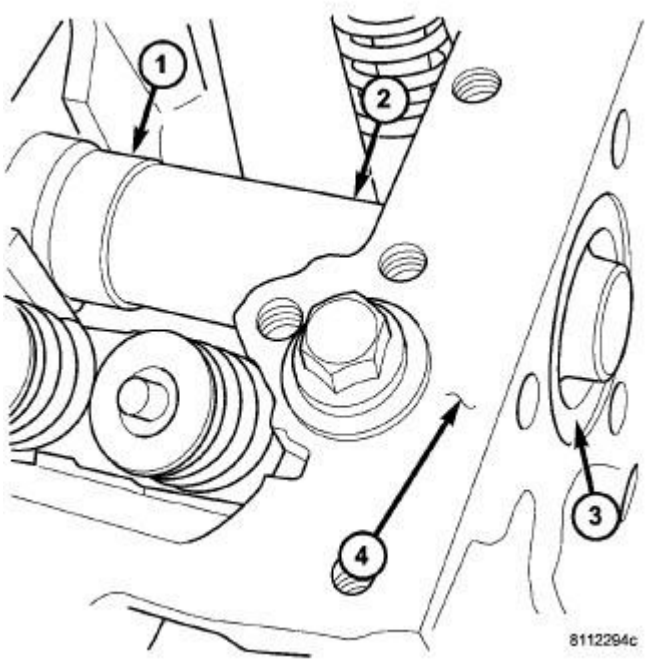

Fig. 156: CAMSHAFT INSTALLATION - LEFT
Courtesy of CHRYSLER LLC

1 - CAMSHAFT
2 - SPECIAL TOOL 6788
3 - CAMSHAFT SEAL
4 - CYLINDER HEAD

9. Apply light coat of clean engine oil to the lip of the camshaft oil seal (3) and Seal Protector Sleeve 6788 (2).

NOTE: When installing the camshaft (1) into the cylinder head (4), you must first insert the Seal Protector Sleeve 6788 (2) through the camshaft seal (3) until the camshaft seats, then remove the Seal Protector Sleeve 6788 (2) from the camshaft.

10. Install the camshaft (1) using Seal Protector Sleeve 6788 (2) into the cylinder head (4).

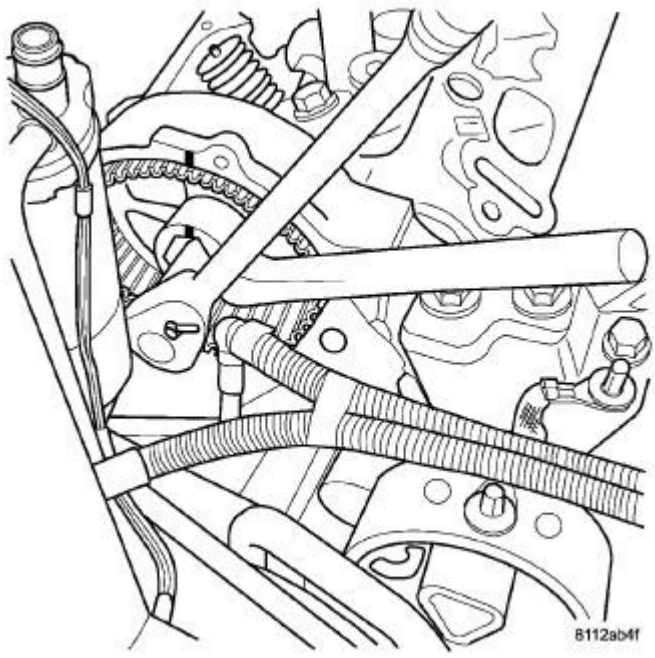

Fig. 157: RIGHT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

11. Install camshaft sprocket. Hold the camshaft sprocket gear and tighten the camshaft sprocket bolt to 102 N.m plus a 1/4 turn (75 lbs. ft. plus a 1/4 turn). See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

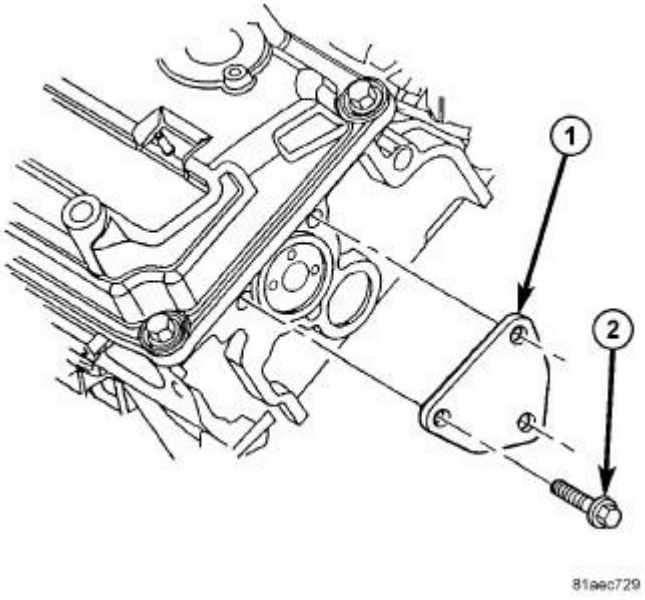

Fig. 158: Camshaft Thrust Plate

Courtesy of CHRYSLER LLC

12. Install the rear camshaft thrust plate (1).

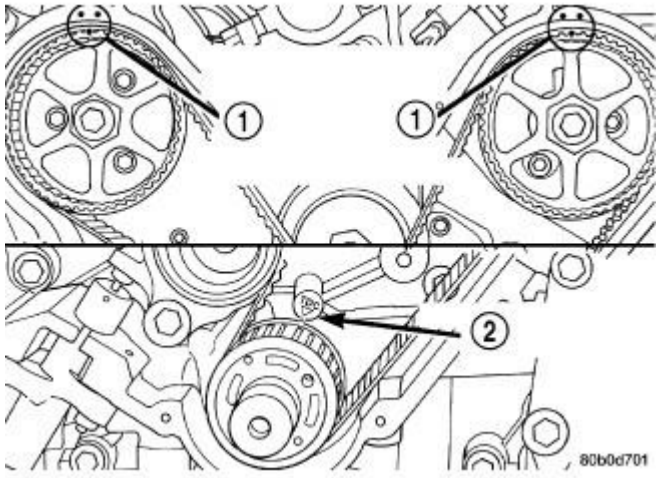

Fig. 159: CAMSHAFT SPROCKET TIMING MARKS
Courtesy of CHRYSLER LLC

1 - ALIGN CAMSHAFT SPROCKET TIMING MARK BETWEEN MARKS ON REAR TIMING BELT COVER 2 - CRANKSHAFT AT TDC

13. Rotate the camshaft gear to the timing mark (1) and verify the left camshaft gear (1) and crankshaft gear timing marks (2) are aligned.
14. Install the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
15. Install the tensioner. See **Engine/Valve Timing/TENSIONER, Engine Timing - Installation**.

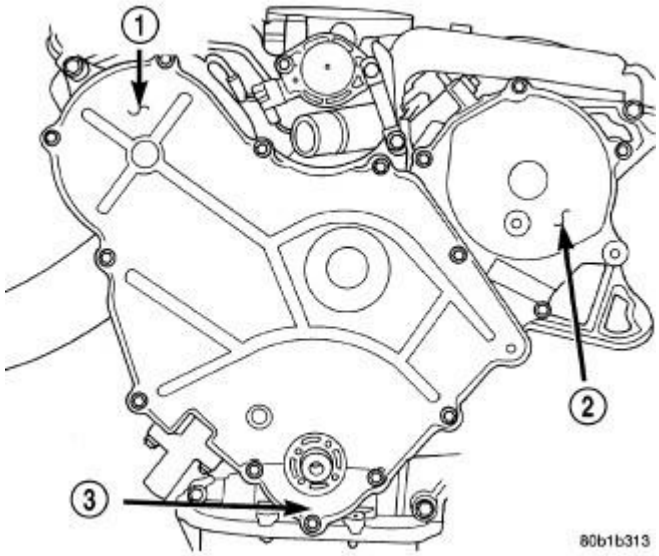

Fig. 160: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED)
2 - LEFT SIDE COVER (CAST)
3 - LOWER COVER

16. Install the timing belt outer cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
17. Install the power steering reservoir.

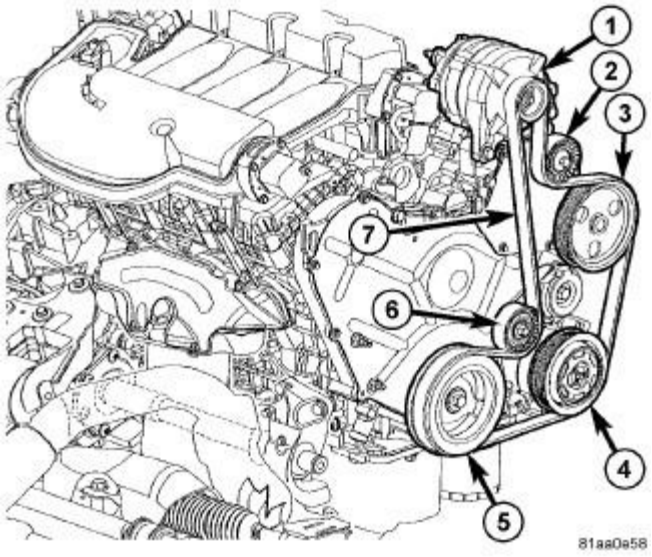

Fig. 161: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

18. Install the vibration damper (5). See **Engine/Engine Block/DAMPER, Vibration - Installation**.
19. Install the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.
20. Install the accessory drive belt tensioner (6).
21. Install the lower accessory drive belt idler pulley (2).
22. Install the right exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

23. Raise the vehicle.
24. Install the exhaust cross over pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.
25. Install the catalytic converter and exhaust system.
26. Connect both oxygen sensors.
27. Lower the vehicle.

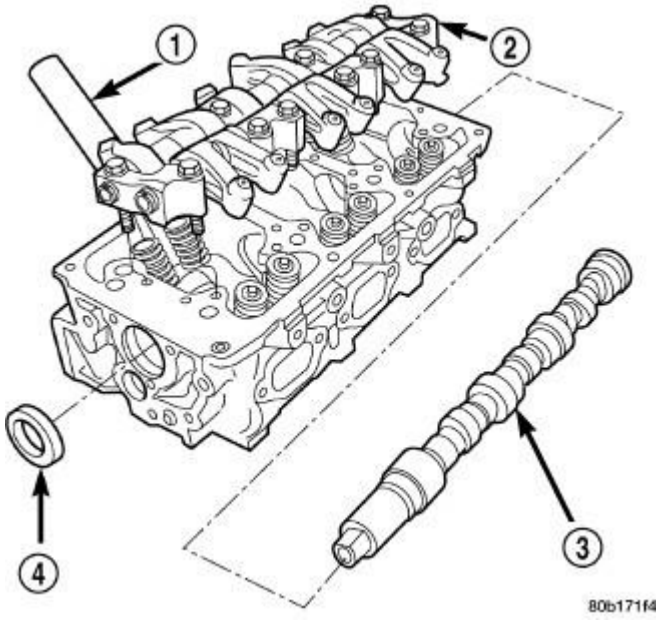

Fig. 162: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

28. Install the right rocker arm assembly (2). See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**.
29. Install the right cylinder head cover and ground strap.

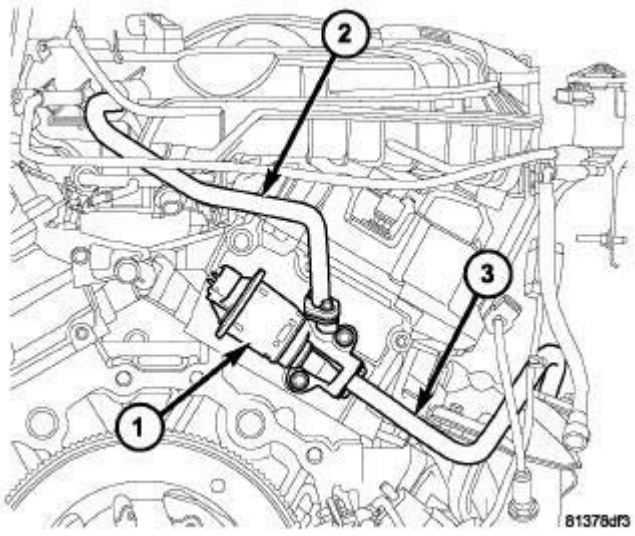

Fig. 163: Exhaust Gas Recirculation System
Courtesy of CHRYSLER LLC

30. Install the EGR valve (1) and tube assembly.

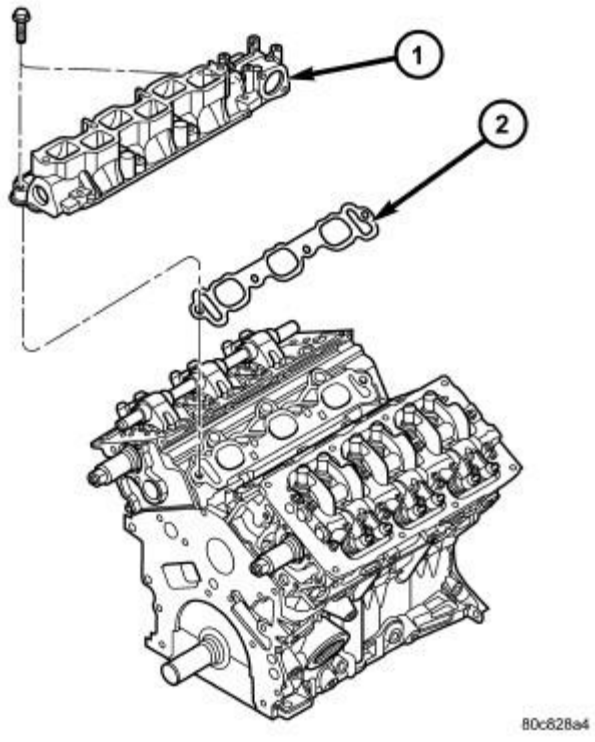

Fig. 164: Lower Intake Manifold
Courtesy of CHRYSLER LLC

1 - LOWER INTAKE MANIFOLD 2 - GASKET

31. Install lower intake manifold (1) and gasket (2). See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

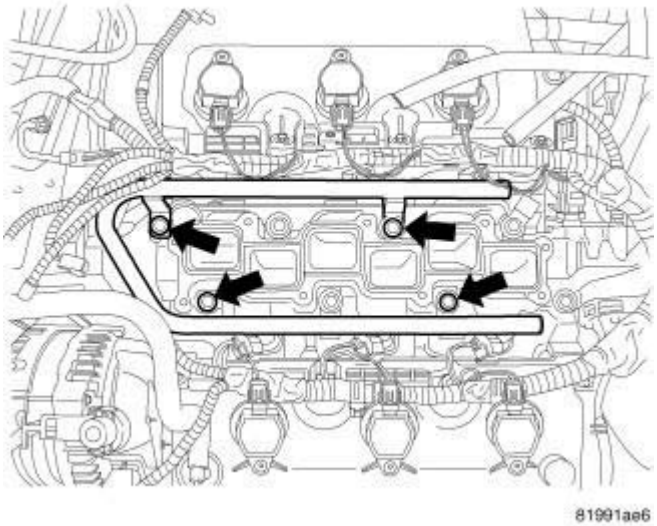

Fig. 165: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

32. Install the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Removal** .

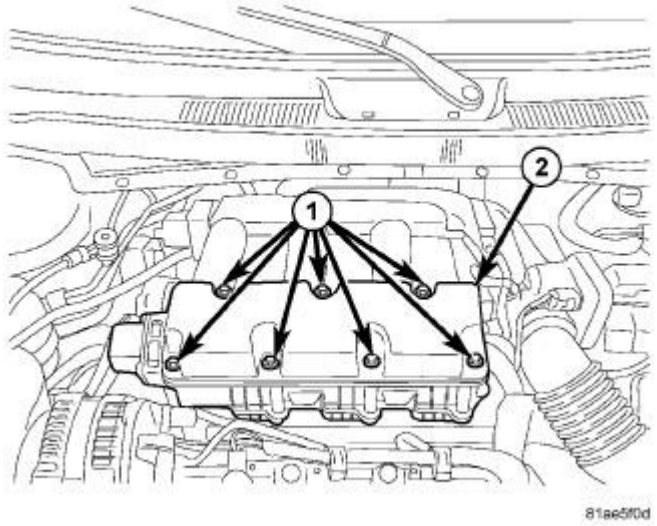

Fig. 166: Upper Intake Manifold
Courtesy of CHRYSLER LLC

33. Install the upper intake manifold (2). See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

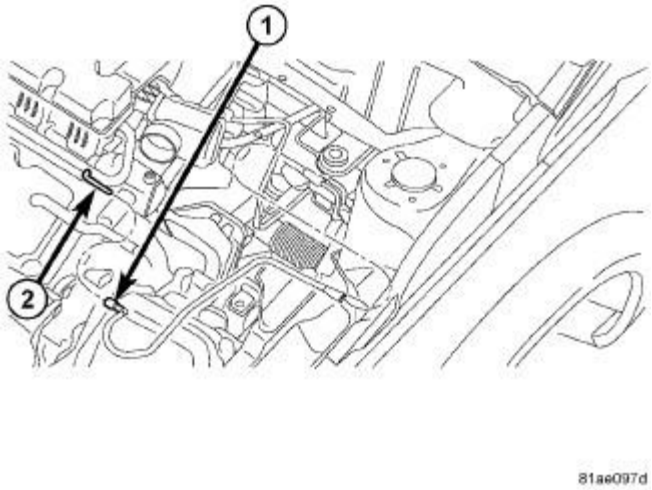

Fig. 167: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

34. Connect the fuel line (1) to the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Installation** .

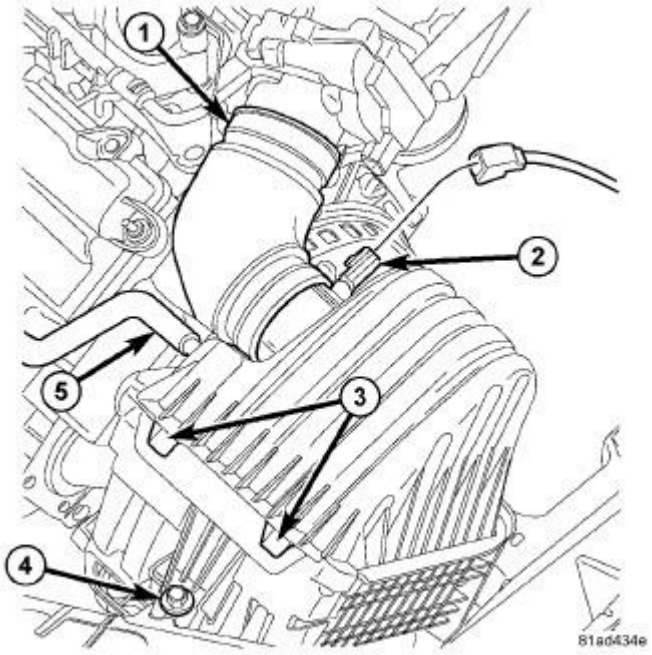

Fig. 168: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

35. Install the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
36. Install the engine cover.
37. Fill the coolant system.

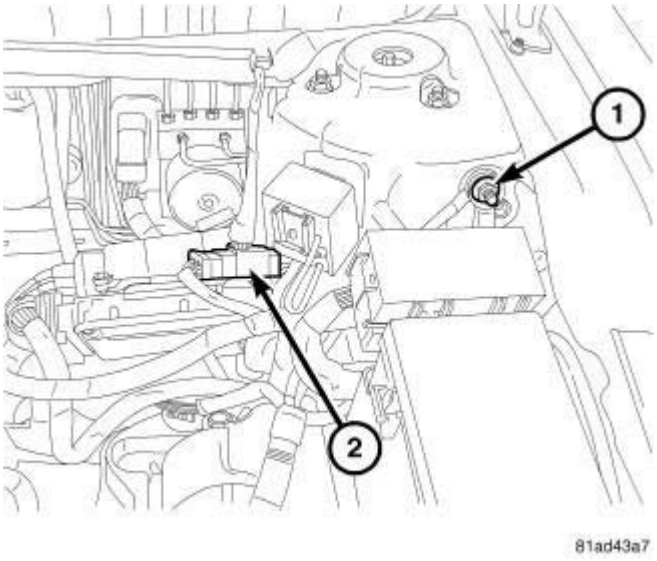

Fig. 169: BATTERY CABLE
Courtesy of CHRYSLER LLC

38. Connect the negative battery cable (1).

LEFT CYLINDER HEAD

CAUTION: When cleaning cylinder head and cylinder block surfaces, DO NOT use a metal scraper because the surfaces could be cut or ground. Use ONLY a wooden or plastic scraper.

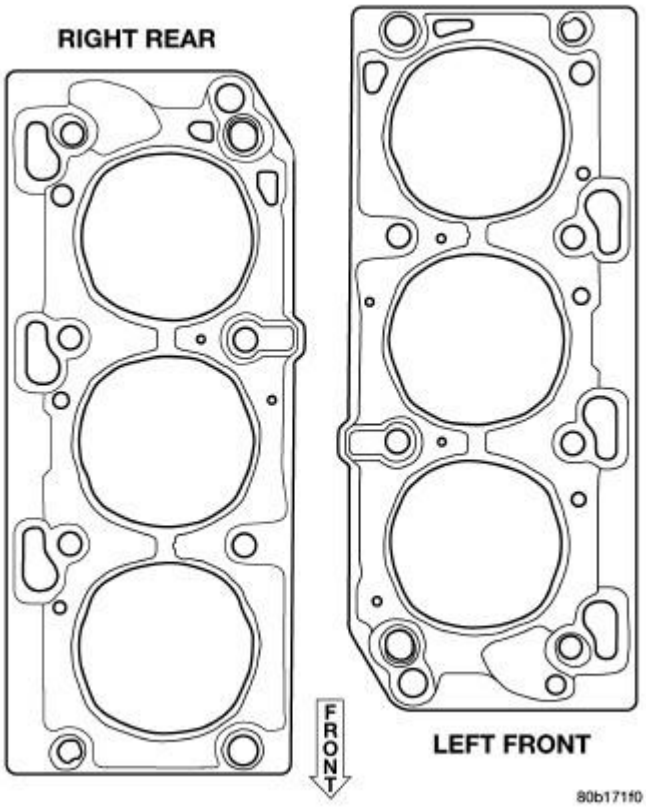

Fig. 170: Cylinder Head Gasket Identification
Courtesy of CHRYSLER LLC

1. Clean sealing surfaces of cylinder head and block. See **Engine - Standard Procedure**.

CAUTION: The cylinder head gaskets are not interchangeable between cylinder heads and are clearly marked right or left.

2. Install head gasket over locating dowels. Ensure the gasket is installed on the correct side of engine.

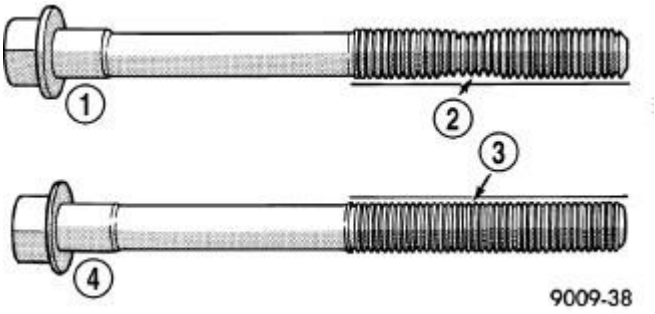

Fig. 171: Check for Stretched Bolts
Courtesy of CHRYSLER LLC

CAUTION: Cylinder head bolts are tightened using a torque plus angle procedure. The bolts must be examined BEFORE reuse. If the threads are necked down the bolts must be replaced. Failure to replace a damaged bolt may lead to possible engine damage.

3. inspect the cylinder head bolts (1 and 4) for straightness, head damage, thread damage and necking. Necking can be checked by holding a scale or straight edge against the threads (3). If all the threads do not contact the scale evenly (2) the bolt must be replaced.
4. Install the cylinder head over locating dowels.

NOTE: Lightly lubricate the threads of the cylinder head bolts with clean engine oil prior to installation.

5. Install the cylinder head bolts finger tight.

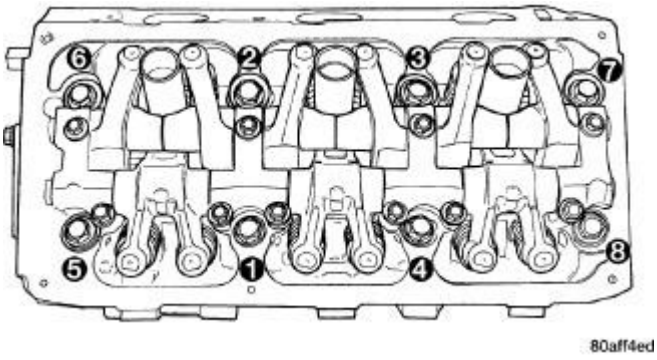

Fig. 172: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

6. Tighten the cylinder head bolts in the sequence shown in illustration using the following 4 step torque-turn method:
   - Step 1: All to 61 N.m (45 ft. lbs.)
   - Step 2: All to 88 N.m (65 ft. lbs.)
   - Step 3: All (again) to 88 N.m (65 ft. lbs.)
   - Step 4: + 90° Turn **Do not use a torque wrench for this step.**
7. Bolt torque after 90° turn should be over 122 N.m (90 ft. lbs.) in the tighten direction. If not, replace the bolt.

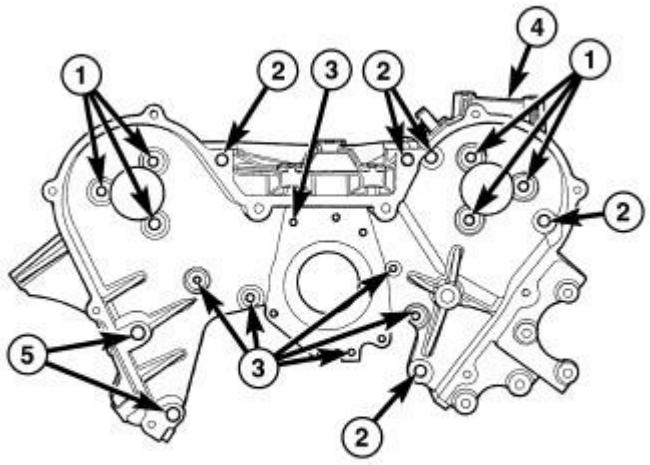

Fig. 173: REAR TIMING BELT COVER FASTENERS
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

8. Install the inner timing cover to cylinder head bolts. Tighten bolts to 54 N.m (40 lbs. ft.).

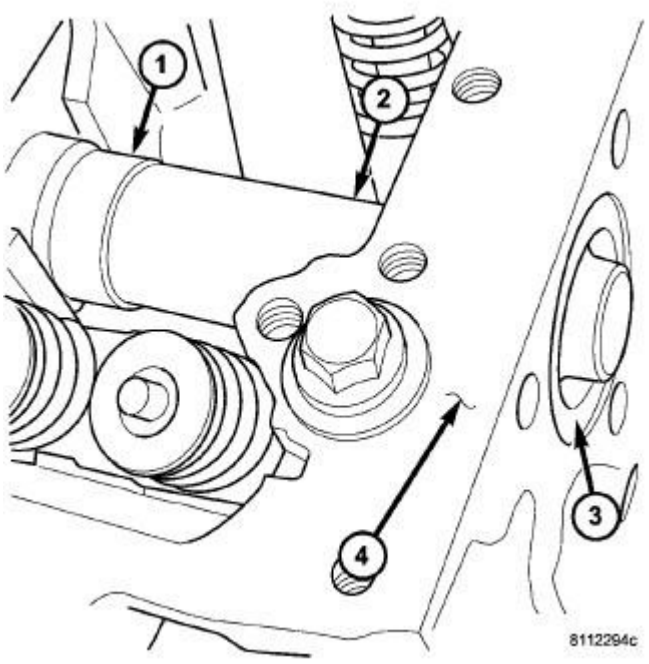

Fig. 174: CAMSHAFT INSTALLATION - LEFT
Courtesy of CHRYSLER LLC

9. Apply light coat of clean engine oil to the lip of the camshaft oil seal (3) and Seal Protector Sleeve 6788 (2).

NOTE: When installing the camshaft into the cylinder head , you must first insert the seal protector through the camshaft seal until the camshaft seats, then remove Seal Protector Sleeve 6788 from the camshaft.

10. Install the oil seal onto the camshaft (1) using Seal Protector Sleeve 6788 and install the camshaft into the cylinder head (4).

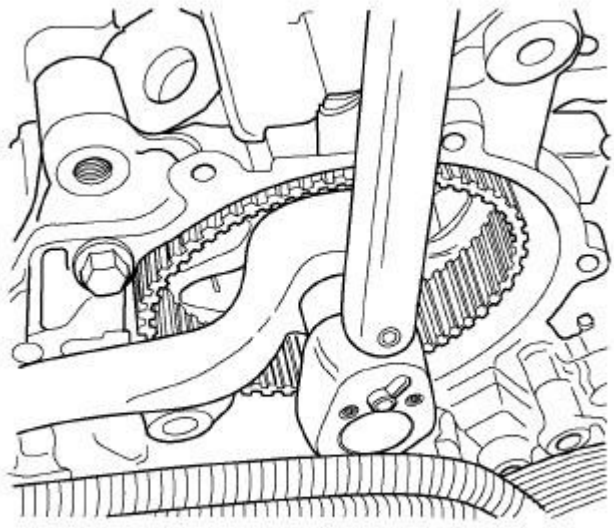

Fig. 175: LEFT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

11. Install camshaft sprocket. Hold the camshaft sprocket gear and tighten the camshaft sprocket bolt to 115 N.m plus a 1/4 turn (85 lbs. ft. plus a 1/4 turn). See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

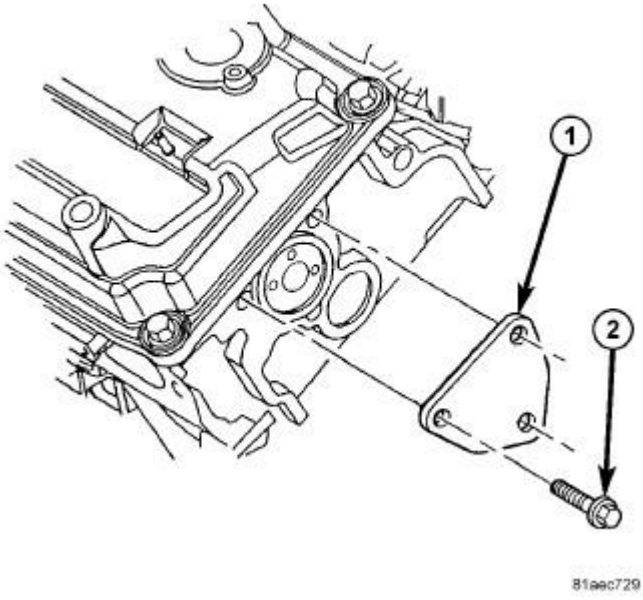

Fig. 176: Camshaft Thrust Plate

Courtesy of CHRYSLER LLC

12. Install the rear camshaft thrust plate (1).

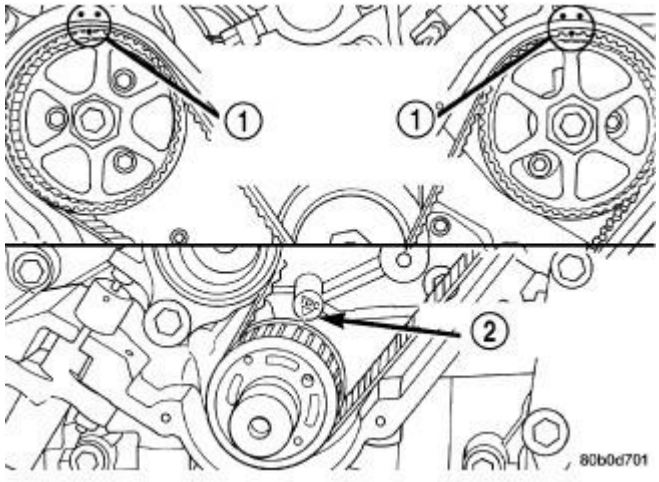

Fig. 177: CAMSHAFT SPROCKET TIMING MARKS
Courtesy of CHRYSLER LLC

13. Rotate the left camshaft gear to the alignment mark (1) on rear timing belt cover. Check the right camshaft gear and crankshaft gear timing alignment marks (1 and 2).
14. Install the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
15. Install the tensioner. See **Engine/Valve Timing/TENSIONER, Engine Timing - Installation**.

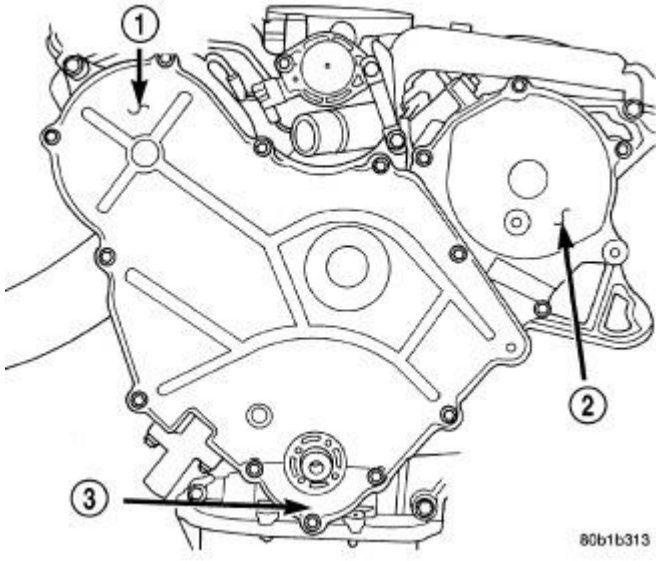

Fig. 178: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

16. Install the timing belt front covers (1, 2 and 3). See **Engine/Valve Timing/COVER(S), Engine Timing -**

Installation.

17. Install the power steering reservoir.

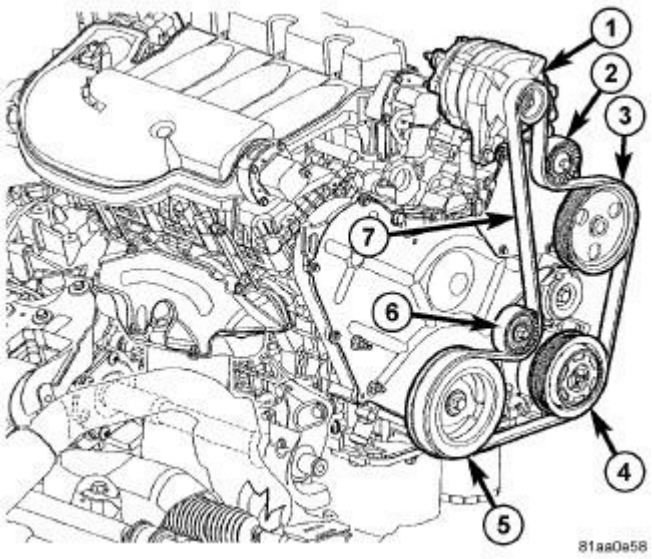

Fig. 179: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

18. Install the vibration damper (5). See **Engine/Engine Block/DAMPER, Vibration - Installation**.
19. Install the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.
20. Install the accessory drive belt tensioner (6).
21. Install the lower accessory drive belt idler pulley (2).
22. Install the left exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.
23. Install the exhaust cross over pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation**.

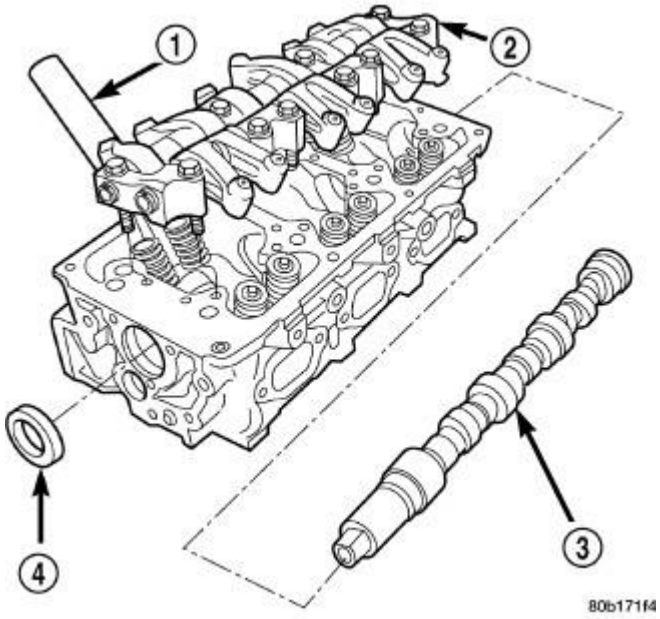

Fig. 180: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

24. Install the left rocker arm assembly (2). See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**.
25. Install the left cylinder head cover and ground strap.

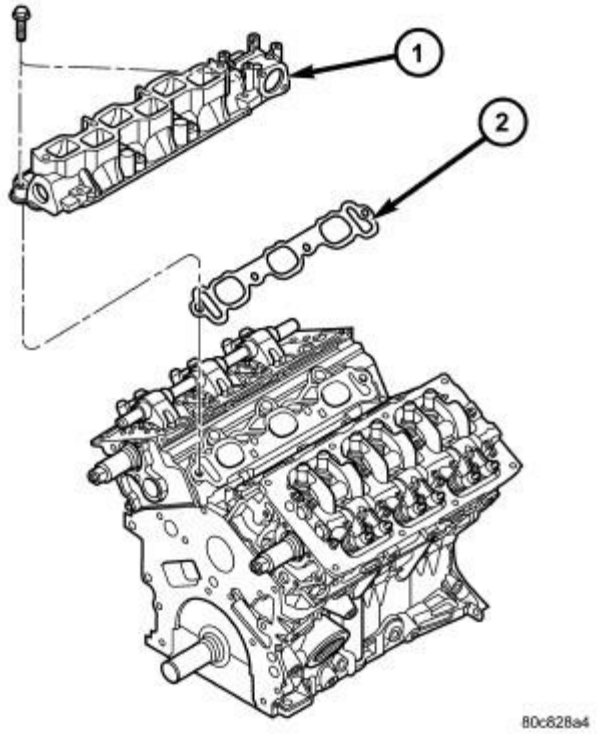

Fig. 181: Lower Intake Manifold
Courtesy of CHRYSLER LLC

26. Install lower intake manifold (1) and gasket (2). See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

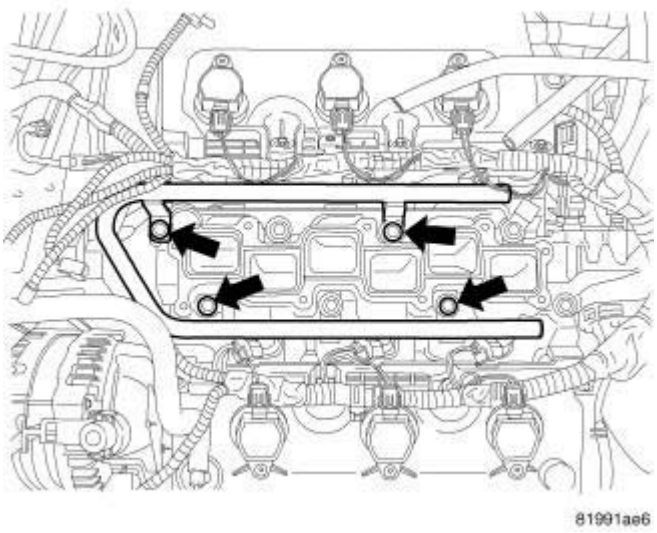

Fig. 182: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

27. Install the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Installation** .

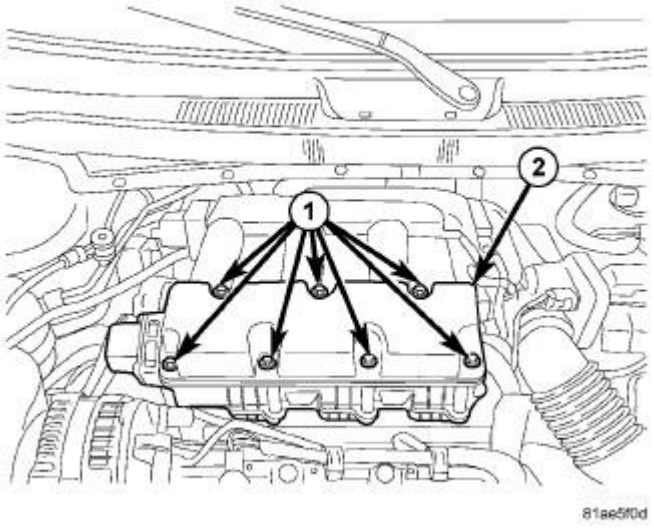

Fig. 183: Upper Intake Manifold
Courtesy of CHRYSLER LLC

28. Install the upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.

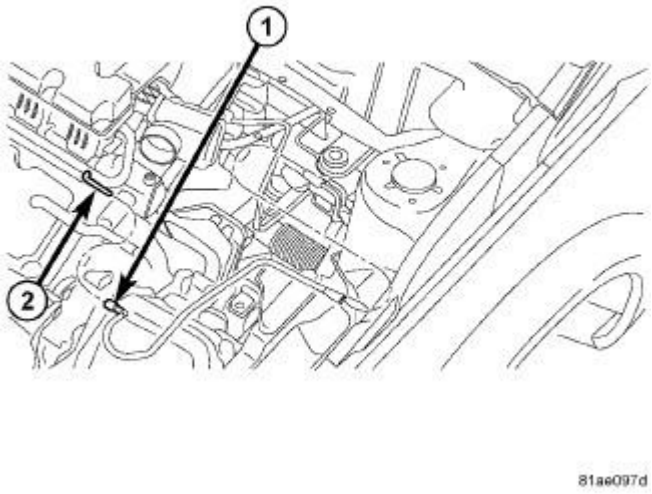

Fig. 184: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

29. Connect the fuel line (1) to the fuel rail.
30. Install the radiator cooling fan assembly. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
31. Install the radiator core support.
32. Install the radiator close out panel.

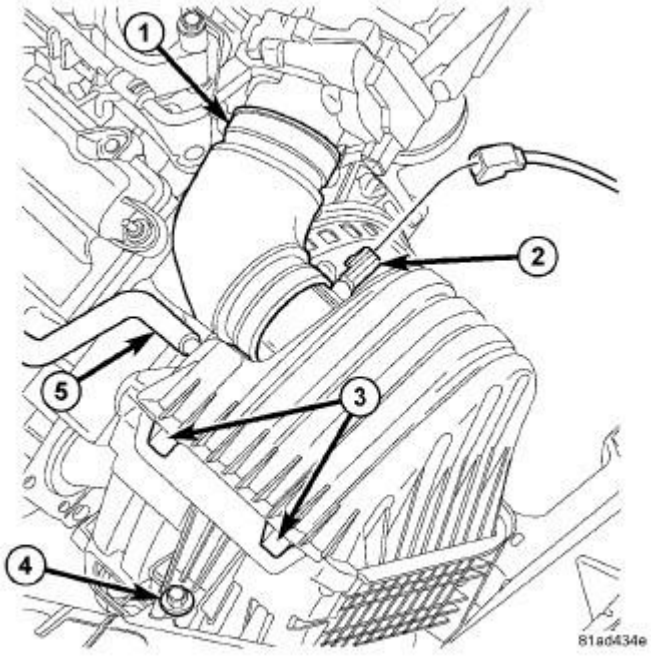

Fig. 185: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

33. Install the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
34. Install the engine cover.
35. Fill the coolant system.

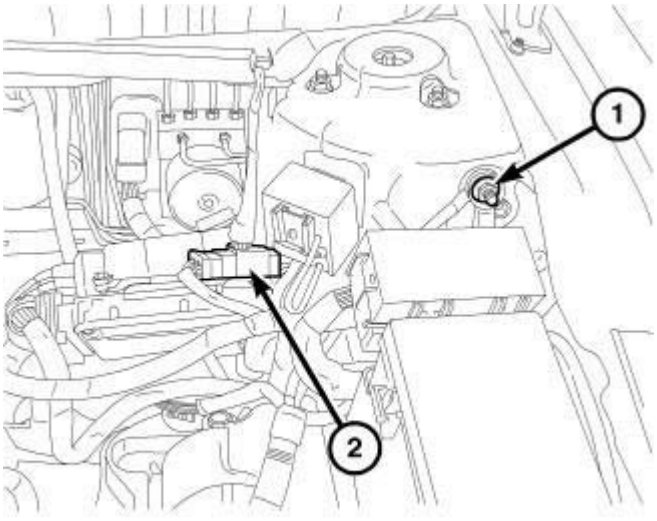

Fig. 186: BATTERY CABLE
Courtesy of CHRYSLER LLC

36. Connect the negative battery cable (1).

CAMSHAFT, ENGINE

Description

DESCRIPTION

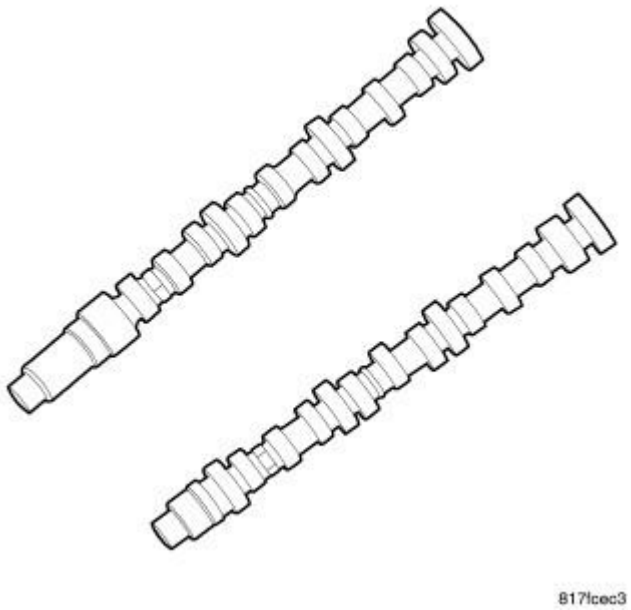

Fig. 187: CAMSHAFTS
Courtesy of CHRYSLER LLC

A single overhead camshaft per cylinder head provides valve actuation. The left camshaft accommodates a cam sensor pick-up wheel and is therefore longer. Each camshaft is supported by four bearing journals. A thrust plate attached to the rear of each cylinder head controls camshaft end play. Right and left camshaft driving sprockets support a timing mark, are keyed, and not interchangeable because of the cam sensor pick-up wheel on the left sprocket. Camshaft bearing lubrication is provided via a oil supply passage through each rocker shaft pedestal dowel.

Operation

OPERATION

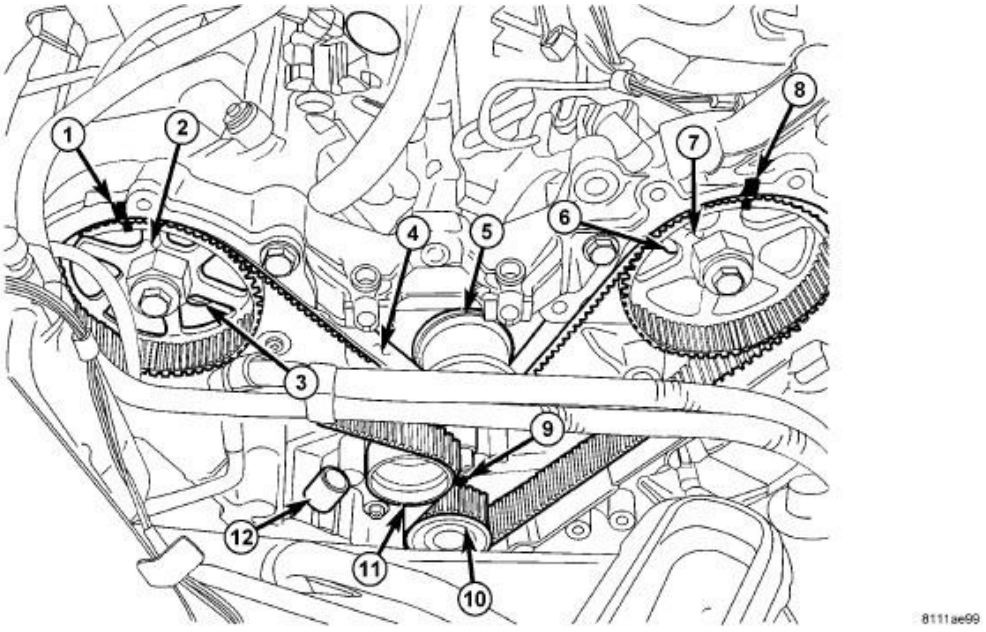

Fig. 188: TIMING GEAR MARKS
Courtesy of CHRYSLER LLC

1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK	7 - LEFT CAMSHAFT GEAR
2 - RIGHT CAMSHAFT GEAR	8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT	9 - CRANKSHAFT GEAR ALIGNMENT MARK
4 - TIMING BELT	10 - CRANKSHAFT GEAR
5 - WATER PUMP PULLEY	11 - TIMING BELT TENSIONER PULLEY
6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT	12 - TIMING BELT TENSIONER

The camshaft is driven by the crankshaft via drive sprockets and belt. As the crankshaft turns, the timing belt turns the camshaft. The camshaft lobes press the lifters which in turn open the valves at the correct time. The valve spring returns the valve to the closed state.

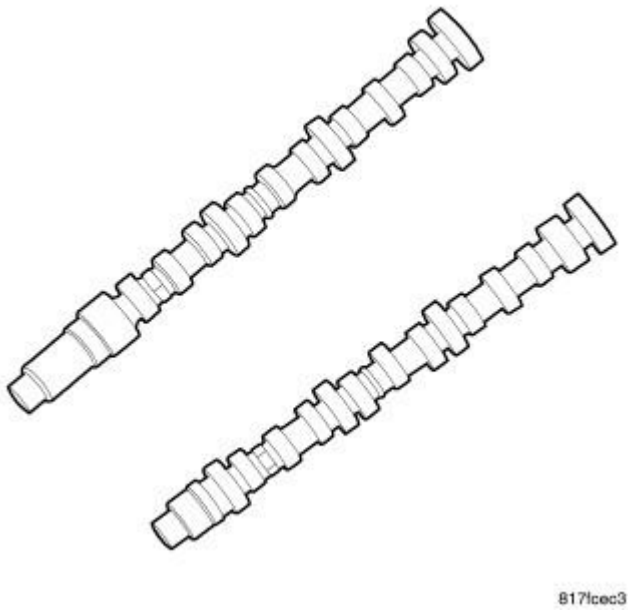

Fig. 189: CAMSHAFTS
Courtesy of CHRYSLER LLC

The camshaft has precisely machined lobes to provide accurate valve timing and duration.

Removal

REMOVAL

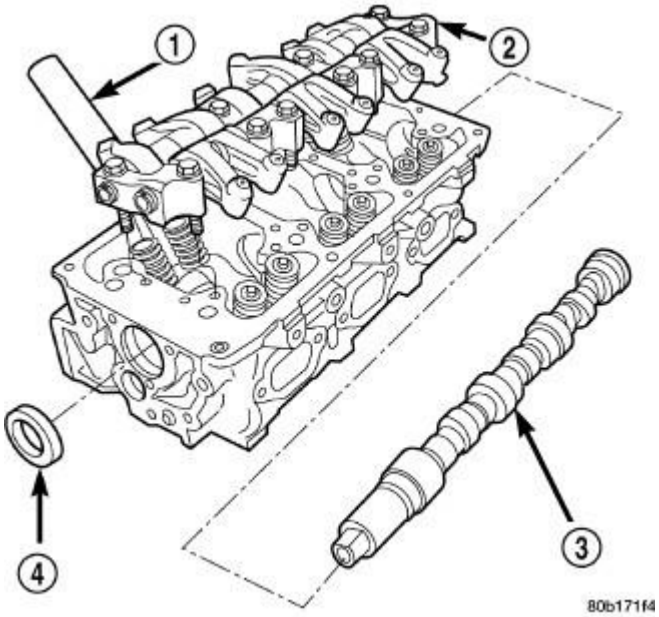

Fig. 190: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

NOTE: Camshafts are removed from the rear of each cylinder head.

CAUTION: Care must be taken not to nick or scratch the journals when removing the camshaft.

1. Remove the camshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
2. Remove the rocker arm shaft assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Disassembly**

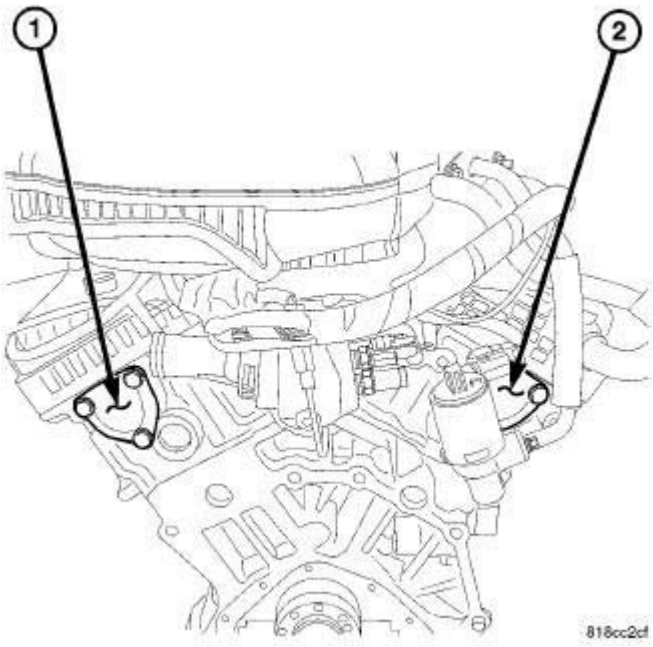

Fig. 191: CAMSHAFT THRUST PLATES
Courtesy of CHRYSLER LLC

3. To remove the right camshaft, remove the EGR Valve assembly.
4. Remove the camshaft thrust plate (1) or (2).
5. Carefully remove the camshaft from the rear of the cylinder head.
6. **NOTE: It may be necessary to remove the Powertrain Control Module (PCM) in order to remove the camshaft from the right cylinder head.**

Inspection

INSPECTION

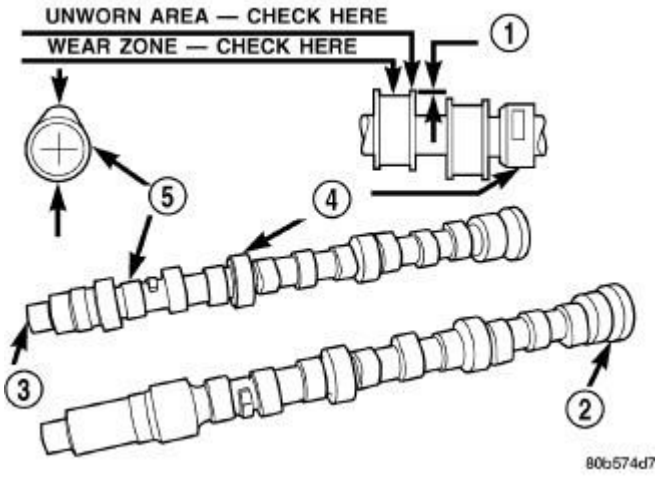

Fig. 192: Camshaft Inspection
Courtesy of CHRYSLER LLC

1 - ACTUAL WEAR
2 - LEFT CAMSHAFT
3 - RIGHT CAMSHAFT
4 - BEARING JOURNAL
5 - LOBE

1. Inspect camshaft bearing journals for damage and binding. If journals are binding, check the cylinder head for damage. Also check cylinder head oil holes for clogging.
2. Check the cam lobe and bearing surfaces for abnormal wear and damage. Replace camshaft if defective.

NOTE: If camshaft is replaced due to lobe wear or damage, always replace the rocker arms.

3. Measure the lobe actual wear and replace camshaft if out of limit. Standard value is 0.0254 mm (0.001 in.), wear **limit** is 0.254 mm (0.010 in.).

Installation

INSTALLATION

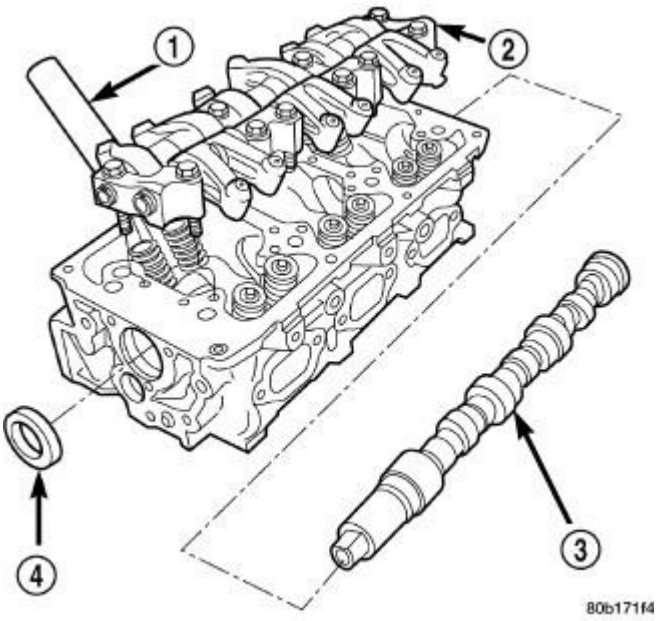

Fig. 193: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

NOTE: Care must be taken not to scrape or nick the camshaft journals when installing the camshaft into position.

1. Lubricate camshaft bearing journals, camshaft lobes and camshaft seal with clean engine oil and install camshaft into cylinder head.

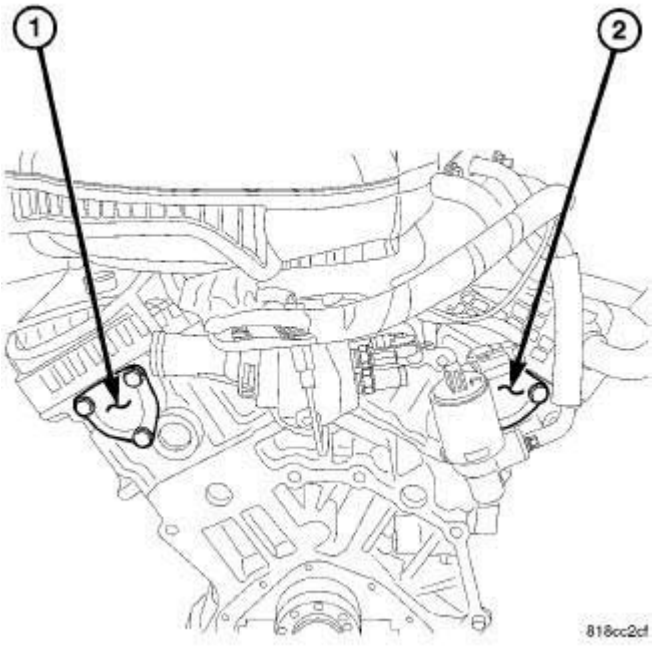

Fig. 194: CAMSHAFT THRUST PLATES
Courtesy of CHRYSLER LLC

2. Install the camshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**
3. Install the camshaft thrust plate (1) or (2). Clean the mating surfaces and apply the appropriate sealer as necessary. Torque fasteners to 28 N.m (250 in. lbs.).
4. If necessary, install the EGR Valve assembly and Powertrain Control Module (PCM).
5. Install the rocker arm assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**

COVER(S), CYLINDER HEAD, LEFT

Removal

REMOVAL

WARNING: Do not start or run the engine with the cylinder head cover removed. Damage or personal injury may occur.

1. Disconnect and isolate the negative battery cable.

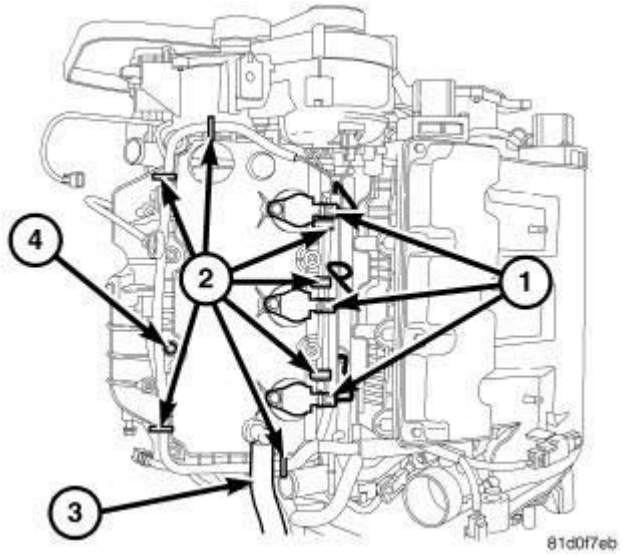

Fig. 195: IGNITION COILS
Courtesy of CHRYSLER LLC

1 - Ignition coil	3 - PCV
ELECTRICAL CONNECTORS	
2 - Engine harness retainer tabs	4 - BRACKET

2. Disconnect and remove the three ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Removal** .
3. Disconnect engine harness retaining clips (2) from cylinder head cover studs. Position the engine harness aside.
4. Disconnect the PCV hose (3) from the valve cover assembly (if required).
5. Completely loosen the eight cylinder head cover retaining bolts (4) and remove the cylinder head cover.

Installation

INSTALLATION

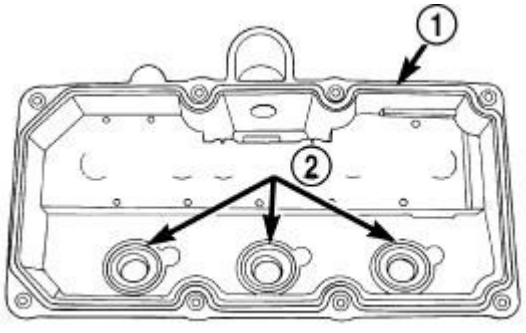

Fig. 196: Cylinder Head Cover Gasket & Spark Plug Tube Seals

Courtesy of CHRYSLER LLC

1 - CYLINDER HEAD COVER GASKET 2 - SPARK PLUG TUBE SEALS

1. Clean cylinder head and all gasket sealing surfaces. Inspect and replace gasket and seals as necessary.
2. Using a suitable pry tool, carefully remove spark plug tube seals (2).
3. Position new seal with the part number on seal facing cylinder head cover.

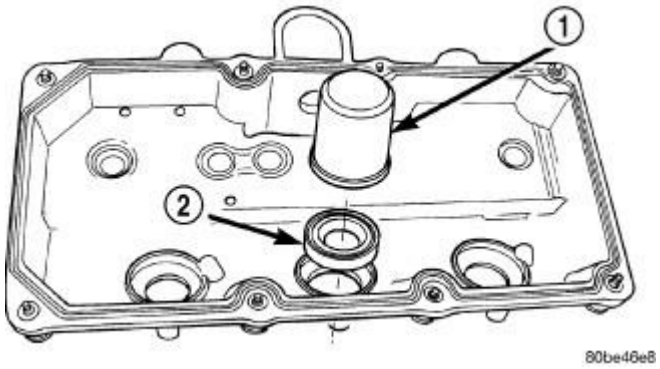

Fig. 197: Spark Plug Tube Seal Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL MD-998306 2 - SPARK PLUG TUBE SEAL

4. Install seals using Camshaft Installer MD-998306 (1).

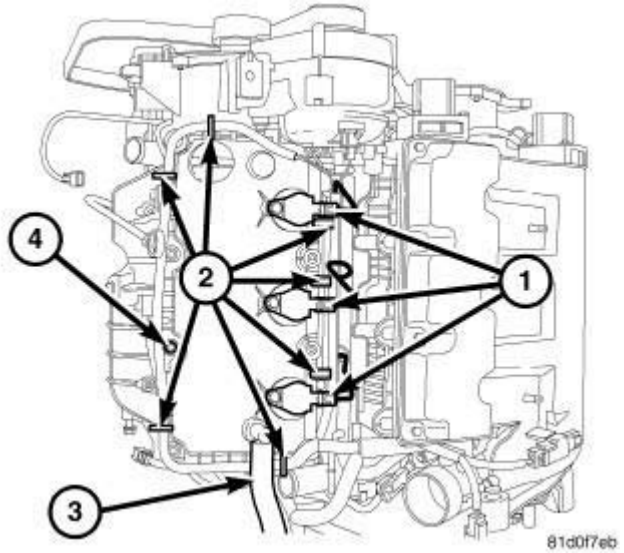

Fig. 198: IGNITION COILS
Courtesy of CHRYSLER LLC

1 - Ignition coil ELECTRICAL CONNECTORS	3 - PCV
2 - Engine harness retainer tabs	4 - BRACKET

5. Install cylinder head cover and bolts (4). Tighten to 10 N.m (90 in. lbs.).
6. Install the PCV hose (3) (if required).
7. Position the wiring harness on the cylinder head cover.
8. Reinstall the wire harness retainers (2) around the perimeter of the valve cover.
9. Install the ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Installation** .
10. Connect the ignition coil electrical connectors (1).
11. Connect negative battery cable.

COVER(S), CYLINDER HEAD, RIGHT

Removal

REMOVAL

WARNING: Do not start or run the engine with the cylinder head cover removed. Damage or personal injury may occur.

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold from the engine. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Cover lower intake manifold intake ports with a clean cover to prevent dirt or debris from entering the ports during service.

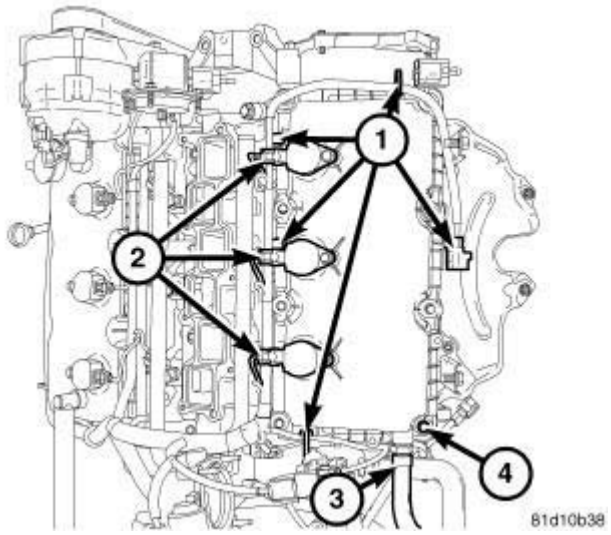

Fig. 199: Cylinder Head Cover Bolts
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTORS 2 - IGNITION COILS

4. Disconnect the ignition coil harness connectors (2).
5. Remove ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Removal** .
6. Disconnect the engine wiring harness retainers (1) from the valve cover.
7. Disconnect the makeup air hose (3).
8. Completely loosen the cylinder head cover retaining bolts (4) and remove the cylinder head cover.

Installation

INSTALLATION

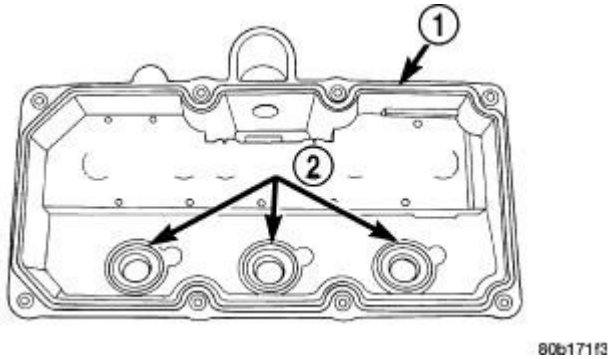

Fig. 200: Cylinder Head Cover Gasket & Spark Plug Tube Seals
Courtesy of CHRYSLER LLC

1 - CYLINDER HEAD COVER GASKET 2 - SPARK PLUG TUBE SEALS

1. Clean cylinder head and cover mating surfaces. Inspect and replace gasket and seals as necessary.
2. Using a suitable pry tool, carefully remove tube seals (2).
3. Position new seal with the part number on seal facing cylinder head cover.

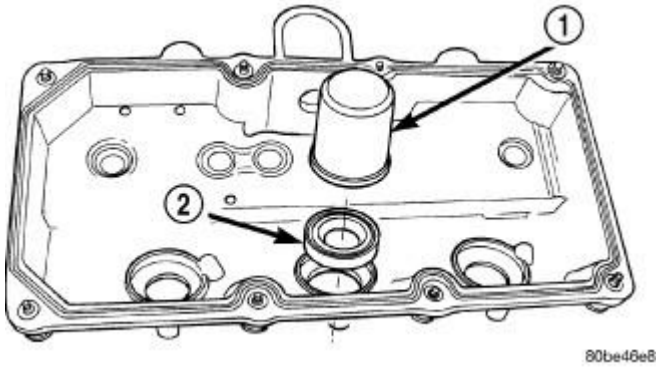

Fig. 201: Spark Plug Tube Seal Installation
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL MD-998306 2 - SPARK PLUG TUBE SEAL

4. Install seals using Camshaft Installer MD-998306 (1).

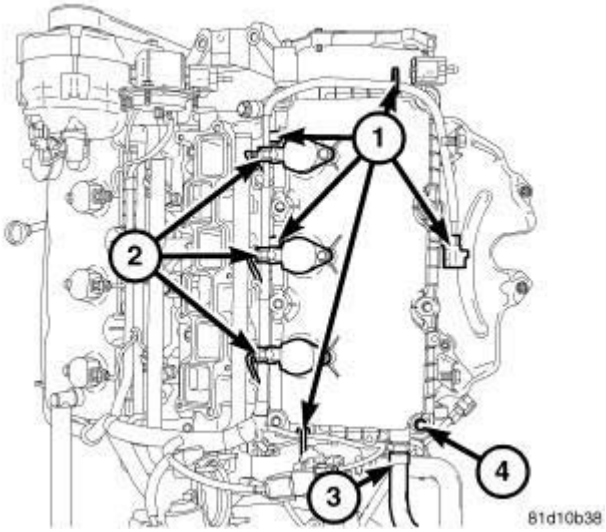

Fig. 202: Cylinder Head Cover Bolts
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTORS

2 - IGNITION COILS

5. Install cylinder head cover bolts (4) and tighten to 10 N.m (90 in. lbs.).
6. Reconnect the wire harness retainers (1) to the valve cover.
7. Install the ignition coils. Refer to **Electrical - Ignition Control/Ignition Control/COIL, Ignition - Installation** .
8. Connect the ignition coil electrical connectors (2).
9. Reconnect the makeup air hose (3).
10. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
11. Connect negative battery cable.

ROCKER ARM, VALVE

Description

ROCKER ARM

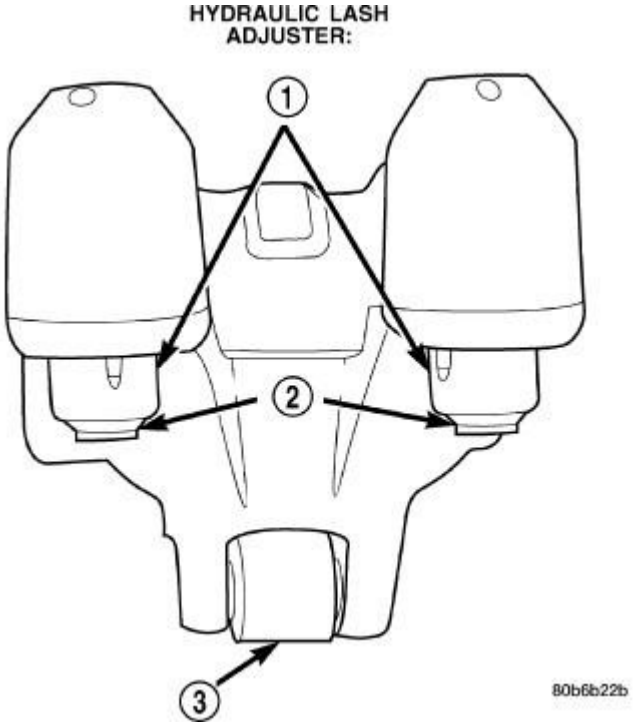

Fig. 203: Rocker Arm Assembly
Courtesy of CHRYSLER LLC

1 - RETAINER
2 - SWIVEL PAD
3 - ROLLER

Rocker arms are made of light weight permanent mold aluminum alloy with a roller type follower operating

against the camshaft. The valve actuating end of the rocker arms are machined to retain hydraulic lash adjusters, eliminating the need for manual valve lash adjustment.

ROCKER ARM SHAFTS

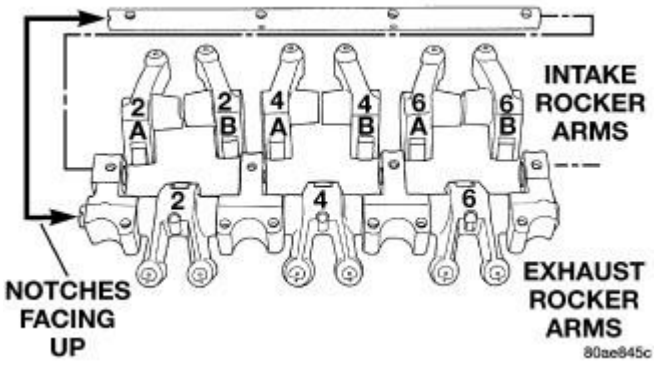

Fig. 204: Rocker Arms & Shafts
Courtesy of CHRYSLER LLC

The rocker arm shafts are tubular steel and supported by several forged aluminum alloy pedestals, which are fastened to the cylinder head. Four shafts are used, one for each intake and exhaust rocker arm bank on each cylinder head. The shafts are hollow to provide a duct for lubricating oil flow from the cylinder head to the valve mechanisms. One hollow dowel per pedestal is used to locate the pedestal to the cylinder head, orient the exhaust rocker shaft, and serve as a cam bearing oil feed passage.

Operation

OPERATION

The rocker arm is the pivot point between the camshaft lobe and the valve.

Diagnosis and Testing

LASH ADJUSTER (TAPPET) NOISE DIAGNOSIS

Proper noise diagnosis is essential in locating the source of a NVH complaint. Locating a lash adjuster (tappet) type noise can sometimes be difficult. As a result, an initial misdiagnosis may occur.

Refer to the following chart indicating possible lash adjuster (tappet) noise sources and possible sources that could lead to a misdiagnosis.

Refer to Lash Adjuster (Tappet) Noise Chart for Possible Causes and Correction of a lash adjuster (tappet) type noise.

POSSIBLE NOISE SOURCES	POSSIBLE NOISE MISDIAGNOSIS SOURCES
Spongy/soft/aerated lash adjusters.	Exhaust leak.
Missing lash adjuster swivel contact pads.	Exhaust rocker arm-to-cylinder head cover contact.

Intake rocker-to-camshaft bearing journal contact.	Piston pin bore fit.
Rocker arm bind-up.	Timing drive hydraulic tensioner tick.
Intake rocker arm-to-spark plug tube contact.	Accessory drive belt deterioration.
Excessive cam end play.	Piston-to-bore clearance knock.
Broken valve spring.	Crankshaft bearing noise.
Broken/loose camshaft sprocket bolt.	-
Incomplete cam lobe machining.	
Cracked lash adjuster cartridge body.	

LASH ADJUSTER (TAPPET) NOISE CHART

POSSIBLE CAUSES	CORRECTION
1. Engine oil level-too high or too low. This may cause aerated oil to enter the adjusters and cause them to be spongy.	1. Check and correct engine oil level.
2. Insufficient running time after rebuilding cylinder head.	2. Low speed running of up to 1 hour may be required to fully evacuate trapped air from the valve train system. During this time, turn engine off and let set for a few minutes before restarting. Repeat this several times after engine has reached normal operating temperature.
3. Air trapped in lash adjuster (after 1 hour run time).	3. See below: (a) Check lash adjusters for sponginess while installed in cylinder head. Depress part of rocker arm over adjuster. Normal adjusters should feel very firm. Very spongy adjusters can be bottomed out easily. (b) Before proceeding, perform **HYDRAULIC LASH ADJUSTER BLEEDING** procedure. (c) If lash adjuster(s) are still spongy, replace with new adjuster/rocker arm assembly*.
4. Low oil pressure	4. See below: (a) Check and correct engine oil level. (b) Check engine oil pressure. (c) Check for excessive bearing clearance and correct. (d) Check for worn oil pump.
5. Oil passage to cylinder head(s) plugged with debris.	5. Check cylinder head oil passages and cylinder head gasket restrictor for blockage. Clean or replace as necessary.
6. Worn valve guide(s).	6. Ream guide(s) and replace valve(s) with oversize valves and seal(s).
7. Air ingested into oil due to broken or cracked oil pump pickup tube.	7. Inspect pickup tube and replace as necessary.
8. Collapsed lash adjuster due to debris ingestion.	8. Clean debris from engine and replace lash

	adjuster/rocker assembly*.
9. Intake rocker arm roller clevis ear(s) contacting camshaft bearing journal(s) on side.	9. Inspect camshaft end play and all valve train components for wear. Replace as necessary.
***Lash adjusters are serviced with the rocker arms-do not disassemble.**	

Standard Procedure

HYDRAULIC LASH ADJUSTER BLEEDING

NOTE: Use this procedure to manually bleed aerated oil from the lash adjuster and remove sponginess.

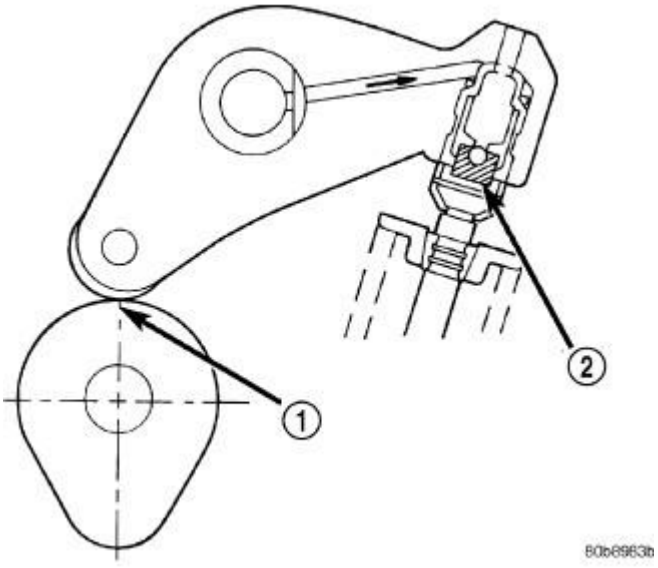

Fig. 205: Rocker Arm Positioned On Base Circle Of Camshaft
Courtesy of CHRYSLER LLC

1. Run the engine, bringing it to operating temperature in order to freshly pressurize and warm the valvetrain system oil supply.
2. Remove cylinder head cover(s).
3. Rotate engine until the rocker arm is positioned on the base circle of the cam (1).

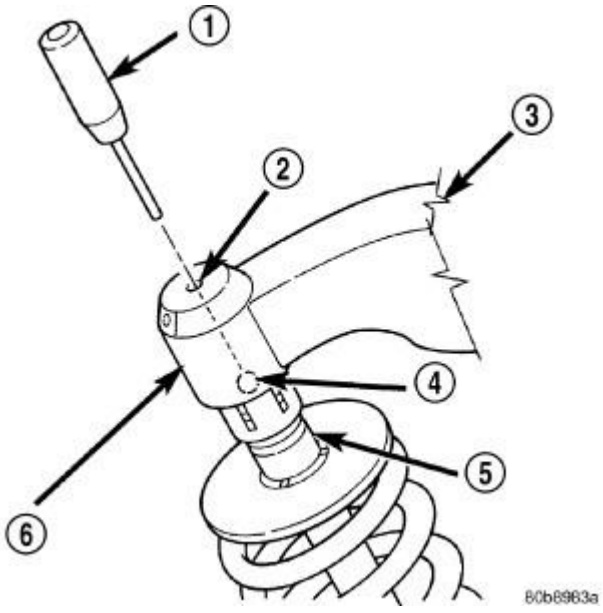

Fig. 206: Purging Air From Lash Adjuster
Courtesy of CHRYSLER LLC

4. For intake rocker arm positions:

CAUTION: If probe tip breaks off within the lash adjuster, replace the affected rocker arm.

a. Adjust the gauge pin of Release Probe 8351 (1) to extend approximately 20 mm (0.787 in.). Then, carefully insert the release probe gauge pin into the lash adjuster service access hole (2).
b. Gently unseat lash adjuster's internal check ball (4).
c. While the internal check ball is held unseated, press the rocker arm (3) into the valve tip (5), allowing the hydraulic lash adjuster (6) within the rocker arm to fully collapse. Hold fully collapsed position for at least one second, or longer.
d. Slowly release the rocker arm, thereby allowing the lash adjuster to extend, which in turn refills the high pressure chamber with non-aerated oil.
e. Remove Release Probe 8351 to allow check ball to seat.
f. Recheck for sponginess. If the lash adjuster sponginess is not completely or nearly eliminated, then repeat procedure.
g. If the spongy condition cannot be removed, replace effected rocker arm(s).

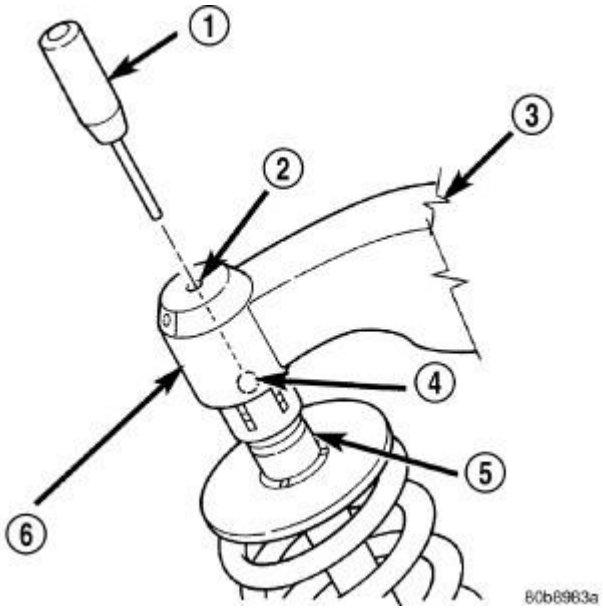

Fig. 207: Purging Air From Lash Adjuster
Courtesy of CHRYSLER LLC

5. For exhaust rocker arm positions:

CAUTION: If probe tip breaks off within the lash adjuster, replace the affected rocker arm.

   a. Adjust the gauge pins of two Release Probes 8351 (1) to extend approximately 20 mm (0.787 in.). Then, using the two release probes, carefully insert gauge pins into the lash adjuster service access holes (2).
   b. Gently unseat BOTH lash adjuster's internal check balls (4) at the same time.
   c. While the internal check balls are held unseated, press the rocker arm (3) into the valve tip (5), allowing the hydraulic lash adjuster (6) within the rocker arm to fully collapse. Hold fully collapsed position for at least one second, or longer.
   d. Slowly release the rocker arm, thereby allowing the lash adjuster to extend, which in turn refills the high pressure chamber with non-aerated oil.
   e. Remove the two Release Probes 8351 to allow check balls to seat.
   f. Recheck for sponginess. If the lash adjuster sponginess is not completely or nearly eliminated, repeat procedure.
   g. If the spongy condition cannot be removed, replace effected rocker arm(s).
6. Install the cylinder head cover(s).

Removal

REMOVAL

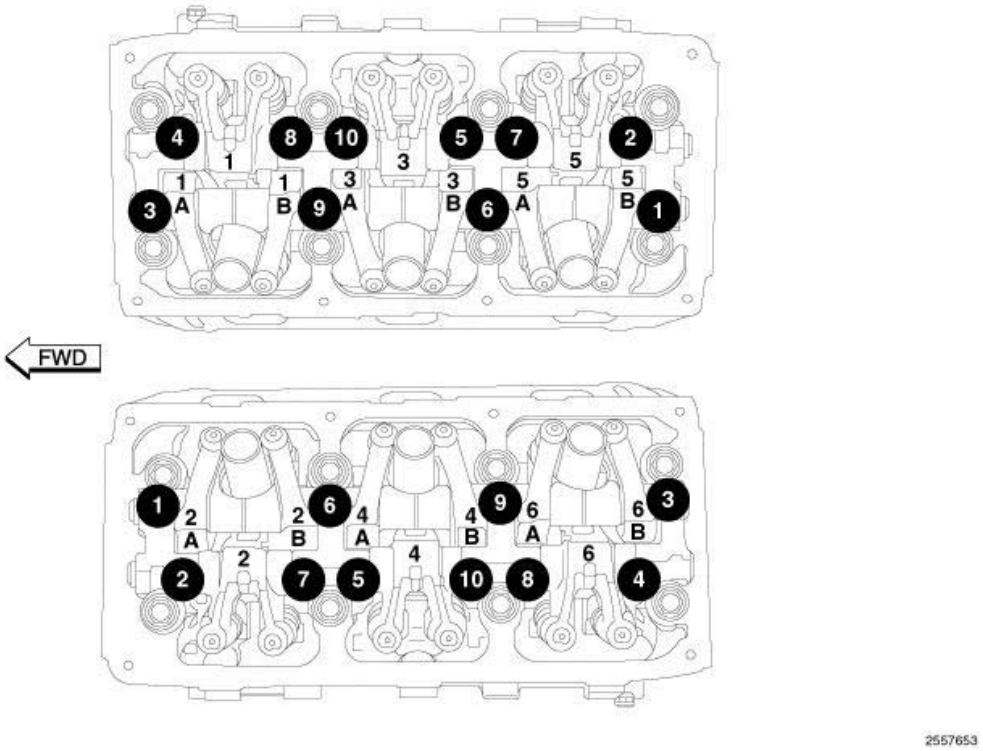

Fig. 208: Rocker Arm Assembly Bolts Torque Sequence
Courtesy of CHRYSLER LLC

1. Remove the cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

CAUTION: DO NOT use a number stamp or a punch to mark the rocker arms. Damage to the rocker arms could occur.

2. Using a permanent ink or paint marker, identify the location and position on each rocker arm.
3. Remove the rocker arm assembly bolts in the sequence shown in illustration.

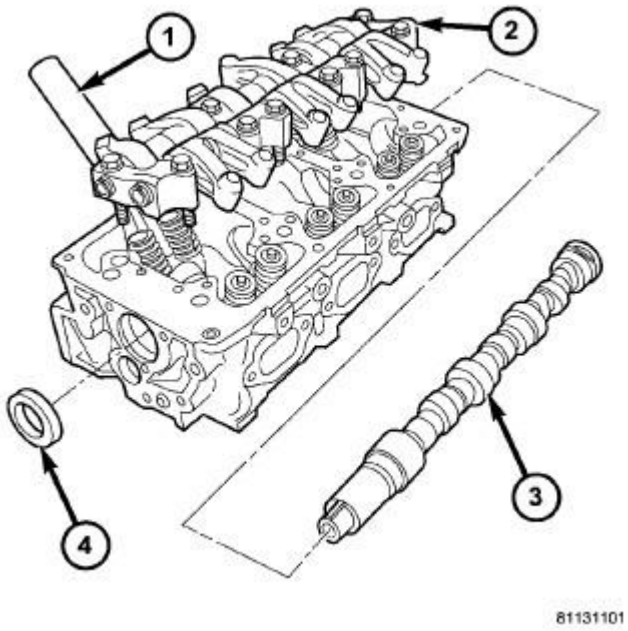

Fig. 209: CYLINDER HEAD, CAMSHAFT & ROCKER ARM
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - SEAL

4. Remove the rocker arm assembly (2).

NOTE: To prevent air ingestion into the lash adjusters, avoid turning the rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjusters and/or plastic retainers.

Disassembly

DISASSEMBLY

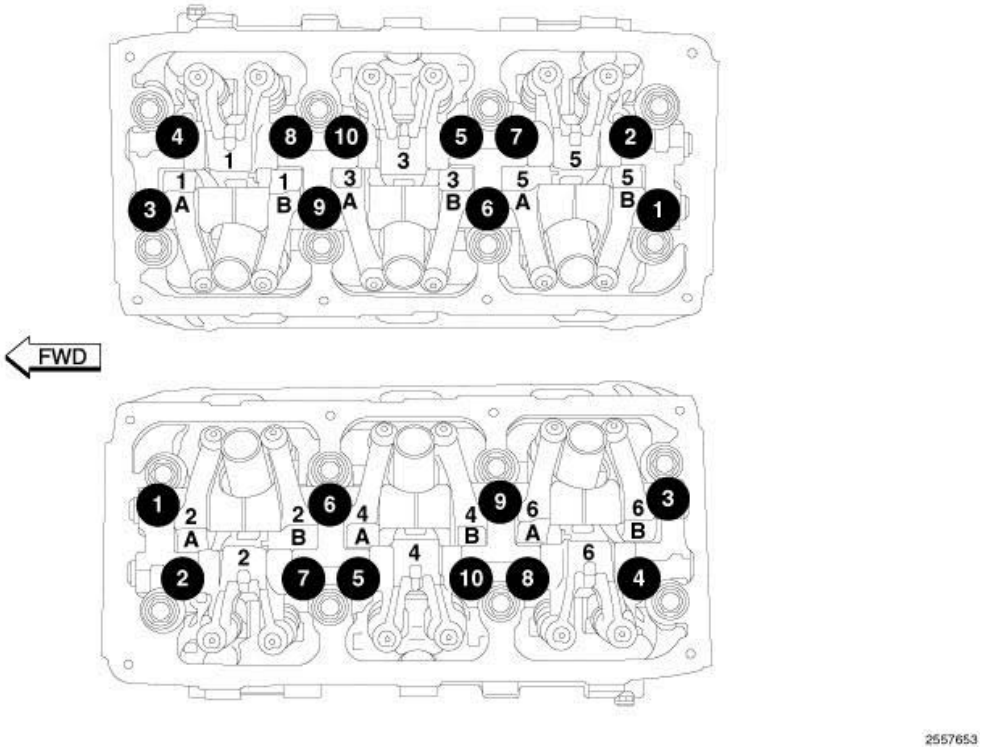

Fig. 210: Rocker Arm Assembly Bolts Torque Sequence
Courtesy of CHRYSLER LLC

CAUTION: DO NOT use a number stamp or a punch to mark the rocker arms. Damage to the rocker arms could occur.

1. Using a permanent ink or paint marker, identify the location and position on each rocker arm and remove the rocker arm and shaft assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**

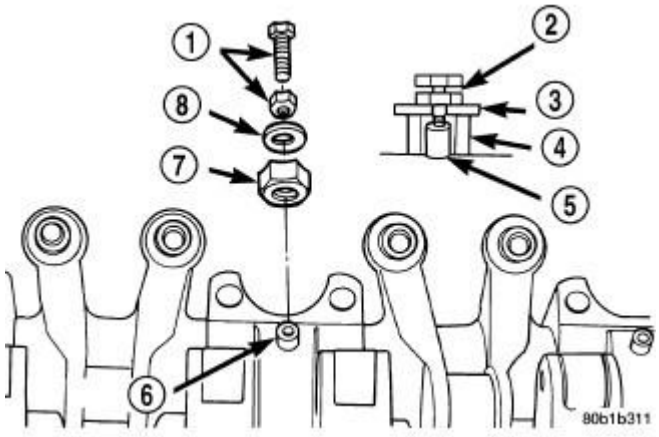

Fig. 211: Rocker Arms & Shaft - Disassembly
Courtesy of CHRYSLER LLC

1 - 4 mm SCREW AND NUT
2 - 4 mm SCREW AND NUT
3 - WASHER
4 - SPACER
5 - DOWEL
6 - DOWEL
7 - SPACER
8 - WASHER

2. Remove the dowel pins using a 4 mm screw, nut, spacer, and washer installed into the pin. Thread the screw into the pin, then loosen the nut on the screw. This will pull the dowel out of the shaft support. Do not reuse the dowel pins.

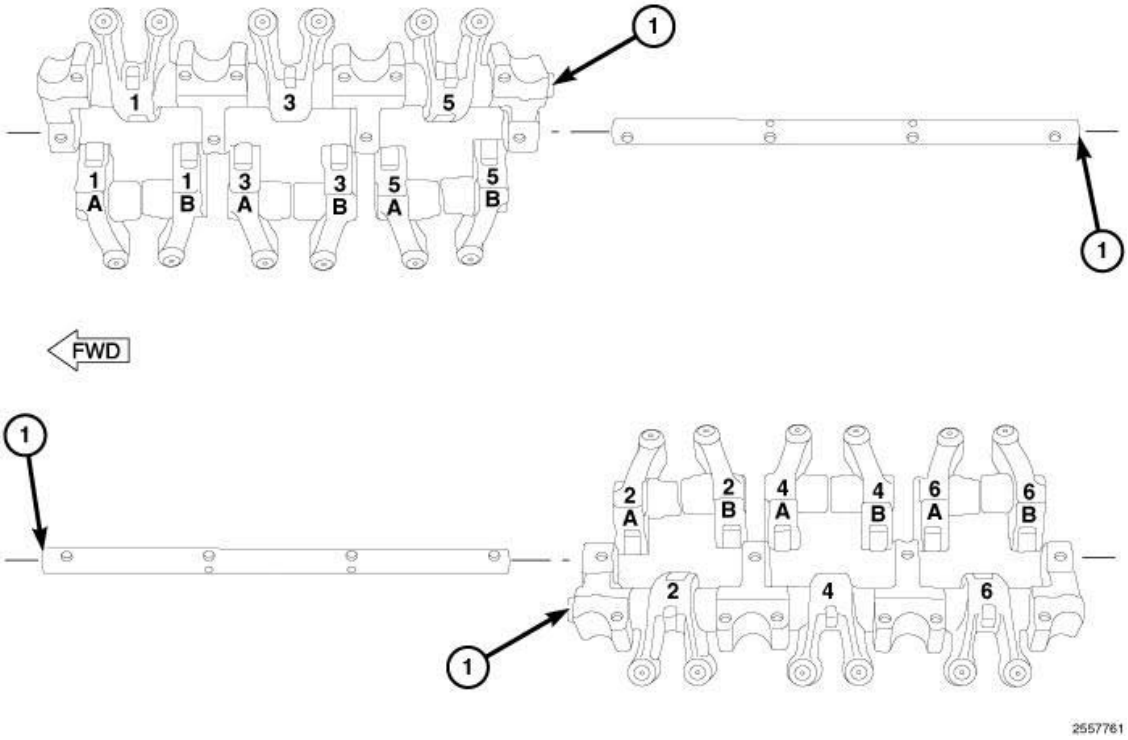

Fig. 212: Identification Marks Face Toward Front Of Engine
Courtesy of CHRYSLER LLC

NOTE: The identification marks (notches) (1) face toward the front of the engine for the left head and toward the rear of the engine for the right head.

3. Remove the rocker arms and pedestals in order.
4. Check the rocker arm mounting portion of the shafts for wear or damage. Replace if damaged or heavily worn.
5. Check the shaft oil holes for clogging with a small wire, clean as required.

Inspection

INSPECTION

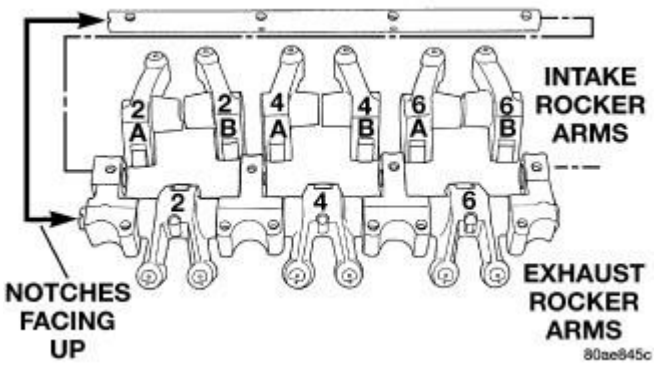

Fig. 213: Rocker Arms & Shafts
Courtesy of CHRYSLER LLC

The rocker arm shafts are hollow and are used as lubrication oil ducts. The rocker arm and shaft assembly on the **right** side of the engine has an oil passage hole from the cylinder head located at the third rocker shaft support pedestal. The rocker arm and shaft assembly on the **left** side of the engine has an oil passage hole from the cylinder head located at the second rocker shaft support pedestal.

NOTE: To prevent air ingestion into lash adjusters, avoid turning rocker arm assembly upside down.

CAUTION: Do not allow rocker arm assembly to rest on lash adjusters, as damage may occur to lash adjuster and plastic retainer.

The intake and exhaust rocker arms are different. They should be identified before disassembling the assembly.

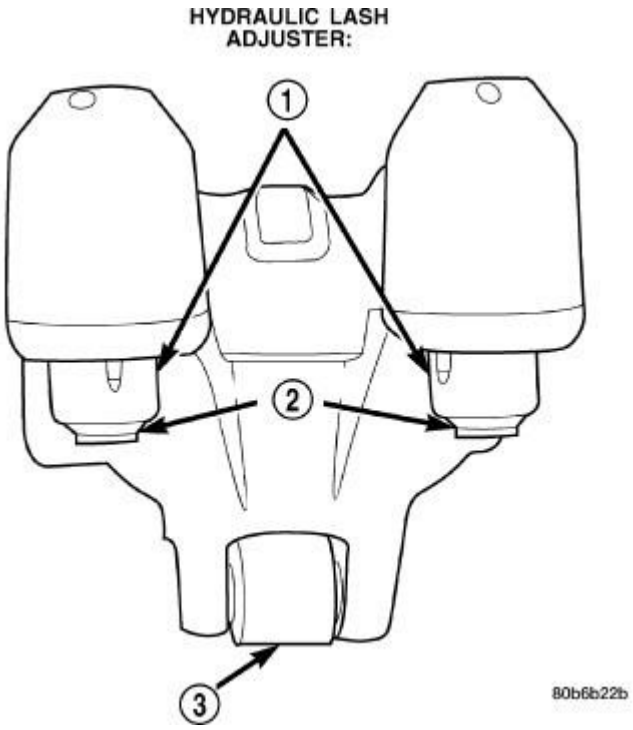

Fig. 214: Rocker Arm Assembly
Courtesy of CHRYSLER LLC

1 - RETAINER 2 - SWIVEL PAD 3 - ROLLER

Check rocker arms for wear or damage:

- Roller scuffing or wear
- Shaft bore scuffing or wear
- Swivel pad on lash adjuster missing or broken
- Rocker arm showing signs of fatigue or cracking
- Roller axle protruding from arm

Replace assembly as necessary if any rocker arms shows signs of wear.

CAUTION: Do not remove lash adjuster from rocker arm assembly. Damage to the adjuster and rocker arm will result.

Assembly

ASSEMBLY

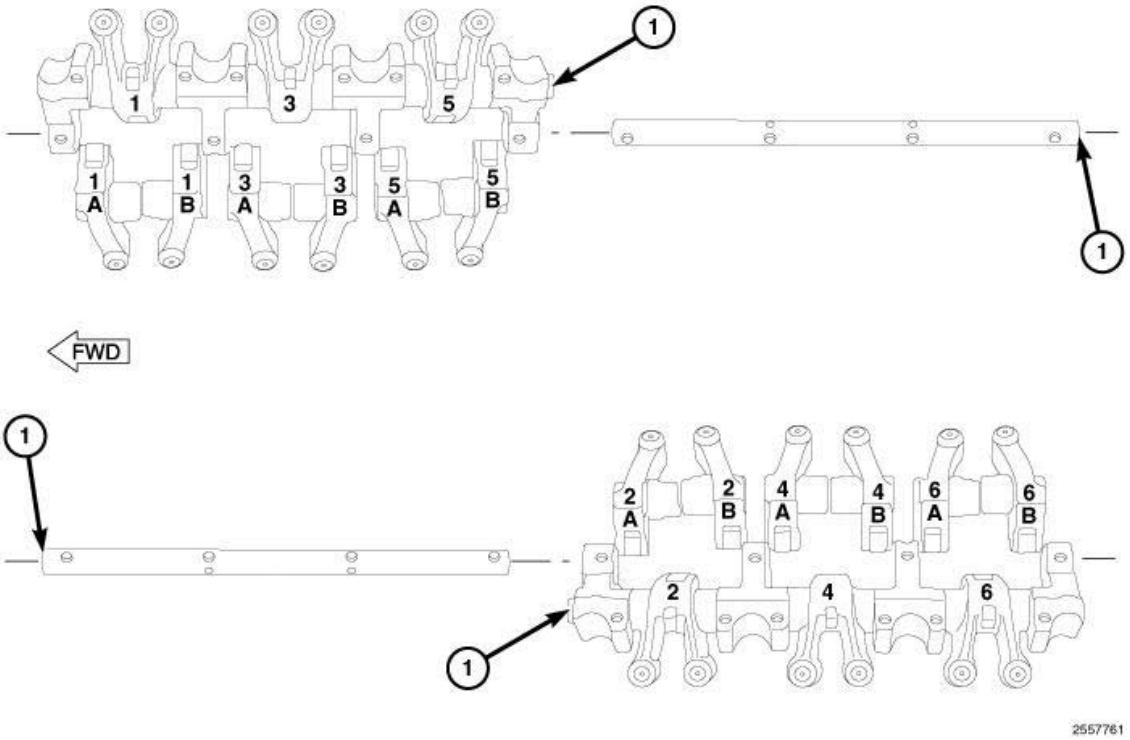

Fig. 215: Identification Marks Face Toward Front Of Engine
Courtesy of CHRYSLER LLC

CAUTION: The rocker arm shafts are hollow and are used as lubrication oil passages. The rocker arm and shaft assembly on the RIGHT side of the engine has an oil passage hole from the cylinder head to the third rocker shaft support. The rocker arm shaft assembly on the LEFT side of the engine has an oil passage hole from the cylinder head to the second rocker shaft support.

NOTE: A new fully assembled rocker arm and shaft assembly can be installed on either the right or left side of the engine. The identification marks (notches) (1) face toward the front of the engine for the left head and toward the rear of the engine for the right head.

1. Position the shafts with the notches (1) facing up. Install the rocker arms and pedestals onto the shafts.

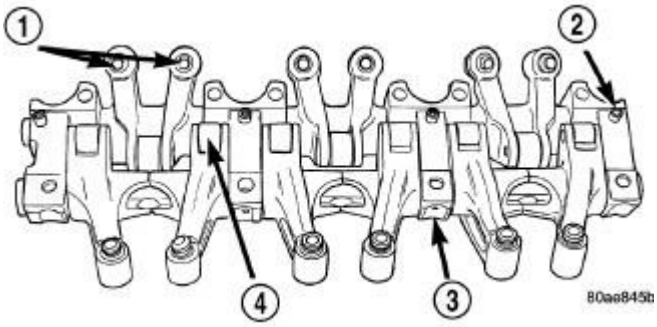

Fig. 216: Assemble Rocker Arms & Shaft
Courtesy of CHRYSLER LLC

1 - HYDRAULIC LASH ADJUSTERS
2 - DOWEL PIN
3 - PEDESTAL
4 - ROLLER

CAUTION: New dowel pins must be installed when reassembling.

2. Install the dowel pins (2). The dowel pins (2) pass through the pedestal (3) into the exhaust rocker shafts. Dowel pins (2) should be pressed in until they bottom-out against the rocker shaft in the pedestal (3).
3. Install the rocker arm and shafts assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**

Installation

INSTALLATION

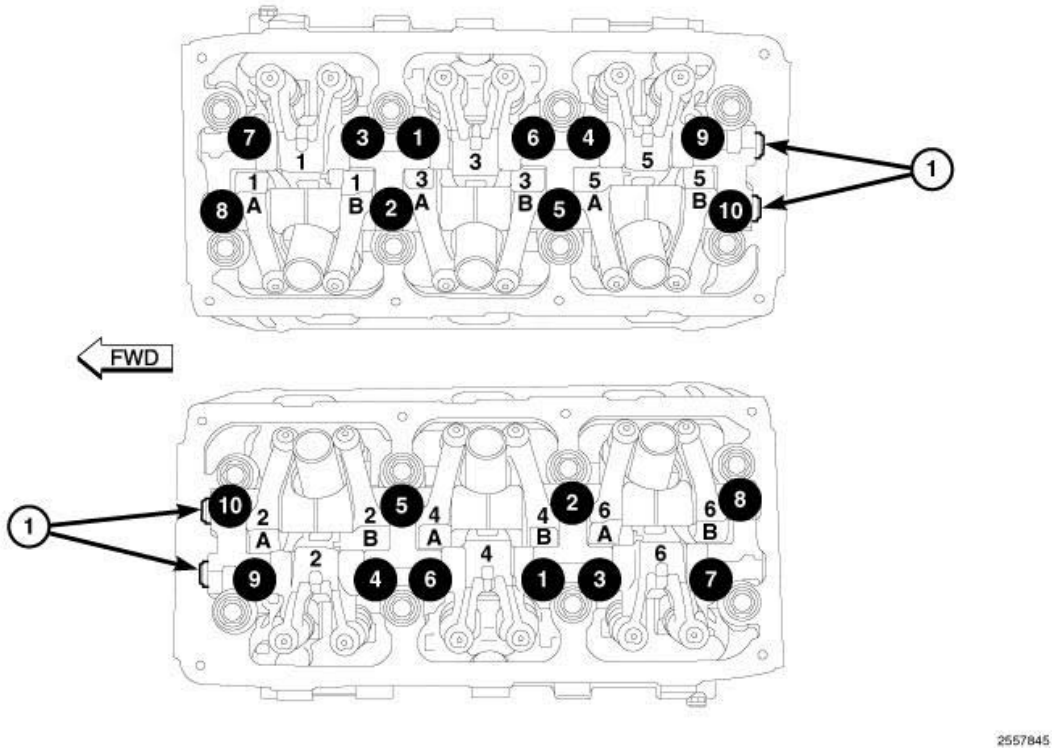

Fig. 217: Identification Marks On Rocker Arm & Shaft Assembly
Courtesy of CHRYSLER LLC

NOTE: The rocker arm and shaft assembly can be installed either prior to or after (preferred) cylinder head installation.

1. Rotate camshaft gears clockwise to where the number one cylinder intake valves would just start to open. The camshaft lobes are now in a neutral position (no load to the valve). This will allow the rocker arm shaft assembly to be tightened into position with little or no valve spring load on it.

NOTE: A new fully assembled rocker arm and shaft assembly can be installed on either the right or left side of the engine. The identification marks (notches) (1) face toward the front of the engine for the left head and toward the rear of the engine for the right head.

2. Install the rocker arm and shaft assembly making sure that the identification marks (1) face toward the front of engine for left head and toward the rear of the engine for right head.
3. Tighten the rocker arm/shaft assembly bolts in the sequence shown in illustration to 31 N.m (275 in. lbs.).
4. Install the cylinder head covers. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

SEAL(S), CAMSHAFT

Removal

REMOVAL

1. Perform the fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .

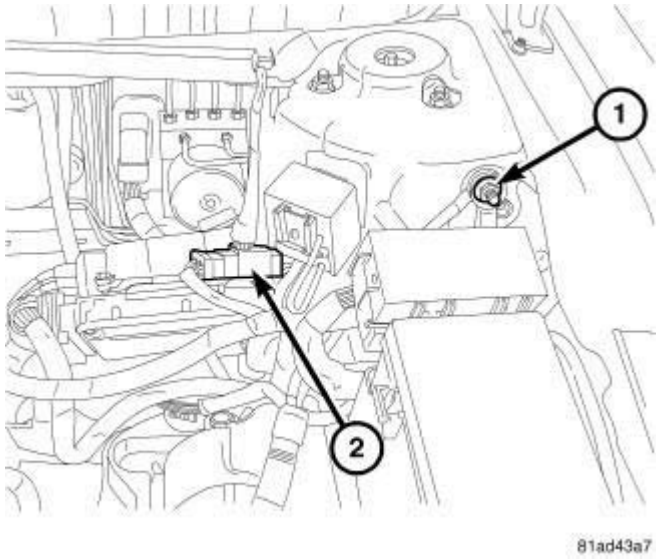

Fig. 218: BATTERY CABLE
Courtesy of CHRYSLER LLC

2. Disconnect the negative battery cable (1).
3. Drain cooling system. Refer to **Cooling - Standard Procedure** .
4. Remove the engine cover.

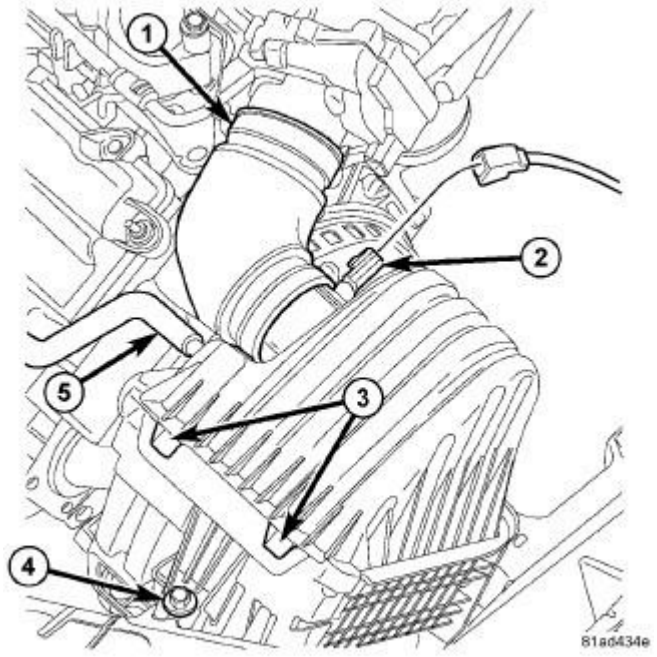

Fig. 219: HOUSING - AIR CLEANER

Courtesy of CHRYSLER LLC

5. Remove air cleaner element housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

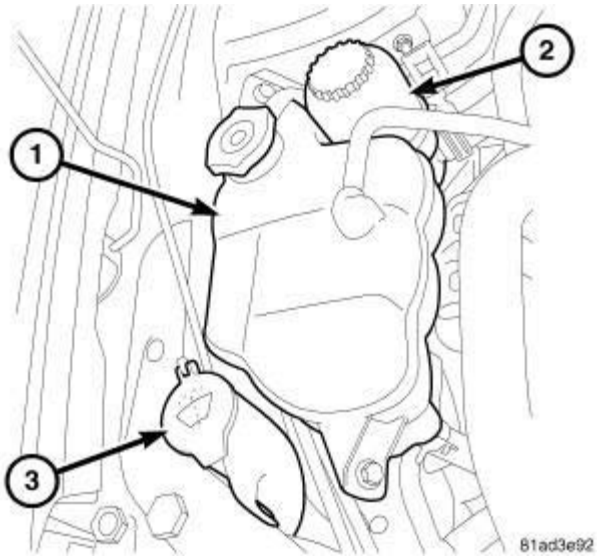

Fig. 220: COOLANT RESERVOIR
Courtesy of CHRYSLER LLC

6. Remove the coolant recovery container (1). Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .

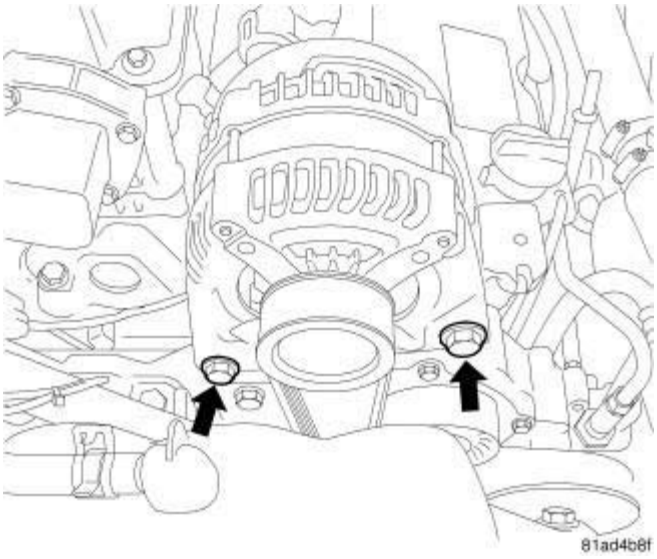

Fig. 221: Identifying Generator Bolts
Courtesy of CHRYSLER LLC

7. Remove the generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal** .

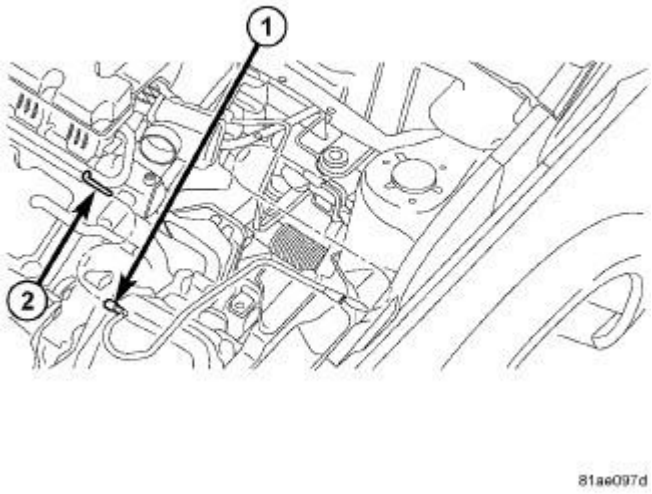

Fig. 222: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

8. Disconnect the fuel line (1) at the fuel rail (2).

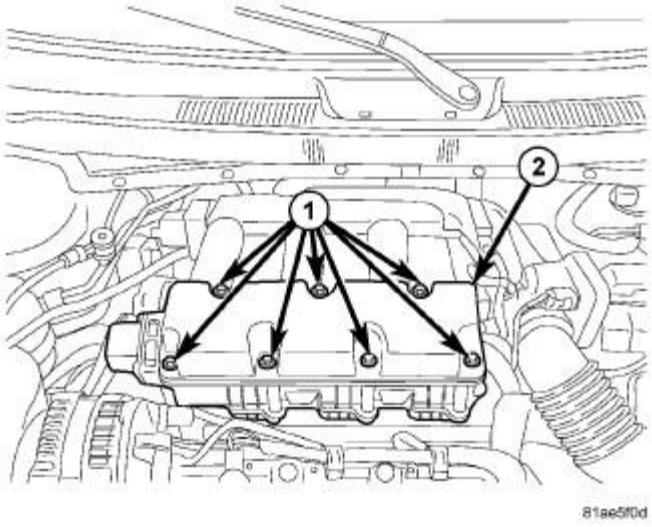

Fig. 223: Upper Intake Manifold
Courtesy of CHRYSLER LLC

9. Remove the upper intake manifold (2). See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

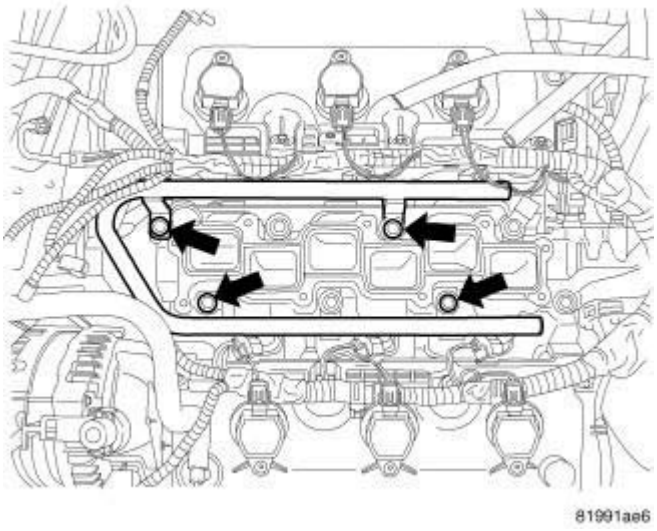

Fig. 224: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

10. Remove the fuel rail. Refer to **Fuel System/Fuel Delivery/RAIL, Fuel - Removal** .

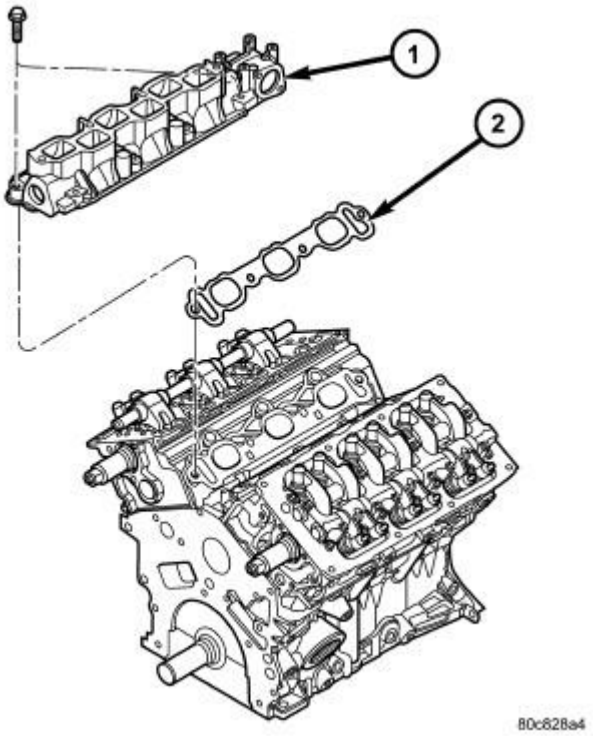

Fig. 225: Lower Intake Manifold
Courtesy of CHRYSLER LLC

11. Remove the lower intake manifold (1). See **Engine/Manifolds/MANIFOLD, Intake - Removal**.

12. Raise the vehicle.
13. Remove right exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
14. Remove right front tire.
15. Remove right inner splash shield.

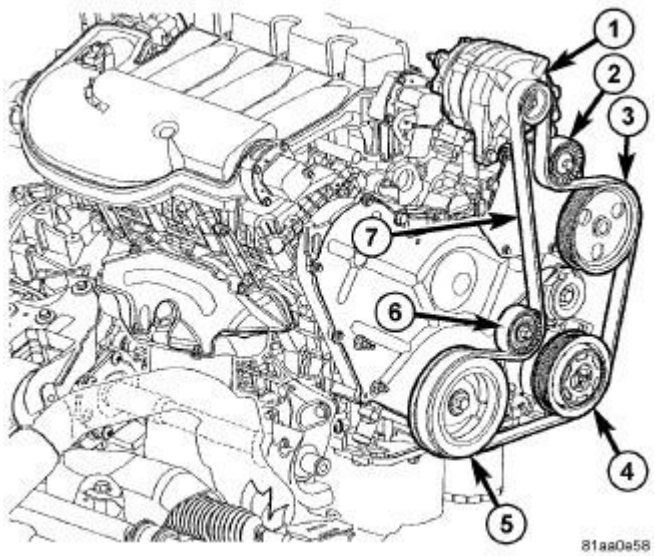

Fig. 226: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

16. Remove accessory drive belt (7).
17. Remove vibration damper (5). See **Engine/Engine Block/DAMPER, Vibration - Removal**.
18. Remove lower accessory drive belt idler pulley (6).

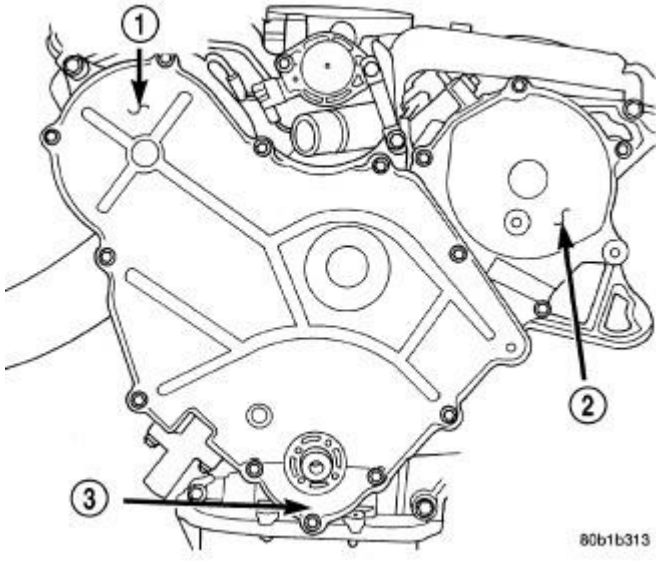

Fig. 227: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

19. Remove lower outer timing belt cover bolts.
20. Lower vehicle.

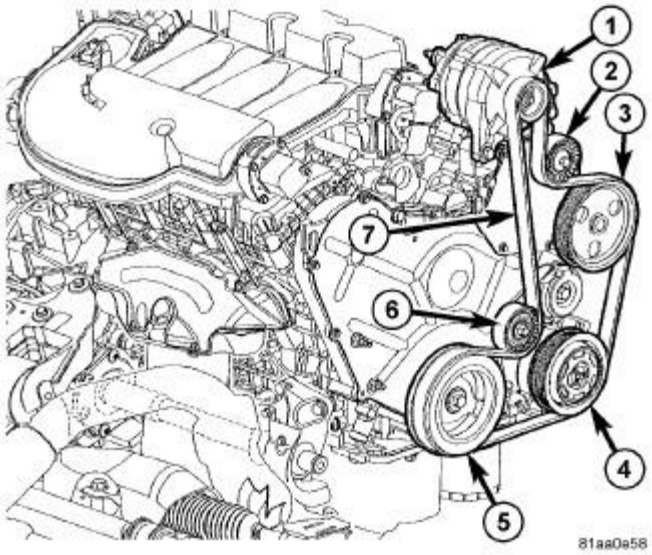

Fig. 228: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

21. Remove the upper accessory drive belt idler pulley (2).
22. Remove the belt tensioner.
23. Support the engine with a block of wood and a floor jack.
24. Remove the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.

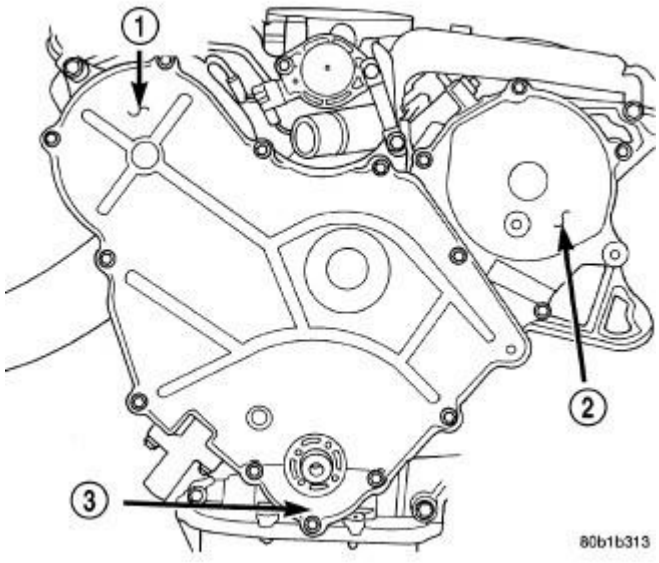

Fig. 229: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

25. Remove the power steering reservoir bolts and set reservoir aside.
26. Remove the remaining outer timing belt cover bolts and cover.
27. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
28. Remove the right valve cover to cylinder head ground strap.

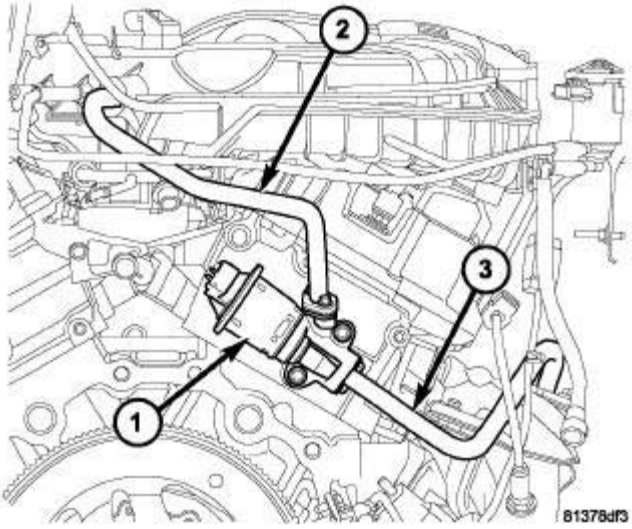

Fig. 230: Exhaust Gas Recirculation System
Courtesy of CHRYSLER LLC

29. Remove the EGR valve (1) and tube assembly (2).
30. Remove the right cylinder head cover.

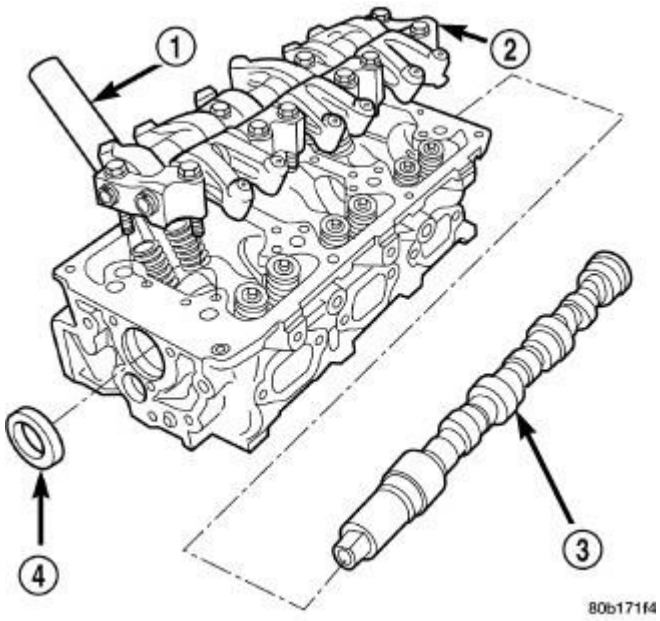

Fig. 231: Cylinder Head, Camshaft & Rocker Arms
Courtesy of CHRYSLER LLC

31. Remove the right rocker arm and shaft assembly (2). See **Engine/Cylinder Head/ROCKER ARM, Valve - Disassembly**.

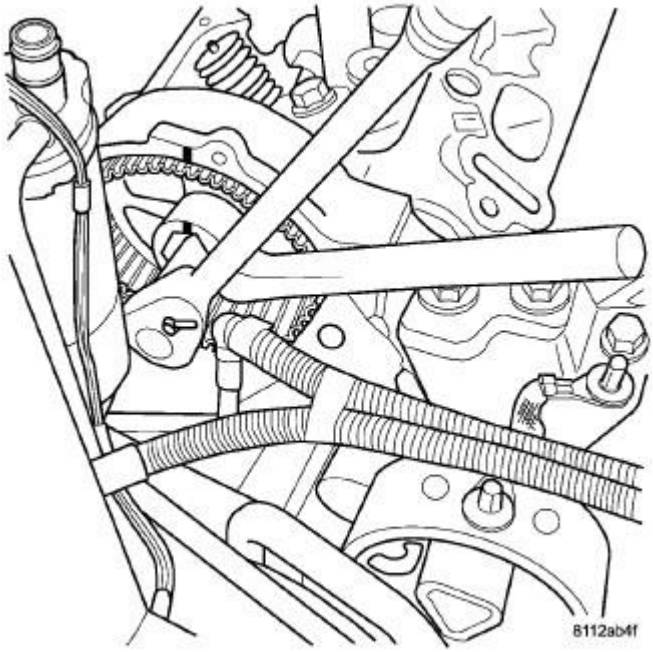

Fig. 232: Identifying Right Camshaft Sprocket
Courtesy of CHRYSLER LLC

32. Counterhold the cam gear and loosen the right cam gear retaining bolt.

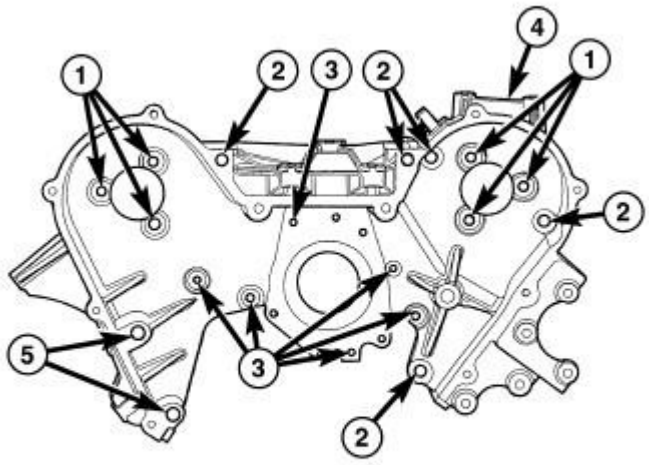

Fig. 233: REAR TIMING BELT COVER FASTENERS
Courtesy of CHRYSLER LLC

33. Remove the inner timing cover to right cylinder head retaining bolts.

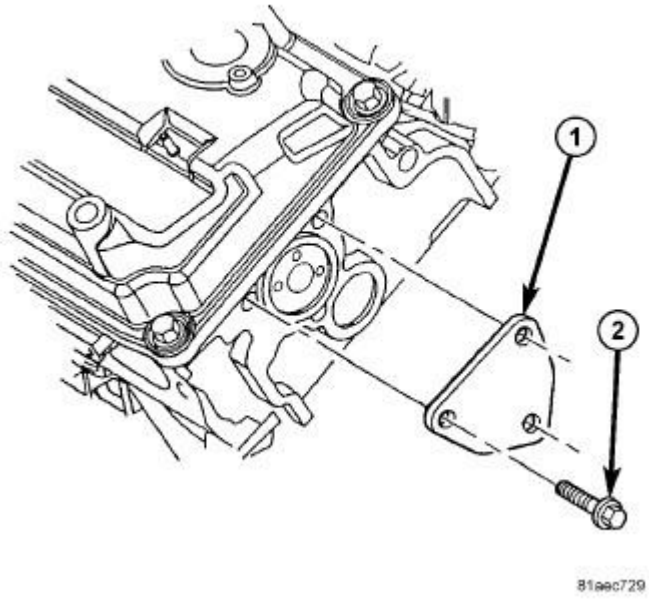

Fig. 234: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

34. Remove the right rear camshaft thrust plate (1).
35. Carefully push the camshaft out of the back of the cylinder head approximately 3.5 inches. Remove the camshaft sprocket and bolt.
36. **NOTE: It may be necessary to raise the engine slightly in order to remove the camshaft sprocket bolt.**

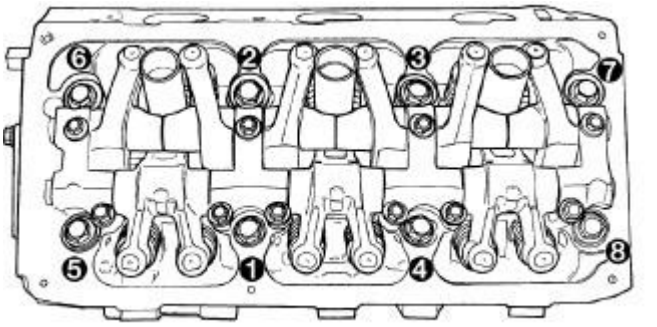

Fig. 235: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER LLC

37. Remove the cylinder head bolts in REVERSE of tightening sequence.

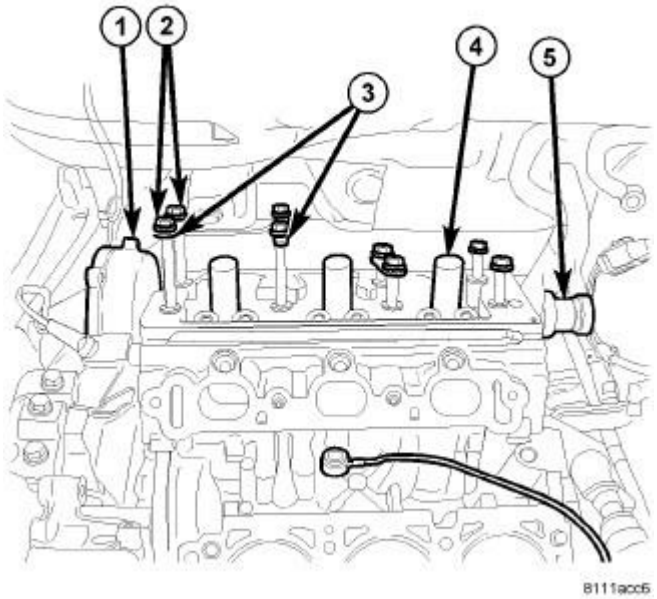

Fig. 236: RIGHT CYLINDER HEAD
Courtesy of CHRYSLER LLC

NOTE: Because of clearance restrictions when removing the right cylinder head, the front four cylinder head bolts must be loosened, raised and supported

with rubber bands before the cylinder head can be removed.

38. Remove the cylinder head.
39. Clean and inspect all mating surfaces.

Installation

INSTALLATION

RIGHT CYLINDER HEAD

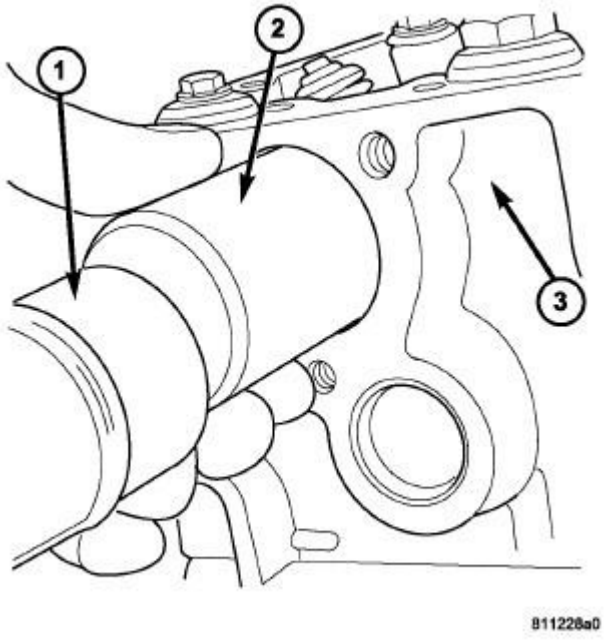

Fig. 237: CAMSHAFT SEAL
Courtesy of CHRYSLER LLC

1 - MALLET
2 - SPECIAL TOOL MD-998306
3 - CYLINDER HEAD

1. Position the camshaft seal into the cylinder head (3).
2. Using Camshaft installer MD-998306 (2) tap the seal into place using a mallet (1).

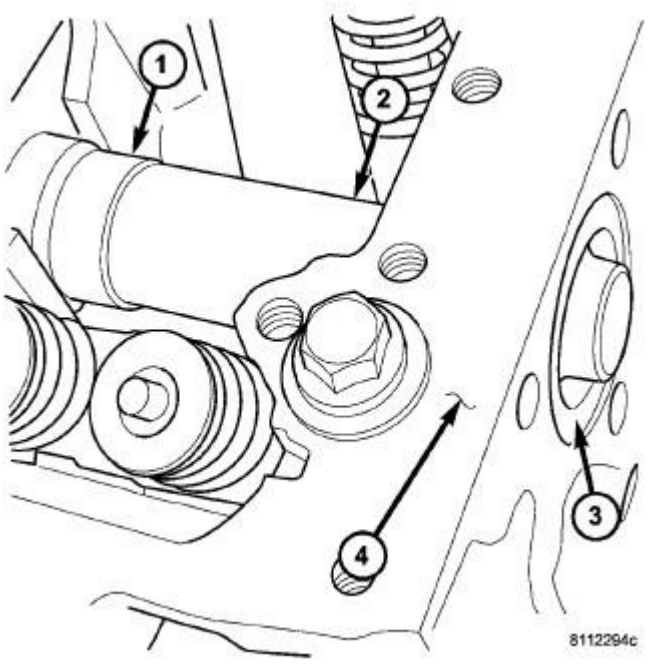

Fig. 238: CAMSHAFT INSTALLATION - LEFT
Courtesy of CHRYSLER LLC

1 - CAMSHAFT
2 - SPECIAL TOOL6788
3 - CAMSHAFT SEAL
4 - CYLINDER HEAD

3. Apply light coat of clean engine oil to the camshaft oil seal lip (3) and Seal Protector Sleeve 6788 (2).

NOTE: When installing the camshaft (1) into the cylinder head (4), you must first insert Seal Protector Sleeve 6788 (2) through the camshaft seal (3) until the camshaft seats, then remove Seal Protector Sleeve 6788 (2) from the camshaft.

4. Install the camshaft using Seal Protector Sleeve 6788.
5. Install the right cylinder head. See **Engine/Cylinder Head - Installation**.

LEFT CYLINDER HEAD

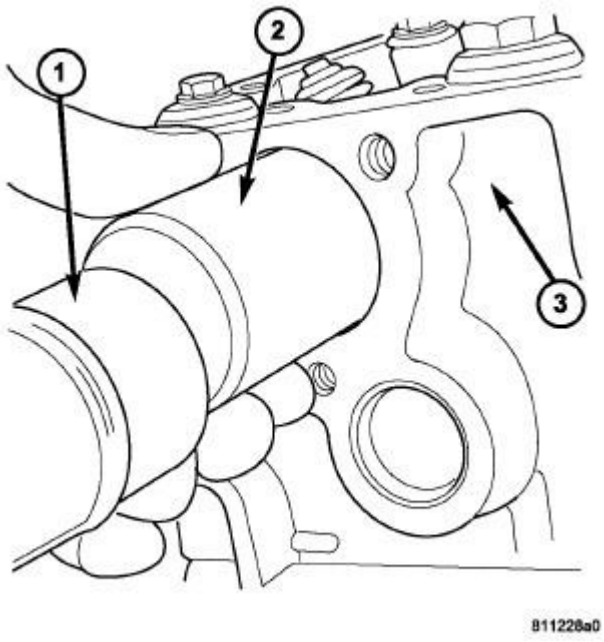

Fig. 239: CAMSHAFT SEAL
Courtesy of CHRYSLER LLC

1 - MALLET
2 - SPECIAL TOOL MD-998306
3 - CYLINDER HEAD

1. Position the camshaft seal into the cylinder head (3).
2. Using Camshaft installer MD-998306 (2) tap the seal into place using a mallet (1).

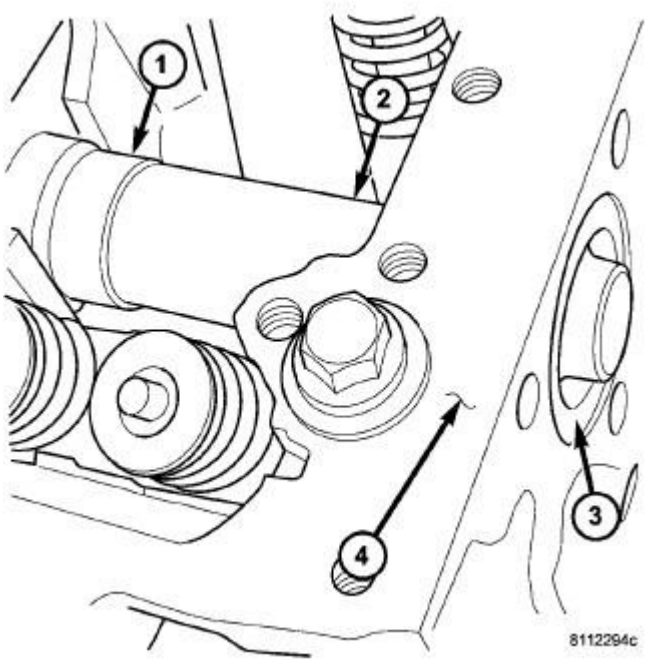

Fig. 240: CAMSHAFT INSTALLATION - LEFT
Courtesy of CHRYSLER LLC

1 - CAMSHAFT
2 - SPECIAL TOOL6788
3 - CAMSHAFT SEAL
4 - CYLINDER HEAD

3. Apply light coat of clean engine oil to the camshaft oil seal lip (3) and Seal Protector Sleeve 6788 (2).

NOTE: When installing the camshaft (1) into the cylinder head (4), you must first insert Seal Protector Sleeve 6788 (2) through the camshaft seal (3) until the camshaft seats, then remove Seal Protector Sleeve 6788 (2) from the camshaft.

4. Install the camshaft using Seal Protector Sleeve 6788.
5. Install the left cylinder head. See **Engine/Cylinder Head - Installation**.

SEAL(S), VALVE GUIDE

Removal

REMOVAL

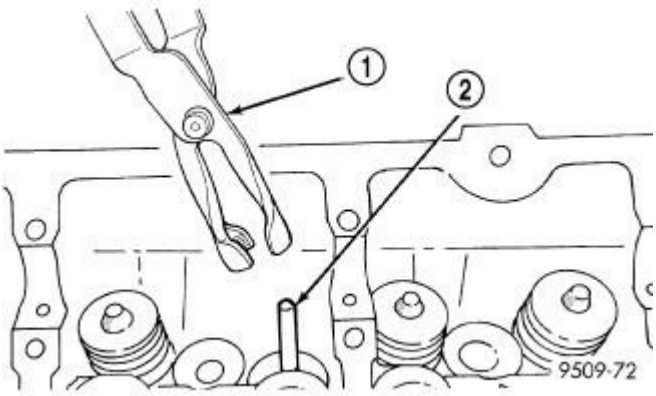

Fig. 241: Valve Stem Seal - Removal
Courtesy of CHRYSLER LLC

1 - VALVE SEAL TOOL 2 - VALVE STEM

1. Remove valve spring. See **Engine/Cylinder Head/SPRING(S), Valve - Removal**
2. Remove valve stem seals using a valve stem seal tool.

Installation

INSTALLATION

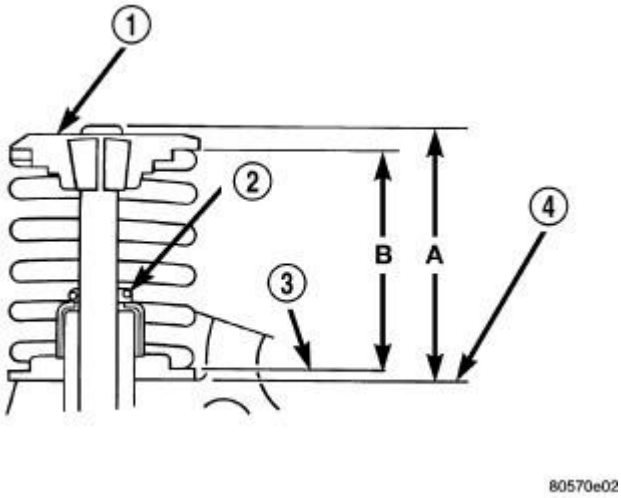

Fig. 242: Checking Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER 2 - GARTER SPRING 3 - VALVE SPRING SEAT TOP 4 - CYLINDER HEAD SURFACE

1. The valve stem seal/valve spring seat should be pushed firmly and squarely over the valve guide using the valve stem as guide. **Do Not Force** seal against top of guide. When installing the valve retainer locks, compress the spring **only enough** to install the locks.

CAUTION: Do not remove garter spring (2) around the seal at the top of the valve stem seal.

2. Install valve spring. See **Engine/Cylinder Head/SPRING(S), Valve - Installation**

SPRING(S), VALVE

Description

DESCRIPTION

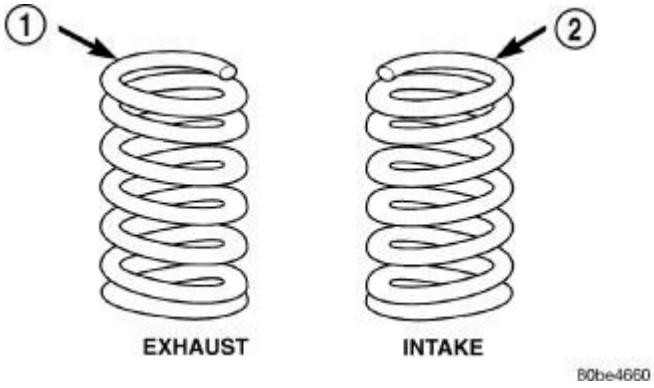

Fig. 243: Valve Spring Identification
Courtesy of CHRYSLER LLC

1 - YELLOW OR WHITE DYE 2 - ORANGE DYE

The valve springs are made from chrome silicon alloy wire and incorporate a "bee-hive" design. Valve spring retainers and locks are common from valve-to-valve. The valve spring seat is integral with the valve stem oil seal, which incorporates a garter spring to maintain consistent lubrication control to the valve stem.

The valve springs are unique for intake compared to exhaust. Both have different lengths and are wound in opposite directions. The valve springs are color coded, intake spring is right hand coil direction with grey dye on the top coils, and the exhaust spring is left hand coil direction with a blue dye on the top coils.

Operation

OPERATION

The valve spring returns the valve against its seat for a positive seal of the combustion chamber.

Removal

CYLINDER HEAD OFF

1. Compress valve spring with valve spring compressor C-3422-D and adapter 6526A. See **Engine - Special Tools**.
2. Remove valve retaining locks. Release valve spring compressor. Remove valve spring retainer and valve spring.
3. Remove valve stem seal assembly. See **Engine/Cylinder Head/SEAL(S), Valve Guide - Removal**

CYLINDER HEAD ON

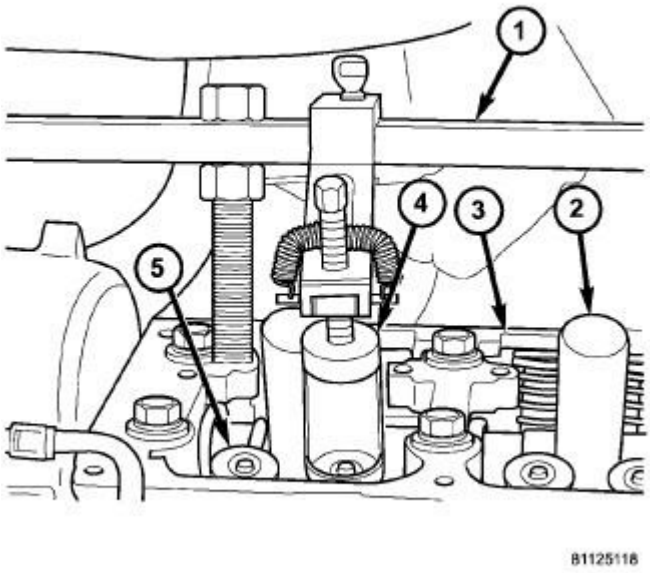

Fig. 244: VALVE SPRING REMOVAL
Courtesy of CHRYSLER LLC

1 - MD 998772A
2 - SPARK PLUG TUBES
3 - CYLINDER HEAD
4 - 6527 - ADAPTOR
5 - VALVE SPRING RETAINER

1. Disconnect negative battery cable.
2. Remove upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Remove cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
4. Remove rocker arm and shaft assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**.

5. Remove spark plugs.
6. Rotate the crankshaft clockwise, until the number 1 piston is at TDC (Top Dead Center) on the compression stroke.
7. With air hose attached to spark plug adapter installed in number 1 spark plug hole, apply 620.5 to 689 kPa (90 to 100 psi) air pressure. This is to hold valves into place while servicing components.

NOTE: It may be necessary to use accessory studs 6886, adapter arm 6887 and 6885 valve adaptor along with MD 998772A, to compress the valve spring on the right cylinder head exhaust valves.

8. Using Tool MD 998772A (1), with adapter 6527 (4) or equivalent, compress valve spring and remove valve locks (5). Release tension on valve spring, remove retainer (5) and valve spring. See **Engine - Special Tools**.
9. Remove valve stem seal, if required. See **Engine/Cylinder Head/SEAL(S), Valve Guide - Removal**
10. Follow the same procedure on the remaining 5 cylinders using the firing sequence 1-2-3-4-5-6. **Make sure piston is at TDC in each cylinder of the valve spring that is being removed.**
11. Remove spark plug adapter tool.

Inspection

INSPECTION

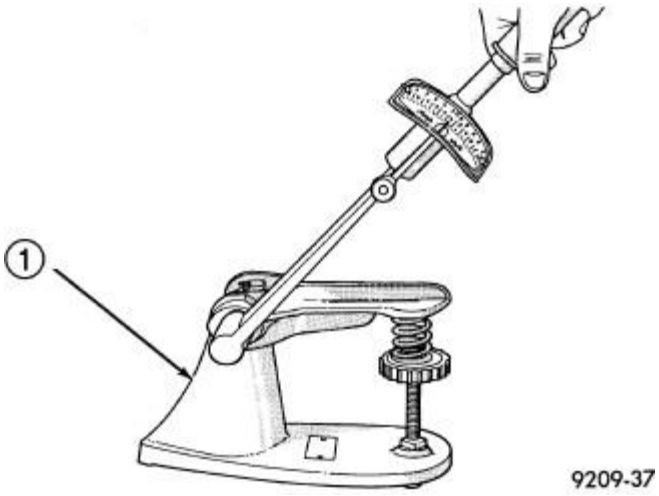

Fig. 245: Testing Valve Spring
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL C-647

When valves have been removed for inspection, reconditioning or replacement, valve springs should be tested. **As an example;** the compression length of the spring to be tested is 38.00 mm (1.496 in.). Turn table of Tool C-647 until surface is in line with the 38.00 mm (1.496 inches.) mark on the threaded stud and the zero mark on the front. Place spring over stud on the table and lift compressing lever to set tone device. Pull on torque wrench

until ping is heard. Take reading on torque wrench at this instant. Multiply this reading by two. This will give the spring load at test length. Fractional measurements are indicated on the table for finer adjustments. Refer to **Engine - Specifications** to obtain specified height and allowable tensions. Replace springs that do not meet specifications.

Installation

CYLINDER HEAD OFF

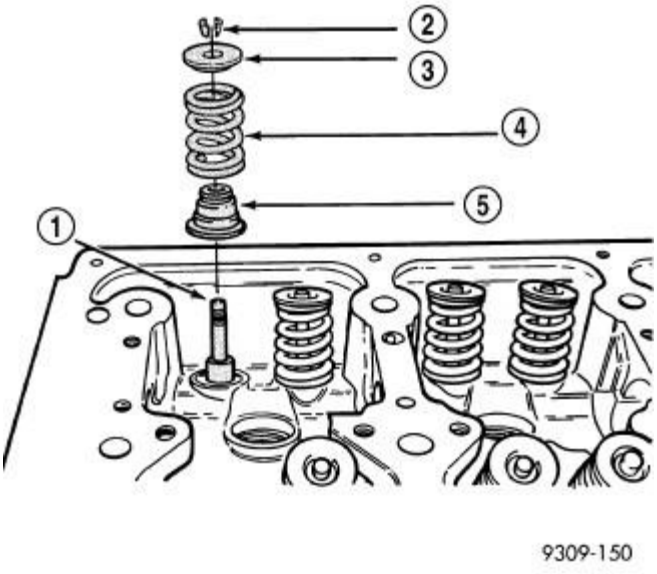

Fig. 246: Valve Seal & Spring-Installation
Courtesy of CHRYSLER LLC

1 - VALVE
2 - VALVE RETAINING LOCKS
3 - VALVE SPRING RETAINER
4 - VALVE SPRING
5 - VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY

1. Install valves if removed.
2. Install valve stem seal/spring seat assembly (5) over valve guides on all valve stems. Ensure that the garter spring is intact around the top of the rubber seal.
3. Place valve spring (color-coded end facing up) (4) and valve retainer into position.

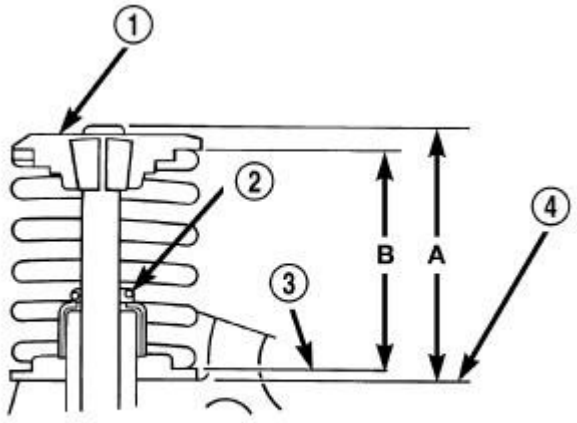

Fig. 247: Checking Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

4. Compress valve spring with valve spring compressor. Install locks and release tool. **If valve and/or seat are reground, measure the installed height of springs (B), make sure measurements are taken from top of spring seat to the bottom surface of spring retainer** . If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

CYLINDER HEAD ON

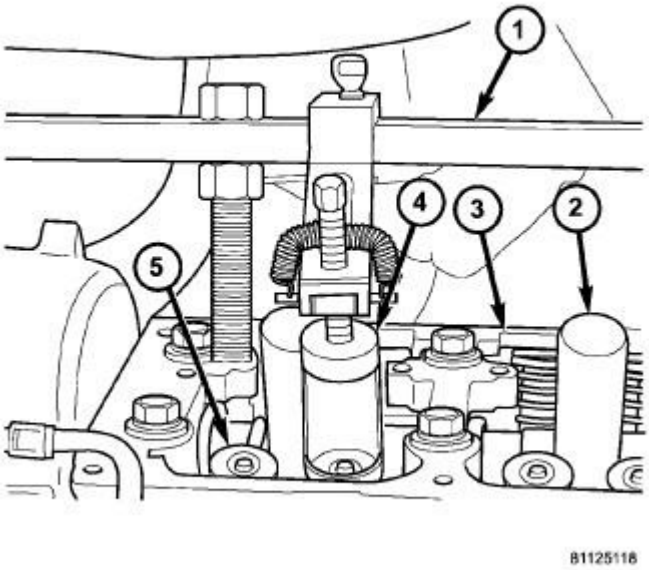

Fig. 248: VALVE SPRING SERVICING
Courtesy of CHRYSLER LLC

1 - MD 998772A
2 - SPARK PLUG TUBES
3 - CYLINDER HEAD
4 - 6527 - ADAPTOR
5 - VALVE SPRING RETAINER

1. Install new valve seal(s) if required. See **Engine/Cylinder Head/SEAL(S), Valve Guide - Installation**.
2. Place valve spring (color-coded end facing up) and valve retainer into position.

NOTE: It may be necessary to use accessory studs 6886, adaptor arm 6887 and 6885 valve adaptor along with MD 998772A, to compress the valve spring on the right cylinder head exhaust valves.

3. Compress valve spring using Special Tool MD 998772A (1) with Adaptor 6527 (4), only enough to install locks (5).
4. After installing locks, release tension on valve spring and verify proper installation.
5. Remove Special Tool MD 998772A (1) and spark plug adapter tool.
6. Install rocker arm and shaft assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**
7. Install cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.
8. Install spark plugs.

9. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
10. Connect negative battery cable.

TUBE, SPARK PLUG

Removal

REMOVAL

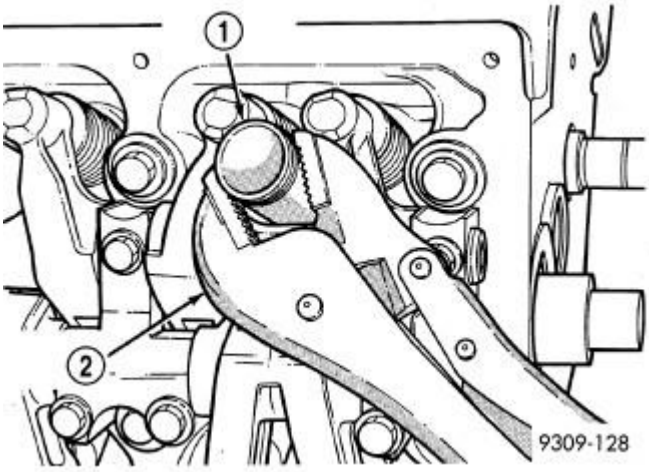

Fig. 249: Servicing Spark Plug Tubes
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE 2 - LOCKING PLIERS

1. Remove cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
2. Using suitable locking pliers, remove the tube (1) from the cylinder head and discard tube.
3. Clean area around spark plug with Mopar® Parts Cleaner or equivalent.

Installation

INSTALLATION

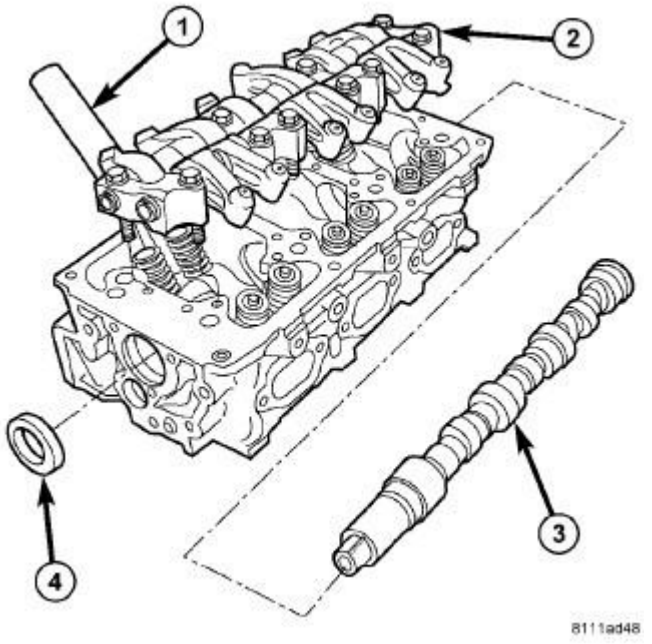

Fig. 250: CAMSHAFT, ROCKER ARM ASSEMBLY & CYLINDER HEAD
Courtesy of CHRYSLER LLC

1 - SPARK PLUG TUBE
2 - ROCKER ARM ASSEMBLY
3 - CAMSHAFT
4 - CAMSHAFT SEAL

1. Apply Mopar® Stud and Bearing Mount to a new tube (1) approximately 1 mm (0.039 in.) from the end of tube, in a 3 mm (0.118 in.) wide area.
2. Install sealer end of tube (1) into the cylinder head. Then carefully install the tube (1) using a hardwood block and mallet. Install the tube (1) until it is seated into the bottom of the bore.
3. For spark plug tube (1) seal replacement. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.
4. Install cylinder head cover(s). See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**.

VALVES, INTAKE AND EXHAUST

Description

DESCRIPTION

Valves are made of highly heat-resistant steel and are chrome plated to prevent stem scuffing. The intake valve is a one-piece forging, while the exhaust valve has a forged head with a welded stem for lock groove durability. The four valves (two intake and two exhaust) employ a three-groove lock design to help facilitate valve rotation.

Operation

OPERATION

The intake valve allows the air/fuel mixture to enter the combustion chamber. The exhaust valve allows the burned air/fuel mixture to exit the combustion chamber. Also, the intake and exhaust valves seal the combustion chamber during the compression and power strokes.

Standard Procedure

VALVE AND VALVE SEAT REFACING

Refer to **Engine - Specifications** for the valve face and valve seat angles.

VALVES

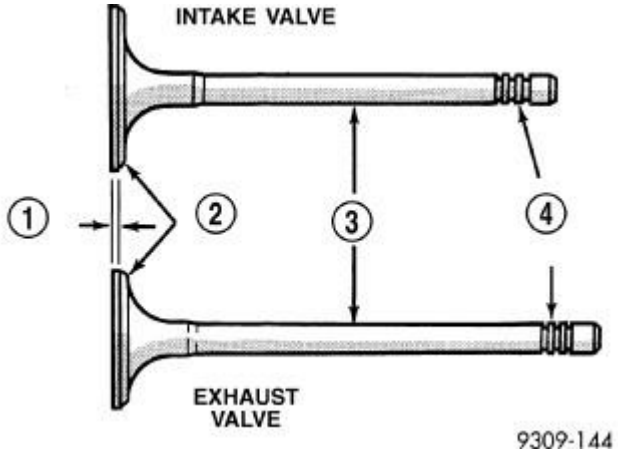

Fig. 251: Intake & Exhaust Valves
Courtesy of CHRYSLER LLC

1 - MARGIN
2 - FACE
3 - STEM
4 - VALVE SPRING RETAINER LOCK GROOVES

1. Inspect the remaining margin after the valves are refaced. See **Engine - Specifications**.

VALVE SEATS

1. When refacing valve seats, it is important that the correct size valve guide pilot be used for re-seating stones. A true and complete surface must be obtained.
2. Measure the concentricity of valve seat using dial indicator. Total runout should not exceed 0.051 mm (0.002 inch.) total indicator reading.

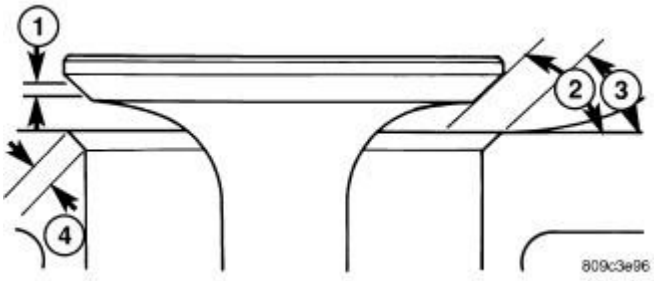

Fig. 252: Valve Face & Seat
Courtesy of CHRYSLER LLC

1 - SEAT WIDTH 2 - FACE ANGLE 3 - SEAT ANGLE 4 - SEAT CONTACT AREA

3. Inspect the valve seat with Prussian blue to determine where the valve contacts the seat. To do this, coat valve seat **LIGHTLY** with Prussian blue then set valve in place. Rotate the valve with light pressure. If the blue is transferred to the center of valve face, contact is satisfactory. If the blue is transferred to top edge of valve face, then lower valve seat with a 15 degree stone. If the blue is transferred to the bottom edge of valve face, then raise valve seat with a 65 degree stone.

NOTE: Valve seats which are worn or burned can be reworked, provided that correct angle and seat width are maintained. Otherwise, the cylinder head must be replaced.

4. When seat is properly positioned, the width of the intake seats should be 0.75 to 1.25 mm (0.0296 to 0.0493 in.) and exhaust seats should be 1.25 to 1.75 mm (0.049 to 0.069 in.).

VALVE AND SPRING INSTALLED HEIGHT

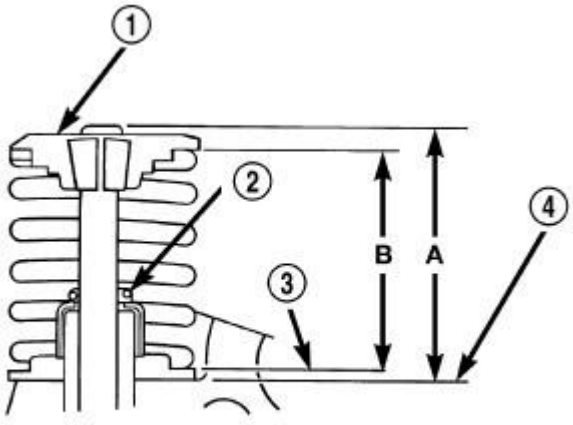

Fig. 253: Checking Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

1. Coat valve stems with clean engine oil and insert the valves into the cylinder head.
2. If valves or seats have been refaced, check valve tip height (A). If valve tip height is greater than 43.65 mm (1.7185 in.) intake or 45.98 mm (1.8102 in.) exhaust, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.

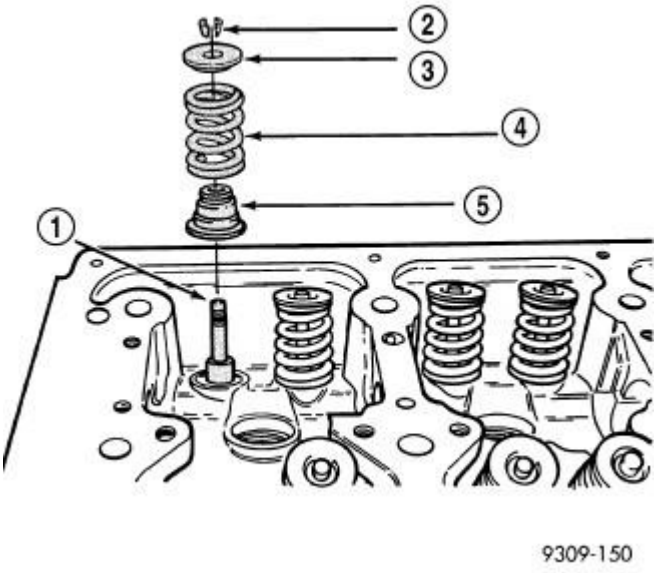

Fig. 254: Valve Seal & Spring-Installation
Courtesy of CHRYSLER LLC

1 - VALVE
2 - VALVE RETAINING LOCKS
3 - VALVE SPRING RETAINER
4 - VALVE SPRING
5 - VALVE SEAL AND VALVE SPRING SEAT ASSEMBLY

3. Install valve seal/spring seat assembly over valve guides on all valve stems. Ensure that the garter spring is intact around the top of the valve seal.
4. Place valve spring (color-coded end facing up) and valve retainer into position on spring seat.
5. Compress valve springs with valve spring compressor C-3422-D and adapter 6526A. See **Engine - Special Tools**, install locks and release tool.

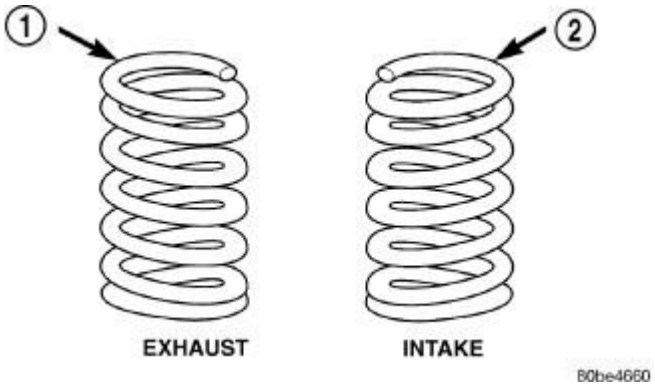

Fig. 255: Valve Spring Identification
Courtesy of CHRYSLER LLC

1 - YELLOW OR WHITE DYE 2 - ORANGE DYE

6. If valves and/or seats are refaced, measure the installed height of springs. Measurements are taken from top of spring seat to the bottom surface of spring retainer. If height is greater than 38.75 mm (1.5256 in.), install a 0.762 mm (0.030 in.) spacer in head counterbore under the valve spring seat to bring spring height back within specification.

Removal

REMOVAL

1. Remove cylinder head(s). See **Engine/Cylinder Head - Removal**.
2. Remove rocker arm assembly. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**.
3. Remove valve spring(s). See **Engine/Cylinder Head/SPRING(S), Valve - Removal**.
4. Before removing valve, **remove any burrs from valve stem lock grooves to prevent damage to the valve guides.** Identify valves to insure installation in original location.
5. Remove valve(s) from cylinder head.

Cleaning

CLEANING

1. Clean all valves thoroughly and discard burned, warped and cracked valves.

Inspection

VALVES

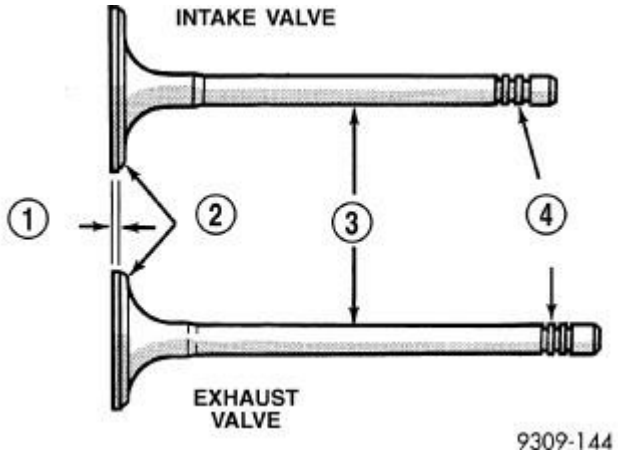

Fig. 256: Intake & Exhaust Valves
Courtesy of CHRYSLER LLC

1 - MARGIN 2 - FACE 3 - STEM 4 - VALVE SPRING RETAINER LOCK GROOVES

1. Measure valve stems for wear approximately 60 mm (2.36 in.) below the valve lock grooves.
2. Compare measurement to specifications. See **Engine - Specifications**.

NOTE: Valve stems are chrome plated and should not be polished.

VALVE GUIDES

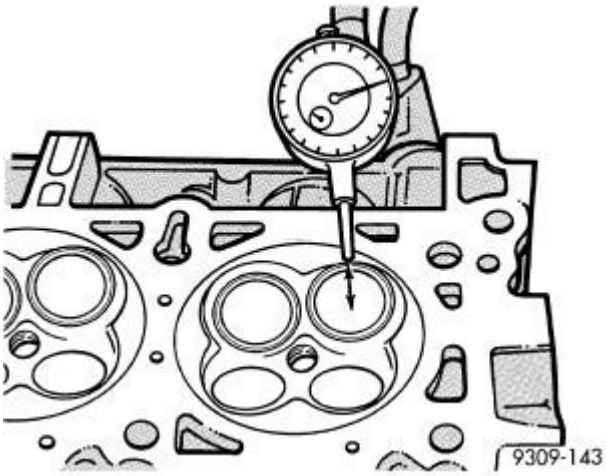

Fig. 257: Measuring Valve Guide Wear
Courtesy of CHRYSLER LLC

1. Measure valve stem-to-guide clearance as follows:

2. Install valve into cylinder head so it is 15 mm (0.590 inch.) off the valve seat. A small piece of hose may be used to hold valve in place.
3. Attach dial indicator Tool C-3339A to cylinder head and set it at right angle of valve stem being measured.
4. Move valve to and from the indicator.
5. Note dial indicator reading and compare to engine specifications. See **Engine - Specifications**

NOTE: Replace cylinder head if stem-to-guide clearance exceeds specifications, or if guide is loose in cylinder head.

Installation

INSTALLATION

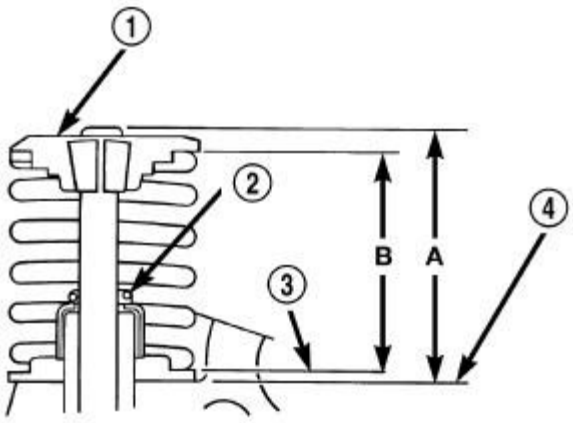

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Fig. 258: Checking Valve Tip Height & Valve Spring Installed Height
Courtesy of CHRYSLER LLC

1 - SPRING RETAINER
2 - GARTER SPRING
3 - VALVE SPRING SEAT TOP
4 - CYLINDER HEAD SURFACE

1. Coat valve stems with clean engine oil and insert the valves into the cylinder head.
2. If valves or seats have been reground, check valve tip height (A). If valve tip height is greater than 43.65 mm (1.7185 in.) intake or 45.98 mm (1.8102 in.) exhaust, grind valve tip until within specifications. Make sure measurement is taken from cylinder head surface to the top of valve stem.
3. Install new valve stem seals.
4. Install valve springs. See **Engine/Cylinder Head/SPRING(S), Valve - Installation**.
5. Install cylinder head(s). See **Engine/Cylinder Head - Installation**.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

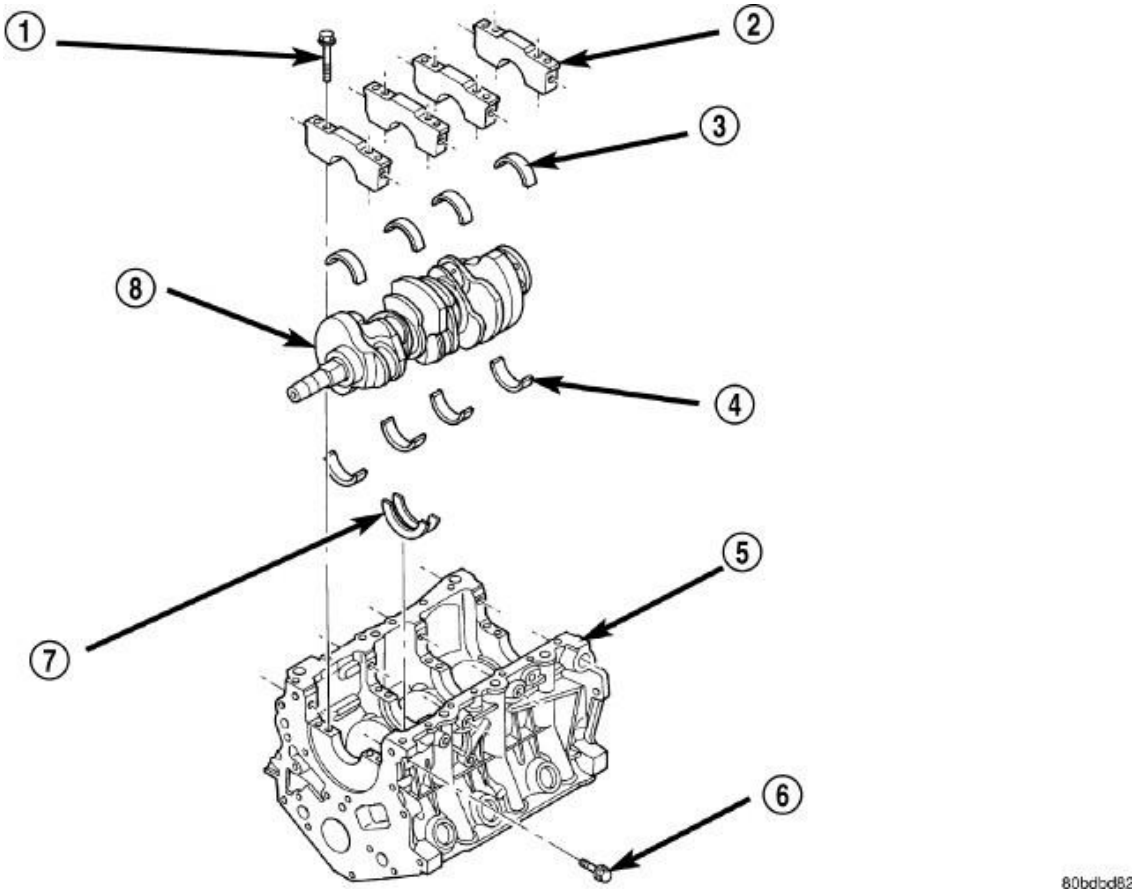

Fig. 259: Cylinder Block & Crankshaft
Courtesy of CHRYSLER LLC

1 - MAIN CAP BOLT - VERTICAL	5 - CYLINDER BLOCK
2 - MAIN CAP	6 - MAIN CAP BOLT - HORIZONTAL
3 - MAIN BEARING - LOWER	7 - CRANKSHAFT THRUST WASHER
4 - MAIN BEARING - UPPER	8 - CRANKSHAFT

The cylinder block (5) is made of heat treated aluminum with cast-in-place iron liners. The block is a closed deck design with the right bank forward. To provide high rigidity and improved noise, vibration and harshness (NVH), the block has cast-in contours and ribs, along with powdered metal 6 bolt main caps (4 vertical, 2 horizontal), with a die cast aluminum structural beam windage tray mounted to the main caps.

CLEANING

CLEANING

Clean cylinder block thoroughly using a suitable cleaning solvent.

INSPECTION

INSPECTION

ENGINE BLOCK

1. Clean cylinder block thoroughly and check all core hole plugs for evidence of leaking.
2. If new core plugs are to be installed. See **Engine - Standard Procedure**.
3. Examine block and cylinder bores for cracks or fractures.
4. Check block deck surfaces for flatness. Deck surface must be within service limit of 0.1 mm (0.004 in.).

CYLINDER BORE

NOTE: The cylinder bores should be measured at normal room temperature, 21°C (70° F).

The cylinder walls should be checked for out-of-round and taper with Tool C119 or equivalent. See **Engine - Specifications**. If the cylinder walls are badly scuffed or scored, the cylinder block should be replaced, and new pistons and rings fitted.

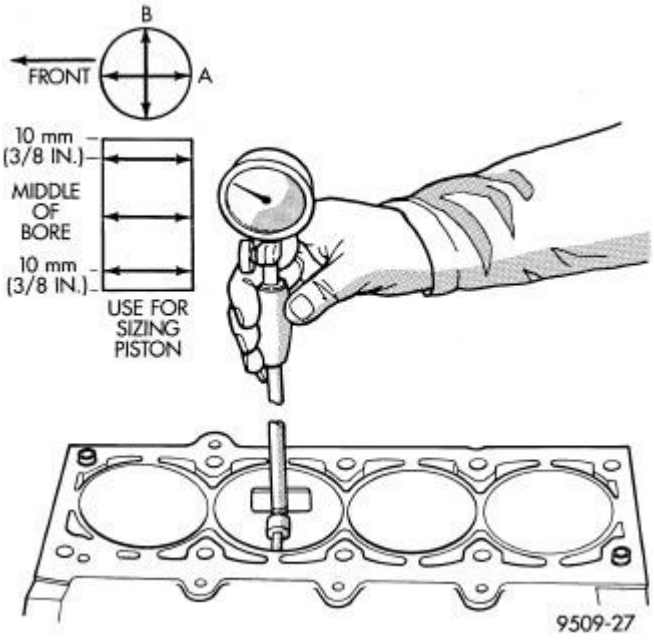

Fig. 260: Cylinder Bore Measurement
Courtesy of CHRYSLER LLC

Measure the cylinder bore at three levels in directions A and B. Top measurement should be 10 mm (3/8 in.) down and bottom measurement should be 10 mm (3/8 in.) up from bottom of bore. See **Engine - Specifications**.

BEARING(S), CONNECTING ROD

Standard Procedure

CONNECTING RODS AND BEARINGS

CONNECTING ROD BEARINGS

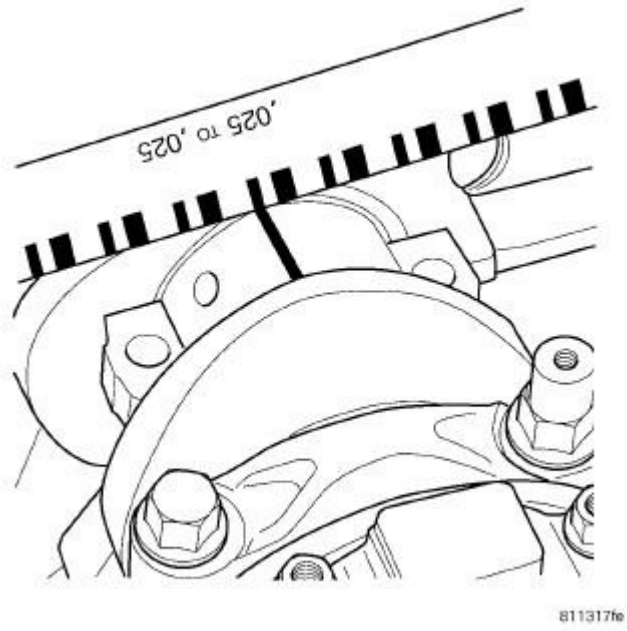

Fig. 261: CONNECTING ROD BEARING CLEARANCE
Courtesy of CHRYSLER LLC

The bearing caps are not interchangeable and should be marked at removal to insure correct assembly.

The bearing shells must be installed with the tangs inserted into the machined grooves in the rods and caps. Install cap with the tangs on the same side as the rod.

Fit all rods on one bank until complete.

Limits of taper or out-of-round on any crankshaft journals should be held to specification limits. Bearings are available in 0.007 mm oversize (0.0003 in oversize), standard, 0.007 mm (0.0003 in) undersize 0.025 mm (0.001 in) undersize, and 0.254 mm (0.010 in undersize. **Install the bearings in pairs. Do not use a new bearing half with an old bearing half. Do not file the rods or bearing caps.**

1. For measuring main bearing clearance and connecting rod bearing clearance use plastigage. For more

information on using plastigage, see **Engine - Standard Procedure**. Refer to **Engine - Specifications** for bearing clearance specifications.

SELECT FIT ROD BEARINGS

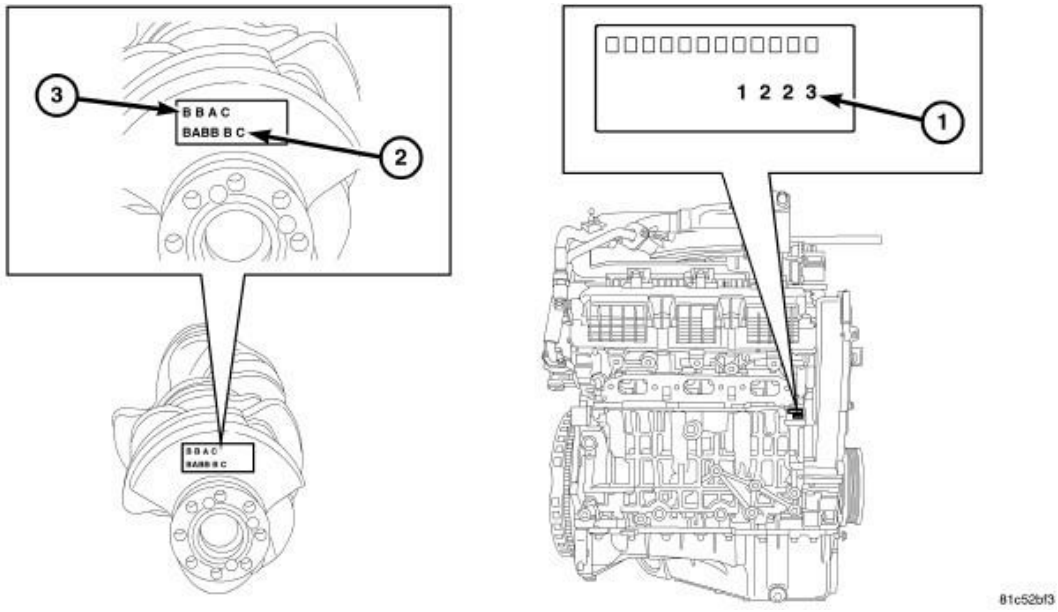

Fig. 262: Crankshaft Engine Block Codes
Courtesy of CHRYSLER LLC

1 - Engine Block Main Bearing Codes 2 - Rod Bearing Codes
3 - Crank Main Bearing Code

1. Connecting rod bearings use select fit to achieve improved clearance control. On a new engine, the crankshaft journal is gaged to use a specific bearing size. The grade is indicated on the #9 counterweight (2) of the crankshaft and listed from left to right with the recommended size.

SELECT FIT ROD BEARING GRADES

GRADE	ROD BEARING CLASS	DESCRIPTION
A	1	0.007 mm (0.0003 in) undersize (+0.0035 mm shell thickness)
B	2	Standard
C	3	0.007 mm (0.0003 in) Oversize (-0.0035 mm Shell Thickness)

How to Determine Rod Bearing Class

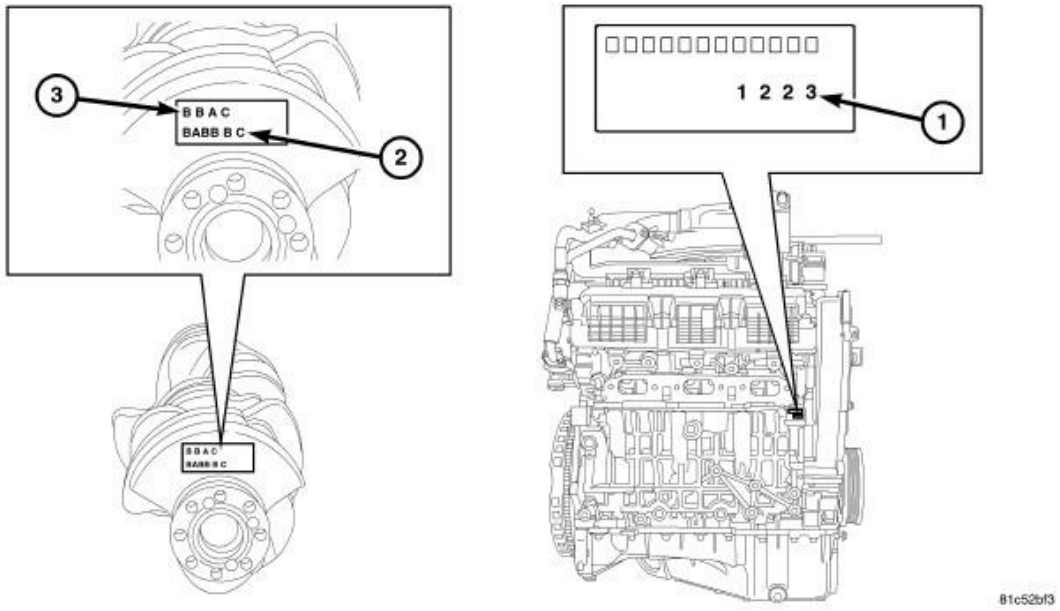

Fig. 263: Crankshaft Engine Block Codes
Courtesy of CHRYSLER LLC

1 - Engine Block Main Bearing Codes
2 - Rod Bearing Codes
3 - Crank Main Bearing Code

This example shows how to determine the bearing class needed for each rod bearing, assuming that a new crankshaft is being installed in a new or existing engine block. If the code 'B' 'A' 'B' 'B' 'B' 'C' is stamped on the #9 counterweight of the crankshaft (3), then rod #1 would require Class 2 bearings, rod #2 would require Class 1 bearings, rod #3 would require Class 2 bearings, rod #4 would require Class 2 bearings, rod #5 would require Class 2 bearings, and rod #6 would require Class 3 bearings.

EXAMPLE

ROD BEARING SELECTION DATA						
Crankshaft #9 Counterweight Rod Bearing Grade Codes	B	A	B	B	B	C
Required rod bearing class	**2**	**1**	**2**	**2**	**2**	**3**

CONNECTING ROD BOLTS

NOTE: The rod bearing bolts should be examined before reuse. If the threads are necked down the bolts must be replaced.

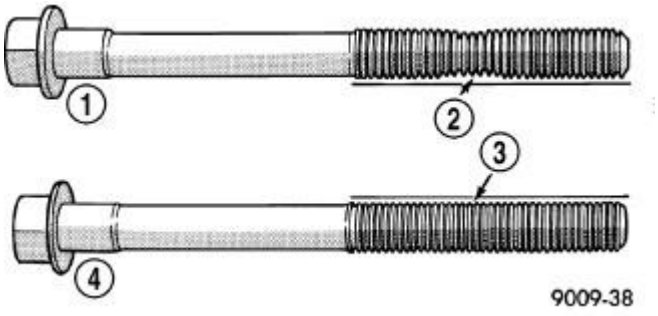

Fig. 264: Check for Stretched Bolts
Courtesy of CHRYSLER LLC

1 - STRETCHED BOLT
2 - THREADS ARE NOT STRAIGHT ON LINE
3 - THREADS ARE STRAIGHT ON LINE
4 - UNSTRETCHED BOLT

1. Examine connecting rod bolts for stretching. Stretching can be checked by holding a scale or straight edge against the threads. If all the threads do not contact the scale the bolt must be replaced.
2. Before installing the bolts the threads should be cleaned and inspected.
3. Install clean bolts finger tight. Then alternately torque each bolt to assemble the cap properly.
4. Tighten the connecting rod cap bolts to specification. See **Engine - Specifications**

CONNECTING ROD SIDE CLEARANCE

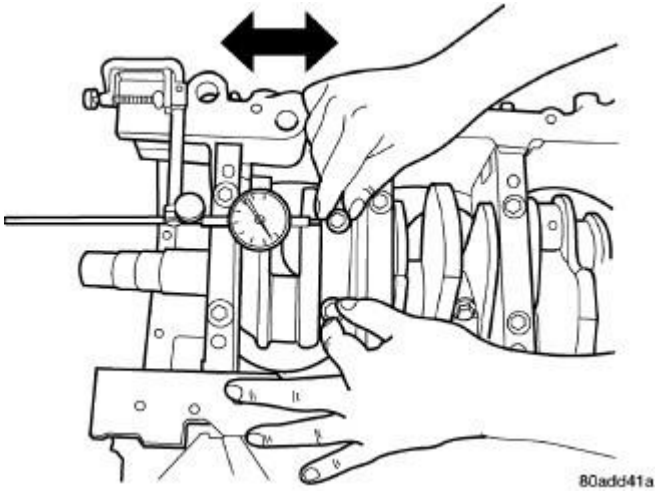

Fig. 265: Connecting Rod Side Clearance Measuring
Courtesy of CHRYSLER LLC

1. Mount a dial indicator to a stationary point on engine. Locate probe perpendicular to and resting against the connecting rod cap being checked. Move connecting rod all the way to rear of its travel (toward flywheel end of crank). Zero the dial indicator. Move connecting rod forward of to limit of travel (toward pulley end of crank) and read the dial indicator. Compare measurement to specification listed in engine

specifications. See **Engine - Specifications**. Repeat procedure for each connecting rod. Turn crankshaft for connecting rod accessibility.

BEARING(S), CRANKSHAFT, MAIN

Standard Procedure

CRANKSHAFT MAIN BEARING FITTING

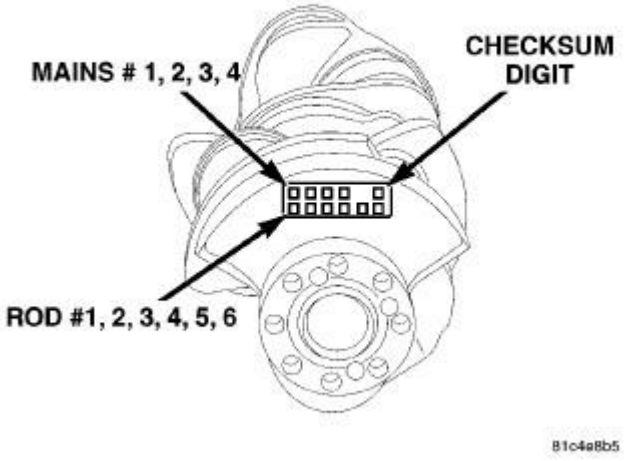

Fig. 266: Crankshaft Main Journal Grade Marking Location-Rear Of Block
Courtesy of CHRYSLER LLC

The main bearings use a "select fit" system to achieve proper oil clearances between the bearings and the crankshaft. When main bearings are being selected for a new crankshaft, the block and crankshaft grade identification marks must be used to identify the correct main bearings to use.

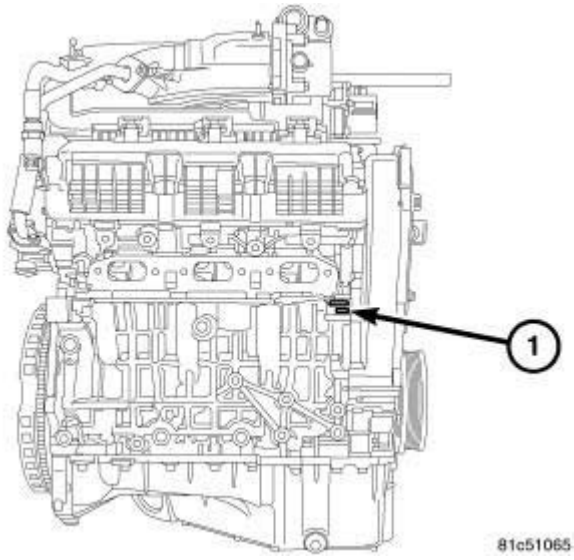

Fig. 267: Cylinder Block Main Bearing Bore Grade Codes
Courtesy of CHRYSLER LLC

1 - cylinder block main bearing bore grade codes

The cylinder block main bearing bore grade codes (1) are located on the left side front of the engine block, just below the cylinder head mounting surface. These grade marks (1, 2, 3, or 4) are read left to right, corresponding to main bearing bore 1, 2, 3, or 4.

The grade marks for the crankshaft are located on the rearmost crankshaft counter weight. The crankshaft journal grade marks (A, B, or C) are read left to right, corresponding with journal number 1, 2, 3, 4. For an example, if the main bore grade on the side of the engine block is 3 and the journal grade on the #9 counterweight of the crankshaft is B, the proper select fit bearing would be a (2) +0.003 mm (+0.0001 in.).

Refer to the **EXAMPLE CRANKSHAFT MAIN BEARING SELECTION DATA** table for a more detailed example of how to properly select the main bearings.

NOTE: Service main bearings have a number from (1-5) marked in ink on the bearing surface. For verification, refer to the MAIN BEARING SELECTION CHART table for number to size identification.

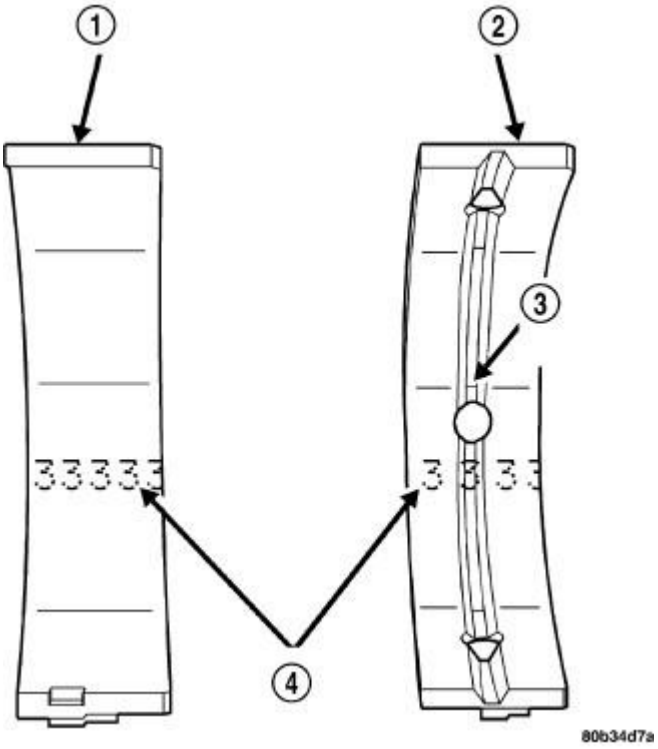

Fig. 268: Main Bearing Grade Marks
Courtesy of CHRYSLER LLC

1 - LOWER MAIN BEARING
2 - UPPER MAIN BEARING
3 - OIL FEED HOLE AND GROOVE
4 - GRADE SELECTION INK MARKS

The upper main bearing (2) has an oil feed hole and a center groove to allow lubrication of the main journal and must be properly positioned in the block.

MAIN BEARING SELECTION CHART

-	Crankshaft Journal Grade Mark	Main Bearing Bore Grade Marks		
		1	2	3
Crankshaft Main Journal Grade Marks	A	(3) Standard	(2) +.003 mm (+0.0001 in.)	(1) +0.006 mm (+0.0002 in.)
	B	(4) -0.003 mm (-0.0001 in.)	(3) Standard	(2) +.003 mm (+0.0001 in.)
	C	(5) -0.006 mm (-0.0002 in.)	(4) -0.003 mm (-0.0001 in.)	(3) Standard

How to Determine Crankshaft Main Bearing Class

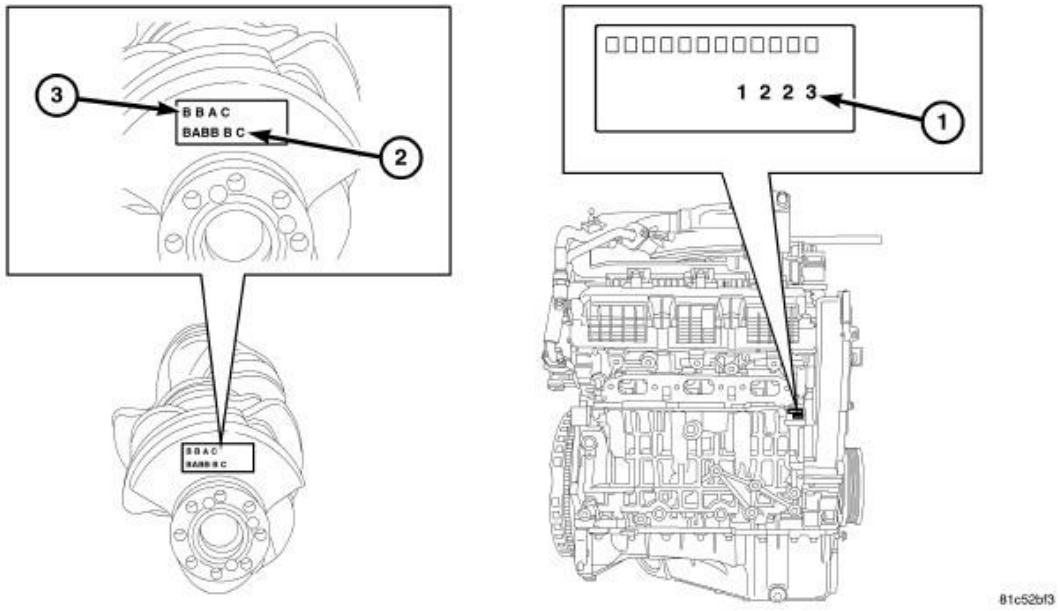

Fig. 269: Crankshaft Engine Block Codes
Courtesy of CHRYSLER LLC

1 - Engine Block Main Bearing Codes 2 - Rod Bearing Codes
3 - Crank Main Bearing Code

This example shows how to determine the bearing class needed for each crankshaft main journal, assuming that a new crankshaft is being installed in a new or existing engine block. If the code 'B' 'B' 'A' 'C' is stamped on the #9 counterweight of the crankshaft (3), and the code '1' '2' '2' '3' is stamped on the side of the engine block (1), then main #1 would require Class 4 bearings, main #2 would require Class 3 bearings, main #3 would require Class 2 bearings, and main #4 would require Class 3 bearings.

EXAMPLE CRANKSHAFT MAIN BEARING SELECTION DATA

Crankshaft Main Journal Grade Codes	**B**	**B**	**A**	**C**
Cylinder Block Main Journal Grade Codes	1	2	2	3
Required bearing class	**4**	**3**	**2**	**3**

Removal

REMOVAL

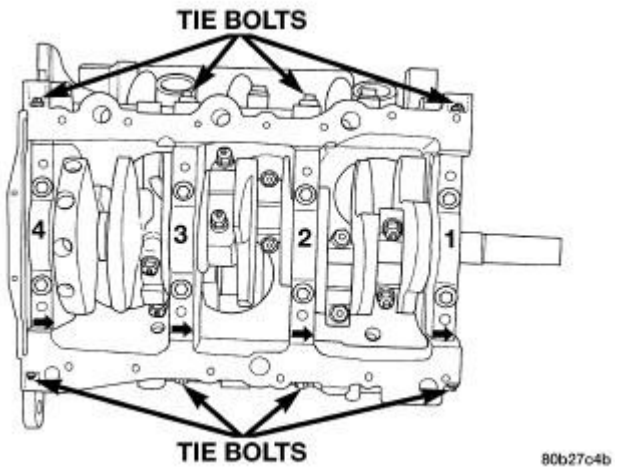

Fig. 270: Main Bearing Cap Identification
Courtesy of CHRYSLER LLC

Bearing caps are not interchangeable and are marked to insure correct assembly. Upper and lower bearing halves are NOT interchangeable.

1. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**
2. Remove oil pick-up tube and windage tray.
3. Identify bearing caps before removal.

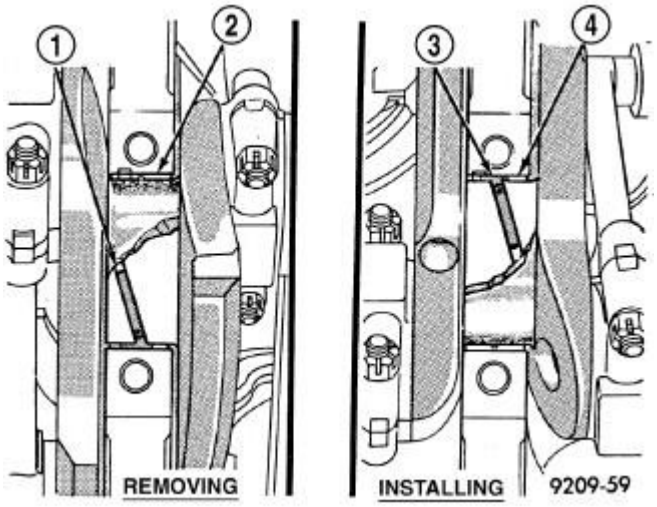

Fig. 271: Removing & Installing Upper Main Bearing With Special Tool C-3059C
Courtesy of CHRYSLER LLC

4. Remove bearing caps one at a time. Remove upper half of bearing (2 and 4) by inserting Special Main Bearing Tool C-3059A (1 and 3) into the oil hole of crankshaft.
5. Slowly rotate crankshaft clockwise, forcing out upper half of bearing shell.

Installation

INSTALLATION

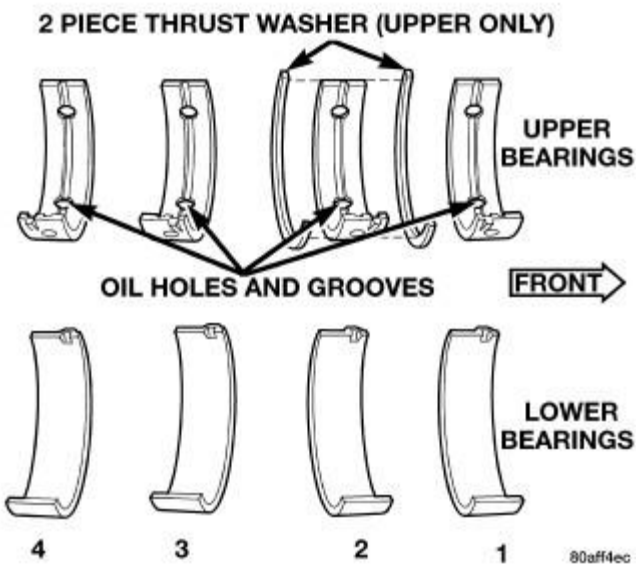

Fig. 272: Main Bearing Identification
Courtesy of CHRYSLER LLC

Bearing caps are not interchangeable and are marked to insure correct assembly. Upper and lower bearing halves are NOT interchangeable.

CAUTION: Main bearings are select fit. See Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure

NOTE: Only one main bearing should be selectively fitted while all other main bearing caps are properly tightened.

When installing a new upper bearing shell, slightly chamfer the sharp edges from the plain side.

1. Lubricate main bearing with clean engine oil.
2. Start bearing in place, and insert Main Bearing Tool C-3059A into oil hole of crankshaft.
3. Slowly rotate crankshaft counterclockwise sliding the bearing into position. Remove Special Main Bearing Tool C-3059A.

NOTE: Lubricate main bearing cap bolts with engine oil before installation.

4. Lubricate and install lower bearing half and main cap Tighten bolts finger tight.

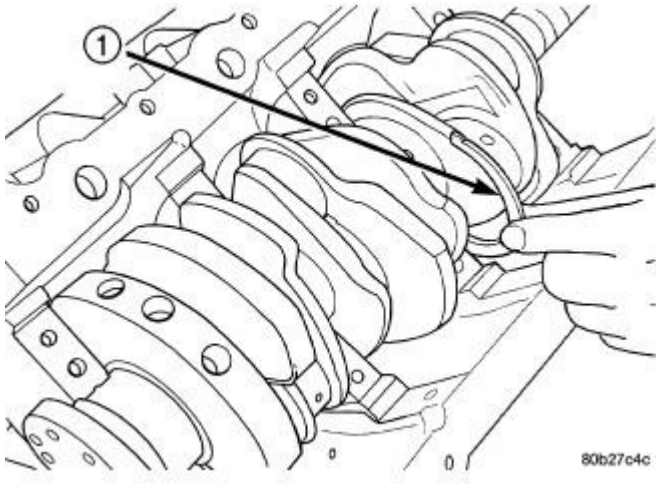

Fig. 273: Thrust Washer Installation
Courtesy of CHRYSLER LLC

5. For installing thrust washers (1) at the No. 2 main bearing location, use the following procedure:
   a. Move crankshaft forward to limit of travel. Lubricate and install the front thrust washer by rolling the washer (1) onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
   b. Move crankshaft rearward to limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

   The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, lastly the main cap tie (horizontal) bolts.

6. Install each main bearing cap and tighten inner bolts finger tight.
7. Tighten inner main bearing cap bolts to 20 N.m + 1/4 turn (15 ft. lbs. + 1/4 turn).
8. Measure crankshaft end play. See **Engine/Engine Block/CRANKSHAFT - Standard Procedure**
9. Install windage tray. Lubricate bolts with engine oil and tighten to 27 N.m + 1/4 turn (20 ft. lbs. + 1/4 turn).
10. Install the main cap tie (horizontal) bolts and tighten to 28 N.m (250 in. lbs.).
11. Install oil pick-up tube.
12. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**
13. Fill engine crankcase with proper oil to correct level.

CRANKSHAFT

Description

DESCRIPTION

The crankshaft is constructed of a forged micro alloy steel. A six throw, nine counterweight crankshaft is

supported by four select fit main bearings with number two serving as the thrust washer location. The six separate connecting rod throws are an even-firing design which reduces torque fluctuations while a torsional vibration damper is used to control torsion caused vibration of the crankshaft. Rubber lipped seals are used at front and rear. The front seal is retained in the oil pump case and the rear seal is retained in a block-mounted housing.

Operation

OPERATION

The crankshaft transfers force generated by combustion within the cylinder to the flywheel or flexplate.

Standard Procedure

MEASURING CRANKSHAFT END PLAY

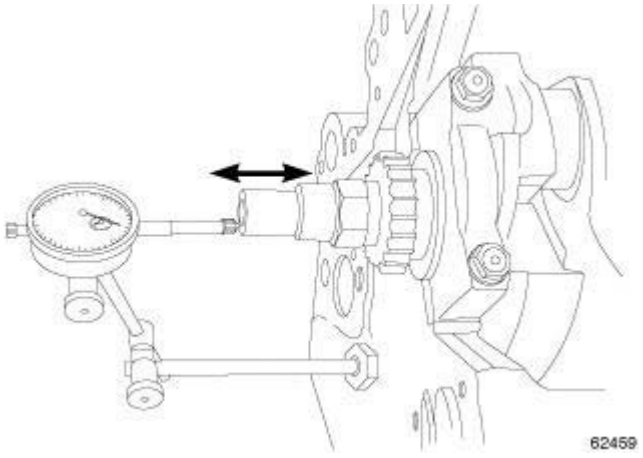

Fig. 274: CRANKSHAFT END PLAY TYPICAL
Courtesy of CHRYSLER LLC

1. Mount a dial indicator to front of engine with the locating probe on nose of crankshaft.
2. Move crankshaft all the way to the rear of its travel.
3. Zero the dial indicator.
4. Move crankshaft all the way to the front and read the dial indicator. Crankshaft end play must be within specification. See **Engine - Specifications**.

Removal

REMOVAL

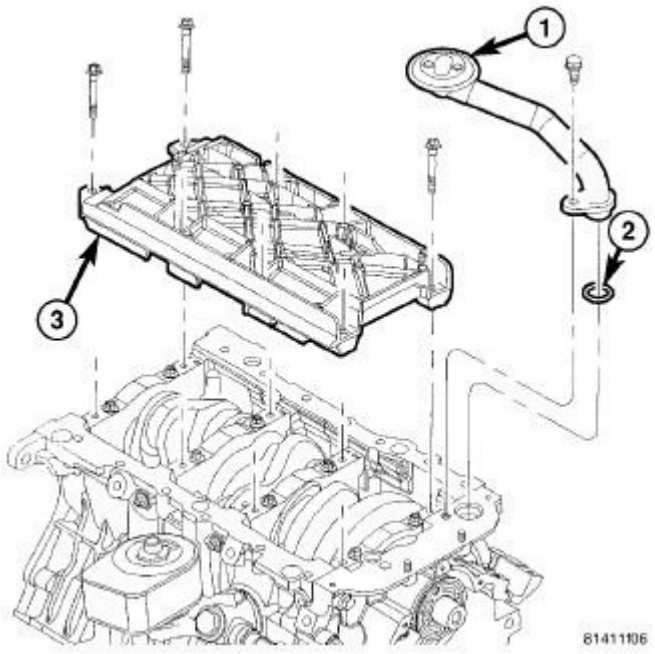

Fig. 275: OIL PICK UP TUBE & WINDAGE TRAY
Courtesy of CHRYSLER LLC

1 - OIL PICK UP TUBE 2 - SEAL 3 - WINDAGE TRAY

1. Remove engine from vehicle. See **Engine - Removal**.
2. Remove oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
3. Remove oil pickup tube (1) and windage tray (3).
4. Remove front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
5. Remove timing belt and tensioner. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
6. Remove crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
7. Tap dowel pin out of crankshaft.
8. Remove oil pump assembly. See **Engine/Lubrication/PUMP, Engine Oil - Removal**.

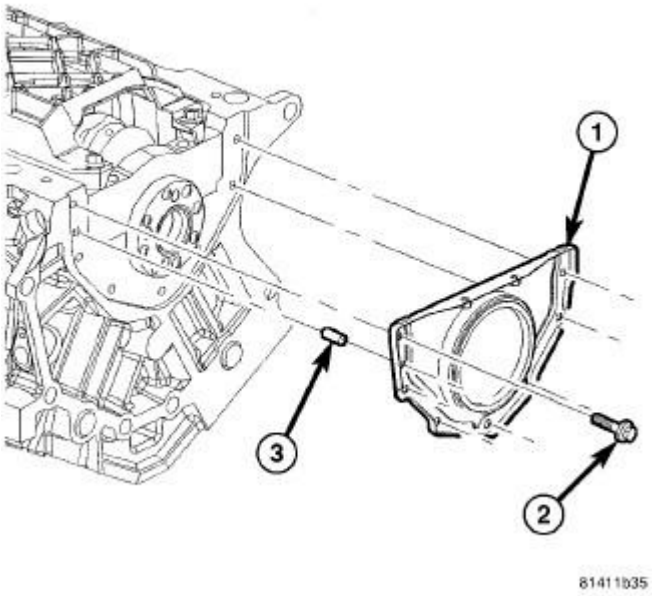

Fig. 276: REAR CRANKSHAFT OIL SEAL & RETAINER
Courtesy of CHRYSLER LLC

1 - REAR OIL SEAL AND RETAINER ASSEMBLY
2 - BOLT
3 - ALIGNMENT DOWEL

9. Remove crankshaft rear oil seal retainer (1).

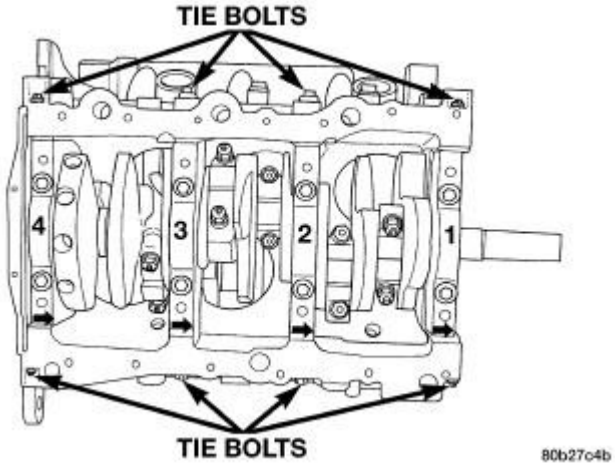

Fig. 277: Main Bearing Cap Identification
Courtesy of CHRYSLER LLC

NOTE: Do not use a metal stamp to mark the bearing caps. Do use a scribe or paint mark.

10. Identify rod bearing caps before removal. Also scribe a location reference mark from the #2 main bearing cap to the engine block to use as a guide during reassembly.
11. Remove connecting rod bearing caps. Connecting rod bearing caps are not interchangeable and should be paint marked or scribed before removal to insure correct assembly.

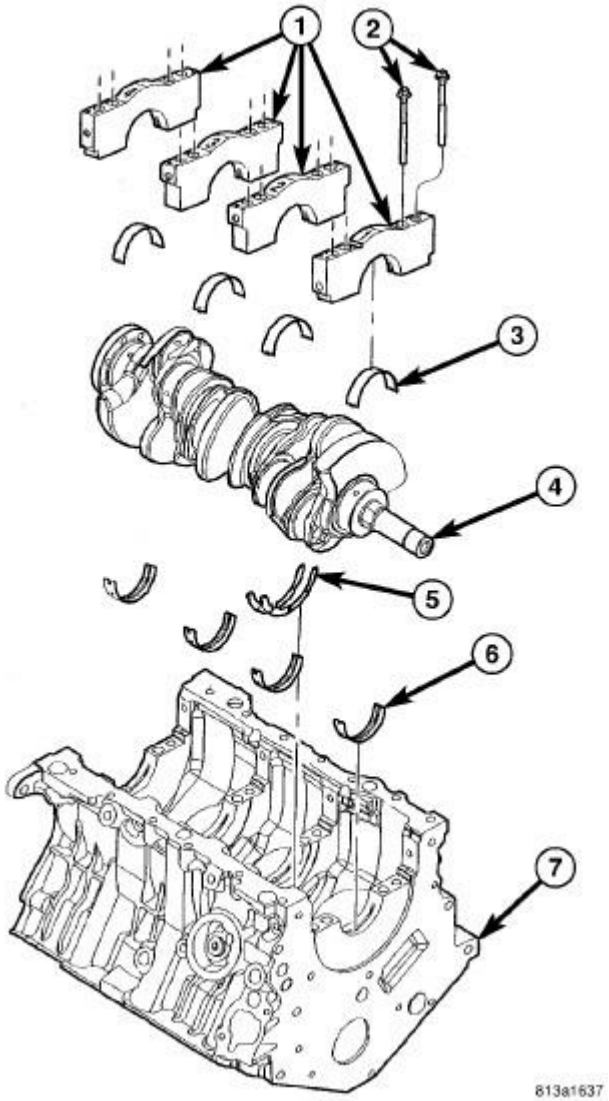

Fig. 278: Cylinder Block & Crankshaft
Courtesy of CHRYSLER LLC

12. Remove main bearing caps (1). Main bearing caps are not interchangeable and are marked to insure correct assembly and location.

13. Remove crankshaft (4) from cylinder block (7).

NOTE: Before installing crankshaft, refer to fitting of main bearings and installation of connecting rod bearings. See Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure and Engine/Engine Block/BEARING(S), Connecting Rod - Standard Procedure.

Inspection

INSPECTION

The crankshaft journals should be checked for excessive wear, taper and scoring. Limits of taper on any crankshaft journals should be held to 0.015 mm (0.0006 in.). Limits for journal roundness should be 0.010 mm (0.0004 in.). Journal grinding should not exceed 0.254 mm (0.010 in.) under the standard journal diameter. DO NOT grind thrust faces of Number 2 main bearing. DO NOT nick crank pin or bearing fillets. After grinding, remove rough edges from crankshaft oil holes and clean out all passages.

CAUTION: With a forged steel crankshaft it is important that the final paper or cloth polish after any journal regrind be in the same direction as normal rotation in the engine.

Installation

INSTALLATION

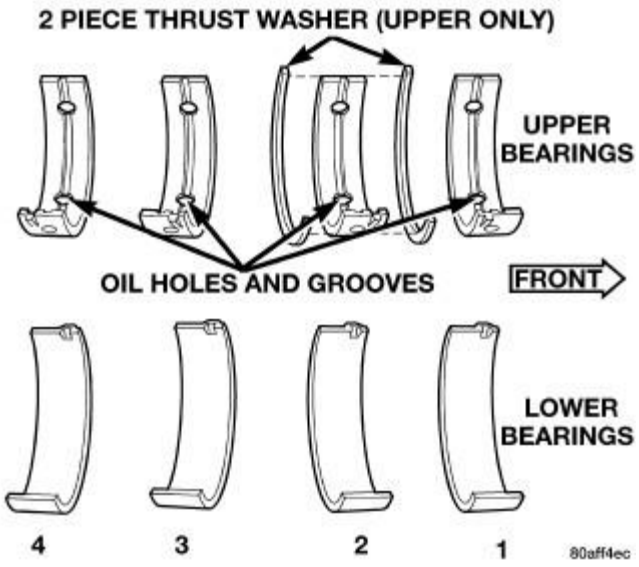

Fig. 279: Main Bearing Identification
Courtesy of CHRYSLER LLC

CAUTION: Main bearings are select fit. See Engine/Engine Block/BEARING(S),

Crankshaft - Standard Procedure for proper bearing size selection.

1. Install crankshaft upper main bearings in cylinder block. Ensure oil holes in bearings line up with oil holes in cylinder block. See **Engine/Engine Block/BEARING(S), Crankshaft - Standard Procedure**.
2. Install the crankshaft to cylinder block.

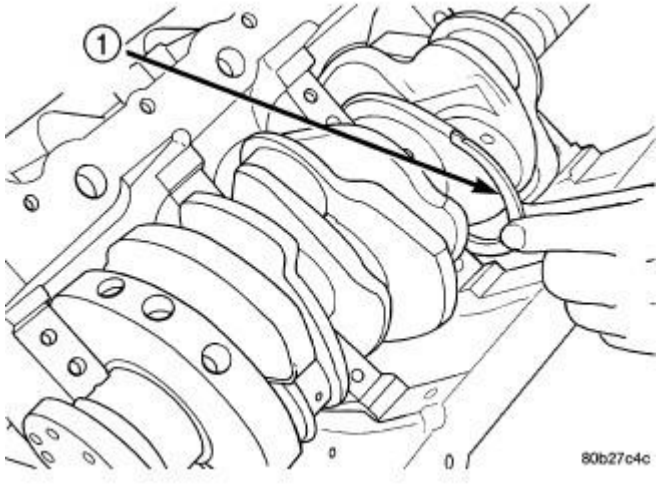

Fig. 280: Thrust Washer Installation
Courtesy of CHRYSLER LLC

1 - FRONT THRUST WASHER

3. Move crankshaft forward to limit of travel. Lubricate and install the front thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.
4. Move crankshaft rearward to limit of travel. Lubricate and install the rear thrust washer by rolling the washer onto the machined shelf between the No. 2 upper main bulk head and crankshaft thrust surface.

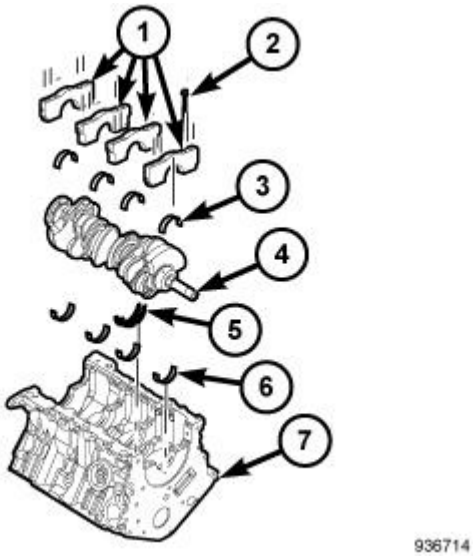

Fig. 281: Main Bearings Assembly
Courtesy of CHRYSLER LLC

5. Install lower main bearings (3) into main main bearing caps (1).
6. Lubricate lower main bearings (3) with clean engine oil.

NOTE: Lubricate main bearing cap inner bolts (2) with engine oil before installation.

7. Install each main cap (1) and tighten inner bolts (2) finger tight. Align the location reference mark scribed on the #2 main bearing cap during disassembly.

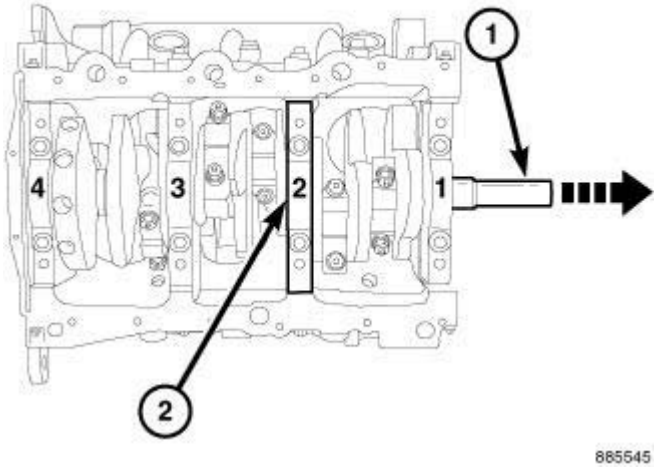

Fig. 282: Moving Crankshaft Forward To Limit Of Travel
Courtesy of CHRYSLER LLC

CAUTION: The #2 main bearing cap must be centered over the inner bolt holes located on the block. Failure to center the bearing cap can result in contact with the crankshaft counterweights and thrust bearing failure.

8. Verify that the #2 main bearing cap is properly centered over the inner bolt holes located in the block. Tighten main bearing cap inner bolts to 20 N.m (15 ft. lbs.).
9. Move crankshaft (1) forward to limit of travel so that crankshaft thrust face (2) is tight against thrust bearing.
10. Verify that a 0.25 mm (0.010 inch) shim or feeler gage will fit between the #2 main cap (rear face) and the crankshaft thrust face. Slide the gage side-to-side all of the way across the cap making sure that the clearance at all areas exceeds 0.25 mm (0.010 inch). The feeler gage should slide all the way down to the #2 main journal.

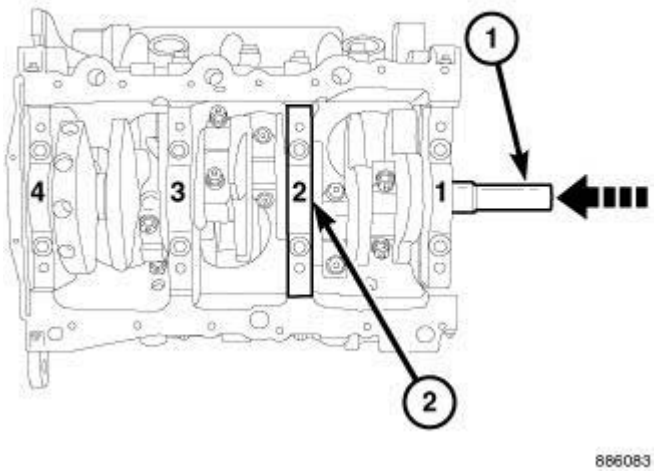

Fig. 283: Moving Crankshaft Rearward To Limit Of Travel
Courtesy of CHRYSLER LLC

11. Move crankshaft (1) rearward to limit of travel so that crankshaft thrust face (2) is tight against thrust bearing.
12. Verify that a 0.25 mm (0.010 inch) shim or feeler gage will fit between the #2 main cap (front face) and the crankshaft thrust face. Slide the gage side-to-side all of the way across the cap making sure that the clearance at all areas exceeds 0.25 mm (0.010 inch). The feeler gage should slide all the way down to the #2 main journal.
13. A properly centered #2 main bearing cap has a minimum of 0.25 mm (0.010 inch) clearance in both the forward and rearward crankshaft positions. If measured clearance is less than 0.25 mm (0.010 inch), loosen and reposition #2 main bearing cap until this minimum clearance can be verified by repeating this procedure.
14. Following verification of proper #2 bearing cap centering, finish tightening the main bearing cap inner bolts an additional 90° turn.

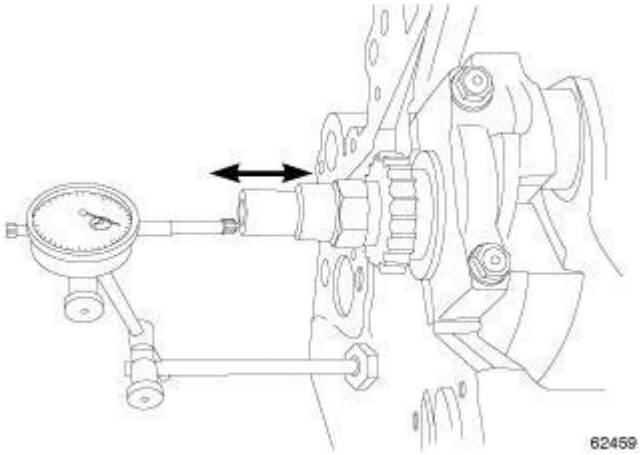

Fig. 284: CRANKSHAFT END PLAY TYPICAL
Courtesy of CHRYSLER LLC

15. Measure crankshaft end play. See **Engine/Engine Block/CRANKSHAFT - Standard Procedure**.

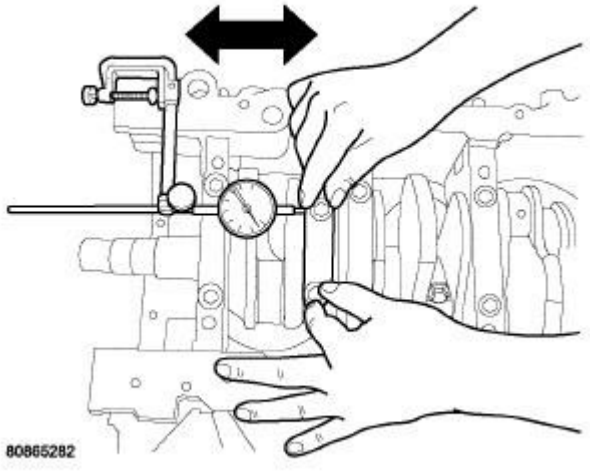

Fig. 285: Measuring Connecting Rod Side Clearance
Courtesy of CHRYSLER LLC

16. Install connecting rods and measure side clearance. See **Engine/Engine Block/BEARING(S), Connecting Rod - Standard Procedure**.

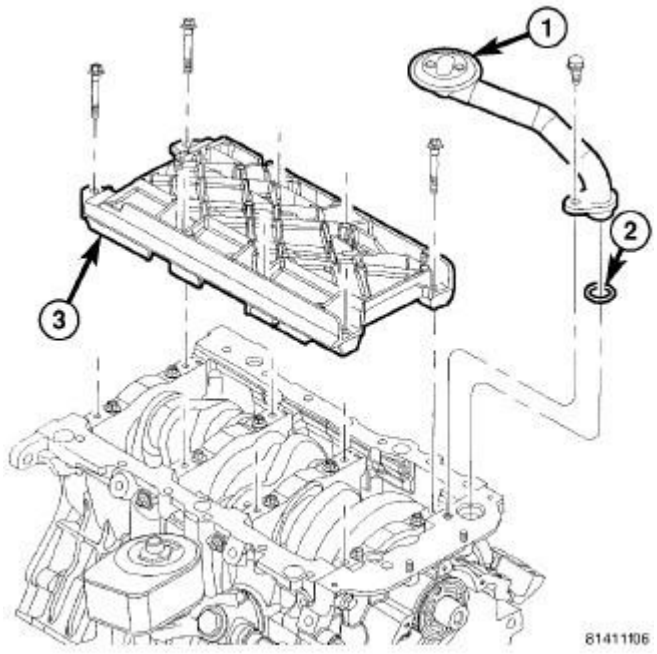

Fig. 286: OIL PICK UP TUBE & WINDAGE TRAY
Courtesy of CHRYSLER LLC

1 - OIL PICK UP TUBE
2 - SEAL
3 - WINDAGE TRAY

NOTE: The main bearing cap bolts must be tightened in the proper sequence. First the inner main cap bolts, secondly the windage tray bolts, lastly the main cap tie (horizontal) bolts.

17. Install windage tray (3). Lubricate bolts with engine oil. Finger tighten all bolts first, then tighten to 28 N.m + 90° turn (20 ft. lbs. + 90° turn) beginning with the inside bolts tightening outward.
18. Install oil pickup tube (1) and tighten bolt to 28 N.m (20 ft. lbs.).

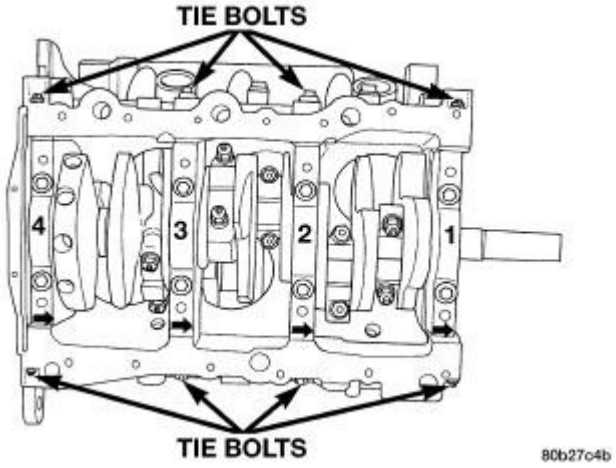

Fig. 287: Main Bearing Cap Identification
Courtesy of CHRYSLER LLC

19. Install the main cap tie (horizontal) bolts and tighten to 28 N.m (20 ft. lbs.).

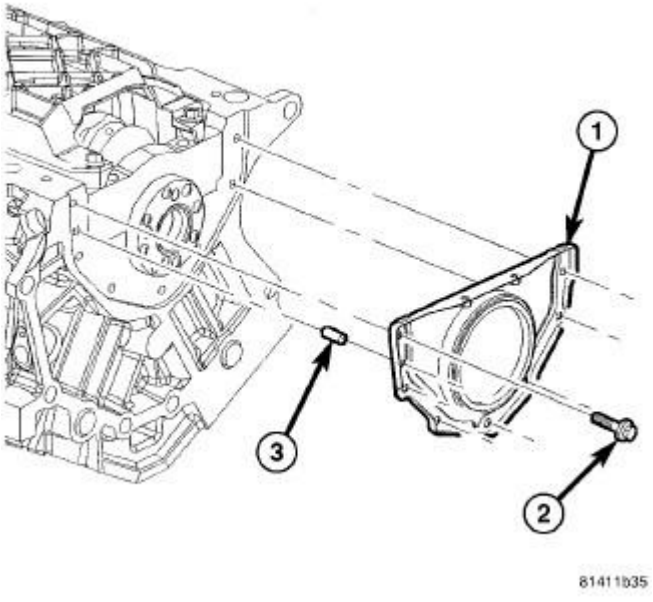

Fig. 288: REAR CRANKSHAFT OIL SEAL & RETAINER
Courtesy of CHRYSLER LLC

1 - REAR OIL SEAL AND RETAINER ASSEMBLY
2 - BOLT
3 - ALIGNMENT DOWEL

20. Install rear crankshaft oil seal retainer and oil seal. See **Engine/Engine Block/RETAINER, Crankshaft**

Rear Oil Seal - Installation and. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.

21. Install oil pump assembly. See **Engine/Lubrication/PUMP, Engine Oil - Installation**.
22. Install dowel pin in crankshaft. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.
23. Install crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
24. Install timing belt and tensioner. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
25. Install front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
26. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
27. Install engine assembly. See **Engine - Installation**.
28. Fill engine crankcase with proper amount of oil.

DAMPER, VIBRATION

Removal

REMOVAL

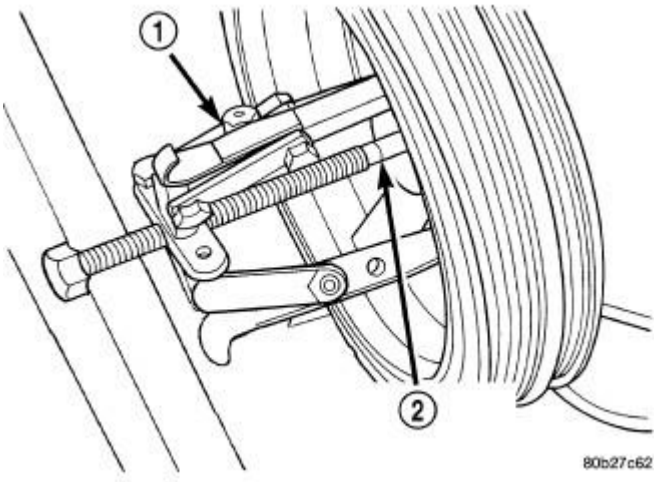

Fig. 289: Crankshaft Damper-Removal
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Raise vehicle on hoist.
3. Remove the right engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.
4. Remove the right front wheel and accessory drive belt splash shield.
5. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
6. Suitably support the engine.
7. Remove the lower crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

8. Low the engine.
9. Remove vibration damper bolt.
10. Use Special Tool 1023 puller (1) , and insert 9020 (2), remove crankshaft damper.

Installation

INSTALLATION

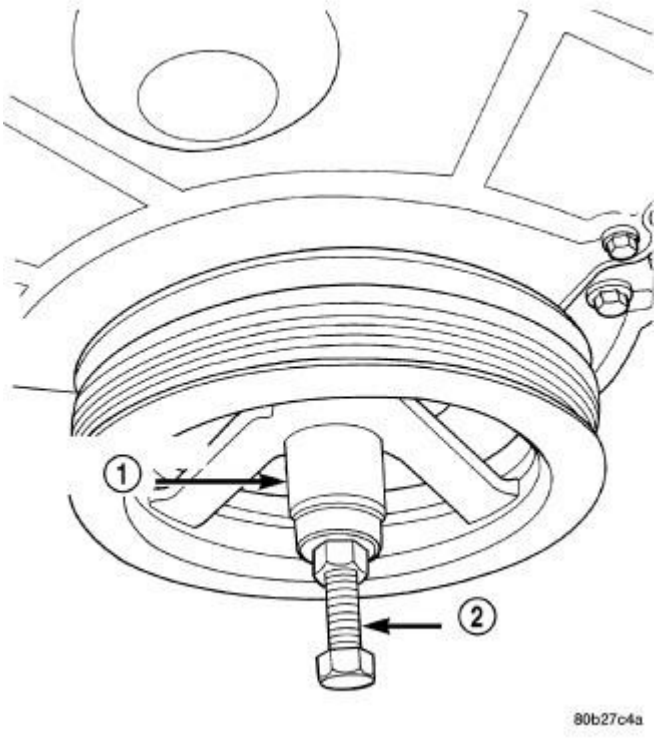

Fig. 290: Crankshaft Damper-Installation
Courtesy of CHRYSLER LLC

1. Install crankshaft damper using Special Tools C-4685-C1 (5.9 in.) Bolt (2), with Nut and Thrust Bearing from 6792, and 6792-1 (1) Installer.
2. Install vibration damper bolt. Torque bolt to 95 N.m (70 ft. lbs.).
3. Install the lower crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
4. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
5. Install the accessory drive belt splash shield and right front wheel.
6. Lower vehicle.
7. Install the right engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.
8. Connect the negative battery cable.

FLEXPLATE

Removal

REMOVAL

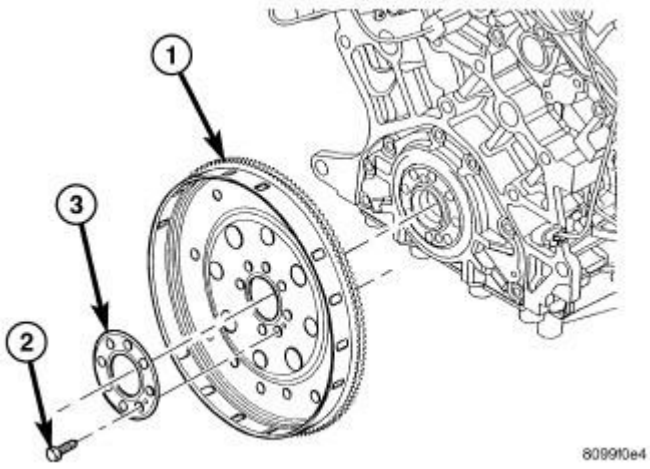

Fig. 291: FLEX PLATE
Courtesy of CHRYSLER LLC

1. Remove the transaxle. Refer to **Transmission and Transfer Case/Automatic - 41TE - Removal** or **Transmission and Transfer Case/Automatic - 62TE - Removal** .
2. Remove 8 flex plate attaching bolts (2).
3. Remove backing plate (3)
4. Remove the flex plate (1).

Installation

INSTALLATION

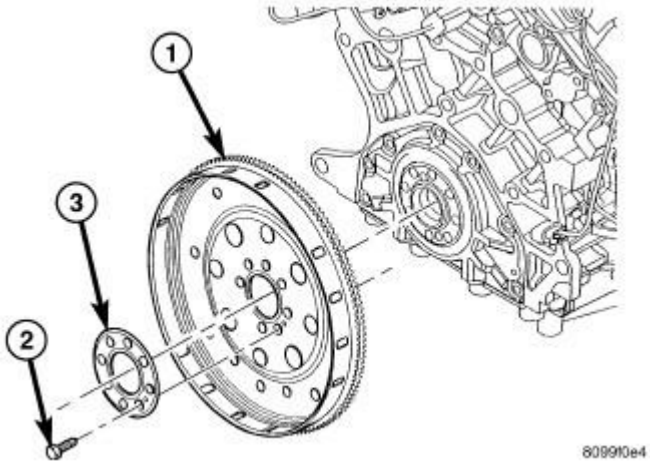

Fig. 292: FLEX PLATE

Courtesy of CHRYSLER LLC

1. Position the flex plate (1) with backing plate (3) on the crankshaft.
2. Apply Mopar® Lock AND Seal Adhesive to the eight flex plate bolts (2).
3. Install the flex plate bolts (2). Tighten the bolts to 95 N.m (70 ft. lbs.).
4. Install the transaxle. Refer to **Transmission and Transfer Case/Automatic - 62TE - Installation** .

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

RETAINER, CRANKSHAFT REAR OIL SEAL

Removal

REMOVAL

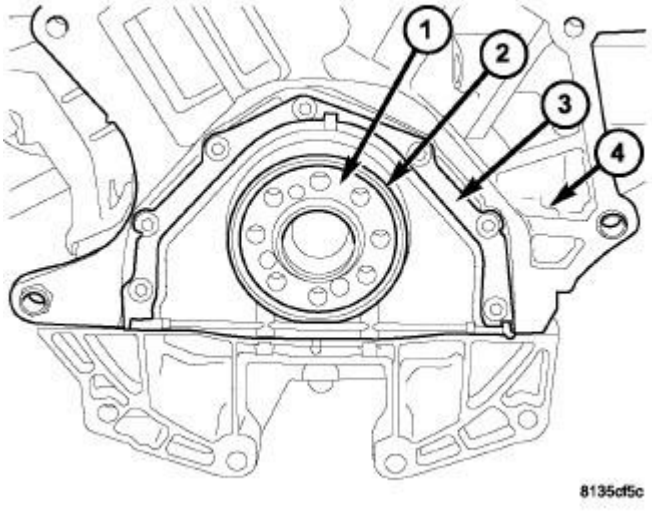

Fig. 293: REAR MAIN SEAL & RETAINER
Courtesy of CHRYSLER LLC

1 - CRANKSHAFT
2 - REAR CRANKSHAFT OIL SEAL
3 - REAR CRANKSHAFT OIL SEAL RETAINER
4 - ENGINE BLOCK

1. Remove the engine oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.

2. Lower the weight of the engine back onto the engine mounts.

NOTE: Before separating the transmission from the engine, use an appropriate support fixture or lifting device to support the weight of the engine.

3. Remove transmission from vehicle.
4. Remove the flex plate.
5. Remove the rear crankshaft oil seal retainer bolts.
6. Remove the crankshaft oil seal and clean all mating surfaces.

Installation

INSTALLATION

CAUTION: If a burr or scratch is present on the crankshaft edge (chamfer), clean surface using 400 grit sand paper to prevent seal damage during installation. Make sure the rear crankshaft oil seal surface is clean and free of any abrasive materials.

NOTE: The rear crankshaft oil seal and retainer are an assembly. DO NOT separate the seal protector from the rear crankshaft oil seal before installation on engine. Damage to the seal lip will occur if the seal protector is removed and installed prior to installation on engine.

1. Apply engine oil to crankshaft seal surface.

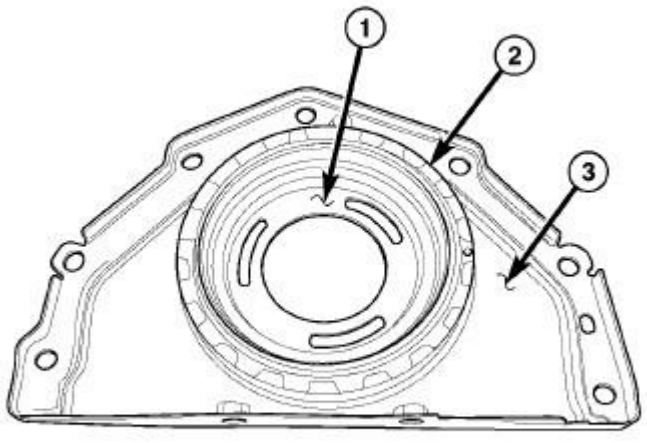

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Fig. 294: CRANKSHAFT OIL SEAL - REAR
Courtesy of CHRYSLER LLC

1 - SEAL PROTECTOR
2 - SEAL
3 - RETAINER

2. If the seal protector (1) is missing or was accidentally dislodged, go to step 3. Otherwise, carefully position the oil seal retainer assembly (3), and seal protector (1) on crankshaft and push firmly into place on engine block (during this step, the seal protector will be pushed from the rear oil seal assembly as a result of installing the rear oil seal). Hand tighten the rear oil seal fasteners, and go to step 4.

NOTE: The seal lip (2) must always uniformly curl inward toward the engine on the crankshaft (1).

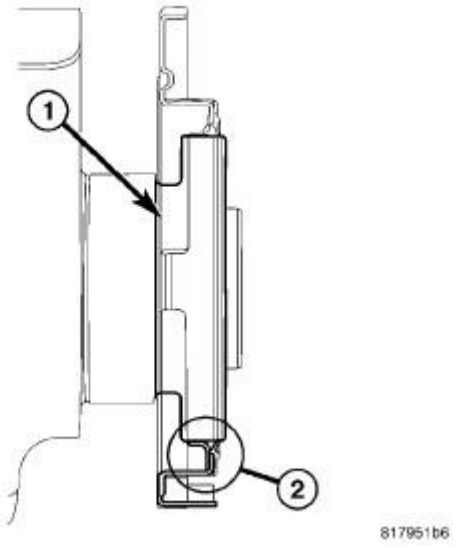

Fig. 295: REAR SEAL INSTALLED
Courtesy of CHRYSLER LLC

CAUTION: If for any reason the installation sleeve is missing or dislodged from rear crankshaft oil seal prior to installation, the following procedure must be performed.

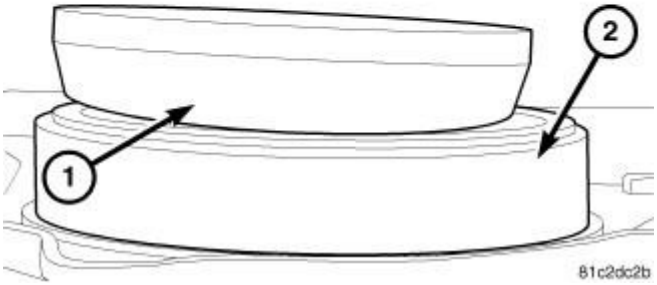

Fig. 296: Rear Crankshaft Oil Seal Assembly
Courtesy of CHRYSLER LLC

3. Using the chamfered seal guide from Special Tool 6926, insert the tapered end (1) into the transmission side of the rear crankshaft oil seal assembly (2), and push the seal guide through the seal assembly. This will ensure the seal lip is positioned toward the engine when the seal assembly is installed. When the seal lip is correctly positioned, go to step 2.

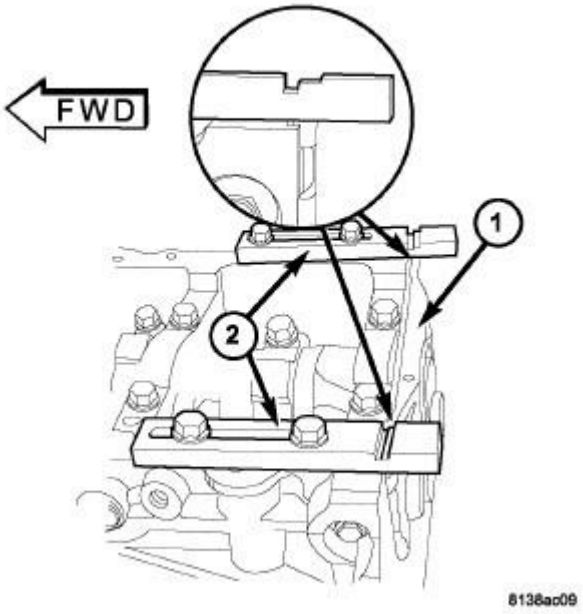

Fig. 297: REAR CRANKSHAFT SEAL RETAINER ALIGNMENT
Courtesy of CHRYSLER LLC

1 - SEAL RETAINER

2 - SPECIAL TOOLS 8225

NOTE: The following steps must be performed to prevent oil leaks at sealing joints.

4. Attach Special Tools 8225 (1) to pan rail using the oil pan fasteners.

NOTE: Special Tools 8225 (1), are use to assist with the fit of the flush mount rear main seal retainer. The notch on tool should be located away the seal retainer.

5. While applying firm pressure to the seal retainer against Special Tools 8225 (1), tighten seal retainer screws to 12 N.m (105 in. lbs.).
6. Remove special tool #8225 (1).

NOTE: Make sure that the seal flange is flush with the block oil pan sealing surface.

7. Install oil pan. Tighten the 6 mm fasteners to 12 N.m (105 in. lbs.) and the 8 mm fasteners to 28 N.m (250 in. lbs.).
8. Install the flex plate and transmission.

RING(S), PISTON

Description

DESCRIPTION

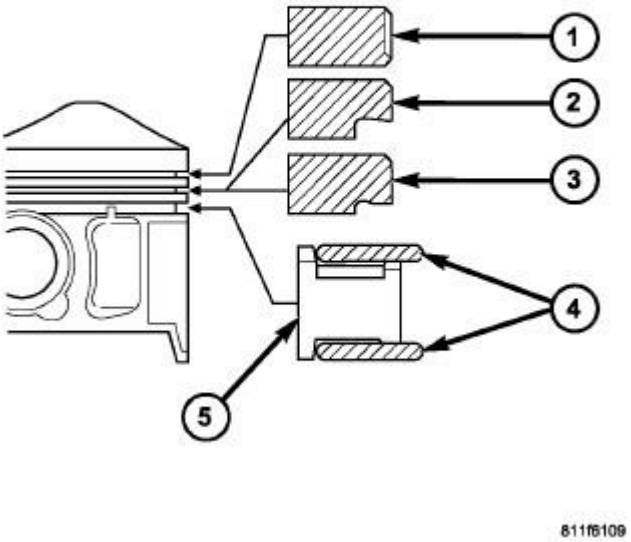

Fig. 298: PISTON RINGS
Courtesy of CHRYSLER LLC

The piston rings include a moly-filled top ring with a symmetrical barrel face. The intermediate piston ring (2 and 3) is of the Micro-Napier design. The Micro-Napier design has a reduced "hook" on the running face, removes the need for chroming and improves oil economy. The oil control package consists of two steel rails and an expander spacer.

Standard Procedure

PISTON RING FITTING

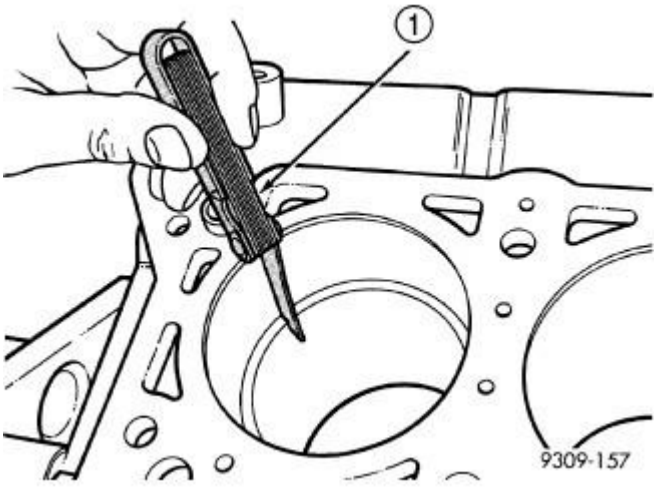

Fig. 299: CHECK GAP ON PISTON RINGS

Courtesy of CHRYSLER LLC

1. Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 12 mm (0.50 in.) from bottom of cylinder bore. Check gap with feeler gauge (1). For clearance specifications. See **Engine - Specifications**.

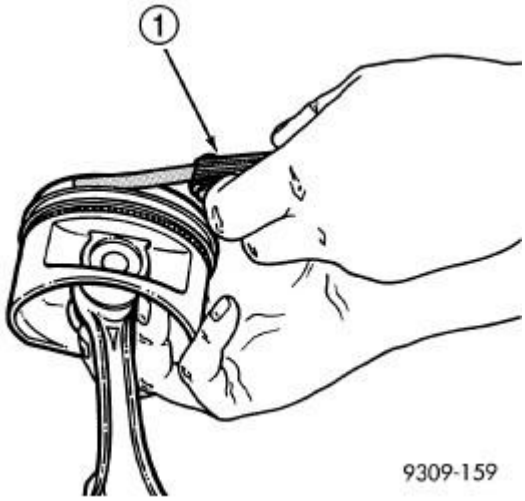

Fig. 300: MEASURING PISTON RING SIDE CLEARANCE
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE

2. Check piston ring to groove clearance (1). For clearance specifications. See **Engine - Specifications**.

Removal

REMOVAL

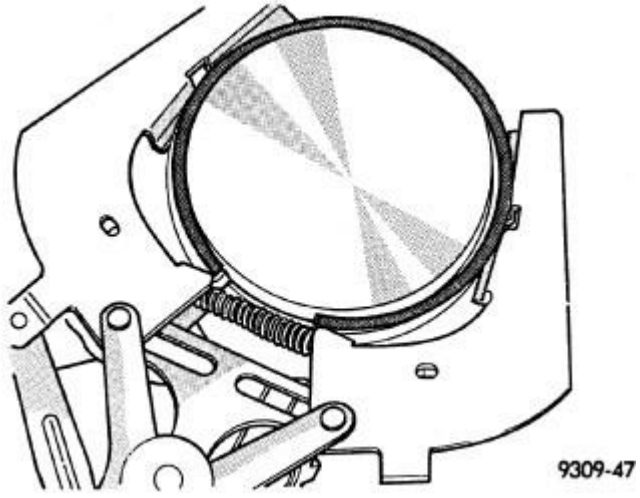

Fig. 301: Removing/Installing Upper And Intermediate Rings
Courtesy of CHRYSLER LLC

1. Remove piston and connecting rod. See **Engine/Engine Block/ROD, Piston and Connecting - Removal**
2. Remove No. 1 and No. 2 piston rings from piston using a ring expander tool.
3. Remove upper oil ring side rail.
4. Remove lower oil ring side rail.
5. Remove oil ring expander

Installation

INSTALLATION

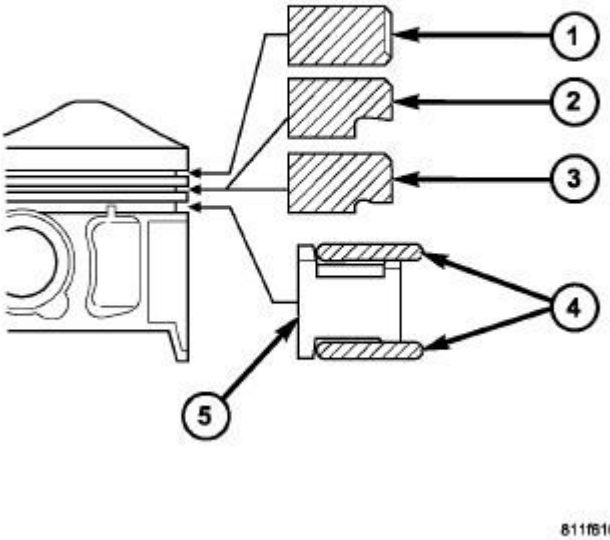

Fig. 302: PISTON RINGS
Courtesy of CHRYSLER LLC

1. Measure clearance of piston rings to the cylinder bore and piston. See **Engine/Engine Block/RING(S), Piston - Standard Procedure**

   The No. 1 and No. 2 piston rings have a different cross section. Ensure that which ever design No. 2 ring is installed, it is installed with manufacturers I.D. mark (dot) facing up, towards top of the piston. See **Engine/Engine Block/RING(S), Piston - Description**.

   Do not use a piston ring expander during this step.

   - Oil ring expander.
   - Lower oil ring side rail.
   - Upper oil ring side rail.

- No. 2 Intermediate piston ring.
- No. 1 Upper piston ring.

2. Install the side rail (1) by placing one end between the piston ring groove and the expander. Hold end firmly and press down the portion to be installed until side rail is in position.

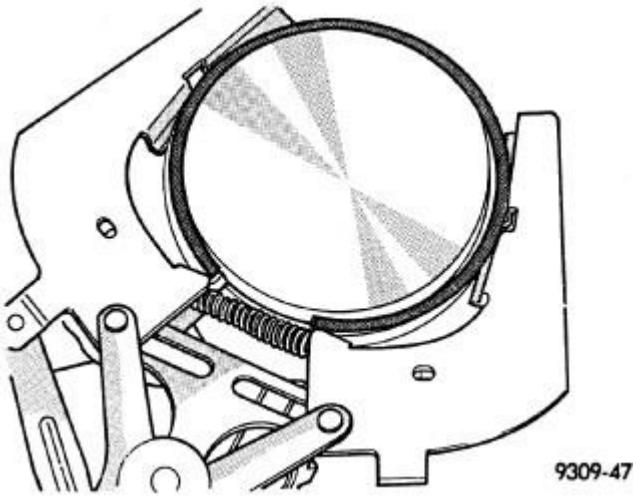

Fig. 303: Removing/Installing Upper And Intermediate Rings
Courtesy of CHRYSLER LLC

The No. 1 and No. 2 piston rings have a different cross section. Ensure that when the No. 2 ring is installed, it is installed with manufacturers I.D. mark facing up, towards top of the piston. See **Engine/Engine Block/RING(S), Piston - Description**.

3. Install upper side rail first and then the lower side rail.
4. Install the No. 2 piston ring and then No. 1 piston ring.

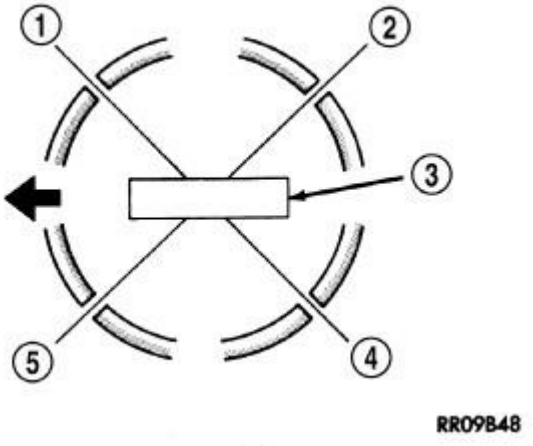

Fig. 304: PISTON RING END GAP POSITION
Courtesy of CHRYSLER LLC

5. Position piston ring end gaps.
6. Position oil ring expander gap at least 45° from the side rail gaps but **not** on the piston pin center or on the thrust direction. Staggering ring gap is important for oil control.

ROD, PISTON AND CONNECTING

Description

DESCRIPTION

The pistons are made of a high strength aluminum alloy. Top land height has been decreased to reduce emissions. Piston skirts are coated with a solid lubricant for scuff resistance. Connecting rod is forged steel with a fractured connecting rod cap design. The connecting rod is also equipped with a squirt hole and attaches to the piston with a full floating pin retained by lock rings.

Standard Procedure

FITTING PISTONS

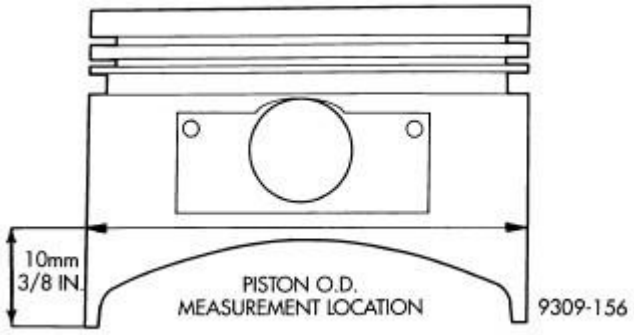

Fig. 305: Piston Measurements
Courtesy of CHRYSLER LLC

The pistons are machined to two different weight specifications and matched to rods based on weight. All piston and rod assemblies weigh the same to maintain engine balance.

Piston and cylinder wall must be clean and dry. Piston diameter should be measured 90 degrees to piston pin at size location. Cylinder bores should be measured halfway down the cylinder bore and transverse to the engine crankshaft center line. See **Engine - Specifications**. **Pistons and cylinder bores should be measured at normal room temperature, 70°F (21°C).**

Removal

REMOVAL

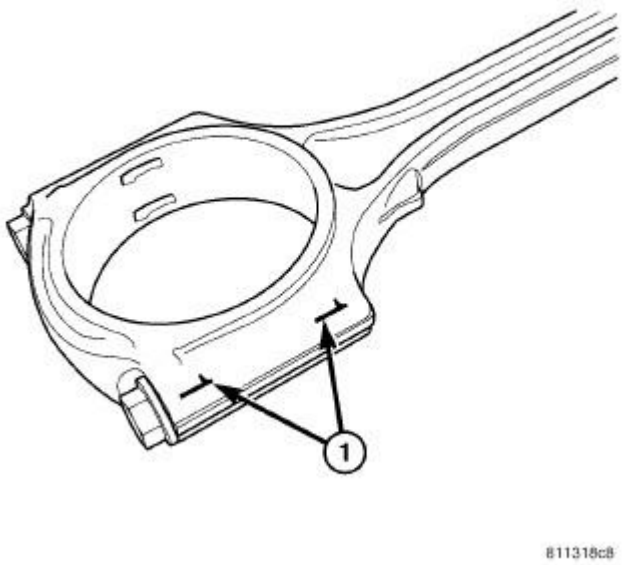

Fig. 306: CONNECTING ROD TO CYLINDER IDENTIFICATION
Courtesy of CHRYSLER LLC

1 - PAINT MARK OR SCRIBE

1. Remove the cylinder heads. See **Engine/Cylinder Head - Removal**
2. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**
3. Remove top ridge of cylinder bores with a reliable ridge reamer before removing pistons from cylinder block. **Be sure to keep tops of pistons covered during this operation. Pistons and connecting rods must be removed from top of cylinder block. When removing piston and connecting rod assemblies from the engine, rotate crankshaft so that each connecting rod is centered in cylinder bore.**
4. Inspect connecting rods and connecting rod caps for cylinder identification. Identify them with a paint mark or scribe (1).
5. Remove connecting rod cap. Install protectors on connecting rod. Push each piston and rod assembly out of cylinder bore.

NOTE: Be careful not to nick crankshaft journals.

6. After removal, install bearing cap on the mating rod.

Installation

INSTALLATION

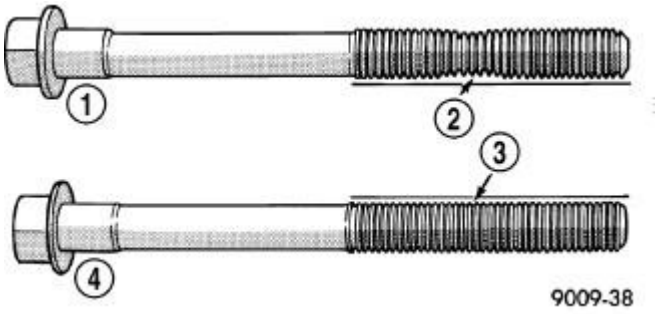

Fig. 307: Check for Stretched Bolts
Courtesy of CHRYSLER LLC

1 - STRETCHED BOLT
2 - THREADS ARE NOT STRAIGHT ON LINE
3 - THREADS ARE STRAIGHT ON LINE
4 - UNSTRETCHED BOLT

1. Install the piston rings. See **Engine/Engine Block/RING(S), Piston - Installation**

NOTE: The connecting rod bearing cap bolts must be examined before reuse. If the threads are necked down (1 and 2), the bolts must be replaced.

2. Check connecting rod bolts for necking by holding a scale or straight edge against the threads. If all threads do not contact the scale, the bolt must be replaced.

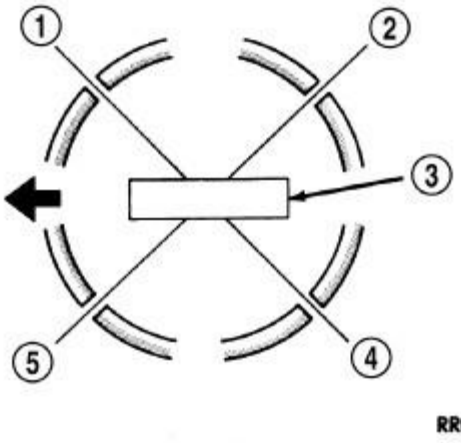

Fig. 308: PISTON RING END GAP POSITION
Courtesy of CHRYSLER LLC

1 - SIDE RAIL UPPER
2 - NO. 1 RING GAP
3 - PISTON PIN

4 - SIDE RAIL LOWER 5 - NO. 2 RING GAP AND SPACER EXPANDER GAP

3. Before installing pistons and connecting rod assemblies into the bore, ensure that compression ring gaps are staggered so that neither is in line with oil ring rail gap.

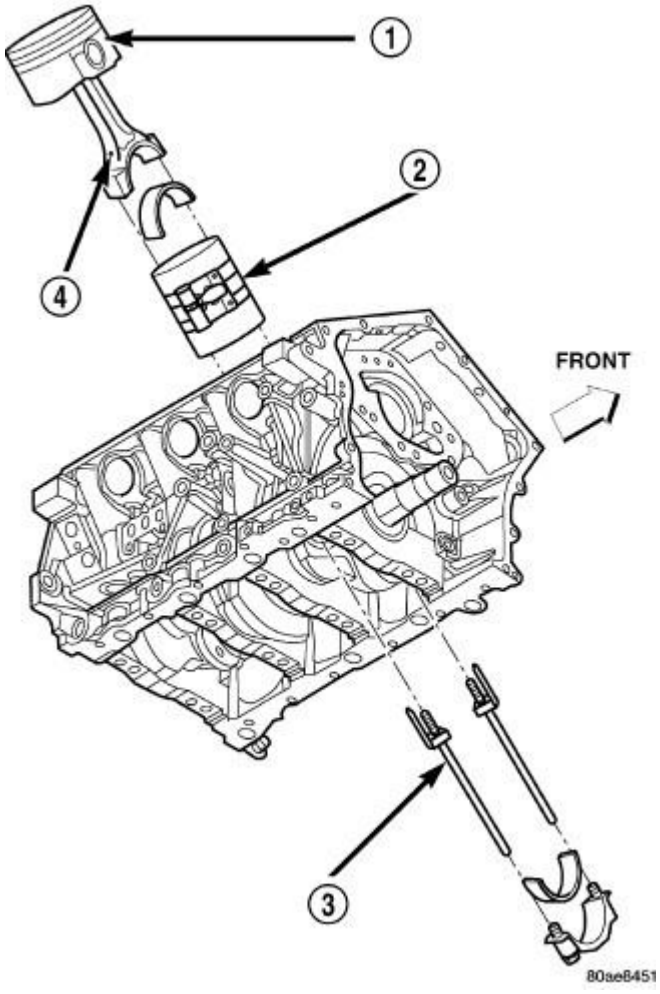

Fig. 309: Piston & Connecting Rod
Courtesy of CHRYSLER LLC

1 - "F" TOWARD FRONT OF ENGINE 2 - RING COMPRESSOR 3 - SPECIAL TOOL 8189 4 - OIL SQUIRT HOLE

4. Immerse the piston head and rings in clean engine oil, slide the ring compressor over the piston and tighten with the special wrench. **Ensure position of rings does not change during this operation.**
5. Install connecting rod bolt protectors on rod bolts.
6. Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and

piston into cylinder bore and guide rod over the crankshaft journal.

CAUTION: Do Not interchange piston assemblies cylinder-to-cylinder or bank-to-bank.

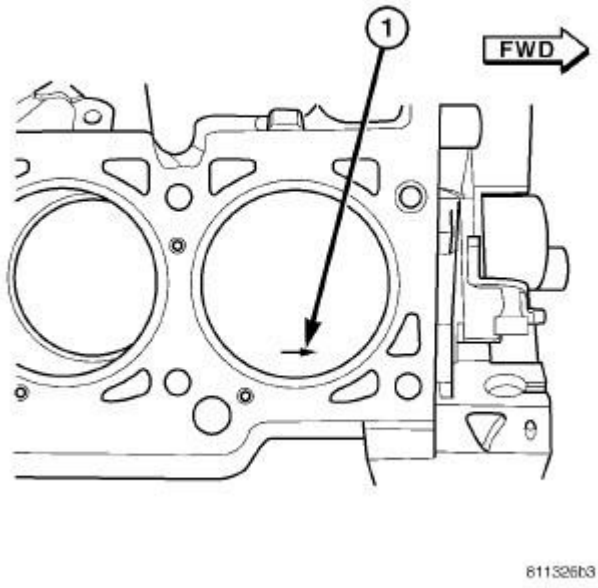

Fig. 310: PISTON ORIENTATION
Courtesy of CHRYSLER LLC

7. The arrow (1) on top of piston must be pointing toward front of engine and oil squirt hole on connecting rod faces the major thrust (right) side of the cylinder bore.

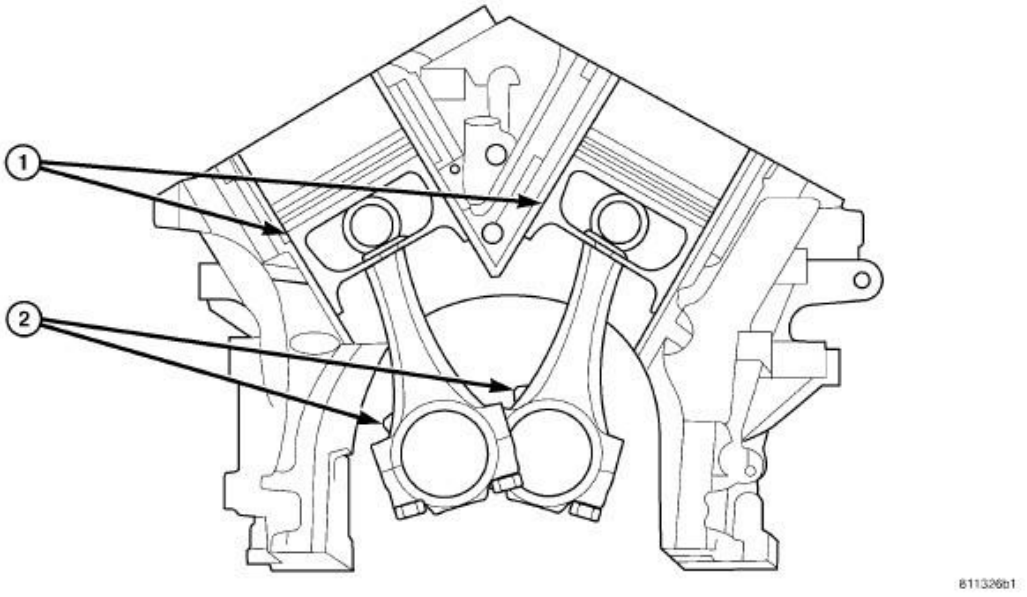

Fig. 311: PISTON & CONNECTING ROD POSITIONING
Courtesy of CHRYSLER LLC

8. Tap the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.
9. Install rod caps. Install cleaned and inspected connecting rod bolts and tighten to 27 N.m (20 ft. lbs.) Plus 1/4 turn.
10. Install the cylinder head(s). See **Engine/Cylinder Head - Installation**
11. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**

SEAL, CRANKSHAFT OIL, FRONT

Removal

REMOVAL

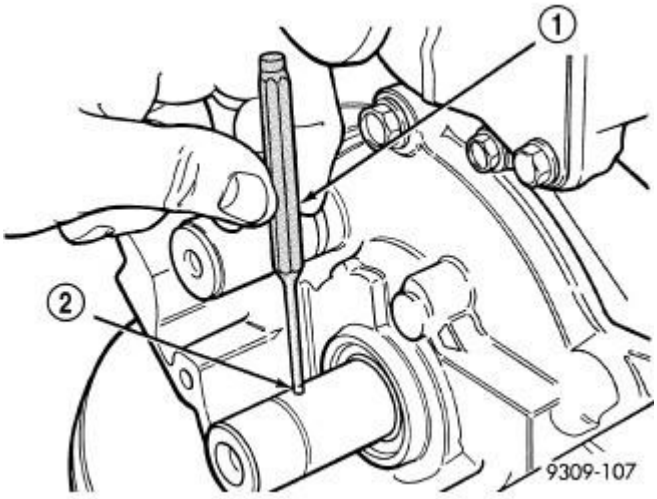

Fig. 312: Crankshaft Sprocket Dowel Pin-Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
2. Tap the dowel pin (2) out of the crankshaft.

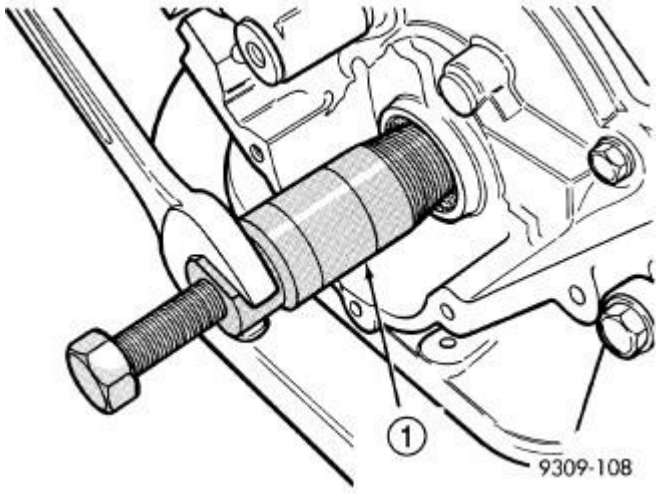

Fig. 313: Crankshaft Oil Seal with Special Tool 6341A-Removal
Courtesy of CHRYSLER LLC

3. Remove crankshaft seal using Special Tool 6341A (1).

CAUTION: Do not nick shaft seal surface or seal bore.

4. Shaft seal lip surface must be free of varnish, dirt or nicks. Polish with 400 grit paper if necessary.

Installation

INSTALLATION

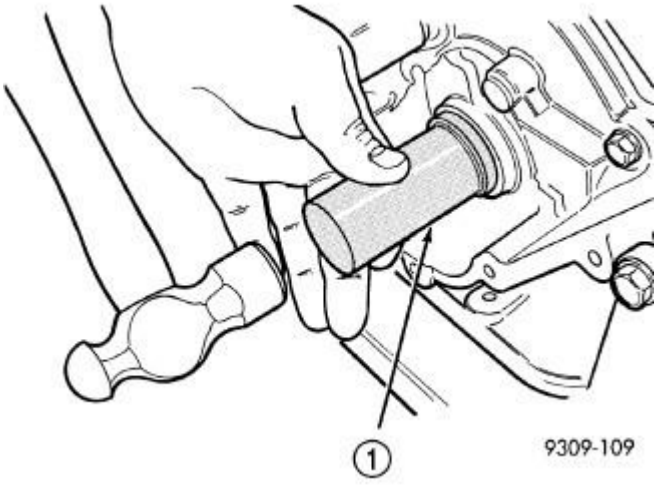

Fig. 314: Crankshaft Oil Seal with Special Tool 6342 - Installation
Courtesy of CHRYSLER LLC

1. Install crankshaft seal using Special Tool 6342 (1).
2. Install the dowel pin into the crankshaft to 1.2 mm (0.047 in.) protrusion.
3. Install the crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

ENGINE MOUNTING

INSULATOR, ENGINE MOUNT, LEFT

Removal

REMOVAL

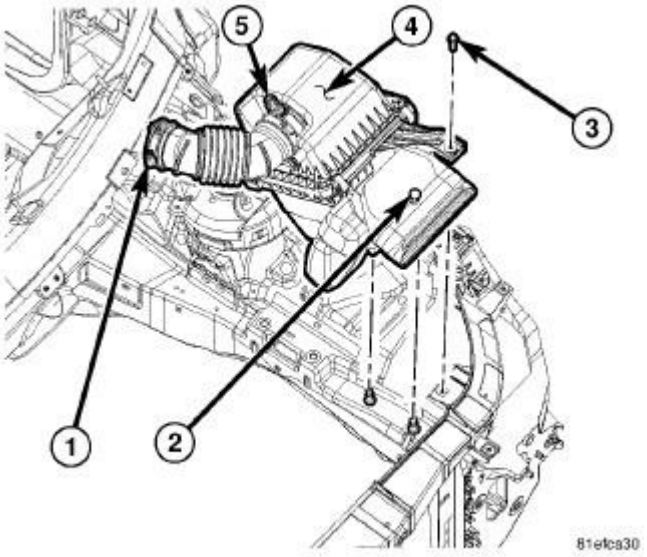

Fig. 315: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove air cleaner housing assembly (4). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

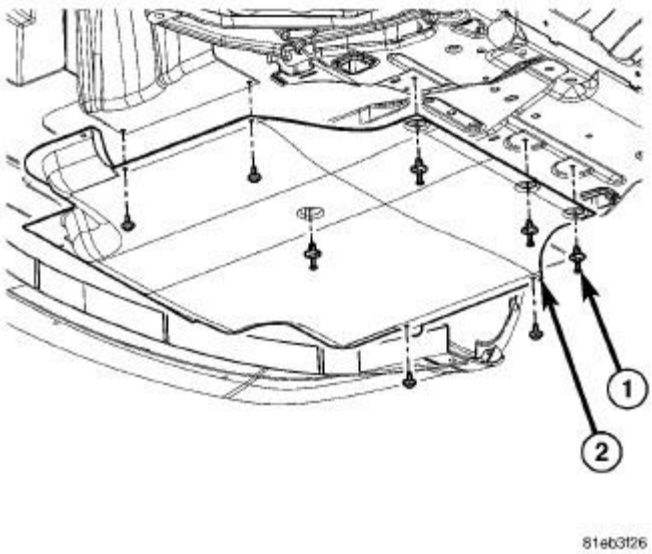

Fig. 316: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

3. Remove the belly pan (2).

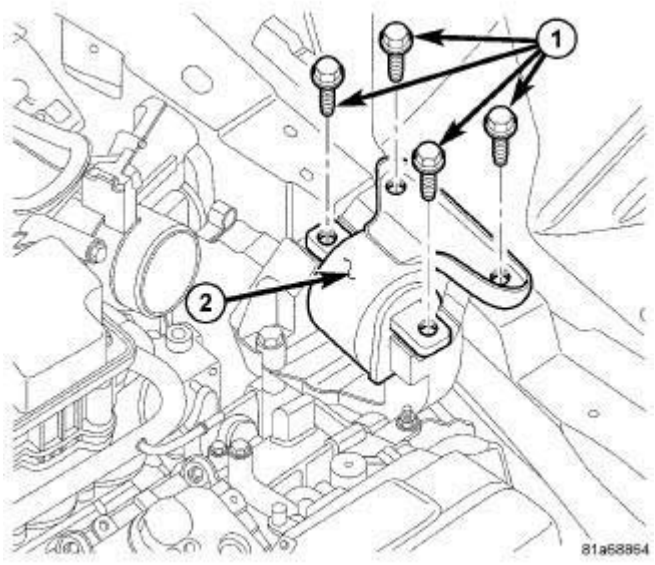

Fig. 317: Vertical Bolts From Left Engine Mount To Transmission Bracket
Courtesy of CHRYSLER LLC

4. Support transmission with floor jack and wooden block.
5. Remove the vertical bolts (1) from the left engine mount (2) to transmission bracket.

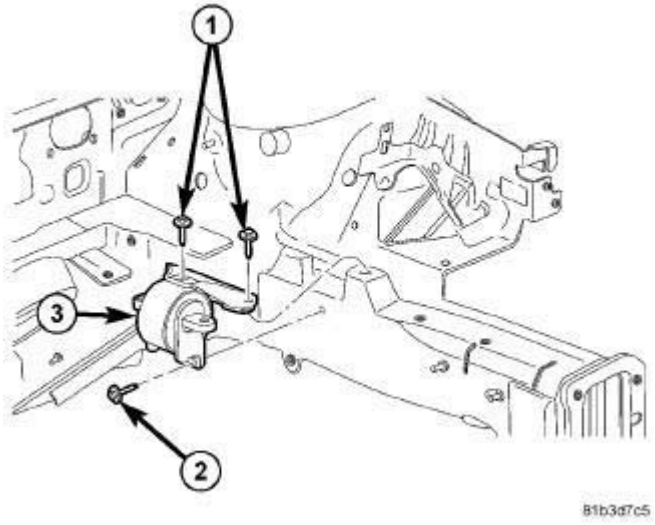

Fig. 318: LEFT ISOLATOR INSTALLATION
Courtesy of CHRYSLER LLC

6. Slightly lower transmission with floor jack to gain access to mount to frame rail fastener (2).
7. Remove mount isolator (3).

Installation

INSTALLATION

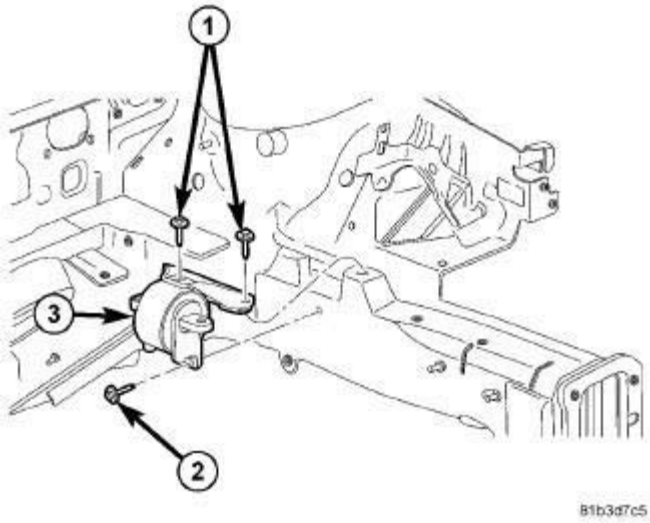

Fig. 319: LEFT ISOLATOR INSTALLATION
Courtesy of CHRYSLER LLC

1. Position mount isolator (3) in place, install bolts (1, 2) and tighten to 50 N.m (37 ft. lbs.).

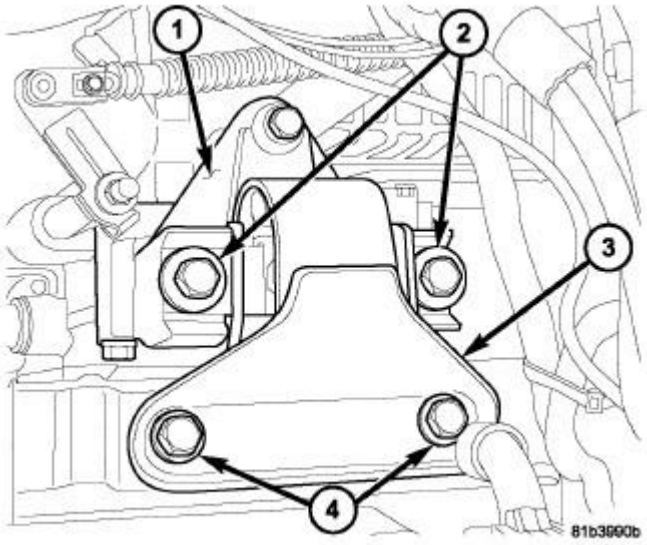

Fig. 320: LEFT MOUNT
Courtesy of CHRYSLER LLC

2. Raise transaxle into position, install bolts (2) and tighten to 98 N.m (72 ft. lbs.).
3. Remove floor jack and wooden block.

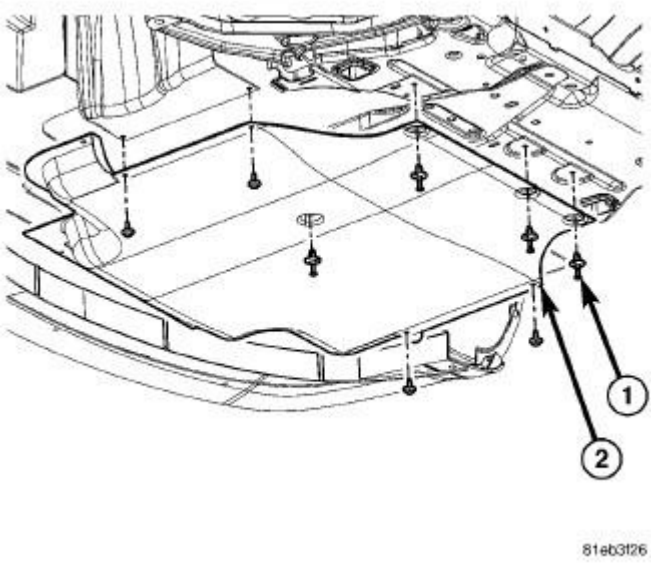

Fig. 321: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

4. Install belly pan (2).

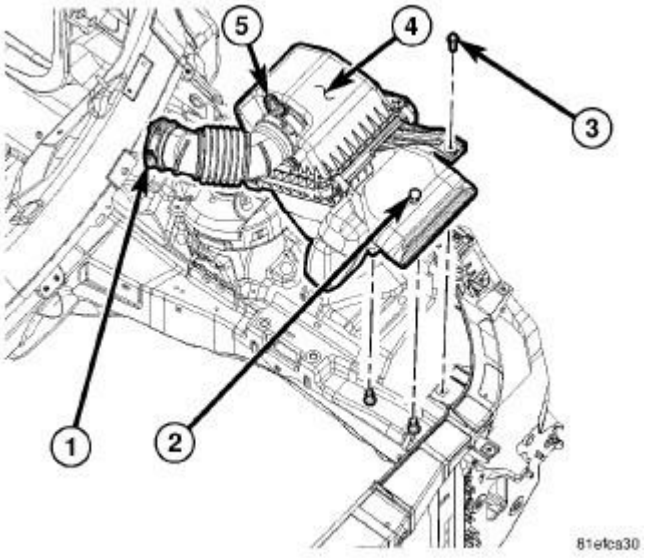

Fig. 322: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

5. Install the air cleaner housing assembly (4). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**
6. Connect negative battery cable.

INSULATOR, ENGINE MOUNT, RIGHT

Removal

REMOVAL

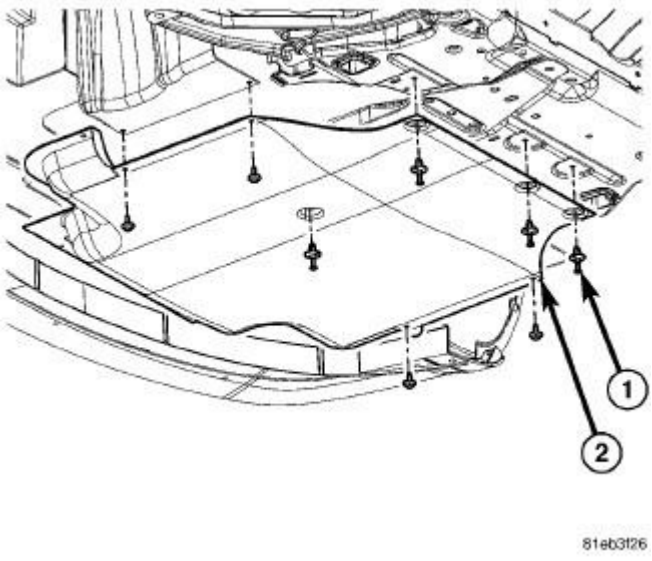

Fig. 323: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1. Remove the belly pan (2).

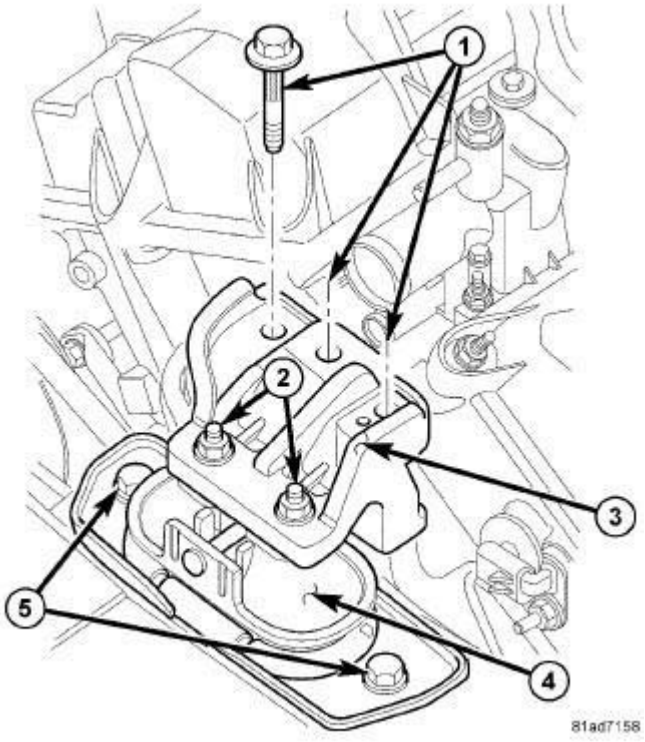

Fig. 324: Right Side Engine Mount Bolts
Courtesy of CHRYSLER LLC

2. Lower vehicle. Remove the load on the engine motor mounts by carefully supporting the engine assembly from below.
3. Remove Power Steering Fluid Reservoir and set aside. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Removal** .
4. Disconnect the ground strap.
5. Remove the right engine support bracket vertical fasteners (1) and (2) and remove support bracket (3).
6. Remove the bolts (5) attaching the right isolator (4) to the frame rail.
7. Remove right isolator (4).

Installation

INSTALLATION

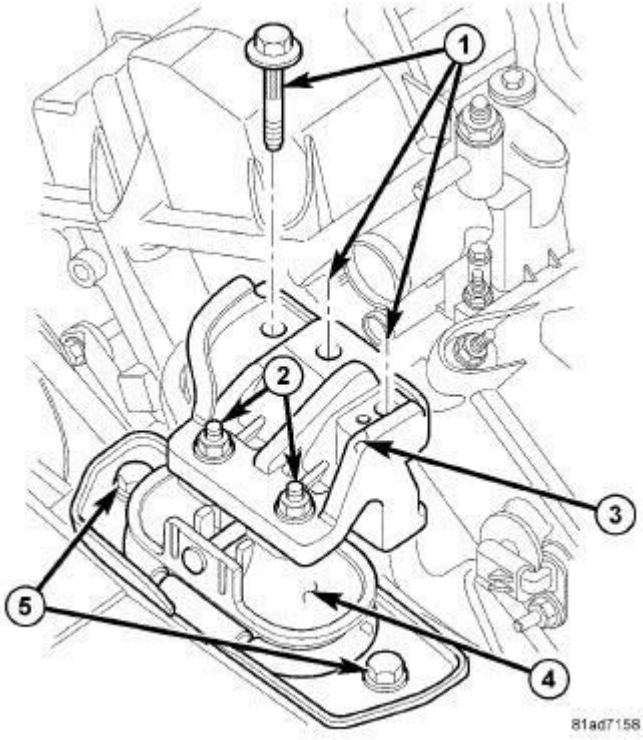

Fig. 325: Right Side Engine Mount Bolts
Courtesy of CHRYSLER LLC

1. Position right isolator (4) and install the isolator to frame rail bolts (5). Tighten bolts to 55 N.m (40 ft. lbs.).
2. Install the engine support bracket (3) and bolts (1). Tighten bolts to 50 N.m (37 ft. lbs).
3. Install the support bracket to isolator nuts (2) and tighten to 30 N.m (22 ft. lbs).
4. Reconnect the ground strap.

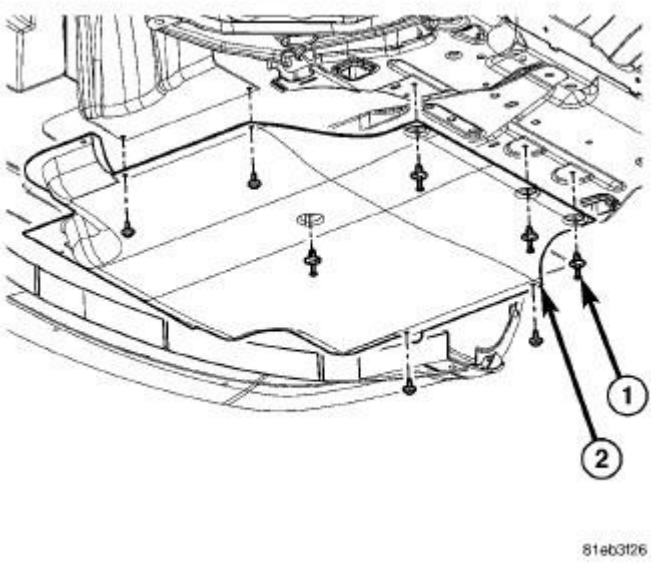

Fig. 326: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

5. Raise vehicle on a hoist.
6. Install the belly pan (2).
7. Install power steering reservoir. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Installation** .

INSULATOR, ENGINE MOUNT, REAR

Removal

REMOVAL

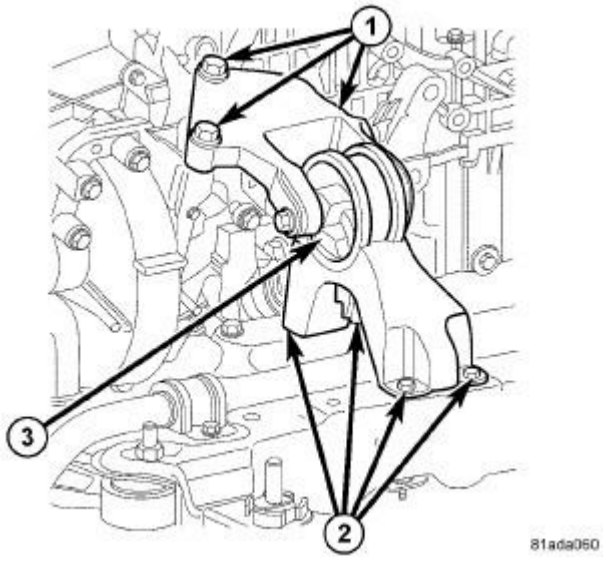

Fig. 327: REAR MOUNT
Courtesy of CHRYSLER LLC

1. Remove the three top mount bracket bolts (1) and one side mount bracket bolt.
2. Raise the vehicle.

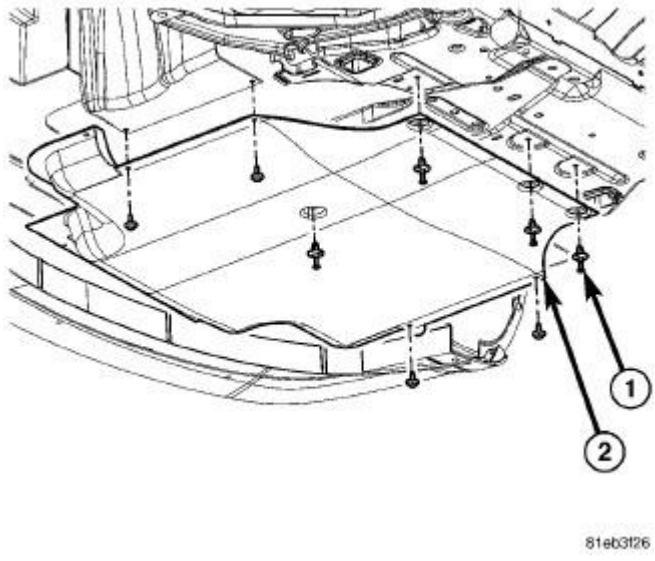

Fig. 328: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

3. Remove the belly pan (2).

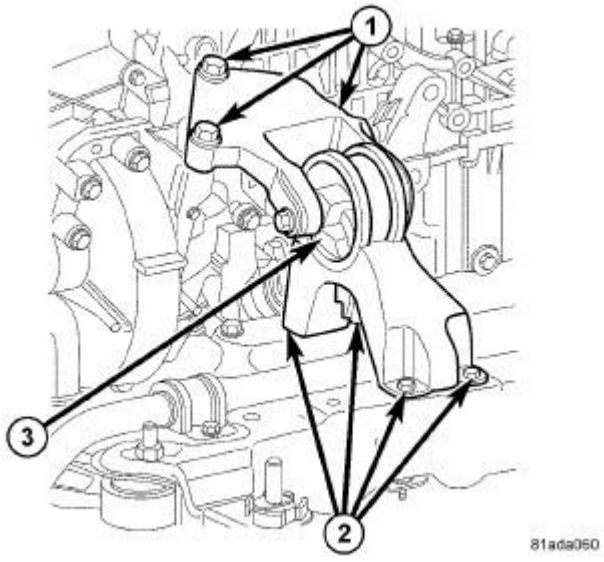

Fig. 329: Removing/Installing Rear Mount
Courtesy of CHRYSLER LLC

4. Remove rear mount bracket through bolt.
5. Remove rear mount bracket from transaxle case.
6. Remove the four rear isolator to suspension crossmember attaching bolts (2).
7. Remove rear isolator (3).

Installation

INSTALLATION

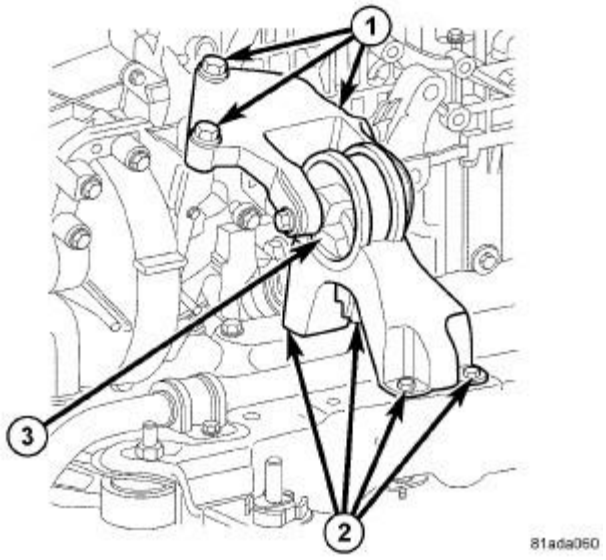

Fig. 330: REAR MOUNT

Courtesy of CHRYSLER LLC

1. Position rear isolator (3).
2. Install the four rear isolator to suspension crossmember attaching bolts (2) and tighten to 50 N.m (37 ft. lbs.).

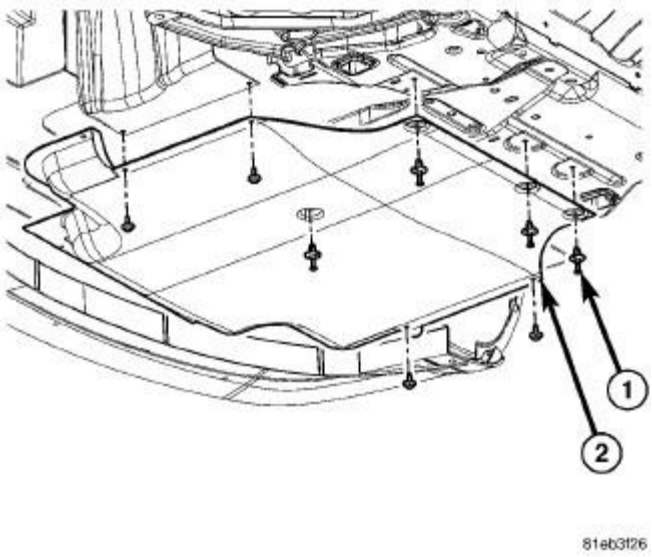

Fig. 331: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

3. Install the belly pan (2).
4. Lower the vehicle.

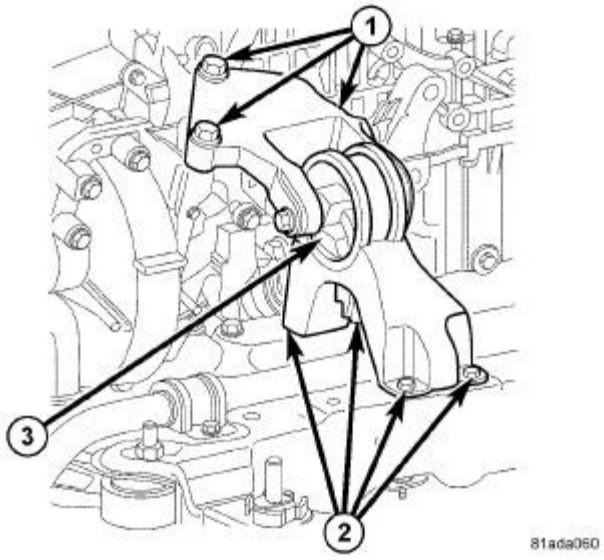

Fig. 332: REAR MOUNT

Courtesy of CHRYSLER LLC

5. Position the rear mount bracket on the transaxle case.
6. Install three top mount bracket bolts (1) and one side mount bracket bolt. Tighten bolts to 88 N.m (65 ft. lbs.).
7. Install rear mount bracket through bolt. Tighten to 75 N.m (55 ft. lbs.).

INSULATOR, ENGINE MOUNT, AWD REAR

Removal

REMOVAL

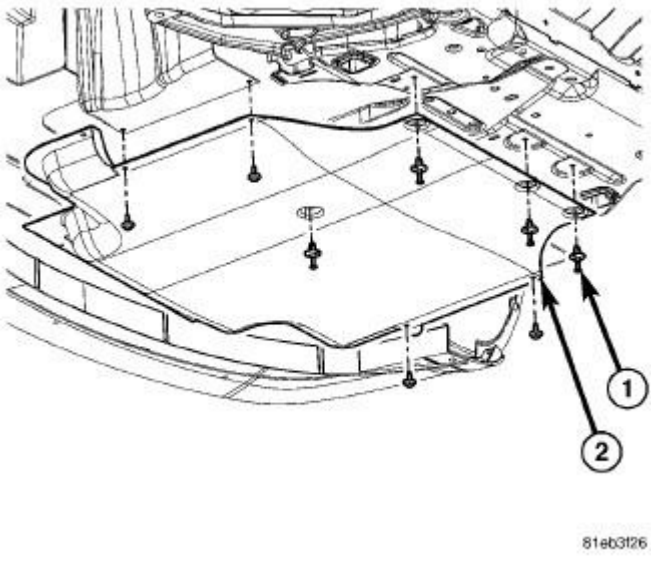

Fig. 333: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

1. Remove the belly pan (2).

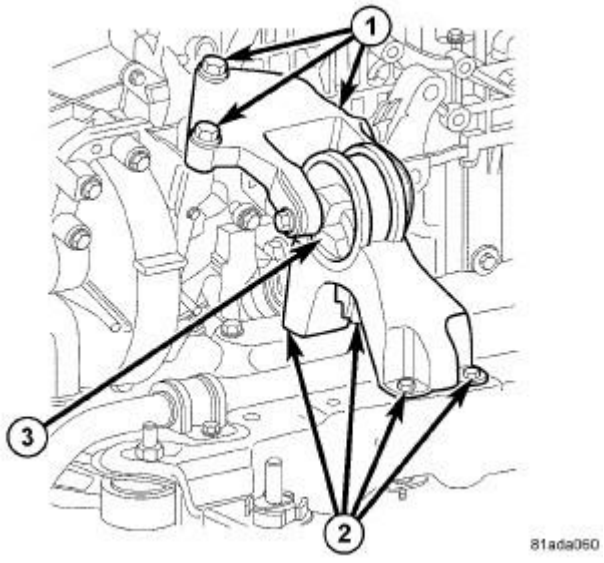

Fig. 334: REAR MOUNT
Courtesy of CHRYSLER LLC

2. Remove the Power Transfer Unit (PTU). Refer to **Transmission and Transfer Case/Power Transfer Unit - Removal** .
3. Remove the 3 top mount bracket bolts (1).
4. Remove the 4 lower mount to cradle bolts (2).
5. Remove rear mount (3).

Installation

INSTALLATION

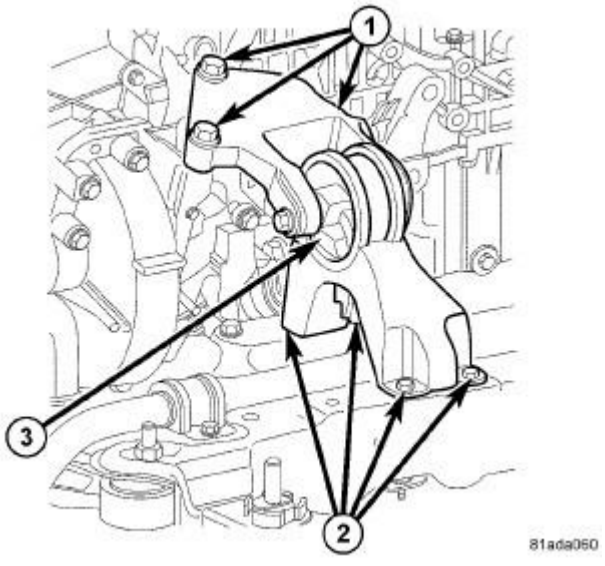

Fig. 335: REAR MOUNT
Courtesy of CHRYSLER LLC

1. Position rear mount (3).
2. Install the 4 lower mount to cradle bolts (2) and torque to 50 N.m (37 ft. lbs.).
3. Install 3 top mount bracket bolts and torque 50 N.m (37 ft. lbs.).
4. Install the Power Transfer Unit (PTU). Refer to **Transmission and Transfer Case/Power Transfer Unit - Installation** .

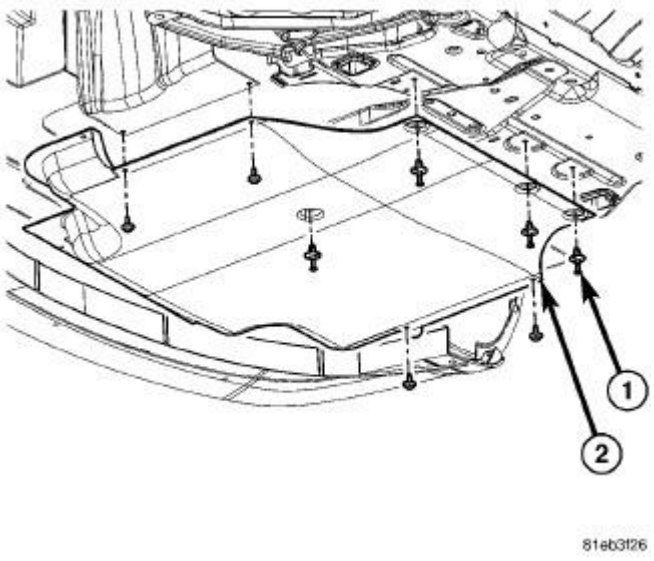

Fig. 336: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

5. Install the belly pan (2).

INSULATOR, ENGINE MOUNT, FRONT

Removal

REMOVAL

1. Raise vehicle.

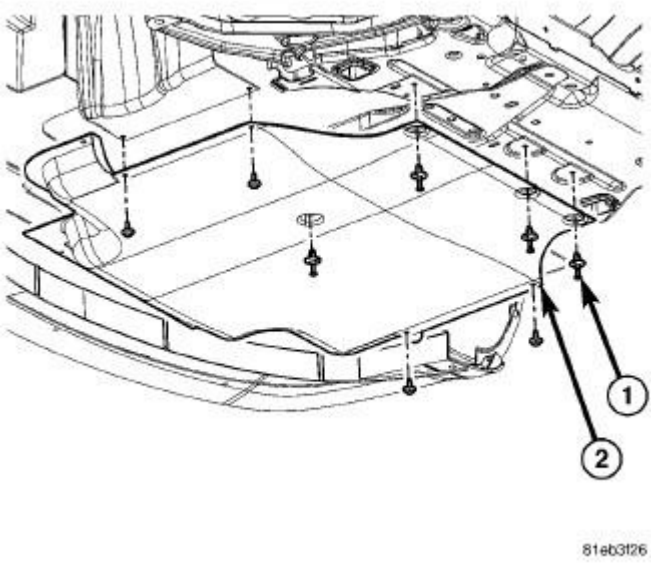

Fig. 337: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

2. Remove the belly pan (2).

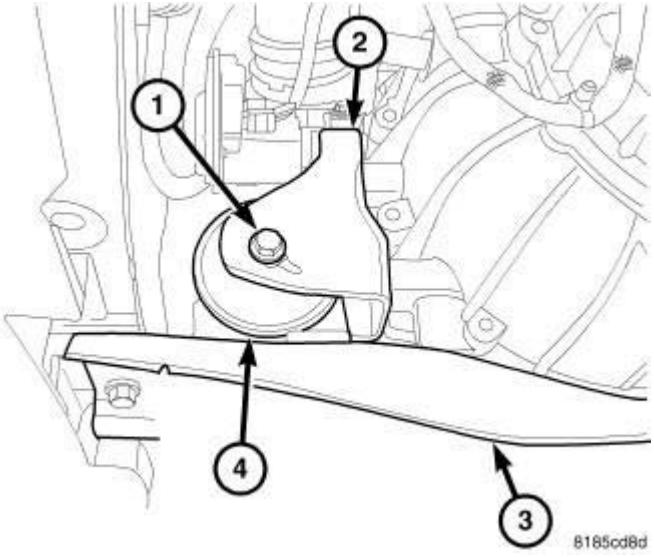

Fig. 338: Removing/Installing Front Mount
Courtesy of CHRYSLER LLC

3. Remove fore aft member (3) to mount (4) bolts.
4. Remove mount through bolt (1).
5. Remove fore aft member (3) mounting bolts and remove.

6. Remove front mount (4).

Installation

INSTALLATION

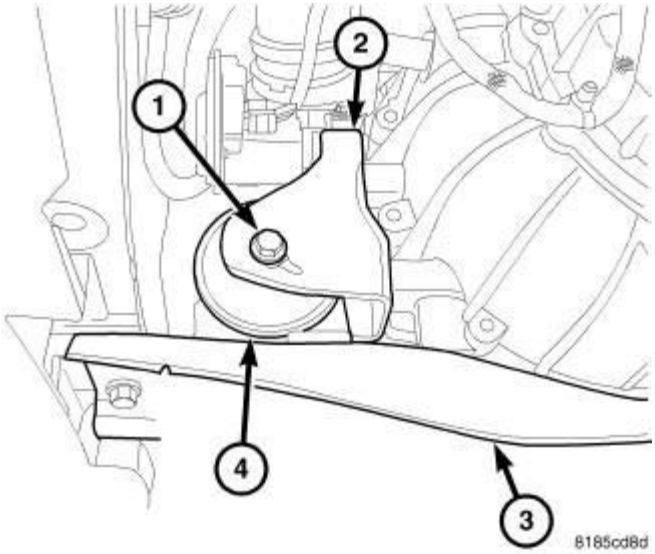

Fig. 339: Removing/Installing Front Mount
Courtesy of CHRYSLER LLC

1. Position mount (4) and torque bolts to 47 N.m (35 ft. lbs.).
2. Install fore aft member (3) and torque bolts to 100 N.m (74 ft. lbs.).
3. Install mount through bolt (1) and torque to 47 N.m (35 ft. lbs.).

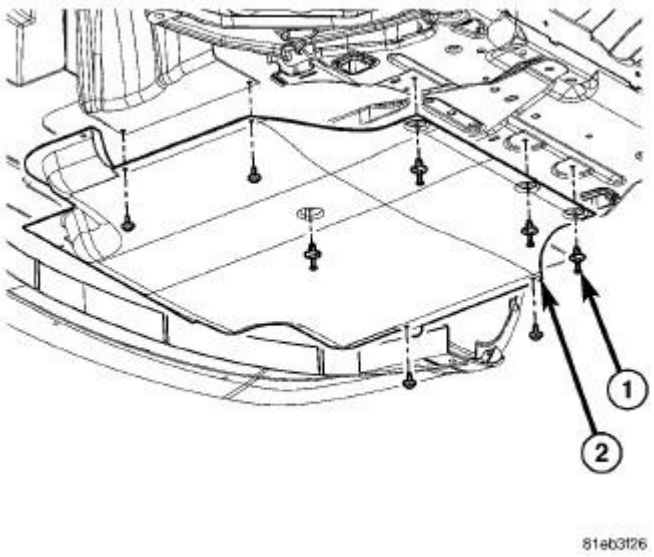

Fig. 340: Belly Pan Fasteners

Courtesy of CHRYSLER LLC

1 - belly pan fasteners 2 - belly pan

4. Install the belly pan (2).
5. Lower vehicle.

LUBRICATION

DESCRIPTION

DESCRIPTION

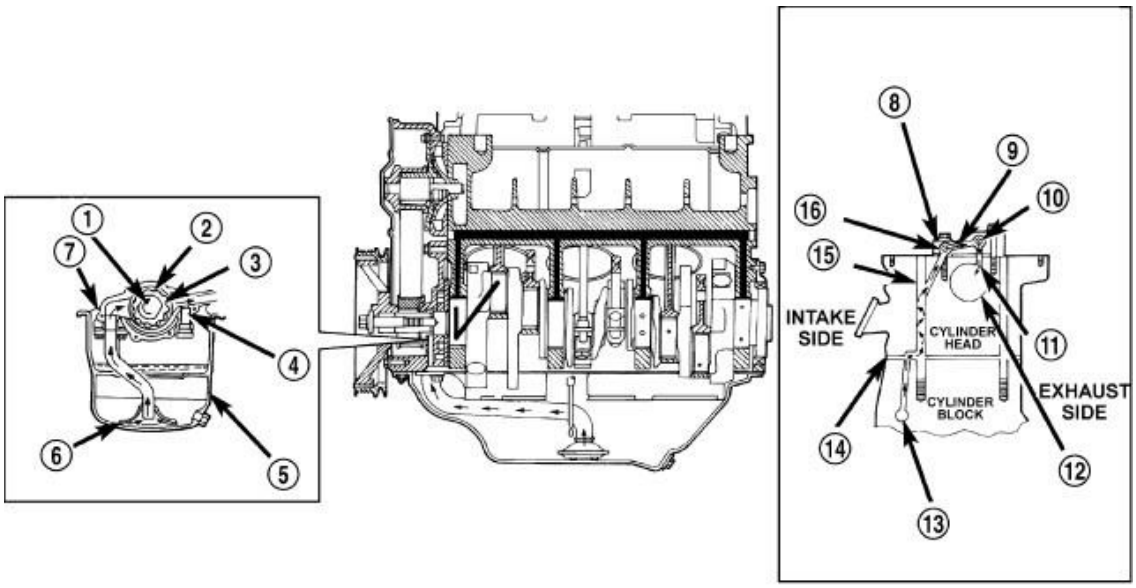

Fig. 341: Oil Lubrication System
Courtesy of CHRYSLER LLC

1 - CRANKSHAFT	9 - PEDESTAL DRILLED PASSAGE
2 - OUTER ROTOR	10 - EXHAUST ROCKER SHAFT
3 - INNER ROTOR	11 - SHAFT/PEDESTAL DOWEL PASSAGE
4 - RELIEF VALVE	12 - CAMSHAFT BEARING BORE
5 - OIL PAN	13 - CYLINDER BLOCK OIL GALLERY
6 - OIL SCREEN	14 - CYLINDER HEAD GASKET
7 - OIL PUMP CASE	15 - HEAD BOLT HOLE
8 - OIL FLOWS TO ONLY ONE PEDESTAL ON EACH HEAD - SECOND FROM REAR ON RIGHT HEAD - SECOND FROM FRONT ON LEFT HEAD	16 - INTAKE ROCKER SHAFT

The oil lubrication system is a full-flow filtration, pressure feed type. The oil pump body (7) is mounted to the engine block. The pump inner rotor (3) is driven by the crankshaft (1). A windage tray, increases engine power by minimizing oil windage at high engine RPM. For increased engine oil cooling, an engine oil-to-engine coolant oil cooler is used.

OPERATION

OPERATION

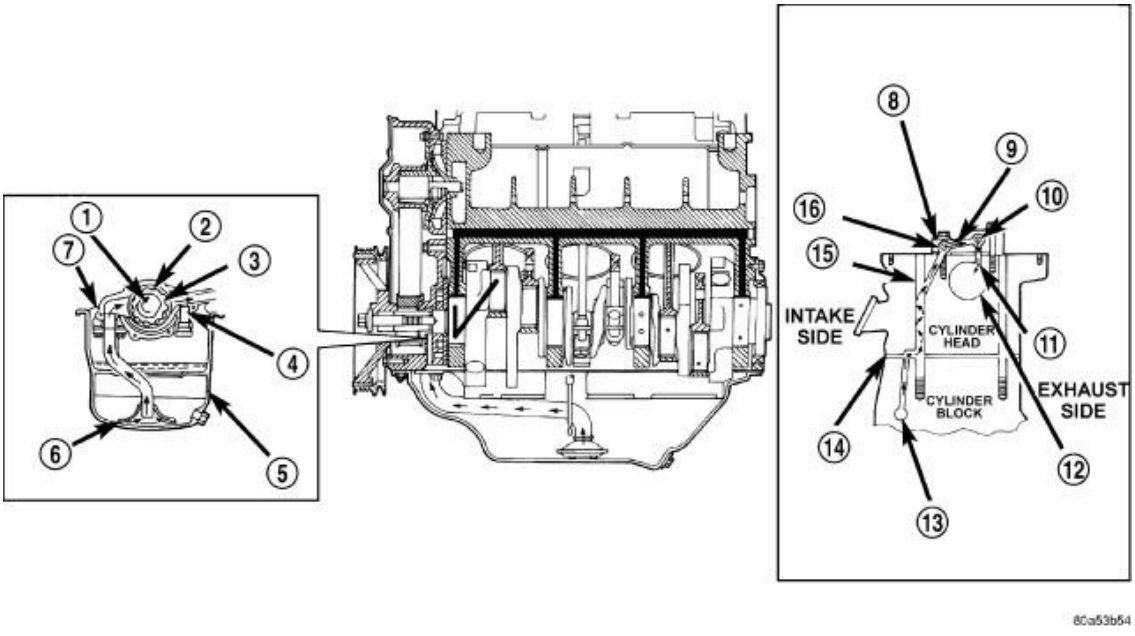

Fig. 342: Oil Lubrication System
Courtesy of CHRYSLER LLC

1 - CRANKSHAFT	9 - PEDESTAL DRILLED PASSAGE
2 - OUTER ROTOR	10 - EXHAUST ROCKER SHAFT
3 - INNER ROTOR	11 - SHAFT/PEDESTAL DOWEL PASSAGE
4 - RELIEF VALVE	12 - CAMSHAFT BEARING BORE
5 - OIL PAN	13 - CYLINDER BLOCK OIL GALLERY
6 - OIL SCREEN	14 - CYLINDER HEAD GASKET
7 - OIL PUMP CASE	15 - HEAD BOLT HOLE
8 - OIL FLOWS TO ONLY ONE PEDESTAL ON EACH HEAD - SECOND FROM REAR ON RIGHT HEAD - SECOND FROM FRONT ON LEFT HEAD	16 - INTAKE ROCKER SHAFT

Engine oil stored in the oil pan is drawn in and discharged by a gerotor type oil pump. The oil pump is directly coupled to the crankshaft. Oil pressure is regulated by a relief valve. The oil is fed through an oil filter and to the crankshaft journals from the oil gallery in the cylinder block. This gallery also feeds oil under pressure to the cylinder heads. Oil flows through each cylinder heads oil passage to the rocker shafts. Oil then feeds the camshaft journals, rocker arms, and hydraulic lash adjusters.

DIAGNOSIS AND TESTING

CHECKING ENGINE OIL PRESSURE

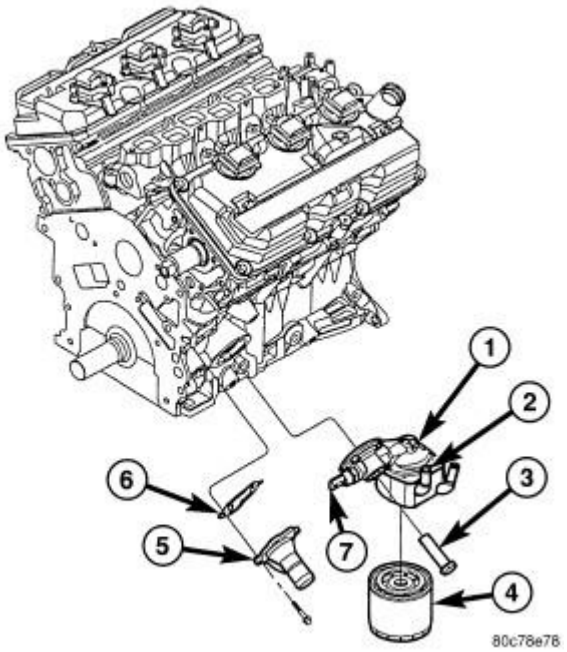

Fig. 343: Engine Oil Cooler & Filter
Courtesy of CHRYSLER LLC

1 - OIL FILTER ADAPTER
2 - OIL COOLER
3 - FASTENER-OIL FILTER ADAPTER
4 - OIL FILTER
5 - WATER INLET TUBE
6 - GASKET
7 - OIL PRESSURE SENSOR

Check oil pressure using a gauge at oil pressure switch location (7).

1. Remove the oil pressure switch (7). See **Engine/Lubrication/SWITCH, Oil Pressure - Removal**.
2. Install oil pressure test gauge, Special Tool C-3292A with Adapter 8406. For Special Tool identification. See **Engine - Special Tools**.

CAUTION: If oil pressure is 0 at idle, Do Not Run engine at 3000 RPM.

3. Warm engine to normal operating temperature.

4. Monitor gauge readings at idle and 3000 RPM. For specifications. See **Engine - Specifications**.

FILTER, ENGINE OIL

Removal

REMOVAL

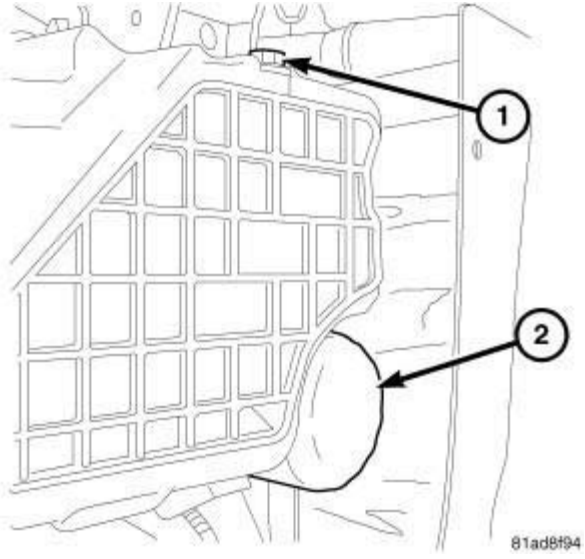

Fig. 344: ENGINE OIL FILTER & COOLER
Courtesy of CHRYSLER LLC

NOTE: When servicing the oil filter, avoid deforming the filter can. Install the remove/install tool band strap against the base lock seam. The lock seam joining the can to the base is reinforced by the base plate.

1. Using a suitable oil filter wrench, unscrew filter (2) from base and discard.

Installation

INSTALLATION

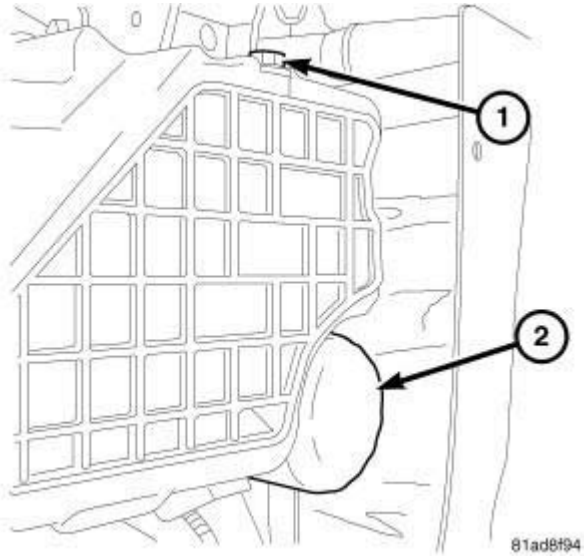

Fig. 345: ENGINE OIL FILTER & COOLER
Courtesy of CHRYSLER LLC

All engines are equipped with a high quality full-flow, disposable type oil filter (2). When replacing oil filter, use a Mopar® filter or equivalent.

1. Wipe base clean, then inspect gasket contact surface.
2. Lubricate gasket of new filter with clean engine oil.
3. Install and tighten oil filter (2) to 16 N.m (12 ft. lbs.) of torque after gasket contacts base. Use filter wrench if necessary.
4. Start engine and check for leaks.

OIL

Description

DESCRIPTION

For engine oil type and capacity, refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

Standard Procedure

ENGINE OIL LEVEL CHECK

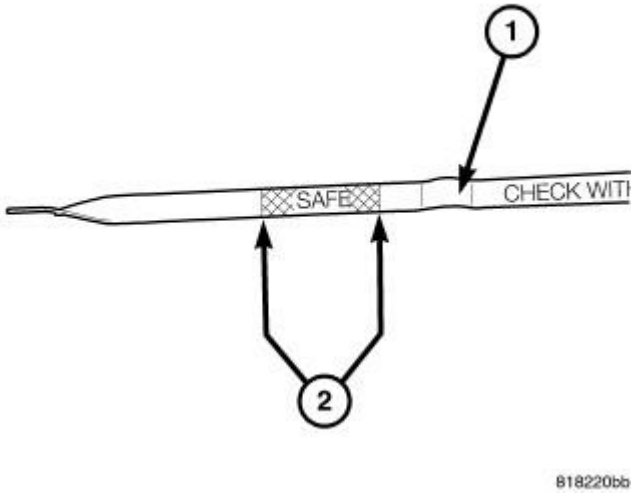

Fig. 346: OIL LEVEL
Courtesy of CHRYSLER LLC

Checking the oil while the vehicle is on level ground will improve the accuracy of the oil level reading. Remove dipstick (1), and observe oil level. Add oil only when the level is at or below the SAFE mark. If the oil level is in the safe (2) range, do not add oil.

CAUTION: Do not operate engine if the oil level is above the MAX mark on the dipstick. Excessive oil volume can cause oil aeration which can lead to engine failure due to loss of oil pressure or increase in oil temperature.

ENGINE OIL AND FILTER CHANGE

Change engine oil at mileage and time intervals described in the Maintenance Schedule. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .

WARNING: New or used engine oil can be irritating to the skin. Avoid prolonged or repeated skin contact with engine oil. Contaminants in used engine oil, caused by internal combustion, can be hazardous to your health. Thoroughly wash exposed skin with soap and water. Do not wash skin with gasoline, diesel fuel, thinner, or solvents, health problems can result. Do not pollute, dispose of used engine oil properly. Contact your dealer or government agency for location of collection center in your area.

TO CHANGE ENGINE OIL

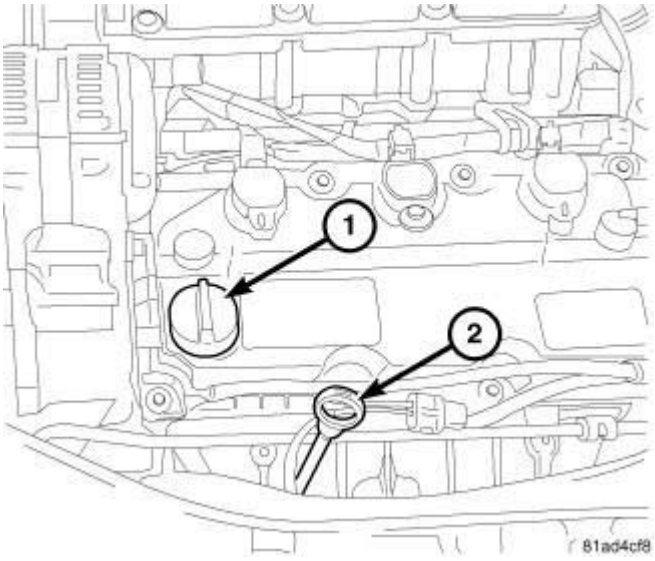

Fig. 347: ENGINE OIL FILLER CAP & DIPSTICK
Courtesy of CHRYSLER LLC

1 - ENGINE OIL FILL CAP 2 - ENGINE OIL DIPSTICK

1. Run engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn engine off.
3. Open hood, remove engine oil fill cap (1).
4. Raise vehicle on hoist.
5. Place a suitable drain pan under crankcase drain.

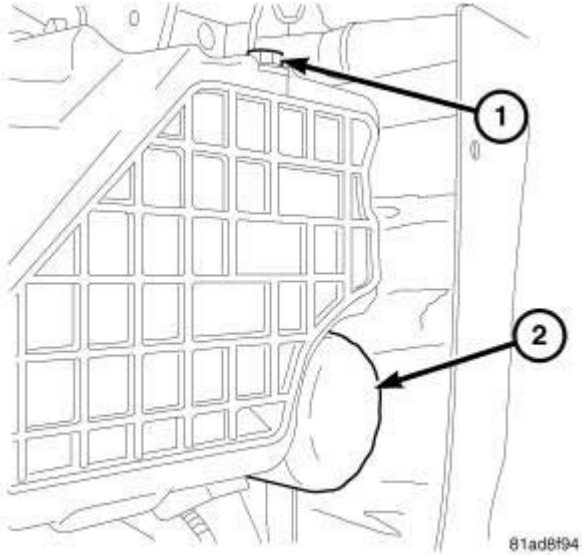

Fig. 348: ENGINE OIL FILTER & COOLER
Courtesy of CHRYSLER LLC

6. Remove oil pan drain plug (1) from crankcase and allow oil to drain into pan. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.
7. Remove oil filter (2).
8. Install drain plug (1) in crankcase. Tighten oil pan drain plug to 27 N.m (20 ft. lbs.).
9. Install new oil filter (2).
10. Lower vehicle.

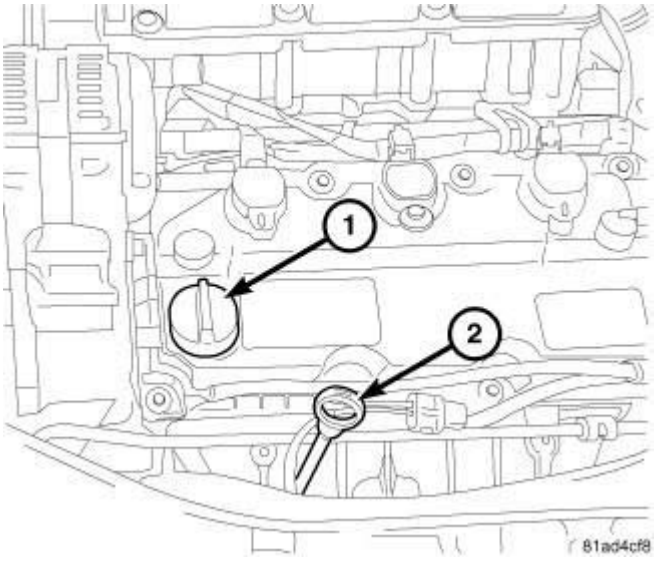

Fig. 349: ENGINE OIL FILLER CAP & DIPSTICK
Courtesy of CHRYSLER LLC

1 - ENGINE OIL FILL CAP
2 - ENGINE OIL DIPSTICK

11. Fill crankcase with specified type and amount of engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** or **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
12. Install oil fill cap (1).
13. Start engine and inspect for leaks.
14. Turn engine off and inspect oil level.

OIL FILTER SPECIFICATION

All engines are equipped with a high quality full-flow, disposable type oil filter. When replacing oil filter, use a Mopar® filter or equivalent.

USED ENGINE OIL DISPOSAL

Care should be exercised when disposing used engine oil after it has been drained from a vehicle engine. Refer to the WARNING above.

PAN, OIL

Removal

REMOVAL

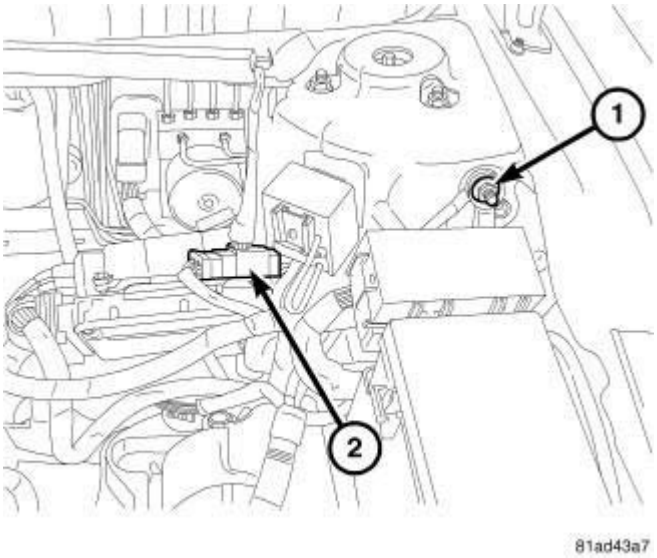

Fig. 350: BATTERY CABLE
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable (1).

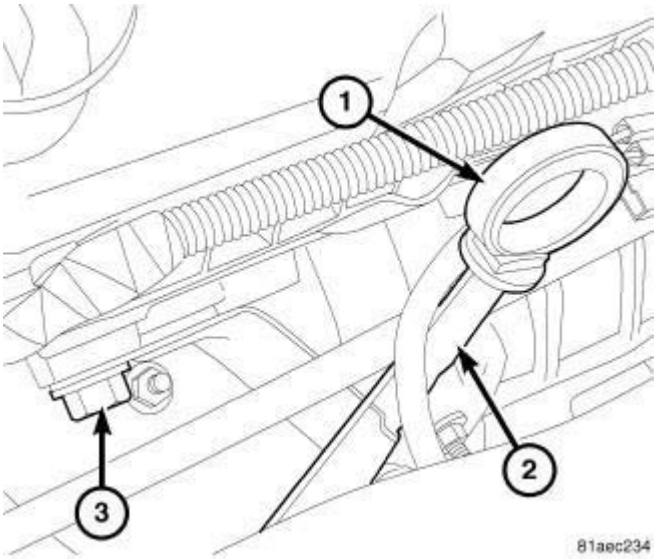

Fig. 351: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

2. Remove the engine oil indicator (1).
3. Remove the engine oil indicator tube bolt (3).

4. Remove the engine oil indicator tube (2).
5. Raise and support the vehicle.

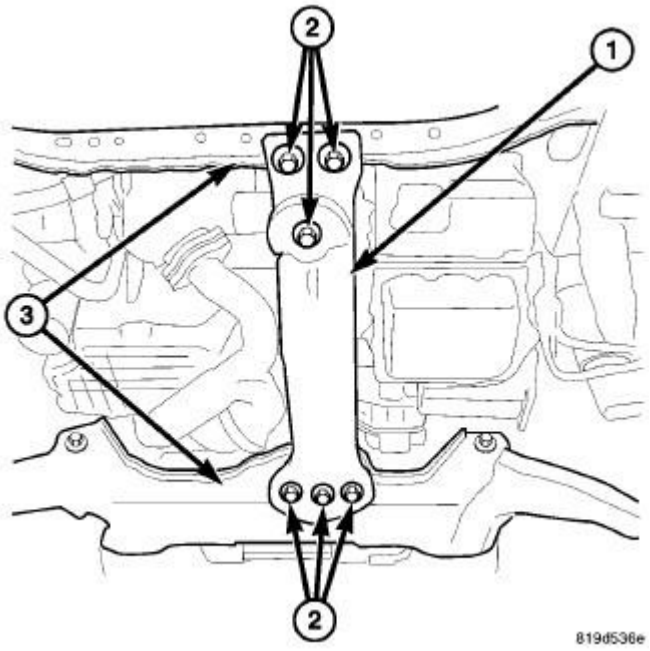

Fig. 352: FORE-AFT Crossmember
Courtesy of CHRYSLER LLC

6. Remove the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

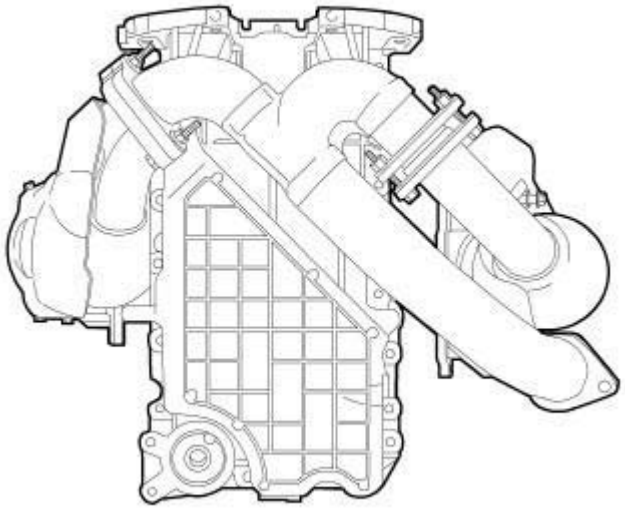

Fig. 353: Maniverters
Courtesy of CHRYSLER LLC

7. Remove the crossover pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.
8. Loosen the front exhaust manifold. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

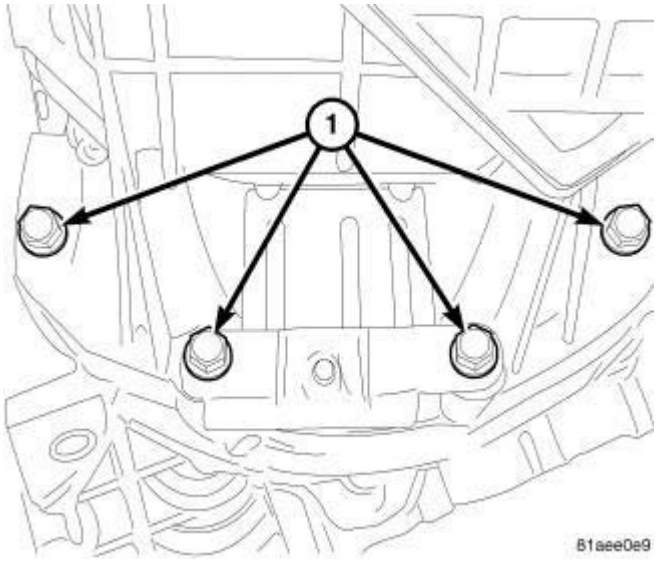

Fig. 354: Oil Pan Bell Housing Bolts
Courtesy of CHRYSLER LLC

9. Remove the oil pan bell housing bolts (1).

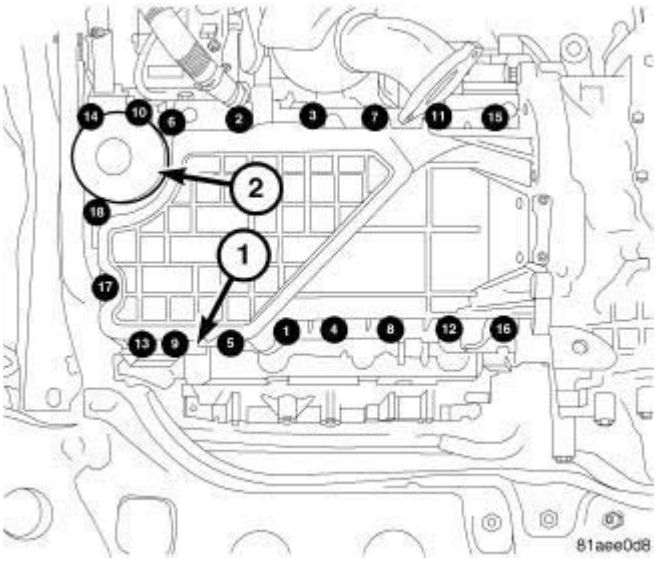

Fig. 355: OIL PAN
Courtesy of CHRYSLER LLC

10. Drain the engine oil (1).

11. Remove the engine oil filter (2).
12. Remove the oil pan fasteners. Remove the oil pan.

NOTE: A small amount of oil will remain in the oil pan. Use care when removing the oil pan from the engine.

13. Remove oil pan gasket.

Installation

INSTALLATION

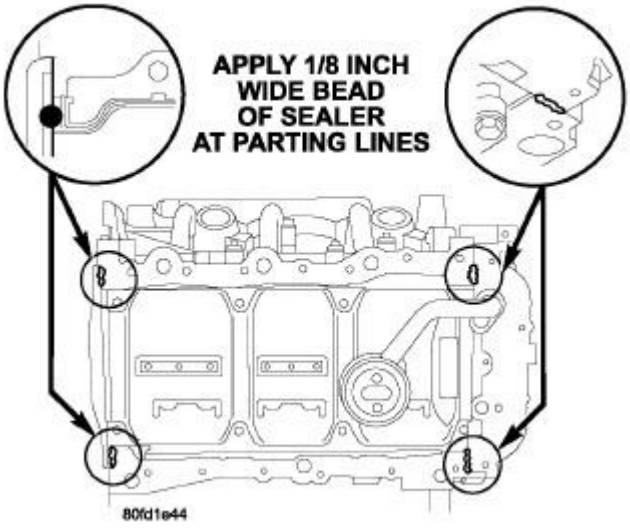

Fig. 356: OIL PAN SEALING - TYPICAL
Courtesy of CHRYSLER LLC

1. Clean oil pan and all gasket surfaces.
2. Apply a 1/8 inch bead of Mopar® Engine RTV GEN II at the parting line of the oil pump housing and the rear seal retainer.
3. Install oil pan gasket to the engine block.

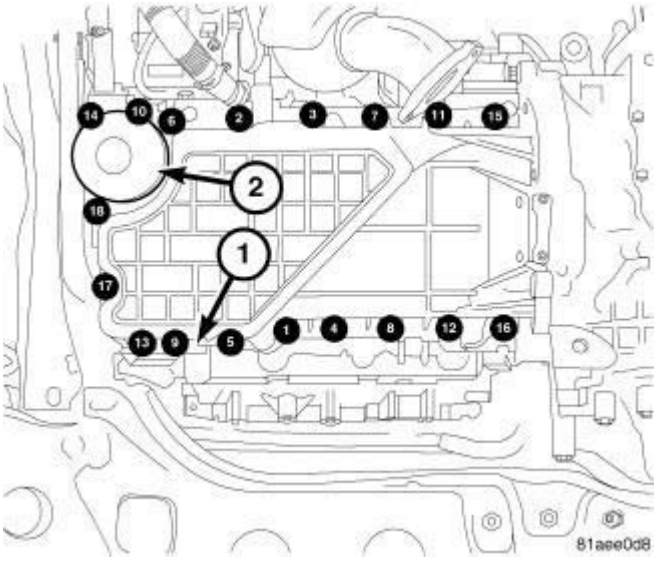

Fig. 357: OIL PAN
Courtesy of CHRYSLER LLC

4. Install the oil pan and tighten the oil pan bolts to 28 N.m (21 ft. lbs.).

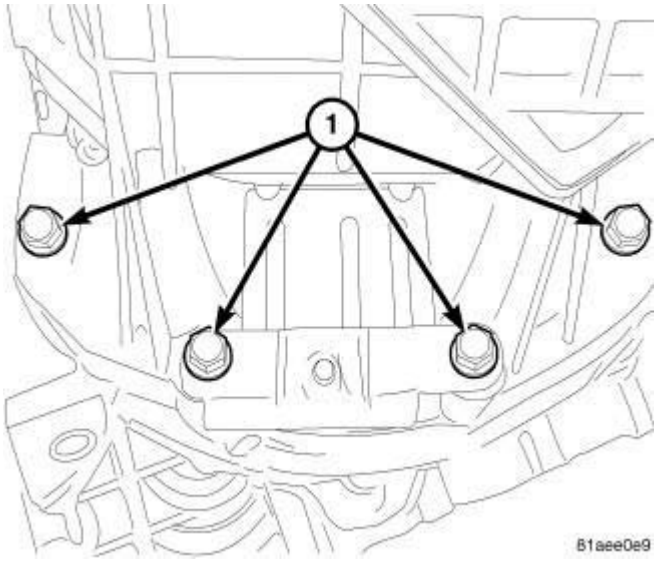

Fig. 358: Oil Pan Bell Housing Bolts
Courtesy of CHRYSLER LLC

5. Tighten the oil pan bell housing bolts to 55 N.m (40 ft. lbs.).

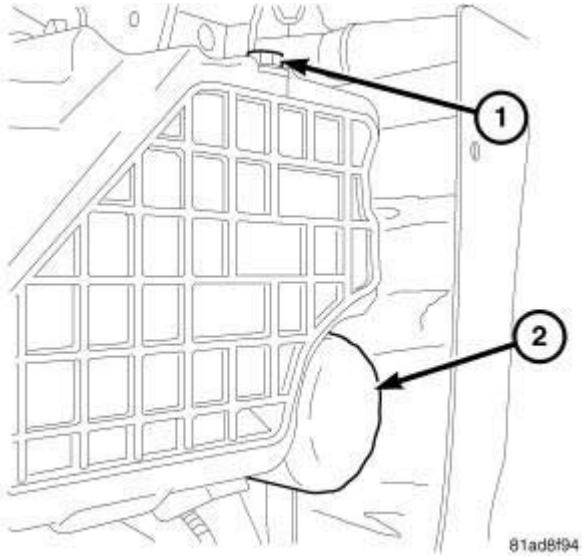

Fig. 359: ENGINE OIL FILTER & COOLER
Courtesy of CHRYSLER LLC

6. All engines are equipped with a high quality full-flow, disposable type oil filter (2). When replacing oil filter, use a Mopar® filter or equivalent.
7. Wipe base clean, then inspect gasket contact surface.
8. Lubricate gasket of new filter with clean engine oil.
9. Install and tighten oil filter (2) to 16 N.m (12 ft. lbs.) of torque after gasket contacts base. Use filter wrench if necessary.

   Lower vehicle.

10. Install and tighten the oil pan drain bolt (1) to 27 N.m (20 ft. lbs.).
11. Tighten the front maniverter bolts. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

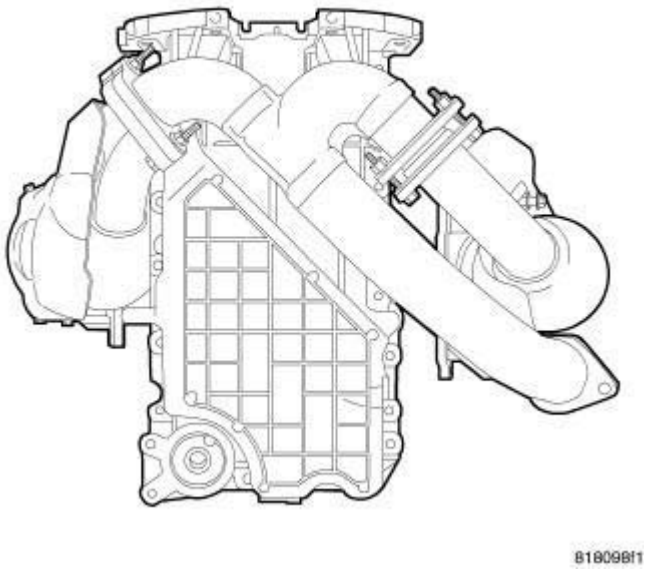

Fig. 360: Maniverters
Courtesy of CHRYSLER LLC

12. Install the crossover pipe. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.

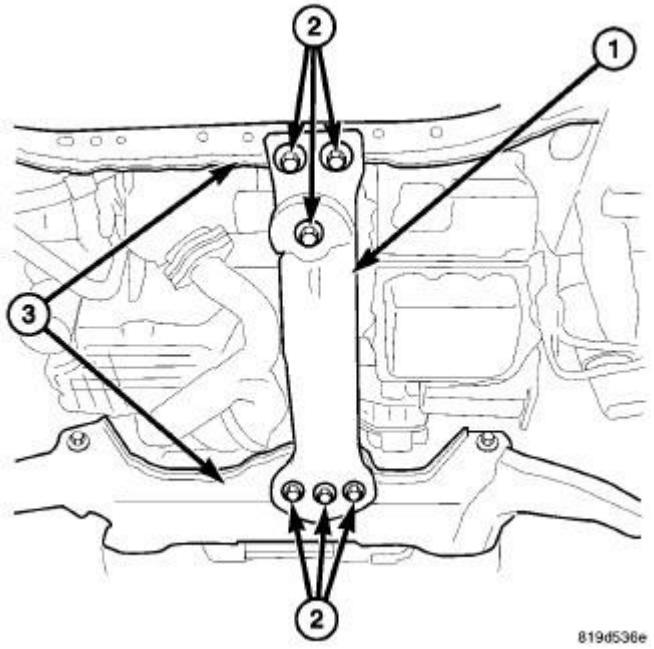

Fig. 361: FORE-AFT Crossmember
Courtesy of CHRYSLER LLC

13. Install the front crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

14. Lower vehicle.

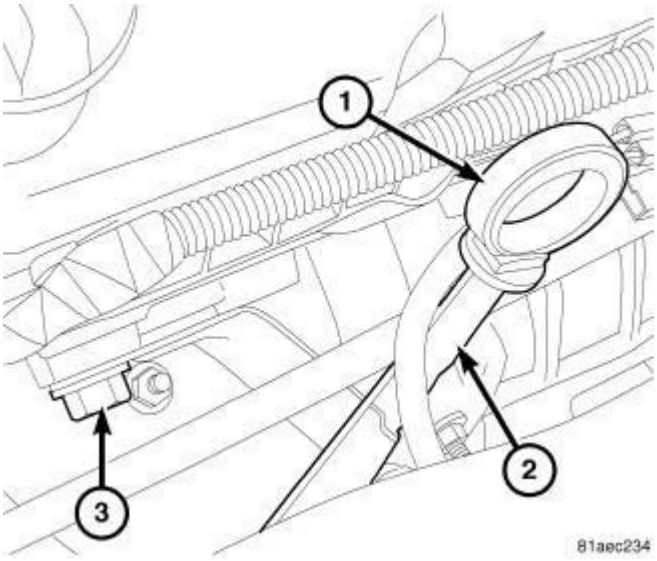

Fig. 362: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

15. Install the oil level indicator tube (2).
16. Tighten the oil level indicator tube bolt (3).
17. Install the oil indicator (1).
18. Fill engine crankcase with proper oil to correct level.

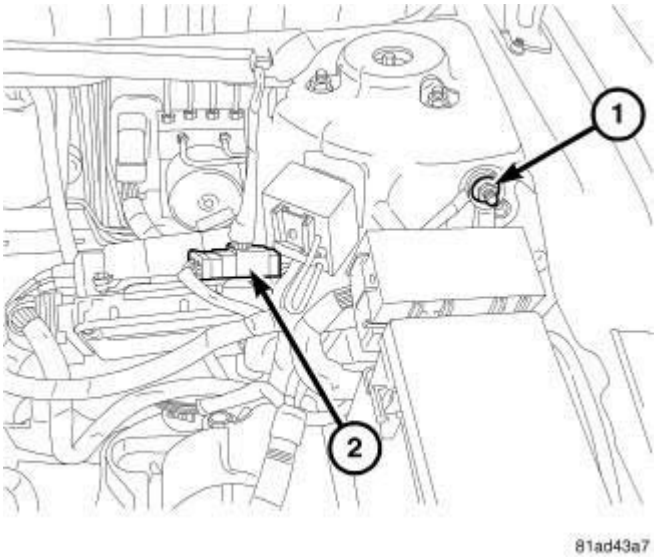

Fig. 363: BATTERY CABLE
Courtesy of CHRYSLER LLC

19. Connect negative battery cable (1).

PUMP, ENGINE OIL

Removal

REMOVAL

It is necessary to remove the oil pump body to service the oil pump rotors.

The oil pump pressure relief valve can be serviced by removing the oil pan. See **Engine/Lubrication/VALVE, Oil Pressure Relief - Removal**

1. Drain the cooling system. Refer to **Cooling - Standard Procedure** .
2. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
3. Remove the crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
4. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
5. Remove the oil pickup tube.
6. Remove the oil pump fasteners. Remove pump and gasket from engine.

Disassembly

DISASSEMBLY

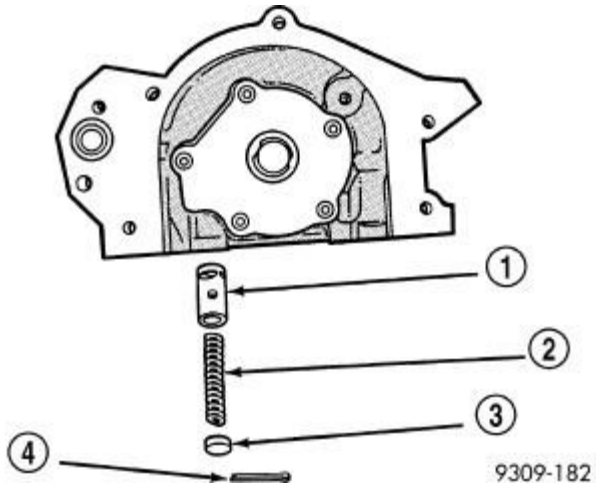

Fig. 364: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE
2 - SPRING
3 - RETAINER CAP
4 - COTTER PIN

1. To remove the relief valve (1), proceed as follows:

2. Drill a 3.175 mm (1/8 inch.) hole into the relief valve retainer cap (3) and insert a self-threading sheet metal screw into cap (3).
3. Clamp screw into a vise and while supporting oil pump body, remove cap by tapping oil pump body using a soft hammer. Discard retainer cap (3) and remove spring (2) and relief valve (1).
4. Remove oil pump cover screws, and lift off cover.
5. Remove pump rotors.
6. Wash all parts in a suitable solvent and inspect carefully for damage or wear.

Cleaning

CLEANING

1. Clean all parts thoroughly in a suitable solvent.

Inspection

INSPECTION

1. Disassemble oil pump. See **Engine/Lubrication/PUMP, Engine Oil - Disassembly**
2. Clean all parts thoroughly. Mating surface of the oil pump housing should be smooth. Replace pump cover if scratched or grooved.

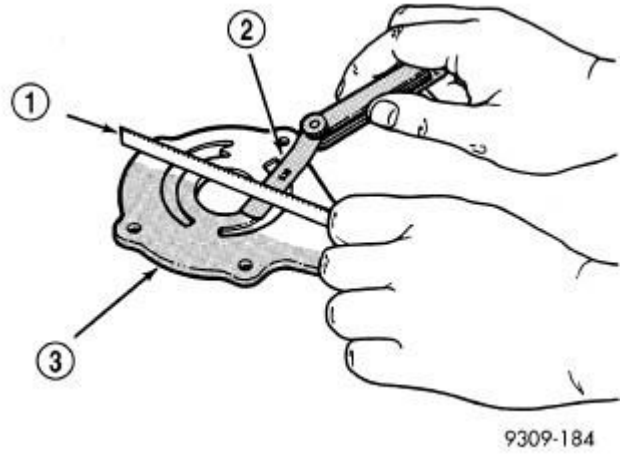

Fig. 365: Checking Oil Pump Cover Flatness
Courtesy of CHRYSLER LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGE
3 - OIL PUMP COVER

3. Lay a straightedge (1) across the pump cover surface. If a 0.025 mm (0.001 in.) feeler gauge blade (2) can be inserted between cover and straight edge, cover should be replaced.

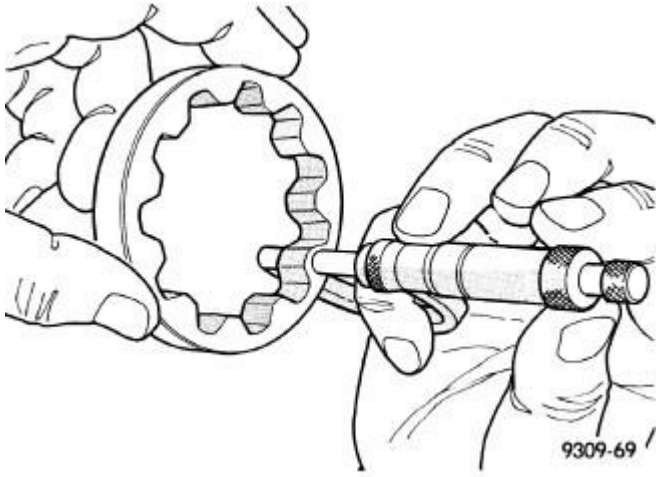

Fig. 366: Measuring Outer Rotor Thickness
Courtesy of CHRYSLER LLC

4. Measure thickness and diameter of outer rotor. If outer rotor thickness measures 14.299 mm (0.563 in.) or less, or if the diameter is 79.78 mm (3.141 inches.) or less, replace outer rotor.

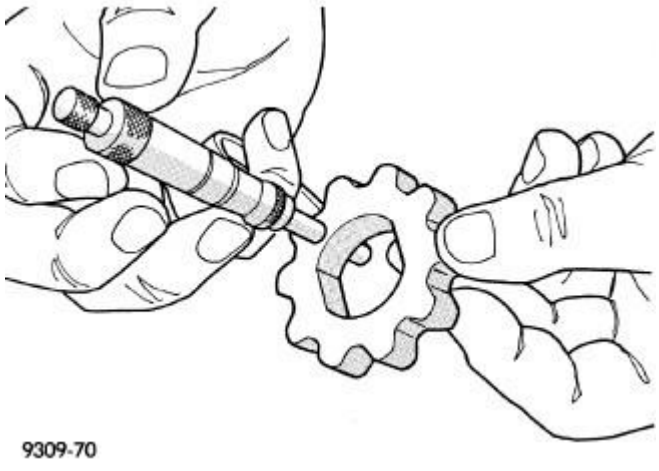

Fig. 367: Measuring Inner Rotor Thickness
Courtesy of CHRYSLER LLC

5. If inner rotor measures 14.299 mm (0.563 in.) or less replace inner rotor.

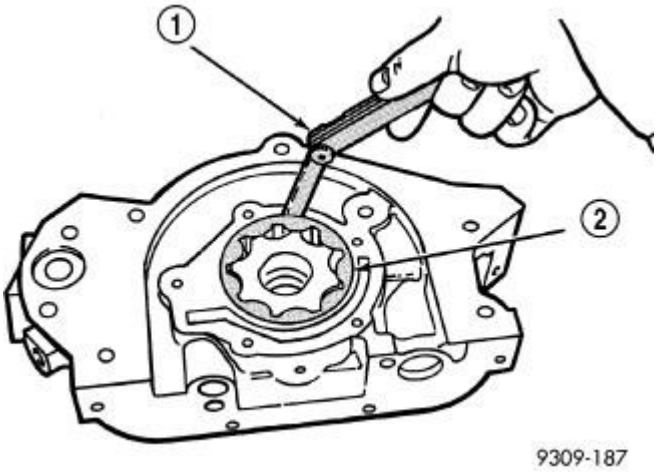

Fig. 368: Measuring Outer Rotor Clearance in Housing
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE 2 - OUTER ROTOR

6. Slide outer rotor into body, press to one side with fingers and measure clearance between rotor and body. If measurement is 0.39 mm (0.015 inch.) or more, replace body only if outer rotor is in specifications.

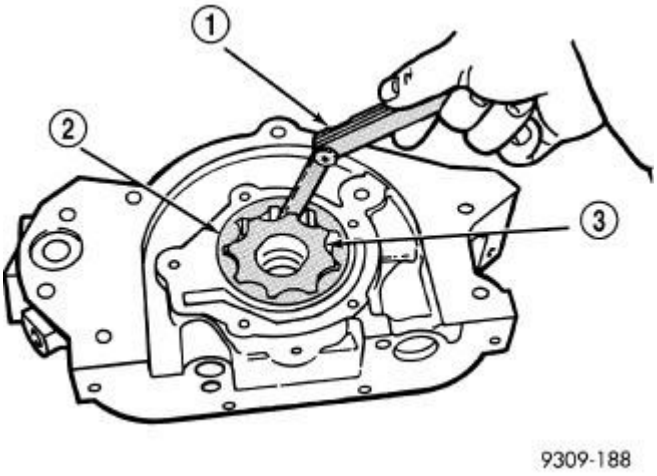

Fig. 369: Measuring Clearance Between Rotors
Courtesy of CHRYSLER LLC

1 - FEELER GAUGE 2 - OUTER ROTOR 3 - INNER ROTOR

7. Install inner rotor into body. If clearance between inner (3) and outer (2) rotors is 0.20 mm (0.008 inch.) or more, replace both rotors.

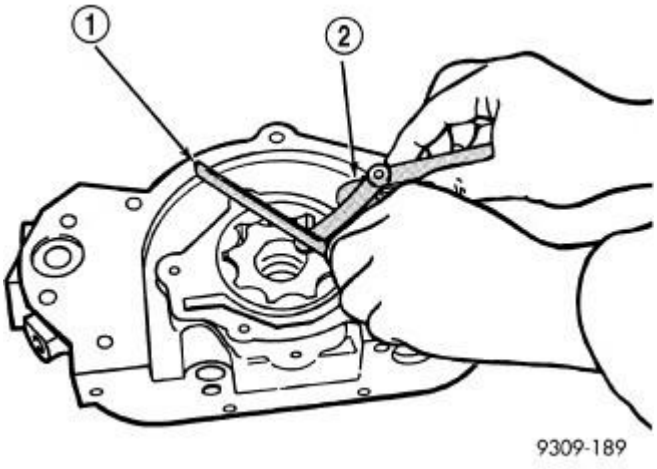

Fig. 370: Measuring Clearance Over Rotors
Courtesy of CHRYSLER LLC

1 - STRAIGHT EDGE
2 - FEELER GAUGES

8. Place a straightedge across the face of the body, between bolt holes. If a feeler gauge of 0.077 mm (0.003 in.) or more can be inserted between rotors and the straightedge, replace pump assembly **ONLY** if rotors are in specs.
9. Inspect oil pressure relief valve plunger for scoring and free operation in its bore. Small marks may be removed with 400-grit wet or dry sandpaper.

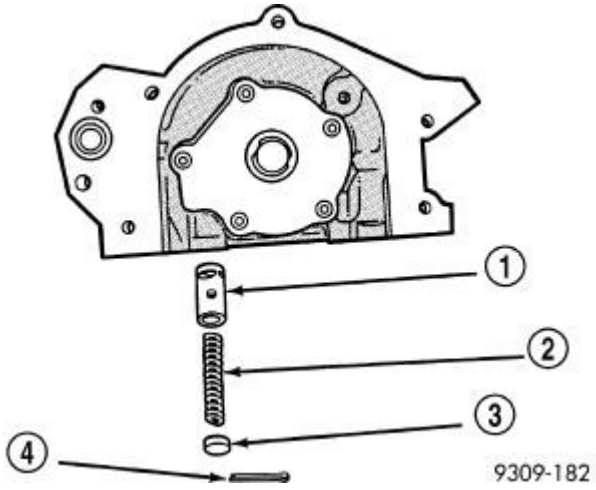

Fig. 371: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE
2 - SPRING
3 - RETAINER CAP
4 - COTTER PIN

10. The relief valve spring (2) has a free length of approximately 49.5 mm (1.95 in.) it should test between 101-110 N (23-25 lbs.) when compressed to 34 mm (1-11/32 in.). Replace spring that fails to meet specifications.
11. Assemble oil pump. See **Engine/Lubrication/PUMP, Engine Oil - Assembly**

Assembly

ASSEMBLY

1. Assemble oil pump using new parts as required.
2. Tighten cover screws to 12 N.m (105 in. lbs.).
3. Prime oil pump before installation by filling rotor cavity with engine oil.
4. If oil pressure is low and pump is within specifications, inspect for worn engine bearings or other reasons for oil pressure loss.

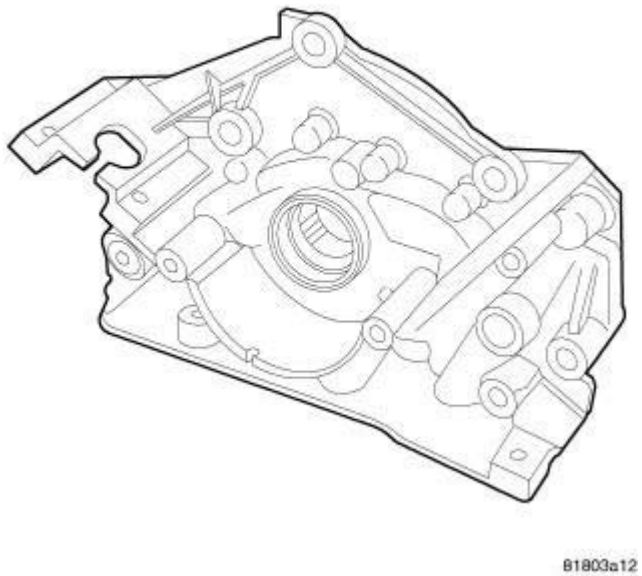

Fig. 372: Oil Pump
Courtesy of CHRYSLER LLC

Installation

INSTALLATION

NOTE: Thoroughly clean all bolt threads and threaded area in the engine, removing all oil residue, before assembly.

1. Prime oil pump before installation by filling rotor cavity with clean engine oil.
2. Install oil pump and gasket carefully over the crankshaft and position pump onto block.

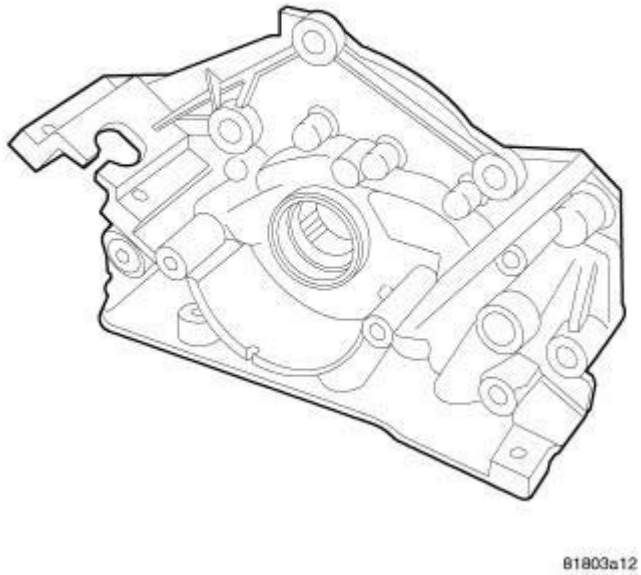

Fig. 373: Oil Pump
Courtesy of CHRYSLER LLC

NOTE: DO NOT apply the thread sealant to the underside of the bolt head.

3. Apply Mopar Thread Sealant as directed on the package to the oil pump cover bolts where indicated. The sealant must be applied from the tip to approximately 10 mm of the thread length. Tighten the oil pump cover bolts to 12 N.m (105 in. lbs.). Tighten oil pump to block bolts to 28 N.m (250 in. lbs.)

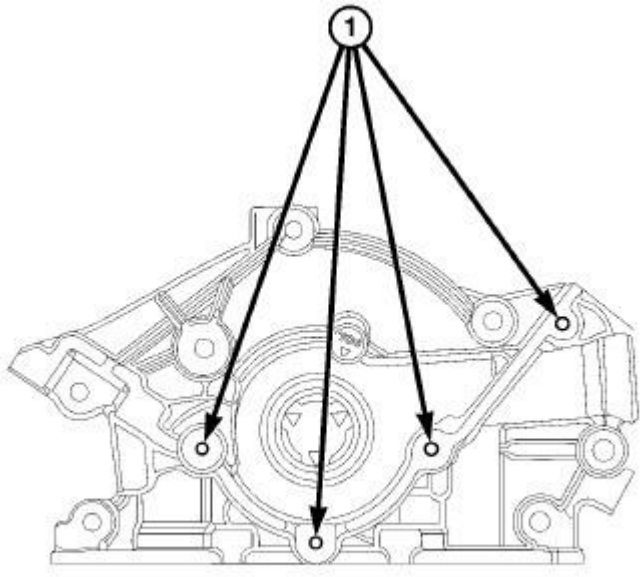

Fig. 374: Oil Pump Cover Bolts
Courtesy of CHRYSLER LLC

1 - SEALANT APPLICATION LOCATION

4. Install new O-ring on oil pickup tube.
5. Install oil pickup tube.
6. Install oil pan. See **Engine/Lubrication/PAN, Oil - Installation**
7. Install crankshaft sprocket. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**
8. Install timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
9. Install the timing belt covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
10. Install the crankshaft vibration damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**
11. Install the accessory drive belts. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
12. Fill the cooling system. Refer to **Cooling - Standard Procedure** .
13. Fill engine crankcase with proper oil to the correct level.

SWITCH, OIL PRESSURE

Removal

REMOVAL

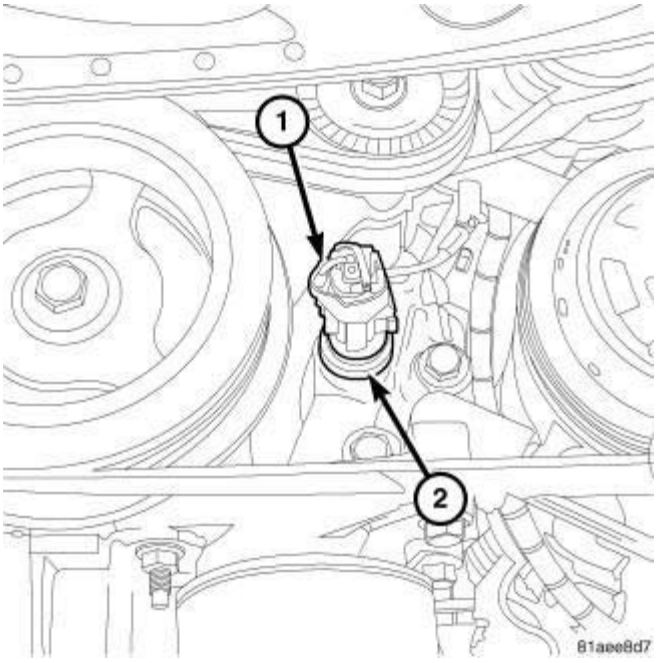

Fig. 375: OIL PRESSURE SWITCH
Courtesy of CHRYSLER LLC

1. Raise vehicle on hoist.

2. Position an oil collecting container under switch location.
3. Disconnect electrical connector (1).
4. Remove the oil pressure switch (2).

Installation

INSTALLATION

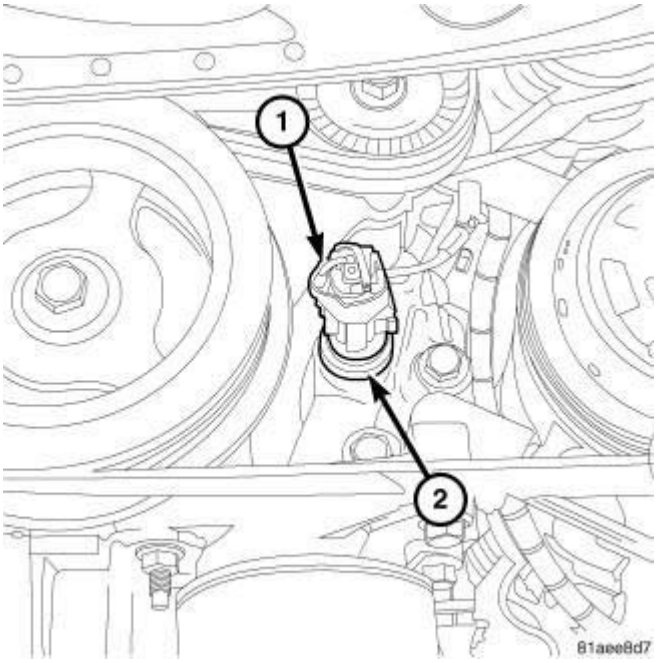

Fig. 376: OIL PRESSURE SWITCH
Courtesy of CHRYSLER LLC

1. Apply Mopar® Thread Sealant to the switch threads.
2. Install oil pressure switch (2).
3. Connect electrical connector (1).
4. Lower vehicle.
5. Start engine and check for leaks.
6. Check engine oil level and adjust as necessary.

VALVE, OIL PRESSURE RELIEF

Removal

REMOVAL

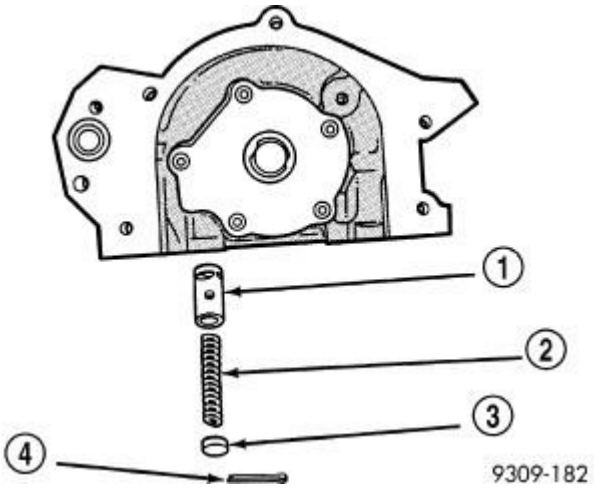

Fig. 377: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE
2 - SPRING
3 - RETAINER CAP
4 - COTTER PIN

1. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**
2. To remove the relief valve, proceed as follows:
    a. Remove the cotter pin that retains the retainer cap.
    b. Drill a 3.175 mm (1/8 inch.) hole into the relief valve retainer cap
    c. Insert a self-threading sheet metal screw into cap.
    d. Using a suitable slide hammer tool, remove retainer cap. Discard retainer cap
    e. Remove spring (2) and relief valve (1).

Inspection

INSPECTION

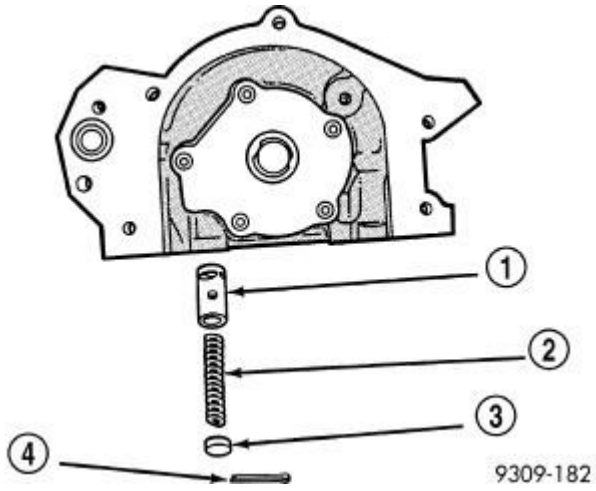

Fig. 378: Oil Pressure Relief Valve
Courtesy of CHRYSLER LLC

1 - RELIEF VALVE
2 - SPRING
3 - RETAINER CAP
4 - COTTER PIN

1. Inspect oil pressure relief valve (1) plunger for scoring and free operation in its bore. Small marks may be removed with 400-grit wet or dry sandpaper.
2. The relief valve spring (2) has a free length of approximately 49.5 mm (1.95 in.) it should test between 101-110 N (23-25 lbs.) when compressed to 34 mm (1.34 in.). Replace spring that fails to meet specifications.

Installation

INSTALLATION

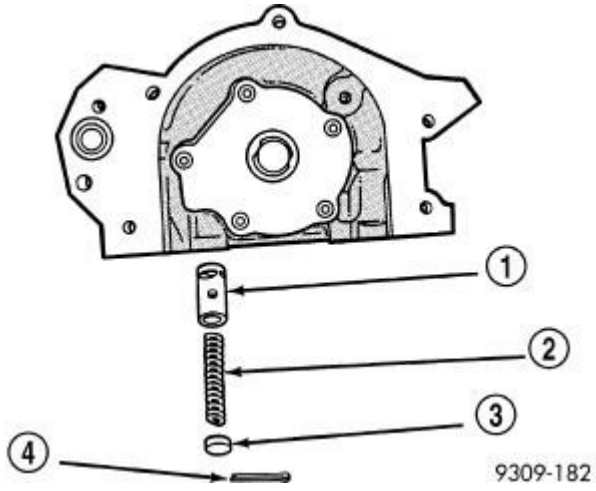

Fig. 379: Oil Pressure Relief Valve

Courtesy of CHRYSLER LLC

1 - RELIEF VALVE 2 - SPRING 3 - RETAINER CAP 4 - COTTER PIN

1. Lubricate relief valve (1) with oil.

CAUTION: The pressure relief valve must be installed as shown in Fig. 379 or engine damage may occur.

2. Install valve (1), spring (2) and retainer cap.
3. Install new cotter pin (4).
4. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**

MANIFOLDS

MANIFOLD, EXHAUST, FRONT

Removal

REMOVAL - FRONT EXHAUST MANIVERTER

1. Disconnect and isolate the negative battery cable.

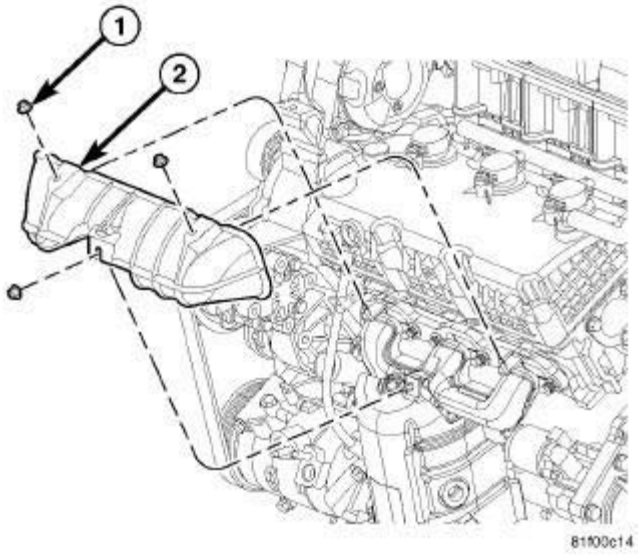

Fig. 380: Upper Heat Shield Fasteners
Courtesy of CHRYSLER LLC

2. Remove the fasteners (1), and remove the upper heat shield (2).

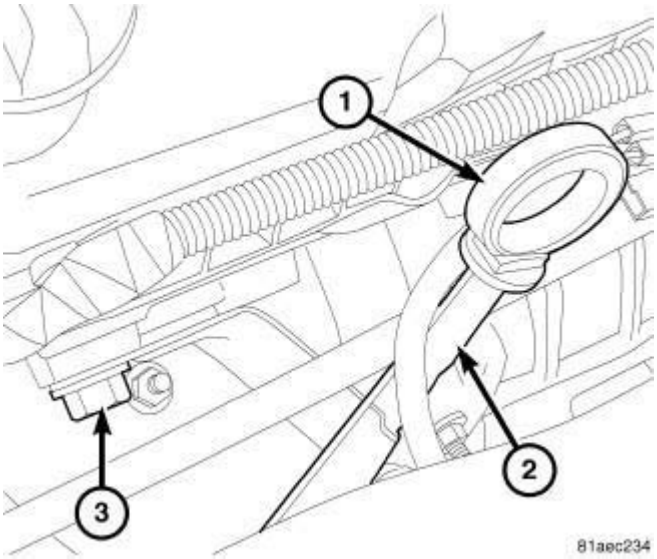

Fig. 381: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

3. Loosen the oil level indicator tube retaining bolt (3) and position the dipstick tube (2) aside.

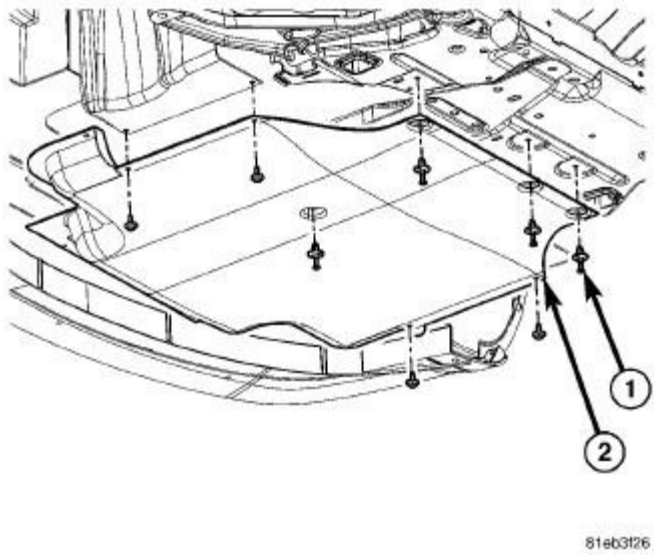

Fig. 382: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - belly pan fasteners
2 - belly pan

4. Remove the 12 belly pan fasteners (1) and remove the belly pan (2).

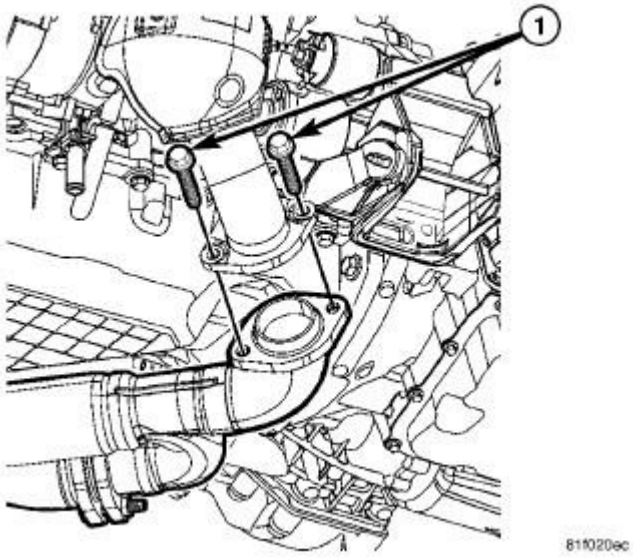

Fig. 383: Left Maniverter-To-Crossunder Pipe Fasteners
Courtesy of CHRYSLER LLC

5. Remove the left maniverter-to-crossunder pipe fasteners (1).

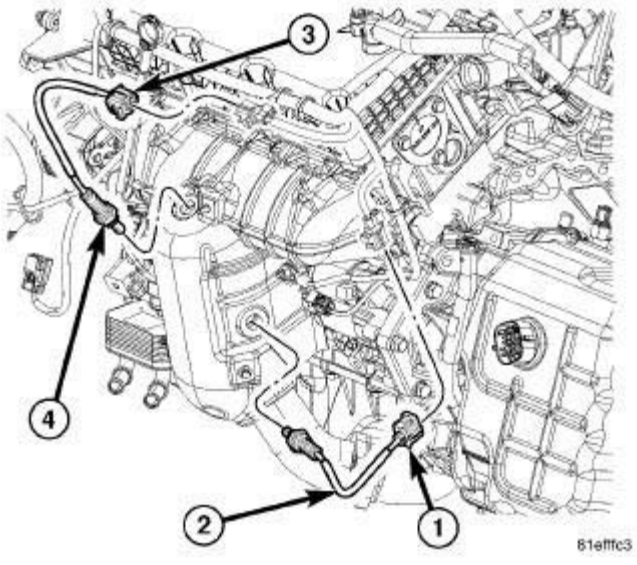

Fig. 384: Harness Connector From Front Maniverter Oxygen Sensor
Courtesy of CHRYSLER LLC

6. Disconnect the harness connector (1) and remove the front lower maniverter oxygen sensor (2).
7. Disconnect the harness connector (3) and remove the front upper maniverter oxygen sensor (4).

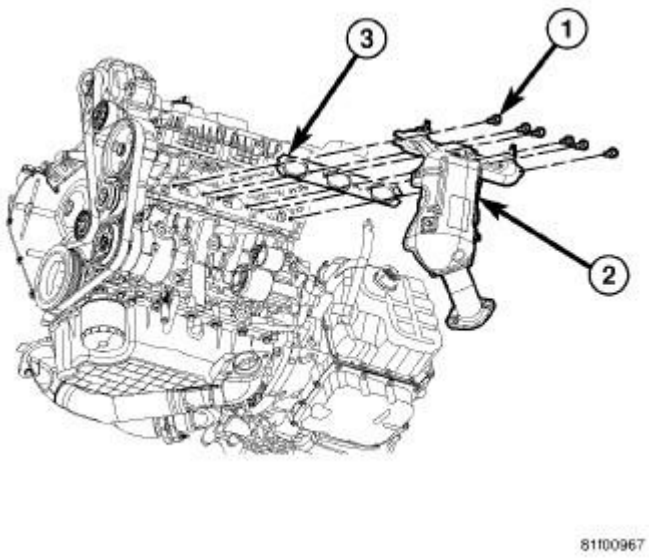

Fig. 385: Right Front Half Shaft Assembly
Courtesy of CHRYSLER LLC

8. Remove the maniverter retaining bolts (1), the maniverter (2), and gasket (3).

Inspection

INSPECTION

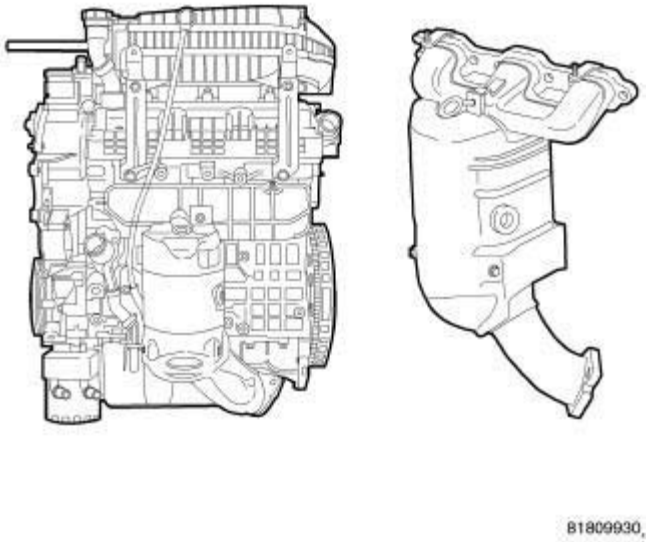

Fig. 386: LEFT MANIVERTER
Courtesy of CHRYSLER LLC

1. Inspect exhaust maniverters for damage or cracks.
2. Check maniverter mounting surface flatness.
3. Inspect the exhaust manifold gasket for obvious discoloration or distortion.
4. Check distortion of the cylinder head mounting surface with a straightedge and thickness gauge.

Installation

INSTALLATION - FRONT EXHAUST MANIVERTER

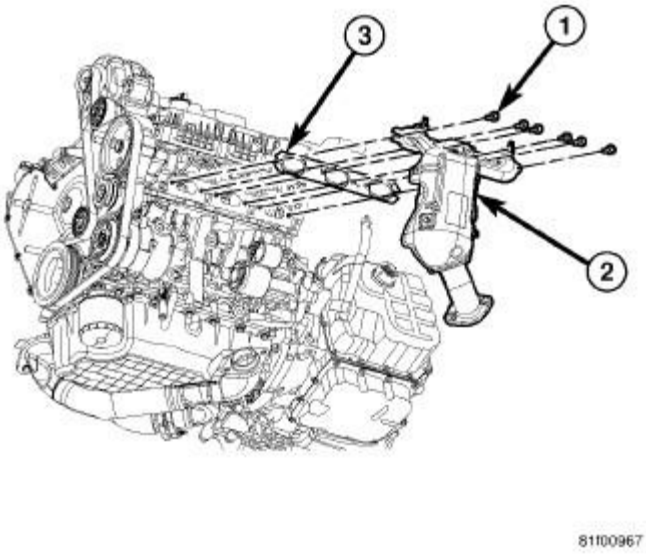

Fig. 387: Right Front Half Shaft Assembly
Courtesy of CHRYSLER LLC

1. Position the maniverter (2) and gasket (3). Install the retaining bolts (1). Tighten bolts starting at the center working outward to 23 N.m (200 in. lbs.).

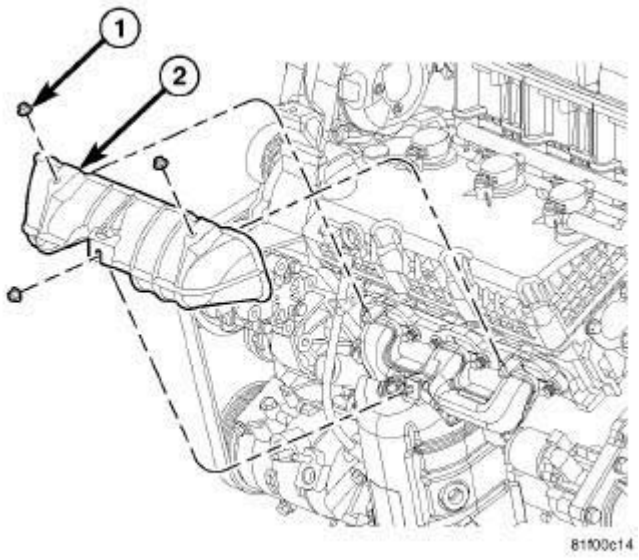

Fig. 388: Upper Heat Shield Fasteners
Courtesy of CHRYSLER LLC

2. Install the upper heat shield (2), and torque nuts (1) to 12 Nm (105 in. lbs).

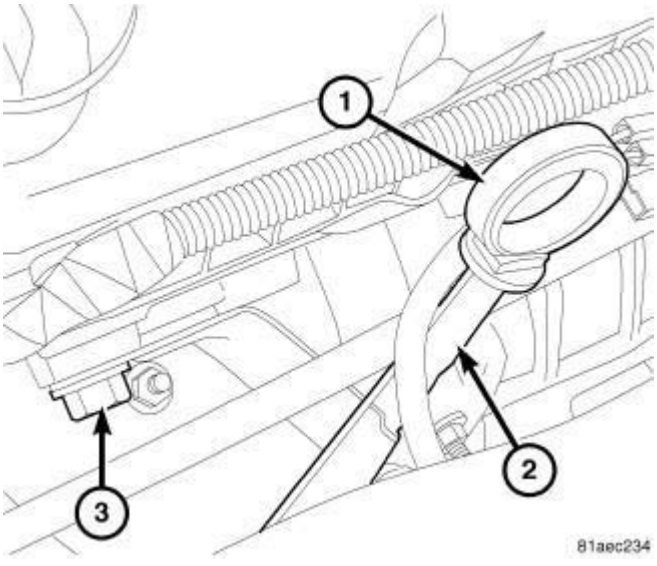

Fig. 389: Engine Oil Dipstick Tube
Courtesy of CHRYSLER LLC

3. Install the oil level indicator tube (2) and the retaining bolt (3).

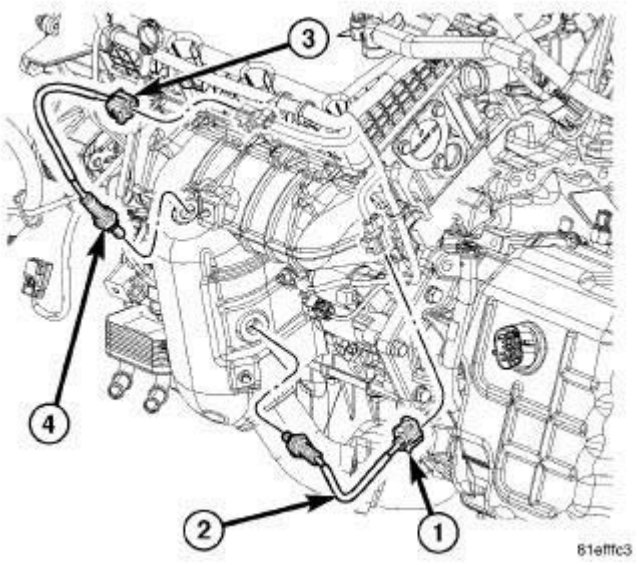

Fig. 390: Harness Connector From Front Maniverter Oxygen Sensor
Courtesy of CHRYSLER LLC

4. Install the left upstream oxygen sensor (4) and connect the harness connector (3).
5. Install the left downstream oxygen sensor (2) and connect the harness connector (1).

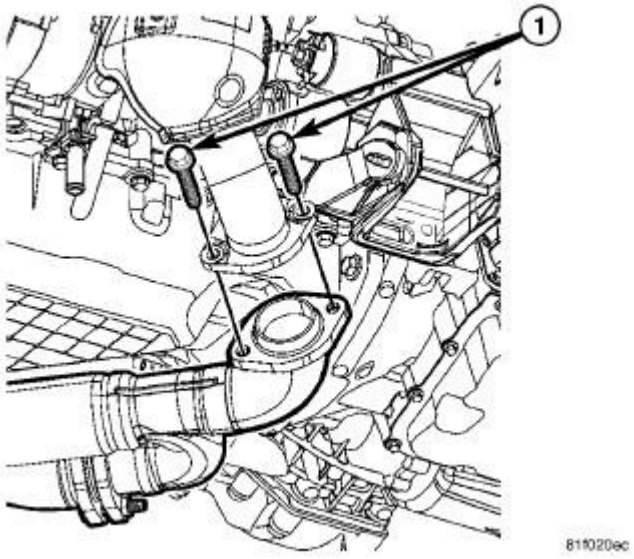

Fig. 391: Left Maniverter-To-Crossunder Pipe Fasteners
Courtesy of CHRYSLER LLC

6. Install the left maniverter cross under pipe retaining bolts (1). Tighten bolts to 31 N.m (275 in. lbs.).

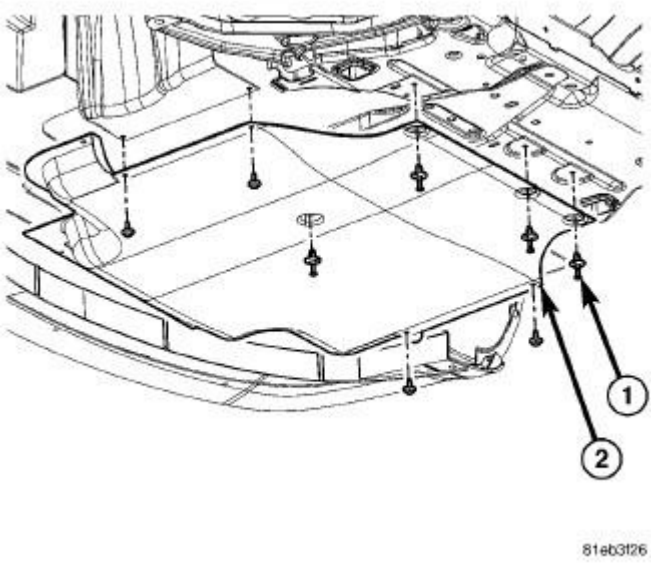

Fig. 392: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1 - belly pan fasteners
2 - belly pan

7. Install the belly pan (2) and the 12 belly pan fasteners (1).
8. Connect the negative battery cable. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure** .

MANIFOLD, EXHAUST, REAR

Removal

REMOVAL - REAR EXHAUST MANIVERTER, FWD

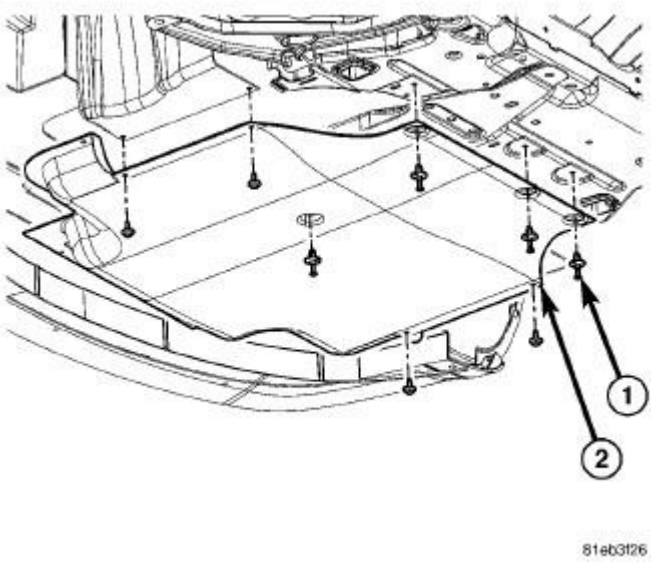

Fig. 393: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
3. Remove twelve belly pan fasteners (1) and remove the belly pan (2).

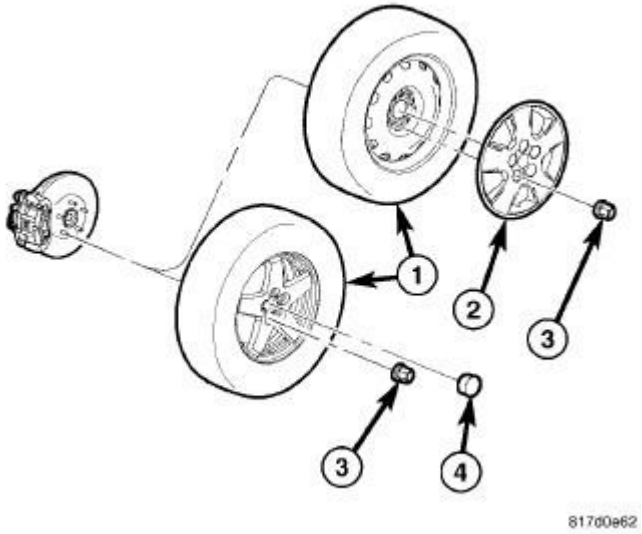

Fig. 394: TIRE & WHEEL MOUNTING
Courtesy of CHRYSLER LLC

4. Remove the right front tire and wheel assembly. Refer to **Tires and Wheels - Removal** .

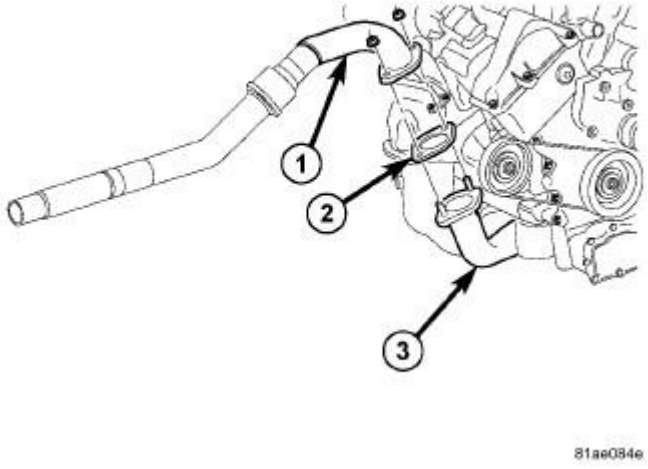

Fig. 395: Exhaust Extension Pipe & Gasket
Courtesy of CHRYSLER LLC

5. Remove the exhaust extension pipe (1). Refer to **Exhaust System/PIPE, Exhaust - Removal** .
6. Remove the exhaust crossunder pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Removal** .

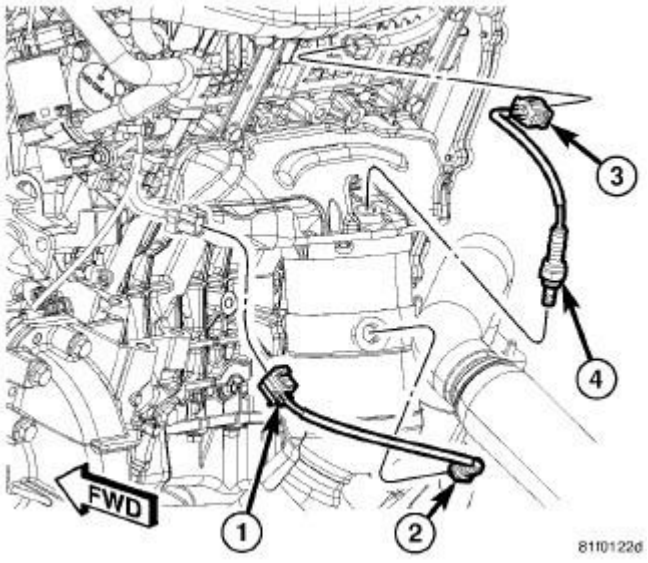

Fig. 396: Right Maniverter Downstream/Upstream Oxygen Sensors
Courtesy of CHRYSLER LLC

7. Disconnect harness connectors (1) and (3). Remove the right maniverter downstream (2) and upstream (4) oxygen sensors. Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Removal** .

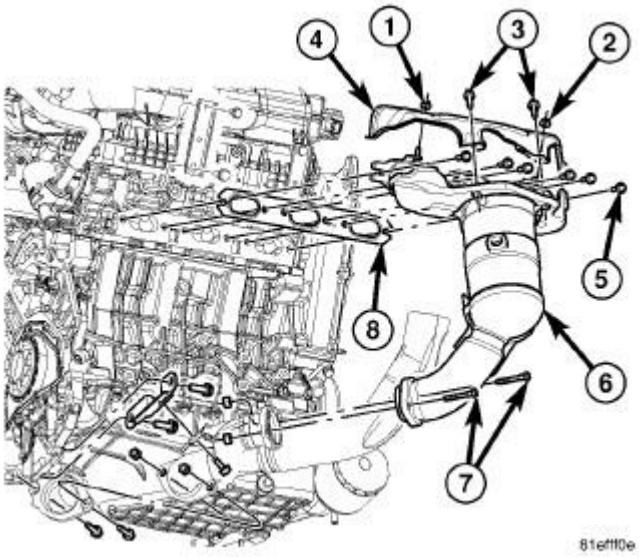

Fig. 397: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

8. Remove heat shield retainers (1), (2), and (3) and remove the upper heat shield (4).
9. Remove the right maniverter retaining bolts (5) and remove the right maniverter (6) and gasket (8).

REMOVAL - REAR EXHAUST MANIVERTER, AWD

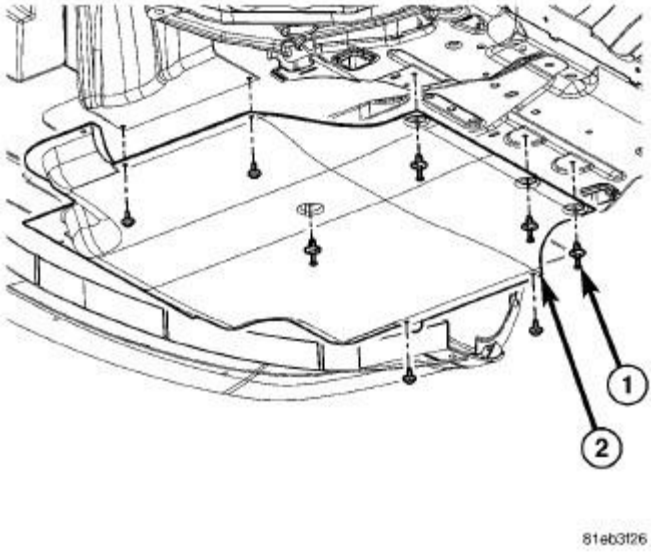

Fig. 398: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

3. Remove twelve belly pan fasteners (1) and remove the belly pan (2).

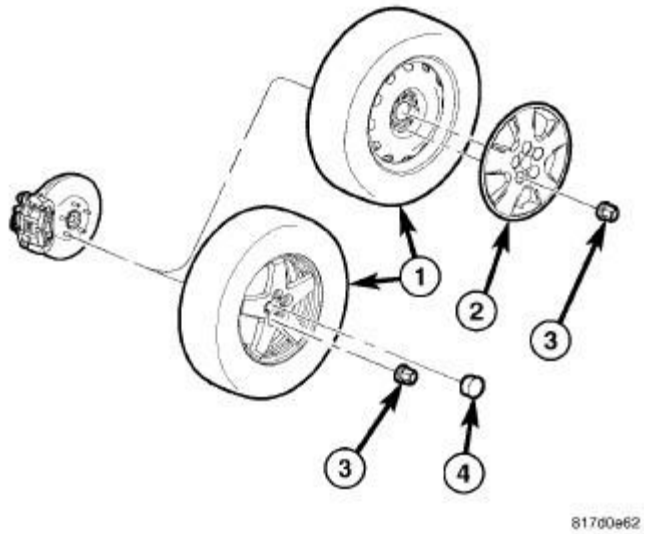

Fig. 399: TIRE & WHEEL MOUNTING
Courtesy of CHRYSLER LLC

4. Remove the right front tire and wheel assembly. Refer to **Tires and Wheels - Removal** .

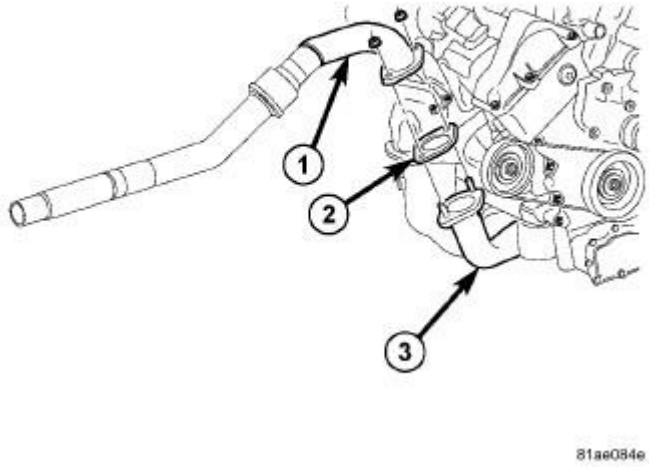

Fig. 400: Exhaust Extension Pipe & Gasket
Courtesy of CHRYSLER LLC

5. Remove the exhaust extension pipe (1). Refer to **Exhaust System/PIPE, Exhaust - Removal** .
6. Remove the exhaust crossunder pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Removal** .

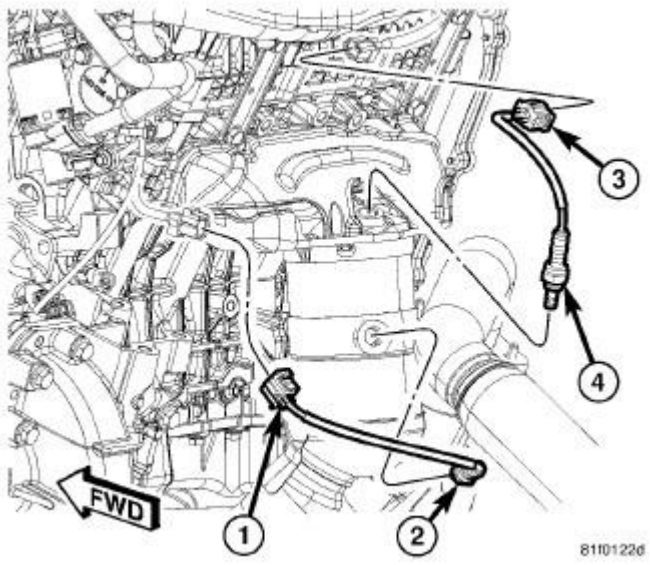

Fig. 401: Right Maniverter Downstream/Upstream Oxygen Sensors
Courtesy of CHRYSLER LLC

7. Disconnect harness connectors (1) and (3). Remove the right maniverter downstream (2) and upstream (4) oxygen sensors. Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Removal** .

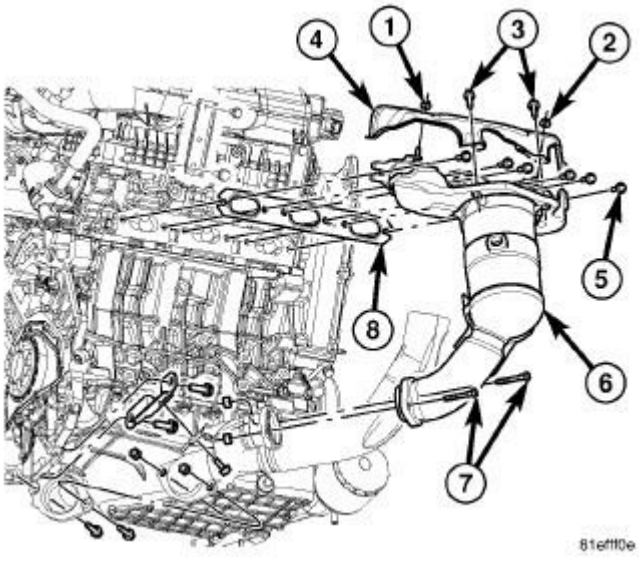

Fig. 402: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

8. Remove heat shield retainers (1), (2), and (3) and remove the upper heat shield (4).

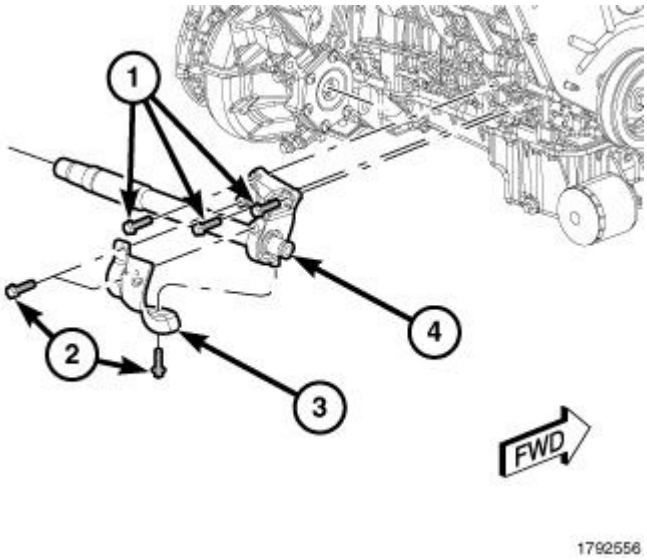

Fig. 403: Right Half Shaft & Intermediate Shaft
Courtesy of CHRYSLER LLC

9. Remove the right half shaft and intermediate shaft (4). Refer to **Differential and Driveline/Intermediate Shaft - Removal** .

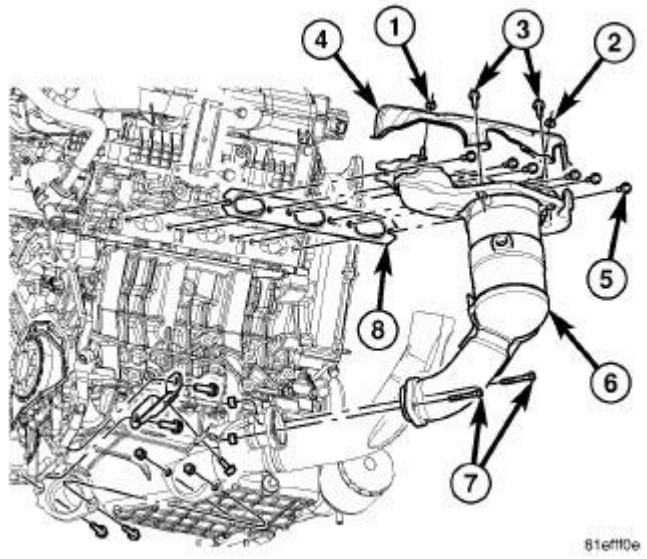

Fig. 404: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

10. Remove the maniverter retaining bolts (5).

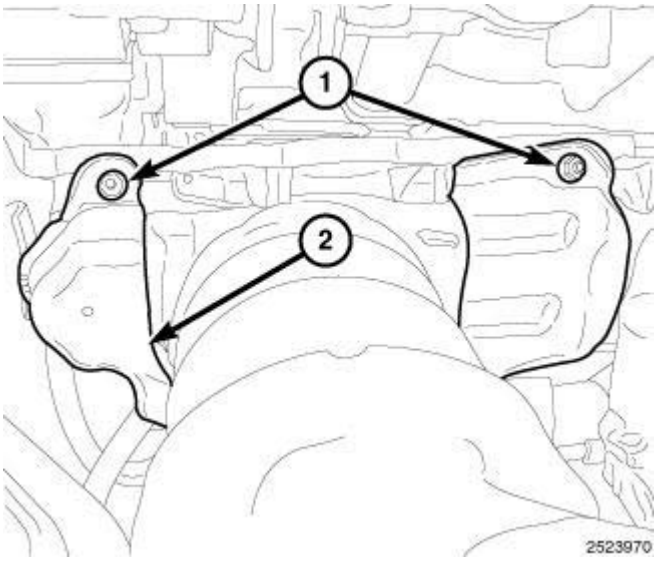

Fig. 405: Lower Maniverter Heatshield
Courtesy of CHRYSLER LLC

11. Reposition the maniverter to allow removal of the lower maniverter heatshield (2).
12. Remove the lower maniverter heat shield retainers (1) and remove the lower maniverter heat shield (2).
13. Remove the maniverter and gasket from the vehicle.

Installation

INSTALLATION - REAR EXHAUST MANIVERTER, FWD

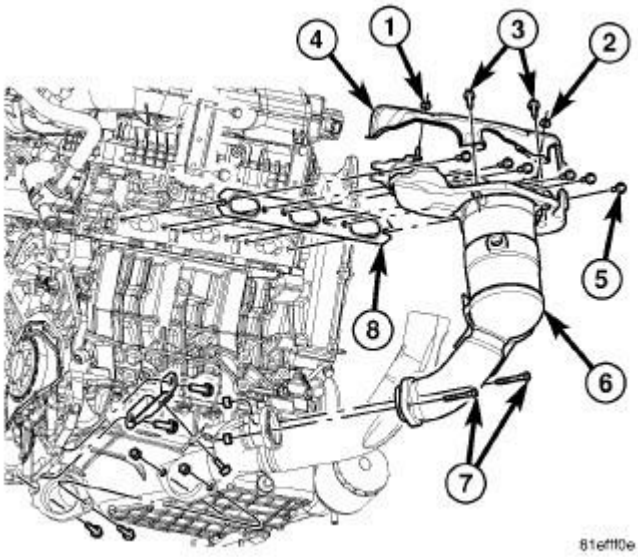

Fig. 406: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

1. Clean the right maniverter gasket sealing surfaces with an appropriate tool. See **Engine - Standard Procedure**.
2. Position the right maniverter (6) and gasket (8). Install the retaining bolts (5) and tighten the bolts starting at the center working outward to 23 N.m (200 in. lbs.).
3. Install the right maniverter upper heat shield (4) with heat shield retainers (1), (2), and (3).

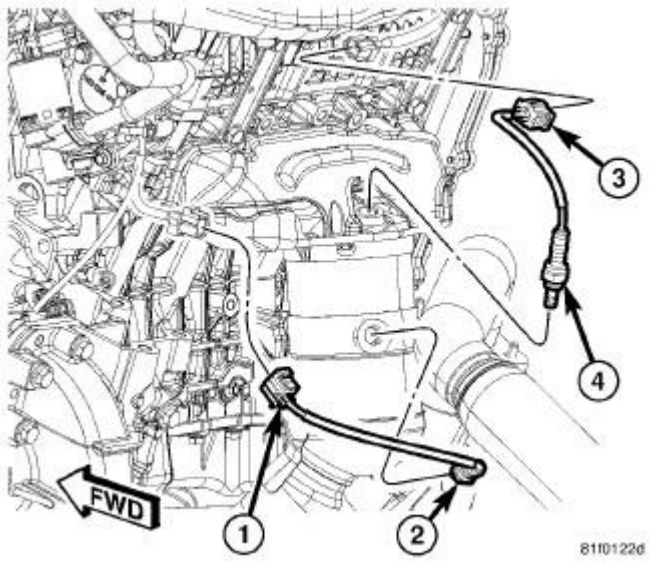

Fig. 407: Right Maniverter Downstream/Upstream Oxygen Sensors
Courtesy of CHRYSLER LLC

4. Install the right maniverter upstream (4) and downstream (2) oxygen sensors and reconnect the harness connectors (1) and (3). Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Installation** .

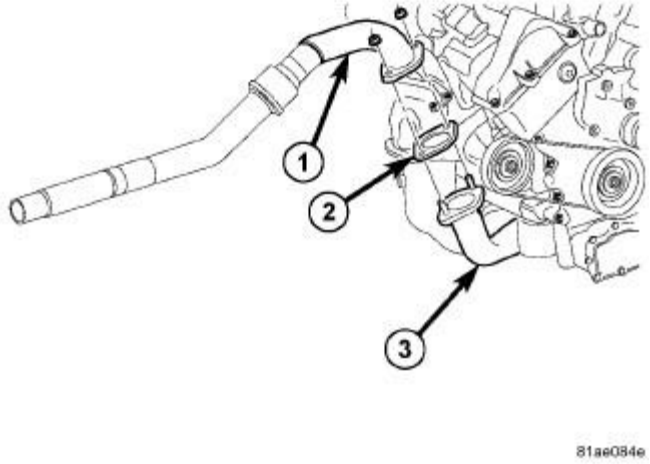

Fig. 408: Exhaust Extension Pipe & Gasket

Courtesy of CHRYSLER LLC

5. Install the exhaust crossunder pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Installation** .
6. Install the exhaust extension pipe (1). Refer to **Exhaust System/PIPE, Exhaust - Installation** .

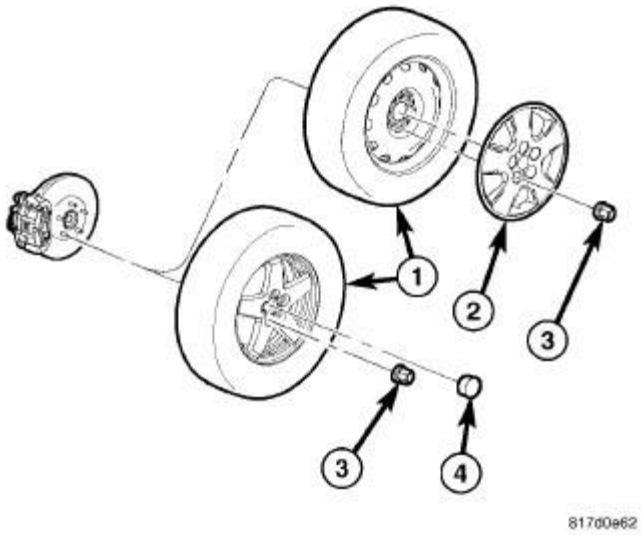

Fig. 409: TIRE & WHEEL MOUNTING
Courtesy of CHRYSLER LLC

7. Install the right front tire and wheel assembly. Refer to **Tires and Wheels - Installation** .

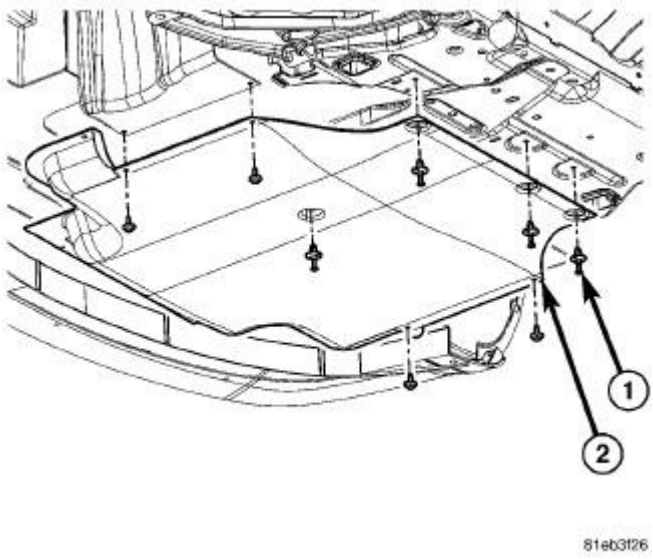

Fig. 410: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

8. Install the belly pan (2) and the twelve belly pan fasteners (1).
9. Lower the vehicle.
10. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

INSTALLATION - REAR EXHAUST MANIVERTER, AWD

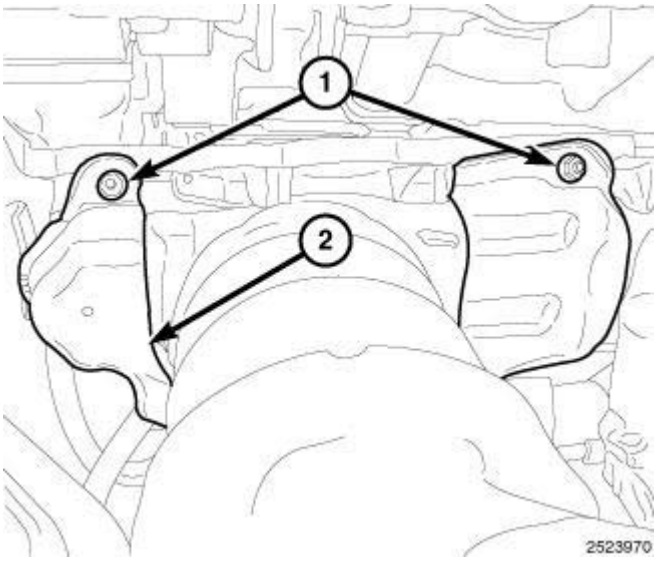

Fig. 411: Lower Maniverter Heatshield
Courtesy of CHRYSLER LLC

1. Clean the right maniverter gasket sealing surfaces with an appropriate tool. See **Engine - Standard Procedure**.
2. Place the right maniverter in the engine compartment and position to allow installation of the maniverter lower heatshield (2).
3. Install the right maniverter lower heat shield (2) with heat shield retainers (1).

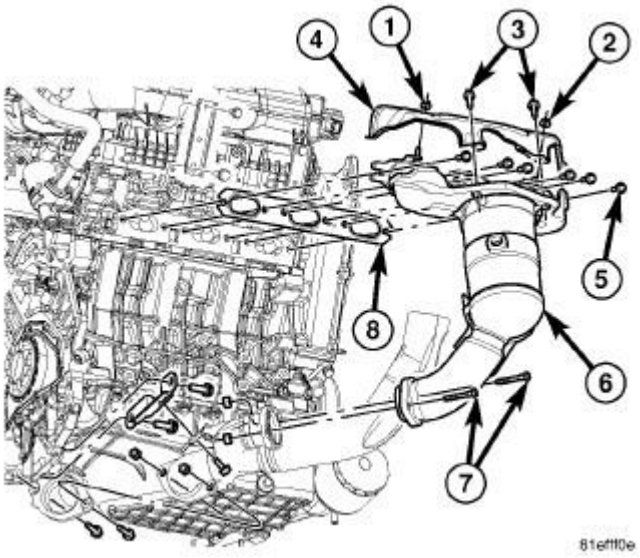

Fig. 412: Maniverter Retaining Bolts
Courtesy of CHRYSLER LLC

4. Install the right maniverter (6) and gasket (8) with retaining bolts (5). Tighten the bolts starting at the center working outward to 23 N.m (200 in. lbs.).
5. Install the right maniverter upper heat shield (4) with heat shield retainers (1), (2), and (3).

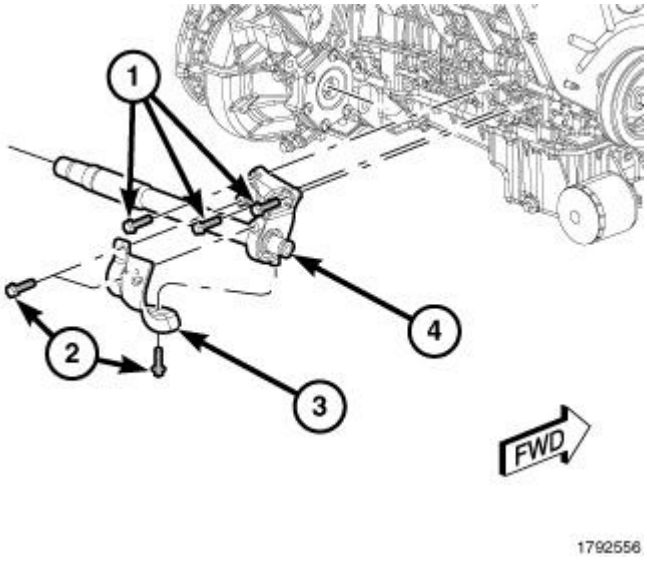

Fig. 413: Right Half Shaft & Intermediate Shaft
Courtesy of CHRYSLER LLC

6. Install the intermediate shaft (4) and right half shaft. Refer to **Differential and Driveline/Intermediate Shaft - Installation** .

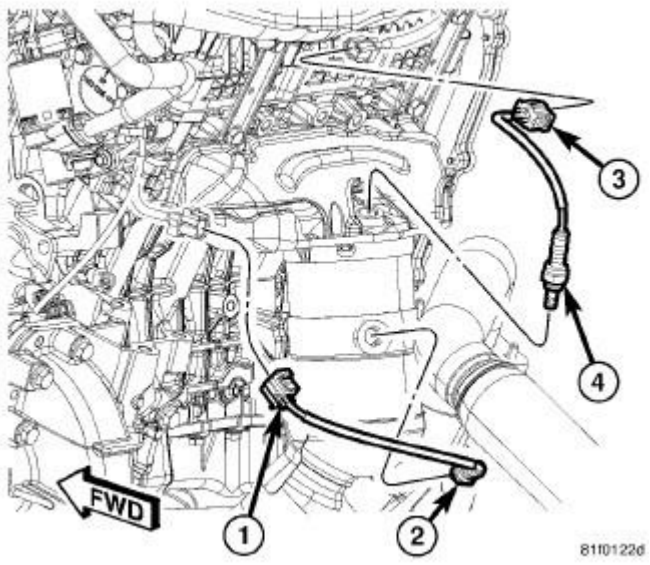

Fig. 414: Right Maniverter Downstream/Upstream Oxygen Sensors
Courtesy of CHRYSLER LLC

7. Install the right maniverter upstream (4) and downstream (2) oxygen sensors and reconnect the harness connectors (1) and (3). Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Installation** .

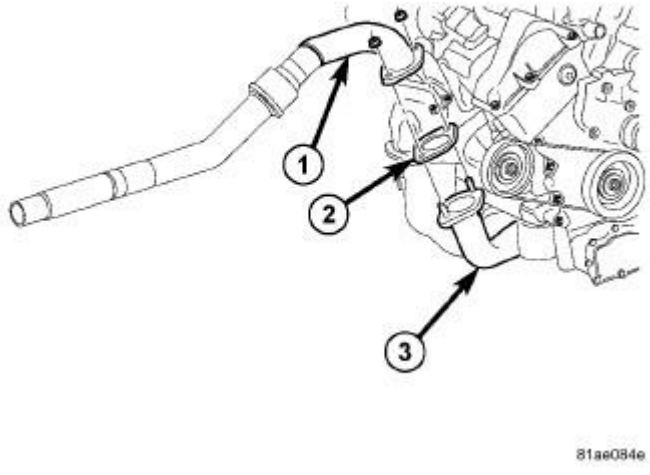

Fig. 415: Exhaust Extension Pipe & Gasket
Courtesy of CHRYSLER LLC

8. Install the exhaust crossunder pipe (3). Refer to **Exhaust System/PIPE, Exhaust Crossunder - Installation** .
9. Install the exhaust extension pipe (1). Refer to **Exhaust System/PIPE, Exhaust - Installation** .

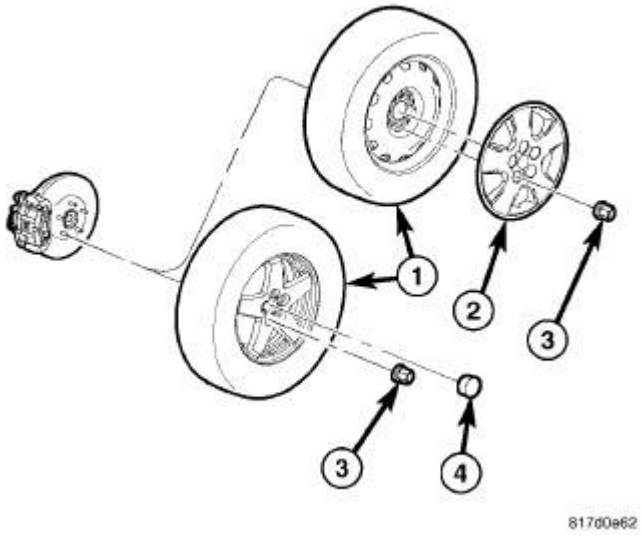

Fig. 416: TIRE & WHEEL MOUNTING
Courtesy of CHRYSLER LLC

10. Install the right front tire and wheel assembly. Refer to **Tires and Wheels - Installation** .

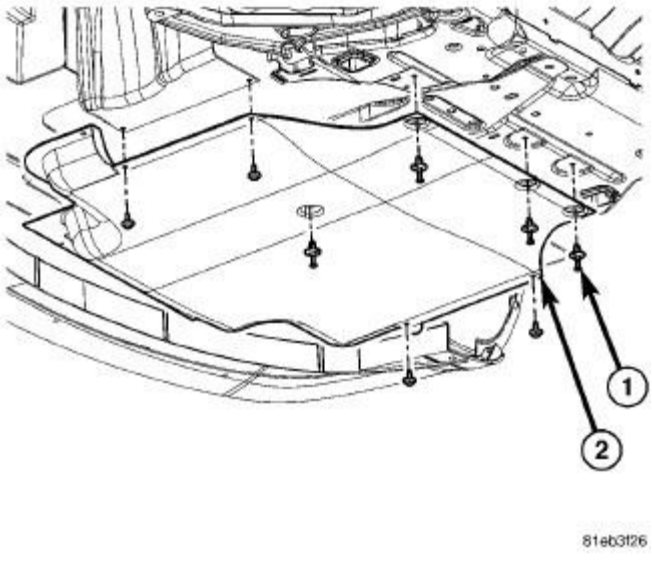

Fig. 417: Belly Pan Fasteners
Courtesy of CHRYSLER LLC

11. Install the belly pan (2) and the twelve belly pan fasteners (1).
12. Lower the vehicle.
13. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

MANIFOLD, INTAKE

Removal

REMOVAL - UPPER INTAKE MANIFOLD

1. Remove engine cover.

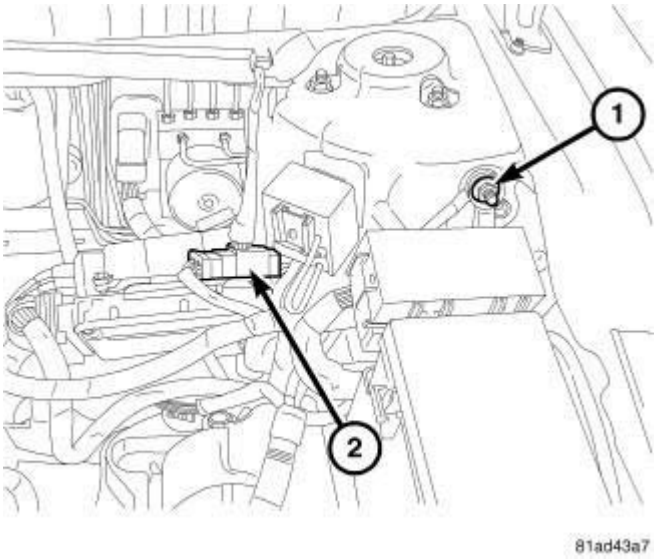

Fig. 418: BATTERY CABLE
Courtesy of CHRYSLER LLC

2. Disconnect negative battery cable.

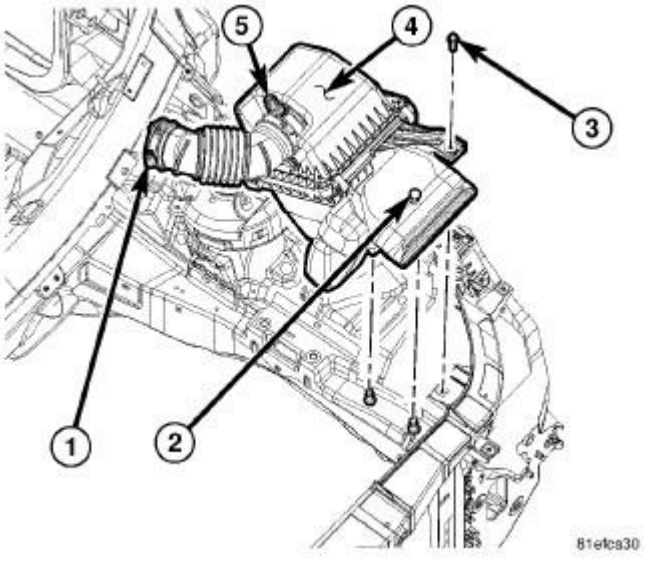

Fig. 419: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

3. Remove air cleaner housing (4) and inlet hose (1). See **Engine/Air Intake System/BODY, Air Cleaner -**

Removal.

4. Disconnect the EGR tube. Refer to **Emissions Control/Exhaust Gas Recirculation/VALVE, Exhaust Gas Recirculation (EGR) - Removal** .

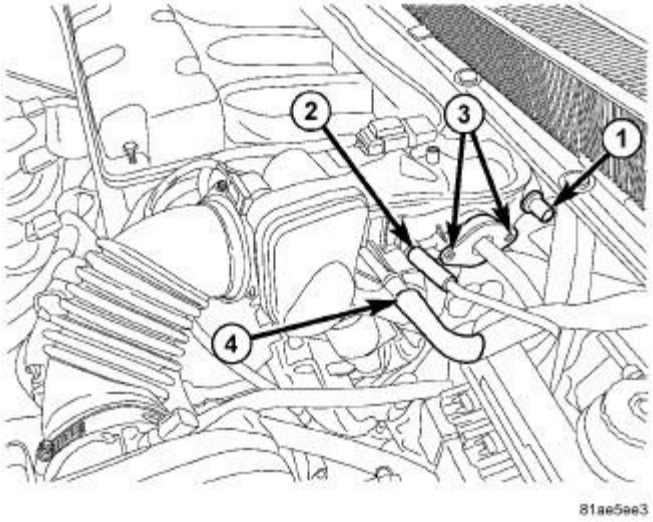

Fig. 420: Locating Manifold Tuning Valve, Short Runner Valve, TP Sensor & MAP Sensor Connections
Courtesy of CHRYSLER LLC

5. Disconnect the following vacuum hoses from the upper intake manifold:

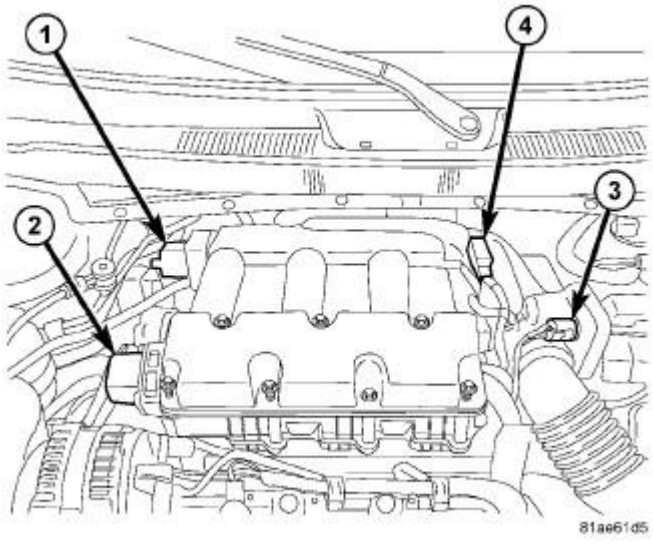

Fig. 421: Identifying PCV Valve, EVAP Purge Solenoid, EGR Tube & Power Brake Booster
Courtesy of CHRYSLER LLC

- Positive Crankcase Ventilation (PCV) Valve (1)
- EVAP Purge Solenoid (2)
- EGR Tube (3)
- Power Brake Booster (4)

6. Disconnect electrical connectors from the following sensors and actuators:

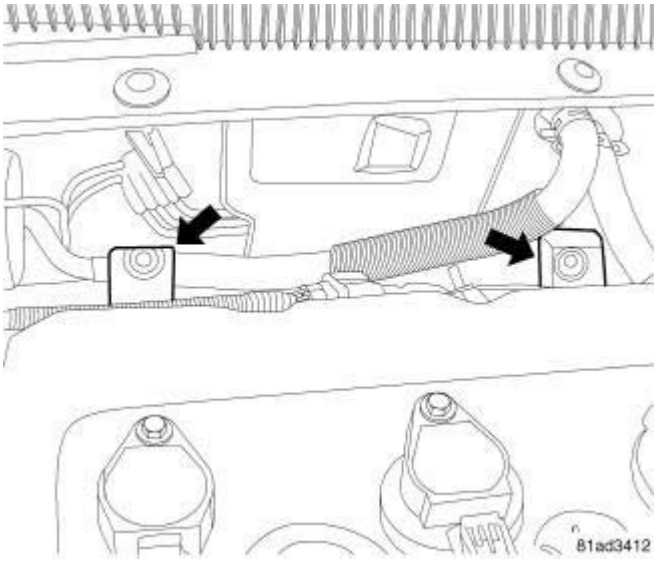

Fig. 422: REAR BRACKETS
Courtesy of CHRYSLER LLC

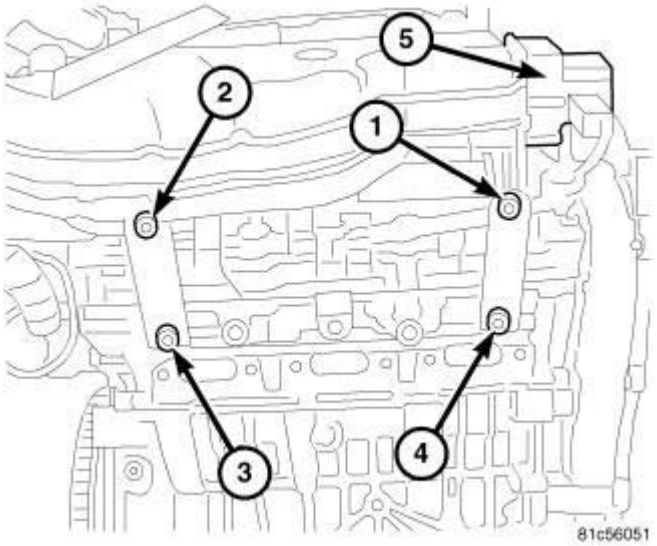

Fig. 423: Manifold Tuning Valve, Short Runner Valve, Throttle Position Sensor & Manifold Absolute Pressure
Courtesy of CHRYSLER LLC

- Manifold Tuning Valve (MTV) (1)

- Short Runner Valve (2)
- Throttle Position Sensor (TPS) (3)
- Manifold Absolute Pressure (MAP) (4)

7. Remove the Manifold Tuning Valve (5), then Remove the 2 nuts (1) and (2) from the rear intake manifold brackets.
8. Loosen the 2 bolts (3) and (4) from rear intake manifold brackets and position brackets aside.

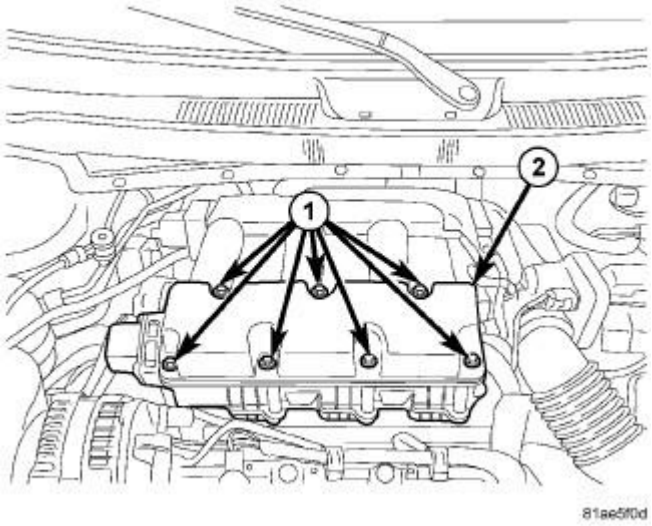

Fig. 424: Upper Intake Manifold
Courtesy of CHRYSLER LLC

9. Remove the 7 upper intake manifold retaining bolts (1) and the upper intake manifold (2). Clean all gasket sealing surfaces.

LOWER INTAKE MANIFOLD

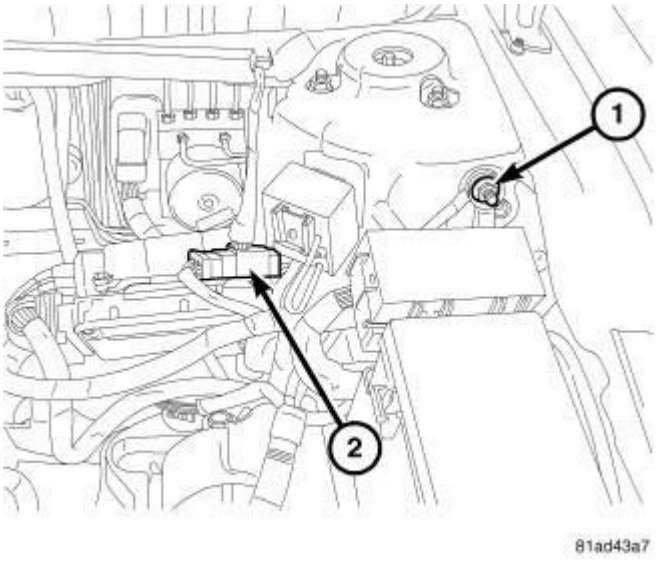

Fig. 425: BATTERY CABLE
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable (1).
2. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
3. Drain the cooling system. Refer to **Cooling - Standard Procedure** .

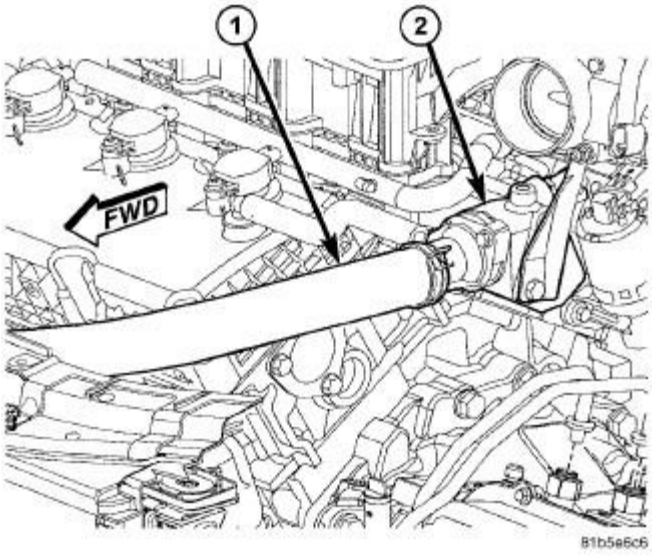

Fig. 426: Upper Radiator Hose From Thermostat Housing
Courtesy of CHRYSLER LLC

4. Disconnect the upper radiator hose (1) from the thermostat housing (2).
5. Remove the upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Removal**.
6. Disconnect the electrical connectors to fuel injectors and coolant temperature sensor.

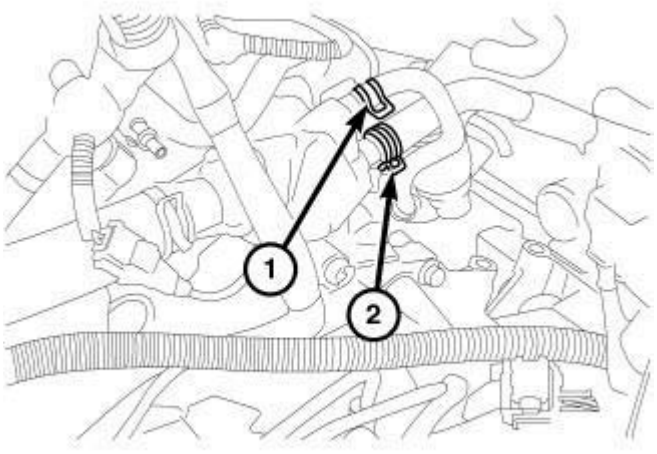

Fig. 427: Heater Supply & Return Hoses
Courtesy of CHRYSLER LLC

7. Disconnect heater supply and return hoses from the thermostat housing.

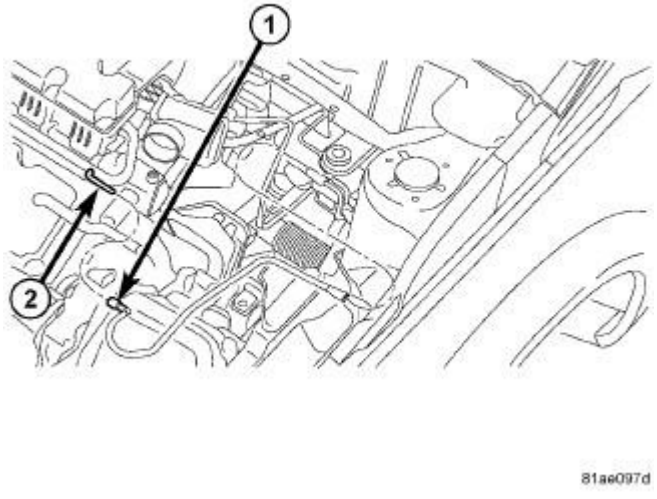

Fig. 428: Fuel Line From Fuel Rail Inlet
Courtesy of CHRYSLER LLC

8. Disconnect the fuel line from the fuel rail.

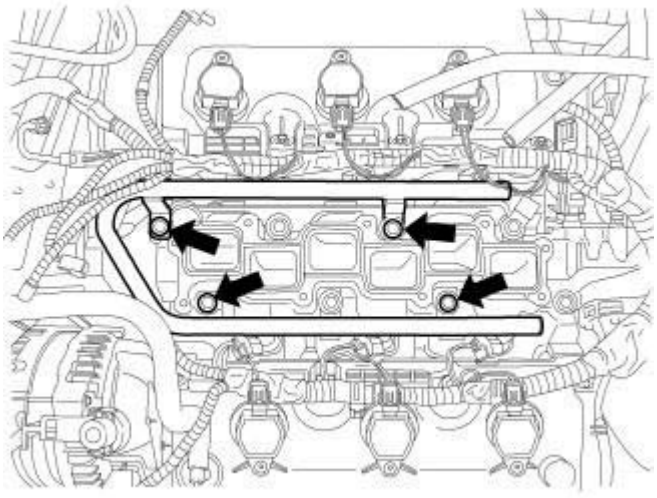

Fig. 429: Fuel Rail Bolts
Courtesy of CHRYSLER LLC

9. Remove the 4 bolts attaching fuel rail.
10. Remove fuel rail and injectors as an assembly.

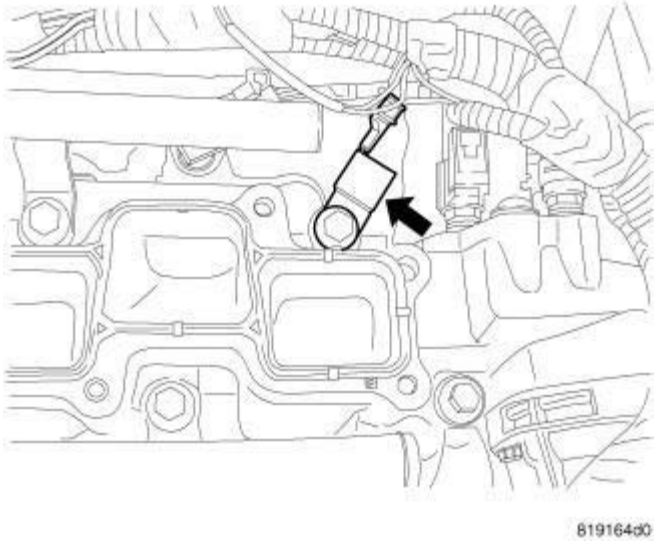

Fig. 430: CAPACITOR LOCATION
Courtesy of CHRYSLER LLC

11. Remove lower intake 4 bolts and position the ignition coil capacitor aside.

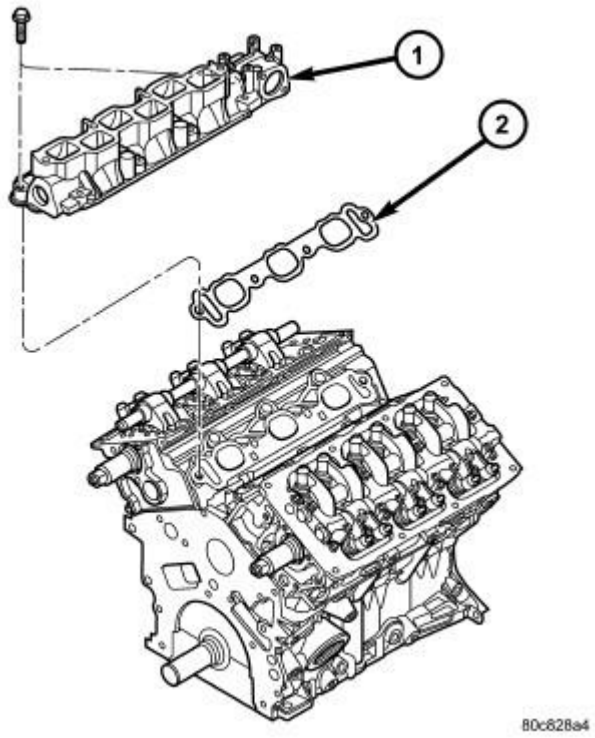

Fig. 431: Lower Intake Manifold
Courtesy of CHRYSLER LLC

1 - LOWER INTAKE MANIFOLD 2 - GASKET

12. Remove the lower intake manifold (1).

Installation

LOWER INTAKE MANIFOLD

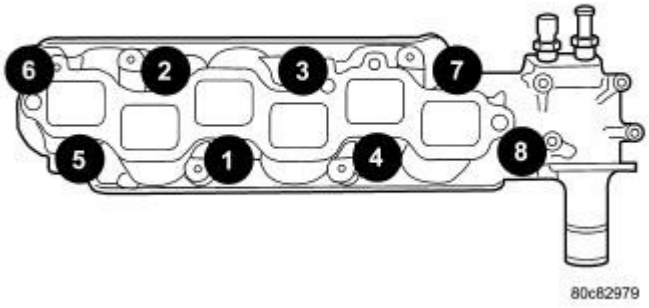

Fig. 432: Lower Intake Manifold Tightening Sequence

Courtesy of CHRYSLER LLC

1. Clean all sealing surfaces.
2. Position new gaskets and intake manifold on cylinder head surfaces.
3. Position the ignition coil capacitor and install the intake manifold bolts. Gradually tighten in sequence shown in illustration until a torque of 28 N.m (250 in. lbs.) is obtained.
4. Install fuel rail and injectors as an assembly.
5. Connect fuel supply hose to fuel rail.
6. Connect heater supply and return hoses to the intake manifold.
7. Connect electrical connectors to fuel injectors and coolant temperature sensor.
8. Install upper intake manifold. See **Engine/Manifolds/MANIFOLD, Intake - Installation**.
9. Connect upper radiator hose to thermostat housing.
10. Fill cooling system. Refer to **Cooling - Standard Procedure** .
11. Connect negative battery cable. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure** .

INSTALLATION - UPPER INTAKE MANIFOLD

1. Clean and inspect gasket sealing surfaces.
2. Position new gasket.
3. Install the throttle body on the upper intake (if required). Refer to **Fuel System/Fuel Injection/THROTTLE BODY - Installation** .

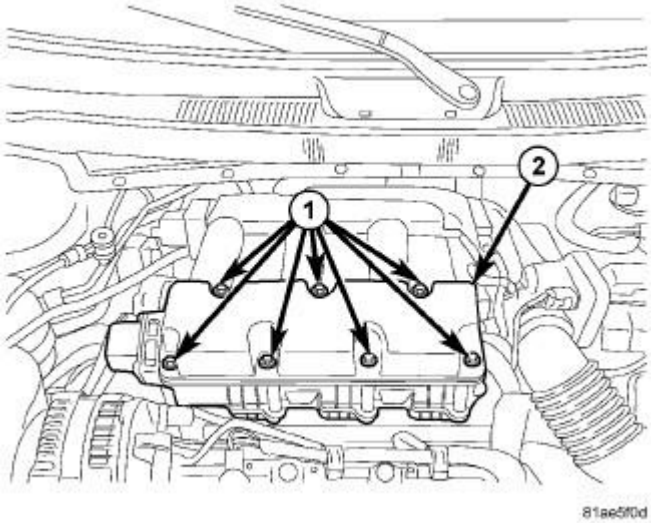

Fig. 433: Upper Intake Manifold
Courtesy of CHRYSLER LLC

4. Install upper intake manifold (2) and hand start all attaching bolts (1).

5. Tighten bolts gradually starting in the center working outward until a torque of 12 N.m (105 in. lbs.) is obtained.
6. Install the rear intake manifold brackets to the head.

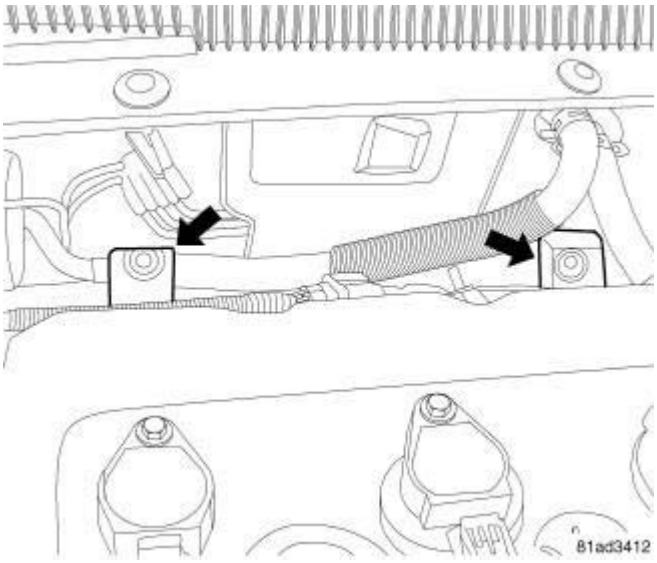

Fig. 434: REAR BRACKETS
Courtesy of CHRYSLER LLC

7. Install the 2 intake manifold to bracket nut retainers.
8. Install the EGR tube. Refer to **Emissions Control/Exhaust Gas Recirculation/VALVE, Exhaust Gas Recirculation (EGR) - Installation** .

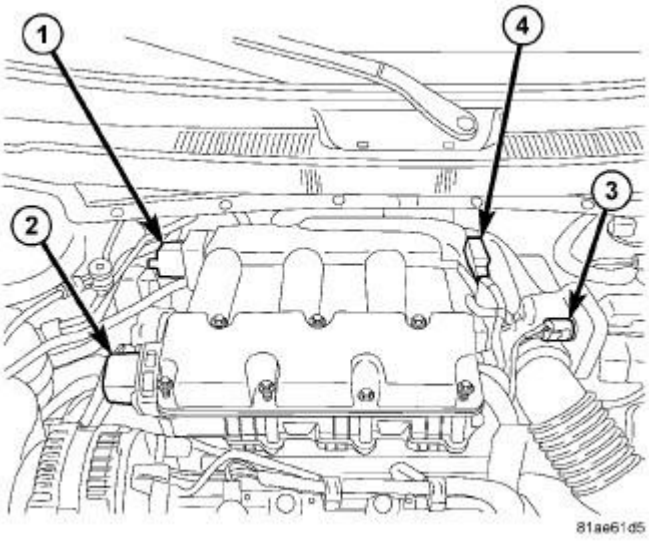

Fig. 435: Identifying PCV Valve, EVAP Purge Solenoid, EGR Tube & Power Brake Booster
Courtesy of CHRYSLER LLC

9. Connect electrical connectors to the following sensors and actuators:

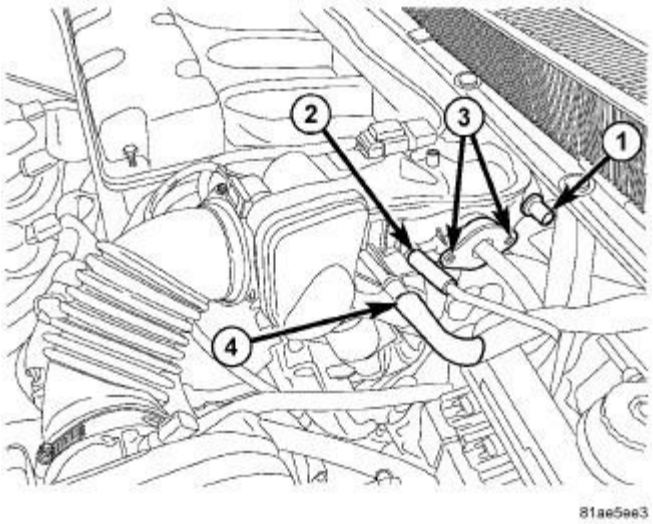

Fig. 436: Locating Manifold Tuning Valve, Short Runner Valve, TP Sensor & MAP Sensor Connections
Courtesy of CHRYSLER LLC

- Manifold Tuning Valve (MTV) (1)
- Short Runner Valve (2)
- Throttle Position Sensor (TPS) (3)
- Manifold Absolute Pressure (MAP) (4)

10. Connect the following vacuum hoses to the upper intake manifold:

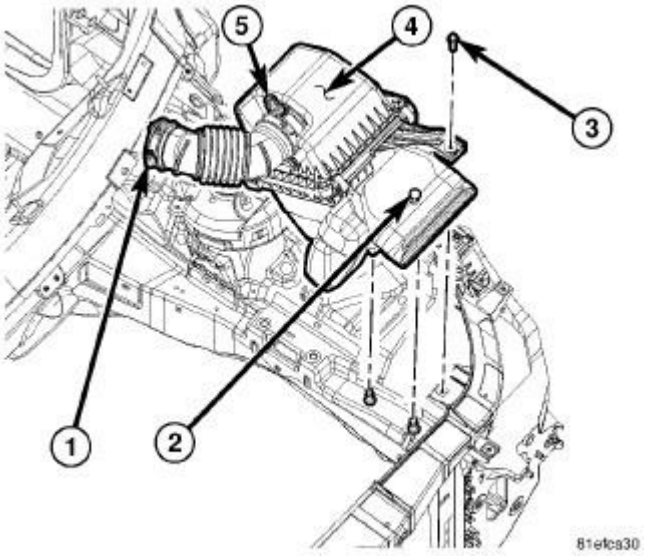

Fig. 437: HOUSING - AIR CLEANER
Courtesy of CHRYSLER LLC

- Positive Crankcase Ventilation (PCV) Valve (1)
- EVAP Purge Solenoid (2)
- EGR Tube (3)
- Power Brake Booster (4)

11. Install air cleaner housing (4) and inlet hose (1). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.

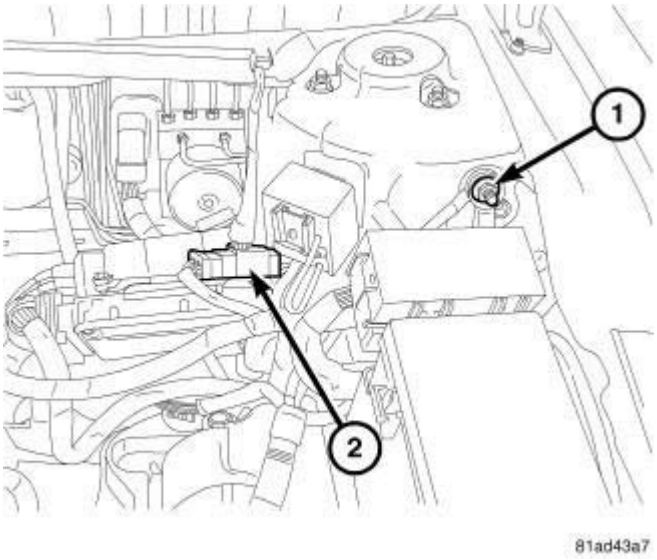

Fig. 438: BATTERY CABLE
Courtesy of CHRYSLER LLC

12. Connect negative battery cable. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure** .
13. Install the engine cover.

VALVE TIMING

DESCRIPTION

DESCRIPTION

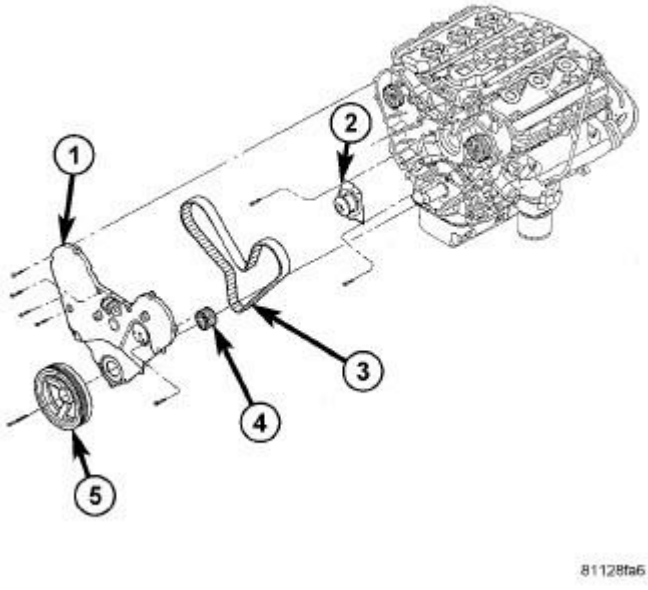

Fig. 439: TIMING DRIVE SYSTEM
Courtesy of CHRYSLER LLC

1 - FRONT TIMING COVER
2 - WATER PUMP
3 - TIMING BELT
4 - CRANKSHAFT SPROCKET
5 - CRANKSHAFT DAMPER

The timing drive system has been designed to provide quiet performance and reliability to support a **NON** free-wheeling engine.

The timing drive components include a crankshaft sprocket, camshaft sprockets, tensioner pulley, hydraulic tensioner and a timing belt. The water pump is driven by the back side of the timing belt. The right and left camshaft sprockets are keyed and not interchangeable because of the cam sensor pick-up wheel on the left sprocket.

STANDARD PROCEDURE

TIMING VERIFICATION

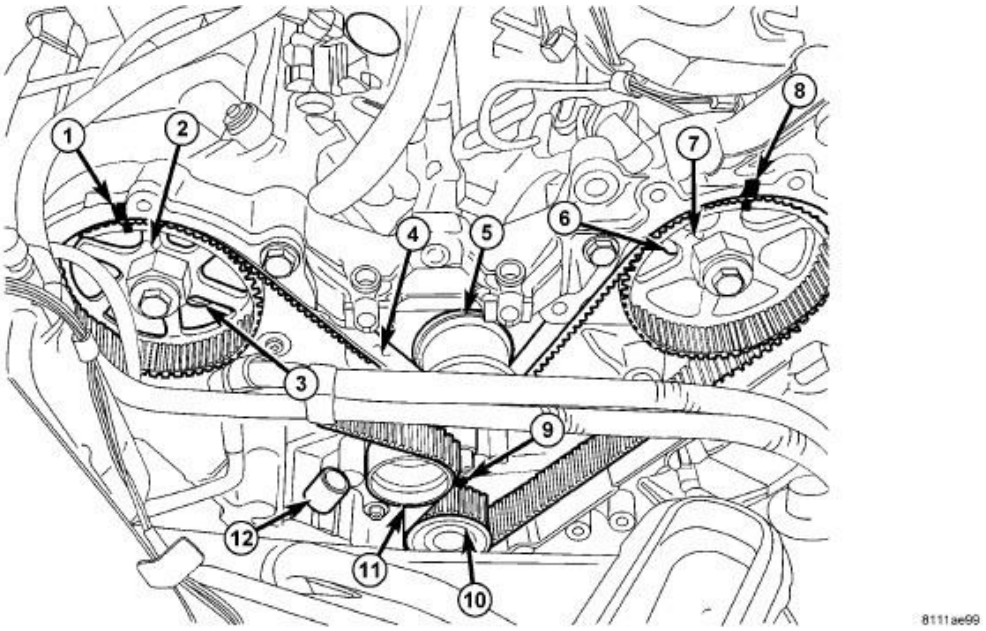

Fig. 440: TIMING GEAR MARKS
Courtesy of CHRYSLER LLC

1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK	7 - LEFT CAMSHAFT GEAR
2 - RIGHT CAMSHAFT GEAR	8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT	9 - CRANKSHAFT GEAR ALIGNMENT MARK
4 - TIMING BELT	10 - CRANKSHAFT GEAR
5 - WATER PUMP PULLEY	11 - TIMING BELT TENSIONER PULLEY
6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT	12 - TIMING BELT TENSIONER

Remove the outer timing covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal** Rotate the crankshaft until the pointer on the crankshaft sprocket aligns the TDC mark on the oil pump. Check to determine if the camshaft sprocket timing marks are aligned with the marks on the inner timing cover. It may take an additional full revolution of the crankshaft before the camshaft sprocket marks are aligned.

BELT AND SPROCKETS, TIMING

Removal

TIMING BELT

1. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect negative battery cable.
3. Remove both cylinder head covers.

4. Remove the front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
5. Mark belt running direction, if timing belt is to be reused.

CAUTION: When aligning timing marks, always rotate engine by turning the crankshaft. Failure to do so will result in valve and/or piston damage.

6. Rotate engine clockwise until crankshaft mark aligns with the TDC mark on oil pump housing and the camshaft sprocket timing marks are aligned with the marks on the rear cover.
7. Remove the timing belt tensioner and remove timing belt.

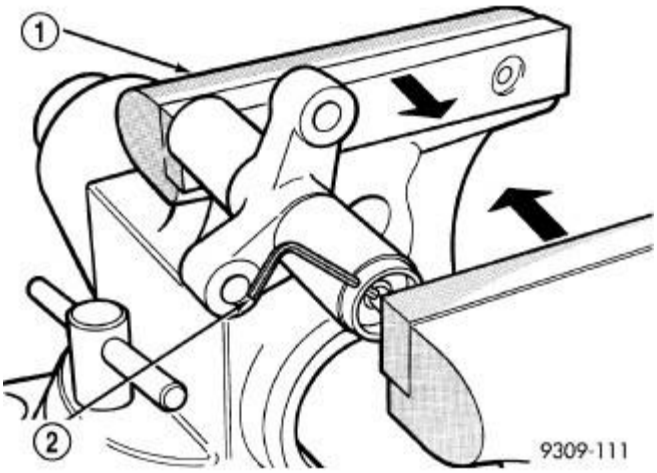

Fig. 441: Compressing Timing Belt Tensioner
Courtesy of CHRYSLER LLC

1 - VISE 2 - LOCKING PIN

8. Inspect the tensioner for fluid leakage.
9. Inspect the pivot and bolt for free movement, bearing grease leakage, and smooth rotation. If not rotating freely, replace the arm and pulley assembly.
10. When tensioner is removed from the engine it is necessary to compress the plunger into the tensioner body.

CAUTION: Index the tensioner in the vise the same way it is installed on the engine. This ensures proper pin orientation when tensioner is installed on the engine.

a. Place the tensioner into a vise and SLOWLY compress the plunger. Total bleed down of tensioner should take about 5 minutes.
b. When plunger is compressed into the tensioner body install a pin through the body and plunger to retain plunger in place until tensioner is installed.

CAMSHAFT SPROCKETS

CAUTION: The 3.5L engine is NOT a free-wheeling design. Therefore, care should be taken not to rotate the camshafts or crankshaft with the timing belt removed.

NOTE: The camshaft timing gears are keyed to the camshaft.

1. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Remove front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
3. Position crankshaft sprocket to the TDC mark on the oil pump housing by turning crankshaft in the clockwise direction
4. Install a dial indicator in number 1 cylinder to check TDC of the piston. Rotate the crankshaft until the piston is at exactly TDC.
5. Remove camshaft retainer/thrust plate from rear of right cylinder head.

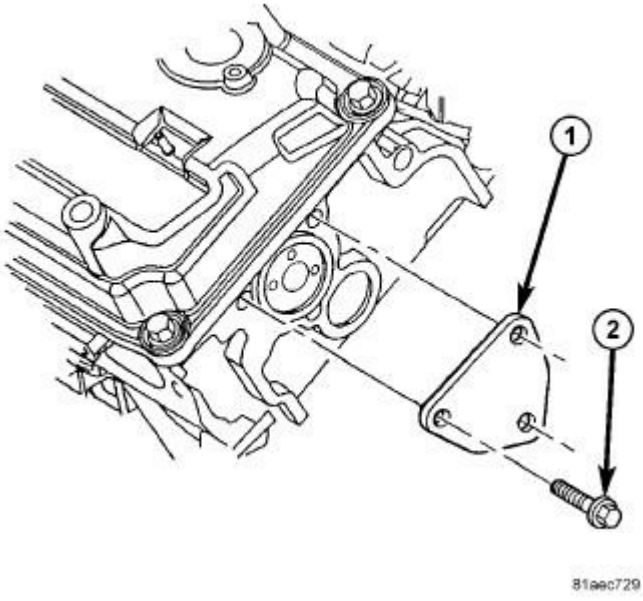

Fig. 442: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

6. Remove the cylinder head covers.
7. Remove rocker arm assemblies.
8. Remove the timing belt tensioner and timing belt.

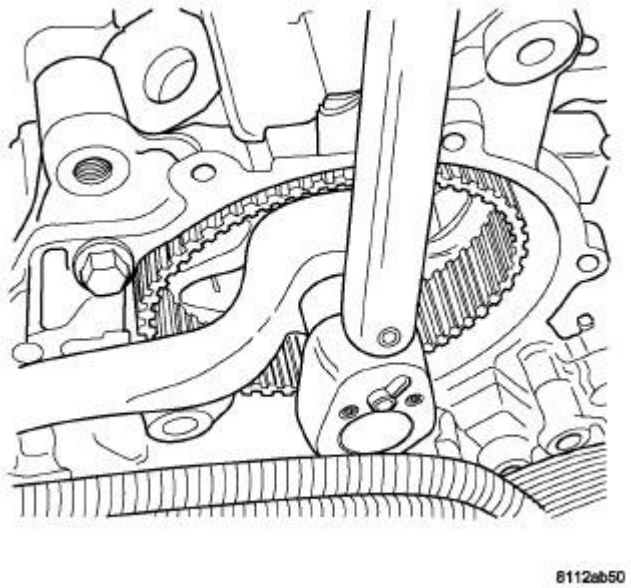

Fig. 443: LEFT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

9. Loosen and remove the left camshaft gear retaining bolt and washer. The left bolt is 255 mm (10.0 in.) long.

NOTE: The camshaft timing gears are keyed to the camshaft.

10. Hold the left camshaft sprocket with 36 mm (1 7/16 in.) box end wrench.
11. Remove the left camshaft sprocket.

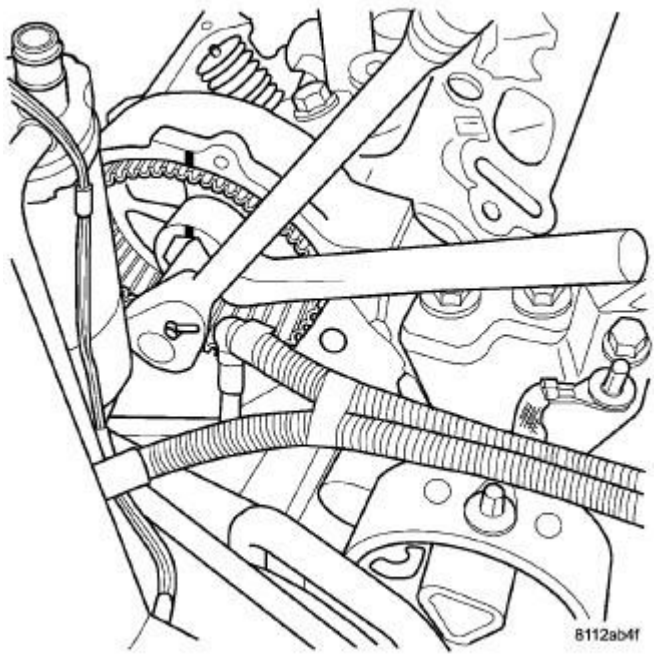

Fig. 444: RIGHT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

CAUTION: The camshaft must be pushed rearward approximately 3 1/2 inches to remove the camshaft gear retaining bolt and gear. Care must be taken not to scratch or nick the camshaft or cylinder head journals when moving camshaft.

12. Loosen and remove the right camshaft gear retaining bolt and washer. The right bolt is 213 mm (8 3/8 in.) long.

NOTE: The camshaft timing gears are keyed to the camshaft.

13. Hold the right camshaft sprocket with 36 mm (1 7/16 in.) box end wrench and loosen the camshaft bolt.
14. Using a floor jack, raise the right side of the engine enough to allow clearance to remove the right camshaft bolt and washer.
15. Remove the right camshaft sprocket.

CRANKSHAFT SPROCKET

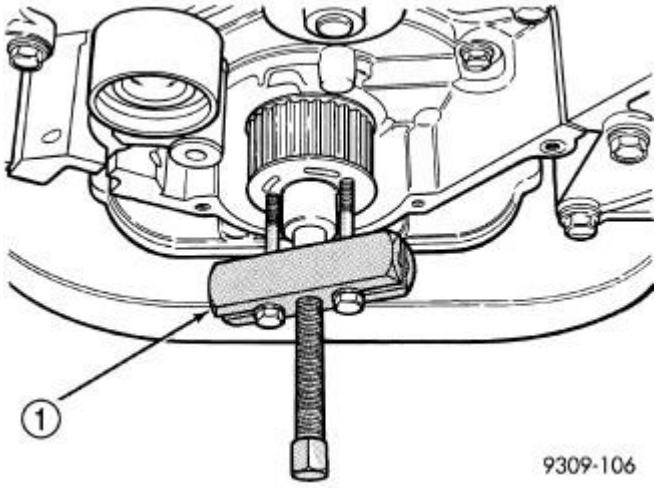

Fig. 445: Crankshaft Sprocket - Removal
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL L-4407A

1. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
2. Remove crankshaft sprocket using Special Tool L-4407A.

Inspection

TIMING VERIFICATION

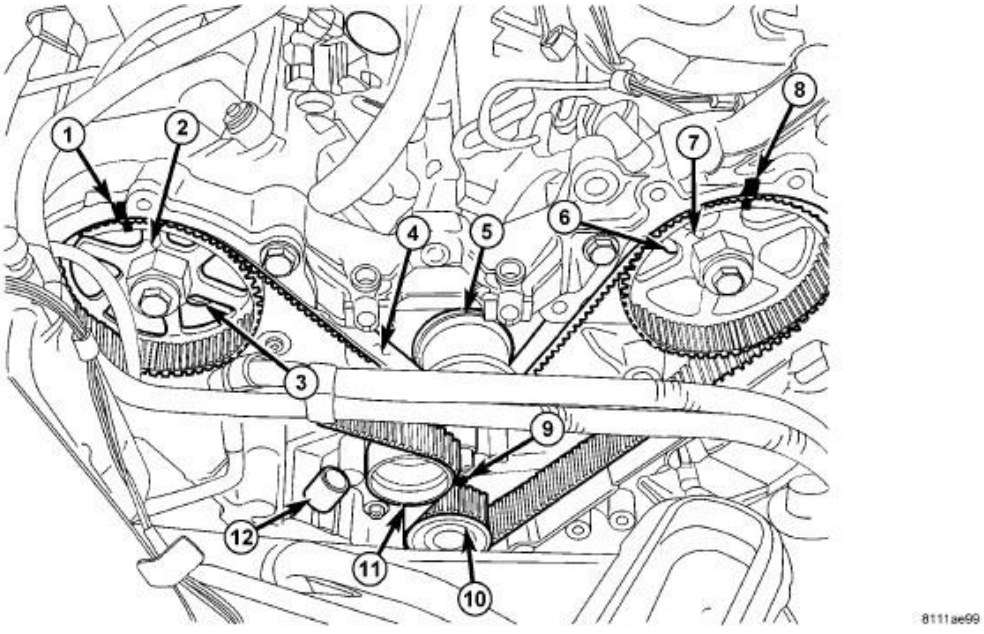

Fig. 446: TIMING GEAR MARKS
Courtesy of CHRYSLER LLC

1 - RIGHT CAMSHAFT GEAR ALIGNMENT MARK	7 - LEFT CAMSHAFT GEAR
2 - RIGHT CAMSHAFT GEAR	8 - LEFT CAMSHAFT GEAR ALIGNMENT MARK
3 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - RIGHT	9 - CRANKSHAFT GEAR ALIGNMENT MARK
4 - TIMING BELT	10 - CRANKSHAFT GEAR
5 - WATER PUMP PULLEY	11 - TIMING BELT TENSIONER PULLEY
6 - CYLINDER HEAD TO INNER TIMING BELT COVER BOLTS - LEFT	12 - TIMING BELT TENSIONER

Remove the outer timing covers. Rotate the crankshaft until the pointer on the crankshaft sprocket (10) aligns the TDC mark on the oil pump (9). Check to determine if the camshaft sprocket (2, 7) timing marks (1, 8) are aligned with the marks on the inner timing cover. It may take an additional full revolution of the crankshaft before the camshaft sprocket marks are aligned.

TIMING BELT

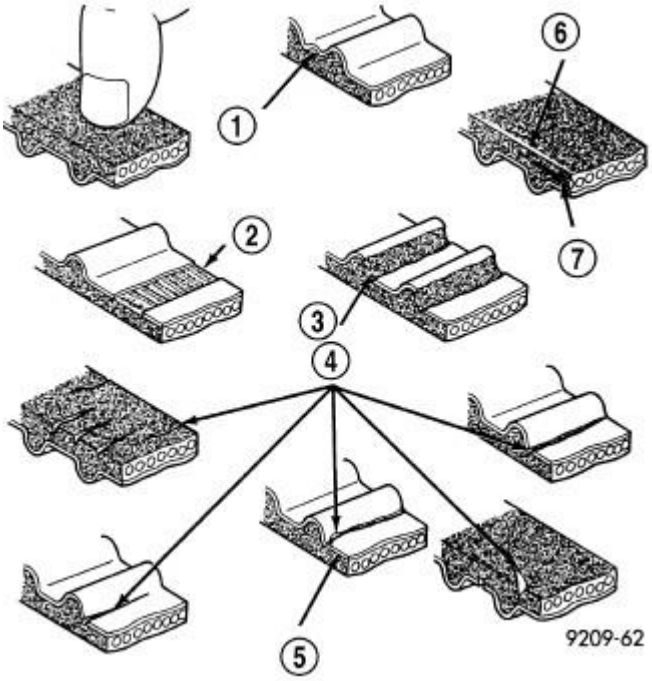

Fig. 447: Timing Belt Inspection
Courtesy of CHRYSLER LLC

1 - PEELING
2 - TOOTH MISSING AND CANVAS FIBER EXPOSED
3 - RUBBER EXPOSED
4 - CRACKS
5 - PEELING

6 - ROUNDED EDGE
7 - ABNORMAL WEAR (FLUFFY STRAND)

1. Remove front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.
2. Inspect both sides of the timing belt. Replace belt if any of the following conditions exist:
   a. Hardening of back rubber back side is glossy without resilience and leaves no indent when pressed with fingernail.
   b. Cracks on rubber back.
   c. Cracks or peeling of canvas.
   d. Cracks on rib root.
   e. Cracks on belt sides.
   f. Missing teeth.
   g. Abnormal wear of belt sides. The sides are normal if they are sharp as if cut by a knife.
   h. Vehicle mileage or time at component maintenance requirement. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** .
3. If none of the above conditions are seen on the belt, the front timing belt cover can be installed. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

Installation

CRANKSHAFT SPROCKET

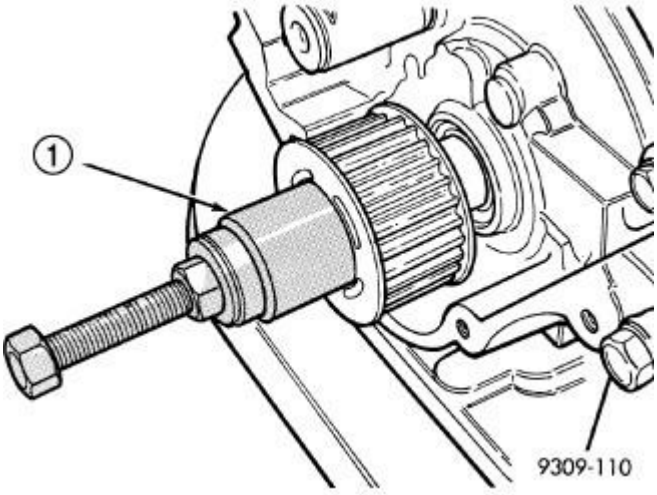

Fig. 448: Crankshaft Sprocket - Installation
Courtesy of CHRYSLER LLC

1 - INSTALL WITH SPECIAL TOOL 6641 WITH 12 mm SCREW C-4685-C1 AND THRUST BEARING AND WASHER

CAUTION: To ensure proper installation depth of crankshaft sprocket, Sprocket Installer 6641 must be used.

1. Install crankshaft sprocket using Special Tools 6641 and C-4685-C1.
2. Install timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

CAMSHAFT SPROCKETS

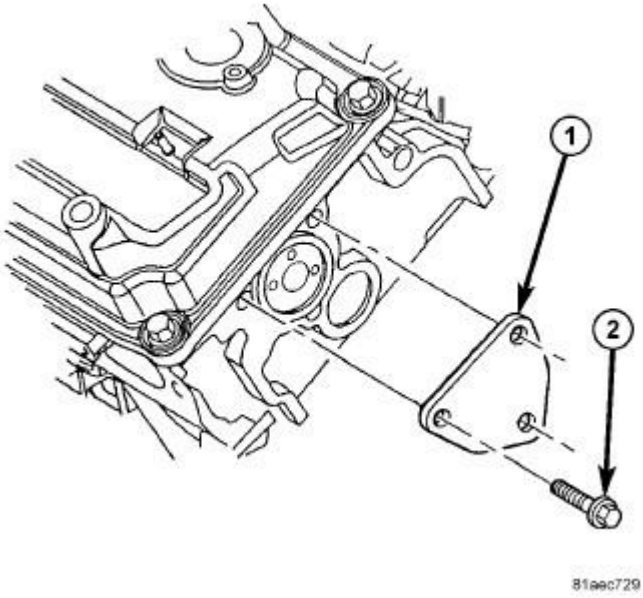

Fig. 449: Camshaft Thrust Plate
Courtesy of CHRYSLER LLC

CAUTION: The camshaft sprockets are keyed and not interchangeable from side to side because of the camshaft position sensor pick-up.

CAUTION: The camshafts must be pushed back into the cylinder head after the camshaft sprockets and retaining bolts are positioned. Care must be taken not to scratch or nick the camshaft or cylinder head journals when moving the camshafts.

1. Install the camshaft sprockets onto the camshafts. Install **NEW** sprocket attaching bolts into place. The 255 mm (10 in.) bolt is installed in the left camshaft and the 213 mm (8 3/8 in.) bolt is installed into the right camshaft. **Do not tighten the bolts at this time, they will be tightened at a later step.** Camshaft sprocket timing marks should be aligned with inner cover timing marks at both sprockets.
2. Install the camshaft thrust plates (1) and seals. Tighten the bolts (2) to 28 N.m (250 in. lbs.).

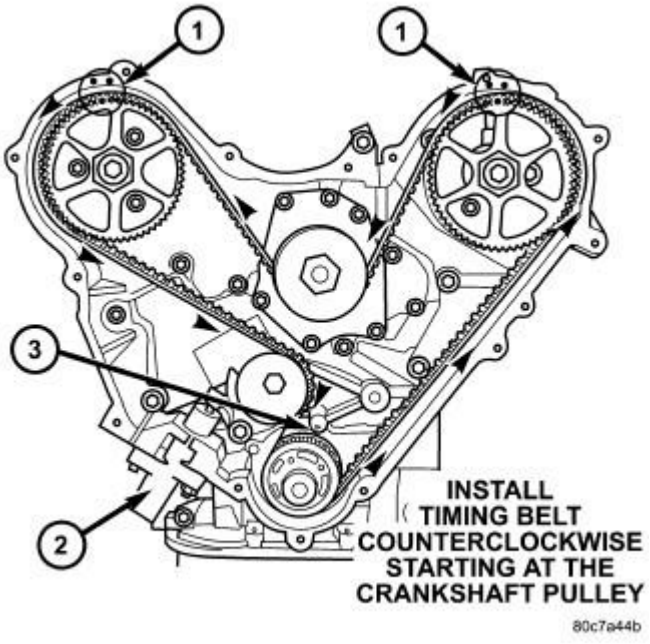

Fig. 450: TIMING BELT INSTALLATION
Courtesy of CHRYSLER LLC

1 - ALIGN CAMSHAFTS WITH TIMING MARKS
2 - INSTALL TENSIONER LOOSE
3 - CRANKSHAFT AT TDC

3. Install the timing belt starting first at the crankshaft sprocket, then to remaining sprockets in a counterclockwise direction.
4. Install the belt around the last sprocket. Maintain tension on the belt as it is positioned around the tensioner pulley. Camshaft sprocket timing marks (1) and crankshaft sprocket timing mark (3) should still be aligned with the inner cover marks.

NOTE: It is necessary to compress the plunger into the tensioner body and install a locking pin prior to reinstalling the tensioner. See Timing Belt Removal for tensioner compression procedure. See Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal.

5. Hold the tensioner pulley against the belt and install the reset (pinned) timing belt tensioner (2) into the housing. Tighten attaching bolts to 28 N.m (250 in. lbs.).
6. Remove tensioner retaining pin to allow the tensioner to extend to the pulley bracket.

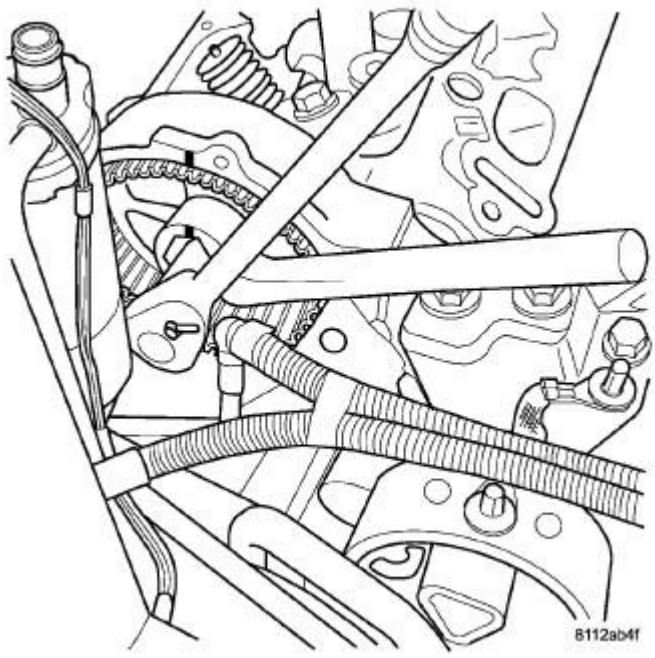

Fig. 451: RIGHT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

7. Hold the right camshaft sprocket hex with a 36 mm (1 7/16 in.) wrench and tighten the right camshaft bolt to 102 N.m (75 ft. lbs.) +90° turn.

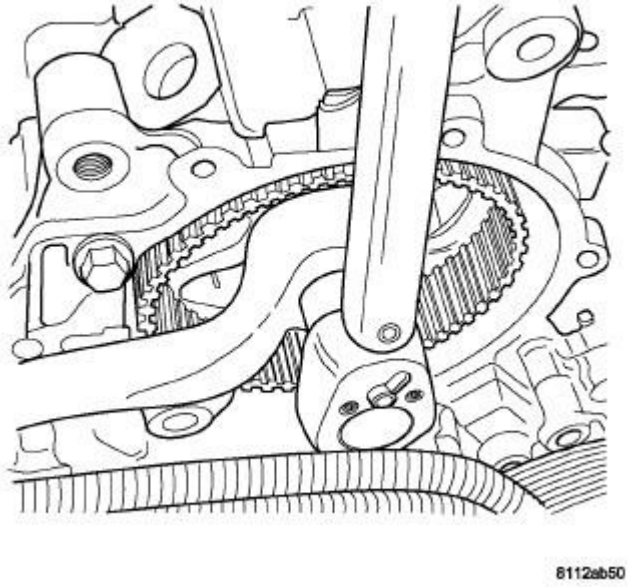

Fig. 452: LEFT CAMSHAFT SPROCKET
Courtesy of CHRYSLER LLC

8. Hold the left camshaft sprocket hex with a 36 mm (1 7/16 in.) wrench and tighten the left camshaft bolts to 102 N.m (75 ft. lbs.) +90° turn.
9. Install the rocker arm assemblies and cylinder head covers. See **Engine/Cylinder Head/ROCKER ARM, Valve - Installation**
10. Install the front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

TIMING BELT

CAUTION: The 3.5L is NOT a freewheeling engine. Therefore, the valve train rocker assemblies must be removed before attempting to rotate either crankshaft or camshafts independently of each other.

CAUTION: If camshafts have moved from the timing marks, always rotate camshaft towards the direction nearest to the timing marks (DO NOT TURN CAMSHAFTS A FULL REVOLUTION OR DAMAGE to valves and/or pistons could result).

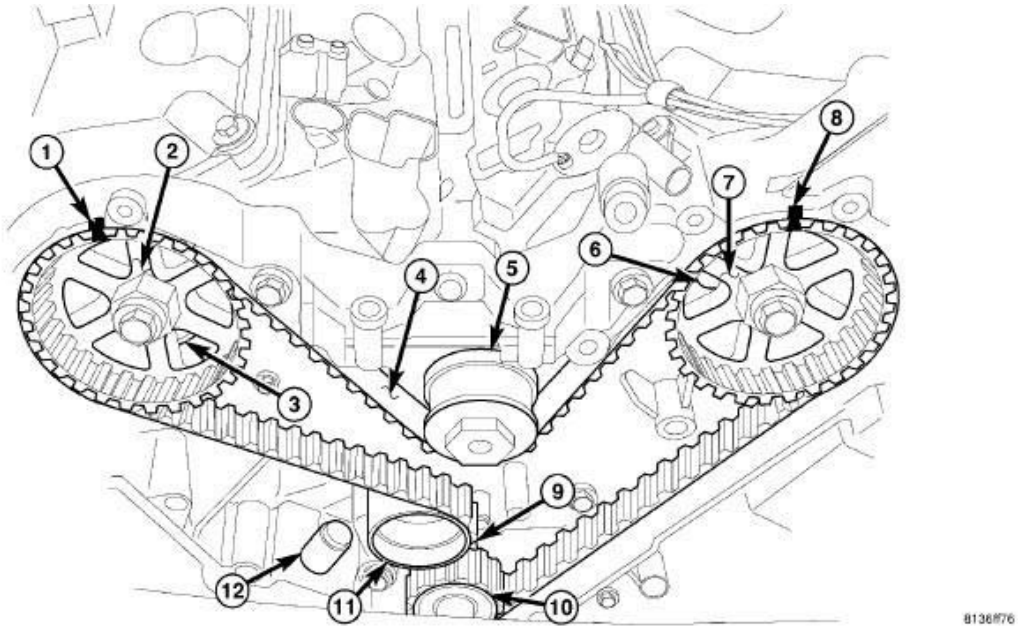

Fig. 453: TIMING GEAR ALIGNMENT
Courtesy of CHRYSLER LLC

1. Align the crankshaft sprocket (10) with the TDC mark (9) on the oil pump cover.
2. Align the camshaft sprockets (2, 7) timing reference marks (1, 8) with the marks on the rear cover.

3. Install the timing belt (4) starting at the crankshaft sprocket (10) going in a counterclockwise direction. Install the belt around the last sprocket and maintain tension on the belt as it is positioned around the tensioner pulley (11).

NOTE: It is necessary to compress the plunger into the tensioner body and install a locking pin prior to reinstalling the tensioner. See Timing Belt Removal for tensioner compression procedure. See Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal.

4. Hold the tensioner pulley (11) against the belt and install the reset (pinned) timing belt tensioner (2) into the housing. Tighten attaching bolts to 28 N.m (250 in. lbs.).
5. When tensioner (12) is in place, pull the retaining pin to allow the tensioner to extend to the pulley bracket.
6. Rotate the crankshaft sprocket (10) two revolutions and check the timing marks on the camshafts and crankshaft. The marks should line up within their respective locations. If the marks do not line up, repeat the procedure.
7. Install the front timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
8. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure .

COVER(S), ENGINE TIMING, FRONT

Removal

REMOVAL

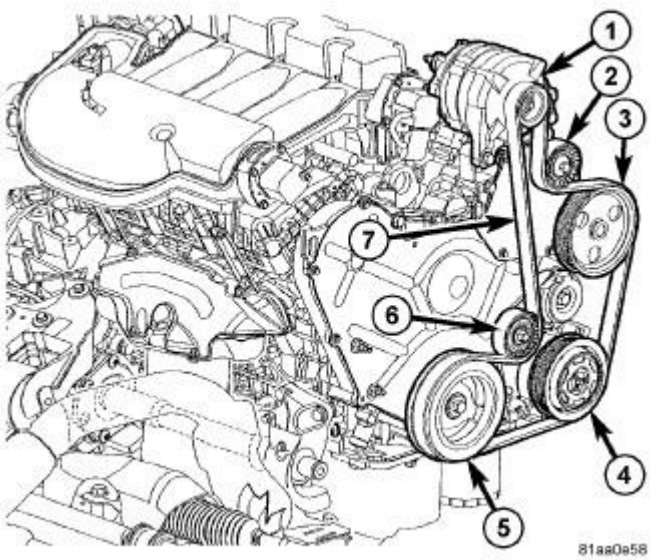

Fig. 454: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

1. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect negative battery cable.
3. Raise the vehicle.
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Remove accessory drive belt tensioner.
6. Remove bolts for power steering pump. Reposition power steering pump aside.
7. Remove crankshaft damper. See **Engine/Engine Block/DAMPER, Vibration - Removal**.

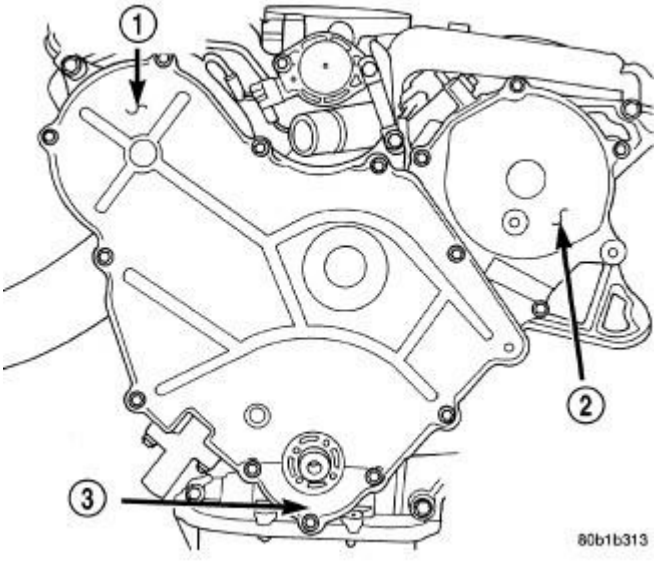

Fig. 455: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED)
2 - LEFT SIDE COVER (CAST)
3 - LOWER COVER

8. Remove the lower front timing belt cover fasteners.
9. Lower the vehicle.
10. Support the engine with a floor jack.
11. Remove the front engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.
12. Disconnect the fuel supply line at the fuel rail.
13. Remove the upper timing belt cover bolts and remove front timing belt cover. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

Installation

INSTALLATION

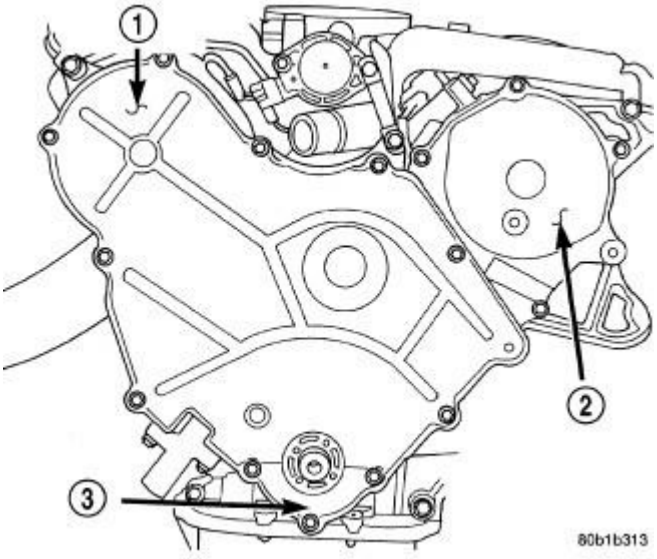

Fig. 456: TIMING BELT COVERS
Courtesy of CHRYSLER LLC

1 - RIGHT SIDE COVER (STAMPED)
2 - LEFT SIDE COVER (CAST)
3 - LOWER COVER

NOTE: The timing cover bolts and both holes to the engine block must be thoroughly cleaned and free of oil residue before assembly. IN ADDITION, add thread sealant to the timing cover bolts that mount to the oil pump. See Engine/Lubrication/PUMP, Engine Oil - Installation.

1. Install front timing belt cover.
2. Install the upper engine mount. See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation**.
3. Connect fuel supply line at fuel rail.
4. Raise the vehicle.

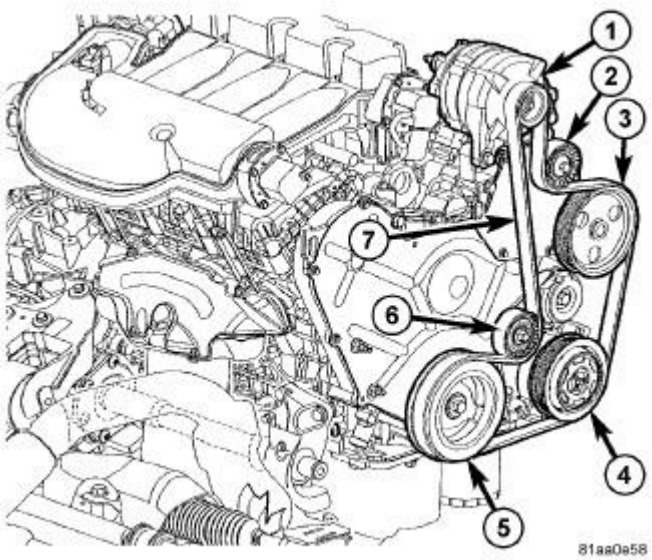

Fig. 457: Identifying Accessory Drive Belt & Pulleys
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER PULLEY
3 - POWER STEERING PUMP
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - TENSIONER

5. Install power steering pump fasteners. Tighten bolts to 23 N.m (200 lbs. in.).
6. Install crankshaft damper. See **Engine/Engine Block/DAMPER, Vibration - Installation**.
7. Install accessory drive belt tensioner. Torque fastener to 28 N.m (250 in. lbs.).
8. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
9. Lower the vehicle.
10. Connect negative battery cable.

COVER(S), ENGINE TIMING, REAR

Removal

REMOVAL

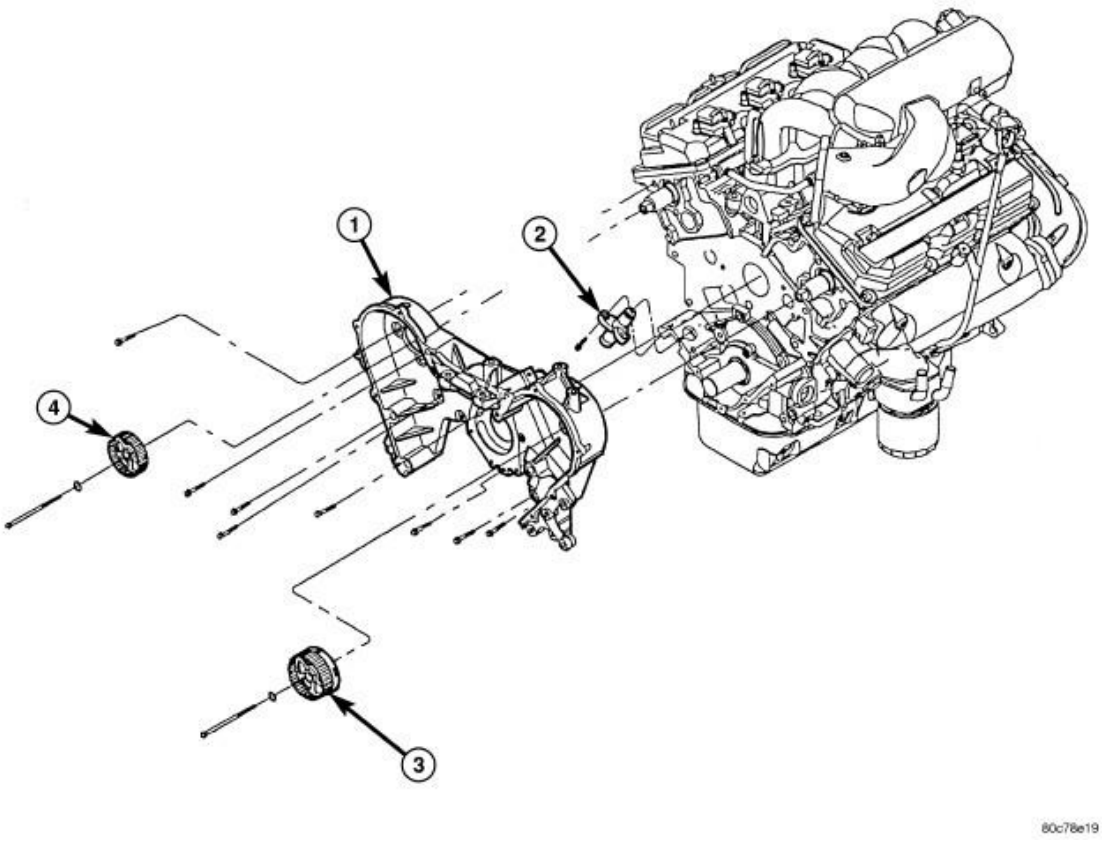

Fig. 458: TIMING BELT COVER - REAR
Courtesy of CHRYSLER LLC

1. Perform fuel pressure release procedure. Refer to **Fuel System/Fuel Delivery - Standard Procedure** .
2. Disconnect the negative battery cable.
3. Remove timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
4. Remove camshaft sprockets. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.

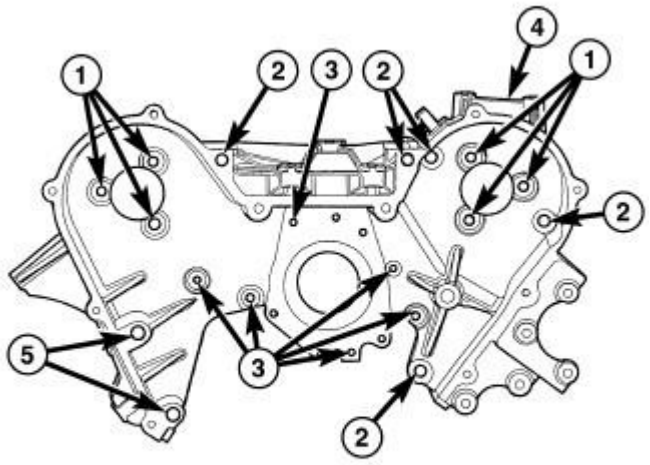

Fig. 459: Rear Timing Belt Cover Fasteners
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

5. Remove rear timing belt cover bolts.
6. Remove the rear cover.

NOTE: The rear timing belt cover has O-rings to seal the water pump passages to cylinder block. Do not reuse the O-rings.

Installation

INSTALLATION

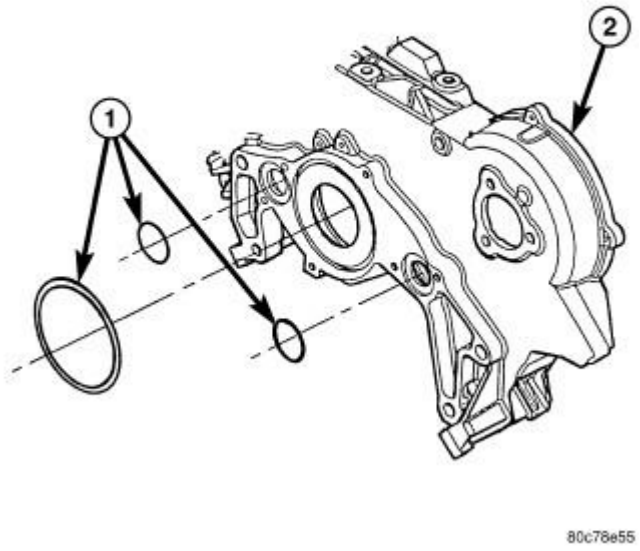

Fig. 460: Rear Timing Belt Cover Seals
Courtesy of CHRYSLER LLC

1 - REAR TIMING BELT COVER SEALS
2 - REAR TIMING BELT COVER

1. Clean rear timing belt cover O-ring sealing surfaces and grooves. Lubricate new O-rings with Mopar® Dielectric Grease or equivalent to facilitate assembly.
2. Position NEW O-rings on cover.

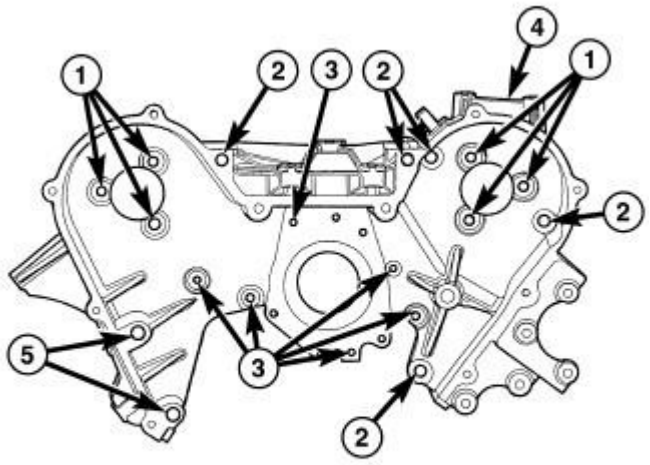

Fig. 461: Rear Timing Belt Cover Fasteners
Courtesy of CHRYSLER LLC

1 - M8 FASTENERS (APPLY THREAD SEALANT)
2 - M10 FASTENERS
3 - M6 FASTENERS
4 - REAR TIMING BELT COVER
5 - M10 FASTENERS (STUD/NUT)

3. Install rear timing belt cover. Tighten bolts to the following specified torque:
   - M10-54 N.m (40 ft. lbs.)
   - M8-28 N.m (20 ft. lbs.)
   - M6-12 N.m (105 in. lbs.)
4. Install camshaft sprockets. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.
5. Install timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

TENSIONER, ENGINE TIMING

Removal

TENSIONER

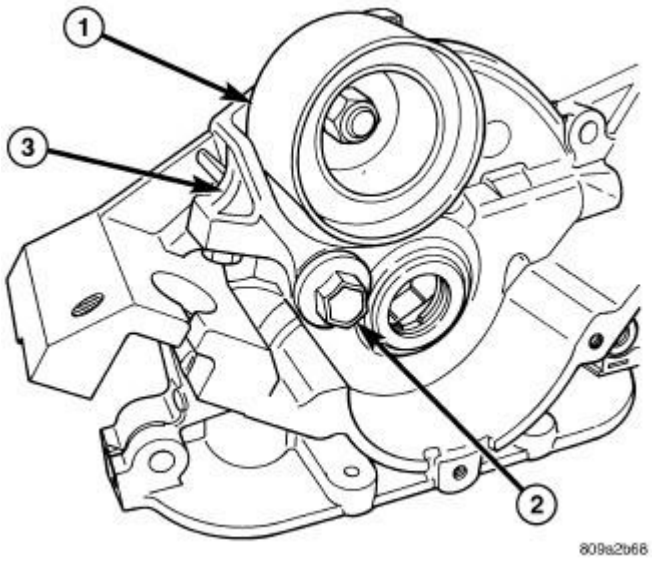

Fig. 462: TENSIONER PULLEY
Courtesy of CHRYSLER LLC

1 - TENSIONER PULLEY
2 - PIVOT BOLT
3 - TENSIONER BRACKET

1. For timing belt tensioner removal procedure. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.

TENSIONER PULLEY ASSEMBLY

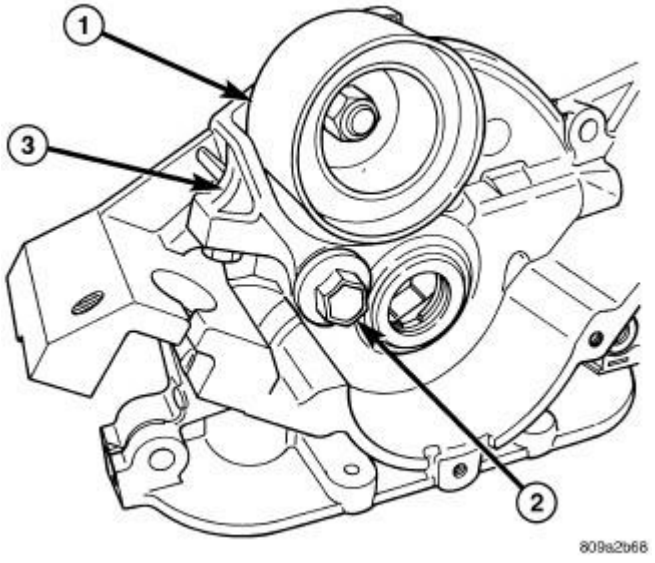

Fig. 463: TENSIONER PULLEY
Courtesy of CHRYSLER LLC

1 - TENSIONER PULLEY
2 - PIVOT BOLT
3 - TENSIONER BRACKET

1. Remove the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal**.
2. Remove the timing belt tensioner pulley and bracket assembly by unscrewing the pivot bolt from the oil pump housing.

Inspection

TENSIONER

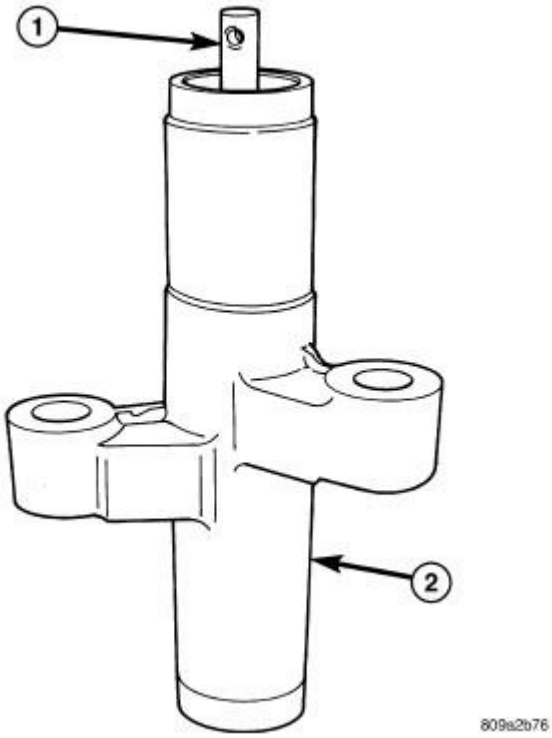

Fig. 464: TIMING BELT TENSIONER
Courtesy of CHRYSLER LLC

1 - PLUNGER (EXTENDED POSITION)
2 - TENSIONER HOUSING

1. Inspect hydraulic tensioner for fluid loss around the plunger seal. Replace tensioner if leaking.

TENSIONER PULLEY ASSEMBLY

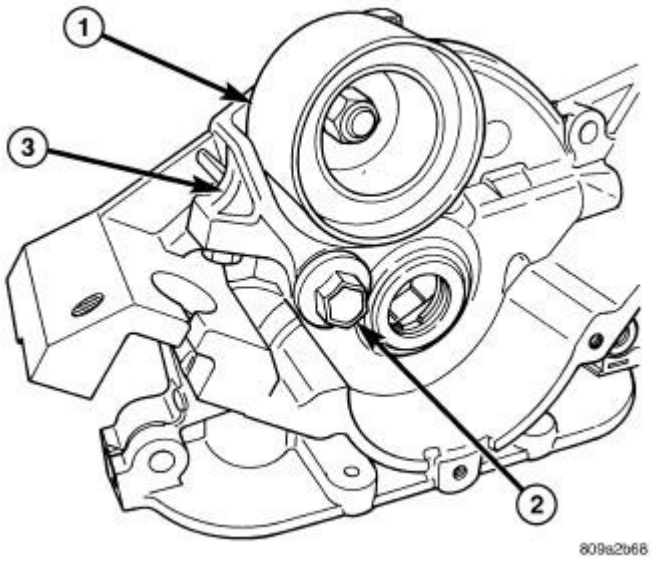

Fig. 465: TENSIONER PULLEY
Courtesy of CHRYSLER LLC

1 - TENSIONER PULLEY
2 - PIVOT BOLT
3 - TENSIONER BRACKET

NOTE: The tensioner pulley, bracket, and pivot bolt is serviced as an assembly.

1. Inspect pulley for free movement. Replace if pulley is loose, seized, or rough turning.
2. Inspect pulley bearing and seal. Replace if damaged.
3. Inspect pivot bolt for free movement in assembly housing. Replace assembly if seized or excessive looseness.

Installation

TENSIONER PULLEY ASSEMBLY

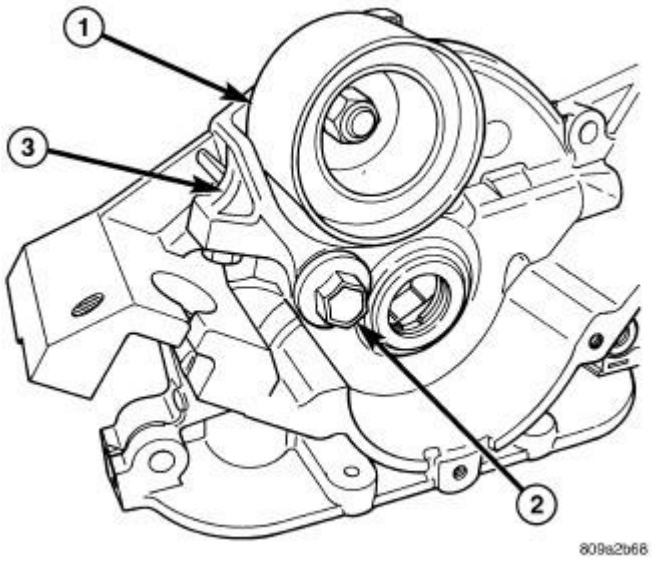

Fig. 466: TENSIONER PULLEY
Courtesy of CHRYSLER LLC

1 - TENSIONER PULLEY
2 - PIVOT BOLT
3 - TENSIONER BRACKET

1. Install the timing belt tensioner pulley (1) assembly. Tighten the pivot bolt (2) to 61 N.m (45 ft. lbs.).
2. Install the timing belt. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

TENSIONER

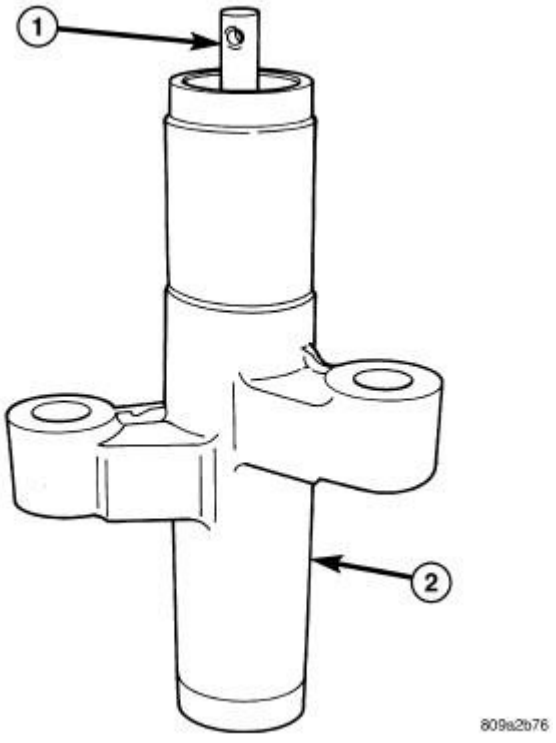

Fig. 467: TIMING BELT TENSIONER
Courtesy of CHRYSLER LLC

1 - PLUNGER (EXTENDED POSITION) 2 - TENSIONER HOUSING

1. For timing belt tensioner installation procedure. See **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation**.

2009 ELECTRICAL

Battery System - Journey

DESCRIPTION

DESCRIPTION

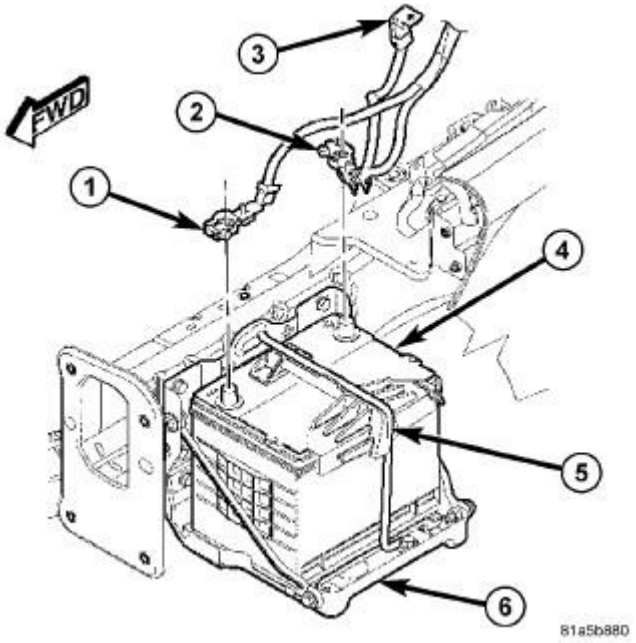

Fig. 1: Battery Components
Courtesy of CHRYSLER LLC

This vehicle is equipped with a single 12-volt battery. All of the components of the battery system are located in the front of the vehicle, just ahead of the left front wheel and tire assembly. The battery system for this vehicle contains the following components:

- **Battery (4)** - The storage battery provides a reliable means of storing a renewable source of electrical energy within the vehicle.
- **Positive (2) and Negative (1) Battery Cables** - The battery cables connect the positive and negative charged battery terminal posts to the vehicle electrical system.
- **Battery Hold-down (5)** - The battery hold-down hardware secures the battery in the battery tray.
- **Battery Tray (6)** - The battery tray provides a secure mounting location in the vehicle for the battery and an anchor point for the battery hold-down hardware.

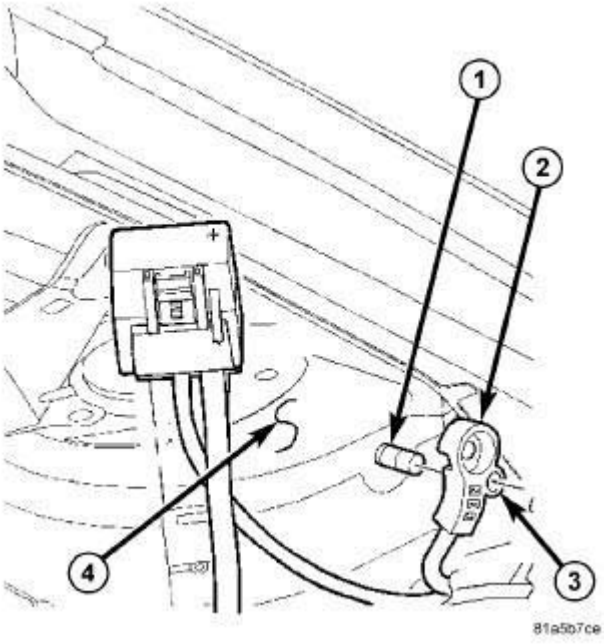

Fig. 2: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

For battery system maintenance schedules. Refer to **Vehicle Quick Reference/Maintenance Schedules - Description** . For the proper jump starting procedures, Refer to the vehicle Owner's Manual.

OPERATION

OPERATION

The battery system is designed to provide a safe, efficient, reliable and mobile means of delivering and storing electrical energy. This electrical energy is required to operate the engine starting system, as well as to operate many of the other vehicle accessory systems for limited durations while the engine and/or the charging system are not operating. The battery system is also designed to provide a reserve of electrical energy to supplement the charging system for short durations while the engine is running and the electrical current demands of the vehicle exceed the output of the charging system. In addition to delivering, and storing electrical energy for the vehicle, the battery system serves as a capacitor and voltage stabilizer for the vehicle electrical system. It absorbs most abnormal or transient voltages caused by the switching of any of the electrical components or circuits in the vehicle.

DIAGNOSIS AND TESTING

BATTERY SYSTEM

The battery, starting, and charging systems in the vehicle operate with one another and must be tested as a complete system. In order for the engine to start and the battery to maintain its charge properly, all of the components that are used in these systems must perform within specifications. It is important that the battery, starting, and charging systems be thoroughly tested and inspected any time a battery needs to be charged or replaced. The cause of abnormal battery discharge, overcharging or early battery failure must be diagnosed and corrected before a battery is replaced and before a vehicle is returned to service. The service information for these systems has been separated within this service information to make it easier to locate the specific information you are seeking. However, when attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used for the battery, starting, and charging systems include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, a volt/ohmmeter, a battery charger, a carbon pile rheostat (load tester) and a 12-volt test lamp may be required. All OBD-sensed systems are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for any failure it detects. Refer to **Electrical - Engine Systems/Charging - Diagnosis and Testing** for the proper charging system on-board diagnostic test procedures.

MICRO 420 BATTERY TESTER (GASOLINE ENGINES)

The Micro 420 automotive battery tester is designed to help diagnose the cause of a defective battery. Follow the instruction service information supplied with the tester to properly diagnose a vehicle. If the instruction service information is not available. See **Standard Procedure** which includes the directions for using the Micro 420 battery tester.

OTC ONE STEP BATTERY ANALYZER AND CHARGER (DIESEL ENGINES)

The OTC One Step Battery Analyzer and Charger is designed to help diagnose the cause of a defective battery. Follow the instruction service information supplied with the tester to properly diagnose a vehicle.

BATTERY SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
THE BATTERY SEEMS WEAK OR DEAD WHEN ATTEMPTING TO START THE ENGINE.	1. The electrical system ignition-off draw is excessive.	1. See **Standard Procedure** for the appropriate test procedures. Repair the excessive ignition-off draw, as required.
	2. The charging system is inoperative.	2. Determine if the charging system is performing to specifications. Refer to **Electrical - Engine Systems/Charging - Diagnosis and Testing** for the appropriate charging system diagnosis and testing procedures. Repair the inoperative charging system, as required.
	3. The battery is discharged.	3. Determine the battery state-of-charge using the appropriate battery tester.

		Charge the inoperative battery, as required.
	4. The battery terminal connections are loose or corroded.	4. See **Diagnosis and Testing** for the appropriate battery cable diagnosis and testing procedures. Clean and tighten the battery terminal connections, as required.
	5. The battery has an incorrect size or rating for this vehicle.	5. See **Specifications** for the proper battery size and rating. Replace an incorrect battery, as required.
	6. The battery is inoperative.	6. Test the battery using the appropriate battery tester. Replace the inoperative battery, as required.
	7. The starting system is inoperative.	7. Determine if the starting system is performing to specifications. Refer to **Electrical - Engine Systems/Starting - Diagnosis and Testing** for the appropriate starting system diagnosis and testing procedures. Repair the inoperative starting system, as required.
	8. The battery is physically damaged.	8. Inspect the battery for loose terminal posts or a cracked and leaking case. Replace the damaged battery, as required.
THE BATTERY STATE OF CHARGE CANNOT BE MAINTAINED.	1. The battery has an incorrect size or rating for this vehicle.	1. See **Specifications** for the proper battery size and rating. Replace an incorrect battery, as required.
	2. The battery terminal connections are loose or corroded.	2. See **Diagnosis and Testing** for the appropriate battery cable diagnosis and testing procedures. Clean and tighten the battery terminal connections, as required.
	3. The electrical system ignition-off draw is excessive.	3. See **Standard Procedure** for the appropriate test procedures. Repair the excessive ignition-off draw, as required.
	4. The battery is inoperative.	4. Test the battery using the appropriate battery tester. Replace the inoperative battery, as required.
	5. The starting system is inoperative.	5. Determine if the starting system is performing to specifications. Refer to **Electrical - Engine Systems/Starting - Diagnosis and Testing** for the appropriate starting system diagnosis and testing procedures. Repair the inoperative starting system, as required.
	6. The charging system is inoperative.	6. Determine if the charging system is performing to specifications. Refer to **Electrical - Engine Systems/Charging - Diagnosis and Testing** for the

		appropriate charging system diagnosis and testing procedures. Repair the inoperative charging system, as required.
	7. Electrical loads exceed the output of the charging system.	7. Inspect the vehicle for aftermarket electrical equipment which might cause excessive electrical loads.
	8. Slow driving or prolonged idling with high-amperage draw loads in use.	8. Advise the vehicle operator, as required.
THE BATTERY WILL NOT ACCEPT A CHARGE.	1. The battery is inoperative.	1. Test the battery using the appropriate battery tester. Replace the inoperative battery, as required.

STANDARD PROCEDURE

BATTERY RECONNECTION

NOTE: This reconnection procedure is to be performed anytime the battery has been disconnected.

1. Connect the negative battery cable remote terminal to the remote battery post and tighten the nut.

CAUTION: Once the battery has been connected, review and perform the following information as applicable.

ELECTRONIC STABILITY PROGRAM (ESP)

If the vehicle is equipped with ESP, once the battery is reconnected, the Steering Angle Sensor (SAS) in the clockspring needs to be calibrated. The SAS requires calibration anytime the battery or an ABS (ESP) component has been disconnected for any length of time. **If the SAS is not calibrated following battery reconnection, the ESP/BAS indicator lamp is illuminated following five ignition cycles indicating the need for calibration.**

To calibrate, perform the following:

1. Start the engine.
2. Center the steering wheel.
3. Turn the steering wheel all the way to the left until the internal stop in the steering gear is met, then turn the wheel all the way to the right until the opposite internal stop in the steering gear is met.
4. Center the steering wheel.
5. Stop the engine.

CLEANING

CLEANING

The following information details the recommended cleaning procedures for the battery and related components. In addition to the maintenance schedules found in this service information and the Owner's Manual, it is recommended that these procedures be performed any time the battery or related components must be removed for vehicle service.

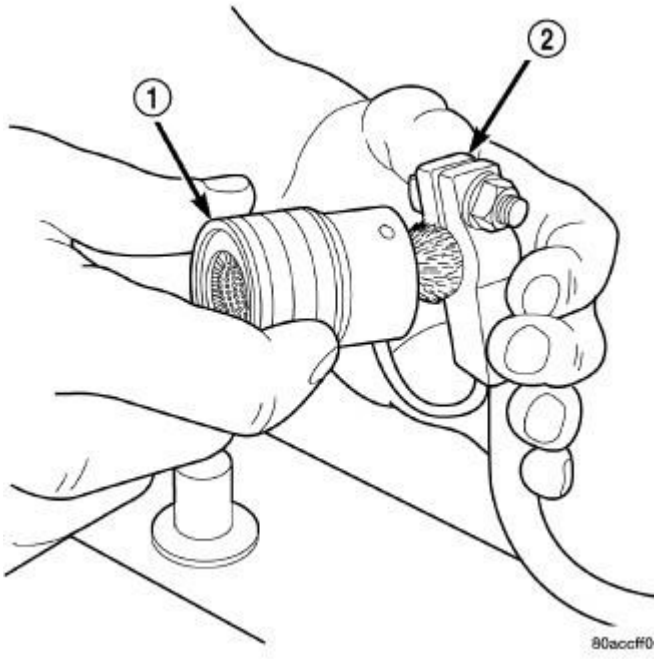

Fig. 3: Cleaning Battery Cable Terminal Clamps Using Terminal Cleaning Tool
Courtesy of CHRYSLER LLC

1. Clean the battery cable terminal clamps (2) of all corrosion. Remove any corrosion using a wire brush (1) or a post and terminal cleaning tool, and a sodium bicarbonate (baking soda) and warm water cleaning solution.
2. Clean the battery tray and battery hold-down hardware of all corrosion. Remove any corrosion using a wire brush and a sodium bicarbonate (baking soda) and warm water cleaning solution. Paint any exposed bare metal.

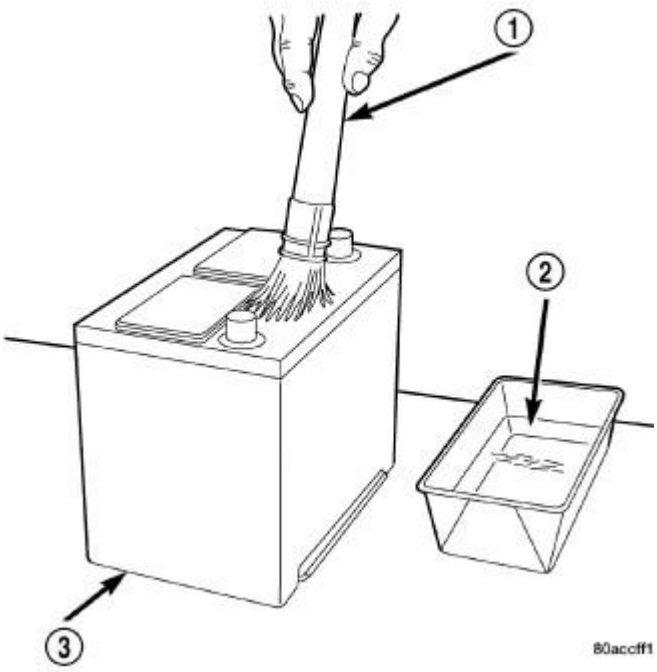

Fig. 4: Cleaning Outside Of Battery Case
Courtesy of CHRYSLER LLC

3. If the removed battery is to be reinstalled, clean the outside of the battery case (3) and the top cover with a sodium bicarbonate (baking soda) and warm water cleaning solution using a stiff bristle parts cleaning brush (1) to remove any acid film. Rinse the battery with clean water. Ensure that the cleaning solution does not enter the battery cells through the vent holes. If the battery is being replaced. See **Specifications** for the factory-installed battery specifications. Confirm that the replacement battery is the correct size and has the correct ratings for the vehicle.
4. Clean the battery thermal guard with a sodium bicarbonate (baking soda) and warm water cleaning solution using a stiff bristle parts cleaning brush to remove any acid film.

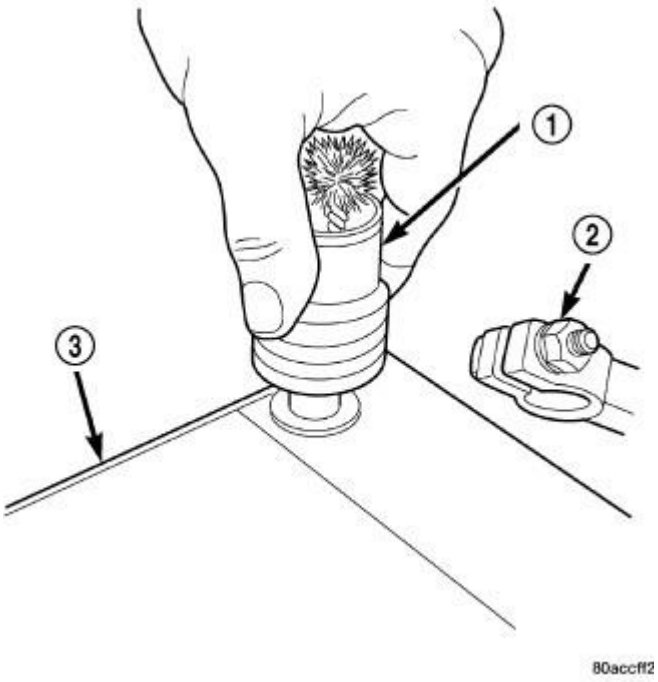

Fig. 5: Cleaning Battery Terminal Post Using Terminal Cleaner
Courtesy of CHRYSLER LLC

5. Clean any corrosion from the battery terminal posts with a wire brush or a post and terminal cleaner, and a sodium bicarbonate (baking soda) and warm water cleaning solution.

INSPECTION

INSPECTION

The following information details the recommended inspection procedures for the battery and related components. In addition to the maintenance schedules found in this service information and the owner's manual, it is recommended that these procedures be performed any time the battery or related components must be removed for vehicle service.

1. Inspect the battery cable terminal clamps for damage. Replace any battery cable that has a damaged or deformed terminal clamp.
2. Inspect the battery tray and battery hold-down hardware for damage. Replace any damaged parts.
3. Slide the thermal guard off of the battery case (if equipped). Inspect the battery case for cracks or other damage that could result in electrolyte leaks. Also, check the battery terminal posts for looseness. Batteries with damaged cases or loose terminal posts must be replaced.
4. Inspect the battery thermal guard for tears, cracks, deformation or other damage (if equipped). Replace any battery thermal guard that has been damaged.
5. Inspect the battery built-in test indicator sight glass (if equipped) for an indication of the battery condition. If the battery is discharged, charge as required. Refer to **Standard Procedure** for detailed instructions.

SPECIFICATIONS

BATTERY

The battery Group Size number, the Cold Cranking Amperage (CCA) rating, and the Reserve Capacity (RC) rating or Ampere-Hours (AH) rating can be found on the original equipment battery label. Be certain that a replacement battery has the correct Group Size number, as well as CCA, and RC or AH ratings that equal or exceed the original equipment specification for the vehicle being serviced. Battery sizes and ratings are discussed in more detail below.

NOTE: Vehicles equipped with a diesel engine utilize a unique battery. The specifications for this battery may differ from the standards shown in this information. Refer to the battery manufacturer for detailed specifications.

- **Group Size** - The outside dimensions and terminal placement of the battery conform to standards established by the Battery Council International (BCI). Each battery is assigned a BCI Group Size number to help identify a correctly-sized replacement.
- **Cold Cranking Amperage** - The Cold Cranking Amperage (CCA) rating specifies how much current (in amperes) the battery can deliver for thirty seconds at -18° C (0° F). Terminal voltage must not fall below 7.2 volts during or after the thirty second discharge period. The CCA required is generally higher as engine displacement increases, depending also upon the starter current draw requirements.
- **Reserve Capacity** - The Reserve Capacity (RC) rating specifies the time (in minutes) it takes for battery terminal voltage to fall below 10.5 volts, at a discharge rate of 25 amperes. RC is determined with the battery fully-charged at 26.7° C (80° F). This rating estimates how long the battery might last after a charging system failure, under minimum electrical load.
- **Ampere-Hours** - The Ampere-Hours (AH) rating specifies the current (in amperes) that a battery can deliver steadily for twenty hours, with the voltage in the battery not falling below 10.5 volts. This rating is also sometimes identified as the twenty-hour discharge rating.
- **Load Test Amperage** - The Load Test Amperage rating specifies the current (in amperes) that a battery should be tested at with the battery load test equipment. This value should always be 50 percent of the CCA. For example: if the CCA for this battery is 700 amps, the Load Test Amperage is 50 percent of that or 350 amps.

BATTERY CLASSIFICATIONS AND RATINGS				
BCI Group Size Classification	**Cold Cranking Amperage**	**Reserve Capacity**	**Ampere - Hours**	**Load Test Amperage**
34	700	120 Minutes	66	350
86	525	150 Minutes	75	265

TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Battery Terminal Clamp	5	-	45

Pinch-Bolt Hex Nut			
Negative Battery Cable Remote Terminal Nut	16.5	-	145
Positive Battery Cable Remote Terminal Nut	16.5	-	145
Battery Hold Down Bolt	16	-	142
Starter Solenoid B(+) Terminal Stud Nut	13	-	115
Battery Negative Cable Ground Eyelet Terminal To Engine Block Bolt	16.5	-	145
Totally Integrated Power Module B(+) Terminal Stud Nut	10	-	90
Battery Tray Support Bolt	16	-	142
Battery Tray Bolt	16	-	142

SPECIAL TOOLS

SPECIAL TOOLS

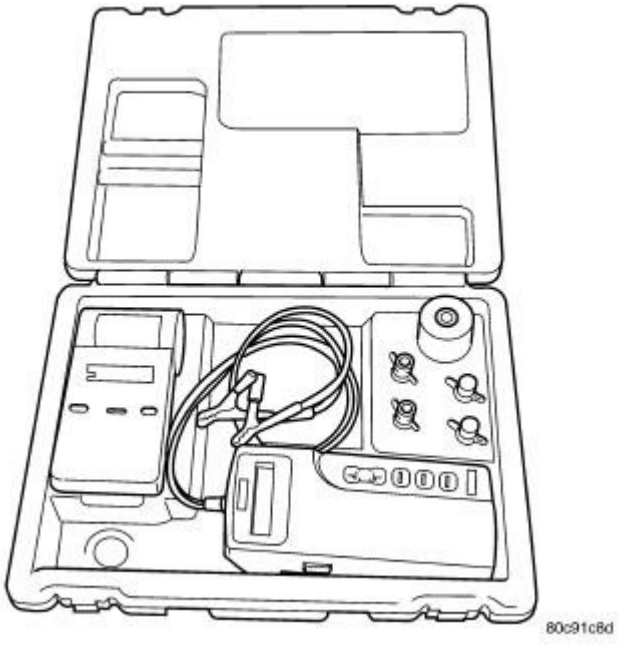

Fig. 6: Micro 420 Battery Tester - PSE p/n 165-EXP-1020KIT
Courtesy of CHRYSLER LLC

BATTERY

DESCRIPTION

DESCRIPTION

There are two different batteries available for this vehicle. Vehicles equipped with a diesel engine utilize a spiral cell battery with recombination technology. This is a maintenance-free battery that is capable of delivering more power than a conventional battery. This additional power is required by a diesel engine during cold cranking. Vehicles equipped with a gasoline engine utilize a conventional battery. Refer to the following information for detailed differences and descriptions of these two batteries.

SPIRAL CELL BATTERY - DIESEL ENGINE

Fig. 7: Spiral Plate Battery - Typical
Courtesy of CHRYSLER LLC

WARNING: Never exceed 14.4 volts when charging a spiral cell battery. Personal injury and/or battery damage may result.

By tightly winding layers of spiral grids and acid-permeated vitreous separators into cells, the battery has more power and service life than conventional batteries of the same size. The spiral cell battery is completely, permanently sealed. Through gas recombination, hydrogen and oxygen within the battery are captured during normal charging and reunited to form the water within the electrolyte, eliminating the need to add distilled water. Therefore, these batteries have non-removable battery vent caps.

The acid inside a spiral cell battery is bound within the vitreous separators, ending the threat of acid leaks. This

feature allows the battery to be installed in any position anywhere in the vehicle.

Spiral cell technology is the process by which the cells holding the active material in the battery are wound tightly in coils instead of hanging flat, like conventional batteries. This design has a lower internal resistance and also increases the active material surface area.

Due to the maintanance-free design, distilled water cannot be added to this battery. Therefore, if more than 14.4 volts are used during the spiral cell battery charging process, water vapor can be exhausted through the pressure-sensitive battery vents and lost for good. This can permanently damage the spiral cell battery.

CONVENTIONAL BATTERY - GASOLINE ENGINE

Low-maintenance conventional batteries are used on vehicles equipped with a gasoline engine, these batteries have non-removable battery cell caps. Under normal service, the composition of this battery reduces gassing and water loss at normal charge rates.

Conventional batteries are made up of six individual cells that are connected in series. Each cell contains positive charged cell groups made of lead oxide, and negatively charged cell groups made of sponge lead. The cells are submerged in a sulfuric acid and water solution called electrolyte.

The battery is used to store electrical energy potential in a chemical form. When an electrical load is applied to the battery terminals, an electrochemical reaction occurs within the battery. This reaction causes the battery to discharge electrical current.

OPERATION

OPERATION

The battery is designed to store electrical energy in a chemical form. When an electrical load is applied to the terminals of the battery, an electrochemical reaction occurs. This reaction causes the battery to discharge electrical current from its terminals. As the battery discharges, a gradual chemical change takes place within each cell. The sulfuric acid in the electrolyte combines with the plate materials, causing both plates to slowly change to lead sulfate. At the same time, oxygen from the positive plate material combines with hydrogen from the sulfuric acid, causing the electrolyte to become mainly water. The chemical changes within the battery are caused by the movement of excess or free electrons between the positive and negative plate groups. This movement of electrons produces a flow of electrical current through the load device attached to the battery terminals.

As the plate materials become more similar chemically, and the electrolyte becomes less acid, the voltage potential of each cell is reduced. However, by charging the battery with a voltage higher than that of the battery itself, the battery discharging process is reversed. Charging the battery gradually changes the sulfated lead plates back into sponge lead and lead dioxide, and the water back into sulfuric acid. This action restores the difference in the electron charges deposited on the plates, and the voltage potential of the battery cells. For a battery to remain useful, it must be able to produce high-amperage current over an extended period. A battery must also be able to accept a charge, so that its voltage potential may be restored.

The battery is vented to release excess hydrogen gas that is created when the battery is being charged or

discharged. However, even with these vents, hydrogen gas can collect in or around the battery. If hydrogen gas is exposed to flame or sparks, it may ignite. If the electrolyte level is low, the battery may arc internally and explode. If the battery is equipped with removable cell caps, add distilled water whenever the electrolyte level is below the top of the plates. If the battery cell caps cannot be removed, the battery must be replaced if the electrolyte level becomes low.

DIAGNOSIS AND TESTING

BATTERY

The battery must be completely charged and the terminals should be properly cleaned and inspected before diagnostic procedures are performed. See **Cleaning** for the proper battery cleaning procedures. See **Inspection** for the proper battery inspection procedures. Refer to **Standard Procedure** for the proper battery charging procedures.

MICRO 420 BATTERY TESTER (GASOLINE ENGINES)

The Micro 420 automotive battery tester is designed to help diagnose the cause of a defective battery. Follow the instruction service information supplied with the tester to properly diagnose a vehicle. If the instruction service information is not available refer to**Standard Procedure** , which includes the directions for using the Micro 420 battery tester.

OTC ONE STEP BATTERY ANALYZER AND CHARGER (DIESEL ENGINES)

The OTC One Step Battery Analyzer and Charger is designed to help diagnose the cause of a defective battery. Follow the instruction information supplied with the tester to properly diagnose a vehicle.

WARNING: If the battery shows signs of freezing, leaking or loose posts, do not test, assist-boost, or charge. The battery may arc internally and explode. Personal injury and/or vehicle damage may result.

WARNING: Explosive hydrogen gas forms in and around the battery. Do not smoke, use flame, or create sparks near the battery. Personal injury and/or vehicle damage may result.

WARNING: The battery contains sulfuric acid, which is poisonous and caustic. Avoid contact with the skin, eyes, or clothing. In the event of contact, flush with water and call a physician immediately. Keep out of the reach of children.

WARNING: Never exceed 14.4 volts when charging a spiral cell battery. Personal injury and/or battery damage may result.

A battery that will not accept a charge is faulty, and must be replaced. Further testing is not required. A fully-charged battery must be tested to determine its cranking capacity. A battery that is fully-charged, but fails the OTC One Step Battery Analyzer and Charger or other load test, is faulty and must be replaced.

NOTE: Completely discharged batteries may take several hours to accept a charge. Refer to Standard Procedure for the proper battery charging procedures.

STANDARD PROCEDURE

SPIRAL CELL BATTERY CHARGING

WARNING: Never exceed 14.4 volts when charging a spiral cell battery. Personal injury and/or battery damage may result.

Vehicles equipped with a diesel engine utilize a unique spiral cell battery. This battery has a maximum charging voltage that must not be exceeded in order to restore the battery to its full potential, failure to use the following spiral cell battery charging procedure could result in damage to the battery or personal injury.

Battery charging is the means by which the battery can be restored to its full voltage potential. A battery is fully-charged when:

- OTC One Step Battery Analyzer and Charger special tool number OT-3641 or equivalent tester indicates battery is OK.
- Open-circuit voltage of the battery is 12.65 volts or above.
- Battery passes Load Test multiple times.

WARNING: If the battery shows signs of freezing, leaking, loose posts or low electrolyte level, do not test, assist-boost, or charge. The battery may arc internally and explode. Personal injury and/or vehicle damage may result.

WARNING: Explosive hydrogen gas forms in and around the battery. Do not smoke, use flame, or create sparks near the battery. Personal injury and/or vehicle damage may result.

WARNING: The battery contains sulfuric acid, which is poisonous and caustic. Avoid contact with the skin, eyes, or clothing. In the event of contact, flush with water and call a physician immediately. Keep out of the reach of children.

CAUTION: Always disconnect and isolate the battery negative cable before charging a battery. Charge the battery directly at the battery terminals. Do not exceed 14.4 volts while charging a battery.

CAUTION: The battery should not be hot to the touch. If the battery feels hot to the touch, turn off the charger and let the battery cool before continuing the charging operation. Damage to the battery may result.

After the battery has been charged to 12.6 volts or greater, perform a load test to determine the battery cranking capacity. If the battery passes a load test, return the battery to service. If the battery fails a load test, it is faulty

and must be replaced.

Clean and inspect the battery hold downs, tray, terminals, posts, and top before completing battery service. See **Cleaning** for the proper battery system cleaning procedures. See **Inspection** for the proper battery system inspection procedures.

CHARGING A COMPLETELY DISCHARGED SPIRAL CELL BATTERY

WARNING: Never exceed 14.4 volts when charging a spiral cell battery. Personal injury and/or battery damage may result.

The following procedure should be used to recharge a completely discharged battery. Unless this procedure is properly followed, a good battery may be needlessly replaced.

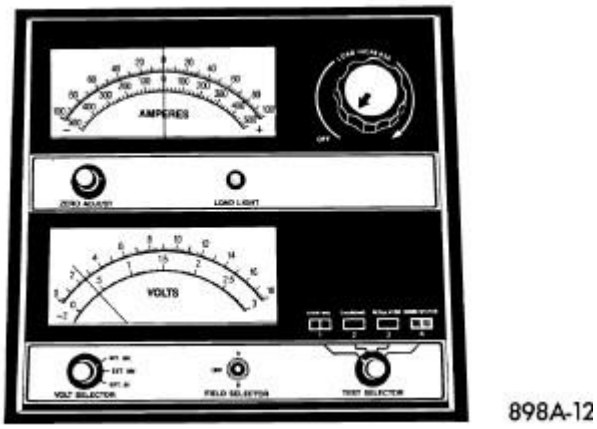

Fig. 8: Voltmeter
Courtesy of CHRYSLER LLC

1. Measure the voltage at the battery posts with a voltmeter, accurate to 1/10 (0.10) volt. Refer to Battery **Removal** and **Installation** for access instructions. If the reading is below ten volts, the battery charging current will be low. It could take several hours before the battery accepts a current greater than a few milliamperes. Such low current may not be detectable on the ammeters built into many battery chargers.
2. Disconnect and isolate the battery negative cable. Connect the OTC One Step Battery Analyzer and Charger special tool number OT-3641 or equivalent.

NOTE: Some battery chargers are equipped with polarity-sensing circuitry. This circuitry protects the battery charger and the battery from being damaged if they are improperly connected. If the battery state-of-charge is too low for the polarity-sensing circuitry to detect, the battery charger will not operate. This makes it appear that the battery will not accept charging current. See the instructions provided by the manufacturer of the battery charger for details on how to bypass the polarity-sensing circuitry.

3. Battery chargers vary in the amount of voltage and current they provide. The amount of time required for

a battery to accept measurable charging current at various voltages is shown in **SPIRAL CELL BATTERY CHARGE RATE TABLE** . If the charging current is still not measurable at the end of the charging time, the battery is faulty and must be replaced. If the charging current is measurable during the charging time, the battery may be good and the charging should be completed in the normal manner.

SPIRAL CELL BATTERY CHARGE RATE TABLE

Voltage	Minutes
14.4 volts maximum	up to 10 minutes
13.0 to 14 volts	up to 20 minutes
12.9 volts or less	up to 30 minutes

CHARGING TIME REQUIRED

The time required to charge a battery will vary, depending upon the following factors:

- **Battery Capacity** - A completely discharged heavy-duty battery requires twice the charging time of a small capacity battery.
- **Temperature** - A longer time will be needed to charge a battery at -18° C (0° F) than at 27° C (80° F). When a fast battery charger is connected to a cold battery, the current accepted by the battery will be very low at first. As the battery warms, it will accept a higher charging current rate (amperage).
- **Charger Capacity** - A battery charger that supplies only five amperes will require a longer charging time. A battery charger that supplies eight amperes will require a shorter charging time.
- **State-Of-Charge** - A completely discharged battery requires more charging time than a partially discharged battery. Electrolyte is nearly pure water in a completely discharged battery. At first, the charging current (amperage) will be low. As the battery charges, the specific gravity of the electrolyte will gradually rise.

The Battery Charging Time Table gives an indication of the time required to charge a typical battery at room temperature based upon the battery state-of-charge and the charger capacity.

SPIRAL CELL BATTERY CHARGE TIME TABLE

Charging Amperage	5 Amps	8 Amps
Open Circuit Voltage	**Hours Charging @ 21° C (70° F)**	
12.25 to 12.49	6 hours	3 hours
12.00 to 12.24	10 hours	5 hours
10.00 to 11.99	14 hours	7 hours
Below 10.00	18 hours	9 hours

CONVENTIONAL BATTERY CHARGING

CAUTION: Vehicles equipped with a diesel engine utilize a unique spiral cell battery. This battery has a maximum charging voltage that must be used in order to restore the battery to its full potential, failure to use the spiral cell battery charging procedure could result in damage to the battery or

personal injury. See Standard Procedure for the appropriate procedure.

Battery charging is the means by which the battery can be restored to its full voltage potential. A battery is fully-charged when:

- Micro 420 battery tester indicates battery is OK.
- Open-circuit voltage of the battery is 12.65 volts or above.
- Battery passes Load Test multiple times.

WARNING: If the battery shows signs of freezing, leaking, loose posts, do not test, assist-boost, or charge. The battery may arc internally and explode. Personal injury and/or vehicle damage may result.

WARNING: Explosive hydrogen gas forms in and around the battery. Do not smoke, use flame, or create sparks near the battery. Personal injury and/or vehicle damage may result.

WARNING: The battery contains sulfuric acid, which is poisonous and caustic. Avoid contact with the skin, eyes, or clothing. In the event of contact, flush with water and call a physician immediately. Keep out of the reach of children.

WARNING: If the battery is equipped with removable cell caps, be certain that each of the cell caps is in place and tight before the battery is returned to service. Personal injury and/or vehicle damage may result from loose or missing cell caps.

CAUTION: Always disconnect and isolate the battery negative cable before charging a battery. Do not exceed sixteen volts while charging a battery. Damage to the vehicle electrical system components may result.

CAUTION: Battery electrolyte will bubble inside the battery case during normal battery charging. Electrolyte boiling or being discharged from the battery vents indicates a battery overcharging condition. Immediately reduce the charging rate or turn off the charger to evaluate the battery condition. Damage to the battery may result from overcharging.

CAUTION: The battery should not be hot to the touch. If the battery feels hot to the touch, turn off the charger and let the battery cool before continuing the charging operation. Damage to the battery may result.

After the battery has been charged to an open-circuit voltage reading of 12.4 volts or greater, retest the battery with the Micro 420 tester or perform a load test to determine the battery cranking capacity. See **Standard Procedure** for the proper battery test procedures. If the battery passes a load test, return the battery to service. If the battery fails a load test, it is faulty and must be replaced.

Clean and inspect the battery hold downs, tray, terminals, posts, and top before completing battery service. See **Cleaning** for the proper battery system cleaning procedures. See **Inspection** for the proper battery system inspection procedures.

CHARGING A COMPLETELY DISCHARGED CONVENTIONAL BATTERY

The following procedure should be used to recharge a completely discharged battery. Unless this procedure is properly followed, a good battery may be needlessly replaced.

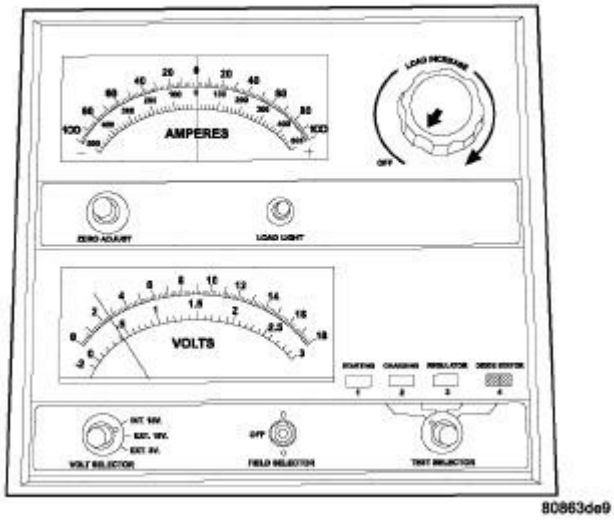

Fig. 9: Identifying Battery Load Tester
Courtesy of CHRYSLER LLC

1. Measure the voltage at the battery posts with a voltmeter, accurate to 1/10 (0.10) volt. If the reading is below ten volts, the battery charging current will be low. It could take some time before the battery accepts a current greater than a few milliamperes. Such low current may not be detectable on the ammeters built into many battery chargers.
2. Disconnect and isolate the battery negative cable. Connect the battery charger leads. Some battery chargers are equipped with polarity-sensing circuitry. This circuitry protects the battery charger and the battery from being damaged if they are improperly connected. If the battery state-of-charge is too low for the polarity-sensing circuitry to detect, the battery charger will not operate. This makes it appear that the battery will not accept charging current. See the instructions provided by the manufacturer of the battery charger for details on how to bypass the polarity-sensing circuitry.
3. Battery chargers vary in the amount of voltage and current they provide. The amount of time required for a battery to accept measurable charging current at various voltages is shown in the **CONVENTIONAL BATTERY CHARGE RATE TABLE** . If the charging current is still not measurable at the end of the charging time, the battery is faulty and must be replaced. If the charging current is measurable during the charging time, the battery may be good and the charging should be completed in the normal manner.

CONVENTIONAL BATTERY CHARGE RATE TABLE

Voltage	Minutes

16.0 volts maximum	up to 10 min.
14.0 to 15.9 volts	up to 20 min.
13.9 volts or less	up to 30 min.

CHARGING TIME REQUIRED

The time required to charge a battery will vary, depending upon the following factors:

- **Battery Capacity** - A completely discharged heavy-duty battery requires twice the charging time of a small capacity battery.
- **Temperature** - A longer time will be needed to charge a battery at -18° C (0° F) than at 27° C (80° F). When a fast battery charger is connected to a cold battery, the current accepted by the battery will be very low at first. As the battery warms, it will accept a higher charging current rate (amperage).
- **Charger Capacity** - A battery charger that supplies only five amperes will require a longer charging time. A battery charger that supplies twenty amperes or more will require a shorter charging time.
- **State-Of-Charge** - A completely discharged battery requires more charging time than a partially discharged battery. Electrolyte is nearly pure water in a completely discharged battery. At first, the charging current (amperage) will be low. As the battery charges, the specific gravity of the electrolyte will gradually rise.

The Conventional Battery Charging Time Table gives an indication of the time required to charge a typical battery at room temperature based upon the battery state-of-charge and the charger capacity.

CONVENTIONAL BATTERY CHARGING TIME TABLE

Charging Amperage	5 Amps	10 Amps	20 Amps
Open Circuit Voltage	**Hours Charging @ 21° C (70° F)**		
12.25 to 12.49	6 hours	3 hours	1.5 hours
12.00 to 12.24	10 hours	5 hours	2.5 hours
10.00 to 11.99	14 hours	7 hours	3.5 hours
Below 10.00	18 hours	9 hours	4.5 hours

USING MICRO 420 BATTERY TESTER (GASOLINE ENGINES)

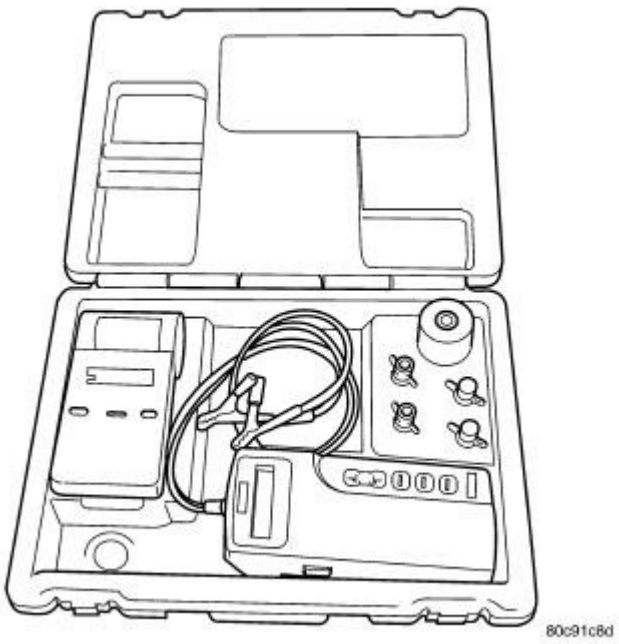

Fig. 10: Identifying Micro Battery Tester
Courtesy of CHRYSLER LLC

NOTE: The Micro 420 battery tester should only be used to test vehicles equipped with gasoline engines. If the vehicle being tested has a diesel engine the OTC, One Step Battery Analyzer and Charger (OTC) special tool number OT-3641 or equivalent should be used to test the battery.

Always use the Micro 420 instruction manual that was supplied with the tester as a reference. If the instruction manual is not available the following procedure can be used:

WARNING: Always wear appropriate eye protection and use extreme caution when working with batteries. Failure to do so may result in serious or fatal injury.

BATTERY TESTING

1. If testing the battery out of vehicle, clean the battery terminals with a wire brush before testing. If the battery is equipped with side post terminals, install and tighten the supplied lead terminal stud adapters. Do not use steel bolts. Failure to properly install the stud adapters or using stud adapters that are dirty or worn-out may result in false test readings.
2. If testing the battery in the vehicle, make certain all of the vehicle accessory loads are off, including the ignition.
3. Connect the tester to the battery, the red clamp to the positive (+) terminal and the black clamp to the negative (-) terminal.

NOTE: Multiple batteries connected in parallel must have the ground cable disconnected to perform a battery test. Failure to disconnect may result in false battery test readings.

4. Using the ARROW key select **in** or **out** of vehicle testing and press ENTER to make a selection.
5. If not selected, choose the Cold Cranking Amp (CCA) battery rating. Or select the appropriate battery rating for your area (see menu). The tester then runs its self programmed test of the battery and display the results. Refer to the BATTERY TEST RESULTS chart.

CAUTION: If replacing the battery is the result of the test, this may mean a poor connection between the vehicle cables and battery exists. After disconnecting the vehicle battery cables from the battery, retest the battery using the out of vehicle test before replacing.

6. While viewing the battery test result, press the CODE button and the tester, prompts you for the last 4 digits of the VIN. Use the UP/DOWN arrow buttons to scroll to the correct character, then press ENTER to select and move to the next digit. Press the ENTER button to view the service code. Pressing the CODE button a second time returns you to the test results.

BATTERY TEST RESULTS	
GOOD BATTERY	Return to service.
GOOD - RECHARGE	Fully charge battery and return to service.
CHARGE AND RETEST	Fully charge battery and retest battery.
REPLACE BATTERY	Replace the battery and retest complete the system.
BAD-CELL REPLACE	Replace the battery and retest complete the system.

OPEN-CIRCUIT VOLTAGE TEST

A battery open-circuit voltage (no load) test will show the approximate state-of-charge of a battery.

Before proceeding with this test, completely charge the battery, refer to the appropriate battery charging procedure.

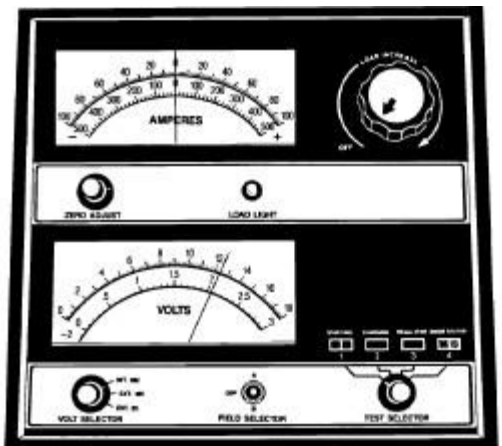

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Fig. 11: Voltmeter
Courtesy of CHRYSLER LLC

1. Before measuring the open-circuit voltage, the surface charge must be removed from the battery. Turn on the headlamps for fifteen seconds, then allow up to five minutes for the battery voltage to stabilize.
2. Disconnect and isolate both battery cables, negative cable first.
3. Using a voltmeter connected to the battery posts (see the instructions provided by the manufacturer of the voltmeter), measure the open-circuit voltage.

See the OPEN-CIRCUIT VOLTAGE chart. This voltage reading will indicate the battery state-of-charge, but will not reveal its cranking capacity. If a battery has an open-circuit voltage reading of 12.4 volts or greater, it may be load tested to reveal its cranking capacity.

OPEN CIRCUIT VOLTAGE TABLE	
Open Circuit Voltage	**Charge Percentage**
11.7 volts or less	0%
12.0 volts	25%
12.2 volts	50%
12.4 volts	75%
12.6 volts or more	100%

IGNITION-OFF DRAW TEST

The term Ignition-Off Draw (IOD) identifies a normal condition where power is being drained from the battery with the ignition switch in the Off position. A normal vehicle electrical system will draw from five to thirty-five milliamperes (0.005 to 0.035 ampere) with the ignition switch in the Off position, and all non-ignition controlled circuits in proper working order. Up to thirty-five milliamperes are needed to enable the memory functions for the Powertrain Control Module (PCM), digital clock, electronically tuned radio, and other modules which may vary with the vehicle equipment.

A vehicle that has not been operated for approximately twenty days, may discharge the battery to an inadequate level. When a vehicle will not be used for twenty days or more (stored), remove the IOD fuse from the Totally Integrated Power Module (TIPM). This will reduce battery discharging.

Excessive IOD can be caused by:

- Electrical items left on.
- Faulty or improperly adjusted switches.
- Faulty or shorted electronic modules and components.
- An internally shorted generator.
- Intermittent shorts in the wiring.

If the IOD is over thirty-five milliamperes, the problem must be found and corrected before replacing a battery. In most cases, the battery can be charged and returned to service after the excessive IOD condition has been

corrected.

1. Verify that all electrical accessories are off. Turn off all lamps, remove the ignition key, and close all doors. If the vehicle is equipped with an illuminated entry system or an electronically tuned radio, allow the electronic timer function of these systems to automatically shut off (time out). This may take up to three minutes.
2. Determine that the underhood lamp is operating properly, then disconnect the lamp wire harness connector or remove the lamp bulb.
3. Disconnect the battery negative cable.
4. Set an electronic digital multi-meter to its highest amperage scale. Connect the multi-meter between the disconnected battery negative cable terminal clamp and the battery negative terminal post. Make sure that the doors remain closed so that the illuminated entry system is not activated. The multi-meter amperage reading may remain high for up to three minutes, or may not give any reading at all while set in the highest amperage scale, depending upon the electrical equipment in the vehicle. The multi-meter leads must be securely clamped to the battery negative cable terminal clamp and the battery negative terminal post. If continuity between the battery negative terminal post and the negative cable terminal clamp is lost during any part of the IOD test, the electronic timer function will be activated and all of the tests will have to be repeated.
5. After about three minutes, the high-amperage IOD reading on the multi-meter should become very low or nonexistent, depending upon the electrical equipment in the vehicle. If the amperage reading remains high, remove and replace each fuse or circuit breaker in the Totally Integrated Power Module (TIPM), one at a time until the amperage reading becomes very low, or nonexistent. **Refer to SYSTEM WIRING DIAGRAMS for complete TIPM fuse, circuit breaker, and circuit identification.** This will isolate each circuit and identify the circuit that is the source of the high-amperage IOD. If the amperage reading remains high after removing and replacing each fuse and circuit breaker, disconnect the wire harness from the generator. If the amperage reading now becomes very low or nonexistent. Refer to **Electrical - Engine Systems/Charging - Diagnosis and Testing** for the proper charging system diagnosis and testing procedures. After the high-amperage IOD has been corrected, switch the multi-meter to progressively lower amperage scales and, if necessary, repeat the fuse and circuit breaker remove-and-replace process to identify and correct all sources of excessive IOD. It is now safe to select the lowest milliampere scale of the multi-meter to check the low-amperage IOD.

CAUTION: Do not open any doors, or turn on any electrical accessories with the lowest milliampere scale selected, or the multi-meter may be damaged.

6. Observe the multi-meter reading. The low-amperage IOD should not exceed thirty-five milliamperes (0.035 ampere). If the current draw exceeds thirty-five milliamperes, isolate each circuit using the fuse and circuit breaker remove-and-replace process in 5. The multi-meter reading will drop to within the acceptable limit when the source of the excessive current draw is disconnected. Repair this circuit as required; whether a wiring short, incorrect switch adjustment, or a component failure is at fault.

REMOVAL

REMOVAL

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

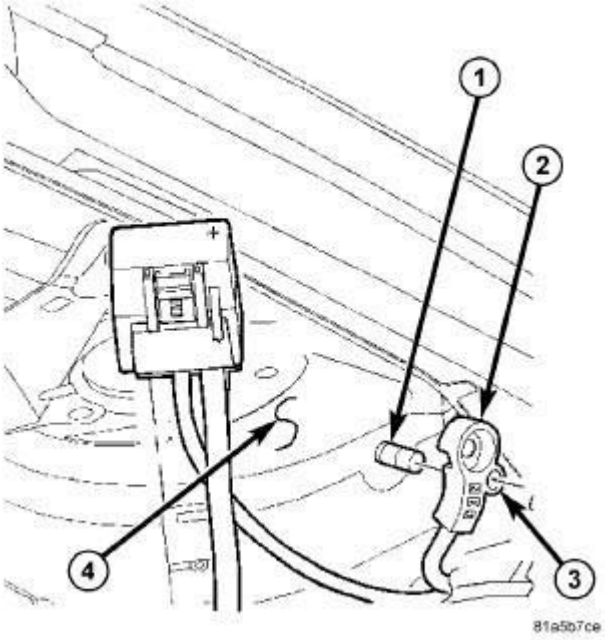

Fig. 12: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable remote terminal from the remote battery post.

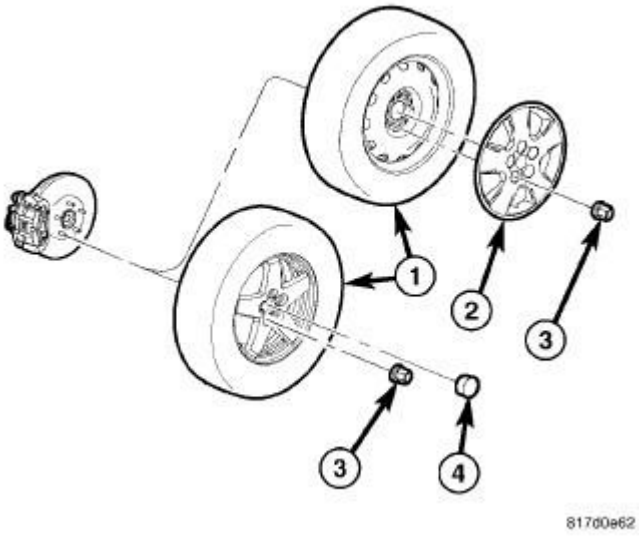

Fig. 13: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the left front wheel and tire assembly. Refer to **Tires and Wheels - Removal** .

NOTE: Gasoline battery shown in illustration, diesel battery similar.

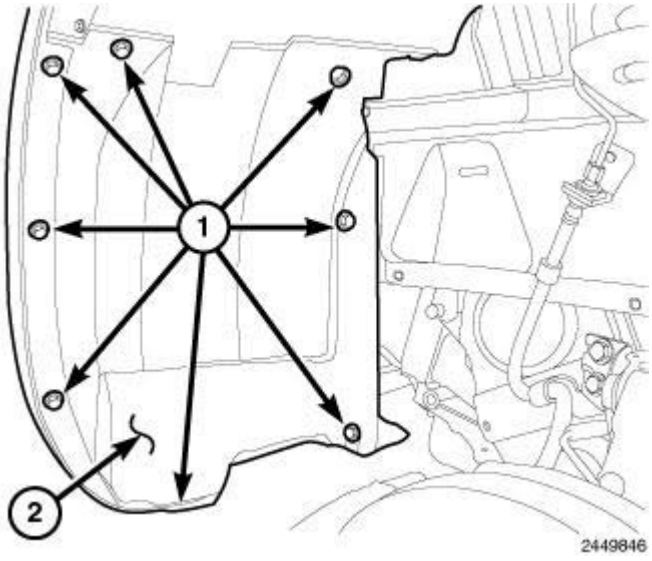

Fig. 14: Push-Puns & Splash Shield
Courtesy of CHRYSLER LLC

3. Remove the push pins (1) and remove the left front wheelhouse splash shield (2). Refer to **Body/Exterior/SHIELD, Splash - Removal** .

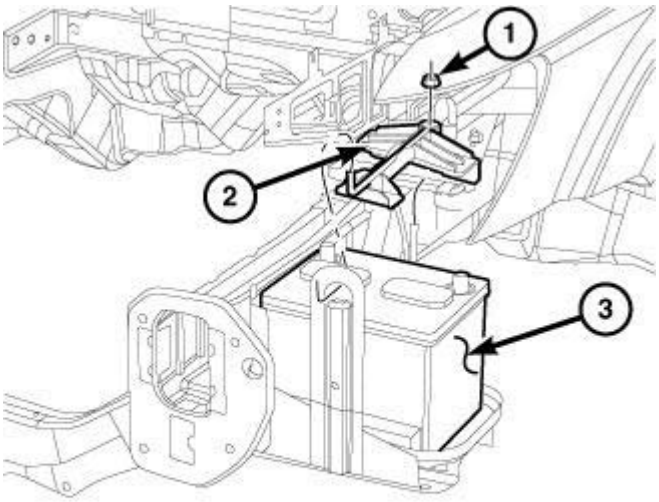

Fig. 15: Battery, Bracket & Nut
Courtesy of CHRYSLER LLC

4. Loosen the nut (1) and position the battery hold down bracket out of the way (3).

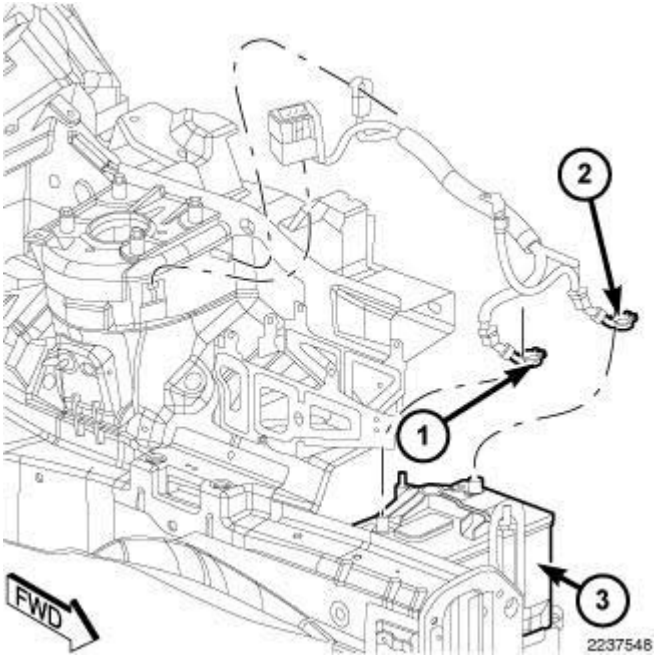

Fig. 16: Battery And Pinch Clamp Bolts
Courtesy of CHRYSLER LLC

5. Loosen the pinch clamp bolts and position aside the battery cable clamps from the battery.

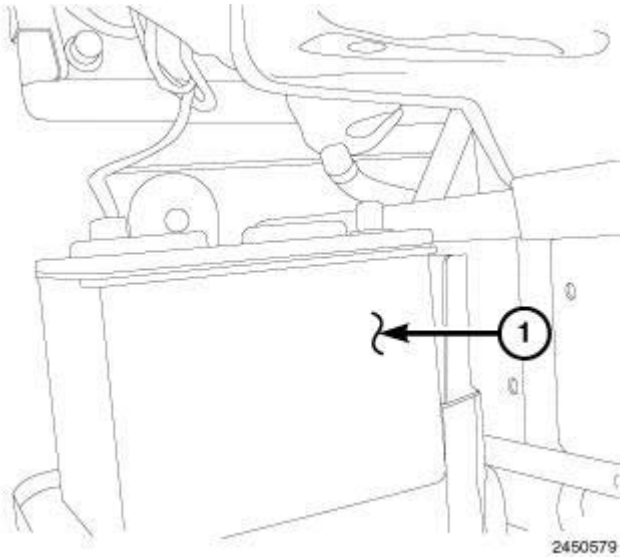

Fig. 17: Battery
Courtesy of CHRYSLER LLC

6. Remove the battery (1) from the battery tray (2).

INSTALLATION

INSTALLATION

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

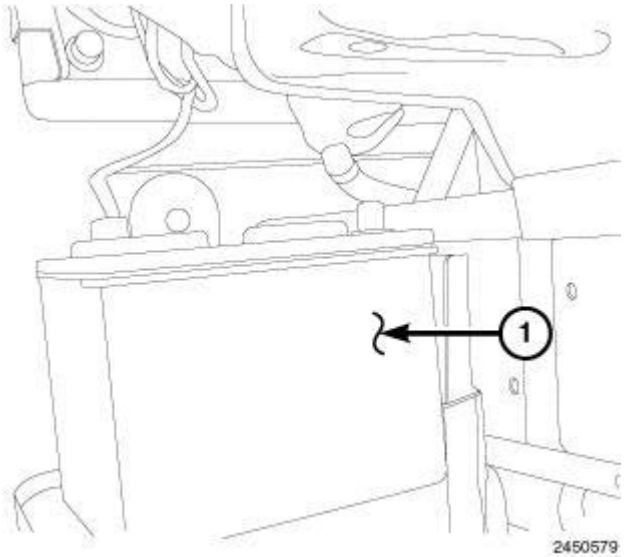

Fig. 18: Battery
Courtesy of CHRYSLER LLC

1. Install the battery (1) into the battery tray (2).

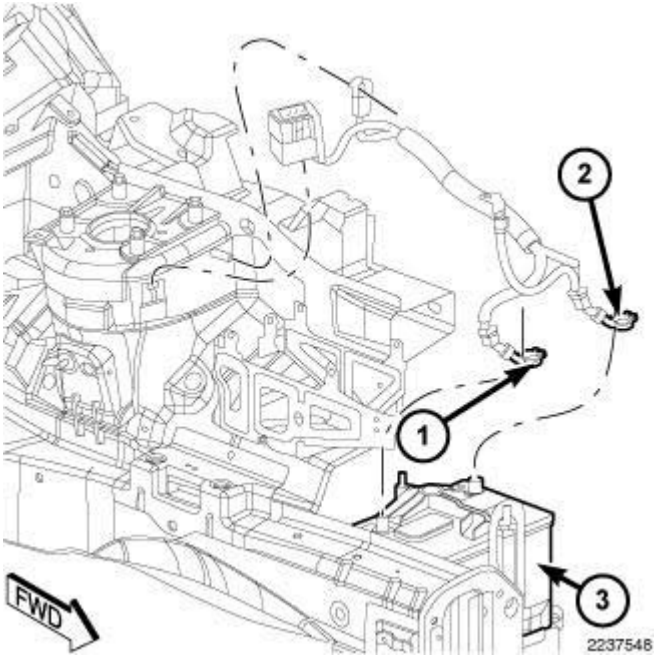

Fig. 19: Battery And Pinch Clamp Bolts
Courtesy of CHRYSLER LLC

2. Install the battery terminal pinch clamps (1, 2) onto the battery posts.

   Tighten the pinch clamp nut to 17.5 N.m (13 in. lbs.)

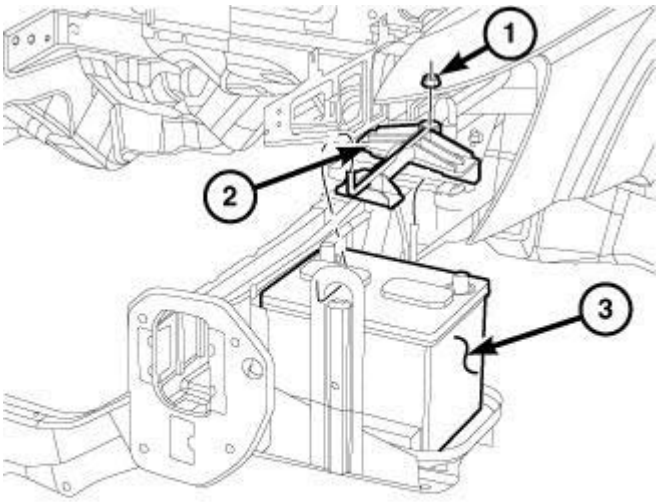

Fig. 20: Battery, Bracket & Nut
Courtesy of CHRYSLER LLC

3. Position back the battery hold down bracket (3) and install the bracket nut (1).

   Tighten the pinch clamp nut to 55 N.m (40 ft. lbs.)

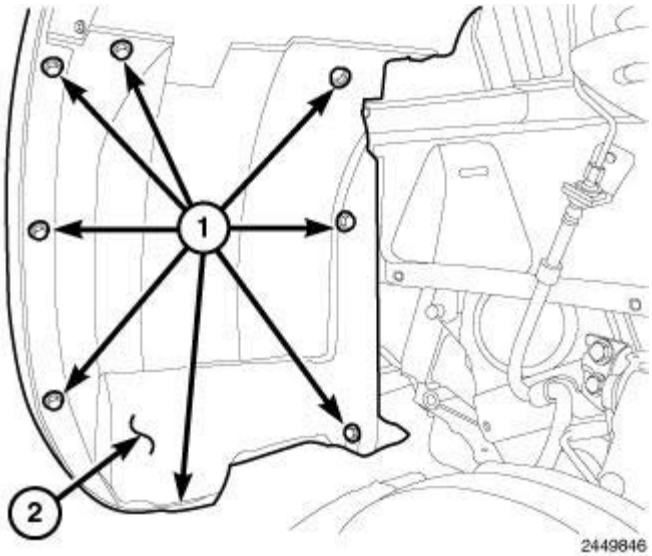

Fig. 21: Push-Puns & Splash Shield
Courtesy of CHRYSLER LLC

4. Install the left front wheelhouse splash shield (2) and push pins (1). Refer to **Body/Exterior/SHIELD, Splash - Installation** .

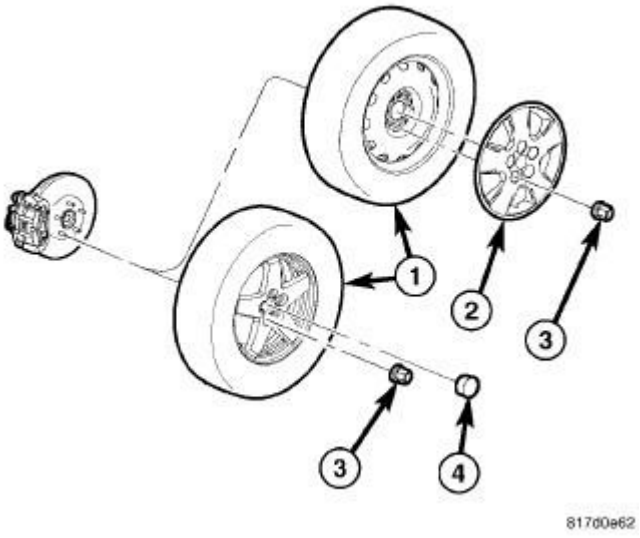

Fig. 22: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

5. Install the left front wheel and tire assembly. Refer to **Tires and Wheels - Removal** .

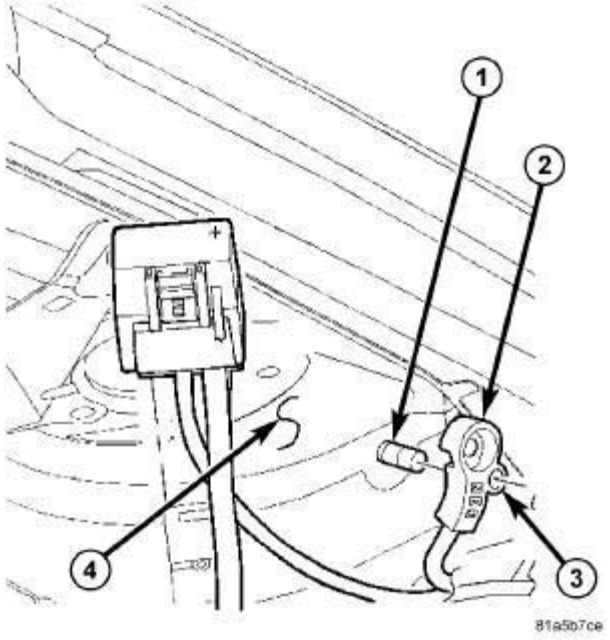

Fig. 23: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

6. Install the negative battery cable remote terminal onto the remote battery post.

   Tighten the nut to 28 N.m (9.5 in. lbs.)

CABLES, BATTERY

DESCRIPTION

DESCRIPTION

The battery cables are large gauge, stranded copper wires sheathed within a heavy plastic or synthetic rubber insulating jacket. The wire used in the battery cables combines excellent flexibility and reliability with high electrical current carrying capacity. The battery cables feature a clamping type female battery terminal made of stamped sheet metal that is die cast onto one end of the battery cable wire. A pinch-bolt and nut are installed at the open end of the female battery terminal clamp. Large eyelet type terminals are crimped onto the opposite end of the battery cable wire and then soldered. The battery positive cable wires feature a larger female battery terminal clamp to allow connection to the larger battery positive terminal post. The battery negative cable wires have a smaller female battery terminal clamp.

There are two separate battery cable harnesses used on this vehicle. The battery harness includes both the battery positive and negative cables to the remote battery connection and may include portions of the wiring circuits for other components on some vehicles. The starter harness includes both the battery positive and negative cables from the remote battery connection down to the starter and engine ground location. These two harnesses are sold as separate assemblies.

OPERATION

OPERATION

The battery cables connect the battery terminal posts to the vehicle electrical system. These cables also provide a path back to the battery for electrical current generated by the charging system for restoring the voltage potential of the battery. The female battery terminal clamps on the ends of the battery cable wires provide a strong and reliable connection of the battery cable to the battery terminal posts. The terminal pinch bolts allow the female terminal clamps to be tightened around the male terminal posts on the top of the battery. The eyelet terminals secured to the opposite ends of the battery cable wires from the female battery terminal clamps provide secure and reliable connection of the battery cables to the vehicle electrical system.

One wire has an eyelet terminal that connects the battery positive cable to the B(+) terminal stud of the Totally Integrated Power Module (TIPM), and the other wire has an eyelet terminal that connects the battery positive cable to the B(+) terminal stud of the engine starter motor solenoid. The battery negative cable terminal clamp has one wire as an eyelet terminal that connects the battery negative cable to the vehicle powertrain through a ground connection, typically on the engine cylinder block.

DIAGNOSIS AND TESTING

BATTERY CABLES

A voltage drop test will determine if there is excessive resistance in the battery cable terminal connections or the battery cable. If excessive resistance is found in the battery cable connections, the connection point should be disassembled, cleaned of all corrosion or foreign material, then reassembled. Following reassembly, check the voltage drop for the battery cable connection and the battery cable again to confirm repair.

When performing the voltage drop test, it is important to remember that the voltage drop is giving an indication of the resistance between the two points at which the voltmeter probes are attached. **EXAMPLE:** When testing the resistance of the battery positive cable, touch the voltmeter leads to the battery positive cable terminal clamp and to the battery positive cable eyelet terminal at the starter solenoid B(+) terminal stud. If you probe the battery positive terminal post and the battery positive cable eyelet terminal at the starter solenoid B(+) terminal stud, you are reading the combined voltage drop in the battery positive cable terminal clamp-to-terminal post connection and the battery positive cable.

VOLTAGE DROP TEST

The following operation will require a voltmeter accurate to 1/10 (0.10) volt. Before performing this test, be certain that the following procedures are accomplished:

- The battery is fully-charged and load tested. Refer to **Standard Procedure** for the proper battery charging and load test procedures.
- Fully engage the parking brake.
- If the vehicle is equipped with an automatic transmission, place the gearshift selector lever in the Park position. If the vehicle is equipped with a manual transmission, place the gearshift selector lever in the Neutral position and block the clutch pedal in the fully depressed position.
- Verify that all lamps and accessories are turned off.
- To prevent the engine from starting, remove the Automatic Shut Down (ASD) relay. The ASD relay can be found in the Junction Block located in the left front engine compartment area. See the layout label affixed to the underside of the Junction Block cover for ASD relay identification and location.

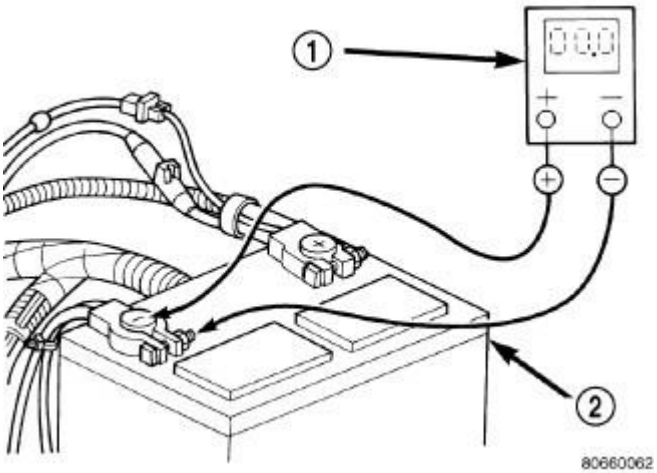

Fig. 24: Connecting Voltmeter Leads To Battery Negative Terminal
Courtesy of CHRYSLER LLC

1. Connect the positive lead of the voltmeter (1) to the battery (2) negative terminal post. Connect the negative lead of the voltmeter (1) to the battery (2) negative cable terminal clamp. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor connection between the battery negative cable terminal clamp and the battery negative terminal post.

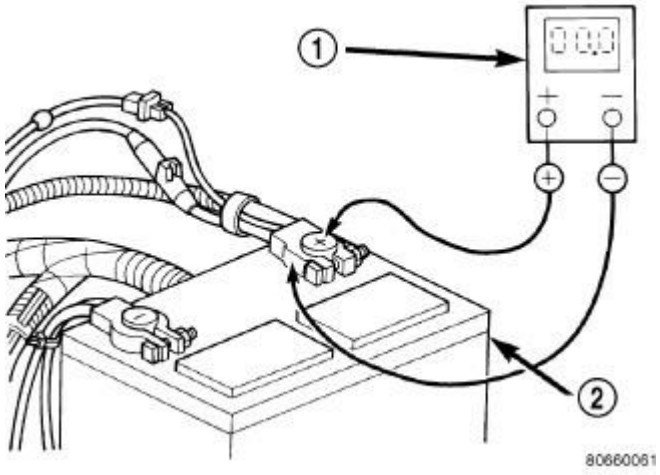

Fig. 25: Connecting Voltmeter Leads To Battery Positive Terminal
Courtesy of CHRYSLER LLC

2. Connect the positive lead of the voltmeter (1) to the battery (2) positive terminal post. Connect the negative lead of the voltmeter (1) to the battery (2) positive cable terminal clamp. Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If voltage is detected, correct the poor connection between the battery positive cable terminal clamp and the battery positive terminal post.

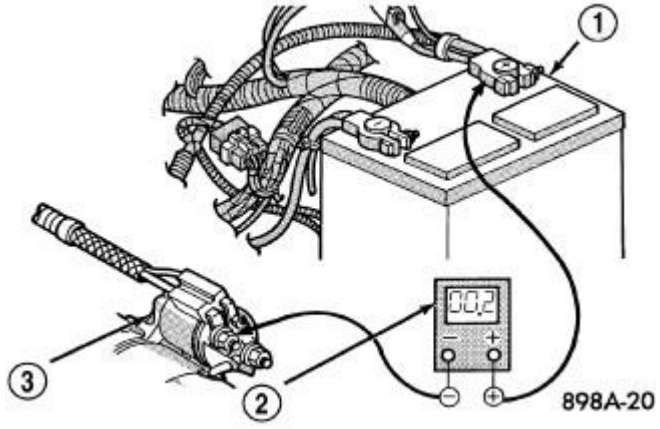

Fig. 26: Connecting Voltmeter To Terminal Clamp And Stud
Courtesy of CHRYSLER LLC

3. Connect the voltmeter (2) to measure between the battery positive cable terminal clamp (1) and the starter solenoid B(+) terminal stud (3). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery positive cable eyelet terminal connection at the starter solenoid B(+) terminal stud. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery positive cable.

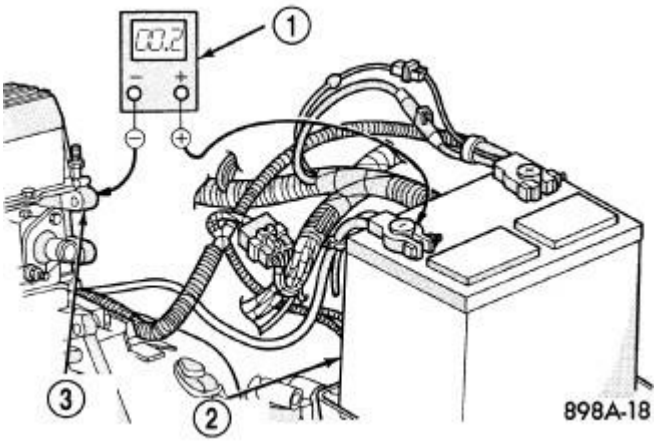

Fig. 27: Connecting Voltmeter To Battery And Engine Block
Courtesy of CHRYSLER LLC

4. Connect the voltmeter (1) to measure between the battery (2) negative cable terminal clamp and a good clean ground on the engine block (3). Rotate and hold the ignition switch in the Start position. Observe the voltmeter. If the reading is above 0.2 volt, clean and tighten the battery negative cable eyelet terminal connection to the engine block. Repeat the test. If the reading is still above 0.2 volt, replace the faulty battery negative cable.

REMOVAL

REMOVAL

BATTERY HARNESS

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

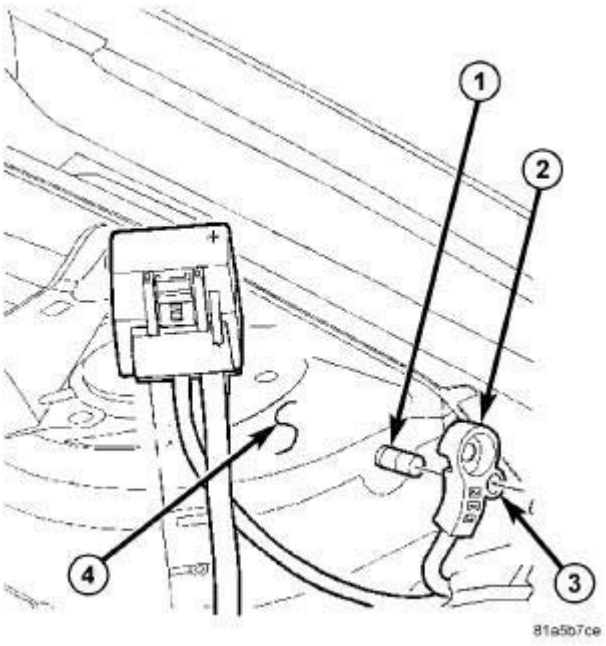

Fig. 28: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

1. Disconnect and isolate the negative battery cable (2) remote terminal from the remote battery post (1).

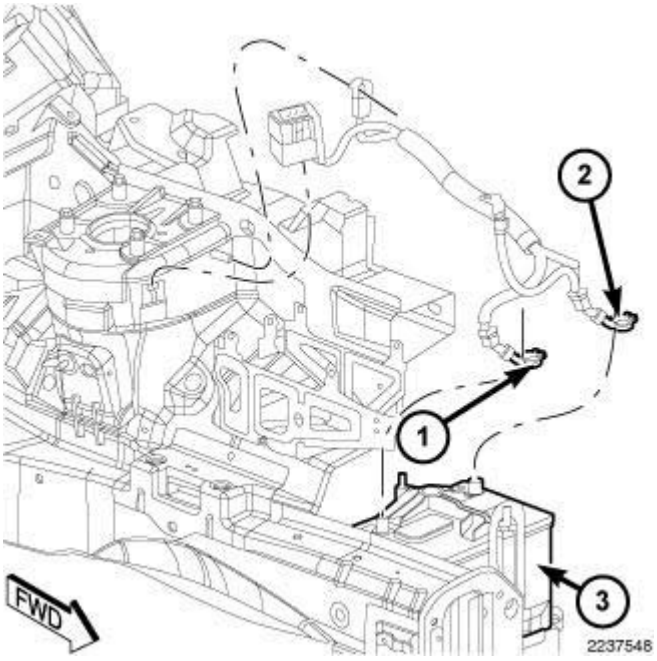

Fig. 29: Battery And Pinch Clamp Bolts
Courtesy of CHRYSLER LLC

2. Raise vehicle on hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
3. Remove the battery and set aside. See **Removal** .
4. On diesel engine equipped vehicles, disconnect the in-line connector to the instrument panel harness (2)

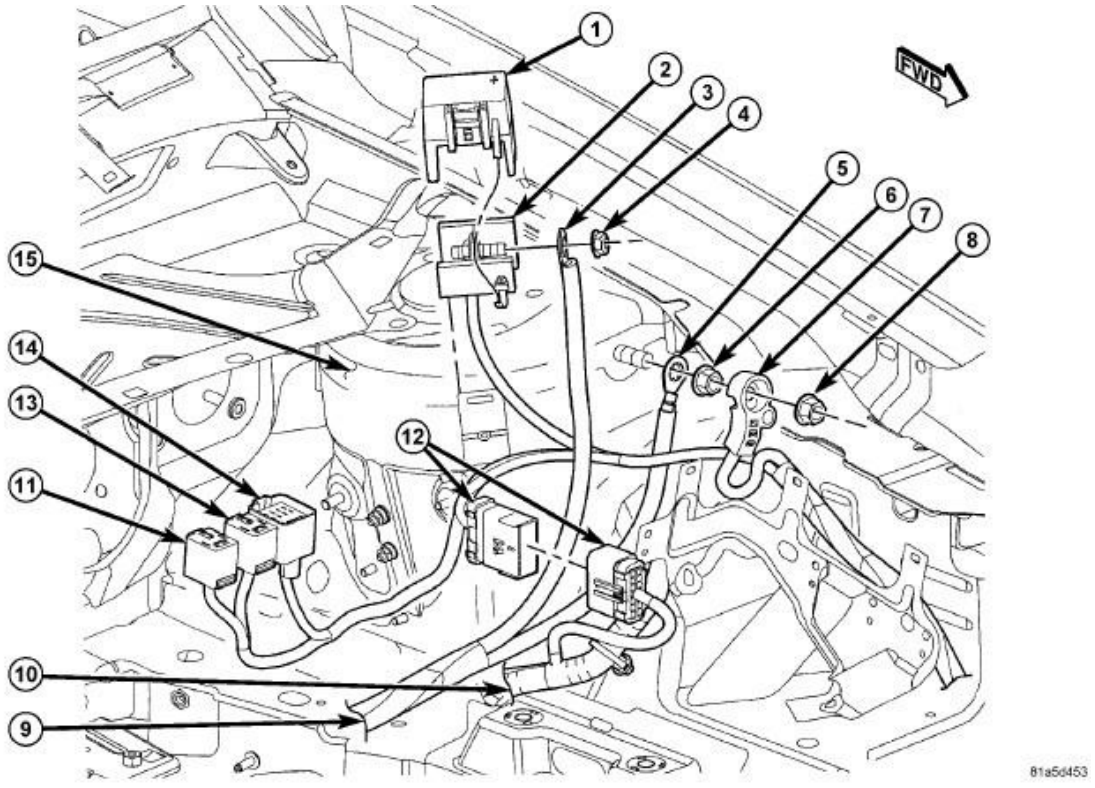

Fig. 30: View Of Battery Harness & Attachments - Diesel Shown, Gasoline Similar
Courtesy of CHRYSLER LLC

NOTE: Diesel battery harness shown in illustration, gasoline battery harness similar.

5. Lower the vehicle.
6. Remove the negative battery cable remote terminal nut (8) from the remote negative battery post. Remove the battery harness negative cable (7) from the remote negative battery post.
7. Remove the cover (1) from the remote positive battery terminal (2). Remove the starter harness positive cable retaining nut (4) and remove the cable (3) from the remote positive battery post.
8. Remove the remote positive battery terminal (2) from mounting bracket on the left strut tower (15) by lifting straight up.
9. On diesel engine equipped vehicles:
    - Disconnect the glow plug module connector (14)
    - Disconnect the cabin heater relay connectors (11 and 13)
    - Disconnect the in-line connector to the instrument panel harness (12)

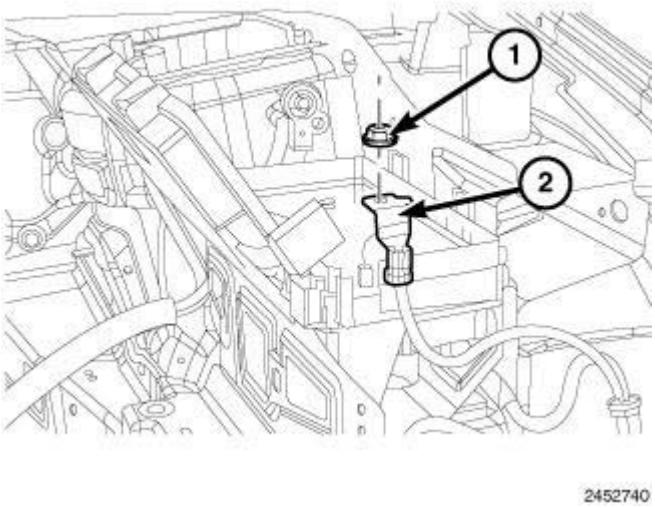

Fig. 31: Retaining Nut And Battery Harness Cable
Courtesy of CHRYSLER LLC

10. Remove the retaining nut (1) and remove the battery harness cable (2) from the TIPM stud.

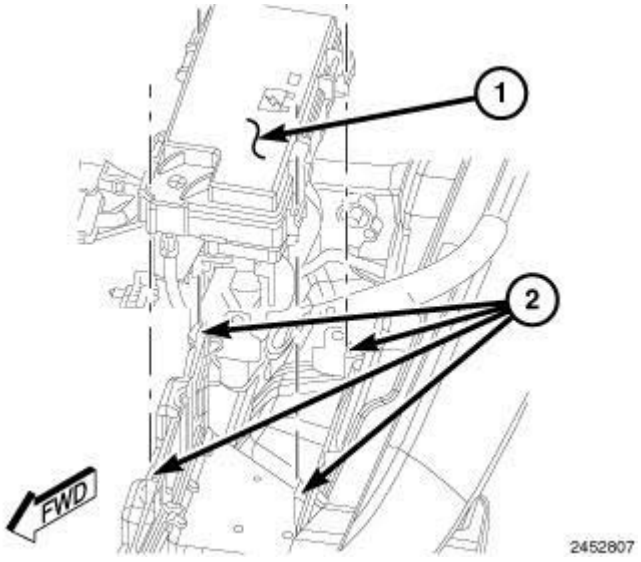

Fig. 32: Mounting Clips And TIPM Housing
Courtesy of CHRYSLER LLC

11. Depress the four mounting clips (2) to disengage and remove the TIPM housing (1) from its mounting bracket, position aside to allow access to the battery harness.
12. One at a time, trace any remaining battery harness retaining push pins, fasteners and routing clips until the harness is free from the vehicle.
13. Remove the battery harness from the vehicle.

STARTER HARNESS

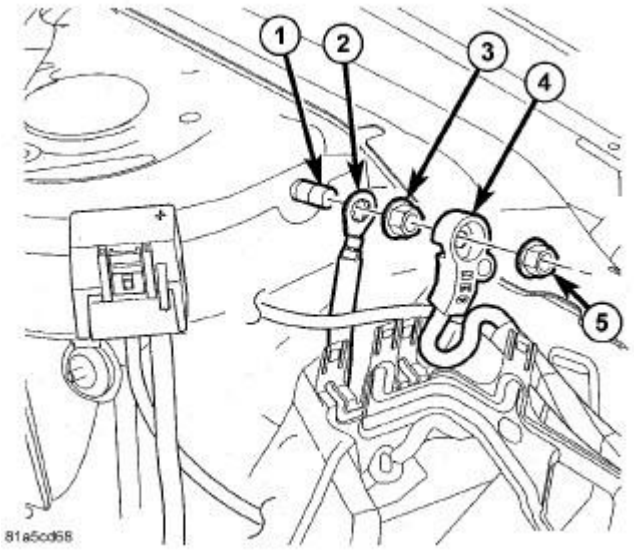

Fig. 33: Identifying Starter Harness Negative Cable Retaining Nut & Cable
Courtesy of CHRYSLER LLC

1. Remove the negative battery cable remote terminal nut (5) from the remote negative battery post (1). Remove and isolate the battery harness negative cable (4) on something other than the remote negative battery post (1).
2. Remove the starter harness negative cable retaining nut (3) and remove the cable (2) from the remote negative battery post (1).

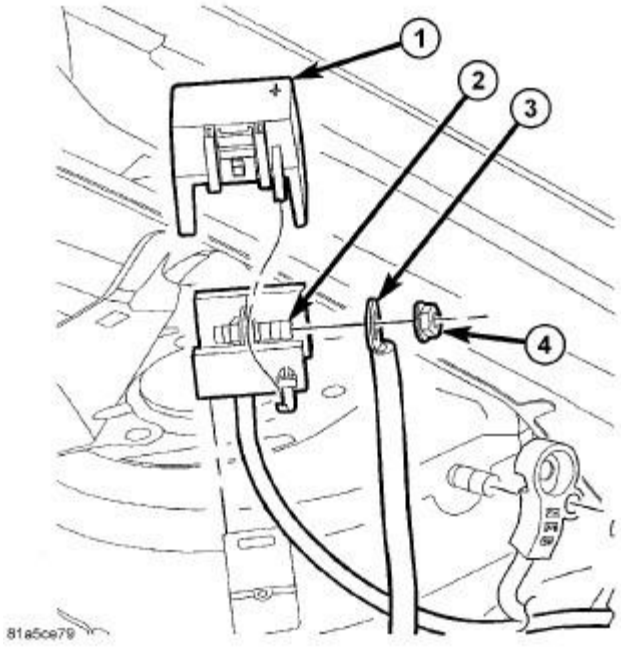

Fig. 34: Identifying Positive Cable Retaining Nut & Cable

Courtesy of CHRYSLER LLC

3. Remove the cover (1) from the remote positive battery terminal. Remove the starter harness positive cable retaining nut (4) and remove the cable (3) from the remote positive battery post (2).

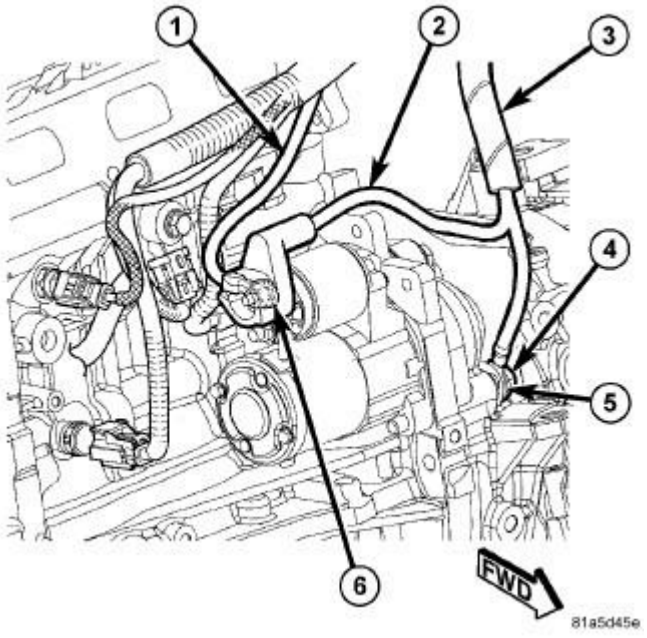

Fig. 35: Identifying Starter & Cables
Courtesy of CHRYSLER LLC

4. Raise vehicle on hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
5. Remove the starter harness negative cable retaining bolt (4) and remove the cable (5) from the engine block.
6. Remove the starter harness positive cable retaining nut (6) and remove the cable (2) from the starter positive battery post.
7. One at a time, trace any remaining starter harness retaining pushpins, fasteners and routing clips until the harness is free from the vehicle.
8. Remove the starter harness (3) from the engine compartment.

INSTALLATION

INSTALLATION

BATTERY HARNESS

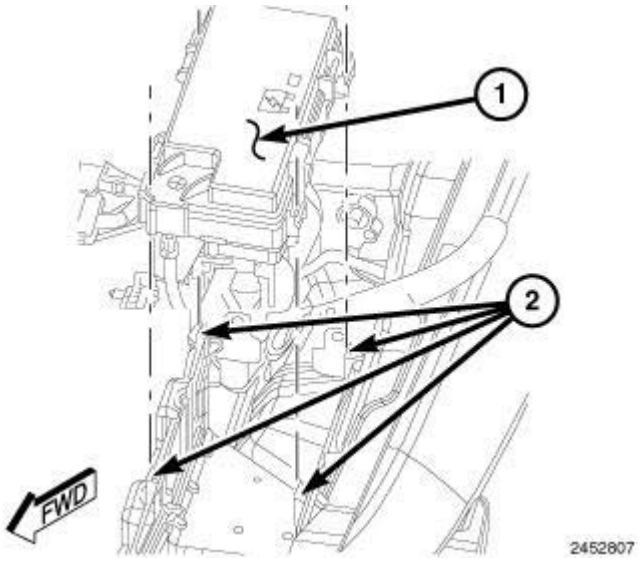

Fig. 36: Mounting Clips And TIPM Housing
Courtesy of CHRYSLER LLC

1. Position the battery harness into the vehicle.
2. One at a time, install the battery harness retaining pushpins, fasteners and routing clips until the harness is installed exactly where it was in the vehicle.
3. Position the battery harness cable (2) onto the TIPM stud (3). Install the retaining nut (1) and tighten to 10 N.m (90 in. lbs.)
4. Install the TIPM on the bracket posts, push down until you hear a click.

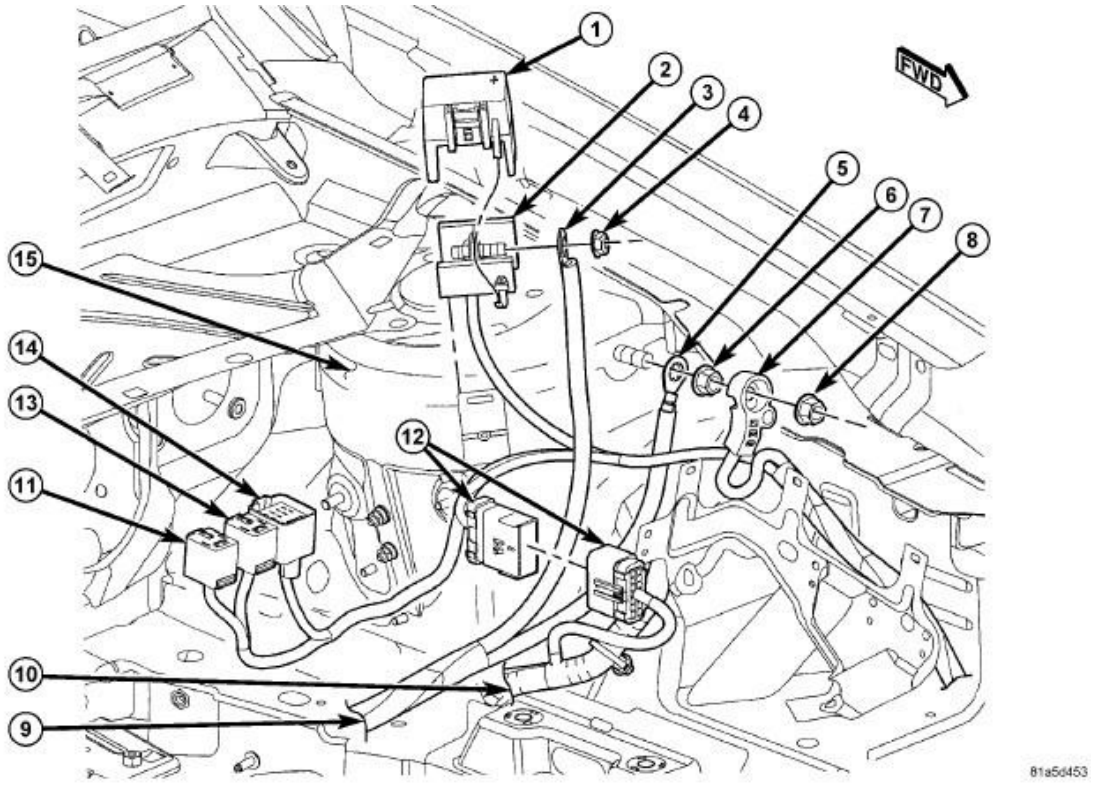

Fig. 37: View Of Battery Harness & Attachments - Diesel Shown, Gasoline Similar
Courtesy of CHRYSLER LLC

NOTE: Diesel battery harness shown in illustration, gasoline battery harness similar.

5. On diesel engine equipped vehicles:
   - Connect the glow plug module connector (14)
   - Connect the cabin heater relay connectors (11 and 13)
   - Connect the in-line connector to the instrument panel harness (12)
6. Install the remote positive battery terminal (2) onto the mounting bracket on the left strut tower (15) by pushing straight down until fully engaged.
7. Remove the cover (1) from the remote positive battery terminal (2). Position the starter harness positive cable (3) onto the remote positive battery post. Install the retaining nut (4) and tighten to 16.5 N.m (145 in. lbs.) Install the cover (1) onto the remote positive battery terminal (2).

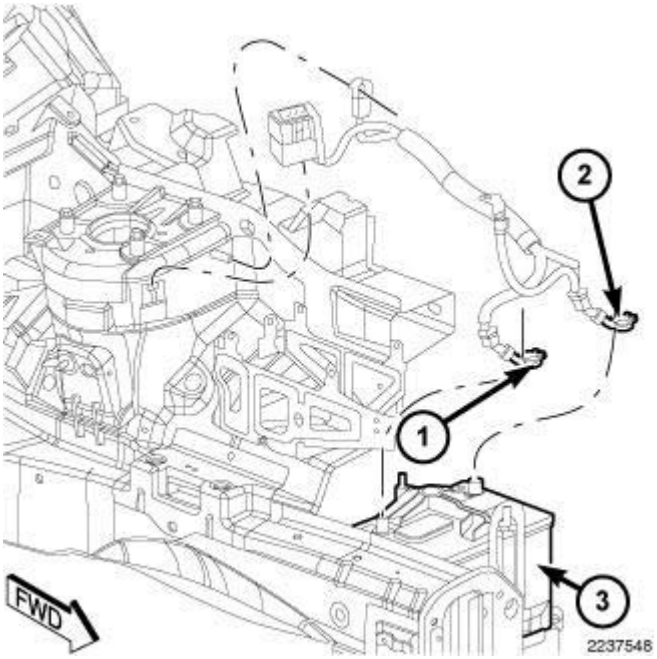

Fig. 38: Battery And Pinch Clamp Bolts
Courtesy of CHRYSLER LLC

8. Raise vehicle on hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
9. Install the battery. See **Installation** .

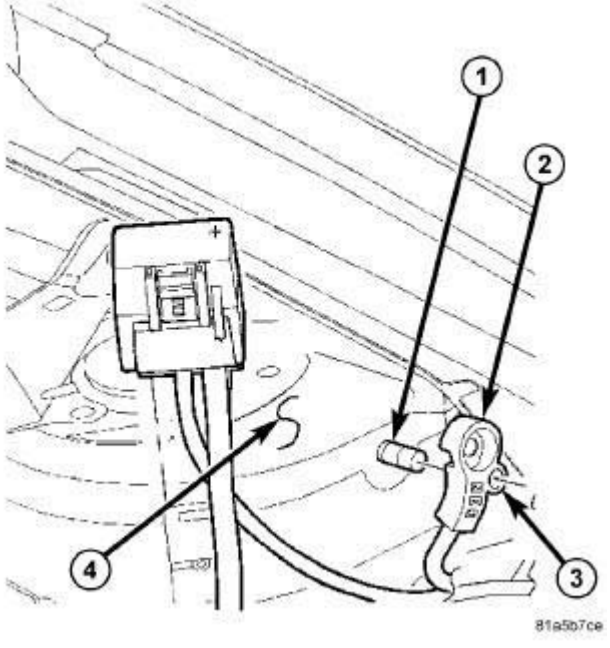

Fig. 39: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

10. Lower the vehicle.
11. Install the negative battery cable remote terminal (2) onto the remote battery post (1). Install the nut (3) and tighten to 16.5 N.m (145 in. lbs.)

STARTER HARNESS

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

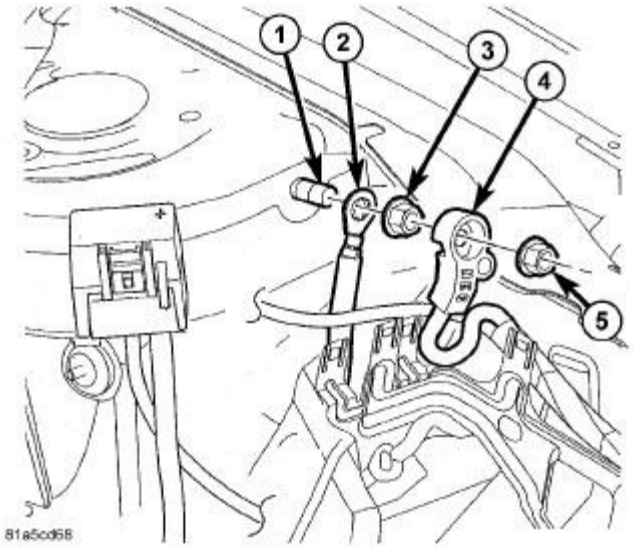

Fig. 40: Identifying Starter Harness Negative Cable Retaining Nut & Cable
Courtesy of CHRYSLER LLC

1. Remove and isolate the battery harness negative cable (4) on something other than the remote negative battery post (1).
2. Position the starter harness into the vehicle.
3. One at a time, install the starter harness retaining pushpins, fasteners and routing clips until the harness is installed exactly where it was in the vehicle.
4. Position the starter harness negative cable (2) onto the remote negative battery post (1). Install the retaining nut (3) and tighten to 16.5 N.m (145 in. lbs.)

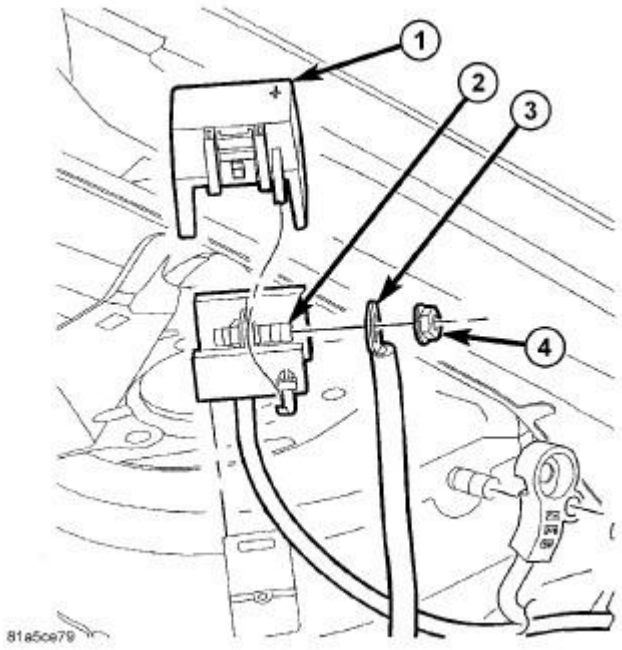

Fig. 41: Identifying Positive Cable Retaining Nut & Cable
Courtesy of CHRYSLER LLC

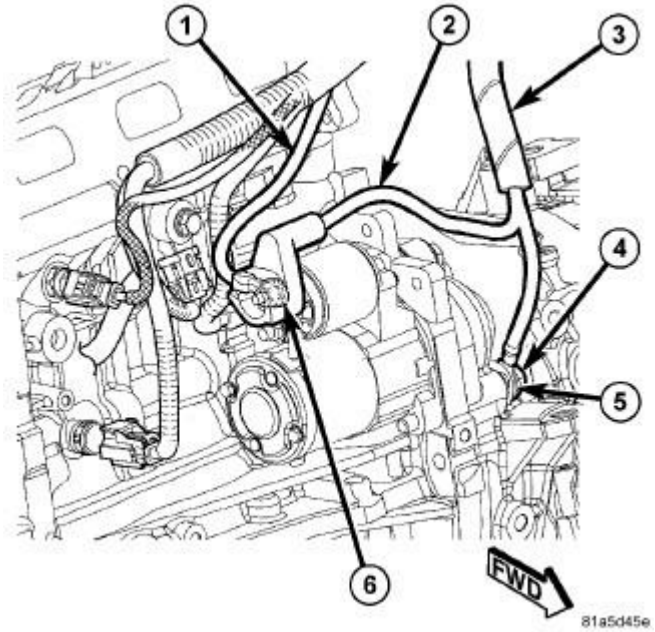

Fig. 42: Identifying Starter & Cables
Courtesy of CHRYSLER LLC

Remove the cover (1) from the remote positive battery terminal (2). Position the starter harness positive cable (3) onto the remote positive battery post. Install the retaining nut (4) and tighten to 16.5 N.m (145

in. lbs.) Install the cover (1) onto the remote positive battery terminal (2).

5. Raise vehicle on hoist. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
6. Position the starter harness positive cable (2) onto the starter positive battery post. Install the retaining nut (6) and tighten to 13 N.m (115 in. lbs.)
7. Position the starter harness negative cable (5) onto the engine block. Install the retaining bolt (4) and tighten to 16.5 N.m (145 in. lbs.)

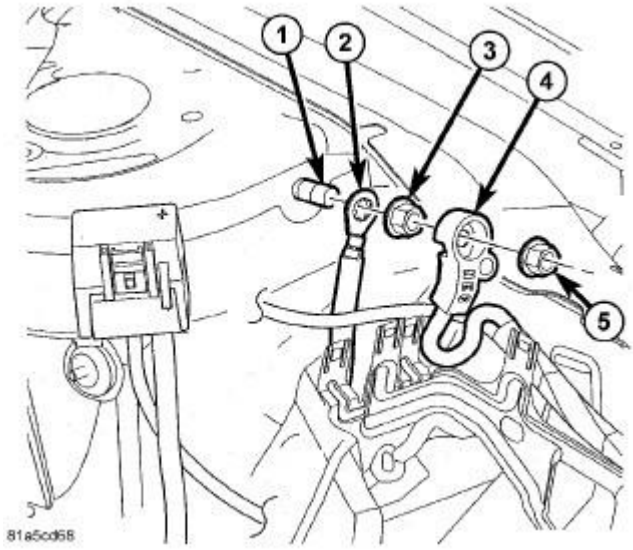

Fig. 43: Identifying Starter Harness Negative Cable Retaining Nut & Cable
Courtesy of CHRYSLER LLC

8. Lower the vehicle.
9. Position the negative battery harness cable remote terminal (4) onto the remote battery post (1). Install the nut (5) and tighten to 16.5 N.m (145 in. lbs.)

TRAY, BATTERY

DESCRIPTION

DESCRIPTION

The battery is placed and secured in a stamped steel battery tray. The battery tray is located in the left front side of the vehicle, just ahead of the left front wheel and tire assembly. The battery tray is secured to the left front frame rail with four bolts.

REMOVAL

REMOVAL

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

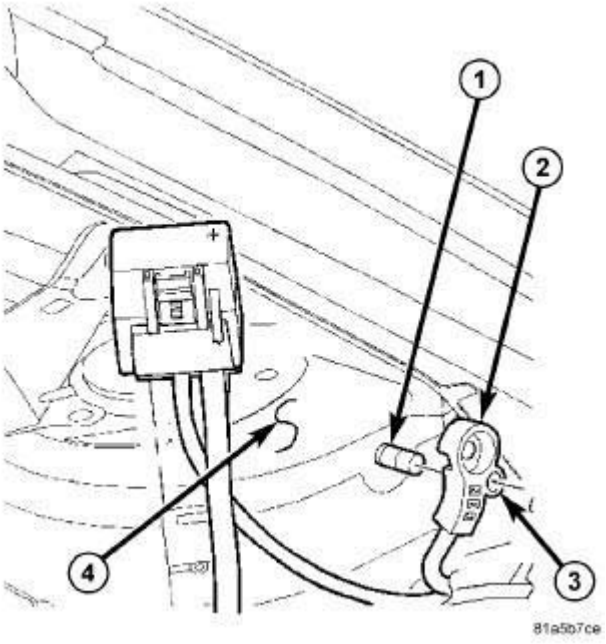

Fig. 44: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

1. Disconnect and isolate the negative battery cable remote terminal from the remote battery post.
2. Remove the battery. See **Removal** .

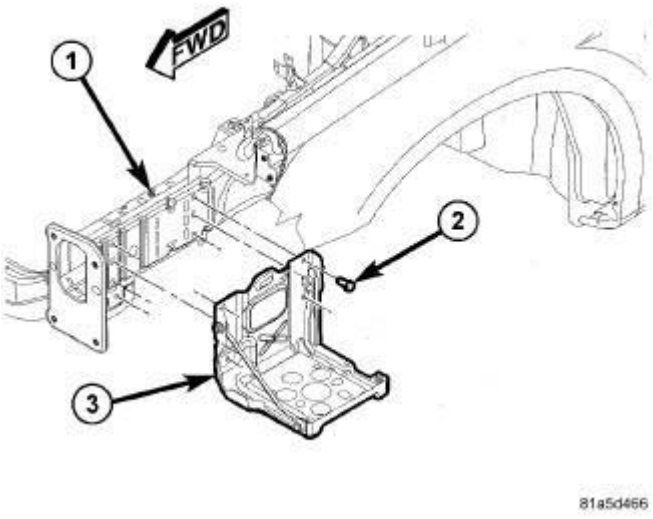

Fig. 45: View Of Battery Tray & Fasteners
Courtesy of CHRYSLER LLC

3. Remove the four bolts (2) securing the battery tray (3) to the left front frame rail (1).
4. Remove the battery tray from the vehicle.

INSTALLATION

INSTALLATION

WARNING: To protect the hands from battery acid, a suitable pair of heavy duty rubber gloves should be worn when removing or servicing a battery. Safety glasses also should be worn.

WARNING: Remove metallic jewelry to avoid injury by accidental arcing of battery current.

CAUTION: The negative battery cable remote terminal (2) must be disconnected and isolated from the remote battery post (1) prior to service of the vehicle electrical systems. The negative battery cable remote terminal can be isolated by using the supplied isolation hole (3) in the terminal casing.

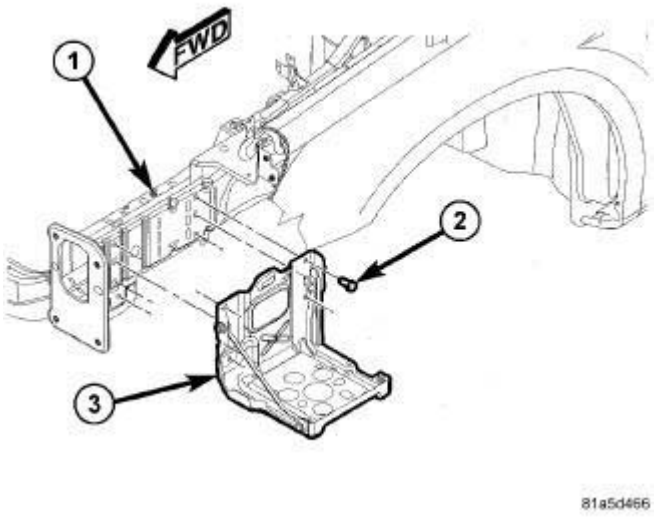

Fig. 46: View Of Battery Tray & Fasteners
Courtesy of CHRYSLER LLC

1. Position the battery tray (3) onto the left front frame rail (1).
2. Install the bolts (2) securing the battery tray (3) to the frame rail (1).

   Tighten the bolts to 16 N.m (142 in. lbs.)

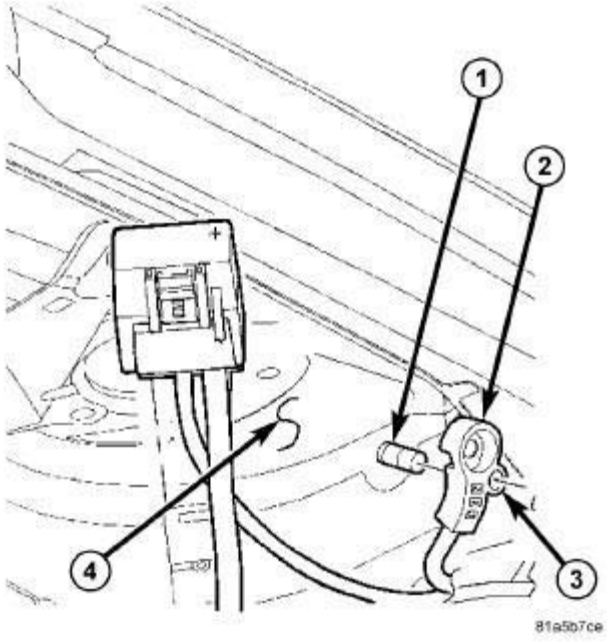

Fig. 47: Identifying Battery Cables & Terminals
Courtesy of CHRYSLER LLC

3. Install the battery. See **Installation** .
4. Install the negative battery cable remote terminal onto the remote battery post.

   Tighten the nut to 16.5 N.m (145 in. lbs.)

2009 ELECTRICAL

Charging - Service Information - Journey

DESCRIPTION

DESCRIPTION

The charging system consists of:

- Generator
- Decoupler Pulley (2.4L and Diesel Only)
- Electronic Voltage Regulator (EVR) circuitry within the Powertrain Control Module (PCM)
- Ignition switch (refer to **IGNITION CONTROL - SERVICE INFORMATION** for information)
- Battery (refer to **BATTERY SYSTEM** for information)
- Inlet Air Temperature (calculated battery temperature) (If equipped)
- Voltmeter (refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION** for information if equipped)
- Wiring harness and connections (refer to **SYSTEM WIRING DIAGRAMS** for information)
- Accessory drive belt (refer to**COOLING** for more information)

OPERATION

OPERATION

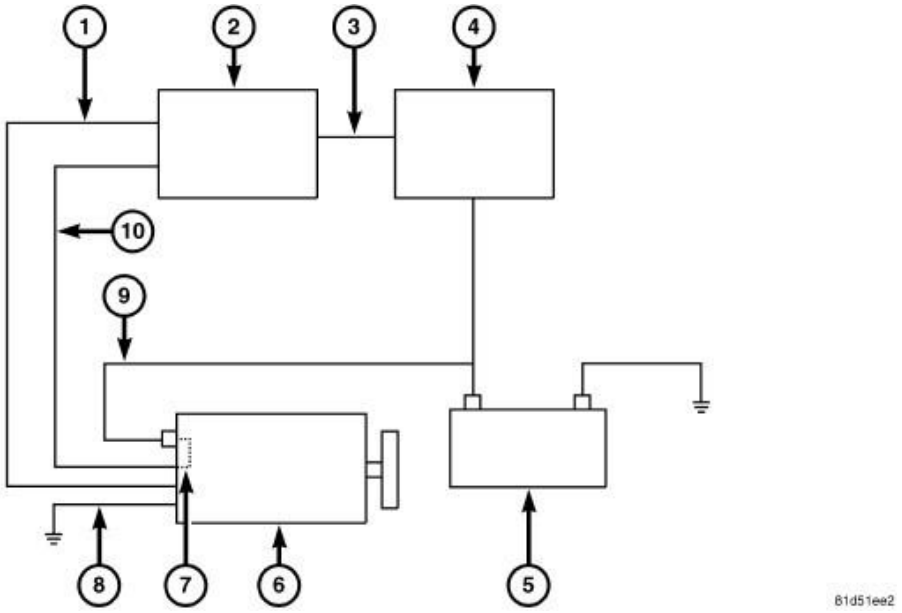

Fig. 1: Charging System Operation
Courtesy of CHRYSLER LLC

1 - Generator Field Circuit 2 - Powertrain Control Module (PCM)	6 - Generator 7 - Resistor (Gasoline Engines Only)
3 - Battery Sense Input	8 - Generator Case Ground
4 - Gateway (Totally Integrated Power Module, Integrated Power Module)	9 - B+ Circuit (Generator Output)
5 - Battery	10 - B+ Sense Circuit

The charging system is turned on and off with the Powertrain Control Module (PCM) (2) and ignition switch with engine running. The field circuit will not be energized until engine is running and ignition switch is on. This voltage is connected through the PCM (2) and supplied to the generator field circuit (1) at the back of the generator (6). The generator (6) is internally grounded through the generator case ground (8). The generator (6) regulates the field using Pin 1 of the field connector (High side driver).

The generator (6) is driven by the engine through a serpentine belt and pulley or decoupler pulley arrangement.

The PCM (2) receives a voltage input from the generator (6) via the B+ sense circuit (10) and also a battery sense input (3) from the Gateway (Totally Integrated Power Module, Integrated Power Module) (4), it then compares the voltages to the desired voltage programed in the Electronic Voltage Regulator (EVR) software and if there is a difference it sends a signal to the generator EVR circuit to increase or decrease output. It uses Pulse Width Modulation (PWM) to send signals to the generator circuitry to control the amount of output from the generator. The amount of DC current produced by the generator is controlled by the EVR circuitry contained within the PCM (2).

All vehicles are equipped with On-Board Diagnostics (OBD). All OBD-sensed systems, including EVR circuitry, are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects.

The Check Gauges Lamp (if equipped) monitors: **charging system voltage,** engine coolant temperature and engine oil pressure. If an extreme condition is indicated, the lamp will be illuminated. This is done as reminder to check the three gauges. The lamp is located on the instrument panel. Refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION** for additional information.

Voltage is monitored at B+ sense circuit (10) to insure the cable is connected. If the B+ circuit (generator output) (9) cable is loose anywhere in the circuit the B+ sense circuit (10) will show high voltage. This condition causes the PCM (2) to shut down the generator field circuit (1). Because of this feature, pin 2 of the field connector is internally connected to the B+ circuit (9).

The diesel generator is internally regulated. The generator and PCM communicate for diagnostics, etc. If the generator regulator becomes disconnected from the PCM it will operate, but in a default mode.

DIAGNOSIS AND TESTING

ON-BOARD DIAGNOSTIC SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit

monitored by the OBD system. Some circuits are checked continuously and some are checked only under certain conditions.

If the OBD system senses that a monitored circuit is bad, it will put a DTC into electronic memory. The DTC will stay in electronic memory as long as the circuit continues to be bad. The PCM is programmed to clear the memory after 40 good trips if the problem does not occur again.

DIAGNOSTIC TROUBLE CODES

A DTC description can be read using the scan tool. Refer to the appropriate Powertrain Diagnostic article for information.

A DTC does not identify which component in a circuit is bad. Thus, a DTC should be treated as a symptom, not as the cause for the problem. In some cases, because of the design of the diagnostic test procedure, a DTC can be the reason for another DTC to be set. Therefore, it is important that the test procedures be followed in sequence, to understand what caused a DTC to be set.

ERASING DIAGNOSTIC TROUBLE CODES

The scan tool must be used to erase a DTC.

The following procedures may be used to diagnose the charging system if:

- the check gauges lamp or battery lamp is illuminated with the engine running
- the voltmeter (if equipped) does not register properly
- an undercharged or overcharged battery condition occurs.

Remember that an undercharged battery is often caused by:

- accessories being left on with the engine not running
- a faulty or improperly adjusted switch that allows a lamp to stay on. Refer to Ignition-Off Draw Test. Refer to **Electrical/Battery System/BATTERY - Standard Procedure**
- loose generator belt.

INSPECTION

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some charging system circuits are checked continuously, and some are checked only under certain conditions.

Refer to Diagnostic Trouble Codes in; Powertrain Diagnostic service information for more DTC information. This will include a complete list of DTC's including DTC's for the charging system.

To perform a complete test of the charging system, refer to the appropriate Powertrain Diagnostic Procedures service information and the scan tool. Perform the following inspections before attaching the scan tool.

1. Inspect the battery condition. Refer to **Electrical/Battery System - Diagnosis and Testing** for procedures.
2. Inspect condition of battery cable terminals, battery posts, connections at engine block, starter solenoid and relay. They should be clean and tight. Repair as required.
3. Inspect all fuses in the fuseblock for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.
4. Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. Refer to **Specifications**. Also refer to **GENERATOR** Removal/Installation procedures. .
5. Inspect generator drive belt condition and tension. Tighten or replace belt as required.
6. Inspect decoupler pulley (if equipped). Ensure decoupler pulley is driving the alternator rotor.
7. Inspect automatic belt tensioner (if equipped). Refer to **BELT, SERPENTINE** for more information.
8. Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

SPECIFICATIONS

GENERATOR

GENERATOR

MANUFACTURER	ENGINE	NOMINAL RATING	MINIMUM OUTPUT (AMPS) (@ SPECIFIED TEST CONDITIONS)
BOSCH	2.0L Diesel	150A	100A
BOSCH	2.0L Diesel	200A	150A
MITSUBISHI ELECTRIC	2.4L	160A	110A
DENSO	2.7, 3.5L	140A	90A
DENSO	2.7, 3.5L	160A	110A
TEST CONDITIONS			
1. Engine RPM : 2500 RPM (ENGINE HOT)			
2. Voltage Output : 13.0 - 16.0 V			

TORQUE

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Battery Terminal Nut	4.5	-	40
Generator B+ Nut	10	-	88.5
Generator Mounting Bolt - 2.4L	61	45	-
Generator Mounting Bolt - 2.7L	27	20	-

Generator Mounting Bolt - 3.5L	42	31	-
Lower Idler Pulley Bolt - 2.4L	50	37	-

GENERATOR

DESCRIPTION

DESCRIPTION

The generator is belt-driven by the engine. It is serviced only as a complete assembly. If the generator fails for any reason, the entire assembly must be replaced. The generator produces DC voltage.

OPERATION

OPERATION

As the energized rotor begins to rotate within the generator, the spinning magnetic field induces a current into the windings of the stator coil.

The Y type stator winding connections deliver the induced AC current to positive and negative diodes for rectification. From the diodes, rectified DC current is delivered to the vehicles electrical system through the generator, battery, and ground terminals.

Noise emitting from the generator may be caused by:

- Worn, loose or defective bearings
- Loose or defective drive pulley
- Incorrect, worn, damaged or misadjusted drive belt
- Loose mounting bolts
- Misaligned drive pulley
- Defective stator or diode
- Damaged internal fins

REMOVAL

2.0L TURBO DIESEL

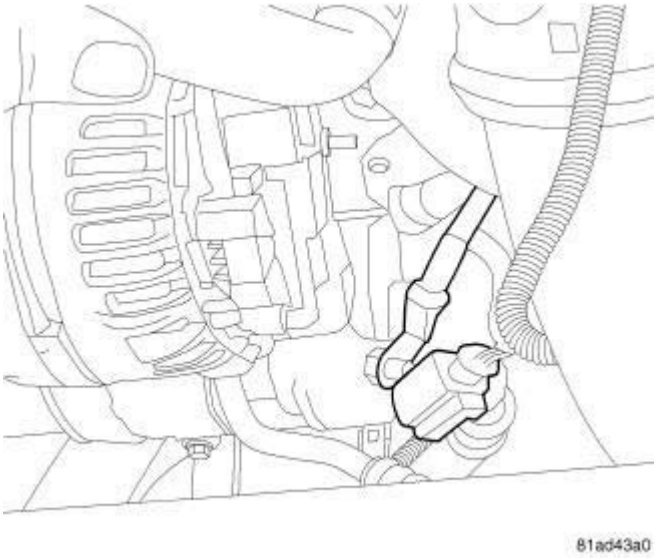

Fig. 2: Generator Cables
Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
4. Disconnect battery cable from generator.
5. Disconnect electrical connector from generator.

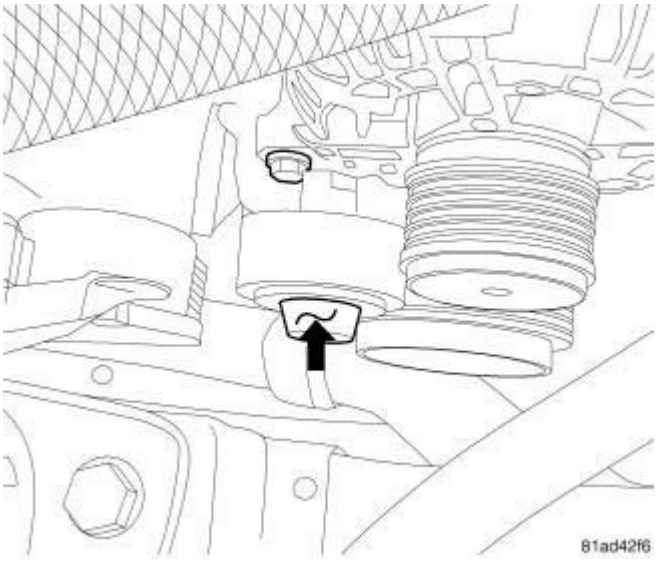

Fig. 3: Idler Cap Location
Courtesy of CHRYSLER LLC

6. Remove cap from idler pulley mounting bolt.

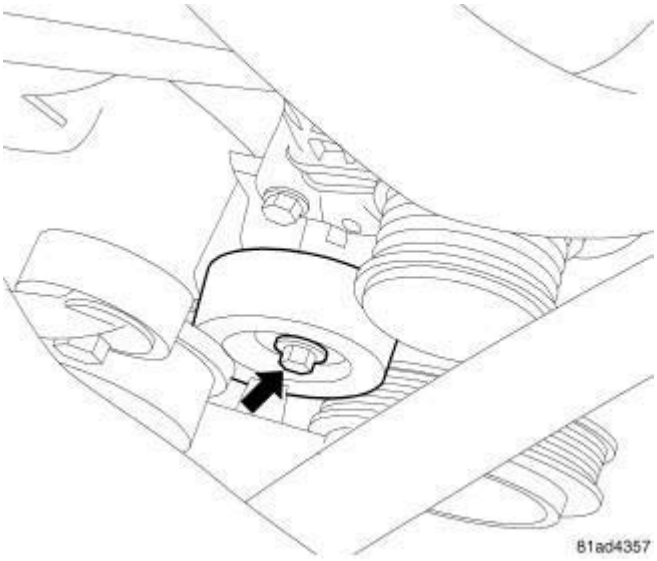

Fig. 4: Idler Pulley Bolt Location
Courtesy of CHRYSLER LLC

7. Remove idler pulley bolt.

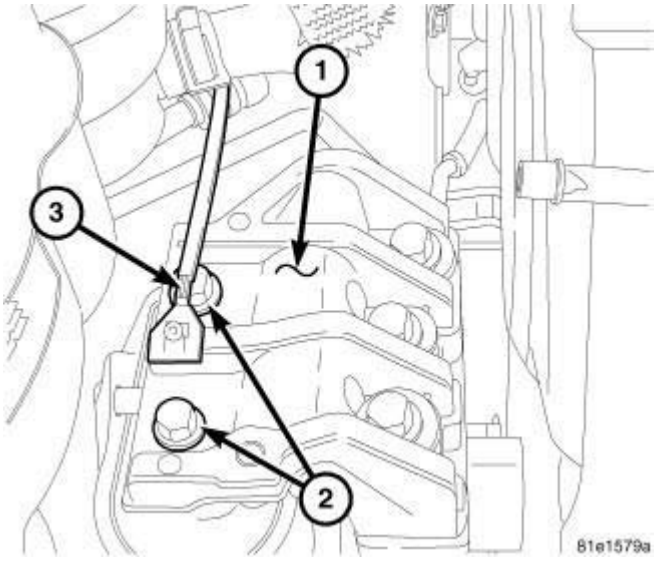

Fig. 5: Right Engine Mount
Courtesy of CHRYSLER LLC

8. It may be necessary to remove the two engine mounting bolts (2) from the right engine mount (1) and reposition engine in order to remove the lower generator mounting bolt. Reposition ground strap (3) if required. Refer to **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal** .

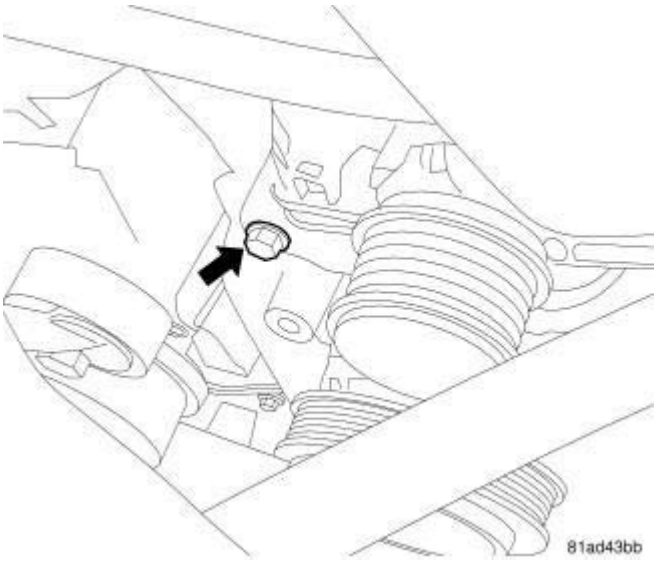

Fig. 6: Generator Lower Mounting Bolt
Courtesy of CHRYSLER LLC

9. Remove lower generator mounting bolt.

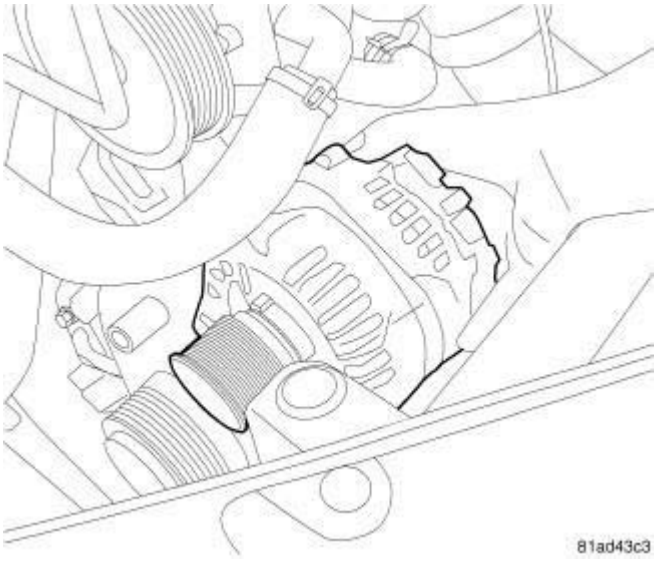

Fig. 7: Removing/Installing Generator
Courtesy of CHRYSLER LLC

10. Remove upper generator mounting bolt.
11. Remove generator.

2.4L

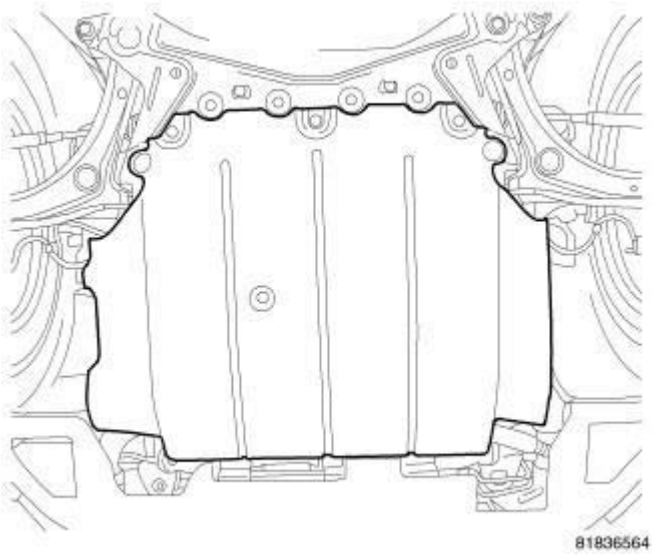

Fig. 8: Removing/Installing Underbody Air Dam
Courtesy of CHRYSLER LLC

CAUTION: Disconnect the negative battery cable before removing the battery output wire from generator. Failure to do so can result in injury or damage to electrical system.

1. Disconnect and isolate negative battery cable.
2. Remove underbody air dam.
3. Remove right front wheelhouse splash shield. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
4. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

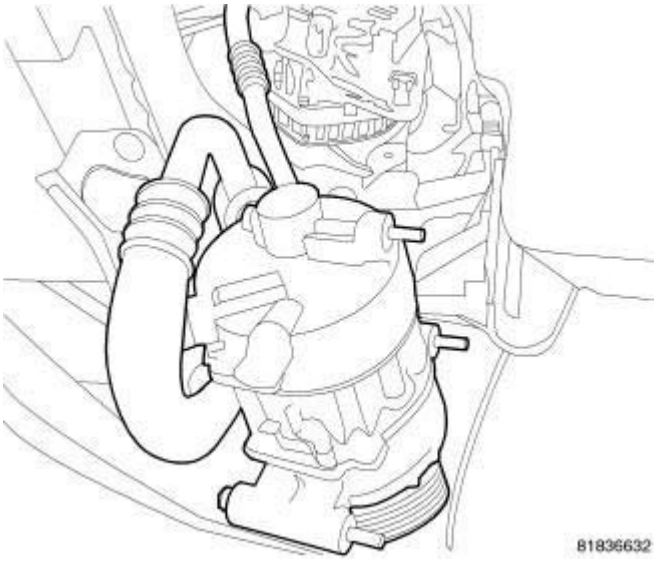

Fig. 9: Identifying A/C Compressor
Courtesy of CHRYSLER LLC

NOTE: Do not disconnect the A/C lines when relocating the A/C compressor.

CAUTION: Support the A/C compressor when relocating. Failure to properly support the A/C compressor can cause damage to the lines and or seals. This can cause a leak in the A/C system.

5. Relocate A/C compressor. Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .

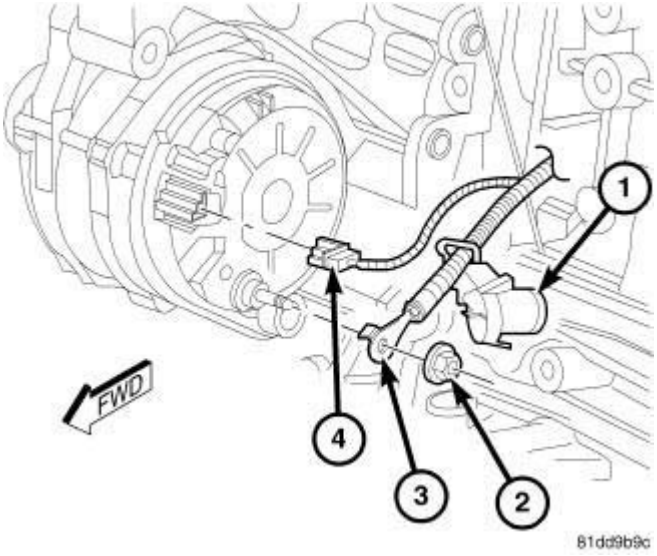

Fig. 10: 2.4L Generator Electrical Connector
Courtesy of CHRYSLER LLC

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

6. Unsnap plastic protective cover (1) from B+ mounting stud.
7. Remove B+ terminal mounting nut (2) and B+ terminal (3) from generator.
8. Disconnect field wire electrical connector (4) by pushing on connector tab.

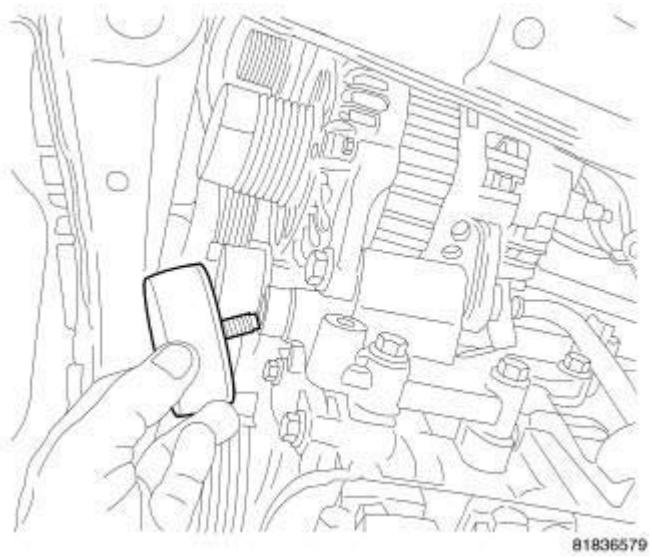

Fig. 11: Removing/Installing Idler Pulley
Courtesy of CHRYSLER LLC

9. Remove bolt and lower idler pulley.

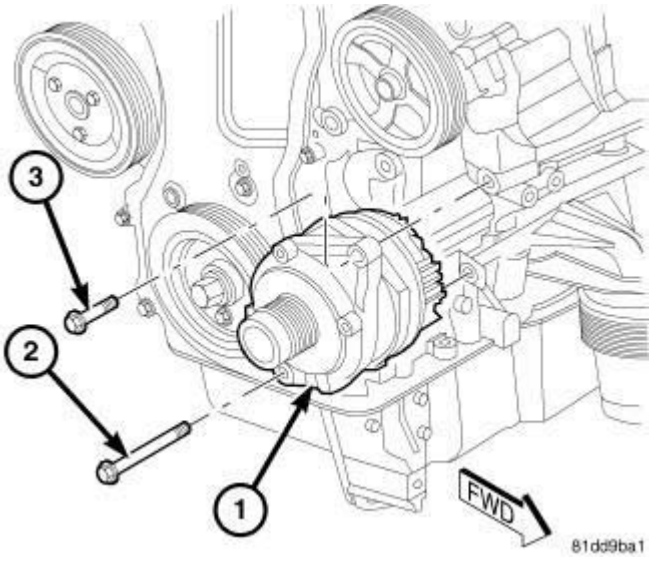

Fig. 12: Removing/Installing Generator
Courtesy of CHRYSLER LLC

10. Remove upper mounting bolt (3) from generator (1).
11. Remove lower mounting bolt (2) from generator (1).
12. Remove generator (1) from engine mounting bracket.

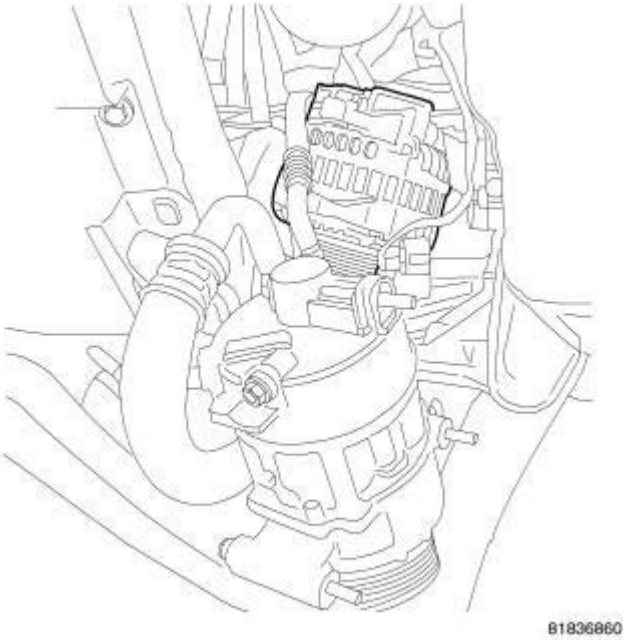

Fig. 13: Identifying Generator Pulley
Courtesy of CHRYSLER LLC

13. Rotate generator so that the pulley faces down.

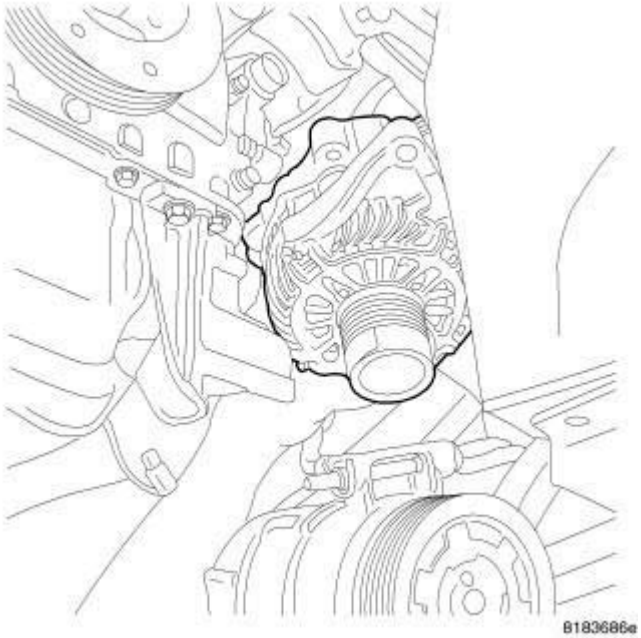

Fig. 14: Removing/Installing Generator
Courtesy of CHRYSLER LLC

14. Position generator in order to move past the A/C compressor and out of vehicle.

2.7L

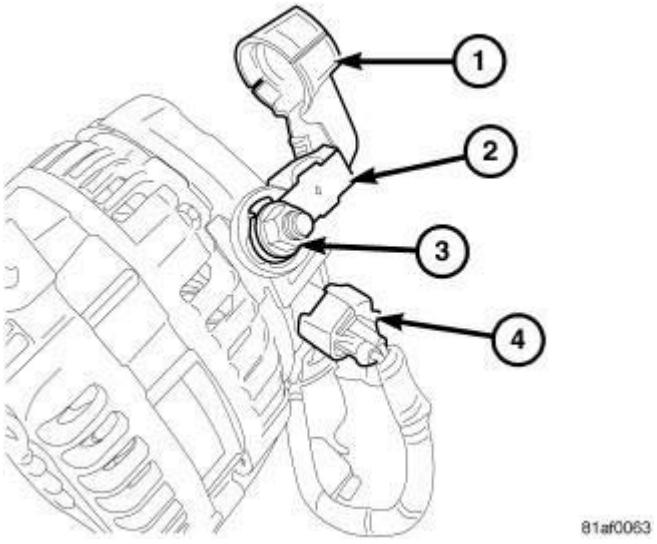

Fig. 15: Alternator Electrical Connection
Courtesy of CHRYSLER LLC

CAUTION: Disconnect the negative battery cable before removing the battery output wire from generator. Failure to do so can result in injury or damage to electrical system.

1. Disconnect and isolate negative battery cable.

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

2. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Unsnap plastic protective cover (1) from B+ mounting stud.
4. Remove B+ terminal mounting nut (2) and B+ terminal (3) at top of generator.
5. Disconnect field wire electrical connector (4) by pushing on connector tab.

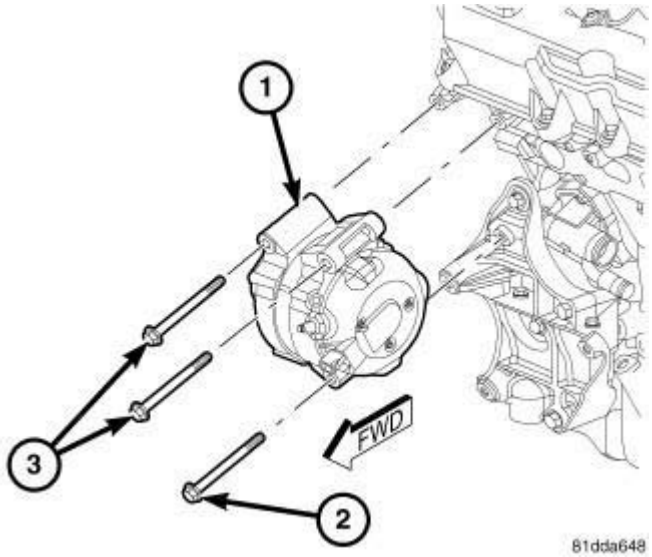

Fig. 16: 2.7L Removing/Installing Generator
Courtesy of CHRYSLER LLC

6. Remove upper mounting bolts (3) from generator (1).
7. Remove lower mounting bolt (2) from generator (1).
8. Remove generator (1) from engine mounting bracket.

3.5L

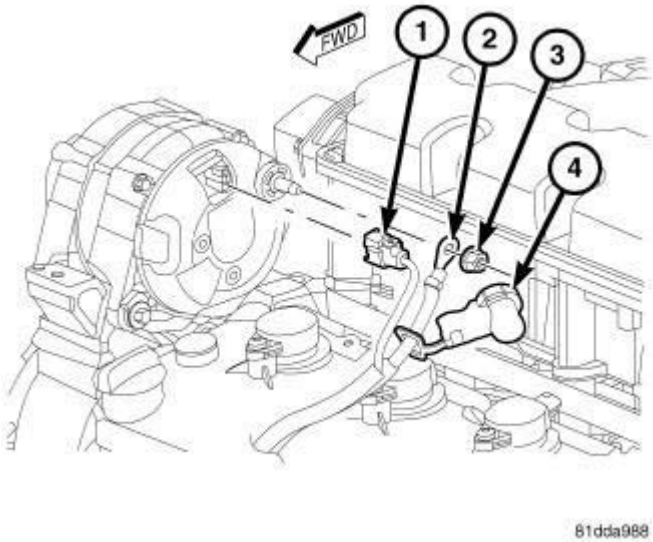

Fig. 17: 3.5L Generator Electrical Connector
Courtesy of CHRYSLER LLC

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

1. Disconnect and isolate negative battery cable.
2. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Unsnap plastic protective cover (4) from B+ mounting stud.
4. Remove B+ terminal mounting nut (3) and B+ terminal (2) at top of generator.
5. Disconnect field wire electrical connector (1) by pushing on connector tab.

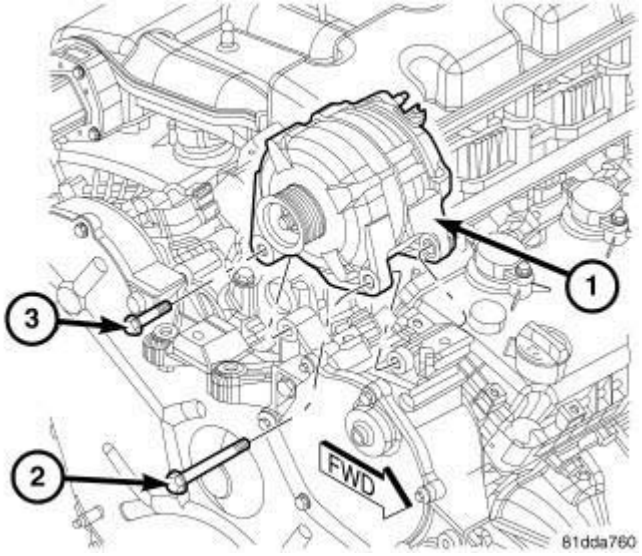

Fig. 18: 3.5L Removing/Installing Generator
Courtesy of CHRYSLER LLC

6. Remove short mounting bolt (3) from generator (1).
7. Remove long mounting bolt (2) from generator (1).
8. Remove generator (1) from engine mounting bracket.

INSTALLATION

2.0L TURBO DIESEL

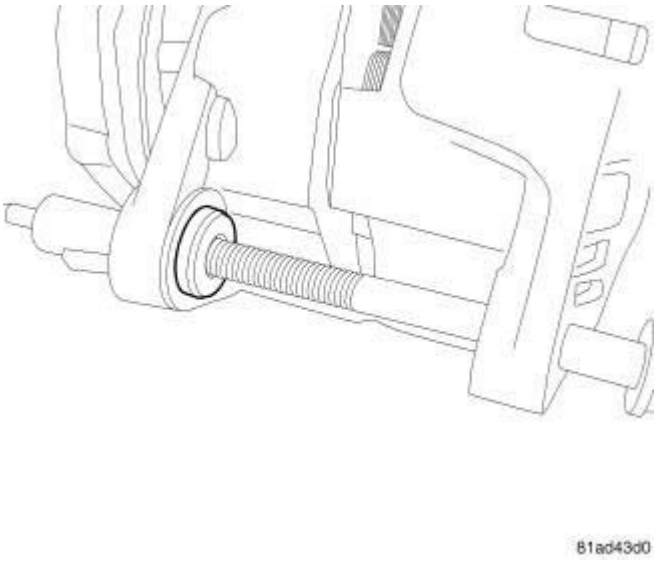

Fig. 19: Generator Bushing
Courtesy of CHRYSLER LLC

1. If reinstalling the old generator, install a generator mounting bolt and tap bushing out slightly to ease mounting of generator.

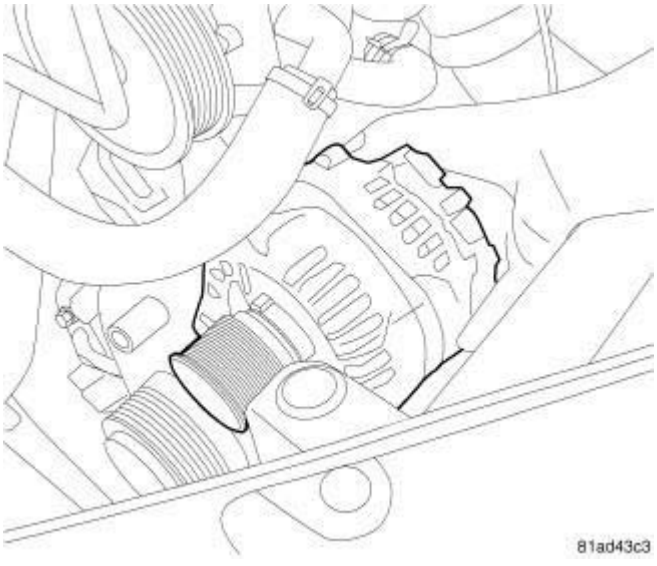

Fig. 20: Removing/Installing Generator
Courtesy of CHRYSLER LLC

2. Install generator.

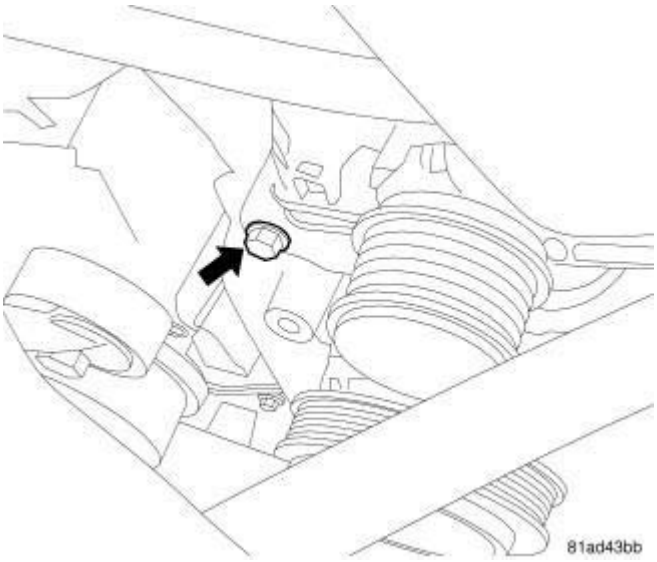

Fig. 21: Generator Lower Mounting Bolt
Courtesy of CHRYSLER LLC

3. Loosely install lower generator mounting bolt.
4. Install upper generator mounting bolt.
5. Tighten generator mounting bolts to 54 N.m (40 ft. lbs.).

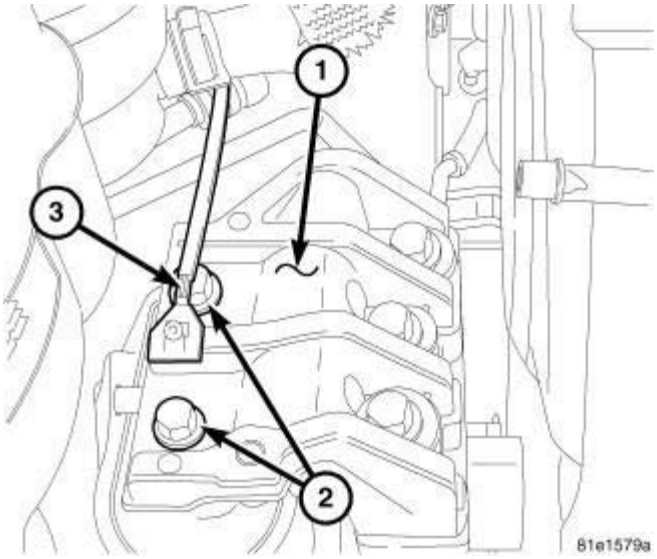

Fig. 22: Right Engine Mount
Courtesy of CHRYSLER LLC

6. If removed, install two engine mounting bolts (2) to right engine mount (1). Reposition ground strap (3) if required. Refer to **Engine/Engine Mounting/BRACKET, Engine Mount - Installation** .

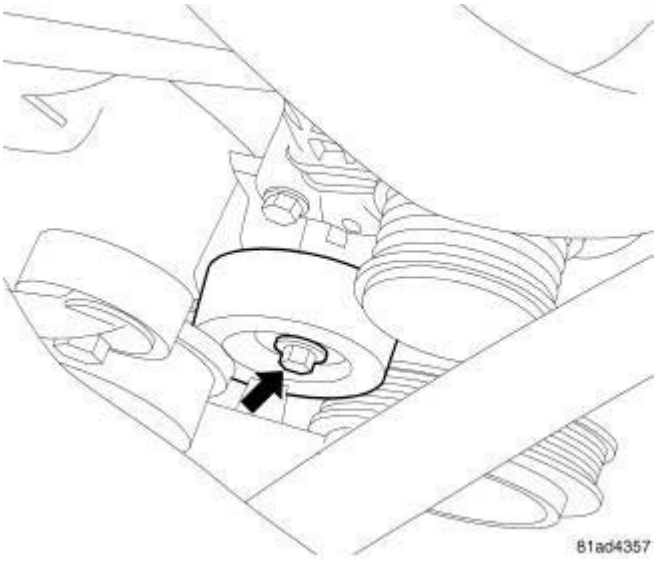

Fig. 23: Idler Pulley Bolt Location
Courtesy of CHRYSLER LLC

7. Install idler pulley and tighten bolt. Refer to **Cooling/Accessory Drive/PULLEY, Idler - Installation** .

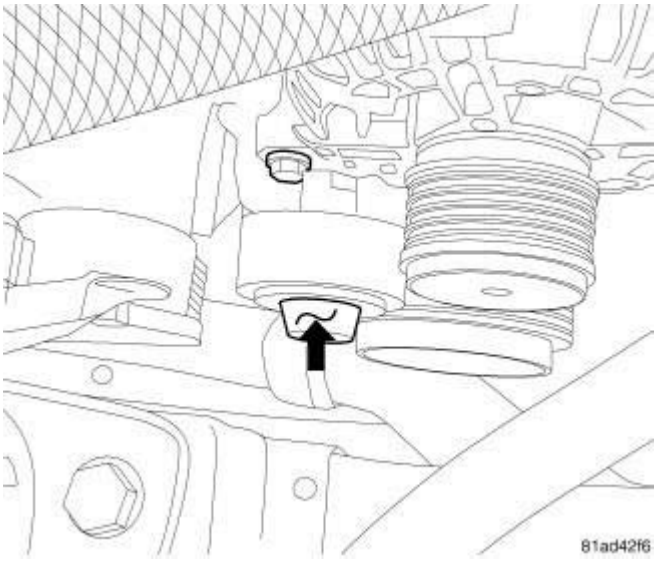

Fig. 24: Idler Cap Location
Courtesy of CHRYSLER LLC

8. Install idler bolt cap.

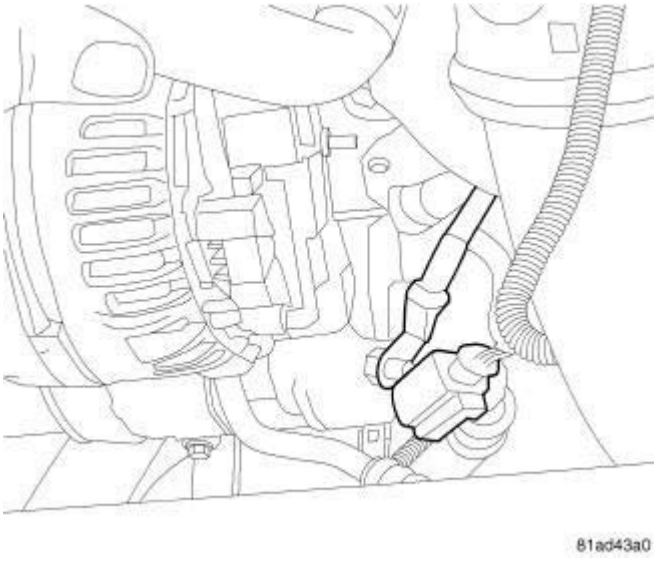

Fig. 25: Generator Cables
Courtesy of CHRYSLER LLC

9. Connect battery cable to generator and tighten nut to 10 N.m (88.5 in. lbs.).
10. Connect electrical connector to generator.
11. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
12. Reconnect negative battery cable.
13. Install engine cover.

2.4L

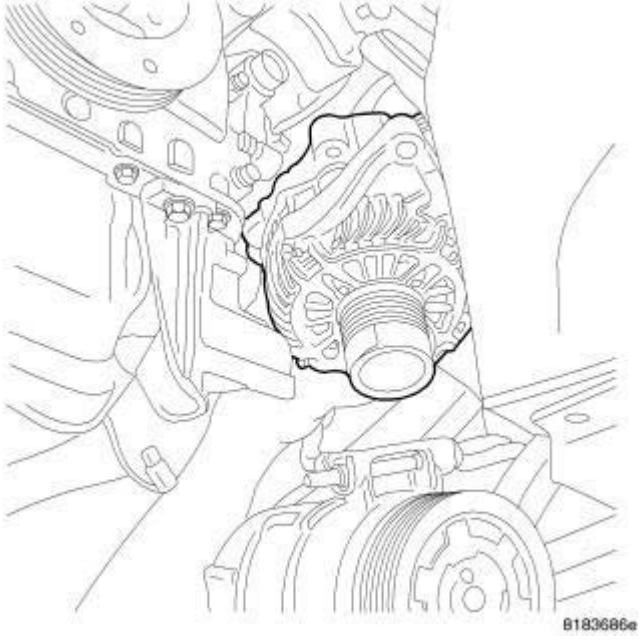

Fig. 26: Removing/Installing Generator

Courtesy of CHRYSLER LLC

1. Position generator in order to move past the A/C compressor and up toward generator mounting bracket.

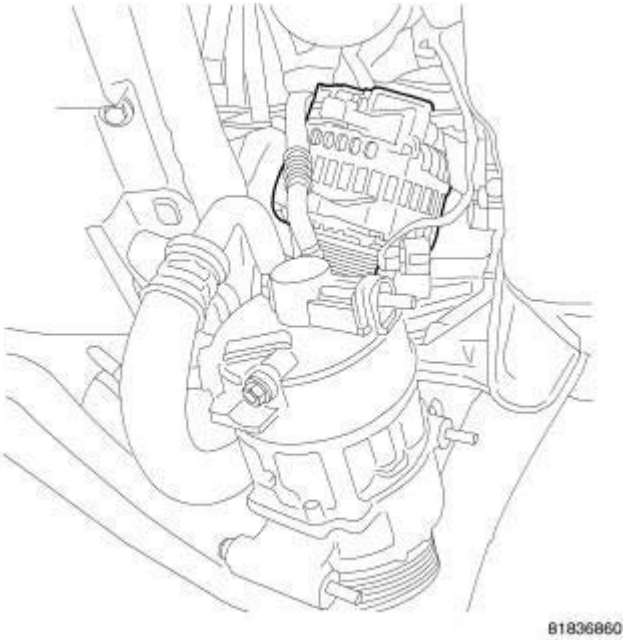

Fig. 27: Identifying Generator Pulley
Courtesy of CHRYSLER LLC

2. Continue moving generator up towards generator mounting bracket.

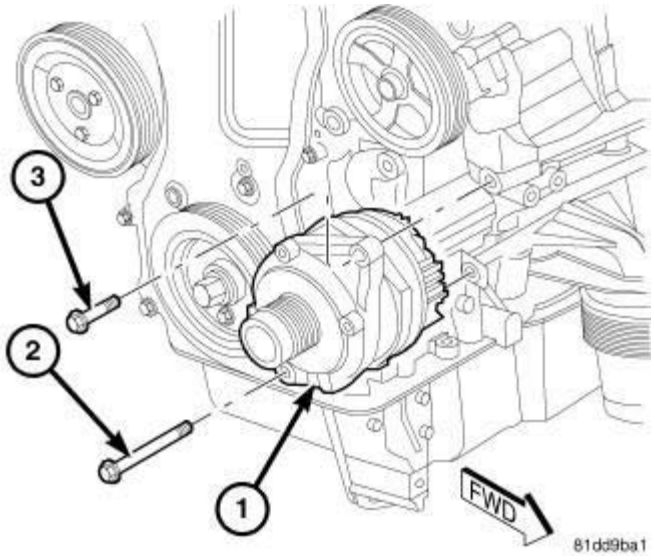

Fig. 28: Removing/Installing Generator
Courtesy of CHRYSLER LLC

3. Install generator (1) to engine mounting bracket.

4. Install lower mounting bolt (2) and upper mounting bolt (3) to generator (1). Tighten bolts to 61 N.m (45 ft. lbs.).

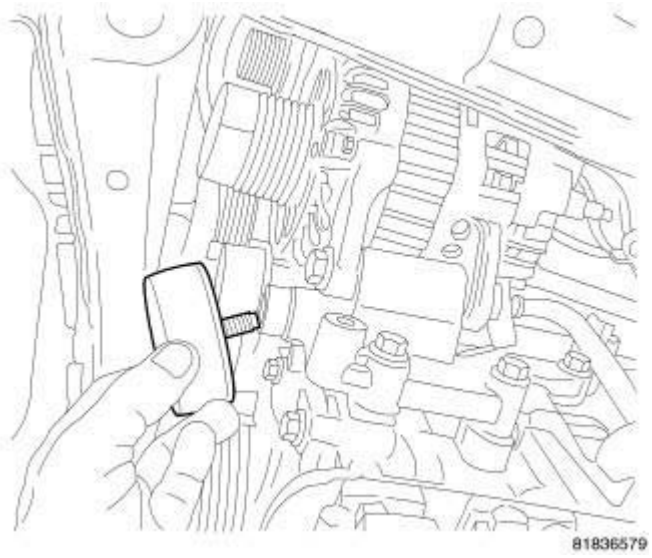

Fig. 29: Removing/Installing Idler Pulley
Courtesy of CHRYSLER LLC

5. Install lower idler pulley and bolt. Tighten bolt to 50 N.m (37 ft. lbs.).

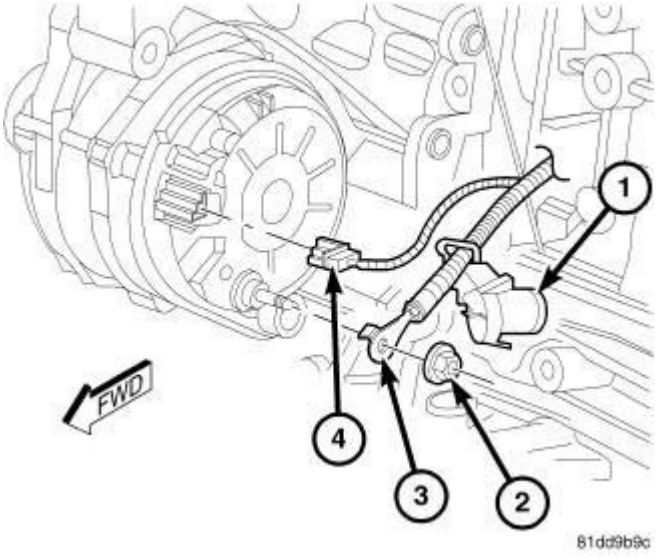

Fig. 30: 2.4L Generator Electrical Connector
Courtesy of CHRYSLER LLC

6. Connect field wire connector (4) into generator.
7. Install B+ terminal (3) and nut (2) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
8. Snap plastic protective cover (1) to B+ terminal.

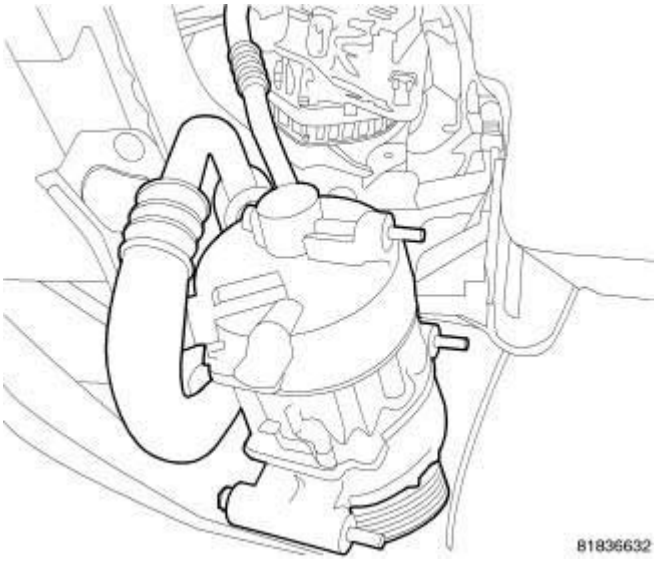

Fig. 31: Identifying A/C Compressor
Courtesy of CHRYSLER LLC

9. Install A/C compressor. Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to BELT, SERPENTINE .

10. Install drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

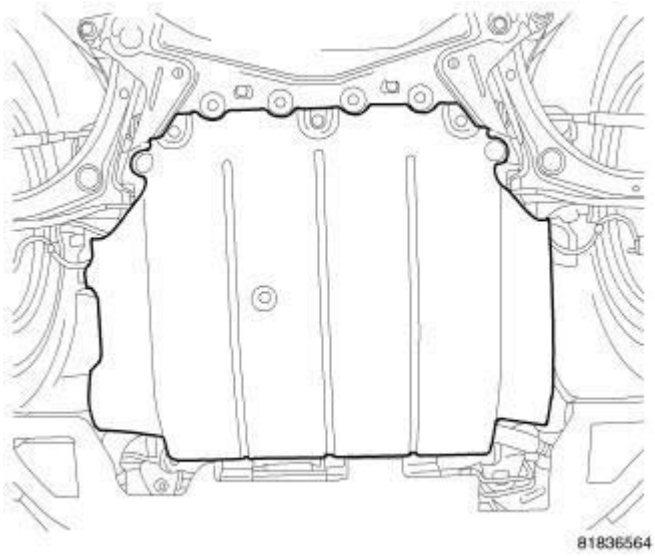

Fig. 32: Removing/Installing Underbody Air Dam
Courtesy of CHRYSLER LLC

11. Install right front wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
12. Install underbody air dam.
13. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

2.7L

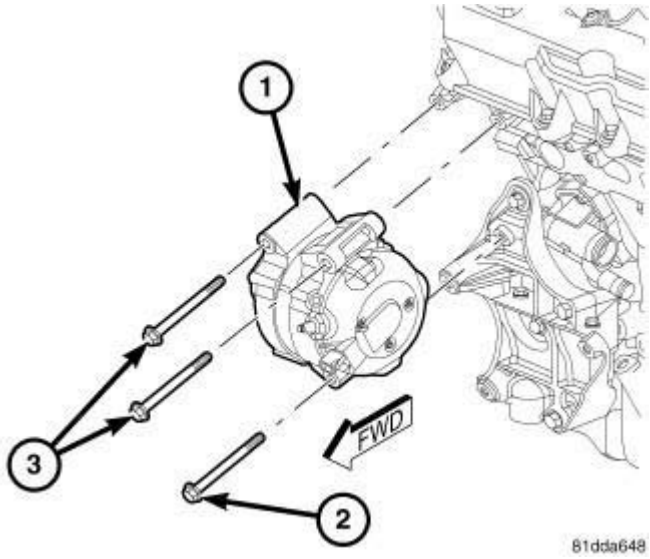

Fig. 33: 2.7L Removing/Installing Generator
Courtesy of CHRYSLER LLC

1. Install generator (1) to engine mounting bracket.
2. Install lower mounting bolt (2) and upper mounting bolt (3) to generator (1). Tighten bolts to 27 N.m (20 ft. lbs.).

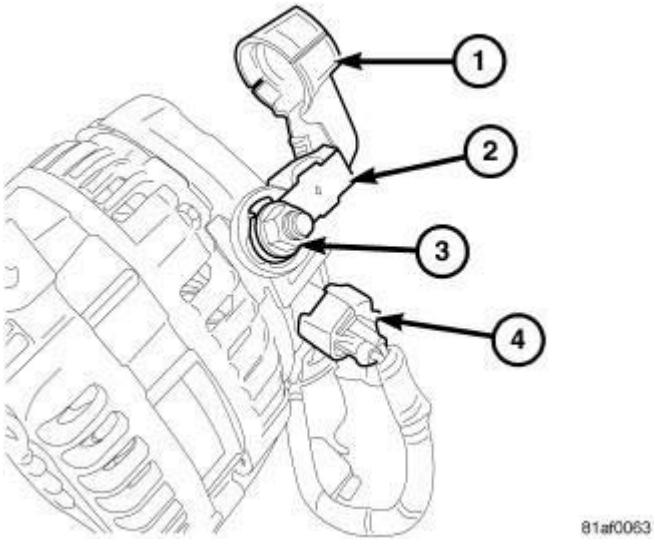

Fig. 34: Alternator Electrical Connection
Courtesy of CHRYSLER LLC

3. Connect field wire connector (4) into generator.
4. Install B+ terminal (3) and nut (2) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
5. Snap plastic protective cover (1) to B+ terminal.

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt MUST be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to BELT, SERPENTINE .

6. Install drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
7. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

3.5L

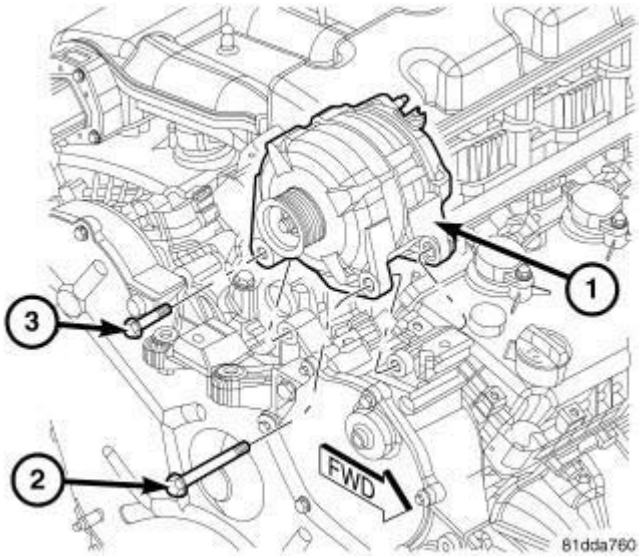

Fig. 35: 3.5L Removing/Installing Generator
Courtesy of CHRYSLER LLC

1. Install generator (1) to engine mounting bracket.
2. Install long mounting bolt (2) and short mounting bolt (3) to generator (1). Tighten bolts to 42 N.m (31 ft. lbs.).

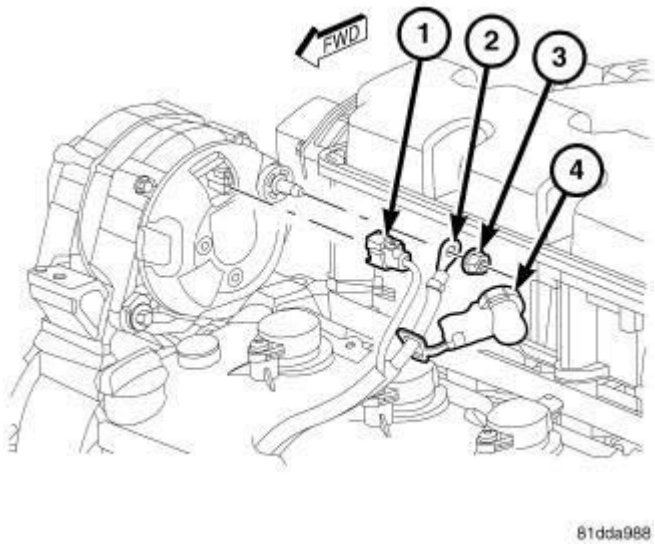

Fig. 36: 3.5L Generator Electrical Connector
Courtesy of CHRYSLER LLC

3. Connect field wire connector (1) into generator.
4. Install B+ terminal (2) and nut (3) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
5. Snap plastic protective cover (4) to B+ terminal.
6. Install drive belt. Refer to **BELT, SERPENTINE** for belt routing, belt adjustment and bolt tightening procedures.

7. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

2009 ENGINE

Cooling - Journey

DESCRIPTION

DESCRIPTION

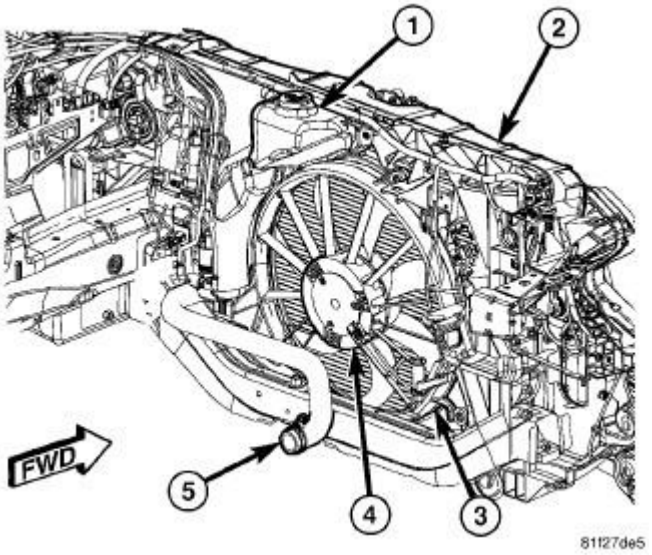

Fig. 1: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

1 - WINDSHIELD WASHER RESERVOIR 2 - UPPER SUPPORT
3 - FAN SHROUD
4 - FAN MOTOR
5 - LOWER RADIATOR HOSE

The cooling system consists of an engine cooling module, thermostat, non-pressure coolant recovery container on the 2.4L engine, or pressurized coolant recovery container on the 2.7L, 3.5L, and 2.0L Diesel engines, coolant, hoses, and a water pump to circulate the coolant. The engine cooling module consists of a radiator, electric fan, shroud, transmission oil cooler, and air conditioning condenser.

OPERATION

GAS ENGINE

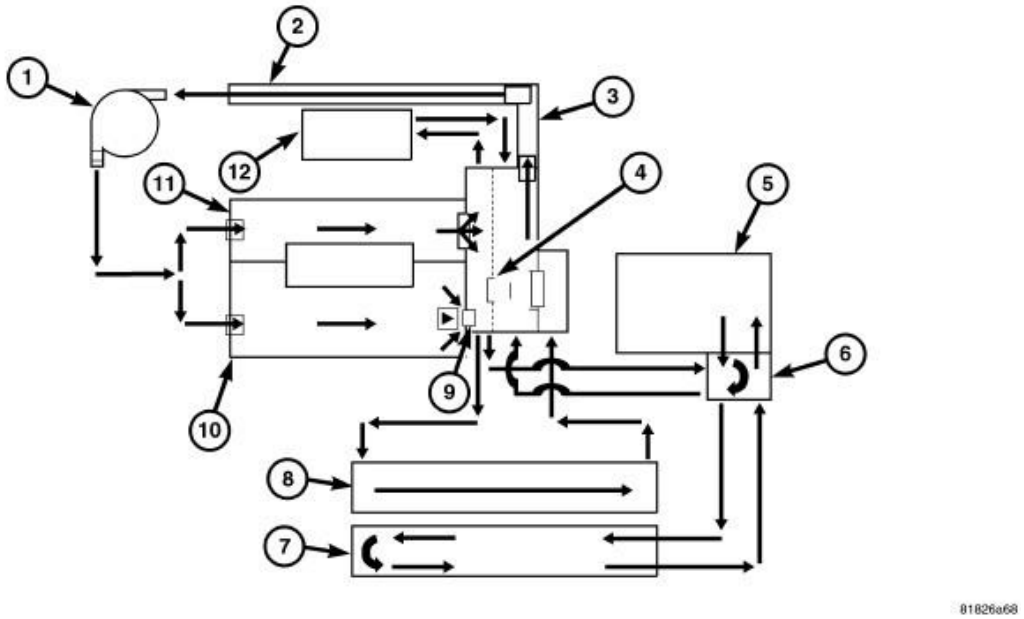

Fig. 2: COOLING SYSTEM FLOW - 2.4L
Courtesy of CHRYSLER LLC

1 - WATER PUMP	7 - COMBINATION COOLER
2 - RETURN TUBE	8 - RADIATOR
3 - WATER PLENUM	9 - SECONDARY THERMOSTAT
4 - PRIMARY THERMOSTAT	10 - CYLINDER BLOCK
5 - TRANSMISSION	11 - CYLINDER HEAD
6 - INTERNAL TRANSMISSION COOLER	12 - HEATER CORE

The primary purpose of a cooling system is to maintain engine temperature in a range that will provide satisfactory engine performance and emission levels under all expected driving conditions.

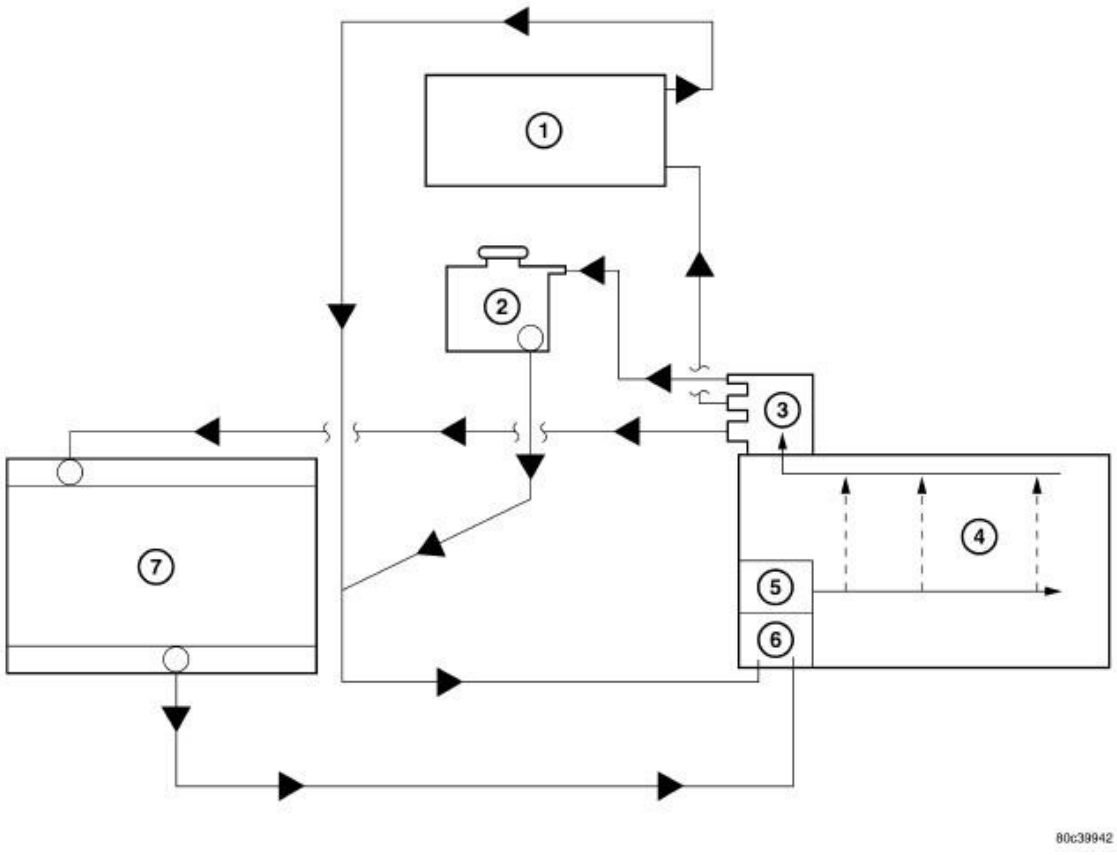

Fig. 3: Cooling System Operation - 2.7L
Courtesy of CHRYSLER LLC

1 - HEATER CORE
2 - COOLANT PRESSURE CONTAINER
3 - COOLANT OUTLET CONNECTOR
4 - ENGINE
5 - WATER PUMP
6 - THERMOSTAT
7 - RADIATOR

The cooling system also provides hot water (coolant) for heater performance.

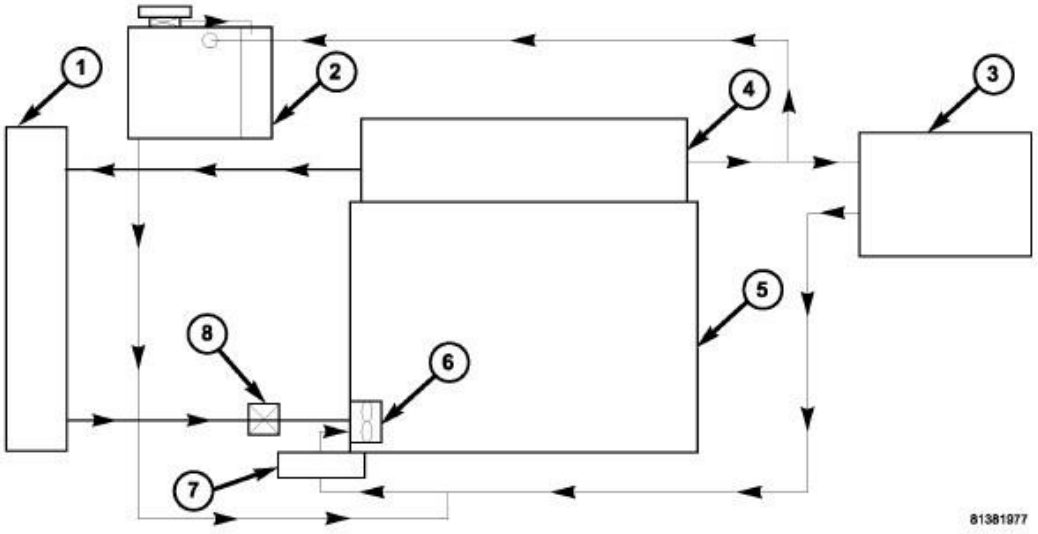

Fig. 4: COOLING FLOW - 3.5L W/ENGINE OIL COOLER ENGINE
Courtesy of CHRYSLER LLC

1 - RADIATOR
2 - HOT BOTTLE/COOLANT RECOVERY BOTTLE
3 - HEATER CORE
4 - CYLINDER HEAD
5 - CYLINDER BLOCK
6 - WATER PUMP
7 - ENGINE OIL COOLER
8 - THERMOSTAT

DIESEL ENGINE

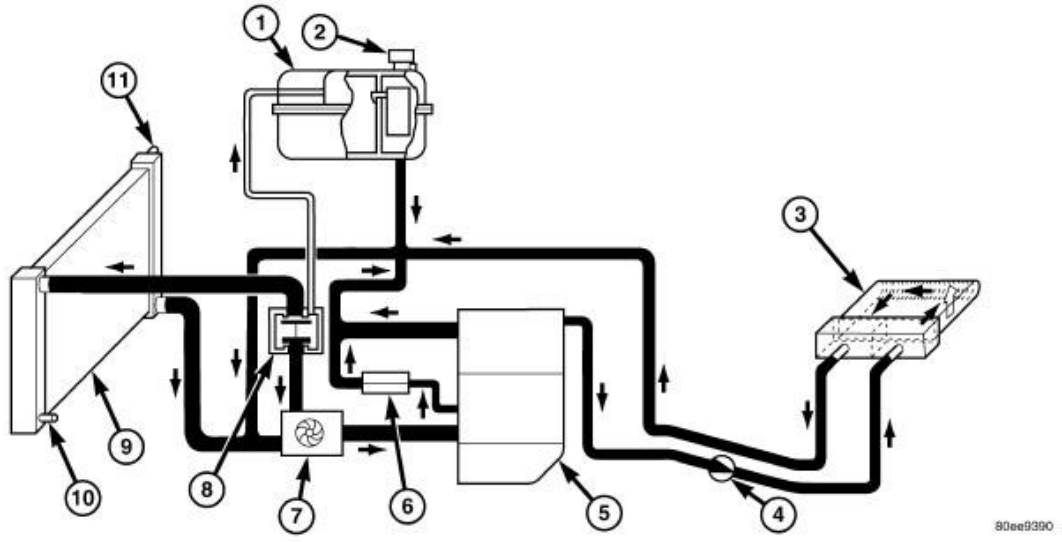

Fig. 5: COOLING SYSTEM FLOW

Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY PRESSURE CONTAINER	7 - WATER PUMP
2 - PRESSURE CAP	8 - THERMOSTAT HOUSING
3 - HEATER CORE	9 - RADIATOR
4 - AUXILIARY HEATER	10 - COOLANT DRAIN VALVE
5 - ENGINE	11 - SERVICE FILL VENT VALVE
6 - OIL COOLER	

The water pump draws coolant from the radiator and delivers it to the engine block. The coolant travels through the engine block into the cylinder head. Coolant exits the engine at the thermostat. If the coolant temperature is less than 87°C (189°F) the thermostat directs all of the coolant back to the water pump. If the coolant temperature is between 87°C (189°F) and 102°C (216°F) the thermostat is in the mix mode and directs the coolant to the radiator and the water pump. If the coolant is greater than 102°C (216°F), the thermostat directs all of the coolant to the radiator.

The thermostat also feeds excess coolant and bleeds air from the system through a hose leading to the coolant reservoir. The reservoir returns coolant to the inlet side of the water pump. A port and hose at the rear of the engine block provides coolant to the heater core. This coolant is returned to the engine at the intake side of the water pump.

The oil cooler receives coolant directly from the engine block. A hose returns this coolant to the inlet side of the water pump.

DIAGNOSIS AND TESTING

PRELIMINARY CHECKS

ENGINE COOLING SYSTEM OVERHEATING

Establish what driving conditions caused the complaint. Abnormal loads on the cooling system such as the following may be the cause:

- Prolonged idle
- Very high ambient temperature
- Slight tail wind at idle
- Slow traffic
- Traffic jams
- High speed or steep grades

Driving techniques that avoid overheating are:

- Idle with A/C off when temperature gauge is at end of normal range.

TRAILER TOWING:

Consult Trailer Towing information of owner's manual. Do not exceed limits.

RECENT SERVICE OR ACCIDENT REPAIR:

Determine if any recent service has been performed on vehicle that may affect the cooling system. This may be:

- Engine adjustments (incorrect timing)
- Slipping engine accessory drive belt(s)
- Brakes (possibly dragging)
- Changed parts. Incorrect water pump or pump rotating in wrong direction due to belt not correctly routed
- Reconditioned radiator or cooling system refilling (possibly under filled or air trapped in system).

NOTE: If investigation reveals none of the previous items as a cause for an engine overheating complaint, refer to COOLING SYSTEM DIAGNOSIS CHART

These charts are to be used as a quick-reference only.

COOLING SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
TEMPERATURE GAUGE READS LOW	1. Diagnostic Trouble Code (DTC) set indicating a stuck open engine thermostat.	1. (Refer to **THERMOSTAT**) Replace thermostat, if necessary. If a (DTC) has not been set, the problem may be with the temperature gauge.
	2. Problem with Engine Coolant Temperature (ECT) sensor or circuit.	2. Refer to **SENSOR, Coolant Temperature** for checking the ECT sensor
	3. Problem with temperature gauge.	3. Check Gauge operation. (Refer to Appropriate Service Information)
	4. Coolant level low during cold ambient temperature, accompanied by poor heater performance.	4. Check coolant level. Inspect the system for leaks. See **Diagnosis and Testing**. Repair as necessary.
TEMPERATURE GAUGE READS HIGH OR ENGINE COOLANT WARNING LAMP ILLUMINATES. COOLANT MAY OR MAY NOT BE LOST FROM SYSTEM.	1. Trailer being towed, a steep hill being climbed, vehicle being operated in slow moving traffic, or engine idling during high ambient (outside) temperatures with air conditioning on. High altitudes could cause these conditions.	1. This may be a temporary condition and repair is not necessary. Turn off the air conditioning and drive the vehicle without any of the previous conditions. Observe the temperature gauge. The gauge should return to the normal range. If the gauge does not return to the

		normal range, determine the cause of the overheating and repair. Refer to POSSIBLE CAUSES in this service information .
-	2. Is temperature gauge (if equipped) reading correctly?	2. Check the gauge. (Refer to the Appropriate Diagnostic Information) Repair as necessary.
-	3. Is temperature warning lamp (if equipped) illuminating unnecessarily?	3. Check warning lamp operation. (Refer to the Appropriate Diagnostic Information) Repair as necessary.
-	4. Low coolant level.	4. Check for coolant leaks. See **Diagnosis and Testing** . Repair as necessary.
-	5. Pressure cap not installed tightly. If cap is loose, boiling point of coolant will be lowered. Also refer to the following step 6.	5. Tighten pressure cap.
-	6. Poor seals at pressure cap.	6. (a) Check condition of cap and cap seals. See **Inspection** Replace cap if necessary.
-		(b) Check condition of filler neck. If neck is damaged, replace as necessary.
-	7. Wrong pressure cap installed.	7. Vehicles equipped with 2.4L engines use different pressure caps than vehicles equipped with 2.7L/3.5L/2.0L Diesel engines. Verify proper pressure cap part number.
-	8. 2.4L Vehicles: Coolant level low in radiator, but not in coolant recovery container. This indicates the radiator is not drawing coolant from the coolant recovery container as the engine cools. As the engine cools, a vacuum is formed inside the cooling system. If the radiator cap seals are defective, or the cooling system has a leak, a vacuum cannot be formed.	8. (a) Check condition of pressure cap and seals. Replace cap if necessary.
-		(b) Check condition of filler neck. Replace if damaged.
-		(c) Check condition of hose from filler neck to coolant container. It should be tight at both ends without any kinks or tears. Replace hose as necessary.
-		(d) Check coolant recovery container and hose for blockage. Repair as necessary.
-	9. Freeze point of coolant not correct. Mixture ratio may be too rich.	9. Check coolant concentration. See **Diagnosis and Testing** Adjust glycol-to-water ratio as required.

-	10. Coolant not flowing through system.	10. (a) 2.4L Vehicles: Check for coolant flow at filler neck with some coolant removed, engine warm, and thermostat open. Coolant should be observed flowing through filler neck. If flow is not observed, determine reason for lack of flow and repair as necessary. (b) 2.7L/3.5L/2.0L Diesel Vehicles: Engine coolant motion should be observable in coolant pressure container when revving the engine while running.
-	11. Radiator or A/C condenser fins are dirty or clogged.	11. Clean obstruction from fins.
-	12. Radiator core is plugged or corroded.	12. Clean or replace radiator as necessary.
-	13. Fuel or ignition system problems.	13. (Refer to **IGNITION CONTROL - SERVICE INFORMATION**)
-	14. Dragging Brakes.	14. Inspect brake system and repair as necessary.
-	15. Bug screen or other aftermarket accessory is being used causing reduced air flow.	15. Remove bug screen or accessory.
-	16. Thermostat partially or completely closed.	16. Check thermostat operation and replace as necessary. See **Diagnosis and Testing**
-	17. Electric radiator fan not operating properly.	17. Check electric fan operation and repair as necessary.
-	18. Cylinder head gasket leaking.	18. Check cylinder head gasket for leaks. Refer to **Engine/Cylinder Head - Diagnosis and Testing**
-	19. Heater core leaking.	19. Check heater core for leaks. Repair as necessary.
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC)	1. The gauge may cycle up and down. This is due to the cycling of the electric radiator fan and/or changing vehicle operating conditions.	1. A normal condition. No correction is necessary. If gauge cycling is going into the hot zone, check electric fan operation and repair as necessary.
	2. During cold weather operation with the heater blower in the high position, the gauge reading may drop slightly.	2. A normal condition. No correction is necessary.
	3. Temperature gauge or engine	3. Check operation of gauge and

	coolant temperature sensor is defective or shorted.	repair as necessary. (Refer to the Appropriate Diagnostic Information)
	4. Gauge reading rises when vehicle is brought to a stop after heavy use (engine still running).	4. A normal condition. No correction is necessary. The gauge should return to normal range after vehicle is driven.
	5. Gauge reading high after restarting a warmed-up (hot) engine.	5. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation.
	6. Coolant level low (air will build up in the cooling system causing the thermostat to open late).	6. Check cooling system for leaks. See **Diagnosis and Testing** . Repair as necessary.
	7. Cylinder head gasket leaking allowing exhaust gas to enter cooling system. This will cause thermostat to open late.	7. (a) Check for cylinder head gasket leaks. Repair as necessary. Refer to **Engine/Cylinder Head - Diagnosis and Testing** (b) Check for coolant in the engine oil. Inspect for white steam emitting from exhaust system. Repair as necessary.
	8. Water pump impeller or pulley loose on shaft.	8. Check water pump and replace as necessary.
	9. Air leak on the suction side of water pump allows air to build up in cooling system. This will cause the thermostat to open late.	9. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT FLOWING INTO RECOVERY CONTAINER. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL, BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN RECOVERY CONTAINER.	1. Pressure relief valve in pressure cap defective or wrong pressure cap installed.	1. Verify proper pressure cap part number. Check condition of pressure cap and seals. Replace as necessary. See **Diagnosis and Testing**
	2. Cooling system over filled.	2. Drain cooling system to proper level.
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE IS READING HIGH OR HOT.	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. See **Diagnosis and Testing**
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM). GAUGE	1. Engine overheating.	1. Check reason for overheating and repair as necessary.
	2. Freeze point of coolant not	2. Check the freeze point of the

MAY OR MAY NOT BE READING HIGH.	correct. 3. Coolant level low.	coolant. See **Diagnosis and Testing** . 3. Fill cooling system to proper level.
HOSE OR HOSES COLLAPSE WHEN ENGINE IS COOLING	1. Vacuum created in cooling system on engine cool-down is not being relieved through coolant recovery container system.	1. (a) Radiator pressure cap relief valve stuck. See **Diagnosis and Testing** Replace as necessary. (b) Hose between coolant recovery container and radiator is kinked. Repair as necessary. (c) Vent at coolant recovery container is plugged. Clean vent and repair as necessary. (d) Coolant recovery container is internally blocked or plugged. Check for blockage and repair as necessary.
ELECTRIC RADIATOR FAN OPERATES ALL THE TIME.	1. Fan relay, Powertrain Control Module (PCM) or engine coolant temperature sensor defective. 2. Check for low coolant level.	1. (Refer to the Appropriate Diagnostic Information) Repair as necessary. 2. See **Standard Procedure** Repair as necessary.
	3. Defective transmission temperature sensor.	3. Check for transmission related diagnostic trouble codes. Refer to 41TE Transmission Diagnostics.
	4. Defective A/C pressure transducer.	4. Refer to appropriate Powertrain Diagnostic Service Information for any related trouble codes.
ELECTRIC RADIATOR FAN WILL NOT OPERATE. GAUGE READING HIGH OR HOT	1. Radiator fan motor defective. 2. Radiator fan relay, Powertrain Control Module (PCM) or engine coolant temperature sensor defective. 3. Blown fuse in Power Distribution Center (PDC).	1. Refer to the Appropriate Diagnostic Information. Repair as necessary. 2. Refer to the Appropriate Diagnostic Information. Repair as necessary. 3. Determine reason for blown fuse and repair as necessary.
NOISY FAN	1. Radiator fan blade loose. 2. Radiator fan blade striking a surrounding object. 3. Air obstructions at radiator or A/C condenser. 4. Radiator fan motor defective.	1. Replace fan assembly. 2. Locate point of fan blade contact and repair as necessary. 3. Remove obstructions and/or clean debris from radiator and/or A/C condenser. 4. Replace as necessary. See **Removal** .

INADEQUATE AIR CONDITIONER PERFORMANCE (COOLING SYSTEM SUSPECTED)	1. Radiator and/or air conditioning condenser is restricted, obstructed or dirty. 2. Electric radiator fan not operating when A/C is on. 3. Engine is overheating (heat may be transferred from radiator to A/C condenser). High under hood temperature due to engine overheating may also transfer heat to A/C components.	1. Remove restriction and/or clean as necessary. 2. Refer to the Appropriate Diagnostic Information. Repair as necessary. 3. Correct overheating condition.
INADEQUATE HEATER PERFORMANCE.	1. Has a Diagnostic Trouble Code (DTC) been set? 2. Coolant level low. 3. Obstructions in heater hose fittings at engine. 4. Heater hose kinked. 5. Water pump is not pumping coolant to heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch.	1. Refer to the Appropriate Diagnostic Information. 2. Repair as necessary. 3. Remove heater hoses at both ends and check for obstructions. Repair as necessary. 4. Locate kinked area and repair as necessary. 5. Repair as necessary.
HEAT ODOR	1. Various heat shields are used at certain driveline components. One or more of these shields may be missing. 2. Is temperature gauge reading above the normal range? 3. Radiator fan operating incorrectly. 4. Has undercoating been applied to any unnecessary component? 5. Engine may be running rich causing the catalytic converter to overheat.	1. Locate missing shields and replace or repair as necessary. 2. Refer to the previous TEMPERATURE GAUGE READS HIGH . Repair as necessary. 3. See **Diagnosis and Testing** Repair as necessary. 4. Clean undercoating as necessary. 5. Refer to the Appropriate Diagnostic Information. Repair as necessary.
POOR DRIVEABILITY (THERMOSTAT POSSIBLY STUCK OPEN). GAUGE MAY BE READING LOW	1. For proper driveability, good vehicle emissions and for preventing build-up of engine oil sludge, the thermostat must be operating properly. Has a Diagnostic Trouble Code (DTC)	1. Refer to the Appropriate Diagnostic Information. Replace thermostat if necessary.

	been set?	
STEAM IS COMING FROM FRONT OF VEHICLE NEAR GRILL AREA WHEN WEATHER IS WET, ENGINE IS WARMED UP, RUNNING, AND VEHICLE IS STATIONARY. TEMPERATURE GAUGE IS IN NORMAL RANGE.	1. During wet weather, moisture (snow, ice or rain condensation) on the radiator will evaporate when the thermostat opens. This opening allows heated water into the radiator. When the moisture contact the hot radiator, steam may be emitted. This usually occurs in cold weather with no fan or airflow to blow it away.	1. Occasional steam emitting from this area is normal. No repair is necessary.
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. Check the freeze point of the coolant. See **Diagnosis and Testing** .
COOLANT LEVEL CHANGES IN COOLANT RECOVERY CONTAINER	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. If the level in the container was between the MIN and MAX marks when the engine was cold, the level should return to within that range after operation at elevated temperatures.	1. A normal condition. No repair is necessary.

FLOW CHECK

To determine whether coolant is flowing through the cooling system, use one of the following procedures:

PREFERRED METHOD

WARNING: Do not remove the cooling system pressure cap or any hose with the system hot and under pressure because serious burns from coolant can occur.

- **2.4L:** Remove pressure cap when engine is cold. Remove small amount of coolant. Idle engine until thermostat opens. You should observe coolant flow while looking down the filler neck. Once flow is detected install the pressure cap. Replace removed coolant into coolant recovery container.
- **2.7L/3.5L/2.0L Diesel:** Start engine, coolant flow should be observable in coolant pressure container when revving the engine.

ALTERNATIVE METHOD

- If engine is cold, idle engine until normal operating temperature is reached. Feel the upper radiator hose.

If it is hot, coolant is circulating.

LEAK TESTING

WARNING: If vehicle has been run recently, wait 15 minutes before removing pressure cap. Place a shop towel over the cap, and without pushing down, rotate it counterclockwise to the first stop. Allow fluids to escape through the overflow tube. When the system stops pushing coolant and steam into the coolant recovery bottle and pressure drops, push down on the cap and remove it completely. Squeezing the radiator inlet hose with a shop towel (to check pressure) before and after turning to the first stop is recommended.

Coolant level should be full. Add coolant if necessary. With engine not running, remove pressure cap and wipe the coolant filler neck sealing seat clean.

Attach a cooling system pressure tester Tool 7700 (or equivalent) to the coolant filler neck, apply 104 kPa (15 psi) pressure. If the pressure drops more than 13.7 kPa (2 psi) in 2 minutes inspect all points for external leaks.

All hoses, radiator and heater, should be moved while at 104 kPa (15 psi) since some leaks occur while driving due to engine rock, etc.

If there are no external leaks after the gauge dial shows a drop in pressure, detach the tester. Start engine and run the engine to normal operating temperature in order to open the thermostat and allow the coolant to expand. Reattach the tester. If the needle on the dial fluctuates, it indicates a combustion leak and is usually a head gasket leak.

WARNING: With tool in place pressure builds up fast. Any excessive amount of pressure built up by continuous engine operation must be released to a safe pressure point. never permit pressure to exceed 138 kPa (20 psi).

If the needle on the dial does not fluctuate, race the engine a few times. If an abnormal amount of coolant or steam is emitted from the tailpipe, it may indicate a faulty head gasket, cracked engine block or cylinder head.

There may be internal leaks which can be determined by removing the oil dipstick. If water globules appear intermixed with the oil, it will indicate a internal leak in the engine. If there is an internal leak, the engine must be disassembled for repair.

AERATION

Low coolant level in a cross flow radiator will equalize in both tanks with engine off. With engine at running and at operating temperature, the high pressure inlet tank runs full and the low pressure outlet tank drops, resulting in cooling system aeration. Aeration will draw air into the water pump resulting in the following:

- High reading shown on the temperature gauge.
- Loss of coolant flow through the heater core.

- Corrosion in the cooling system.
- Water pump seal may run dry, increasing the risk of premature seal failure.
- Combustion gas leaks into the coolant can also cause the above problems.

DEAERATION

2.4L

Removal of air from the engine cooling system only occurs when the engine is first warming up. Air in the cooling system will collect under the cooling system pressure cap while the engine is run and will be pushed into the coolant recovery container. When the engine cools down, coolant will be drawn from the coolant recovery container back into the active cooling system. Once the thermostat opens, deaeration no longer occurs. Multiple warm up and cool down cycles may be required to remove all the air in the cooling system. If the system is very low on coolant, deaeration will not occur. Following the proper cooling system fill procedure is essential for proper operation. This system will not function if the wrong cooling system pressure cap is installed. Ensure proper cooling system pressure cap is used. Verify proper pressure cap part number.

2.7L/3.5L/2.0L DIESEL

This engine has a pressure system to remove air from the engine cooling system. Removal of air from the engine cooling system occurs continuously when the engine is run at speeds above idle. Thirty minutes of normal driving after a properly completed service fill will deaerate the engine cooling system. This system will not function if the wrong cooling system pressure cap is installed. Ensure proper cooling system pressure cap is used. Verify proper pressure cap part number.

STANDARD PROCEDURE

DRAINING

When servicing the cooling system, it is essential that coolant does not drip onto the accessory drive belts and/or pulleys. Shield the belts with shop towels before working on the cooling system. If coolant contacts the belts or pulleys, flush both with clean water.

> **WARNING: Make sure engine cooling system is cool before servicing. Do not remove any clamps or hoses , pressure cap, or open the radiator draincock. When the system is hot and under pressure serious burns from coolant can occur.**

1. Position a clean collecting container under draincock location.
2. Open radiator draincock located at the lower right side of radiator. Turn draincock counterclockwise until it stops.
3. Remove coolant pressure cap.
4. Raise vehicle on hoist.
5. **2.7L/3.5L:** Remove heater hose at heater tube located at the right front inner frame rail and direct coolant flow into container.

FILLING

NOTE: Make sure all hoses are connected and radiator draincock is closed. Draincock should be hand tightened only.

2.4L

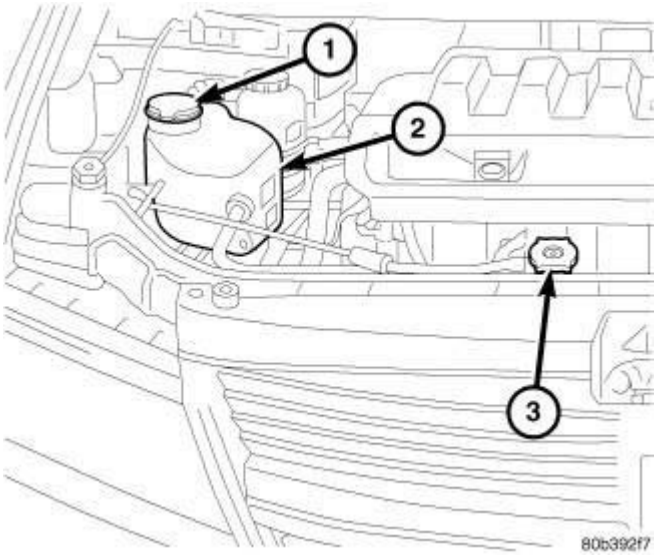

Fig. 6: Cooling System Filling - 2.4L
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER
2 - FILL LINE
3 - RADAITOR PRESSURE CAP

1. Close radiator draincock by turning clockwise.
2. Remove cooling system pressure cap and fill cooling system with recommended coolant mixture. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .
3. Fill coolant to the top of pressure cap neck.
4. Install cooling system pressure cap.
5. Fill coolant recovery container to the MAX mark.
6. Start engine and allow to run until thermostat opens and radiator fans cycle.

NOTE: It may be necessary to add additional coolant to the coolant recovery container after three or four warm-up/cool down cycles to maintain coolant level between the MIN and MAX marks; as additional trapped air is removed from the system.

2.7L/3.5L/2.0L

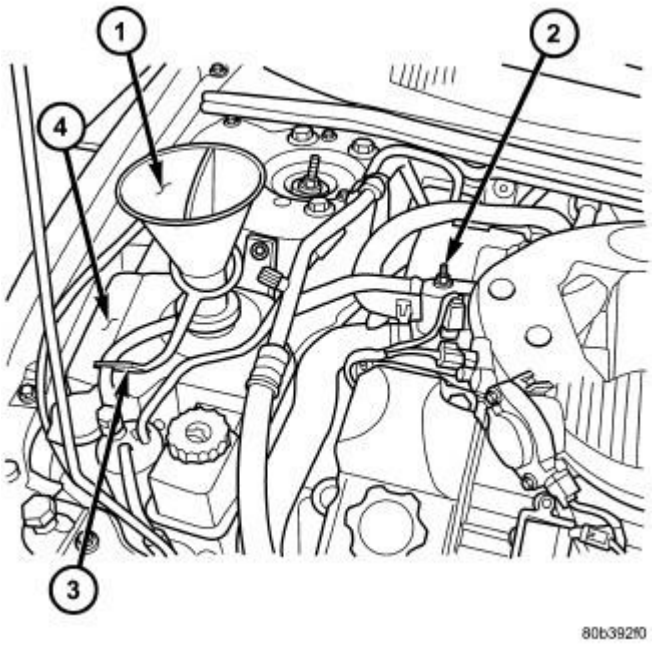

Fig. 7: Cooling System Filling - 2.7L
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL 8195
2 - COOLING SYSTEM BLEED VALVE
3 - PINCH OVERFLOW HOSE
4 - COOLANT PRESSURE CONTAINER

NOTE: Draincock should be hand tightened only.

1. Close radiator draincock by turning clockwise.

NOTE: It is imperative that the cooling system air bleed valve be opened before any coolant is added to the cooling system. Failure to open the bleed valve first will result in an incomplete fill of the system.

2. Open cooling system bleed valve.
3. Attach a 6.35 mm (0.250 in.) inside diameter clear hose that is 120.0 cm (48 in.) long to the bleed valve. Route the hose away from accessory drive belts and radiator fan. Position the other end of hose into a clean collecting container. The hose will prevent coolant from contacting accessory drive belts and other components.
4. Remove cooling system pressure cap. Attach Filling Aid Funnel 8195, to coolant pressure container filler neck.
5. Use the supplied clip to pinch overflow hose that connects between the two chambers of the pressure container.

6. Pour coolant into the larger section of Filling Aid Funnel (the smaller section of funnel is to allow air to escape).
7. Slowly continue filling until a steady stream of coolant flows from attached hose on bleed valve.
8. Close bleed valve and continue filling system to top of Filling Aid Funnel. DO NOT overtighten. Tighten to 12.4 N.m (110 lbs. in.).
9. Remove clip from overflow hose.
10. Allow coolant in Filling Aid Funnel to drain into overflow chamber of pressure container.
11. Remove Filling Aid Funnel 8195 and install pressure cap on pressure container.
12. Remove hose from bleed valve.
13. Start engine and allow to run until thermostat opens and radiator fans cycle.

NOTE: The engine cooling system will push any remaining air into the pressure container within about one half hour of normal driving. As a result, a drop in coolant level in the pressure container may occur.

If the engine cooling system overheats and pushes coolant into the overflow chamber of the pressure container, this coolant will be sucked back into the cooling system ONLY IF THE PRESSURE CAP IS LEFT ON THE PRESSURE CONTAINER. Removing the pressure cap breaks the vacuum path between the two chambers of the pressure container and the coolant will not return to the cooling system.

14. Shut off engine and allow it to cool down. This permits coolant to be drawn into the pressure chamber.
15. With engine COLD, observe coolant level in pressure chamber. Coolant level should be within MIN and MAX marks. Adjust coolant level as necessary.

LEVEL CHECK

NOTE: Do not remove pressure cap for routine coolant level inspections.

The coolant bottle provides a quick visual method for determining the coolant level without removing the pressure cap. **With the engine cold and not running** , simply observe the level of the coolant in the coolant recovery container. The level should be between the MIN and MAX marks.

ADDING ADDITIONAL COOLANT

NOTE: 2.4L - The pressure cap should only be removed if the coolant recovery container is empty.

When additional coolant is needed, it should be added to the coolant recovery container, 2.4L, pressurized coolant recovery container, 2.7L, 3.5L, and 2.0L Diesel.

Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** for the proper type of coolant.

REVERSE FLUSHING

REVERSE FLUSHING DESCRIPTION

Reverse flushing of the cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

REVERSE FLUSHING RADIATOR

Disconnect the radiator hoses from the radiator inlet and outlet. Attach a section of the radiator hose to the radiator bottom outlet fitting and insert the flushing gun. Connect a water supply hose and air supply hose to the flushing gun.

CAUTION: Internal radiator pressure must not exceed 138 kPa (20 psi) as damage to radiator may result.

Allow the radiator to fill with water. When the radiator is filled, apply air in short blasts. Allow the radiator to refill between blasts. Continue this reverse flushing until clean water flows out through the rear of the radiator cooling tube passages.

REVERSE FLUSHING SYSTEM

Drain the cooling system. Remove the thermostat housing and thermostat. Install the thermostat housing. Disconnect the radiator upper hose from the radiator and attach the flushing gun to the hose. Disconnect the radiator lower hose from the water pump and attach a lead-away hose to the water pump inlet fitting.

Connect the water supply hose and air supply hose to flushing gun. Allow the engine to fill with water. When the engine is filled, apply air in short blasts, allowing the system to fill between air blasts. Continue until clean water flows through the lead away hose.

Remove the lead away hose, flushing gun, water supply hose and air supply hose. Remove the thermostat housing and install the thermostat. Install the thermostat housing with a replacement gasket. Refer to **THERMOSTAT** for replacement. Connect the radiator hoses. Refill the cooling system with the correct antifreeze/water mixture. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** . Refer to **FILLING** .

CHEMICAL CLEANING

In some instances, use a radiator cleaner (Mopar® Radiator Kleen or equivalent) before flushing. This will soften scale and other deposits and aid flushing operation.

CAUTION: Follow manufacturers instructions when using these products.

CLEANING

CLEANING

Drain cooling system and refill with clean water. Refer to drain and fill procedures in this service information . Run engine with radiator cap installed until upper radiator hose is hot. Stop engine and drain water from system. If water is dirty; fill, run, and drain system again, until water runs clear. Refill cooling system with a 50/50 mixture of the recommended ethylene-glycol and distilled water. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

INSPECTION

INSPECTION

After performing a cleaning/flush procedure, inspect all hoses, clamps and connections for deterioration and leaks. Inspect radiator and heater core for leaks.

SPECIFICATIONS

FILL VOLUMES

FILL VOLUMES

DESCRIPTION	SPECIFICATION	
-	Metric	US
2.4L Engine	7.3L	7.7 qts
2.7L Engine	9.3L	9.8 qts.
3.5L Engine	11L	11.6 qts
2.0L Diesel*	7.3L	7.7 qts
* All Diesel Engines use Glysantin G 30-91 coolant		

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fasteners-Accessory Drive Belt Tensioner Bracket (2.0L Diesel)	30	22	-
Fastener-Accessory Drive Belt Tensioner Assembly(2.4L)	54	40	-
Fasteners-Accessory Drive Belt Tensioner Bracket (2.7L)	28	21	-
Fastener-Accessory Drive Belt Tensioner (2.4L)	24	18	-
Fastener-Accessory Drive Belt Tensioner (3.5L)	41	30	-
Fastener-Idler Pulley (2.4L)	35	26	-
Fastener-Idler Pulley (2.5L)	35	26	-
Fastener-Idler Pulley (2.0L Diesel)	35	26	-
Fasteners-A/C Condenser to Radiator	5	-	44
Fastener-Block Heater (2.7L)	12	9	106
Fastener-Block Heater (3.5L)	12	9	106

Bolts-Coolant Outlet Connector (3.5L)	12	9	106
Cooling System Bleed Valve	12	9	106
ETC Sensor (2.4L)	19	14	-
ETC Sensor (2.7L)	19	14	-
ETC Sensor (3.5L)	28	20	-
Fasteners-Fan Module to Radiator	5	-	44
Fasteners-Fan Motor to Shroud	5	-	44
Bolts-Thermostat Housing (3.5L)	12	9	106
Bolts-Thermostat Housing to cylinder head (2.0L Diesel/2.4L)	28	21	-
Bolts-Thermostat Housing (2.7L)	12	9	106
Fastener-Transmission Cooler Tube Bracket	5	-	44
Fastener-Transmission Cooler Tube	9	-	80
Fitting - Transmission oil cooler quick connect fitting	15	11	-
Bolts-Water Pump (2.7L/3.5L)	12	9	106
Hose Clamps-Transmission Cooler	3	-	27
Bolts-Water Pump Mounting (2.0L Diesel/2.4L)	24	18	-
Bolts-Water Pump Inlet Tube to Block (2.0L Diesel/2.4L)	12	9	106
Bolts-EGR Bypass assembly-to EGR Cooler body	10	7	89
Bolts-EGR Tube -to-Exhaust manifold	20	15	-
Bolts, Water Pump Inlet Tube to water pump housing (2.0L Diesel/2.4L)	24	18	-
Bolts, Water Pump to Water Pump Adapter (2.4L)	22	16	-
Bolts, Water Pump Pulley to Water Pump (2.4L)	9	-	80

SPECIAL TOOLS

SPECIAL TOOLS

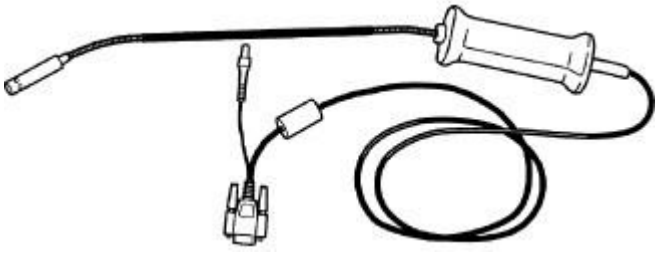

Fig. 8: BELT TENSION GAUGE ADAPTER - 8371
Courtesy of CHRYSLER LLC

Fig. 9: HOSE CLAMP PLIERS 8495
Courtesy of CHRYSLER LLC

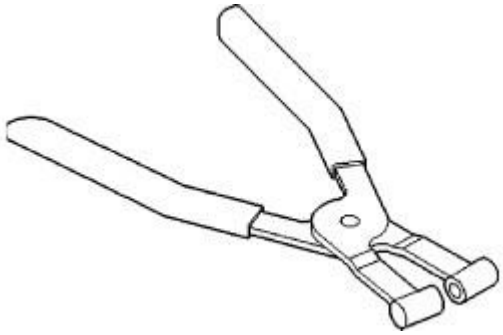

Fig. 10: HOSE CLAMP PLIERS 6094
Courtesy of CHRYSLER LLC

Fig. 11: FILLING AID FUNNEL 8195
Courtesy of CHRYSLER LLC

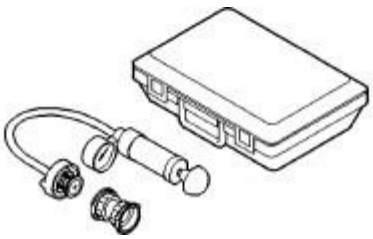

Fig. 12: COOLING SYSTEM TESTER 7700
Courtesy of CHRYSLER LLC

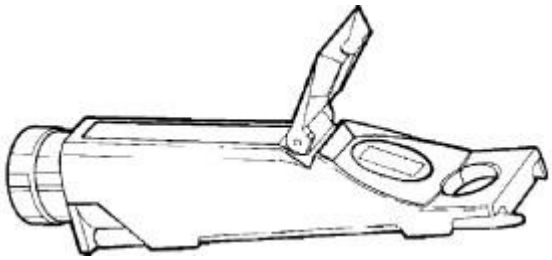

Fig. 13: COOLANT REFRACTOMETER 8286
Courtesy of CHRYSLER LLC

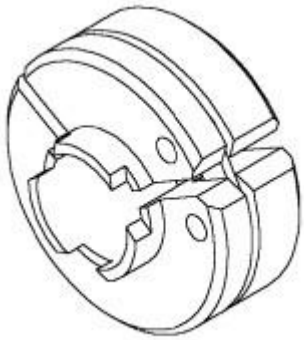

Fig. 14: RELEASE TOOL 8875A
Courtesy of CHRYSLER LLC

ACCESSORY DRIVE

BELT, SERPENTINE

Description

DESCRIPTION

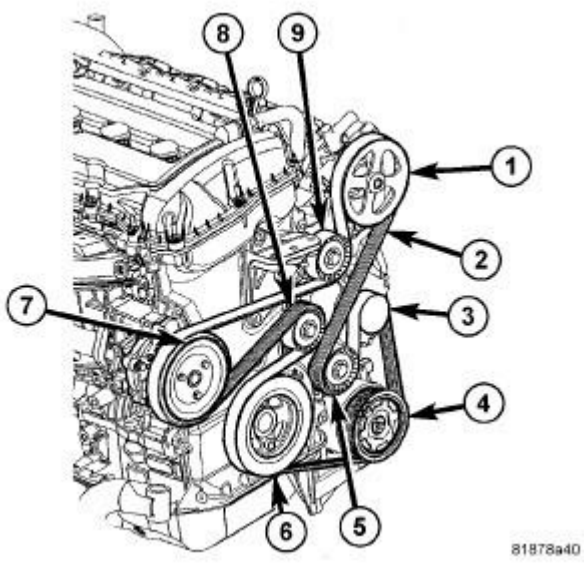

Fig. 15: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP 2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

The accessory drive belt is a Poly-V type belt. On the 2.4L engine, the accessory drive belt drives the generator, P/S pump and air conditioning compressor.

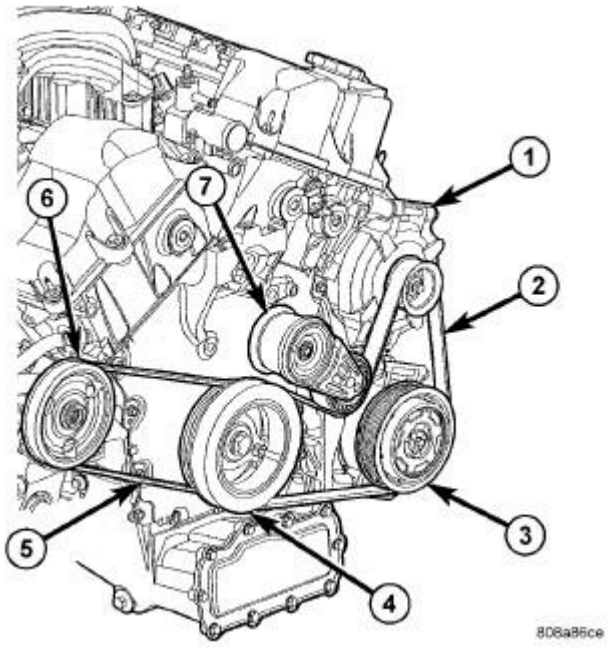

Fig. 16: ACCESSORY DRIVE BELT SYSTEM - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR 2 - IDLER/TENSIONER

On the 2.7L engine, the accessory drive belt drives the generator, and air conditioning compressor. The P/S is driven by a separate, stretch to fit drive belt.

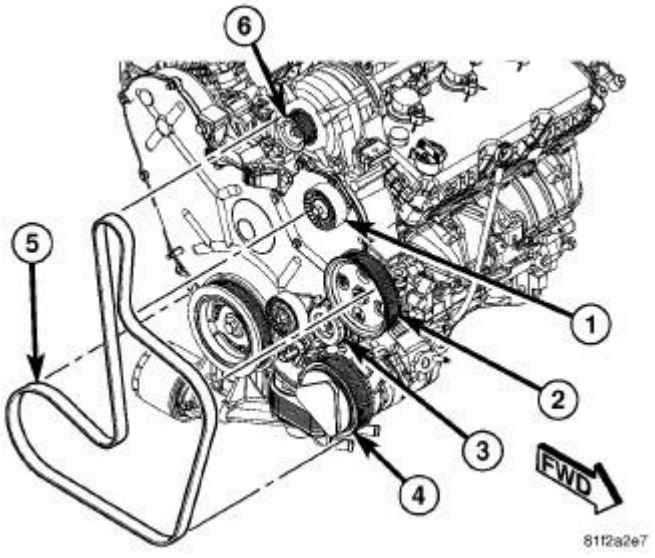

Fig. 17: ACCESSORY DRIVE BELT - 3.5L

Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - P/S PUMP PULLEY
3 - ACCESSORY DRIVE BELT TENSIONER
4 - A/C COMPRESSOR PULLEY
5 - ACCESSORY DRIVE BELT
6 - GENERATOR PULLEY

On the 3.5L, the accessory drive belt drives the generator, P/S pump, and A/C compressor.

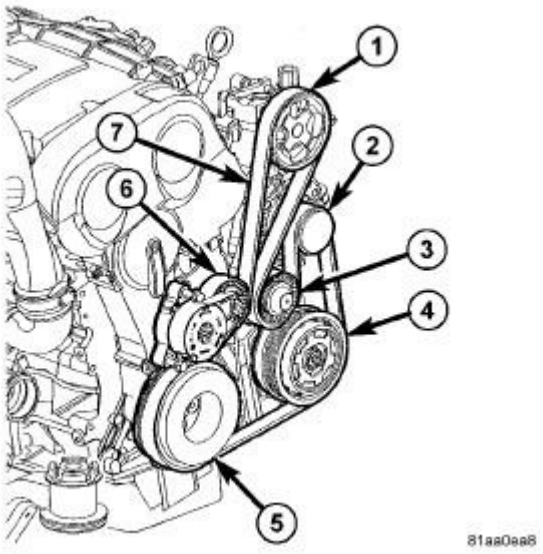

Fig. 18: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

1 - P/S PULLEY 2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

The 2.0L Diesel engine accessory drive belt drives the P/S pump, Generator, and A/C compressor. Belt tension is maintained by an automatic accessory drive belt tensioner.

Diagnosis and Testing

ACCESSORY DRIVE BELTS

Satisfactory performance of the belt driven accessories depends on belt condition and proper belt tension.

ACCESSORY DRIVE BELT DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
INSUFFICIENT ACCESSORY OUTPUT DUE TO BELT SLIPPAGE	1. Belt too loose. 2. Belt excessively glazed or worn.	1. Adjust belt tension. 2. Replace and tighten as specified.
BELT SQUEAL WHEN ACCELERATING ENGINE	1. Belts too loose. 2. Belts glazed.	1. Adjust belt tension. 2. Replace belts.
BELT CHIRP AT IDLE	1. Belts too loose. 2. Foreign material imbedded in belt. 3. Non-uniform belt. 4. Misaligned pulley(s). 5. Non-uniform groove or eccentric pulley.	1. Adjust belt tension. 2. Replace belt. 3. Replace belt. 4. Align accessories. 5. Replace pulley(s).
BELT ROLLED OVER IN GROOVE OR BELT JUMPS OFF	1. Broken cord in belt. 2. Belt too loose, or too tight. 3. Misaligned pulleys. 4. Non-uniform grooves or eccentric pulley.	1. Replace belt. 2. Adjust belt tension. 3. Align accessories. 4. Replace pulley(s).

Removal

2.4L ENGINE

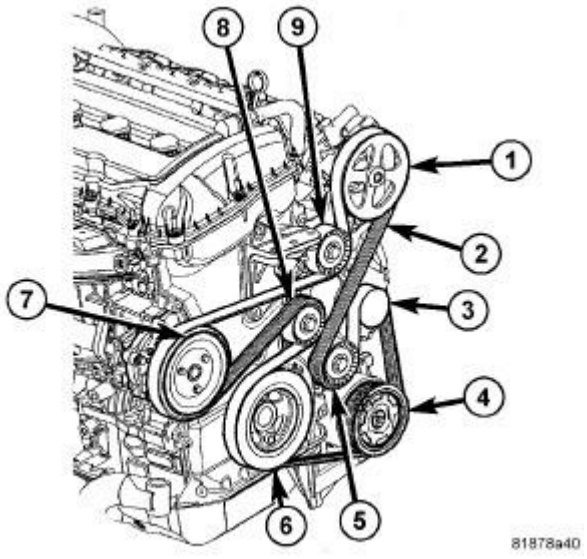

Fig. 19: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP 2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

1. Using a wrench, rotate accessory drive belt tensioner (8) counterclockwise until accessory drive belt (2) can be removed from pulleys (5 and 9).
2. Remove accessory drive belt (2).

2.7L ENGINE

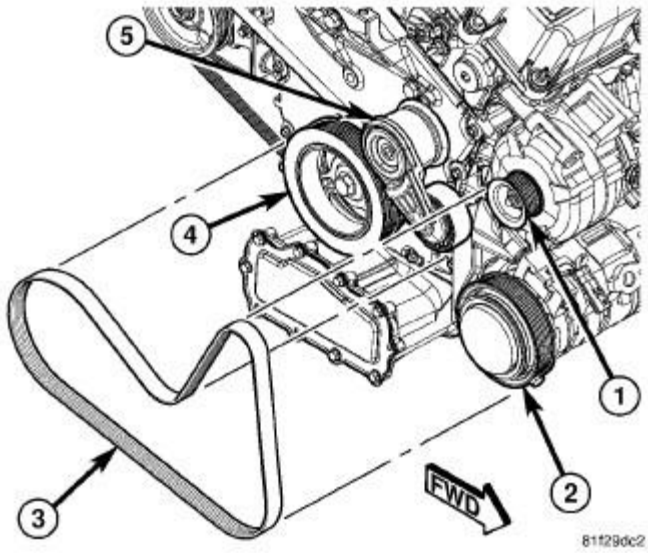

Fig. 20: ACCESSORY DRIVE BELT - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR PULLEY 2 - A/C PULLEY
3 - ACCESSORY DRIVE BELT
4 - CRANKSHAFT PULLEY
5 - ACCESSORY DRIVE BELT TENSIONER

1. Raise vehicle on hoist.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**

3. Rotate accessory drive belt tensioner (5) clockwise to allow enough slack to remove accessory drive belt (3).

3.5L ENGINE

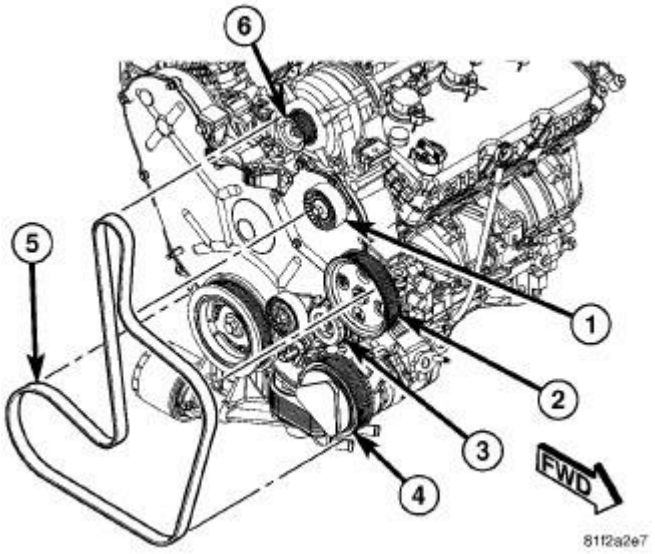

Fig. 21: ACCESSORY DRIVE BELT - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - P/S PUMP PULLEY
3 - ACCESSORY DRIVE BELT TENSIONER
4 - A/C COMPRESSOR PULLEY
5 - ACCESSORY DRIVE BELT
6 - GENERATOR PULLEY

1. Raise vehicle on hoist.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Rotate accessory drive belt tensioner (3) clockwise to allow enough slack to remove accessory drive belt (5).

2.0L DIESEL ENGINE

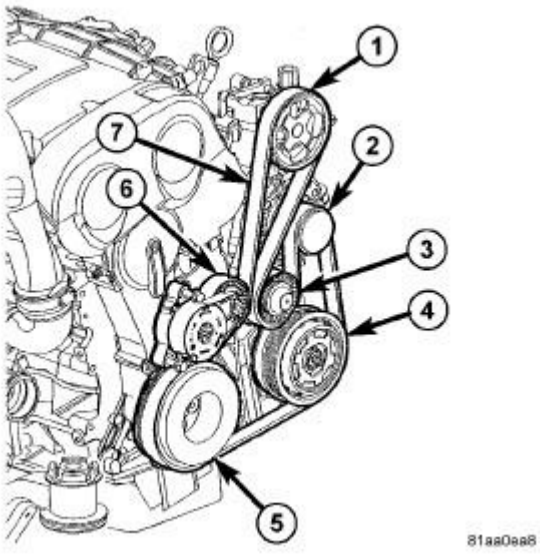

Fig. 22: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

1 - P/S PULLEY 2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Disconnect negative battery cable.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Working through wheelhouse, using a suitable wrench, rotate accessory drive belt tensioner (6) counterclockwise.
4. Remove accessory drive belt (7).

Cleaning

CLEANING

Clean all foreign debris from belt pulley grooves. The belt pulleys must be free of oil, grease, and coolants before installing the drive belt.

Inspection

INSPECTION

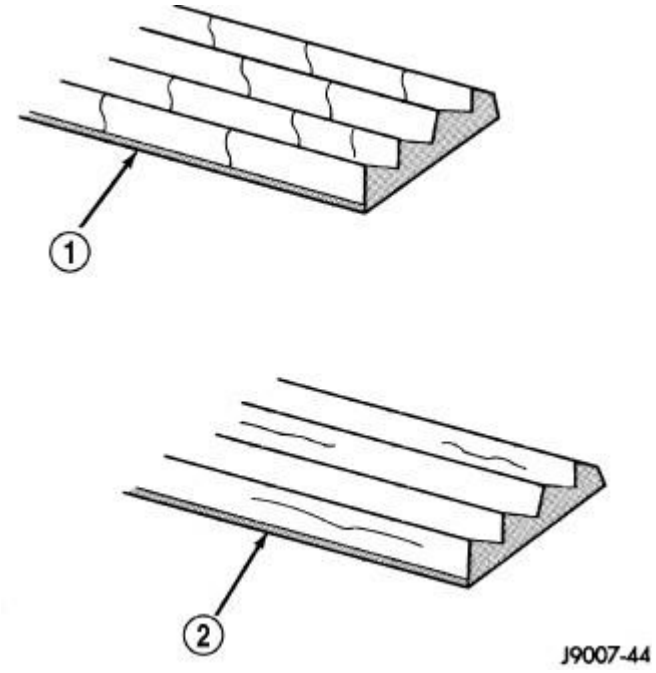

Fig. 23: DRIVE BELT WEAR PATTERN
Courtesy of CHRYSLER LLC

1 - NORMAL CRACKS - BELT OK 2 - NOT NORMAL CRACKS - REPLACE BELT

Belt replacement under any or all of the following conditions is required:

- Excessive wear
- Frayed cords
- Severe glazing

Poly-V Belt system may develop minor cracks across the ribbed side (due to reverse bending). These minor cracks are considered normal and acceptable. Parallel cracks are not .

NOTE: Do not use any type of belt dressing or restorer on Poly-V Belts.

Installation

2.4L ENGINE

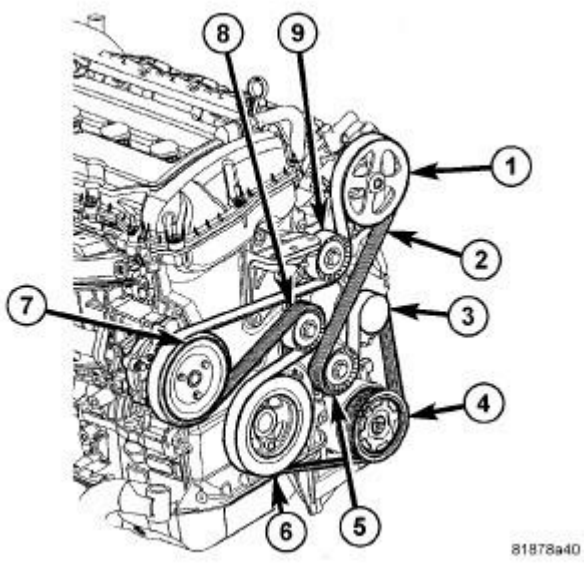

Fig. 24: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP 2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

NOTE: When installing drive belt on the pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulley grooves.

1. Install the accessory drive belt (2) around all the pulleys except for the generator pulley (3).
2. Using a wrench, rotate accessory drive belt tensioner (8) counterclockwise until accessory drive belt (2) can be installed on the generator pulley (3). Release spring tension onto accessory drive belt (2).

2.7L ENGINE

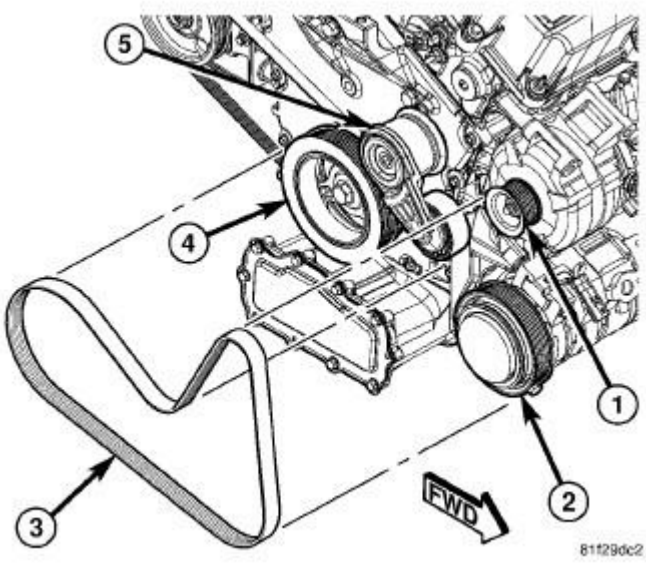

Fig. 25: ACCESSORY DRIVE BELT - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR PULLEY 2 - A/C PULLEY
3 - ACCESSORY DRIVE BELT
4 - CRANKSHAFT PULLEY
5 - ACCESSORY DRIVE BELT TENSIONER

NOTE: When installing drive belt onto pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulley.

1. Position accessory drive belt (3) on all pulleys except generator (1).
2. Rotate accessory drive belt tensioner (5) clockwise.
3. Position accessory drive belt (3) on generator pulley (1).
4. Slowly release accessory drive belt tensioner (5).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**
6. Lower vehicle.

3.5L ENGINE

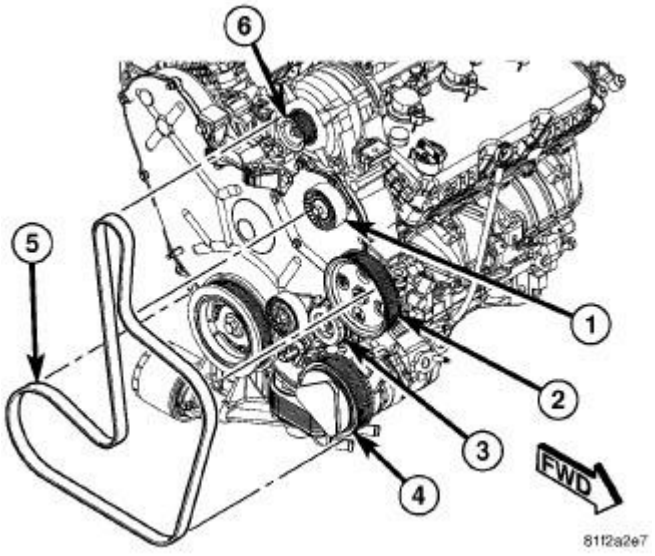

Fig. 26: ACCESSORY DRIVE BELT - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - P/S PUMP PULLEY
3 - ACCESSORY DRIVE BELT TENSIONER
4 - A/C COMPRESSOR PULLEY
5 - ACCESSORY DRIVE BELT
6 - GENERATOR PULLEY

1. Position accessory drive belt (5) on all pulleys except generator (6).
2. Rotate accessory drive belt tensioner (3) clockwise.
3. Position accessory drive belt (5) on generator pulley (6).
4. Slowly release accessory drive belt tensioner (3).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**
6. Lower vehicle.

2.0L DIESEL ENGINE

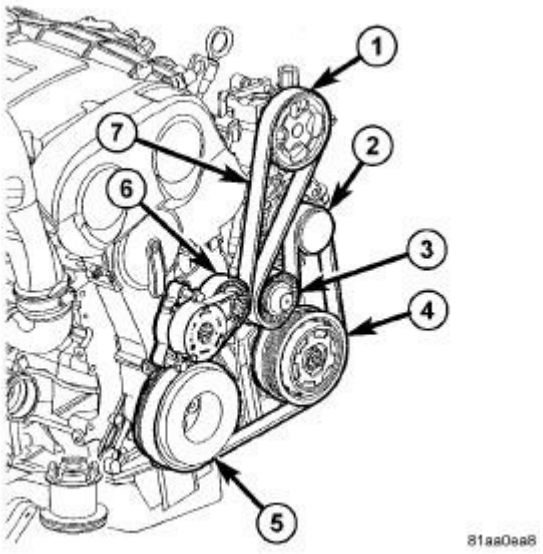

Fig. 27: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

1 - P/S PULLEY 2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Route accessory drive belt (7) around all pulleys except accessory drive belt tensioner (6). Rotate the tensioner arm (6) until it contacts it's stop position. Route the belt (7) around the idler (3) and slowly let the tensioner (6) rotate into the belt. Make sure the belt (7) is seated onto all pulleys.
2. Working through RH wheelhouse, using suitable wrench, rotate accessory drive belt tensioner (6) counterclockwise.
3. Position accessory drive belt (7).
4. Slowly release accessory drive belt tensioner (6) against accessory drive belt (7).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**

BELT, SERPENTINE, POWER STEERING

Removal

2.7L ENGINE

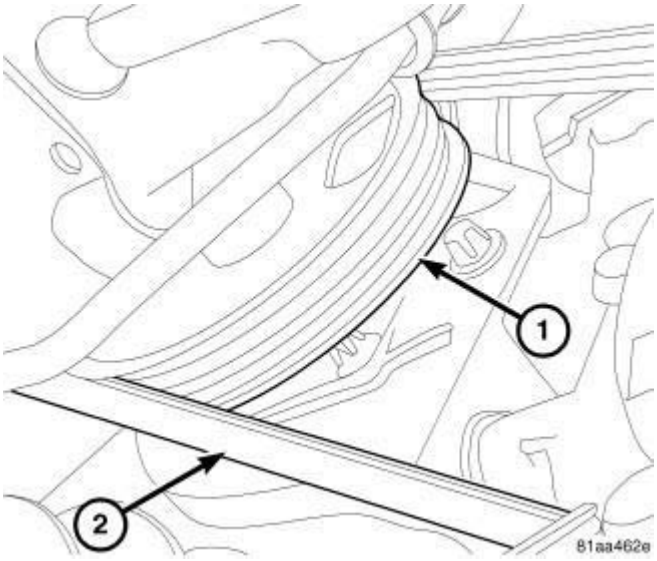

Fig. 28: STRETCH TO FIT POWER STEERING BELT REMOVAL
Courtesy of CHRYSLER LLC

1 - POWER STEERING PULLEY
2 - STRETCH TO FIT POWER STEERING BELT

1. Raise and support the vehicle.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Use a socket and ratchet to rotate the crankshaft clockwise.
4. While rotating the crankshaft clockwise, walk the power steering drive belt (2) off of the power steering pulley (1).
5. Remove the power steering drive belt (2).

Installation

2.7L ENGINE

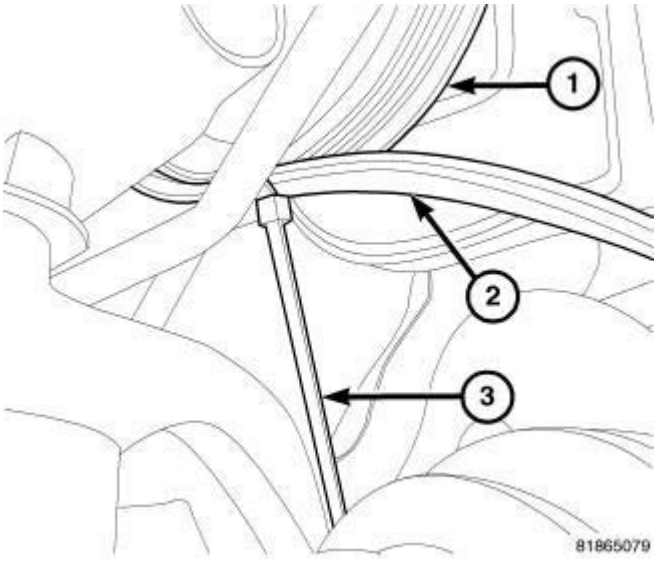

Fig. 29: POWER STEERING DRIVE BELT INSTALLATION
Courtesy of CHRYSLER LLC

1 - P/S PUMP PULLEY 2 - POWER STEERING BELT
3 - NYLON WIRE TIE

1. Position the power steering drive belt (2) on the crankshaft pulley. Make sure the belt (2) is fully seated in the crankshaft pulley grooves.
2. Position the bottom of the drive belt (2) on the bottom of the power steering pulley (1).

NOTE: Use only wire ties with nylon locks, not metal.

3. Working from the back side of the power steering pulley (1), insert a nylon wire tie (3), 7.75X1/8x0.050 in. through one of the holes in the pulley (1).
4. Tighten the wire tie to hold the drive belt (2) in position.
5. While holding the drive belt (2) to make sure it stays in position, slowly rotate the engine clockwise.
6. Once the belt is in position on the pulley (1), continue rotating the engine until the wire tie snaps (3).
7. Remove the wire tie (3) from the vehicle.
8. Install the RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**

PULLEY, IDLER

Removal

2.4L ENGINE

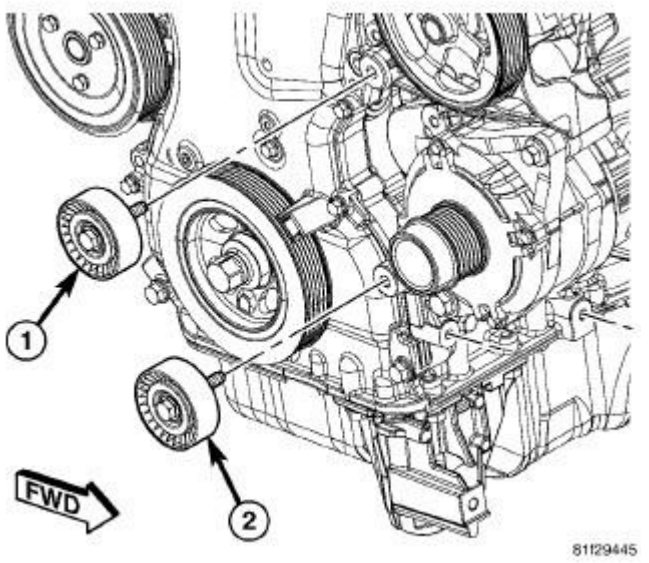

Fig. 30: ACCESSORY DRIVE BELT IDLER PULLEY - 2.4L
Courtesy of CHRYSLER LLC

1 - UPPER PULLEY 2 - LOWER PULLEY

1. Remove accessory drive belt. See **Removal**
2. Remove upper idler pulley (1) and bolt.
3. Remove lower idler pulley (2) and bolt.

3.5L ENGINE

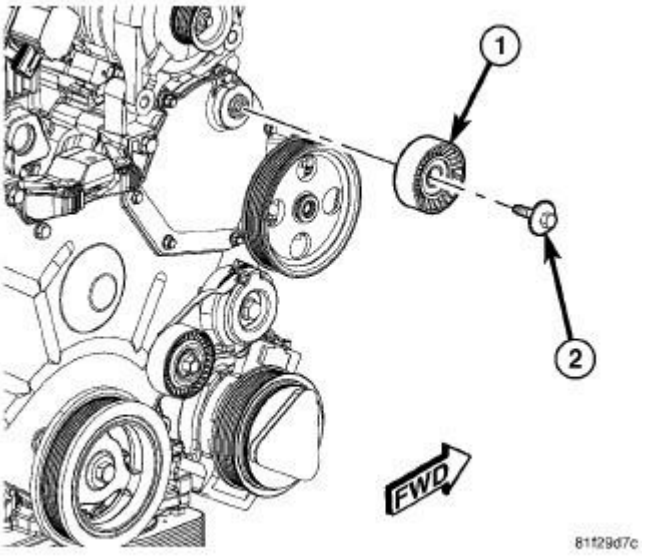

Fig. 31: IDLER PULLEY - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY
2 - BOLT

1. Remove accessory drive belt. See **Removal** .
2. Remove mounting bolt (2) and idler pulley (1).

2.0L DIESEL ENGINE

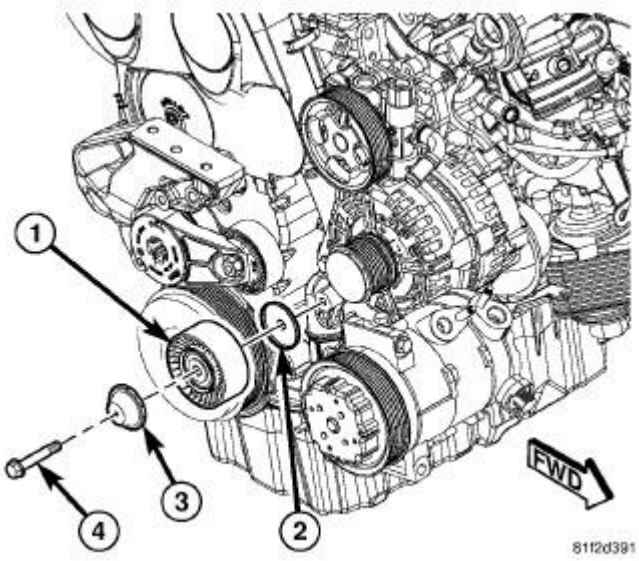

Fig. 32: IDLER PULLEY - 2.0L DIESEL
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - DUST SHIELD
3 - CAP
4 - BOLT

1. Remove accessory drive belt. See **Removal** .
2. Remove bolt (4), cap (3), idler pulley (1), and dust shield (2).

Installation

2.4L ENGINE

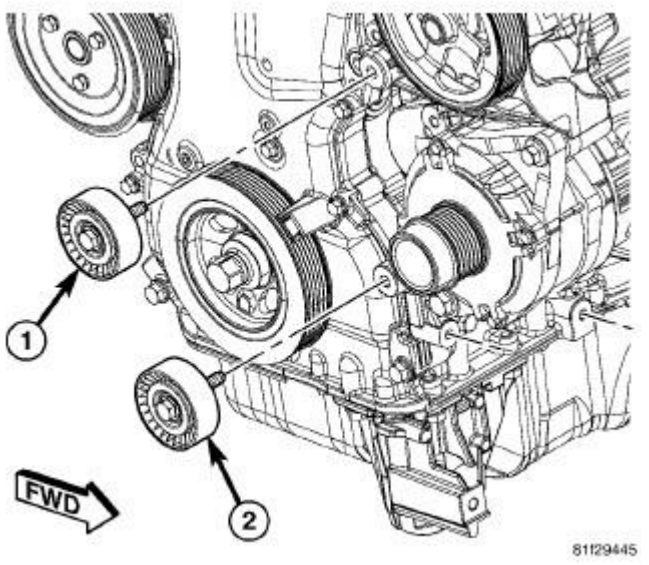

Fig. 33: ACCESSORY DRIVE BELT IDLER PULLEY - 2.4L
Courtesy of CHRYSLER LLC

1 - UPPER PULLEY 2 - LOWER PULLEY

1. Position lower idler pulley (2) and bolt.
2. Tighten bolt to 35 N.m (25 ft. lbs.).
3. Position upper idler pulley (1) and bolt.
4. Tighten bolt to 35 N.m (25 ft. lbs.).
5. Install accessory drive belt. See **Installation** .

3.5L ENGINE

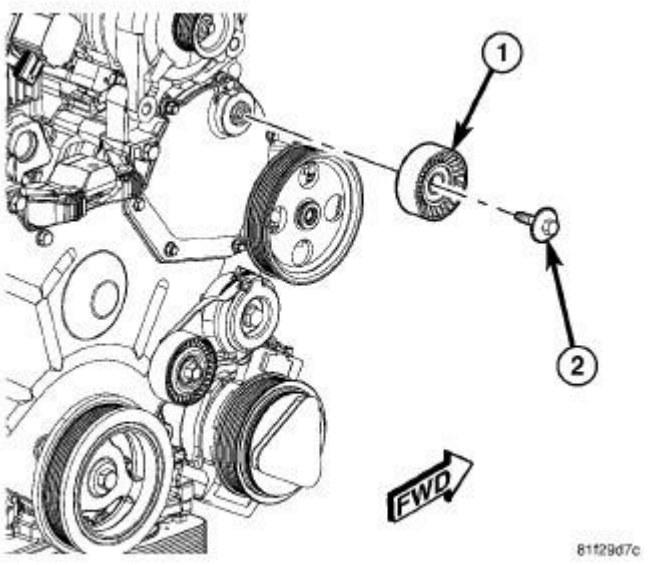

Fig. 34: IDLER PULLEY - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - BOLT

1. Position idler pulley and bolt.
2. Tighten bolt to 35 N.m (25 ft. lbs.).
3. Install accessory drive belt. See **Installation** .

2.0L DIESEL ENGINE

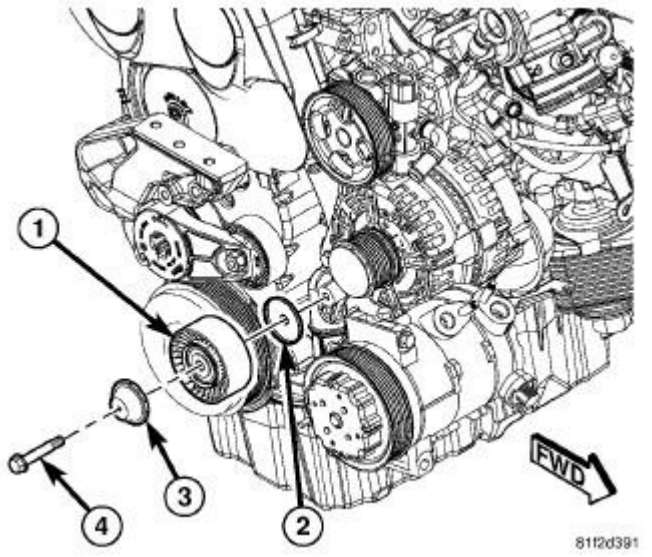

Fig. 35: IDLER PULLEY - 2.0L DIESEL
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY 2 - DUST SHIELD
3 - CAP
4 - BOLT

1. Position bolt (4), cap (3), idler pulley (1) and dust shield (2) on front engine cover.
2. Tighten bolt to 35 N.m (25 ft.lbs.).
3. Install accessory drive belt. See **Installation** .

TENSIONER, BELT

Removal

2.4L ENGINE

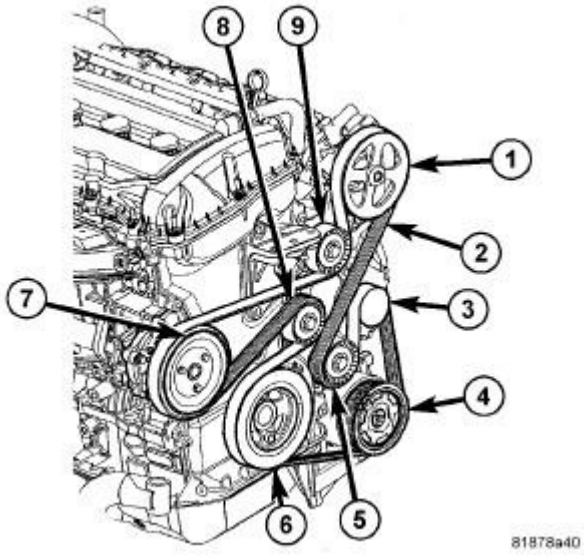

Fig. 36: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP 2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY

8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

1. Raise vehicle on hoist.
2. Remove belt splash shield.
3. Remove accessory drive belt (2). See **Removal** .
4. Remove accessory drive belt tensioner mounting bolt. Remove accessory drive belt tensioner (8).

2.7L ENGINE

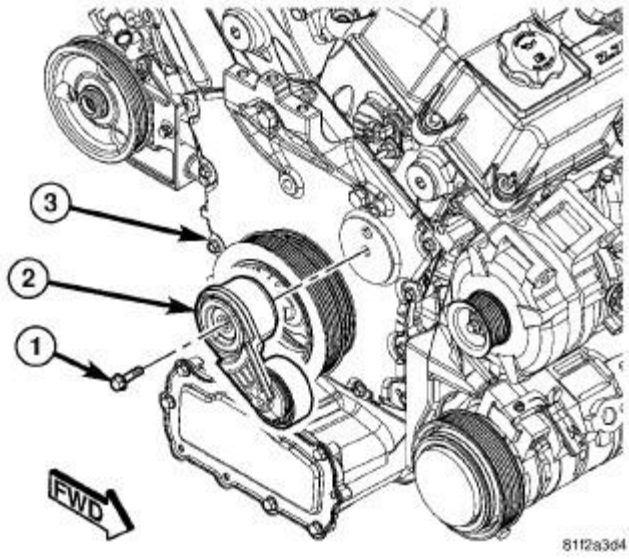

Fig. 37: ACCESSORY DRIVE BELT TENSIONER - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT
2 - ACCESSORY DRIVE BELT TENSIONER
3 - FRONT ENGINE COVER

WARNING: Because of high spring pressure, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly.

1. Remove accessory drive belt. See **Removal** .
2. Remove accessory drive belt tensioner bolt (1).
3. Remove accessory drive belt tensioner (2) from front engine cover (3).

3.5L ENGINE

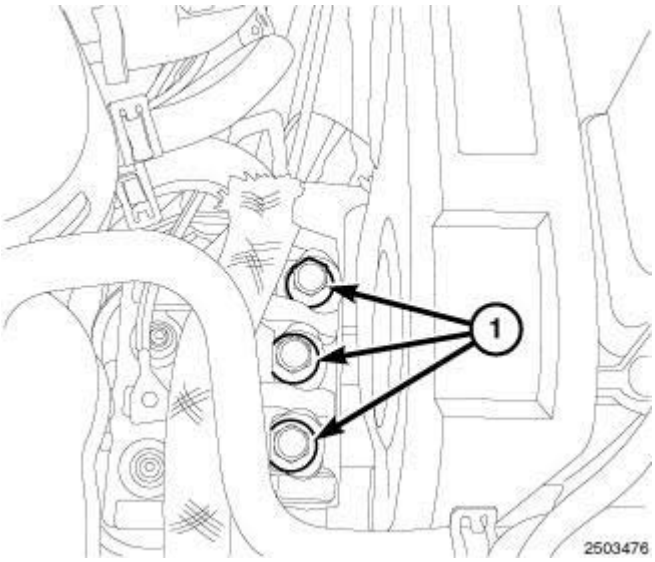

Fig. 38: ENGINE SUPPORT BRACKET BOLTS
Courtesy of CHRYSLER LLC

WARNING: Because of high spring pressure, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly.

1. Remove the passenger side engine support bracket bolts (1).

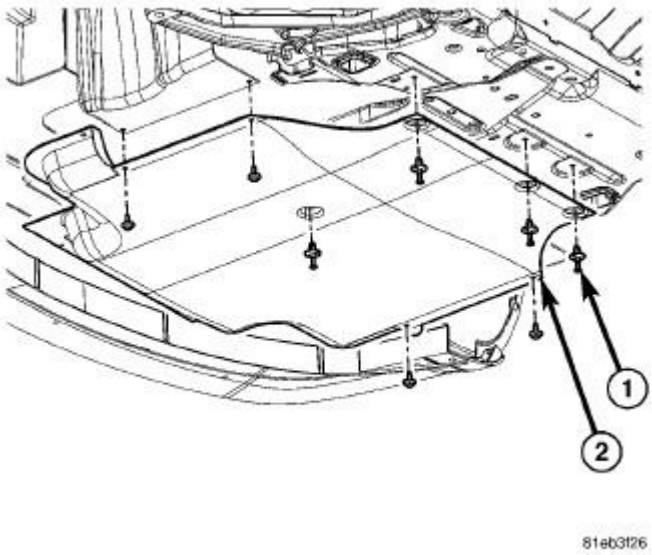

Fig. 39: BELLY PAN
Courtesy of CHRYSLER LLC

2. Raise and support the vehicle.
3. Remove the accessory drive belt. See **Removal** .

4. Remove the belly pan retainers (1).
5. Remove the belly pan (2).

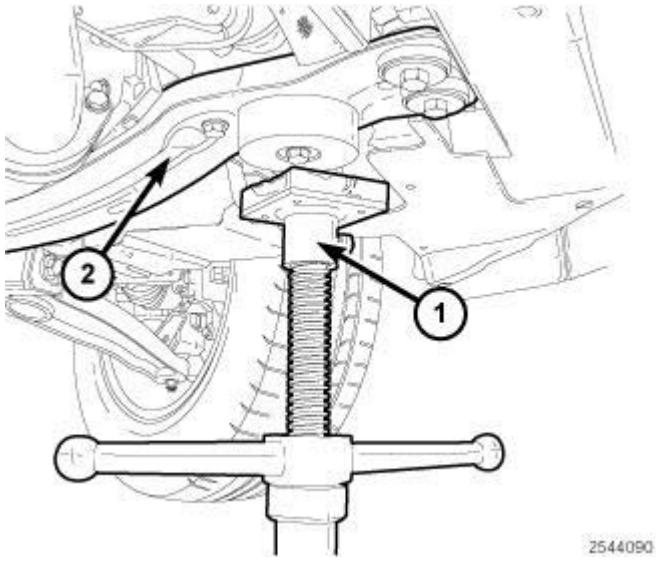

Fig. 40: ENGINE FORE/AFT CROSSMEMBER
Courtesy of CHRYSLER LLC

6. Support the engine fore/aft crossmember (2) with an appropriate stand (1).

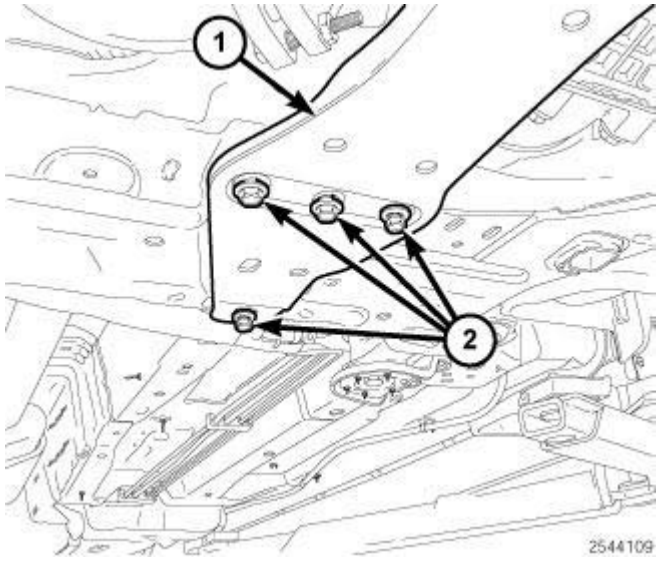

Fig. 41: REAR BOLTS & FORE/AFT CROSSMEMBER
Courtesy of CHRYSLER LLC

7. Loosen the rear bolts (2) from the fore/aft crossmember (1).
8. Remove the front bolts from the fore/aft crossmember.

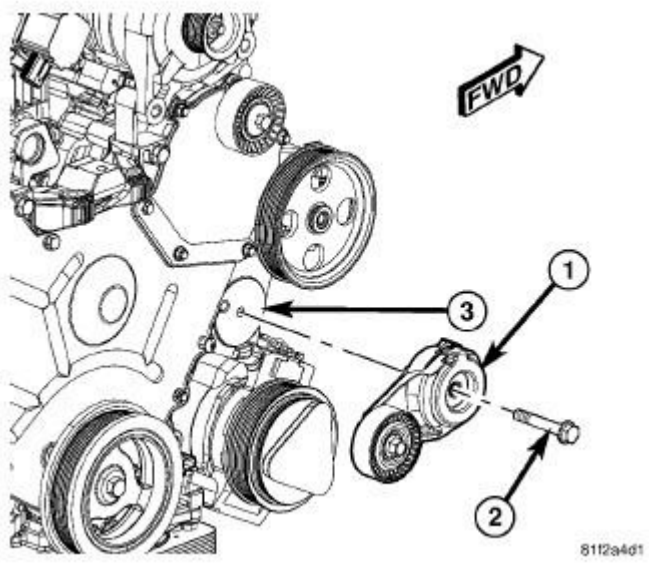

Fig. 42: ACCESSORY DRIVE BELT TENSIONER - 3.5L
Courtesy of CHRYSLER LLC

1 - ACCESSORY DRIVE BELT TENSIONER
2 - BOLT
3 - FRONT ENGINE COVER

9. Lower the stand supporting the fore/aft crossmember approximately 3/4" to 1".
10. Remove the tensioner assembly bolt (2).
11. Remove the accessory drive belt tensioner (1) from the vehicle.

2.0L DIESEL

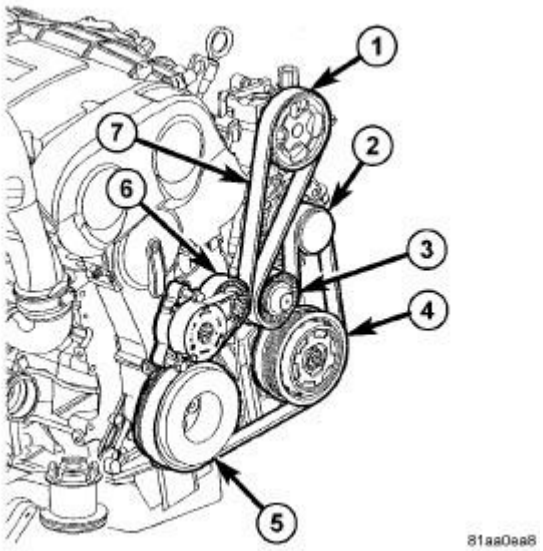

Fig. 43: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

1 - P/S PULLEY 2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Remove accessory drive belt. See **Removal** .
2. Remove accessory drive belt tensioner mounting bolts.
3. Remove accessory drive belt tensioner (6)

Installation

2.4L ENGINE

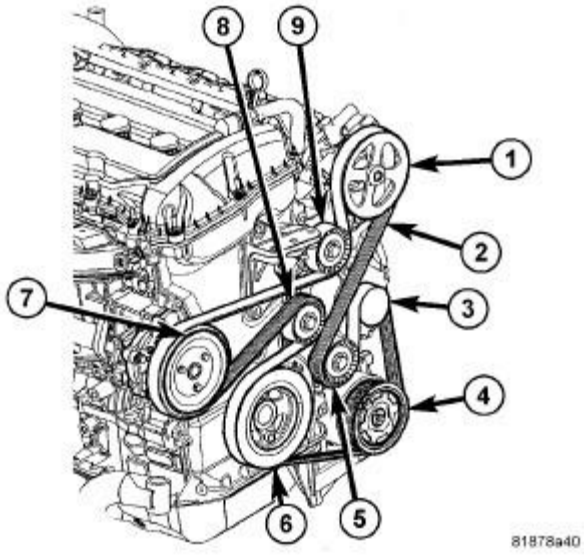

Fig. 44: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP 2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY

7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

1. Position accessory drive belt tensioner (8) and install mounting bolt. Tighten bolt to 24 N.m (212 in. lbs.).
2. Install accessory drive belt (2). See **Installation** .
3. Install belt splash shield
4. Lower vehicle.

2.7L ENGINE

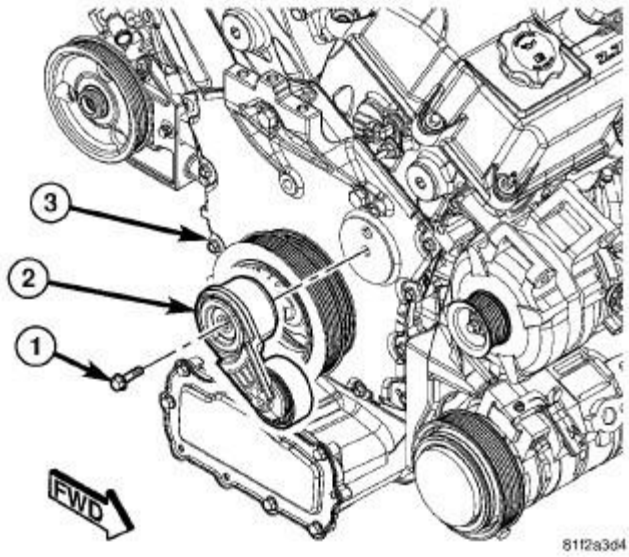

Fig. 45: ACCESSORY DRIVE BELT TENSIONER - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT 2 - ACCESSORY DRIVE BELT TENSIONER
3 - FRONT ENGINE COVER

1. Position accessory drive belt tensioner (2).
2. Install tensioner mounting bolt (1). Tighten bolt (1) to 34 N.m (40 ft. lbs.).
3. Install accessory drive belt. See **Installation** .

3.5L ENGINE

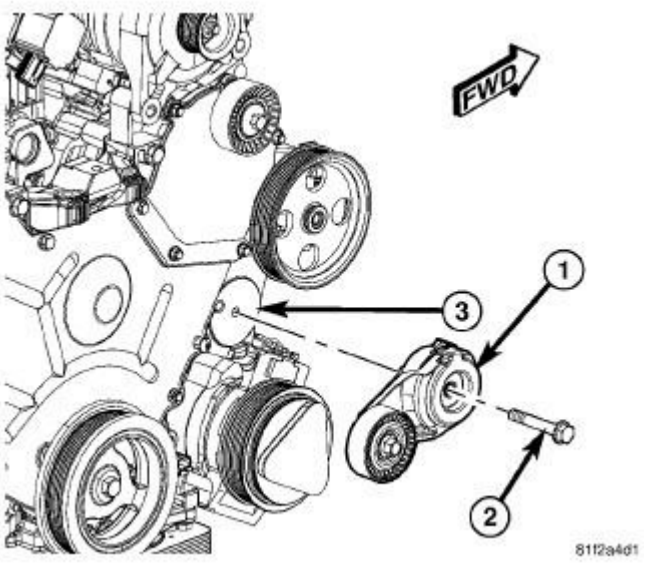

Fig. 46: ACCESSORY DRIVE BELT TENSIONER - 3.5L
Courtesy of CHRYSLER LLC

1. Position the accessory drive belt tensioner (1) on the front engine cover (3).
2. Install the mounting bolt (2). Tighten the bolt to 41 N.m (30 ft. lbs.).

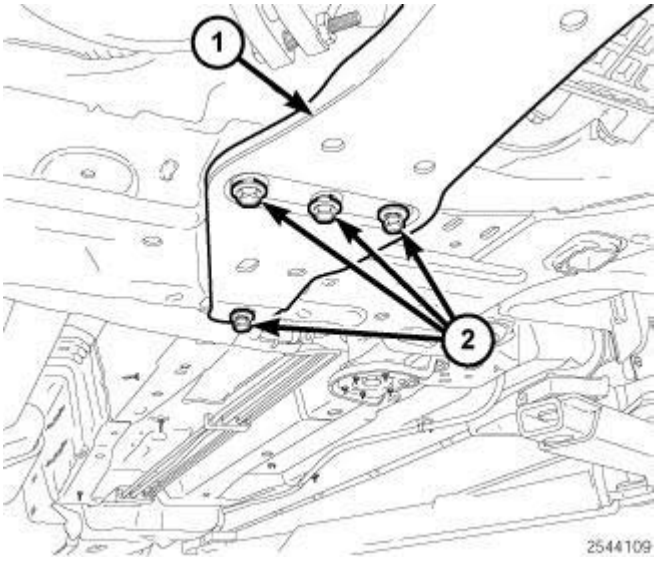

Fig. 47: REAR BOLTS & FORE/AFT CROSSMEMBER
Courtesy of CHRYSLER LLC

3. Raise the fore/aft crossmember (1) approximately 3/4" to 1".
4. Install the front fore/aft crossmember bolts. Tighten the bolts to 55 N.m (41 ft. lbs.).
5. Tighten the rear fore/aft crossmember bolts (2) to 55 N.m (41 ft. lbs.).

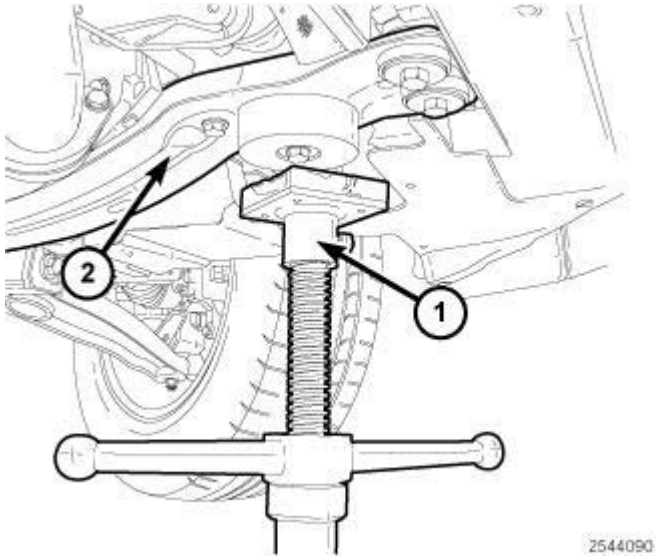

Fig. 48: ENGINE FORE/AFT CROSSMEMBER
Courtesy of CHRYSLER LLC

6. Remove the stand (1) from the fore/aft crossmember (2).

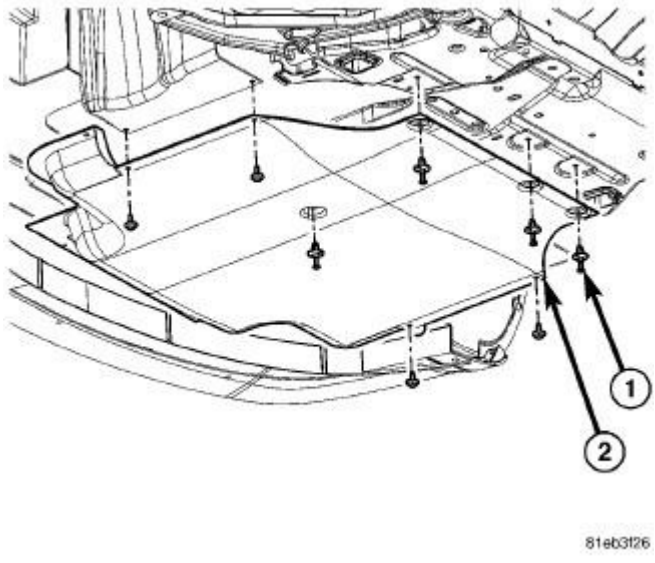

Fig. 49: BELLY PAN
Courtesy of CHRYSLER LLC

7. Install the belly pan (2).
8. Install accessory drive belt. See **Installation**

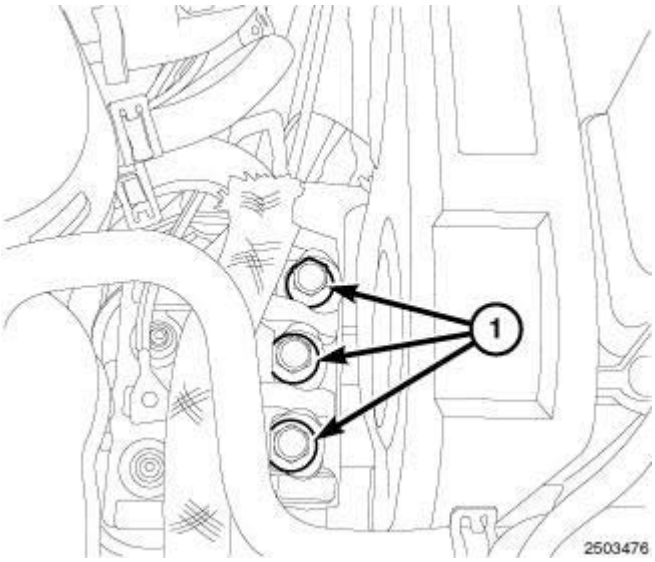

Fig. 50: ENGINE SUPPORT BRACKET BOLTS
Courtesy of CHRYSLER LLC

9. Lower the vehicle.
10. Install the three bolts (1) at the passenger side engine support bracket. Tighten the bolts to 45 N.m (33 ft. lbs.)

2.0L DIESEL

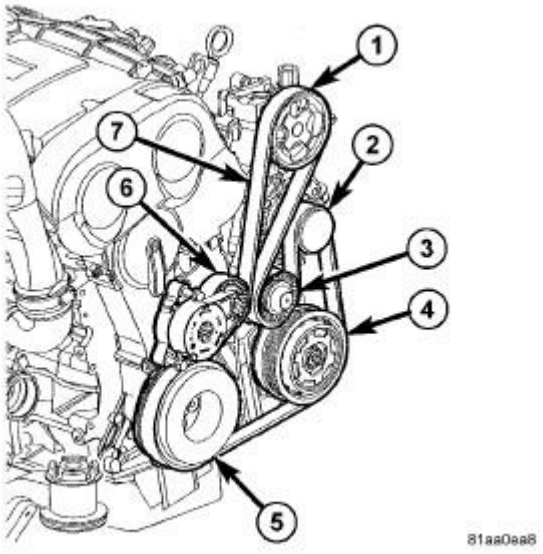

Fig. 51: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

1 - P/S PULLEY
2 - GENERATOR PULLEY

3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Position accessory drive belt tensioner (6).
2. Install mounting bolts. Tighten bolts to 28 N.m (250 in. lbs.).
3. Install accessory drive belt. See **Installation** .

ENGINE

BOTTLE, COOLANT RECOVERY

Description

NON-PRESSURE

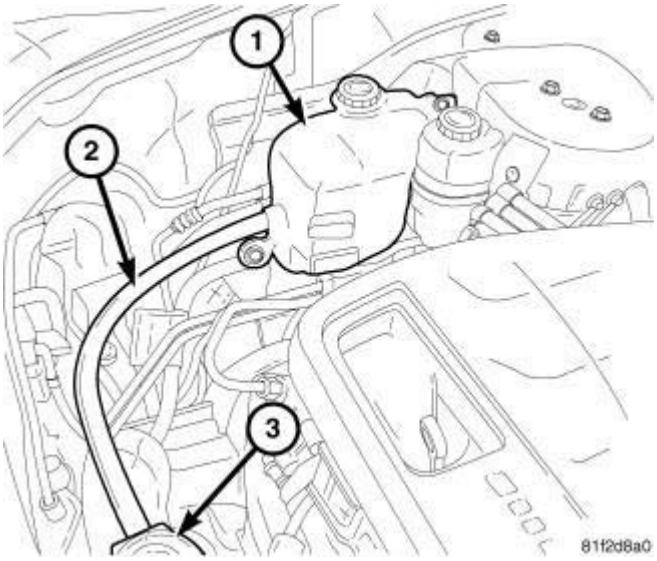

Fig. 52: NON-PRESSURE COOLANT RECOVERY CONTAINER
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER
2 - OVERFLOW HOSE
3 - RADIATOR PRESSURE CAP

The coolant recovery system used on 2.4L engine consists of a coolant recovery container and an overflow hose that is connected to the radiator. The coolant recovery container is mounted in the right side engine compartment.

PRESSURE SYSTEM

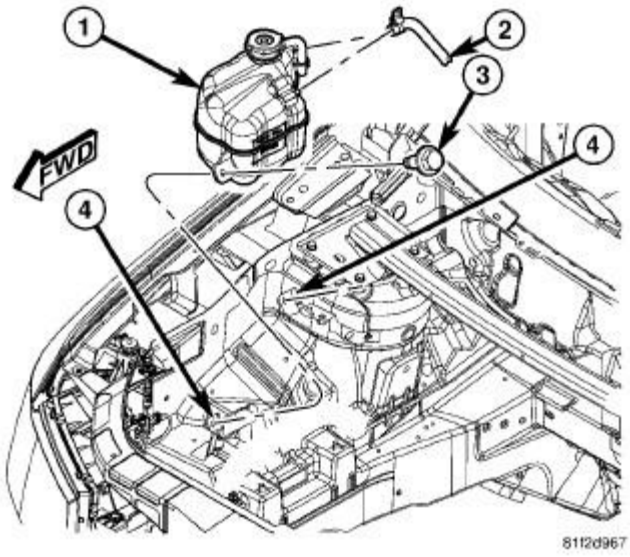

Fig. 53: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM 2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

The coolant pressure container consists of a pressure chamber and a overflow chamber. The coolant pressure container is mounted in the right side engine compartment.

NOTE: Coolant will normally be in the pressure chamber side of the coolant bottle. The overflow chamber should normally be empty

Operation

NON-PRESSURE SYSTEM

This system works in conjunction with the pressure cap to utilize thermal expansion and contraction of the coolant to keep the coolant free of trapped air. It provides a volume for expansion and contraction, provides a convenient and safe method for checking coolant level, and adjusting level at atmospheric pressure without removing the pressure cap. It also provides some reserve coolant to cover minor leaks and evaporation or boiling losses.

PRESSURE SYSTEM

The pressure chamber keeps the coolant free of trapped air, provides a volume for expansion and contraction, and provides a convenient and safe method for checking and adjusting coolant level at atmospheric pressure. It

also provides some reserve coolant to cover minor leaks, evaporation or boiling losses. The overflow chamber allows coolant recovery in case of an overheat.

Removal

NON-PRESSURE SYSTEM

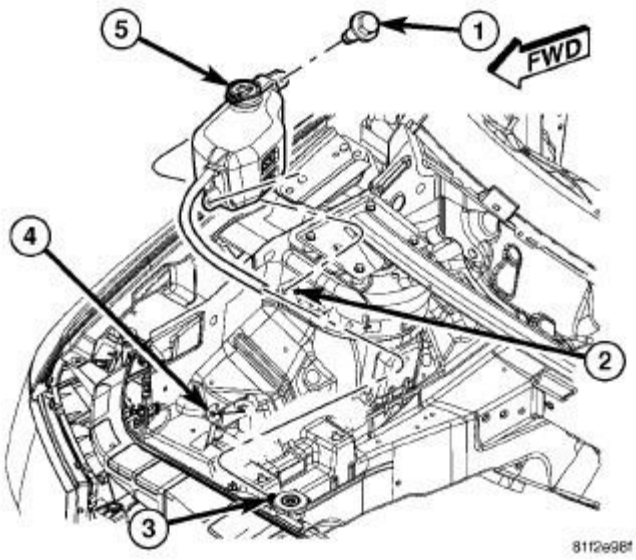

Fig. 54: COOLANT RECOVERY CONTAINER - NON-PRESSURE
Courtesy of CHRYSLER LLC

1 - BOLT 2 - OVERFLOW TUBE
3 - RADIATOR NIPPLE
4 - MOUNTING TAB
5 - COOLANT RECOVERY CONTAINER

1. Disconnect the over flow tube (2) from radiator nipple (3).
2. Remove coolant recovery container mounting bolts (1).
3. Remove coolant recovery container (5).

PRESSURE SYSTEM

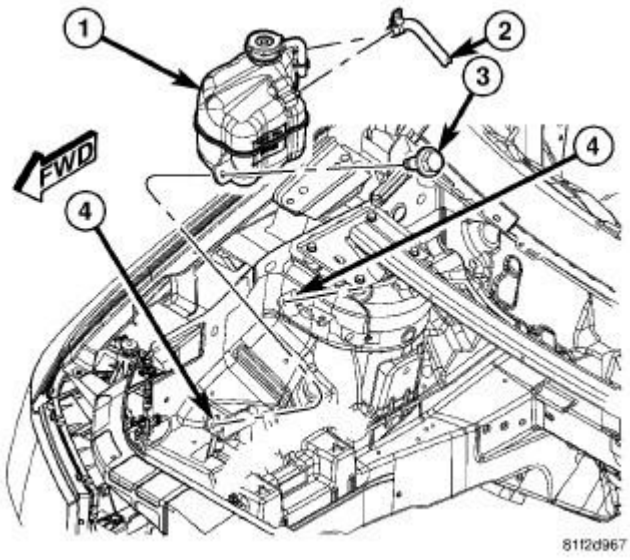

Fig. 55: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM 2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

1. Drain coolant below the coolant recovery container level. See **Standard Procedure** .
2. Disconnect the return hose from coolant recover container (1).
3. Remove coolant recovery container mounting bolts (3).
4. Disconnect supply hose (2) from the bottom of the coolant recovery container (1).
5. Remove coolant recovery container (1).

Installation

NON-PRESSURE SYSTEM

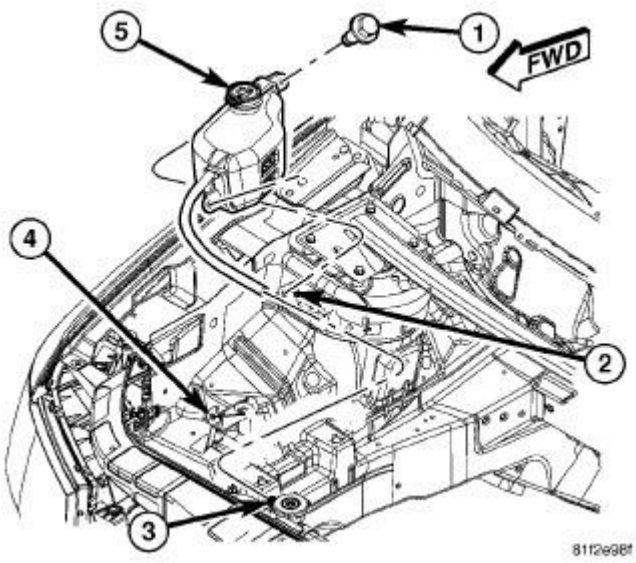

Fig. 56: COOLANT RECOVERY CONTAINER - NON-PRESSURE
Courtesy of CHRYSLER LLC

1 - BOLT 2 - OVERFLOW TUBE
3 - RADIATOR NIPPLE
4 - MOUNTING TAB
5 - COOLANT RECOVERY CONTAINER

1. Connect the overflow tube (2) to the radiator nipple (3).
2. Position coolant recovery container on mounting tab (4). Install mounting bolts (1).
3. Tighten mounting bolts to 10 N.m (89 in. lbs.).
4. Fill cooling system. See **Standard Procedure** .

PRESSURIZED SYSTEM

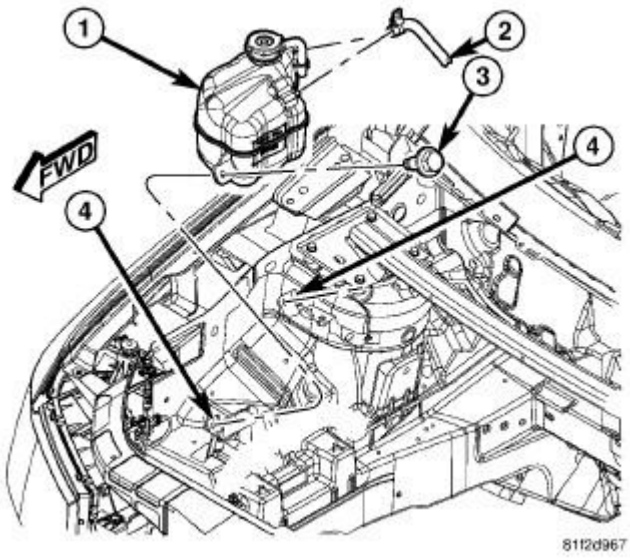

Fig. 57: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM 2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

1. Connect hose (3) to coolant recovery container (4).
2. Install coolant recovery container (4) in mounting position and install mounting bolts (1) Tighten bolts to 10 N.m (89 in. lbs.).
3. Connect return hose (2) to the coolant recovery container (4).
4. Fill cooling system. See **Standard Procedure** .

CAP, RADIATOR

Description

DESCRIPTION

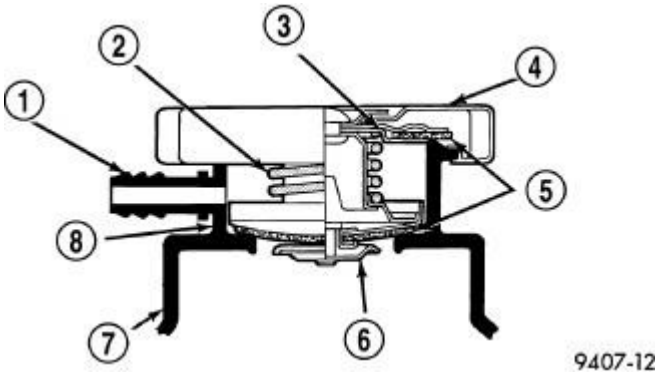

Fig. 58: Cooling System Pressure Cap
Courtesy of CHRYSLER LLC

1 - OVERFLOW NIPPLE
2 - MAIN SPRING
3 - GASKET RETAINER
4 - STAINLESS-STEEL SWIVEL TOP
5 - RUBBER SEALS
6 - VENT VALVE
7 - COOLANT OUTLET CONNECTOR (2.0L/2.4L)/PRESSURE CONTAINER (2.7L)
8 - FILLER NECK

The cooling system is equipped with a pressure cap that releases built up pressure, maintaining a range of 97-124 kPa (14-18 psi).

There is also a vent valve in the center of the cap. This valve also opens when coolant is cooling and contracting, allowing coolant to return to radiator from coolant reserve/recovery system container by vacuum through connecting hose.**If valve is stuck shut, the radiator hoses will be collapsed on cool down. Clean the vent valve to ensure proper sealing when boiling point is reached.**

Operation

OPERATION

The pressure cap allows the cooling system to operate at higher than atmospheric pressure. The higher pressure raises the coolant boiling point; this allows increased radiator cooling capacity.

The gasket in the cap seals the filler neck, so that vacuum can be maintained, allowing coolant to be drawn back into the cooling system from the reserve container.

Diagnosis and Testing

RADIATOR PRESSURE CAP TESTING

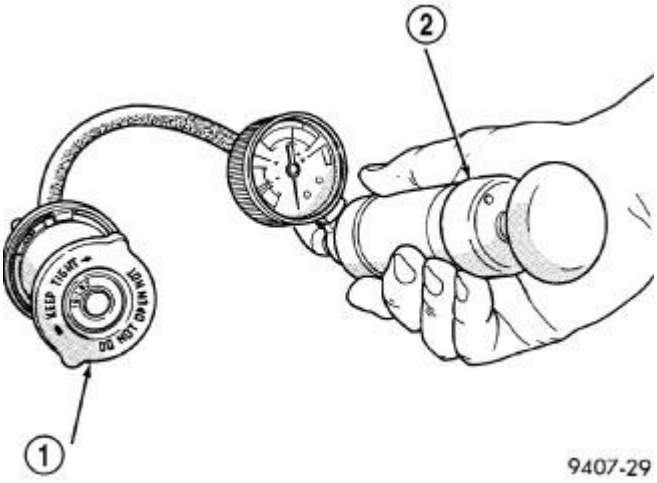

Fig. 59: Testing Cooling System Pressure Cap
Courtesy of CHRYSLER LLC

1 - PRESSURE CAP
2 - PRESSURE TESTER

CAUTION: Vehicles equipped with 2.4L engines use a different pressure cap than vehicles equipped with 2.7L engines. The pressure caps are NOT interchangeable. Verify proper pressure cap part number.

Dip the pressure cap in water. Clean any deposits off the vent valve or its seat and apply cap to end of the Pressure Cap Test Adaptor that is included with the Cooling System Tester 7700. Working the plunger, bring the pressure to 104 kPa (15 psi) on the gauge. If the pressure cap fails to hold pressure of at least 97 kPa (14 psi), replace the pressure cap.

CAUTION: The Cooling System Tester Tool is very sensitive to small air leaks that will not cause cooling system problems. A pressure cap that does not have a history of coolant loss should not be replaced just because it leaks slowly when tested with this tool. Add water to the tool. Turn tool upside down and recheck pressure cap to confirm that cap is bad.

If the pressure cap tests properly while positioned on Cooling System Tester but will not hold pressure or vacuum when positioned on the filler neck. Inspect the filler neck and cap top gasket for irregularities that may prevent the cap from sealing properly.

PRESSURE RELIEF TESTING

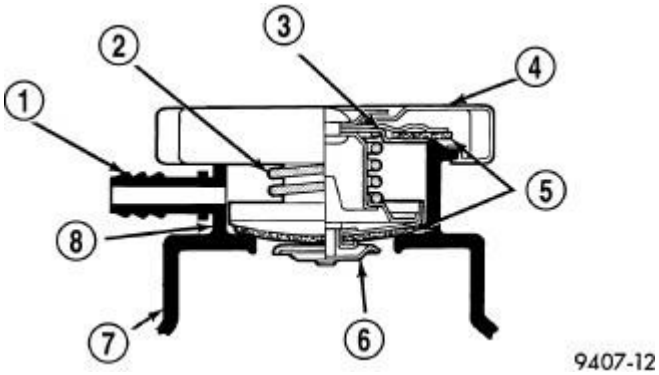

Fig. 60: Cooling System Pressure Cap
Courtesy of CHRYSLER LLC

1 - OVERFLOW NIPPLE
2 - MAIN SPRING
3 - GASKET RETAINER
4 - STAINLESS-STEEL SWIVEL TOP
5 - RUBBER SEALS
6 - VENT VALVE
7 - COOLANT OUTLET CONNECTOR (2.0L/2.4L)/PRESSURE CONTAINER (2.7L)
8 - FILLER NECK

WARNING: The warning words "DO NOT OPEN HOT" on the pressure cap is a safety precaution. When hot, the cooling system builds up pressure. To prevent scalding or other injury, the pressure cap should not be removed while the system is hot and/or under pressure.

CAUTION: Vehicles equipped with 2.4L engines use a different pressure cap than vehicles equipped with 2.7L engines. The pressure caps are NOT interchangeable. Verify proper pressure cap part number.

The pressure cap upper gasket to filler neck seal can be checked by removing the overflow hose at the filler neck overflow nipple. Attach the radiator pressure tester to the **filler neck overflow nipple,** and pump air into the system. The pressure cap upper gasket should relieve pressure at 69-124 kPa (10-18 psi), and hold pressure at 55 kPa (8 psi) minimum.

There is no need to remove the pressure cap at any time **except** for the following purposes:

- Check and adjust coolant freeze point
- Refill system with new coolant
- Conducting service procedures
- Checking for leaks

WARNING: If vehicle has been run recently, wait 15 minutes before removing cap.

Place a shop towel over the cap, and without pushing down, rotate it counterclockwise to the first stop. Allow fluids to escape through the overflow tube. When the system stops pushing coolant and steam into the coolant recovery tank and pressure drops, push down on the cap and remove it completely. Squeezing the radiator inlet hose with a shop towel (to check pressure) before and after turning to the first stop is recommended.

Cleaning

CLEANING

Use only a mild soap to clean the pressure cap.

Inspection

INSPECTION

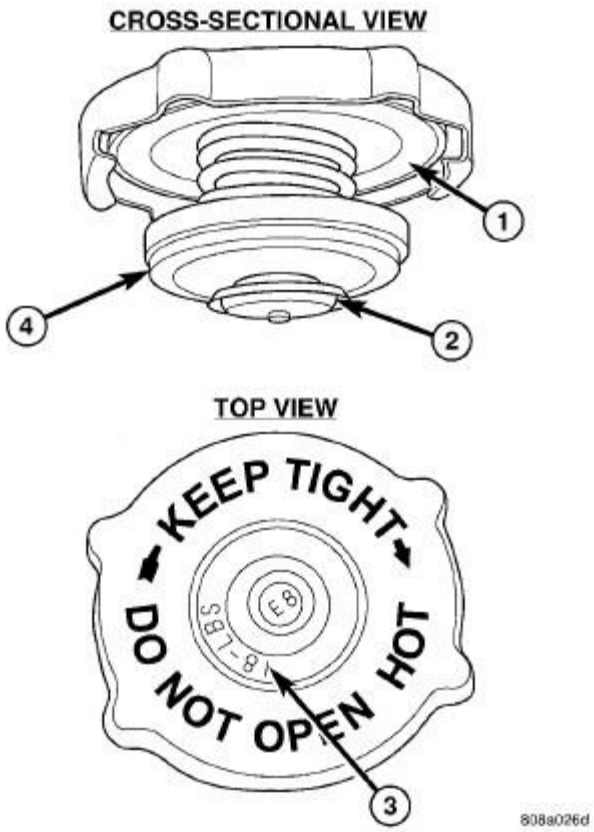

Fig. 61: Cooling System Pressure Cap - Typical
Courtesy of CHRYSLER LLC

1 - FILLER NECK SEAL

2 - VACUUM VENT VALVE
3 - PRESSURE RATING
4 - PRESSURE VALVE

Hold the cap in your hand, **right side up** . The vent valve at the bottom of the cap should fall open. Turn the cap upside down. The vent valve should close.

Replace the cap for any of the following conditions:

- Rubber gasket has swollen, preventing the valve from opening.
- Any light can be seen between the vent valve and the rubber gasket (with cap upside down).
- Gasket on the bottom of the cap shows noticeable thinning.
- Cap has been through more than one engine overheat.

COOLANT

Description

ENGINE COOLANT

GAS ENGINES

WARNING: Antifreeze is an ethylene glycol based coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting. If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene glycol. Keep out of reach of children. Dispose of glycol based coolant properly, contact your government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan when engine compartment related service is performed, personal injury can result.

CAUTION: Use of propylene glycol based coolants is not recommended, as they provide less freeze protection and less boiling protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769), or the equivalent ethylene glycol based coolant with hybrid organic corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% Ethylene

Glycol and 50% distilled water to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

The green coolant **MUST NOT BE MIXED** with the orange or magenta coolants. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CAUTION: Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769) may not be mixed with any other type of antifreeze. Doing so will reduce the corrosion protection and may result in premature water pump seal failure. If non-HOAT coolant is introduced into the cooling system in an emergency, it should be replaced with the specified coolant as soon as possible.

DIESEL ENGINE

CAUTION: Use of propylene glycol based coolants is not recommended, as they provide less freeze protection and less boiling protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Glysantin G 30-91 Antifreeze/Coolant, 5 Year/150,000 Mile Formula (ASTM D3306), or the equivalent ethylene glycol based coolant. This coolant offers the best engine cooling without corrosion when mixed with 50% coolant and 50% distilled water to obtain a freeze point of -36°C (-34°F). It is dyed purple to distinguish it's unique chemistry from traditional green and yellow silicate coolants. If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

The purple coolant **MUST NOT BE MIXED** with the orange, green or magenta coolants. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CAUTION: Glysantin G 30-91 Antifreeze/Coolant, 5 Year/150,00 Mile Formula (ASTM D3306) may not be mixed with any other type of antifreeze. Doing so will reduce the corrosion protection and may result in premature water pump seal failure.

Operation

COOLANT

Coolant flows through the engine block absorbing the heat from the engine, then flows to the radiator where the cooling fins in the radiator transfers the heat from the coolant to the atmosphere. During cold weather the ethylene-glycol or coolant prevents water present in the cooling system from freezing within temperatures indicated by mixture ratio of coolant to water.

Diagnosis and Testing

COOLANT CONCENTRATION TESTING

Check coolant concentration when any additional coolant is added to the system, or after a coolant drain, flush and refill. Use of a hydrometer or Refractometer Tool 8286, refractometer can be used to test coolant concentration.

A hydrometer tests the amount of glycol in a mixture by measuring the specific gravity of the mixture. The higher the concentration of ethylene glycol, the larger the number of balls that will float, and the higher the freeze protection (up to a maximum of 60% by volume glycol).

A Refractometer Tool 8286 tests the amount of glycol in a coolant mixture by measuring the amount a beam of light bends as it passes through the fluid.

Some coolant manufacturers use other types of glycols into their coolant formulations. Propylene glycol is the most common new coolant. However, propylene glycol based coolants do not provide the same freezing protection and corrosion protection and are not recommended.

CAUTION: Do not mix types of coolant - corrosion protection will be severely reduced.

COOLER, EGR

Description

DESCRIPTION

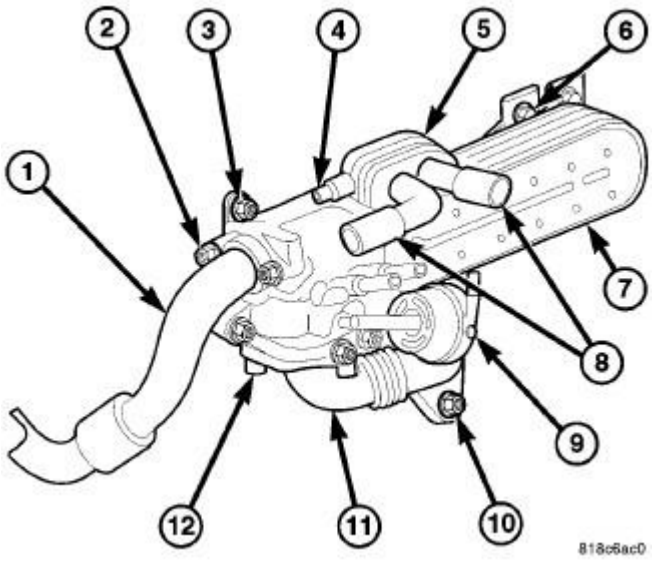

Fig. 62: EGR COOLER
Courtesy of CHRYSLER LLC

1 - EGR COOLER TO EGR VALVE TUBE 2 - MOUNTING SCREWS 3 - EGR COOLER MOUNTING SCREW 4 - MOUNTING SCREW 5 - EGR COOLER BODY 6 - EGR COOLER MOUNTING NUT 7 - EGR COOLER 8 - INLET TUBES 9 - VACUUM CONTROL UNIT
10 -EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT
11 - EGR COOLER TO EXHAUST MANIFOLD TUBE
12 - MOUNTING SCREW

The EGR cooler (7) cools recirculated exhaust gasses to reduce combustion temperature and a greater mass of exhaust gases can thus be circulated. There is less nitrogen oxides as a result.

The EGR cooler (7) allows the engine and catalytic converter to reach their operating temperature quickly.

Removal

REMOVAL

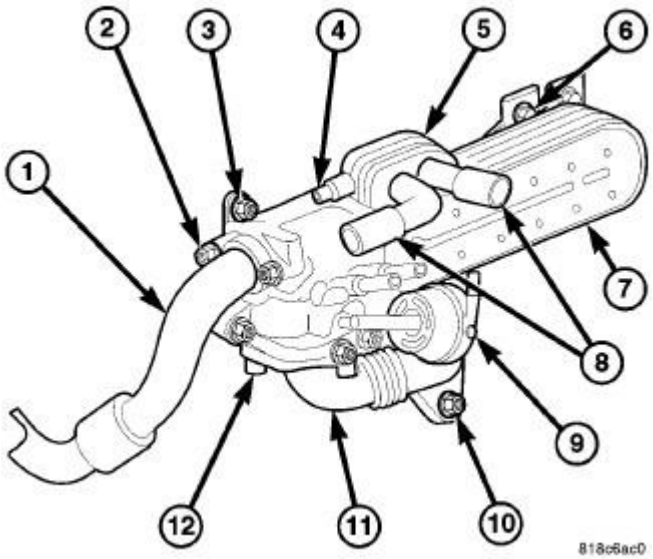

Fig. 63: EGR COOLER
Courtesy of CHRYSLER LLC

1 - EGR COOLER TO EGR VALVE TUBE 2 - MOUNTING SCREWS 3 - EGR COOLER MOUNTING SCREW

4 - MOUNTING SCREW
5 - EGR COOLER BODY
6 - EGR COOLER MOUNTING NUT
7 - EGR COOLER
8 - INLET TUBES
9 - VACUUM CONTROL UNIT
10 -EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT
11 - EGR COOLER TO EXHAUST MANIFOLD TUBE
12 - MOUNTING SCREW

1. Remove engine cover. Refer to **Engine - Removal** .
2. Drain cooling system. See **Standard Procedure** .
3. Remove EGR cooler coolant hoses (8).
4. Remove EGR cooler to exhaust manifold tube (11).
5. Remove EGR cooler to EGR valve tube (1).
6. Remove EGR cooler mounting nuts (6).
7. Remove EGR cooler (7).
8. Remove the bypass valve mounting screws (3).
9. Separate the bypass valve assembly from the EGR cooler body (5).

Installation

INSTALLATION

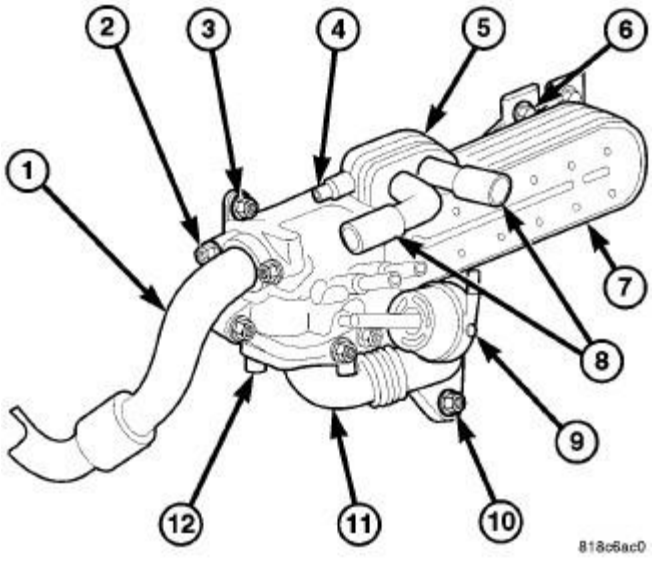

Fig. 64: EGR COOLER
Courtesy of CHRYSLER LLC

1 - EGR COOLER TO EGR VALVE TUBE 2 - MOUNTING SCREWS 3 - EGR COOLER MOUNTING SCREW 4 - MOUNTING SCREW 5 - EGR COOLER BODY 6 - EGR COOLER MOUNTING NUT 7 - EGR COOLER 8 - INLET TUBES 9 - VACUUM CONTROL UNIT
10 -EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT
11 - EGR COOLER TO EXHAUST MANIFOLD TUBE
12 - MOUNTING SCREW

1. Using a new gasket, position the bypass valve assembly to the EGR cooler body (5). Tighten screws to 10 N.m (88 in. lbs.).
2. Position EGR cooler (7) and install mounting screws. Tighten to 10 N.m (88 in. lbs.).
3. Install EGR cooler to exhaust manifold tube (11). Tighten bolts to 20 N.m (14 ft. lbs.) and nuts to 20 N.m (14 ft. lbs.).
4. Install EGR cooler to EGR valve tube (1). Tighten bolts to 20 N.m (14 ft. lbs.).
5. Install coolant hoses.
6. Install vacuum line.
7. Fill cooling system. See **Standard Procedure** .
8. Install engine cover. Refer to **Engine - Installation** .

DRAINCOCK, RADIATOR

Removal

DRAINCOCK

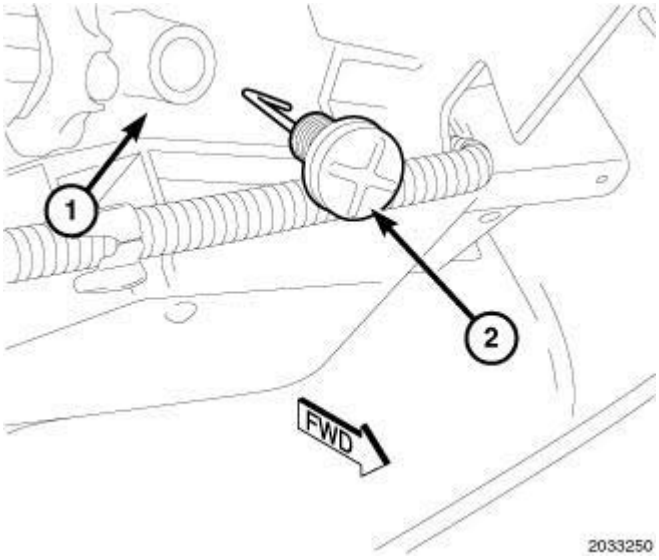

Fig. 65: DRAINCOCK & RADIATOR TANK
Courtesy of CHRYSLER LLC

CAUTION: Use of pliers on draincock is not recommended. Damage may occur to radiator or draincock.

NOTE: It is not necessary to remove draincock during a routine coolant drain.

1. Remove belly pan (if equipped).
2. Drain the cooling system. See **Standard Procedure** .
3. Open the draincock (2) by turning it counterclockwise until it stops.
4. Turn the draincock (2) back (clockwise) 1/8 turn.
5. Pull the draincock (2) from the radiator tank (1).

Installation

DRAINCOCK

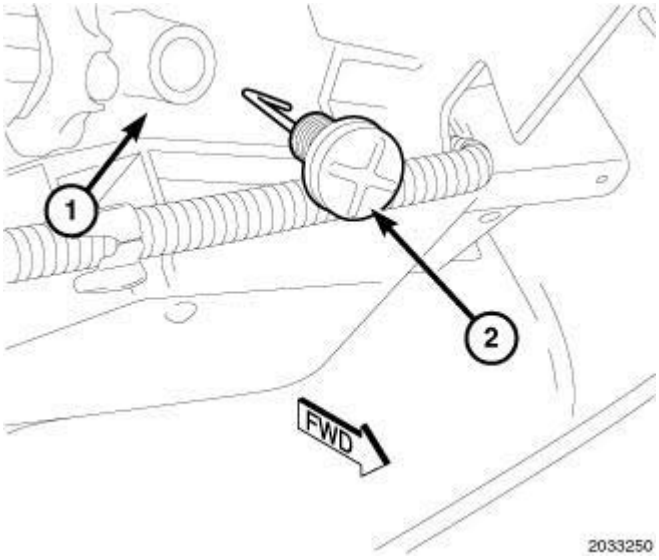

Fig. 66: DRAINCOCK & RADIATOR TANK
Courtesy of CHRYSLER LLC

1. Align draincock (2) stem to radiator tank (1) opening.
2. Push draincock (2) into the radiator tank (1) opening.
3. Tighten the draincock (2) by turning clockwise until it stops.
4. Fill the cooling system. See **Standard Procedure** .
5. Install belly pan (if equipped).

FAN, COOLING

Description

DESCRIPTION

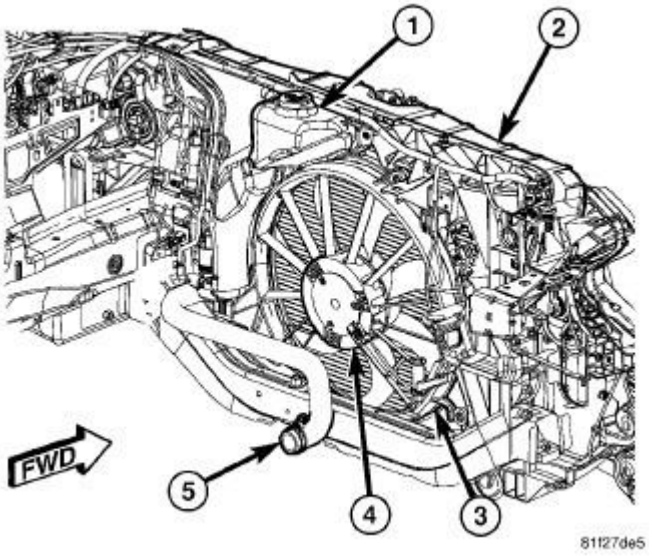

Fig. 67: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

1 - WINDSHIELD WASHER RESERVOIR 2 - UPPER SUPPORT
3 - FAN SHROUD
4 - FAN MOTOR
5 - LOWER RADIATOR HOSE

The radiator fan module includes a support shroud (2) with an electrically driven motor (1) with a fan blade. The radiator fan module is attached to the radiator.

Operation

OPERATION

The radiator fans are controlled by the Powertrain Control Module (PCM) which energizes a high speed or low speed fan relay. The electric motor drives the cooling fan to produce air flow across the radiator fins.

Diagnosis and Testing

RADIATOR FAN CONTROL

Fan control is accomplished three ways. The fan runs when the air conditioning pressure reaches a set pressure, refer to RADIATOR FAN OPERATION charts. In addition to this control, the fan is turned on by the temperature of the coolant which is sensed by the coolant temperature sensor which sends the message to the Powertrain Control Module (PCM). The PCM turns on the fan through a fan relay. On models equipped with automatic transmission, a transmission fluid thermistor may have some influences on fan operation. See **WIRING HARNESS - SERVICE INFORMATION** for circuity and diagnostics provided.

The Powertrain Control Module (PCM) provides fan control for the following conditions:

- The fan will not run during cranking until the engine starts no matter what the coolant temperature is.
- Fan will run when the air conditioning clutch is engaged, and once set compressor head pressure is reached. See charts.
- Fan will run according to the following information charts.

RADIATOR FAN OPERATION - 2.4L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	**Low**	**High**	N/A	N/A
Fan On:	104°C (219°F)	110°C (230°F)	N/A	N/A
Fan Off:	99°C (210°F)	105°C (221°F)	N/A	N/A
A/C On	**Low**	**High**	**Low**	**High**
Fan On:	99°C (210°F)	110°C (230°F)	1,448 Kpa (210 psi)	1,718 Kpa (249 psi)
Fan Off:	93°C (199°F)	105°C (221°F)	1,207 Kpa (175 Psi)	1,585 Kpa (229 Psi)

EATX Fluid Temperature	Low Speed	High Speed
Fan On:	109°C (228°F)	111°C (232°F)
Fan Off:	104°C (220°F)	109°C (228°F)

RADIATOR FAN OPERATION - 2.7L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	**Low**	**High**	N/A	N/A
Fan On:	104°C (220°F)	110°C (230°F)	N/A	N/A
Fan Off:	98°C (208°F)	105°C (221°F)	N/A	N/A
A/C On	**Low**	**High**	**Low**	**High**
Fan On:	99°C (210°F)	110°C (230°F)	1,448 Kpa (210 psi)	1,718 Kpa (249 psi)
Fan Off:	93°C (199°F)	105°C (221°F)	1,207 Kpa (175 psi)	1,585 kpa (229 psi)

EATX Fluid Temperature	Low Speed	High Speed
Fan On:	109°C (228°F)	111°C (232°F)
Fan Off:	104°C (220°F)	109°C (228°F)

RADIATOR FAN OPERATION - 3.5L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	**Low**	**High**	N/A	N/A
Fan On:	102°C (215°F)	104°C (219°F)	N/A	N/A
Fan Off:	98°C (208°F)	100°C (212°F)	N/A	N/A

A/C On	Low	High	Low	High
Fan On:	102°C (215°F)	104°C (219°F)	1,526 Kpa (221 psi)	1,932 Kpa (280 psi)
Fan Off:	98°C (208°F)	100°C (212°F)	1,246 Kpa (180 psi)	1,666 Kpa (224 psi)

EATX Fluid Temperature	Low Speed	High Speed
Fan On:	102°C (215°F)	110°C (230°F)
Fan Off:	97°C (206° F)	107°C (224°F)

ELECTRIC FAN MOTOR TEST

Refer to the appropriate Diagnostic Service Information for testing the fan motor with the scan tool.

For wiring diagrams of the fan motor systems refer to **WIRING HARNESS - SERVICE INFORMATION** .

Removal

REMOVAL

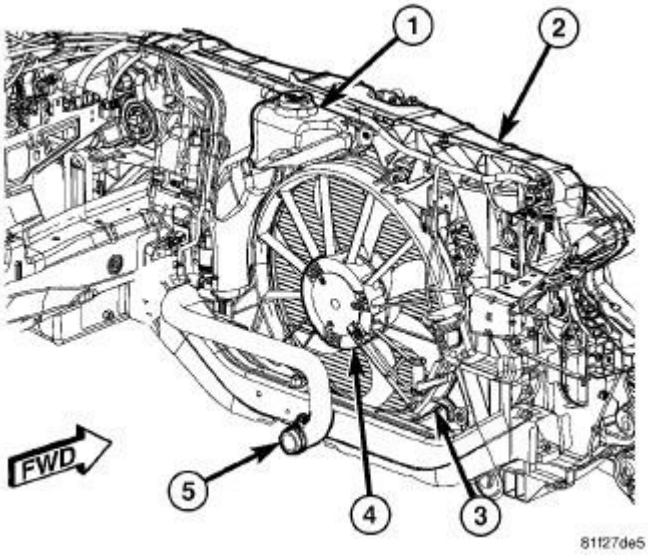

Fig. 68: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

1 - WINDSHIELD WASHER RESERVOIR 2 - UPPER SUPPORT
3 - FAN SHROUD
4 - FAN MOTOR
5 - LOWER RADIATOR HOSE

1. Disconnect and isolate negative battery cable.
2. Remove windshield washer reservoir.
3. Drain cooling system below level of the upper radiator hose. See **Standard Procedure** .
4. Remove upper radiator hose at radiator and position aside.
5. Disconnect radiator fan electrical connector.
6. Remove fasteners and un-clip radiator fan assembly from radiator.
7. Remove radiator fan assembly by lifting upward.

Inspection

INSPECTION

Inspect fan blades for damage. If the fan blades are warped, cracked, or otherwise damaged, it must be replaced with **only** the recommended replacement part for adequate strength, performance and safety.

Check fan motor operation. If fan motor is inoperative, and the fan blades are not damaged, the fan motor can be replaced separately.

Installation

INSTALLATION

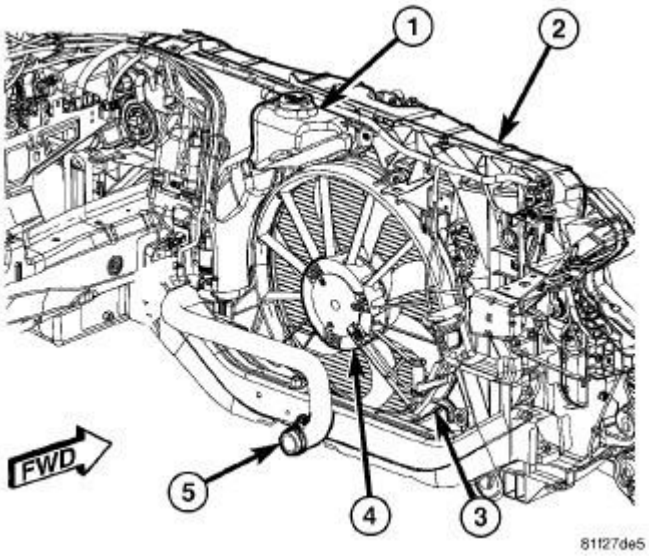

Fig. 69: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

1 - WINDSHIELD WASHER RESERVOIR 2 - UPPER SUPPORT
3 - FAN SHROUD

4 - FAN MOTOR
5 - LOWER RADIATOR HOSE

1. Position radiator fan into retaining clips.
2. Install mounting bolts. Tighten bolts to 35 N.m (25 ft. lbs.)
3. Connect radiator fan electrical connector.
4. Install windshield washer reservoir.
5. Install upper radiator hose at radiator.
6. Fill cooling system. See **Standard Procedure**.
7. Connect negative battery cable.

HEATER, ENGINE BLOCK

Description

2.4L

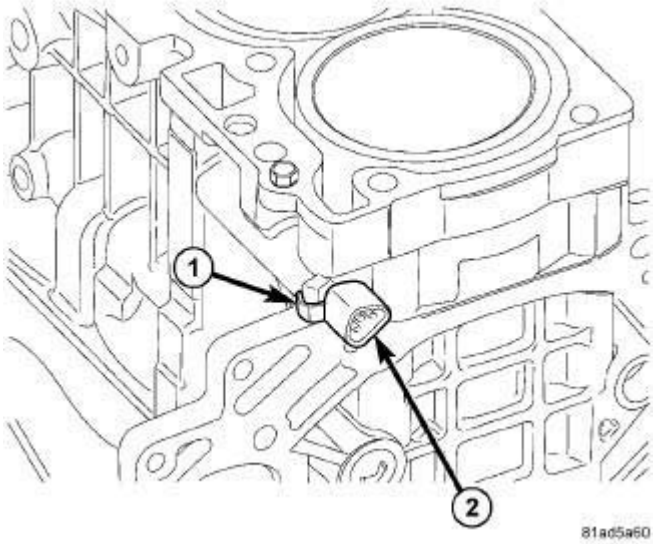

Fig. 70: BLOCK HEATER 2.4L ENGINE
Courtesy of CHRYSLER LLC

1 - RETAINING CLIP
2 - BLOCK HEATER

CAUTION: The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.

The block heater is operated by ordinary house current (110 Volt A.C.) through a power cord and connector

located in the engine compartment. The heater is mounted in a bore in the engine block and held in place by a retaining clip.

2.7L

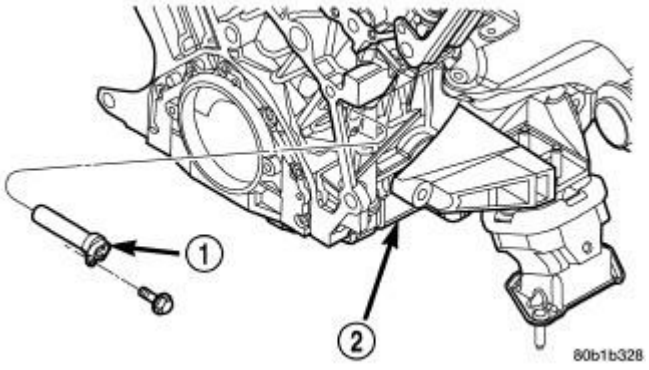

Fig. 71: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

1 - BLOCK HEATER 2 - ENGINE - RIGHT SIDE

The engine block heater is mounted in the cylinder block, near the right rear corner. The block heater is a dry cylinder type design and is powered by 110 volt AC. **The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.**

Operation

OPERATION

When power is applied (110 volt A.C.) to the block heater, the heating element transfers heat through the aluminum engine block and into the coolant without directly penetrating the cooling system.

Diagnosis and Testing

ENGINE BLOCK HEATER TESTING

If unit does not operate, test power cord for continuity with a 110-volt voltmeter or 110-volt test light. Test heater element continuity with an ohmmeter or 12-volt test light.

Removal

2.4L

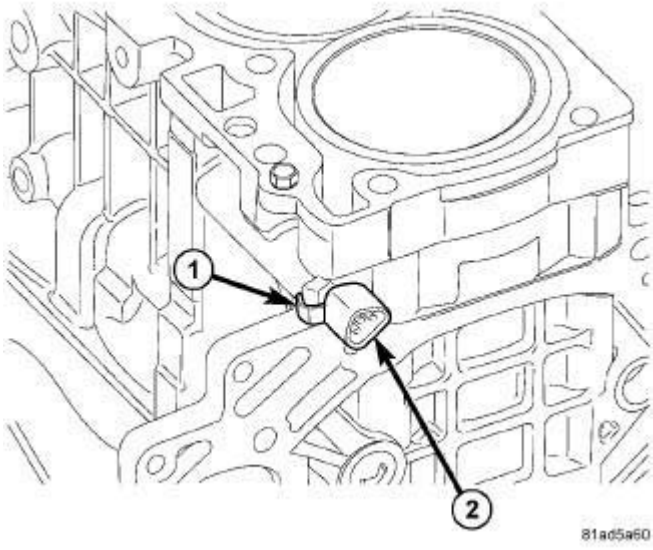

Fig. 72: BLOCK HEATER 2.4L ENGINE
Courtesy of CHRYSLER LLC

1 - RETAINING CLIP 2 - BLOCK HEATER

1. Detach power cord plug from block heater.
2. Unclip retainer clip. Remove block heater assembly.

2.7L

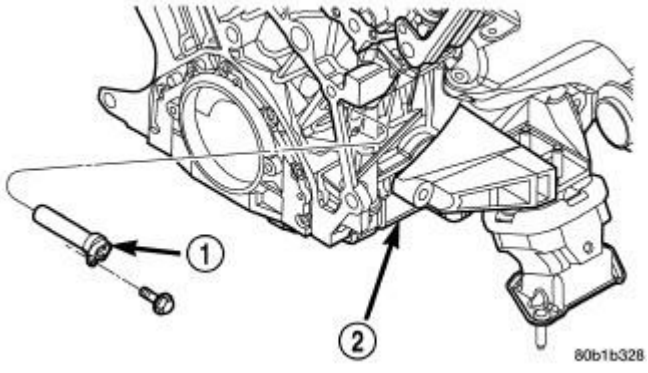

Fig. 73: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

1 - BLOCK HEATER 2 - ENGINE - RIGHT SIDE

1. Raise vehicle on hoist.

2. Detach power cord plug from heater.
3. Remove block heater attaching screw located below heater terminals.
4. Remove block heater from cylinder block.

3.5L

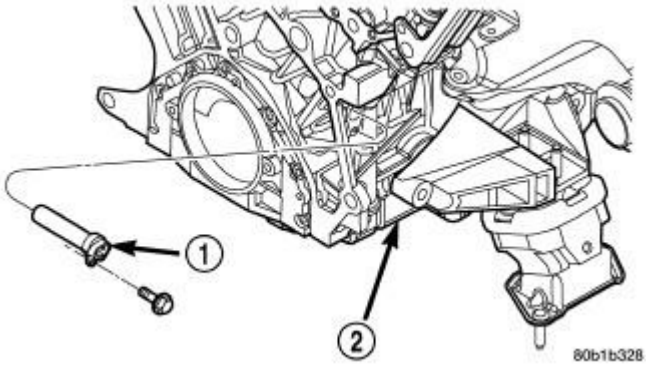

Fig. 74: Engine Block Heater
Courtesy of CHRYSLER LLC

1 - BLOCK HEATER 2 - ENGINE - RIGHT SIDE

1. Raise vehicle on hoist.
2. Detach power cord plug from heater.
3. Remove block heater attaching screw located below heater terminals.
4. Remove block heater from cylinder block.

Installation

2.4L

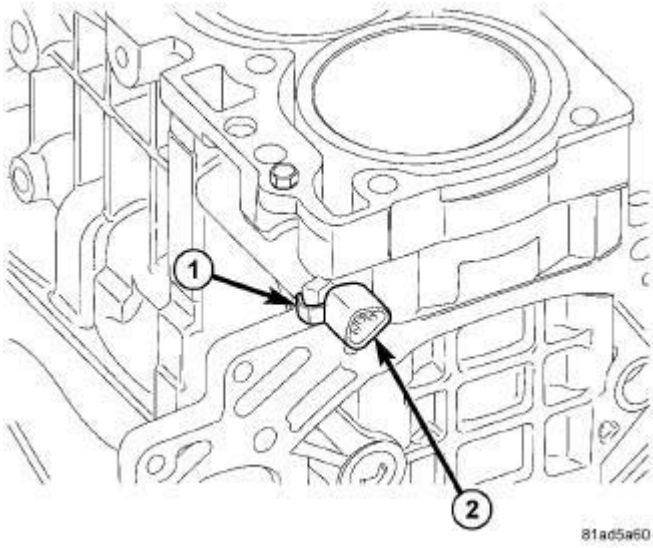

Fig. 75: BLOCK HEATER 2.4L ENGINE
Courtesy of CHRYSLER LLC

1 - RETAINING CLIP 2 - BLOCK HEATER

CAUTION: To prevent damage, the power cord must be secured in it's retaining clips, and not positioned so it could contact linkages or exhaust manifold.

1. Thoroughly clean block heater bore.
2. Insert block heater assembly. Make sure retaining clip engages on cylinder block.
3. Connect power cord to heater.
4. Lower vehicle.

2.7L

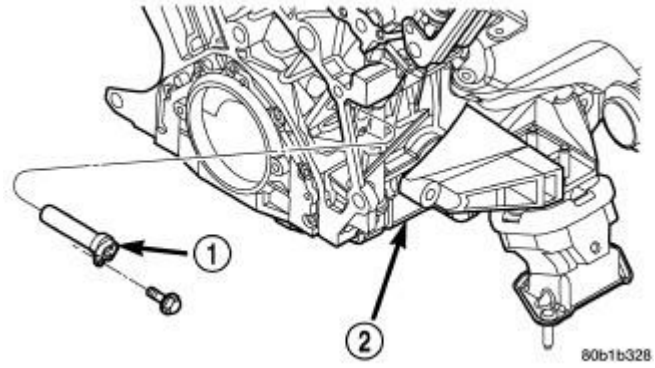

Fig. 76: ENGINE BLOCK HEATER

Courtesy of CHRYSLER LLC

1 - BLOCK HEATER 2 - ENGINE - RIGHT SIDE

1. Thoroughly clean cylinder block heater cavity.
2. Insert heater assembly into block such that mounting hole is located below heater terminals.
3. Install mounting screw and tighten to 12 N.m (105 in. lb.).

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

4. Attach power cord to heater.
5. Lower vehicle.

3.5L

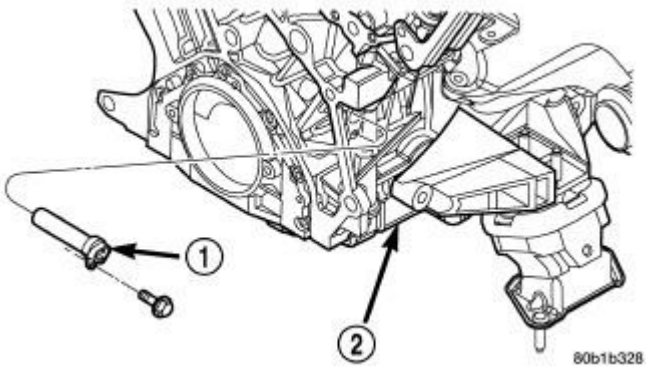

Fig. 77: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

1 - BLOCK HEATER 2 - ENGINE - RIGHT SIDE

1. Thoroughly clean cylinder block heater cavity.
2. Insert heater assembly into block such that mounting hole is located below heater terminals.
3. Install mounting screw and tighten to 12 N.m (105 in. lb.).

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

4. Attach power cord to heater.

5. Lower vehicle.

HOUSING, COOLANT OUTLET

Removal

REMOVAL

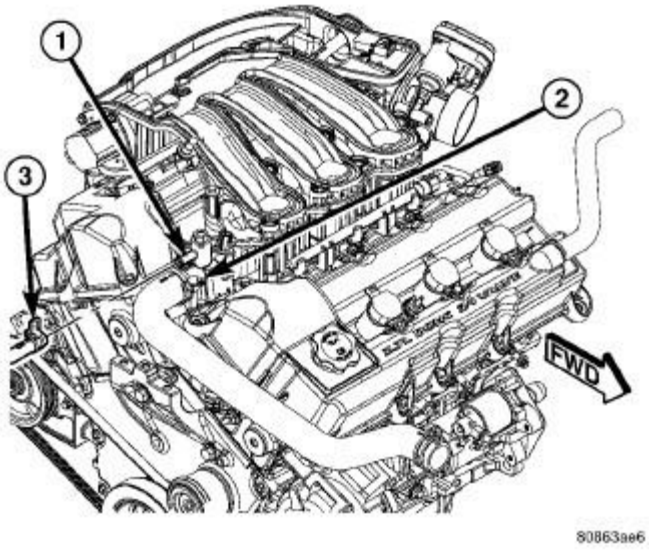

Fig. 78: COOLANT OUTLET CONNECTOR - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT (2)
2 - BOLT (2)
3 - COOLANT OUTLET CONNECTOR

WARNING: Do not remove pressure cap with the system hot and under pressure because serious burns from coolant can occur.

1. Drain cooling system. See **Standard Procedure**
2. Disconnect engine coolant temperature sensor connector.
3. Disconnect hoses at coolant outlet connector.
4. Remove bolts attaching coolant outlet connector.
5. Remove coolant outlet connector.

Installation

INSTALLATION

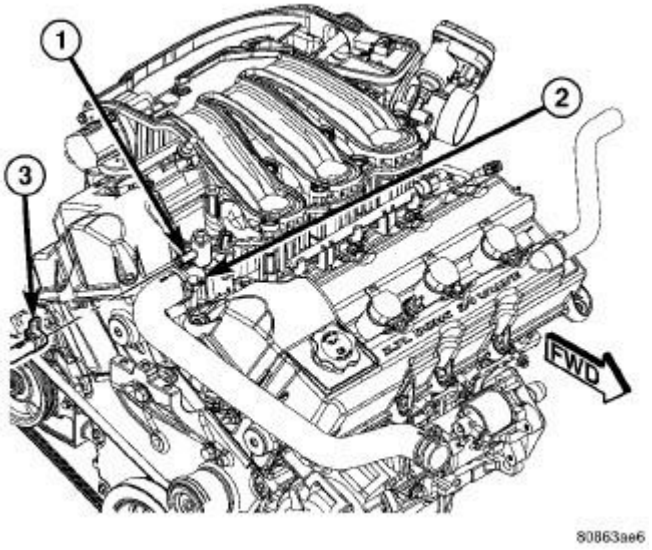

Fig. 79: COOLANT OUTLET CONNECTOR - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT (2)
2 - BOLT (2)
3 - COOLANT OUTLET CONNECTOR

1. Clean sealing surfaces. Inspect gaskets for tears and cuts. Replace as necessary.
2. Install coolant outlet connector and tighten bolts to 12 N.m (105 in. lbs.).
3. Connect hoses at coolant outlet connector.
4. Connect engine coolant temperature sensor connector.
5. Fill cooling system. See **Standard Procedure**

PUMP, WATER

Description

2.4L

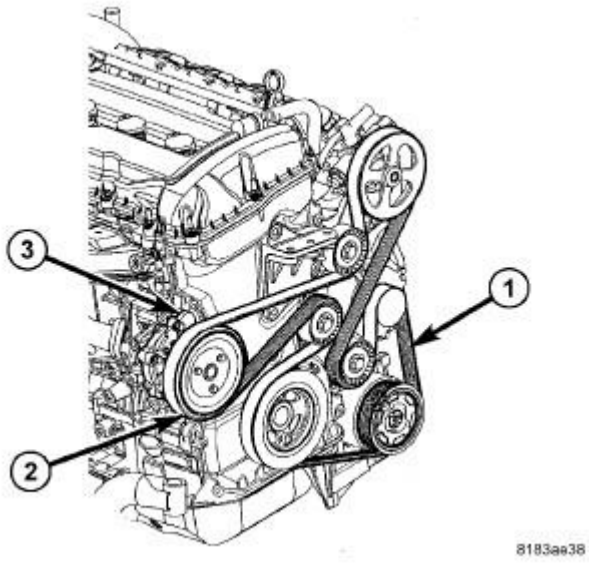

Fig. 80: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - ACCESSORY DRIVE BELT 2 - WATER PUMP PULLEY
3 - WATER PUMP

The water pump (3) on the world engine is attached to the water pump adapter on the front of the cylinder block.

The water pump is driven by the accessory drive belt. The water pump is connected to the water plenum by the return tube.

DESCRIPTION - 2.7L

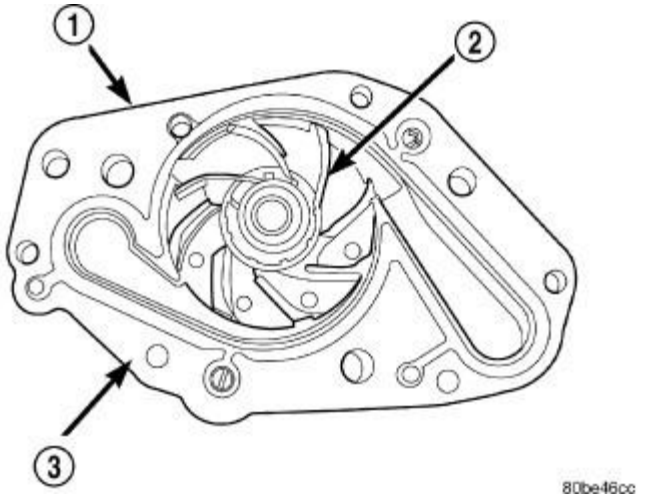

Fig. 81: Water Pump - 2.7L Engine

Courtesy of CHRYSLER LLC

1 - WATER PUMP BODY 2 - IMPELLER 3 - GASKET

The 2.7L pump has a die cast aluminum housing and a plastic swept vane impeller. It bolts directly to the cylinder block, behind the timing chain cover. The water pump is driven by the back side of the engine's primary timing chain.

Standard Procedure

COOLANT AIR EVACUATION

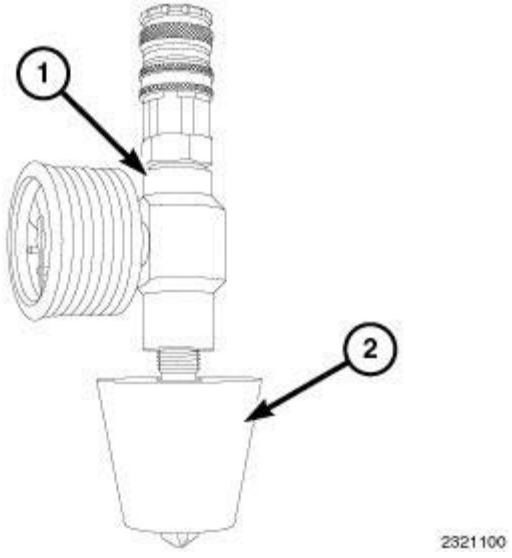

Fig. 82: PRESSURIZED AIR OPERATED VACUUM GENERATOR
Courtesy of CHRYSLER LLC

Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

NOTE: To avoid damage to the cooling system, ensure that no component would be susceptible to damage when a vacuum is drawn on the system.

WARNING: ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH

ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.

WARNING: WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.

NOTE: The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.

NOTE: For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the motor).

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating service specification for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).

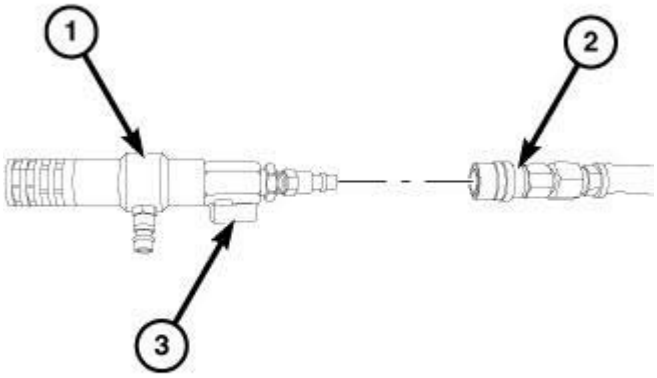

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Fig. 83: VACUUM GENERATOR/VENTURI BALL VALVE
Courtesy of CHRYSLER LLC

4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) (minimum

shop air requirement of 80 PSI/5.5 bar) to the vacuum generator/venturi (1).

5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adapter cone is sealed properly.

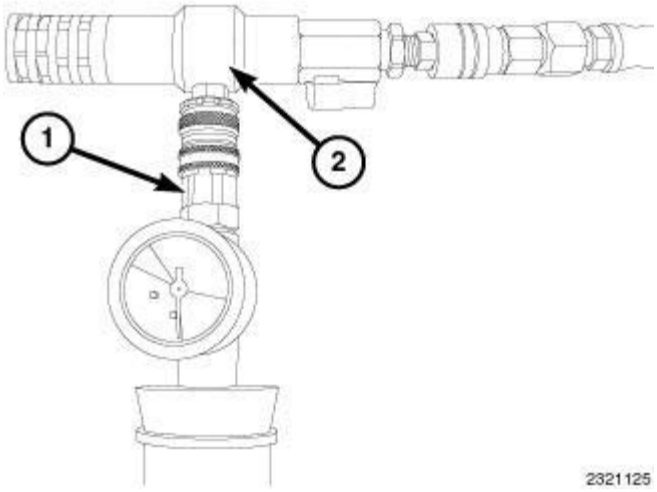


Fig. 84: VACUUM GENERATOR/VENTURI
Courtesy of CHRYSLER LLC

6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

NOTE: Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating service information for appropriate pressure readings.

NOTE: If a strong vacuum is being created in the system, it is normal to see the radiator hoses to collapse.

9. Close the vacuum generator/venturi ball valve.

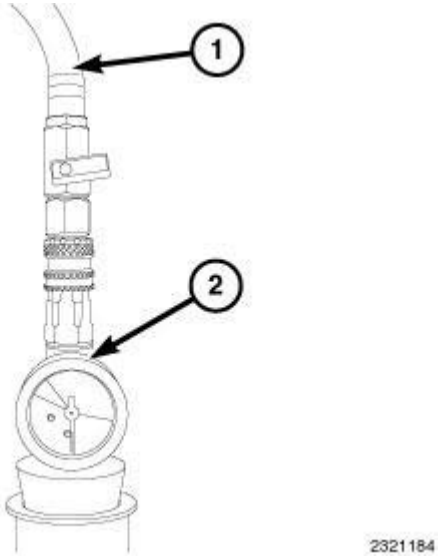


Fig. 85: VACUUM GENERATOR/VENTURI AND AIR LINE
Courtesy of CHRYSLER LLC

10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

NOTE: Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).

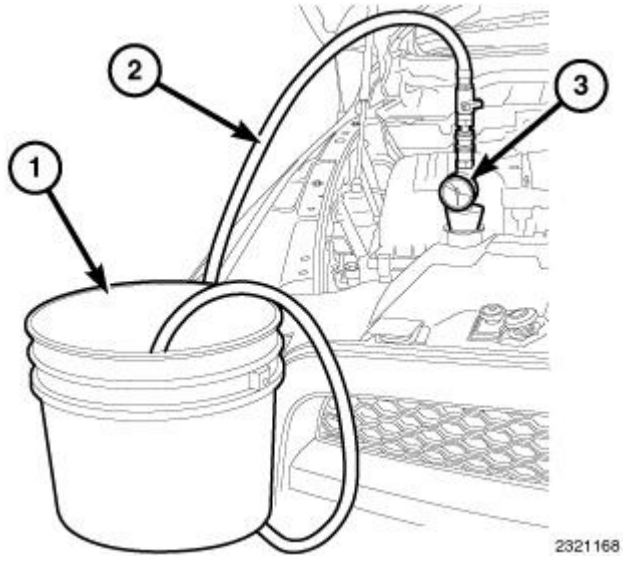


Fig. 86: SUCTION HOSE BALL VALVE
Courtesy of CHRYSLER LLC

14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

NOTE: On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

Removal

2.4L ENGINE

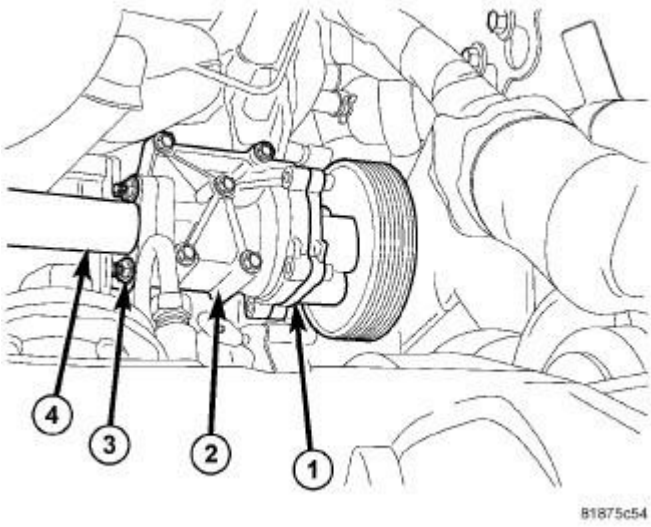


Fig. 87: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - WATER PUMP
2 - MOUNTING BOLT
3 - WATER INLET TUBE NUTS
4 - INLET WATER TUBE

1. Remove the accessory drive belt. See **Removal** .
2. Raise vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
3. Remove accessory drive belt splash shield.
4. Drain cooling system. See **Standard Procedure** .
5. Remove screws attaching water pump pulley (1). Remove pulley (1).
6. Remove water pump mounting bolts (2).
7. Remove water pump (3).

2.7L ENGINE

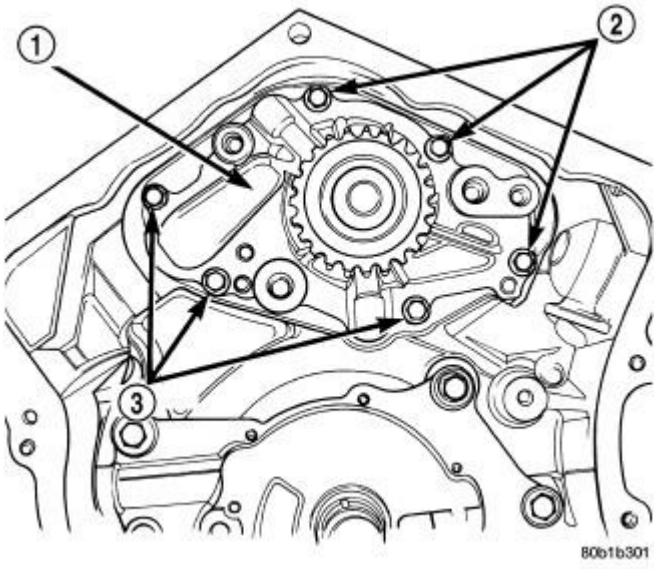


Fig. 88: WATER PUMP - 2.7L
Courtesy of CHRYSLER LLC

1 - WATER PUMP
2 - BOLTS
3 - BOLTS

WARNING: Do not remove pressure cap with the system hot and pressurized. Serious burns from coolant can result.

1. Disconnect negative battery cable.
2. Drain cooling system. See **Standard Procedure**.

NOTE: The water pump is driven by the primary timing chain.

3. Remove the timing chain cover, timing chain, and all chain guides. Refer to **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal** .
4. Remove bolts attaching water pump to block.
5. Remove water pump and gasket.

3.5L ENGINE

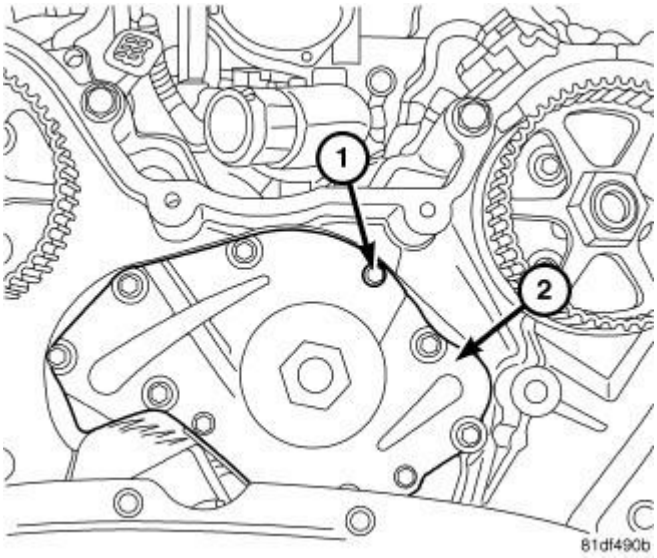


Fig. 89: WATER PUMP - 3.5L
Courtesy of CHRYSLER LLC

1 - MOUNTING BOLTS 2 - WATER PUMP

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain on water pump body). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident on water pump body from the weep hole (shaft seal failure). Be sure to perform a thorough analysis before replacing water pump.

1. Drain cooling system. See **Standard Procedure** .
2. Remove engine timing belt. Refer to **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal** .
3. Remove water pump mounting bolts. Note position of longer bolt for proper re-installation.
4. Remove water pump body from engine.
5. Clean water pump mounting surface.

2.0L DIESEL

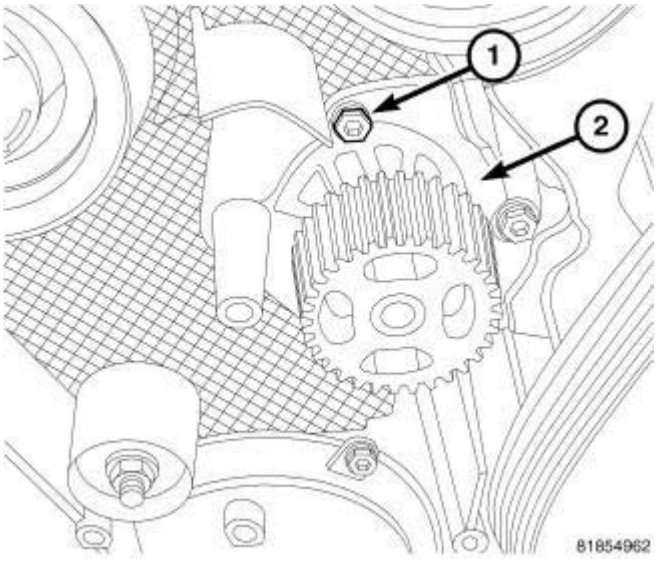


Fig. 90: WATER PUMP - 2.0L DIESEL
Courtesy of CHRYSLER LLC

1 - BOLT 2 - WATER PUMP

1. Remove timing chain. Refer to **Engine/Valve Timing/BELT, Timing - Removal** .
2. Remove water pump mounting bolts (1).
3. Remove water pump (2).
4. Remove O-ring from water pump.

Cleaning

CLEANING

Clean gasket mating surfaces as necessary.

Inspection

INSPECTION - 2.7L

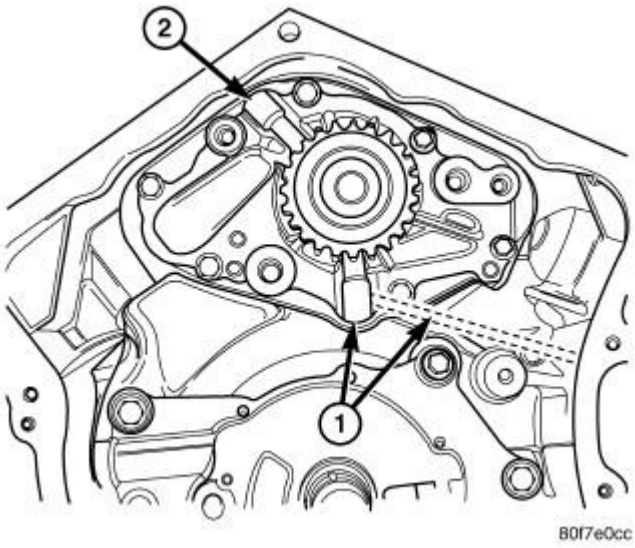


Fig. 91: WATER PUMP WEEP PASSAGES - 2.7L
Courtesy of CHRYSLER LLC

1 - PRIMARY WEEP PASSAGE 2 - SECONDARY WEEP PASSAGE

Inspect and replace the water pump if it has any of the following defects:

1. Damage or cracks on the pump body.
2. Coolant leaks: If the shaft seal is leaking, this will be evident by traces of thick deposits of dried glycol running down from the pump primary weep passage. A thin black stain below the pump primary weep hole/passage is considered normal operation.
3. Coolant leaks: If the pump primary weep passage is plugged, coolant may come from the secondary weep passage and collect in the valley of the engine. The coolant will eventually run out the back side of the engine. Leakage from the secondary weep passage may give false indications that core plug(s) may be leaking on the back side of the engine block. If this condition is found, clean the primary weep passage of debris.
4. Impeller rubs inside of cylinder block.
5. Excessively loose or rough turning bearing.

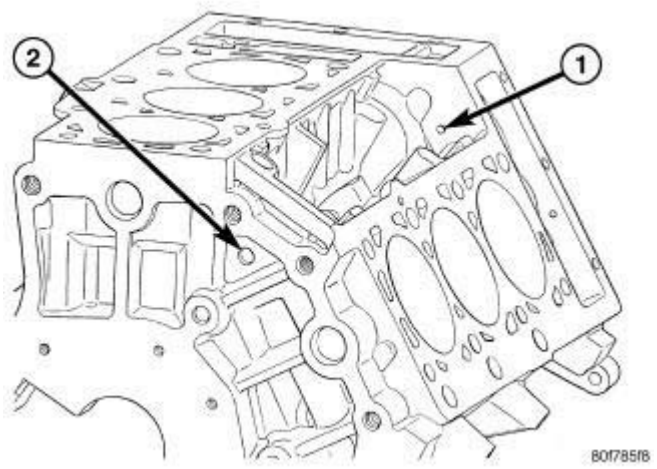


Fig. 92: SECONDARY WATER PUMP WEEP PASSAGE - 2.7L
Courtesy of CHRYSLER LLC

1 - WEEP PASSAGE TO VALLEY OF BLOCK
2 - HOLE IN REAR OF BLOCK

NOTE: **It is normal for the water pump to weep a small amount of coolant from the primary weep hole (black stain at weep passage). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident from the primary weep passage. This indicates a shaft seal failure and pump must be replaced. Coolant may leak from the secondary weep passage and fill the valley of the engine. If this condition is found, clean the primary weep passage of debris. Be sure to perform a thorough analysis before replacing water pump.**

Disassembly

WATER PUMP - GAS ENGINE

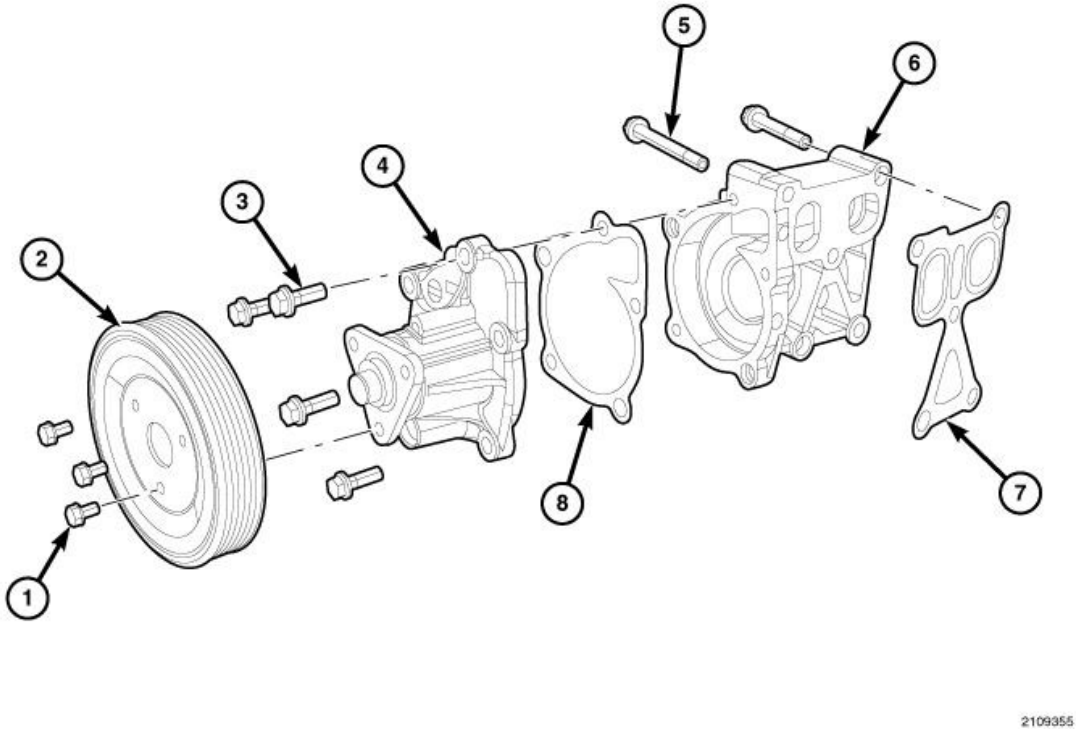


Fig. 93: WATER PUMP ASSEMBLY
Courtesy of CHRYSLER LLC

1. Remove the water pump assembly from the vehicle. See **Removal**
2. Discard the water pump outlet gasket (7).
3. Remove the three bolts (1) attaching the water pump pulley (2) to the water pump (4).
4. Remove the water pump pulley (2).
5. Remove the five bolts (3) attaching the water pump (4) to the water pump adapter (6).
6. Remove and discard the gasket (8).
7. Remove the water pump (4) and inspect carefully for any damage. See **Inspection**

Assembly

WATER PUMP - GAS ENGINE

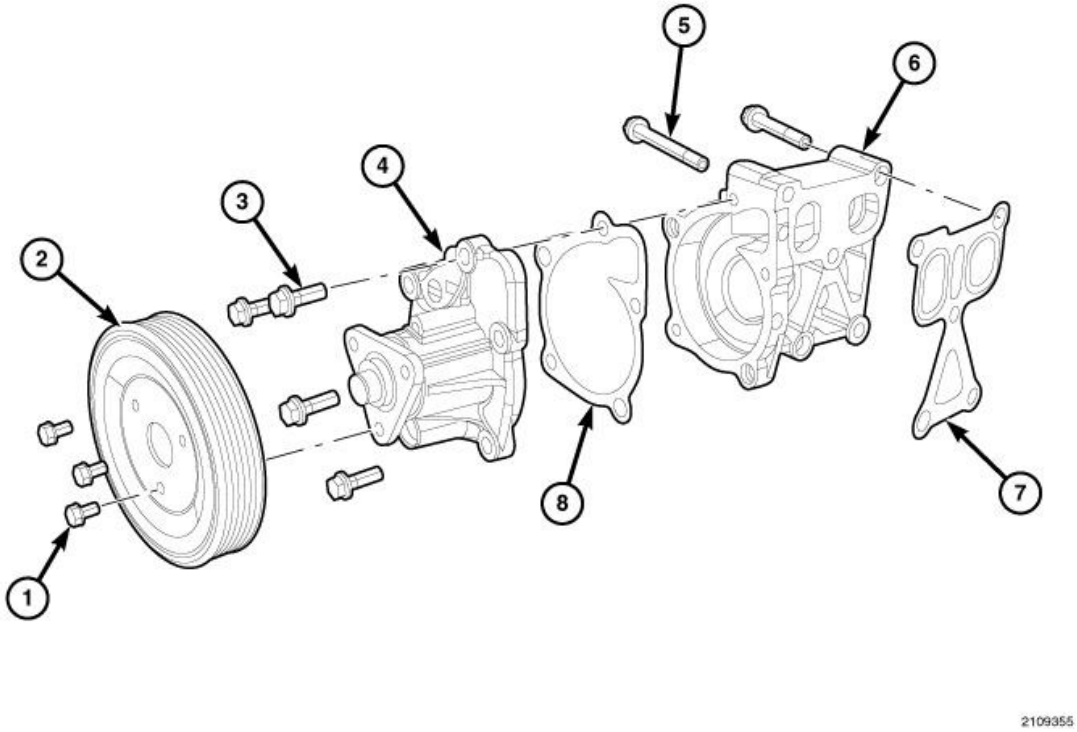


Fig. 94: WATER PUMP ASSEMBLY
Courtesy of CHRYSLER LLC

1. Thoroughly clean all gasket mating surfaces before assembling.
2. Inspect water pump and components for any damage. See **Inspection**
3. Using bolts (3), install the water pump (4) and gasket (8) to the water pump adapter (6). Tighten the bolts (3) to 22 N-m (16 lbs. ft.)
4. Using bolts (1), install the water pump pulley (2) to the water pump (4). Tighten the bolts (1) to 9 N-m (80 lbs. in.)
5. Using bolts (5), install the water pump assembly and gasket to the engine block. Tighten the bolts to 24 N.m (18 lbs. ft.). See **Cooling/Engine/PUMP, Water - Installation**
6. Start the engine and check for leaks. See **Diagnosis and Testing**

Installation

2.4L ENGINE

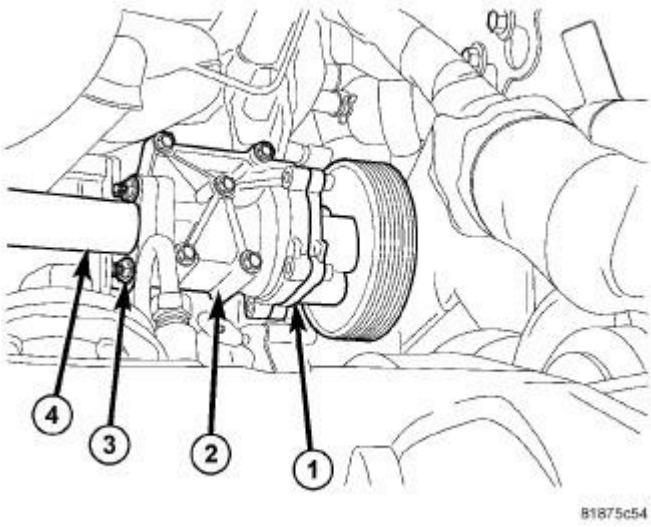


Fig. 95: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - WATER PUMP
2 - MOUNTING BOLT
3 - WATER INLET TUBE NUTS
4 - INLET WATER TUBE

1. Position water pump assembly (1) and gasket onto cylinder block.
2. Position water inlet tube (4) and gasket onto water pump (1).
3. Install mounting bolts (2). Tighten bolts to 25.5 N.m (225 in. lbs.).
4. Install drive belt splash shield.
5. Lower vehicle.
6. Install accessory drive belt. See **Installation** .
7. Evacuate air and refill cooling system. See **Standard Procedure**
8. Check cooling system for leaks. See **Diagnosis and Testing**

2.7L ENGINE

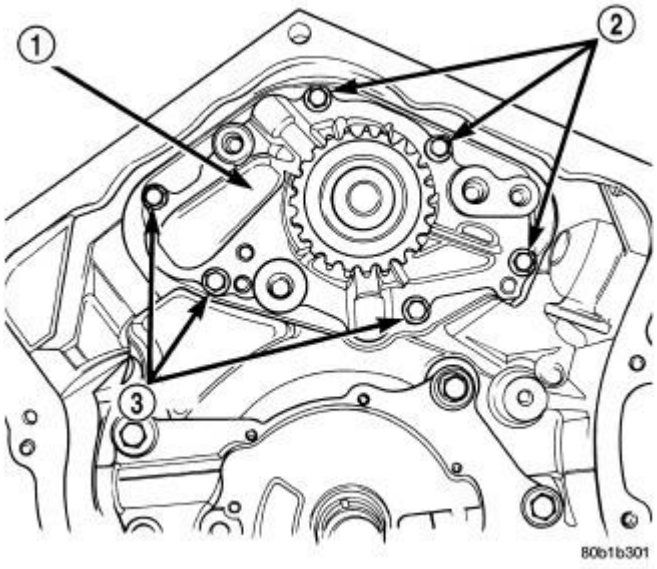


Fig. 96: WATER PUMP - 2.7L
Courtesy of CHRYSLER LLC

1 - WATER PUMP 2 - BOLTS 3 - BOLTS

1. Clean all sealing surfaces.
2. Install water pump and gasket. Tighten mounting bolts to 12 N.m (105 in. lbs.).
3. Install timing chain guides, timing chain, and timing chain cover. Refer to **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation** .
4. Reconnect negative battery cable.
5. Evacuate air and refill cooling system. See **Standard Procedure**
6. Check cooling system for leaks. See **Diagnosis and Testing**

3.5L ENGINE

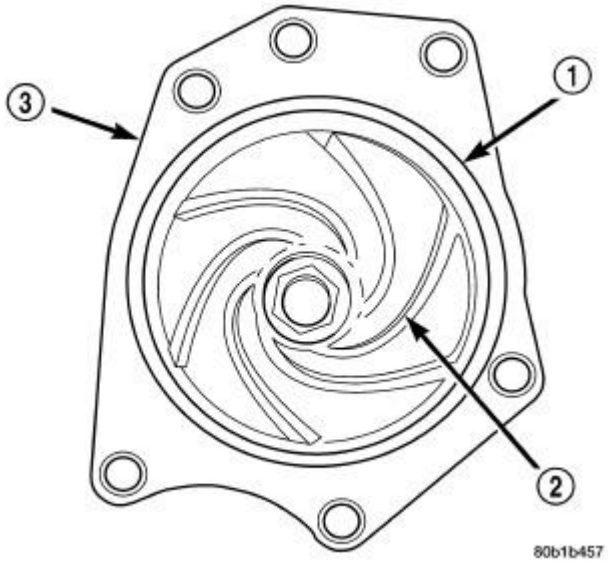


Fig. 97: WATER PUMP - 3.5L ENGINE
Courtesy of CHRYSLER LLC

1 - O-RING
2 - IMPELLER
3 - WATER PUMP BODY

1. Clean all O-ring surfaces on pump and cover.
2. Install new O-ring on water pump.
3. Position water pump to engine.
4. Install mounting bolts and tighten to 12 N.m (105 in. lbs.).
5. Install timing belt. Refer to **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation** .
6. Evacuate air and refill cooling system. See **Standard Procedure**
7. Check cooling system for leaks. See **Diagnosis and Testing**

2.0L DIESEL

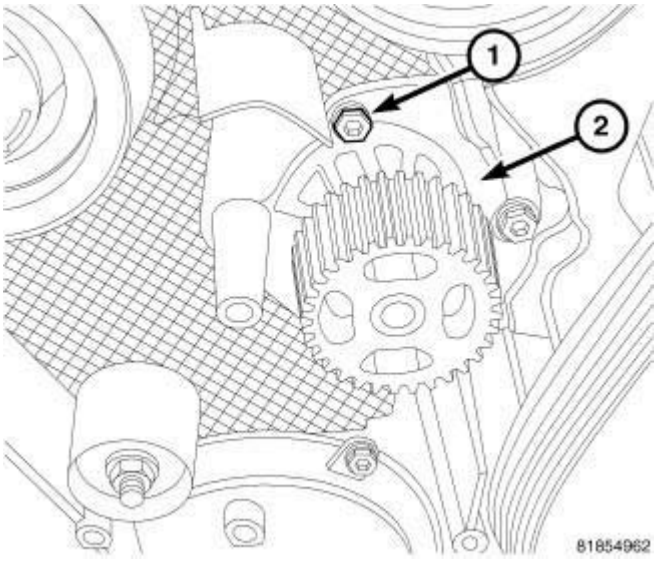


Fig. 98: WATER PUMP - 2.0L DIESEL
Courtesy of CHRYSLER LLC

1 - BOLT 2 - WATER PUMP

1. Clean the O-ring mating surfaces on water pump (2) and front of timing chain cover.
2. Install O-ring onto water pump (2).
3. Apply a small amount of petroleum jelly to lubricate O-ring.
4. Install water pump and mounting bolts. Tighten bolts (1) to mounting bolts to 24 N.m (18 ft. lbs.).
5. Install timing belt. Refer to **Engine/Valve Timing/BELT, Timing - Installation** .
6. Evacuate air and refill cooling system. See **Standard Procedure**
7. Check cooling system for leaks. See **Diagnosis and Testing**

RADIATOR, ENGINE COOLING

Description

DESCRIPTION

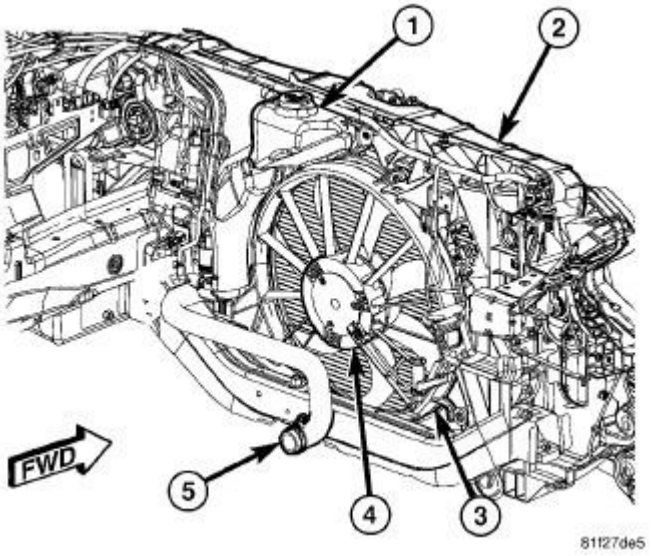


Fig. 99: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

1 - WINDSHIELD WASHER RESERVOIR 2 - UPPER SUPPORT
3 - FAN SHROUD
4 - FAN MOTOR
5 - LOWER RADIATOR HOSE

All vehicles are equipped with a cross flow type radiator with plastic side tanks.

Plastic tanks, while stronger than brass, are subject to damage by impact, such as from tools or wrenches. Handle radiator with care.

Removal

RADIATOR

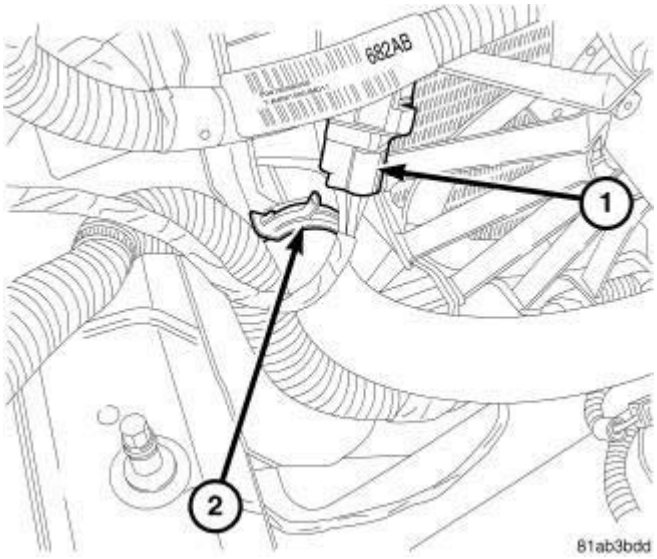


Fig. 100: UPPER RADIATOR HOSE
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR 2 - UPPER RADIATOR HOSE

1. Disconnect negative cable from auxiliary jumper terminal.
2. Remove engine cover.
3. Remove air box assembly. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .
4. Recover A/C system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .

WARNING: Do not remove pressure cap or any hose with the system hot and under pressure because serious burns from coolant can occur.

5. Drain cooling system. See **Standard Procedure** .
6. Remove the grille.
7. Remove under belly pan (if equipped).
8. Remove front bottom splash shield (if equipped).
9. Remove upper and lower radiator hoses at radiator.
10. Disconnect radiator fan electrical connector (1).

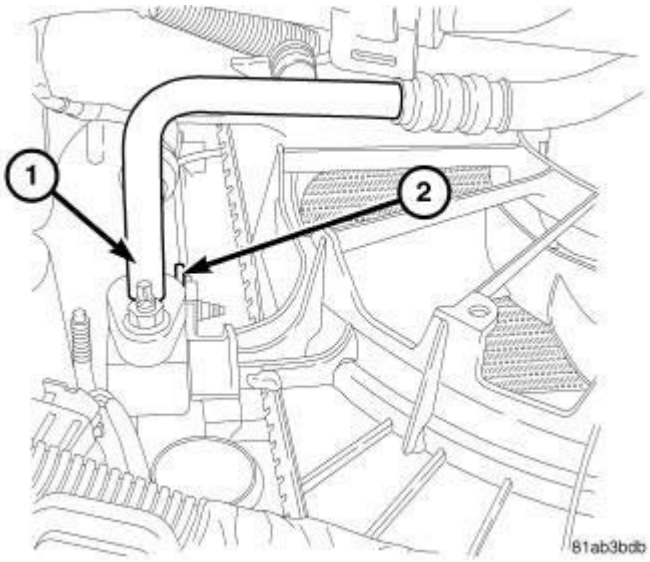


Fig. 101: A/C LINE
Courtesy of CHRYSLER LLC

1 - A/C LINE
2 - SUPPORT BRACKET

11. Separate radiator cooling fans from radiator.
12. Disconnect A/C line (1) at condenser/cooler.
13. Remove transmission oil cooler tubes support bracket at left side of radiator (if equipped) (2).

CAUTION: Plastic tanks, while stronger than brass are subject to damage by impact, such as wrenches.

14. Remove the two torx screws located on the upper radiator support that hold the upper radiator mounting brackets.
15. Tilt the top of the radiator rearward so the mounting brackets slide out of the upper core support.
16. Remove radiator/condenser assembly by lifting the assembly out of the vehicle between the engine and the core support.
17. Separate the A/C condenser from the radiator.

Cleaning

CLEANING

Clean radiator fins are necessary for good heat transfer. The radiator and air conditioning fins should be cleaned when an accumulation of debris has occurred. With the engine cold, apply cold water and compressed air to the back (engine side) of the radiator to flush the radiator and/or A/C condenser of debris.

Inspection

INSPECTION

Inspect the radiator tanks for cracks, broken or missing fittings also inspect the joint where the tanks seam up to the radiator core for signs of leakage and/or deteriorating seals.

Inspect radiator core for corroded, bent or missing cooling fins. Inspect the core for bent or damaged cooling tubes.

Installation

RADIATOR

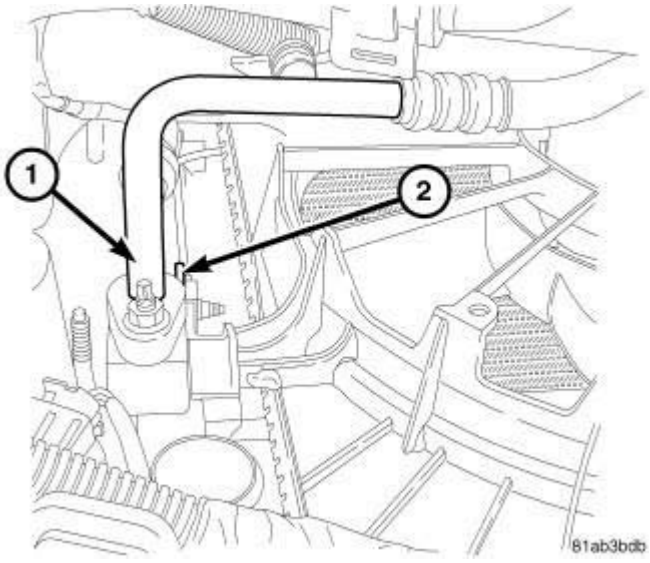


Fig. 102: A/C LINE
Courtesy of CHRYSLER LLC

1 - A/C LINE 2 - SUPPORT BRACKET

1. Position radiator cooling fans on radiator.
2. Position combination A/C condenser/cooler on radiator.
3. Slide radiator into position and seat the radiator assembly lower rubber isolators in the mount holes.
4. Install A/C lines (1) to condenser.
5. Install support bracket (2) to radiator. Tighten mounting screws to 5 N.m (45 in. lbs.).
6. Connect cooling fan electrical connector (1).
7. Install lower radiator hose at radiator.
8. Install upper radiator mount.
9. Install front bottom splash shield

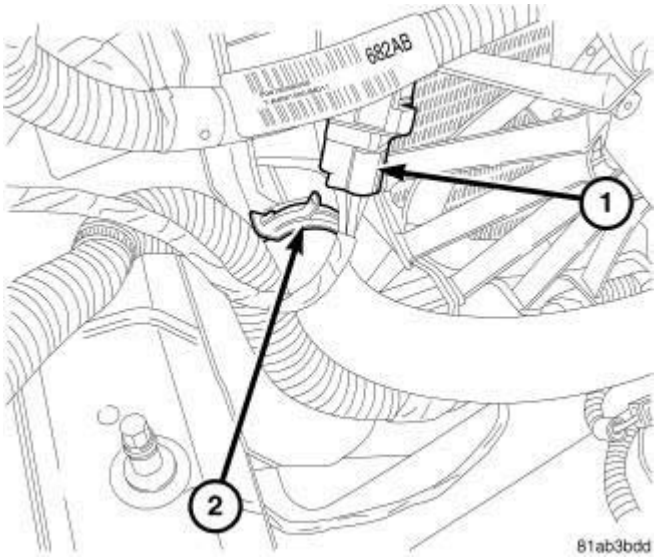


Fig. 103: UPPER RADIATOR HOSE
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR
2 - UPPER RADIATOR HOSE

10. Install under engine splash shield.
11. Fill cooling system. See **Standard Procedure** .
12. Charge A/C system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
13. Install air filter housing. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .
14. Install engine cover.
15. Install transmission oil cooler tube support bracket and attaching screw to left side of radiator. Tighten mounting screw to 5 N.m (45 in. lbs.).
16. Connect hoses to radiator.
17. Install radiator fan.
18. Connect radiator fan electrical connector.
19. Connect negative cable.

SENSOR, COOLANT TEMPERATURE

Description

DESCRIPTION

There are two Engine Coolant Temperature (ECT) Sensors. One of the sensors threads into the block. The other sensor is located at the top of the coolant adapter housing. The ECT Sensor is a negative thermal coefficient sensor.

2.7L ENGINE

The Engine Coolant Temperature (ECT) Sensor threads into the coolant outlet connector. The ECT Sensor is a negative thermal coefficient sensor.

3.5L ENGINE

The Engine Coolant Temperature (ECT) Sensor threads into the lower intake manifold. The ECT Sensor is a negative thermal coefficient sensor.

Operation

OPERATION

The ECT sensor provides an input to the PCM. As temperature increases, resistance of the sensor decreases. As coolant temperature varies, the ECT sensor resistance changes resulting in a different voltage value at the PCM ECT sensor signal circuit. The ECT sensor provides input for various PCM operations. The PCM uses the input to control air-fuel mixture, timing, and radiator fan on/off times. The PCM uses ECT sensor input to send messages over the CAN bus to various modules for other functions such as temperature gauge and AC operation.

Removal

2.4L

CYLINDER BLOCK MOUNTED

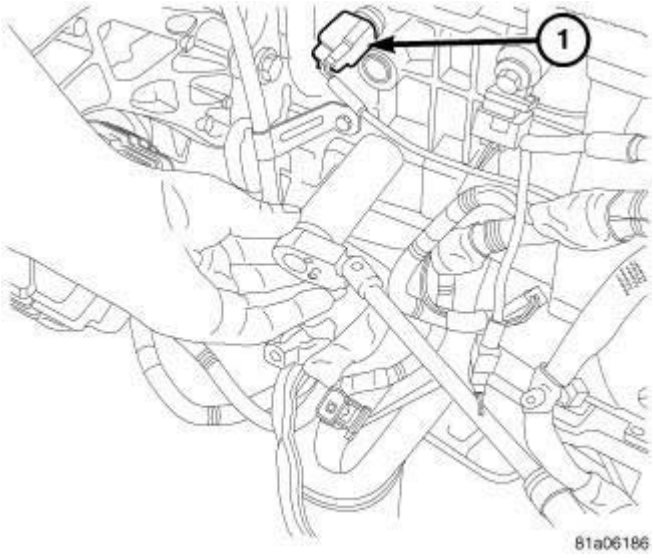


Fig. 104: ECT Sensor
Courtesy of CHRYSLER LLC

1 - ECT

1. Disconnect negative battery cable.
2. Partially drain cooling system below level of ECT Sensor.

3. Disconnect ECT Sensor electrical connector.
4. Remove ECT Sensor.

COOLANT ADAPTER MOUNTED

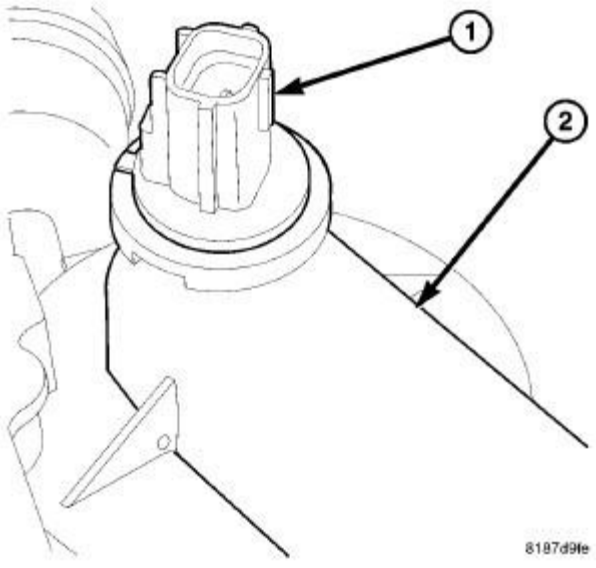


Fig. 105: ECT SENSOR AND COOLANT ADAPTER
Courtesy of CHRYSLER LLC

1 - ETC 2 - COOLANT ADAPTER

1. Disconnect negative battery cable.
2. Partially drain cooling system below level of ECT Sensor (1).
3. Disconnect ECT Sensor electrical connector.
4. Remove ECT Sensor (1).

2.7L ENGINE

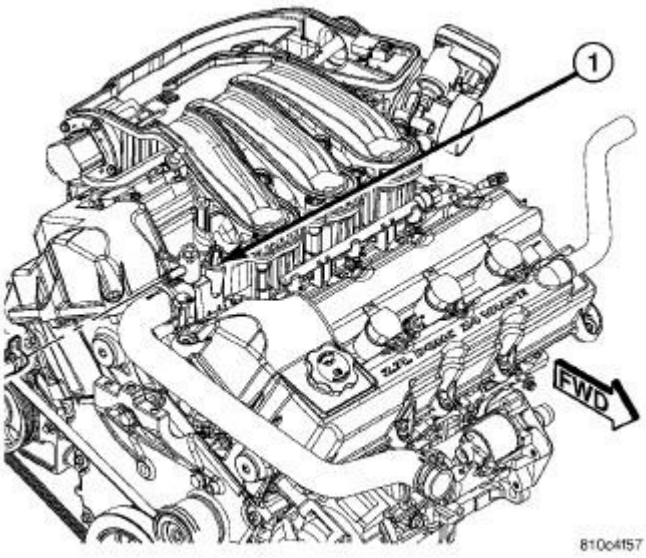


Fig. 106: ECT SENSOR 2.7L
Courtesy of CHRYSLER LLC

1 - ECT SENSOR

1. Partially drain cooling system below level of ECT sensor.
2. Remove upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
3. Disconnect ECT sensor electrical connector.
4. Remove ECT sensor.

3.5L ENGINE

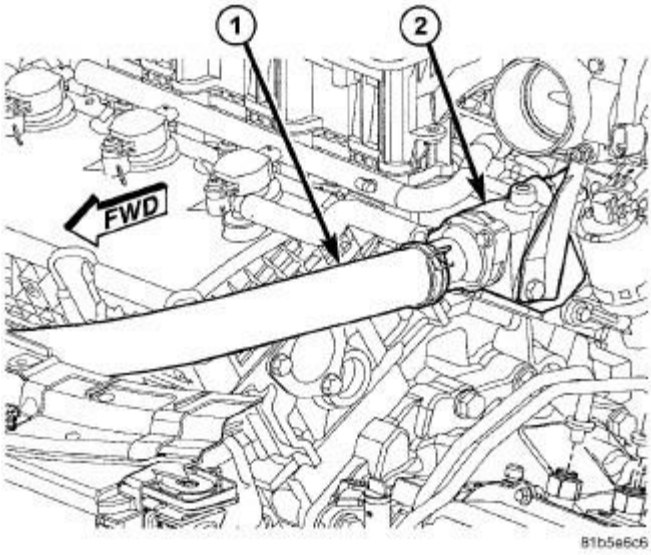


Fig. 107: 3.5L THERMOSTAT HOUSING
Courtesy of CHRYSLER LLC

1 - THERMOSTAT HOUSING
2 - RADIATOR HOSE

1. Disconnect negative battery cable.
2. Partially drain cooling system. See **Standard Procedure** .
3. Disconnect coolant sensor electrical connector.
4. Remove coolant temperature sensor.

DIESEL ENGINE

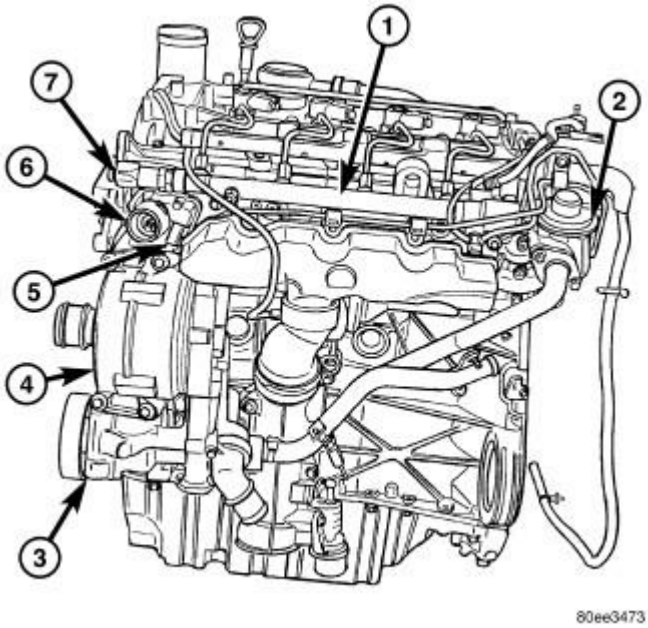


Fig. 108: THERMOSTAT AND SENSOR
Courtesy of CHRYSLER LLC

1 - FUEL RAIL
2 - EGR VALVE
3 - POWER STEERING PUMP
4 - GENERATOR
5 - COOLANT TEMPERATURE SENSOR
6 - THERMOSTAT HOUSING
7 - FUEL RAIL PRESSURE SENSOR

1. Disconnect negative battery cable.

2. Remove engine cover. Refer to **Engine - Removal** .
3. Partially drain coolant system below pressurized coolant recovery container. See **Standard Procedure** .
4. Unplug coolant temperature sensor electrical connector.

NOTE: Capture any residual coolant that may flow.

5. Remove coolant temperature sensor (5).

Installation

2.4L

COOLANT ADAPTER MOUNTED

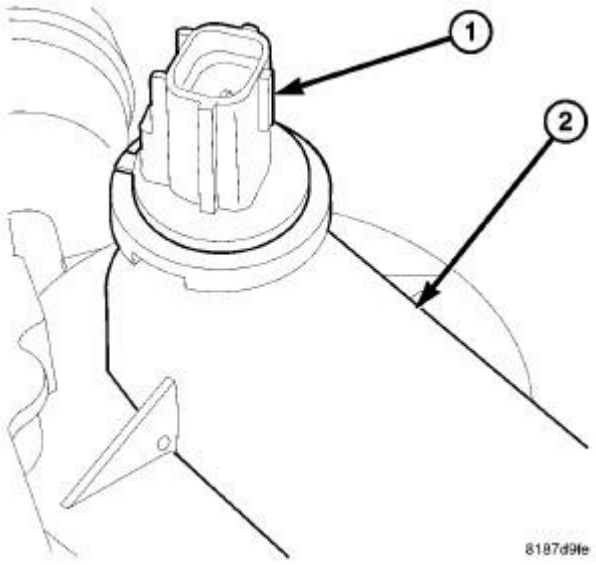


Fig. 109: ECT SENSOR AND COOLANT ADAPTER
Courtesy of CHRYSLER LLC

1 - ETC 2 - COOLANT ADAPTER

1. Install ECT Sensor (1). Make sure coolant sensor is locked in place
2. Reconnect ECT Sensor electrical connector.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

CYLINDER BLOCK MOUNTED

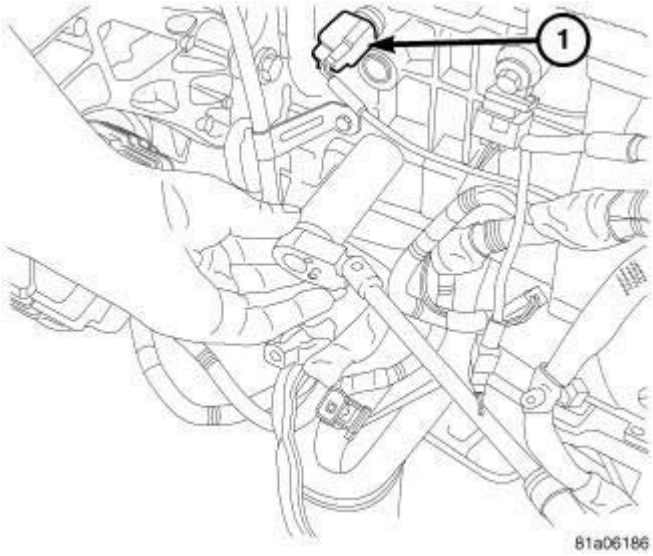


Fig. 110: ECT Sensor
Courtesy of CHRYSLER LLC

1 - ECT

1. Install ECT Sensor. Tighten sensor to 19 N.m (168 in. lbs.).
2. Reconnect ECT Sensor electrical connector.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

2.7L ENGINE

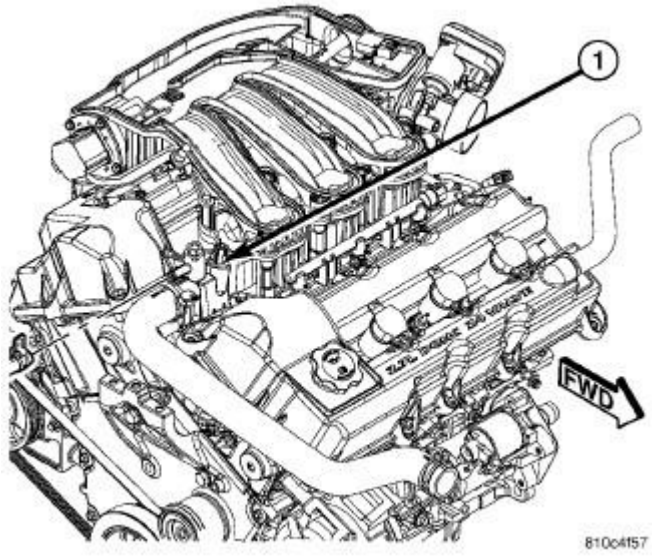


Fig. 111: ECT SENSOR 2.7L
Courtesy of CHRYSLER LLC

1 - ECT SENSOR

1. Install ECT sensor. Tighten sensor to 19 N.m (168 in. lbs.).
2. Reconnect ECT sensor electrical sensor.
3. Fill cooling system. See **Standard Procedure** .

3.5L ENGINE

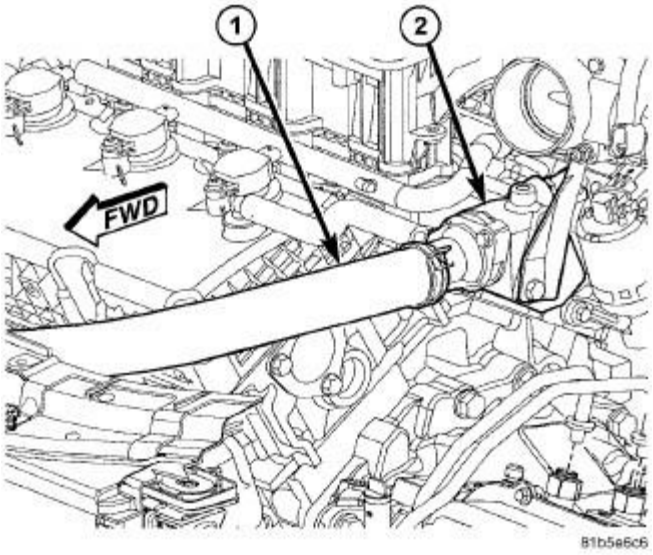


Fig. 112: 3.5L THERMOSTAT HOUSING
Courtesy of CHRYSLER LLC

1 - THERMOSTAT HOUSING 2 - RADIATOR HOSE

1. Install engine coolant temperature sensor. Tighten sensor to 28 N.m (20 ft. lbs.) torque.
2. Attach electrical connector to sensor.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

DIESEL ENGINE

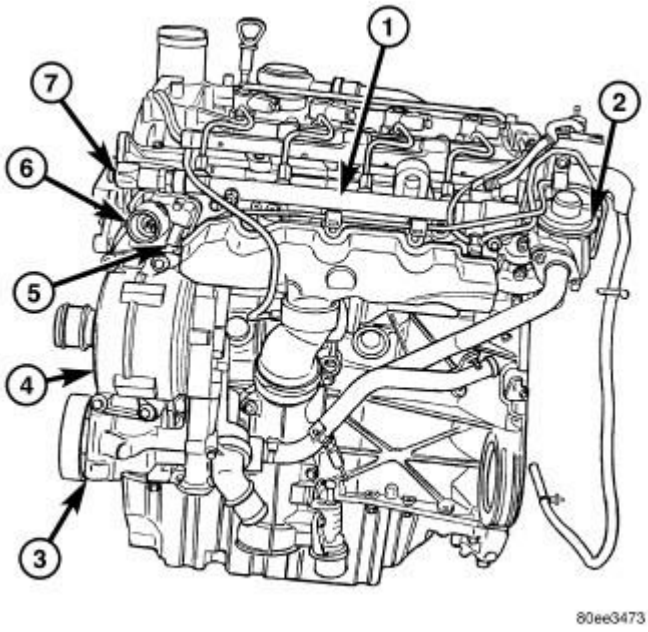


Fig. 113: THERMOSTAT AND SENSOR
Courtesy of CHRYSLER LLC

1 - FUEL RAIL
2 - EGR VALVE
3 - POWER STEERING PUMP
4 - GENERATOR
5 - COOLANT TEMPERATURE SENSOR
6 - THERMOSTAT HOUSING
7 - FUEL RAIL PRESSURE SENSOR

1. Position and install coolant temperature sensor (5).
2. Connect coolant temperature sensor electrical connector.

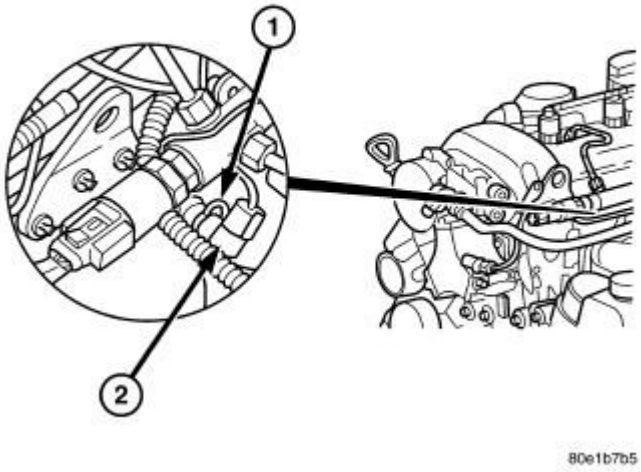


Fig. 114: ENGINE COOLANT TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

1 - RETAINING CLAMP 2 - ENGINE COOLANT TEMPERATURE SENSOR

3. Refill coolant system to proper level with proper mixture of coolant. See **Standard Procedure** .
4. Install engine cover. Refer to **Engine - Installation** .
5. Connect negative battery cable.

WARNING: Use extreme caution when engine is operating. Do not stand in a direct line with fan. Do not put your hands near pulleys, belts or fan. Do not wear loose clothes.

6. Start engine and inspect for leaks.

THERMOSTAT

Description

2.0L DIESEL/2.4L ENGINE

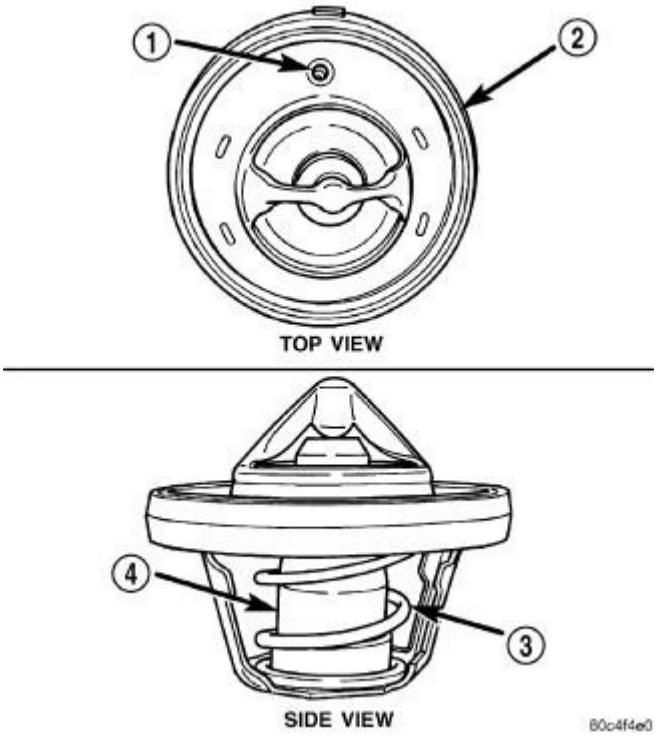


Fig. 115: THERMOSTAT
Courtesy of CHRYSLER LLC

1 - AIR BLEED
2 - SEAL
3 - RETURN SPRING
4 - PELLET CHAMBER

The primary thermostat for the 2.0L diesel and 2.4L gas engines are located on the front of the water plenum in the thermostat housing/coolant inlet. The thermostat has an air bleed vent located on its flange. The air bleed vent (1) and the locator dimple on thermostat seal provide for proper positioning of thermostat in inlet housing.

The 2.4L engine has a secondary thermostat. The secondary thermostat is located in the cylinder head under the water plenum.

2.7L/3.5L

The thermostat is located on the lower left side of engine, near the front. The thermostat is on the inlet side of the water pump. It has an air bleed located in the thermostat flange. The air bleed allows internal trapped air during cooling system filling to be released.

Operation

OPERATION

The engine cooling thermostat is a wax pellet driven, reverse poppet choke type. The thermostat is designed to provide the fastest warm up possible by preventing leakage through it and to guarantee a minimum engine operating temperature of 88 to 93°C (192 to 199°F). The thermostat also will automatically reach wide open so it will not restrict flow to the radiator as temperature of the coolant rises in hot weather to around 104°C (220° F). Above this temperature the coolant temperature is controlled by the radiator, fan, and ambient temperature, not the thermostat.

Diagnosis and Testing

ENGINE COOLANT THERMOSTAT TESTING

The thermostat is operated by a wax filled container (pellet) which is sealed. When heated coolant reaches a predetermined temperature the wax pellet expands enough to overcome the closing spring and water pump pressure, which forces the valve to open. Coolant leakage into the pellet will cause a thermostat to fail open. Do not attempt to free up a thermostat with a screwdriver.

The thermostat that opens too soon type failure mode is included in the on-board diagnosis. The check engine light will be lit by an open too soon condition. If it has failed open, a Diagnostic Trouble Code (DTC) will be set. Do not change a thermostat for lack of heater performance or temperature gauge position, unless a DTC is present. For other probable causes. See **Diagnosis and Testing** . Thermostat failing shut is the normal long term mode of failure, and normally, only on high mileage vehicles. The temperature gauge will indicate this.

Removal

2.4L - PRIMARY THERMOSTAT

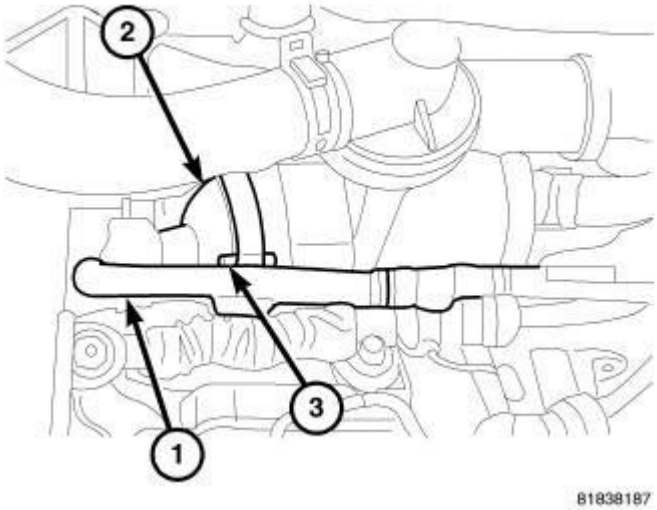


Fig. 116: PRIMARY THERMOSTAT
Courtesy of CHRYSLER LLC

1 - COOLANT HOSE 2 - INLET HOUSING
3 - BOLT

1. Partially drain cooling system. See **Standard Procedure** .
2. Remove air filter housing.
3. Disconnect coolant hose (1) from inlet housing (2).
4. Remove inlet housing bolts (3).
5. Remove thermostat assembly, and clean sealing surfaces.

2.4L - SECONDARY THERMOSTAT

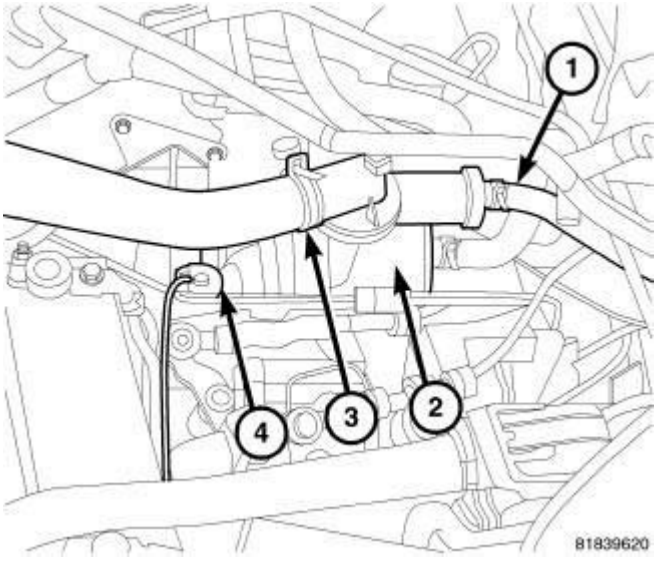


Fig. 117: SECONDARY THERMOSTAT
Courtesy of CHRYSLER LLC

1 - COOLANT HOSE (REAR) 2 - COOLANT ADAPTER
3 - RADIATOR HOSE
4 - RADIATOR HOSE (FRONT)

1. Partially drain cooling system. See **Standard Procedure** .
2. Remove air filter housing.
3. Disconnect coolant hoses (1) from rear of coolant adapter (2).
4. Remove radiator hose (3).
5. Remove radiator hose (4) from front of coolant adapter (2).
6. Remove coolant adapter mounting bolts.
7. Carefully slide coolant adapter off water pump inlet tube and remove coolant adapter (2) and secondary thermostat.

2.7L ENGINE

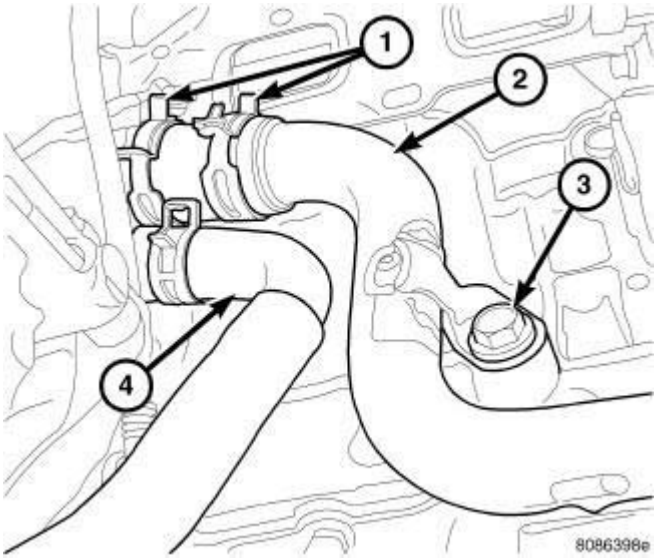


Fig. 118: THERMOSTAT AND HOUSING - 2.7L ENGINE
Courtesy of CHRYSLER LLC

1 - HOSE CLAMPS
2 - RADIATOR HOSE TUBE
3 - MOUNTING BOLT
4 - RADIATOR HOSE

1. Disconnect negative cable from remote jumper terminal.
2. Drain cooling system. See **Standard Procedure** .
3. Raise vehicle on hoist.
4. Remove right front wheel and belt splash shield.
5. Remove accessory drive belts. See **Removal** .
6. Remove lower generator mounting bolt.
7. Lower vehicle.
8. Disconnect generator electrical connectors.
9. Disconnect AC clutch and AC pressure sensor electrical connectors. Reposition wiring harness.
10. Remove oil dipstick and tube. Plug hole in oil pan where dipstick tube mounts with water tight stopper.

WARNING: If hole for dipstick tube in oil pan is not plugged, coolant will enter oil pan. Serious engine damage can occur.

11. Remove remaining generator mounting bolts. Remove generator.
12. Remove radiator hose tube mounting bolt (3).
13. Disconnect hose clamps (1) at thermostat housing.
14. Remove thermostat housing bolts.
15. Remove thermostat and housing.

3.5L ENGINE

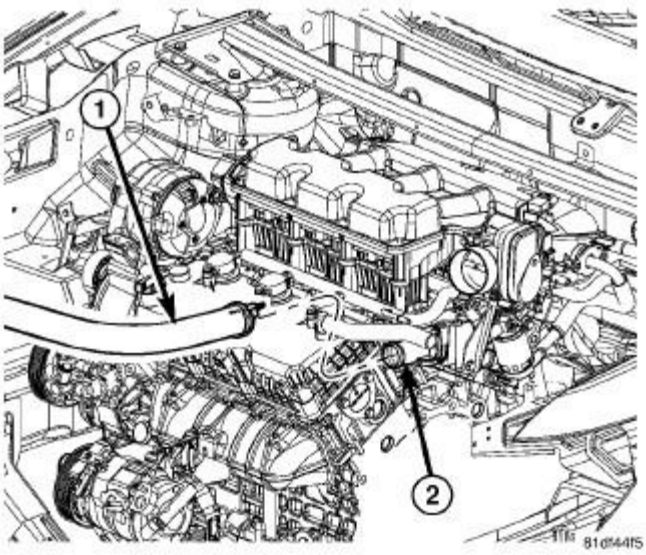


Fig. 119: THERMOSTAT HOUSING & RADIATOR HOSE
Courtesy of CHRYSLER LLC

1 - RADIATOR HOSE
2 - THERMOSTAT HOUSING

WARNING: Do not remove pressure cap with the system hot and under pressure because serious burns from coolant can occur.

1. Disconnect negative battery cable.
2. Drain cooling system. See **Standard Procedure** .
3. Remove engine cover.
4. Disconnect radiator upper hose from thermostat housing.
5. Remove thermostat housing bolts.
6. Remove housing, thermostat, and gasket.

2.0L DIESEL ENGINE

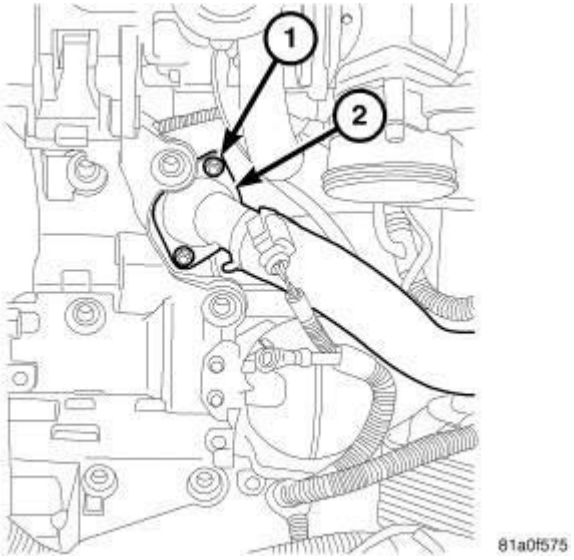


Fig. 120: THERMOSTAT HOUSING - DIESEL
Courtesy of CHRYSLER LLC

1 - MOUNTING BOLT 2 - THERMOSTAT HOUSING

WARNING: Do not loosen the radiator cap with the cooling system hot and pressurized. Serious burns from the coolant can occur.

1. Disconnect negative battery cable.
2. Remove engine cover. Refer to **Engine - Removal** .
3. Drain engine coolant below thermostat level using draincock only. See **Standard Procedure** .
4. Disconnect coolant temperature sensor electrical connector.
5. Remove coolant hoses and by-pass hose from thermostat housing.
6. Loosen accessory drive belt and reposition generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal** .
7. Remove thermostat housing (2) and O-ring.
8. Clean all sealing surfaces.

Installation

2.4L - PRIMARY THERMOSTAT

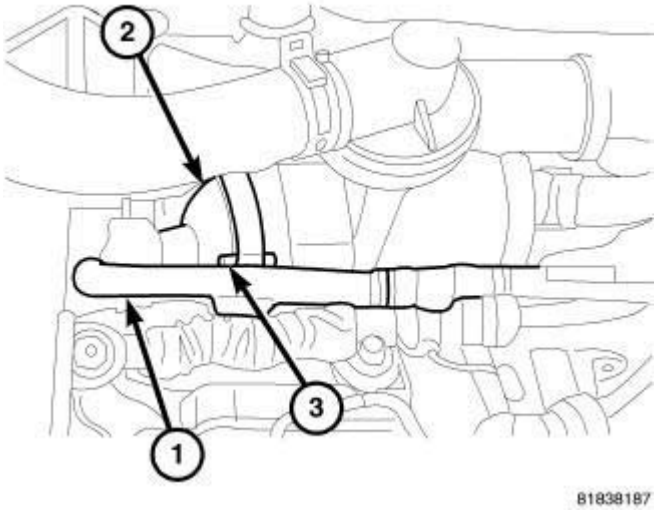


Fig. 121: PRIMARY THERMOSTAT
Courtesy of CHRYSLER LLC

1 - COOLANT HOSE 2 - INLET HOUSING
3 - BOLT

1. Position thermostat into the water plenum, aligning air bleed with the location notch on inlet housing (2).
2. Install inlet housing (2) onto coolant adapter. Tighten bolts to 9 N.m (79 in. lbs.).
3. Connect coolant hose (1).
4. Install air filter housing.
5. Fill cooling system. See **Standard Procedure** .

2.4L - SECONDARY THERMOSTAT

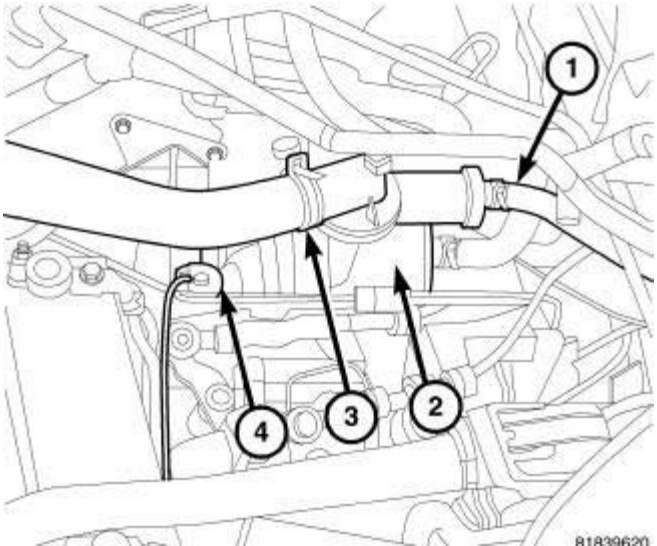


Fig. 122: SECONDARY THERMOSTAT
Courtesy of CHRYSLER LLC

1 - COOLANT HOSE (REAR) 2 - COOLANT ADAPTER
3 - RADIATOR HOSE
4 - RADIATOR HOSE (FRONT)

1. Position thermostat into the cylinder head.
2. Inspect the water pump inlet tube O-rings for damage before installing the tube in the coolant adapter. Replace O-ring as necessary.
3. Lubricate O-rings with soapy water.
4. Position coolant adapter on water pump inlet tube and cylinder head.
5. Install coolant adapter mounting bolts. Tighten bolts to 18.1 N.m (159 in. lbs.).
6. Connect front coolant hose (1).
7. Connect two rear coolant hoses (1).
8. Connect radiator hose (3).
9. Install air filter housing.
10. Fill cooling system. See **Standard Procedure** .

2.7L ENGINE

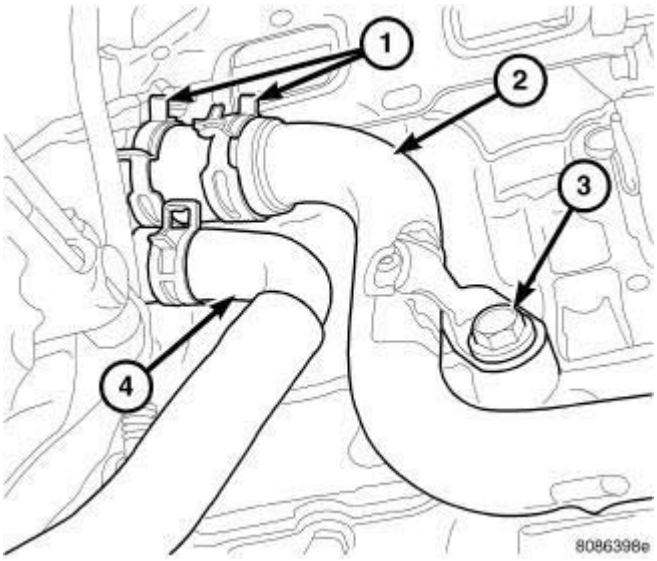


Fig. 123: THERMOSTAT AND HOUSING - 2.7L ENGINE
Courtesy of CHRYSLER LLC

1 - HOSE CLAMPS 2 - RADIATOR HOSE TUBE 3 - MOUNTING BOLT

4 - RADIATOR HOSE

1. Clean gasket sealing surfaces.

NOTE: Install thermostat with the bleed valve located at the 12 o'clock position.

2. Install thermostat and gasket into the thermostat housing.
3. Install thermostat and housing to cylinder block. Tighten attaching bolts to 12 N.m (105 in. lbs.).
4. Connect hoses at thermostat housing.
5. Install generator and attaching bolts.

CAUTION: Before removing plug in oil pan, clean residual coolant from area.

6. Remove plug in oil pan and install engine oil dipstick tube.
7. Reconnect AC clutch and AC pressure sensor connectors.
8. Reconnect generator connectors.
9. Raise vehicle on hoist.
10. Install accessory drive belts. See **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
11. Install belt splash shield and right front wheel.
12. Lower vehicle.
13. Reconnect negative battery cable.
14. Fill cooling system. See **Standard Procedure** .

3.5L ENGINE

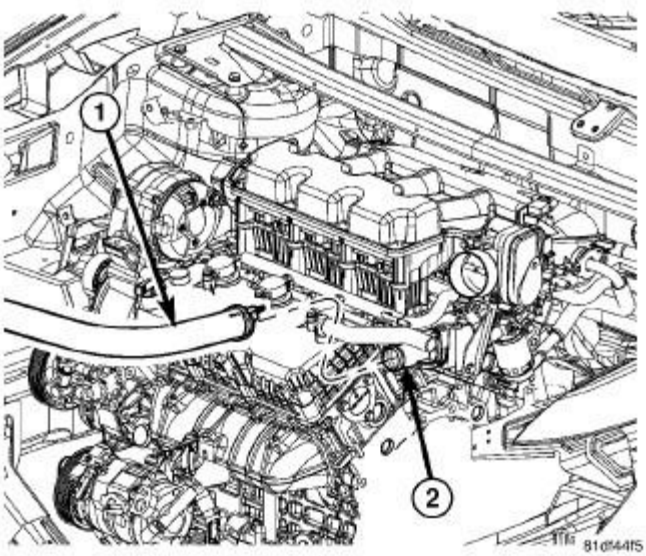


Fig. 124: THERMOSTAT HOUSING & RADIATOR HOSE
Courtesy of CHRYSLER LLC

1 - RADIATOR HOSE 2 - THERMOSTAT HOUSING

1. Clean gasket sealing surfaces.
2. Install thermostat and gasket into thermostat housing. For ease of installation, install bolts in housing for thermostat and gasket retention.
3. Install thermostat and housing to Intake manifold. Tighten bolts to 12 N.m (105 in. lbs.).
4. Connect radiator hoses and install hose clamp.
5. Install engine cover.
6. Refill cooling system. See **Standard Procedure** .
7. Connect negative cable.

2.0L DIESEL ENGINE

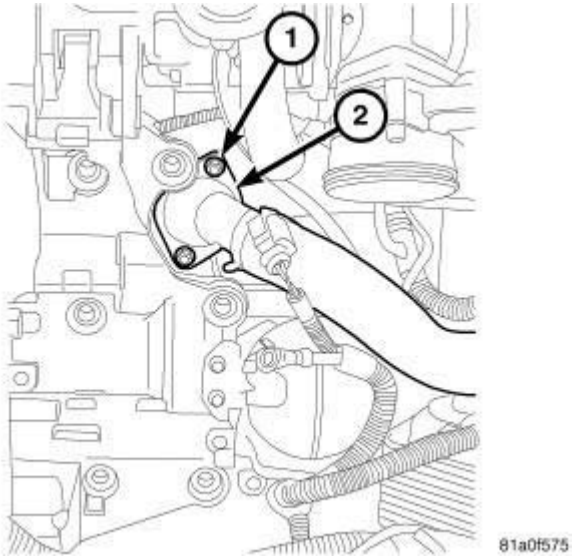


Fig. 125: THERMOSTAT HOUSING - DIESEL
Courtesy of CHRYSLER LLC

1 - MOUNTING BOLT 2 - THERMOSTAT HOUSING

1. Clean all sealing surfaces.
2. Position and install thermostat housing (2). Tighten bolts to 9N.m (80 lbs.in.).

NOTE: Inspect condition of all clamps and hoses, replace as necessary.

3. Connect coolant temperature sensor electrical connector.
4. Install generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Installation** .
5. Install engine cover. Refer to **Engine - Installation** .
6. Connect negative battery cable.
7. Fill coolant system to proper level with appropriate coolant mixture. See **Standard Procedure** .
8. Start engine and inspect for leaks.

TUBE, WATER INLET

Removal

WATER INLET TUBE

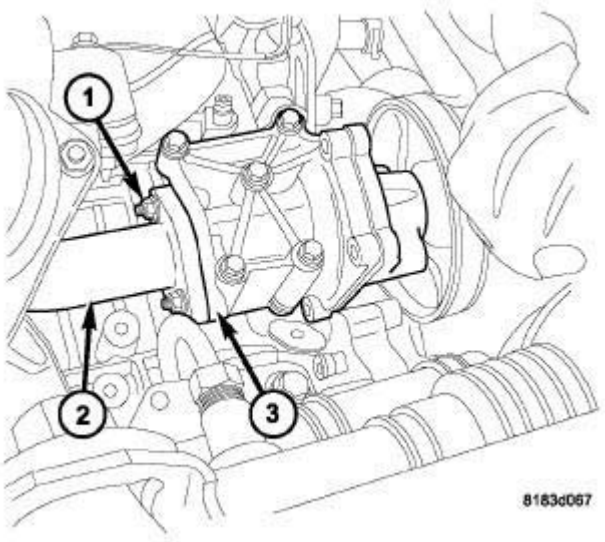


Fig. 126: WATER PUMP INLET TUBE WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - NUTS
2 - WATER PUMP INLET TUBE
3 - WATER PUMP HOUSING

The water pump inlet tube (2) connects the water pump to the coolant adapter. This tube is sealed by an O-ring and held in place by fasteners to the water pump housing.

1. Drain cooling system. See **Standard Procedure** .
2. Remove the coolant adapter and secondary thermostat. See **Removal** .
3. Raise and support vehicle.
4. Remove inlet tube mounting nuts (1).

5. Remove inlet tube (2).

Installation

WATER INLET TUBE

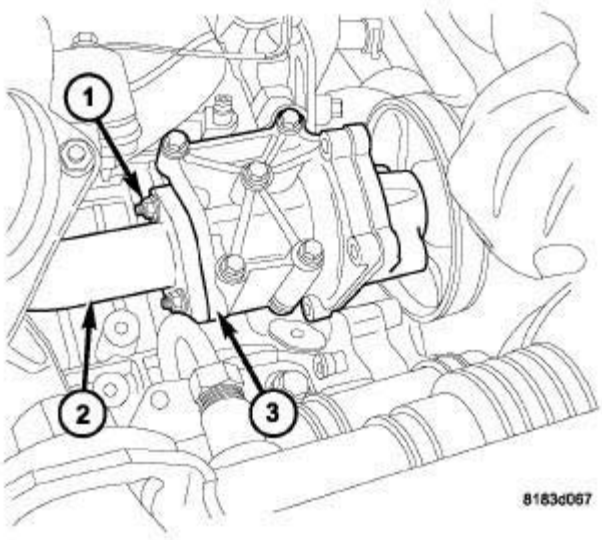


Fig. 127: WATER PUMP INLET TUBE WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - NUTS
2 - WATER PUMP INLET TUBE
3 - WATER PUMP HOUSING

1. Inspect the O-ring for damage before installing the tube. Replace O-ring as necessary.
2. Lubricate O-rings with soapy water.
3. Install new water inlet gasket between tube and water pump housing (2).
4. Position water pump inlet tube (3) on water pump housing (2). Hand tighten nuts to aide in tube alignment.
5. Install secondary thermostat and coolant adapter. See **Installation** .
6. Tighten coolant tube nuts (1) to 24 N.m (212 in. lbs.).
7. Fill cooling system. See **Standard Procedure** .

TRANSMISSION

COOLER, TRANSMISSION OIL

Description

DESCRIPTION

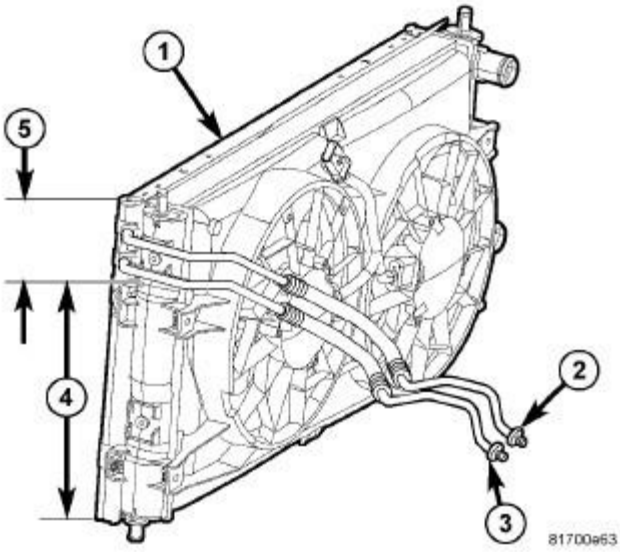


Fig. 128: TRANSMISSION OIL COOLER
Courtesy of CHRYSLER LLC

1 - Air Conditioning Condenser/Transmission Oil Cooler
2 - Transmission Cooler Outlet
3 - Transmission Cooler Inlet
4 - Air Conditioning Condenser Portion
5 - Transmission Cooler Portion

An external oil-to-air type automatic transmission oil cooler is mounted to the front of the radiator and is integral to the A/C condenser. The six upper tubes are used for transaxle oil cooling, and the remaining tubes below are for the A/C system.

The cooler uses tubes and rubber hoses to feed oil to and from the automatic transaxle. The replaceable inlet and outlet tubes use quick-connect type fittings. The trans oil cooler is replaced with the A/C condenser.

Operation

OPERATION

The oil flows from the transmission to the oil-to-air cooler. Heat is then transferred into the air.

Removal

TRANSMISSION OIL COOLER

1. The transmission oil cooler is integral to the A/C condenser. To remove the AC condenser assembly. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Removal** .

Cleaning

CLEANING

Check the AC condenser for debris on the cooling fin surfaces. Clean as necessary.

Inspection

INSPECTION

Inspect all hoses, tubes, clamps and connections for leaks, cracks, or damage. Replace as necessary. Use only approved transmission oil cooler hoses that are molded to fit the space available.

Installation

TRANSMISSION OIL COOLER

1. The transmission oil cooler is integral to the A/C condenser. To install the AC condenser assembly. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Installation** .

TUBES AND HOSES, TRANSMISSION OIL COOLER

Standard Procedure

QUICK CONNECT FITTING DISASSEMBLY/ASSEMBLY

DISCONNECT

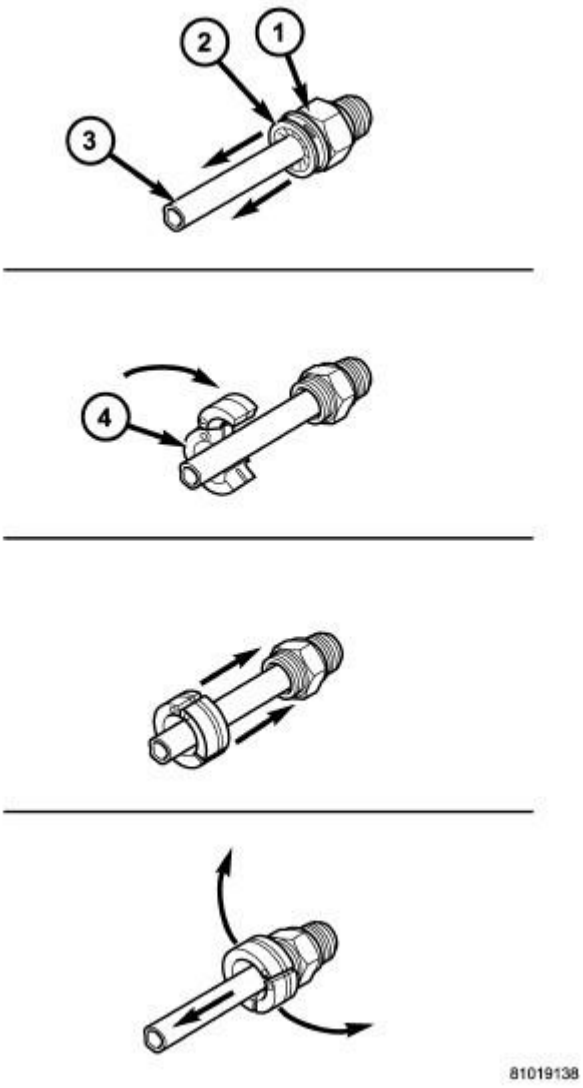


Fig. 129: OIL COOLER LINE QUICK CONNECT FITTING - DISASSEMBLY
Courtesy of CHRYSLER LLC

1 - QUICK CONNECT FITTING
2 - DUST CAP
3 - OIL COOLER LINE
4 - SPECIAL TOOL 8875A

1. Remove the dust cap by pulling it straight back off of the quick connect fitting (1).
2. Place the properly sized release tool (4) onto the transmission cooler line with the fingers of the tool facing the quick connect fitting.
3. Slide the release tool down the transmission line and engage the fingers of the tool into the retaining clip.

When properly engaged in the clip, the tool will fit flush against the quick connect fitting.

4. Rotate the release tool 60° to expand the retaining clip.
5. While holding the release tool against the quick connect fitting, pull back on the transmission cooler line to remove it.
6. If thequick connect fitting is damaged or leaking at the transmission oil cooler or transmission, remove the fitting.

CONNECT

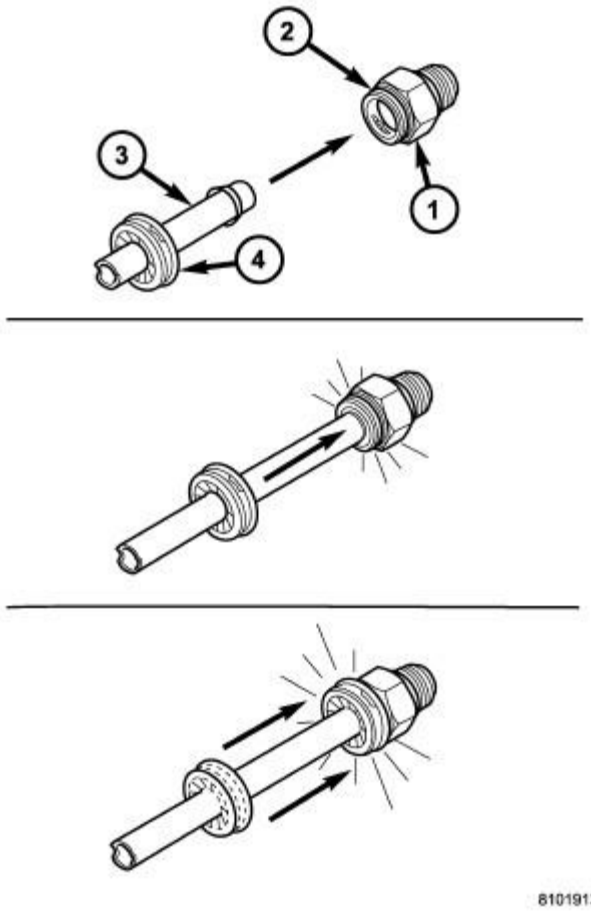


Fig. 130: OIL COOLER LINE QUICK CONNECT FITTING - ASSEMBLY
Courtesy of CHRYSLER LLC

1 - QUICK CONNECT FITTING
2 - CLIP
3 - OIL COOLER LINE
4 - DUST CAP

1. If removed, install the quick connect fitting into the transmission oil cooler or the transmission. Tighten

the fitting to 15 N.m (132 in. lbs.).

2. Align the cooler line (3) with the quick connect fitting while pushing straight into the fitting.
3. Push in on the transmission cooler line until a clicks heard or felt.
4. Slide the dust cap (4) down the transmission cooler line and snap it over the quick connect fitting until it is fully seated and rotates freely. The dust cap will only snap over the quick connect fitting when the transmission cooler line is properly installed.

NOTE: If the dust cap will not snap into place, repeat step 2.

2009 ENGINE PERFORMANCE

Emissions Control - Journey

DESCRIPTION

VEHICLE EMISSION CONTROL INFORMATION LABEL

All vehicles have a Vehicle Emission Control Information (VECI) Label. Chrysler permanently attaches the label in the engine compartment. It cannot be removed without defacing information and destroying the label.

The label contains the vehicle's emission specifications and vacuum hose routings. All hoses must be connected and routed according to the label.

TRIP DEFINITION

A "Trip" means vehicle operation (following an engine-off period) of duration and driving mode such that all components and systems are monitored at least once by the diagnostic system. The monitors must successfully pass before the PCM can verify that a previously malfunctioning component is meeting the normal operating conditions of that component. For misfire or fuel system malfunction, the MIL may be extinguished if the fault does not recur when monitored during three subsequent sequential driving cycles in which conditions are similar to those under which the malfunction was first determined.

Anytime the MIL is illuminated, a DTC is stored. The DTC can self erase only after the MIL has been extinguished. Once the MIL is extinguished, the PCM must pass the diagnostic test for the most recent DTC for 40 warm-up cycles (80 warm-up cycles for the Fuel System Monitor and the Misfire Monitor). A warm-up cycle can best be described by the following:

- The engine must be running
- A rise of 40° F (4.5° C) in engine temperature must occur from the time when the engine was started
- Engine coolant temperature must crossover 160° F (71° C)
- A "driving cycle" that consists of engine start up and engine shut off.

Once the above conditions occur, the PCM is considered to have passed a warm-up cycle. Due to the conditions required to extinguish the MIL and erase the DTC, it is most important that after a repair has been made, all DTC's be erased and the repair verified by running 1 good trip.

DESCRIPTION - MONITORED COMPONENT

There are several components that will affect vehicle emissions if they malfunction. If one of these components malfunctions the Malfunction Indicator Lamp (Check Engine) will illuminate.

Some of the component monitors are checking for proper operation of the part. Electrically operated components now have input (rationality) and output (functionality) checks as well as continuity tests (opens/shorts). Previously, a component like the Throttle Position sensor (TPS) was checked by the PCM for an open or shorted circuit. If one of these conditions occurred, a DTC was set. Now there is a check to ensure that

the component is working. This is done by watching for a TPS indication of a greater or lesser throttle opening than MAP and engine RPM indicate. In the case of the TPS, if engine vacuum is high and engine RPM is 1600 or greater and the TPS indicates a large throttle opening, a DTC will be set. The same applies to low vacuum and 1600 RPM.

Any component that has an associated limp in will set a fault after 1 trip with the malfunction present.

Refer to the **DTC INDEX** for diagnostic procedures.

The following is a list of the monitored components:

- Catalyst Monitor
- Comprehensive Components
- EGR (if equipped)
- Fuel Control (rich/lean)
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Purge
- Misfire
- ESIM (Evaporative System Integrity Monitor)

COMPREHENSIVE COMPONENTS

Along with the major monitors, OBD II requires that the diagnostic system monitor any component that could affect emissions levels. In many cases, these components were being tested under OBD I. The OBD I requirements focused mainly on testing emissions-related components for electrical opens and shorts.

However, OBD II also requires that inputs from powertrain components to the PCM be tested for rationality, and that outputs to powertrain components from the PCM be tested for functionality. Methods for monitoring the various Comprehensive Components include:

1. Circuit Continuity
    - Open
    - Shorted high
    - Shorted to ground
2. Rationality or Proper Functioning

NOTE: Comprehensive component monitors are continuous. Therefore, enabling conditions do not apply. All will set a DTC and illuminate the MIL in 1- trip.

- Inputs tested for rationality
- Outputs tested for functionality

Input Rationality- While input signals to the PCM are constantly being monitored for electrical opens and shorts, they are also tested for rationality. This means that the input signal is compared against other inputs and information to see if it makes sense under the current conditions.

PCM sensor inputs that are checked for rationality include:

- Manifold Absolute Pressure (MAP) Sensor
- Oxygen Sensor (O2S) (slow response)
- Engine Coolant Temperature (ECT) Sensor
- Camshaft Position (CMP) Sensor
- Vehicle Speed Sensor
- Crankshaft Position (CKP) Sensor
- Inlet Air Temperature (IAT) Sensor
- Power Steering Switch
- Oxygen Sensor Heater
- Engine Controller
- Brake Switch
- ESIM (Evaporative System Integrity Monitor)
- P/N Switch
- Trans Controls

Output Functionality- PCM outputs are tested for functionality in addition to testing for opens and shorts. When the PCM provides a voltage to an output component, it can verify that the command was carried out by monitoring specific input signals for expected changes. For example, when the PCM commands the Idle Air Control (IAC) Motor to a specific position under certain operating conditions, it expects to see a specific (target) idle speed (RPM). If it does not, it stores a DTC.

PCM outputs monitored for functionality include:

- Fuel Injectors
- Ignition Coils
- Torque Converter Clutch Solenoid
- Purge Solenoid
- EGR Solenoid
- Radiator Fan Control
- Trans Controls

OXYGEN SENSOR (O2S) MONITOR

DESCRIPTION- Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperature 300° to 350°C (572° to 662°F), the sensor generates a voltage that is inversely

proportional to the amount of oxygen in the exhaust. When there is a large amount of oxygen in the exhaust caused by a lean condition, misfire or exhaust leak, the sensor produces a low voltage, below 450 mV. When the oxygen content is lower, caused by a rich condition, the sensor produces a higher voltage, above 450mV.

The information obtained by the sensor is used to calculate the fuel injector pulse width. The PCM is programmed to maintain the optimum air/fuel ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrous oxide (NOx) from the exhaust.

The O2S is also the main sensing element for the EGR, Catalyst and Fuel Monitors, and purge.

The O2S may fail in any or all of the following manners:

- Slow response rate (Big Slope)
- Reduced output voltage (Half Cycle)
- Heater Performance

Slow Response Rate (Big Slope)- Response rate is the time required for the sensor to switch from lean to rich signal output once it is exposed to a richer than optimum A/F mixture or vice versa. As the PCM adjusts the air/fuel ratio, the sensor must be able to rapidly detect the change. As the sensor ages, it could take longer to detect the changes in the oxygen content of the exhaust gas. The rate of change that an oxygen sensor experiences is called 'Big Slope'. The PCM checks the oxygen sensor voltage in increments of a few milliseconds.

Reduced Output Voltage (Half Cycle)- The output voltage of the O2S ranges from 0 to 1 volt. A good sensor can easily generate any output voltage in this range as it is exposed to different concentrations of oxygen. To detect a shift in the A/F mixture (lean or rich), the output voltage has to change beyond a threshold value. A malfunctioning sensor could have difficulty changing beyond the threshold value. Many times the condition is only temporary and the sensor will recover. Under normal conditions the voltage signal surpasses the threshold, and a counter is increments by one. This is called the Half Cycle Counter.

Heater Performance- The heater is tested by a separate monitor. Refer to **OXYGEN SENSOR HEATER MONITOR (NGC)**.

OPERATION- As the Oxygen Sensor signal switches, the PCM monitors the half cycle and big slope signals from the oxygen sensor. If during the test neither counter reaches a predetermined value, a malfunction is entered and a Freeze Frame is stored. Only one counter reaching its predetermined value is needed for the monitor to pass.

The Oxygen Sensor Signal Monitor is a two trip monitor that is tested only once per trip. When the Oxygen Sensor fails the test in two consecutive trips, the MIL is illuminated and a DTC is set. The MIL is extinguished when the Oxygen Sensor monitor passes in three consecutive trips. The DTC is erased from memory after 40 consecutive warm-up cycles without test failure.

Enabling Conditions- The following conditions must typically be met for the PCM to run the oxygen sensor monitor:

- Battery voltage

- Engine temperature
- Engine run time
- Engine run time at a predetermined speed
- Engine run time at a predetermined speed and throttle opening
- Transmission in gear (automatic only)
- Fuel system in Closed Loop
- Long Term Adaptive (within parameters)
- Power Steering Switch in low PSI (no load)
- Engine at idle
- Fuel level above 15%
- Ambient air temperature
- Barometric pressure
- Engine RPM within acceptable range of desired idle
- Closed throttle speed

Pending Conditions- The Task Manager typically does not run the Oxygen Sensor Signal Monitor if overlapping monitors are running or the MIL is illuminated for any of the following:

- Misfire Monitor
- Front Oxygen Sensor and Heater Monitor
- MAP Sensor
- Vehicle Speed Sensor
- Engine Coolant Temperature Sensor
- Engine Controller Self Test Faults
- Cam or Crank Sensor
- Injector and Coil
- EVAP Electrical
- EGR Solenoid Electrical
- Inlet Air Temperature
- 5 Volt Feed

Conflict- The Task Manager does not run the Oxygen Sensor Monitor if any of the following conditions are present:

- A/C ON (A/C clutch cycling temporarily suspends monitor)
- Purge flow in progress

Suspend- The Task Manager suspends maturing a fault for the Oxygen Sensor Monitor if an of the following are present:

- Oxygen Sensor Heater Monitor, Priority 1
- Misfire Monitor, Priority 2

OXYGEN SENSOR HEATER MONITOR (NGC)

DESCRIPTION- If the Oxygen sensor (O2S) DTC as well as a O2S heater DTC is present, the O2S Heater DTC MUST be repaired first. After the O2S Heater is repaired, verify that the sensor circuit is operating correctly.

The voltage reading taken from the O2S are very temperature sensitive. The readings taken from the O2S are not accurate below 300 degrees C. Heating the O2S is done to allow the engine controller to shift to closed loop control as soon as possible. The heating element used to heat the O2S must be tested to ensure that it is heating the sensor properly. Starting with the introduction on the NGC module the strategy for checking the heater circuit has changed. The heater resistance is checked by the NGC almost immediately after the engine is started. The same O2S heater return pin used to read the heater resistance is capable of detecting an open circuit, a shorted high or shorted low condition.

CATALYST MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide.

Normal vehicle miles or engine misfire can cause a catalyst to decay. A meltdown of the ceramic core can cause a reduction of the exhaust passage. This can increase vehicle emissions and deteriorate engine performance, driveability and fuel economy.

The catalyst monitor uses dual oxygen sensors (O2S's) to monitor the efficiency of the converter. The dual O2S strategy is based on the fact that as a catalyst deteriorates, its oxygen storage capacity and its efficiency are both reduced. By monitoring the oxygen storage capacity of a catalyst, its efficiency can be indirectly calculated. The upstream O2S is used to detect the amount of oxygen in the exhaust gas before the gas enters the catalytic converter. The PCM calculates the A/F mixture from the output of the O2S. A low voltage indicates high oxygen content (lean mixture). A high voltage indicates a low content of oxygen (rich mixture).

When the upstream O2S detects a high oxygen condition, there is an abundance of oxygen in the exhaust gas. A functioning converter would store this oxygen so it can use it for the oxidation of HC and CO. As the converter absorbs the oxygen, there will be a lack of oxygen downstream of the converter. The output of the downstream O2S will indicate limited activity in this condition.

As the converter loses the ability to store oxygen, the condition can be detected from the behavior of the downstream O2S. When the efficiency drops, no chemical reaction takes place. This means the concentration of oxygen will be the same downstream as upstream. The output voltage of the downstream O2S copies the voltage of the upstream sensor. The only difference is a time lag (seen by the PCM) between the switching of the O2S's.

To monitor the system, the number of lean-to-rich switches of upstream and downstream O2S's is counted. The ratio of downstream switches to upstream switches is used to determine whether the catalyst is operating properly. An effective catalyst will have fewer downstream switches than it has upstream switches i.e., a ratio

closer to zero. For a totally ineffective catalyst, this ratio will be one-to-one, indicating that no oxidation occurs in the device.

The system must be monitored so that when catalyst efficiency deteriorates and exhaust emissions increase to over the legal limit, the MIL (check engine lamp) will be illuminated.

Monitor Operation- To monitor catalyst efficiency, the PCM expands the rich and lean switch points of the heated oxygen sensor. With extended switch points, the air/fuel mixture runs richer and leaner to overburden the catalytic converter. Once the test is started, the air/fuel mixture runs rich and lean and the O2 switches are counted. A switch is counted when an oxygen sensor signal goes from below the lean threshold to above the rich threshold. The number of Rear O2 sensor switches is divided by the number of Front O2 sensor switches to determine the switching ratio.

The test runs for 20 seconds. As catalyst efficiency deteriorated over the life of the vehicle, the switch rate at the downstream sensor approaches that of the upstream sensor. If at any point during the test period the switch ratio reaches a predetermined value, a counter is increments by one. The monitor is enabled to run another test during that trip. When the test fails three times, the counter increments to three, a malfunction is entered, and a Freeze Frame is stored. When the counter increments to three during the next trip, the code is matured and the MIL is illuminated. If the test passes the first, no further testing is conducted during that trip.

The MIL is extinguished after three consecutive good trips. The good trip criteria for the catalyst monitor is more stringent than the failure criteria. In order to pass the test and increment one good trip, the downstream sensor switch rate must be less than 80% of the upstream rate (60% for manual transmissions). The failure percentages are 90% and 70% respectively.

Enabling Conditions- The following conditions must typically be met before the PCM runs the catalyst monitor. Specific times for each parameter may be different from engine to engine.

- Accumulated drive time
- Enable time
- Ambient air temperature
- Barometric pressure
- Catalyst warm-up counter
- Engine coolant temperature
- Accumulated throttle position sensor
- Vehicle speed
- MAP
- RPM
- Engine in closed loop
- Fuel level

Pending Conditions-

- Misfire DTC

- Front Oxygen Sensor Response
- Front Oxygen Sensor Heater Monitor
- Front Oxygen Sensor Electrical
- Rear Oxygen Sensor Rationality (middle check)
- Rear Oxygen Sensor Heater Monitor
- Rear Oxygen Sensor Electrical
- Fuel System Monitor
- All MAP faults
- All ECT sensor faults
- Purge flow solenoid functionality
- Purge flow solenoid electrical
- All PCM self test faults
- All CMP and CKP sensor faults
- All injector and ignition electrical faults
- Vehicle Speed Sensor
- Brake switch
- Inlet air temperature

Conflict- The catalyst monitor does not run if any of the following are conditions are present:

- EGR Monitor in progress
- Fuel system rich intrusive test in progress
- EVAP Monitor in progress
- Time since start is less than 60 seconds
- Low fuel level
- Low ambient air temperature

Suspend- The Task Manager does not mature a catalyst fault if any of the following are present:

- Oxygen Sensor Monitor, Priority 1
- Upstream Oxygen Sensor Heater, Priority 1
- EGR Monitor, Priority 1
- EVAP Monitor, Priority 1
- Fuel System Monitor, Priority 2
- Misfire Monitor, Priority 2

NON-MONITORED CIRCUITS

The PCM does not monitor all circuits, systems and conditions that could have malfunctions causing driveability problems. However, problems with these systems may cause the PCM to store diagnostic trouble

codes for other systems or components. For example, a fuel pressure problem will not register a fault directly, but could cause a rich/lean condition or misfire. This could cause the PCM to store an oxygen sensor or misfire diagnostic trouble code.

The major non-monitored circuits are listed below along with examples of failures modes that do not directly cause the PCM to set a DTC, but for a system that is monitored.

FUEL PRESSURE

The fuel pressure regulator controls fuel system pressure. The PCM cannot detect a clogged fuel pump inlet filter, clogged inline fuel filter, or a pinched fuel supply or return line. However, these could result in a rich or lean condition causing the PCM to store an oxygen sensor, fuel system, or misfire diagnostic trouble code.

SECONDARY IGNITION CIRCUIT

The PCM cannot detect an inoperative ignition coil, fouled or worn spark plugs, ignition cross firing, or open spark plug cables. The misfire will however, increase the oxygen content in the exhaust, deceiving the PCM in to thinking the fuel system is too lean. Also see misfire detection. There are DTC's that can detect misfire and Ionization shorts in the secondary ignition circuit, refer to **POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 545RE** for more information.

CYLINDER COMPRESSION

The PCM cannot detect uneven, low, or high engine cylinder compression. Low compression lowers O2 content in the exhaust. Leading to fuel system, oxygen sensor, or misfire detection fault.

EXHAUST SYSTEM

The PCM cannot detect a plugged, restricted or leaking exhaust system. It may set a EGR (if equipped) or Fuel system or O2S fault.

FUEL INJECTOR MECHANICAL MALFUNCTIONS

The PCM cannot determine if a fuel injector is clogged, the needle is sticking or if the wrong injector is installed. However, these could result in a rich or lean condition causing the PCM to store a diagnostic trouble code for either misfire, an oxygen sensor, or the fuel system.

EXCESSIVE OIL CONSUMPTION

Although the PCM monitors engine exhaust oxygen content when the system is in closed loop, it cannot determine excessive oil consumption.

THROTTLE BODY AIR FLOW

The PCM cannot detect a clogged or restricted air cleaner inlet or filter element.

VACUUM ASSIST

The PCM cannot detect leaks or restrictions in the vacuum circuits of vacuum assisted engine control system devices. However, these could cause the PCM to store a MAP sensor diagnostic trouble code and cause a high idle condition.

PCM SYSTEM GROUND

The PCM cannot determine a poor system ground. However, one or more diagnostic trouble codes may be generated as a result of this condition. The module should be mounted to the body at all times, including when diagnostics are performed.

PCM CONNECTOR ENGAGEMENT

The PCM may not be able to determine spread or damaged connector pins. However, it might store diagnostic trouble codes as a result of spread connector pins.

DESCRIPTION - MONITORED SYSTEMS

There are new electronic circuit monitors that check fuel, emission, engine and ignition performance. These monitors use information from various sensor circuits to indicate the overall operation of the fuel, engine, ignition and emission systems and thus the emissions performance of the vehicle.

The fuel, engine, ignition and emission systems monitors do not indicate a specific component problem. They do indicate that there is an implied problem within one of the systems and that a specific problem must be diagnosed.

If any of these monitors detect a problem affecting vehicle emissions, the Malfunction Indicator (Check Engine) Lamp will be illuminated. These monitors generate Diagnostic Trouble Codes that can be displayed with the a scan tool.

The following is a list of the system monitors:

- EGR Monitor (if equipped)
- Misfire Monitor
- Fuel System Monitor
- Oxygen Sensor Monitor
- Oxygen Sensor Heater Monitor
- Catalyst Monitor
- Evaporative System Leak Detection Monitor (if equipped)

Following is a description of each system monitor, and its DTC.

Refer to POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 545RE for diagnostic procedures.

OXYGEN SENSOR (O2S) MONITOR

Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperatures of 300° to 350°C (572° to 662°F), the sensor generates a voltage that is inversely proportional to the amount of oxygen in the exhaust. The information obtained by the sensor is used to calculate the fuel injector pulse width. The PCM is programmed to maintain the optimum air/fuel ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrous oxide (NOx) from the exhaust.

The O2S is also the main sensing element for the EGR (if equipped), Catalyst and Fuel Monitors.

The O2S may fail in any or all of the following manners:

- Slow response rate
- Reduced output voltage
- Dynamic shift
- Shorted or open circuits

Response rate is the time required for the sensor to switch from lean to rich once it is exposed to a richer than optimum A/F mixture or vice versa. As the sensor starts malfunctioning, it could take longer to detect the changes in the oxygen content of the exhaust gas.

The output voltage of the O2S ranges from 0 to 1 volt (voltages are offset by 2.5 volts on NGC vehicles). A good sensor can easily generate any output voltage in this range as it is exposed to different concentrations of oxygen. To detect a shift in the A/F mixture (lean or rich), the output voltage has to change beyond a threshold value. A malfunctioning sensor could have difficulty changing beyond the threshold value.

OXYGEN SENSOR HEATER MONITOR

If there is an oxygen sensor (O2S) DTC as well as a O2S heater DTC, the O2S heater fault MUST be repaired first. After the O2S fault is repaired, verify that the heater circuit is operating correctly.

Effective control of exhaust emissions is achieved by an oxygen feedback system. The most important element of the feedback system is the O2S. The O2S is located in the exhaust path. Once it reaches operating temperatures of 300° to 350°C (572 ° to 662°F), the sensor generates a voltage that is inversely proportional to the amount of oxygen in the exhaust. The information obtained by the sensor is used to calculate the fuel injector pulse width. This maintains a 14.7 to 1 Air Fuel (A/F) ratio. At this mixture ratio, the catalyst works best to remove hydrocarbons (HC), carbon monoxide (CO) and nitrogen oxide (NOx) from the exhaust.

The voltage readings taken from the O2S are very temperature sensitive. The readings are not accurate below 300°C. Heating of the O2S is done to allow the engine controller to shift to closed loop control as soon as possible. The heating element used to heat the O2S must be tested to ensure that it is heating the sensor properly.

The O2S circuit is monitored for a drop in voltage. The sensor output is used to test the heater by isolating the effect of the heater element on the O2S output voltage from the other effects.

EGR MONITOR (if equipped)

The Powertrain Control Module (PCM) performs an on-board diagnostic check of the EGR system.

The EGR monitor is used to test whether the EGR system is operating within specifications. The diagnostic check activates only during selected engine/driving conditions. When the conditions are met, the EGR is turned off (solenoid energized) and the O2S compensation control is monitored. Turning off the EGR shifts the air fuel (A/F) ratio in the lean direction. The O2S data should indicate an increase in the O2 concentration in the combustion chamber when the exhaust gases are no longer recirculated. While this test does not directly measure the operation of the EGR system, it can be inferred from the shift in the O2S data whether the EGR system is operating correctly. Because the O2S is being used, the O2S test must pass its test before the EGR test. Also looks at EGR linear potentiometer for feedback.

MISFIRE MONITOR

Excessive engine misfire results in increased catalyst temperature and causes an increase in HC emissions. Severe misfires could cause catalyst damage. To prevent catalytic convertor damage, the PCM monitors engine misfire.

The Powertrain Control Module (PCM) monitors for misfire during most engine operating conditions (positive torque) by looking at changes in the crankshaft speed. If a misfire occurs the speed of the crankshaft will vary more than normal.

The PCM can detect and compensate for variances in the engine and its components. To learn these variations, the PCM uses the input of the actual crankshaft rotation pattern and ideal crankshaft rotation pattern that has been calibrated into the PCM. The PCM then compares the two patterns. The variation between the two values is the Adaptive Numerator. If the Adaptive Numerator is not learned by the PCM, the misfire monitor will not run and the Multi-Cylinder Displacement System (MDS) will not operate. Without MDS operation, the customer will experience decreased fuel economy. If the customer experiences decrease fuel economy, use the scan tool to ensure that the Adaptive Numerator is learned.

FUEL SYSTEM MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide. The catalyst works best when the air fuel (A/F) ratio is at or near the optimum of 14.7 to 1.

The PCM is programmed to maintain the optimum air/fuel ratio. This is done by making short term corrections in the fuel injector pulse width based on the O2S output. The programmed memory acts as a self calibration tool that the engine controller uses to compensate for variations in engine specifications, sensor tolerances and engine fatigue over the life span of the engine. By monitoring the actual air-fuel ratio with the O2S (short term) and multiplying that with the program long-term (adaptive) memory and comparing that to the limit, it can be determined whether it will pass an emissions test. If a malfunction occurs such that the PCM cannot maintain the optimum A/F ratio, then the MIL will be illuminated.

CATALYST MONITOR

To comply with clean air regulations, vehicles are equipped with catalytic converters. These converters reduce the emission of hydrocarbons, oxides of nitrogen and carbon monoxide.

Normal vehicle miles or engine misfire can cause a catalyst to decay. A meltdown of the ceramic core can cause a reduction of the exhaust passage. This can increase vehicle emissions and deteriorate engine performance, driveability and fuel economy.

The catalyst monitor uses dual oxygen sensors (O2S's) to monitor the efficiency of the converter. The dual O2S's strategy is based on the fact that as a catalyst deteriorates, its oxygen storage capacity and its efficiency are both reduced. By monitoring the oxygen storage capacity of a catalyst, its efficiency can be indirectly calculated. The upstream O2S is used to detect the amount of oxygen in the exhaust gas before the gas enters the catalytic converter. The PCM calculates the A/F mixture from the output of the O2S. A low voltage indicates high oxygen content (lean mixture). A high voltage indicates a low content of oxygen (rich mixture).

When the upstream O2S detects a lean condition, there is an abundance of oxygen in the exhaust gas. A functioning converter would store this oxygen so it can use it for the oxidation of HC and CO. As the converter absorbs the oxygen, there will be a lack of oxygen downstream of the converter. The output of the downstream O2S will indicate limited activity in this condition.

As the converter loses the ability to store oxygen, the condition can be detected from the behavior of the downstream O2S. When the efficiency drops, no chemical reaction takes place. This means the concentration of oxygen will be the same downstream as upstream. The output voltage of the downstream O2S copies the voltage of the upstream sensor. The only difference is a time lag (seen by the PCM) between the switching of the O2S's.

To monitor the system, the number of lean-to-rich switches of upstream and downstream O2S's is counted. The ratio of downstream switches to upstream switches is used to determine whether the catalyst is operating properly. An effective catalyst will have fewer downstream switches than it has upstream switches i.e., a ratio closer to zero. For a totally ineffective catalyst, this ratio will be one-to-one, indicating that no oxidation occurs in the device.

The system must be monitored so that when catalyst efficiency deteriorates and exhaust emissions increase to over the legal limit, the MIL (Check Engine lamp) will be illuminated.

EVAPORATIVE SYSTEM LEAK DETECTION MONITOR (if equipped)

The ESIM (Evaporative System Integrity Monitor) is the next generation evaporative leak detection system that is used on vehicles equipped with either the Next Generation Controller (NGC) or Global Powertrain Engine Controller (GPEC). The operation of this monitor is similar to the Natural Vacuum Leak Detection (NVLD) system it replaces. A leak detection pump is no longer required and the system is able to detect a leak equivalent to a 0.020" (0.5 mm) hole.

The basic leak detection theory employed with ESIM is the "Gas Law". This is to say that the pressure in a sealed vessel will change if the temperature of the gas in the vessel changes. The vessel will only see this effect if it is indeed sealed. Even small leaks will allow the pressure in the vessel to come to equilibrium with the ambient pressure. In addition to the detection of very small leaks, this system has the capability of detecting medium as well as large evaporative system leaks.

The ESIM seals the canister vent during engine off conditions. If the EVAP system has a leak of less than the failure threshold, the evaporative system will be pulled into a vacuum, either due to the cool down from

operating temperature or diurnal ambient temperature cycling. The diurnal effect is considered one of the primary contributors to the leak determination by this diagnostic. When the vacuum in the system exceeds about 1" H2O (0.25 KPA), a vacuum switch closes. The switch closure sends a signal to the powertrain module. The module, via appropriate logic strategies, utilizes the switch signal, or lack thereof, to make a determination of whether a leak is present.

HIGH AND LOW LIMITS

The PCM compares input signal voltages from each input device with established high and low limits for the device. If the input voltage is not within limits and other criteria are met, the PCM stores a diagnostic trouble code in memory. Other diagnostic trouble code criteria might include engine RPM limits or input voltages from other sensors or switches that must be present before verifying a diagnostic trouble code condition.

OPERATION

SYSTEM

The Powertrain Control Module (PCM) monitors many different circuits in the fuel injection, ignition, emission and engine systems. If the PCM senses a problem with a monitored circuit often enough to indicate an actual problem, it stores a Diagnostic Trouble Code (DTC) in the PCM's memory. If the code applies to a non-emissions related component or system, and the problem is repaired or ceases to exist, the PCM cancels the code after 40 warm-up cycles. Diagnostic trouble codes that affect vehicle emissions illuminate the Malfunction Indicator Lamp (MIL). Refer to **DESCRIPTION - MONITORED COMPONENT**.

Certain criteria must be met before the PCM stores a DTC in memory. The criteria may be a specific range of engine RPM, engine temperature, and/or input voltage to the PCM.

The PCM might not store a DTC for a monitored circuit even though a malfunction has occurred. This may happen because one of the DTC criteria for the circuit has not been met. **For example** , assume the diagnostic trouble code criteria requires the PCM to monitor the circuit only when the engine operates between 750 and 2000 RPM. Suppose the sensor's output circuit shorts to ground when engine operates above 2400 RPM (resulting in 0 volt input to the PCM). Because the condition happens at an engine speed above the maximum threshold (2000 RPM), the PCM will not store a DTC.

There are several operating conditions for which the PCM monitors and sets DTC's. Refer to **DESCRIPTION - MONITORED SYSTEMS**.

NOTE: Various diagnostic procedures may actually cause a diagnostic monitor to set a DTC. For instance, pulling a spark plug wire to perform a spark test may set the misfire code. When a repair is completed and verified, use the scan tool to erase all DTC's and extinguish the MIL.

Technicians can display stored DTC's. For obtaining the DTC information, use the Data Link Connector with the scan tool .

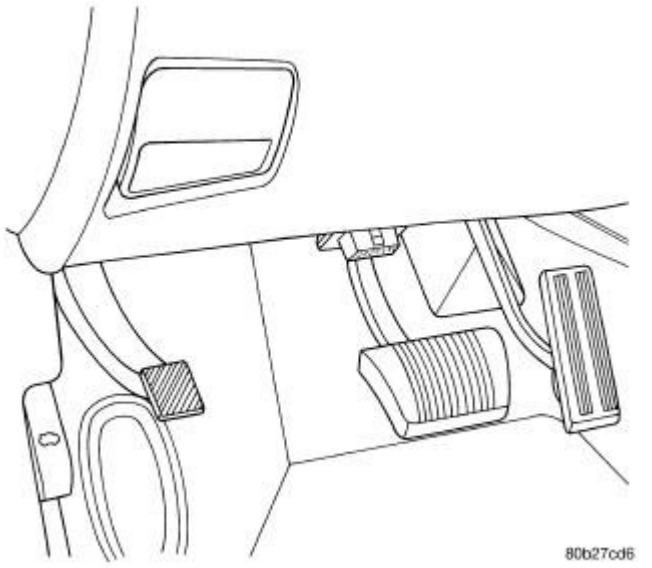


Fig. 1: Data Link Connector
Courtesy of CHRYSLER LLC

STATE DISPLAY TEST MODE

OPERATION

The switch inputs to the Powertrain Control Module (PCM) have two recognized states; HIGH and LOW. For this reason, the PCM cannot recognize the difference between a selected switch position versus an open circuit, a short circuit, or a defective switch. If the State Display screen shows the change from HIGH to LOW or LOW to HIGH, assume the entire switch circuit to the PCM functions properly. From the state display screen, access either State Display Inputs and Outputs or State Display Sensors.

AIR INJECTION

PUMP, AIR

Description

DESCRIPTION

The air injection pump is located on the left side of the engine compartment. The pump is operated by an internal electrical motor and is mounted to a bracket by rubber isolators. An inlet and outlet air hoses are attached to the air pump. A heat shield is attached at the air pump mounting bracket to ensure that the air pump is not damaged by heat coming off the exhaust system.

Operation

OPERATION

The electric air pump only functions during cold starts. The PCM will not command the electric air pump to run if the engine coolant temperature is 10° Celsius (18° Fahrenheit) above ambient temperature or if the engine coolant temperature is above 37° Celsius (98.6° Fahrenheit). The air pump will not run more than 20 seconds during this cold start condition. The air inlet tube to the electric air pump is equipped with a mass air flow (MAF) sensor. This MAF sensor monitors air flow to the exhaust system and is used to diagnose the system by making sure the correct amount of air, not too much or too little, reaches the exhaust system. Each component of the secondary air system is diagnosed assuming the other part is functioning correctly. The diagnostic tool can command the air pump ON with the key ON and engine OFF (KOEO).

Removal

REMOVAL

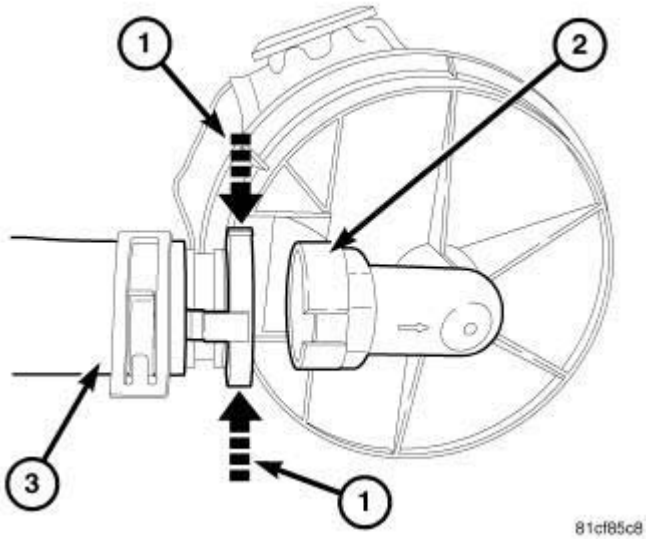


Fig. 2: AIR INLET TUBE AT AIR PUMP
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery.
2. Remove engine cover.
3. Remove air inlet tube (3) by pushing the ends (1) together while pulling the air inlet tube (3) away from air pump housing connection (2).
4. Remove air outlet tube by pushing the coupling ends together while pulling the air outlet tube away from the air pump.

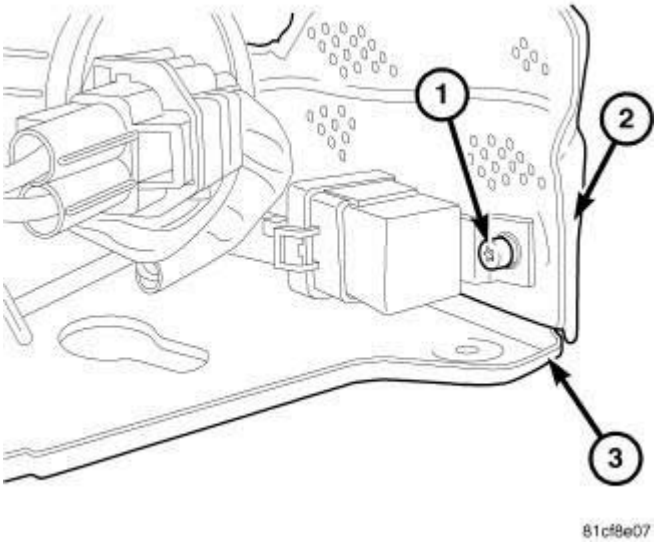


Fig. 3: RELAY
Courtesy of CHRYSLER LLC

5. Remove bolt (1) from heat shield (2) and air pump bracket (3).

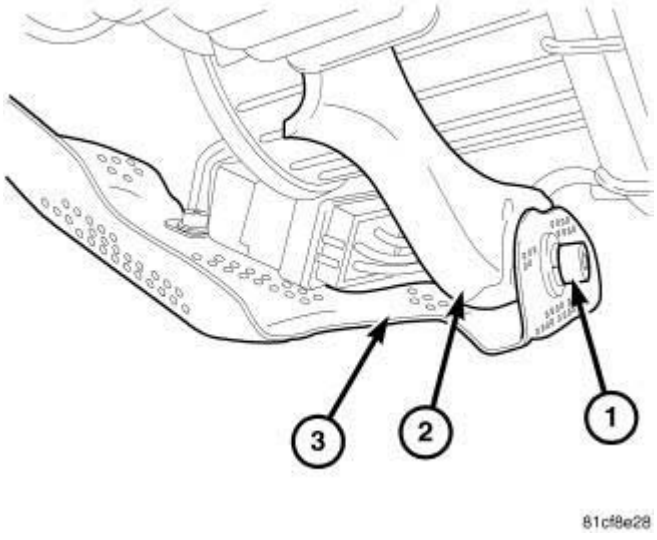


Fig. 4: HEAT SHIELD
Courtesy of CHRYSLER LLC

6. Remove heat shield bolt (1) and heat shield (3) from air pump bracket (2).

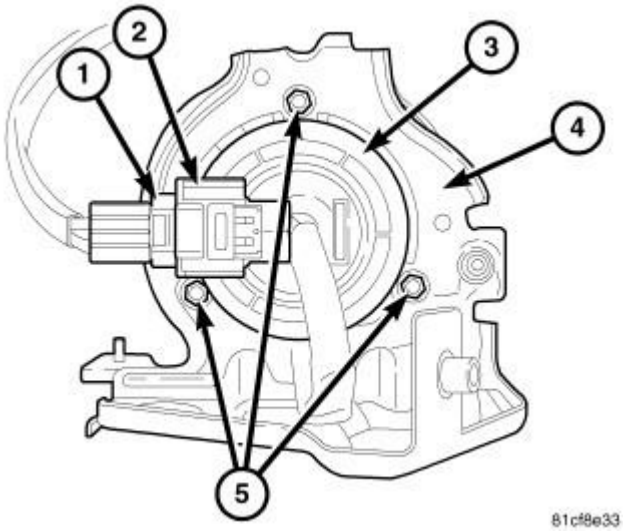


Fig. 5: PUMP TO BRACKET
Courtesy of CHRYSLER LLC

7. Disconnect electrical harness connector (1) from the air pump electrical connector (2).
8. Remove air pump and bracket assembly from vehicle.
9. Remove air pump mounting nuts (5) from bracket (4).
10. Remove air pump (3) from bracket (4).

Installation

INSTALLATION

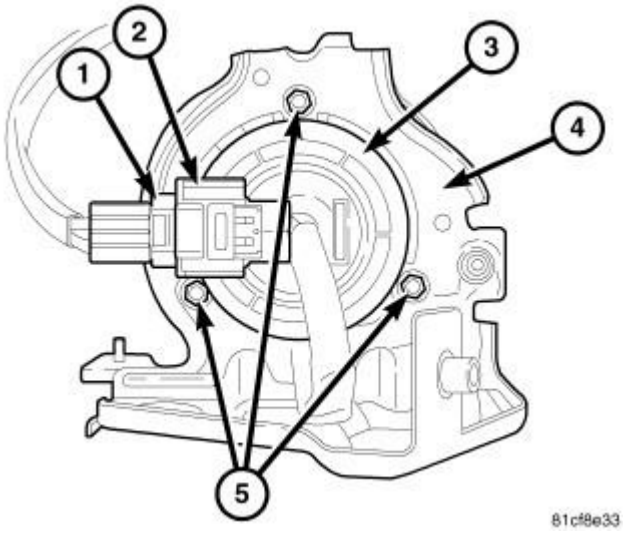


Fig. 6: PUMP TO BRACKET
Courtesy of CHRYSLER LLC

1. Install air pump (3) to bracket (4).
2. Install air pump mounting nuts (5) to bracket (4). Tighten the nuts to 8 N.m (71 in. lbs.).
3. Position air pump and bracket assembly in vehicle.
4. Connect electrical harness connector (1) to the air pump electrical connector (2).

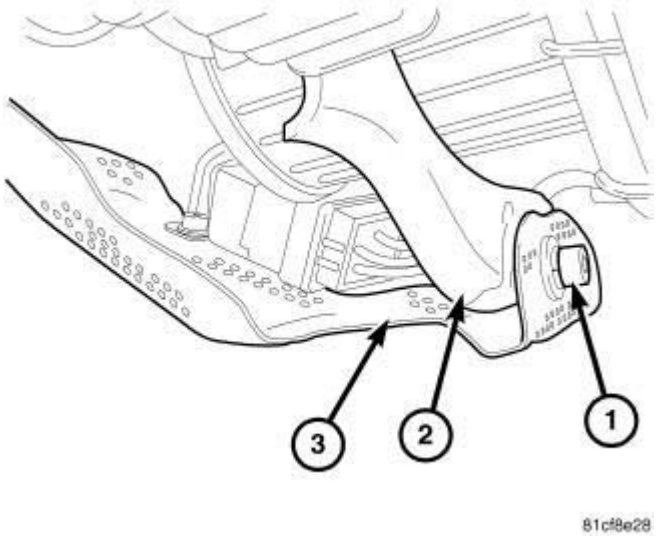


Fig. 7: HEAT SHIELD
Courtesy of CHRYSLER LLC

5. Install heat shield (3) and bolt (1) to air pump bracket (2). Tighten the bolt to 8 N.m (71 in. lbs.).

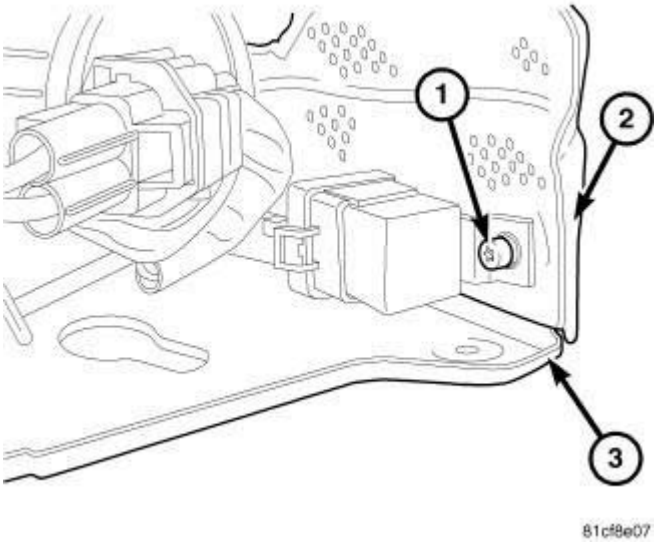


Fig. 8: RELAY
Courtesy of CHRYSLER LLC

6. Install relay, heat shield (2) and bolt (1) to air pump bracket (3). Tighten the bolt to 8 N.m (71 in. lbs.).

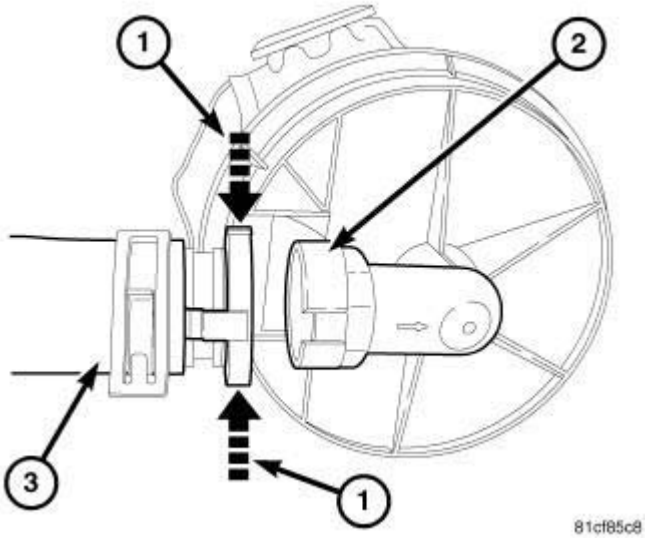


Fig. 9: AIR INLET TUBE AT AIR PUMP
Courtesy of CHRYSLER LLC

NOTE: The quick connect fitting on the air inlet tube is slotted to fit the air pump housing fitting. Line the slot up when making the connection.

7. Install air inlet tube (3) to air pump housing connection (2). A click noise will indicate a good connection.
8. Install air outlet tube to air pump housing. A click noise will indicate a good connection.
9. Connect the negative battery cable, tighten the nut to 5 N.m (45 in. lbs.).
10. Install engine cover.

SENSOR, MASS AIR FLOW (MAF)

Removal

REMOVAL

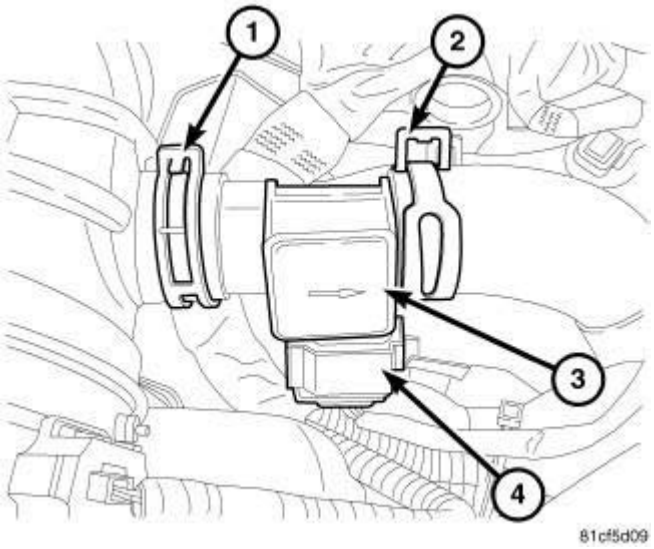


Fig. 10: MASS AIR FLOW SENSOR
Courtesy of CHRYSLER LLC

1. Disconnect air flow sensor electrical connector (4).
2. Remove constant tension clamps (1), (2) securing the air flow sensor (3).
3. Remove air flow sensor (3) from hoses.

Installation

INSTALLATION

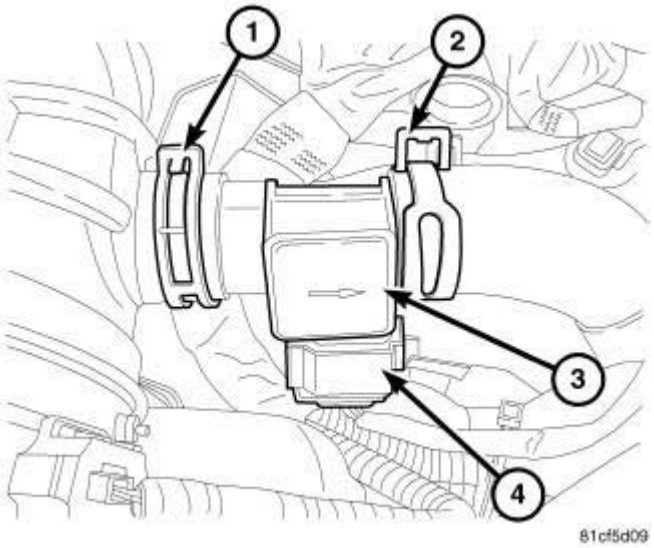


Fig. 11: MASS AIR FLOW SENSOR
Courtesy of CHRYSLER LLC

1. Note the arrow direction on the sensor and correctly position the air flow sensor (3) to hoses.

2. Install constant tension clamps (1), (2) to secure air flow sensor (3) to hoses.
3. Connect air flow sensor electrical connector (4).

TUBE, AIR PUMP, INLET

Description

DESCRIPTION

The air pump inlet tube is located on the left side of the engine compartment. The tube attaches to the air injection pump using a quick connect style fitting. The other end of the tube connects to the mass air flow sensor using a constant tension clamp.

Removal

REMOVAL

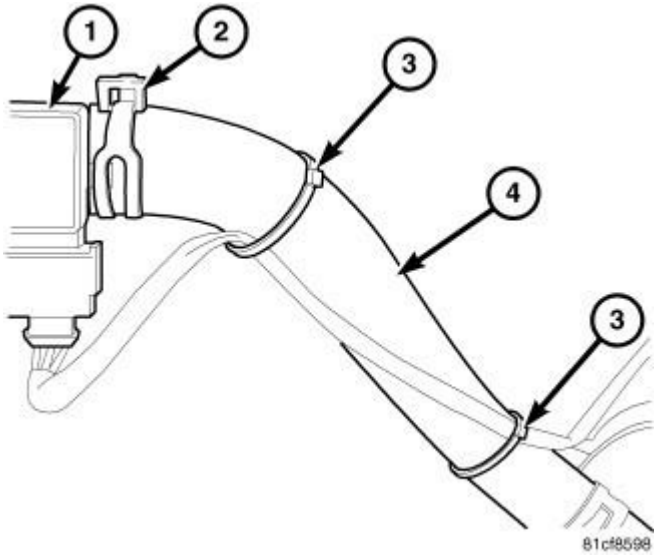


Fig. 12: Air Inlet Tube At Mass Air Flow
Courtesy of CHRYSLER LLC

1. Cut the tie straps (3) being careful not to damage the air inlet tube (4).
2. Remove the constant tension clamp (2) and remove the mass air flow (MAF) sensor (1) from the air inlet tube (4). Position MAF sensor (1) and wiring aside.

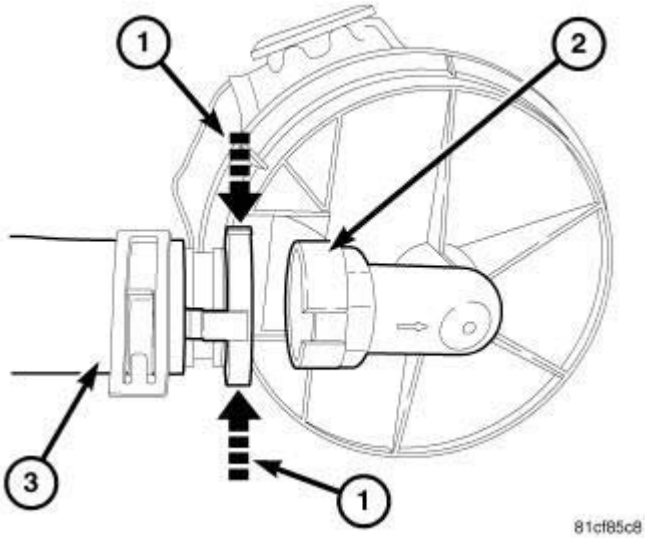


Fig. 13: AIR INLET TUBE AT AIR PUMP
Courtesy of CHRYSLER LLC

3. Remove air inlet tube (3) by pushing the ends (1) together, while pulling the air inlet tube (3) away from air pump housing connection (2).

Installation

INSTALLATION

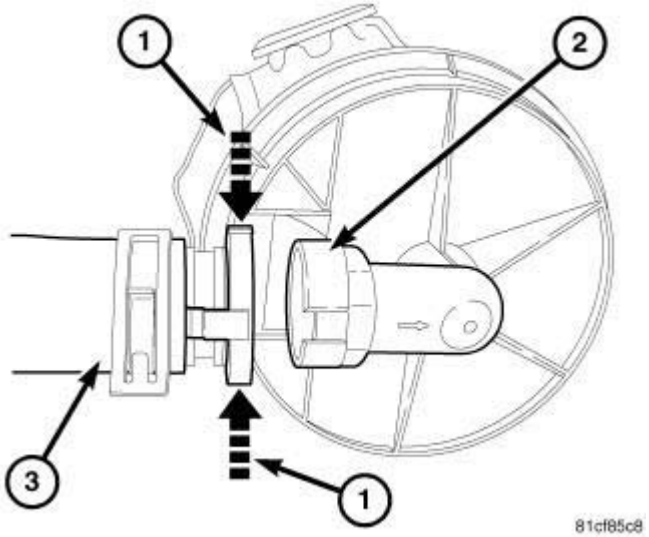


Fig. 14: AIR INLET TUBE AT AIR PUMP
Courtesy of CHRYSLER LLC

NOTE: The quick connect fitting on the air inlet tube is slotted to fit the air pump housing fitting. Line the slot up when making the connection.

1. Install air inlet tube (3) to air pump housing connection (2). A click noise will indicate a good connection.

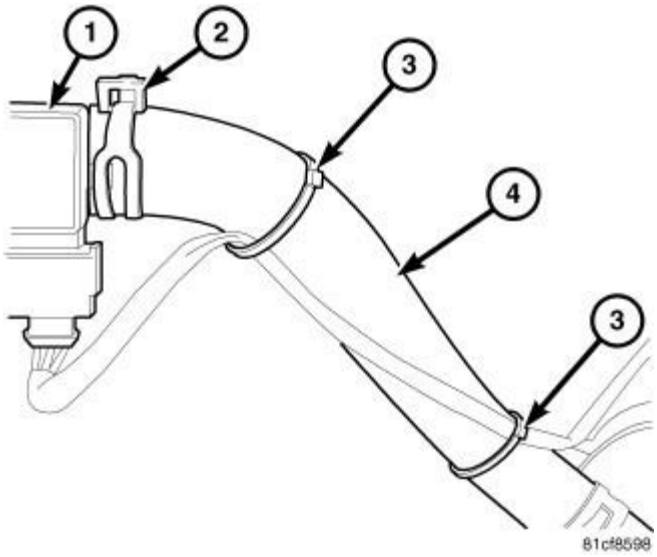


Fig. 15: Air Inlet Tube At Mass Air Flow
Courtesy of CHRYSLER LLC

2. Install mass air flow (MAF) sensor (1) and constant tension clamp (2) to air inlet tube (4).
3. Position MAF sensor wiring to air inlet tube (4). Install new tie straps (3) securing the MAF sensor wiring to air inlet tube (4).

VALVE, ONE WAY CHECK

Description

DESCRIPTION

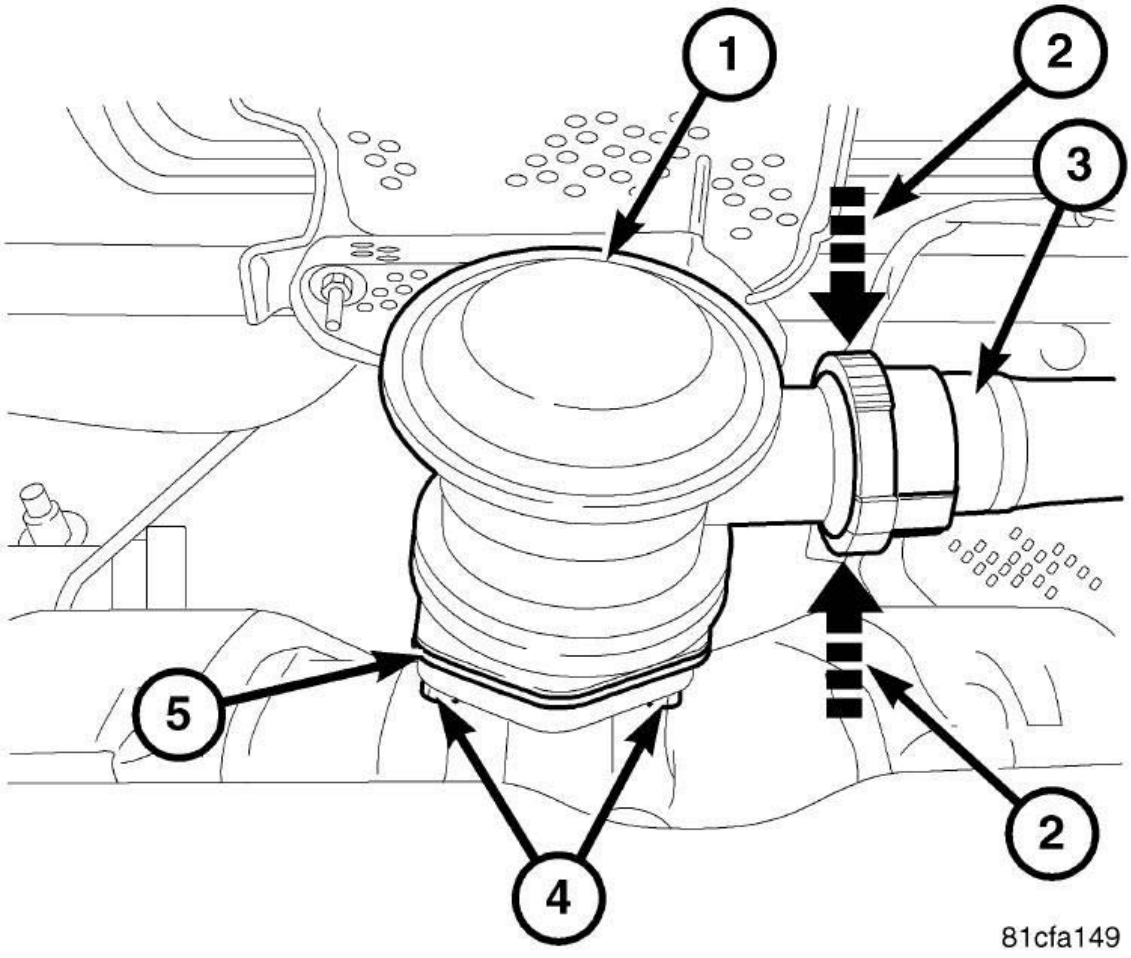


Fig. 16: AIR INJECTION CHECK VALVE
Courtesy of CHRYSLER LLC

The air injection check valve (1) is a one-valve check valve that allows air to flow in one direction only. The valve is located at exhaust side of the engine at the top of the exhaust manifold.

Operation

OPERATION

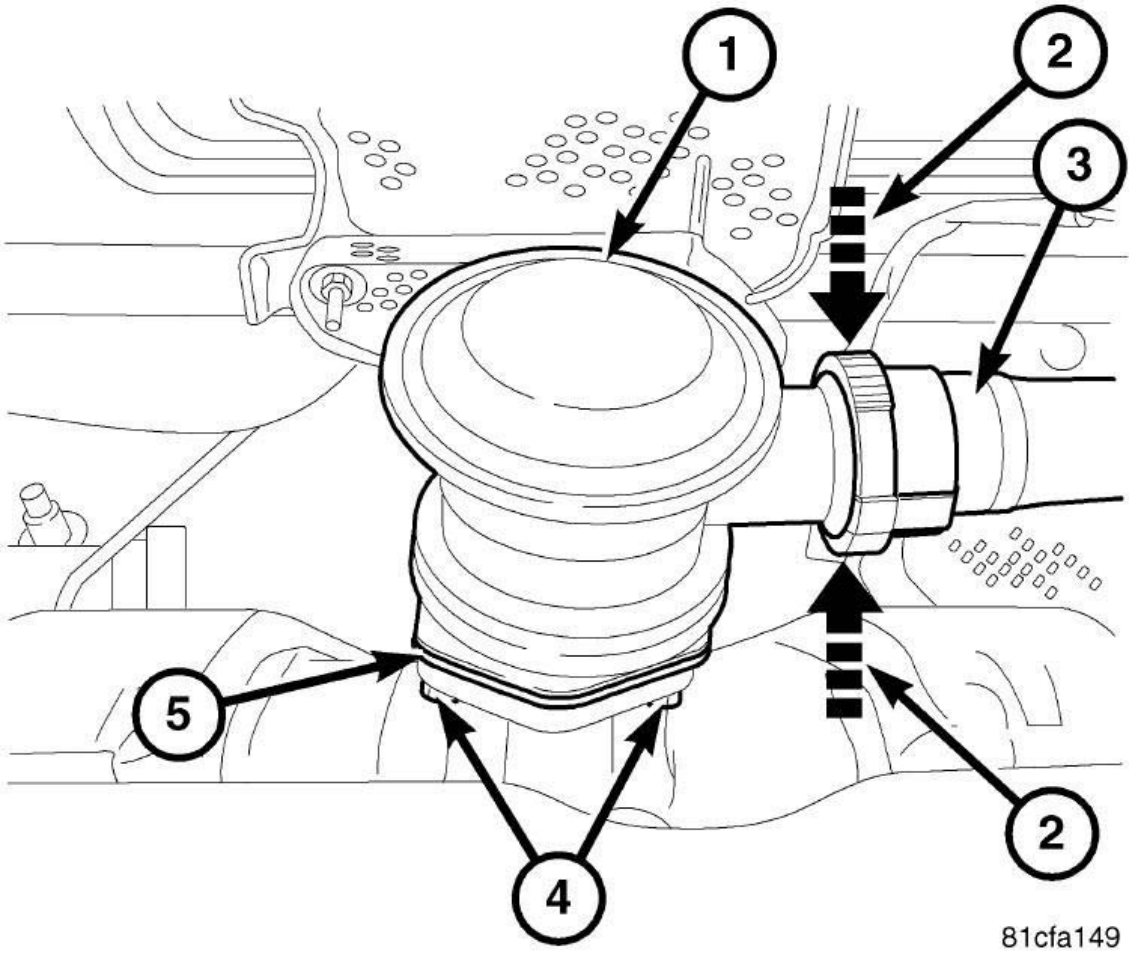


Fig. 17: AIR INJECTION CHECK VALVE
Courtesy of CHRYSLER LLC

The air injection check valve (1) allows air pumped from the air injection pump to enter the exhaust manifold during cold engine starts only. Air pressure from the air injection pump causes the spring inside the air injection check valve to open allowing air to flow into the exhaust system.

Removal

REMOVAL

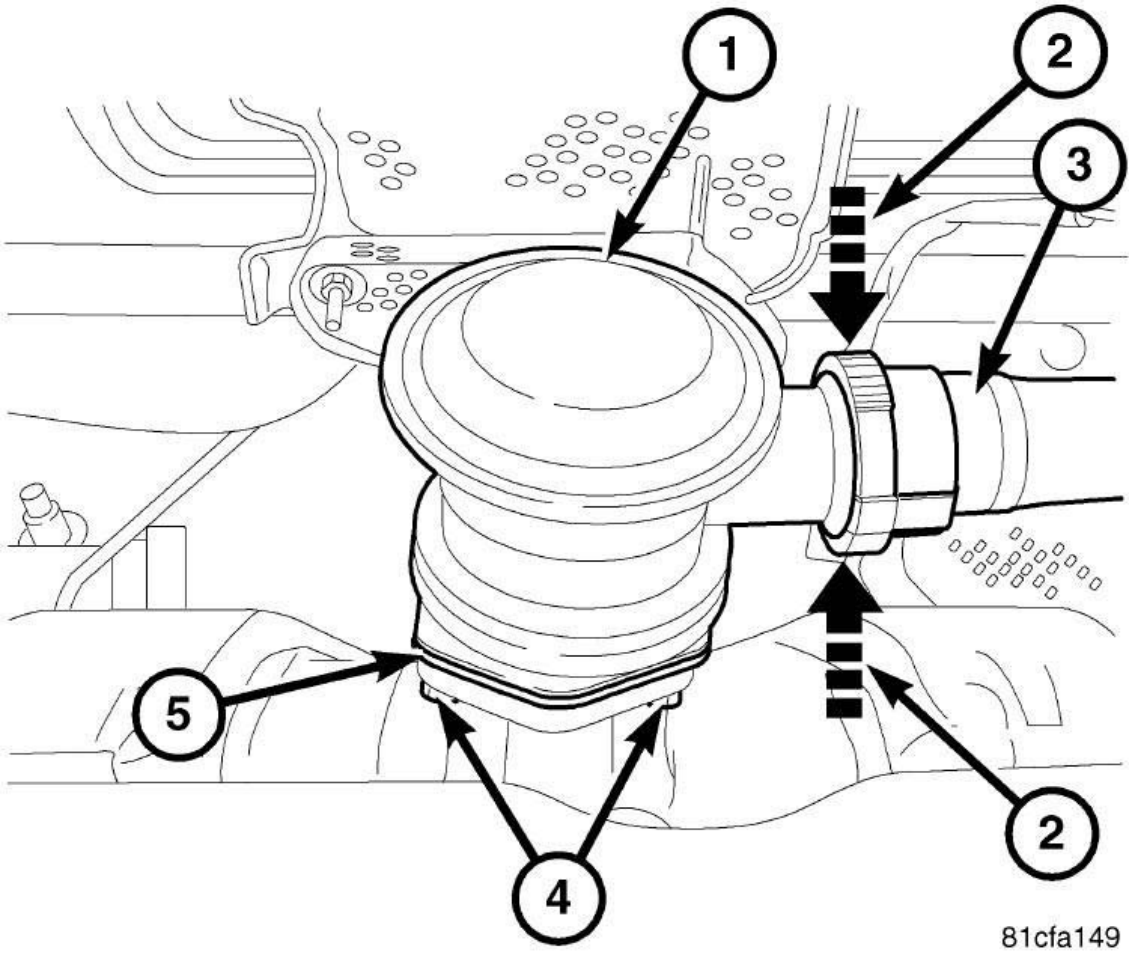


Fig. 18: AIR INJECTION CHECK VALVE
Courtesy of CHRYSLER LLC

WARNING: THE EXHAUST MANIFOLD, AIR INJECTION PIPES, EXHAUST PIPES AND CATALYTIC CONVERTER(S) BECOME VERY HOT DURING ENGINE OPERATION. ALLOW ENGINE TO COOL BEFORE REMOVING AIR INJECTION CHECK VALVE. FAILURE TO ALLOW ENGINE TO COOL BEFORE REMOVAL MAY RESULT IN PERSONAL INJURY CAUSED BY BURNS.

1. Remove engine cover.
2. Remove air outlet tube (3) by pushing the ends (2) together, while pulling the air pump outlet tube (3)

away from air injection check valve (1).

3. Remove air injection check valve mounting bolts (4).
4. Remove air injection check valve (1) and gasket (5) from pipe. Clean old gasket material from air injection pipe.

Installation

INSTALLATION

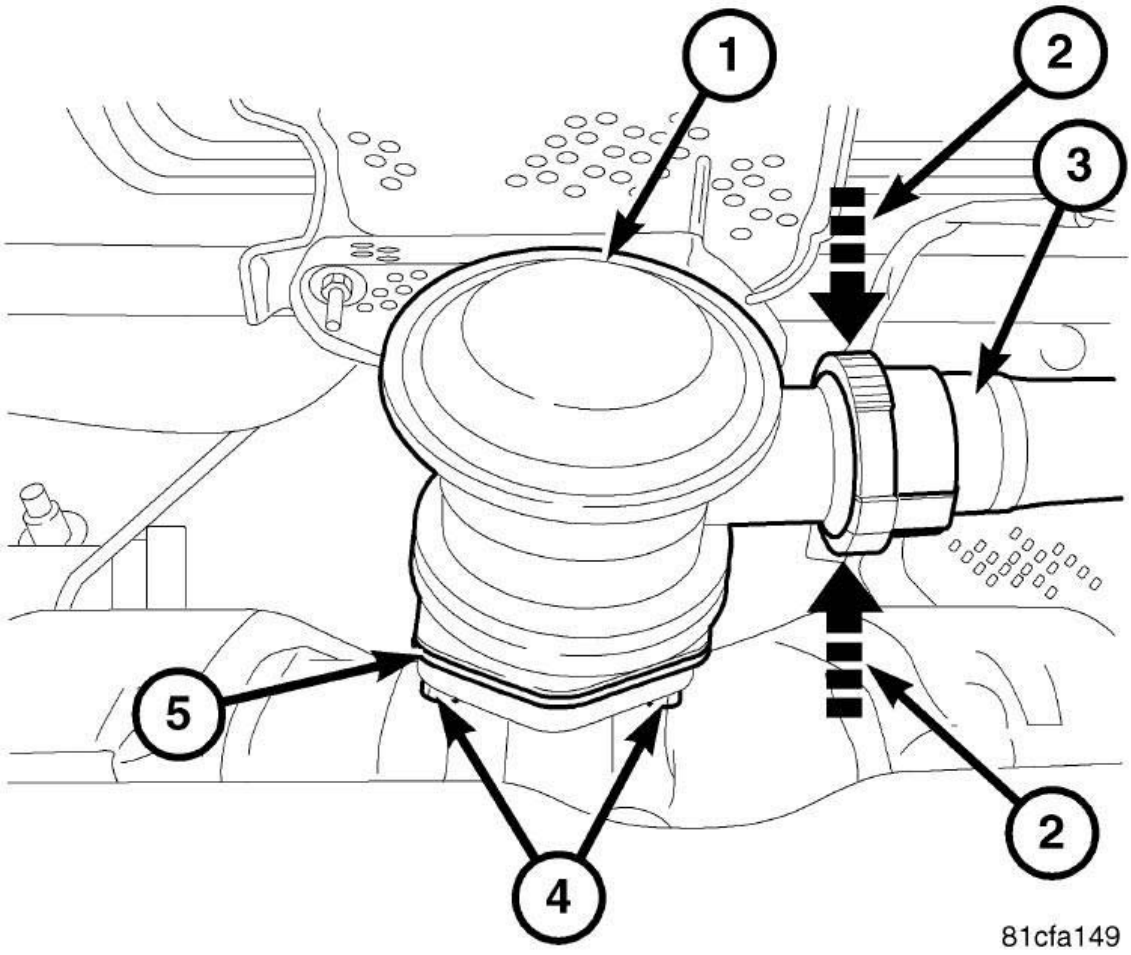


Fig. 19: AIR INJECTION CHECK VALVE
Courtesy of CHRYSLER LLC

NOTE: Make sure the old gasket material is completely removed from air injection pipe.

1. Install new gasket (5) and air injection check valve (1) to pipe.
2. Install air injection check valve mounting bolts (4).

NOTE: The quick connect fitting on the air outlet tube is slotted to fit the air injection check valve fitting. Line the slot up when making the connection.

3. Install air pump outlet tube (3) to air injection check valve (1) connection. A click noise will indicate a good connection.
4. Install engine cover.

EVAPORATIVE EMISSIONS

CANISTER, VAPOR

Operation

OPERATION

All gasoline fueled vehicles use a maintenance free, evaporative (EVAP) canister. Fuel tank vapors vent into the canister. The canister temporarily holds the fuel vapors until intake manifold vacuum draws them into the combustion chamber. The Powertrain Control Module (PCM) purges the canister through the proportional purge solenoid. The PCM purges the canister at predetermined intervals and engine conditions. The proportional purge solenoid controls the purge rate of fuel vapors from the vapor canister and fuel tank to the engine intake manifold.

Removal

REMOVAL

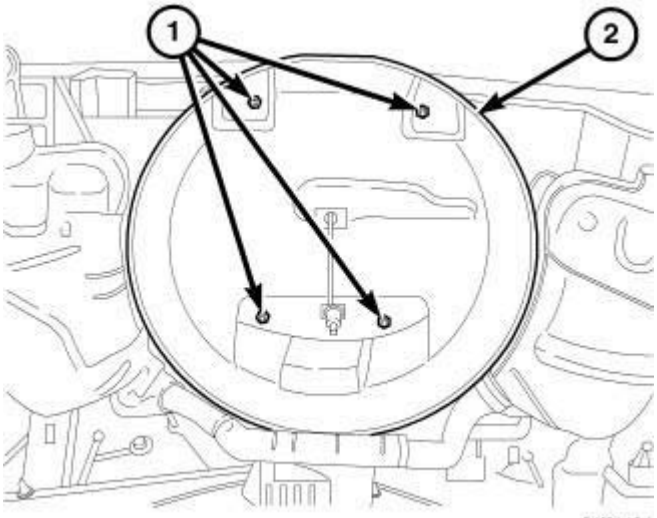


Fig. 20: Spare Tire Well
Courtesy of CHRYSLER LLC

1 - Nuts 2 - Spare Tire Well

1. Disconnect and isolate negative battery cable.
2. Remove the spare tire.
3. Raise and support vehicle.
4. Remove the 4 nuts (1) and the spare tire well (2).

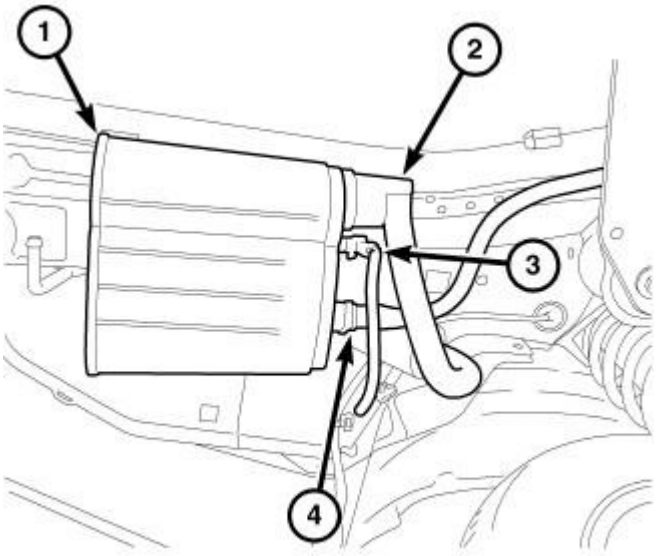


Fig. 21: Canister Mounting Evaporative System Integrity Monitor
Courtesy of CHRYSLER LLC

5. Remove 2 nuts from EVAP canister mounting brackets and reposition EVAP canister assembly.
6. Disconnect purge line (4) from EVAP canister (1). Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
7. Remove fresh air hose (2) and electrical connector (3) from the ESIM.
8. Remove EVAP canister assembly from vehicle.

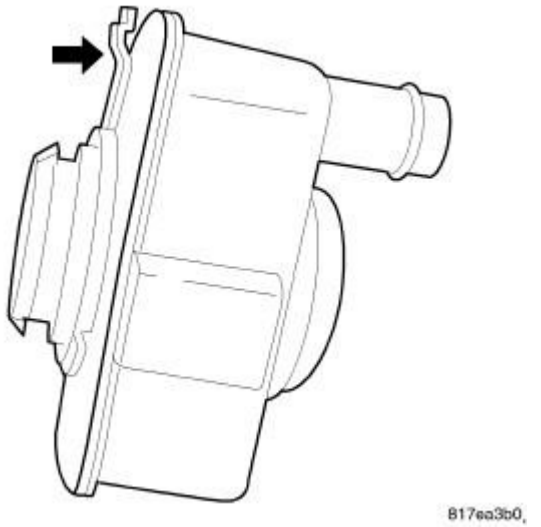


Fig. 22: Natural Vacuum Leak Detection Locking Tab
Courtesy of CHRYSLER LLC

9. A lock tab (see arrow) is used on the back of the switch. Push lock tab towards switch while rotating switch counterclockwise 1/4 turn for removal.

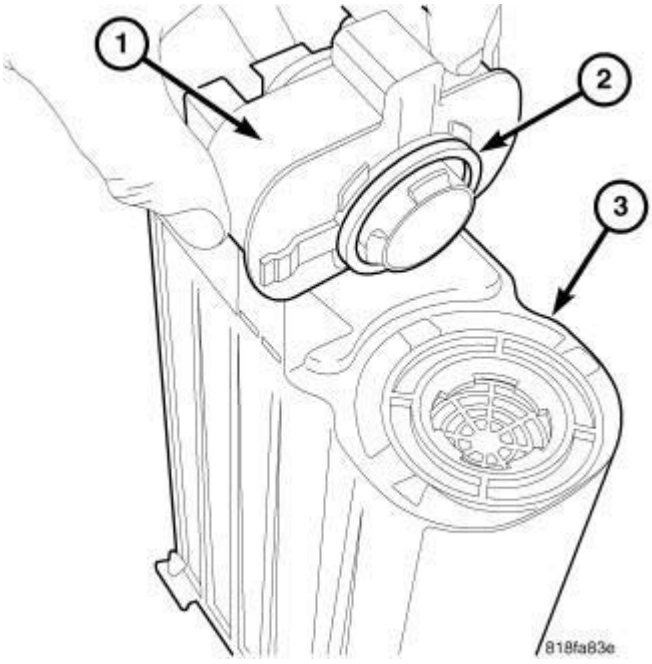


Fig. 23: Evaporative System Integrity Monitor Switch Removed
Courtesy of CHRYSLER LLC

10. Remove ESIM (1) from the EVAP canister (3).
11. Remove mounting brackets from EVAP canister.

Installation

INSTALLATION

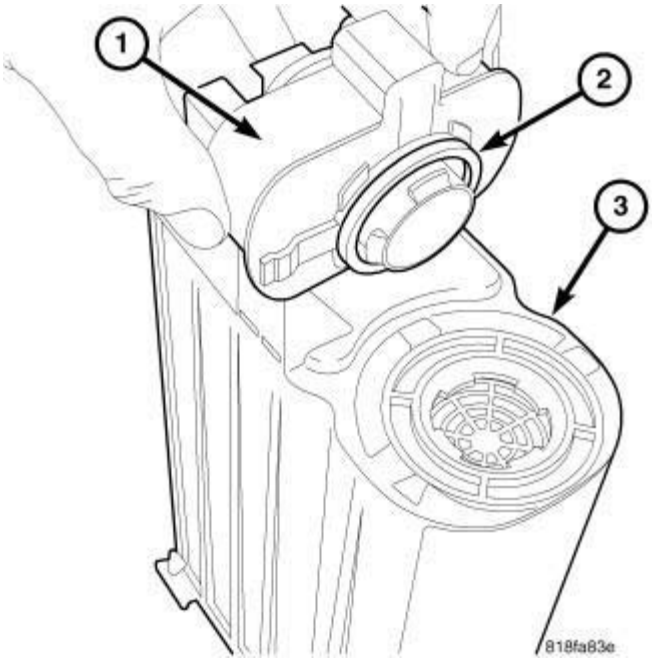


Fig. 24: Evaporative System Integrity Monitor Switch Removed
Courtesy of CHRYSLER LLC

The picture displays a typical EVAP Canister and a typical ESIM switch. After installing any ESIM switch, the electrical connector on the switch must be in the 3 O'clock position. This step must be done for proper ESIM switch operation.

1. The fresh air hose that attaches to the ESIM must have a clear opening to the atmosphere. Check the fresh air hose, including the fresh air filter, for obstructions or restrictions at the ESIM. If a restriction is present, the system will not allow free flow passage of clean air, and an early shut off of the fuel fill nozzle may occur during fuel fill.
2. Be sure O-ring (2) and EVAP canister opening are clean.
3. Install ESIM (1) to the EVAP canister (3).
4. Instal mounting brackets to EVAP canister assembly.

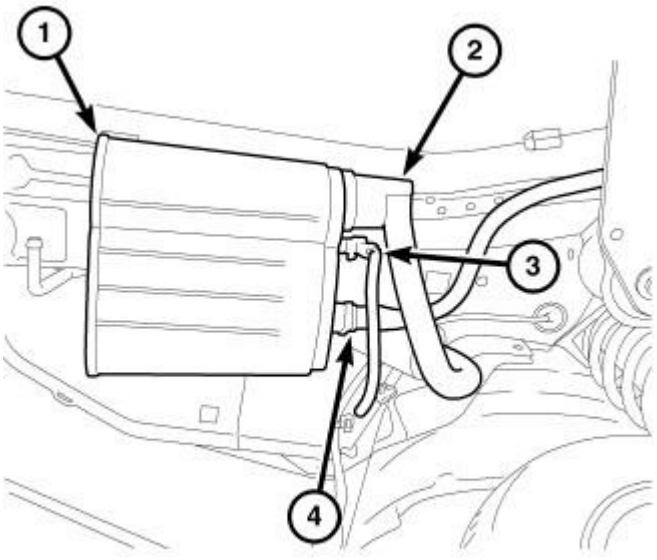


Fig. 25: Canister Mounting Evaporative System Integrity Monitor
Courtesy of CHRYSLER LLC

5. Install EVAP canister assembly to vehicle.
6. Install purge line (4) to EVAP canister (1). Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
7. Install fresh air hose (2) and electrical connector (3) to the ESIM.

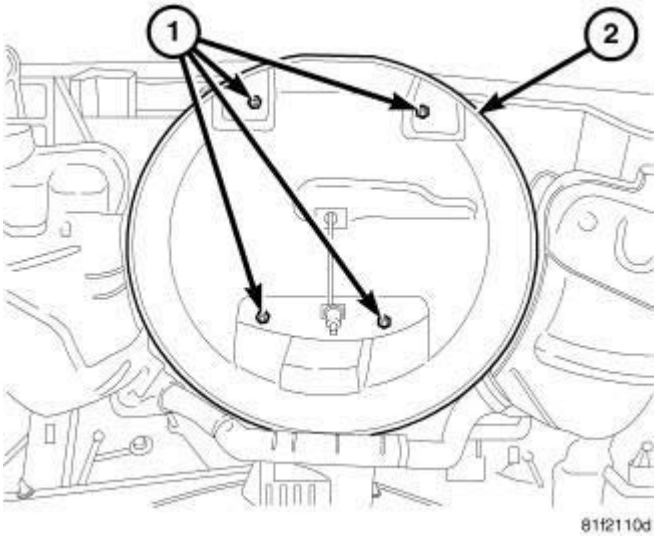


Fig. 26: Spare Tire Well
Courtesy of CHRYSLER LLC

1 - Nuts

2 - Spare Tire Well

8. Install the spare tire well (2) with 4 nuts (1).
9. Lower vehicle.
10. Install the spare tire.
11. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

CAP, FUEL FILLER

Description

DESCRIPTION

The plastic fuel fill cap is a threaded/quarter turn onto the end of the fuel filler tube. Its purpose is to retain vapors and fuel in the fuel tank.

Operation

OPERATION

The loss of any fuel vapor out of fuel filler tube is prevented by the use of pressure-vacuum fuel fill cap. Relief valves inside the cap will release fuel tank pressure at predetermined pressures. Fuel tank vacuum will also be released at predetermined values. This cap must be replaced by a similar unit if replacement is necessary. This is in order for the system to remain effective.

CAUTION: Remove fill cap before servicing any fuel system component to relieve tank pressure. If the cap is left loose, a Diagnostic Trouble Code (DTC) may be set.

SOLENOID, EVAPORATIVE EMISSIONS PURGE

Operation

OPERATION

During the cold start warm-up period and the hot start time delay, the PCM does not energize the solenoid. When de-energized, no vapors are purged.

The proportional purge solenoid operates at a frequency of 200 hz and is controlled by an engine controller circuit that senses the current being applied to the proportional purge solenoid and then adjusts that current to achieve the desired purge flow. The proportional purge solenoid controls the purge rate of fuel vapors from the vapor canister and fuel tank to the engine intake manifold.

Removal

REMOVAL

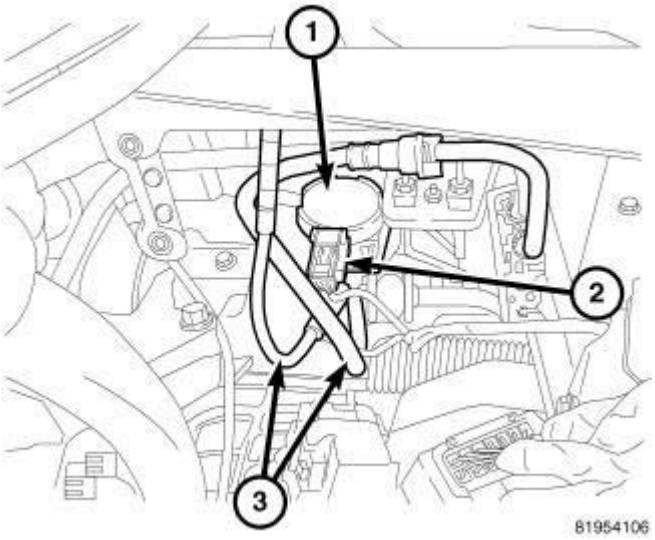


Fig. 27: PURGE SOLENOID CONNECTIONS
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable at battery.
2. If equipped with 2.7L or 3.5L engine, remove the PCM. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Removal** .
3. Disconnect electrical connector (2) from evaporator purge solenoid (1).
4. Remove purge hose and quick connect fuel tank hose (3) from evaporator purge solenoid (1). Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
5. Release tab to remove evaporator purge solenoid (1) from bracket.

Installation

INSTALLATION

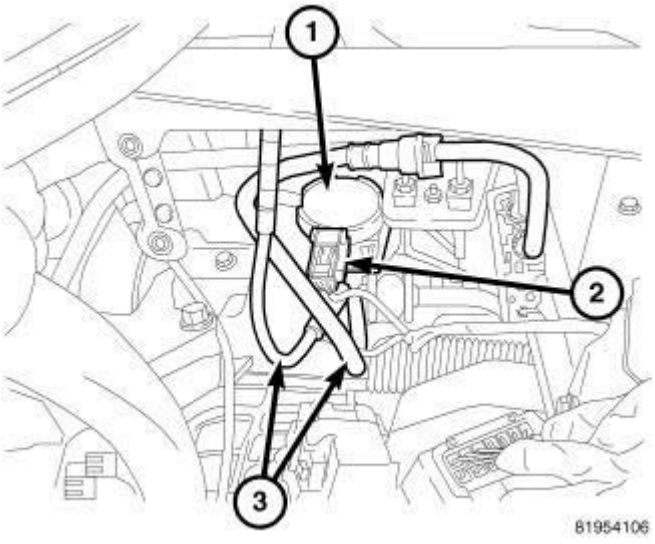


Fig. 28: PURGE SOLENOID CONNECTIONS
Courtesy of CHRYSLER LLC

1. Install evaporator purge solenoid (1) to bracket. Make sure the tab secures the solenoid to the bracket.
2. Install quick connect fuel tank hose and purge hose (3) to evaporator purge solenoid (1). Refer to **Fuel System/Fuel Delivery/FITTING, Quick Connect - Standard Procedure** .
3. Connect electrical connector (2) to evaporator purge solenoid (1).
4. If equipped with 2.7L or 3.5L engine, install the PCM. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Installation** .
5. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

SWITCH, EVAPORATIVE EMISSIONS SYSTEM MONITOR

Operation

OPERATION

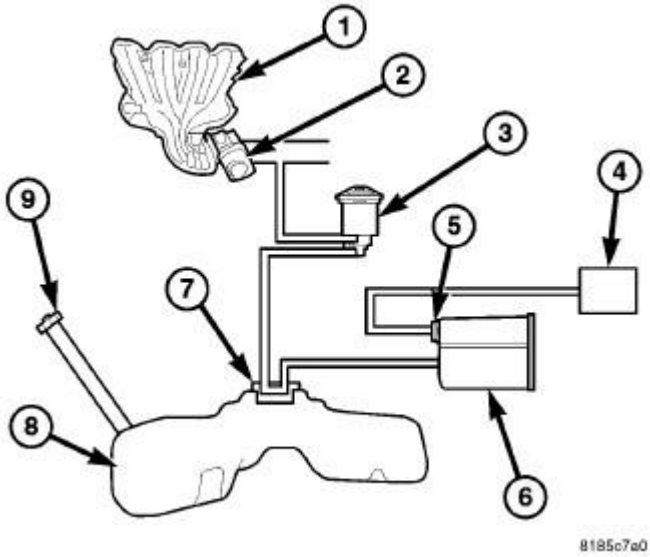


Fig. 29: Evaporative Emissions System Monitor Switch
Courtesy of CHRYSLER LLC

1 - Intake Manifold
2 - Throttle Body
3 - Purge Solenoid
4 - Filter
5 - ESIM
6 - Vapor Canister
7 - Control Valve
8 - Fuel Tank

9 - Gas Cap

The ESIM (Evaporative System Integrity Monitor) is very similar to the NVLD. However, the design of the ESIM has been simplified and unlike the NVLD the ESIM does not require a solenoid. The ESIM mounts directly to the canister, eliminating the need for a mounting bracket. It is critical that the ESIM is mounted vertically. On vehicles where the canister is mounted on an angle, the ESIM requires an adaptor to maintain a vertical position. When the ESIM is installed vertically, the electrical connector is in the 3 o'clock position.

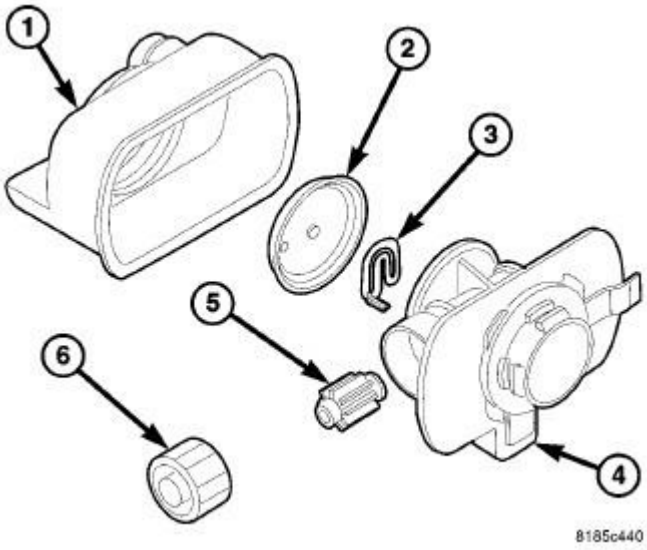


Fig. 30: EXPLODED VIEW
Courtesy of CHRYSLER LLC

1 - ESIM Housing
2 - Diaphragm
3 - Switch
4 - Cover
5 - Small Check Valve
6 - Large Check Valve

The ESIM assembly consists of a housing, a small weight and a large weight that serve as check valves, a diaphragm, a switch and a cover. There is one large weight and one small weight check valve in the ESIM assembly. A seal is attached at the end of each weighted check valve. The large weight check valve seals for pressure. The small weight check valve seals for vacuum. The weighted check valves are contained within the ESIM housing.

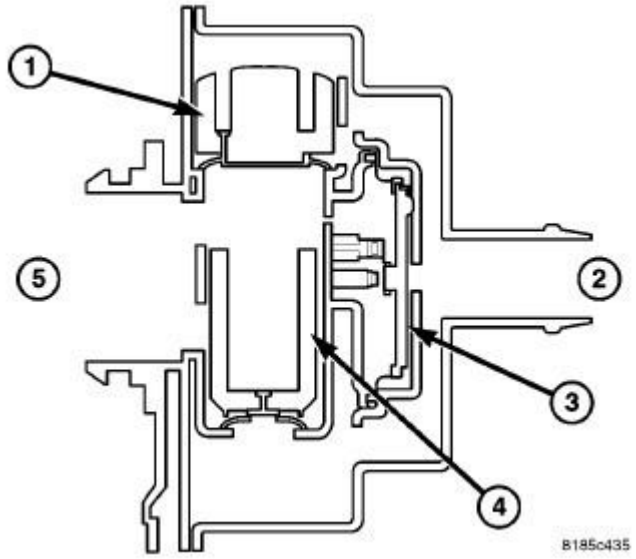


Fig. 31: CUT AWAY OF MODULE
Courtesy of CHRYSLER LLC

1 - Large Check Valve
2 - Fresh Air Inlet
3 - Diagram
4 - Small Check Valve
5 - Vapor Canister

The ESIM (Evaporative System Integrity Monitor), while physically different than the NVLD system, performs the same basic function as the NVLD does - controlling evaporative emissions. The ESIM has been simplified because the solenoid used on the NVLD is not used on the ESIM.

The ESIM consists of housing, two check valves (sometimes referred to as weights), a diaphragm, a switch and a cover. The larger check valve seals for pressure and the smaller one seals for vacuum.

During refueling, pressure is built up in the evaporative system. When pressure reaches approximately.5 inches of water, the large check valve unseats and pressure vents to the fresh air filter.

Conversely, when the system cools and the resulting vacuum lifts the small check valve from its seat and allows fresh air to enter the system and relieve the vacuum condition. When a calibrated amount of vacuum is achieved in the evaporative system, the diaphragm is pulled inward, pushing on the spring and closing the contacts.

The ESIM conducts test on the evaporative system as follows: An engine off, non-intrusive test for small leaks and an engine running, intrusive test for medium/large leaks.

The ESIM weights seal the EVAP system during engine off conditions. If the EVAP system is sealed, it will be pulled into a vacuum, either due to the cool down from operating temperature or diurnal ambient temperature cycling. When the vacuum in the system exceeds about 1" H20, the vacuum switch closes. The switch closure

sends a signal to the powertrain control module (PCM). In order to pass the non-intrusive small leak test, the ESIM switch must close within a calculated amount of time and within a specified amount of key-off events.

If the ESIM switch does not close as specified, the test is considered inconclusive and the intrusive engine running test will be run during the next key-on cycle. This intrusive test will run on the next cold engine running condition.

Conditions for running the intrusive test are:

- After the vehicle is started, the engine coolant temperature must be within 10° C (50°F) of ambient to indicate a cold start.
- The fuel level must be between 12% and 88%.
- The engine must be in closed loop.
- Manifold vacuum must be greater than a minimum specified value.
- Ambient temperature must be between 4° C and 37° C (39° F and 98° F) and the elevation level must be below 8500 feet.

The test is accomplished by the PCM activating the purge solenoid to create a vacuum in the evaporative system. The PCM then measures the amount of time it takes for the vacuum to dissipate. This is known as the vacuum decay method. If the switch opens quickly a large leak is recorded. If the switch opens after a predetermined amount of time, then the small leak matures. If the switch does not close, then a general evaporative failure is recorded.

Even when all of the thresholds are met, a small leak won't be recorded until after the medium/large leak monitor has been run. If the medium/large leak test runs and the ESIM switch doesn't close, a general evaporative test is run. The purge solenoid is activated for approximately 10 seconds, increasing the amount of vacuum in the system. IF the ESIM switch closes after the extended purge activation, a large leak fault is generated. If the switch doesn't close, a general evaporative system fault is generated.

The purge monitor tests the integrity of the hose attached between the purge valve and throttle body/intake. The purge monitor is a two stage test and it runs only after the evaporative system passes the small leak test.

Stage one of the purge monitor is non-intrusive. The PCM monitors the purge vapor ratio. If the ratio is above a calibrated specification, the monitor passes. Stage two is an intrusive test and it runs only if stage one fails. During the stage two test, the PCM commands the purge solenoid to flow at a specified rate to force the purge vapor ratio to update. The vapor ratio is compared to a calibrated specification and if it is less than specified, a one-trip failure is recorded.

The ESIM switch stuck closed monitor checks to see if the switch is stuck closed. This is a power down test that runs at key-off; when the PCM sees 0 rpm's, the purge solenoid is energized for a maximum of 30 seconds, venting any vacuum trapped in the evaporative system. If the switch opens or was open before the test began, the monitor passes. If the switch doesn't open, the monitor fails. This is a two-trip MIL. The star scan tool can be used to force the ESIM switch stuck closed monitor to run.

The PCM also uses the ESIM to detect a loose or missing gas cap. The PCM looks for a change in the fuel level (25% minimum). If a medium/large leak is then detected, a loose gas cap light illuminates and a pending one-

trip fault code is set. This is a three-trip fault before the code matures.

Removal

REMOVAL

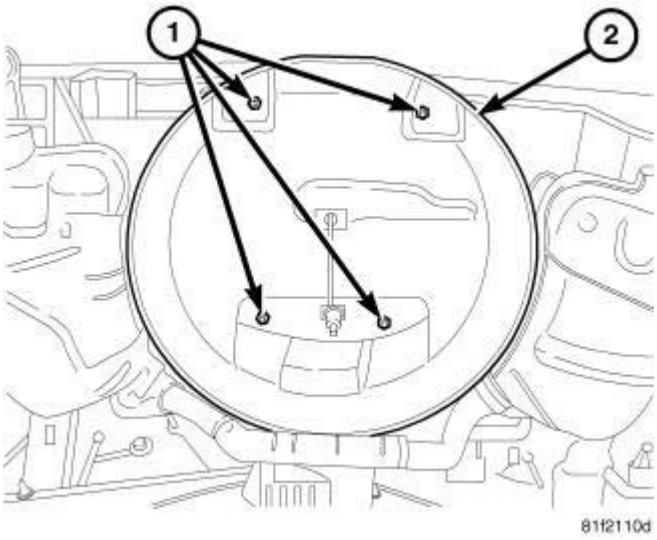


Fig. 32: Spare Tire Well
Courtesy of CHRYSLER LLC

1 - Nuts 2 - Spare Tire Well

1. Disconnect and isolate negative battery cable.
2. Remove the spare tire.
3. Raise and support vehicle.
4. Remove the 4 nuts (1) and the spare tire well (2).

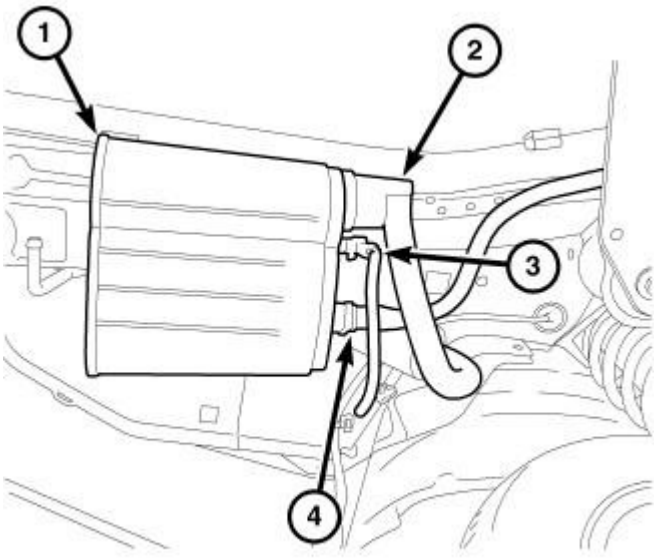


Fig. 33: Canister Mounting Evaporative System Integrity Monitor
Courtesy of CHRYSLER LLC

5. Remove fresh air hose (2) and electrical connector (3) from the ESIM.

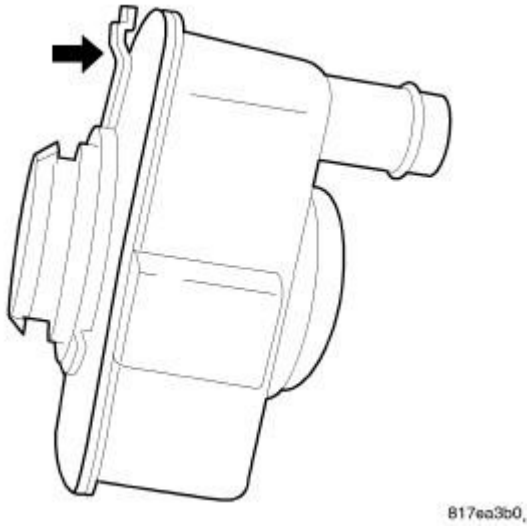


Fig. 34: Natural Vacuum Leak Detection Locking Tab
Courtesy of CHRYSLER LLC

6. A lock tab (see arrow) is used on the back of the switch. Push lock tab towards switch while rotating switch counterclockwise 1/4 turn for removal.

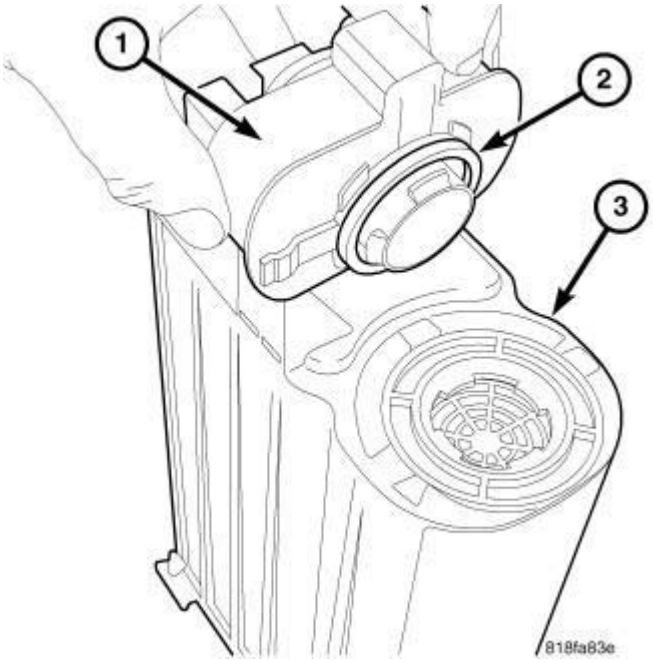


Fig. 35: Evaporative System Integrity Monitor Switch Removed
Courtesy of CHRYSLER LLC

7. Remove ESIM (1) from the EVAP canister (3).

Installation

INSTALLATION

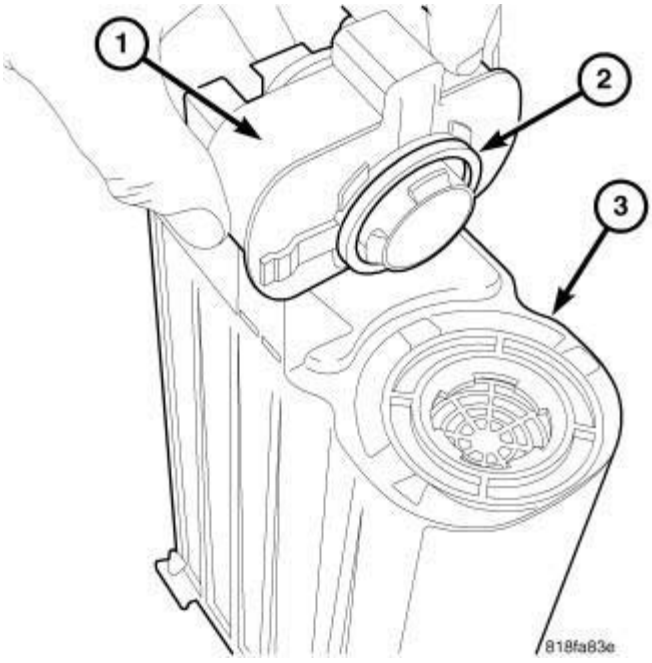


Fig. 36: Evaporative System Integrity Monitor Switch Removed

Courtesy of CHRYSLER LLC

The picture displays a typical EVAP Canister and a typical ESIM switch. After installing any ESIM switch, the electrical connector on the switch must be in the 3 O'clock position. This step must be done for proper ESIM switch operation.

1. The fresh air hose that attaches to the ESIM must have a clear opening to the atmosphere. Check the fresh air hose, including the fresh air filter, for obstructions or restrictions at the ESIM. If a restriction is present, the system will not allow free flow passage of clean air, and an early shut off of the fuel fill nozzle may occur during fuel fill.
2. Be sure O-ring (2) and EVAP canister opening are clean.
3. Install ESIM (1) to the EVAP canister (3).

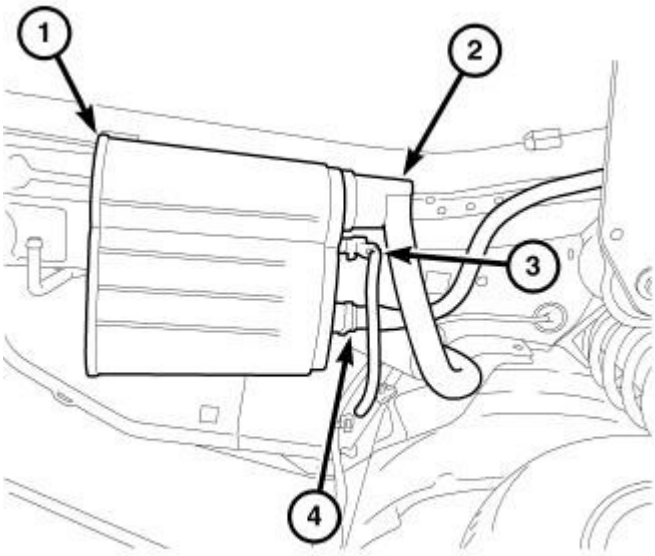


Fig. 37: Canister Mounting Evaporative System Integrity Monitor
Courtesy of CHRYSLER LLC

4. Install fresh air hose (2) and electrical connector (3) to the ESIM.

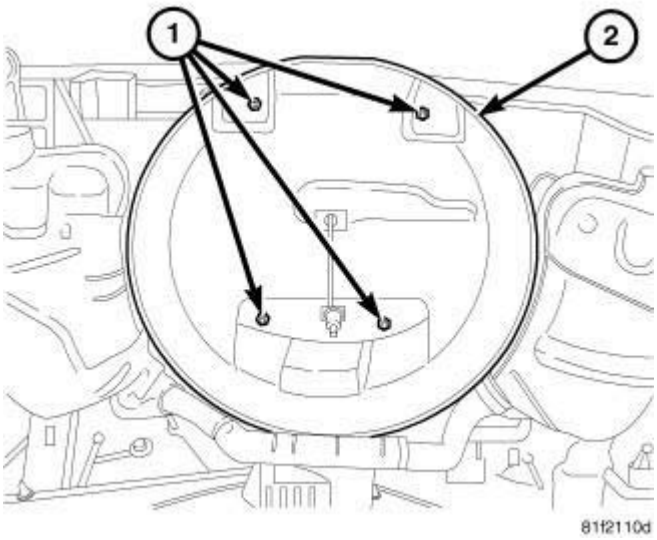


Fig. 38: Spare Tire Well
Courtesy of CHRYSLER LLC

1 - Nuts
2 - Spare Tire Well

5. Install the spare tire well (2) with 4 nuts (1).
6. Lower vehicle.
7. Install the spare tire.
8. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

VALVE, POSITIVE CRANKCASE VENTILATION (PCV)

Description

DESCRIPTION

The PCV valve contains a spring loaded plunger. The plunger meters the amount of crankcase vapors routed into the combustion chamber based on intake manifold vacuum.

Operation

OPERATION

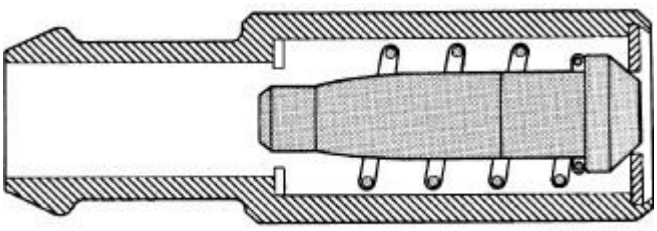


Fig. 39: Engine Off or Engine Backfire No Vapor Flow
Courtesy of CHRYSLER LLC

When the engine is not operating or during an engine backfire, the spring forces the plunger back against the seat. This prevents vapors from flowing through the valve.

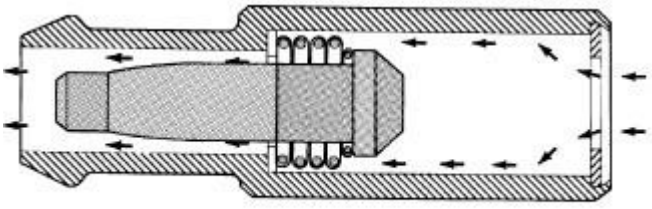


Fig. 40: High Intake Manifold Vacuum Minimal Vapor Flow
Courtesy of CHRYSLER LLC

When the engine is at idle or cruising, high manifold vacuum is present. At these times manifold vacuum is able to completely compress the spring and pull the plunger to the top of the valve. In this position there is minimal vapor flow through the valve.

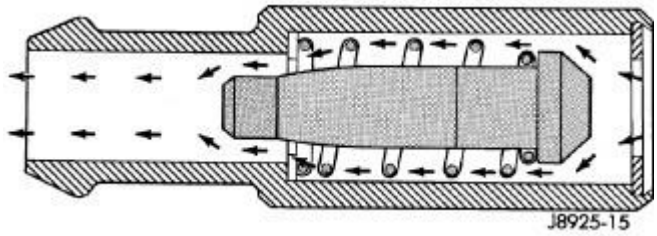


Fig. 41: Moderate Intake Manifold Vacuum Maximum Vapor Flow
Courtesy of CHRYSLER LLC

During periods of moderate intake manifold vacuum the plunger is only pulled part way back from the inlet. This results in maximum vapor flow through the valve.

Diagnosis and Testing

PCV SYSTEM

WARNING: apply parking brake and/or block wheels before performing any test or adjustment with the engine operating.

1. With engine idling, remove the hose from the PCV valve. If the valve is not plugged, a hissing noise will be heard as air passes through the valve. A strong vacuum should also be felt when a finger is placed over the valve inlet.
2. Install hose on PCV valve. Remove the make-up air hose from the air plenum at the rear of the engine. Hold a piece of stiff paper (parts tag) loosely over the end of the make-up air hose.
3. After allowing approximately one minute for crankcase pressure to reduce, the paper should draw up

against the hose with noticeable force. If the engine does not draw the paper against the grommet after installing a new valve, replace the PCV valve hose.

4. Turn the engine off. Remove the PCV valve from intake manifold. The valve should rattle when shaken.
5. Replace the PCV valve and retest the system if it does not operate as described in the preceding tests. **Do not attempt to clean the old PCV valve.**

Removal

2.4L

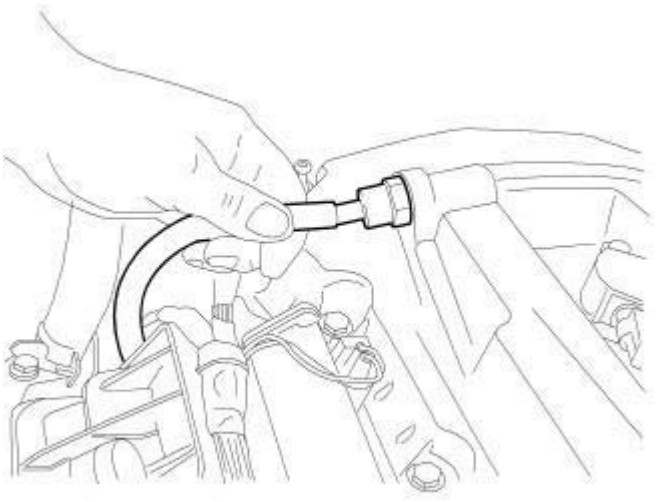


Fig. 42: Positive Crankcase Ventilation Hose Removed
Courtesy of CHRYSLER LLC

1. Remove the engine cover.
2. Remove the hose from the PCV valve.

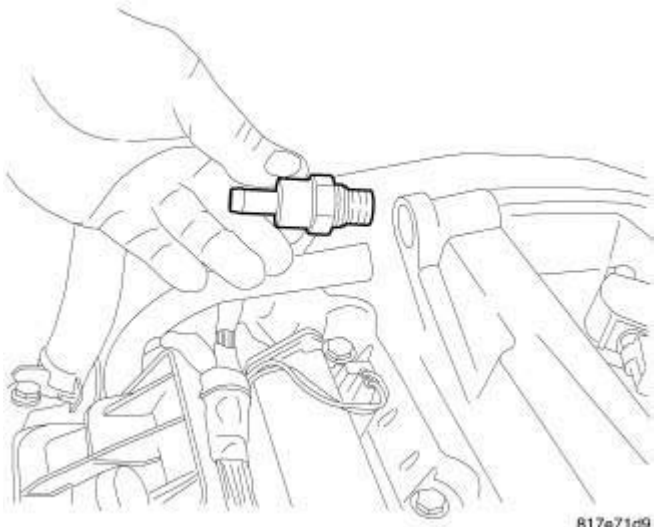


Fig. 43: Positive Crankcase Ventilation Removed
Courtesy of CHRYSLER LLC

3. Unscrew the PCV valve.

2.7L

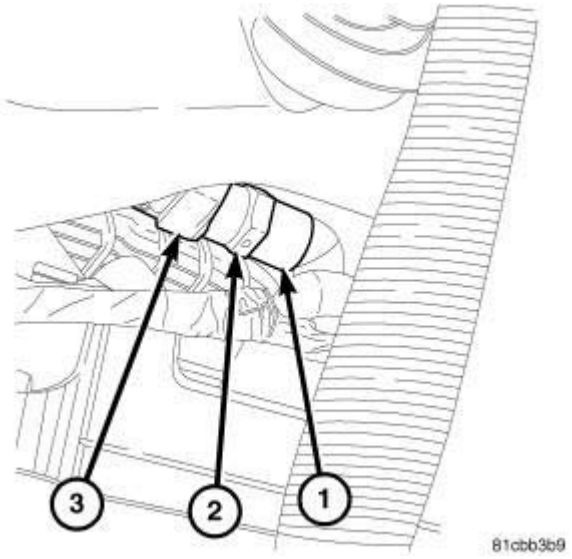


Fig. 44: Positive Crankcase Ventilation Valve - 2.7L
Courtesy of CHRYSLER LLC

The Positive Crankcase Ventilation (PCV) valve is located under the intake manifold on the right rear bank of the engine.

1. Remove positive crankcase ventilation (PCV) hose (3) from PCV valve (2).
2. Unscrew PCV valve (2) from valve cover (1).

3.5L

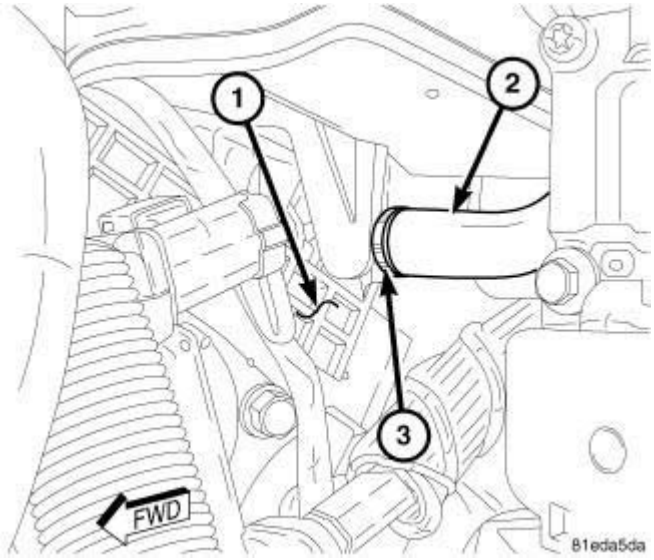


Fig. 45: Positive Crankcase Ventilation Valve - 3.5L
Courtesy of CHRYSLER LLC

The Positive Crankcase Ventilation (PCV) valve is located on the end of the rear valve cover.

1. Remove positive crankcase ventilation (PCV) hose (2) from PCV valve (3).
2. Unscrew PCV valve (3) from valve cover (1).

Installation

2.4L

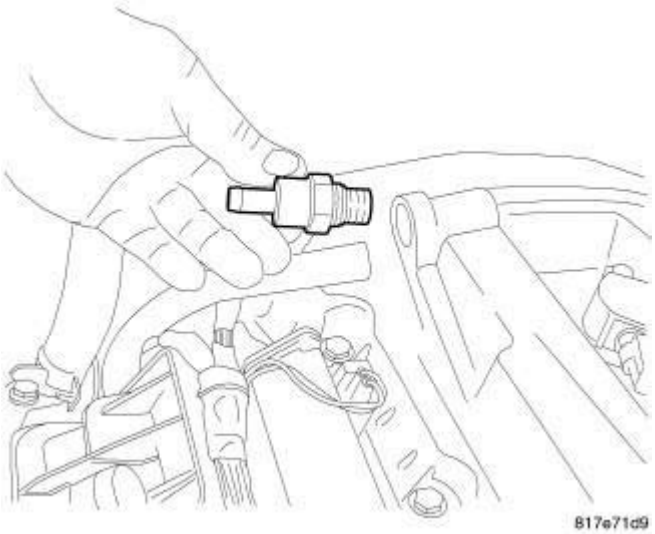


Fig. 46: Positive Crankcase Ventilation Removed
Courtesy of CHRYSLER LLC

1. Lubricate the O-ring on the valve.

2. Install the PCV valve and tighten the valve to 8.1 N.m (72 in. lbs.).

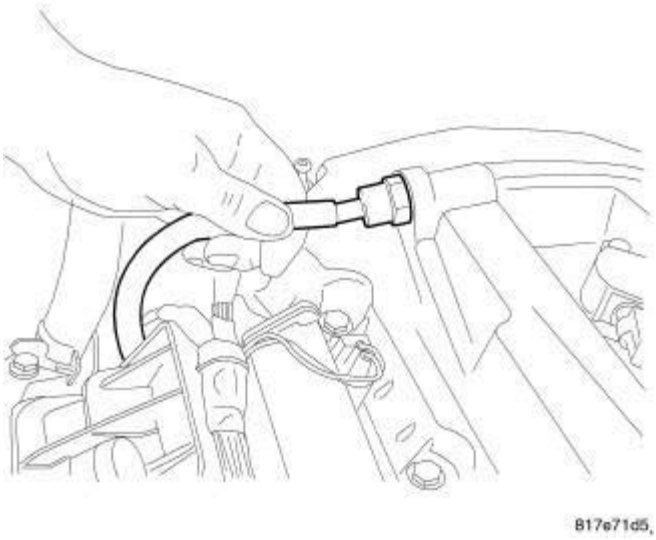


Fig. 47: Positive Crankcase Ventilation Hose Removed
Courtesy of CHRYSLER LLC

3. Install the hose.
4. Install engine cover.

2.7L

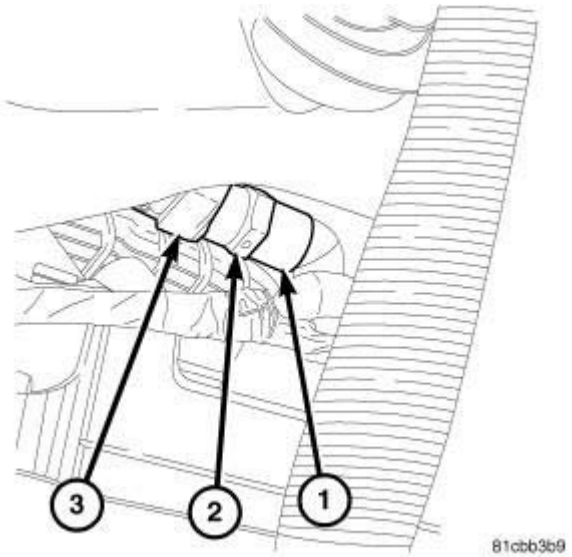


Fig. 48: Positive Crankcase Ventilation Valve - 2.7L
Courtesy of CHRYSLER LLC

1. Install positive crankcase ventilation (PCV) valve (2) to valve cover (1) and tighten to 4 N.m (35 in. lbs.).
2. Install positive crankcase ventilation (PCV) hose (3) to PCV valve (2).

3.5L

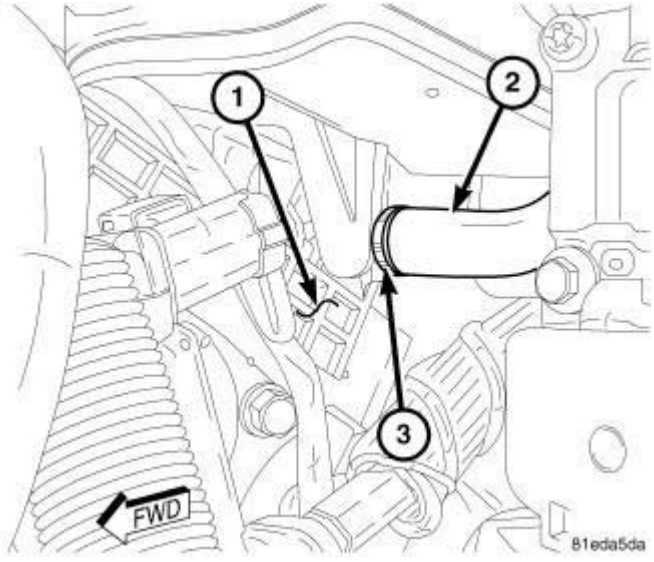


Fig. 49: Positive Crankcase Ventilation Valve - 3.5L
Courtesy of CHRYSLER LLC

1. Install positive crankcase ventilation (PCV) valve (3) to valve cover (1) and tighten to 4 N.m (35 in. lbs.).
2. Install positive crankcase ventilation (PCV) hose (2) to PCV valve (3).

EXHAUST GAS RECIRCULATION

SPECIFICATIONS

TORQUE

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Tube to Exhaust Manifold Bolts	31	23	275
Tube to EGR valve Bolts	11	-	95
EGR Valve to Cyl. Head Bolts	31	23	275

TUBE, EXHAUST GAS RECIRCULATION (EGR)

Removal

2.7L - LOWER TUBE

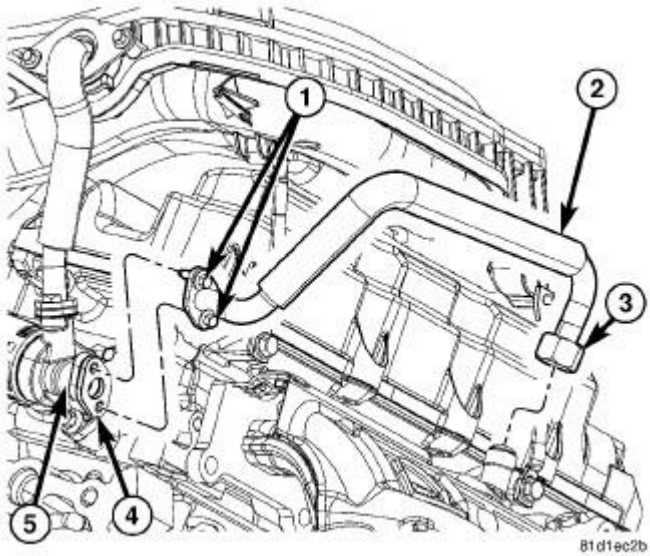


Fig. 50: Lower Exhaust Gas Recirculation Tube - 2.7L
Courtesy of CHRYSLER LLC

WARNING: The normal operating temperature of the exhaust gas recirculate (EGR) valve and tube is very high. Therefore, never work around or attempt to service any engine component until it is completely cooled.

1. Remove lower EGR tube nut (3) from exhaust manifold.
2. Remove lower EGR tube bolts (1) from EGR valve (5).
3. Remove gasket (4) from EGR valve (5). Clean gasket surfaces on EGR valve.
4. Remove lower EGR tube (2) from vehicle.

2.7L - UPPER TUBE

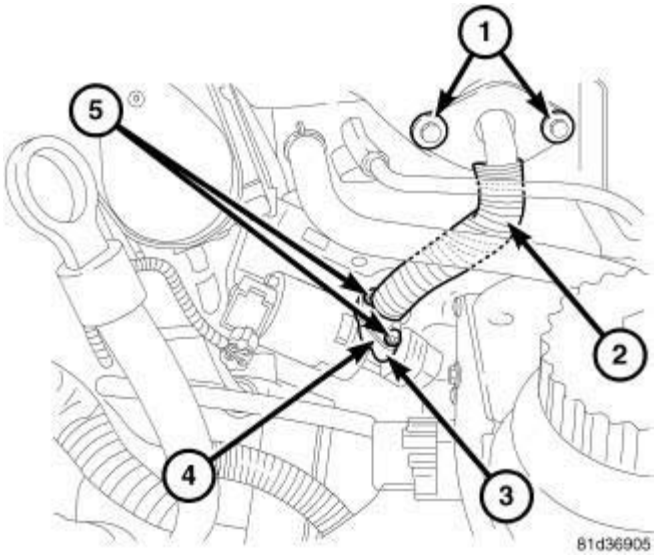


Fig. 51: Upper Tube
Courtesy of CHRYSLER LLC

WARNING: The normal operating temperature of the exhaust gas recirculate (EGR) valve and tube is very high. Therefore, never work around or attempt to service any engine component until it is completely cooled.

1. Disconnect negative battery cable.
2. Remove upper bolts (1) from intake manifold. Inspect gasket, replace if necessary.
3. Remove bolts (5) attaching upper tube (2) to EGR valve (3).
4. Remove the gasket (4) between upper tube (2) and EGR valve (3).

CAUTION: Clean mounting surface of EGR valve. Do not use sharp metal scraping tools. Damage may occur to the sealing surfaces of the EGR valve causing a leak.

5. Clean mounting surface of EGR valve.

3.5L

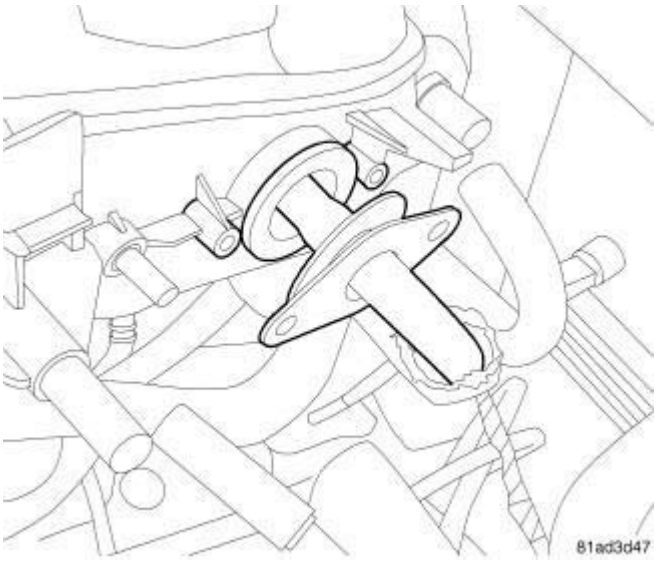


Fig. 52: UPPER MOUNTING
Courtesy of CHRYSLER LLC

WARNING: The normal operating temperature of the exhaust gas recirculate (EGR) valve and tube is very high. Therefore, never work around or attempt to service any engine component until it is completely cooled.

1. Remove two upper tube mounting bolts.
2. When removing EGR tube assembly be careful not to drop the silicone rubber seals into the intake

manifold. Clean gasket surfaces on the EGR valve. Note that any loose dirt can lodge between the pintle and the seat and cause valve leakage that will give a rough idle and depressed manifold vacuum.

Fig. 53: UPPER TUBE
Courtesy of CHRYSLER LLC

3. Remove two lower tube mounting bolts.
4. Remove tube assembly from vehicle.

Installation

2.7L - LOWER TUBE

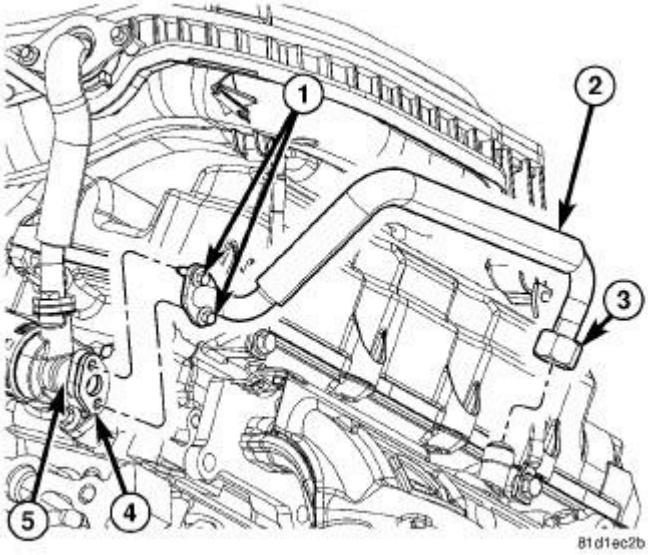


Fig. 54: Lower Exhaust Gas Recirculation Tube - 2.7L
Courtesy of CHRYSLER LLC

1. Install gasket (4) to EGR valve (5).
2. Install lower EGR tube (2) to vehicle.
3. Install lower EGR tube bolts (1) to EGR valve (5). Tighten bolts to 12 N.m (106 in. lbs.).
4. Install lower EGR tube nut (3) to exhaust manifold. Tighten nut to 70 N.m (51.5 ft. lbs.).

2.7L - UPPER TUBE

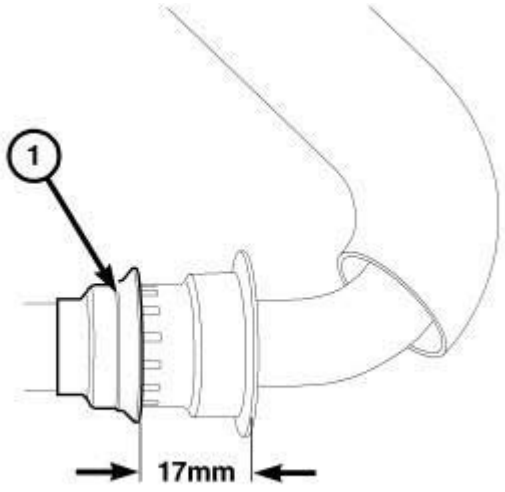


Fig. 55: Identifying Inner Exhaust Gas Recirculation Tube Seal
Courtesy of CHRYSLER LLC

CAUTION: Do Not use metal scrapers when cleaning the mounting surface of the EGR valve. Damage from scratching the surface may cause an improper seal.

CAUTION: Do not allow debris to enter the EGR valve when cleaning the mounting surface. Debris can lodge between the pintle and the seat causing valve leakage that results in rough idle and depressed manifold vacuum.

1. Clean and inspect gasket sealing surfaces.

NOTE: Install new rubber silicone seals on intake manifold end of EGR tube any time it is removed from the intake manifold.

2. Install new silicone rubber seal (1) on the intake manifold end of the EGR tube. Position seal 17 mm (0.67 in.) from the tube flange.

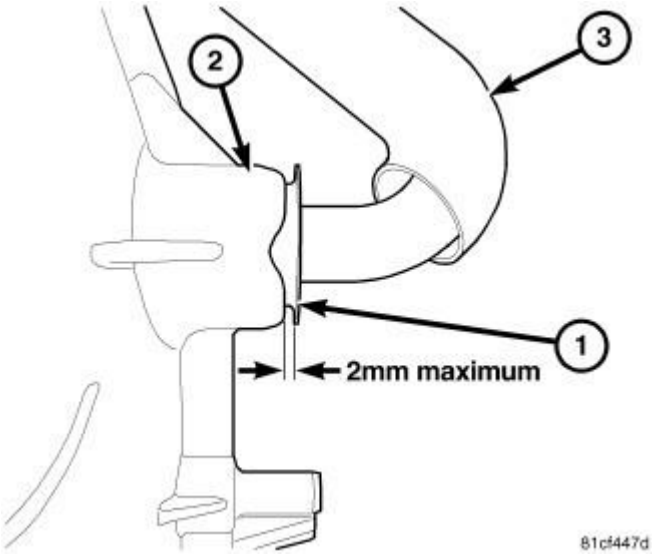


Fig. 56: Identifying Exhaust Gas Recirculation Flange, Tube & Intake Manifold
Courtesy of CHRYSLER LLC

1 - EGR tube flange 2 - intake manifold

3. Lubricate the EGR mounting tube hole in the intake manifold with Mopar® Rubber Bushing Installation Lube. Do not lubricate the EGR tube or seal.
4. Install the EGR tube (3) into the intake manifold (2) being careful not to damage the silicone rubber seals, and verify that the seals are correctly positioned in the intake manifold.

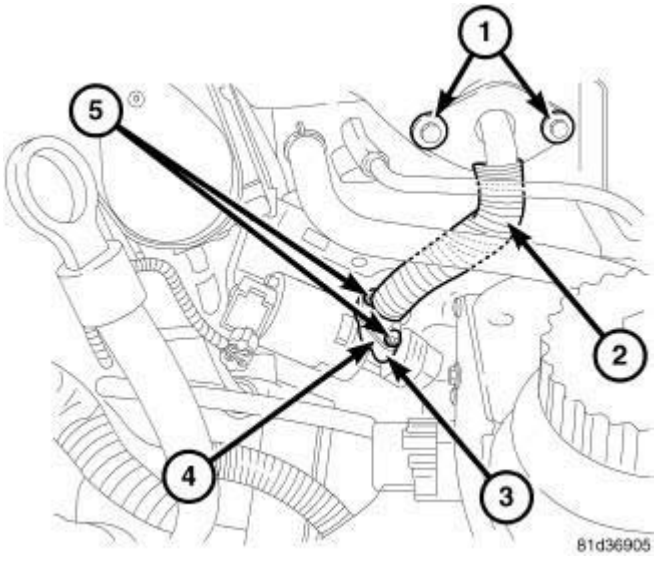


Fig. 57: Upper Tube
Courtesy of CHRYSLER LLC

5. Install new gasket (4) between the EGR valve (3) and tube (2) and install bolts (5). Tighten bolts to 12

N.m (106 in. lbs.).

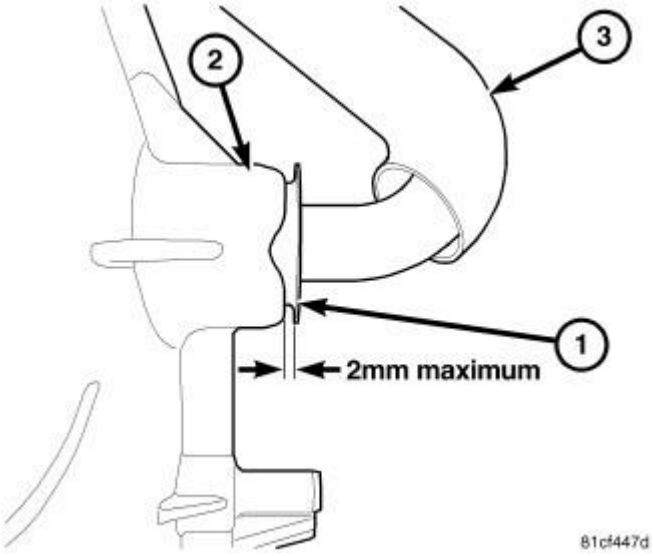


Fig. 58: Identifying Exhaust Gas Recirculation Flange, Tube & Intake Manifold
Courtesy of CHRYSLER LLC

1 - EGR tube flange 2 - intake manifold

NOTE: The EGR tube flange (1) does not need to be flush with the intake manifold (2) to be sealed. The EGR tube flange can be up to 2 mm (0.08 in.) from intake manifold and still be sealed. This design allows the EGR tube position to vary with the tolerance stack up and remain properly sealed.

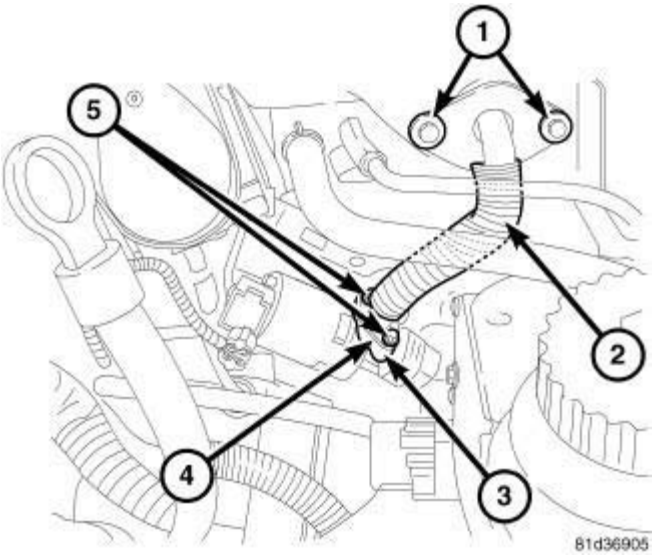


Fig. 59: Upper Tube
Courtesy of CHRYSLER LLC

6. Tighten the EGR tube to intake manifold bolts (1) to 6 N.m (53 in. lbs.).
7. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

3.5L

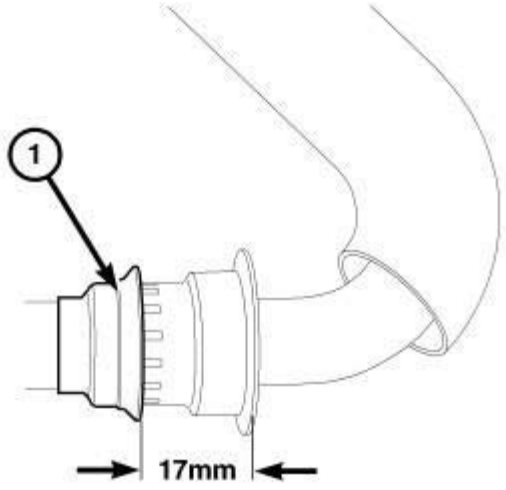


Fig. 60: Identifying Inner Exhaust Gas Recirculation Tube Seal
Courtesy of CHRYSLER LLC

CAUTION: Do Not use metal scrapers when cleaning the mounting surface of the EGR valve. Damage from scratching the surface may cause an improper seal.

CAUTION: Do not allow debris to enter the EGR valve when cleaning the mounting surface. Debris can lodge between the pintle and the seat causing valve leakage that results in rough idle and depressed manifold vacuum.

1. Clean and inspect gasket sealing surfaces.

NOTE: Install new rubber silicone seals on intake manifold end of EGR tube any time it is removed from the intake manifold.

2. Install new silicone rubber seal (1) on the intake manifold end of the EGR tube. Position seal 17 mm (0.67 in.) from the tube flange.

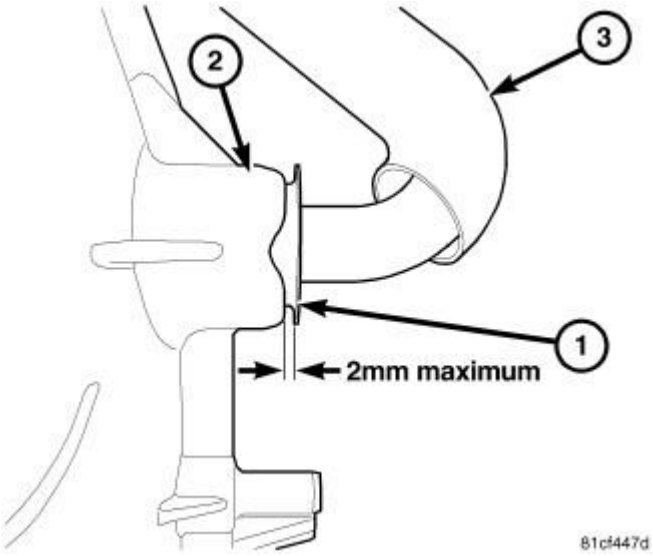


Fig. 61: Identifying Exhaust Gas Recirculation Flange, Tube & Intake Manifold
Courtesy of CHRYSLER LLC

1 - EGR tube flange
2 - intake manifold

3. Lubricate the EGR mounting tube hole in the intake manifold with Mopar® Rubber Bushing Installation Lube. Do not lubricate the EGR tube or seal.
4. Install the EGR tube (3) into the intake manifold (2) being careful not to damage the silicone rubber seals, and verify that the seals are correctly positioned in the intake manifold.

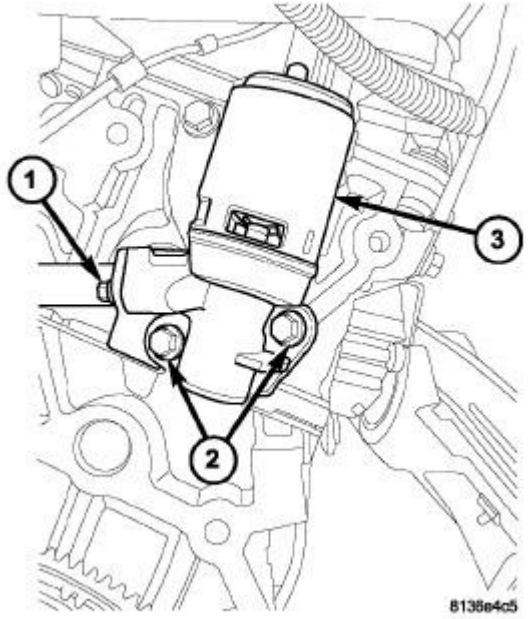


Fig. 62: Exhaust Gas Recirculation Valve Mounting Bolts 3.5
Courtesy of CHRYSLER LLC

5. Install new gasket between the EGR valve and tube and install bolts (1). Tighten bolts to 15 N.m (11 ft. lbs.).

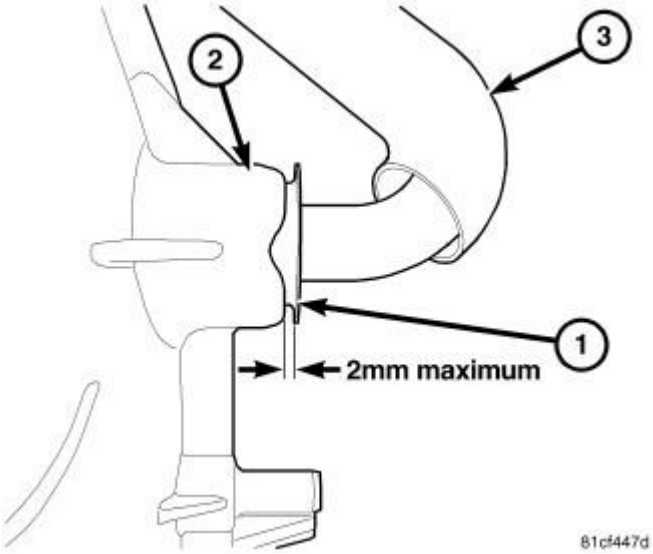


Fig. 63: Identifying Exhaust Gas Recirculation Flange, Tube & Intake Manifold
Courtesy of CHRYSLER LLC

1 - EGR tube flange
2 - intake manifold

NOTE: **The EGR tube flange (1) does not need to be flush with the intake manifold (2) to be sealed. The EGR tube flange can be up to 2 mm (0.08 in.) from intake manifold and still be sealed. This design allows the EGR tube position to vary with the tolerance stack up and remain properly sealed.**

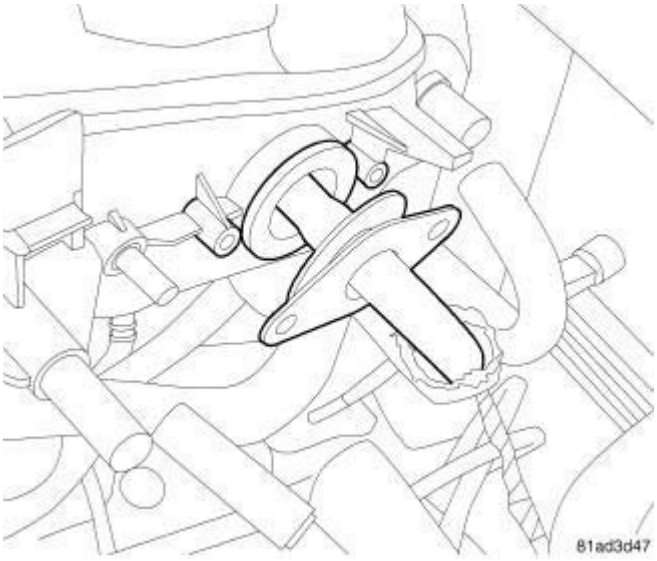


Fig. 64: UPPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: DO NOT use air tools to install bolts to intake manifold. Install bolts using hand tools only. Torque all fasteners to specification. The use of air tools can cause the threads of the intake manifold to become stripped.

6. Install the EGR tube flange mounting bolts to intake manifold. Tighten bolts to 12 N.m (106 in. lbs.).

VALVE, EXHAUST GAS RECIRCULATION (EGR)

Description

DESCRIPTION

The EGR valve consists of three major components. First there is the pintle, valve seat, and housing which contains and regulates the gas flow. Second there is the armature, return spring, and solenoid coil to provide the operating force to regulate the flow by changing the pintle position. The solenoid coil assembly is in parallel with a diode and connects to the two connectors in the connector assembly. The third major component which senses pintle position and is connected to the three connectors in the electrical connector.

Operation

OPERATION

The exhaust gas recirculation flow is determined by the engine controller. For a given set of conditions, the engine controller knows the ideal exhaust gas recirculation flow to optimize NOx and fuel economy as a function of the pintle position. Pintle position is obtained from the position sensor. The engine controller adjusts the duty cycle of 128 Hz power supplied to the solenoid coil to obtain the correct position.

Removal

2.7L

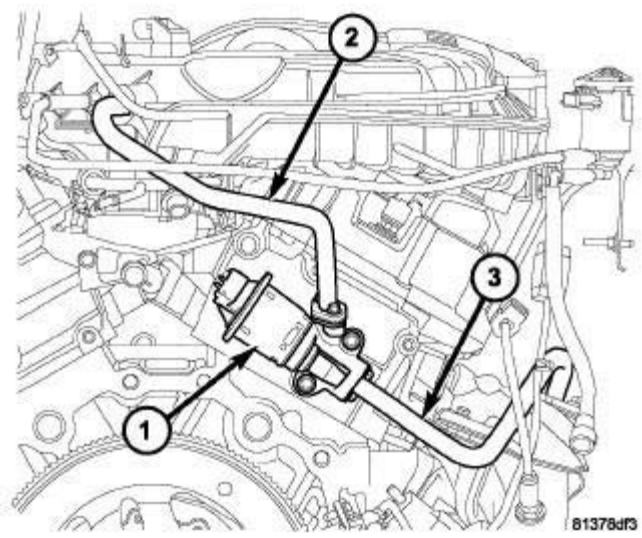


Fig. 65: Exhaust Gas Recirculation System
Courtesy of CHRYSLER LLC

WARNING: The normal operating temperature of the exhaust gas recirculate (EGR) valve and tube is very high. Therefore, never work around or attempt to service any engine component until it is completely cooled.

NOTE: It is very important to disconnect the battery due to the addresses (cells) within the engine controller that store learned values related to powertrain operation. A malfunctioning EGR system can cause bad values to be stored in these cells that can cause an erroneous fault to occur after the system is repaired. Disconnecting the battery for at least two minutes will remove all power from the controller and reset these cells to normal default values.

1. EGR system components and location. Upper tube (2), EGR valve (1), and Lower tube (3).
2. Disconnect negative battery cable.
3. Unlock and disconnect the electrical connector from EGR valve.

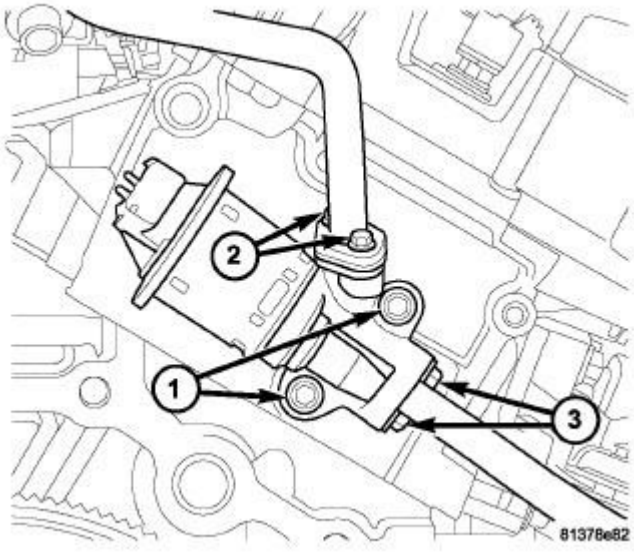


Fig. 66: Exhaust Gas Recirculation Valve
Courtesy of CHRYSLER LLC

4. Remove the bolts from the EGR tube to exhaust manifold.
5. Remove the lower tube bolts to EGR valve and remove tube (3).
6. Remove upper tube bolts to EGR valve (2).
7. Remove the EGR valve mounting bolts (1).
8. Remove valve from vehicle.
9. Clean mounting surface.

3.5L

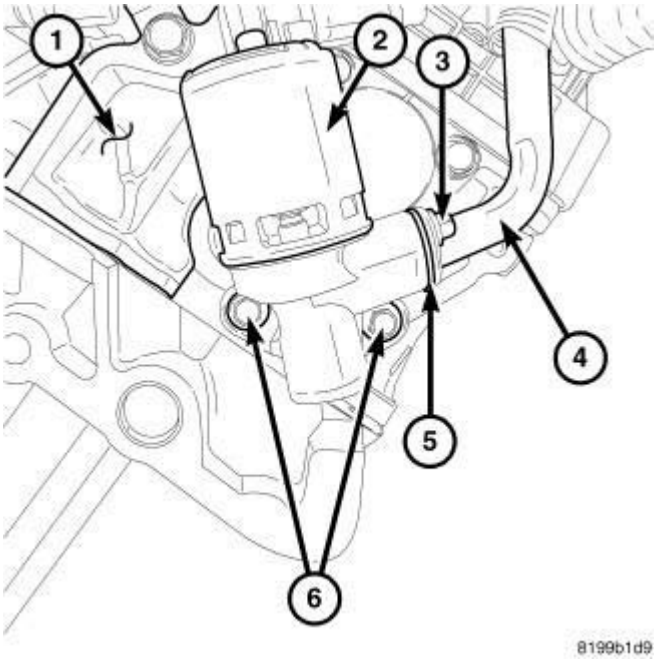


Fig. 67: Exhaust Gas Recirculation Valve/Solenoid Removal - 4.0L
Courtesy of CHRYSLER LLC

WARNING: The normal operating temperature of the exhaust gas recirculate (EGR) valve and tube is very high. Therefore, never work around or attempt to service any engine component until it is completely cooled.

NOTE: It is very important to disconnect the battery due to the addresses (cells) within the engine controller that store learned values related to powertrain operation. A malfunctioning EGR system can cause bad values to be stored in these cells that can cause an erroneous fault to occur after the system is repaired. Disconnecting the battery for at least two minutes will remove all power from the controller and reset these cells to normal default values.

1. Disconnect and isolate negative battery cable at battery.
2. Remove EGR tube bolts (3) at exhaust gas recirculate (EGR) valve (2).
3. Remove EGR tube (4) from EGR valve (2).
4. Remove and discard gasket (5) located between EGR valve (2) and EGR tube (4).
5. Disconnect electrical connector at EGR valve (2).
6. Remove EGR valve mounting bolts (6).
7. Remove EGR valve (2) from cylinder head (1).
8. Remove and discard gasket located between EGR valve (2) and cylinder head (1).

Installation

2.7L

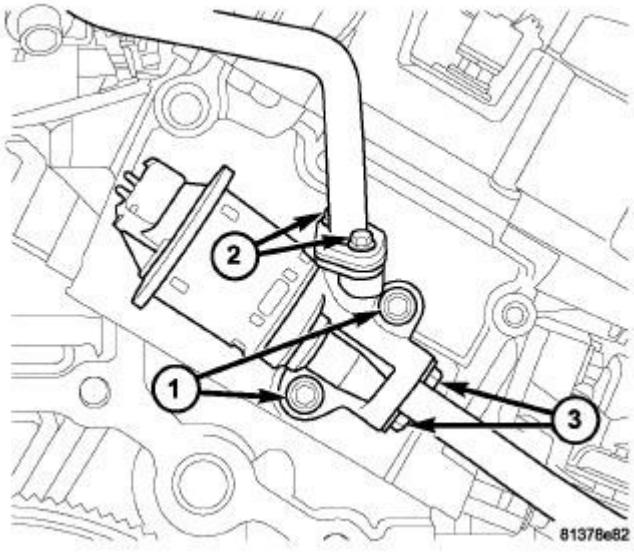


Fig. 68: Exhaust Gas Recirculation Valve
Courtesy of CHRYSLER LLC

1. Clean mounting surface.
2. Install EGR valve.
3. Install the EGR valve mounting bolts (1).
4. Install new gasket between the EGR valve and upper tube and install bolts (2).
5. Install the lower tube to exhaust manifold.
6. Install new gasket between the EGR valve and lower tube and install bolts (3).
7. Tighten the lower tube to EGR valve bolts (3) to 12 N.m (106 in. lbs.).
8. Tighten the lower tube to exhaust manifold nuts to 70 N.m (51.5 ft. lbs.).
9. Tighten the upper tube to EGR valve bolts (2) to 12 N.m (106 in. lbs.).
10. Tighten EGR valve to cylinder head bolts (1) to 31 N.m (275 in. lbs.).
11. Tighten the upper tube to intake manifold bolts to 5 N.m (45 in. lbs.).
12. Connect the electrical connector to EGR valve and lock.
13. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

3.5L

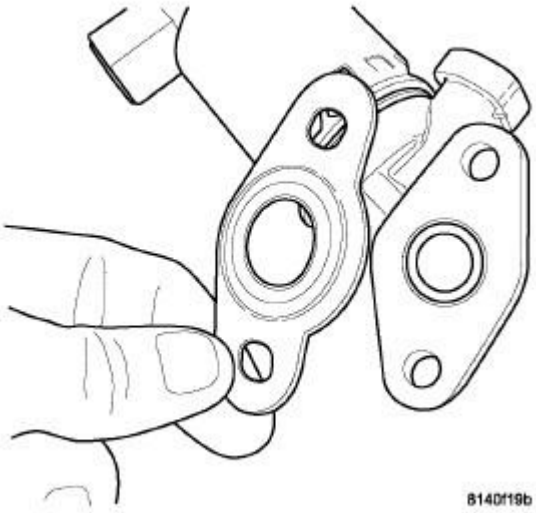


Fig. 69: Exhaust Gas Recirculation Valve Gasket
Courtesy of CHRYSLER LLC

1. Install new exhaust gas recirculate (EGR) valve gasket to EGR valve.

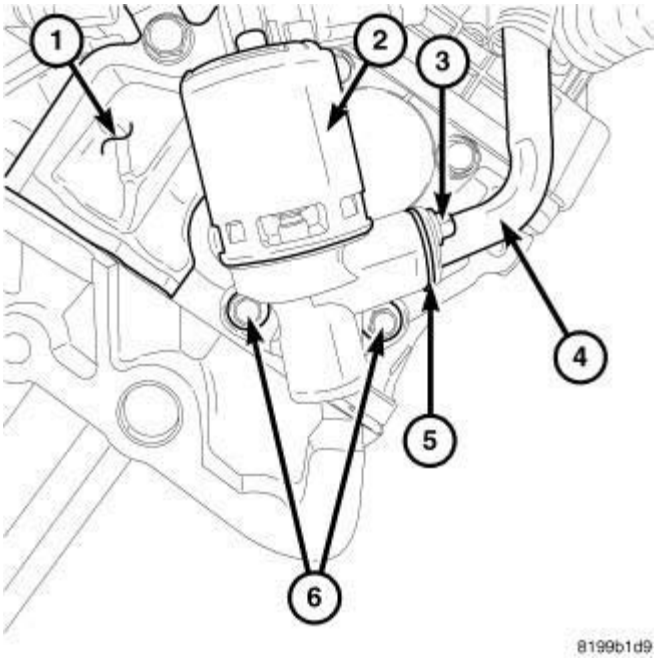


Fig. 70: Exhaust Gas Recirculation Valve/Solenoid Removal - 4.0L
Courtesy of CHRYSLER LLC

2. Install EGR valve (2), gasket and bolts (6) to cylinder head (1). Tighten to 31 N.m (23 ft. lbs.).
3. Install new gasket (5), EGR tube (4) and bolts (3) to EGR valve (2). Tighten to 12 N.m (106 in. lbs.).
4. Tighten the EGR tube to intake manifold bolts to 5 N.m (45 in. lbs.).

5. Connect electrical connector to EGR valve (2).
6. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

ON-BOARD DIAGNOSTICS

DESCRIPTION

DESCRIPTION

ACRONYM	DEFINITION
APPS	Accelerator Pedal Position Sensor
AAT	Ambient Air Temperature
ABS	Anti-Lock Brake System
ASD	Auto Shut Down
AWD	All Wheel Drive
BARO	Barometric
CGW	Central Gateway
CKP	Crankshaft Position Sensor
CMP	Camshaft Position Sensor
CMTC	Compass/Mini-Trip Computer
DCHA	Diesel Cabin Heater Assist
DLC	Data Link Connector
DTC	Diagnostic Trouble Code
EATX	Electronic Automatic Transaxle
ECT	Engine Coolant Temperature
ECM	Engine Control Module
EGR	Exhaust Gas Recirculation
ESIM	Evaporative System Integrity Monitor
ETC	Electronic Throttle Control
GEN	Generator
GPEC	Global Powertrain Engine Controller
FCM	Front Control Module
FDCM	Final Drive Control Module
FFV	Flex Fuel Vehicle
IAT	Intake/Inlet Air Temperature
IAC	Idle Air Control
IOD	Ignition Off-Draw
IPM	Integrated Power Module
JTEC	Jeep Truck Engine Controller
KS	Knock Sensor
LDP	Leak Detection Pump

MAP	Manifold Air Pressure
MDS	Multi Displacement System
MIC	Mechanical Instrument Cluster
MIL	Malfunction Indicator Lamp
MTV	Manifold Tuning Valve
NGC	Next Generation Controller
NVLD	Natural Vacuum Leak Detection
O2S	Oxygen Sensor
OBD	On Board Diagnostic
PDC	Power Distribution Center
PCI	Programmable Communication Interface
PCM	Powertrain Control Module
PCV	Positive Crankcase Ventilation
PEP	Peripheral Expansion Port
SBEC	Single Board Engine Controller
SCM	Steering Control Module
S/C	Speed Control
SKIS	Sentry Key Immobilizer System
SOL	Solenoid
SRV	Short Runner Valve
TCM	Transmission Control Module
TCC	Torque Converter Clutch
TIP	Throttle Inlet Pressure
TIPM	Totally Integrated Power Module
TP	Throttle Position
TPS	Throttle Position Sensor
TPMS	Tire Pressure Monitor System
TRS	Transmission Range Sensor
VSS	Vehicle Speed Sensor/Signal
WIN	Wireless Ignition Node

OPERATION

OPERATION

The following procedure has been established to assist technicians in the field with enabling and running OBD II Monitors. The order listed in the following procedure is intended to allow the technician to effectively complete each monitor and to set the CARB Readiness Status in the least time possible.

NOTE: Once the monitor run process has begun, do not turn off the ignition. By turning the ignition key off, monitor enabling conditions will be lost. EVAP Monitor runs after key off. By performing a Battery Disconnect, or Selecting

Erase DTCs, the CARB Readiness and all additional OBD II information will be cleared.

Monitor Preliminary Checks:

1. Plug a scan tool into the vehicle's Data Link Connector (DLC).
2. Turn the ignition, KEY ON - ENGINE OFF. Watch for the MIL lamp illumination during the bulb check. MIL lamp must illuminate, if not, repair MIL lamp.
3. Using a scan tool check for Powertrain related DTCs.

NOTE: Only the monitors, which are not YES in the CARB Readiness Status, need to be completed. Specific criteria need to be met for each monitor. The most efficient order to run the monitors has been outlined below, including suggestions to aid the process.

- Verify that No Emissions Related DTCs are Present. If an Emissions DTC is Present, the OBD II Monitors may not run and the CARB Readiness will not update.
- The Emissions related DTC, will need to be repaired, then cleared. By clearing DTCs, the OBD Monitors will need to be run and completed to set the CARB Readiness Status.

Using the scan tool check the CARB Readiness Status.

Do all the CARB Readiness Status Locations read YES?

- YES - all monitors have been completed and this vehicle is ready to be I/M or Emission Tested.
- NO - then the following procedure needs to be followed to run/complete all available monitors.

Evaporative Emission System Leak Detection with Purge Monitor

This monitor requires a cool down cycle, usually an overnight soak for at least 8 hours without the engine running. The ambient temperature must decrease overnight - parking the vehicle outside is advised. To run this test the fuel level must be between 15-85% full. Criteria for EVAP monitor:

- Engine off time greater than one hour.
- Fuel Level between 15% and 85%.
- Start Up ECT and IAT within 10°C (18°F).
- Vehicle started and run until Purge Monitor reports a result.

NOTE: If the vehicle does not report a result and the conditions where correct. It may take up to two weeks to fail the small leak monitor. DO NOT use this test to attempt to determine a fault. Use the appropriate service information procedure for finding a small leak. If there are no faults and the conditions are correct this test will run and report a pass. Note the Small leak test can find leaks less than 10 thousands of an inch. If a small leak is present it takes approximately one

week of normal driving to report a failure.

Catalyst / O2 Monitor

The Catalyst and O2 Monitor information are acquired and processed at the same time. Most vehicles will need to be driven at highway speed (less than 50 mph) (73km/h) for a few minutes. Some vehicles run the monitor at idle in drive. If the vehicle is equipped with a manual transmission, using 4th gear may assist in meeting the monitor running criteria.

- Engine RPM between 1200 to 3000.
- Enginetemperature greater than 70°C (158°F)
- Engine run time greater than 92 seconds
- MAP between 10 - 20 kPa (7.5 - 15 Hg)
- Vehicle speed between 20 - 70 mph (29-103 km/h)

EGR Monitor

After the vehicle has reached the below conditions and during a throttle decel the EGR monitor will run.

- Engine RPM between 1375 - 2500
- Engine temperature greater than 70°C (158°F)
- Engine run time greater than 125 seconds
- Vehicle speed between 25 - 70 mph (37-103 km/h)

O2 Sensor Heater Monitor

This monitor is now continuously running once the heaters are energized. Pass information will be processed at power down.

Mis-Fire Monitor

The Misfire Monitor is a continuous two-trip monitor. The monitor uses two different tests/counters:

NOTE: The Adaptive Numerator must be learned before the PCM will run the Mis-Fire Monitor. The PCM updates the Adaptive Numerator at every key-ON, and is relearned after battery disconnect. The Misfire Monitor will not run until the Adaptive Numerator has updated since the last battery disconnect. If the Adaptive Numerator is equal to the default value then the PCM knows that the Adaptive Numerator has not been learned and does not permit the Misfire Monitor to run. If the Adaptive Numerator exceeds a calibrated percentage, the PCM sets a DTC for CKP NOT LEARNED and illuminates the MIL.

- 200 Revolution Counter - Looks for misfire that can cause immediate catalyst damage.
- 1000 Revolution Counter - Looks for misfire that can cause emissions to increase 1.5 times the Federal Test Procedure (FTP) standards. This test must also identify misfire percentages that might cause a

"durability demonstration vehicle" to fail an Inspection and Maintenance Program tailpipe emissions test.

TASK MANAGER

Description

DESCRIPTION

The PCM is responsible for efficiently coordinating the operation of all the emissions-related components. The PCM is also responsible for determining if the diagnostic systems are operating properly. The software designed to carry out these responsibilities is call the "Task Manager".

Operation

OPERATION

The Task Manager determines when tests happen and when functions occur. Many of the diagnostic steps required by OBD II must be performed under specific operating conditions. The Task Manager software organizes and prioritizes the diagnostic procedures. The job of the Task Manager is to determine if conditions are appropriate for tests to be run, monitor the parameters for a trip for each test, and record the results of the test. Following are the responsibilities of the Task Manager software:

- Test Sequence
- MIL Illumination
- Diagnostic Trouble Codes (DTCs)
- Trip Indicator
- Freeze Frame Data Storage
- Similar Conditions Window

Test Sequence

In many instances, emissions systems must fail diagnostic tests more than once before the PCM illuminates the MIL. These tests are known as 'two trip monitors.' Other tests that turn the MIL lamp on after a single failure are known as 'one trip monitors.' A trip is defined as 'start the vehicle and operate it to meet the criteria necessary to run the given monitor.'

Many of the diagnostic tests must be performed under certain operating conditions. However, there are times when tests cannot be run because another test is in progress (conflict), another test has failed (pending) or the Task Manager has set a fault that may cause a failure of the test (suspend).

Pending

Under some situations the Task Manager will not run a monitor if the MIL is illuminated and a fault is stored from another monitor. In these situations, the Task Manager postpones monitors pending resolution of the original fault. The Task Manager does not run the test until the problem is remedied.

For example, when the MIL is illuminated for an Oxygen Sensor fault, the Task Manager does not run the

Catalyst Monitor until the Oxygen Sensor fault is remedied. Since the Catalyst Monitor is based on signals from the Oxygen Sensor, running the test would produce inaccurate results.

Conflict

There are situations when the Task Manager does not run a test if another monitor is in progress. In these situations, the effects of another monitor running could result in an erroneous failure. If this conflict is present, the monitor is not run until the conflicting condition passes. Most likely the monitor will run later after the conflicting monitor has passed.

For example, if the Fuel System Monitor is in progress, the Task Manager does not run the catalyst Monitor. Since both tests monitor changes in air/fuel ratio and adaptive fuel compensation, the monitors will conflict with each other.

Suspend

Occasionally the Task Manager may not allow a two trip fault to mature. The Task Manager will suspend the maturing of a fault if a condition exists that may induce an erroneous failure. This prevents illuminating the MIL for the wrong fault and allows more precise diagnosis.

For example, if the PCM is storing a one trip fault for the Oxygen Sensor and the catalyst monitor, the Task Manager may still run the catalyst Monitor but will suspend the results until the Oxygen Sensor Monitor either passes or fails. At that point the Task Manager can determine if the catalyst system is actually failing or if an Oxygen Sensor is failing.

MIL Illumination

The PCM Task Manager carries out the illumination of the MIL. The Task Manager triggers MIL illumination upon test failure, depending on monitor failure criteria.

The Task Manager Screen shows both a Requested MIL state and an Actual MIL state. When the MIL is illuminated upon completion of a test for a good trip, the Requested MIL state changes to OFF. However, the MIL remains illuminated until the next key cycle. (On some vehicles, the MIL will actually turn OFF during the third good trip) During the key cycle for the third good trip, the Requested MIL state is OFF, while the Actual MIL state is ON. After the next key cycle, the MIL is not illuminated and both MIL states read OFF.

Diagnostic Trouble Codes (DTCs)

With OBD II, different DTC faults have different priorities according to regulations. As a result, the priorities determine MIL illumination and DTC erasure. DTCs are entered according to individual priority. DTCs with a higher priority overwrite lower priority DTCs.

Priorities

- Priority 1 One-Trip Failure of Non-Fuel or Non-Mis-Fire Fault (e.g., Cat Mon Failure)
- Priority 3 Matured Fault (either One-Trip or Two-Trip) Non-Fuel AND Non-Mis-Fire
- Priority 4 One-Trip Failure of Fuel System or Mis-Fire Fault

- Priority 6 Matured Fault for Fuel System or Mis-Fire (either One-Trip or Two-Trip)

Non-emissions related failures have no priority. One trip failures of two trip faults have low priority. Two trip failures or matured faults have higher priority. One and two trip failures of fuel system and misfire monitor take precedence over non-fuel system and non-misfire failures.

DTC Self Erasure

With one trip components or systems, the MIL is illuminated upon test failure and DTCs are stored.

Two trip monitors are components requiring failure in two consecutive trips for MIL illumination. Upon failure of the first test, the Task Manager enters a maturing code. If the component fails the test for a second time the code matures and a DTC is set.

After three good trips the MIL is extinguished and the Task Manager automatically switches the trip counter to a warm-up cycle counter. DTCs are automatically erased following 40 warm-up cycles if the component does not fail again.

For misfire and fuel system monitors, the component must pass the test under a Similar Conditions Window in order to record a good trip. A Similar Conditions Window is when engine RPM is within ±375 RPM and load is within ±20% of when the fault occurred.

NOTE: It is important to understand that a component does not have to fail under a similar window of operation to mature. It must pass the test under a Similar Conditions Window when it failed to record a Good Trip for DTC erasure for misfire and fuel system monitors.

DTCs can be erased anytime with a scan tool. Erasing the DTC with the scan tool erases all OBD II information. The scan tool automatically displays a warning that erasing the DTC will also erase all OBD II monitor data. This includes all counter information for warm-up cycles, trips and Freeze Frame.

Trip Indicator

The Trip is essential for running monitors and extinguishing the MIL. In OBD II terms, a trip is a set of vehicle operating conditions that must be met for a specific monitor to run. All trips begin with a key cycle.

Good Trip

The Good Trip counters are as follows:

- Global Good Trip
- Fuel System Good Trip
- Misfire Good Trip
- Alternate Good Trip (appears as a Global Good Trip on scan tool)
    a. Comprehensive Components

b. Major Monitor
- Warm-Up Cycles

Global Good Trip

To increment a Global Good Trip, the Oxygen sensor and Catalyst efficiency monitors must have run and passed, and 2 minutes of engine run time.

Fuel System Good Trip

To count a good trip (three required) and turn off the MIL, the following conditions must occur:

- Engine in closed loop
- Operating in Similar Conditions Window
- Short Term multiplied by Long Term less than threshold
- Less than threshold for a predetermined time

If all of the previous criteria are met, the PCM will count a good trip (three required) and turn off the MIL.

Misfire Good Trip

If the following conditions are met the PCM will count one good trip (three required) in order to turn off the MIL:

- Operating in Similar Condition Window
- 1000 engine revolutions with no misfire

Alternate Good Trip

Alternate Good Trips are used in place of Global Good Trips for Comprehensive Components and Major Monitors. If the Task Manager cannot run a Global Good Trip because a component fault is stopping the monitor from running, it will attempt to count an Alternate Good Trip.

The Task Manager counts an Alternate Good Trip for Comprehensive components when the following conditions are met:

- Two minutes of engine run time, idle or driving
- No other faults occur

The Task Manager counts an Alternate Good Trip for a Major Monitor when the monitor runs and passes. Only the Major Monitor that failed needs to pass to count an Alternate Good Trip.

Warm-Up Cycles

Once the MIL has been extinguished by the Good Trip Counter, the PCM automatically switches to a Warm-Up

Cycle Counter that can be viewed on the scan tool. Warm-Up Cycles are used to erase DTCs and Freeze Frames. Forty Warm-Up cycles must occur in order for the PCM to self-erase a DTC and Freeze Frame. A Warm-Up Cycle is defined as follows:

- Engine coolant temperature must start below and rise above 160° F (71° C)
- Engine coolant temperature must rise by 40° F (4.5° C)
- No further faults occur

Freeze Frame Data Storage

Once a failure occurs, the Task Manager records several engine operating conditions and stores it in a Freeze Frame. The Freeze Frame is considered one frame of information taken by an on-board data recorder. When a fault occurs, the PCM stores the input data from various sensors so that technicians can determine under what vehicle operating conditions the failure occurred.

The data stored in Freeze Frame is usually recorded when a system fails the first time for two trip faults. Freeze Frame data will only be overwritten by a different fault with a higher priority.

CAUTION: Erasing DTCs, either with the scan tool, or by disconnecting the battery, also clears all Freeze Frame data.

Similar Conditions Window

The Similar Conditions Window displays information about engine operation during a monitor. Absolute MAP (engine load) and Engine RPM are stored in this window when a failure occurs. There are two different Similar conditions Windows: Fuel System and Misfire.

FUEL SYSTEM

- **Fuel System Similar Conditions Window** - An indicator that 'Absolute MAP When Fuel Sys Fail' and 'RPM When Fuel Sys Failed' are all in the same range when the failure occurred. Indicated by switching from 'NO' to 'YES'.
- **Absolute MAP When Fuel Sys Fail** - The stored MAP reading at the time of failure. Informs the user at what engine load the failure occurred.
- **Absolute MAP** - A live reading of engine load to aid the user in accessing the Similar Conditions Window.
- **RPM When Fuel Sys Fail** - The stored RPM reading at the time of failure. Informs the user at what engine RPM the failure occurred.
- **Engine RPM** - A live reading of engine RPM to aid the user in accessing the Similar Conditions Window.
- **Adaptive Memory Factor** - The PCM utilizes both Short Term Compensation and Long Term Adaptive to calculate the Adaptive Memory Factor for total fuel correction.
- **Upstream O2S Volts** - A live reading of the Oxygen Sensor to indicate its performance. For example, stuck lean, stuck rich, etc.

- **SCW Time in Window (Similar Conditions Window Time in Window)** - A timer used by the PCM that indicates that, after all Similar Conditions have been met, if there has been enough good engine running time in the SCW without failure detected. This timer is used to increment a Good Trip.
- **Fuel System Good Trip Counter** - A Trip Counter used to turn OFF the MIL for Fuel System DTCs. To increment a Fuel System Good Trip, the engine must be in the Similar Conditions Window, Adaptive Memory Factor must be less than calibrated threshold and the Adaptive Memory Factor must stay below that threshold for a calibrated amount of time.
- **Test Done This Trip** - Indicates that the monitor has already been run and completed during the current trip.

MISFIRE

- **Same Misfire Warm-Up State** - Indicates if the misfire occurred when the engine was warmed up (above 160° F).
- **In Similar Misfire Window** - An indicator that 'Absolute MAP When Misfire Occurred' and 'RPM When Misfire Occurred' are all in the same range when the failure occurred. Indicated by switching from 'NO' to 'YES'.
- **Absolute MAP When Misfire Occurred** - The stored MAP reading at the time of failure. Informs the user at what engine load the failure occurred.
- **Absolute MAP** - A live reading of engine load to aid the user in accessing the Similar Conditions Window.
- **RPM When Misfire Occurred** - The stored RPM reading at the time of failure. Informs the user at what engine RPM the failure occurred.
- **Engine RPM** - A live reading of engine RPM to aid the user in accessing the Similar Conditions Window.
- **Adaptive Memory Factor** - The PCM utilizes both Short Term Compensation and Long Term Adaptive to calculate the Adaptive Memory Factor for total fuel correction.
- **200 Rev Counter** - Counts 0-100 720 degree cycles.
- **SCW Cat 200 Rev Counter** - Counts when in similar conditions.
- **SCW FTP 1000 Rev Counter** - Counts 0-4 when in similar conditions.
- **Misfire Good Trip Counter** - Counts up to three to turn OFF the MIL.

EXHAUST GAS RECIRCULATION

DESCRIPTION

DESCRIPTION

The EGR system reduces oxides of nitrogen (NOx) in the engine exhaust. This is accomplished by allowing a predetermined amount of hot exhaust gas to recirculate and dilute the incoming fuel/air mixture.

A malfunctioning EGR system can cause engine stumble, sags, or hesitation, rough idle, engine stalling and poor driveability.

OPERATION

OPERATION

The system consists of:

- An EGR valve assembly, located toward the rear of the engine.
- An EGR solenoid, located in the left rear of engine compartment near EGR valve. The EGR solenoid controls the "on time" of the EGR valve.
- The ECM operates the EGR solenoid. The ECM is located under the hood next to the air cleaner housing.
- The tandem pump supplies vacuum for the EGR solenoid and the EGR valve. This pump also supplies vacuum for operation of the power brake booster and the heating and air conditioning system. The pump is located in the rear of the cylinder head and is driven by the exhaust camshaft.
- Vacuum lines and hoses connect the various components.

When the ECM supplies a variable ground signal to the EGR solenoid, EGR system operation begins. The ECM will monitor and determine when to supply and remove this variable ground signal. This will depend on inputs from the engine coolant temperature, throttle position and engine speed sensors.

When the variable ground signal is supplied to the EGR solenoid, vacuum from the tandem pump will be allowed to pass through the EGR solenoid and on to the EGR valve with a connecting hose.

Exhaust gas recirculation will begin in this order when:

- The ECM determines that EGR system operation is necessary.
- The engine is running to operate the vacuum pump.
- A variable ground signal is supplied to the EGR solenoid.
- Variable vacuum passes through the EGR solenoid to the EGR valve.
- The inlet seat (poppet valve) at the bottom of the EGR valve opens to dilute and recirculate exhaust gas back into the mixing chamber.

The EGR system will be shut down by the ECM after 60 seconds of continuous engine idling to improve idle quality.

SOLENOID, EXHAUST GAS RECIRCULATION (EGR), 2.0L DIESEL

Description

DESCRIPTION

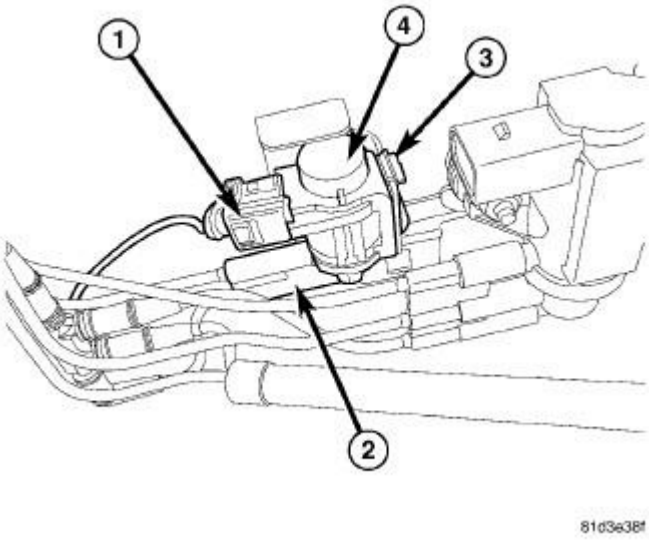


Fig. 71: Exhaust Gas Recirculation (EGR) Solenoid - 2.0L Diesel
Courtesy of CHRYSLER LLC

1 - EGR solenoid electrical connector
2 - EGR vacuum harness

The EGR solenoid (4) is mounted to a bracket attached to the battery tray in the engine compartment. The EGR solenoid serves two different functions. One is to control vacuum bleed-off of the EGR valve. The other is to control the "on time" of the EGR valve.

Removal

REMOVAL

1. Disconnect negative battery cable.

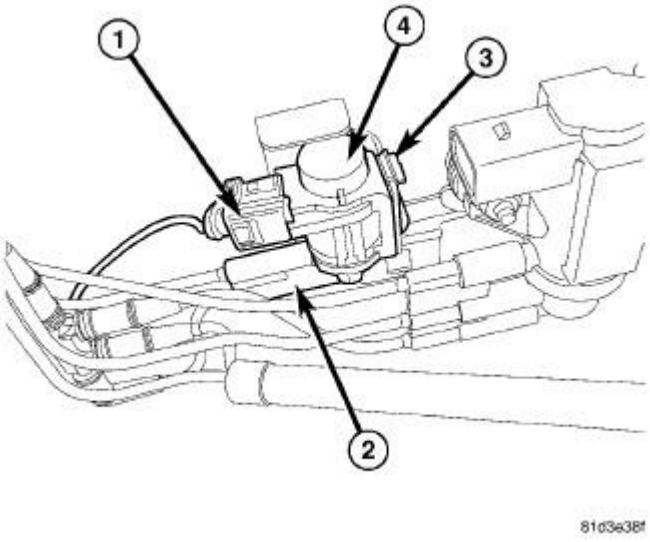


Fig. 72: Exhaust Gas Recirculation (EGR) Solenoid - 2.0L Diesel
Courtesy of CHRYSLER LLC

1 - EGR solenoid electrical connector
2 - EGR vacuum harness

2. Disconnect the EGR solenoid electrical connector (1).
3. Disconnect the EGR vacuum harness (2) from the EGR solenoid (4) valve block.
4. Release EGR solenoid retainer clip (3) and push down to remove the EGR solenoid valve (4) from the bracket.

Installation

INSTALLATION

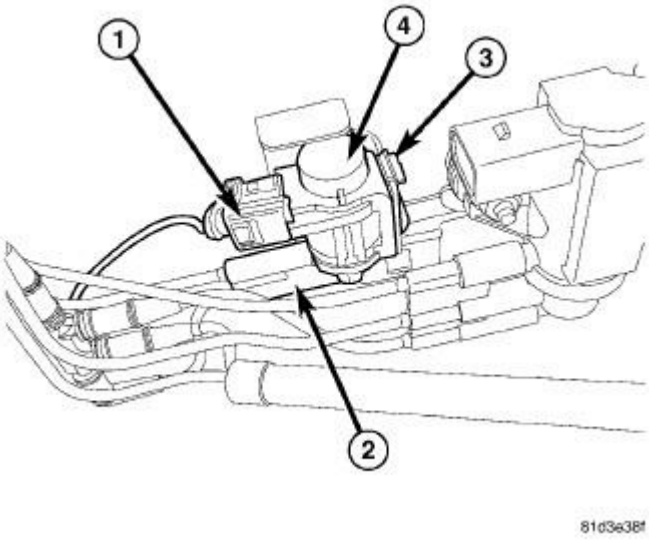


Fig. 73: Exhaust Gas Recirculation (EGR) Solenoid - 2.0L Diesel
Courtesy of CHRYSLER LLC

1 - EGR solenoid valve electrical connector 2 - EGR vacuum harness

1. Position and install EGR solenoid valve (4) onto bracket.
2. Connect EGR vacuum harness (2) to the EGR solenoid valve (4).
3. Connect EGR solenoid valve electrical connector (1).
4. Connect negative battery cable.

VALVE, EXHAUST GAS RECIRCULATION (EGR), 2.0L DIESEL

Description

DESCRIPTION

The EGR valve is mounted to the intake manifold.

Operation

OPERATION

The engines use Exhaust Gas Recirculation (EGR) systems. The EGR system reduces oxides of nitrogen (NOx) in engine exhaust and helps prevent detonation (engine knock). Under normal operating conditions, engine cylinder temperature can reach more than 1649°C (3000°F). Formation of NOx increases proportionally with combustion temperature. To reduce the emission of these oxides, the cylinder temperature must be lowered. The system allows a predetermined amount of hot exhaust gas to recirculate and dilute the incoming air/fuel mixture. The diluted air/fuel mixture reduces peak flame temperature during combustion.

Removal

REMOVAL

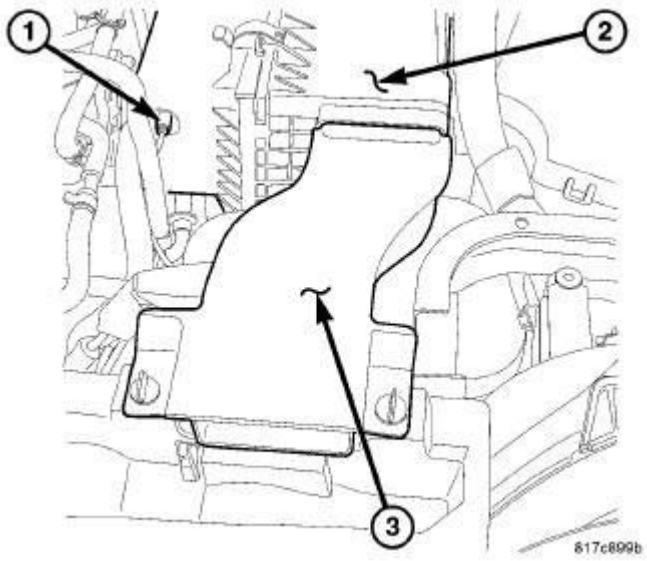


Fig. 74: Air Inlet Duct
Courtesy of CHRYSLER LLC

1. Remove air inlet duct (3).
2. Disconnect negative battery cable.

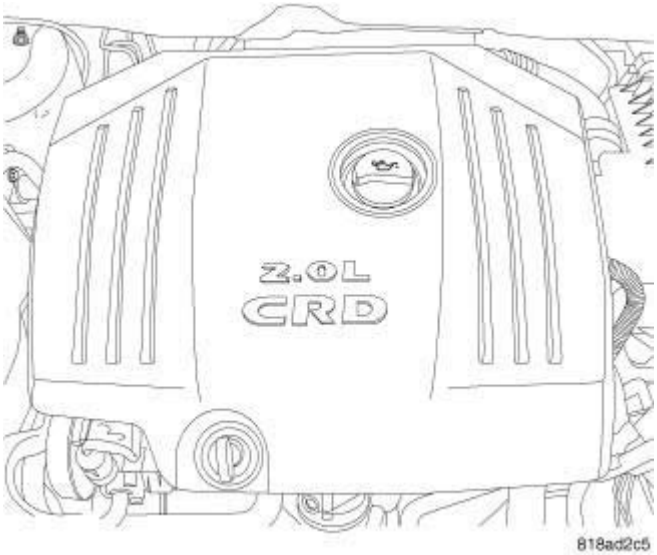


Fig. 75: ENGINE COVER-REMOVAL
Courtesy of CHRYSLER LLC

3. Remove engine cover. Refer to **Engine - Removal** .

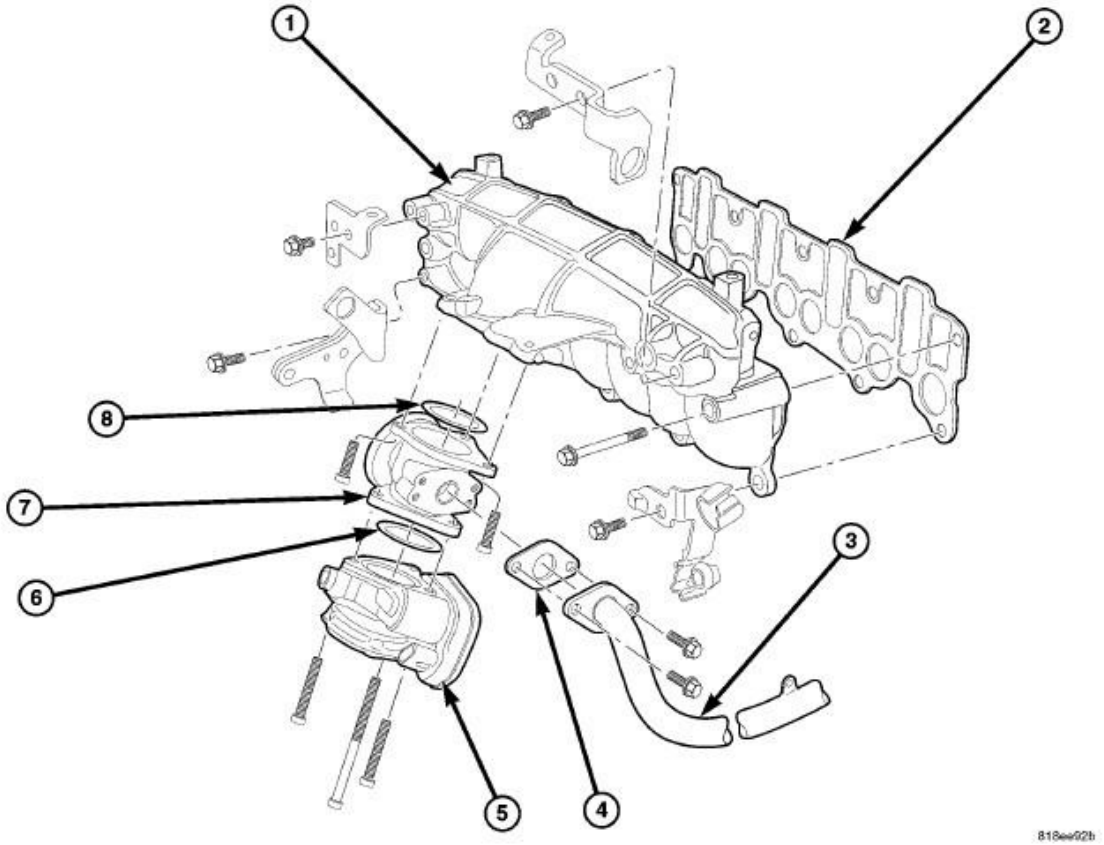


Fig. 76: Intake Manifold
Courtesy of CHRYSLER LLC

4. Disconnect EGR valve vacuum line.
5. Disconnect EGR pipe (3) at EGR valve.
6. Remove air inlet tube from intake manifold flap motor (5).
7. Remove intake manifold flap motor (5).
8. Remove EGR valve retaining bolts and remove EGR valve (7).

Installation

INSTALLATION

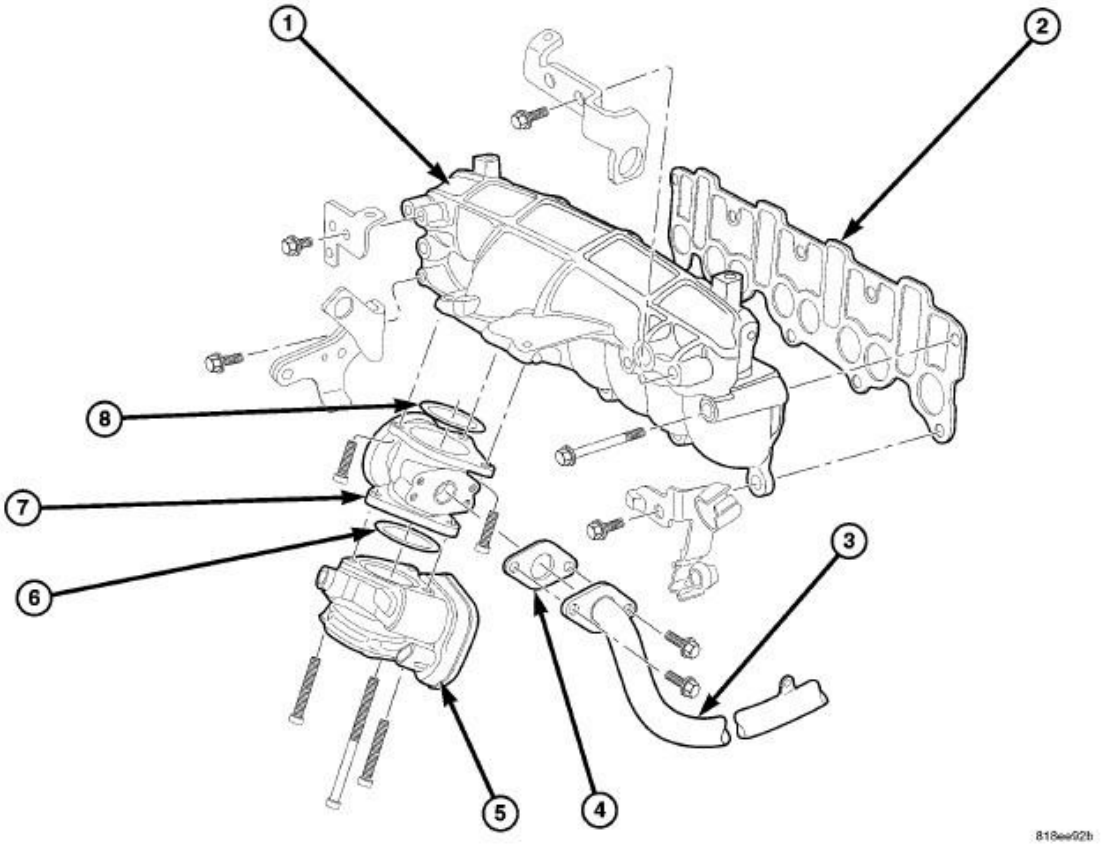


Fig. 77: Intake Manifold
Courtesy of CHRYSLER LLC

1. Inspect EGR and intake manifold flap motor o-rings (6,8) for damage. Replace as necessary.
2. Install EGR valve (7) to intake manifold. Torque retaining bolts to 10.m (88 lbs.in.).
3. Install intake manifold flap motor (5) to EGR valve (7). Torque retaining bolts to 10 N.m (88 lbs.in.).
4. Inspect EGR pipe gasket (4)for damage, replace as necessary.
5. Connect EGR pipe (3) to EGR valve. Torque retaining bolts to 20N.m (177 lbs.in.).
6. Connect EGR valve vacuum line.

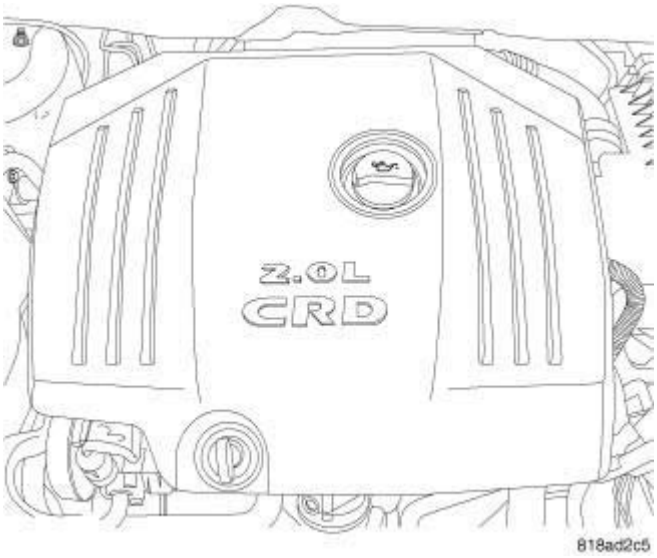


Fig. 78: Engine Cover
Courtesy of CHRYSLER LLC

7. Install engine cover. Refer to **Engine - Installation** .

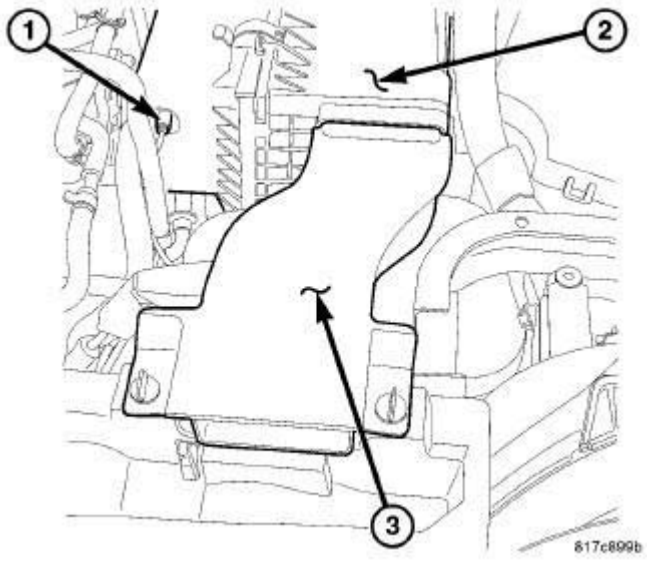


Fig. 79: Air Inlet Duct
Courtesy of CHRYSLER LLC

8. Connect negative battery cable.
9. Install air inlet duct (3).

2009 ENGINE

Exhaust System - Journey

DESCRIPTION

DESCRIPTION

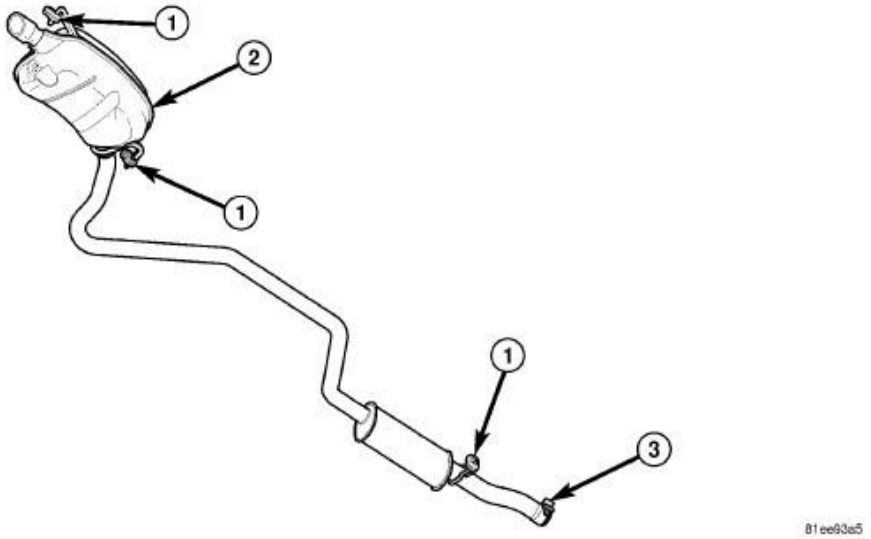


Fig. 1: Muffler/Exhaust Pipe Assembly - Single Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR 2 - MUFFLER/EXHAUST PIPE ASSEMBLY
3 - BAND CLAMP

The exhaust system on the 2.4L and 2.7L engine models consists of a front mounted catalytic converter, single outlet resonator/muffler assembly, band clamp, and support isolators. The upstream oxygen sensor is located in the exhaust manifold. The downstream oxygen sensor is located in the catalytic converter.

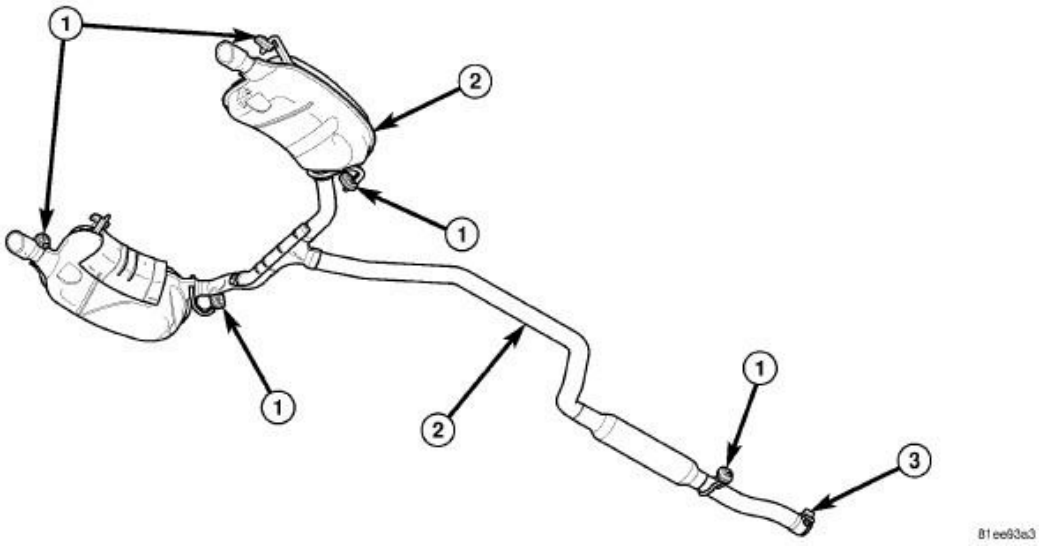


Fig. 2: Muffler/Exhaust Pipe Assembly - Dual Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR 2 - MUFFLER/EXHAUST PIPE ASSEMBLY
3 - BAND CLAMP

The exhaust system on the 3.5L engine models consists of a front mounted catalytic converter, dual outlet resonator/muffler assembly, band clamp, and support isolators. The upstream oxygen sensor is located in the exhaust manifold. The downstream oxygen sensor is located in the catalytic converter.

DIAGNOSIS AND TESTING

EXCESSIVE EXHAUST SYSTEM NOISE

CONDITION	POSSIBLE CAUSES	CORRECTION
EXCESSIVE EXHAUST NOISE (UNDER HOOD)	1. Exhaust manifold cracked or broken.	1. Replace manifold.
	2. Manifold to cylinder head leak.	2. Tighten manifold and/or replace gasket.
	3. EGR Valve to manifold gasket leakage.	3. Tighten fasteners or replace gasket.
	4. EGR Valve to EGR tube gasket leakage.	4. Tighten fasteners or replace gasket.
	5. EGR tube to manifold tube leakage.	5. Tighten tube nut.
	6. Exhaust flex-joint to manifold leak.	6. Tighten joint fasteners and/or replace gasket.
	7. Exhaust flex-joint.	7. Replace catalytic converter assembly.

	8. Pipe and shell noise from front exhaust pipe.	8. Characteristic of single wall pipe.
EXCESSIVE EXHAUST NOISE	1. Leak at exhaust pipe joints.	1. Tighten clamps at leaking joints.
	2. Burned or rusted out muffler assembly or exhaust pipe.	2. Replace muffler resonator tailpipe assembly or exhaust pipe with catalytic converter assembly.
	3. Burned or rusted out resonator.	3. Replace muffler resonator tailpipe assembly.
	4. Restriction in exhaust system.	4. Perform Exhaust System Restriction Check. Replace component as necessary.
	5. Converter material in muffler.	5. Replace muffler and converter assemblies. Check fuel injection and ignition systems for proper operation.

RESTRICTION CHECK

Exhaust system restriction can be checked by measuring back pressure using the scan tool and PEP module pressure tester.

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

1. Disconnect and remove the upstream (before catalytic converter) oxygen sensor. Refer to **Fuel System/Fuel Injection/SENSOR, Oxygen - Removal**
2. Install the Exhaust Back Pressure Fitting Adaptor CH8519.
3. Connect the Low Pressure Sensor (15 psi) CH7063 to the back pressure fitting.
4. Following the PEP module instruction service information , connect all required cables to the scan tool and PEP module. Select the available menu options on the scan display screen for using the digital pressure gauge function.
5. Apply the park brake and start the engine.
6. With transmission in Park or Neutral, raise engine speed to 2000 RPM. Monitor the pressure readings on the scan. Back pressure should not exceed specified limit. Refer to specification in **EXHAUST BACK PRESSURE LIMITS**.

NOTE: For applications with dual catalytic converters, repeat test on opposite converter using the previous steps.

7. If pressure exceeds maximum limits, inspect exhaust system for restricted component. For further

catalytic converter inspection procedures. See **Inspection** . Replace component(s) as necessary.

EXHAUST BACK PRESSURE LIMITS

Exhaust Back Pressure Limit (Max)	
Vehicle in Park/Neutral (no load) @2000 RPM	3.45 kPa (0.5 psi)

LEAK TESTING

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

1. Raise and support vehicle.

CAUTION: The air pressure must not exceed 4 psi, otherwise engine damage can occur.

2. Connect Tool 8404-EC or 8404-ECT, Exhaust Cone to an adjustable air pressure regulator.
3. Attach shop air to the air pressure regulator.
4. Adjust the air pressure regulator to 4 psi
5. Insert Tool 8404-EC or 8404-ECT, Exhaust Cone into the vehicle tail pipe.
6. If the vehicle is equipped with dual exhaust, use Tool 8404-EC or 8404-ECT, Exhaust Cone with equipped attached plug. Plug one side of the dual exhaust pipe. Pressurize the other as described.
7. Apply a mixture of liquid dish soap and water to the following areas:
   - - All welded joints from 6 inches rearward of the downstream O2 sensor forward
   - - O2 sensor seal points
   - - O2 sensor boss welds
   - - Flange/joint connection(s)
   - - Exhaust manifold to cylinder head connection(s)
   - - EGR solenoid gasket base and tube seal points (if equipped)
8. Watch for the liquid/soapy water to bubble.
9. Use the following definitions to help determine if system or component repair/replacement is necessary:

- **Type 1 Leak** is defined as a leak where very small foam like bubbles 1mm (.039 in.) or less appear. Any Type 1 or greater leaks found in welded joints, O2 sensor seal points or O2 sensor boss welds must be repaired or the component must be replaced.
- **Type 2 Leak** is defined as a leak where larger bubbles 8mm (.031 in.) or greater appear. Any Type 2 or greater leaks found in flange or joint connections, exhaust manifold to cylinder head connections, or EGR gasket and tube seal points must be repaired or the components must be replaced.

Leak Location	Repair required if results at 4 psi reveal bubble size:
Welded joints	Type 1 - 1 mm (.039 in.) or greater
O2 Sensor seal points	Type 1 - 1 mm (.039 in.) or greater
O2 Sensor boss welds	Type 1 - 1 mm (.039 in.) or greater
Flange/joint connections	Type 2 - 8 mm (.031 in.) or greater
Exhaust Manifold to cylinder head connections	Type 2 - 8 mm (.031 in.) or greater
EGR gasket and tube seal points	Type 2 - 8 mm (.031 in.) or greater

If a leak is found that matches the above definition, repair or replace the component as necessary.

Once the repair is complete, repeat the procedure to verify that all leaks have been repaired.

INSPECTION

INSPECTION

Inspect the exhaust pipes, catalytic converters, muffler, and resonators for cracked joints, broken welds and corrosion damage that would result in a leaking exhaust system. Inspect the clamps, support brackets, and insulators for cracks and corrosion damage.

ADJUSTMENTS

ADJUSTMENTS

A misaligned exhaust system is usually indicated by a vibration, rattling noise, or binding of exhaust system components. These noises are sometimes hard to distinguish from other chassis noises. Inspect exhaust system for broken or loose clamps, heat shields, isolators, and brackets. Replace or tighten as necessary. It is important that exhaust system clearances and alignment be maintained.

Perform the following procedures to align the exhaust system:

1. Loosen clamps and support brackets.
2. Align the exhaust system starting at the front, working rearward.
3. Tighten all clamps and brackets once alignment and clearances are achieved.

SPECIFICATIONS

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fastener, Band Clamps	54	40	-
Fasteners, Body Heat Shield	5	-	44

Fasteners, Catalytic Converter to Exhaust Manifold Flange	28	21	-
Fasteners, Cross-Under Pipe (2.0L/2.4L)	28	21	-
Fasteners, Cross-Under Pipe (2.7L)	28	21	-

SPECIAL TOOLS

EXHAUST SYSTEM

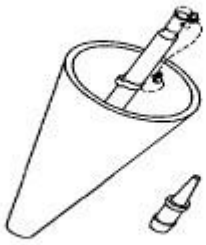


Fig. 3: Exhaust Cone Tool - 8404-ECT
Courtesy of CHRYSLER LLC

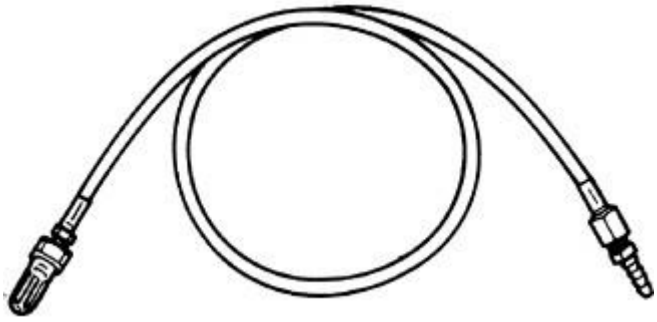


Fig. 4: Back Pressure Test Adapter - CH8519
Courtesy of CHRYSLER LLC

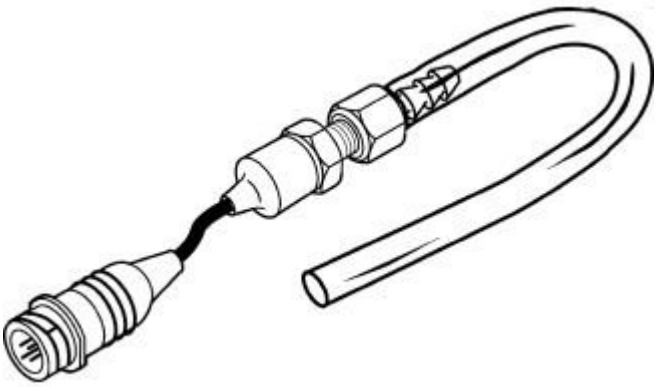


Fig. 5: Pressure Transducer CH7063
Courtesy of CHRYSLER LLC

CONVERTER, CATALYTIC

DESCRIPTION

DESCRIPTION

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

CAUTION: DO NOT remove spark plug wires from plugs or by any other means short out cylinders. Failure of the catalytic converter can occur due to a temperature increase caused by unburned fuel passing through the converter.

The stainless steel catalytic converter body is designed to last the life of the vehicle. Excessive heat can result in bulging or other distortion, but excessive heat will not be the fault of the converter. If unburned fuel enters the converter, overheating may occur. If a converter is heat-damaged, correct the cause of the damage at the same time the converter is replaced. Also, inspect all other components of the exhaust system for heat damage.

Unleaded gasoline must be used to avoid contaminating the catalyst core.

REMOVAL

2.4L

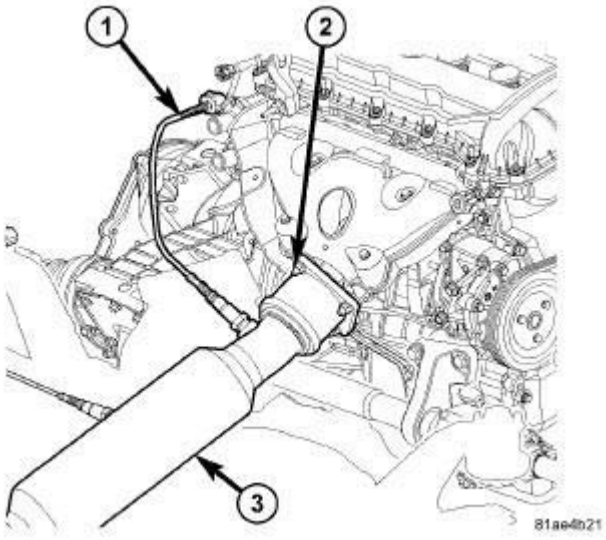


Fig. 6: Catalytic Converter - 2.4L
Courtesy of CHRYSLER LLC

1 - OXYGEN SENSOR ELECTRICAL CONNECTOR 2 - FLANGE NUTS
3 - CATALYTIC CONVERTER - 2.0/2.4L

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never work around or attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operating time.

NOTE: When replacement is required on any component of the exhaust system, you must use original equipment parts (or their equivalent).

1. Raise and support vehicle.
2. Apply penetrating oil to band clamp nut and bolt.
3. Disconnect oxygen sensor connector (1).
4. Remove oxygen sensor.
5. Loosen resonator and muffler assembly to catalytic converter band clamp.
6. Pull muffler and resonator assembly rearward to remove from catalytic converter.
7. Remove flange nuts (2) at exhaust manifold.
8. Remove catalytic converter from vehicle (3).
9. Remove and discard gasket.

FRONT - 2.7L

For removal of the front catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Removal** .

REAR - 2.7L

For removal of the rear catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Removal** .

3.5L

For removal of the catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Removal** .

INSPECTION

INSPECTION

WARNING: The normal operating temperature of the exhaust system is very high. Therefore, never attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

Check catalytic converter for a flow restriction. See **Diagnosis and Testing** Exhaust System Restriction Check for procedure.

Visually inspect the catalytic converter element by using a borescope or equivalent. Remove oxygen sensor(s) and insert borescope. If borescope is not available, remove converter and inspect element using a flashlight. Inspect element for cracked or melted substrate.

NOTE: Before replacing a catalytic converter, determine the root cause of failure. Most catalytic converter failures are caused by air, fuel or ignition problems. (Refer to appropriate Diagnostic Service Information) for test procedures.

INSTALLATION

2.4L

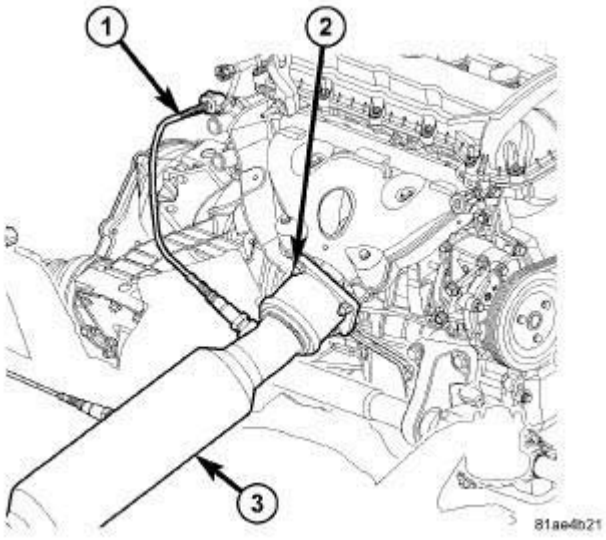


Fig. 7: Catalytic Converter - 2.4L
Courtesy of CHRYSLER LLC

1 - OXYGEN SENSOR ELECTRICAL CONNECTOR 2 - FLANGE NUTS
3 - CATALYTIC CONVERTER - 2.0/2.4L

NOTE: Always work from the front to rear of exhaust system when aligning and tightening exhaust system components.

1. Clean manifold to converter sealing surfaces.
2. Using a new gasket, position catalytic converter to exhaust manifold.
3. Install catalytic converter mounting bolts (2). Tighten to 28 N.m (250 in. lbs.).
4. Position a new band clamp onto the resonator and muffler assembly.
5. Install resonator and muffler assembly onto catalytic converter.
6. Align exhaust system to maintain position and proper clearance with underbody parts. All support isolators should have equal load on them.
7. Tighten resonator and muffler assembly band clamp to 54 N.m (40 ft. lbs.).
8. Lower vehicle.
9. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary.
10. Check the exhaust system for contact with the body panels. Make the necessary adjustments, if needed.

FRONT - 2.7L

For installation of the front catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Installation** .

REAR - 2.7L

For installation of the rear catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Installation** .

3.5L

For installation of the catalytic converter. Refer to **Engine/Manifolds/MANIFOLD, Exhaust - Installation** .

FILTER, DIESEL PARTICULATE

DESCRIPTION

DESCRIPTION

A diesel particulate filter (DPF) is installed for exhaust gas after-treatment. The DPF filters, stores and burns particulate matter (soot) that is generated during the combustion process. The soot is oxidized to carbon dioxide CO2 at exhaust temperatures over 600° C (1,112° F).

OPERATION

OPERATION

The oxidation catalysts raise the exhaust gas temperatures to regenerate the DPF , which is passive regeneration. If the passive regeneration cannot keep up with the build up of soot in the DPF, the ECM will actively regenerate the DPF to burn off the soot. Residue remains inside the DPF in the form of non burnable ash. Ash comes from the oils and other materials that are trapped in the oils and are present in the soot. Ash is not eliminated by the regeneration cycle. Excessive ash accumulation requires the replacement of the DPF. The DPF uses a silicon carbide wall-flow monolith with a platinum coating to trap particulates. The monolith contains a large number of square parallel channels, which run in the axial direction and are separated by thin porous walls. The channels are alternatively open at one end, but plugged at the other. The exhaust gases flow through the walls and escape through the pores in the wall material. Particulates, however, are too large to escape and are trapped in the monolith walls. The ECM starts the regeneration of the DPF if the soot load exceeds a performance map value. The ECM determines the load condition of the DPF based upon the exhaust gas pressure upstream and downstream of the DPF. A pressure differential sensor provides the pressure input to the ECM. During the regeneration process, the ECM raises the temperature in the DPF to burn off the soot accumulated. Under normal operation, the engine does not produce enough heat to oxidize the soot inside the DPF. This process requires temperatures above 550 °C (1,022 °F). After regeneration, the ECM reads the actual pressure difference at the DPF and compares it with a reference value. From this comparison, the ECM determines the ash quantity inside the DPF.

REMOVAL

DIESEL PARTICULATE FILTER

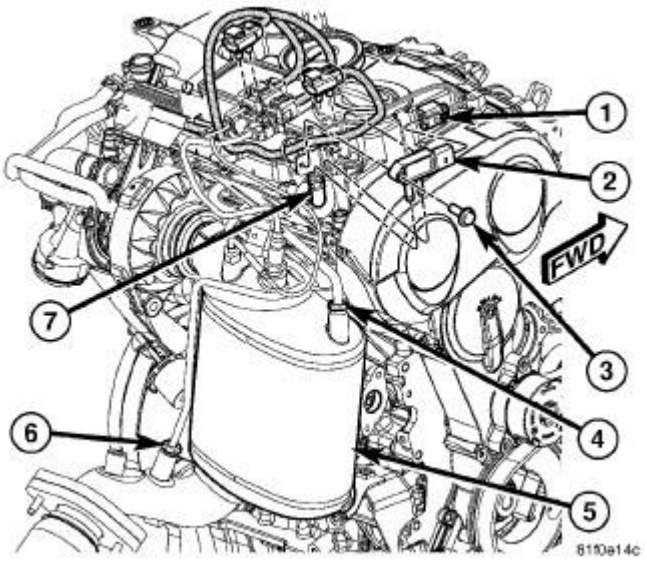


Fig. 8: DPF Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR 2 - PRESSURE DIFFERENTIAL SENSOR
3 - MOUNTING BOLT
4 - UPSTREAM PRESSURE TUBE
5 - DPF
6 - DOWNSTREAM PRESSURE TUBE
7 - TUBING

1. Disconnect negative battery cable.
2. Remove the engine cover. Refer to **Engine - Removal**
3. Remove the windshield wiper arm linkage. Refer to **Electrical - Wipers/Washers/Wipers/Washers/LINKAGE, Wiper Arm - Removal**
4. Remove the eight bolts from the strut tower brace.
5. Remove the HVAC air intake box assembly.
6. Remove the differential pressure sensor tube bracket at the diesel particulate filter (DPF) (5).
7. Remove the upper DPF (5) heat shield mounting bolts.
8. Remove the right side rear engine harness bracket.
9. Disconnect the temperature sensor electrical connectors.
10. Remove the upper temperature sensor from the DPF (5).
11. Disconnect the oxygen sensor electrical connector at the DPF (5).
12. Remove the oxygen sensor from top of DPF (5).
13. Detach the lower temperature sensor wires from their retainer.

14. Remove the upper pressure differential tubing (4) from top of DPF (5).
15. Remove the DPF (5) to turbocharger clamp and gasket.

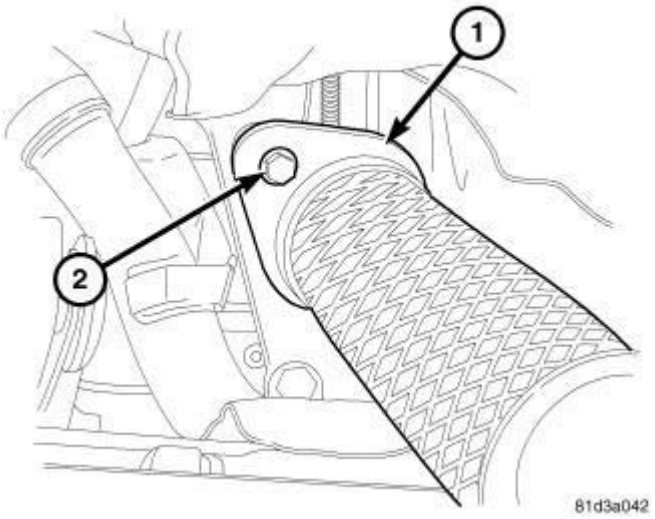


Fig. 9: Removing/Installing Diesel Particulate Filter To Exhaust Pipe Mounting Bolts
Courtesy of CHRYSLER LLC

1 - FLANGE
2 - BOLT

16. Raise and support the vehicle.
17. Remove the lower engine splash shield.
18. Remove the lower DPF (5) heat shield mounting bolts.
19. Remove the DPF heat shield.
20. Remove the exhaust pipe to DPF mounting bolts (2).
21. Remove the exhaust pipe from the muffler and tailpipe assembly.

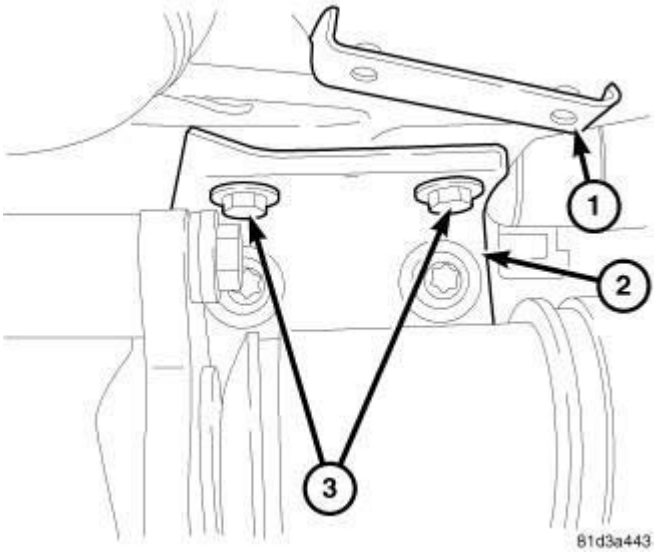


Fig. 10: Removing/Installing Diesel Particulate Filter To Axle Bracket Bolts
Courtesy of CHRYSLER LLC

1 - DPF
2 - AXLE SUPPORT BRACKET
3 - DPF TO AXLE SUPPORT BRACKET BOLTS

22. Remove the lower pressure differential tubing from the DPF.
23. Remove the exhaust manifold temperature sensor.
24. Remove the DPF (1) to axle support bracket bolts (3)
25. Lower the vehicle.

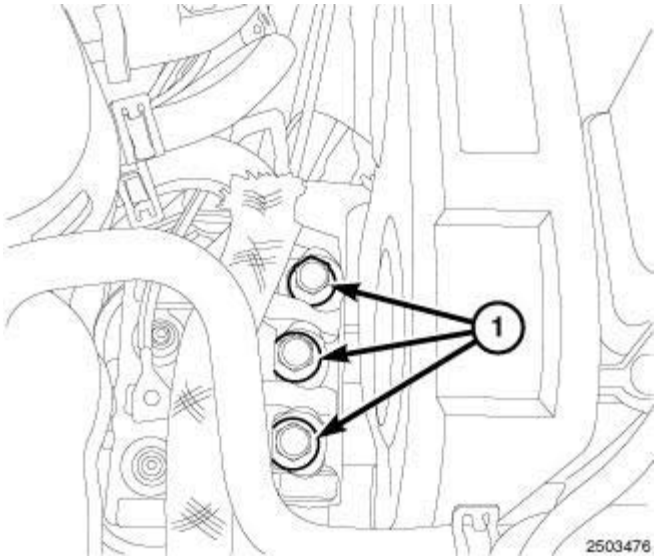


Fig. 11: Engine Support Bracket Bolts
Courtesy of CHRYSLER LLC

26. Loosen the three bolts (1) at the right engine support bracket. **Do not remove the engine support bracket bolts.**
27. Remove the DPF and DPF to turbocharger gasket from vehicle.

INSTALLATION

DIESEL PARTICULATE FILTER

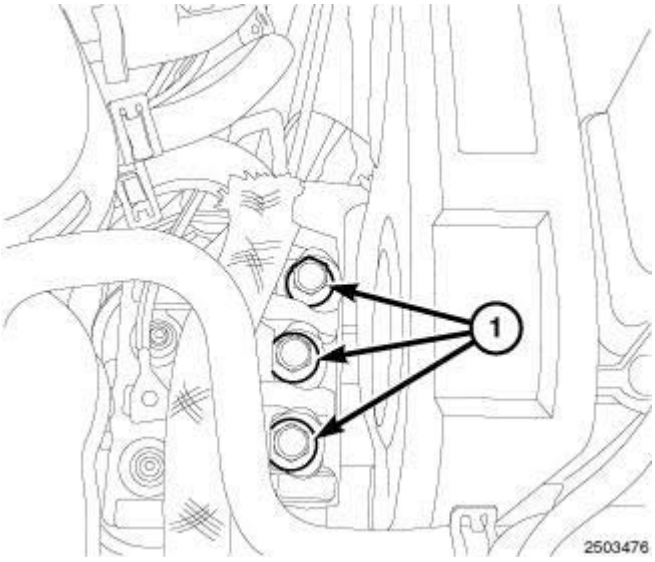


Fig. 12: Engine Support Bracket Bolts
Courtesy of CHRYSLER LLC

1. Position the DPF and turbocharger gasket into the vehicle. Do not tighten at this time
2. Tighten the three bolts (1) at the right engine support bracket. Tighten the bolts to 45 N.m (33 ft. lbs.)
3. Raise and support the vehicle.

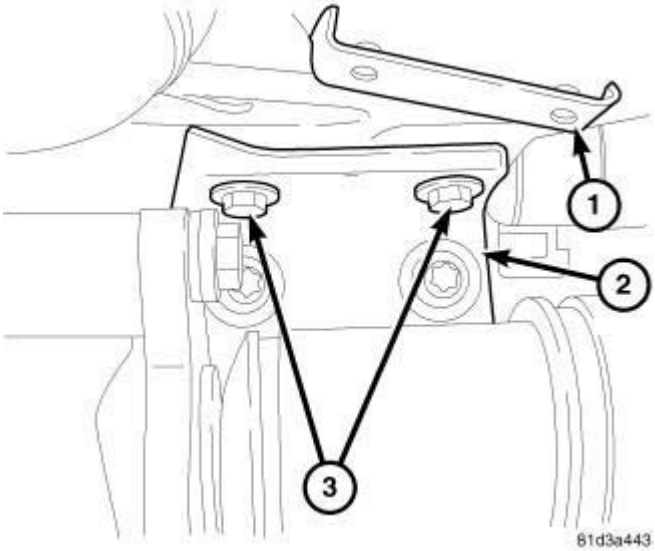


Fig. 13: Removing/Installing Diesel Particulate Filter To Axle Bracket Bolts
Courtesy of CHRYSLER LLC

1 - DPF
2 - AXLE SUPPORT BRACKET
3 - DPF TO AXLE SUPPORT BRACKET BOLTS

4. Install the DPF to the axle support bolts (3). Tighten the bolts to 25 N.m (18 ft. lbs.).
5. Install the exhaust manifold temperature sensor.
6. Install the lower pressure differential tubing into DPF. Tighten the fitting to 45 N.m (33 ft.lbs.)

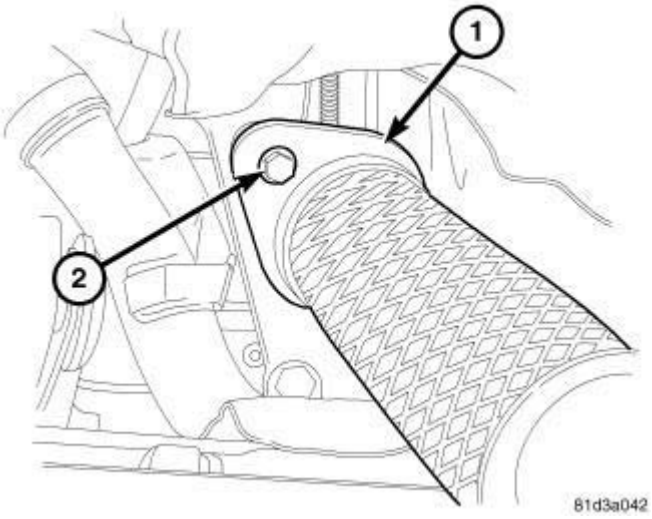


Fig. 14: Removing/Installing Diesel Particulate Filter To Exhaust Pipe Mounting Bolts
Courtesy of CHRYSLER LLC

1 - FLANGE
2 - BOLT

7. Install the exhaust pipe to the DPF. Tighten the bolts (2) to 35 N.m (25 ft. lbs.).
8. Install the exhaust pipe to the muffler and tailpipe assembly. Tighten the bolts (2) to 35 N.m (25 ft. lbs.).
9. Position the DPF heat shield and install the lower DPF heat shield mounting bolts. Tighten the bolts to 5 N.m (44 in. lbs.).
10. Install the lower engine splash shield.
11. Lower the vehicle.

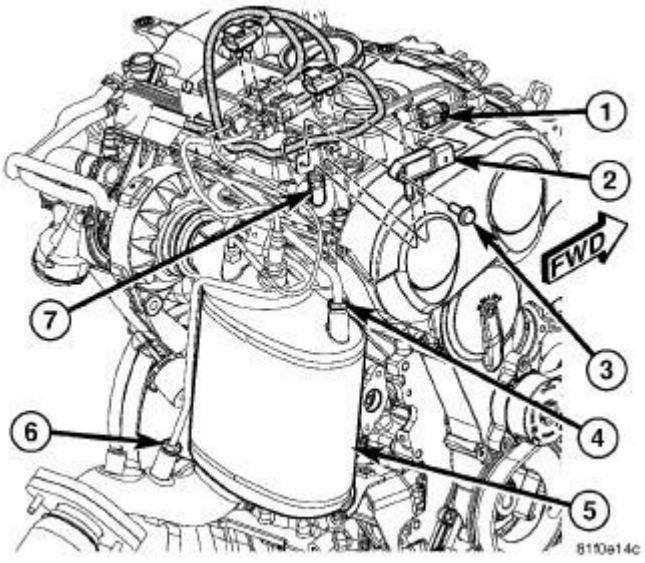


Fig. 15: DPF Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR 2 - PRESSURE DIFFERENTIAL SENSOR
3 - MOUNTING BOLT
4 - UPSTREAM PRESSURE TUBE
5 - DPF
6 - DOWNSTREAM PRESSURE TUBE
7 - TUBING

12. Install the DPF (5) , gasket and clamp to the turbocharger. Tighten the clamp nut to 35 N.m (25 ft. lbs.).
13. Install the upper pressure differential tubing (4) into the DPF (5). Tighten the tubing to 45 N.m (33 ft.lbs.).
14. Attach the lower temperature sensor wires to their retainer.
15. Install the oxygen sensor into the top of the DPF (5). Tighten to 45 N.m (33 ft. lbs.).
16. Connect the oxygen sensor electrical connector at the DPF (5).
17. Install the upper temperature sensor to the DPF (5). Tighten the sensor to 45 N.m (33 ft.lbs.).
18. Connect the temperature sensor electrical connectors.
19. Install the right side rear engine harness bracket. Tighten the bolts to 10 N.m (89 in. lbs.).
20. Install the DPF heat shield upper mounting bolts. Tighten the bolts to 5 N.m (44 in. lbs.).
21. Install the differential pressure sensor tube bracket at the diesel particulate filter (DPF) (5).
22. Install the HVAC air intake box assembly.
23. Install the eight nuts to the strut tower brace. Tighten the sensor to 55 N.m (41 ft.lbs.).
24. Install the windshield wiper arm linkage. Refer to **Electrical - Wipers/Washers/Wipers/Washers/LINKAGE, Wiper Arm - Installation**

25. Install the engine cover. Refer to **Engine - Installation**
26. Connect the negative battery cable.
27. Start vehicle and check for leaks. Repair as necessary.

MUFFLER, EXHAUST

REMOVAL

MUFFLER

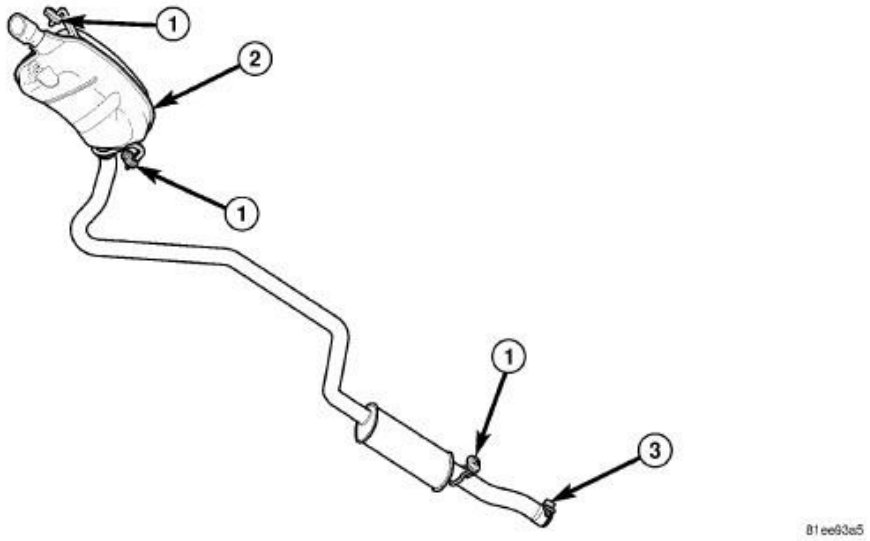


Fig. 16: Muffler/Exhaust Pipe Assembly - Single Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR
2 - MUFFLER/EXHAUST PIPE ASSEMBLY
3 - BAND CLAMP

NOTE: Band clamps (3) are spot welded to exhaust system. If a band clamp must be replaced, the spot weld must be ground off the exhaust pipe.

NOTE: When replacement is required on any component of the exhaust system, it is most important that original equipment parts (or their equivalent) be used.

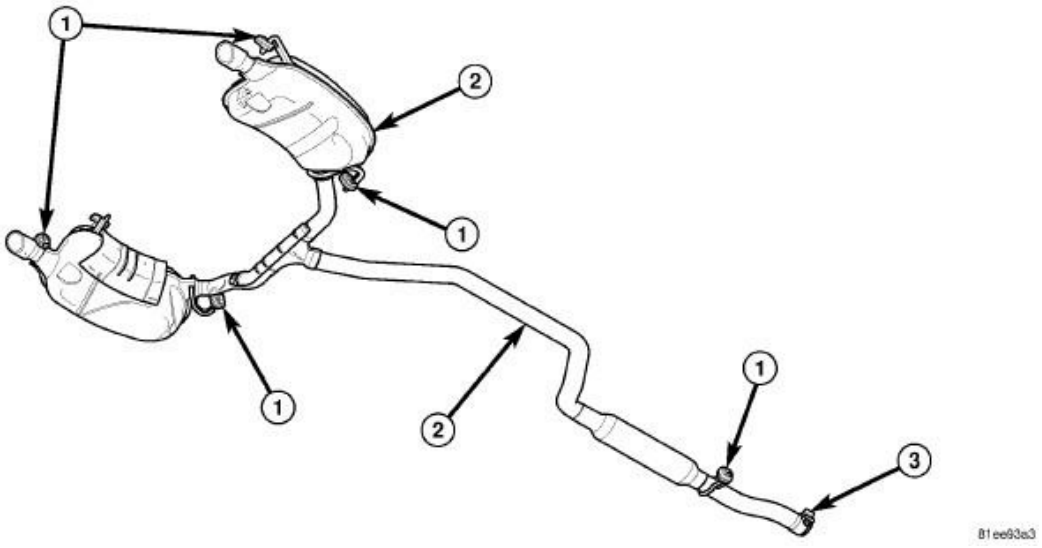


Fig. 17: Muffler/Exhaust Pipe Assembly - Dual Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR 2 - MUFFLER/EXHAUST PIPE ASSEMBLY
3 - BAND CLAMP

1. Raise vehicle on hoist.
2. Apply penetrating oil to band clamp (3).
3. Remove band clamp (3).
4. Remove ground strap from muffler (2).

CAUTION: Do not use any tools to remove the rubber isolators-remove by hand only. Soapy water or silicone based lubricant spray may be used to assist removal/installation of isolators. DO NOT use a petroleum based lubricant on the isolators, as damage to the rubber material can occur.

5. Remove support isolators from muffler supports.
6. Remove the one muffler/resonator assembly.

INSTALLATION

MUFFLER

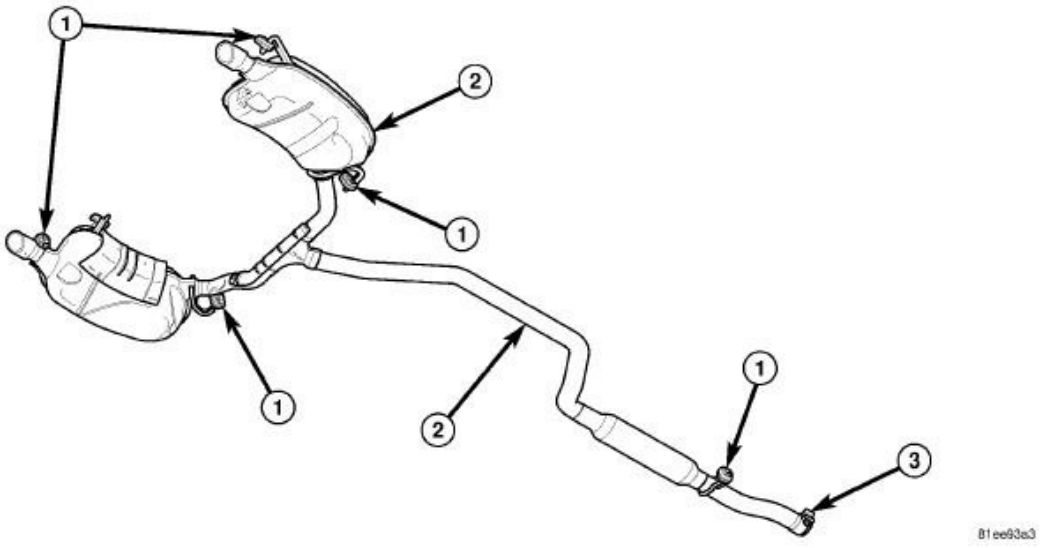


Fig. 18: Muffler/Exhaust Pipe Assembly - Dual Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR 2 - MUFFLER/EXHAUST PIPE ASSEMBLY
3 - BAND CLAMP

NOTE: Always work from the front to rear of exhaust system when aligning and tightening exhaust system components.

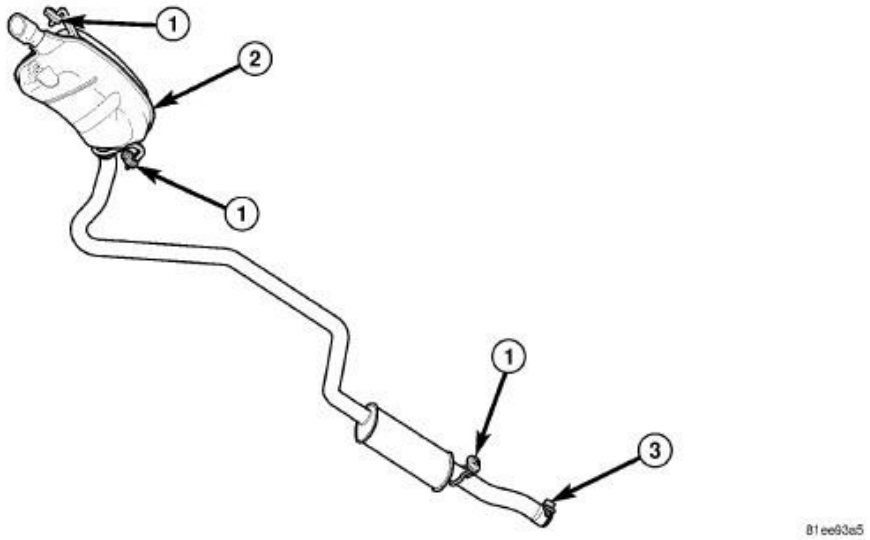


Fig. 19: Muffler/Exhaust Pipe Assembly - Single Tail Pipe
Courtesy of CHRYSLER LLC

1 - INSULATOR 2 - MUFFLER/EXHAUST PIPE ASSEMBLY

3 - BAND CLAMP

1. Position muffler/resonator assembly (2) onto exhaust pipe.
2. Install support isolators.
3. Align muffler and resonator assembly to maintain position and proper clearance with underbody parts. All support isolators should have equal load on them.
4. Install new band clamp (3). Tighten to 54 N.m (40 ft. lbs.).
5. Connect ground strap to muffler (2).
6. Lower vehicle.
7. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary. See **Diagnosis and Testing**
8. Check the exhaust system for contact with the body panels. Make the necessary adjustments, if needed.

PIPE, EXHAUST

REMOVAL

2.7L/3.5L

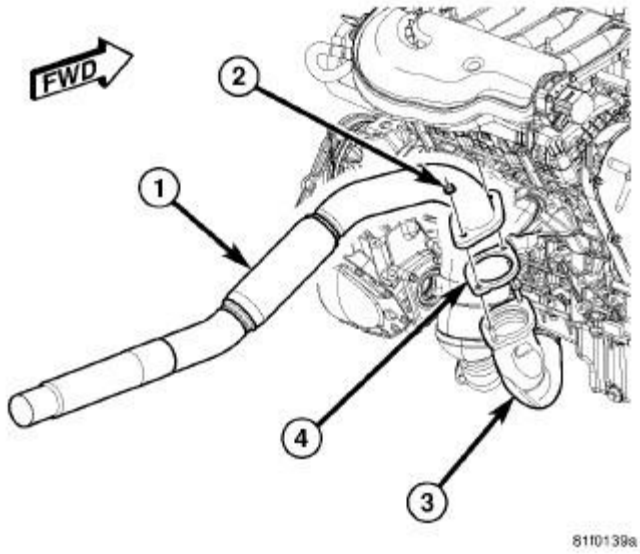


Fig. 20: Exhaust Pipe - 2.7L/3.5L
Courtesy of CHRYSLER LLC

1 - EXHAUST PIPE 2 - NUTS
3 - CROSS UNDER PIPE
4 - GASKET

WARNING: The normal operating temperature of the exhaust system is very high. Never attempt to service any part of the exhaust system until it is cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operation time.

1. Raise vehicle on hoist.
2. Apply penetrating oil to exhaust pipe band clamp, and fasteners (2).
3. Loosen band clamp for resonator/pipe assembly.
4. Remove exhaust pipe mounting nuts (2) at cross under pipe (3).
5. Remove exhaust pipe (1) and gasket from vehicle.
6. Discard band clamp.

INSTALLATION

2.7L/3.5L

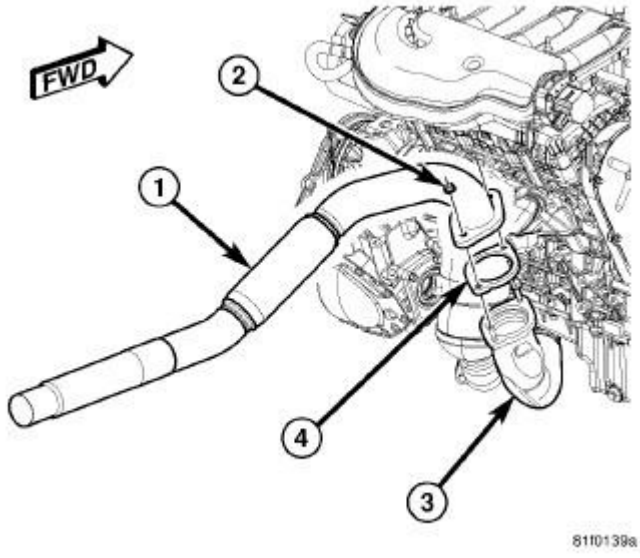


Fig. 21: Exhaust Pipe - 2.7L/3.5L
Courtesy of CHRYSLER LLC

1 - EXHAUST PIPE 2 - NUTS
3 - CROSS UNDER PIPE
4 - GASKET

1. Position exhaust pipe (1) into muffler/resonator assembly.
2. Position exhaust pipe onto cross over pipe.

3. Install exhaust pipe (1) to cross over pipe nuts. Tighten to 28 N.m (250 in. lbs.).
4. Align exhaust pipe (1) and resonator/muffler pipe assembly to maintain position and proper clearance with underbody parts. All support isolators should have equal load on them. Tighten fasteners attaching exhaust pipe (1) to cross-under pipe (3) to 28 N.m (21 ft. lbs.).
5. Install new band clamp. Tighten band clamp to 54 N.m (40 ft. lbs.).
6. Lower vehicle.
7. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary. See **Diagnosis and Testing**
8. Check the exhaust system for contact with the body panels. Make the necessary adjustments, if needed.

PIPE, EXHAUST CROSS UNDER

REMOVAL

2.7L ENGINE

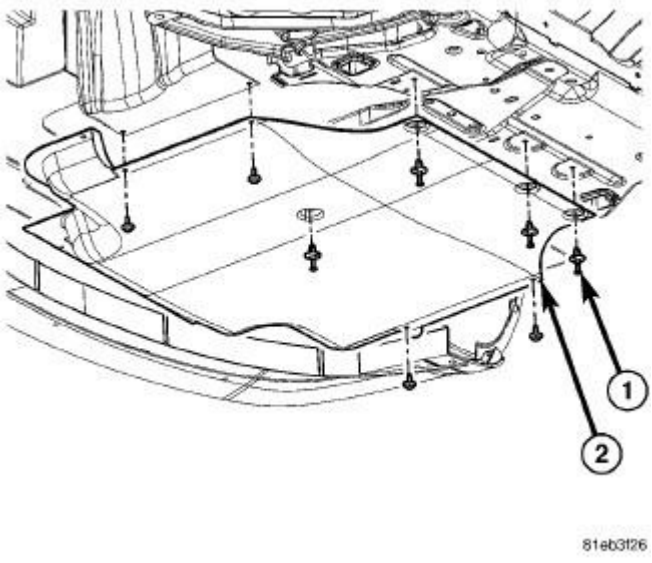


Fig. 22: Belly Pan
Courtesy of CHRYSLER LLC

1 - BELLY PAN
2 - EXHAUST EXTENSION PIPE

1. Remove the belly pan (2).

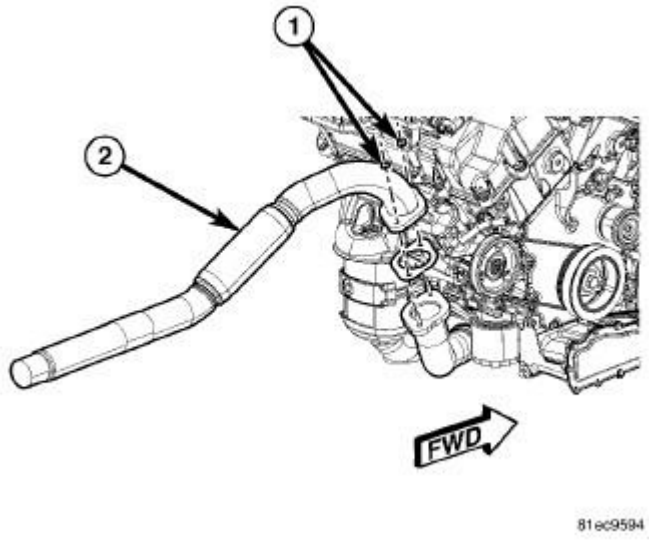


Fig. 23: 2.7L Extension Pipe
Courtesy of CHRYSLER LLC

2. Remove the fasteners (1), and remove the exhaust extension pipe (2) from the cross under pipe.

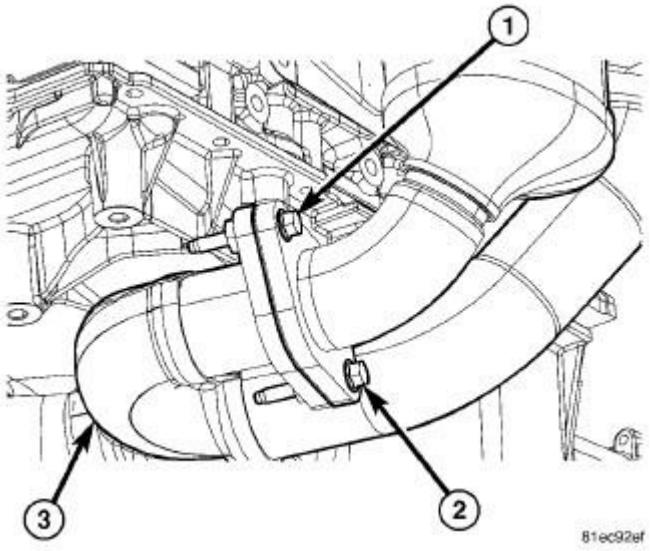


Fig. 24: Cross Under Pipe Fasteners
Courtesy of CHRYSLER LLC

3. Remove the rear maniverter-to-cross under pipe fasteners (1) and (2).

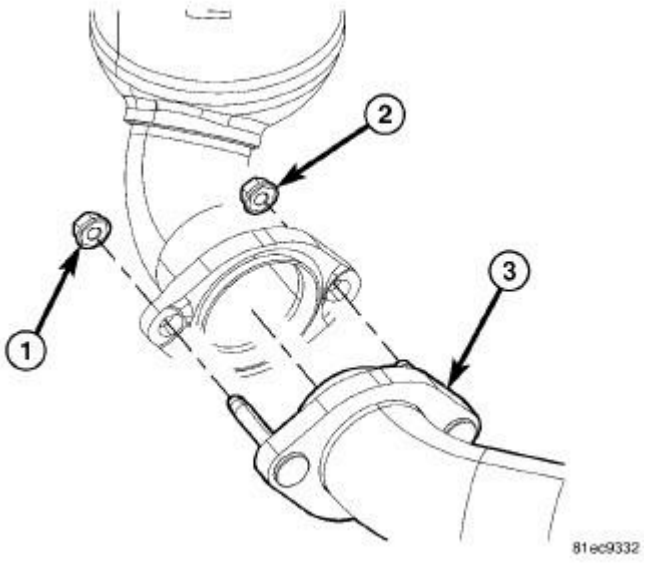


Fig. 25: Maniverter To Cross Under Fasteners
Courtesy of CHRYSLER LLC

4. Remove the front maniverter-to-cross under fasteners (1) and (2), and remove the cross under pipe (3).

3.5L ENGINE

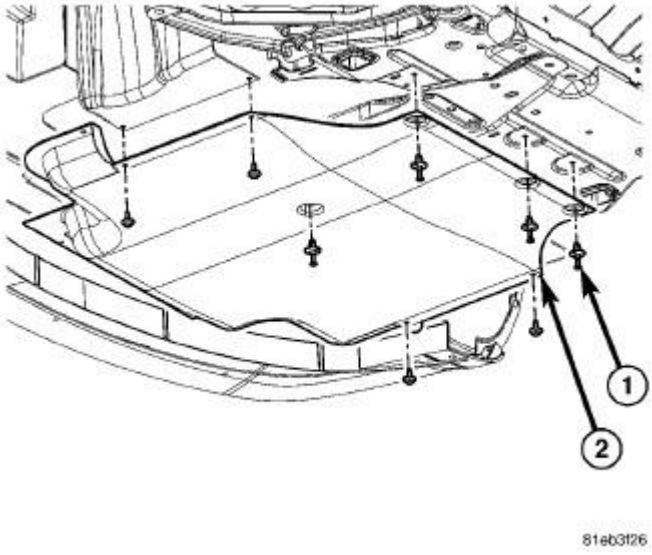


Fig. 26: Belly Pan
Courtesy of CHRYSLER LLC

1. Raise vehicle on hoist.
2. Remove the fasteners (1) and remove the belly pan (2).

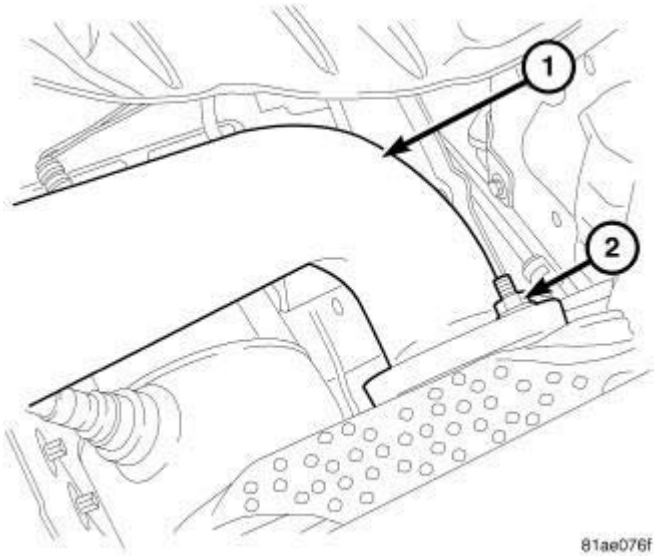


Fig. 27: Exhaust System Pipe
Courtesy of CHRYSLER LLC

1 - EXHAUST PIPE
2 - NUTS

3. Disconnect exhaust system pipe (1) from cross under pipe.

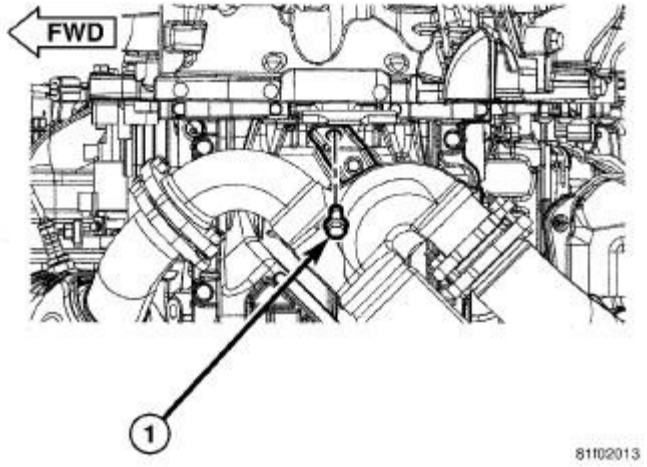


Fig. 28: Cross Under To Bracket
Courtesy of CHRYSLER LLC

4. Remove cross-under pipe bracket to cross under pipe bolt (1).

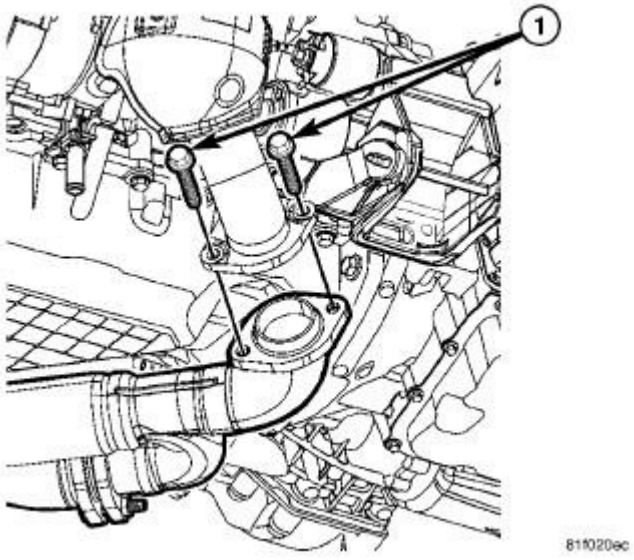


Fig. 29: Left Maniverter To Cross Under
Courtesy of CHRYSLER LLC

5. Remove cross under to front maniverter bolts and nuts (1).

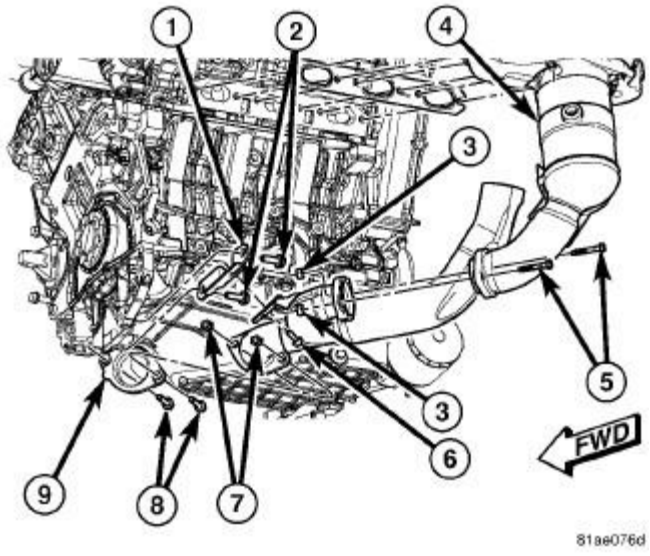


Fig. 30: Cross Under Pipe - 3.5L
Courtesy of CHRYSLER LLC

1 - BRACKET 2 - BRACKET MOUNTING BOLTS
3 - CROSS UNDER PIPE TO REAR MANIVERTER NUTS
4 - REAR MANIVERTER

5 - REAR MANIVERTER TO CROSS UNDER BOLTS
6 - CROSS UNDER PIP TO BRACKET BOLTS
7 - CROSS UNDER PIPE TO FRONT MANIVERTER NUTS
8 - CROSS UNDER PIPE TO FRONT MANIVERTER BOLTS
9 - FRONT MANIVERTER

6. Remove cross under to rear maniverter bolts (5) and nuts (3).
7. Remove cross under pipe.

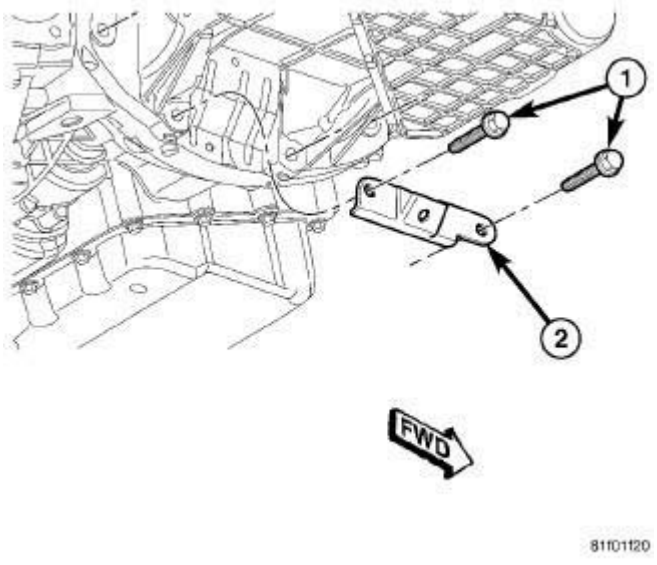


Fig. 31: Cross Under Bracket Transmission Bracket
Courtesy of CHRYSLER LLC

8. If necessary, remove cross under transmission bracket (2).

INSTALLATION

2.7L ENGINE

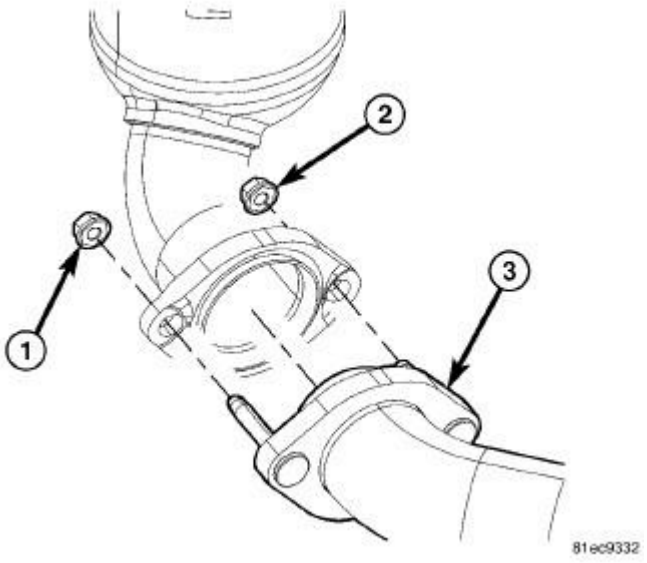


Fig. 32: Maniverter To Cross Under Fasteners
Courtesy of CHRYSLER LLC

1. Install the cross under pipe (3). and the front maniverter-to-cross under fasteners (1) and (2). Tighten to 27 Nm (20 ft. lb.).

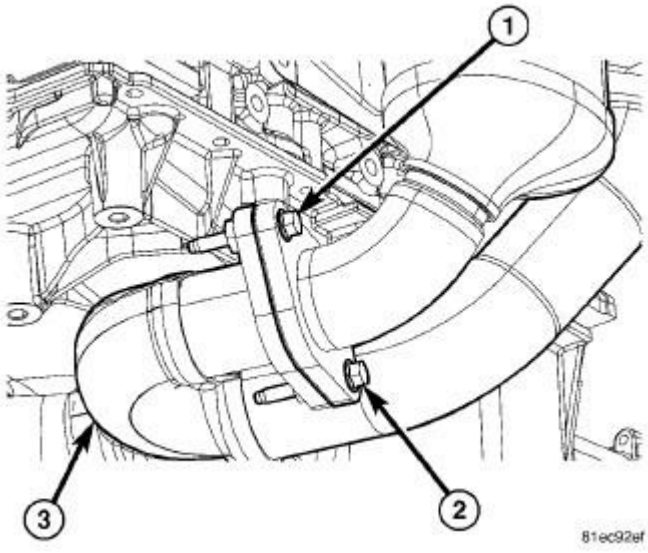


Fig. 33: Cross Under Pipe Fasteners
Courtesy of CHRYSLER LLC

2. Install the rear maniverter-to-cross under pipe fasteners (1) and (2). Tighten to 29 Nm (21 ft. lb.).

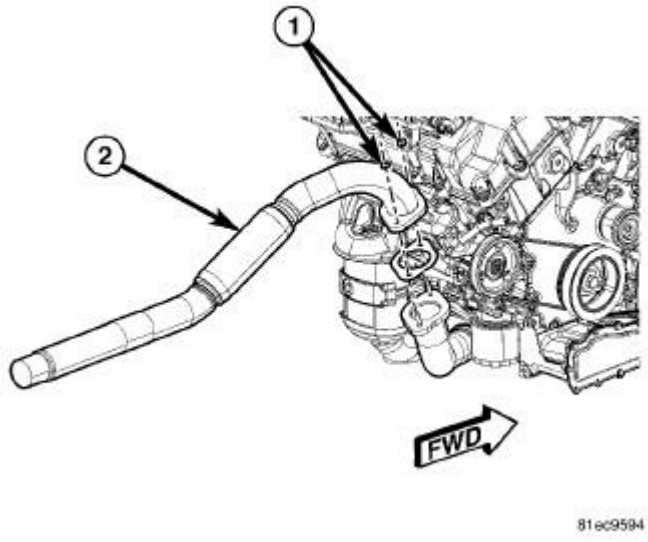


Fig. 34: 2.7L Extension Pipe
Courtesy of CHRYSLER LLC

3. Install the exhaust extension pipe (2) to the cross under pipe, and install the fasteners (1). Tighten to 27 Nm (20 ft. lb.)

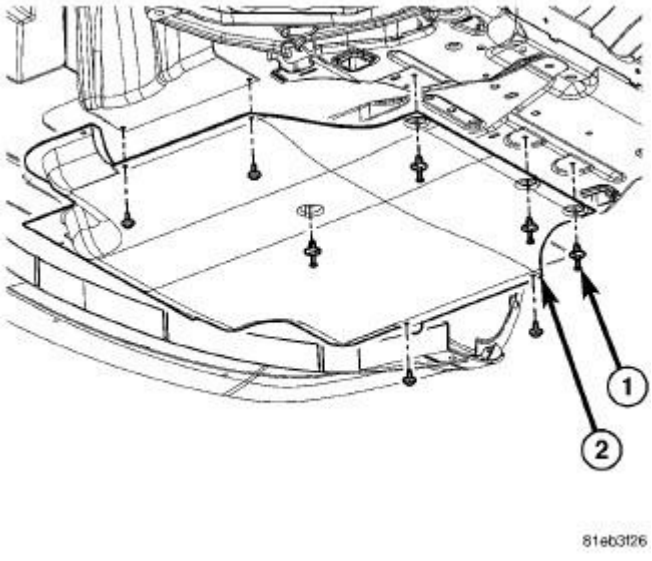


Fig. 35: Exhaust Extension Pipe
Courtesy of CHRYSLER LLC

1 -FASTENERS
2 -BELLY PAN

4. Install the belly pan (2).

3.5L ENGINE

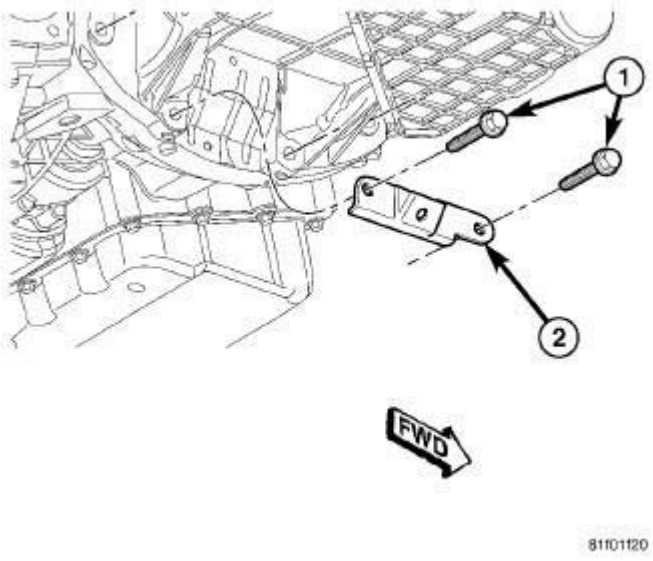


Fig. 36: Cross Under Bracket Transmission Bracket
Courtesy of CHRYSLER LLC

1. If removed, install bracket (2). Tighten bolts (1) to 29 N.m (21 ft. lb.).

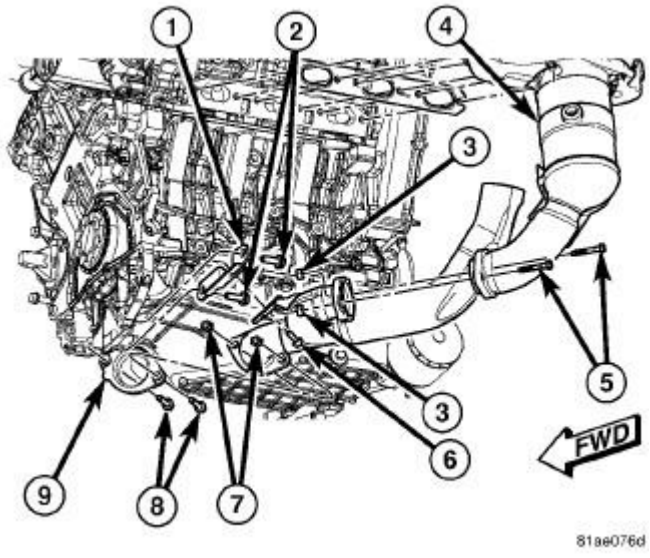


Fig. 37: Cross Under Pipe - 3.5L
Courtesy of CHRYSLER LLC

1 - BRACKET
2 - BRACKET MOUNTING BOLTS
3 - CROSS UNDER PIPE TO REAR MANIVERTER NUTS

4 - REAR MANIVERTER
5 - REAR MANIVERTER TO CROSS UNDER BOLTS
6 - CROSS UNDER PIP TO BRACKET BOLTS
7 - CROSS UNDER PIPE TO FRONT MANIVERTER NUTS
8 - CROSS UNDER PIPE TO FRONT MANIVERTER BOLTS
9 - FRONT MANIVERTER

2. Position cross under pipe.
3. Install cross under to rear maniverter bolts (5) and nuts (3). Tighten to 27 N.m (20 ft. lbs.).

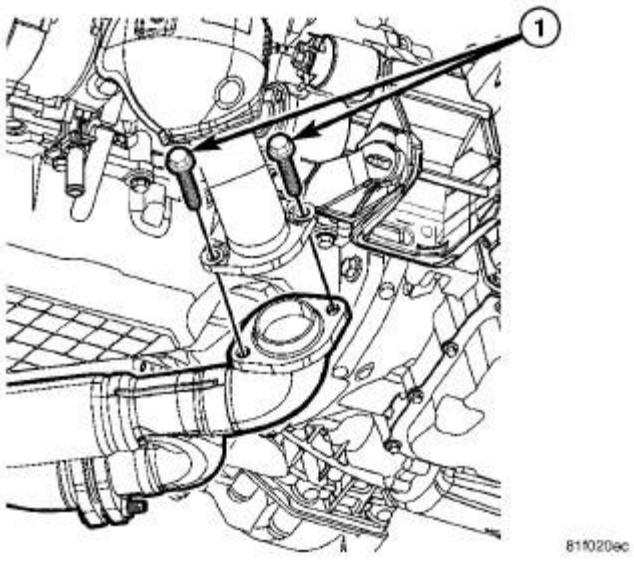


Fig. 38: Left Maniverter To Cross Under
Courtesy of CHRYSLER LLC

4. Install cross under to front maniverter bolts and nuts. Tighten to 27 N.m (20 ft. lbs.).

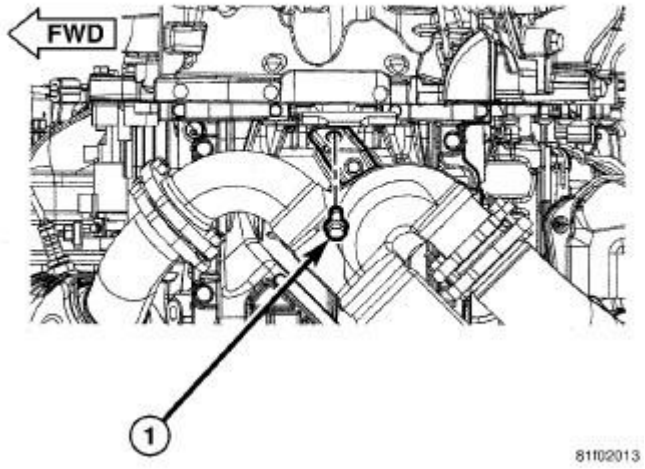


Fig. 39: Cross Under To Bracket
Courtesy of CHRYSLER LLC

5. Install cross under pipe bracket to cross under pipe bolt (1). Tighten to 27 N.m (20 ft. lbs.).

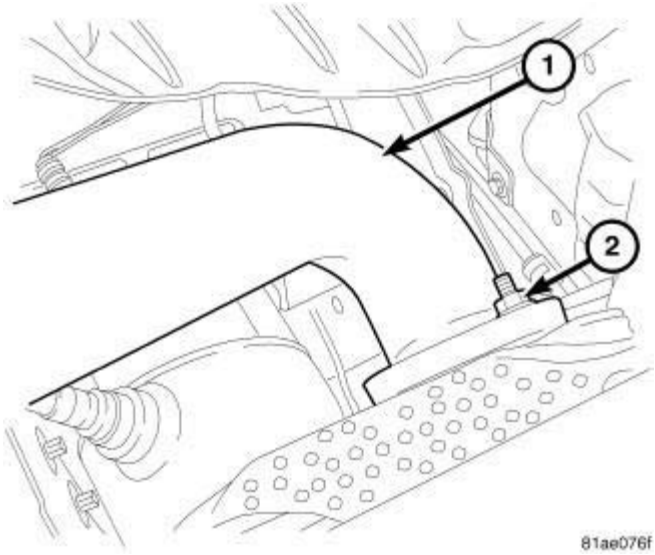


Fig. 40: Exhaust System Pipe
Courtesy of CHRYSLER LLC

1 - EXHAUST PIPE
2 - NUTS

6. Install exhaust system pipe. Tighten flange nuts to 28 N.m (21 ft. lbs.).

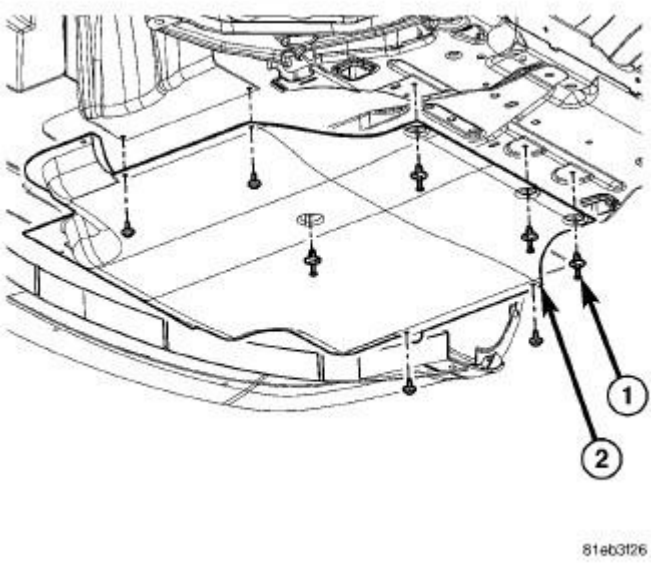


Fig. 41: Belly Pan
Courtesy of CHRYSLER LLC

7. Install belly pan (2) and fasteners (1).
8. Lower vehicle.
9. Start the engine and inspect for exhaust leaks. Repair exhaust leaks as necessary. See **Diagnosis and Testing**
10. Check the exhaust system for contact with the body panels. Make the necessary adjustments, if needed.

RESONATOR, EXHAUST

REMOVAL

EXHAUST RESONATOR

For removal of the exhaust resonator. See **Removal** .

INSTALLATION

EXHAUST RESONATOR

For installation of the exhaust resonator. See **Installation** .

SENSOR, EXHAUST PRESSURE

REMOVAL

EXHAUST PRESSURE SENSOR

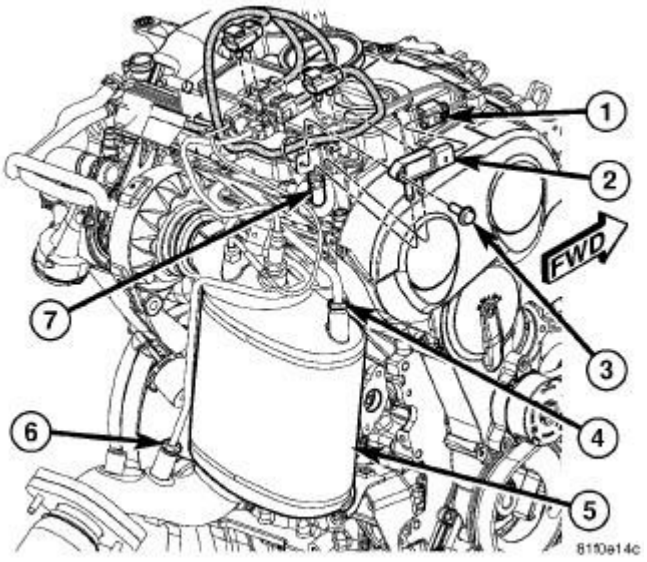


Fig. 42: DPF Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR 2 - PRESSURE DIFFERENTIAL SENSOR
3 - MOUNTING BOLT
4 - UPSTREAM PRESSURE TUBE
5 - DPF
6 - DOWNSTREAM PRESSURE TUBE
7 - TUBING

1. Disconnect and isolate negative battery cable.
2. Remove electrical connector at pressure differential sensor (2).
3. Remove upstream exhaust pressure tube (4) from catalytic converter
4. Remove downstream pressure tube (6) from catalytic converter.
5. Remove pressure differential sensor mounting bolt.
6. Remove pressure differential sensor (2) and tubing (7) from vehicle.
7. Remove tubing (7) from pressure differential sensor (2).

INSTALLATION

EXHAUST PRESSURE SENSOR

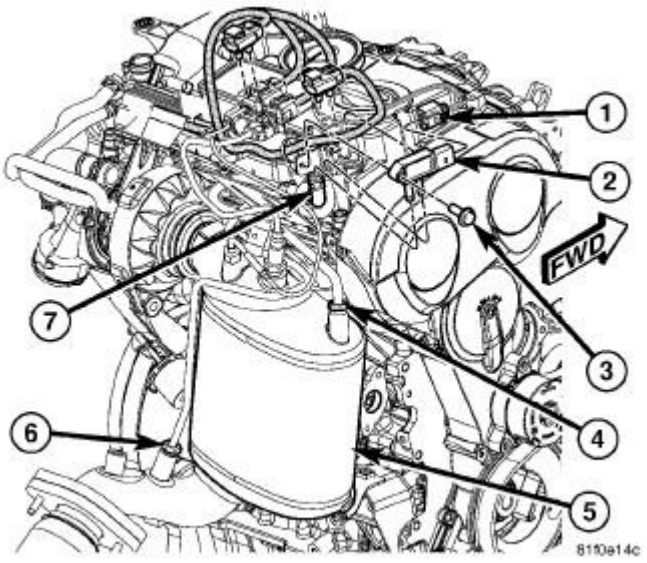


Fig. 43: DPF Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR 2 - PRESSURE DIFFERENTIAL SENSOR
3 - MOUNTING BOLT
4 - UPSTREAM PRESSURE TUBE
5 - DPF
6 - DOWNSTREAM PRESSURE TUBE
7 - TUBING

1. Install tubing (7) on pressure differential sensor (2).
2. Position pressure differential sensor (2) and tubing (7).
3. Install pressure differential sensor mounting bolt (3). Tighten to 10 N.m (89 in. lbs.).
4. Install downstream pressure tube (6) into catalytic converter. Tighten the fitting to 10 N.m (89 in. lbs.).
5. Install upstream pressure tube (4) into catalytic converter. Tighten the fitting to 10 N.m (89 in. lbs.)
6. Position electrical connector (1) into bracket.
7. Connect negative battery cable.

SENSOR, EXHAUST TEMPERATURE

REMOVAL

EXHAUST TEMPERATURE SENSOR

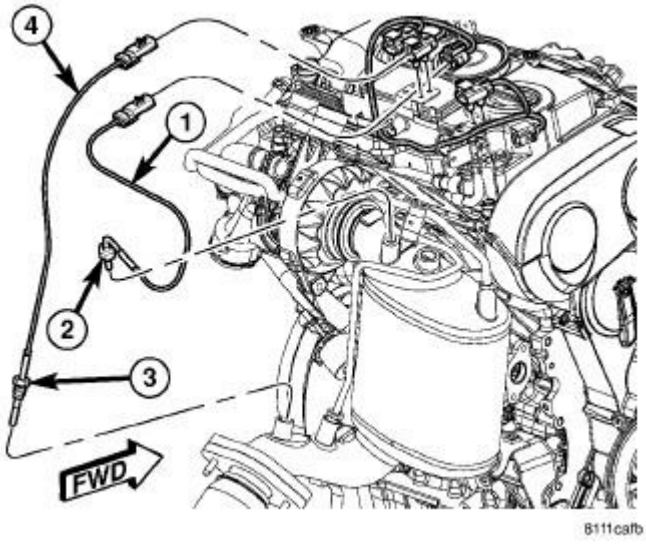


Fig. 44: Exhaust Temperature Sensor
Courtesy of CHRYSLER LLC

1 - DPF TEMPERATURE SENSOR ELECTRICAL CONNECTOR 2 - DPF TEMPERATURE SENSOR

1. Remove engine cover.
2. Disconnect and isolate negative battery cable.
3. Disconnect upstream DPF temperature sensor electrical connector (1).
4. Remove upstream DPF temperature sensor (2).
5. Disconnect downstream DPF temperature sensor electrical connector (4).
6. Remove downstream DPF temperature sensor (3).

INSTALLATION

EXHAUST TEMPERATURE SENSOR

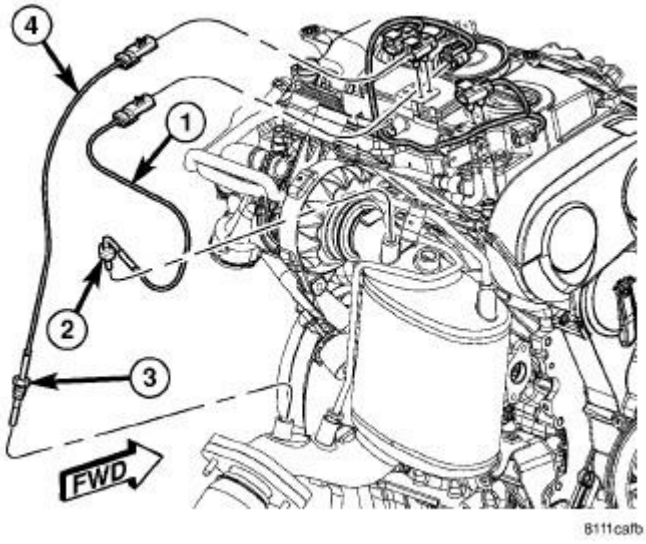


Fig. 45: Exhaust Temperature Sensor
Courtesy of CHRYSLER LLC

1 - DPF TEMPERATURE SENSOR ELECTRICAL CONNECTOR 2 - DPF TEMPERATURE SENSOR

1. Position DPF downstream temperature sensor (3) into DPF. Tighten to 25 N.m (18 ft. lbs.).
2. Connect downstream temperature sensor electrical connector (4).
3. Position DPF upstream temperature sensor (2) into DPF. Tighten to 25 N.m (18 ft. lbs.).
4. Connect upstream temperature sensor electrical connector (1).
5. Install engine cover.
6. Connect negative battery cable.

SHIELD, HEAT

DESCRIPTION

DESCRIPTION

The exhaust system heat shields are attached to the under body of the vehicle.

OPERATION

OPERATION

Heat shields are needed to protect both the vehicle and the environment from the high temperatures developed near the catalytic converter.

Avoid application of rust prevention compounds or undercoating materials to exhaust system floor pan heat shields on vehicles so equipped. Light over spray near the edges is permitted. Application of coating will greatly reduce the efficiency of the heat shields resulting in excessive floor pan temperatures and objectionable fumes.

2009 ENGINE

Starting - Service Information - Journey

DESCRIPTION

REMOTE START SYSTEM

NOTE: Available on automatic transmission equipped vehicles only.

Remote start conveniently starts the engine from outside the vehicle by using the Remote Keyless Entry (RKE) key fob while maintaining security. The system has a targeted range of 300 ft. (91.4 m). The vehicle must be locked, the deck lid and hood closed and the transmission in Park in order to start the engine using the Remote Start button on the key fob.

STANDARD STARTING SYSTEM

The starting system consists of:

- Starter relay
- Starter motor (including an integral starter solenoid)

Other components to be considered as part of starting system are:

- Battery
- Battery cables
- Ignition switch and key lock cylinder
- Clutch pedal position switch (manual transmission)
- Park/neutral position switch (automatic transmission)
- Wire harnesses and connections.

The Battery, Starting, and Charging systems operate in conjunction with one another, and must be tested as a complete system. For correct operation of starting/charging systems, all components used in these 3 systems must perform within specifications. When attempting to diagnose any of these systems, it is important that you keep their interdependency in mind.

The diagnostic procedures used in each of these groups include the most basic conventional diagnostic methods, to the more sophisticated On-Board Diagnostics (OBD) built into the Powertrain Control Module (PCM). Use of an induction-type milliampere ammeter, volt/ohmmeter, battery charger, carbon pile rheostat (load tester), and 12-volt test lamp may be required.

OPERATION

REMOTE START SYSTEM

Remote Start Operating Conditions

In order to operate remote start, the following conditions must be met:

- Key fob sequence must be operated within a 100 meter range of the vehicle.
- The vehicle must be in Park.
- Key is not in the ignition.
- The hazard switch off.
- Vehicle Theft Alarm or Panic is not alarming.
- Doors and hood must be closed.
- The battery voltage is normal (11 to 15 volts).

Remote Start Shut Down/Deactivate Conditions

Engine will NOT start or will shut down/deactivate during any of the following conditions:

- Key in Ignition.
- Doors or hood are opened before remote unlock.
- Hazard Switch depressed.
- Panic or theft alarm active.
- Brake applied.
- A prior remote start cranked the engine , but failed to start the engine.
- Battery voltage NOT in the normal range.
- High (run away) or Low Idle (stall) RPM.
- MIL Active.
- High Engine Coolant Temperature.
- Low Engine Oil Pressure.

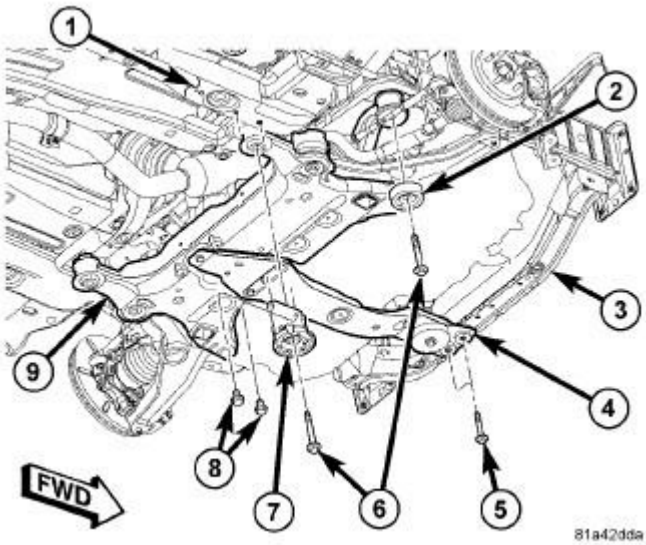


Fig. 1: KEY FOB
Courtesy of CHRYSLER LLC

Initiate Remote Start

To Remote Start the vehicle:

1. Press remote button on the Key Fob twice within 5 seconds.

NOTE: Engine will run for 15 minutes after a remote start is initiated. After 15 minutes, the engine will shut off. The system allows for only two sequential remote starts without a key ignition cycle.

2. Unlock vehicle with Key Fob to enter the vehicle.
3. Put key in ignition, turn key to run position to exit remote start and enter a normal start without engine shut off.

Identification that Remote Start is Activated

To identify that Remote Start has been activated the following will occur:

- Horn will sound and lights will flash to acknowledge a start command was received.
- Park Lamps will turn on to indicate that the engine is running in remote start mode.

Terminate Remote Start

To terminate Remote Start, press Remote Start button on the Key Fob once.

NOTE: In order to avoid inadvertent shut downs, the one-time press to shut down the

vehicle will be disabled for two seconds after receipt of a valid remote start request.

STANDARD STARTING SYSTEM

These components form two separate circuits. A high amperage circuit that feeds the starter motor up to 300+ amps, and a control circuit that operates on less than 30 amps.

The PCM controls a double start over-ride safety that does not allow the starter to be engaged if the engine is already running.

DIAGNOSIS AND TESTING

CONTROL CIRCUIT TEST

The starter control circuit has:

- Starter motor with integral solenoid
- Starter relay
- Transmission range sensor, or Park/Neutral Position switch with automatic transmissions
- Ignition switch
- Battery
- All related wiring and connections
- Powertrain Control Module (PCM)

CAUTION: Before performing any starter tests, the ignition and fuel systems must be disabled.

- Disable ignition and fuel systems.

STARTER SOLENOID

WARNING: Check to ensure that the transmission is in the park position with the parking brake applied. This may result in personal injury or death.

1. Verify battery condition. Battery must be in good condition with a full charge before performing any starter tests. Refer to **BATTERY** .
2. Perform Starter Solenoid test BEFORE performing the starter relay test.
3. Perform a visual inspection of the starter/starter solenoid for corrosion, loose connections or faulty wiring.
4. Locate and remove the starter relay.
5. Connect a remote starter switch or a jumper wire between the remote battery positive post and terminal 87

of the starter relay connector.

a. If engine cranks, starter/starter solenoid is good. Go to **STARTER RELAY** .
b. If engine does not crank or solenoid chatters, check wiring and connectors from starter relay to starter solenoid and from the battery positive terminal to starter post for loose or corroded connections. Particularly at starter terminals.
c. Repeat test. If engine still fails to crank properly, trouble is within starter or starter mounted solenoid, and replace starter. Inspect the ring gear teeth.

STARTER RELAY

WARNING: Check to ensure that the transmission is in the park/neutral position with the parking brake applied. This may result in personal injury or death.

RELAY TEST

Remove the starter relay as described in this group to perform the following tests:

1. A relay in the de-energized position should have continuity between terminals 87A and 30, and no continuity between terminals 87 and 30. If OK, go to 2. If not OK, replace the faulty relay.
2. Resistance between terminals 85 and 86 (electromagnet) should be 75 ±5 ohms. If OK, go to 3. If not OK, replace the faulty relay.
3. Connect a battery B+ lead to terminals 85 and a ground lead to terminal 86 to energize the relay. The relay should click. Also test for continuity between terminals 30 and 87, and no continuity between terminals 87A and 30. If OK, refer to **RELAY CIRCUIT TEST** . If not OK, replace the faulty relay.

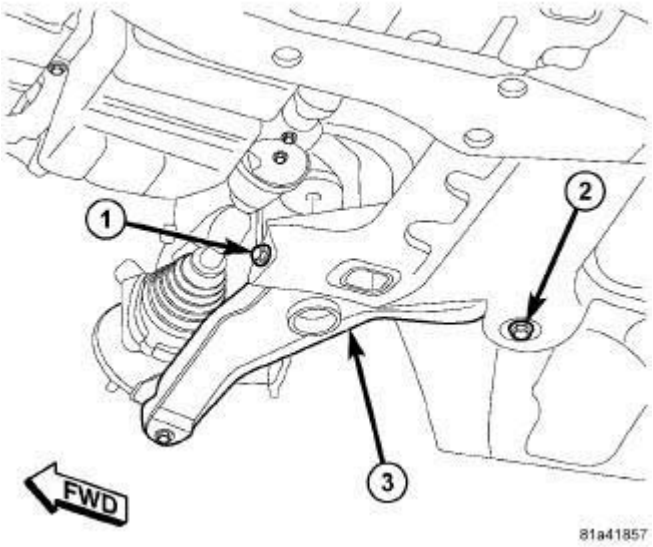


Fig. 2: Starter Relay Pinout
Courtesy of CHRYSLER LLC

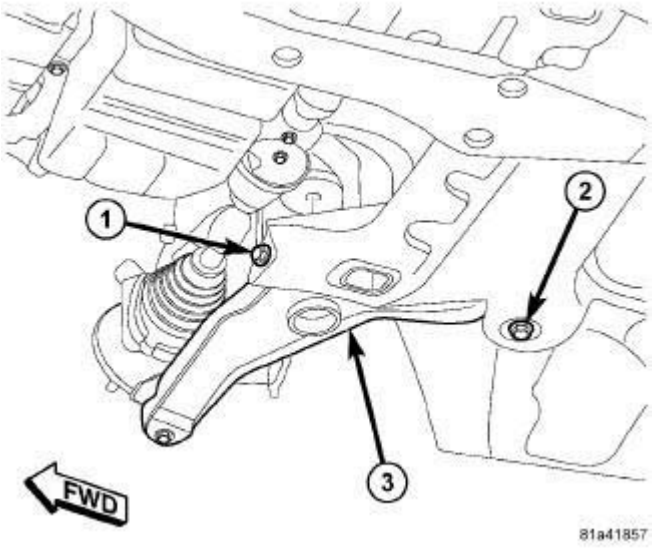


Fig. 3: Starter Relay Pinout
Courtesy of CHRYSLER LLC

30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

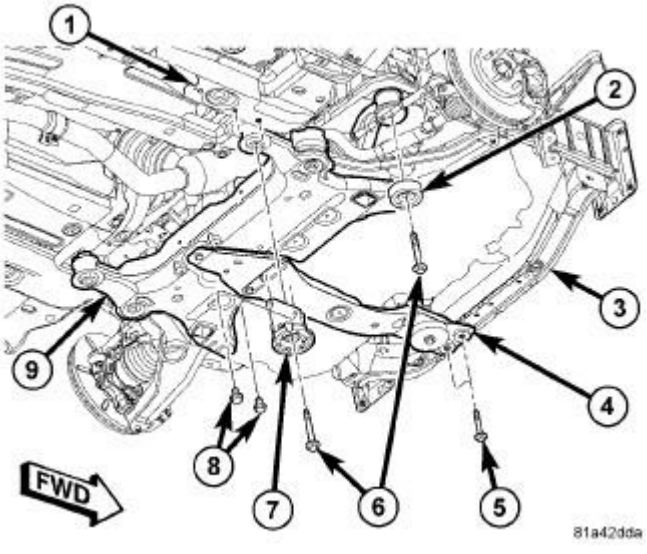


Fig. 4: Starter Relay Pinout
Courtesy of CHRYSLER LLC

CAV	FUNCTION
30	B (+)
85	IGNITION SWITCH OUTPUT
86	PCM-CONTROLLED GROUND
87	STARTER RELAY OUTPUT
87A	NO CONNECT

RELAY CIRCUIT TEST

1. The relay common feed terminal cavity (30) is connected to battery voltage and should be hot at all times. If OK, go to 2. If not OK, repair the open circuit to the PDC (Diesel Only) or the TIPM fuse as required.
2. The relay normally closed terminal (87A) is connected to terminal 30 in the de-energized position, but is not used for this application. Go to 3.
3. The relay normally open terminal (87) is connected to the common feed terminal (30) in the energized position. This terminal supplies battery voltage to the starter solenoid field coils. There should be continuity between the cavity for relay terminal 87 and the starter solenoid terminal at all times. If OK, go to 4. If not OK, repair the open circuit to the starter solenoid as required.
4. The coil battery terminal (85) is connected to the electromagnet in the relay. It is energized when the ignition switch is held in the Start position and the clutch pedal is depressed (manual trans). Check for battery voltage at the cavity for relay terminal 86 with the ignition switch in the Start position and the clutch pedal is depressed (manual trans), and no voltage when the ignition switch is released to the On position. If OK, go to 5. If not OK, check for an open or short circuit to the ignition switch and repair, if required. If the circuit to the ignition switch is OK, see **IGNITION SWITCH** .
5. The coil ground terminal (86) is connected to the electromagnet in the relay. It is grounded by the PCM if the conditions are right to start the car. For automatic trans. cars the PCM must see Park Neutral switch low and near zero engine speed (rpm). For manual trans. cars the PCM only needs to see near zero engine speed (rpm) and low clutch interlock input and see near zero engine speed (rpm). To diagnose the Park Neutral switch of the trans range sensor refer to the appropriate transaxle service information . Check for continuity to ground while the ignition switch is in the start position and if equipped the clutch pedal depressed. If not OK and the vehicle has an automatic trans. verify Park Neutral switch operation. If that checks OK check for continuity between PCM and the terminal 86. Repair open circuit as required. Also check the clutch interlock switch operation if equipped with a manual transmission. If OK, the PCM may be defective.

SAFETY SWITCHES

For diagnostics of the Transmission Range Sensor, refer to the appropriate transaxle service information for more information.

If equipped with Clutch Interlock/Upstop Switch, refer to **DIAGNOSIS AND TESTING** .

IGNITION SWITCH

After testing starter solenoid and relay, test ignition switch and wiring. Refer to **IGNITION CONTROL - SERVICE INFORMATION** or **SYSTEM WIRING DIAGRAMS** for more information. Check all wiring for

opens or shorts, and all connectors for being loose or corroded.

BATTERY

For battery diagnosis and testing, refer to **BATTERY** article for procedures.

ALL RELATED WIRING AND CONNECTORS

Refer to **SYSTEM WIRING DIAGRAMS** for more information.

FEED CIRCUIT RESISTANCE TEST

Before proceeding with this operation, review Diagnostic Preparation and Starter Feed Circuit Tests. The following operation will require a voltmeter, accurate to 1/10 of a volt.

CAUTION: Ignition and Fuel systems must be disabled to prevent engine start while performing the following tests.

1. To disable the Ignition and Fuel systems, disconnect the Automatic Shutdown Relay (ASD).
2. Gain access to battery terminals.
3. With all wiring harnesses and components properly connected, perform the following:
   a. Connect the negative lead of the voltmeter to the battery negative post, and positive lead to the battery negative cable clamp. Rotate and hold the ignition switch in the START position. Observe the voltmeter. If voltage is detected, correct poor contact between cable clamp and post.
   b. Connect positive lead of the voltmeter to the battery positive post, and negative lead to the battery positive cable clamp. Rotate and hold the ignition switch key in the START position. Observe the voltmeter. If voltage is detected, correct poor contact between the cable clamp and post.
   c. Connect negative lead of voltmeter to battery negative terminal, and positive lead to engine block near the battery cable attaching point. Rotate and hold the ignition switch in the START position. If voltage reads above 0.2 volt, correct poor contact at ground cable attaching point. If voltage reading is still above 0.2 volt after correcting poor contacts, replace ground cable.
4. Connect positive voltmeter lead to the starter motor housing and the negative lead to the battery negative terminal. Hold the ignition switch key in the START position. If voltage reads above 0.2 volt, correct poor starter to engine ground.
   a. Connect the positive voltmeter lead to the battery positive terminal, and negative lead to battery cable terminal on starter solenoid. Rotate and hold the ignition switch in the START position. If voltage reads above 0.2 volt, correct poor contact at battery cable to solenoid connection. If reading is still above 0.2 volt after correcting poor contacts, replace battery positive cable.
   b. If resistance tests do not detect feed circuit failures, replace the starter motor.

STARTING SYSTEM TEST

For circuit descriptions and diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

WARNING: On vehicles equipped with airbags, refer toPASSIVE RESTRAINTS before attempting steering wheel, steering column, or instrument panel component diagnosis or service. Failure to take the proper precautions could result in accidental airbag deployment and possible personal injury.

INSPECTION

Before removing any unit from the starting system for repair or diagnosis, perform the following inspections:

- **Battery** - Visually inspect the battery for indications of physical damage and loose or corroded cable connections. Determine the state-of-charge and cranking capacity of the battery. Charge or replace the battery, if required. Refer to **BATTERY SYSTEM** for more information.
- **Ignition Switch** - Visually inspect the ignition switch for indications of physical damage and loose or corroded wire harness connections.
- **Transmission Range Sensor or Park/Neutral Switch** - Visually inspect the transmission range sensor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Relay** - Visually inspect the starter relay for indications of physical damage and loose or corroded wire harness connections.
- **Starter Motor** - Visually inspect the starter motor for indications of physical damage and loose or corroded wire harness connections.
- **Starter Solenoid** - Visually inspect the starter solenoid for indications of physical damage and loose or corroded wire harness connections.
- **Wiring** - Visually inspect the wire harness for damage. Repair or replace any faulty wiring, as required. Check for loose or corroded wire harness connections at main engine ground and remote jump post.

STARTING SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
STARTER FAILS TO ENGAGE.	1. Battery discharged or faulty.	1. Refer to **BATTERY SYSTEM** for more information. Charge or replace battery, if required.
-	2. Starting circuit wiring faulty.	2. Refer to **FEED CIRCUIT RESISTANCE TEST** in this service information.
-	3. Starter relay faulty.	3. Refer to **RELAY TEST** , in this service information . Replace relay, if necessary.
-	4. Ignition switch faulty.	4. Refer to ignition switch test, in the steering service information or **SYSTEM WIRING DIAGRAMS** . Replace switch, if necessary.
-	5. Park/neutral position switch (auto trans) faulty or mis-adjusted.	5. Refer to park/neutral position switch test, in appropriate TRANSMISSION SERVICE INFORMATION for more information. Replace switch, if necessary.
-	6. Clutch interlock switch	6. Refer to clutch pedal position switch

	(man trans) faulty.	test, in **PEDAL AND PAD, CLUTCH** . Replace switch, if necessary.
-	7. Starter solenoid faulty.	7. Refer to **STARTER SOLENOID** , in this service information . Replace starter assembly, if necessary.
-	8. Starter assembly faulty.	8. If all other starting system components and circuits check ok, replace starter assembly.
-	9. Faulty teeth on ring gear.	9. Rotate flywheel 360°, and inspect teeth and ring gear replaced if damaged.
-	10. PCM double start override output failure.	10. Refer to PCM diagnostic. Check for continuity between PCM and terminal 85. Repair open circuit as required. If ok, PCM may be defective.
STARTER ENGAGES, FAILS TO TURN ENGINE.	1. Battery discharged or faulty.	1. Refer to **BATTERY SYSTEM** for more information. Charge or replace battery as necessary.
-	2. Starting circuit wiring faulty.	2. Refer to **FEED CIRCUIT RESISTANCE TEST** and the feed circuit test in this service information. Repair as necessary.
-	3. Starter assembly faulty.	3. If all other starting system components and circuits check ok, replace starter assembly.
-	4. Engine seized.	4. Refer to the appropriate engine service information , for diagnostic and service procedures.
-	5. Loose connection at battery, PDC (Diesel Only), TIPM, starter, or engine ground.	5. Inspect for loose connections.
-	6. Faulty teeth on ring gear.	6. Rotate flywheel 360°, and inspect teeth and ring gear replaced if damaged.
STARTER ENGAGES, SPINS OUT BEFORE ENGINE STARTS.	1. Broken teeth on starter ring gear.	1. Remove starter. Inspect ring gear and replace if necessary.
-	2. Starter assembly faulty.	2. If all other starting system components and circuits check ok, replace starter assembly.
STARTER DOES NOT DISENGAGE.	1. Starter improperly installed.	1. Install starter. Tighten starter mounting hardware to correct torque specifications.
-	2. Starter relay faulty.	2. Refer to **RELAY TEST** , in this service information . Replace relay, if necessary.
-	3. Ignition switch faulty.	3. Refer to**SWITCH, IGNITION** . Replace switch, if necessary.

-	4. Starter assembly faulty.	4. If all other starting system components and circuits check ok, replace starter assembly.
-	5. Faulty teeth on ring gear.	5. Rotate flywheel 360°, and inspect teeth and ring gear replaced if damaged.

SPECIFICATIONS

STARTER MOTOR

STARTER MOTOR

Engine Application	Power Rating	Cranking Amperage Draw Test
2.4L	1.2 Kilowatt / 1.6 Horsepower	150 - 280 Amperes
2.7L	1.2 Kilowatt / 1.6 Horsepower	100 - 300 Amperes
3.5L	1.2 Kilowatt / 1.6 Horsepower	100 - 300 Amperes
* Test at operating temperature. Cold engine, tight (new) engine, or heavy oil will increase starter amperage draw. **The starter is equipped with permanent magnets. Never strike the starter case to attempt to loosen a sticking/stuck armature as permanent magnets may crack or break.		

TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Engine Anti-Roll to Fore/Aft Crossmember Bolt	47	35	-
Engine Anti-Roll Mount Bolts	50	37	-
Engine Anti-Roll Mount Thru Bolt	47	35	-
Fore/Aft Crossmember Front Bolts	55	40.5	-
Fore/Aft Crossmember Rear Bolts	50	37	-
Negative Battery Cable Nut	4.5	-	40
Remote Start Antenna Mounting Screws	2.5	-	22
Starter Mounting Bolts	54	40	-
Starter Solenoid Battery Nut	10	-	90
Torque Reaction Bracket Bolts	54	40	-

ANTENNA, REMOTE START

DESCRIPTION

DESCRIPTION

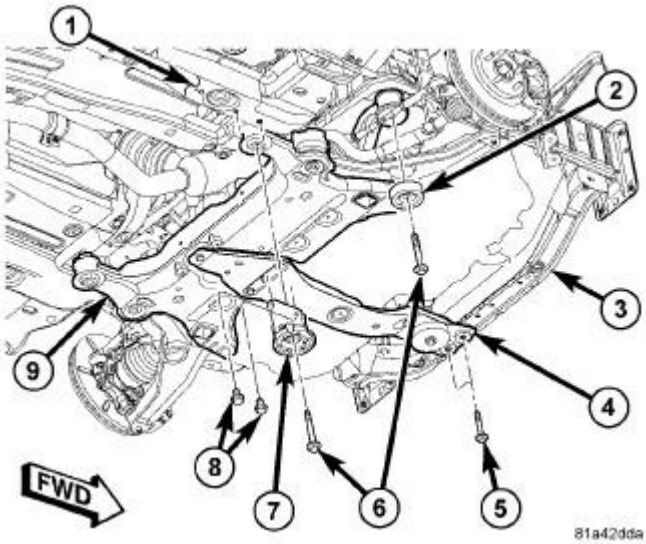


Fig. 5: Remote Start Antenna Module Assembly
Courtesy of CHRYSLER LLC

The Remote Start Antenna Module Assembly consists of an electrical connection to the Wireless Ignition Node (WIN) (1), a length of coaxial cable (2), two mounting clips (3 and 4) and a control module/antenna (5).

OPERATION

OPERATION

The remote start antenna is an external hidden antenna located at the driver's side front of dash. The antenna interfaces with the Wireless Integration Node (WIN) through a coaxial electrical cable and electrical connector. The antenna helps to amplify the signal for the Remote Keyless Entry (RKE) key fob.

REMOVAL

REMOVAL

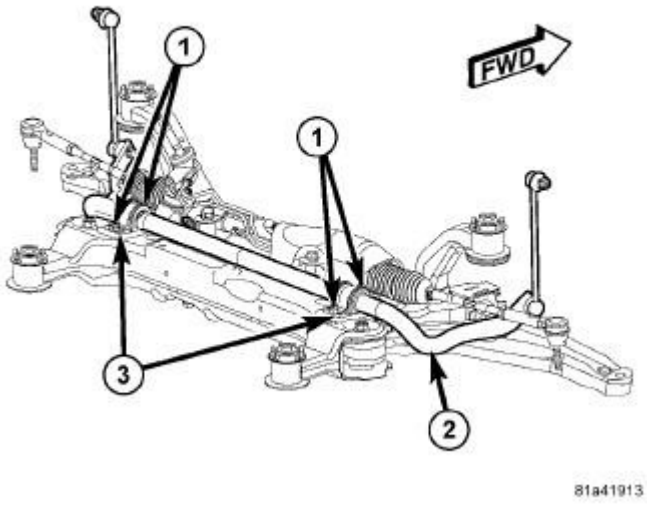


Fig. 6: Remote Start Antenna Connector
Courtesy of CHRYSLER LLC

WARNING: Wait two minutes for the system reserve capacitor to discharge before servicing any airbag components. Failure to do this may result in serious or fatal injury.

The remote start antenna is located driver's side front of dash.

1. Disconnect and isolate the battery negative cable.
2. Remove radio. Refer to **Electrical - Audio and Video/Audio and Video/RADIO - Removal** .
3. Remove instrument cluster. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Removal** .
4. Remove the instrument panel top pad. Refer to **Body/Instrument Panel/PAD, Instrument Panel - Removal** .

NOTE: During removal of the remote start antenna note the routing location of the coaxial cable.

5. Disconnect remote start antenna coaxial cable connector (1) from skreem module (3).
6. Remove the mounting clip (2).

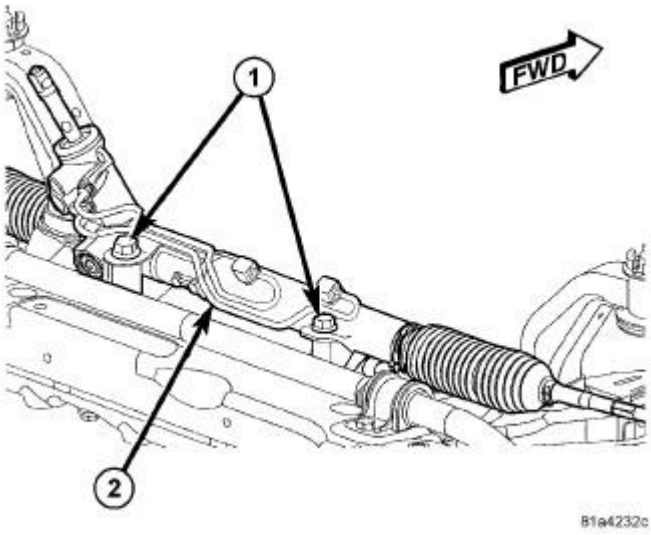


Fig. 7: LHD Remote Start Antenna
Courtesy of CHRYSLER LLC

7. Remove the mounting clip at the steering column reinforcement bracket.
8. Remove screws (1) and remove remote start antenna (2) from instrument panel assembly.

INSTALLATION

INSTALLATION

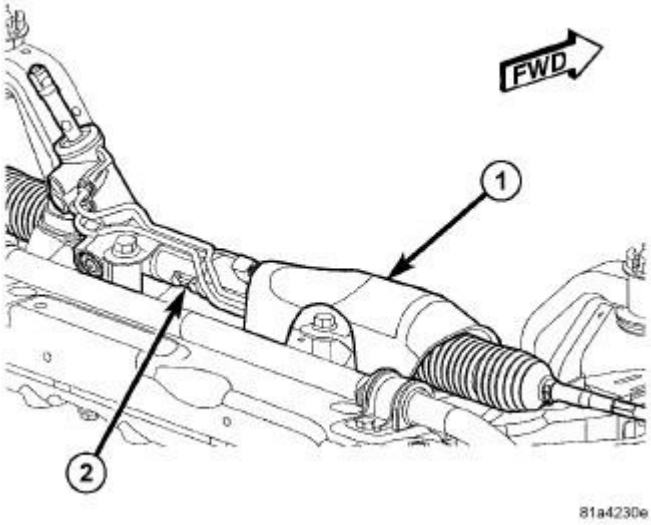


Fig. 8: LHD Remote Start Antenna
Courtesy of CHRYSLER LLC

NOTE: Make sure the remote start antenna is positioned the same way noted during the removal procedure.

1. Install the remote start antenna (2) and screws (1) to instrument panel assembly. Tighten to 2.5 N.m (22 in. lbs.).
2. Route the remote start coaxial cable in the position noted during the removal procedure.
3. Install the coaxial cable mounting clip at the steering column reinforcement bracket.

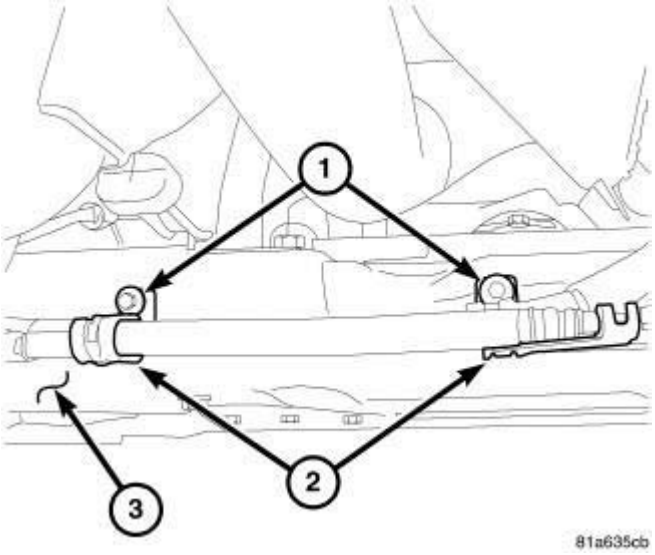


Fig. 9: Remote Start Antenna Connector
Courtesy of CHRYSLER LLC

4. Install the mounting clip (2).
5. Connect remote start antenna coaxial cable connector (1) to skreem module (3).
6. Install instrument cluster. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Installation** .
7. Install radio. Refer to **Electrical - Audio and Video/Audio and Video/RADIO - Installation** .
8. Install the instrument panel top pad. Refer to **Body/Instrument Panel/PAD, Instrument Panel - Installation** .
9. Connect negative battery cable. Tighten to 5 N.m (45 in. lbs.)

STARTER

REMOVAL

2.0L TURBO DIESEL

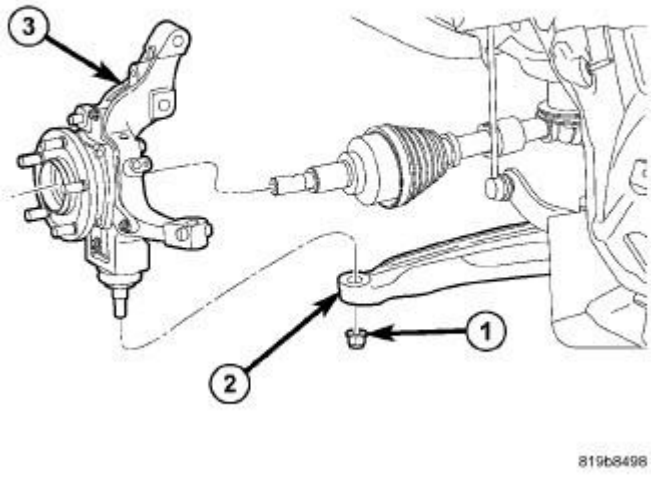


Fig. 10: Air Box
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air box. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .

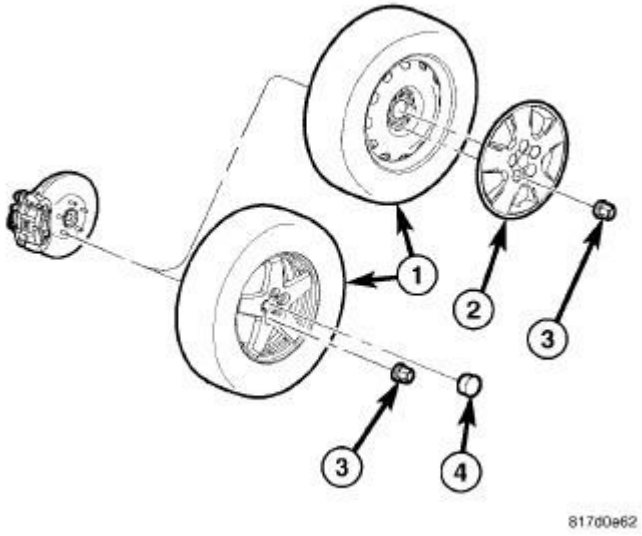


Fig. 11: Starter Cables
Courtesy of CHRYSLER LLC

3. Disconnect the battery cable from the starter.
4. Disconnect the solenoid connector from the starter.

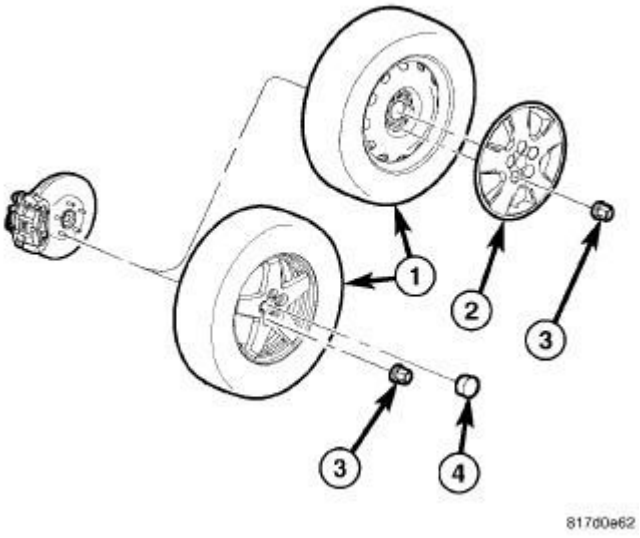


Fig. 12: Ground Cable Location
Courtesy of CHRYSLER LLC

5. Remove the upper mounting bolt and the ground cable.

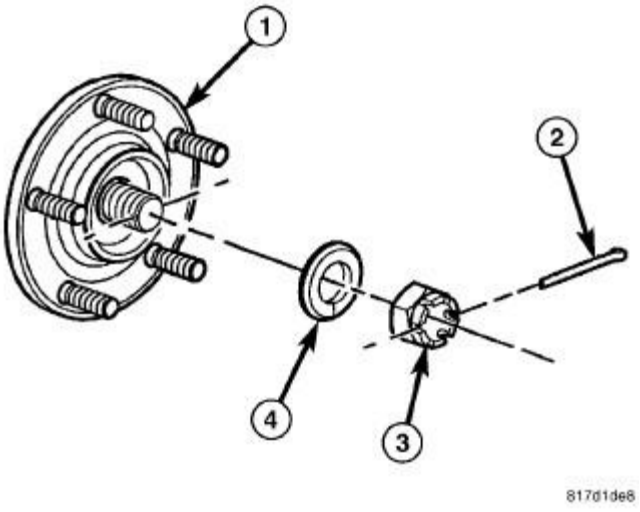


Fig. 13: Mounting Bolt Location
Courtesy of CHRYSLER LLC

6. Remove the two lower mounting bolts.
7. Remove the starter.

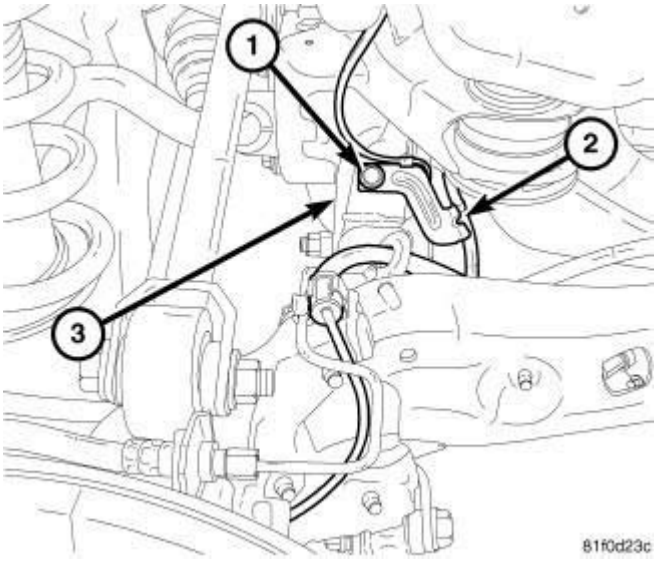


Fig. 14: Removing & Installing Starter Motor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove throttle body. Refer to **Fuel System/Fuel Injection/THROTTLE BODY - Removal** .
3. Remove starter mounting bolts (1) and negative battery cable (2) from transmission housing (3).
4. Remove starter motor (4) from transmission housing (3).

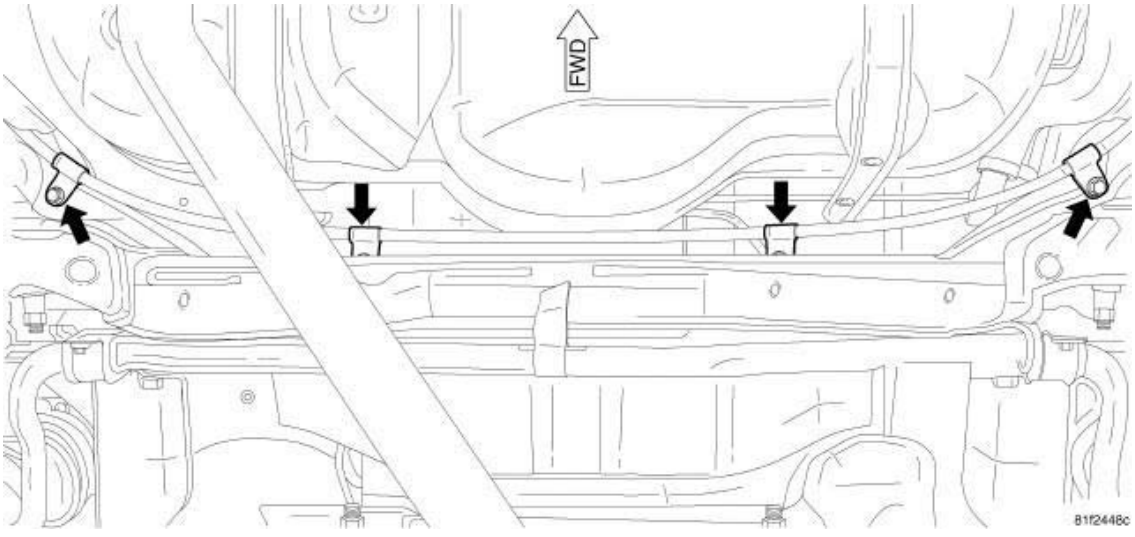


Fig. 15: Rotate Starter
Courtesy of CHRYSLER LLC

5. Position starter to move past the intake manifold.

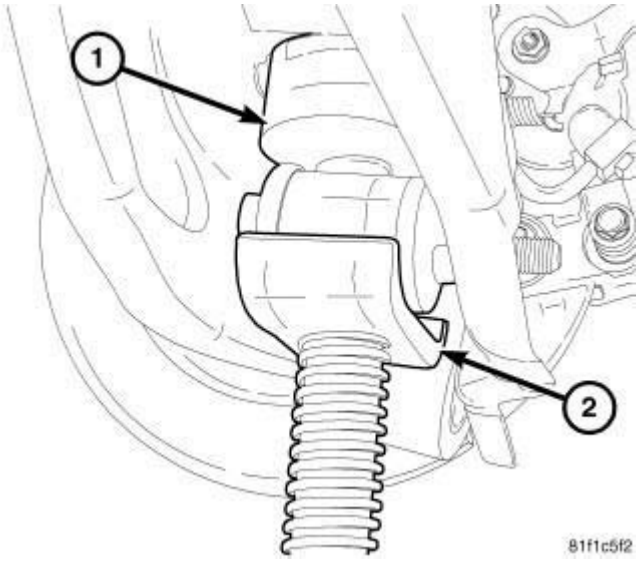


Fig. 16: Removing & Installing 2.4L Electrical Connection
Courtesy of CHRYSLER LLC

6. Remove battery cable nut (5), ignition sense wire (4) and battery cable (1) from solenoid stud.
7. Disconnect electrical connector (3) from starter solenoid (2).
8. Remove starter from vehicle.

2.7L

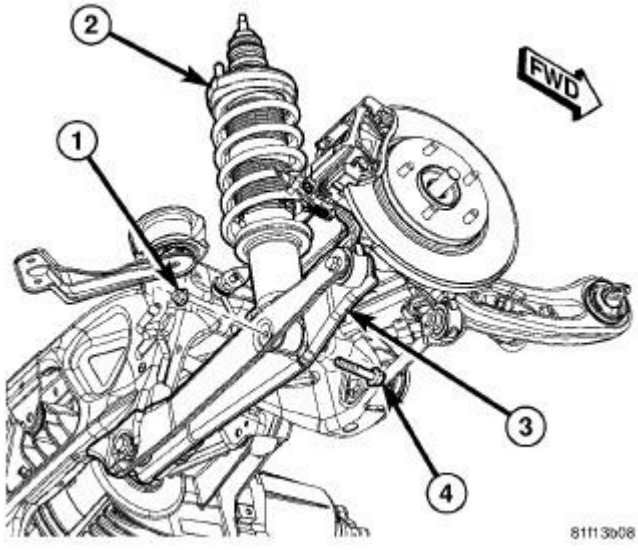


Fig. 17: Front Mount Through Bolt
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Remove the front mount through bolt (1).

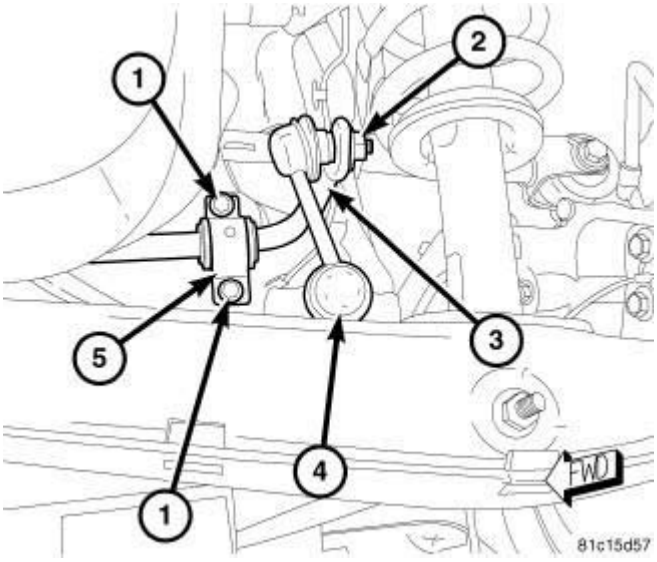


Fig. 18: Engine Mount Bolt & Cross Member Bolts
Courtesy of CHRYSLER LLC

3. Remove lower engine anti-roll mount bolt (2)
4. Remove crossmember mounting bolts (1).

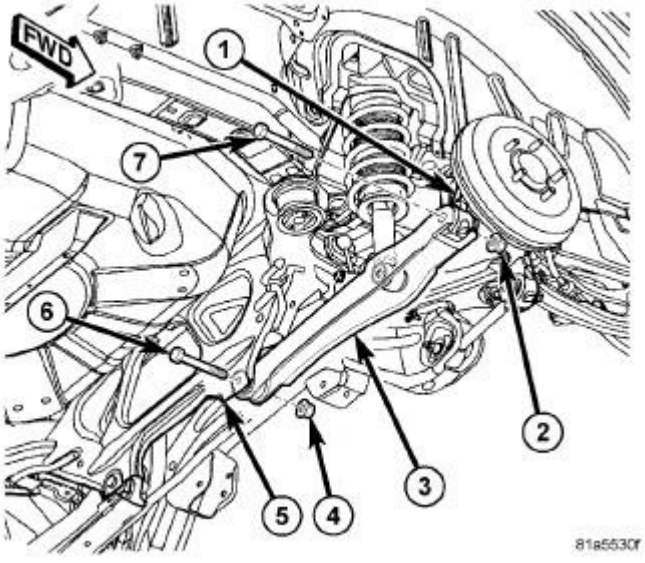


Fig. 19: Crossmember Mounting Bolts
Courtesy of CHRYSLER LLC

5. Remove crossmember mounting bolts (1).
6. Remove crossmember from vehicle.

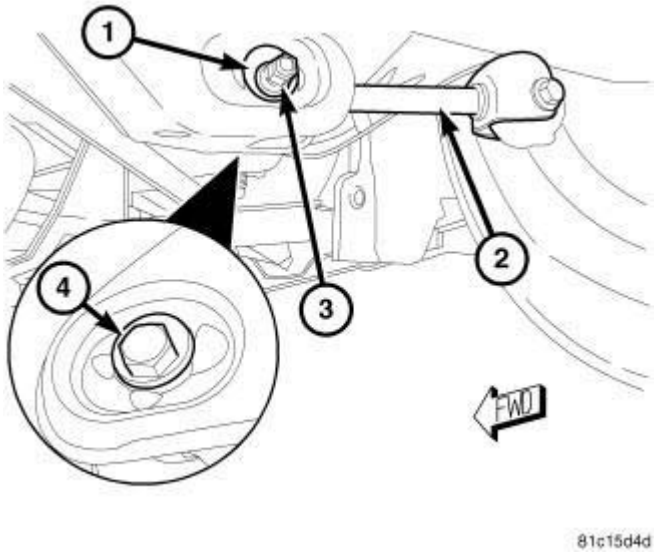


Fig. 20: 2.7L Torque Reaction Bracket
Courtesy of CHRYSLER LLC

7. Remove torque reaction bracket transmission to starter bolt (1).
8. Remove negative battery cable (2).
9. Remove torque reaction bracket to transmission bolt (4).
10. Remove torque reaction bracket to engine bolt (5).
11. Remove torque reaction bracket (3) from vehicle.

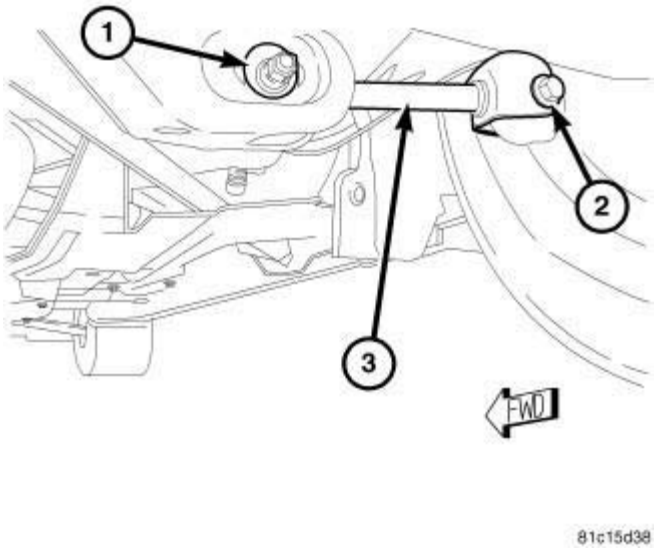


Fig. 21: Removing & Installing 2.7L Electrical Connector
Courtesy of CHRYSLER LLC

12. Remove battery cable nut (1), ignition sense wire (2) and battery cable (3) from solenoid stud.
13. Disconnect electrical connector (4) from starter solenoid.

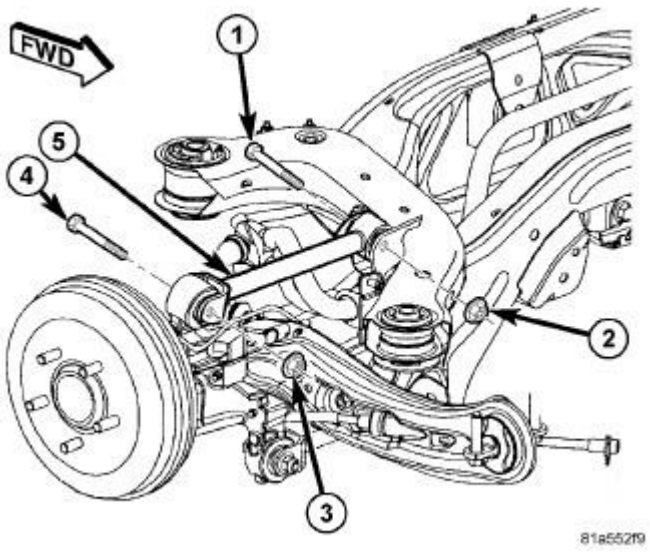


Fig. 22: Removing & Installing 2.7L Starter Motor
Courtesy of CHRYSLER LLC

14. Remove starter mounting bolts (1) from transmission housing (2).
15. Remove starter motor (4) and dust shield (3) from transmission housing (2).
16. Remove starter motor (4) from vehicle.

3.5L

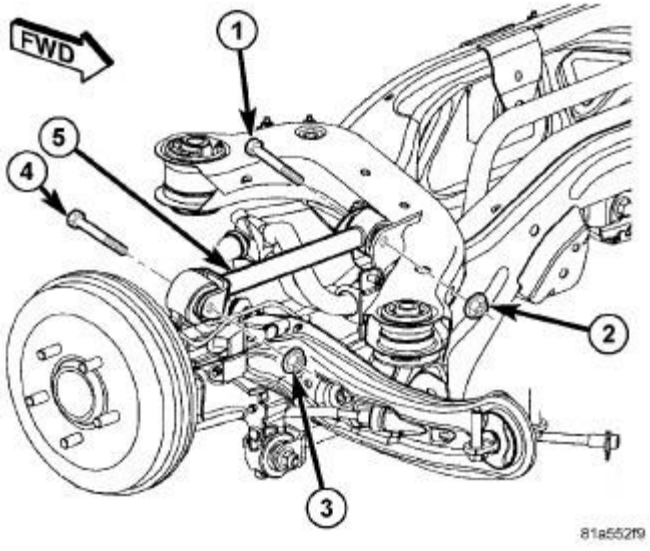


Fig. 23: Position Heat Shield
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.

2. Remove heat shield nuts (1), (3) and position heat shield (2) aside.

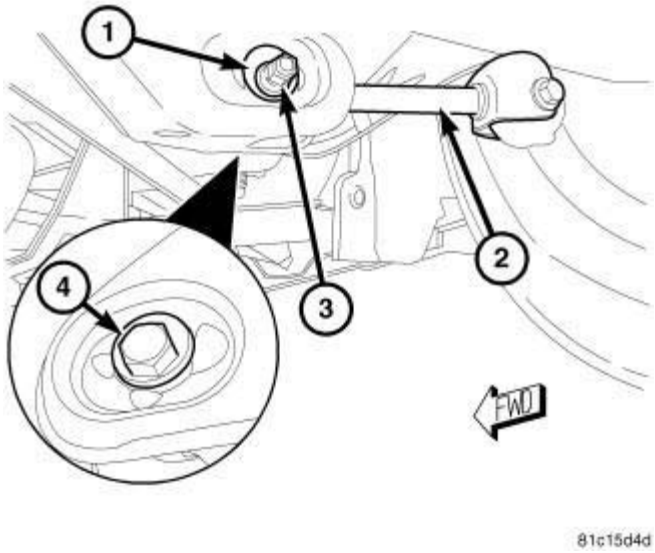


Fig. 24: Crossmember Through Bolt
Courtesy of CHRYSLER LLC

3. Remove belly pan, if equipped.
4. Remove front mount through bolt (1) from transmission bracket (2) and mount (3).

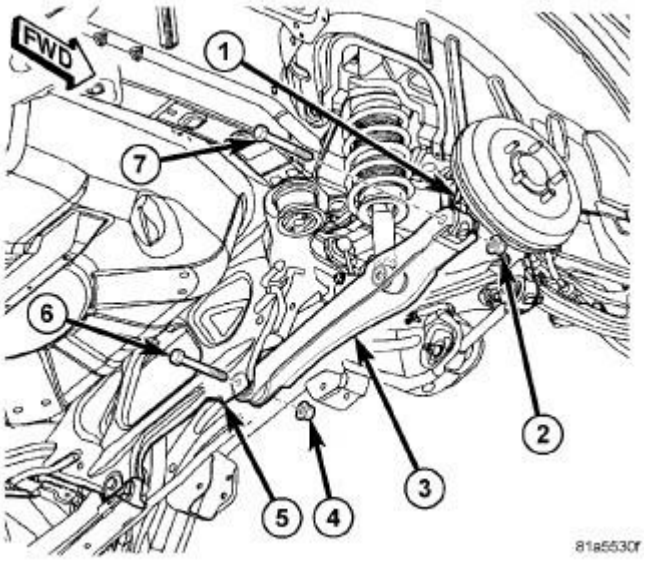


Fig. 25: Crossmember Mounting Bolts
Courtesy of CHRYSLER LLC

5. Remove rear bolts (1) from transmission crossmember.

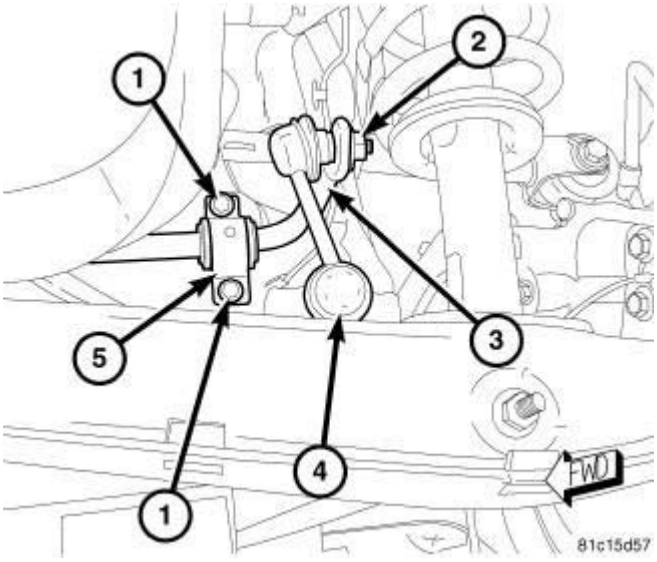


Fig. 26: Transmission Crossmember Bolts
Courtesy of CHRYSLER LLC

6. Remove front bolts (1) from transmission crossmember.
7. Remove transmission crossmember.

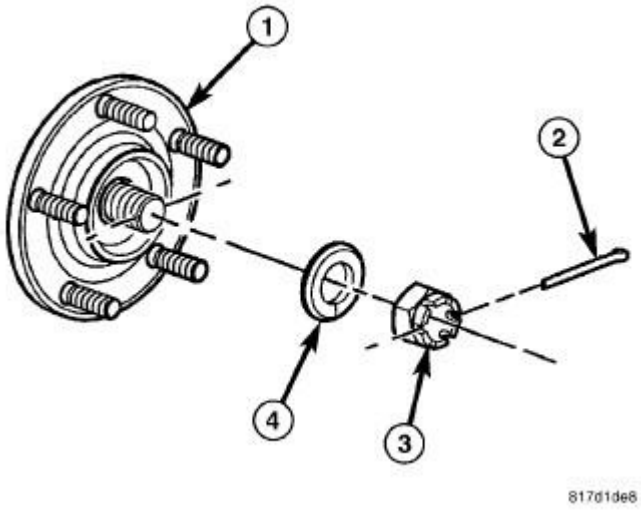


Fig. 27: Heat Shield
Courtesy of CHRYSLER LLC

8. Remove heat shield bolts (1) and remove heat shield (3).
9. Remove oxygen sensor (2) and position aside.

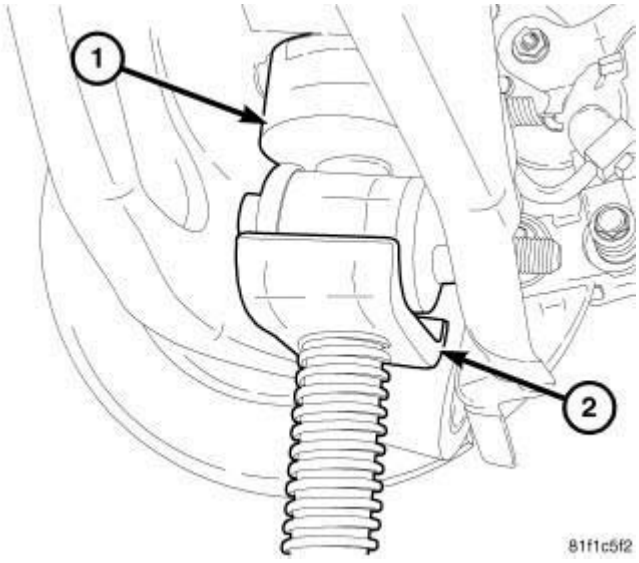


Fig. 28: Transmission Mount 1
Courtesy of CHRYSLER LLC

10. Remove bolt (2) from transmission bracket (1).

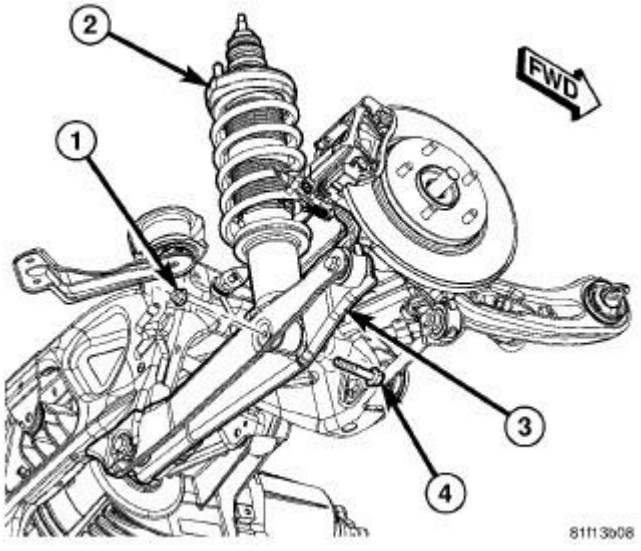


Fig. 29: Transmission Mount 2
Courtesy of CHRYSLER LLC

11. Remove bolts (1), (3) and transmission bracket (2) from transmission housing.

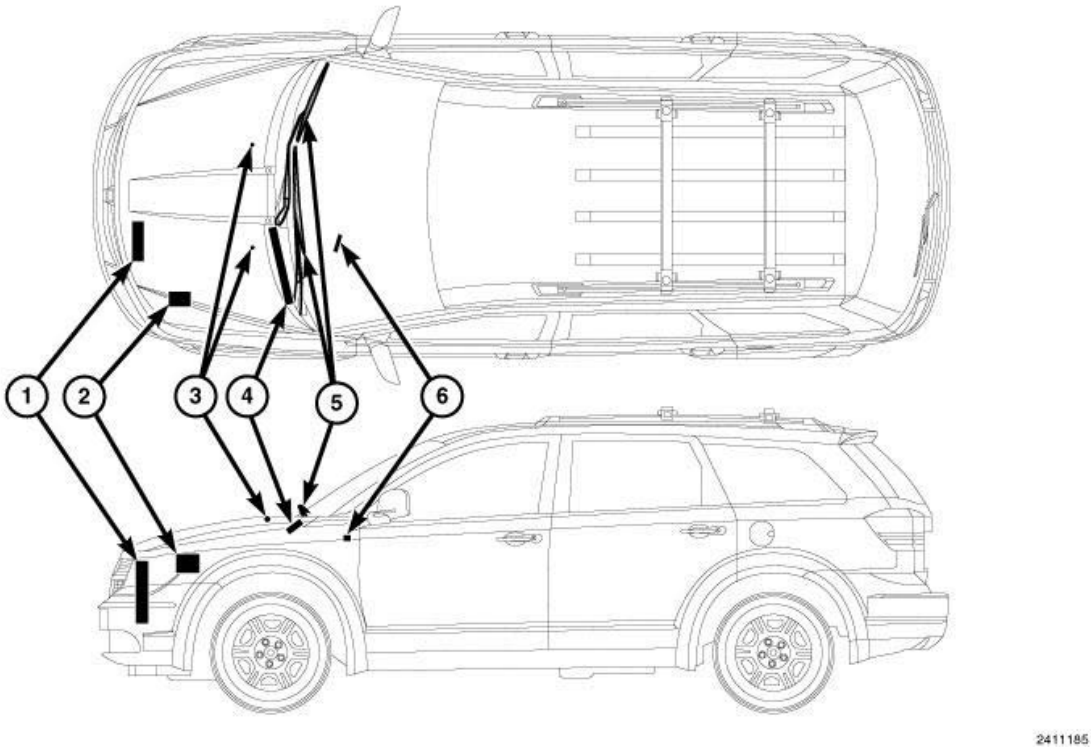


Fig. 30: 3.5L Starter Electrical Connections
Courtesy of CHRYSLER LLC

12. Remove battery cable nut (1), ignition wire (2) and battery cable (3) from starter solenoid stud.
13. Disconnect electrical connector (4) from starter solenoid.

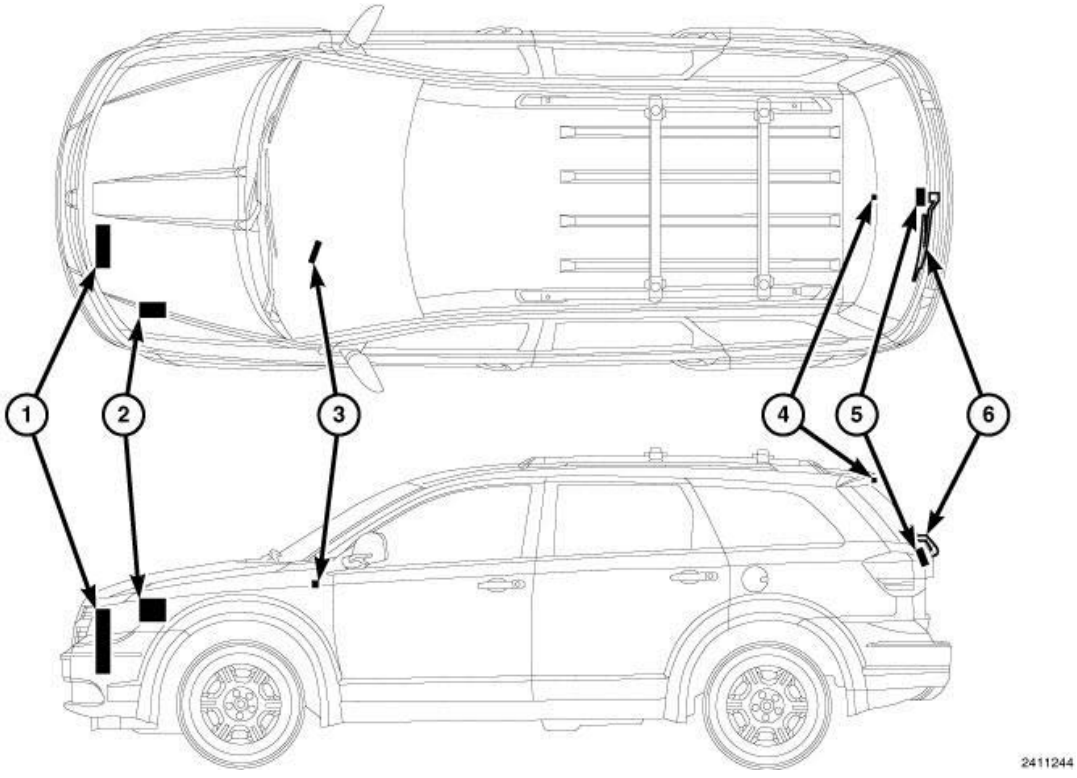


Fig. 31: 3.5L Starter Removal
Courtesy of CHRYSLER LLC

14. Remove starter mounting bolts (2) and ground wire (1) and remove the starter (4) from the transmission housing (3).

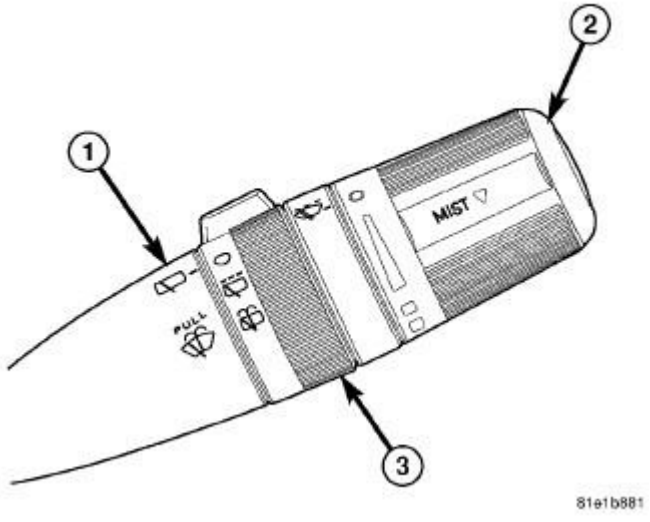


Fig. 32: 3.5L Starter Shield
Courtesy of CHRYSLER LLC

15. Remove starter motor dust shield (2) from starter (1).

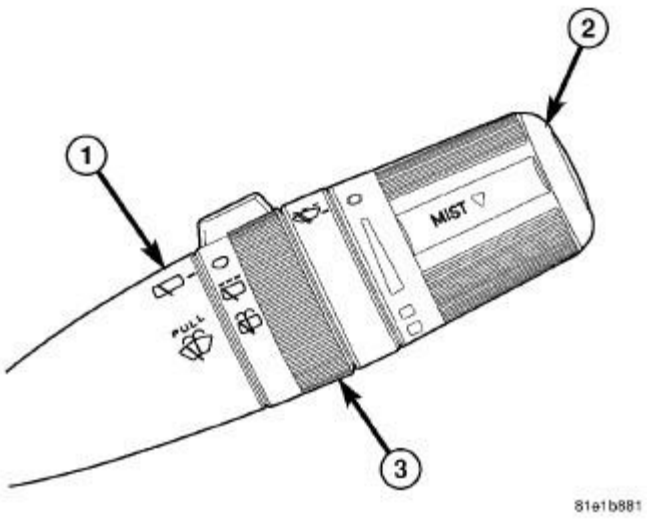


Fig. 33: Flywheel Inspection
Courtesy of CHRYSLER LLC

NOTE: If the flywheel is damaged refer to the appropriate transmission service information for flywheel replacement.

16. Rotate and fully inspect flywheel gears (1) and wields (2) for damage.

INSTALLATION

2.0L TURBO DIESEL

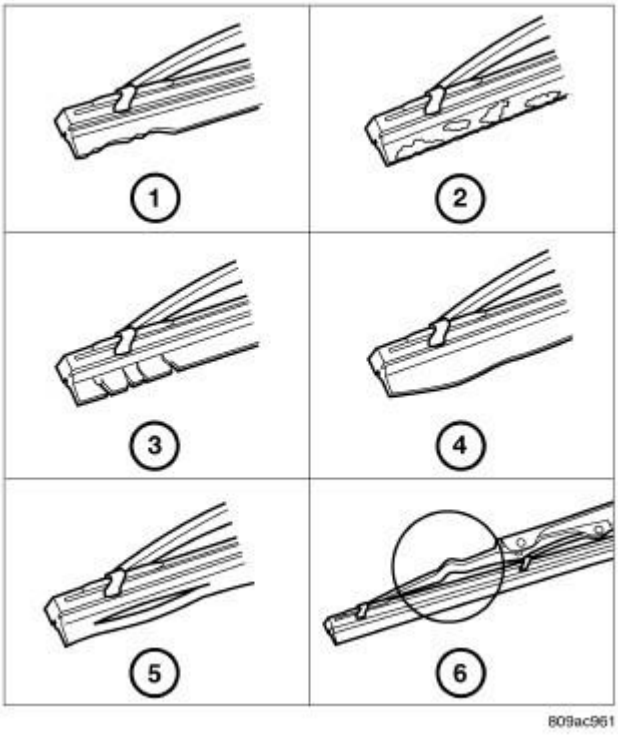


Fig. 34: Mounting Bolt Location
Courtesy of CHRYSLER LLC

1. Install the starter.
2. Install the two lower starter mounting bolts.

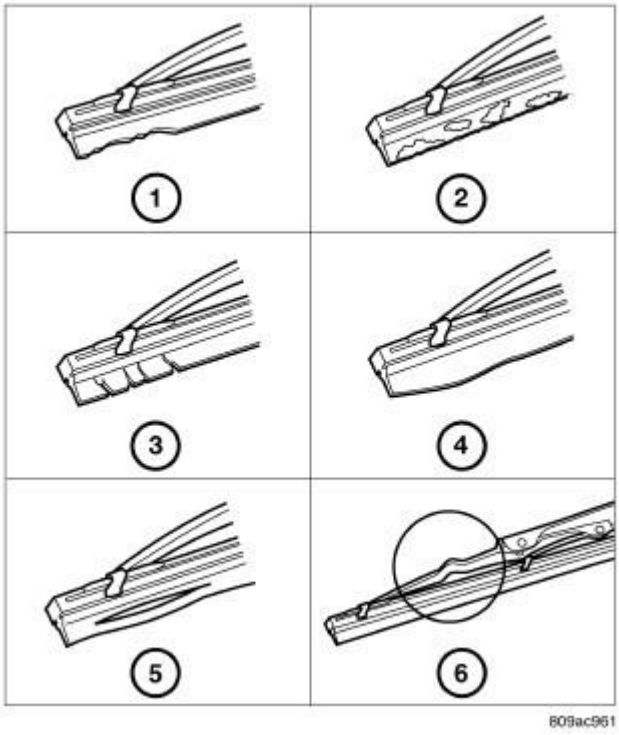


Fig. 35: Ground Cable Location
Courtesy of CHRYSLER LLC

3. Install the upper starter mounting bolt and the ground cable.
4. Tighten the bolts to 54 N.m (40 ft. lbs.).

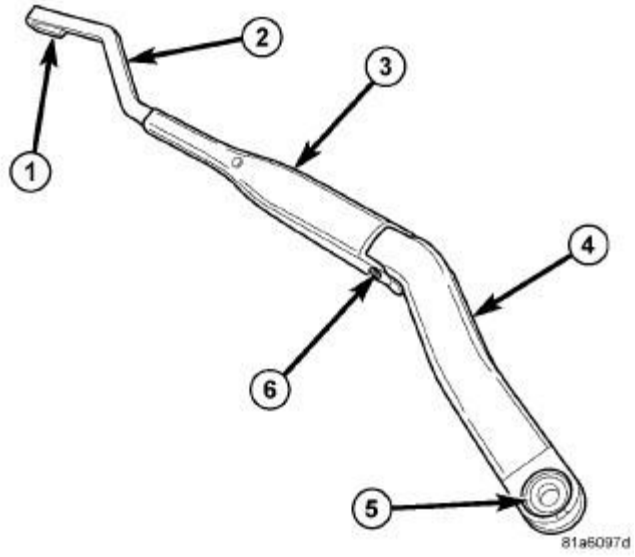


Fig. 36: Starter Cables

Courtesy of CHRYSLER LLC

5. Connect the battery cable to the starter.
6. Connect the solenoid connector to the starter.
7. Install the air box. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .
8. Connect the negative battery cable.

2.4L

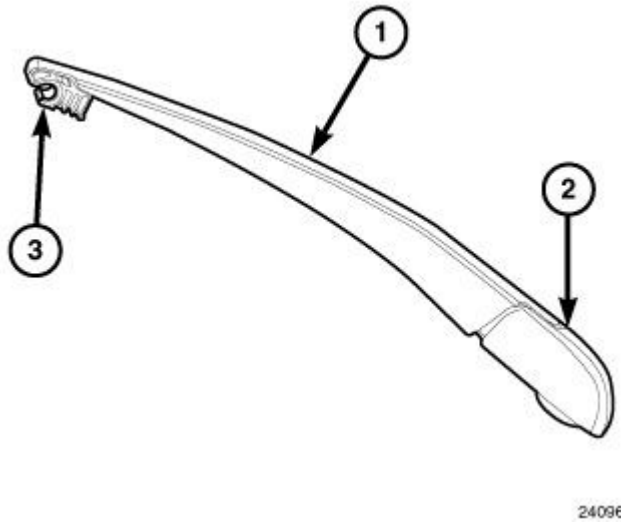


Fig. 37: Removing & Installing 2.4L Electrical Connection
Courtesy of CHRYSLER LLC

1. Install starter to vehicle.
2. Connect electrical connector (3) to starter solenoid (2).
3. Install battery cable (1), ignition sense wire (4) and battery cable nut (5) to solenoid stud. Tighten nut to 10 N.m (90 in. lbs.).

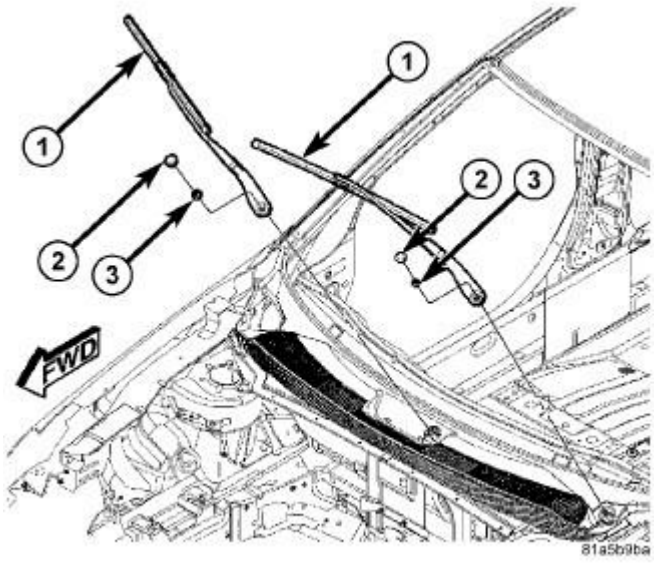


Fig. 38: Rotate Starter
Courtesy of CHRYSLER LLC

4. Position starter motor past the intake manifold.

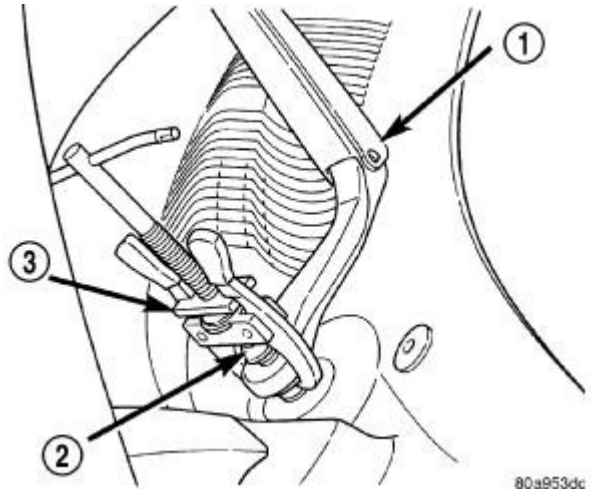


Fig. 39: Removing & Installing Starter Motor
Courtesy of CHRYSLER LLC

5. Install starter motor (4) to transmission housing (3).
6. Install negative battery cable (2) and starter mounting bolts (1) to transmission housing (3). Tighten bolts to 54 N.m (40 ft. lbs.).
7. Install throttle body. Refer to **Fuel System/Fuel Injection/THROTTLE BODY - Installation** .
8. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

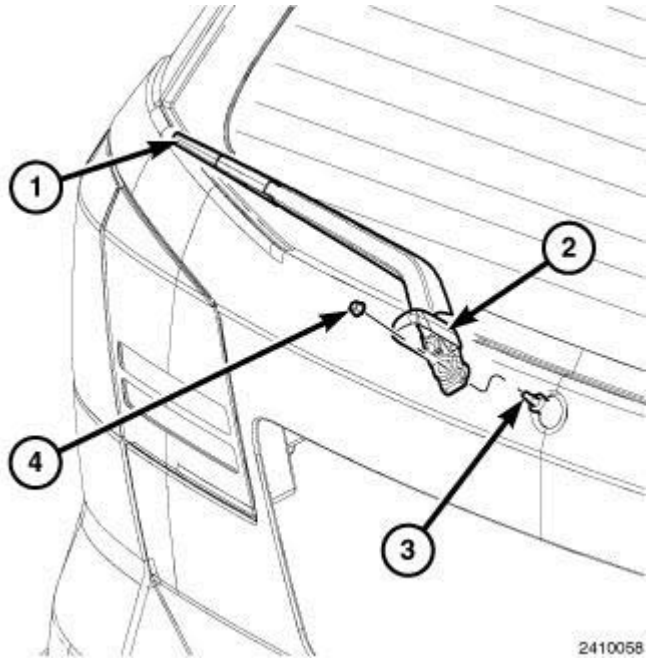


Fig. 40: Removing & Installing 2.7L Starter Motor
Courtesy of CHRYSLER LLC

1. Install starter motor (4) and dust shield (3) to transmission housing (2).
2. Install starter mounting bolts (1) to transmission housing (2). Tighten bolts to 54 N.m (40 ft. lbs.).

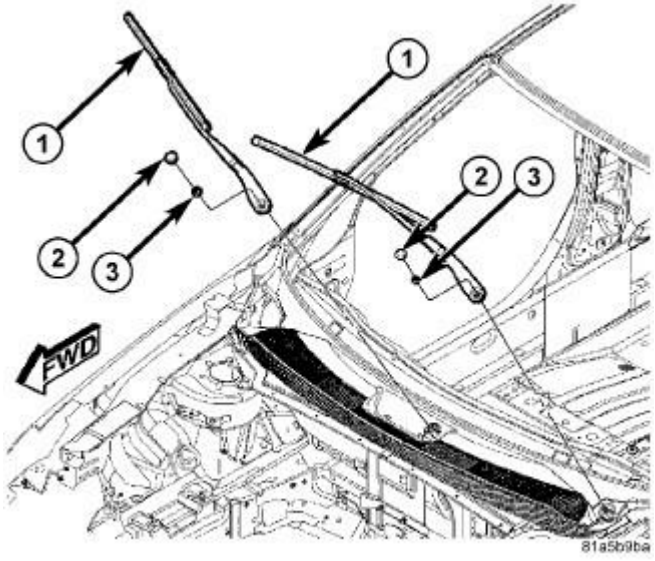


Fig. 41: Removing & Installing 2.7L Electrical Connector
Courtesy of CHRYSLER LLC

3. Install battery cable (3), ignition sense wire (2) and battery cable nut (1) to solenoid stud. Tighten nut to 10 N.m (90 in. lbs.).

4. Connect electrical connector (4) to starter solenoid.

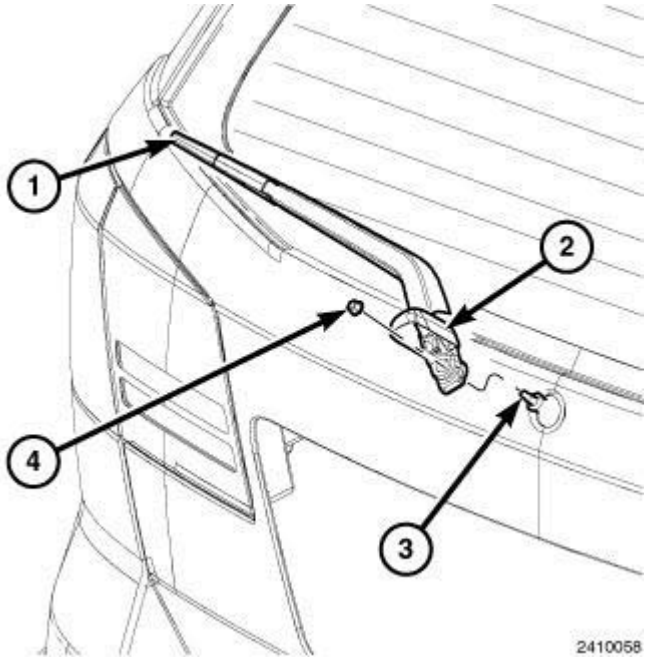


Fig. 42: 2.7L Torque Reaction Bracket
Courtesy of CHRYSLER LLC

5. Install torque reaction bracket (3) to vehicle.
6. Install torque reaction bracket to engine bolt (5). Hand tighten bolt.
7. Install torque reaction bracket to transmission bolt (4). Hand tighten bolt.
8. Install negative battery cable (2).
9. Install torque reaction bracket transmission to starter bolt (1). Hand tighten bolt.

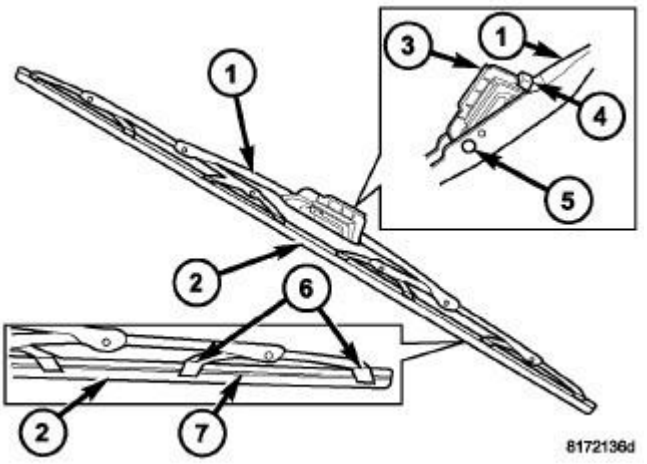


Fig. 43: 2.7L Mandatory Torque Sequence
Courtesy of CHRYSLER LLC

CAUTION: The torque reaction bracket bolts need to be tightened using a mandatory torque sequence. Failure to tighten bolts using the mandatory torque sequence provided may result in damage to the fasteners, bracket, and threaded bolts holes for the engine and transmission.

10. Tighten bolts in a mandatory torque sequence to 54 N.m (40 ft. lbs.).

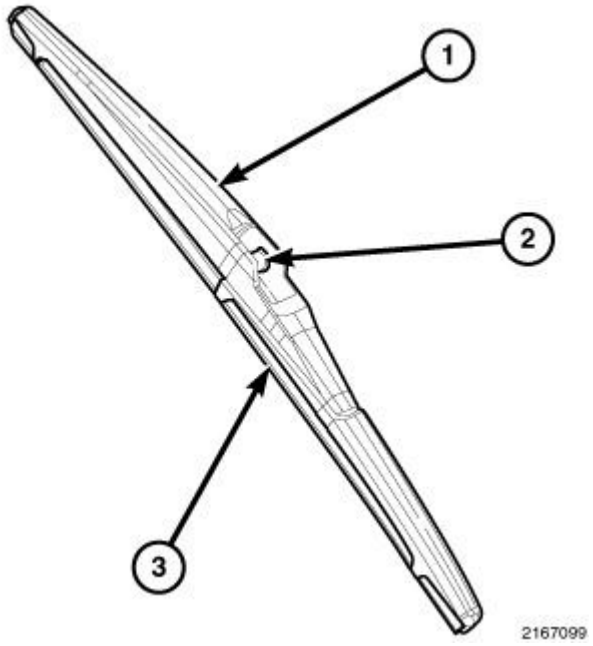


Fig. 44: Crossmember Mounting Bolts
Courtesy of CHRYSLER LLC

11. Install crossmember to vehicle. Tighten bolts (1) to 50 N.m (37 ft. lbs.).

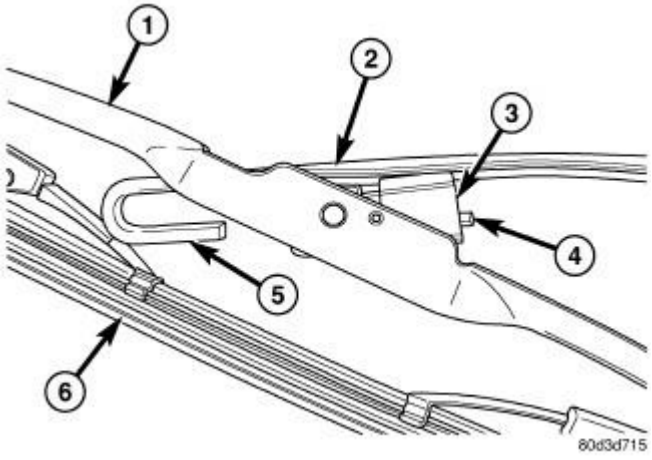


Fig. 45: Engine Mount Bolt & Cross Member Bolts

Courtesy of CHRYSLER LLC

12. Install lower engine anti-roll mount bolt (2) and tighten bolt to 47 N.m (35 ft. lbs.).
13. Install crossmember bolts (1) and tighten bolts to 55 N.m (40.5 ft. lbs.).

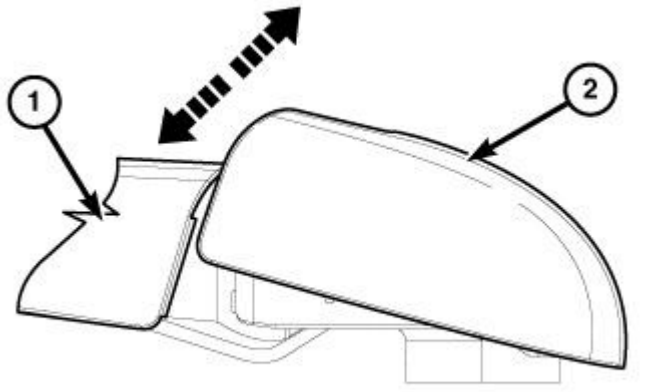


Fig. 46: Front Mount Through Bolt
Courtesy of CHRYSLER LLC

14. Install mount through bolt (1) and tighten to 47 N.m (35 ft. lbs.).
15. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

3.5L

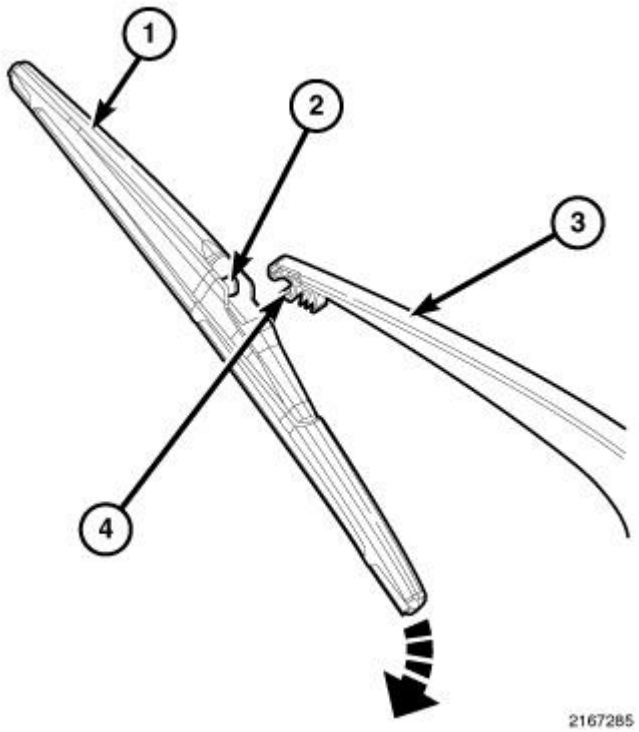


Fig. 47: 3.5L Starter Shield
Courtesy of CHRYSLER LLC

1. Install starter motor dust shield (2) to starter (1).

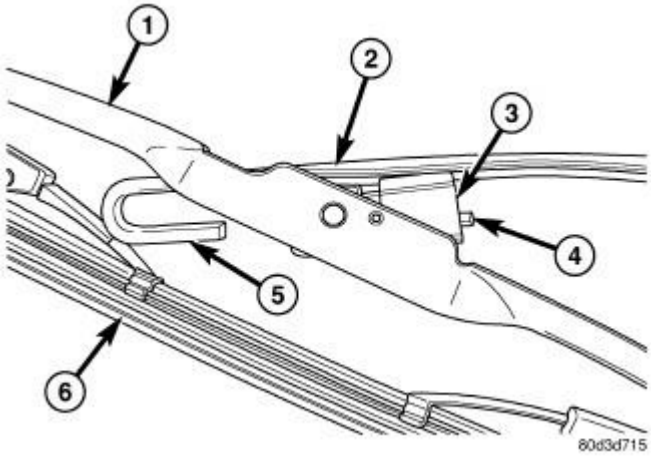


Fig. 48: 3.5L Starter Removal
Courtesy of CHRYSLER LLC

2. Position starter (4) into transmission housing (3), install ground wire (1) and starter mounting bolts (2). Tighten bolts to 54 N.m (40 ft. lbs.).

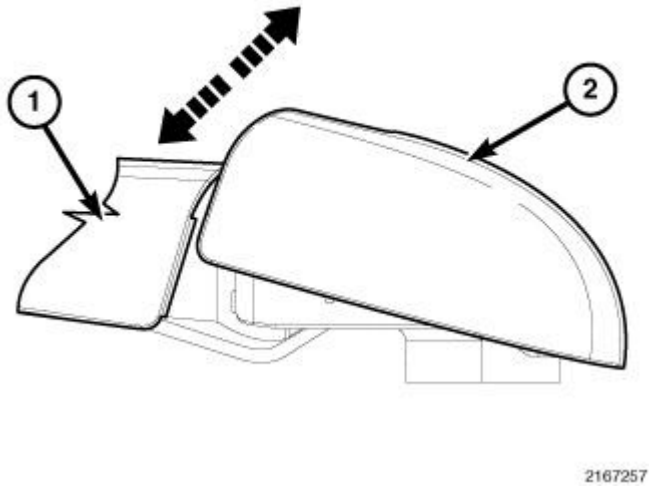


Fig. 49: 3.5L Starter Electrical Connections
Courtesy of CHRYSLER LLC

3. Install battery cable (3), ignition wire (2) and battery cable nut (1) to starter solenoid stud. Tighten nut to 10 N.m (90 in. lbs.).
4. Connect electrical connector (4) to starter solenoid.

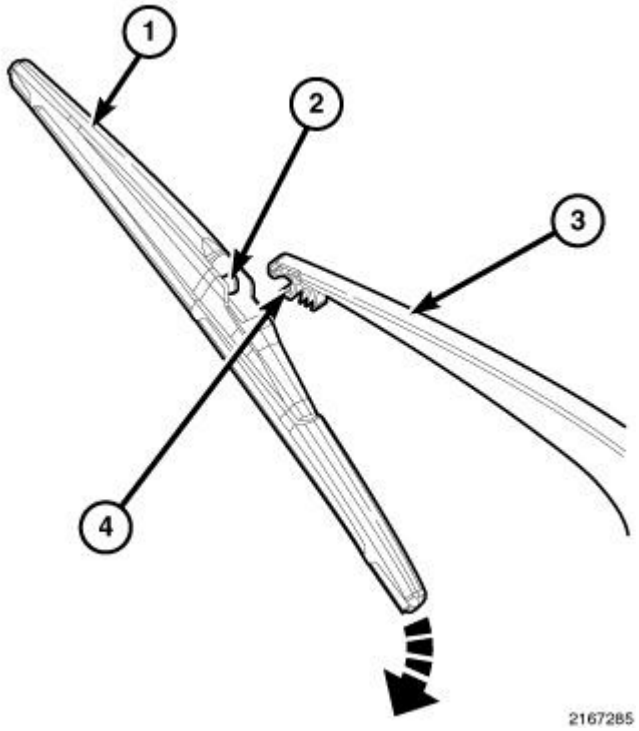


Fig. 50: Transmission Mount 2
Courtesy of CHRYSLER LLC

5. Install transmission bracket (2) and bolts (1), (3) to transmission housing. Hand tighten bolts.

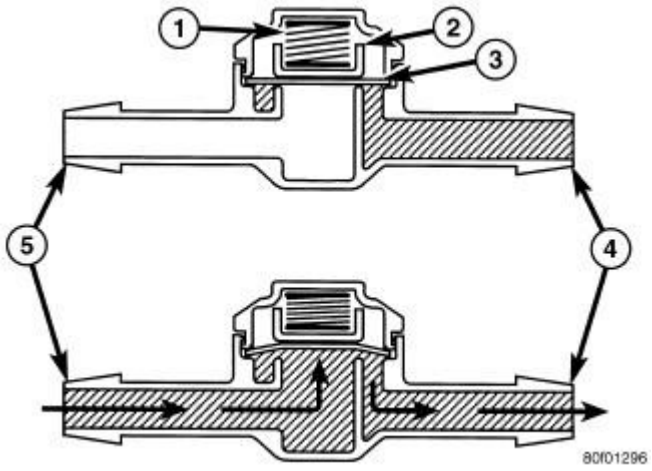


Fig. 51: Transmission Mount 1
Courtesy of CHRYSLER LLC

6. Install bolt (2) to transmission bracket (1). Hand tighten bolt.

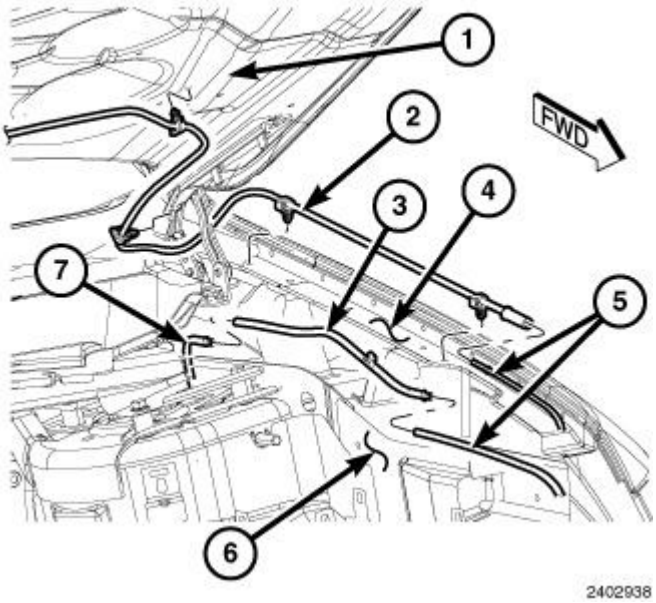


Fig. 52: 3.5L TBR Mandatory Torque Sequence
Courtesy of CHRYSLER LLC

CAUTION: The torque reaction bracket bolts need to be tightened using a mandatory torque sequence. Failure to tighten bolts using the mandatory torque sequence provided may result in damage to the fasteners, bracket, and threaded bolts holes for the engine and

transmission.

7. Tighten bolts in a mandatory torque sequence to 50 N.m (37 ft. lbs.).

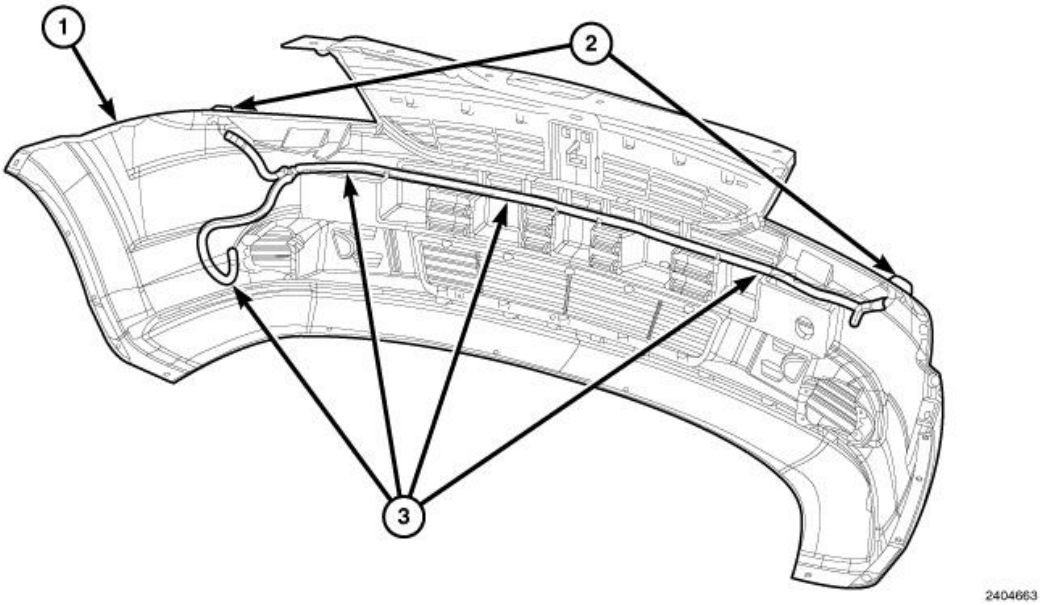


Fig. 53: Heat Shield
Courtesy of CHRYSLER LLC

8. Install oxygen sensor (2) and tighten to 41 N.m (30 ft. lbs).
9. Install heat shield (3) and bolts (1). Tighten bolts to 12 N.m (106 in. lbs).

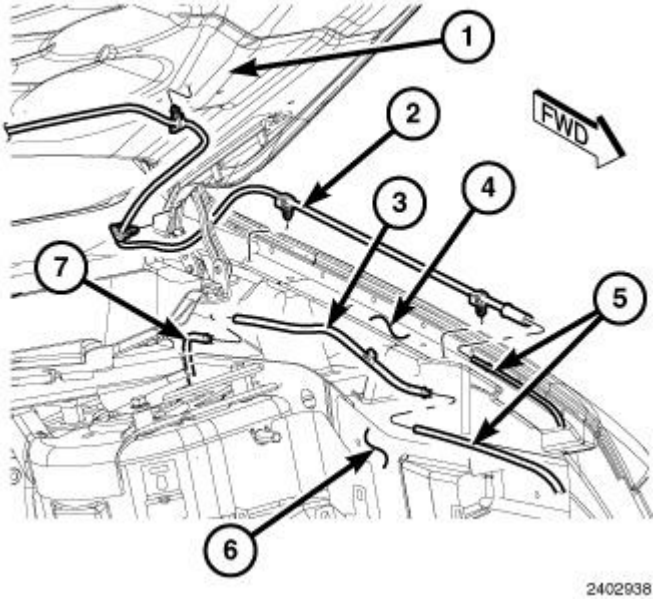


Fig. 54: Transmission Crossmember Bolts

Courtesy of CHRYSLER LLC

10. Install bolts (1) to transmission crossmember. Tighten bolts to 55 N.m (40.5 ft. lbs.).

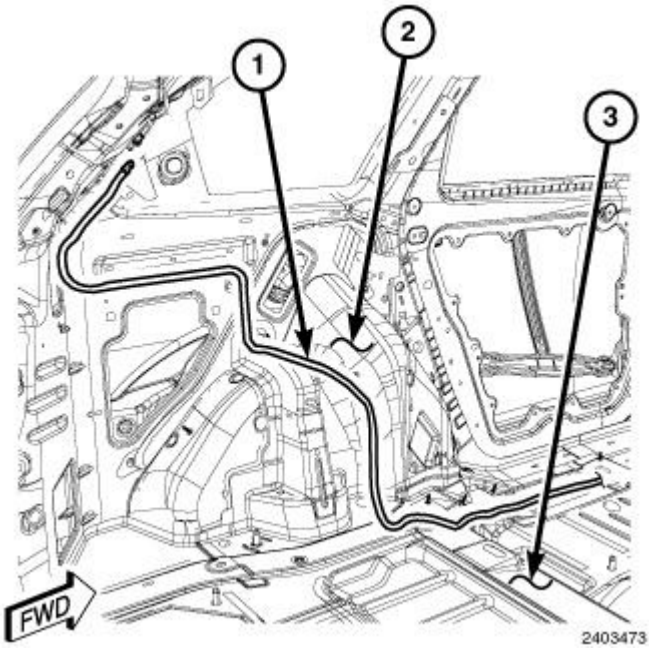


Fig. 55: Crossmember Mounting Bolts
Courtesy of CHRYSLER LLC

11. Install bolts (1) to transmission crossmember. Tighten bolts to 50 N.m (37 ft. lbs.).

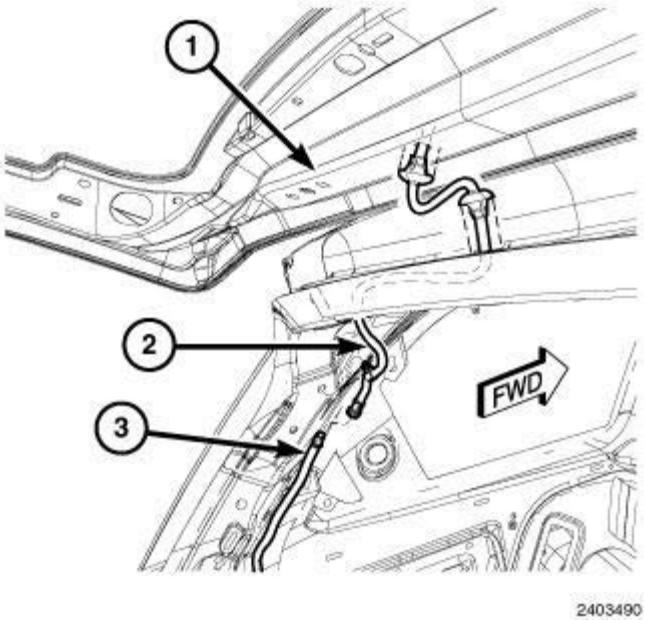


Fig. 56: Crossmember Through Bolt

Courtesy of CHRYSLER LLC

12. Install front mount through bolt (1) to transmission bracket (2) and mount (3). Tighten bolt to 47 N.m (35 ft. lbs.).
13. If equipped, install belly pan.

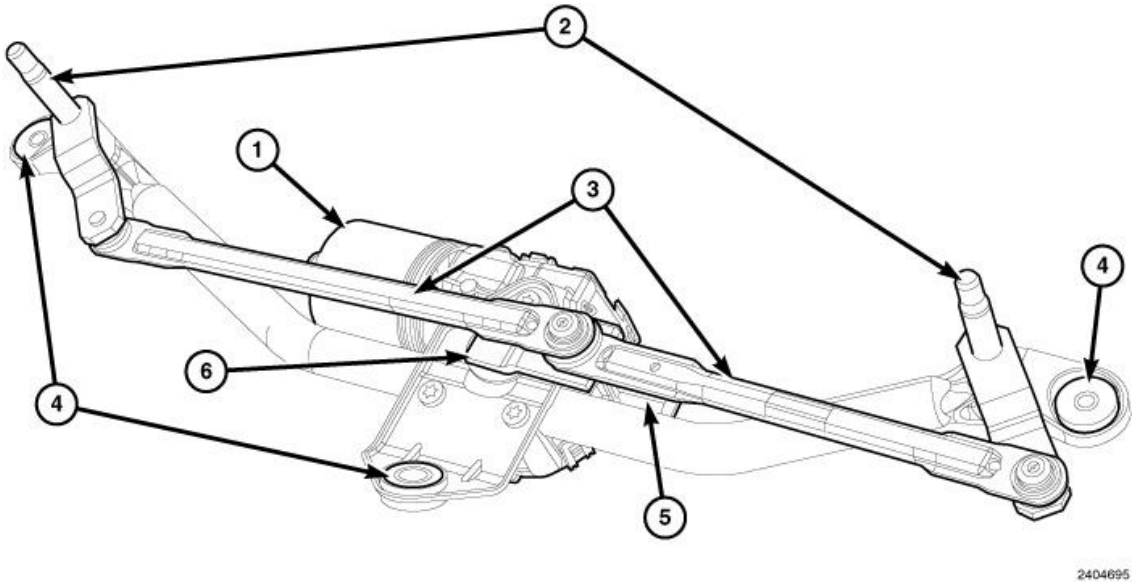


Fig. 57: Position Heat Shield
Courtesy of CHRYSLER LLC

NOTE: Make sure the lower heat shield is installed to the lower stud before the upper heat shield is install. The upper heat shield stacks on top of the lower heat shield, and both shields are held together by the lower nut.

14. Position heat shield (2) over the studs and install heat shield nuts (1), (3). Tighten nuts to 12 N.m (106 in. lbs).
15. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2009 ACCESSORIES AND EQUIPMENT

Speed Control - Service Information - Journey

SWITCH, SPEED CONTROL

REMOVAL

REMOVAL

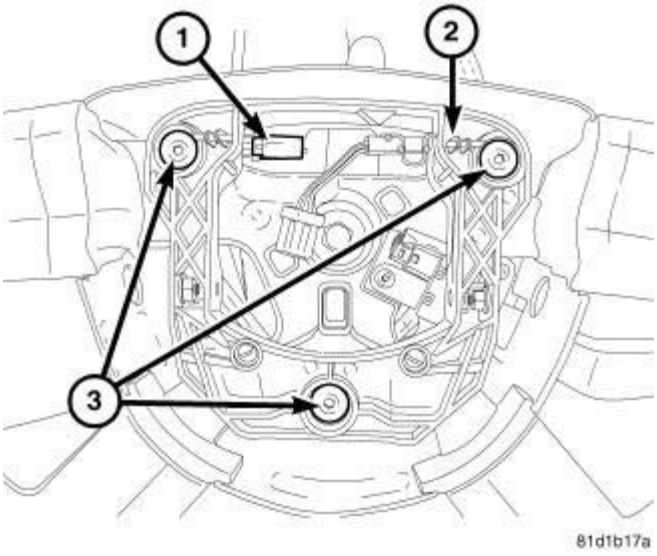


Fig. 1: Removing/Installing Horn Switch
Courtesy of CHRYSLER LLC

WARNING: Disconnect and isolate the battery negative (ground) cable before beginning steering wheel removal or installation. Allow the front airbag system capacitor to discharge for two minutes before removing the steering wheel or any front airbag system component. This will disable the front airbag system. Failure to disconnect the battery could result in accidental front airbag module deployment and possible personal injury. Do not place a non-deployed airbag face down on a hard surface as the airbag will propel into the air if accidentally deployed, and could result in serious or fatal injury.

1. Disconnect and isolate the negative battery cable before beginning steering wheel removal. Allow the front airbag system capacitor to discharge for two minutes before removing the steering wheel or any front airbag system component.
2. Turn off ignition.
3. Remove the driver's side airbag. Refer to **Restraints/AIR BAG, Driver - Removal** .
4. Disconnect electrical connector (1) from horn switch (2).
5. Remove mounting screws (3) and horn switch (2) from steering wheel.

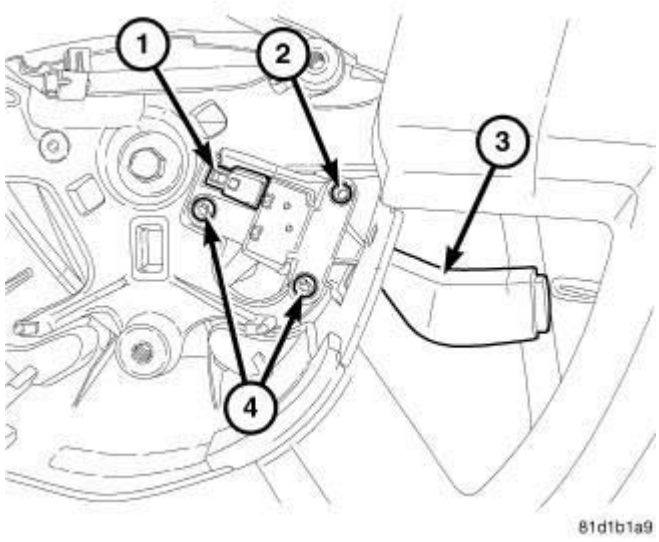


Fig. 2: Identifying Speed Control Switch Screws & Electrical Connector
Courtesy of CHRYSLER LLC

6. Disconnect electrical connector (1) from speed control switch (3).
7. Remove screws (4) from speed control switch (3).
8. Remove speed control switch (3) from steering wheel.

INSTALLATION

INSTALLATION

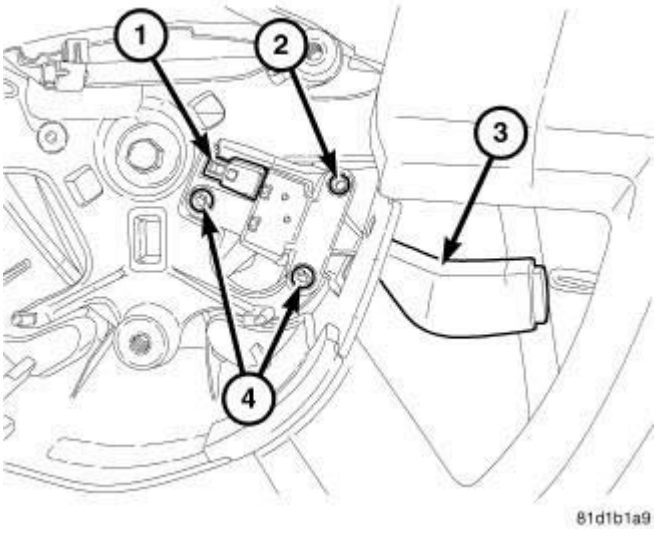


Fig. 3: Identifying Speed Control Switch Screws & Electrical Connector
Courtesy of CHRYSLER LLC

1. Install speed control switch (3) onto the locating pin (2) in the steering wheel.

2. Install speed control switch mounting screws (4) and tighten screws to 1.6 N.m (15 ins. lbs.).
3. Connect electrical connector (1) to speed control switch (3).

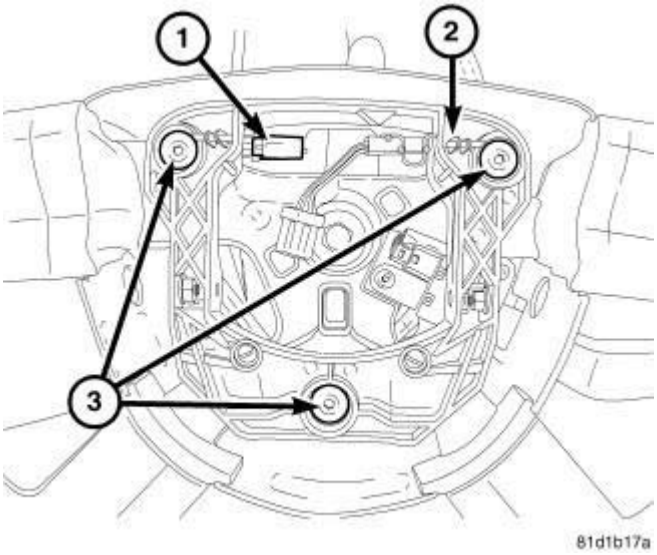


Fig. 4: Removing/Installing Horn Switch
Courtesy of CHRYSLER LLC

4. Install horn switch (2) to steering wheel.
5. Install horn switch mounting screws (3) and tighten screws to 8 N.m (71 ins. lbs.).
6. Connect electrical connector to horn switch.
7. Install driver's side airbag. Refer to **Restraints/AIR BAG, Driver - Installation** .
8. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).
9. Verify vehicle and system operation.

2009 ENGINE PERFORMANCE

Driveability - Gas - Non-DTC Diagnostics - Journey

DIAGNOSIS AND TESTING

CHECKING A NO CRANK CONDITION - NGC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **NO CRANK CONDITION**

   NOTE: Diagnose and repair DTC B2229-SKREEM Internal - SKIM Immobilizer before continuing.

   NOTE: Diagnose and repair any Totally Integrated Power Module (TIPM) DTCs before continuing.

   NOTE: Make sure the gear selector is in Park or Neutral.

   NOTE: Insect all fuses for opens.

   NOTE: The battery must be fully charged and in good condition. An undercharged battery may produce invalid test results.

   1. Attempt to start the engine.

      Does the starter turn the engine over?

      Yes

      - Test complete.

      No

      - Refer to **Electrical/Starting - Diagnosis and Testing** and perform the appropriate procedure.

CHECKING A NO CRANK CONDITION - GPEC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
MECHANICAL CONDITION
BATTERY CIRCUIT RESISTANCE TOO HIGH
START ENABLE CIRCUITS
TRANSMISSION RANGE SENSOR
FUSED IGNITION SWITCH OUT (START)
CLUTCH INTERLOCK SWITCH SIGNAL CIRCUIT
CLUTCH INTERLOCK SWITCH GROUND CIRCUIT
CLUTCH INTERLOCK SWITCH
STARTER

Diagnostic Test

1. **MECHANICAL CONDITION**

NOTE: Diagnose and repair DTC B2229-SKREEM Internal - SKIM Immobilizer before continuing.

NOTE: Check and diagnose all the Totally Integrated Power Module (TIPM) DTC(s) before continuing.

NOTE: Ensure the Gear selector is in Park or Neutral.

NOTE: Insect all fuses for opens.

NOTE: Verify the battery is fully charged and capable of passing a load test before continuing.

WARNING: Make sure the battery is disconnected, then wait two minutes before proceeding. Failure to do so may result in possible serious or fatal injury.

1. Turn the engine over by hand to make sure the engine is not seized.

   Is the engine able to turn over?

   Yes

   - Go to step 2

   No

   - Repair the mechanical condition preventing the starter motor from cranking.

- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

2. **EXCESSIVE RESISTANCE IN THE BATTERY CIRCUIT**
   1. Connect the battery cables.
   2. Turn the ignition off.
   3. Check the Battery Cables for excessive resistance using the service information procedure.

      Did either Battery Cable have a voltage drop greater than 0.2 of a volt?

      Yes

      - Repair the excessive resistance in the Battery circuit.
      - Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 3

3. **MANUAL TRANSMISSION**

   Is this vehicle equipped with a Manual transmission?

   Yes

   - Go to step 8

   No

   - Go to step 4

4. **START ENABLE OPERATION (ATX)**
   1. Turn ignition on.
   2. Using a scan tool, monitor the Ignition Start Switch Sense.
   3. Turn the ignition switch to the crank position.

      Does the Ignition Start Switch Sense state change from Low to High?

      Yes

      - Ensure the battery connection is clean and fastened tightly to the Starter. If OK, replace the Starter in accordance with the Service Information.

      No

      - Go to step 5

5. **START ENABLE CIRCUIT (ATX)**

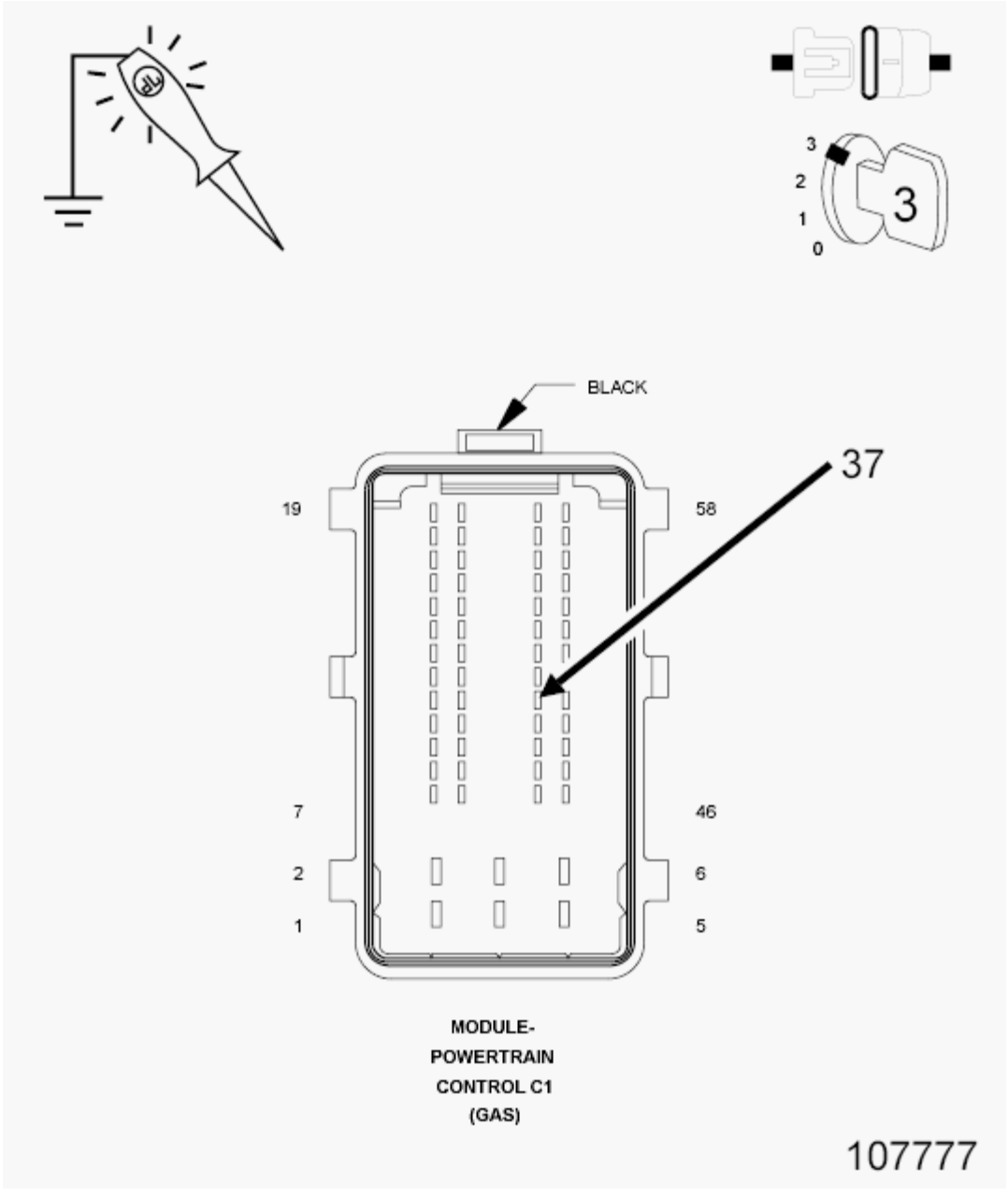


Fig. 1: Checking Start Enable Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to ground, probe the Start Enable circuit in the PCM harness connector while holding the ignition key in the start position.

   Does the test light illuminate brightly?

Yes

- Replace the PCM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 6

6. **TRANSMISSION RANGE SENSOR (ATX)**

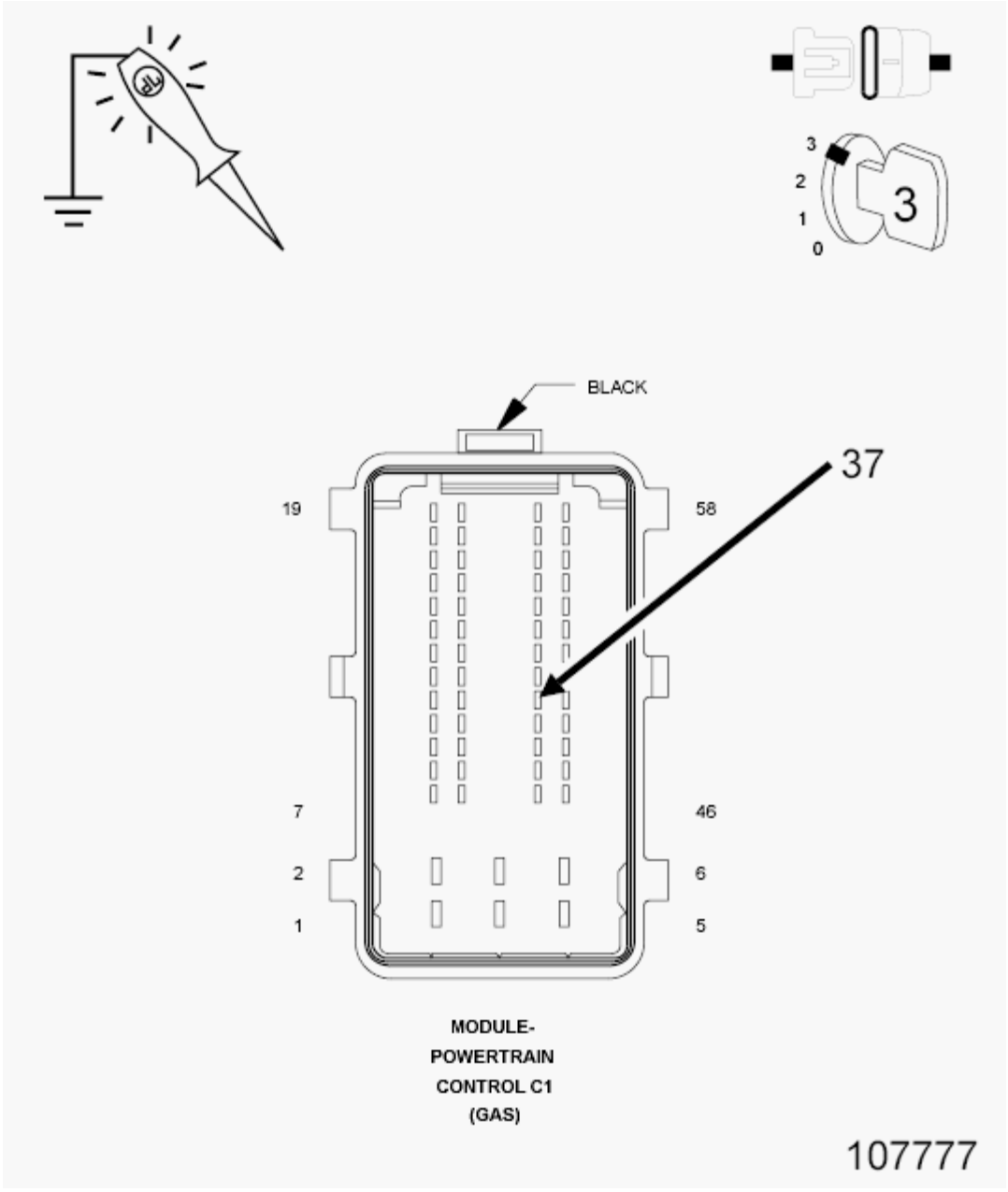


Fig. 2: Checking Start Enable Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Test light still in the above position.
3. Disconnect the Transmission Range Sensor harness connector.
4. Using a jumper wire, connect one end to the Start Enable circuit and the other to the Fused Ignition Switch Output (Start) circuit in the Transmission Range Sensor harness connector.
5. Turn the ignition to the crank position.

   Does the test light illuminate brightly?

   Yes

   - Replace Transmission Range Sensor harness.
   - Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   No

   - Go to step 7

7. **FUSED IGNITION SWITCH OUTPUT (START) CIRCUIT (ATX)**

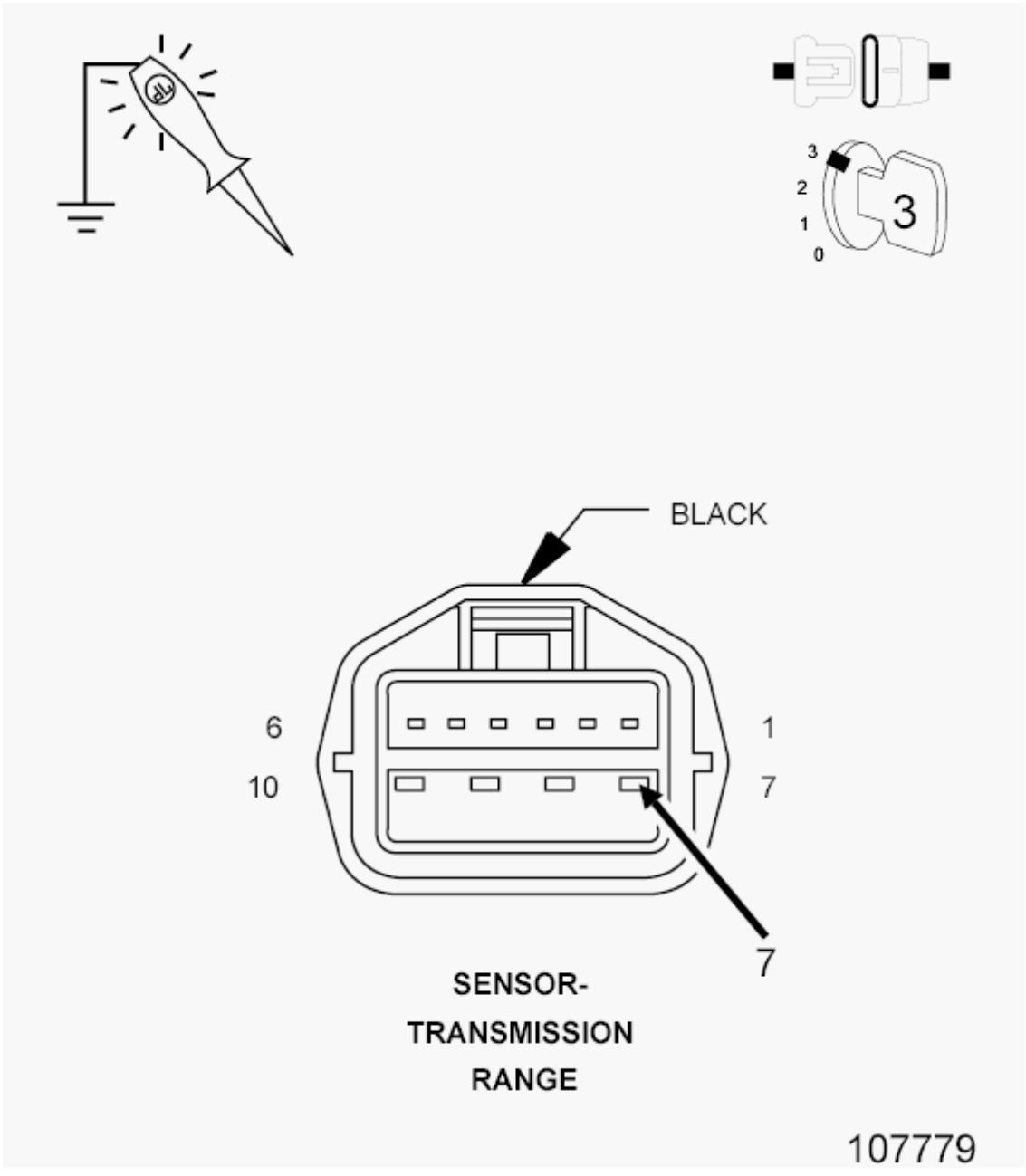


Fig. 3: Checking Fused Ignition Switch Output (Start) Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Using a 12-volt test light connected to ground, probe the Fused Ignition Switch Output (Start) circuit in the Transmission Range Sensor harness connector.
3. Turn the ignition to the crank position.

   Does the test light illuminate brightly?

Yes

- Repair the Start Enable circuit.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Check the Fused Ignition Switch Output (Start) circuit for an open. If OK, replace the TIPM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

8. **START ENABLE OPERATION (MTX)**
   1. Turn ignition on.
   2. Using a scan tool, monitor the Ignition Start Switch Sense.
   3. Turn the ignition switch to the crank position.

   Does the Ignition Start Switch Sense state change from Low to High?

   Yes

   - Go to step 10

   No

   - Go to step 9
9. **STATER ENABLE CIRCUIT (MTX)**

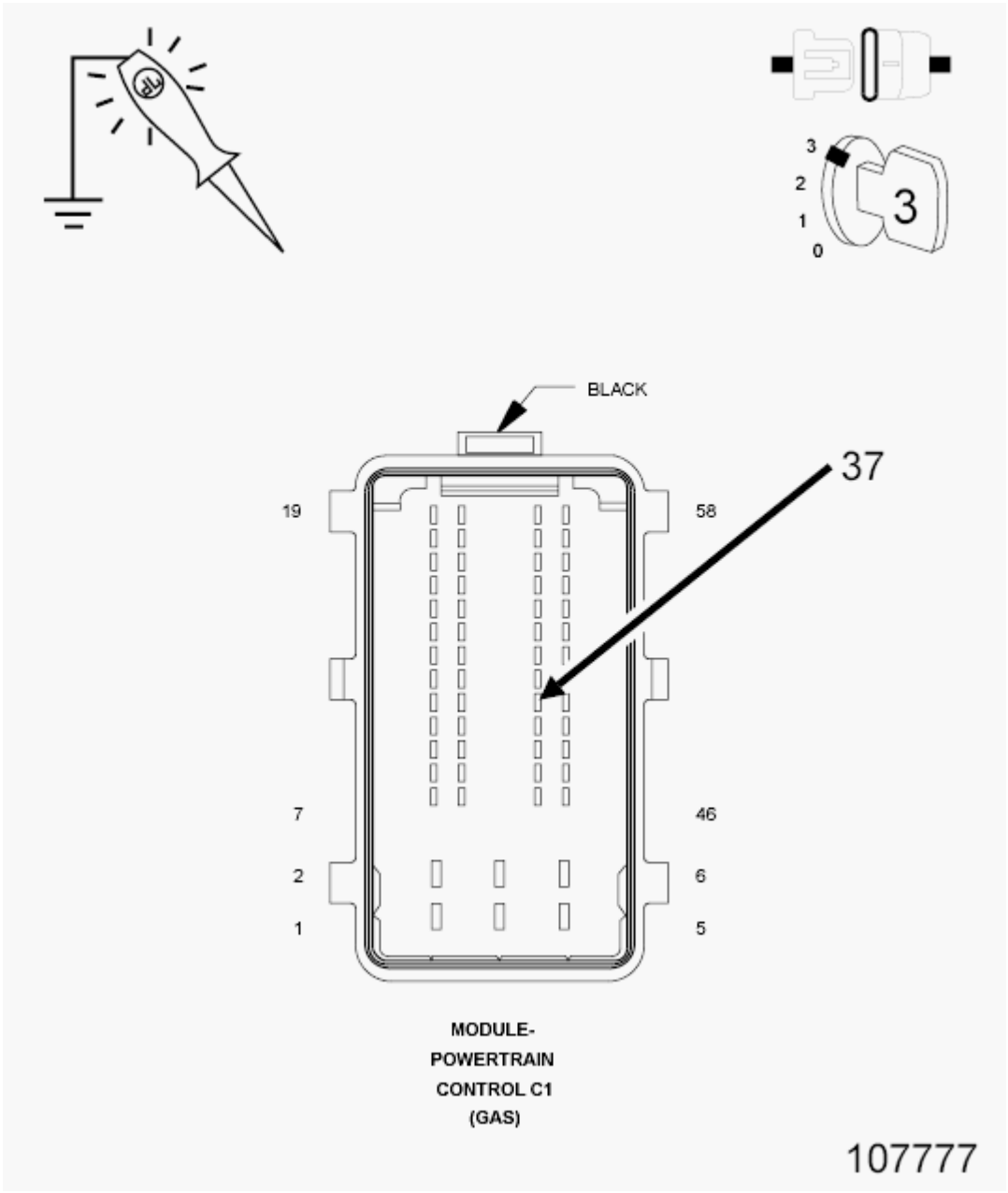


Fig. 4: Checking Start Enable Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to ground, probe the Start Enable circuit in the PCM harness connector while holding the ignition key in the start position.

   Does the test light illuminate brightly?

   Yes

- Replace the PCM in accordance with the Service information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Check the Start Enable circuit. If OK, replace the TIPM in accordance with the Service Information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

10. **CLUTCH INTERLOCK OPERATION (MTX)**
    1. Turn ignition on.
    2. Using a scan tool, monitor the Clutch Switch.
    3. Press the Clutch in and out.

    Does Clutch Switch display Released and then Pressed?

    Yes

    - Replace the Starter in accordance with the Service Information.
    - Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

    No

    - Go to step 11
11. **CLUTCH INTERLOCK OPERATION (MTX)**

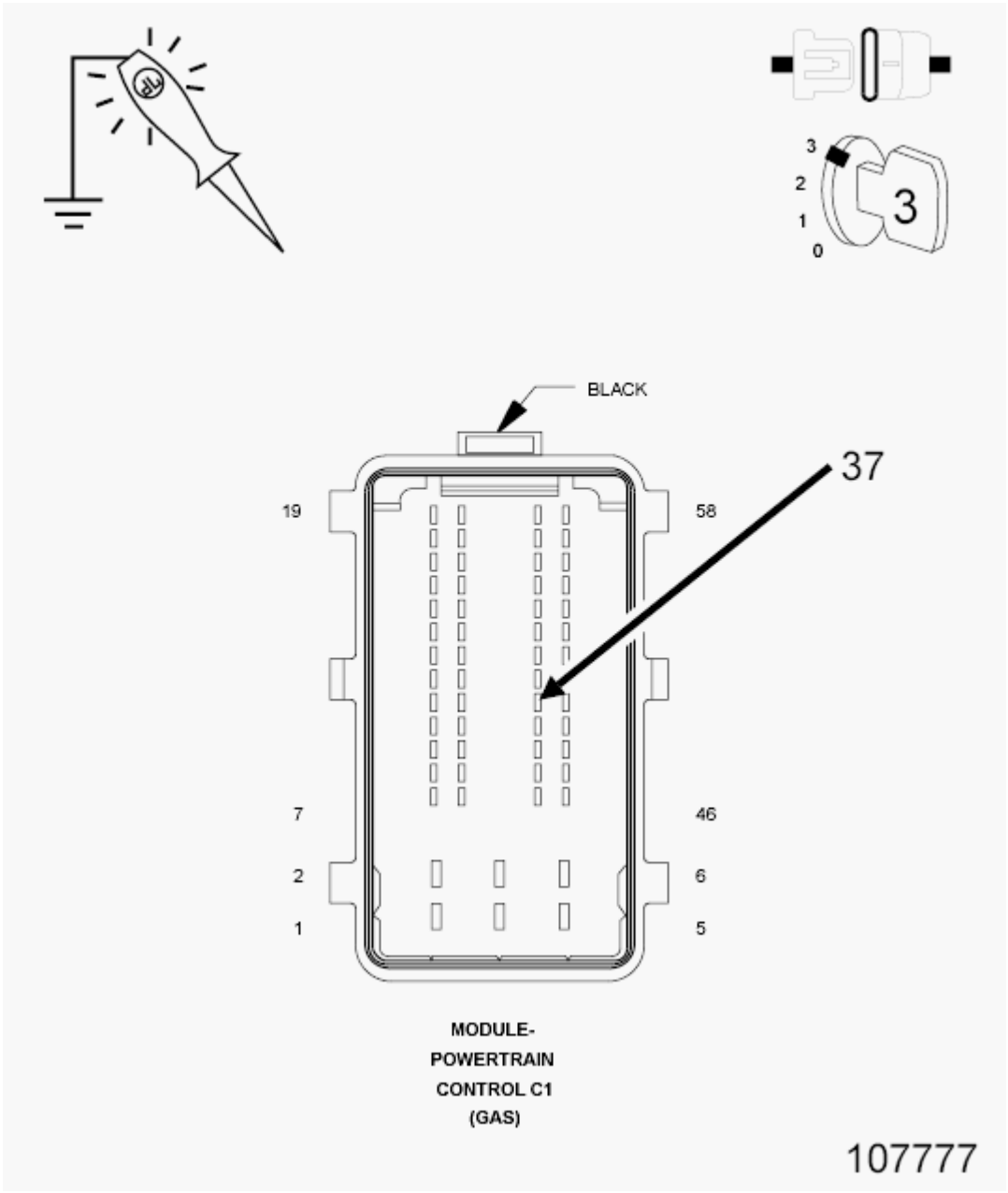


Fig. 5: Checking Start Enable Circuit (ATX)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Using a 12-volt test light connected to battery voltage, probe the Clutch interlock Signal circuit in the PCM harness connector while pressing the clutch pedal in.

   Does the test light illuminate brightly?

   Yes

- Replace the PCM in accordance with the Service information.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 12

12. **CLUTCH INTERLOCK SWITCH (MTX)**

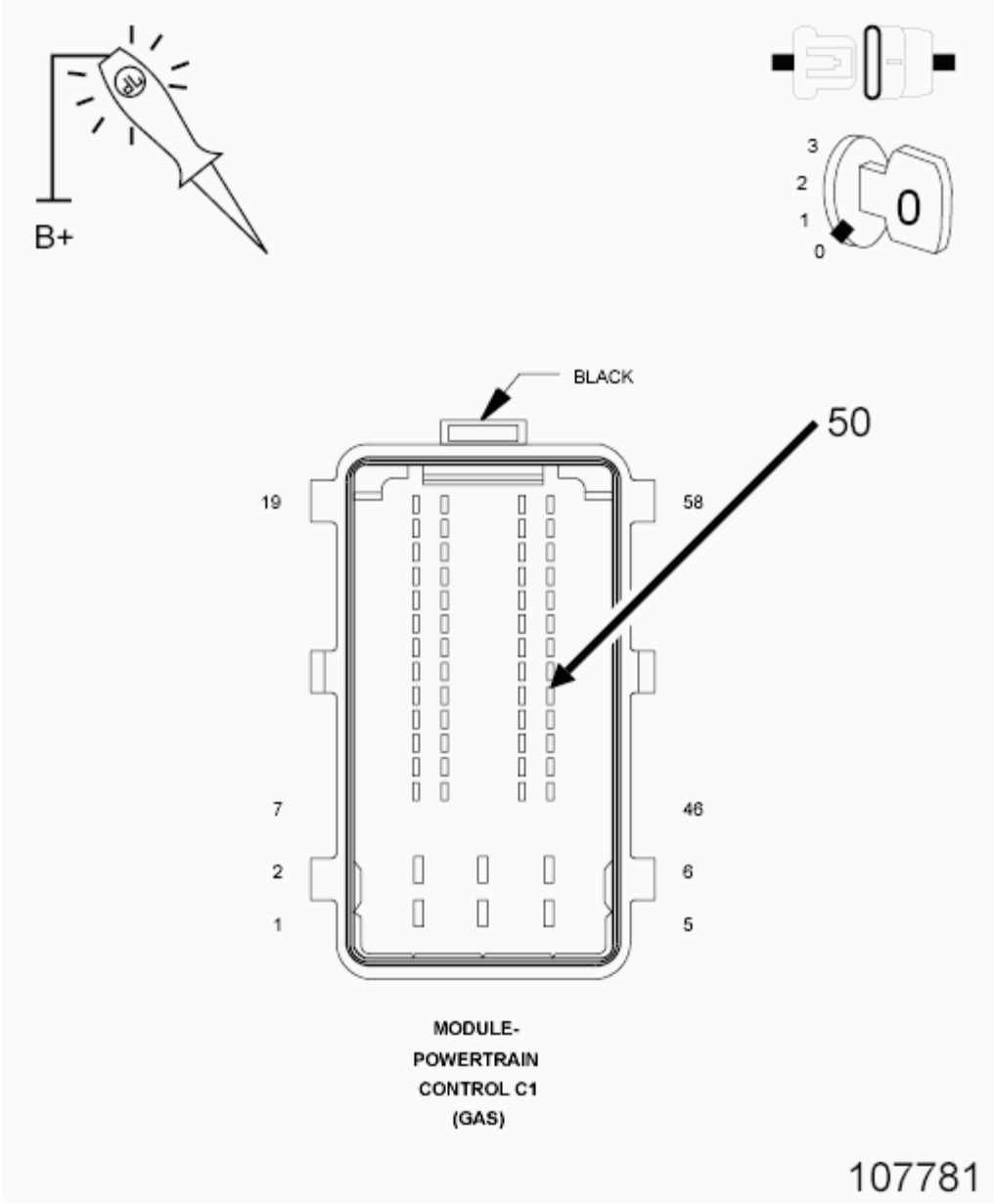


Fig. 6: Checking Clutch Interlock Signal Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Test light still in the above position.
3. Disconnect the Clutch Interlock Switch harness connector.
4. Using a jumper wire, connect one end to the Clutch Interlock Switch Signal circuit and the other to the Clutch Interlock Switch ground circuit in the Clutch Interlock Switch harness connector.

   Does the test light illuminate brightly?

   Yes

   - Replace Clutch Interlock Switch.
   - Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   No

   - Go to step 13

13. **CLUTCH INTERLOCK OPERATION (MTX)**

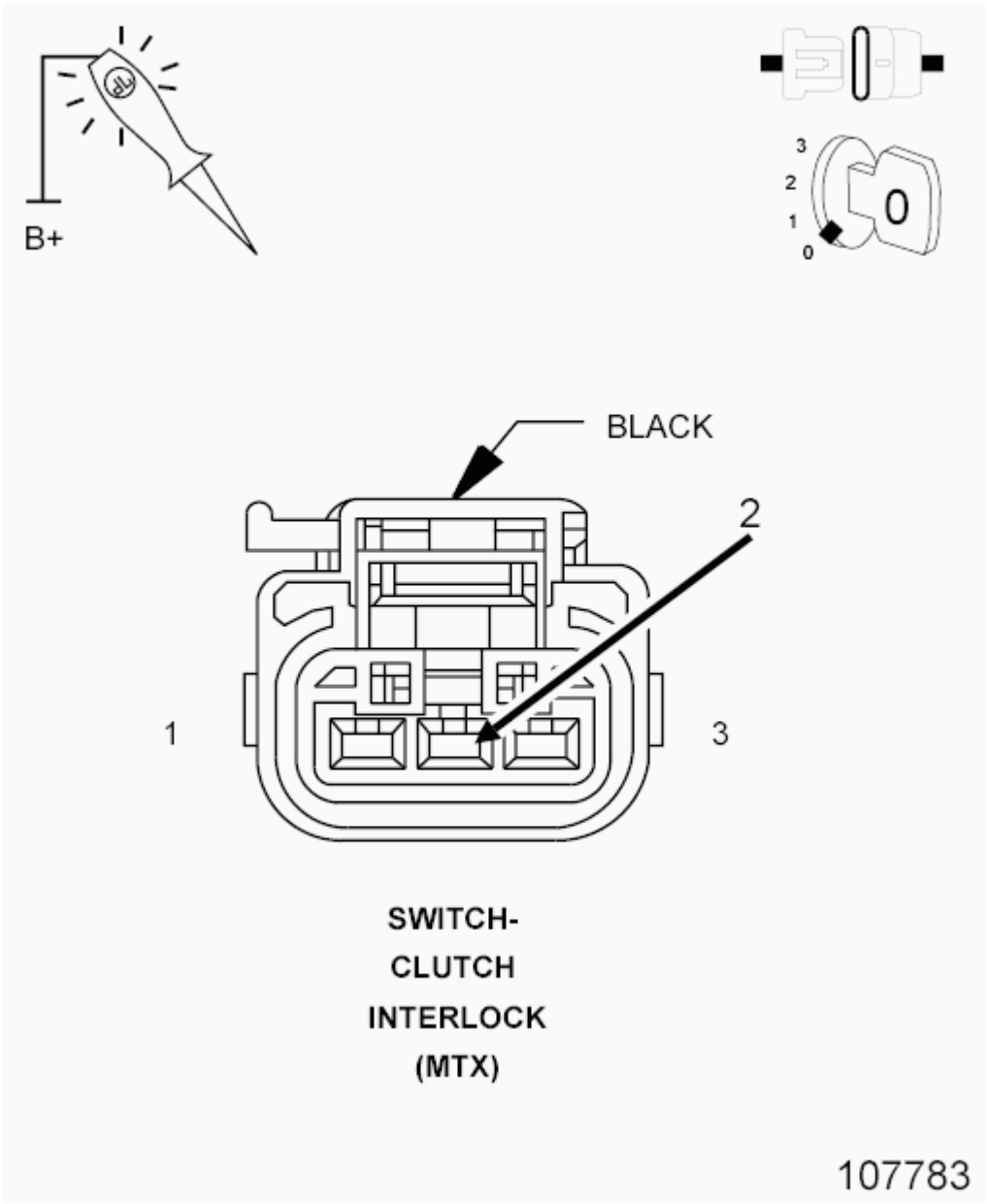


Fig. 7: Checking Clutch Interlock Switch Ground Circuit
Courtesy of CHRYSLER LLC

1. Remove the jumper wire.
2. Using a 12-volt test light connected to battery voltage, probe the Clutch Interlock Switch ground circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the Clutch Interlock Switch ground circuit.

- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Repair the Clutch Interlock Switch signal circuit.
- Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE CHARGING SYSTEM OPERATION

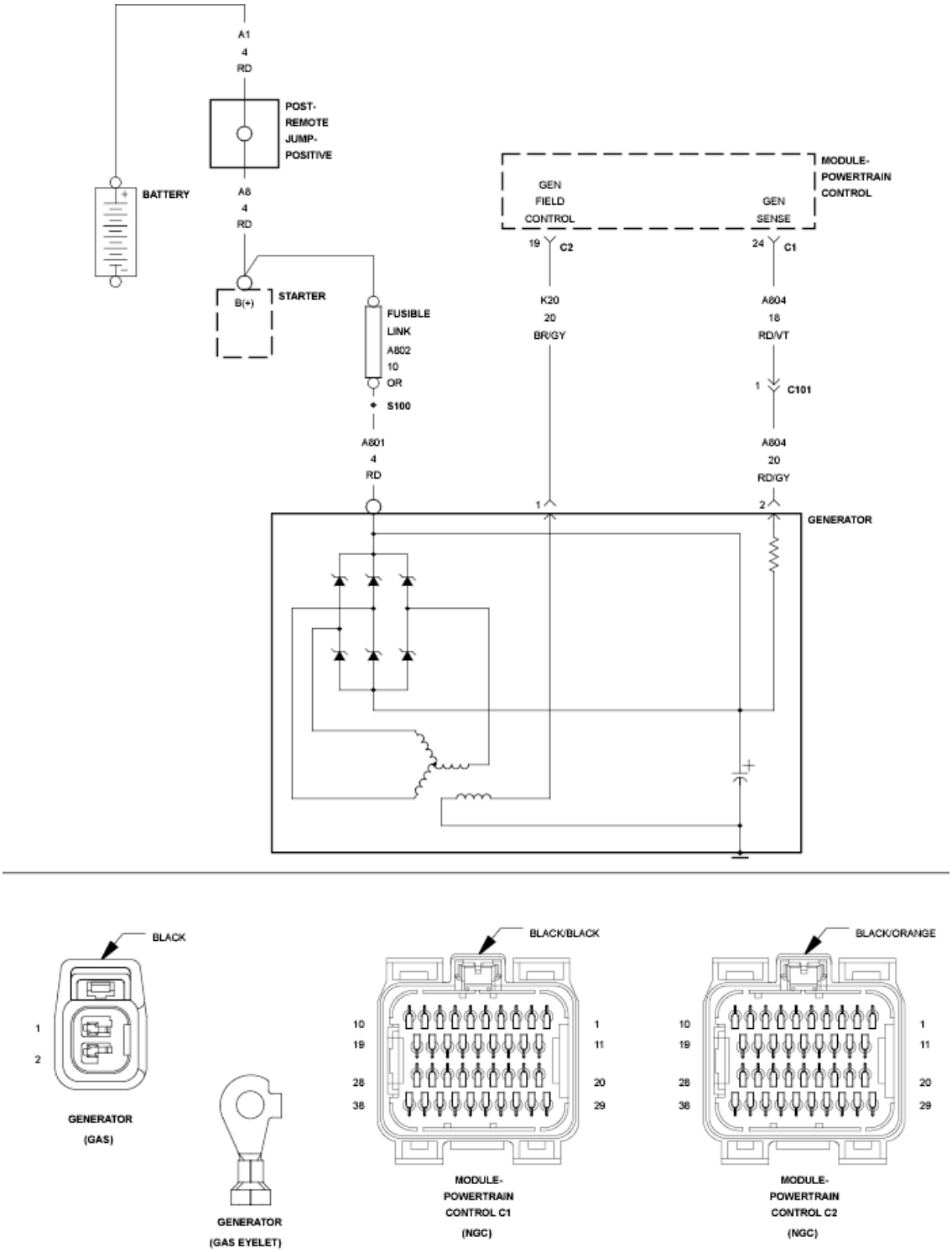


Fig. 8: Charging System Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **GENERATOR FULL FIELD TEST**

   NOTE: Diagnose and repair any generator sense or field control circuit DTCs before proceeding with this test.

   1. Start the engine and allow it to reach operating temperature.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   2. With the scan tool, perform the Generator Full Field test. Follow the instructions displayed on the scan tool.
   3. Monitor the system (battery) voltage and the generator sense voltage on the scan tool while performing the test.

      NOTE: With the engine running, the difference between the system (battery) voltage and the generator sense voltage should be below .2 volts.

      NOTE: With the generator field fully actuated, the system (battery) voltage should be above 14.0 volts.

      NOTE: With the generator field actuated off, the system (battery) voltage should be below 13.0 volts, and eventually drop as battery load is increased.

      Did the system voltage change as described above during the Generator Full Field test?

      Yes

      - Test complete.

      No

      - Go to step 2

2. **CHARGING SYSTEM INSPECTION**
   1. Inspect and test the battery in accordance with the Service Information.
   2. Inspect the generator drive belt for proper alignment and adjustment.
   3. Inspect the vehicle for aftermarket accessories that may exceed the generator system output.
   4. Inspect the fuses in the TIPM. If an open fuse is found, use the wire diagram/schematics as a guide and inspect the wiring and connectors for a damaged or shorted circuit.

Were any problems found?

Yes

- Repair as necessary.

No

- Go to step 3

3. **BATTERY POSITIVE (+) CIRCUIT HIGH RESISTANCE**

NOTE: Make sure all testing equipment and cables are clear of any engine parts before starting the engine.

1. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. Measure the voltage between the B (+) Terminal at the Generator and the Battery Positive (+) Post.

Is the voltage below 0.4 volts?

Yes

- Go to step 4

No

- Repair the battery positive (+) circuit between the generator and battery for high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. **GENERATOR CASE GROUND HIGH RESISTANCE**

NOTE: Make sure all testing equipment and cables are clear of any engine parts before starting the engine.

1. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

2. Measure the voltage between the Generator case and the Battery Negative (-) post.

   Is the voltage below 0.1 volt?

   Yes

   - Go to step 5

   No

   - Repair the Generator Case ground for high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. **(A109) FUSED B(+) CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

      CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by probing the battery positive (+) terminal and the appropriate terminal(s) of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   3. Start the engine.

      Is the voltage below 0.5 volts?

      Yes

      - Go to step 6

      No

      - Repair the (A109) Fused B(+) circuit for high resistance.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. **(A804) GENERATOR SENSE CIRCUIT HIGH RESISTANCE**

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (A804) Generator Sense circuit at the Generator harness connector and probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

   Is the voltage below 0.5 volts?

   Yes

   - Go to step 7

   No

   - Repair the (A804) Generator Sense circuit for high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. **(K20) GEN FIELD CONTROL CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the (K20) Gen Field Control circuit at the Generator harness connector and probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions

may result in possible serious or fatal injury.

3. Start the engine.

   Is the voltage below 0.5 volts?

   Yes

   - Go to step 8

   No

   - Repair the (K20) Gen Field Control circuit for high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. **GENERATOR**

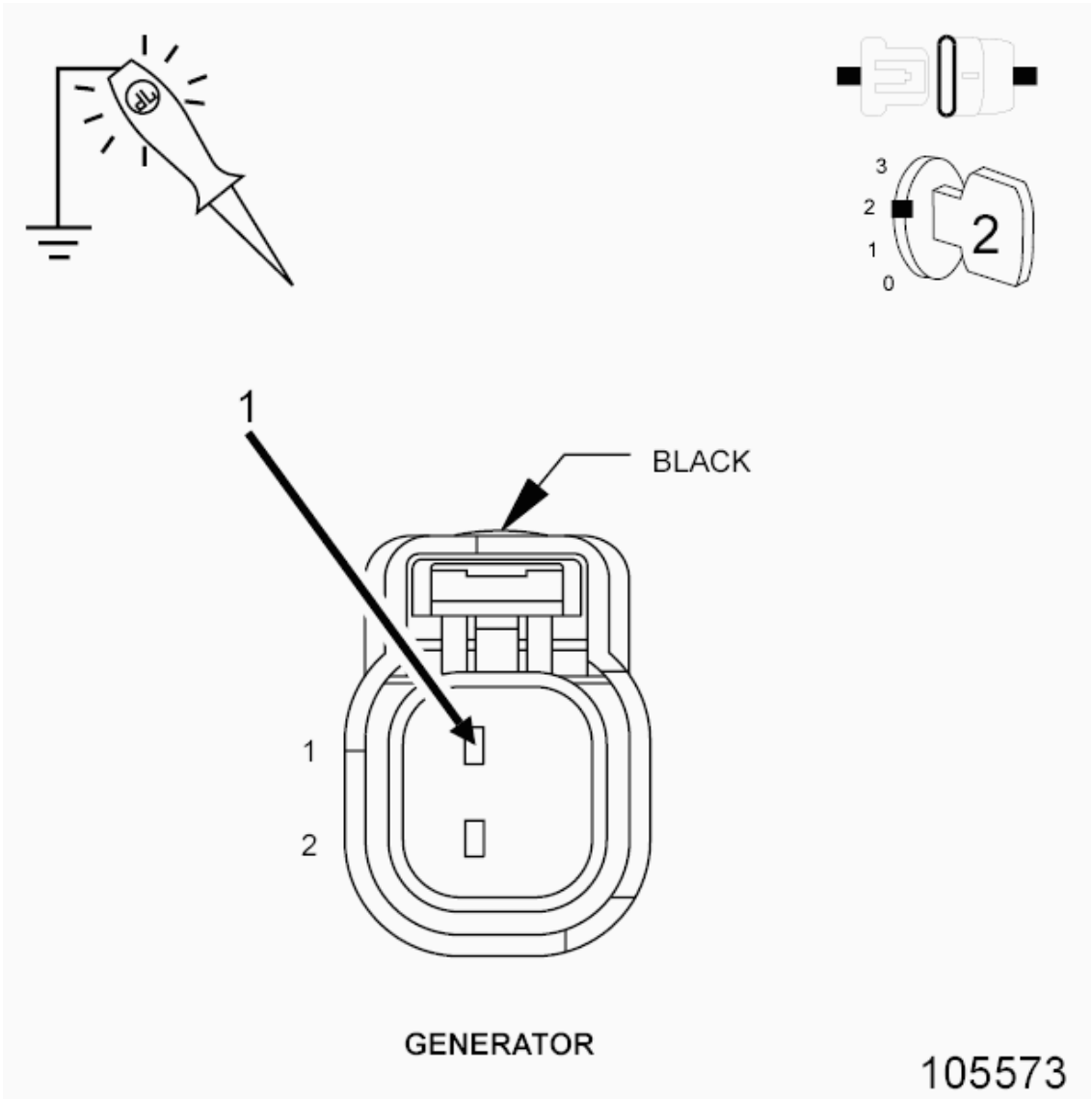


Fig. 9: Checking Generator Field Control Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Generator harness connector.
3. Connect a 12 volt test light connected between ground and the (K20) Gen Field Control circuit in the Generator harness connector.
4. Turn the ignition on.
5. With the scan tool, actuate the Generator Field Control State to toggle.

NOTE: The test light should toggle on and off with the actuation.

NOTE: If a DTC is active, the actuation test may not be allowed by the PCM.

If may be necessary to clear DTCs before starting the actuation.

Does the test light illuminate on and off with the actuation?

Yes

- Replace the Generator in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 9

9. **(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Powertrain Control Module (PCM) connector.
    3. Turn the ignition on.
    4. Measure the voltage of the (K20) Gen Field Control circuit in the Generator harness connector.

    Is there any voltage present?

    Yes

    - Repair the (K20) Gen Field Control circuit for a short to voltage.
    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

    No

    - Go to step 10

10. **(K20) GEN FIELD CONTROL CIRCUIT SHORTED TO GROUND**

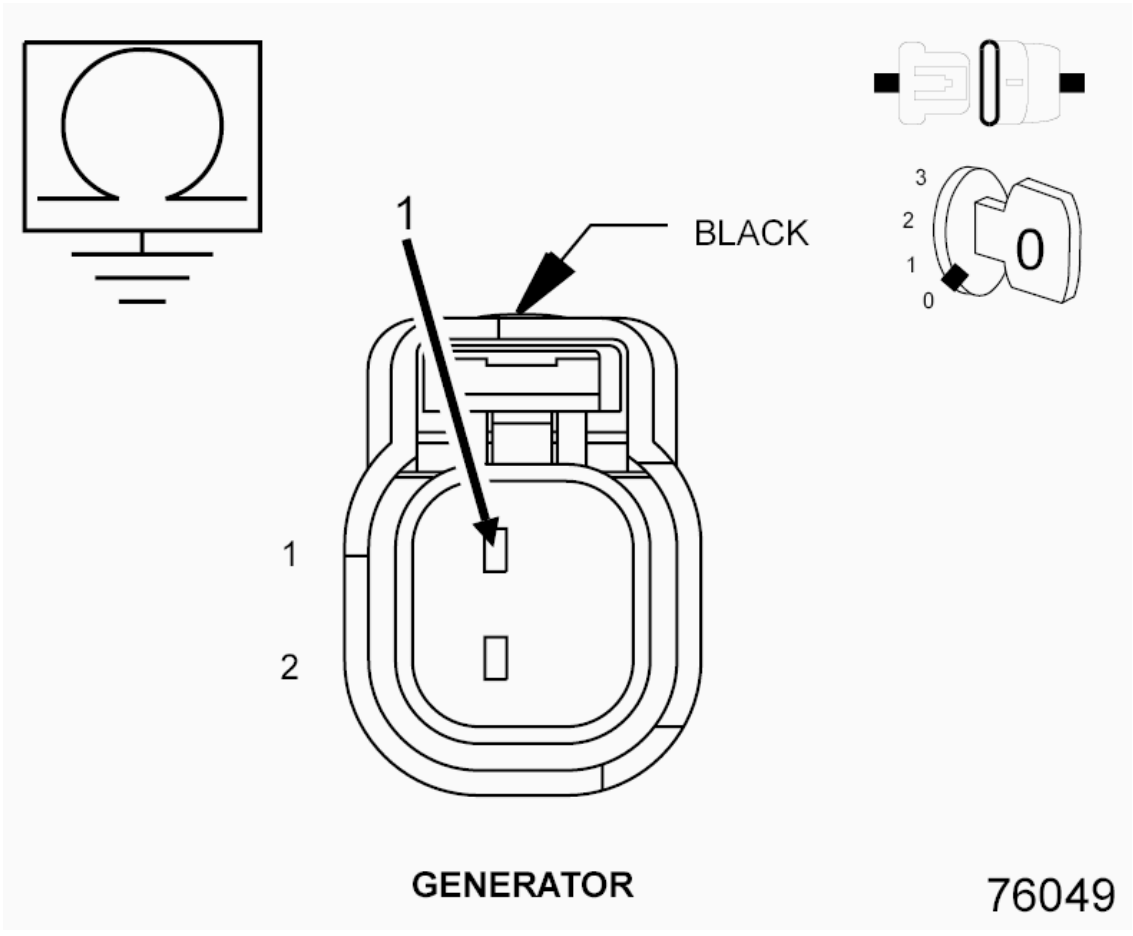


Fig. 10: Checking Generator Field Control Circuit For Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (K20) Gen Field Control circuit in the Generator harness connector.

   Is the resistance below 100 ohms?

   Yes

   - Repair the (K20) Gen Field Control circuit for a short to ground.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

   No

   - Go to step 11

11. **(K20) GEN FIELD CONTROL CIRCUIT OPEN OR HIGH RESISTANCE**

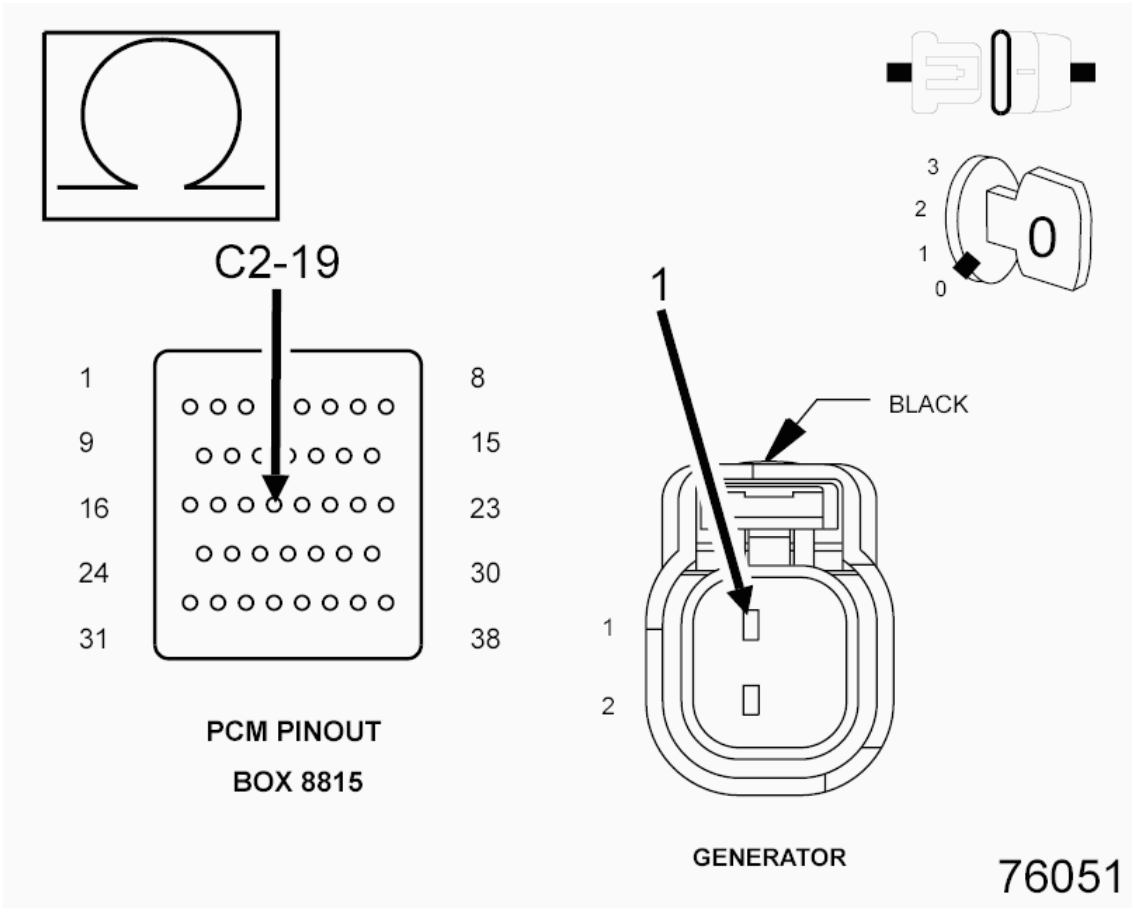


Fig. 11: Checking Generator Field Control Circuit For Open Or High Resistance
Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the (K20) Gen Field Control circuit between the Generator harness connector and the appropriate terminal of special tool #8815.

   Is the resistance below 5.0 ohms?

   Yes

   - Go to step 12

   No

   - Repair the (K20) Gen Field Control circuit for an open circuit or high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

12. **CHECKING THE PCM POWER AND GROUND CIRCUITS**
    1. Perform the diagnostic procedure for **CHECKING THE PCM POWER AND GROUND CIRCUITS**.

       Were any problems found?

       Yes

       - Repair the PCM power and ground circuit(s) as necessary.
       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

       No

       - Go to step 13
13. **POWERTRAIN CONTROL MODULE (PCM)**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Generator and the Powertrain Control Module (PCM).
    2. Look for any chafed, pierced, pinched, or partially broken wires.
    3. Look for broken, bent, pushed out or corroded terminals.
    4. Refer to any Technical Service Bulletins that may apply.

       Were any problems found?

       Yes

       - Repair as necessary.
       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

       No

       - Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information.
       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE COOLING FAN OPERATION

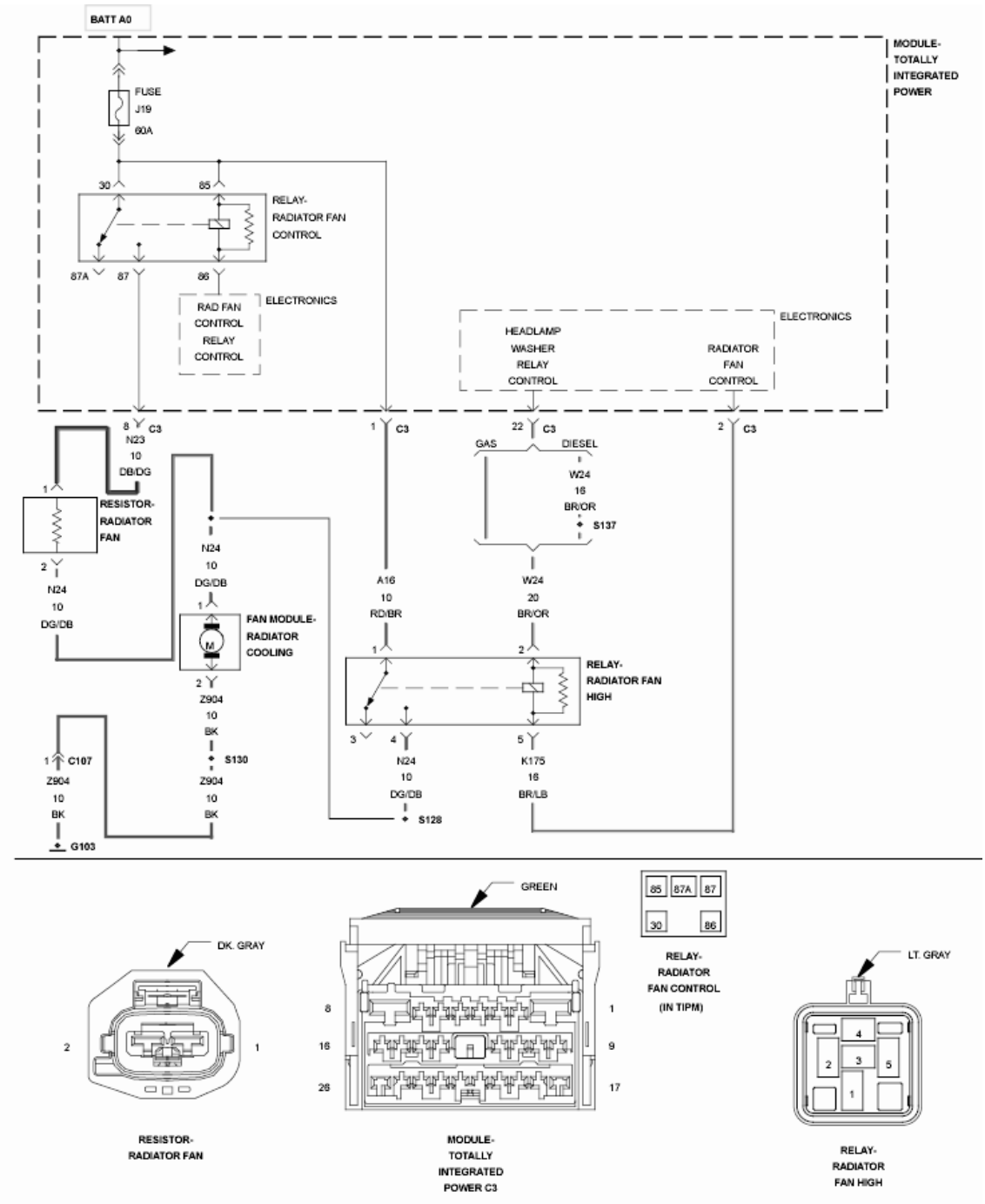


Fig. 12: Cooling Fan Operation Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **RADIATOR FAN HIGH RELAY OPERATION**

NOTE: Diagnose and repair any Coolant Fan circuit or Temperature Sensor circuit DTCs before proceeding with this test.

1. Turn the ignition on.
2. With the scan tool, actuate the Radiator Fan High Relay.

   Does the Cooling Fan operate?

   Yes

   - Go to step 2

   No

   - Go to step 3

2. **RADIATOR FAN CONTROL RELAY OPERATION**
   1. With the scan tool, actuate the Radiator Fan Control Relay.

      Does the Cooling Fan operate?

      Yes

      - Test complete.

      No

      - Go to step 8

3. **RADIATOR FAN HIGH RELAY**
   1. Turn the ignition off.
   2. Verify the Radiator Fan High Relay is installed properly and that the terminals are making a tight fit.
   3. Remove the Radiator Fan High Relay and substitute it with a known good Relay.
   4. Ignition on, engine not running.
   5. With a scan tool, actuate the Radiator Fan High Relay.

      Is the Cooling Fan operating?

      Yes

      - Replace the Radiator Fan High Relay.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

      No

- Go to step 4

4. **(Z904) GROUND CIRCUIT OPEN**
   1. Turn the ignition off.
   2. Disconnect the Radiator Cooling Fan harness connector.
   3. Using a 12-volt test light connected to voltage, check the (Z904) Ground circuit in the Cooling Fan harness connector.

      NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

      Is the test light illuminated and bright?

      Yes

      - Go to step 5

      No

      - Repair the (Z904) Ground circuit for an open or high resistance.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .
5. **RADIATOR COOLING FAN MODULE**
   1. Turn the ignition on.
   2. Using a 12-volt test light connected to ground, check the (N24) Radiator Fan Relay Output circuit in the Radiator Cooling Fan harness connector.
   3. With the scan tool, actuate the Radiator Fan High Relay.

      NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

      Is the test light illuminated and bright?

      Yes

      - Replace the Cooling Fan.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

      No

      - Go to step 6
6. **(N24) RAD FAN CONTROL RELAY OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.

2. Remove the Radiator Fan High Relay.
3. Turn the ignition on.
4. Using a 12-volt test light connected to voltage, check the (A16) Fused B+ circuit in the Radiator Fan High Relay harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Repair the (N24) Rad Fan Control Relay Output circuit for an open or high resistance.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 7

7. **(A16) FUSED B+ CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the C3 TIPM harness connector.
   3. Measure the resistance in the (A16) Fused B+ circuit from the Radiator Fan High Relay harness connector to the Totally Integrated Power Module (TIPM) harness connector.

   Is the resistance below 100 Ohms?

   Yes

   - Go to step 13

   No

   - Repair the (A16) Fused B+ circuit for an open or high resistance.
   - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

8. **RADIATOR FAN CONTROL RELAY**
   1. Turn the ignition off.
   2. Verify the Radiator Fan Control Relay is installed properly and that the terminals are making a tight fit.
   3. Remove the Radiator Fan Control Relay and substitute it with a known good Relay.
   4. Ignition on, engine not running.
   5. With a scan tool, actuate the Radiator Fan Control Relay

Is the Cooling Fan operating?

Yes

- Replace the Radiator Fan Control Relay.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 9

9. **RADIATOR COOLING FAN MODULE**
   1. Turn the ignition off.
   2. Disconnect the Radiator Cooling Fan harness connector.
   3. Turn the ignition on.
   4. Using a 12-volt test light connected to ground, check the (N24) Radiator Fan Relay Output circuit in the Radiator Cooling Fan harness connector.
   5. With the scan tool, actuate the Radiator Fan Control Relay.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Replace the Cooling Fan.
- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

No

- Go to step 10

10. **RADIATOR FAN CONTROL RELAY OUTPUT**
    1. Turn the ignition off.
    2. Disconnect the Radiator Fan Resistor harness connector.
    3. Turn the ignition on.
    4. Using a 12-volt test light connected to ground, check the (N23) Low Speed Fan Control Output circuit in the Radiator Fan Resistor harness connector.
    5. With the scan tool, actuate the Radiator Fan Control Relay.

NOTE: The test light should be illuminated and bright. Compare the

brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 11

No

- Go to step 12

11. **(N24) RAD FAN CONTROL RELAY OUTPUT OPEN OR HIGH RESISTANCE.**
    1. Turn the ignition off.
    2. Measure the resistance in the (N24) Rad Fan Control Relay Output circuit from the Cooling Fan harness connector to the Radiator Fan Resistor harness connector.

    Is the resistance below 100 Ohms?

    Yes

    - Replace the Radiator Fan Resistor in accordance with the Service Information.
    - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

    No

    - Repair the open or high resistance in the (N24) Rad Fan Control Relay Output circuit.
    - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .
12. **(N23) LOW SPEED RAD FAN CONTROL OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE**
    1. Turn the ignition off.
    2. Disconnect the C3 TIPM harness connector.
    3. Measure the resistance in the (N23) Low Speed Rad Fan Control Output circuit from the Radiator Fan Resistor harness connector to the C3 TIPM harness connector.

    Is the resistance below 100 Ohms?

    Yes

    - Go to step 13

    No

    - Repair the open or high resistance in the (N23) Low Speed Rad Fan Control Output circuit.

- Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

13. **TOTALLY INTEGRATED POWER MODULE (TIPM)**
    1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Cooling Fan Module, TIPM and the Powertrain Control Module (PCM).
    2. Look for any chafed, pierced, pinched or partially broken wires.
    3. Look for broken, bent, pushed out or corroded terminals. Verify that there is good pin to terminal contact in the Cooling Fan Module, TIPM and Powertrain Control Module (PCM) connectors.
    4. Perform any Technical Service Bulletins (TSBs) that may apply.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

    No

    - Replace the Totally Integrated Power Module (TIPM) in accordance with the Service Information.
    - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

CHECKING THE ENGINE COOLANT TEMPERATURE SENSOR OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **ENGINE COOLANT TEMPERATURE SENSOR WIRING OR CONNECTORS**

    NOTE: Diagnose and repair any ECT circuit DTCs before proceeding with this test.

    NOTE: Allow the engine to cool to ambient temperature before proceeding.

    1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Engine Coolant Temperature sensor(s) and the PCM.
    2. Look for any chafed, pierced, pinched, or partially broken wires.
    3. Look for broken, bent, pushed out or corroded terminals.
    4. Turn the ignition on.

5. Monitor the scan tool data relative to the sensor(s) and wiggle test the wiring and connectors.
6. Look for the data to change or for a DTC to set during the wiggle test.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. **ENGINE COOLANT LEVEL AND CONDITION**

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. Check the engine coolant level and the condition of the engine coolant. Refer to the appropriate Service Information.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 3

3. **THERMOSTAT**

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. Using the appropriate service information, determine the proper opening temperature of the thermostat.

2. With the scan tool, read the Engine Coolant Temperature Sensor value. If the engine was allowed to cool completely, the value should be approximately equal to the ambient temperature.
3. Monitor the sensor value on the scan tool.
4. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The thermostat should not open until the engine reaches the temperature specified in the Service Information.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 4

4. **ENGINE COOLANT TEMPERATURE SENSOR**

NOTE: Allow the engine to cool to ambient temperature before proceeding.

WARNING: Make sure the engine cooling system is cool before removing the pressure cap or any hose. The cooling system is pressurized when hot. Failure to follow these instructions can result in possible serious or fatal injury.

1. With the scan tool, read the Engine Coolant Temperature Sensor value. If the engine was allowed to cool completely, the value should be approximately equal to the ambient temperature.
2. Monitor the sensor value on the scan tool and the actual coolant temperature with a thermometer.
3. Start the engine.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: The sensor value transition should be smooth as the engine reaches operating temperature. The thermometer reading and the coolant temperature value on the scan tool should remain relatively close.

Were any problems found?

Yes

- Go to step 5.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test complete.

5. **(K2) ECT SIGNAL CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

      CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the (K2) ECT Signal circuit at the Engine Coolant Temperature Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   3. Start the engine.

      Is the voltage below 0.5 volts?

      Yes

      - Go to step 6

      No

      - Repair the (K2) ECT Signal circuit for excessive resistance.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE,**

Powertrain Control (PCM) - Standard Procedure .

6. **(K900) SENSOR GROUND CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

      CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the (K900) Sensor Ground circuit at the Engine Coolant Temperature Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   3. Start the engine.

      Is the voltage below 0.5 volts?

      Yes

      - Go to step 7

      No

      - Repair the (K900) Sensor Ground circuit for excessive resistance.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. **ENGINE COOLANT TEMPERATURE SENSOR**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Engine Coolant Temperature Sensor and the Powertrain Control Module (PCM).
   2. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Look for broken, bent, pushed out or corroded terminals.
   4. Refer to any Technical Service Bulletins that may apply.

      Were any problems found?

      Yes

      - Repair as necessary.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace the Engine Coolant Temperature Sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE ENGINE MECHANICAL SYSTEM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **CHECKING THE ENGINE MECHANICAL SYSTEM**
    1. Turn the ignition off.
    2. Check for any of the following conditions/mechanical problems:
    - AIR INDUCTION SYSTEM - must be free from leaks and restrictions
    - ENGINE VACUUM - must be at least 13 inches in neutral
    - ENGINE VALVE TIMING - must be within specifications
    - ENGINE COMPRESSION - must be within specifications
    - ENGINE EXHAUST SYSTEM - must be free from leaks and restrictions
    - ENGINE OIL - must be clean, at the proper level, free from contamination or fuel
    - ENGINE PCV SYSTEM - must flow freely
    - TORQUE CONVERTER STALL SPEED - must be within specifications
    - POWER BRAKE BOOSTER - no internal vacuum leaks
    - FUEL - must be free of contamination
    - FUEL INJECTOR - plugged or restricted injector(s); control wire not connected to the correct injector
    - CAM LOBES - must not be worn excessively
    - CYLINDER LEAKAGE TEST - must be within specifications
    - VALVE SPRINGS - cannot be weak or broken

CHECKING THE EVAPORATIVE SYSTEM FOR LEAKS

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **EVAPORATIVE SYSTEM INSPECTION**
    1. Turn the ignition off.

2. Raise the vehicle as necessary in accordance with the Service Information.
3. Visually and physically inspect the entire Evaporative Emission System for any of the following conditions:
   - Holes or cracks
   - Loose seal points
   - Evidence of damaged components
   - Incorrect routing of hoses or tubes
   - Loose or missing fuel filler cap
   - Improper installation of the fuel filler cap
   - Damaged locking tabs on cap and/or fill tube
   - Damaged seal points on cap and/or fill tube
   - Fuel cap gasket seal missing or damaged

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   No

   - Go to step 2

2. **VERIFY EVAPORATIVE EMISSION LEAK**

   WARNING: Keep lit cigarettes, sparks, flames, and other ignition sources away from the test area to prevent the ignition of explosive gases. Keep the test area well ventilated. Failure to do so may result in possible serious or fatal injury.

1. Turn the ignition off.
2. To continue testing, you will need Evaporative Emission Leak Detector (EELD) 8404A.

   NOTE: The fuel tank should have between 20% and 80% of fuel tank capacity to properly test the Evap system.

3. Connect the red power lead of EELD to the battery positive terminal and the black ground lead to battery negative terminal.
4. Block the vent hose of the Evap Canister.
5. Connect shop air to the EELD.
6. Set the smoke/air control switch to AIR.

7. Insert the tester's AIR supply tip (clear hose) into the .040 orifice on the tester's control panel.
8. Press the remote smoke/air start button.
9. Position the red flag on the air flow meter so it is aligned with the indicator ball.
10. When the calibration is complete, release the remote button. The EELD flow meter is now calibrated in liters per minute.
11. Install the service port adapter 8404-14 on the vehicle's service port (if equipped) or install the 8404-ADP into the filter line.
12. Connect the AIR supply hose from the EELD to the service port (if equipped) or to the 8404-ADP adapter.
13. Press the remote button to activate AIR flow.

NOTE: Larger volume fuel tanks, lower fuel levels, or vehicles equipped with a Flow Management Valve may indicate high flow and will require four to five minutes to fill.

14. Compare the flow meter indicator ball reading to the red flag.
15. ABOVE the red flag indicates a leak present.
16. BELOW the red flag indicates a sealed system.

Is the indicator ball above the red flag?

Yes

- Go to step 3

No

- Refer to the Freeze Frame data, if applicable. If the Freeze Frame data indicates that the vehicle was in motion when the DTC was set, verify that all hoses are connected properly.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

3. **EVAPORATIVE EMISSION LEAK DETECTION**

NOTE: A thorough inspection of the Evap system hoses, tubes, and connections may save time in diagnosis. Look for physical damage or signs of wetness at connections. The strong smell of fuel vapors may aid diagnosis also.

1. To continue testing, you will need Evaporative Emissions Leak Detector (EELD) 8404A.
2. Remove the AIR supply hose from the service port (if equipped) or from the adapter 8404-ADP.
3. Connect the SMOKE supply tip (black hose) to the service port (if equipped) or to the adapter 8404-ADP.
4. Set the smoke/air control switch to SMOKE.

NOTE: The flow meter indicator ball will not move in the smoke mode.

5. Press the remote smoke/air start button.

NOTE: Make sure that smoke has filled the Evap system by continuing to press the remote smoke/air start button, remove the vehicle fuel cap, and wait for the smoke to exit. Once smoke is detected, reinstall the fuel cap.

NOTE: For the best results, introduce smoke into the system for an additional 60 seconds and continue introducing smoke at 15 second intervals, as necessary.

6. While still holding the remote smoke/air start button, use the white light 8404-CLL to follow the Evap system path, and look for the source of the leak as indicated by exiting smoke.
7. If a leak is concealed from view (at the top of the fuel tank, for example), release the remote smoke/air start button, and use the ultraviolet (UV) black light 8404-UVL and the UV goggles 8404-20 to look for residual traces of dye that is left behind by the smoke.
8. The exiting smoke deposits a residual fluid that is either bright green or bright yellow when viewed with a UV light.

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go To 4

4. **CHECKING THE GAS CAP AND FUEL FILLER TUBE**
   1. Thoroughly check the gas cap and filler tube area for leaks.

   Was a leak found at the gas cap or filler tube?

   Yes

   - Go to step 5

   No

   - Go to step 6

5. **GAS CAP OR FUEL FILLER TUBE**
    1. Remove the SMOKE supply tip (black hose) from the service port (if equipped) or from the 8404-ADP adapter.
    2. Install leak check adapter 8382 (1/4 turn cap) or fuel tank adapter 6922 (screw cap) and leak check adapter 8399 (secondary seal depressor) and repeat test 4.

    Was a leak found at the gas cap adapter?

    Yes

    - Replace the fuel filler tube assembly.
    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

    No

    - Replace the gas cap.
    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .
6. **CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 1**

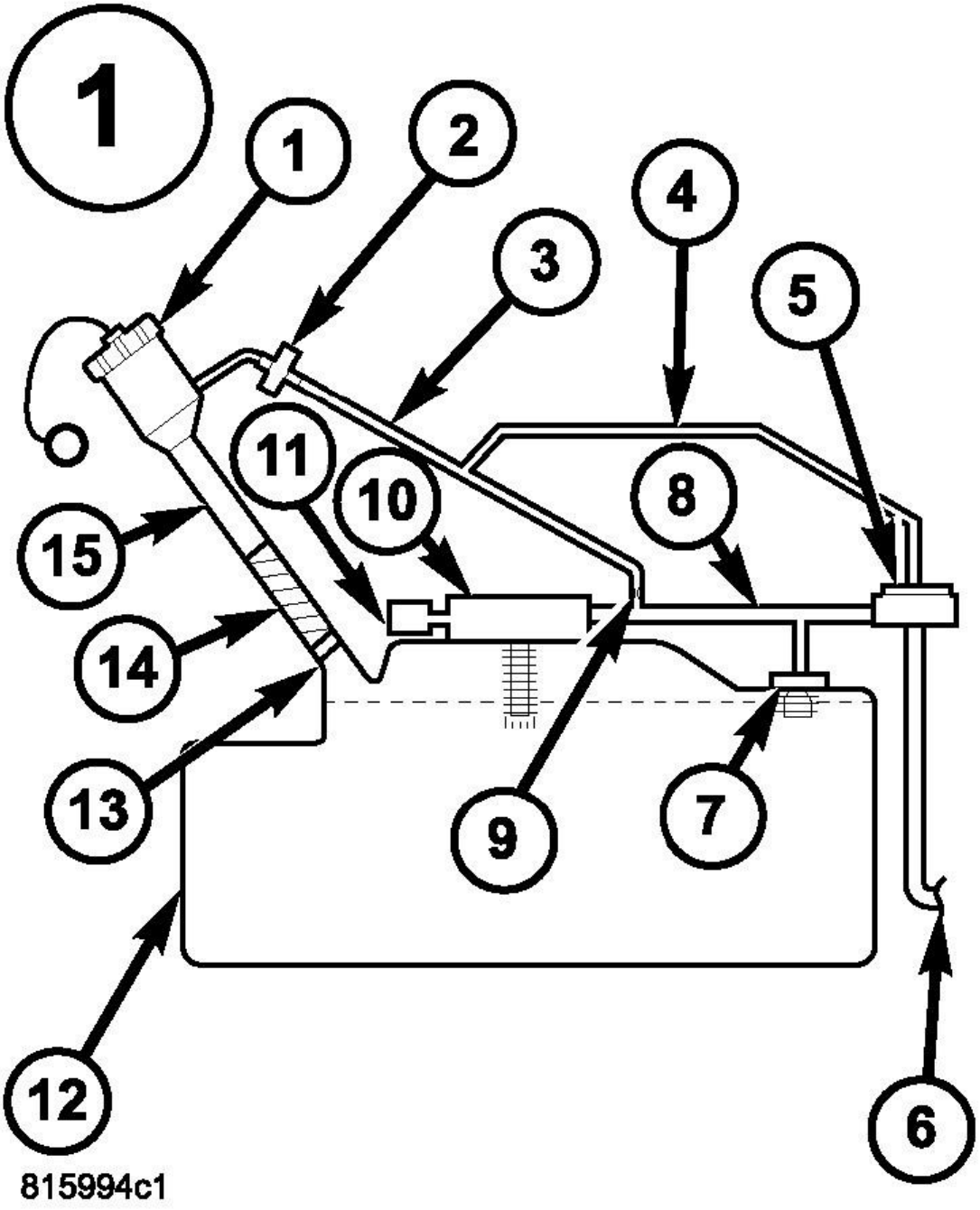


Fig. 13: Identifying EVAP System Zone 1
Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 1 of the evaporative system for leaks:
   - 1 Fuel Cap

- 2 Recirculation Check Valve
- 3 Vapor Recirculation Line
- 4 Signal Vapor Line for FVM
- 5 Flow Management Valve
- 6 Fuel Tank to Canister Vapor Line
- 7 Fuel Tank Vent (Check Valve)
- 8 Vapor Line to Canister
- 9 Flow Control Orifice
- 10 Control Valve
- 11 Liquid Trap
- 12 Fuel Tank
- 13 Check Valve
- 14 Fuel Fill Tube to Tank connector
- 15 Fuel Fill Tube
- Damaged or disconnected components

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 7

7. **CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 2**

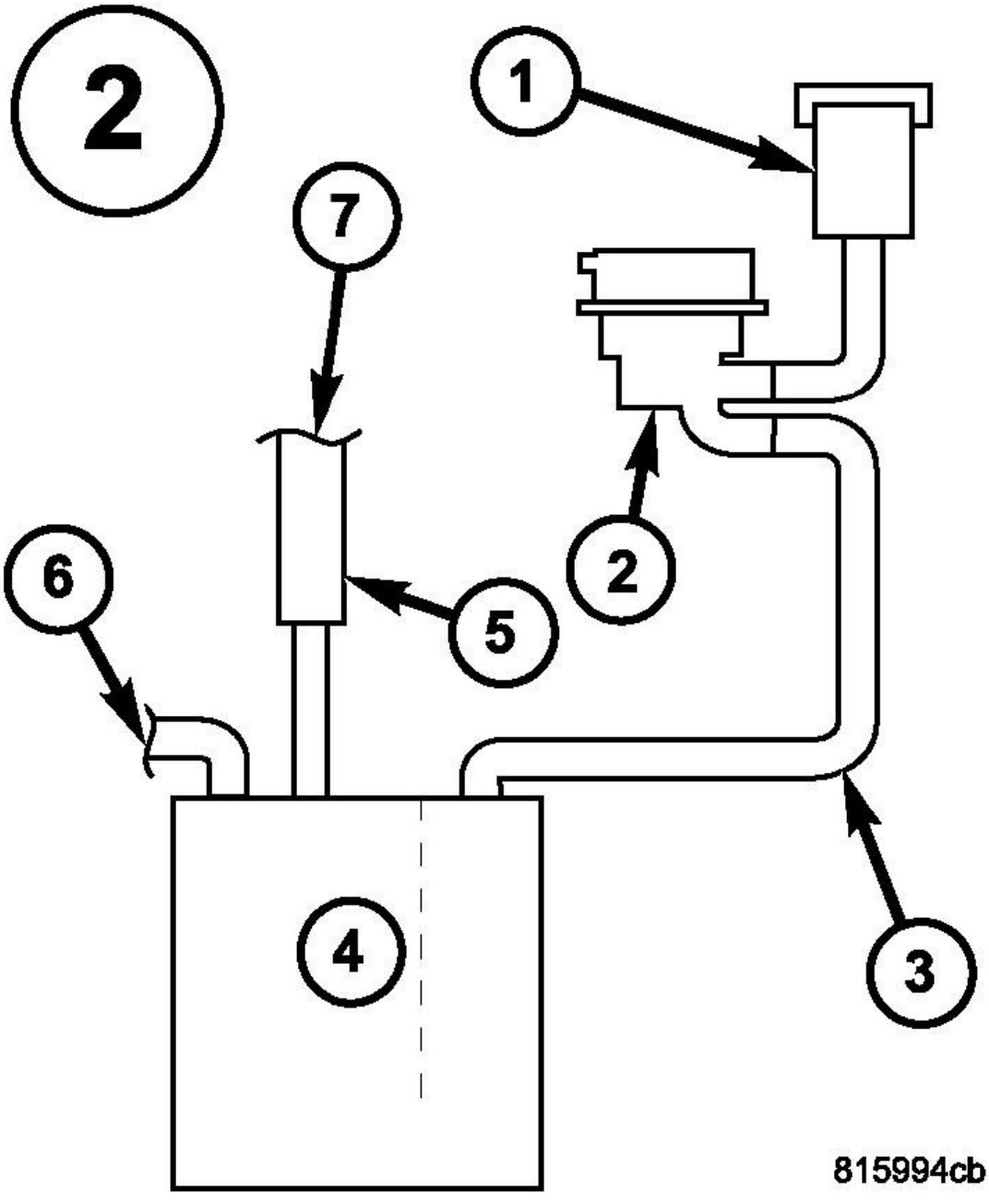


Fig. 14: Identifying EVAP System Zone 2
Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 2 of the evaporative system for leaks:
   - 1 Filter

- 2 ESIM Switch
- 3 Canister Vent Line
- 4 Evap Canister
- 5 Chassis Purge Valve
- 6 Fuel Tank to Canister Vapor Line connection
- 7 Evap Purge connection

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 8

8. **CHECKING FOR EVAPORATIVE SYSTEM LEAKS IN ZONE 3**

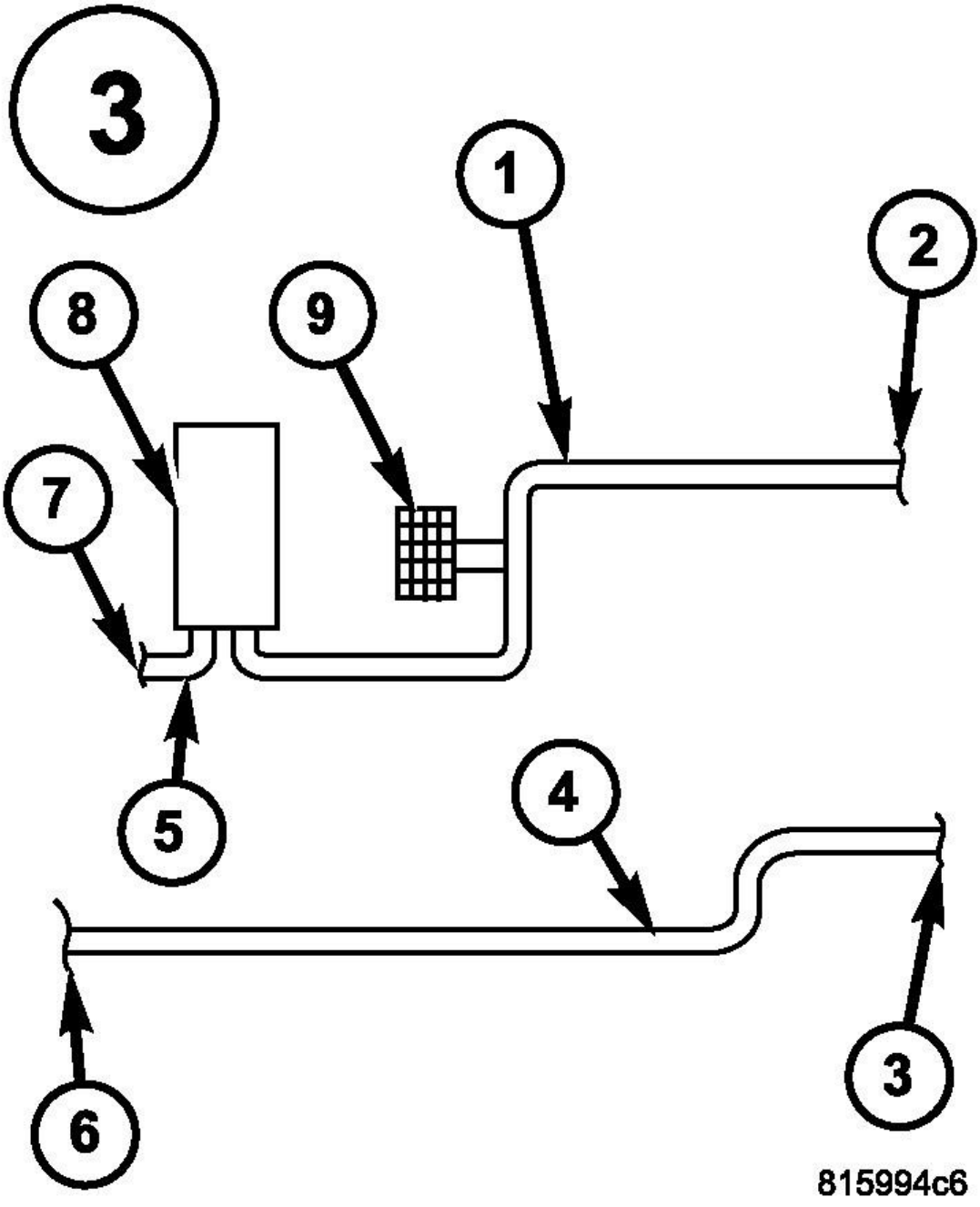


Fig. 15: Identifying EVAP System Zone 3
Courtesy of CHRYSLER LLC

NOTE: For testing purposes, the Evap System is divided into three zones. A leak from any of these zones can cause a DTC to set. The lists in the following steps below specify possible leak points in one of the specific zones.

1. Using the list below, check each of the components in Zone 3 of the evaporative system for leaks:
   - 1 Evap Purge Vacuum Line

- 2 Connection to Chassis Line
- 3 Connection to Canister
- 4 Chassis Purge Line
- 5 Evap Purge Vacuum Line
- 6 Connection to Evap Purge Harness
- 7 Chassis Evap Purge Line connection to Engine Vacuum
- 8 Evap Purge Valve
- 9 Service Port

Were any problems found?

Yes

- Repair or replace the leaking component as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test complete.

CHECKING THE EXHAUST SYSTEM FOR LEAKS

Diagnostic Test

1. **CHECKING THE EXHAUST SYSTEM FOR LEAKS**
    1. Turn the ignition off.
    2. Raise the vehicle in accordance with the Service Information.

WARNING: The normal operating temperature of the exhaust system is very high. Never work around or attempt to service any part of the exhaust system until it has cooled. Special care should be taken when working near the catalytic converter. The temperature of the converter rises to a high level after a short period of engine operating time

    3. Connect Exhaust Cone 8404-EC or 8404-EC to Air Pressure Regulator (with hose) W-18-MIL-1146AS.

CAUTION: The air pressure must not exceed 27.6 kPa (4 psi), otherwise engine damage can occur.

    4. Attach shop air to the air pressure regulator.

5. Adjust the Air Pressure Regulator to 27.6 kPa (4 psi).
6. Insert the exhaust cone into the vehicle tail pipe.
7. If the vehicle is equipped with dual exhaust. Use the 8404-ECT with equipped attached plug, plug one side of the dual exhaust pipe. Pressurize the other as described above.
8. Apply Mopar® Air Leak Detector PN 05191804AA (or an equivalent leak finder liquid) to the following areas:
    - All welded joints from the exhaust manifold to 152.4 mm (6 in.) behind the downstream O2 sensor
    - O2 sensor seal points
    - O2 sensor boss welds
    - Flange/joint connection(s)
    - Exhaust manifold to cylinder head connection(s)
    - EGR solenoid gasket base and tube seal points (if equipped)
9. Watch for the Mopar® Air Leak Detector PN 05191804AA (or the equivalent leak finder liquid) to bubble.
10. Use the following definitions to help determine if system or component repair/replacement is necessary:
    - **Type 1 Leak** is defined as a leak where very small foam like bubbles 1 mm (0.04 of an inch) or less appear. Any Type 1 or greater leaks found in welded joints, O2 sensor seal points or O2 sensor boss welds must be repaired or the component must be replaced.
    - **Type 2 Leak** is defined as a leak where larger bubbles pea size, 8 mm (0.3 of an inch) or greater appear. Any Type 2 or greater leaks found in flange or joint connections, exhaust manifold to cylinder head connections, or EGR gasket and tube seal points must be repaired or the components must be replaced.

Leak Location	Repair required if results at 4 psi reveal bubble size:
Welded joints	Type 1: 1 mm (0.04 in.) or greater
O2 Sensor seal points	Type 1: 1 mm (0.04 in.) or greater
O2 Sensor boss welds	Type 1: 1 mm (0.04 in.) or greater
Flange/joint connections	Type 2: 8 mm (0.31 in.) or greater
Exhaust Manifold to cylinder head connections	Type 2: 8 mm (0.31 in.) or greater
EGR gasket and tube seal points	Type 2: 8 mm (0.31 in.) or greater

11. If a leak is found that matches the above definition, repair or replace the component as necessary.
12. Once the repair is complete, repeat the procedure to verify that all leaks have been repaired.

Were any exhaust leaks found?

Yes

- Repair or replace the leaking exhaust parts as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test complete.

CHECKING THE FUEL DELIVERY SYSTEM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
RESTRICTED FUEL SUPPLY LINE
FUEL PUMP INLET STRAINER PLUGGED
FUEL PUMP GROUND CIRCUIT
PLUGGED FUEL PUMP INLET
FUEL PUMP MODULE

Diagnostic Test

1. **FUEL PUMP OPERATION**
    1. Ignition on, engine not running.
    2. With a scan tool, actuate the Fuel System test.

    NOTE: It may be necessary to use a mechanics stethoscope in the next step.

    3. Listen for fuel pump operation at the fuel tank. The fuel pump should operate smoothly with no excessive noise. If the pump has excessive noise such as grinding, the pump should be replaced.

    CAUTION: Stop All Actuations.

    Does the Fuel Pump sound to be operate normally?

    Yes

    - Go to step 2

    No

- Go to step 7

2. **FUEL PRESSURE**
   1. Turn the ignition off.

      WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   2. Install a fuel pressure gauge.
   3. Ignition on, engine not running.
   4. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

      NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

      CAUTION: Stop All Actuations.

      Choose a conclusion that best matches your fuel pressure reading.

      Below Specification

      - Go to step 3

      Within Specification

      - Test Complete.

      Above Specification

      - Replace the Fuel Pump Module in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. **RESTRICTED FUEL SUPPLY LINE**
   1. Turn the ignition off.

      WARNING: The fuel system is under a constant pressure even with the engine off. Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released.

   2. Raise vehicle on hoist, and disconnect the fuel pressure line at the fuel pump module.
   3. Install special tool #6539 (5/16") or #6631(3/8") fuel line adapter and the fuel pressure gauge

between the fuel supply line and the fuel pump module.

4. Ignition on, engine not running.
5. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

CAUTION: Stop All Actuations.

Is the fuel pressure within specification now?

Yes

- Repair/replace fuel supply line as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 4

4. **SADDLE FUEL TANK**

Is the vehicle equipped with a saddle type fuel tank?

Yes

- Go to step 5

No

- Go to step 6

5. **CHECKING FUEL TANK SIPHON HOSE AND FUEL LINE**
   1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   2. Gain access to the Fuel Pump Module and the Fuel Tank Module.
   3. Inspect the following fuel components:
      - Fuel line and siphon hose between the Fuel Pump Module and the Fuel Tank Module. Look

for disconnected and/or damaged lines or hoses.
- Fuel Pressure Regulator not properly seated in the module.

Were the above items in good working condition?

Yes

- Go to step 6

No

- Repair or replace as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. **CHECKING THE FUEL PUMP INLET**
   1. Turn the ignition off.

      WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   2. Remove the Fuel Pump Module and Fuel Tank Module (if equipped), inspect the Fuel Inlet and the bottom of the fuel tank for debris that could cause the fuel pump inlet to be plugged.

      Is the Fuel Pump Inlet plugged?

      Yes

      - Repair/Replace as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Replace the Fuel Pump Module.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. **FUEL PUMP MOTOR GROUND CIRCUIT**

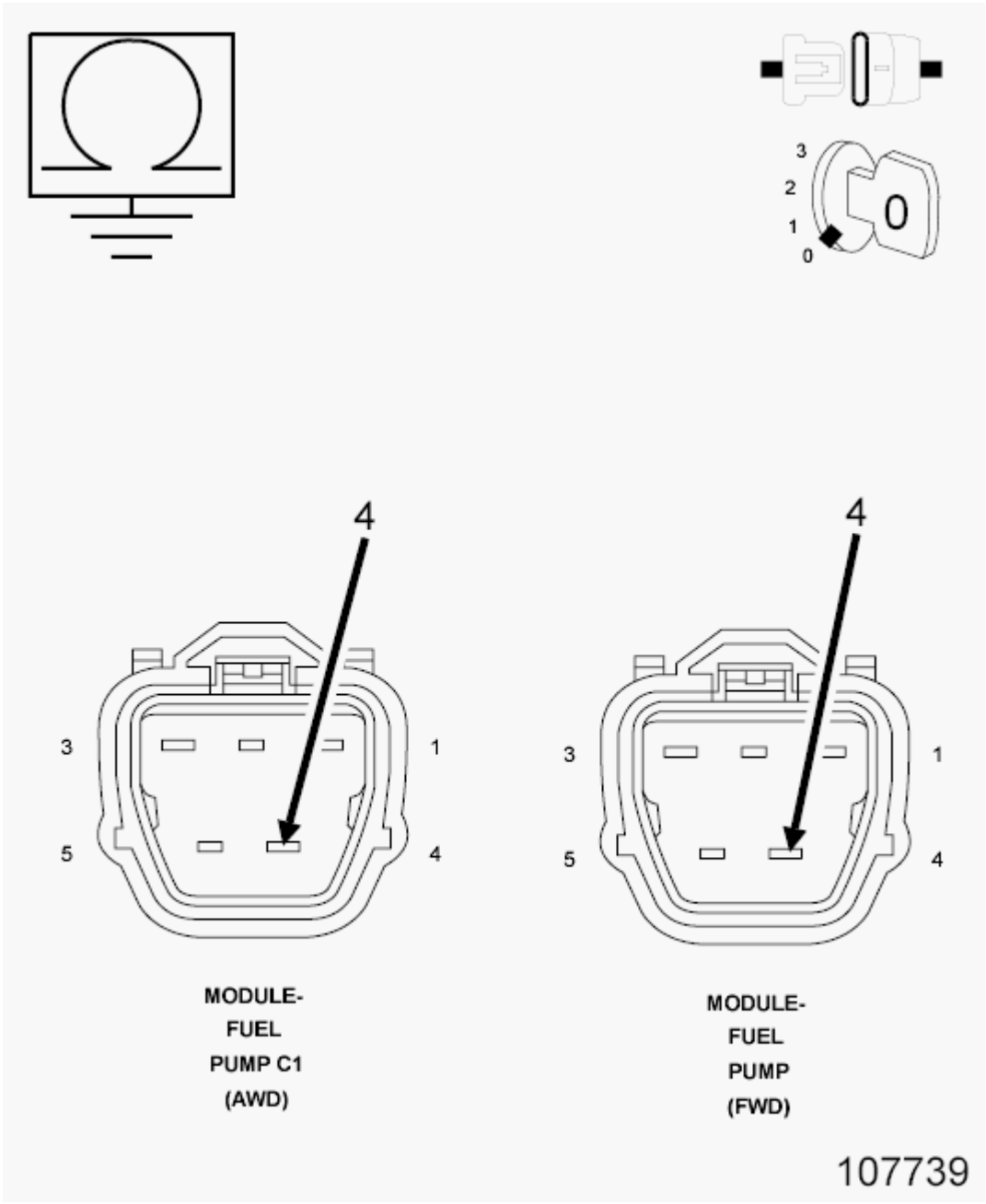


Fig. 16: Checking Fuel Pump Motor Ground Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Fuel Pump Module harness connector.
3. Using a 12-volt test light to battery voltage, probe the Fuel Pump Motor Ground circuit in the Fuel Pump Module harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly.

Yes

- Replace the Fuel Pump Module in accordance with the Service information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Repair the Fuel Pump Motor Ground circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING THE IGNITION COIL OPERATION

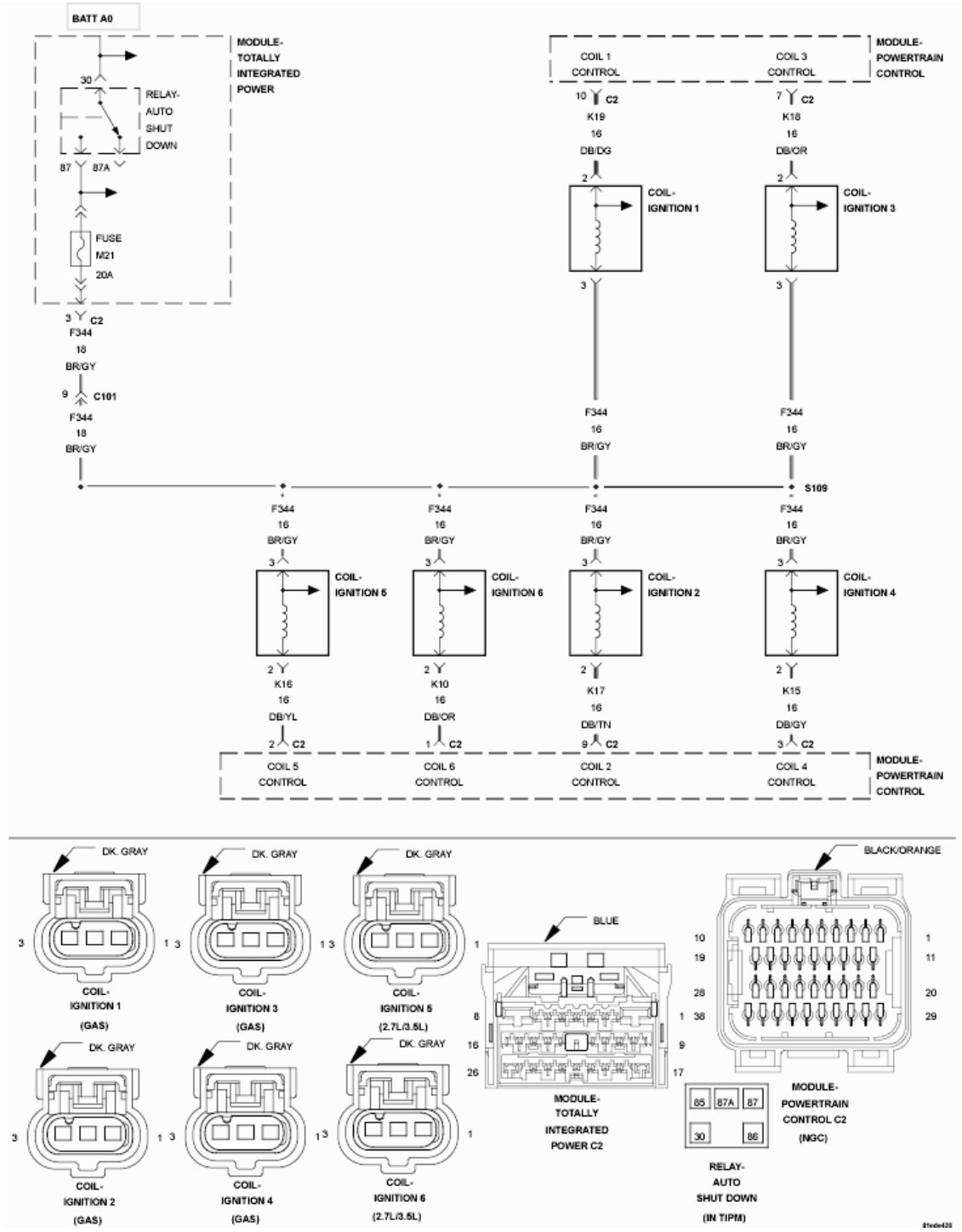


Fig. 17: Ignition Coil Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **IGNITION COIL WIRING OR CONNECTORS**

NOTE: Diagnose and repair any ignition coil, CMP sensor, or CKP sensor DTCs before proceeding with this test.

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Ignition Coil for the cylinder being tested and the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.

NOTE: If the vehicle is not equipped with the coil on plug ignition system, check the resistance of the ignition wire(s) before checking the cylinder with a spark tester. The resistance should be below 10k Ohms.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. **IGNITION COIL OPERATION**

NOTE: Inspect the ignition coil for damage, carbon tracking on the coil or a damaged spark plug insulator boot. If a problem is found, replace the ignition coil.

NOTE: 6.1L coils must have a spark tester installed on both sides of the coil during the following test. During the test, each side of the coil should output a crisp blue spark that is able to jump the gap of the spark tester.

NOTE: On the 2.7 and 3.5 engines, cylinders 1, 3 and 5, it is necessary to remove the upper intake manifold to access the ignition coils. Once the ignition coil has been removed, the intake must be installed in order to crank the engine. Move the ignition coil harness connector through the slots in the upper intake and then connect the coil to the harness connector. Secure the upper intake to the lower intake in accordance with the Service Information.

1. Turn the ignition off.
2. If the vehicle is equipped with coil on plug ignition system, remove the ignition coil for the cylinder being tested.
3. Disconnect the fuel injector harness connector for the cylinder being tested.
4. For coil on plug ignition systems, install a spark tester(s) on the ignition coil, otherwise install the spark tester to the ignition wire.
5. While cranking the engine observe the spark coming from the spark tester.

NOTE: A crisp blue spark that jumps the gap of the spark tester should be generated.

Is good spark present?

Yes

- Go to step 7

No

- Go to step 3

3. **MAIN/ASD RELAY OUTPUT CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the Ignition Coil harness connector.
   3. Turn the ignition on.
   4. With the scan tool, actuate the Main/ASD Relay to on.
   5. Using a 12-volt test light connected to ground, check the Main/ASD Relay output circuit in the ignition coil harness connector.

   NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

   Is the test light illuminated and bright during the actuation?

   Yes

   - Go to step 4

   No

   - Repair the Main/ASD Relay output circuit for an open circuit or high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

4. **IGNITION COIL**

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Using a 12-volt test light connected to 12 volts, check the Ignition Coil control circuit for the cylinder being tested in the Ignition Coil harness connector.
2. Crank the engine for 5 seconds.

NOTE: The test light should blink each time the circuit is activated by the PCM.

Does the test light blink each time the circuit is activated by the PCM?

Yes

- Replace the Ignition Coil in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go To 5

5. **IGNITION COIL CONTROL CIRCUIT OPEN OR HIGH RESISTANCE**

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the Ignition Coil control circuit for the cylinder being tested between the Ignition Coil harness connector and the appropriate terminal of PCM Pinout Box 8815.

Is the resistance below 5.0 Ohms?

Yes

- Go To 6

No

- Repair the Ignition Coil control circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

6. **POWERTRAIN CONTROL MODULE (PCM)**

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Ignition Coil for the cylinder being tested and the PCM.
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Perform any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. **SPARK PLUG(S)**
   1. Turn the ignition off.
   2. Remove the spark plug.

NOTE: Vehicles equipped with 5.7L or 6.1L engines must have both spark plugs (per cylinder) removed and inspected to ensure proper operation.

3. Inspect the spark plug for any of the following conditions:
   - Cracks or damage
   - Carbon tracking
   - Foreign material
   - Gap not within specification
   - Loose or broken electrode

NOTE: Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.

Were any problems found?

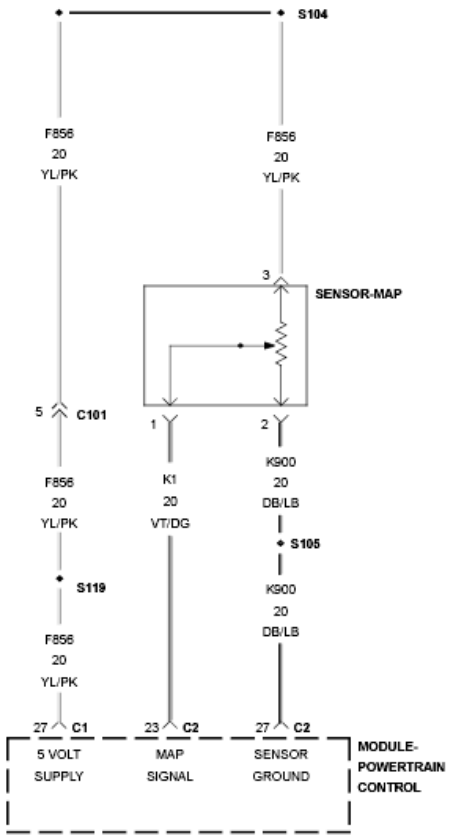
Yes

- Replace the spark plug.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Test Complete.

CHECKING THE MAP SENSOR OPERATION



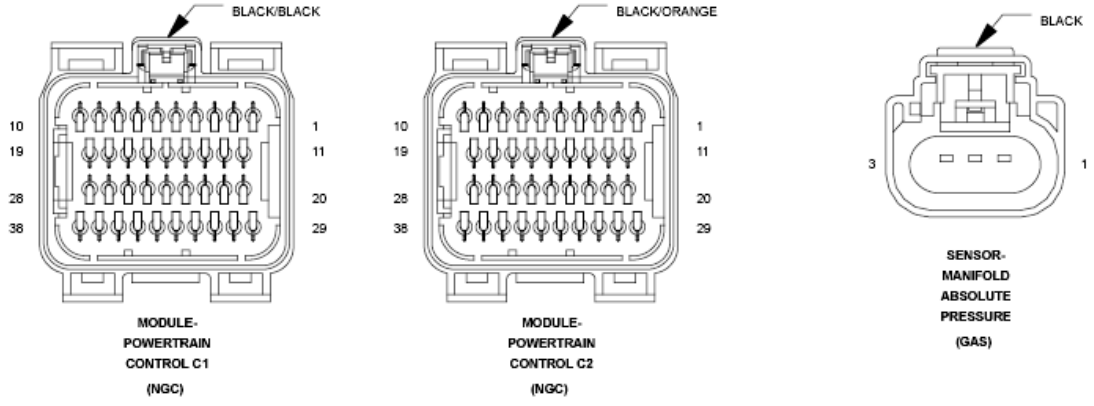


Fig. 18: Manifold Absolute Pressure Sensor Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **MAP SENSOR WIRING OR CONNECTORS**

   NOTE: Diagnose and repair any MAP Sensor circuit DTCs before proceeding with this test.

   NOTE: Diagnose and repair any sensor supply or system voltage DTCs before proceeding with this test.

   1. Turn the ignition off.
   2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the MAP Sensor and the PCM.
   3. Look for any chafed, pierced, pinched, or partially broken wires.
   4. Look for broken, bent, pushed out or corroded terminals.
   5. Turn the ignition on.
   6. Monitor the scan tool data relative to the sensor and wiggle test the wiring and connectors.
   7. Look for the data to change or for a DTC to set during the wiggle test. If necessary, check each sensor circuit for high resistance or a shorted condition.

      Were any problems found?

      Yes

      - Repair as necessary in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Go to step 2

2. **MAP VACUUM/BAROMETRIC PRESSURE**
   1. With a scan tool, read the Barometric Pressure.

      NOTE: The Barometric Pressure should be approximately equal to the actual barometric pressure. If necessary, compare the Barometric Pressure value of the tested vehicle to the value of a known good vehicle of a similar make and model.

   2. Connect a vacuum gauge to a manifold vacuum source.
   3. Start the engine.

      NOTE: If engine will not idle, maintain a constant RPM above idle.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

4. With the scan tool, read the MAP Sensor vacuum.

NOTE: The scan tool reading for MAP vacuum should be within 1" of the vacuum gauge reading.

Were any problems found?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. **MAP SENSOR VOLTAGE**
   1. With the scan tool, monitor the MAP Sensor signal voltage.
   2. With the engine idling in neutral or park, snap the throttle.

NOTE: The MAP Sensor signal voltage should change from below 2.0 volts at idle to above 3.5 volts at wide open throttle.

Were any problems found?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Test complete.

4. **(F856) 5 VOLT SUPPLY CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in

poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

2. Using a voltmeter, perform a voltage drop test by backprobing the (F856) 5 Volt Supply circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

   WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

   Is the voltage below 0.5 volts?

   Yes

   - Go to step 5

   No

   - Repair the (F856) 5 Volt Supply circuit for excessive resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. **(K1) MAP SIGNAL CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

      CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the (K1) MAP Signal circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   3. Start the engine.

Is the voltage below 0.5 volts?

Yes

- Go to step 6

No

- Repair the (K1) MAP Signal circuit for excessive resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. **(K900) SENSOR GROUND CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

      CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the (K900) Sensor Ground circuit at the MAP Sensor harness connector and by probing the appropriate terminal of the special tool #8815. Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   3. Start the engine.

      Is the voltage below 0.5 volts?

      Yes

      - Go to step 7

      No

      - Repair the (K900) Sensor Ground circuit for excessive resistance.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. **MAP SENSOR**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the MAP Sensor and the Powertrain Control Module (PCM).

2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace the MAP Sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE OXYGEN SENSOR OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **OXYGEN SENSOR, WIRING, OR CONNECTORS**

NOTE: Diagnose and repair any O2 sensor or rationality DTCs before proceeding with this test.

NOTE: When performing this procedure as part of another diagnostic process, it may be necessary to repeat this test for all of the oxygen sensors on the vehicle.

1. Turn the ignition off.
2. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Oxygen sensor and the PCM.
3. Look for any chafed, pierced, pinched, or partially broken wires.
4. Look for broken, bent, pushed out or corroded terminals.
5. Turn the ignition on.
6. Monitor the scan tool data relative to the sensor and wiggle test the wiring and connectors.
7. Look for the data to change or for a DTC to set during the wiggle test. If necessary, check each sensor circuit for high resistance or a shorted condition.

Were any problems found?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 2

2. **OXYGEN SENSOR VOLTAGE**
   1. Start the engine and allow it to reach normal operating temperature.

      WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   2. With a scan tool, monitor all O2 Sensor voltage readings.

      Is the voltage switching between 2.5 and 3.4 volts for all O2 sensors?

      Yes

      - Go to step 3
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Go to step 4

3. **O2 SENSOR HEATER OPERATION**
   1. Turn the ignition off.

      NOTE: Wait a minimum of 10 minutes to allow the O2 Sensor to cool down before continuing the test. Allow the O2 Sensor voltage to stabilize at 5.0 volts.

   2. Turn the ignition on.
   3. With a scan tool, actuate the O2 Sensor heater.
   4. With the scan tool, monitor O2 Sensor voltage for at least 2 minutes.

      Does the voltage stay above 4.5 volts?

Yes

- Go to step 4
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Test complete.

4. **O2 SENSOR**
   1. Turn the ignition off.

      NOTE: Check for contaminants that may cause improper O2 Sensor operation, such as contaminated fuel, unapproved silicone, or evidence of oil or coolant.

   2. Disconnect the O2 Sensor harness connector.
   3. Turn the ignition on.
   4. With a scan tool, monitor the O2 Sensor voltage.

      NOTE: The voltage should be approximately 5.0 volts with the connector disconnected.

   5. Connect a jumper wire between the signal circuit and the return circuit in the O2 Sensor harness connector.

      NOTE: The voltage should drop from 5.0 volts to 2.5 volts with the jumper wire in place.

      Is the O2 Sensor voltage displayed on the scan tool as described?

      Yes

      - Replace the O2 Sensor.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Go to step 5

5. **O2 SENSOR SIGNAL CIRCUIT**
   1. Using the wiring diagram/schematic as a guide, inspect the O2 Sensor Signal circuit and connectors between the O2 sensor and the PCM.

2. Check the O2 Sensor signal circuit for a short to ground, open circuit, short to voltage, or high resistance.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

   No

   - Go to step 6

6. **O2 SENSOR RETURN CIRCUIT**
   1. Using the wiring diagram/schematic as a guide, inspect the O2 Sensor Return circuit and connectors between the O2 sensor and the PCM.
   2. Check the O2 Sensor return circuit for a short to ground, open circuit, short to voltage or high resistance.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Go to step 7

7. **POWERTRAIN CONTROL MODULE (PCM)**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the O2 sensor and the PCM.
   2. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Look for broken, bent, pushed out or corroded terminals.
   4. Monitor the scan tool data relative to the components tested in this procedure and wiggle test the wiring and connectors.
   5. Look for the data to change or for a DTC to set during the wiggle test.
   6. Refer to any Technical Service Bulletins that may apply.

      Were any problems found?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE PCM POWER AND GROUND CIRCUITS

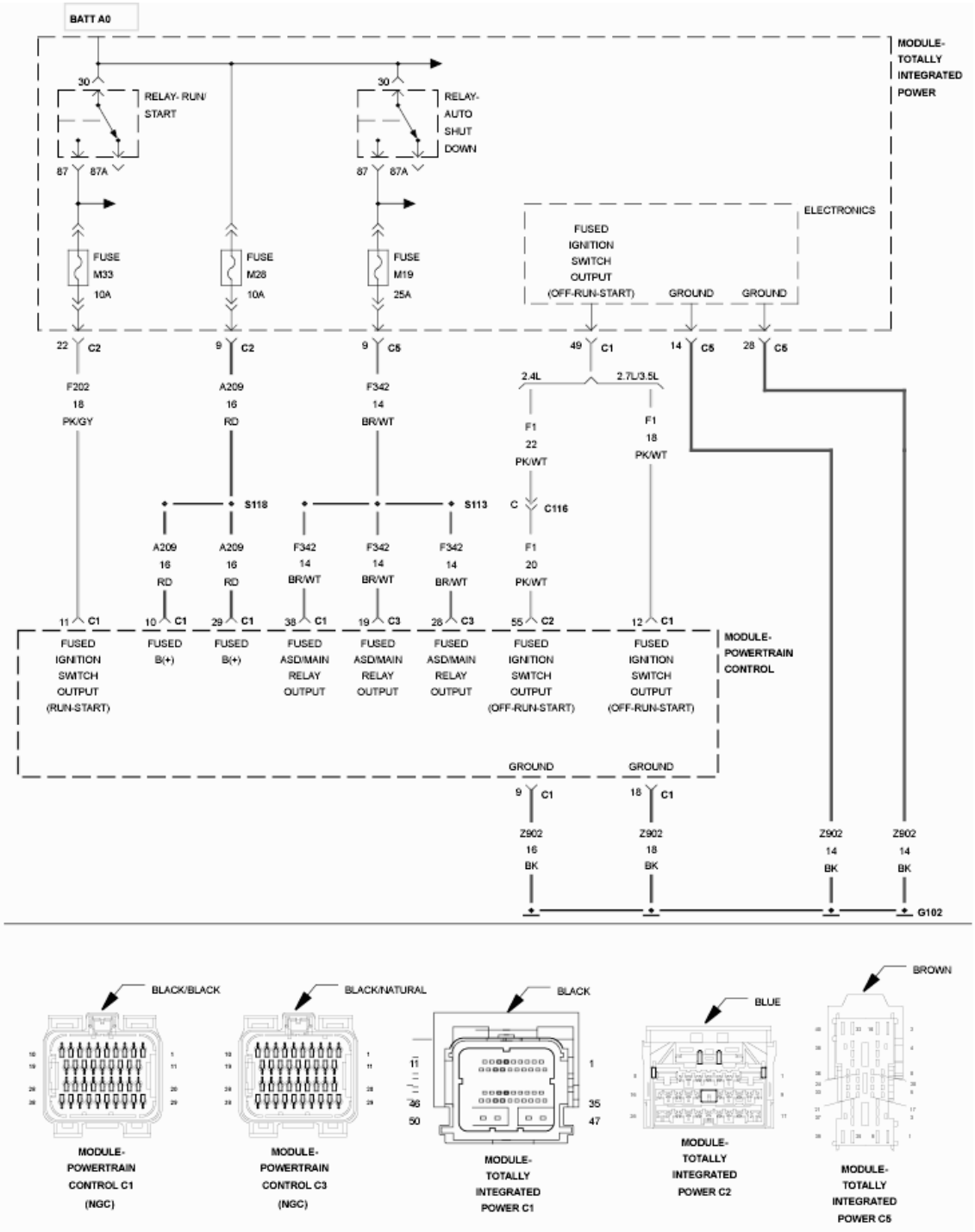


Fig. 19: PCM Power And Ground Circuits Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **PCM WIRING OR CONNECTORS**
    1. Turn the ignition off.
    2. Using the wiring diagram/schematic as a guide, inspect the wiring and each connector at the PCM.
    3. Look for any chafed, pierced, pinched, or partially broken wires.
    4. Look for broken, bent, pushed out or corroded terminals.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

    No

    - Go to step 2
2. **CHECKING THE PCM GROUND CIRCUITS**

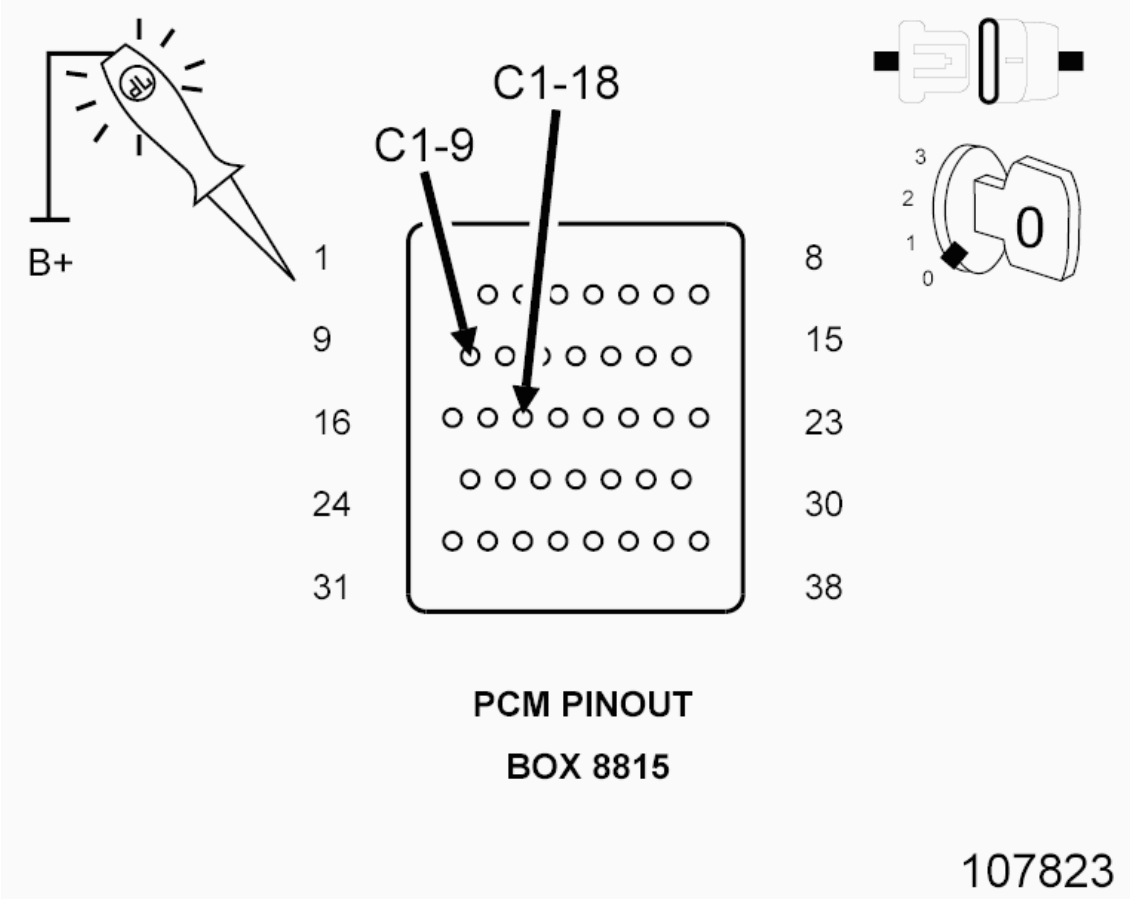


Fig. 20: Checking PCM Ground Circuits For Open

Courtesy of CHRYSLER LLC

1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to 12 volts, check the PCM ground circuits.
3. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 3.

No

- Repair the PCM ground circuit(s) for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. **CHECKING THE PCM FUSED B+ CIRCUITS**

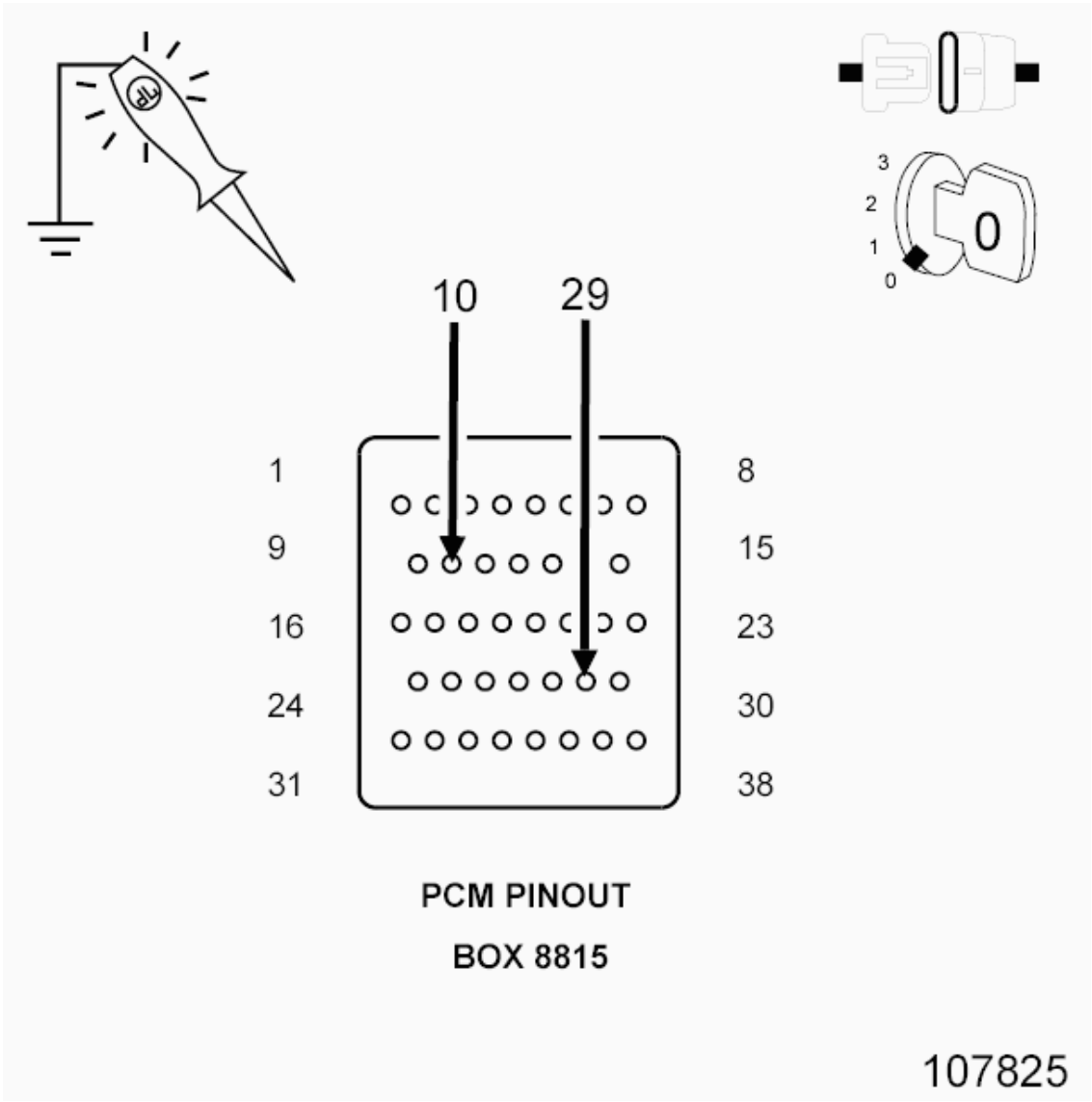


Fig. 21: Checking Fused B+ Circuits For Open Or Short To Ground
Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

1. Using a 12 volt test light connected to ground, check the PCM power supply circuits.
2. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 4.

No

- Repair the PCM power supply circuit(s) for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. **CHECKING THE PCM FUSED IGNITION SWITCH CIRCUITS**

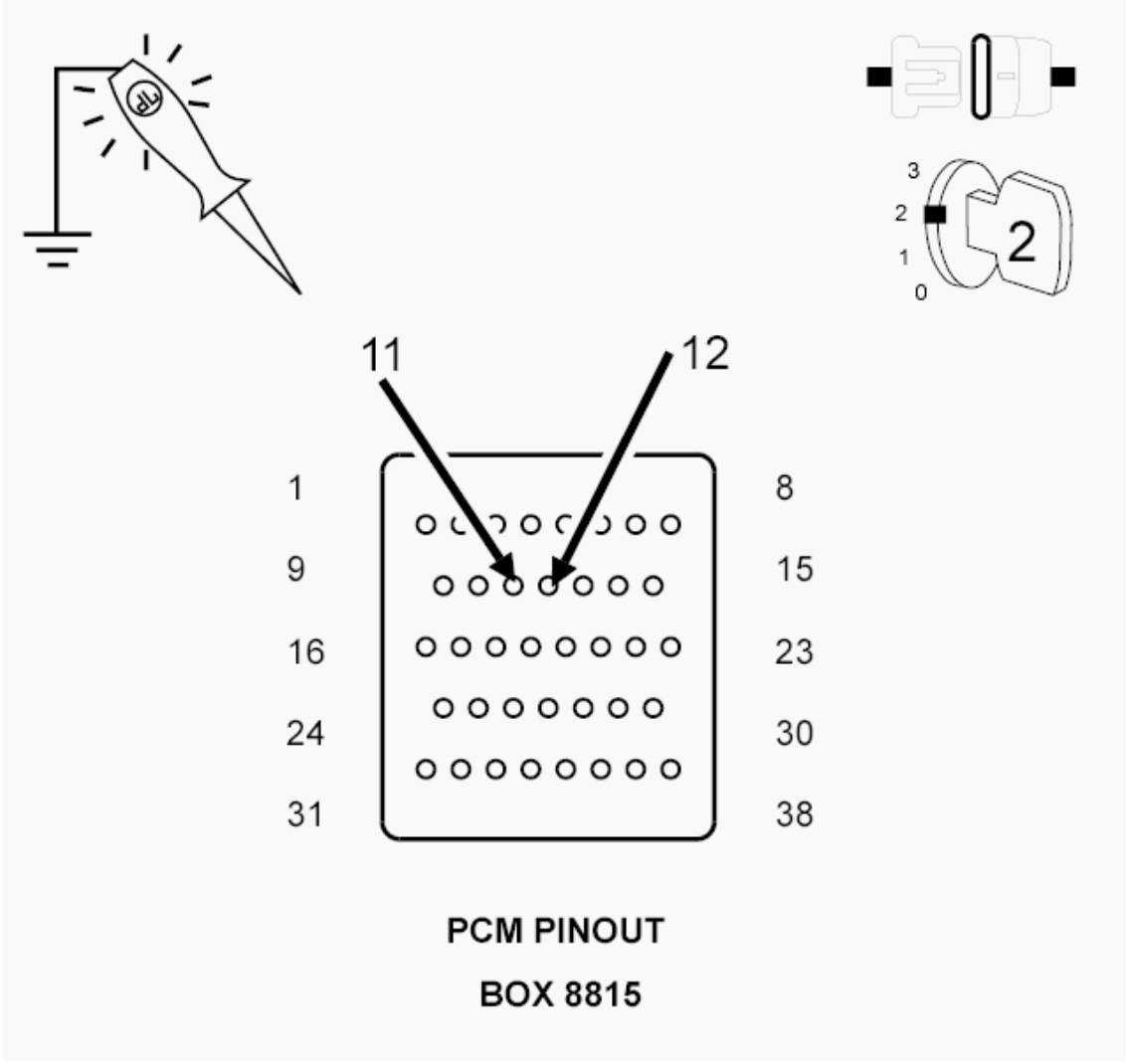


Fig. 22: Checking PCM Fused Ignition Switch Circuits For Open Or Short
Courtesy of CHRYSLER LLC

1. Turn the ignition on.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to ground, check the PCM (F202) and (F1) Fused Ignition circuits.
3. Wiggle test each circuit during the test to check for an intermittent open or short in the circuit.

NOTE: The test light should be illuminated and bright with the ignition on and not illuminated with the ignition off. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated as described above?

Yes

- Go to step 5.

No

- Repair the open or short in the Fused Ignition Switch circuits.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. **CHECKING THE PCM FUSED IGNITION SWITCH CIRCUITS**

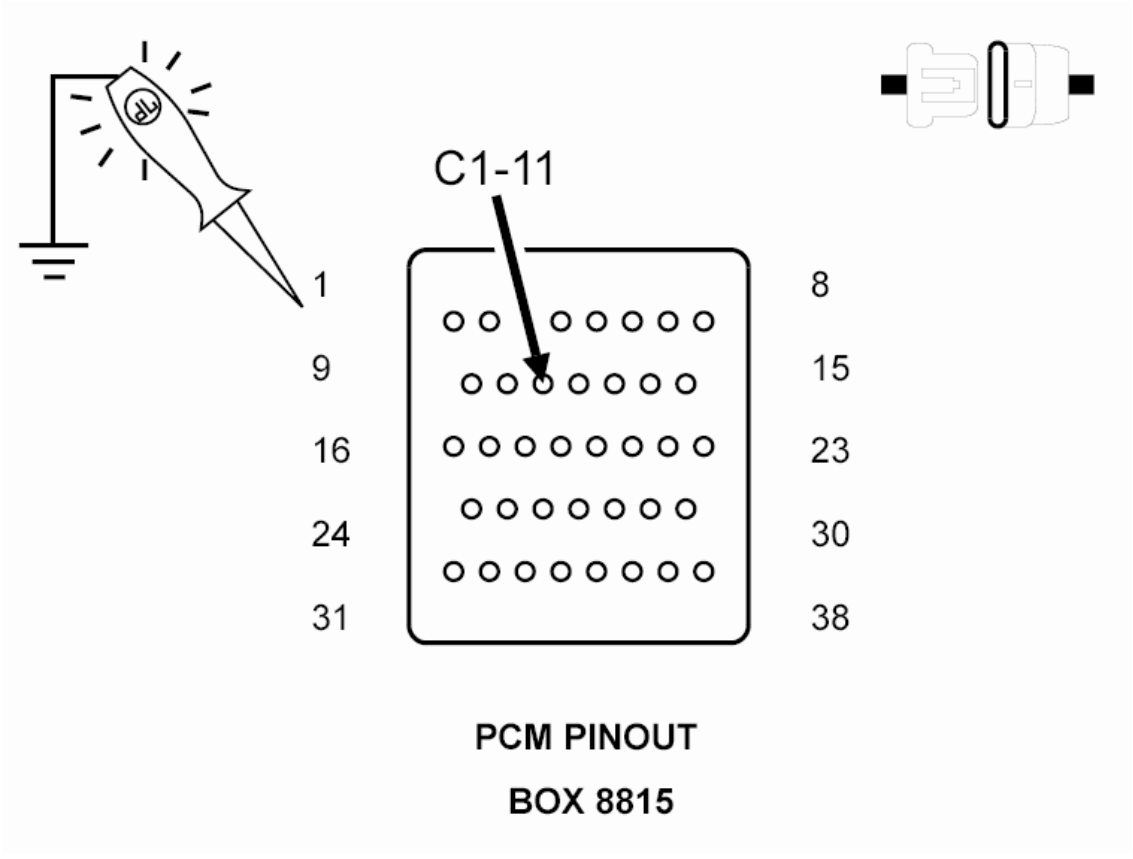


Fig. 23: Checking PCM Fused Ignition Switch Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition on.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

2. Using a 12 volt test light connected to ground, check the PCM Fused Ignition Switch circuits.
3. Check each circuit with the ignition off, ignition on, engine not running position, and during cranking.
4. Wiggle test each circuit during the test to check for an intermittent open in the circuit.

NOTE: The test light should be illuminated and bright with the ignition on and not illuminated with the ignition off. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated as described above?

Yes

- Test complete.

No

- Repair the PCM Fused Ignition Switch circuit(s) for as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

CHECKING THE TEMPERATURE SENSORS

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **COMPARE TEMPERATURE SENSOR VALUES**
   1. Turn the ignition off.
   2. Allow the vehicle to sit with the ignition off in an environment where the temperature is consistent and above -7° C (19.4° F) until the engine coolant temperature is equal to ambient temperature.
   3. Turn the ignition on.
   4. Using a thermometer, measure and record the underhood and ambient temperatures.
   5. With a scan tool, read the ambient air temperature (AAT), engine coolant temperature (ECT), engine oil temperature (EOT) and intake air temperature (IAT) sensor values, as applicable.

      Are all temperature sensor values within 10° C (18° F) of the thermometer and the other sensor values?

      Yes

      - Test complete.

      No

      - Go to step 2
2. **TEMPERATURE SENSOR WIRING OR CONNECTORS**

   NOTE: Perform the following procedures for each sensor that was not within the specified range as described in the previous step.

   1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the temperature sensor(s) and the applicable control module.
   2. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Look for broken, bent, pushed out or corroded terminals.
   4. Turn the ignition on.

5. Monitor the scan tool data relative to the sensor(s) and wiggle test the wiring and connectors.
6. Look for the data to change or for a DTC to set during the wiggle test.

Were any problems found?

Yes

- Repair as necessary in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 3

3. **SENSOR VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the temperature sensor harness connector.
   3. Connect a jumper wire between the signal circuit and the sensor ground circuit in the sensor harness connector.
   4. Turn the ignition on.
   5. With a scan tool, read the sensor voltage.

NOTE: The sensor voltage should be approximately 0.0 volts (plus or minus .1 volt) with the jumper wire in place.

Does the scan tool display the voltage as described above?

Yes

- Go to step 4

No

- Go to step 5

4. **TEMPERATURE SENSOR**
   1. Turn the ignition off.
   2. Remove the jumper wire from between the signal circuit and the sensor ground circuit in the sensor harness connector.
   3. Turn the ignition on.
   4. With a scan tool, read the sensor voltage.

NOTE: The sensor voltage should be approximately 5.0 volts (plus or

minus .1 of a volt) with the connector disconnected.

Does the scan tool display the voltage as described above?

Yes

- Replace the sensor.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 5

5. **SIGNAL CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Measure the resistance between ground and the signal circuit in the sensor harness connector.

      Is the resistance above 100 Ohms?

      Yes

      - Go to step 6

      No

      - Repair the signal circuit for a short to ground.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .
6. **SIGNAL CIRCUIT SHORTED TO SENSOR GROUND CIRCUIT**
   1. Measure the resistance between the signal circuit and the sensor ground circuit in the sensor harness connector.

      Is the resistance above 100 Ohms?

      Yes

      - Go to step 7

      No

      - Repair the signal circuit for a short to the sensor ground circuit.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .
7. **SIGNAL CIRCUIT HIGH RESISTANCE**

1. Turn the ignition off.
2. Connect the temperature sensor harness connector.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. Using a voltmeter, perform a voltage drop test by backprobing the signal circuit at the sensor harness connector and at the applicable module connector (or by probing the appropriate terminal of the PCM Pinout Box 8815). Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

4. Start the engine.

   Is the voltage below 0.5 of a volt?

   Yes

   - Go to step 8

   No

   - Repair the signal circuit for high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

8. **SENSOR GROUND CIRCUIT HIGH RESISTANCE**
   1. Turn the ignition off.

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

   2. Using a voltmeter, perform a voltage drop test by backprobing the sensor ground circuit at the sensor harness connector and at the applicable module connector (or by probing the appropriate terminal of the PCM Pinout Box 8815). Make sure the voltmeter leads are connected so that positive polarity is displayed on the voltmeter.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

3. Start the engine.

   Is the voltage below 0.5 of a volt?

   Yes

   - Go to step 9

   No

   - Repair the sensor ground circuit for high resistance.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

9. **MODULE**
   1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the sensor and the applicable control module. Refer to the system schematic.
   2. Look for any chafed, pierced, pinched, or partially broken wires.
   3. Look for broken, bent, pushed out or corroded terminals.
   4. Monitor the scan tool data relative to this circuit and wiggle test the wiring and connectors.
   5. Look for the data to change or for the DTC to reset during the wiggle test.
   6. Perform any Technical Service Bulletins that may apply.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Replace the applicable control module in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

CHECKING A NO RESPONSE - NO START CONDITION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
INTERMITTENT NO RESPONSE CONDITION
(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE
(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND
(K51) ASD RELAY CONTROL CIRCUIT OPEN OR HIGH RESISTANCE
FUSED B+ CIRCUIT(S) OPEN OR HIGH RESISTANCE
FUSED IGNITION SWITCH OUTPUT CIRCUITS OPEN OR HIGH RESISTANCE
PCM GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE
(D65) CAN C BUS (+) CIRCUIT OPEN
(D64) CAN C BUS (-) CIRCUIT OPEN
POWERTRAIN CONTROL MODULE (PCM)

Diagnostic Test

1. **INTERMITTENT NO RESPONSE CONDITION**

NOTE: Verify that the IOD fuse is installed and not open. If the fuse is open, check the circuit for a short to ground.

NOTE: The battery must be fully charged and in good condition. An undercharged battery may produce invalid test results.

NOTE: The battery cables must be clean and fastened properly. The chassis ground must be clean and fastened properly.

NOTE: The scan tool (including the cable) must be operating properly for the results of this test to be valid.

NOTE: With the scan tool, check the FCM for any active CAN C hardware DTCs, and perform appropriate diagnostic procedure before continuing with this test.

NOTE: On the scan tool screen, a red X next to a module indicates that the module is not active (communicating) on the Bus network. A green check indicates that the module is active on the Bus network.

1. Turn the ignition on.
2. With the scan tool, select ECU view.

   Is the PCM active (communicating) on the BUS?

   Yes

- The PCM no response condition is not present at this time. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors for any problems that would result in an intermittent no response condition.

No

- Go to step 2

2. **(K51) ASD RELAY CONTROL CIRCUIT OPERATION**
   1. Turn the ignition off.
   2. Remove the Auto Shutdown Relay.
   3. Using a 12 volt test light connected to 12 volts, check the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.
   4. Turn the ignition on.

   NOTE: The test light should illuminate for approximately 3 seconds and then turn off, this is considered normal operation.

   Is the test light illuminated and bright as described above?

   Yes

   - Go to step 9

   No

   - Go to step 3

3. **(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO VOLTAGE**
   1. Turn the ignition off.
   2. Disconnect the C3 Powertrain Control Module (PCM) harness connector.
   3. Turn the ignition on.
   4. Measure the voltage of the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.

   Is there any voltage present?

   Yes

   - Repair the short to voltage in the (K51) ASD Relay Control circuit.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

   No

- Go to step 4

4. **(K51) ASD RELAY CONTROL CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Measure the resistance between ground and the (K51) ASD Relay Control circuit at the Auto Shutdown Relay connector.

      Is the resistance below 100 ohms?

      Yes

      - Repair the short to ground in the (K51) ASD Relay Control circuit.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Go to step 5

5. **(K51) ASD RELAY CONTROL CIRCUIT OPEN OR HIGH RESISTANCE**

   CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

   1. Measure the resistance of the (K51) ASD Relay Control between the Auto Shutdown Relay connector and the appropriate terminal of special tool #8815.

      Is the resistance below 5.0 ohms?

      Yes

      - Go to step 6

      No

      - Repair the open or high resistance in the (K51) ASD Relay Control circuit.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. **FUSED B+ CIRCUIT(S) OPEN OR HIGH RESISTANCE**

   CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install PCM Pinout Box 8815 to perform diagnosis.

   1. Using a 12 volt test light connected to ground check the Fused B+ circuit(s) at the appropriate

terminal of special tool #8815.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 7

No

- Repair the Fused B+ circuit(s) as necessary. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

7. **FUSED IGNITION SWITCH OUTPUT CIRCUIT(S) OPEN OR HIGH RESISTANCE**
   1. Turn the ignition on.
   2. Using a 12 volt test light connected to ground, check the Fused Ignition Switch Output circuit(s) in the appropriate terminal(s) of special tool #8815.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 8

No

- Repair the Fused Ignition Switch Output circuit(s) as necessary. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. **PCM GROUND CIRCUITS**
   1. Turn the ignition off.
   2. Using a 12 volt test light connected to battery voltage, check the PCM ground circuits in the appropriate terminals of special tool #8815.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 11

No

- Repair the PCM ground circuit(s) as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

9. **(D65) CAN C BUS (+) CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the C1 TIPM harness connector.
   3. Measure the resistance of the (D65) CAN C Bus (+) circuit between the TIPM connector and the appropriate terminal of the special tool #8815.

      Is the resistance below 5.0 ohms?

      Yes

      - Go to step 10

      No

      - Repair the open or high resistance in the (D65) CAN C Bus (+) circuit.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**
10. **(D64) CAN C BUS (-) CIRCUIT OPEN OR HIGH RESISTANCE**
    1. Measure the resistance of the (D64) CAN C Bus (-) circuit between the C1 TIPM harness connector and the appropriate terminal of the special tool #8815.

       Is the resistance below 5.0 ohms?

       Yes

       - Go to step 11

       No

       - Repair the open or high resistance in the (D64) CAN C Bus (-) circuit.
       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**
11. **POWERTRAIN CONTROL MODULE (PCM)**

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Auto Shutdown Relay and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires.
3. Look for broken, bent, pushed out or corroded terminals.
4. Refer to any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

ENGINE CRANKS BUT DOES NOT START

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
5 VOLT SUPPLY CIRCUIT OPEN OR SHORTED
UNDERCHARGED BATTERY
SYSTEM DTCS PRESENT
POWERTRAIN POWER AND GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE
POWERTRAIN FUSES OPEN
FUEL DELIVERY SYSTEM
FUEL CONTAMINATION
INADEQUATE SPARK
ENGINE MECHANICAL PROBLEM

Diagnostic Test

1. **UNDERCHARGED BATTERY**

NOTE: Diagnose any 5 Volt Supply DTCs before continuing

NOTE: The battery must be fully charged and in good condition. An undercharged

battery may produce invalid test results.

1. Test the battery in accordance with the Service Information.

   Were any problems found?

   Yes

   - Charge or replace the battery as necessary and retest.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   No

   - Go to step 2

2. **SYSTEM DTCS PRESENT**

   NOTE: If the battery was low, make sure the battery is properly charged and attempt to start the vehicle. Crank the engine for 15 seconds, 3 consecutive times. This will allow any DTCs to set that may have been erased due to a dead battery.

   1. With the scan tool, select System DTCs to read DTCs in all modules. If any DTCs are present, perform the appropriate diagnostic procedure before continuing with this test. If a no response condition is detected in any module, refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate NO RESPONSE diagnostic procedure.

      Were any problems found?

      Yes

      - Perform the appropriate diagnostic procedure and repair as necessary. If any pending DTCs are detected, perform the diagnostic procedure as if the DTC is active.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 3

3. **PCM POWER OR GROUND CIRCUIT OPEN OR HIGH RESISTANCE**
   1. Turn the ignition off.
   2. Disconnect the PCM harness connector(s).
   3. Using a 12-volt test light, check all PCM power and ground circuits.

NOTE: The test light must be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright when checking each of the PCM power and ground circuits?

Yes

- Repair the PCM power or ground circuit for an open circuit or high resistance.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 4

4. **OPEN FUSE(S)**
   1. Inspect all of the fuses in the TIPM. If any open fuses are found, check the related circuit(s) for a short to ground or high resistance.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 5

5. **CHECKING THE FUEL DELIVERY SYSTEM**

   NOTE: Verify that the fuel tank is not empty before continuing.

   1. Perform the diagnostic procedure for **CHECKING THE FUEL DELIVERY SYSTEM**.

      Were any problems found?

      Yes

      - Repair as necessary in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

- Go to step 6

6. **FUEL CONTAMINATION**
   1. Check the fuel system for contamination in accordance with the Service Information.

      Was any evidence of fuel contamination found?

      Yes

      - Clean and repair the fuel system as necessary in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 7

7. **CHECKING THE IGNITION COIL OPERATION**
   1. Perform the diagnostic procedure for **CHECKING THE IGNITION COIL OPERATION**.

      Were any problems found?

      Yes

      - Repair as necessary in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 8

8. **CHECKING THE ENGINE MECHANICAL SYSTEM**
   1. Perform the diagnostic procedure for **CHECKING THE ENGINE MECHANICAL SYSTEM**.

      Were any problems found?

      Yes

      - Repair as necessary in accordance with the Service Information.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Test complete. Refer to any Technical Service Bulletins that may apply.

FUEL DELIVERY SYSTEM OUTPUT - FLOW TEST

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

WARNING: Follow these safety precautions to reduce the risk of fire and possible serious or fatal injury when performing this test procedure.

- **Fuel or fuel vapors are highly flammable. A fire could occur if an ignition source is present. Do not expose the fuel or the test equipment used in this procedure to open flames or sparks.**
- **Inhalation of fuel vapors could lead to disorientation and personal injury. Keep the service area well ventilated, or perform this test procedure in an area where there is a building exhaust removal system.**
- **Relieve fuel system pressure before servicing fuel system components.**
- **Use extreme caution when connecting and disconnecting fuel lines.**
- **Considerable fuel leakage may occur when servicing the fuel system. Wear protective eyewear and clothing to protect from fuel splash, and take suitable fuel containment measures.**
- **Wrap a shop towel around the fuel pressure gauge connection to absorb fuel leakage that occurs when connecting the test equipment. Place the towel in an approved container when complete.**
- **Never store fuel in an open container due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.**

Diagnostic Test

1. **CHECK FUEL DELIVERY SYSTEM FOR LEAKS AND DAMAGE**

   WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   1. Visually and physically inspect the fuel delivery system for external leaks and damage.

      Is the system leaking or damaged?

      Yes

      - Repair or replace as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 2

2. **INSTALL APPROPRIATE FUEL LINE ADAPTERS/FITTING FROM THE GAS AND DIESEL FUEL PRESSURE/DECAY TESTER 8978A**

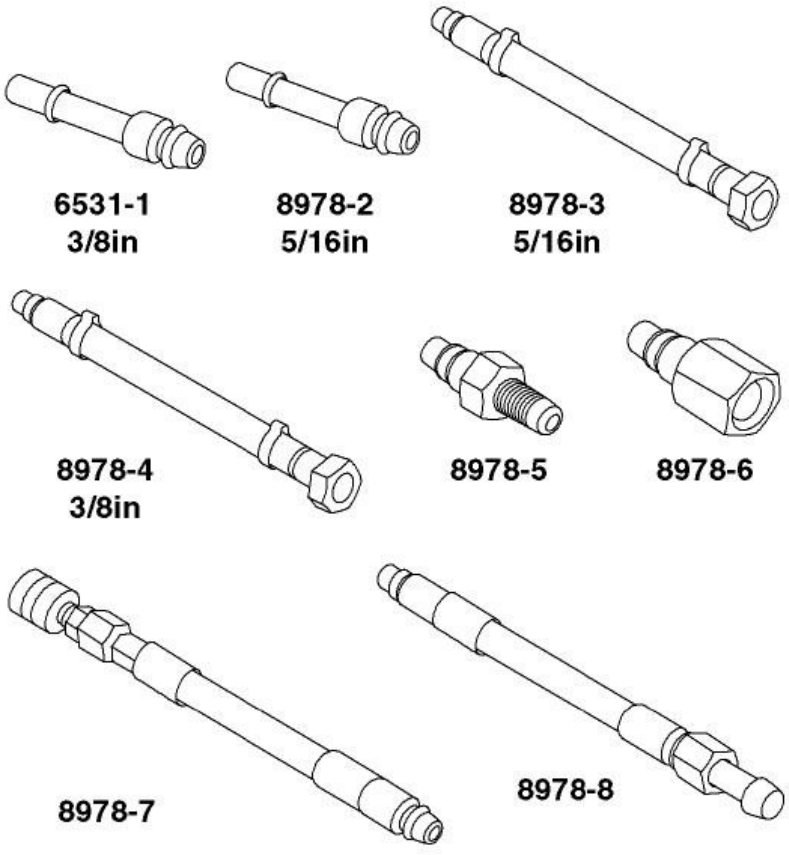


Fig. 24: Fuel Line Adapters/Fitting
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the

engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Disconnect the frame rail fuel supply line connector between the fuel supply line and the fuel rail.
3. Install the appropriate Fuel Line Adapters/Fitting from the Gas and Diesel Fuel Pressure/Decay Tester 8978A.

Proceed

- Go to step 3

3. **INSTALL FUEL PRESSURE GAUGE ASSEMBLY**

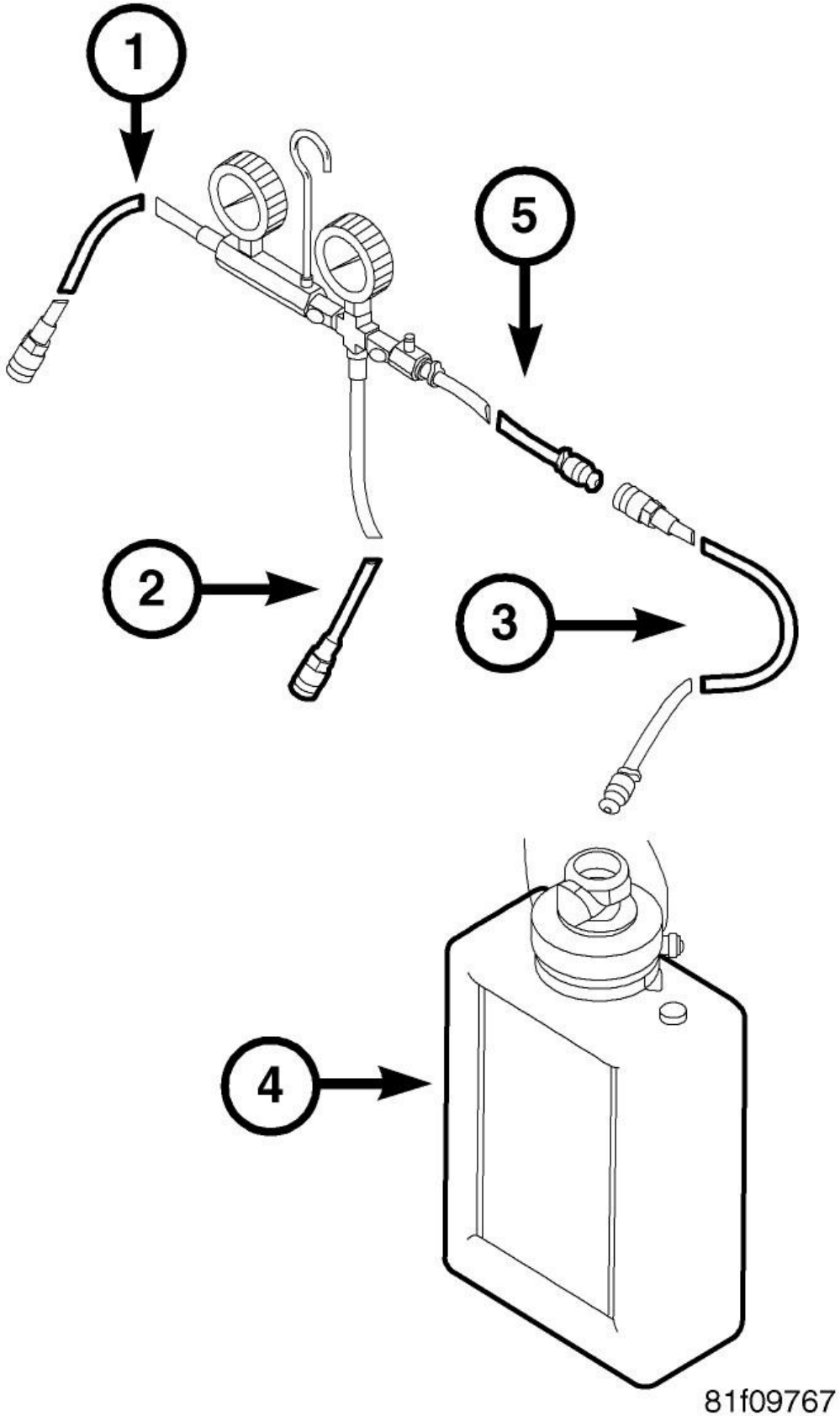

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Fig. 25: Identifying Fuel Pressure Gauge Assembly
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Connect the Gas and Diesel Fuel Pressure/Decay Tester 8978A, Fuel Inlet Hose (1) and Fuel Outlet Hose (2) to the Fuel Line Adapters/Fitting.
2. Connect special tool Drain Extension Hose 535680 (3) to the Fuel Pressure Gauge Assembly Drain Hose (5).
3. Connect Reservoir Assembly 534960 (4) to Drain Extension Hose 535680 (3).

WARNING: To reduce the risk of fire and possible serious or fatal injury, place Reservoir Assembly 534960 (4) on the floor and out of the way so that it is not a trip hazard.

Proceed

- Go to step 4

4. **CHECK FUEL PRESSURE**

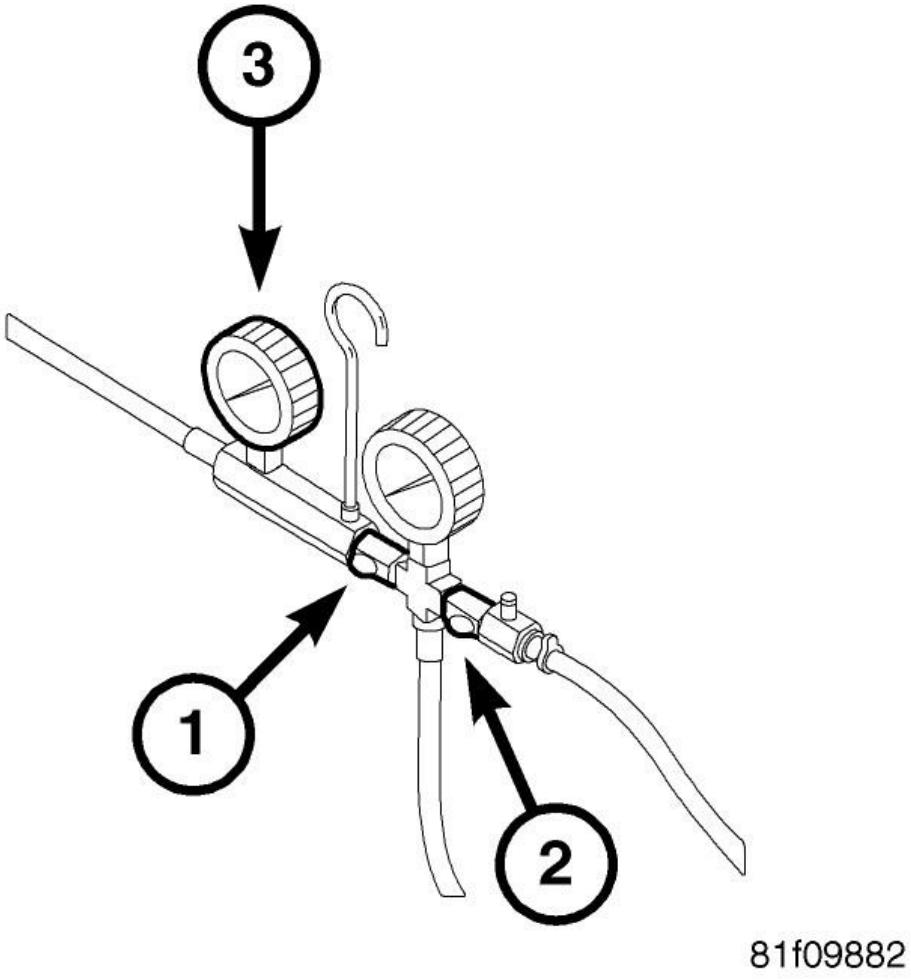

Fig. 26: Checking Fuel Pressure
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

Perform the following procedure to purge air from the system:

- Open the Fuel System Isolation Valve (1).
- Close the Flow Test Valve (2).
- Ignition on, engine not running.
- With the scan tool, actuate the fuel pump.
- Open the Flow Test Valve (1) for 10 seconds, then close the Valve.
- **CAUTION: Stop All Actuations.**

- Turn the ignition off.
- Disconnect, empty and then reconnect the Reservoir Assembly.

1. Turn the ignition on, wait five seconds, turn the ignition off and then wait one minute before proceeding.
2. Read the Fuel Pressure Gauge (3) and record the reading. **Non SRT-4** fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi). **SRT-4** fuel pressure specification is 552 kPa +/- 34 kPa (80 psi +/- 5 psi).

   Is the fuel pressure within specifications?

   Yes

   - Go to step 5

   No

   - Perform the **CHECKING THE FUEL DELIVERY SYSTEM** diagnostic procedure.

5. **CHECK FUEL DELIVERY SYSTEM OUTPUT**

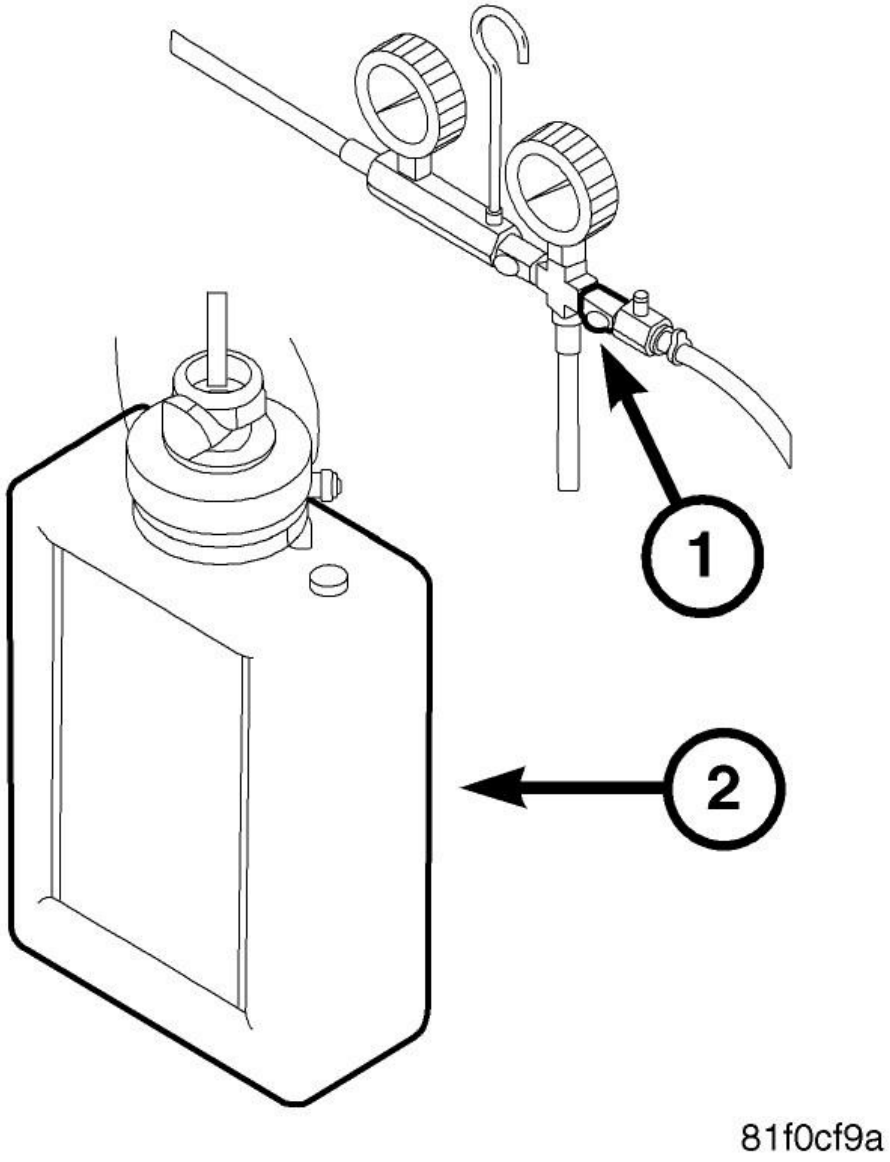

Fig. 27: Checking Fuel Delivery System Output
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Ignition on, engine not running.
2. With the scan tool, actuate the fuel pump.
3. Open the Flow Test Valve (1) for 20 seconds, then close the Valve.

CAUTION: Stop All Actuations.

4. Turn the ignition off.
5. Measure the amount of fuel in the Reservoir Assembly (2). The fuel output specification is ml/s x 20 seconds = fuel flow in ml.

FUEL FLOW		
ENGINE	ml/s	ml per 20 Seconds
4 Cylinder and 6 Cylinder	20.8333A	417
8 Cylinder	38.88889	778
SRT-4	50	1000

FUEL PRESSURE LEAK DOWN

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
FUEL DELIVERY SYSTEM LEAKING OR DAMAGED
FUEL PUMP MODULE
FUEL INJECTOR(S)

WARNING: Follow these safety precautions to reduce the risk of fire and serious possible serious or fatal injury when performing this test procedure.

- **Fuel or fuel vapors are highly flammable. A fire could occur if an ignition source is present. Do not expose the fuel or the test equipment used in this procedure to open flames or sparks.**
- **Inhalation of fuel vapors could lead to disorientation and personal injury. Keep the service area well ventilated, or perform this test procedure in an area where there is a building exhaust removal system.**
- **Relieve fuel system pressure before servicing fuel system components.**
- **Use extreme caution when connecting and disconnecting fuel lines.**
- **Considerable fuel leakage may occur when servicing the fuel system. Wear protective eye wear and clothing to protect from fuel splash, and take suitable fuel containment measures.**
- **Wrap a shop towel around the fuel pressure gauge connection to absorb fuel leakage that occurs when connecting the test equipment. Place the towel in an approved container when complete.**

- **Never store fuel in an open container due to the possibility of fire or explosion. Have a dry chemical (Class B) fire extinguisher nearby.**

Diagnostic Test

1. **CHECK FUEL DELIVERY SYSTEM FOR LEAKS AND DAMAGE**

   WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   1. Visually and physically inspect the fuel delivery system for external leaks and damage.

      Is the system leaking or damaged?

      Yes

      - Repair/replace as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 2

2. **INSTALL APPROPRIATE FUEL LINE ADAPTERS/FITTING FROM GAS AND DIESEL FUEL PRESSURE/DECAY TESTER 8978A**

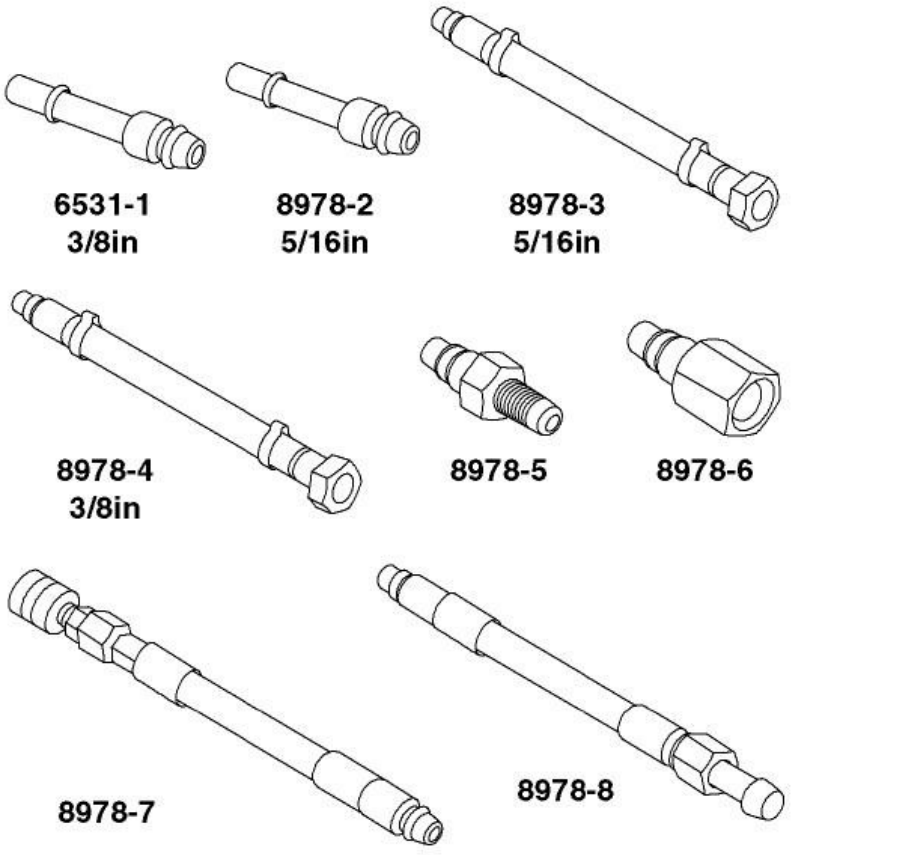

Fig. 28: Fuel Line Adapters/Fitting
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Disconnect the frame rail fuel supply line connector between the fuel supply line and the fuel rail.

3. Install the appropriate Fuel Line Adapters/Fitting from Gas and Diesel Fuel Pressure/Decay Tester 8978A.

   Proceed

   - Go to step 3

3. **INSTALL FUEL PRESSURE GAUGE ASSEMBLY**

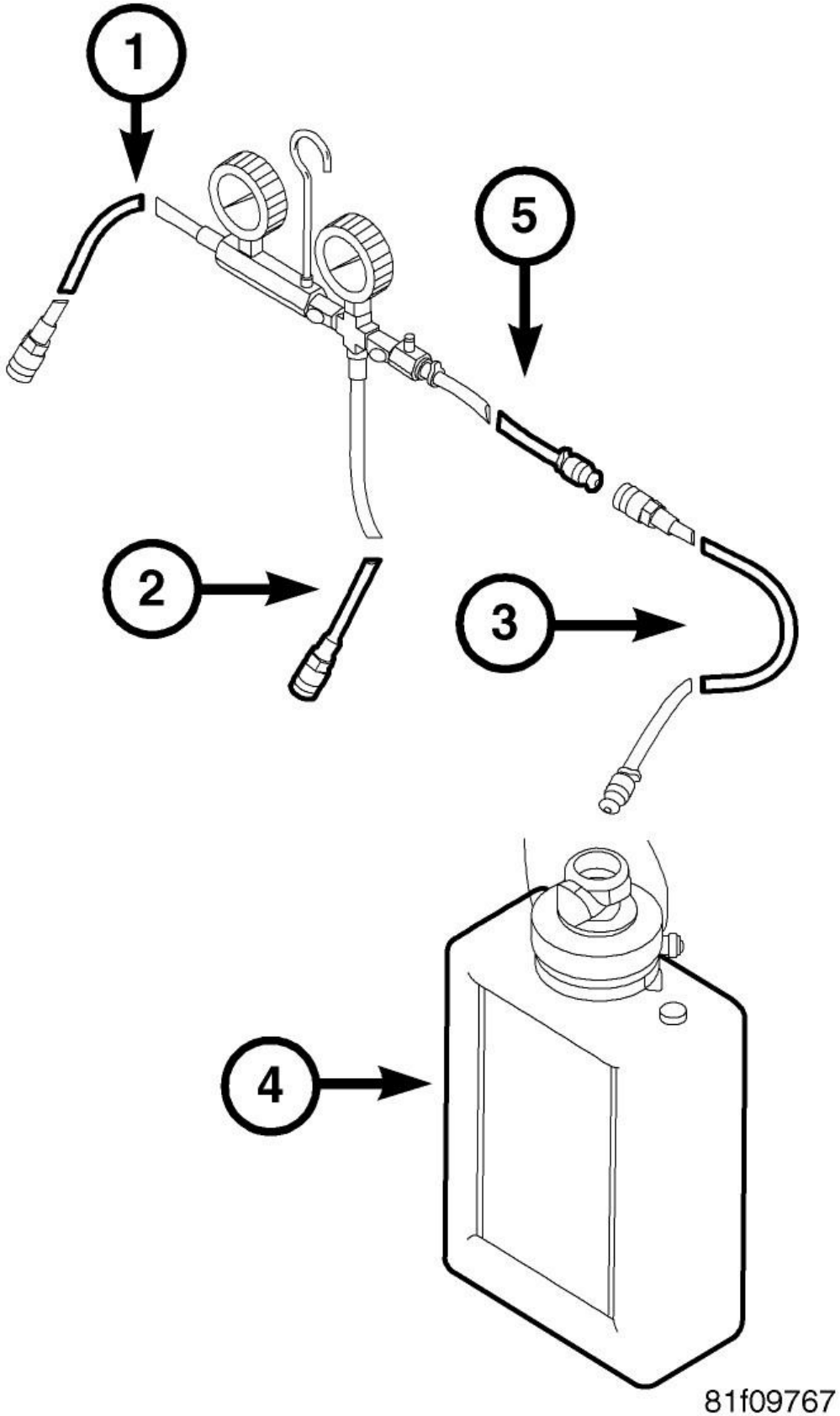
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Fig. 29: Identifying Fuel Pressure Gauge Assembly
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Connect Gas and Diesel Fuel Pressure/Decay Tester 8978A, Fuel Inlet Hose (1) and Fuel Outlet Hose (2) to the Fuel Line Adapters/Fitting.
2. Connect Drain Extension Hose 535680 (3) to the Fuel Pressure Gauge Assembly Drain Hose (5).
3. Connect the Reservoir Assembly 534960 (4) to the Drain Extension Hose 535680 (3).

WARNING: To reduce the risk of fire and serious possible serious or fatal injury, place Reservoir Assembly 534960 (4) on the floor and out of the way so that it is not a trip hazard.

Proceed

- Go to step 4

4. **CHECK FUEL PRESSURE**

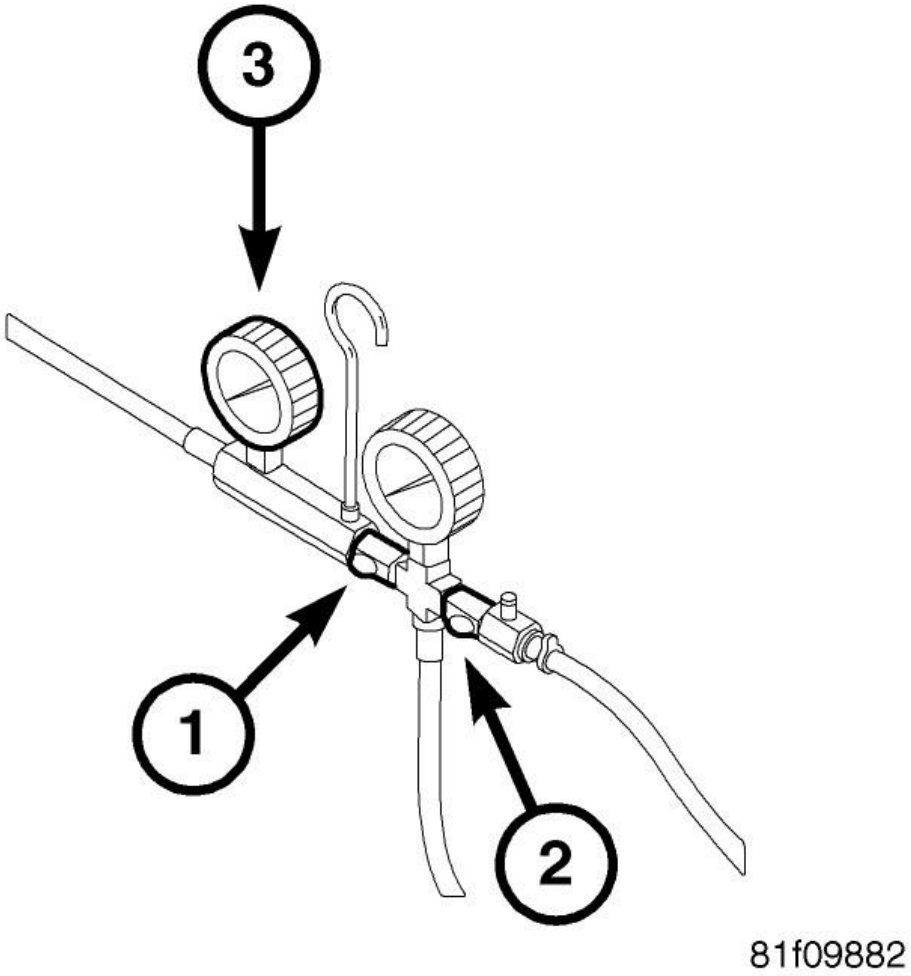

Fig. 30: Checking Fuel Pressure
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Perform the following procedure to purge air from the system:
   - Open the Fuel System Isolation Valve (1).
   - Close the Flow Test Valve (2).
   - Ignition on, engine not running.
   - With the scan tool, actuate the fuel pump.
   - Open the Flow Test Valve (1) for 10 seconds, then close the Valve.
   - **CAUTION: Stop All Actuations.**
   - Turn the ignition off.

- Disconnect, empty and then reconnect the Reservoir Assembly.

2. Turn the ignition on, wait five seconds, turn the ignition off and then wait 1 minute before proceeding.
3. Read the Fuel Pressure Gauge (3) and record the reading. **Non SRT-4** fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi). **SRT-4** fuel pressure specification is 552 kPa +/- 34 kPa (80 psi +/- 5 psi).

   Is the fuel pressure within specifications?

   Yes

   - Go to step 5

   No

   - Perform the **CHECKING THE FUEL DELIVERY SYSTEM** diagnostic procedure as directed.

5. **CHECK FUEL DELIVERY SYSTEM FOR LEAK DOWN**

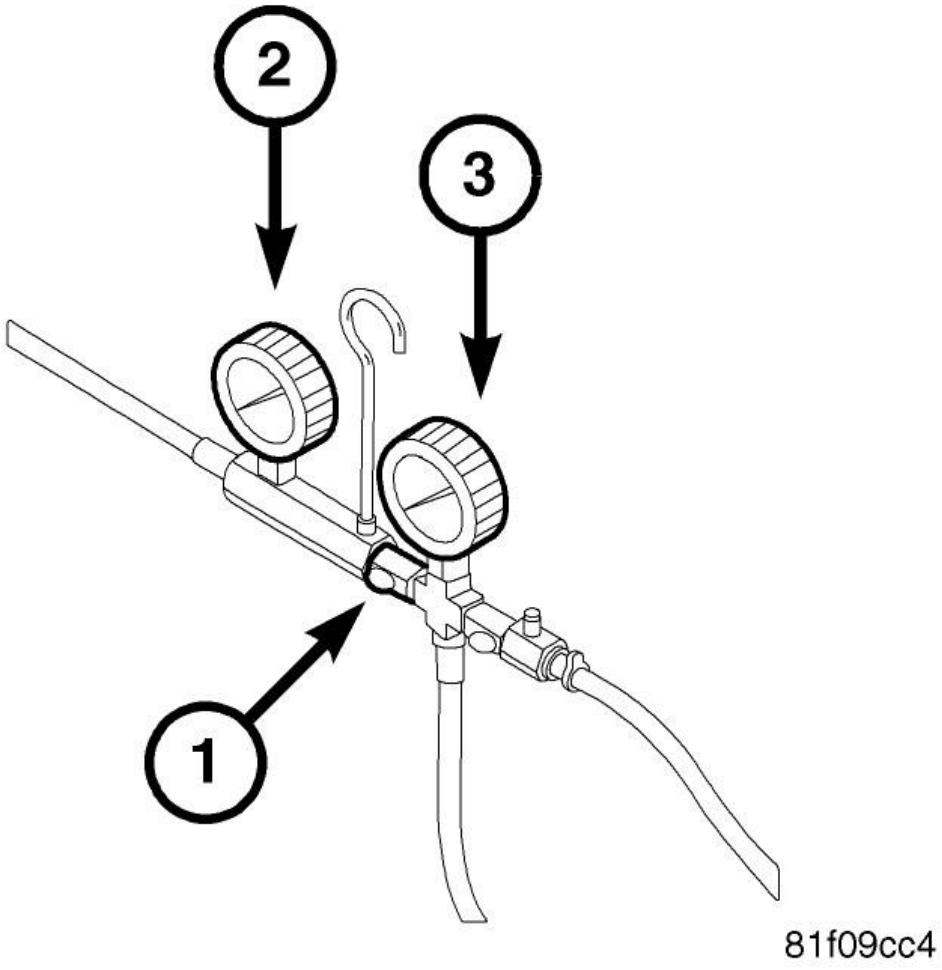

Fig. 31: Checking Fuel Delivery System For Leak Down
Courtesy of CHRYSLER LLC

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting, or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Close the Fuel System Isolation Valve (1) and then wait five minutes before proceeding.
2. Read the Fuel Inlet (2) and Fuel Outlet (3) Pressure Gauges. The pressure should not drop more than 10 psi on either gauge.

   Does the fuel pressure drop more than 10 psi?

   Yes - On Fuel Inlet Gauge (1)

   - Replace the appropriate fuel pump module as indicated in the table below.

Vehicle	Check Valve Location
LC	Auxiliary fuel pump module (right-side of fuel tank)
LX	Auxiliary fuel pump module (right-side of fuel tank)
JC	Primary fuel pump module (left-side of fuel tank)
JS	Primary fuel pump module (left-side of fuel tank)
MK	Primary fuel pump module (left-side of fuel tank)
PM	Primary fuel pump module (left-side of fuel tank)

NOTE: The check valve allows residual fuel pressure to remain in the line and not depressurize into the tank when the fuel pump is off.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

Yes - On Fuel Outlet Gauge (2)

- Replace the leaking fuel injector(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- If directed here by another test, return to that test. Otherwise, test complete.

HARD START FUEL SYSTEM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
FUEL CONTAMINATION
RESTRICTED FUEL SUPPLY LINE
FUEL PUMP INLET STRAINER PLUGGED
FUEL PUMP MODULE
FAULTY FUEL PUMP MODULE
FUEL INJECTOR(S)

Diagnostic Test

1. **CHECKING FUEL PRESSURE**
    1. Turn the ignition off.

        WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

    2. Install a fuel pressure gauge at the engine.
    3. Ignition on, engine not running.
    4. With a scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

        NOTE: NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

        Choose a conclusion that best matches your fuel pressure reading.

        Below Specification

        - Go to step 2

        Within Specification

        - Go to step 4
2. **RESTRICTED FUEL SUPPLY LINE**
    1. Turn the ignition off.

        WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

    2. Raise vehicle on hoist, and disconnect the fuel supply line at the fuel pump module.
    3. Install special tool #6539 (5/16") #6631(3/8") fuel line adapter and the fuel pressure gauge between the fuel supply line and the fuel pump module.
    4. Ignition on, engine not running.
    5. With the scan tool, actuate the Fuel Pump and observe the fuel pressure gauge.

        NOTE: Fuel pressure specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

        Is the fuel pressure within specification?

Yes

- Visually and physically inspect the fuel supply lines between the fuel tank and the fuel rail. Repair/replace as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 3

3. **CHECKING THE FUEL PUMP INLET**
   1. Turn the ignition off.

      WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

   2. Remove the Fuel Pump Module and Fuel Tank Module (if equipped), inspect the Fuel Pump Inlet and the bottom of the fuel tank for debris that could cause the fuel pump inlet to be plugged.

      Is the Fuel Inlet Strainer plugged?

      Yes

      - Repair/Replace as necessary.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

      No

      - Replace the Fuel Pump Module.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. **FUEL PUMP MODULE**

   NOTE: Before continuing visually and physically inspect the fuel delivery system for external leaks or damage. Repair/replace as necessary.

   1. Turn the ignition off.

      WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose,

fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

2. Install special tool #6539 (5/16") or #6631 (3/8") fuel line adapter.
3. Install the fuel pressure gauge.
4. Start the engine and allow the fuel system to reach maximum pressure.
5. Turn the ignition off.

NOTE: Fuel specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

6. Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and the engine.
7. Monitor the fuel pressure gauge for a minimum of 5 minutes.

NOTE: The pressure should not fall below 241 kPa (35 psi).

Does the fuel pressure drop below 241 kPa (35 psi)?

Yes

- Replace Fuel Pump Module.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Go to step 5

5. **FUEL INJECTOR(S)**

WARNING: The fuel system is under a constant pressure (even with the engine off). Before testing or servicing any fuel system hose, fitting or line, the fuel system pressure must be released. Failure to follow these instructions can result in possible serious or fatal injury.

1. Remove special tool #C4390.
2. Start the engine and allow the fuel system to reach maximum pressure.
3. Turn the ignition off.

NOTE: Fuel specification is 407 kPa +/- 34 kPa (59 psi +/- 5 psi).

4. Using special tool #C4390, Hose Clamp Pliers, pinch the rubber fuel line between the fuel pressure gauge and fuel pump module.

5. Monitor the fuel pressure gauge for a minimum of 5 minutes.

NOTE: The pressure should not fall below 241 kPa (35 psi)

Does the fuel pressure drop below 241 kPa (35 psi)?

Yes

- Replace the leaking fuel injectors.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Check the fuel for contaminants.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

NO RESPONSE WITH A NO START CONDITION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
(A931) FUSED B+ CIRCUIT (PCM)
(F202) FUSED IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS (PCM)
(Z925) PCM GROUND CIRCUITS (PCM)
(K51) MAIN RELAY CONTROL CIRCUIT
(A14) FUSED B+ CIRCUIT (MAIN RELAY)
(A935) FUSED B+ CIRCUIT (MAIN RELAY)
(K542) MAIN RELAY OUTPUT CIRCUIT (TO TIPM)
(F342/F343/344) MAIN RELAY OUTPUT CIRCUIT (TO PCM)
TIPM
PCM

Diagnostic Test

1. **(A931) FUSED B+ CIRCUIT (PCM)**

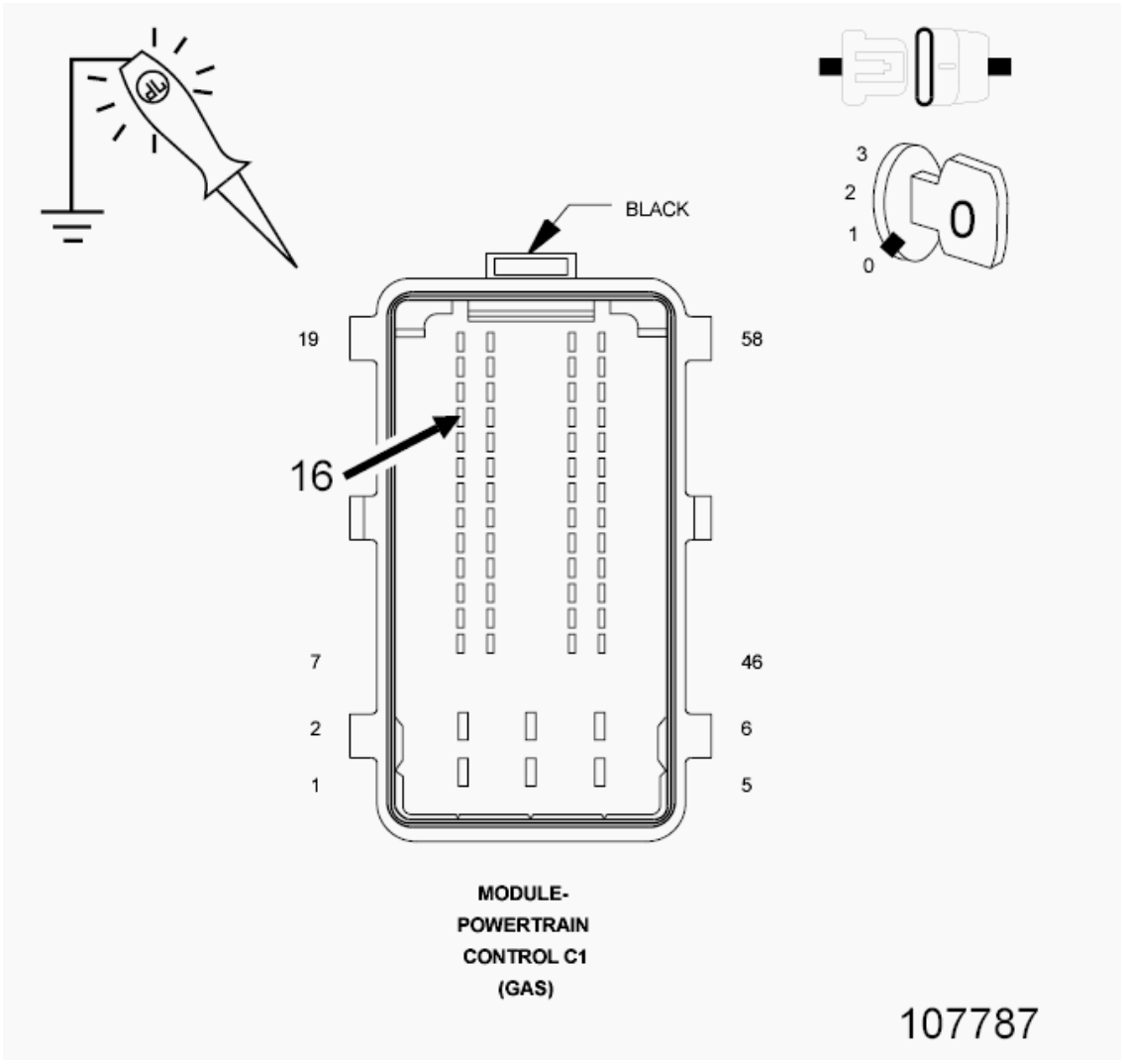

Fig. 32: Checking Fused B(+) Circuit
Courtesy of CHRYSLER LLC

NOTE: The scan tool and cable must be operating properly for the results of this test to be valid.

NOTE: Make sure the ignition switch was on while trying to communicate with the PCM.

1. Turn the ignition off.
2. Disconnect the C1 PCM harness connectors.
3. Using a 12-volt test light connected to ground, probe the (A931) Fused B+ circuit in the PCM harness connector.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Go to step 2

No

- Repair the open or short to ground in the (A931) Fused B+ circuit. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

2. **(F202) IGNITION SWITCH OUTPUT (RUN-START) CIRCUITS (PCM)**

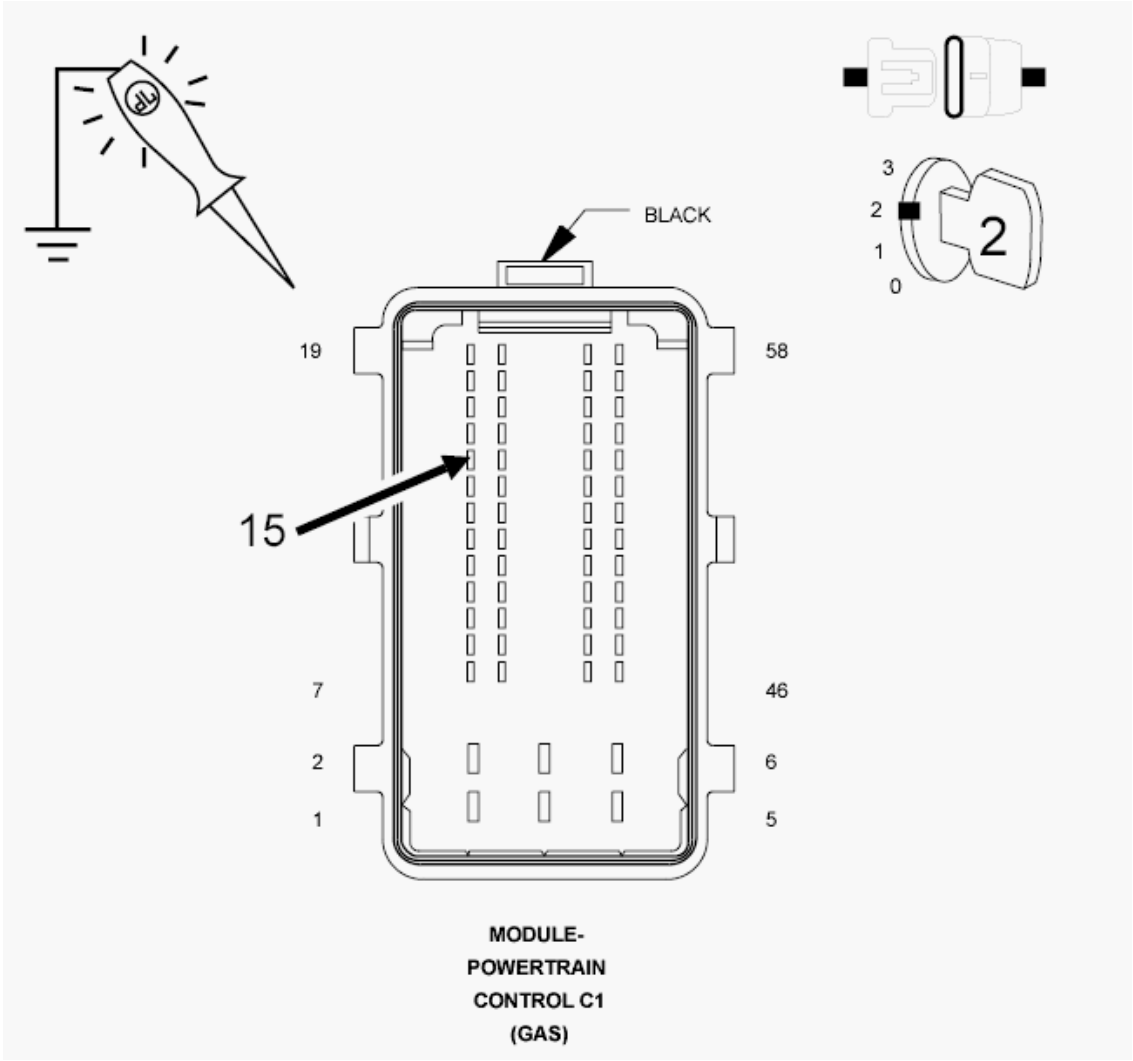

Fig. 33: Checking Ignition Switch Output Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Using a 12-volt test light connected to ground, probe the (F202) Fused Ignition Switch Output circuit in the PCM harness connector.
3. Turn the ignition to run.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Go to step 3

No

- Repair the (F202) Ignition Switch Output circuits. Inspect and replace fuses as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

3. **(Z925) GROUND CIRCUITS (PCM)**

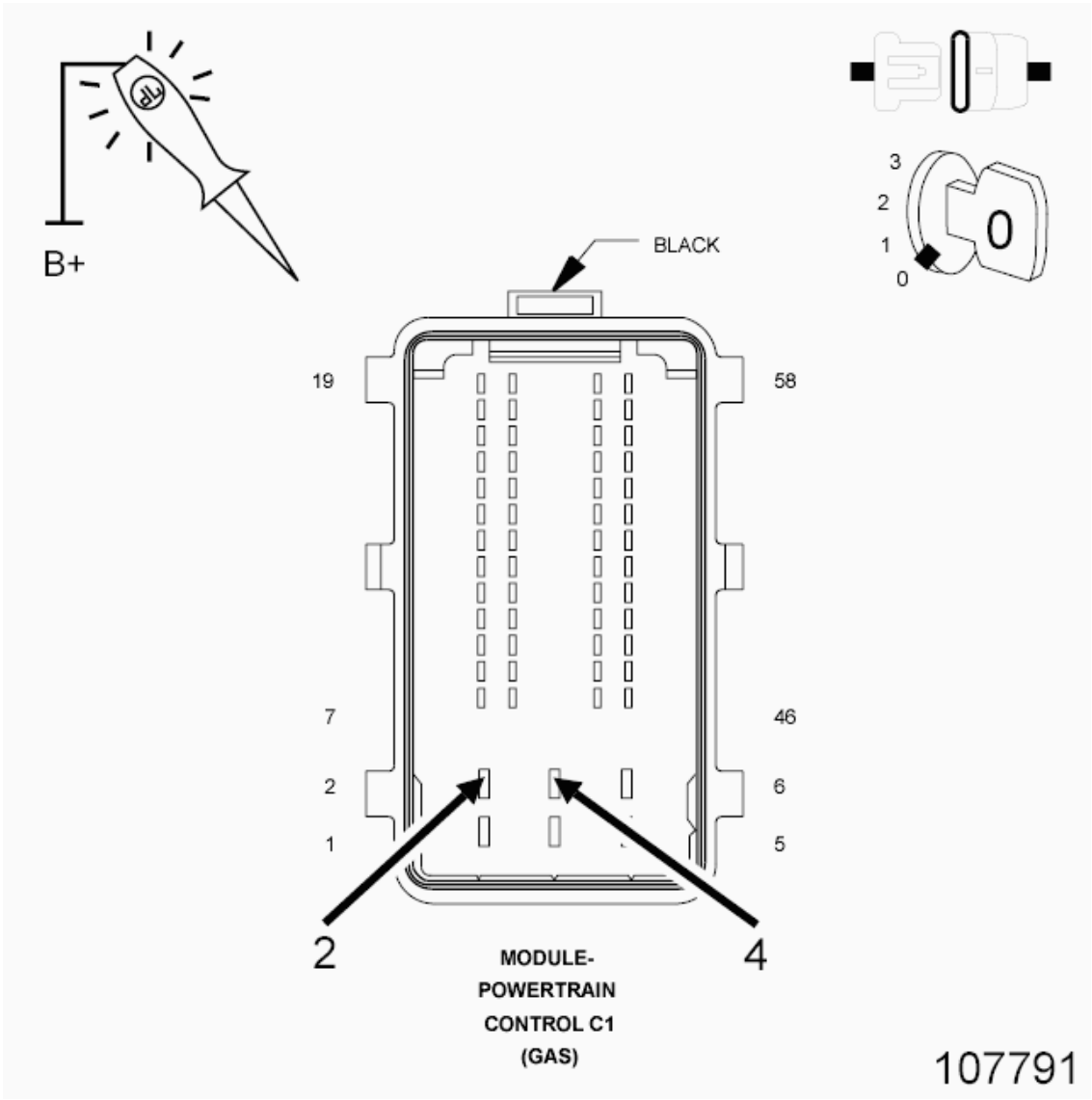

Fig. 34: Checking Ground Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Using a 12-volt test light connected to battery voltage, probe both the (Z925) PCM ground circuits

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly at both terminals?

Yes

- Go to step 4

No

- Repair the Ground circuit(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

4. **(A14) FUSED B+ CIRCUIT (MAIN RELAY)**

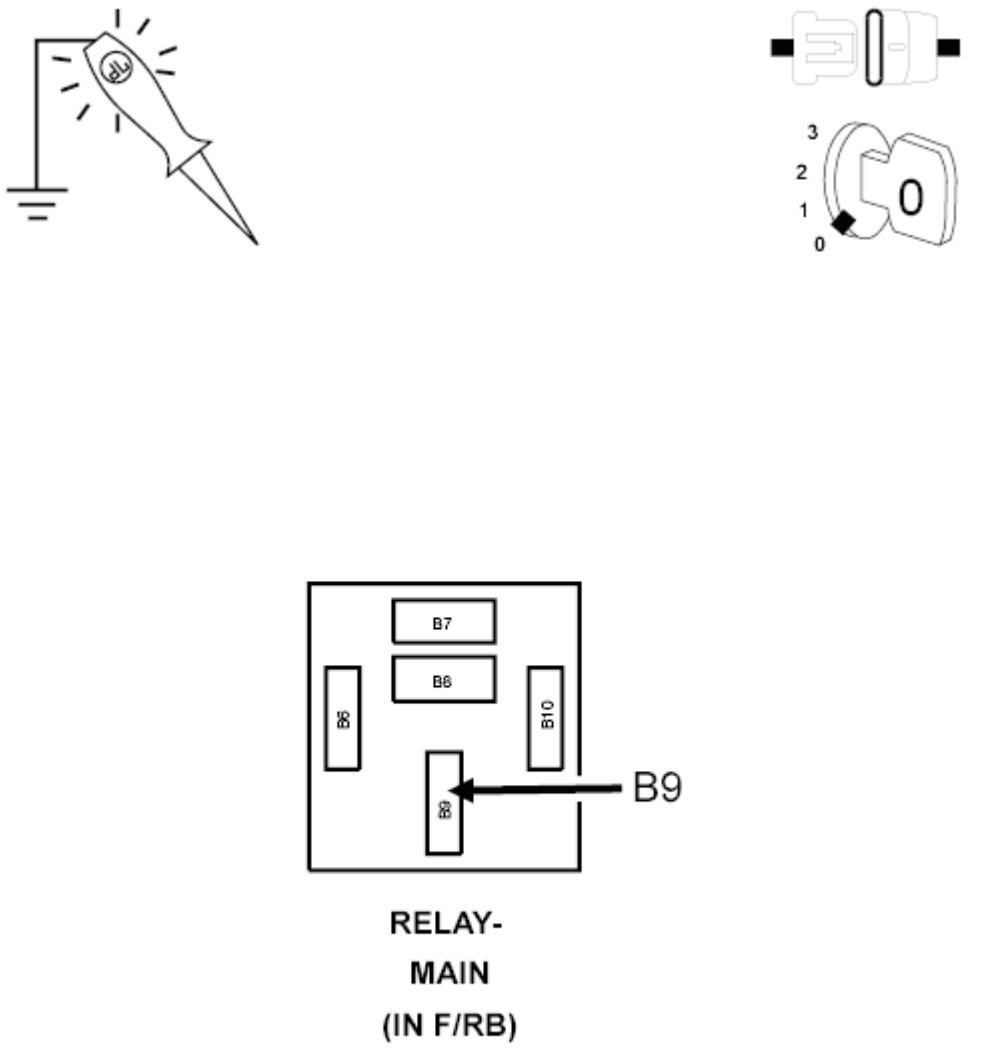

Fig. 35: Checking Fused B+ Circuit A14 At Main Relay
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. Remove the Main Relay.
3. Using a 12-volt test light connected to ground, probe the (A14) Fused B+ circuit at the Main Relay terminal.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Go to step 5

No

- Repair the (A14) Fused B+ circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

5. **(A935) FUSED B+ CIRCUIT (MAIN RELAY)**

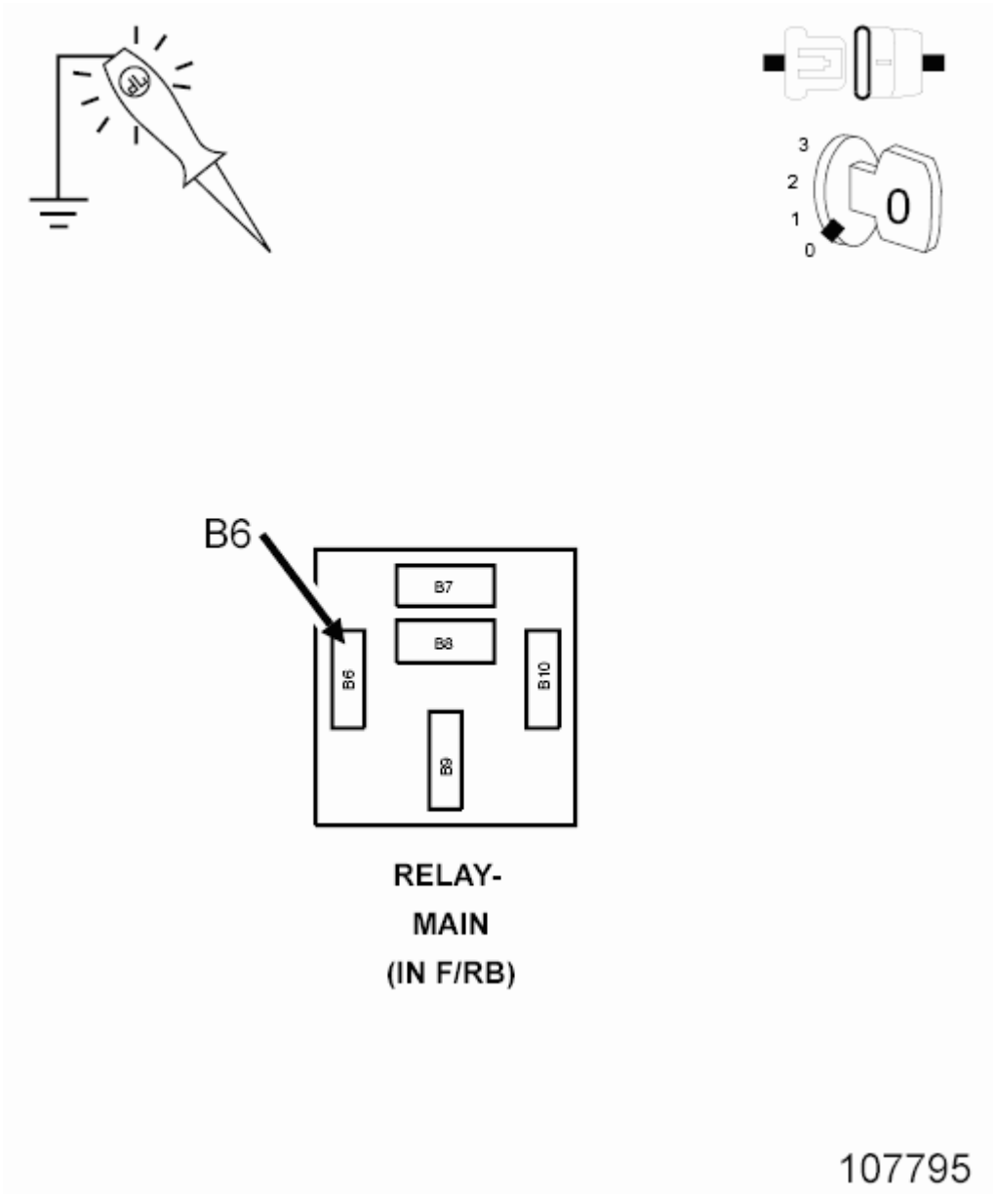

Fig. 36: Checking Fused B+ Circuit A935 At Main Relay
Courtesy of CHRYSLER LLC

1. Using a 12-volt test light connected to ground, probe the (A935) Fused B+ circuit at the Main Relay terminal.

   NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

   Does the test light illuminate brightly?

   Yes

- Go to step 6

No

- Repair the (A935) Fused B+ circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

6. **(F342) MAIN RELAY OUTPUT CIRCUITS**

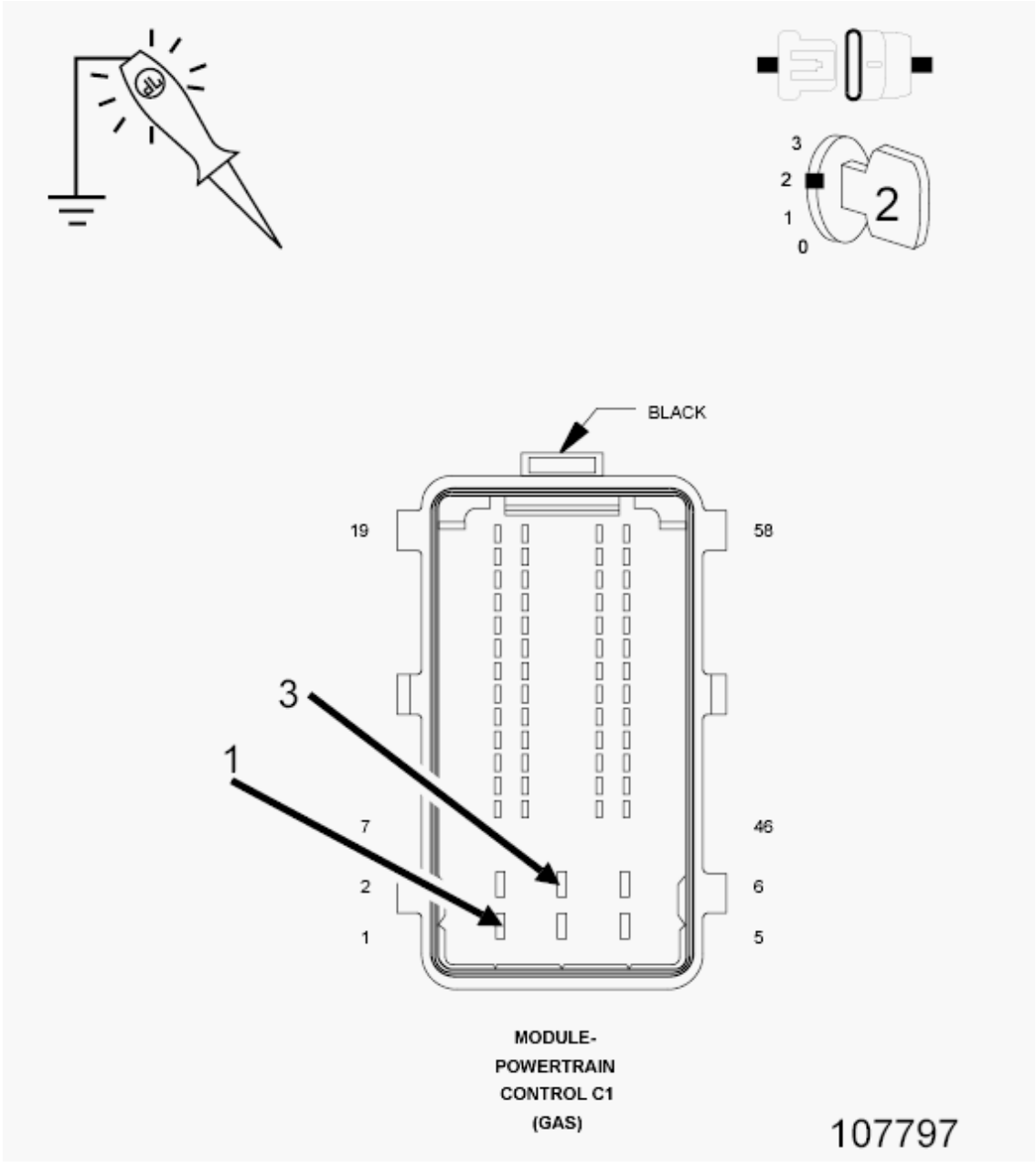

Fig. 37: Checking Main Relay Output Circuits F342 At PCM Harness Connector C1
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Using a jumper wire, jumper across the Main Relay from (K542) Main Relay Output circuit and the (A14) Fused B+ circuit.
3. With a 12-volt test light connected to ground, probe the (F342) Main Relay Output circuits in the PCM harness connector.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly at both terminals?

Yes

- Go to step 8

No

- Go to step 7

7. **(K542) MAIN RELAY OUTPUT CIRCUIT**

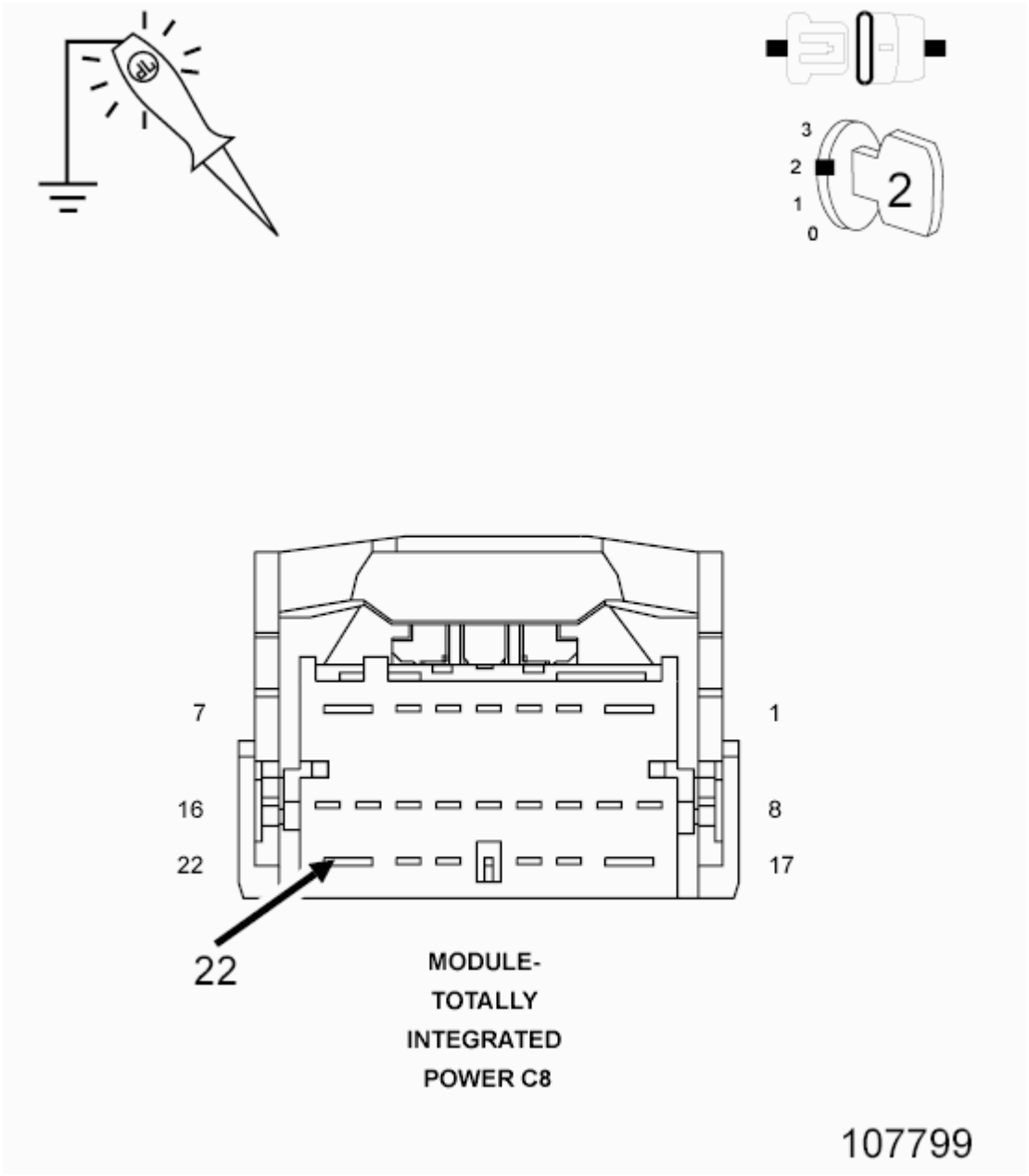

Fig. 38: Checking Main Relay Output Circuit K542 At TIPM Connector
Courtesy of CHRYSLER LLC

1. Jumper wire still installed.
2. Disconnect the C8 TIPM harness connector.
3. Using a 12-volt test light connected to ground, probe the (K542) Main Relay Output circuit in the TIPM harness connector.

NOTE: The test light should be illuminated and bright. Compared the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Repair the (K542) Main Relay Output circuit between the TIPM and the Main Relay. Inspect the related fuses.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Repair the (F342) Main Relay Output circuit(s).
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

8. MAIN RELAY OUTPUT
    1. Turn the ignition off.
    2. Remove one end of the jumper wire.
    3. Connect the PCM harness connector.
    4. Turn the ignition on.
    5. Return the jumper wire across the Main Relay.
    6. Using a scan tool, attempt to communication with the PCM.

    Were you able to communication with the PCM?

    Yes

    - Go to step 9

    No

    - Go to step 11
9. **MAIN RELAY**

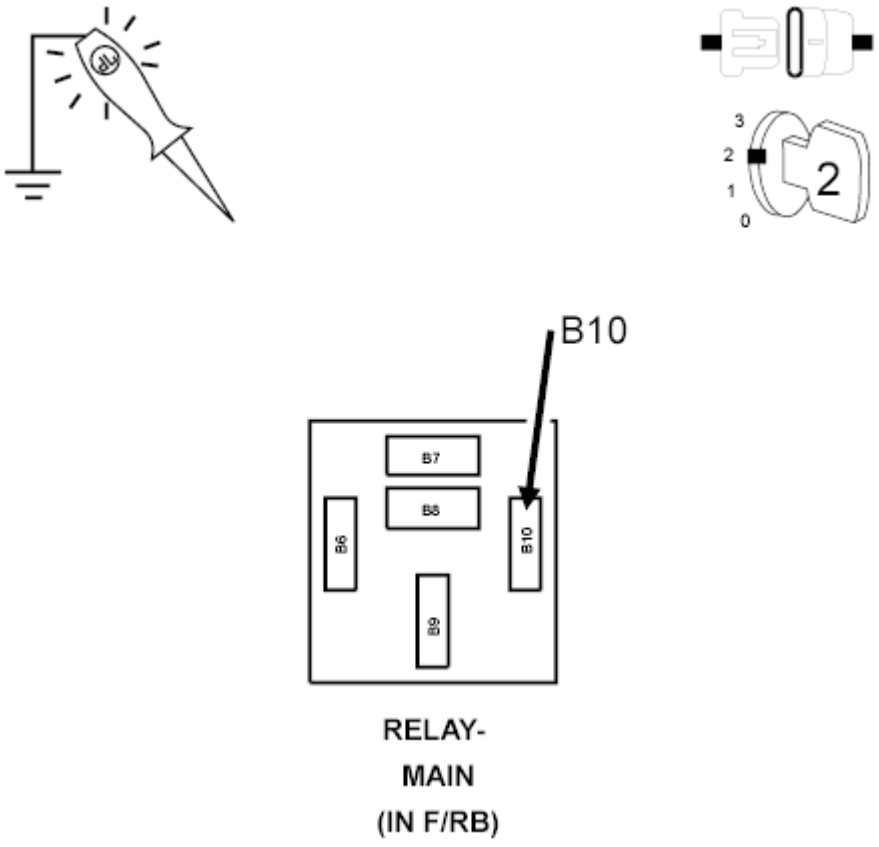

Fig. 39: Checking Main Relay Control Circuit K51 At Main Relay
Courtesy of CHRYSLER LLC

NOTE: To continue the following test, leave the jumper wire in place with the ignition on.

1. Using the scan tool, actuate the Main Relay.
2. Using a 12-volt test light connected to battery voltage, probe the (K51) Main Relay Control circuit in the Main Relay connector.

   Does the test light illuminate and flash on and off?

   Yes

   - Replace the Main Relay.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

   No

   - Go to step 10

10. **(K51) MAIN RELAY CONTROL CIRCUIT**

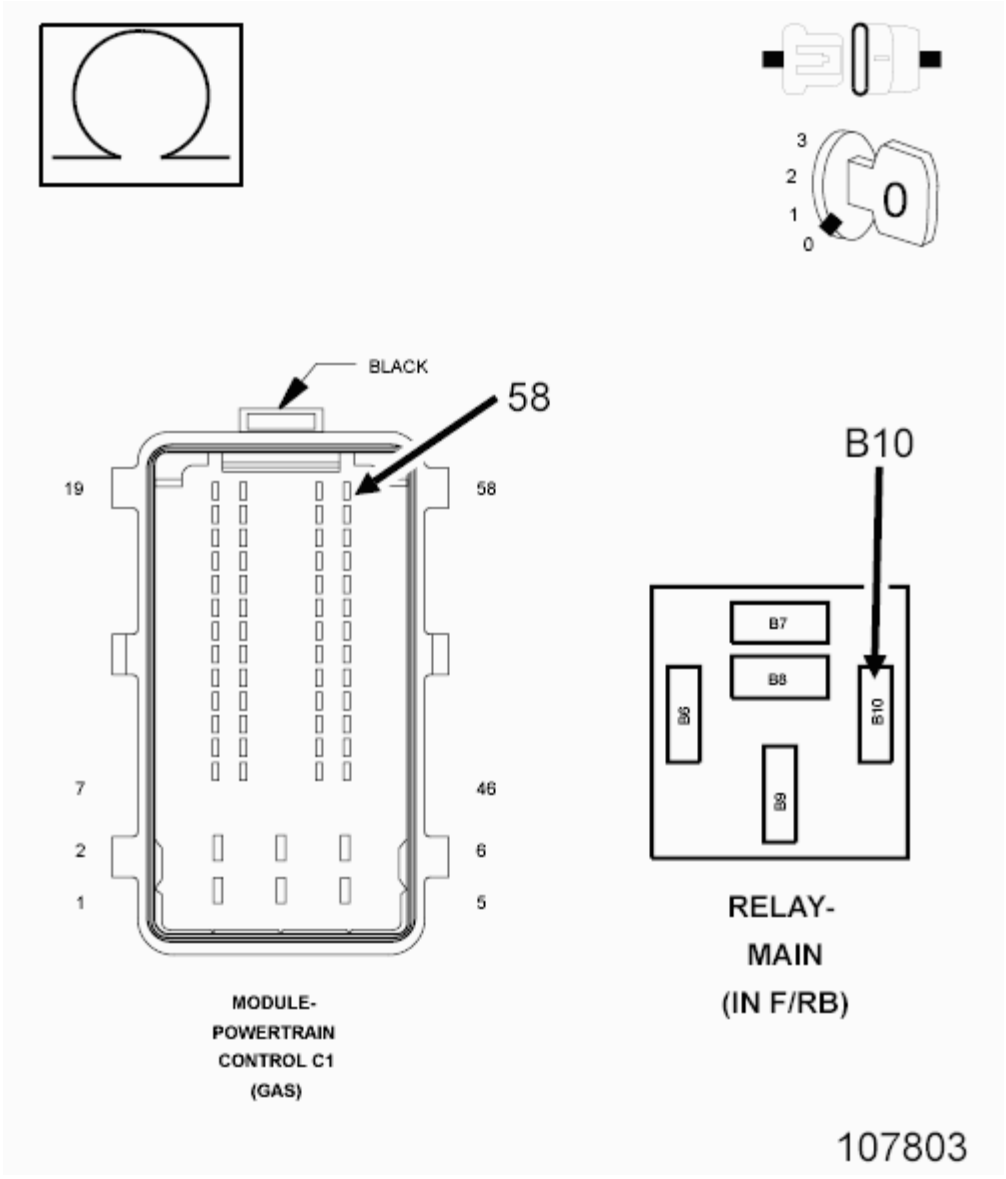

Fig. 40: Checking Main Relay Control Circuit K51 Between PCM & Main Relay
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the PCM harness connector.
3. Disconnect the C1 PCM harness connector.
4. Measure the resistance of the (K51) Main Relay Control circuit between the PCM harness connector and the Main relay connector.

   Is the resistance below 5.0 ohms?

Yes

- Repair the open in the (K51) Main Relay Control circuit.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

No

- Replace and program the Powertrain Control Module per Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

11. **(D65) CAN C BUS (+) CIRCUIT OPEN**

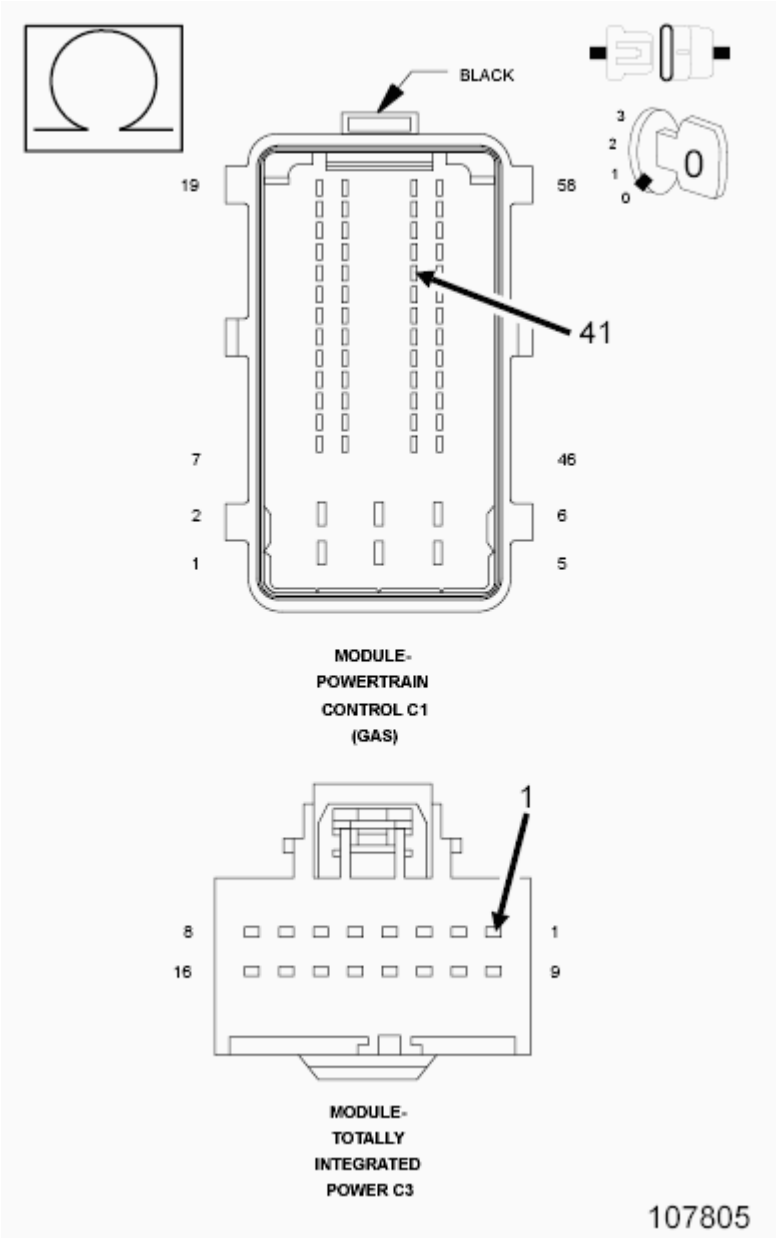

Fig. 41: Checking CAN C Bus (+) Circuit For Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the TIPM harness connector.
3. Measure the resistance of the (D65) CAN C Bus (+) circuit between the TIPM connector and the PCM harness connector.

   Is the resistance below 5.0 ohms?

   Yes

- Go to step 12

No

- Repair the (D65) CAN C Bus (+) circuit for an open.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

12. **(D64) CAN C BUS (-) CIRCUIT OPEN**

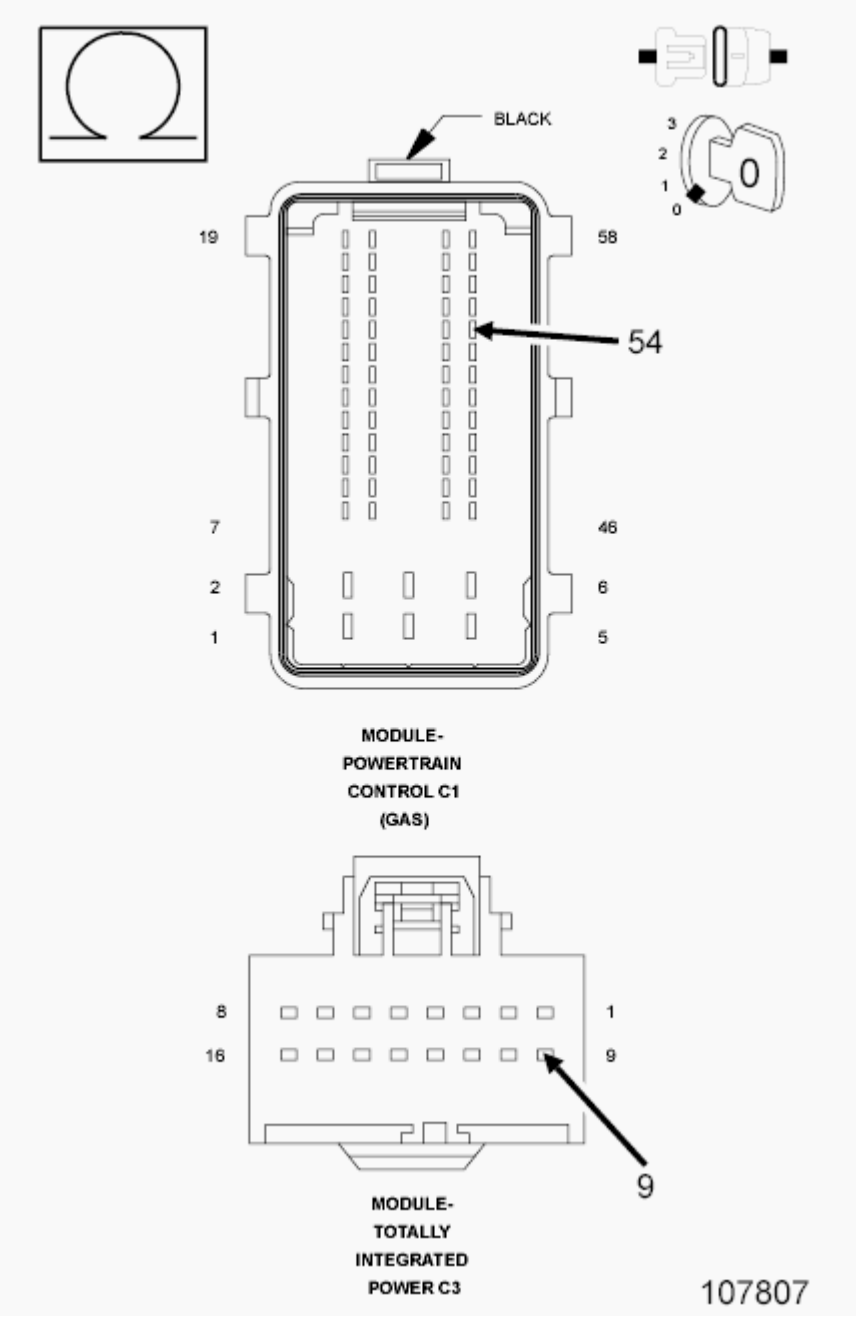

Fig. 42: Checking CAN C Bus (-) Circuit For Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D64) CAN C Bus (-) circuit between the TIPM connector and the PCM harness connector.

   Is the resistance below 5.0 ohms?

   Yes

   - Replace and program the Powertrain Control Module in accordance with the service information.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

   No

   - Repair the (D64) CAN C Bus (-) circuit for an open.
   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure**

START AND STALL CONDITION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Possible Causes
CURRENT PCM DTCS
CURRENT WIN THEFT DTCS
RESTRICTED EXHAUST
ENGINE MECHANICAL
VACUUM LEAKS
CRACKED SPARK PLUG(S), CARBON TRACKING SPARK PLUG AND COIL
CARBON BUILDUP ON THROTTLE BODY
FUEL CONTAMINATION
FUEL DELIVERY
VALVE TIME OUT OF SPECIFICATION
5-VOLT SUPPLY CIRCUIT
SENSOR GROUND CIRCUIT
CMP SIGNAL CIRCUIT
CAMSHAFT POSITION SENSOR
CKP SIGNAL CIRCUIT
CRANKSHAFT POSITION SENSOR
FLEX PLATE (TARGET WHEEL)
CMP AIRGAP

CKP AIRGAP
POWERTRAIN CONTROL MODULE (PCM)

Diagnostic Test

1. **CHECKING DTCS**

   NOTE:
   - **Before continuing with this procedure, review the TSBs that may be related to a start and stall condition.**
   - **It may be helpful to review Secondary Indicators, if a two trip DTC(s) is present, drive the vehicle to try and mature the DTC to Active.**

   1. Ignition on, engine not running.
   2. With a scan tool, read DTCs.

      Are any DTCs present?

      Yes

      - Perform the appropriate diagnostic procedures.
      - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Go to step 2

2. **CHECKING VEHICLE THEFT DTCS**

   NOTE: **If you are unable to communicate with the Wireless Ignition Node (WIN), refer to Non-DTC Diagnostics/Communication - Diagnosis and Testing .**

   1. With the scan tool, read the WIN codes.

      Are there any WIN DTCs?

      Yes

      - Refer to **DTC-Based Diagnostics/NODE, Wireless Ignition (WIN) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 3

3. **CAM/CRANK VERIFICATION**

1. Using a scan tool, under OBDII Monitors, read and record the Cam Crank Synchronization Event Monitors.
2. Using this table, determine if any of the values are present in the Cam Crank Synchronization Event Monitor display.

CAM EVENT STATUS						
CM1ULTRH	CM1ULTLH	CM1TOL1	CM1LOW	CM1ULZERO	CM1MFS	CM1MFR
CM1IF	CM1ONLY	CM2ULTRH	CM2ULTLH	CM2TOL1	CM2LOW	CM2ULZERO
CM2MFS	CM2MFR	CM2IF	CM2ONLY	CM3ULTRH	CM3ULTLH	CM3TOL1
CM3LOW	CM3ULZERO	CM3MFS	CM3MFR	CM3IF	CM3ONLY	CM4ULTRH
CM4ULTLH	CM4TOL1	CM4LOW	CM4ULZERO	CM4MFS	CM4MFR	CM4IF
CM4ONLY	SYULCAM	-	-	-	-	-
CRANK EVENT STATUS						
CKULTRH	CKULTLH	CKLOW	CKUL60M2	CKMFS	CKMFR	CK1IF
CKULGTRH	CKULGTLH	CKULGTVR	CKULGTVL	CKUL220	CKUL40	SYULCRK
SYNOCLCK	-	-	-	-	-	-
SYNC EVENT STATUS						
SYULTOL	SYTOLF	-	-	-	-	-

4. **SPARK PLUG(S)**

NOTE: Inspect the ignition coil for damage, carbon tracking on the coil or a damaged spark plug insulator boot. If a problem is found, replace the ignition coil.

1. Turn the ignition off.
2. Remove the spark plug.
3. Inspect the spark plug for any of the following conditions:
   - Cracks or damage
   - Carbon tracking
   - Foreign material
   - Gap not within specification
   - Loose or broken electrode

NOTE: Lightly tap the bottom of the spark plug on a solid surface. The electrode in the spark plug should not move.

Were any problems found?

Yes

- Replace the spark plug.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 5

5. **POSSIBLE CAUSES OF START AND STALL CONDITION**

The following items should be checked as a possible cause for a start and stall condition:

- Perform any Technical Service Bulletins (TSBs) that may apply to the symptom.
- The exhaust system must be free of any restrictions.
- The engine compression must be within specifications.
- The engine valve timing must be within specifications.
- The engine must be free from vacuum leaks.
- The throttle body must be free of carbon buildup and dirt.
- Cracked spark plugs, carbon track on spark plugs, coil and coil boot.

Do any of the above conditions exist?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Go to step 6

6. **FUEL PUMP DELIVERY**
   1. Verify that the Fuel tank is not empty before continuing.
   2. Follow the diagnostics for **CHECKING THE FUEL DELIVERY SYSTEM** . .

   Was the No Start condition solved after following the above diagnostic test?

   Yes

   - Test Complete.

   No

   - Check for contamination/water in the fuel. Make sure the fuel being used in this vehicle meets OEM Fuel Requirement.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

7. **5-VOLT SUPPLY CIRCUIT VOLTAGE (CMP)**
   1. Turn the ignition off.
   2. Disconnect the Camshaft Position Sensor connector.
   3. Turn the ignition on.
   4. Measure the voltage of between the Sensor Ground circuit and the 5-volt Supply circuit in the Camshaft Position Sensor harness connector.

   Is the voltage 5.0 volts?

   Yes

   - Go to step 8

   No

   - Repair the 5-volt Supply.

   NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

   - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

8. **SENSOR GROUND CIRCUIT TEST**
   1. Turn the ignition off.
   2. Using a 12-volt test light connected to 12 volts, probe the Sensor Ground circuit in the Camshaft Position Sensor harness connector.

   NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

   Is the test light illuminated and bright?

   Yes

   - Go to step 9

   No

   - Repair the Ground Circuit.

   NOTE: A battery disconnect must be performed to clear the Cam Crank

Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

9. **CMP SIGNAL**
   1. Turn the ignition on.
   2. Measure the voltage of the CMP Signal circuit in the Camshaft Position Sensor harness connector.

      Is the voltage between 4.7 and 5.0 volts?

      Yes

      - Go to step 13

      No

      - Go to step 10
10. **CMP SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the C2 Powertrain Control Module harness connector.
    3. Turn the ignition on.
    4. Measure the voltage of the CMP Signal circuit in the Camshaft Position Sensor harness connector.

       Is there any voltage present?

       Yes

       - Repair the CMP Signal circuit for a short to voltage.

         NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

       No

       - Go to step 11
11. **CMP SIGNAL CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between ground and the CMP Signal circuit in the Camshaft Position Sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 12

No

- Repair the CMP Signal circuit for a short to ground.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

12. **CMP SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE**

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the CMP Signal circuit between the Camshaft Position Sensor harness connector and the appropriate terminal of PCM Pinout Box 8815.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 24

   No

   - Repair the CMP Signal circuit for an open circuit or high resistance.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

13. **CAMSHAFT POSITION SENSOR SIGNAL**

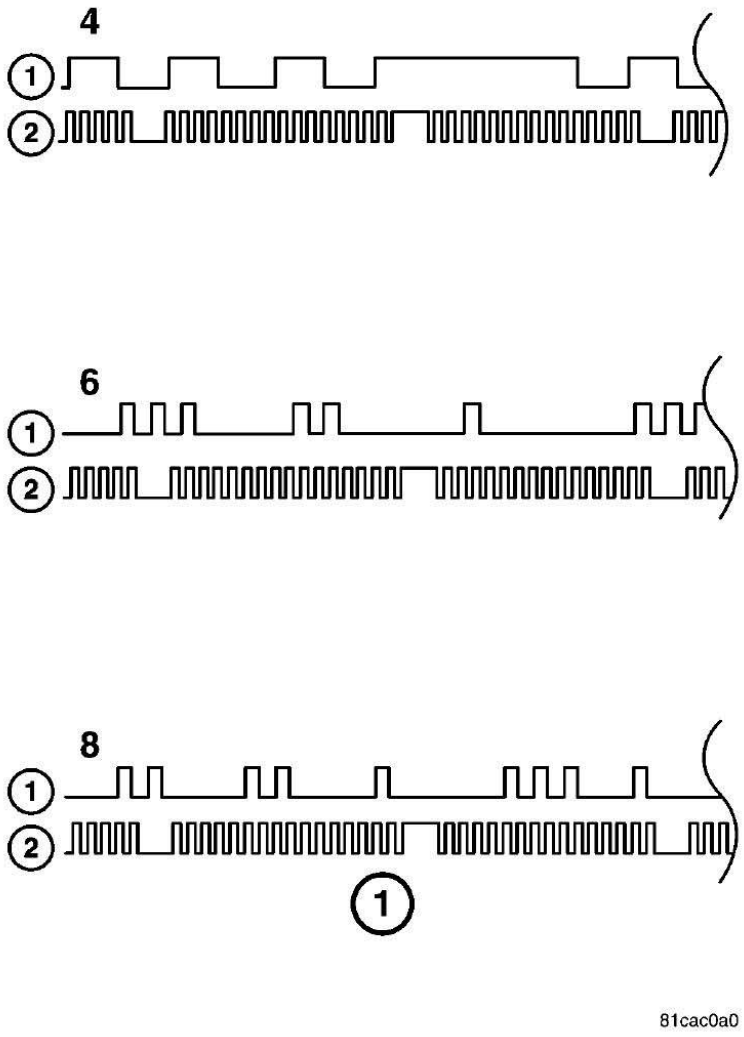

Fig. 43: Cam/Crank Sensors Scope Patterns (1 Of 2)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. **Fig. 43 is a depiction of typical scope patterns of the Cam (1) and Crank (2) sensors for 4, 6, and 8 cylinder engines. The square wave patterns are uniform and are identical to one another. The patterns must be evenly spread apart and at the same height. The larger gap pattern (signature) after the shorter wave forms are used for cylinder identification (Crank signal) and the distance between the series of slots (trigger) on the camshaft pulley (cam signal). Any variation of the pattern will indicate an issue with the sensor, wiring, or trigger (target) wheel.**

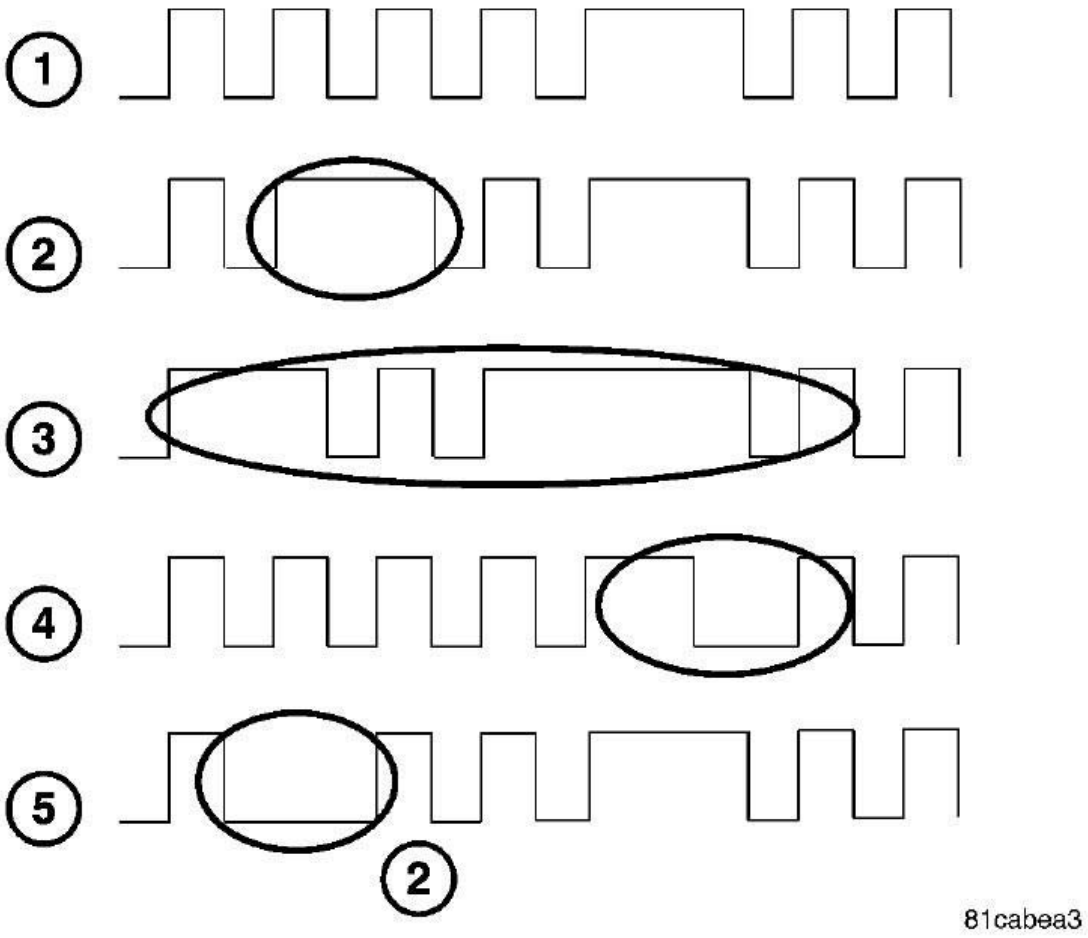

Fig. 44: Cam/Crank Sensors Scope Patterns (2 Of 2)

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. With a lab scope, probe the CMP Signal circuit in the appropriate terminal of the PCM Pinout Box 8815.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothing. Failure to follow these instructions can result in possible serious or fatal injury.

4. Start and allow the engine to run.
5. Observe the lab scope screen.
6. Compare the scope pattern with the ones in Figure 2.
    1. Pattern indicates a clean (good) square wave form that is identical to what the cam and crank should be. The square wave patterns are uniformed and are identical to one another.
    2. Two pulses joined together in the same spot on target. Indicates damage to the target (trigger) on the flex plate or broke tooth, runout in the target or large air gap between the sensor and the target wheel.
    3. Wide air gap or intermittent connection.
    4. Early signature, predominately at high speed. Large air gap between the sensor and the target wheel.
    5. Missed pulse. Possible burr or light damage to target or incorrect lateral position of the crank sensor to target (trigger).

NOTE: If any of the above (except pattern 1) is displayed on the lab scope repair as necessary.

Was the square wave found to match any of the above except pattern 1?

Yes

- Repair as necessary.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace the Camshaft Position Sensors.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

14. **5-VOLT SUPPLY CIRCUIT VOLTAGE (CKP)**
    1. Turn the ignition off.
    2. Disconnect the Crankshaft Position Sensor connector.
    3. Turn the ignition on.
    4. Measure the voltage of the 5-volt Supply circuit in the Crankshaft Position Sensor harness connector.

    Is the voltage 5.0 volts?

    Yes

    - Go to step 15

    No

    - Repair the 5-volt Supply.

    NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

15. **SENSOR GROUND CIRCUIT TEST**
    1. Turn the ignition off.
    2. Using a 12-volt test light connected to 12 volts, check the Sensor Ground circuit in the Crankshaft Position Sensor harness connector.

    NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

    Is the test light illuminated and bright?

    Yes

    - Go to step 16

    No

    - Repair the Ground Circuit.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

16. **CKP SIGNAL**
    1. Turn the ignition on.
    2. Measure the voltage of the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

    Is the voltage between 4.7 and 5.0 volts?

    Yes

    - Go to step 20

    No

    - Go to step 17
17. **CKP SIGNAL CIRCUIT SHORTED TO VOLTAGE**
    1. Turn the ignition off.
    2. Disconnect the Powertrain Control Module (PCM) connector.
    3. Turn the ignition on.
    4. Measure the voltage of the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

    Is there any voltage present?

    Yes

    - Repair the CKP Signal circuit for a short to voltage.

    NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

    - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

    No

    - Go to step 18
18. **CKP SIGNAL CIRCUIT SHORTED TO GROUND**
    1. Turn the ignition off.
    2. Measure the resistance between ground and the CKP Signal circuit in the Crankshaft Position Sensor harness connector.

Is the resistance above 100 Ohms?

Yes

- Go to step 19

No

- Repair the CMP Signal circuit for a short to ground.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

19. **CKP SIGNAL CIRCUIT OPEN OR HIGH RESISTANCE**

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals, resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 to perform diagnosis.

1. Measure the resistance of the CKP Signal circuit between the Camshaft Position Sensor harness connector and the appropriate terminal of PCM Pinout Box 8815.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 24

   No

   - Repair the CMP Signal circuit for an open circuit or high resistance.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

20. **CRANKSHAFT POSITION SENSOR SIGNAL**

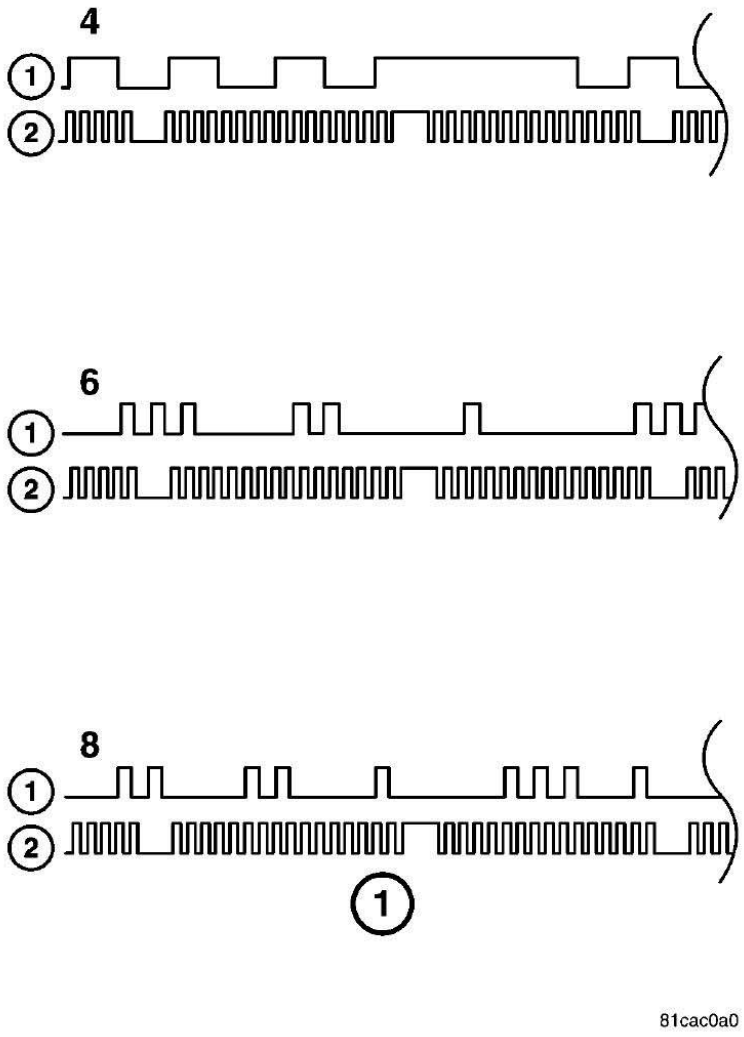

Fig. 45: Cam/Crank Sensors Scope Patterns (1 Of 2)
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. **Fig. 45 is a depiction of typical scope patterns of the Cam (1) and Crank (2) sensors for 4, 6, and 8 cylinder engines. The square wave patterns are uniform and are identical to one another. The patterns must be evenly spread apart and at the same height. The larger gap pattern (signature) after the shorter wave forms are used for cylinder identification (Crank signal) and the distance between the series of slots (trigger) on the camshaft pulley (cam signal). Any variation of the pattern will indicate an issue with the sensor, wiring, and trigger (target) wheel.**

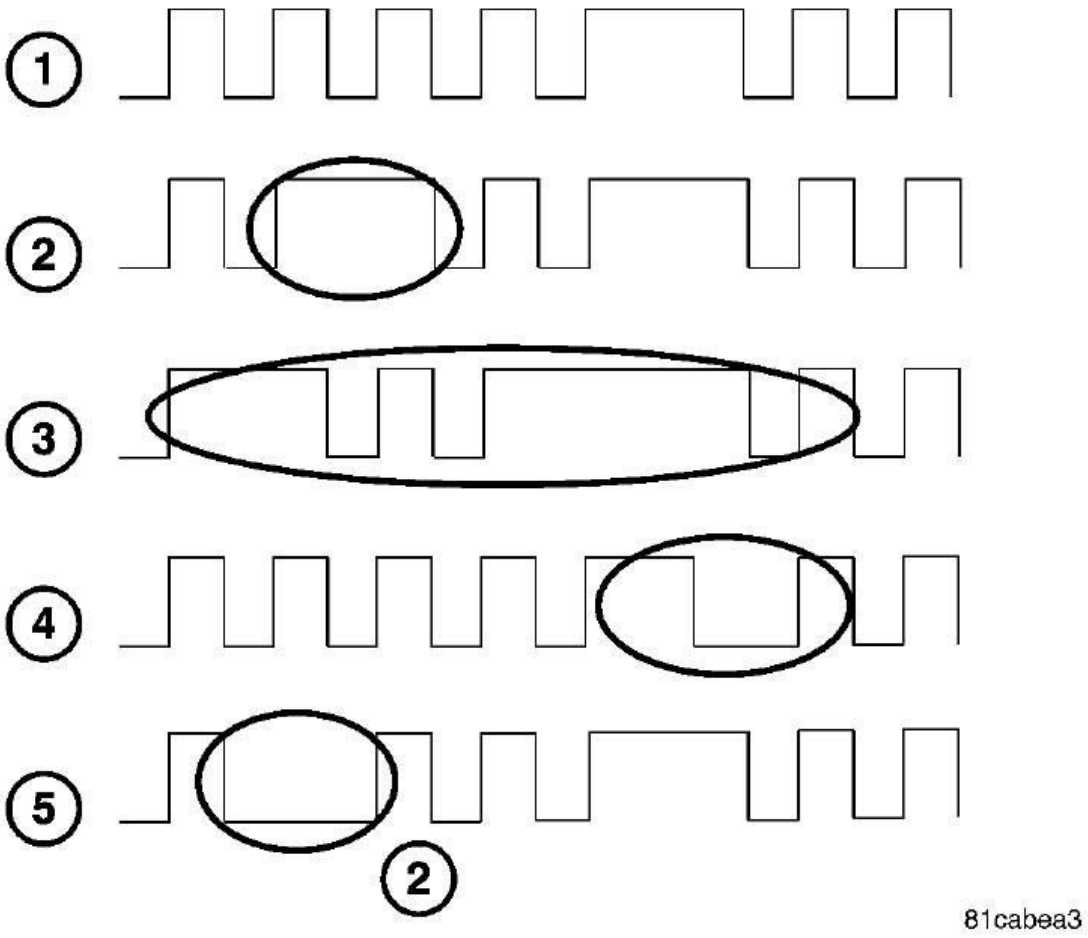

Fig. 46: Cam/Crank Sensors Scope Patterns (2 Of 2)

Courtesy of CHRYSLER LLC

CAUTION: Do not probe the PCM harness connectors. Probing the PCM harness connectors will damage the PCM terminals resulting in poor terminal to pin connection. Install the PCM Pinout Box 8815 along with the Adapter 8815-1 to perform the diagnosis.

3. With a lab scope, probe the CKP Signal circuit in the appropriate terminal of the PCM Pinout Box 8815.

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts, or fan. Do not wear loose clothing. Failure to follow these instructions can result in possible serious or fatal injury.

4. Start and allow the engine to run.
5. Observe the lab scope screen.
6. Compare the scope pattern with the ones in Figure 2.
    1. Pattern indicates a clean (good) square wave form that is identical to what the cam and crank should be. The square wave patterns are uniformed and are identical to one another.
    2. Two pulses joined together in the same spot on target. Indicates damage to the target (trigger) on the flex plate or broke tooth, runout in the target or large air gap between the sensor and the target wheel.
    3. Wide air gap or intermittent connection.
    4. Early signature, predominately at high speed. Large air gap between the sensor and the target wheel.
    5. Missed pulse. Possible burr or light damage to target or incorrect lateral position of the crank sensor to target (trigger).

NOTE: If any of the above (except pattern 1) is displayed on the lab scope repair as necessary.

Was the square wave found to match any of the above except pattern 1?

Yes

- Repair as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace the Crankshaft Position Sensor.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

21. **VALVE TIMING**
    1. Make sure the valve timing is within specification. Refer to the appropriate diagnostic procedure.

       Was the valve timing within specification?

       Yes

       - Go to step 22

       No

       - Repair as necessary.
       - Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

22. **5-VOLT SUPPLY CIRCUIT VOLTAGE (CMP/CKP)**

NOTE: The 5-volt Supply circuit must be present at both CMP and CKP Sensors.

1. Turn the ignition off.
2. Disconnect the Camshaft Position Sensor connector.
3. Turn the ignition on.
4. Measure the voltage of the 5-volt Supply circuit in the Camshaft Position Sensor harness connector.
5. **Repeat the above test at the Crankshaft Position Sensor (Crankshaft Position Sensor harness connector measure).**

   Is the voltage 5.0 volts at each sensor?

   Yes

   - Go to step 23

   No

   - Repair the 5-volt Supply circuit(s) as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

23. **SENSOR GROUND CIRCUIT**

NOTE: The Ground circuit must be present at both CMP and CKP Sensors.

1. Turn the ignition off.
2. Using a 12-volt test light connected to 12 volts, probe the Sensor Ground circuit in the Camshaft Position Sensor harness connector.
3. **Repeat the above test at the Crankshaft Position Sensor (Crankshaft Position Sensor harness connector measure).**

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Replace both the Camshaft Position Sensor and Crankshaft Position Sensor in accordance with the Service Information.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Repair the Ground Circuit(s) as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

24. **POWERTRAIN CONTROL MODULE (PCM)**

1. Using the wiring diagram/schematic as a guide, inspect the wiring and connectors between the Camshaft Position Sensor and the Powertrain Control Module (PCM).
2. Look for any chafed, pierced, pinched, or partially broken wires

3. Look for broken, bent, pushed out or corroded terminals.
4. Monitor the scan tool data relative to this circuit and wiggle test the wiring and connectors.
5. Look for the data to change or for the DTC to reset during the wiggle test.
6. Perform any Technical Service Bulletins that may apply.

Were any problems found?

Yes

- Repair as necessary.

NOTE: A battery disconnect must be performed to clear the Cam Crank Synchronization Events.

- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Replace and program the Powertrain Control Module (PCM) in accordance with the Service Information.
- Perform the PCM VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

2009 ENGINE

Ignition Control - Service Information - Journey

DESCRIPTION

DESCRIPTION

NOTE: All engines use a fixed ignition timing system. Basic ignition timing is not adjustable. All spark advance is determined by the Powertrain Control Module (PCM).

The ignition system used on these engines is referred to as coil on plug. The system's four main components are the coils, crankshaft position sensor, spark plugs, and camshaft position sensors. The coil on plug ignition system utilizes an ignition coil for every cylinder. The ignition coils are mounted directly over the each spark plug.

OPERATION

OPERATION

The crankshaft position sensor and camshaft position sensor are hall effect devices. The camshaft position sensor and crankshaft position sensor generate square wave pulses that are inputs to the PCM. The PCM determines engine position from these sensors. The PCM calculates injector sequence and ignition timing from crankshaft AND camshaft position.

SPECIFICATIONS

FIRING ORDER

2.4L

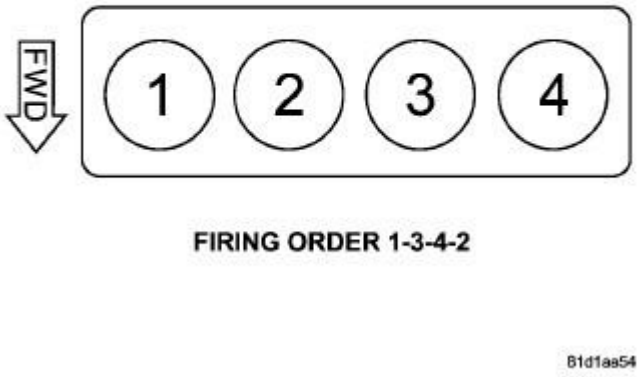

Fig. 1: Identifying Firing Order 2.4L
Courtesy of CHRYSLER LLC

The firing order is 1-3-4-2.

2.7, 3.5L

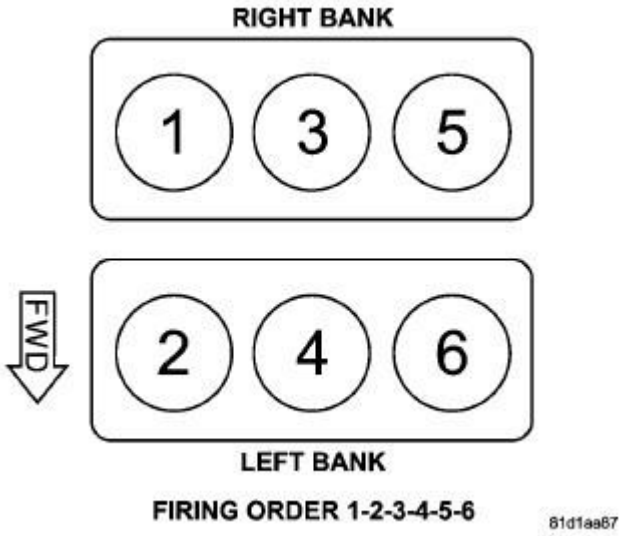

Fig. 2: Transverse 6 Cyl. Firing Order
Courtesy of CHRYSLER LLC

The firing order is 1-2-3-4-5-6.

IGNITION RESISTANCE

IGNITION COIL RESISTANCE

IGNITION COIL RESISTANCE

MANUFACTURER	Engine	Primary Resistance at 21°C-27°C (70°F-80°F)	Secondary Resistance at 21°C-27°C (70°F-80°F)
Diamond Electric Mfg. Corporation	2.4L, 2.7L, 3.5L	0.495 to 0.605 ohms	5.13K to 6.27K ohms

SPARK PLUG

SPARK PLUG

Engine	Spark Plug	Electrode Gap	Thread Size
2.4L* (with PZEV)	ZFR5AP	0.8 mm (0.031 in.)	M14 X 1.25
2.4L (without PZEV)	ZFR5F-11	1.1 mm (0.043 in.)	M14 X 1.25
2.7L	TE10PMC5	1.27 mm (0.050 in.)	M14 X 1.25
3.5L	ZFR5LP-13G	1.27 mm (0.050 in.)	M14 X 1.25
*Partial Zero Emission Vehicle			

TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
2.4 Camshaft Sensor Screw	9	-	79.5
2.7, 3.5L Camshaft Sensor Screw	12	-	106
2.4L Ignition Coil Bolts	9	-	79.5
2.7L Ignition Coil Bolts	7.5	-	65
2.4L Spark Plugs	27	20	-
2.7L Spark Plugs	18	13	-
3.5L Spark Plugs	27	20	-
Knock Sensor 2.4, 2.7L	10	7	-
Knock Sensor 3.5L	20	15	-
Ignition Coil Capacitor Bolt 2.4, 2.7L	10	-	88.5
Ignition Coil Capacitor Bolt 3.5L	28	20.5	-
Transmission Mounting Bolt	61	45	-

CAPACITOR, IGNITION

REMOVAL

2.4L

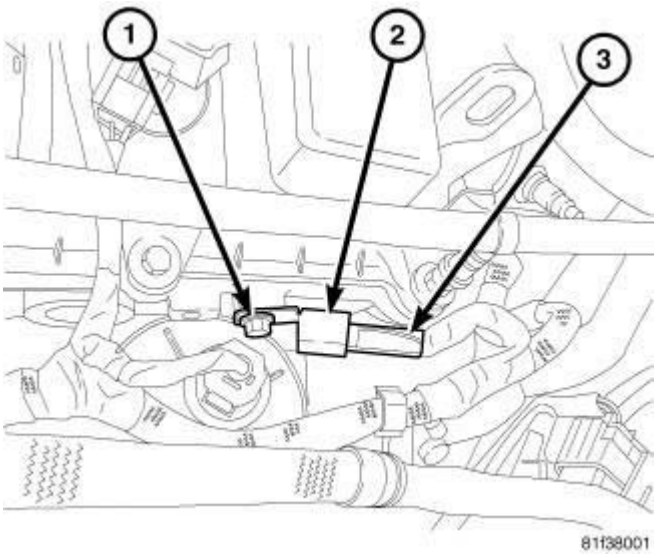

Fig. 3: Capacitor 2.4L
Courtesy of CHRYSLER LLC

1 - Bolt 2 - Capacitor
3 - Connector

1. Disconnect and isolate negative battery cable at battery.
2. Remove engine cover.
3. Remove electrical connector (3).
4. Remove mounting bolt (1) and ignition capacitor (2).

2.7L 1st

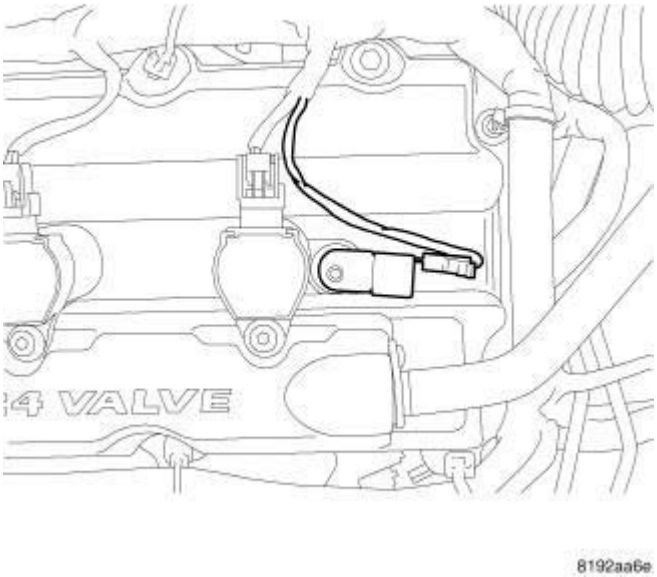

Fig. 4: 1st Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Disconnect the electrical connector.
3. Remove nut and capacitor.

2.7L 2nd

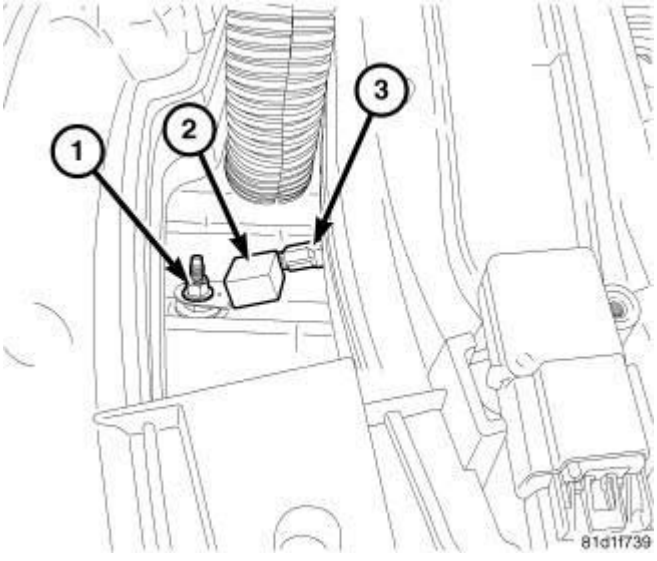

Fig. 5: 2nd Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

The ignition capacitor is located under the intake manifold on the drivers side of the engine.

1. Disconnect and isolate negative battery cable at battery.
2. Remove electrical connector (3).
3. Remove mounting bolt (1) and ignition capacitor (2).

3.5L

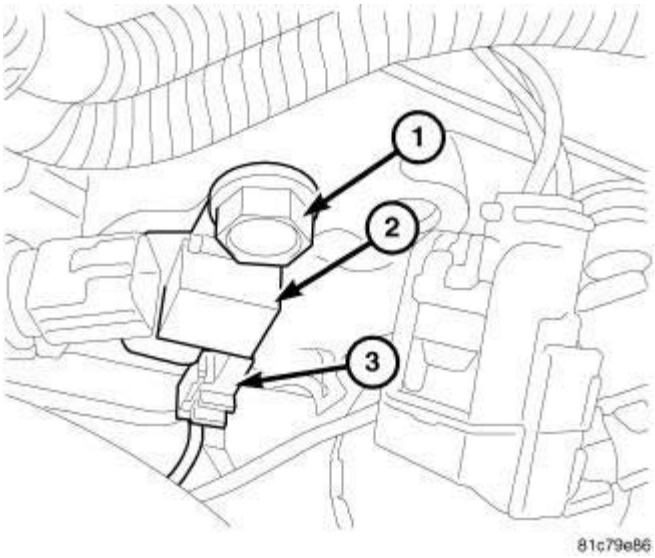

Fig. 6: Ignition Capacitor - 3.5L
Courtesy of CHRYSLER LLC

The ignition capacitor is located on the drivers side of the engine.

1. Disconnect and isolate negative battery cable at battery.
2. Remove electrical connector (3).
3. Remove mounting bolt (1) and ignition capacitor (2).

INSTALLATION

2.4L

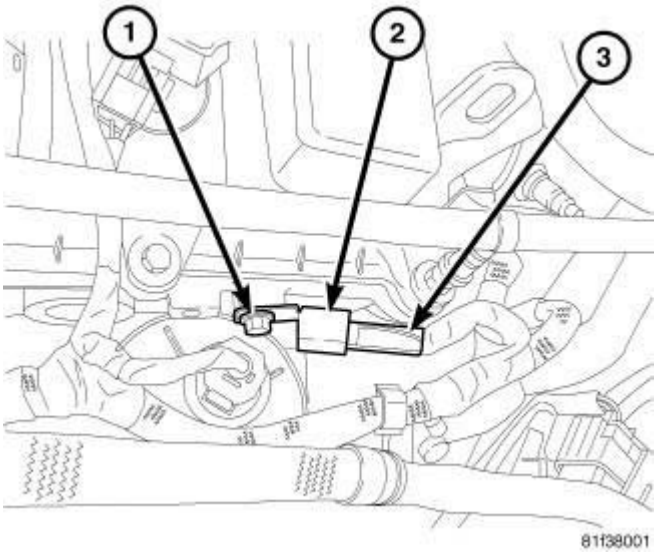

Fig. 7: Capacitor 2.4L
Courtesy of CHRYSLER LLC

1 - Bolt 2 - Capacitor
3 - Connector

1. Install ignition coil capacitor (2) and bolt (1), tighten bolt to 10 N.m (88.5 ft. lbs.).
2. Connect electrical connector (3).
3. Install engine cover.
4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.7L 1st

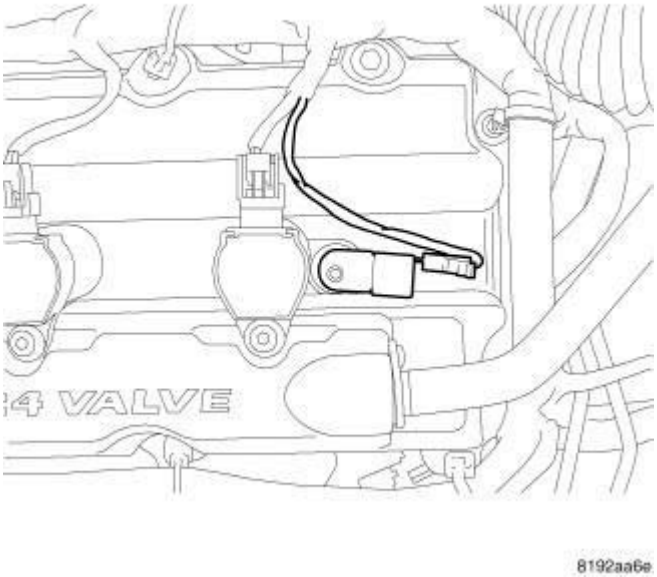

Fig. 8: 1st Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor and nut.
2. Tighten nut to 10 N.m (88.5 in. lbs.).
3. Attach electrical connector to capacitor.
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

2.7L 2nd

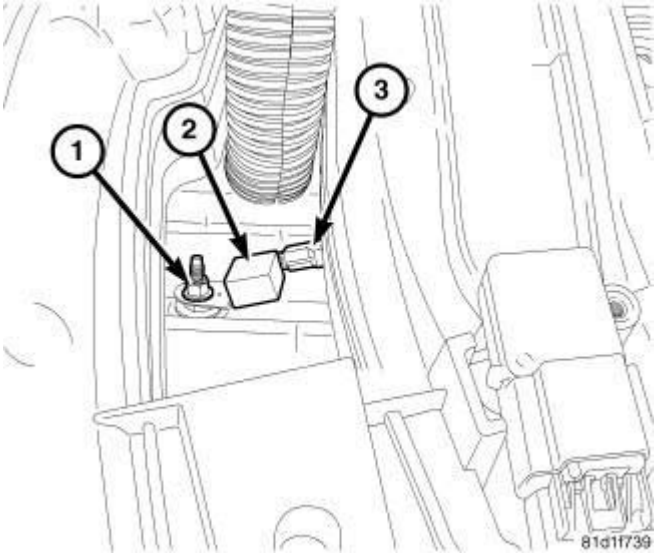

Fig. 9: 2nd Ignition Capacitor - 2.7L
Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor (2) and bolt (1).
2. Tighten bolt to 28 N.m (20.5 ft. lbs.).
3. Connect electrical connector (3).
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

3.5L

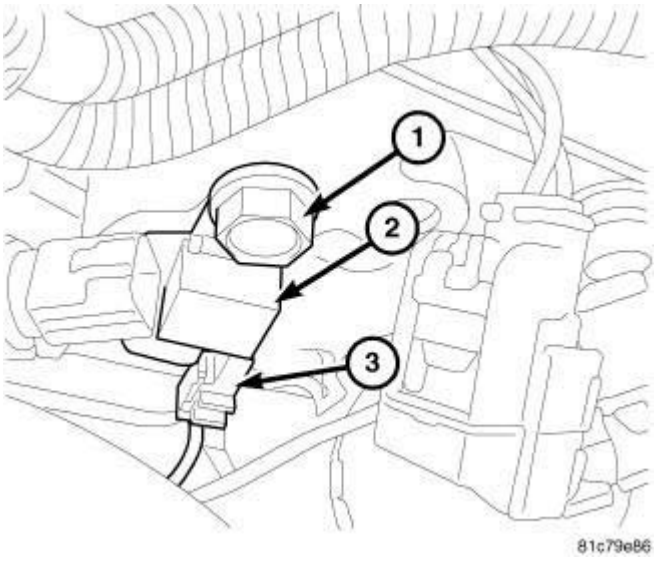

Fig. 10: Ignition Capacitor - 3.5L
Courtesy of CHRYSLER LLC

1. Install ignition coil capacitor (2) and bolt (1).
2. Tighten bolt to 28 N.m (20.5 ft. lbs.).
3. Connect electrical connector (3).
4. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

COIL, IGNITION

REMOVAL

2.4L

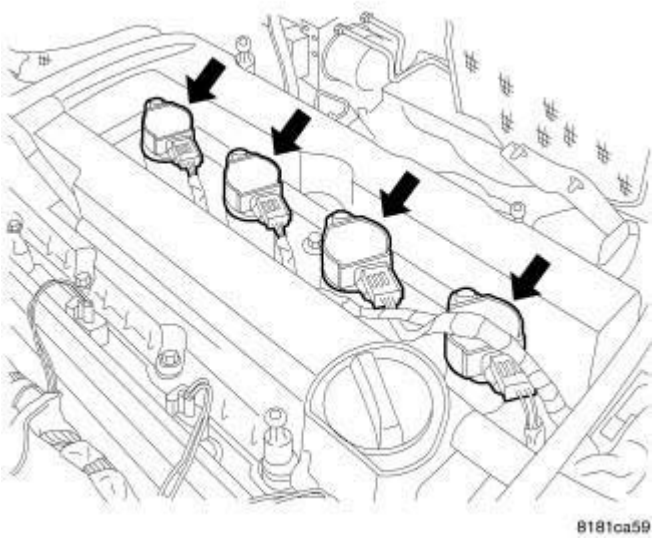

Fig. 11: Identifying Ignition Coil Electrical Connectors
Courtesy of CHRYSLER LLC

NOTE: Prior to removing coil, spray compressed air around coil top to make sure no dirt drops into the spark plug tube.

The electronic ignition coil attaches directly to the valve cover.

1. Disconnect and isolate the negative battery cable.
2. Remove engine cover.
3. Disconnect electrical connector from ignition coil.

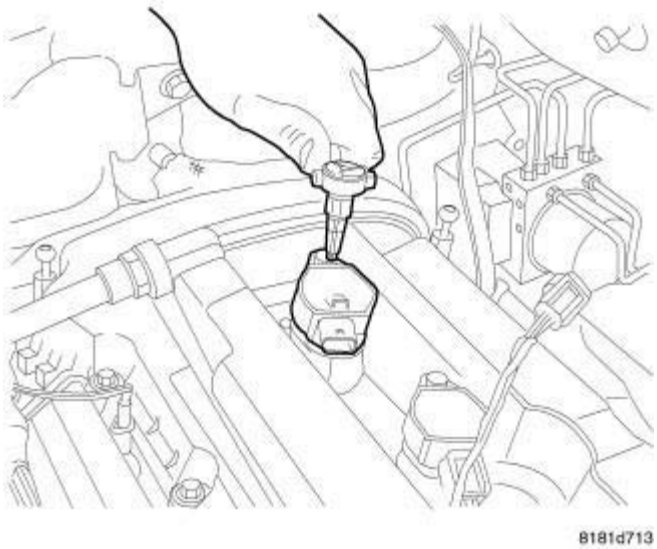

Fig. 12: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

4. Remove ignition coil mounting bolts.

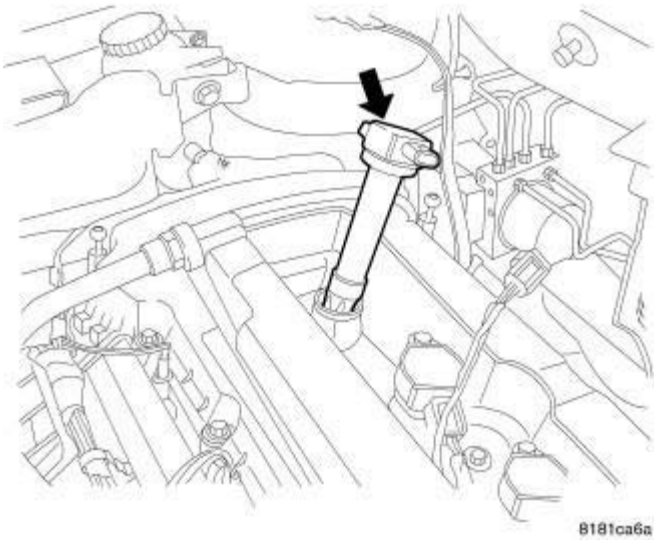

Fig. 13: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

5. Twist the ignition coil then pull straight up.

2.7L

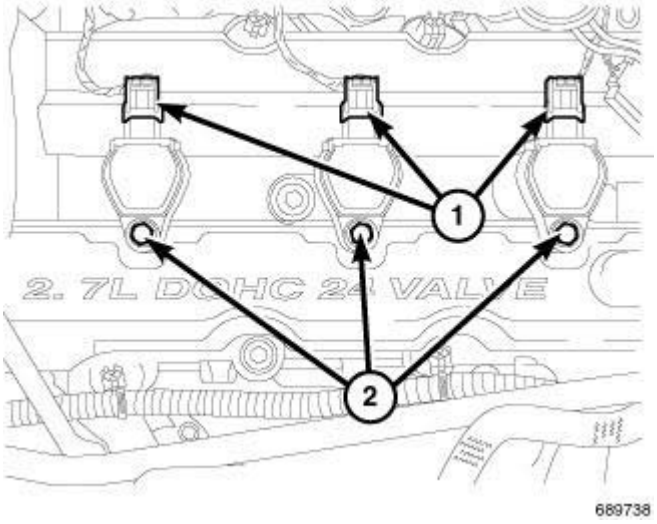

Fig. 14: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

NOTE: Always remove the ignition coil assembly by turning the assembly 1/2 turn and pulling up in a steady motion.

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
3. Disconnect electrical connector (1) from ignition coil.
4. Remove mounting bolt (2) from ignition coil.

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

5. Remove the ignition coils.

3.5L

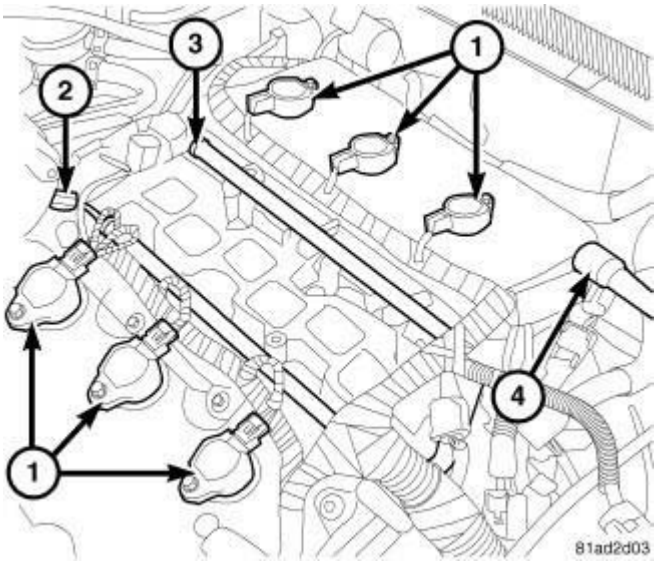

Fig. 15: Ignition Coils And Fuel Rail
Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .

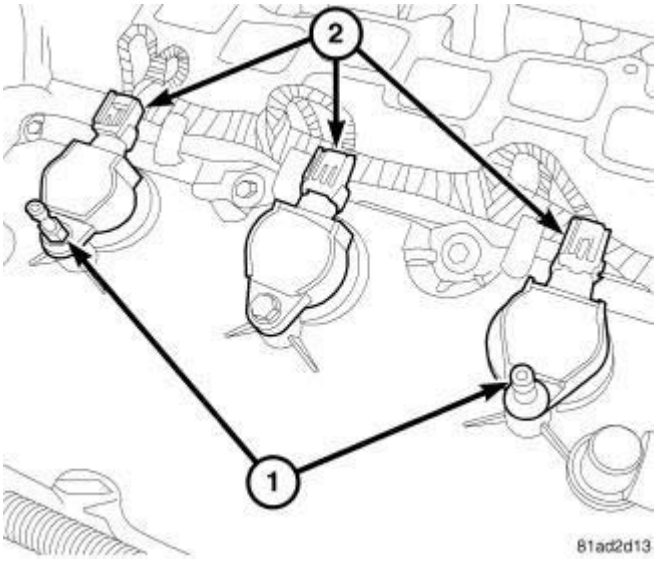

Fig. 16: Ignition Coils
Courtesy of CHRYSLER LLC

4. Unlock and disconnect electrical connector (2) from ignition coils.
5. Remove mounting bolts and engine cover studs (1).

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

6. Twist, lift and remove ignition coil from engine.

INSTALLATION

2.4L

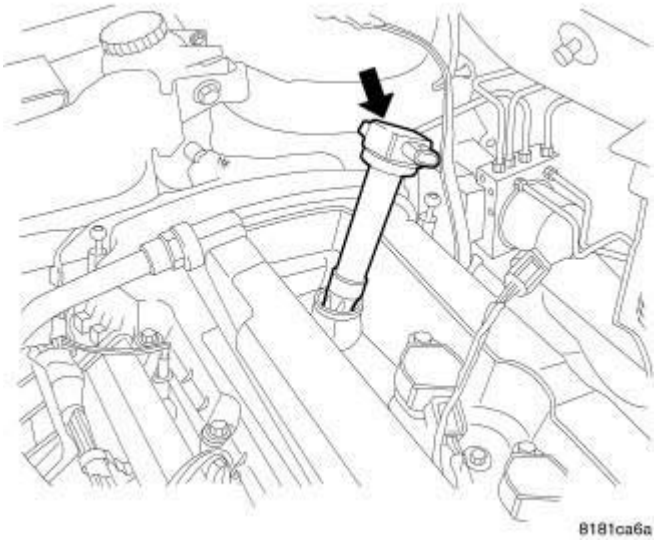

Fig. 17: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

1. Install ignition coil onto spark plug.

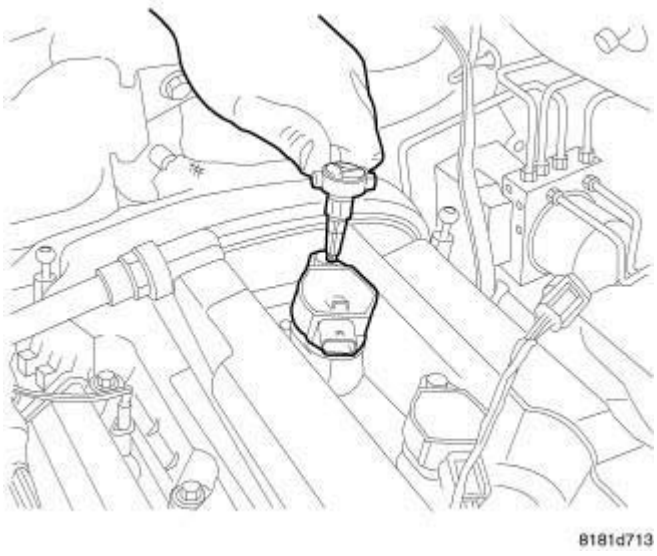

Fig. 18: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

2. Install ignition coil mounting bolt, tighten to 9 N.m (79.5 in. lbs.).
3. Connect ignition coil electrical connectors.
4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
5. Install engine cover.

2.7L

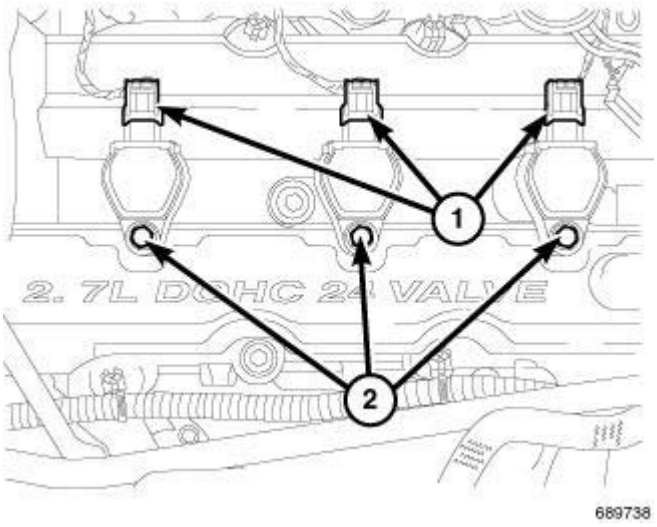

Fig. 19: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

1. Align ignition coil with top of spark plug.
2. Twist and push down ignition coil assembly onto spark plug and valve cover. Install mounting bolt (2) and tighten to 7.5 N.m (65 in. lbs.).
3. Connect electrical connector (1) to ignition coil.
4. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
5. Connect negative battery cable.

3.5L

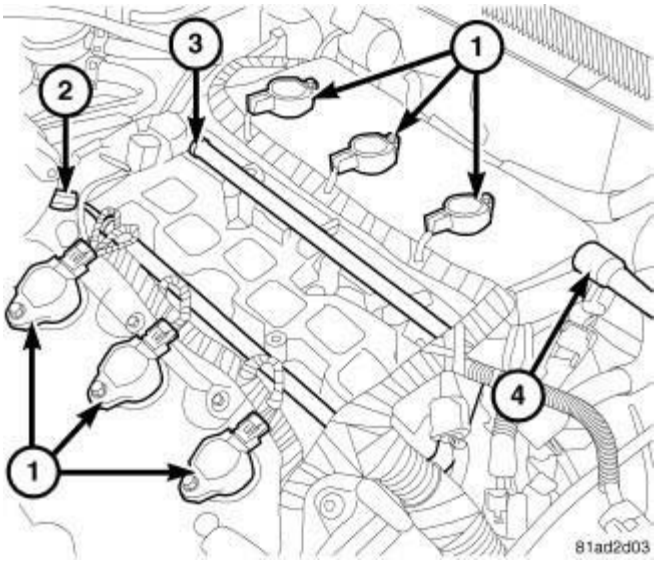

Fig. 20: Ignition Coils And Fuel Rail
Courtesy of CHRYSLER LLC

1. Install ignition coil (1).

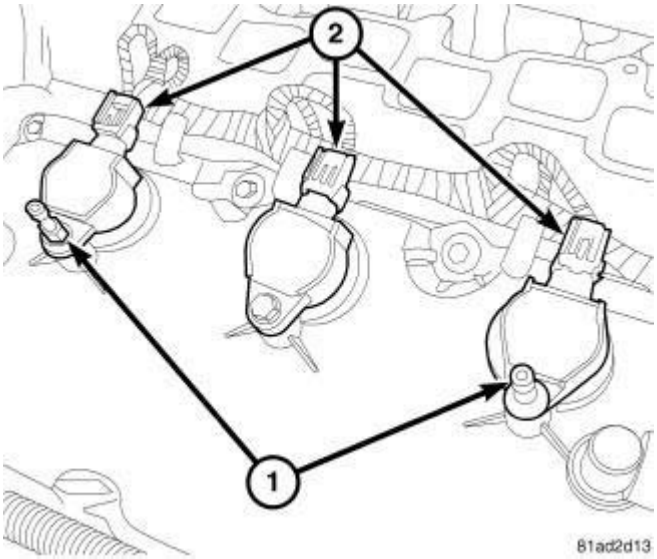

Fig. 21: Ignition Coils
Courtesy of CHRYSLER LLC

2. Install engine cover studs (1) in the two outside ignition coils on the front of the engine. Install bolts on the other ignition coils.
3. Tighten studs and bolts to 8 N.m (71 in. lbs.).

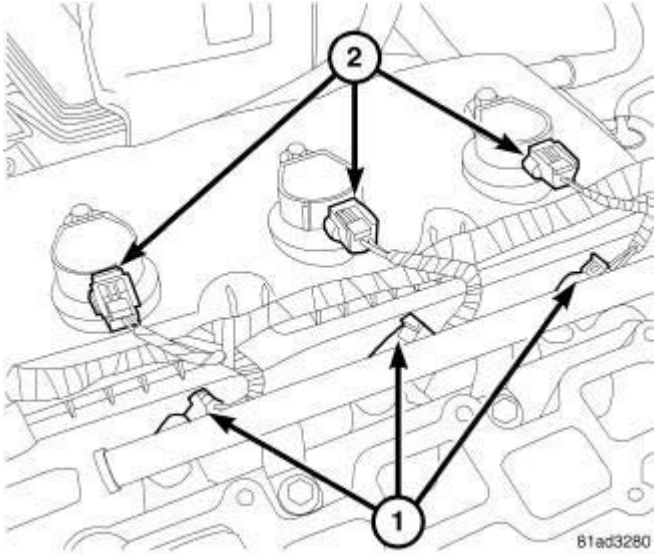

Fig. 22: Identifying Coil & Fuel Injector Connectors
Courtesy of CHRYSLER LLC

4. Connect electrical connector and lock (2).
5. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
6. Connect negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

7. Install engine cover.

MODULE, GLOW PLUG

DESCRIPTION

DESCRIPTION

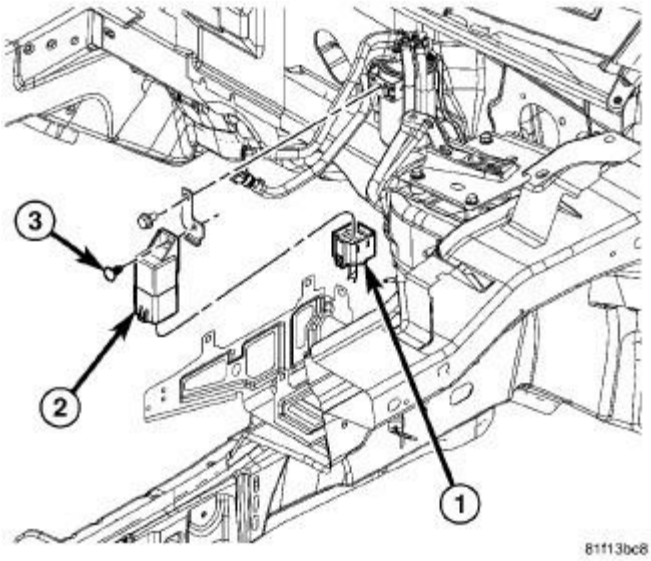

Fig. 23: Locating Diesel Glow Plug Control Module
Courtesy of CHRYSLER LLC

The glow plug control module is mounted to the fuel filter/water separator bracket, and is controlled by the engine control module.

OPERATION

OPERATION

When the ignition (key) switch is placed in the ON position, a signal is sent to the ECM relating current engine coolant temperature. This signal is sent from the engine coolant temperature sensor.

The glow plug control module receives information about the glow function from the engine control module. The start of glow plug operation, the period of glow plug operation, the actuation frequency and the pulse duty factor are therefore determined by the engine control module.

REMOVAL

REMOVAL

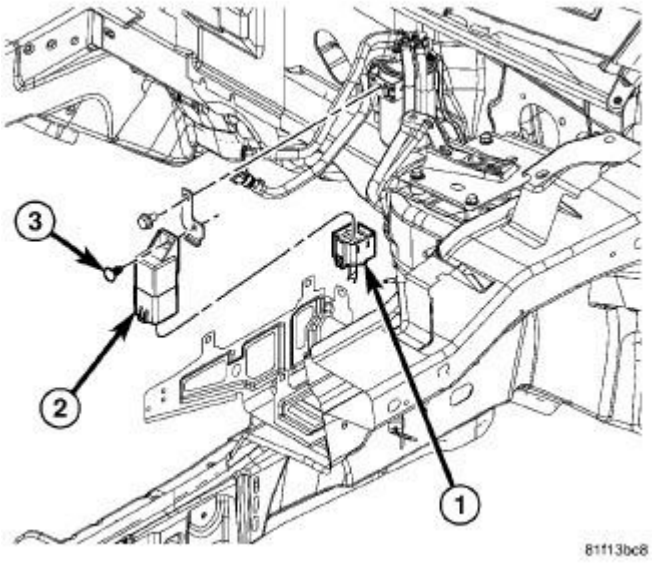

Fig. 24: Locating Diesel Glow Plug Control Module
Courtesy of CHRYSLER LLC

1. Disconnect the glow plug module harness connector (1)
2. Remove the fastener (3).
3. Remove the glow plug module (2).

INSTALLATION

INSTALLATION

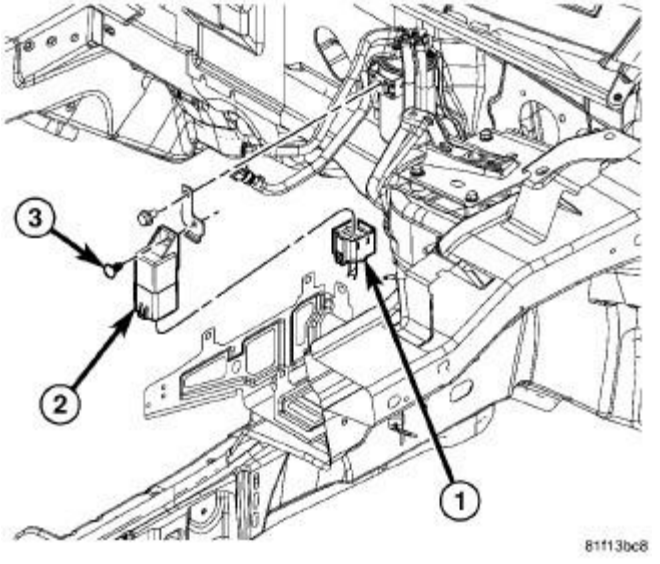

Fig. 25: Locating Diesel Glow Plug Control Module
Courtesy of CHRYSLER LLC

1. Install the glow plug module (2).
2. Install the fastener (3).
3. Reconnect the glow plug module harness connector (1)

PLUG, GLOW

DESCRIPTION

DESCRIPTION

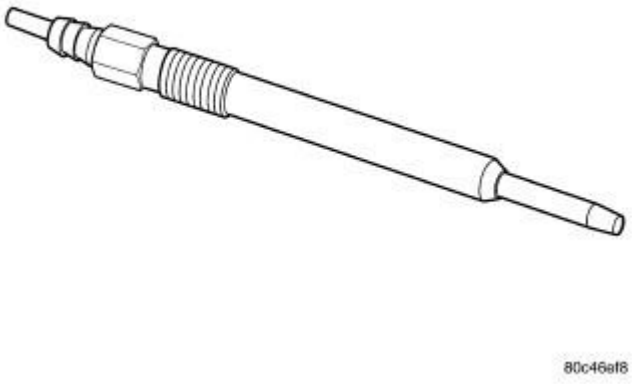

Fig. 26: Glow Plug
Courtesy of CHRYSLER LLC

Glow plugs are used to help start a cold or cool engine. The glow plugs will heat up and glow to heat the combustion chamber of each cylinder. An individual glow plug is used for each cylinder. Each glow plug is threaded into the cylinder head below the cylinder head cover.

OPERATION

OPERATION

The glow plugs are used to preheat the combustion chambers in order to achieve the ignition temperature required for the fuel-air mixture.

The heating element is integrated in the glow rod. It consists of a heating winding and a control winding connected in series.

The glow plug system is a quick start type. This allows for immediate start in practically all weather conditions without long periods of preglowing. This works in conjunction with 6-hole injectors, which have a special "ignition" spray pattern. The glow plugs reach 1000° C (1832° F) in 2 seconds.

REMOVAL

REMOVAL

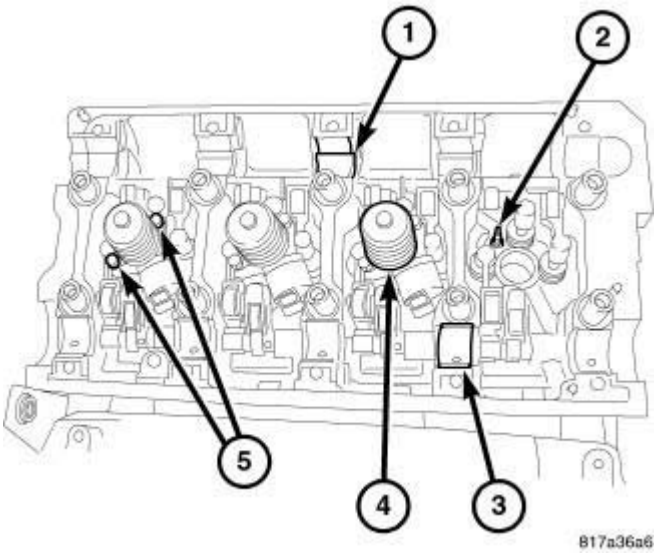

Fig. 27: Glow Plugs
Courtesy of CHRYSLER LLC

NOTE: If replacing a one or more glow plugs that failed, check the glow plug relay control circuit (K202) for a short to voltage. Back probe circuit (K202) between the engine control module and the glow plug control module. Any reading higher than 9.8 volts with the key on would be considered a short to voltage.

1. Disconnect negative battery cable.
2. Remove engine cover. Refer to **Engine - Removal** .
3. Remove cylinder head cover. Refer to **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**).
4. Disconnect glow plug electrical connector.
5. Remove glow plugs (2) from cylinder head.

INSTALLATION

INSTALLATION

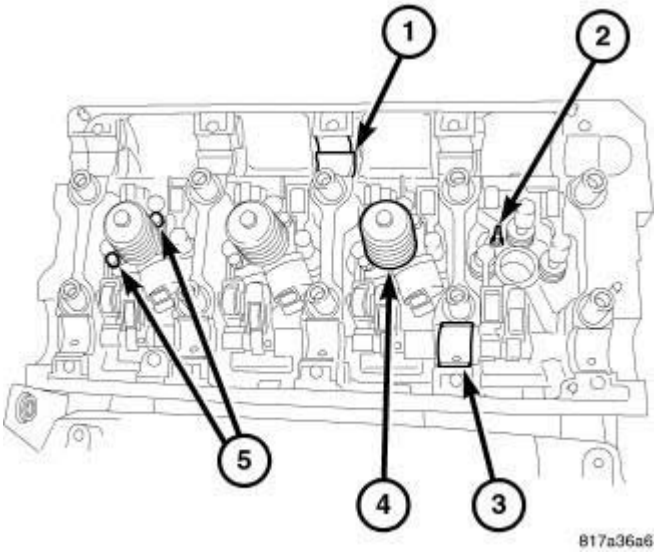

Fig. 28: Glow Plugs
Courtesy of CHRYSLER LLC

1. Clean glow plug bay and install glow plug.
2. Tighten glow plugs to 10 N.m (89 lbs. in.).
3. Connect glow plug electrical connector.
4. Install cylinder head cover. Refer to **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation**).
5. Install engine cover. Refer to **Engine - Installation** .
6. Connect negative battery cable.

SENSOR, CAMSHAFT POSITION

OPERATION

CAMSHAFT AND CRANKSHAFT SIGNALS

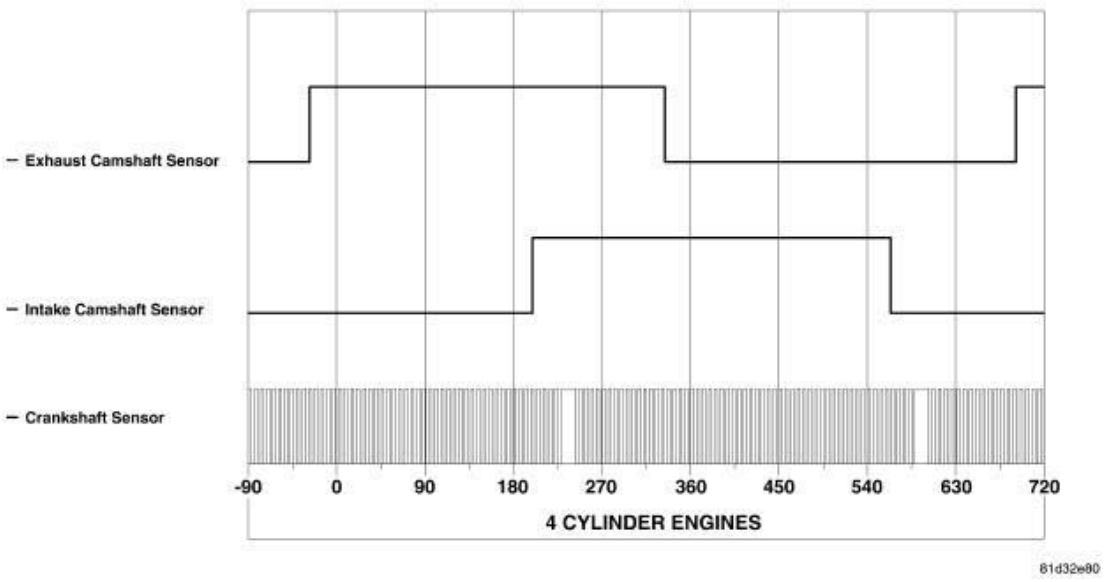

Fig. 29: 4 Cylinder Cam & Crank Signals
Courtesy of CHRYSLER LLC

NOTE: The graphic represents the relationship between camshaft and crankshaft sensors edges with camshafts in "lock pin" position (cam shafts are not "phasing"). This is normally seen during idle.

Depiction of good camshaft and crankshaft square wave signals for 4 cylinder engines.

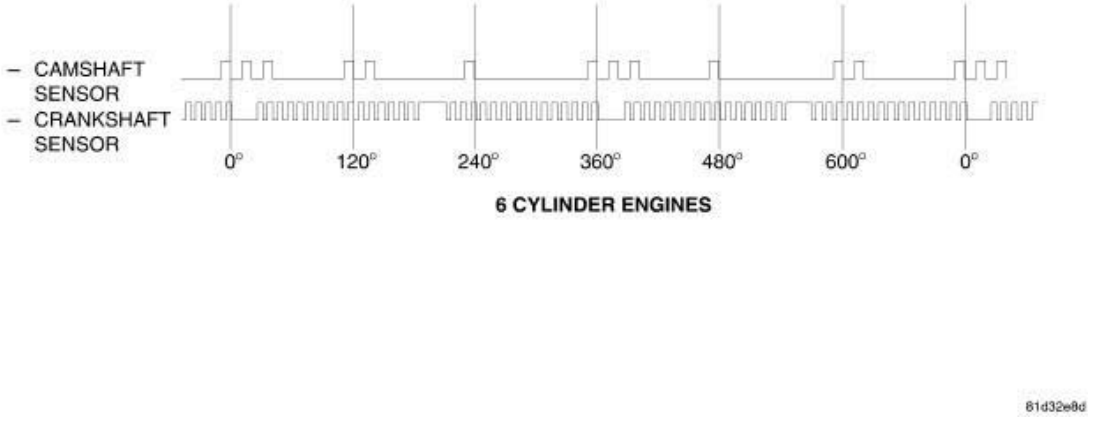

Fig. 30: 6 Cylinder Cam & Crank Signals
Courtesy of CHRYSLER LLC

Depiction of good camshaft and crankshaft square wave signals for 6 cylinder engines.

REMOVAL

2.4L FRONT

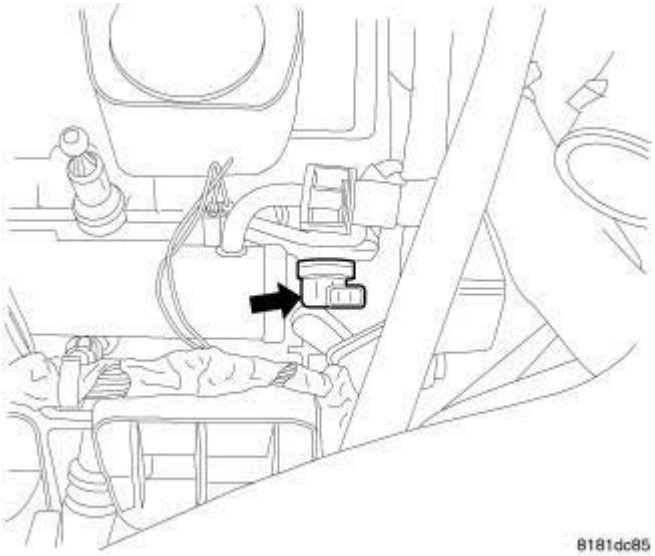

Fig. 31: Front Cam Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Disconnect electrical connector from camshaft position sensor.
3. Remove camshaft position sensor mounting screw.

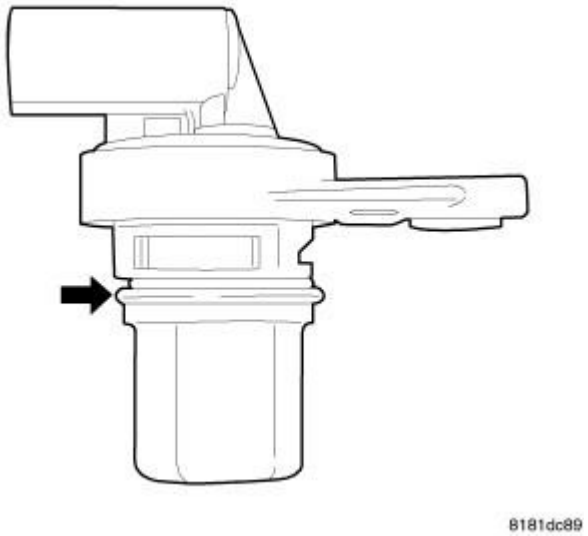

Fig. 32: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

4. Remove sensor.

2.4L REAR

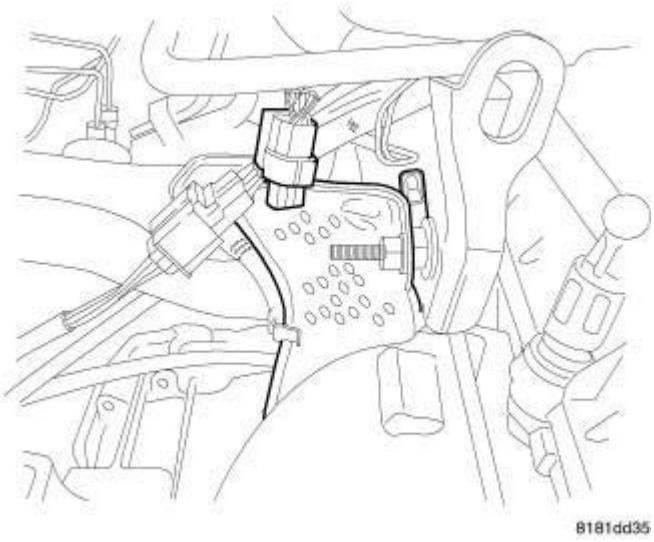

Fig. 33: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

1. Disconnect and isolate negative battery cable.
2. Disconnect electrical connector at sensor.
3. Remove nut retaining heat shield.

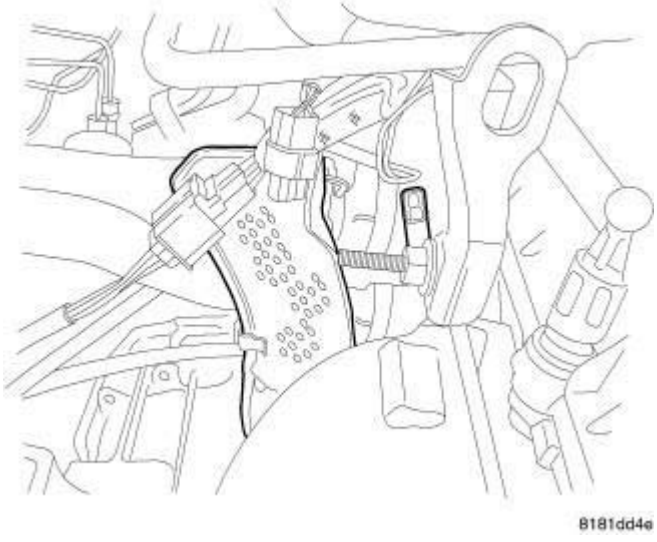

Fig. 34: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

4. Pull heat shield out to uncover sensor.

5. Remove mounting bolt.

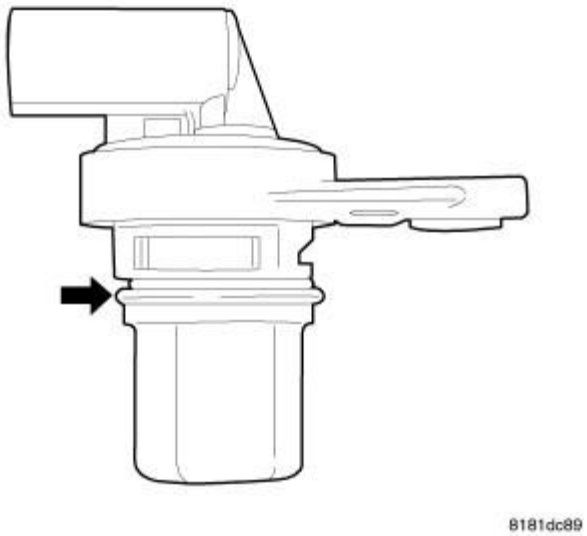

Fig. 35: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

6. Remove sensor.

2.7L

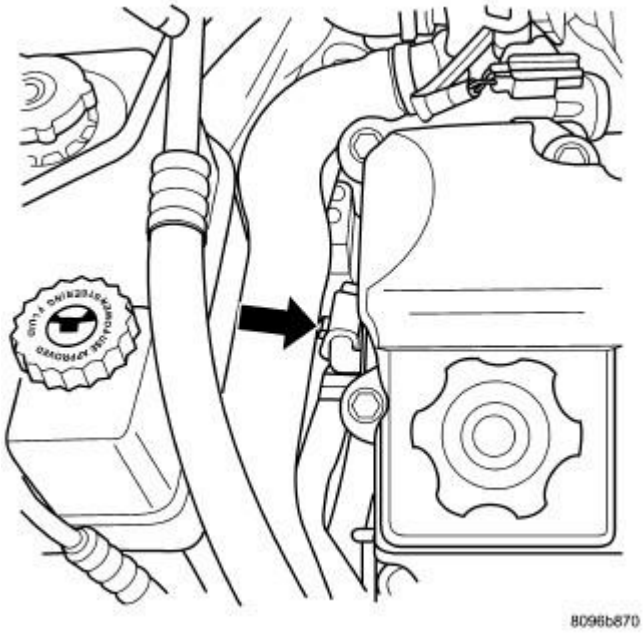

Fig. 36: Cam Sensor Location 2.7L
Courtesy of CHRYSLER LLC

The camshaft position sensor is mounted in the front of the head.

1. Disconnect electrical connector from sensor.
2. Remove camshaft position sensor screw.
3. Without pulling on the connector, pull the sensor out of the chain case cover.

3.5L

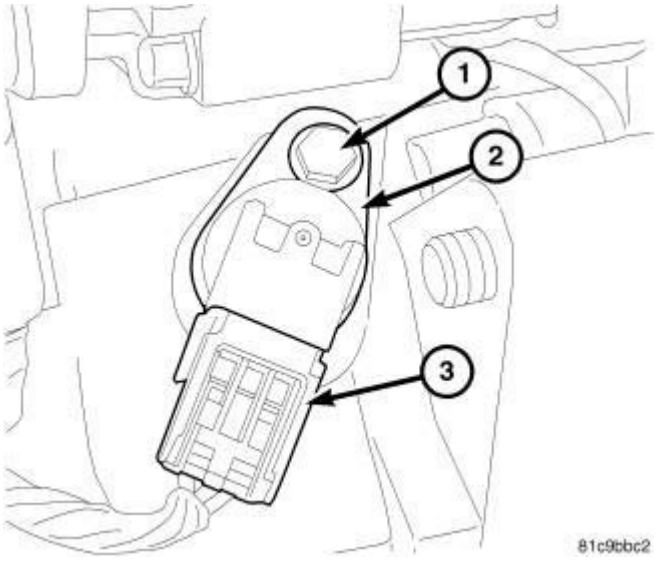

Fig. 37: 3.5L Camshaft Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable at battery.
2. Disconnect electrical connector (3) from camshaft position (CMP) sensor (2).
3. Remove bolt (1) and CMP sensor (2).

INSTALLATION

2.4L FRONT

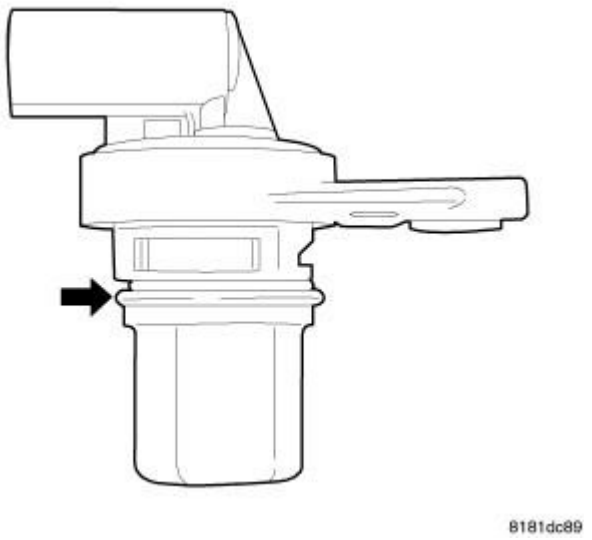

Fig. 38: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

1. Lubricate sensor O-ring.

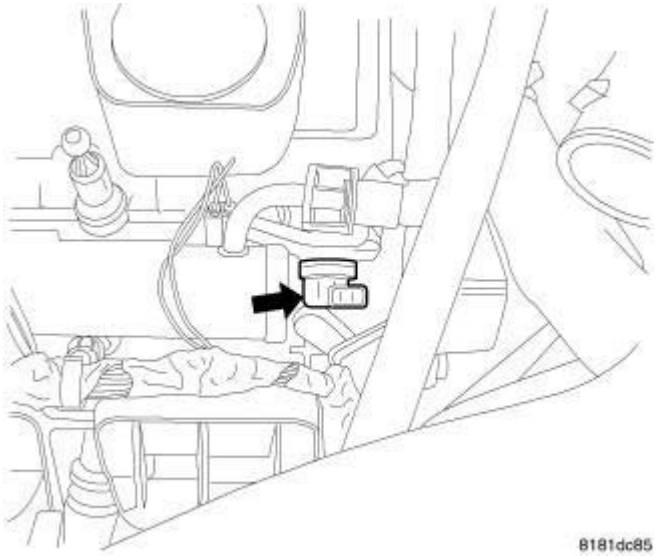

Fig. 39: Front Cam Sensor
Courtesy of CHRYSLER LLC

2. Install CMP sensor and mounting bolt, tighten to 9 N.m (79.5 in. lbs.).
3. Connect electrical connector to camshaft position sensor.

4. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.4L REAR

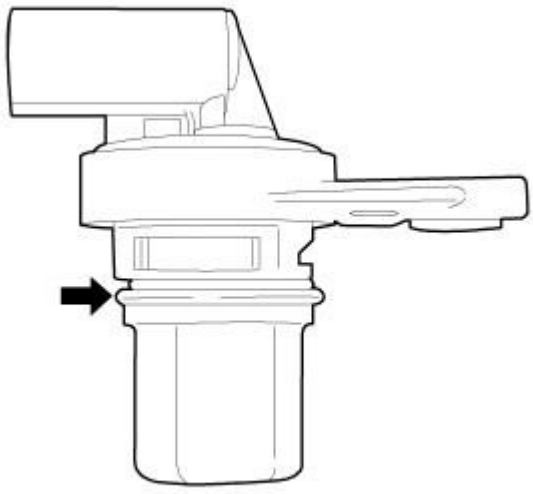

Fig. 40: Removing/Installing Camshaft Position Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

1. Lubricate sensor O-ring.
2. Install CMP sensor and mounting bolt, tighten to 9 N.m (79.5 in. lbs.).

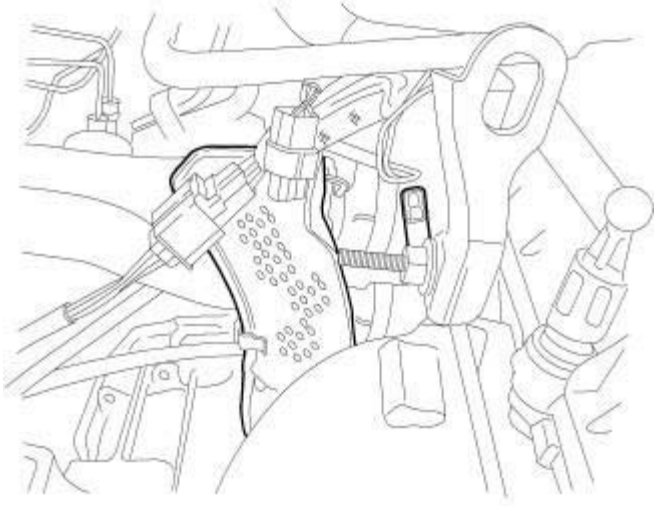

Fig. 41: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

3. Connect electrical connector to camshaft position sensor.
4. Install heat shield onto mounting stud.
5. Install heat shield retaining nut and tighten.

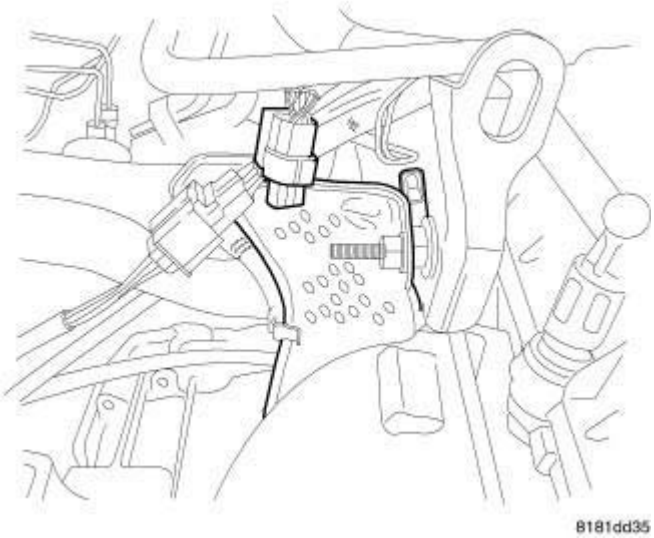

Fig. 42: Identifying Camshaft Position Sensor Heat Shield - Remove/Install
Courtesy of CHRYSLER LLC

6. Connect the electrical connector.
7. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).

2.7L

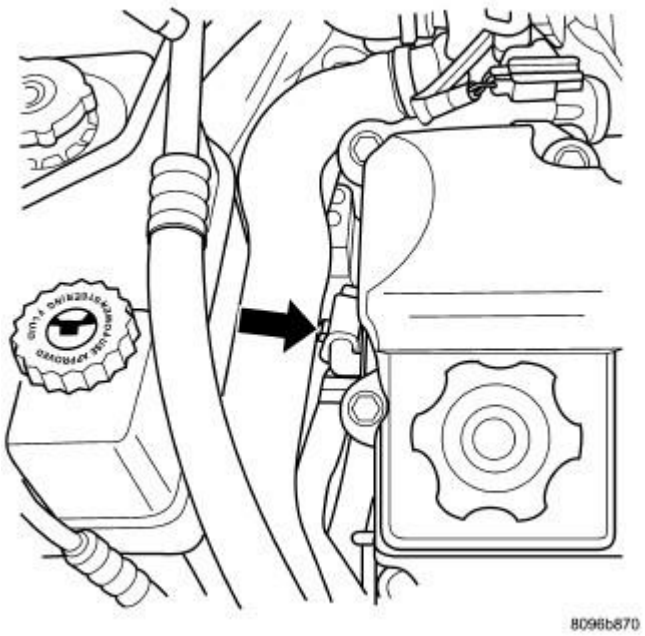

Fig. 43: Cam Sensor Location 2.7L
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

NOTE: If reinstalling the sensor, check the sensor O-ring for damage and replace if necessary. Lubricate the O-ring with clean engine oil before installing the sensor.

1. Push the CMP sensor into the chain case cover with a twisting motion until fully seated.
2. While holding the sensor in this position, install and tighten the retaining bolt to 12 N.m (106 in. lbs.).
3. Connect and lock the electrical connector to the CMP sensor.
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure

3.5L

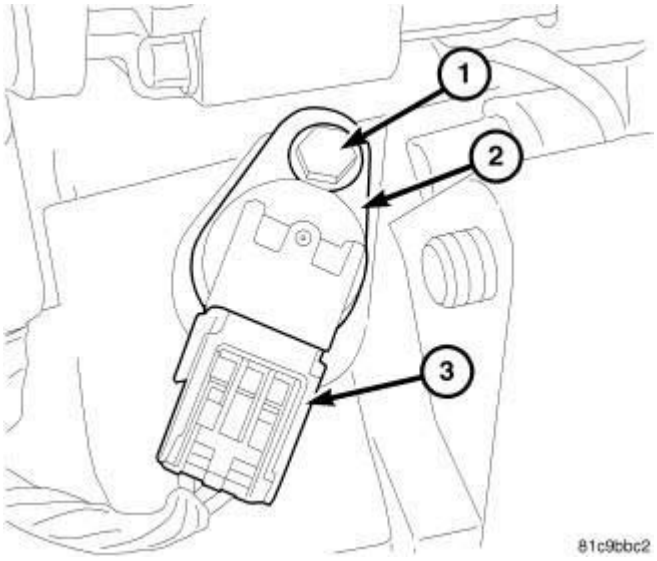

Fig. 44: 3.5L Camshaft Sensor
Courtesy of CHRYSLER LLC

CAUTION: Install camshaft position (CMP) sensor utilizing twisting motion. Make sure CMP sensor is fully seated. Do not drive CMP sensor into the bore with mounting screw. This may cause CMP sensor to be incorrectly seated causing a faulty signal or no signal at all.

NOTE: If reinstalling the sensor, check the sensor O-ring for damage and replace if necessary. Lubricate the O-ring with clean engine oil before installing the sensor.

1. Push the CMP sensor (2) into the timing belt cover with a twisting motion until fully seated.
2. While holding the sensor (2) in this position, install and tighten the retaining bolt (1) to 12 N.m (106 in. lbs.).
3. Connect and lock the electrical connector (3) to the CMP sensor (2).
4. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

NOTE: The Cam/Crank Variation Relearn procedure must be performed anytime there has been a repair/replacement made to a powertrain system, for example: flywheel, valvetrain, camshaft and/or crankshaft sensors or components. Refer to DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure

SENSOR, KNOCK

REMOVAL

2.4L

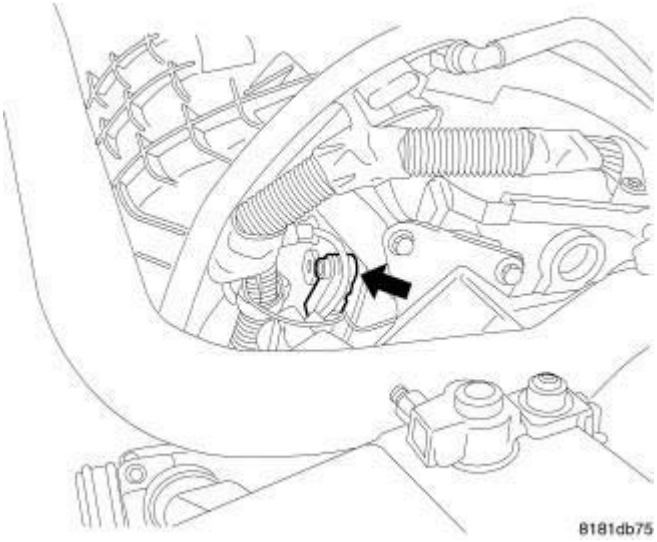

Fig. 45: Locating Knock Sensor
Courtesy of CHRYSLER LLC

The knock sensor bolts into the side of the cylinder block in front of the starter under the intake manifold.

1. Disconnect and isolate negative battery cable.

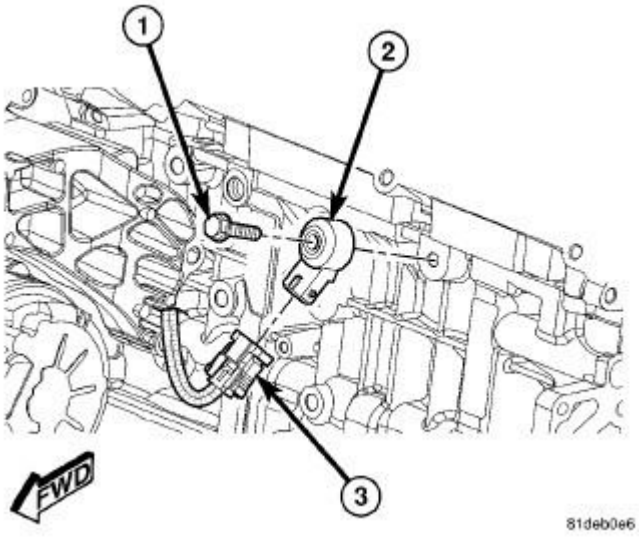

Fig. 46: 2.4L Knock Sensor
Courtesy of CHRYSLER LLC

2. Disconnect electrical connector (3) from knock sensor (2).
3. Remove bolt (1) and knock sensor (2) from engine block.

2.7L

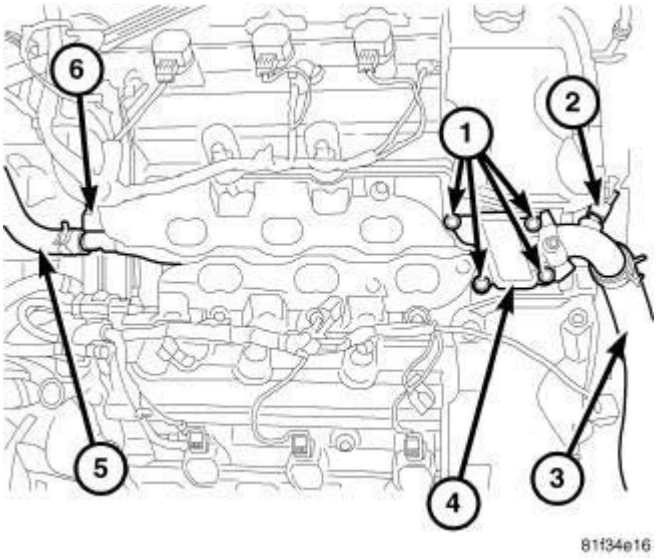

Fig. 47: Water Housing Outlet Tube 2.7L
Courtesy of CHRYSLER LLC

1 - Bolts 2 - Coolant Temp Sensor Connector
3 - Radiator Upper Hose
4 - Water Housing Outlet Tube
5 - Heater Hose
6 - Retaining Clip

WARNING: Do not remove pressure cap with the system hot and under pressure because serious burns from coolant can occur.

1. Drain cooling system. Refer to **Cooling - Standard Procedure** .
2. Disconnect and isolate the negative battery cable.
3. Remove lower intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
4. Remove radiator upper hose (3) at water housing outlet tube (4).
5. Remove heater hose (5) from water housing outlet tube (4) at rear of engine.
6. Disconnect water housing outlet tube (4) from retaining clip (6) at rear of engine.
7. Disconnect electrical connector (2) from coolant temperature sensor.
8. Remove 4 bolts (1) attaching water housing outlet tube (4) to cylinder heads.

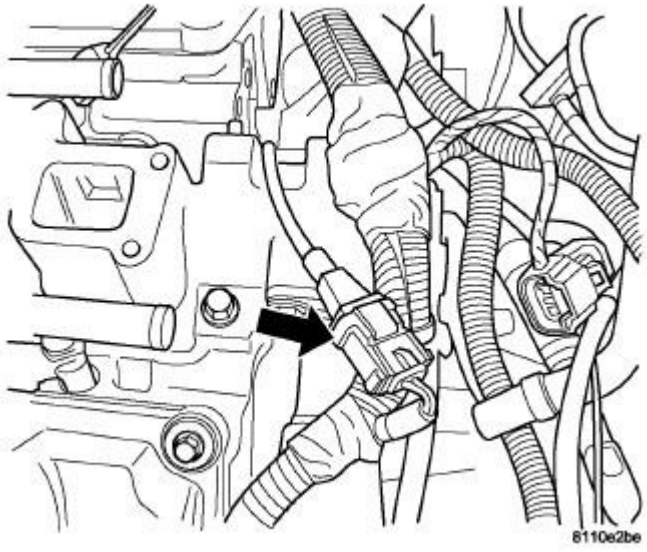

Fig. 48: Knock Sensor Connector
Courtesy of CHRYSLER LLC

9. Disconnect electrical connector from knock sensor.

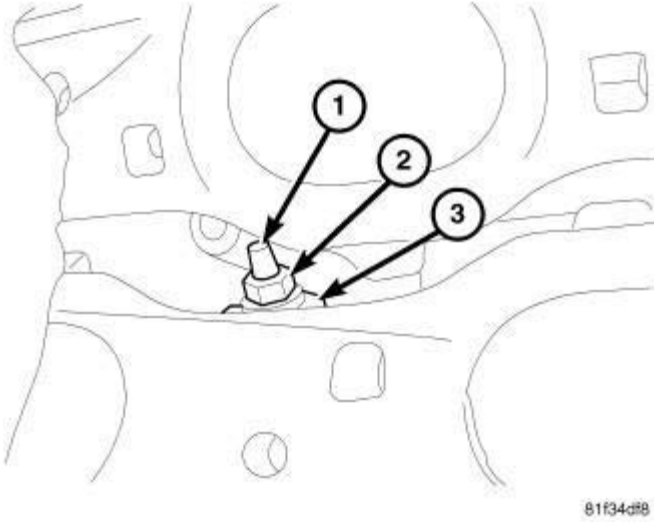

Fig. 49: Knock Sensor 2.7L
Courtesy of CHRYSLER LLC

1 - Stud 2 - Nut
3 - Knock Sensor

10. Reposition the water housing outlet tube and remove nut (2) from knock sensor mounting stud (1).
11. Remove knock sensor (3) from engine block.

3.5L

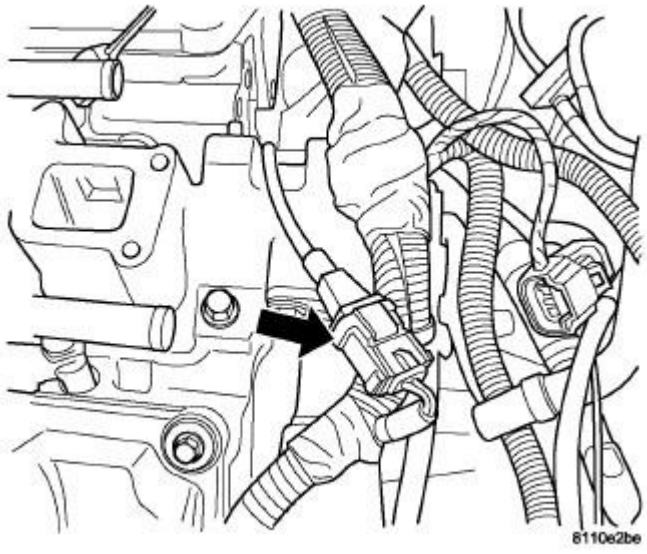

Fig. 50: Knock Sensor Connector
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
3. Disconnect the electrical connector.

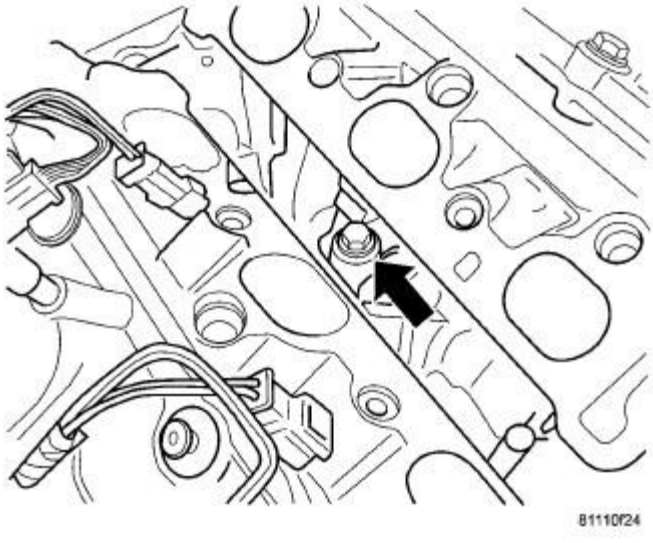

Fig. 51: Knock Sensor Location
Courtesy of CHRYSLER LLC

4. Remove the knock sensor .

INSTALLATION

2.4L

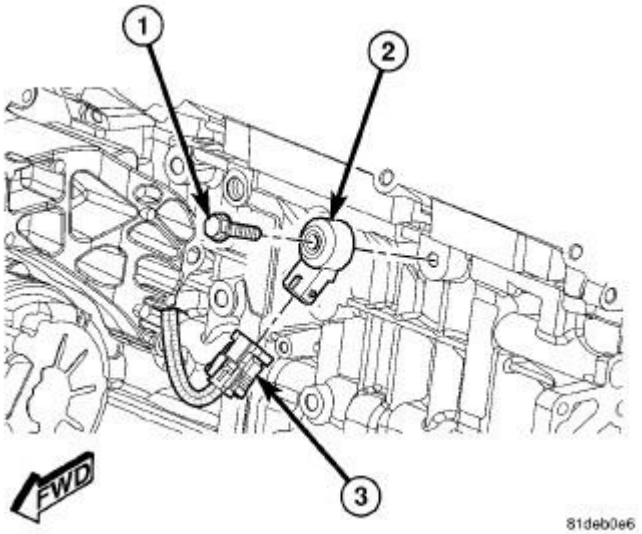

Fig. 52: 2.4L Knock Sensor
Courtesy of CHRYSLER LLC

CAUTION: Always torque knock sensors to the correct torque specification. Over or under tightening effects knock sensor performance. Ensure the electrical connector orientation is at the sic O'clock position to the engine block.

1. Install knock sensor (2) and bolt (1) to engine block. Tighten bolt to 22 N.m (195 in. lbs.).
2. Connect electrical connector (3) to knock sensor (2).
3. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

2.7L

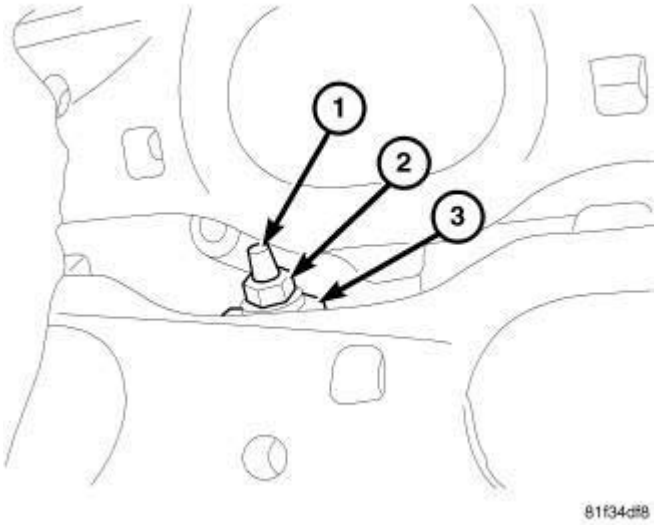

Fig. 53: Knock Sensor 2.7L
Courtesy of CHRYSLER LLC

1 - Stud 2 - Nut
3 - Knock Sensor

CAUTION: Over or under tightening effects knock sensor performance resulting in possible improper spark control.

1. Install knock sensor (3) and nut (2) onto stud (1).

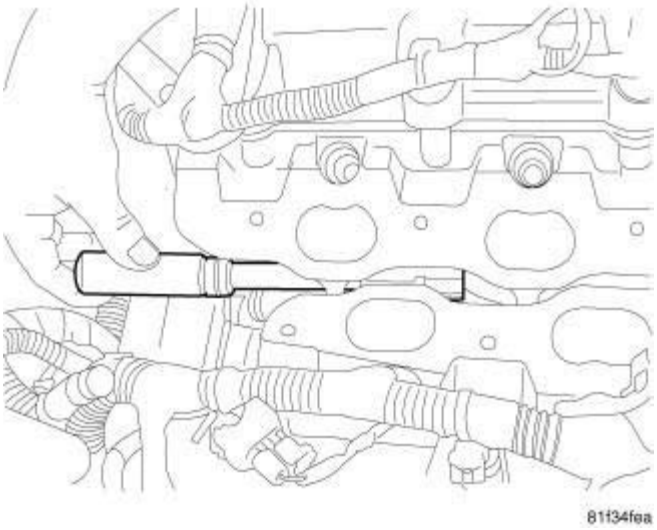

Fig. 54: Tighten Knock Sensor Nut
Courtesy of CHRYSLER LLC

2. Tighten knock sensor nut to 15 N.m (11 ft. lbs.).

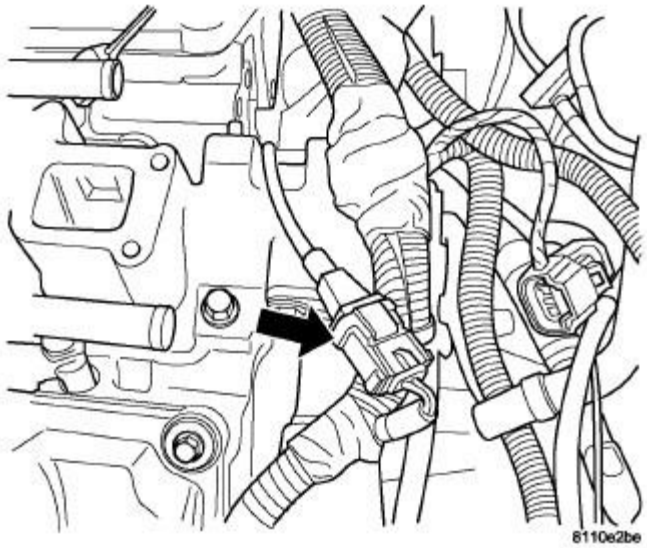

Fig. 55: Knock Sensor Connector
Courtesy of CHRYSLER LLC

3. Attach electrical connector to knock sensor.

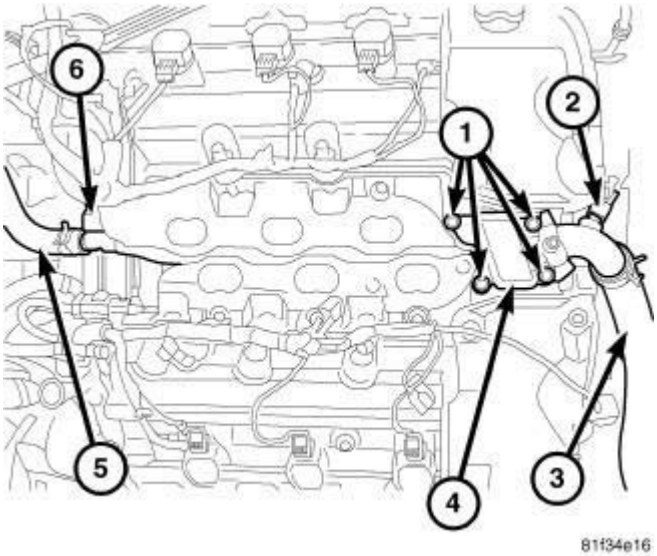

Fig. 56: Water Housing Outlet Tube 2.7L
Courtesy of CHRYSLER LLC

1 - Bolts 2 - Coolant Temp Sensor Connector
3 - Radiator Upper Hose

4 - Water Housing Outlet Tube
5 - Heater Hose
6 - Retaining Clip

4. Position the water housing outlet tube (4) to the cylinder heads and loosely install four bolts (1).
5. Attach water housing outlet tube (4) to the retaining clip (6) at rear of engine.
6. Tighten the four bolts (1) to 3 N.m (30 in. lbs.).
7. Connect electrical connector (2) to the coolant temperature sensor.
8. Install heater hose (5) to water housing outlet tube (4) at rear of engine.
9. Install radiator upper hose (3) to water housing outlet tube (4).
10. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
11. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
12. Fill cooling system. Refer to **Cooling - Standard Procedure** .
13. Operate engine until it reaches normal operating temperature. Check cooling system for correct fluid levels.

3.5L

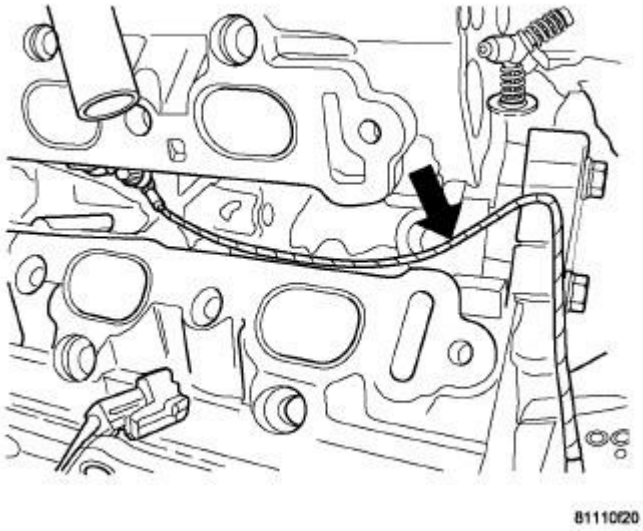

Fig. 57: Knock Sensor Wire Route
Courtesy of CHRYSLER LLC

CAUTION: Always use the specified torque when installing the knock sensor bolt. Over or under tightening the sensor mounting bolt will affect knock sensor performance, possibly causing improper spark control.

1. Install knock sensor. Tighten knock sensor to 20 N.m (15 ft. lbs.).
2. Route the knock sensor wire in the proper location.

3. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .

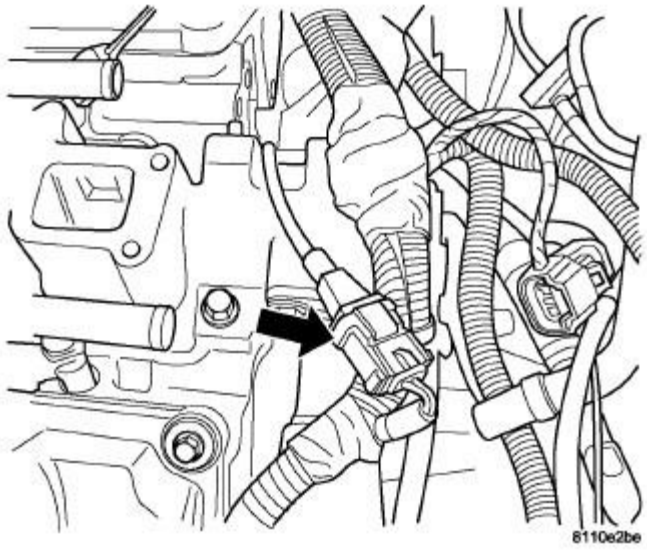

Fig. 58: Knock Sensor Connector
Courtesy of CHRYSLER LLC

4. Connect the electrical connector.
5. Connect the negative battery cable.

SPARK PLUG

REMOVAL

2.4L

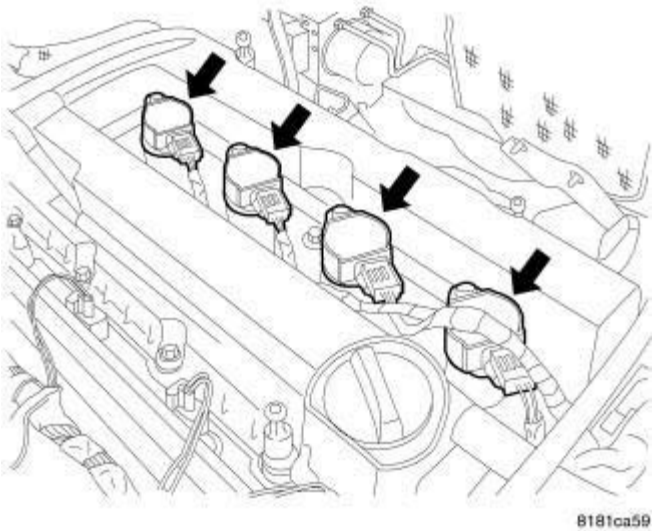

Fig. 59: Identifying Ignition Coil Electrical Connectors
Courtesy of CHRYSLER LLC

NOTE: Prior to removing coil, spray compressed air around coil top to make sure no dirt drops into the spark plug tube.

1. Disconnect and isolate the negative battery cable.
2. Remove engine cover.
3. Disconnect the electrical connectors from ignition coils.

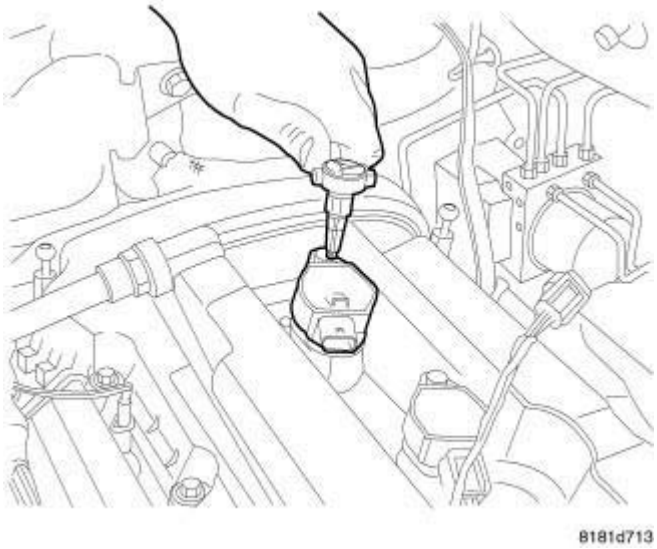

Fig. 60: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

4. Remove the ignition coil mounting bolt.

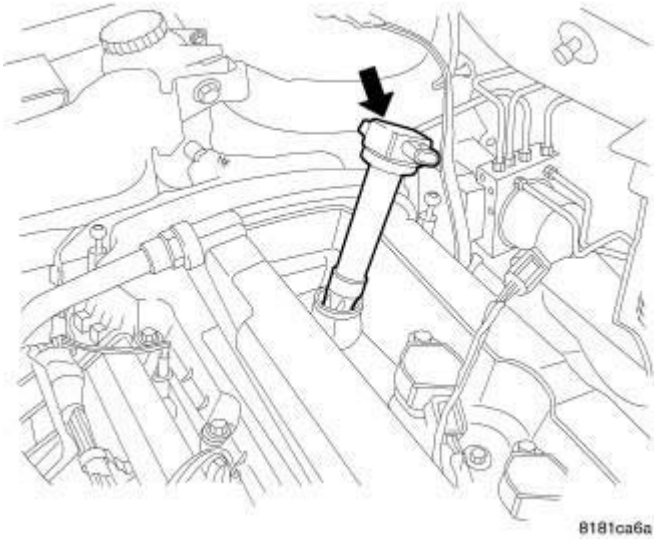

Fig. 61: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

5. Twist the ignition coil then pull straight up.

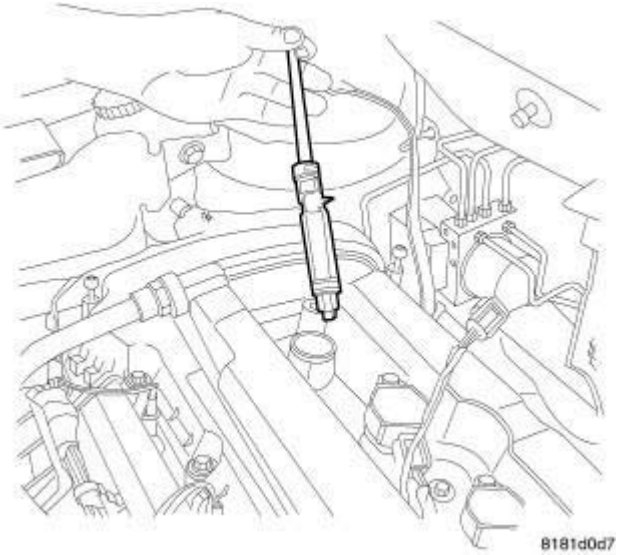

Fig. 62: Removing/Installing Spark Plug
Courtesy of CHRYSLER LLC

NOTE: Prior to loosening the spark plug, use compressed air to blow out any debris that might be in the spark plug tube.

6. Remove the spark plug using a quality socket with a rubber or foam insert.
7. Inspect the spark plug condition.

2.7L

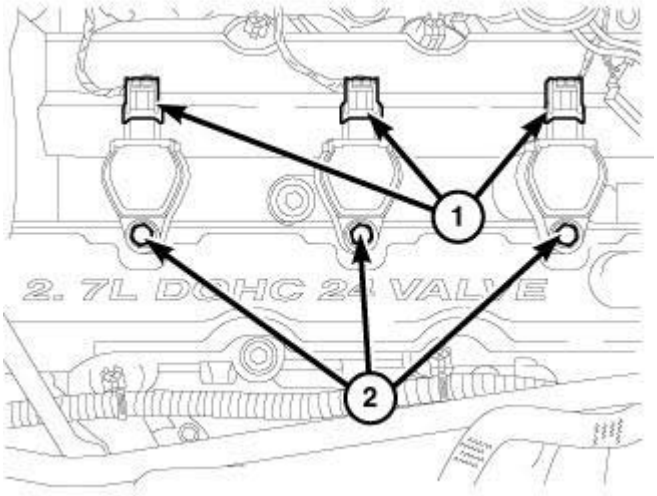

Fig. 63: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

NOTE: Always remove the ignition coil assembly by turning the assembly 1/2 turn and pulling straight back in a steady motion.

1. Disconnect the negative battery cable.
2. Remove the upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
3. Disconnect electrical connector (1) from ignition coil.
4. Remove mounting bolt (2) from ignition coil.

CAUTION: Prior to removing the ignition coils, spray compressed air around the coils and spark plugs. If dirt and debris enter the engine, this may cause internal engine damage.

5. Remove the ignition coils.
6. Remove the spark plugs.

3.5L

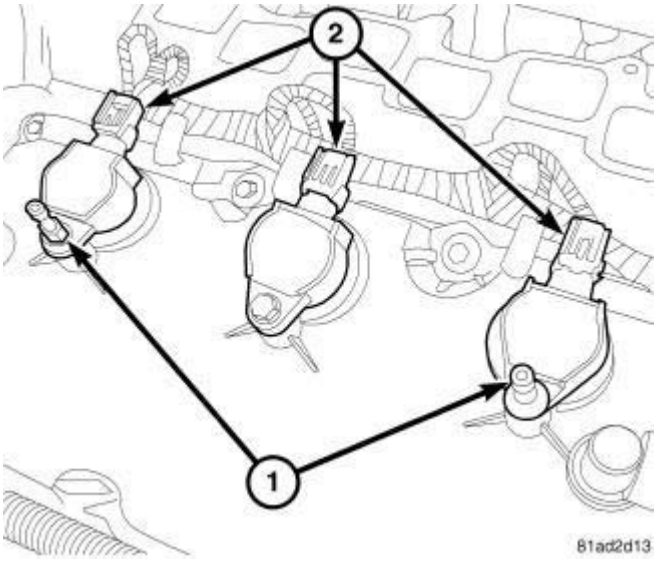

Fig. 64: Ignition Coils
Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove the intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal** .
4. Unlock and disconnect electrical connector (2) from ignition coils.
5. Remove mounting bolts and engine cover studs (1).

6. Twist, lift and remove ignition coil from engine.

CAUTION: Prior to removing the spark plugs, use compressed air to remove any accumulated dirt and debris. If dirt and debris enter the engine, this may cause internal engine damage.

7. Remove spark plug using a quality socket with a rubber or foam insert.

INSTALLATION

2.4L

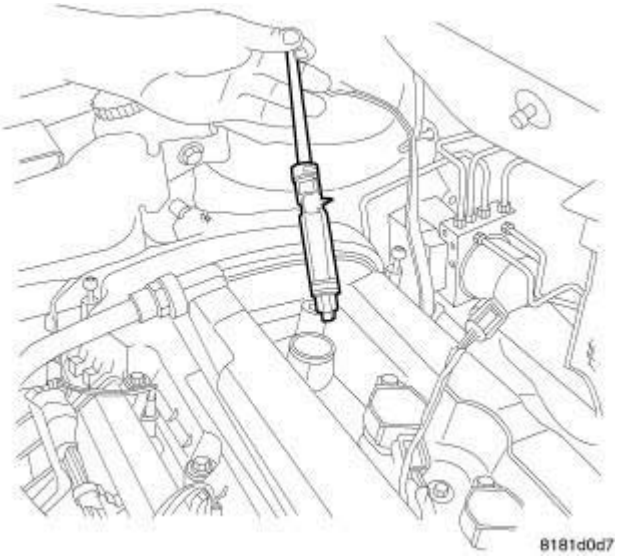

Fig. 65: Removing/Installing Spark Plug
Courtesy of CHRYSLER LLC

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur.
Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.
Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

1. Install each spark plug to the cylinder head. Tighten spark plugs to 27 N.m (20 ft. lbs.).

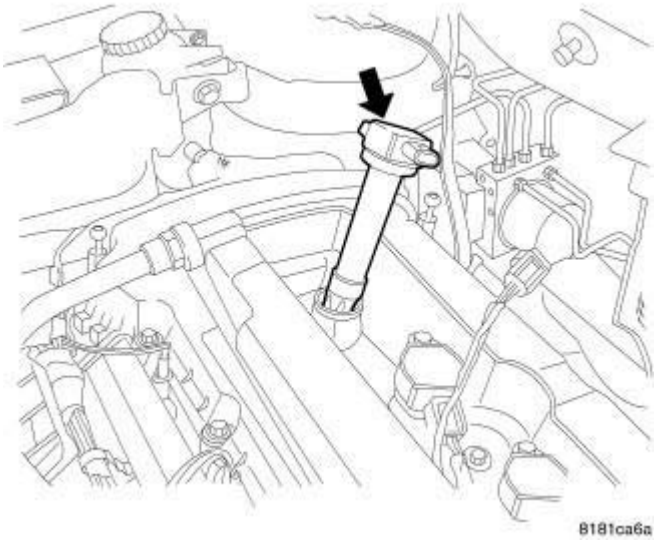

Fig. 66: Removing/Installing Ignition Coil
Courtesy of CHRYSLER LLC

2. Install ignition coil onto spark plug.

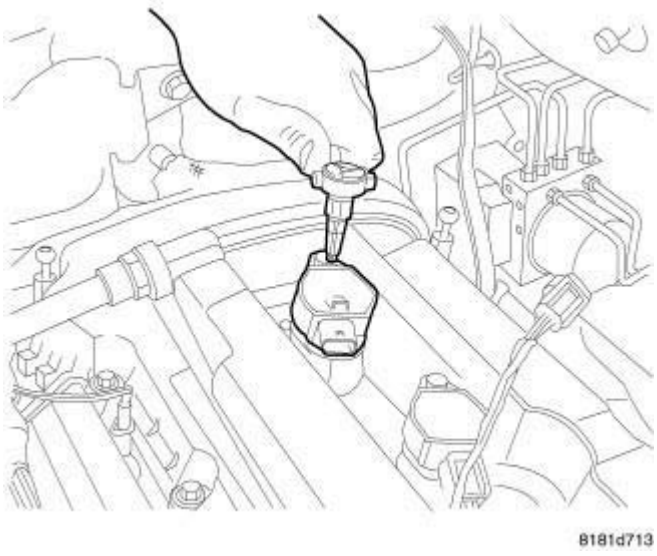

Fig. 67: Removing/Installing Ignition Coil Mounting Bolts
Courtesy of CHRYSLER LLC

3. Install ignition coil mounting bolt. Tighten to 9 N.m (79.5 in. lbs.).
4. Connect ignition coil electrical connectors.
5. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
6. Install engine cover.

2.7L

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.
Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

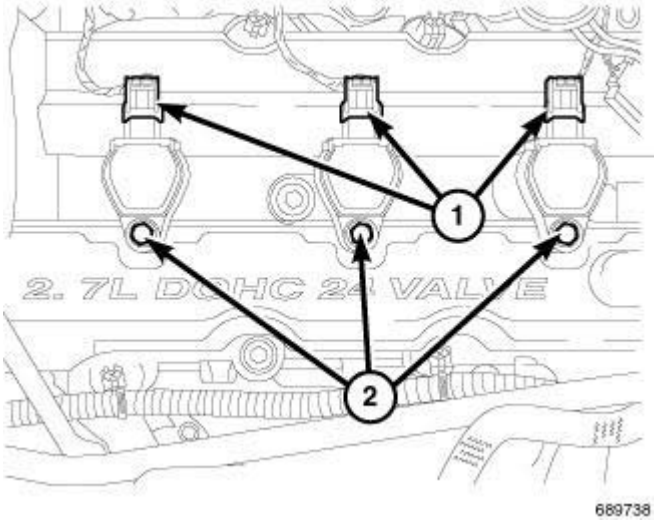

Fig. 68: Removing/Installing Electrical Connectors And Mounting Bolts At Ignition Coil
Courtesy of CHRYSLER LLC

1. Install each spark plug to the cylinder head. Tighten spark plugs to 17 N.m (13 ft. lbs.).
2. Align ignition coil with top of spark plug.
3. Twist and push down ignition coil assembly onto spark plug and valve cover. Install mounting bolt (2) and tighten to 7.5 N.m (65 in. lbs.).
4. Connect electrical connector (1) to ignition coil.
5. Install upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
6. Connect negative battery cable.

3.5L

CAUTION: Handle the spark plugs with care. Do not drop or force the spark plugs into the wells, damage to the electrodes and/or porcelain body may occur. Always start each spark plug by hand in order to avoid cross-threading the spark plug in the cylinder head.
Always tighten spark plugs to the specified torque. Too much or not enough torque will cause damage to the cylinder head and/or spark plug and may lead to poor engine performance.

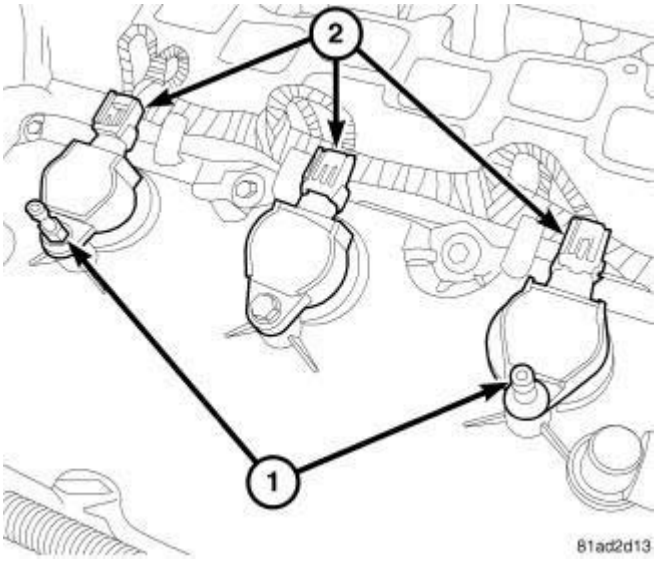

Fig. 69: Ignition Coils
Courtesy of CHRYSLER LLC

1. To avoid cross threading, start the spark plug into the cylinder head by hand.
2. Tighten spark plugs to 27 N.m (20 ft. lbs.).
3. Install ignition coil.
4. Install engine cover studs (1) in the two outside ignition coils on the front of the engine. Install bolts on the other ignition coils.
5. Tighten studs and bolts to 8 N.m (71 in. lbs.).

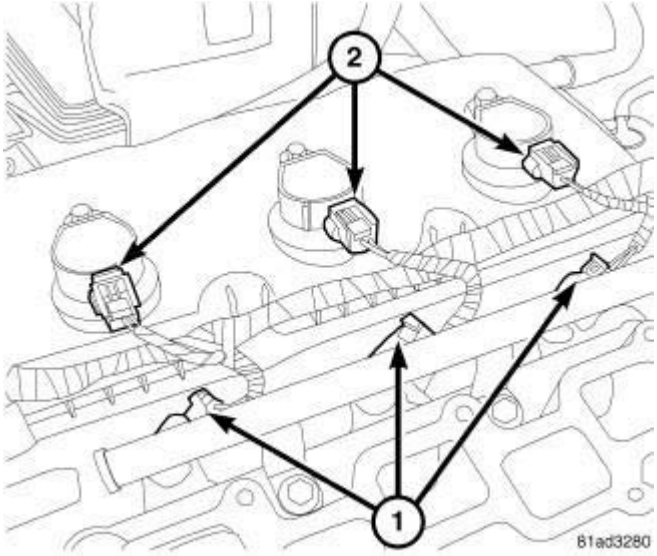

Fig. 70: Identifying Coil & Fuel Injector Connectors
Courtesy of CHRYSLER LLC

6. Connect electrical connector and lock (2).

7. Install intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Installation** .
8. Reconnect the negative battery cable.
9. Install the engine cover.

SWITCH, IGNITION

DESCRIPTION

DESCRIPTION

This vehicle is equipped with a Wireless Ignition Node (WIN). The WIN, along with the FOB with Integrated Key (FOBIK) are the primary components of the keyless ignition system. The only visible component of the WIN is the ignition switch located on the face of the instrument panel just to the inboard side of the steering column. The remainder of the WIN including its mounting provisions and electrical connections are concealed within the instrument panel.

In addition to replacing a conventional keyed ignition switch, the WIN is an integrated electronic receiver that serves as the base station in the vehicle. It communicates with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The WIN interfaces with the Remote Keyless Entry (RKE) FOBIK and the Tire Pressure Monitor (TPM) sensors (if equipped) using Radio Frequency (RF) communication, with the Sentry Key Immobilizer System (SKIS) transponder within the FOBIK using Low Frequency (LF) RF communication.

The WIN cannot be adjusted or repaired, but is flash update capable. If ineffective or damaged the entire WIN must be replaced. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/RECEIVER, Wireless Ignition Node - Removal** .

2009 CHRYSLER

Journey

BUZZERS, RELAYS & TIMERS

BUZZERS, RELAYS & TIMERS LOCATION

Component	Location
Auto Shut Down Relay	Totally Integrated power module. See **Fig. 42**.
Blower Motor - Rear Relay	Totally Integrated power module. See **Fig. 42**.
Brake Lamp Relay	Left quarterpanel. See **Fig. 52**.
PCM Relay	Totally Integrated power module. See **Fig. 51**.
Radiator Fan Control Relay	Totally Integrated power module. See **Fig. 42**.
Radiator Fan High Relay	Behind radiator. See **Fig. 46**.
Rear Window Defogger Relay	Totally Integrated power module. See **Fig. 42**.
Run/Accessory Relay	Totally Integrated power module. See **Fig. 42**.
Run Relay	Totally Integrated power module. See **Fig. 42**.
Run/Start Relay	Totally Integrated power module. See **Fig. 42**.
Secondary Air Pump Relay	Right side of engine. See **Fig. 23**.
Secondary Door Unlock Relay	Left front of engine compartment. See **Fig. 21**.
Starter Relay	Totally Integrated power module. See **Fig. 42**.
Trailer Tow Stop Lamp Left - Relay	Under left side of rear bumper. See **Fig. 39**.
Trailer Tow Stop Lamp Right - Relay	Under right side of rear bumper. See **Fig. 39**.
Trailer Tow Stop/Turn Left - Relay	Base of left "D" pillar. See **Fig. 39**.
Trailer Tow Stop/Turn Right - Relay	Base of right "D" pillar. See **Fig. 39**.

CIRCUIT PROTECTION DEVICES

CIRCUIT PROTECTION DEVICES LOCATION

Component	Location
Circuit Breaker 1	Totally Integrated power module. See **Fig. 42**.
Power Seat Circuit Breaker	Under driver's seat. See **Fig. 34**.
Totally Integrated Power Module	Left rear of engine compartment. See **Fig. 20**.

CONTROL UNITS

CONTROL UNITS LOCATION

Component	Location
All Wheel Drive Control Module	Left side of dash. See **Fig. 54**.
Anti-Lock Brakes Module	Right rear of engine compartment. See **Fig. 49**.
Driver Door Module	Driver's door. See **Fig. 26**.

Front Blower Power (ATC) Module	Right end of HVAC. See **Fig. 4**.
Hands Free Module	Left end of dash. See **Fig. 2**.
Heated Seats Module	Under driver's seat. See **Fig. 34**.
Inverter Module	Under driver's seat. See **Fig. 35**.
Occupant Restraint Controller Module	Center of dash. See **Fig. 1**.
Powertrain Control Module	Left side of engine compartment. See **Fig. 18**.
Rear Blower Module	Right quarterpanel. See **Fig. 33**.
Steering Column Lock Module (VTSA)	On steering column. See **Fig. 2**.
Steering Control Module	In steering wheel. See **Fig. 5**.
Video Screen Module	Center rear of roof. See **Fig. 44**.

MOTORS

MOTORS LOCATION

Component	Location
Blend Door Actuator - Left	On HVAC unit. See **Fig. 1**.
Blend Door Actuator - Right	On front HVAC. See **Fig. 3**.
Blower Motor - Front	Right end of HVAC. See **Fig. 3**.
Blower Motor - Rear	Right quarterpanel. See **Fig. 33**.
Door Latch - Driver	Driver's door. See **Fig. 26**.
Door Latch - Left Rear	Left rear door. See **Fig. 27**.
Door Latch - Passenger	Front passenger's door.
Door Latch - Right Rear	Right rear door.
Fuel Pump Module	Top left side of fuel tank. See **Fig. 50**.
Fuel Pump Module C1 (AWD)	Top left side of fuel tank. See **Fig. 37**.
Fuel Pump Module C2 (AWD)	Top right side of fuel tank. See **Fig. 37**.
Horizontal Seat Adjuster Motor - Driver	Under driver's seat. See **Fig. 34**.
Mode Door Actuator	Middle of front HVAC. See **Fig. 3**.
Outside Rearview Mirror - Driver	Driver's door.
Outside Rearview Mirror - Passenger	Front passenger's door. See **Fig. 48**.
Radiator Cooling Fan Module	Behind radiator. See **Fig. 46**.
Recirculation Door Actuator	Right side of HVAC. See **Fig. 4**.
Secondary Air Pump	Right side of engine. See **Fig. 23**.
Starter (2.4L)	Lower left rear of engine. See **Fig. 47**.
Starter (3.5L)	Lower left rear of engine. See **Fig. 19**.
Sunroof Motor	Center front of roof. See **Fig. 44**.
Throttle Body (2.4L)	Left rear of engine. See **Fig. 14**.
Throttle Body (3.5L)	Top rear of engine. See **Fig. 13**.
Vertical Seat Adjuster Motor - Driver Front	Under driver's seat. See **Fig. 34**.
Vertical Seat Adjuster Motor - Driver Rear	Under driver's seat. See **Fig. 34**.
Window Motor - Driver	Driver's door. See **Fig. 26**.

Window Motor - Left Rear	Left rear door. See **Fig. 27**.
Window Motor - Passenger	Front passenger's door.
Window Motor - Right Rear	Right rear door.
Windshield Washer Pump	Left front of engine compartment. See **Fig. 20**.
Wiper Motor - Front	Left rear of engine compartment. See **Fig. 18**.

SENDING UNITS & SENSORS

SENDING UNITS & SENSORS LOCATION

Component	Location
Accelerator Pedal Position Sensor	Left side of dash. See **Fig. 54**.
A/C Pressure Transducer	Right front corner of engine compartment. See **Fig. 53**.
Air Flow Sensor	Rear of engine. See **Fig. 23**.
Ambient Air Temperature Sensor	Behind center of front fascia. See **Fig. 20**.
Brake Fluid Level Sensor	Left rear of engine compartment. See **Fig. 18**.
Camshaft 1/1 Position Sensor (2.4L)	Left rear of engine. See **Fig. 43**.
Camshaft 1/1 Position Sensor (3.5L)	Left rear of engine. See **Fig. 47**.
Camshaft 1/2 Position Sensor (2.4L)	Left rear of engine. See **Fig. 40**.
Crankshaft Position Sensor (2.4L)	Rear of engine. See **Fig. 14**.
Crankshaft Position Sensor (3.5L)	Right rear of engine. See **Fig. 19**.
Dynamics Sensor	Center of dash. See **Fig. 16**.
Engine Coolant Temperature 1 Sensor	Rear of engine. See **Fig. 13**.
Engine Coolant Temperature 2 Sensor	Left rear of engine. See **Fig. 47**.
Evaporator Temperature Sensor	On HVAC unit. See **Fig. 1**.
Front Impact Sensor - Left	Left front of engine compartment. See **Fig. 20**.
Front Impact Sensor - Right	Right front of engine compartment. See **Fig. 46**.
Infrared Sensor	Front of headliner. See **Fig. 44**.
Input Speed Sensor (2.4L)	Left side of transmission. See **Fig. 14**.
Input Speed Sensor (3.5L)	Top of transmission. See **Fig. 17**.
Intake Air Temperature/Boost Pressure Sensor	Left front of engine compartment. See **Fig. 21**.
Intake Air Temperature Sensor (2.4L)	Left rear of engine. See **Fig. 40**.
Intake Air Temperature Sensor (3.5L)	Rear of engine. See **Fig. 13**.
Intrusion Transceiver Module	Center of overhead rail. See **Fig. 12**.
Knock Sensor (2.4L)	Left rear of engine. See **Fig. 47**.
Knock Sensor (3.5L)	Right rear of engine. See **Fig. 13**.
Manifold Absolute Pressure Sensor (2.4L)	Top left of engine. See **Fig. 14**.
Manifold Absolute Pressure Sensor (3.5L)	Right rear of engine. See **Fig. 13**.
Oil Temperature Sensor	Left front of engine. See **Fig. 43**.
Output Speed Sensor (2.4L)	Left side of transmission. See **Fig. 14**.
Output Speed Sensor (3.5L)	Right side of transmission. See **Fig. 17**.

Oxygen Sensor 1/1 (2.4L)	Left rear of engine. See **Fig. 40**.
Oxygen Sensor 1/1 (3.5L)	Right side of engine. See **Fig. 13**.
Oxygen Sensor 1/2 (2.4L)	Right side of transmission. See **Fig. 14**.
Oxygen Sensor 1/2 (3.5L)	Right side of transmission. See **Fig. 19**.
Oxygen Sensor 2/1	Left side of engine. See **Fig. 19**.
Oxygen Sensor 2/2	Left side of transmission. See **Fig. 19**.
Seat Track Position Sensor - Driver	Under driver's seat. See **Fig. 34**.
Seat Track Position Sensor - Passenger	Under front passenger's seat. See **Fig. 9**.
Side Impact Sensor - Left 1	Driver's door. See **Fig. 26**.
Side Impact Sensor - Left 2	Left "C" pillar. See **Fig. 52**.
Side Impact Sensor - Left 3	Left quarterpanel. See **Fig. 30**.
Side Impact Sensor - Right 1	Front passenger's door.
Side Impact Sensor - Right 2	Right "C" pillar. See **Fig. 32**.
Side Impact Sensor - Right 3	Right quarterpanel. See **Fig. 32**.
Sun Sensor	Top center of dash. See **Fig. 1**.
Transfer Speed Sensor	Right rear of transmission. See **Fig. 17**.
Transmission Range Sensor	Left side of transmission. See **Fig. 14**.
Washer Fluid Level Sensor - Front	Left front of engine compartment. See **Fig. 20**.
Wheel Speed Sensor - Left Front	Left front wheel hub assembly. See **Fig. 18**.
Wheel Speed Sensor - Left Rear	Left rear wheel hub assembly.
Wheel Speed Sensor - Right Front	Right front wheel hub assembly. See **Fig. 49**.
Wheel Speed Sensor - Right Rear	Right rear wheel hub assembly.

SOLENOIDS & SOLENOID VALVES

SOLENOIDS & SOLENOID VALVES LOCATION

Component	Location
A/C Compressor Clutch (2.4L)	Lower left front of engine. See **Fig. 14**.
A/C Compressor Clutch (3.5L)	Lower left front of engine. See **Fig. 19**.
EGR Valve Assembly	Rear of engine. See **Fig. 13**.
Electronically Controlled Clutch Solenoid	Rear differential. See **Fig. 37**.
EVAP/Purge Solenoid	Left rear corner of engine compartment. See **Fig. 18**.
Fuel Injector 1 (2.4L)	Top left of engine. See **Fig. 43**.
Fuel Injector 1 (3.5L)	Top right of engine. See **Fig. 13**.
Fuel Injector 2 (2.4L)	Top left of engine. See **Fig. 43**.
Fuel Injector 2 (3.5L)	Top left of engine. See **Fig. 13**.
Fuel Injector 3 (2.4L)	Top left of engine. See **Fig. 43**.
Fuel Injector 3 (3.5L)	Top right of engine. See **Fig. 13**.
Fuel Injector 4 (2.4L)	Top left of engine. See **Fig. 43**.
Fuel Injector 4 (3.5L)	Top left of engine. See **Fig. 13**.

Fuel Injector 5	Top right of engine. See **Fig. 13**.
Fuel Injector 6	Top left of engine. See **Fig. 13**.
Manifold Flow Valve	Left rear of engine. See **Fig. 14**.
Manifold Tuning Valve	Right front of engine. See **Fig. 19**.
Pressure Sensor/Variable Force Solenoid	Left side of transmission. See **Fig. 14**.
Short Runner Valve Solenoid	Front of engine. See **Fig. 13**.
Transmission Solenoid/TRS Assembly	Left side of transmission. See **Fig. 17**.
Variable Valve Timing Solenoid - Exhaust	Right front of engine. See **Fig. 43**.
Variable Valve Timing Solenoid - Intake	Left front of engine. See **Fig. 43**.

SWITCHES

SWITCHES LOCATION

Component	Location
Clutch Interlock Switch	Left side of dash. See **Fig. 54**.
Driver Seat Belt Switch	Base of left "B" pillar. See **Fig. 28**.
Hood Ajar Switch	Right front of engine compartment. See **Fig. 46**.
Horn Switch	Under steering wheel pad. See **Fig. 5**.
Oil Pressure Switch (2.4L)	Lower left rear of engine. See **Fig. 47**.
Oil Pressure Switch (3.5L)	Lower left side of engine. See **Fig. 41**.
Parking Brake Switch (A/T)	Under rear of enter console. See **Fig. 16**.
Parking Brake Switch (M/T)	Left kick panel. See **Fig. 54**.
Stop Lamp Switch	Left side of dash. See **Fig. 54**.
Transmission Solenoid/Pressure Switch	Left side of transmission. See **Fig. 14**.

MISCELLANEOUS

MISCELLANEOUS LOCATION

Component	Location
Airbag Squib 1 - Driver's	Under steering wheel pad. See **Fig. 5**.
Airbag Squib 1 - Passenger	Right side of dash. See **Fig. 4**.
Airbag Squib 2 - Driver's	Under steering wheel pad. See **Fig. 5**.
Airbag Squib 2 - Passenger	Right side of dash. See **Fig. 4**.
Amplifier - Radio	Right kick panel. See **Fig. 10**.
Antenna - Navigation	Left side of dash. See **Fig. 11**.
Antenna - Radio	Rear of overhead rail. See **Fig. 12**.
Blower Motor Resistor - Front	Under front blower motor. See **Fig. 3**.
Blower Motor Resistor - Rear	Rear blower motor. See **Fig. 33**.
Data Link Connector	Left side of dash. See **Fig. 45**.
Generator (2.4L)	Left front of engine. See **Fig. 14**.
Generator (3.5L)	Top left front of engine. See **Fig. 19**.

Horn 1	Right front of engine compartment.
Ignition Coil 1 (2.4L)	Top right of engine. See **Fig. 43**.
Ignition Coil 1 (3.5L)	Top right of engine. See **Fig. 13**.
Ignition Coil 2 (2.4L)	Top right of engine. See **Fig. 43**.
Ignition Coil 2 (3.5L)	Top left of engine. See **Fig. 13**.
Ignition Coil 3 (2.4L)	Top right of engine. See **Fig. 43**.
Ignition Coil 3 (3.5L)	Top right of engine. See **Fig. 13**.
Ignition Coil 4 (2.4L)	Top right of engine. See **Fig. 43**.
Ignition Coil 4 (3.5L)	Top left of engine. See **Fig. 13**.
Ignition Coil 5	Top right of engine. See **Fig. 13**.
Ignition Coil 6	Top left of engine. See **Fig. 13**.
Ignition 1 Capacitor (2.4L)	Left rear of engine. See **Fig. 40**.
Ignition 1 Capacitor (3.5L)	Left rear of engine. See **Fig. 13**.
Radiator Fan Resistor	Behind radiator. See **Fig. 46**.
Rear Cabin Heater	Right quarterpanel. See **Fig. 32**.
Rear Video Camera	Left side of liftgate. See **Fig. 38**.
Remote Jump Post - Negative	Left side of engine compartment. See **Fig. 19**.
Seat Back Heater - Driver	Driver's seat back. See **Fig. 8**.
Seat Back Heater - Passenger	Front passenger's seat back. See **Fig. 9**.
Seat Belt Tensioner - Driver	Base of left "B" pillar. See **Fig. 28**.
Seat Belt Tensioner - Passenger	Under front passenger's seat. See **Fig. 29**.
Seat Cushion Heater - Passenger	Under passenger seat. See **Fig. 9**.
Shift Lever Assembly	Under center console. See **Fig. 15**.
Side Curtain Airbag - Left	Top of left "C" pillar. See **Fig. 6**.
Side Curtain Airbag - Right	Top of right "C" pillar. See **Fig. 7**.
Side Thorax Airbag - Left	Left side of driver's seat back. See **Fig. 8**.
Side Thorax Airbag - Right	Right side of front passenger's seat back. See **Fig. 9**.
Siren	Left front of engine compartment. See **Fig. 20**.

CONNECTORS

CONNECTORS LOCATION

Component	Location
C100 (Black, 8 Pin)	Left side of engine compartment. See **Fig. 18**.
C101 (Black, 14 Pin)	Left side of engine compartment. See **Fig. 18**.
C105 (6 Pin)	Above transmission. See **Fig. 17**.
C106 (12 Pin)	Above left headlight assembly. See **Fig. 21**.
C107 (Black, 1 Pin)	Above left headlight assembly. See **Fig. 20**.
C112 (Gray, 40 Pin)	Left kick panel. See **Fig. 54**.
C113 (Natural, 57 Pin)	Left end of dash. See **Fig. 54**.
C114 (Natural, 57 Pin)	Left kick panel. See **Fig. 2**.

C116 (16 Pin)	Left side of engine compartment. See **Fig. 22**.
C117 (Black, 2 Pin)	Left side of engine compartment. See **Fig. 22**.
C118 (Dark Gray, 4 Pin)	Left side of engine compartment. See **Fig. 22**.
C119 (Dark Gray, 2 Pin)	Left side of engine compartment. See **Fig. 22**.
C200 (Natural, 57 Pin)	Left kick panel. See **Fig. 45**.
C201 (8 Pin)	Base of left "A" pillar. See **Fig. 24**.
C202 (White, 2 Pin)	Base of left "A" pillar. See **Fig. 24**.
C203 (12 Pin)	Base of left "A" pillar. See **Fig. 24**.
C204 (Early) (8 Pin)	Base of right "A" pillar. See **Fig. 25**.
C204 (Late) (12 Pin)	Base of right "A" pillar. See **Fig. 25**.
C205 (Black, 16 Pin)	Base of right "A" pillar. See **Fig. 25**.
C206 (14 Pin)	Base of right "A" pillar. See **Fig. 25**.
C207 (Natural, 2 Pin)	Left kick panel. See **Fig. 2**.
C208 (Yellow, 2 Pin)	Base of right "A" pillar. See **Fig. 55**.
C211 (Light Gray, 2 Pin)	Left kick panel. See **Fig. 2**.
C300 (Black, 18 Pin)	Left kick panel. See **Fig. 26**.
C301 (Black, 12 Pin)	Left kick panel. See **Fig. 54**.
C302 (Black, 18 Pin)	Right kick panel. See **Fig. 10**.
C303 (Black, 12 Pin)	Right kick panel. See **Fig. 10**.
C304 (12 Pin)	Left "B" pillar. See **Fig. 28**.
C305 (14 Pin)	Right "B" pillar. See **Fig. 29**.
C306 (Black, 12 Pin)	Under center console. See **Fig. 15**.
C307 (Black, 6 Pin)	Left "D" pillar. See **Fig. 30**.
C308 (Natural, 12 Pin)	Left "D" pillar. See **Fig. 30**.
C309 (Black, 8 Pin)	Under front of center console. See **Fig. 31**.
C310 (Black, 10 Pin)	Right "D" pillar. See **Fig. 33**.
C312 (Light Gray, 12 Pin)	Under driver's seat. See **Fig. 34**.
C313 (Yellow, 4 Pin)	Under driver's seat. See **Fig. 34**.
C314 (Light Gray, 13 Pin)	Under front passenger's seat. See **Fig. 9**.
C315 (Yellow, 4 Pin)	Under front passenger's seat. See **Fig. 9**.
C316 (Gray, 4 Pin)	Top left of fuel tank. See **Fig. 37**.
C317 (Black, 2 Pin)	Left center of liftgate. See **Fig. 38**.
C318 (Black, 3 Pin)	Base of left "D" pillar. See **Fig. 39**.
C319 (Green, 3 Pin)	Base of left "D" pillar. See **Fig. 39**.
C320 (Green, 3 Pin)	Base of right "D" pillar. See **Fig. 39**.

GROUNDS

GROUNDS LOCATION

Component	Location
G100	Left rear of engine. See **Fig. 19**.

G102	Left rear of engine compartment. See **Fig. 18**.
G103	Right rear of engine compartment. See **Fig. 49**.
G104	Left rear of engine compartment. See **Fig. 18**.
G105	Right rear of engine compartment. See **Fig. 49**.
G200	Left end of dash. See **Fig. 2**.
G201	Right end of dash. See **Fig. 4**.
G203	Center of dash. See **Fig. 1**.
G204	Left end of dash. See **Fig. 2**.
G300	Right kick panel. See **Fig. 10**.
G301	Under driver's seat. See **Fig. 35**.
G302	Left end of dash. See **Fig. 54**.
G303	Right quarterpanel. See **Fig. 32**.
G304	Under driver's seat. See **Fig. 35**.
G305	Under front passenger's seat. See **Fig. 36**.
G306	Left quarterpanel. See **Fig. 30**.

SPLICES

SPLICES LOCATION

Component	Location
S100 (2.4L)	Left rear of engine. See **Fig. 47**.
S100 (3.5L)	Left rear of engine. See **Fig. 41**.
S101	Top left side of engine. See **Fig. 43**.
S102 (2.4L)	Left rear of engine. See **Fig. 40**.
S102 (3.5L)	Rear of engine. See **Fig. 13**.
S103	Rear of engine. See **Fig. 43**.
S104 (2.4L)	Rear of engine. See **Fig. 43**.
S104 (3.5L)	Rear of engine. See **Fig. 13**.
S105 (2.4L)	Left rear of engine. See **Fig. 40**.
S105 (3.5L)	Rear of engine. See **Fig. 13**.
S106 (2.4L)	Rear of engine. See **Fig. 43**.
S106 (3.5L)	Left side of engine. See **Fig. 13**.
S107	Left rear of engine. See **Fig. 40**.
S108 (2.4L)	Left rear of engine. See **Fig. 47**.
S108 (3.5L)	Rear of engine. See **Fig. 13**.
S109 (2.4L)	Rear of engine. See **Fig. 43**.
S109 (3.5L)	Left rear of engine. See **Fig. 13**.
S110	Right rear of engine. See **Fig. 13**.
S111	Left rear of engine. See **Fig. 13**.
S113	Left side of engine compartment. See **Fig. 18**.
S114	Left side of engine compartment. See **Fig. 22**.

S116	Under TIPM. See **Fig. 51**.
S117	Under TIPM. See **Fig. 51**.
S118	Left side of engine compartment. See **Fig. 18**.
S119	Left side of engine compartment. See **Fig. 18**.
S125	Above transmission. See **Fig. 17**.
S126	Above transmission. See **Fig. 17**.
S127 (2.4L)	Above transmission. See **Fig. 14**.
S127 (3.5L)	Above transmission. See **Fig. 17**.
S128	Near radiator fan relay. See **Fig. 46**.
S129	Above left headlight assembly. See **Fig. 20**.
S130	Left front of engine compartment. See **Fig. 20**.
S131	Left side headlight harness. See **Fig. 20**.
S132	Left side headlight harness. See **Fig. 20**.
S133	Above right headlight assembly. See **Fig. 46**.
S134	Left side headlight harness. See **Fig. 20**.
S135	Above right headlight assembly. See **Fig. 46**.
S136	Right front of engine compartment. See **Fig. 46**.
S142	Left of transmission. See **Fig. 14**.
S143	Left rear of engine. See **Fig. 47**.
S144	Left rear of engine. See **Fig. 47**.
S153	Left front of engine compartment. See **Fig. 21**.
S154	Headlight & dash harness.
S160	Air pump assembly.
S170	Near right headlight assembly. See **Fig. 46**.
S171	Front end lighting harness.
S172	Front end lighting harness.
S200	Left side of dash. See **Fig. 2**.
S201	Right side of dash. See **Fig. 3**.
S202	Right side of dash. See **Fig. 4**.
S203	Instrument cluster.
S204	Left side of dash. See **Fig. 2**.
S205	Left side of dash. See **Fig. 2**.
S206	Left side of dash. See **Fig. 2**.
S207	Left side of dash. See **Fig. 2**.
S208	Right side of dash. See **Fig. 4**.
S210	Left side of dash. See **Fig. 2**.
S211	Left side of dash. See **Fig. 2**.
S212	Left side of dash. See **Fig. 2**.
S213	Center of dash. See **Fig. 1**.
S214	Center of dash. See **Fig. 1**.
S215	Right side of dash. See **Fig. 3**.

	Right side of dash. See **Fig. 4**.
S219	Right side of dash. See **Fig. 4**.
S221	Center of dash. See **Fig. 1**.
S230	Steering wheel jumper.
S231	Steering wheel jumper.
S232	Steering wheel jumper.
S233	Steering wheel jumper.
S240	Left side of dash. See **Fig. 2**.
S241	Left side of dash. See **Fig. 2**.
S300	Left quarterpanel. See **Fig. 30**.
S301	Left kick panel. See **Fig. 54**.
S302	Right footwell. See **Fig. 10**.
S303	Left kick panel. See **Fig. 54**.
S304	Left kick panel. See **Fig. 54**.
S305	Body harness.
S306	Base of left "C" pillar. See **Fig. 28**.
S307	Left kick panel. See **Fig. 54**.
S308	Right footwell. See **Fig. 10**.
S309	Left kick panel. See **Fig. 54**.
S310	Left kick panel. See **Fig. 54**.
S311	Left quarterpanel. See **Fig. 52**.
S312	Base of right "C" pillar. See **Fig. 29**.
S313	Under front of center console. See **Fig. 16**.
S316	Left kick panel. See **Fig. 54**.
S317	Left kick panel. See **Fig. 54**.
S320	Body harness.
S322	Left front of headliner. See **Fig. 44**.
S323	Left front of headliner. See **Fig. 44**.
S324	Left side of headliner. See **Fig. 44**.
S327	Front passenger's door. See **Fig. 48**.
S328	Driver's door. See **Fig. 26**.
S329	Driver's door. See **Fig. 26**.
S330	Driver's door. See **Fig. 26**.
S332	Left rear door. See **Fig. 27**.
S333	Right rear door. See **Fig. 27**.
S338	Left "D" pillar. See **Fig. 39**.
S339	Left "D" pillar. See **Fig. 39**.
S340	Under left rear of vehicle. See **Fig. 39**.
S341	Under left rear of vehicle. See **Fig. 39**.
S342	Right rear of vehicle. See **Fig. 39**.
S350	Right footwell. See **Fig. 10**.

	Right footwell. See **Fig. 10**.
S380	Rear HVAC jumper.
S388	Seat jumper.
S389	Seat jumper.
S390	Seat jumper.
S391	Seat jumper.
S392	Driver's seat.
S393	Driver's seat.
S394	Driver's seat.

COMPONENT LOCATION GRAPHICS

NOTE: Figures may show multiple component locations. Refer to appropriate table for proper figure references.

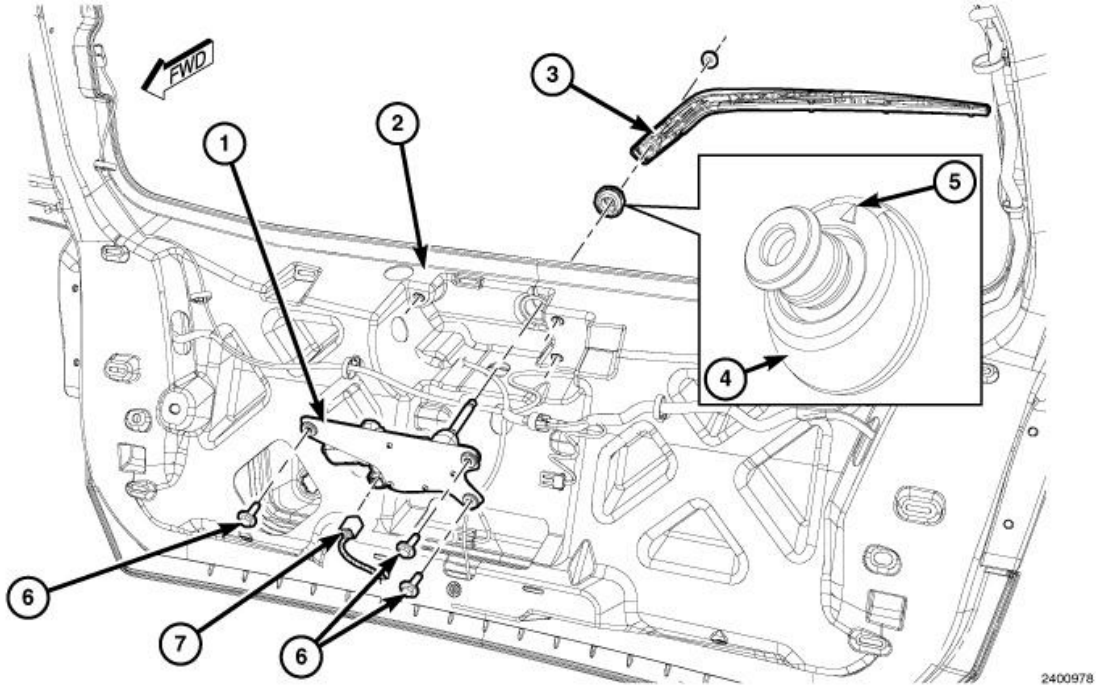

Fig. 1: Center Of Dash
Courtesy of CHRYSLER LLC

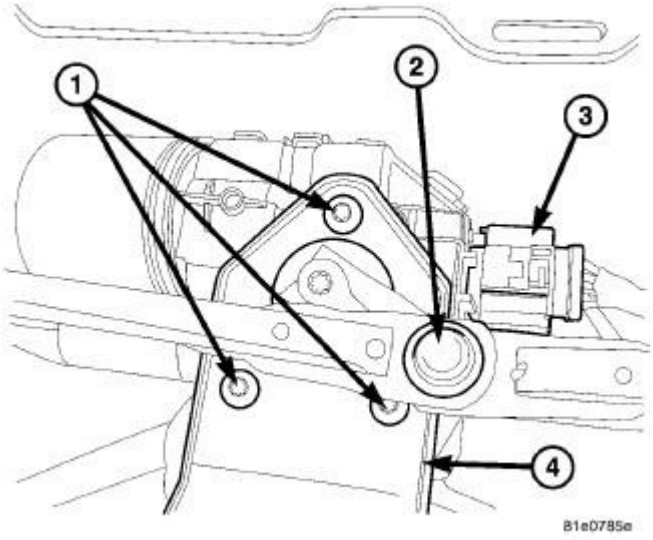

Fig. 2: Left Side Of Dash
Courtesy of CHRYSLER LLC

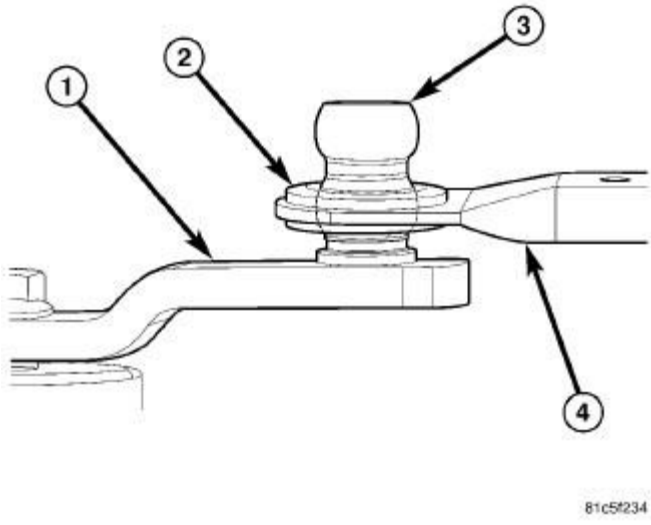

Fig. 3: Right Side Of Dash
Courtesy of CHRYSLER LLC

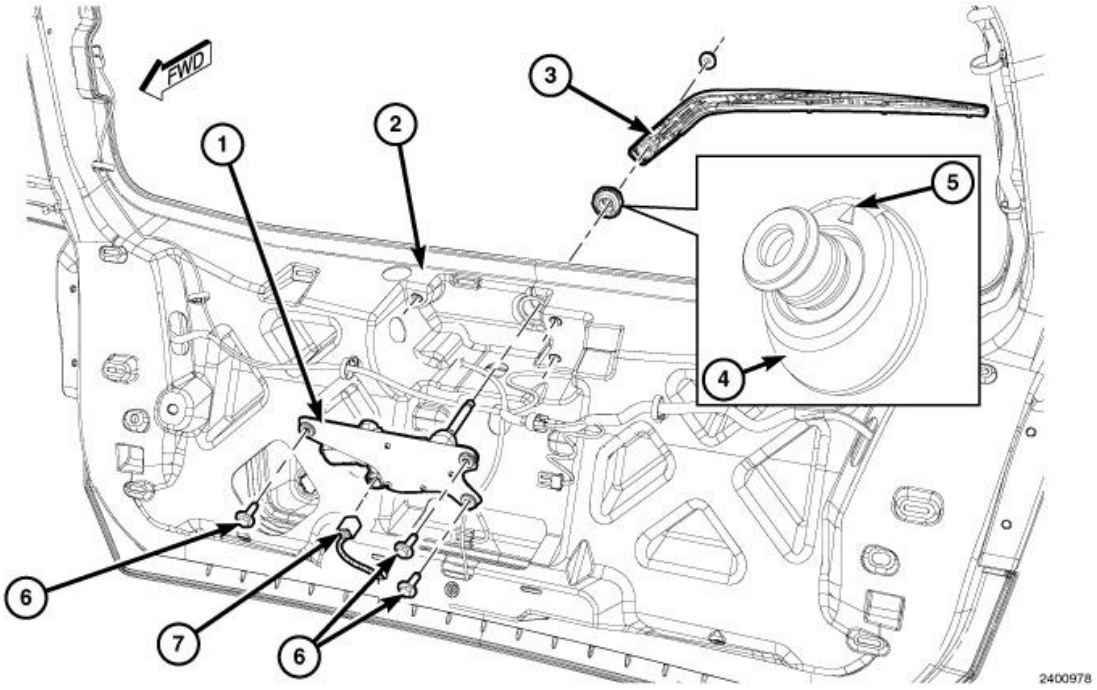

Fig. 4: Right Side Of Dash
Courtesy of CHRYSLER LLC

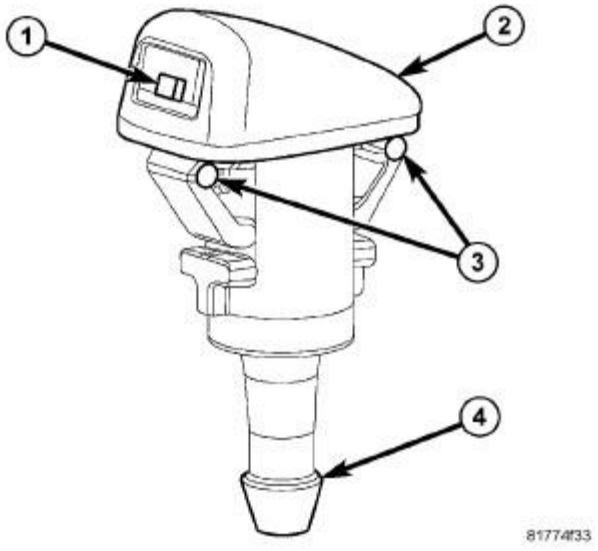

Fig. 5: Steering Wheel
Courtesy of CHRYSLER LLC

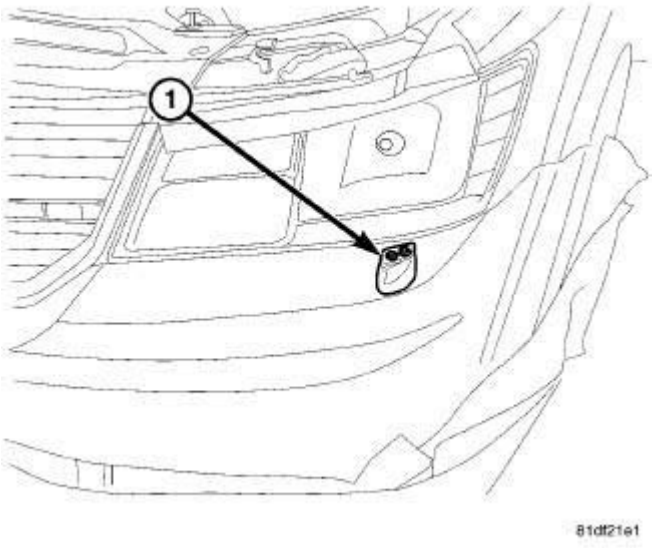

Fig. 6: Left "C" Pillar
Courtesy of CHRYSLER LLC

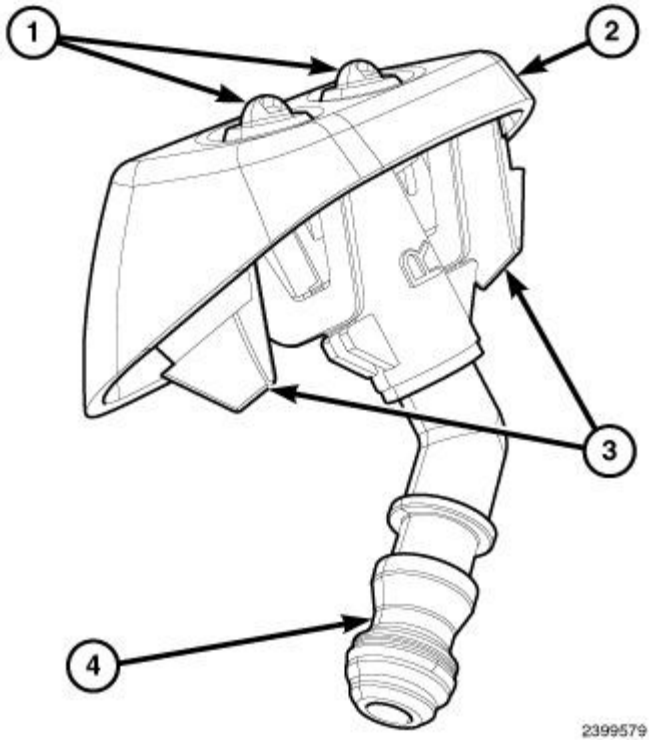

Fig. 7: Right "C" Pillar
Courtesy of CHRYSLER LLC

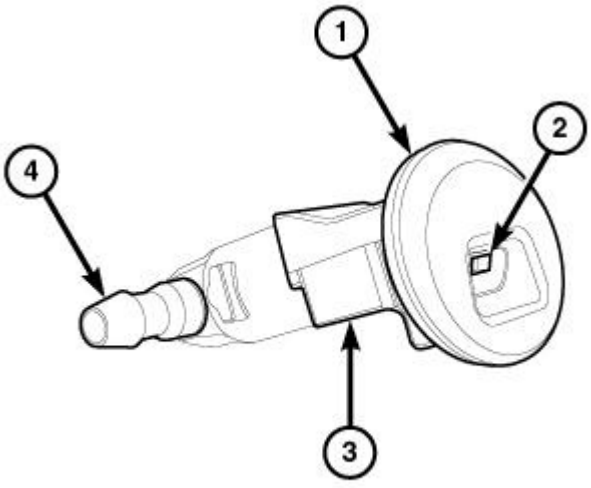

Fig. 8: Driver's Seat
Courtesy of CHRYSLER LLC

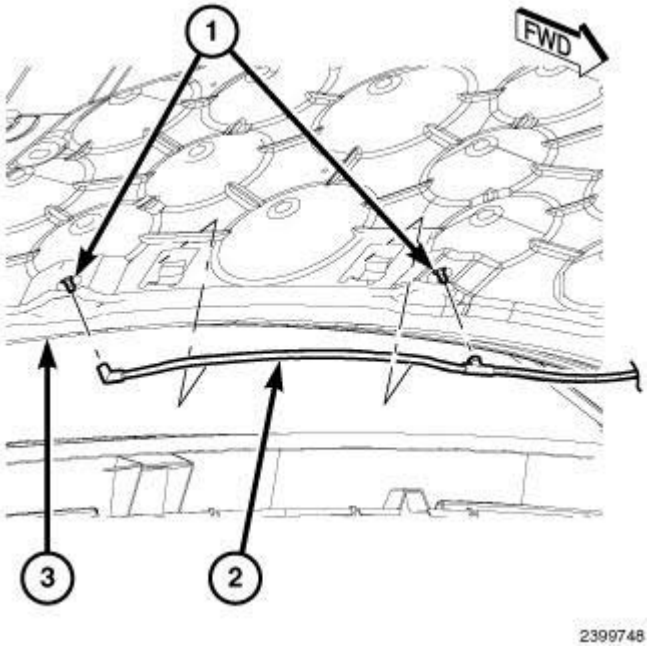

Fig. 9: Front Passenger's Seat
Courtesy of CHRYSLER LLC

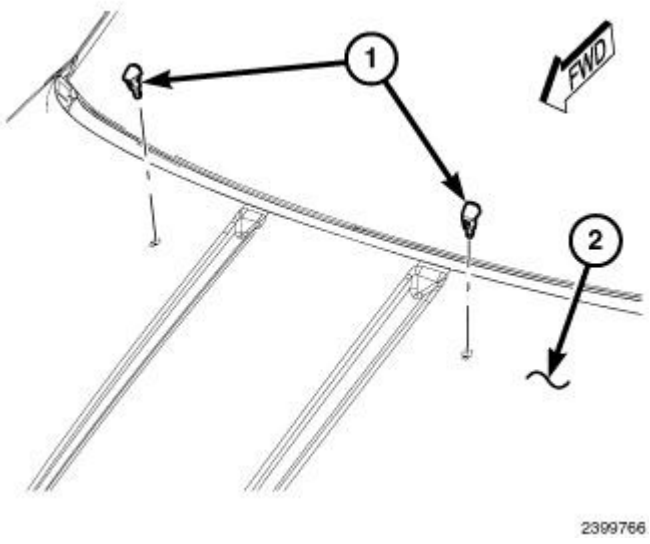

Fig. 10: Right Kick Panel
Courtesy of CHRYSLER LLC

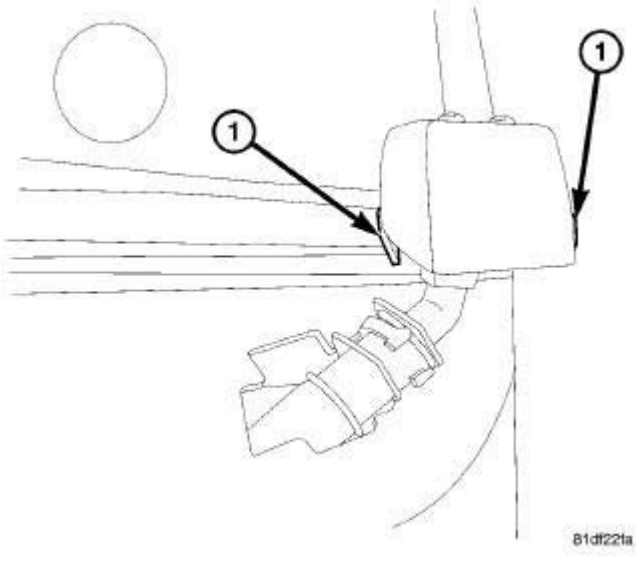

Fig. 11: Left Side Of Dash
Courtesy of CHRYSLER LLC

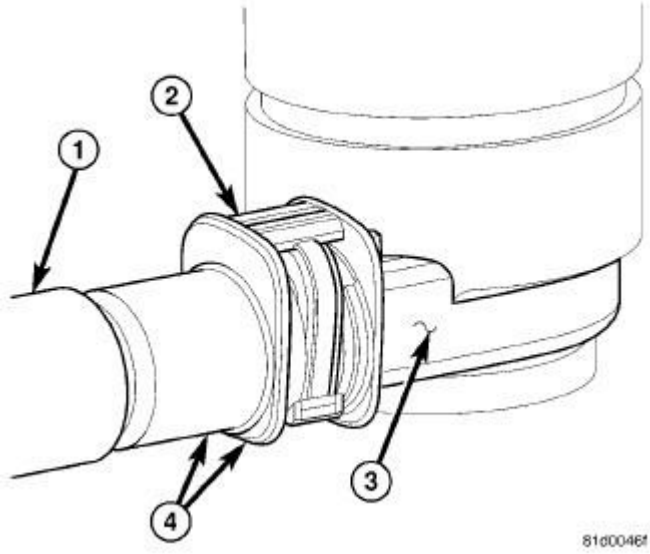

Fig. 12: Overhead Rail
Courtesy of CHRYSLER LLC

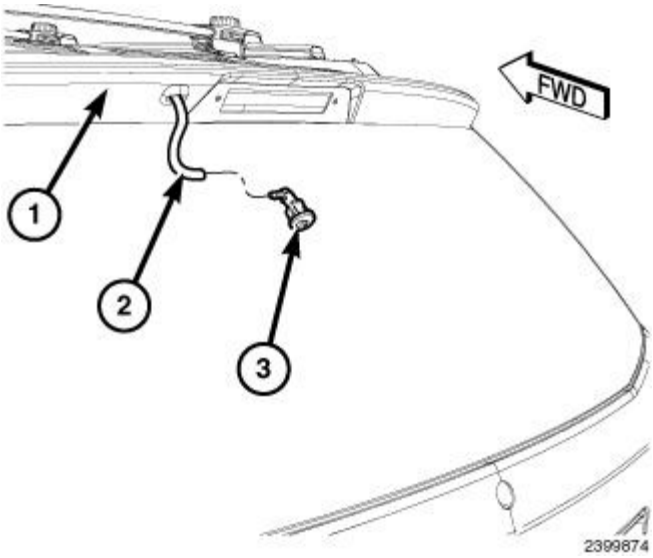

Fig. 13: Top Of Engine (3.5L)
Courtesy of CHRYSLER LLC

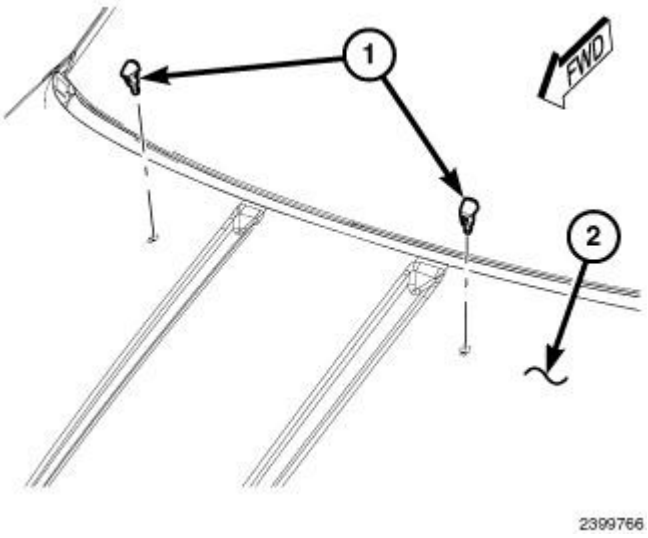

Fig. 14: Left Side & Rear Of Engine (2.4L)
Courtesy of CHRYSLER LLC

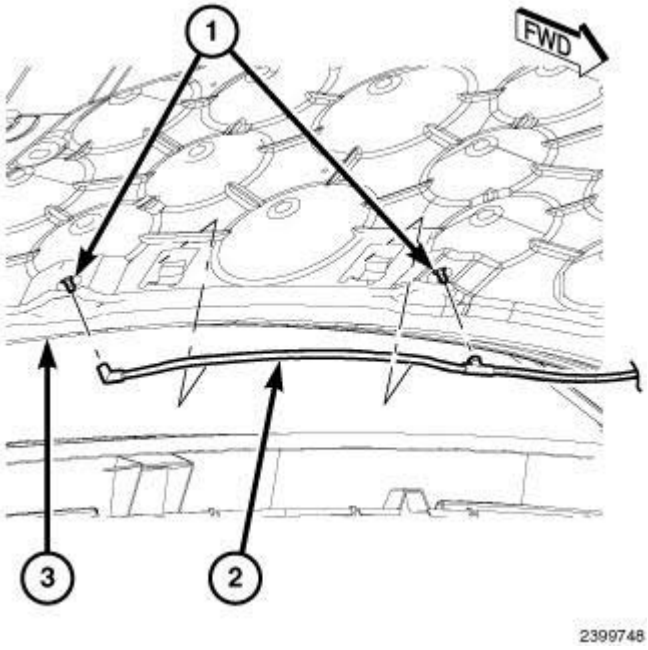

Fig. 15: Center Console
Courtesy of CHRYSLER LLC

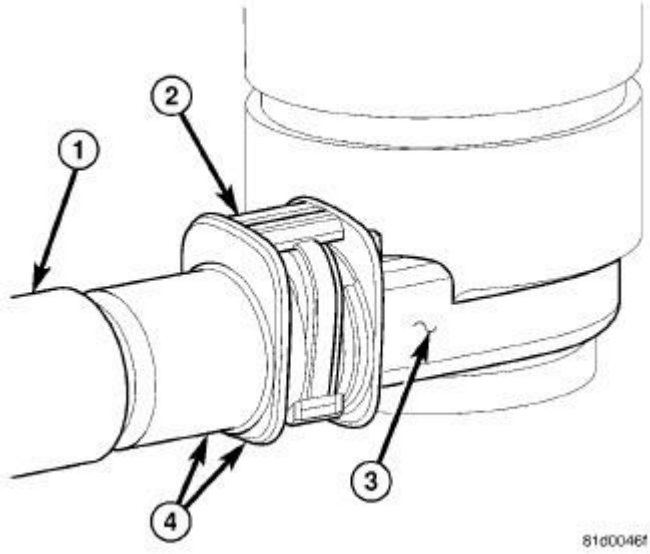

Fig. 16: Left Front Floor
Courtesy of CHRYSLER LLC

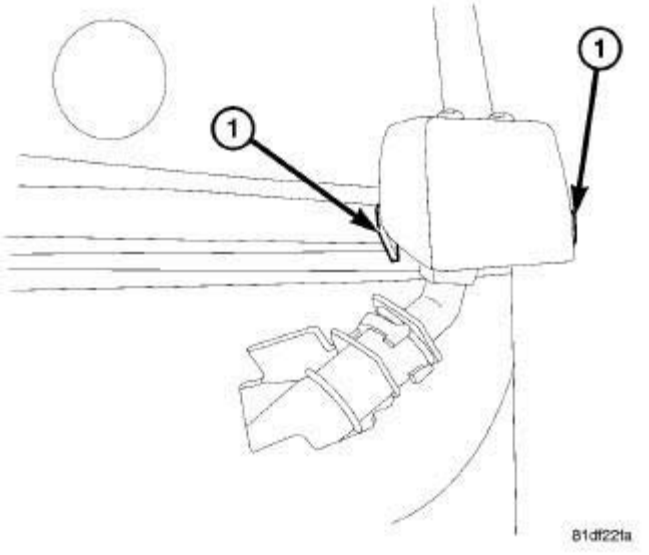

Fig. 17: Transmission (3.5L)
Courtesy of CHRYSLER LLC

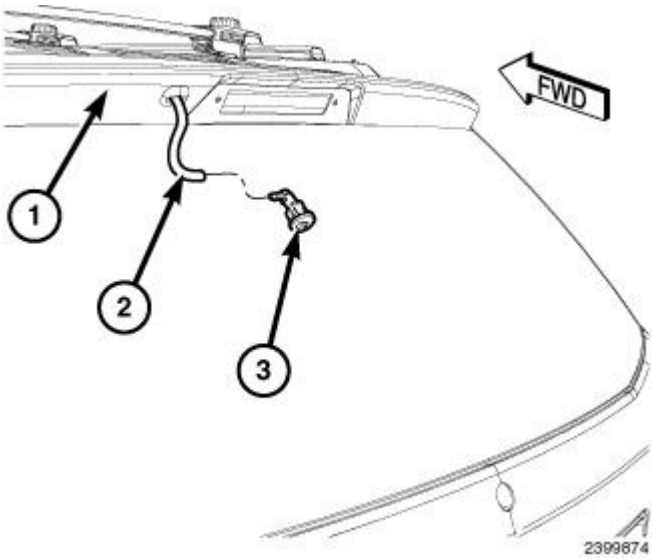

Fig. 18: Left Rear Of Engine Compartment
Courtesy of CHRYSLER LLC

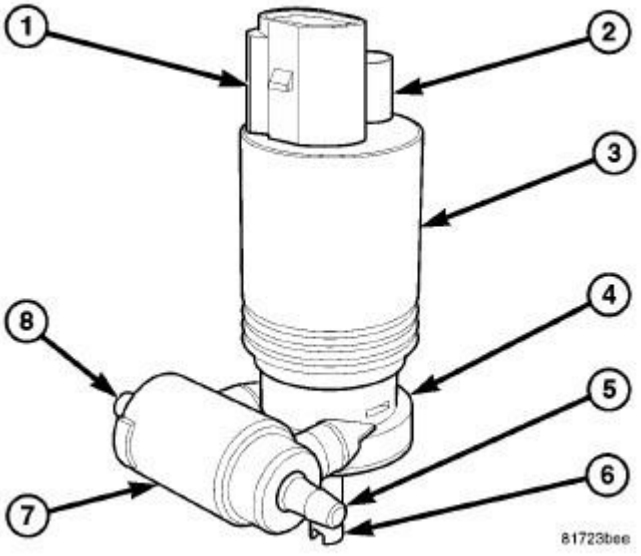

Fig. 19: Left Side & Rear Of Engine (3.5L)
Courtesy of CHRYSLER LLC

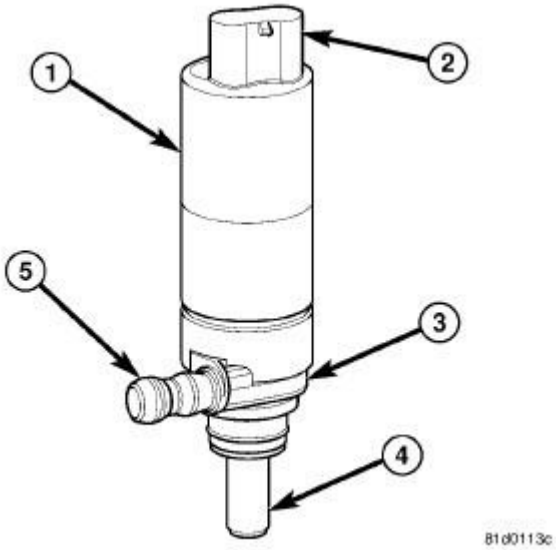

Fig. 20: Left Front Of Engine Compartment
Courtesy of CHRYSLER LLC

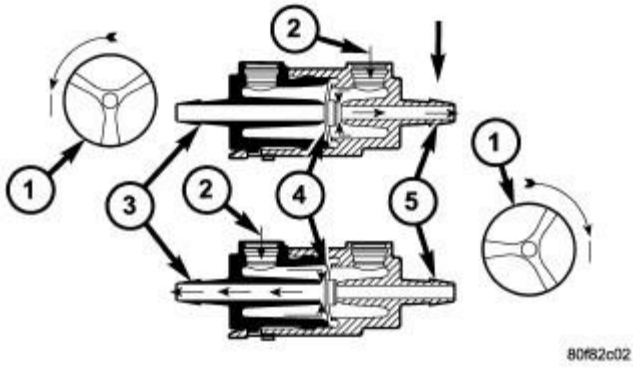

Fig. 21: Left Side Of Engine Compartment
Courtesy of CHRYSLER LLC

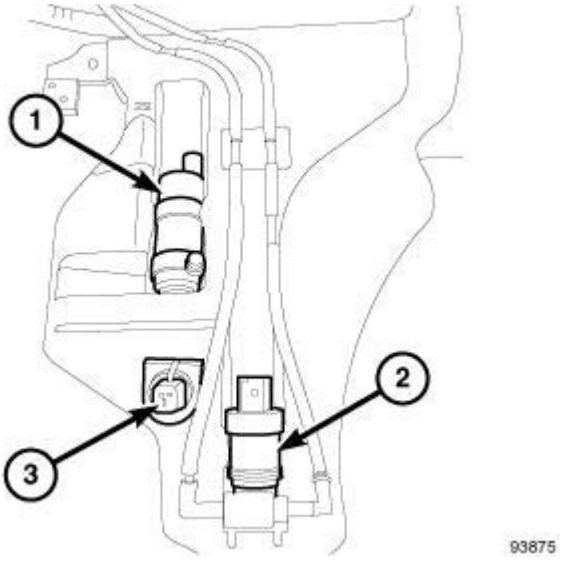

Fig. 22: Left Side Of Engine Compartment
Courtesy of CHRYSLER LLC

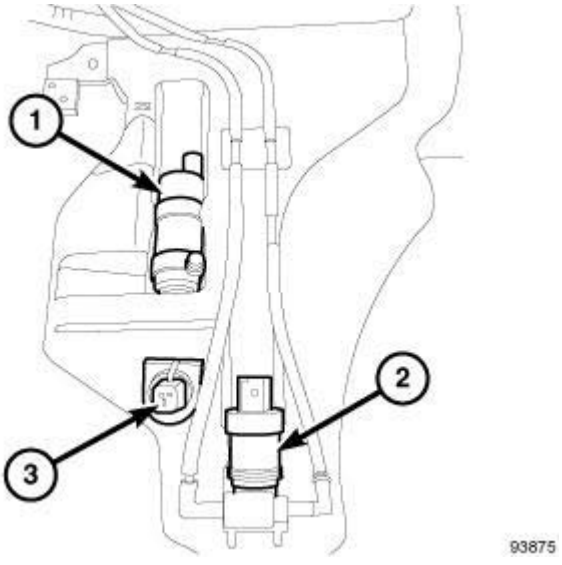

Fig. 23: Right Side Of Engine (2.4L)
Courtesy of CHRYSLER LLC

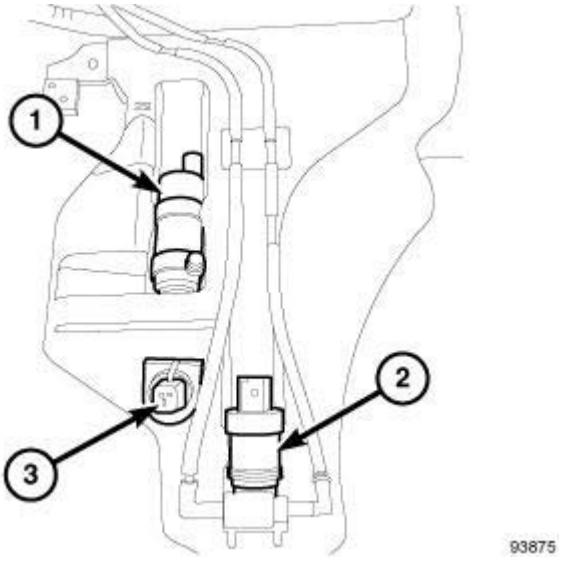

Fig. 24: Left "A" Pillar
Courtesy of CHRYSLER LLC

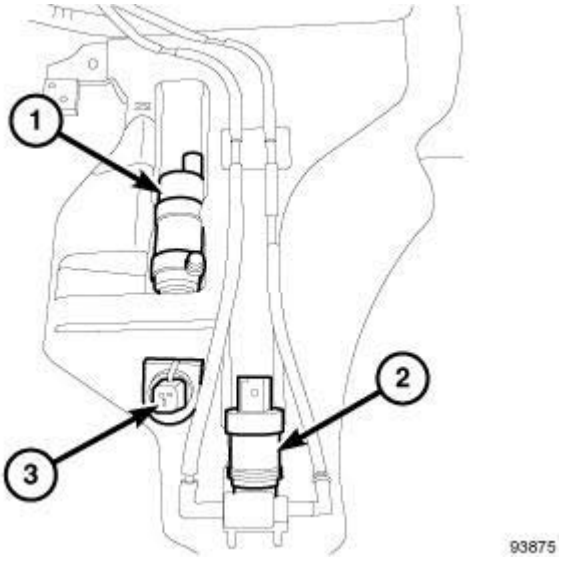

Fig. 25: Right "A" Pillar
Courtesy of CHRYSLER LLC

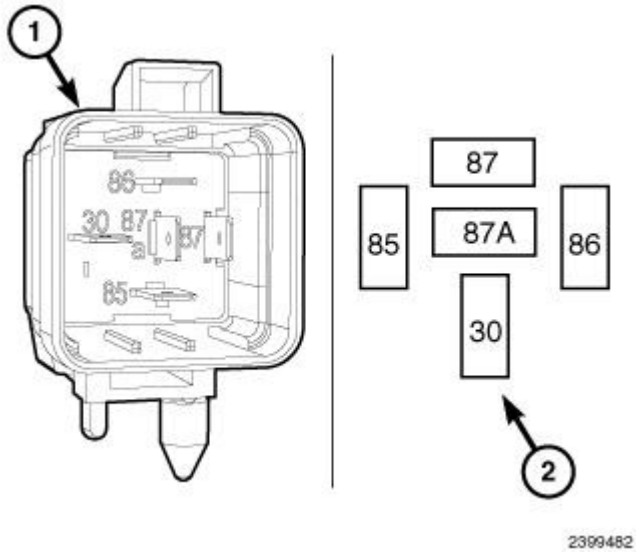

Fig. 26: Driver's Door (Front Passenger's Similar)
Courtesy of CHRYSLER LLC

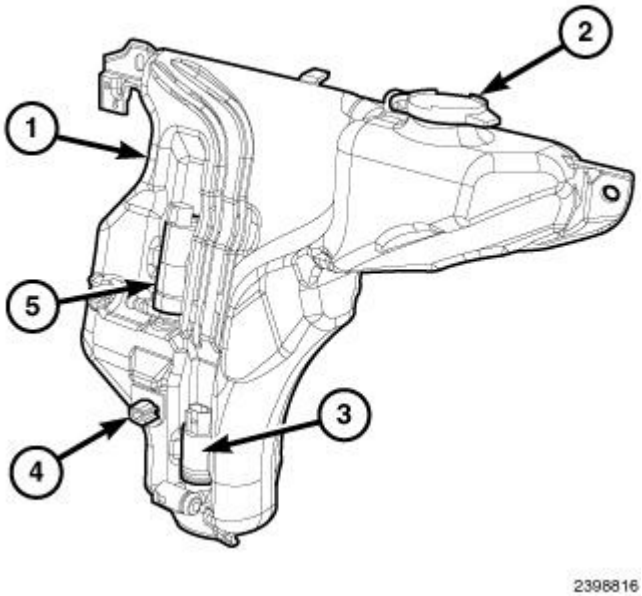

Fig. 27: Left Rear Door (Right Rear Similar)
Courtesy of CHRYSLER LLC

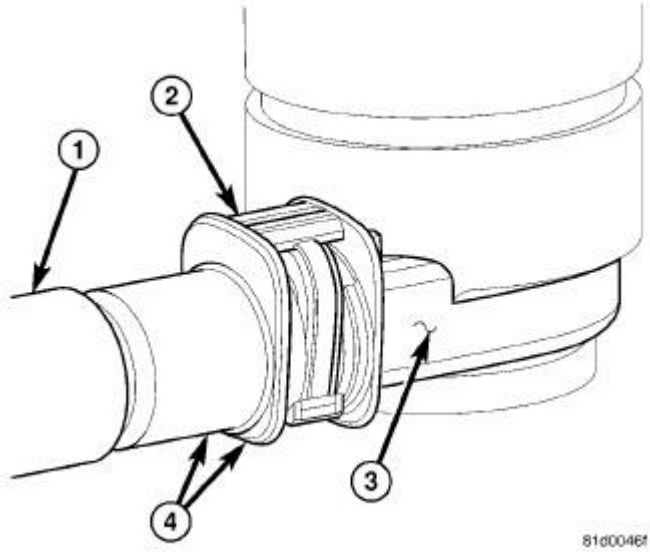

Fig. 28: Left "B" & "C" Pillars
Courtesy of CHRYSLER LLC

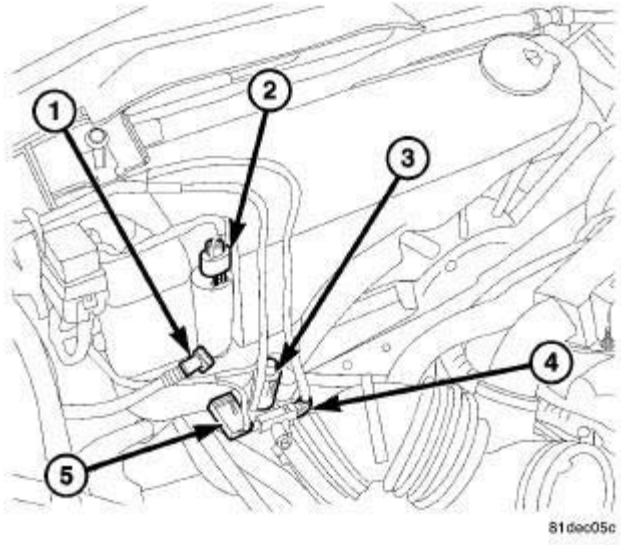

Fig. 29: Right "B" & "C" Pillars
Courtesy of CHRYSLER LLC

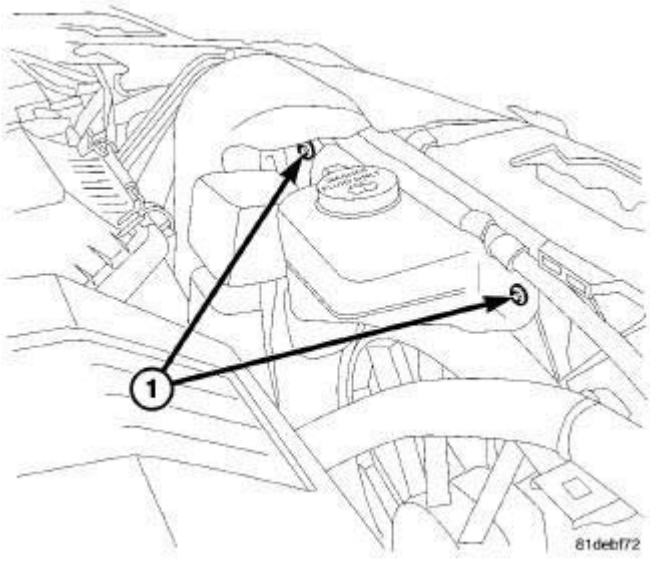

Fig. 30: Left Quarterpanel
Courtesy of CHRYSLER LLC

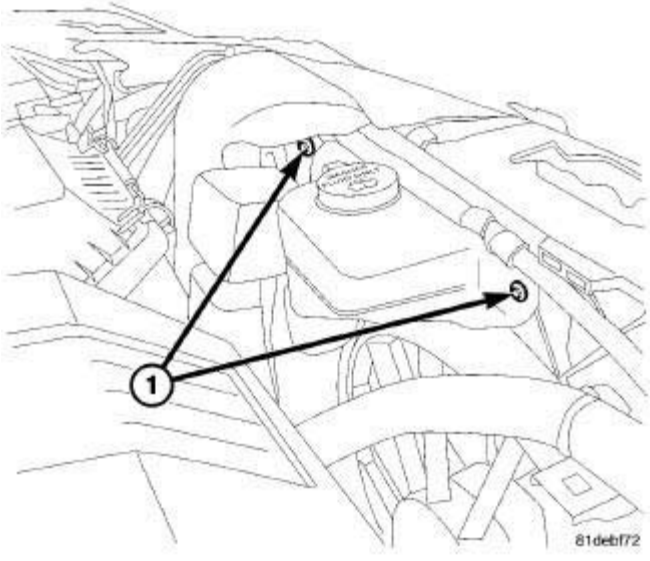

Fig. 31: Under Center Of Dash
Courtesy of CHRYSLER LLC

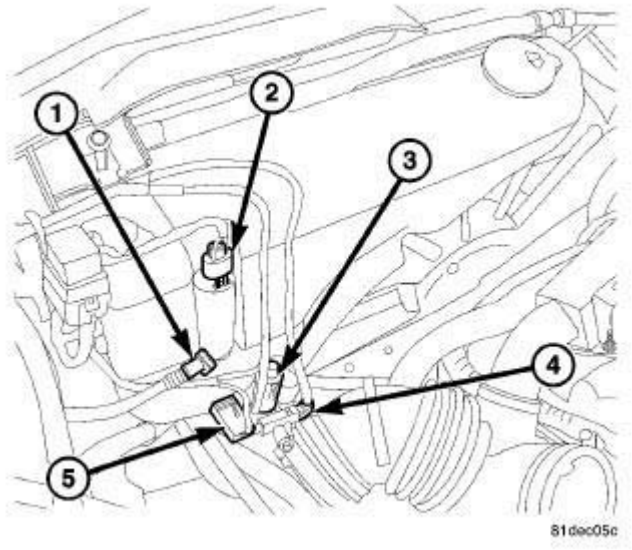

Fig. 32: Right Quarterpanel
Courtesy of CHRYSLER LLC

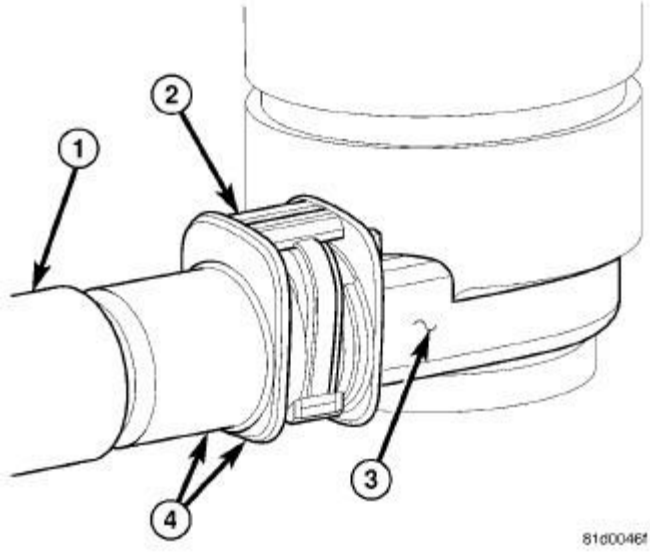

Fig. 33: Right Quarterpanel
Courtesy of CHRYSLER LLC

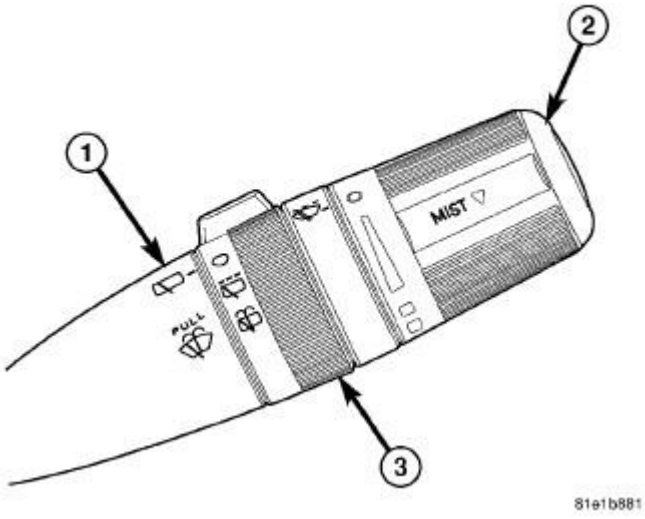

Fig. 34: Driver's Seat
Courtesy of CHRYSLER LLC

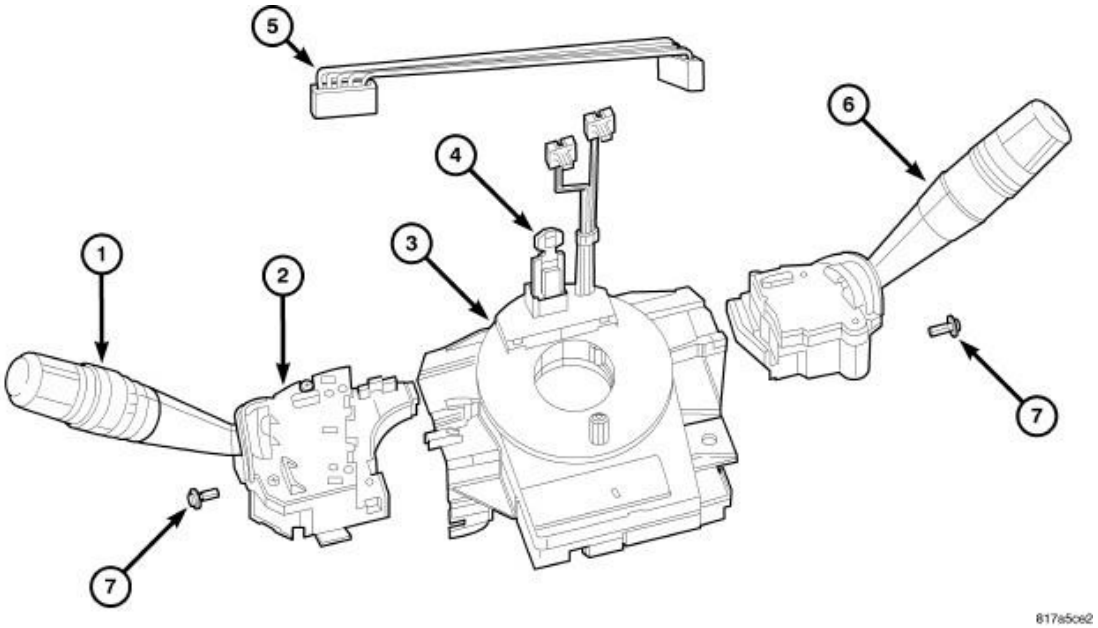

Fig. 35: Floor Under Driver's Seat
Courtesy of CHRYSLER LLC

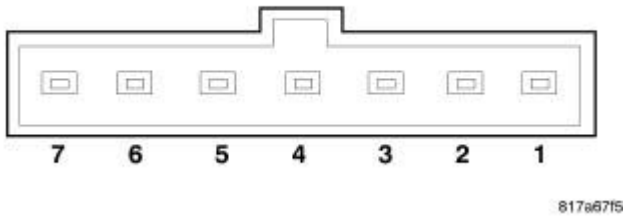

Fig. 36: Floor Under Front Passenger's Seat
Courtesy of CHRYSLER LLC

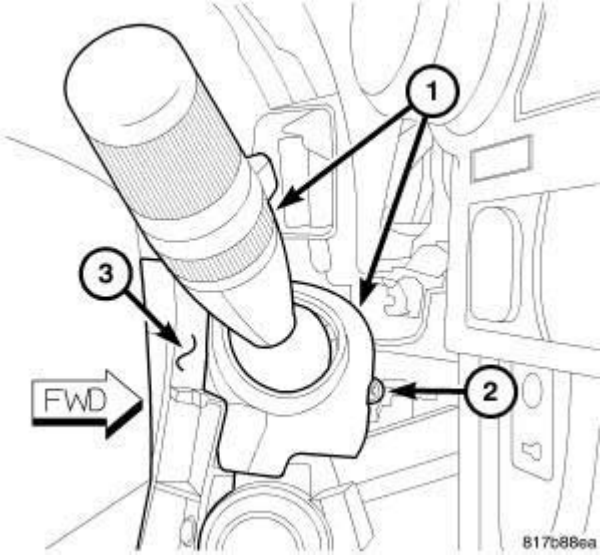

Fig. 37: Top Of Fuel Tank (AWD)
Courtesy of CHRYSLER LLC

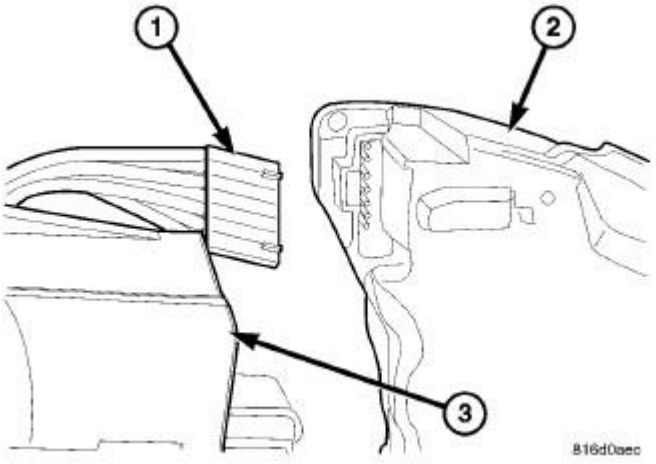

Fig. 38: Liftgate
Courtesy of CHRYSLER LLC

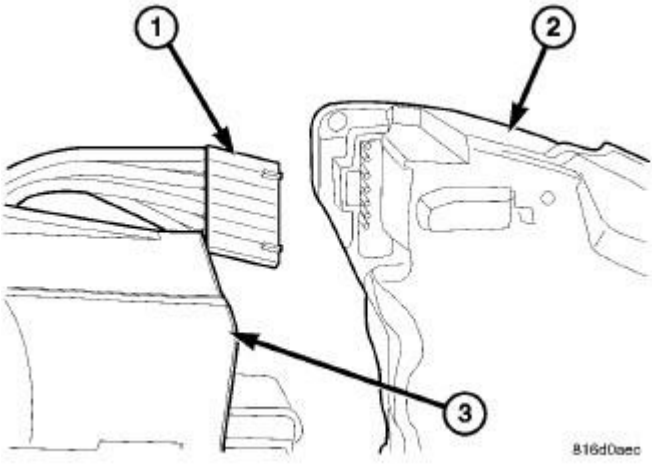

Fig. 39: Rear Of Vehicle
Courtesy of CHRYSLER LLC

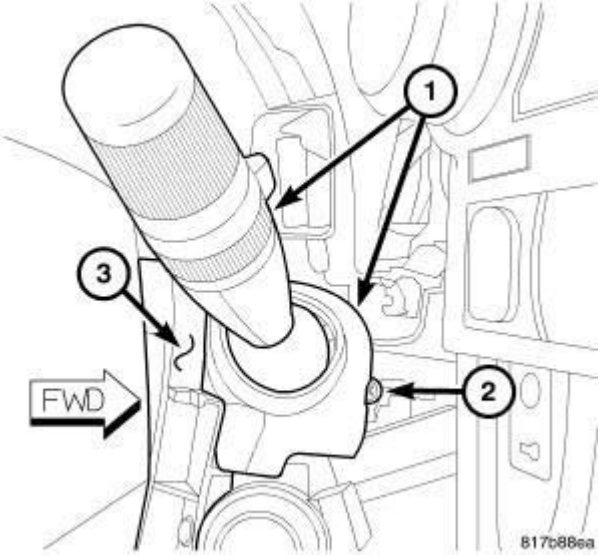

Fig. 40: Left Side Of Engine (2.4L)
Courtesy of CHRYSLER LLC

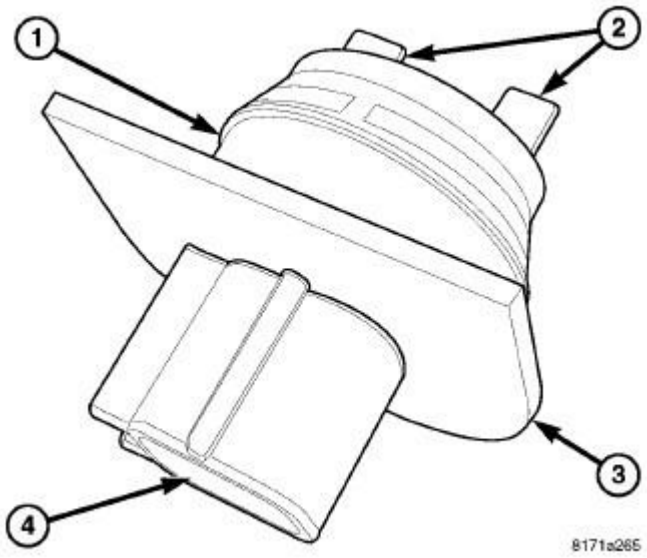

Fig. 41: Left Rear Of Engine (3.5L)
Courtesy of CHRYSLER LLC

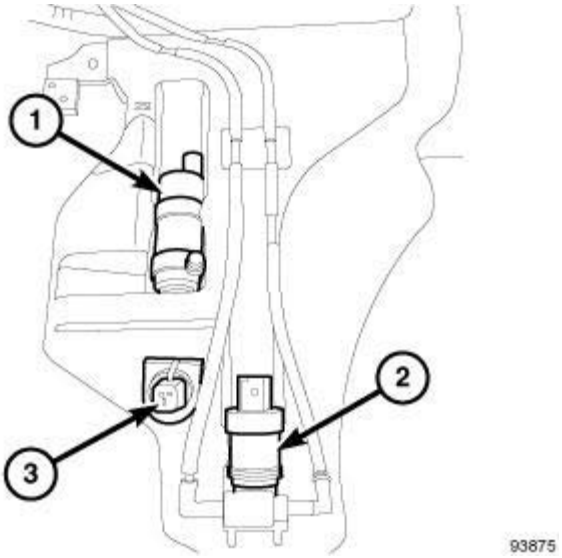

Fig. 42: Totally Integrated Power Module
Courtesy of CHRYSLER LLC

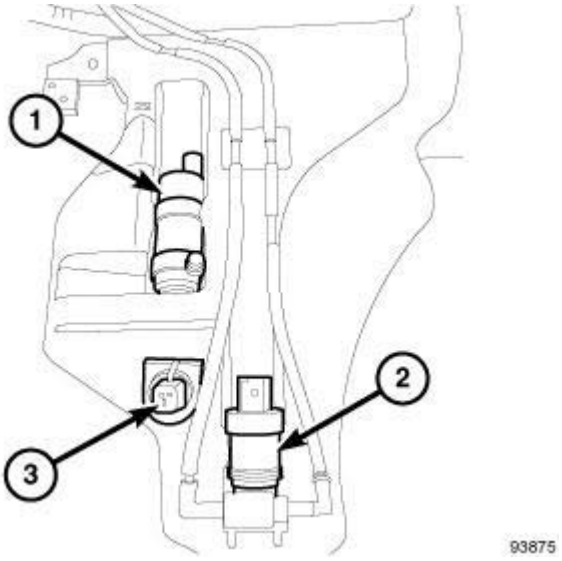

Fig. 43: Top Of Engine (2.4L)
Courtesy of CHRYSLER LLC

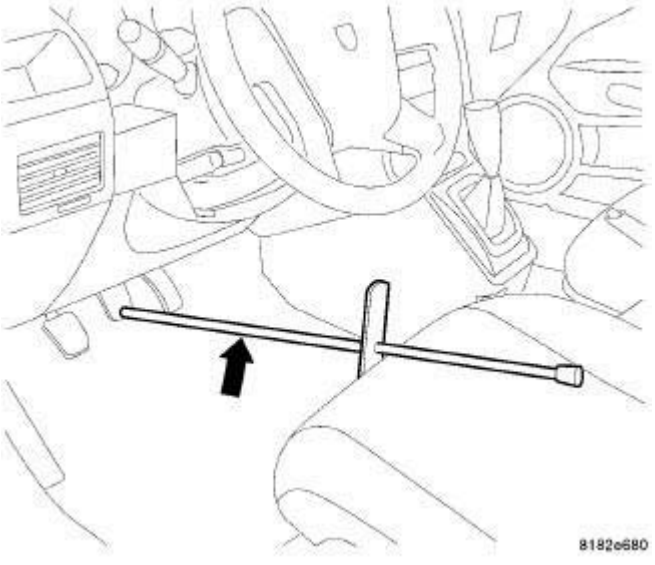

Fig. 44: Roof
Courtesy of CHRYSLER LLC

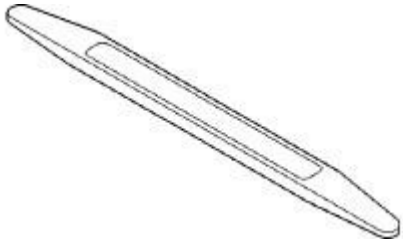

Fig. 45: Lower Left Side Of Dash
Courtesy of CHRYSLER LLC

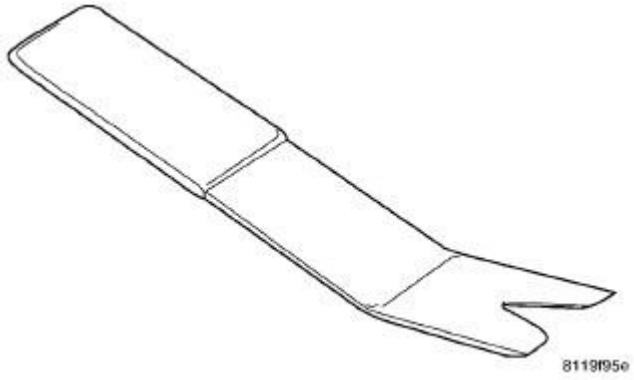

Fig. 46: Right Front Of Engine Compartment
Courtesy of CHRYSLER LLC

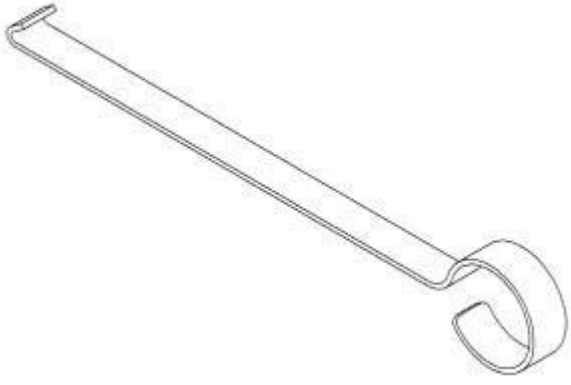

Fig. 47: Left Rear Of Engine (2.4L & 3.5L)
Courtesy of CHRYSLER LLC

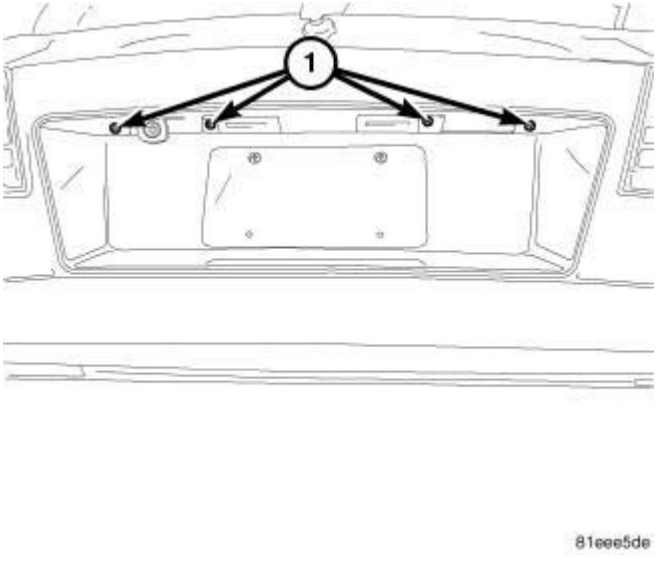

Fig. 48: Front Passenger's Door (Driver's Similar)
Courtesy of CHRYSLER LLC

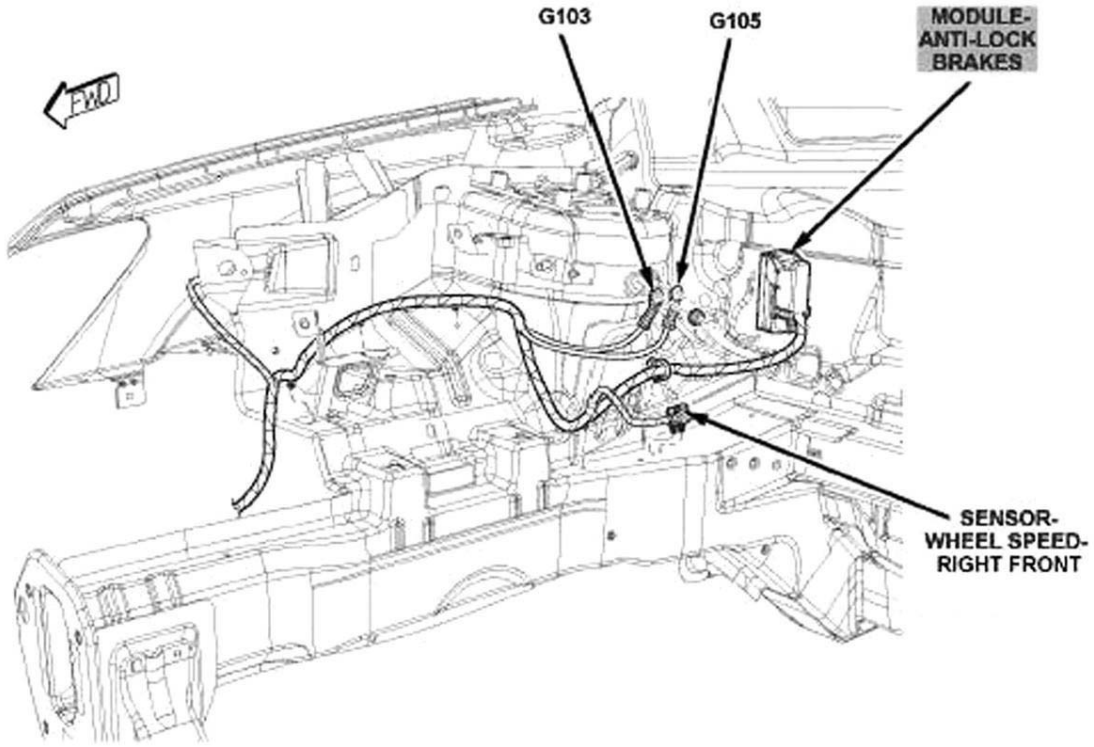

Fig. 49: Right Rear Of Engine Compartment
Courtesy of CHRYSLER LLC

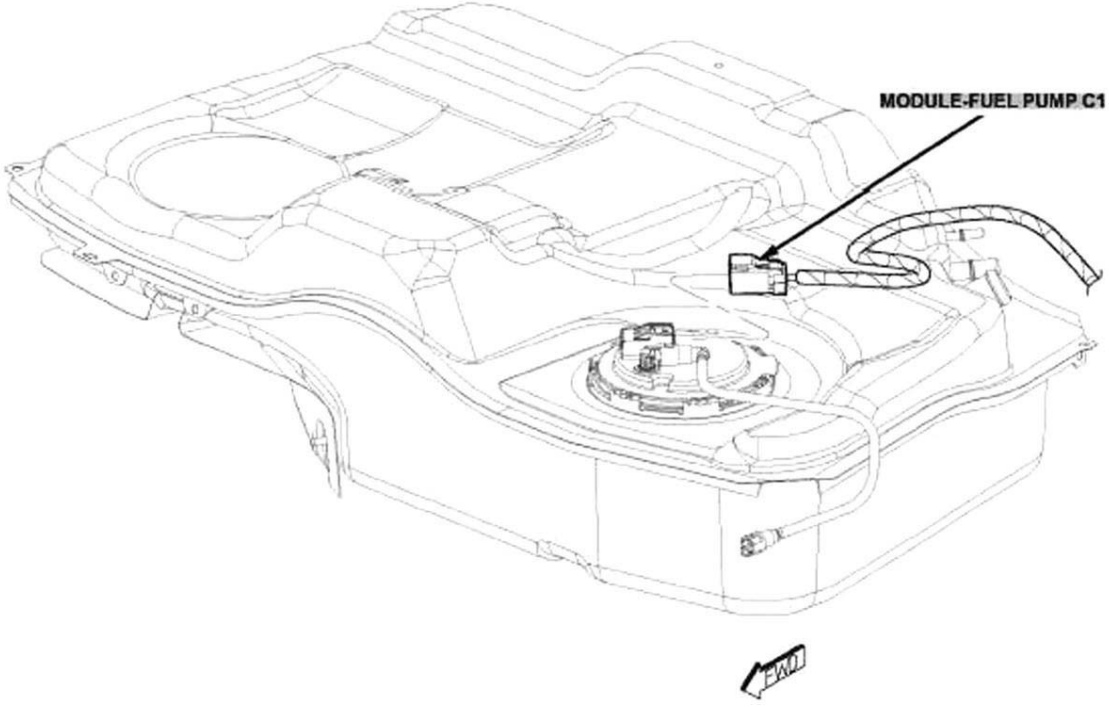

Fig. 50: Top Of Fuel Tank (Except AWD)
Courtesy of CHRYSLER LLC

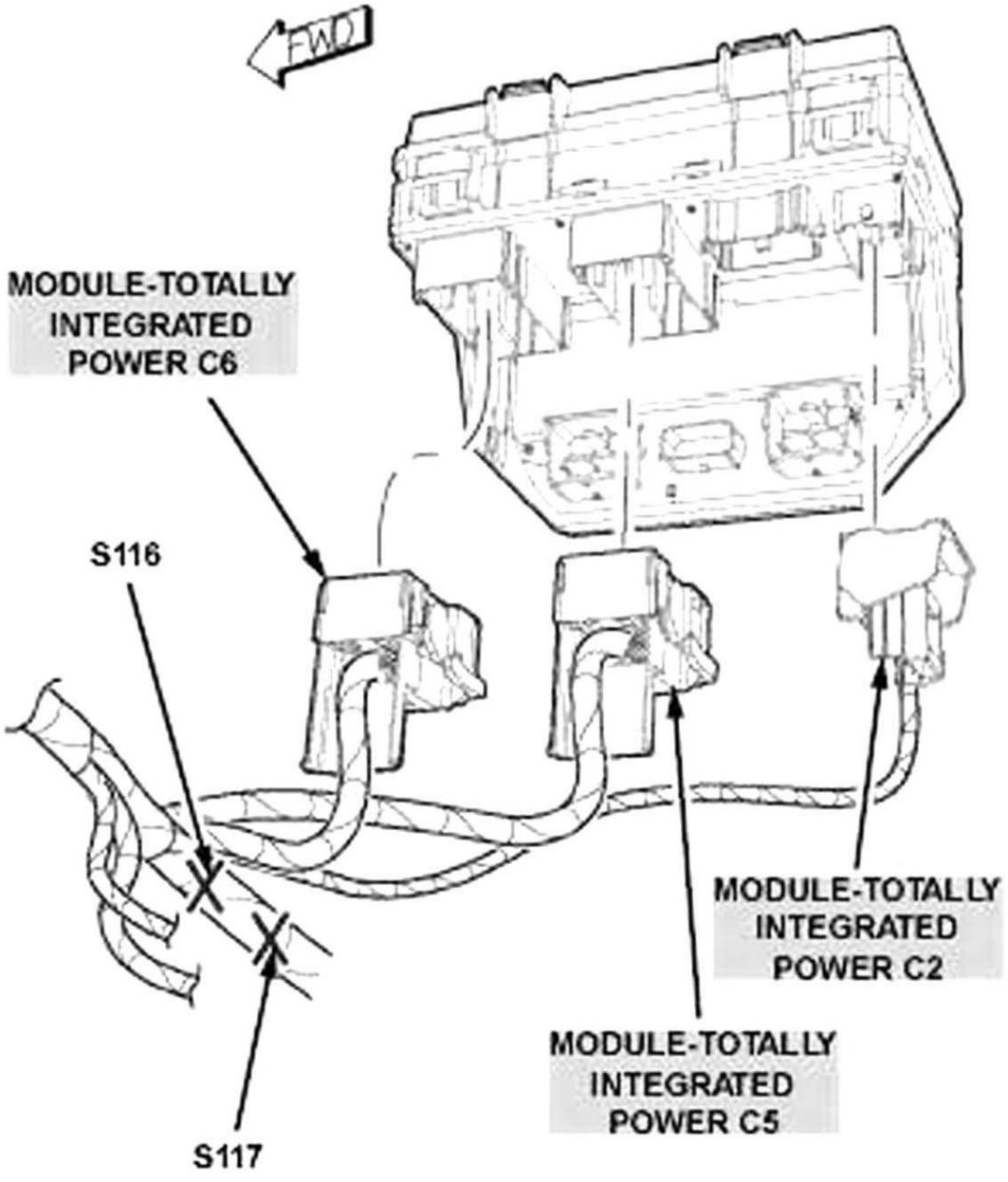

Fig. 51: Totally Integrated Power Module
Courtesy of CHRYSLER LLC

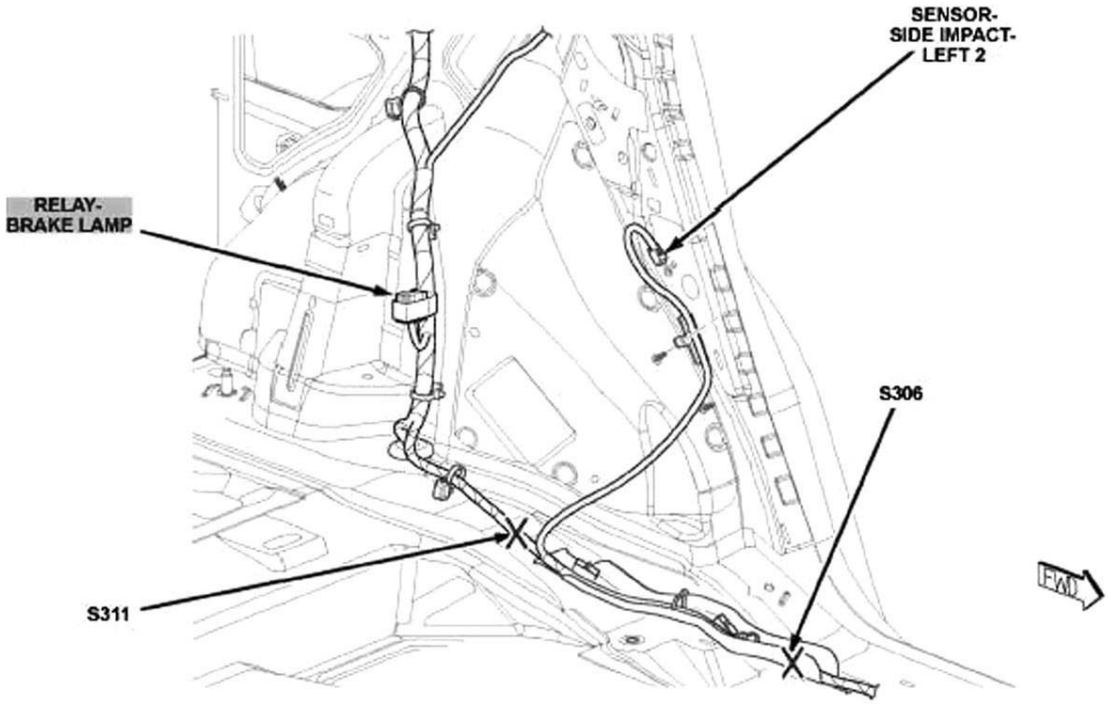

Fig. 52: Left "C" Pillar
Courtesy of CHRYSLER LLC

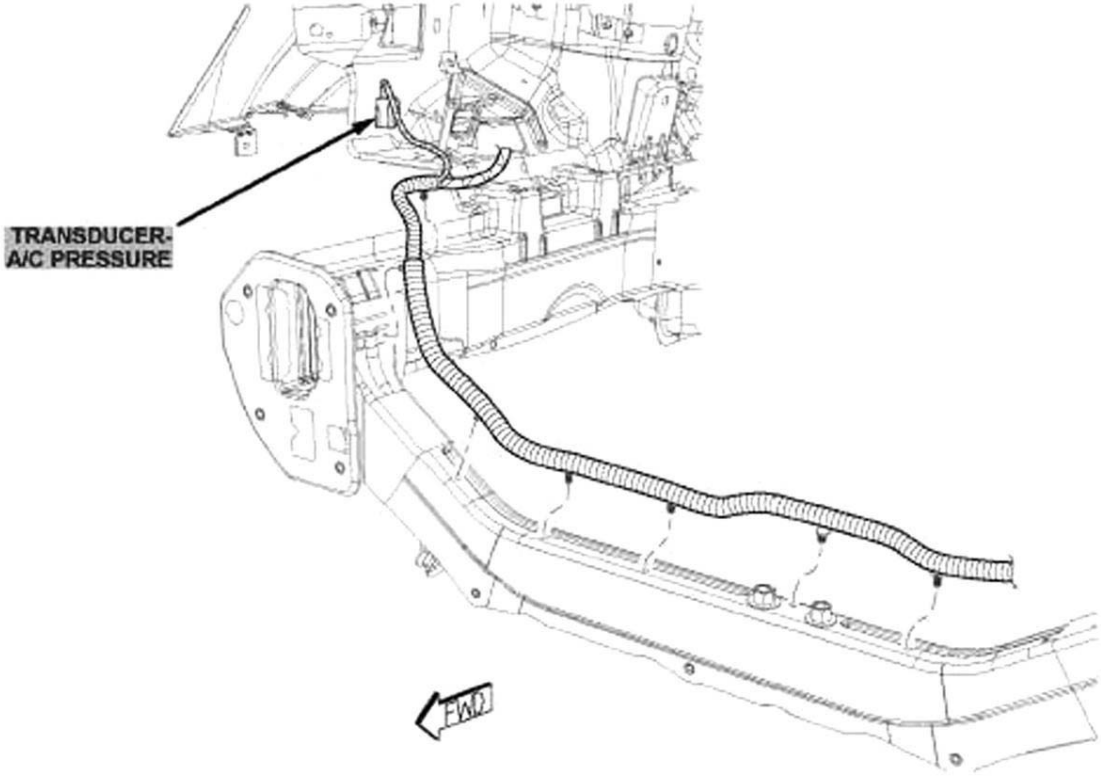

Fig. 53: Right Front Of Engine Compartment

Courtesy of CHRYSLER LLC

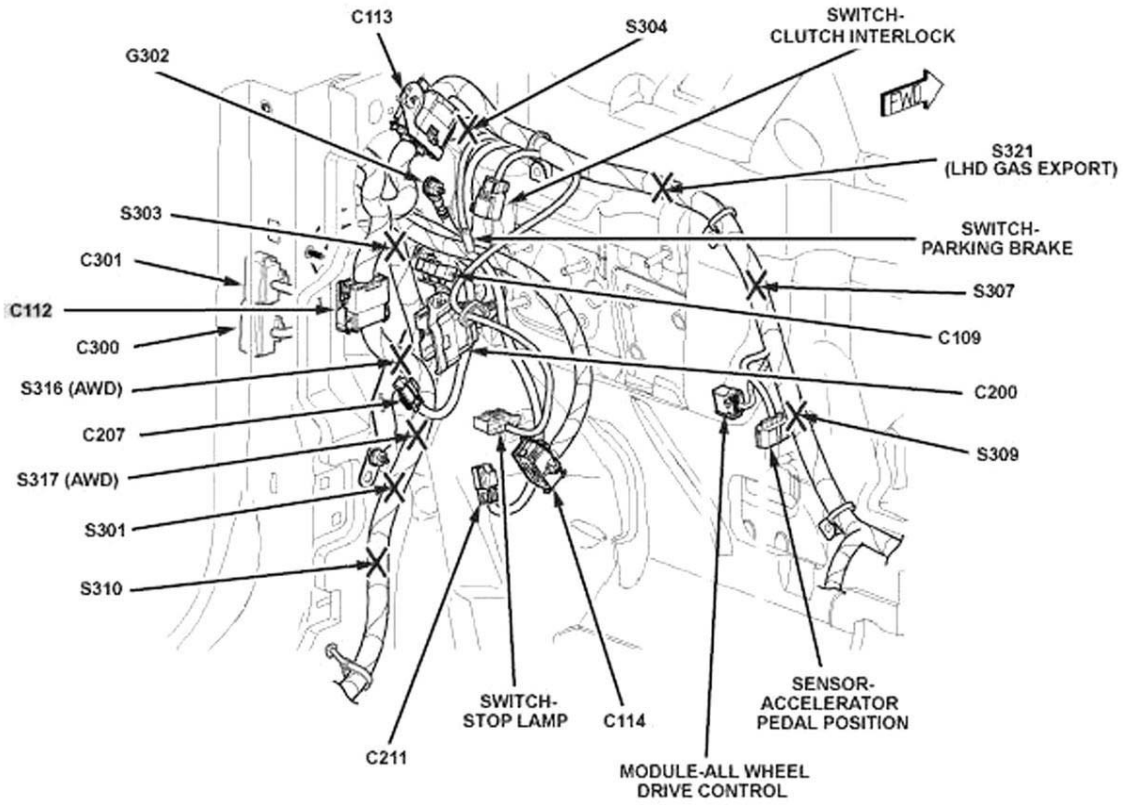

Fig. 54: Left Side Of Dash & Kick Panel
Courtesy of CHRYSLER LLC

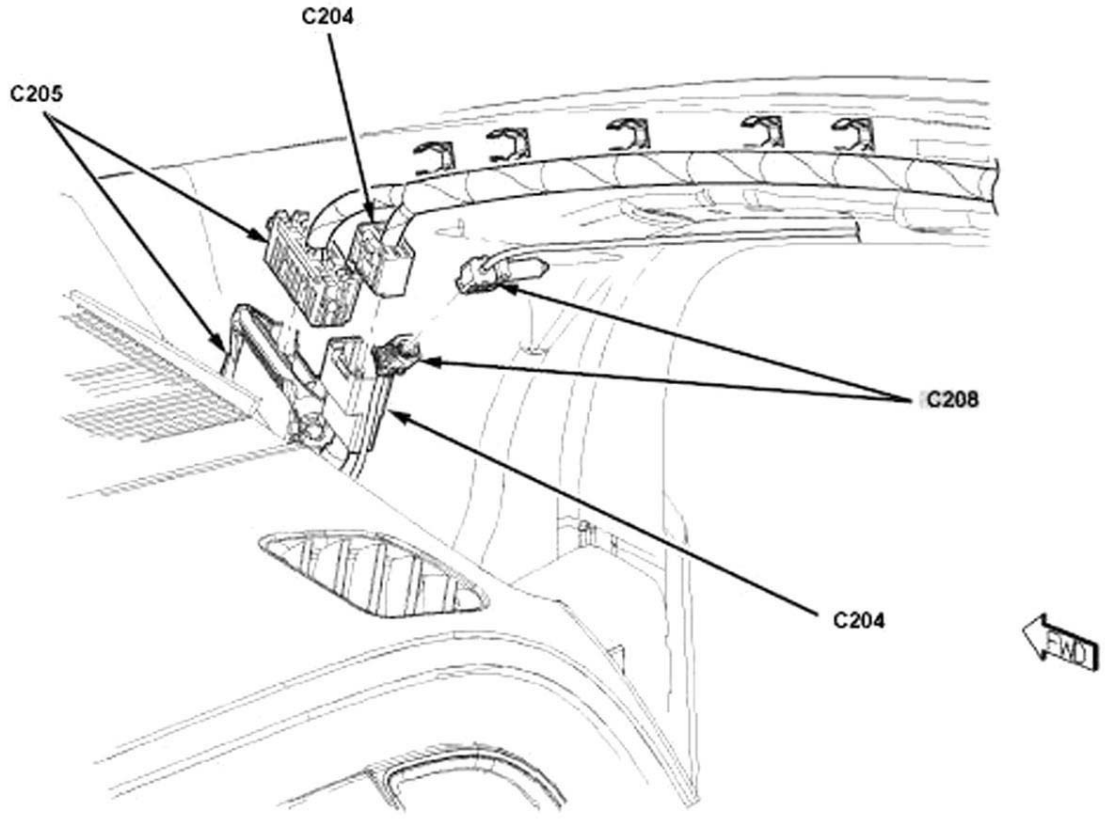

Fig. 55: Right "A" Pillar
Courtesy of CHRYSLER LLC

2009 ACCESSORIES AND EQUIPMENT

Electronic Control Modules - Service Information - Journey

STANDARD PROCEDURE

MODULE/PROGRAMMING ORDER REPLACEMENT GUIDE

MODULE/PROGRAMMING ORDER REPLACEMENT GUIDE

MODULE	MODULE REPLACEMENT GUIDE						
	Condition 1	Condition 2	Condition 3	Condition 4	Condition 5	Condition 6	Condition 7
PCM	Existing Part	Existing Part	New Part	Existing Part	New Part	New Part	New Part
WCM/WIN	Existing Part	New Part	New Part	New Part	Existing Part	Existing Part	New Part
"Ignition Keys / FOBIKS"	New Part	New Part	New Part	Existing Part	Existing Part	New Part	Existing Part
PROGRAMMING ORDER	SCANTOOL MISC. FUNCTION						
1	Program Ignition Keys or Key FOBs	WIN Replaced	Check PCM VIN	WIN Replaced	PCM Replaced	PCM Replaced	Attempt to avoid this situation. If possible, try to execute condition 4 or 5 Otherwise, keys must be replaced also (condition 3)
2	----	Program Ignition Keys or Key FOBs	WIN Replaced	Program Ignition Keys or Key FOBs	----	Program Ignition Keys or Key FOBs	
3	----	----	Program Ignition Keys or Key FOBs	----	----	----	

MODULE PROGRAMMING

The Wireless Ignition Node (WIN) controls the Vehicle Theft Security System (VTSS), Remote Keyless Entry (RKE). When a Powertrain Control Module (PCM) is in need of replacement, perform the following steps in order:

NOTE: The PCM and the WIN should never be replaced at the same time. They should be replaced independently of each other.

1. If applicable, first replace the PCM with the original WIN still connected to the vehicle.

2. Using a scan tool program the new PCM. (This will ensure the transfer of the Secret Key data from the original WIN into the new PCM).
3. Replace the WIN, using the scan tool program the new WIN module. This will transfer the Secret Key data from the PCM into the new WIN.
4. With the scan tool reprogram the key FOBIK to the new WIN.
5. Ensure all the customer's keys have been programmed to the new module.

NOTE: If the original keys do not successfully program to the new WIN after the proper procedures are followed correctly, programming new keys will be necessary.

NOTE: Programming the PCM or WIN is done using a diagnostic scan tool and a PIN to enter secure access mode. If three attempts are made to enter secure access mode using an incorrect PIN, secure access mode will be locked out for one hour. To exit this lockout mode, turn the ignition to the RUN position for one hour and then enter the correct PIN. Be certain that all accessories are turned OFF. Also, monitor the battery state and connect a battery charger if necessary.

CAUTION: Read all notes and cautions for programming procedures.

NOTE: Have a unique vehicle PIN readily available before running the routine

CAUTION: If the PCM and WIN are replaced at the same time, the PCM MUST be programmed before the WIN.

NOTE: If the PCM and the WIN are replaced at the same time, all vehicle keys will need to be replaced and programmed to the new WIN.

CAUTION: Read all notes and cautions for programming procedures.

NOTE: If the original keys do not successfully program to the new WIN after the proper procedures are followed correctly, programming new keys will be necessary.

NOTE: A maximum of eight keys can be learned by the WIN. Once a key is learned by a WIN, that key has acquired the Secret Key for that WIN and cannot be transferred to any other WIN or vehicle.

CAUTION: Read all notes and cautions for programming procedures.

CAUTION: If the PCM and WIN are replaced at the same time, the PCM MUST be programmed before the WIN.

PROGRAMMING THE SECRET KEY TO THE WIN

The secret key is an ID code that is unique to each WIN. This code is programmed and stored in the WIN, the PCM, and each ignition key transponder chip. When the PCM or WIN is replaced, it is necessary to program the Secret Key Code into the new module using a diagnostic scan tool. Follow the programming steps outlined in the diagnostic scan tool for **PCM REPLACED** , **WIN REPLACED** , or **TIPM REPLACED** under **MISCELLANEOUS FUNCTIONS** for the **WIRELESS CONTROL MODULE** menu item as appropriate.

NOTE: Programming the PCM or WIN is done using a diagnostic scan tool and a PIN to enter secure access mode. If three attempts are made to enter secure access mode using an incorrect PIN, secure access mode will be locked out for one hour. To exit this lockout mode, turn the ignition to the RUN position for one hour and then enter the correct PIN. Be certain that all accessories are turned OFF. Also, monitor the battery state and connect a battery charger if necessary.

PCM/WIN PROGRAMMING

When an PCM and the WIN are replaced at the same time, perform the following steps in order:

1. Program the new WIN.
2. Replace all ignition keys and program them to the new WIN.

PROGRAMMING THE WIN

CAUTION: Read all notes and cautions for programming procedures.

1. Connect a battery charger to the vehicle.
2. Connect the scan tool.

NOTE: Have a unique vehicle PIN readily available before running the routine

CAUTION: If the PCM and WIN are replaced at the same time, the PCM MUST be programmed before the WIN.

3. Select "ECU View."
4. Select "WIN".

5. Select "Miscellaneous Functions."
6. Select "WIN Replaced".
7. Enter the PIN when prompted.
8. Cycle ignition key after the successful routine completion.

NOTE: If the PCM and the WIN are replaced at the same time, all vehicle keys will need to be replaced and programmed to the new WIN.

PROGRAMMING IGNITION KEYS TO THE WIN

Each FOBIK has a unique ID code that is assigned at the time the key is manufactured. When a key is programmed into the WIN, the module learns the transponder ID code and the transponder acquires the unique Secret Key ID code from the WIN.

CAUTION: Read all notes and cautions for programming procedures.

1. Connect a battery charger to the vehicle.
2. Connect the scan tool.
3. Have a unique vehicle PIN readily available before running the routine.
4. Ignition key should be in RUN position.
5. Select "ECU View".
6. Select "WIN Wireless Control".
7. Select "Miscellaneous Functions."
8. Select "Program Ignition Keys or Key FOBs", Start
9. Enter the PIN when prompted.
10. Verify the correct information.
11. Cycle ignition key after the successful routine completion.

NOTE: If the original keys do not successfully program to the new WIN after the proper procedures are followed correctly, programming new keys will be necessary.

NOTE: A maximum of eight keys can be learned by the WIN. Once a key is learned by a WIN, that key has acquired the Secret Key for that WIN and cannot be transferred to any other WIN or vehicle.

PROGRAMMING THE PCM

CAUTION: Read all notes and cautions for programming procedures.

1. Connect a battery charger to the vehicle.
2. Connect the scan tool.
3. Have a unique vehicle PIN readily available before running the routine.
4. Ignition key should be in RUN position.

CAUTION: If the PCM and WIN are replaced at the same time, the PCM MUST be programmed before the WIN.

5. Select "ECU View".
6. Select "WIN Wireless Control".
7. Select "Miscellaneous Functions."
8. Select "PCM Replaced".
9. Enter the PIN when prompted.
10. Verify the correct information.
11. Cycle ignition key after the successful routine completion.

COMMUNICATION

DESCRIPTION

DESCRIPTION

The primary on-board communication network between microprocessor-based electronic control modules in this vehicle is the Controller Area Network (CAN) data bus system. A data bus network minimizes redundant wiring connections; and, at the same time, reduces wire harness complexity, sensor current loads and controller hardware by allowing each sensing device to be connected to only one module (also referred to as a node). Each node reads, then broadcasts its sensor data over the bus for use by all other nodes requiring that data. Each node ignores the messages on the bus that it cannot use.

The CAN bus is a two-wire multiplex system. Multiplexing is any system that enables the transmission of multiple messages over a single channel or circuit. The CAN bus is used for communication between most vehicle nodes. However, in addition to the CAN bus network, certain nodes may also be equipped with a Local Interface Network (LIN) data bus. The LIN data bus is a single wire low-speed (9.6 Kbps) serial link bus used to provide direct communication between a LIN master module and certain switch or sensor inputs.

There are actually three separate CAN bus systems used in the vehicle. They are designated: the CAN-Interior (also known as CAN Interior High Speed/IHS), the CAN-C and the Diagnostic CAN-C. The CAN-Interior and CAN-C systems provide on-board communication between all nodes in the vehicle. The CAN-C is the faster of the two systems providing near real-time communication (500 Kbps). The CAN-C is used typically for communications between more critical nodes, while the slower (125 Kbps) CAN-Interior system is used for communications between less critical nodes.

The added speed of the CAN data bus is many times faster than previous data bus systems. This added speed facilitates the addition of more electronic control modules or nodes and the incorporation of many new

electrical and electronic features in the vehicle.

The Diagnostic CAN-C bus is also capable of 500 Kbps communication, and is sometimes informally referred to as the CAN-D system to differentiate it from the other high speed CAN-C bus. The Diagnostic CAN-C is used exclusively for the transmission of diagnostic information between the Totally Integrated Power Module/Central GateWay (TIPM or TIPMCGW) and a diagnostic scan tool connected to the industry-standard 16-way Data Link Connector (DLC) located beneath the instrument panel on the driver side of the vehicle.

The TIPM is located in the engine compartment near the battery. The central CAN gateway or hub module integral to the TIPM is connected to all three CAN buses. This gateway physically and electrically isolates the CAN buses from each other and coordinates the bi-directional transfer of messages between them.

OPERATION

OPERATION

The Controller Area Network (CAN) data bus allows all electronic modules or nodes connected to the bus to share information with each other. Regardless of whether a message originates from a module on the lower speed CAN-Interior (also known as CAN Interior High Speed/IHS) bus or on the higher speed CAN-C or CAN-D bus, the message structure and layout is similar, which allows the Totally Integrated Power Module/Central GateWay (TIPM or TIPMCGW) to process and transfer messages between the CAN buses. The TIPM also stores a Diagnostic Trouble Code (DTC) for certain bus network faults.

All modules (also referred to as nodes) transmit and receive messages over one of these buses. Data exchange between nodes is achieved by serial transmission of encoded data messages. Each node can both send and receive serial data simultaneously. Each digital bit of a CAN bus message is carried over the bus as a voltage differential between the two bus circuits which, when strung together, form a message. Each node uses arbitration to sort the message priority if two competing messages are attempting to be broadcast at the same time.

The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) is the Local Interface Network (LIN) master module in this vehicle and it gathers information from the compass module, the instrument panel switch bank, the Steering Control Module (SCM), and the Heated Seat Module (HSM) through the LIN data bus. There is also LIN bus communication between the individual Tire Pressure Monitor (TPM) transponders and the Wireless Ignition Node (WIN). Both the EMIC and the WIN either act directly upon the information received through the LIN data bus, relay the information to other nodes in the vehicle using electronic messages placed on the CAN bus, or both.

The voltage network used to transmit messages requires biasing and termination. Each module on the CAN bus network provides its own biasing and termination. There are two types of nodes used in the CAN bus network. On the CAN-C or the IHS bus, a dominant node has a 120 ohm termination resistance while a non-dominant (or recessive) node has about a 2500 to 3000 ohm (2.5 to 3.0 kilohm) termination resistance. The dominant nodes on the CAN-C bus are the WIN and the Powertrain Control Module (PCM). The dominant nodes on the IHS bus are the EMIC and the TIPM.

The termination resistance of two dominant nodes is combined in parallel to provide a total of about 60 ohms. This resistance value may vary somewhat by application, depending upon the number of non-dominant nodes

on the bus. On the CAN-D bus (or Diagnostic CAN-C) all of the 60 ohm termination resistance is present in the Central GateWay (TIPMCGW).

NOTE: All measurement of termination resistance is done with the vehicle battery disconnected.

The communication protocol being used for the CAN data bus is a non-proprietary, open standard adopted from the Bosch CAN Specification 2.0b. The CAN-C is the faster of the two primary buses in the CAN bus system, providing near real-time communication (500 Kbps).

The CAN bus nodes are connected in parallel to the two-wire bus using a twisted pair, where the wires are wrapped around each other to provide shielding from unwanted electromagnetic induction, thus preventing interference with the relatively low voltage signals being carried through them. The twisted pairs have between 33 and 50 twists per meter (yard). While the CAN bus is operating (active), one of the bus wires will carry a higher voltage and is referred to as the CAN High or CAN bus (+) wire, while the other bus wire will carry a lower voltage and is referred to as the CAN Low or CAN bus (-) wire. Refer to the CAN BUS VOLTAGES chart.

CAN Bus Voltages (Normal Operation)								
CAN-C Bus Circuits	**Sleep**	**Recessive (Bus Idle)**	**Dominant (Bus Active)**	**CAN-L Short to Ground**	**CAN-H Short to Ground**	**CAN-L Short to Battery**	**CAN-H Short to Battery**	**CAN-H Short to CAN-L**
CAN-L (-)	0 V	2.4 - 2.5 V	1.3 - 2.3 V	0 V	0.3 - 0.5V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN-H (+)	0 V	2.4 - 2.5 V	2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
CAN-Interior Bus Circuits	**Key-Off (Bus Asleep)**		**Key-On (Bus Active)**	**CAN-L Short to Ground**	**CAN-H Short to Ground**	**CAN-L Short to Battery**	**CAN-H Short to Battery**	**CAN-H Short to CAN-L**
CAN-L (-)	0.0 V		1.3 - 2.3 V	0 V	0.3 - 0.5 V	Battery Voltage	Battery Voltage Less 0.75 V	2.45 V
CAN-H (+)	0.0 V		2.6 - 3.5 V	0.02 V	0 V	Battery Voltage Less 0.75 V	Battery Voltage	2.45 V
Notes								
All measurements taken between node ground and CAN terminal with a standard DVOM. DVOM will display average network voltage. Total resistance of CAN-C network can also be measured (60 ohms). Total resistance of CAN-Interior								

network varies, depending upon the number of optional non-dominant nodes on the bus. CAN-Interior total resistance should range between about 60 ohms with the minimal number of nodes, to about 42 ohms with the maximum number of nodes.

In order to minimize the potential effects of Ignition-OFF Draw (IOD), the CAN-Interior network employs a sleep strategy. However, a network sleep strategy should not be confused with the sleep strategy of the individual nodes on that network, as they may differ. For example: The CAN-C bus network is awake only when the ignition switch is in the ON or START positions; however, the TIPM, which is on the CAN-C bus, may still be awake with the ignition switch in the ACCESSORY or UNLOCK positions. The integrated circuitry of an individual node may be capable of processing certain sensor inputs and outputs without the need to utilize network resources.

The CAN-Interior bus network remains active until all nodes on that network are ready for sleep. This is determined by the network using tokens in a manner similar to polling. When the last node that is active on the network is ready for sleep, and it has already received a token indicating that all other nodes on the bus are ready for sleep, it broadcasts a **bus sleep acknowledgment** message that causes the network to sleep. Once the CAN-Interior bus network is asleep, any node on the bus can awaken it by transmitting a message on the network. The TIPM will keep either the CAN-Interior or the CAN-C bus awake for a timed interval after it receives a diagnostic message for that bus over the Diagnostic CAN-C bus.

In the CAN system, available options are configured into the TIPM at the assembly plant, but additional options can be added in the field using the diagnostic scan tool. The configuration settings are stored in non-volatile memory. The TIPM also has two 64-bit registers, which track each of the **as-built** and **currently responding** nodes on the CAN-Interior and CAN-C buses. The TIPM stores a Diagnostic Trouble Code (DTC) in one of two caches for any detected active or stored faults in the order in which they occur. One cache stores powertrain (P-Code), chassis (C-Code) and body (B-Code) DTCs, while the second cache is dedicated to storing network (U-Code) DTCs.

If there are intermittent or active faults in the CAN network, a diagnostic scan tool connected to the Diagnostic CAN-C bus through the 16-way Data Link Connector (DLC) may only be able to communicate with the TIPM. To aid in CAN network diagnosis, the TIPM will provide CAN-Interior and CAN-C network status information to the scan tool using certain diagnostic signals. In addition, the transceiver in each node on the CAN-C bus will identify a **bus off hardware failure** , while the transceiver in each node on the CAN-Interior bus will identify a **general bus hardware failure** . The transceivers for some CAN-Interior nodes will also identify certain failures for both CAN-Interior bus signal wires.

CONNECTOR, DATA LINK

DESCRIPTION

DESCRIPTION

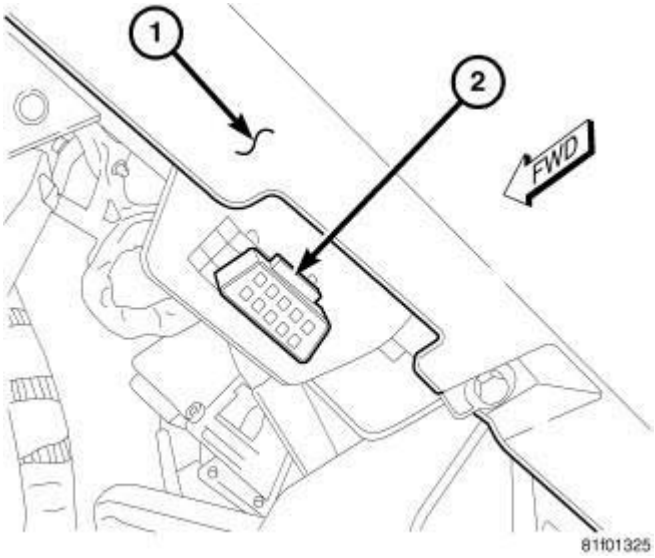

Fig. 1: Data Link Connector
Courtesy of CHRYSLER LLC

The Data Link Connector (DLC) (2) is a 16-way molded plastic connector insulator on a dedicated take out of the instrument panel wire harness. This connector is located at the lower edge of the instrument panel, outboard of the steering column. The connector insulator is retained by integral snap features within a rectangular cutout in the lower instrument panel reinforcement, just forward of the instrument panel steering column opening cover (1).

OPERATION

OPERATION

The Data Link Connector (DLC) is an industry-standard 16-way connector that permits the connection of a diagnostic scan tool to the Controller Area Network (CAN) data bus for interfacing with, configuring and retrieving Diagnostic Trouble Code (DTC) data from the electronic modules that reside on the data bus network of the vehicle.

MODULE, ANTI-LOCK BRAKE SYSTEM

DESCRIPTION

DESCRIPTION

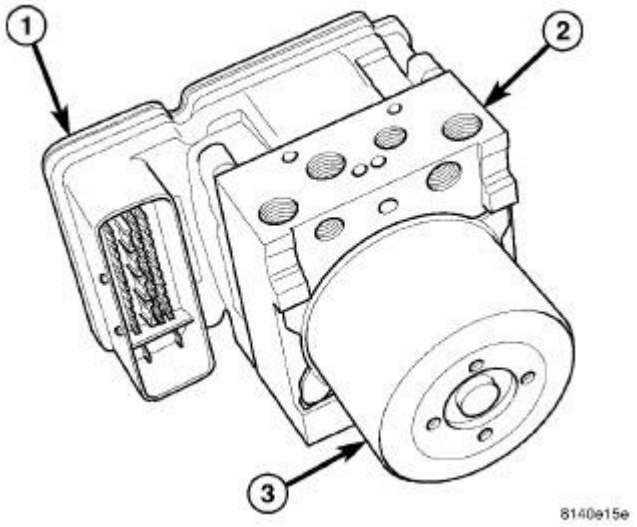

Fig. 2: Antilock Brake Module
Courtesy of CHRYSLER LLC

1 - ANTILOCK BRAKE MODULE (ABM)
2 - HYDRAULIC CONTROL UNIT (HCU)
3 - PUMP/MOTOR

The Antilock Brake Module (ABM) is a microprocessor-based device which monitors the antilock brake system (ABS) during normal braking and controls it when the vehicle is in an ABS stop or when in a traction control situation. The ABM utilizes a 47-way electrical connector on the vehicle wiring harness. The power source for the ABM is through the ignition switch in the RUN or ON position.

NOTE: The ABM is only separately serviceable for non-HSA (Hill Start Assist) equipped vehicles. Do not remove the ABM for vehicles equipped with HSA.

The ABM (1) is mounted to the HCU (2) as part of the Integrated Control Unit (ICU). The ICU is located in the engine compartment below the master cylinder on the front suspension cradle/crossmember. For information on the ICU. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Description**).

OPERATION

OPERATION

The primary functions of the Antilock Brake Module (ABM) are to:

- Monitor the antilock brake system for proper operation.
- Detect wheel locking or wheel slipping tendencies by monitoring the speed of all four wheels of the vehicle.
- Control fluid modulation to the wheel brakes while the system is in an ABS mode.

- Store diagnostic information.
- Provide communication to the scan tool while in diagnostic mode.
- Illuminate the amber ABS warning indicator lamp.
- Illuminate the ESP function lamp in the message center on the instrument panel when a traction control event occurs.
- Illuminate the ESP function lamp when the amber ABS warning indicator lamp illuminates.

The ABM constantly monitors the antilock brake system for proper operation. If the ABM detects a fault, it will turn on the amber ABS warning indicator lamp and disable the antilock braking system. The normal base braking system will remain operational.

NOTE: If the vehicle is equipped with traction control, the ESP function lamp will illuminate anytime the amber ABS warning indicator lamp illuminates.

The ABM continuously monitors the speed of each wheel through the signals generated by the wheel speed sensors to determine if any wheel is beginning to lock. When a wheel locking tendency is detected, the ABM commands the ABM command coils to actuate. The coils then open and close the valves in the HCU that modulate brake fluid pressure in some or all of the hydraulic circuits. The ABM continues to control pressure in individual hydraulic circuits until a locking tendency is no longer present.

The ABM contains a self-diagnostic program that monitors the antilock brake system for system faults. When a fault is detected, the amber ABS warning indicator lamp is turned on and the fault diagnostic trouble code (DTC) is then stored in a diagnostic program memory. A latched fault will disable certain system functionality for the current ignition cycle. An unlatched fault will disable certain system functionality until the fault condition disappears. These DTC's will remain in the ABM memory even after the ignition has been turned off. The DTC's can be read and cleared from the ABM memory by a technician using a scan tool. If not cleared with a scan tool, the fault occurrence and DTC will be automatically cleared from the ABM memory after the identical fault has not been seen during the next 3,500 miles. Drive-off may be required for the amber ABS warning indicator lamp to go out on the next ignition cycle.

ABM INPUTS

- Wheel speed sensors (four)
- Brake lamp switch
- Ignition switch
- System and pump voltage
- Ground
- ESP/BAS warning indicator lamp
- Diagnostic communication

ABM OUTPUTS

- Amber ABS warning indicator lamp actuation (via BUS)
- Red BRAKE warning indicator lamp actuation (via BUS)

- Instrument cluster (MIC) communication
- ESP/BAS warning indicator lamp
- Diagnostic communication

REMOVAL

LEFT-HAND DRIVE

NOTE: The ABM is only separately serviceable for non-HSA (Hill Start Assist) equipped vehicles. Do not remove the ABM for vehicles equipped with HSA.

1. Disconnect the negative (ground) cable from the battery and isolate it.
2. Remove the engine appearance cover.

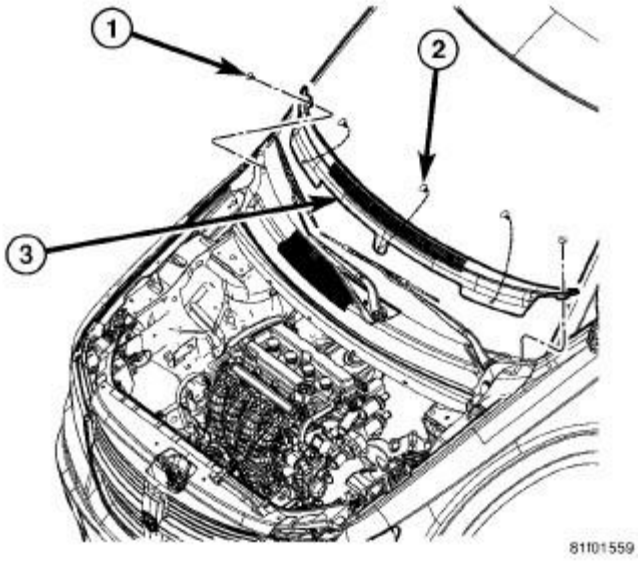

Fig. 3: Cowl Top Screen
Courtesy of CHRYSLER LLC

3. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
4. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

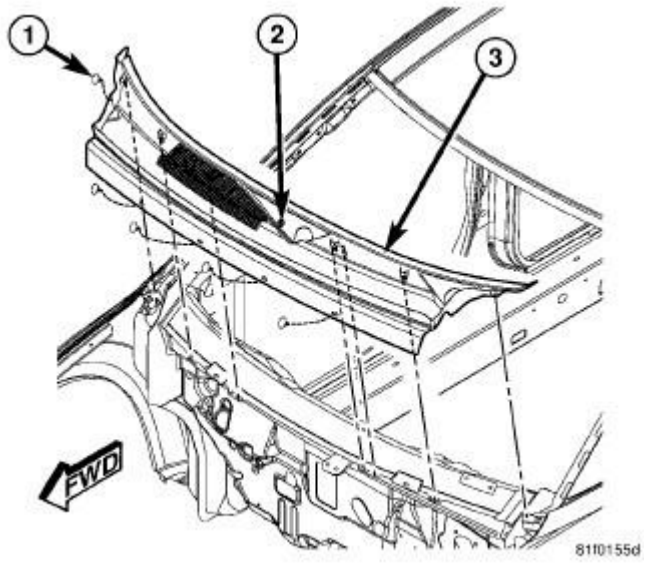

Fig. 4: Cowl Screen
Courtesy of CHRYSLER LLC

5. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

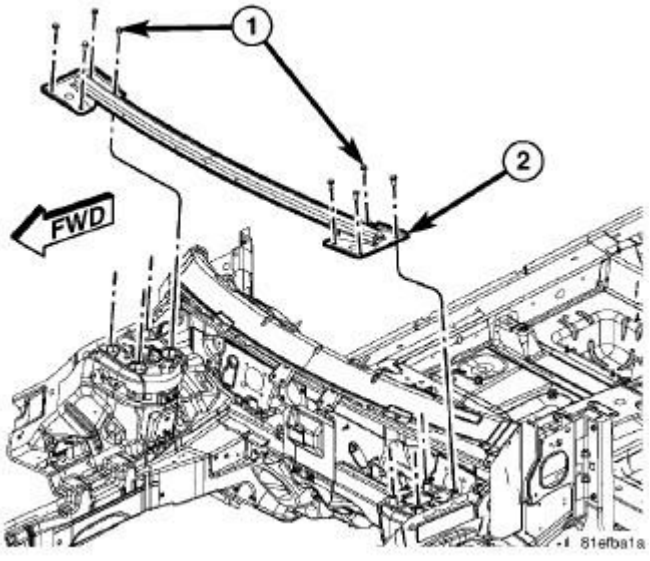

Fig. 5: Wheelhouse Brace
Courtesy of CHRYSLER LLC

6. Remove the eight mounting bolts (four each side) (1) securing the wheel house brace to the strut towers.
7. Remove the wheelhouse brace (2).
8. Remove two screws, then remove the fresh air plenum.
9. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

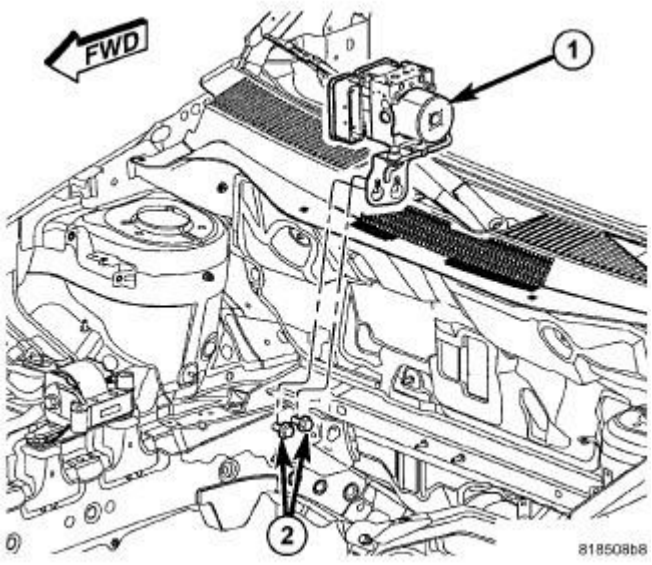

Fig. 6: Locating Integrated Control Unit (ICU)
Courtesy of CHRYSLER LLC

10. Loosen, but do not remove, the two mounting screws (2) attaching the ICU (1) mounting bracket to the body.
11. Lift the ICU and mounting bracket (1) upward to near the top of the slots in the bracket, then snug one or both of the mounting screws (2) to hold the ICU in this position.
12. Lower the vehicle.

CAUTION: Before disassembling the ICU, the ICU must be thoroughly cleaned. This must be done to prevent dirt particles and debris from entering into vital areas of the ICU.

13. Thoroughly clean all surfaces of the ICU and brake tubes. Use only a solvent such as Mopar® Brake Parts Cleaner or equivalent.

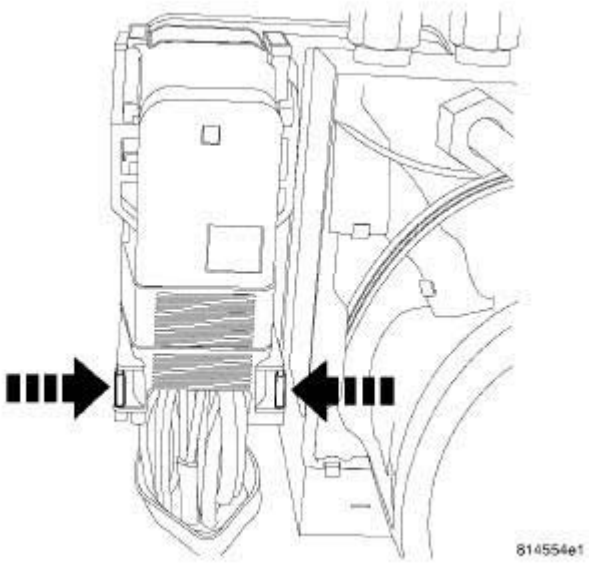

Fig. 7: ABM Connector Release Tabs
Courtesy of CHRYSLER LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

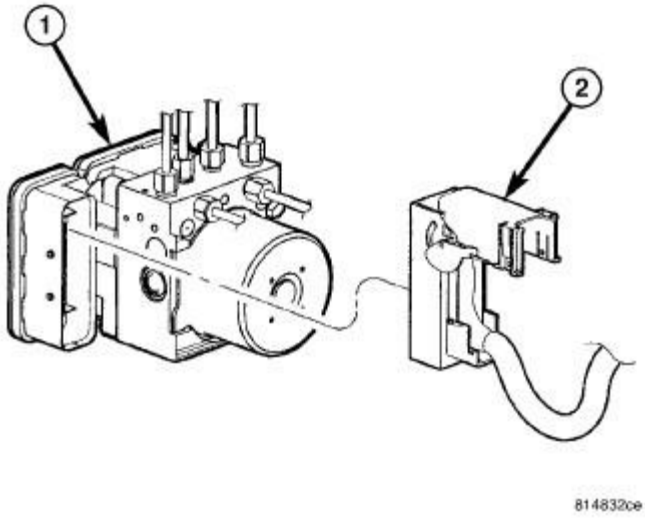

Fig. 8: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

14. Disconnect the ABM harness connector from the Antilock Brake Module (ABM). To do so:

a. Depress the tabs on each side of the connector cover, then
b. Pull outward and upward on the lower half of the cover until it locks into position pointing straight outward (2). The connector can then be pulled straight outward off the ABM (1).

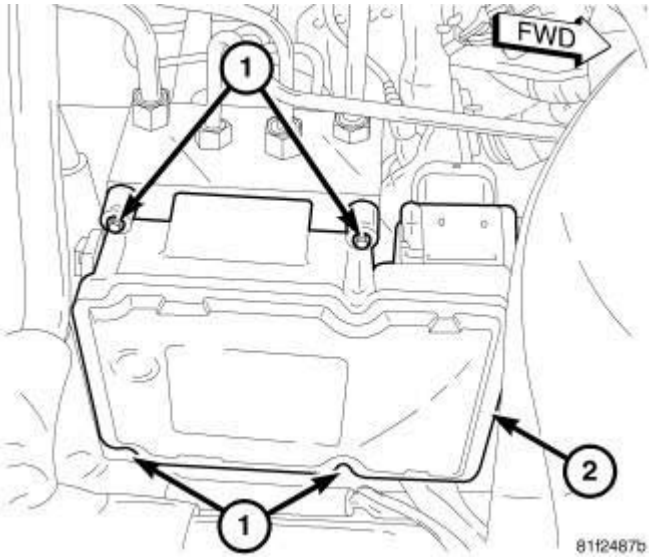

Fig. 9: ABM Mounting
Courtesy of CHRYSLER LLC

15. Remove the four screws (1) attaching the ABM (2) to the HCU. A Torx T20 bit approximately 2 inches long works well.

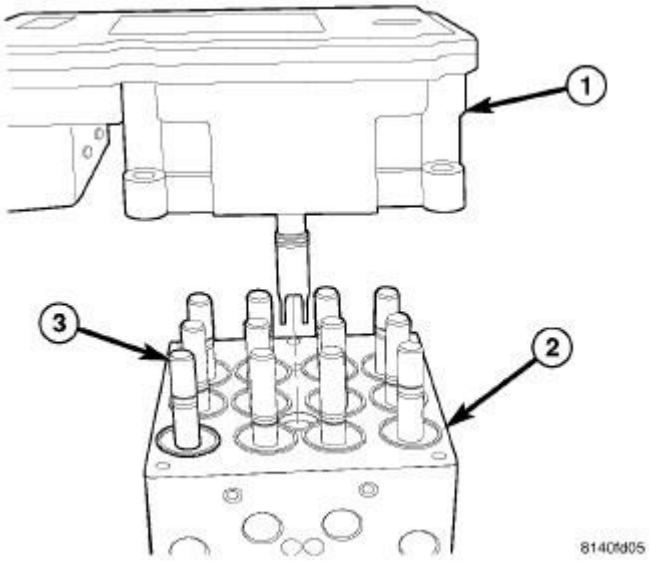

Fig. 10: Identifying ABM, HCU, & Solenoid Valve Stem
Courtesy of CHRYSLER LLC

1 - ABM

2 - HCU 3 - SOLENOID VALVE STEM

CAUTION: When removing the ABM from the HCU, be sure to completely separate the two components (approximately 38 mm (1.5 inches)) before removing the ABM. Otherwise, damage to the pressure sensor or pump motor connection may result, requiring HCU replacement. Do not to touch the sensor terminals on the HCU side or the contact pads on the ABM side as this may result in contamination and issues in the future.

16. Separate the ABM (1) from the HCU (2).

RIGHT-HAND DRIVE

NOTE: The ABM is only separately serviceable for non-HSA (Hill Start Assist) equipped vehicles. Do not remove the ABM for vehicles equipped with HSA.

1. Disconnect the negative (ground) cable from the battery and isolate it.
2. Remove air inlet hose (1) between air cleaner housing and engine.

CAUTION: Before disassembling the ICU, the ICU must be thoroughly cleaned. This must be done to prevent dirt particles and debris from entering into vital areas of the ICU.

3. Thoroughly clean all surfaces of the ICU and brake tubes. Use only a solvent such as Mopar® Brake Parts Cleaner or equivalent.

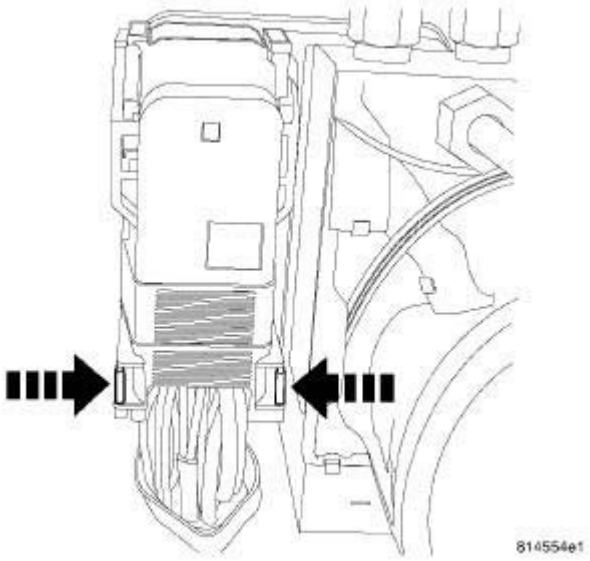

Fig. 11: ABM Connector Release Tabs
Courtesy of CHRYSLER LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

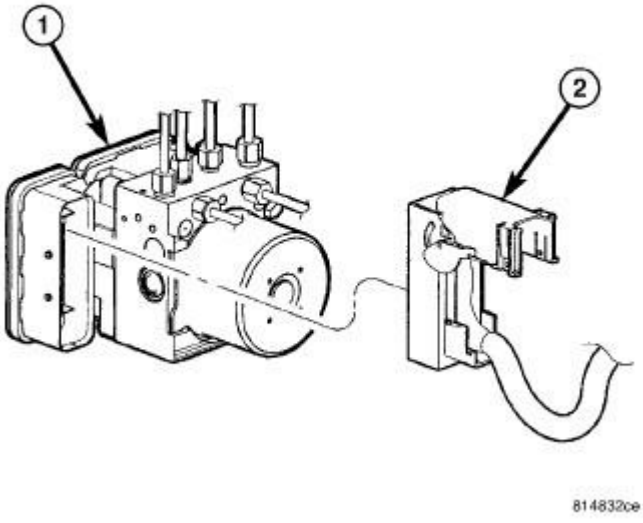

Fig. 12: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

4. Disconnect the ABM harness connector from the Antilock Brake Module (ABM). To do so:
   a. Depress the tabs on each side of the connector cover, then
   b. Pull outward and upward on the lower half of the cover until it locks into position pointing straight outward (2). The connector can then be pulled straight outward off the ABM (1).

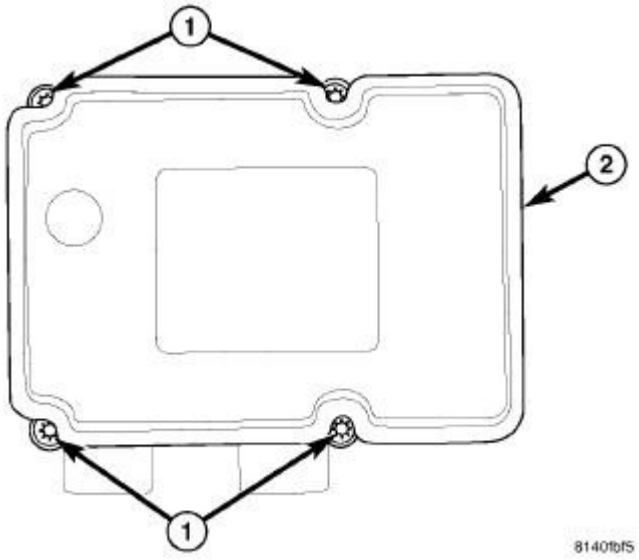

Fig. 13: ABM Mounting Screws
Courtesy of CHRYSLER LLC

1 - MOUNTING SCREWS 2 - ABM

5. Remove the four screws (1) attaching the ABM (2) to the HCU.

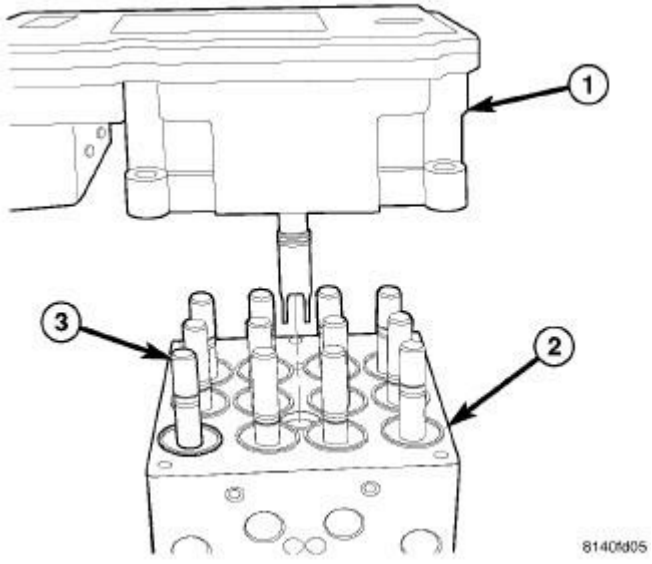

Fig. 14: ABM Assembly To HCU
Courtesy of CHRYSLER LLC

1 - ABM

2 - HCU 3 - SOLENOID VALVE STEM

CAUTION: When removing the ABM from the HCU, be sure to completely separate the two components (approximately 38 mm (1.5 inches)) before removing the ABM. Otherwise, damage to the pressure sensor or pump motor connection may result, requiring HCU replacement. Do not to touch the sensor terminals on the HCU side or the contact pads on the ABM side as this may result in contamination and issues in the future.

6. Separate the ABM (1) from the HCU (2).

INSTALLATION

LEFT-HAND DRIVE

1. Clean any debris off the mating surfaces of the HCU and ABM.

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

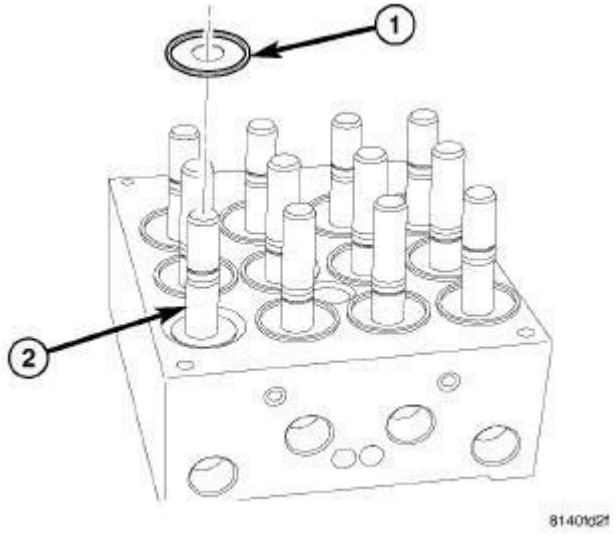

Fig. 15: Solenoid Valve Seal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - SOLENOID VALVE STEM

2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris;**do not reuse solenoid valve stem seals.**

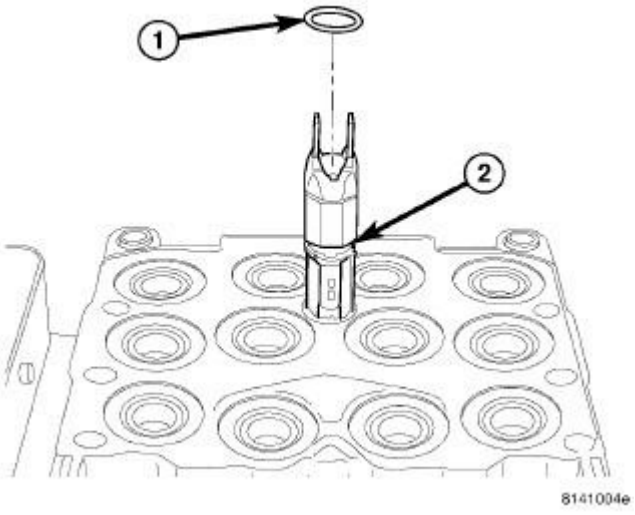

Fig. 16: Internal Pump Connector O-Ring
Courtesy of CHRYSLER LLC

1 - O-RING
2 - O-RING MOUNTING GROOVE

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

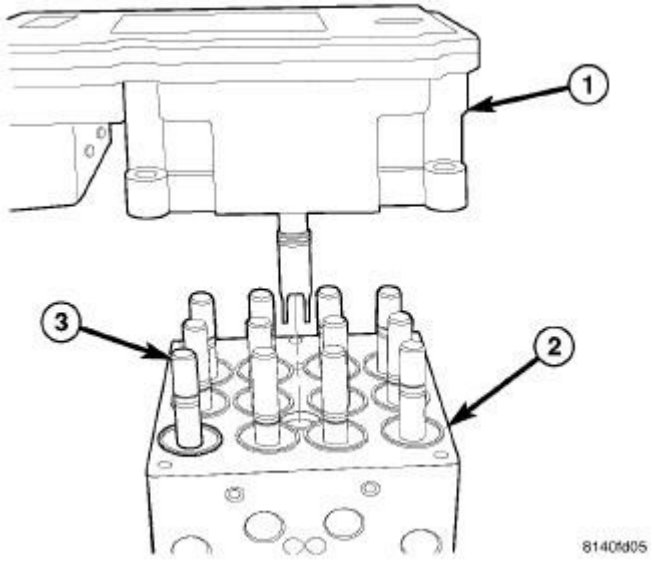

Fig. 17: Identifying ABM, HCU, & Solenoid Valve Stem

Courtesy of CHRYSLER LLC

1 - ABM 2 - HCU 3 - SOLENOID VALVE STEM

4. Align components and install the ABM (1) on the HCU (2).

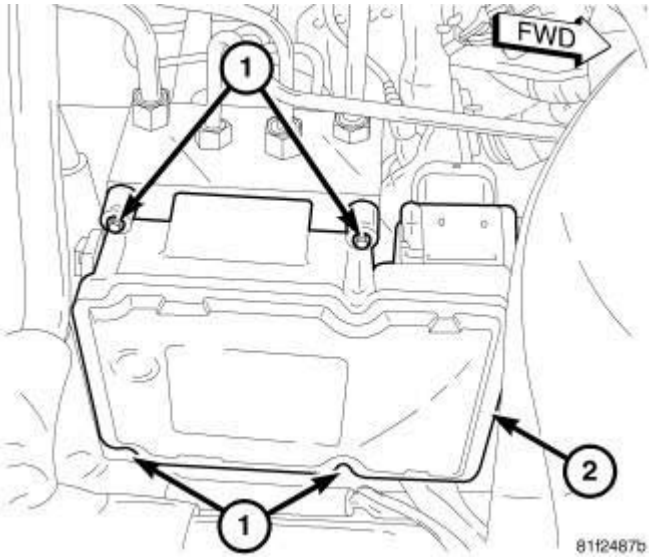

Fig. 18: ABM Mounting
Courtesy of CHRYSLER LLC

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).

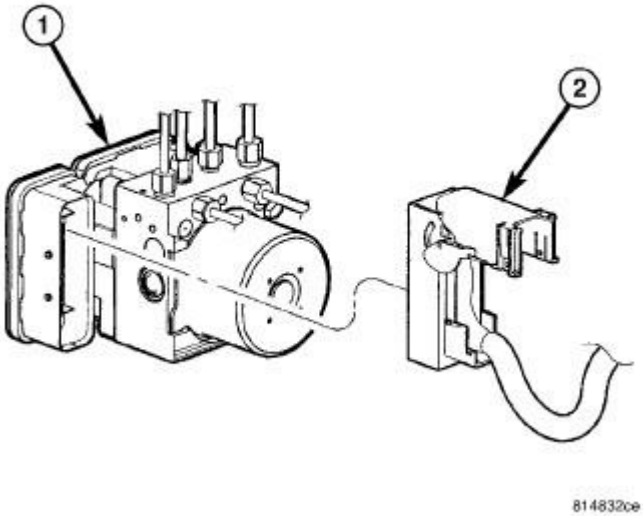

Fig. 19: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

CAUTION: Before installing the ABM harness connector on the ABM, be sure the seal is properly installed in the connector.

6. Insert the ABM wiring harness connector (2) into the socket of the ABM (1) and close the cover, locking the connector in place.
7. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

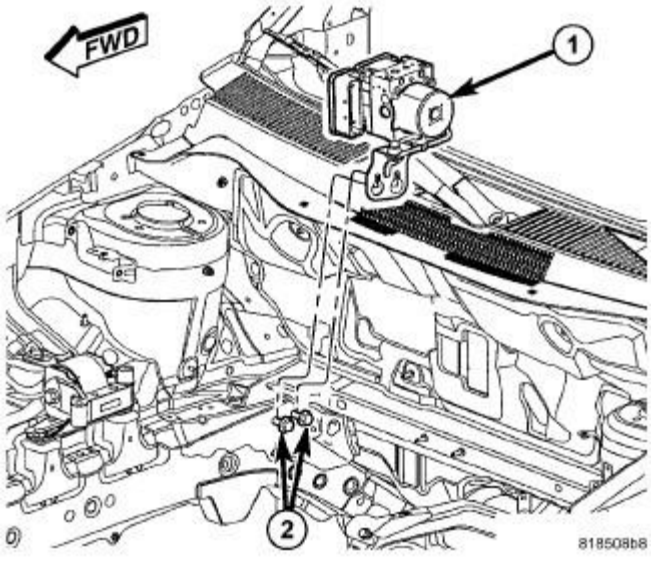

Fig. 20: Locating Integrated Control Unit (ICU)
Courtesy of CHRYSLER LLC

8. Loosen the two mounting screws (2) as necessary and allow the ICU (1) mounting bracket to slide down over the mounting screws and hang the assembly in place. Tighten the two mounting screws (2) to 23 N.m (17 ft. lbs.).
9. Lower the vehicle.
10. Position the fresh air plenum and install the two mounting screws.

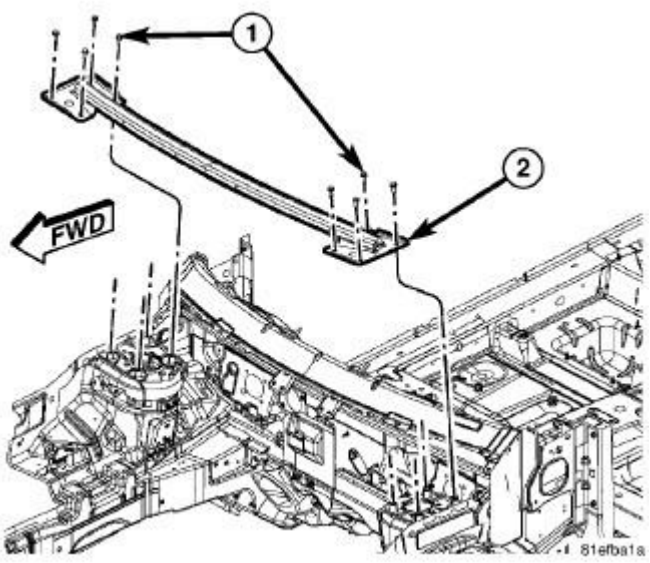

Fig. 21: Wheelhouse Brace
Courtesy of CHRYSLER LLC

11. Install the wheelhouse brace (2). Install and tighten the eight mounting bolts (four each side) (1) to 48 N.m (35 ft. lbs.).

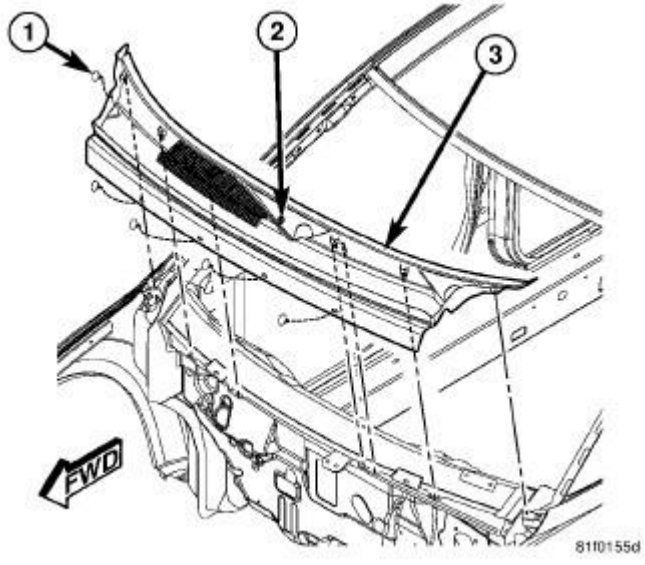

Fig. 22: Cowl Screen
Courtesy of CHRYSLER LLC

12. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.
13. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper -**

Installation

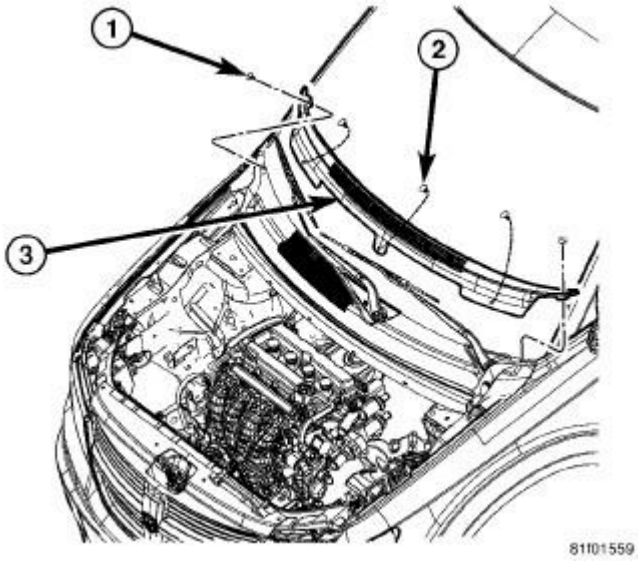

Fig. 23: Cowl Top Screen
Courtesy of CHRYSLER LLC

14. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).
15. Install the engine appearance cover.
16. Connect the negative cable on the battery negative post.
17. Hook up the scan tool to initialize the ABM and perform the following:
    a. Clear any faults.
    b. Perform the ABS Verification Test and road test the vehicle. Refer to **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

RIGHT-HAND DRIVE

1. Clean any debris off the mating surfaces of the HCU and ABM.

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

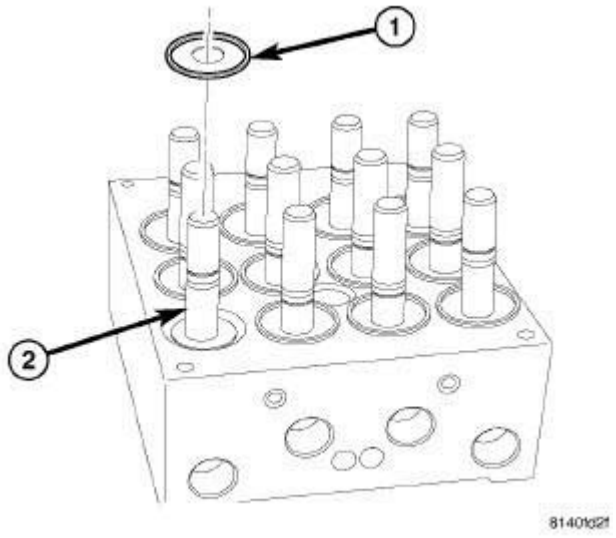

Fig. 24: Solenoid Valve Seal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - SOLENOID VALVE STEM

2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris;**do not reuse solenoid valve stem seals.**

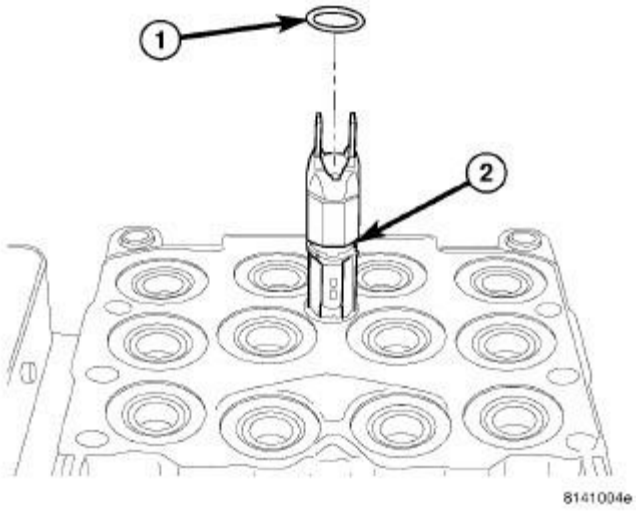

Fig. 25: Internal Pump Connector O-Ring
Courtesy of CHRYSLER LLC

1 - O-RING

2 - O-RING MOUNTING GROOVE

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

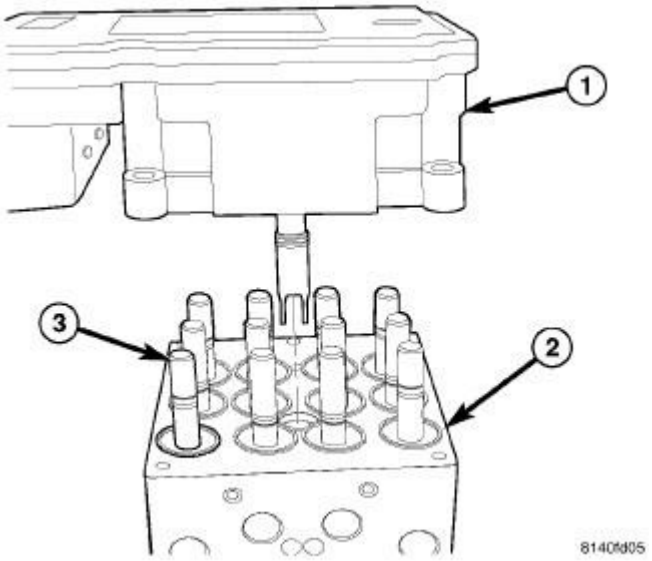

Fig. 26: ABM Assembly To HCU
Courtesy of CHRYSLER LLC

1 - ABM 2 - HCU 3 - SOLENOID VALVE STEM

4. Align components and install the ABM (1) on the HCU (2).

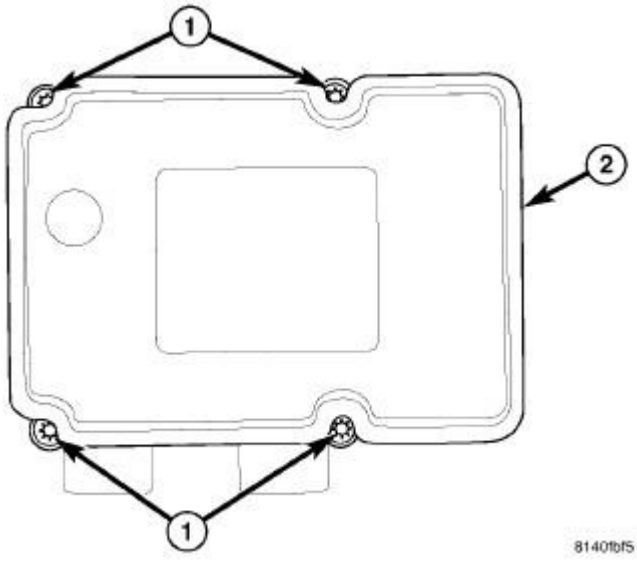

Fig. 27: ABM Mounting Screws
Courtesy of CHRYSLER LLC

1 - MOUNTING SCREWS 2 - ABM

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).

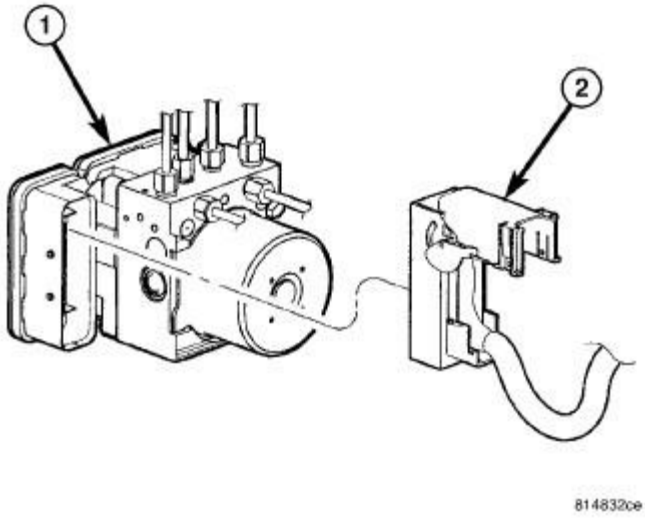

Fig. 28: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)

2 - WIRING HARNESS CONNECTOR

CAUTION: Before installing the ABM harness connector on the ABM, be sure the seal is properly installed in the connector.

6. Insert the ABM wiring harness connector (2) into the socket of the ABM (1) and close the cover, locking the connector in place.
7. Install the air inlet hose (1) between the air cleaner housing and engine.
8. Connect the negative cable on the battery negative post.
9. Hook up the scan tool to initialize the ABM and perform the following:
   a. Clear any faults.
   b. Perform the ABS Verification Test and road test the vehicle. Refer to **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

MODULE, DOOR

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the door trim panel as necessary to gain access to the door control module. Refer to **Body/Door - Front/PANEL, Door Trim - Removal** .
3. Disconnect the electrical connectors.
4. Remove the door control module mounting fasteners and remove the module from the vehicle.

INSTALLATION

INSTALLATION

1. Place the door control module into position and install the mounting fasteners.
2. Connect the electrical connectors.
3. Install the door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Installation** .
4. Install the battery negative cable.

MODULE, ENGINE CONTROL

DESCRIPTION

DESCRIPTION

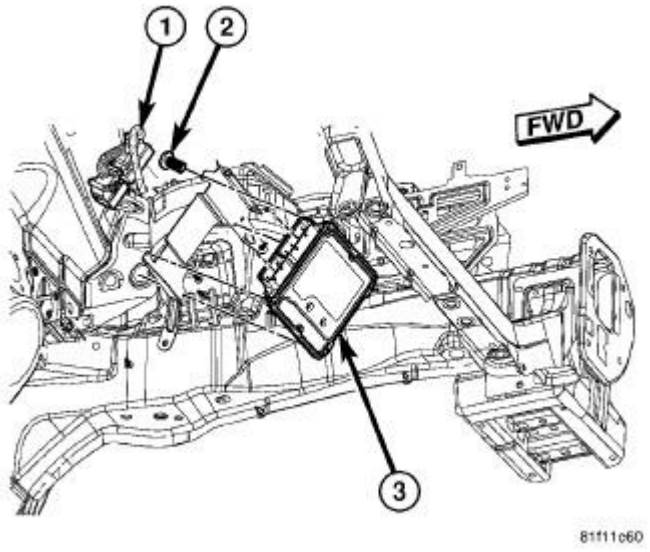

Fig. 29: Removing/Installing ECM - 2.0L Diesel
Courtesy of CHRYSLER LLC

The ECM (3) is located in the left side of engine compartment attached to the left inner fender below the air filter housing.

OPERATION

OPERATION

The ECM has been programmed to monitor different circuits of the diesel fuel injection system. This monitoring is called on-board diagnostics. Certain criteria must be met for a diagnostic trouble code to be entered into the ECM memory. The criteria may be a range of: engine rpm, engine temperature, time or other input signals to the ECM. If all of the criteria for monitoring a system or circuit are met, and a problem is sensed, then a DTC will be stored in the ECM memory. It is possible that a DTC for a monitored circuit may not be entered into the ECM memory, even though a malfunction has occurred. This may happen when the monitoring criteria have not been met. The ECM compares input signal voltages from each input device with specifications (the established high and low limits of the input range) that are programmed into it for that device. If the input voltage is not within the specifications and other trouble code criteria are met, a DTC will be stored in the ECM memory.

ECM OPERATING MODES

As input signals to the ECM change, the ECM adjusts its response to the output devices. For example, the ECM must calculate a different fuel quantity and fuel timing for engine idle condition than it would for a wide open throttle condition. There are several different modes of operation that determine how the ECM responds to the various input signals.

Ignition Switch On (Engine Off)

When the ignition is turned on, the ECM activates the glow plug relay for a time period that is determined by

engine coolant temperature, atmospheric temperature and battery voltage.

Engine Start-Up Mode

The ECM uses the engine temperature sensor and the crankshaft position sensor (engine speed) inputs to determine fuel injection quantity.

Normal Driving Modes

Engine idle, warm-up, acceleration, deceleration and wide open throttle modes are controlled based on all of the sensor inputs to the ECM. The ECM uses these sensor inputs to adjust fuel quantity and fuel injector timing.

Limp-In Mode

If there is a fault detected with the accelerator pedal position sensor, the ECM will set the engine speed at 1100 RPM.

Overspeed Detection Mode

If the ECM detects engine RPM that exceeds 5200 RPM, the ECM will set a DTC in memory and illuminate the MIL until the DTC is cleared.

After-Run Mode

The ECM transfers RAM information to ROM and performs an Input/Output state check.

MONITORED CIRCUITS

The ECM is able to monitor and identify most driveability related trouble conditions. Some circuits are directly monitored through ECM feedback circuitry. In addition, the ECM monitors the voltage state of some circuits and compares those states with expected values. Other systems are monitored indirectly when the ECM conducts a rationality test to identify problems. Although most subsystems of the engine control module are either directly or indirectly monitored, there may be occasions when diagnostic trouble codes are not immediately identified. For a trouble code to set, a specific set of conditions must occur and unless these conditions occur, a DTC will not set.

DIAGNOSTIC TROUBLE CODES

Each diagnostic trouble code (DTC) is diagnosed by following a specific procedure. The diagnostic test procedure contains step-by-step instruction for determining the cause of the DTC as well as no trouble code problems. Refer to the appropriate Diesel Powertrain Diagnostic service information for more information.

HARD CODE

A DTC that comes back within one cycle of the ignition key is a hard code. This means that the problem is current every time the ECM/SKIM checks that circuit or function. Procedures in this service information verify if the DTC is a hard code at the beginning of each test. When the fault is not a hard code, an intermittent test must be performed. NOTE: If the scantool displays faults for multiple components (i.e. ECT, VSS, IAT

sensors) identify and check the shared circuits for possible problems before continuing (i.e. sensor grounds or 5-volt supply circuits). Refer to the appropriate schematic diagram to identify shared circuits. Refer to the appropriate Diesel Powertrain Diagnostic service information for more information.

INTERMITTENT CODE

A DTC that is not current every time the ECM/SKIM checks the circuit or function is an intermittent code. Most intermittent DTCs are caused by wiring or connector problems. Problems that come and go like this are the most difficult to diagnose; they must be looked for under specific conditions that cause them. **NOTE: Electromagnetic (radio) interference can cause an intermittent system malfunction.** This interference can interrupt communication between the ignition key transponder and the SKIM.

The following checks may assist you in identifying a possible intermittent problem:

- Visually inspect the related wire harness connectors. Look for broken, bent, pushed out or corroded terminals.
- Visually inspect the related wire harness. Look for chafed, pierced or partially broken wire.
- Refer to hotlines or technical service bulletins that may apply.

Refer to the appropriate Diesel Powertrain Diagnostic service information for more information.

ECM DIAGNOSTIC TROUBLE CODES

NOTE: Before replacing the ECM for a failed driver, control circuit or ground circuit, be sure to check the related component/circuit integrity for failures not detected due to a double fault in the circuit. Most ECM driver/control circuit failures are caused by internal failures to components (i.e. relays and solenoids) and shorted circuits (i.e. sensor pull-ups, drivers and ground circuits). These faults are difficult to detect when a double fault has occurred and only one DTC has set. If the scan tool displays faults for multiple components (i.e.VSS, ECT, Batt Temp, etc.) identify and check the shared circuits for possible problems before continuing (i.e. sensor grounds or 5-volt supply circuits). Refer to SYSTEM WIRING DIAGRAMS to identify shared circuits. Refer to the appropriate Diesel Powertrain Diagnostic service information for more information.

STANDARD PROCEDURE

PCM/ECM REPROGRAMMING

Follow the instructions in order, refer to **RECEIVER, Wireless Ignition Node** .

REMOVAL

REMOVAL

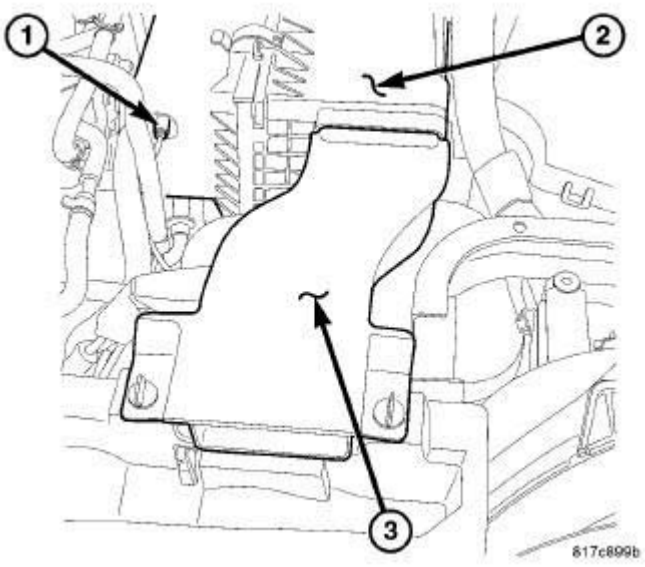

Fig. 30: Air Inlet Duct
Courtesy of CHRYSLER LLC

1. Remove air inlet duct (3).
2. Disconnect negative battery cable.
3. Disconnect vacuum hose (1).
4. Remove air filter housing assembly (2). Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .

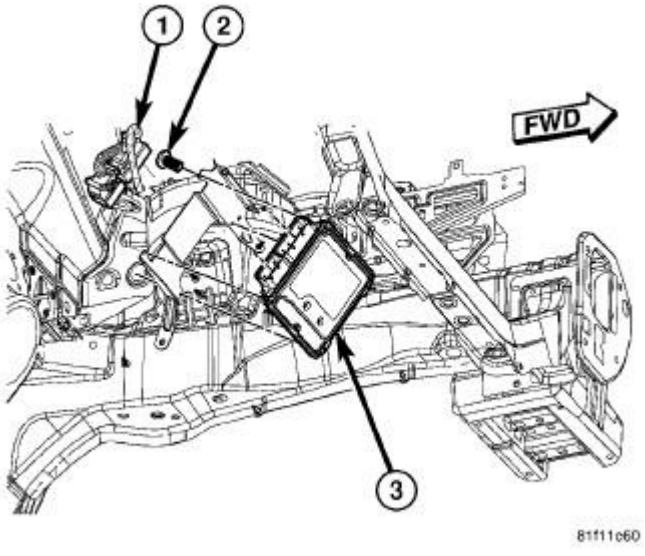

Fig. 31: Removing/Installing ECM - 2.0L Diesel
Courtesy of CHRYSLER LLC

5. Disconnect both ECM (1) electrical connectors.

6. Remove ECM bracket retaining bolts (2) and remove ECM (3).

INSTALLATION

INSTALLATION

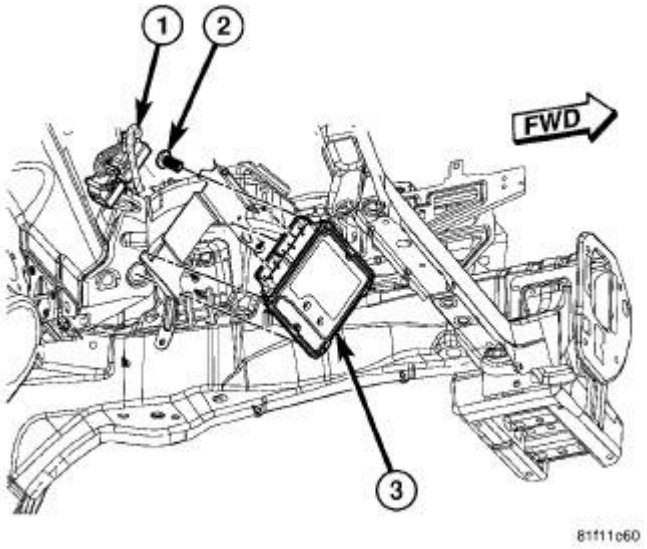

Fig. 32: Removing/Installing ECM - 2.0L Diesel
Courtesy of CHRYSLER LLC

1. Install ECM (3) on mounting bracket. Torque fastener to 10.7N.m (95 lbs. in.).
2. Connect both ECM electrical connectors (1).

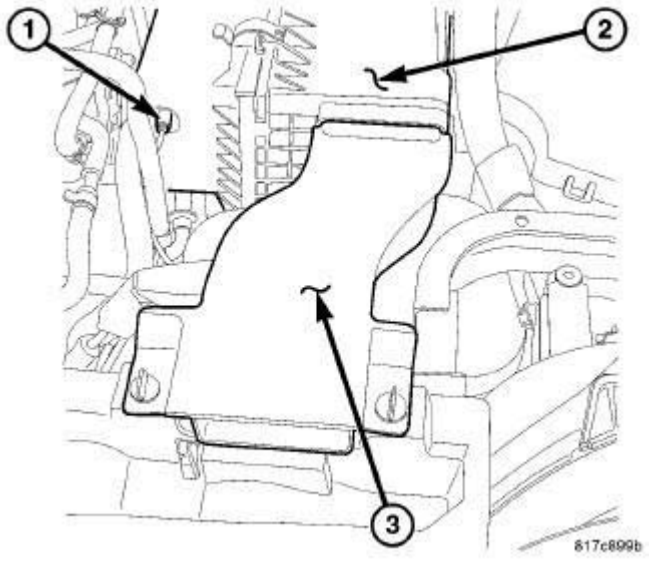

Fig. 33: Air Inlet Duct

Courtesy of CHRYSLER LLC

3. Install air filter housing assembly (2). Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .
4. Connect vacuum hose (1).
5. Connect negative battery cable.
6. Install air inlet tube (3).
7. Reprogram ECM. See **Standard Procedure** .

MODULE, FINAL DRIVE CONTROL

DESCRIPTION

DESCRIPTION

The AWD ECM (electronic control module) mounts on the driver side cowl side panel, where it is concealed by the instrument panel. It communicates with other systems over the high-speed CAN-C bus.

OPERATION

OPERATION

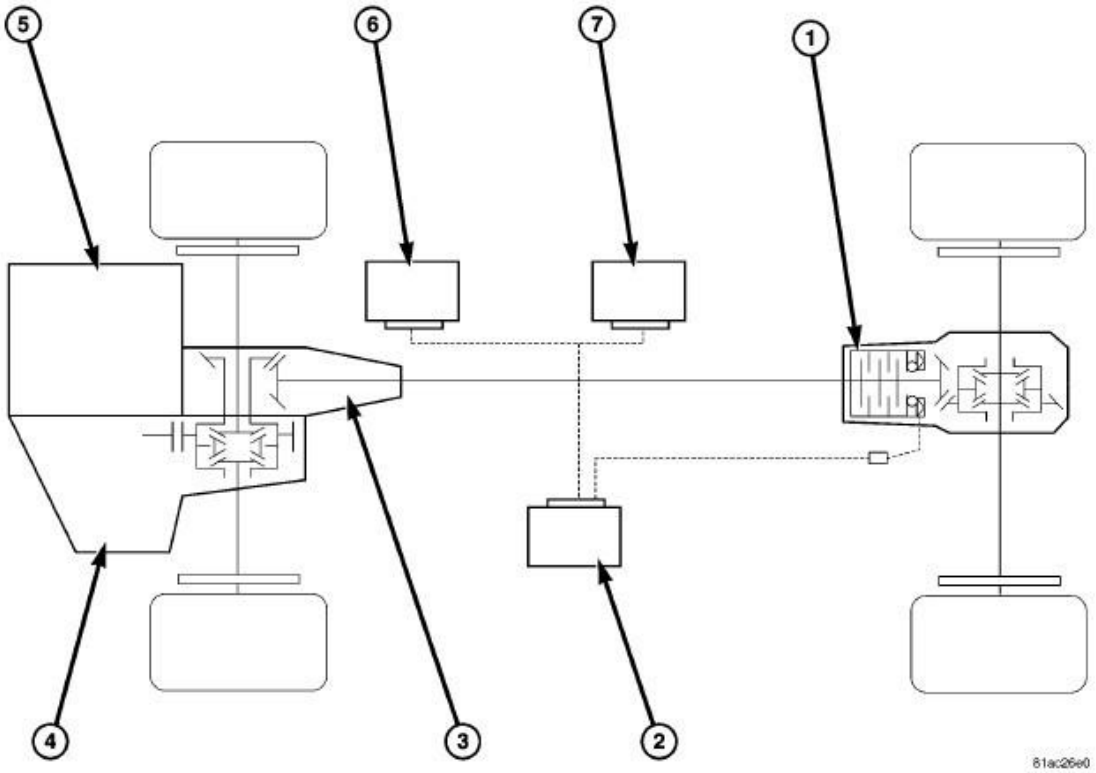

Fig. 34: AWD Outline
Courtesy of CHRYSLER LLC

1 - ECC 2 - AWD ECU	5 - ENGINE 6 - NGC
3 - PTU	7 - ABS CONTROLLER
4 - TRANSMISSION	-

The all-wheel-drive system requires no driver input or control. Under most driving conditions, it is passive and power is transmitted to the front wheels alone. The system functions to optimize traction and handling under the following conditions:

Anticipates slip by responding to pedal position unlike all-wheel drive systems that rely on pumps or viscous fluids to transfer torque, the system requires no front-to-rear slippage for activation. This allows the system to transfer torque in response to accelerator pedal position. If the driver is asking for a lot of power, the system immediately starts clamping the Electronically Controlled Coupling (ECC), transferring a high percentage of power to the rear wheels. This avoids front wheel slippage, as power to propel the car is transmitted through all four tires. This mode of operation is called open-loop operation in that there is no feedback to affect the torque transfer.

Modulates torque to optimize traction on slippery surfaces a second, closed loop, operating mode uses feedback from the wheel-speed sensors to determine the appropriate torque transfer. When the front wheels slip, the all-wheel-drive electronic control module tells the ECC to start clamping, sending power to the rear wheels. Attempting the same aggressive launch described above with the front wheels on ice and the rear wheels on dry pavement, the ECC sends even more torque to the rear wheels to minimize slippage and launch the vehicle. Both modes are always active and the maximum of the two is chosen. Power to the rear wheels is modulated during lost of traction while traveling at freeway speeds; for example, hydroplaning on a puddle of water, will send very little power to the rear wheels because the controller knows at those speeds a lot of power is not needed at the rear wheels.

Prevents binding during low-speed turns a third condition, which is independent of the others, uses the ESP steering angle sensor to determine when the vehicle is turning in a tight circle. This condition causes the electronic control module to reduce torque to the rear wheels to prevent binding in the driveline. The electronic control module is always checking for this condition as well.

Influences handling at moderate speeds. The AWD system is used to influence vehicle dynamics. Other manufacturers limit AWD to aiding traction or providing off-road capability. They concentrate on launching the vehicle or going off road at speeds up to about 25 mph (40 km/hr). Above that speed range, they use it to limit wheel slip for traction. Additional ECM calibration controls torque to the rear wheels for improved handling in the 25-65 mph (40-105 km/hr) range. In this speed range, the system utilizes torque to the rear wheels during cornering with the throttle open to make the car turn more easily - make the handling more neutral. This is more readily accomplished with an electronically controlled system, than with viscous-coupling or gerotor systems that require some degree of front-to-rear slip to transfer torque to the rear wheels. Above 53 mph (113 km/hr), the control strategy provides minimal torque to the rear wheels under normal driving conditions to aid fuel economy.

Works with ESP and Traction Control the electronic control module also interfaces with the ESP and traction control systems. The interface allows the ESP system to use the ECC to help gain control of the vehicle. For this purpose, torque transmitted to the rear wheels by the ECC can be reduced. The AWD system is not traction

control. It only works on situations where front-torear traction varies, for instance, front wheels on ice, rear wheels on dry pavement or climbing steep grades. AWD does not aid side-to-side traction. ESP does that through brake intervention.

REMOVAL

REMOVAL

1. Remove the left front trim panel.
2. Remove the electrical connector.
3. Remove the mounting nuts.
4. Remove the ECC module.

INSTALLATION

INSTALLATION

1. Install ECC module into mounting studs.
2. Install mounting nuts and tighten to 8N.m (71 in. lbs.) torque.
3. Install the electrical connector.
4. Install the left front trim panel.

MODULE, HEATED SEAT

DESCRIPTION

DESCRIPTION

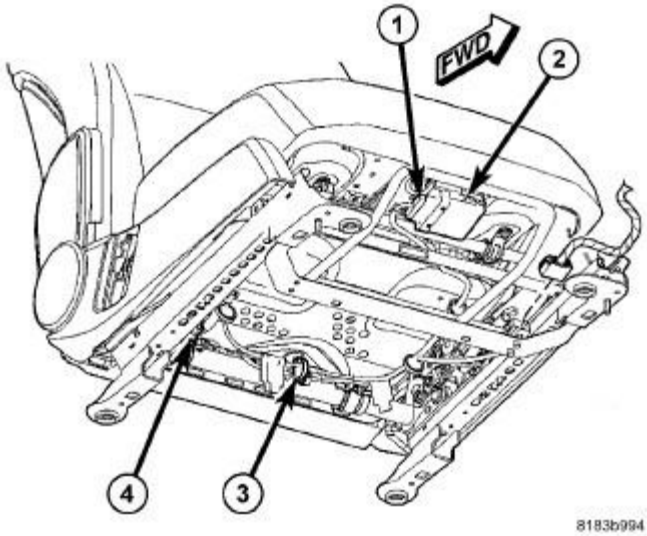

Fig. 35: Locating Heated Seat Module

Courtesy of CHRYSLER LLC

The heated seat module (2) is located under the driver front seat. It has a single electrical connector (1) and a push pin style retainer that secures it to the seat pan (4). The module can be accessed from under the Driver seat with the seat in the full back and up position.

The heated seat module is a microprocessor designed to use the Local Interface Network (LIN) data bus messages from the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN). The CCN receives inputs from the heated seat switches and in turn signals the heated seat module to operate the heated seat elements for both front seats.

OPERATION

OPERATION

The heated seat module operates on fused battery current received from the ignition switch. The module is grounded to the body at all times through the electrical connector. Inputs to the module include Local Interface Network (LIN) data bus messages and standard hardwired 12 volt power and ground. In response to the LIN inputs the heated seat module will control the battery current to the appropriate heated seat elements.

When a heated seat switch LIN data bus signal is received by the heated seat module, the module energizes the selected heated seat element. The Low heat set point is about 38° C (100.4° F), and the High heat set point is about 42° C (107.6° F).

In addition to operating the heated seat elements, the heated seat module sends LED illumination messages to the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN) via the LIN data bus. The CCN then sends the LED illumination message to the accessory switch bank so that the appropriate LEDs are illuminated for any given heating level. Pressing the switch once will select high-level heating. Pressing the switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

If the heated seat module detects a heated seat element OPEN or SHORT circuit, it will record and store the appropriate Diagnostic Trouble Code (DTC).

DIAGNOSIS AND TESTING

HEATED SEAT MODULE

In order to obtain conclusive testing, the heated seat system and the Local Interface Network (LIN) data bus circuit must be checked. **Any diagnosis of the heated seat system should begin with, the use of a scan tool and the appropriate diagnostic service information.**

Refer to SYSTEM WIRING DIAGRAMS for complete circuit schematic or connector pin-out information.

NOTE: Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle

voltage is below 11.7v or above 15.5v. Be certain to check the vehicle electrical system for proper voltage anytime the power seat system appears inoperative.

Before any testing of the heated seat system is attempted, the battery should be fully-charged.

REMOVAL

REMOVAL

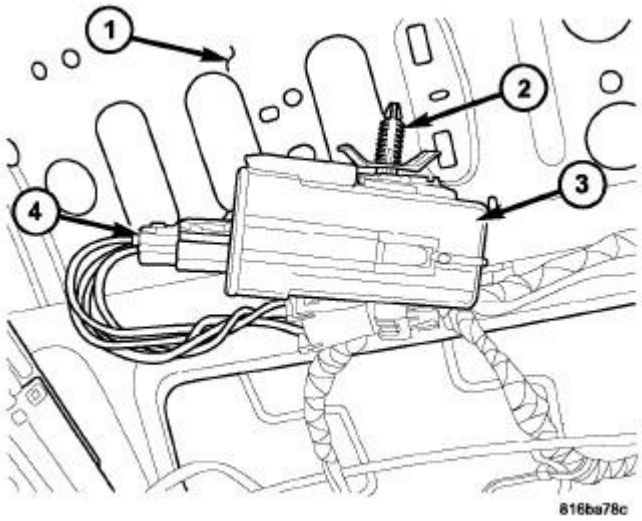

Fig. 36: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

CAUTION: The Heated Seat Module mounting tab can be damaged during module removal and installation. Use care to properly align tab to prevent binding that could result in tab breakage.

1. Position the driver front seat to the full rearward position.
2. Disconnect and isolate the battery negative cable.
3. Disconnect the wire harness connector (4) from the heated seat module (3).
4. Unsnap the heated seat module retaining tab (2) from the seat pan (1).
5. Remove the heated seat module (3) from the vehicle.

INSTALLATION

INSTALLATION

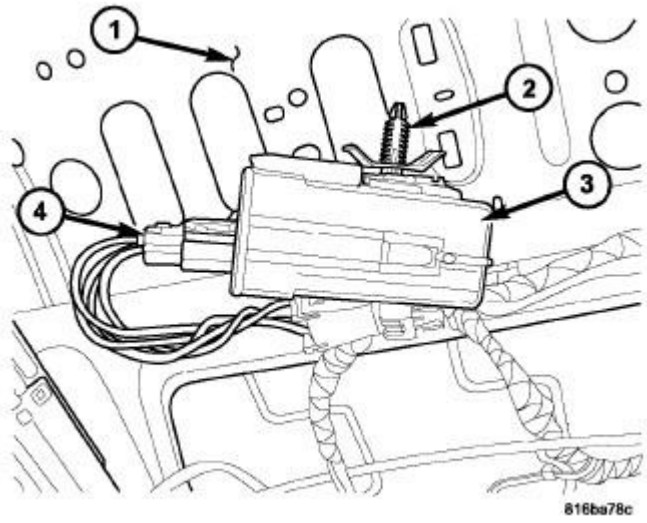

Fig. 37: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

CAUTION: The Heated Seat Module mounting tab can be damaged during module removal and installation. Use care to properly align tab to prevent binding that could result in tab breakage.

1. Install the heated seat module (3) into the vehicle.
2. Position the retaining tab (2) with the mounting hole in the seat pan (1). Firmly apply even pressure to the module (3) until the mounting tab is fully seated.
3. Connect the wire harness connector (4) to the heated seat module (3).
4. Connect the battery negative cable.
5. Check for proper heated seat system operation.

MODULE, POWERTRAIN CONTROL

DESCRIPTION

POWERTRAIN CONTROL MODULE (PCM)

The Powertrain Control Module (PCM) is a digital computer containing a microprocessor. The PCM receives input signals from various switches and sensors referred to as Powertrain Control Module Inputs. Based on these inputs, the PCM adjusts various engine and vehicle operations through devices referred to as Powertrain Control Module Outputs.

NOTE: PCM Inputs:

- Air Conditioning Pressure Transducer

- ASD/Main Relay
- Battery Voltage
- Brake Switch
- Camshaft Position Sensor
- Crankshaft Position Sensor
- Distance Sensor (from transmission control module)
- EGR Position Feedback (if equipped)
- Engine Coolant Temperature Sensor
- Heated Oxygen Sensors
- Ignition sense
- Inlet Air Temperature Sensor
- Knock Sensor
- Manifold Absolute Pressure (MAP) Sensor
- Park/Neutral (from trans range sensor)
- Power Steering Pressure Switch
- Proportional Purge Sense
- CAN C Bus
- Speed Control
- Transmission Control Relay (Switched B+)
- Transmission Pressure Switches
- Transmission Temperature Sensor
- Transmission Input Shaft Speed Sensor
- Transmission Output Shaft Speed Sensor
- Vehicle Speed

NOTE: PCM Outputs:

- Air Conditioning Clutch Relay
- Data Link Connector (CAN C Bus)
- Double Start Override
- EGR Solenoid (if equipped)
- Fuel Injectors
- Generator Field
- High Speed Fan Relay
- Ignition Coils
- Natural Vacuum Leak Detection
- Low Speed Fan Relay
- MTV Actuator

- Proportional Purge Solenoid
- SRV Valve
- Speed Control Relay
- Speed Control Vent Relay
- Speed Control Vacuum Relay
- Torque Reduction Request
- Transmission Control Relay
- Transmission Solenoids
- 5 Volt Output

Based on inputs it receives, the powertrain control module (PCM) adjusts fuel injector pulse width, idle speed, ignition timing, and canister purge operation and EGR if equipped. The PCM regulates the cooling fans, air conditioning and speed control systems. The PCM changes generator charge rate by adjusting the generator field.

The PCM adjusts injector pulse width (air-fuel ratio) based on the following inputs.

- Manifold Absolute Pressure
- Engine Speed (crankshaft position sensor)
- Battery Voltage
- Inlet Air Temperature Sensor
- Engine Coolant Temperature
- Exhaust Gas Oxygen Content (heated oxygen sensors)
- Throttle Position

The PCM adjusts engine idle speed through the idle air control motor based on the following inputs.

- Brake Switch
- Engine Coolant Temperature
- Engine Speed (crankshaft position sensor)
- Park/Neutral
- Transaxle Gear Engagement
- Throttle Position
- Vehicle Speed (from Transmission Control Module)

The PCM adjusts ignition timing based on the following inputs.

- Inlet Air Temperature
- Engine Coolant Temperature
- Engine Speed (crankshaft position sensor)
- Knock Sensor

- Manifold Absolute Pressure
- Park/Neutral (from trans range sensor)
- Transaxle Gear Engagement
- Throttle Position

The camshaft and crankshaft signals are sent to the Powertrain Control Module (PCM). If the PCM does not receive both signals within approximately one second of engine cranking, it deactivates the fuel pump. When deactivated, power is shut off to the fuel injectors, ignition coils, fuel pump and the heating element in each oxygen sensor.

The PCM contains a voltage converter that changes battery voltage to a regulated 5.0 volts. The 5.0 volts power the camshaft position sensor, and crankshaft position sensor. The PCM also provides a regulated 5.0 volts supply for the, manifold absolute pressure sensor, throttle position sensor and EGR (if equipped).

The PCM engine control strategy prevents reduced idle speeds until after the engine operates for 320 km (200 miles). If the PCM is replaced after 320 km (200 miles) of usage, update the mileage in new PCM. Use the scan tool to change the mileage in the PCM. Refer to the appropriate Powertrain Diagnostic Service Information and the scan tool. If equipped with SKREEM, must use SKREEM function to program VIN number in new PCM.

TRANSMISSION CONTROL

CVI CALCULATION

An important function of the PCM is to monitor Clutch Volume Index (CVI). CVIs represent the volume of fluid needed to compress a clutch pack.

The PCM monitors gear ratio changes by monitoring the Input and Output Speed Sensors. The Input, or Turbine Speed Sensor sends an electrical signal to the PCM that represents input shaft rpm. The Output Speed Sensor provides the PCM with output shaft speed information.

By comparing the two inputs, the PCM can determine transaxle gear ratio. This is important to the CVI calculation because the PCM determines CVIs by monitoring how long it takes for a gear change to occur .

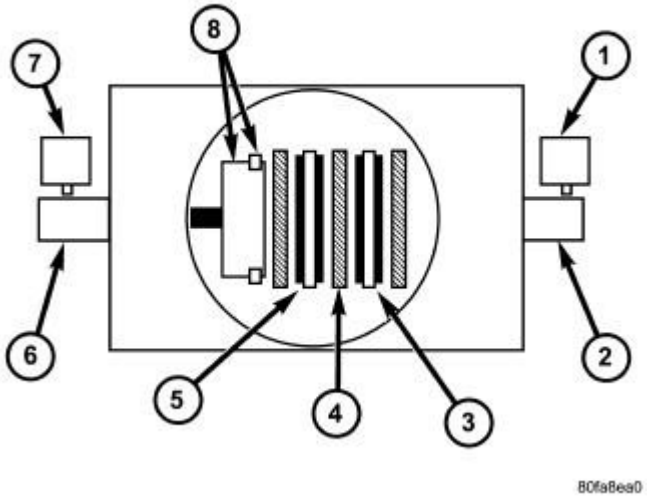

Fig. 38: Example of CVI Calculation
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR
2 - OUTPUT SHAFT
3 - CLUTCH PACK
4 - SEPARATOR PLATE
5 - FRICTION DISCS
6 - INPUT SHAFT
7 - INPUT SPEED SENSOR
8 - PISTON AND SEAL

Gear ratios can be determined by using the scan tool and reading the Input/Output Speed Sensor values in the "Monitors" display. Gear ratio can be obtained by dividing the Input Speed Sensor value by the Output Speed Sensor value.

For example, if the input shaft is rotating at 1000 rpm and the output shaft is rotating at 500 rpm, then the PCM can determine that the gear ratio is 2:1. In direct drive (3rd gear), the gear ratio changes to 1:1. The gear ratio changes as clutches are applied and released. By monitoring the length of time it takes for the gear ratio to change following a shift request, the PCM can determine the volume of fluid used to apply or release a friction element.

The volume of transmission fluid needed to apply the friction elements are continuously updated for adaptive controls. As friction material wears, the volume of fluid need to apply the element increases.

Certain mechanical problems within the clutch assemblies (broken return springs, out of position snap rings, excessive clutch pack clearance, improper assembly, etc.) can cause inadequate or out-of-range clutch volumes. Also, defective Input/Output Speed Sensors and wiring can cause these conditions. The following chart identifies the appropriate clutch volumes and when they are monitored/updated:

CLUTCH VOLUMES				
Clutch	When Updated			Proper Clutch Volume
	Shift Sequence	Oil Temperature	Throttle Angle	
L/R	2-1 or 3-1 coast downshift	>21° C (70° F)	< 5°	35 to 83
2/4	1-2 shift	> 43° C (110° F)	5 - 54°	20 to 77
OD	2-3 shift			48 to 150
UD	4-3 or 4-2 shift		> 5°	24 to 70

SHIFT SCHEDULES

The PCM has programming that allows it to select a variety of shift schedules. Shift schedule selection is dependent on the following:

- Shift lever position
- Throttle position
- Engine load
- Fluid temperature
- Software level

As driving conditions change, the PCM appropriately adjusts the shift schedule. Refer to the following chart to determine the appropriate operation expected, depending on driving conditions.

Schedule	Condition	Expected Operation	
Extreme Cold	Oil temperature at start-up below -27° C (16° F)	Park, Reverse, Neutral and 2nd gear only (prevents shifting which may fail a clutch with frequent shifts)	-
Cold	Oil temperature at start-up above -24° C (-12° F) and below 2° C (36° F)	- Delayed 2-3 upshift (approximately 35-50 kmh (22-31 mph) - Delayed 3-4 upshift 72.5-85 kmh (45-53 mph) - Early 4-3 coastdown shift (approximately 30 mph) - Early 3-2	-

		coastdown shift (approximately 27 kmh (17 mph)) - High speed 4-2, 3-2, 2-1 kickdown shifts are prevented - No EMCC	
Warm	Oil temperature at start-up above 2° C (36° F) and below 27° C (80° F)	- Normal operation (upshift, kickdowns, and coastdowns) - No EMCC	-
Hot	Oil temperature at start-up above 27° C (80° F)	- Normal operation (upshift, kickdowns, and coastdowns) - Full EMCC, no PEMCC except to engage FEMCC (except at closed throttle at speeds above 112.5-133.5 kmh (70-83 mph))	-
Overheat	Oil temperature above 115° C (240° F) or engine coolant temperature above 118° C (244° F)	- Delayed 2-3 upshift 40-51.5 kmh (25-32 mph) - Delayed 3-4 upshift 66-77 kmh (41-48 mph) - 3rd gear FEMCC from 48-77 kmh (30-48 mph) - 3rd gear PEMCC from 43.5-50 kmh (27-31 mph)	
Super Overheat	Oil temperature above 127° C (260° F)	- All "Overheat" shift schedule features apply - 2nd gear PEMCC above 35 kmh (22 mph) - Above 35 kmh (22 mph) the torque converter will not unlock unless the throttle is closed or if a wide open throttle 2nd	

		PEMCC to 1 kickdown is made	

SENSOR RETURN - PCM INPUT

The sensor return circuit provides a low electrical noise ground reference for all of the systems sensors. The sensor return circuit connects to internal ground circuits within the Powertrain Control Module (PCM).

PCM REPLACEMENT

DESCRIPTION

Use the scan tool to reprogram the new pcm with the vehicle's original identification number (vin) and the vehicle's original mileage. If this step is not done a Diagnostic Trouble Code (DTC) may be set.

PCM GROUND

Ground is provided through multiple pins of the PCM connector. Depending on the vehicle there may be as many as two different ground pins. There are power grounds and sensor grounds.

The power grounds are used to control the ground side of relays, solenoids, ignition coil or injectors. The signal ground is used for any input that uses sensor return for ground, and the ground side of any internal processing component.

The PCM case is shielded to prevent RFI and EMI. The PCM case is grounded and must be firmly attached to a good, clean body ground.

Internally all grounds are connected together, however there is noise suppression on the sensor ground. For EMI and RFI protection the housing and cover are also grounded via the mounting screws AND bracket to the chassis, separately from the ground pins.

OPERATION

OPERATION

The PCM supplies two regulated 5 volts supplies - a 5V primary and a 5V secondary (auxiliary) to the following sensors:

- Camshaft Position Sensor (5V secondary)
- Crankshaft Position Sensor (5V primary)
- EGR Position feedback sensor (5V secondary) (if equipped)
- Engine coolant temperature sensor (connected to 5V internal via a pullup resistor)
- Inlet Air Temperature Sensor (connected to 5V internal via a pullup resistor)
- Knock sensor (connected to 5V internal via a pullup resistor)
- Manifold absolute pressure sensor (5V secondary)

- Oil Pressure Switch (connected to 5V internal via pullup resistor)
- Pedal Value Sensor #1 (5V Primary)
- Pedal Value Sensor #2 (5V Secondary)
- SRV Position Feedback Sensor (5V Secondary)
- Throttle Position Sensors (5V Primary)
- Variable Line Pressure Sensor (5V Secondary)

STANDARD PROCEDURE

PCM/ECM REPROGRAMMING - GAS

Follow the instructions in order. See **Standard Procedure**.

OBTAINING DIAGNOSTIC TROUBLE CODES

BULB CHECK

Key on: Bulb illuminated until vehicle starts, as long as all once per trip (readiness) monitors completed. If monitors have **not** been completed, then: Key on: bulb check for about 5 to 8 seconds, lamp then flashes if once per trip (readiness) monitors have **not** been completed until vehicle is started, then MIL is extinguished.

OBTAINING DTC'S USING SCAN TOOL

1. Connect the scan tool to the data link (diagnostic) connector. This connector is located in the passenger compartment; at the lower edge of instrument panel; near the steering column.
2. Turn the ignition switch on and access the "Read Fault" screen.
3. Record all the DTC's and "freeze frame" information shown on the scan tool.
4. To erase DTC's, use the "Erase Trouble Code" data screen on the scan tool.**Do not erase any DTC's until problems have been investigated and repairs have been performed.**

PINION FACTOR SETTING

NOTE: This procedure must be performed if the PCM has been replaced with a NEW or replacement unit. Failure to perform this procedure will result in an inoperative or improperly calibrated speedometer.

The vehicle speed readings for the speedometer are taken from the output speed sensor. The PCM must be calibrated to the different combinations of equipment (final drive and tires) available. Pinion Factor allows the technician to set the Powertrain Control Module initial setting so that the speedometer readings will be correct. To properly read and/or reset the Pinion Factor, it is necessary to use a scan tool.

1. Plug the scan tool into the diagnostic connector located under the instrument panel.
2. Select the Transmission menu.
3. Select the Miscellaneous menu.

4. Select Pinion Factor. Then follow the instructions on the scan tool screen.

QUICK LEARN PROCEDURE

The quick learn procedure requires the use of the scan tool. This program allows the electronic transaxle system to recalibrate itself. This will provide the best possible transaxle operation.

NOTE: The quick learn procedure should be performed if any of the following procedures are performed:

- Transaxle Assembly Replacement
- Powertrain Control Module Replacement
- Solenoid/Pressure Switch Assembly Replacement
- Clutch Plate and/or Seal Replacement
- Valve Body Replacement or Recondition

To perform the Quick Learn Procedure, the following conditions must be met:

- The brakes must be applied
- The engine speed must be above 500 rpm
- The throttle angle (TPS) must be less than 3 degrees
- The shift lever position must stay until prompted to shift to overdrive
- The shift lever position must stay in overdrive after the Shift to Overdrive prompt until the scan tool indicates the procedure is complete
- The calculated oil temperature must be above 15.5° C (60° F) and below 93° C (200° F)

1. Plug the scan tool into the diagnostic connector. The connector is located under the instrument panel.
2. Go to the Transmission screen.
3. Go to the Miscellaneous screen.
4. Select Quick Learn Procedure. Follow the instructions of the scan tool to perform the Quick Learn Procedure.

REMOVAL

REMOVAL - NGC CONTROLLER

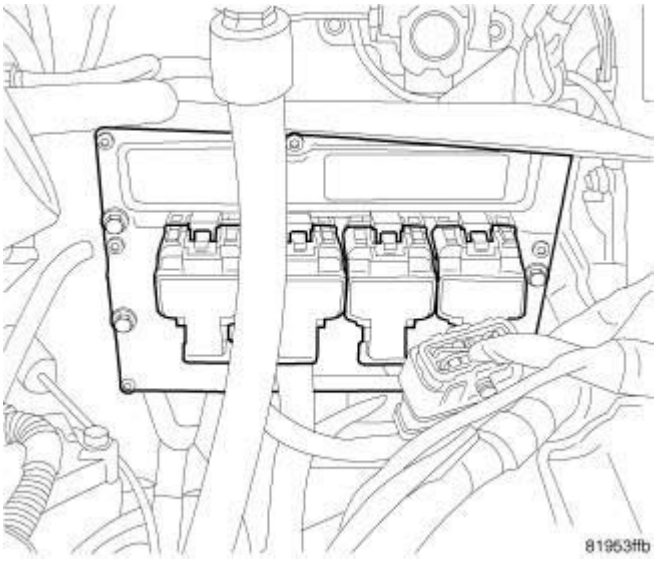

Fig. 39: Remove/Install PCM
Courtesy of CHRYSLER LLC

NOTE: USE THE SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

To avoid possible voltage spike damage to PCM, ignition key must be off, and the negative battery cable must be disconnected before unplugging the PCM connectors.

1. Disconnect and isolate the negative battery cable.
2. Unlock and disconnect the 4 electrical connectors at the PCM.

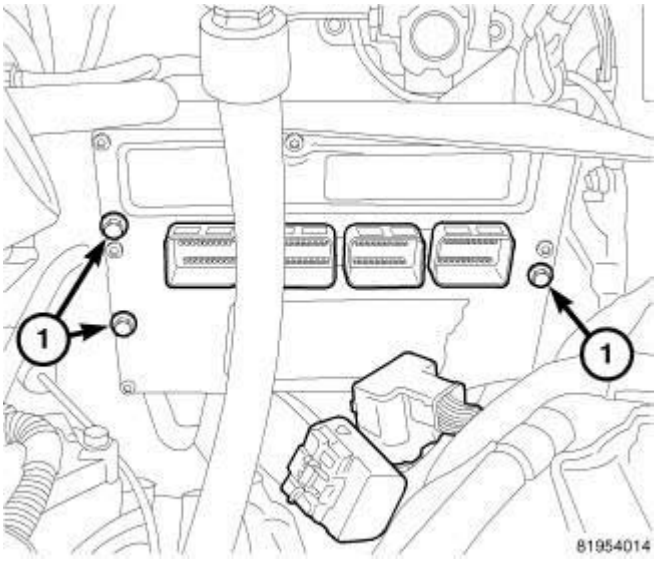

Fig. 40: Mounting Screws/Electrical Connectors

Courtesy of CHRYSLER LLC

3. Remove the 3 fasteners (1) holding the PCM to the bracket.

REMOVAL - GPEC CONTROLLER (2.4L)

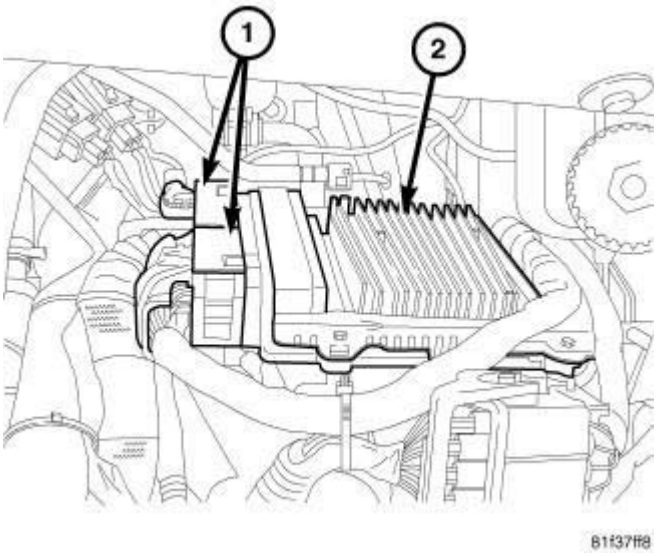

Fig. 41: GPEC Controller
Courtesy of CHRYSLER LLC

1 - Connectors
2 - PCM

NOTE: USE THE SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

To avoid possible voltage spike damage to PCM, ignition key must be off, and the negative battery cable must be disconnected before unplugging the PCM connectors.

1. Disconnect and isolate the negative battery cable.
2. Unlock and disconnect the 2 electrical connectors (1) at the PCM (2).

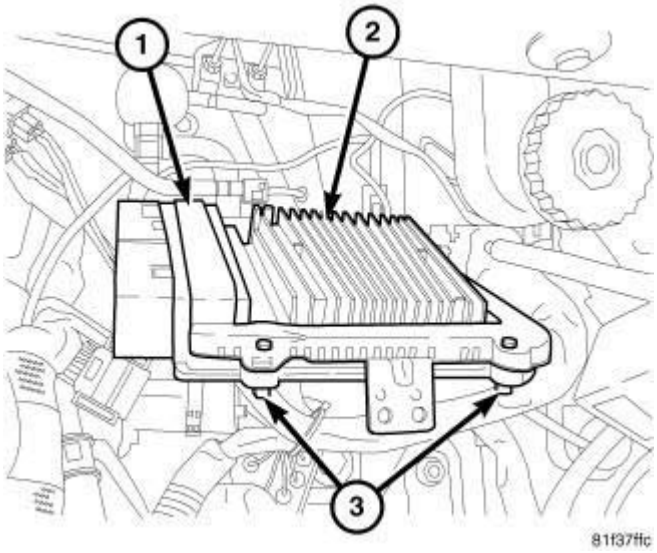

Fig. 42: GPEC Controller Mounting
Courtesy of CHRYSLER LLC

1 - Bracket
2 - PCM
3 - Bolts

3. Remove the 4 bolts (3) holding the PCM (2) to the bracket (1) and remove the PCM (2) from the vehicle.

INSTALLATION

INSTALLATION - NGC CONTROLLER

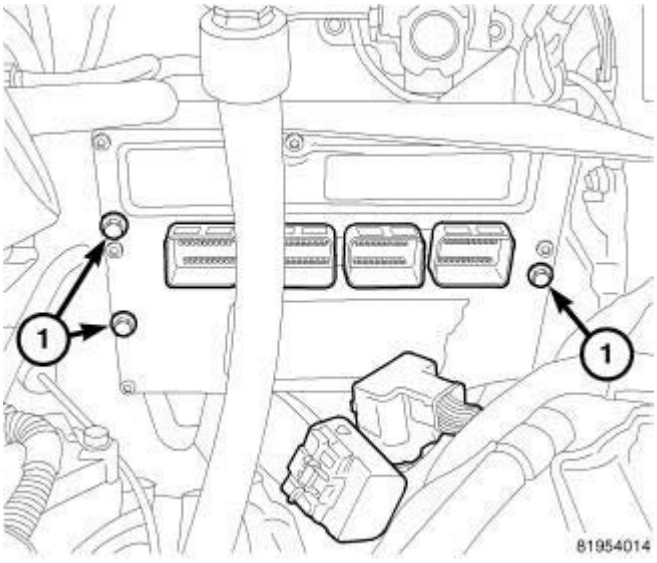

Fig. 43: Mounting Screws/Electrical Connectors
Courtesy of CHRYSLER LLC

NOTE: USE THE SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

1. Install PCM to bracket with 3 fasteners (1).

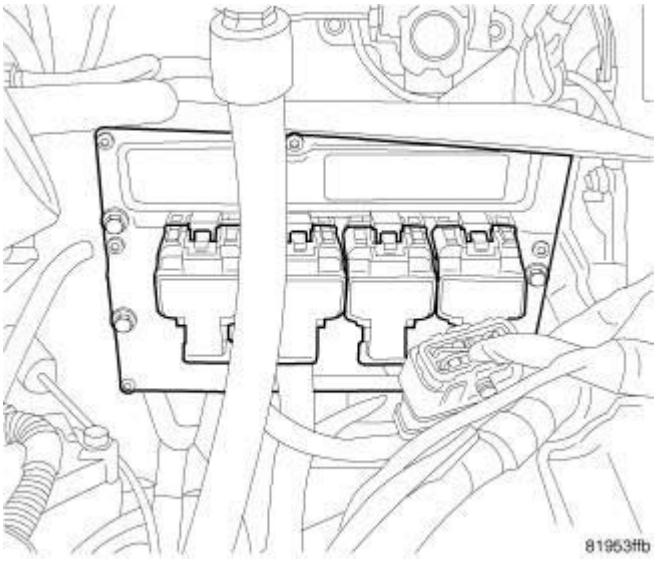

Fig. 44: Remove/Install PCM
Courtesy of CHRYSLER LLC

2. Install and lock the 4 electrical connectors to the PCM.
3. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
4. Use the scan tool to reprogram new PCM with vehicles original Identification Number (VIN) and original vehicle mileage.

INSTALLATION - GPEC CONTROLLER (2.4L)

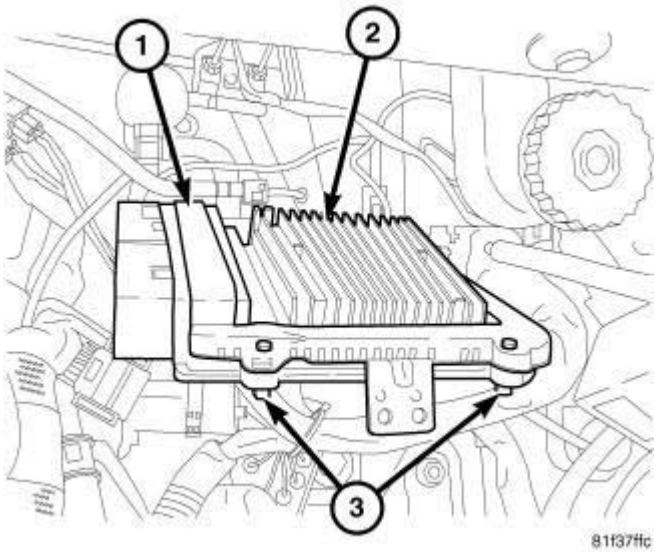

Fig. 45: GPEC Controller Mounting
Courtesy of CHRYSLER LLC

1 - Bracket 2 - PCM
3 - Bolts

NOTE: USE THE SCAN TOOL TO REPROGRAM THE NEW POWERTRAIN CONTROL MODULE (PCM) WITH THE VEHICLES ORIGINAL IDENTIFICATION NUMBER (VIN) AND THE VEHICLES ORIGINAL MILEAGE. IF THIS STEP IS NOT DONE, A DIAGNOSTIC TROUBLE CODE (DTC) MAY BE SET.

1. Install PCM (2) to bracket (1) with 4 bolts (3).

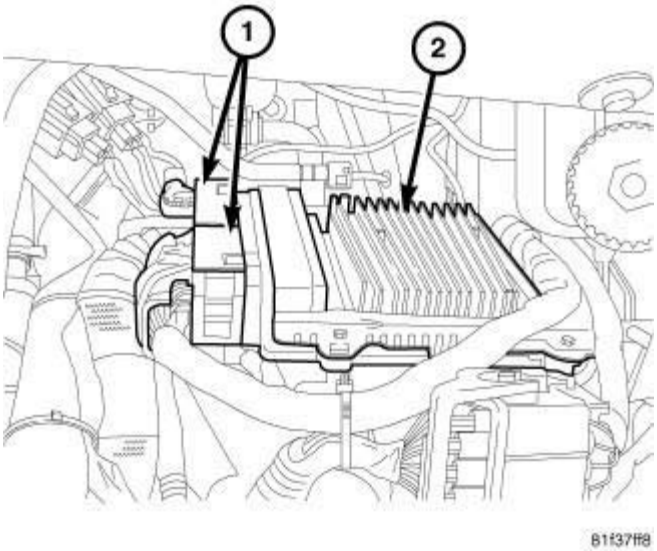

Fig. 46: GPEC Controller

Courtesy of CHRYSLER LLC

1 - Connectors 2 - PCM

2. Install and lock the 2 electrical connectors (1) to the PCM (2).
3. Connect negative battery cable, tighten nut to 5 N.m (45 in. lbs.).
4. Use the scan tool to reprogram new PCM with vehicles original Identification Number (VIN) and original vehicle mileage.

MODULE, STEERING COLUMN

DESCRIPTION

DESCRIPTION

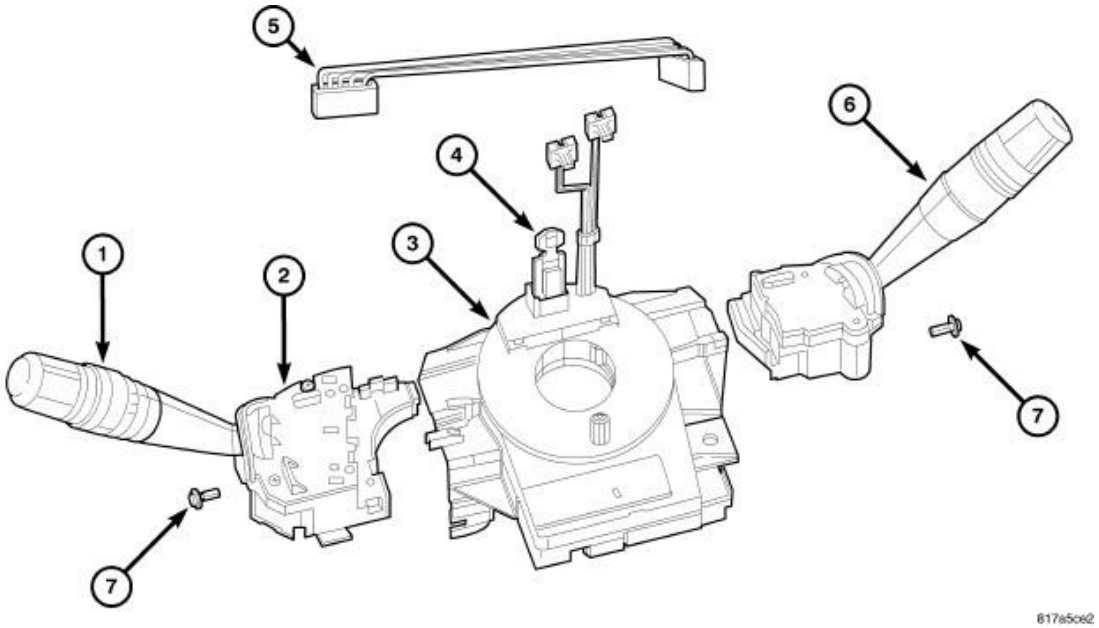

Fig. 47: Steering Control Module
Courtesy of CHRYSLER LLC

This vehicle is equipped with a Steering Control Module (SCM) that is internal to the left multi-function switch housing (2). The left (lighting) multi-function switch is located on the left side of the steering column, just below the steering wheel. This switch is the primary control for the interior and exterior lighting systems. The only visible components of the switch are the control stalk (1), control knob and control sleeve that extend through the steering column shrouds on the left side of the column. The remainder of the switch including its mounting provisions and electrical connections are concealed beneath the shrouds.

The switch housing and controls are constructed of molded black plastic. A single screw (7) through a mounting tab integral to the back of the switch housing, and a slide tab integral to the bottom of the switch housing secure

the switch to the mounting bracket integral to the clockspring (3). A connector receptacle containing seven terminal pins is integral to the inboard end of the switch housing and connects the SCM through a jumper wire harness (5) directly to the right (wiper) multi-function switch (6). A second connector receptacle containing four terminal pins is integral to the back of the switch housing and connects the SCM to the vehicle electrical system through a dedicated takeout and connector of the instrument panel wire harness.

The SCM cannot be adjusted or repaired. If ineffective or damaged the entire left multi-function switch must be replaced. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Multifunction - Removal** . The clockspring (with the multi-function switch mounting bracket), the left multi-function switch (with the SCM), the right multi-function switch and the jumper wire harness are each available for separate service replacement.

OPERATION

OPERATION

The Steering Control Module (SCM) communicates over the Local Interconnect Network (LIN) data bus with other electronic modules in the vehicle and/or a diagnostic scan tool. The horn switch circuits pass through the clockspring to the Cab Compartment Node (CCN) and the CCN sends a CAN message to the Totally Integrated Power Module (TIPM) to control the horn. The CCN stores Diagnostic Trouble Codes (DTC's) for the SCM. The right (wiper) multi-function switch has several inputs to the CCN.

The SCM is connected to a fused B(+) circuit and receives a path to ground at all times. These connections allow it to remain functional regardless of the ignition switch position. The driver airbag squib circuits of the clockspring, the horn, and the speed control switch circuits pass through the SCM, but the SCM does not monitor, and has no control outputs related to these circuits. Any other input to the SCM that would cause a vehicle system to function but does not require that the ignition switch be in the On position, such as turning on the lights or sounding the horn, prompts the SCM to wake up and transmit on the CAN data bus.

The most reliable, efficient, and accurate means to diagnose the SCM, the CAN data bus, the hard wired inputs or the electronic communication related to SCM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

The integral SCM is not available for separate service replacement. If found inoperative or defective, the entire left (lighting) multi-function switch must be replaced. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Multifunction - Removal** .

DIAGNOSIS AND TESTING

STEERING CONTROL MODULE

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service.

This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard wired circuits between components related to the Steering Control Module (SCM) may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SCM or the electronic controls or communication between modules and other devices that provide some features of the SCM. The most reliable, efficient, and accurate means to diagnose the SCM or the electronic controls and communication related to SCM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

RECEIVER, WIRELESS IGNITION NODE

DESCRIPTION

DESCRIPTION

This vehicle is equipped with a Wireless Ignition Node (WIN) (1). The WIN and the FOB with Integrated Key (FOBIK) are the primary components of the keyless ignition system. The only visible component of the WIN is the ignition switch (5) located on the face of the instrument panel just to the inboard side of the steering column.

The WIN housing is constructed of molded black plastic and it includes four integral mounting bosses (4), which are secured to the instrument panel structure with screws. Two connector receptacles are integral to the back of the switch housing. One (3) connects the WIN to the vehicle electrical system through a dedicated takeout and connector of the instrument panel wire harness. The other (2) is a dedicated connector for the coaxial cable input from the optional remote start system external antenna module.

The WIN is an integrated electronic receiver that replaces the ignition switch. It communicates with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus.

The WIN interfaces with the Remote Keyless Entry (RKE) FOBIK and the Tire Pressure Monitor (TPM) sensors (if equipped) using Radio Frequency (RF) communication, with the Sentry Key Immobilizer System (SKIS) transponder within the FOBIK using Low Frequency (LF) communication. It also communicates with the TPM trigger transponders (if equipped) and steering column lock module (if equipped) using a Local Interface Network (LIN) data bus connection.

The WIN provides a switched 12-volt source through an isolated switch for the steering column lock module required for certain export market vehicles. It also contains a key removal inhibit solenoid, an electronic Brake Transmission Shift Interlock (BTSI) solenoid, a key-in warning contact and it serves as the real time vehicle clock by transmitting the clock information to other electronic modules over the CAN data bus.

The WIN cannot be adjusted or repaired, but is flash update capable. If ineffective or damaged, the entire WIN must be replaced. When replacing the WIN, you must also replace the steering column lock module (if

equipped).

OPERATION

OPERATION

Following are brief descriptions of the systems that the WIN controls.

IGNITION SWITCH

The Wireless Ignition Node (WIN) incorporates an integral ignition switch that consists of four rotary positions with three detent positions and one spring-loaded position. The one extreme clockwise position is a spring-loaded momentary contact **"START"** position. When released from the **"START"** position, the switch will automatically return to the detent **"ON"** position. The other position includes a detent **"ACCESSORY"** position and a detent **"LOCK"** position.

The WIN reads the position of the ignition switch and transmits the data via the CAN data bus. These positions include **"LOCK"** with ignition key-out, **"LOCK"** with ignition key-in, **"ACCESSORY," "RUN,"** and **"START."**

SENTRY KEY IMMOBILIZER SYSTEM (SKIS)

Upon failure of proper Sentry Key Immobilizer (SKIS) communication to the Powertrain Control Module, (PCM), the PCM will not allow the vehicle to crank. The engine will not re-crank on the key cycle that the failure occurred, a full key down sequence must be performed for the engine to crank again. Refer to **Electrical - Vehicle Theft Security/Vehicle Theft Security - Operation** .

REMOTE KEYLESS ENTRY (RKE)

The Remote Keyless Entry (RKE), transmitter uses Radio Frequency (RF) signals to communicate with the WIN, and the WIN relays the RKE requests to other modules in the vehicle over the CAN data bus. Refer to **Electrical - Power Systems/Power Locks - Operation**

TIRE PRESSURE MONITORING (TPM)

The Tire Pressure Monitoring (TPM) system uses radio and sensor technology to monitor tire air pressure levels. Refer to **Tires and Wheels/Tire Pressure Monitoring - Operation** .

REMOTE START WITH/EXTENDED RANGE ANTENNA

Further information concerning the Remote Start System can be located in , Starting System. Refer to **Electrical - Engine Systems/Starting - Operation**

BRAKE TRANSMISSION SHIFTER INTERLOCK (BTSI)

The Brake Transmission Shifter/Ignition Interlock (BTSI) is controlled by the WIN. The BTSI prevents the transmission gear shifter from being moved out of PARK without a driver in place.

PARK SHIFT INTERLOCK

The key removal inhibit solenoid internal to the WIN prevents the FOB with Integrated KEY (FOBIK) from being rotated in the ignition switch to the LOCK position for all vehicles with an automatic transmission unless the transmission shift lever is in the PARK position. The WIN module monitors a hard wired input from a switch integral to the automatic transmission shifter module to control this feature. The key removal inhibit solenoid is electronically disabled internally by the WIN on vehicles with a manual transmission.

DIAGNOSIS AND TESTING

FOBIK TRAPPED IN WIN

For more information. Refer to **Electrical/Power Locks/TRANSMITTER, Integrated Key FOB - Diagnosis and Testing** .

REMOVAL

REMOVAL

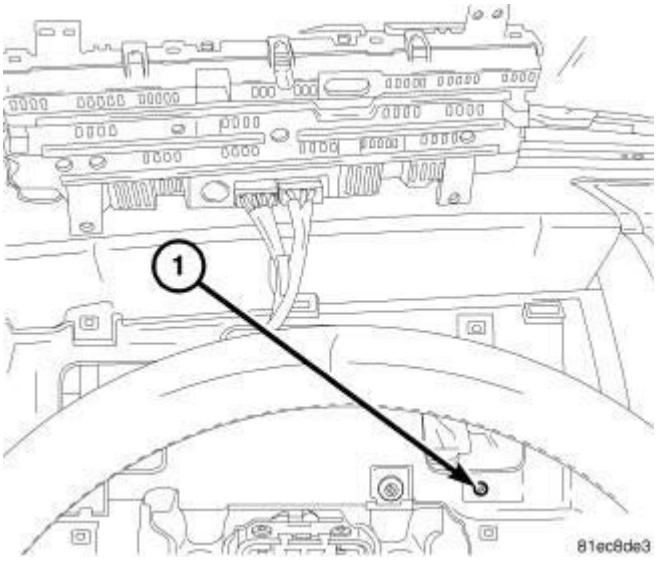

Fig. 48: Lower Instrument Panel Knee Blocker
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the lower instrument panel knee blocker. Refer to **Body/Instrument Panel/KNEEBLOCKER - Removal** .
3. Remove upper steering column shroud. Refer to **Steering/Column/SHROUD, Steering Column - Removal** .
4. Remove the instrument cluster bezel, reposition the instrument, and remove the upper WIN bracket attaching screw (1). Refer to **Electrical - Instrument Cluster/Instrument Cluster - Removal** .

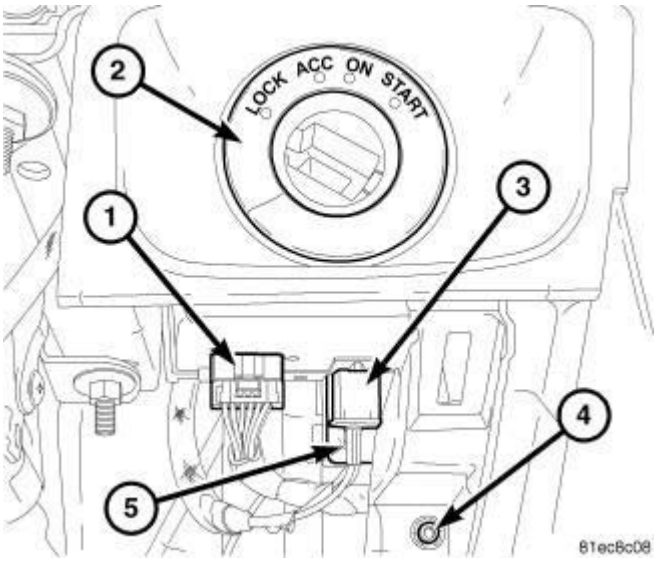

Fig. 49: WIN Electrical Connector And Antenna Connector
Courtesy of CHRYSLER LLC

5. Disconnect the WIN electrical connector (1) and the antenna connector (3) from the WIN.
6. Utilize a trim stick or equivalent and gently pry WIN trim ring (2) away from the instrument panel.
7. Remove the lower WIN attaching screw (5).
8. Remove the lower WIN bracket attaching screw (4).

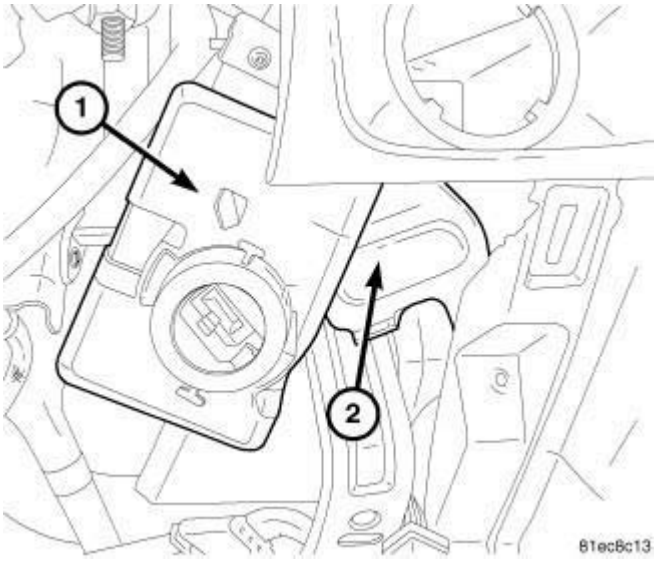

Fig. 50: Bracket-Wireless Ignition Node
Courtesy of CHRYSLER LLC

9. Rotate the WIN (1) and (2) bracket to assist in removal from the instrument panel.
10. Remove the WIN from the instrument panel opening.

INSTALLATION

INSTALLATION

NOTE: The WIN initialization procedure is required whenever the WIN or shaft lock module is replaced on vehicles equipped with the shaft lock module. Refer to Electrical - Vehicle Theft Security/Vehicle Theft Security - Standard Procedure .

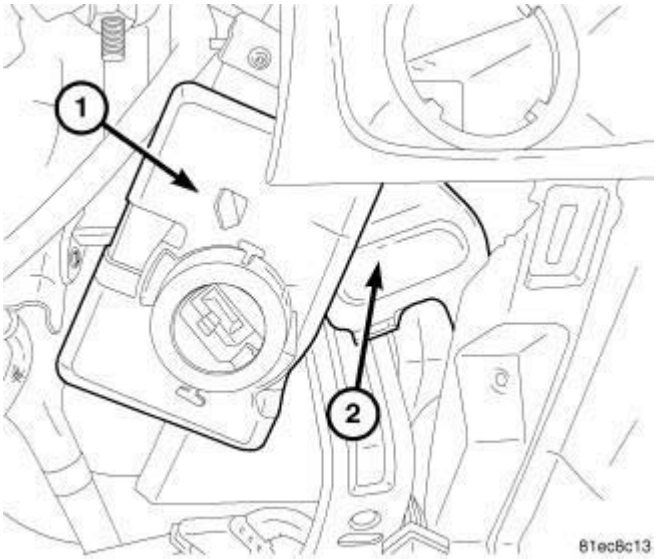

Fig. 51: Bracket-Wireless Ignition Node
Courtesy of CHRYSLER LLC

1. Rotate and position the WIN (1) and bracket (2) into the to instrument panel opening.

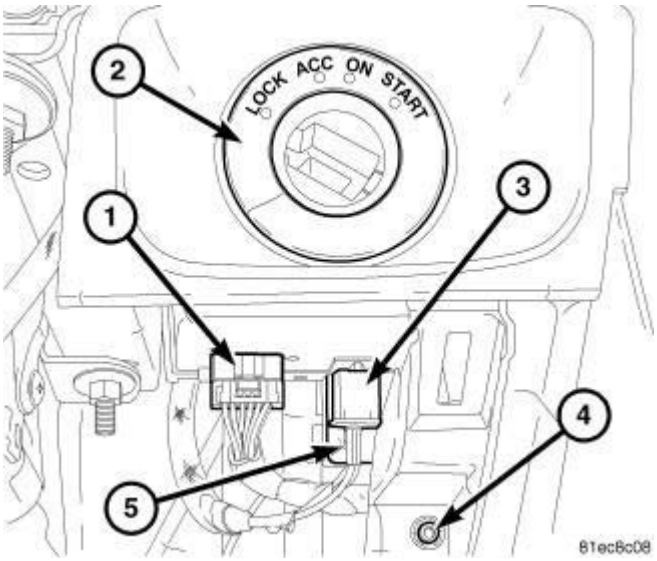

Fig. 52: WIN Electrical Connector And Antenna Connector
Courtesy of CHRYSLER LLC

2. Install the lower WIN bracket attaching screw (4).

3. Install the lower WIN attaching screw (5).
4. Connect the WIN electrical connector (1) and antenna connector (3) to the WIN.
5. Install the WIN trim ring (2).

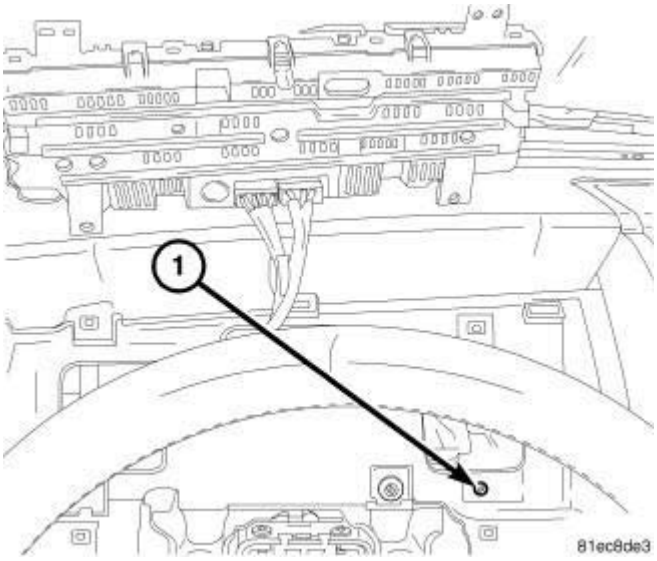

Fig. 53: Lower Instrument Panel Knee Blocker
Courtesy of CHRYSLER LLC

6. Install the upper WIN bracket attaching screw (1) and reposition the instrument cluster into the instrument panel and install the instrument cluster bezel. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Installation** .
7. Install upper steering column shroud. Refer to **Steering/Column/SHROUD, Steering Column - Installation** .
8. Install knee blocker. Refer to **Body/Instrument Panel/KNEEBLOCKER - Installation** .
9. Connect negative battery cable.
10. If necessary, program the WIN. See **Standard Procedure** .

2009 DRIVELINE/AXLES

Differential and Driveline - Journey

HALF SHAFT, FRONT

DESCRIPTION

DESCRIPTION

This vehicle is equipped with either an equal length halfshaft system, consisting of short halfshafts on both sides with an intermediate drive shaft on the right side, or an unequal length halfshaft system consisting of short left and long right halfshafts. The halfshafts consist of a fixed constant velocity (CV) joint at the outboard end connected by a solid shaft to a plunging CV joint on the inboard end. The inner (CV) joint has a splined connection into the transmission, or onto the intermediate drive shaft, and is retained with a snap ring. The outer joint has a spline connection to the wheel hub and is retained with a steel lock nut.

All the halfshaft assemblies use the same type of inner and outer joints. The inner joint is a tripod joint that allows for the changes in halfshaft length through the jounce and rebound travel of the front suspension. The outer joint is a Rzeppa joint that allows articulation during front suspension travel and steering. Both tripod joints and Rzeppa joints are true constant velocity (CV) joint assemblies.

The inner tripod joints are designed with a retention feature that prevents the tripod rollers from coming out of the inner joint housing up to a specific load. If this feature is overcome and any of the rollers are pulled past the retention feature the joint will "lock-up" and no longer function properly. The entire halfshaft assembly must be replaced if this occurs.

DIAGNOSIS AND TESTING

HALFSHAFT

VEHICLE INSPECTION

1. Check for grease in the vicinity of the inboard tripod joint and outboard CV joint; this is a sign of inner or outer joint seal boot or seal boot clamp damage.

NOISE OR VIBRATION IN TURNS

A clicking noise or a vibration in turns could be caused by one of the following conditions:

- Damaged outer CV or inner tripod joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.
- Noise may also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

- A torn seal boot on the inner or outer joint of the half shaft assembly.
- A loose or missing clamp on the inner or outer joint of the half shaft assembly.
- A damaged or worn half shaft CV joint.

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

- A worn or damaged half shaft inner tripod joint.
- A sticking tripod joint spider assembly (inner tripod joint only).
- Improper wheel alignment. Refer to **Front Suspension/Wheel Alignment - Standard Procedure**

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels. Refer to **Tires and Wheels - Standard Procedure**
- Improper tire or wheel runout. Refer to **Tires and Wheels - Diagnosis and Testing**

REMOVAL

WITHOUT INTERMEDIATE SHAFT

NOTE: Never grasp the halfshaft assembly by the inner or outer boots doing so may damage to the boot.

NOTE: The inner tripod joints are designed with a retention feature that prevents the tripod rollers from coming out of the inner joint housing up to a specific load. If this feature is overcome and any of the rollers are pulled past the retention feature the joint will "lock-up" and no longer function properly. The entire halfshaft assembly must be replaced if this occurs.

NOTE: Some halfshafts use a tuned rubber damper weight. When replacing a halfshaft assembly, be sure the replacement halfshaft has a damper weight.

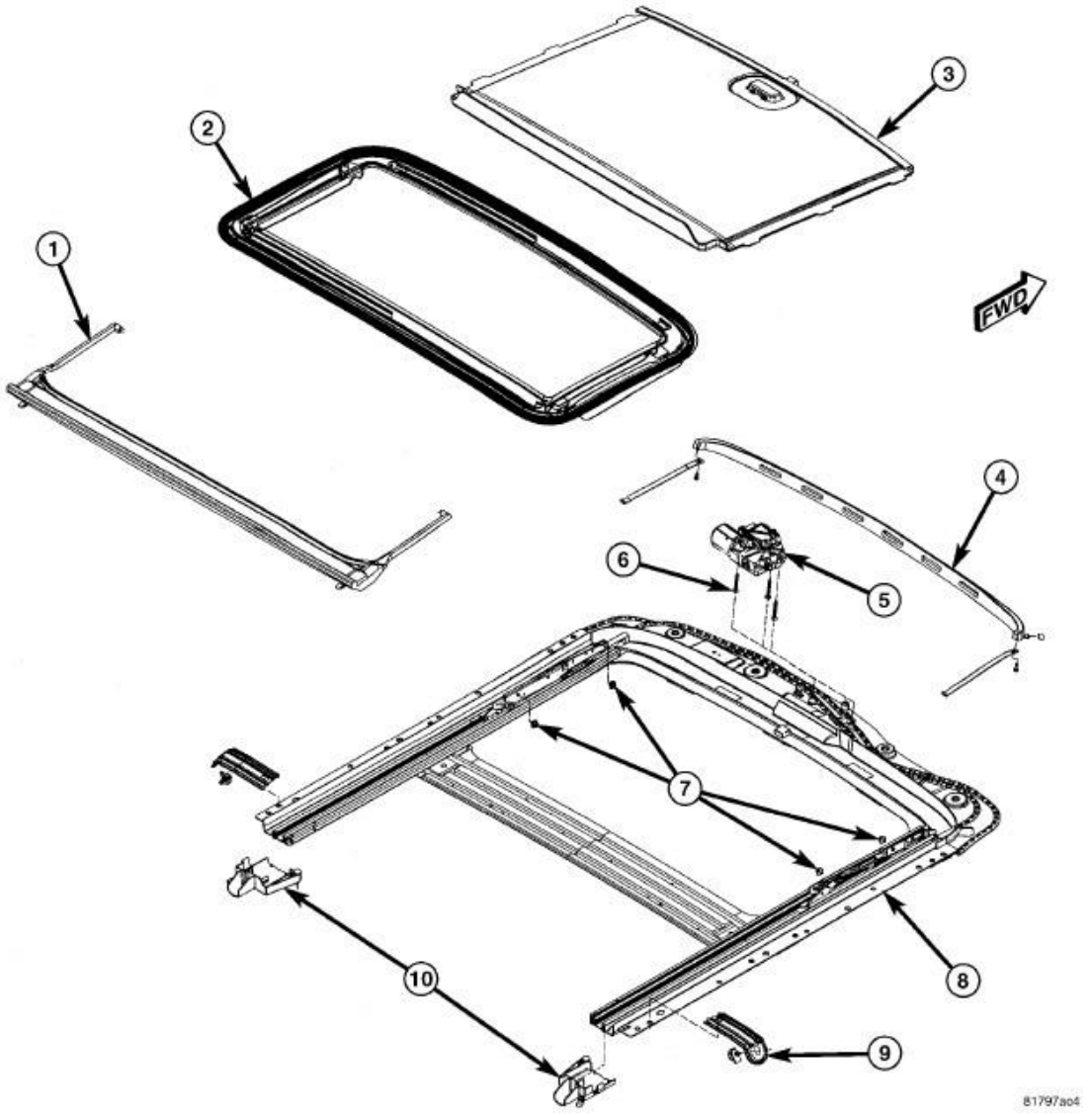

Fig. 1: Removing/Installing Halfshaft Nut
Courtesy of CHRYSLER LLC

1. Raise vehicle.
2. Remove the wheel and tire assembly from the vehicle. Refer to **Tires and Wheels - Removal**
3. Apply the service brakes to keep hub from turning, then loosen the halfshaft nut (2).

NOTE: Do not re-use the hub nut. The hub nut is a single-use type. A new hub nut is required for reassembly.

4. Remove the nut (2) from the halfshaft (1) and discard it.

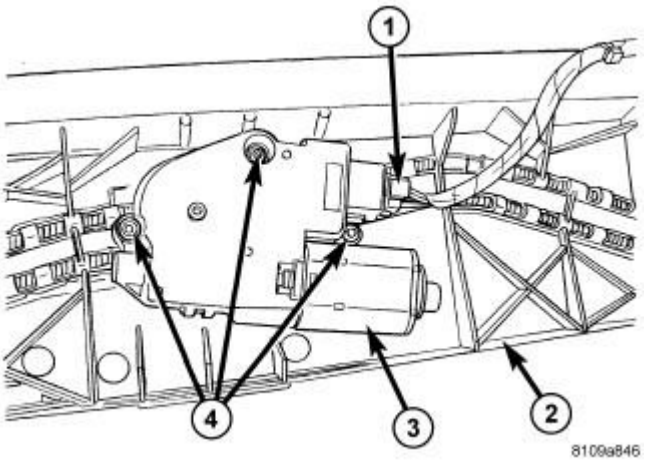

Fig. 2: Front Brake Mounting
Courtesy of CHRYSLER LLC

5. Remove the two bolts (4) that secure the front disc brake caliper (5) and adapter (6) to the steering knuckle (3).

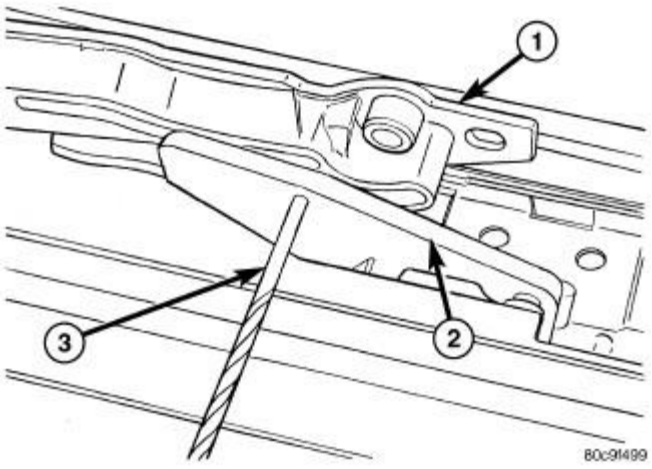

Fig. 3: Properly Supported Disc Brake Caliper - Typical
Courtesy of CHRYSLER LLC

6. Remove the disc brake caliper assembly (3) from the steering knuckle (1). Caliper assembly is removed by first rotating top of caliper assembly away from steering knuckle and then removing bottom of assembly out from under machined abutment on steering knuckle.

NOTE: Do not allow the brake caliper assembly to hang by the brake flex hose (2).

7. Support disc brake caliper assembly by using a wire hanger (4) and suspend it from the strut assembly (5).

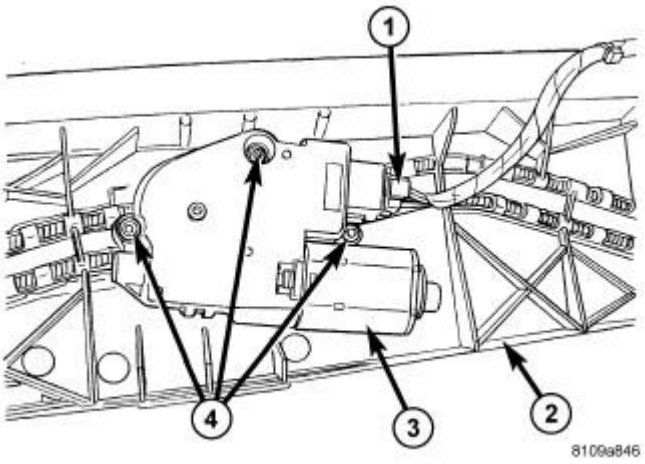

Fig. 4: Strut To Steering Knuckle Attaching Bolts
Courtesy of CHRYSLER LLC

8. Remove the brake rotor from the hub and bearing assembly.
9. Remove the steering knuckle-to-strut attachment bolts (2) from the steering knuckle (3).
10. Pull the steering knuckle from the strut clevis bracket (1).

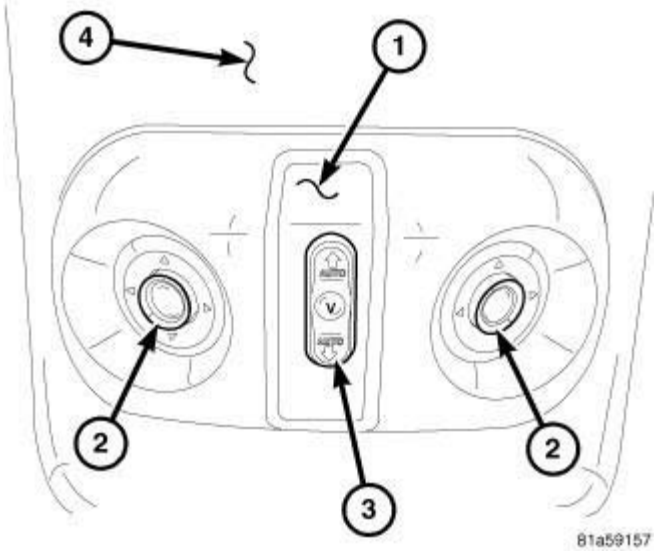

Fig. 5: Outer C/V Joint On Interconnecting Shaft
Courtesy of CHRYSLER LLC

NOTE: Due to tight tolerances, the outer C/V joint might have to be forced apart from the bearing hub. To avoid damaging the axle half shaft threads during removal, install the hub nut (4) so that approximately half the threads are engaged on the shaft, and use a soft faced hammer (1) to tap the shaft (2) out of the hub.

NOTE: Care must be taken not to separate the inner C/V joint during this operation. Do not allow halfshaft to hang by inner C/V joint after removing outer C/V Joint from the hub/bearing assembly in steering knuckle, end of halfshaft must be supported.

11. Pull steering knuckle assembly down and away from the outer C/V joint of the half shaft assembly while pulling the joint out of the hub bearing.

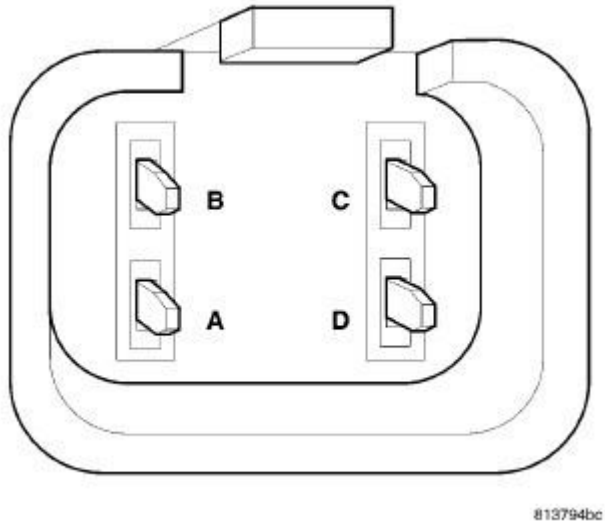

Fig. 6: Disengaging Inner Tripod Joint From Transaxle
Courtesy of CHRYSLER LLC

NOTE: Transaxle fluid might leak when the half shaft is removed from the transaxle.

12. If equipped, remove the engine belly pan.
13. Support the outer end of the halfshaft assembly. Insert a pry bar (3) between inner tripod joint (1) and transaxle case (2). Pry against inner tripod joint, until tripod joint retaining snap-ring is disengaged from transaxle side gear.

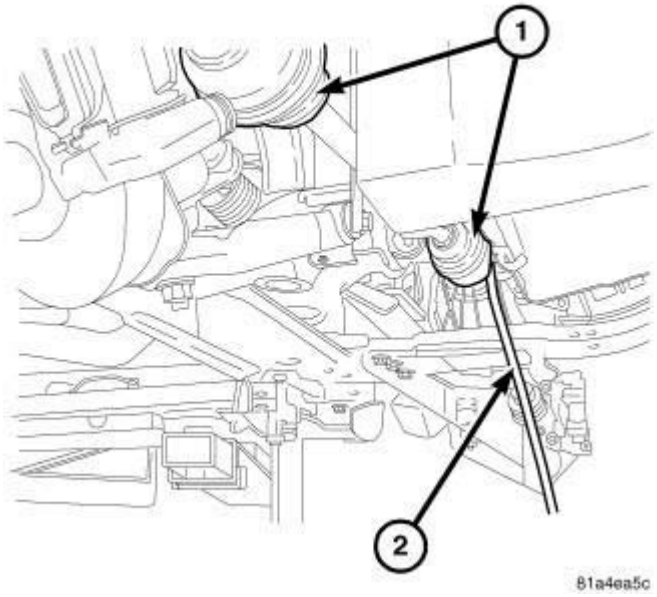

Fig. 7: View Of Manual Right Side Axle - 2.0L Gas
Courtesy of CHRYSLER LLC

14. Pull the steering knuckle assembly down and away from the outer C/V joint of the half shaft assembly while pulling the halfshaft (1) out of the transmission.
15. Remove the half shaft.

WITH INTERMEDIATE SHAFT

NOTE: Never grasp the halfshaft assembly by the inner or outer boots. This can cause damage to the boot, which will allow contaminants to enter the C/V joint.

NOTE: The inner tripod joints are designed with a retention feature that prevents the tripod rollers from coming out of the inner joint housing up to a specific load. If this feature is overcome and any of the rollers are pulled past the retention feature the joint will "lock-up" and no longer function properly. The entire halfshaft assembly must be replaced if this occurs.

NOTE: Some halfshafts use a tuned rubber damper weight to cancel vibration. When replacing a halfshaft assembly, be sure the replacement halfshaft has a damper.

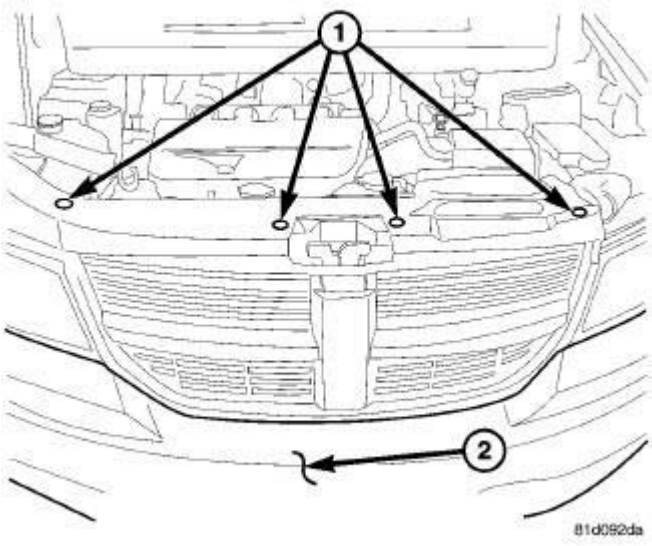

Fig. 8: Removing/Installing Halfshaft Nut
Courtesy of CHRYSLER LLC

1. Raise vehicle.
2. Remove the wheel and tire assembly from the vehicle. Refer to **Tires and Wheels - Removal**
3. Apply the service brakes to keep hub from turning, then loosen the halfshaft nut (2).

NOTE: Do not re-use the hub nut. The hub nut is a single-use type. A new hub nut is required for reassembly.

4. Remove the nut (2) from the halfshaft (1) and discard it.

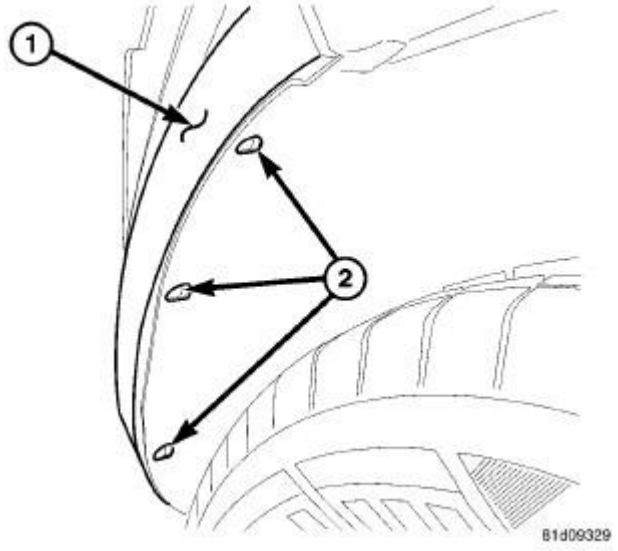

Fig. 9: Front Brake Mounting
Courtesy of CHRYSLER LLC

5. Remove the two bolts (4) that secure the front disc brake caliper (5) and adapter (6) to the steering knuckle (3).

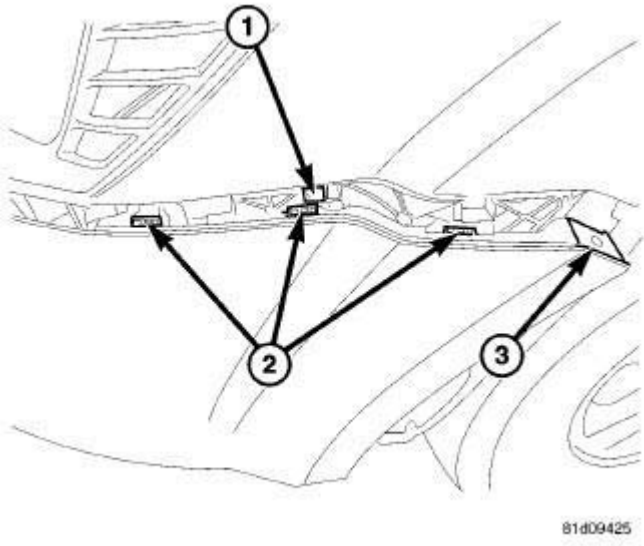

Fig. 10: Properly Supported Disc Brake Caliper - Typical
Courtesy of CHRYSLER LLC

6. Remove the disc brake caliper assembly (3) from the steering knuckle (1). Caliper assembly is removed by first rotating top of caliper assembly away from steering knuckle and then removing bottom of assembly out from under machined abutment on steering knuckle.

NOTE: Do not allow the brake caliper assembly to hang by the brake flex hose (2).

7. Support disc brake caliper assembly by using a wire hanger (4) and suspend it from the strut assembly (5).

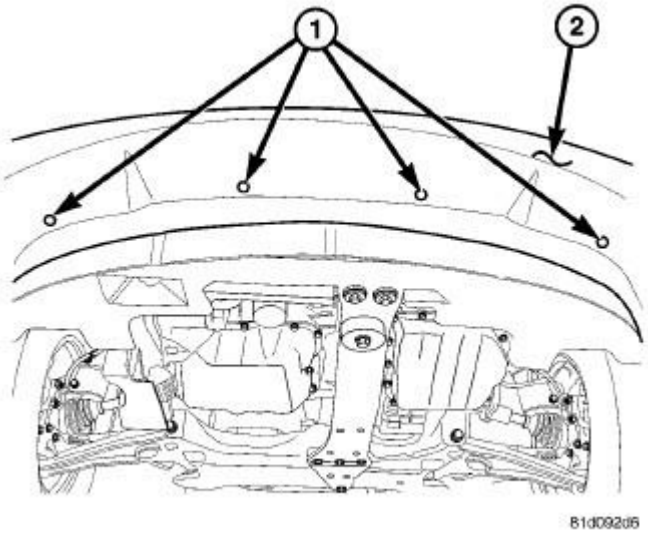

Fig. 11: Strut To Steering Knuckle Attaching Bolts
Courtesy of CHRYSLER LLC

8. Remove the brake rotor from the hub and bearing assembly.
9. Remove the steering knuckle-to-strut attachment bolts (2) from the steering knuckle (3).
10. Pull the steering knuckle from the strut clevis bracket (1).

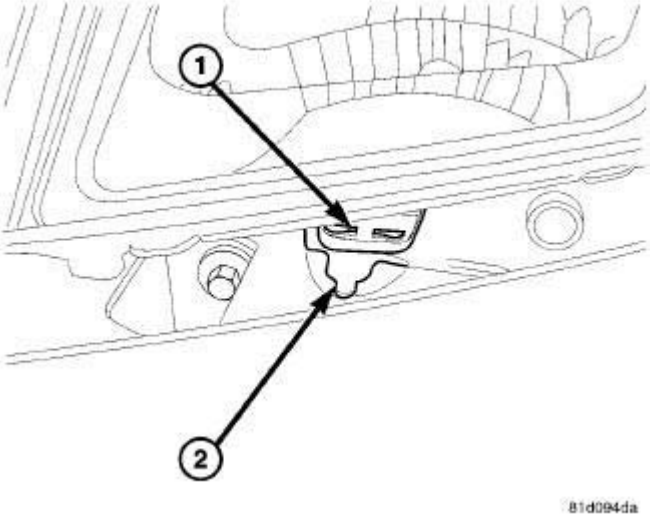

Fig. 12: Outer C/V Joint On Interconnecting Shaft
Courtesy of CHRYSLER LLC

NOTE: Due to tight tolerances, the outer C/V joint might have to be forced apart from the bearing hub. To avoid damaging the axle half shaft threads

during removal, install the hub nut (4) so that approximately half the threads are engaged on the shaft, and use a soft faced hammer (1) to tap the shaft (2) out of the hub.

NOTE: Care must be taken not to separate the inner C/V joint during this operation. Do not allow halfshaft to hang by inner C/V joint after removing outer C/V Joint from the hub/bearing assembly in steering knuckle, end of halfshaft must be supported.

11. Pull steering knuckle assembly down and away from the outer C/V joint of the half shaft assembly while pulling the joint out of the hub bearing.

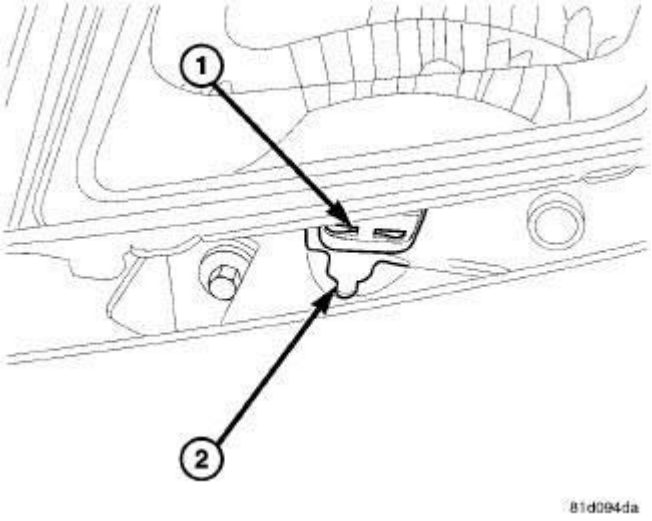

Fig. 13: Right Halfshaft From Intermediate Shaft
Courtesy of CHRYSLER LLC

NOTE: Transaxle fluid might leak when the half shaft is removed from the transaxle.

12. If equipped, remove the engine belly pan.
13. Support the outer end of the halfshaft assembly. Insert a pry bar (2) between inner tripod joint (1) and the intermediate shaft (3), or the transaxle case if removing the left half shaft. Pry against inner tripod joint, until tripod joint retaining snap-ring is disengaged from the intermediate shaft or transaxle side gear.

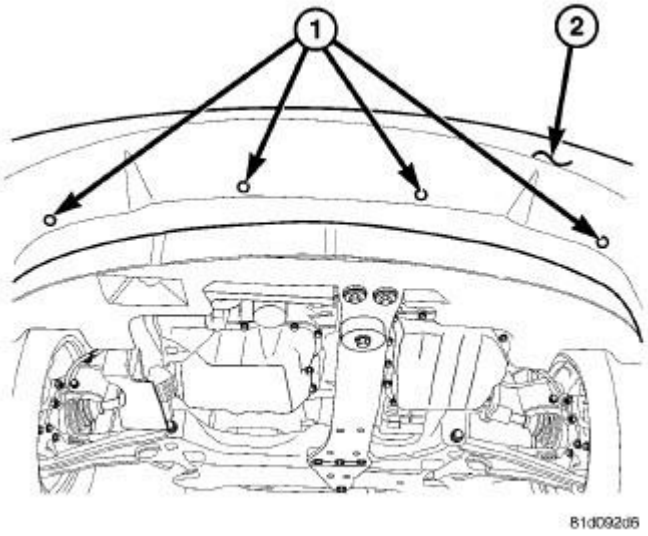

Fig. 14: Outer C/V Joint Of Half Shaft Assembly
Courtesy of CHRYSLER LLC

NOTE: 3.5L Shown in illustration, all others equipped with an intermediate shaft are similar.

14. Pull the steering knuckle assembly down and away from the outer C/V joint of the half shaft assembly while pulling the halfshaft (1 or 2) out of the transmission.
15. Remove the half shaft.

INSTALLATION

WITHOUT INTERMEDIATE SHAFT

NOTE: The inner tripod joints are designed with a retention feature that prevents the tripod rollers from coming out of the inner joint housing up to a specific load. If this feature is overcome and any of the rollers are pulled past the retention feature the joint will "lock-up" and no longer function properly. The entire halfshaft assembly must be replaced if this occurs.

NOTE: Some halfshafts use a tuned rubber damper weight. When replacing a halfshaft assembly, be sure the replacement halfshaft has the same damper weight as the original.

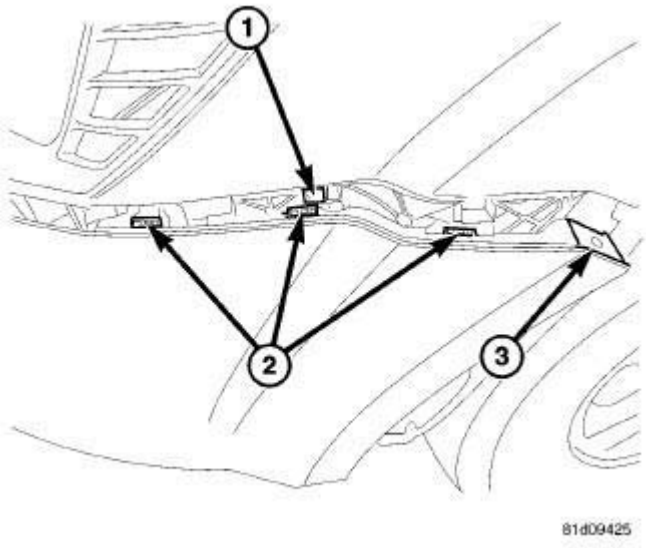

Fig. 15: View Of Manual Right Side Axle - 2.0L Gas
Courtesy of CHRYSLER LLC

1. Thoroughly clean spline and oil seal sealing surface on tripod joint. Lightly lubricate oil seal sealing surface on tripod joint with fresh clean transmission lubricant.
2. Holding halfshaft assembly (1) by tripod joint and interconnecting shaft, install tripod joint into transaxle side gear as far as possible by hand. Be sure to engage splines prior to applying force.

NOTE: Attempt to remove tripod joint by hand to verify that the snap ring is fully engaged. If snap ring is fully engaged, tripod joint will not be removable from transmission by hand.

3. Forcefully push the tripod joint into the transaxle side gear, until snap-ring is fully engaged.

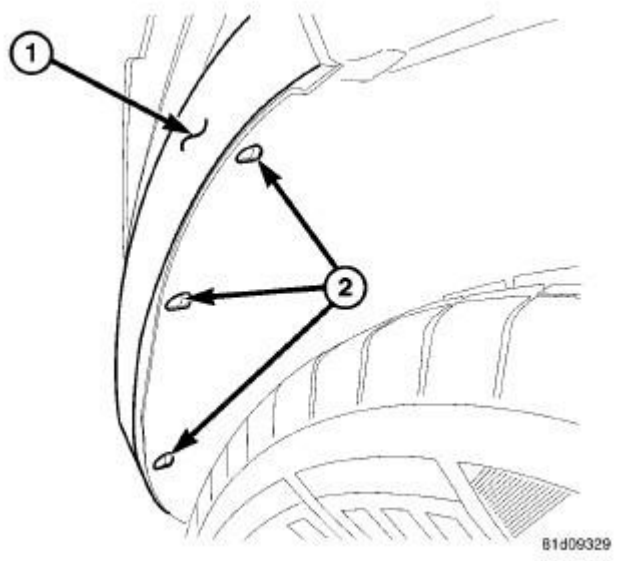

Fig. 16: Outer CV Joint Inspection
Courtesy of CHRYSLER LLC

4. Clean all debris and moisture out of steering knuckle, in the area were outer CV joint (1) will be installed into steering knuckle.
5. Ensure that front of outer CV joint (2) which fits against the face of the hub and bearing is free of debris and moisture before installing outer CV joint into hub and bearing assembly.

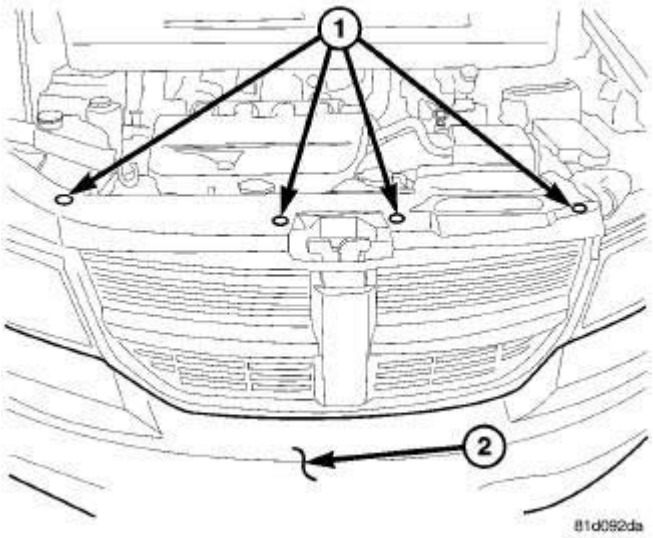

Fig. 17: Correctly Installed Eccentric Attaching Bolt
Courtesy of CHRYSLER LLC

6. Slide half shaft back into front hub and bearing assembly.

CAUTION: The steering knuckle to strut assembly attaching bolts are serrated and must not be turned during installation. Install nuts while holding bolts stationary in the steering knuckle.

CAUTION: If the vehicle being serviced is equipped with eccentric strut assembly attaching bolts, the eccentric bolt must be installed in the bottom (slotted) hole on the strut clevis bracket.

7. Install steering knuckle (1) into clevis bracket (4). Install the strut damper to steering knuckle attaching bolts (3 and 3). Tighten both bolts to 88 N.m (65 ft. lbs.) plus an additional 1/4 turn.

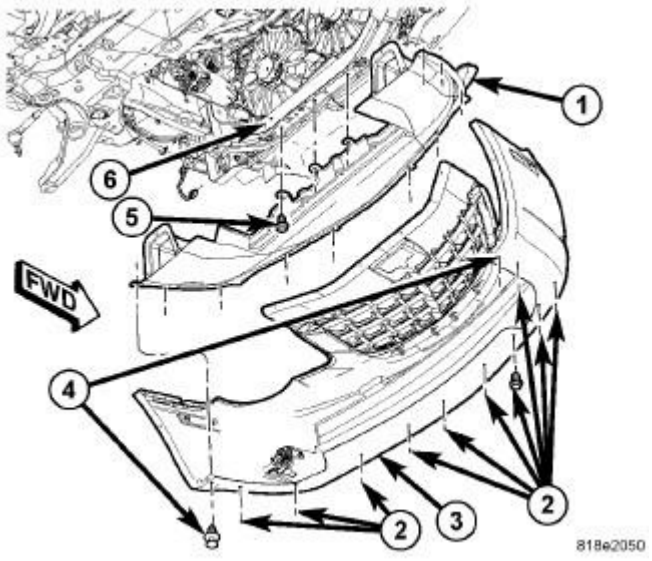

Fig. 18: Front Brake Mounting
Courtesy of CHRYSLER LLC

8. Install brake disc (1) onto hub and bearing assembly (2).
9. Install front disc brake caliper (5) and adapter (6) to the steering knuckle (3). Caliper is installed by first sliding bottom of caliper assembly under abutment on steering knuckle, and then rotating top of caliper against top abutment.
10. Install the two bolts (4) that secure the front disc brake caliper and adapter to the steering knuckle. Tighten the bolts to 169 N.m (125 ft. lbs.).

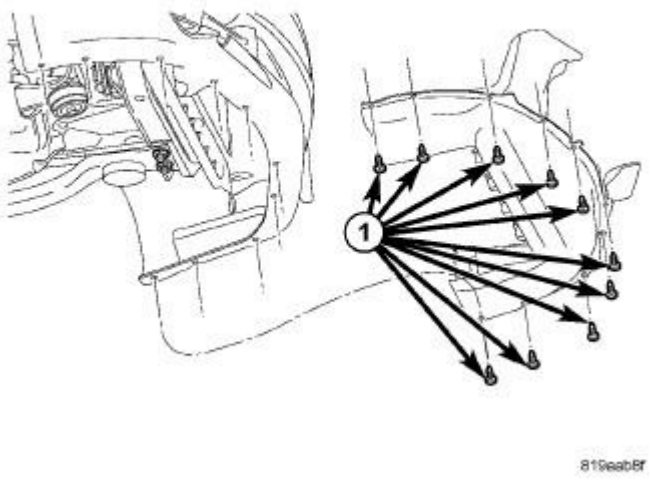

Fig. 19: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

11. Clean all foreign matter from the threads of the outer CV joint. Install the half shaft to hub/bearing assembly nut (1) onto halfshaft (2).
12. With the brakes applied to keep hub from turning, tighten the hub nut to 160 N.m (118 ft. lbs.).
13. Install front wheel and tire assembly. Install and tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half the required specification. Then repeat the tightening sequence to the full specified torque of 135 N.m (100 ft. lbs.).
14. Lower vehicle.
15. Check for correct fluid level in transaxle assembly. Refer to **Transmission and Transfer Case/Manual Automatic - Getrag MPS6/FLUID - Standard Procedure**
16. If equipped, install the engine belly pan.

WITH INTERMEDIATE SHAFT

NOTE: The inner tripod joints are designed with a retention feature that prevents the tripod rollers from coming out of the inner joint housing up to a specific load. If this feature is overcome and any of the rollers are pulled past the retention feature the joint will "lock-up" and no longer function properly. The entire halfshaft assembly must be replaced if this occurs.

NOTE: Some halfshafts use a tuned rubber damper weight. When replacing a halfshaft assembly, be sure the replacement halfshaft has the same damper weight as the original.

NOTE: 3.5L Shown in illustration, all others equipped with an intermediate shaft are similar.

NOTE: Care must be taken not to separate the inner C/V joint during this operation. Do not allow halfshaft to hang by inner C/V joint after removing outer C/V Joint from the hub/bearing assembly in steering knuckle, end of halfshaft must be supported.

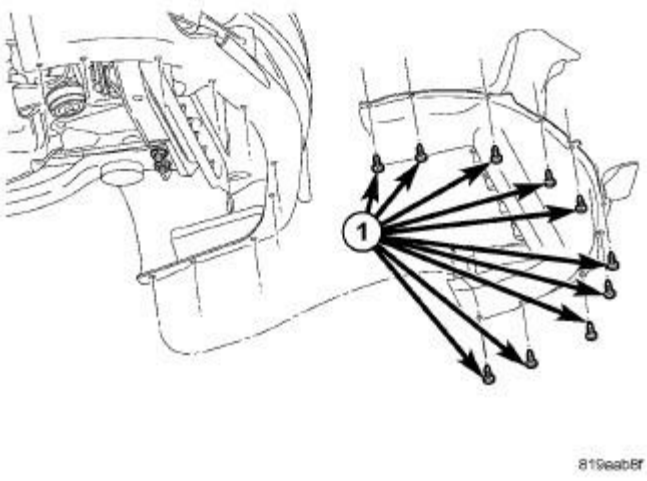

Fig. 20: Outer C/V Joint Of Half Shaft Assembly
Courtesy of CHRYSLER LLC

1. Thoroughly clean spline and oil seal sealing surface on tripod joint. Lightly lubricate oil seal sealing surface on tripod joint with fresh clean transmission lubricant.
2. Holding half shaft assembly (1) or (2) by tripod joint and interconnecting shaft, install tripod joint into transaxle side gear (left side) or the intermediate shaft (right side) as far as possible by hand. Be sure to engage splines prior to applying force.

NOTE: Attempt to remove tripod joint by hand to verify that the snap ring is fully engaged. If snap ring is fully engaged, tripod joint will not be removable from transmission by hand.

3. Forcefully push the tripod joint into the transaxle side gear, until snap-ring is fully engaged.

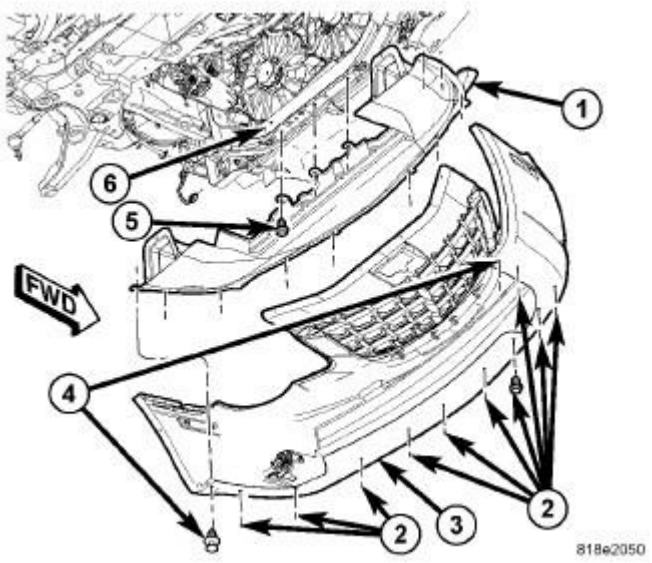

Fig. 21: Outer CV Joint Inspection
Courtesy of CHRYSLER LLC

4. Clean all debris and moisture out of steering knuckle, in the area were outer CV joint (1) will be installed into steering knuckle.
5. Ensure that front of outer CV joint (2) which fits against the face of the hub and bearing is free of debris and moisture before installing outer CV joint into hub and bearing assembly.

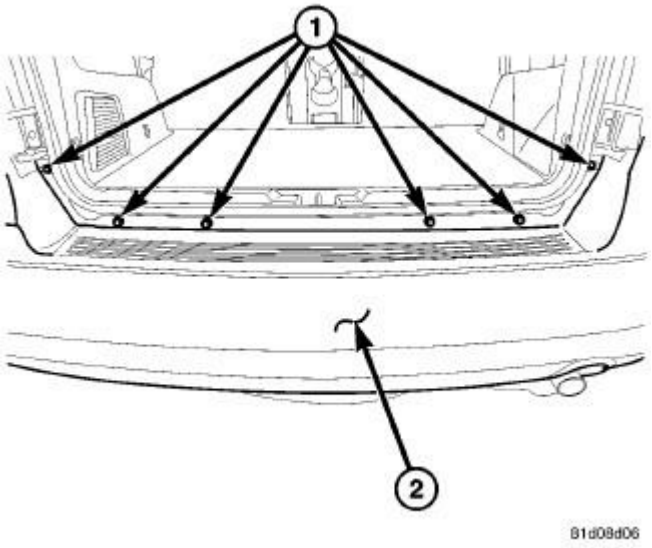

Fig. 22: Strut To Steering Knuckle Attaching Bolts
Courtesy of CHRYSLER LLC

6. Install the steering knuckle(3) to the strut clevis bracket (1).
7. Install the steering knuckle-to-strut attachment bolts and nuts (2). While holding the bolts in place, tighten

the nuts to 140 N.m (103 ft. lbs.)

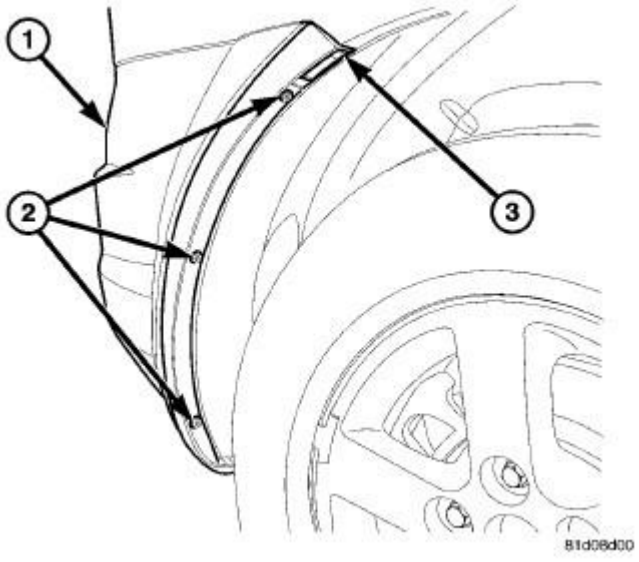

Fig. 23: Front Brake Mounting
Courtesy of CHRYSLER LLC

8. Install brake disc (1) onto hub and bearing assembly (2).
9. Install front disc brake caliper (5) and adapter (6) to the steering knuckle (3). Caliper is installed by first sliding bottom of caliper assembly under abutment on steering knuckle, and then rotating top of caliper against top abutment.
10. Install the two bolts (4) that secure the front disc brake caliper and adapter to the steering knuckle. Tighten the bolts to 169 N.m (125 ft. lbs.).

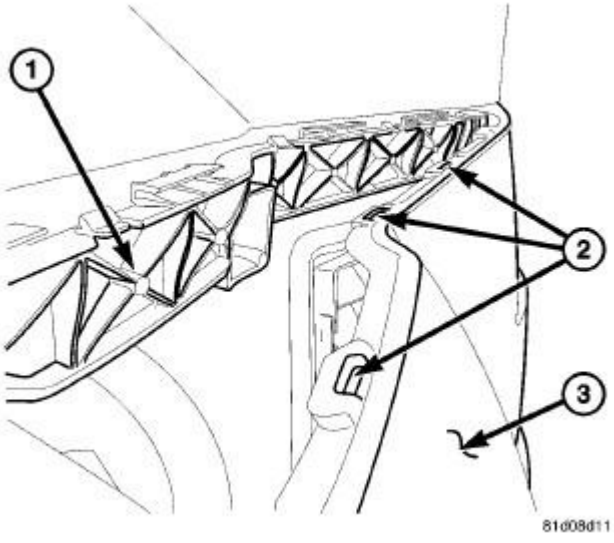

Fig. 24: View Of Hub Nut & Axle Shaft

Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

11. Clean all foreign matter from the threads of the outer CV joint. Install the half shaft to hub/bearing assembly nut (1) onto halfshaft (2).
12. With the brakes applied to keep hub from turning, tighten the hub nut to 160 N.m (118 ft. lbs.).
13. Install front wheel and tire assembly. Install and tighten the wheel mounting stud nuts in proper sequence until all nuts are torqued to half the required specification. Then repeat the tightening sequence to the full specified torque of 135 N.m (100 ft. lbs.).
14. Lower vehicle.
15. Check for correct fluid level in transaxle assembly. Refer to **Transmission and Transfer Case/Manual Automatic - Getrag MPS6/FLUID - Standard Procedure**
16. If equipped, install the engine belly pan.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolts, Caliper Adapter to Knuckle	169	125	-
Nut, Hub	160	118	-
Nuts, Front Wheel Lug	135	100	-
Nut, Tie Rod End to Knuckle	75	55	-
Nut, Strut Clevis to Knuckle	88 +90°	65 +90°	-
Bolts, Heat shield	14	-	124
Bolts, Strut Damper to Steering Knuckle	88	65	-
Bolts, Disc Brake Caliper Adapter	169	125	-
10 mm Bolts, Intermediate Bearing to block	54	39	-

BOOT, DRIVE SHAFT, OUTER

Removal

REMOVAL

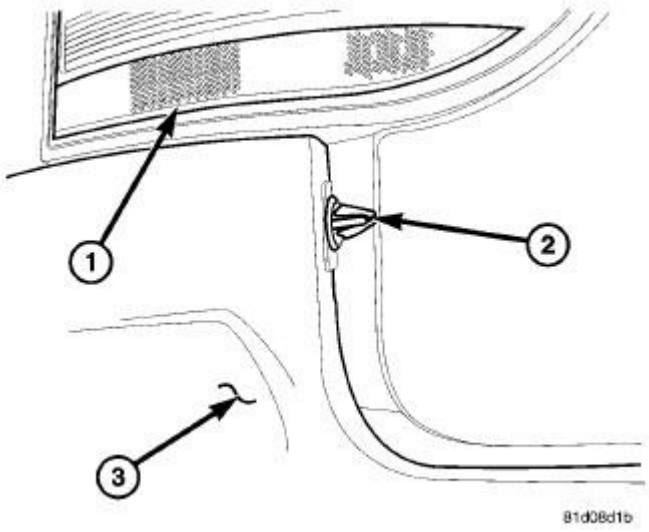

Fig. 25: Outer C/V Joint Seal Boot Clamps
Courtesy of CHRYSLER LLC

1 - SMALL CLAMP
2 - SEALING BOOT
3 - OUTER CV JOINT HOUSING
4 - LARGE CLAMP
5 - INTERCONNECTING SHAFT

1. Remove halfshaft assembly requiring boot replacement from vehicle. See **Removal**
2. Remove large boot clamp (4) retaining CV joint sealing boot to CV joint housing (3) and discard. Remove small clamp (1) that retains outer CV joint sealing boot to interconnecting shaft (5) and discard. Remove sealing boot (2) from outer CV joint housing and slide it down interconnecting shaft.
3. Wipe away grease to expose outer CV joint and interconnecting shaft.

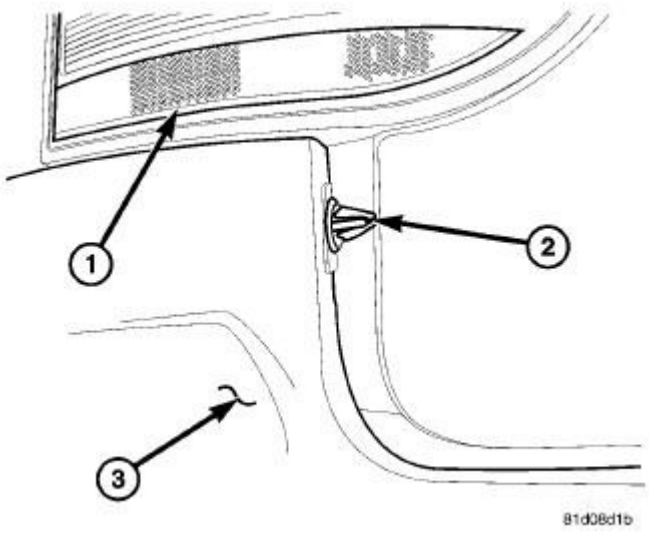

Fig. 26: Outer C/V Joint Removal from Interconnecting Shaft
Courtesy of CHRYSLER LLC

1 - SOFT HAMMER (TAP INNER RACE ONLY)
2 - WEAR SLEEVE
3 - CIRCLIP (OUTER END OF SHAFT)

4. Remove outer CV joint from interconnecting shaft using the following procedure: Support interconnecting shaft in a vise equipped with protective caps on jaws of vise to prevent damage to interconnecting shaft. Then, using a soft-faced hammer (1) , sharply hit the end of the CV joint housing to dislodge housing from internal circlip (3) on interconnecting shaft. Then slide outer CV joint off end of interconnecting shaft, joint may have to be tapped off shaft using a **soft-faced** hammer.

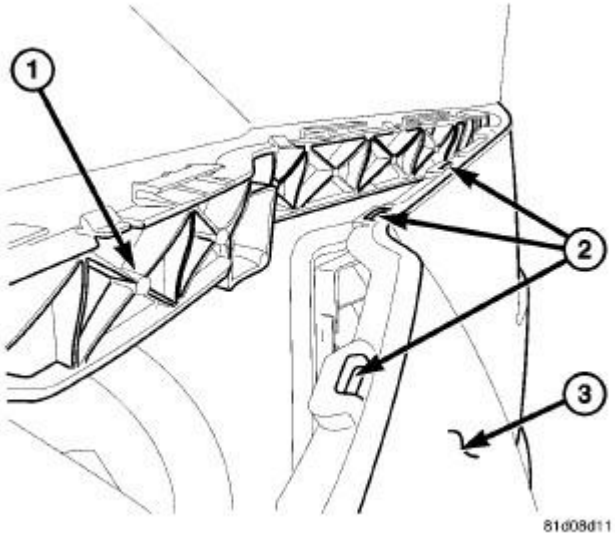

Fig. 27: Circlip Removal from Interconnecting Shaft
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS
2 - INTERCONNECTING SHAFT
3 - CIRCLIP

NOTE: Always use a new circlip.

5. Remove large circlip (3) from the interconnecting shaft (2) before attempting to remove outer CV joint sealing boot.
6. Slide sealing boot off interconnecting shaft.
7. Thoroughly clean and inspect outer CV joint assembly and interconnecting joint for any signs of excessive wear. **If any parts show signs of excessive wear, the halfshaft assembly will require replacement. Component parts of these halfshaft assemblies are not serviceable.**

Installation

INSTALLATION

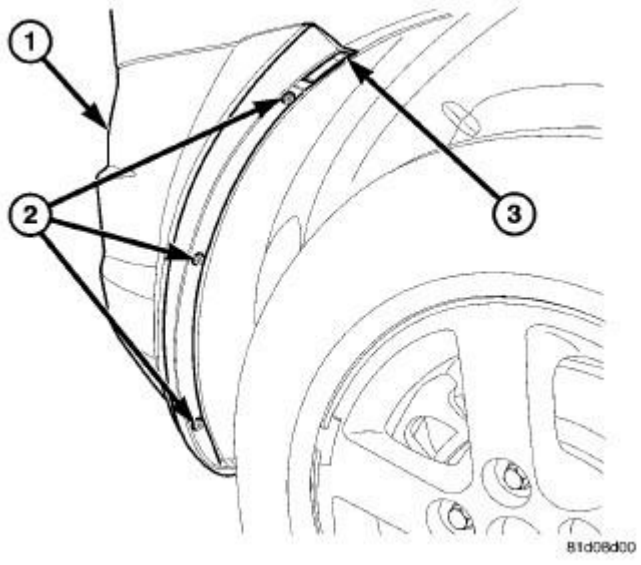

Fig. 28: Sealing Boot Installation on Interconnecting Shaft
Courtesy of CHRYSLER LLC

1 - SEALING BOOT
2 - RAISED BEAD IN THIS AREA OF SEALING BOOT
3 - GROOVE
4 - INTERCONNECTING SHAFT

1. Slide new sealing boot clamp (2) onto interconnecting shaft (4). Slide the outer CV joint assembly sealing boot (1) onto the interconnecting shaft (4). **Seal boot MUST be positioned on interconnecting shaft so the raised bead on the inside of the seal boot is in groove on interconnecting shaft.**

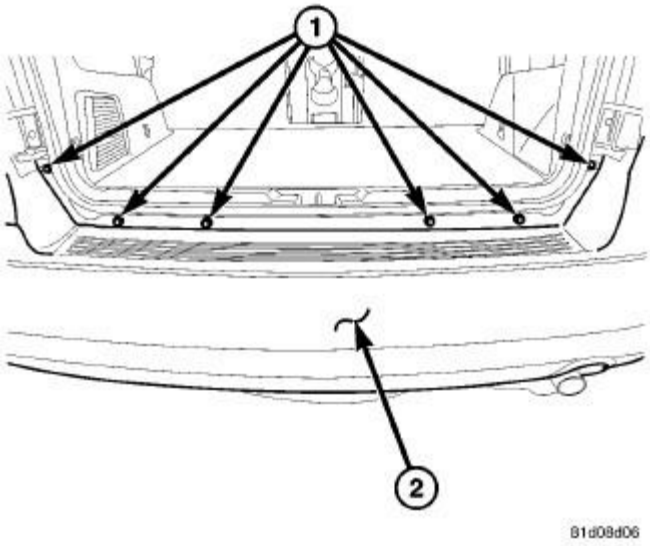

Fig. 29: Outer C/V Joint On Interconnecting Shaft
Courtesy of CHRYSLER LLC

1 - SOFT FACED HAMMER
2 - STUB AXLE
3 - OUTER C/V JOINT
4 - HUB NUT

NOTE: Always use a new circlip.

2. Align splines on interconnecting shaft with splines on cross of outer CV joint assembly and start outer CV joint onto interconnecting shaft.
3. Install outer CV joint assembly onto interconnecting shaft by using a **soft-faced** hammer (1) and tapping end of stub axle (2) (with hub nut (4) installed) until outer CV joint (3) is fully seated on interconnecting shaft.

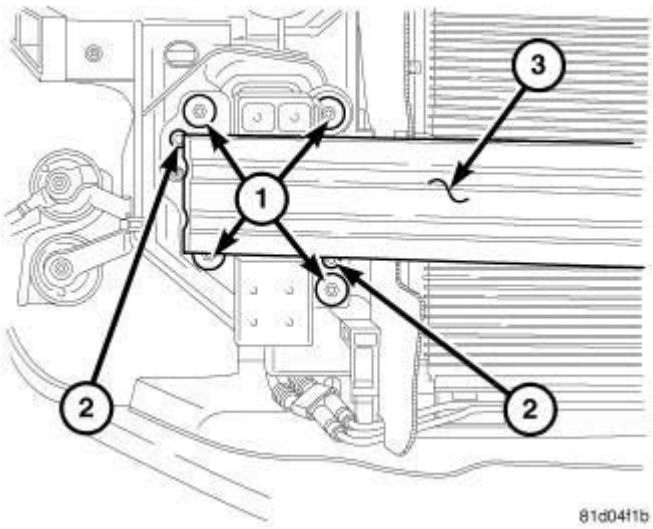

Fig. 30: Outer CV Joint Correctly Installed on Interconnecting Shaft
Courtesy of CHRYSLER LLC

1 - INTERCONNECTING SHAFT
2 - CROSS
3 - OUTER C/V JOINT ASSEMBLY

4. Outer CV joint assembly must be installed on interconnecting shaft until cross (2) of outer CV joint assembly (3) is seated against circlip on interconnecting shaft (1).

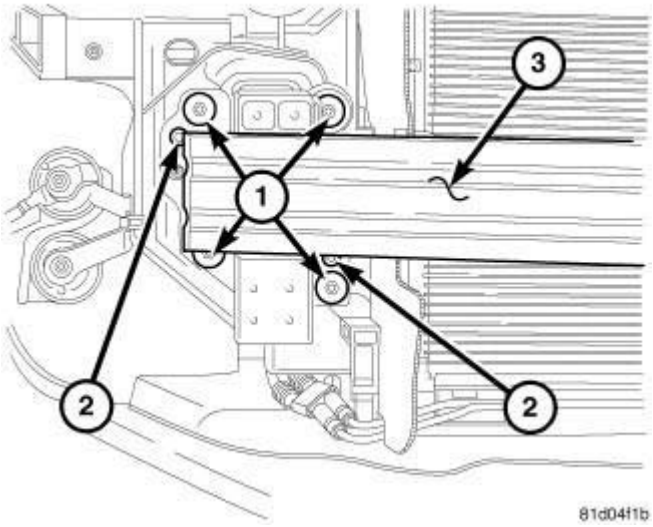

Fig. 31: Crimping Tool Installed on Sealing Boot Clamp
Courtesy of CHRYSLER LLC

1 - CRIMPING TOOL C-4975A
2 - INTERCONNECTING SHAFT

3 - CLAMP
4 - SEALING BOOT

5. Distribute 1/2 the amount of grease provided in seal boot service package (DO NOT USE ANY OTHER TYPE OF GREASE) into outer CV joint assembly housing. Put the remaining amount into the sealing boot (4) .
6. Install outer CV joint sealing boot to interconnecting shaft clamp evenly on sealing boot.
7. Clamp sealing boot onto interconnecting shaft (2) using crimper, Crimping Tool C-4975A and the following procedure. Place Crimping Tool C-4975A (1) over bridge of clamp (3).

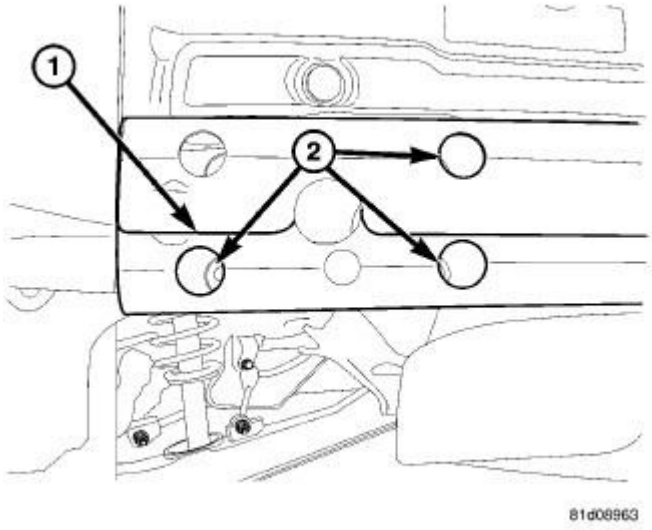

Fig. 32: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER LLC

1 - CLAMP
2 - JAWS OF CRIMPING TOOL C-4975A MUST BE CLOSED COMPLETELY TOGETHER HERE
3 - INTERCONNECTING SHAFT
4 - SEALING BOOT

8. Tighten nut on Crimping Tool C-4975A until jaws on tool (2) are closed completely together, face to face.

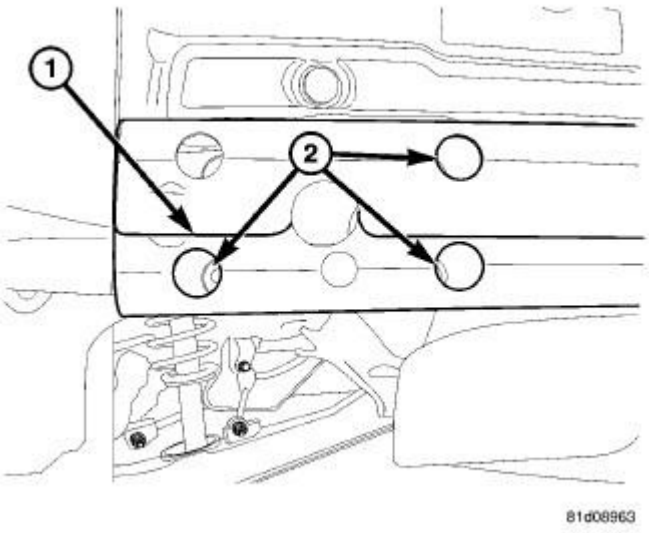

Fig. 33: Crimping Tool Installed on Sealing Boot Clamp
Courtesy of CHRYSLER LLC

1 - CLAMP
2 - TRIPOD JOINT HOUSING
3 - CRIMPING TOOL C-4975A
4 - SEALING BOOT

CAUTION: Seal must not be dimpled, stretched, or out-of-shape in any way. If seal is NOT shaped correctly, equalize pressure in seal and shape it by hand.

9. Position outer CV joint sealing boot (4) into its retaining groove on outer CV joint housing. Install sealing boot to outer CV joint retaining clamp (1) evenly on sealing boot.
10. Clamp sealing boot onto outer CV joint housing using Crimping Tool C-4975A (3) and the following procedure. Place Crimping Tool C-4975A over bridge of clamp (1).

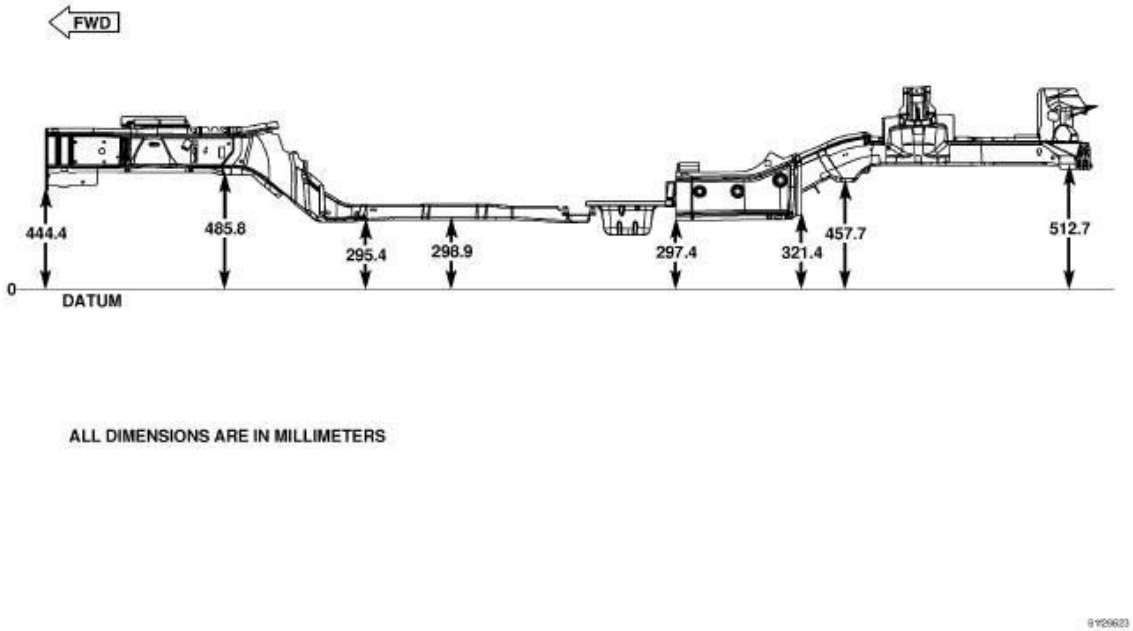

Fig. 34: Sealing Boot Retaining Clamp Installed
Courtesy of CHRYSLER LLC

1 - CLAMP
2 - TRIPOD HOUSING
3 - CRIMPING TOOL C-4975A
4 - JAWS OF CRIMPING TOOL C-4975A MUST BE CLOSED COMPLETELY TOGETHER HERE
5 - SEALING BOOT

11. Tighten nut on Crimping Tool C-4975A until jaws on tool are closed completely together (4) , face to face.
12. Install the halfshaft requiring boot replacement back on the vehicle. See **Installation**

HALF SHAFT, REAR

DESCRIPTION

DESCRIPTION

The inner joints of both half shaft assemblies are tripod joints. The outer joints of both assemblies are Rzeppa Joints. The tripod joints are true constant velocity (CV) joint assemblies, which allow for the changes in half shaft length through the jounce and rebound travel of the rear suspension.

The inner tripod joint of both half shafts is splined into the rear differential assembly and retained by a snap ring. The outer CV joint has a stub shaft that is splined into the wheel hub and retained by a steel hub nut.

DIAGNOSIS AND TESTING

HALFSHAFT

VEHICLE INSPECTION

1. Check for grease in the vicinity of the inboard tripod joint and outboard CV joint; this is a sign of inner or outer joint seal boot or seal boot clamp damage.

NOISE OR VIBRATION IN TURNS

A clicking noise or a vibration in turns could be caused by one of the following conditions:

- Damaged outer CV or inner tripod joint seal boot or seal boot clamps. This will result in the loss and/or contamination of the joint grease, resulting in inadequate lubrication of the joint.
- Noise may also be caused by another component of the vehicle coming in contact with the half shafts.

CLUNKING NOISE DURING ACCELERATION

This noise may be a result of one of the following conditions:

- A torn seal boot on the inner or outer joint of the half shaft assembly.
- A loose or missing clamp on the inner or outer joint of the half shaft assembly.
- A damaged or worn half shaft CV joint.

SHUDDER OR VIBRATION DURING ACCELERATION

This problem could be a result of:

- A worn or damaged half shaft inner tripod joint.
- A sticking tripod joint spider assembly (inner tripod joint only).
- Improper wheel alignment. Refer to **Front Suspension/Wheel Alignment - Standard Procedure**

VIBRATION AT HIGHWAY SPEEDS

This problem could be a result of:

- Foreign material (mud, etc.) packed on the backside of the wheel(s).
- Out of balance tires or wheels. Refer to **Tires and Wheels - Standard Procedure**
- Improper tire or wheel runout. Refer to **Tires and Wheels - Diagnosis and Testing**

REMOVAL

REMOVAL

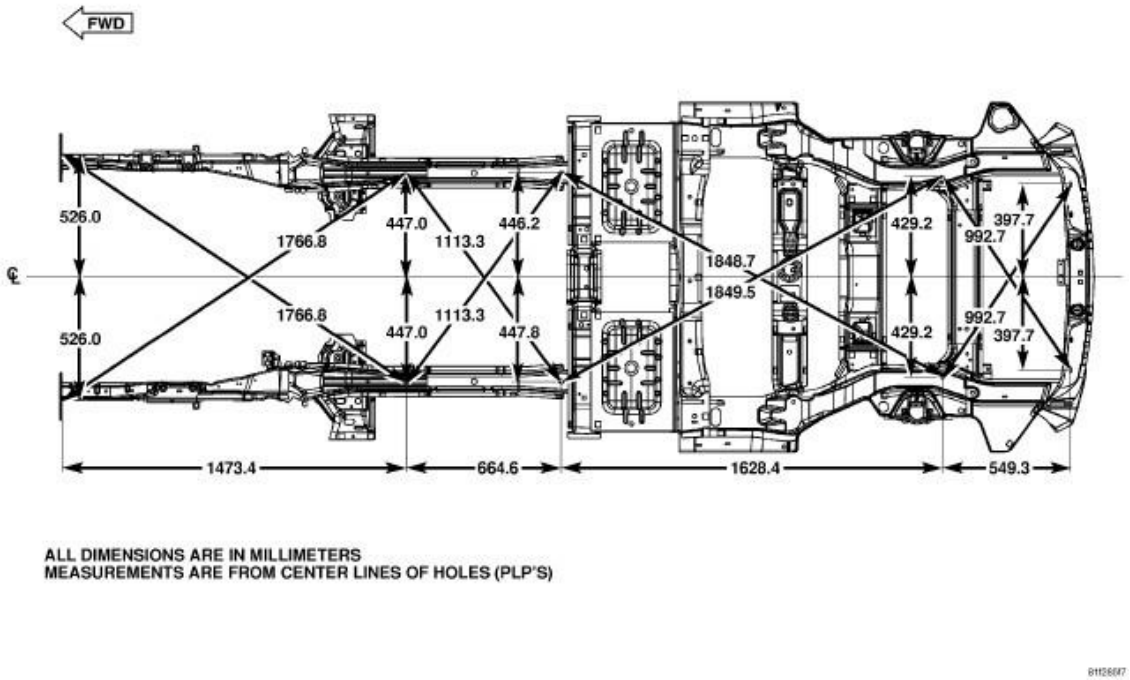

Fig. 35: Removing/Installing Halfshaft Nut
Courtesy of CHRYSLER LLC

NOTE: Rear suspension and drivetrain design require this procedure to be performed on a "drive-on" hoist, as the front and rear suspension needs to be compressed to ride height to facilitate rear halfshaft removal.

1. Place vehicle on drive-on hoist in Park.
2. Remove rear wheel center cap.
3. Remove hub nut.

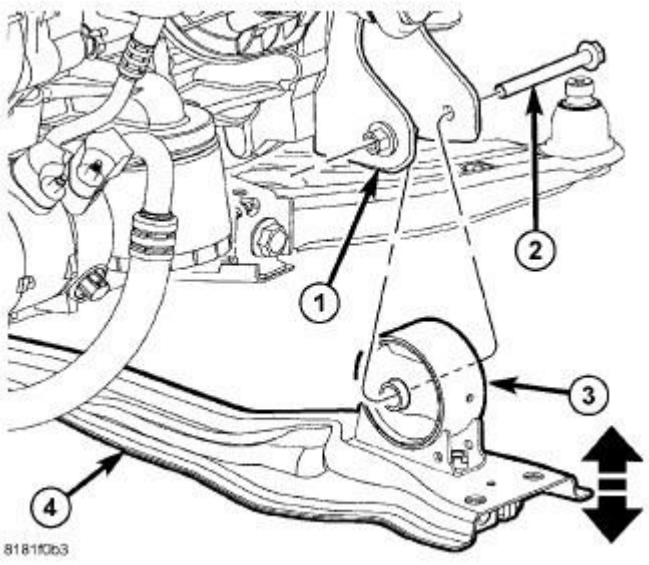

Fig. 36: Support Module With Jack
Courtesy of CHRYSLER LLC

1 - DRIVELINE MODULE 2 - TRANSMISSION JACK

4. Raise vehicle on hoist.
5. Remove exhaust system center hanger (at propeller shaft bearing/support).
6. Disconnect exhaust system at rear-most hanger and lower.
7. Lower exhaust system at least 254 mm (10 in.). Support system with suitable wire or rope.
8. Support driveline module (1) with transmission jack (or equivalent) (2).

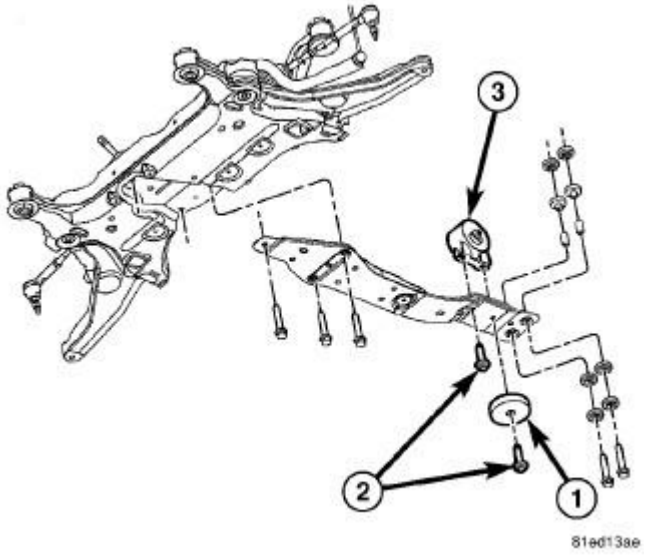

Fig. 37: Seal Protector
Courtesy of CHRYSLER LLC

1 - HALFSHAFT
2 - SEAL PROTECTOR

NOTE: Never grasp the halfshaft assembly by the inner or outer boots doing so may damage to the boot.

9. Using suitable screwdriver, partially dislodge halfshaft (side being removed) from differential. Install Seal Protector 9099 (2) to protect seal upon disassembly.

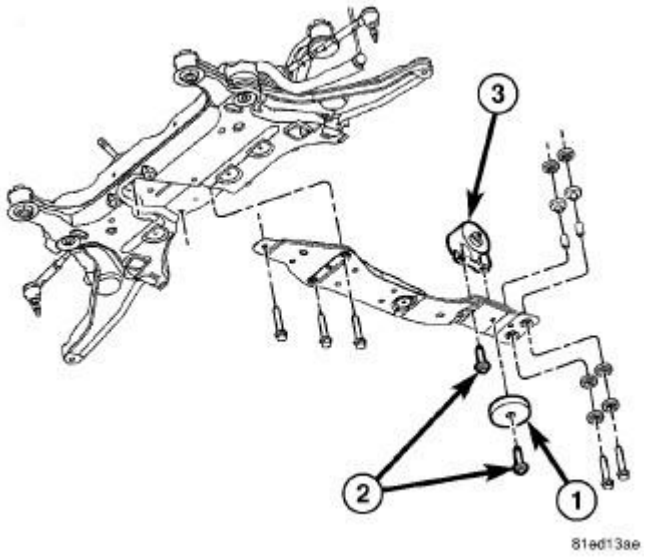

Fig. 38: Module Mounting Bolts
Courtesy of CHRYSLER LLC

1 - BOLT (2)
2 - DRIVELINE MODULE

10. Remove two rear driveline module-to-crossmember bolts .

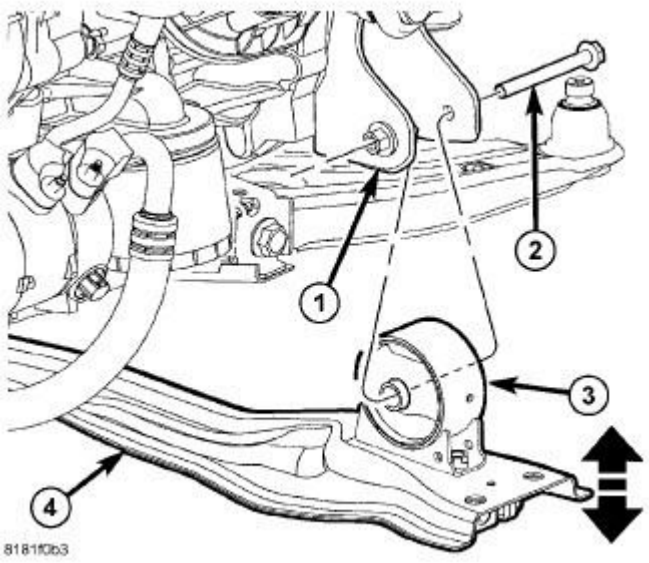

Fig. 39: Module Mounting Bolt
Courtesy of CHRYSLER LLC

1 - BOLT 2 - DRIVELINE MODULE

11. Remove the remaining driveline module-to-crossmember bolt (1) .
12. Lower driveline module assembly just enough to facilitate removal of shaft from differential. Make sure Seal Protector 9099 engages seal.
13. Remove halfshaft from hub/bearing assembly.

INSTALLATION

INSTALLATION

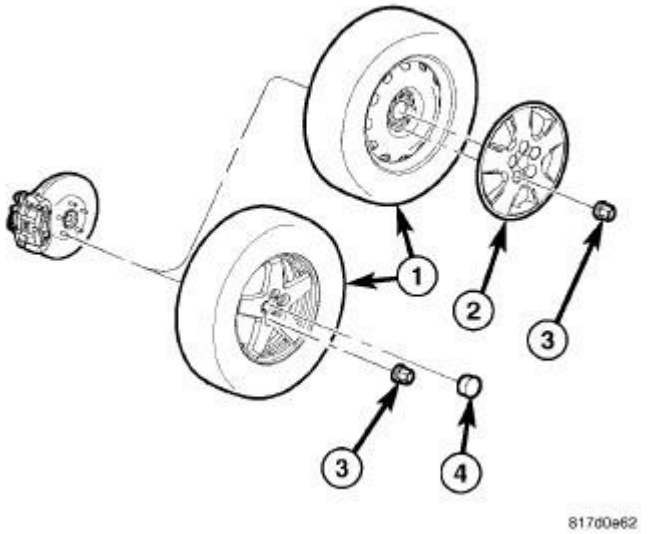

Fig. 40: Seal Protector
Courtesy of CHRYSLER LLC

1 - HALFSHAFT 2 - SEAL PROTECTOR

1. Install halfshaft to hub/bearing assembly. Install hub nut and washer but do not tighten at this time.
2. Using Seal Protector 9099 (2) , install halfshaft (1) to differential assembly. Clean tool and seal area to prevent debris intrusion.

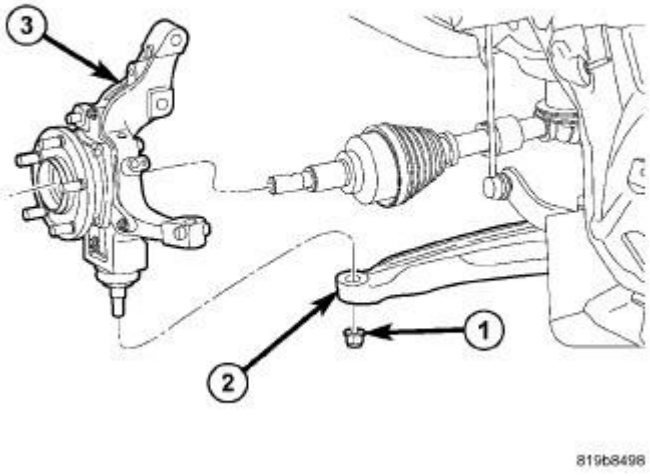

Fig. 41: Module Mounting Bolt
Courtesy of CHRYSLER LLC

1 - BOLT 2 - DRIVELINE MODULE

3. Raise driveline module into position. Install module mounting bolt (1) .

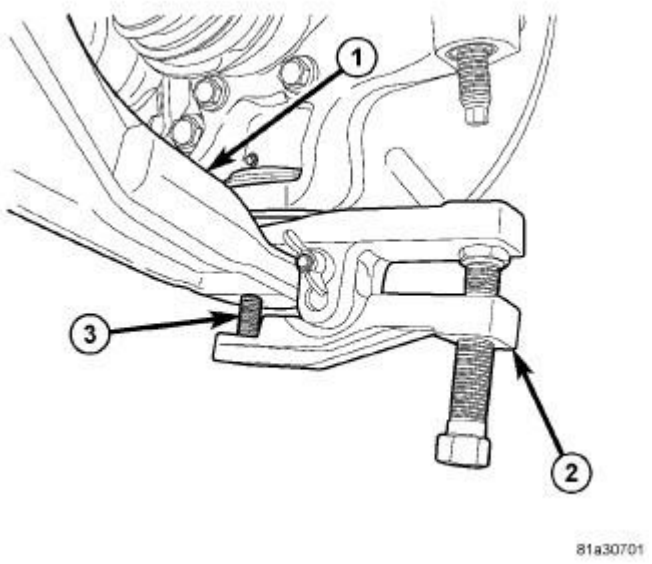

Fig. 42: Module Mounting Bolts
Courtesy of CHRYSLER LLC

1 - BOLT (2) 2 - DRIVELINE MODULE

4. Install remaining two module mounting bolts (2) .
5. Torque module-to-cradle bolts to 102 N.m (75 ft. lbs.)
6. Torque the halfshaft/hub nut to 160 N.m (118 ft.lbs.).
7. Install wheel center cap.
8. Check and adjust differential fluid level. See **STANDARD PROCEDURE - DIFFERENTIAL ASSEMBLY FLUID CHANGE**

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, Propeller Shaft-to-Driveline Module	55	40	-
Bolt/Nut, Driveline Module-to-Cradle	102	75	-
Nut, Hub	160	118	-

Nuts, Rear Wheel Lug	135	100	-

SPECIAL TOOLS

SPECIAL TOOLS

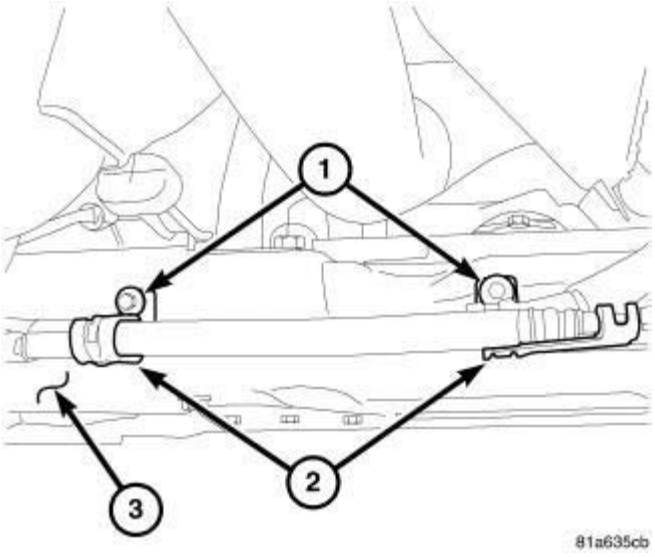

Fig. 43: Protector, 9099
Courtesy of CHRYSLER LLC

INTERMEDIATE SHAFT, GAS

REMOVAL

2.4L

1. Remove the right half shaft. See **Removal** .

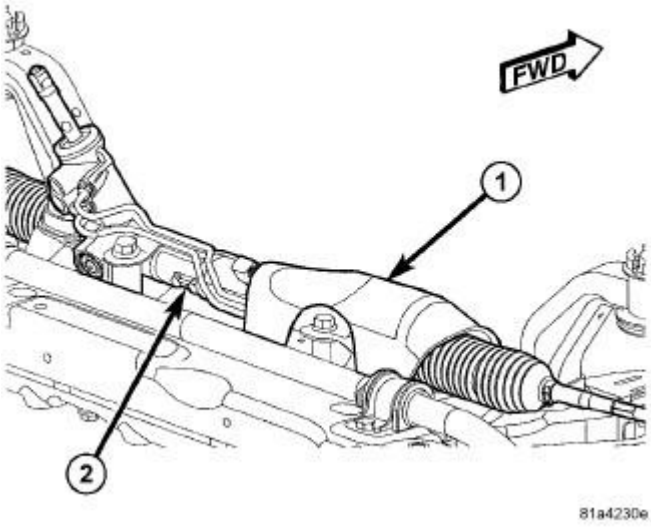

Fig. 44: Intermediate Shaft - 2.4L
Courtesy of CHRYSLER LLC

2. Remove the three intermediate shaft bolts (1).
3. Remove the intermediate shaft (2).

2.7L

1. Remove the right half shaft. See **Removal** .

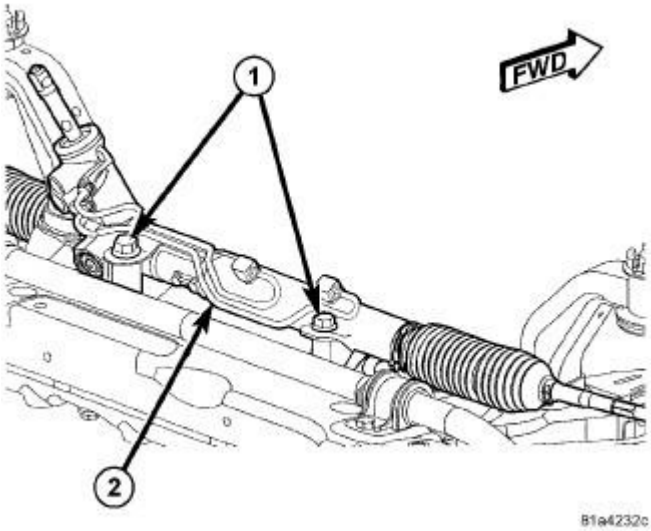

Fig. 45: Identifying Intermediate Shaft, Heat Shield & Bolts
Courtesy of CHRYSLER LLC

2. Remove the heat shield bolts (2).
3. Remove the heat shield (3).
4. Remove the intermediate shaft bolts (1) and (5).
5. Remove the intermediate shaft (4).

3.5L

1. Remove the right half shaft. See **Removal** .

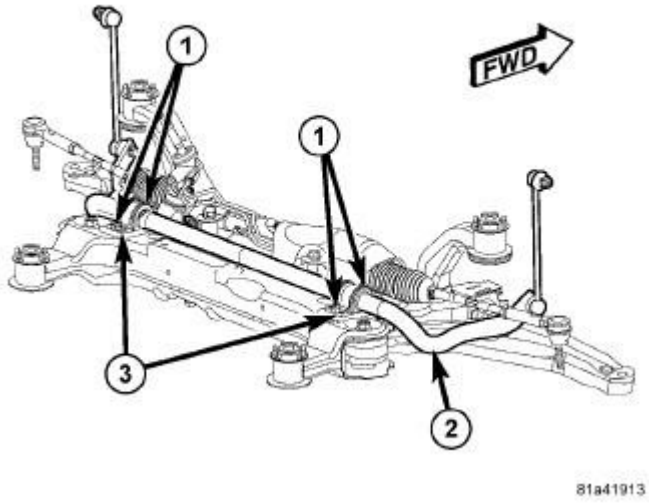

Fig. 46: 3.5L Right Half Shaft Components
Courtesy of CHRYSLER LLC

2. Remove the intermediate shaft bolts (1).
3. Remove the heat shield bolts (2).
4. Remove the heat shield (3).
5. Remove the intermediate shaft (4).

INSTALLATION

2.4L

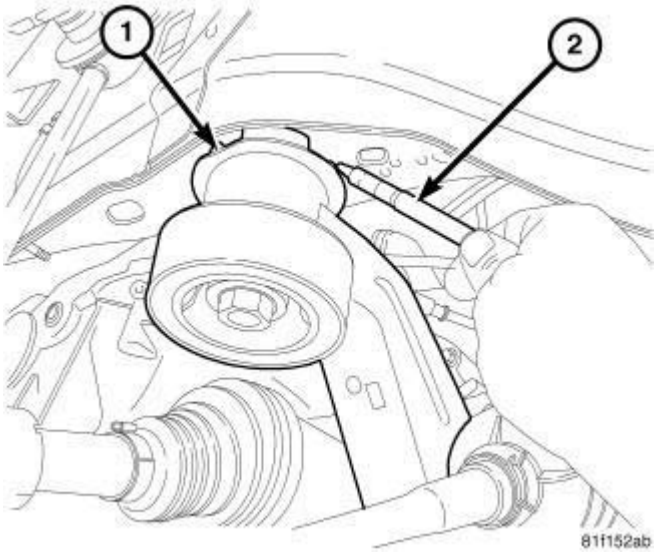

Fig. 47: Intermediate Shaft - 2.4L
Courtesy of CHRYSLER LLC

1. Install the intermediate shaft (2).
2. Install the three intermediate shaft bolts (1).
3. Install the right half shaft. See **Removal** .

2.7L

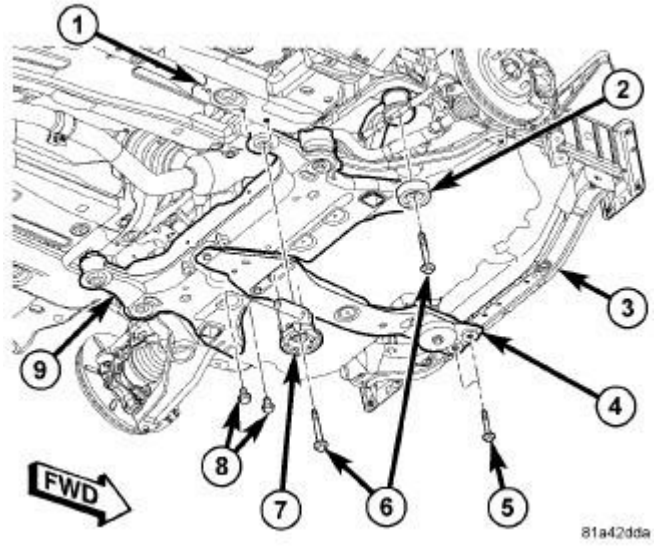

Fig. 48: Identifying Intermediate Shaft, Heat Shield & Bolts
Courtesy of CHRYSLER LLC

1. Install the intermediate shaft (4).
2. Install the intermediate shaft bolts (1) and (5). Tighten bolt (1) to 38 Nm (28 ft. lb.) and bolts (5) to 23

Nm (17 ft. lb.).

3. Install the heat shield (3).
4. Install the heat shield bolts (2).
5. Install the right half shaft. See **Installation** .

3.5L

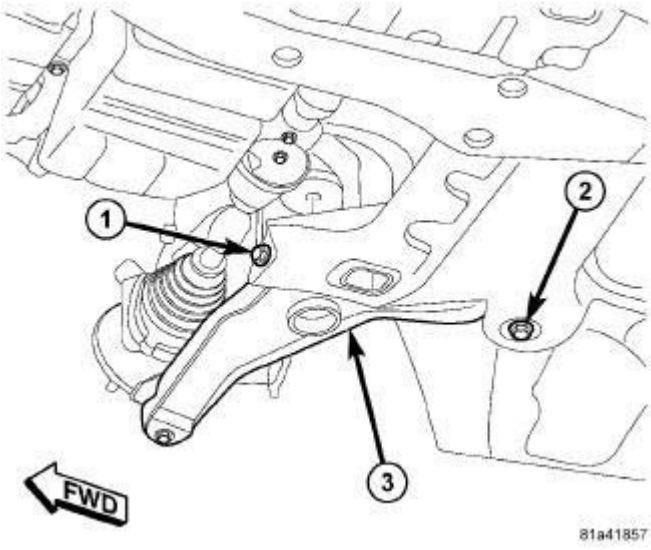

Fig. 49: 3.5L Right Half Shaft Components
Courtesy of CHRYSLER LLC

1. Install the intermediate shaft (4).
2. Install the intermediate shaft bolts (1) and tighten to 38 Nm (28 ft. lb.).
3. Install the heat shield (3).
4. Install the heat shield bolts (2) and tighten to 10 Nm (7 ft. lb).
5. Install the right half shaft. See **Installation** .

INTERMEDIATE SHAFT, DIESEL

REMOVAL

2.0L DIESEL

1. Remove the right half shaft. See **Removal** .

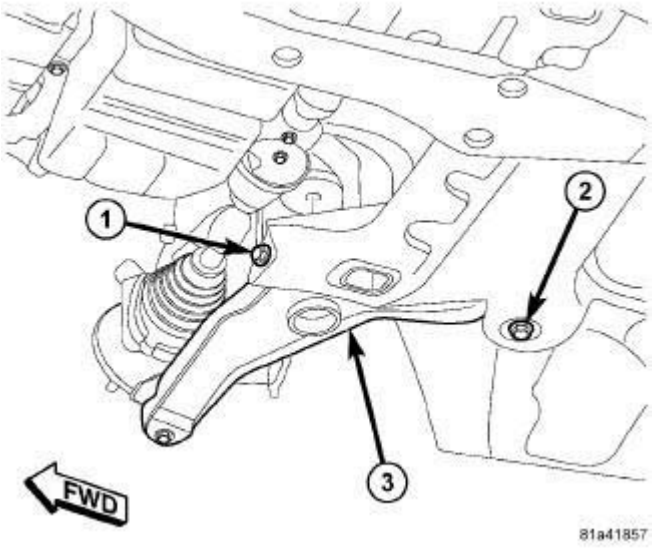

Fig. 50: 2.0L Diesel Right Half Shaft Components
Courtesy of CHRYSLER LLC

2. Remove the two intermediate shaft bolts (1).
3. Remove the intermediate shaft (2).

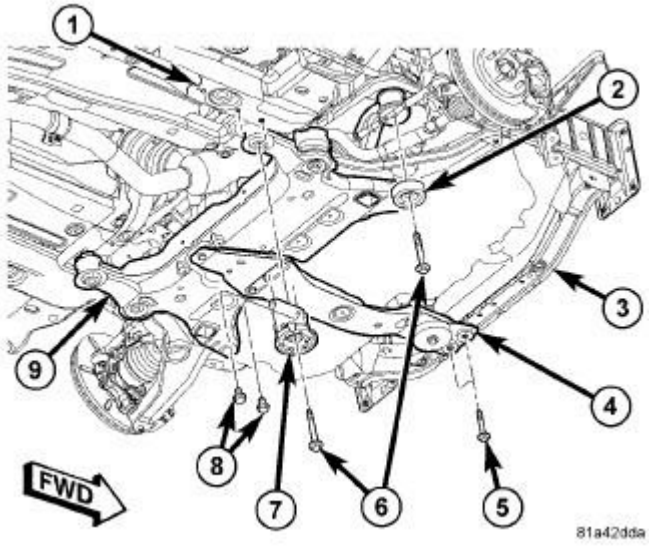

Fig. 51: Intermediate Shaft Bracket & Bolts
Courtesy of CHRYSLER LLC

4. If necessary, remove the intermediate shaft bracket bolts (1) and the intermediate shaft bracket (2).

INSTALLATION

2.0L DIESEL

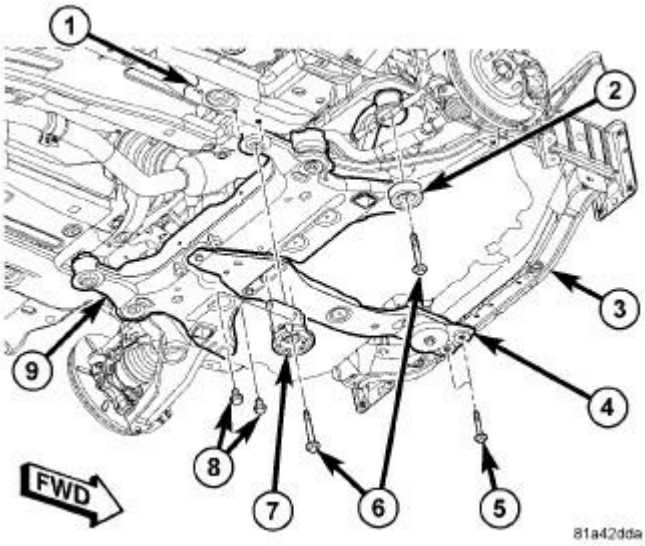

Fig. 52: Intermediate Shaft Bracket & Bolts
Courtesy of CHRYSLER LLC

1. If the intermediate shaft bracket was removed, install the intermediate shaft bracket (2), and the intermediate shaft bracket bolts (1). Tighten the bolts to 23 Nm (17 in. lbs.).

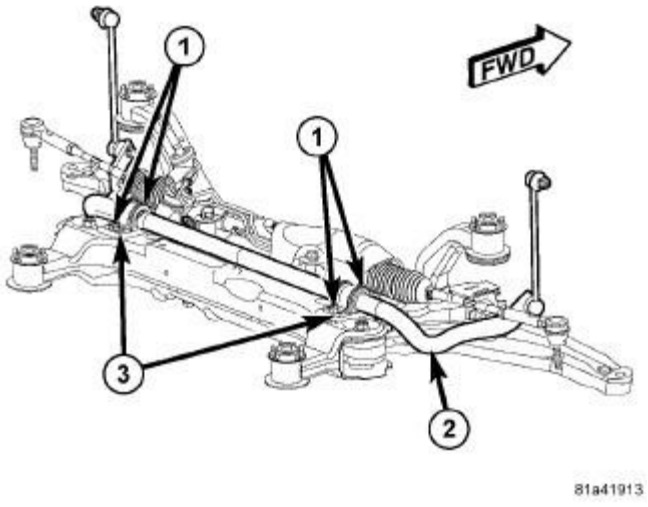

Fig. 53: 2.0L Diesel Right Half Shaft Components
Courtesy of CHRYSLER LLC

2. Install the intermediate shaft (2).
3. Install the two intermediate shaft bolts (1). Tighten the bolts to 38 Nm (28 in. lbs.).

4. Install the right axle half shaft. See **Installation** .

PROPELLER SHAFT

DESCRIPTION

DESCRIPTION

WARNING: Due to propeller shaft imbalance concerns, the propeller shaft can only be serviced as an assembly.

AWD models utilize a "three-piece" propeller shaft to transmit torque to the rear driveline module assembly. This three-piece design consists of:

- Front center and rear shaft segments
- Plunging front CV joint.
- Center support bearings
- Rubber coupler at driveline module flange

The front shaft segment utilizes a plunging CV joint at the power transfer unit connection. The center and rear shaft segments utilize a support bearing/bracket assembly. The rear shaft segment uses a rubber coupler at the driveline module flange.

OPERATION

OPERATION

The propeller shaft is used to transmit torque from the transaxle power transfer unit (PTU) to the rear driveline module of AWD equipped models.

The propeller shaft front segment utilizes a plunging CV joint at the PTU flange. The joint is flexible, allowing for torsional movement of the powertrain.

The propeller shaft center and rear segments utilize a support bearing/bracket, which support this three-piece assembly and isolates driveline vibrations from the body. The rubber coupler at the driveline module flange dampens out propeller shaft torsional vibrations, as the driveline module it connects to is fastened to the rear suspension crossmember.

REMOVAL

REMOVAL

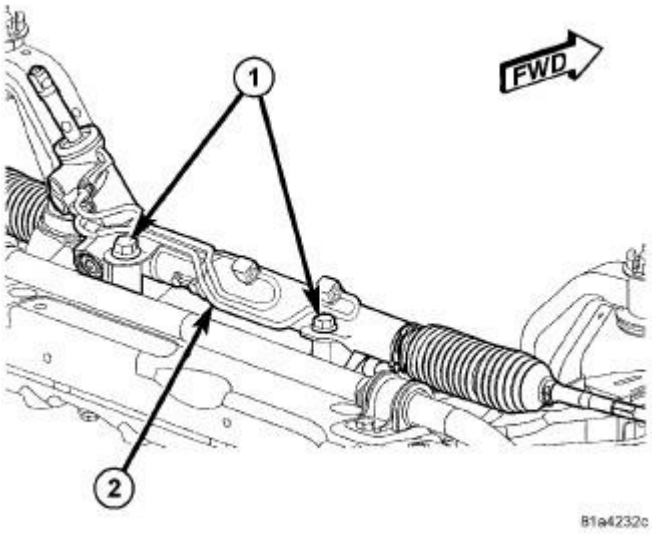

Fig. 54: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

CAUTION: Propeller shaft removal is a two-man operation. Never allow propeller shaft to hang from the center bearing, or while only connected to power transfer unit (PTU) or rear driveline module flanges. A helper is required. If a propshaft section is hung unsupported, damage may occur to the joint, boot, and/or center bearing from over-angulation. This may result in driveline vibrations.

NOTE: Rubber coupler is part of the propeller shaft assembly. Removing coupler from propeller shaft will result in vibration/balance issues.

1. Make sure transaxle is in neutral (N).
2. Raise vehicle on hoist.
3. Apply alignment index marks (4) on the rear axle flange (5) and rubber coupler (1).
4. Remove three rear propeller shaft rubber coupler to rear axle input flange retaining bolts (3).

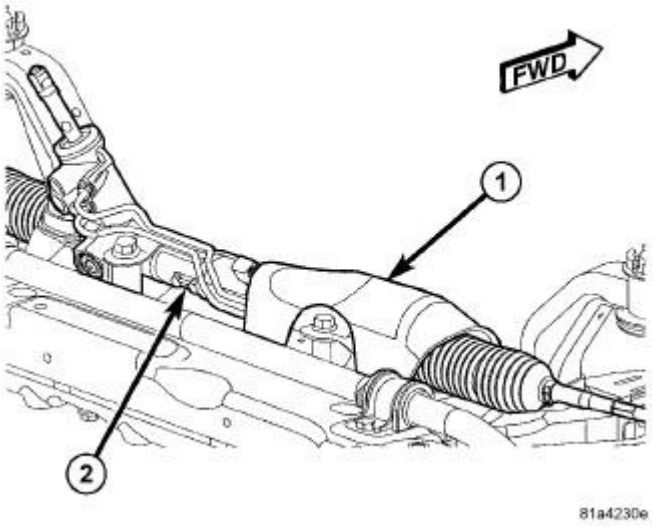

Fig. 55: Center Bracket/Heat Shield
Courtesy of CHRYSLER LLC

5. Remove the bolts (3) from the center support heat shield (2).
6. Remove the heat shield (2).
7. Remove the center support mounting bolts (1).

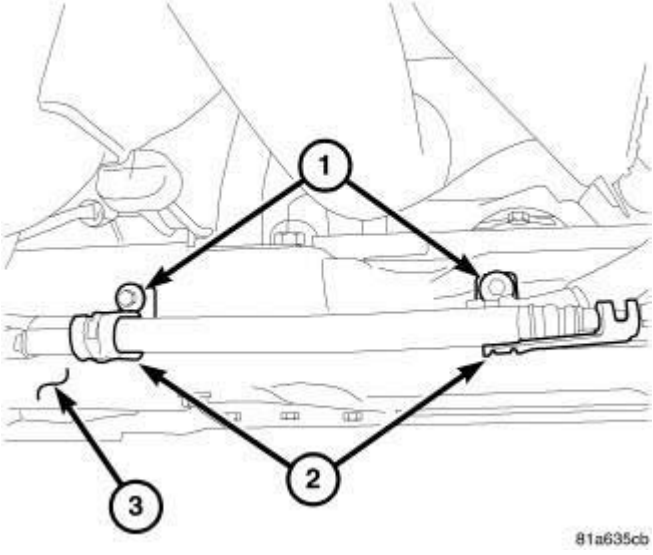

Fig. 56: Removing / Installing Propeller Shaft
Courtesy of CHRYSLER LLC

8. Remove the bolts (2) at the PTU
9. Remove the propeller shaft (3).

INSTALLATION

INSTALLATION

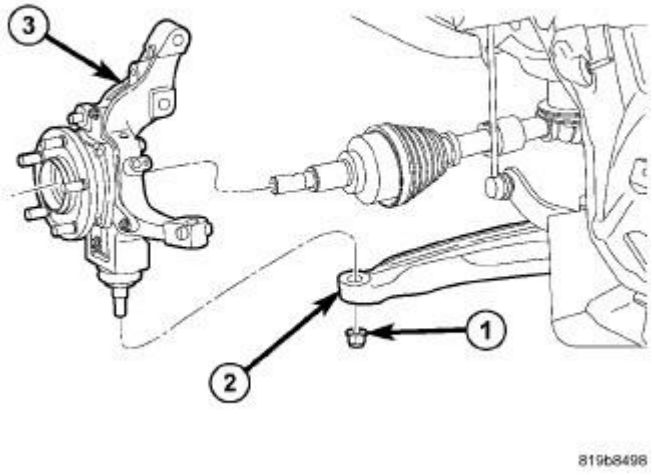

Fig. 57: Removing / Installing Propeller Shaft
Courtesy of CHRYSLER LLC

CAUTION: Propeller shaft installation. Never allow propeller shaft to hang while connected to Power Transfer Unit (PTU), rear driveline module flanges or center bearings. If propeller shaft section is hung unsupported, damage may occur to joint, boot and/or center bearing from over-angulation. This may result in vibration/balance issues. A helper may be needed.

1. Make sure transaxle is in Neutral (N) position.
2. Raise vehicle on hoist.
3. Obtain a helper if needed and lift propeller shaft assembly into position. Install propeller shaft to PTU with mounting bolts and tighten to 30 N.m (22 ft. lbs.).

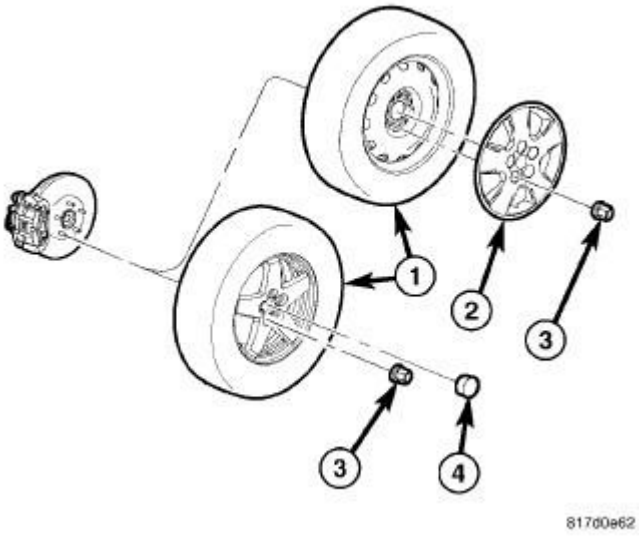

Fig. 58: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

4. Align marks (4) on propeller shaft rubber coupler (1) to rear axle input flange (5).
5. Install three rear propeller shaft to rear axle retaining bolts (3) and tighten to 58 N.m (43 ft. lbs.).

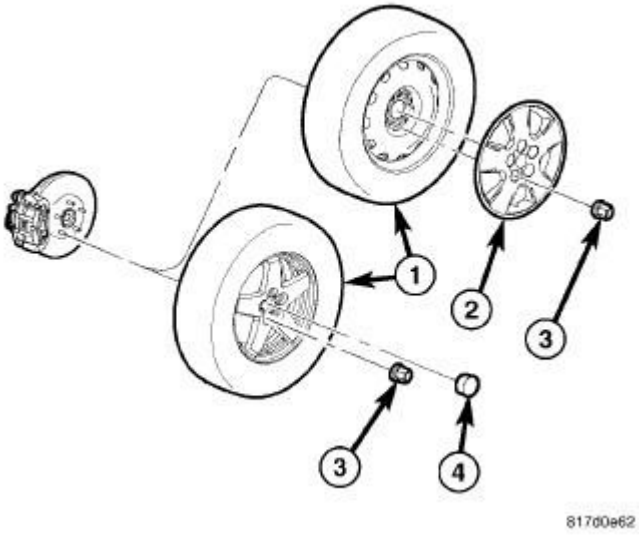

Fig. 59: Center Bracket/Heat Shield
Courtesy of CHRYSLER LLC

6. Raise the center support into position and install mounting bolts (1), tighten bolts to 41 N.m (30 lbs.ft.).
7. Install heat shield (2) and retaining nuts tighten to 21 N.m (15 ft. lbs.).
8. Lower vehicle.

REAR DRIVELINE MODULE

OPERATION

OPERATION

The primary benefits of All Wheel Drive are:

- Superior straight line acceleration, and cornering on all surfaces
- Better traction and handling under adverse conditions, resulting in improved hill climbing ability and safer driving.

The electronically controlled clutch (ECC) controls torque transfer to the rear differential assembly.

ECU (Inside vehicle) uses throttle position, wheel speeds and steering angle (if equipped) to control clutch.

DIAGNOSIS AND TESTING

REAR DRIVELINE MODULE NOISE

Different sources can be the cause of noise that the rear driveline module assembly is suspected of making. Refer to the following causes for noise diagnosis.

DRIVELINE MODULE ASSEMBLY NOISE

The most important part of driveline module service is properly identifying the cause of failures and noise complaints. The cause of most driveline module failures is relatively easy to identify. The cause of driveline module noise is more difficult to identify.

If vehicle noise becomes intolerable, an effort should be made to isolate the noise. Many noises that are reported as coming from the driveline module may actually originate at other sources. For example:

- Tires
- Road surfaces
- Wheel bearings
- Engine
- Transmission
- Exhaust
- Propeller shaft (vibration)
- Vehicle body (drumming)

Driveline module noises are normally divided into two categories: gear noise or bearing noise. A thorough and careful inspection should be completed to determine the actual source of the noise before replacing the driveline module.

The rubber mounting bushings help to dampen-out driveline module noise when properly installed. Inspect to confirm that no metal contact exists between the driveline module case and the body or suspension cradle. The complete isolation of noise to one area requires expertise and experience. Identifying certain types of vehicle noise baffles even the most capable technicians. Often such practices as:

- Increase tire inflation pressure to eliminate tire noise.
- Listen for noise at varying speeds with different driveline load conditions
- Swerving the vehicle from left to right to detect wheel bearing noise.

All driveline module assemblies produce noise to a certain extent. Slight carrier noise that is noticeable only at certain speeds or isolated situations should be considered normal. Carrier noise tends to peak at a variety of vehicle speeds. Noise is **NOT ALWAYS** an indication of a problem within the carrier.

TIRE NOISE

Tire noise is often mistaken for driveline module noise. Tires that are unbalanced, worn unevenly or are worn in a saw-tooth manner are usually noisy. They often produce a noise that appears to originate in the driveline module.

Tire noise changes with different road surfaces, but driveline module noise does not. Inflate all four tires with approximately 20 psi (138 kPa) more than the recommended inflation pressure (for test purposes only). This will alter noise caused by tires, but will not affect noise caused by the differential. Rear axle noise usually ceases when coasting at speeds less than 30 mph (48 km/h); however, tire noise continues, but at a lower frequency, as the speed is reduced.

After test has been completed lower tire pressure back to recommended pressure.

GEAR NOISE (DRIVE PINION AND RING GEAR)

Abnormal gear noise is rare and is usually caused by scoring on the ring gear and drive pinion. Scoring is the result of insufficient or incorrect lubricant in the carrier housing.

Abnormal gear noise can be easily recognized. It produces a cycling tone that will be very pronounced within a given speed range. The noise can occur during one or more of the following drive conditions:

- Drive
- Road load
- Float
- Coast

Abnormal gear noise usually tends to peak within a narrow vehicle speed range or ranges. It is usually more pronounced between 30 to 40 mph (48 to 64 km/h) and 50 to 60 mph (80 to 96 km/h). When objectionable gear noise occurs, note the driving conditions and the speed range.

BEARING NOISE (DRIVE PINION AND DIFFERENTIAL)

Defective bearings produce a rough growl that is constant in pitch and varies with the speed of vehicle. Being aware of this will enable a technician to separate bearing noise from gear noise.

Drive pinion bearing noise that results from defective or damaged bearings can usually be identified by its constant, rough sound. Drive pinion front bearing is usually more pronounced during a coast condition. Drive pinion rear bearing noise is more pronounced during a drive condition. The drive pinion bearings are rotating at a higher rate of speed than either the differential side bearings or the axle shaft bearing.

Differential side bearing noise will usually produce a constant, rough sound. The sound is much lower in frequency than the noise caused by drive pinion bearings.

Bearing noise can best be detected by road testing the vehicle on a smooth road (black top). However, it is easy to mistake tire noise for bearing noise. If a doubt exists, the tire treads should be examined for irregularities that often causes a noise that resembles bearing noise.

ENGINE AND TRANSMISSION NOISE

Sometimes noise that appears to be in the driveline module assembly is actually caused by the engine or the transmission. To identify the true source of the noise, note the approximate vehicle speed and/or RPM when the noise is most noticeable. Stop the vehicle next to a flat brick or cement wall (this will help reflect the sound). Place the transaxle in **NEUTRAL** . Accelerate the engine slowly up through the engine speed that matches the vehicle speed noted when the noise occurred. If the same noise is produced, it usually indicates that the noise is being caused by the engine or transaxle.

REAR DRIVELINE MODULE OPERATION

Driveline module operation requires relatively straight-forward diagnosis. Refer to the following chart:

CONDITION	POSSIBLE CAUSES	CORRECTION
No AWD in forward or reverse directions, propeller shaft turning	1. Check ECC	1. Review ECC diagnostic information
	2. Rear differential failure	2. Replace the rear differential assembly
No AWD in forward or reverse directions, propeller shaft not turning	1. Power transfer unit failure.	1. Replace power transfer unit components as necessary
Vibration at all speeds, continuous torque transfer	1. Mis-matched tires, worn tires on front axle.	1. Replace worn or incorrect (mis-matched) tires with same make and size

REMOVAL

REMOVAL

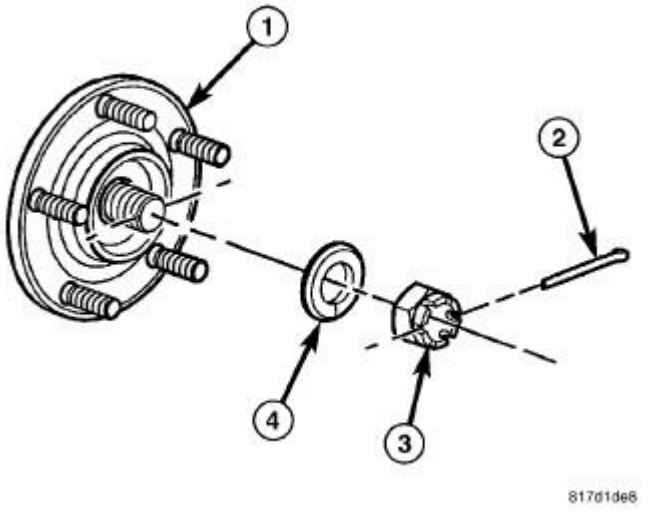

Fig. 60: Support Module With Jack
Courtesy of CHRYSLER LLC

1 - DRIVELINE MODULE 2 - TRANSMISSION JACK

NOTE: Rear suspension and drivetrain design require this procedure to be performed on a "drive-on" hoist, as the front and rear suspension needs to be compressed to ride height to facilitate rear halfshaft removal.

1. Make sure transaxle is in Neutral (N) position.
2. Raise vehicle on hoist.
3. Remove exhaust system center hanger (at propeller shaft bearing/support).
4. Disconnect exhaust system at rear-most hanger and lower at least 254 mm (10 in.). Support system with suitable wire or rope.
5. Drain differential lubricant to prevent fluid spillage upon removal. See **STANDARD PROCEDURE - DIFFERENTIAL ASSEMBLY FLUID CHANGE**.
6. Support driveline module (1) with transmission jack (2) (or equivalent).

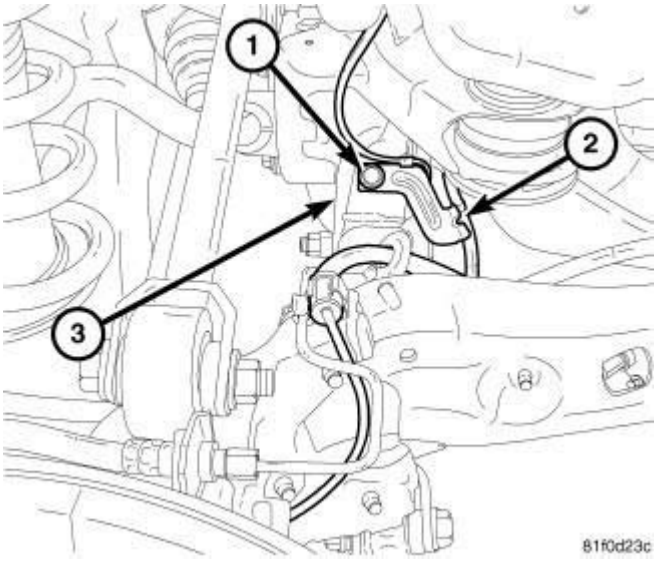

Fig. 61: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

7. Apply alignment index marks (4) on the rear axle flange (5) and rubber coupler (1).
8. Remove three rear propeller shaft rubber coupler to rear axle input flange retaining bolts (3).

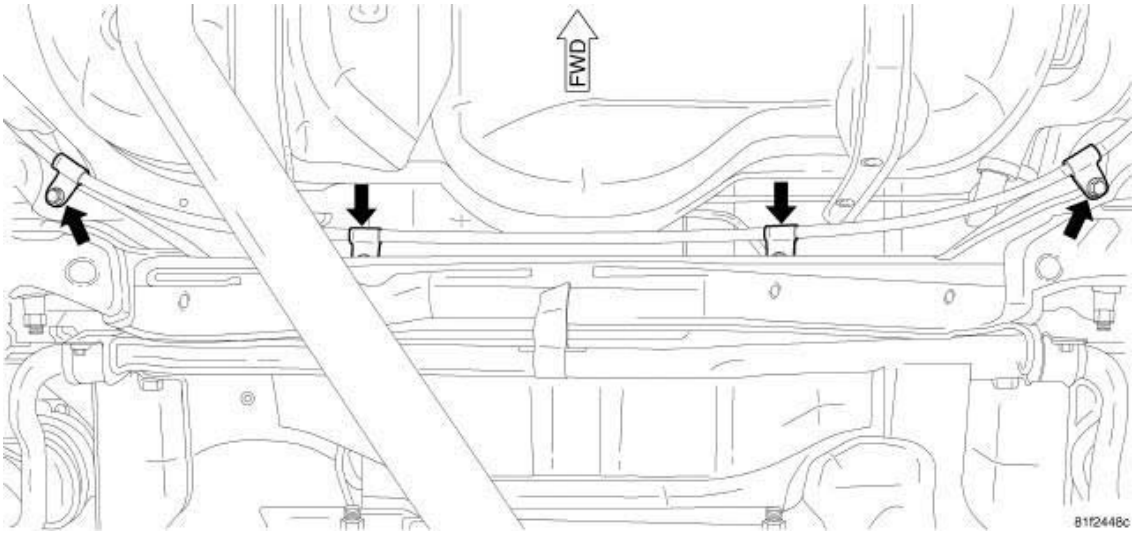

Fig. 62: ECC Electrical Connector
Courtesy of CHRYSLER LLC

9. Unplug ECC electrical connector.

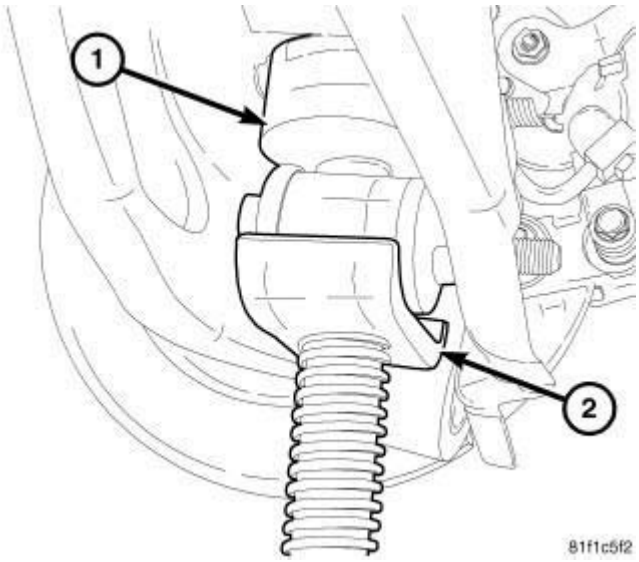

Fig. 63: Seal Protector
Courtesy of CHRYSLER LLC

1 - HALFSHAFT
2 - SEAL PROTECTOR

10. Using suitable screwdriver, partially dislodge halfshafts (1) from differential. Install Seal Protector 9099 (2) to protect seal upon disassembly. Clean tool and seal area to prevent debris intrusion.

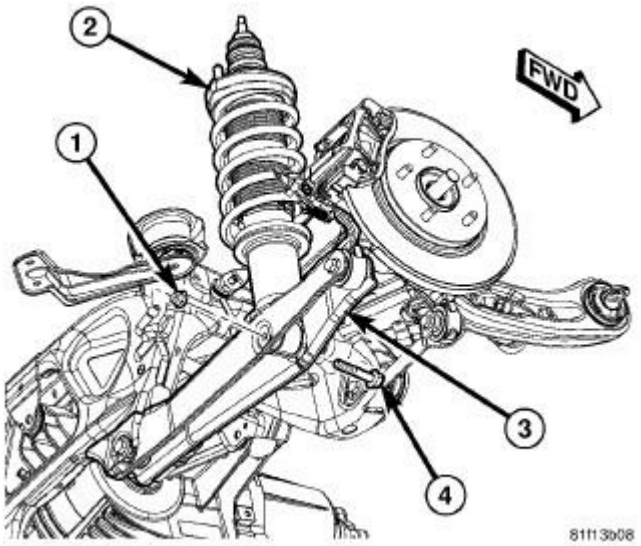

Fig. 64: RDA To Crossmember Bolts
Courtesy of CHRYSLER LLC

11. Remove the RDA - to - crossmember mounting bolts (1).

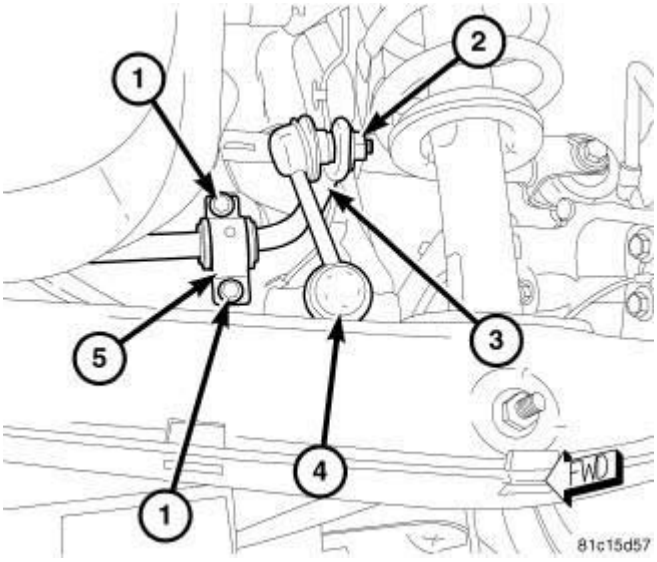

Fig. 65: Rear RDA Module-To-Crossmember Bolt
Courtesy of CHRYSLER LLC

12. Remove the rear RDA module-to-crossmember bolt (2).

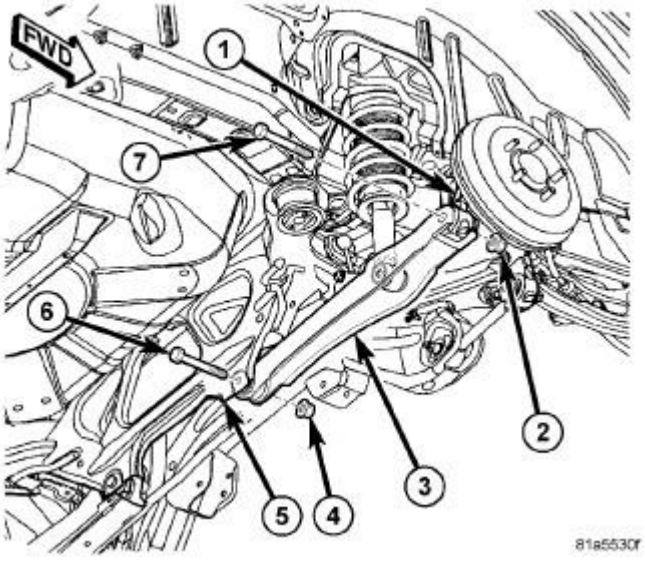

Fig. 66: Secure Propeller Shaft to Exhaust
Courtesy of CHRYSLER LLC

1 - PROPELLER SHAFT
2 - EXHAUST SYSTEM
3 - STRAP

13. Lower driveline module assembly just enough to facilitate removal of halfshafts from differential. Make sure Seal Protector 9099 engages seal.

14. Disconnect propeller shaft (1) from driveline module and secure to exhaust system (2) or support with jack stand.

CAUTION: Do not allow the propeller shaft to hang from the vehicle unsupported. Damage may occur to the joint, boot, and center bearing from over-angulation.

15. Remove driveline module assembly.

INSTALLATION

INSTALLATION

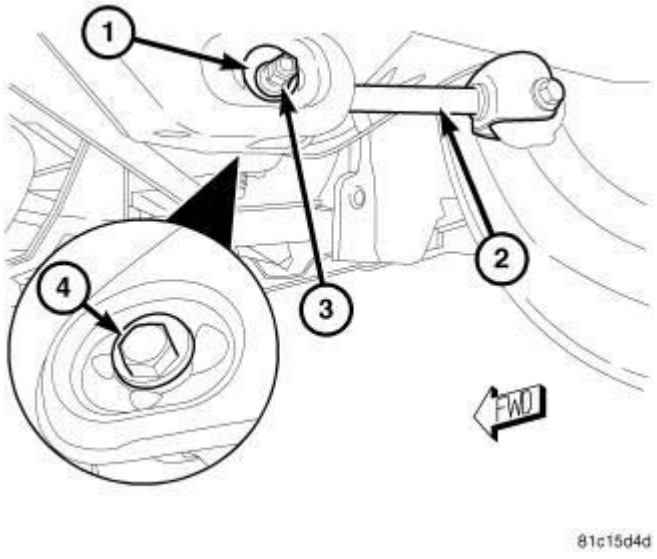

Fig. 67: Seal Protector
Courtesy of CHRYSLER LLC

1 - HALFSHAFT 2 - SEAL PROTECTOR

1. Install driveline module to transmission jack. Secure module to jack.
2. Using Seal Protector 9099 (2), load halfshafts to differential, one side at a time. Clean tool and seal area to prevent debris intrusion.

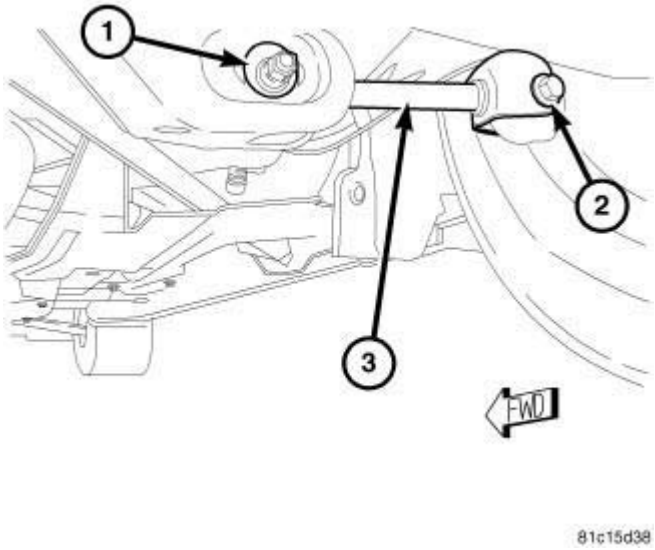

Fig. 68: Support Module With Jack
Courtesy of CHRYSLER LLC

1 - DRIVELINE MODULE 2 - TRANSMISSION JACK

3. Raise driveline module (1) into position.

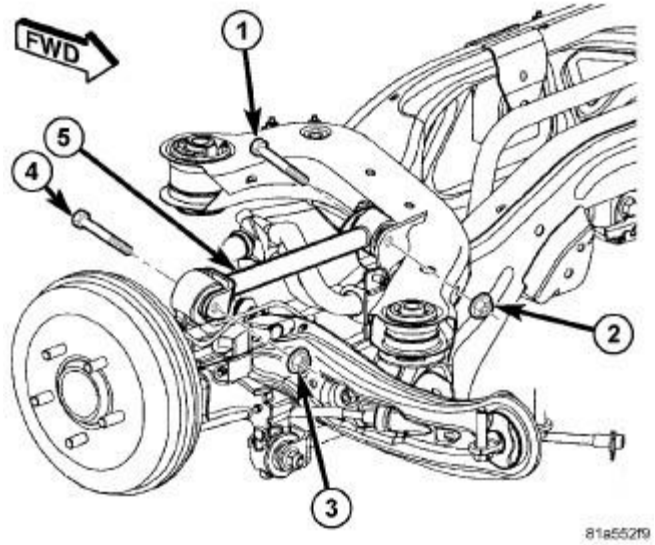

Fig. 69: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

4. Align marks (4) on propeller shaft rubber coupler (1) to rear axle input flange (5).
5. Install three rear propeller shaft to rear axle retaining bolts (3) but do not tighten at this time.

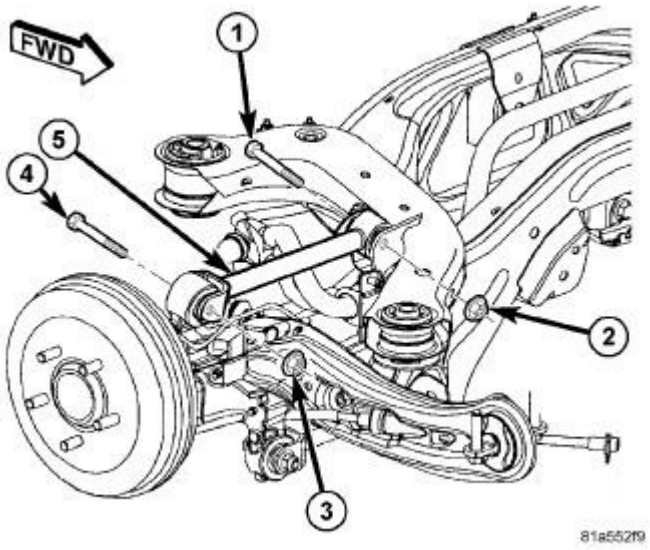

Fig. 70: RDA To Crossmember Bolts
Courtesy of CHRYSLER LLC

6. Install the RDA - to - crossmember mounting bolts (1) and tighten to 102 N.m (75 ft. lbs.).

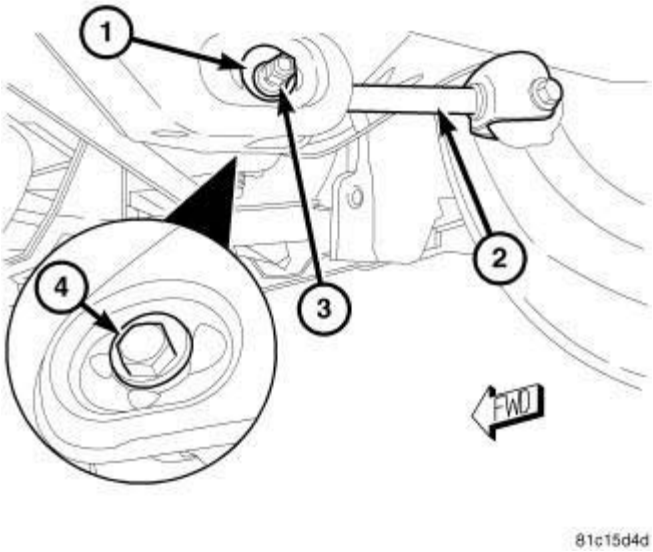

Fig. 71: Rear RDA Module-To-Crossmember Bolt
Courtesy of CHRYSLER LLC

7. Install the rear RDA - to - crossmember mounting bolt (2) to 102 N.m (75 ft. lbs.)
8. Tighten propeller shaft-to-driveline module bolts to 58 N.m (43 ft.lbs.).
9. Raise exhaust system into position and install hanger/brackets.
10. Fill differential with 0.7L (0.74 Quarts) of Mopar® Gear and Axle Lubricant (75W-90). See **STANDARD PROCEDURE - DIFFERENTIAL ASSEMBLY FLUID CHANGE**.

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, Driveline Module-to-Body	54	40	-
Bolt, Overrunning Clutch Housing-to-Differential	60	44	-
Nut, Input Flange	135	100	-
Plug, Differential Drain/Fill	35	26	-
Bolt, Module to Cradle	102	75	-
Bolts, Propeller Shaft-to-Driveline Module	54	40	-

SPECIAL TOOLS

SPECIAL TOOLS

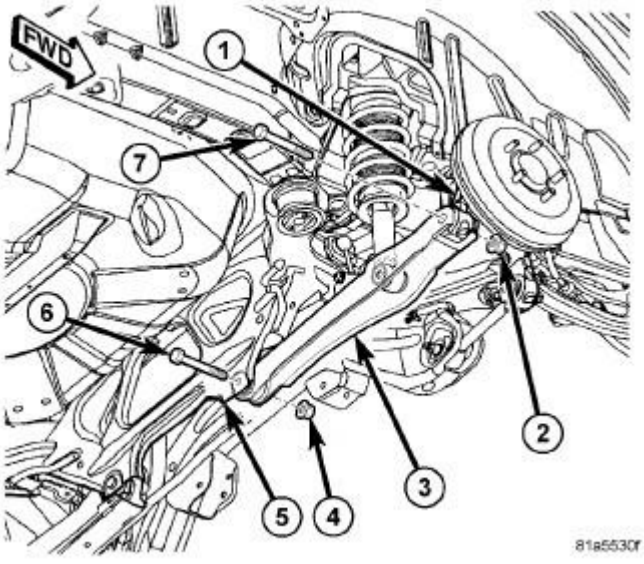

Fig. 72: Flange Wrench, C-3281
Courtesy of CHRYSLER LLC

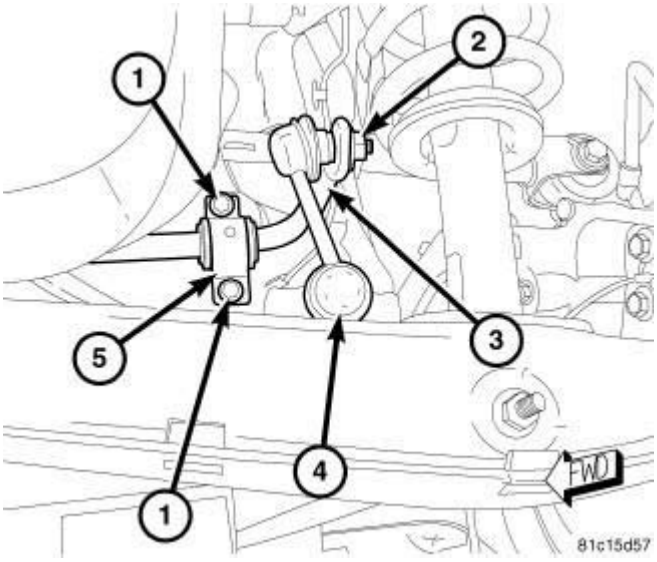

Fig. 73: Installer 8493
Courtesy of CHRYSLER LLC

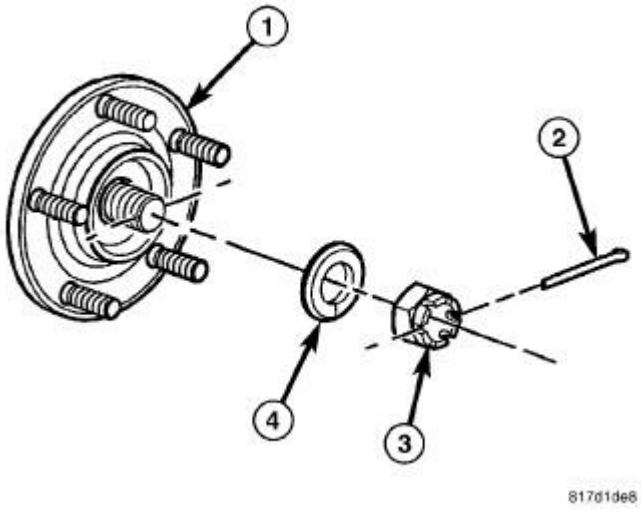

Fig. 74: Installer 9231A
Courtesy of CHRYSLER LLC

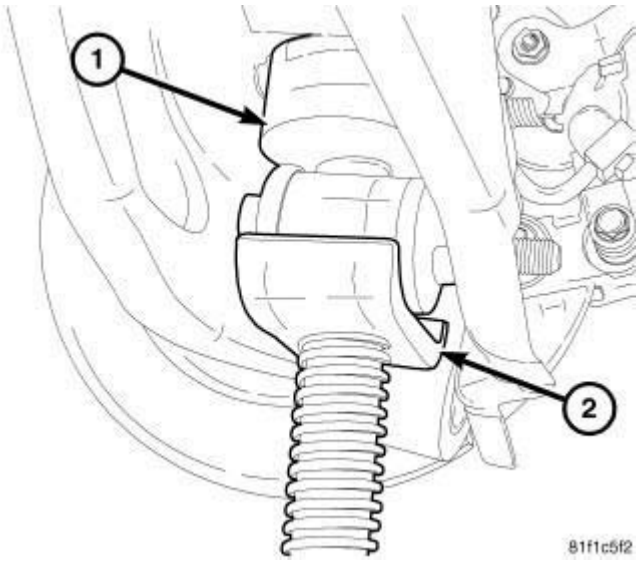

Fig. 75: Protector, 9099
Courtesy of CHRYSLER LLC

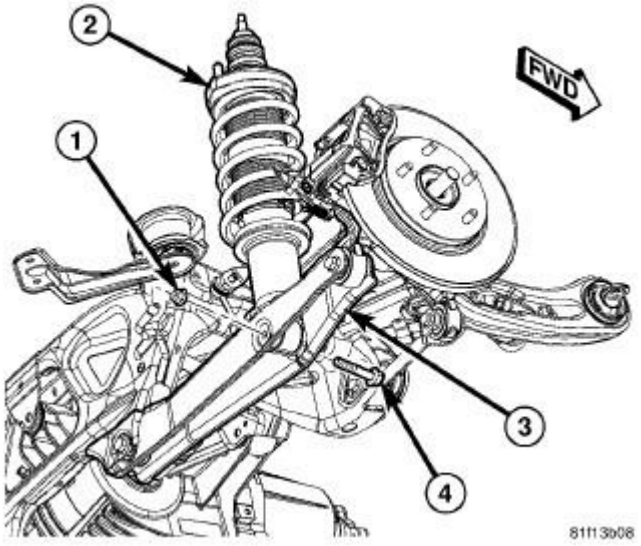

Fig. 76: Universal Handle C-4171
Courtesy of CHRYSLER LLC

CASE ASSEMBLY, DIFFERENTIAL

Description

DESCRIPTION

The differential gear system divides the torque between the axle shafts. It allows the axle shafts to rotate at different speeds when turning corners.

Each differential side gear is splined to an axle shaft. The pinion gears are mounted on a pinion mate shaft and are free to rotate on the shaft. The pinion gear is fitted in a bore in the differential case and is positioned at a right angle to the axle shafts.

Operation

OPERATION

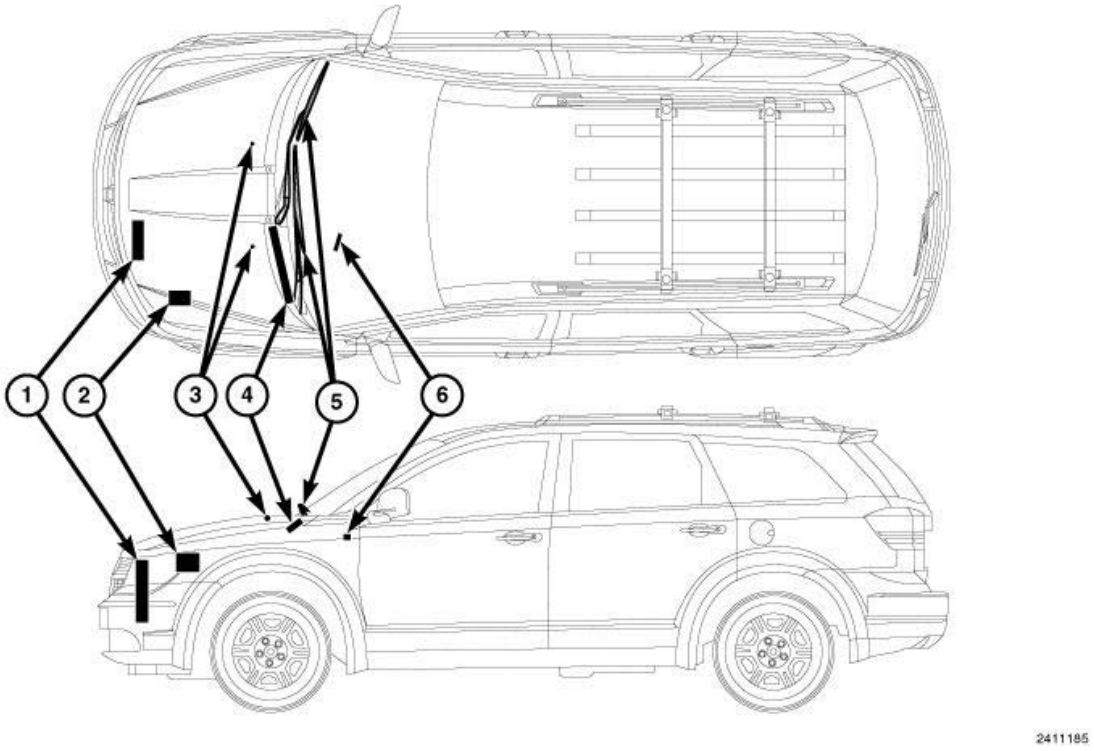

Fig. 77: Differential Operation-Straight Ahead Driving
Courtesy of CHRYSLER LLC

1 - IN STRAIGHT AHEAD DRIVING EACH WHEEL ROTATES AT 100% OF CASE SPEED
2 - PINION GEAR
3 - SIDE GEAR
4 - PINION GEARS ROTATE WITH CASE

In operation, power flow occurs as follows:

- The pinion gear (2) rotates the ring gear
- The ring gear (bolted to the differential case) rotates the case
- The differential pinion gears (mounted on the pinion mate shaft in the case) rotate the side gears
- The side gears (splined to the axle shafts) rotate the shafts

During straight-ahead driving, the differential pinion gears do not rotate on the pinion mate shaft. This occurs

because input torque applied to the gears is divided and distributed equally between the two side gears. As a result, the pinion gears revolve with the pinion mate shaft but do not rotate around it.

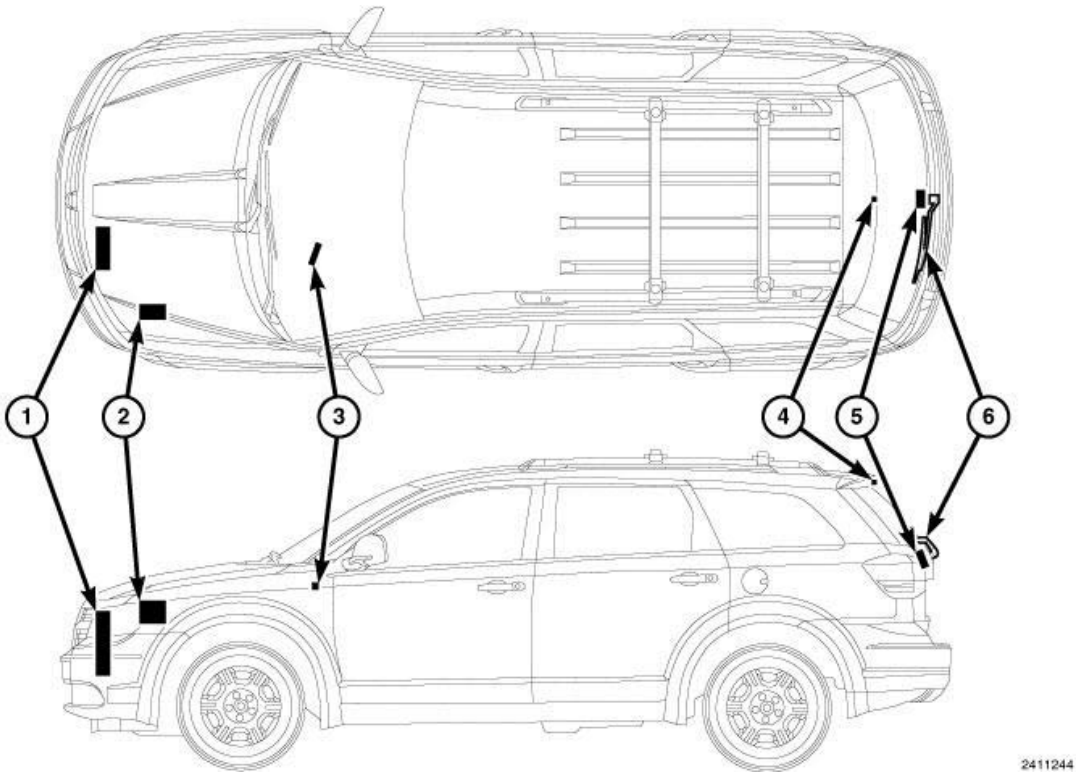

Fig. 78: Pinion Gears
Courtesy of CHRYSLER LLC

1 - PINION GEARS ROTATE ON PINION SHAFT

When turning corners, the outside wheel must travel a greater distance than the inside wheel to complete a turn. The difference must be compensated for to prevent the tires from scuffing and skidding through turns. To accomplish this, the differential allows the axle shafts to turn at unequal speeds. In this instance, the input torque applied to the pinion gears is not divided equally. The pinion gears now rotate around the pinion mate shaft in opposite directions. This allows the side gear and axle shaft attached to the outside wheel to rotate at a faster speed.

FLUID, DIFFERENTIAL

Standard Procedure

STANDARD PROCEDURE - DIFFERENTIAL ASSEMBLY FLUID CHANGE

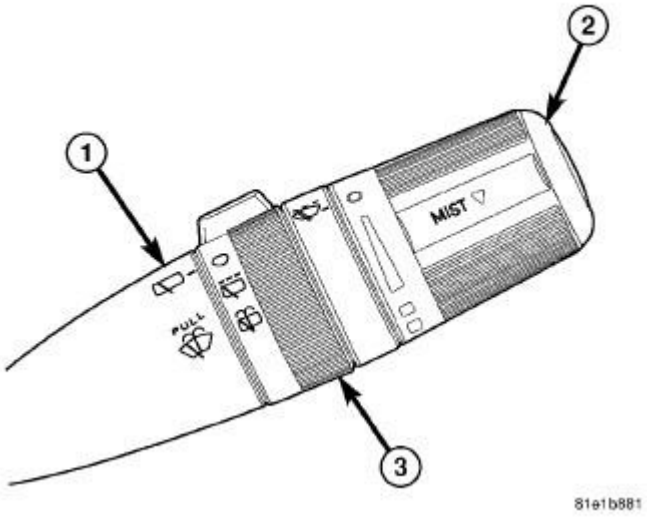

Fig. 79: Differential Assembly Fluid Change
Courtesy of CHRYSLER LLC

The drain plug (2) for the differential assembly is located in the bottom of the differential assembly case, toward the rear of the unit.

The fill plug (3) for the differential assembly is located on the left side of the assembly case.

The correct fill level is to the bottom of the fill plug hole. Be sure the vehicle is on a level surface, or is hoisted in a level manner, in order to obtain the correct fill level.

1. Raise the vehicle on a hoist.
2. Position a drain pan under the differential drain plug.
3. Remove the drain plug and allow the fluid to drain into the pan.
4. Install the drain plug and torque to 35 N.m (26 ft. lbs.).
5. Re-position the drain pan under the differential fill plug.
6. Remove the differential fill plug.
7. Using a suction gun or equivalent, fill the differential assembly with 0.7 L (0.74 Quarts) of Mopar® Gear and Axle Lubricant (75W-90).
8. Install the fill plug and torque to 35 N.m (26 ft. lbs.).

SEAL, INPUT FLANGE

Removal

REMOVAL

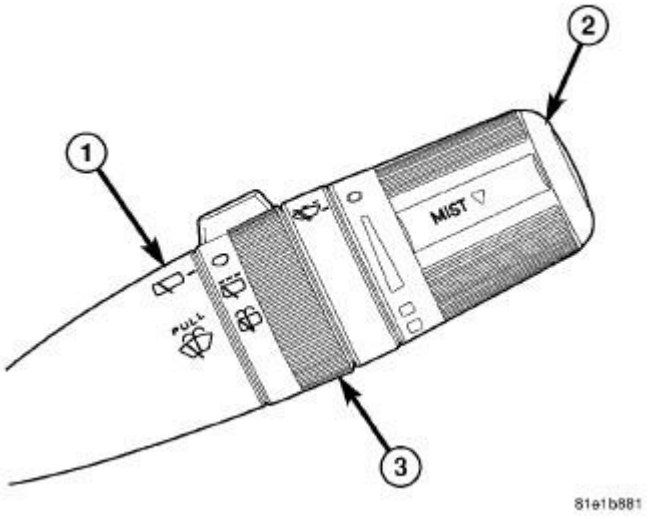

Fig. 80: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

NOTE: Rubber coupler is part of the propeller shaft assembly. Removing coupler from propeller shaft will result in vibration/balance issues.

1. Raise vehicle on hoist.
2. Apply alignment index marks (4) on the rear axle flange (5) and rubber coupler (1).
3. Remove three rear propeller shaft rubber coupler to rear axle input flange retaining bolts (3).
4. Slide propeller shaft (2) back off rear axle input flange (5) and move out of the way as needed.

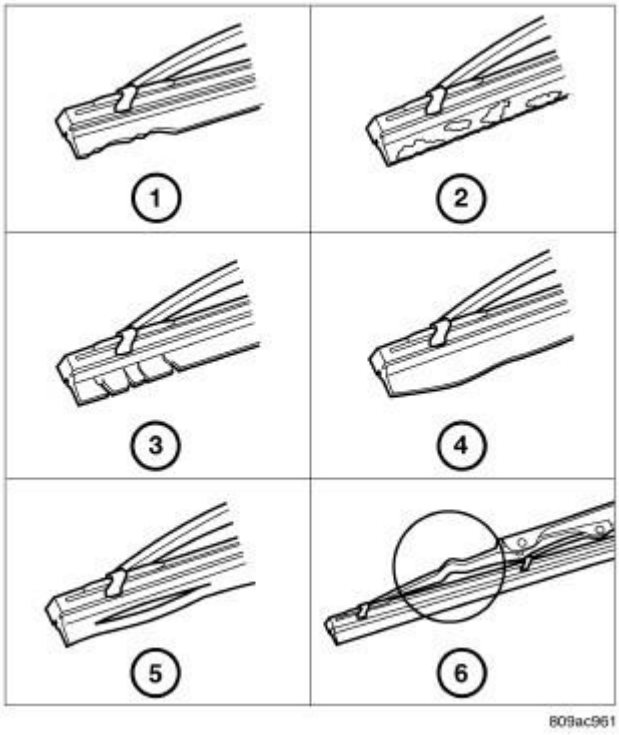

Fig. 81: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER LLC

5. Using tool C-3281 (1), loosen input flange nut.

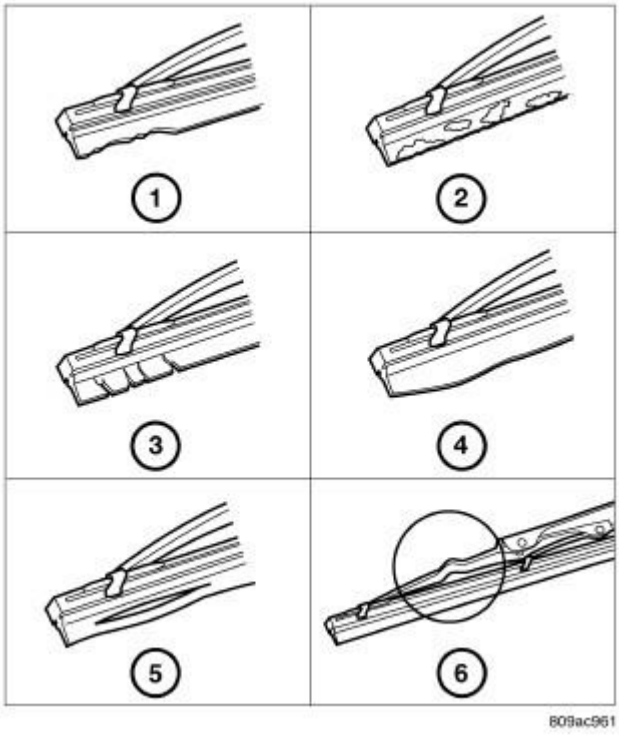

Fig. 82: Input Flange Nut Removal/Installation
Courtesy of CHRYSLER LLC

1 - NUT

6. Remove input flange nut (1), and discard.

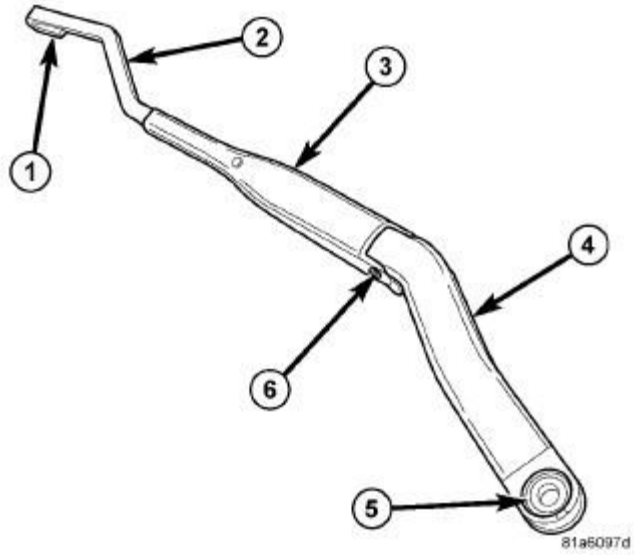

Fig. 83: Input Flange Washer
Courtesy of CHRYSLER LLC

1 - WASHER

7. Remove input flange washer (1).

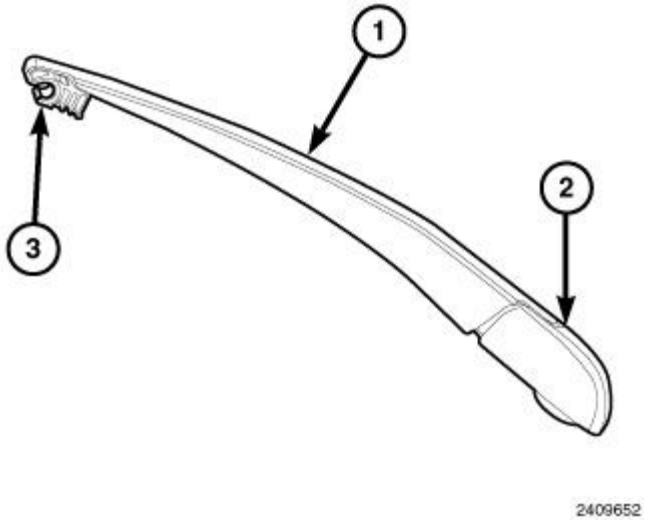

Fig. 84: Suitable Puller & Input Flange
Courtesy of CHRYSLER LLC

8. Using suitable puller (2), remove input flange (1).

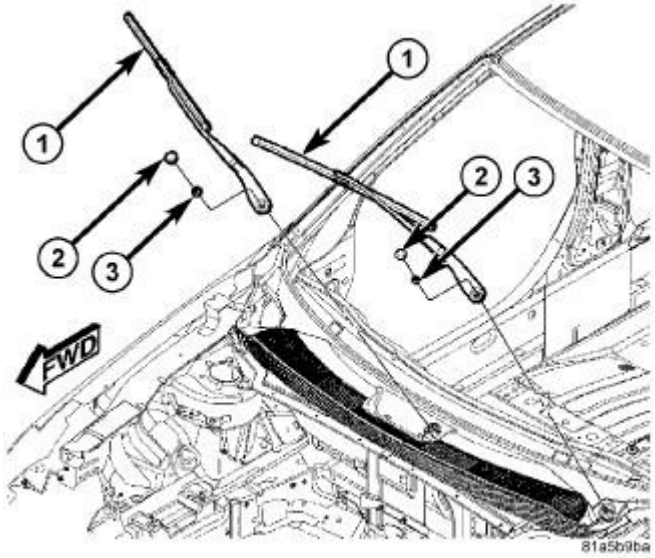

Fig. 85: Input Flange Seal Removal/Installation
Courtesy of CHRYSLER LLC

1 - SEAL 2 - SCREWDRIVER

9. Using suitable screwdriver (2), remove input flange seal from overrunning clutch housing.

Installation

INSTALLATION

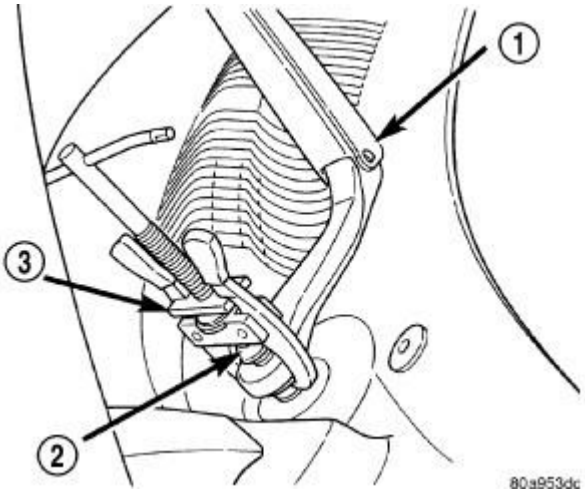

Fig. 86: Clutch Case
Courtesy of CHRYSLER LLC

1. Using tool 9231A (1), install input flange seal to overrunning clutch case (2).

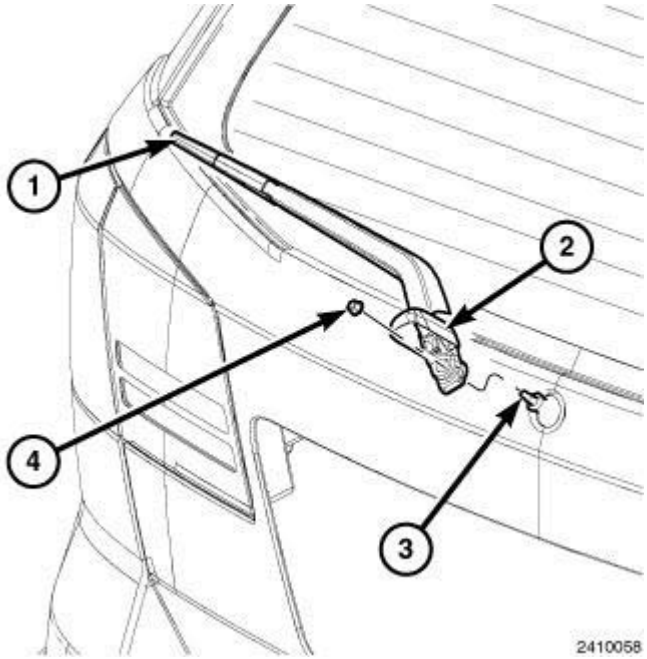

Fig. 87: Input Flange Shaft Seal

Courtesy of CHRYSLER LLC

2. Install input flange shaft seal (1), on shaft threads at midway point of threads (2).

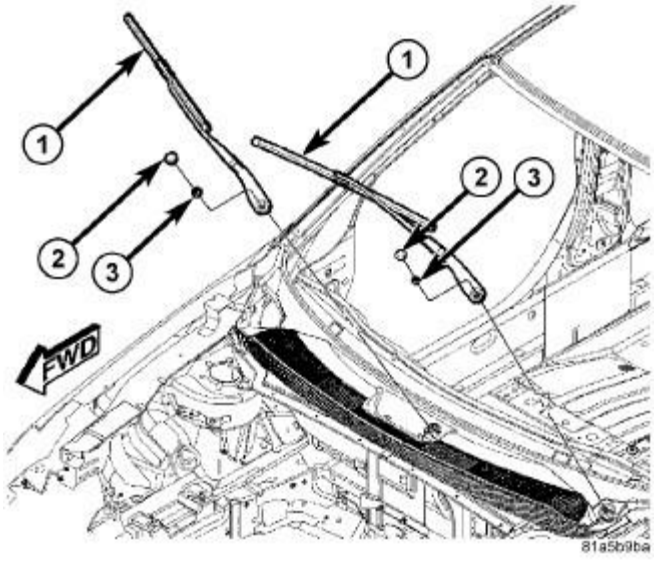

Fig. 88: Input Flange Removal/Installation
Courtesy of CHRYSLER LLC

1 - INPUT FLANGE

3. Install input flange (1).

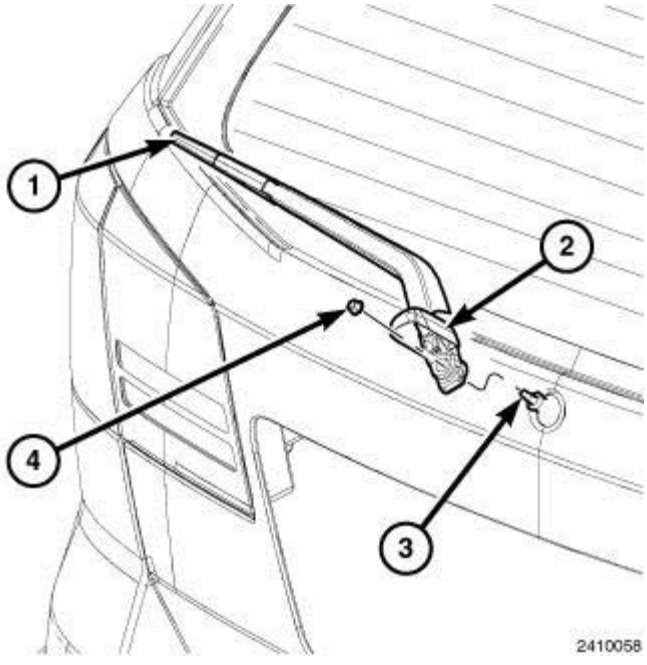

Fig. 89: Input Flange Washer
Courtesy of CHRYSLER LLC

1 - WASHER

4. Install flange washer (1).

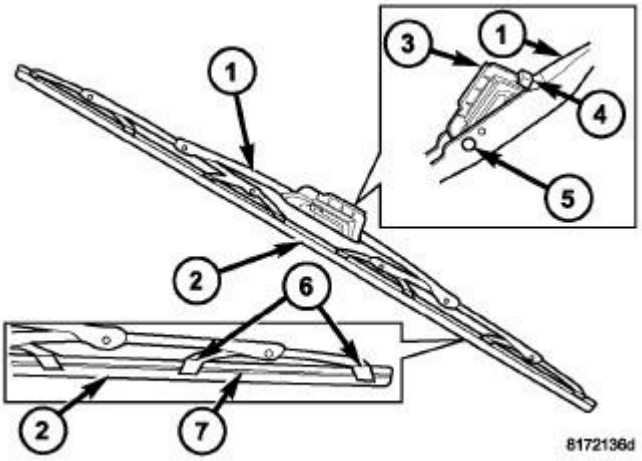

Fig. 90: Input Flange Nut Removal/Installation
Courtesy of CHRYSLER LLC

1 - NUT

5. Install new flange nut (1).

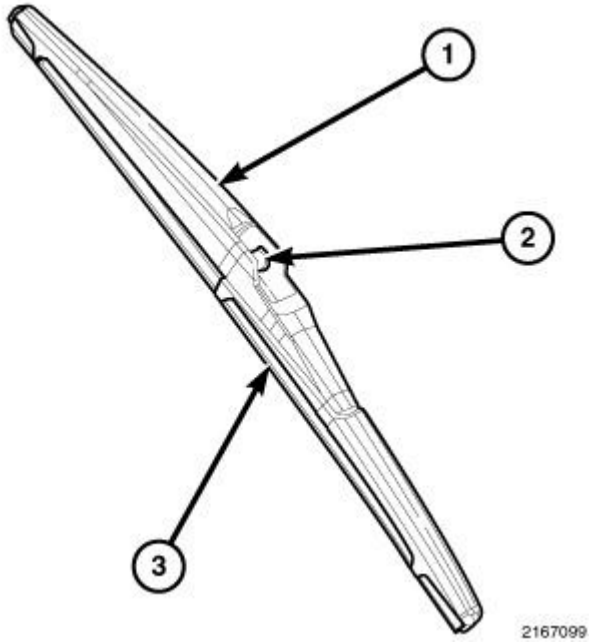

Fig. 91: Pinion Flange Nut Removal/Installation
Courtesy of CHRYSLER LLC

6. Using tool C-3281 (2), torque flange nut to 135 N.m (100 ft. lbs.).

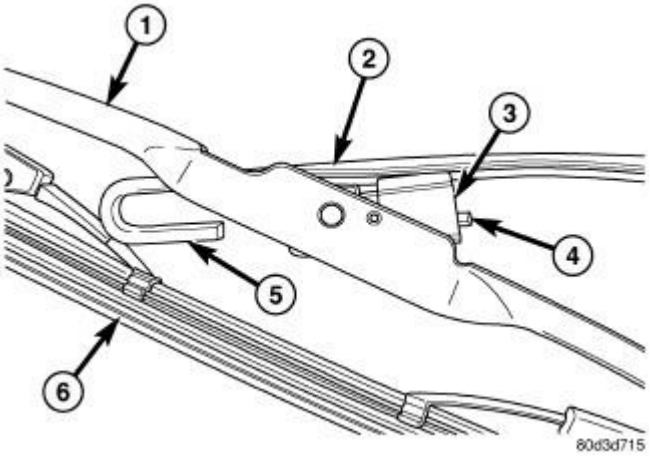

Fig. 92: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

7. Align marks (4) on propeller shaft rubber coupler (1) to rear axle input flange (5).
8. Install three rear propeller shaft to rear axle retaining bolts (3) and tighten to 58 N.m (43 ft. lbs.).
9. Lower vehicle.

SEAL, OUTPUT FLANGE

Removal

REMOVAL

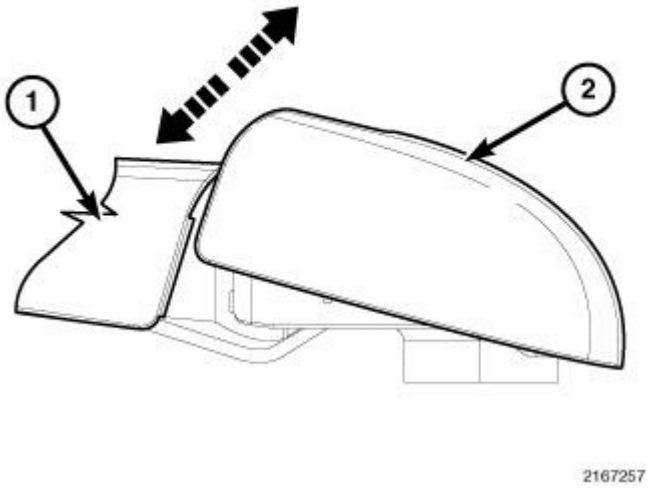

Fig. 93: Axle Seal Removal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - SCREWDRIVER

1. Raise vehicle on hoist.
2. Remove rear driveline module. See **Removal**
3. Use suitable screwdriver (2) to remove output seal (1).

Installation

INSTALLATION

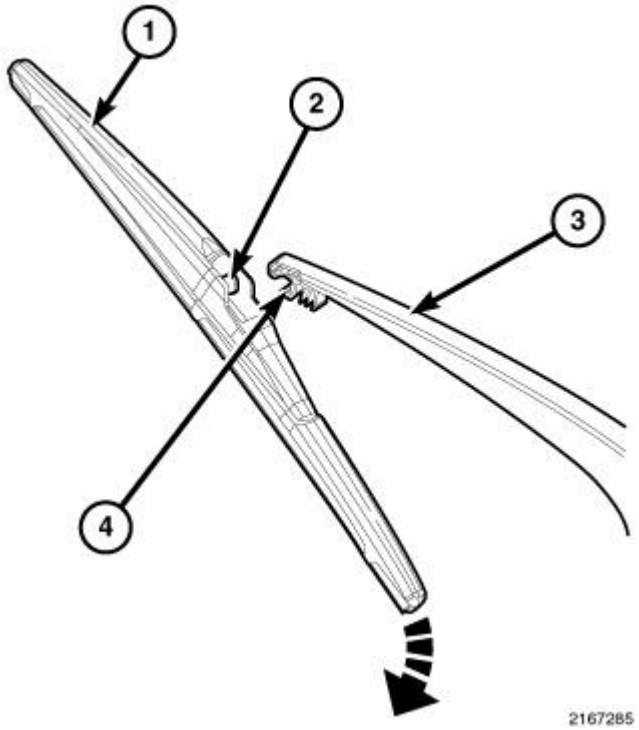

Fig. 94: Axle Seal Installation
Courtesy of CHRYSLER LLC

1 - HANDLE C-4171 2 - INSTALLER 8493

1. Install output flange seal to differential housing using handle C- 4171A (1) and installer 8493 (2).
2. Install rear driveline module. See **Installation**
3. Check differential assembly fluid level and adjust as required. See **STANDARD PROCEDURE - DIFFERENTIAL ASSEMBLY FLUID CHANGE**

ELECTRONICALLY CONTROLLED CLUTCH

REMOVAL

REMOVAL

NOTE: Rubber coupler is part of the propeller shaft assembly. Removing coupler from propeller shaft will result in vibration/balance issues.

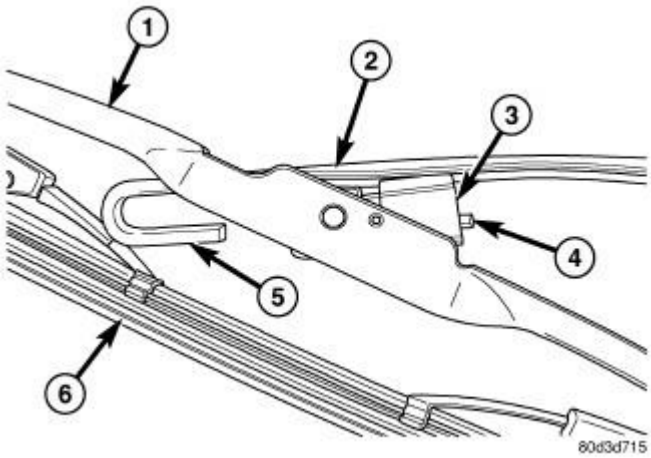

Fig. 95: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

1. Make sure transaxle is in neutral (N).
2. Raise vehicle on hoist.
3. Apply alignment index marks (4) on the rear axle flange (5) and rubber coupler (1).
4. Remove three rear propeller shaft rubber coupler to rear axle input flange retaining bolts (3).
5. Slide propeller shaft (2) back off rear axle input flange (5) and move out of the way as needed.

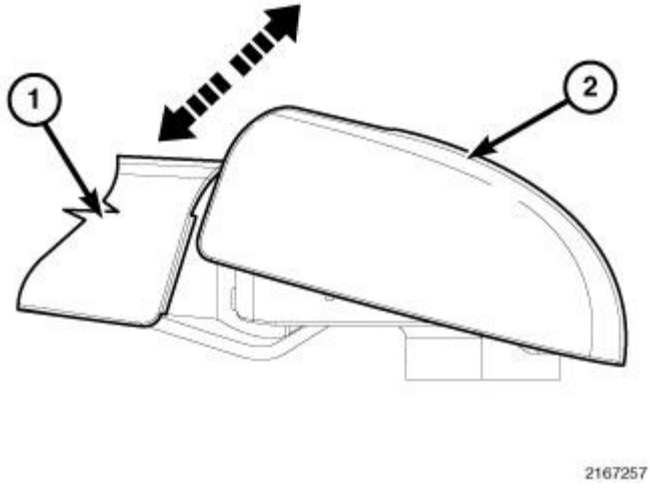

Fig. 96: Electrical Connector At ECC
Courtesy of CHRYSLER LLC

6. Unplug the electrical connector at the ECC.
7. Remove the mounting bolts at the ECC.
8. Remove the ECC.

INSTALLATION

INSTALLATION

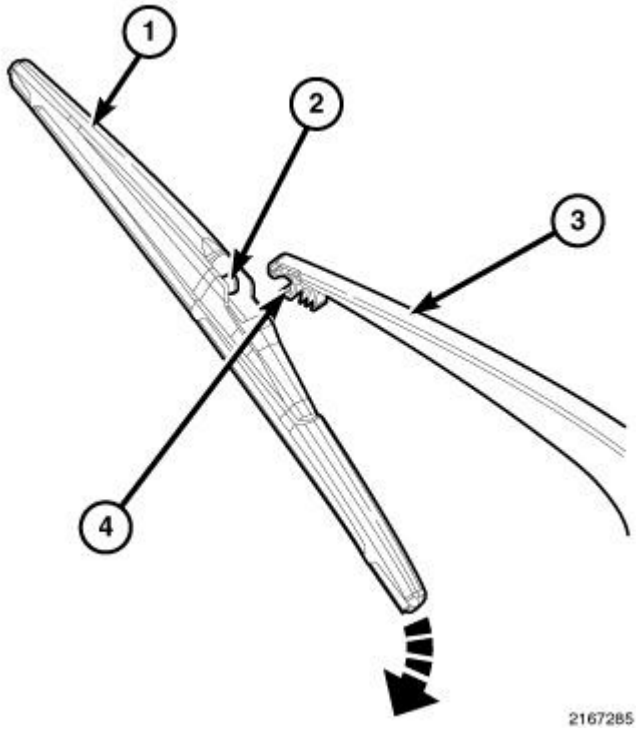

Fig. 97: Electrical Connector At ECC
Courtesy of CHRYSLER LLC

1. Make sure transaxle is in Neutral (N) position.
2. Raise vehicle on hoist.
3. Install the ECC.
4. Install the mounting bolts at the ECC and tighten to 60 N.m (44 ft. lbs.).
5. Connect the electrical connector at the ECC.

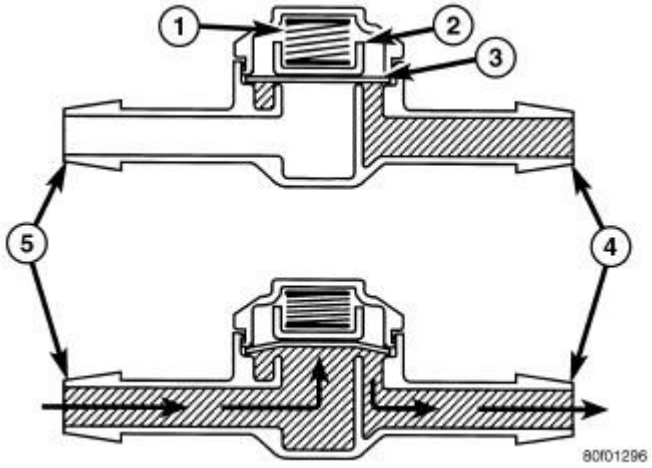

Fig. 98: Removing /Installing Propeller Shaft
Courtesy of CHRYSLER LLC

6. Align marks (4) on propeller shaft rubber coupler (1) to rear axle input flange (5).
7. Install three rear propeller shaft to rear axle retaining bolts (3) and tighten to 58 N.m (43 ft. lbs.).
8. Lower vehicle.

2009 AUTOMATIC TRANSMISSION

41TE - Service Information - [redacted]

DESCRIPTION

DESCRIPTION

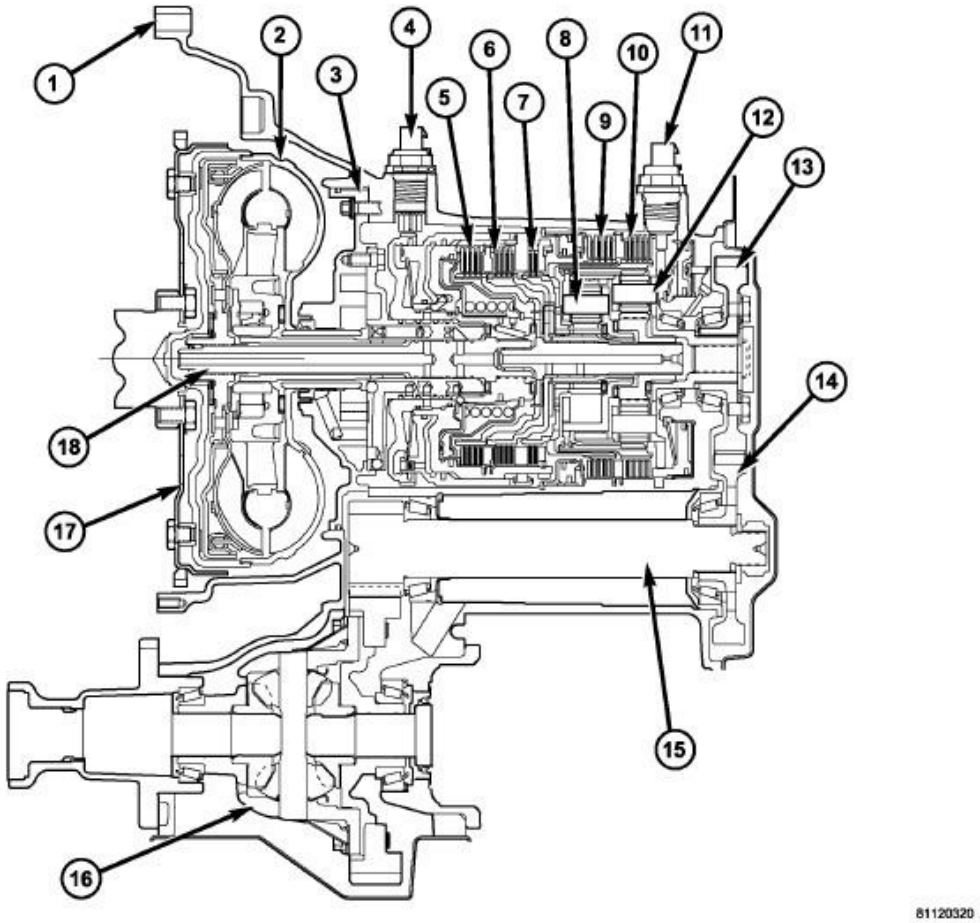

Fig. 1: Identifying 41TE Automatic Transaxle Components
Courtesy of CHRYSLER LLC

1 - TRANSAXLE CASE	7 - REVERSE CLUTCH	13 - OUTPUT SHAFT GEAR
2 - TORQUE CONVERTER	8 - FRONT PLANET CARRIER	14 - TRANSFER SHAFT GEAR
3 - OIL PUMP	9 - 2/4 CLUTCH	15 - TRANSFER SHAFT
4 - INPUT SPEED SENSOR	10 - L/R CLUTCH	16 - DIFFERENTIAL
5 - UNDERDRIVE CLUTCH	11 - OUTPUT SPEED SENSOR	17 - CONVERTER DRIVE PLATE
6 - OVERDRIVE CLUTCH	12 - REAR PLANET CARRIER/OUTPUT SHAFT	18 - INPUT SHAFT

The 41TE is a four-speed transaxle that is a conventional hydraulic/mechanical assembly with an integral differential, and is controlled with adaptive electronic controls and monitors. The hydraulic system of the transaxle consists of the transaxle fluid, fluid passages, hydraulic valves, and various line pressure control components. An input clutch assembly which houses the underdrive, overdrive, and reverse clutches is used. It also utilizes separate holding clutches: 2nd/4th gear and Low/Reverse. The primary mechanical components of the transaxle consist of the following:

- Three multiple disc input clutches
- Two multiple disc holding clutches
- Four hydraulic accumulators
- Two planetary gear sets
- Hydraulic oil pump
- Valve body
- Solenoid/Pressure switch assembly
- Integral differential assembly

Control of the transaxle is accomplished by fully adaptive electronics. Optimum shift scheduling is accomplished through continuous real-time sensor feedback information provided to the Powertrain Control Module (PCM) or Transmission Control Module (TCM).

The PCM/TCM is the heart of the electronic control system and relies on information from various direct and indirect inputs (sensors, switches, etc.) to determine driver demand and vehicle operating conditions. With this information, the PCM/TCM can calculate and perform timely and quality shifts through various output or control devices (solenoid pack, transmission control relay, etc.).

The PCM/TCM also performs certain self-diagnostic functions and provides comprehensive information (sensor data, DTC's, etc.) which is helpful in proper diagnosis and repair. This information can be viewed with the scan tool.

TRANSAXLE IDENTIFICATION

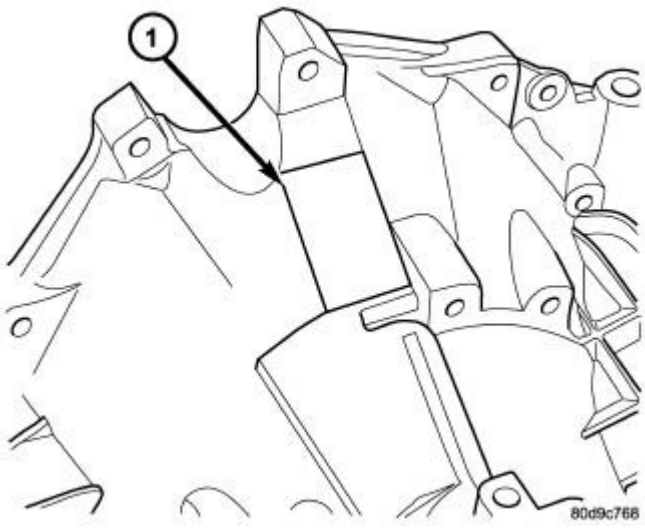

Fig. 2: Locating Transaxle Identification Label
Courtesy of CHRYSLER LLC

1 - IDENTIFICATION LABEL

The 41TE transaxle is identified by a barcode label (1) that is fixed to the transaxle.

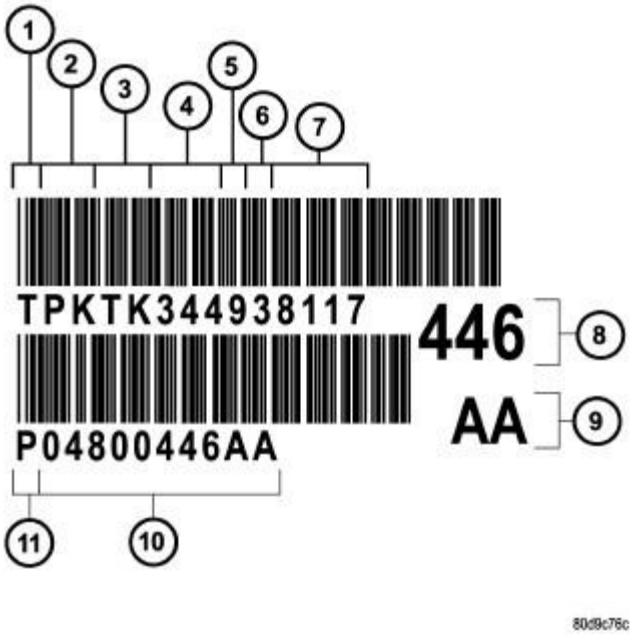

Fig. 3: Identification Label Breakdown
Courtesy of CHRYSLER LLC

1 - T=TRACEABILITY
2 - SUPPLIER CODE (PK=KOKOMO)
3 - COMPONENT CODE (TK=KOKOMO TRANSMISSION)
4 - BUILD DAY (344=DEC. 9)
5 - BUILD YEAR (9=1999)
6 - LINE/SHIFT CODE (3=3RD SHIFT)
7 - BUILD SEQUENCE NUMBER
8 - LAST THREE OF P/N
9 - ALPHA
10 - TRANSAXLE PART NUMBER
11 - P=PART NUMBER

The label contains a series of digits that can be translated into useful information such as transaxle part number, date of manufacture, manufacturing origin, plant shift number, build sequence number, etc. Refer to **Fig. 3** for identification label breakdown.

If the tag is not legible or missing, the "PK" number, which is stamped into the transaxle case behind the transfer gear cover, can be referred to for identification. This number differs slightly in that it contains the entire transaxle part number, rather than the last three digits.

OPERATION

OPERATION

Transmission output is directed to an integral differential by a transfer gear system in the following input-to-output ratios:

First

2.84 : 1

Second

1.57 : 1

Third

1.00 : 1

Overdrive

0.69 : 1

Reverse

2.21 : 1

DIAGNOSIS AND TESTING

40/41TE TRANSAXLE GENERAL DIAGNOSIS

NOTE: Before attempting any repair on a 40/41TE four-speed automatic transaxle, check for Diagnostic Trouble Codes (DTC's) using the scan tool. Refer to POWERTRAIN CONTROL MODULE (PCM) - ELECTRICAL DIAGNOSTICS - 40/41TE .

Transaxle malfunctions may be caused by these general conditions:

- Poor engine performance
- Improper adjustments
- Hydraulic malfunctions
- Mechanical malfunctions
- Electronic malfunctions

Diagnosis of these problems should always begin by checking the easily accessible variables: fluid level and condition, gearshift cable adjustment. Then perform a road test to determine if the problem has been corrected or that more diagnosis is necessary. If the problem persists after the preliminary tests and corrections are completed, hydraulic pressure checks should be performed.

ROAD TEST

Prior to performing a road test, verify that the fluid level, fluid condition, and linkage adjustment have been approved.

During the road test, the transaxle should be operated in each position to check for slipping and any variation in shifting.

If the vehicle operates properly at highway speeds, but has poor acceleration, the converter stator overrunning clutch may be slipping. If acceleration is normal, but high throttle opening is needed to maintain highway speeds, the converter stator clutch may have seized. Both of these stator defects require replacement of the torque converter and thorough transaxle cleaning.

Slipping clutches can be isolated by comparing the "Elements in Use" chart with clutch operation encountered on a road test. This chart identifies which clutches are applied at each position of the selector lever.

A slipping clutch may also set a DTC and can be determined by operating the transaxle in all selector positions.

ELEMENTS IN USE AT EACH POSITION OF SELECTOR LEVER

SHIFT LEVER POSITION	INPUT CLUTCHES			HOLDING CLUTCHES	
	Underdrive	Overdrive	Reverse	2/4	Low/Reverse

P - PARK	-	-	-	-	X
R - REVERSE	-	-	X	-	X
N - NEUTRAL	-	-	-	-	X
OD - OVERDRIVE First	- X	- -	- -	- -	- X
Second	X	-	-	X	-
Direct	X	X	-	-	-
Overdrive	-	X	-	X	-
D - DRIVE* First	- X	- -	- -	- -	- X
Second	X	-	-	X	-
Direct	X	X	-	-	-
L - LOW* First	- X	- -	- -	- -	- X
Second	X	-	-	X	-
Direct	X	X	-	-	-
* Vehicle upshift and downshift speeds are increased when in these selector positions.					

The process of elimination can be used to detect any unit which slips and to confirm proper operation of good units. Road test analysis can diagnose slipping units, but the cause of the malfunction cannot be determined. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.

HYDRAULIC PRESSURE TESTS

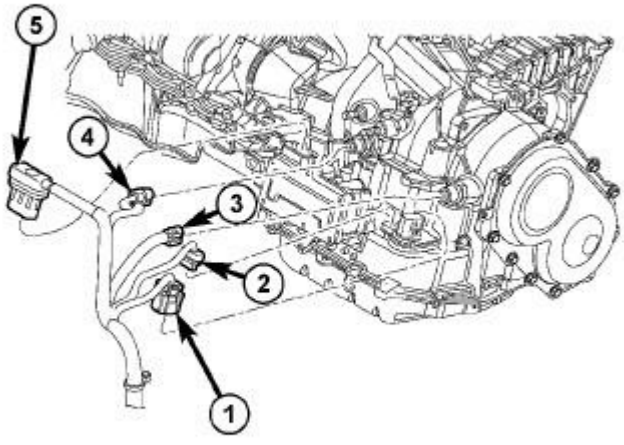

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Fig. 4: Identifying Transmission Electrical Connectors
Courtesy of CHRYSLER LLC

NOTE: Before preforming the hydraulic pressure tests be certain to disconnect the Variable Line Pressure (VLP) electrical connector (2) at the transmission. Check for and clear any codes that may have been set after preforming any hydraulic pressure tests and connecting the Variable Line Pressure (VLP) electrical connector.

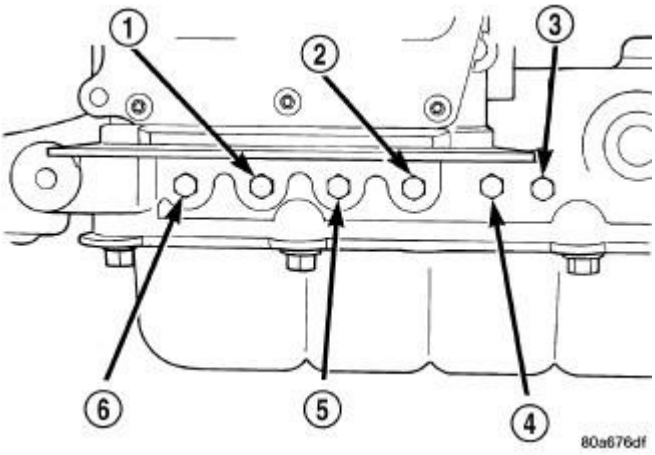


Fig. 5: Identifying Pressure Ports
Courtesy of CHRYSLER LLC

1 - OVERDRIVE CLUTCH
2 - TORQUE CONVERTER OFF
3 - LOW/REVERSE CLUTCH
4 - 2/4 CLUTCH
5 - REVERSE CLUTCH
6 - UNDERDRIVE CLUTCH

Pressure testing is a very important step in the diagnostic procedure. These tests usually reveal the cause of most hydraulic transaxle problems.

Before performing pressure tests, be certain that fluid level and condition, and shift cable adjustments have been checked and approved. Fluid must be at operating temperature 150 to 200 ° F. (66 to 93 ° C).

Install an engine tachometer, raise vehicle on hoist which allows front wheels to turn, and position tachometer so it can be read.

Attach 300 psi Gauge C-3293SP to port(s) (1) overdrive clutch, (2) torque converter off, (3) low/reverse clutch, (4) 2/4 clutch, (5) reverse clutch, (6) underdrive clutch required for test(s) being conducted. Use Adapter Set L-4559 to adapt gauge(s) to transaxle.

TEST ONE-SELECTOR IN LOW (1st GEAR)

1. Attach pressure gauge to the low/reverse clutch tap.
2. Move selector lever to the (L) position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed to 20 mph.
4. Low/reverse clutch pressure should read 115 to 145 psi.
5. This test checks pump output, pressure regulation and condition of the low/reverse clutch hydraulic circuit and shift schedule.

TEST TWO-SELECTOR IN DRIVE (2nd GEAR)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

1. Attach gauge to the underdrive clutch tap.
2. Move selector lever to the 3 position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph.
4. In second gear the underdrive clutch pressure should read 110 to 145 psi.

TEST TWO A-SELECTOR IN OD (4th Gear)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

1. Attach gauge to the underdrive clutch tap.
2. Move selector lever to the (OD) position.
3. Allow wheels to rotate freely and increase throttle opening to achieve an indicated speed of 40 mph.
4. Underdrive clutch pressure should read below 5 psi. If not, then either the solenoid assembly or PCM/TCM is at fault.

TEST THREE-OVERDRIVE CLUTCH CHECK (3rd and 2nd Gear)

1. Attach gauge to the overdrive clutch tap.
2. Move selector lever to the (OD) position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 20 mph. Vehicle should be in 3rd gear.
4. Overdrive clutch pressure should read 74 to 95 psi.
5. Move selector lever to the (3) position and increase indicated vehicle speed to 30 mph.
6. The vehicle should be in second gear and overdrive clutch pressure should be less than 5 psi.
7. This test checks the overdrive clutch hydraulic circuit as well as the shift schedule.

TEST FOUR-SELECTOR IN OVERDRIVE (4th Gear)

1. Attach gauge to the 2/4 clutch tap.
2. Move selector lever to the (OD) position.
3. Allow vehicle front wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph. Vehicle should be in 4th gear.
4. The 2/4 clutch pressure should read 75 to 95 psi.
5. This test checks the 2/4 clutch hydraulic circuit.

TEST FIVE-SELECTOR IN OVERDRIVE (4th Gear-CC on)

1. Attach gauge to the torque converter clutch off pressure tap.
2. Move selector lever to the (OD) position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph. Vehicle should be in 4th gear, CC on.

CAUTION: Both wheels must turn at the same speed.

4. Torque converter clutch off pressure should be less than 5 psi.
5. This test checks the torque converter clutch hydraulic circuit.

TEST SIX-SELECTOR IN REVERSE

1. Attach gauges to the reverse and LR clutch tap.
2. Move selector lever to the (R) position.
3. Read reverse clutch pressure with output stationary (foot on brake) and throttle opened to achieve 1500 RPM.
4. Reverse and LR clutch pressure should read 165 to 235 psi.
5. This test checks the reverse clutch hydraulic circuit.

TEST RESULT INDICATIONS

1. If proper line pressure is found in any one test, the pump and pressure regulator are working properly.
2. Low pressure in all positions indicates a defective pump, a clogged filter, or a stuck pressure regulator valve.
3. Clutch circuit leaks are indicated if pressures do not fall within the specified pressure range.
4. If the overdrive clutch pressure is greater than 5 psi in 4 of Test Three, a worn reaction shaft seal ring or a defective solenoid assembly is indicated.
5. If the underdrive clutch pressure is greater than 5 psi in 4 of Test Two A, a defective solenoid assembly or PCM/TCM is the cause.

PRESSURE CHECK SPECIFICATIONS

GEAR SELECTOR POSITION	ACTUAL GEAR	PRESSURE TAPS					
		Underdrive Clutch	Overdrive Clutch	Reverse Clutch	Torque Converter Clutch Off	2/4 Clutch	Low/Reverse Clutch
PARK 0 mph *	PARK	0-2	0-5	0-2	60-110	0-2	115-145
REVERSE 0 mph *	REVERSE	0-2	0-7	165-235	50-100	0-2	165-235
NEUTRAL 0 mph *	NEUTRAL	0-2	0-5	0-2	60-110	0-2	115-145
LOW 20 mph #	FIRST	110-145	0-5	0-2	60-110	0-2	115-145
3 30 mph #	SECOND	110-145	0-5	0-2	60-110	115-145	0-2
3 45 mph #	DIRECT	75-95	75-95	0-2	60-90	0-2	0-2
OD 30 mph #	OVERDRIVE	0-2	75-95	0-2	60-90	75-95	0-2
OD 50 mph #	OVERDRIVE WITH TCC	0-2	75-95	0-2	0-5	75-95	0-2

*** Engine speed at 1500 RPM**
 # CAUTION: Both front wheels must be turning at the same speed.

CLUTCH AIR PRESSURE TESTS

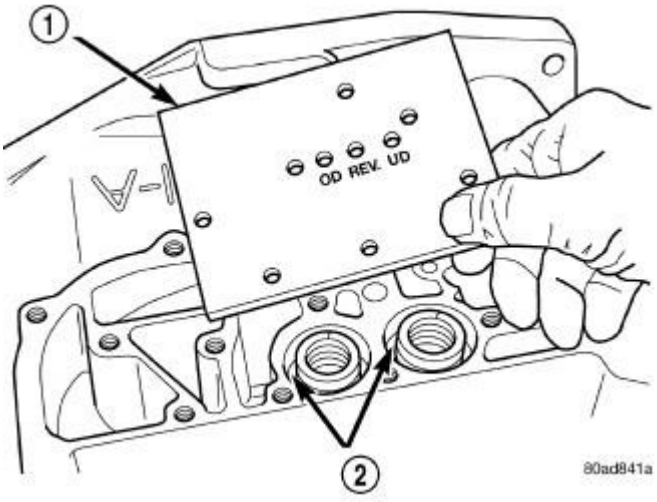


Fig. 6: Identifying Air Pressure Test Plate Tool 6056
Courtesy of CHRYSLER LLC

1 - AIR PRESSURE TEST PLATE TOOL 6056

2 - ACCUMULATORS

Inoperative clutches can be located using a series of tests by substituting air pressure for fluid pressure using Air Pressure Test Plate 6056 (1) .

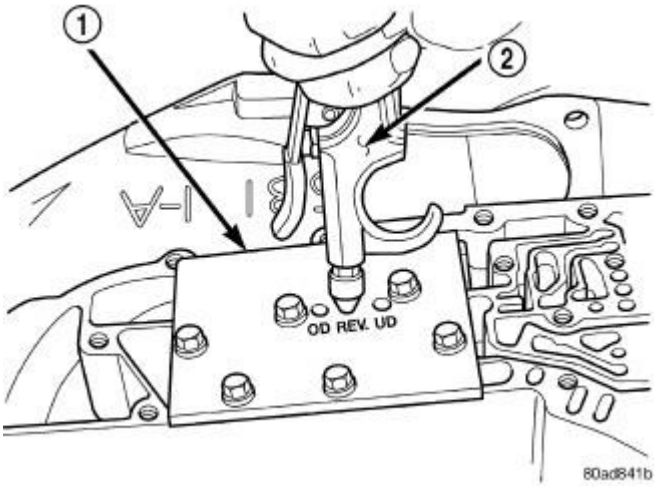


Fig. 7: Testing Clutches Using Air Pressure Test Plate 6056
Courtesy of CHRYSLER LLC

1 - AIR PRESSURE TEST PLATE 6056
2 - AIR NOZZLE

The clutches may be tested by applying air pressure (2) to their respective passages. The valve body must be removed and Air Pressure Test Plate 6056 (1) installed. To make air pressure tests, proceed as follows:

NOTE: The compressed air supply must be free of all dirt and moisture. Use a pressure of 30 psi.

Remove oil pan and valve body. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Removal**.

OVERDRIVE CLUTCH

Apply air pressure to the overdrive clutch apply passage and watch for the push/pull piston to move forward. The piston should return to its starting position when the air pressure is removed.

REVERSE CLUTCH

Apply air pressure to the reverse clutch apply passage and watch for the push/pull piston to move rearward. The piston should return to its starting position when the air pressure is removed.

2/4 CLUTCH

Apply air pressure to the feed hole located on the 2/4 clutch retainer. Look in the area where the 2/4 piston contacts the first separator plate and watch carefully for the 2/4 piston to move rearward. The piston should return to its original position after the air pressure is removed.

LOW/REVERSE CLUTCH

Apply air pressure to the low/reverse clutch feed hole (rear of case, between 2 bolt holes). Then, look in the area where the low/reverse piston contacts the first separator plate. Watch carefully for the piston to move forward. The piston should return to its original position after the air pressure is removed.

UNDERDRIVE CLUTCH

Because this clutch piston cannot be seen, its operation is checked by function. Air pressure is applied to the low/reverse and the 2/4 clutches. This locks the output shaft. Use a piece of rubber hose wrapped around the input shaft and a pair of clamp-on pliers to turn the input shaft. Next apply air pressure to the underdrive clutch. The input shaft should not rotate with hand torque. Release the air pressure and confirm that the input shaft will rotate.

TORQUE CONVERTER HOUSING FLUID LEAKAGE

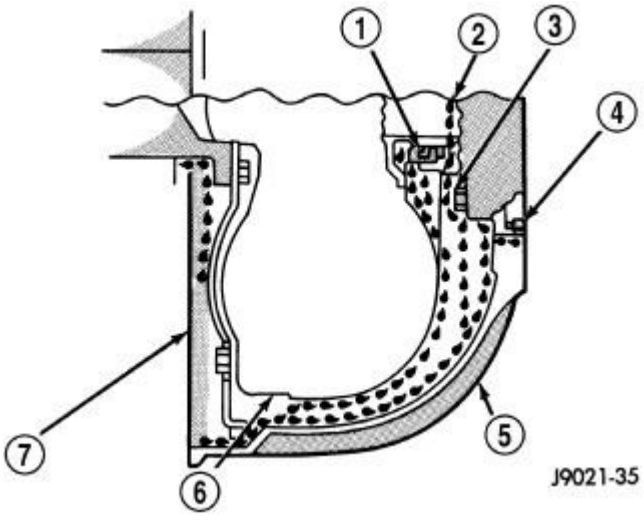


Fig. 8: Identifying Converter Housing Leak Paths
Courtesy of CHRYSLER LLC

1 - PUMP SEAL
2 - PUMP VENT
3 - PUMP BOLT
4 - PUMP GASKET
5 - CONVERTER HOUSING
6 - CONVERTER
7 - REAR MAIN SEAL LEAK

When diagnosing converter housing fluid leaks, three actions must be taken before repair:

1. Verify proper transmission fluid level.
2. Verify that the leak originates from the converter housing area and is transmission fluid.
3. Determine the true source of the leak.

Fluid leakage at or around the torque converter area may originate from an engine oil leak. The area should be examined closely. Factory fill fluid is red and, therefore, can be distinguished from engine oil.

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill, or fill after repair. Converter housing leaks have several potential sources inspect pump seal (1), pump vent (2), pump bolts (3), pump gasket (4), converter housing (5), converter (6) and a rear main seal leak (7). Through careful observation, a leak source can be identified before removing the transmission for repair.

Pump seal leaks tend to move along the drive hub and onto the rear of the converter. Pump O-ring or pump body leaks follow the same path as a seal leak. Pump attaching bolt leaks are generally deposited on the inside of the converter housing and not on the converter itself. Pump seal or gasket leaks usually travel down the inside of the converter housing.

TORQUE CONVERTER LEAKAGE

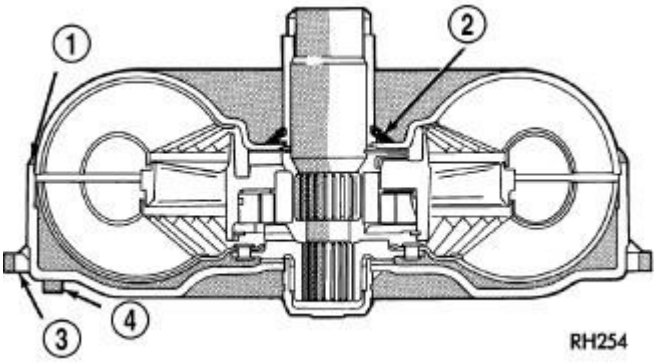


Fig. 9: Identifying Torque Converter Leak Points
Courtesy of CHRYSLER LLC

1 - OUTSIDE DIAMETER WELD
2 - TORQUE CONVERTER HUB WELD
3 - STARTER RING GEAR
4 - LUG

Possible sources of torque converter leakage are:

- Torque converter weld leaks at the outside diameter weld (1) .
- Torque converter hub weld (2).

REMOVAL

REMOVAL

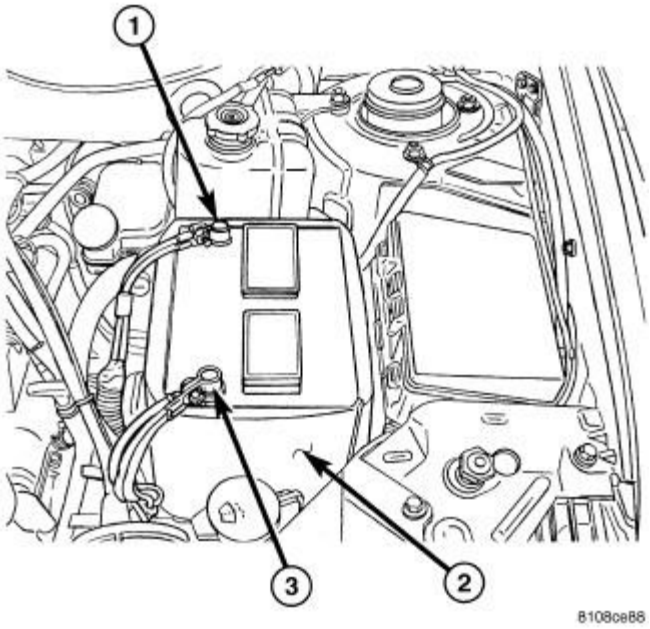


Fig. 10: Identifying Battery Cables
Courtesy of CHRYSLER LLC

NOTE: If transaxle assembly is being replaced or overhauled (clutch and/or seal replacement), it is necessary to perform the "Quick-Learn" Procedure. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Open hood.
2. Disconnect the battery cables (1).
3. Remove the battery hold down bolt and remove the battery (2).

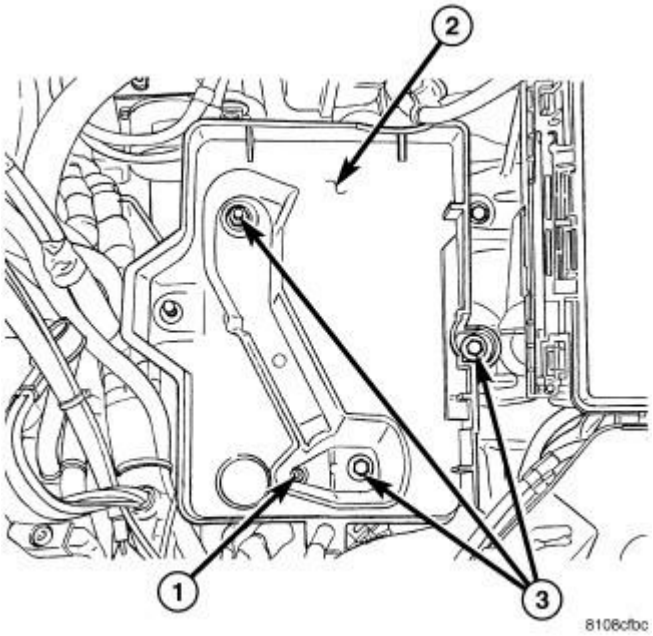


Fig. 11: Removing/Installing Battery Tray
Courtesy of CHRYSLER LLC

4. Remove the clips holding harness and ground cable to the battery tray.
5. Remove the battery tray hold down bolts (3) and remove the battery tray (2).

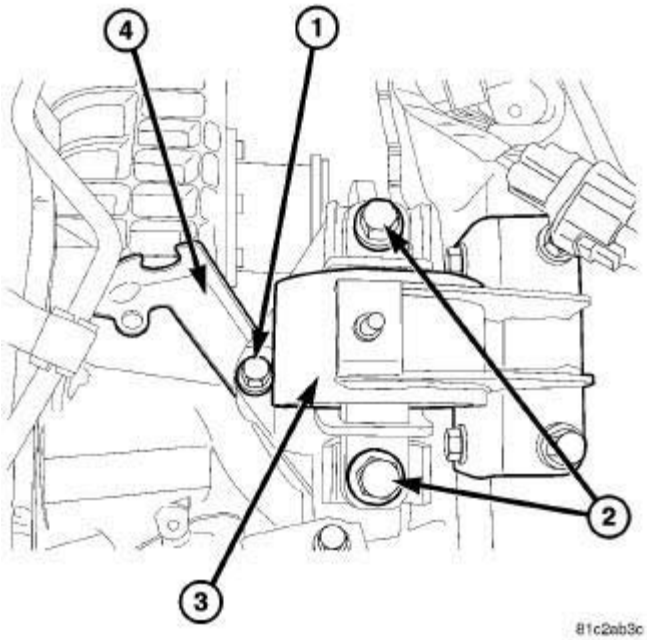


Fig. 12: Identifying Left Mount Bolts

Courtesy of CHRYSLER LLC

6. Remove the bolts at left mount (1, 2).

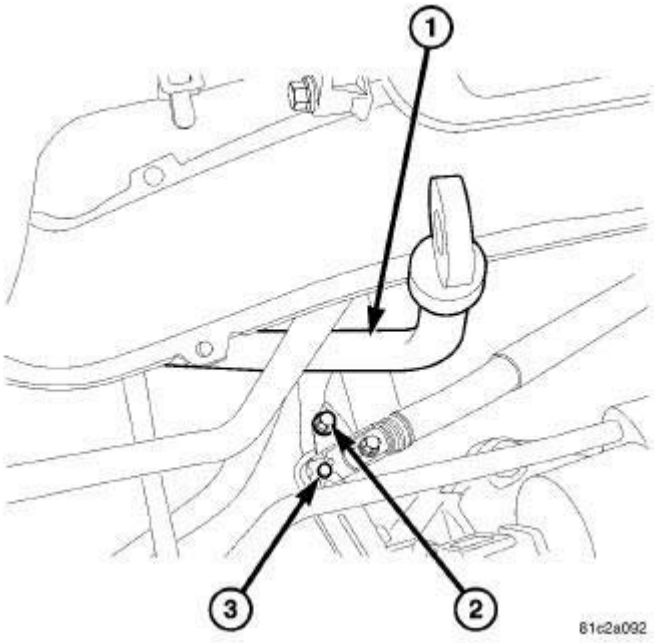


Fig. 13: Removing/Installing Fluid Level Indicator/Tube Assembly
Courtesy of CHRYSLER LLC

7. Remove the bolt (2) at the fluid level indicator/tube assembly.
8. Remove fluid level indicator/tube assembly (1). Plug opening to prevent debris from entering transaxle.

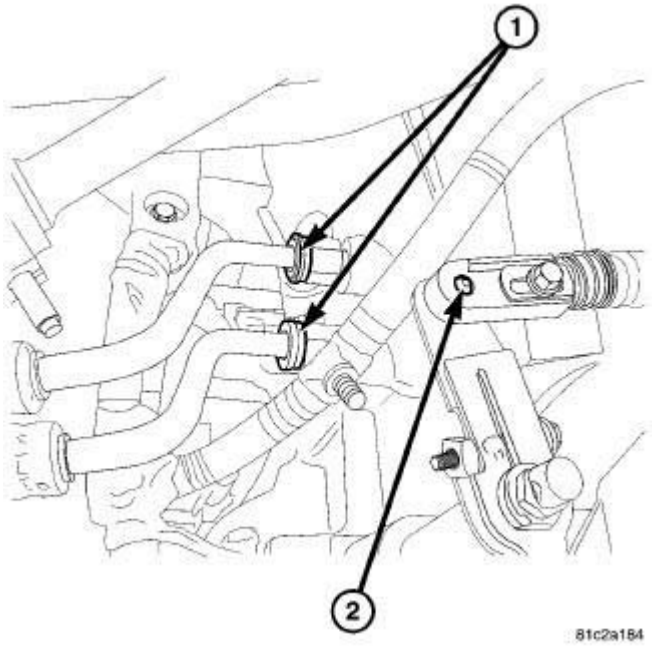


Fig. 14: Identifying Oil Cooler Lines
Courtesy of CHRYSLER LLC

9. Disconnect oil cooler lines (1) from transaxle using Disconnect Tool 8875A.

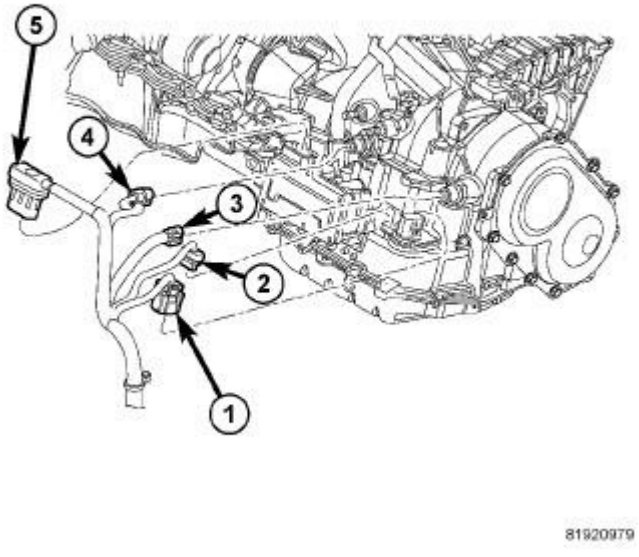


Fig. 15: Identifying Transmission Electrical Connectors
Courtesy of CHRYSLER LLC

10. Disconnect the electrical connectors at transmission (1, 2, 3, 4 and 5).

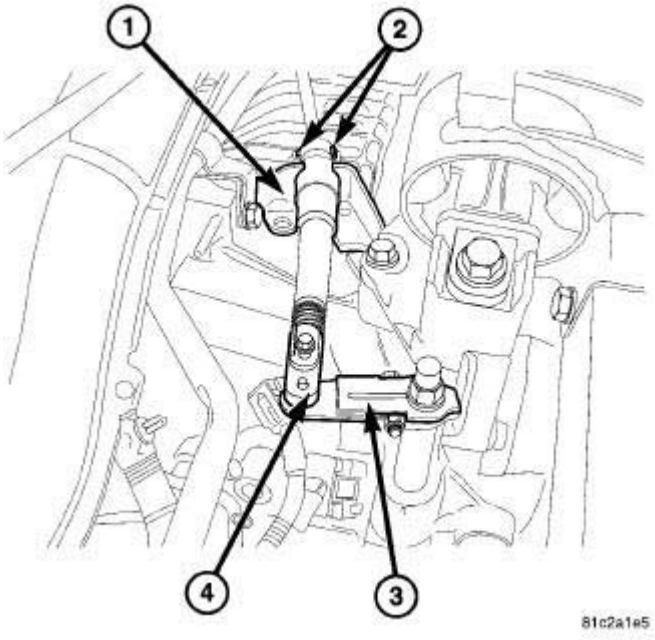


Fig. 16: Identifying Shift Cable At Manual Valve & Cable Bracket
Courtesy of CHRYSLER LLC

11. Disconnect gear shift cable from manual valve (4) lever and cable bracket (2).

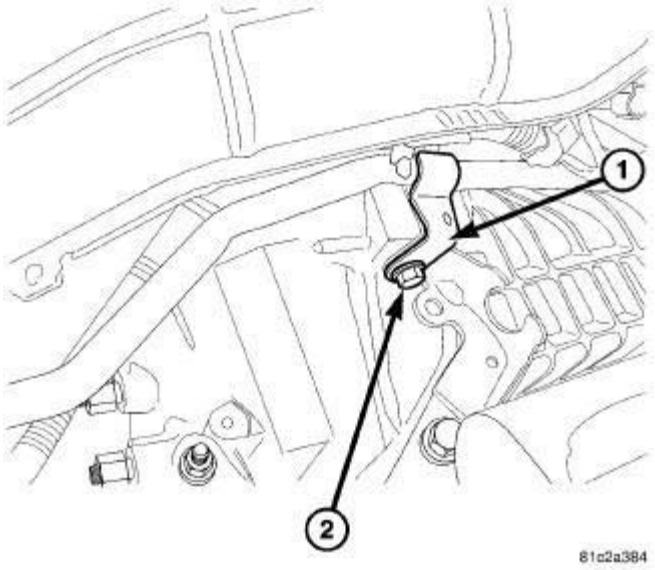


Fig. 17: Identifying Heater Tube Bolt At Bellhousing
Courtesy of CHRYSLER LLC

12. Remove the heater tube bolt (1) at the bellhousing.
13. Move the heater tube out of the way to gain access to the bellhousing bolts.

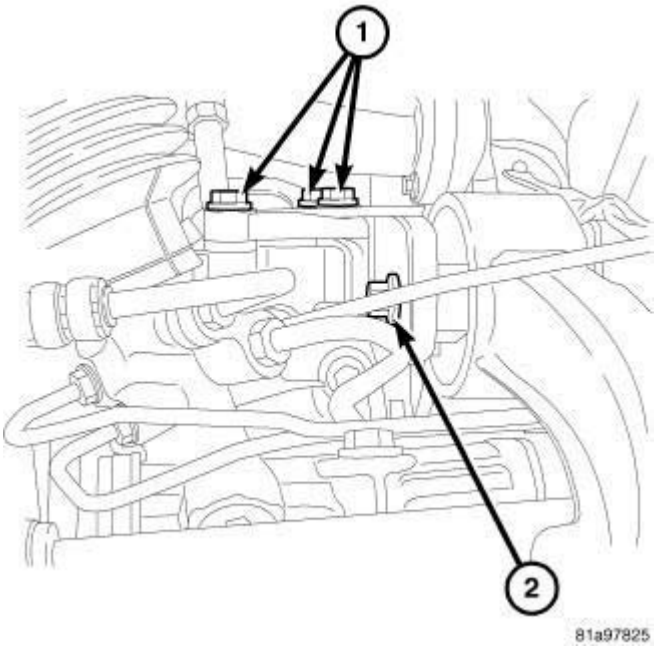


Fig. 18: Identifying Rear Mount Bracket-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

14. Remove rear mount bracket-to-transaxle case bolts (1).
15. Raise vehicle on hoist.
16. Remove transaxle oil pan and drain fluid into suitable container.
17. Remove front wheel/tire assemblies.
18. Remove left and right halfshaft assemblies. Refer to **Differential and Driveline/Half Shaft - Removal** .

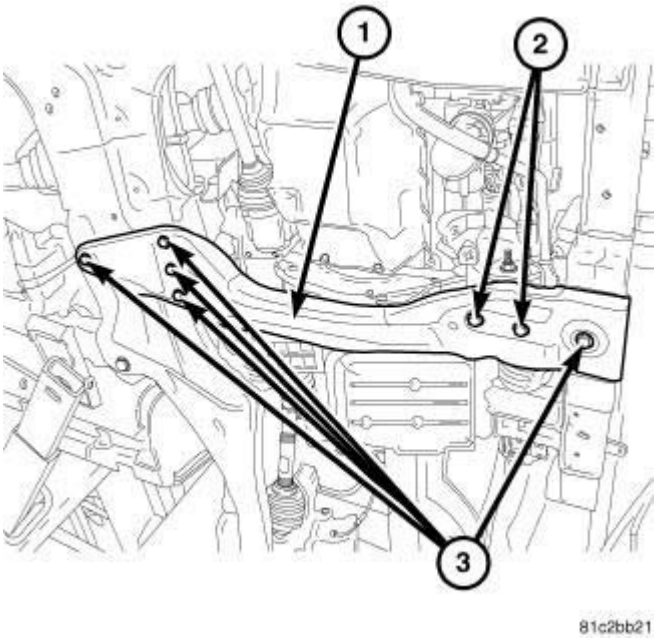


Fig. 19: Removing/Installing Crossmember
Courtesy of CHRYSLER LLC

19. Support engine with a screw jack and transmission with a transmission jack.
20. Remove the bolts at the crossmember (2, 3).
21. Remove the crossmember (1).

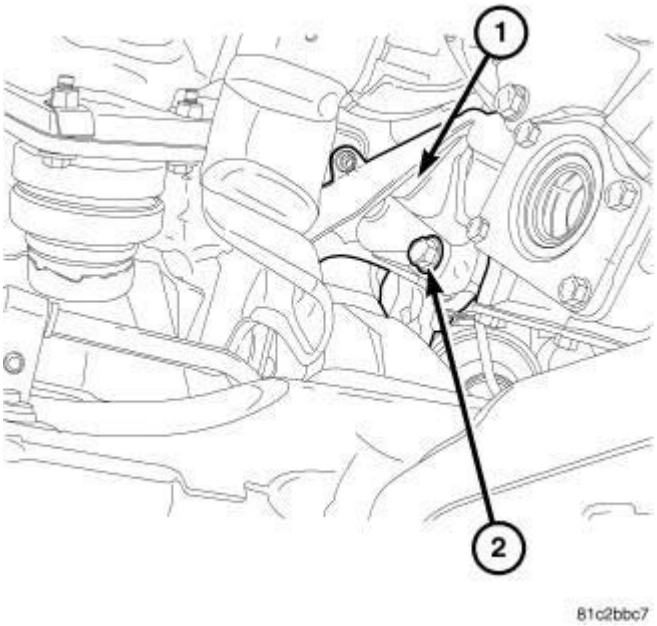


Fig. 20: Removing/Installing Rear Mount Side Bolt
Courtesy of CHRYSLER LLC

22. Remove the rear mount (1) side bolt (2).

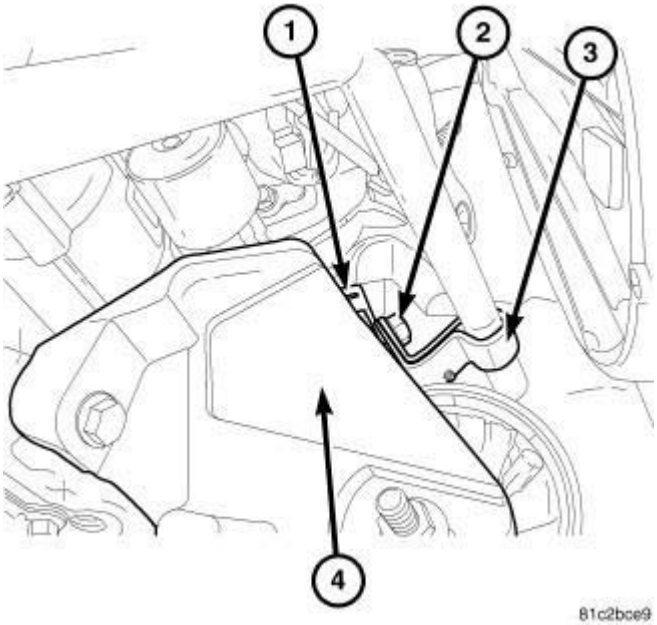


Fig. 21: Identifying Heater Tube & Ground Cable Bolt At Front Mount
Courtesy of CHRYSLER LLC

23. Remove the bolt (2) holding the ground cable (1) and the heater tube bracket (3) to the front mount (4).

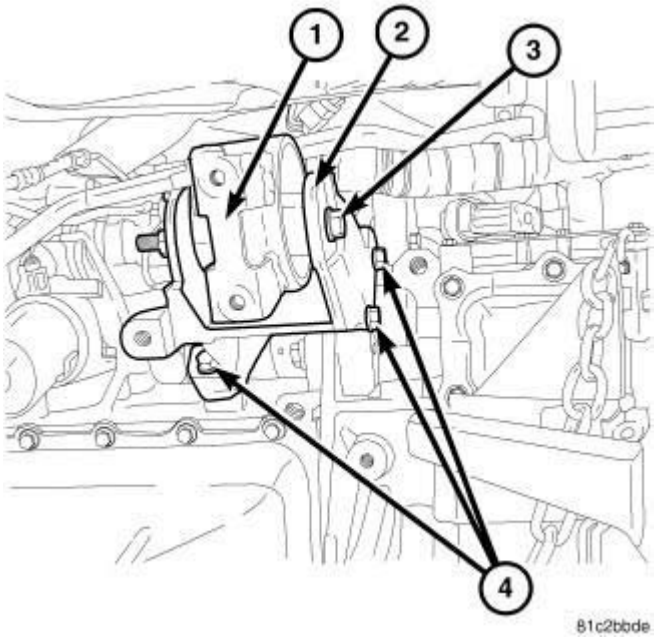


Fig. 22: Removing/Installing Front Transmission Mount
Courtesy of CHRYSLER LLC

24. Remove the bolts (4) at the front mount (2)
25. Remove the front mount (2).
26. Remove the starter motor. Refer to **Electrical - Engine Systems/Starting/STARTER - Removal** .

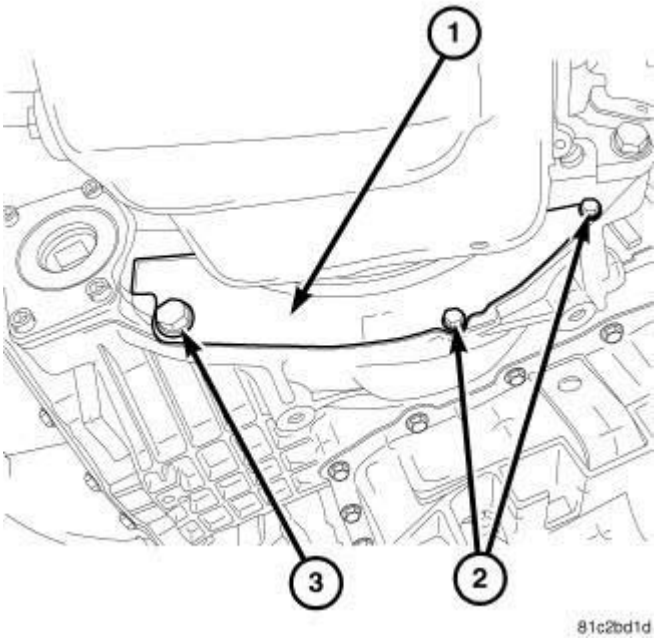


Fig. 23: Removing/Installing Inspection Cover
Courtesy of CHRYSLER LLC

27. Remove inspection cover bolts (2, 3).
28. Remove inspection cover (1).

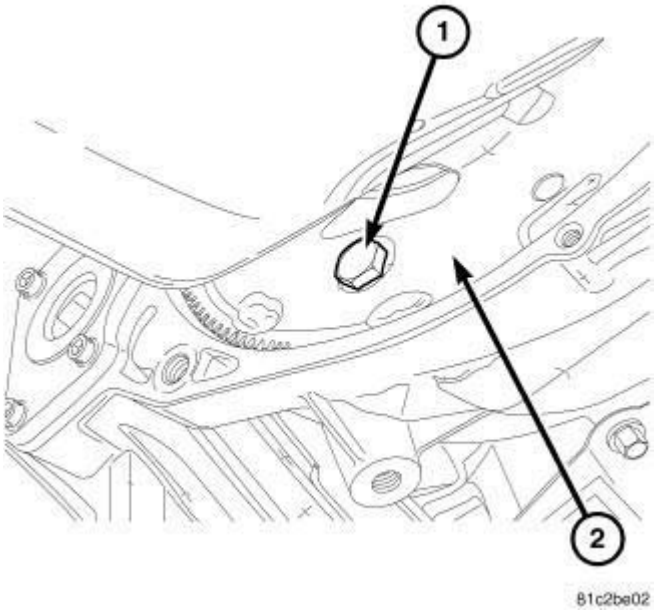


Fig. 24: Removing/Installing Torque Converter-To-Drive Plate Bolts
Courtesy of CHRYSLER LLC

29. Remove torque converter-to-drive plate bolts (1).

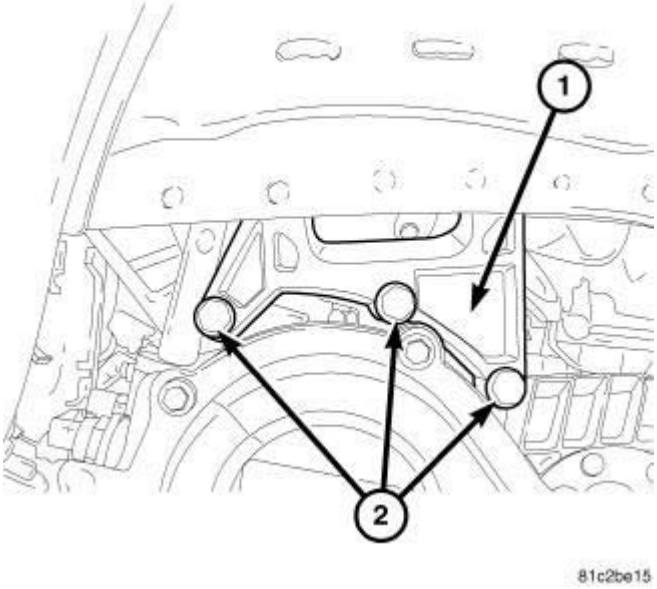


Fig. 25: Removing/Installing Left Mount To Block Bolts
Courtesy of CHRYSLER LLC

30. Lower engine and transmission enough to gain access to the left mount to block bolts.
31. Remove left mount to block bolts (2).

32. Remove left mount.

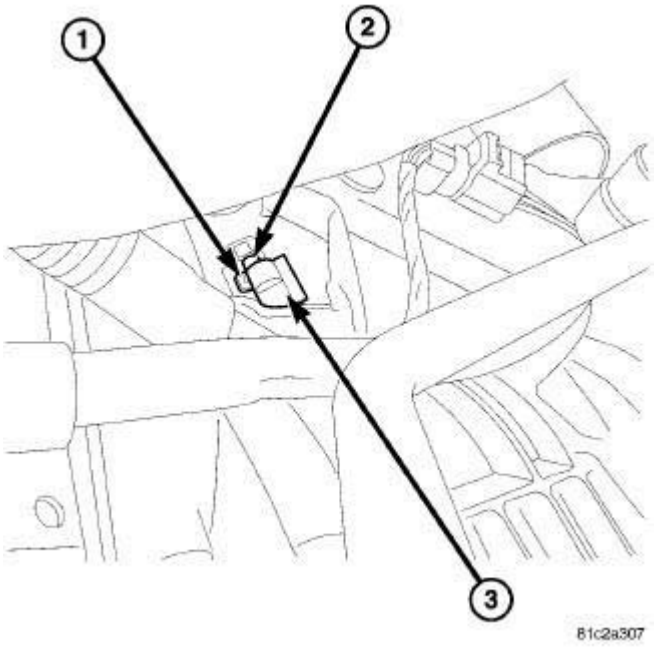


Fig. 26: Removing/Installing CKP Sensor
Courtesy of CHRYSLER LLC

33. Unplug the electrical connector (3) at the CKP sensor (2).
34. Remove the bolt (1) at the CKP sensor.
35. Remove CKP sensor (2).

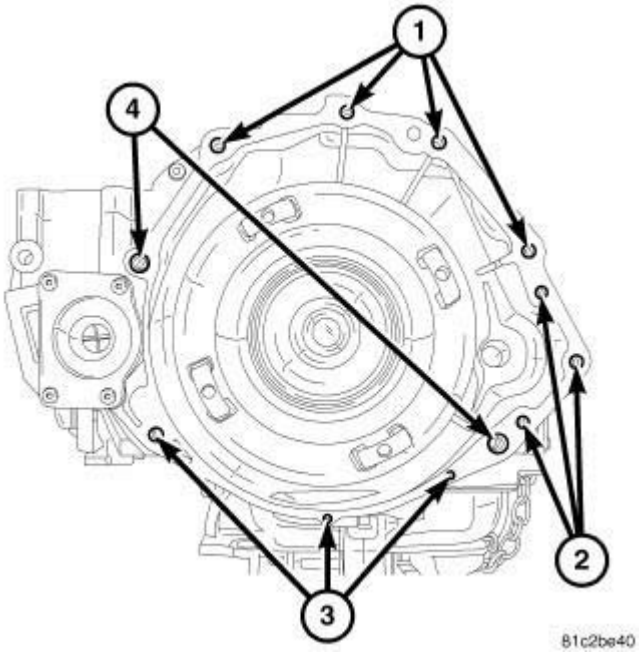


Fig. 27: Removing/Installing Bellhousing Upper & Lower Bolts
Courtesy of CHRYSLER LLC

36. Remove the bellhousing upper (1) and lower bolts (2) from transmission.
37. Remove transaxle assembly from vehicle.

DISASSEMBLY

DISASSEMBLY

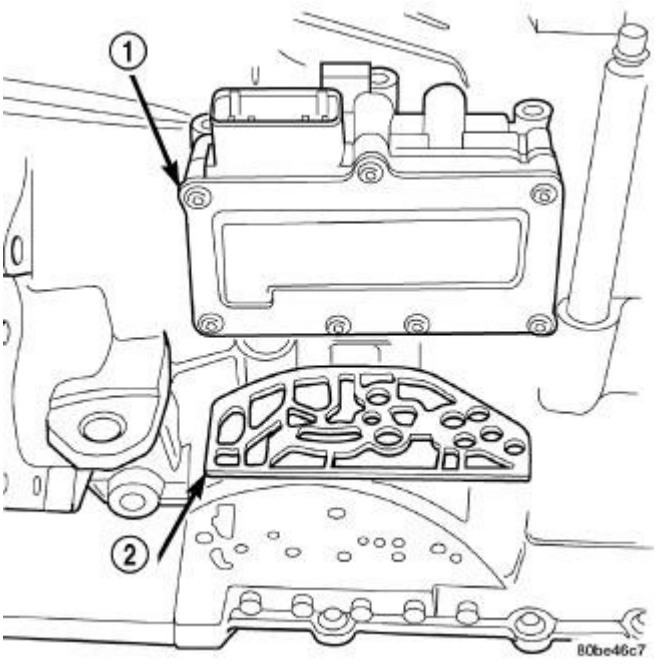


Fig. 28: Identifying Solenoid/Pressure Switch Assembly & Gasket
Courtesy of CHRYSLER LLC

1 - SOLENOID/PRESSURE SWITCH ASSEMBLY
2 - GASKET

NOTE: If transaxle is being overhauled (clutch and/or seal replacement) or replaced, it is necessary to perform the PCM/TCM Quick Learn Procedure. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

NOTE: This procedure does not include final drive (differential) disassembly.

1. Remove input and output speed sensors.
2. Remove the solenoid/pressure switch assembly-to-case bolts.
3. Remove solenoid/pressure switch assembly and gasket (2).

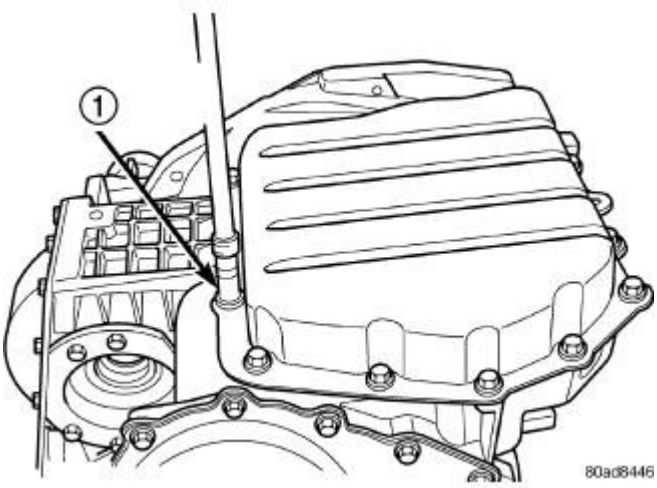


Fig. 29: Identifying Oil Pan Bolts
Courtesy of CHRYSLER LLC

1 - OIL PAN BOLTS (USE RTV UNDER BOLT HEADS)

4. Remove oil pan-to-case bolts (1) .

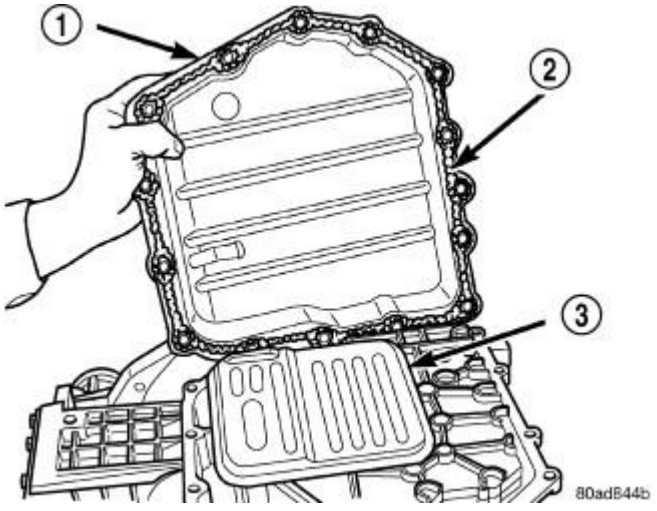


Fig. 30: Removing/Installing Oil Pan
Courtesy of CHRYSLER LLC

1 - OIL PAN
2 - 1/8 INCH BEAD OF MOPAR® ATF RTV (MS-GF41)
3 - OIL FILTER

5. Remove oil pan (1) .

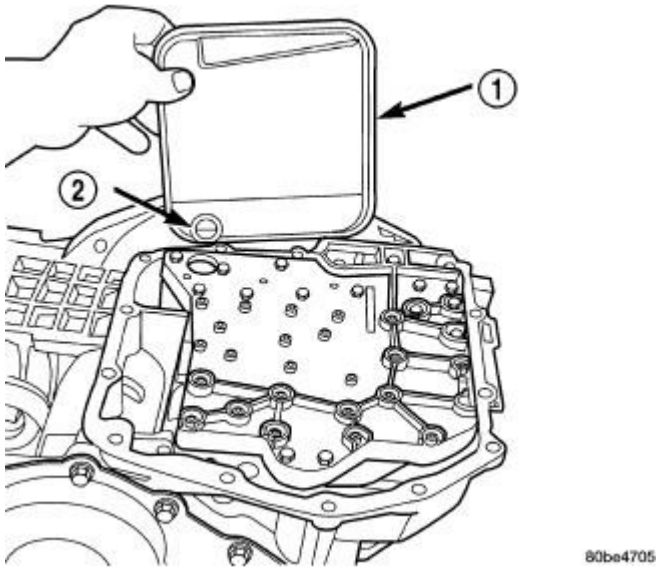


Fig. 31: Removing/Installing Oil Filter
Courtesy of CHRYSLER LLC

1 - OIL FILTER
2 - O-RING

6. Remove oil filter (1) .

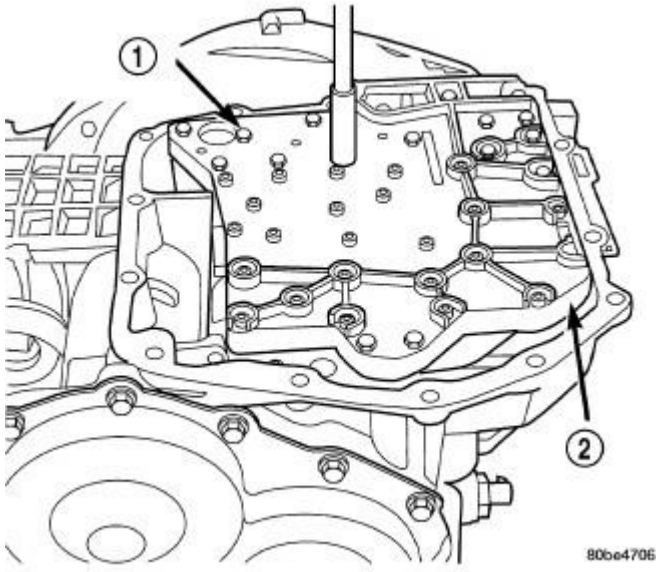


Fig. 32: Removing/Installing Valve Body-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - VALVE BODY ATTACHING BOLTS (18)

2 - VALVE BODY

7. Turn manual valve fully clockwise to get park rod into position for removal.
8. Remove valve body-to-case bolts (1) .

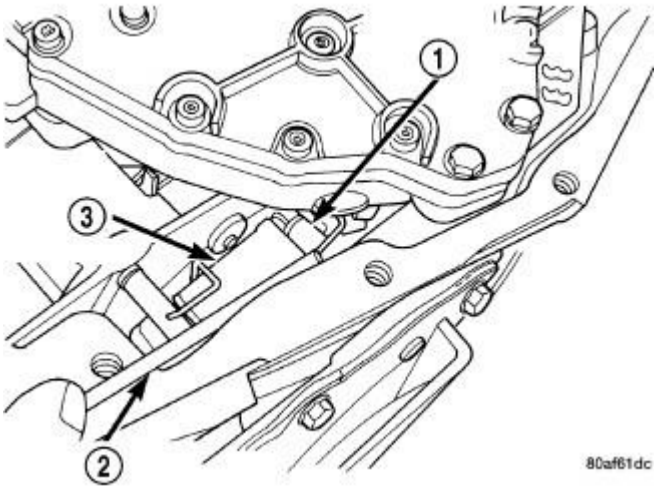


Fig. 33: Identifying Push Park Rod Rollers & Guide Bracket
Courtesy of CHRYSLER LLC

1 - PARK SPRAG ROLLERS
2 - SCREWDRIVER
3 - PARK SPRAG GUIDE BRACKET

9. Using a screwdriver (2), push park rod rollers away from guide bracket (3) .

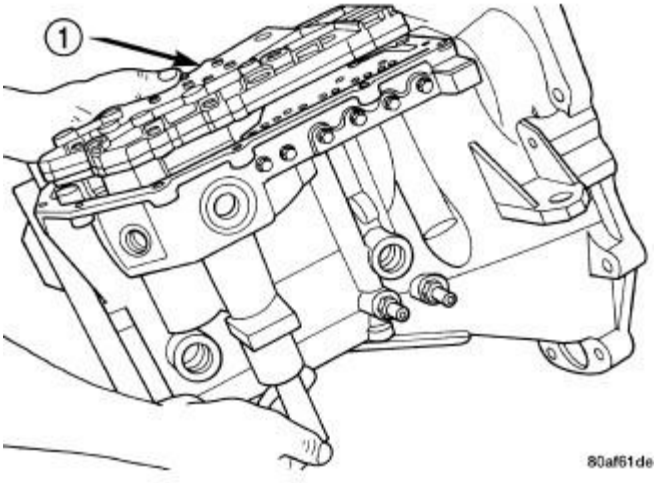


Fig. 34: Removing/Installing Valve Body Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY

CAUTION: Do not handle the valve body assembly from the manual valve. Damage can result.

10. Remove valve body assembly (1).

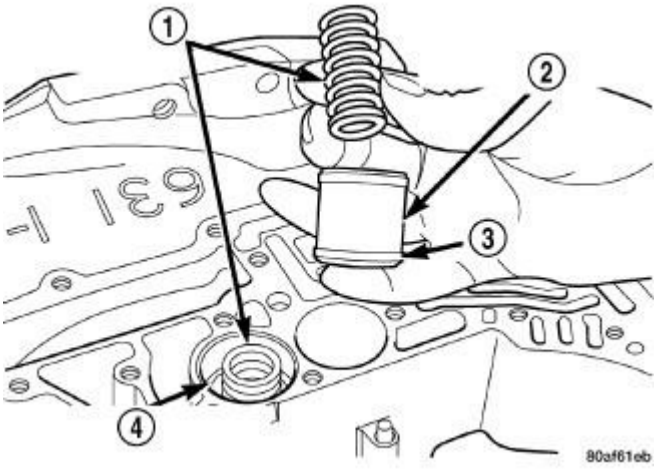


Fig. 35: Removing/Installing Underdrive & Overdrive Accumulators
Courtesy of CHRYSLER LLC

1 - RETURN SPRING
2 - UNDERDRIVE CLUTCH ACCUMULATOR
3 - SEAL RING (2)
4 - OVERDRIVE CLUTCH ACCUMULATOR

NOTE: Depending on engine application, some accumulators will have two springs and others will have one spring. The springs are color-coded according to application and year. When disassembling, mark accumulator spring location to ease assembly.

11. Remove underdrive (2) and overdrive (4) accumulators.

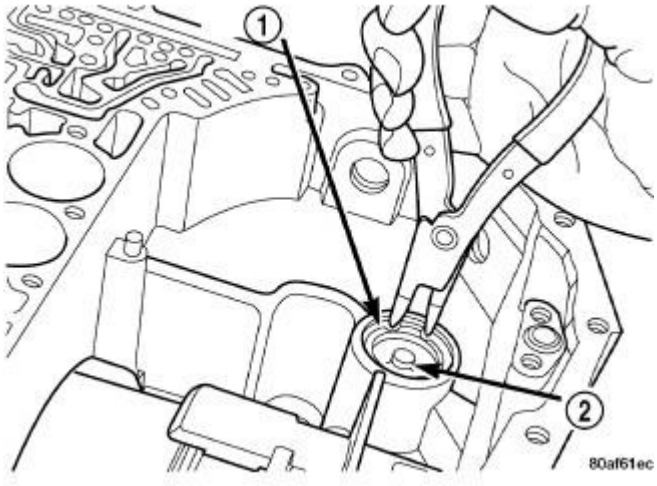


Fig. 36: Removing/Installing Low/Reverse Accumulator Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - PLUG

12. Remove low/reverse accumulator snap ring (1) .

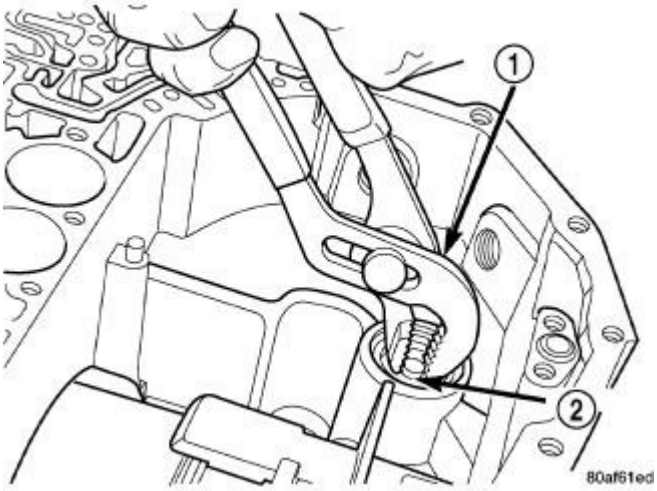


Fig. 37: Removing/Installing Low/Reverse Accumulator Plug
Courtesy of CHRYSLER LLC

1 - ADJUSTABLE PLIERS
2 - PLUG

13. Remove low/reverse accumulator plug (2) .

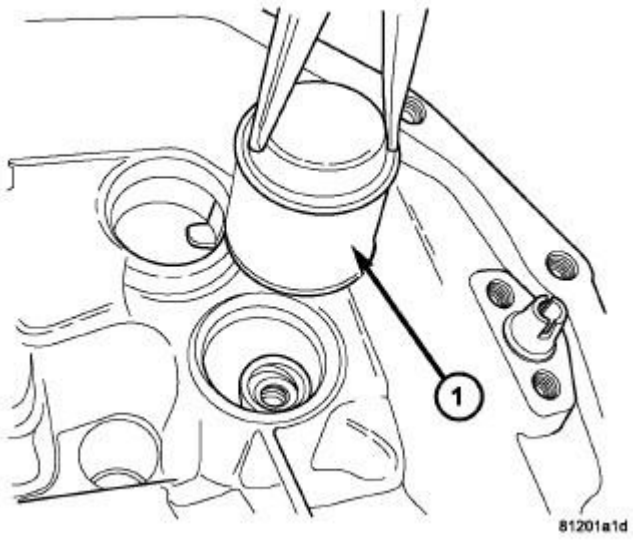


Fig. 38: Removing/Installing Low/Reverse Accumulator Piston
Courtesy of CHRYSLER LLC

1 - ACCUMULATOR PISTON

14. Remove low/reverse accumulator piston (1) using suitable pliers.

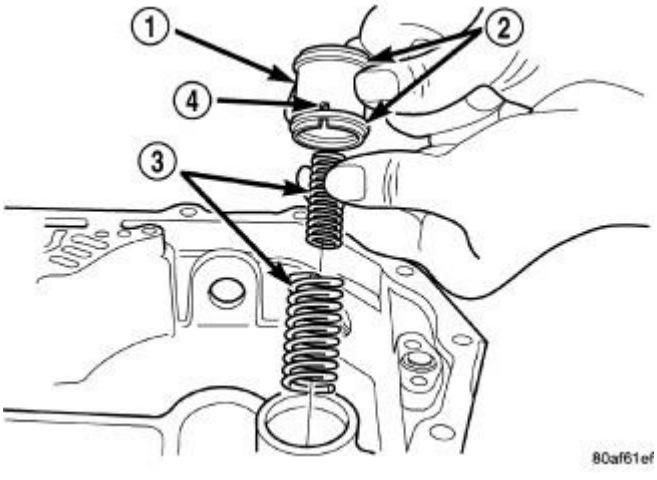


Fig. 39: Removing/Installing Low/Reverse Accumulator Return Springs
Courtesy of CHRYSLER LLC

1 - ACCUMULATOR PISTON
2 - SEAL RINGS
3 - RETURN SPRINGS
4 - (NOTE NOTCH)

15. Remove low/reverse accumulator return springs (3) .

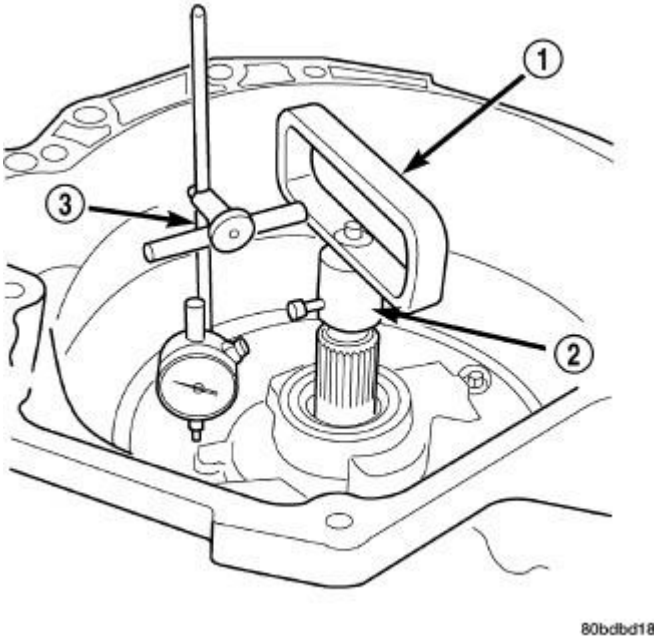


Fig. 40: Measuring Input Shaft End Play Using End Play Fixtures 8266 & Dial Indicator C-3339A
Courtesy of CHRYSLER LLC

1 - END PLAY FIXTURES 8266A
2 - DIAL INDICATOR C-3339A

16. Measure input shaft end play. Place transaxle so input shaft is vertical. Set up End Play fixture and dial indicator (2,3) . **Input shaft end play should be within 0.13-0.64 mm (0.005-0.025 in.).** If outside of this range, a #4 thrust plate change is required. Record indicator reading for reference upon reassembly.

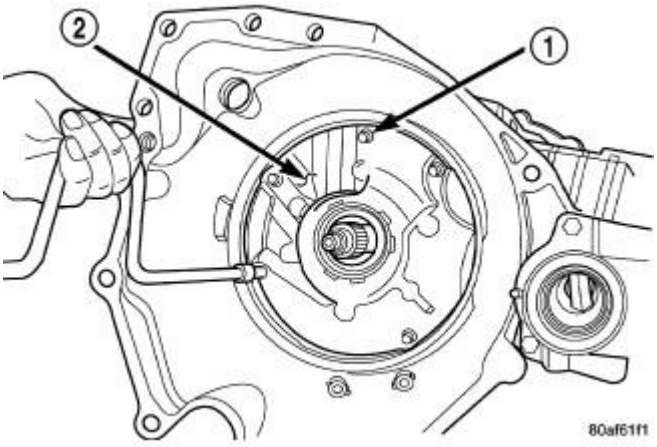


Fig. 41: Removing/Installing Oil Pump-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - PUMP ATTACHING BOLTS
2 - PUMP HOUSING

17. Remove oil pump-to-case bolts (1) .

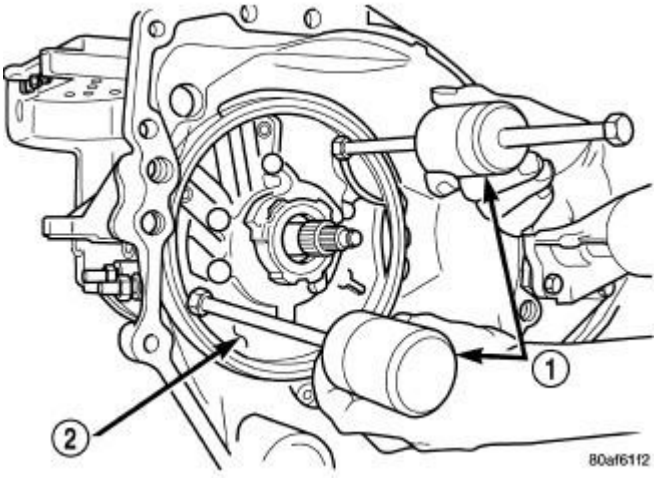


Fig. 42: Identifying Slide Hammers C-3752 & Oil Pump
Courtesy of CHRYSLER LLC

1 - SLIDE HAMMERS C-3752
2 - PUMP

CAUTION: Be sure input speed sensor is removed before removing oil pump.

18. Install slide hammers C-3752 (1) .

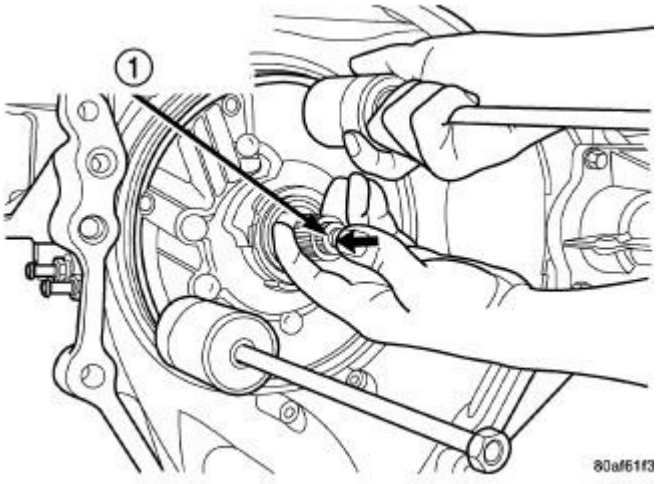


Fig. 43: Removing/Installing Oil Pump Assembly

Courtesy of CHRYSLER LLC

1 - "PUSH IN" ON INPUT SHAFT WHILE REMOVING PUMP

19. Remove oil pump assembly (1) .

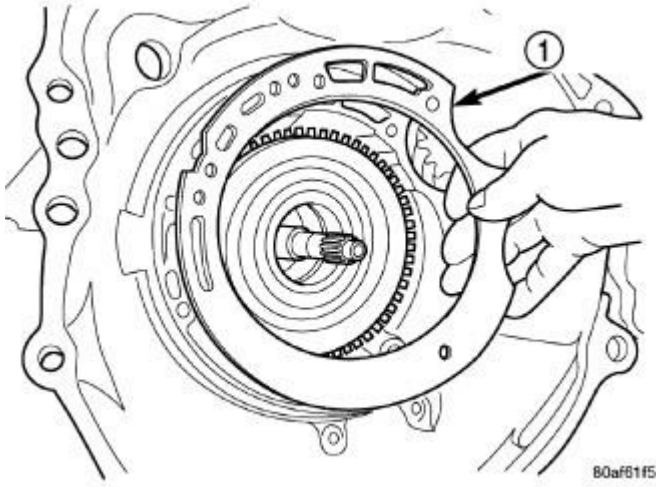


Fig. 44: Removing/Installing Oil Pump Gasket
Courtesy of CHRYSLER LLC

1 - PUMP GASKET

20. Remove oil pump gasket (1) .

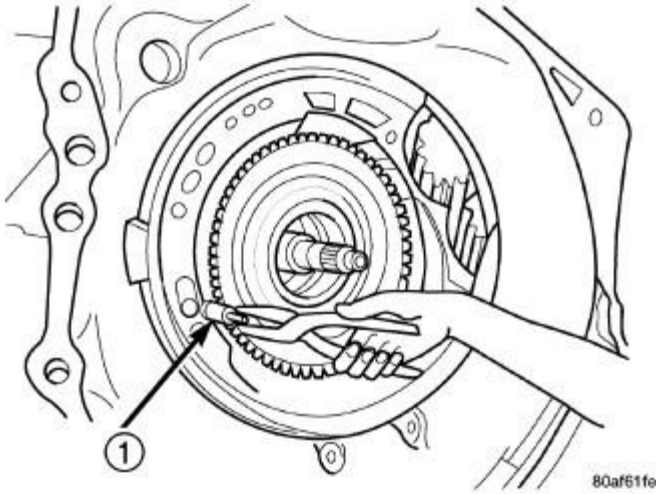


Fig. 45: Removing/Installing Cooler Bypass Valve
Courtesy of CHRYSLER LLC

1 - COOLER BYPASS VALVE

CAUTION: If transaxle failure has occurred, the cooler bypass valve must be replaced. Do not re-use or attempt to clean valve.

21. Remove cooler bypass valve (1) .

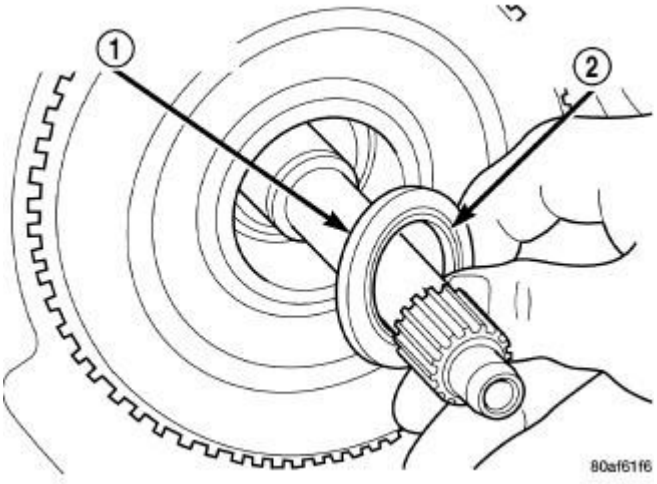


Fig. 46: Removing/Installing #1 Caged Needle Bearing
Courtesy of CHRYSLER LLC

1 - #1 CAGED NEEDLE BEARING
2 - NOTE: TANGED SIDE OUT

22. Remove #1 needle bearing (1) .

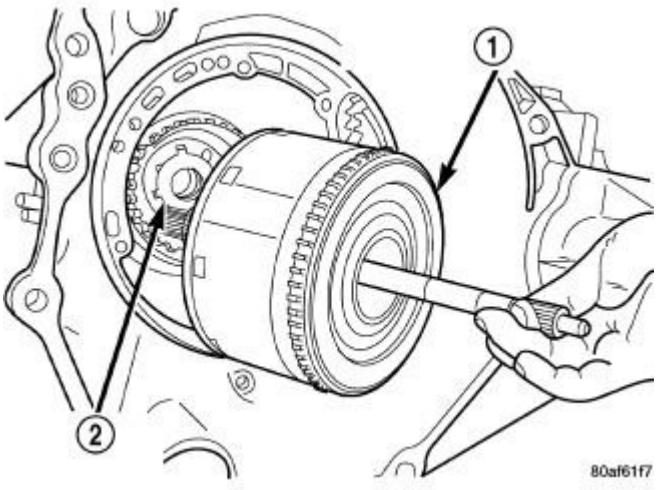


Fig. 47: Removing/Installing Input Clutch Assembly
Courtesy of CHRYSLER LLC

1 - INPUT CLUTCH ASSEMBLY

2 - #4 THRUST WASHER

23. Remove input clutch assembly (1) .

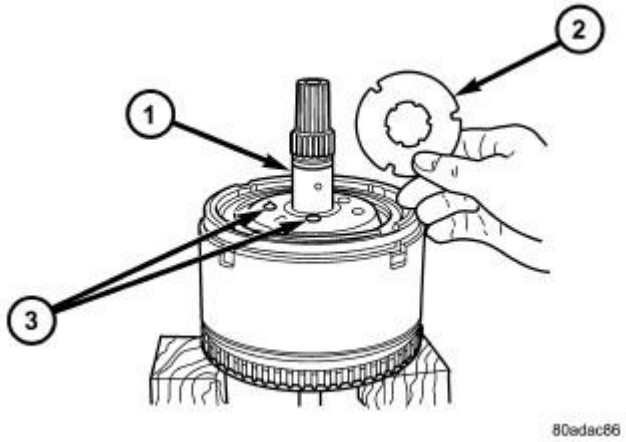


Fig. 48: Removing/Installing #4 Thrust Plate
Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT ASSEMBLY
2 - #4 THRUST PLATE (SELECT)
3 - 3 DABS OF PETROLATUM FOR RETENTION

24. Remove #4 thrust plate (2) .

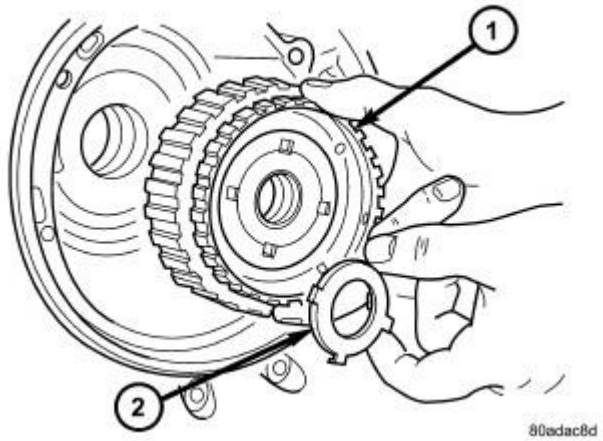


Fig. 49: Removing/Installing Front Sun Gear Assembly
Courtesy of CHRYSLER LLC

1 - FRONT SUN GEAR ASSEMBLY

2 - #4 THRUST WASHER (FOUR TABS)

25. Remove front sun gear assembly (1) and #4 thrust washer (2).

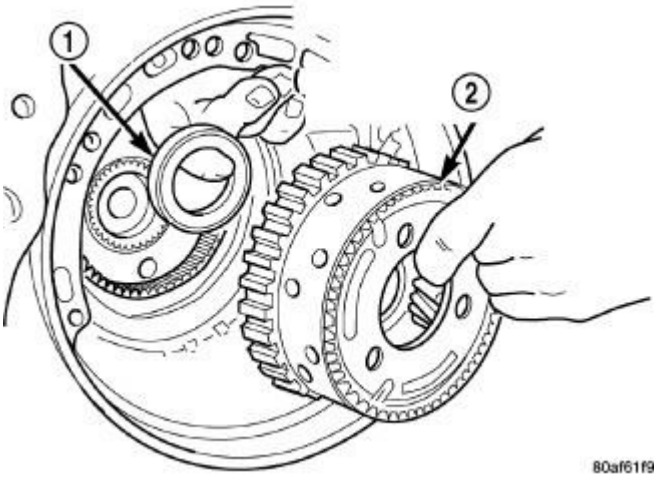


Fig. 50: Removing/Installing Front Carrier/Rear Annulus Assembly
Courtesy of CHRYSLER LLC

1 - #6 NEEDLE BEARING
2 - FRONT CARRIER AND REAR ANNULUS ASSEMBLY (TWIST AND PULL OR PUSH TO REMOVE OR INSTALL).

26. Remove front carrier/rear annulus assembly (2) and #6 needle bearing (1).

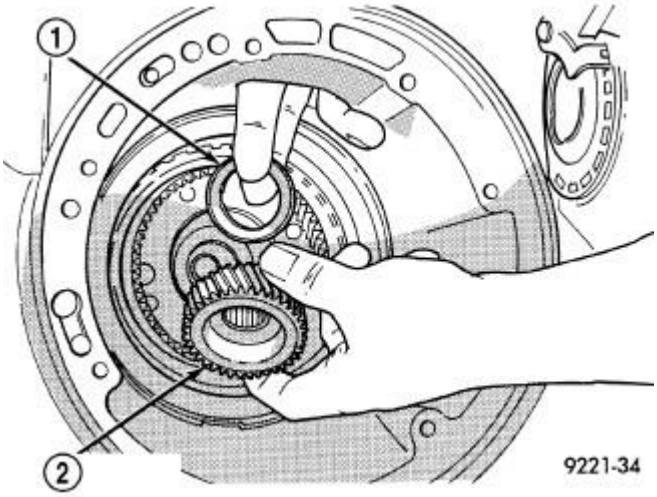


Fig. 51: Removing/Installing Rear Sun Gear
Courtesy of CHRYSLER LLC

1 - #7 NEEDLE BEARING

2 - REAR SUN GEAR

27. Remove rear sun gear (2) and #7 needle bearing (1).

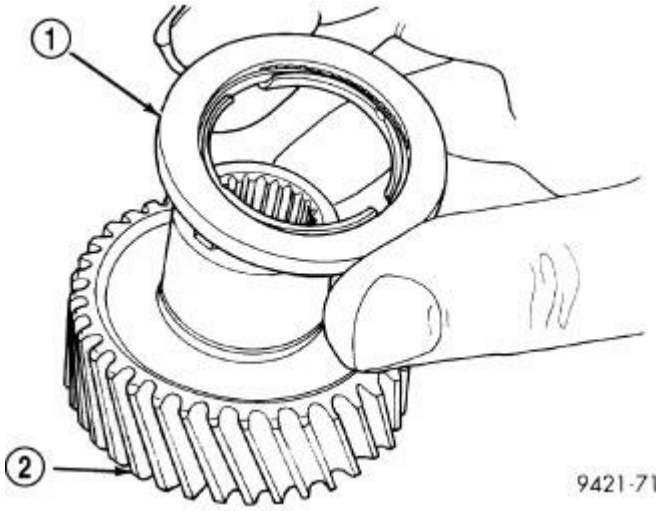


Fig. 52: Removing/Installing #7 Needle Bearing
Courtesy of CHRYSLER LLC

1 - #7 NEEDLE BEARING 2 - REAR SUN GEAR

NOTE: The number 7 needle bearing (1) has three anti-reversal tabs and is common with the number five and number two position. The orientation should allow the bearing to seat flat against the rear sun gear (2). A small amount of petrolatum can be used to hold the bearing to the rear sun gear.

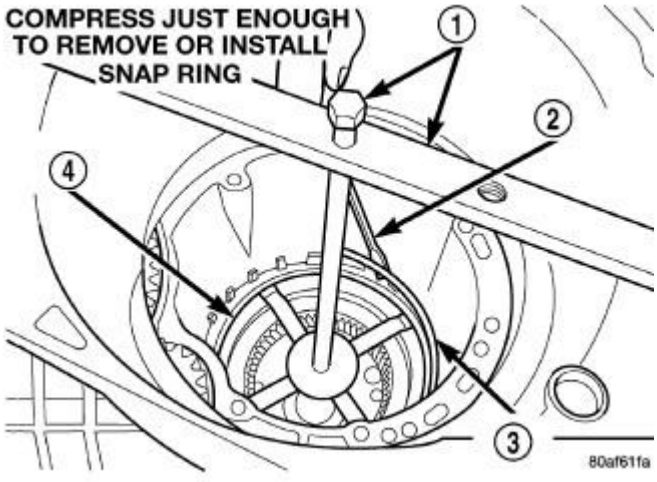


Fig. 53: Removing/Installing Snap Ring
Courtesy of CHRYSLER LLC

1 - SPRING COMPRESSOR 5058A
2 - SCREWDRIVER
3 - SNAP RING
4 - 2/4 CLUTCH RETAINER

28. Setup spring compressor 5058A (1) , Compress 2/4 clutch return spring (4) (just enough to remove snap ring) and remove snap ring (3).

NOTE: Verify that spring compressor 5058A is centered properly over the 2/4 clutch retainer before compressing. If necessary, fasten the 5058A bar to the bellhousing flange with any combination of locking pliers and bolts to center the tool properly.

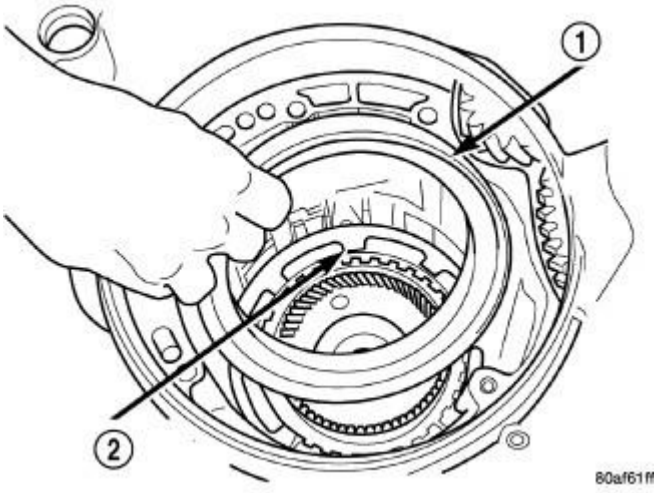


Fig. 54: Removing/Installing 2/4 Clutch Retainer
Courtesy of CHRYSLER LLC

1 - 2/4 CLUTCH RETAINER
2 - 2/4 CLUTCH RETURN SPRING

NOTE: The 2/4 Clutch Piston has bonded seals which are not individually serviceable. Seal replacement requires replacement of the piston assembly.

29. Remove 2/4 clutch retainer (1) .

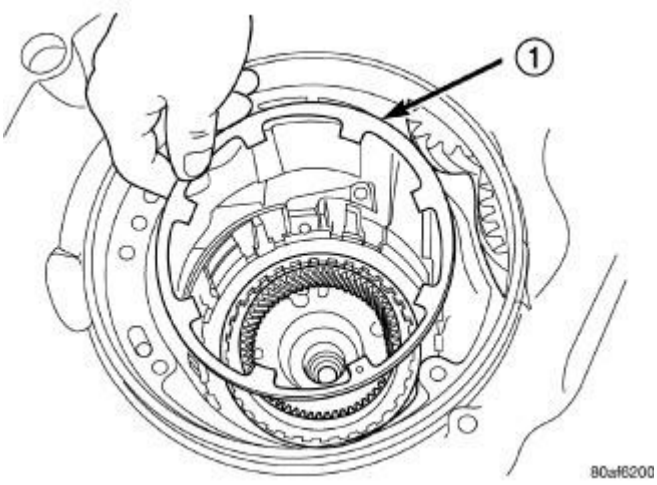


Fig. 55: Removing/Installing 2/4 Clutch Return Spring
Courtesy of CHRYSLER LLC

1 - 2/4 CLUTCH RETURN SPRING

30. Remove 2/4 clutch return spring (1) .

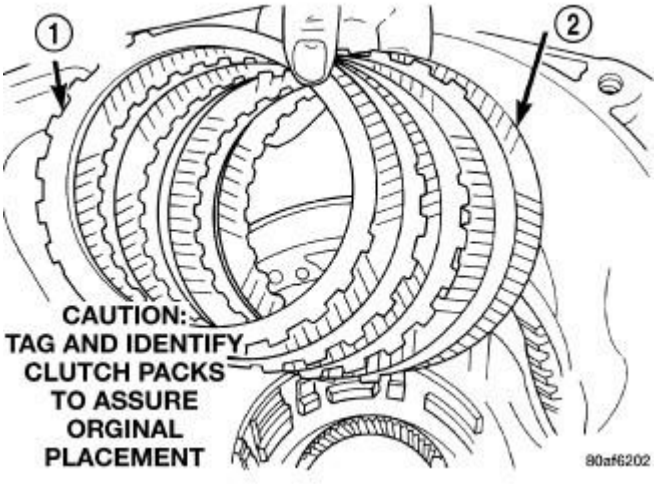


Fig. 56: Removing/Installing 2/4 Clutch Pack
Courtesy of CHRYSLER LLC

1 - CLUTCH PLATE (4)
2 - CLUTCH DISC (4)

31. Remove 2/4 clutch pack (1,2) . **Tag 2/4 clutch pack for reassembly identification.**

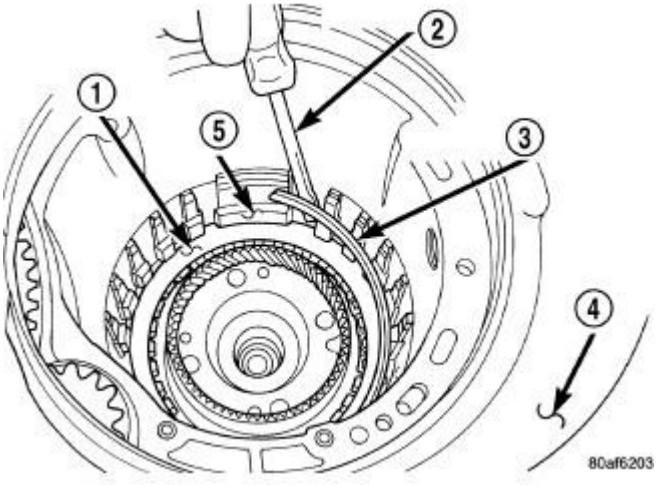


Fig. 57: Removing/Installing Tapered Snap Ring
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH REACTION PLATE
2 - SCREWDRIVER
3 - LOW/REVERSE TAPERED SNAP RING (TAPERED SIDE UP)
4 - OIL PAN FACE
5 - LONG TAB

32. Remove tapered snap ring (3) .

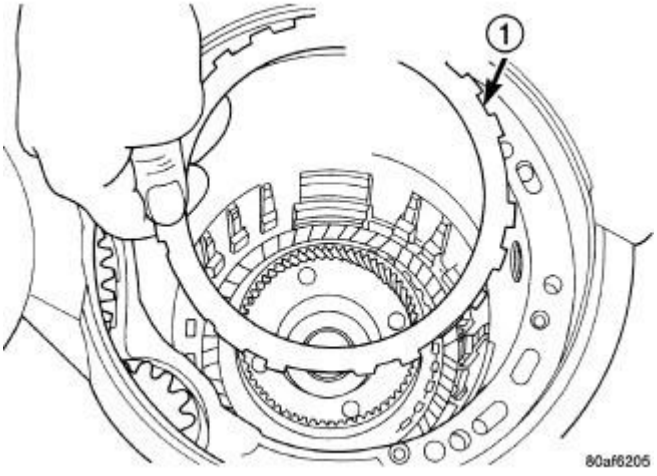


Fig. 58: Removing/Installing Low/Reverse Reaction Plate
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE REACTION PLATE (FLAT SIDE UP)

33. Remove low/reverse reaction plate (1) .

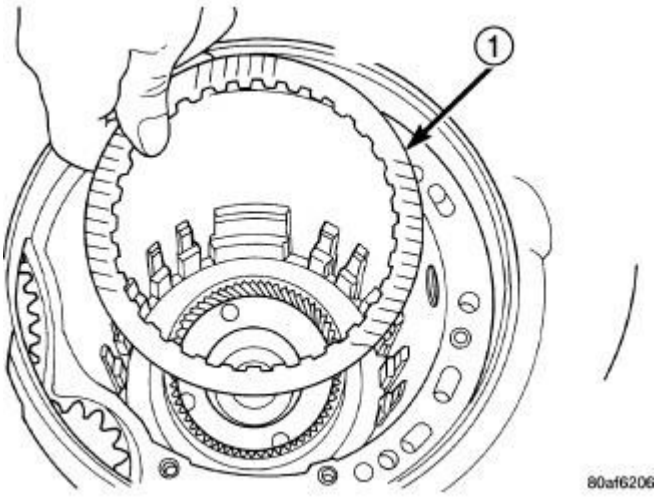


Fig. 59: Removing/Installing Low/Reverse Clutch Disc
Courtesy of CHRYSLER LLC

1 - ONE DISC FROM LOW/REVERSE CLUTCH

34. Remove one low/reverse clutch disc (1) .

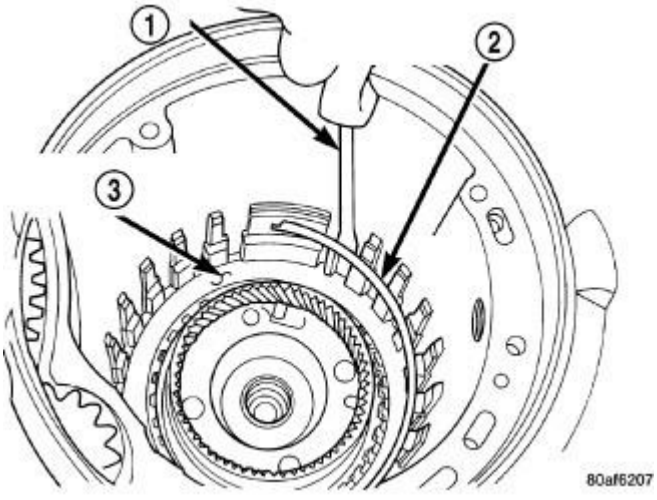


Fig. 60: Removing/Installing Low/Reverse Reaction Plate Snap Ring
Courtesy of CHRYSLER LLC

1 - SCREWDRIVER
2 - LOW/REVERSE REACTION PLATE FLAT SNAP RING
3 - DO NOT SCRATCH CLUTCH PLATE

35. Remove low/reverse reaction plate snap ring (2) .

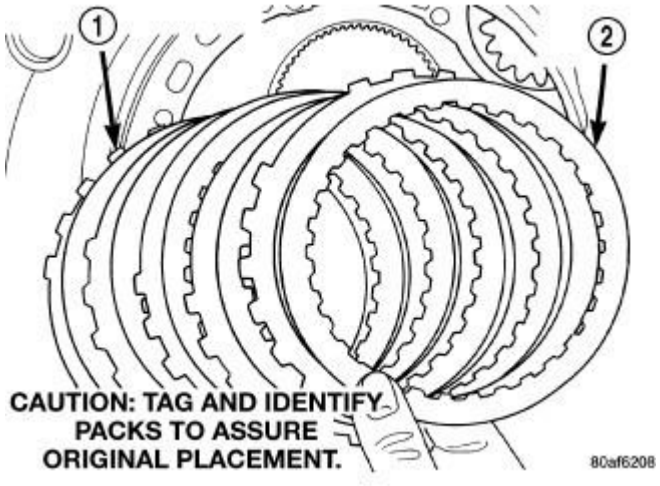


Fig. 61: Removing/Installing Low/Reverse Clutch Pack
Courtesy of CHRYSLER LLC

1 - CLUTCH PLATES (5)
2 - CLUTCH DISCS (5)

36. Remove low/reverse clutch pack (1,2) .

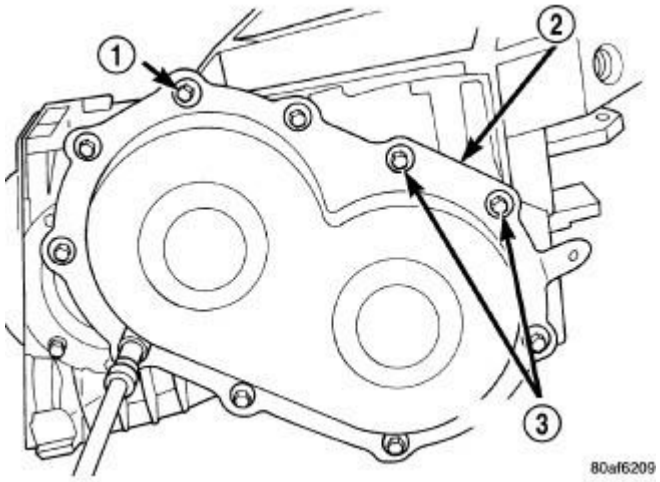


Fig. 62: Removing/Installing Transfer Gear Cover-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - REAR COVER BOLTS
2 - REAR COVER
3 - USE SEALANT ON BOLTS

37. Remove transfer gear cover-to-case bolts (1) .

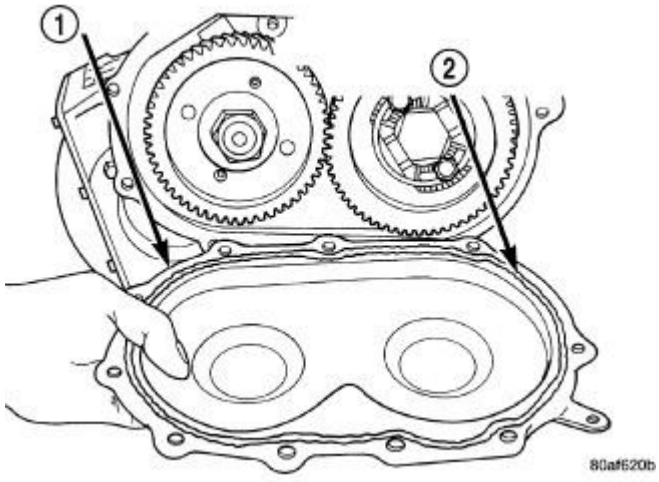


Fig. 63: Removing/Installing Transfer Gear Cover
Courtesy of CHRYSLER LLC

1 - REAR COVER
2 - 1/8 INCH BEAD OF MOPAR® ATF RTV (MS-GF41)

38. Remove transfer gear cover (1) .

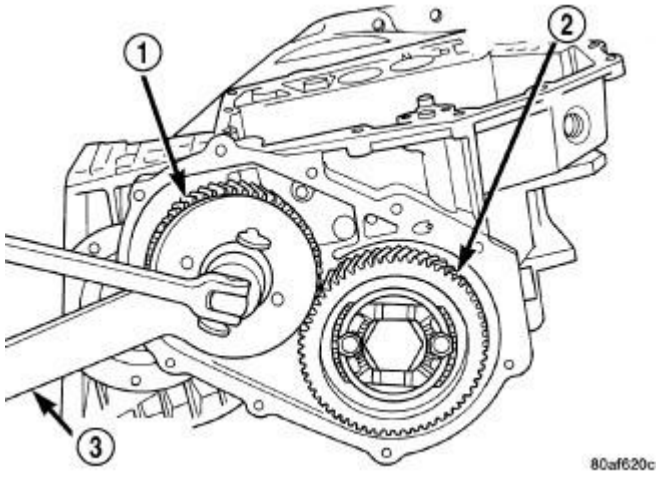


Fig. 64: Identifying Holder 6259
Courtesy of CHRYSLER LLC

1 - TRANSFER SHAFT GEAR
2 - OUTPUT GEAR
3 - HOLDER 6259

39. Install holder 6259 (3) .

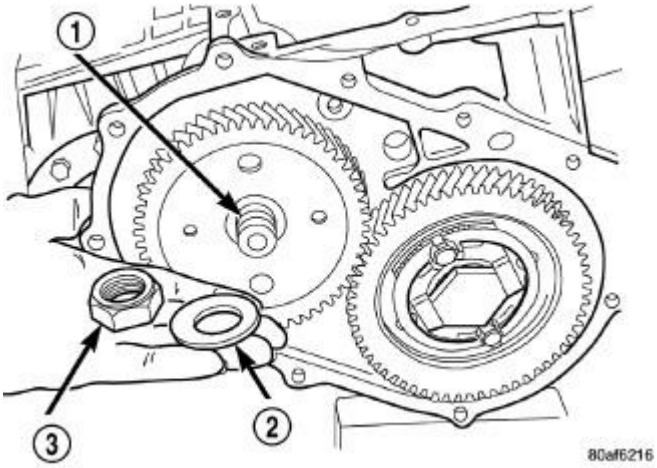


Fig. 65: Removing/Installing Transfer Shaft Gear Nut & Coned Washer
Courtesy of CHRYSLER LLC

1 - TRANSFER SHAFT
2 - LOCK WASHER
3 - NUT

40. Remove transfer shaft gear-to-shaft nut (3) and coned washer (2).

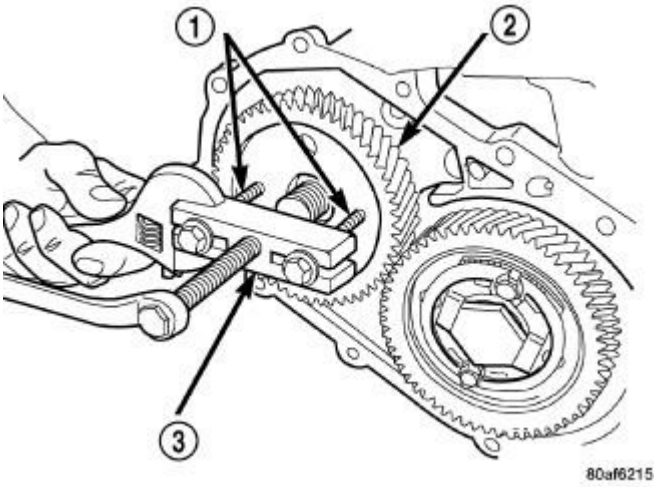


Fig. 66: Removing/Installing Transfer Shaft Gear
Courtesy of CHRYSLER LLC

1 - GEAR PULLER L-4407A
2 - TRANSFER SHAFT GEAR

41. Using Gear Puller L-4407A (3) remove transfer shaft gear (2).

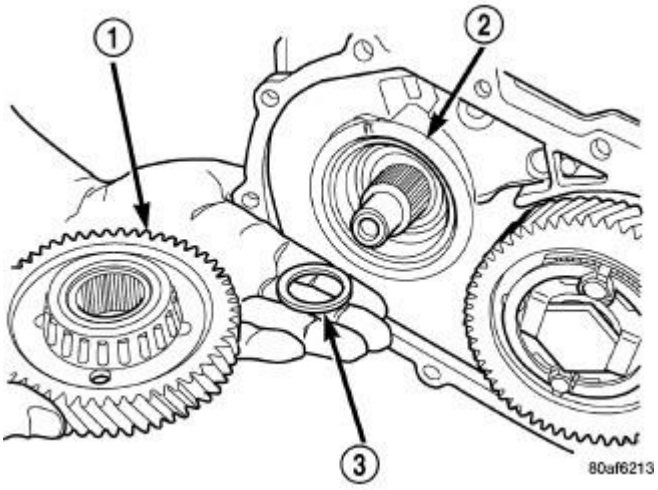


Fig. 67: Removing/Installing Transfer Gear Shim (Select)
Courtesy of CHRYSLER LLC

1 - TRANSFER SHAFT GEAR
2 - BEARING CUP RETAINER
3 - SHIM (SELECT)

42. Remove transfer gear shim (select) (3) .

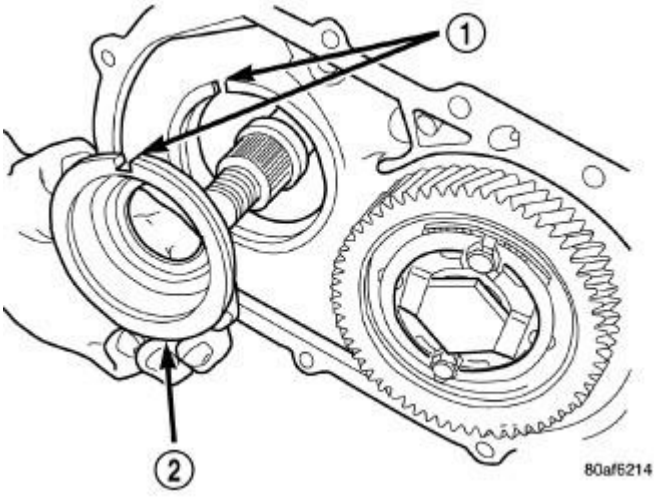


Fig. 68: Removing/Installing Bearing Cup Retainer
Courtesy of CHRYSLER LLC

1 - ALIGN INDEXING TAB TO SLOT
2 - BEARING CUP RETAINER

43. Remove bearing cup retainer (2) .

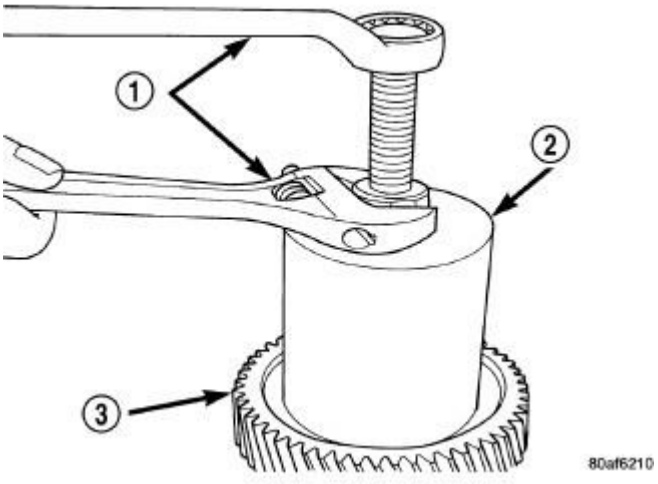


Fig. 69: Removing Transfer Gear Bearing Cone
Courtesy of CHRYSLER LLC

1 - WRENCHES
2 - BEARING PULLER 5048 WITH JAWS 5048-4 AND THRUST PAD L-4539-2
3 - TRANSFER SHAFT GEAR

44. Remove transfer gear bearing cone using setup using bearing puller 5048 with jaws 5048-4 and thrust pad L-4539-2 (2) .

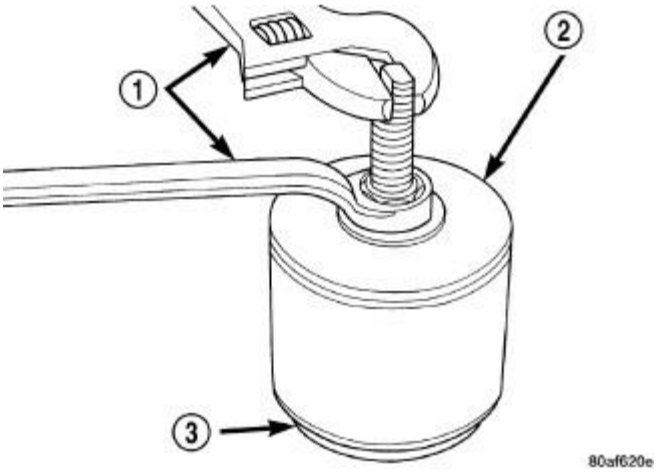


Fig. 70: Removing Transfer Shaft Bearing Cup
Courtesy of CHRYSLER LLC

1 - WRENCHES
2 - BEARING CUP PULLER 6062A
3 - TRANSFER SHAFT BEARING CUP RETAINER

45. Remove transfer shaft bearing cup from retainer (3) using bearing cup puller 6062A (2).

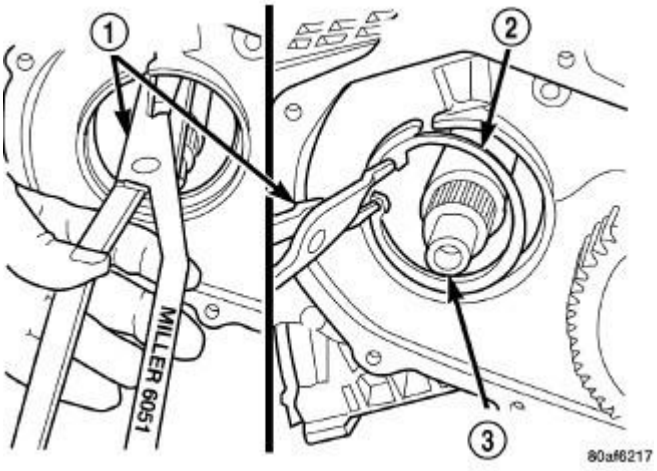


Fig. 71: Removing/Installing Transfer Shaft Bearing Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS 6051A
2 - TRANSFER SHAFT BEARING SNAP RING
3 - TRANSFER SHAFT

46. Using Snap Ring Pliers 6051A (1) remove transfer shaft bearing snap ring (2).

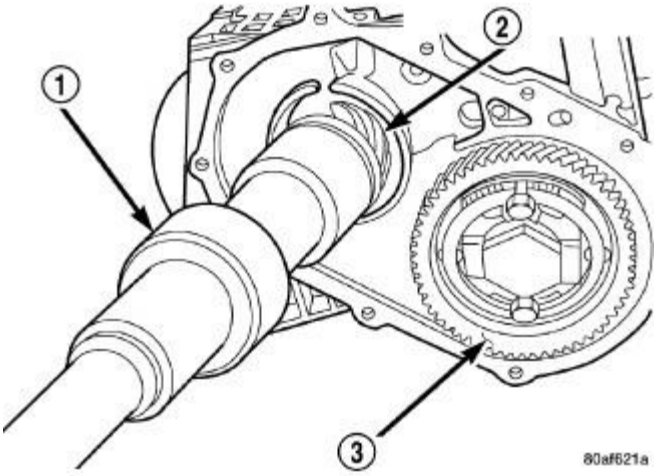


Fig. 72: Removing/Installing Transfer Shaft
Courtesy of CHRYSLER LLC

1 - REMOVER/INSTALLER 5049-A
2 - TRANSFER SHAFT
3 - OUTPUT GEAR

47. Using the Remover/Installer 5049-A (1) remove transfer shaft (2) from transaxle.

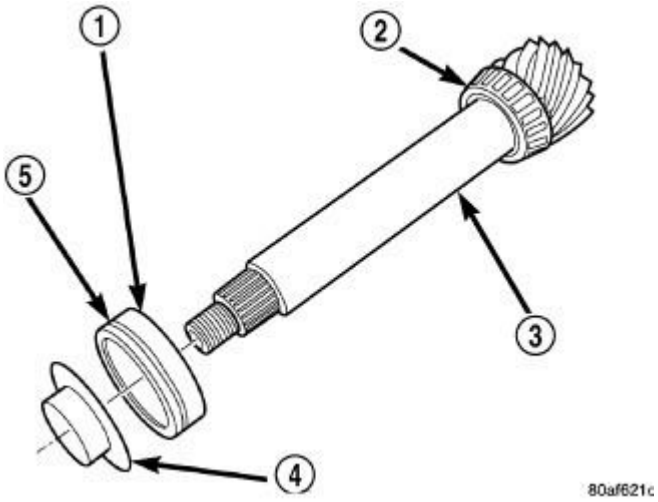


Fig. 73: Identifying Bearing Cup Retainer & Oil Baffle
Courtesy of CHRYSLER LLC

1 - BEARING CUP
2 - BEARING CONE
3 - TRANSFER SHAFT
4 - OIL BAFFLE
5 - O-RING

48. Slip bearing cup retainer (1) and oil baffle (4) off of shaft.

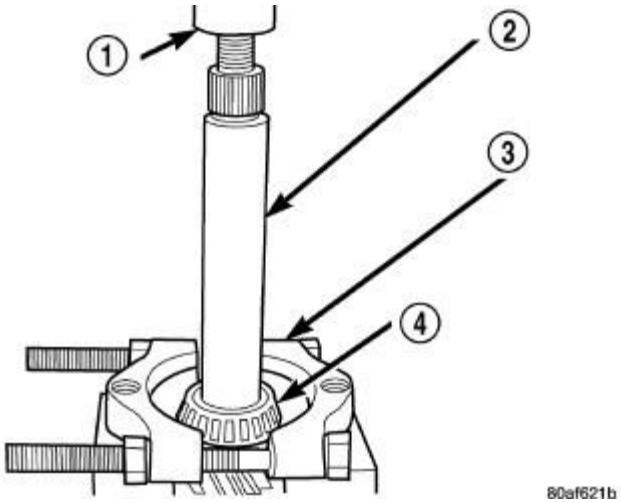


Fig. 74: Identifying Bearing Splitter P-334, Transfer Shaft Bearing Cone, & Transfer Shaft
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - TRANSFER SHAFT
3 - BEARING SPLITTER P-334

4 - BEARING CONE

49. Using Bearing Splitter P-334 (3) press transfer shaft bearing cone (4) off of shaft (2).

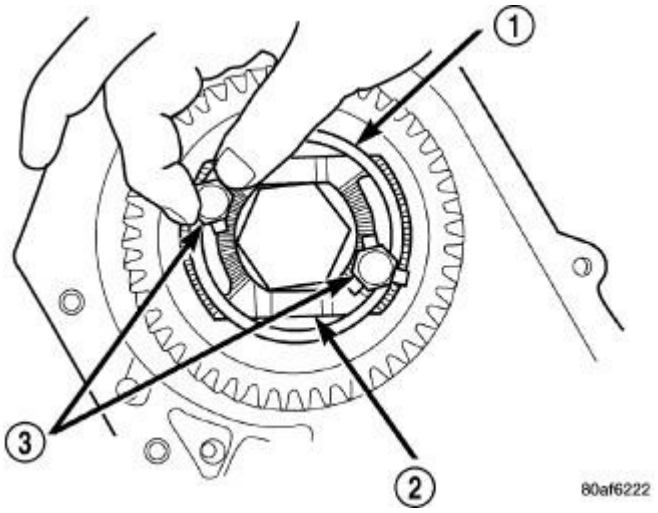


Fig. 75: Removing/Installing Retaining Strap Bolts
Courtesy of CHRYSLER LLC

1 - RETAINING STRAP
2 - STIRRUP
3 - RETAINING STRAP BOLTS

50. Bend output gear retaining strap (1) ears flat to allow bolt removal.
51. Remove output shaft stirrup strap bolts (3).

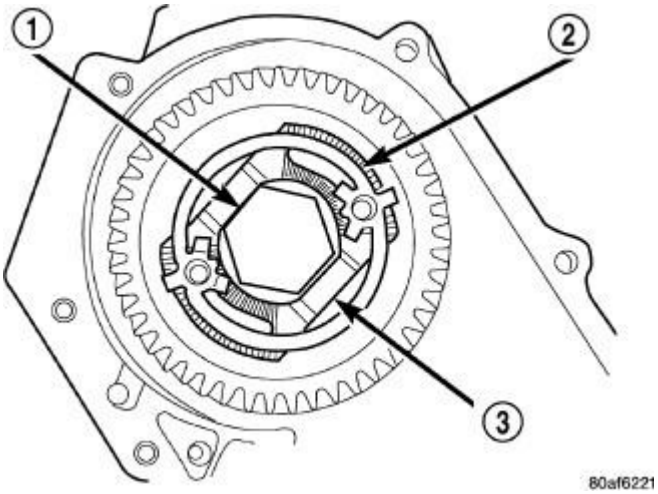


Fig. 76: Removing/Installing Stirrup & Strap
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR BOLT
2 - RETAINING STRAP
3 - STIRRUP

52. Remove stirrup (3) and strap (2).

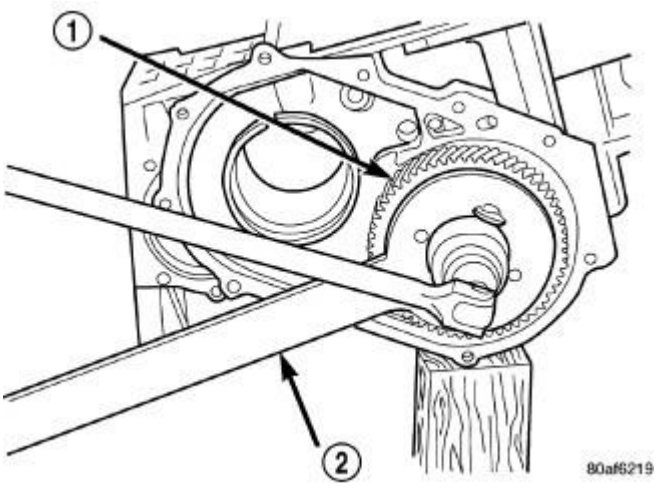


Fig. 77: Identifying Holder 6259
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR
2 - HOLDER 6259

53. Install Holder 6259 (2). .

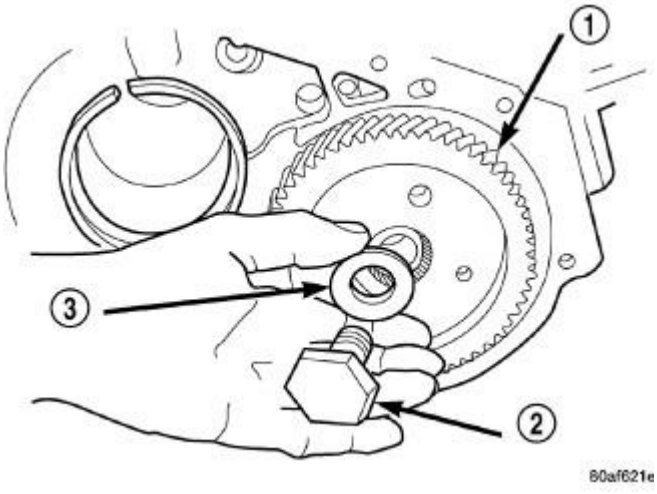


Fig. 78: Removing/Installing Output Gear Bolt & Washer
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR

2 - BOLT
3 - CONED LOCK WASHER

54. Remove output shaft gear-to-shaft bolt (2) and washer (3).

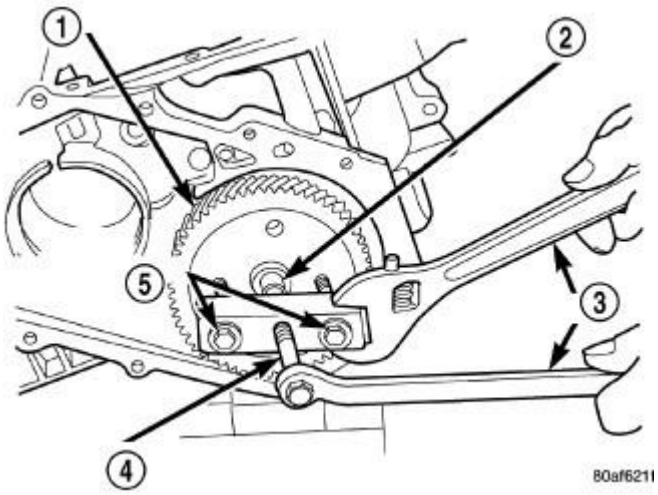


Fig. 79: Removing Output Gear
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR
2 - THRUST BUTTON 6055
3 - WRENCHES
4 - GEAR PULLER L4407A
5 - BOLTS L4407-6

55. Using Gear Puller L4407A (4) and thrust button 6055 (2), remove output gear (1) from shaft.

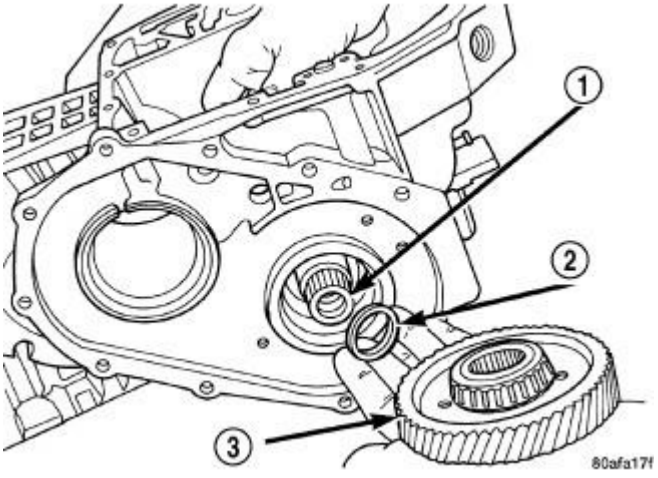


Fig. 80: Removing Output Gear Bearing Shim (Select)

Courtesy of CHRYSLER LLC

1 - REAR CARRIER ASSEMBLY
2 - SHIM (SELECT)
3 - OUTPUT GEAR

56. Remove output gear bearing shim (select) (2) .

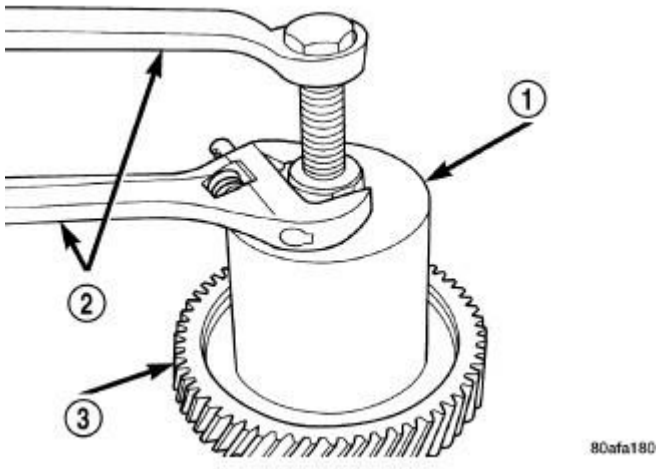


Fig. 81: Removing Output Gear Bearing Cone
Courtesy of CHRYSLER LLC

1 - BEARING PULLER 5048 WITH JAWS 5048-5 AND THRUST PAD L-4539-2
2 - WRENCHES
3 - OUTPUT GEAR

57. Using bearing puller 5048 with jaws 5048-5 and thrust pad L-4539-2 (1) Remove output gear bearing cone.

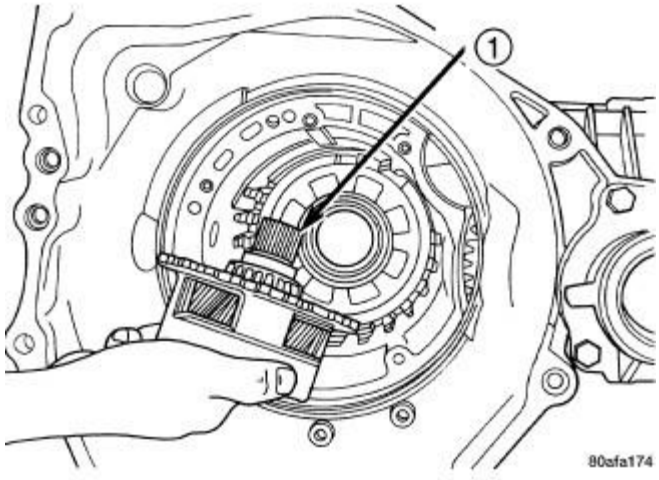


Fig. 82: Removing/Installing Rear Carrier Assembly
Courtesy of CHRYSLER LLC

1 - REAR CARRIER ASSEMBLY

58. Remove rear carrier assembly (1) from transaxle.

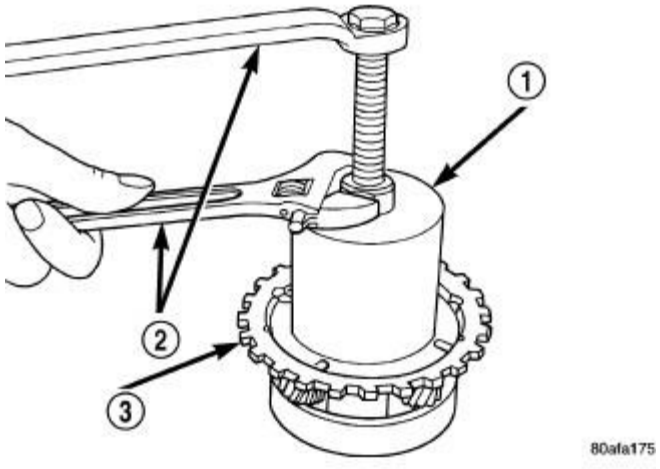


Fig. 83: Removing Rear Carrier Assembly Bearing Cone
Courtesy of CHRYSLER LLC

1 - BEARING PULLER 5048 WITH JAWS 5048-3 AND THRUST BUTTON 6055
2 - WRENCHES
3 - REAR CARRIER ASSEMBLY

59. Remove rear carrier assembly (3) bearing cone using bearing puller 5048 with jaws 5048-3 and thrust button 6055.

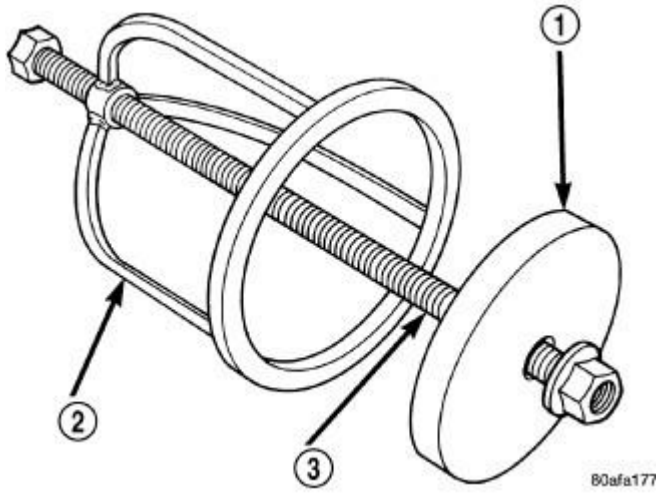


Fig. 84: Identifying Spring Compressor 5059-A, Spring Compressor Disc 6057, & Forcing Screw

5058A-3
Courtesy of CHRYSLER LLC

1 - SPRING COMPRESSOR DISC 6057
2 - SPRING COMPRESSOR 5059-A
3 - FORCING SCREW 5058A-3

60. Install disk 6057 (1) , spring compressor 5059-A (2) and forcing screw 5058A-3 (3).

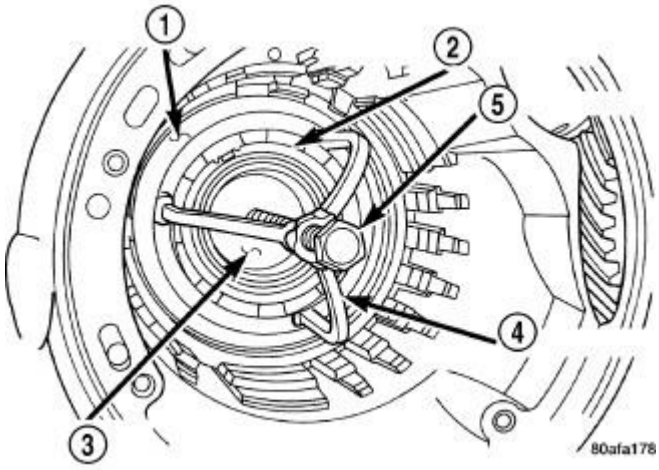


Fig. 85: Removing/Installing Low/Reverse Spring Compressor
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH RETURN SPRING
2 - SNAP RING (INSTALL AS SHOWN IN ILLUSTRATION)
3 - SPRING COMPRESSOR DISC 6057
4 - SPRING COMPRESSOR 5059-A
5 - FORCING SCREW 5058A-3

61. Install low/reverse spring compressor .

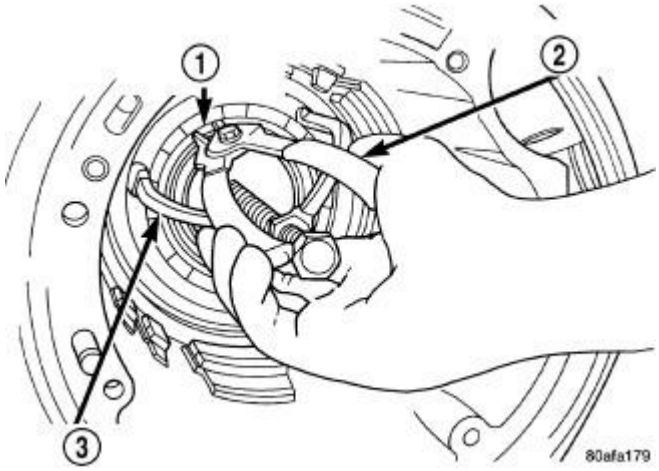


Fig. 86: Removing/Installing Remove Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING OPENING MUST BE BETWEEN SPRING LEVERS (AS SHOWN IN ILLUSTRATION)
2 - SNAP RING PLIERS
3 - SPRING COMPRESSOR DISC 6057

62. Compress low/reverse piston return spring and remove snap ring (1) .

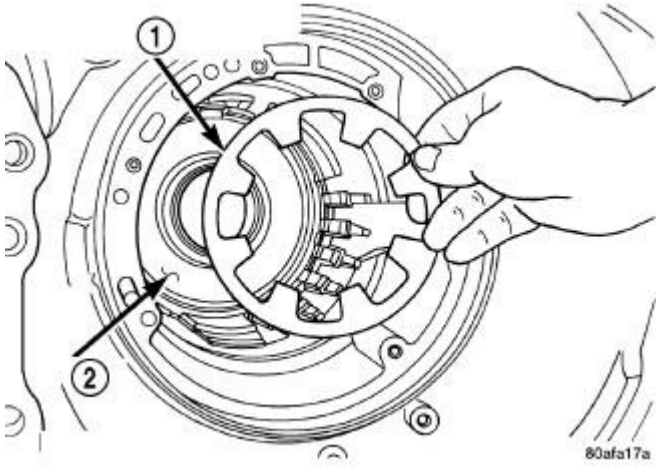


Fig. 87: Removing/Installing Low/Reverse Piston Return Spring
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE PISTON RETURN SPRING
2 - PISTON

63. Remove low/reverse spring compressor tool and low reverse piston return spring (1) .

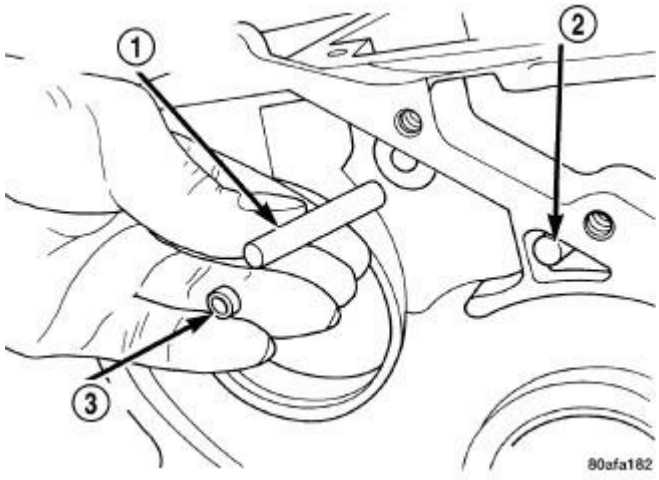


Fig. 88: Driving Out Park Guide Bracket Pivot Shaft Plug
Courtesy of CHRYSLER LLC

1 - GUIDE BRACKET ANCHOR SHAFT
2 - PIVOT SHAFT
3 - ANCHOR SHAFT PLUG

64. Using a suitable punch , drive out park guide bracket pivot shaft plug (3) .

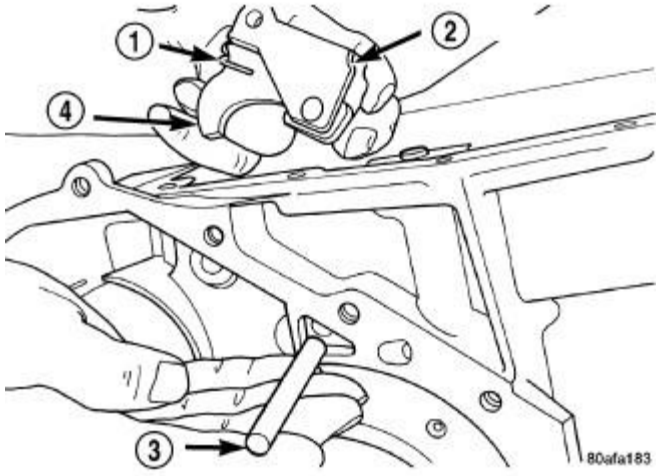


Fig. 89: Removing/Installing Pivot Shaft & Guide Bracket Assembly
Courtesy of CHRYSLER LLC

1 - ANTIRACHET SPRING
2 - GUIDE BRACKET
3 - PIVOT SHAFT
4 - PAWL

65. Using ordinary pliers, remove pivot shaft (3) and guide bracket assembly (2).

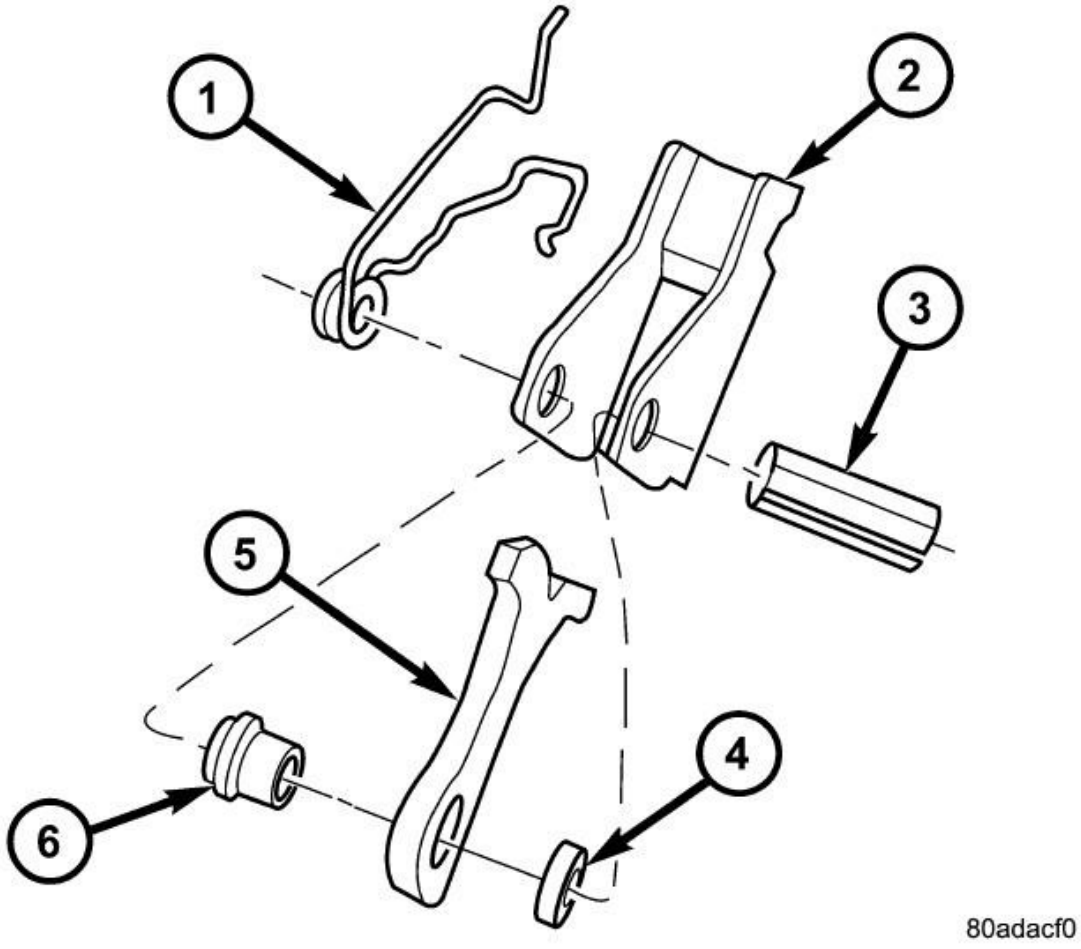


Fig. 90: Identifying Guide Bracket Components
Courtesy of CHRYSLER LLC

66. Inspect guide bracket components for excessive wear and replace Anti-ratching spring (1), guide bracket (2), Split sleeve (3), spacer (4), pawl (5) and stepped spacer (6) if necessary.

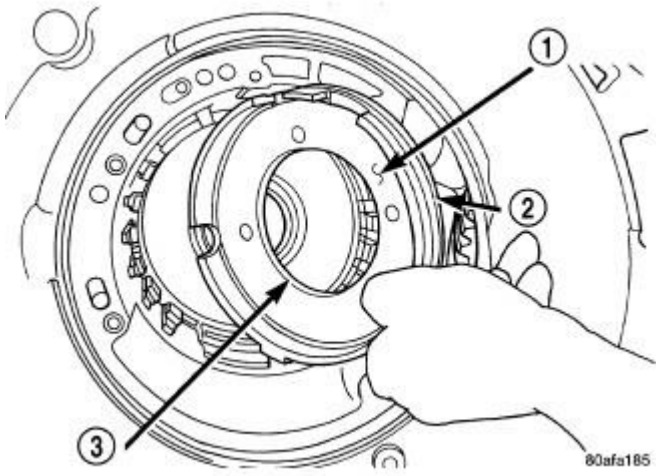


Fig. 91: Identifying Low/Reverse Clutch Piston & Bonded Seals
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON
2 - BONDED SEAL
3 - BONDED SEAL

NOTE: The Low/Reverse Clutch Piston has bonded seals which are not individually serviceable. Seal replacement requires replacement of the piston assembly.

67. Remove low/reverse clutch piston (1) .

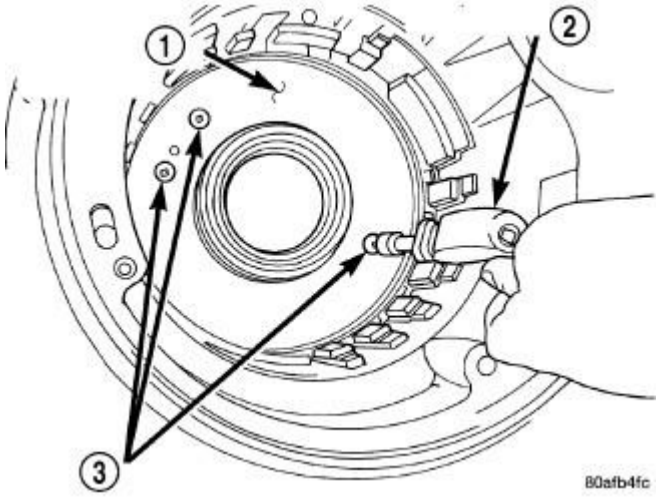


Fig. 92: Removing/Installing Low/Reverse Piston Retainer-To-Case Screws
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON RETAINER

2 - SCREWDRIVER
3 - TORX-LOC SCREWS

68. Remove low/reverse piston retainer-to-case screws (3) .

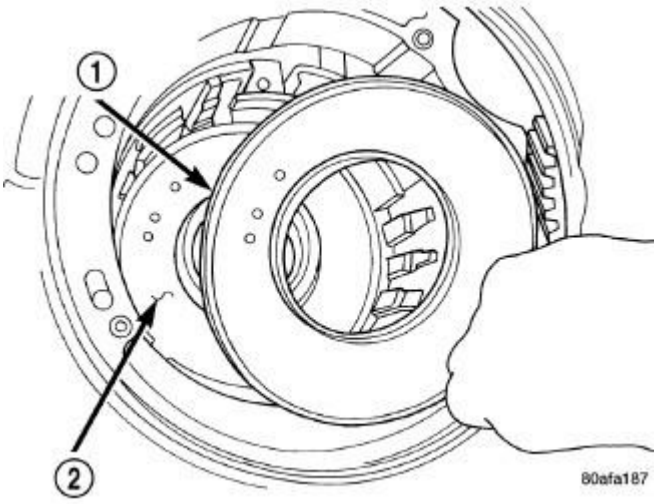


Fig. 93: Removing/Installing Low/Reverse Piston Retainer
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON RETAINER
2 - GASKET

69. Remove low/reverse piston retainer (1) .

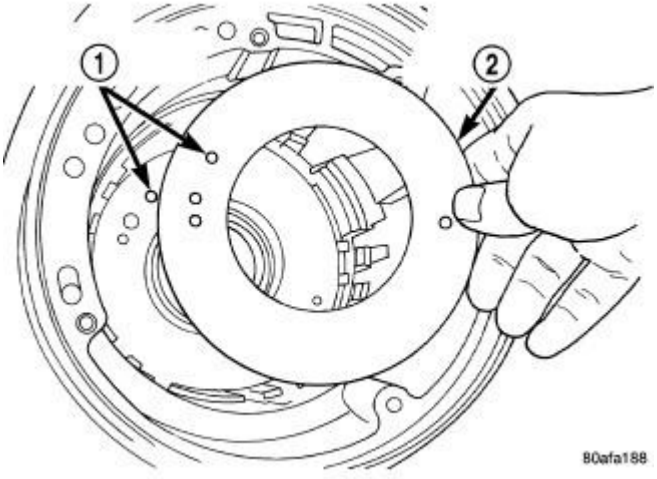


Fig. 94: Removing/Installing Low/Reverse Piston Retainer-To-Case Gasket
Courtesy of CHRYSLER LLC

1 - GASKET HOLES MUST LINE UP

2 - LOW/REVERSE CLUTCH PISTON RETAINER GASKET

70. Remove low/reverse piston retainer-to-case gasket (2) , gasket holes must line up (1).

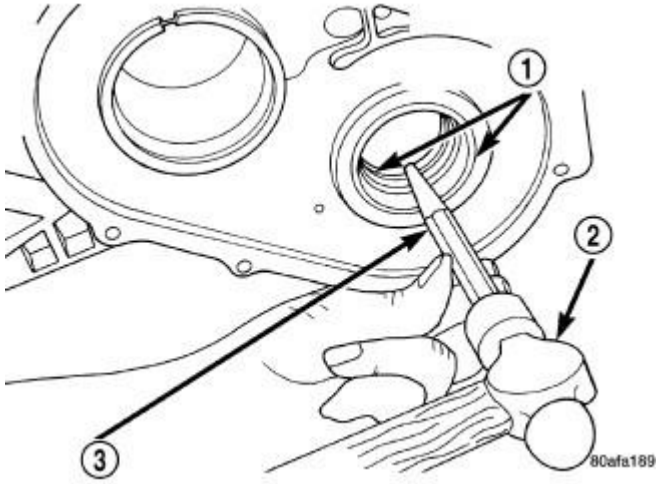


Fig. 95: Removing Inner Output Bearing Cup
Courtesy of CHRYSLER LLC

1 - OUTPUT BEARING CUPS (REPLACE IN PAIRS)
2 - HAMMER
3 - BRASS DRIFT

71. Using a hammer (2) and suitable drift (3), drive out inner output bearing cup (1).

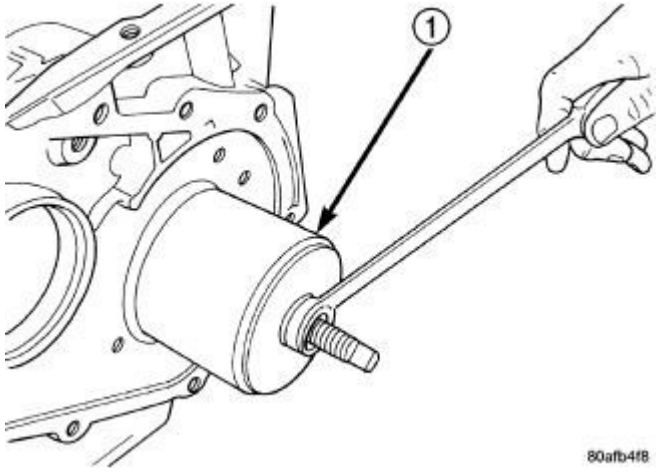


Fig. 96: Removing Outer Output Bearing Cup
Courtesy of CHRYSLER LLC

1 - BEARING CUP PULLER 6062A

72. Using bearing cup puller 6062A (1) , remove outer output bearing cup.

ASSEMBLY

ASSEMBLY

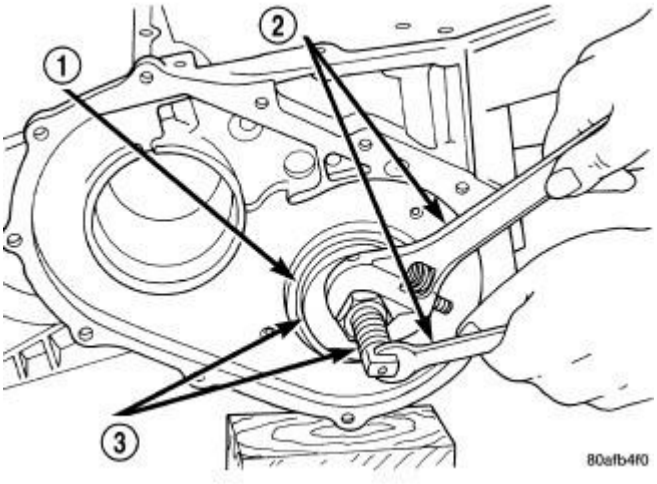


Fig. 97: Installing Output Bearing Cups
Courtesy of CHRYSLER LLC

1 - OUTPUT BEARING CUPS
2 - WRENCHES
3 - INSTALLER - 5050A

CAUTION: The cooler bypass valve must be replaced if transaxle failure has occurred. Do not attempt to reuse or clean old valve.

NOTE: If transaxle is being overhauled (clutch and/or seal replacement), the TCM/PCM Quick Learn procedure must be performed. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Install both output bearing cups (1) using Installer 5050A (3).

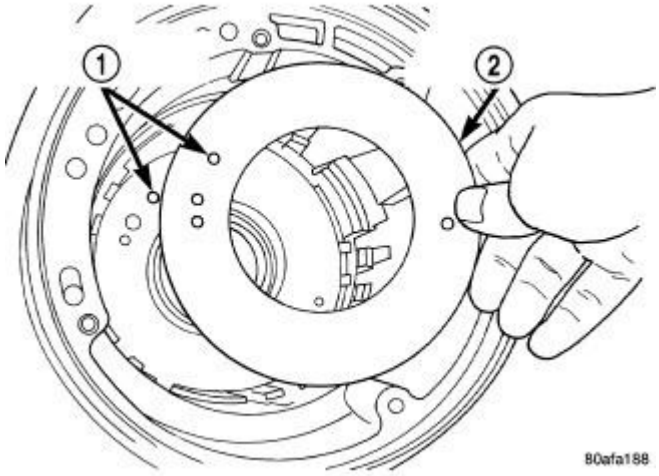


Fig. 98: Removing/Installing Low/Reverse Piston Retainer-To-Case Gasket
Courtesy of CHRYSLER LLC

1 - GASKET HOLES MUST LINE UP
2 - LOW/REVERSE CLUTCH PISTON RETAINER GASKET

2. Install low/reverse piston retainer gasket (2) . Make sure gasket holes line up with case (1).

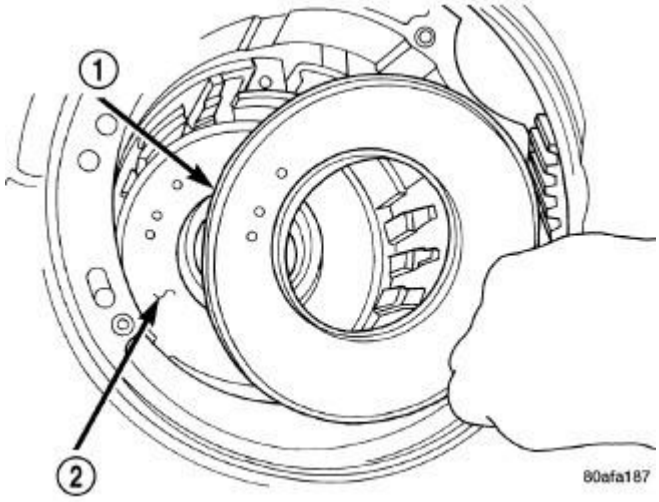


Fig. 99: Removing/Installing Low/Reverse Piston Retainer
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON RETAINER
2 - GASKET

3. Install low/reverse piston retainer (1) .

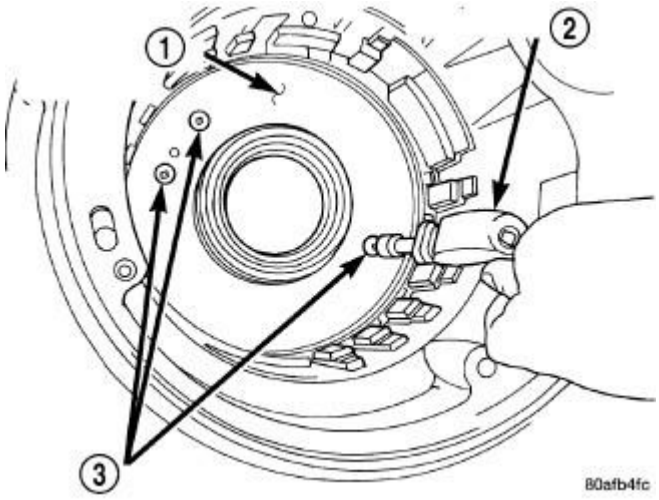


Fig. 100: Removing/Installing Low/Reverse Piston Retainer-To-Case Screws
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON RETAINER
2 - SCREWDRIVER
3 - TORX-LOC SCREWS

4. Install low/reverse piston retainer-to-case screws (3) and torque to 5 N.m (45 in. lbs.).

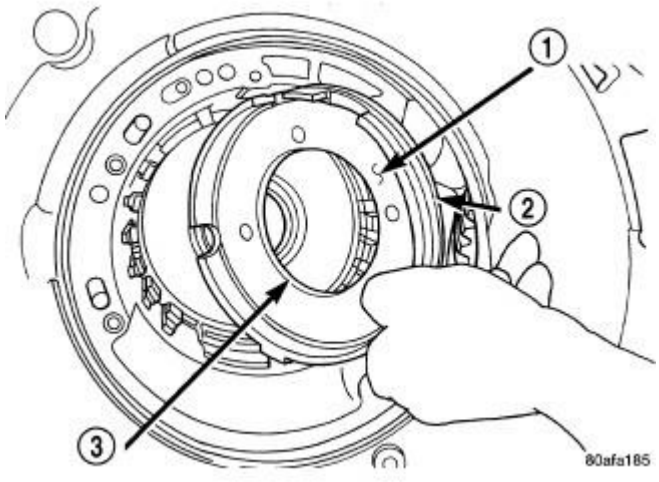


Fig. 101: Identifying Low/Reverse Clutch Piston & Bonded Seals
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH PISTON
2 - BONDED SEAL
3 - BONDED SEAL

NOTE: The Low/Reverse Clutch Piston has bonded seals which are not

individually serviceable. Seal replacement requires replacement of the piston assembly.

5. Install low/reverse clutch piston (1) .

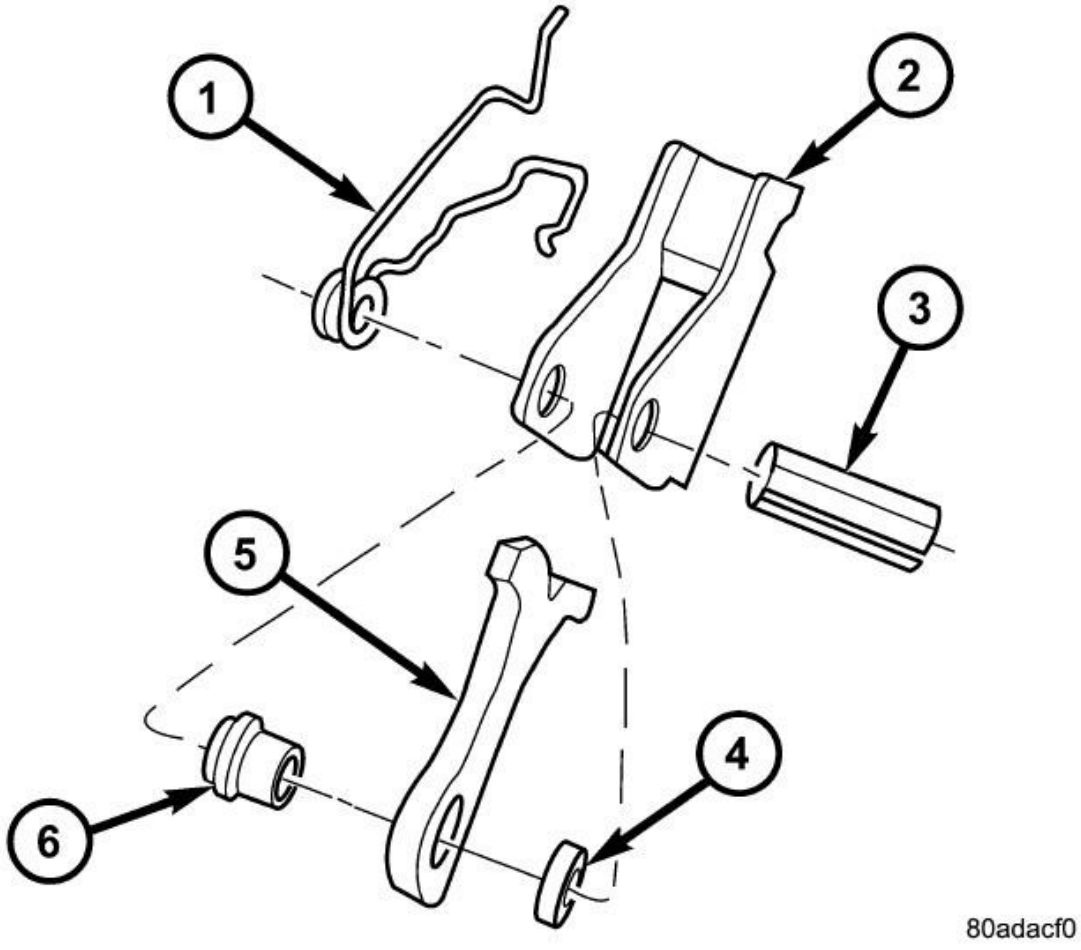


Fig. 102: Identifying Guide Bracket Components
Courtesy of CHRYSLER LLC

6. Use figure Anti-ratching spring (1), guide bracket (2), Split sleeve (3), spacer (4), pawl (5) and stepped spacer (6) as a reference while assembling park guide bracket assembly.

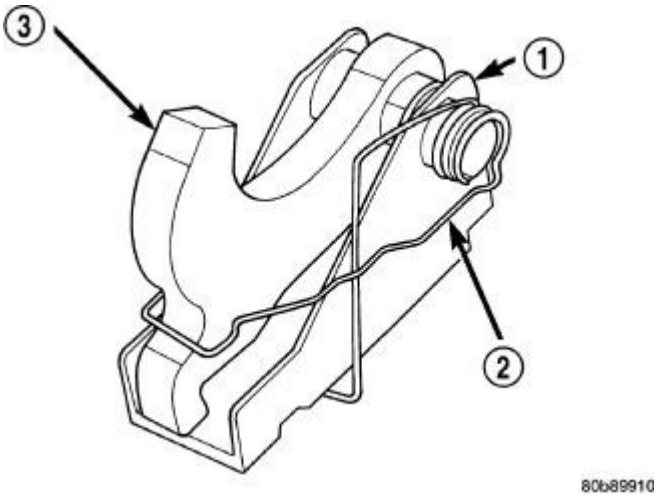


Fig. 103: Identifying Guide Bracket Assembly
Courtesy of CHRYSLER LLC

1 - GUIDE BRACKET
2 - ANTIRATCHET SPRING (MUST BE ASSEMBLED AS SHOWN IN ILLUSTRATION)
3 - PAWL

7. Assemble park guide bracket assembly .

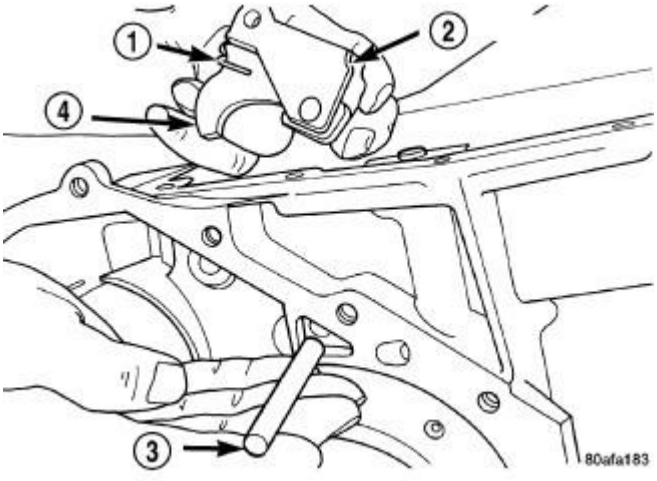


Fig. 104: Removing/Installing Pivot Shaft & Guide Bracket Assembly
Courtesy of CHRYSLER LLC

1 - ANTIRACHET SPRING
2 - GUIDE BRACKET
3 - PIVOT SHAFT
4 - PAWL

8. Install guide bracket (2) into position and insert pivot shaft (3).

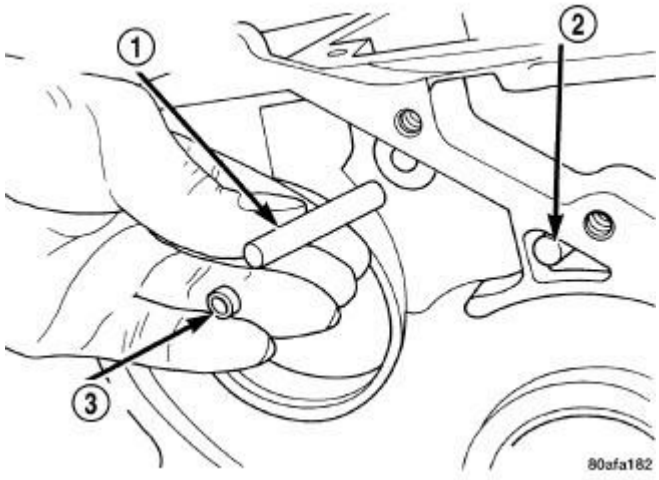


Fig. 105: Installing Anchor Shaft & Plug
Courtesy of CHRYSLER LLC

1 - GUIDE BRACKET ANCHOR SHAFT
2 - PIVOT SHAFT
3 - ANCHOR SHAFT PLUG

9. Install anchor shaft (1) and plug (3). Make sure guide bracket and split sleeve are in contact with the rear of the transaxle case.

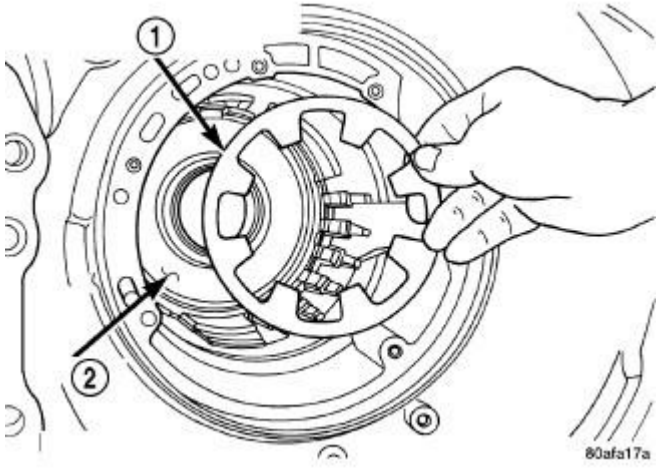


Fig. 106: Removing/Installing Low/Reverse Piston Return Spring
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE PISTON RETURN SPRING
2 - PISTON

10. Install low/reverse piston return spring (1) .

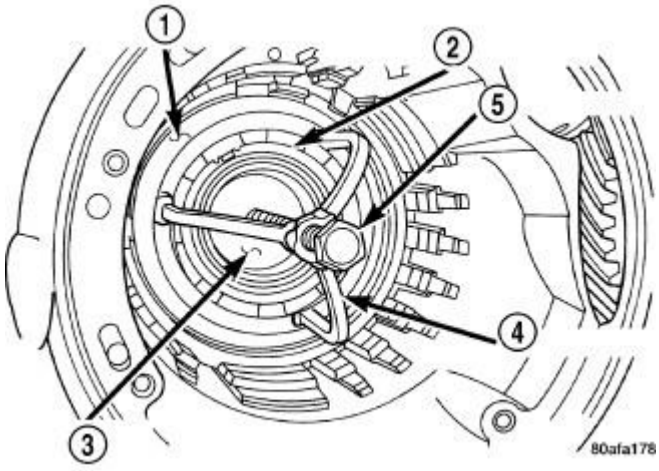


Fig. 107: Removing/Installing Low/Reverse Spring Compressor
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE CLUTCH RETURN SPRING
2 - SNAP RING (INSTALL AS SHOWN IN ILLUSTRATION)
3 - DISC 6057
4 - COMPRESSOR 5059-A
5 - COMPRESSOR BAR 5058A-3

11. Install low/reverse spring compressor into position .

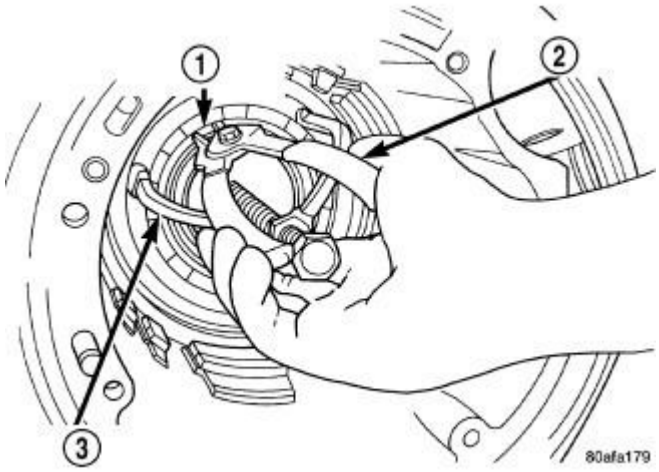


Fig. 108: Removing/Installing Remove Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING OPENING MUST BE BETWEEN SPRING LEVERS (AS SHOWN IN ILLUSTRATION)
2 - SNAP RING PLIERS
3 - DISC 6057

12. Compress low/reverse piston and install snap ring (1) .

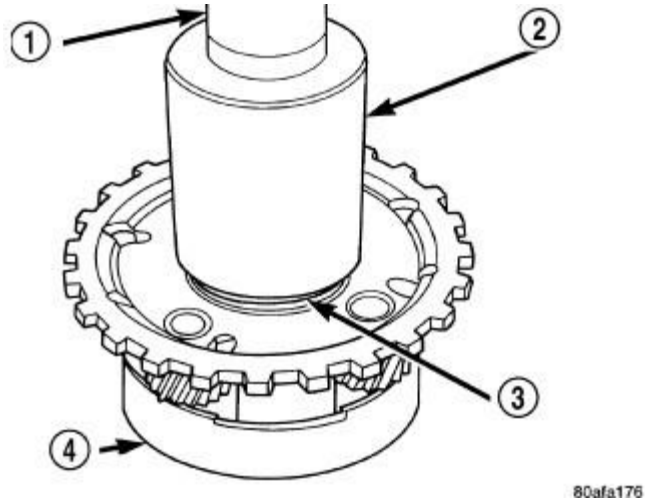


Fig. 109: Installing Rear Carrier Bearing Cone
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - INSTALLER 6053
3 - NEW BEARING CONE
4 - REAR CARRIER ASSEMBLY

13. Install rear carrier bearing cone (3) using Installer 6053 (1).

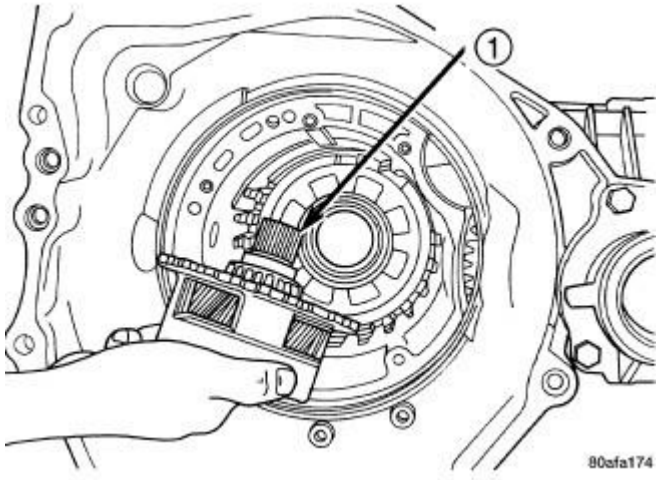


Fig. 110: Removing/Installing Rear Carrier Assembly
Courtesy of CHRYSLER LLC

1 - REAR CARRIER ASSEMBLY

14. Install rear carrier assembly (1) to transaxle case.

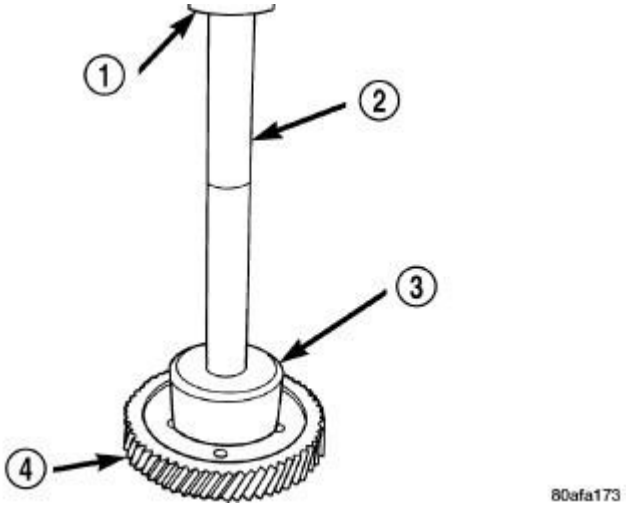


Fig. 111: Installing Output Gear Bearing Cone
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - HANDLE C-4171
3 - INSTALLER 5052
4 - OUTPUT GEAR

15. Install output gear bearing cone using Installer 5052 (3) .

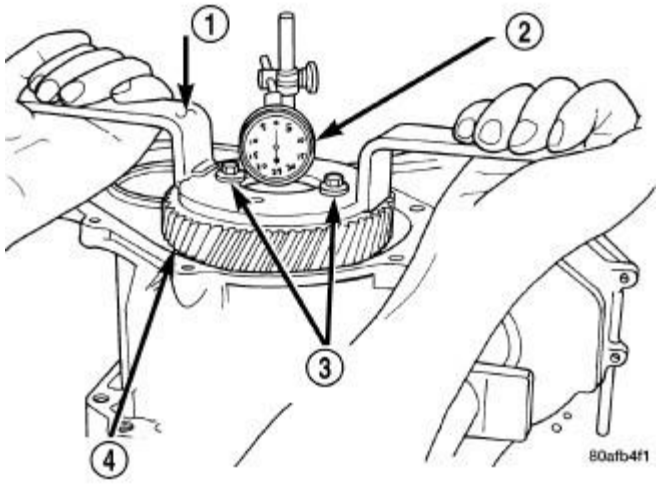


Fig. 112: Measuring End Play Of Output Gear Bearings
Courtesy of CHRYSLER LLC

1 - GEAR CHECKING PLATE L-4432
2 - DIAL INDICATOR

3 - SPECIAL SCREWS 6260
4 - OUTPUT GEAR

16. **OUTPUT GEAR BEARING ADJUSTMENT:**
    a. With output gear removed, install a 4.50 mm (0.177 in.) gauging shim on the rear carrier assembly hub, using grease to hold the shim in place.
    b. Using Holder 6259, install output gear and bearing assembly. Torque to 271 N.m (200 ft. lbs.).
    c. Measure bearing end play. Attach Gear Checking Plate L-4432 (1) to the gear.
    d. Push and pull the gear while rotating back and forth to ensure seating of bearing rollers.
    e. Using a dial indicator mounted to the transaxle case, measure output gear end play.
    f. Refer to **OUTPUT GEAR BEARING SHIM CHART** for the required shim to obtain proper bearing setting.
    g. Use Holder 6259 to remove the output gear retaining bolt and washer. To remove the output gear, use Gear Puller L-4407A.
    h. Remove the gauging shim and install the proper shim determined by the chart. Use grease to hold the shim in place.

OUTPUT GEAR BEARING SHIM CHART

End Play	Shim Needed	Part Number	-	End Play	Shim Needed	Part Number
0.05mm (0.002 in.)	4.42mm (0.174 in.)	4412830AB	-	0.53mm (0.021 in.)	3.94mm (0.155 in.)	4412818AB
0.08mm (0.003 in.)	4.38mm (0.172 in.)	4412829AB	-	0.56mm (0.022 in.)	3.90mm (0.154 in.)	4412817AB
0.10mm (0.004 in.)	4.38mm (0.172 in.)	4412829AB	-	0.58mm (0.023 in.)	3.90mm (0.154 in.)	4412817AB
0.13mm (0.005 in.)	4.34mm (0.171 in.)	4412828AB	-	0.61mm (0.024 in.)	3.86mm (0.152 in.)	4412816AB
0.15mm (0.006 in.)	4.30mm (0.169 in.)	4412827AB	-	0.64mm (0.025 in.)	3.82mm (0.150 in.)	4412815AB
0.18mm (0.007 in.)	4.30mm (0.169 in.)	4412827AB	-	0.66mm (0.026 in.)	3.82mm (0.150 in.)	4412815AB
0.20mm (0.008 in.)	4.26mm (0.168 in.)	4412826AB	-	0.69mm (0.027 in.)	3.78mm (0.149 in.)	4412814AB
0.23mm (0.009 in.)	4.22mm (0.166 in.)	4412825AB	-	0.71mm (0.028 in.)	3.74mm (0.147 in.)	4412813AB
0.25mm (0.010 in.)	4.22mm (0.166 in.)	4412825AB	-	0.74mm (0.029 in.)	3.74mm (0.147 in.)	4412813AB
0.28mm (0.011 in.)	4.18mm (0.165 in.)	4412824AB	-	0.76mm (0.030 in.)	3.70mm (0.146 in.)	4412812AB
0.30mm (0.012 in.)	4.14mm (0.163 in.)	4412823AB	-	0.79mm (0.031 in.)	3.66mm (0.144 in.)	4412811AB
0.33mm (0.013 in.)	4.14mm (0.163 in.)	4412823AB	-	0.81mm (0.032 in.)	3.66mm (0.144 in.)	4412811AB

0.36mm (0.014 in.)	4.10mm (0.161 in.)	4412822AB	-	0.84mm (0.033 in.)	3.62mm (0.143 in.)	4412810AB
0.38mm (0.015 in.)	4.10mm (0.161 in.)	4412822AB	-	0.86mm (0.034 in.)	3.62mm (0.143 in.)	4412810AB
0.41mm (0.016 in.)	4.06mm (0.160 in.)	4412821AB	-	0.89mm (0.035 in.)	3.58mm (0.141)	4412809AB
0.43mm (0.017 in.)	4.02mm (0.158 in.)	4412820AB	-	0.91mm (0.036in.)	3.54mm (0.139 in.)	4412808AB
0.46mm (0.018 in.)	4.02mm (0.158 in.)	4412820AB	-	0.94mm (0.037 in.)	3.54mm (0.139 in.)	4412808AB
0.48mm (0.019 in.)	3.98mm (0.157 in.)	4412819AB	-	0.97mm (0.038 in.)	3.50mm (0.138 in.)	4412807AB
0.51mm (0.020 in.)	3.94mm (0.155 in.)	4412818AB	-	-	-	-

17. Install the output gear (3) and bearing assembly using Installer 6261 (2).

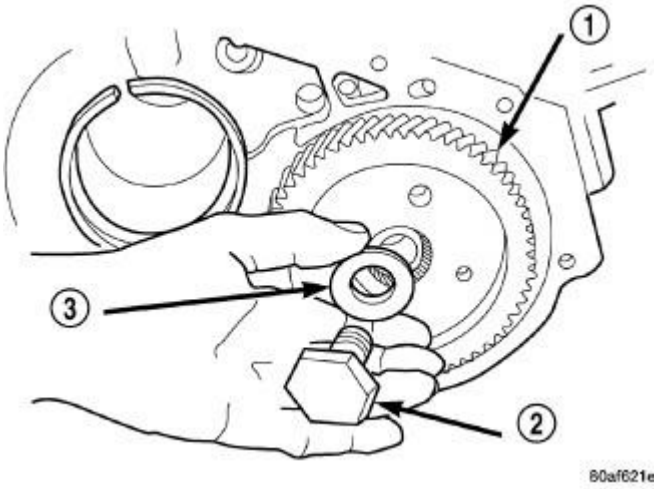


Fig. 113: Removing/Installing Output Gear Bolt & Washer
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR
2 - BOLT
3 - CONED LOCK WASHER

18. Install NEW output gear retaining bolt (2) and washer (3).

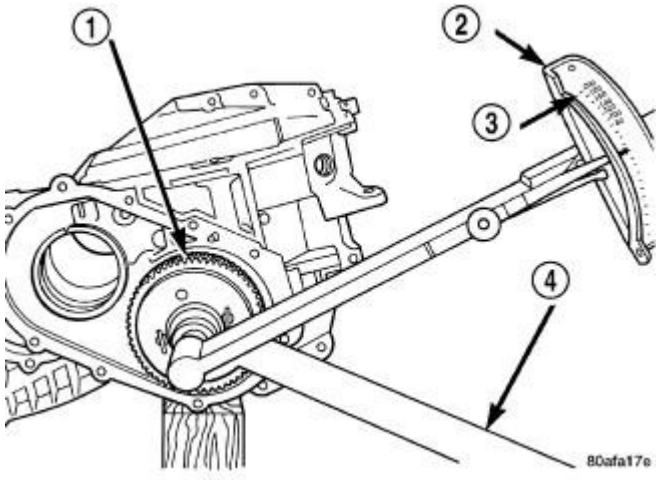


Fig. 114: Tightening Output Gear Retaining Bolt
Courtesy of CHRYSLER LLC

1 - OUTPUT GEAR
2 - TORQUE WRENCH
3 - 200 FT. LBS.
4 - HOLDER 6259

19. Using Holder 6259 (4) , torque output gear (1) retaining bolt to 271 N.m (200 ft. lbs.).

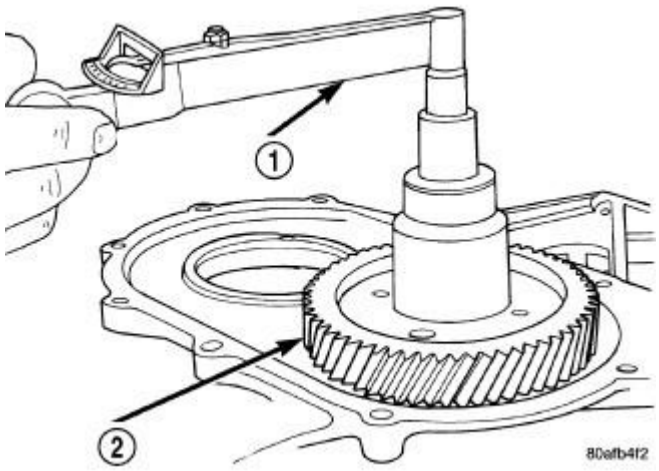


Fig. 115: Checking Output Shaft Turning Torque
Courtesy of CHRYSLER LLC

1 - INCH-POUND TORQUE WRENCH
2 - OUTPUT GEAR

20. Using an inch pound torque wrench (1) , check output shaft turning torque. **Output shaft turning torque should be within 3-8 in. lbs.** If the turning torque is too high, install a 0.04 mm (0.0016 in.) thicker shim

If the turning torque is too low, install a 0.04 mm (0.0016 in.) thinner shim. Repeat until the proper turning torque of 3-8 in. lbs. is obtained.

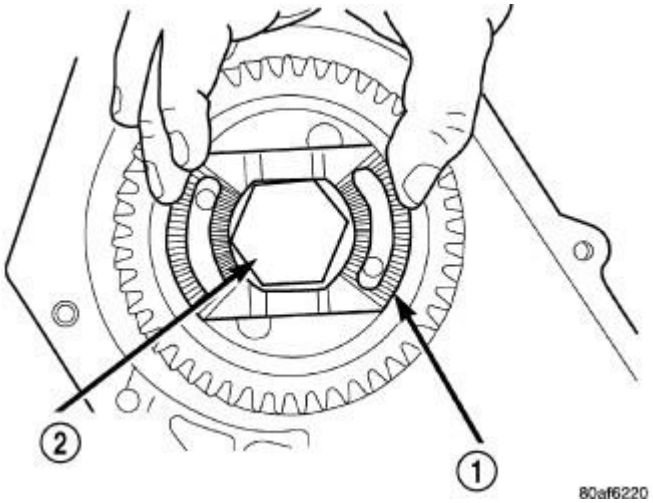


Fig. 116: Installing Output Gear Stirrup
Courtesy of CHRYSLER LLC

1 - STIRRUP
2 - OUTPUT GEAR RETAINING BOLT

21. Install output gear stirrup (1) with serrated side out.

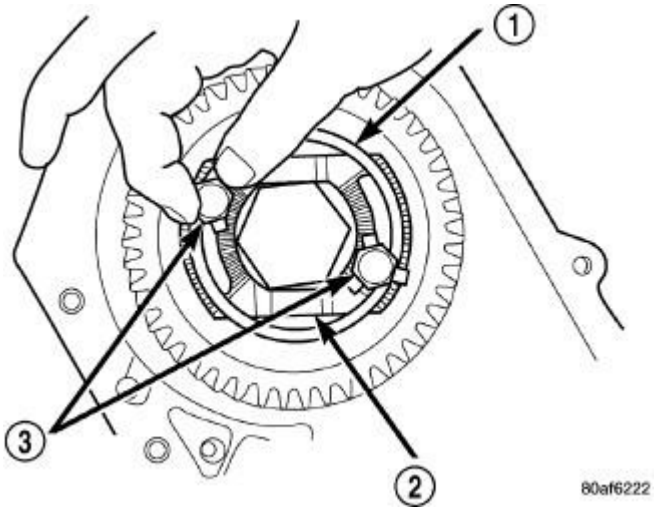


Fig. 117: Removing/Installing Retaining Strap Bolts
Courtesy of CHRYSLER LLC

1 - RETAINING STRAP
2 - STIRRUP
3 - RETAINING STRAP BOLTS

22. Install retaining strap (1) .
23. Install strap bolts (3) but do not tighten at this time.

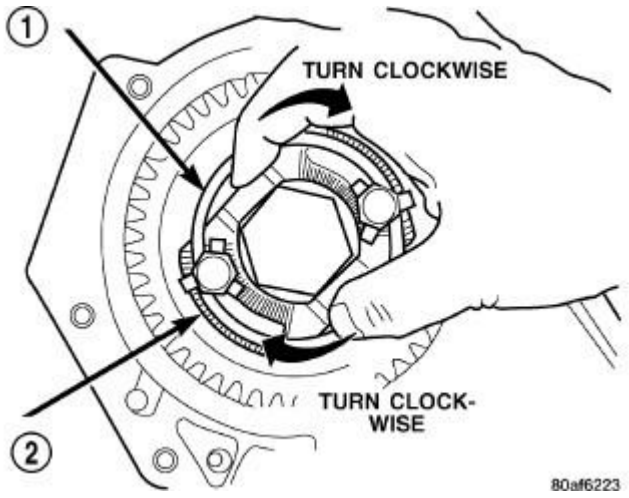


Fig. 118: Rotating Stirrup Clockwise Against Flats Of Retaining Bolt
Courtesy of CHRYSLER LLC

1 - RETAINING STRAP
2 - STIRRUP

24. Rotate stirrup (2) clockwise against flats of retaining bolt.

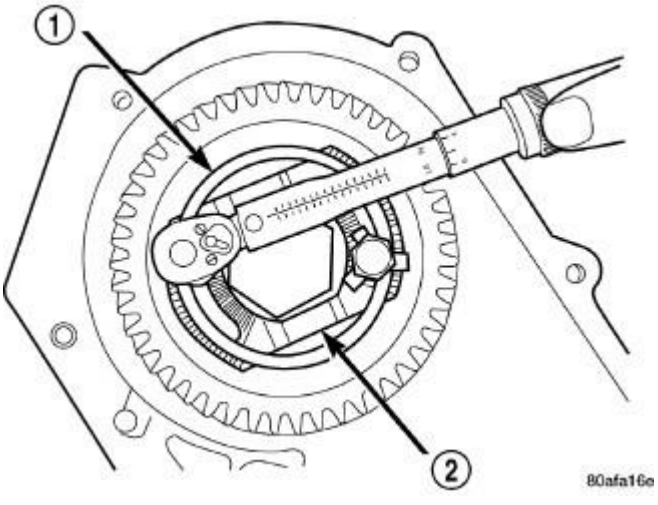


Fig. 119: Tightening Stirrup Strap Bolts
Courtesy of CHRYSLER LLC

1 - RETAINING STRAP
2 - STIRRUP

25. Torque stirrup strap bolts to 23 N.m (204 in. lbs.) .

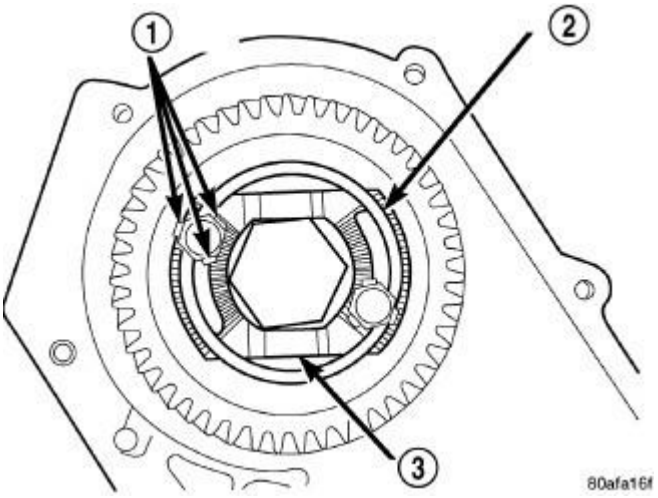


Fig. 120: Bending Tabs On Strap Up Against Flats Of Bolts
Courtesy of CHRYSLER LLC

1 - RETAINING STRAP TABS
2 - RETAINING STRAP
3 - STIRRUP

26. Bend tabs (1) on strap up against flats of bolts.

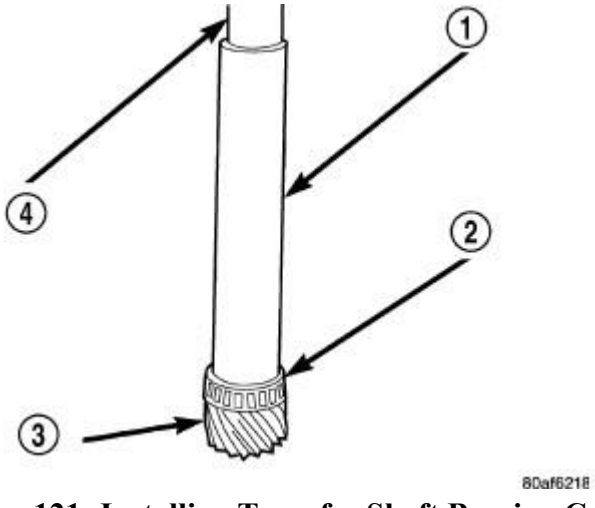


Fig. 121: Installing Transfer Shaft Bearing Cone
Courtesy of CHRYSLER LLC

1 - INSTALLER 6052
2 - NEW BEARING CONE
3 - TRANSFER SHAFT
4 - ARBOR PRESS RAM

27. Install new transfer shaft bearing cone (2) using Installer 6052 (1).

28. Using Remover/Installer 5049-A (1) , install transfer shaft (2).

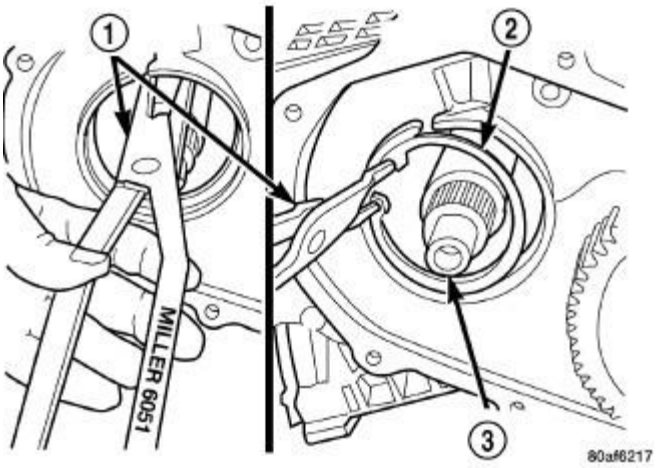


Fig. 122: Removing/Installing Transfer Shaft Bearing Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS 6051A
2 - TRANSFER SHAFT BEARING SNAP RING
3 - TRANSFER SHAFT

29. Using Snap Ring Pliers 6051A (1) , install transfer shaft bearing snap ring (2).

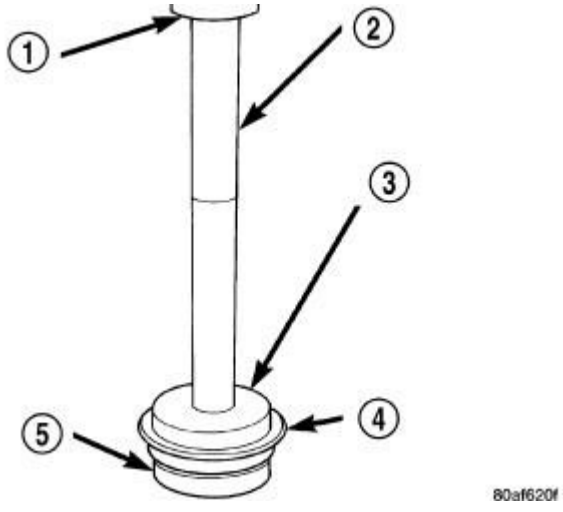


Fig. 123: Installing Transfer Shaft Bearing Cup Into Retainer
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - HANDLE C-4171
3 - INSTALLER 6061

4 - TRANSFER SHAFT BEARING CUP RETAINER
5 - USE REMOVED BEARING CUP TO SUPPORT RETAINER

30. Using an arbor press (1) install transfer shaft bearing cup into retainer using Installer 6061(3). Use removed bearing cup to support retainer (4).

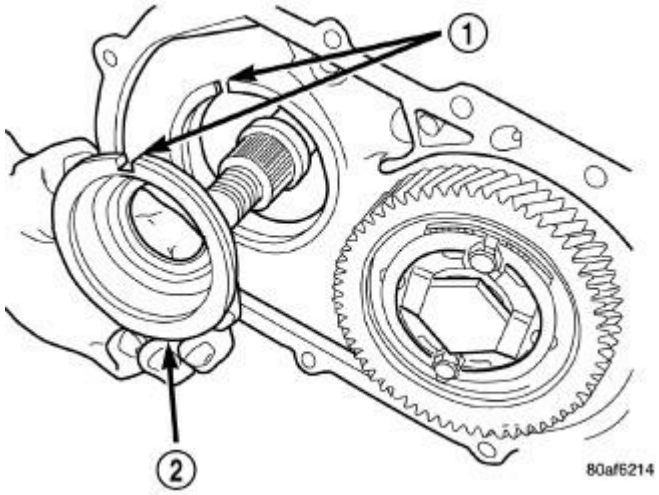


Fig. 124: Removing/Installing Bearing Cup Retainer
Courtesy of CHRYSLER LLC

1 - ALIGN INDEXING TAB TO SLOT
2 - BEARING CUP RETAINER

31. Install bearing cup retainer (2) to transaxle.

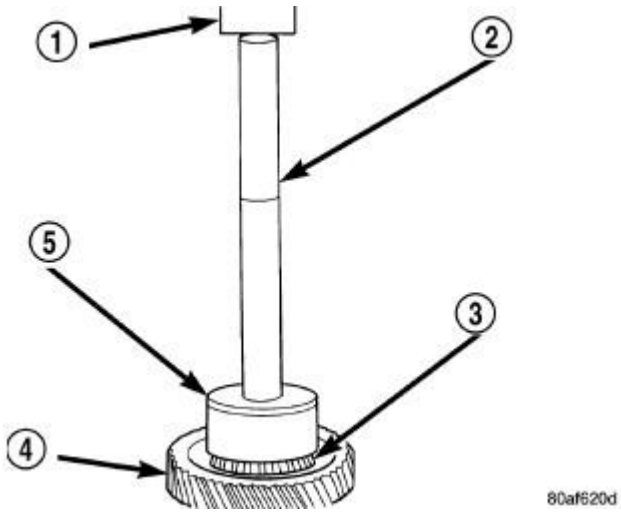


Fig. 125: Installing Transfer Gear Bearing Cone
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - HANDLE C-4171
3 - NEW BEARING CONE
4 - TRANSFER SHAFT GEAR
5 - INSTALLER 5052

32. Install new transfer gear bearing cone (3) to transfer gear (4) using Installer 5052 (5).

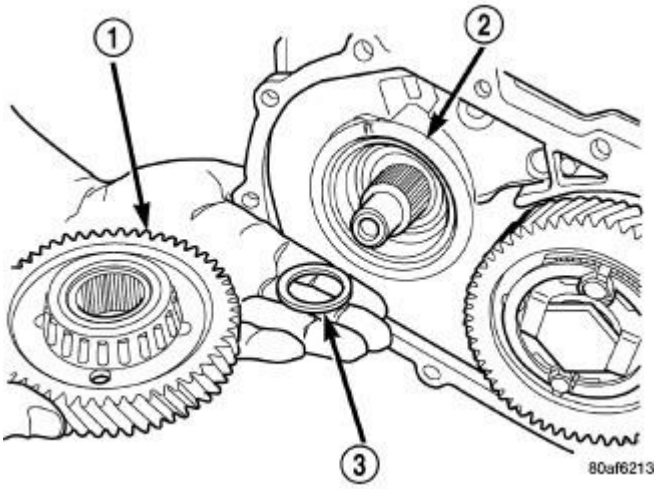


Fig. 126: Removing/Installing Transfer Gear Shim (Select)
Courtesy of CHRYSLER LLC

1 - TRANSFER SHAFT GEAR
2 - BEARING CUP RETAINER
3 - SHIM (SELECT)

33. **TRANSFER GEAR BEARING ADJUSTMENT:**
    a. Install a 4.66 mm (0.183 in.) gauging shim on the transfer shaft .
    b. Install transfer shaft gear using Installer 6261. Using Holder 6259, install transfer shaft gear retaining nut to 271 N.m (200 ft. lbs.).
    c. Measure end play. Attach Gear Checking Plate L-4432 to the transfer gear.
    d. Mount a steel ball with grease into the end of the transfer shaft.
    e. Push and pull the gear while rotating back and forth to ensure seating of the bearing rollers.
    f. Using a dial indicator, measure transfer shaft end play.
    g. Refer to **TRANSFER SHAFT BEARING SHIM CHART** for the required shim combination to obtain the proper bearing setting.
    h. Use Holder 6259 to remove the retaining nut and washer. Remove the transfer shaft gear using Gear Puller L-4407A.
    i. Remove the gauging shim and install the proper shim indicated by the chart.

TRANSFER SHAFT BEARING SHIM CHART

End Play	Shim Needed	Part Number	-	End Play	Shim Needed	Part Number
0.05mm (0.002 in.)	4.66mm (0.183 in.)	4505588AB	-	0.76mm (0.030 in.)	3.94mm (0.155 in.)	4412818AB
0.08mm (0.003 in.)	4.62mm (0.182 in.)	4412835AB	-	0.79mm (0.031 in.)	3.90mm (0.154 in.)	4412817AB
0.10mm (0.004 in.)	4.58mm (0.180 in.)	4412834AB	-	0.81mm (0.032 in.)	3.90mm (0.154 in.)	4412817AB
0.13mm (0.005 in.)	4.58mm (0.180 in.)	4412834AB	-	0.84mm (0.033 in.)	3.86mm (0.152 in.)	4412816AB
0.15mm (0.006 in.)	4.54mm (0.178 in.)	4412833AB	-	0.86mm (0.034 in.)	3.82mm (0.150 in.)	4412815AB
0.18mm (0.007 in.)	4.50mm (0.177 in.)	4412832AB	-	0.89mm (0.035 in.)	3.82mm (0.150 in.)	4412815AB
0.20mm (0.008 in.)	4.50mm (0.177 in.)	4412832AB	-	0.91mm (0.036 in.)	3.78mm (0.149 in.)	4412814AB
0.23mm (0.009 in.)	4.46mm (0.175 in.)	4412831AB	-	0.94mm (0.037 in.)	3.74mm (0.147 in.)	4412813AB
0.25mm (0.010 in.)	4.46mm (0.175 in.)	4412831AB	-	0.97mm (0.038 in.)	3.74mm (0.147 in.)	4412813AB
0.28mm (0.011 in.)	4.42mm (0.174 in.)	4412830AB	-	0.99mm (0.039 in.)	3.70mm (0.146 in.)	4412812AB
0.30mm (0.012 in.)	4.38mm (0.172 in.)	4412829AB	-	1.02mm (0.040 in.)	3.66mm (0.144 in.)	4412811AB
0.33mm (0.013 in.)	4.38mm (0.172 in.)	4412829AB	-	1.04mm (0.041 in.)	3.66mm (0.144 in.)	4412811AB
0.36mm (0.014 in.)	4.34mm (0.171 in.)	4412828AB	-	1.07mm (0.042 in.)	3.62mm (0.143 in.)	4412810AB
0.38mm (0.015 in.)	4.30mm (0.169 in.)	4412827AB	-	1.08mm (0.043 in.)	3.62mm (0.143 in.)	4412810AB
0.41mm (0.016 in.)	4.30mm (0.169 in.)	4412827AB	-	1.12mm (0.044 in.)	3.58mm (0.141)	4412809AB
0.43mm (0.017 in.)	4.26mm (0.168 in.)	4412826AB	-	1.14mm (0.045 in.)	3.54mm (0.139 in.)	4412808AB
0.46mm (0.018 in.)	4.22mm (0.166 in.)	4412825AB	-	1.17mm (0.046 in.)	3.54mm (0.139 in.)	4412808AB
0.48mm (0.019 in.)	4.22mm (0.166 in.)	4412825AB	-	1.19mm (0.047 in.)	3.50mm (0.138 in.)	4412807AB
0.50mm (0.020 in.)	4.18mm (0.165 in.)	4412824AB	-	1.22mm (0.048 in.)	3.46mm (0.136 in.)	4412806AB
0.53mm (0.021 in.)	4.18mm (0.165 in.)	4412824AB	-	1.24mm (0.049 in.)	3.46mm (0.136 in.)	4412806AB
0.56mm (0.022 in.)	4.14mm (0.163 in.)	4412823AB	-	1.27mm (0.050 in.)	3.42mm (0.135 in.)	4412805AB

0.58mm (0.023 in.)	4.10mm (0.161 in.)	4412822AB	-	1.30mm (0.051 in.)	3.38mm (0.133 in.)	4412804AB
0.61mm (0.024 in.)	4.10mm (0.161 in.)	4412822AB	-	1.32mm (0.052 in.)	3.38mm (0.133 in.)	4412804AB
0.64mm (0.025 in.)	4.06mm (0.160 in.)	4412821AB	-	1.35mm (0.053 in.)	3.34mm (0.132 in.)	4412803AB
0.66mm (0.026 in.)	4.02mm (0.158 in.)	4412820AB	-	1.37mm (0.054 in.)	3.34mm (0.132 in.)	4412803AB
0.69mm (0.027 in.)	4.02mm (0.158 in.)	4412820AB	-	1.40mm (0.055 in.)	3.30mm (0.130 in.)	4412802AB
0.71mm (0.028 in.)	3.98mm (0.157 in.)	4412819AB	-	1.45mm (0.057 in	3.26mm (0.128 in.)	4412801AB
0.74mm (0.029 in.)	3.94mm (0.155 in.)	4412818AB	-	1.47mm (0.058 in.)	2.22mm (0.127 in.)	4505570AB

34. Install the transfer shaft gear (4) using Installer 6261 (2).

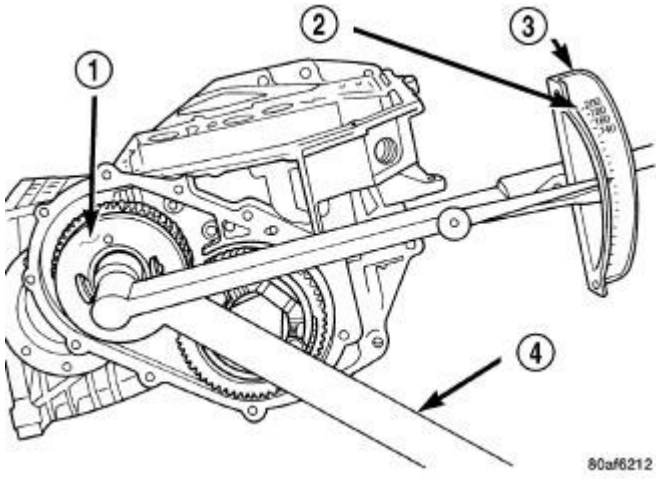


Fig. 127: Tightening Transfer Gear Retaining Nut
Courtesy of CHRYSLER LLC

1 - TRANSFER SHAFT GEAR
2 - 200 FT. LBS.
3 - TORQUE WRENCH
4 - HOLDER 6259

CAUTION: Install a NEW retaining nut, as the original nut MUST NOT be reused.

35. Install the new retaining nut and washer.
36. Using Holder 6259 (4) , torque transfer gear retaining nut to 271 N.m (200 ft. lbs.).

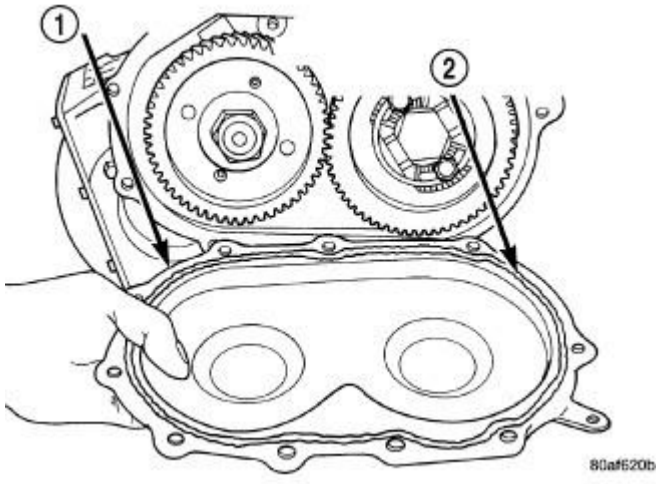


Fig. 128: Removing/Installing Transfer Gear Cover
Courtesy of CHRYSLER LLC

1 - REAR COVER
2 - 1/8 INCH BEAD OF MOPAR® ATF RTV (MS-GF41)

37. Measure transfer shaft end play. **Transfer shaft end play should be within 0.05-0.10 mm (0.002-0.004 in.).** If the end play is too high, install a 0.04 mm (0.0016 in.) thicker shim. If the end play is too low, install a 0.04 mm (0.0016 in.) thinner shim. Repeat until 0.05-0.10 mm (0.002-0.004 in.) end play is obtained.
38. Install a bead of Mopar® ATF RTV (MS-GF41) (2) to transfer gear cover (1).

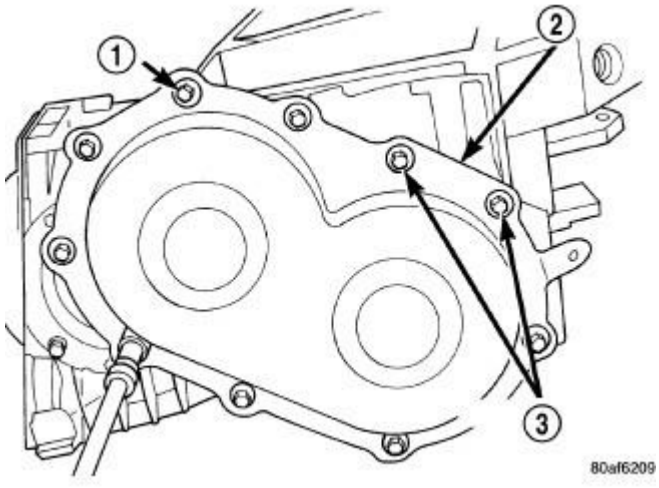


Fig. 129: Removing/Installing Transfer Gear Cover-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - REAR COVER BOLTS
2 - REAR COVER

3 - USE SEALANT ON BOLTS

39. Use sealant on bolts (3) , install transfer gear cover-to-case bolts (1) and torque to 20 N.m (175 in. lbs.) torque.

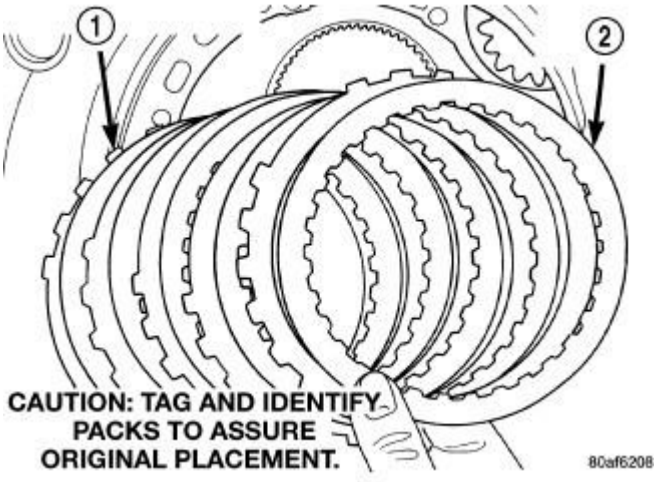


Fig. 130: Removing/Installing Low/Reverse Clutch Pack
Courtesy of CHRYSLER LLC

1 - CLUTCH PLATES (5)
2 - CLUTCH DISCS (5)

40. Install low/reverse clutch pack (1,2) . Leave uppermost disc out until snap ring is installed.

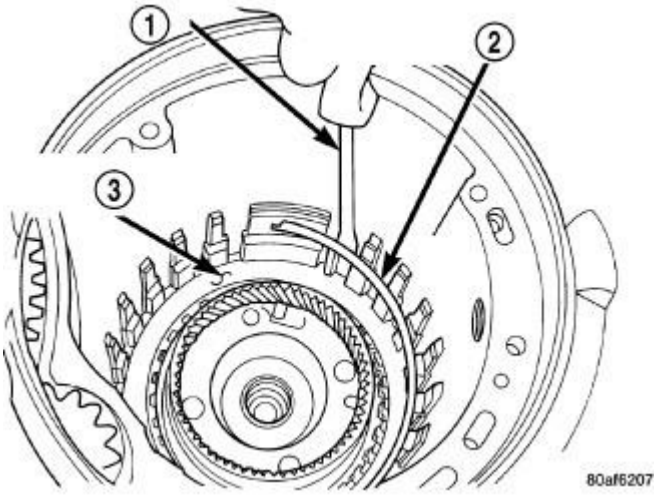


Fig. 131: Removing/Installing Low/Reverse Reaction Plate Snap Ring
Courtesy of CHRYSLER LLC

1 - SCREWDRIVER

2 - LOW/REVERSE REACTION PLATE FLAT SNAP RING
3 - DO NOT SCRATCH CLUTCH PLATE

41. Install low/reverse reaction plate flat snap ring (2) insure you do not scratch clutch plate (3).

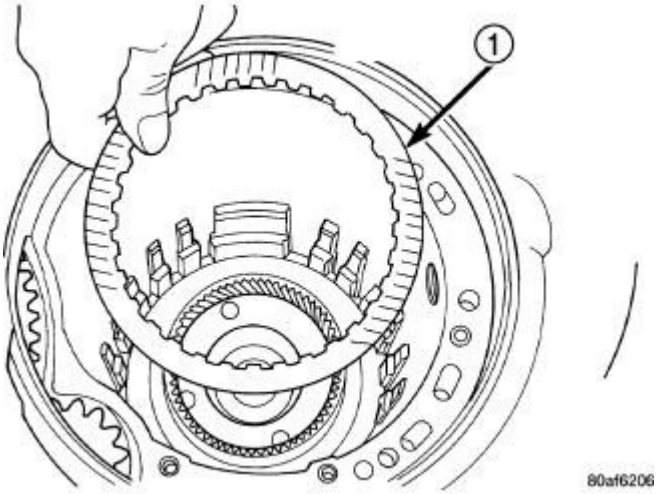


Fig. 132: Removing/Installing Low/Reverse Clutch Disc
Courtesy of CHRYSLER LLC

1 - ONE DISC FROM LOW/REVERSE CLUTCH

42. Install remaining low/reverse clutch disc (1) .

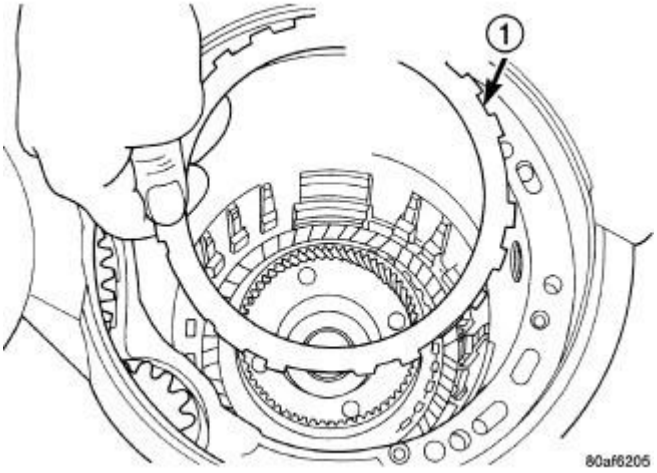


Fig. 133: Removing/Installing Low/Reverse Reaction Plate
Courtesy of CHRYSLER LLC

1 - LOW/REVERSE REACTION PLATE (FLAT SIDE UP)

43. Install low/reverse reaction plate with flat side up (1)

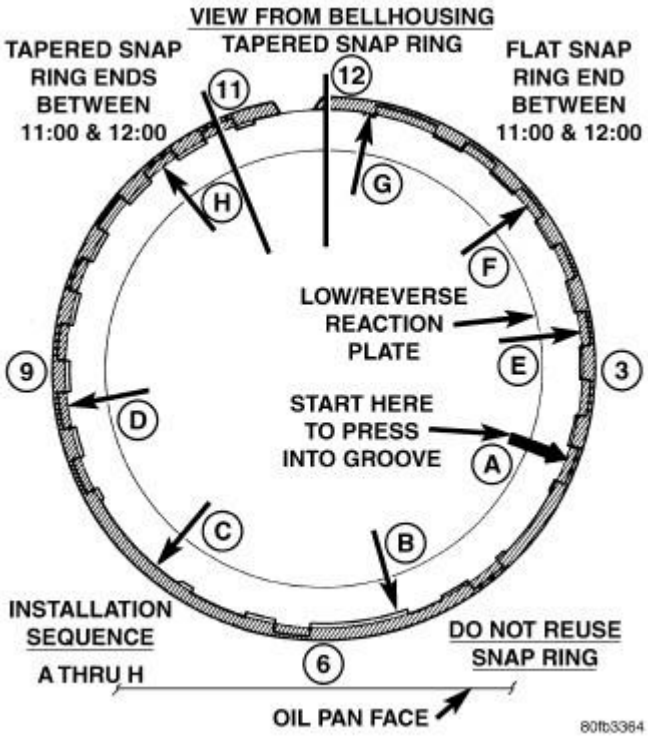


Fig. 134: Installing Tapered Snap Ring
Courtesy of CHRYSLER LLC

44. Use as a reference while installing tapered snap ring .

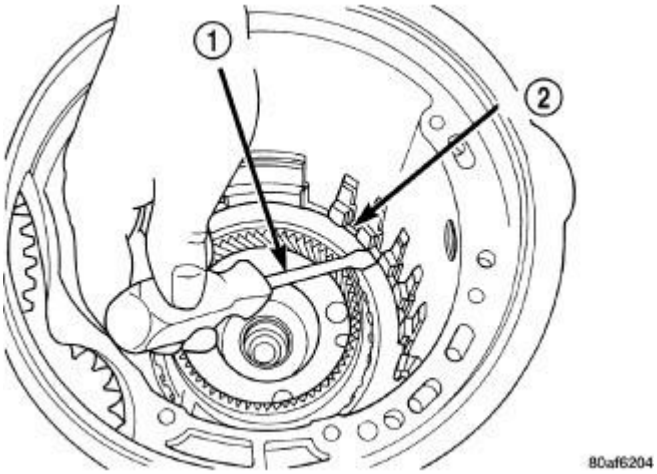


Fig. 135: Installing Tapered Snap Ring With Tapered Side Up
Courtesy of CHRYSLER LLC

1 - SCREWDRIVER
2 - TAPERED SNAP RING (INSTALL AS SHOWN IN ILLUSTRATION)

45. Install tapered snap ring (with tapered side up) (2) .

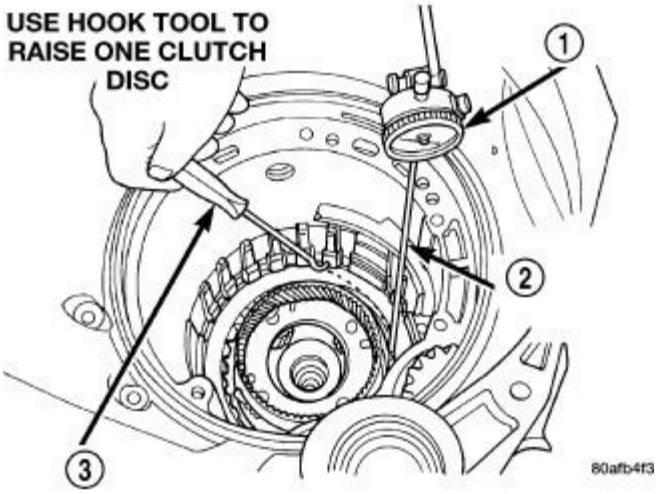


Fig. 136: Measuring Low/Reverse Clutch Clearance
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - DIAL INDICATOR TIP TOOL 6268
3 - HOOK TOOL

46. Set up dial indicator (1) to measure low/reverse clutch clearance. Press down on clutch pack with finger and zero dial indicator. **Low/Reverse clutch pack clearance is 0.89-1.47 mm (0.035-0.058 in.)** . Set up indicator and record measurement in four places. Take average of readings and select the proper low/reverse reaction plate to achieve specifications.

LOW/REVERSE REACTION PLATE CHART

PART NUMBER	THICKNESS
4799846AA	5.88 mm (0.232 in.)
4799847AA	6.14 mm (0.242 in.)
4799848AA	6.40 mm (0.252 in.)
4799849AA	6.66 mm (0.262 in.)
4799855AA	6.92 mm (0.273 in.)

47. Install 2/4 clutch pack (1, 2) .

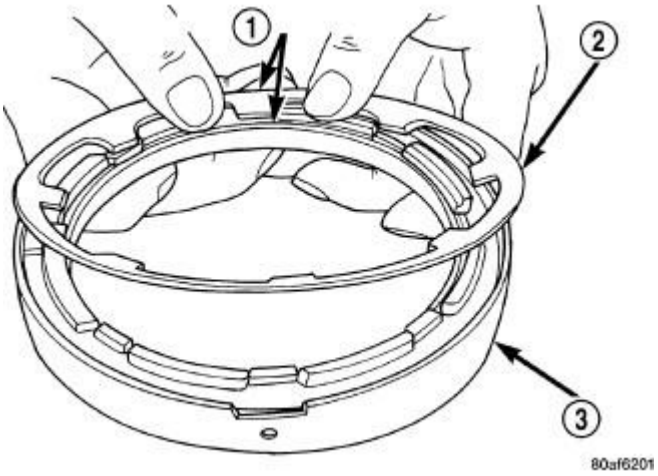


Fig. 137: Identifying Proper Orientation Of 2/4 Clutch Retainer & Return Spring
Courtesy of CHRYSLER LLC

1 - NOTE POSITION
2 - RETURN SPRING
3 - 2/4 CLUTCH RETAINER

NOTE: The 2/4 Clutch Piston has bonded seals which are not individually serviceable. Seal replacement requires replacement of the piston assembly.

48. Orient 2/4 clutch return spring to retainer (3) .

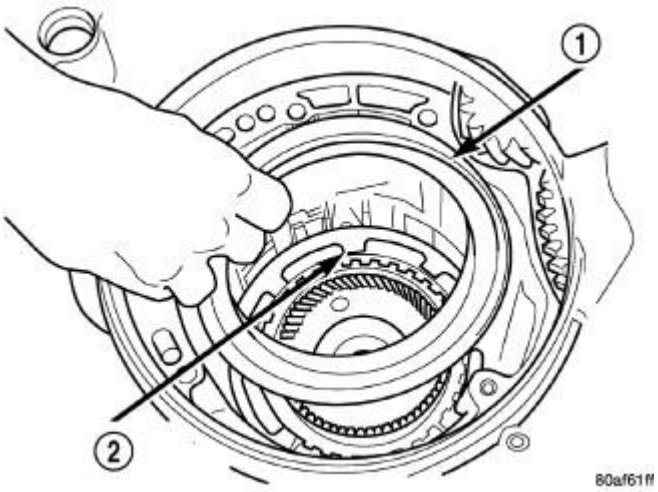


Fig. 138: Removing/Installing 2/4 Clutch Retainer
Courtesy of CHRYSLER LLC

1 - 2/4 CLUTCH RETAINER

2 - 2/4 CLUTCH RETURN SPRING

49. Install 2/4 clutch retainer to transaxle (1, 2) .

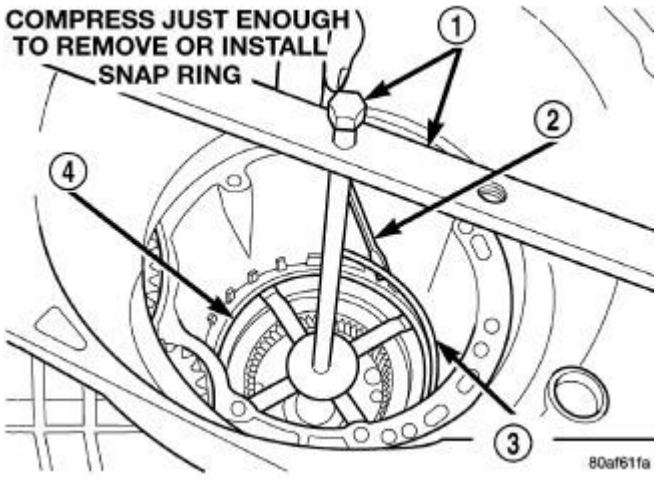


Fig. 139: Removing/Installing Snap Ring
Courtesy of CHRYSLER LLC

1 - COMPRESSING TOOL 5058A
2 - SCREWDRIVER
3 - SNAP RING
4 - 2/4 CLUTCH RETAINER

50. Using Compressing Tool 5058A (1) , compress 2/4 clutch return spring just enough to install snap ring (3).
51. Install snap ring.

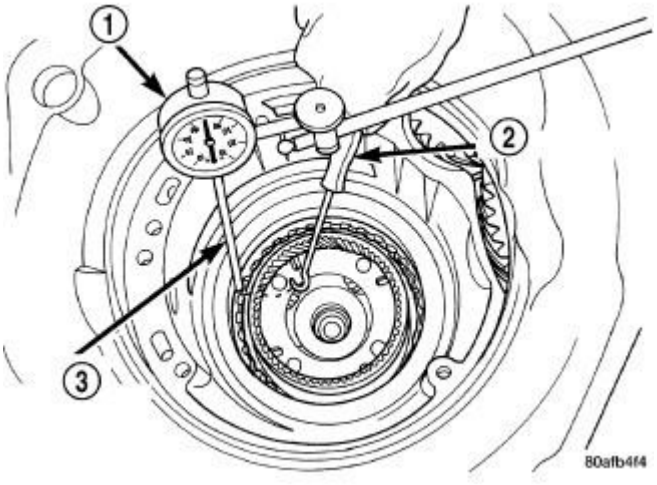


Fig. 140: Measuring 2/4 Clutch Clearance

Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - HOOK TOOL
3 - DIAL INDICATOR TIP 6268

52. Set up dial indicator (1) and measure 2/4 clutch clearance. Press down on clutch pack with finger and zero dial indicator. **2/4 clutch pack clearance is 0.76-2.64 mm (0.030-0.104 in.).** Set up indicator and record measurement in four (4) places. Take average of readings. If clearance is outside this range, the clutch is assembled improperly. **There is no adjustment for 2/4 clutch clearance.**

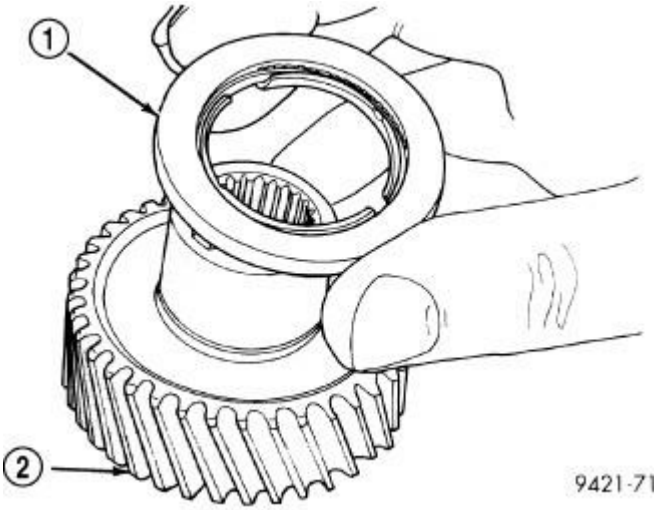


Fig. 141: Removing/Installing #7 Needle Bearing
Courtesy of CHRYSLER LLC

1 - #7 NEEDLE BEARING
2 - REAR SUN GEAR

NOTE: The number seven needle (1) bearing has three anti-reversal tabs and is common with the number five and number two position. The orientation should allow the bearing to seat flat against the rear sun gear. A small amount of petrolatum can be used to hold the bearing to the rear sun gear (2).

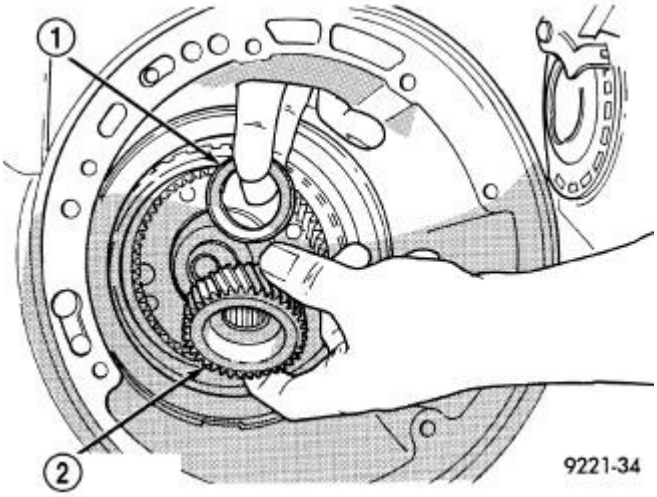


Fig. 142: Removing/Installing Rear Sun Gear
Courtesy of CHRYSLER LLC

1 - #7 NEEDLE BEARING
2 - REAR SUN GEAR

53. Install rear sun gear (2) and #7 needle bearing (1).

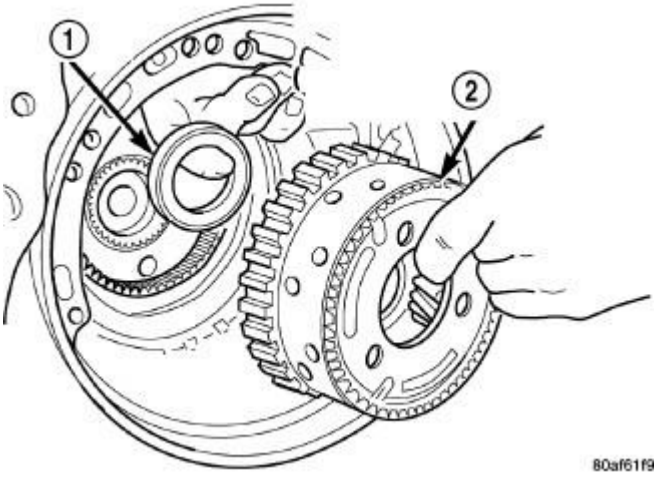


Fig. 143: Removing/Installing Front Carrier/Rear Annulus Assembly
Courtesy of CHRYSLER LLC

1 - #6 NEEDLE BEARING
2 - FRONT CARRIER AND REAR ANNULUS ASSEMBLY (TWIST AND PULL OR PUSH TO REMOVE OR INSTALL).

54. Install front carrier/rear annulus assembly (2) and #6 needle bearing (1).

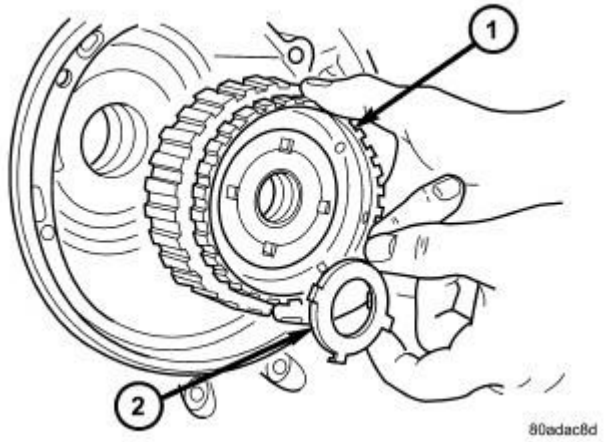


Fig. 144: Removing/Installing Front Sun Gear Assembly
Courtesy of CHRYSLER LLC

1 - FRONT SUN GEAR ASSEMBLY
2 - #4 THRUST WASHER (FOUR TABS)

55. Install front sun gear assembly (1) and #4 thrust washer (2).

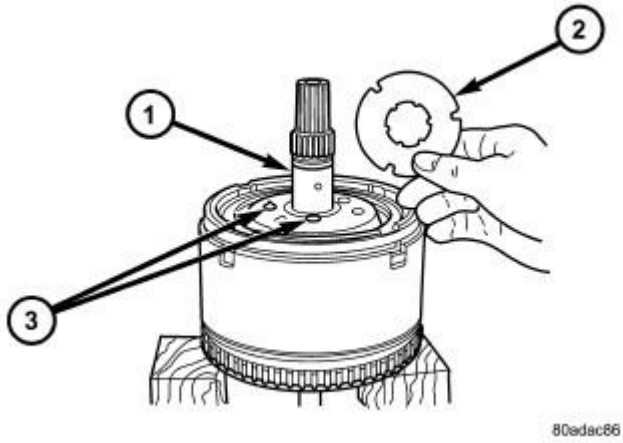


Fig. 145: Removing/Installing #4 Thrust Plate
Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT ASSEMBLY
2 - #4 THRUST PLATE (SELECT)
3 - 3 DABS OF PETROLATUM FOR RETENTION

56. Select the thinnest #4 thrust plate thickness (2) and install to input clutch assembly. Use petrolatum to retain (3).

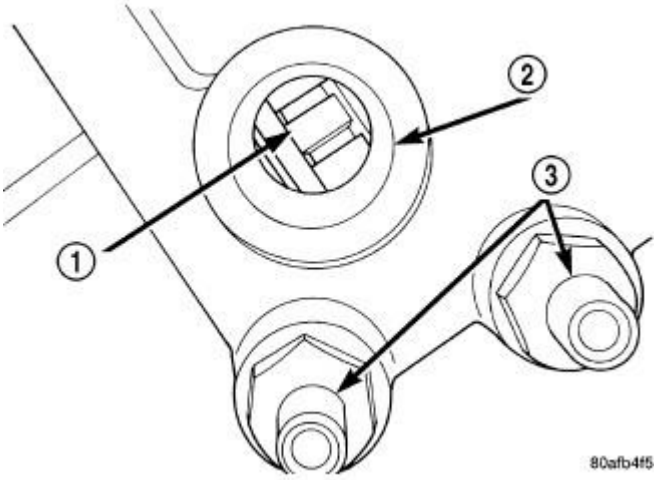


Fig. 146: Verifying Proper Seating Of Input Clutch Assembly
Courtesy of CHRYSLER LLC

1 - INPUT CLUTCH RETAINER
2 - INPUT SPEED SENSOR HOLE
3 - OIL COOLER FITTINGS

57. Install input clutch assembly into position and verify that it is completely seated by viewing through input speed sensor hole (2) . If view through input speed sensor hole is not as shown in **Fig. 146**, the input clutch assembly is not seated properly.

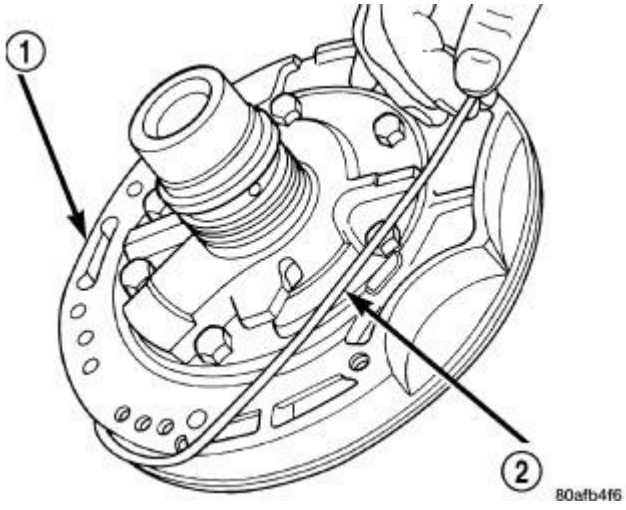


Fig. 147: Removing/Installing Oil Pump O-Ring
Courtesy of CHRYSLER LLC

1 - OIL PUMP ASSEMBLY
2 - O-RING

58. Remove oil pump o-ring (2) . **Be sure to reinstall oil pump o-ring after selecting the proper #4 thrust**

plate.

59. Install pump and gasket to transmission. Install and torque bolts.

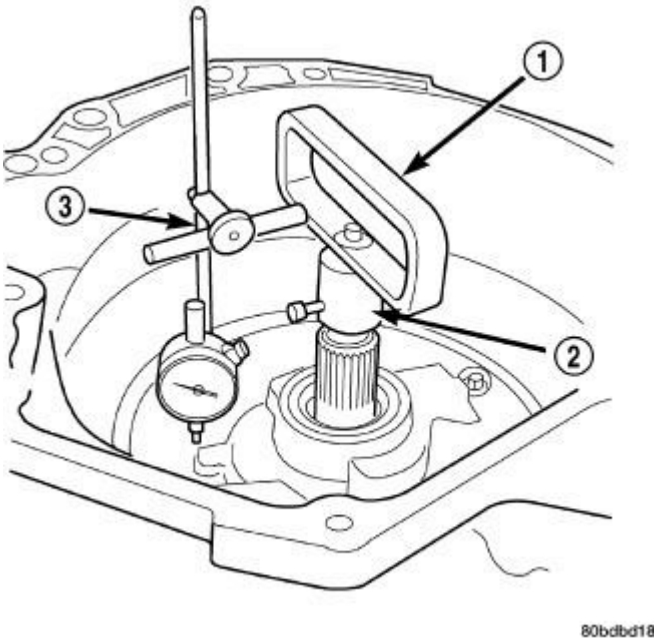


Fig. 148: Measuring Input Shaft End Play
Courtesy of CHRYSLER LLC

1 - END PLAY SOCKET SET 8266A
2 - DIAL INDICATOR C-3339A
-

60. Set up input shaft for measurement with Indicator Set C-3339A (3) and End Play Set 8266A (1) .
61. Measure the input shaft end play with the transaxle in the vertical position. **Input shaft end play must be within 0.005 to 0.025 inch.** For example, if end play reading is 0.055 inch, select No. 4 Thrust Plate which is 0.071 to 0.074 thick. This should provide an input shaft end play reading of 0.020 inch which is within specifications.
62. Refer to **NO. 4 THRUST PLATE CHART** to select the proper No. 4 thrust plate.

NO. 4 THRUST PLATE CHART

PART NUMBER	THICKNESS
4431665AB	1.60mm (0.063 in.)
3836237AB	1.73mm (0.068 in.)
4431666AB	1.80mm (0.071 in.)
3836238AB	1.96mm (0.077 in.)
4431667AB	2.03mm (0.080 in.)
3836239AB	2.16mm (0.085 in.)
4431668AB	2.24mm (0.088 in.)

3836240AB	2.39mm (0.094 in.)
4431669AB	2.46mm (0.097 in.)
3836241AB	2.62mm (0.103 in.)
4446670AB	2.67mm (0.105 in.)
4446671AB	2.90mm (0.114 in.)

63. Install input clutch assembly (1) .

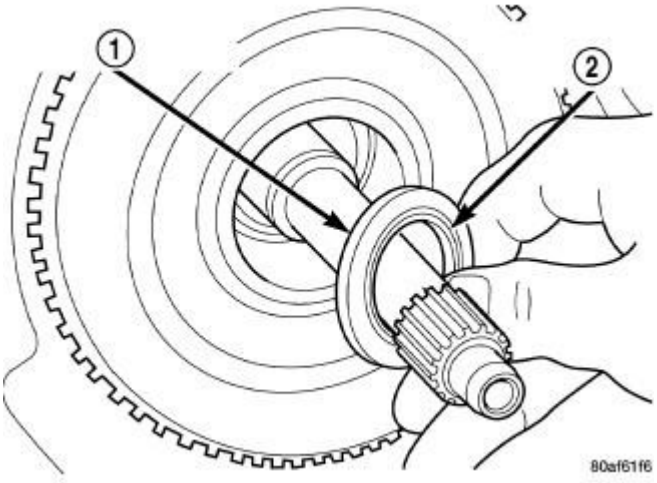


Fig. 149: Removing/Installing #1 Caged Needle Bearing
Courtesy of CHRYSLER LLC

1 - #1 CAGED NEEDLE BEARING
2 - NOTE: TANGED SIDE OUT

64. Install #1 caged needle bearing (1) note: tanged side out (2).

CAUTION: The cooler bypass valve must be replaced if transaxle failure has occurred. Do not attempt to reuse or clean old valve.

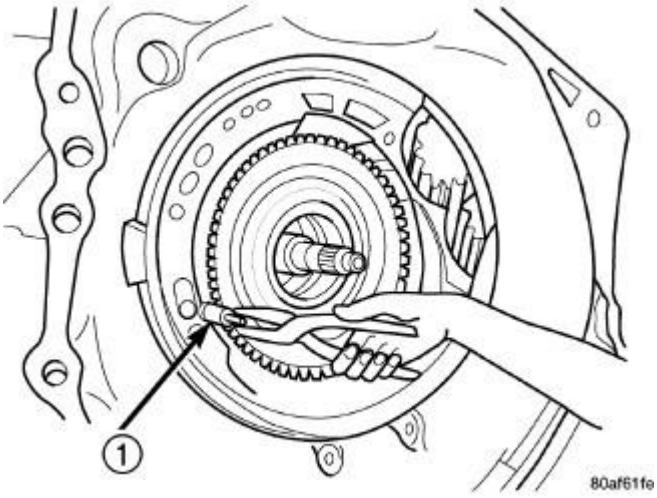


Fig. 150: Removing/Installing Cooler Bypass Valve
Courtesy of CHRYSLER LLC

1 - COOLER BYPASS VALVE

65. Install cooler bypass valve (1) with o-ring end towards rear of case.

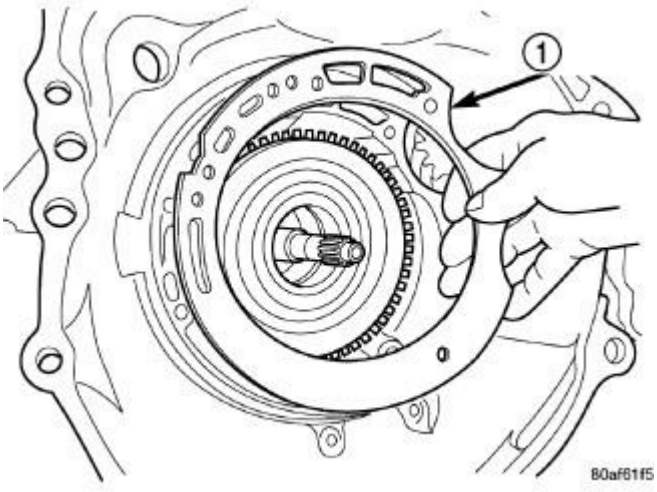


Fig. 151: Removing/Installing Oil Pump Gasket
Courtesy of CHRYSLER LLC

1 - PUMP GASKET

66. Install oil pump gasket (1) .

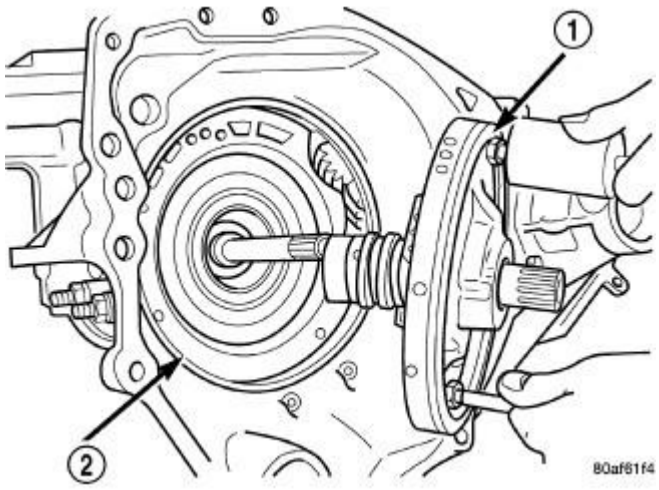


Fig. 152: Installing Oil Pump
Courtesy of CHRYSLER LLC

1 - OIL PUMP
2 - GASKET

67. Install oil pump (1) .

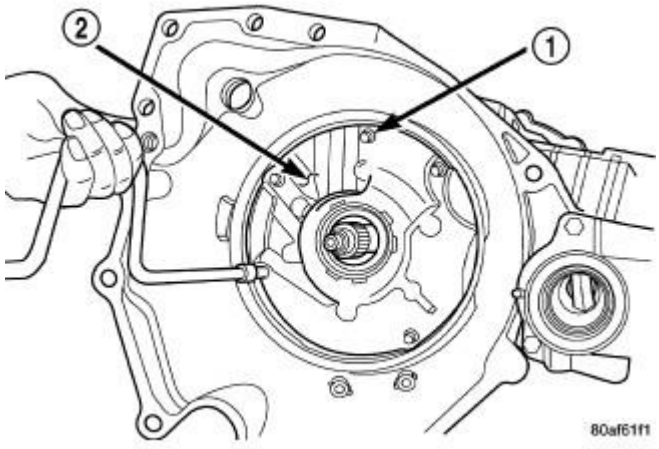


Fig. 153: Removing/Installing Oil Pump-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - PUMP ATTACHING BOLTS
2 - PUMP HOUSING

68. Install oil pump-to-case bolts (1) and torque to 27 N.m (20 ft. lbs.).

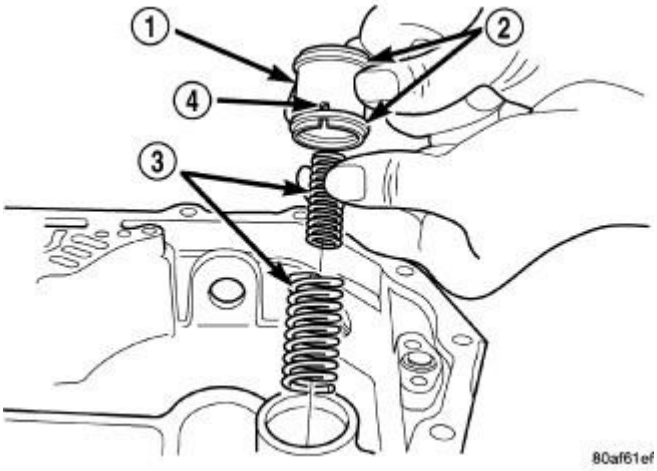


Fig. 154: Installing Low/Reverse Accumulator
Courtesy of CHRYSLER LLC

1 - ACCUMULATOR PISTON
2 - SEAL RINGS
3 - RETURN SPRINGS
4 - (NOTE NOTCH)

69. Install low/reverse accumulator (1) .

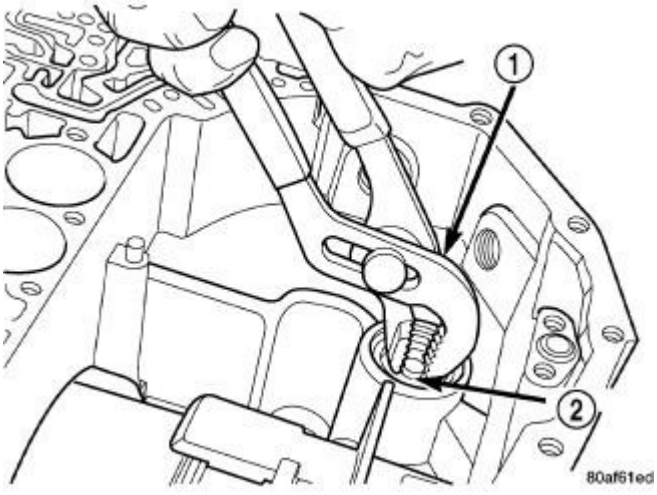


Fig. 155: Removing/Installing Low/Reverse Accumulator Plug
Courtesy of CHRYSLER LLC

1 - ADJUSTABLE PLIERS
2 - PLUG

70. Install low/reverse accumulator plug (2) .

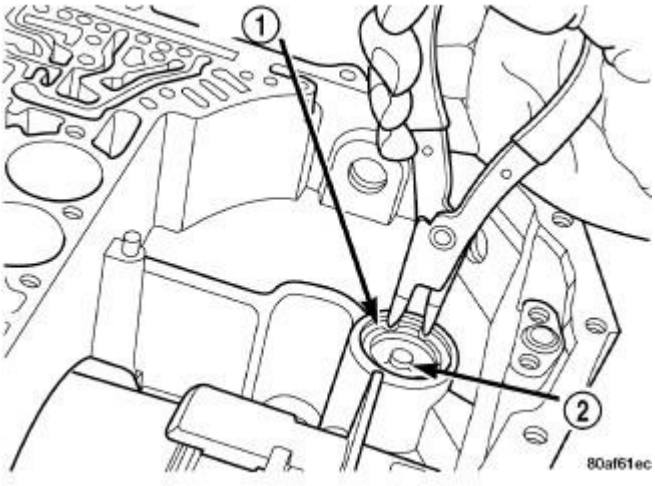


Fig. 156: Removing/Installing Low/Reverse Accumulator Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - PLUG

71. Install low/reverse accumulator snap ring (1) .

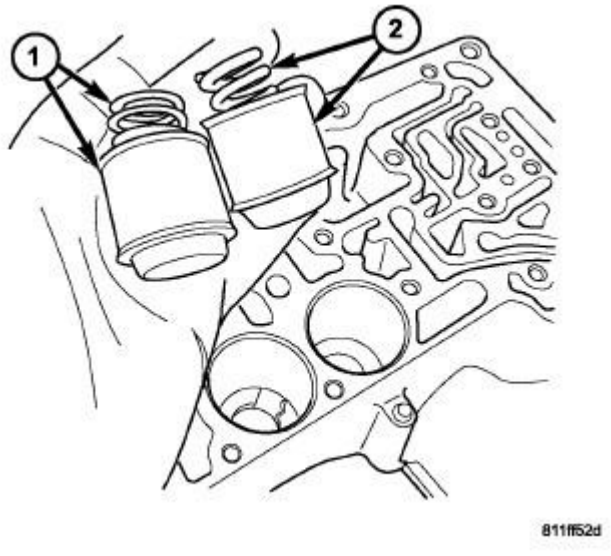


Fig. 157: Installing Underdrive & Overdrive Accumulators
Courtesy of CHRYSLER LLC

1 - OVERDRIVE PISTON AND SPRING
2 - UNDERDRIVE PISTON AND SPRING

NOTE: Depending on engine application, some accumulators will have two

springs, and others will have one spring. The springs are color-coded for application and year.

72. Install underdrive and overdrive accumulators (1, 2) .

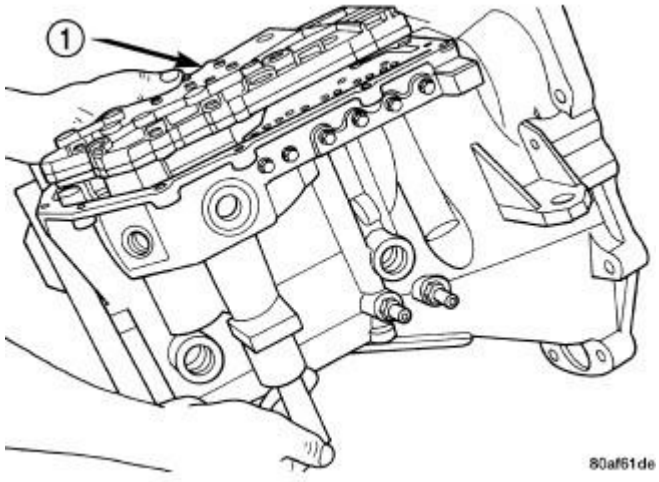


Fig. 158: Removing/Installing Valve Body Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY

73. Install valve body (1) to transaxle. Rotate manual valve shaft fully clockwise to ease installation. Make sure park rod rollers are positioned within park guide bracket.

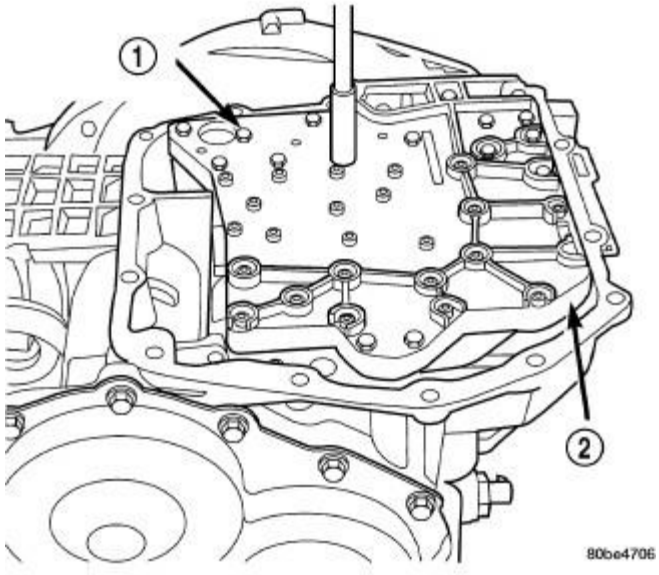


Fig. 159: Removing/Installing Valve Body-To-Case Bolts
Courtesy of CHRYSLER LLC

1 - VALVE BODY ATTACHING BOLTS (18)
2 - VALVE BODY

74. Install and torque valve body-to-case bolts (1) to 12 N.m (105 in. lbs.).

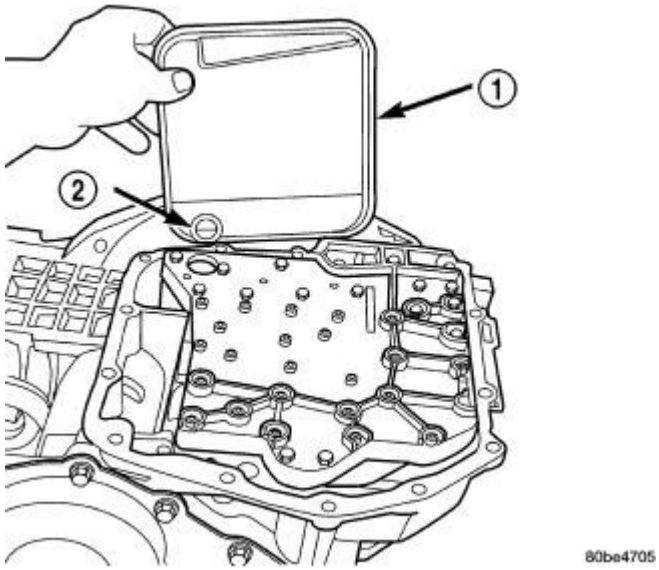


Fig. 160: Removing/Installing Oil Filter
Courtesy of CHRYSLER LLC

1 - OIL FILTER
2 - O-RING

75. Install oil filter (1) and new o-ring (2).

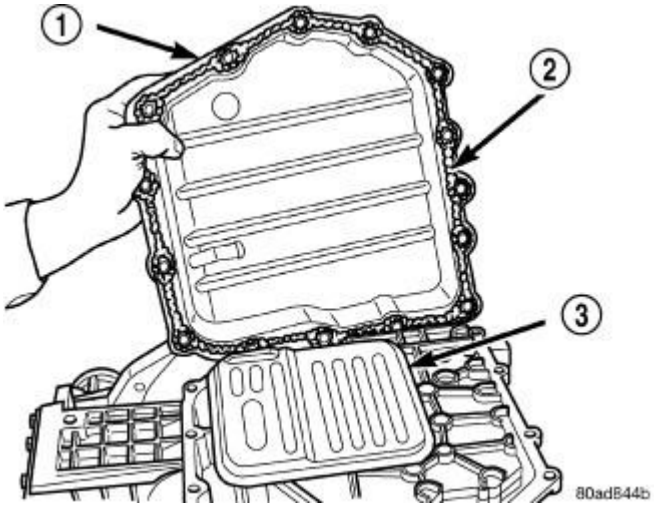


Fig. 161: Removing/Installing Oil Pan
Courtesy of CHRYSLER LLC

1 - OIL PAN
2 - 1/8 INCH BEAD OF MOPAR® ATF RTV (MS-GF41)
3 - OIL FILTER

76. Apply an 1/8" bead of Mopar® ATF RTV (MS-GF41) (2) to oil pan (1) and immediately install to case.

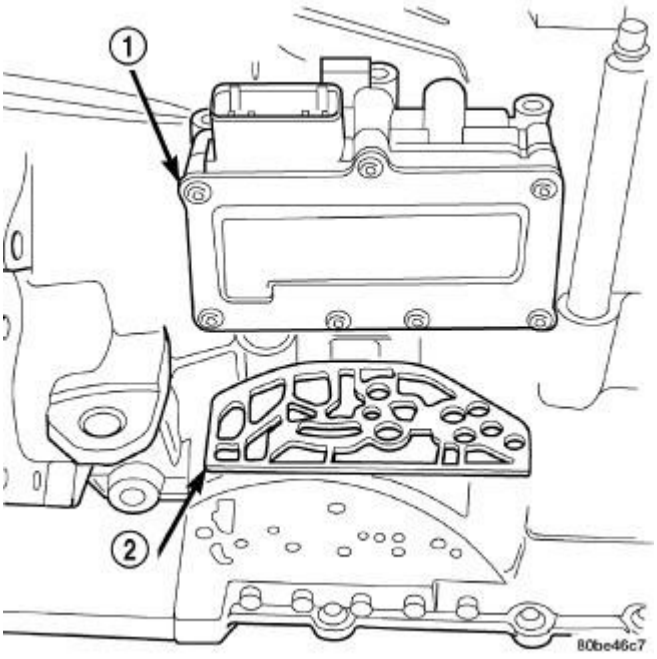


Fig. 162: Identifying Solenoid/Pressure Switch Assembly & Gasket
Courtesy of CHRYSLER LLC

1 - SOLENOID/PRESSURE SWITCH ASSEMBLY
2 - GASKET

77. Install oil pan-to-case bolts and torque to 19 N.m (165 in. lbs.).
78. Install solenoid/pressure switch assembly (1) and gasket (2) to case.

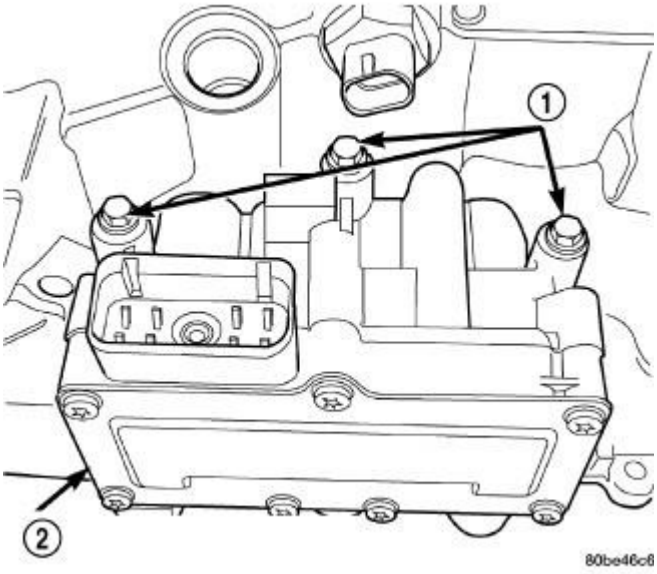


Fig. 163: Identifying Solenoid/Pressure Switch Assembly-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

1 - BOLTS
2 - SOLENOID AND PRESSURE SWITCH ASSEMBLY

79. Install and tighten solenoid/pressure switch assembly-to-transaxle case bolts (1) to 12 N.m (110 in. lbs.) .
80. Install and torque input and output speed sensors to case to 27 N.m (20 ft. lbs.).

INSTALLATION

INSTALLATION

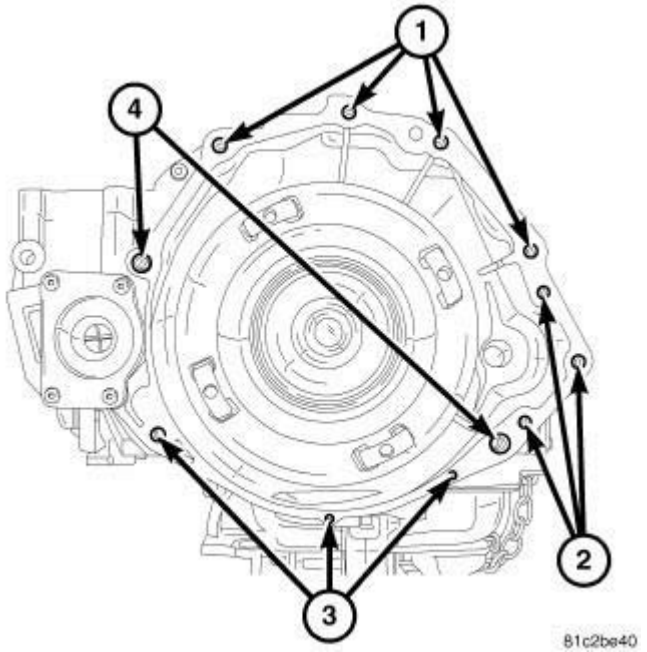


Fig. 164: Removing/Installing Bellhousing Upper & Lower Bolts
Courtesy of CHRYSLER LLC

NOTE: If transaxle assembly is being replaced or overhauled (clutch and/or seal replacement), it is necessary to perform the "Quick-Learn" Procedure. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Install the transaxle assembly into vehicle.
2. Install the bellhousing upper (1) and lower bolts (2) and tighten to 75 N.m (55 ft. lbs.).

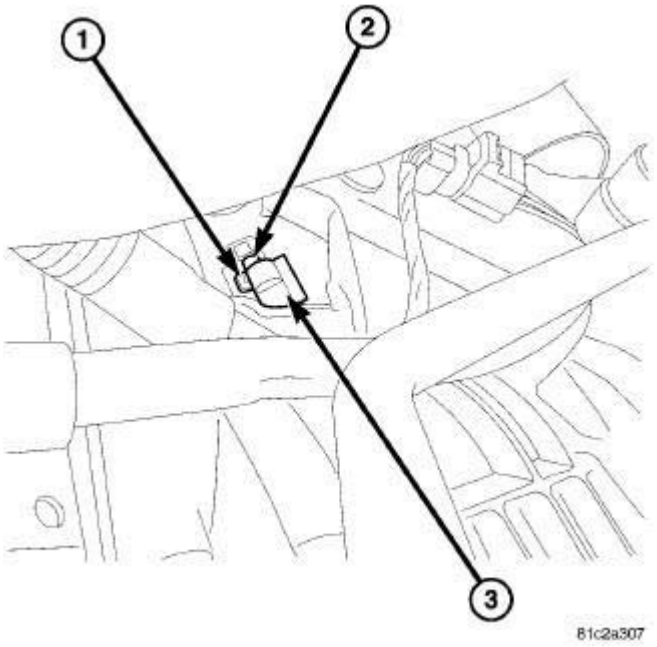


Fig. 165: Removing/Installing CKP Sensor
Courtesy of CHRYSLER LLC

3. Install and connect crank position sensor and tighten bolt to 12 N.m (106 in. lbs.). Refer to **Electrical - Ignition Control/Ignition Control/SENSOR, Camshaft Position - Installation** .

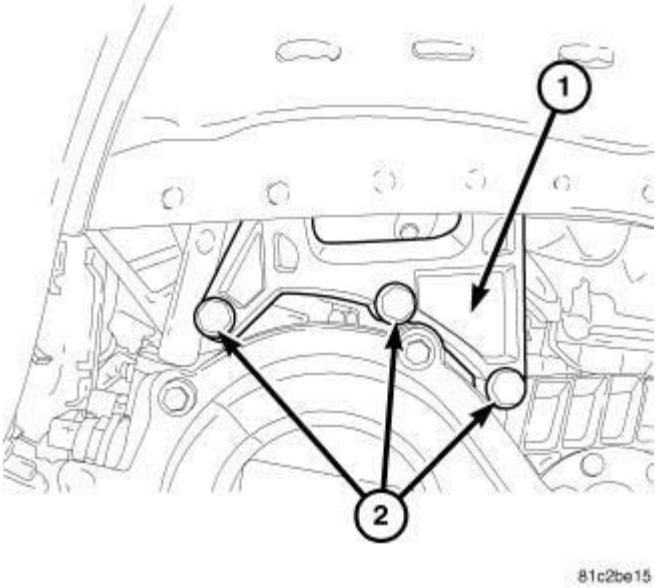


Fig. 166: Removing/Installing Left Mount To Block Bolts
Courtesy of CHRYSLER LLC

4. Install left mount bracket assembly (1) to transaxle and tighten bolts (2) to 54 N.m (40 ft. lbs.).

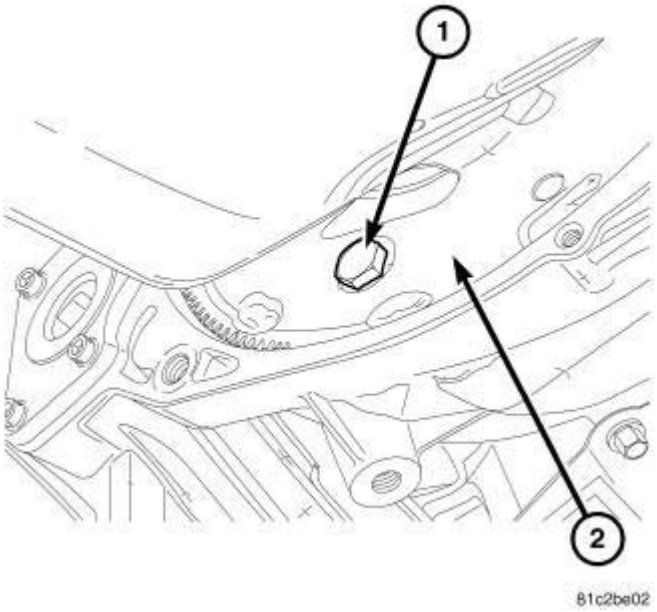


Fig. 167: Removing/Installing Torque Converter-To-Drive Plate Bolts
Courtesy of CHRYSLER LLC

5. Raise engine/transaxle assembly into position.
6. Install torque converter-to-drive plate bolts and tighten to 88 N.m (65 ft. lbs.)

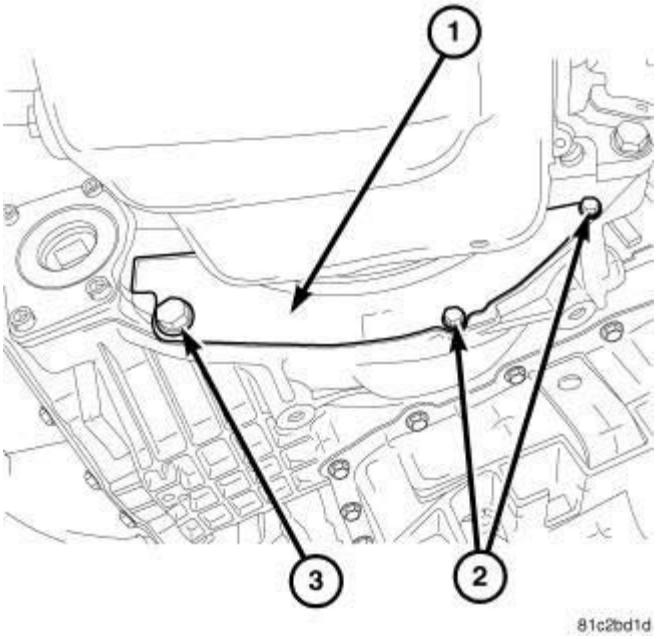


Fig. 168: Removing/Installing Inspection Cover
Courtesy of CHRYSLER LLC

7. Install inspection cover.
8. Install inspection cover (1) and tighten the larger fastener (3) to 95 N.m (70 ft. lbs.) and the smaller fasteners (2) to 12 Nm (70 ft. lbs.).

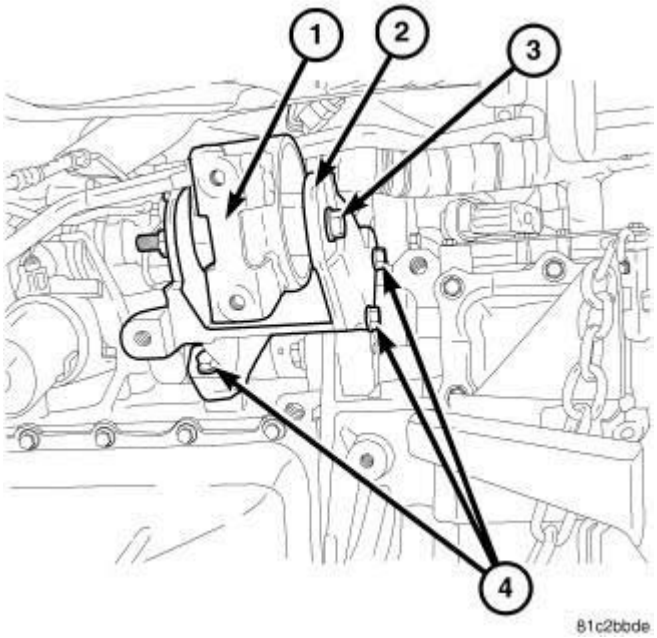


Fig. 169: Removing/Installing Front Transmission Mount
Courtesy of CHRYSLER LLC

9. Install front mount to transmission (2).
10. Install front mount bolts (4) and tighten to 95 N.m (70 ft. lbs.).
11. Install the starter motor. Refer to **Electrical - Engine Systems/Starting/STARTER - Installation** .

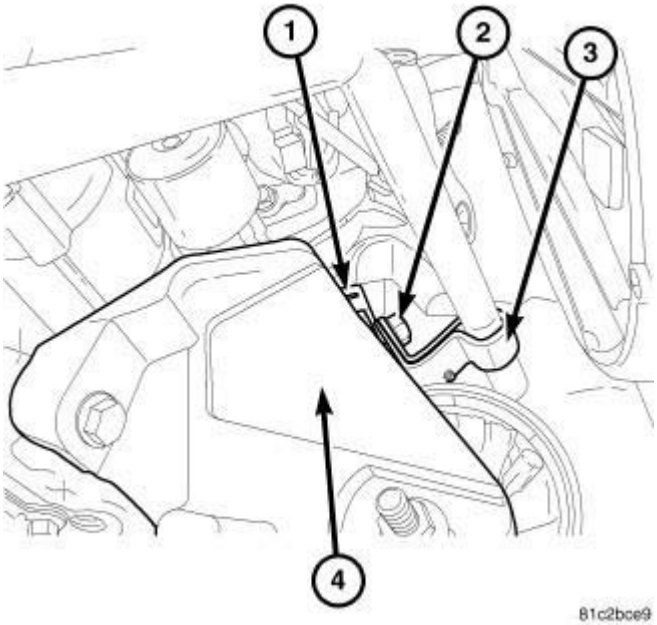


Fig. 170: Identifying Heater Tube & Ground Cable Bolt At Front Mount
Courtesy of CHRYSLER LLC

12. Install the bolt (2) holding the ground cable (1) and the heater tube bracket (3) to the front mount (4).

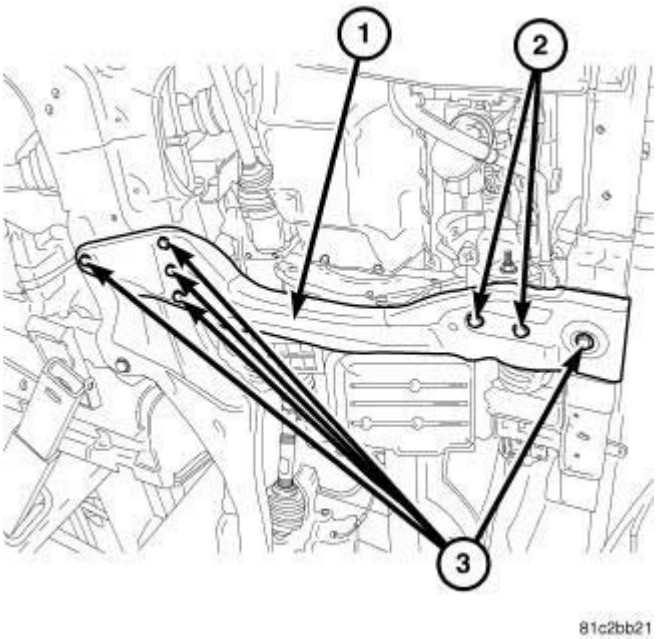


Fig. 171: Removing/Installing Crossmember
Courtesy of CHRYSLER LLC

13. Install the crossmember (1).
14. Install the bolts at the crossmember (2, 3) and tighten to 40 N.m (30 ft. lbs.).

15. Remove the transmission jack and screw jack at engine.

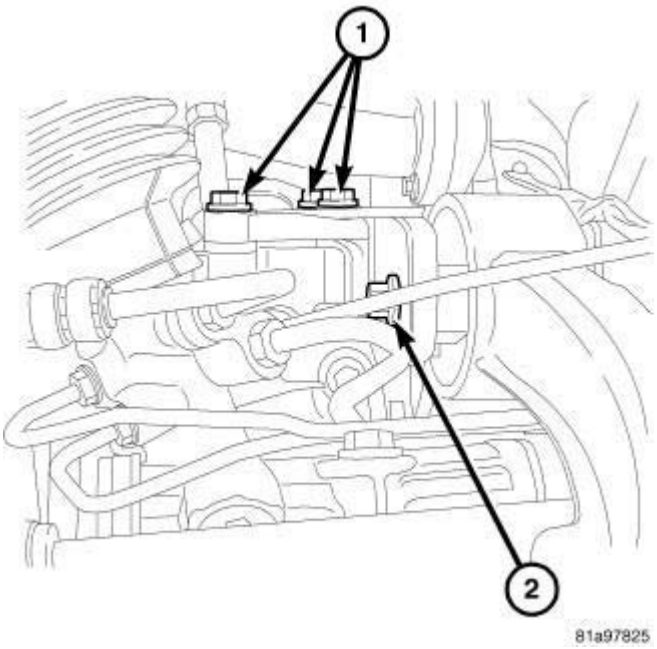


Fig. 172: Identifying Rear Mount Bracket-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

16. Lower the hoist.
17. Install left and right halfshaft assemblies. Refer to **Differential and Driveline/Half Shaft - Installation** .
18. Install front wheel/tire assemblies.
19. install rear mount bracket-to-transaxle case bolts (1) and tighten to 75 N.m (55 ft. lbs.).

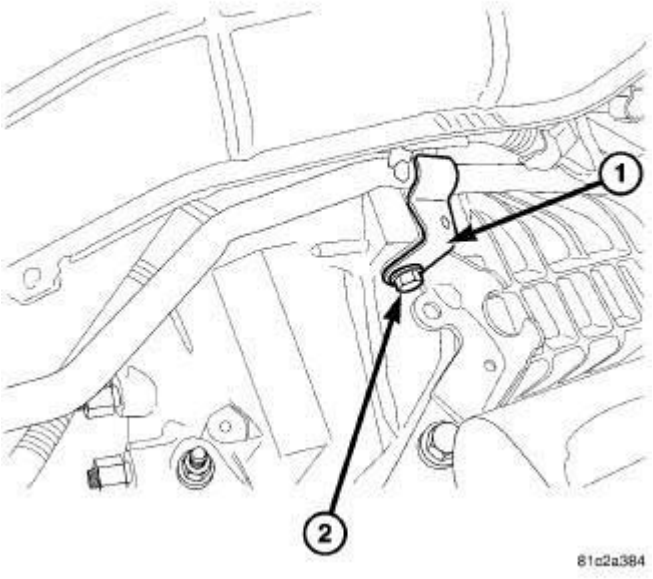


Fig. 173: Identifying Heater Tube Bolt At Bellhousing
Courtesy of CHRYSLER LLC

20. Install the heater tube bolt (1) at the bellhousing and tighten to 5 N.m (44 in. lbs.).

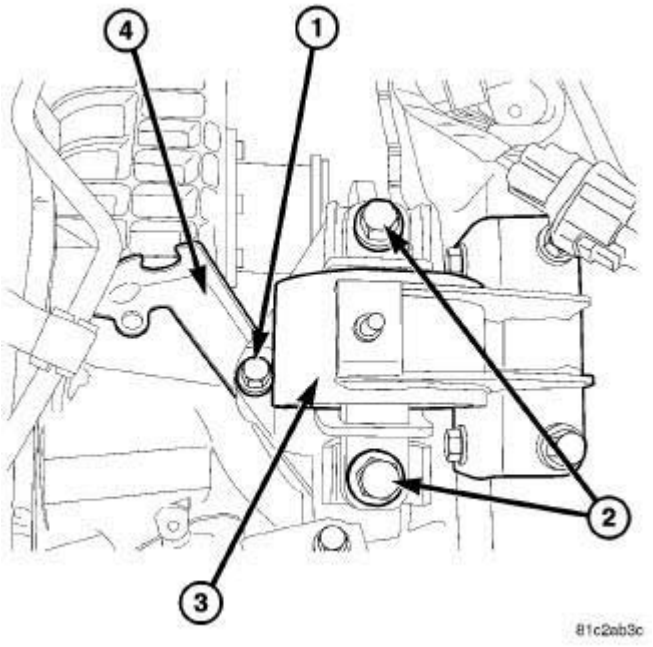


Fig. 174: Identifying Left Mount Bolts
Courtesy of CHRYSLER LLC

21. Insure that the shift cable bracket (4) is in place.
22. Install the bolts at left mount (1, 2) and tighten to 95 N.m (70 ft. lbs.).

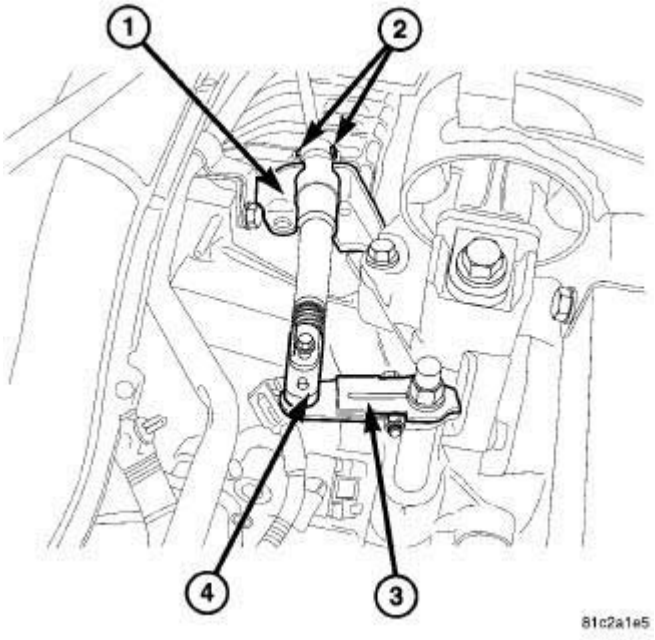


Fig. 175: Identifying Shift Cable At Manual Valve & Cable Bracket
Courtesy of CHRYSLER LLC

23. Connect gear shift cable to the manual valve lever (4) and shift cable bracket (2).

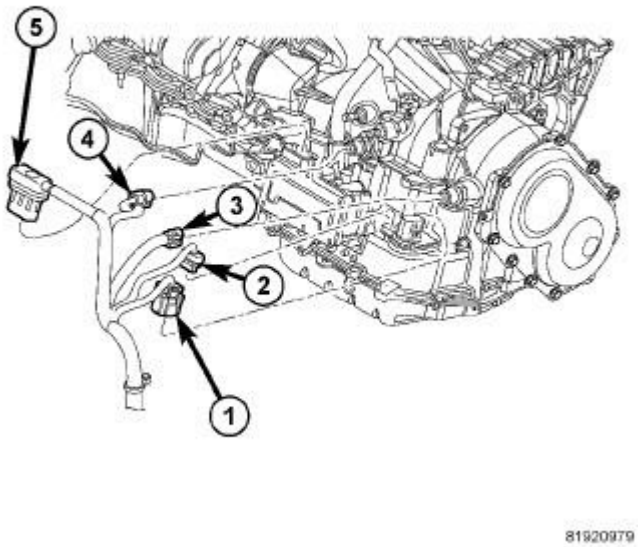


Fig. 176: Identifying Transmission Electrical Connectors
Courtesy of CHRYSLER LLC

24. Connect the electrical connectors at transmission (1, 2, 3, 4 and 5).

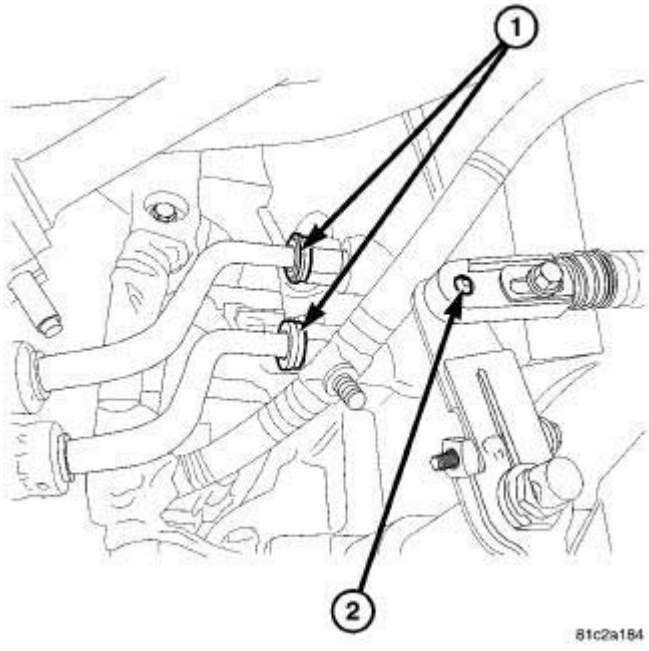


Fig. 177: Identifying Oil Cooler Lines
Courtesy of CHRYSLER LLC

25. Connect oil cooler lines (1) to transaxle.

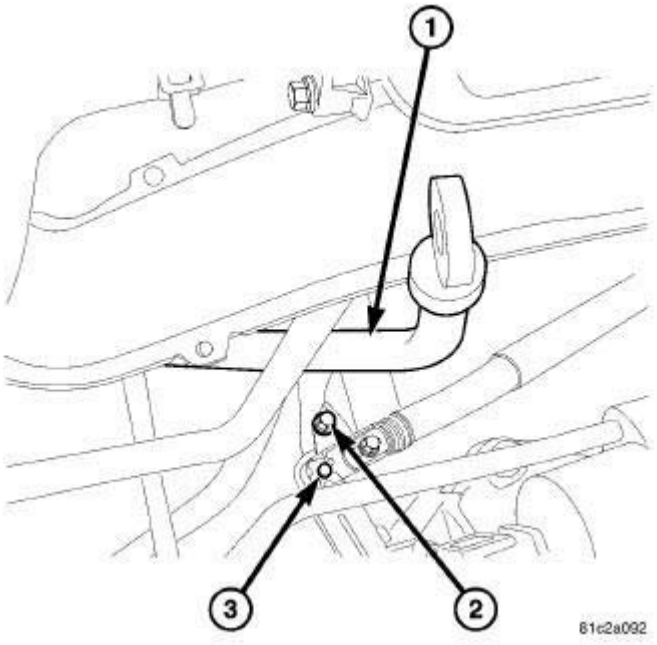


Fig. 178: Removing/Installing Fluid Level Indicator/Tube Assembly
Courtesy of CHRYSLER LLC

26. Install fluid level indicator/tube assembly (1).
27. Install the bolt (2) at the fluid level indicator/tube assembly and tighten to 5 N.m (44 in. lbs.).

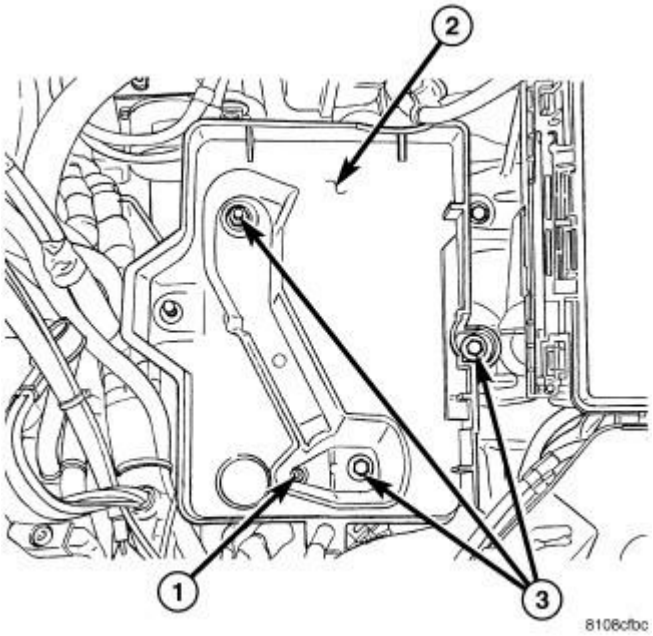


Fig. 179: Removing/Installing Battery Tray
Courtesy of CHRYSLER LLC

28. Install the battery tray (2). Refer to **Electrical - Engine Systems/Battery System/TRAY, Battery - Installation** .
29. Install the tie straps holding harness and ground cable to the battery tray.

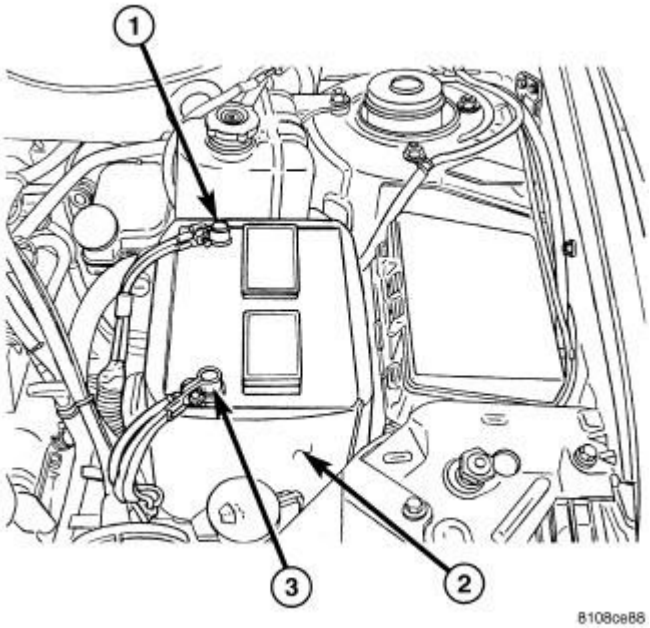


Fig. 180: Identifying Battery Cables
Courtesy of CHRYSLER LLC

30. Install the battery (2) and battery hold down bolt (3).
31. Connect battery cables.
32. Fill transaxle. See **FLUID AND FILTER SERVICE**.

SCHEMATICS AND DIAGRAMS

40/41TE - WITH VARIABLE LINE PRESSURE

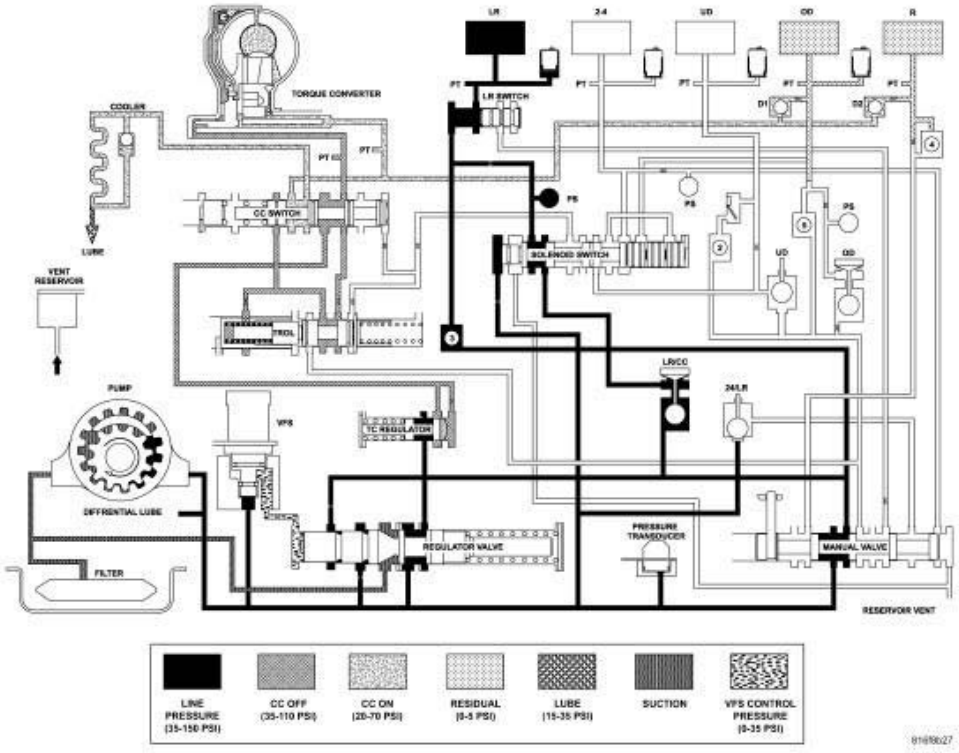


Fig. 181: Identifying Line Pressure - Park & Neutral
Courtesy of CHRYSLER LLC

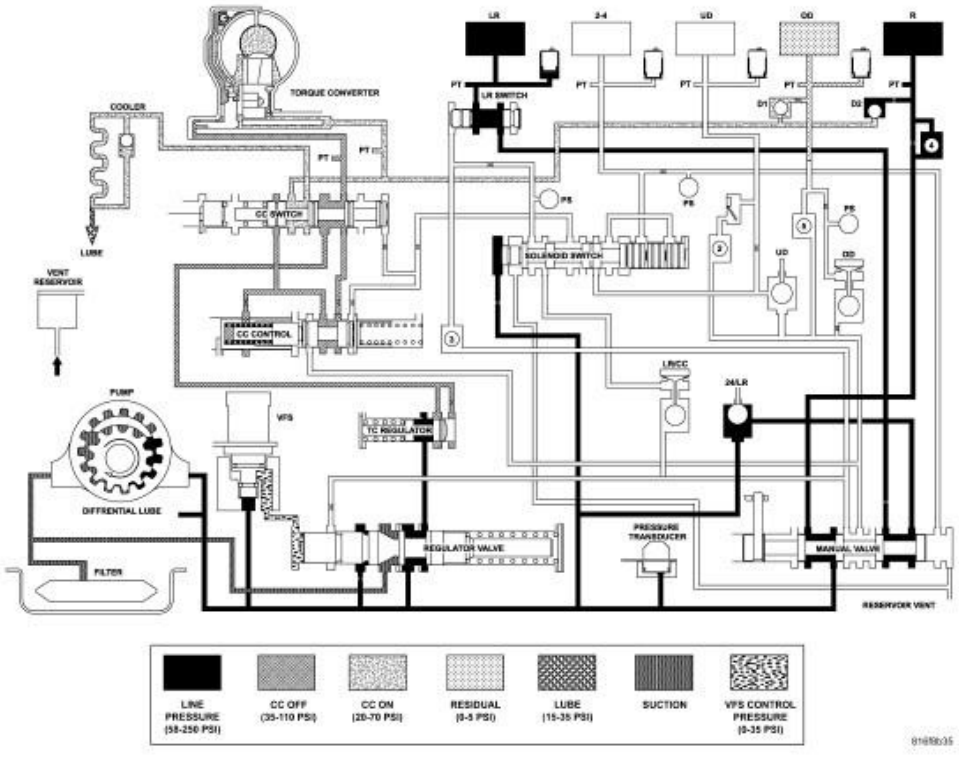


Fig. 182: Identifying Line Pressure - Reverse
Courtesy of CHRYSLER LLC

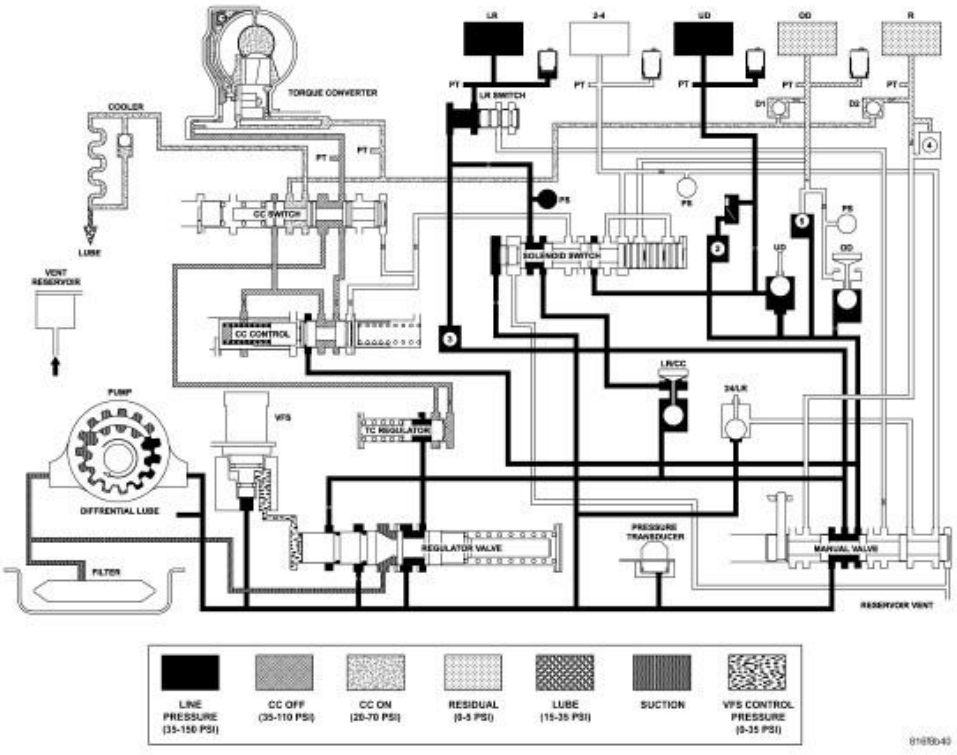


Fig. 183: Identifying Line Pressure - First Gear (Drive)
Courtesy of CHRYSLER LLC

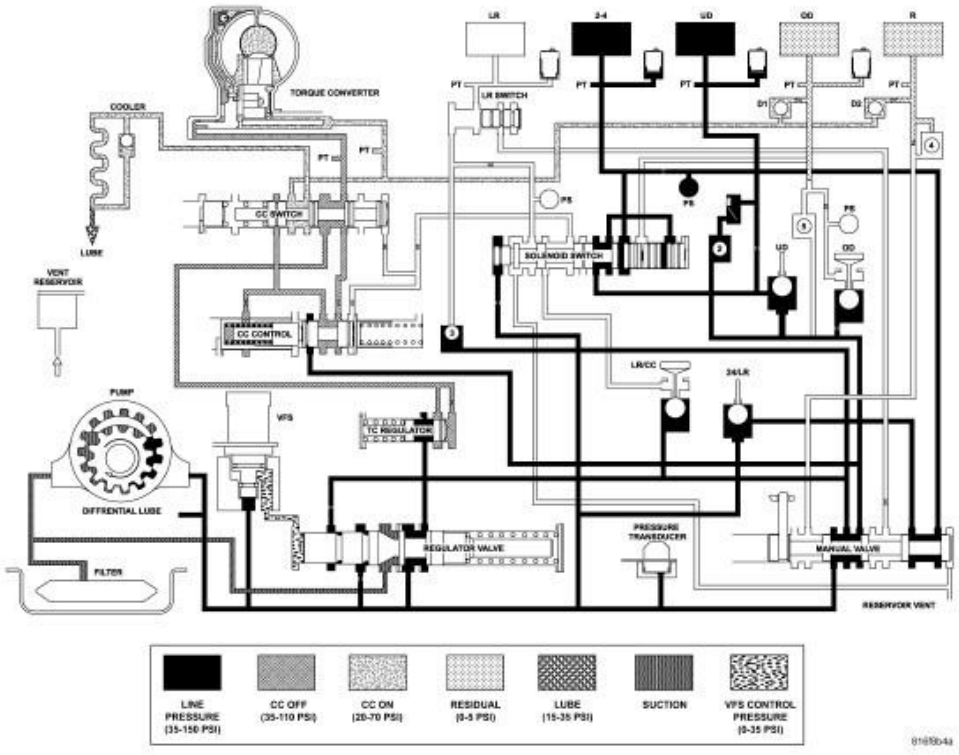


Fig. 184: Identifying Line Pressure - Second Gear (Drive)
Courtesy of CHRYSLER LLC

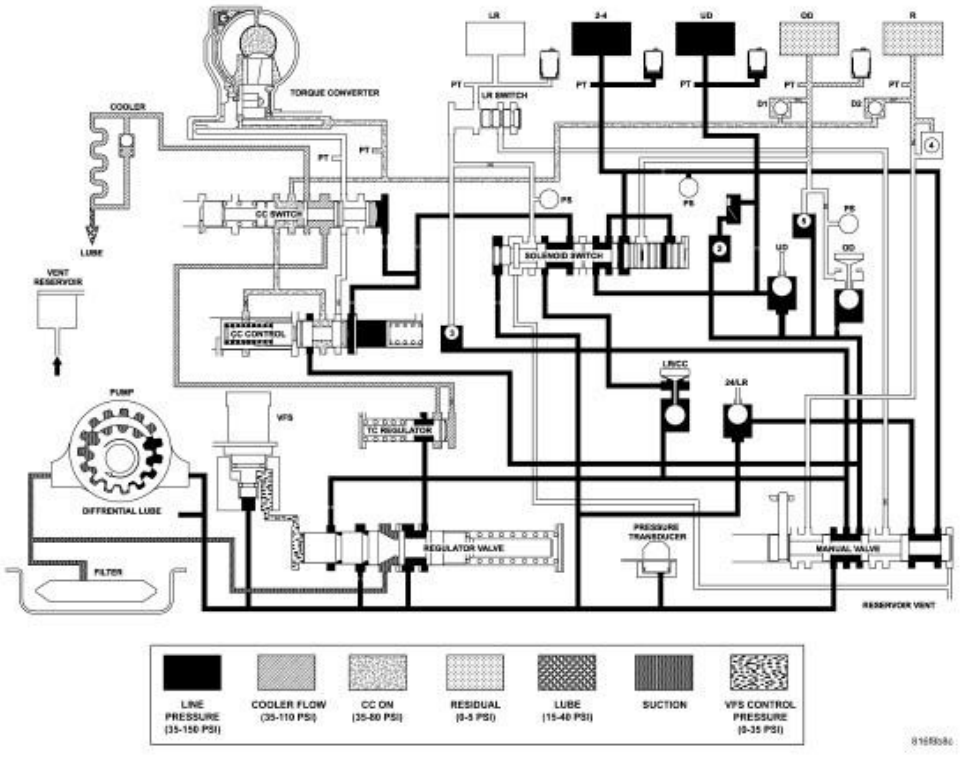


Fig. 185: Identifying Line Pressure - Second Gear EMCC (Drive)
Courtesy of CHRYSLER LLC

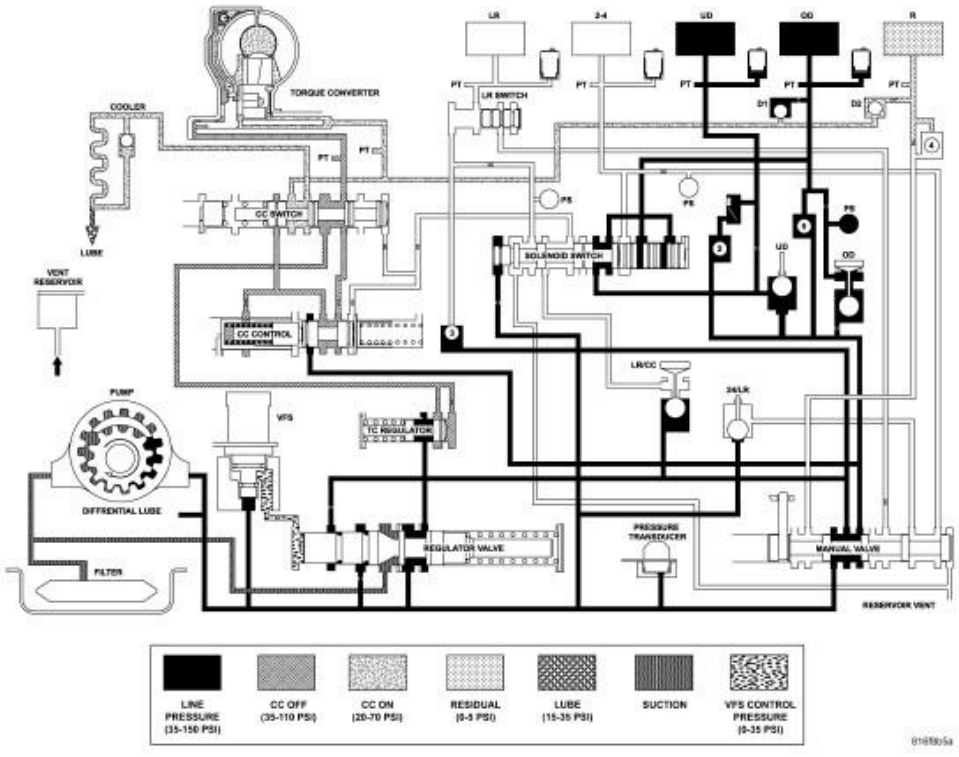


Fig. 186: Identifying Line Pressure - Direct Gear (Drive)
Courtesy of CHRYSLER LLC

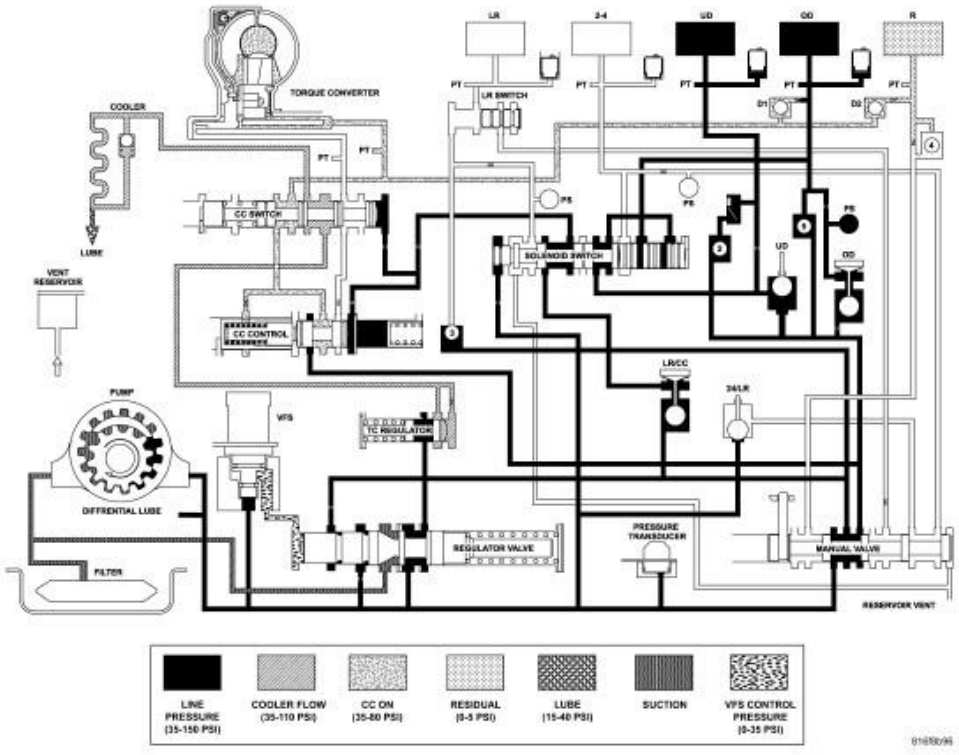


Fig. 187: Identifying Line Pressure - Direct Gear EMCC (Drive)
Courtesy of CHRYSLER LLC

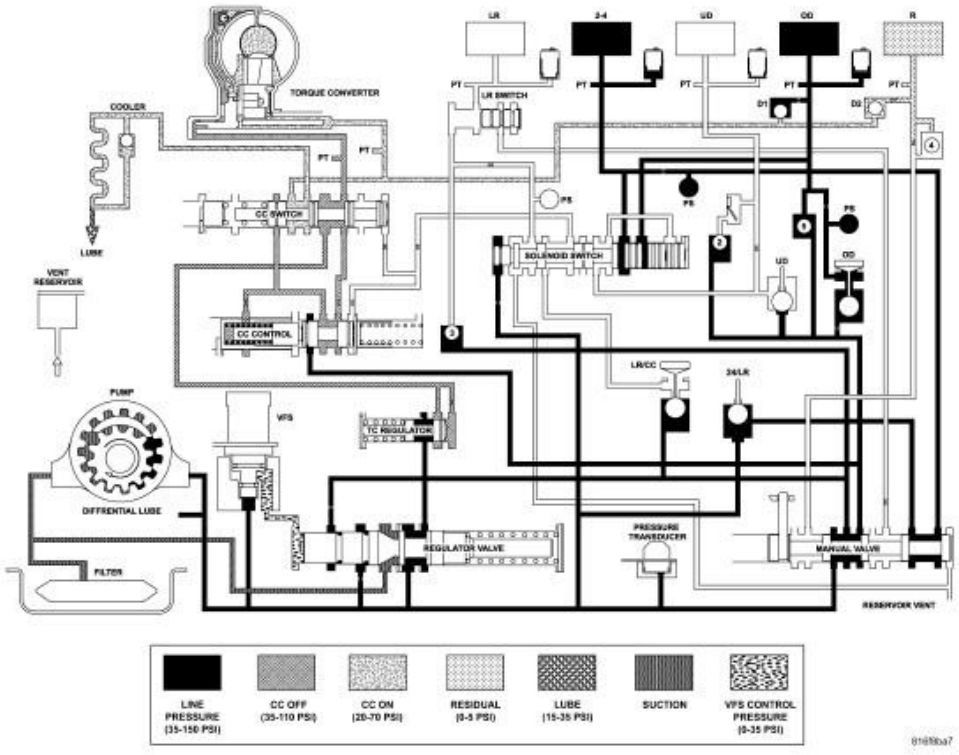


Fig. 188: Identifying Line Pressure - Fourth Gear Overdrive (Drive)
Courtesy of CHRYSLER LLC

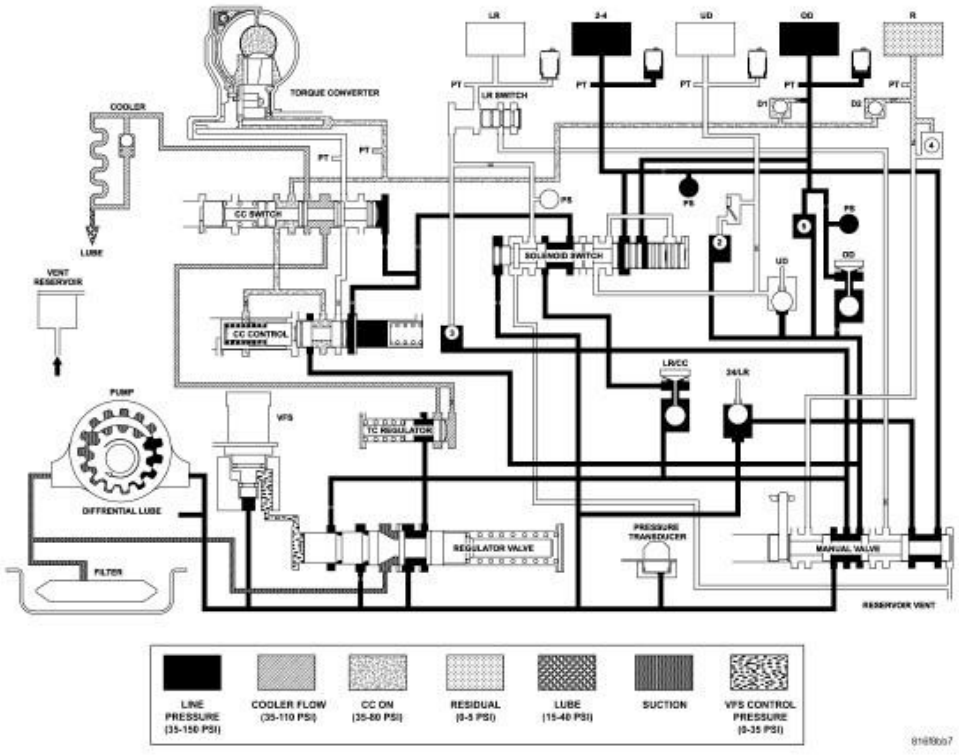


Fig. 189: Identifying Line Pressure - Fourth Gear Overdrive EMCC (Drive)
Courtesy of CHRYSLER LLC

SPECIFICATIONS

SPECIFICATIONS

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Transaxle Type	Fully adaptive, electronically controlled, four speed automatic with torque converter and integral differential
Cooling Method	Air-to-oil heat exchanger
Lubrication	Pump (internal-external gear-type)

GEAR RATIOS

DESCRIPTION	SPECIFICATION
First Gear	2.84
Second Gear	1.57
Direct Gear	1.00
Overdrive Gear	0.69

Reverse Gear	2.21

BEARING SETTINGS (END PLAY AND TURNING TORQUE)

DESCRIPTION	METRIC	STANDARD
Differential Assembly	0.6-2 N.m	5-18 in. lbs.
Output Hub	0.3-2 N.m	3-8 in. lbs.
Transfer Shaft (End Play)	0.051-0.102 mm	0.002-0.004 in.
Overall Drag At Output Hub	0.3-1.9 N.m	3-16 in. lbs.

CLUTCH CLEARANCES

DESCRIPTION	METRIC	STANDARD
Low/Rev Clutch (Select Reaction Plate)	0.89-1.47 mm	0.035-0.058 in.
Two/Four Clutch (No Selection)	0.76-2.64 mm	0.030-0.104 in.
Reverse Clutch (Select Snap Ring)	0.89-1.37 mm	0.035-0.054 in.
Overdrive Clutch (No Selection)	1.07-3.25 mm	0.042-0.128 in.
Underdrive Clutch (Select Pressure Plate)	0.94-1.50 mm	0.037-0.059 in.

OIL PUMP CLEARANCES

DESCRIPTION	METRIC	STANDARD
Outer Gear-to-Crescent	0.060-0.298 mm	0.0023-0.0117 in.
Inner Gear-to-Crescent	0.093-0.385 mm	0.0036-0.0151 in.
Outer Gear-to-Pocket	0.089-0.202 mm	0.0035-0.0079 in.
Outer Gear Side Clearance	0.020-0.046 mm	0.0008-0.0018 in.
Inner Gear Side Clearance	0.020-0.046 mm	0.0008-0.0018 in.
Reaction shaft support bearing sleeve	45.22 - 45.23 mm	1.780 - 1.781 in.

INPUT SHAFT

DESCRIPTION	METRIC	SPECIFICATION
End Play	0.127-0.635mm	0.005-0.025 in.

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolt, Differential Cover-to-Case	19	-	165
Bolt, Differential Ring Gear-to-Case	95	70	-
Bolt, Differential Bearing Retainer-to-Case	28	21	-
Bolt, Driveplate-to-Crankshaft	95	70	-
Bolt, Extension Housing/Plate-to-Case	28	21	-
Bolt, Oil Pan-to-Case	19	-	165
Bolt, Output Gear	271	200	-

Bolt, Output Gear Stirrup/Strap	23	-	204
Bolt, Oil Pump-to-Case	27	20	-
Bolt, Reaction Support-to-Case	27	20	-
Bolts, Solenoid/Pressure Switch Assembly-to-Case	12	-	110
Bolt, Torque Converter-to-Driveplate	88	65	-
Bolt, Transfer Gear Cover	20	-	175
Bolt, Valve Body-to-Case	12	-	105
Fitting, Oil Cooler Line	12	-	105
Nut, Transfer Gear	271	200	-
Tap, Transaxle Pressure	5	-	45
Screw, L/R Clutch Retainer	5	-	45
Screw, Valve Body-to-Transfer Plate	5	-	45
Sensor, Input Speed	27	20	-
Sensor, Output Speed	27	20	-
Sensor, Transmission Range Sensor	5	-	45
Bolts, Engine Front Mount	95	70	-
Bolts, Cradle-to-Body	162	120	-
Nuts, Rear Mount-to-Cradle	54	40	-
Line, Power Steering-to-Steering Gear	31	23	-
Nuts, Torque Strut	54	40	-
Nuts, Link-to-Strut	88	65	-
Screw, Solenoid/Pressure Switch-to-Case Connector	5	-	35
Bolts, Differential Bearing Retainer	28	-	250
Screw, Cable Adjustment	8	-	70
Nuts, Mechanism-to-Console Base	12	-	105
Bolts, Bellhousing- to-Engine	95	70	-
Bolt, Crank Position Sensor	12	-	106
Bolts, Left Mount Bracket Assembly-to- transaxle	54	40	-
Bolt - Inspection Cover, Large	95	70	-
Bolts, Inspection Cover, Small	12	-	105
Bolts, Rear Mount Bracket-to-Transaxle Case	75	55	-
Bolt, Heater Tube- to -Bellhousing	5	-	44
Bolts, Left Mount -to-Bracket	95	70	-
Bolt, Fluid Level Indicator-to-Transmission	5	-	44

SPECIAL TOOLS

SPECIAL TOOLS

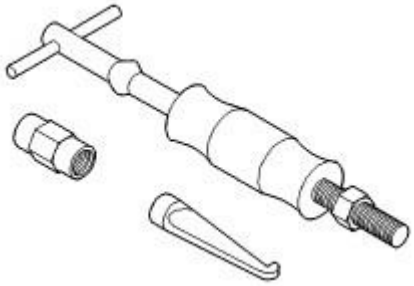


Fig. 190: Puller C-637
Courtesy of CHRYSLER LLC

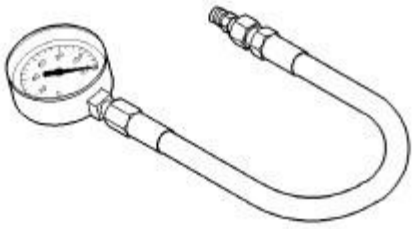


Fig. 191: Pressure Gauge (High) C-3293SP
Courtesy of CHRYSLER LLC

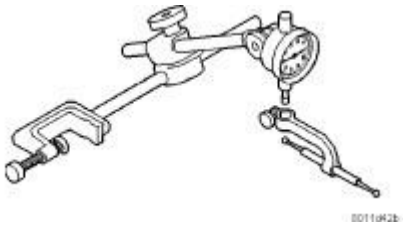


Fig. 192: Dial Indicator C-3339
Courtesy of CHRYSLER LLC

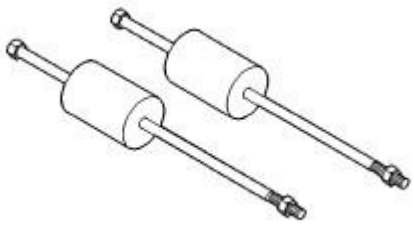


Fig. 193: Oil Pump Puller C-3752
Courtesy of CHRYSLER LLC

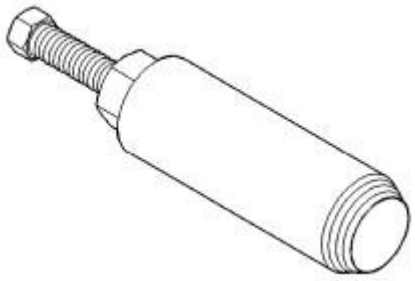


Fig. 194: Seal Puller C-3981B
Courtesy of CHRYSLER LLC

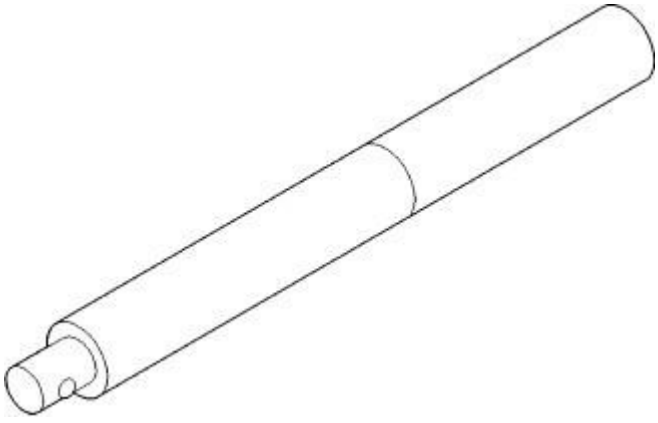


Fig. 195: Universal Handle C-4171
Courtesy of CHRYSLER LLC

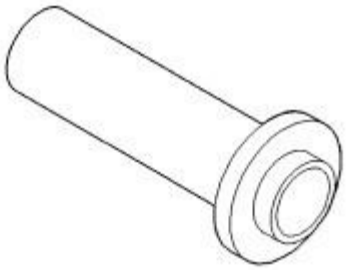


Fig. 196: Seal Installer C-4193A
Courtesy of CHRYSLER LLC

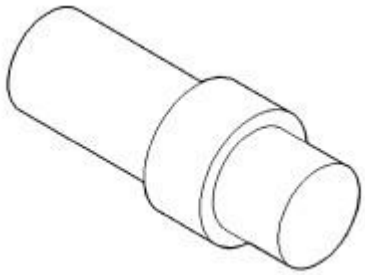


Fig. 197: Adapter C-4996
Courtesy of CHRYSLER LLC

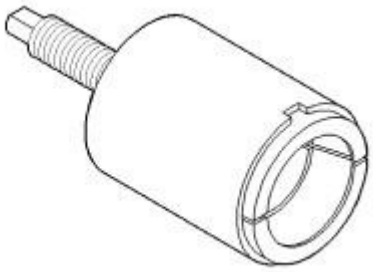


Fig. 198: Remover Kit L-4406
Courtesy of CHRYSLER LLC

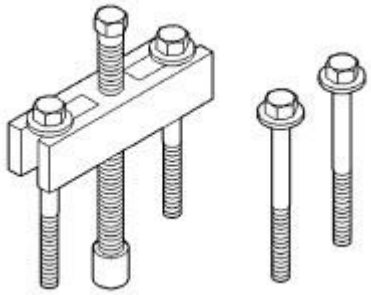


Fig. 199: Gear Puller L-4407A
Courtesy of CHRYSLER LLC

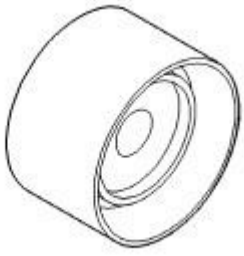


Fig. 200: Bearing Installer L-4410
Courtesy of CHRYSLER LLC

Fig. 201: Gear Checking Plate L-4432

Courtesy of CHRYSLER LLC

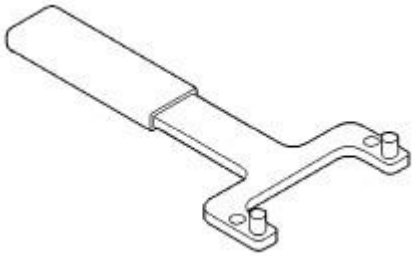


Fig. 202: Bearing Puller L-4435
Courtesy of CHRYSLER LLC

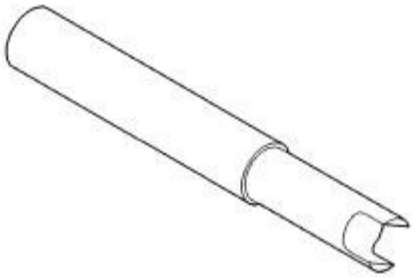


Fig. 203: Differential Tool L-4436A
Courtesy of CHRYSLER LLC

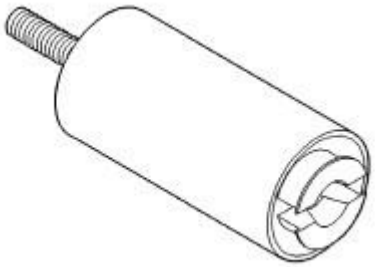


Fig. 204: Special Jaw Set L-4518
Courtesy of CHRYSLER LLC

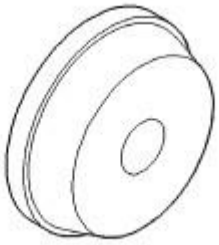


Fig. 205: Installer L-4520
Courtesy of CHRYSLER LLC

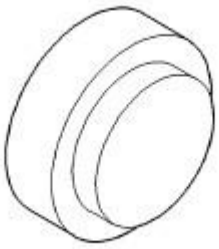


Fig. 206: Thrust Button L-4539-2
Courtesy of CHRYSLER LLC

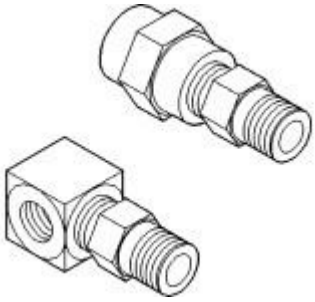


Fig. 207: Adapter L-4559
Courtesy of CHRYSLER LLC

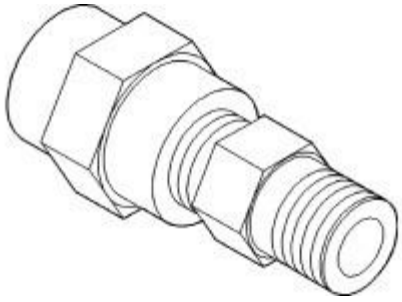


Fig. 208: Adapter L-4559-2
Courtesy of CHRYSLER LLC

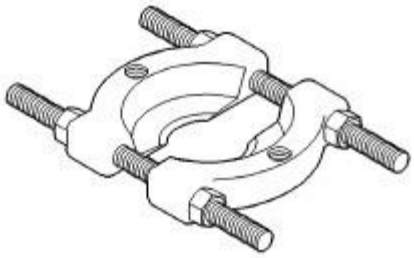


Fig. 209: Bearing Splitter P-334
Courtesy of CHRYSLER LLC

Fig. 210: Puller Set 5048
Courtesy of CHRYSLER LLC

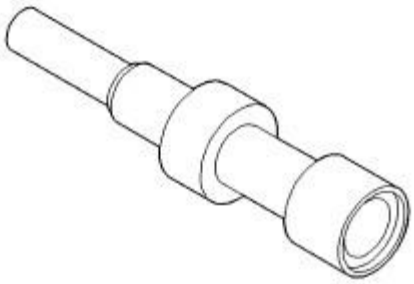


Fig. 211: Remover/Installer 5049-A
Courtesy of CHRYSLER LLC

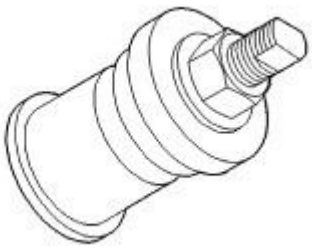


Fig. 212: Installer 5050A
Courtesy of CHRYSLER LLC

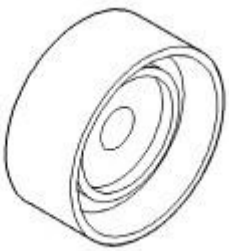


Fig. 213: Installer 5052
Courtesy of CHRYSLER LLC

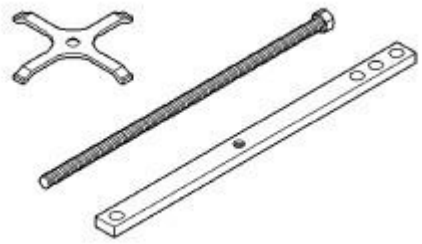


Fig. 214: Compressor 5058A
Courtesy of CHRYSLER LLC

Fig. 215: Compressor 5059-A
Courtesy of CHRYSLER LLC

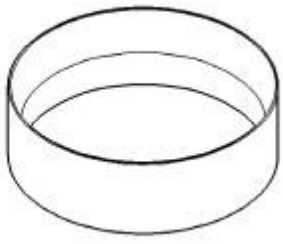


Fig. 216: Installer 5067
Courtesy of CHRYSLER LLC

Fig. 217: Pliers 6051
Courtesy of CHRYSLER LLC

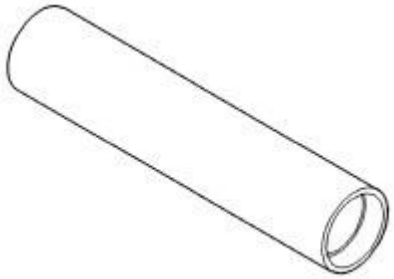


Fig. 218: Installer 6052
Courtesy of CHRYSLER LLC

Fig. 219: Installer 6053
Courtesy of CHRYSLER LLC

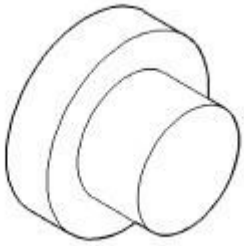


Fig. 220: Button 6055
Courtesy of CHRYSLER LLC

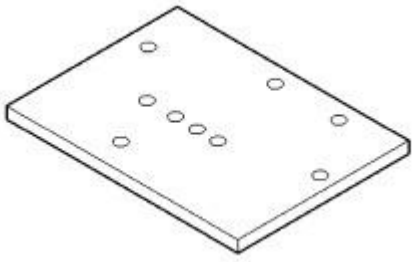


Fig. 221: Plate 6056
Courtesy of CHRYSLER LLC

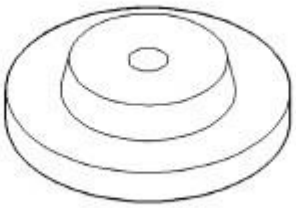


Fig. 222: Disk 6057
Courtesy of CHRYSLER LLC

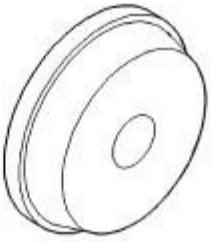


Fig. 223: Installer 6061
Courtesy of CHRYSLER LLC

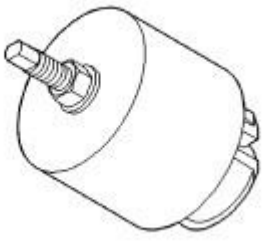


Fig. 224: Remover 6062-A
Courtesy of CHRYSLER LLC

Fig. 225: Holder 6259
Courtesy of CHRYSLER LLC

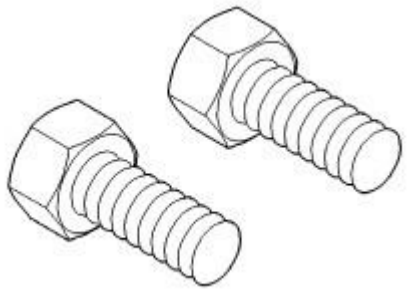


Fig. 226: Bolt 6260
Courtesy of CHRYSLER LLC

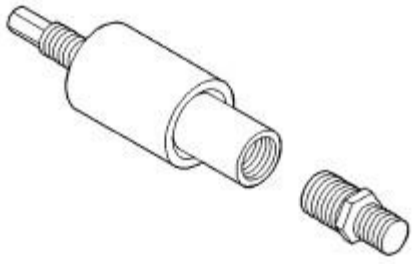


Fig. 227: Installer 6261
Courtesy of CHRYSLER LLC

Fig. 228: Tip 6268
Courtesy of CHRYSLER LLC

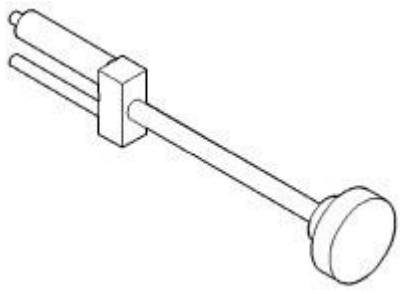


Fig. 229: Remover/Installer 6301
Courtesy of CHRYSLER LLC

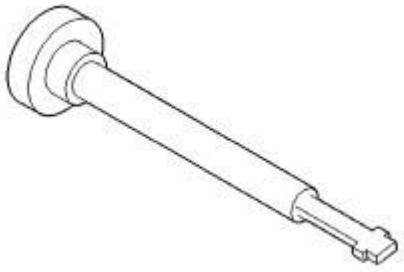


Fig. 230: Remover/Installer 6302
Courtesy of CHRYSLER LLC

Fig. 231: Installer 6536-A
Courtesy of CHRYSLER LLC

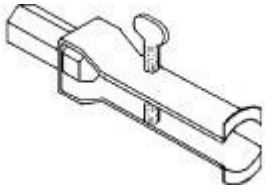


Fig. 232: Puller 7794-A
Courtesy of CHRYSLER LLC

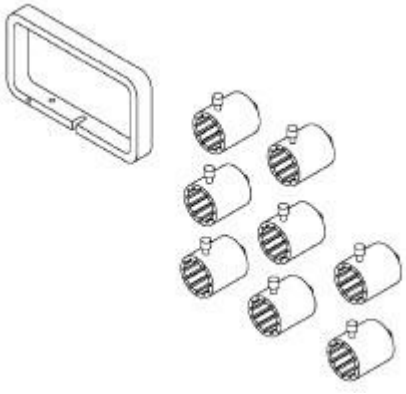


Fig. 233: End Play Socket Set 8266
Courtesy of CHRYSLER LLC

Fig. 234: Input Clutch Pressure Fixture 8391
Courtesy of CHRYSLER LLC

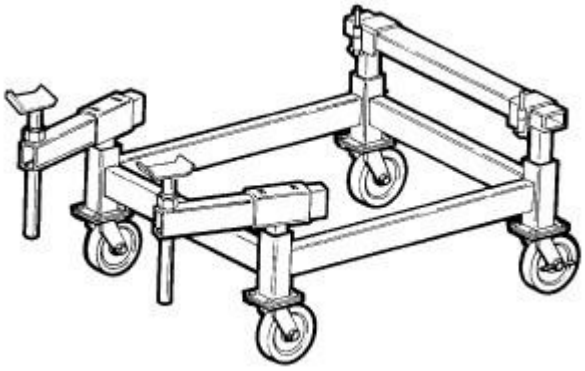


Fig. 235: Driveline Support Table 8874
Courtesy of CHRYSLER LLC

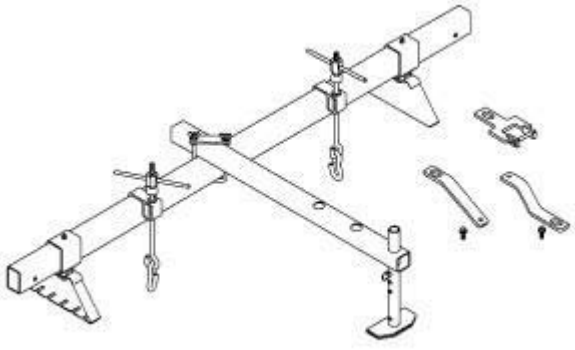


Fig. 236: Driveline Support Fixture 8534B
Courtesy of CHRYSLER LLC

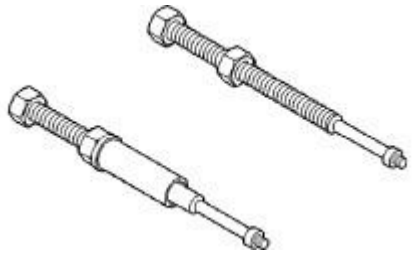


Fig. 237: Steering Shaft Roll Pin Remover/Installer 6831A
Courtesy of CHRYSLER LLC

ACCUMULATOR

DESCRIPTION

DESCRIPTION

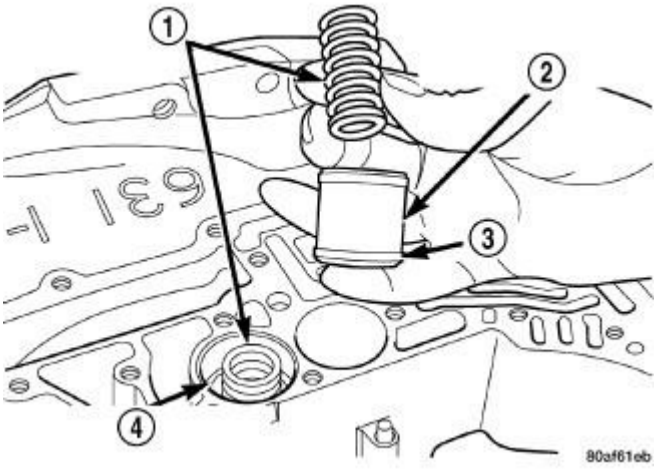


Fig. 238: Identifying Underdrive & Overdrive Accumulators
Courtesy of CHRYSLER LLC

1 - RETURN SPRING
2 - UNDERDRIVE CLUTCH ACCUMULATOR
3 - SEAL RING (2)
4 - OVERDRIVE CLUTCH ACCUMULATOR

The 41TE underdrive, overdrive, low/reverse, and 2/4 clutch hydraulic circuits each contain an accumulator. An accumulator typically consists of a piston (2), seal rings (3) return spring(s) (1) and a cover or plug. The overdrive and underdrive accumulators are located within the transaxle case, and are retained by the valve body.

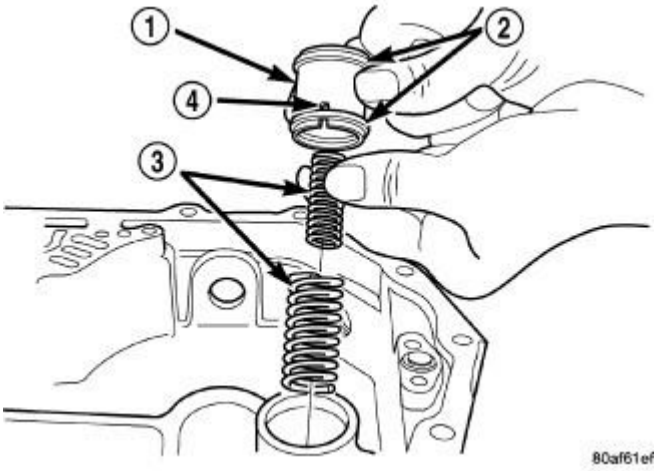


Fig. 239: Removing/Installing Low/Reverse Accumulator Return Springs
Courtesy of CHRYSLER LLC

1 - ACCUMULATOR PISTON
2 - SEAL RINGS
3 - RETURN SPRINGS
4 - (NOTE NOTCH)

The low reverse accumulator (1) is also located within the transaxle case, but the assembly is retained by a cover and a snap-ring.

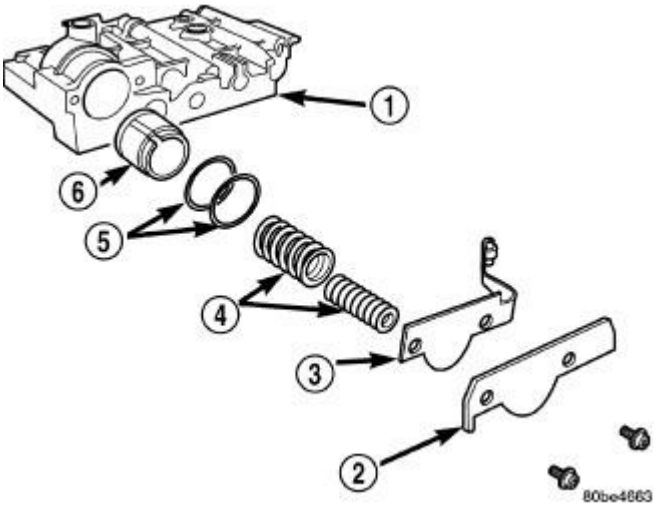


Fig. 240: Identifying 2/4 Accumulator Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY
2 - RETAINER PLATE
3 - DETENT SPRING

4 - SPRINGS
5 - SEALS
6 - PISTON

The 2/4 accumulator is located in the valve body (1) . It is retained by a cover and retaining screws.

OPERATION

OPERATION

The function of an accumulator is to cushion the application of a frictional clutch element. When pressurized fluid is applied to a clutch circuit, the application force is dampened by fluid collecting in the respective accumulator chamber against the piston and spring(s). The intended result is a smooth, firm clutch application.

ASSEMBLY, INPUT CLUTCH

DISASSEMBLY

DISASSEMBLY

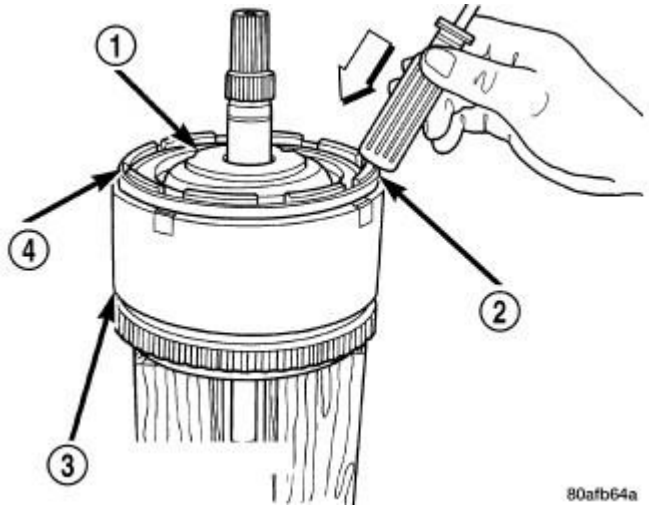


Fig. 241: Tapping Down Reverse Clutch Reaction Plate
Courtesy of CHRYSLER LLC

1 - #4 THRUST PLATE (SELECT)
2 - TAP DOWN REVERSE CLUTCH REACTION PLATE TO REMOVE OR INSTALL SNAP RING
3 - INPUT SHAFT CLUTCHES RETAINER ASSEMBLY
4 - REVERSE CLUTCH REACTION PLATE

1. Mount input clutch assembly (3) to Input Clutch Pressure Fixture Tool 8391.
2. Tap down reverse clutch reaction plate (4) to release pressure from snap ring (2).

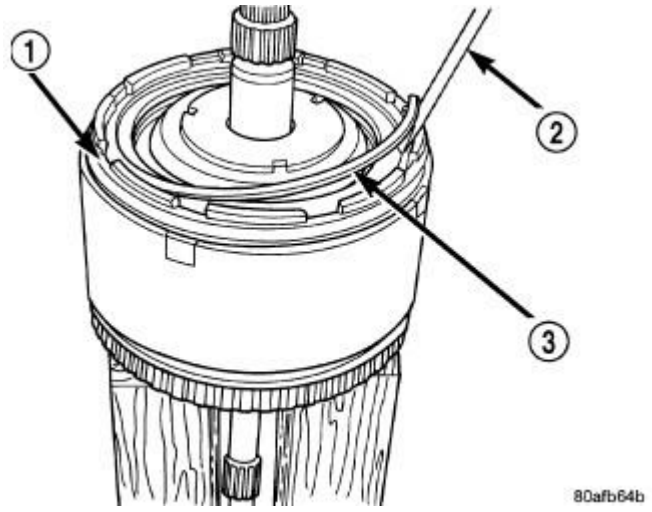


Fig. 242: Removing Reverse Clutch Snap Ring
Courtesy of CHRYSLER LLC

1 - REACTION PLATE
2 - SCREWDRIVER
3 - REVERSE CLUTCH SNAP RING (SELECT)

3. Remove reverse clutch snap ring (3) .

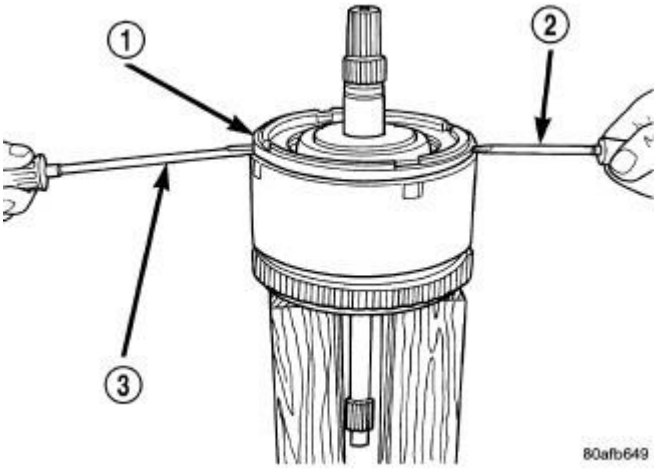


Fig. 243: Removing Reverse Clutch Reaction Plate
Courtesy of CHRYSLER LLC

1 - REVERSE CLUTCH REACTION PLATE
2 - SCREWDRIVER
3 - SCREWDRIVER

4. Pry up and remove reverse clutch reaction plate (1) .

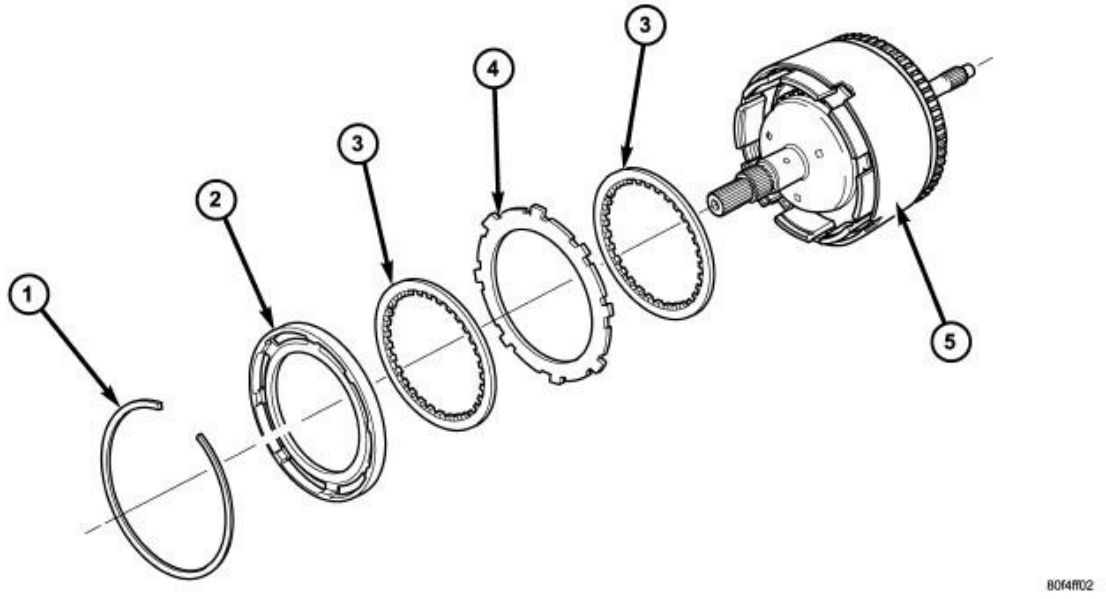


Fig. 244: Removing/Installing Reverse Clutch Pack
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - REACTION PLATE
3 - CLUTCH DISC (2)
4 - CLUTCH PLATE (1)
5 - INPUT CLUTCH ASSEMBLY

5. Remove reverse clutch pack (3,4) . **Tag components for assembly identification.**

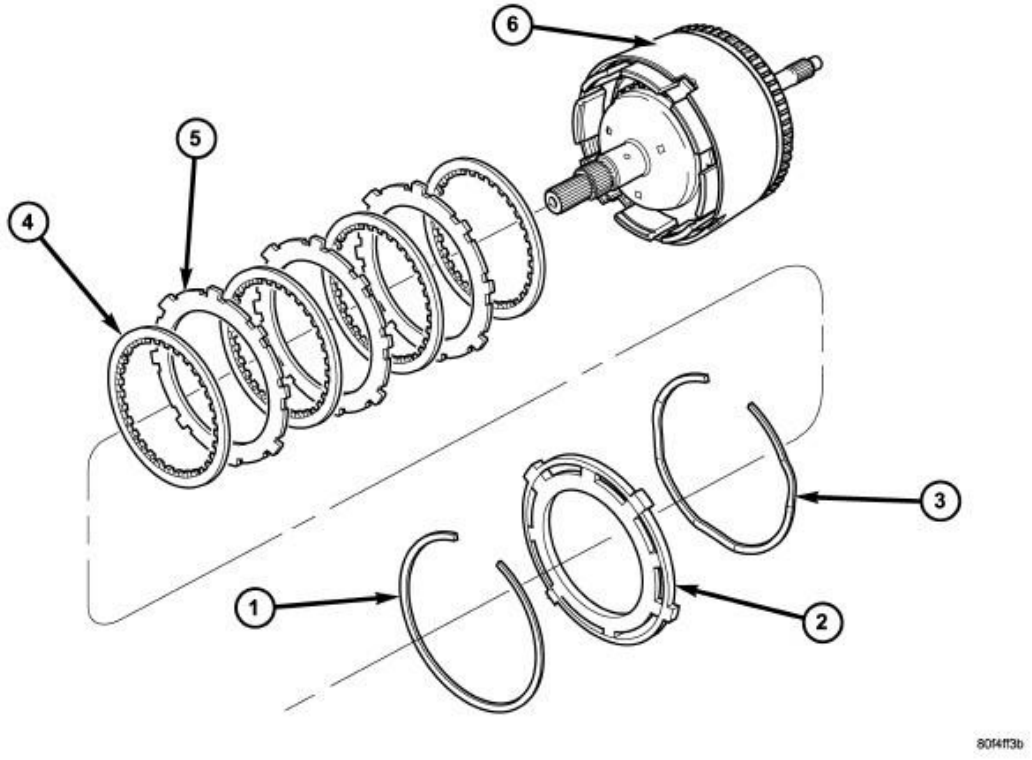


Fig. 245: Removing/Installing OD/Reverse Pressure Plate Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - OD/REVERSE PRESSURE PLATE
3 - SNAP RING (WAVE)
4 - CLUTCH DISC (4)
5 - CLUTCH STEEL (3)
6 - INPUT CLUTCH ASSEMBLY

6. Remove the OD/Reverse pressure plate snap ring (1) .
7. Remove OD/Reverse pressure plate (2).
8. Remove OD/Reverse pressure plate wave snap ring (3).
9. Remove OD clutch pack (4,5). **Tag components for assembly identification.**

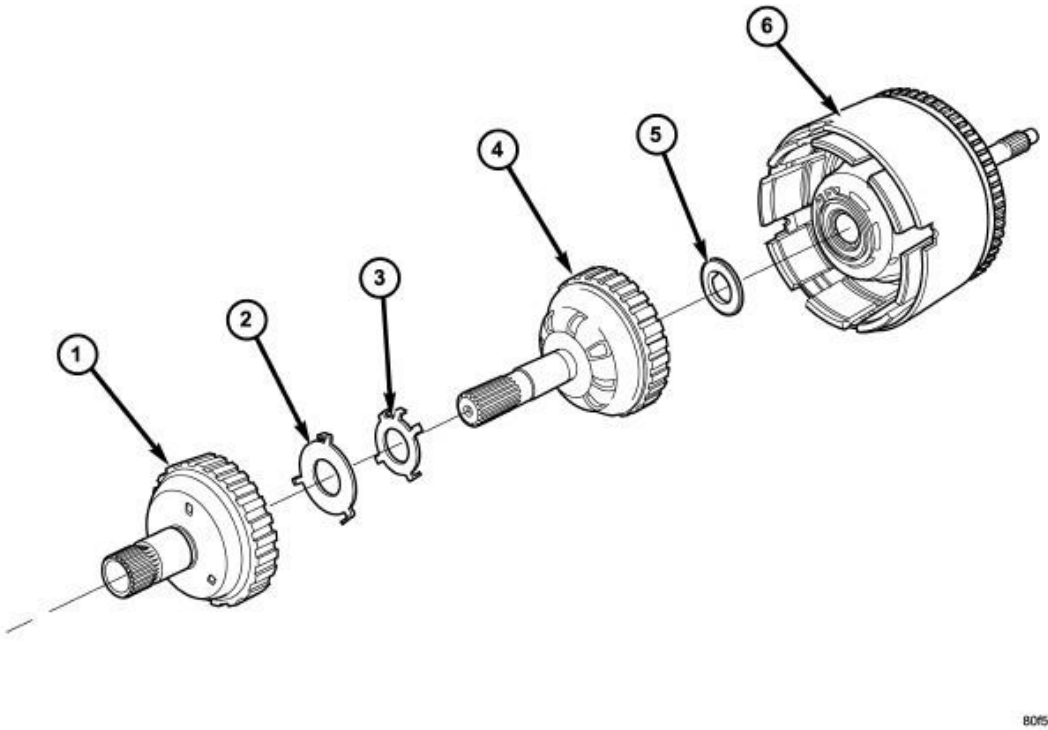


Fig. 246: Removing/Installing OD & UD Shafts, Thrust Washer & Plate, & #2 Needle Bearing
Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT
2 - #3 THRUST PLATE (3 TABS)
3 - #3 THRUST WASHER (5 TABS)
4 - UNDERDRIVE SHAFT
5 - #2 NEEDLE BEARING (3 TABS)
6 - INPUT CLUTCH ASSEMBLY

10. Remove and inspect OD (1) and UD Shafts (4), as well as #3 thrust washer and plate (2, 3), and #2 needle bearing (5).

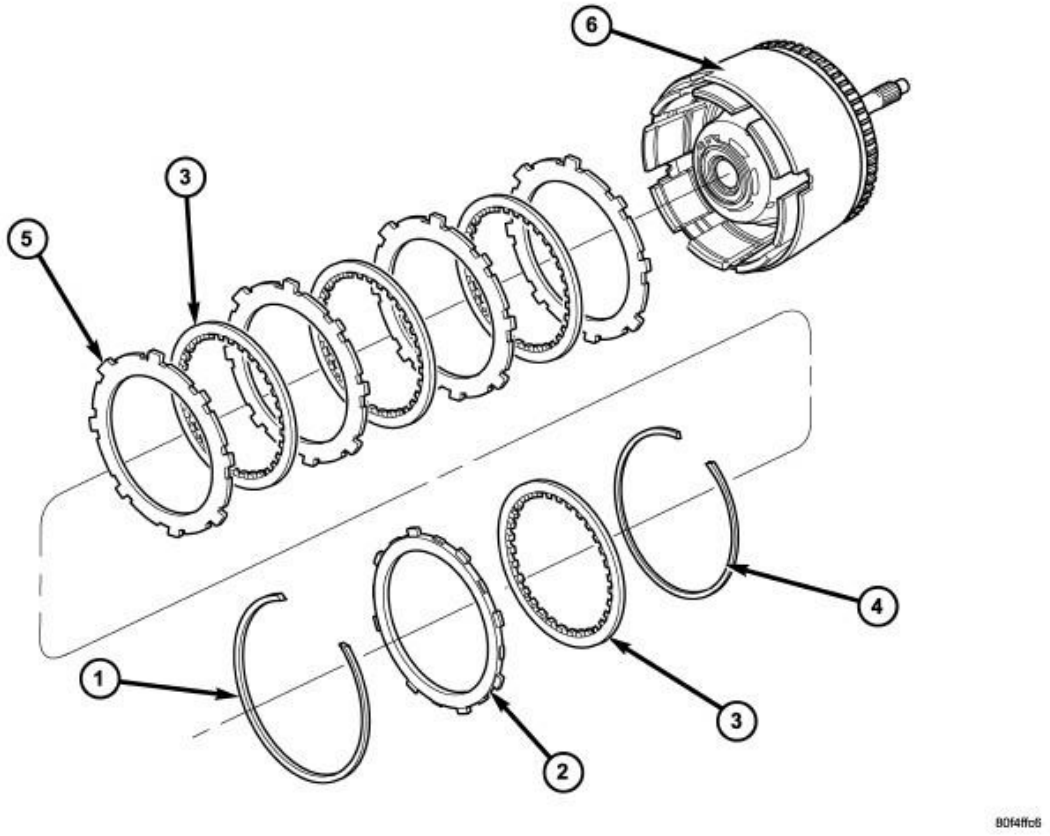


Fig. 247: Removing/Installing OD/UD Reaction Plate Tapered Snap Ring, Clutch Plate, & First Clutch Disc
Courtesy of CHRYSLER LLC

1 - SNAP RING (TAPERED)
2 - OD/UD REACTION PLATE
3 - CLUTCH DISC
4 - SNAP RING (FLAT)
5 - CLUTCH PLATE
6 - INPUT CLUTCH ASSEMBLY

11. Remove the OD/UD reaction plate tapered snap ring (1) , clutch plate (5), and first clutch disc (3).
12. Remove the UD clutch flat snap ring (4) and rest of the input clutch assembly (6). **Tag clutch pack for assembly identification.**

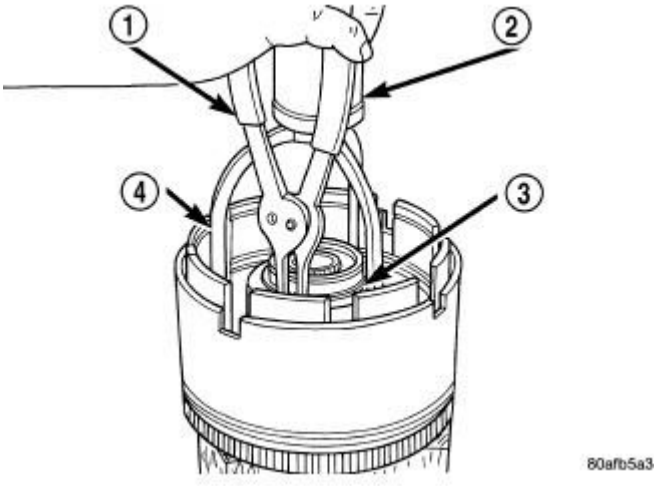


Fig. 248: Compressing UD Clutch Piston/Spring Enough To Remove Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS
2 - ARBOR PRESS RAM
3 - SNAP RING
4 - COMPRESSOR 5059-A

CAUTION: Compress return spring just enough to remove or install snap ring.

13. Using compressor 5059-A (4) and an arbor press (2), compress UD clutch piston/spring enough to remove snap ring (3).

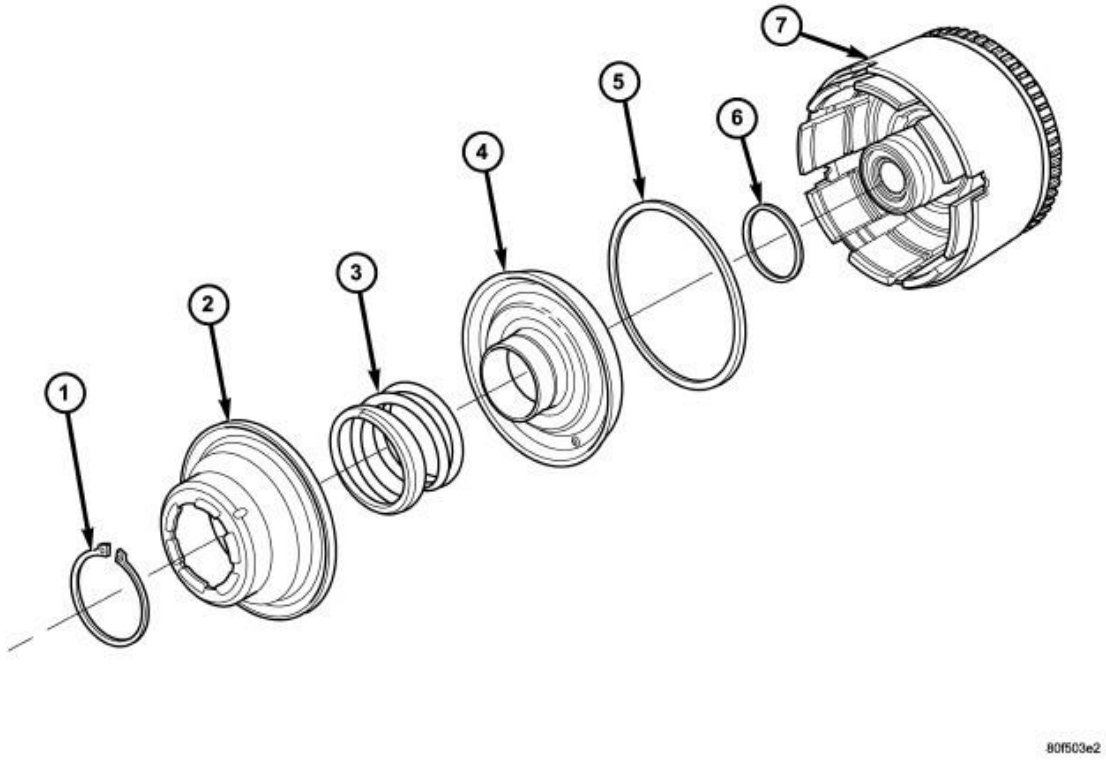


Fig. 249: Removing/Installing Underdrive Clutch Piston, Spring & Retainer
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - SPRING RETAINER
3 - SPRING
4 - UD CLUTCH PISTON
5 - SEAL, OUTER
6 - SEAL, INNER
7 - INPUT CLUTCH ASSEMBLY

14. Refer to **Fig. 249** as necessary when performing the following steps
15. Remove spring retainer (2) , spring (3), and UD clutch piston (4).

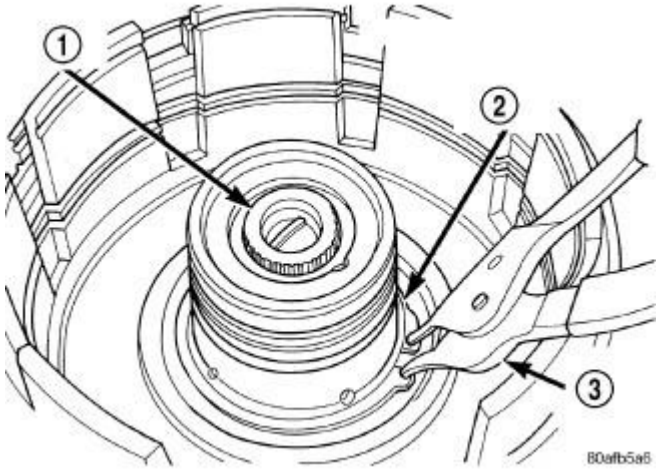


Fig. 250: Removing Input Hub Tapered Snap Ring
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - INPUT HUB SNAP RING (TAPERED SIDE UP WITH TABS IN CAVITY)
3 - SNAP RING PLIERS

16. Remove input hub tapered snap ring (2) .

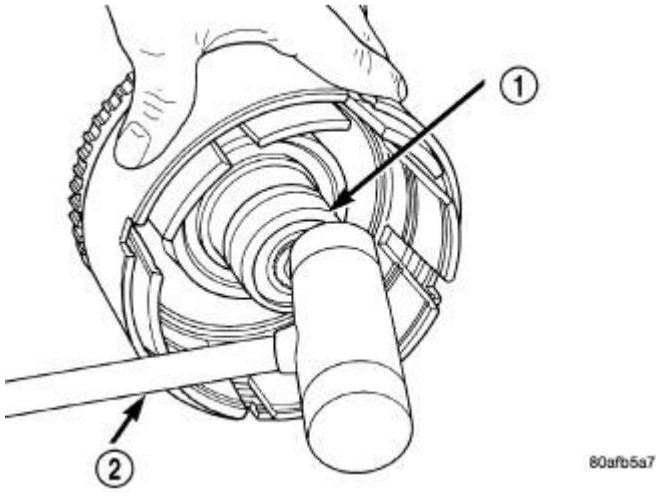


Fig. 251: Tapping On Input Hub With Soft Faced Hammer
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT AND HUB ASSEMBLY
2 - SOFT FACED HAMMER

17. Tap on input hub with soft faced hammer (2) and separate input hub from OD/Reverse piston and clutch retainer.

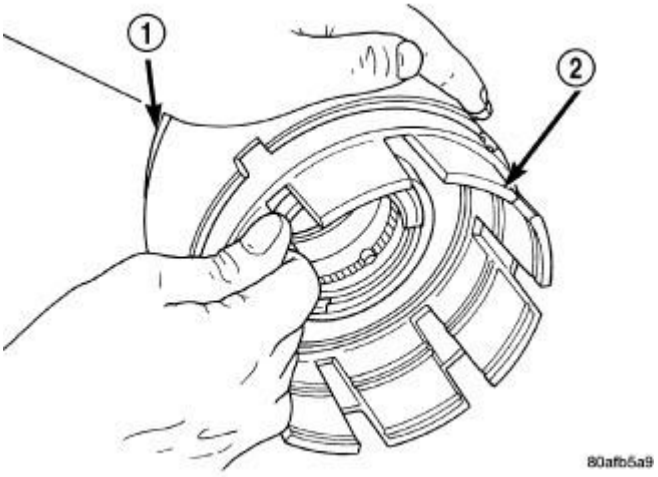


Fig. 252: Identifying Clutch Retainer & OD/Reverse Piston
Courtesy of CHRYSLER LLC

1 - OVERDRIVE/REVERSE PISTON
2 - INPUT CLUTCHES RETAINER

18. Separate clutch retainer (2) from OD/Reverse piston (1).

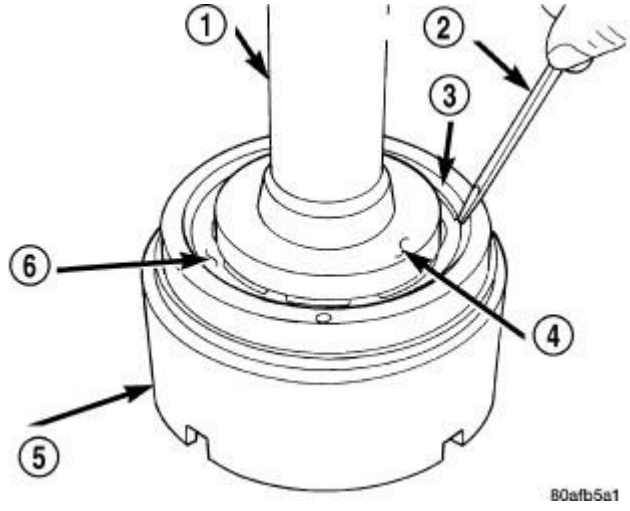


Fig. 253: Compressing Return OD/Reverse Piston Return Spring To Remove Snap Ring
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM (COMPRESS RETURN SPRING JUST ENOUGH TO REMOVE OR INSTALL SNAP RING)
2 - SCREWDRIVER
3 - SNAP RING
4 - Disk 6057
5 - OD/REVERSE PISTON

6 - RETURN SPRING

19. Using Disk 6057 (4) and an arbor press (1), compress return OD/Reverse piston return spring just enough to remove snap ring (3).

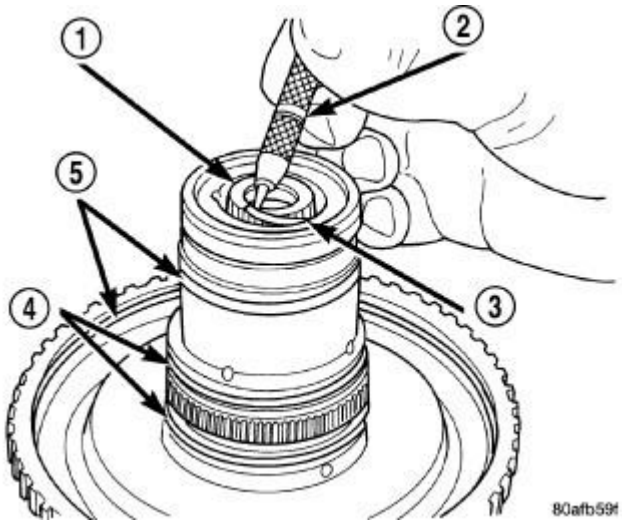


Fig. 254: Removing Input Shaft-To-Input Clutch Hub Snap Ring
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - SHARP-POINTED TOOL
3 - SNAP RING
4 - O-RINGS
5 - SEALS

20. Remove input shaft to input clutch hub snap ring (3) .

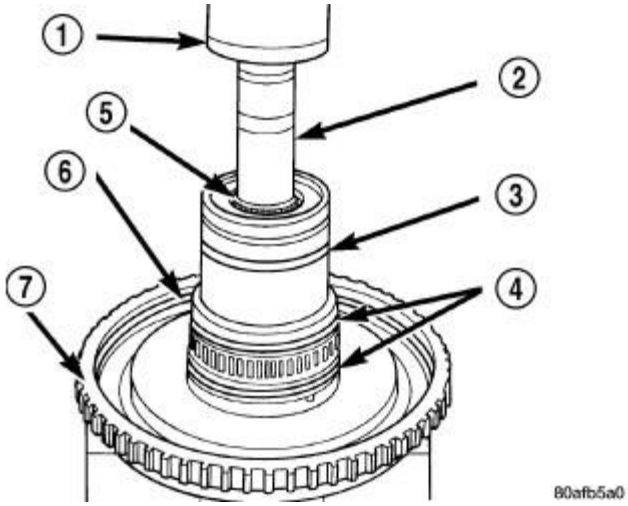


Fig. 255: Removing Input Shaft

Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - SOCKET
3 - SEAL
4 - O-RINGS
5 - INPUT SHAFT
6 - SEAL
7 - INPUT SHAFT HUB ASSEMBLY

21. Using a suitably sized socket (2) and an arbor press (1), remove input shaft (5) from input shaft hub (7).

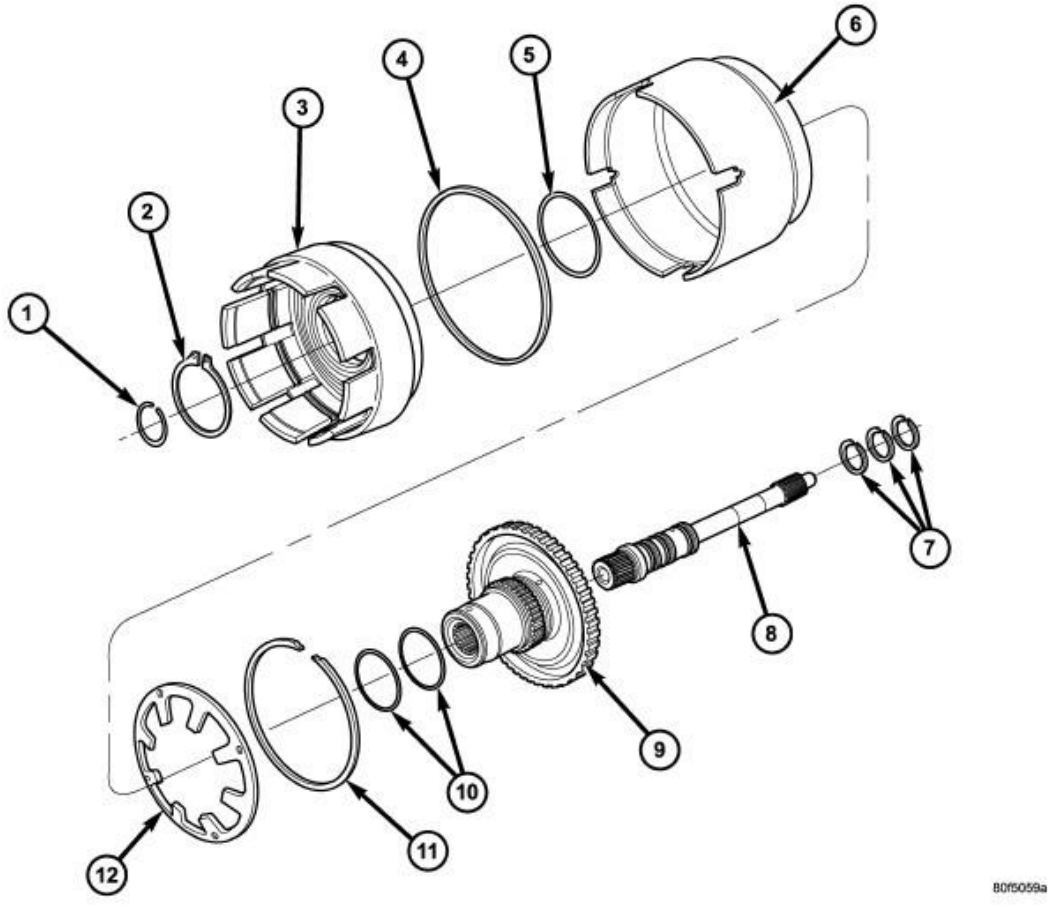


Fig. 256: Identifying Input Clutch Hub, Retainer, & OD/Reverse Piston
Courtesy of CHRYSLER LLC

1 - SNAP RING (INPUT SHAFT)
2 - SNAP RING
3 - CLUTCH RETAINER
4 - SEAL, OUTER

5 - SEAL, INNER 6 - OD/REVERSE PISTON 7 - SEAL, INPUT SHAFT 8 - SHAFT, INPUT 9 - HUB 10 - SEAL 11 - SNAP RING 12 - BELLEVILLE SPRING

22. Refer to **Fig. 256** as necessary when performing the above steps

ASSEMBLY

ASSEMBLY

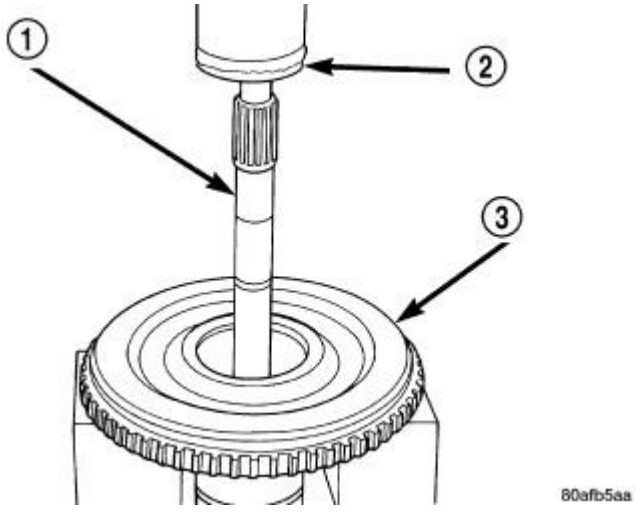


Fig. 257: Installing Input Shaft
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - ARBOR PRESS
3 - INPUT SHAFT HUB ASSEMBLY

Use petrolatum on all seals to ease assembly of components.

1. Using an arbor press (2), install input shaft (1) to input shaft hub (3) .

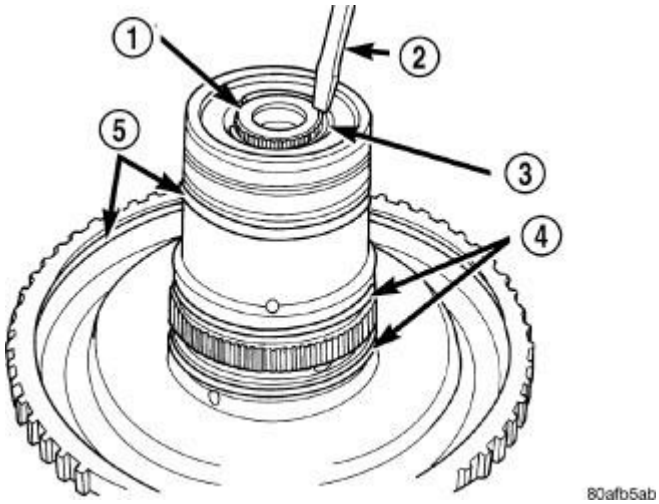


Fig. 258: Installing Input Shaft Snap Ring
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - SCREWDRIVER (DO NOT SCRATCH BEARING SURFACE)
3 - SNAP RING
4 - O-RINGS
5 - SEALS

2. Install input shaft snap ring (3) .

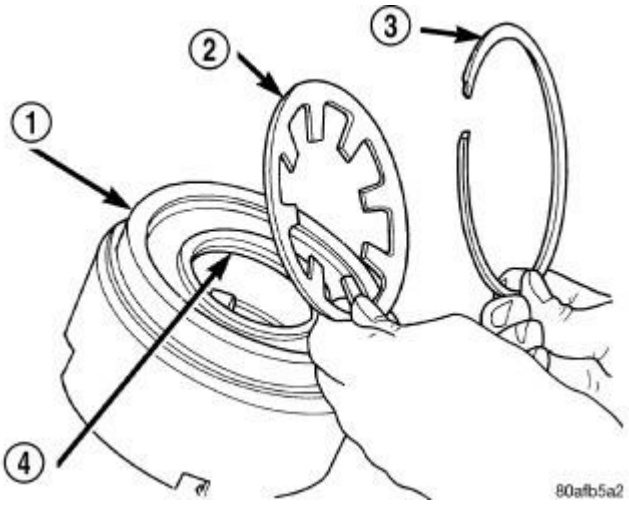


Fig. 259: Identifying OD/Reverse Piston, Return Spring, & Snap Ring
Courtesy of CHRYSLER LLC

1 - OD/REVERSE PISTON
2 - RETURN SPRING
3 - SNAP RING

4 - O-RING

3. Place OD/Reverse piston (1) return spring (2) and snap ring (3) into position.

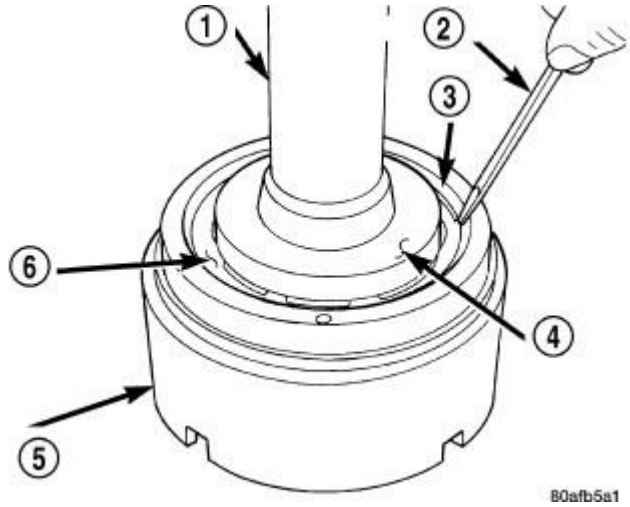


Fig. 260: Installing OD/Reverse Piston, Return Spring, & Snap Ring
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM (COMPRESS RETURN SPRING JUST ENOUGH TO REMOVE OR INSTALL SNAP RING)
2 - SCREWDRIVER
3 - SNAP RING
4 - Disk 6057
5 - OD/REVERSE PISTON
6 - RETURN SPRING

4. Using an arbor press (1) and Disk 6057 (4), install OD/Reverse piston (5) return spring (6) and snap ring (3).

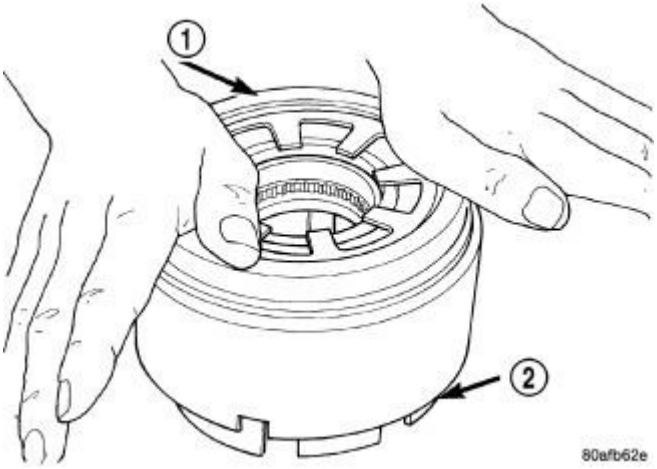


Fig. 261: Installing OD/Reverse Piston
Courtesy of CHRYSLER LLC

1 - PUSH DOWN TO INSTALL OVERDRIVE/REVERSE PISTON
2 - INPUT CLUTCHES RETAINER

5. Install the OD/Reverse piston assembly (1) to the input clutch retainer (2).

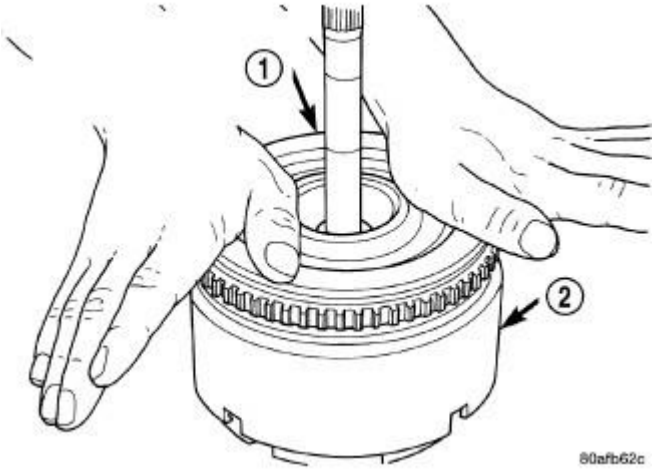


Fig. 262: Installing Input Shaft Hub Assembly
Courtesy of CHRYSLER LLC

1 - PUSH DOWN TO INSTALL INPUT SHAFT HUB ASSEMBLY (ROTATE TO ALIGN SPLINES)
2 - OD/REV. PISTON

6. Install the input hub/shaft assembly (rotate to align splines) (1) to the OD/Reverse piston/clutch retainer assembly (2).

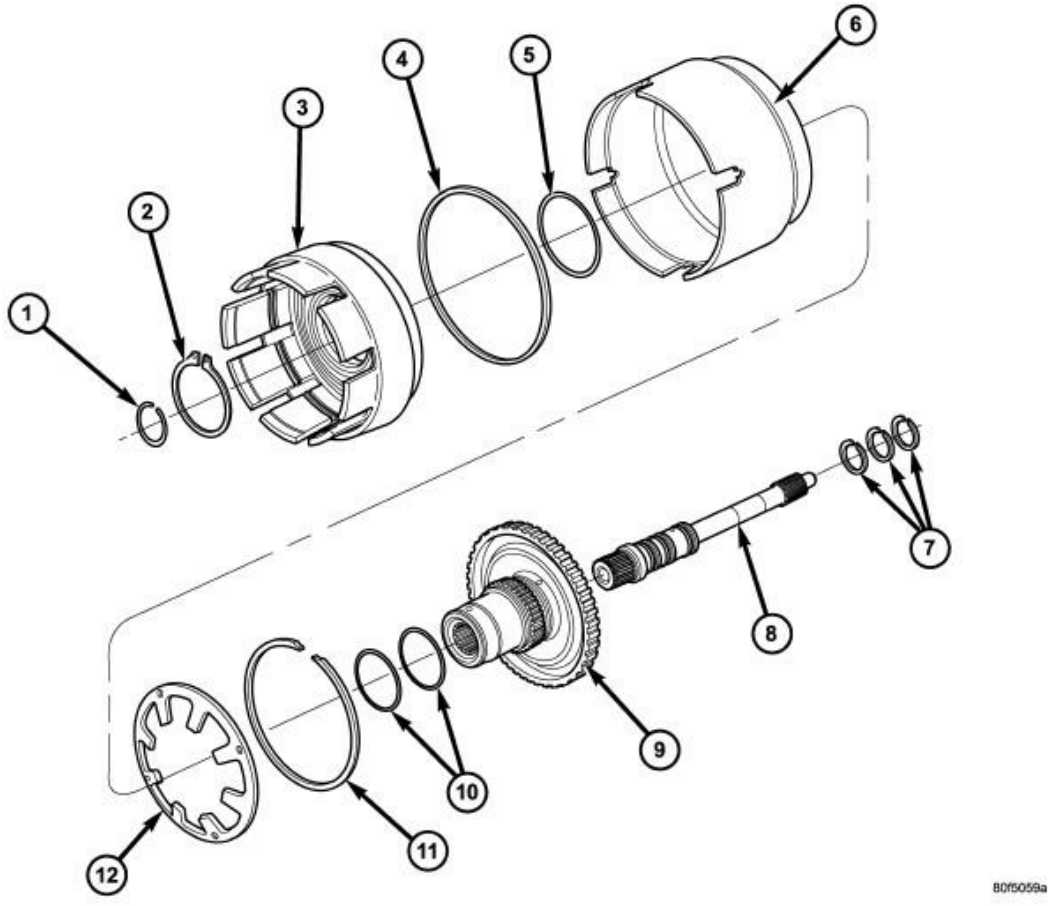


Fig. 263: Identifying Input Clutch Hub, Retainer, & OD/Reverse Piston
Courtesy of CHRYSLER LLC

1 - SNAP RING (INPUT SHAFT)
2 - SNAP RING
3 - CLUTCH RETAINER
4 - SEAL, OUTER
5 - SEAL, INNER
6 - OD/REVERSE PISTON
7 - SEAL, INPUT SHAFT
8 - SHAFT, INPUT
9 - HUB
10 - SEAL
11 - SNAP RING
12 - BELLEVILLE SPRING

7. Refer to **Fig. 263** as necessary when performing the following steps .

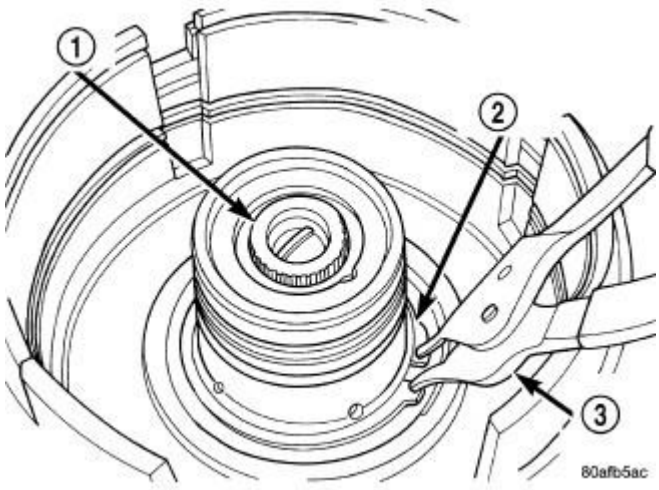


Fig. 264: Installing Input Hub Tapered Snap Ring
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - INPUT HUB SNAP RING (TAPERED SIDE UP WITH TABS IN CAVITY)
3 - SNAP RING PLIERS

8. Install input hub tapered snap ring (tapered side up with tabs in cavity) (2) .

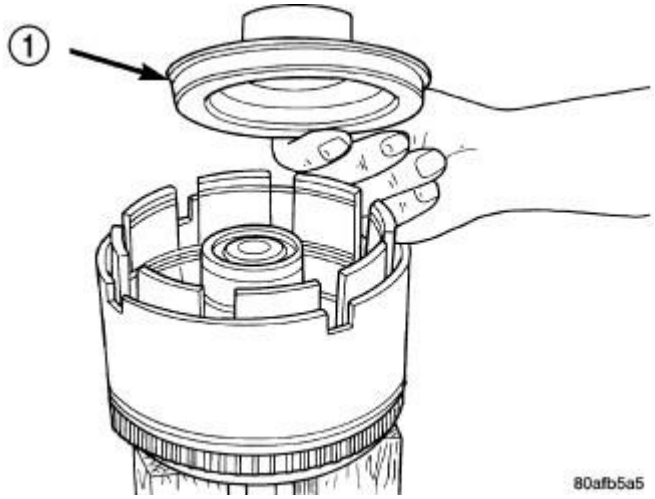


Fig. 265: Installing Underdrive Clutch Piston
Courtesy of CHRYSLER LLC

1 - PISTON

9. Install UD clutch piston (1) .

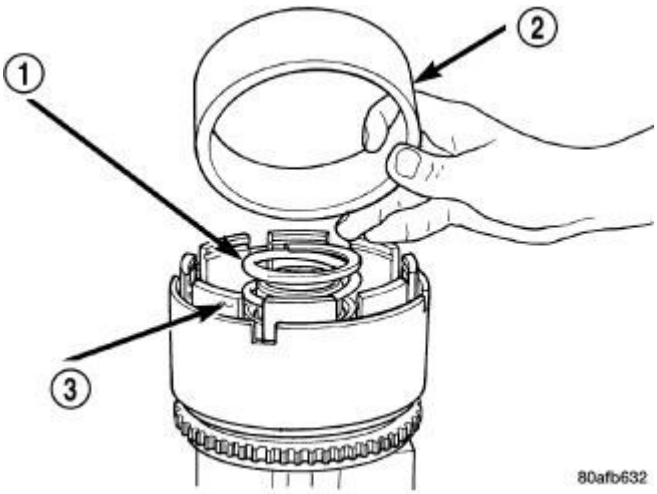


Fig. 266: Installing UD Piston Return Spring & Installer 5067
Courtesy of CHRYSLER LLC

1 - PISTON RETURN SPRING
2 - INSTALLER 5067
3 - INPUT SHAFT CLUTCHES RETAINER ASSEMBLY

10. Install UD piston return spring (1) and Installer 5067 (2).

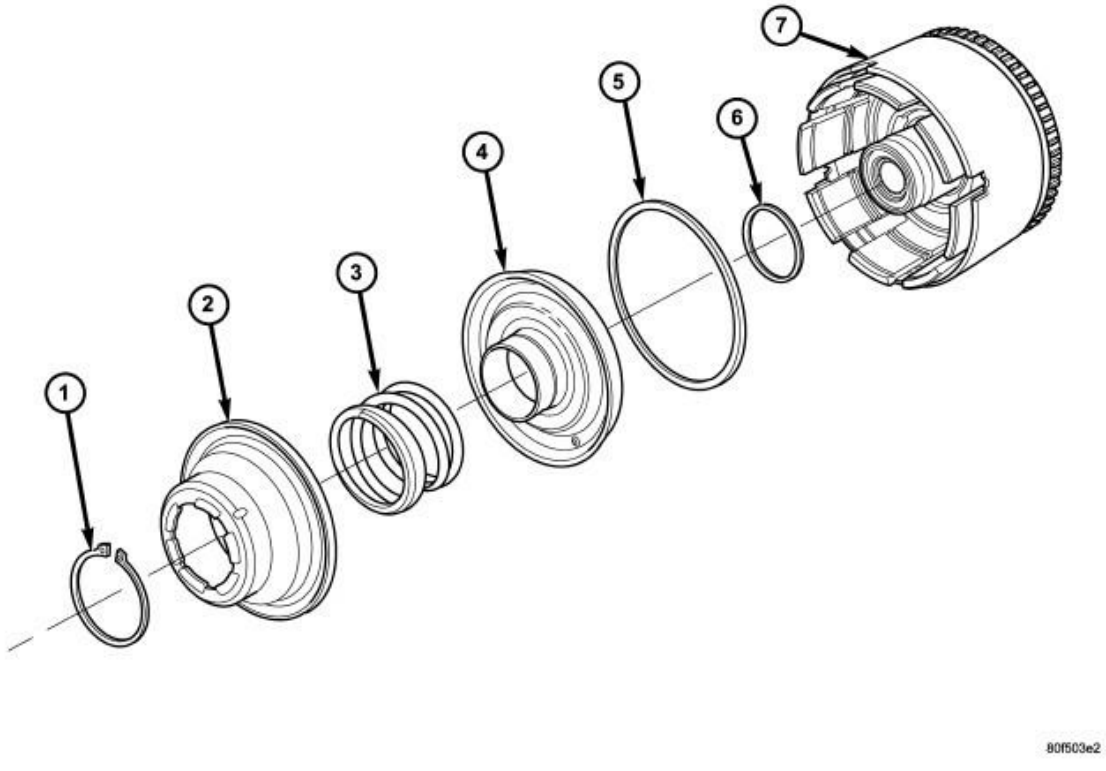


Fig. 267: Removing/Installing Underdrive Clutch Piston, Spring & Retainer
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - SPRING RETAINER
3 - SPRING
4 - UD CLUTCH PISTON
5 - SEAL, OUTER
6 - SEAL, INNER
7 - INPUT CLUTCH ASSEMBLY

11. Refer to **Fig. 267** as necessary when performing the following steps.

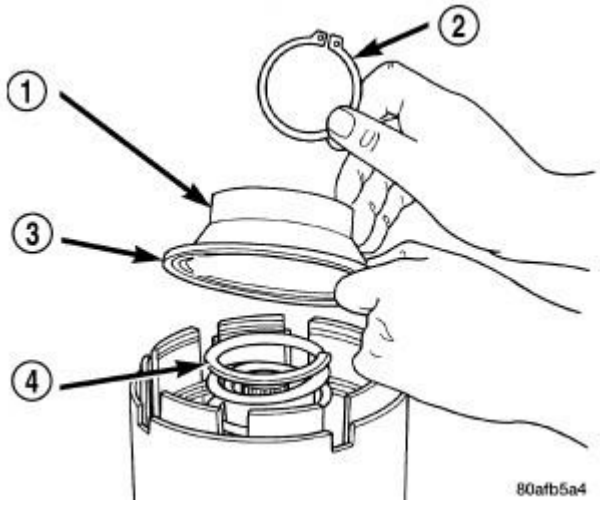


Fig. 268: Identifying UD Spring Retainer & Snap Ring
Courtesy of CHRYSLER LLC

1 - UNDERDRIVE SPRING RETAINER
2 - SNAP RING
3 - SEAL
4 - PISTON RETURN SPRING

12. Place the UD spring retainer (1) and snap ring (2) into position.

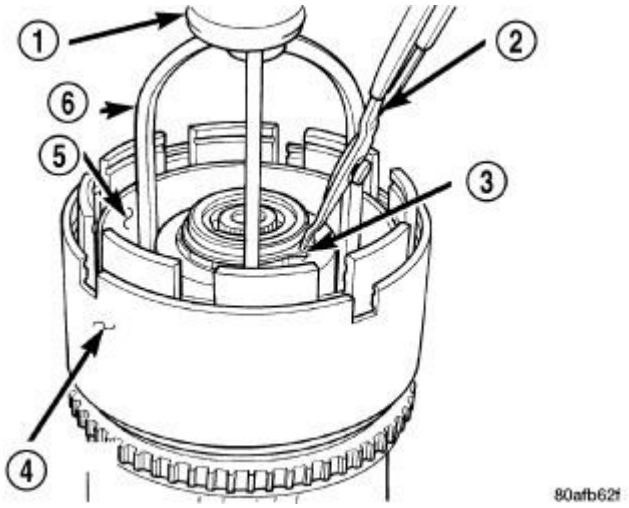


Fig. 269: Installing UD Spring Retainer and Snap Ring
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - SNAP RING PLIERS
3 - SNAP RING
4 - OD/REVERSE PISTON
5 - INSTALLER 5067
6 - COMPRESSOR 5059-A

13. Using Compressor 5059-A (6) and an arbor press (1), Install the UD spring retainer and snap ring (3) Compress just enough to install snap ring (3).

CAUTION: Compress return spring just enough to install snap ring.

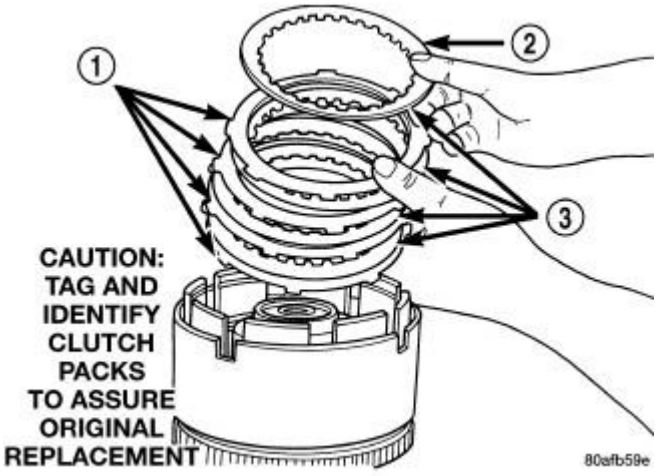


Fig. 270: Installing Underdrive UD Clutch Pack

Courtesy of CHRYSLER LLC

1 - CLUTCH PLATE
2 - ONE UD CLUTCH DISC
3 - CLUTCH DISC

14. Install the UD clutch pack (1,3) . Leave out upper disc (2), until snap ring is installed.

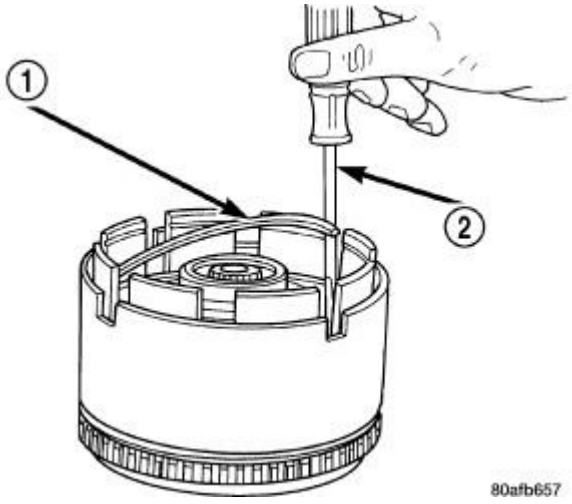


Fig. 271: Installing UD Clutch Flat Snap Ring
Courtesy of CHRYSLER LLC

1 - UNDERDRIVE CLUTCH REACTION PLATE FLAT SNAP RING
2 - SCREWDRIVER

15. Install the UD clutch flat snap ring (1) .

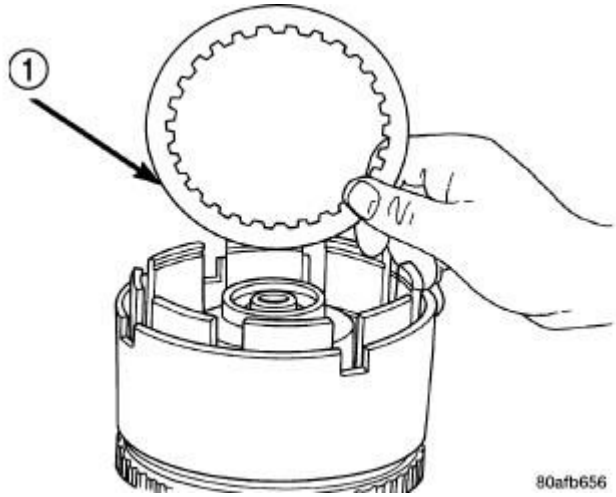


Fig. 272: Installing Last UD Clutch Disc
Courtesy of CHRYSLER LLC

1 - ONE UNDERDRIVE CLUTCH DISC

16. Install the last UD clutch disc (1) .

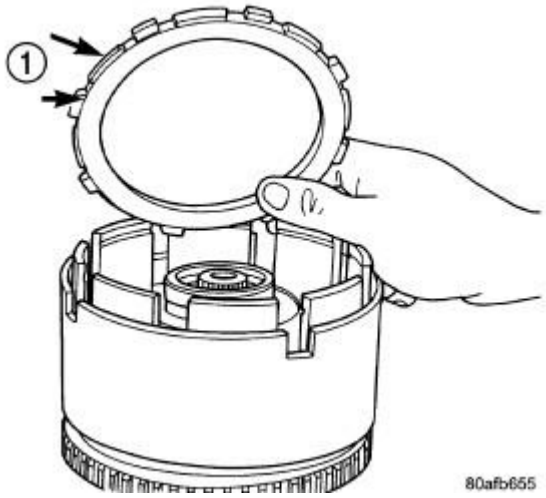


Fig. 273: Installing OD/UD Clutches Reaction Plate
Courtesy of CHRYSLER LLC

1 - OD/UD CLUTCH REACTION PLATE (TAPERED STEP SIDE UP)

17. Place the OD/UD clutch reaction plate (1) and snap ring into position. The OD/UD clutches reaction plate has a step on both sides. Install the OD/UD clutches reaction plate tapered step side up.

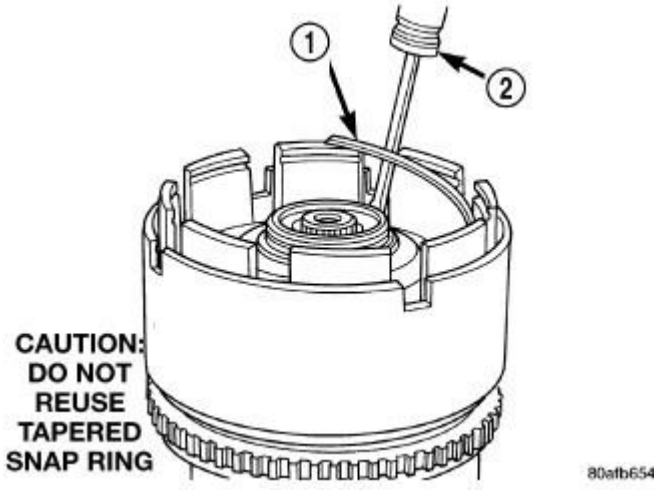


Fig. 274: Installing Snap Ring
Courtesy of CHRYSLER LLC

1 - OVERDRIVE/UNDERDRIVE CLUTCHES REACTION PLATE TAPERED SNAP RING
2 - SCREWDRIVER (DO NOT SCRATCH REACTION PLATE)

18. Install the snap ring (1) using a screwdriver (2).

NOTE: Snap ring ends must be located within one finger of the input clutch hub. Be sure that snap ring is fully seated, by pushing with screwdriver, into snap ring groove all the way around.

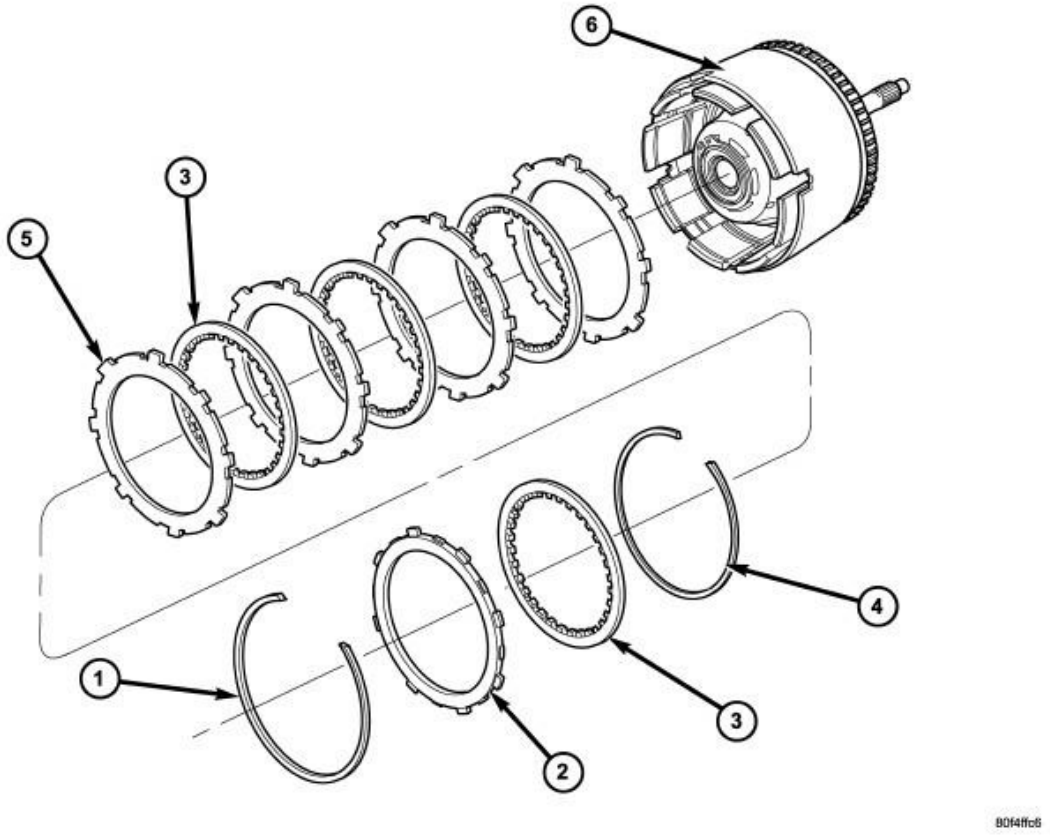


Fig. 275: Removing/Installing OD/UD Reaction Plate Tapered Snap Ring, Clutch Plate, & First Clutch Disc
Courtesy of CHRYSLER LLC

1 - SNAP RING (TAPERED)
2 - OD/UD REACTION PLATE
3 - CLUTCH DISC
4 - SNAP RING (FLAT)
5 - CLUTCH PLATE
6 - INPUT CLUTCH ASSEMBLY

19. Refer to **Fig. 275** as necessary when performing the following steps .

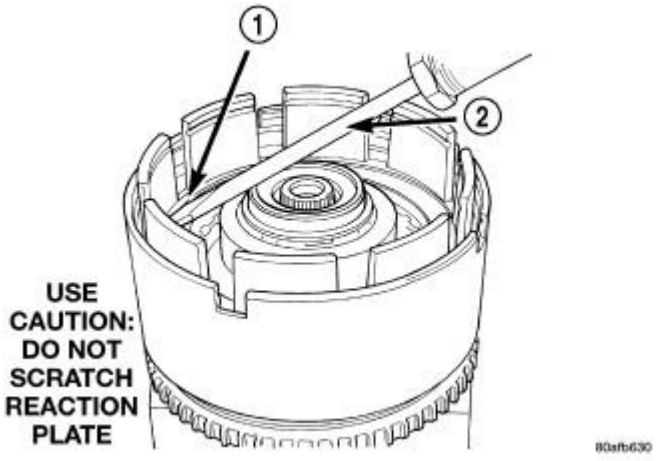


Fig. 276: Seating Tapered Snap Ring
Courtesy of CHRYSLER LLC

1 - OVERDRIVE/UNDERDRIVE CLUTCHES REACTION PLATE TAPERED SNAP RING
2 - SCREWDRIVER

20. Seat tapered snap ring (1) to ensure proper installation.

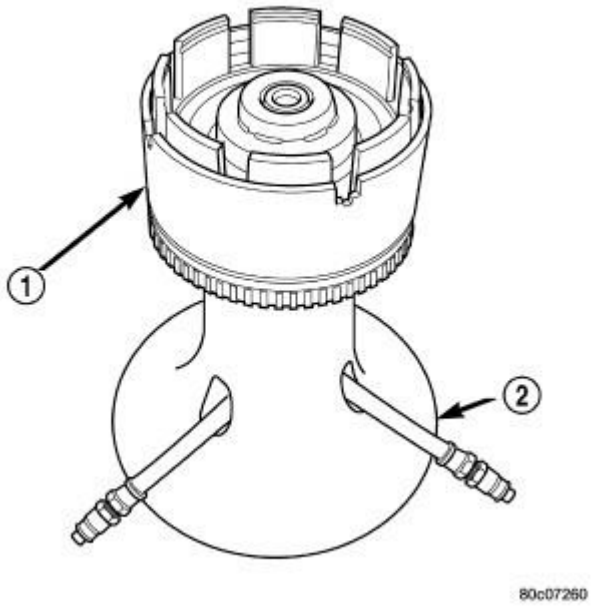


Fig. 277: Installing Input Clutch Assembly
Courtesy of CHRYSLER LLC

1 - INPUT CLUTCH ASSEMBLY

2 - INPUT CLUTCH PRESSURE FIXTURE 8391

21. Install input clutch assembly (1) to the Input Clutch Pressure Fixture 8391 (2) .

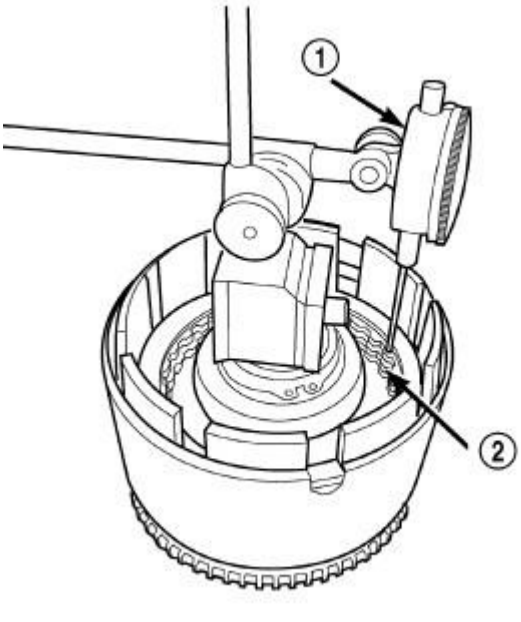


Fig. 278: Identifying Dial Indicator & UD Clutch Pack
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - UNDERDRIVE CLUTCH

22. Set up dial indicator (1) on the UD clutch pack (2) .

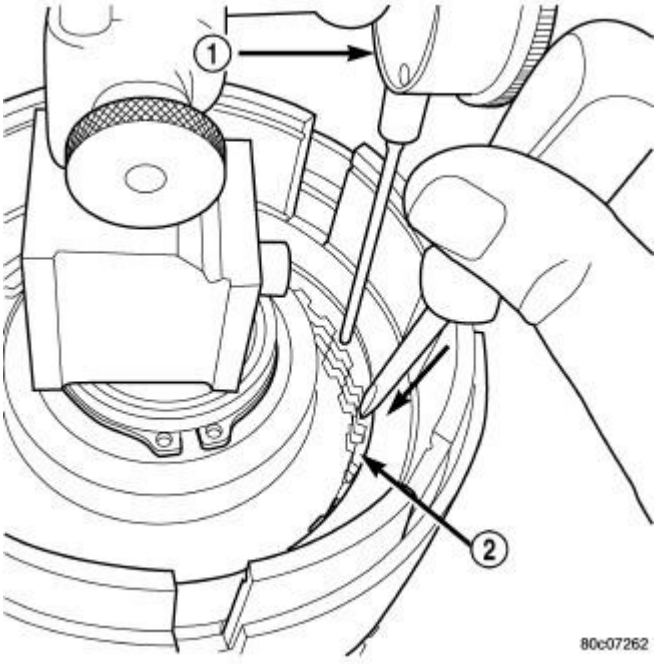


Fig. 279: Measuring UD Clutch Pack Clearance
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - UNDERDRIVE CLUTCH

23. Using moderate pressure, press down and hold (near indicator) the UD clutch pack (2) with screwdriver or suitable tool and zero dial indicator . When releasing pressure on clutch pack, indicator reading should advance 0.005-0.010.

CAUTION: Do not apply more than 30 psi (206 kPa) to the underdrive clutch pack.

24. Apply 30 psi (206 kPa) to the underdrive hose on Input Clutch Pressure Fixture 8391 and measure UD clutch clearance. Measure and record UD clutch pack measurement in four places, 90° apart.
25. Take average of four measurements and compare with UD clutch pack (2) clearance specification. **Underdrive clutch pack clearance must be 0.94-1.50 mm (0.037-0.059 in.).**
26. If necessary, select the proper reaction plate to achieve specifications:

UNDERDRIVE REACTION PLATE THICKNESS	
4659939AB	5.837-5.937 mm (0.230-0.234 in.)
4659940AB	6.147-6.248 mm (0.242-0.246 in.)
4659941AB	6.457-6.557 mm (0.254-0.258 in.)

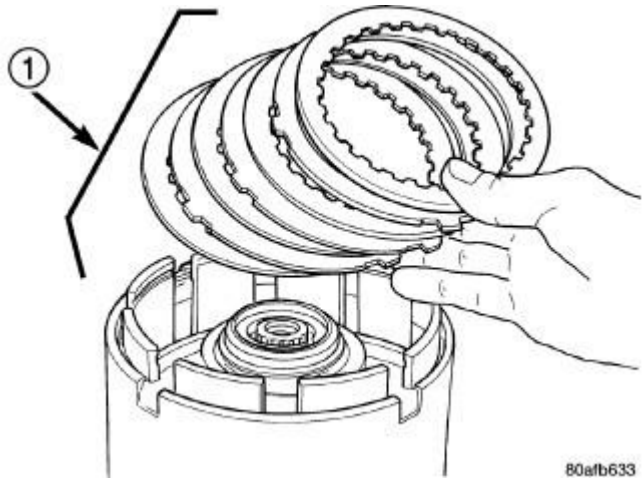


Fig. 280: Installing OD Clutch Pack
Courtesy of CHRYSLER LLC

1 - OVERDRIVE CLUTCH PACK

27. Install the OD clutch pack (four frictions/three steels) (1) .

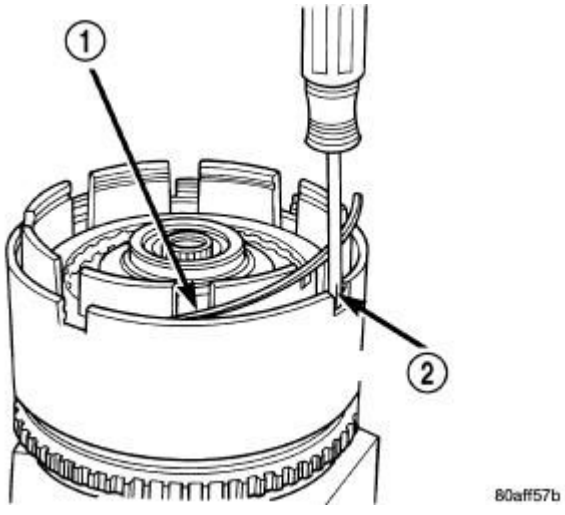


Fig. 281: Installing Waved Snap Ring
Courtesy of CHRYSLER LLC

1 - OVERDRIVE PRESSURE PLATE WAVED SNAP RING
2 - SCREWDRIVER

28. Install OD pressure plate waved snap ring (1) .

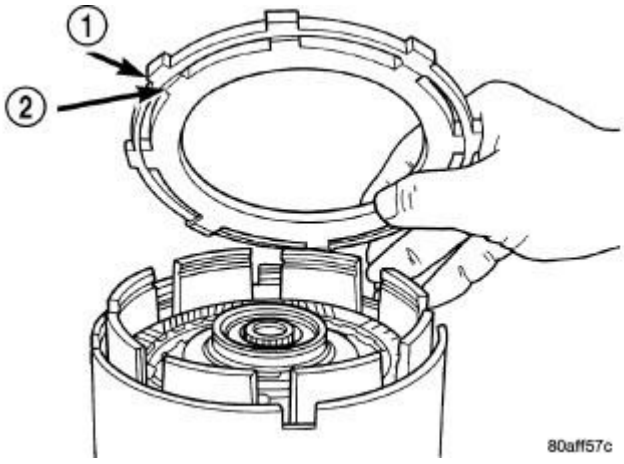


Fig. 282: Installing OD/Reverse Pressure Plate
Courtesy of CHRYSLER LLC

1 - OVERDRIVE/REVERSE PRESSURE PLATE
2 - (STEP SIDE DOWN)

29. Install the OD/Reverse pressure plate (1) with large step down (towards OD clutch pack) (2) .

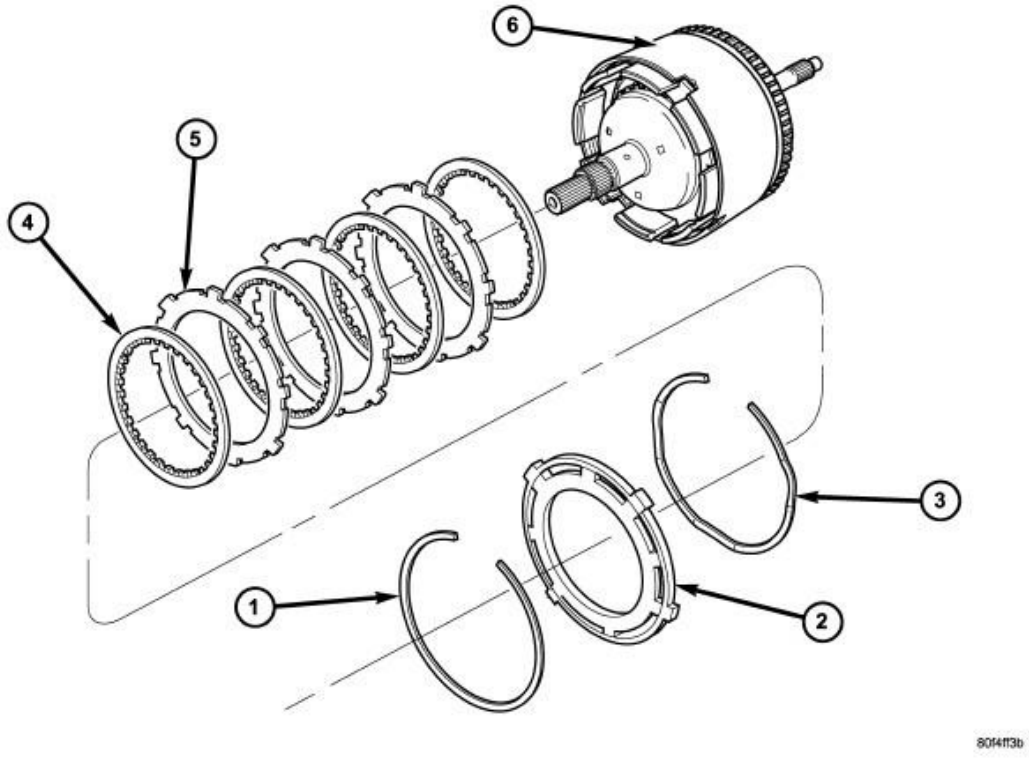


Fig. 283: Removing/Installing OD/Reverse Pressure Plate Snap Ring
Courtesy of CHRYSLER LLC

1 - SNAP RING

2 - OD/REVERSE PRESSURE PLATE
3 - SNAP RING (WAVE)
4 - CLUTCH DISC (4)
5 - CLUTCH STEEL (3)
6 - INPUT CLUTCH ASSEMBLY

30. Refer to **Fig. 283** as necessary when performing the following steps .

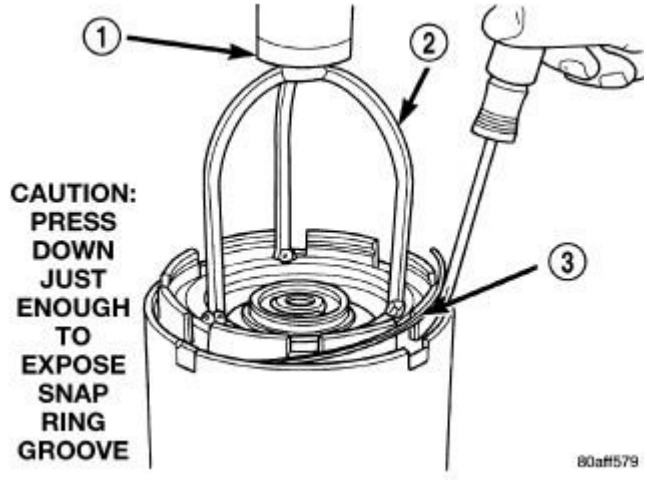


Fig. 284: Installing Flat Snap Ring
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM
2 - COMPRESSOR 5059-A
3 - FLAT SNAP RING

31. Install OD pressure plate flat snap ring (3) .

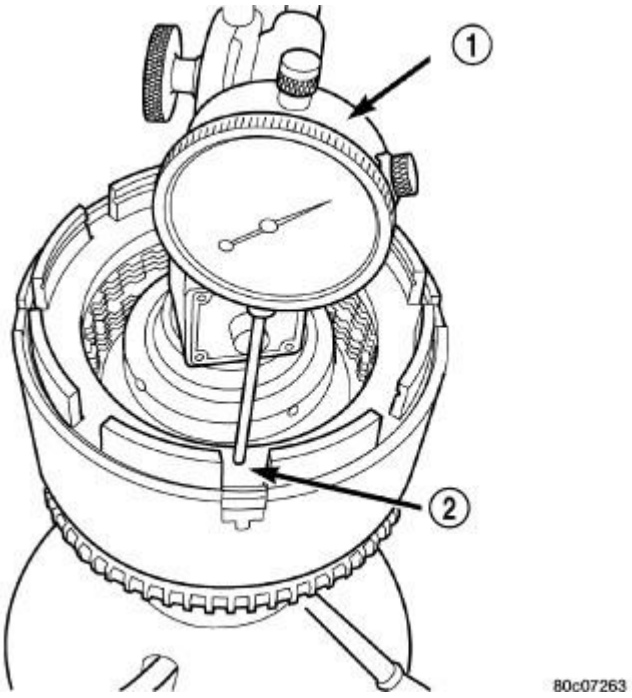


Fig. 285: Measuring OD Clutch Pack Clearance
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - OD/REVERSE REACTION PLATE

32. Measure OD clutch pack clearance. Set up dial indicator (1) on top of the OD/Reverse pressure plate.
33. Zero dial indicator and apply 30 psi (206 kPa) air pressure to the overdrive clutch hose on Tool 8391. Measure and record OD clutch pack measurement in four places, 90° apart.
34. Take average of four measurements and compare with OD clutch pack clearance specification. **The overdrive (OD) clutch pack clearance is 1.07-3.25 mm (0.042-0.128 in.).**

    If not within specifications, the clutch is not assembled properly. There is no adjustment for the OD clutch clearance.

35. Install reverse clutch pack (two frictions/one steel) (1,2) .

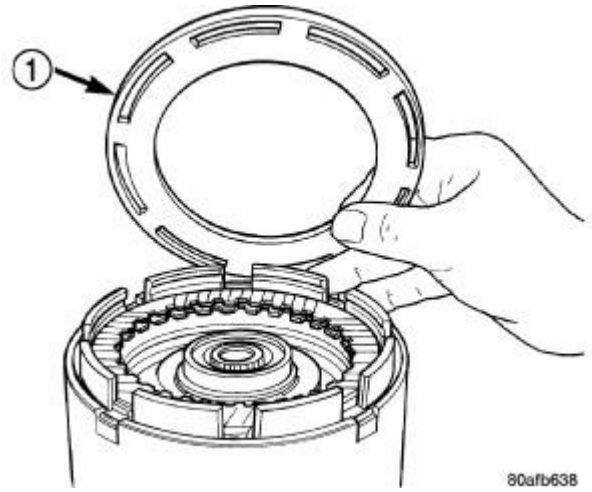


Fig. 286: Installing Reverse Clutch Reaction Plate
Courtesy of CHRYSLER LLC

1 - REVERSE CLUTCH REACTION PLATE (FLAT SIDE DOWN)

36. Install reverse clutch reaction plate with the flat side down towards reverse clutch .

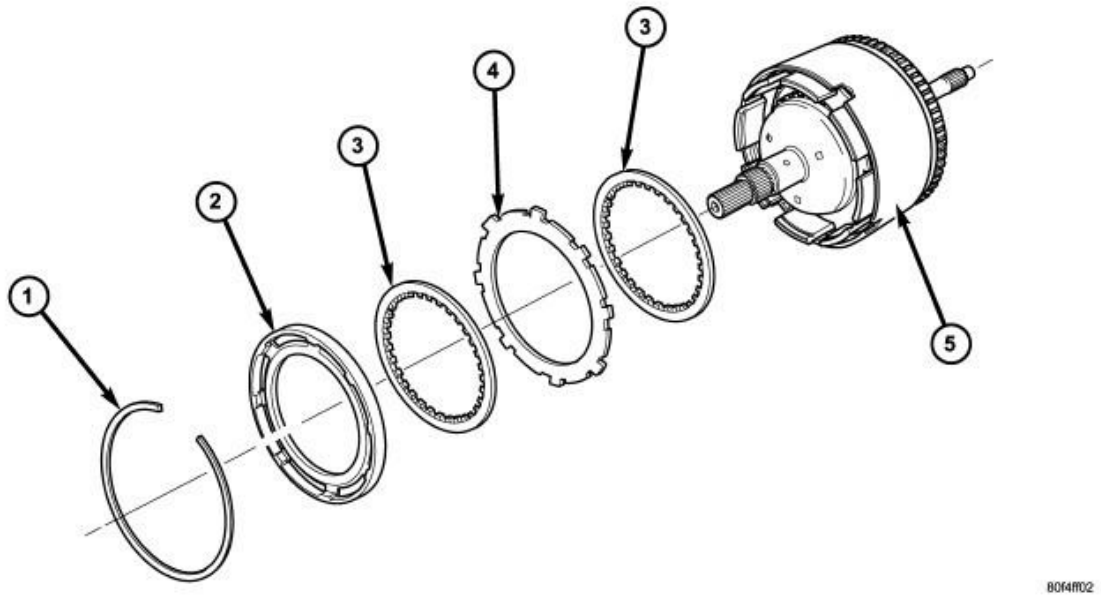


Fig. 287: Removing/Installing Reverse Clutch Pack
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - REACTION PLATE
3 - CLUTCH DISC (2)
4 - CLUTCH PLATE (1)
5 - INPUT CLUTCH ASSEMBLY

37. Refer to **Fig. 287** as necessary when performing the following steps .

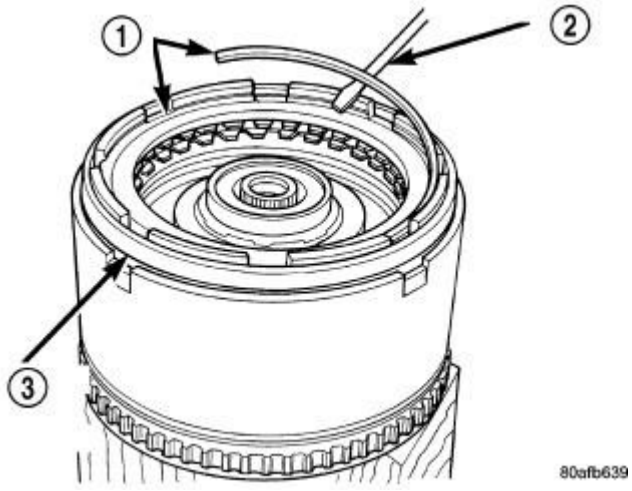


Fig. 288: Installing Reverse Clutch Snap Ring
Courtesy of CHRYSLER LLC

1 - REVERSE CLUTCH SNAP RING (SELECT)
2 - SCREWDRIVER
3 - REVERSE CLUTCH REACTION PLATE

38. Tap reaction plate (3) down to allow installation of the reverse clutch snap ring (1) Install reverse clutch snap ring (1).

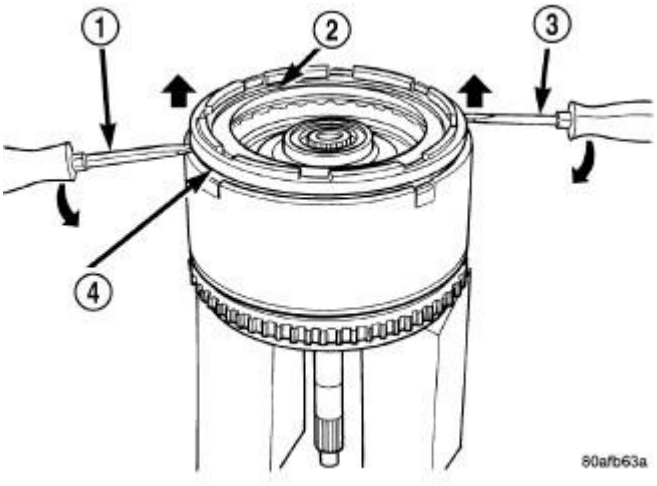


Fig. 289: Prying Up Reaction Plate To Seat Against Snap Ring
Courtesy of CHRYSLER LLC

1 - SCREWDRIVER
2 - SNAP RING

3 - SCREWDRIVER
4 - MUST RAISE REVERSE REACTION PLATE TO RAISE SNAP RING

39. Pry up reverse reaction plate (4) to seat against snap ring (2).

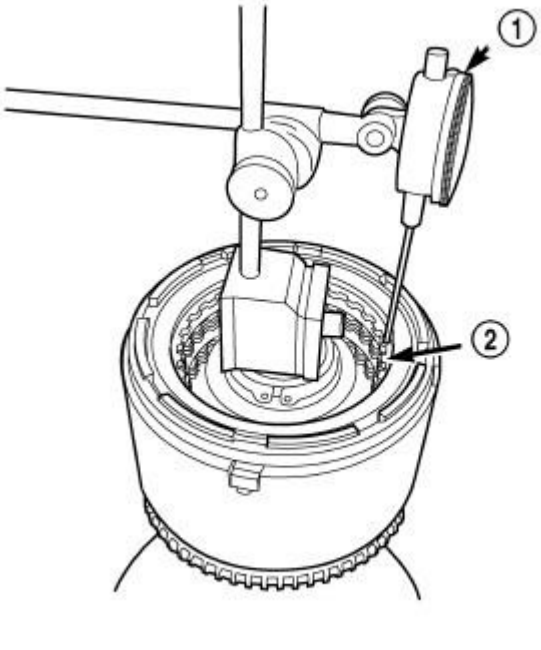


Fig. 290: Identifying Dial Indicator & Reverse Clutch Pack
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - REVERSE CLUTCH

40. Set up a dial indicator (1) on the reverse clutch pack (2).

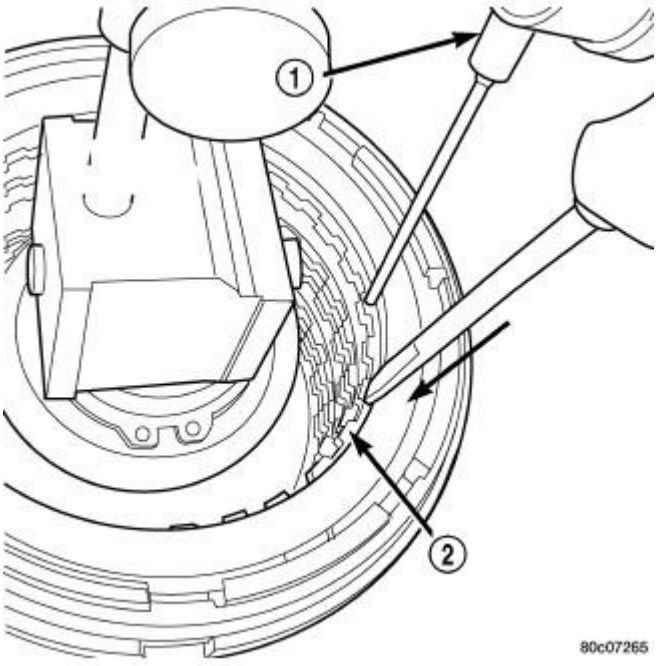


Fig. 291: Measuring Reverse Clutch Pack Clearance
Courtesy of CHRYSLER LLC

1 - DIAL INDICATOR
2 - REVERSE CLUTCH

41. Using moderate pressure, press down and hold (near indicator) reverse clutch disc (2) with screwdriver or suitable tool and zero dial indicator (1). When releasing pressure, indicator should advance 0.005-0.010. as clutch pack relaxes.
42. Apply 30 psi (206 kPa) air pressure to the reverse clutch hose on Input Clutch Pressure Fixture 8391. Measure and record reverse clutch pack measurement in four places, 90° apart.
43. Take average of four measurements and compare with reverse clutch pack clearance specification. **The reverse clutch pack clearance is 0.89-1.37 mm (0.035-0.054 in.).** Select the proper reverse clutch snap ring to achieve specifications:

REVERSE CLUTCH SNAP RING THICKNESS	
4377195	1.53-1.58 mm (0.060-0.062 in.)
4412871	1.77-1.83 mm (0.070-0.072 in.)
4412872	2.02-2.07 mm (0.080-0.082 in.)
4412873	2.27-2.32 mm (0.090-0.091 in.)

44. To complete the assembly, reverse clutch and overdrive clutch must be removed.
45. Install the #2 needle bearing (note 3 small tabs up) (1) .

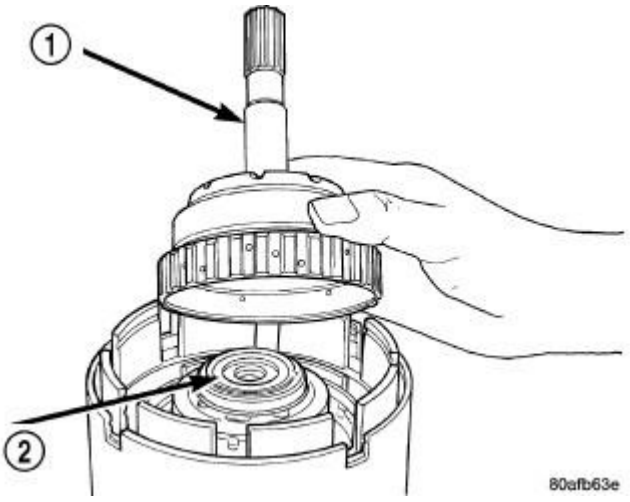


Fig. 292: Installing Underdrive Shaft Assembly
Courtesy of CHRYSLER LLC

1 - UNDERDRIVE SHAFT ASSEMBLY
2 - #2 NEEDLE BEARING

46. Install the underdrive shaft assembly (1) .

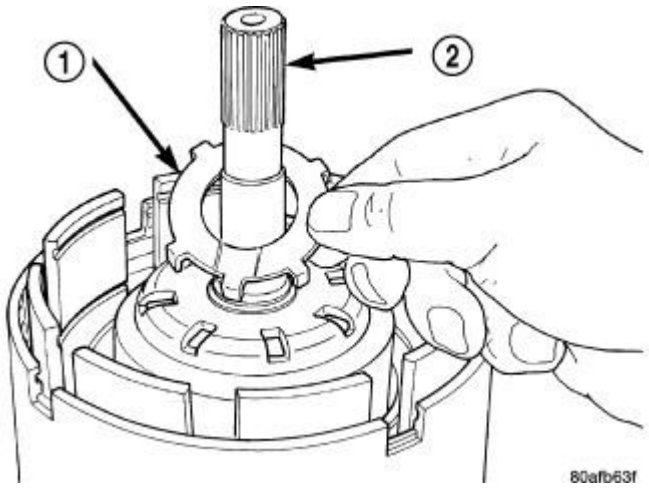


Fig. 293: Installing No. 3 Thrust Washer
Courtesy of CHRYSLER LLC

1 - #3 THRUST WASHER (NOTE 5 TABS)
2 - UNDERDRIVE SHAFT ASSEMBLY

47. Install the #3 thrust washer (1) to the underdrive shaft assembly (2). Be sure five tabs are seated properly.

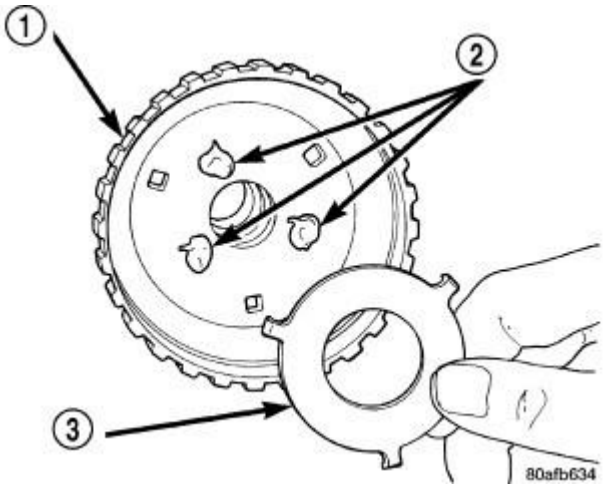


Fig. 294: Installing No. 3 Thrust Plate
Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT ASSEMBLY
2 - DABS OF PETROLATUM (FOR RETENTION)
3 - #3 THRUST PLATE (NOTE 3 TABS)

48. Install the #3 thrust plate (3) (note 3 tabs) to the bottom of the overdrive shaft assembly (1). Retain with petrolatum or transmission assembly gel (2).

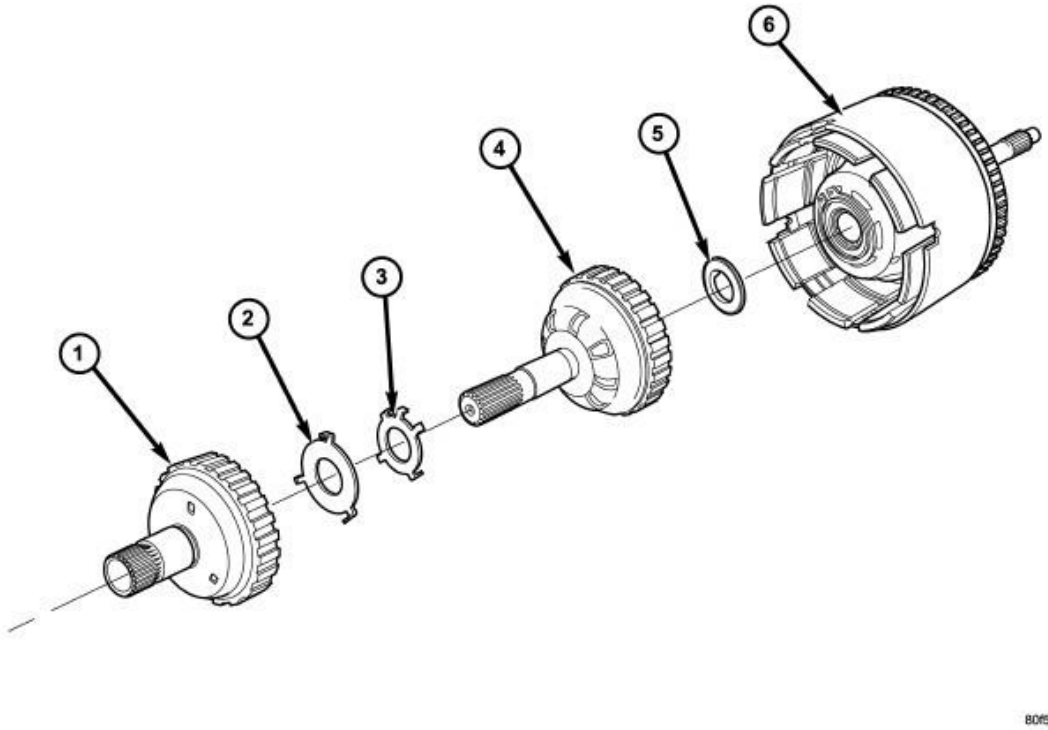


Fig. 295: Removing/Installing OD & UD Shafts, Thrust Washer & Plate, & #2 Needle Bearing

Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT
2 - #3 THRUST PLATE (3 TABS)
3 - #3 THRUST WASHER (5 TABS)
4 - UNDERDRIVE SHAFT
5 - #2 NEEDLE BEARING (3 TABS)
6 - INPUT CLUTCH ASSEMBLY

49. Refer to **Fig. 295** as necessary when performing the following steps .

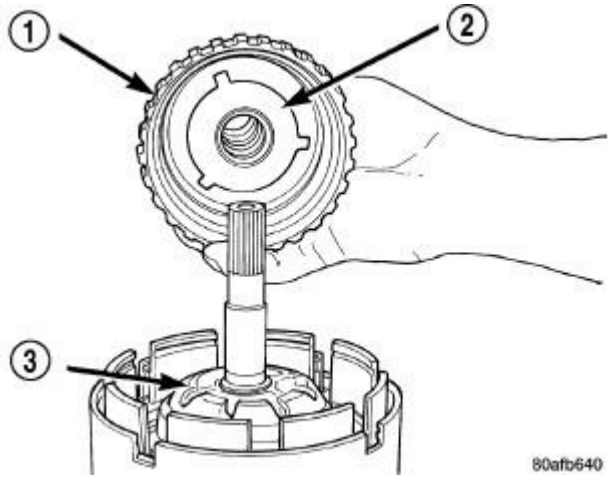


Fig. 296: Installing Overdrive Shaft Assembly
Courtesy of CHRYSLER LLC

1 - OVERDRIVE SHAFT ASSEMBLY
2 - #3 THRUST PLATE
3 - #3 THRUST WASHER

50. Install the overdrive shaft assembly (1) .
51. Reinstall overdrive and reverse clutch as shown in **Fig. 296**. **Rechecking these clutch clearances is not necessary.**

ASSEMBLY, TRANSMISSION SOLENOID AND PRESSURE SWITCH

DESCRIPTION

DESCRIPTION

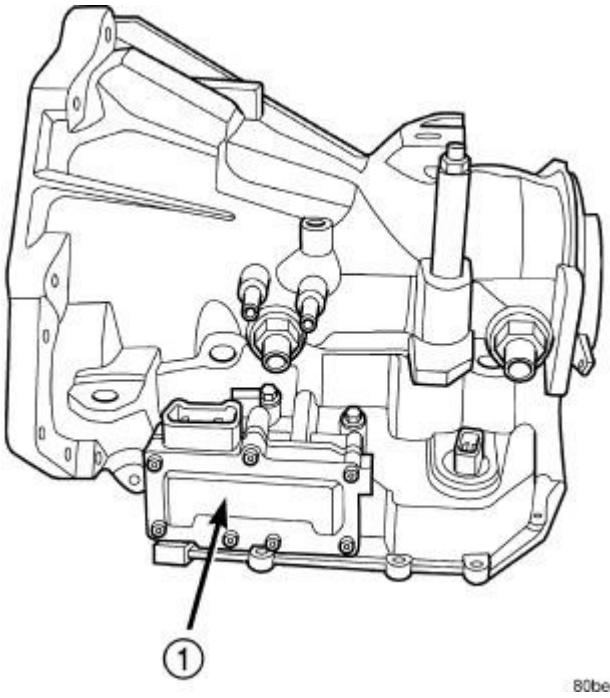


Fig. 297: Identifying Solenoid/Pressure Switch Assembly
Courtesy of CHRYSLER LLC

1 - SOLENOID AND PRESSURE SWITCH ASSEMBLY

The Solenoid/Pressure Switch Assembly (1) is external to the transaxle and mounted to the transaxle case. The assembly consists of four solenoids that control hydraulic pressure to the LR/CC, 2/4, OD, and UD friction elements. The reverse clutch is controlled by line pressure from the manual valve in the valve body. The solenoids are contained within the Solenoid/Pressure Switch Assembly, and can only be serviced by replacing the assembly.

The solenoid assembly also contains pressure switches that monitor and send hydraulic circuit information to the PCM/TCM. Likewise, the pressure switches can only be service by replacing the assembly.

OPERATION

OPERATION

SOLENOIDS

The solenoids receive electrical power from the Transmission Control Relay through a single wire. The PCM/TCM energizes or operates the solenoids individually by grounding the return wire of the solenoid needed. When a solenoid is energized, the solenoid valve shifts, and a fluid passage is opened or closed (vented or applied), depending on its default operating state. The result is an apply or release of a frictional element.

The 2/4 and UD solenoids are normally applied, which by design allow fluid to pass through in their relaxed or "off" state. This allows transaxle limp-in (P,R,N,2) in the event of an electrical failure.

The continuity of the solenoids and circuits are periodically tested. Each solenoid is turned on or off depending on its current state. An inductive spike should be detected by the PCM/TCM during this test. It no spike is detected, the circuit is tested again to verify the failure. In addition to the periodic testing, the solenoid circuits are tested if a speed ratio or pressure switch error occurs.

PRESSURE SWITCHES

The PCM/TCM relies on three pressure switches to monitor fluid pressure in the L/R, 2/4, and OD hydraulic circuits. The primary purpose of these switches is to help the PCM/TCM detect when clutch circuit hydraulic failures occur. The range for the pressure switch closing and opening points is 11-23 psi. Typically the switch opening point will be approximately one psi lower than the closing point. For example, a switch may close at 18 psi and open at 17 psi. The switches are continuously monitored by the PCM/TCM for the correct states (open or closed) in each gear as shown in the following chart:

PRESSURE SWITCH STATES

GEAR	L/R	2/4	OD
R	OP	OP	OP
P/N	CL	OP	OP
1st	CL	OP	OP
2nd	OP	CL	OP
D	OP	OP	CL
OD	OP	CL	CL
OP = OPEN			
CL = CLOSED			

A Diagnostic Trouble Code (DTC) will set if the PCM/TCM senses any switch open or closed at the wrong time in a given gear.

The PCM/TCM also tests the 2/4 and OD pressure switches when they are normally off (OD and 2/4 are tested in 1st gear, OD in 2nd gear, and 2/4 in 3rd gear). The test simply verifies that they are operational, by looking for a closed state when the corresponding element is applied. Immediately after a shift into 1st, 2nd, or 3rd gear with the engine speed above 1000 RPM, the PCM/TCM momentarily turns on element pressure to the 2/4 and/or OD clutch circuits to identify that the appropriate switch has closed. If it doesn't close, it is tested again. If the switch fails to close the second time, the appropriate Diagnostic Trouble Code (DTC) will set.

REMOVAL

REMOVAL

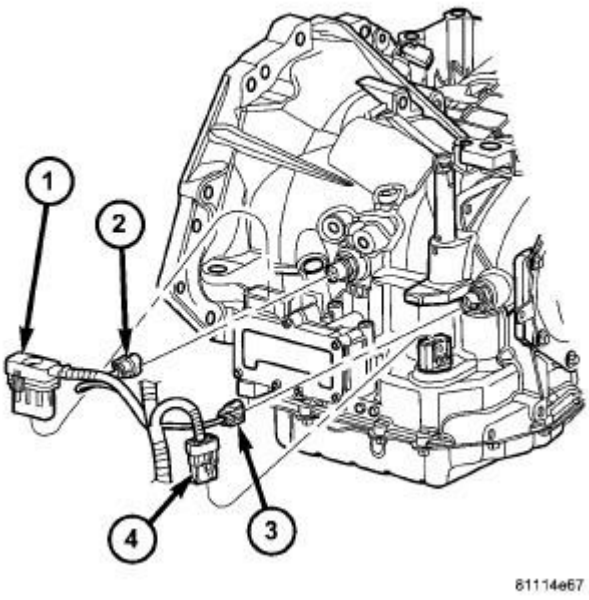


Fig. 298: Identifying Transmission Connectors
Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR
2 - INPUT SPEED SENSOR CONNECTOR
3 - OUTPUT SPEED SENSOR CONNECTOR
4 - TRANSMISSION RANGE SENSOR CONNECTOR

NOTE: If solenoid/pressure switch assembly is being replaced, the "Quick-Learn" procedure must be performed. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Disconnect battery negative cable.
2. Remove air cleaner assembly.
3. Disconnect solenoid/pressure switch assembly connector (1) .
4. Disconnect input speed sensor connector (2).

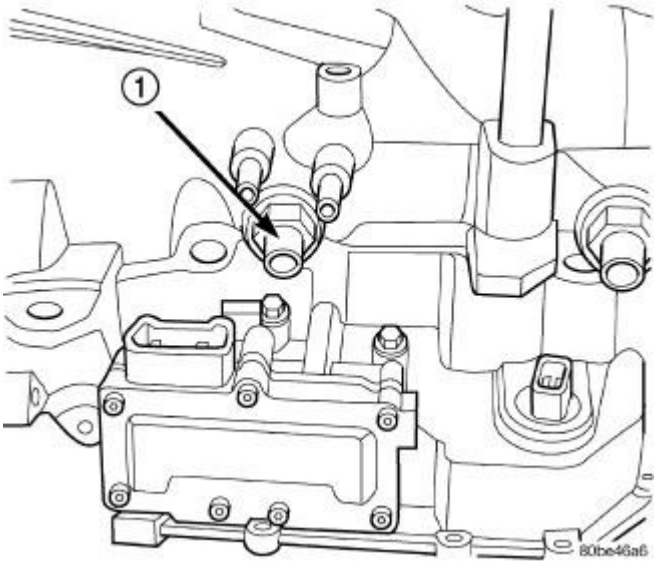


Fig. 299: Removing/Installing Input Speed Sensor
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR

5. Remove input speed sensor (1) .

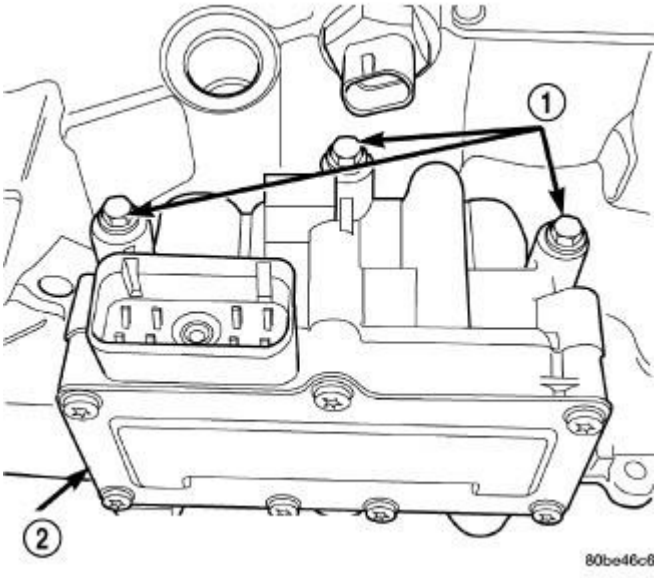


Fig. 300: Removing/Installing Solenoid/Pressure Switch Assembly-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

1 - BOLTS
2 - SOLENOID AND PRESSURE SWITCH ASSEMBLY

6. Remove three solenoid/pressure switch assembly-to-transaxle case bolts (1) .

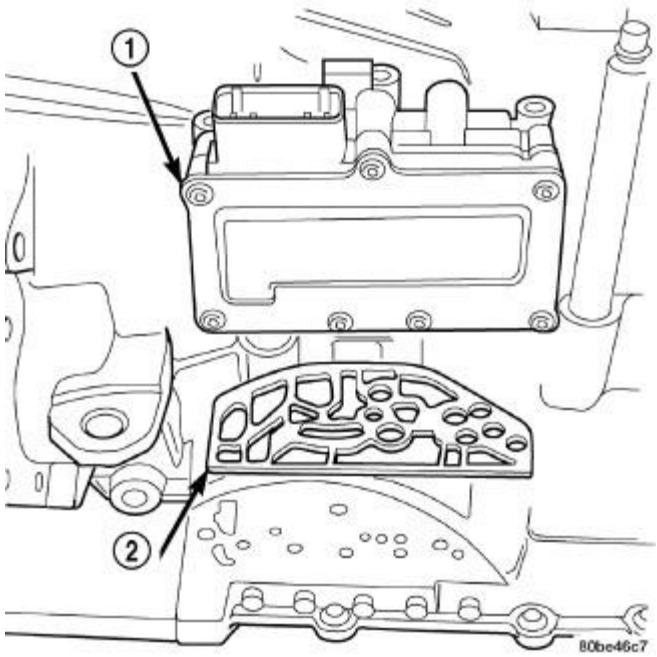


Fig. 301: Removing/Installing Solenoid/Pressure Switch Assembly & Gasket
Courtesy of CHRYSLER LLC

1 - SOLENOID/PRESSURE SWITCH ASSEMBLY
2 - GASKET

7. Remove solenoid/pressure switch assembly (1) and gasket (2). Use care to prevent gasket material and foreign objects from become lodged in the transaxle case ports.

INSTALLATION

INSTALLATION

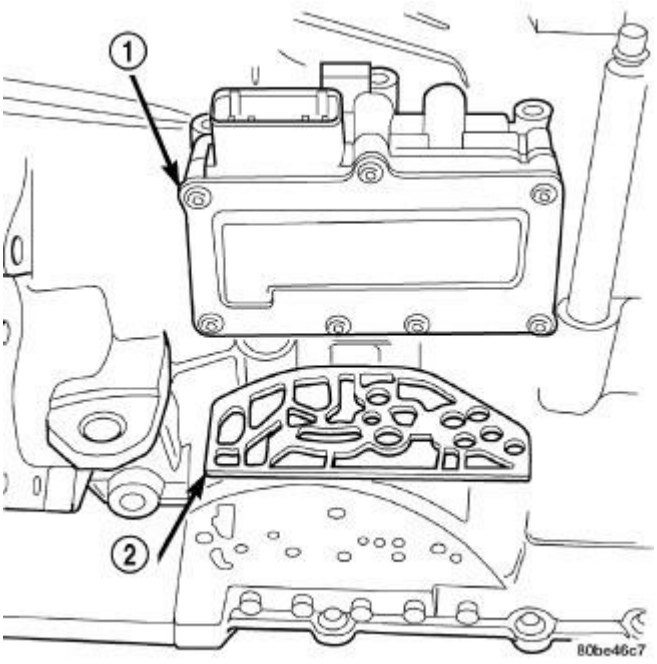


Fig. 302: Removing/Installing Solenoid/Pressure Switch Assembly & Gasket
Courtesy of CHRYSLER LLC

1 - SOLENOID/PRESSURE SWITCH ASSEMBLY
2 - GASKET

NOTE: If solenoid/pressure switch assembly is being replaced, it is necessary to perform the "Quick-Learn" procedure. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Install solenoid/pressure switch assembly and new gasket to transaxle .

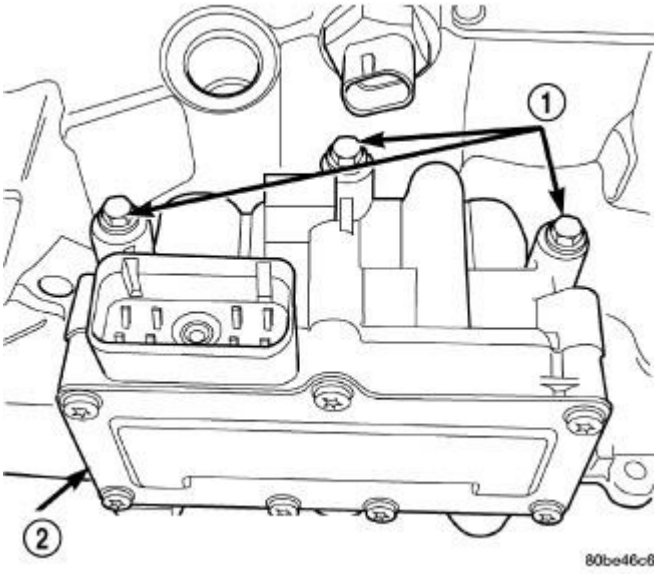


Fig. 303: Removing/Installing Solenoid/Pressure Switch Assembly-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

1 - BOLTS
2 - SOLENOID AND PRESSURE SWITCH ASSEMBLY

2. Install and torque three bolts (1) to 12 N.m (105 in. lbs.).

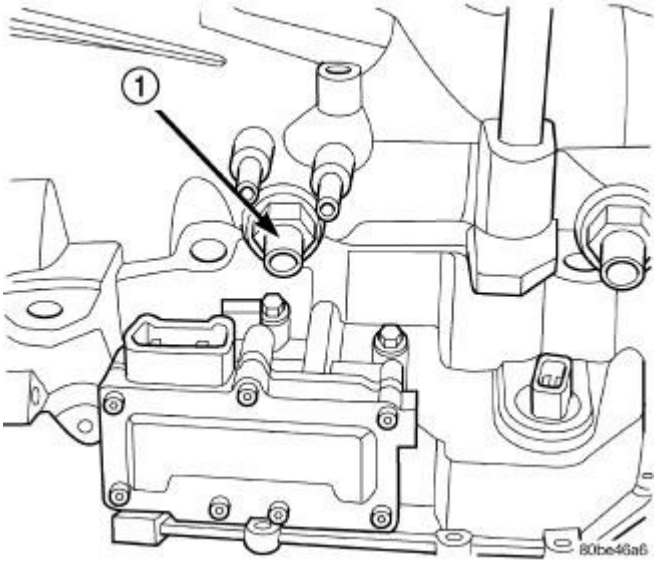


Fig. 304: Removing/Installing Input Speed Sensor
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR

3. Install input speed sensor (1) and torque to 27 N.m (20 ft. lbs.).

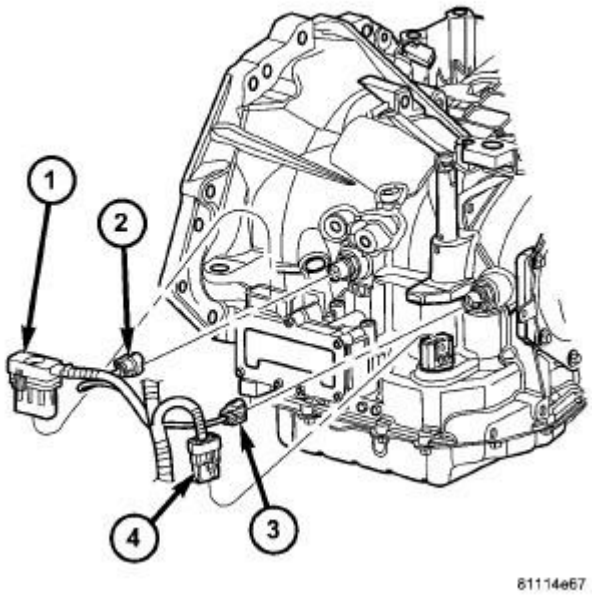


Fig. 305: Identifying Transmission Connectors
Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR
2 - INPUT SPEED SENSOR CONNECTOR
3 - OUTPUT SPEED SENSOR CONNECTOR
4 - TRANSMISSION RANGE SENSOR CONNECTOR

4. Connect input speed sensor connector (2) .
5. Install solenoid/pressure switch 8-way connector and torque to 4 N.m (35 in. lbs.).
6. Install air cleaner assembly.
7. Connect battery negative cable.
8. If solenoid/pressure switch assembly was replaced, perform the "Quick-Learn" procedure. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure** .

CABLE, SHIFT

REMOVAL

REMOVAL

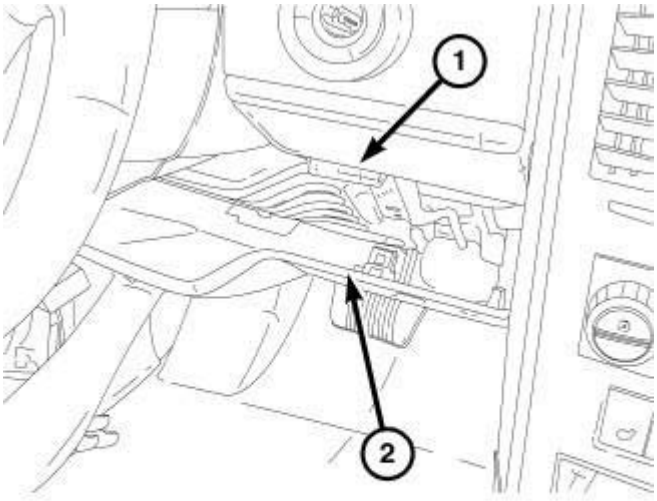


Fig. 306: Identifying Knee Blocker
Courtesy of CHRYSLER LLC

1. Remove the knee blocker (2). Refer to **Body/Instrument Panel/KNEEBLOCKER - Removal** .

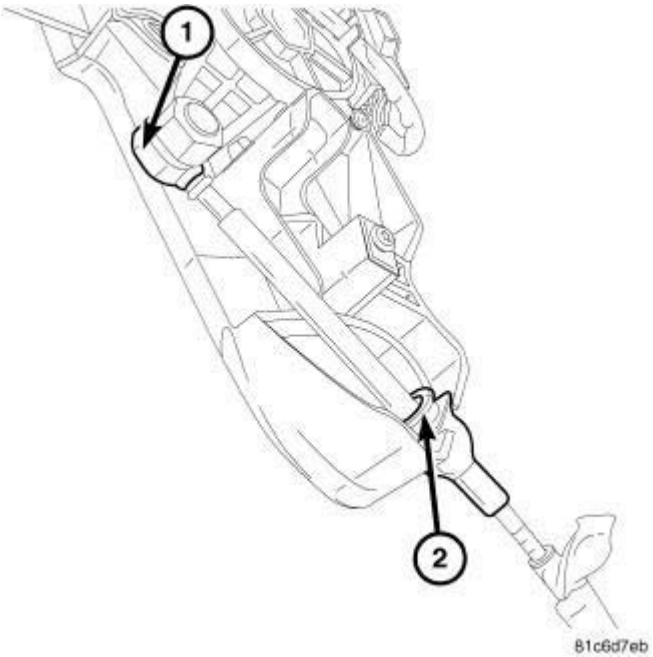


Fig. 307: Identifying Shift Cable At Shifter
Courtesy of CHRYSLER LLC

NOTE: Ensure the lock tab on the shift cable (2) is depressed before pulling the cable from the shifter housing.

2. Remove the cable from the shifter (1, 2).

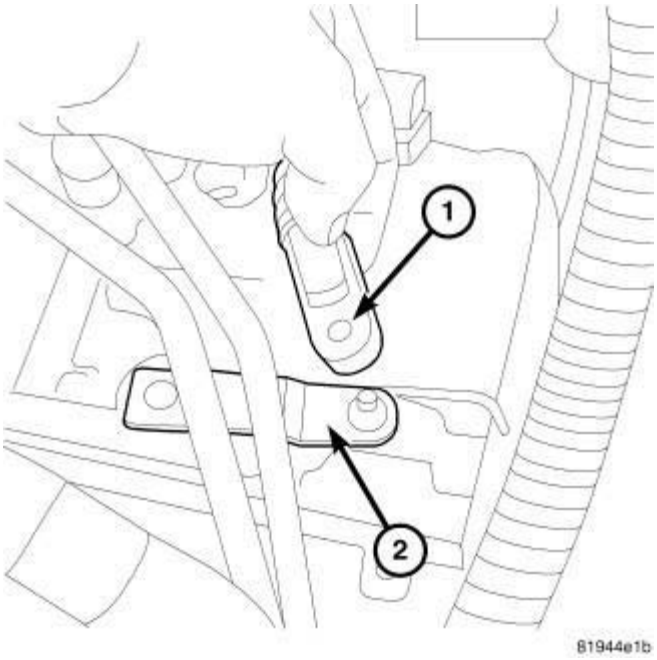


Fig. 308: Identifying Gearshift Cable & Transaxle Manual Valve Lever
Courtesy of CHRYSLER LLC

3. Disconnect gearshift cable (1) from transaxle manual valve lever (2).
4. Disconnect gearshift cable from the bracket.

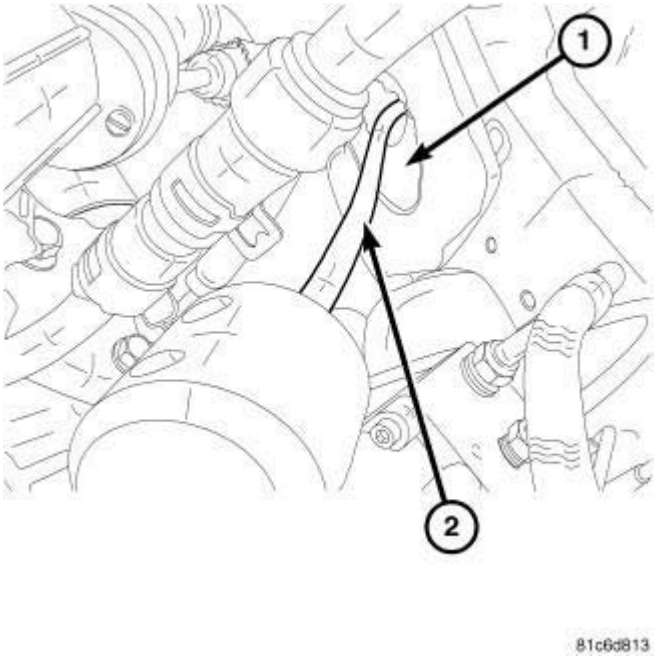


Fig. 309: Identifying Shift Cable At Bulkhead
Courtesy of CHRYSLER LLC

5. Remove the grommet form the bulkhead
6. Pull the cable (2) through the bulkhead (1) into the passenger compartment.

INSTALLATION

INSTALLATION

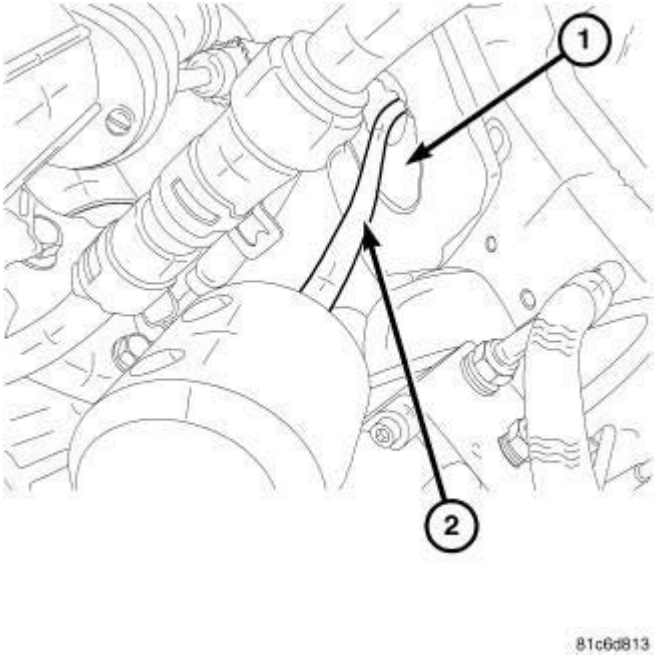


Fig. 310: Identifying Shift Cable At Bulkhead
Courtesy of CHRYSLER LLC

NOTE: Ensure rubber grommet in the bulkhead is fully seated to prevent water leaking into the passenger compartment.

1. Install the shift cable (2) through the bulkhead (1) from the passenger compartment.
2. Seat rubber grommet in the bulkhead.

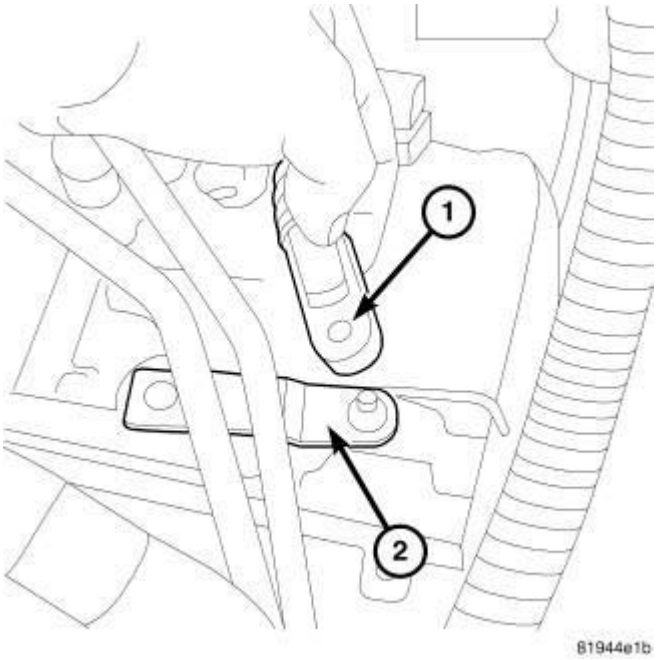


Fig. 311: Identifying Gearshift Cable & Transaxle Manual Valve Lever
Courtesy of CHRYSLER LLC

3. Connect gearshift cable to the bracket.
4. Connect gearshift cable (1) to transaxle manual valve lever (2).

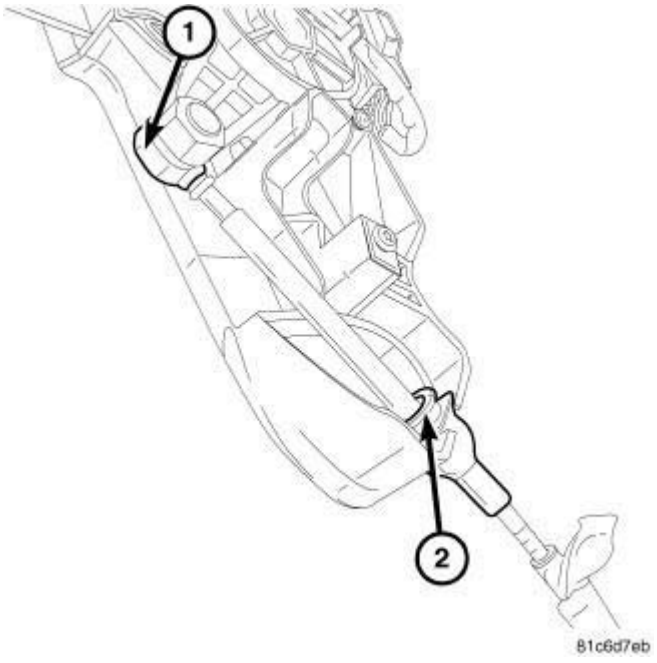


Fig. 312: Identifying Shift Cable At Shifter
Courtesy of CHRYSLER LLC

NOTE: Ensure the lock tab on the shift cable (2) is seated after the cable in

installed to the shifter housing.

5. Install the cable to the shifter (1, 2).
6. Install the knee blocker (2). Refer to **INSTALLATION** .

ADJUSTMENTS

ADJUSTMENTS

ADJUSTMENT

1. Park the vehicle on level ground and set the parking brake.
2. Place the gearshift lever in gated park (P) and remove ignition key.
3. Loosen the cable adjustment screw at the transaxle manual valve lever.
4. Pull the gearshift lever fully forward to the park detent position.
5. Release the park brake, then rock the vehicle to assure it is in park. Reset the park brake.
6. Tighten the cable adjustment screw to 8 N.m (70 in. lbs.). Gearshift cable should now be properly adjusted.
7. Verify adjustment by using the verification procedure.

VERIFICATION

1. Place gearshift lever in gated park (P).
2. Attempt to move vehicle by rocking back and forth on level ground. If vehicle does not move, attempt to start engine. If engine starts, the park position is correct.
3. Set parking brake.
4. Turn key to on/run and depress brake pedal. Place gearshift lever in neutral (N).
5. Attempt to start engine. If engine starts in both neutral (N) or park (P), gearshift cable is adjusted properly. No adjustment is required.
6. If engine does not start in either park (P) or neutral (N), perform adjustment procedure.

DRIVE, FINAL

DESCRIPTION

DESCRIPTION

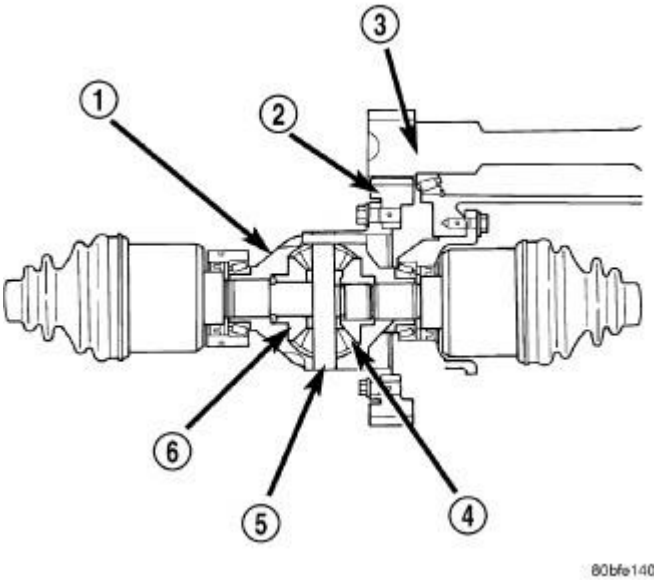


Fig. 313: Identifying Differential Assembly
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE
2 - RING GEAR
3 - TRANSFER SHAFT
4 - PINION GEAR
5 - PINION SHAFT
6 - SIDE GEAR

The 41TE differential is a conventional open design. It consists of a ring gear and a differential case. The differential case consists of pinion and side gears, and a pinion shaft. The differential case is supported in the transaxle by tapered roller bearings .

OPERATION

OPERATION

The differential assembly is driven by the transfer shaft by way of the differential ring gear. The ring gear drives the differential case, and the case drives the driveshafts through the differential gears. The differential pinion and side gears are supported in the case by thrust washers and a pinion shaft. Differential pinion and side gears make it possible for front tires to rotate at different speeds while cornering.

DISASSEMBLY

DISASSEMBLY

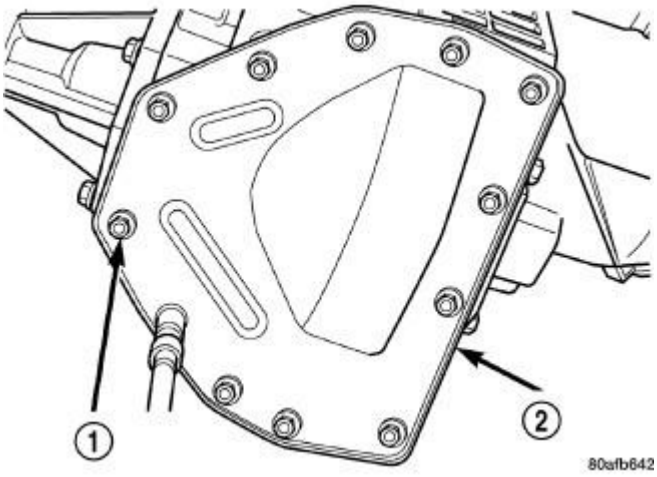


Fig. 314: Removing/Installing Differential Cover Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL COVER BOLTS
2 - DIFFERENTIAL COVER

NOTE: The transfer shaft should be removed for differential repair and bearing turning torque checking

1. Remove the differential cover bolts (1).

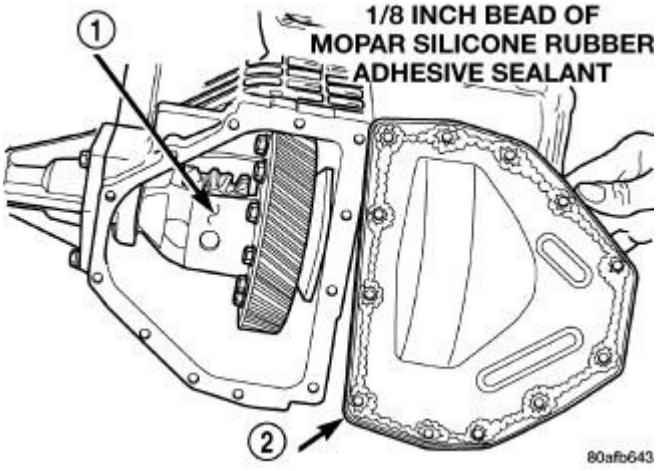


Fig. 315: Identifying Differential Cover
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL ASSEMBLY
2 - DIFFERENTIAL COVER

2. Remove the differential cover (2).

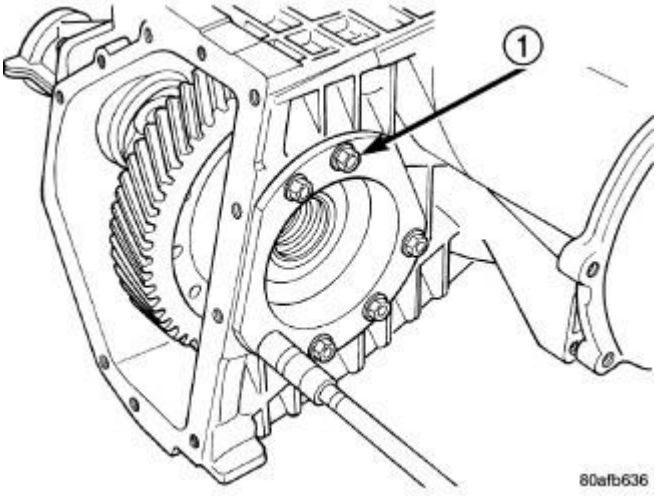


Fig. 316: Removing/Installing Differential Bearing Retainer Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL RETAINER BOLTS

3. Remove the differential bearing retainer bolts (1).

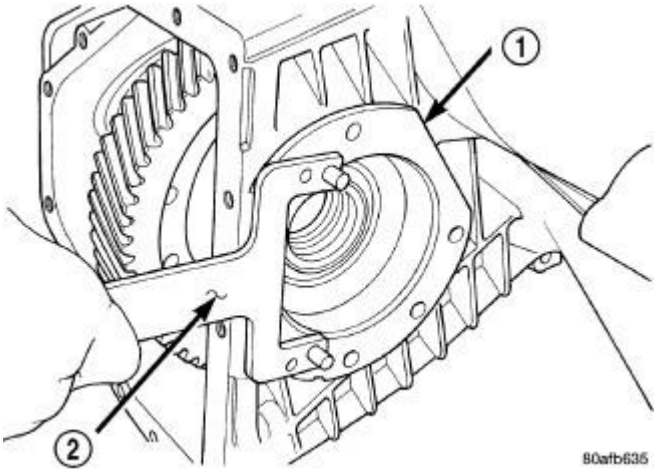


Fig. 317: Removing Differential Bearing Retainer
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL BEARING RETAINER
2 - BEARING PULLER L-4435

4. Remove the differential bearing retainer (1).

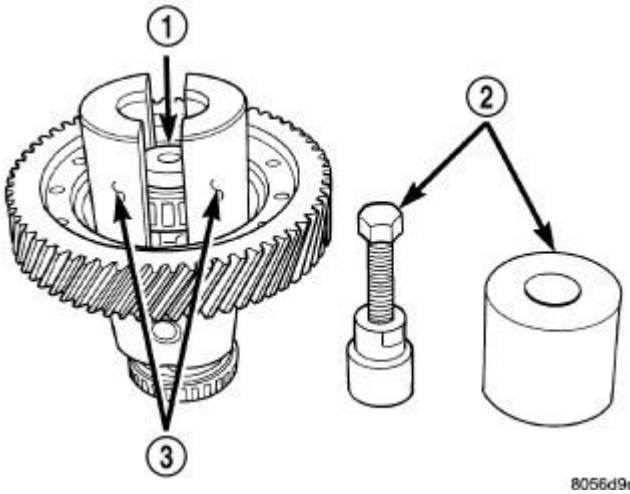


Fig. 318: Removing Differential Bearing Cone On Extension Housing Side
Courtesy of CHRYSLER LLC

1 - THRUST BUTTON L-4539-2
2 - PULLER SET 5048
3 - COLLETS 5048-4

5. Using a plastic hammer, remove extension housing/adapter plate on the right side of the transaxle.

WARNING: Hold onto differential assembly to prevent it from rolling out of housing.

6. Use Puller Set 5048 (2), 5048-3 Collets (3), and L-4539-2 Button (1) to remove the differential bearing cone on the extension housing side.

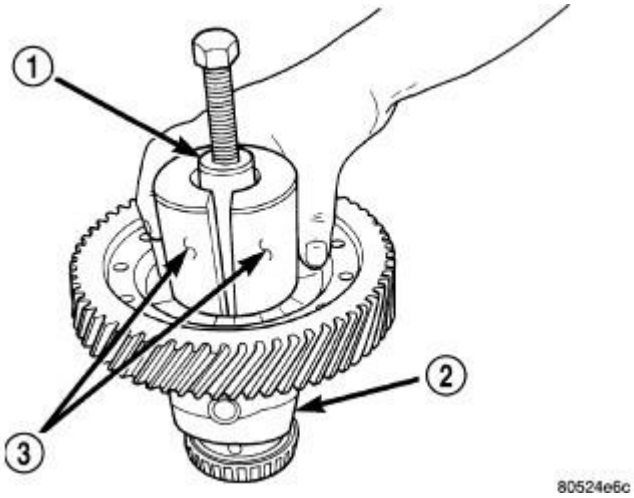


Fig. 319: Installing Puller Set 5048, 5048-4 Collets, & L-4539-2 Button To Differential Bearing Cone On Bearing Retainer Side
Courtesy of CHRYSLER LLC

1 - PULLER SET 5048
2 - DIFFERENTIAL
3 - COLLETS 5048-4

7. Install Puller Set 5048 (1), 5048-4 Collets (3), and L-4539-2 Button to the differential bearing cone on the bearing retainer side.

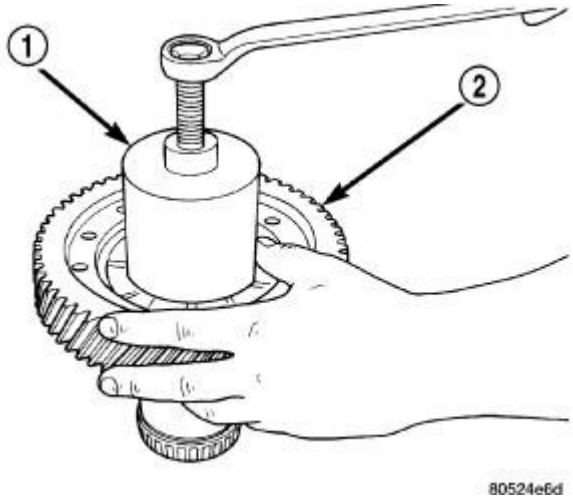


Fig. 320: Removing Differential Bearing Cone On Bearing Retainer Side
Courtesy of CHRYSLER LLC

1 - PULLER SET 5048
2 - RING GEAR

8. Remove the differential bearing cone on the bearing retainer side.

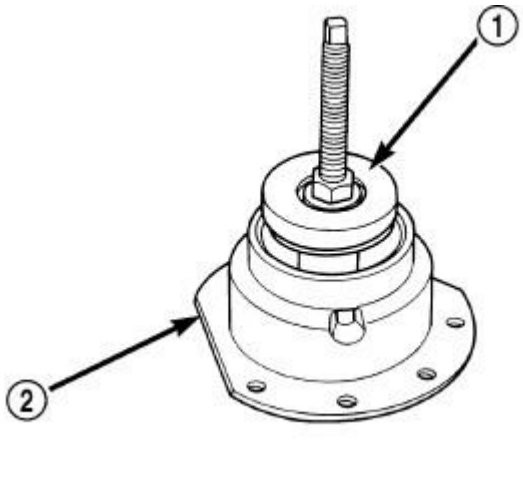


Fig. 321: Installing Special Jaw Set L-4518 & Remover 6062A Onto Differential Bearing Race
Courtesy of CHRYSLER LLC

1 - REMOVER 6062A
2 - DIFFERENTIAL BEARING RETAINER

9. Install Special Jaw Set L-4518 and Remover 6062A (1), onto the differential bearing race from the extension housing.

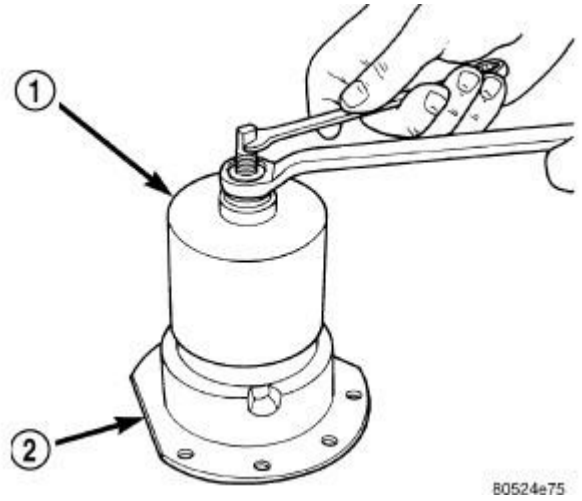


Fig. 322: Removing Differential Bearing Race From Bearing Retainer
Courtesy of CHRYSLER LLC

1 - REMOVER 6062A
2 - DIFFERENTIAL BEARING RETAINER

10. Remove the differential bearing race from the bearing retainer (2).

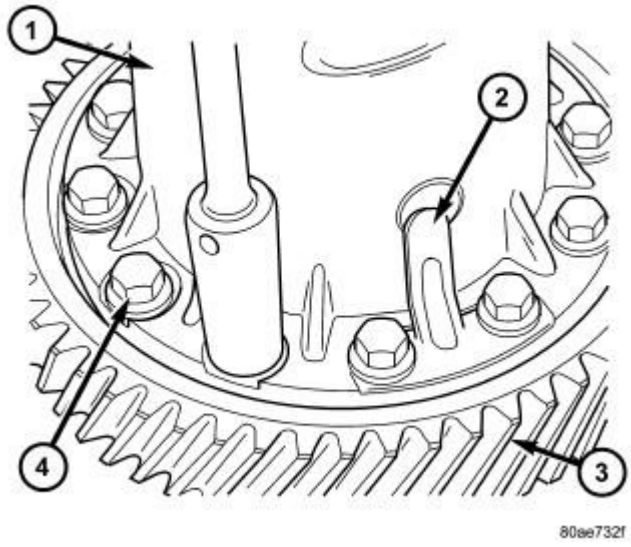


Fig. 323: Identifying Ring Gear-To-Differential Case Bolts & Floating Pinion Shaft Retainers

Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE 2 - PINION SHAFT RETAINER 3 - RING GEAR 4 - RING GEAR-TO-CASE BOLT

11. Remove ring gear-to-differential case bolts (4) and floating pinion shaft retainers (2).

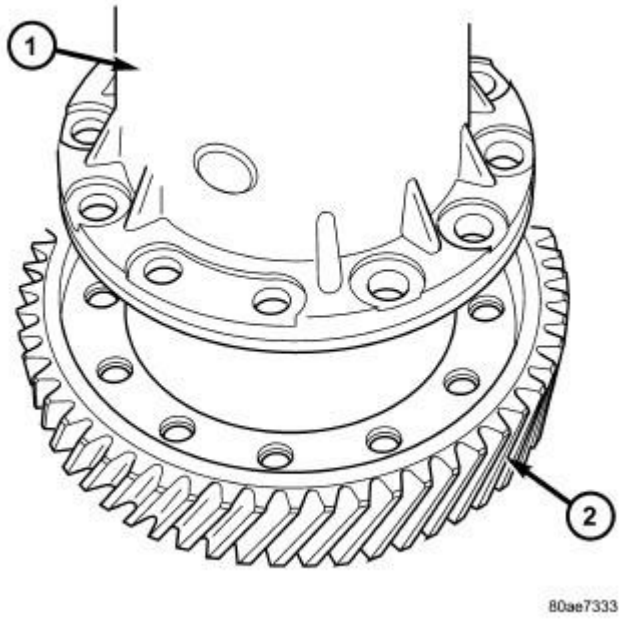


Fig. 324: Identifying Ring Gear & Differential Case
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE 2 - RING GEAR

12. Separate ring gear (2) from differential case (1).

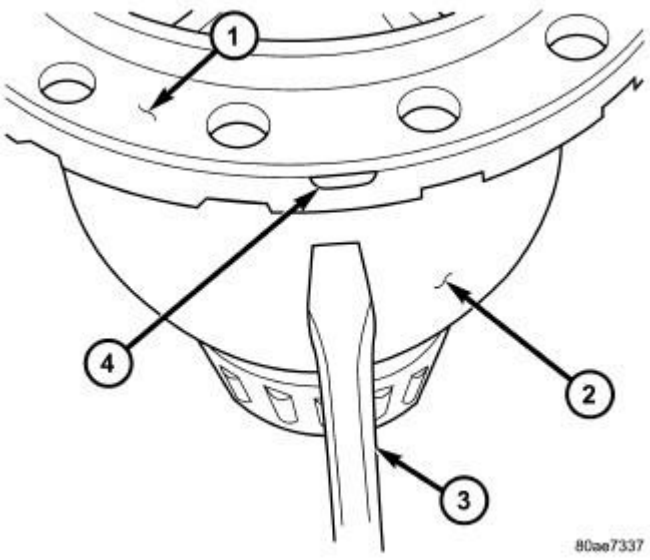


Fig. 325: Identifying Differential Cover At Case
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SUPPORT
2 - DIFFERENTIAL CASE
3 - SCREWDRIVER
4 - RELIEF (2 @ 180° APART)

13. Separate differential cover (1) from case (2) using suitable screwdrivers at position.

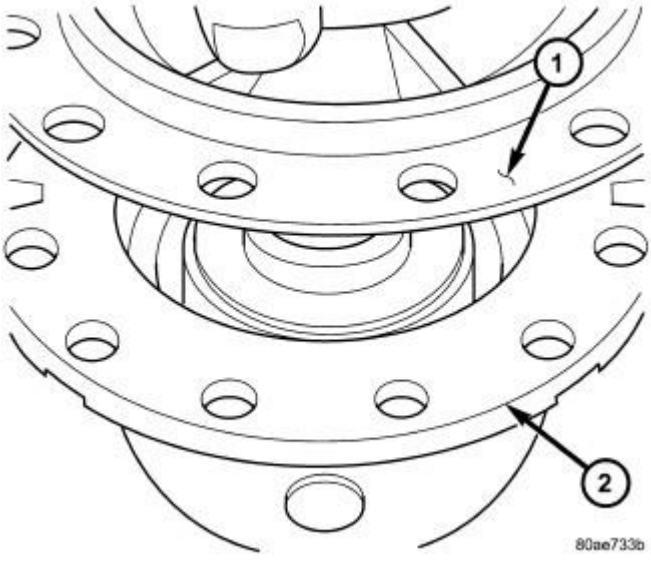


Fig. 326: Identifying Differential Support
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SUPPORT 2 - DIFFERENTIAL CASE

14. Lift support (1) from case (2) .

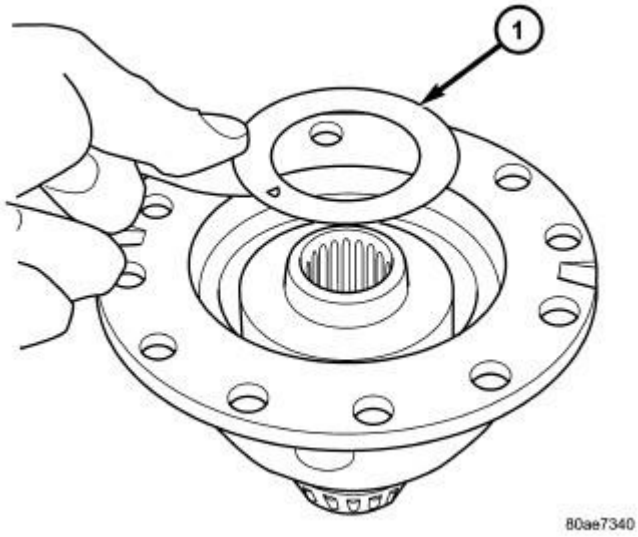


Fig. 327: Removing/Installing Side Gear Thrust Washer
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER

15. Remove side gear thrust washer (1) .

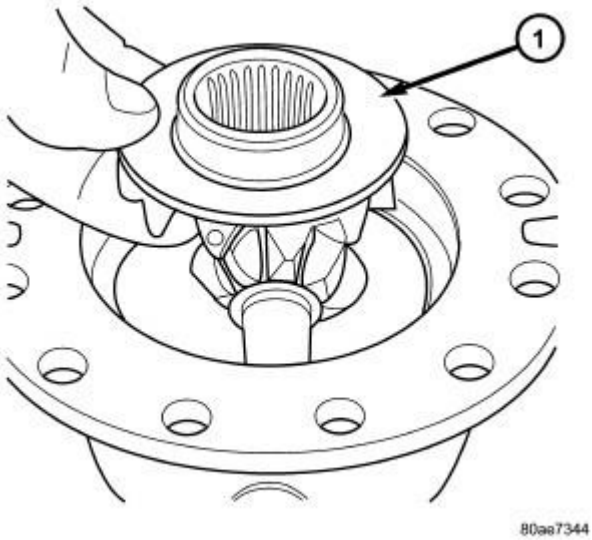


Fig. 328: Removing/Installing Side Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

16. Remove side gear (1) .

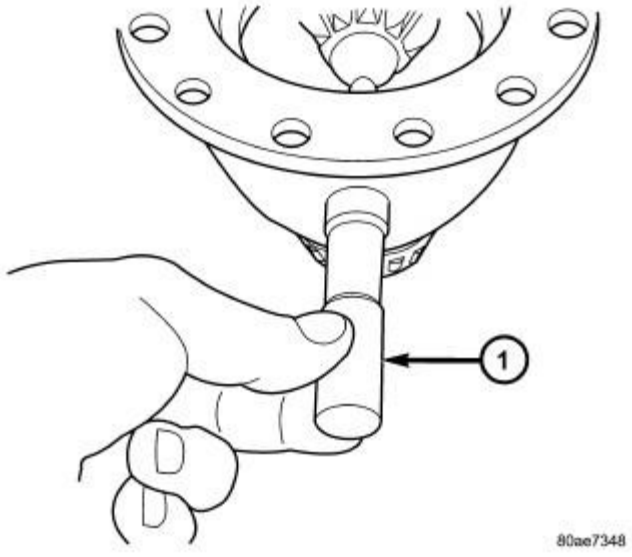


Fig. 329: Removing/Installing Pinion Shaft
Courtesy of CHRYSLER LLC

1 - PINION SHAFT

17. Remove pinion shaft (1) .

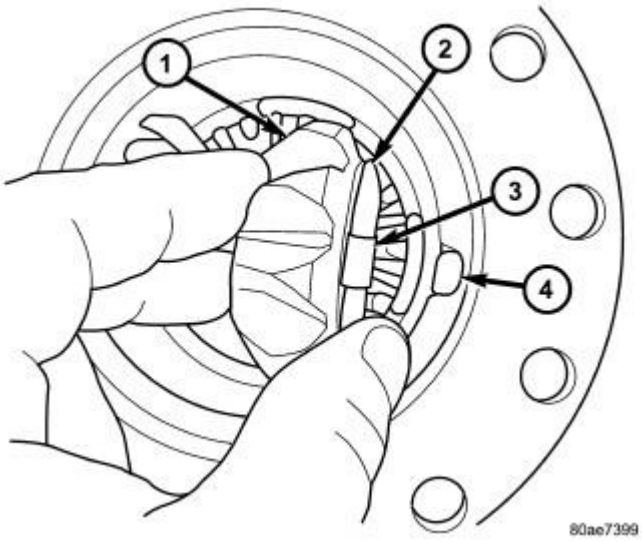


Fig. 330: Removing/Installing Pinion Gears & Tabbed Washers
Courtesy of CHRYSLER LLC

1 - PINION GEAR 2 - TABBED WASHER 3 - LOCATING TAB 4 - NOTCH

18. Remove pinion gears (1) and tabbed washers (2) .

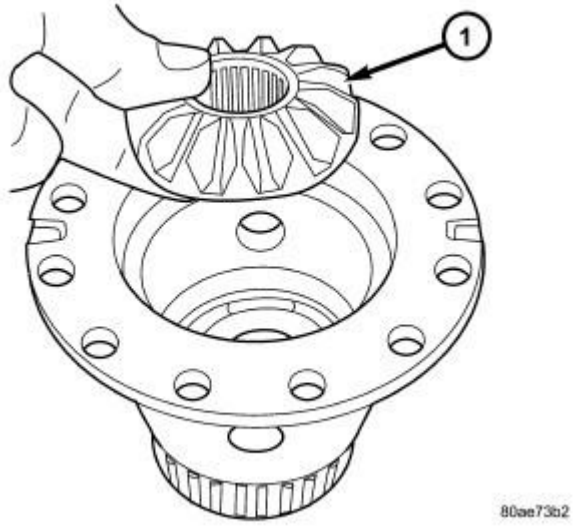


Fig. 331: Removing/Installing Differential Side Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

19. Remove differential side gear (1) .

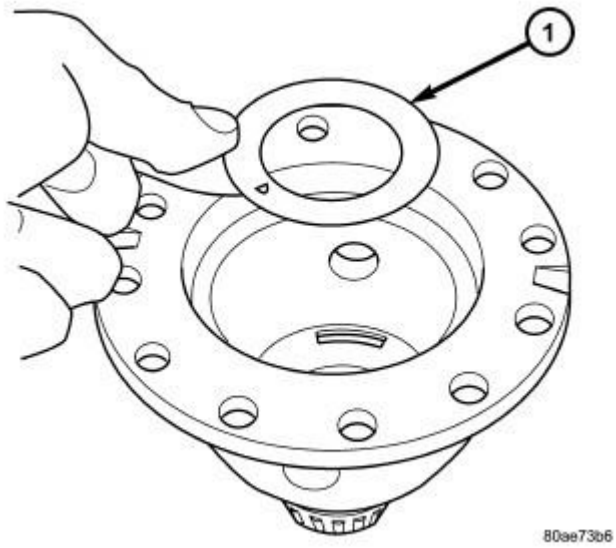


Fig. 332: Removing/Installing Side Gear Thrust Washer
Courtesy of CHRYSLER LLC

1 - THRUST WASHER

20. Remove side gear thrust washer (1) .
21. Inspect all components for excessive wear.

ASSEMBLY

ASSEMBLY

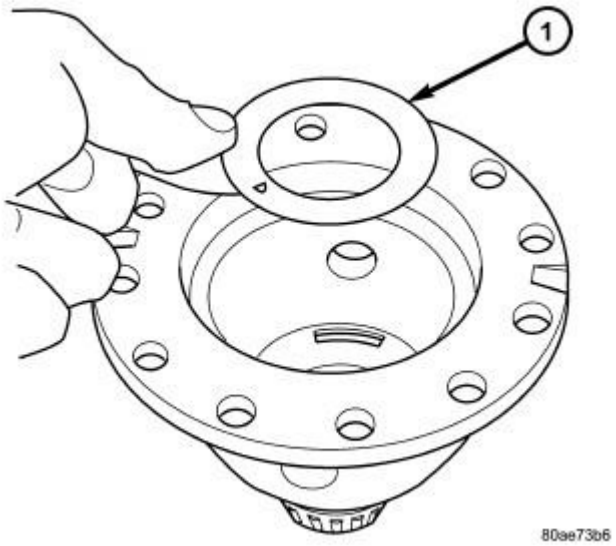


Fig. 333: Identifying Thrust Washer
Courtesy of CHRYSLER LLC

1 - THRUST WASHER

NOTE: The differential is serviced as an assembly. Differential service is limited to bearing cups and cones. Any other differential component failure must be remedied by differential assembly and transfer shaft replacement.

1. Install side gear thrust washer to differential case.

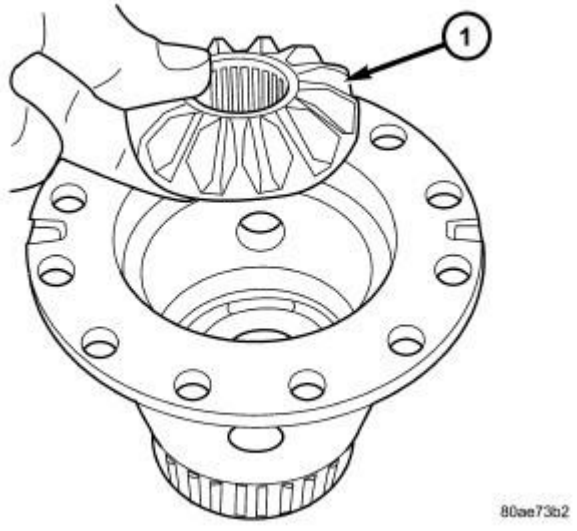


Fig. 334: Identifying Side Gear

Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

2. Install side gear to differential case.

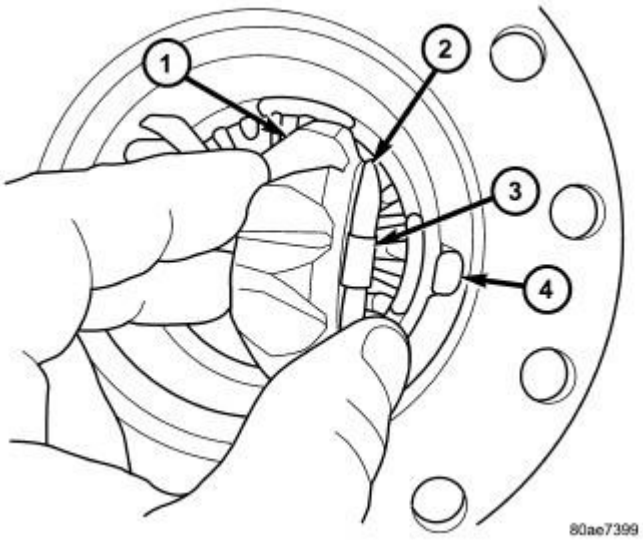


Fig. 335: Identifying Pinion Gear & Washer
Courtesy of CHRYSLER LLC

1 - PINION GEAR 2 - TABBED WASHER 3 - LOCATING TAB 4 - NOTCH

3. Install both pinion gears and washers to case, while orientating washer tabs to notch in case.

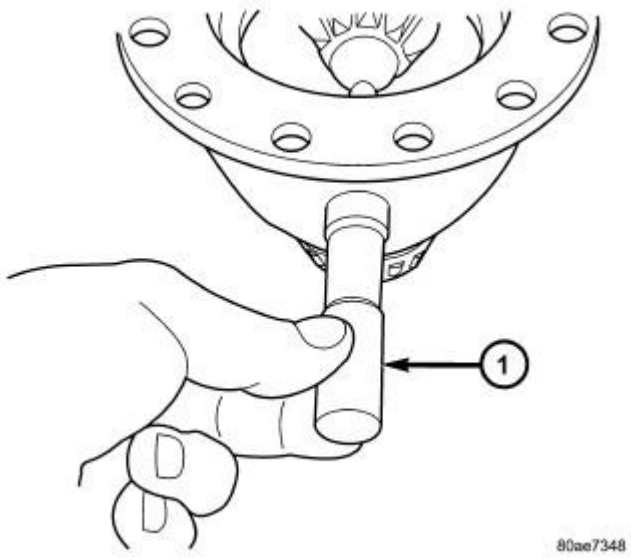


Fig. 336: Identifying Pinion Shaft
Courtesy of CHRYSLER LLC

1 - PINION SHAFT

4. Install pinion shaft.

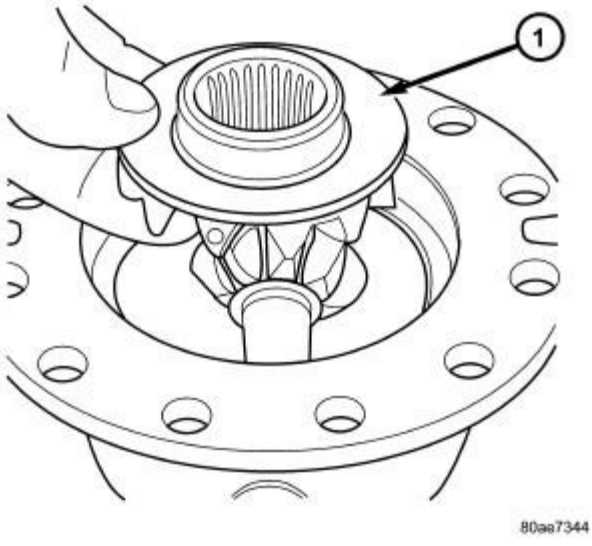


Fig. 337: Identifying Side Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

5. Install side gear to case.

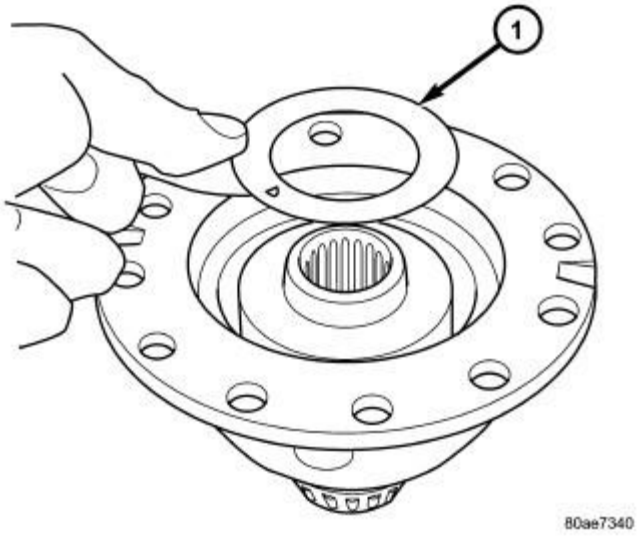


Fig. 338: Identifying Side Gear Thrust Washer
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER

6. Install side gear thrust washer to case.

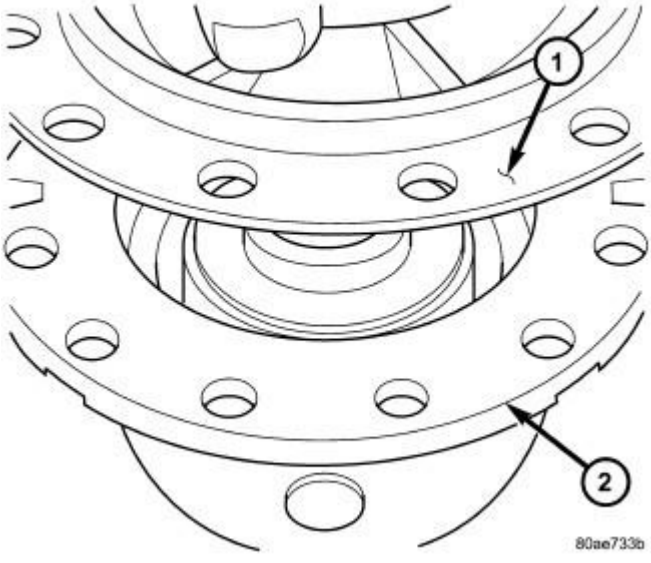


Fig. 339: Identifying Differential Support
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SUPPORT 2 - DIFFERENTIAL CASE

7. Install differential support into position, while aligning through-holes.

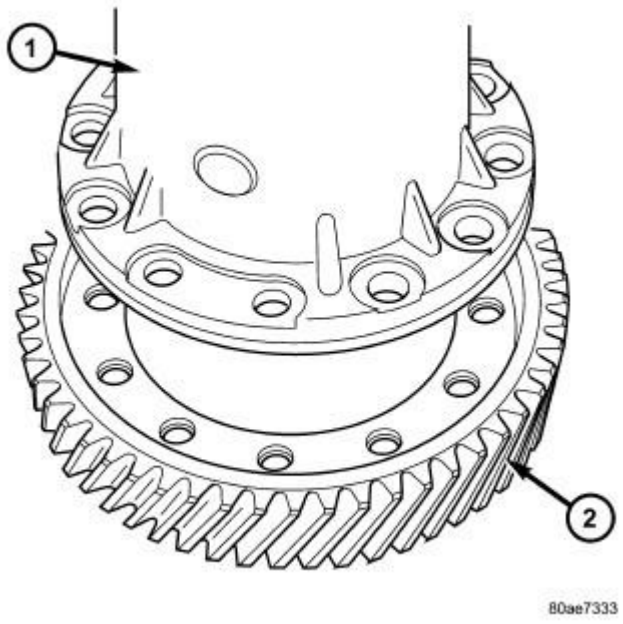


Fig. 340: Identifying Differential Ring Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE 2 - RING GEAR

8. Install differential ring gear to case.

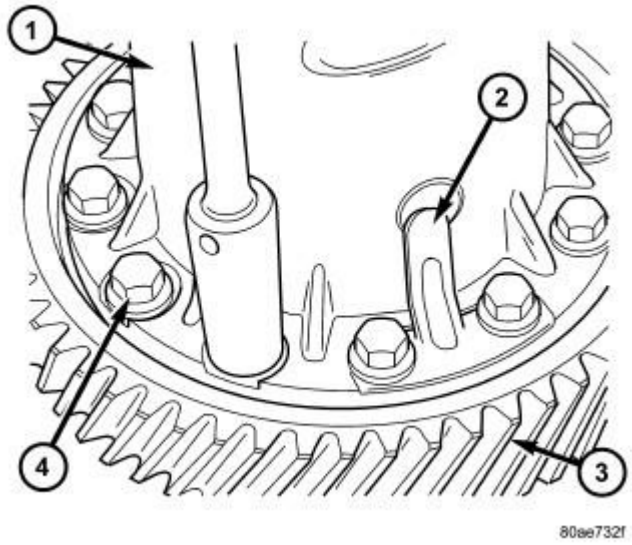


Fig. 341: Identifying Ring Gear-To-Case Bolts & Pinion Shaft Retainers
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE
2 - PINION SHAFT RETAINER
3 - RING GEAR
4 - RING GEAR-TO-CASE BOLT

9. Install ring gear-to-case bolts, with pinion shaft retainers, and torque bolts to 95 N.m (70 ft. lbs.).

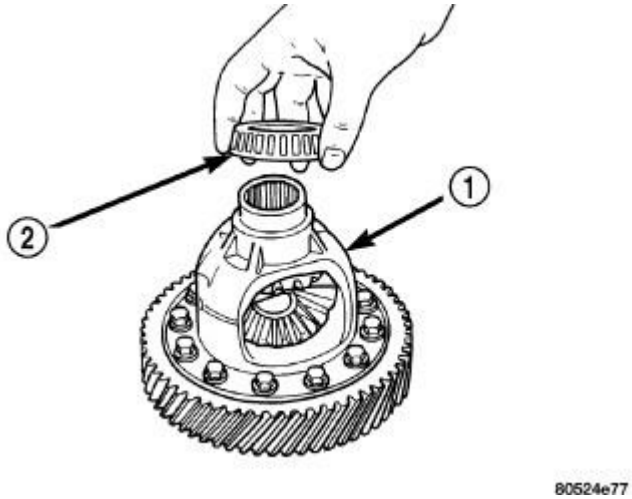
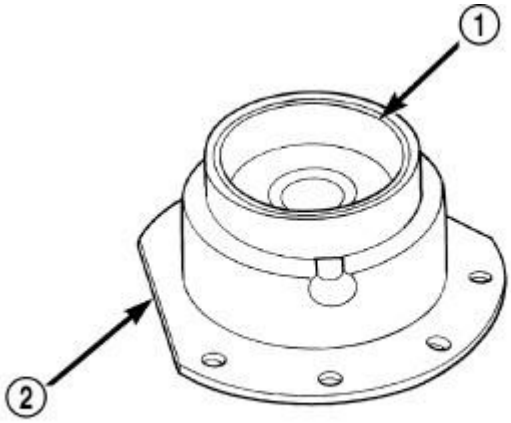


Fig. 342: Installing Differential Bearing To Differential (Extension Housing Side)
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL ASSEMBLY
2 - DIFFERENTIAL BEARING

10. Using Miller Special Tool L-4410, and C-4171, install differential bearing to differential (extension housing side).

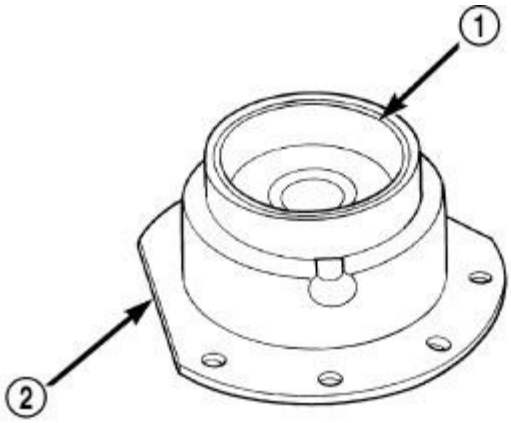


80524e73

Fig. 343: Removing/Installing Differential Bearing & Bearing Race
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL BEARING CUP
2 - DIFFERENTIAL BEARING RETAINER

11. Using Miller Special Tool 5052 and C-4171, install differential bearing to differential (bearing retainer side).
12. Using Miller Special Tool 6061 and C-4171, install differential bearing race to bearing retainer.



80524e73

Fig. 344: Removing/Installing Differential Bearing & Bearing Race
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL BEARING CUP
2 - DIFFERENTIAL BEARING RETAINER

13. Using Miller Special Tool L-4520 and C-4171, install differential bearing to extension housing.

NOTE: Use Mopar® Silicone Rubber Adhesive Sealant, or equivalent, on retainer and extension housing/adapter plate to seal to case.

14. Install differential assembly into transaxle case. Install differential bearing retainer.

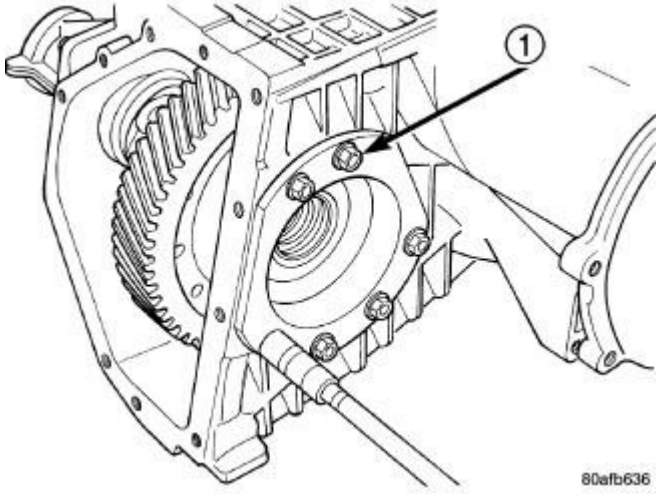


Fig. 345: Removing/Installing Differential Bearing Retainer Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL RETAINER BOLTS

15. Torque retainer-to-case bolts to 28 N.m (21 ft. lbs.).

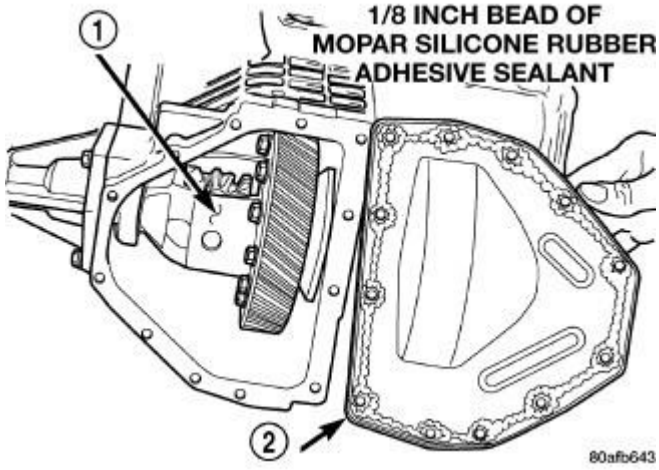


Fig. 346: Identifying Differential Cover
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL ASSEMBLY

2 - DIFFERENTIAL COVER

16. Apply a bead of Mopar® Silicone Rubber Adhesive Sealant to extension housing/adapter plate and install into position. Install and torque bolts to 28 N.m (21 ft. lbs.).
17. Measure and adjust differential bearing preload. See **Transmission and Transfer Case/Automatic - 41TE/DRIVE, Final - Adjustments**.
18. Apply a bead of Mopar® Silicone Rubber Adhesive Sealant to differential cover and install to case.

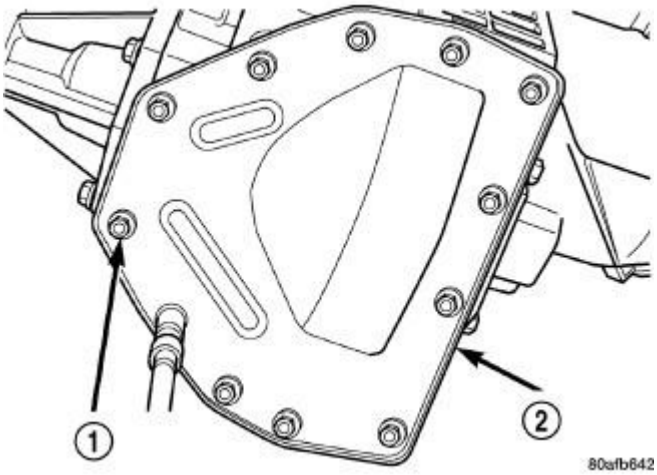


Fig. 347: Removing/Installing Differential Cover Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL COVER BOLTS
2 - DIFFERENTIAL COVER

19. Install and torque cover-to-case bolts to 19 N.m (165 in. lbs.).

ADJUSTMENTS

ADJUSTMENTS

NOTE: Perform all differential bearing preload measurements with the transfer shaft and gear removed.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT USING EXISTING SHIM

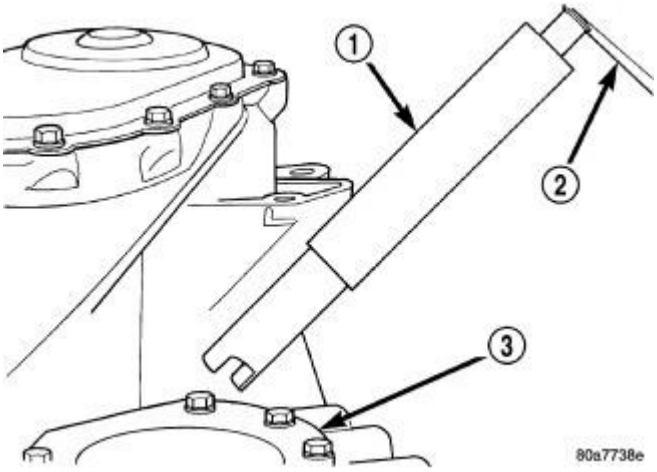


Fig. 348: Installing Tool L-4436-A Into Differential & Onto Pinion Mate Shaft
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL TOOL L-4436-A
2 - TORQUE WRENCH
3 - DIFFERENTIAL BEARING RETAINER

1. Position the transaxle assembly vertically on the support stand, differential bearing retainer side up.
2. Install Tool L-4436-A into the differential and onto the pinion mate shaft .

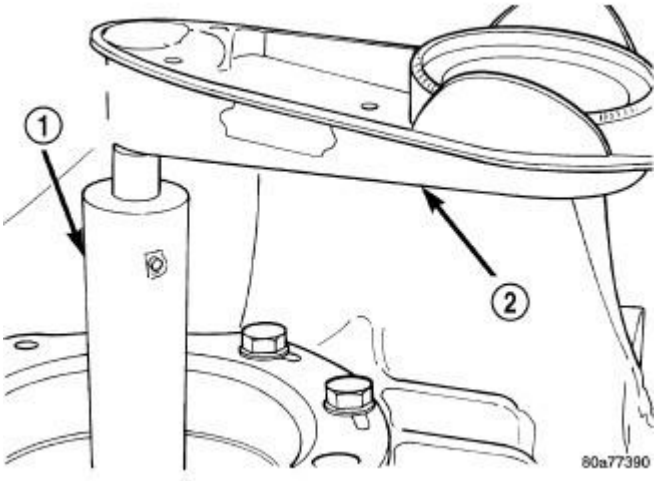


Fig. 349: Measuring Turning Torque Of Differential
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL TOOL L-4436-A
2 - TORQUE WRENCH

3. Rotate the differential at least one full revolution to ensure the tapered roller bearings are fully seated.

4. Using Tool L-4436-A and an inch-pound torque wrench, check the turning torque of the differential . **The turning torque should be between 5 and 18 inch-pounds.**
5. If the turning torque is within specifications, remove tools. Setup is complete.
6. If turning torque is not within specifications, proceed with the following steps:
   a. Remove differential bearing retainer from the transaxle case.
   b. Remove the bearing cup from the differential bearing retainer using Tool 6062A.
   c. Remove the existing shim from under the cup.
   d. Measure the existing shim.
   e. If the turning torque was too high when measured, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is was too low, install a 0.05 mm (0.002 inch) thicker shim. Repeat until 5-18 inch-pounds turning torque is obtained.

      Oil Baffle is not required to be installed when making shim selection.

   f. Install the proper shim under the bearing cup. Make sure the oil baffle is installed properly in the bearing retainer, below the bearing shim and cup.
   g. Install the differential bearing retainer using Tool 5052 and C-4171. Seal the retainer to the housing with MOPAR® Silicone Rubber Adhesive Sealant and torque bolts to 28 N.m (250 in. lbs.).
7. Using Tool L-4436-A and an inch-pound torque wrench, recheck the turning torque of the differential. **The turning torque should be within 5-18 inch-pounds.**

Shim thickness need be determined only if any of the following parts are replaced:

- Transaxle case
- Differential carrier
- Differential bearing retainer
- Extension housing
- Differential bearing cups and cones

DIFFERENTIAL BEARING SHIM CHART

PART NUMBER	SHIM THICKNESS	
	MM	INCH
4659257	980	0.0386
4659258	1.02	0.0402
4659259	1.06	0.0418
4659260	1.10	0.0434
4659261	1.14	0.0449
4659262	1.18	0.0465
4659263	1.22	0.0481
4659264	1.26	0.0497
4659265	1.30	0.0512

4659266	1.34	0.0528
4659267	1.38	0.0544
4659268	1.42	0.0560
4659269	1.46	0.0575
4659270	1.50	0.0591
4659271	1.54	0.0607
4659272	1.58	0.0623
4659273	1.62	0.0638
4659274	1.66	0.0654
4659275	1.70	0.0670
4659283	2.02	0.0796
4659284	2.06	0.0812

PRELOAD ADJUSTMENT W/O SHIM

1. Remove the bearing cup from the differential bearing retainer using Miller special Tool 6062A.
2. Remove existing shim from under bearing cup.
3. Reinstall the bearing cup into the retainer using Miller Special Tool 6061, and C-4171.

NOTE: Oil baffle is not required when making the shim calculation.

4. Install the bearing retainer into the case. Torque bolts to 28 N.m (250 in. lbs.).
5. Position the transaxle assembly vertically on the support stand and install Miller Special Tool L-4436-A into the bearing retainer.
6. Rotate the differential at least one full revolution to ensure the tapered roller bearings are fully seated.
7. Attach a dial indicator to the case and zero the dial. Place the tip on the end of Special Tool L-4436-A.
8. Place a large screwdriver to each side of the ring gear and lift. Check the dial indicator for the amount of end play.

CAUTION: Do not damage the transaxle case and/or differential retainer sealing surface.

9. Using the end play measurement that was determined, add 0.18mm (0.007 inch). This should give you between 5-18 inch pounds of bearing preload. Refer to **DIFFERENTIAL BEARING SHIM CHART** to determine which shim to use.
10. Remove the differential bearing retainer. Remove the bearing cup.
11. Install the oil baffle. Install the proper shim combination under the bearing cup.
12. Install the differential bearing retainer. Seal the retainer to the housing with Mopar® Silicone Rubber Adhesive Sealant. Torque bolts to 28 N.m (250 in. lbs.).
13. Using Miller Special Tool L-4436-A and an inch-pound torque wrench, check the turning torque of the differential . The turning torque should be between 5-18 inch-pounds.

NOTE: If turning torque is too high install a 0.05mm (0.002 inch) thicker shim. If the turning torque is too low, install a 0.05mm (0.002 inch) thinner shim. Repeat until 5-18 inch-pounds of turning torque is obtained.

DRIVING CLUTCHES

DESCRIPTION

DESCRIPTION

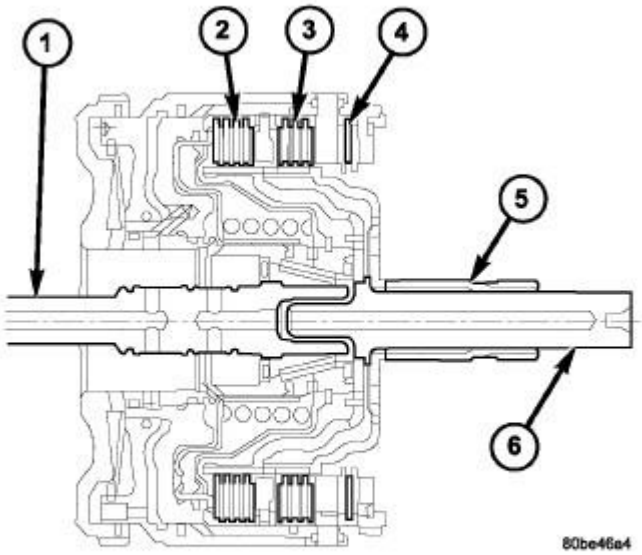


Fig. 350: Identifying Input Clutch Assembly
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - UNDERDRIVE CLUTCH
3 - OVERDRIVE CLUTCH
4 - REVERSE CLUTCH
5 - OVERDRIVE SHAFT
6 - UNDERDRIVE SHAFT

Three hydraulically applied input clutches are used to drive planetary components. The underdrive, overdrive, and reverse clutches are considered input clutches and are contained within the input clutch assembly . The input clutch assembly also contains:

- Input shaft
- Input hub
- Clutch retainer
- Underdrive piston
- Overdrive/reverse piston
- Overdrive hub
- Underdrive hub

OPERATION

OPERATION

The three input clutches are responsible for driving different components of the planetary geartrain.

NOTE: Refer to ELEMENTS IN USE AT EACH POSITION OF SELECTOR LEVER for a collective view of which clutch elements are applied at each position of the selector lever.

UNDERDRIVE CLUTCH

The underdrive clutch is hydraulically applied in first, second, and third (direct) gears by pressurized fluid against the underdrive piston. When the underdrive clutch is applied, the underdrive hub drives the rear sun gear.

OVERDRIVE CLUTCH

The overdrive clutch is hydraulically applied in third (direct) and overdrive gears by pressurized fluid against the overdrive/reverse piston. When the overdrive clutch is applied, the overdrive hub drives the front planet carrier.

REVERSE CLUTCH

The reverse clutch is hydraulically applied in reverse gear only by pressurized fluid against the overdrive/reverse piston. When the reverse clutch is applied, the front sun gear assembly is driven.

FLUID

STANDARD PROCEDURE

FLUID LEVEL AND CONDITION CHECK

FLUID LEVEL CHECK

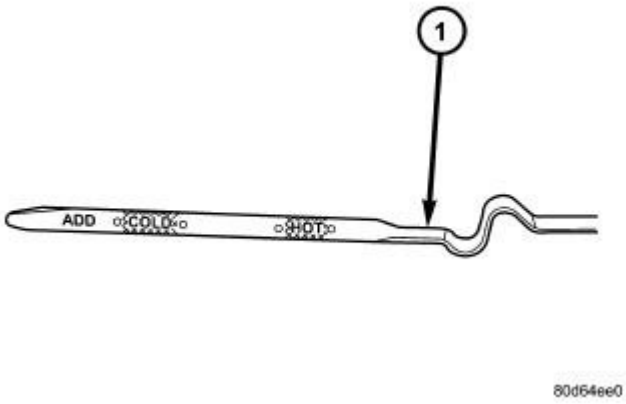


Fig. 351: Identifying Fluid Level Indicator
Courtesy of CHRYSLER LLC

1 - FLUID LEVEL INDICATOR

NOTE: Only transmission fluid of the type labeled Mopar ATF+4 (Automatic Transmission Fluid) should be used in this transaxle.

The transmission sump has a fluid level indicator (dipstick) to check oil similar to most automatic transmissions. It is located on the left side of the engine. Be sure to wipe all dirt from dipstick handle before removing.

The torque converter fills in both the P Park and N Neutral positions. Place the selector lever in P Park to be sure that the fluid level check is accurate. **The engine should be running at idle speed for at least one minute, with the vehicle on level ground.** At normal operating temperature 82° C (180° F), the fluid level is correct if it is in the HOT region on the oil level indicator (1) . The fluid level should be within the COLD region of the dipstick at 27° C (80° F) fluid temperature.

FLUID LEVEL CHECK USING DRB

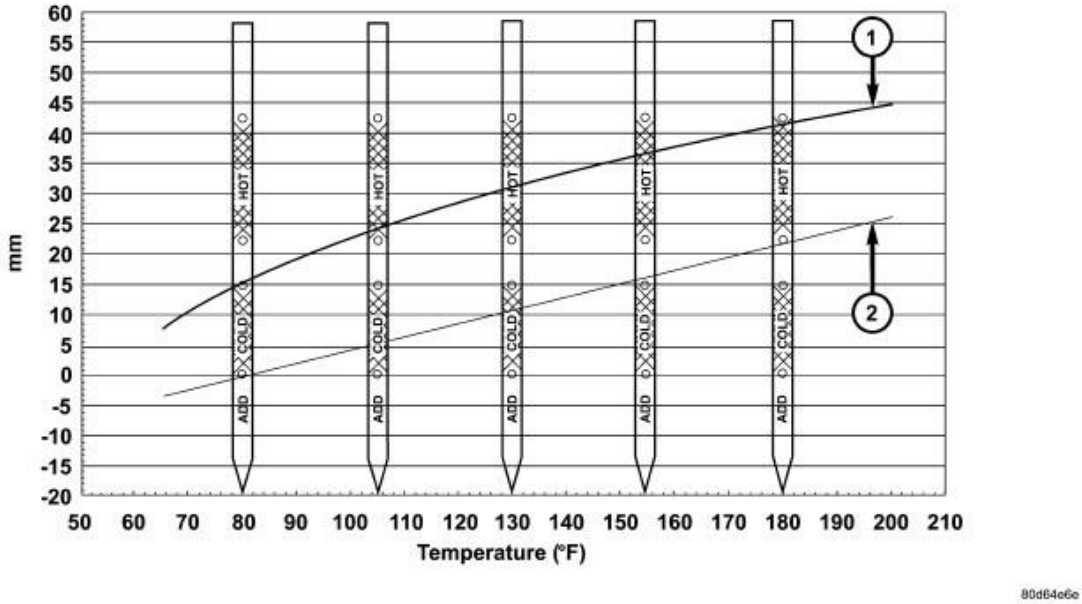


Fig. 352: Transmission Fluid Temperature Chart
Courtesy of CHRYSLER LLC

1 - MAX. LEVEL 2 - MIN. LEVEL

NOTE: Engine and Transaxle should be at normal operating temperature before performing this procedure.

1. Start engine and apply parking brake.
2. Hook up DRB scan tool and select transmission.
3. Select sensors.
4. Read the transmission temperature value.
5. Compare the fluid temperature value with the fluid temperature chart (1,2) .
6. Adjust transmission fluid level shown on the indicator according to **Fig. 352**.
7. Check transmission for leaks.

Low fluid level can cause a variety of conditions because it allows the pump to take in air along with the fluid. As in any hydraulic system, air bubbles make the fluid spongy, therefore, pressures will be low and build up slowly.

Improper filling can also raise the fluid level too high. When the transaxle has too much fluid, the gears churn up foam and cause the same conditions which occur with a low fluid level.

In either case, air bubbles can cause overheating and/or fluid oxidation, and varnishing. This can interfere with

normal valve, clutch, and accumulator operation. Foaming can also result in fluid escaping from the transaxle vent where it may be mistaken for a leak.

FLUID CONDITION

Along with fluid level, it is important to check the condition of the fluid. When the fluid smells burned, and is contaminated with metal or friction material particles, a complete transaxle recondition is probably required. Be sure to examine the fluid on the dipstick closely. If there is any doubt about its condition, drain out a sample for a double check.

Mopar® ATF+4 (Automatic Transmission Fluid), when new, is red in color. The ATF is dyed red so it can be identified from other fluids used in the vehicle such as engine oil or antifreeze. The red color is not permanent and is not an indicator of fluid condition. As the vehicle is driven, the ATF will begin to look darker in color and may eventually become brown. **This is normal.** ATF+4 also has a unique odor that may change with age. Consequently, **odor and color cannot be used to indicate the fluid condition or the need for a fluid change.**

After the fluid has been checked, seat the dipstick fully to seal out water and dirt.

FLUID AND FILTER SERVICE

FLUID/FILTER SERVICE (RECOMMENDED)

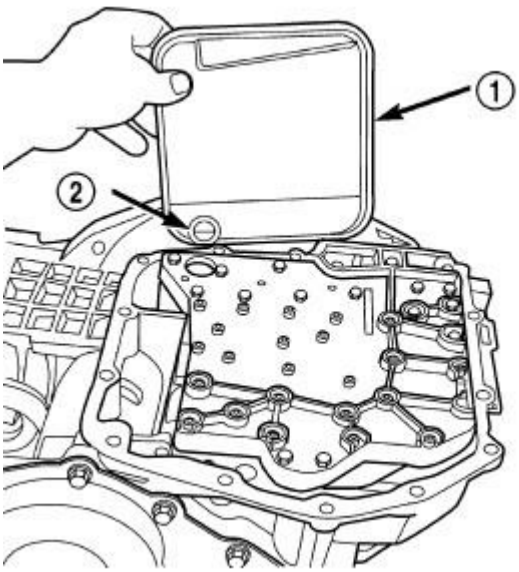


Fig. 353: Identifying Filter & O-Ring
Courtesy of CHRYSLER LLC

1 - OIL FILTER
2 - O-RING

NOTE: **Refer to MAINTENANCE SCHEDULES for the recommended maintenance (fluid/filter change) intervals for this transaxle.**

NOTE: Only fluids of the type labeled Mopar® ATF+4 should be used. A filter change should be made at the time of the transmission oil change. The magnet (on the inside of the oil pan) should also be cleaned with a clean, dry cloth.

NOTE: If the transaxle is disassembled for any reason, the fluid and filter should be changed.

1. Raise vehicle on a hoist. Refer to **HOISTING** for proper procedures. Place a drain container with a large opening, under transaxle oil pan.
2. Remove both engine mount-to-engine crossmember cradle nuts. Using suitable screw jack and wood block, raise engine and transmission slightly to facilitate transaxle oil pan removal and installation.
3. Loosen pan bolts and tap the pan at one corner to break it loose allowing fluid to drain, then remove the oil pan.
4. Install a new filter and o-ring on bottom of the valve body .

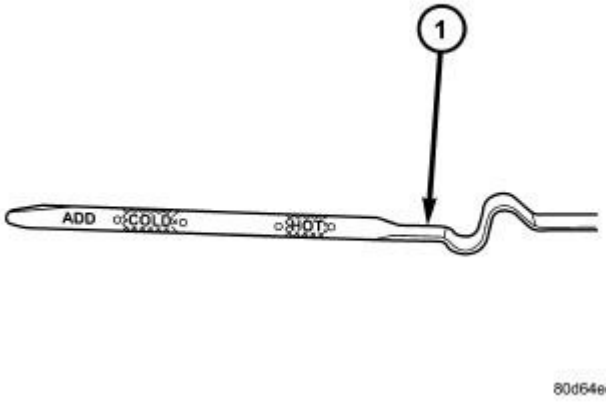


Fig. 354: Identifying Fluid Level Indicator
Courtesy of CHRYSLER LLC

1 - FLUID LEVEL INDICATOR

5. Clean the oil pan and magnet. Reinstall pan using new Mopar Silicone Adhesive sealant. Tighten oil pan bolts to 19 N.m (165 in. lbs.).
6. Pour four Quarts of Mopar® ATF+4 through the dipstick opening.
7. Start engine and allow to idle for at least one minute. Then, with parking and service brakes applied, move selector lever momentarily to each position, ending in the park or neutral position.
8. Check the transaxle fluid level and add an appropriate amount to bring the transaxle fluid level to 3mm (1/8 in.) below the lowest mark on the dipstick .
9. Recheck the fluid level after the transaxle has reached normal operating temperature (180°F.[82°C]). Refer to **FLUID LEVEL AND CONDITION CHECK** for the proper fluid fill procedure.
10. To prevent dirt from entering transaxle, make certain that dipstick is fully seated into the dipstick

opening.

DIPSTICK TUBE FLUID SUCTION METHOD (ALTERNATIVE)

1. When performing the fluid suction method, make sure the transaxle is at full operating temperature.
2. To perform the dipstick tube fluid suction method, use a suitable fluid suction device (Vacula™ or equivalent).
3. Insert the fluid suction line into the dipstick tube.

NOTE: Verify that the suction line is inserted to the lowest point of the transaxle oil pan. This will ensure complete evacuation of the fluid in the pan.

4. Follow the manufacturers recommended procedure and evacuate the fluid from the transaxle.
5. Remove the suction line from the dipstick tube.
6. Pour four Quarts of Mopar® ATF+4 through the dipstick opening.
7. Start engine and allow to idle for at least one minute. Then, with parking and service brakes applied, move selector lever momentarily to each position, ending in the park or neutral position.
8. Check the transaxle fluid level and add an appropriate amount to bring the transaxle fluid level to 3mm (1/8 in.) below the lowest mark on the dipstick .
9. Recheck the fluid level after the transaxle has reached normal operating temperature (180°F.[82°C]). See **FLUID LEVEL CHECK**.
10. To prevent dirt from entering transaxle, make certain that dipstick is fully seated into the dipstick opening.

GEARTRAIN, PLANETARY

DESCRIPTION

DESCRIPTION

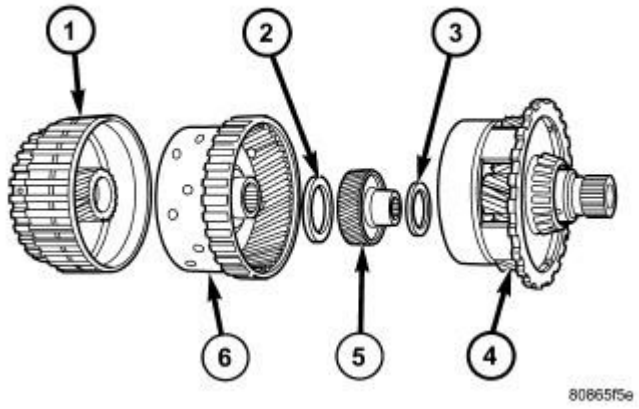


Fig. 355: Identifying Planetary Geartrain Components
Courtesy of CHRYSLER LLC

1 - FRONT SUN GEAR ASSEMBLY
2 - #6 THRUST BEARING
3 - #7 THRUST BEARING
4 - REAR CARRIER/FRONT ANNULUS ASSEMBLY
5 - REAR SUN GEAR
6 - FRONT CARRIER/REAR ANNULUS ASSEMBLY

The planetary geartrain is located between the input clutch assembly and the rear of the transaxle case. The planetary geartrain consists of two sun gears (1,5) , two planetary carriers, two annulus (ring) gears (4,6), and one output shaft.

OPERATION

OPERATION

The planetary geartrain utilizes two planetary gear sets that connect the transmission input shaft to the output shaft. Input and holding clutches drive or lock different planetary members to change output ratio or direction.

HOLDING CLUTCHES

DESCRIPTION

DESCRIPTION

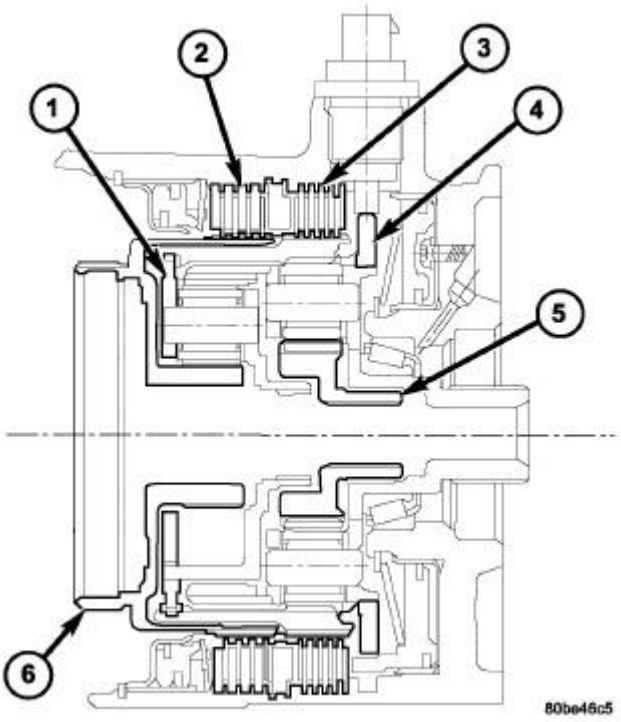


Fig. 356: Identifying 2/4 & Low/Reverse Clutches & Planetary Geartrain Components
Courtesy of CHRYSLER LLC

1 - FRONT PLANET CARRIER/REAR ANNULUS
2 - 2/4 CLUTCH
3 - L/R CLUTCH
4 - REAR PLANET CARRIER/FRONT ANNULUS
5 - REAR SUN GEAR
6 - FRONT SUN GEAR ASSEMBLY

Two hydraulically applied multi-disc clutches are used to hold planetary geartrain components (1,4) stationary while the input clutches drive others. The 2/4 (2) and Low/Reverse (3) clutches are considered holding clutches and are contained at the rear of the transaxle case.

OPERATION

OPERATION

NOTE: Refer to ELEMENTS IN USE AT EACH POSITION OF SELECTOR LEVER for a collective view of which clutch elements are applied at each position of the selector lever.

2/4 CLUTCH

The 2/4 clutch is hydraulically applied in Second and Fourth gears by pressurized fluid against the 2/4 clutch piston. When the 2/4 clutch is applied, the front sun gear assembly is held or grounded to the transaxle case.

LOW/REVERSE CLUTCH

The Low/Reverse clutch is hydraulically applied in Park, Reverse, Neutral, and First gears by pressurized fluid against the Low/Reverse clutch piston. When the Low/Reverse clutch is applied, the front planet carrier/rear annulus assembly is held or grounded to the transaxle case.

KNOB, GEARSHIFT

REMOVAL

REMOVAL

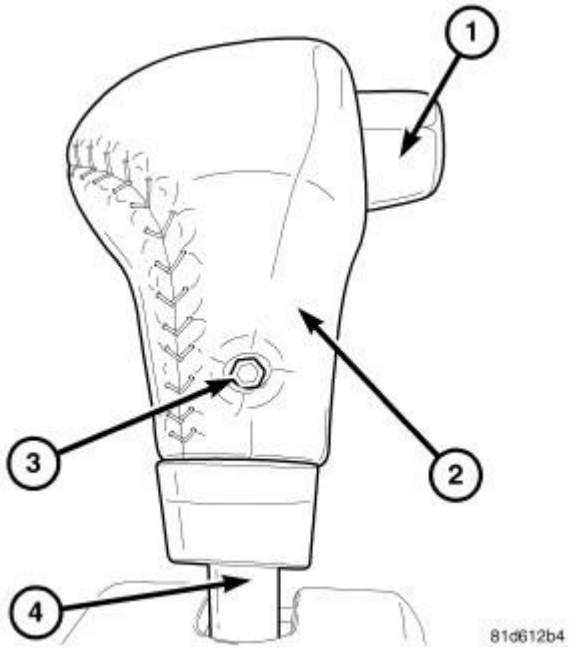


Fig. 357: Removing/Installing Gearshift Knob
Courtesy of CHRYSLER LLC

1. Loosen the set screw (3) on the shift knob (2).
2. Hold in the shift knob button (1).
3. Pull up on the shift knob (2) while holding the shift knob button (1) in.

INSTALLATION

INSTALLATION

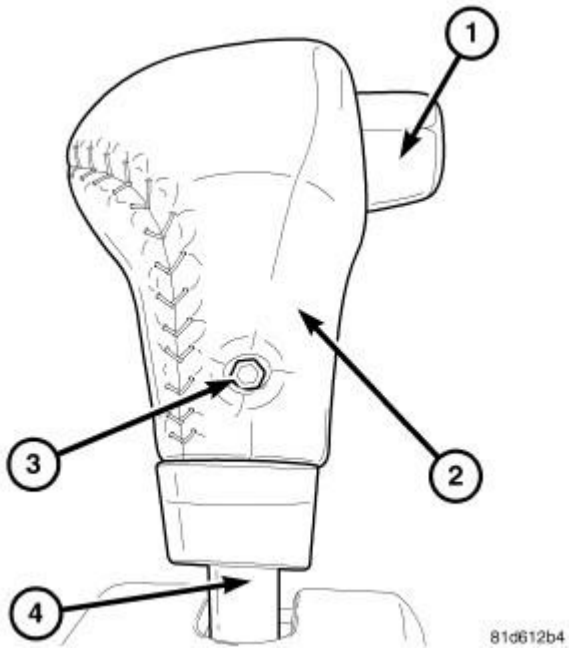


Fig. 358: Removing/Installing Gearshift Knob
Courtesy of CHRYSLER LLC

1. While holding the shift knob button (1) in install the shift knob (1) onto the shift mechanism shaft (4).
2. Tighten the set screw (3).

PUMP, TRANSMISSION OIL

DESCRIPTION

DESCRIPTION

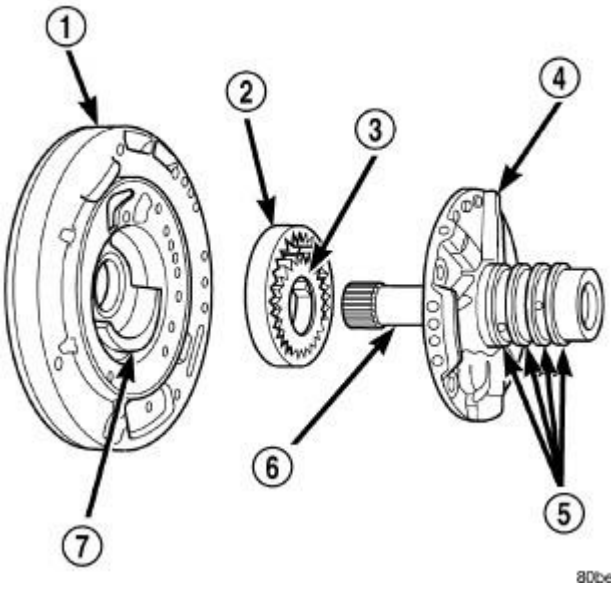


Fig. 359: Identifying Transmission Oil Pump Assembly
Courtesy of CHRYSLER LLC

1 - PUMP HOUSING
2 - OUTER PUMP GEAR
3 - INNER PUMP GEAR
4 - REACTION SHAFT SUPPORT
5 - SEAL RINGS (4)
6 - REACTION SHAFT
7 - CRESCENT

The oil pump is located in the pump housing inside the bell housing of the transmission case. The oil pump assembly consists of an inner (3) and outer (2) gear, a housing (1), and a cover that also serves as the reaction shaft support (6).

OPERATION

OPERATION

As the torque converter rotates, the converter hub rotates the inner and outer gears. As the gears rotate, the clearance between the gear teeth increases in the crescent area, and creates a suction at the inlet side of the pump. This suction draws fluid through the pump inlet from the oil pan. As the clearance between the gear teeth in the crescent area decreases, it forces pressurized fluid into the pump outlet and to the valve body.

STANDARD PROCEDURE

OIL PUMP VOLUME CHECK

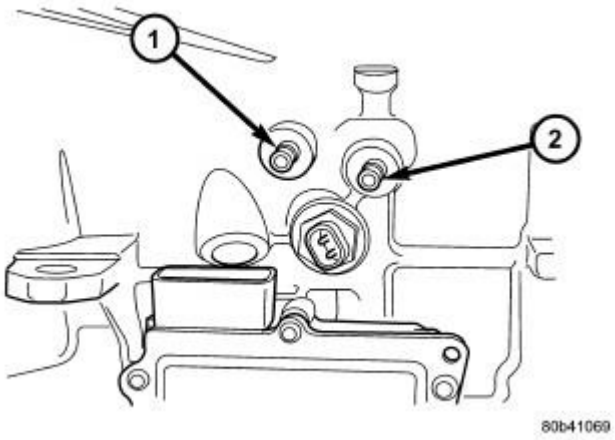


Fig. 360: Identifying Transmission Oil Cooler Ports
Courtesy of CHRYSLER LLC

1 - FROM COOLER 2 - TO COOLER

Measuring oil pump output volume will determine if sufficient flow to the transmission oil cooler exists, and whether or not an internal transmission failure is present.

Verify that transmission fluid is at the proper level. If adding fluid is necessary, fill to the proper level with Mopar® ATF+4 (Automatic Transmission Fluid-Type 9602). The following procedure is to check oil pump output volume:

1. Using hose cutters or a suitable blade, cut the "to cooler" line off flush with the cooler inlet fitting and place a collection container under the open line.

CAUTION: With the fluid set at the proper level, fluid collection should not exceed (1) quart or internal damage to the transmission may occur.

2. Start engine and run **at curb idle speed** , with the shift selector in neutral.
3. If one quart of ATF is collected in 20 seconds or less, flow is within acceptable limits. If fluid flow is intermittent or it takes more than 20 seconds to collect one quart of ATF, see **Transmission and Transfer Case/Automatic - 41TE - Diagnosis and Testing**.
4. Inspect the cooler hose for damage. Replace if necessary.
5. Re-connect the to cooler line to the transmission using a service splice kit. Refer to instructions included with the kit.
6. Refill the transaxle to proper level with Mopar® ATF+4 (Automatic Transmission Fluid-Type 9602).

DISASSEMBLY

DISASSEMBLY

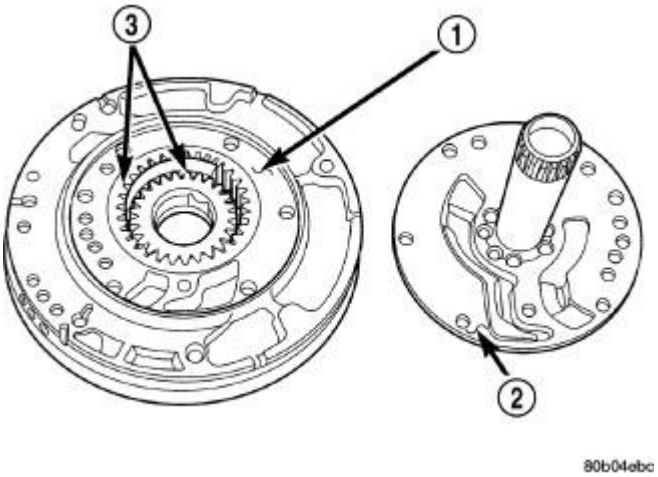


Fig. 361: Removing/Installing Reaction Shaft Support
Courtesy of CHRYSLER LLC

1 - PUMP HOUSING
2 - REACTION SHAFT SUPPORT
3 - PUMP GEARS

1. Remove the reaction shaft support bolts.
2. Remove the reaction shaft support (2) from the pump housing (1).

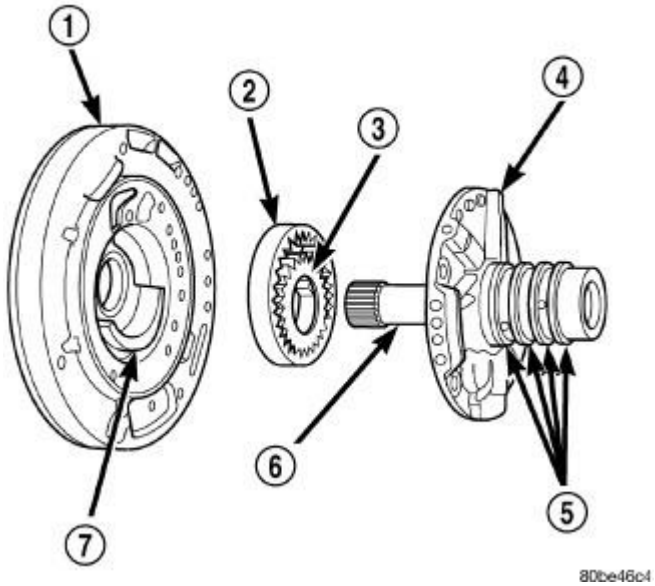


Fig. 362: Identifying Oil Pump Gears & Housing
Courtesy of CHRYSLER LLC

1 - PUMP HOUSING

2 - OUTER PUMP GEAR 3 - INNER PUMP GEAR 4 - REACTION SHAFT SUPPORT 5 - SEAL RINGS (4) 6 - REACTION SHAFT 7 - CRESCENT

3. Remove the pump gears (2, 3) and check for wear and damage on pump housing (1) and gears (2, 3).

CLEANING

CLEANING

Clean pump and support components with solvent and dry them with compressed air.

INSPECTION

INSPECTION

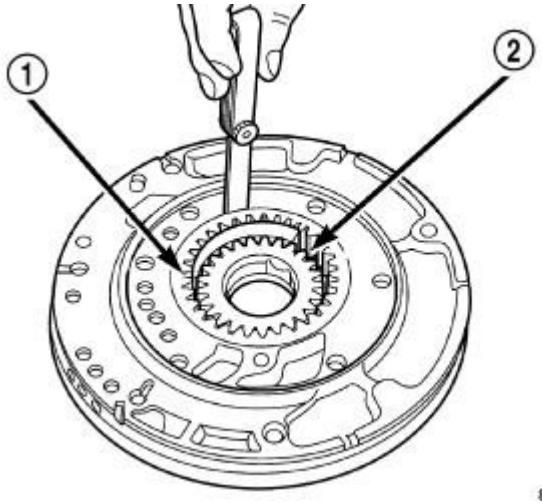


Fig. 363: Measuring Gear Clearances Between Pump Socket & Crescent
Courtesy of CHRYSLER LLC

1 - OUTER GEAR 2 - POCKET

1. Re-install the gears and check clearances.
2. Measure the clearance between the outer gear (1) and the pump pocket (2) . Clearance should be 0.089-0.202 mm (0.0035-0.0079 in.).
3. Measure clearance between outer gear and crescent. Clearance should be 0.060-0.298 mm (0.0023-0.0117 in.).
4. Measure clearance between inner gear and crescent. Clearance should be 0.093-0.385 mm (0.0036-0.0151

in.).

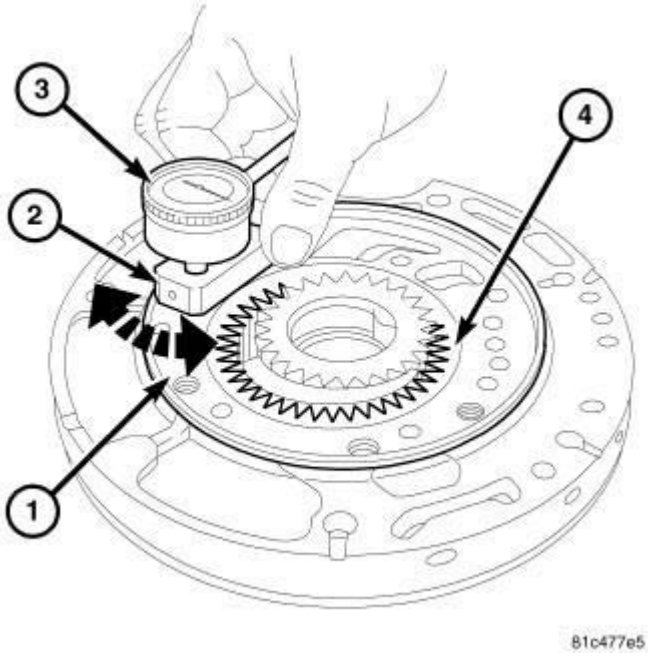


Fig. 364: Measuring Gear Height To Pump Housing Case Clearance
Courtesy of CHRYSLER LLC

1 - OIL PUMP HOUSING FLAT SURFACE
2 - SCOOTER BLOCK D-115-2A
3 - 9524 90° DIAL INDICATOR or C-3339A DIAL INDICATOR
4 - PUMP GEAR

5. Install the 9524 90° or the C-3339A Dial indicator (3) into the Scooter Block D-115-2A (2).
6. Zero the Dial Indicator (3) in the scooter block assembly on a flat surface (1) of the pump housing.
7. While applying slight downward pressure rotate the front of the scooter block side ways onto the outer gear (4).
8. Measure and record the gear height to the pump housing case clearance.
9. The clearance should be 0.020-0.046 mm (0.0008-0.0018 in.). If not replace the oil pump assembly.

ASSEMBLY

ASSEMBLY

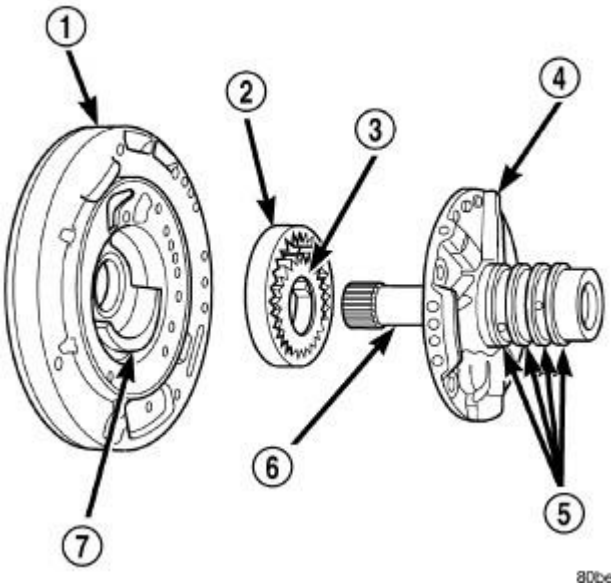


Fig. 365: Identifying Transmission Oil Pump Components
Courtesy of CHRYSLER LLC

1 - PUMP HOUSING
2 - OUTER PUMP GEAR
3 - INNER PUMP GEAR
4 - REACTION SHAFT SUPPORT
5 - SEAL RINGS (4)
6 - REACTION SHAFT
7 - CRESCENT

1. Assemble oil pump as shown in **Fig. 365** .
2. Install and torque reaction shaft support-to-oil pump housing bolts to 28 N.m (250 in. lbs.) torque.

RELAY, TRANSMISSION CONTROL

DESCRIPTION

DESCRIPTION

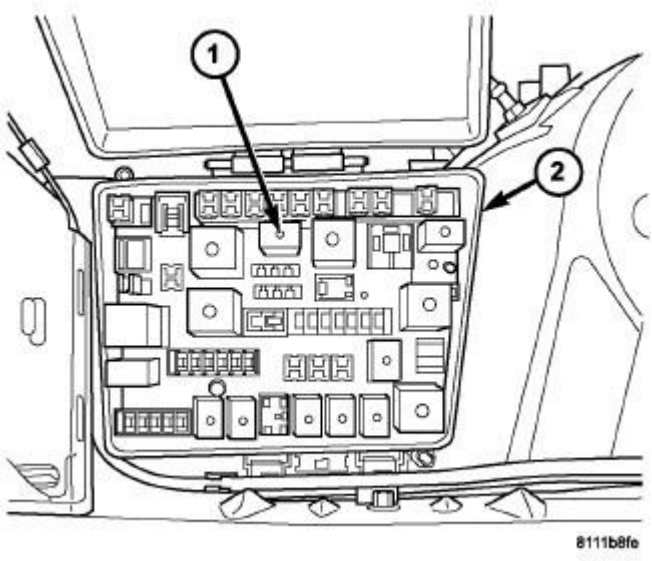


Fig. 366: Locating Transmission Control Relay
Courtesy of CHRYSLER LLC

1 - TRANSMISSION CONTROL RELAY 2 - POWER DISTRIBUTION CENTER

The transmission control relay (1) is located in the Power Distribution Center (PDC) (2), which is located on the left side of the engine compartment between the battery and radiator upper support.

OPERATION

OPERATION

The Transmission Control Relay is supplied fused B+ voltage, energized by the PCM, and is used to supply power to the solenoid pack when the transmission is in normal operating mode. When the relay is "off", no power is supplied to the solenoid pack and the transmission is in "limp-in" mode. After a controller reset (ignition key turned to the "run" position or after cranking engine), the PCM energizes the relay. Prior to this, the PCM verifies that the contacts are open by checking for no voltage at the switched battery terminals. After this is verified, the voltage at the solenoid pack pressure switches is checked. After the relay is energized, the PCM monitors the terminals to verify that the voltage is greater than 3 volts.

SEAL, OIL PUMP

REMOVAL

REMOVAL

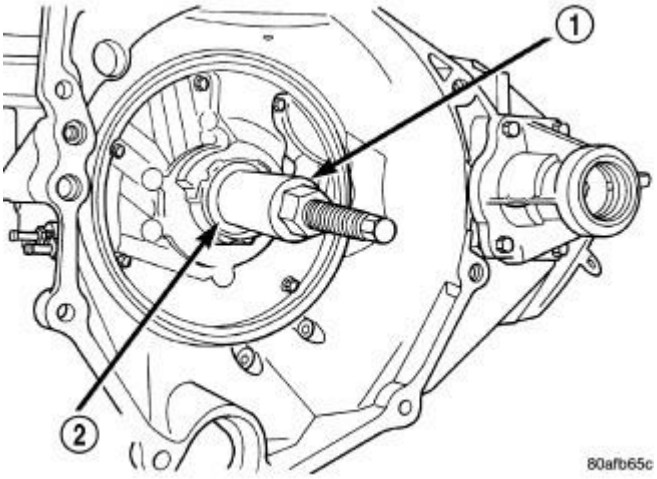


Fig. 367: Removing Oil Pump Seal
Courtesy of CHRYSLER LLC

1 - SEAL PULLER C-3981-B
2 - OIL PUMP SEAL

1. Remove transaxle from vehicle. See **Transmission and Transfer Case/Automatic - 41TE - Removal**.
2. Using Seal Puller C-3981B (1) , remove oil pump seal (2).

INSTALLATION

INSTALLATION

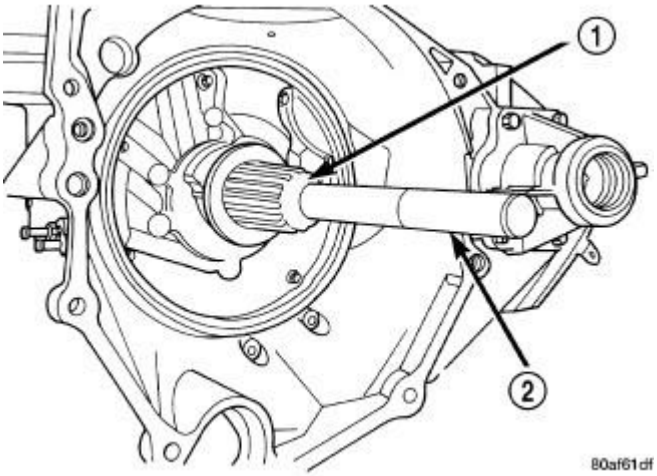


Fig. 368: Installing Oil Pump Seal
Courtesy of CHRYSLER LLC

1 - SEAL INSTALLER C-4193

2 - HANDLE C-4171

1. Using Seal Installer C-4193A (1) , install oil pump seal.
2. Install transaxle to vehicle. See **Transmission and Transfer Case/Automatic - 41TE - Installation**.

SENSOR, SPEED, INPUT

DESCRIPTION

DESCRIPTION

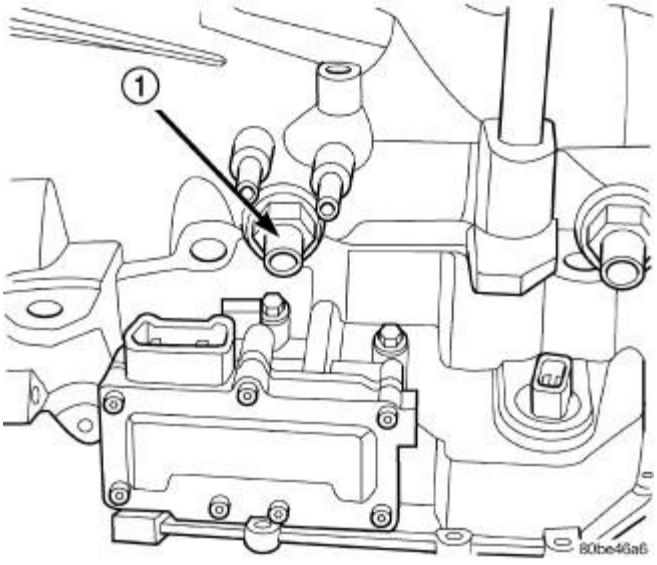


Fig. 369: Removing/Installing Input Speed Sensor
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR

The Input Speed Sensor (1) , is a two-wire magnetic pickup device that generates AC signals as rotation occurs. It is threaded into the transaxle case.

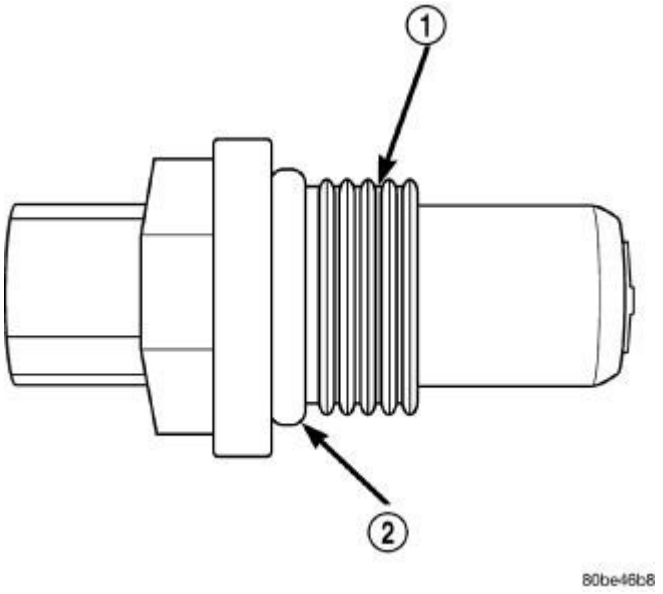


Fig. 370: Identifying Input Speed Sensor & O-Ring
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR
2 - O-RING

The Input Speed Sensor (1) is sealed with an O-ring (2) , and is considered a primary input to the Powertrain/Transmission Control Module.

OPERATION

OPERATION

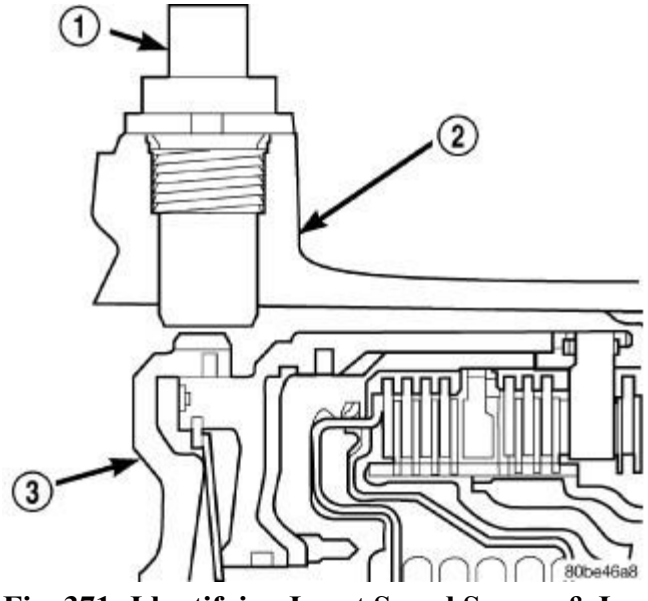


Fig. 371: Identifying Input Speed Sensor & Input Clutch Hub

Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR
2 - TRANSAXLE CASE
3 - INPUT CLUTCH HUB

The Input Speed Sensor (1) provides information on how fast the input shaft is rotating. As the teeth of the input clutch hub (3) pass by the sensor coil, an AC voltage is generated and sent to the PCM/TCM. The PCM/TCM interprets this information as input shaft RPM.

The PCM/TCM compares the input speed signal with output speed signal to determine the following:

- Transmission gear ratio
- Speed ratio error detection
- CVI calculation

The PCM/TCM also compares the input speed signal and the engine speed signal to determine the following:

- Torque converter clutch slippage
- Torque converter element speed ratio

REMOVAL

REMOVAL

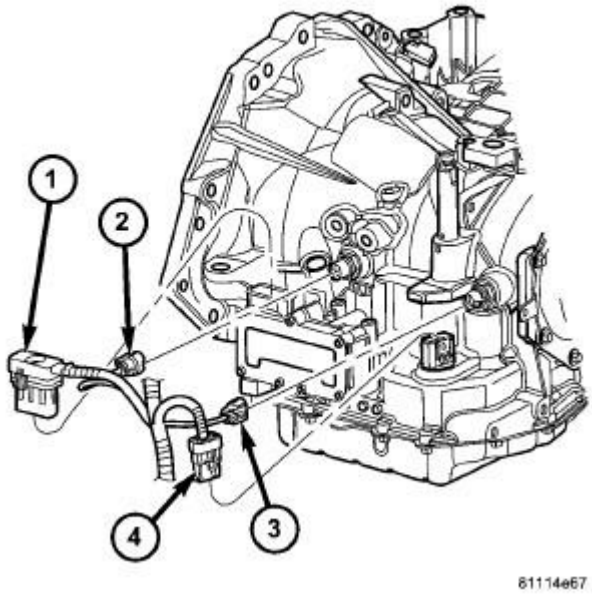


Fig. 372: Identifying Transmission Connectors

Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR 2 - INPUT SPEED SENSOR CONNECTOR 3 - OUTPUT SPEED SENSOR CONNECTOR 4 - TRANSMISSION RANGE SENSOR CONNECTOR

1. Disconnect battery negative cable.
2. Disconnect input speed sensor connector (2) .

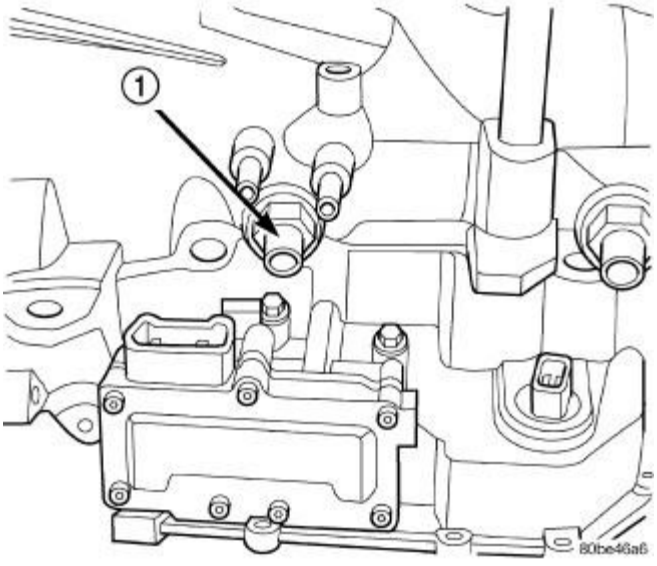


Fig. 373: Removing/Installing Input Speed Sensor
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR

3. Unscrew and remove input speed sensor (1) .

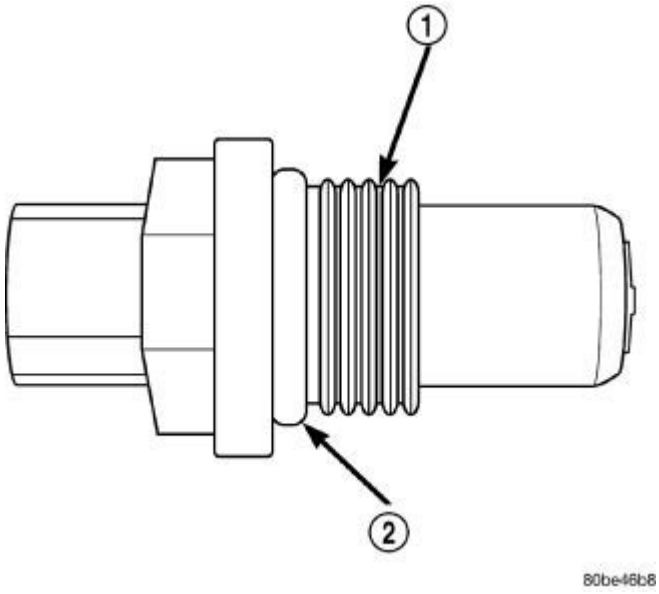


Fig. 374: Identifying Input Speed Sensor & O-Ring
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR
2 - O-RING

4. Inspect speed sensor O-ring (2) and replace if necessary.

INSTALLATION

INSTALLATION

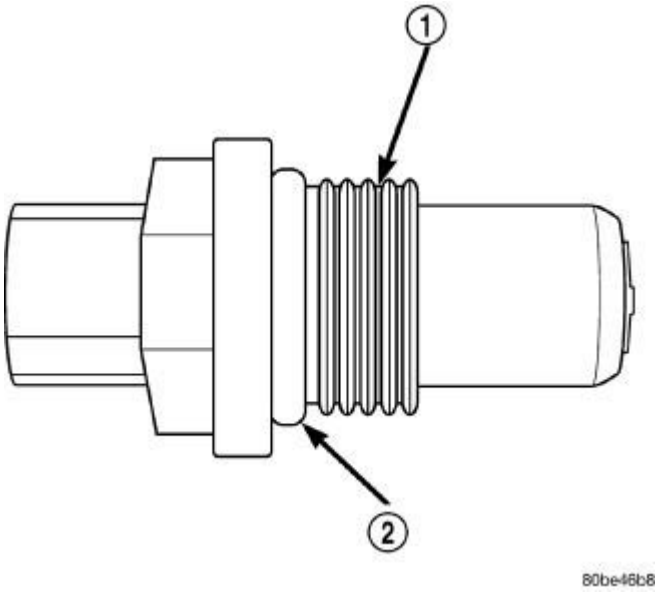


Fig. 375: Identifying Input Speed Sensor & O-Ring

Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR
2 - O-RING

1. Verify O-ring (2) is installed into position.

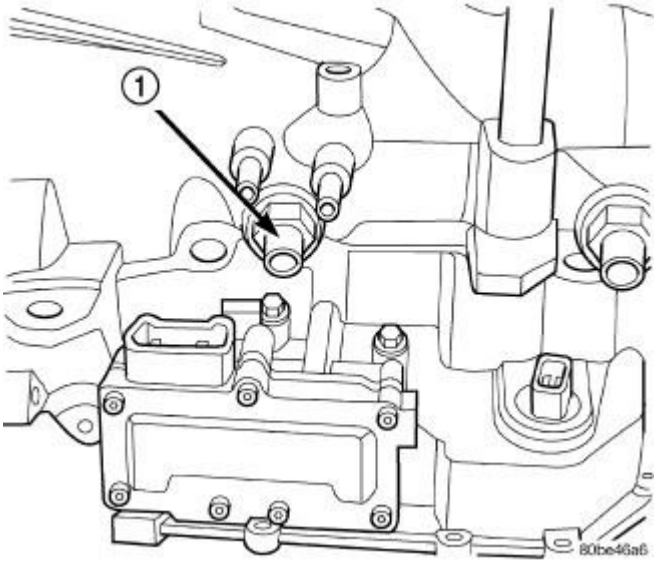


Fig. 376: Removing/Installing Input Speed Sensor
Courtesy of CHRYSLER LLC

1 - INPUT SPEED SENSOR

2. Install and tighten input speed sensor (1) to 27 N.m (20 ft. lbs.).

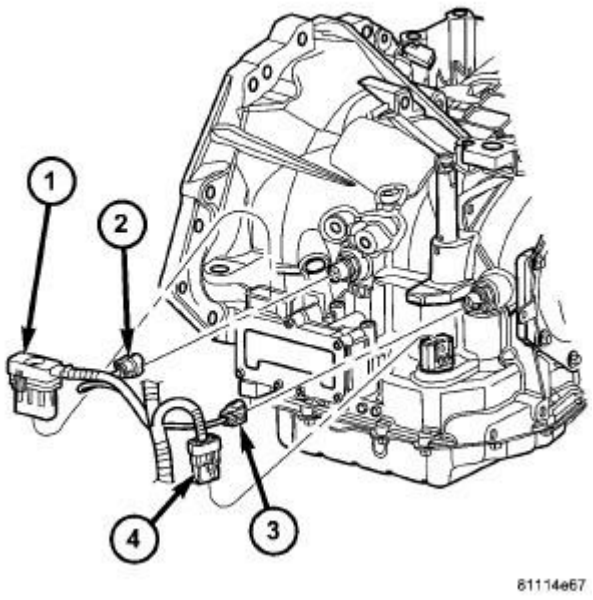


Fig. 377: Identifying Transmission Connectors
Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR
2 - INPUT SPEED SENSOR CONNECTOR
3 - OUTPUT SPEED SENSOR CONNECTOR
4 - TRANSMISSION RANGE SENSOR CONNECTOR

3. Connect speed sensor connector (4) .
4. Connect battery negative cable.

SENSOR, SPEED, OUTPUT

DESCRIPTION

DESCRIPTION

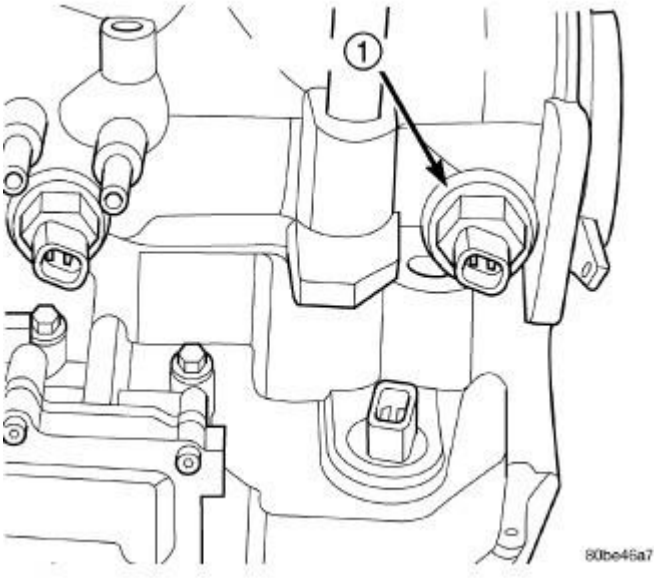


Fig. 378: Identifying Output Speed Sensor
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR

The Output Speed Sensor (1) is a two-wire magnetic pickup device that generates an AC signal as rotation occurs. It is threaded into the transaxle case.

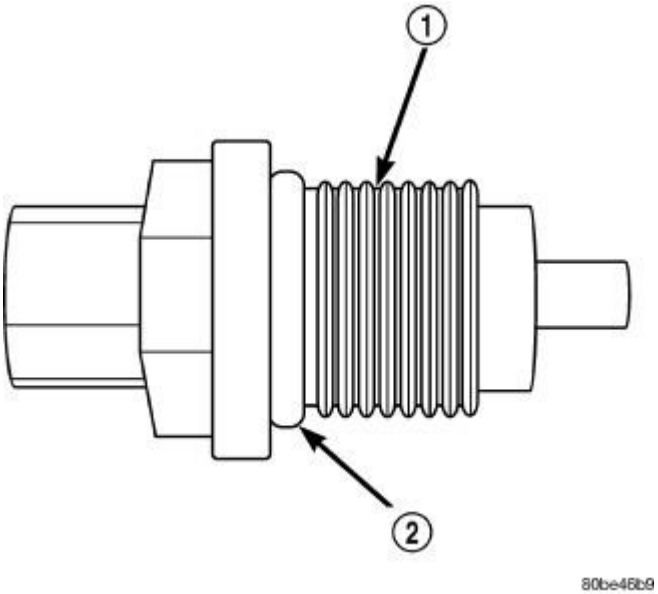


Fig. 379: Identifying Output Speed Sensor & O-Ring
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR
2 - O-RING

The Output Speed Sensor (1) is sealed with an O-ring (2) , and is considered a primary input to the Powertrain/Transmission Control.

OPERATION

OPERATION

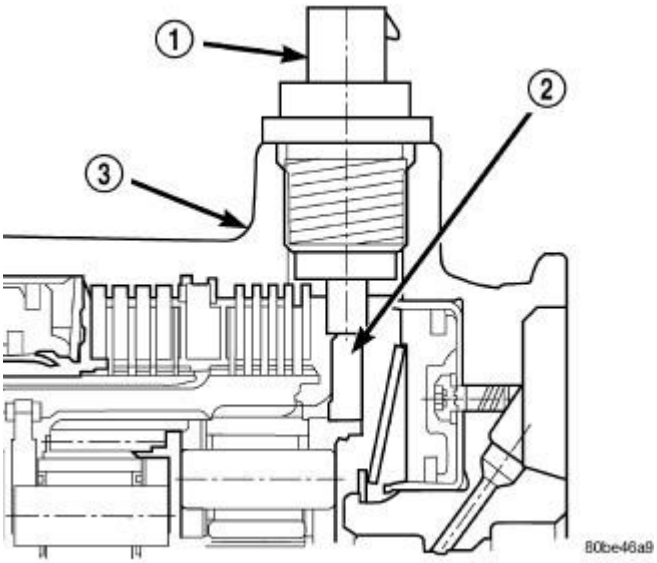


Fig. 380: Identifying Output Speed Sensor & Rear Planet Carrier/Output Shaft Assembly
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR
2 - REAR PLANET CARRIER/OUTPUT SHAFT ASSEMBLY
3 - TRANSAXLE CASE

The Output Speed Sensor (1) provides information on how fast the output shaft is rotating. As the rear planetary carrier park pawl lugs pass by the sensor coil, an AC voltage is generated and sent to the PCM/TCM. The PCM/TCM interprets this information as output shaft RPM.

The PCM/TCM compares the input and output speed signals to determine the following:

- Transmission gear ratio
- Speed ratio error detection
- CVI calculation

VEHICLE SPEED SIGNAL

The vehicle speed signal is taken from the Output Speed Sensor. The PCM converts this signal into a pulse per mile signal and sends the vehicle speed message across the communication bus to the BCM. The BCM sends this signal to the Instrument Cluster to display vehicle speed to the driver. The vehicle speed signal pulse is roughly 8000 pulses per mile.

REMOVAL

REMOVAL

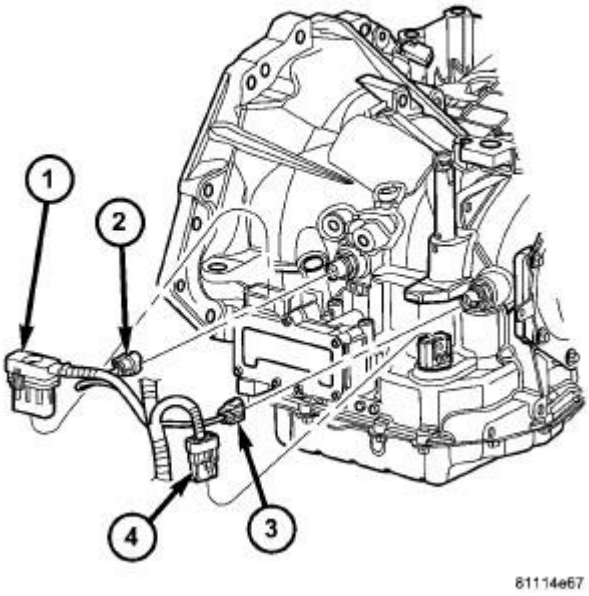


Fig. 381: Identifying Transmission Connectors
Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR
2 - INPUT SPEED SENSOR CONNECTOR
3 - OUTPUT SPEED SENSOR CONNECTOR
4 - TRANSMISSION RANGE SENSOR CONNECTOR

1. Disconnect battery negative cable.
2. Raise vehicle on hoist.
3. Disconnect output speed sensor connector (3) .

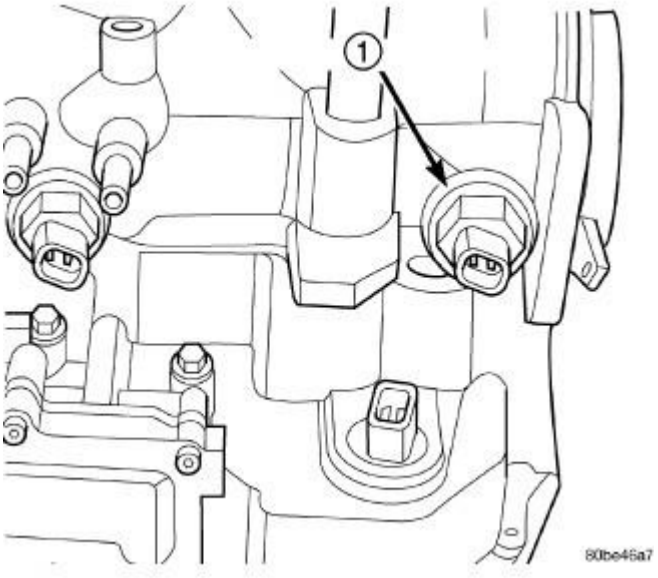


Fig. 382: Identifying Output Speed Sensor
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR

4. Unscrew and remove output speed sensor (1) .

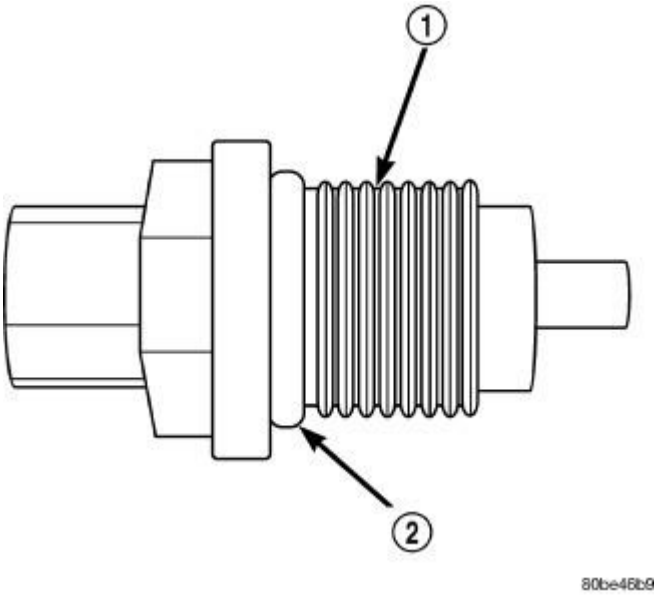


Fig. 383: Identifying Output Speed Sensor & O-Ring
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR
2 - O-RING

5. Inspect speed sensor O-ring (2) and replace if necessary.

INSTALLATION

INSTALLATION

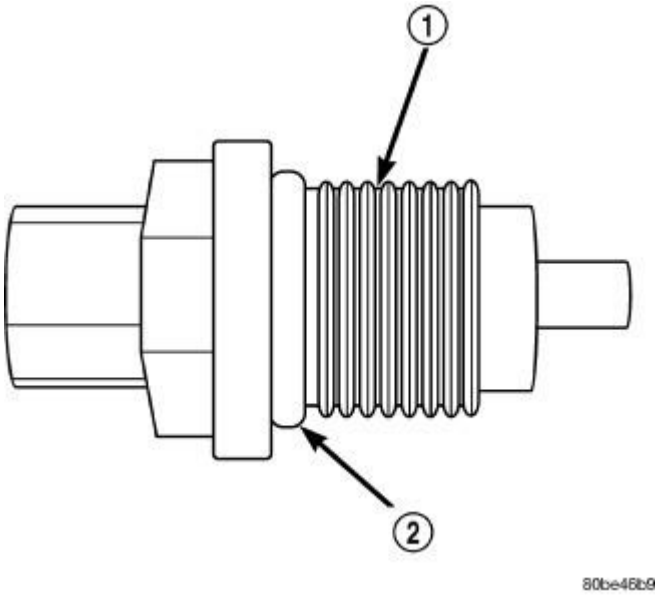


Fig. 384: Identifying Output Speed Sensor & O-Ring
Courtesy of CHRYSLER LLC

1 - OUTPUT SPEED SENSOR
2 - O-RING

1. Verify o-ring (2) is installed into position.
2. Install and tighten output speed sensor (1) to 27 N.m (20 ft. lbs.).

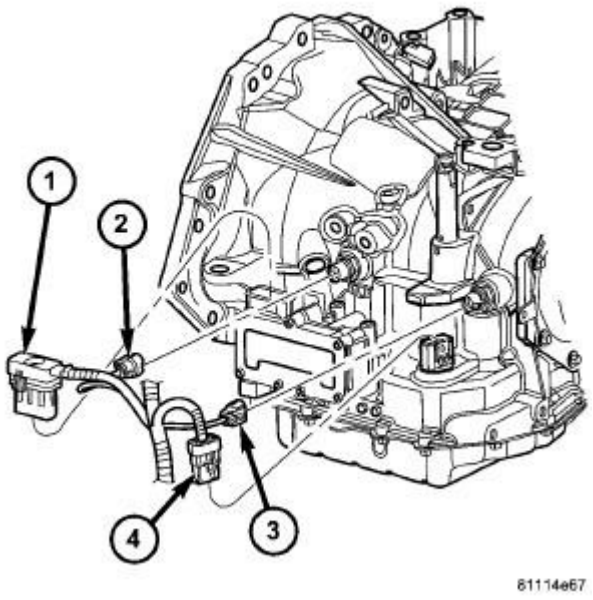


Fig. 385: Identifying Transmission Connectors
Courtesy of CHRYSLER LLC

1 - SOLENOID PACK CONNECTOR
2 - INPUT SPEED SENSOR CONNECTOR
3 - OUTPUT SPEED SENSOR CONNECTOR
4 - TRANSMISSION RANGE SENSOR CONNECTOR

3. Connect speed sensor connector.
4. Connect battery negative cable.

SENSOR, TRANSMISSION RANGE

DESCRIPTION

DESCRIPTION

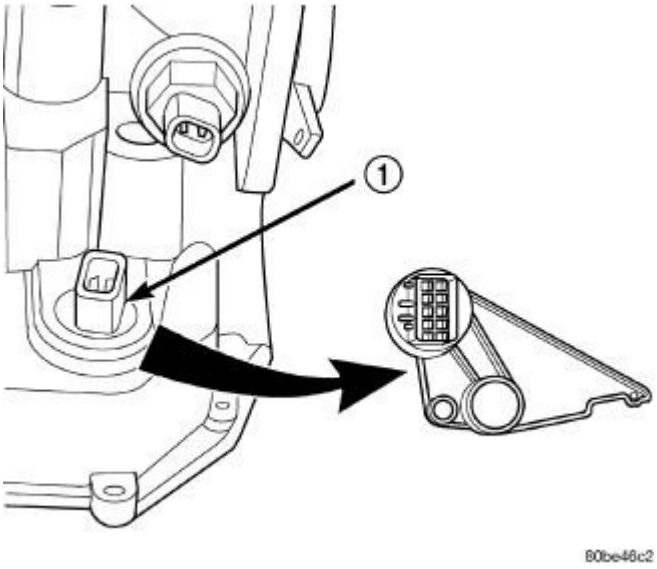


Fig. 386: Locating Transmission Range Sensor (TRS)
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR

The Transmission Range Sensor (TRS) (1) is mounted to the top of the valve body inside the transaxle and can only be serviced by removing the valve body. The electrical connector extends through the transaxle case.

The Transmission Range Sensor (TRS) has four switch contacts that monitor shift lever position and send the information to the PCM/TCM.

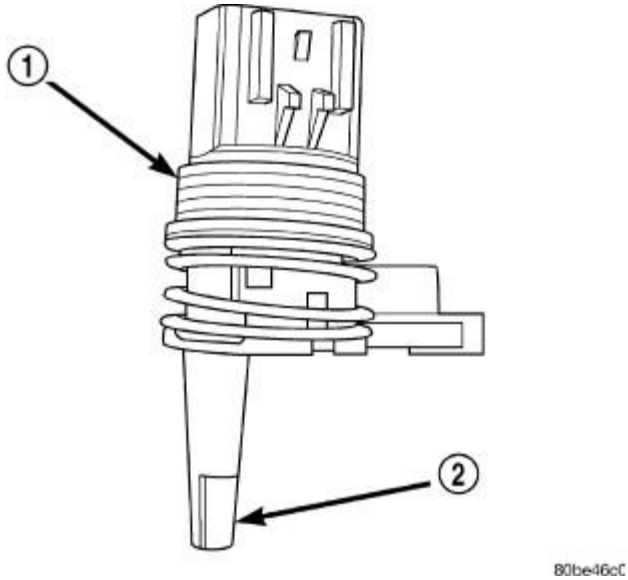


Fig. 387: Identifying Transmission Range Sensor With Integrated Temperature Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR
2 - TEMPERATURE SENSOR

The TRS (1) also has an integrated temperature sensor (thermistor) (2) that communicates transaxle temperature to the TCM and PCM .

OPERATION

OPERATION

The Transmission Range Sensor (TRS) communicates Shift Lever Position (SLP) to the PCM/TCM as a combination of open and closed switches. Each shift lever position has an assigned combination of switch states (open/closed) that the PCM/TCM receives from four sense circuits. The PCM/TCM interprets this information and determines the appropriate transaxle gear position and shift schedule.

Since there are four switches, there are 16 possible combinations of open and closed switches (codes). Seven of these codes are related to gear position and three are recognized as "between gear" codes. This results in six codes which should never occur. These are called "invalid" codes. An invalid code will result in a DTC, and the PCM/TCM will then determine the shift lever position based on pressure switch data. This allows reasonably normal transmission operation with a TRS failure.

TRS SWITCH STATES

SHIFT LEVER POSITION	T42	T41	T3	T1
P	CL	CL	CL	OP
R	CL	OP	OP	OP
N	CL	CL	OP	CL
OD	OP	OP	OP	CL
3	OP	OP	CL	OP
L	CL	OP	CL	CL

TRANSMISSION TEMPERATURE SENSOR

The TTS has an integrated thermistor that the PCM/TCM uses to monitor the transmission's sump temperature. Since fluid temperature can affect transmission shift quality and convertor lock up, the PCM/TCM requires this information to determine which shift schedule to operate in. The PCM also monitors this temperature data so it can energize the vehicle cooling fan(s) when a transmission "overheat" condition exists. If the thermistor circuit fails, the PCM/TCM will revert to calculated oil temperature usage.

CALCULATED TEMPERATURE

A failure in the temperature sensor or circuit will result in calculated temperature being substituted for actual temperature. Calculated temperature is a predicted fluid temperature which is calculated from a combination of inputs:

- Battery (ambient) temperature

- Engine coolant temperature
- In-gear run time since start-up

REMOVAL

REMOVAL

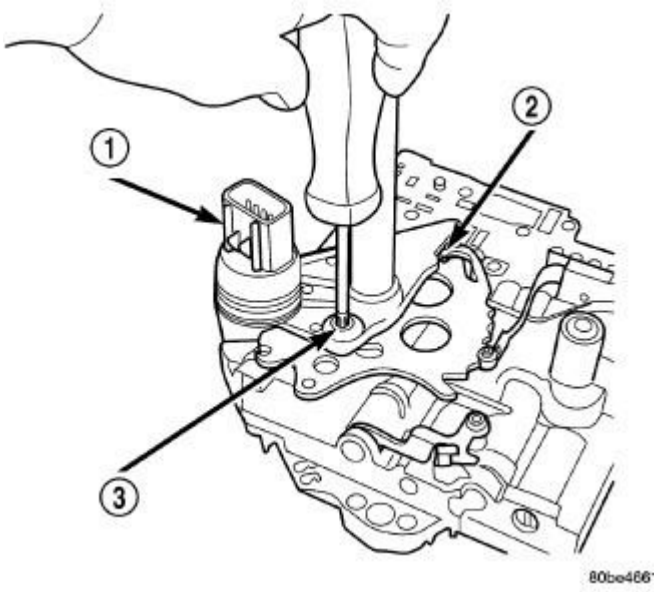


Fig. 388: Removing/Installing Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR
2 - MANUAL VALVE CONTROL PIN
3 - RETAINING SCREW

1. Remove valve body assembly from transaxle. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Removal**.
2. Remove Transmission Range Sensor retaining screw (3) and remove sensor (1) from valve body.
3. Remove TRS (1) from manual shaft.

INSTALLATION

INSTALLATION

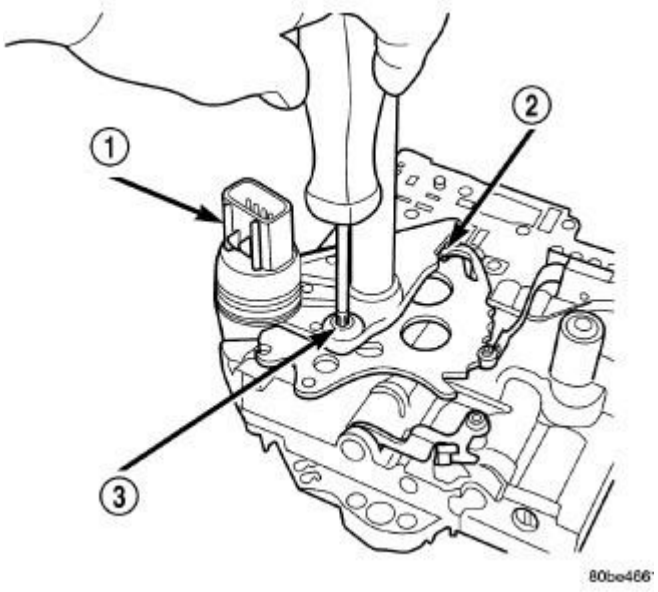


Fig. 389: Removing/Installing Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR
2 - MANUAL VALVE CONTROL PIN
3 - RETAINING SCREW

1. Install Transmission Range Sensor (TRS) (1) to the valve body and torque retaining screw (3) to 5 N.m (45 in. lbs.).
2. Install valve body to transaxle. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Installation**.

SENSOR, VARIABLE LINE PRESSURE

DESCRIPTION

DESCRIPTION

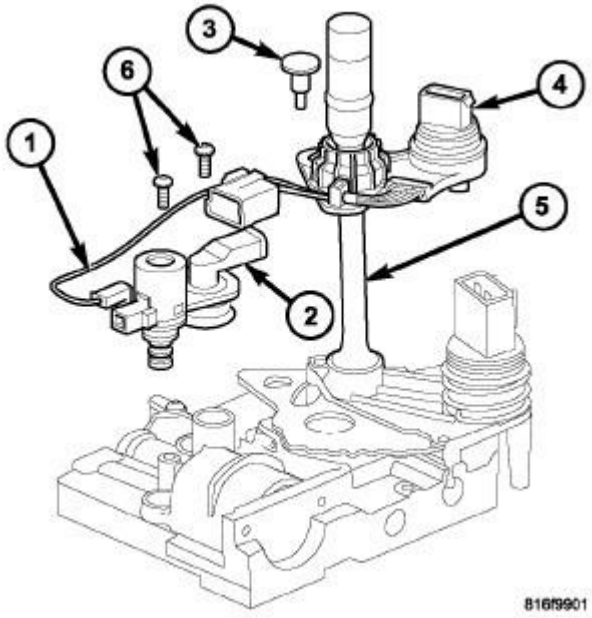


Fig. 390: Identifying Variable Line Pressure Sensor
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

The line pressure sensor (2) is mounted on the top of the valve body, next to the pressure control solenoid (1).

The TCM utilizes a closed-loop system to control transmission line pressure. The system contains a variable force style solenoid, the Pressure Control Solenoid. The solenoid is duty cycle controlled by the TCM to vent the unnecessary line pressure supplied by the oil pump back to the sump. The system also contains a variable pressure style sensor, the Line Pressure Sensor, which is a direct input to the TCM. The line pressure solenoid monitors the transmission line pressure and completes the feedback loop to the TCM. The TCM uses this information to adjust its control of the pressure control solenoid to achieve the desired line pressure.

OPERATION

OPERATION

The TCM calculates the desired line pressure based upon inputs from the transmission and engine. The TCM calculates the torque input to the transmission and uses that information as the primary input to the calculation. The line pressure is set to a predetermined value during shifts and when the transmission is in the PARK and NEUTRAL positions. This is done to ensure consistent shift quality. During all other operation, the actual line

pressure is compared to the desired line pressure and adjustments are made to the pressure control solenoid duty cycle.

REMOVAL

REMOVAL

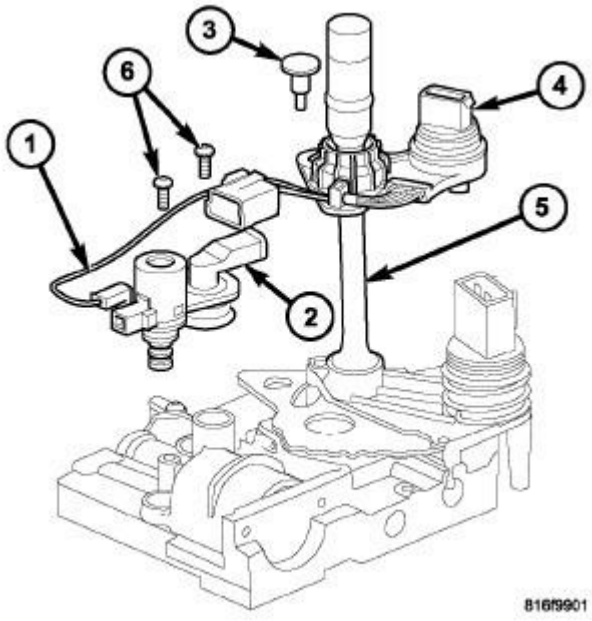


Fig. 391: Removing/Installing Variable Line Pressure Sensor
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

1. Remove the valve body from the transmission. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Removal**.
2. Remove the electrical connectors from the pressure control solenoid (1) and the line pressure sensor (2).
3. Remove the screws (6) holding the pressure control solenoid (1) and line pressure sensor (2) to the valve body.
4. Remove the pressure control solenoid and line pressure sensor from the valve body.

INSTALLATION

INSTALLATION

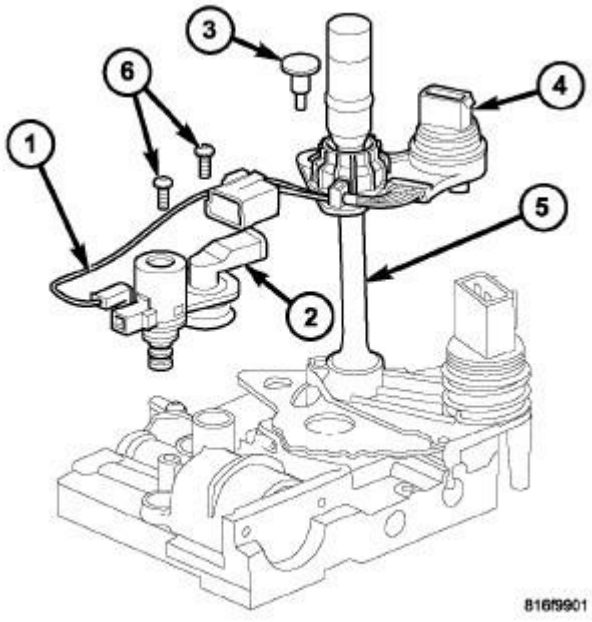


Fig. 392: Removing/Installing Variable Line Pressure Sensor
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

1. Install the pressure control solenoid (1) and line pressure sensor (2) into the valve body.
2. Install the screws (6) to hold the pressure control solenoid (1) and line pressure sensor (2) to the valve body.
3. Install the electrical connectors to the pressure control solenoid (1) and the line pressure sensor (2).
4. Install the valve body into the transmission. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Installation**.

SHIFTER, TRANSMISSION

REMOVAL

REMOVAL

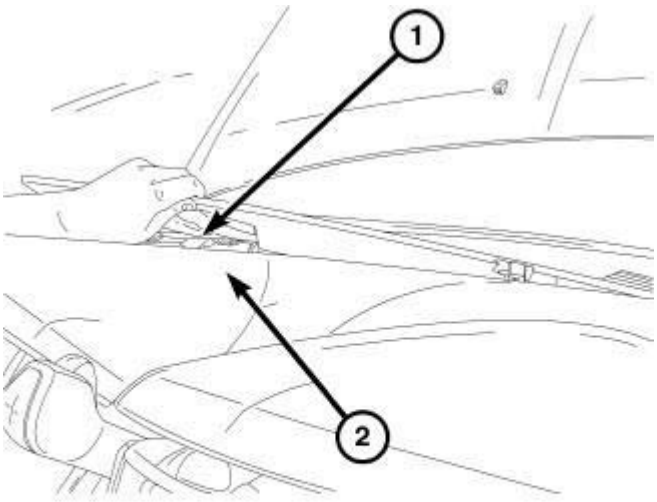


Fig. 393: Removing/Installing Defroster Cover
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Using a trim stick remove the defroster cover (1).

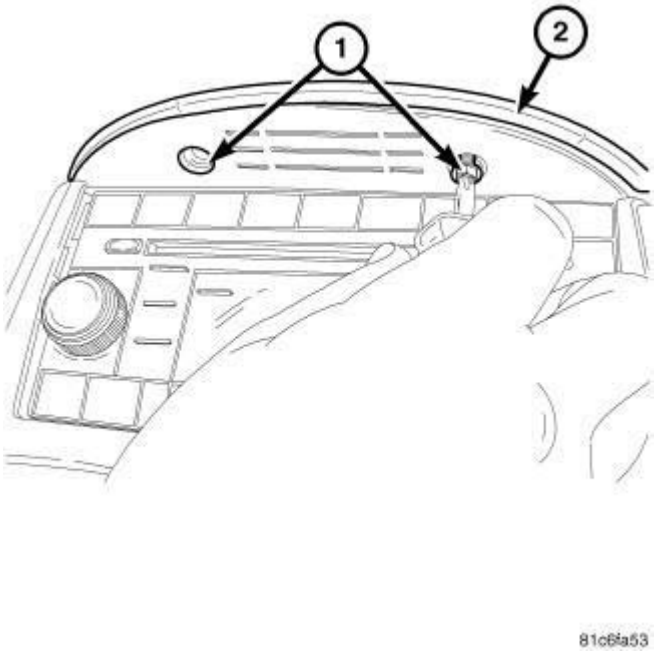


Fig. 394: Removing/Installing Screws At Center Stack Cover
Courtesy of CHRYSLER LLC

3. Remove the screws (1) at the center stack cover (2).

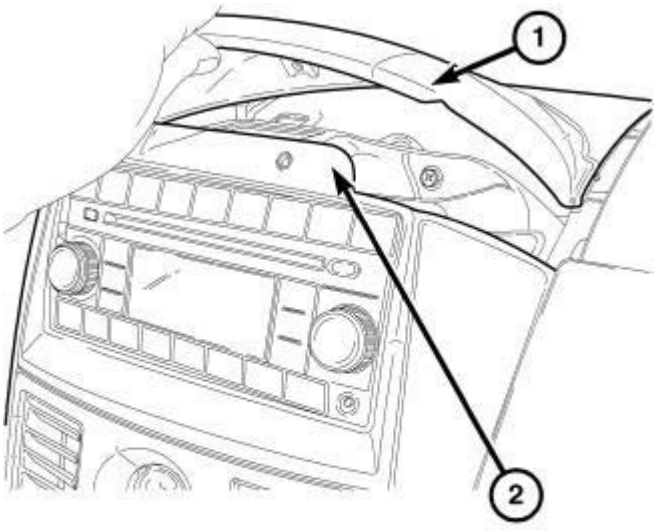


Fig. 395: Removing/Installing Center Stack Cover
Courtesy of CHRYSLER LLC

4. Remove the center stack cover (1).

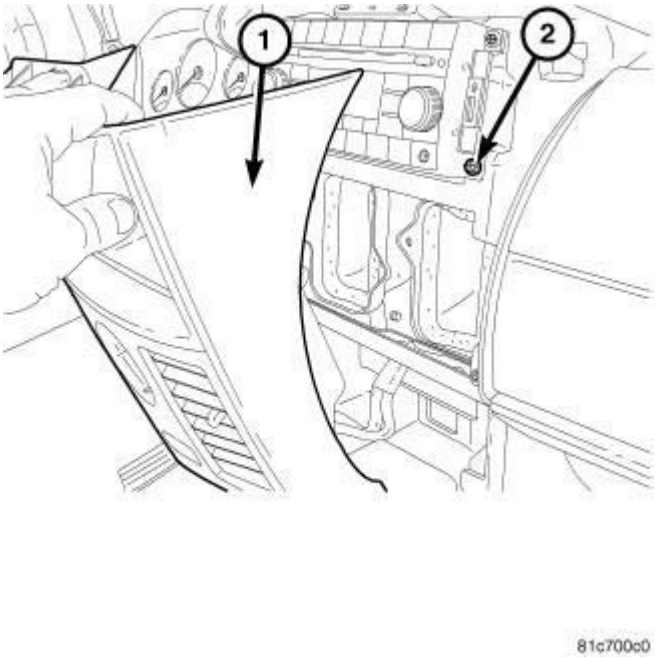


Fig. 396: Pulling Center Stack Back
Courtesy of CHRYSLER LLC

5. Pull center stack (1) back.

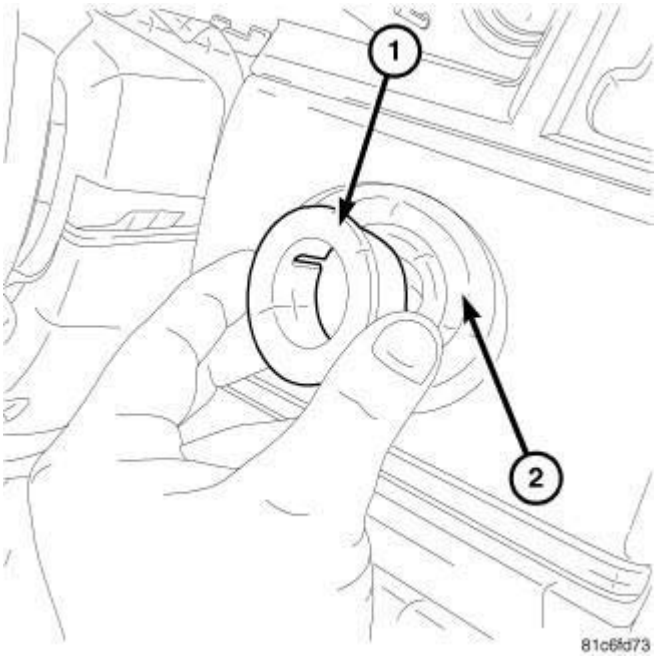


Fig. 397: Removing/Installing Ignition Switch Bezel
Courtesy of CHRYSLER LLC

6. Remove the ignition switch bezel (1) from I/P cover (2).

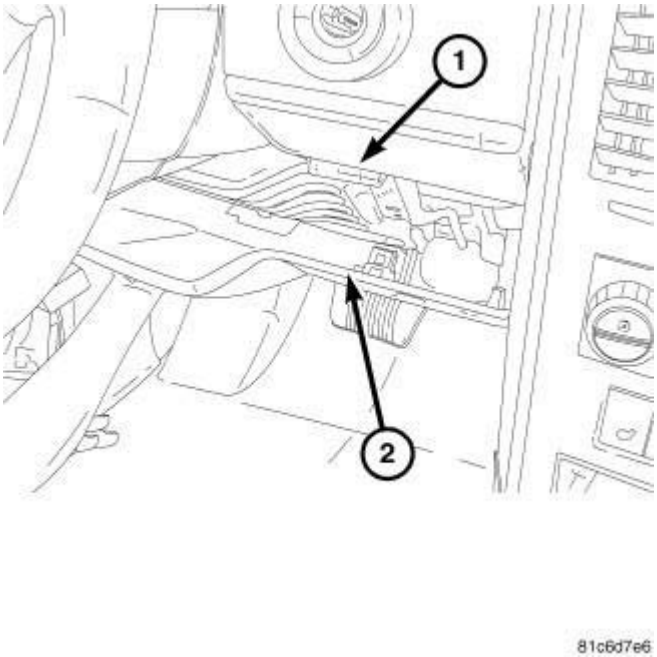


Fig. 398: Identifying Knee Blocker
Courtesy of CHRYSLER LLC

7. Remove the knee blocker (2).

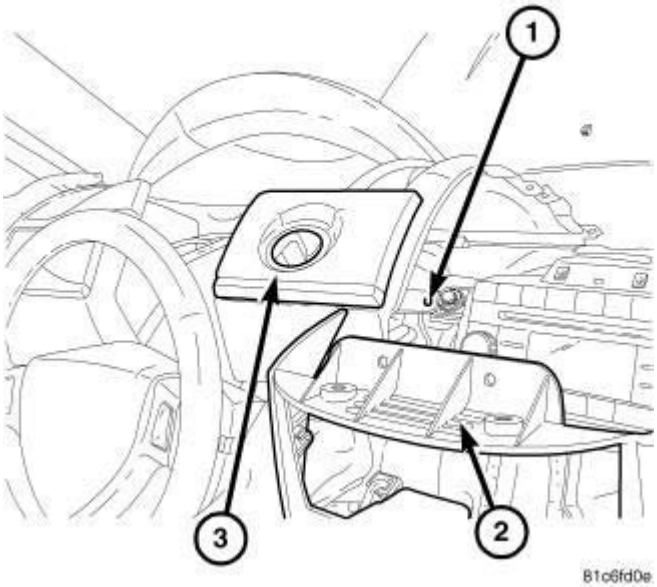


Fig. 399: Removing/Installing I/P Cover
Courtesy of CHRYSLER LLC

8. Remove the I/P cover (3) (if equipped).

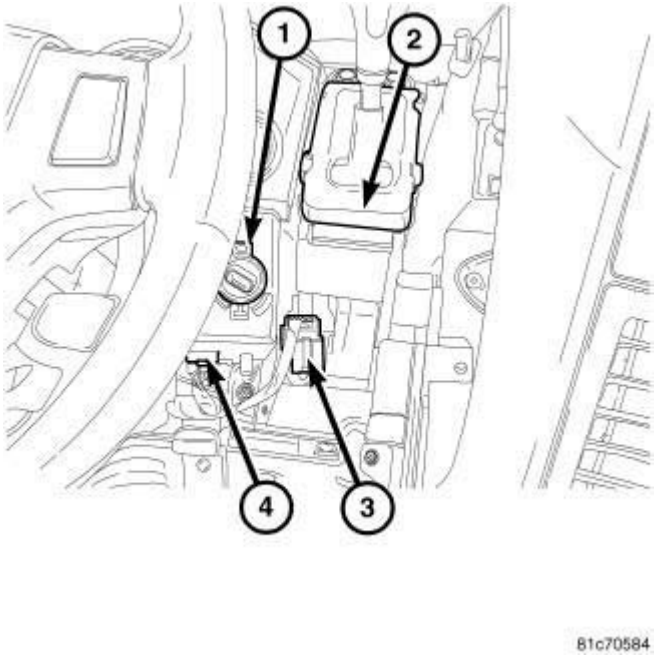


Fig. 400: Identifying Electrical Connectors At WIN & Shifter
Courtesy of CHRYSLER LLC

9. Remove the cluster bezel.
10. Remove the shift knob.

11. Unplug the electrical connectors (3, 4) at the WIN (1) and the shifter (2).

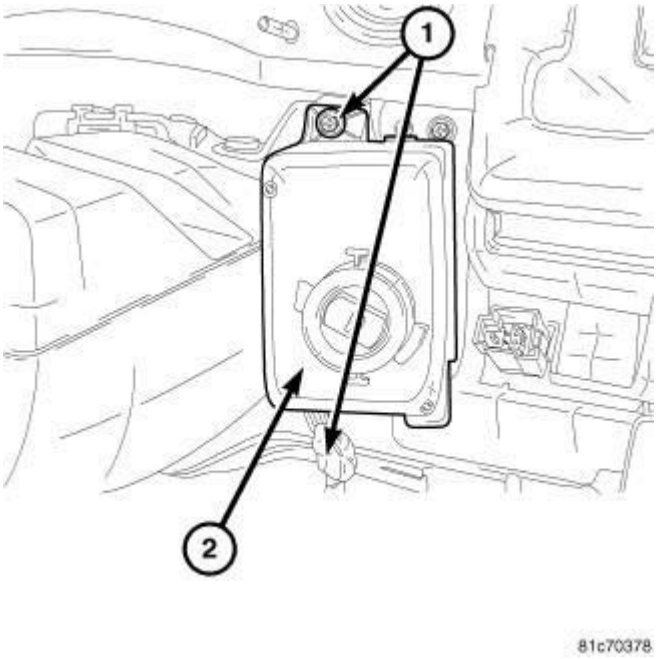


Fig. 401: Removing/Installing Screws At Win
Courtesy of CHRYSLER LLC

12. Remove the screws (1) at the WIN (2).
13. Remove the WIN to gain access to the lower shifter bolts.

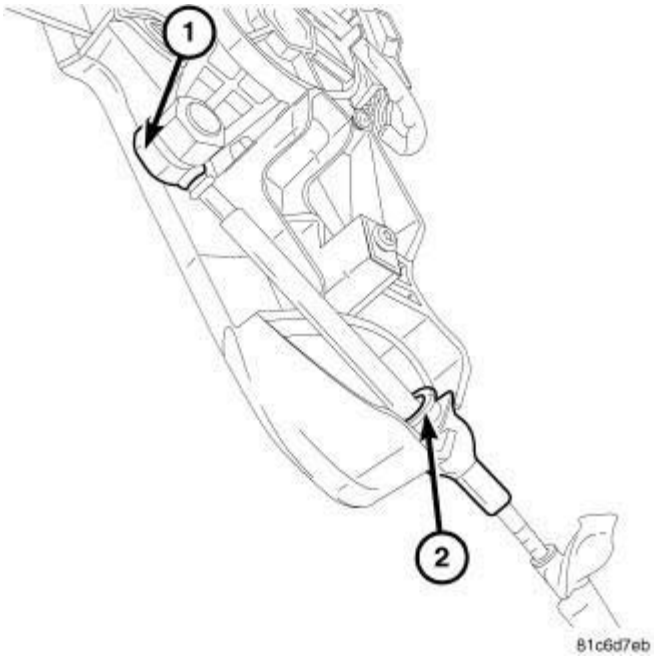


Fig. 402: Identifying Shift Cable At Shifter
Courtesy of CHRYSLER LLC

NOTE: Ensure the lock tab at the shifter housing (2) is depressed before pulling the cable from the shifter housing.

14. Remove the shift cable (1, 2) at the shifter.

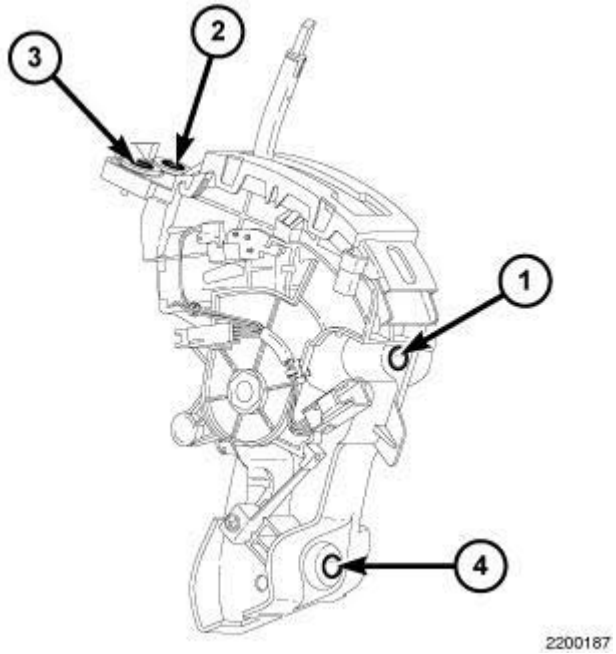


Fig. 403: Identifying Shifter Mounting Bolts
Courtesy of CHRYSLER LLC

15. Remove the shifter mounting bolts 1 thru 4.
16. Remove the shifter.

INSTALLATION

INSTALLATION

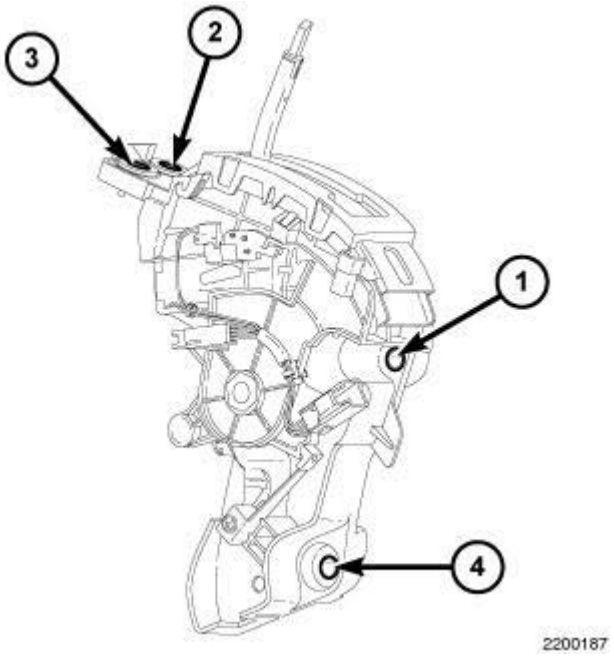


Fig. 404: Identifying Shifter Mounting Bolts
Courtesy of CHRYSLER LLC

1. Install the shifter mounting bolts and tighten to 20 N.m (15 ft. lbs.) in the proper sequence as indicated on drawing.

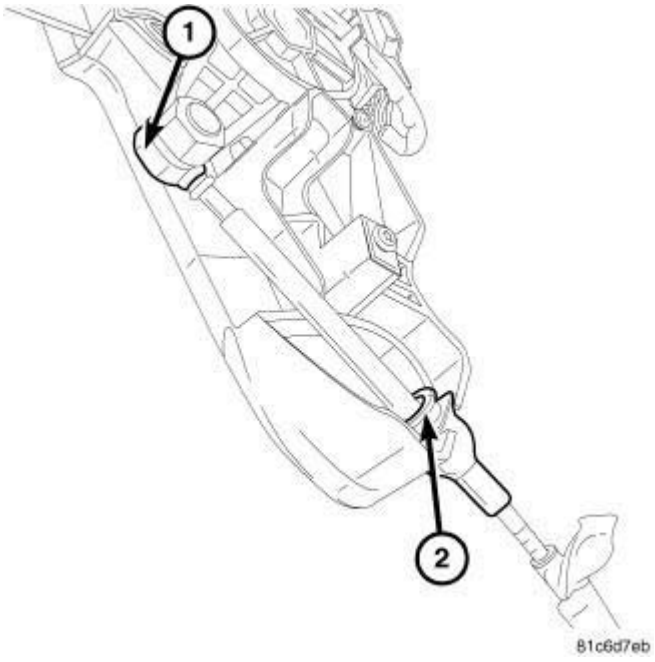


Fig. 405: Identifying Shift Cable At Shifter
Courtesy of CHRYSLER LLC

NOTE: Ensure the lock tab is in the lock position after the cable is installed onto

the shifter housing (2).

2. Install the shift cable (1, 2) at the shifter.

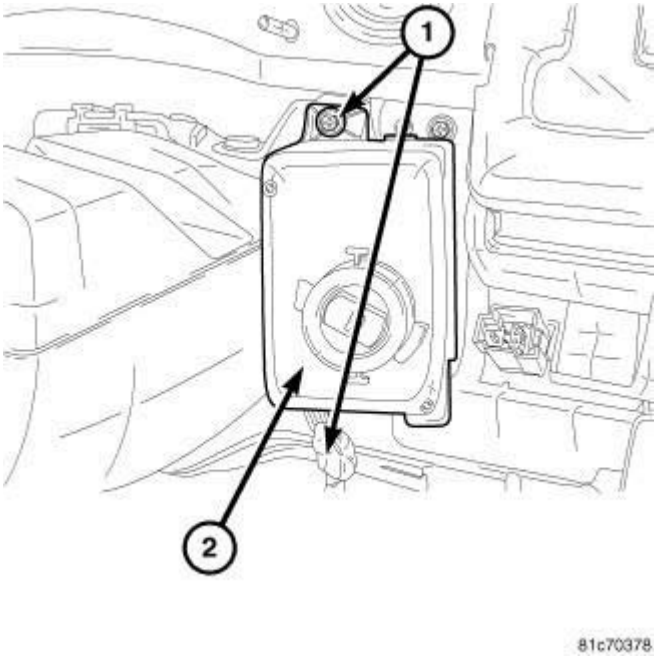


Fig. 406: Removing/Installing Screws At Win
Courtesy of CHRYSLER LLC

3. Install the WIN (2) and install the mounting screws (1).

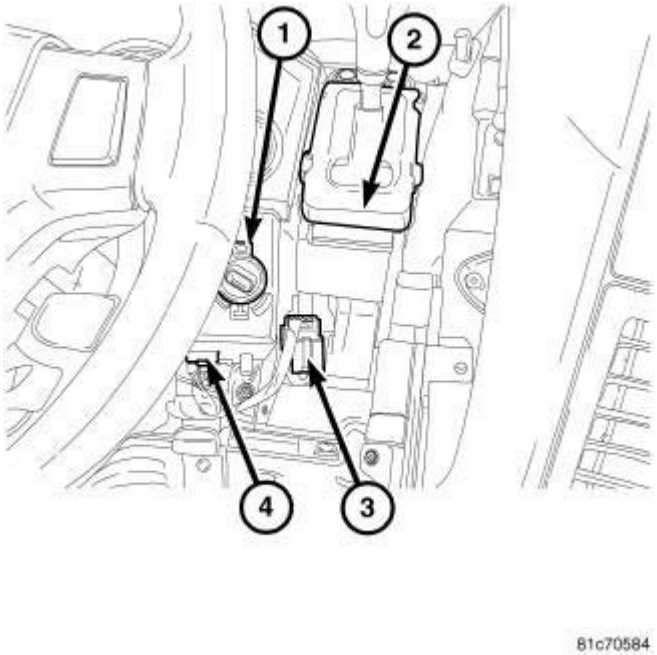


Fig. 407: Identifying Electrical Connectors At WIN & Shifter

Courtesy of CHRYSLER LLC

4. Connect the electrical connectors (3, 4) at the WIN (1) and the shifter (2).

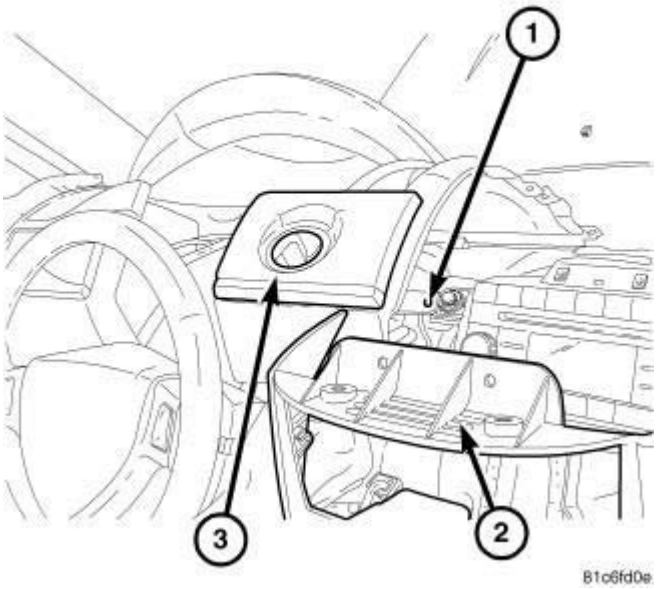


Fig. 408: Removing/Installing I/P Cover
Courtesy of CHRYSLER LLC

5. Install the I/P cover (3).

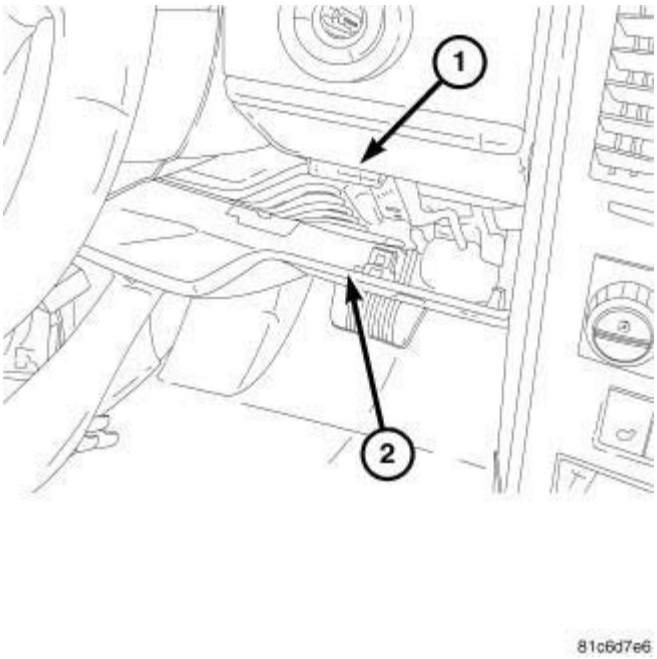


Fig. 409: Identifying Knee Blocker

Courtesy of CHRYSLER LLC

6. Install the knee blocker (2).

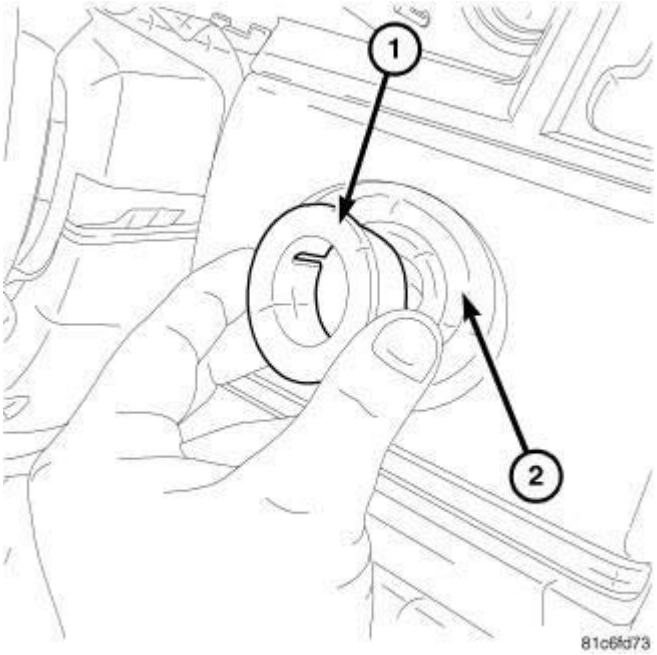


Fig. 410: Removing/Installing Ignition Switch Bezel
Courtesy of CHRYSLER LLC

7. Install the shift knob.
8. Install the ignition switch bezel (1) to I/P cover (2).

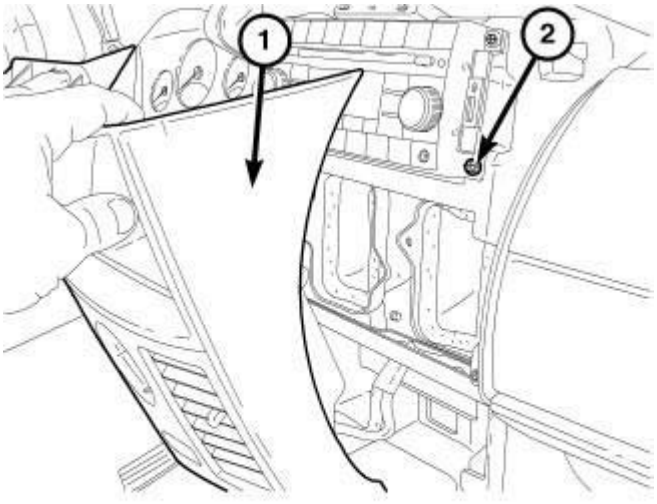


Fig. 411: Pulling Center Stack Back
Courtesy of CHRYSLER LLC

9. Install center stack cover (1) back into position.

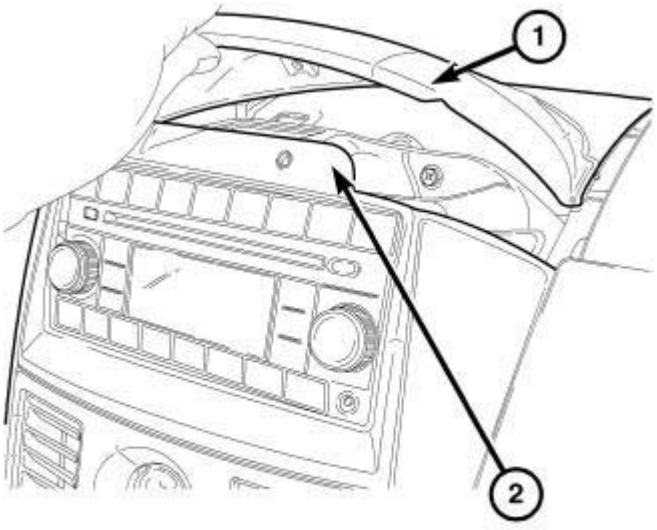


Fig. 412: Removing/Installing Center Stack Cover
Courtesy of CHRYSLER LLC

10. Install the center stack top cover (1) back.
11. Install the cluster bezel.

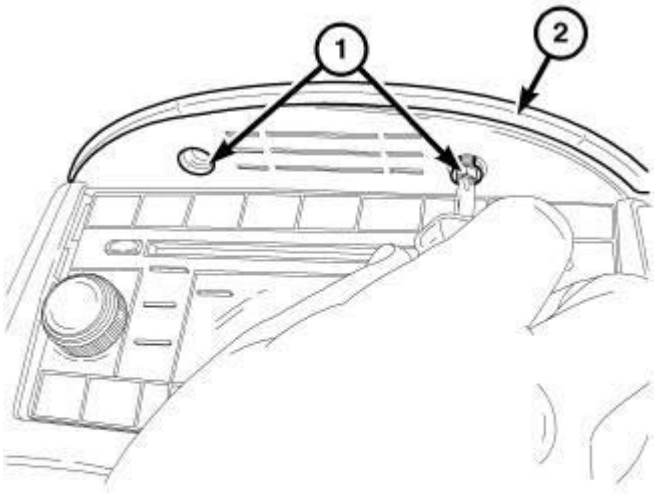


Fig. 413: Removing/Installing Screws At Center Stack Cover
Courtesy of CHRYSLER LLC

12. Install the screws (1) at the center stack cover (2).

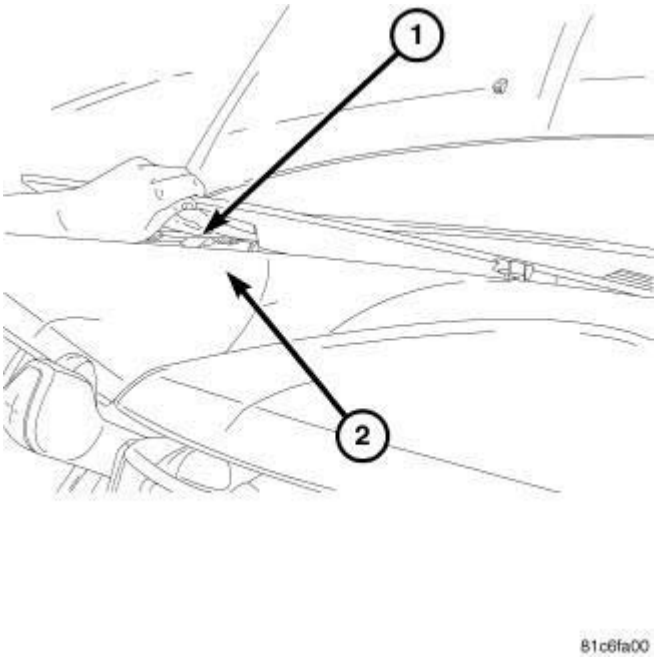


Fig. 414: Removing/Installing Defroster Cover
Courtesy of CHRYSLER LLC

13. Install the defroster cover (1).
14. Connect the battery cable.

SOLENOID, PRESSURE CONTROL

DESCRIPTION

DESCRIPTION

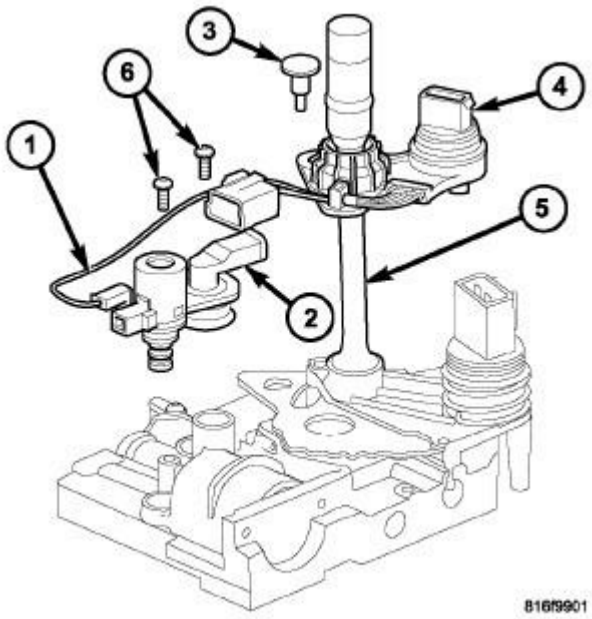


Fig. 415: Identifying Variable Line Pressure Components
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

The pressure control solenoid (1) is mounted on the top of the valve body, next to the line pressure sensor (2).

The TCM utilizes a closed-loop system to control transmission line pressure. The system contains a variable force style solenoid, the Pressure Control Solenoid. The solenoid is duty cycle controlled by the TCM to vent the unnecessary line pressure supplied by the oil pump back to the sump. The system also contains a variable pressure style sensor, the Line Pressure Sensor, which is a direct input to the TCM. The line pressure solenoid monitors the transmission line pressure and completes the feedback loop to the TCM. The TCM uses this information to adjust its control of the pressure control solenoid to achieve the desired line pressure.

OPERATION

OPERATION

The pressure control solenoid (PCS) is a variable force (VFS) style solenoid. A VFS solenoid is an electro-hydraulic actuator, combining a solenoid and a regulating valve.

The transmission control module varies the current for the PCS, which varies the pressure in the line pressure hydraulic circuit. When the current (duty cycle) of the PCS is low, the pressure in the circuit is higher. At 0 current (0% duty cycle), the pressure is at the maximum value. Conversely, when the current is maximized (100% duty cycle), the pressure in the circuit is at the lowest possible value.

REMOVAL

REMOVAL

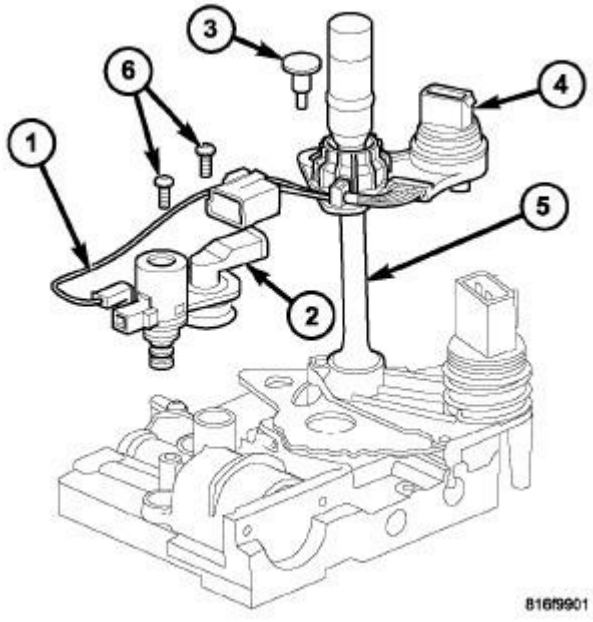


Fig. 416: Removing/Installing Pressure Control Solenoid & Line Pressure Sensor
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

1. Remove the valve body from the transmission. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Removal**.

2. Remove the electrical connectors from the pressure control solenoid (1) and the line pressure sensor (2).
3. Remove the screws (6) holding the pressure control solenoid (1) and line pressure sensor (2) to the valve body.
4. Remove the pressure control solenoid and line pressure sensor from the valve body.

INSTALLATION

INSTALLATION

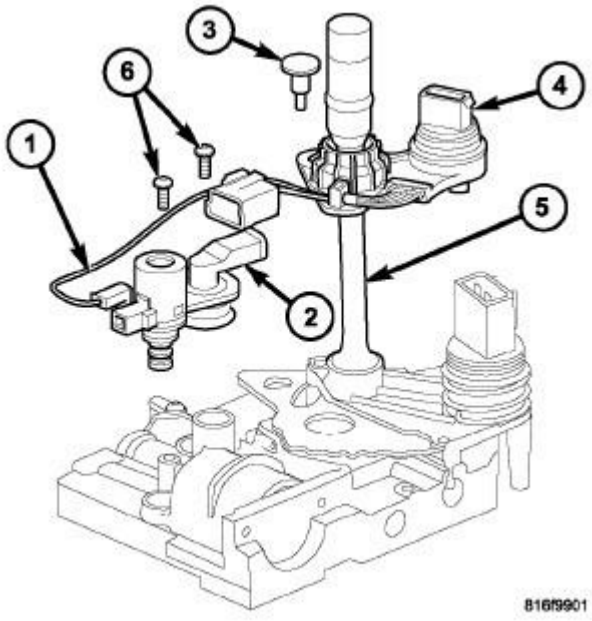


Fig. 417: Removing/Installing Pressure Control Solenoid & Line Pressure Sensor
Courtesy of CHRYSLER LLC

1 - PRESSURE CONTROL SOLENOID
2 - LINE PRESSURE SENSOR
3 - SHOULDER SCREW
4 - VARIABLE LINE PRESSURE HEADER
5 - MANUAL SHAFT
6 - SCREWS

1. Install the pressure control solenoid (1) and line pressure sensor (2) into the valve body.
2. Install the screws (6) to hold the pressure control solenoid (1) and line pressure sensor (2) to the valve body.
3. Install the electrical connectors to the pressure control solenoid (1) and the line pressure sensor (2).
4. Install the valve body into the transmission. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Installation**.

SWITCH, AUTOSTICK

DESCRIPTION

DESCRIPTION

Autostick is a driver-interactive transmission feature that offers manual gear shifting capability to provide you with more control. Autostick allows you to maximize engine braking, eliminate undersirable upshifts and downshifts, and improve overall vehicle performance. This system can also provide you with more control during passing, city driving, cold slippery conditions, mountain driving, trailer towing, and many other situations.

OPERATION

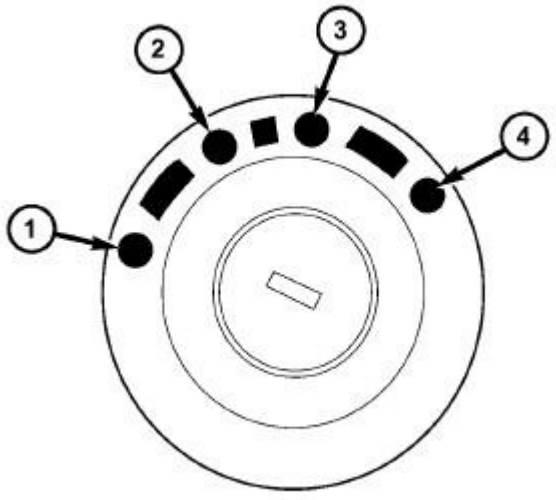
OPERATION

Autostick is a driver interactive transaxle feature that offers manual gear shifting capability. When the shifter is moved into the Autostick position, the transaxle remains in whatever gear it was using before Autostick was activated. Moving the shifter to the left (towards the driver) causes a downshift and moving to the right (towards the passenger) causes an upshift. The instrument cluster will illuminate the selected gear. The vehicle can be launched in 1st, 2nd, or 3rd gear while in the Autostick mode. The speed control is operable in 3rd and 4th gear Autostick mode. Speed control will be deactivated if the transaxle is shifted to 2nd gear. Shifting into OD position cancels the Autostick mode, and the transaxle resumes the OD shift schedule.

SYSTEM, SHIFT INTERLOCK

DESCRIPTION

DESCRIPTION



8111e2ba

Fig. 418: Identifying Ignition Key/Switch Positions
Courtesy of CHRYSLER LLC

1 - LOCK 2 - ACC 3 - ON 4 - START

The Brake Transmission Shifter/Ignition Interlock (BTSI) is a solenoid operated system that prevents the transmission gear shifter from being moved out of PARK without a driver in place.

OPERATION

OPERATION

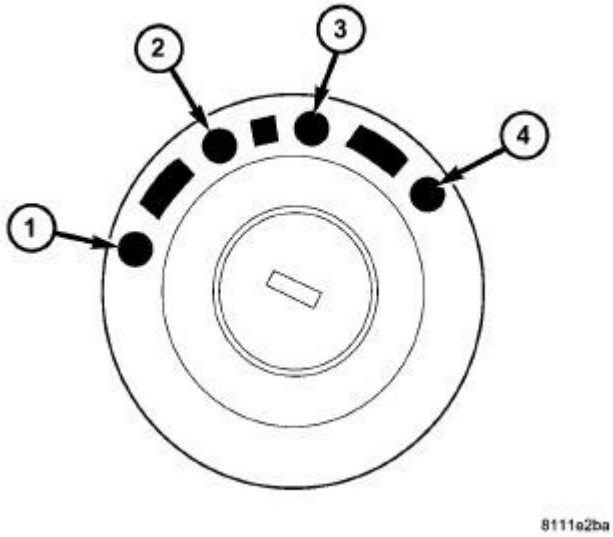


Fig. 419: Identifying Ignition Key/Switch Positions
Courtesy of CHRYSLER LLC

1 - LOCK 2 - ACC 3 - ON 4 - START

The Brake Transmission Shifter/Ignition Interlock (BTSI) is engaged whenever the ignition switch is in the LOCK or ACC position. An additional electrically activated feature will prevent shifting out of the PARK position unless the brake pedal is depressed at least one-half inch. When the key is in the ON position and the brake pedal is depressed, the shifter is unlocked and will move into any position.

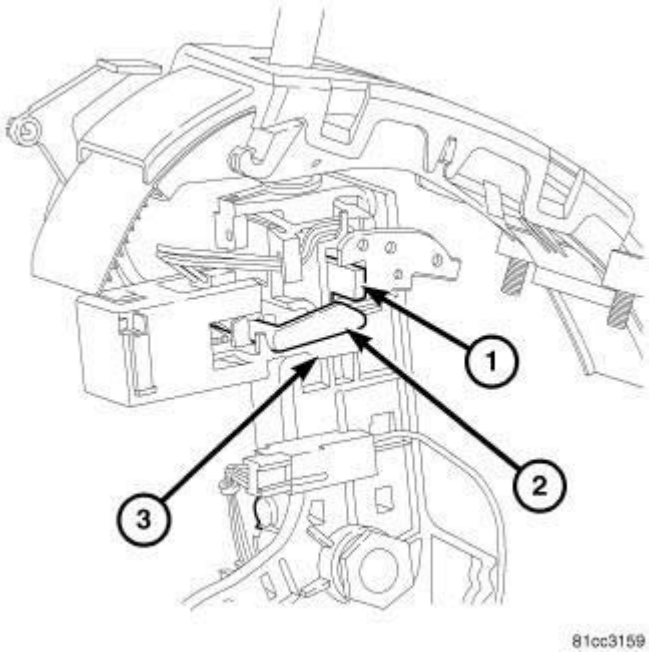


Fig. 420: Identifying Rotating Arm, Blocking Arm, & Shifter Gate Pin
Courtesy of CHRYSLER LLC

When service brake pedal is not depressed the solenoid rotating arm (2) is free to rotate. The shifter gate pin (1) hits the blocking arm (3) and is prevented from moving from park.

When service brake is applied the rotating arm (2) is prevented from rotating by magnetic force within the solenoid. The shifter gate pin (1) pushes the rotating arm (2) and blocker arm (3) allowing the shifter to move out of park.

DIAGNOSIS AND TESTING

SHIFT INTERLOCK SYSTEM

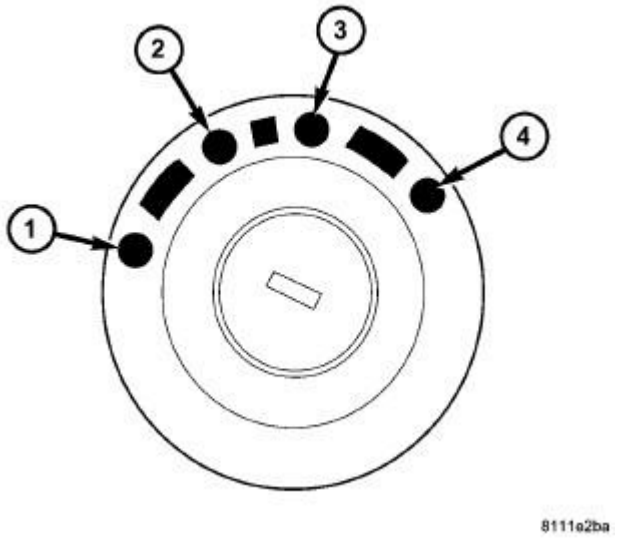


Fig. 421: Identifying Ignition Key/Switch Positions
Courtesy of CHRYSLER LLC

1 - LOCK
2 - ACC
3 - ON
4 - START

The Shifter Response Table describes the normal operation of the Brake Transmission Shift Interlock (BTSI) system. If the "expected response" differs from the vehicle's response, then system repair is necessary.

Refer to **SHIFTER RESPONSE** for expected shifter response, depending on ignition key/switch and brake pedal positions.

If the shifter cannot be moved out of the PARK position, refer to **SHIFTER LOCKED IN PLACE**. If the shift lever can be shifted out of PARK without the brake pedal depressed, the BTSI solenoid is faulty and the shifter must be replaced. If the shift lever still does not move from the park position, the problem is in the shift lever assembly. .

SHIFTER LOCKED IN PLACE

1. Gain access to the brake transmission shift interlock (BTSI) solenoid. The solenoid is part of the shifter assembly.
2. Disconnect the wire connector from the rear of the BTSI solenoid.
3. Insert the ignition key and turn it to the ON position.
4. With the brakes applied, try moving the shifter out of the PARK position.

   If the above test passes and the shifter can still be moved freely in and out of PARK without the brake pedal depressed, replace shifter assembly.

SHIFTER RESPONSE

ACTION	EXPECTED RESPONSE
1. Turn key to the "ACC" position and depress brake pedal.	1. Shifter CAN be shifted out of park.
2. Turn key to the "ON" position, with foot off of brake pedal.	2. Shifter CANNOT be shifted out of park.
3. Turn key to the "ON" position and depress the brake pedal.	3. Shifter CAN be shifted out of park.
4. Leave shifter in any gear and try to return key to the "LOCK" position.	4. Key cannot be returned to the "LOCK" position.
5. Return shifter to "PARK" and try to remove the key.	5. Key can be removed (after returning to "LOCK" position).
6. With the key removed, try to shift out of "PARK".	6. Shifter cannot be shifted out of "PARK".
Insert the key into the ignition cylinder and leave it at "LOCK." Try to move the transmission out of "Park".	Shifter cannot be shifted out of "PARK".
NOTE: Any failure to meet these expected responses requires system repair.	

TORQUE CONVERTER

DESCRIPTION

DESCRIPTION

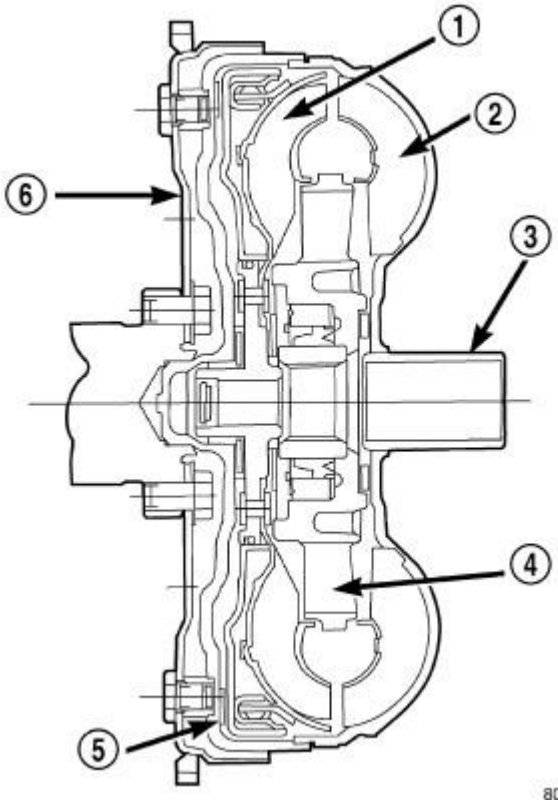


Fig. 422: Identifying Torque Converter Components
Courtesy of CHRYSLER LLC

1 - TURBINE
2 - IMPELLER
3 - HUB
4 - STATOR
5 - CONVERTER CLUTCH DISC
6 - DRIVE PLATE

The torque converter is a hydraulic device that couples the engine crankshaft to the transmission. The torque converter consists of an outer shell with an internal turbine (1) , a stator (4), an over-running clutch, an impeller (2) and an electronically applied converter clutch (5). The converter clutch provides reduced engine speed and greater fuel economy when engaged. Clutch engagement also provides reduced transmission fluid temperatures. The converter clutch engages in third gear. The torque converter hub (3) drives the transmission oil (fluid) pump.

The torque converter is a sealed, welded unit that is not repairable and is serviced as an assembly.

IMPELLER

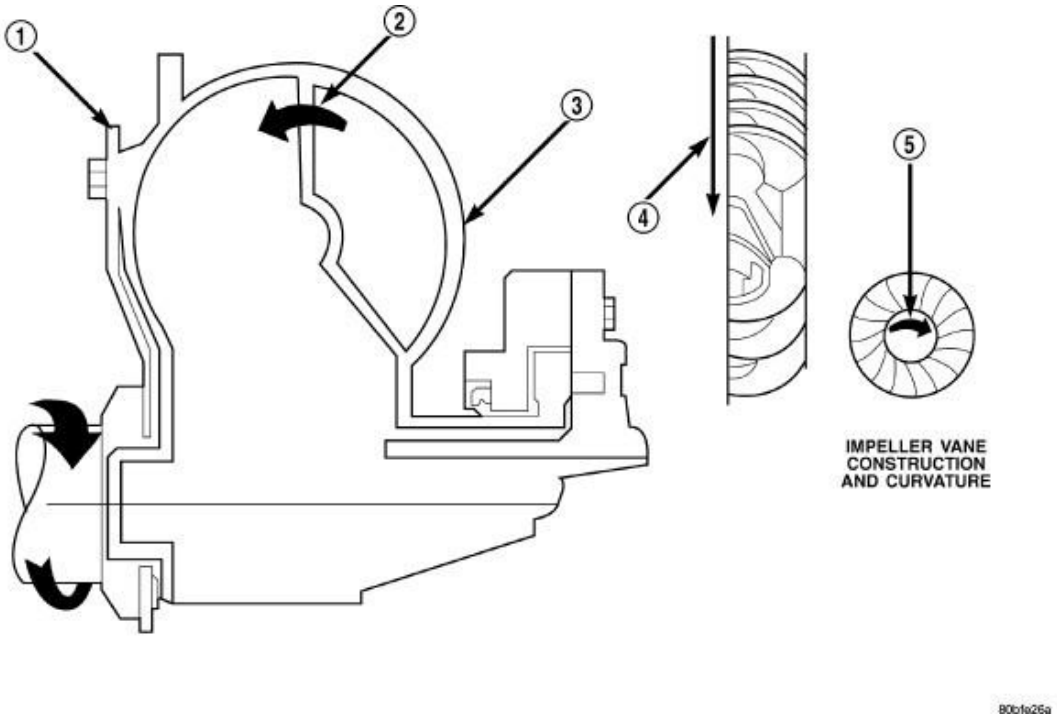


Fig. 423: Identifying Impeller Operation
Courtesy of CHRYSLER LLC

1 - ENGINE FLEXPLATE	4 - ENGINE ROTATION
2 - OIL FLOW FROM IMPELLER SECTION INTO TURBINE SECTION	5 - ENGINE ROTATION
3 - IMPELLER VANES AND COVER ARE INTEGRAL	

The impeller (3) is an integral part of the converter housing. The impeller consists of curved blades placed radially along the inside of the housing on the transmission side of the converter. As the converter housing is rotated by the engine (4,5), so is the impeller, because they are one and the same and are the driving member of the system.

TURBINE

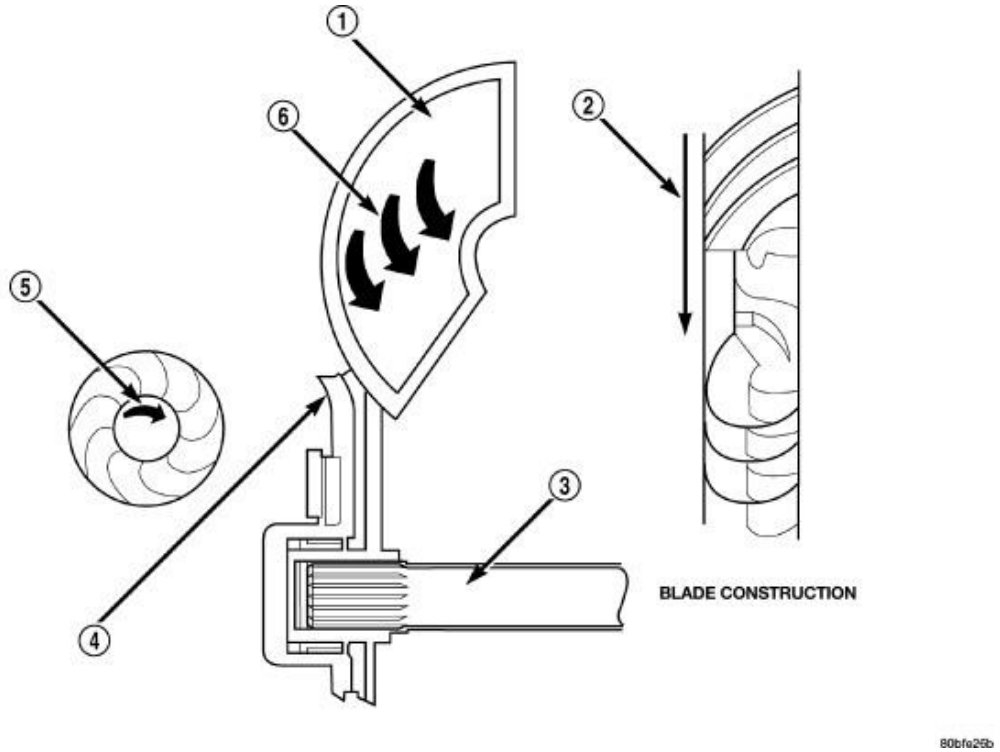


Fig. 424: Identifying Turbine Operation
Courtesy of CHRYSLER LLC

1 - TURBINE VANE
2 - ENGINE ROTATION
3 - INPUT SHAFT
4 - PORTION OF TORQUE CONVERTER COVER
5 - ENGINE ROTATION
6 - OIL FLOW WITHIN TURBINE SECTION

The turbine (1) is the output, or driven, member of the converter. The turbine is mounted within the housing opposite the impeller, but is not attached to the housing. The input shaft (3) is inserted through the center of the impeller and splined into the turbine. The design of the turbine is similar to the impeller, except the blades of the turbine are curved in the opposite direction.

STATOR

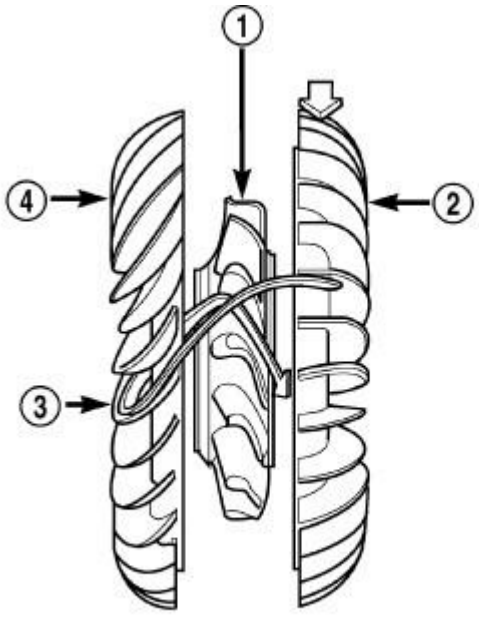


Fig. 425: Locating Stator Assembly
Courtesy of CHRYSLER LLC

1 - STATOR
2 - IMPELLER
3 - FLUID FLOW
4 - TURBINE

The stator assembly (1) is mounted on a stationary shaft which is an integral part of the oil pump. The stator is located between the impeller (2) and turbine (4) within the torque converter case. The stator contains an over-running clutch, which allows the stator to rotate only in a clockwise direction. When the stator is locked against the over-running clutch, the torque multiplication feature of the torque converter is operational.

TORQUE CONVERTER CLUTCH (TCC)

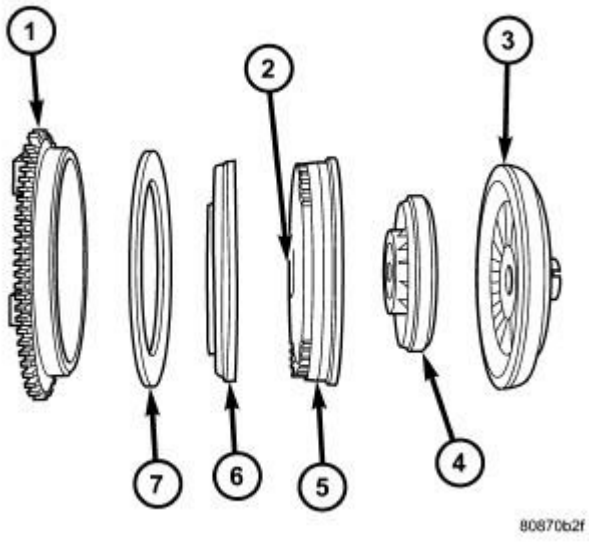


Fig. 426: Identifying Torque Converter Clutch (TCC) Components
Courtesy of CHRYSLER LLC

1 - IMPELLER FRONT COVER
2 - THRUST WASHER ASSEMBLY
3 - IMPELLER
4 - STATOR
5 - TURBINE
6 - PISTON
7 - FRICTION DISC

The TCC was installed to improve the efficiency of the torque converter that is lost to the slippage of the fluid coupling. Although the fluid coupling provides smooth, shock-free power transfer, it is natural for all fluid couplings to slip. If the impeller (3) and turbine (5) were mechanically locked together, a zero slippage condition could be obtained. A hydraulic piston (6) was added to the turbine (5), and a friction material (7) was added to the inside of the front cover (1) to provide this mechanical lock-up.

OPERATION

OPERATION

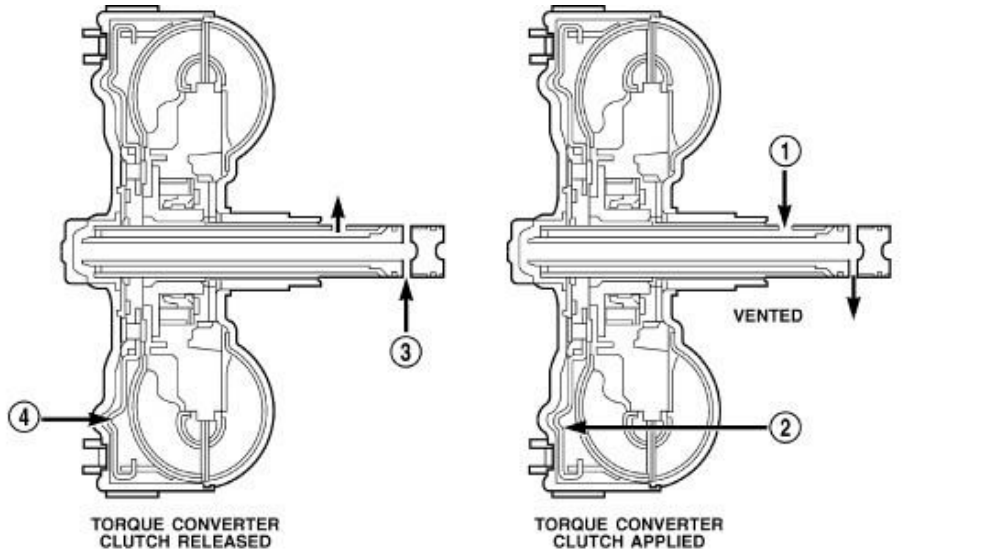


Fig. 427: Identifying Torque Converter Fluid Pressure Operation
Courtesy of CHRYSLER LLC

1 - APPLY PRESSURE	3 - RELEASE PRESSURE
2 - THE PISTON MOVES SLIGHTLY FORWARD	4 - THE PISTON MOVES SLIGHTLY REARWARD

The converter impeller (driving member), which is integral to the converter housing and bolted to the engine drive plate, rotates at engine speed. The converter turbine (driven member), which reacts from fluid pressure generated by the impeller, rotates and turns the transmission input shaft .

TURBINE

As the fluid that was put into motion by the impeller blades strikes the blades of the turbine, some of the energy and rotational force is transferred into the turbine and the input shaft. This causes both of them (turbine and input shaft) to rotate in a clockwise direction following the impeller. As the fluid is leaving the trailing edges of the turbine's blades, it continues in a "hindering" direction back toward the impeller. If the fluid is not redirected before it strikes the impeller, it will strike the impeller in such a direction that it would tend to slow it down.

STATOR

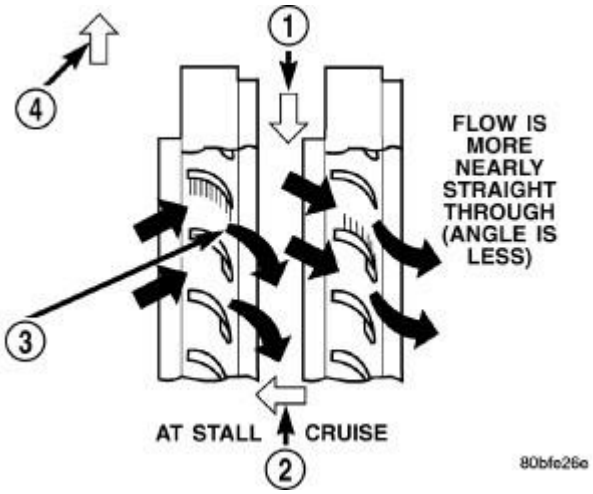


Fig. 428: Identifying Stator Operation
Courtesy of CHRYSLER LLC

1 - DIRECTION STATOR WILL FREE WHEEL DUE TO OIL PUSHING ON BACKSIDE OF VANES
2 - FRONT OF ENGINE
3 - INCREASED ANGLE AS OIL STRIKES VANES
4 - DIRECTION STATOR IS LOCKED UP DUE TO OIL PUSHING AGAINST STATOR VANES

Torque multiplication is achieved by locking the stator's over-running clutch to its shaft. Under stall conditions (the turbine is stationary), the oil leaving the turbine blades strikes the face of the stator blades and tries to rotate them in a counterclockwise direction. When this happens the over-running clutch of the stator locks and holds the stator from rotating. With the stator locked, the oil strikes the stator blades and is redirected into a "helping" direction before it enters the impeller. This circulation of oil from impeller to turbine, turbine to stator, and stator to impeller, can produce a maximum torque multiplication of about 2.4:1. As the turbine begins to match the speed of the impeller, the fluid that was hitting the stator in such as way as to cause it to lock-up is no longer doing so. In this condition of operation, the stator begins to free wheel and the converter acts as a fluid coupling .

TORQUE CONVERTER CLUTCH (TCC)

In a standard torque converter, the impeller and turbine are rotating at about the same speed and the stator is freewheeling, providing no torque multiplication. By applying the turbine's piston to the front cover's friction material, a total converter engagement can be obtained. The result of this engagement is a direct 1:1 mechanical link between the engine and the transmission.

The engagement and disengagement of the TCC are automatic and controlled by the Powertrain Control Module (PCM). The engagement cannot be activated in the lower gears because it eliminates the torque multiplication effect of the torque converter necessary for acceleration. Inputs that determine clutch engagement are: coolant temperature, vehicle speed and throttle position. The torque converter clutch is engaged by the clutch solenoid on the valve body. The clutch will engage at approximately 56 km/h (35 mph) with light throttle, after the shift to third gear.

REMOVAL

REMOVAL

1. Remove transmission and torque converter from vehicle. See **Transmission and Transfer Case/Automatic - 41TE - Removal**.
2. Place a suitable drain pan under the converter housing end of the transmission.

CAUTION: Verify that transmission is secure on the lifting device or work surface, the center of gravity of the transmission will shift when the torque converter is removed creating an unstable condition.

The torque converter is a heavy unit. Use caution when separating the torque converter from the transmission.

3. Pull the torque converter forward until the center hub clears the oil pump seal.
4. Separate the torque converter from the transmission.

INSTALLATION

INSTALLATION

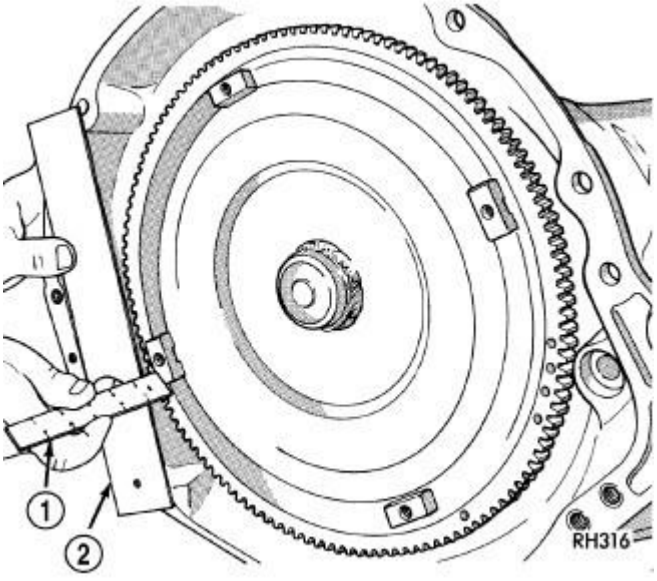


Fig. 429: Checking Torque Converter Seating
Courtesy of CHRYSLER LLC

1 - SCALE 2 - STRAIGHTEDGE

Check converter hub and drive notches for sharp edges, burrs, scratches, or nicks. Polish the hub and notches

with 320/400 grit paper or crocus cloth if necessary. The hub must be smooth to avoid damaging the pump seal at installation.

1. Lubricate converter hub and oil pump seal lip with transmission fluid.
2. Place torque converter in position on transmission.

CAUTION: Do not damage oil pump seal or bushing while inserting torque converter into the front of the transmission.

3. Align torque converter to oil pump seal opening.
4. Insert torque converter hub into oil pump.
5. While pushing torque converter inward, rotate converter until converter is fully seated in the oil pump gears.
6. Check converter seating with a scale (1) and straightedge (2). Surface of converter lugs should be 1/2 in. to rear of straightedge when converter is fully seated.
7. If necessary, temporarily secure converter with C-clamp attached to the converter housing.
8. Install the transmission in the vehicle. See **Transmission and Transfer Case/Automatic - 41TE - Installation**.
9. Fill the transmission with the recommended fluid. See **FLUID AND FILTER SERVICE**.

VALVE BODY

DESCRIPTION

DESCRIPTION

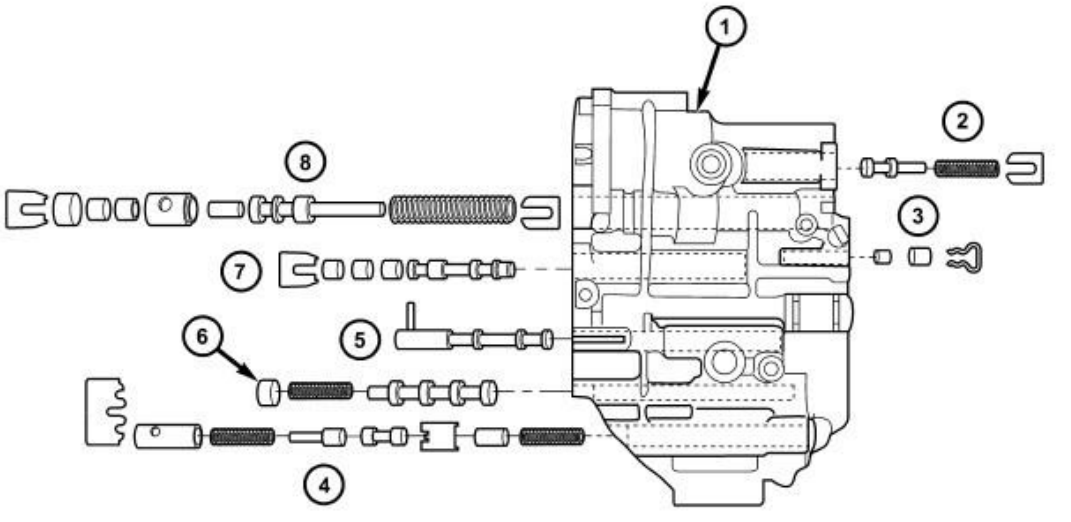


Fig. 430: Identifying Valve Body Assembly

Courtesy of CHRYSLER LLC

1 - VALVE BODY	5 - MANUAL VALVE
2 - T/C REGULATOR VALVE	6 - CONVERTER CLUTCH SWITCH VALVE
3 - L/R SWITCH VALVE	7 - SOLENOID SWITCH VALVE
4 - CONVERTER CLUTCH CONTROL VALVE	8 - REGULATOR VALVE

The valve body assembly consists of a cast aluminum valve body, a separator plate, and transfer plate. The valve body contains valves and check balls that control fluid delivery to the torque converter clutch, solenoid/pressure switch assembly, and frictional clutches. The valve body contains the following components :

- Regulator valve (8)
- Solenoid switch valve (7)
- Manual valve (5)
- Converter clutch switch valve (6)
- Converter clutch control valve (4)
- Torque converter regulator valve (2)
- Low/Reverse switch valve (3)

In addition, the valve body also contains the thermal valve, #2, #3 and #4 check balls, the #5 (overdrive) check valve and the 2/4 accumulator assembly. See **Transmission and Transfer Case/Automatic - 41TE/VALVE BODY - Disassembly**.

OPERATION

OPERATION

NOTE: Refer to Schematics and Diagrams for a visual aid in determining valve location, operation and design.

REGULATOR VALVE

The regulator valve controls hydraulic pressure in the transaxle. It receives unregulated pressure from the pump, which works against spring tension to maintain oil at specific pressures. A system of sleeves and ports allows the regulator valve to work at one of three predetermined pressure levels. Regulated oil pressure is also referred to as "line pressure."

SOLENOID SWITCH VALVE

The solenoid switch valve controls line pressure from the LR/CC solenoid. In one position, it allows the low/reverse clutch to be pressurized. In the other, it directs line pressure to the converter control and converter clutch valves.

MANUAL VALVE

The manual valve is operated by the mechanical shift linkage. Its primary responsibility is to send line pressure to the appropriate hydraulic circuits and solenoids. The valve has three operating ranges or positions.

CONVERTER CLUTCH SWITCH VALVE

The main responsibility of the converter clutch switch valve is to control hydraulic pressure applied to the front (off) side of the converter clutch piston. Line pressure from the regulator valve is fed to the torque converter regulator valve, where it passes through the valve, and is slightly regulated. The pressure is then directed to the converter clutch switch valve and to the front side of the converter clutch piston. This pressure pushes the piston back and disengages the converter clutch.

CONVERTER CLUTCH CONTROL VALVE

The converter clutch control valve controls the back (on) side of the torque converter clutch. When the PCM/TCM energizes or modulates the LR/CC solenoid to apply the converter clutch piston, both the converter clutch control valve and the converter control valve move, allowing pressure to be applied to the back side of the clutch.

T/C REGULATOR VALVE

The torque converter regulator valve slightly regulates the flow of fluid to the torque converter.

LOW/REVERSE SWITCH VALVE

The low/reverse clutch is applied from different sources, depending on whether low (1st) gear or reverse is selected. The low/reverse switch valve alternates positions depending on from which direction fluid pressure is applied. By design, when the valve is shifted by fluid pressure from one channel, the opposing channel is blocked. The switch valve alienates the possibility of a sticking ball check, thus providing consistent application of the low/reverse clutch under all operating conditions.

REMOVAL

REMOVAL

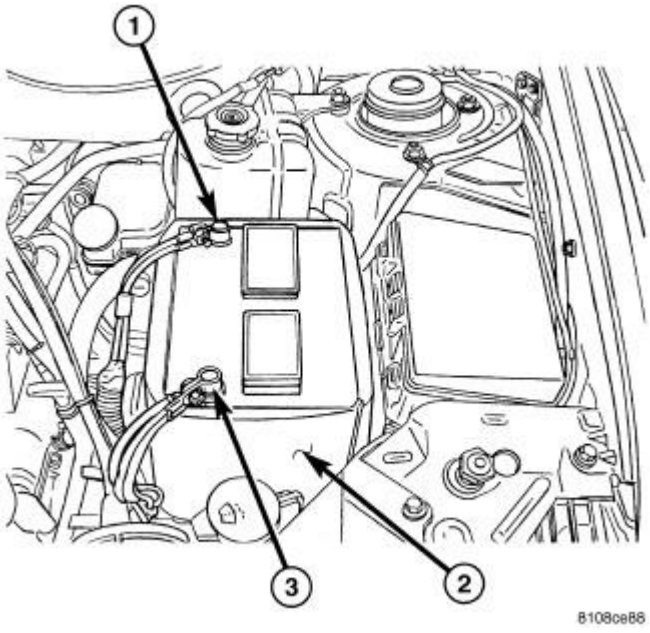


Fig. 431: Identifying Battery Cables
Courtesy of CHRYSLER LLC

1 - BATTERY POSITIVE CABLE
2 - THERMO-WRAP
3 - BATTERY NEGATIVE CABLE

NOTE: If valve body is replaced or reconditioned, the PCM Quick Learn Procedure must be performed. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

NOTE: The Engine Cradle Crossmember assembly must be partially lowered to gain access to and remove the Valve Body assembly.

1. Disconnect battery negative cable.

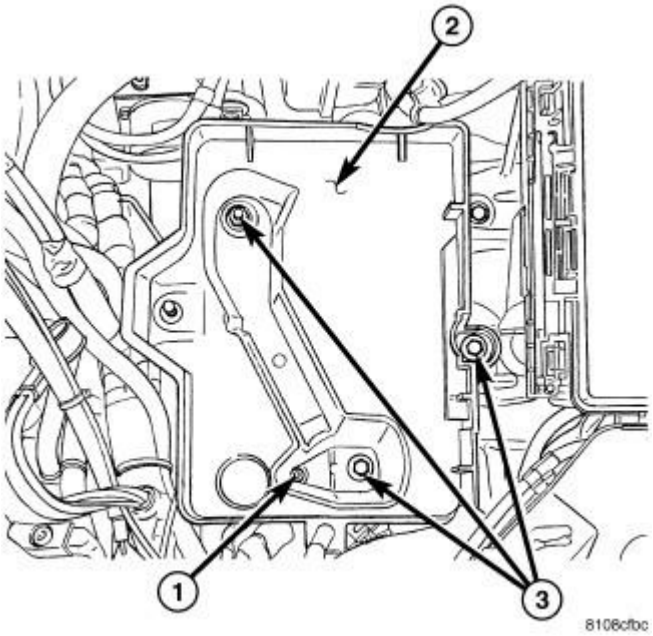


Fig. 432: Removing/Installing Battery & Tray
Courtesy of CHRYSLER LLC

1 - DRAIN HOLE/HOSE ATTACHMENT
2 - BATTERY TRAY
3 - BOLTS

2. Remove battery and tray.

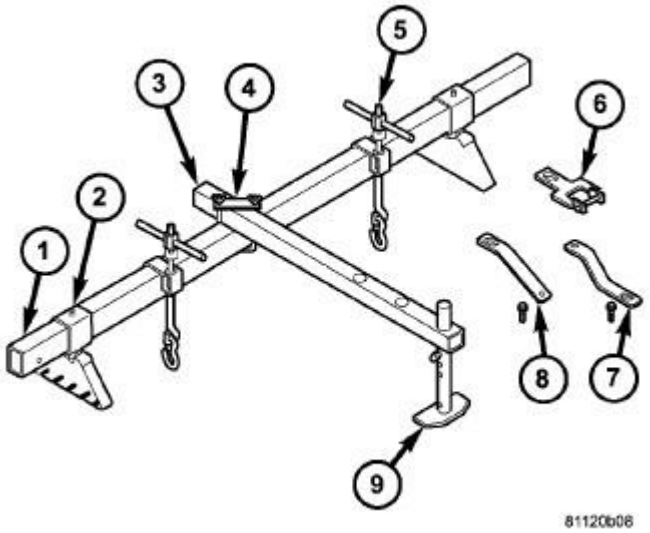


Fig. 433: Installing Overhead Powertrain Support Fixture

Courtesy of CHRYSLER LLC

1 - SUPPORT TUBE 8534-1 2 - BRACKET/SLEEVE 8534-2 3 - CROSS-BAR 8534-3 4 - CLAMP 8534-5 5 - LIFT HOOK ASSEMBLY 6 - LIFT BRACKET/BOLT 8534-15 7 - LIFT BRACKET/BOLT 8534-7 8 - LIFT BRACKET/BOLT 8534-8 9 - SUPPORT LEG 8534-4

3. Install overhead powertrain support fixture (Tool 8534B and adapter kit 8534-12)

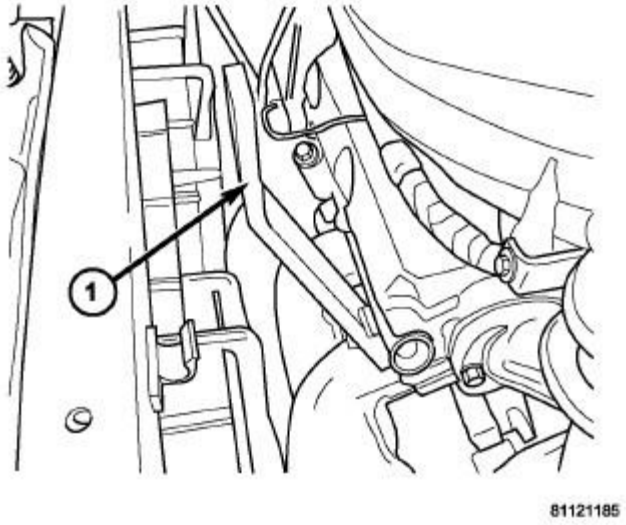


Fig. 434: Installing Lift/Support Bracket 8534-8
Courtesy of CHRYSLER LLC

1 - BRACKET 8534-8

4. Remove engine oil dipstick tube-to-cylinder head fastener. Install lift/support bracket 8534-8 and secure with dipstick tube bolt.

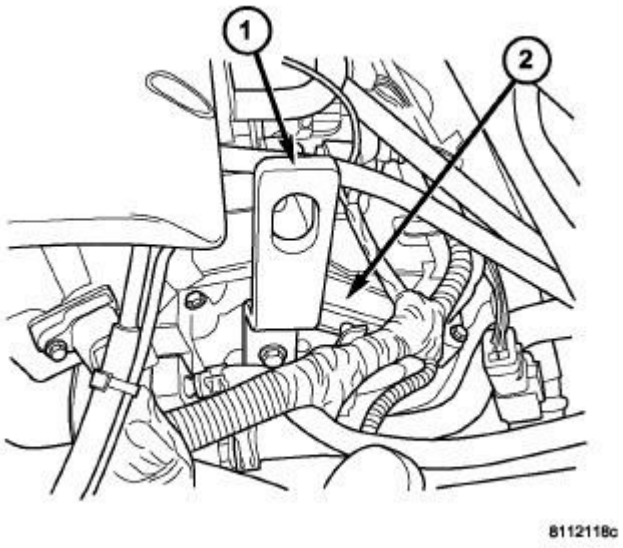


Fig. 435: Installing Lift/Support Bracket 8534-7 & Bolt
Courtesy of CHRYSLER LLC

1 - BRACKET 8534-7 2 - REAR CYLINDER HEAD

5. Disconnect coolant temperature sensor (at thermostat housing). Remove engine harness-to-cylinder head bolt. Position harness out of the way. Install and secure lift/support bracket and bolt 8534-7

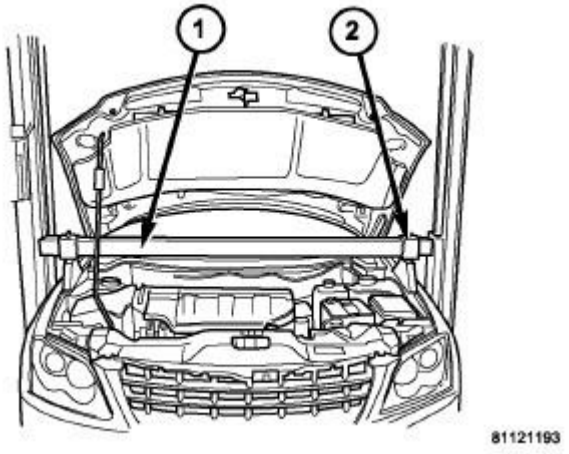


Fig. 436: Identifying Support Tube & Sleeve/Bracket
Courtesy of CHRYSLER LLC

1 - SUPPORT TUBE 8534-1 2 - BRACKET/SLEEVE 8534-2

6. Assemble cross-bar 8534-3, clamp 8534-5 and support leg 8534-4 to support tube, allowing support leg to rest on radiator upper support.

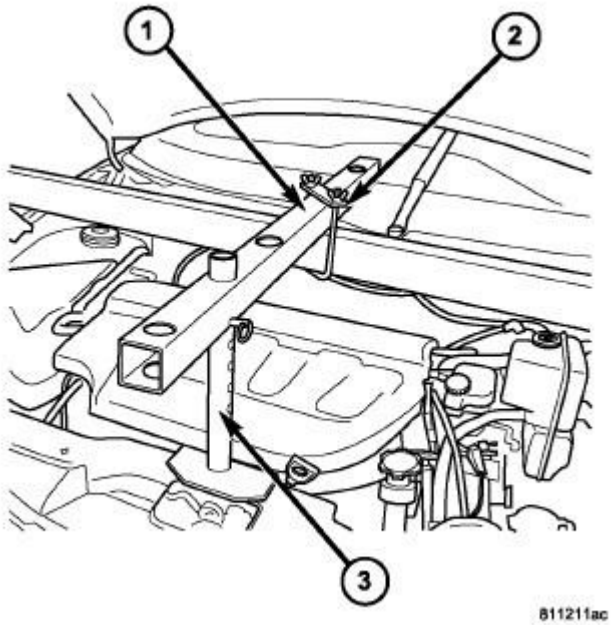


Fig. 437: Identifying Crossbar, Support Leg, & Clamp
Courtesy of CHRYSLER LLC

1 - CROSS-BAR 8534-3
2 - CLAMP 8534-5
3 - SUPPORT LEG 8534-4

7. Tighten cross-bar-to-support tube clamp 8534-5 , as well as mounting bracket/sleeve 8534-2 thumb screw and hex nut to secure fixture.

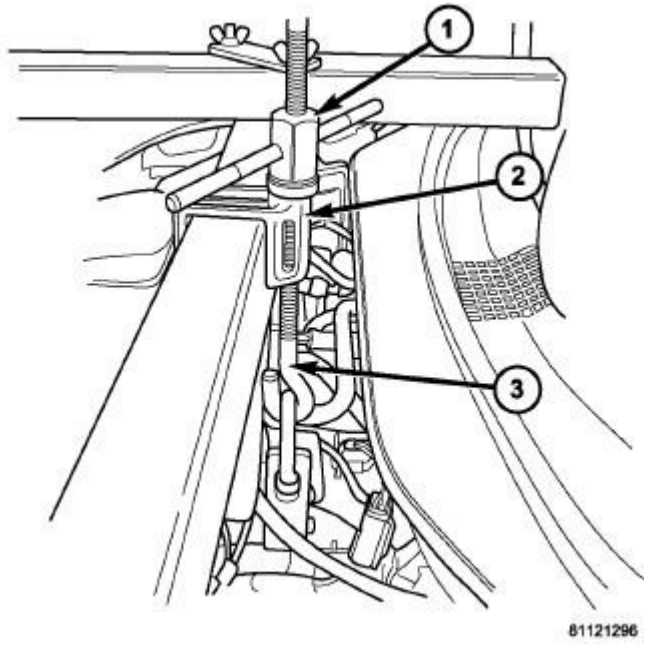


Fig. 438: Installing Bracket/Hook Assemblies
Courtesy of CHRYSLER LLC

1 - T-HANDLE 8534-14
2 - LIFTING BRACKET 8534-13
3 - HOOK ASSEMBLY 8534-11

8. Install lift bracket/hook assemblies.

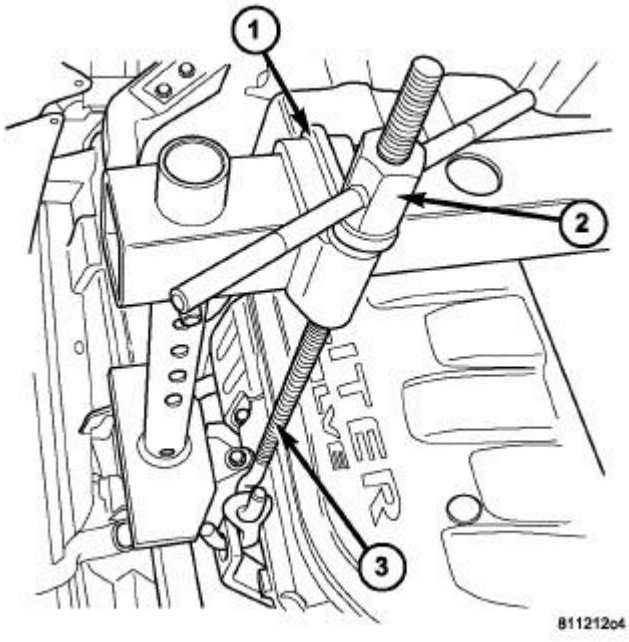


Fig. 439: Identifying T-Handle, Lifting Bracket, & Hook Assembly
Courtesy of CHRYSLER LLC

1 - LIFTING BRACKET 8534-13
2 - T-HANDLE 8534-14
3 - HOOK ASSEMBLY 8534-11

9. Tighten t-handles just enough to build tension between the fixture and drivetrain.
10. Disconnect gearshift cable from manual valve lever.
11. Remove manual valve lever from manual shaft.
12. Raise vehicle on hoist.
13. Remove engine mount (front and rear) to engine cradle crossmember nuts.
14. Place scribe marks at engine cradle crossmember and body for alignment upon reassembly.
15. Support cradle at rear with screw jack or equivalent. Partially remove engine cradle crossmember-to-body bolts, lowering cradle at rear enough to facilitate cradle pivoting.
16. Support cradle at front with screw jack or equivalent. Remove engine cradle crossmember-to-body bolts. Lower cradle at front approximately 10 inches to facilitate valve body removal.

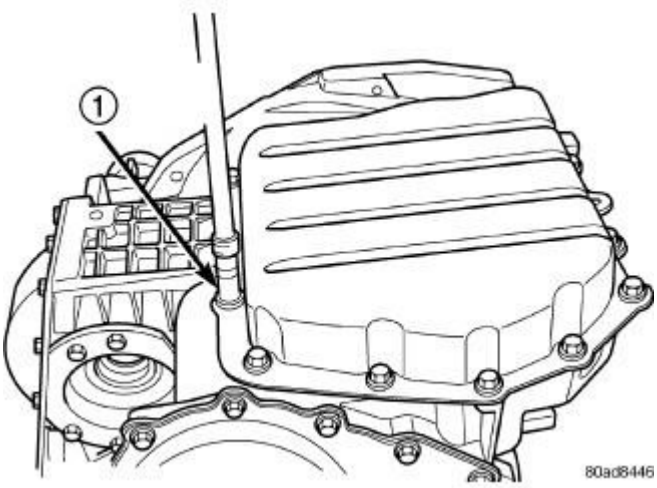


Fig. 440: Identifying Oil Pan Bolts
Courtesy of CHRYSLER LLC

1 - OIL PAN BOLTS (USE RTV UNDER BOLT HEADS)

17. Remove oil pan bolts.

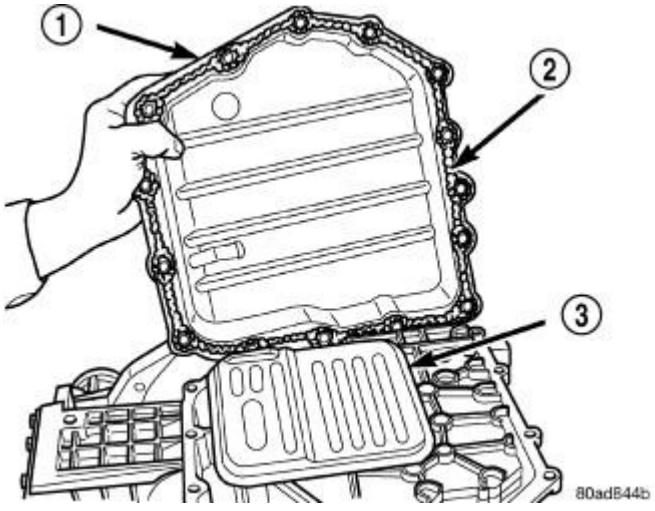


Fig. 441: Removing/Installing Oil Pan
Courtesy of CHRYSLER LLC

1 - OIL PAN
2 - 1/8 INCH BEAD OF RTV SEALANT
3 - OIL FILTER

18. Remove oil pan.

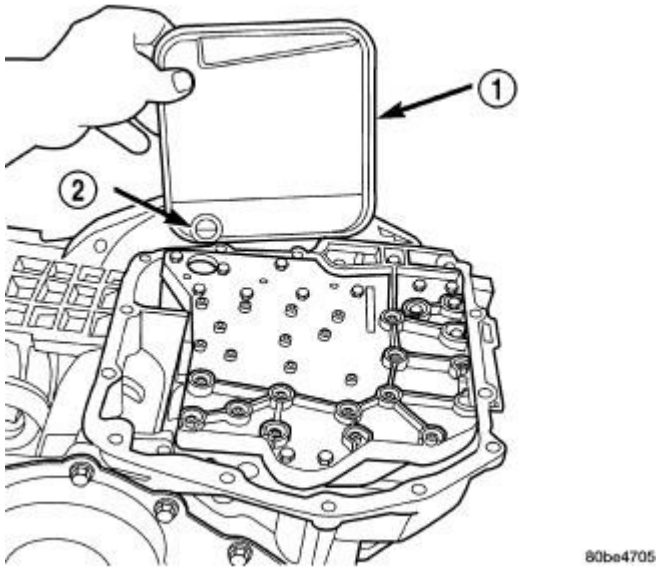


Fig. 442: Identifying Filter & O-Ring
Courtesy of CHRYSLER LLC

1 - OIL FILTER
2 - O-RING

19. Remove oil filter.

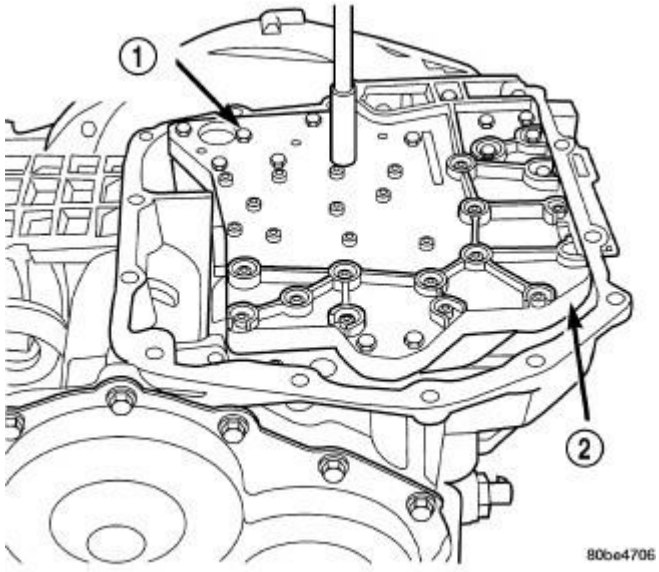


Fig. 443: Identifying Valve Body-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

1 - VALVE BODY ATTACHING BOLTS (18)

2 - VALVE BODY

20. Remove the valve body-to-transaxle case bolts.

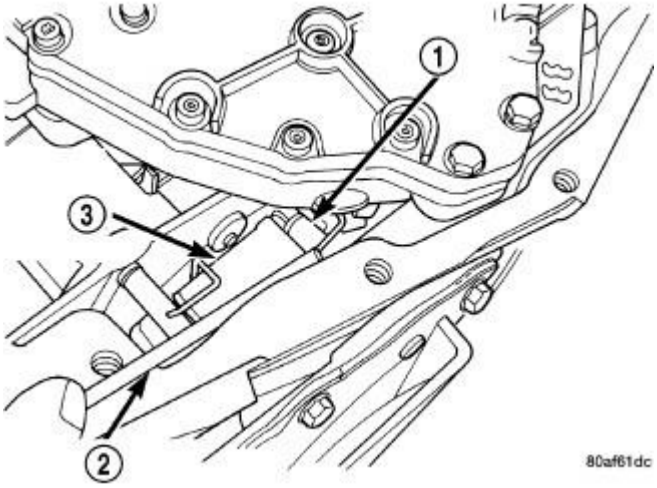


Fig. 444: Removing/Installing Park Rod Rollers
Courtesy of CHRYSLER LLC

1 - PARK SPRAG ROLLERS
2 - SCREWDRIVER
3 - PARK SPRAG GUIDE BRACKET

NOTE: To ease removal of the valve body, turn the manual valve lever fully clockwise to low or first gear.

21. Remove park rod rollers from guide bracket.

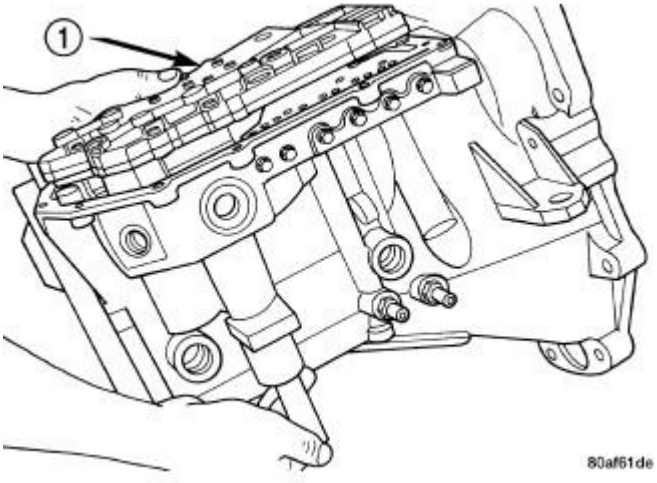


Fig. 445: Removing/Installing Valve Body

Courtesy of CHRYSLER LLC

1 - VALVE BODY

22. Remove valve body from transaxle. **Note position of accumulator and springs upon removal for assembly reference.**

CAUTION: The valve body manual shaft pilot may distort and bind the manual valve if the valve body is mishandled or dropped.

DISASSEMBLY

DISASSEMBLY

NOTE: Cleanliness through entire disassembly and assembly of the valve body cannot be overemphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. Do not wipe parts with shop towels. All mating surfaces in the valve body are accurately machined; therefore, careful handling of all parts must be exercised to avoid nicks or burrs.

NOTE: If valve body assembly is being reconditioned, the PCM/TCM Quick Learn Procedure must be performed. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

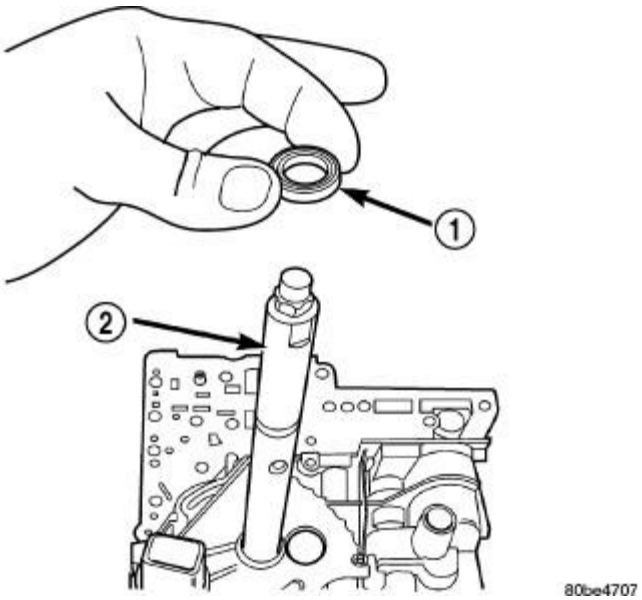


Fig. 446: Removing/Installing Manual Shaft Seal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - MANUAL SHAFT

1. Remove manual shaft seal (1).

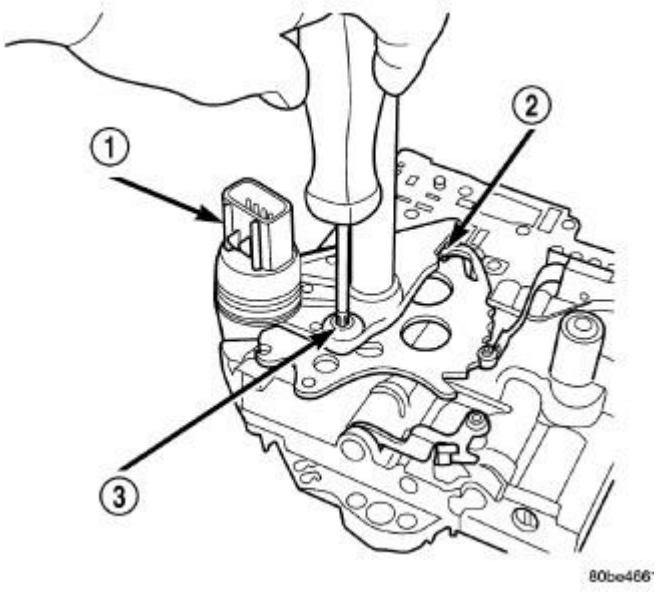


Fig. 447: Removing/Installing Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR 2 - MANUAL VALVE CONTROL PIN 3 - RETAINING SCREW

2. Remove Transmission Range Sensor retaining screw (3).

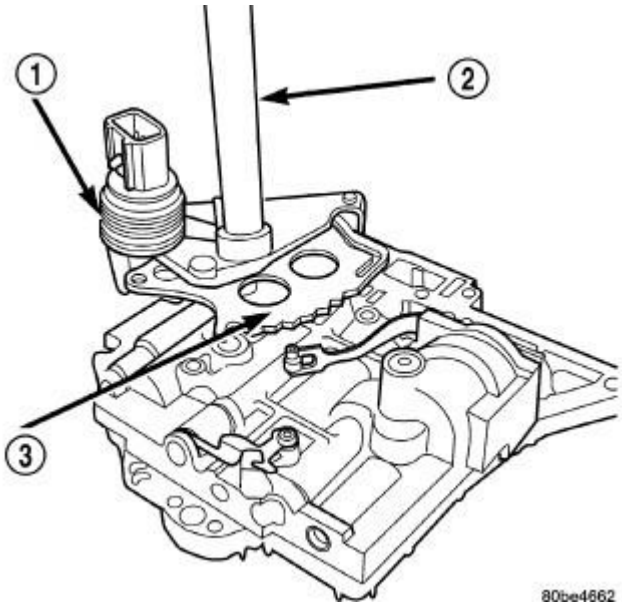


Fig. 448: Removing/Installing Manual Shaft/Rooster Comb & Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR 2 - MANUAL SHAFT / ROOSTER COMB 3 - ROOSTER COMB

3. Remove Manual Shaft/Rooster Comb (3) and Transmission Range Sensor (1).

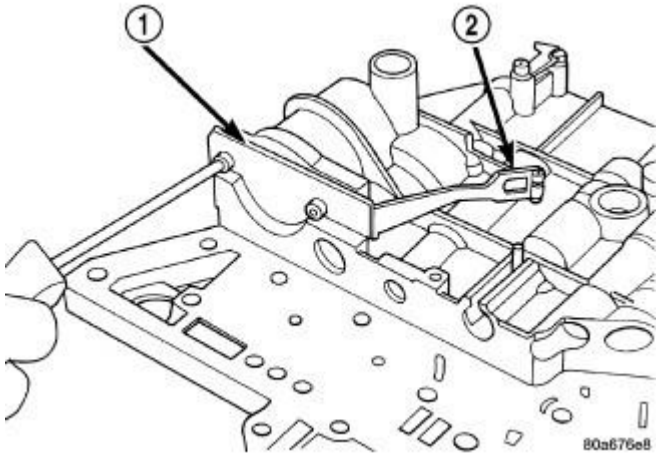


Fig. 449: Removing/Installing 2/4 Accumulator Retaining Plate
Courtesy of CHRYSLER LLC

1 - 2-4 ACCUMULATOR RETAINING PLATE 2 - DETENT SPRING

4. Remove 2/4 Accumulator Retaining Plate (1).

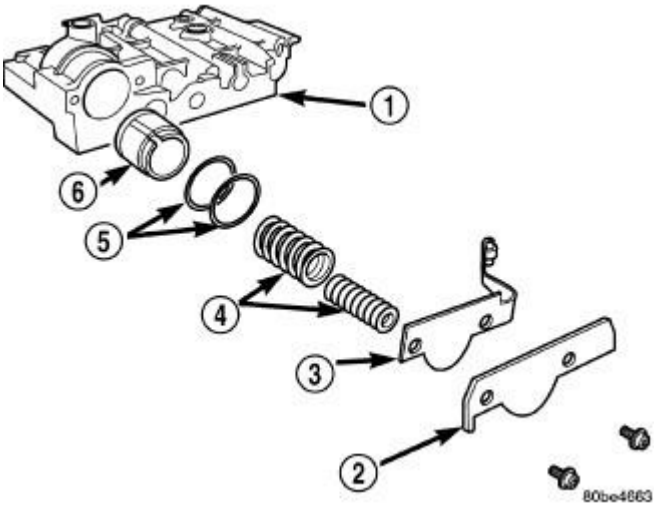


Fig. 450: Identifying 2/4 Accumulator Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY
2 - RETAINER PLATE
3 - DETENT SPRING
4 - SPRINGS
5 - SEALS
6 - PISTON

5. Remove 2/4 Accumulator components (2,3,4,5 and 6).

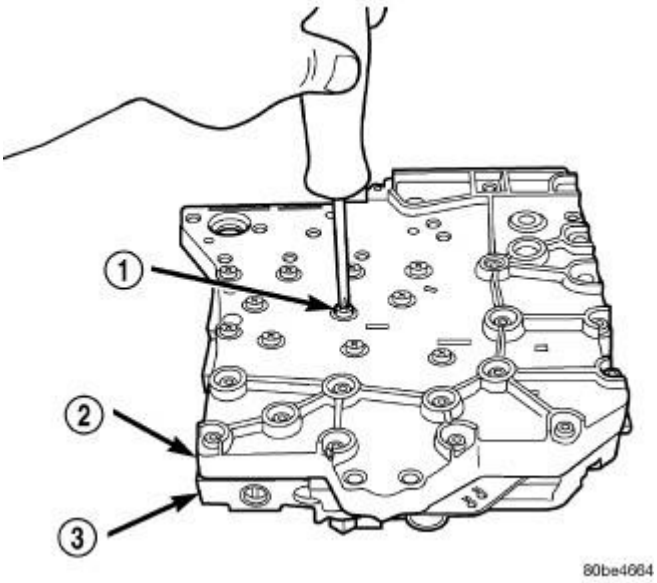


Fig. 451: Identifying Valve Body-To-Transfer Plate Screws
Courtesy of CHRYSLER LLC

1 - SCREW (24) 2 - TRANSFER PLATE 3 - VALVE BODY

6. Remove Valve Body (3) to Transfer Plate (2) screws (1).

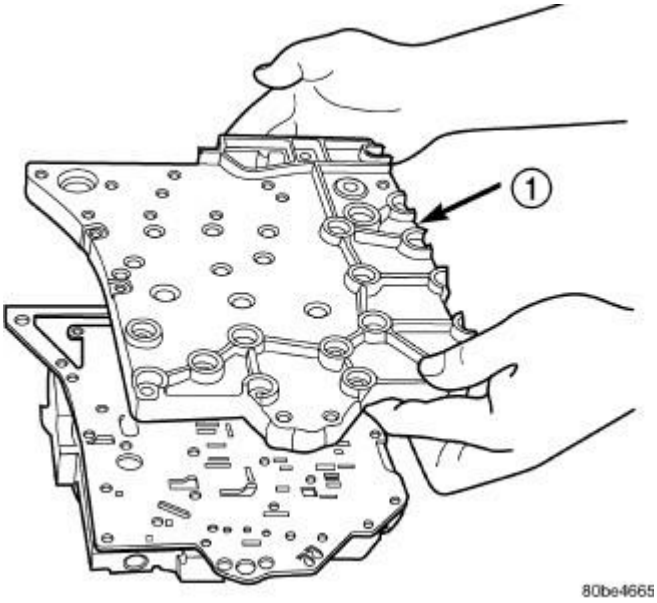


Fig. 452: Removing/Installing Transfer Plate
Courtesy of CHRYSLER LLC

1 - TRANSFER PLATE

7. Invert assembly and remove Transfer Plate (1). Beware of loose check balls.

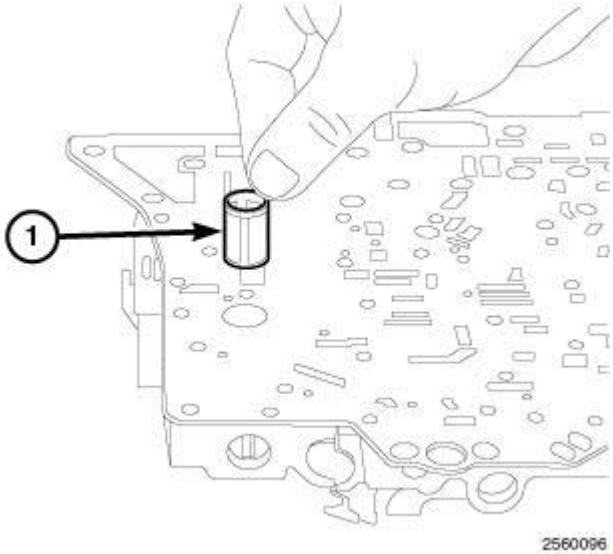


Fig. 453: Identifying Oil Screen

Courtesy of CHRYSLER LLC

8. Remove oil screen (1).

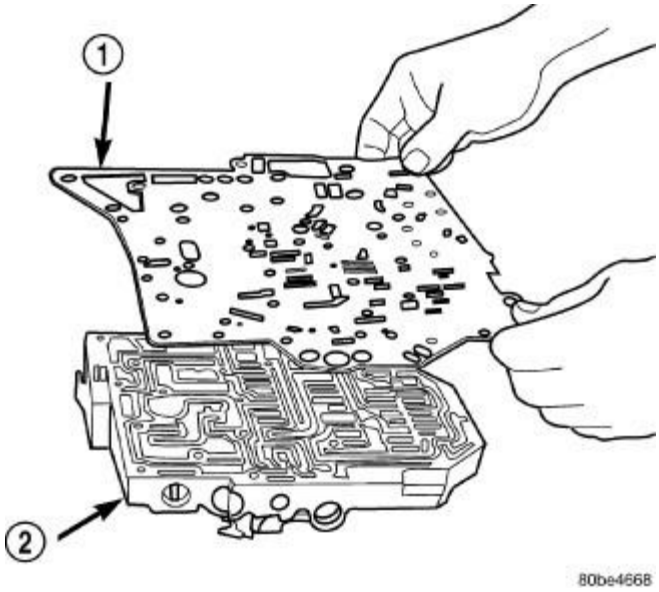


Fig. 454: Removing/Installing Separator Plate
Courtesy of CHRYSLER LLC

1 - SEPARATOR PLATE
2 - VALVE BODY

9. Remove separator plate (1).

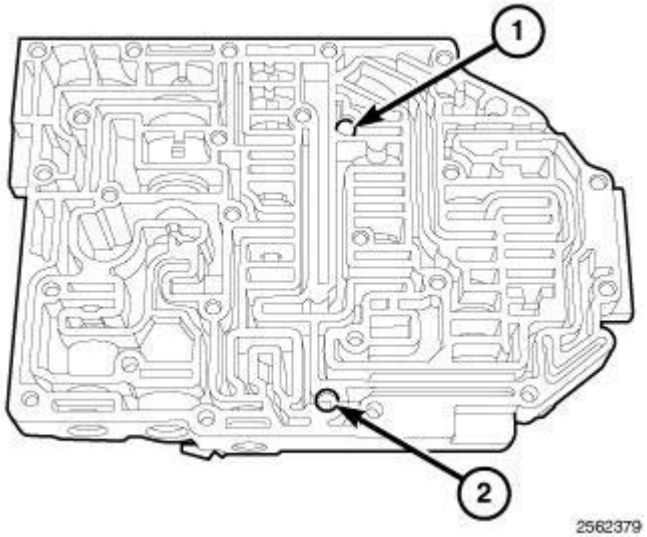


Fig. 455: Identifying Valve Body Check Balls
Courtesy of CHRYSLER LLC

1 - (#4) REVERSE CHECK BALL 2 - (#3) L/R CHECK BALL

10. Remove valve body check balls (1 and 2). Note their location for assembly ease.

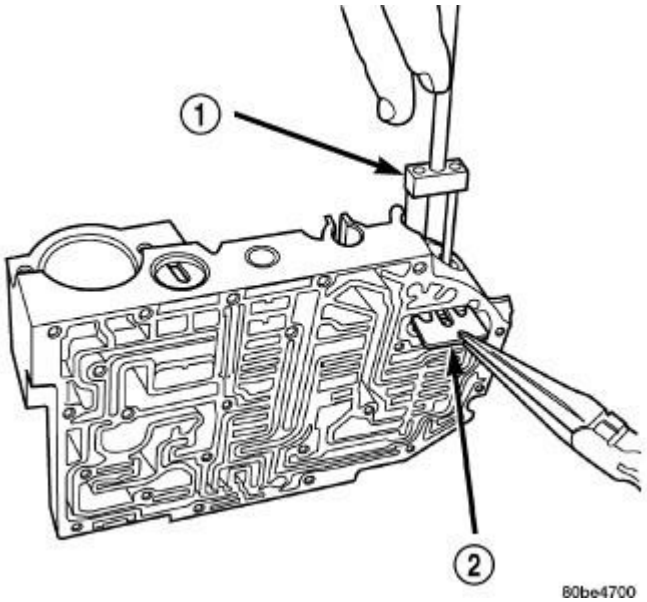


Fig. 456: Removing/Installing Dual Retainer Plate
Courtesy of CHRYSLER LLC

1 - REMOVER/INSTALLER 6301 2 - RETAINER

NOTE: Tag all valve/spring assemblies for reassembly identification.

11. Remove dual retainer plate (2) using Remover/Installer 6301(1).

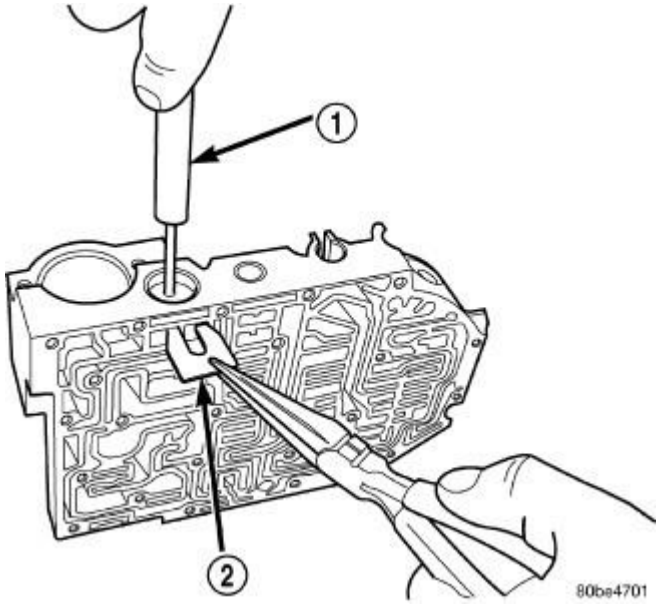


Fig. 457: Removing/Installing Regulator Valve Spring Retainer
Courtesy of CHRYSLER LLC

1 - REMOVER/INSTALLER 6302 2 - RETAINER

12. Remove regulator valve spring retainer (2) using Remover/Installer 6302 (1).

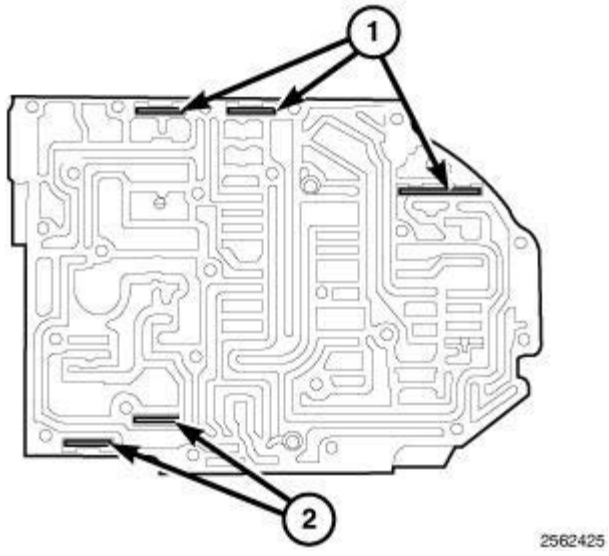


Fig. 458: Removing/Installing Valve Retainers
Courtesy of CHRYSLER LLC

1 - RETAINER 2 - RETAINER

13. Remove retainers (1and 2).

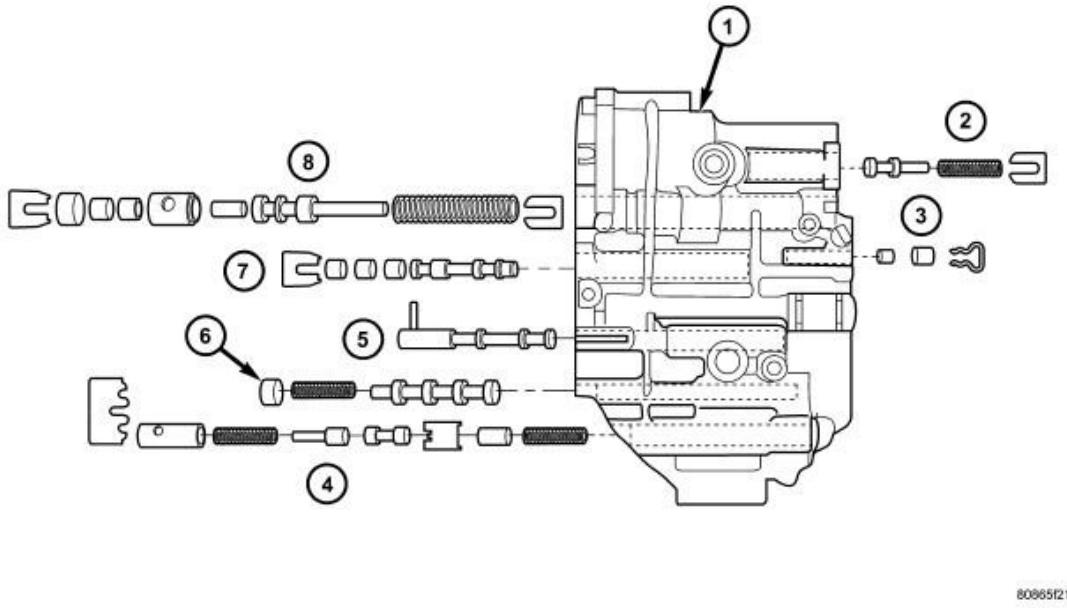


Fig. 459: Identifying Valve Body Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY	5 - MANUAL VALVE
2 - T/C REGULATOR VALVE	6 - CONVERTER CLUTCH SWITCH VALVE
3 - L/R SWITCH VALVE	7 - SOLENOID SWITCH VALVE
4 - CONVERTER CLUTCH CONTROL VALVE	8 - REGULATOR VALVE

14. Remove valves and springs.

ASSEMBLY

ASSEMBLY

NOTE: Cleanliness through entire disassembly and assembly of the valve body cannot be overemphasized. When disassembling, each part should be washed in a suitable solvent, then dried by compressed air. Do not wipe parts with shop towels. All mating surfaces in the valve body are accurately machined; therefore, careful handling of all parts must be exercised to avoid nicks or burrs.

NOTE: If valve body assembly is reconditioned, the PCM/TCM Quick Learn Procedure must be performed. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

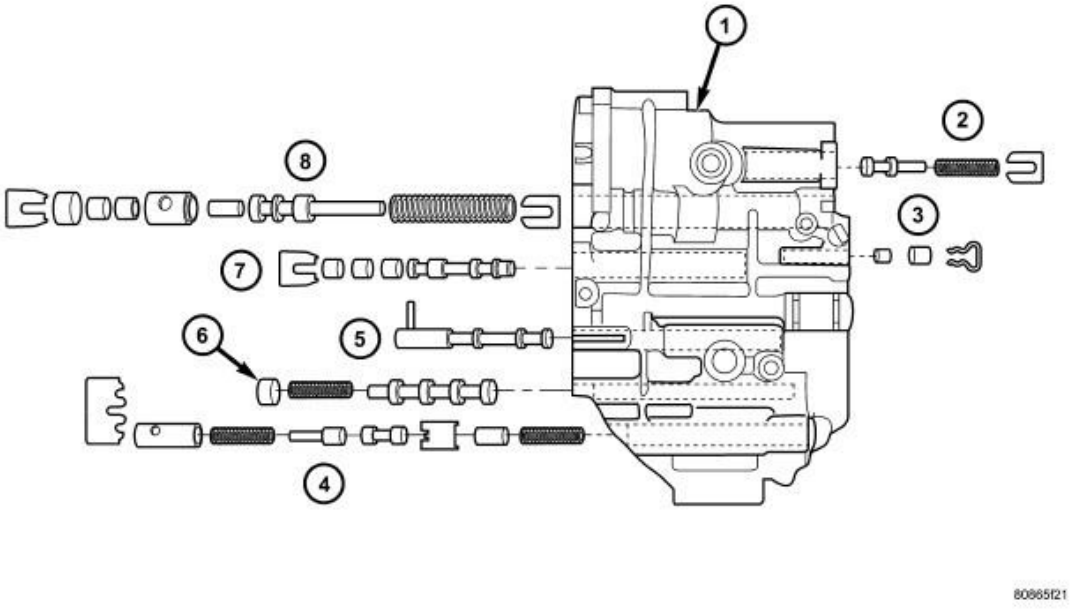


Fig. 460: Identifying Valve Body Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY	5 - MANUAL VALVE
2 - T/C REGULATOR VALVE	6 - CONVERTER CLUTCH SWITCH VALVE
3 - L/R SWITCH VALVE	7 - SOLENOID SWITCH VALVE
4 - CONVERTER CLUTCH CONTROL VALVE	8 - REGULATOR VALVE

1. Install valves and springs.

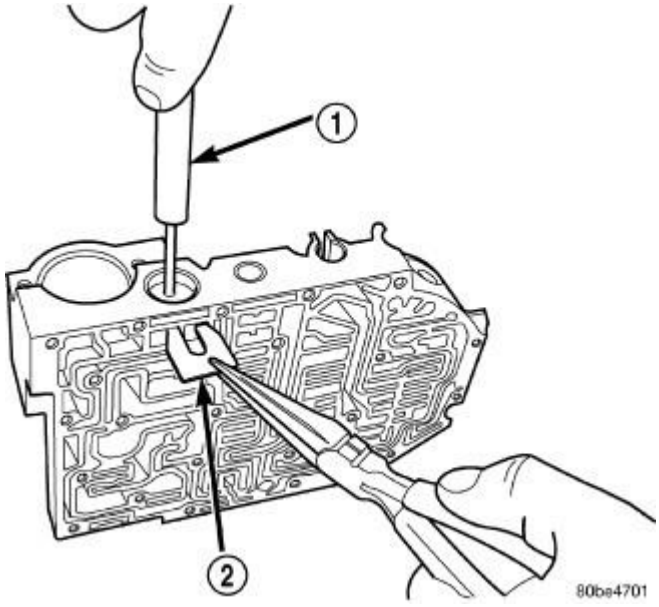


Fig. 461: Removing/Installing Regulator Valve Spring Retainer
Courtesy of CHRYSLER LLC

1 - REMOVER/INSTALLER 6302 2 - RETAINER

2. Install regulator valve spring retainer (2) using remover/installer 6302 (1).

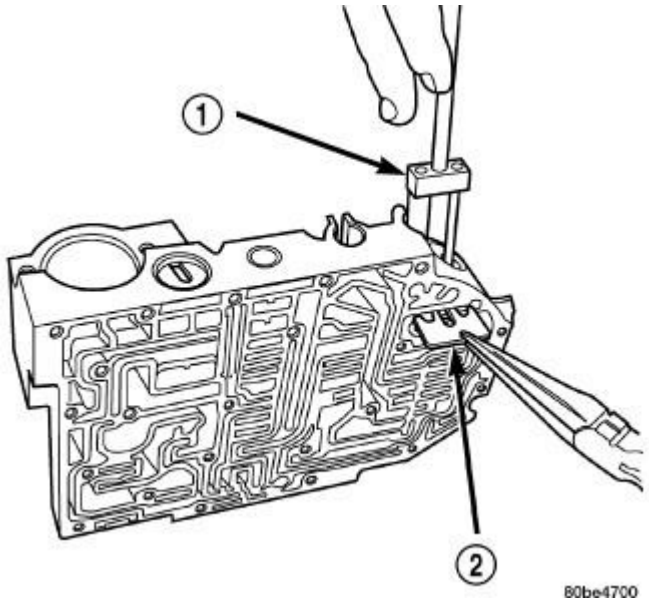


Fig. 462: Removing/Installing Dual Retainer Plate
Courtesy of CHRYSLER LLC

1 - REMOVER/INSTALLER 6301 2 - RETAINER

3. Install dual retainer plate (2) using remover/installer 6301 (1).

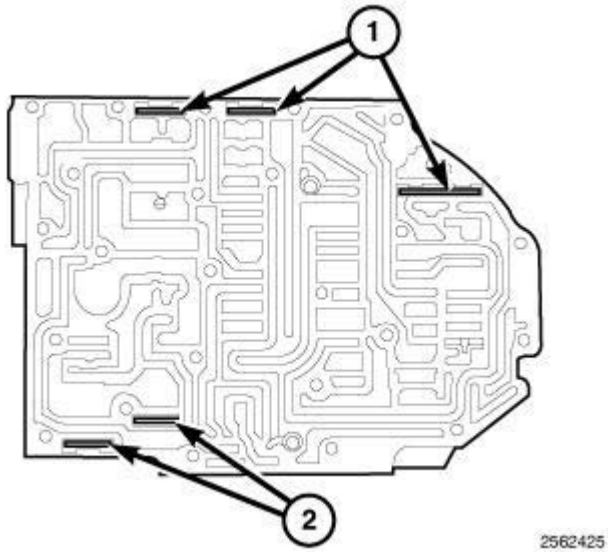


Fig. 463: Removing/Installing Valve Retainers

Courtesy of CHRYSLER LLC

1 - RETAINER 2 - RETAINER

4. Verify that all retainers are installed (1,2). Retainers should be flush or below valve body surface.

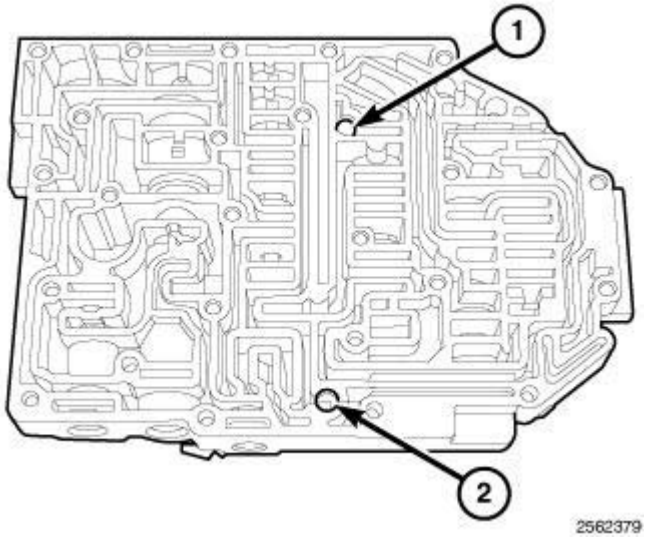


Fig. 464: Identifying Valve Body Check Balls
Courtesy of CHRYSLER LLC

1 - (#4) REVERSE CHECK BALL 2 - (#5) (#3) L/R CHECK BALL

5. Install check balls (1 and 2) into position as shown in **Fig. 464**. If necessary, secure them with petrolatum or transmission assembly gel for assembly ease.

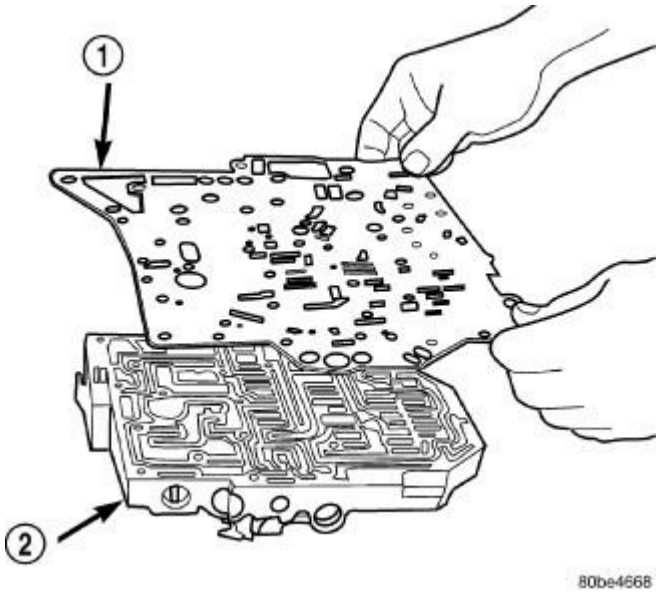


Fig. 465: Removing/Installing Separator Plate
Courtesy of CHRYSLER LLC

1 - SEPARATOR PLATE 2 - VALVE BODY

6. Install separator plate (1) to valve body (2).

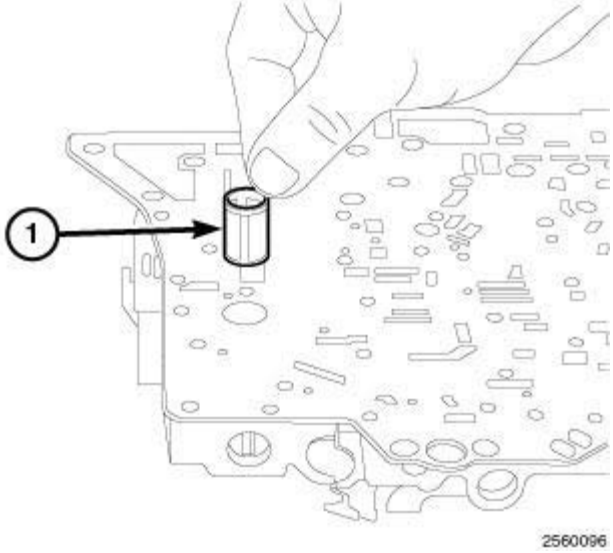


Fig. 466: Identifying Oil Screen
Courtesy of CHRYSLER LLC

7. Install oil screen (1) to separator plate.

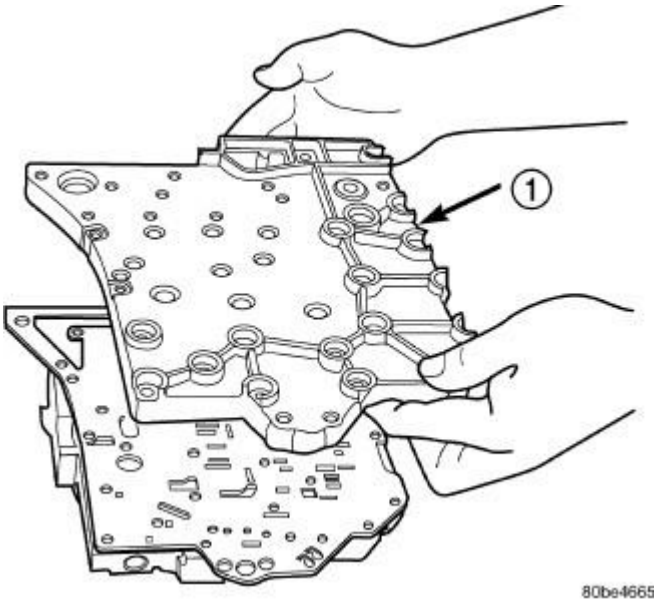


Fig. 467: Removing/Installing Transfer Plate
Courtesy of CHRYSLER LLC

1 - TRANSFER PLATE

8. Install transfer plate (1) to valve body and separator plate.

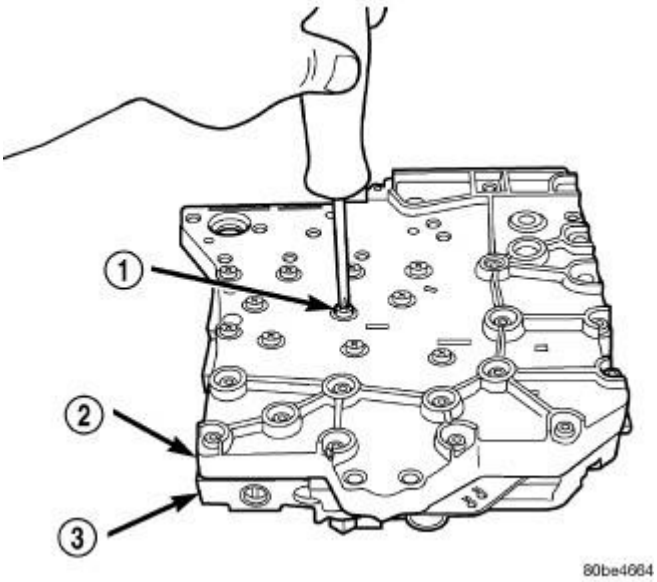


Fig. 468: Identifying Valve Body-To-Transfer Plate Screws
Courtesy of CHRYSLER LLC

1 - SCREW (24)
2 - TRANSFER PLATE
3 - VALVE BODY

9. Install twenty-four transfer plate to valve body screws (1) and torque to 5 N.m (45 in. lbs.).

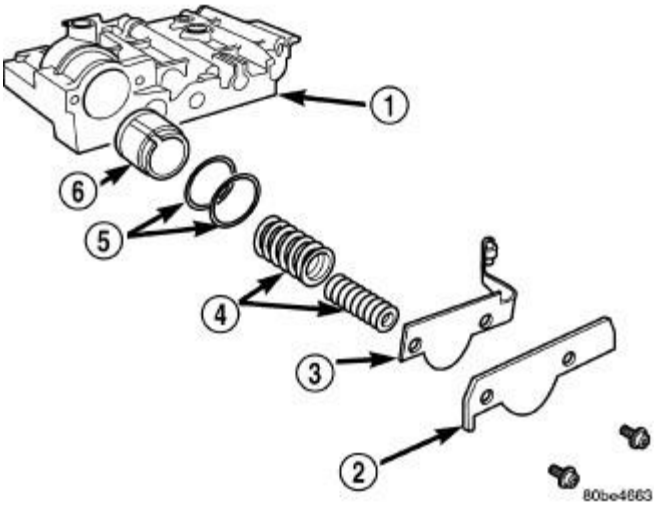


Fig. 469: Identifying 2/4 Accumulator Assembly
Courtesy of CHRYSLER LLC

1 - VALVE BODY
2 - RETAINER PLATE
3 - DETENT SPRING
4 - SPRINGS
5 - SEALS
6 - PISTON

10. Install 2/4 Accumulator components (2,3,4,5 and 6).

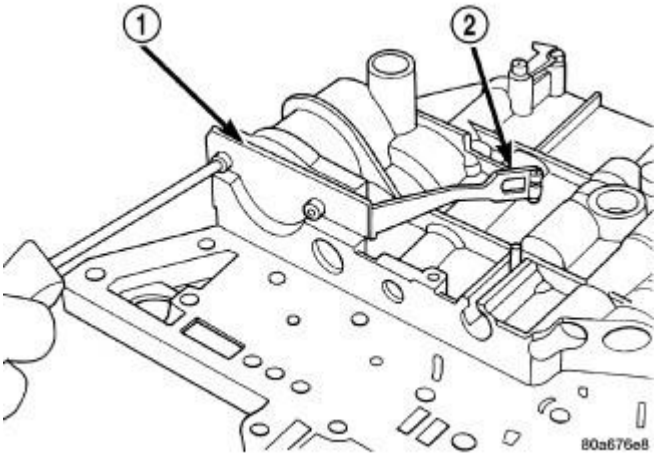


Fig. 470: Removing/Installing 2/4 Accumulator Retaining Plate
Courtesy of CHRYSLER LLC

1 - 2-4 ACCUMULATOR RETAINING PLATE
2 - DETENT SPRING

11. Torque 2/4 Accumulator retainer (1) to 5 N.m (45 in. lbs.).

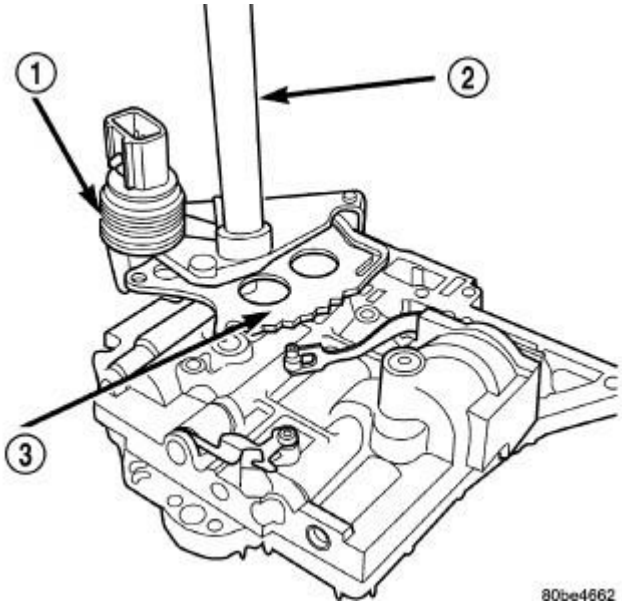


Fig. 471: Removing/Installing Manual Shaft/Rooster Comb & Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR
2 - MANUAL SHAFT / ROOSTER COMB
3 - ROOSTER COMB

12. Install Manual Shaft/Rooster Comb (3) and Transmission Range Sensor (1).

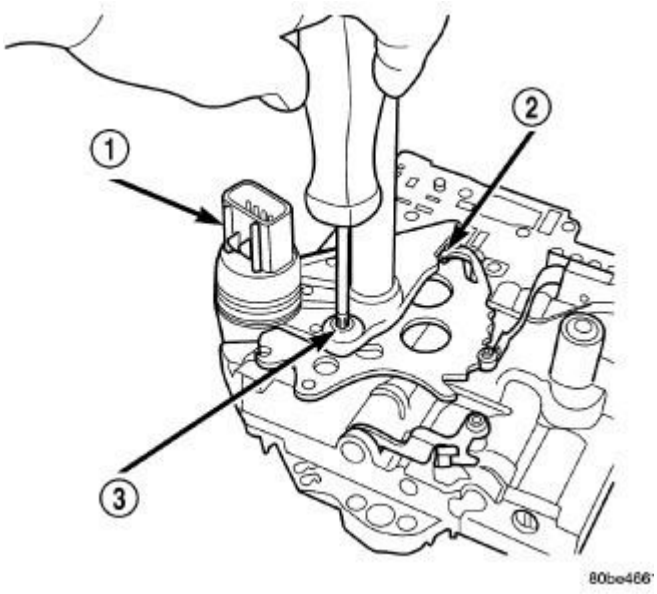


Fig. 472: Removing/Installing Transmission Range Sensor
Courtesy of CHRYSLER LLC

1 - TRANSMISSION RANGE SENSOR
2 - MANUAL VALVE CONTROL PIN
3 - RETAINING SCREW

13. Make sure Manual Valve control pin (2) is contained within the rooster comb slot. Install Transmission Range Sensor retaining screw (3) and torque to 5 N.m (45 in. lbs.).

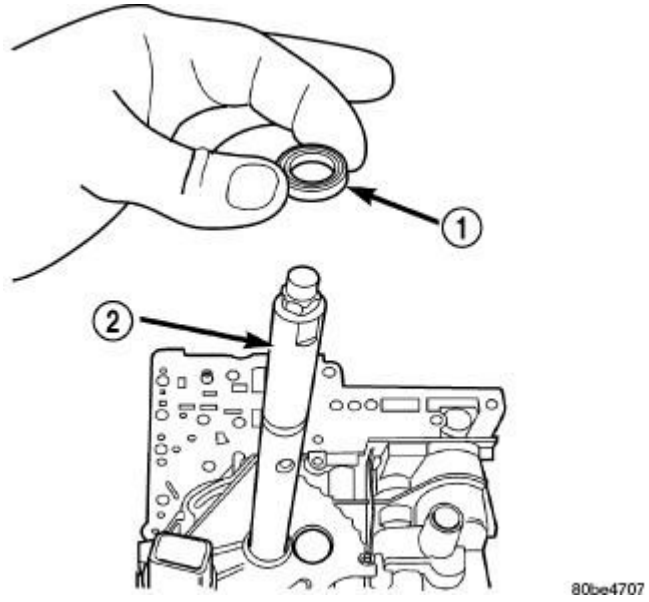


Fig. 473: Removing/Installing Manual Shaft Seal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - MANUAL SHAFT

14. Install manual shaft seal (1).

INSTALLATION

INSTALLATION

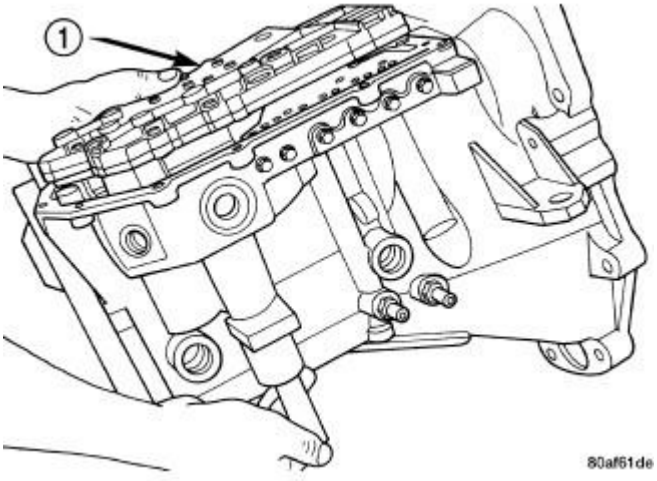


Fig. 474: Removing/Installing Valve Body
Courtesy of CHRYSLER LLC

1 - VALVE BODY

NOTE: If valve body assembly is being replaced or reconditioned, it is necessary to perform the PCM Quick Learn Procedure. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

1. Install accumulators and springs as previously removed. Install valve body assembly to transaxle.

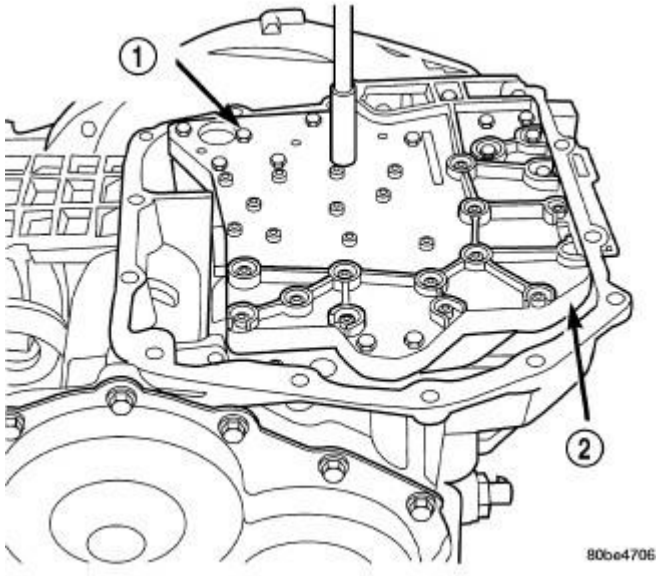


Fig. 475: Identifying Valve Body-To-Transaxle Case Bolts
Courtesy of CHRYSLER LLC

1 - VALVE BODY ATTACHING BOLTS (18)
2 - VALVE BODY

2. Install and torque valve body-to-transaxle case bolts to 12 N.m (105 in. lbs.).

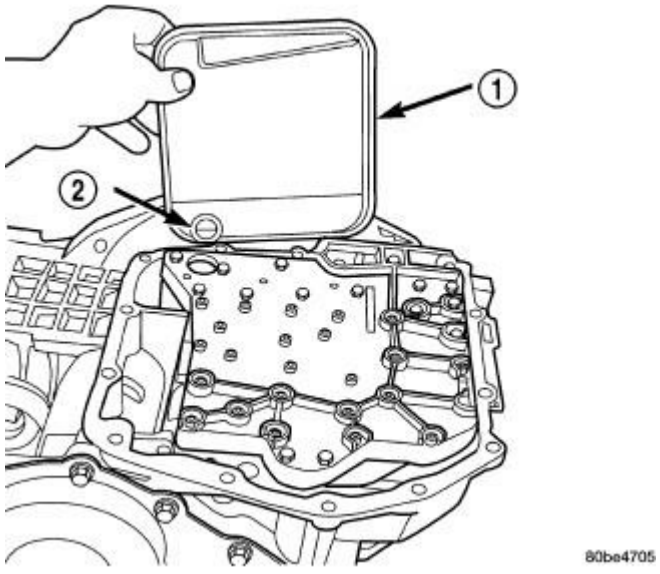


Fig. 476: Identifying Filter & O-Ring
Courtesy of CHRYSLER LLC

1 - OIL FILTER

2 - O-RING

3. Install transaxle oil filter. Inspect the o-ring and replace if necessary.

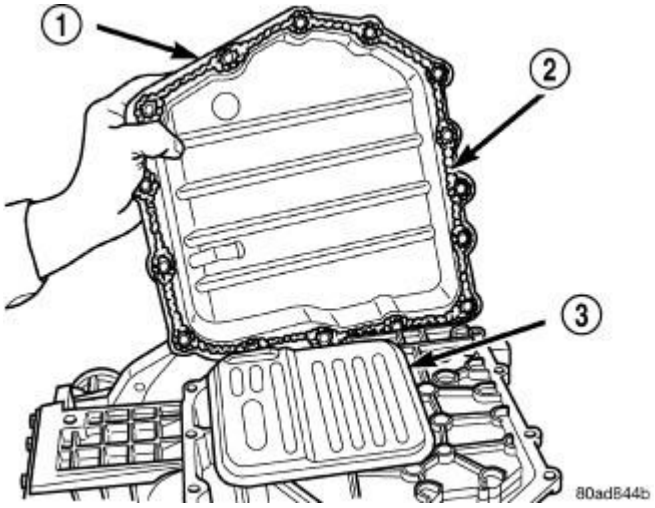


Fig. 477: Removing/Installing Oil Pan
Courtesy of CHRYSLER LLC

1 - OIL PAN
2 - 1/8 INCH BEAD OF RTV SEALANT
3 - OIL FILTER

4. Ensure the transaxle oil pan and transaxle case sealing surfaces are clean and dry. Install an 1/8" bead of MOPAR® Silicone Rubber Adhesive Sealant to the oil pan and install.

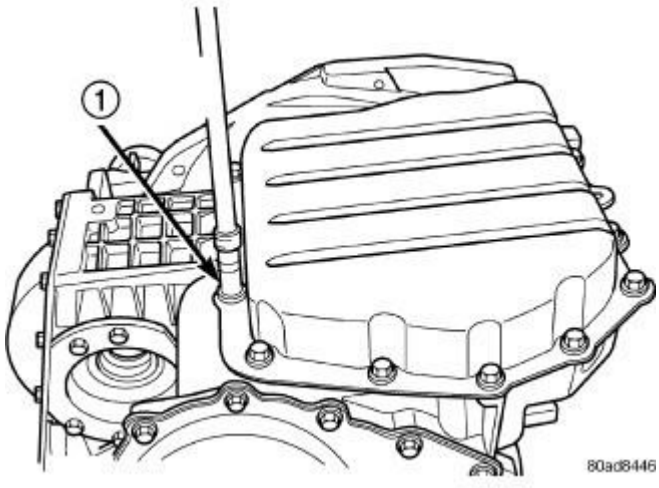


Fig. 478: Identifying Oil Pan Bolts
Courtesy of CHRYSLER LLC

1 - OIL PAN BOLTS (USE RTV UNDER BOLT HEADS)

5. Torque oil pan-to-transaxle case bolts to 19 N.m (165 in. lbs.).
6. Raise engine cradle crossmember into position.
7. Aligning index/scribe mark placed upon disassembly, Install four cradle-to-body bolts and torque to 162 N.m (120 ft. lbs.).
8. Lower vehicle.
9. Remove engine support fixture 8534B.
10. Raise vehicle.
11. Install and torque engine front and rear mount-to-cradle nuts to 54 N.m (40 ft. lbs.).
12. Lower vehicle.
13. Connect transmission range sensor connector.
14. Install manual valve lever to manual shaft.
15. Install gearshift cable to manual valve lever.
16. Install battery and tray.
17. Connect battery negative cable.
18. Fill transaxle with Mopar® ATF +4 Transmission fluid. See **FLUID AND FILTER SERVICE**

2009 AUTOMATIC/MANUAL TRANSMISSION

Getrag MPS6 - Service Information - Journey

OPERATION

OPERATION

The MPS6 is an electronically controlled and automatically shifted transaxle with a dual clutch torque conversion system. In the MPS6 dual clutch system, one clutch is splined to one half of a split input shaft, while the other clutch is splined to other half of the split input shaft. Only one of the dual clutches will be engaged at a time, depending on what gear ratio is selected. The MPS6 contains a set of constantly meshed helical gears, which are synchronized in all forward ranges, similar to the type of gears typically found in manual transmissions. The key difference between a typical manual transmission with a single clutch and the MPS6 dual clutch system is that the MPS6 dual clutch assembly allows engine torque to be constantly applied to the output shaft between shifts. When shifting a manual transmission, engine torque has to be completely removed from the transmission by disengaging the clutch.

The MPS6 is a considered a powershift transaxle, which means that when it is engaged in a forward or reverse gear, or when upshifting between gears, engine torque is constantly applied to the output shaft. All conventional automatic transmissions, or transmissions that transfer engine torque through the fluid coupling of a torque converter and achieve gear ratios by holding parts of a planetary gearset, or continuously variable transmissions (CVTs) fall into the category of powershift transmissions, as engine torque is constantly applied to the output shaft when the transmission is in a forward or reverse gear.

First Gear Operation

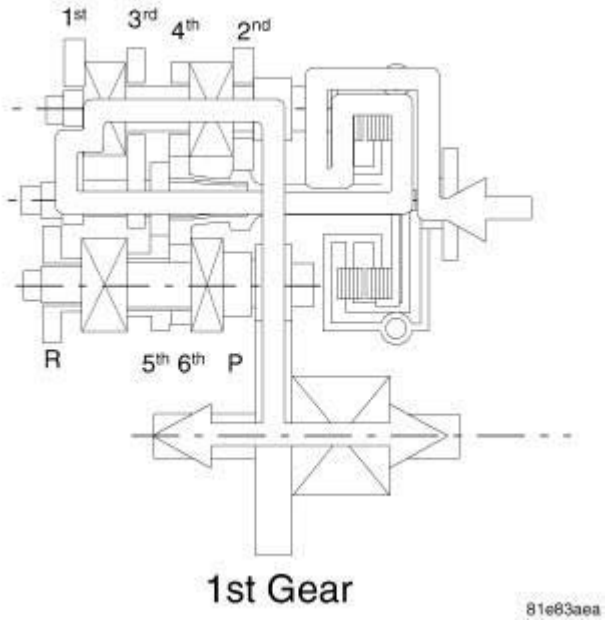


Fig. 1: FIRST GEAR PF
Courtesy of CHRYSLER LLC

In first gear, the first/third synchronizer locks the first gear to the 1st-4th output shaft. When the clutch pack connects the engine and the 1/3/5/R input shaft, power is transferred from the engine to the 1/3/5/R input shaft, to the first gear, to the 1st-4th output shaft, to the ring gear, and to the differential.

Under certain driving conditions, two gears on opposite input shafts are engaged. For example, if the transmission is in first gear while in Drive or AUTOSTICK™ Mode, the second/fourth synchronizer locks the second gear to the 1st-4th output shaft. Because the 2/4/6 input shaft is not engaged, the second gear and the 2/4/6 output shaft will freewheel with as the 1st-4th output shaft rotates. When the second gear is required, the transmission releases the 1/3/5/R input shaft clutch and engages the 2/4/6 input shaft clutch to complete the upshift.

Second Gear Operation

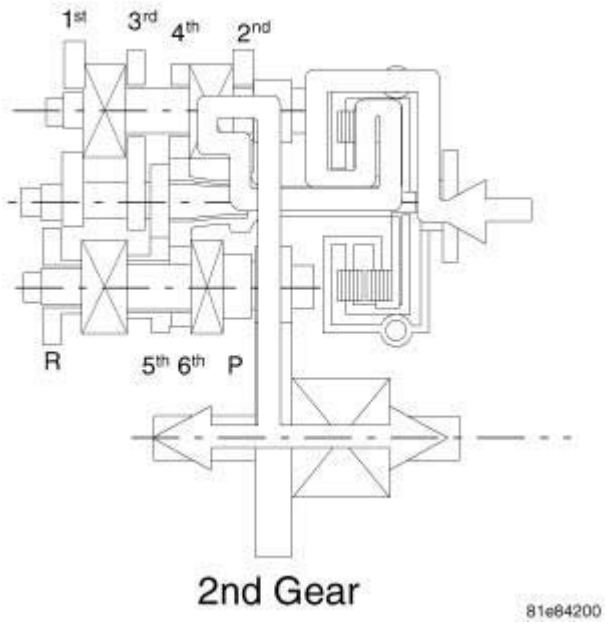


Fig. 2: 2ND GEAR PF
Courtesy of CHRYSLER LLC

To shift from first to second gear, the transmission disengages the wet clutch pack for the 1/3/5/R input shaft and engages the 2/4/6 input shaft. Because the second/fourth synchronizer has already locked the second gear to the 1st-4th output shaft, the transmission shifts to second gear. Engine power is transferred to the 2/4/6 input shaft, to the second gear, to the 1st-4th output shaft, and then to the ring gear.

When the transmission is operating in AUTOSTICK™ Mode, 3rd gear is preselected.

Third Gear Operation

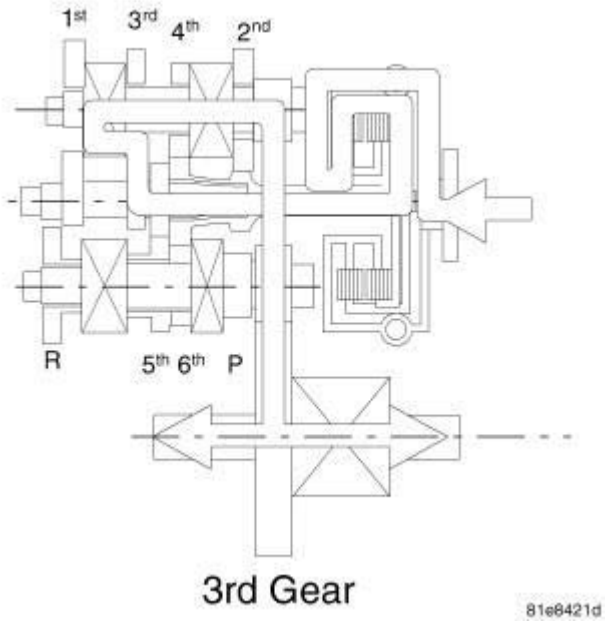


Fig. 3: 3RD GEAR PF
Courtesy of CHRYSLER LLC

When operating in the second in AUTOSTICK™ Mode the third gear is already engaged, shifting from the second to the third gear requires only that the wet clutch pack disengage the 2/4/6 input shaft from the engine and engage the 1/3/5/R input shaft. Power is then transferred from the 1/3/5/R input shaft, to the third gear, to the 1st-4th output shaft and then to the ring gear.

Fourth Gear Operation

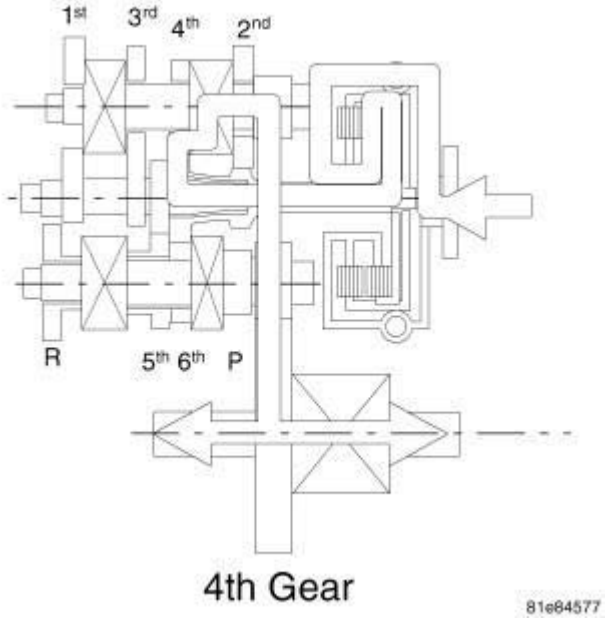


Fig. 4: 4TH GEAR PF
Courtesy of CHRYSLER LLC

When operating in the third gear, the fourth gear is not preselected. An upshift to the fourth gear requires that the shift fork move the second/fourth synchronizer to the fourth gear position. The wet clutch pack for the 1/3/5/R input is then disengaged from the engine and the 2/4/6 input shaft is engaged. Engine power is transferred to the 2/4/6 input shaft, to the fourth gear, to the 1st-4th output shaft, and then to the ring gear.

When operating in the fourth gear in AUTOSTICK™ Mode, the 3rd gear is preselected.

Fifth Gear Operation

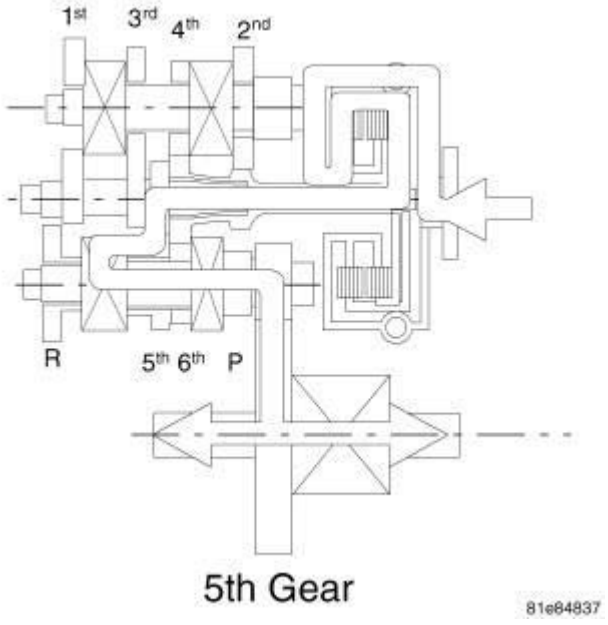


Fig. 5: 5TH GEAR PF
Courtesy of CHRYSLER LLC

To shift into fifth gear during an increase in speed, the fifth/reverse synchronizer locks the fifth gear to the output shaft, disengages the 2/4/6 input shaft and engages the 1/3/5/R input shaft. Engine power is transferred through the 1/3/5/R input shaft, to the fifth gear, to the 5th, 6th and Reverse output shaft and then to the ring gear.

When operating in the fifth gear in AUTOSTICK™ Mode, the 4th gear is preselected.

Sixth Gear Operation

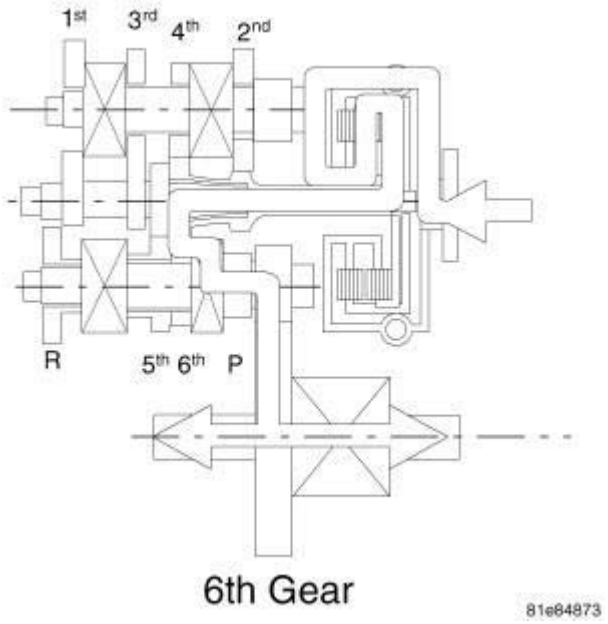


Fig. 6: 6TH GEAR PF
Courtesy of CHRYSLER LLC

To shift from the fifth gear to the sixth gear, the fifth/reverse synchronizer unlocks the fifth gear from the 5th, 6th, and Reverse output shaft, the sixth gear synchronizer locks the sixth gear to the 5th, 6th, and Reverse output shaft, the 1/3/5/R input shaft is disengaged from the engine, and the 2/4/6 input shaft is engaged. Engine power is transferred through the 2/4/6 input shaft, to the sixth gear, to the 5th, 6th and reverse output shaft and then to the ring gear.

Preselection is not used in sixth gear.

Shift Fork Preselection

Locking a second gear to the output shaft is called preselection. The SHIFT FORK PRESELECTION - VEHICLE MOVING table lists the driving conditions under which preselection occurs and which gear is preselected.

SHIFT FORK PRESELECTION - VEHICLE MOVING

Autostick		Drive	
Active Gear	Preselected Gear	Active Gear	Preselected Gear
1st	2nd	1st	2nd
2nd	3rd	2nd	0
3rd	2nd	3rd	0
4th	3rd	4th	0
5th	4th	5th	0
6th	0	6th	0

The SHIFT FORK PRESELECTION - VEHICLE STOPPED table lists the shifter and engine conditions under which preselection occurs when the vehicle is stopped.

SHIFT FORK PRESELECTION - VEHICLE STOPPED

Engine Off		Engine Running	
Shifter Position	**Preselected Gears**	**Shifter Position**	**Preselected Gears**
P	Reverse and 2nd	P	Reverse and 2nd
R	Reverse and 2nd	R	Reverse and 2nd
N	Reverse and 2nd	N	Reverse and 2nd
D	Reverse and 2nd	D	1st and 2nd
Autostick™	Reverse and 2nd	Autostick™	1st and 2nd

DIAGNOSIS AND TESTING

COMMON PROBLEM CAUSES

The majority of transaxle malfunctions are a result of:

- Insufficient lubrication
- Incorrect lubricant
- Mis-assembled or damaged internal components
- Improper operation

NOISY OPERATION

Transaxle noise is most often a result of worn or damaged components. Chipped, broken gear or synchronizer teeth, and brinnelled, spalled bearings all cause noise.

Abnormal wear and damage to the internal components is frequently the end result of insufficient lubricant.

LOW LUBRICANT LEVEL

Insufficient transaxle lubricant is usually the result of leaks, or inaccurate fluid level check or refill method. **Vehicle must be level to accurately check fluid level.** Leakage is evident by the presence of oil around the leak point. If leakage is not evident, the condition is probably the result of an underfill.

If air-powered lubrication equipment is used to add fluid to the MPS6 transaxle, be sure the equipment is properly calibrated. Equipment out of calibration can lead to an under fill condition. Refer to **Standard Procedure** in this service information.

REMOVAL

REMOVAL

NOTE: If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

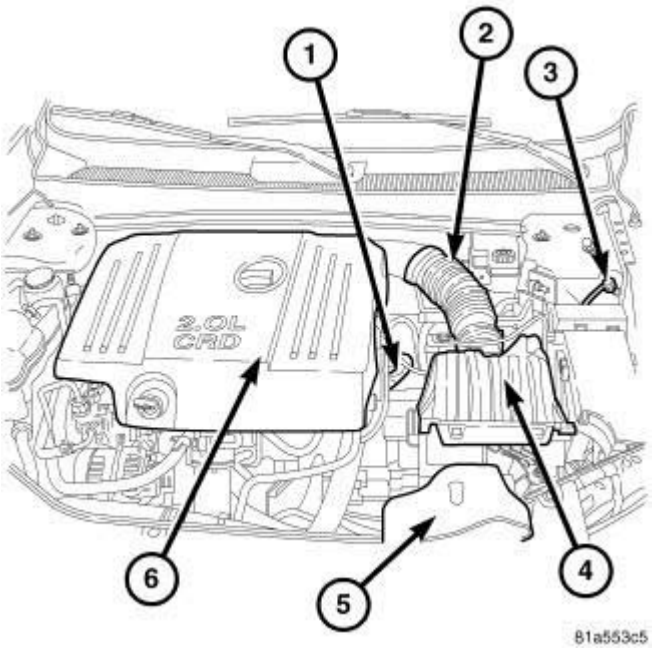


Fig. 7: ENGINE COVER
Courtesy of CHRYSLER LLC

1. Remove the engine cover (6).
2. Disconnect battery negative cable (3).
3. Remove air inlet tube (2) and air cleaner assembly (4). Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .

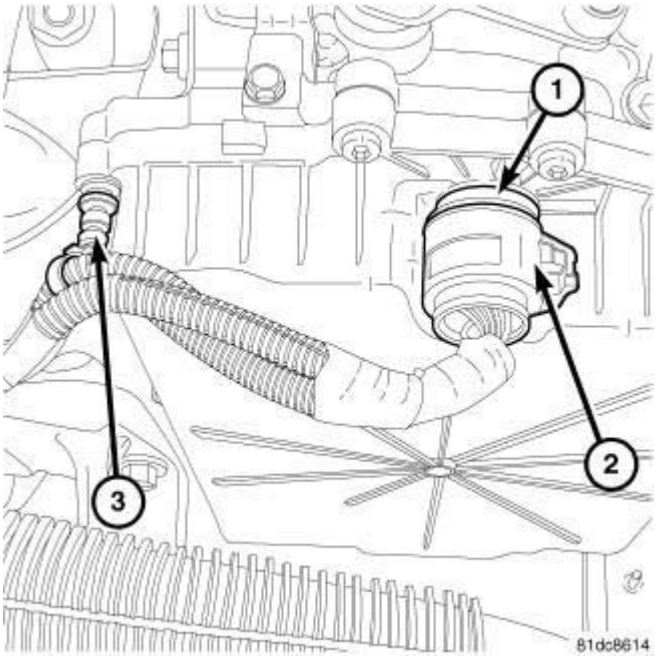


Fig. 8: Solenoid Pack Electrical Connector
Courtesy of CHRYSLER LLC

4. Disconnect the harness connector (2) at the transmission.
5. Remove the harness retaining clip (3) from stud at valve body cover.

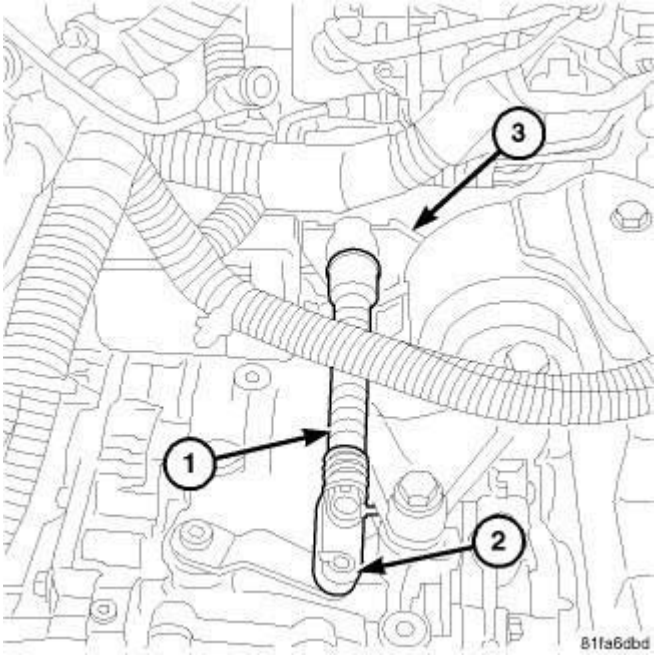


Fig. 9: GEAR SHIFT CABLE
Courtesy of CHRYSLER LLC

6. Remove the gear shift cable (1) at the manual lever (2).

7. Remove the gear shift cable and lock at the cable bracket (3).

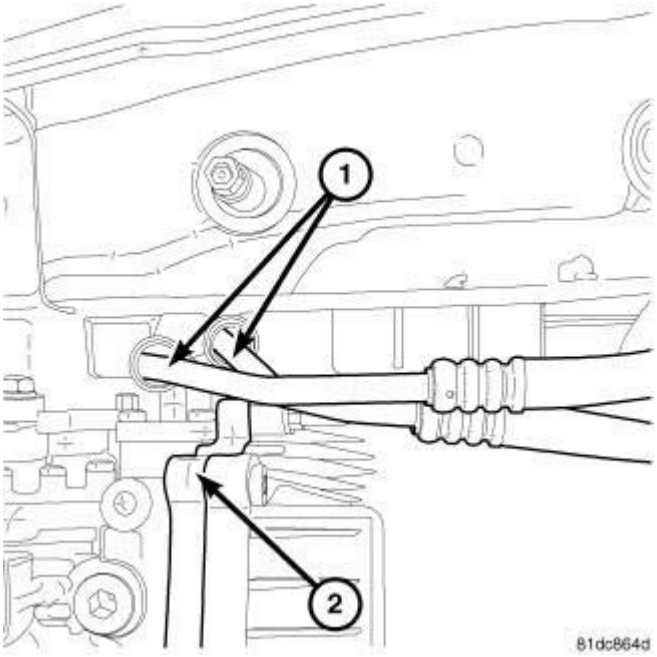


Fig. 10: QUICK-CONNECT FITTINGS
Courtesy of CHRYSLER LLC

8. Using Disconnect Release Tool 8875A, disconnect the transmission cooler line quick-connect fittings (1) from the transaxle.

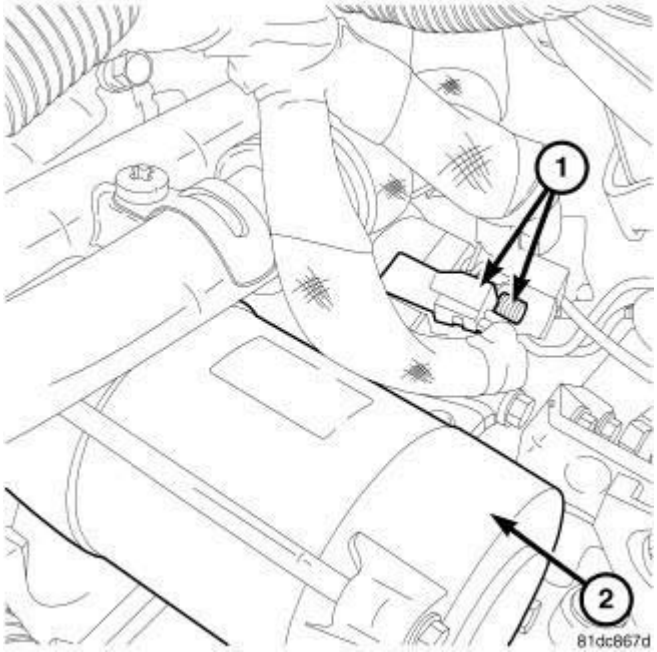


Fig. 11: STARTER ELECTRICAL CONNECTORS
Courtesy of CHRYSLER LLC

9. Disconnect the electrical connectors (1) from the starter (2).

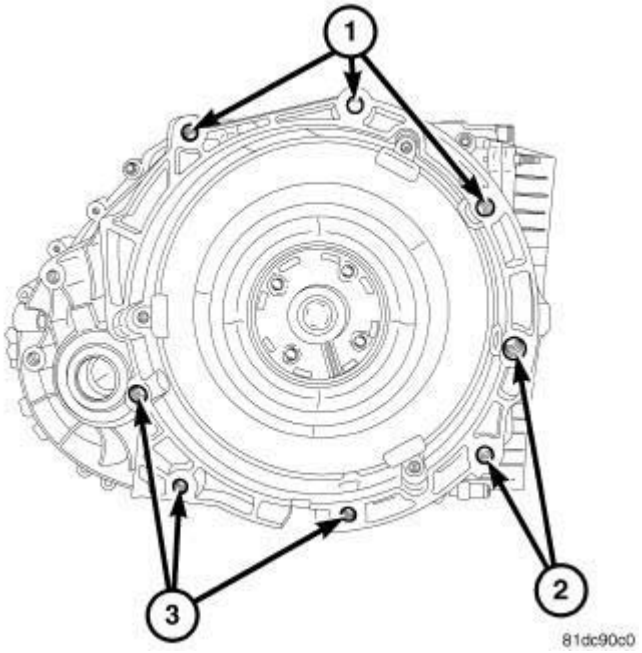


Fig. 12: BELLHOUSING BOLTS
Courtesy of CHRYSLER LLC

10. Remove the upper bellhousing bolts (1).
11. Lift the vehicle on a hoist.
12. If equipped, remove the engine belly pan.
13. Remove both front side splash shields.

NOTE: The MPS6 transmission has sealed differential side gears so oil won't come out after the half shaft removal. Hence there is no need to drain the oil for removing the transmission.

14. Remove the halfshafts. Refer to **Differential and Driveline/Half Shaft - Removal** .
15. Lower the hoist.

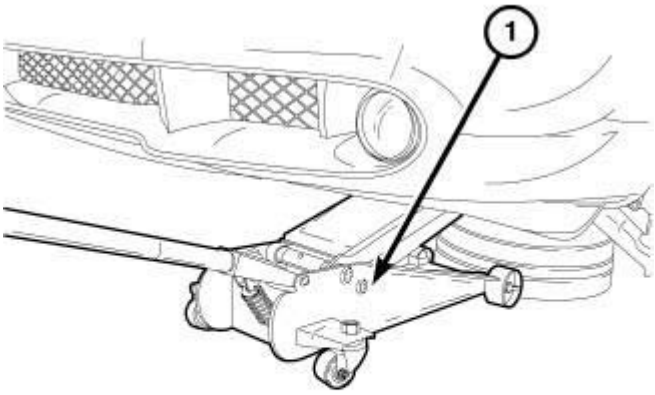


Fig. 13: SUPPORT WITH JACK
Courtesy of CHRYSLER LLC

16. Support the transmission with a floor jack (1).

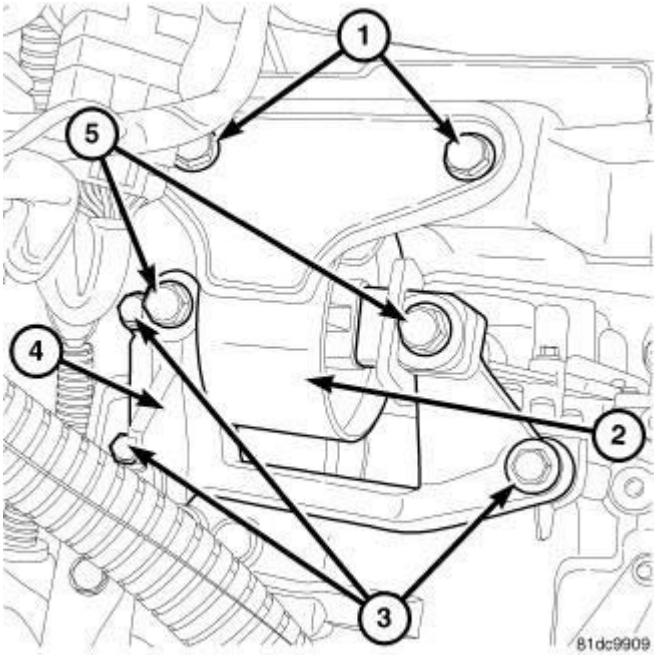


Fig. 14: LEFT TRANSMISSION MOUNT AND BRACKET
Courtesy of CHRYSLER LLC

17. Remove left transmission mount bracket bolts (3, 5).
18. Remove the left transmission mount bolts (5) from the transmission mount.

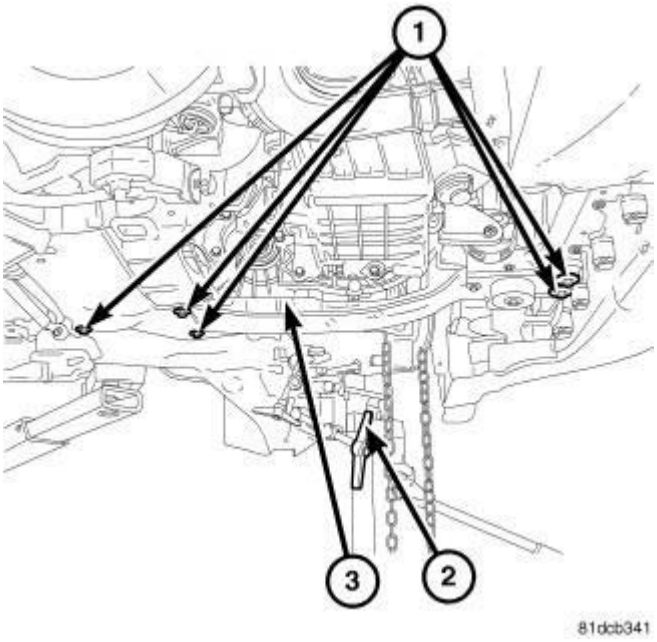


Fig. 15: Crossmember And Transmission Jack
Courtesy of CHRYSLER LLC

19. Lift the vehicle on a hoist.
20. Support the transmission with a jack (2).

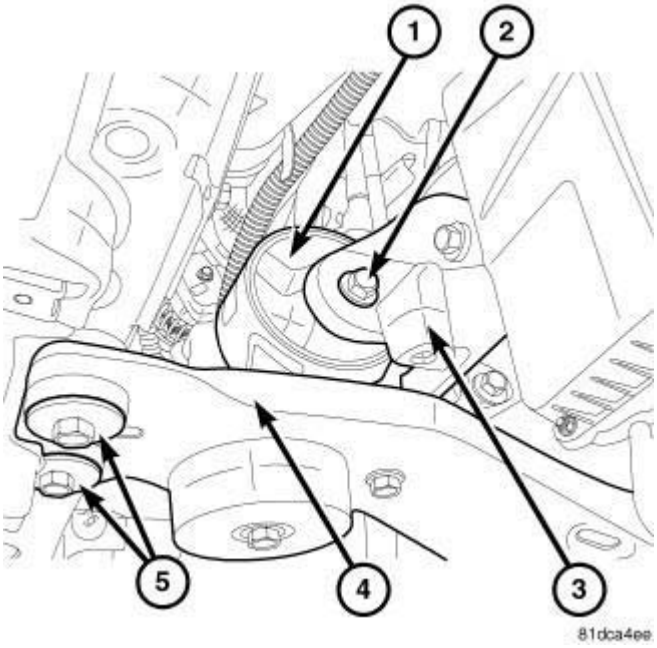


Fig. 16: CROSSMEMBER THROUGH BOLT
Courtesy of CHRYSLER LLC

21. Remove the crossmember through bolt (2).

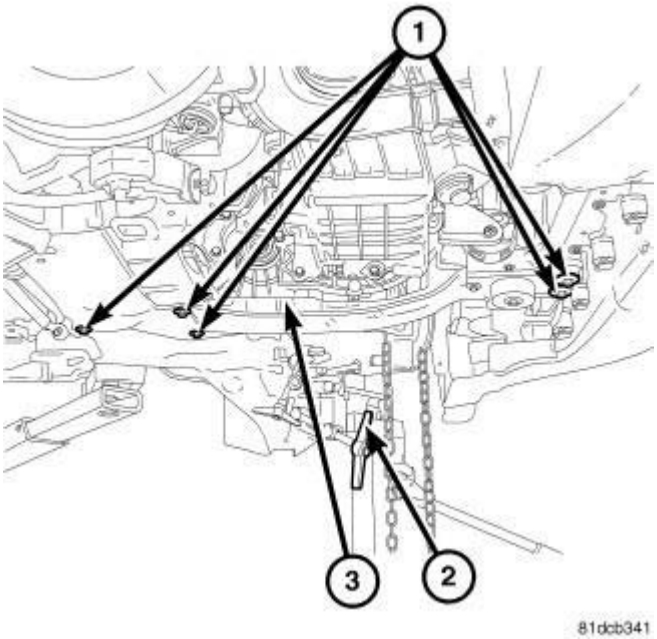


Fig. 17: Crossmember And Transmission Jack
Courtesy of CHRYSLER LLC

22. Remove the crossmember bolts (1).
23. Remove the crossmember.

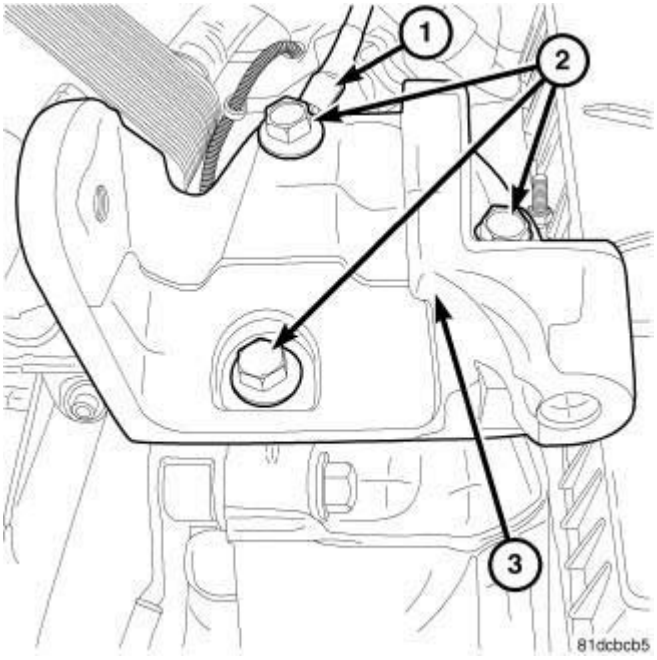


Fig. 18: FRONT MOUNT BRACKET
Courtesy of CHRYSLER LLC

24. Remove the front mount bracket bolts (2).

25. Remove the front mount bracket.

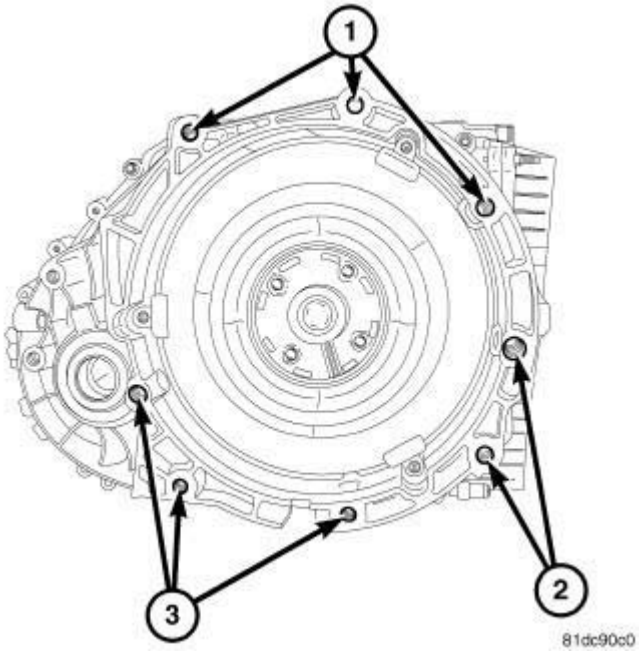


Fig. 19: BELLHOUSING BOLTS
Courtesy of CHRYSLER LLC

26. Remove the three lower bellhousing bolts.

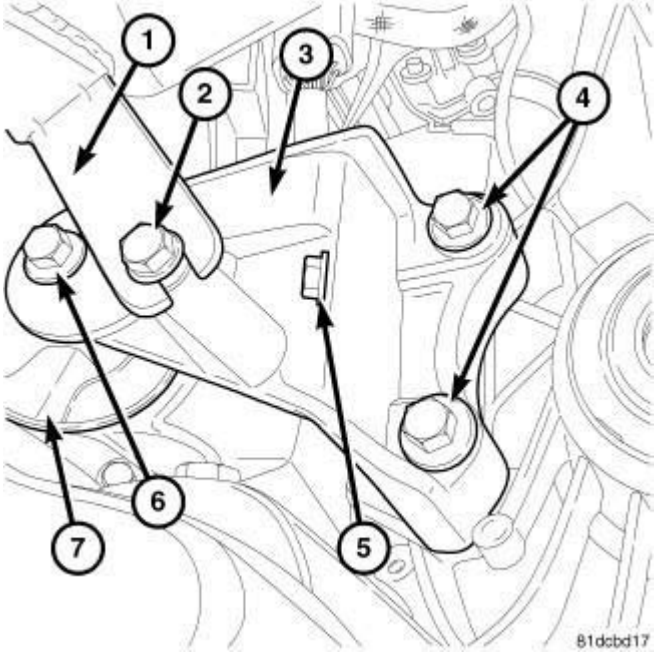


Fig. 20: REAR MOUNT BRACKET
Courtesy of CHRYSLER LLC

NOTE: Early 08 model year mount shown in illustration. Late 08 and 09 model year mount similar.

27. Remove the right rear mount bracket bolts (4 and 5).
28. Remove the rear mount bracket bolts (2 and 6) and position the mount (3) aside.

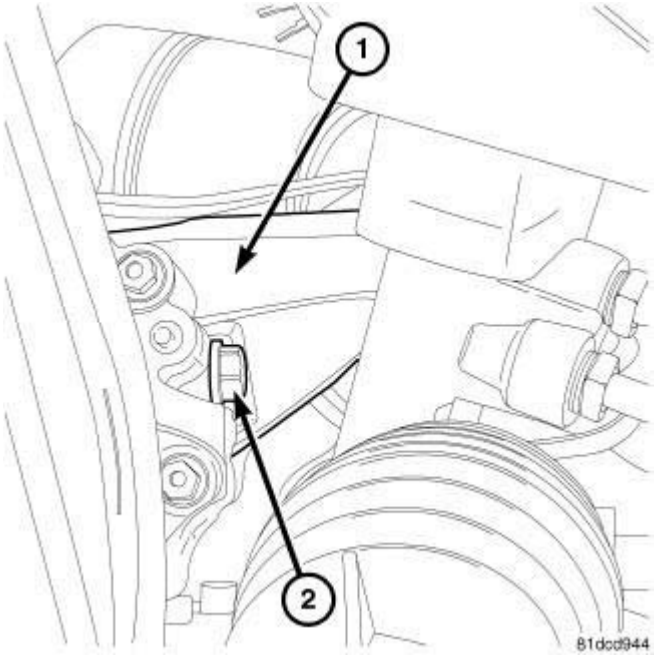


Fig. 21: Left Rear Mount Bracket Bolt
Courtesy of CHRYSLER LLC

29. Remove the left rear mount bracket bolt (2).

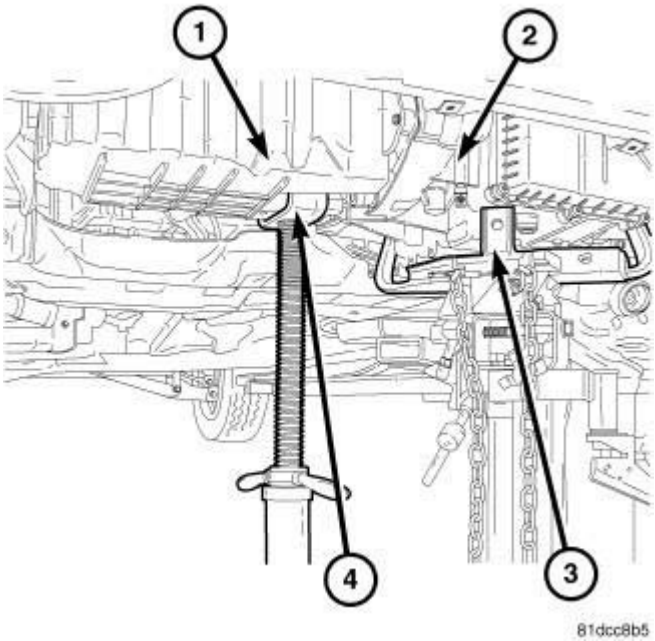


Fig. 22: SUPPORT ENGINE WITH A JACK
Courtesy of CHRYSLER LLC

30. Support the engine (1) with a jack (4).

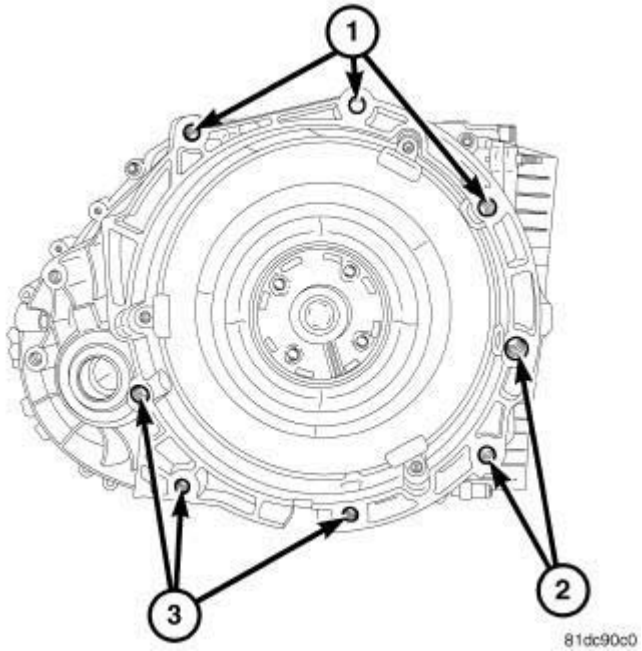


Fig. 23: BELLHOUSING BOLTS
Courtesy of CHRYSLER LLC

31. Remove the remaining bellhousing bolts.

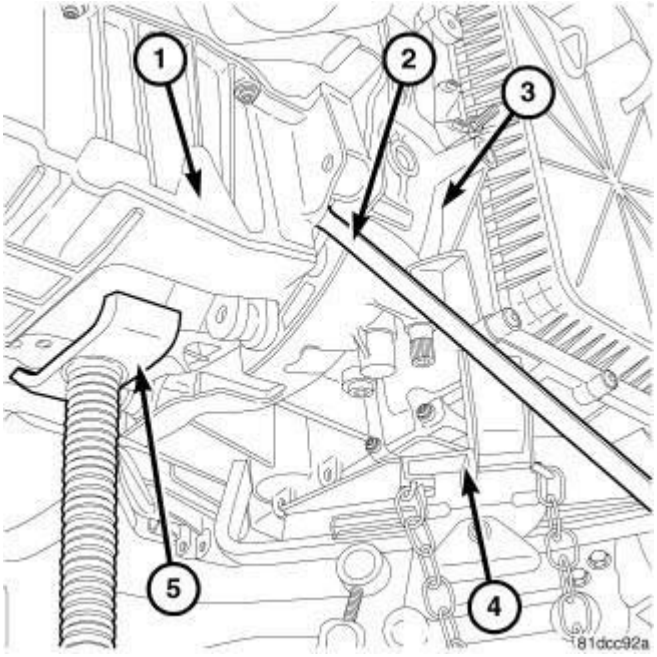


Fig. 24: Separate Transmission From Engine
Courtesy of CHRYSLER LLC

32. Angle the engine and transmission slightly down with the jacks.

NOTE: Keep the mounting surface of the bellhousing parallel to the mounting surface on the engine while moving the transmission and jack away from the engine.

33. If necessary, Use a pry bar (2) to separate the transmission (3) from the engine (1).
34. Lower the transmission (3) from the vehicle.

DISASSEMBLY

DISASSEMBLY

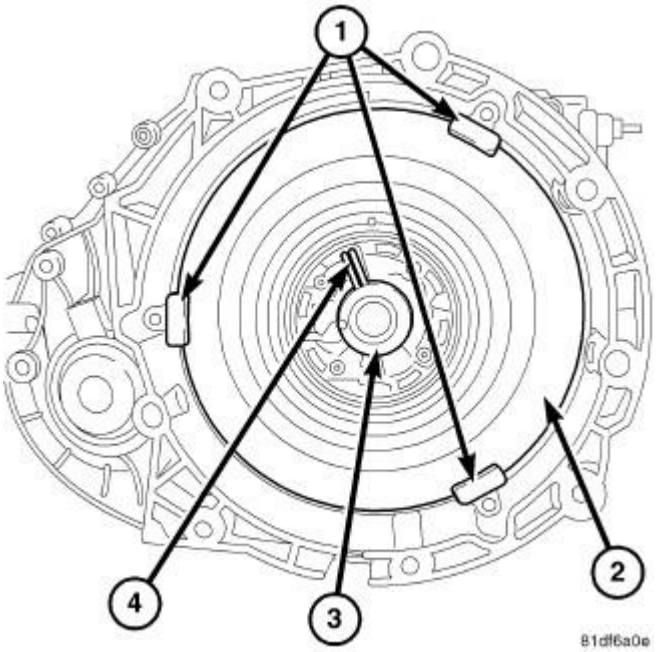


Fig. 25: RETAINING CLIPS
Courtesy of CHRYSLER LLC

1. Remove and discard the three screws holding the retaining clips (1) that secure the front cover (2).

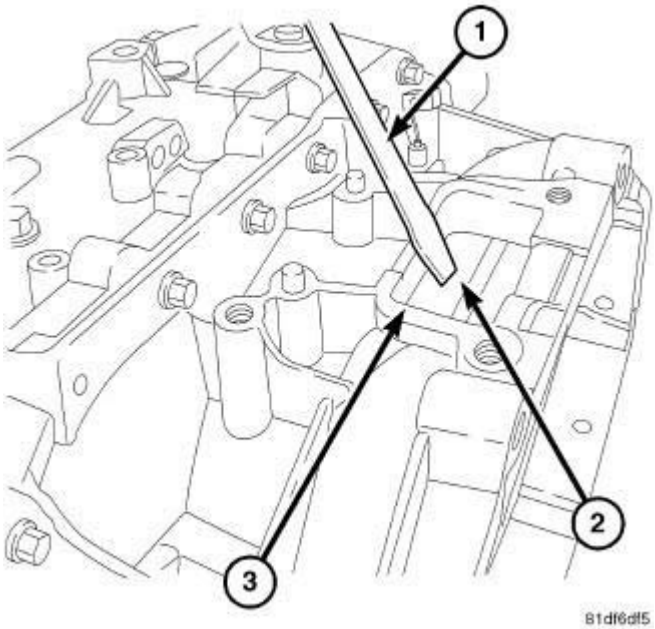


Fig. 26: FRONT COVER
Courtesy of CHRYSLER LLC

2. Using a screw driver (1) through the starter hole remove and discard the front cover (2).
3. Remove the Double Clutch Assembly. See **Removal** .

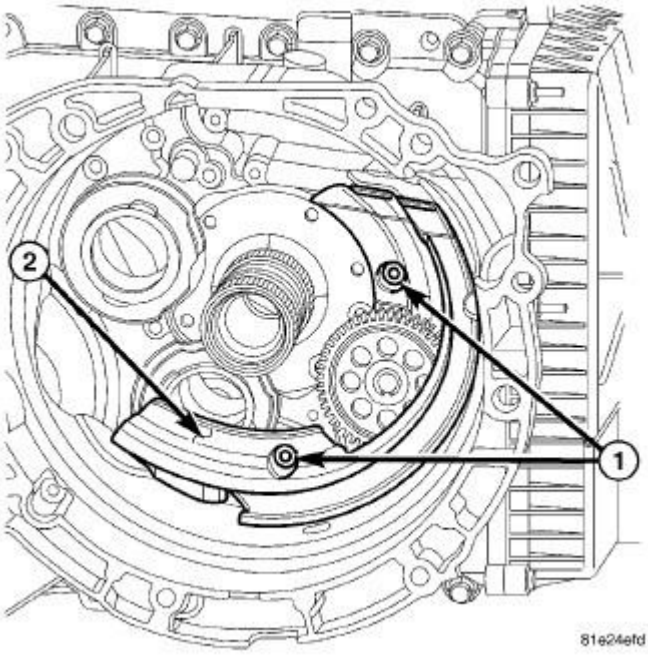


Fig. 27: Retaining Screws & Clutch Case Spacer
Courtesy of CHRYSLER LLC

4. Remove the retaining screws (1) holding the clutch case spacer (2).
5. Remove the clutch case spacer (2).

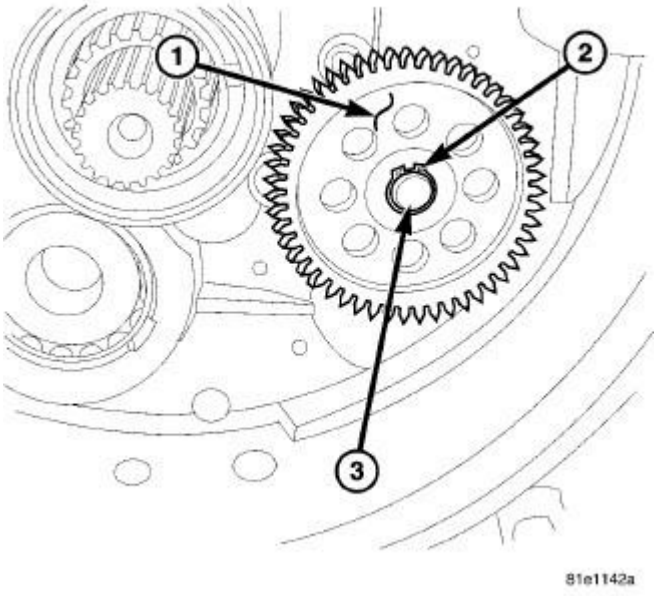


Fig. 28: SNAP RING AT THE OIL PUMP GEAR
Courtesy of CHRYSLER LLC

6. Remove the snap ring (2) at the oil pump gear (1).

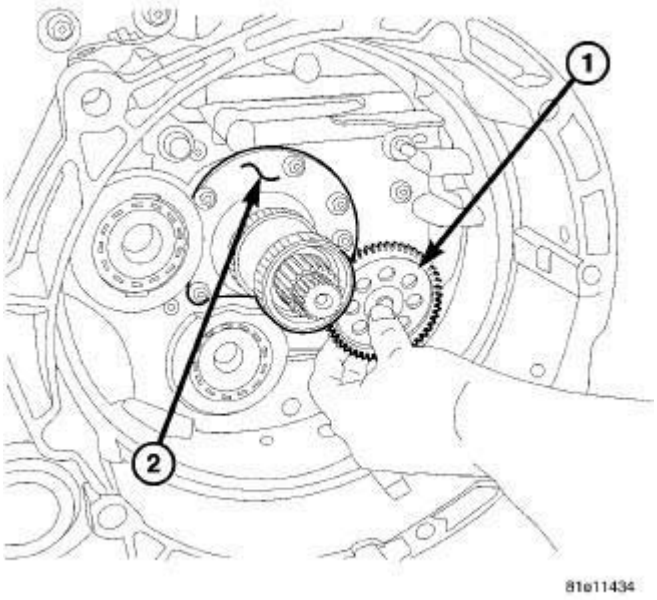


Fig. 29: OIL PUMP GEAR
Courtesy of CHRYSLER LLC

7. Remove the oil pump gear (1).

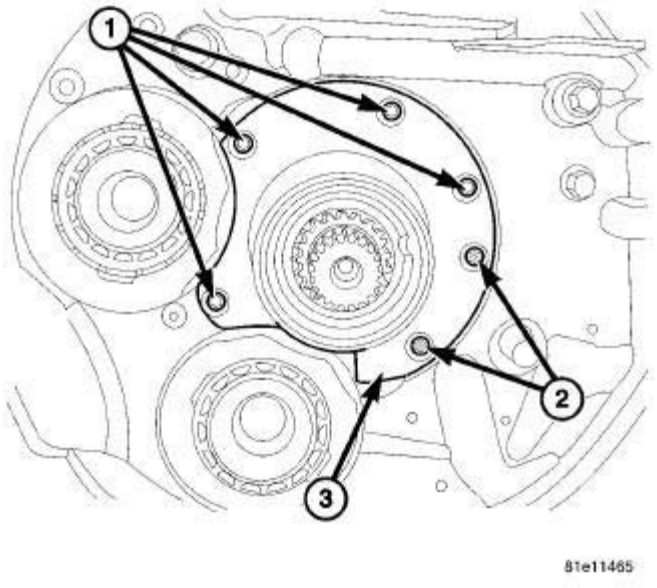


Fig. 30: Retaining Bolts At Clutch Support
Courtesy of CHRYSLER LLC

NOTE: Two of the retaining bolts (2) are longer.

8. Remove the retaining bolts (1, 2) at the clutch support (3).

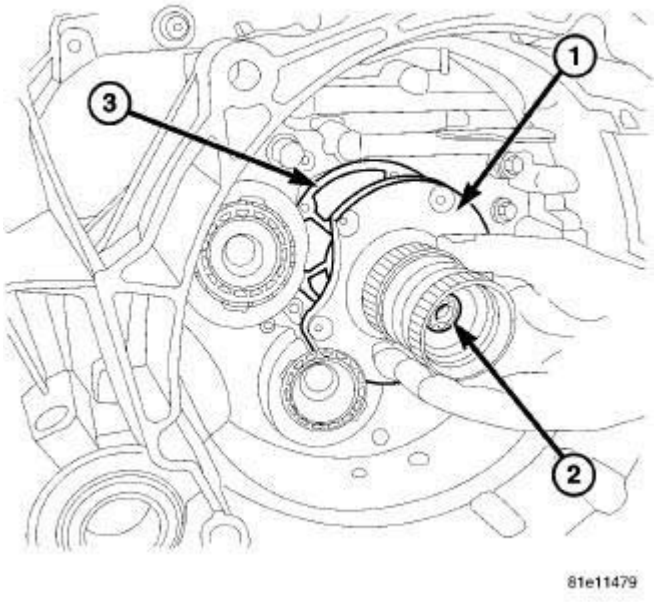


Fig. 31: Clutch Support & Gasket
Courtesy of CHRYSLER LLC

9. Remove the clutch support (1).
10. Remove the clutch support gasket (3).
11. Remove the clutch support needle bearings and sealing rings.

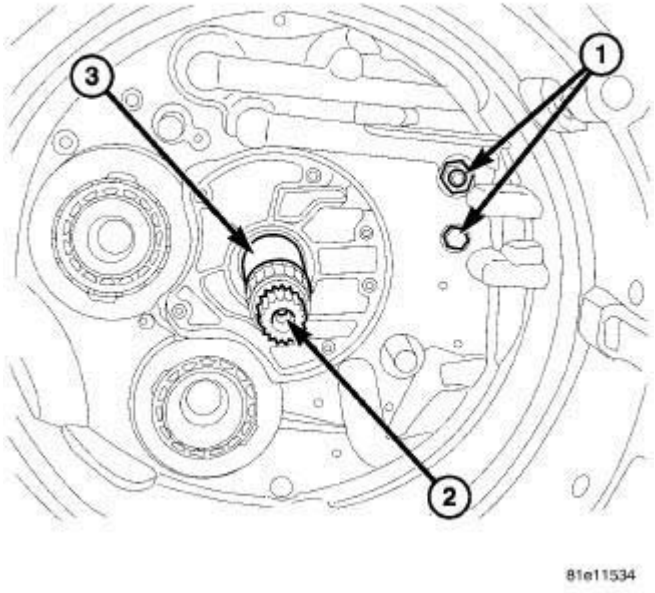


Fig. 32: Case Half Bolts In Bellhousing
Courtesy of CHRYSLER LLC

NOTE: The upper bolt is longer than the other case half bolts.

12. Remove the case half bolts (1) in the bellhousing area.

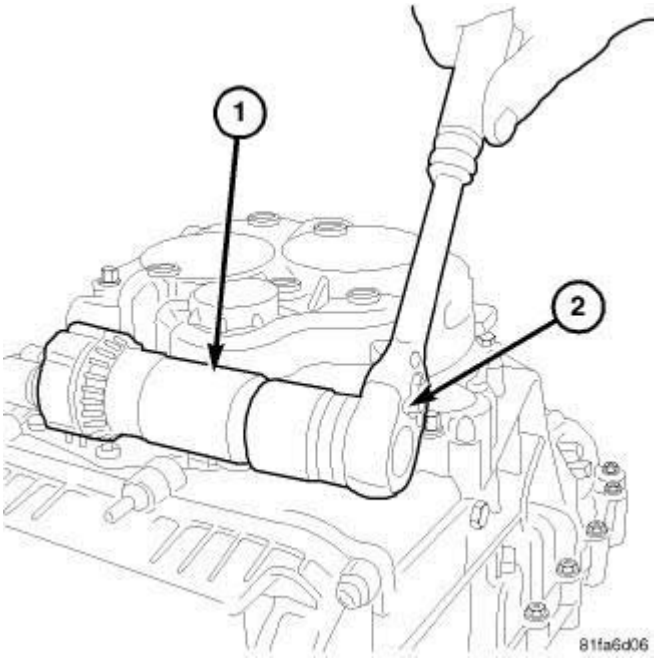


Fig. 33: OIL FILTER HOUSING AND FILTER
Courtesy of CHRYSLER LLC

13. Remove the external oil filter housing and filter (1) using a wrench and socket (2).

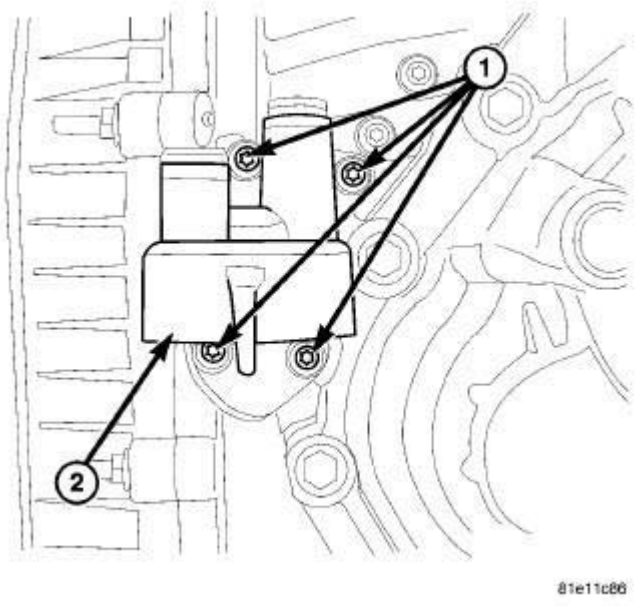


Fig. 34: OIL FILTER ADAPTOR BOLTS
Courtesy of CHRYSLER LLC

14. Remove the bolts (1) at external oil filter adaptor (2).

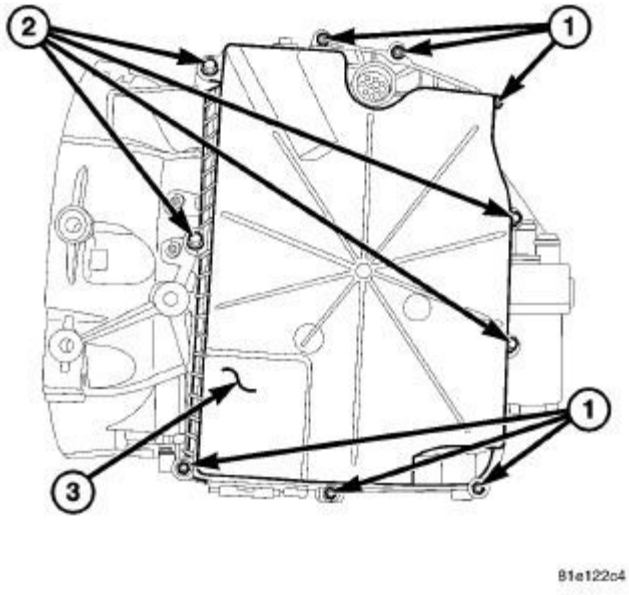


Fig. 35: Valve Body Oil Pan & Bolts
Courtesy of CHRYSLER LLC

NOTE: Mark the location of studs (2).

15. Remove the studs (2) and bolts (1) at the Transmission Control Module Assembly (TCMA)/valve body oil pan.
16. Remove the valve body oil pan (3).

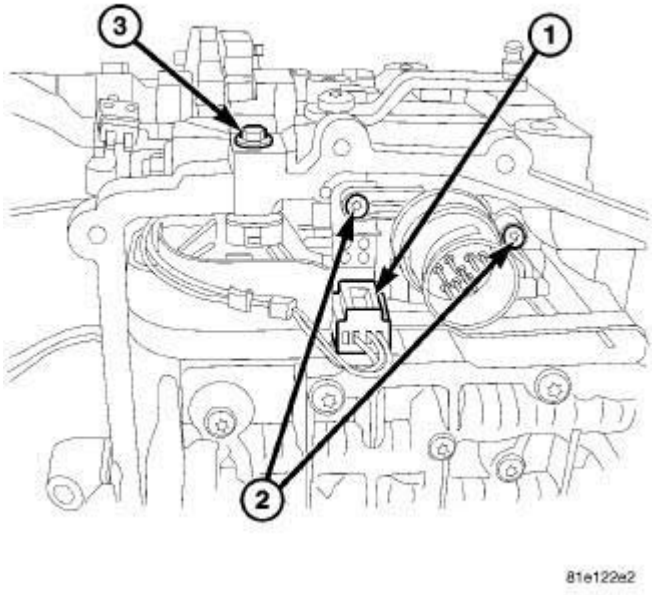


Fig. 36: TRS ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

17. Remove the electrical connector (1) at the TRS.
18. Remove the bolt (3) at the TRS.
19. Remove the screws (2) at the TRS.

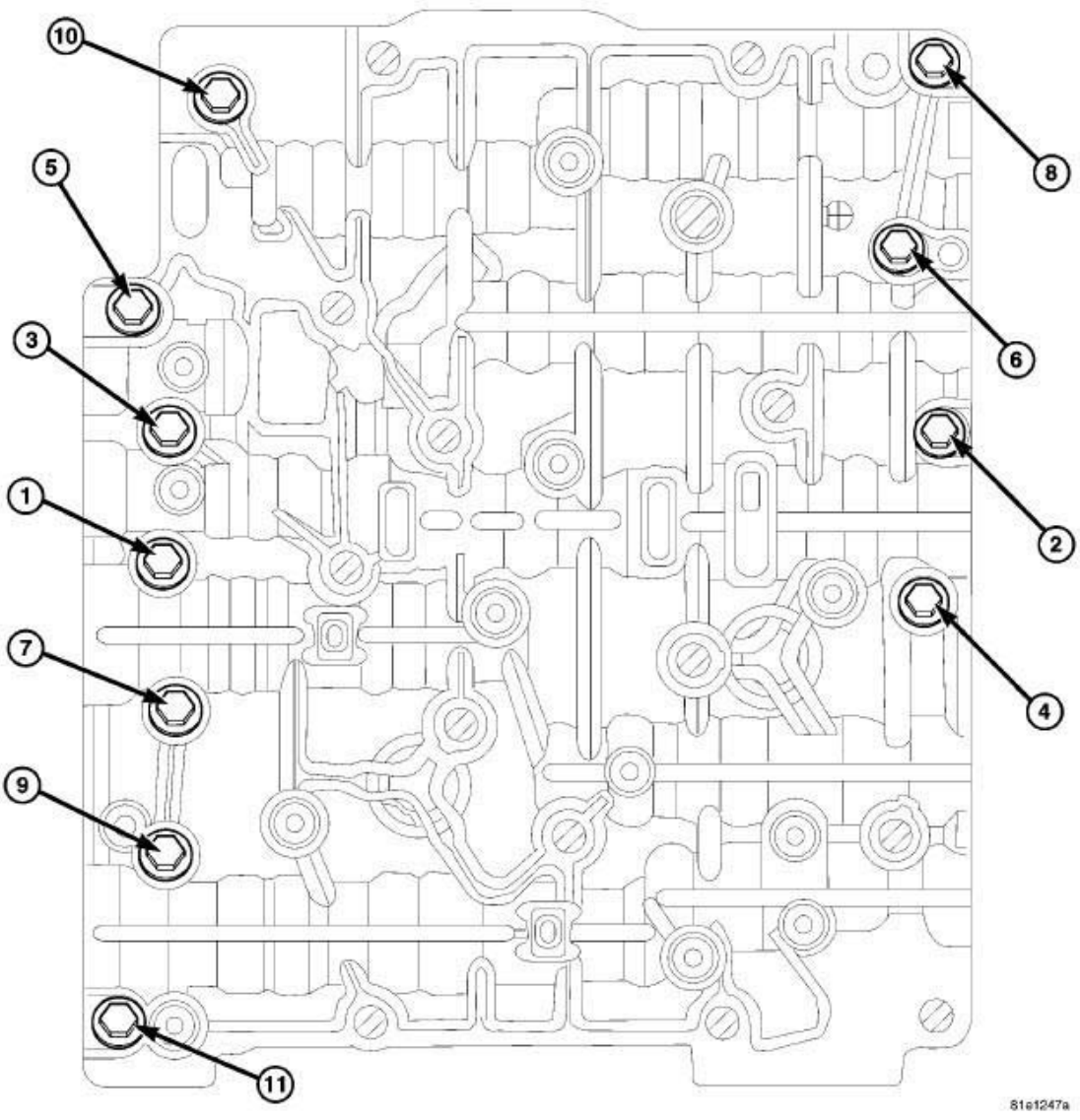


Fig. 37: VALVE BODY BOLTS
Courtesy of CHRYSLER LLC

20. Remove the eleven valve body bolts.

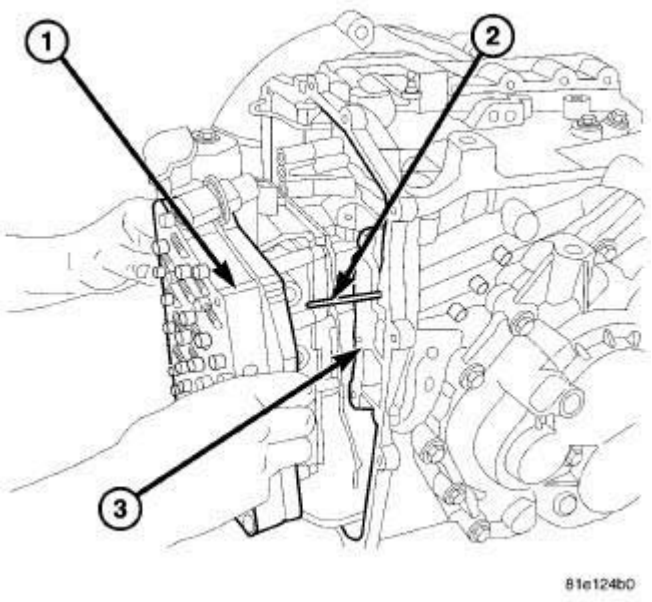


Fig. 38: Valve Body & Alignment Pins
Courtesy of CHRYSLER LLC

21. Remove the TCMA/valve body (1).

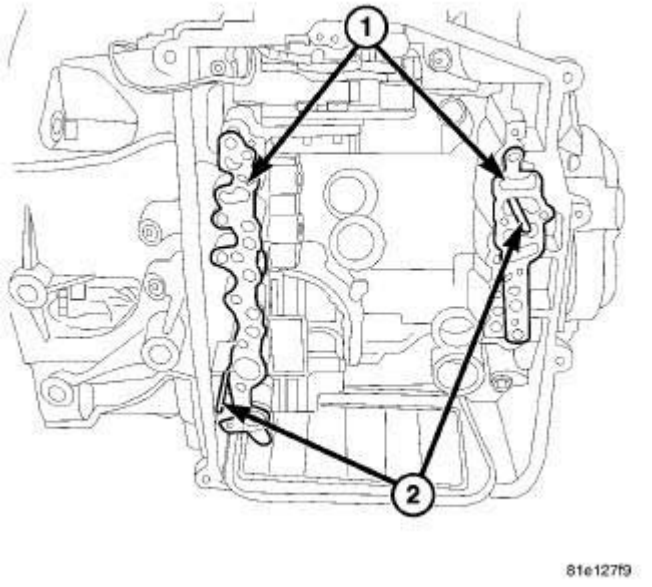


Fig. 39: VALVE BODY GASKETS
Courtesy of CHRYSLER LLC

22. Remove the metal TCMA/valve body gaskets (1).

NOTE: Make a note of alignment pin locations.

23. Remove the TCMA/valve body alignment pins (2) from the case.

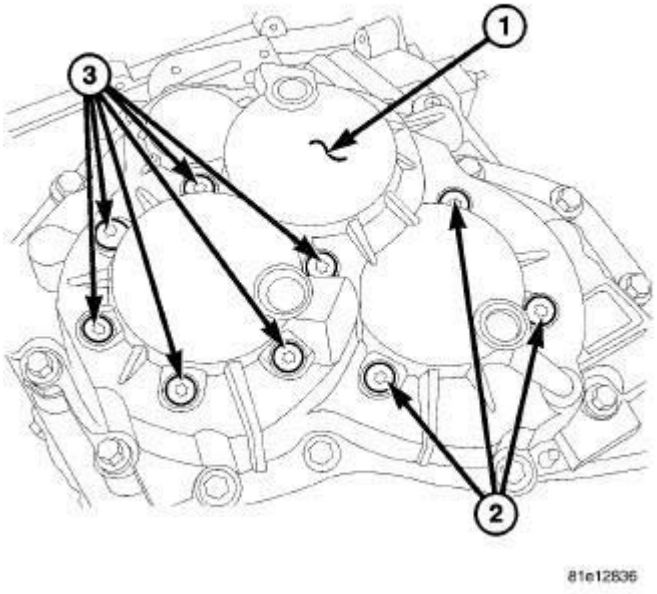


Fig. 40: SHAFT SUPPORT BOLTS
Courtesy of CHRYSLER LLC

24. Remove the bolts (2, 3) at the shaft support plates.

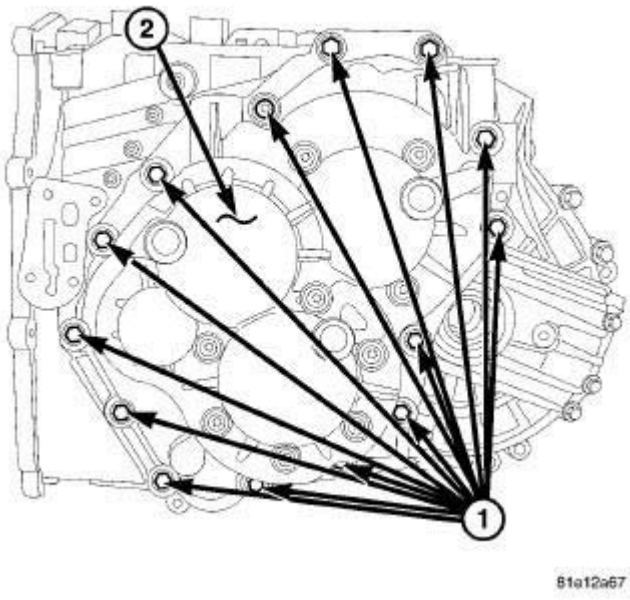


Fig. 41: Rear Cover Bolts
Courtesy of CHRYSLER LLC

NOTE: The oil trough may remain attached to cover, be careful not to damage it when removing the cover.

25. Remove the bolts (1) at the rear cover.
26. Remove the rear cover (2).

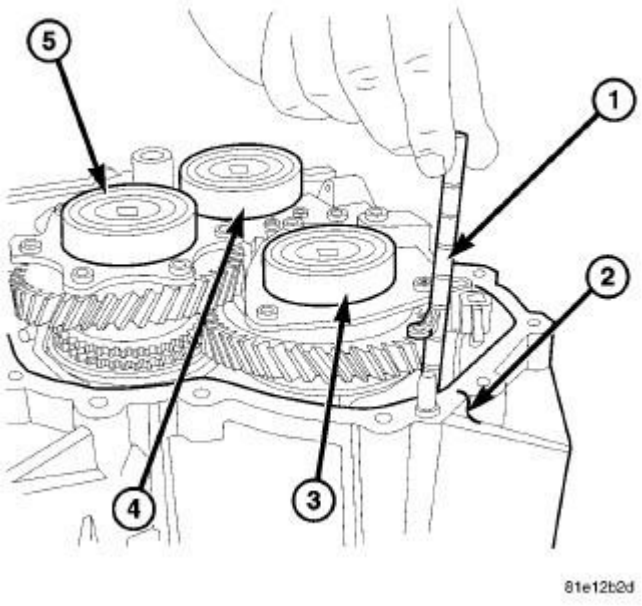


Fig. 42: OIL TROUGH
Courtesy of CHRYSLER LLC

27. Remove the oil trough (1).

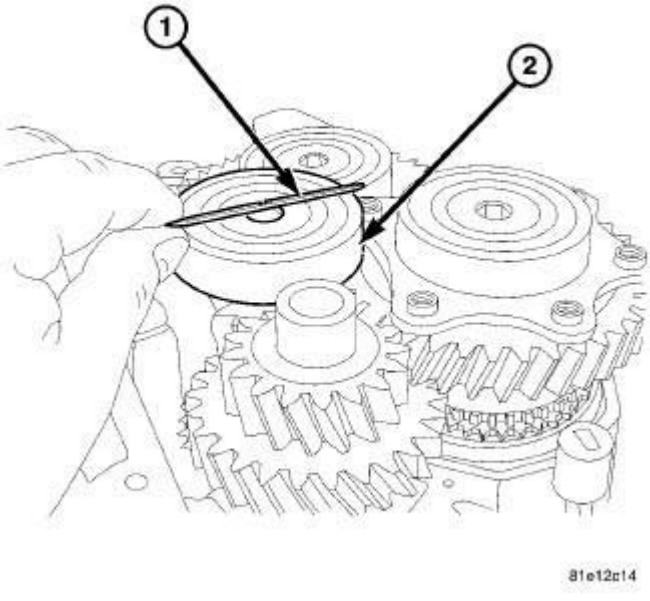


Fig. 43: INPUT SHAFT SHIM
Courtesy of CHRYSLER LLC

28. Remove the shim (1) at the input shaft (2).

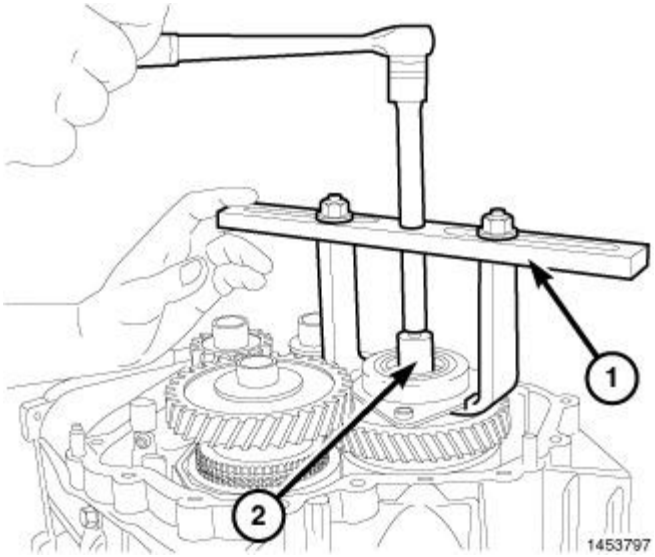


Fig. 44: PULLER 8244-2 AND PLUG 10073
Courtesy of CHRYSLER LLC

29. Remove the bearing from the input shaft using Puller 8244-2 (1) and Plug 10073 (2).
30. Place transmission in park.

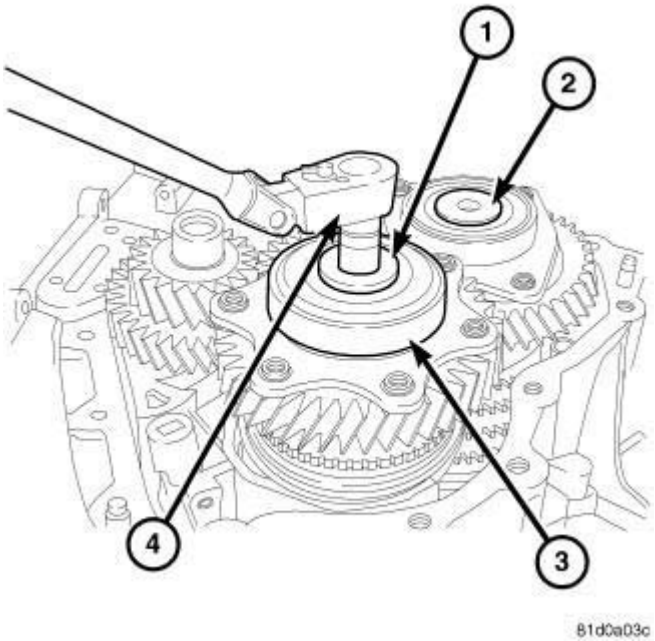


Fig. 45: BEARING AND RETAINING PLATE
Courtesy of CHRYSLER LLC

NOTE: This bolt has left hand threads.

31. Remove the R, 5th and 6th shaft bearing retaining bolt (1).
32. Remove the R, 5 and 6 shaft bearing and retaining plate (3) using Puller 8244-2 and Plug 10073.

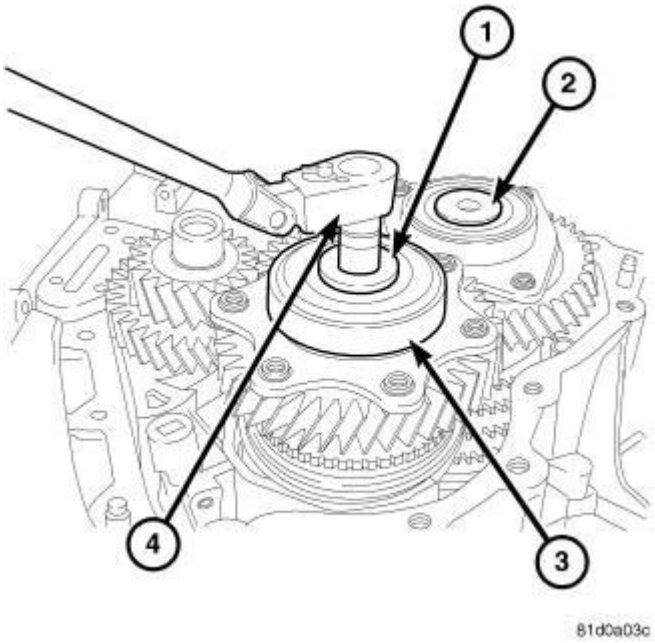


Fig. 46: BEARING AND RETAINING PLATE
Courtesy of CHRYSLER LLC

NOTE: This bolt has left hand threads.

33. Remove the 1st through 4th shaft bearing retaining bolt (2).
34. Remove the 1st through 4th shaft bearing and retaining plate using Puller 8244-2 and Plug 10073.
35. Place transmission in neutral.

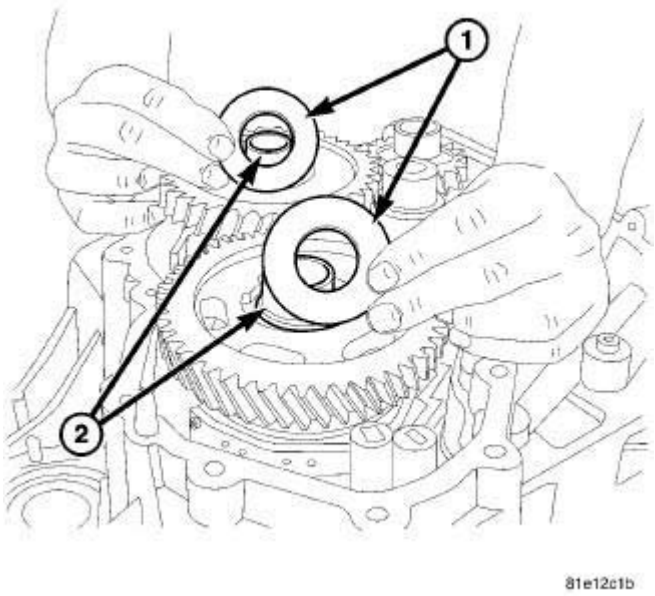


Fig. 47: OUTPUT SHAFT SHIMS
Courtesy of CHRYSLER LLC

36. Remove the thrust washers (1) from the two gears (2).

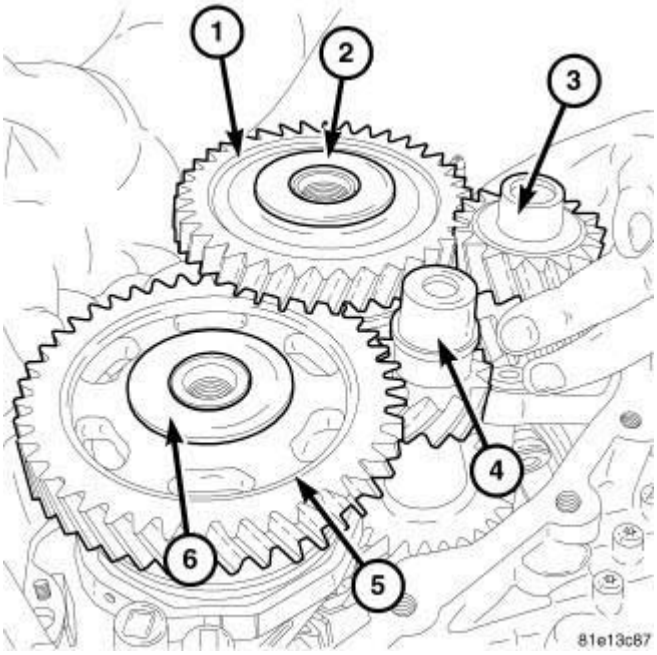


Fig. 48: IDLER AND OUTPUT GEARS
Courtesy of CHRYSLER LLC

37. Remove 1st and reverse gears (1, 5) from shafts together.

38. Remove the idler gear (3).

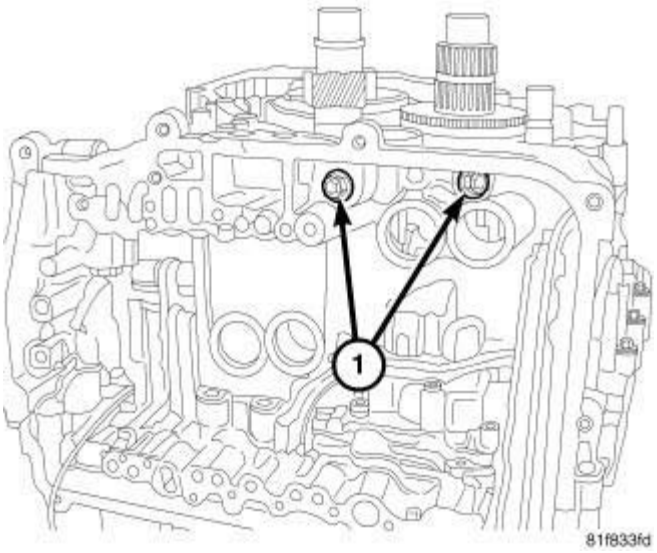


Fig. 49: IDLER GEAR SUPPORT BOLTS
Courtesy of CHRYSLER LLC

39. Remove the idler gear support bolts (1).

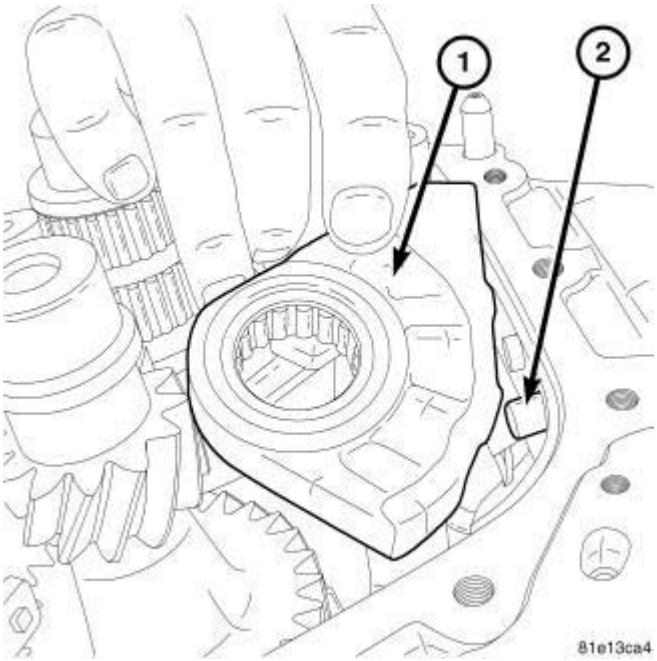


Fig. 50: IDLER SUPPORT
Courtesy of CHRYSLER LLC

40. Remove the idler gear support (1) from the case (2).

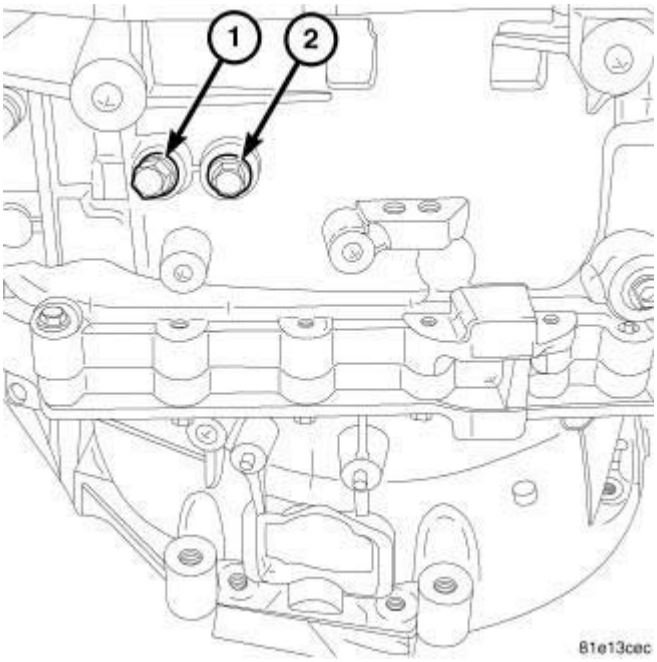


Fig. 51: Upper Detents
Courtesy of CHRYSLER LLC

41. Remove the upper detentes (1, 2).

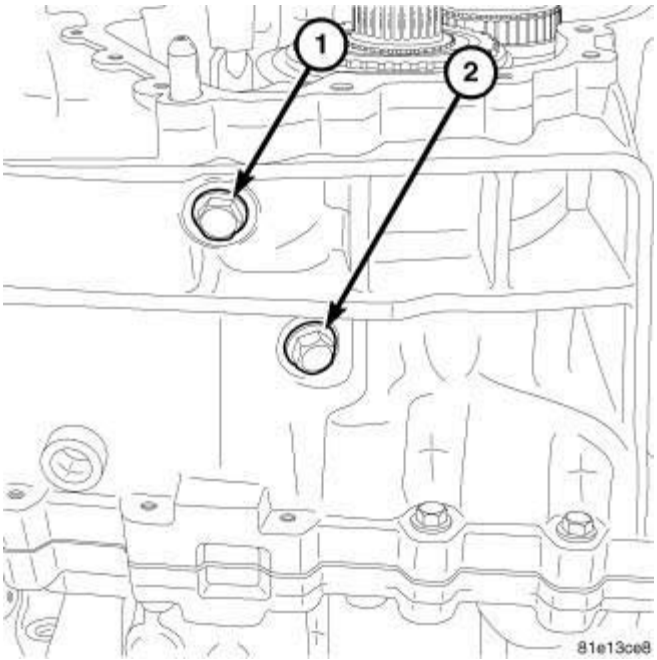


Fig. 52: Lower Detents
Courtesy of CHRYSLER LLC

42. Remove the lower detentes (1, 2).

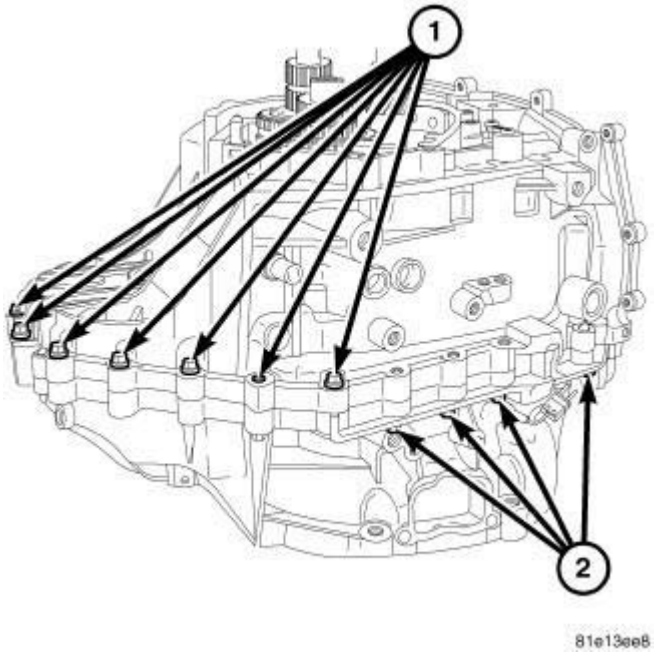


Fig. 53: CASE SIDE BOLTS
Courtesy of CHRYSLER LLC

43. Remove the case half bolts (1) from the transmission side of the case.
44. Remove the bellhousing side bolts (2).

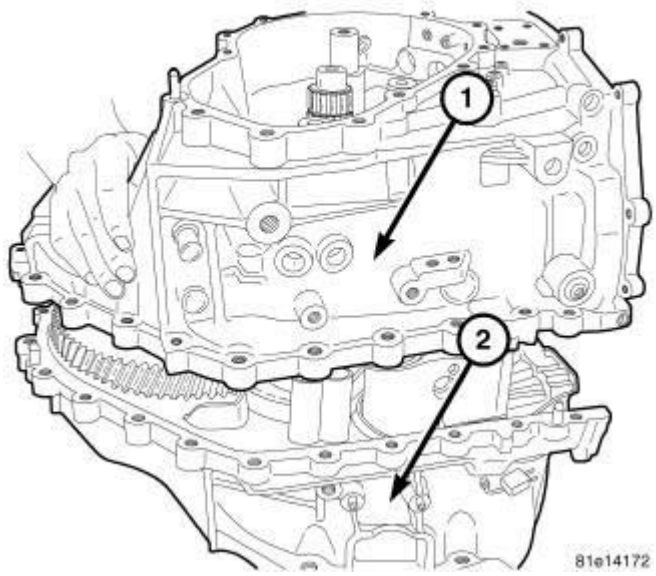


Fig. 54: SPLIT CASES
Courtesy of CHRYSLER LLC

NOTE: Move Parking Pawl to neutral. This will make separating the case halves

easier.

NOTE: The case halves may be bonded together with sealer. Use caution not to scratch, gouge or damage the sealing surfaces.

45. Separate case half (1) from the bellhousing half (2).

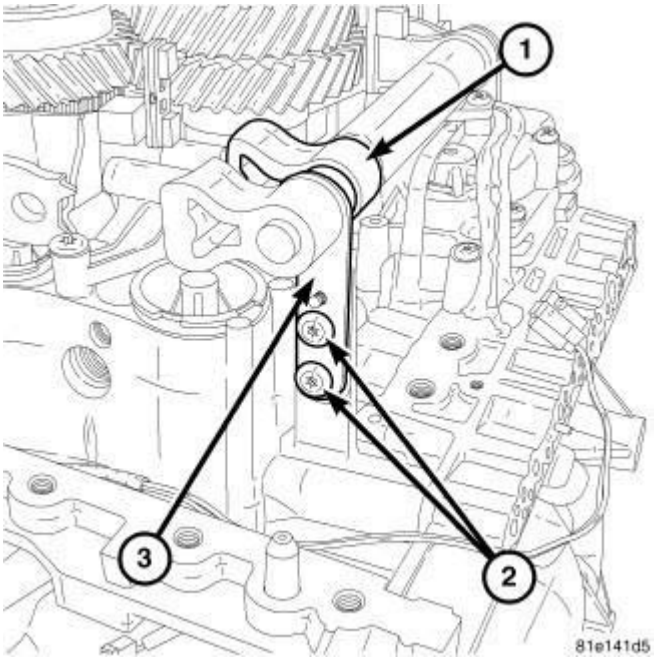


Fig. 55: BOLTS AT PIVOT SHAFT
Courtesy of CHRYSLER LLC

46. Remove the bolts (2) at pivot shaft.
47. Remove the pivot shaft (3).

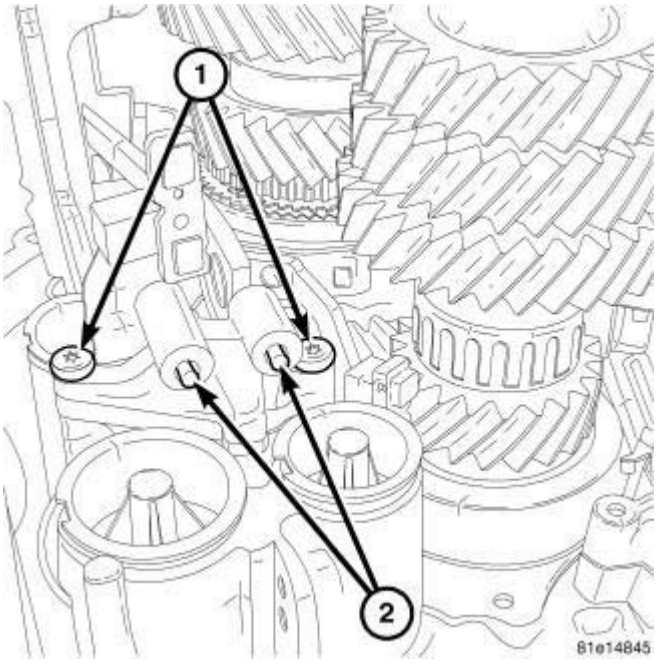


Fig. 56: LOCK OUT PINS
Courtesy of CHRYSLER LLC

48. Remove the bolts (1) holding the interlock bracket.
49. Remove the interlock bracket from the case.

NOTE: The lock out pins are different lengths. Make a note of their original locations for reassembly

50. Remove the lock out pins (2).

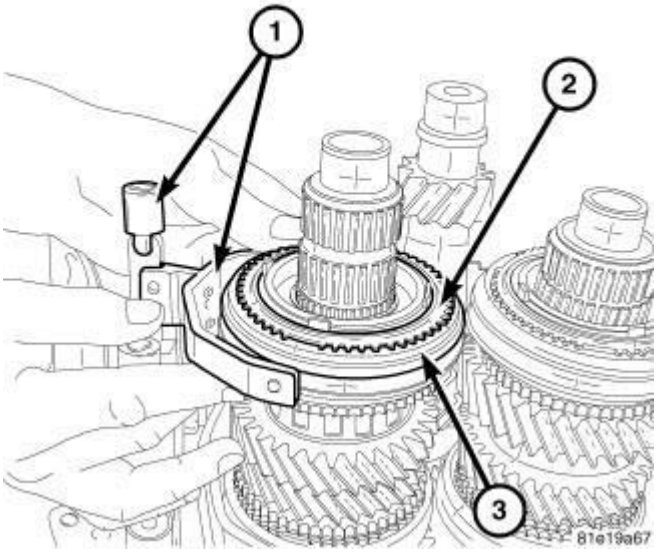


Fig. 57: FIFTH/REVERSE SYNCHRONIZER
Courtesy of CHRYSLER LLC

NOTE: Do not mix synchronizer parts from one synchronizer with the other synchronizers. Keep all parts for a synchronizer together.

51. Remove the first/third synchronizer and fork from the reverse, fifth and six output shaft (1, 2, 3).

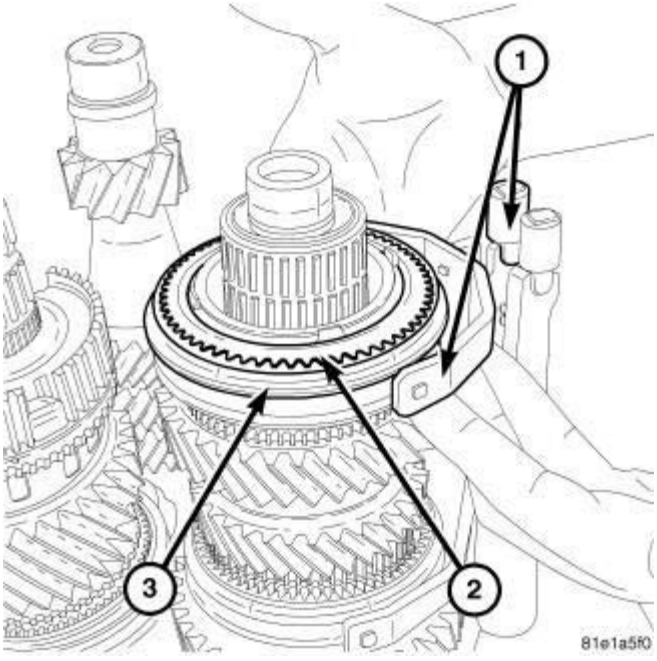


Fig. 58: 2ND AND 4TH GEAR SYNCHRONIZER
Courtesy of CHRYSLER LLC

NOTE: Do not mix synchronizer parts from one synchronizer with the other synchronizers. Keep all parts for a synchronizer together.

52. Remove the second and fourth gear synchronizer and fork (1, 2, 3) from the first through fourth gear output shaft.

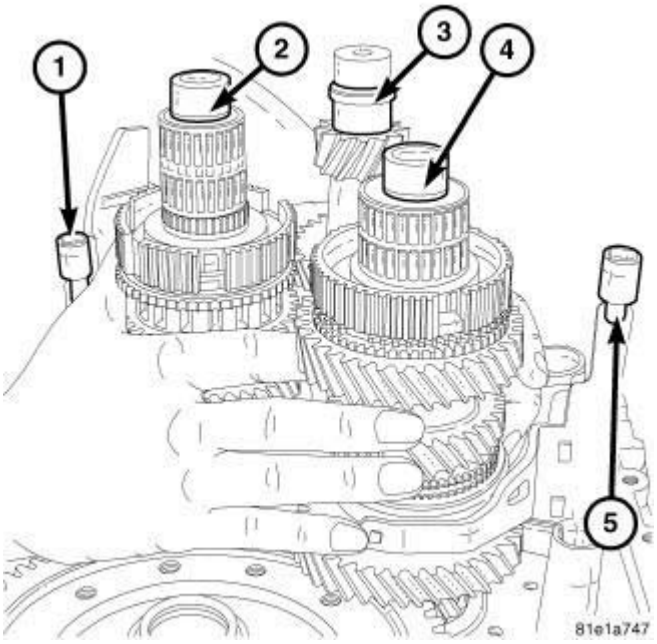


Fig. 59: INPUT AND OUTPUT SHAFTS
Courtesy of CHRYSLER LLC

53. Remove input and both output shafts along with the remaining shift forks from the case at the same time.

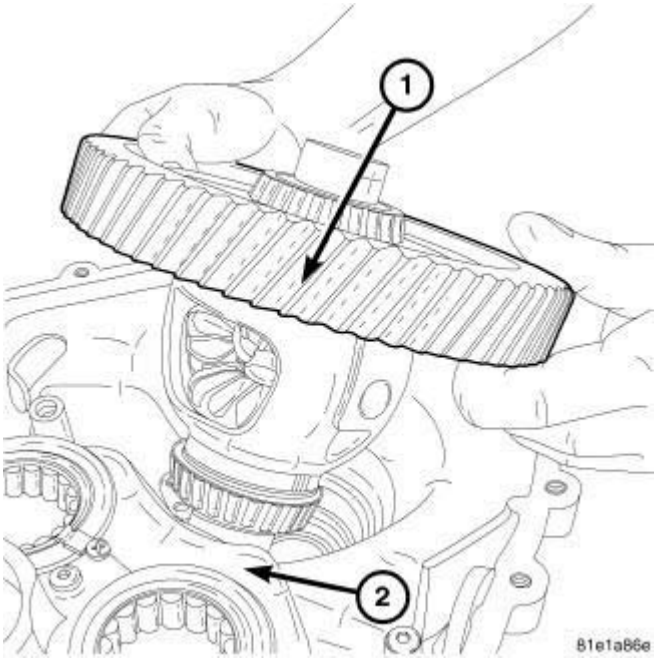


Fig. 60: DIFFERENTIAL
Courtesy of CHRYSLER LLC

54. Remove the differential (1) from the case.

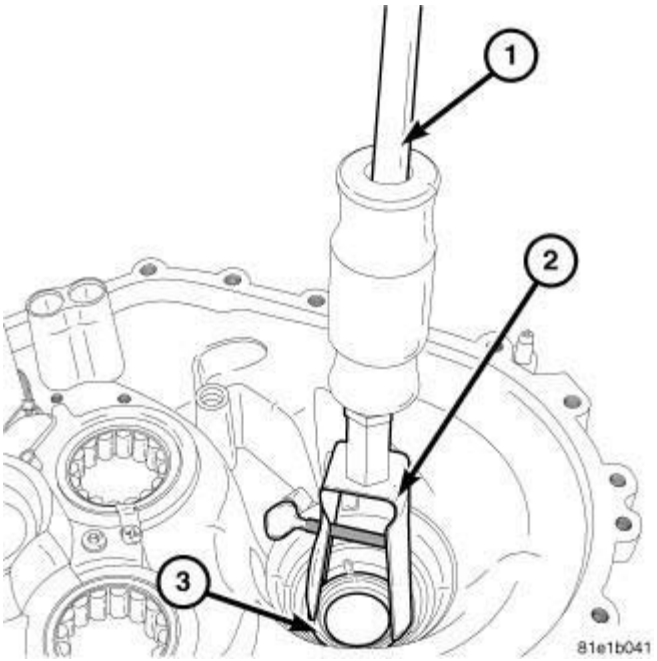


Fig. 61: REMOVE BELLHOUSING SIDE DIFFERENTIAL CUP
Courtesy of CHRYSLER LLC

55. Remove the bellhousing side differential bearing cup (3) using Slide Hammer C-637 (1) and Puller 9664 (2).

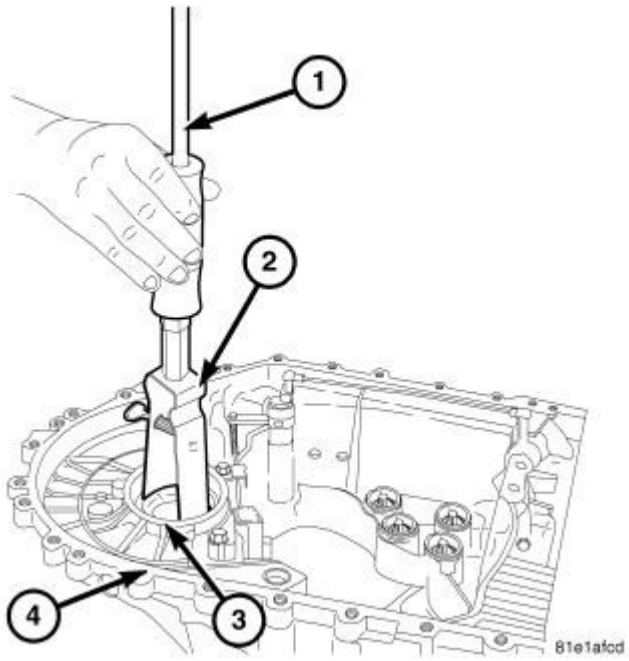


Fig. 62: REMOVE CASE SIDE DIFFERENTIAL CUP
Courtesy of CHRYSLER LLC

56. Remove the case side differential bearing cup (3) using Slide Hammer C-637 (1) and Puller 9664 (2).

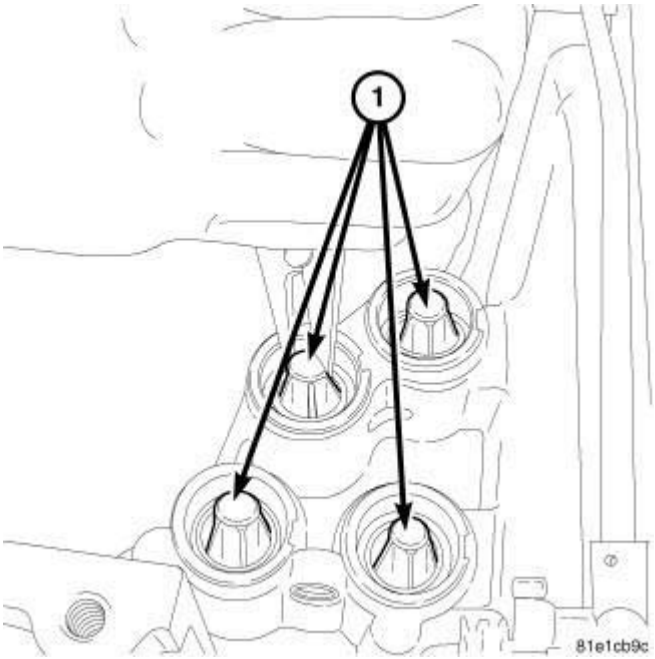


Fig. 63: PISTONS CASE SIDE
Courtesy of CHRYSLER LLC

57. Remove the servo pistons (1) from the case half.

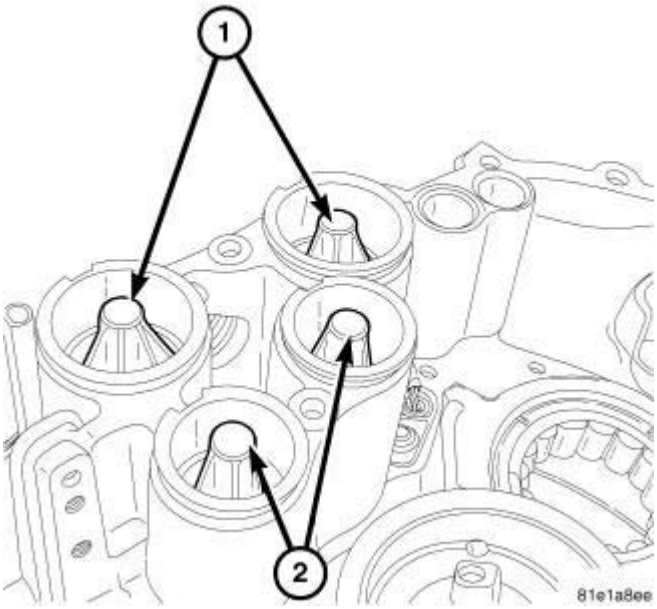


Fig. 64: PISTONS BELLHOUSING SIDE
Courtesy of CHRYSLER LLC

58. Remove the servo pistons (1, 2) from the bellhousing half.

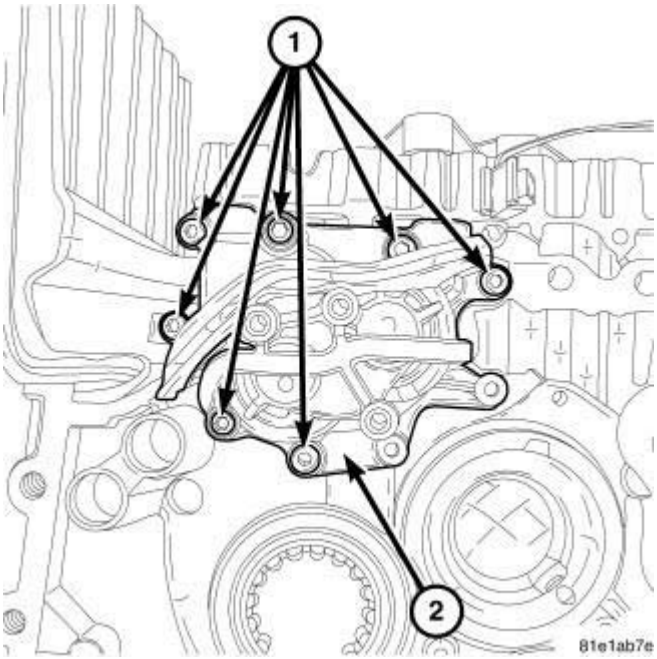


Fig. 65: OIL PUMP BOLTS
Courtesy of CHRYSLER LLC

59. Remove the oil pump bolts (1).

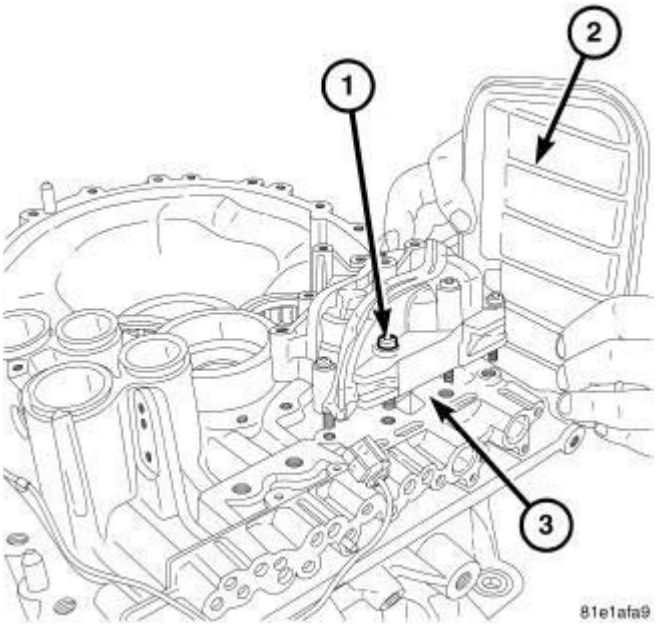


Fig. 66: OIL PUMP AND FILTER
Courtesy of CHRYSLER LLC

60. Remove the oil pump and filter (2) from the case and clean the sealer from both the case and the pump.
61. Remove the oil pump filter (2) from the oil pump (1).

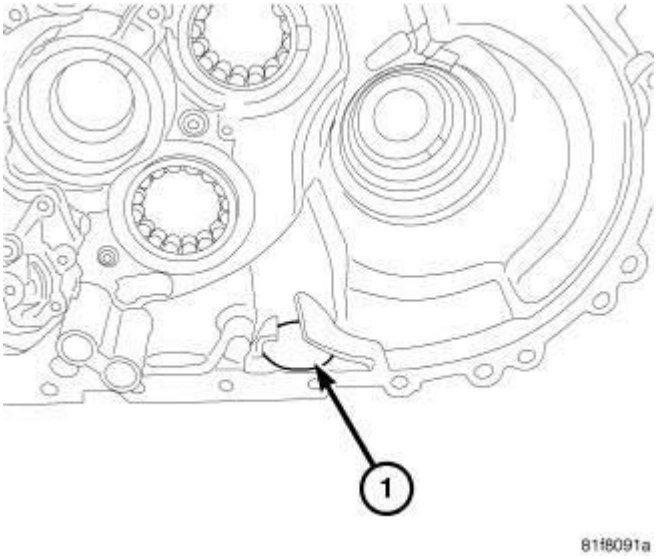


Fig. 67: MAGNET
Courtesy of CHRYSLER LLC

62. Remove the magnet (1) from the case.

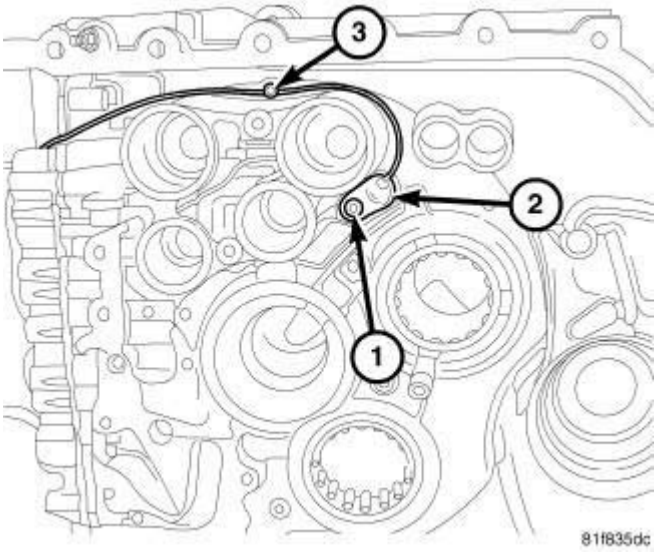


Fig. 68: INPUT SHAFT SPEED SENSOR FASTENER
Courtesy of CHRYSLER LLC

63. Disconnect the harness retainer (3), remove the input shaft speed sensor fastener (1) and the input shaft speed sensor (2).

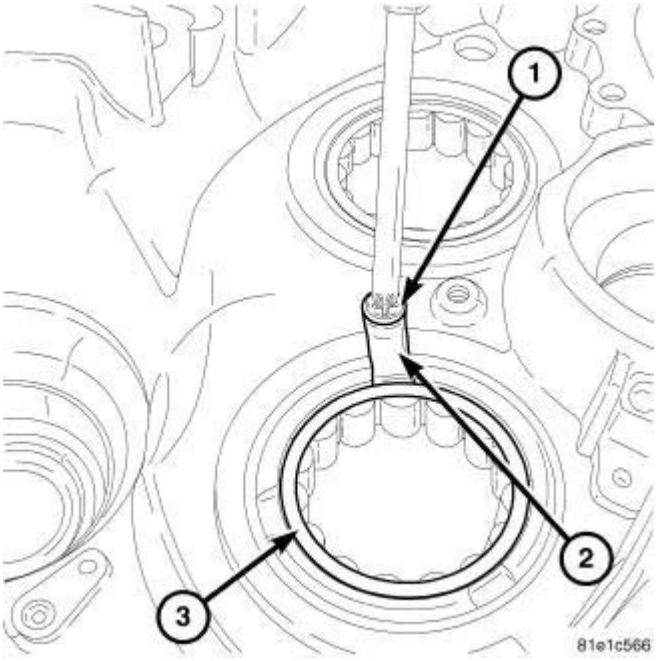


Fig. 69: BEARING RETAINING CLIP
Courtesy of CHRYSLER LLC

64. Remove the screw at the bearing retaining clip (1) and remove the clip (2).

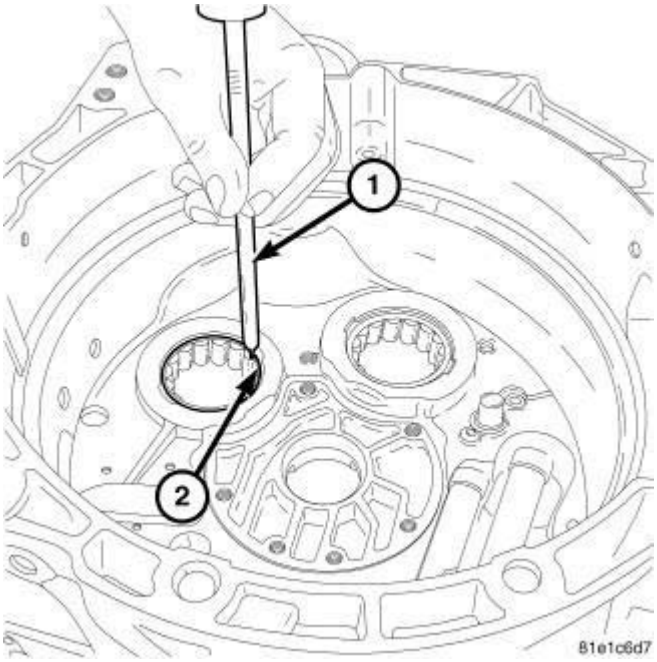


Fig. 70: OUTPUT SHAFT CASE BEARING
Courtesy of CHRYSLER LLC

65. Remove the first through fourth output shaft case bearing (2) using a punch (1).

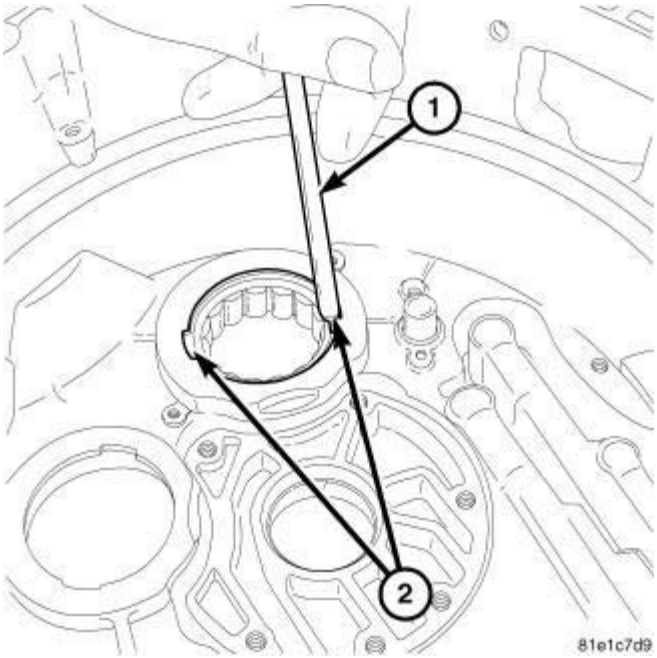


Fig. 71: OUTPUT SHAFT CASE BEARING
Courtesy of CHRYSLER LLC

66. Remove the fifth, sixth and reverse output shaft case bearing (2) using a punch (1).
67. Remove the hold down screw for the speed sensor and remove the speed sensor.

68. Remove the bearing from the idler gear support using a socket.

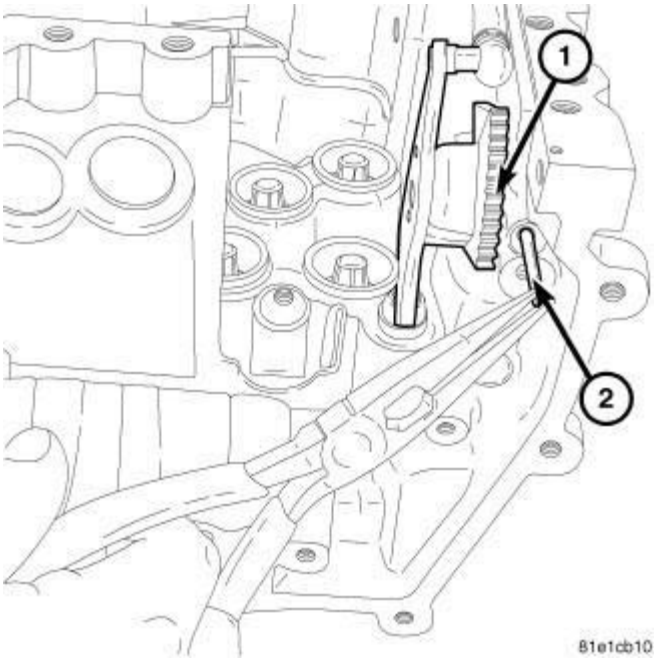


Fig. 72: MANUAL LEVER PIN
Courtesy of CHRYSLER LLC

69. Remove the manual lever pin (2) to allow removal of the manual lever (1).

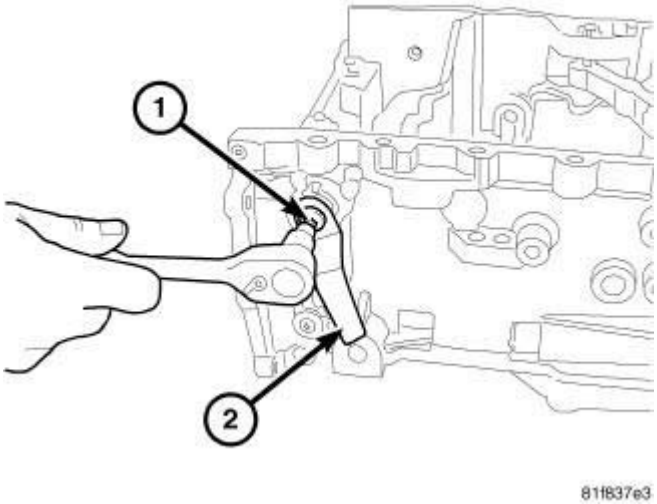


Fig. 73: MANUAL LEVER RETAINER AND MANUAL LEVER
Courtesy of CHRYSLER LLC

70. Remove the manual lever retainer (1) and the manual lever (2).

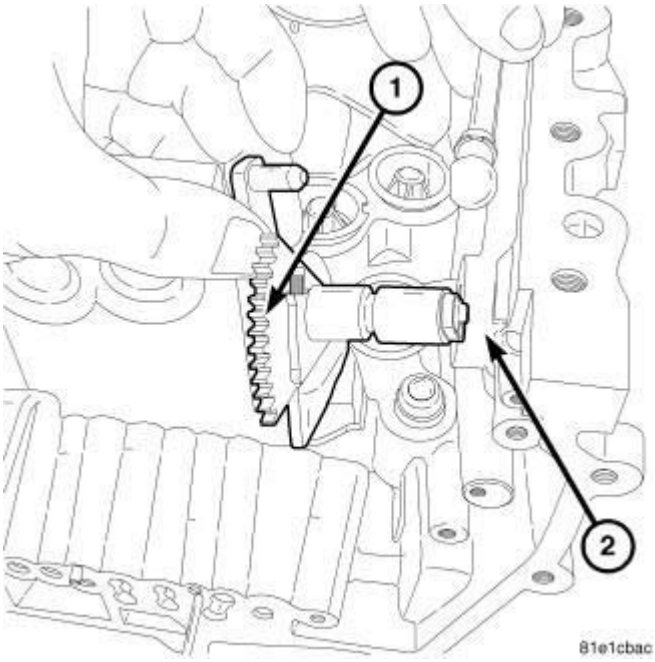


Fig. 74: MAIN SHAFT ROOSTER COMB
Courtesy of CHRYSLER LLC

71. Disconnect the park pawl connecting rod and remove the manual shaft/rooster comb (1).

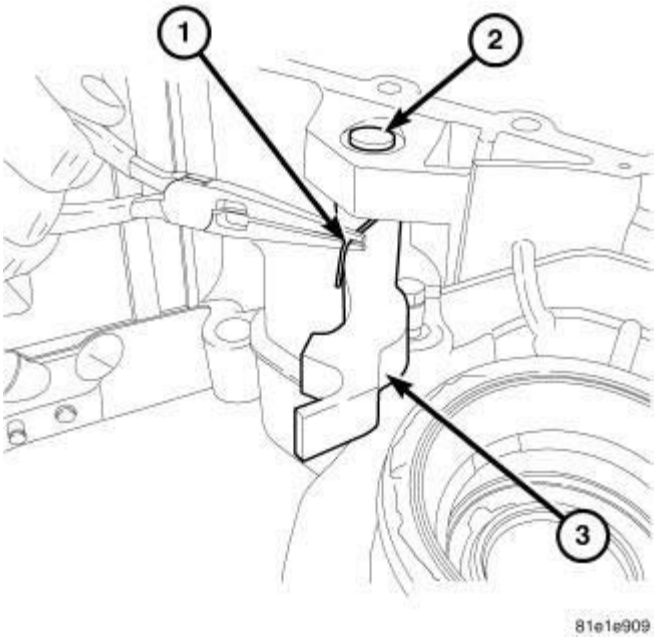


Fig. 75: PARK PAWL AND SPRING
Courtesy of CHRYSLER LLC

72. Remove the park pawl spring (1).
73. Remove the park pawl pin (2).

74. Remove the park pawl (3).

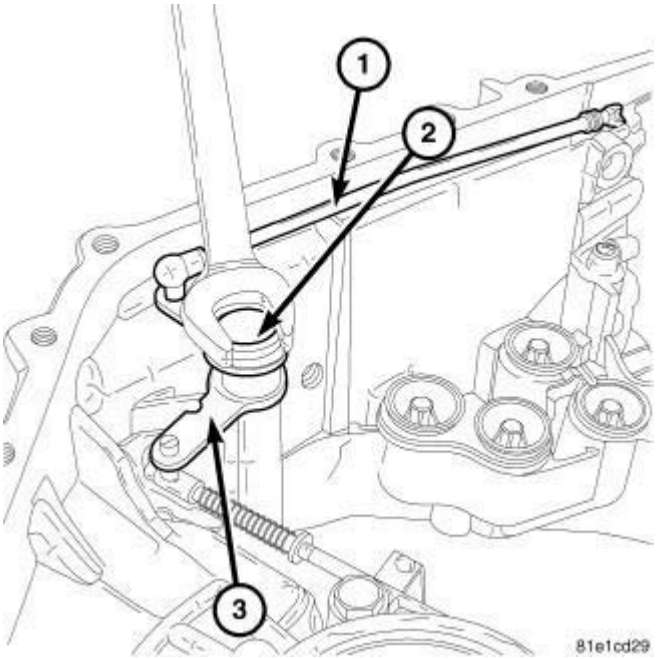


Fig. 76: PIVOT PIN
Courtesy of CHRYSLER LLC

75. Remove the park pawl pivot bolt (2).

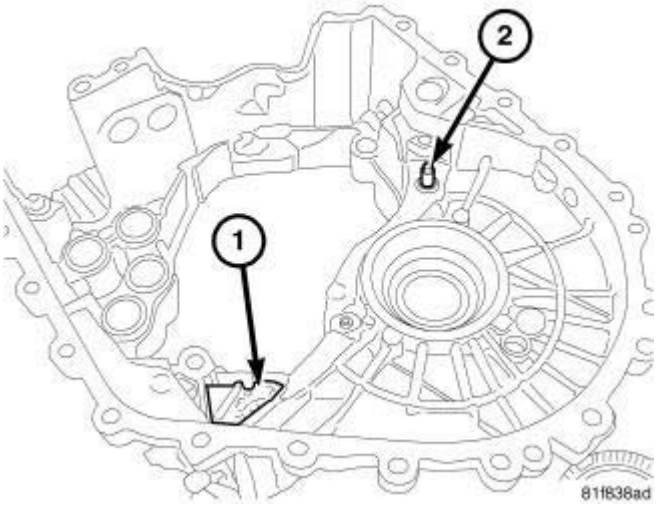


Fig. 77: BAFFLE
Courtesy of CHRYSLER LLC

76. Remove the baffle (1).

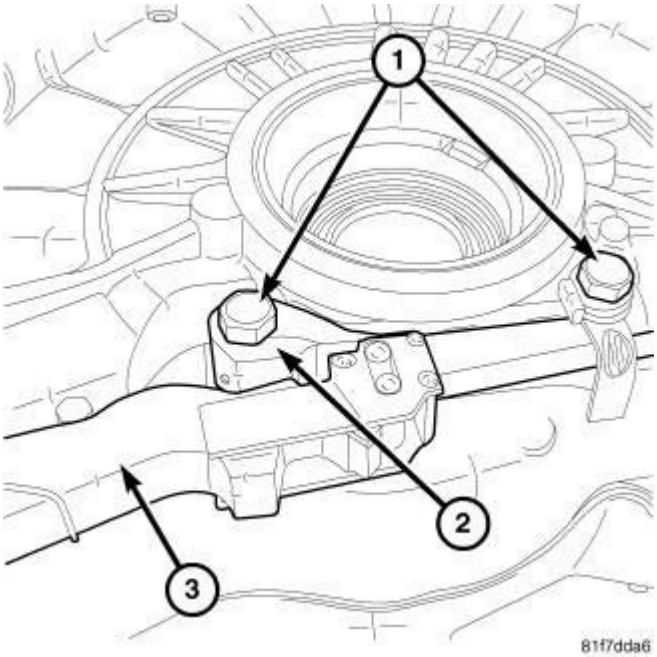


Fig. 78: BOLTS AT PARK PAWL BRACKET
Courtesy of CHRYSLER LLC

77. Remove the bolts (1) at the park pawl bracket (2) and remove the bracket from the case.

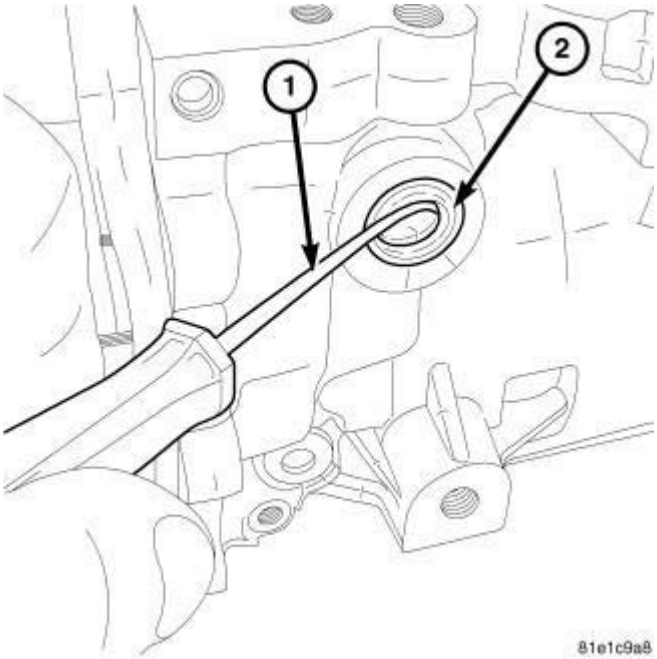


Fig. 79: MAIN SHAFT SEAL OUT
Courtesy of CHRYSLER LLC

78. Remove the manual lever shaft seal (2).

CLEANING

CLEANING

Clean the gears, bearings, shafts, synchronizers, thrust washers, oil feeder, shift mechanism, gear case, and bellhousing. Do not use solvent to clean sealed bearings. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

ASSEMBLY

ASSEMBLY

NOTE: If a new double clutch assembly is being installed, proceed to Step 1. Otherwise, assemble the double clutch. See Assembly .

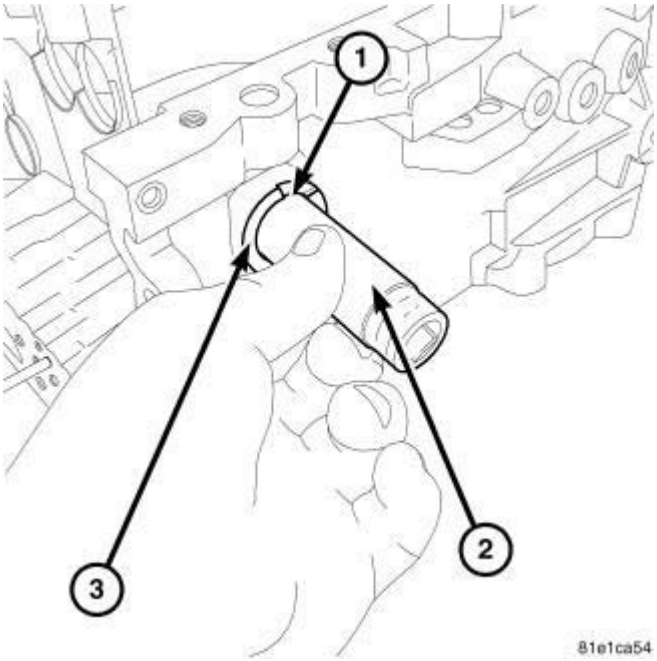


Fig. 80: MAIN SHAFT SEAL IN
Courtesy of CHRYSLER LLC

1. Using a socket (2) install the manual shaft seal (1) to a depth of 1.4 mm into the case (3).

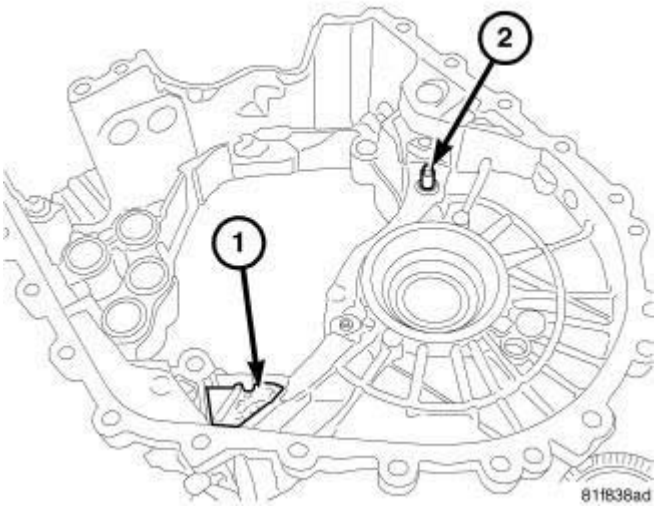


Fig. 81: INTERNAL OIL BAFFLE
Courtesy of CHRYSLER LLC

2. Install the internal oil baffle (1).
3. If necessary, install a new park pawl stop pin (2) and tighten to 25 Nm (18 ft. lbs.).

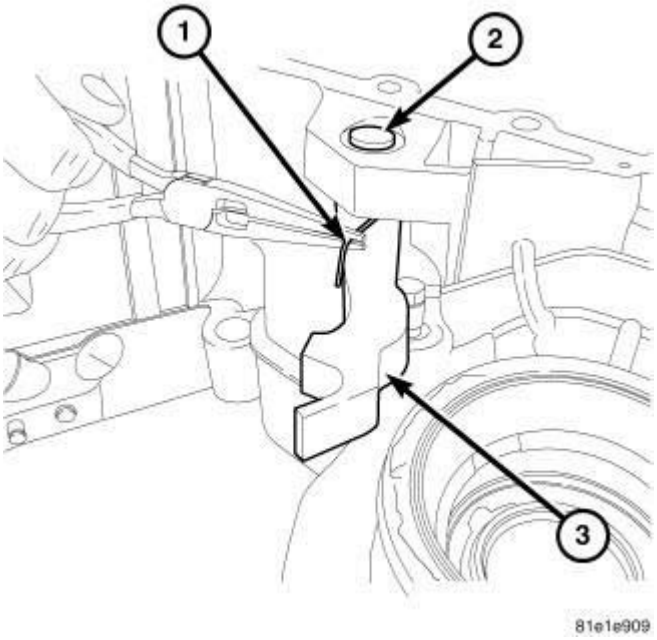


Fig. 82: PARK PAWL AND SPRING
Courtesy of CHRYSLER LLC

4. Install the park pawl (3).
5. Install the park pawl pin (2).
6. Install the park pawl spring (1).

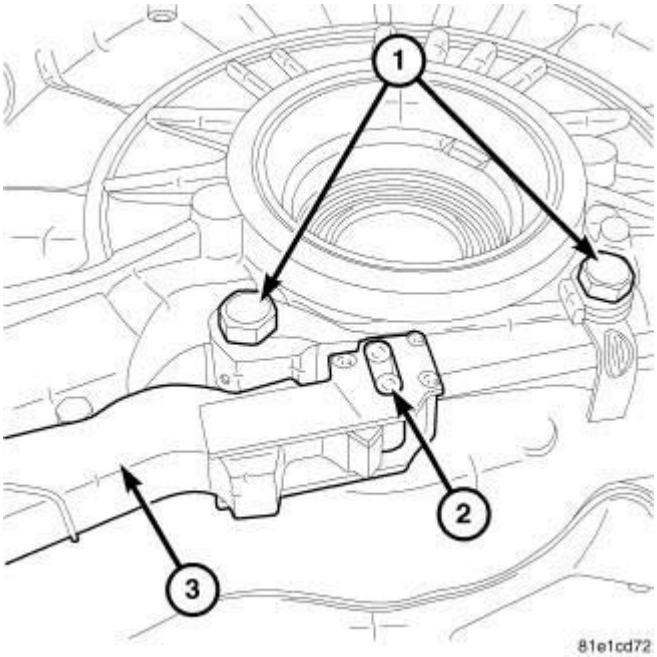


Fig. 83: PARK PAWL BRACKET BOLTS
Courtesy of CHRYSLER LLC

7. Install the parking pawl.
8. Install the park pawl bracket (2, 3) and bolts (1) and tighten to 25 N.m (18 ft. lbs.).

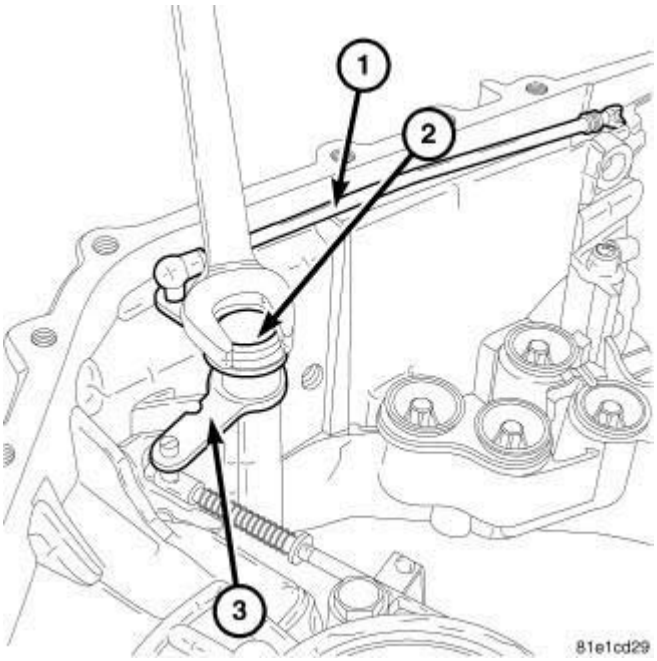


Fig. 84: PIVOT PIN
Courtesy of CHRYSLER LLC

9. Install the park pawl pivot bolt (2) and tighten to 30 N.m (22 ft. lbs.).

10. Install the park pawl link rod (1), verify the ball joint is positively engaged on the stud and moves freely without coming off.

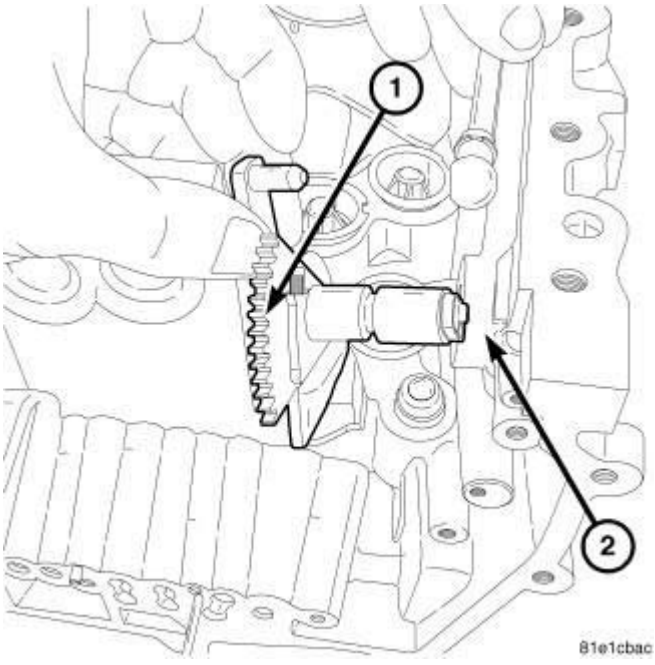


Fig. 85: MAIN SHAFT ROOSTER COMB
Courtesy of CHRYSLER LLC

NOTE: Make sure the park pawl rod is positively engaged to the ball stud.

11. Install the main shaft/rooster comb (1).

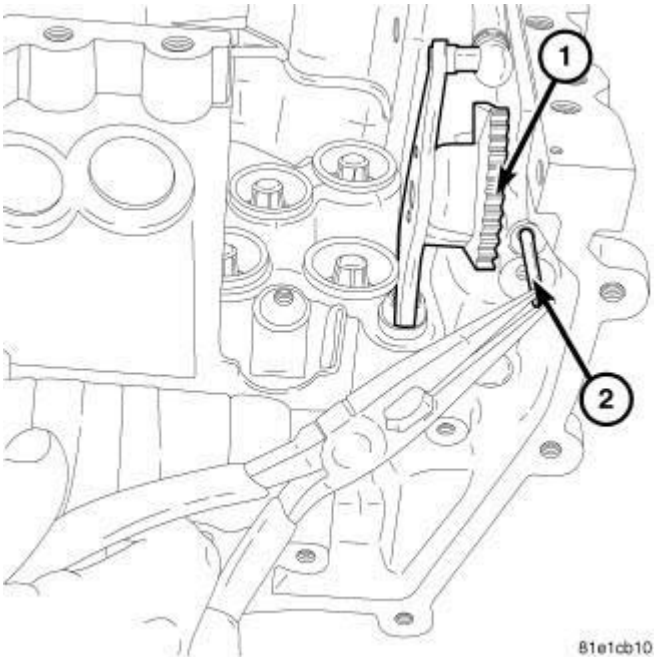


Fig. 86: MANUAL LEVER PIN
Courtesy of CHRYSLER LLC

12. Install the manual lever pin (2).
13. Install the manual lever and tighten the bolt to 20 Nm (15 ft. lbs).

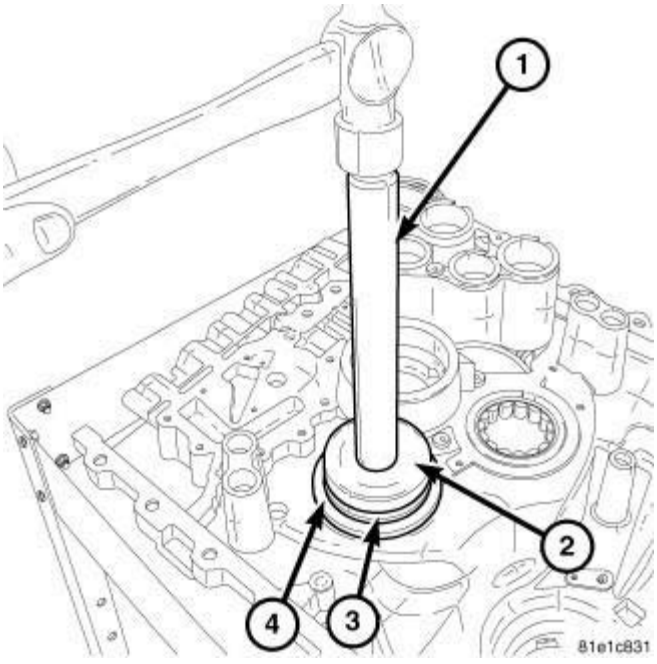


Fig. 87: Install 5th, 6th & Reverse Bearing To Case
Courtesy of CHRYSLER LLC

14. Install the fifth, sixth and reverse output shaft case bearing (3) using Installer 9928 (2) and Handle C-4171 (1).

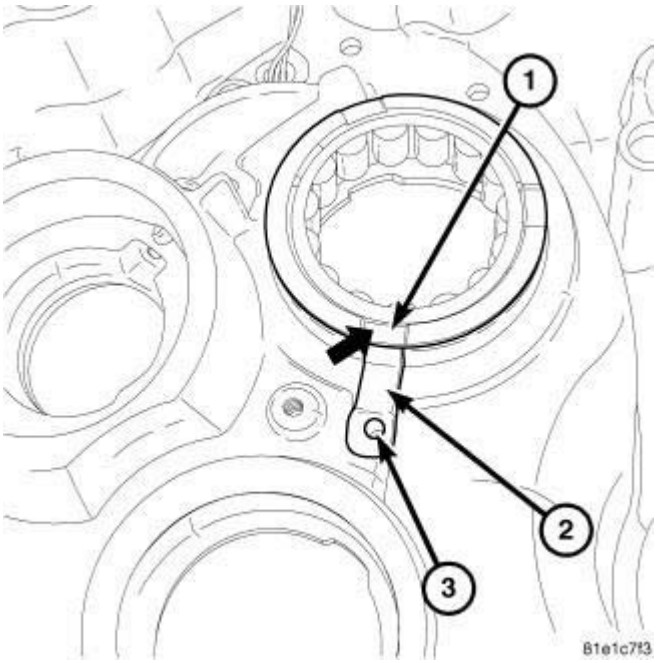


Fig. 88: OUTPUT SHAFT CASE BEARING RETAINING CLIP
Courtesy of CHRYSLER LLC

15. Install the first through fourth output shaft case bearing using Installer 9928 and Handle C-4171.
16. Install the first through fourth output shaft case bearing retaining clip (2) and hold down screw (3). Tighten the screw to 10 Nm (7 ft. lb).

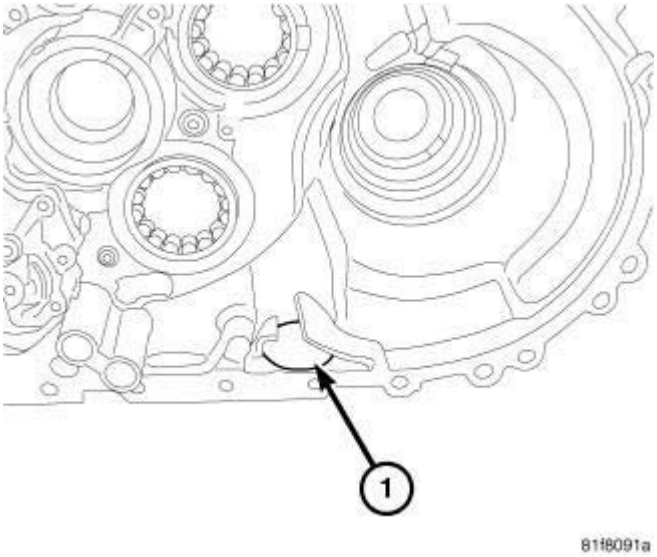


Fig. 89: MAGNET
Courtesy of CHRYSLER LLC

17. Install the magnet (1) into the case.

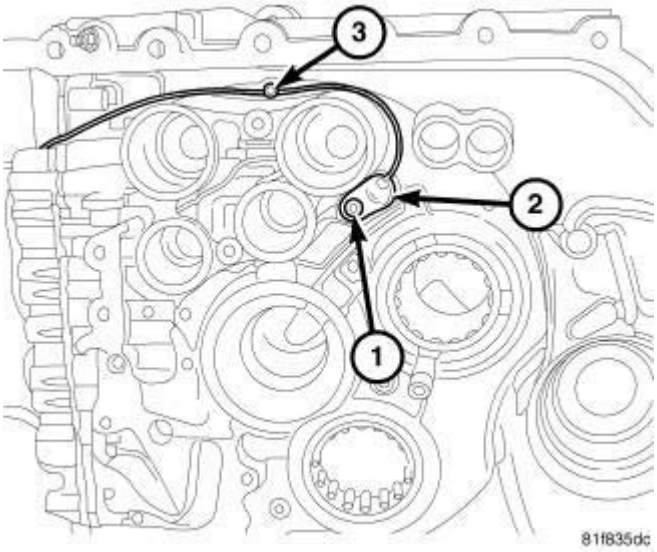


Fig. 90: INPUT SHAFT SPEED SENSOR FASTENER
Courtesy of CHRYSLER LLC

18. Install the input shaft speed sensor (2), input shaft speed sensor fastener (1) and reconnect the harness retainer (3).

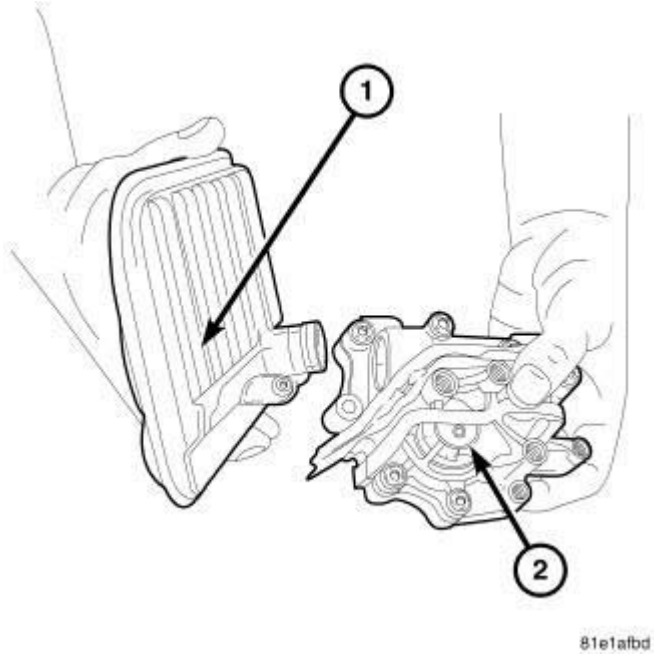


Fig. 91: FILTER AT THE PUMP
Courtesy of CHRYSLER LLC

NOTE: Use BOT-341 fluid to lubricate the seal on the filter

19. Install the oil pump filter (1) onto the oil pump (2).

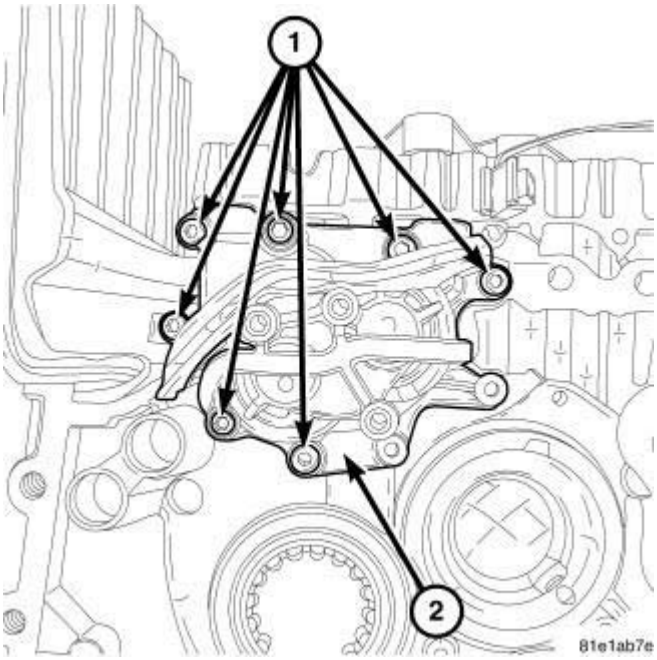


Fig. 92: OIL PUMP BOLTS
Courtesy of CHRYSLER LLC

20. Install the oil pump to the case and install the oil pump bolts. Do not tighten the bolts at this time.

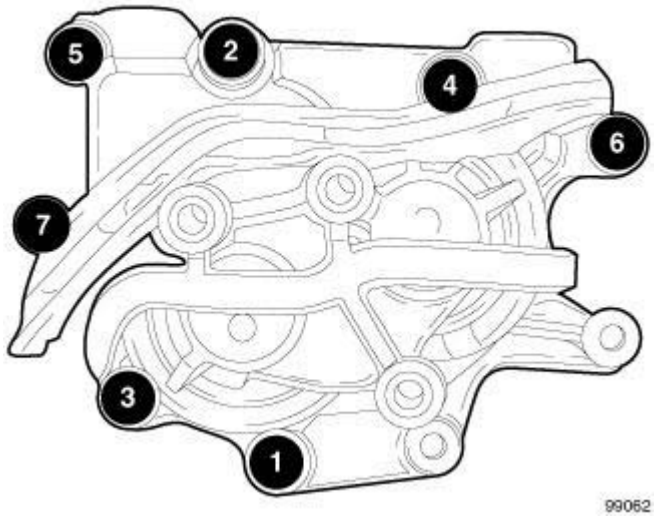


Fig. 93: Oil Pump Bolts Tightening Sequence
Courtesy of CHRYSLER LLC

21. Tighten the oil pump bolts in the order shown in illustration to 10 N.m (88 in. lbs.).

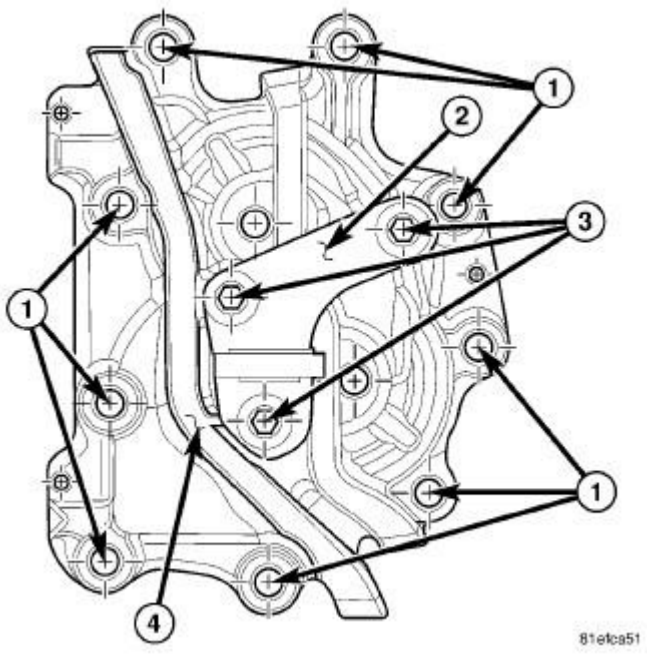


Fig. 94: Oil Pump With Pivot Bracket
Courtesy of CHRYSLER LLC

NOTE: After torquing, rotate the oil pump rotor by hand to confirm that it does not bind.

22. Install the pivot bracket (2) onto the oil pump and tighten the bolts (3) to 10 N.m (88 in. lbs.).

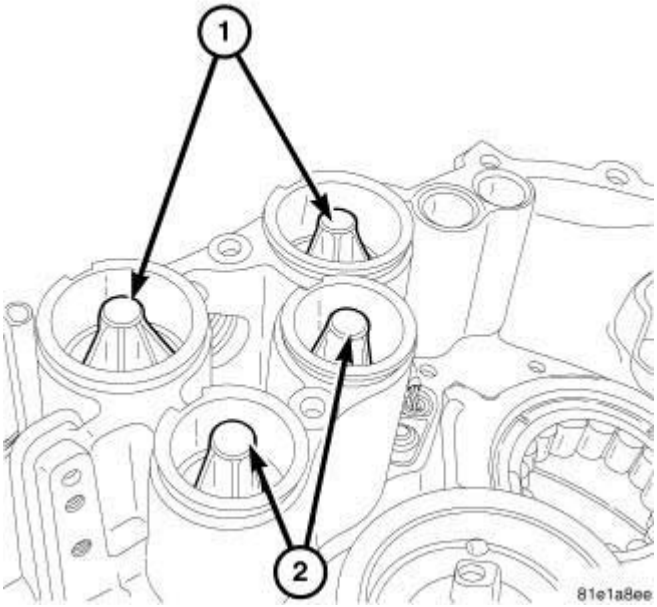


Fig. 95: PISTONS BELLHOUSING SIDE

Courtesy of CHRYSLER LLC

23. Install the servo pistons (1, 2) into the bellhousing half.

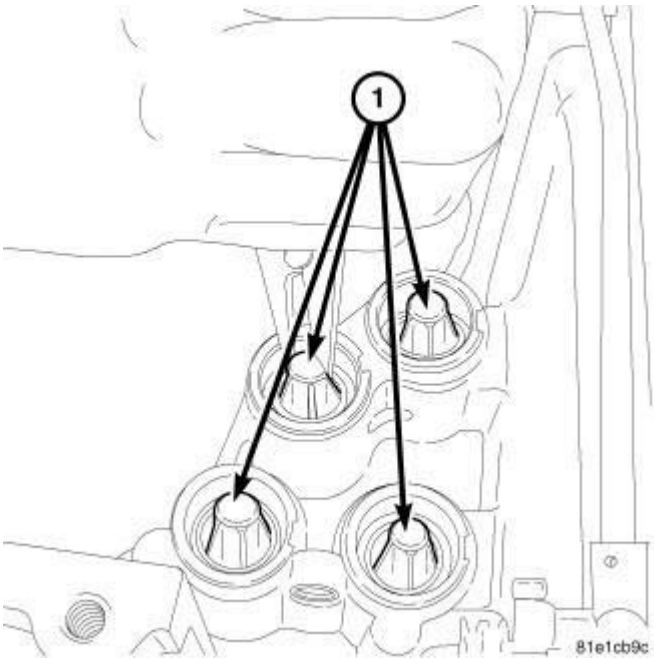


Fig. 96: PISTONS CASE SIDE
Courtesy of CHRYSLER LLC

24. Install the servo pistons (1) into the case half.
25. Select shim(s) for the input shaft. See **Adjustments** .

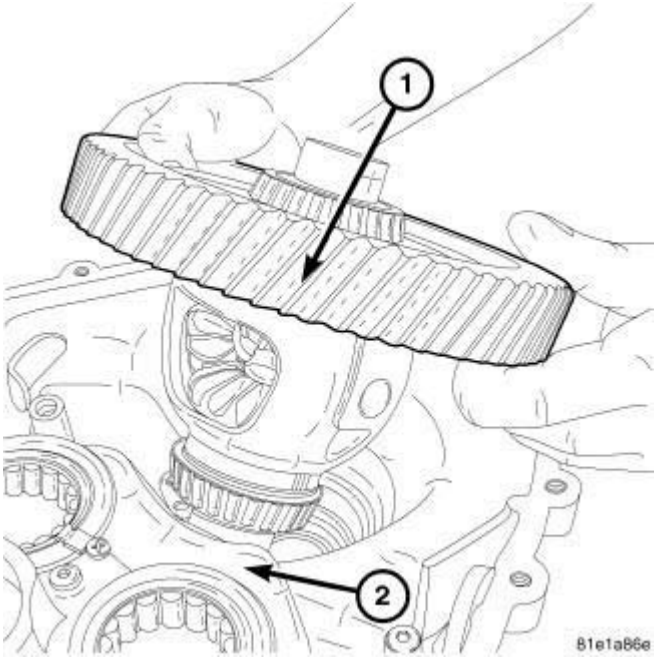


Fig. 97: DIFFERENTIAL
Courtesy of CHRYSLER LLC

26. Install the differential (1) into the case and select shim(s). See **Adjustments** .

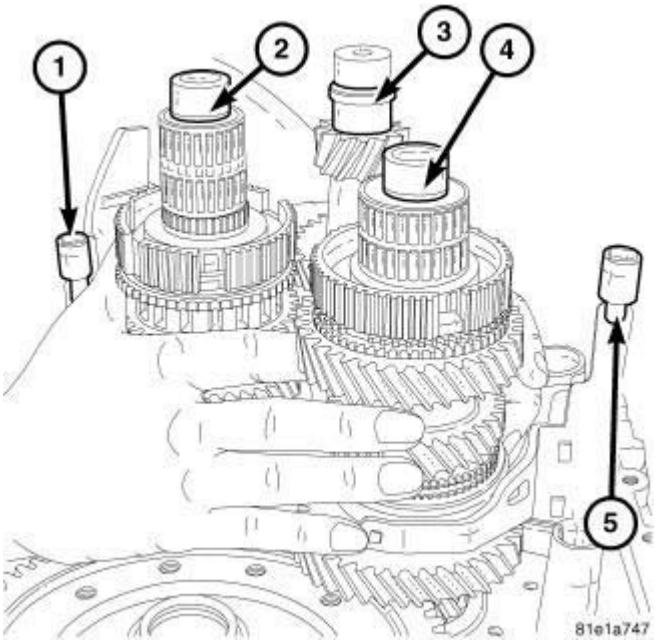


Fig. 98: INPUT AND OUTPUT SHAFTS
Courtesy of CHRYSLER LLC

NOTE: This step may require an assistant to keep the shafts and shift forks aligned during installation.

27. Install the input and both output shafts along with the lower shift forks (removed with the shafts during disassembly) into the case at the same time.

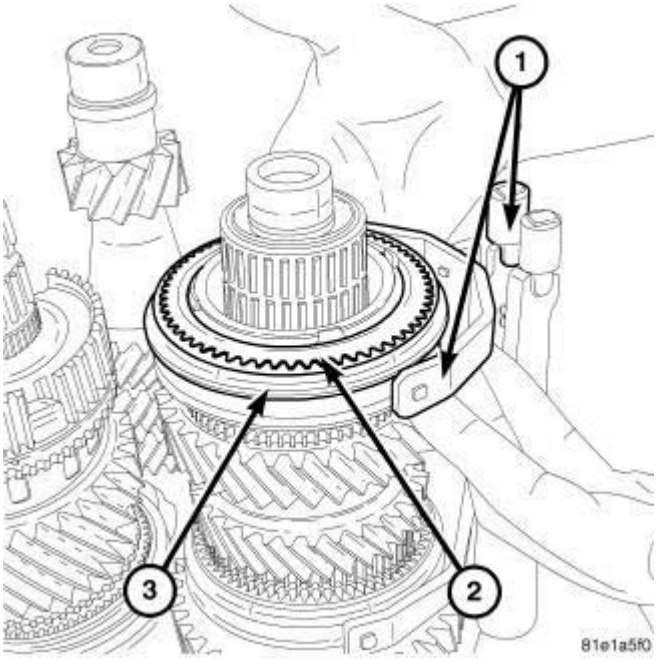


Fig. 99: 2ND AND 4TH GEAR SYNCHRONIZER
Courtesy of CHRYSLER LLC

28. Install the first and third gear synchronizer in the following order:
    - first gear sleeve/collar and shift fork.
    - first gear pressure pieces (3 total).
    - first gear blocker (3 total).
    - third gear sleeve/collar and shift fork.
    - third gear pressure pieces (3 total).
    - third gear blocker (3 total).

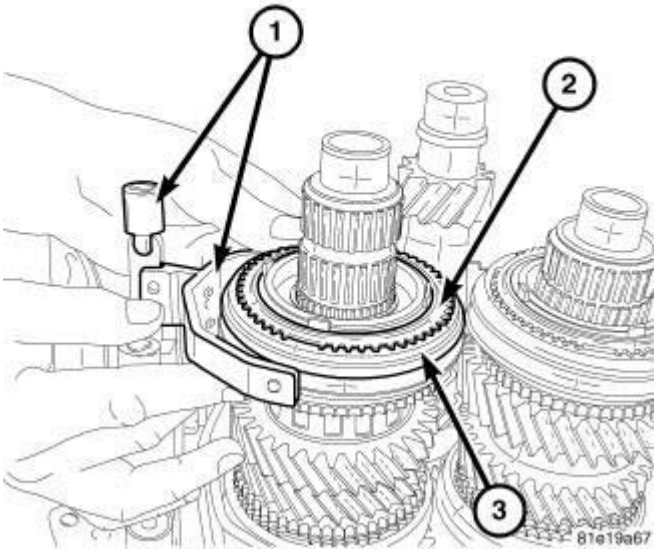


Fig. 100: FIFTH/REVERSE SYNCHRONIZER
Courtesy of CHRYSLER LLC

29. Install the fifth/reverse synchronizer and fork onto the reverse, fifth and six output shaft (1, 2, 3).

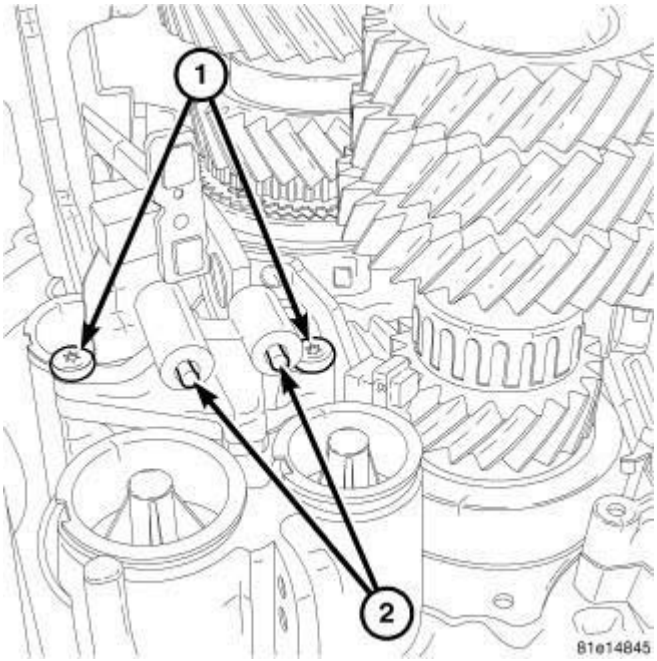


Fig. 101: LOCK OUT PINS
Courtesy of CHRYSLER LLC

30. Install the lock out pin housing (2) onto the case.
31. Install the bolts (1) holding the lock out pins (2) to the case and tighten to 10 N.m (88 in. lbs.).

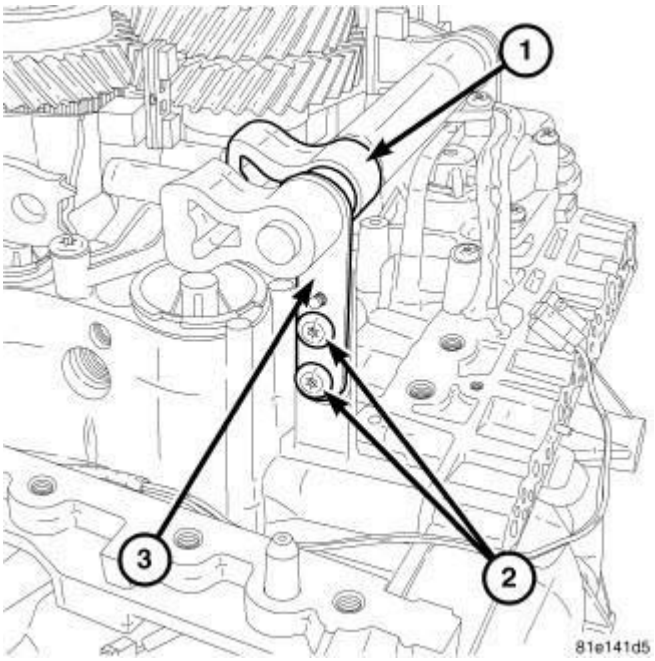


Fig. 102: BOLTS AT PIVOT SHAFT
Courtesy of CHRYSLER LLC

32. Install the pivot shaft (3).
33. Install the bolts (2) at the pivot shaft and tighten to 10 N.m (88 in. lbs.).

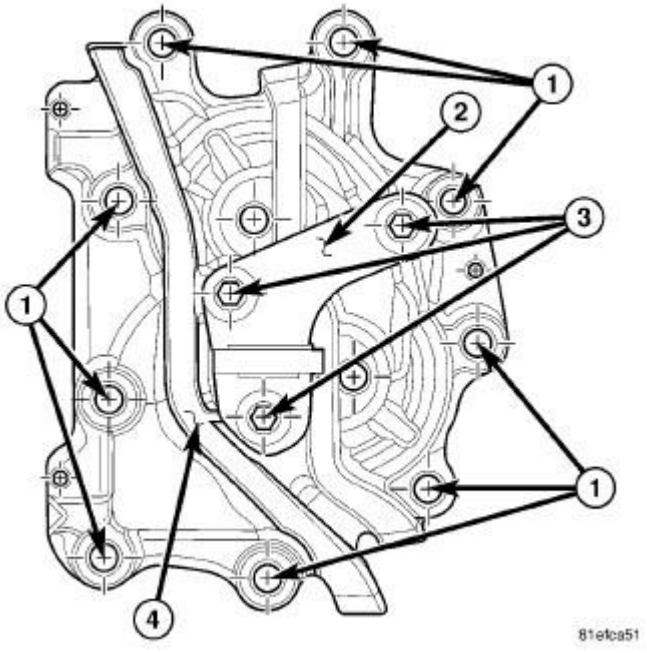


Fig. 103: Oil Pump With Pivot Bracket
Courtesy of CHRYSLER LLC

NOTE: All traces of original sealant must be cleaned from the top of the oil pump.

34. Apply a 4 mm bead of Mopar® ATF-RTV sealant (part number 05010884AA) to the top of the oil pump, where it meets the case half (4).

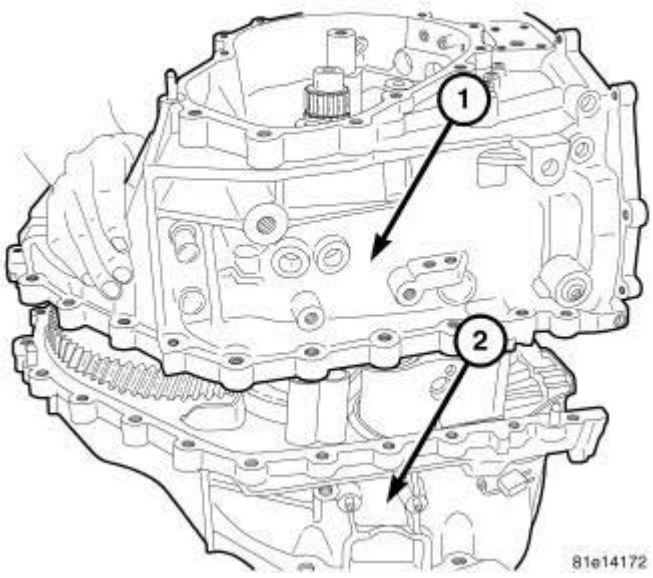


Fig. 104: SPLIT CASES
Courtesy of CHRYSLER LLC

NOTE: The case halves must be assembled within 15 minutes after the application of the anaerobic sealant. Do not allow transmission oil or any other lubricants to come in contact with the sealant for at least one hour after the case halves have been assembled.

35. Apply Mopar® Gasket Maker anaerobic sealant (part number 04318083) to the sealing surface of the case.
36. Verify that the transmission is in neutral, and that no synchronizers are engaging gears onto the shafts.
37. Verify that the blocker ring tabs are engaged with the slots in the synchronizers. Otherwise, a gear can be locked to a shaft, damaging the related synchronizer after the transmission is installed in the vehicle.

CAUTION: Verify the transmission manual lever is in neutral before assembling the case halves, and that all gears rotate freely on their respective shafts. Otherwise, damage to the synchronizers can occur after the transaxle is installed in the vehicle.

38. Install case half (1) onto the bellhousing half (2).

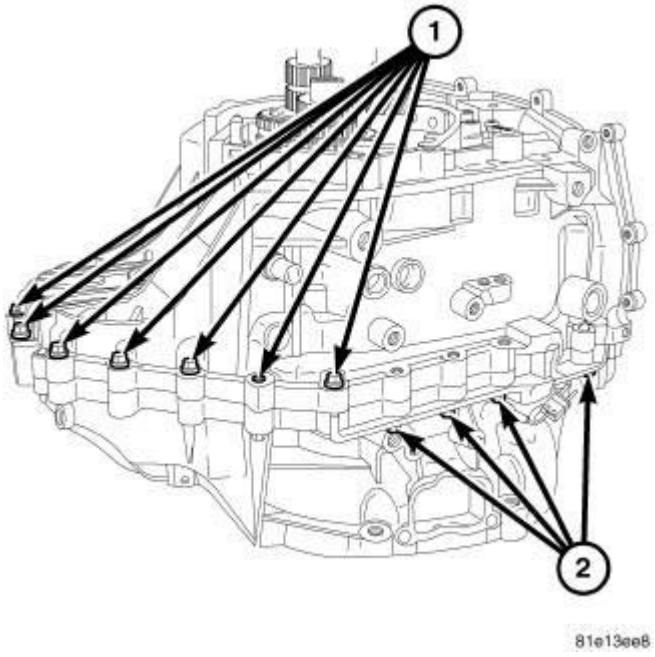


Fig. 105: CASE SIDE BOLTS
Courtesy of CHRYSLER LLC

CAUTION: Do not force the case halves together with the case half bolts.

39. Install the case half bolts (1) and gradually draw the case halves together by tightening the bolts near the case half alignment dowels.
40. When the case halves are drawn together, tighten the case half bolts to 30 N.m (22 ft. lbs.).
41. Install the bellhousing side bolts (2) and tighten to 30 N.m (22 ft. lbs.).

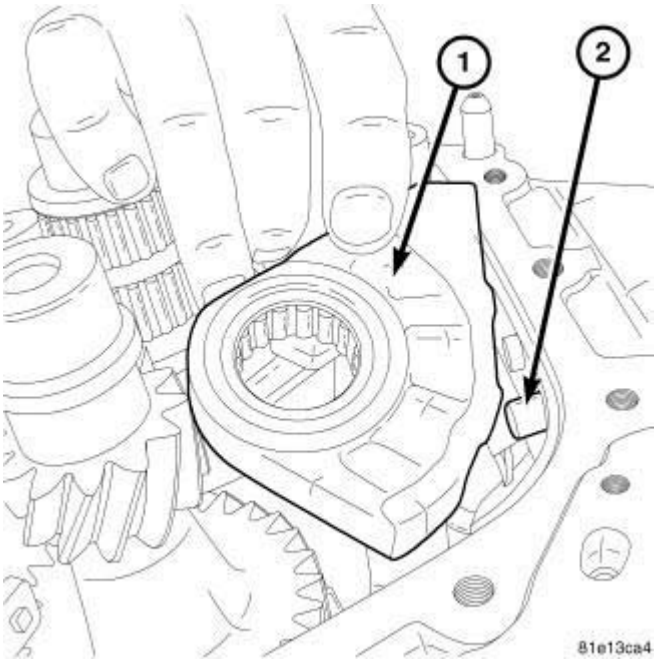


Fig. 106: IDLER SUPPORT
Courtesy of CHRYSLER LLC

42. Install the idler gear support (1) into the case (2).

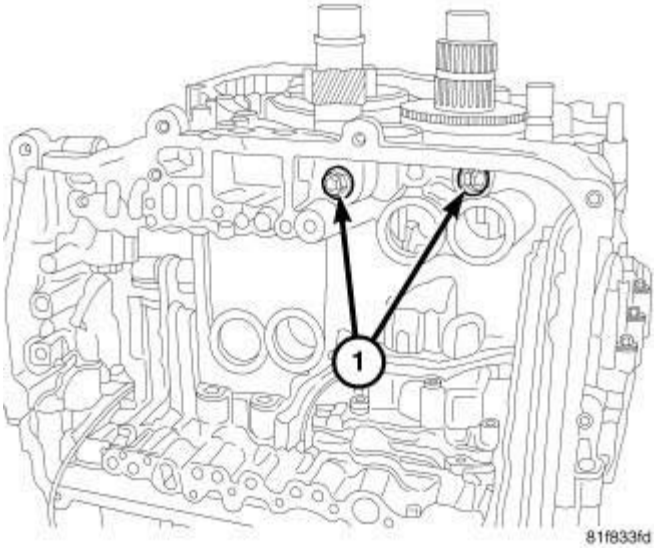


Fig. 107: IDLER GEAR SUPPORT BOLTS
Courtesy of CHRYSLER LLC

43. Install the idler gear support bolts (1) and tighten to 30 N.m (22 ft. lbs.).

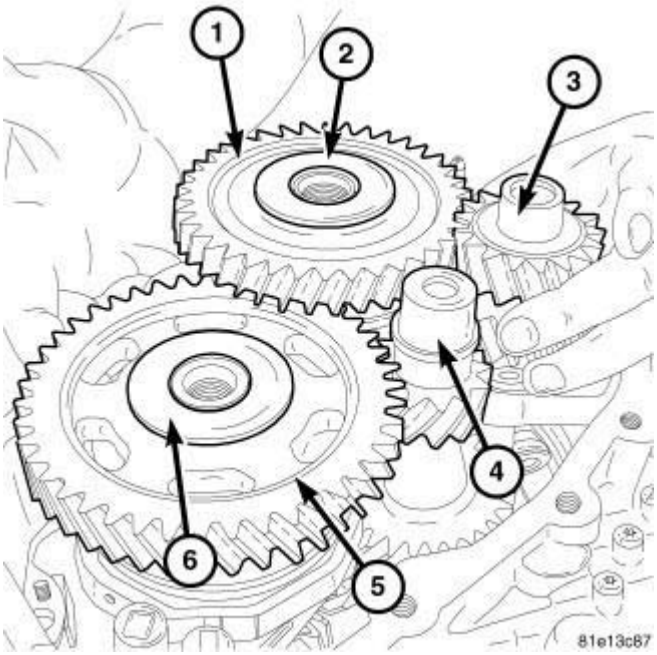


Fig. 108: IDLER AND OUTPUT GEARS
Courtesy of CHRYSLER LLC

44. Install the idler gear (3).

NOTE: Make sure the blocker ring tabs are engaged into the notches in first gear and reverse gear. Otherwise, the synchronizer can be damaged after the transaxle is installed in the vehicle.

45. Install 1st and reverse gears (1, 5) onto the shafts together.

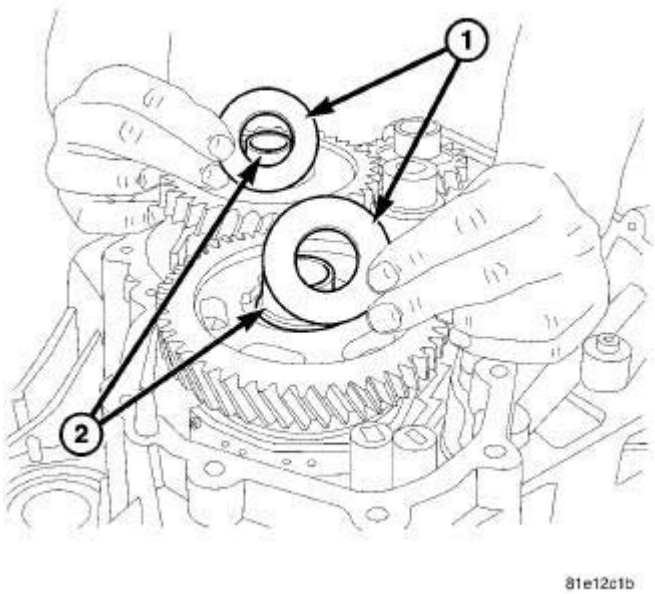


Fig. 109: OUTPUT SHAFT SHIMS
Courtesy of CHRYSLER LLC

46. Ensure that the thrust washers (1) are installed onto the two shafts (2).

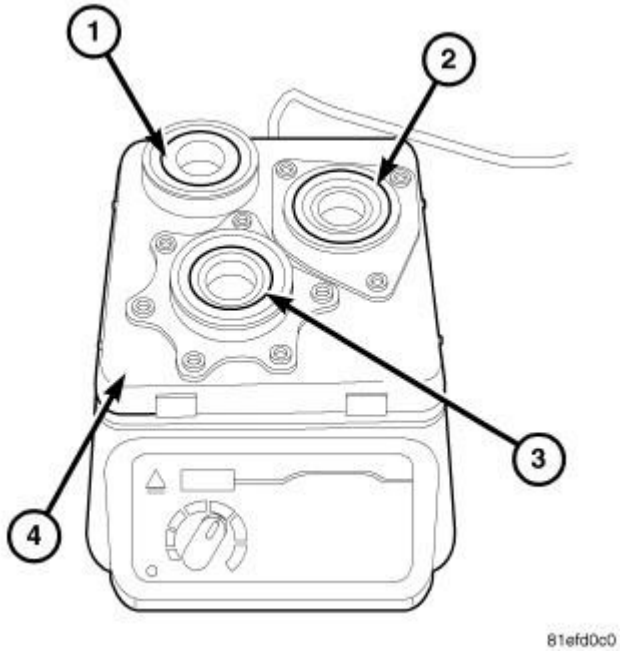


Fig. 110: HEAT BEARINGS
Courtesy of CHRYSLER LLC

WARNING: Use welding gloves or tongs when handling heated components.

Failure to follow these instructions will result in personal injury.

CAUTION: Use only a bearing heater/hot plate and follow manufacturer's instructions. Heat components to 100 - 177 Celsius (212° Min. - 350° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

47. Heat the 3 bearings with a bearing heater.

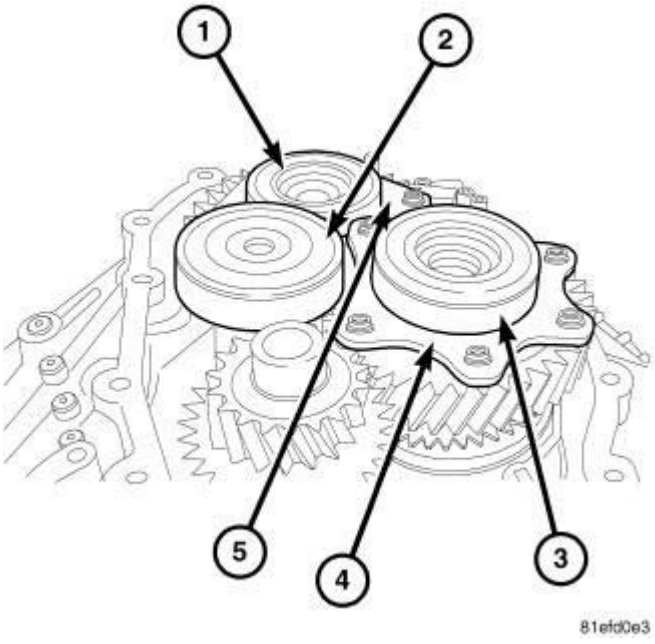


Fig. 111: Install Bearings And Retaining Plate
Courtesy of CHRYSLER LLC

48. Immediately after heating, install the 1st through 4th shaft bearing (1) and retaining plate (5).
49. Immediately after heating, install the R, 5 and 6 shaft bearing (3) and retaining plate (5)
50. Immediately after heating, install the bearing (3) onto the input shaft.

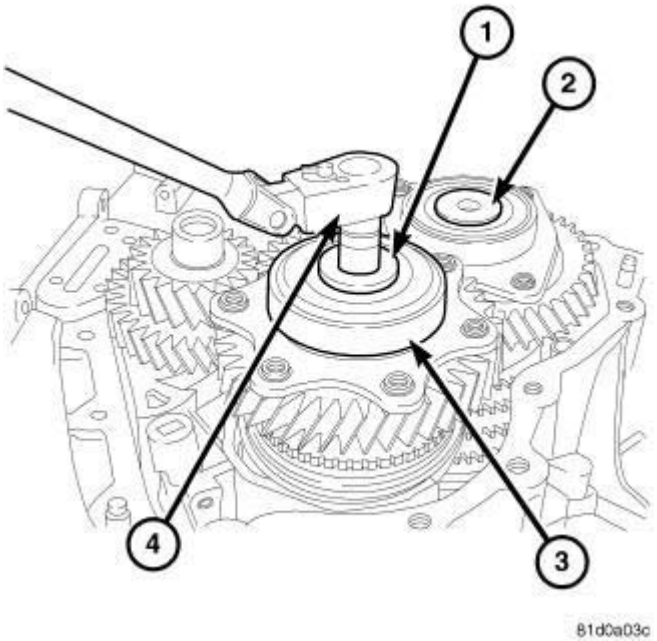


Fig. 112: BEARING AND RETAINING PLATE
Courtesy of CHRYSLER LLC

NOTE: Always use a new retaining bolt

NOTE: The bolt is left hand threaded

51. Install the 1st through 4th shaft bearing retaining bolt (2) and tighten to tighten to 110 N.m (81 ft. lbs.).
52. Install the reverse, 5th and 6th shaft bearing retaining bolt (1) and tighten to tighten to 110 N.m (81 ft. lbs.).

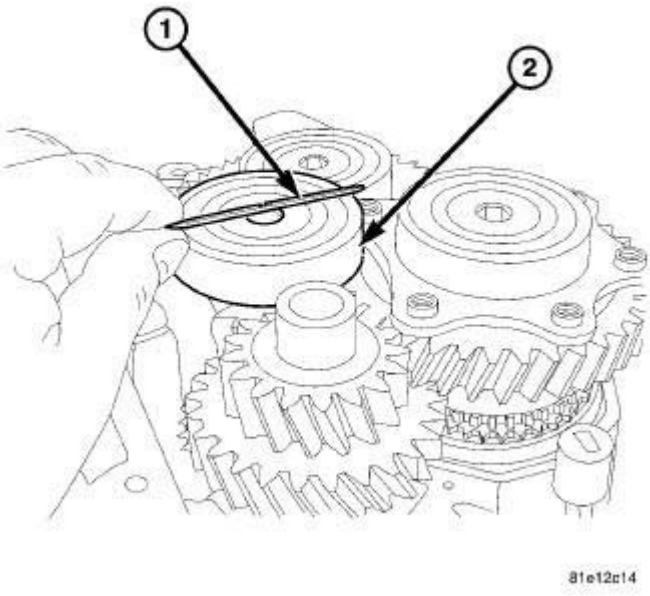


Fig. 113: INPUT SHAFT SHIM
Courtesy of CHRYSLER LLC

53. Install the shim (1) at the input shaft (2).

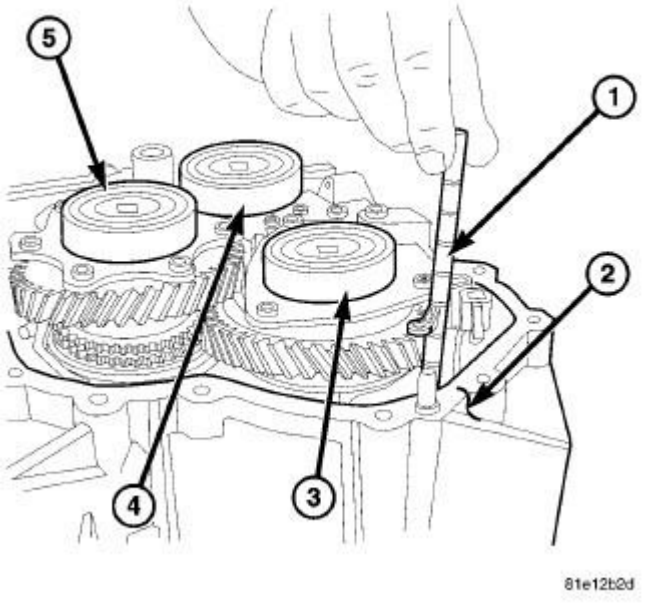


Fig. 114: OIL TROUGH
Courtesy of CHRYSLER LLC

54. Install the oil trough (1).

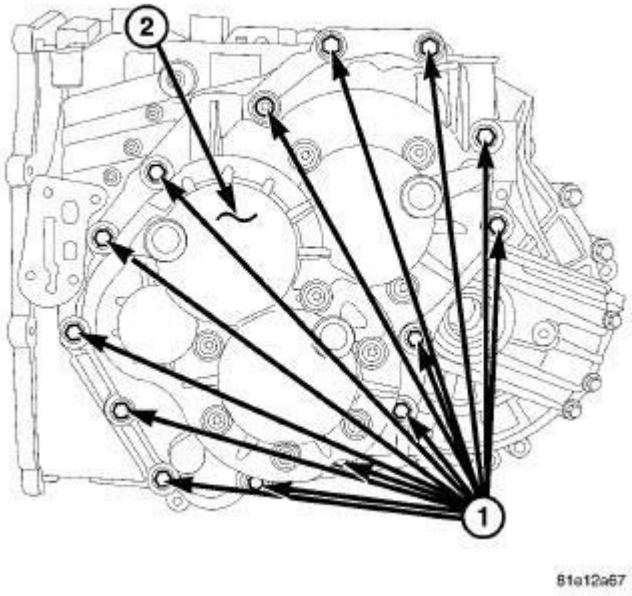


Fig. 115: Rear Cover Bolts
Courtesy of CHRYSLER LLC

NOTE: All traces of the original sealant must be removed from the rear cover.

55. Apply Mopar® Gasket Maker anaerobic sealant (part number 04318083) to the sealing surface of the rear cover.
56. Install the rear cover (2).
57. Align rear cover retainers (1) with the holes in the cover and the case.
58. Verify the shim is centered.
59. Verify the shift forks are inserted into the hose in the cover.
60. Start the rear cover retainers by hand. Gradually tighten rear cover retainers to 30 N.m (22 ft. lbs.).

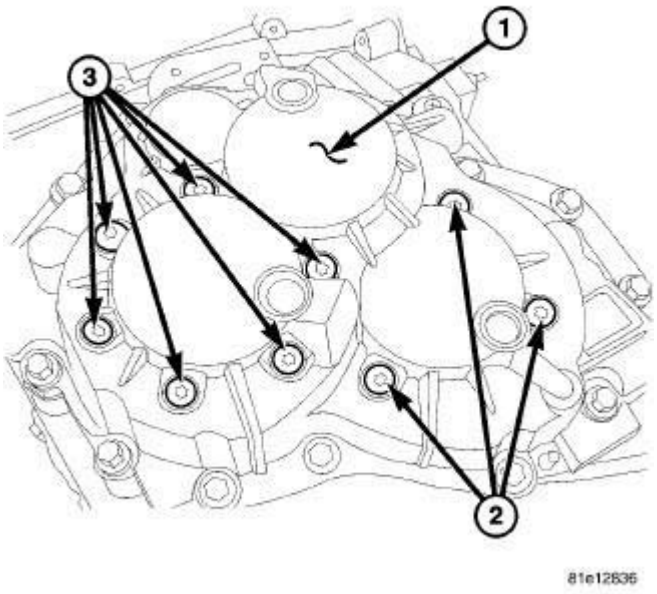


Fig. 116: SHAFT SUPPORT BOLTS
Courtesy of CHRYSLER LLC

61. Install the shaft support bolts (2,3). Tighten to 30 Nm (22 ft. lbs.).

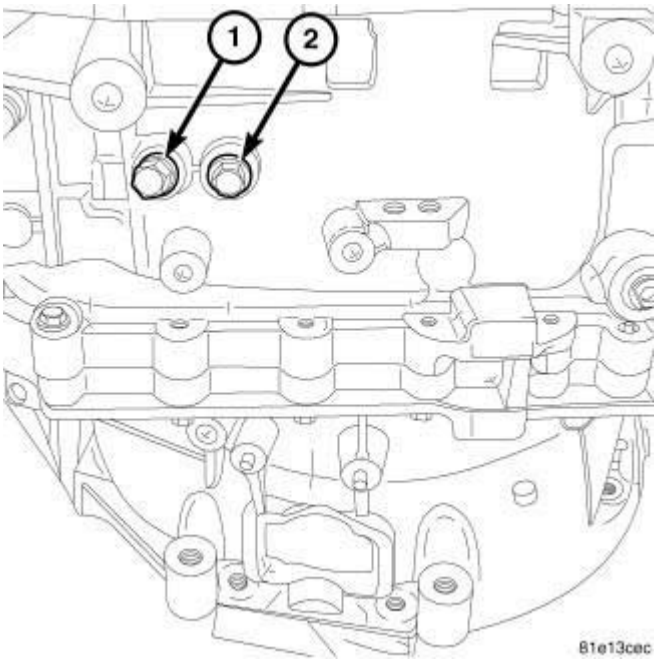


Fig. 117: Upper Detents
Courtesy of CHRYSLER LLC

62. Install the 2 upper detents (1,2). Tighten to 18 Nm (13 ft. lbs.).

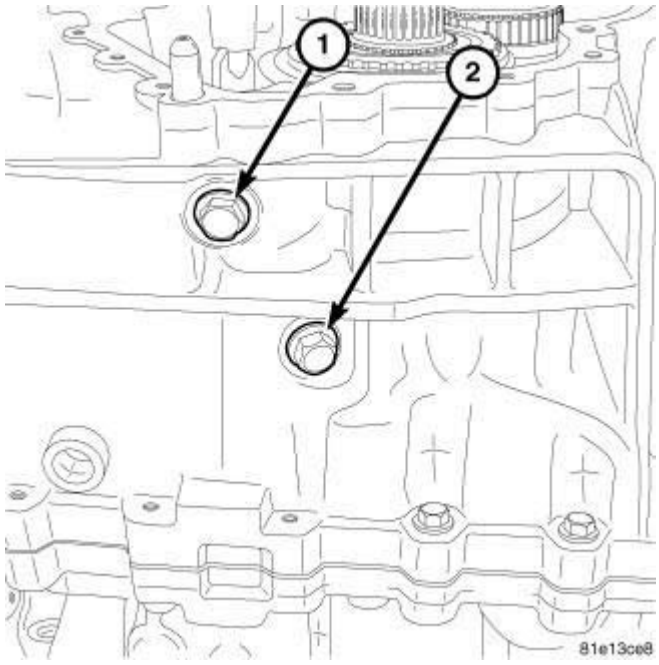


Fig. 118: Lower Detents
Courtesy of CHRYSLER LLC

63. Install the 2 lower detents (1,2). Tighten to 18 Nm (13 ft. lbs.).
64. Install the bolts (2, 3) at the shaft support plates and tighten to 30 N.m (22 ft. lbs.).

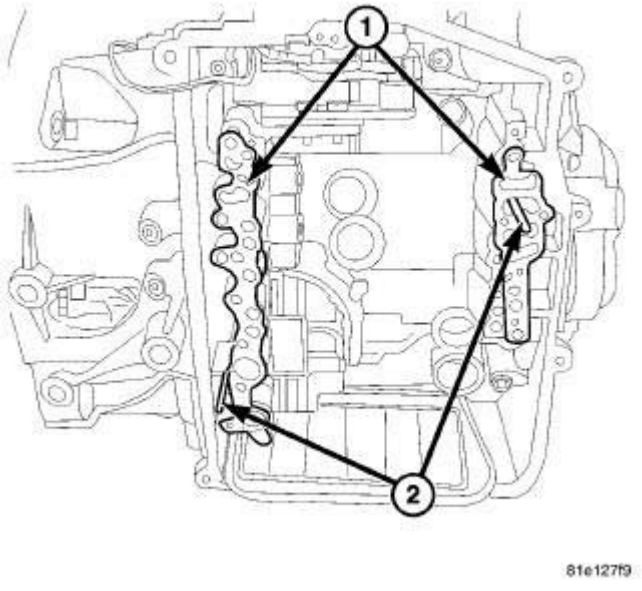


Fig. 119: VALVE BODY GASKETS
Courtesy of CHRYSLER LLC

NOTE: The valve body alignment pins are flared at the base. The narrow end is used to align the valve body during assembly.

NOTE: There are four pins, two short ones, and two long ones.

65. Install the valve body alignment pins (2) into the case in the same positions they were removed from during disassembly.
66. Install the metal valve body gaskets (1).

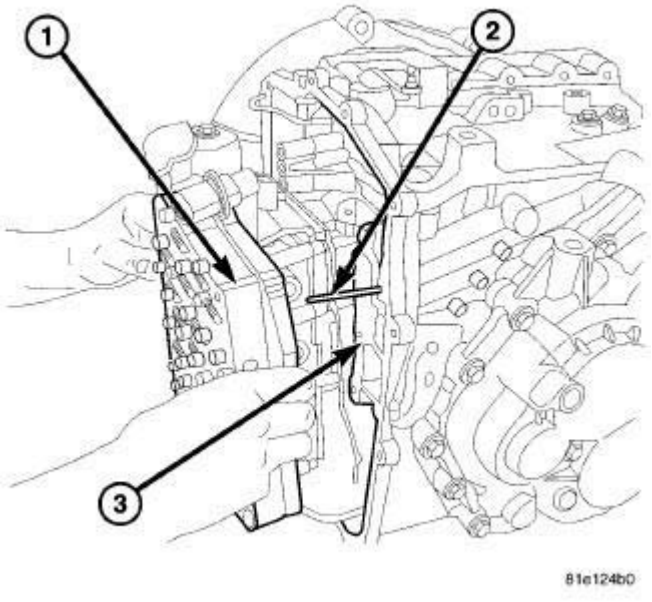


Fig. 120: Valve Body & Alignment Pins
Courtesy of CHRYSLER LLC

67. Move the manual lever to the Drive position.
68. Install new rubber seals on the four valve body towers.
69. Verify the speed sensor wire is positioned so that it will not get pinched between the valve body mounting surfaces during installation of the valve body.
70. Verify that the metal valve body gaskets are installed on the alignment posts.
71. Install a pin/drill bit into the TRS tone wheel.
72. Install the valve body (1).

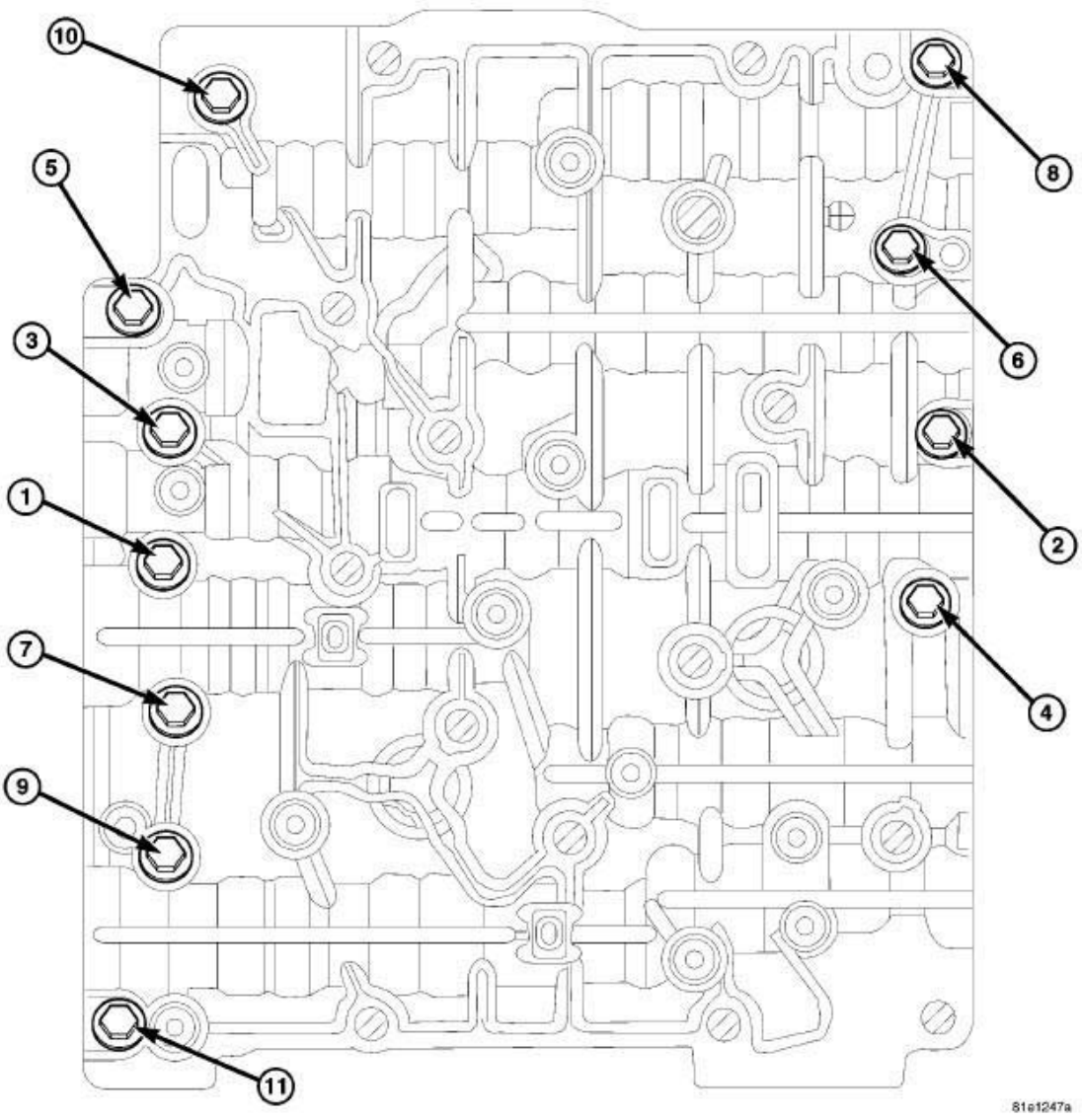


Fig. 121: VALVE BODY BOLTS
Courtesy of CHRYSLER LLC

73. Install the eleven valve body bolts and tighten in two stages in the sequence shown in illustration. In the first stage, tighten the valve body bolts 5 Nm (44 in. lbs.). In the second stage, tighten the valve body bolts to 10 N.m (88 in. lbs.).

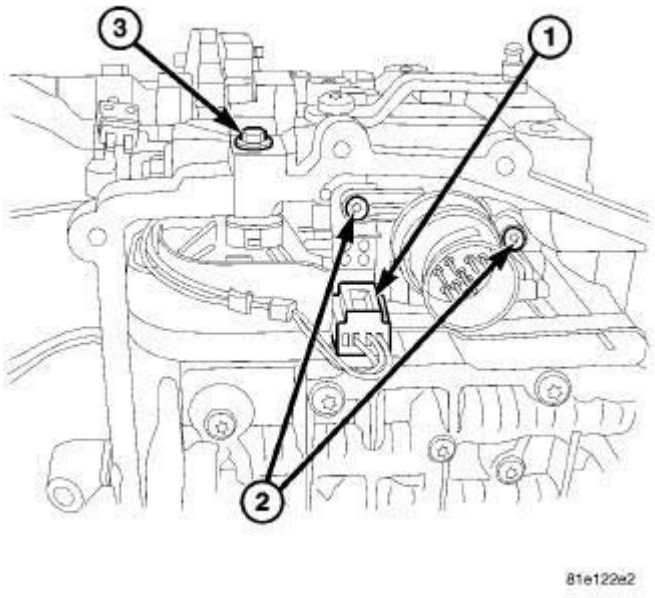


Fig. 122: TRS ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

NOTE: Maintain pin/drill bit position in the TRS hole and verify the manual lever stays in the Drive position during TRS installation.

74. Install the TRS into the case.
75. Install the screws (2) at the TRS and tighten to 6 N.m (53 in. lbs.).
76. Install the bolt (3) and a new O-ring at the TRS and tighten to 7 N.m (70 in. lbs.).
77. Remove the previously installed pin/drill bit from the TRS tone wheel.
78. Connect the speed sensor electrical connector (1) to the TRS.

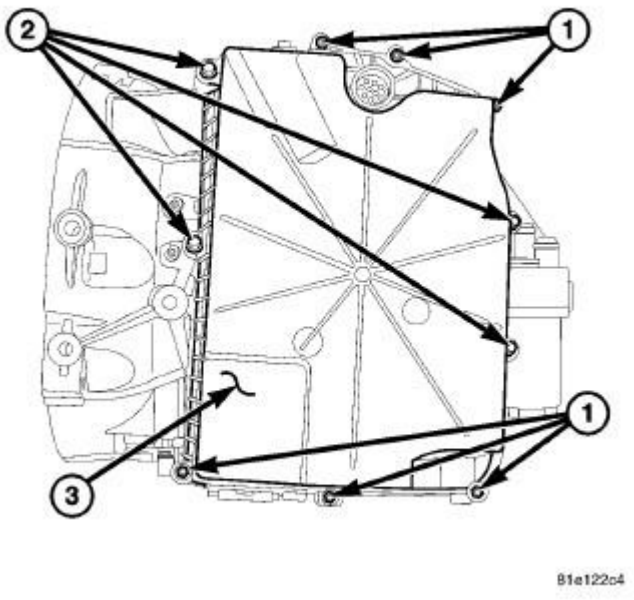


Fig. 123: Valve Body Oil Pan & Bolts
Courtesy of CHRYSLER LLC

79. Install the valve body oil pan (3).
80. Install the bolts (1, 2) at the valve body oil pan and tighten to 8 N.m (70 in. lbs.)

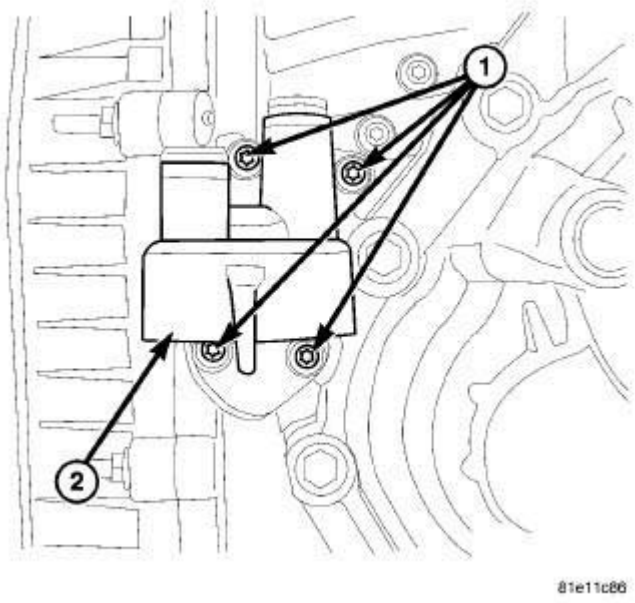


Fig. 124: OIL FILTER ADAPTOR BOLTS

Courtesy of CHRYSLER LLC

81. Install the external oil filter adaptor (2).
82. Install the bolts (1) at external oil filter adaptor (2) and gradually tighten to 10 N.m (88 in. lbs.).

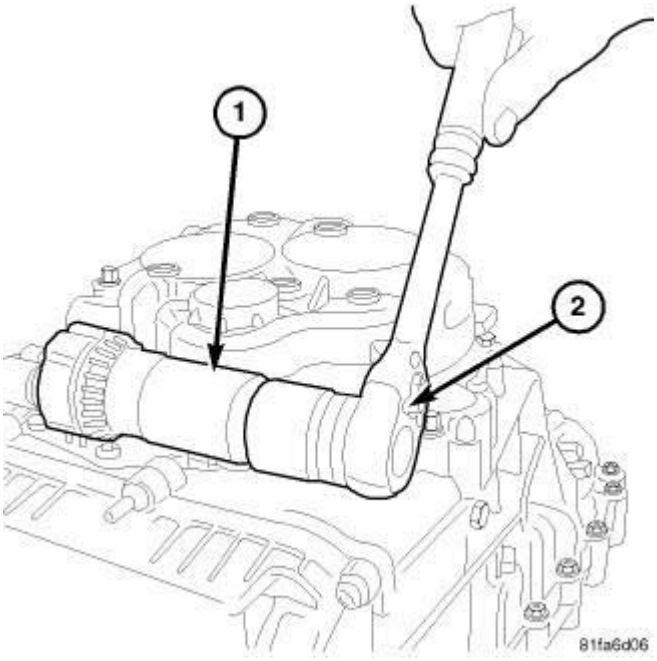


Fig. 125: OIL FILTER HOUSING AND FILTER
Courtesy of CHRYSLER LLC

83. Install a new external oil filter housing and filter (1) using a wrench and socket (2).

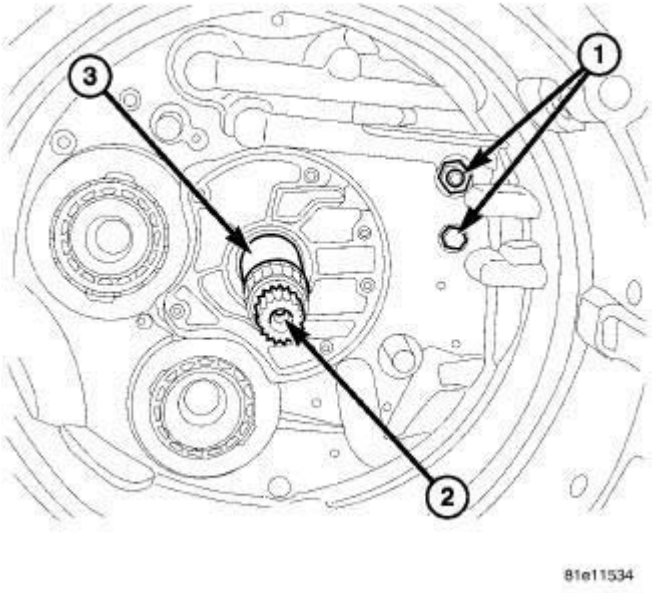


Fig. 126: Case Half Bolts In Bellhousing
Courtesy of CHRYSLER LLC

84. Install the case half bolts (1) in the bellhousing area and tighten to 30 N.m (22 ft. lbs.).

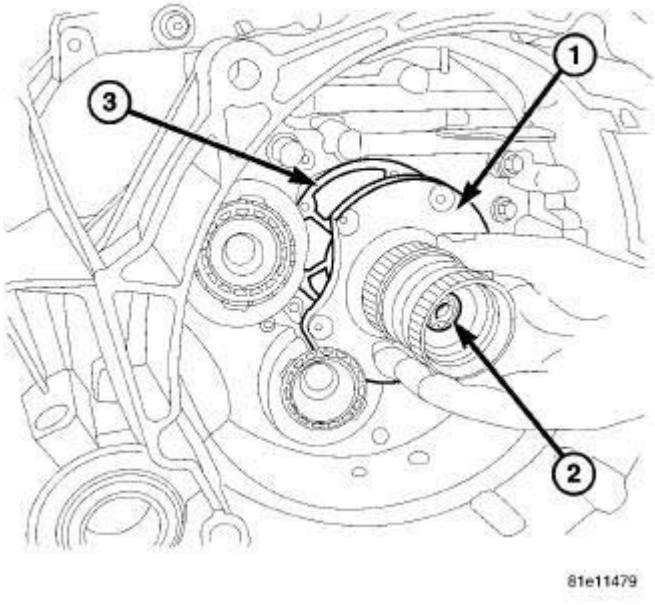


Fig. 127: Clutch Support & Gasket
Courtesy of CHRYSLER LLC

85. Install a new clutch support gasket (3).
86. Install the clutch support (1).
87. Make sure the clips on the ends of the split bearings and sealing rings are engaged.

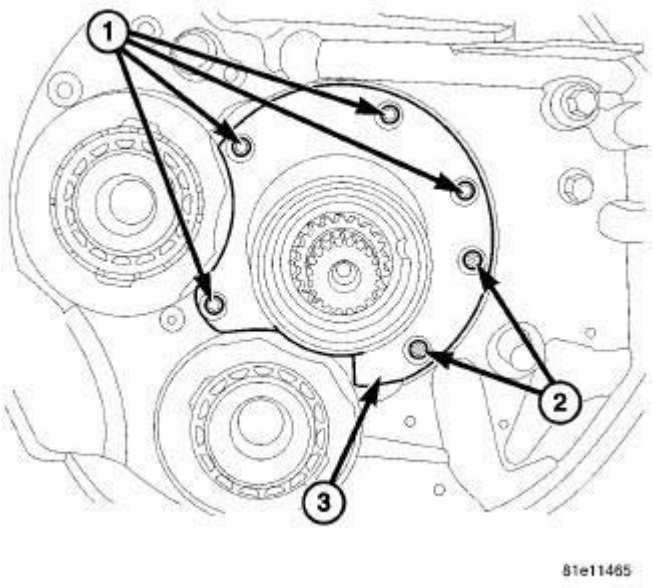


Fig. 128: Retaining Bolts At Clutch Support
Courtesy of CHRYSLER LLC

NOTE: Two of the retaining bolts (2) are longer.

88. Install the clutch support retaining bolts (1, 2). Tighten 10 N.m (88 in. lbs.).

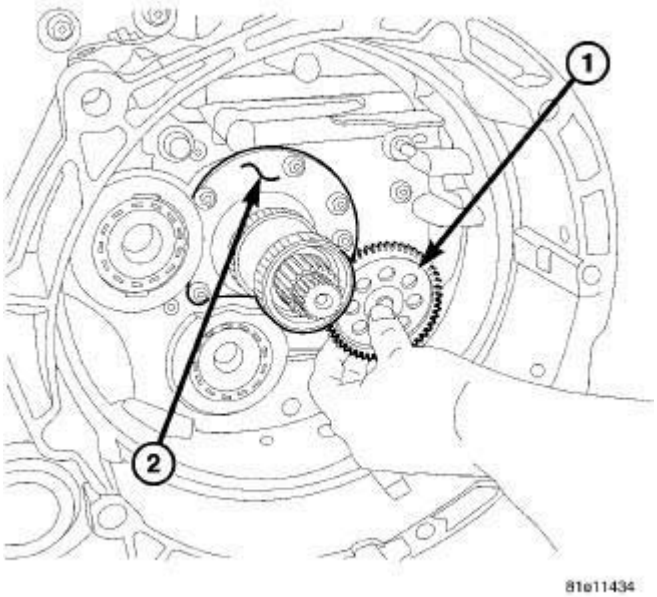


Fig. 129: OIL PUMP GEAR
Courtesy of CHRYSLER LLC

89. Install the oil pump gear (1).

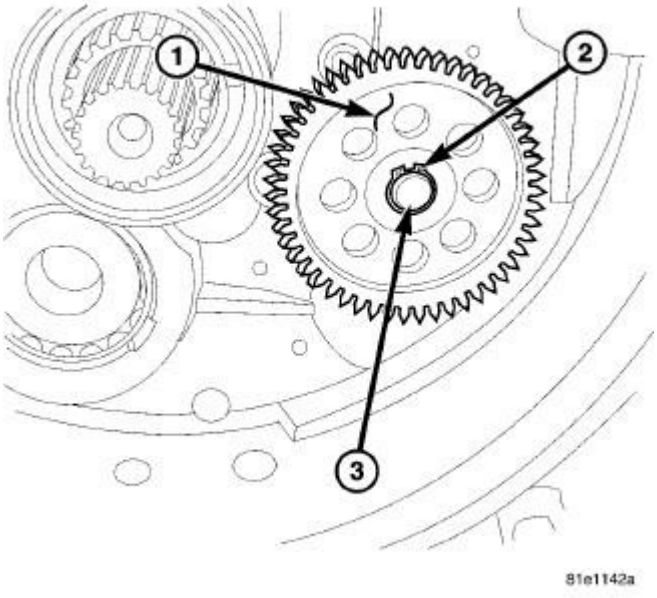


Fig. 130: SNAP RING AT THE OIL PUMP GEAR
Courtesy of CHRYSLER LLC

NOTE: Rotate the oil pump gear at least one full revolution and make sure the oil pump turns freely and is not catching or binding.

90. Install the snap ring (2) at the oil pump gear (1).

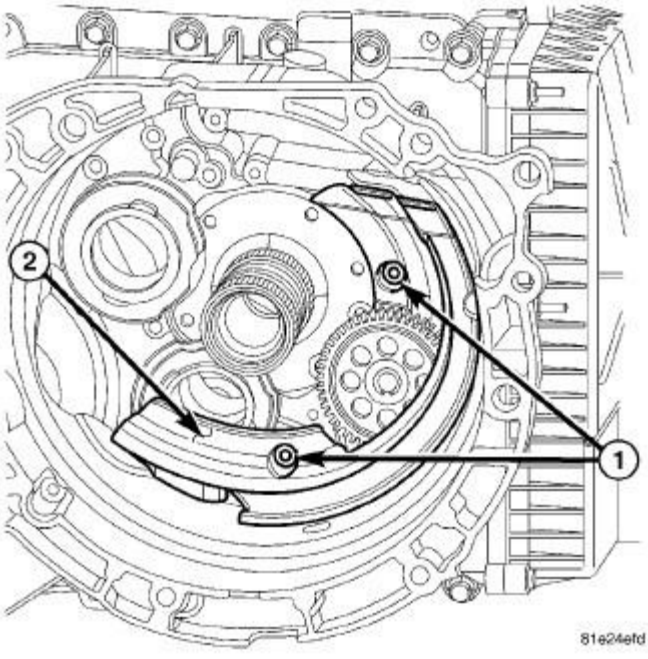


Fig. 131: Retaining Screws & Clutch Case Spacer
Courtesy of CHRYSLER LLC

91. Install the clutch support needle bearings and clip the ends of the needle bearings together.
92. Install the clutch support oil sealing rings and clip the ends of the sealing rings together.
93. Install the oil clutch case spacer (2) and retaining screws. Tighten screws to 10 Nm (88 in. lbs.).
94. Install the Double Clutch Assembly. See **Installation**.

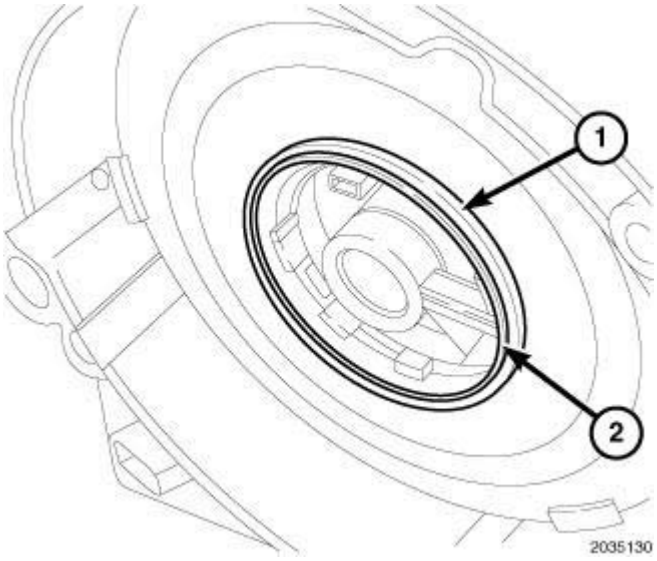


Fig. 132: CLUTCH HUB AND SEAL
Courtesy of CHRYSLER LLC

NOTE: Do not reuse the original front cover.

NOTE: Apply BOT 41 transmission oil to the seals on the new front cover.

NOTE: Do not roll the clutch hub seal (1).

95. Install a new front cover. Verify the clutch hub seal in the front cover is not rolled over the clutch hub (2). If necessary, use a plastic trim tool to carefully walk the clutch hub seal (1) around the clutch hub.

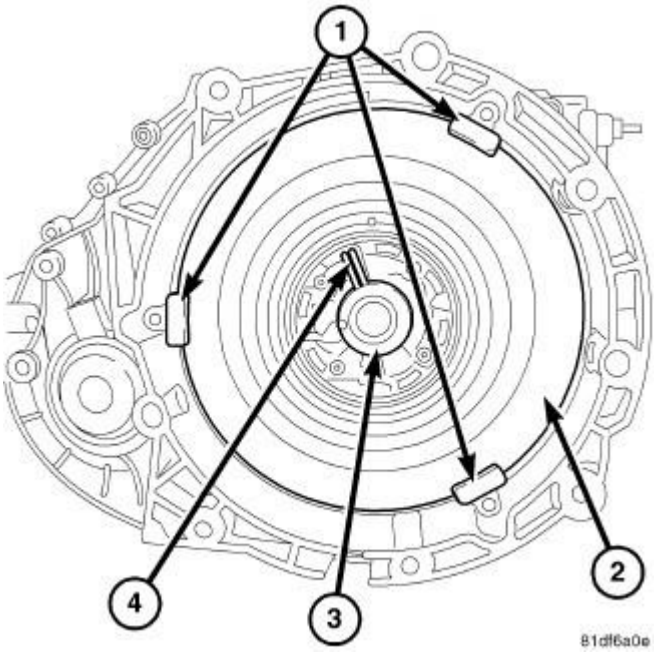


Fig. 133: RETAINING CLIPS
Courtesy of CHRYSLER LLC

NOTE: Do not reuse the original fasteners.

96. Install the retaining clips (1) that secure the front cover (2) and tighten the new fasteners to 10 N.m (88 in. lbs.).
97. Install the transaxle. See **Installation** .

INSTALLATION

INSTALLATION

NOTE: If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

NOTE: If a new transaxle assembly is being installed due to warranty, be sure to keep all packing materials, plugs and retainers for returning the original transaxle. Be sure to install the shipping plugs in the axle openings and transaxle oil cooler fittings prior to shipment of the original transaxle.

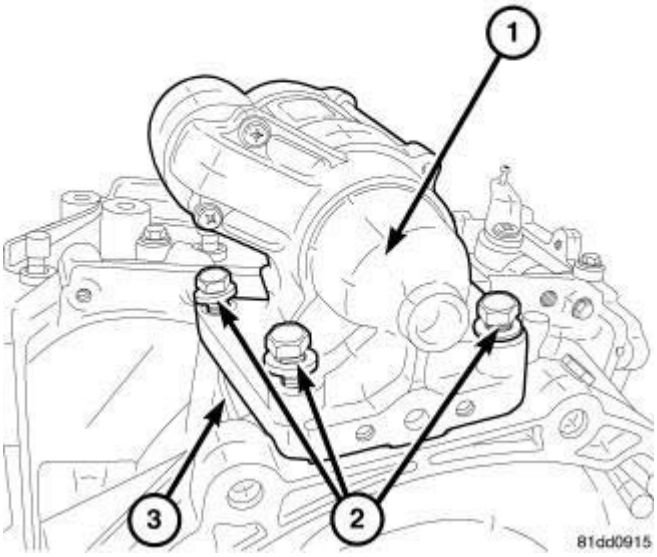


Fig. 134: STARTER
Courtesy of CHRYSLER LLC

1. Install the starter (1) onto the transmission (3).

2. Install the starter bolts and tighten to 25 N.m (18 ft. lbs.).

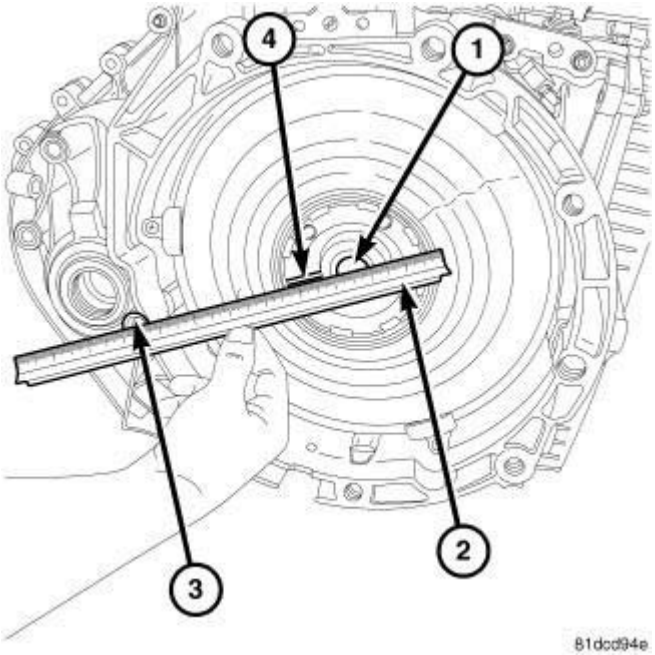


Fig. 135: Identifying Straight Edge, Hub, Spring Legs & Dowel Hole
Courtesy of CHRYSLER LLC

NOTE: Alignment of transaxle hub/coupler and engine crankshaft is critical for installation.

NOTE: Before aligning the clutch hub on a new transaxle, the shipping retainer must be removed from the bellhousing, and the locking pin must be loosened enough to allow the clutch to rotate freely.

CAUTION: Damage to the clutch assembly can occur if the clutch hub is not aligned correctly with the engine crankshaft.

3. Align the center of the hub (1), the center of both hub spring legs (4) and the center of the rear bellhousing stepped dowel hole (3) using a straight edge (2).

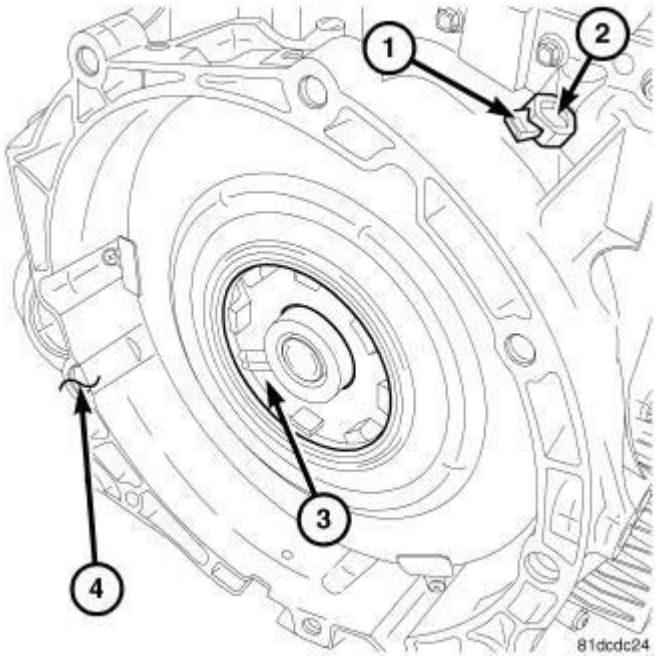


Fig. 136: Identifying Pull Out Tab & Locking Pin
Courtesy of CHRYSLER LLC

NOTE: If the original transaxle is being reinstalled, always use a NEW locking pin. A replacement (new) transaxle will have a new locking pin installed.

4. If the original transaxle is being reinstalled, install a **new** locking pin (2) into the transaxle bellhousing.
5. Tighten the locking pin (2) to 3 Nm (27 in. lb). Then tighten the locking pin until the pull-out tab (1) is oriented at approximately a 45° angle relative to the transaxle mounting surface.

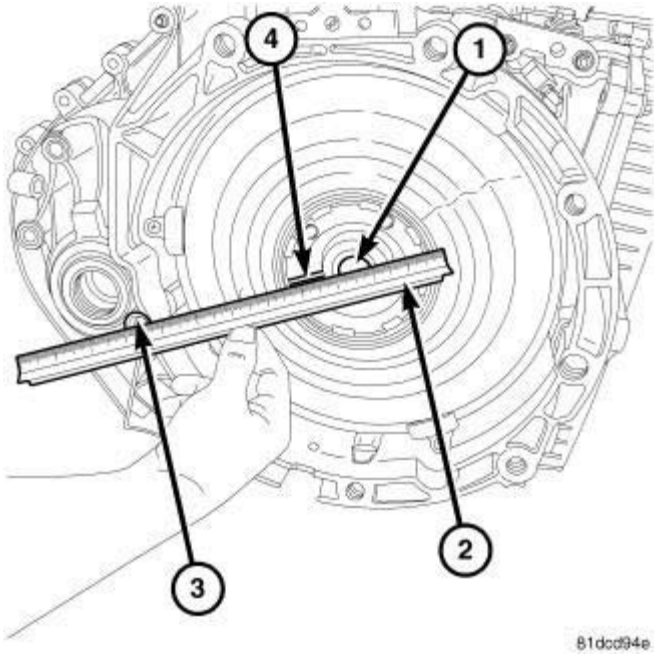


Fig. 137: Identifying Straight Edge, Hub, Spring Legs & Dowel Hole
Courtesy of CHRYSLER LLC

NOTE: Alignment of transaxle hub/coupler is critical for installation.

CAUTION: Damage to the clutch housing can occur if clutch hub alignment is not set correctly.

6. Use a straight edge (2) to verify that the center of the hub (1), the center of both hub spring legs (4) and the center of the bellhousing hole (3) are still aligned.

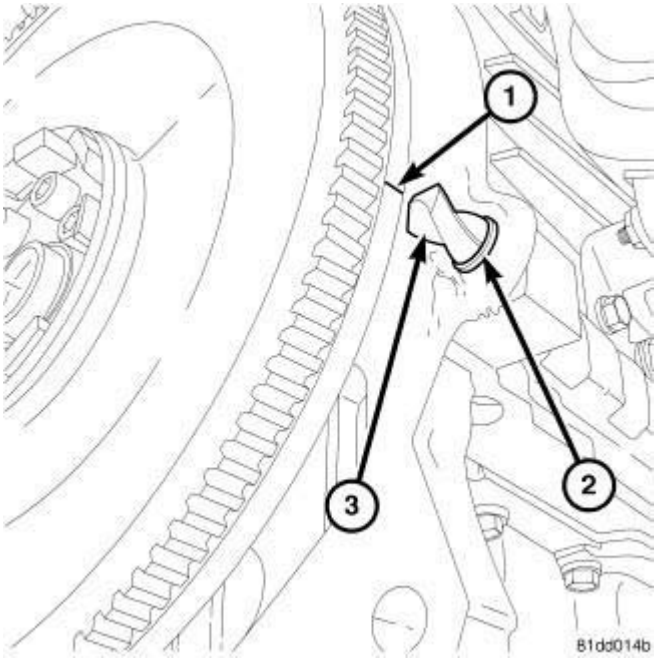


Fig. 138: Identifying Flywheel Alignment Mark, Drill Hole & Pin/Dowel Hole
Courtesy of CHRYSLER LLC

NOTE: Always use the largest drill bit (3) that will fit in the alignment pin/hole (2).

NOTE: Make sure that the couplers on both the transmission and engine are clean.

7. Apply grease to the couplers.
8. Install a drill bit (3) into the alignment pin/dowel hole (2).

NOTE: The alignment pin/dowel hole (2) at the rear (exhaust) side of the engine is shown in illustration.

9. Rotate the crankshaft by hand until the flywheel alignment mark (1) aligns with the tip of the drill bit (3)

in the alignment pin/dowel hole (2).

NOTE: Make sure that the bellhousing mounting surface remains parallel to the engine block mounting surface while raising transaxle into position.

10. Place transaxle on a transmission jack and lift it into place.

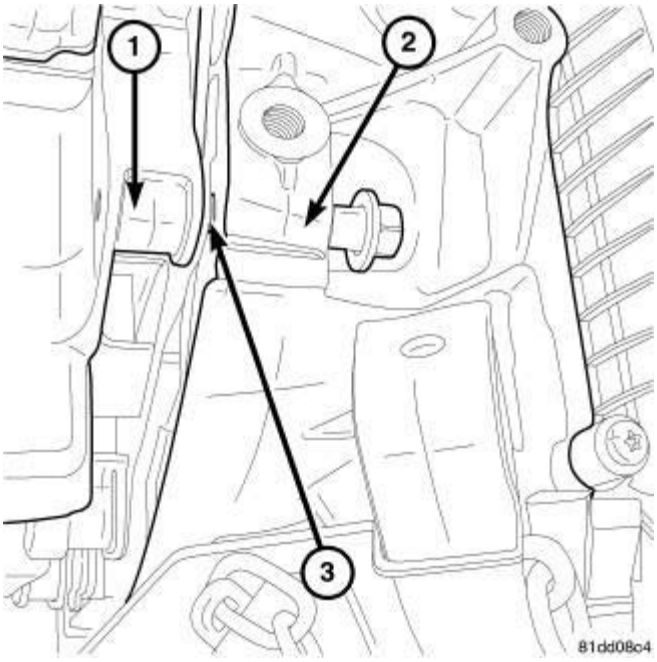


Fig. 139: Draw Transmission To Engine
Courtesy of CHRYSLER LLC

CAUTION: If the entire gap between the engine and transmission is more than 4 mm, then the clutch hub and engine crankshaft are not aligned correctly. If the gap between the engine and transaxle is more than 4 mm, do not use the bellhousing bolts to pull the transaxle and the engine block together.

NOTE: Verify transaxle mounting surface is square/aligned with engine block mounting surface.

11. When the entire gap between the engine and the transmission is at 4 mm (3), install bolts through the alignment dowels and draw the transmission to the engine.
12. While listening for any signs of misalignment of the clutch hub such as scraping noise inside the bellhousing, use the crankshaft damper to rotate the engine by hand.
13. Tighten the bellhousing bolts to 70 N.m (52 ft. lbs.).

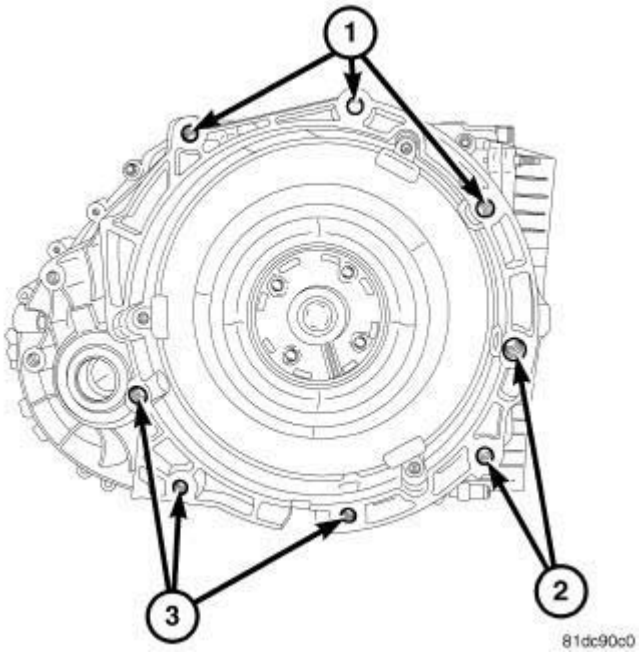


Fig. 140: BELLHOUSING BOLTS
Courtesy of CHRYSLER LLC

NOTE: If bolts do not easily pull the transmission to the engine, STOP and check for correct alignment of the bellhousing.

14. Install the rest of the lower transmission bolts (2, 3) and tighten to 70 N.m (52 ft. lbs.).

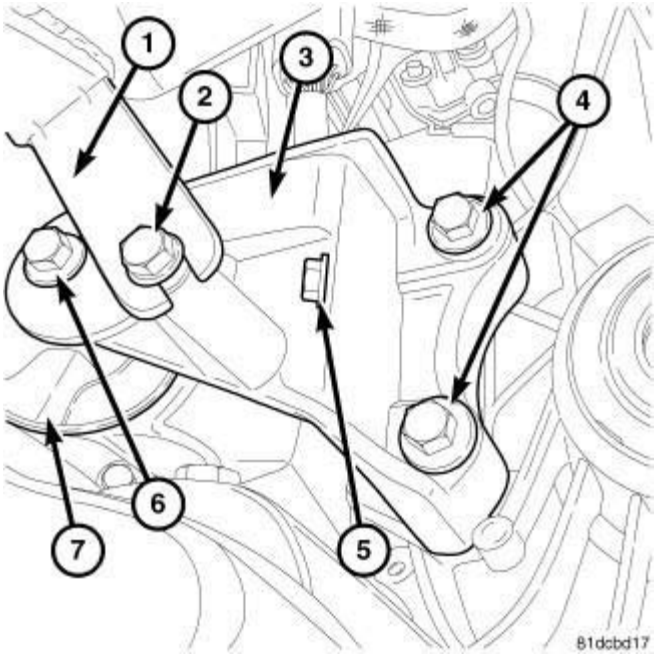


Fig. 141: REAR MOUNT BRACKET
Courtesy of CHRYSLER LLC

NOTE: Early 08 model year mount shown in illustration. Late 08 and 09 model year mount similar.

15. Align the right rear mount bracket (3) to the transaxle and loosely install the bolts (2, 4, 5 and 6).

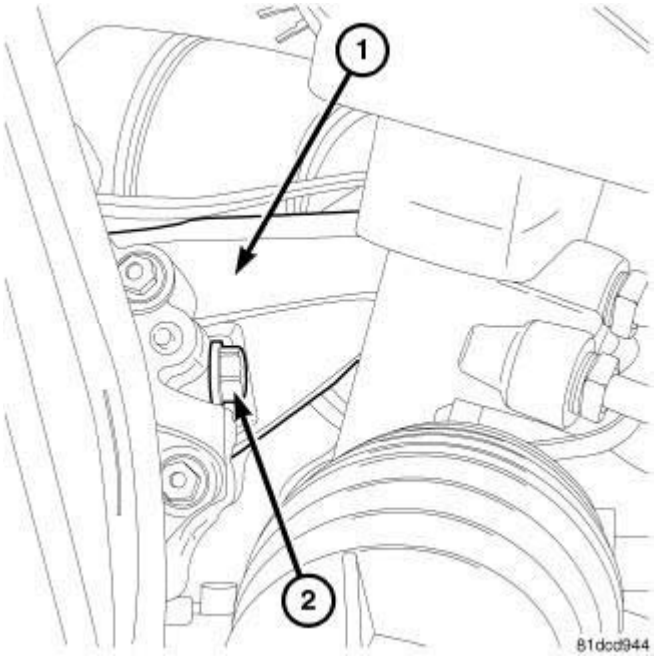


Fig. 142: Left Rear Mount Bracket Bolt
Courtesy of CHRYSLER LLC

16. Install the bolt (2) to the left rear mount bracket (1) and tighten to 100 N.m (74 ft. lbs.).

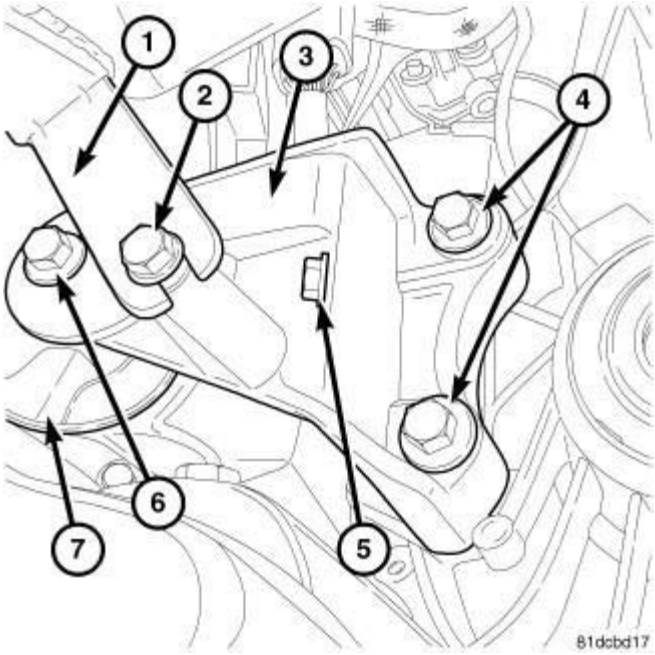


Fig. 143: REAR MOUNT BRACKET
Courtesy of CHRYSLER LLC

NOTE: Early 08 model year mount shown in illustration. Late 08 and 09 model year mount similar.

17. Tighten the bolts (2, 4, 5 and 6) to the right rear mount bracket (3) to 115 N.m (85 ft. lbs.).

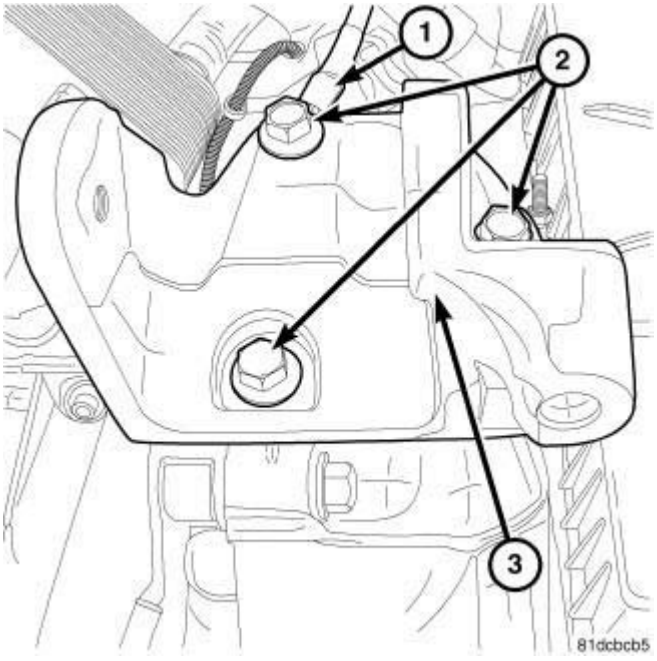


Fig. 144: FRONT MOUNT BRACKET
Courtesy of CHRYSLER LLC

18. Install the front mount bracket, the front mount bracket bolts (2) and ground cable (1) and tighten the bolts to 100 N.m (74 ft. lbs.).

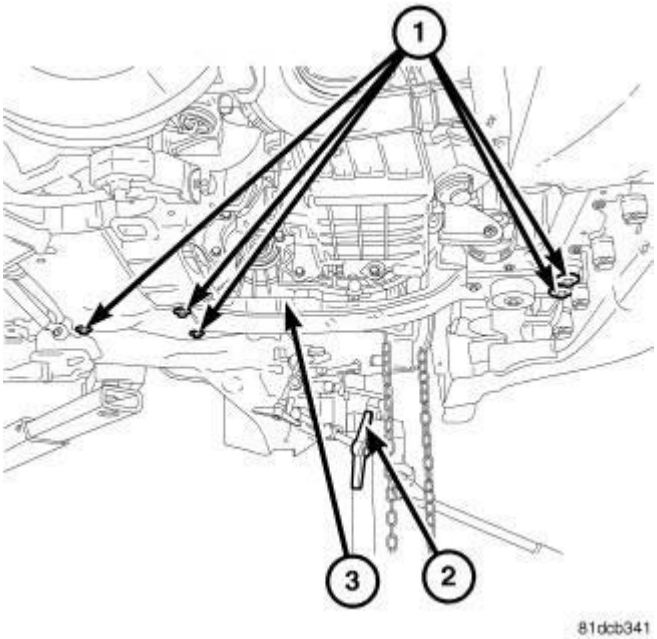


Fig. 145: Crossmember And Transmission Jack
Courtesy of CHRYSLER LLC

19. Install the crossmember (3) and crossmember bolts (1) and tighten to 50 N.m (37 ft. lbs.).

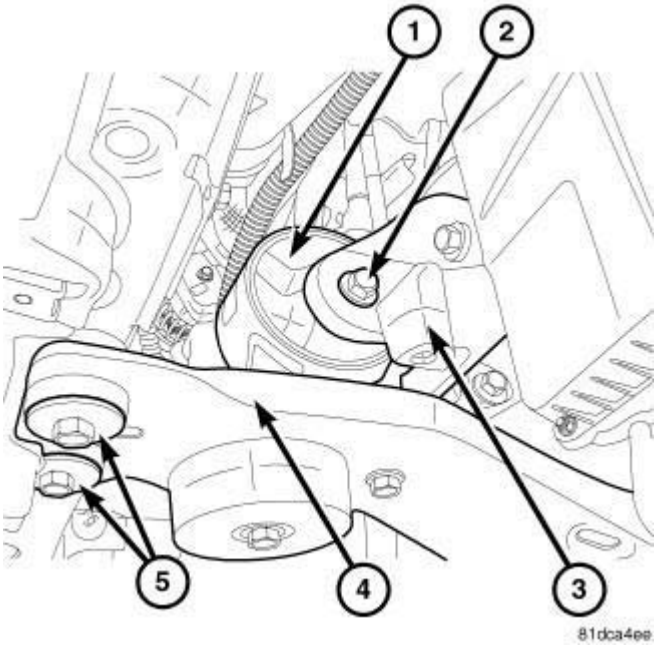


Fig. 146: CROSSMEMBER THROUGH BOLT
Courtesy of CHRYSLER LLC

20. Install the crossmember through bolt (2) and tighten to 50 N.m (37 ft. lbs.).

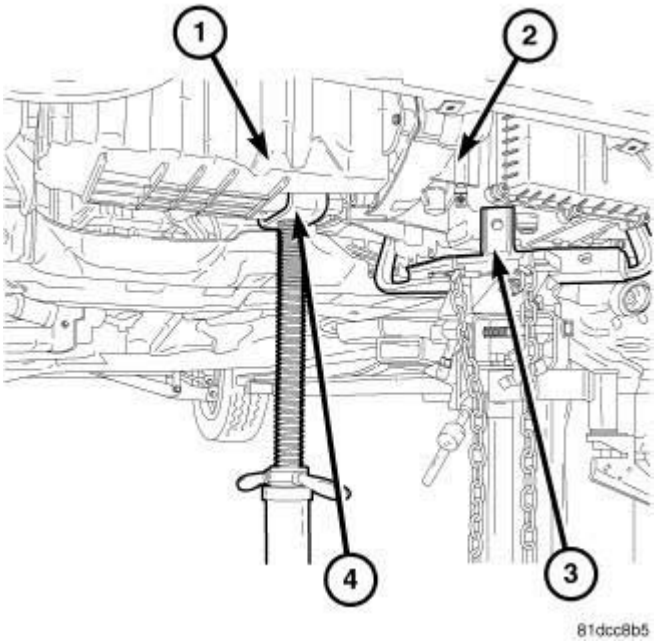


Fig. 147: SUPPORT ENGINE WITH A JACK
Courtesy of CHRYSLER LLC

21. Remove the jacks (3, 4).

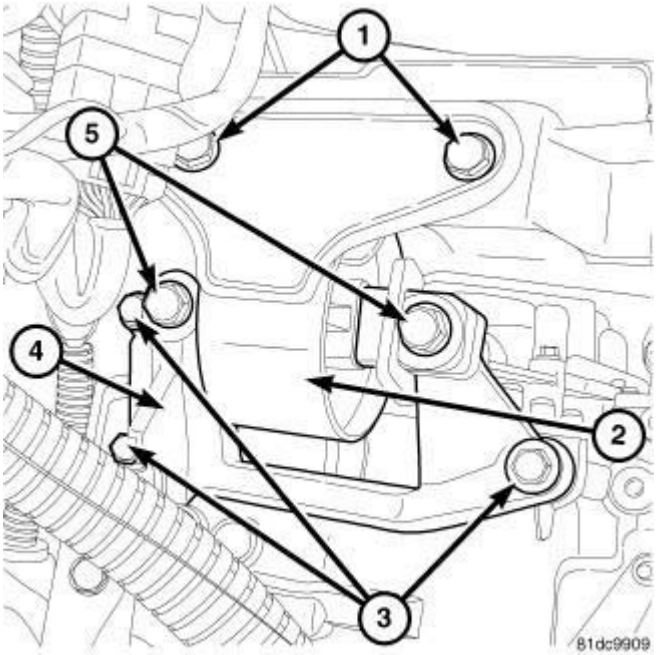


Fig. 148: LEFT TRANSMISSION MOUNT AND BRACKET
Courtesy of CHRYSLER LLC

22. Lower the vehicle, support the transmission with a floor jack (1) and install the left side transmission bracket (4).

23. Install the left side transmission bracket bolts (3) and tighten to 100 N.m (74 ft. lbs.).
24. Install left side transmission mount bolts (5) and tighten to 100 N.m (74 ft. lbs.).

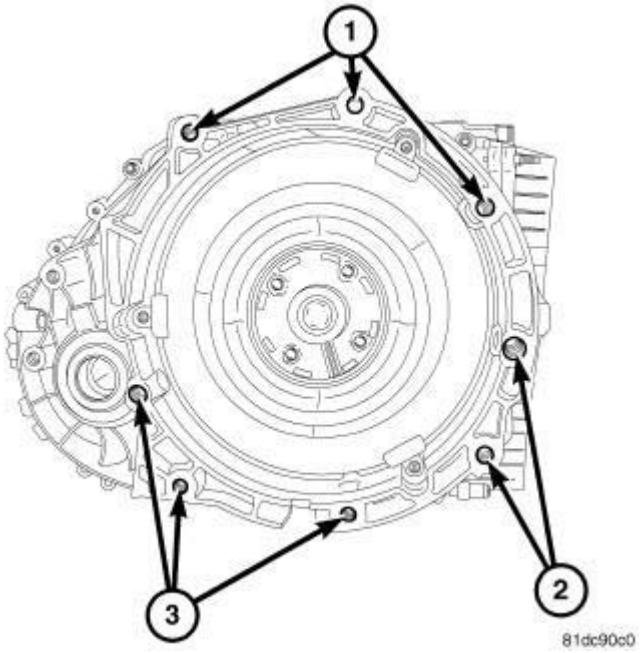


Fig. 149: BELLHOUSING BOLTS
Courtesy of CHRYSLER LLC

25. Install the upper bellhousing bolts (1) and tighten to 70 N.m (52 ft. lbs.).
26. Lift the vehicle on a hoist.
27. Apply MICROLUBE® GL 261/GL 262 or equivalent grease to the halfshaft splines and o-rings, then Install the halfshafts. Refer to **Differential and Driveline/Half Shaft - Installation** .
28. Install right front side splash shield.

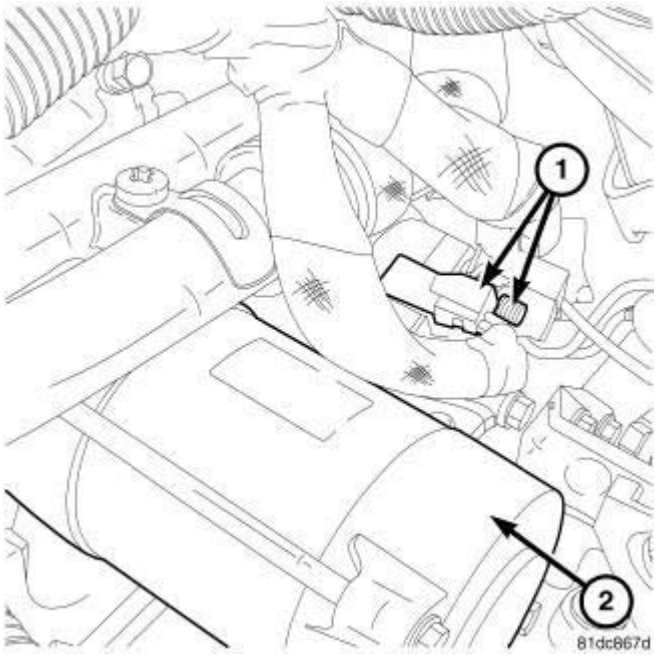


Fig. 150: STARTER ELECTRICAL CONNECTORS
Courtesy of CHRYSLER LLC

29. Lower the vehicle.
30. Install the electrical connectors (1) at the starter (2).

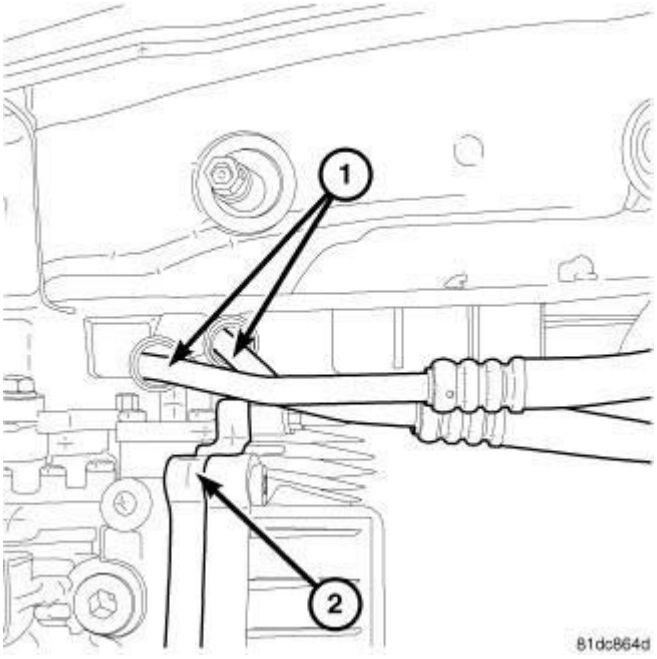


Fig. 151: QUICK-CONNECT FITTINGS
Courtesy of CHRYSLER LLC

31. Install the transmission cooler line quick-connect fittings (1).

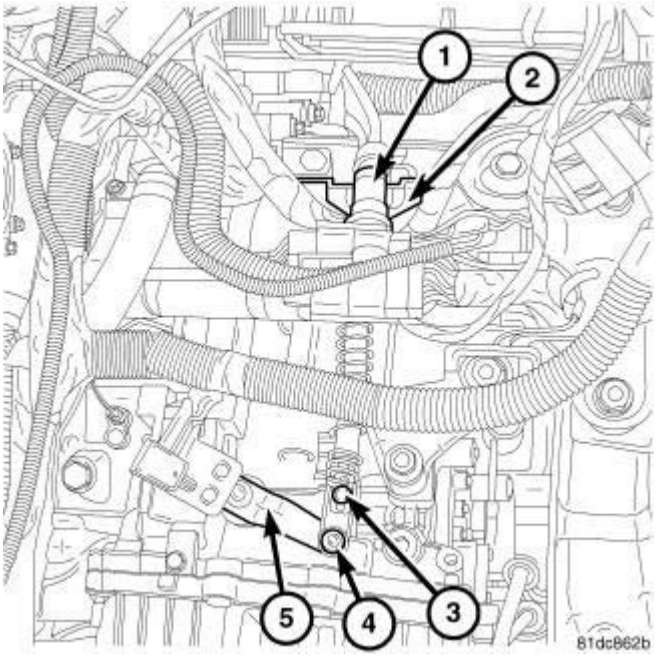


Fig. 152: GEAR SHIFT CABLE
Courtesy of CHRYSLER LLC

32. Move the manual lever on the transaxle and the shifter to the park position.
33. Install the gear shift cable (4) at the cable bracket (2) along with the lock.
34. Loosen the adjustment nut (3) at the shift cable.
35. Install the gear shift cable (4) at the manual lever (5).

NOTE: Shifter and manual lever must be in PARK.

36. Tighten the adjustment nut (3) at the shift cable to 6 N.m (40 in. lbs.).

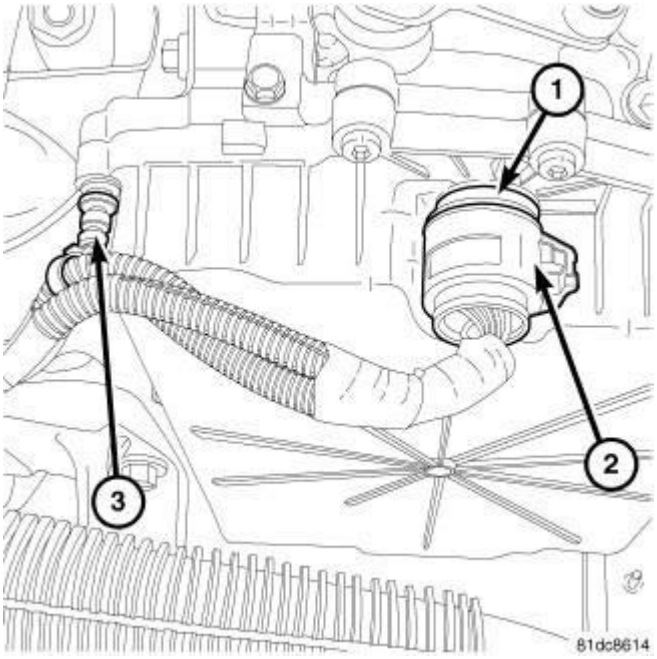


Fig. 153: Solenoid Pack Electrical Connector
Courtesy of CHRYSLER LLC

37. Install the harness retaining clip (3) to the stud at valve body cover.
38. Install the speed sensor electrical connector (2) to the TRS (1).

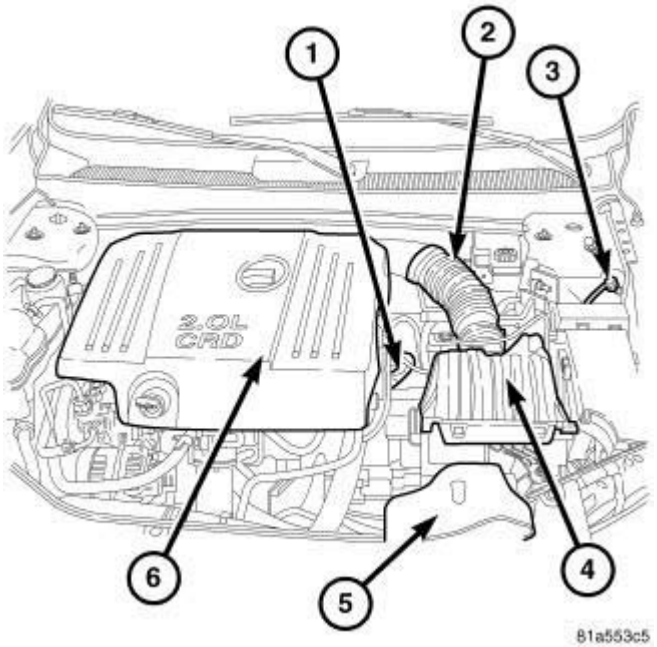


Fig. 154: ENGINE COVER
Courtesy of CHRYSLER LLC

39. Install the air inlet tube (2) and air cleaner assembly (4).

40. Install the engine cover.
41. Connect battery negative cable.
42. Check and adjust Transmission oil level as needed. See **Standard Procedure** .

ADJUSTMENTS

ADJUSTMENT

BEARING ADJUSTMENT PROCEDURE

NOTE: Use only new bearings on both output shafts and the differential to ensure correct turning torque. The bearings can loose as much as one half of its turning torque after break-in.

1. Use extreme care when removing and installing bearing cups and cones. Use only an arbor press for installation, as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat give a false end-play reading while gauging for proper shims. Improperly seated bearing cups and cones are subject to low-mileage failure.
2. Bearing cups and cones should be replaced if they show signs of pitting or heat distress. If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.
3. Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of the original drag torque after break-in.
4. Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.
5. Bearing cones must not be reused if removed unless a ground cone is used to find proper shim size.
6. Turning-torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning-torque readings can be obtained only with the geartrain removed from the case.

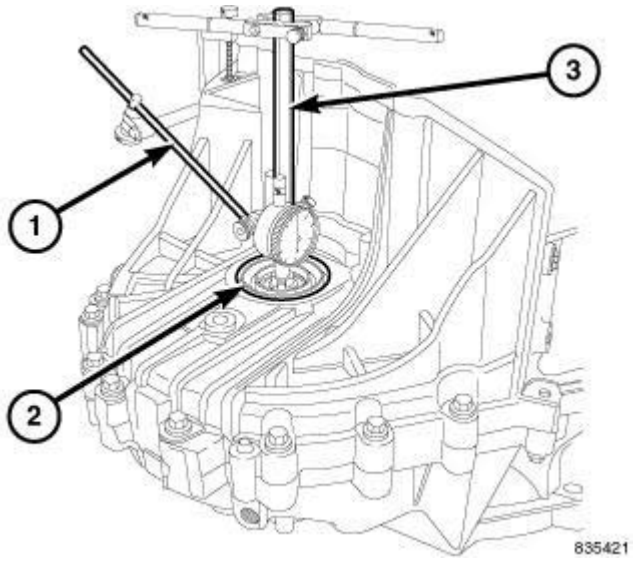


Fig. 155: TRANSAXLE GEAR CASE AND T-HANDLE
Courtesy of CHRYSLER LLC

1. Remove bearing cup and existing shim from clutch bellhousing case.
2. Use a cup that has been ground down on the outer edge for ease of measurement.
3. Oil differential bearings with transmission fluid. Install differential assembly (1) into transaxle gear case (2). Install clutch bellhousing over gear case. Install and tighten case bolts to 16 N.m (12 ft. lbs.).
4. Position transaxle with bellhousing facing down on workbench with C-clamps. Position Dial Indicator C-3339A (1) to measure differential endplay in the location shown in illustration (2).

NOTE: The dial indicator should be mounted parallel to the torque tool to obtain the most accurate reading.

5. Apply a medium load to differential with Torque Tool C-4995A and a T-handle (3), in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator. To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth. Record end play.

NOTE: If the original shim is missing or broken always start out with the middle shim size in the new parts package.

6. The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.19 mm (0.007 in.).** Never combine shims to obtain the required preload.
7. Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected, then press the bearing cup into clutch bellhousing.

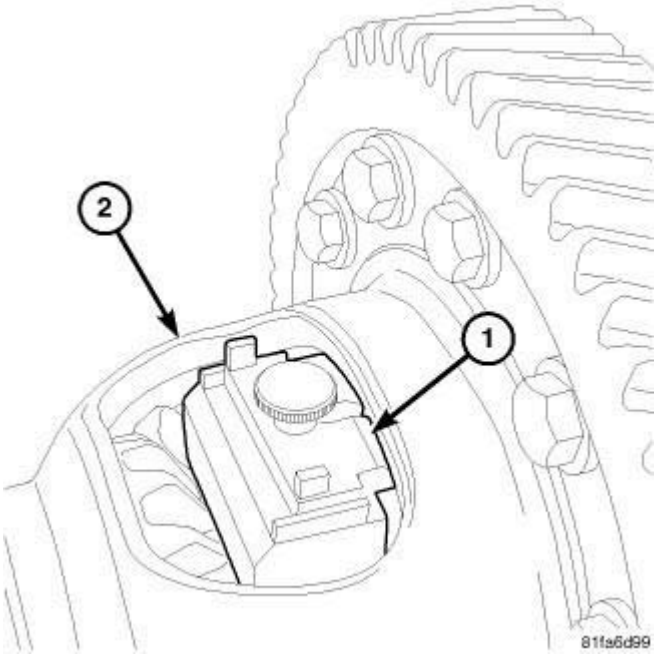


Fig. 156: SIDE GEAR LOCKING TOOL 10150
Courtesy of CHRYSLER LLC

8. Install Side Gear Locking Tool 10150 (1) to the side gears.

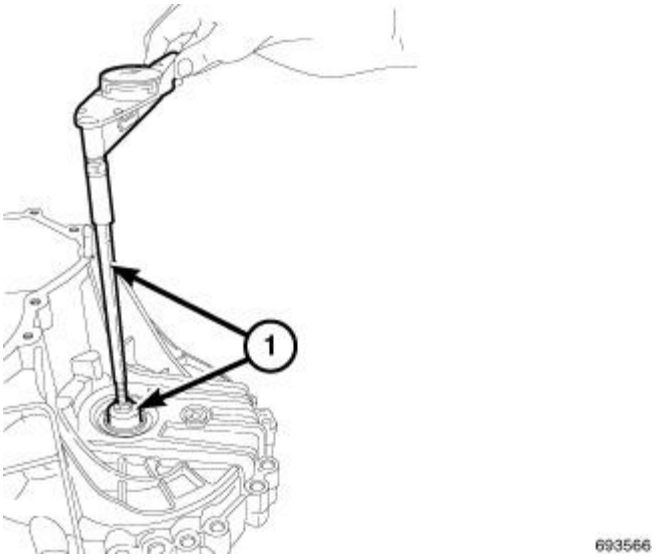


Fig. 157: TORQUE TOOL C-4995A
Courtesy of CHRYSLER LLC

9. Install clutch bellhousing case half. Install and tighten case bolts to 16 N.m (12 ft. lbs.).
10. Using Torque Tool C-4995A (1) and an inch-pound torque wrench, check turning torque of the differential assembly. **The turning torque should be 2 to 3 N.m (18 to 27 in. lbs.) If the turning torque is too high, install as close to 0.02 mm (0.0008 inch) thinner shim in shim pack. If the turning torque is too low, install as close to 0.02 mm (0.0008 inch) thicker shim in shim pack.**

11. Recheck turning torque (1). Repeat until the proper turning torque is obtained.
12. Install the correct shim.
13. Remove the cup used during measurement and install the **new** cup.

INPUT SHAFT BEARING ADJUSTMENT PROCEDURE

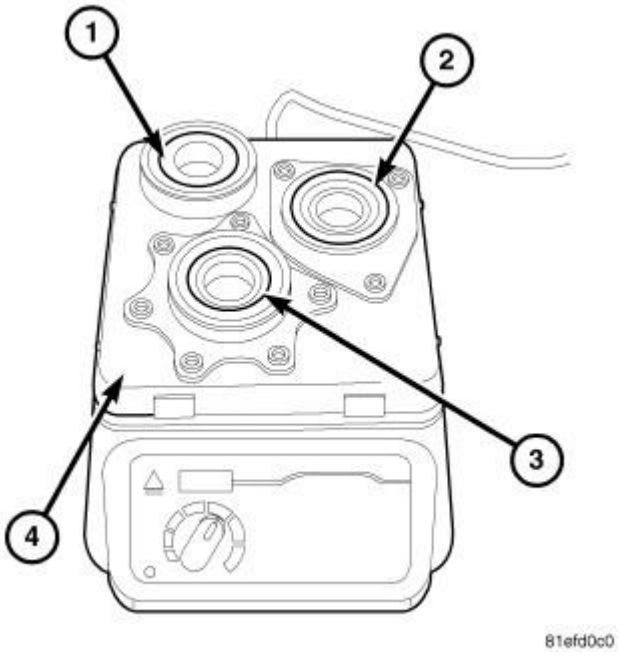


Fig. 158: HEAT BEARINGS
Courtesy of CHRYSLER LLC

WARNING: Use welding gloves or tongs when handling heated components. Failure to follow these instructions will result in personal injury.

CAUTION: Use only a bearing heater/hot plate and follow manufacturer's instructions. Heat components to 100 - 177 Celsius (212° Min. - 350° Max Fahrenheit). Never use an open flame to heat components. Never leave components on heater for an extended amount of time. If component is discolored after heating, the component has been overheated and must not be used. Failure to follow these instructions will result in component damage.

NOTE: After installation, allow the bearings to cool down to ambient temperature. The input shaft bearings must be at a temperature between 15° - 27° C (60° - 80° F) before checking total input shaft endplay.

1. Heat the front and rear bearings (1) with a bearing heater, install the front bearing on the front half of the input shaft and the rear bearing on the rear half of the input shaft.

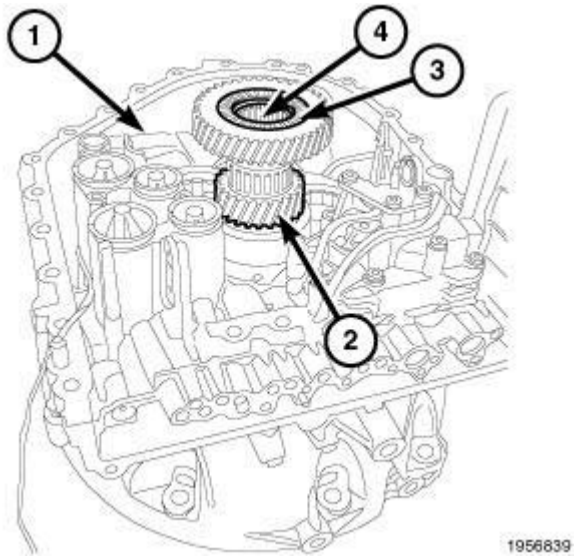


Fig. 159: CLUTCH HOUSING, INPUT SHAFT, THRUST BEARINGS AND LARGER ROLLER BEARINGS
Courtesy of CHRYSLER LLC

2. Set the clutch housing case half (1) on a bench with the engine mounting surface facing down.
3. Install the front half of the input shaft (2) into the clutch housing case half (1).

NOTE: Oil the needle bearings prior to installation

4. Install the large roller bearing (4) and the needle thrust bearing (3) into the front half of the input shaft (2).

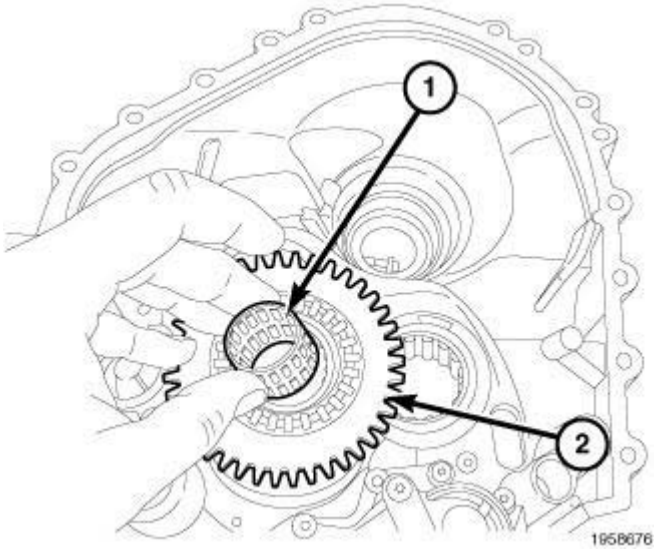


Fig. 160: SMALL NEEDLE BEARING AND INPUT SHAFT
Courtesy of CHRYSLER LLC

NOTE: Oil the needle bearing prior to installation

5. Install the small needle bearing (1) into the front half of the input shaft (2). Verify all bearings are correctly seated.

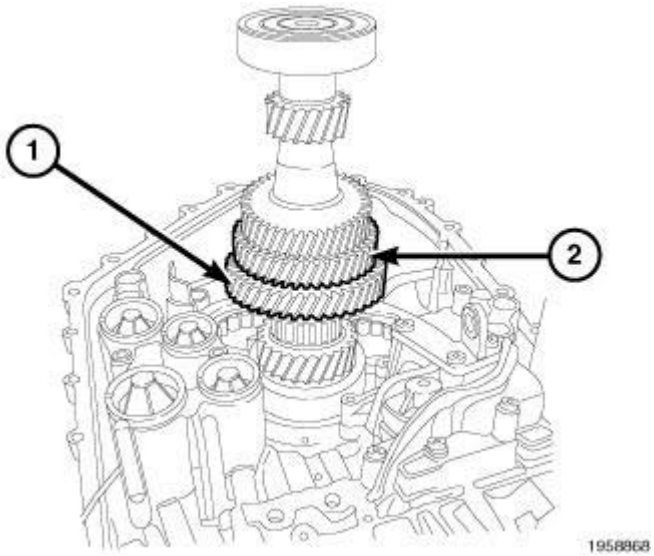


Fig. 161: FRONT HALF AND REAR HALF OF INPUT SHAFT
Courtesy of CHRYSLER LLC

6. Install the rear half of the input shaft (2) into the front half of the input shaft (1).

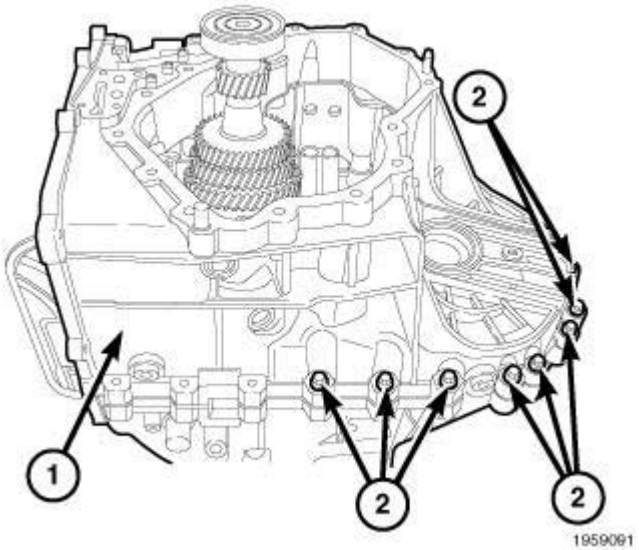


Fig. 162: CASE HALF AND BOLTS
Courtesy of CHRYSLER LLC

7. Install the case half (1) and the bolts (2). Tighten bolts (2) to 16 N.m (12 ft. lbs.).

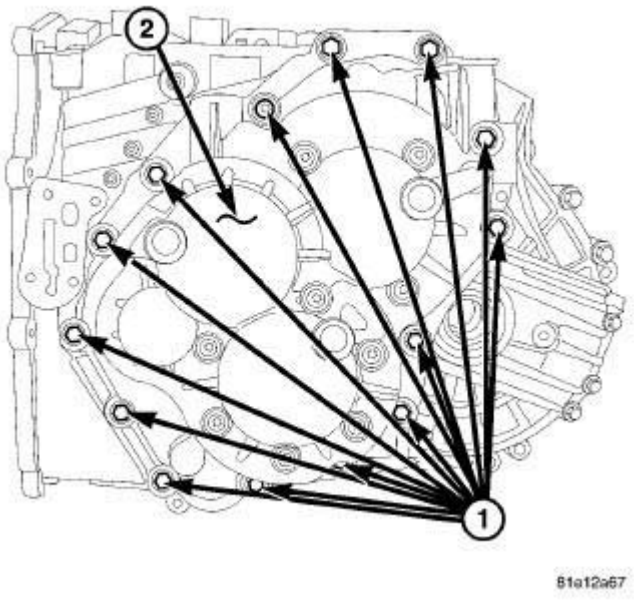


Fig. 163: Rear Cover Bolts
Courtesy of CHRYSLER LLC

8. Install the bearing cover (2) without an input shaft shim. Install the bearing cover bolts (1) and tighten bolts to 16 N.m (12 ft. lbs.).
9. Set the case assembly so the clutch housing is facing up.
10. Verify the input shaft bearing is fully seated in the end cover.

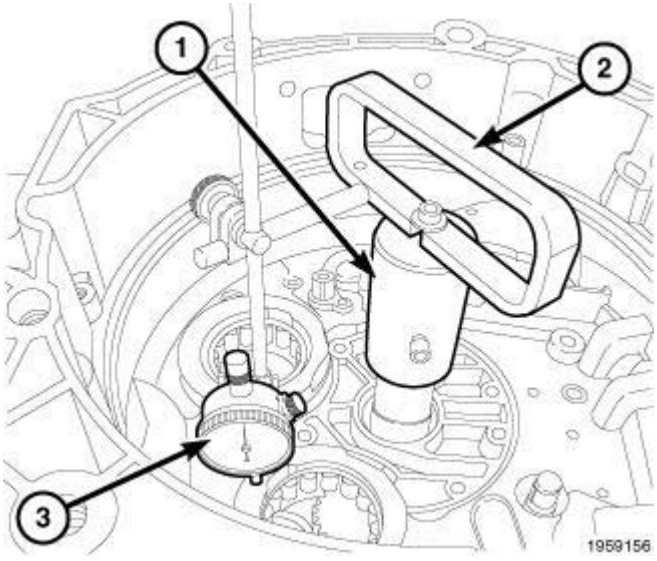


Fig. 164: TOOL 8266-21, HANDLE 8266-8 AND DIAL INDICATOR C-3339A
Courtesy of CHRYSLER LLC

11. Install the Input Shaft Endplay Tool 8266-21 (1), Handle 8266-8 (2) and set up a Dial Indicator C-3339A (3) as shown in illustration to measure endplay on the input shaft.

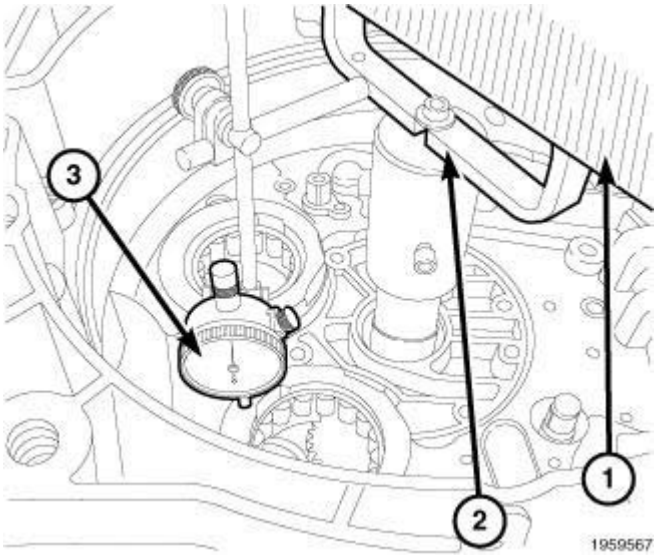


Fig. 165: INPUT SHAFT ENDPLAY TOOL
Courtesy of CHRYSLER LLC

12. Apply approximately 4.535 Kg. (10 lbs.) of force to the handle of the input shaft endplay tool (2) to load the bearings, then, while applying downward force, zero the dial indicator (3).
13. Pull upward on the input shaft endplay tool and record the measurement. Press down on the input shaft endplay tool and verify the tip of the dial indicator remains in one spot. Repeat this step several times and record each measurement. Average the measurements to get the input shaft endplay measurement.
14. Determine the required shim size by subtracting the preload value of 0.36 mm (0.006 in.) from the total input shaft endplay measurement found in step 13.
15. After the input shaft shim is installed, the final endplay of the input shaft should be 0.17 mm +/- 0.05 mm (0.006 in. +/- 0.002 in.).

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolts, Park Pawl Bracket	25	18	221
Pivot Shaft Bracket to Oil Pump (Park Pawl Pivot Shaft)	10	7	88
Bolt, Park Pivot	30	22	266
Bolt, Manual Lever	20	15	177
Bolts, Oil Pump	10	7	88

Bolts, Pivot Bracket	10	7	88
Bolts, Lock Out Housing	10	7	88
Bolt, Pivot Shaft to Case (Park Pawl Pivot Shaft)	10	7	88
Bolts, Case Half	30	22	266
Bolts, Bearing Retainer	110	81	-
Bolts, Rear Cover	30	22	266
Bolts, Shaft support Plates	30	22	266
Connector Screws at TRS	6	-	53
Bolt, at TRS	7	-	70
Bolts, at Valve Body	10	7	88
Bolts, Valve Body Oil Pan (Stage 1 of 2)	5	-	44
Bolts, Valve Body Oil Pan (Stage 2 of 2)	8	6	70
Bolts, at External Oil Filter Adaptor	10	7	88
Bolts, Idler Gear Support	30	22	266
Bolts, Reaction Shaft	11	8	97
Clutch retaining collar	7	5	62
Retaining clips, Front Cover	10	7	88
Plug, Drain	35	25	309
Plug, Fill	35	25	309
Bolts, Ring Gear	83	61	-

SPECIAL TOOLS

SPECIAL TOOLS

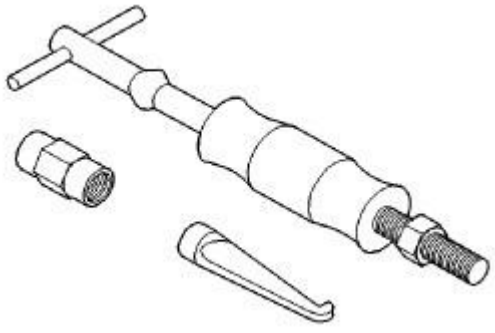


Fig. 166: SLIDE HAMMER, UNIVERSAL - C-637
Courtesy of CHRYSLER LLC

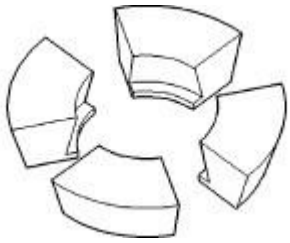


Fig. 167: ADAPTER - 8353
Courtesy of CHRYSLER LLC

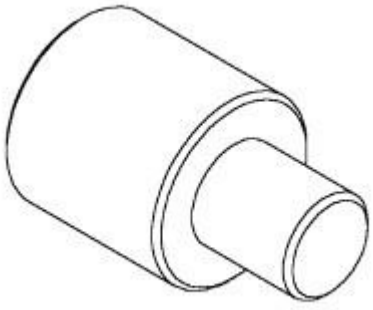


Fig. 168: PROTECTOR - 8923
Courtesy of CHRYSLER LLC

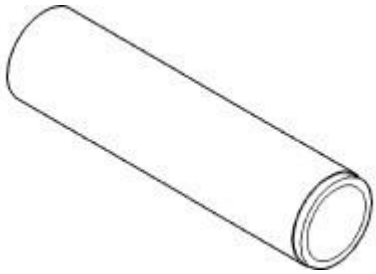


Fig. 169: INSTALLER, BEARING - W-262
Courtesy of CHRYSLER LLC

Fig. 170: INSTALLER - 10124
Courtesy of CHRYSLER LLC

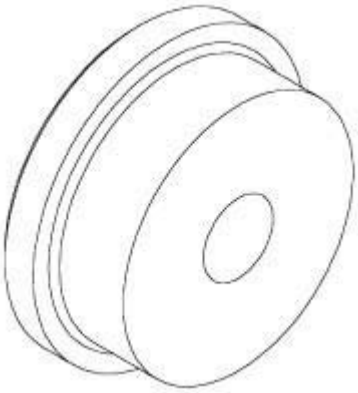


Fig. 171: INSTALLER, DIFFERENTIAL SIDE SEAL - 9928
Courtesy of CHRYSLER LLC

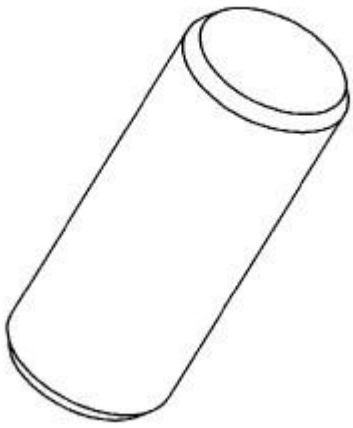


Fig. 172: ADAPTER, PLUG - 10038
Courtesy of CHRYSLER LLC

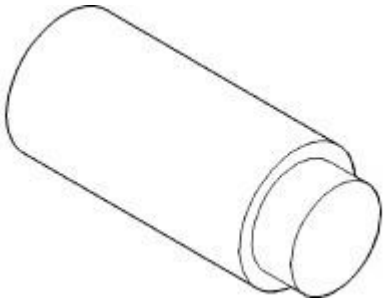


Fig. 173: ADAPTER, BEARING/GEAR - C-293-3
Courtesy of CHRYSLER LLC

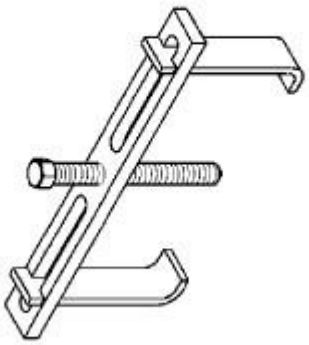


Fig. 174: PULLER, EXTENSION HOUSING - 8244
Courtesy of CHRYSLER LLC

Fig. 175: PULLER SET - 10073
Courtesy of CHRYSLER LLC

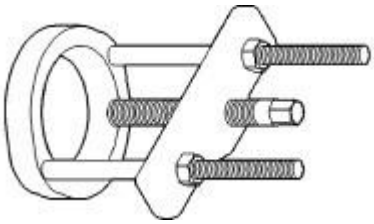


Fig. 176: PULLER, PRESS - C-293-PA
Courtesy of CHRYSLER LLC

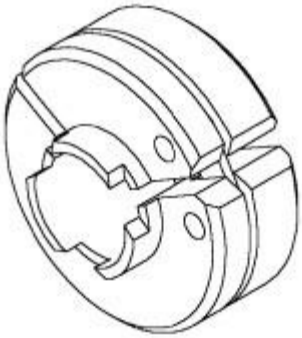


Fig. 177: DISCONNECT, TRANS COOLER LINE - 8875A
Courtesy of CHRYSLER LLC

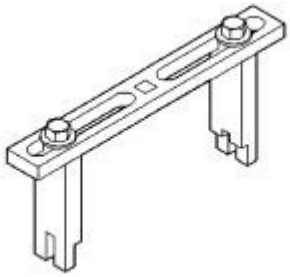


Fig. 178: SPANNER, FUEL PUMP RING - 6856
Courtesy of CHRYSLER LLC

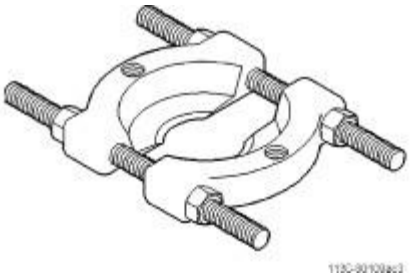


Fig. 179: SPLITTER, BEARING/GEAR - 1130
Courtesy of CHRYSLER LLC

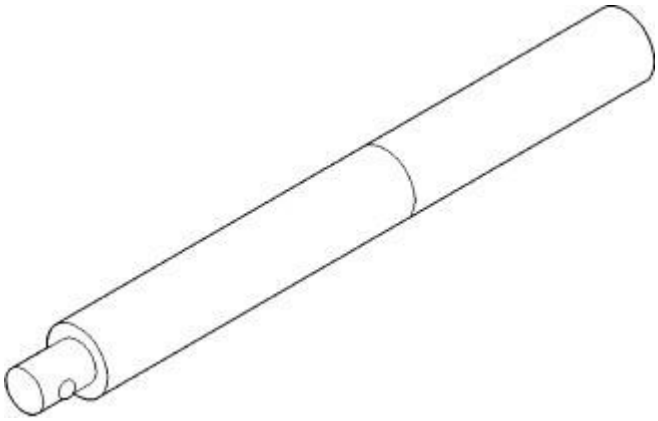


Fig. 180: DRIVER HANDLE, UNIVERSAL - C-4171
Courtesy of CHRYSLER LLC

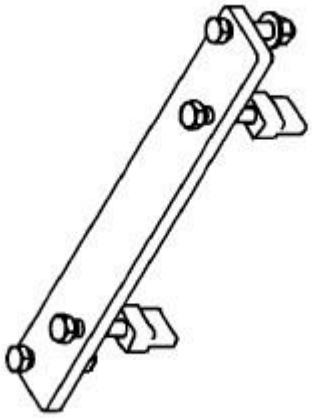


Fig. 181: COMPRESSOR 10129
Courtesy of CHRYSLER LLC

Fig. 182: COMPRESSOR, SPRING - 5058A
Courtesy of CHRYSLER LLC

Fig. 183: COMPRESSOR, SPRING - 5059-A
Courtesy of CHRYSLER LLC

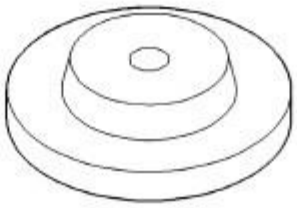


Fig. 184: DISC, SPRING COMPRESSOR - 6057
Courtesy of CHRYSLER LLC

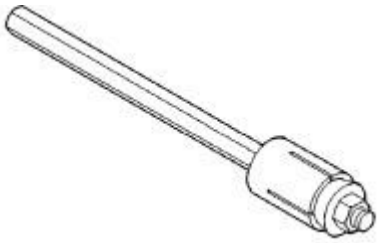


Fig. 185: TOOL, DIFFERENTIAL BEARING TORQUE - C-4995A
Courtesy of CHRYSLER LLC

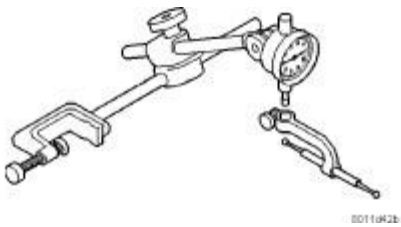


Fig. 186: SET, DIAL INDICATOR - C-3339A
Courtesy of CHRYSLER LLC

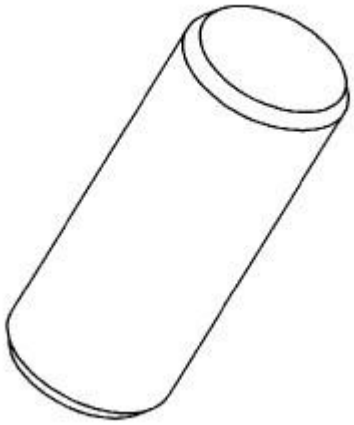


Fig. 187: ADAPTER, PLUG - 10038
Courtesy of CHRYSLER LLC

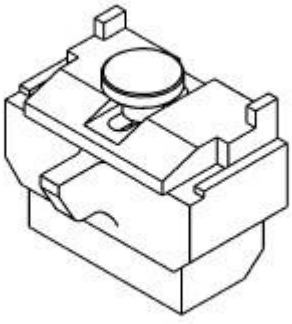


Fig. 188: DIFFERENTIAL LOCKING TOOL 10150
Courtesy of CHRYSLER LLC

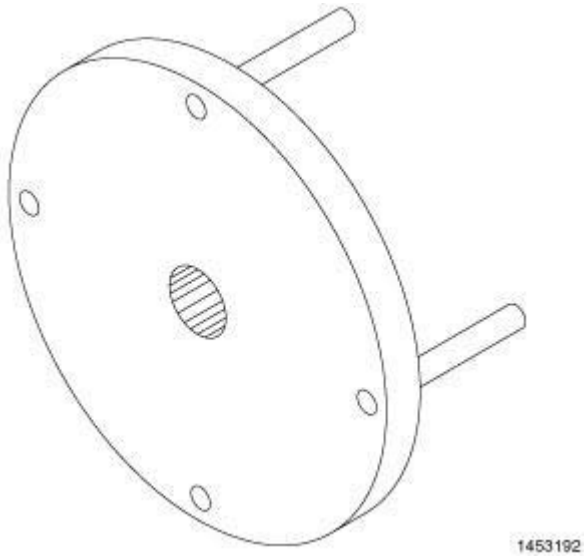


Fig. 189: CLUTCH REMOVAL TOOL 10164
Courtesy of CHRYSLER LLC

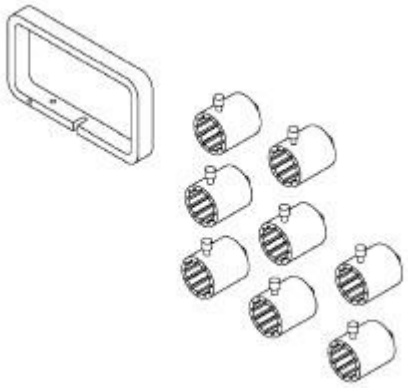


Fig. 190: FIXTURES, END PLAY - 8266A
Courtesy of CHRYSLER LLC

CLUTCH, DOUBLE

REMOVAL

REMOVAL

NOTE: **If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .**

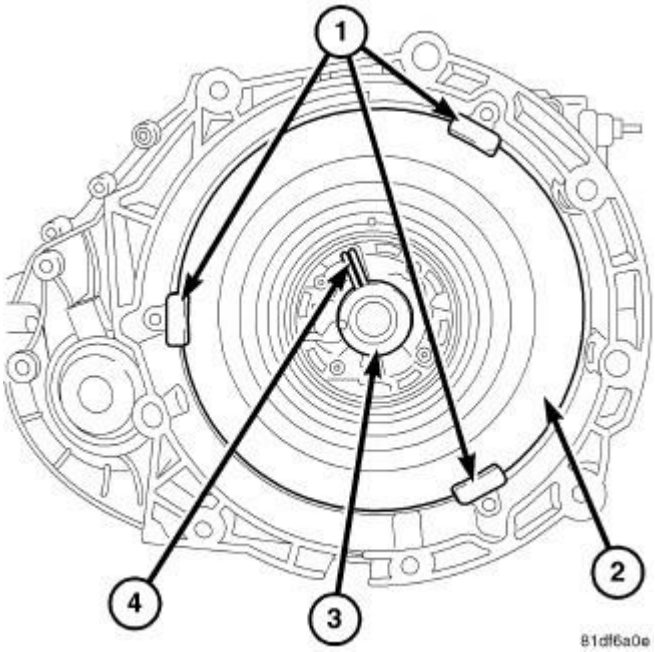


Fig. 191: RETAINING CLIPS
Courtesy of CHRYSLER LLC

1. Drain the transaxle.
2. Remove the transaxle. See **Removal** .
3. Remove and discard the three screws holding the retaining clips (1).

NOTE: Check shift fork positions and set to neutral (if not in "N" or unknown).

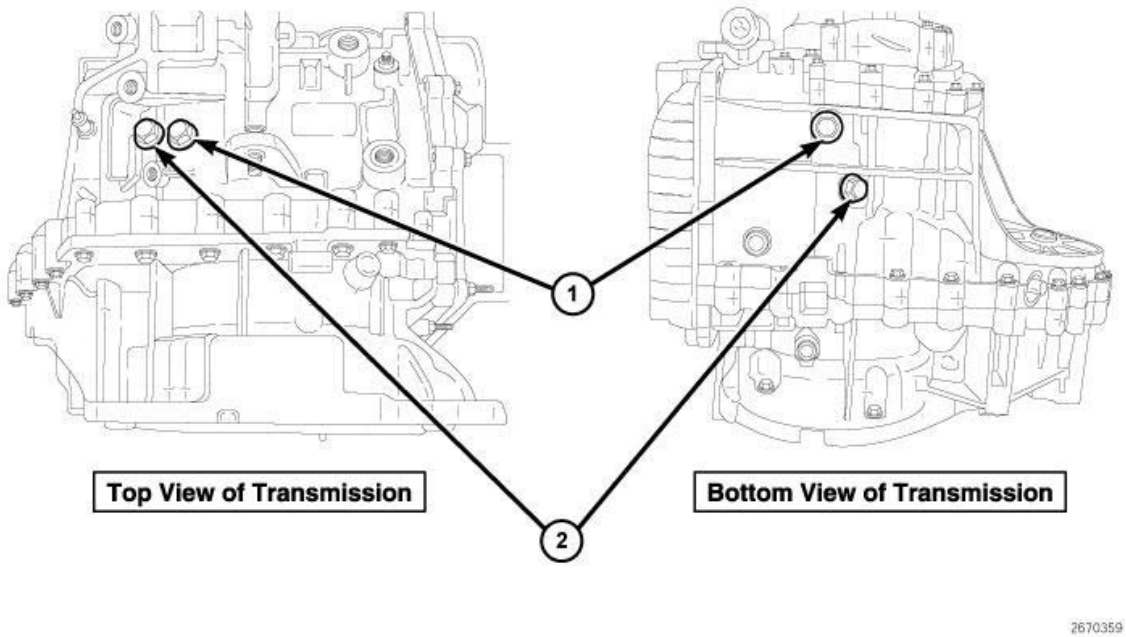


Fig. 192: PLUNGERS
Courtesy of CHRYSLER LLC

4. Unscrew the two plungers of either the odd (1) or even (2) gear path.

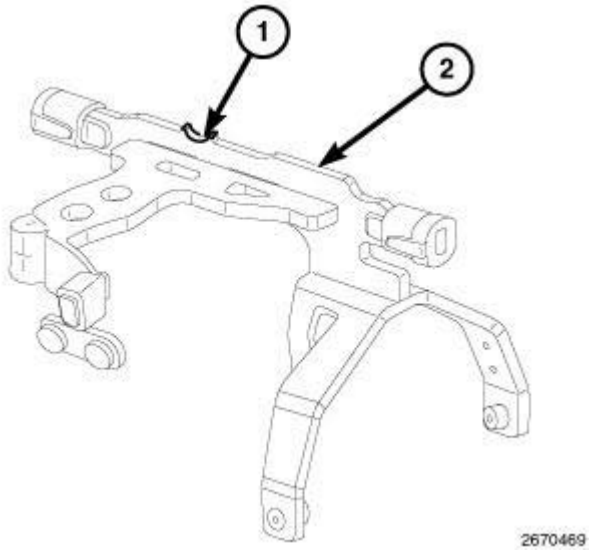


Fig. 193: DENTED NOTCHES UNDER CENTER OF BORE
Courtesy of CHRYSLER LLC

5. Check if the detent notches (1) are under the center of the bore. If not move the shift fork (2) with a screw driver to the center (neutral) position.

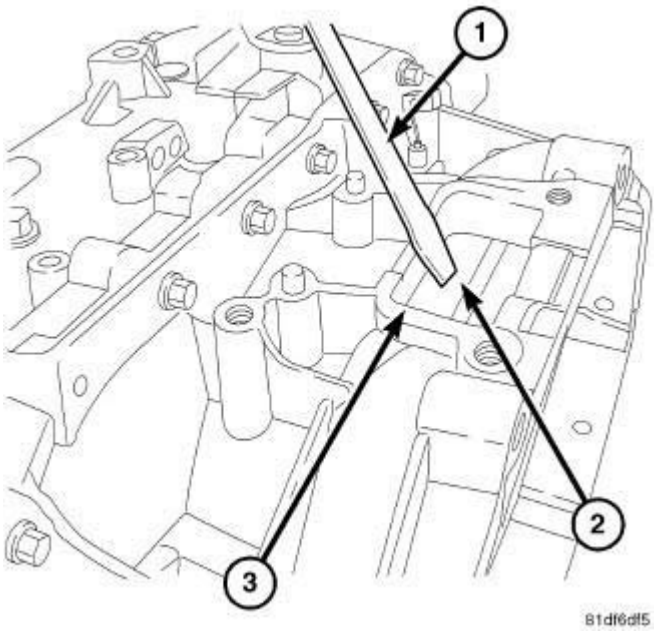


Fig. 194: FRONT COVER
Courtesy of CHRYSLER LLC

6. Using a screw driver (1) through the starter hole remove and discard the front cover (2).

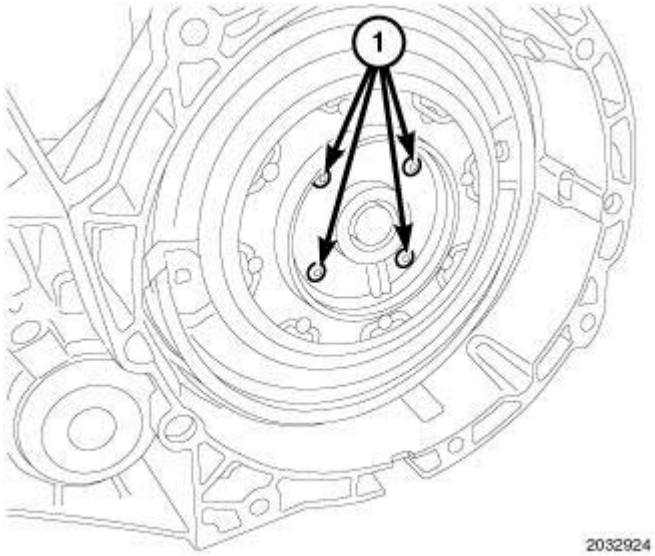


Fig. 195: CLUTCH HUB NUTS
Courtesy of CHRYSLER LLC

7. Remove and discard the four plugs (1) from the holes in the clutch hub.

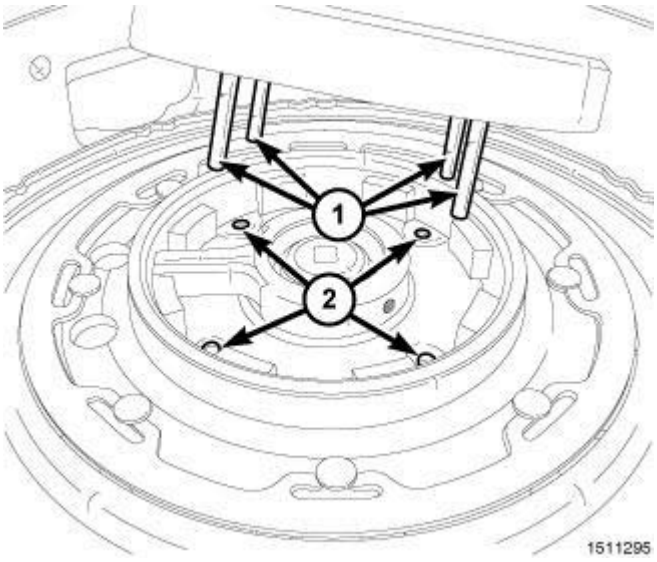


Fig. 196: ALIGNING LEGS OF CLUTCH TOOL 10164 WITH HOLES IN CLUTCH HUB
Courtesy of CHRYSLER LLC

8. Align the legs (1) of the Clutch Tool 10164 with the holes in the clutch hub (2).

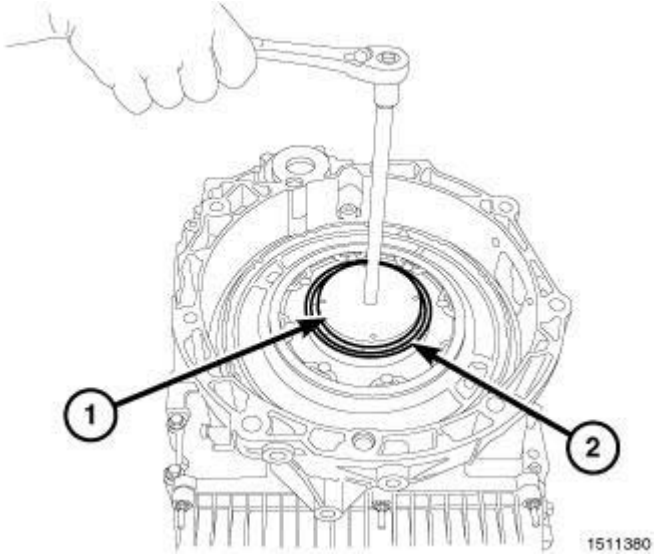


Fig. 197: CLUTCH TOOL 10164
Courtesy of CHRYSLER LLC

NOTE: It might be necessary to rotate the double clutch assembly so that the legs on the Clutch Tool 10164 (1) can be pressed completely down to engage the tabs on the clutch hub nut.

9. Verify the four legs of the Clutch Tool 10164 are completely engaged with the tabs on the clutch nut.
10. Use the 10164 Clutch Tool (1) turning counter clockwise to remove the clutch hub nut. If the clutch hub nut is seized due to a damaged or worn clutch, or otherwise cannot be removed with Clutch Tool 10164,

refer to **CLUTCH REMOVAL - LOCKED HUB NUT**.

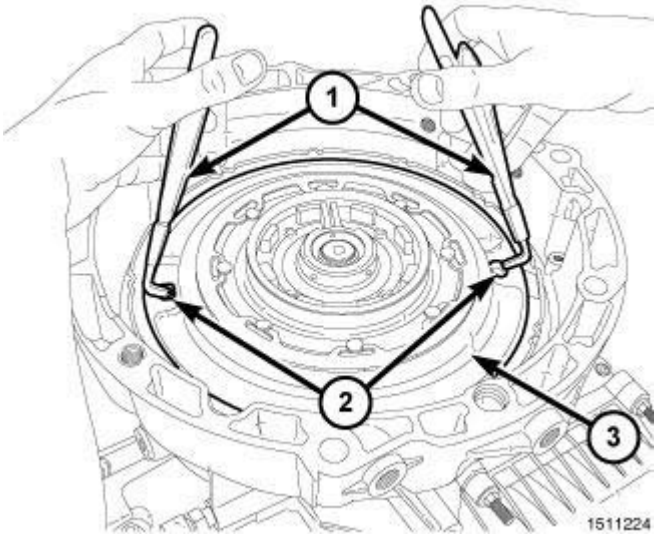


Fig. 198: ANGLING SNAP PLIERS IN THE OPENINGS OF THE DOUBLE CLUTCH ASSEMBLY
Courtesy of CHRYSLER LLC

NOTE: Angled snap pliers (1) or brake spring tools can be used in the openings (2) to remove the double clutch assembly (3).

11. Remove the double clutch assembly (3).

CLUTCH REMOVAL - LOCKED HUB NUT

NOTE: This procedure should only be used if the clutch hub nut is locked and cannot be removed with the Clutch Tool 10164.

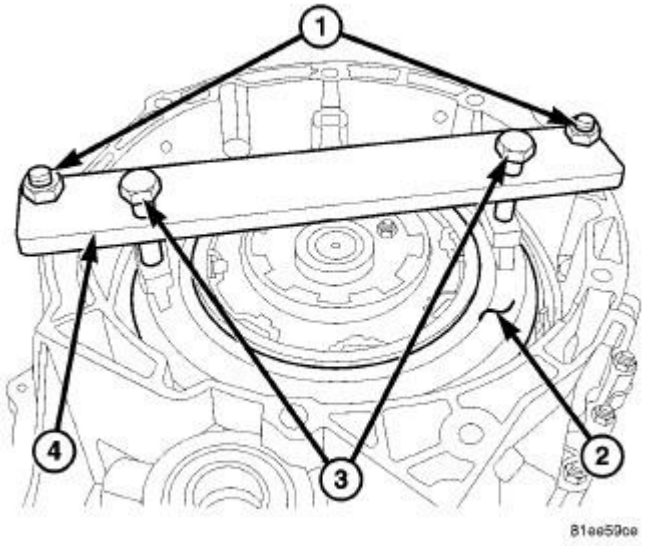


Fig. 199: COMPRESSOR 10129
Courtesy of CHRYSLER LLC

CAUTION: Compress the front clutch only enough to remove the snap ring. Exerting excessive force on the front clutch with the 10129 Compressor can damage the entire dual clutch assembly.

1. Install Compressor 10129 (4) over bellhousing (1) and front clutch (2).

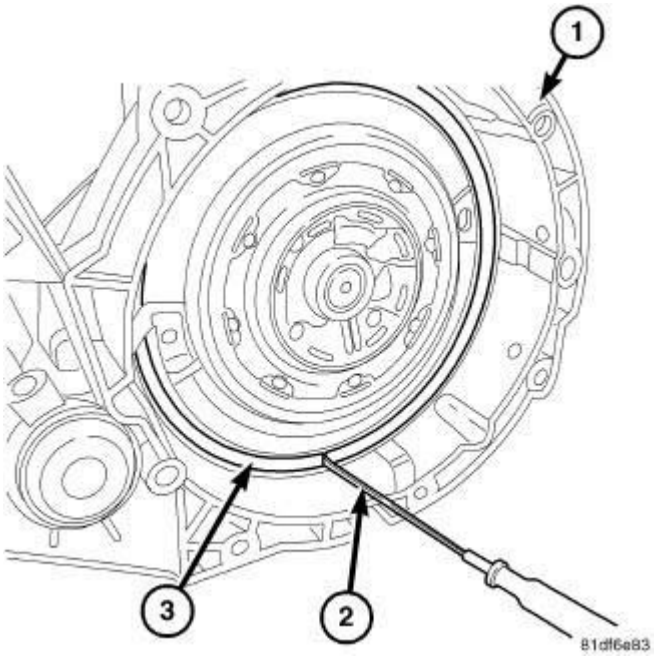


Fig. 200: SNAP RING AT CLUTCH
Courtesy of CHRYSLER LLC

2. Remove the snap ring (3) at the dual clutch.
3. Remove Compressor 10129.

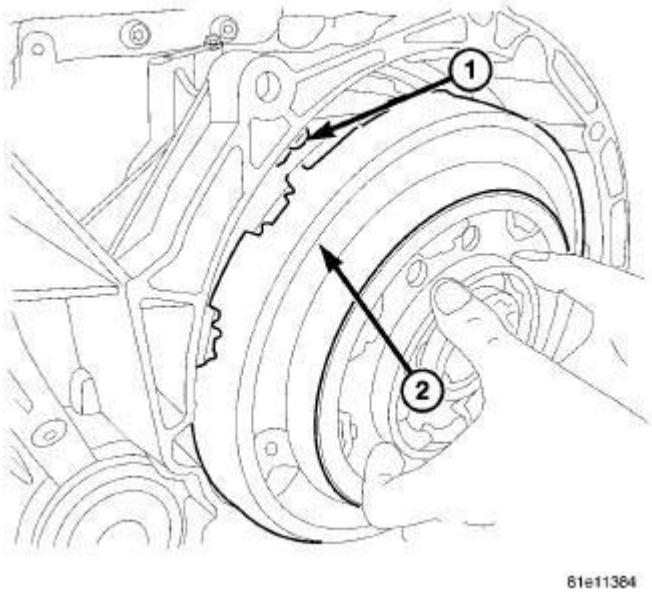


Fig. 201: CLUTCH OUTER COVER
Courtesy of CHRYSLER LLC

4. Remove the outer cover (2) of the dual clutch.

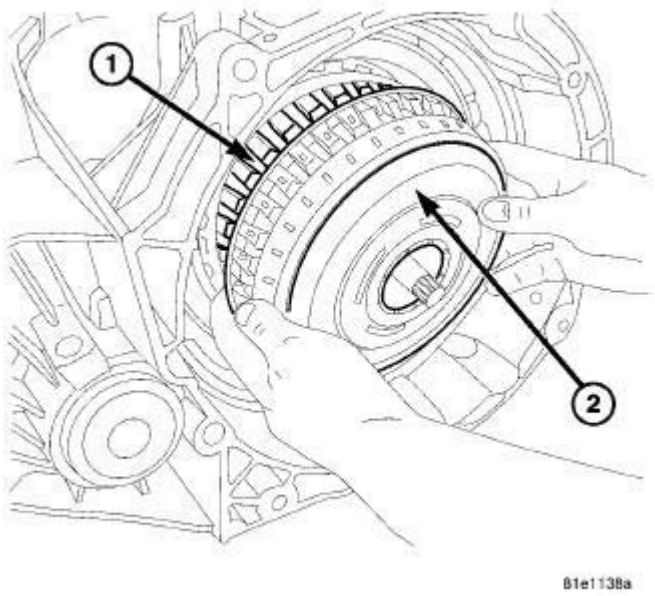


Fig. 202: OUTER CLUTCH HUB
Courtesy of CHRYSLER LLC

5. Remove the outer clutch hub (2).

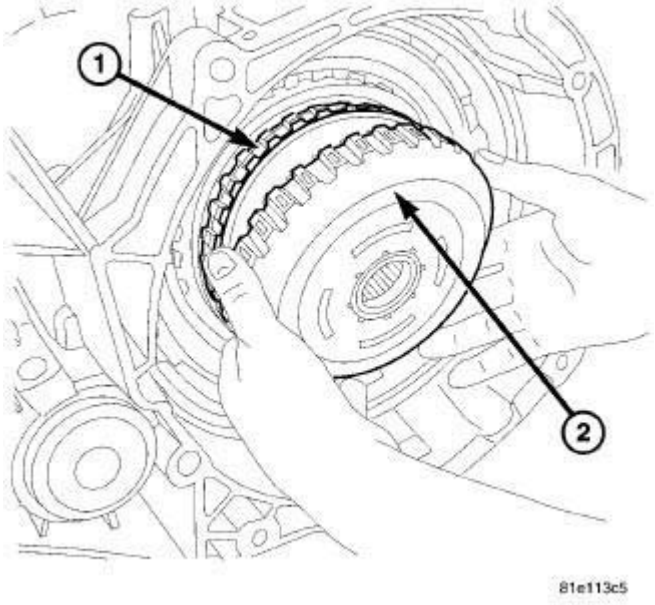


Fig. 203: INNER CLUTCH HUB
Courtesy of CHRYSLER LLC

6. Remove the inner clutch hub (2).

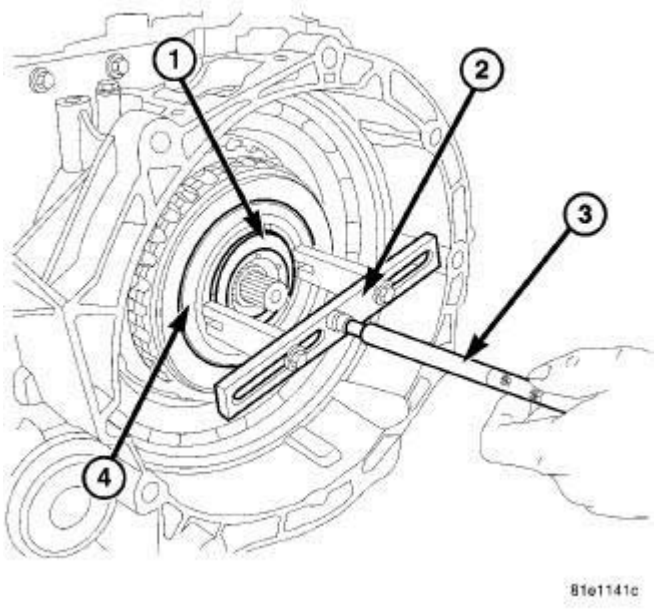


Fig. 204: RETAINING COLLAR
Courtesy of CHRYSLER LLC

7. Remove the retaining collar (1) using Spanner 6856 (2).

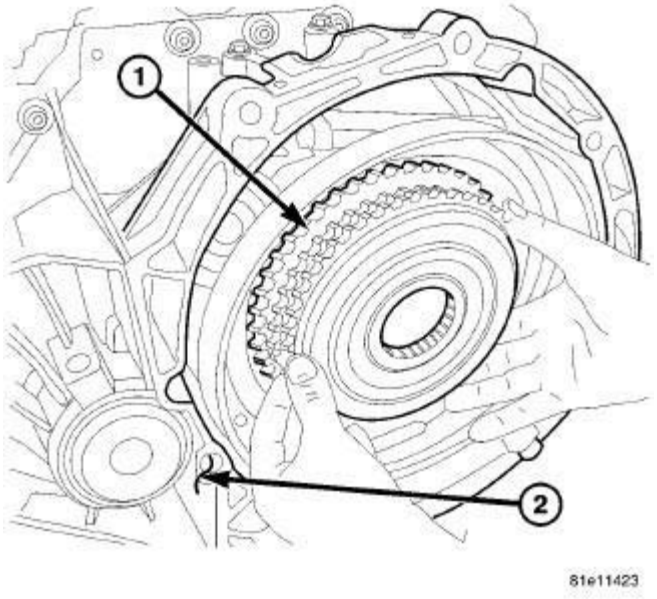


Fig. 205: INNER CLUTCH HOUSING
Courtesy of CHRYSLER LLC

8. Remove the inner clutch housing (1) and front needle bearing.

DISASSEMBLY

DISASSEMBLY

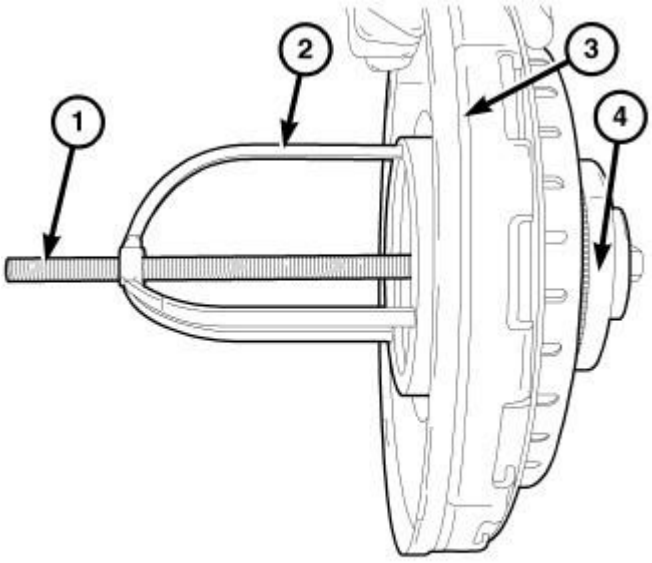


Fig. 206: COMPRESS CLUTCH
Courtesy of CHRYSLER LLC

1. Install Compressor 5059-A (2), Threaded Rod form kit 5058A (1) and Disc 6057 (4) onto the clutch (3).

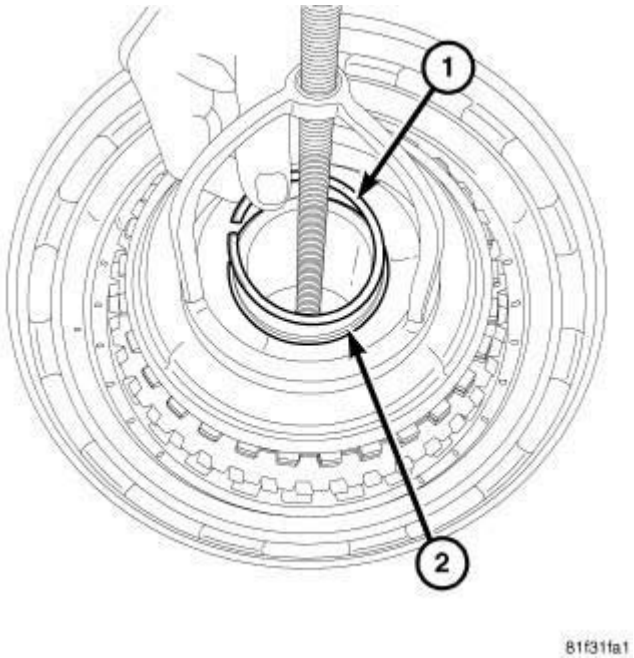


Fig. 207: Removing/Installing Snap Ring At Piston
Courtesy of CHRYSLER LLC

2. Compress clutch enough to remove the inner snap-ring at the piston (1) using snap-ring pliers.

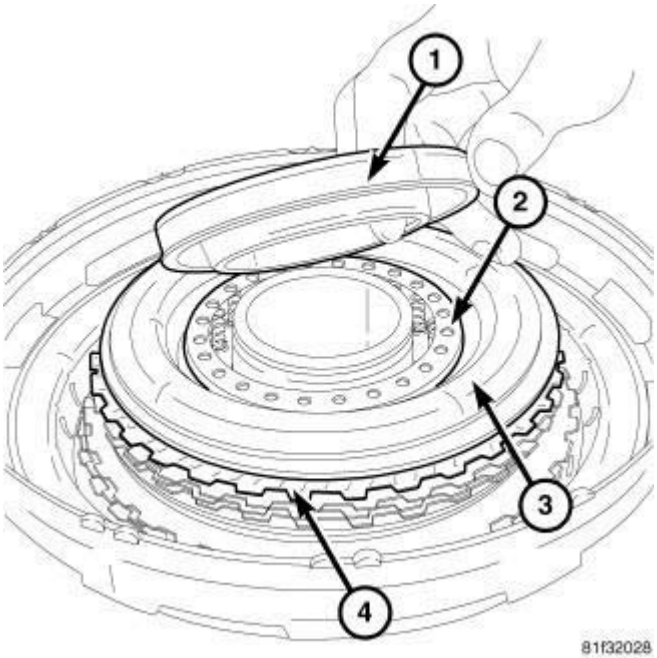


Fig. 208: INNER PISTON
Courtesy of CHRYSLER LLC

3. Remove the inner piston (1).

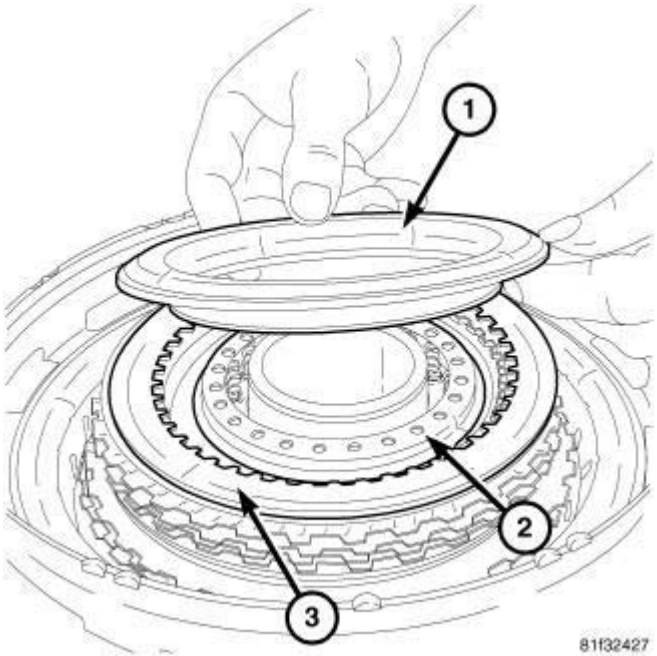


Fig. 209: Outer Piston
Courtesy of CHRYSLER LLC

4. Remove the outer piston (1).

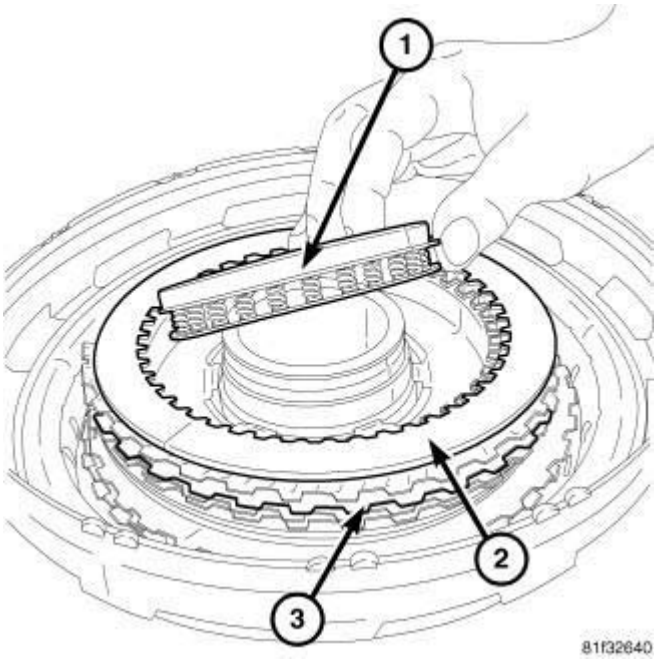


Fig. 210: SPRING PACK
Courtesy of CHRYSLER LLC

5. Remove the spring pack (1).

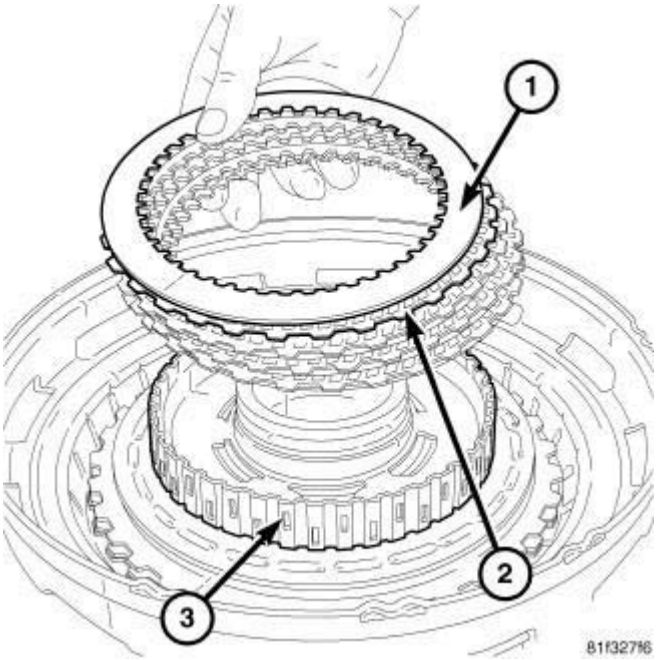


Fig. 211: SMALL CLUTCH PACK
Courtesy of CHRYSLER LLC

6. Remove the small clutch pack (1, 2) from the hub (3).

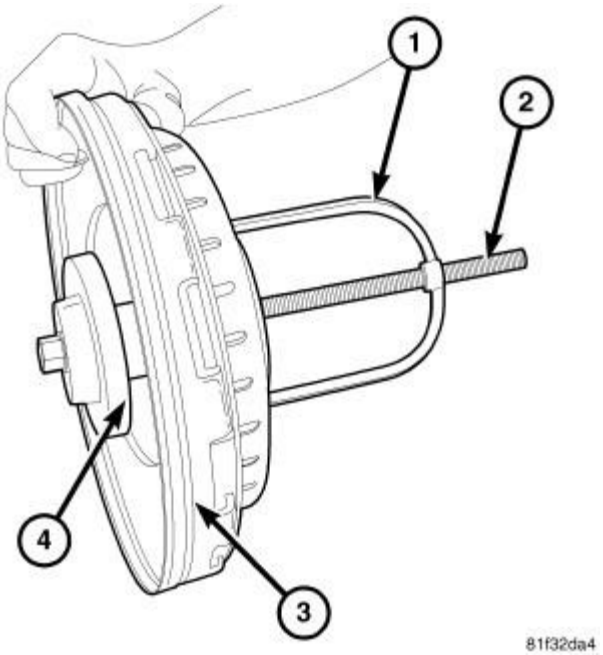


Fig. 212: COMPRESS LARGE PISTON
Courtesy of CHRYSLER LLC

7. Install Compressor 5059-A (1), Threaded Rod form kit 5058A (2) and Disc 6057 (4) onto the clutch (3).

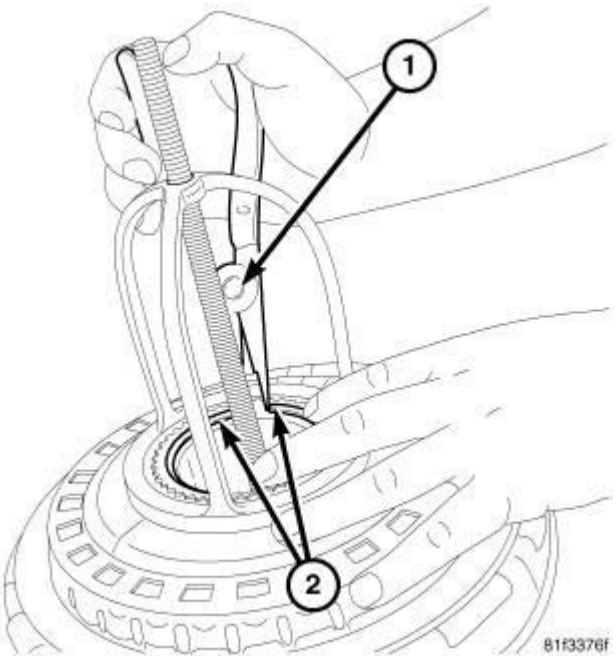


Fig. 213: Removing/Installing Snap Ring At Large Piston
Courtesy of CHRYSLER LLC

8. Using Snap-ring Pliers (1) remove snap-ring (2) at the large piston.
9. Remove the compressor.

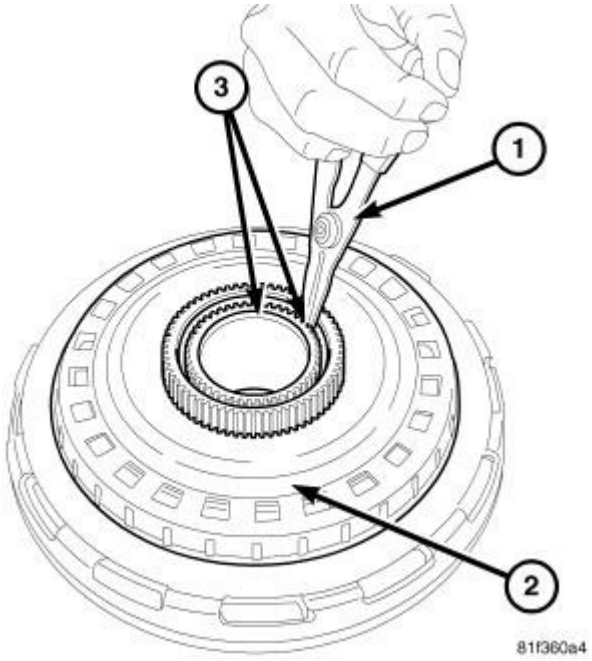


Fig. 214: SNAP RING AT HUB
Courtesy of CHRYSLER LLC

10. Remove the snap-ring (3) retaining the hub (2).

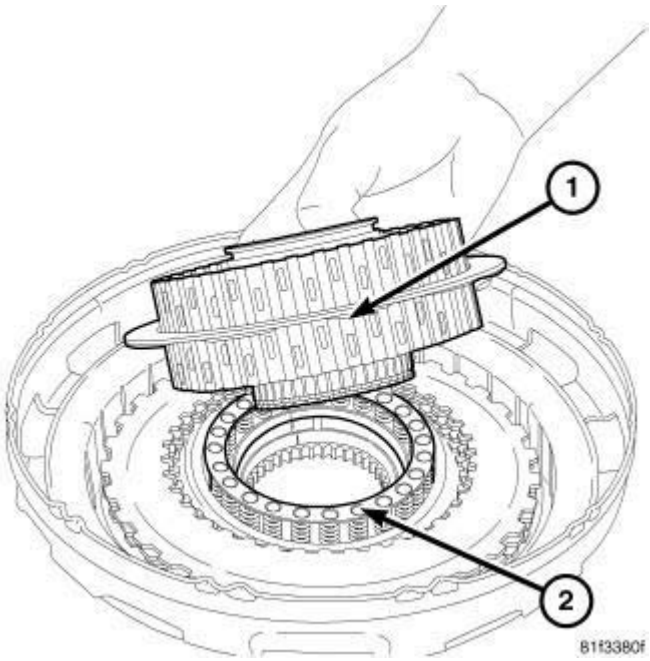


Fig. 215: HUB
Courtesy of CHRYSLER LLC

11. Remove the hub (1).

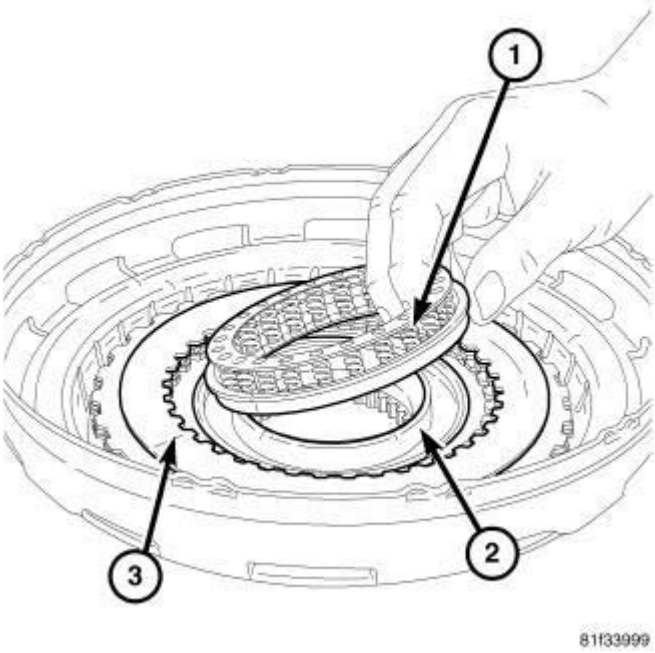


Fig. 216: INNER SPRING PACK
Courtesy of CHRYSLER LLC

12. Remove the inner spring pack (1).

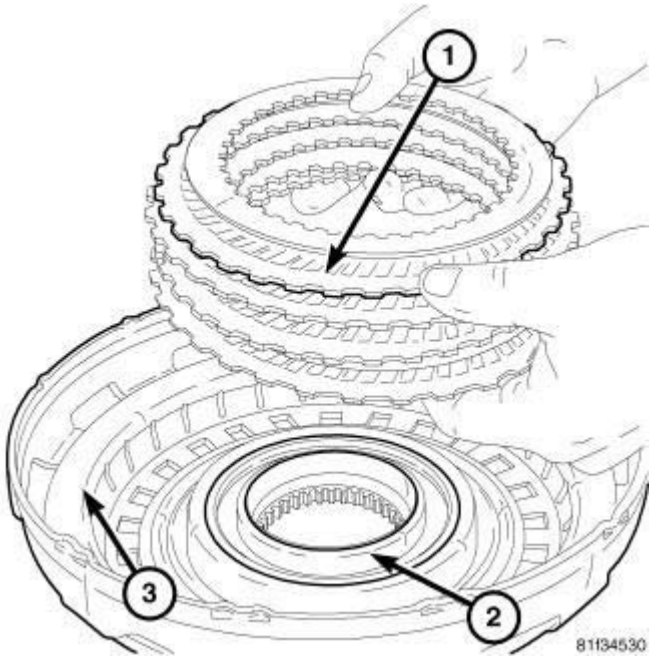


Fig. 217: LARGE CLUTCH PACK
Courtesy of CHRYSLER LLC

13. Remove the inner/large clutch pack (1).

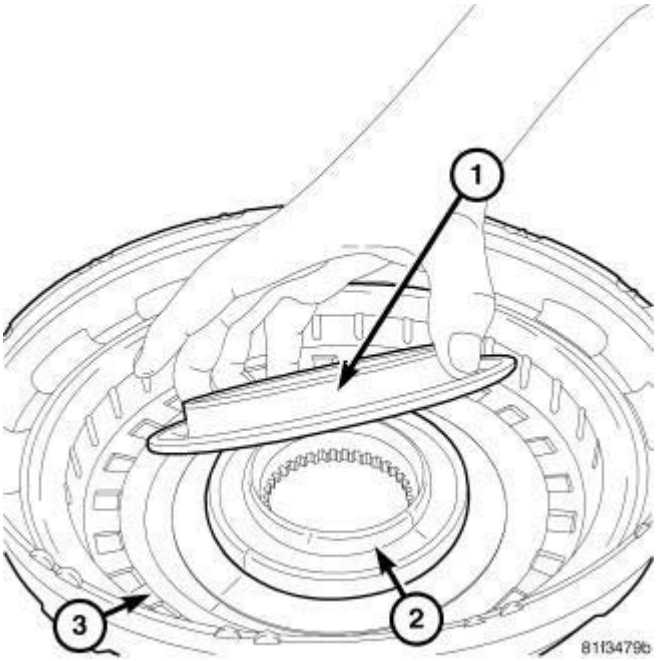


Fig. 218: LARGE OUTER PISTON
Courtesy of CHRYSLER LLC

14. Remove the large/outer piston (1).

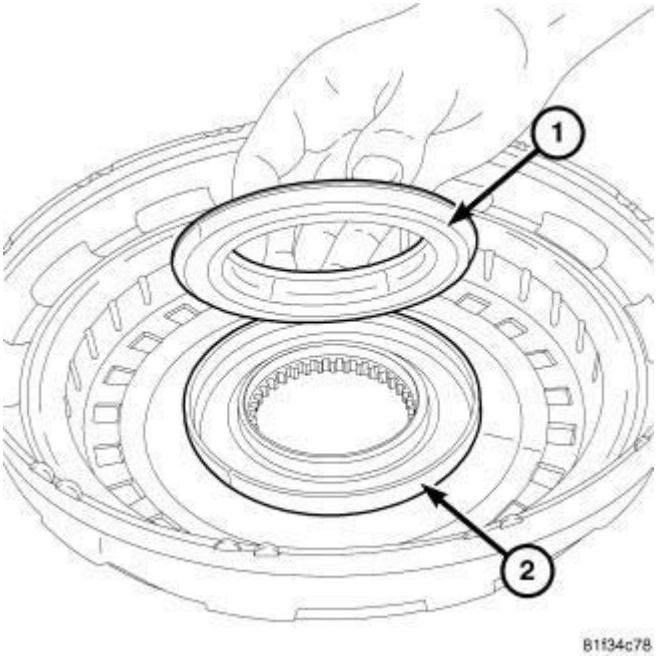


Fig. 219: SMALL INNER PISTON
Courtesy of CHRYSLER LLC

15. Remove the small inner piston (1).

INSPECTION

INSPECTION

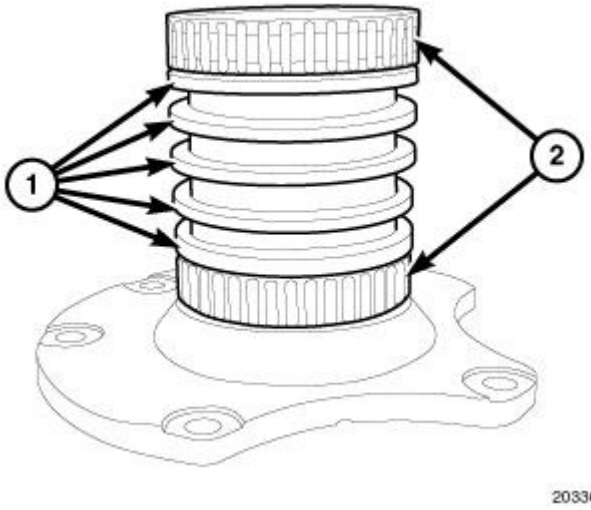


Fig. 220: SEALING RINGS AND NEEDLE BEARINGS
Courtesy of CHRYSLER LLC

1. Inspect the sealing rings (1) on the clutch support.

2. Verify the needle bearings (2) are not damaged pitted or marred and that they roll smoothly.
3. Replace any worn or damaged parts.

ASSEMBLY

ASSEMBLY

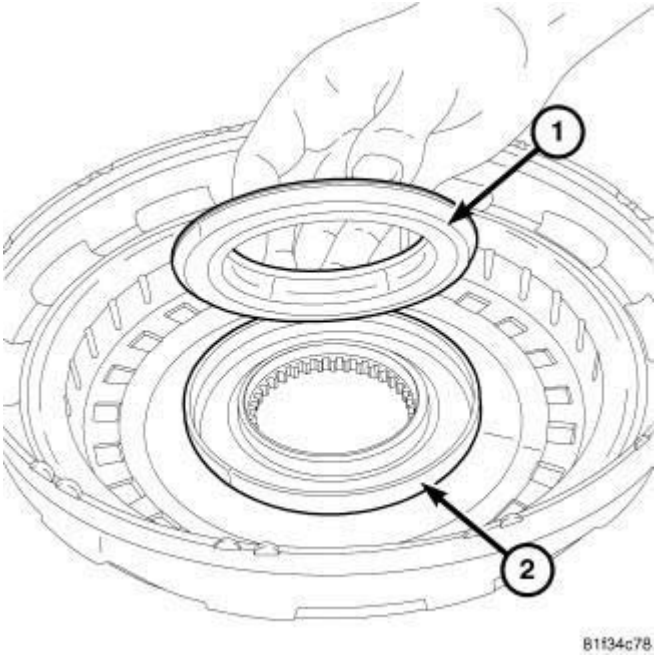


Fig. 221: SMALL INNER PISTON
Courtesy of CHRYSLER LLC

1. Install the small/inner piston (1) onto housing.

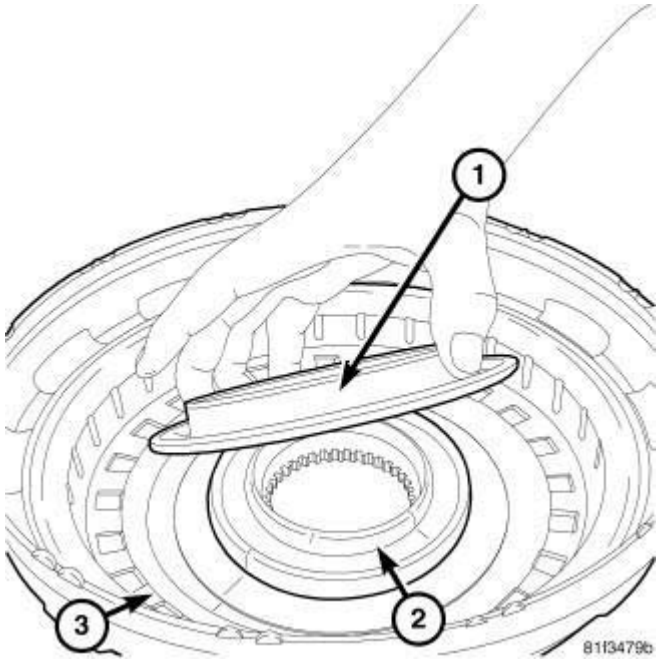


Fig. 222: LARGE OUTER PISTON
Courtesy of CHRYSLER LLC

2. Install the inner piston (1) onto housing.

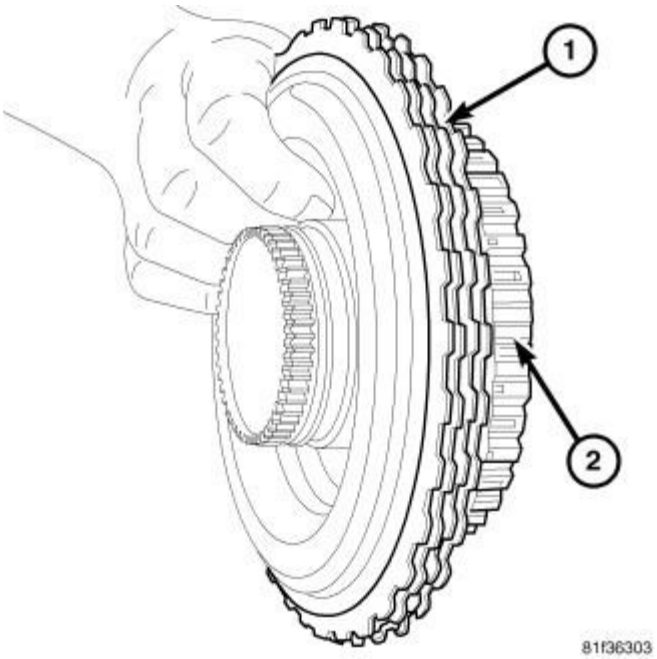


Fig. 223: CLUTCHES ON HUB
Courtesy of CHRYSLER LLC

3. Install the inner/large clutches (1) on the hub (2).

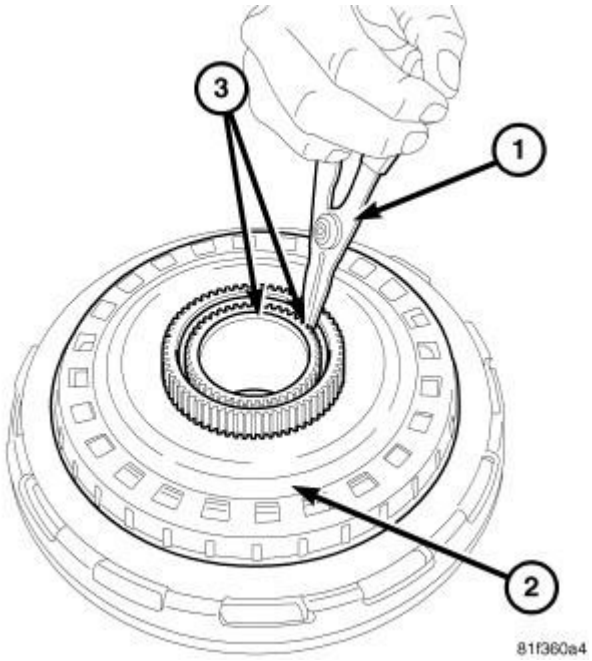


Fig. 224: SNAP RING AT HUB
Courtesy of CHRYSLER LLC

4. Install the hub (2) onto the housing and install the snap-ring (1).

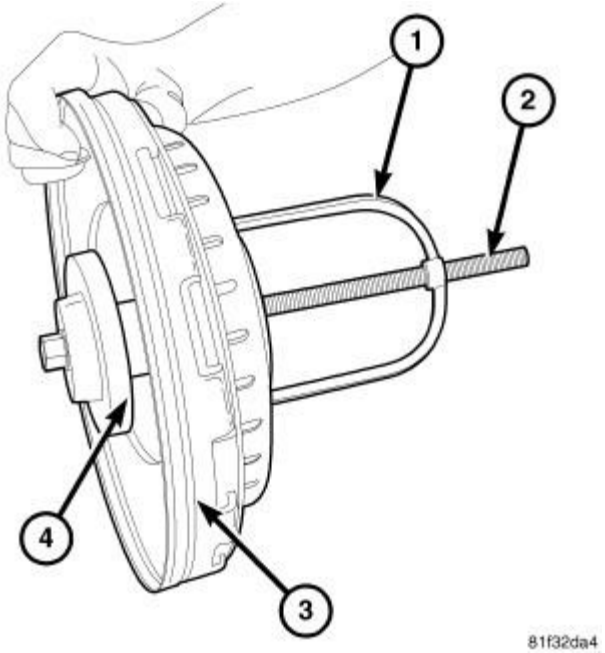


Fig. 225: COMPRESS LARGE PISTON
Courtesy of CHRYSLER LLC

5. Install Compressor 5059-A (1), Threaded Rod form kit 5058A (2) and Disc 6057 (4) onto the clutch (3).

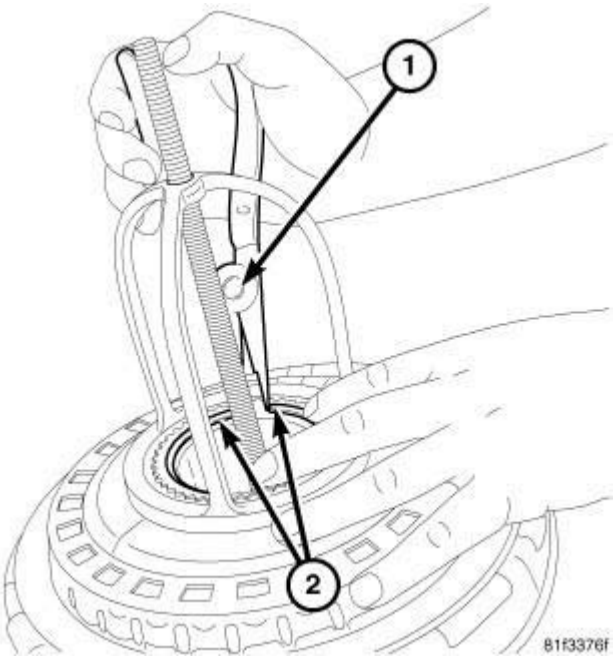


Fig. 226: Removing/Installing Snap Ring At Large Piston
Courtesy of CHRYSLER LLC

6. Using Snap-ring Pliers (1) install snap-ring (2) at the large piston.
7. Remove the compressor.

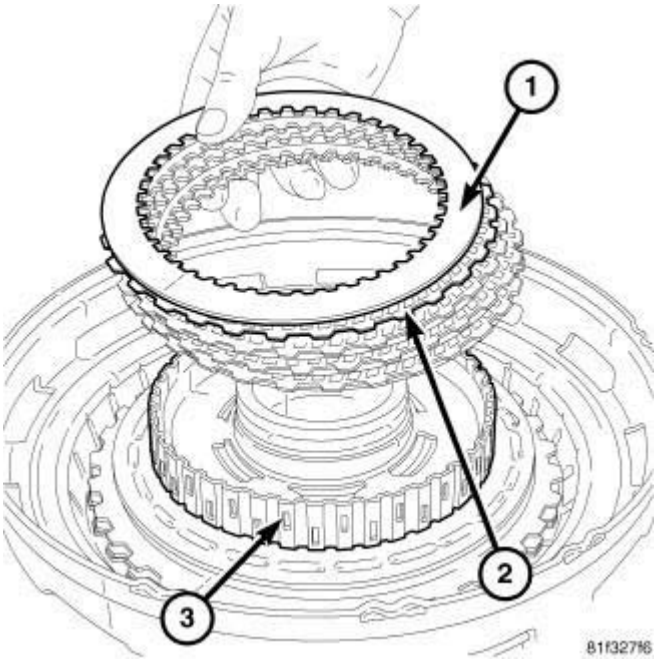


Fig. 227: SMALL CLUTCH PACK
Courtesy of CHRYSLER LLC

8. Install the small clutch pack (1, 2) onto the hub (3).

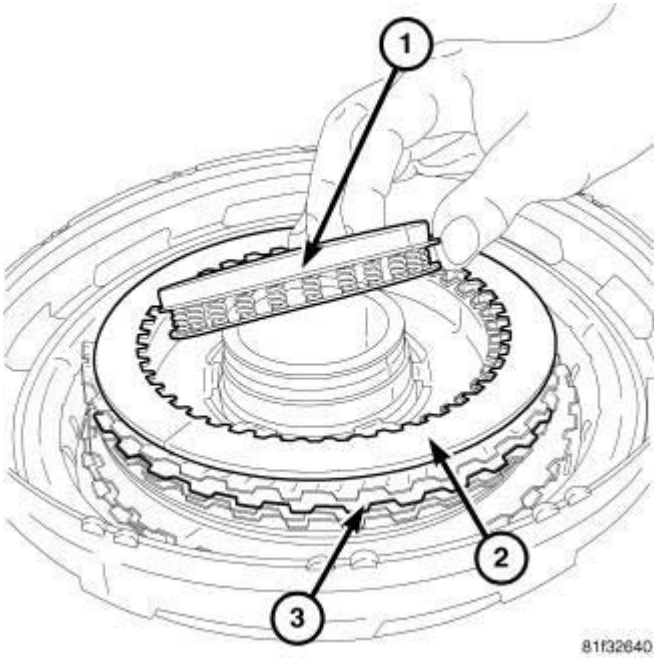


Fig. 228: SPRING PACK
Courtesy of CHRYSLER LLC

9. Install the spring pack (1).

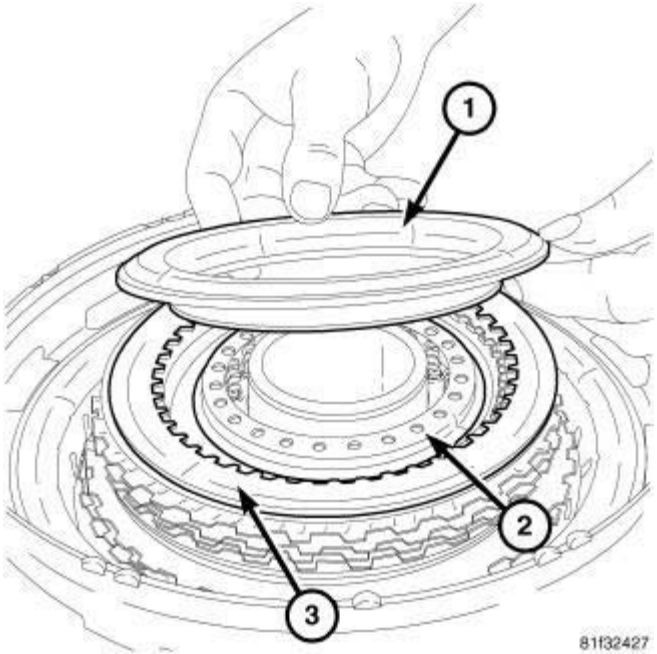


Fig. 229: OUTER PISTON
Courtesy of CHRYSLER LLC

10. Install the outer piston (1).

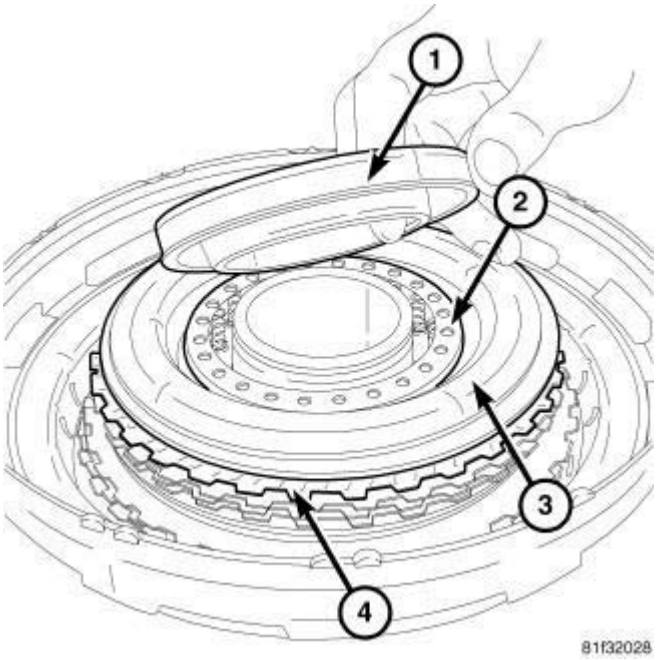


Fig. 230: INNER PISTON
Courtesy of CHRYSLER LLC

11. Install the inner piston (1).

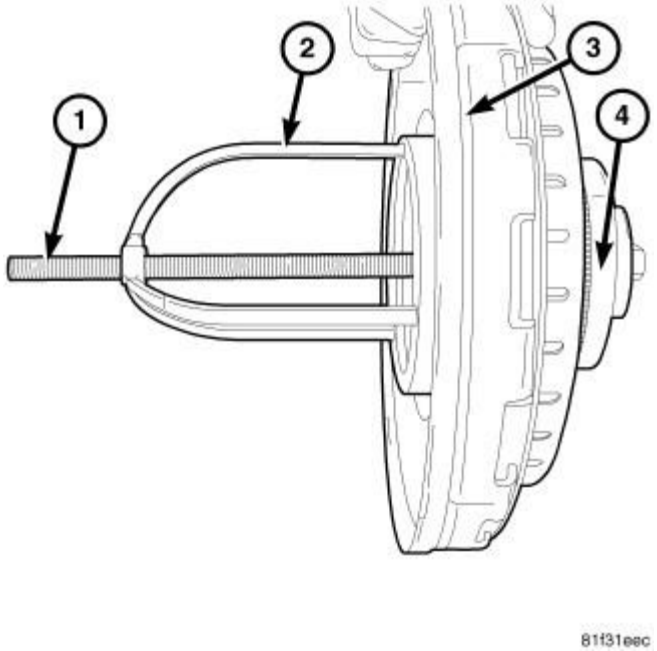


Fig. 231: COMPRESS CLUTCH
Courtesy of CHRYSLER LLC

12. Install Compressor 5059-A (2), Threaded Rod form kit 5058A (1) and Disc 6057 (4) onto the clutch (3).

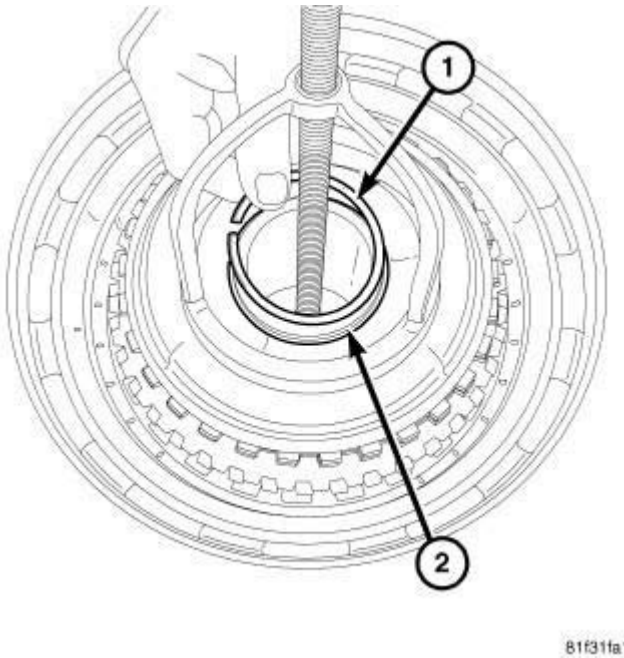


Fig. 232: Removing/Installing Snap Ring At Piston
Courtesy of CHRYSLER LLC

13. Compress clutch enough to install the inner snap-ring at the piston (1) using snap-ring pliers.
14. Install the snap ring and remove Compressor 5059-A from the clutch.

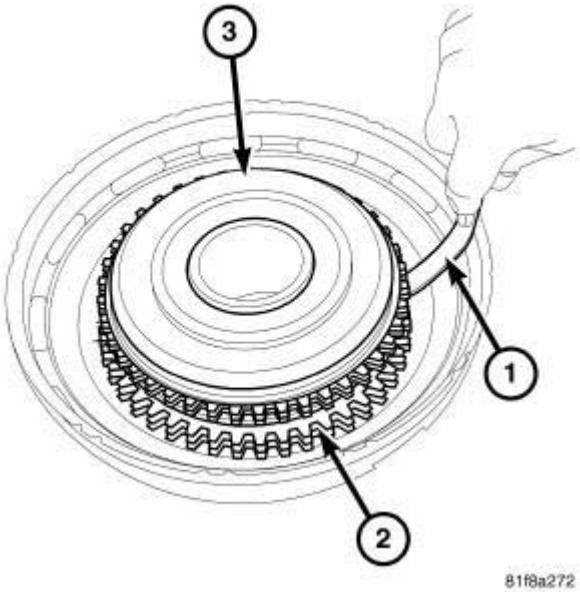


Fig. 233: Measuring Clearance Between Small Clutch & Large Clutch
Courtesy of CHRYSLER LLC

15. Use a feeler gage (1) to measure the clearance between the small clutch (3) and the large clutch (2). Make

a note of the measurement.

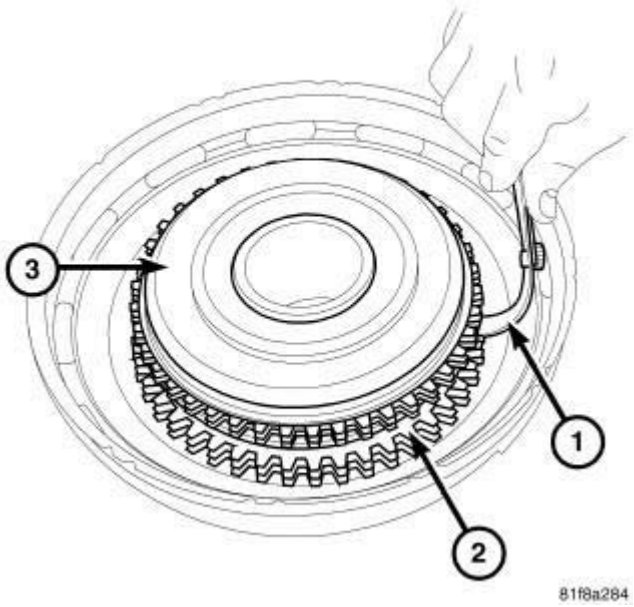


Fig. 234: Measuring Clearance Between Large Clutch & Clutch Housing
Courtesy of CHRYSLER LLC

16. Use a feeler gage (1) to measure the clearance between the large clutch (2) and the clutch housing. The total measurement of the clearance between the small clutch and the large clutch, and the clearance between the large clutch and the clutch housing should be 2.1 mm +/- 0.3 mm (.08 in +/-.01 in).

INSTALLATION

INSTALLATION

NOTE: If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

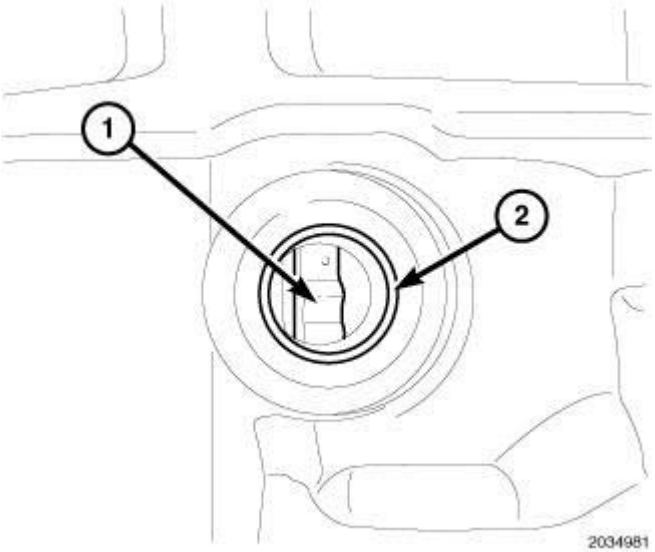


Fig. 235: NOTCH CENTERED IN DENTED HOLE
Courtesy of CHRYSLER LLC

1. Remove all four detents and verify the transaxle is in neutral. The notch (1) in each shift fork must be centered in the detent hole (2).

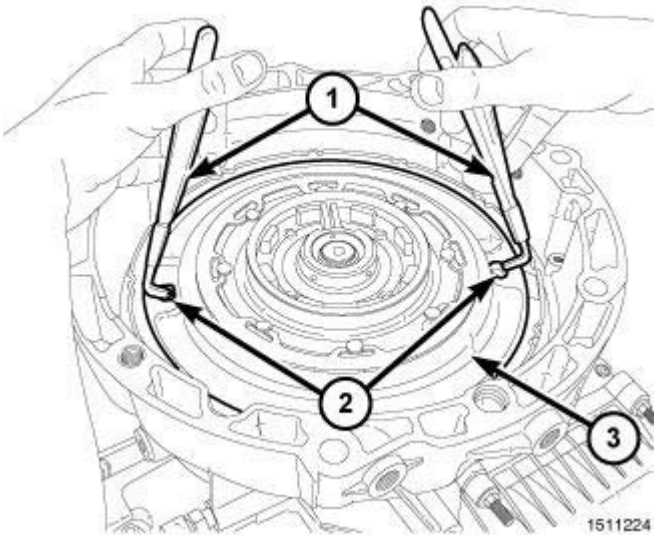


Fig. 236: ANGLING SNAP PLIERS IN THE OPENINGS OF THE DOUBLE CLUTCH ASSEMBLY
Courtesy of CHRYSLER LLC

NOTE: Angled snap pliers (1) or brake spring tools can be used in the openings (2) to position the double clutch assembly (3) during installation.

2. Install the double clutch assembly (3).

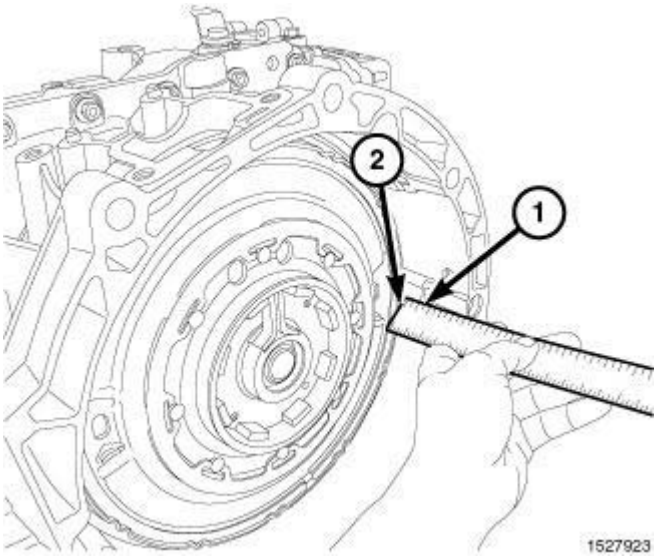


Fig. 237: Verifying Clutch Assembly Is Fully Seated
Courtesy of CHRYSLER LLC

3. Verify the clutch assembly is fully seated. The installed depth of the double clutch assembly between the edge of the assembly (2) and the notch in the clutch housing should be approximately 14 mm (0.55 in.).

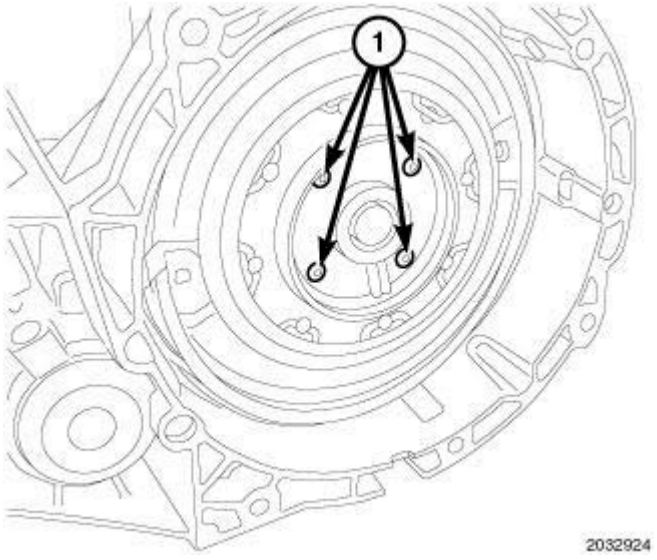


Fig. 238: CLUTCH HUB NUTS
Courtesy of CHRYSLER LLC

NOTE: The transaxle must be positioned as it would be when installed in the vehicle prior to installation of the clutch hub nut.

4. Position the transaxle so that it is on its side or as it would be positioned when installed in the vehicle.

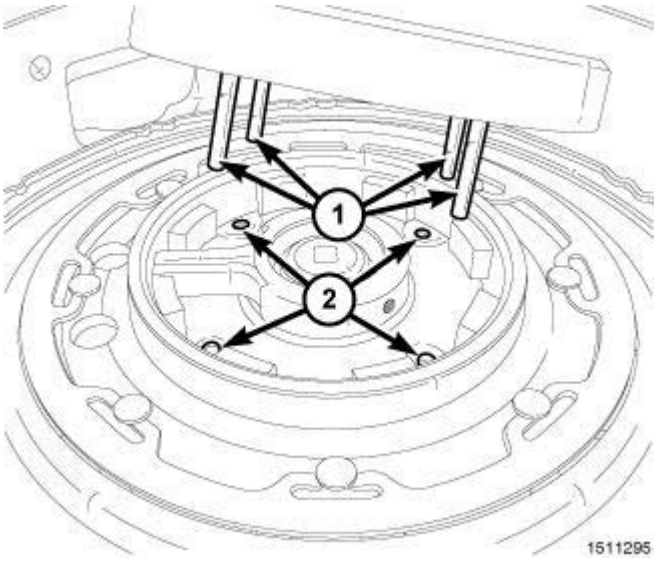


Fig. 239: ALIGNING LEGS OF CLUTCH TOOL 10164 WITH HOLES IN CLUTCH HUB
Courtesy of CHRYSLER LLC

5. Align the legs (1) of the Clutch Tool 10164 with the holes in the clutch hub (2).

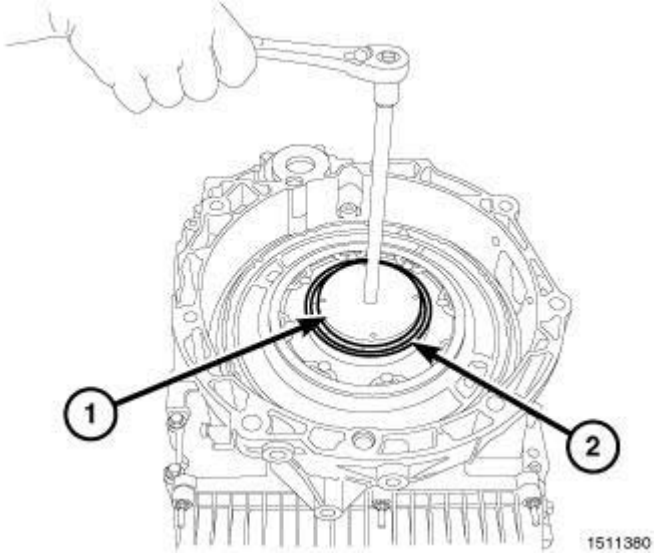


Fig. 240: CLUTCH TOOL 10164
Courtesy of CHRYSLER LLC

NOTE: It might be necessary to rotate the double clutch assembly so that the prongs on the 10164 Clutch Tool (1) can be pressed completely down to engage the tabs on the clutch hub nut.

6. Verify the Clutch Tool 10164 (1) is completely engaged with the tabs on the clutch hub nut.

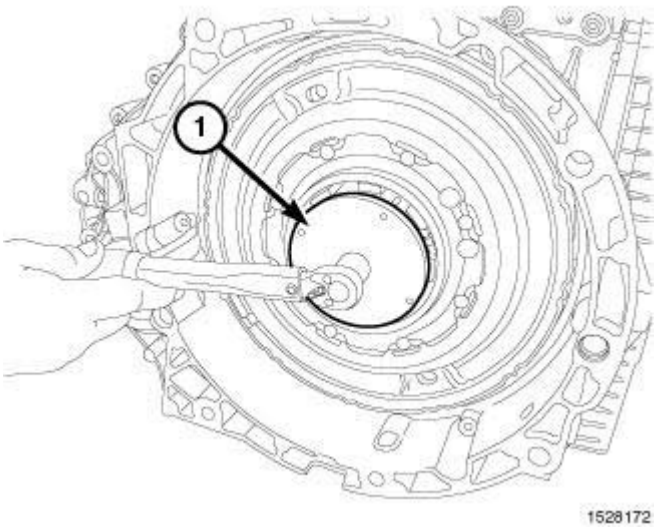


Fig. 241: Turning Clutch Tool Clockwise To Tighten Clutch Hub/Washer
Courtesy of CHRYSLER LLC

7. Use the Clutch Tool 10164 (1) turning clockwise to tighten the clutch hub nut/washer 7 Nm (62 in. lbs.).

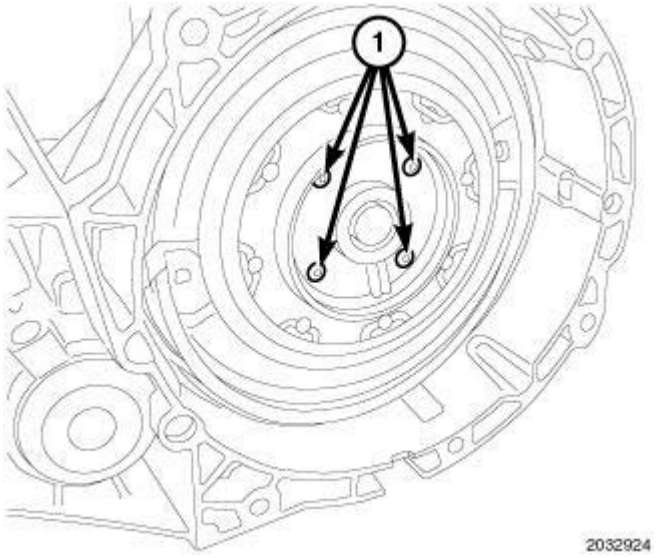


Fig. 242: CLUTCH HUB NUTS
Courtesy of CHRYSLER LLC

8. Apply high temp silicone grease to the new four plugs (1) for the holes in the clutch hub and install the plugs.
9. Apply high temp silicone grease to the splines the clutch hub.

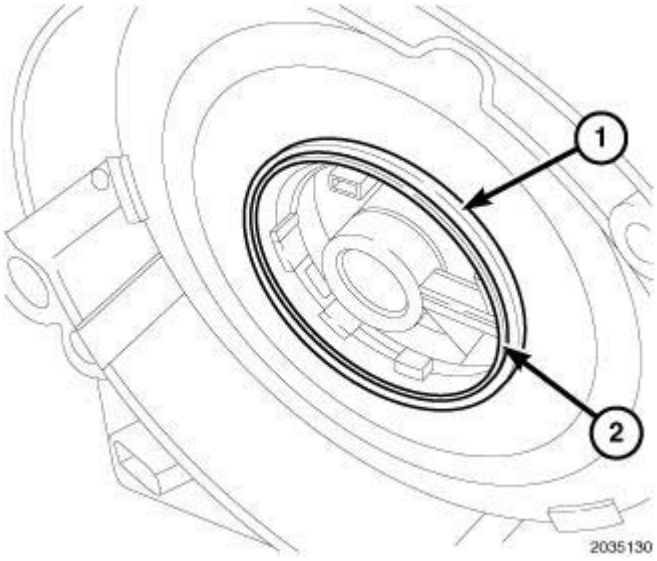


Fig. 243: CLUTCH HUB AND SEAL
Courtesy of CHRYSLER LLC

NOTE: Do not reuse the original front cover.

NOTE: Apply BOT 41 transmission oil to the seals on the new front cover.

NOTE: Do not roll the clutch hub seal (1).

10. Install a new front cover. Verify the clutch hub seal (1) in the front cover is not rolled over the clutch hub (2). If necessary, use a plastic trim tool to carefully walk the clutch hub seal around the clutch hub.

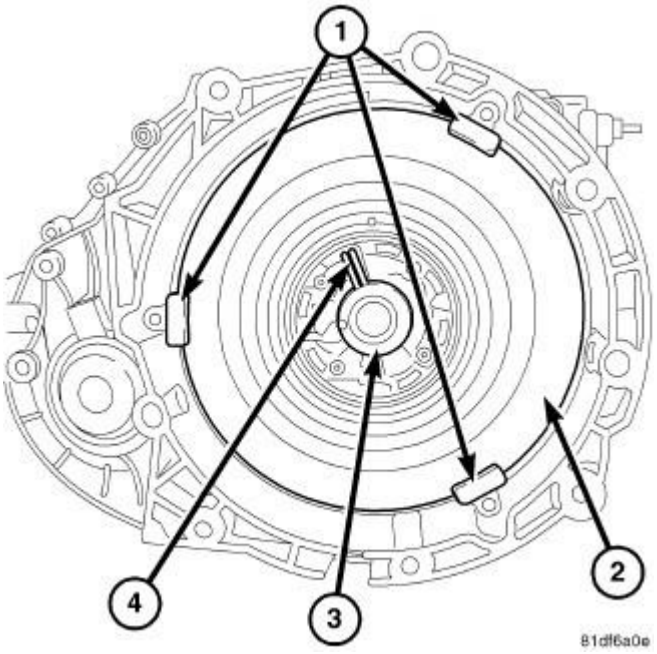


Fig. 244: RETAINING CLIPS
Courtesy of CHRYSLER LLC

NOTE: Do not reuse the original fasteners.

11. Install the retaining clips (1) that secure the new front cover (2) and tighten the new fasteners to 10 N.m (88 in. lbs.).
12. Install the transaxle. See **Installation** .

DIFFERENTIAL, TRANSAXLE

DISASSEMBLY

DISASSEMBLY

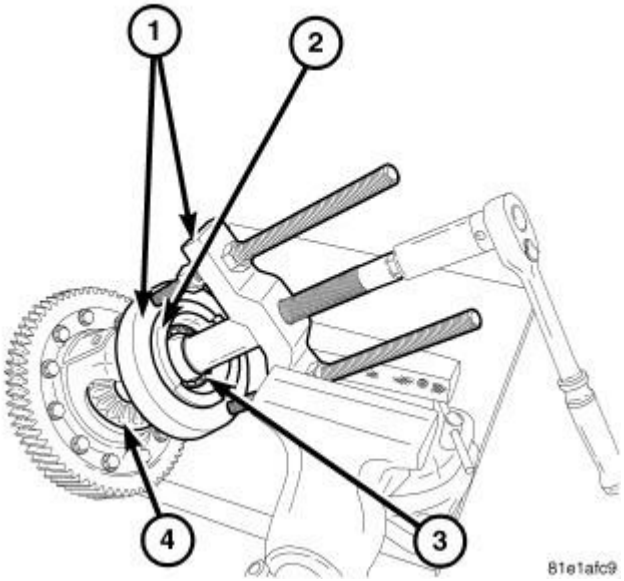


Fig. 245: REMOVE PINION SIDE BEARING
Courtesy of CHRYSLER LLC

1. Using Bearing Remover C-293-PA (1), Plug SP-3289 (3) and Collets 8353-1 (2) remove the pinion side differential bearing.

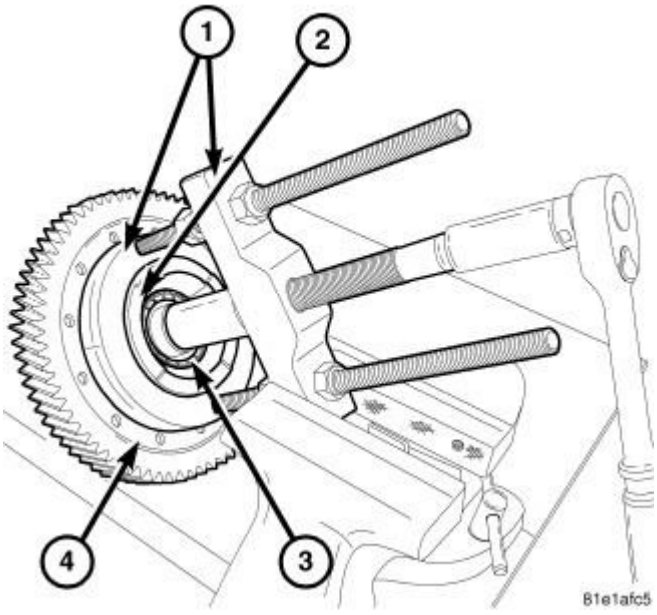


Fig. 246: REMOVE RING GEAR SIDE BEARING
Courtesy of CHRYSLER LLC

2. Using Bearing Remover C-293-PA (1), Plug SP-3289 (3) and Collets 8353-1 (2) remove the ring gear side differential bearing.
3. Remove the ring gear bolts.
4. Remove the ring gear.

ASSEMBLY

ASSEMBLY

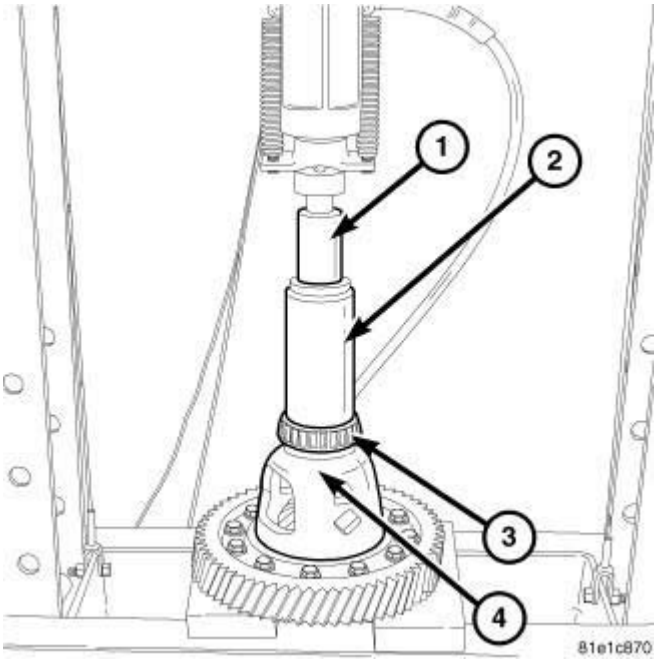


Fig. 247: Install Differential Bearing
Courtesy of CHRYSLER LLC

1. Install a **new** pinion side differential bearing using a Press (1) and Installer 8445-1 (2).
2. Install a **new** ring gear side differential bearing using a Press (1) and Installer 8445-1 (2).
3. Install the ring gear.
4. Install **new** ring gear bolts (1) and tighten to 83 N.m (61 ft. lbs.).

FLUID

STANDARD PROCEDURE

FLUID LEVEL AND CONDITION CHECK

FLUID LEVEL CHECK

WARNING: There is a risk of accident from vehicle starting off by itself when engine is running. There is a risk of injury from contusions and burns if you insert your hands into the engine when it is started or when it is running. Secure vehicle to prevent it from moving off by itself. Wear properly fastened and close-fitting work clothes. Do not touch hot or rotating parts.

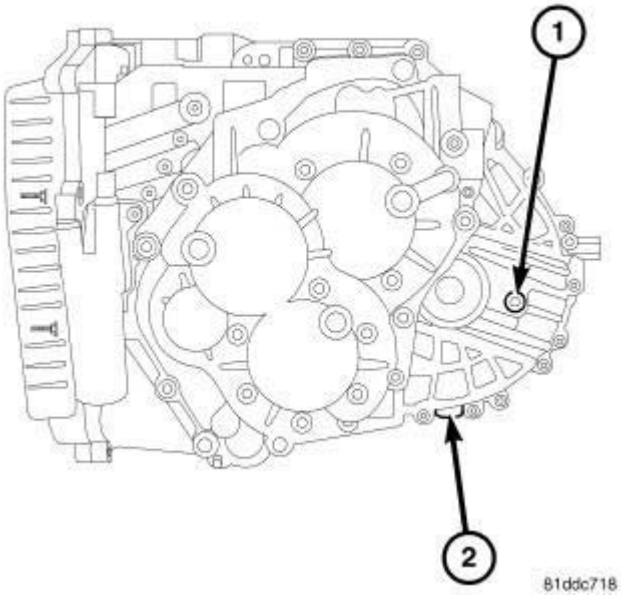


Fig. 248: DRAIN AND FILL PLUGS
Courtesy of CHRYSLER LLC

1. With the vehicle in neutral, position the vehicle on a hoist.
2. If equipped, remove the engine belly pan.
3. Start the vehicle and allow the engine to reach normal operating temperature. If the engine and transmission are cold, this may take up to 15 minutes.
4. Apply the brake and slowly cycle the gear shift through all ranges.
5. Shut off the engine, raise the vehicle and remove the transaxle fluid level check plug (1).
6. Verify the oil level is at the bottom of the transaxle check hole.
7. If the oil level is below the bottom of the fluid level check plug hole, add fluid. Refer to **Transmission and Transfer Case/Manual/FLUID - Standard Procedure** .

FLUID CONDITION CHECK

Along with fluid level, it is important to check the condition of the fluid. If the fluid is contaminated with metal or friction material particles, or has been burnt due to abuse or a mechanical problem, a complete transaxle recondition is probably required. If there is any question about the condition of the transmission fluid, drain out a sample to inspect for contamination. **Odor and color alone cannot be used to indicate the fluid condition or the need for a fluid change.**

DRAINING AND FILLING

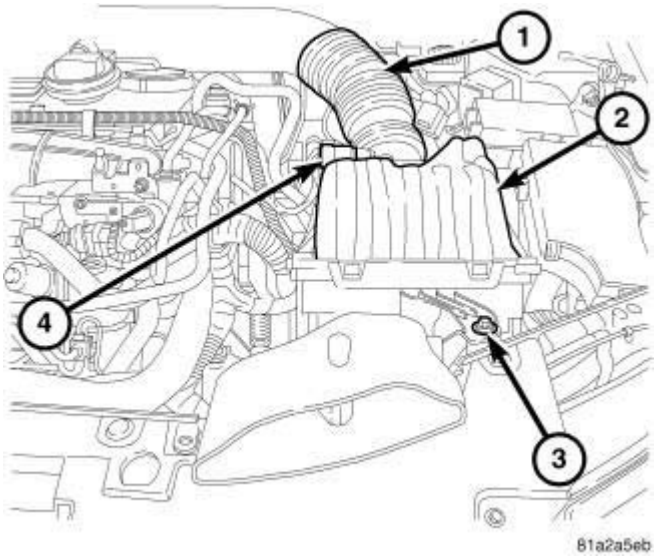


Fig. 249: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

1. Remove the hold down screw (3) from the air cleaner housing (2).
2. Pull air cleaner housing straight up and set aside to gain access to the transmission oil filling bore.
3. With the vehicle in neutral, hoist and support the vehicle.
4. If equipped, remove the engine belly pan.

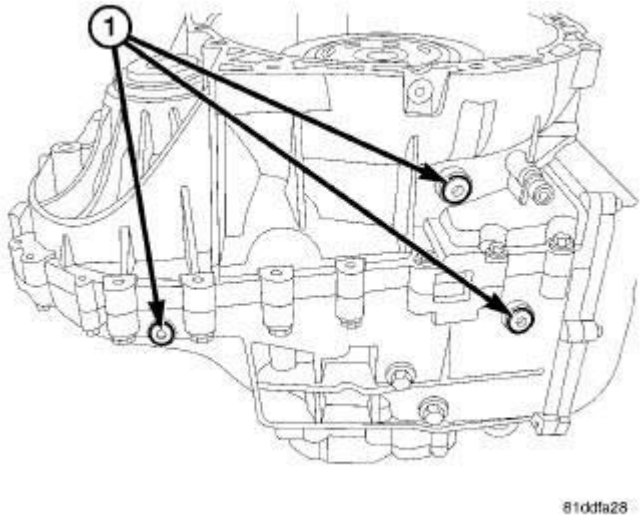


Fig. 250: DRAIN PLUGS
Courtesy of CHRYSLER LLC

5. The transaxle drain plugs (1) are located on the bottom of the transaxle differential housing. Remove all three drain plugs and allow the fluid to completely drain out of the transmission.
6. Install the drain plugs (1). Tighten drain plugs to 35 N.m (25 ft. lbs.).

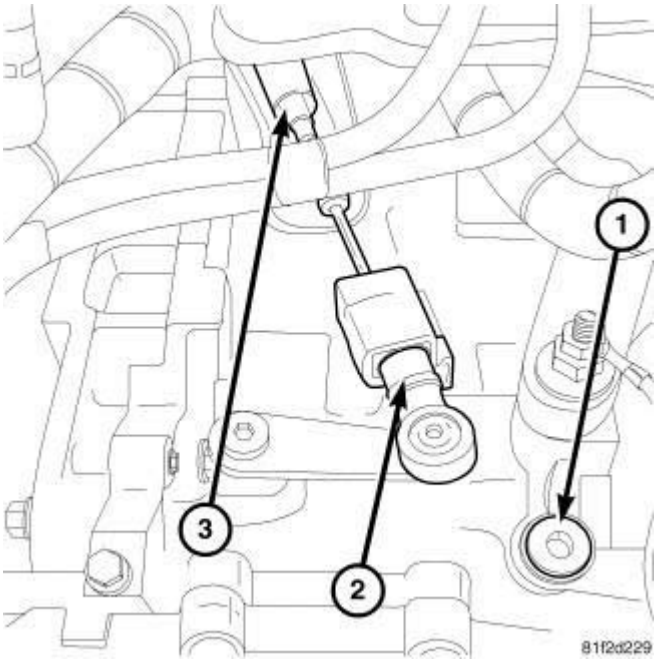


Fig. 251: FILL PLUG
Courtesy of CHRYSLER LLC

7. Lower the vehicle.
8. Remove the transaxle fill plug (1) located on the top of the transaxle.

NOTE: Use only BOT 341 fluid which is a full synthetic SAE 75W transmission fluid.

9. Add approximately 5.5 Liters of BOT 341 fluid and temporarily install the transaxle fill plug.
10. Start the vehicle and allow the engine to reach normal operating temperature. If the engine and transmission are cold, this may take up to 15 minutes.
11. Apply the brake, and slowly cycle the gear shift through all ranges.

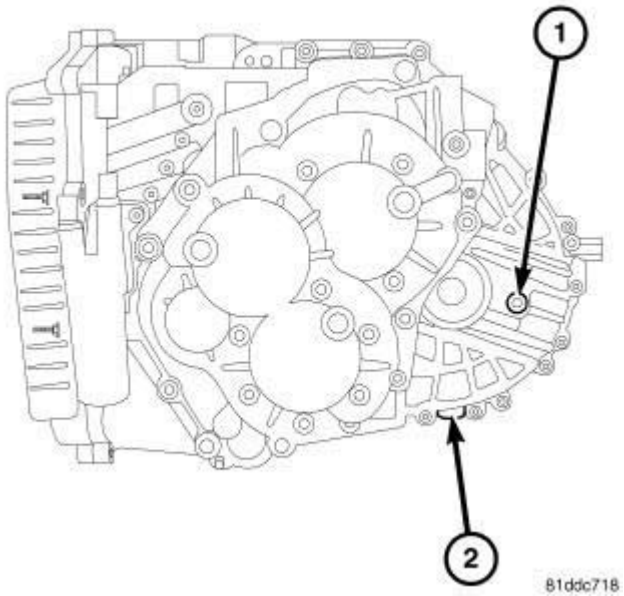


Fig. 252: DRAIN AND FILL PLUGS
Courtesy of CHRYSLER LLC

12. Shut off the engine, raise and support the vehicle and remove the transaxle fluid level check plug (1).
13. The fluid level should be at the top of the transaxle check hole (1) approximately 5.5 Liters. The vehicle must be level and the engine and transaxle must be warm when checking the level of the fluid. If the external transmission oil filter has been replaced, then an additional 0.1 Liter of BOT 341 fluid may be required. If the transaxle cooler and lines are empty, approximately 0.52 Liters of fluid may be required
14. When the fluid is at the correct level transmission oil will start to drain out through the oil level check bore (1), install the transaxle fluid level check plug. Tighten the check plug (1) to 35 N.m (25 ft. lbs.).
15. If equipped, install the engine belly pan.

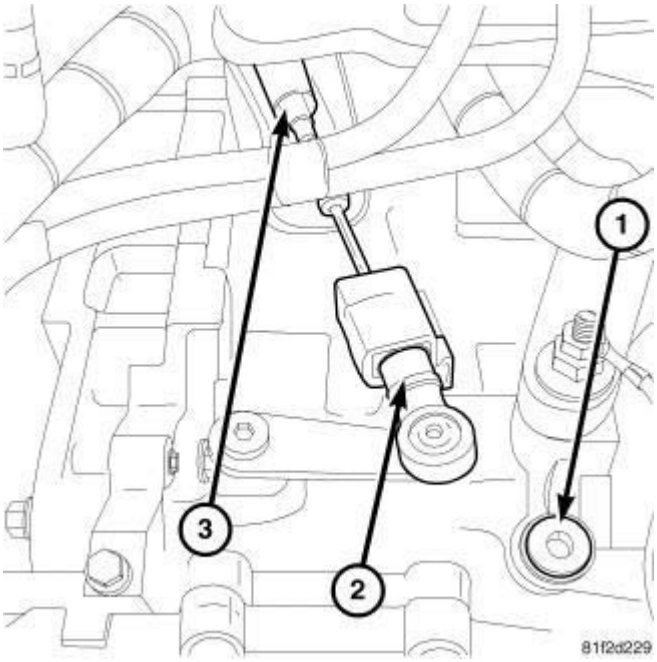


Fig. 253: FILL PLUG
Courtesy of CHRYSLER LLC

16. Lower the vehicle.
17. Install the transaxle fill plug (1) on the top of the transaxle. Tighten fill plug (1) to 35 N.m (25 ft. lbs.).

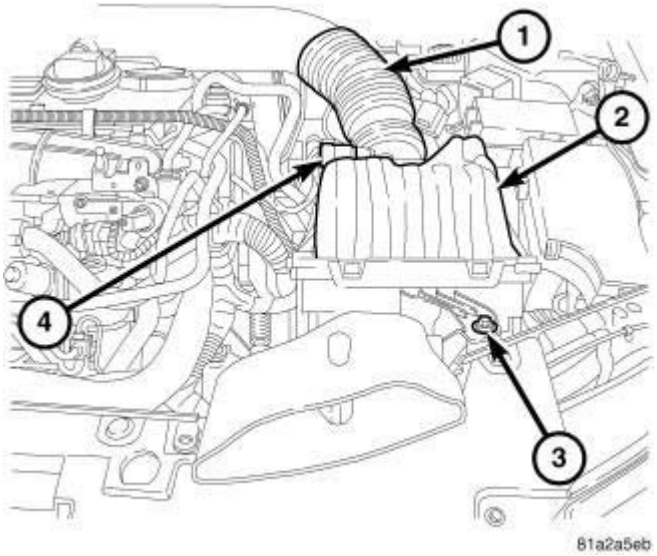


Fig. 254: AIR CLEANER HOUSING
Courtesy of CHRYSLER LLC

18. Lower air cleaner housing assembly into engine compartment and align studs at bottom of housing with bracket. Push housing assembly (2) down until fully seated in bracket.
19. Install hold down screw (3) and tighten.

INPUT SHAFT, TRANSMISSION

DISASSEMBLY

DISASSEMBLY

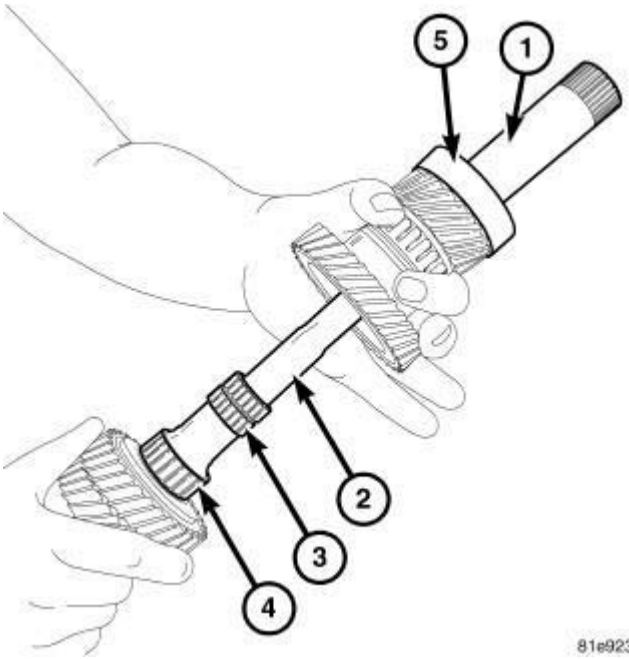


Fig. 255: Removing/Installing Input Shaft 2/4/6 At Input Shaft 1/3/5R
Courtesy of CHRYSLER LLC

1. Separate the 2/4/6 shaft (1) from the 1/3/5/R shaft (2).

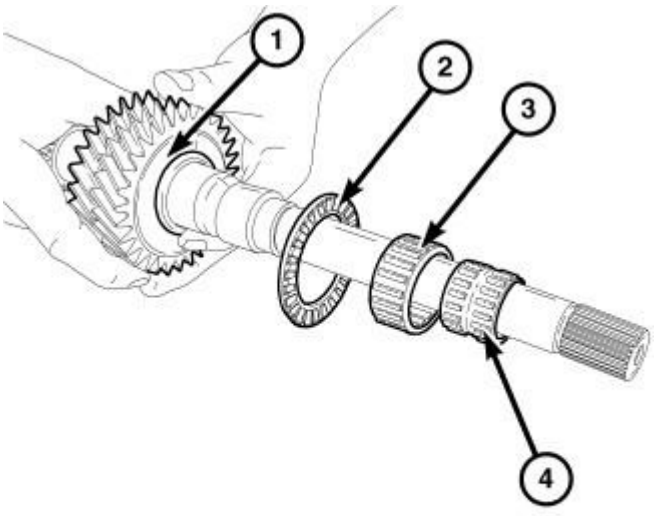


Fig. 256: Removing/Installing Bearings At 1/3/5 Input Shaft
Courtesy of CHRYSLER LLC

2. Remove the bearings (2, 3 and 4) from the 1/3/5/R shaft (1).

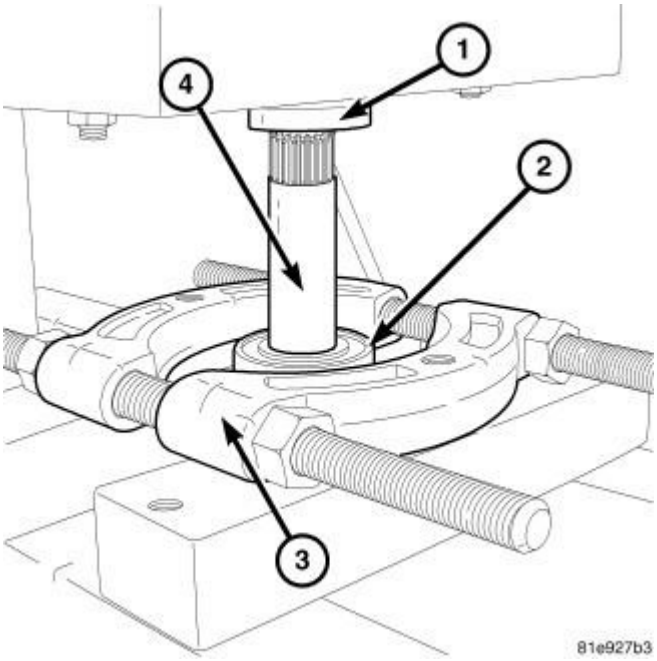


Fig. 257: Removing Bearing From 2/4/6 Input Shaft
Courtesy of CHRYSLER LLC

3. Using a Press (1) and the 1130 Bearing Splitter (3) remove the bearing (2) from the input shaft (4).

ASSEMBLY

ASSEMBLY

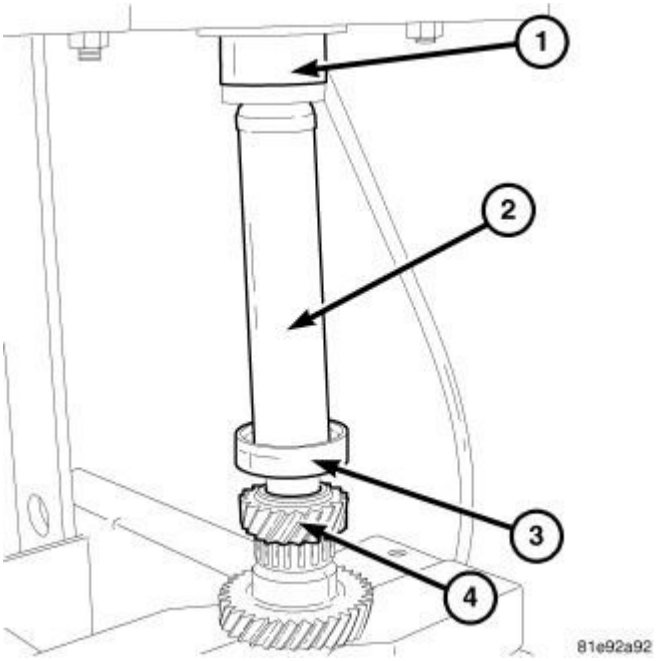


Fig. 258: Installing Bearing On 2/4/6 Input Shaft
Courtesy of CHRYSLER LLC

1. Using a Press (1) and Bearing Installer W-262 (2) install a **new** bearing (3) onto the 2/4/6 input shaft (4).

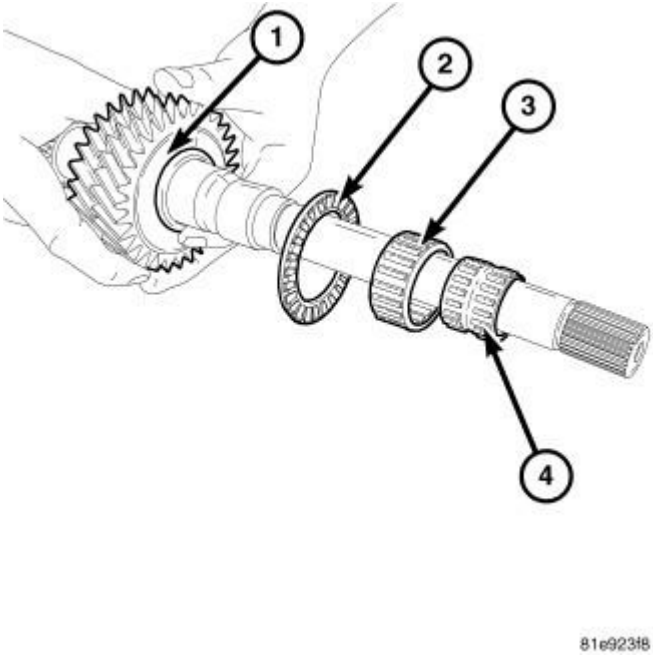


Fig. 259: Removing/Installing Bearings On 1/3/5/R Input Shaft

Courtesy of CHRYSLER LLC

2. Install **new** bearings (2, 3 and 4) onto the 1/3/5/R input shaft (1).

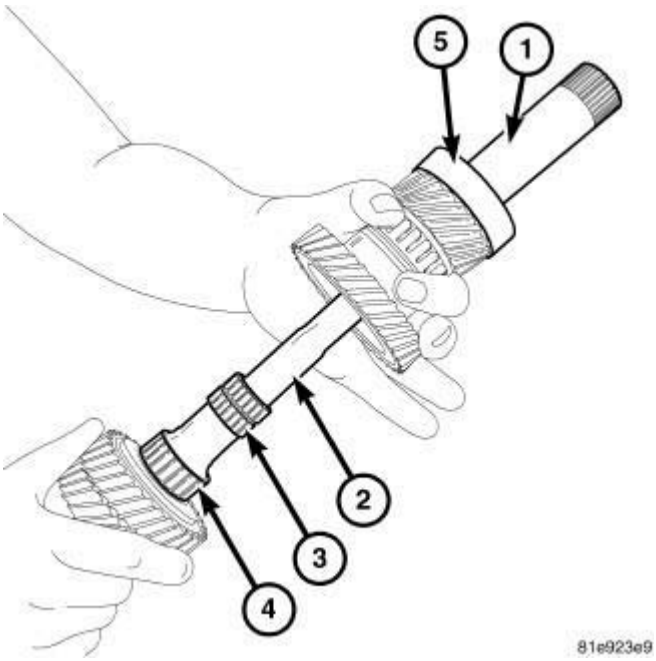


Fig. 260: Removing/Installing Input Shaft 2/4/6 At Input Shaft 1/3/5R
Courtesy of CHRYSLER LLC

3. Install input shaft 2/4/6 (1) onto input shaft 1/3/5R (2).

MECHANISM, GEARSHIFT

REMOVAL

REMOVAL

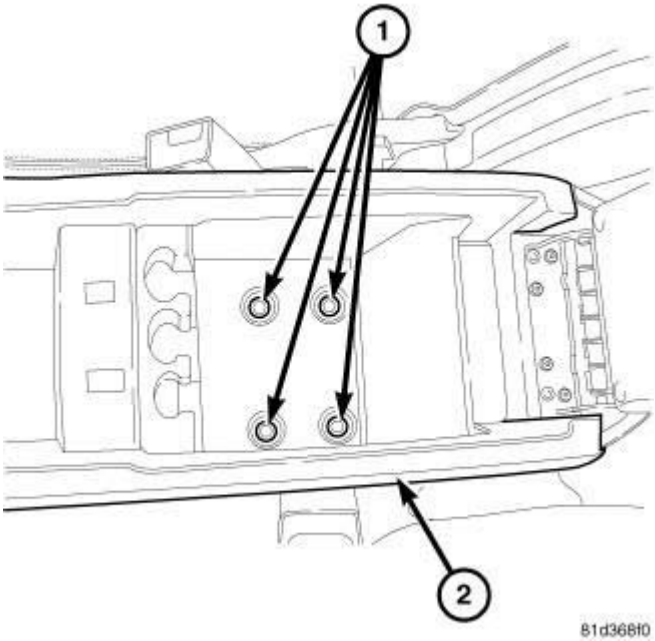


Fig. 261: CENTER CONSOLE
Courtesy of CHRYSLER LLC

1. Disconnect battery negative cable.
2. Remove the center console.

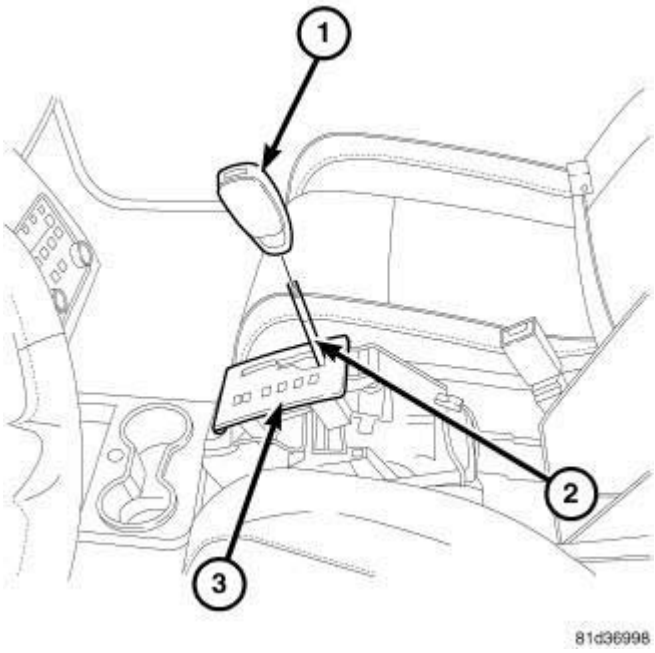


Fig. 262: Shift Knob
Courtesy of CHRYSLER LLC

3. Disconnect harness connector (1).

4. Remove the shift knob by pulling up on the knob.

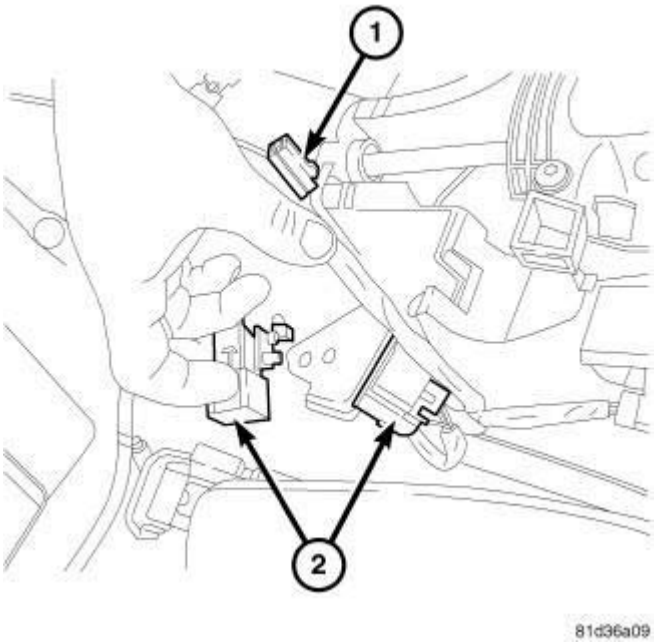


Fig. 263: ELECTRICAL CONNECTORS
Courtesy of CHRYSLER LLC

5. Remove the electrical connectors (1, 2) at the shifter.

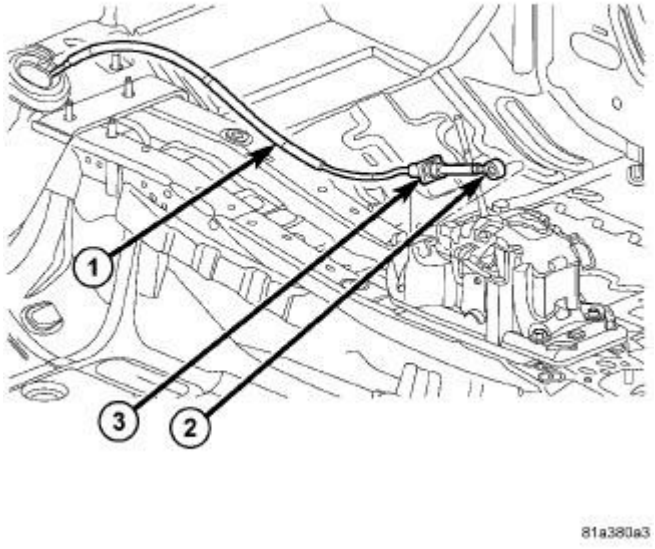


Fig. 264: SHIFT CABLE AT SHIFTER
Courtesy of CHRYSLER LLC

6. Disconnect and remove gearshift cable (2, 3) from shift mechanism.

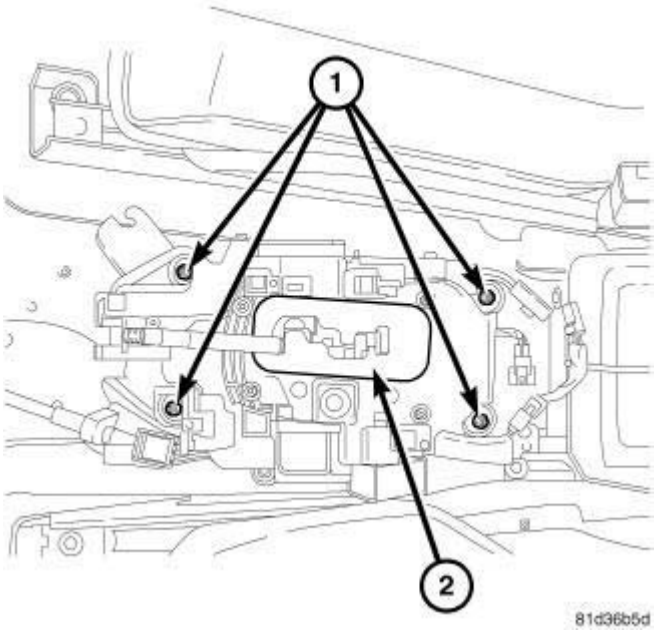


Fig. 265: SHIFT MECHANISM-TO-LOWER CONSOLE NUTS
Courtesy of CHRYSLER LLC

7. Remove four shift mechanism-to-lower console nuts (1). Remove shift mechanism (2).

INSTALLATION

INSTALLATION

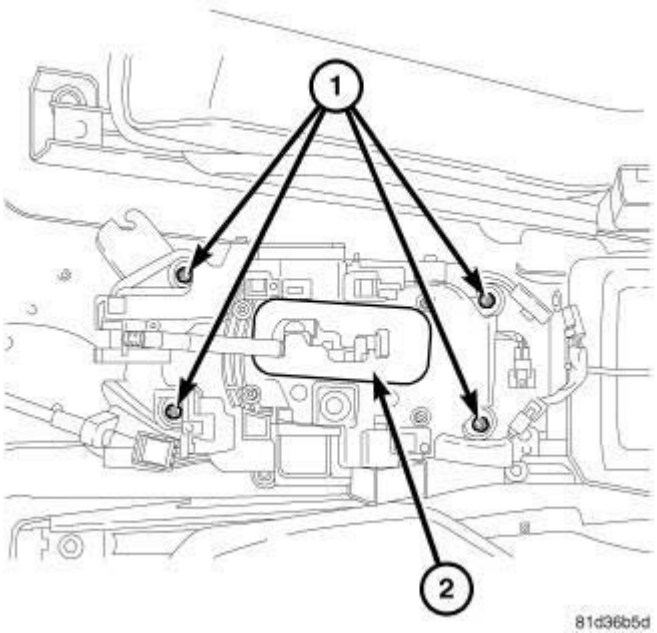


Fig. 266: SHIFT MECHANISM-TO-LOWER CONSOLE NUTS
Courtesy of CHRYSLER LLC

1. Install shifter to studs.
2. Install and tighten the shift mechanism-to-lower console nuts (1) to 8 N.m (71 in. lbs.).

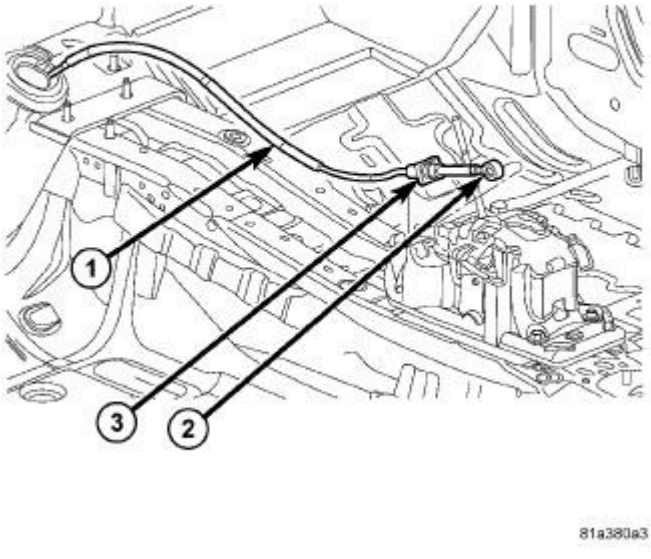


Fig. 267: SHIFT CABLE AT SHIFTER
Courtesy of CHRYSLER LLC

3. Install gearshift cable (2, 3) to shift mechanism.

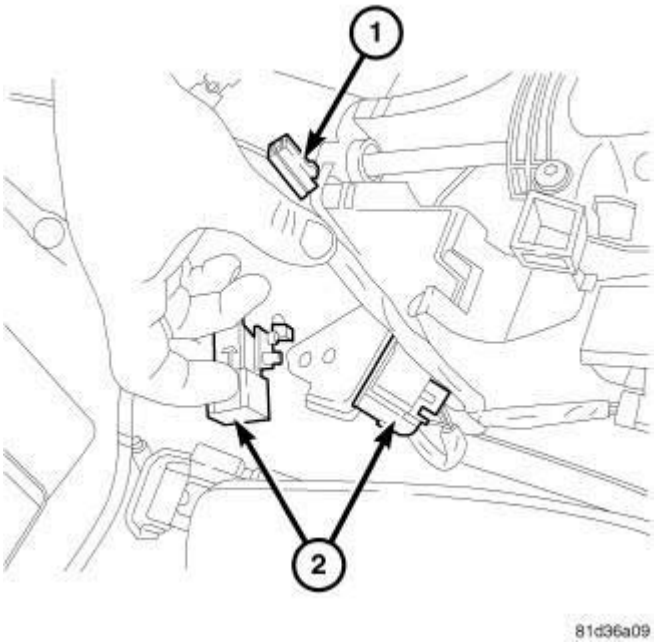


Fig. 268: ELECTRICAL CONNECTORS
Courtesy of CHRYSLER LLC

4. Connect the harness connectors (1, 2).

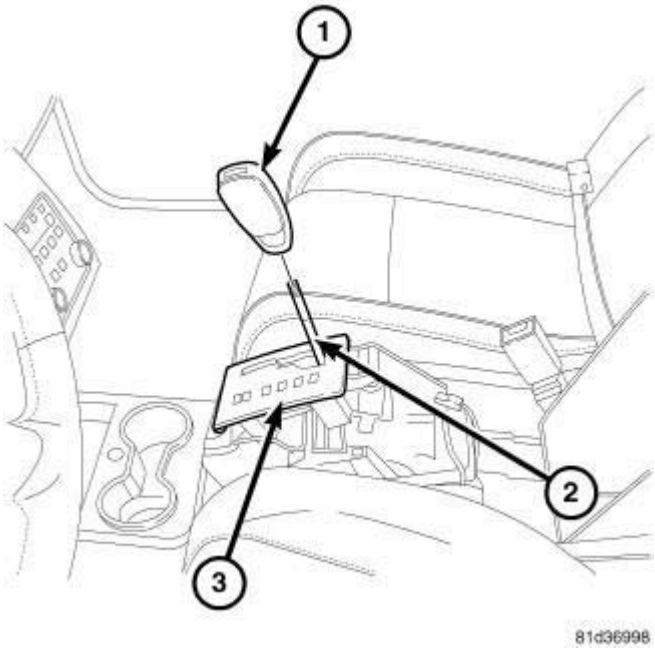


Fig. 269: Shift Knob
Courtesy of CHRYSLER LLC

5. Install the shift knob (1).
6. Verify the shifter and transaxle are both in Park.
7. Loosen the cable adjust bolt, then tighten the bolt to 6 Nm (40 in. lb.).

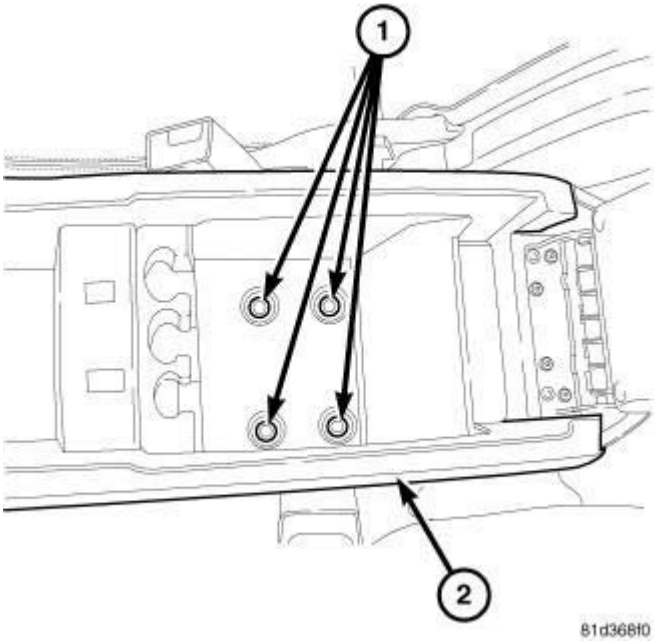


Fig. 270: CENTER CONSOLE
Courtesy of CHRYSLER LLC

8. Install the center console.
9. Connect battery negative cable.

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

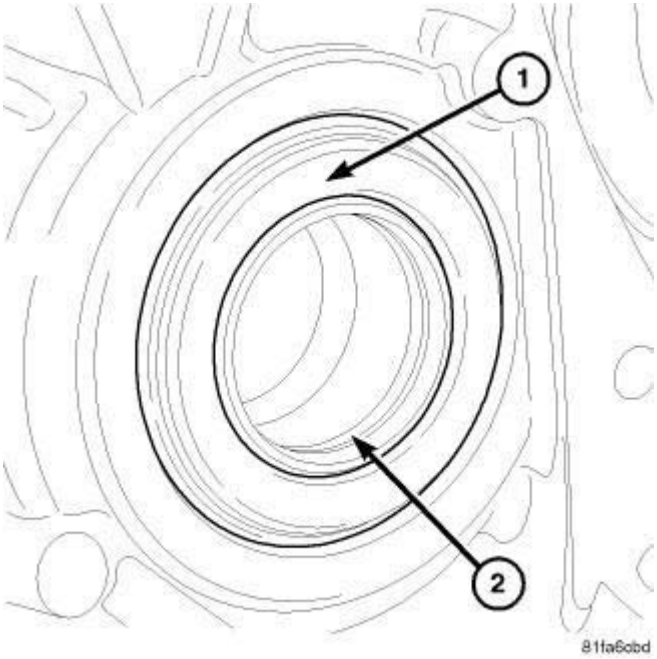


Fig. 271: SEAL DUST COVER(S)
Courtesy of CHRYSLER LLC

1. Remove the halfshafts. Refer to **Differential and Driveline/Half Shaft - Removal** .
2. Remove the right or left axle seal dust cover(s) (1).

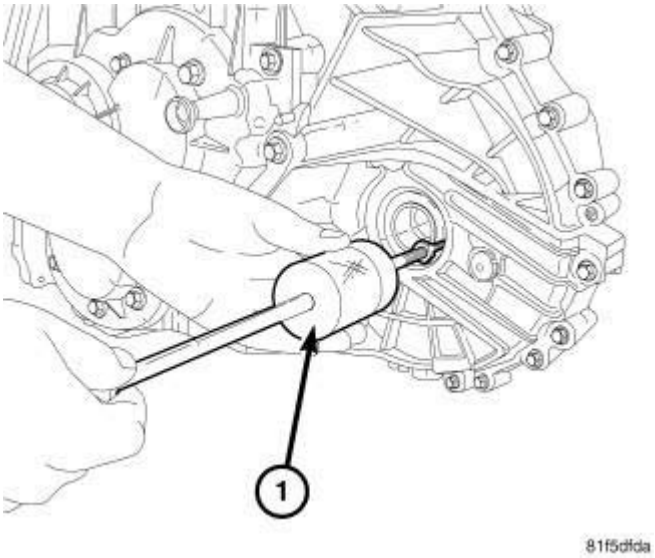


Fig. 272: SLIDE HAMMER
Courtesy of CHRYSLER LLC

3. Remove the axle seal(s) by using a screw-type seal puller bit on a slide hammer (1).

INSTALLATION

INSTALLATION

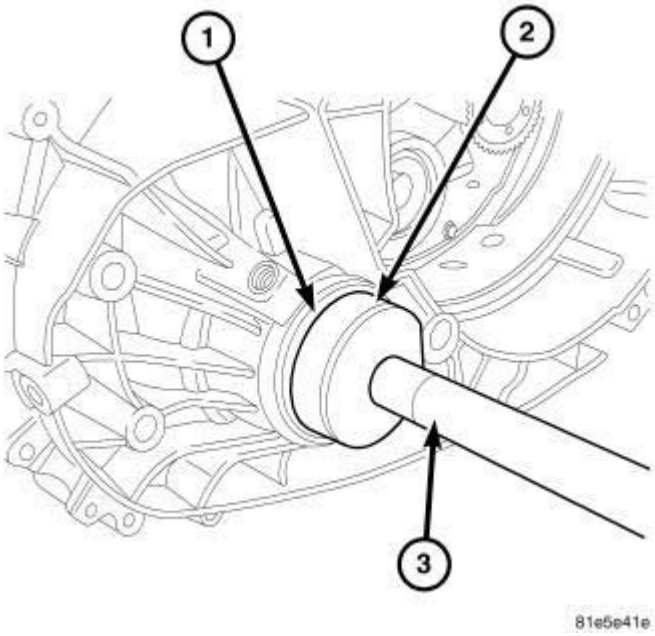


Fig. 273: Bellhousing Side Differential Seal
Courtesy of CHRYSLER LLC

1. Using Installer 10124 (2) and Handle C- 4171 (3) install the bellhousing side differential seal (1).
2. Using the flat side of Installer 10124 (2) and Handle C- 4171 (3), install the side seal dirt cover.

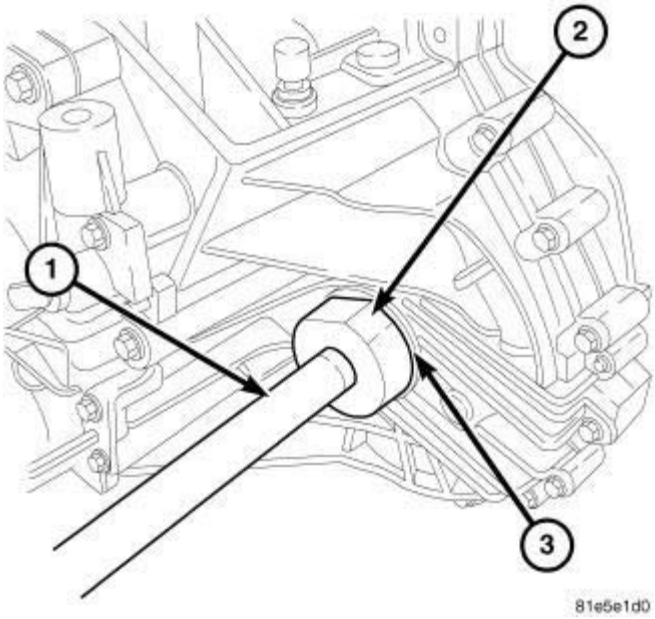


Fig. 274: Case Side Differential Seal
Courtesy of CHRYSLER LLC

3. Using Installer 10124 (2) and Handle C- 4171 (1) install the differential seal (1) to the bearing cover side of the differential housing.

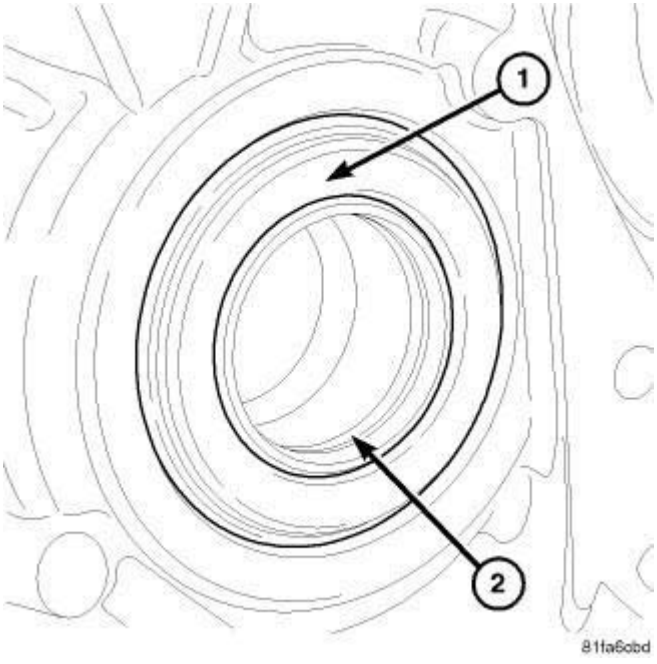


Fig. 275: SEAL DUST COVER(S)
Courtesy of CHRYSLER LLC

4. Position the axle seal dust cover(s) (1) to both sides of the differential housing.
5. Using the flat side of Installer 10124 (2) and Handle C- 4171 (3), tap the side seal dirt cover into the seal bore.

SHAFT, OUTPUT, 1ST TO 4TH

DISASSEMBLY

DISASSEMBLY

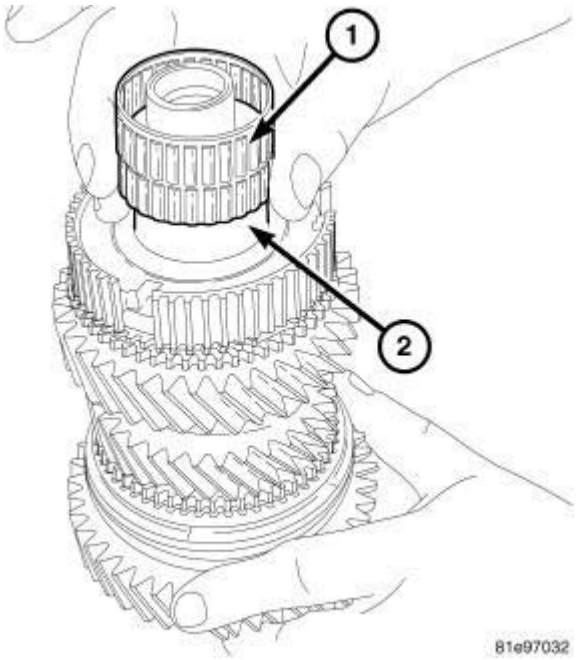


Fig. 276: 1st Gear Needle Bearing At Output Shaft
Courtesy of CHRYSLER LLC

1. Remove the needle bearing (1) from the output shaft (2).

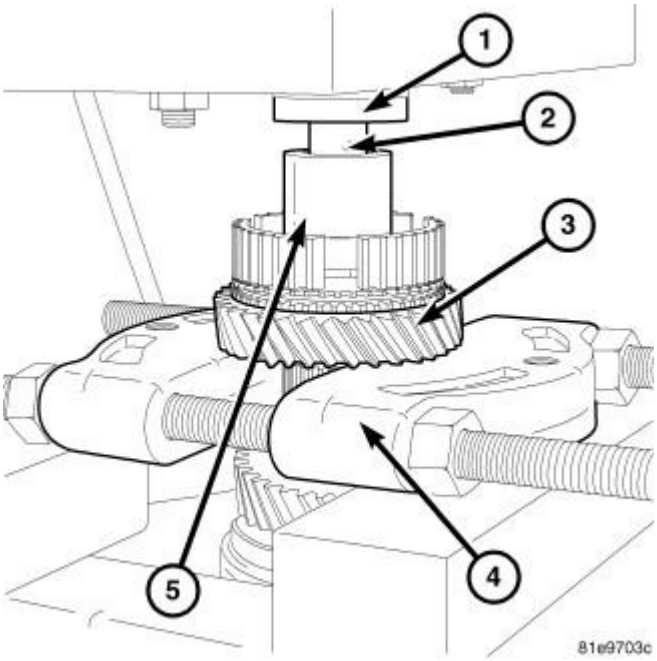


Fig. 277: 3rd Gear And 1/3 Synchronizer At Shaft
Courtesy of CHRYSLER LLC

2. Remove the 1/3 synchronizer and third gear (3) using the 1130 Bearing Splitter (4) , Plug 8923 (2)_ and a press (1).

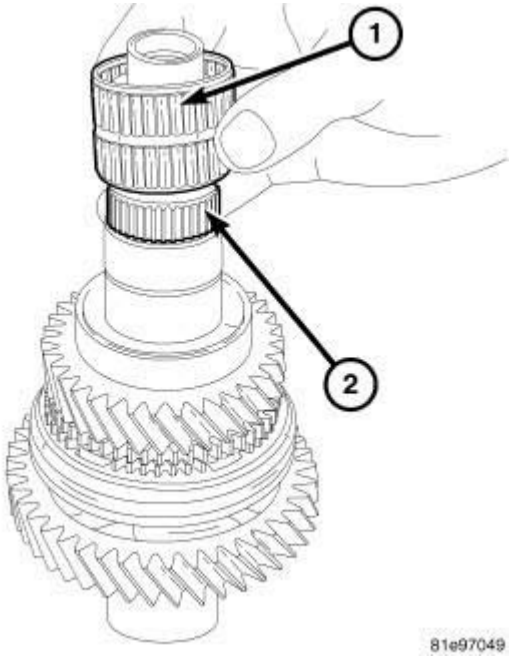


Fig. 278: 3rd Gear Bearing At Output Shaft
Courtesy of CHRYSLER LLC

3. Remove the third gear bearing (1) from the output shaft (2).

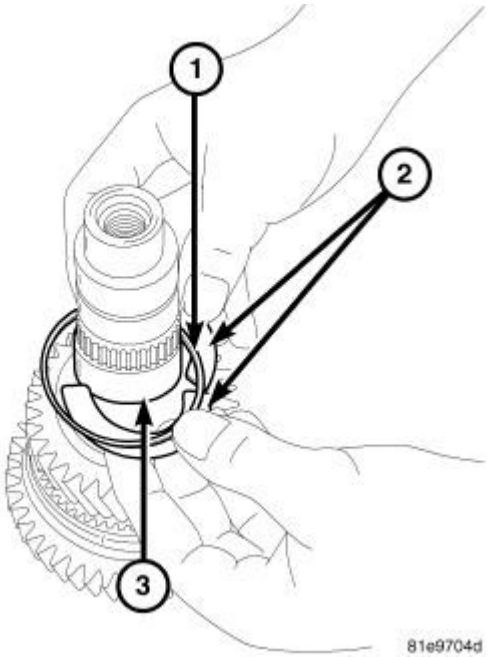


Fig. 279: Split Thrust Washer & Lock Ring At Output Shaft
Courtesy of CHRYSLER LLC

4. Remove the split thrust washers (2) and lock ring (1) from the output shaft.

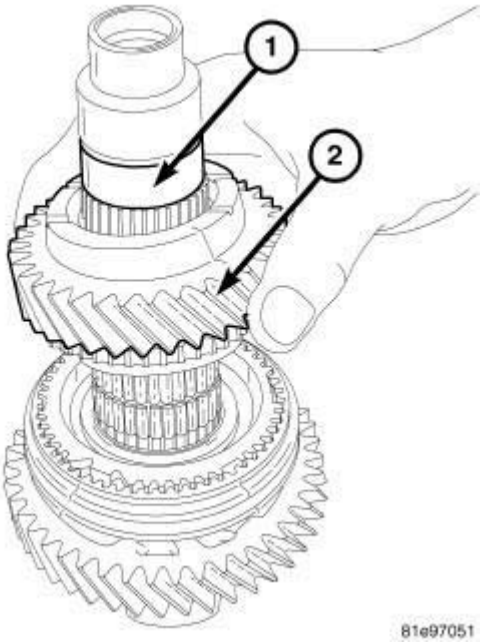


Fig. 280: 4th Gear At Output Shaft
Courtesy of CHRYSLER LLC

5. Remove forth gear (3) from the output shaft (1).

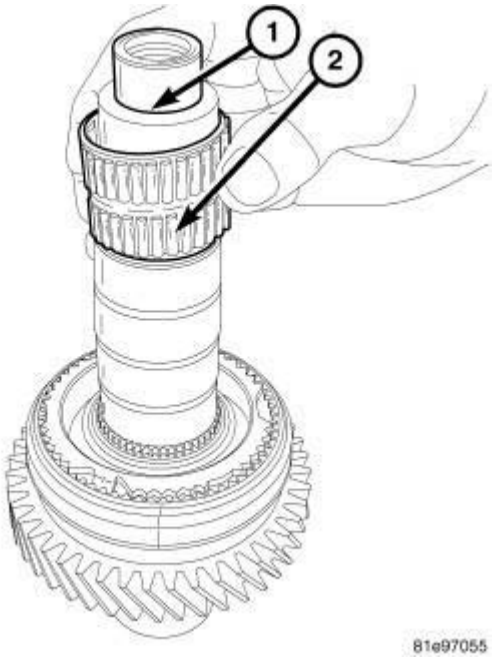


Fig. 281: 4TH GEAR BEARING
Courtesy of CHRYSLER LLC

6. Remove forth gear bearing (2) from the output shaft (1).

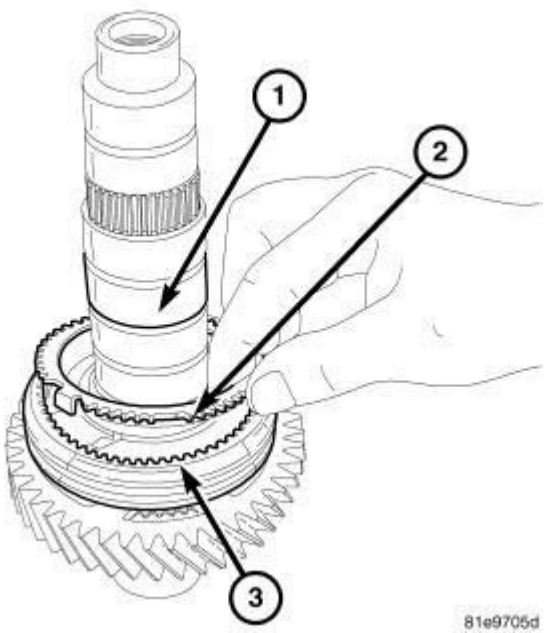


Fig. 282: 4TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

7. Remove forth gear blocker ring (2).

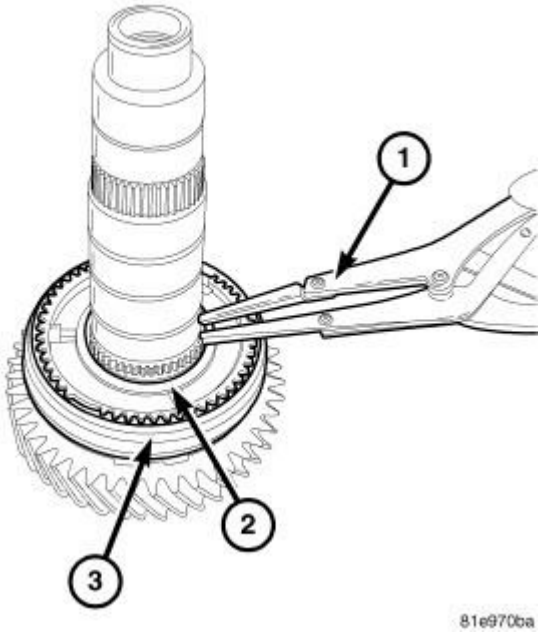


Fig. 283: 2/4 Synchronizer Snap Ring
Courtesy of CHRYSLER LLC

8. Remove the 2/4 synchronizer snap ring (2).

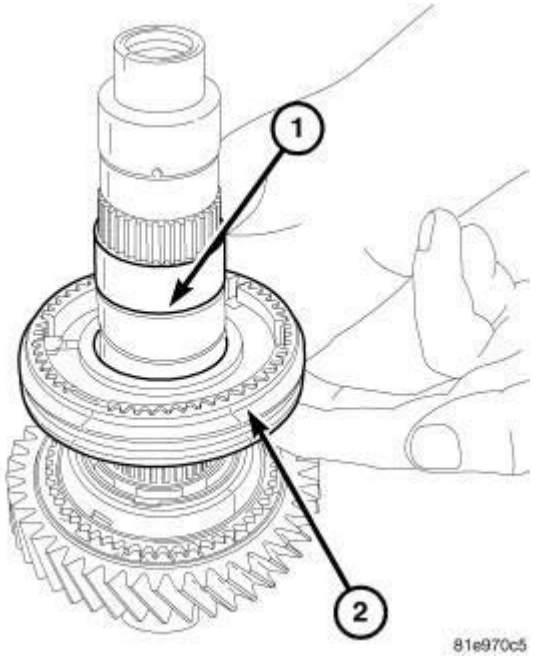


Fig. 284: 2/4 Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Verify location and installation of the pressure pieces before removal.

9. Remove the 2/4 synchronizer (2) and the three pressure pieces.

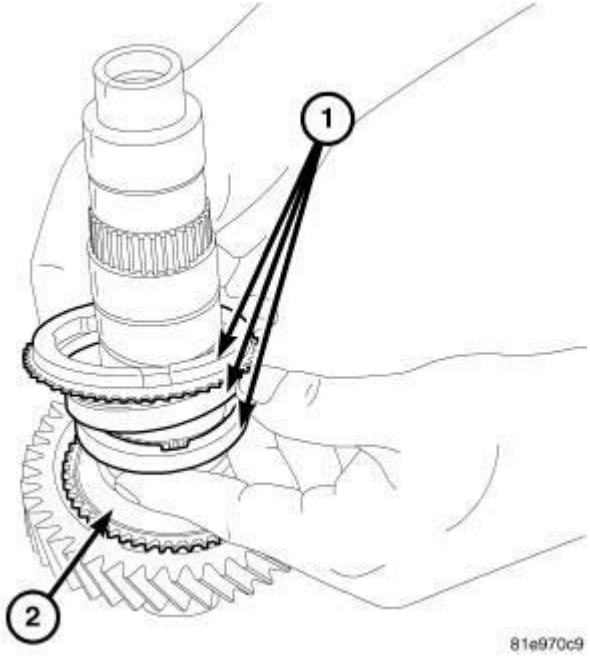


Fig. 285: 2ND GEAR BLOCKER ASSEMBLY
Courtesy of CHRYSLER LLC

10. Remove the second gear blocker ring assembly (1) from second gear synchronizer (2).

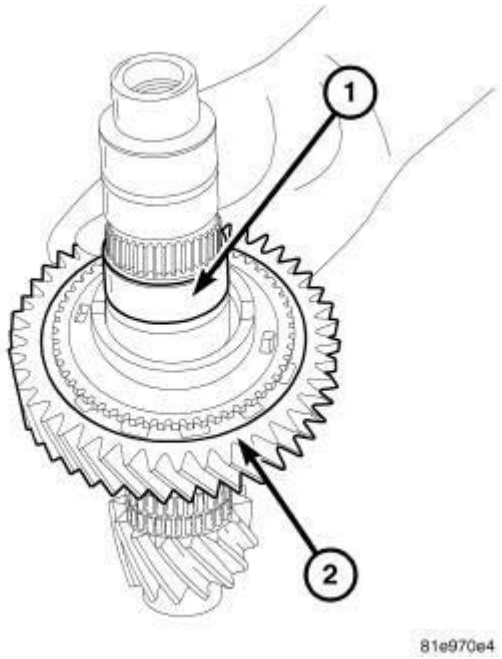


Fig. 286: 2nd Gear At Output Shaft
Courtesy of CHRYSLER LLC

11. Remove second gear (2) from the output shaft (1).

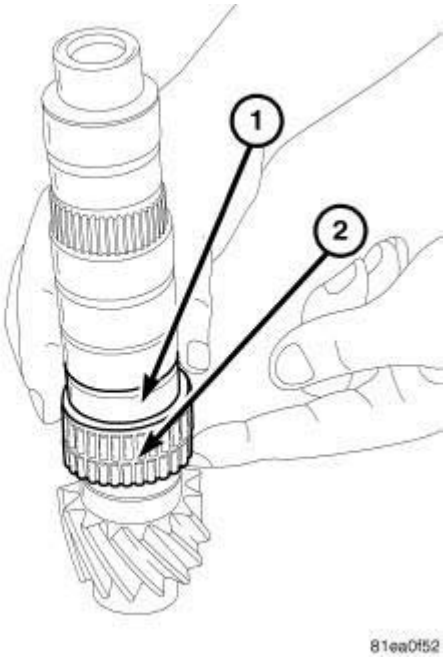


Fig. 287: 2nd Gear Bearing At Output Shaft
Courtesy of CHRYSLER LLC

12. Remove second gear bearing (2) from the output shaft (1).

ASSEMBLY

ASSEMBLY

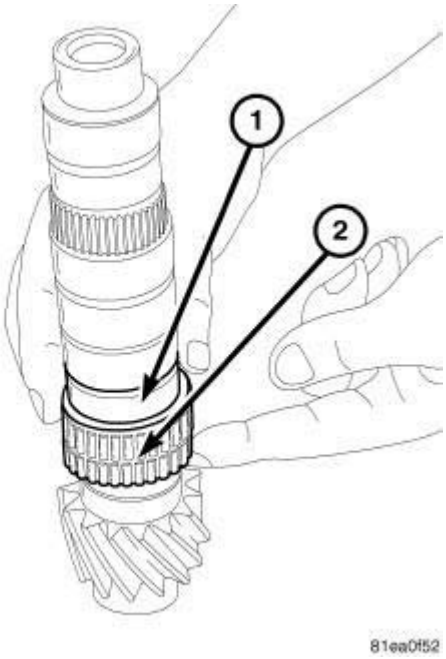


Fig. 288: 2nd Gear Bearing At Output Shaft
Courtesy of CHRYSLER LLC

1. Install second gear bearing (2) onto the output shaft (1).

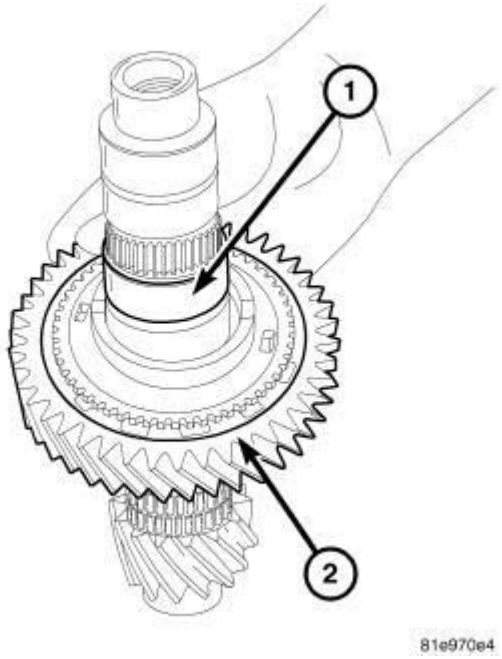


Fig. 289: 2nd Gear At Output Shaft
Courtesy of CHRYSLER LLC

2. Install second gear (2) onto the output shaft (1).

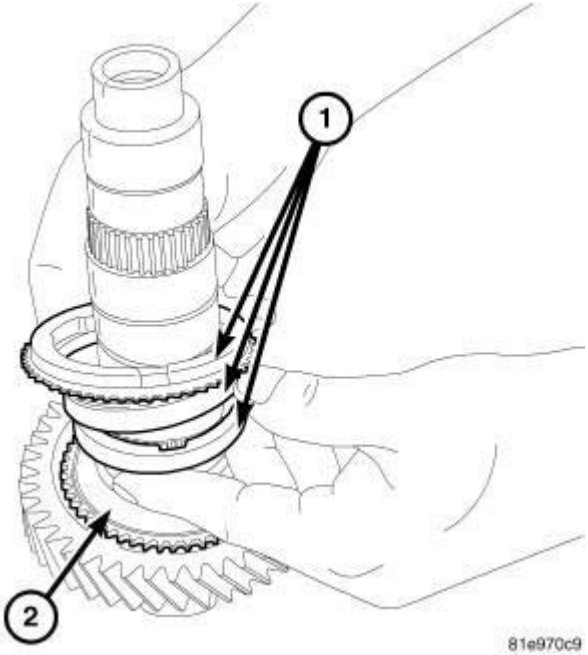


Fig. 290: 2ND GEAR BLOCKER ASSEMBLY
Courtesy of CHRYSLER LLC

3. Install the second gear blocker ring assembly (1) onto the second gear (2).

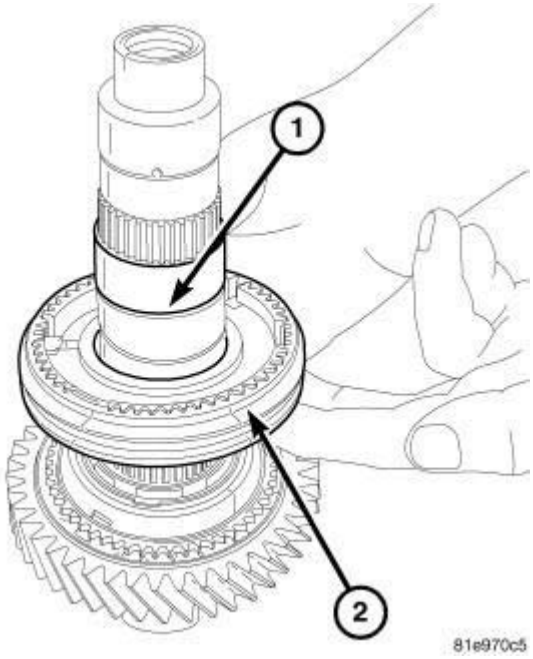


Fig. 291: 2/4 Synchronizer
Courtesy of CHRYSLER LLC

4. Install the 2/4 synchronizer (2) and the 3 pressure pieces.

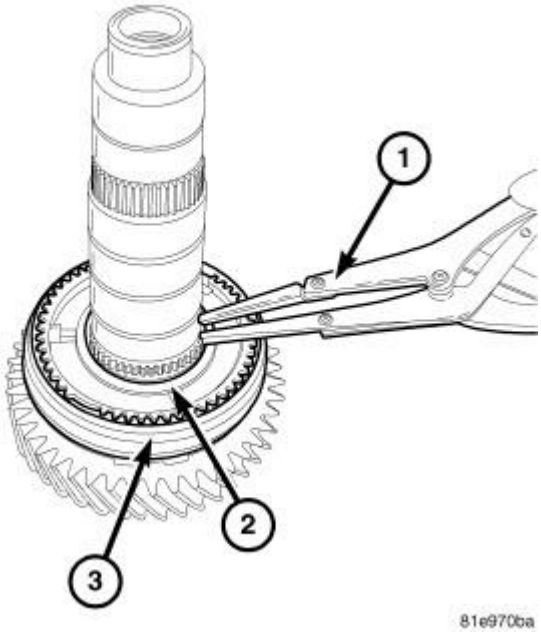


Fig. 292: 2/4 Synchronizer Snap Ring
Courtesy of CHRYSLER LLC

5. Install the 2/4 synchronizer snap ring (2).

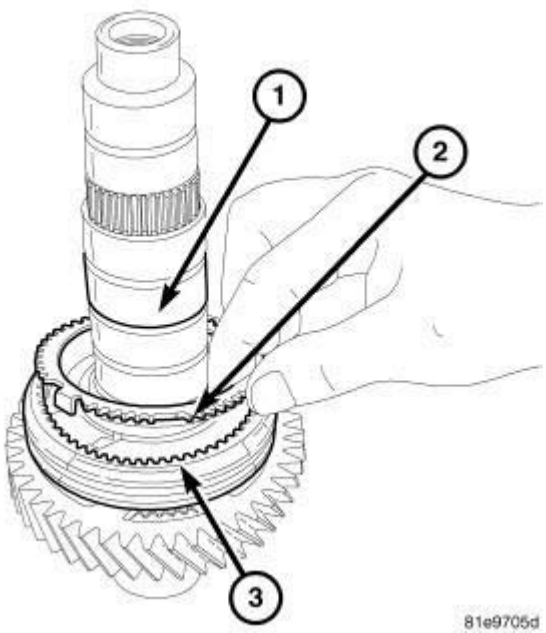


Fig. 293: 4TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

6. Install fourth gear blocker ring (2).

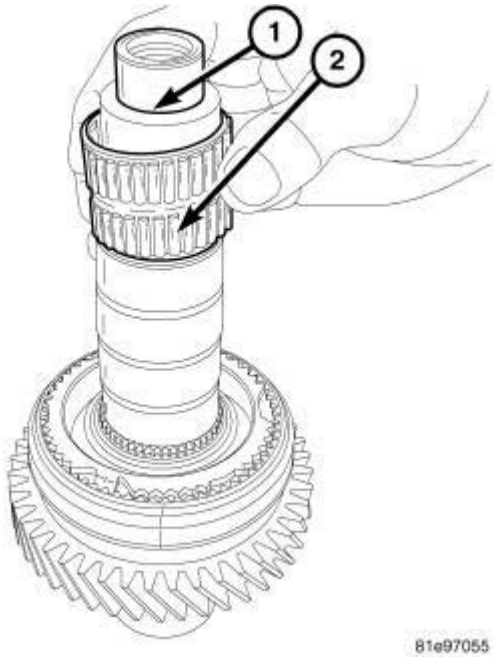


Fig. 294: 4TH GEAR BEARING
Courtesy of CHRYSLER LLC

7. Install fourth gear bearing (2) onto the output shaft (1).

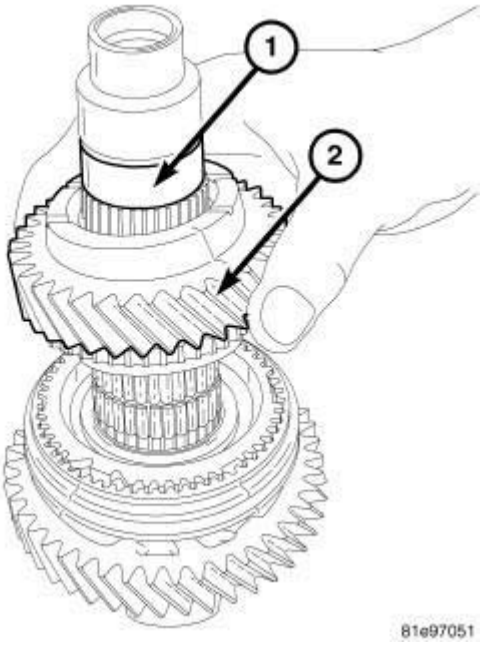


Fig. 295: 4th Gear At Output Shaft
Courtesy of CHRYSLER LLC

8. Install fourth gear (3) onto the output shaft (1).

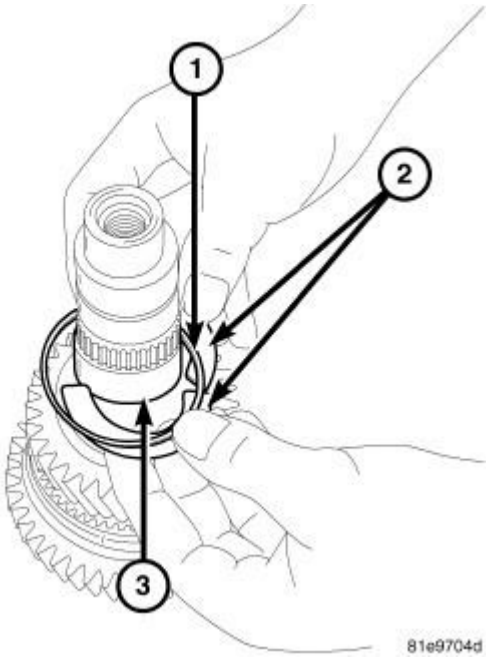


Fig. 296: Split Thrust Washer & Lock Ring At Output Shaft
Courtesy of CHRYSLER LLC

9. Install the split thrust washers (2) and lock ring (1) onto the output shaft.

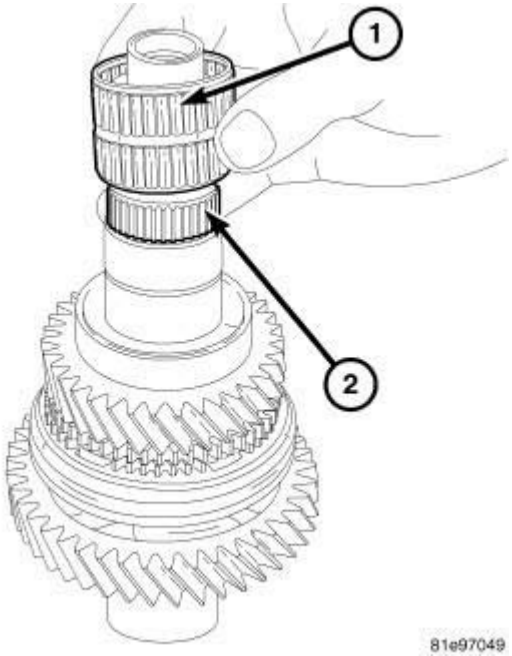


Fig. 297: 3rd Gear Bearing At Output Shaft
Courtesy of CHRYSLER LLC

10. Install the third gear bearing (1) onto the output shaft (2).

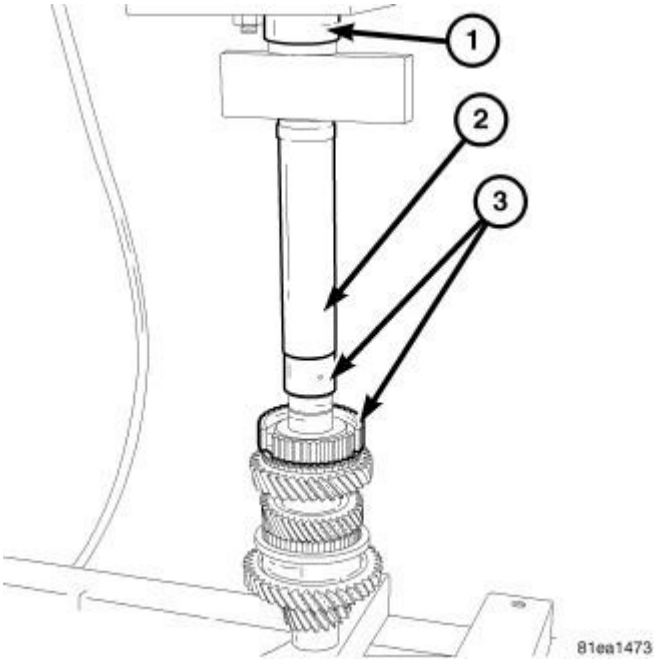


Fig. 298: 1/3 Synchronizer & Third Gear
Courtesy of CHRYSLER LLC

11. Install the 1/3 synchronizer and third gear (3) using Installer W-262 and a Press (1).

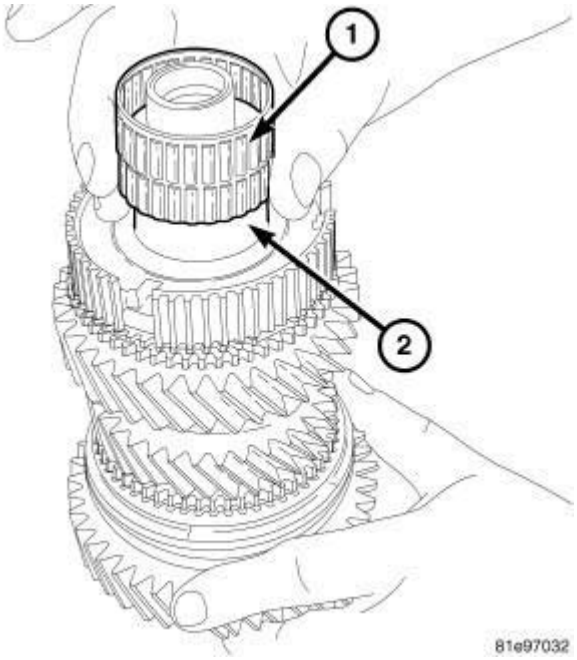


Fig. 299: 1st Gear Needle Bearing At Output Shaft
Courtesy of CHRYSLER LLC

12. Install the needle bearing (1) onto the output shaft (2).

SHAFT, OUTPUT, 5TH, 6TH, AND REVERSE

DISASSEMBLY

DISASSEMBLY

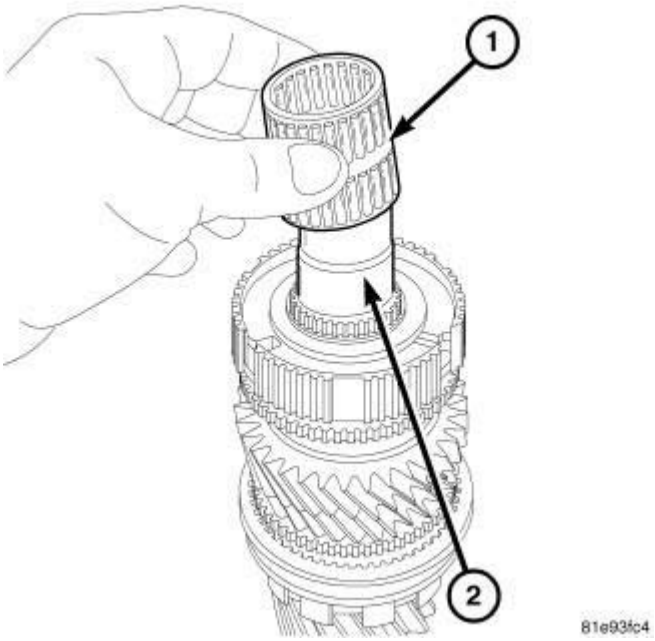


Fig. 300: Reverse, 5th & 6th Needle Bearing
Courtesy of CHRYSLER LLC

1. Remove the needle bearing (1) from the 5, 6 and reverse shaft (2).

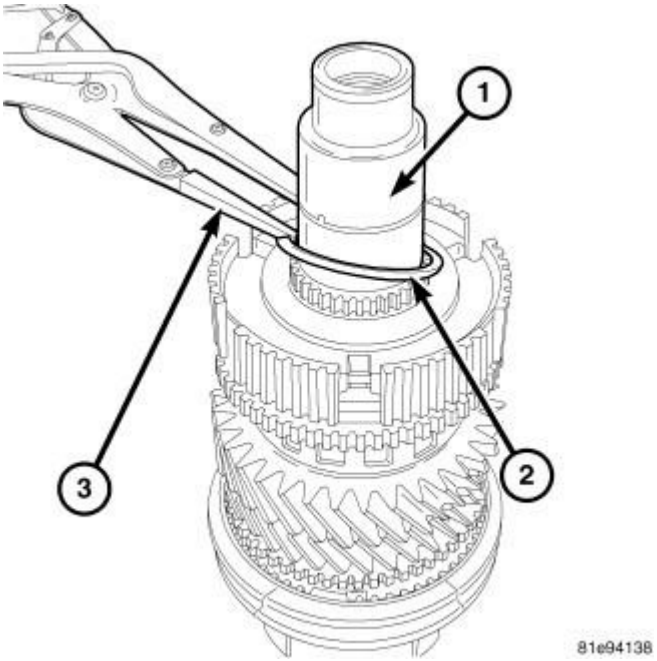


Fig. 301: Reverse/5th Synchronizer Hub Snap Ring
Courtesy of CHRYSLER LLC

2. Remove the snap ring (2) at reverse/fifth gear synchronizer hub (3).

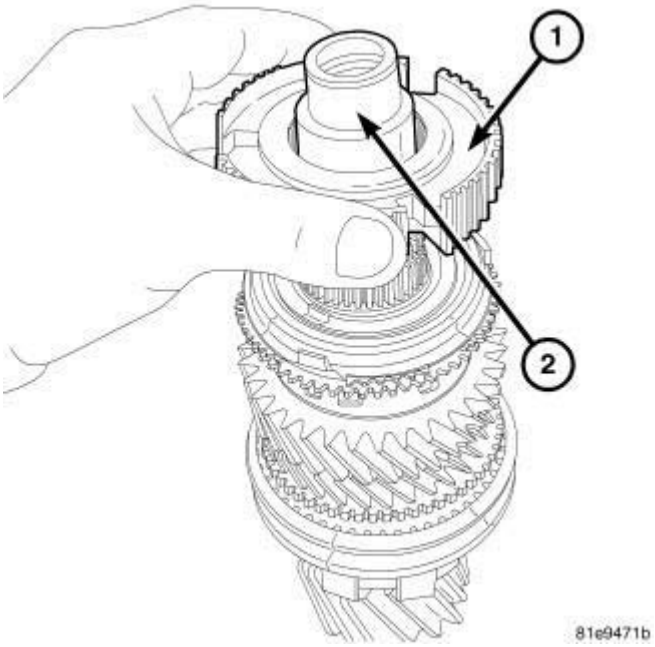


Fig. 302: Reverse/5th Synchronizer Hub
Courtesy of CHRYSLER LLC

3. Remove the reverse/fifth gear synchronizer hub (1) from the output shaft (2).

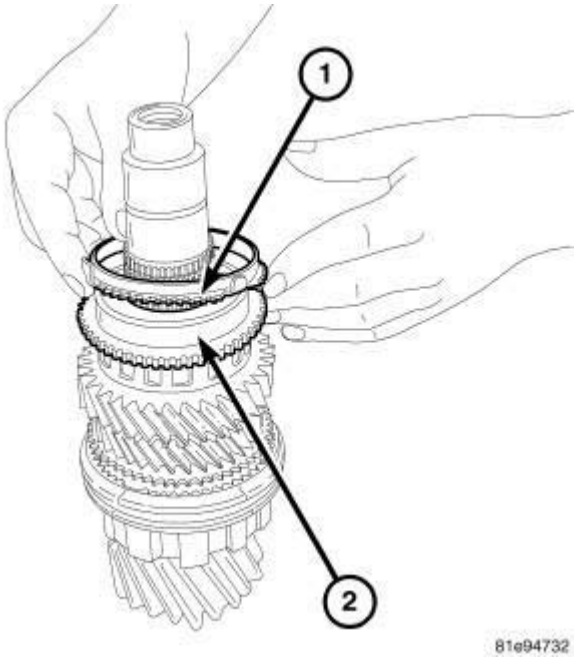


Fig. 303: 5TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

4. Remove the fifth gear blocker ring (1).

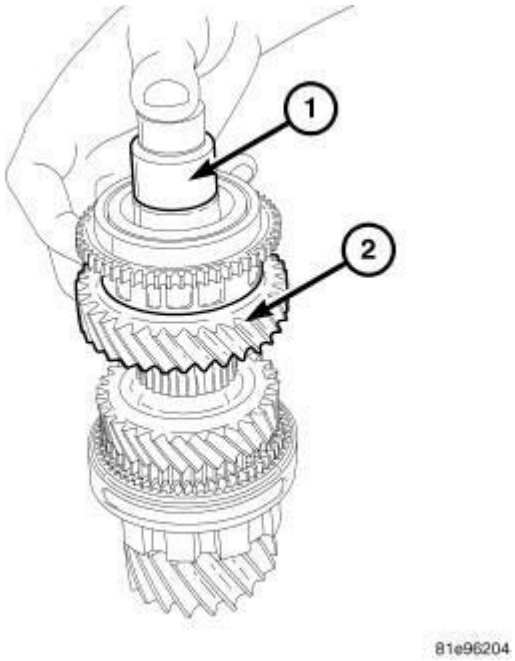


Fig. 304: 5th Gear & Output Shaft
Courtesy of CHRYSLER LLC

5. Remove fifth gear (2) from the output shaft (1).

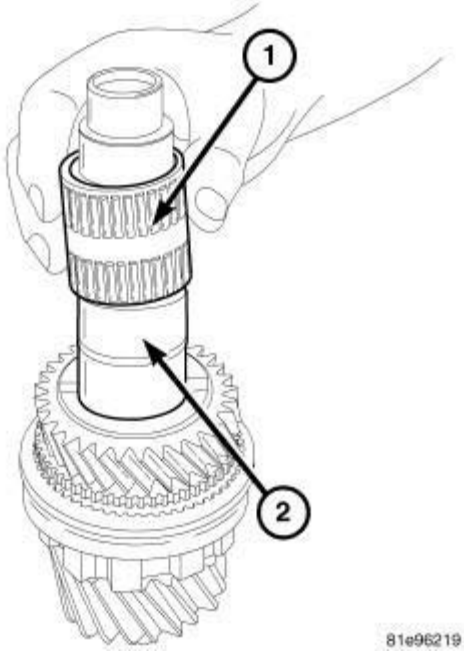


Fig. 305: 5TH GEAR BEARING
Courtesy of CHRYSLER LLC

6. Remove the fifth gear bearing (1) from the output shaft (2).

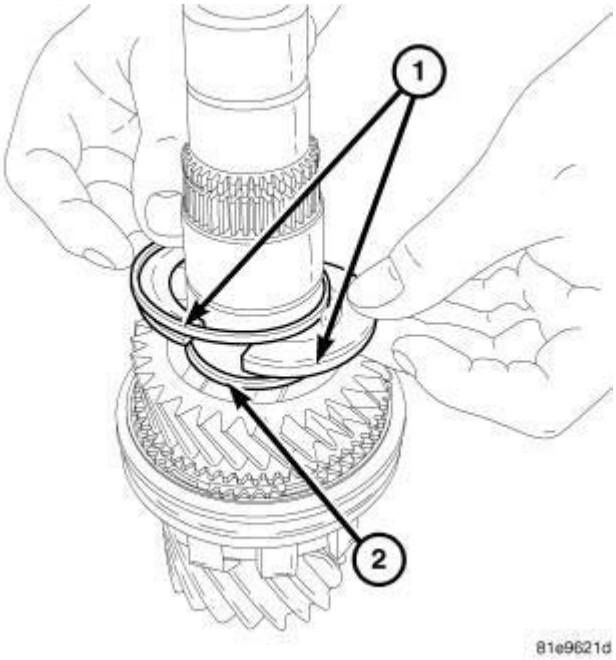


Fig. 306: Split Thrust Washer & Lock Ring
Courtesy of CHRYSLER LLC

7. Remove the split thrust washers (1) and lock ring (2) form the output shaft.

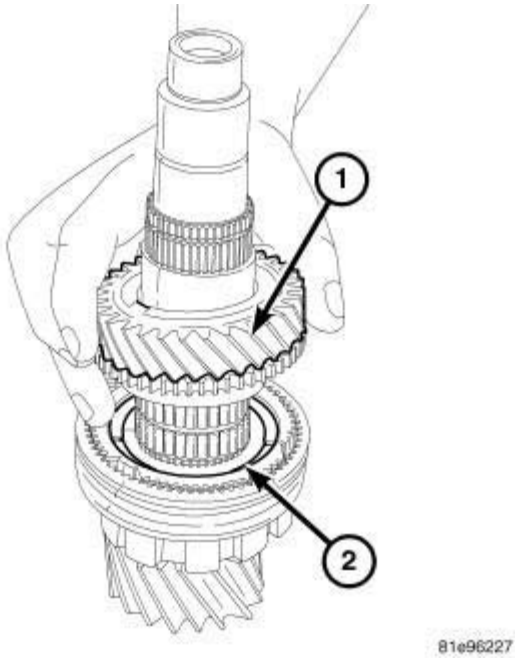


Fig. 307: 6th Gear & Output Shaft
Courtesy of CHRYSLER LLC

8. Remove the sixth gear (1) from the output shaft (2).

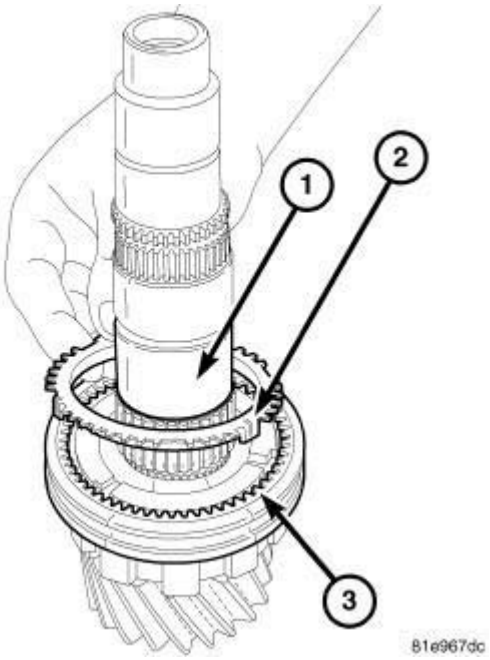


Fig. 308: 6TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

9. Remove the sixth gear blocker ring (2) from the sixth gear synchronizer (3).

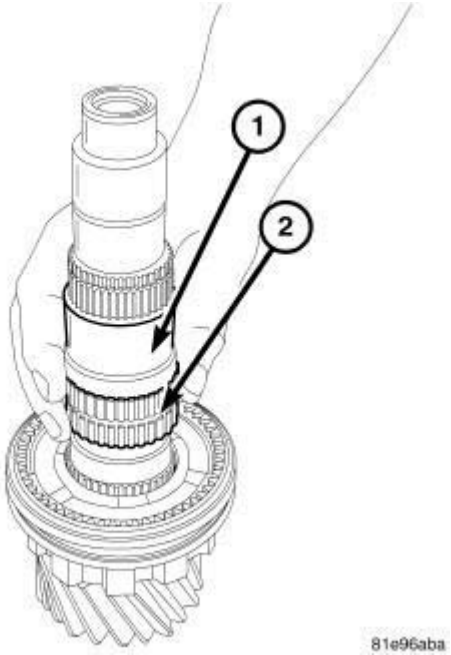


Fig. 309: 6TH GEAR BEARING
Courtesy of CHRYSLER LLC

10. Remove the sixth gear bearing (2) from the output shaft (1).

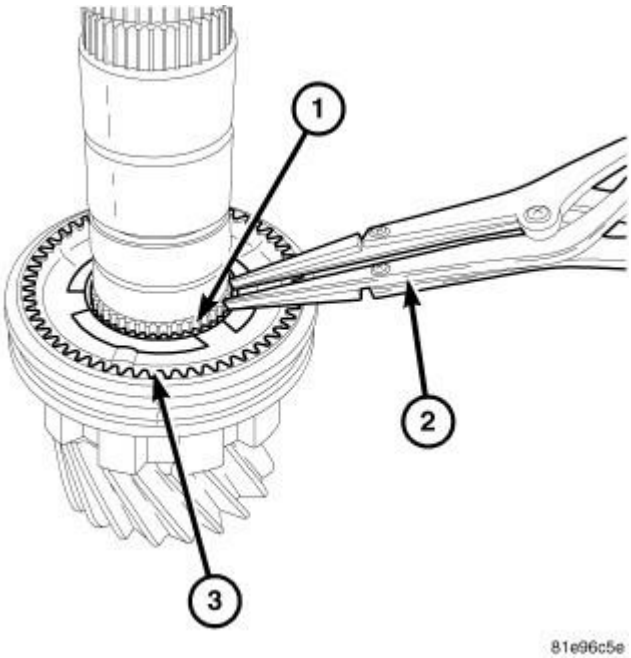


Fig. 310: 6th Gear Synchronizer Snap Ring
Courtesy of CHRYSLER LLC

11. Remove the sixth gear synchronizer snap ring (1).

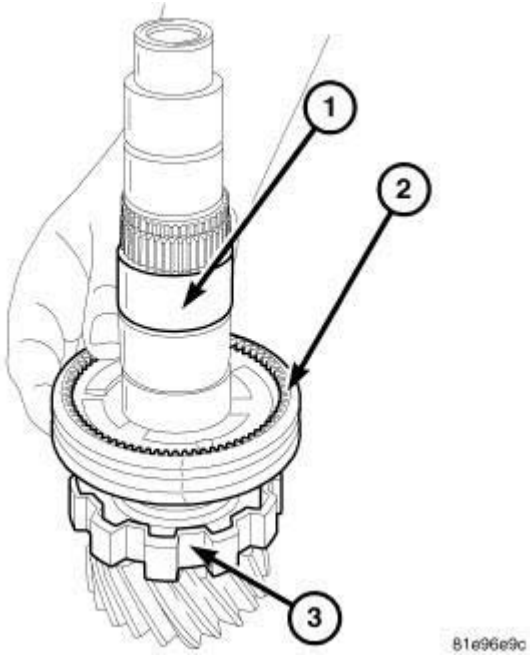


Fig. 311: 6th Gear Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Verify location and installation of the pressure pieces before removal

12. Remove the sixth gear synchronizer (2) and the three pressure pieces.

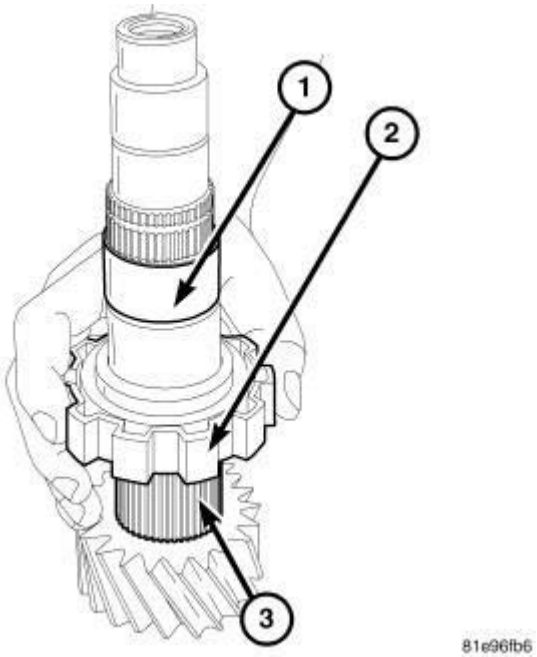


Fig. 312: PARK GEAR
Courtesy of CHRYSLER LLC

13. Remove the park gear (2).

ASSEMBLY

ASSEMBLY

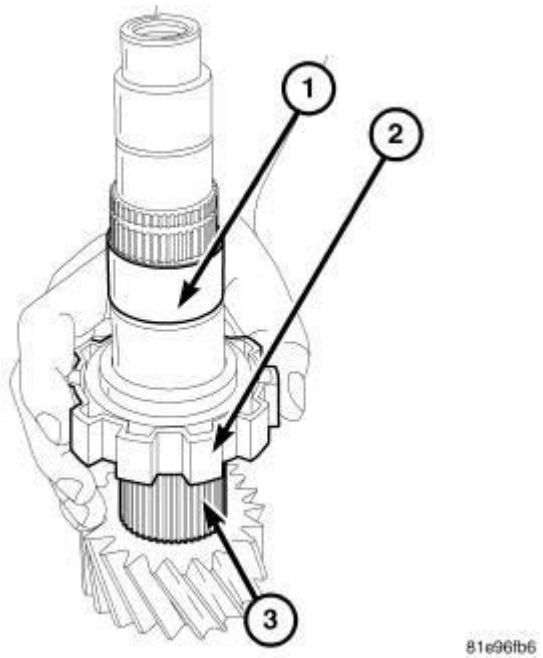


Fig. 313: PARK GEAR
Courtesy of CHRYSLER LLC

1. Install the park gear (2).

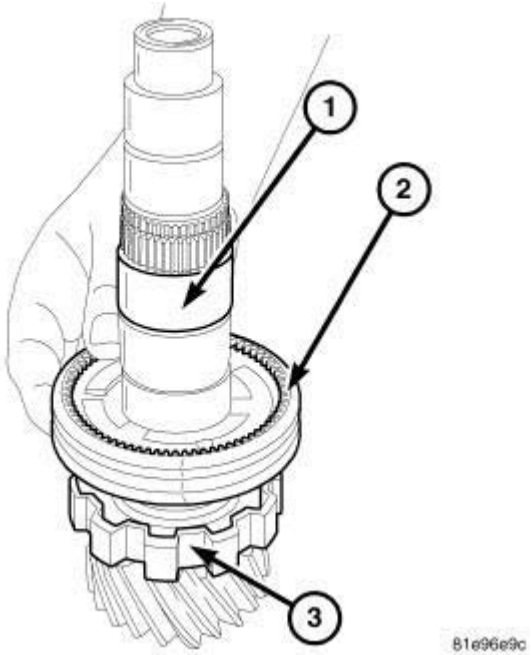


Fig. 314: 6th Gear Synchronizer
Courtesy of CHRYSLER LLC

2. Install the sixth gear synchronizer (2).

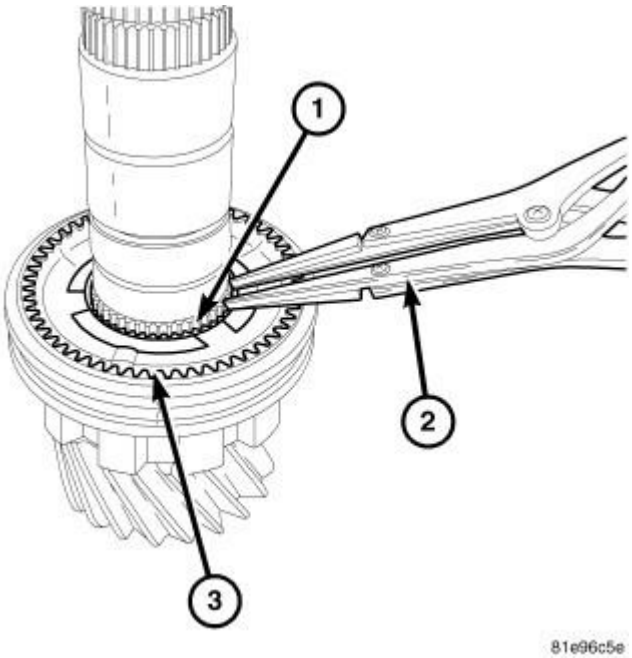


Fig. 315: 6th Gear Synchronizer Snap Ring
Courtesy of CHRYSLER LLC

3. Install the sixth gear synchronizer snap ring (1).

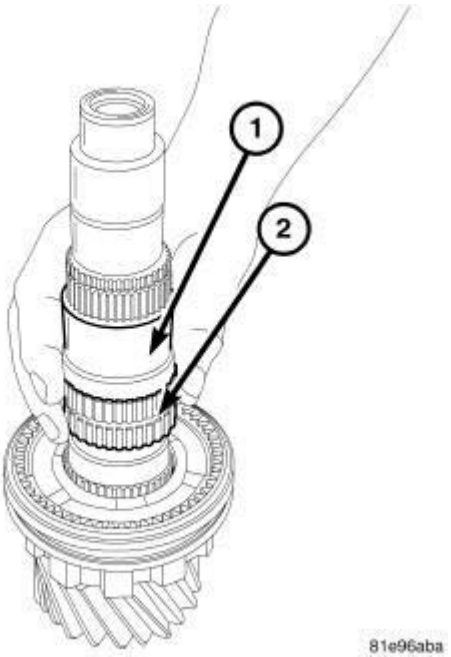


Fig. 316: 6TH GEAR BEARING
Courtesy of CHRYSLER LLC

4. Install the sixth gear bearing (2) onto the output shaft (1).

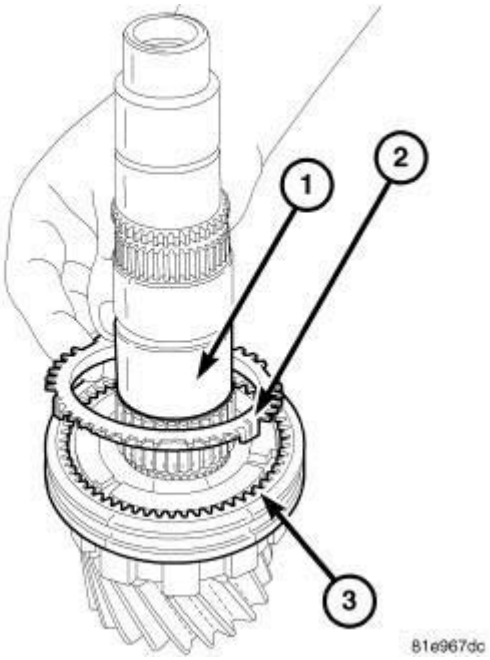


Fig. 317: 6TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

5. Install the sixth gear blocker ring (2) onto the sixth gear synchronizer (3).

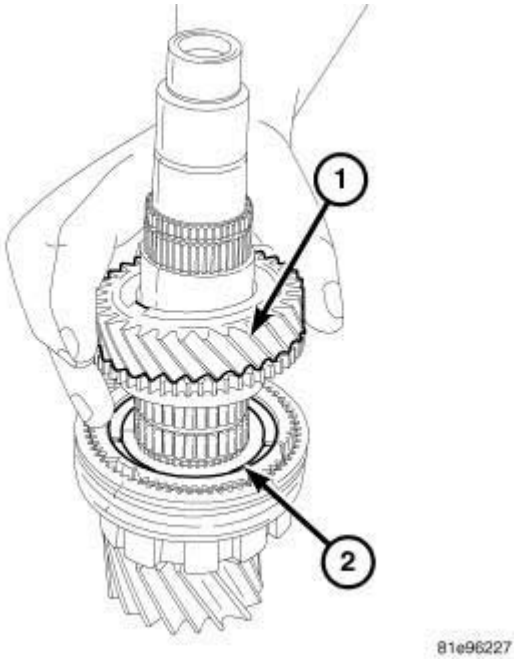


Fig. 318: 6th Gear & Output Shaft
Courtesy of CHRYSLER LLC

6. Install sixth gear (1) onto the output shaft (2).

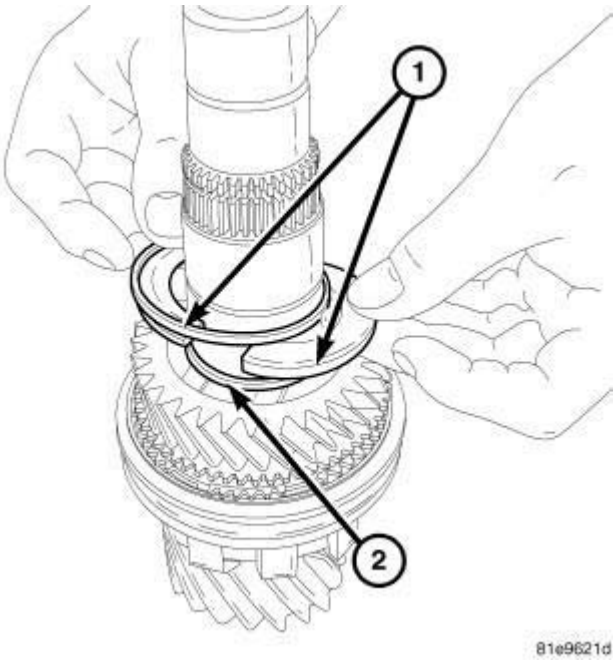


Fig. 319: Split Thrust Washer & Lock Ring
Courtesy of CHRYSLER LLC

7. Install the split thrust washers (1) and lock ring (2) onto the output shaft.

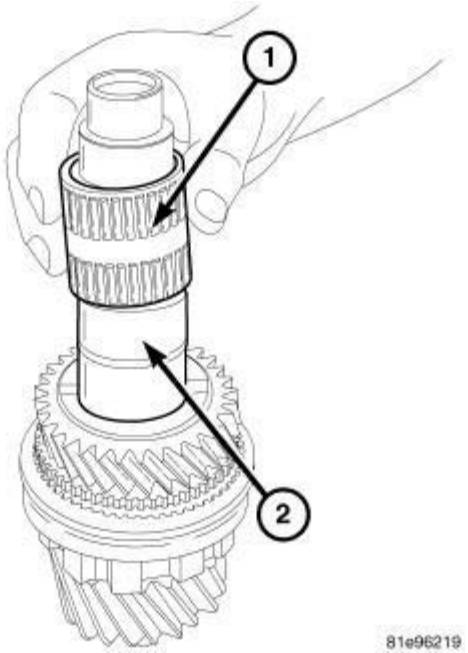


Fig. 320: 5TH GEAR BEARING
Courtesy of CHRYSLER LLC

8. Install the fifth gear bearing (1) onto the output shaft (2).

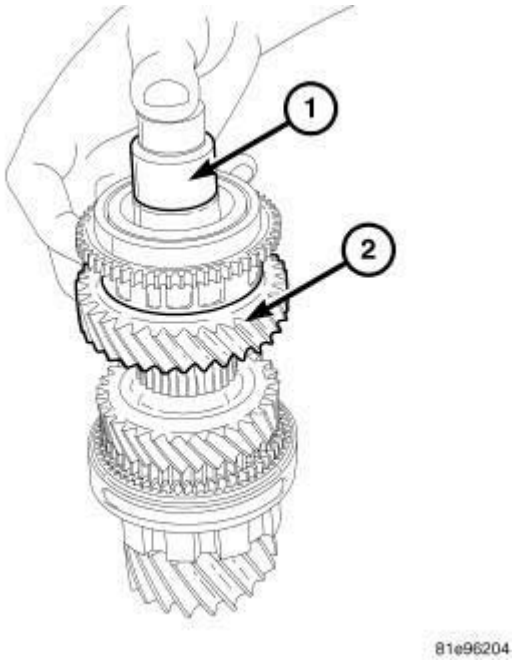


Fig. 321: 5th Gear & Output Shaft
Courtesy of CHRYSLER LLC

9. Install fifth gear (2) onto the output shaft (1).

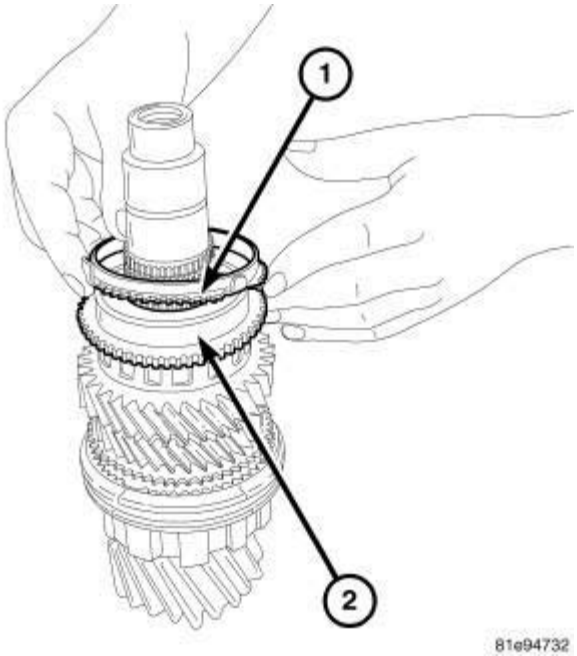


Fig. 322: 5TH GEAR BLOCKER RING
Courtesy of CHRYSLER LLC

10. Install the fifth gear blocker ring (1).

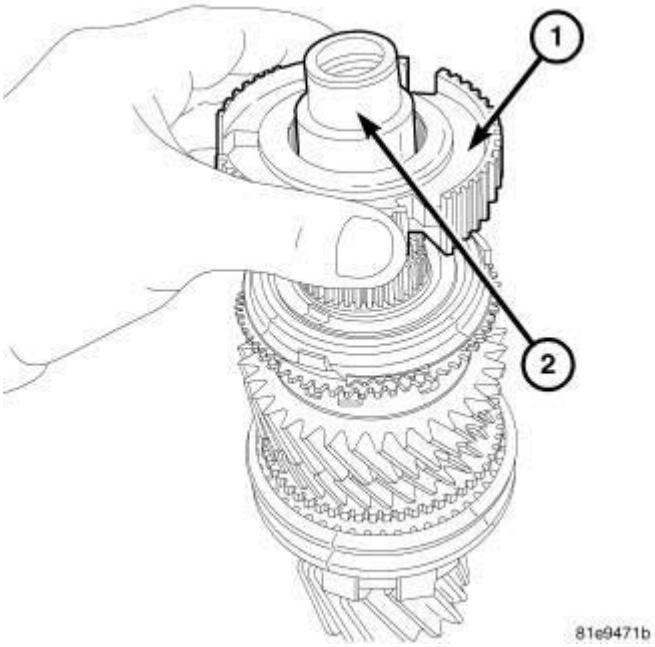


Fig. 323: Reverse/5th Synchronizer Hub
Courtesy of CHRYSLER LLC

11. Install the reverse/fifth gear synchronizer hub (1) onto the output shaft (2).

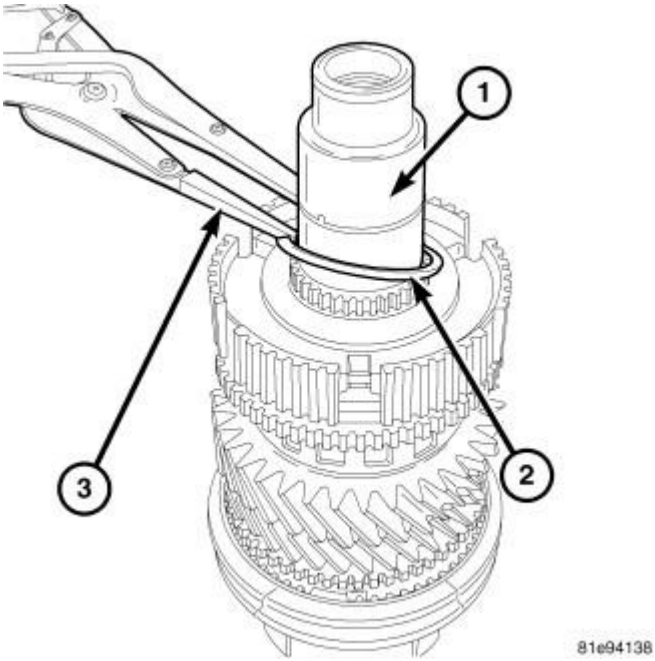


Fig. 324: Reverse/5th Synchronizer Hub Snap Ring
Courtesy of CHRYSLER LLC

12. Install the snap ring (2) at reverse/fifth gear synchronizer hub (3).

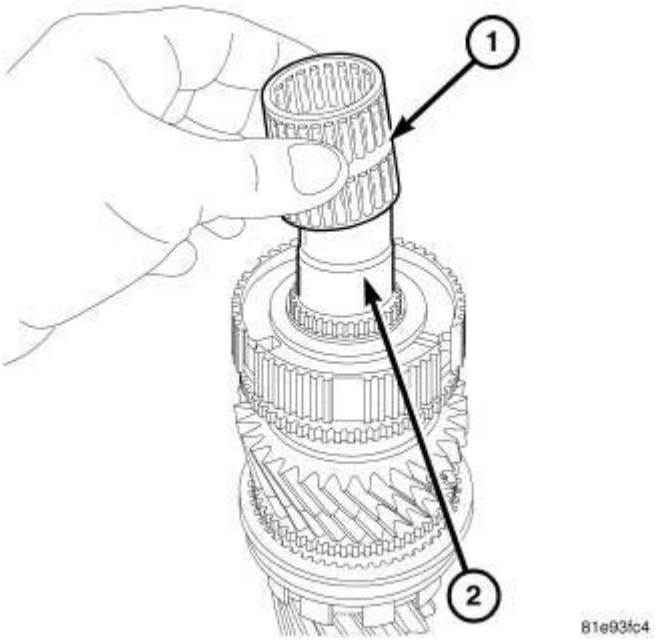


Fig. 325: Reverse, 5th & 6th Needle Bearing
Courtesy of CHRYSLER LLC

13. Install the needle bearing (1) onto the 5, 6 and reverse shaft (2).

VALVE BODY

OPERATION

OPERATION

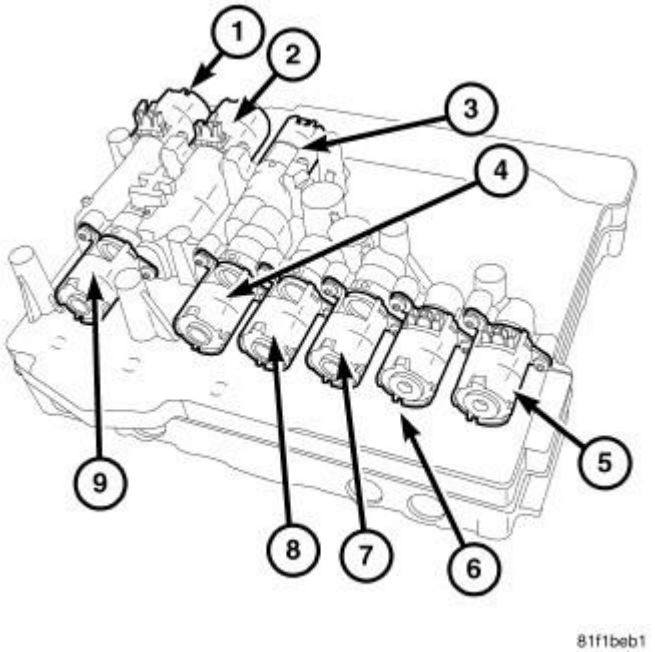


Fig. 326: Valve Body Solenoids
Courtesy of CHRYSLER LLC

1 - Clutch Shift Pressure Solenoid-2 (CSPS2)	6 - Clutch cooling Flow Solenoid (CCFS)
2 - Clutch Shift Pressure Solenoid-1 (CSPS1)	7 - SHSS1 Shift Select Solenoid (ON/OFF) - Move/Drive Shift Fork 1/3
3 - Clutch Shift Multiplex Solenoid-2 (CSMS2)	8 - SHSS2 Shift Select Solenoid (ON/OFF) - Move/Drive Shift Fork 2/4
4 - Clutch Shift Multiplex Solenoid-1 (CSMS1)	9 - Shift Cooling Multiplex Solenoid (SHCMS)
5 - Line Pressure Solenoid (LPS)	-

The valve body, which includes the transmission control module (TCM) and transmission range sensor (TRS), controls the delivery and pressure of transaxle fluid. The TCM and the TRS are integrated with the valve body. The TCM regulates the amount of hydraulic pressure used to engage the dual clutches, in addition to directing hydraulic pressure to actuate the shift forks. The TCM will actuate the valves and solenoids based on the position of the shifter/TRS, shift fork position sensors, transaxle fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the shift fork solenoids to match the gear ranges to the optimal torque range of the engine based on the position of the accelerator pedal, shifter/TRS, and vehicle speed as determined by the ECM based on input from the Vehicle Speed Sensor (VSS) and ABS module. Due to the complexity of the MPS6 transaxle control system and related mechanical and electrical components, always refer to the transaxle electrical/electronic diagnostics in this service information when attempting to diagnose transaxle problems.

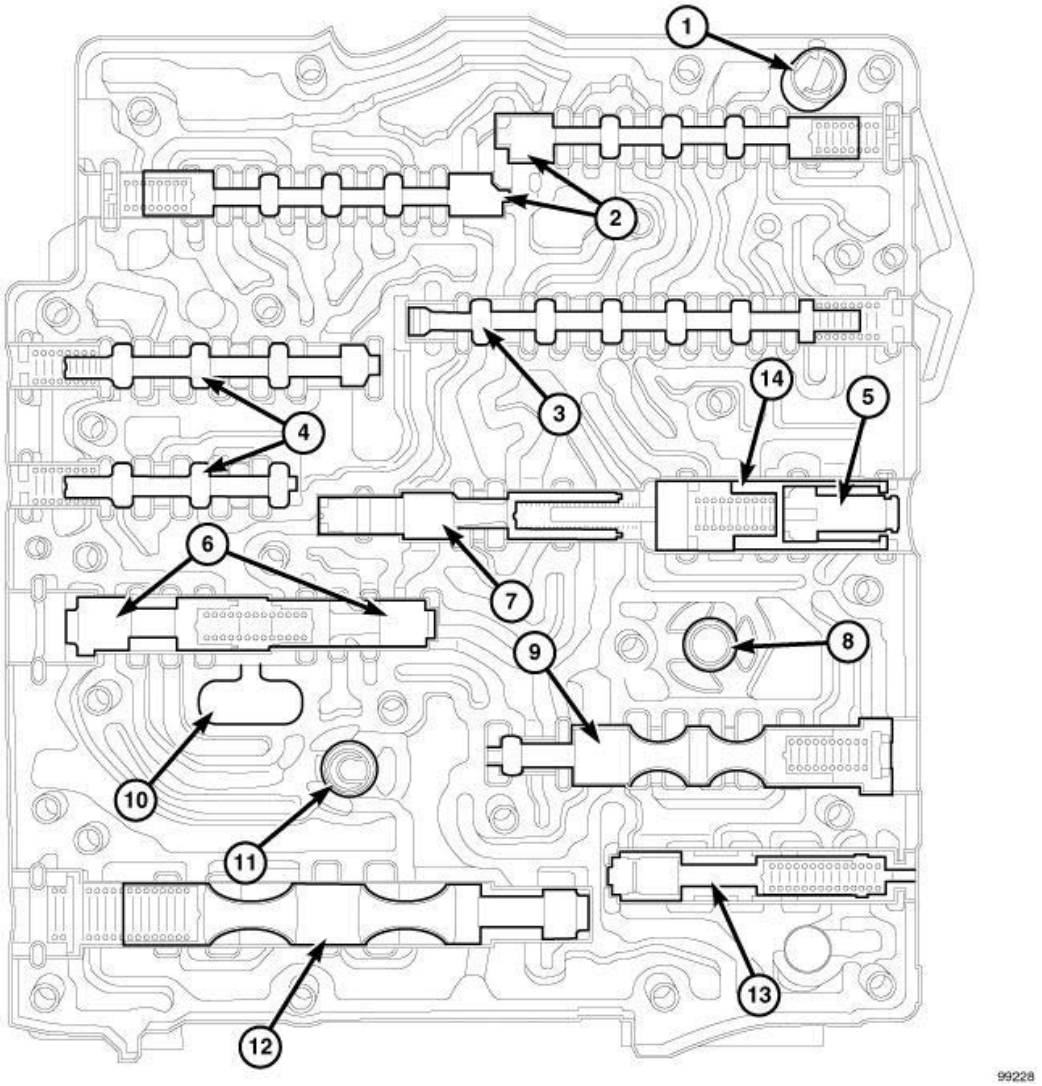


Fig. 327: Identifying Valves
Courtesy of CHRYSLER LLC

1 - Actuator Blow Off Valve	8 - Lube

	Blow-Off Valve
2 - Actuator Control Valve	9 - Cooling Shuttle Valve
3 -Odd-Even Control Valve	10 - Shift Control Shuttle Ball Check
4 - Clutch Shift Multiplex Valve	11 - Line Pressure Blow-Off Valve
5 - Thermo Cooler Bypass Valve	12 - Line Press Main Regulator Valve
6 - Shift Selector Control Valve	13 - Clutch Cooling Regulator Valve
7 - Line Pressure Cut Valve	14 - Cooler Bypass Valve

REMOVAL

REMOVAL

NOTE: If the Transaxle Control Module (TCM) is being replaced, the TCM/PCM Quick Learn procedure must be performed. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

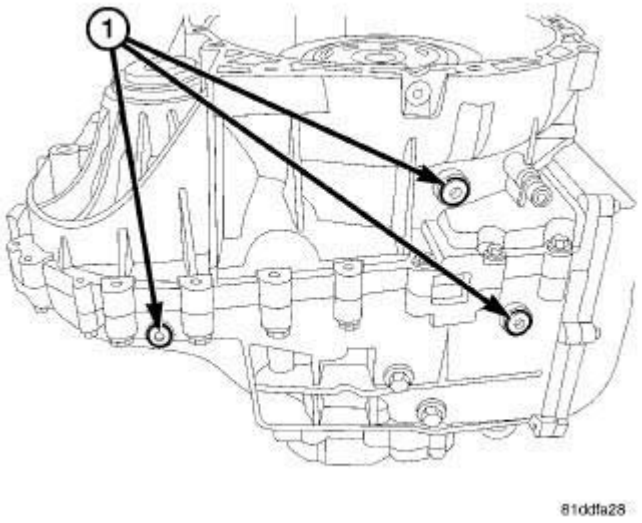


Fig. 328: DRAIN PLUGS
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the air filter housing.
3. Raise and support the vehicle.
4. If equipped, remove the engine belly pan.
5. The transaxle drain plugs (1) are located on the bottom of the transaxle differential housing. Remove all three drain plugs and allow the fluid to completely drain out of the transmission.
6. Install the drain plugs (1). Tighten drain plugs to 35 N.m (25 ft. lbs.).

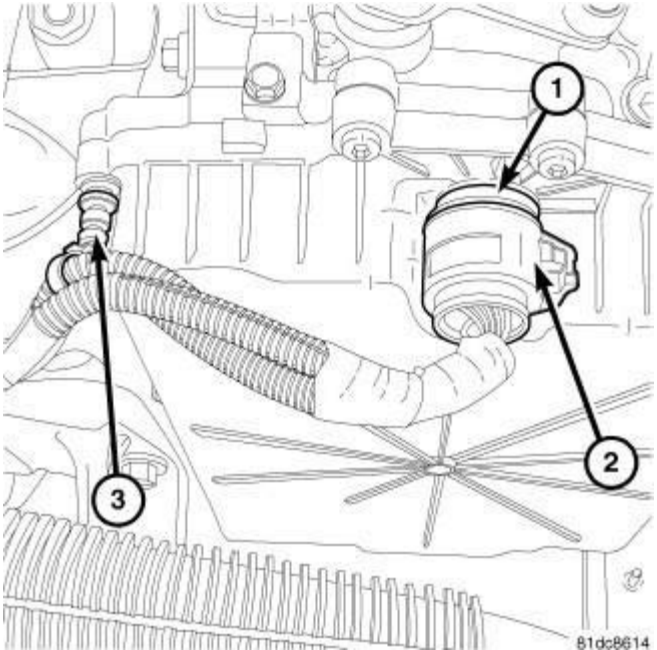


Fig. 329: Solenoid Pack Electrical Connector
Courtesy of CHRYSLER LLC

7. Disconnect the harness connector (2) from the TRS (1).
8. Remove the harness retaining clip (3) from stud at valve body cover.

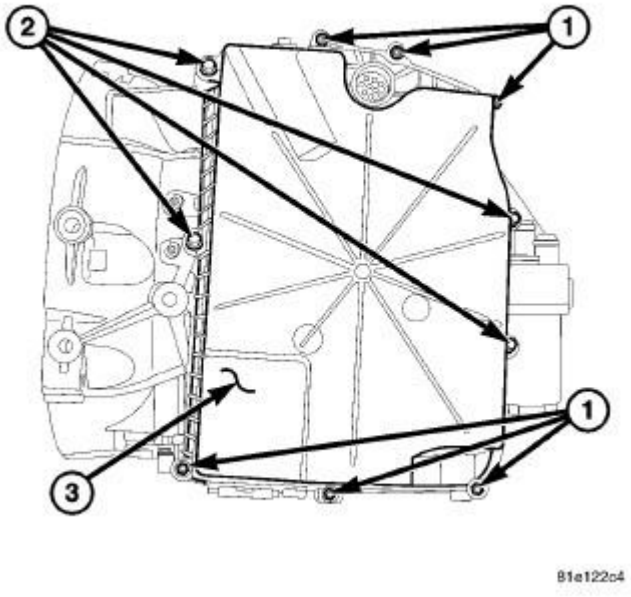


Fig. 330: Valve Body Oil Pan & Bolts
Courtesy of CHRYSLER LLC

NOTE: Mark the location of studs (2).

9. Remove the studs (2) and bolts (1) at the Transmission Control Module Assembly (TCMA)/valve body oil pan.
10. Remove the valve body oil pan (3).

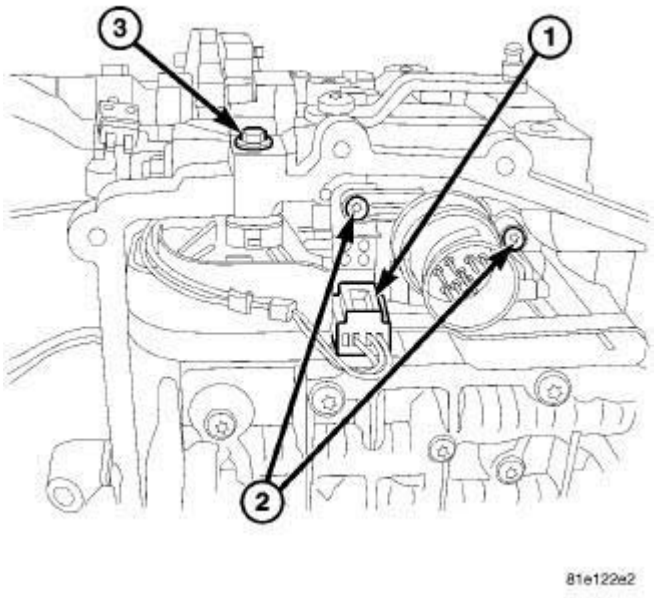


Fig. 331: TRS ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

11. Disconnect the speed sensor electrical connector (1) from the TRS.
12. Remove the bolt (3) at the TRS.
13. Remove the screws (2) at the TRS.

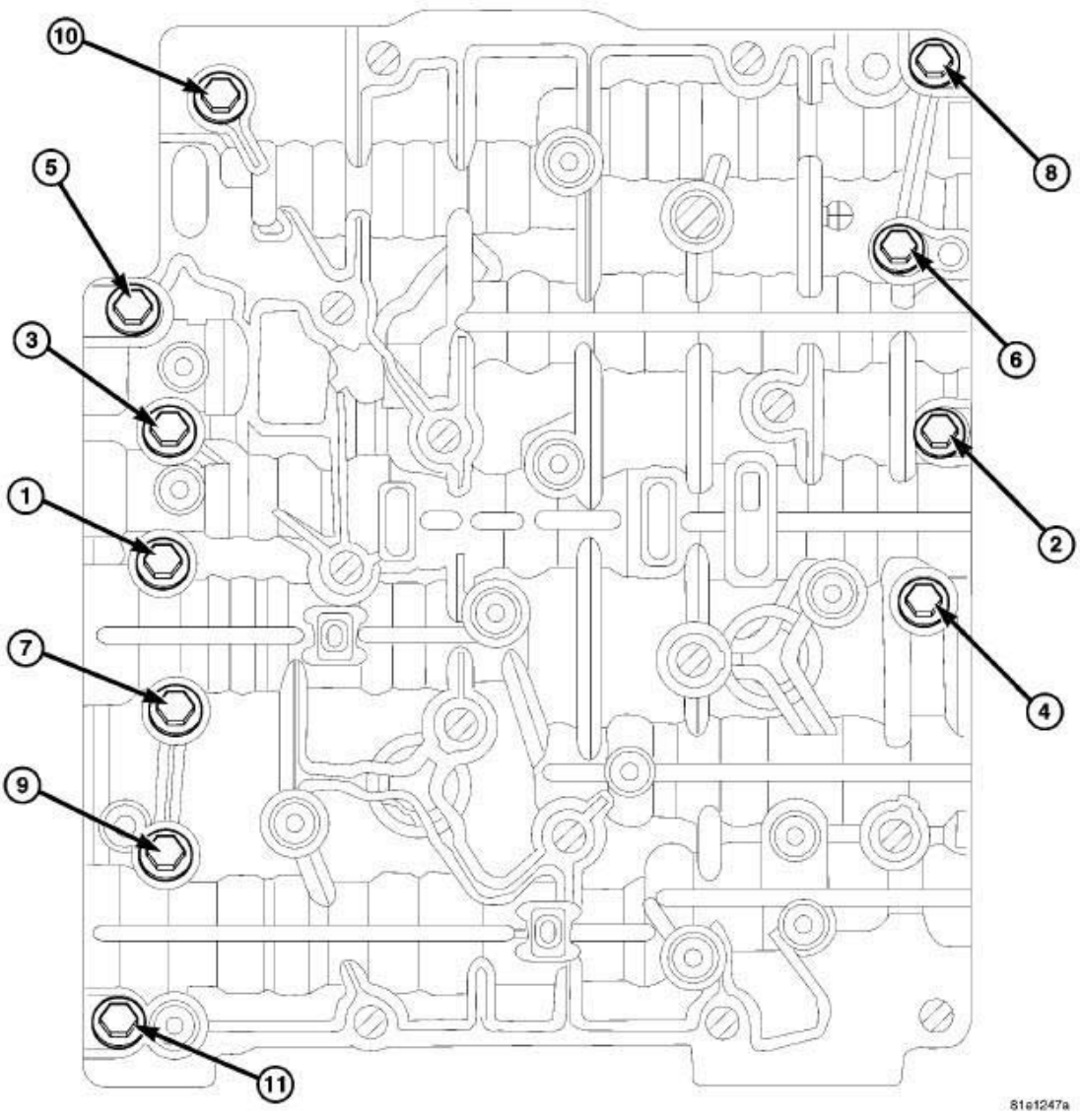


Fig. 332: VALVE BODY BOLTS
Courtesy of CHRYSLER LLC

14. Remove the eleven valve body bolts.

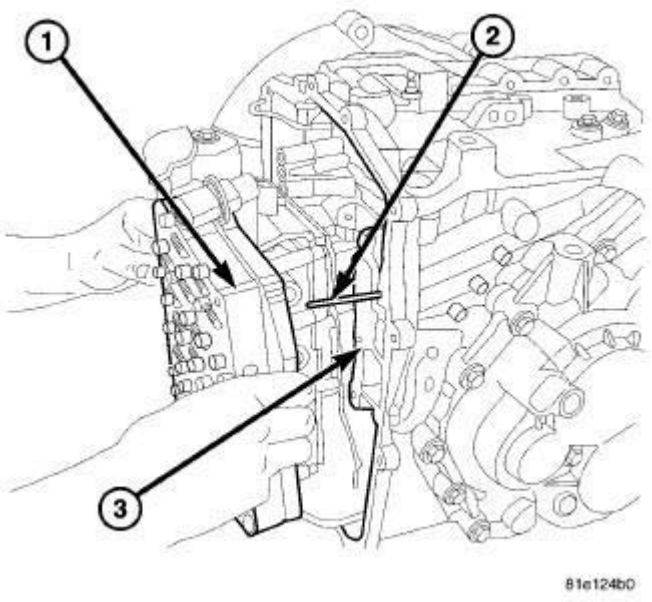


Fig. 333: Valve Body & Alignment Pins
Courtesy of CHRYSLER LLC

15. Remove the TCMA/valve body (1).

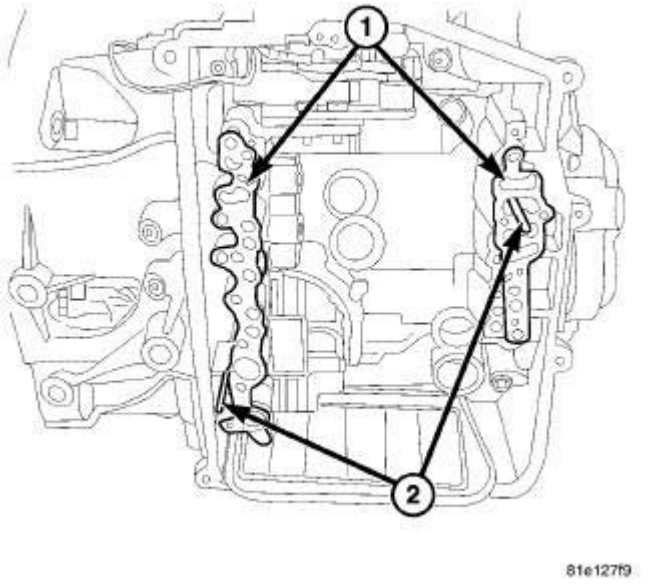


Fig. 334: VALVE BODY GASKETS
Courtesy of CHRYSLER LLC

16. Remove the metal TCMA/valve body gaskets (1).

NOTE: Make a note of alignment pin locations.

17. Remove the TCMA/valve body alignment pins (2) from the case.

DISASSEMBLY

DISASSEMBLY

NOTE: If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

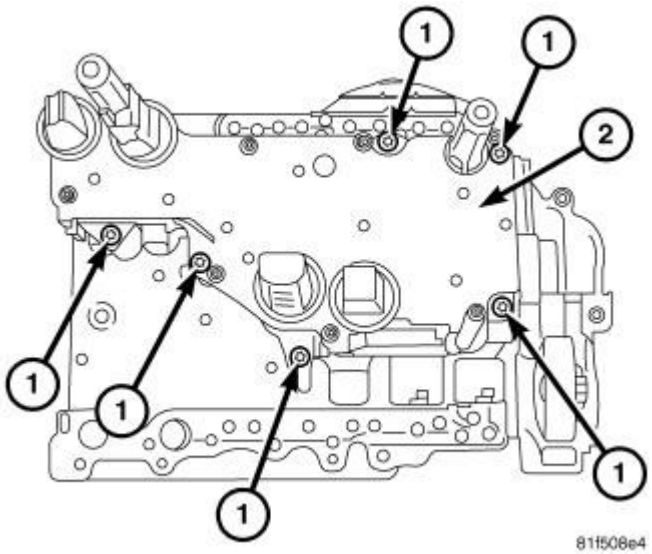


Fig. 335: TCM RANGE SENSOR
Courtesy of CHRYSLER LLC

1. Remove the O-rings
2. Remove the fasteners (1) from the TCM range sensor (2) and remove the sensor assembly.

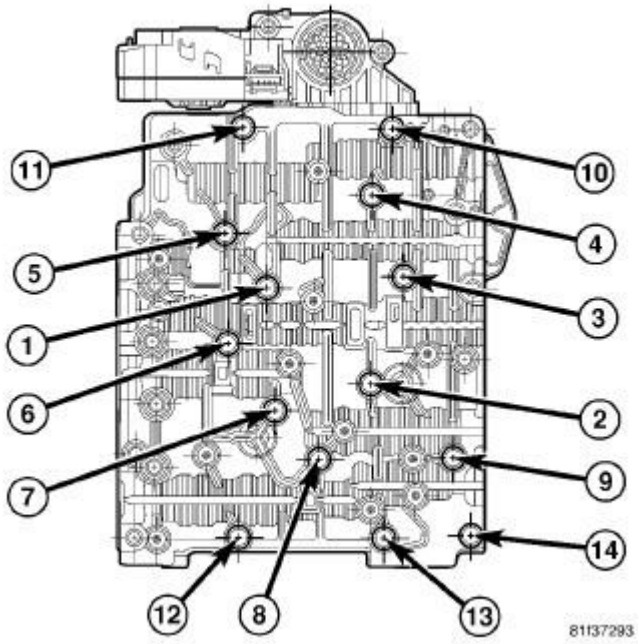


Fig. 336: Valve Body Case Half Bolts
Courtesy of CHRYSLER LLC

3. Remove the 14 valve body case half bolts.

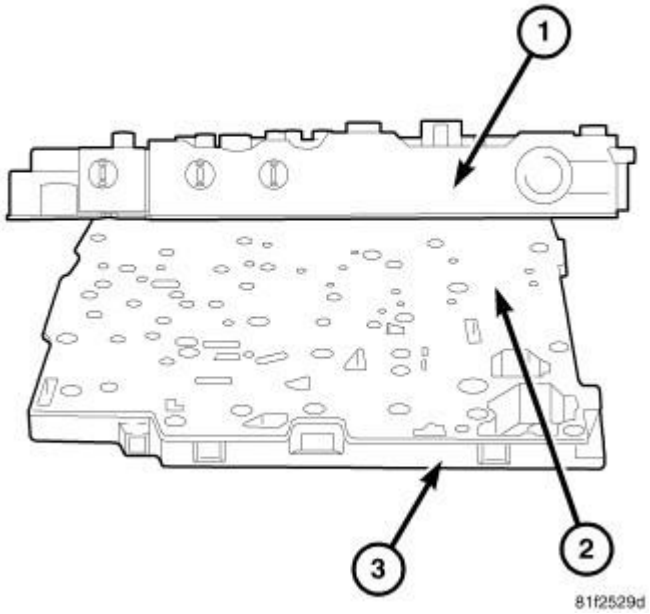


Fig. 337: Valve Body Halves
Courtesy of CHRYSLER LLC

4. Separate the valve body halves (1) and (3).

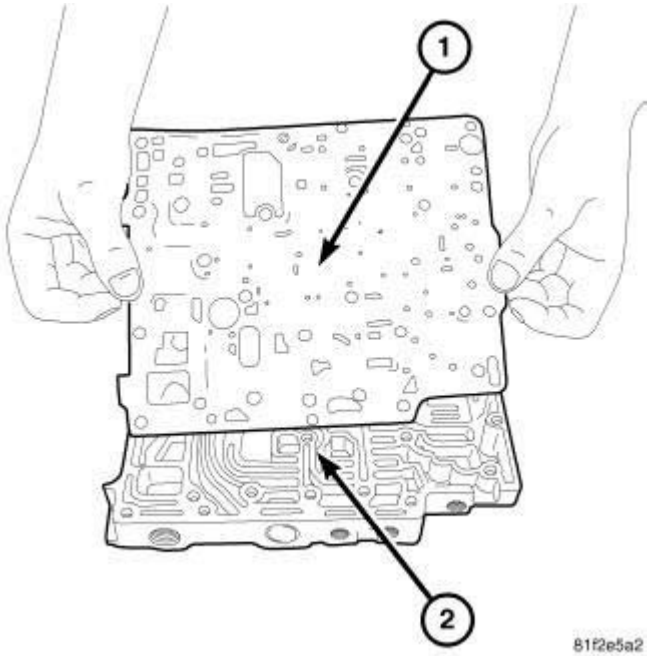


Fig. 338: Valve Body Gasket At Upper Half
Courtesy of CHRYSLER LLC

5. Remove the gasket from upper half (1).

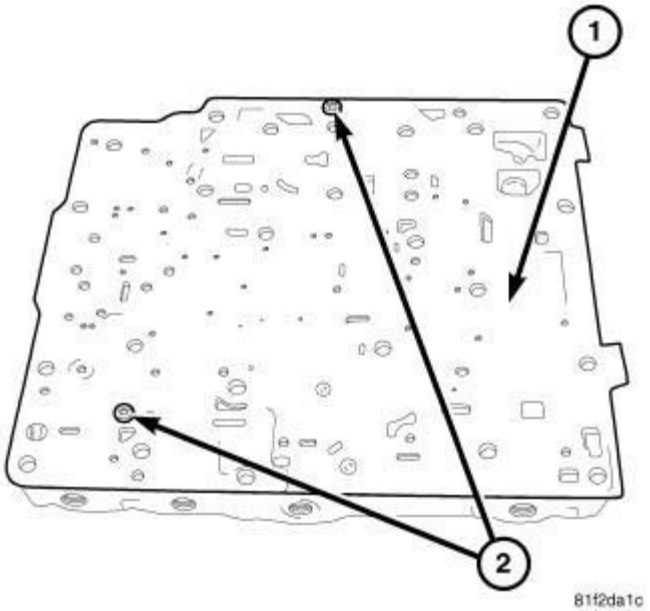


Fig. 339: Separator Plate Bolts
Courtesy of CHRYSLER LLC

6. Remove the separator plate bolts (2).

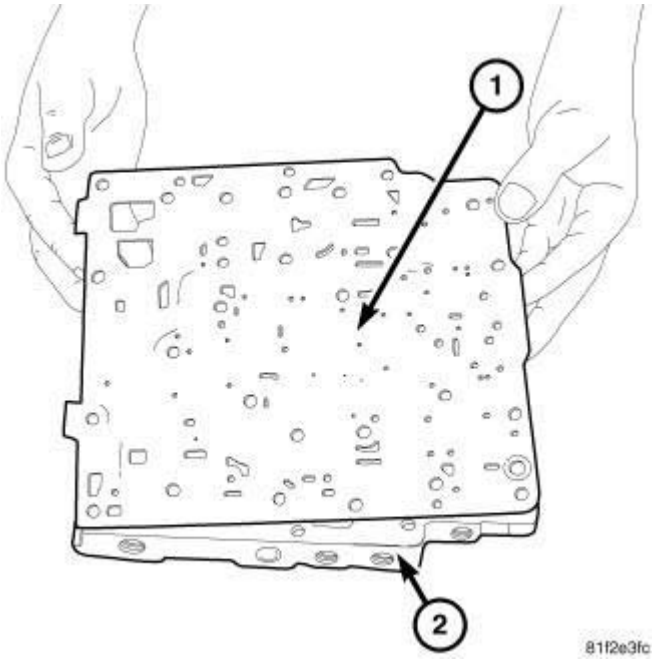


Fig. 340: Separator Plate
Courtesy of CHRYSLER LLC

7. Remove the separator plate (1).
8. Remove the steel check ball and spring.

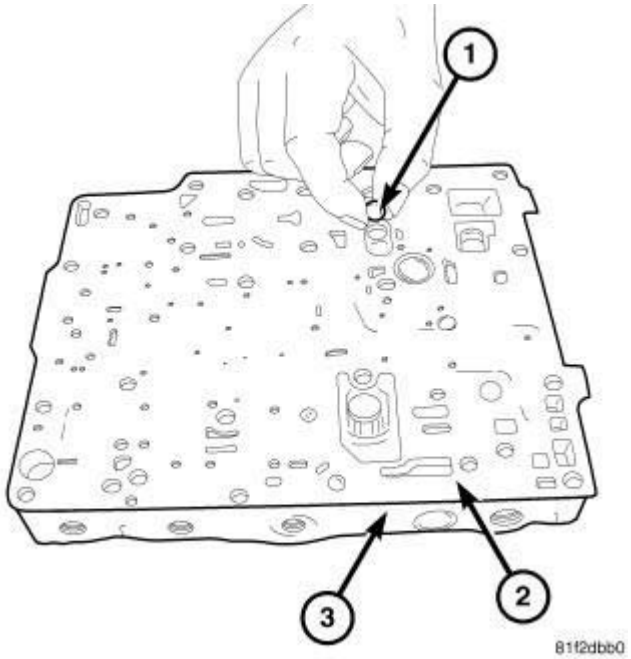


Fig. 341: PLASTIC CHECK BALL
Courtesy of CHRYSLER LLC

9. Remove the plastic check ball.

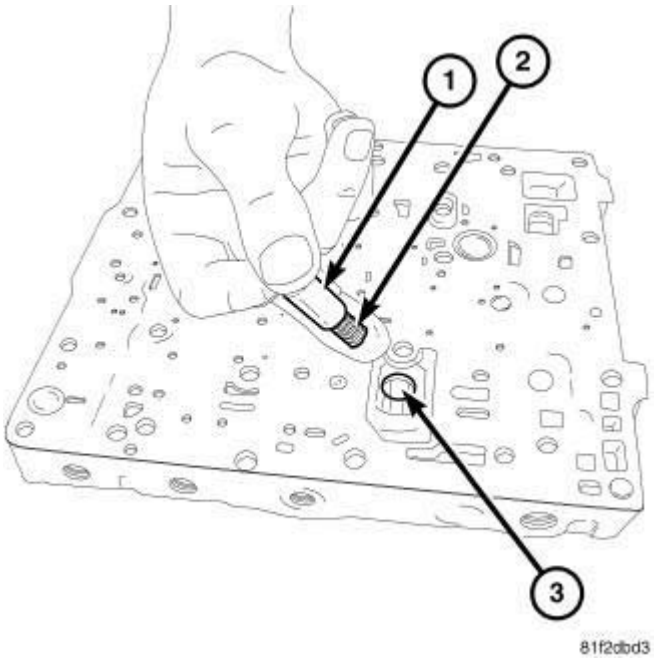


Fig. 342: Valve Body Spring And Valve
Courtesy of CHRYSLER LLC

10. Remove the valve (1) and spring (2).

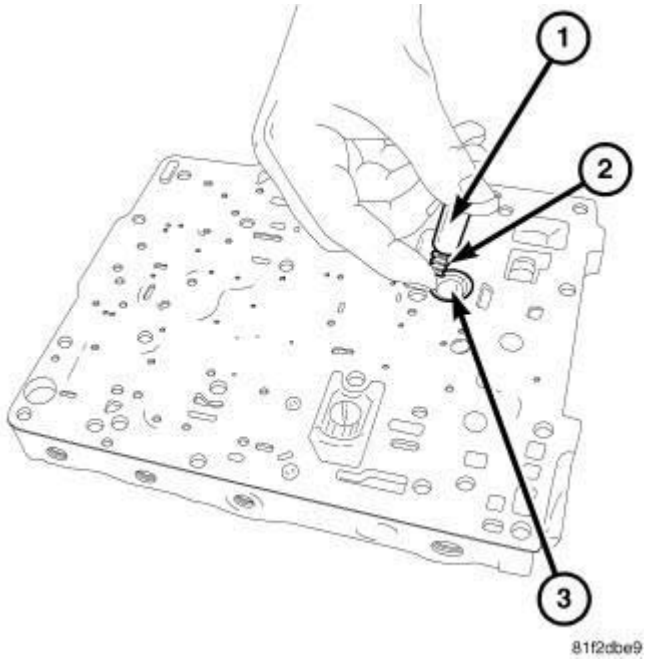


Fig. 343: Heavy Spring & Valve
Courtesy of CHRYSLER LLC

11. Remove the valve (1) and heavy spring (1).
12. Remove the gasket from bottom.

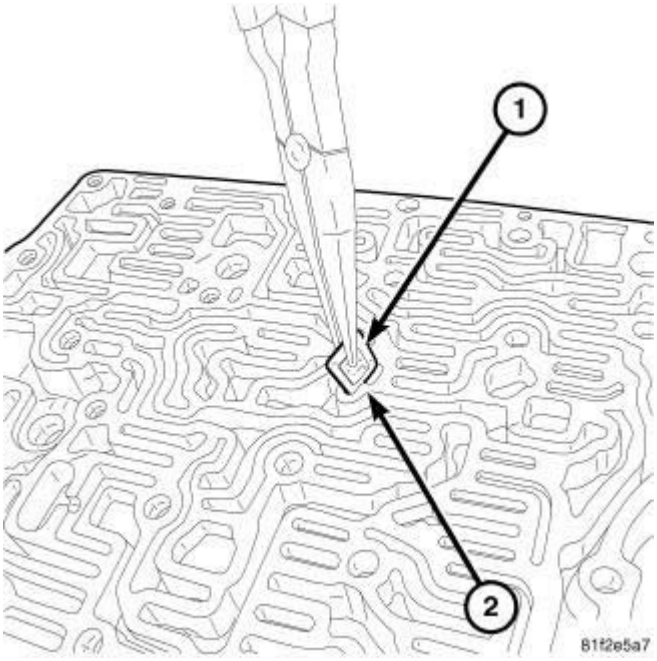


Fig. 344: SCREEN
Courtesy of CHRYSLER LLC

13. Remove the screen (1).

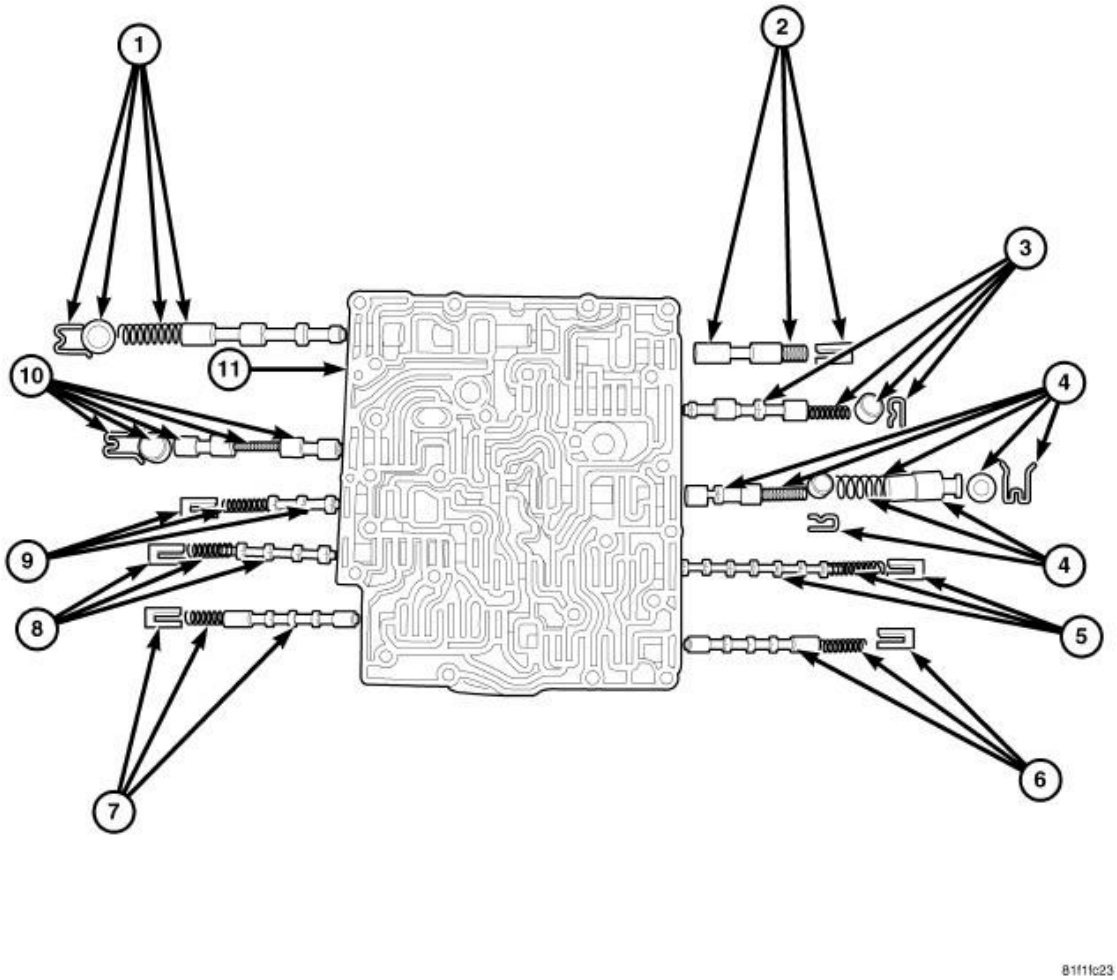


Fig. 345: Exploded View Of Valve Body Components
Courtesy of CHRYSLER LLC

14. Remove retaining C-clips, valves and return springs.

ASSEMBLY

ASSEMBLY

NOTE: If transaxle assembly or Transaxle Control Module (TCM) is being overhauled or replaced, it is necessary to perform the TCM/PCM Quick Learn Procedure. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

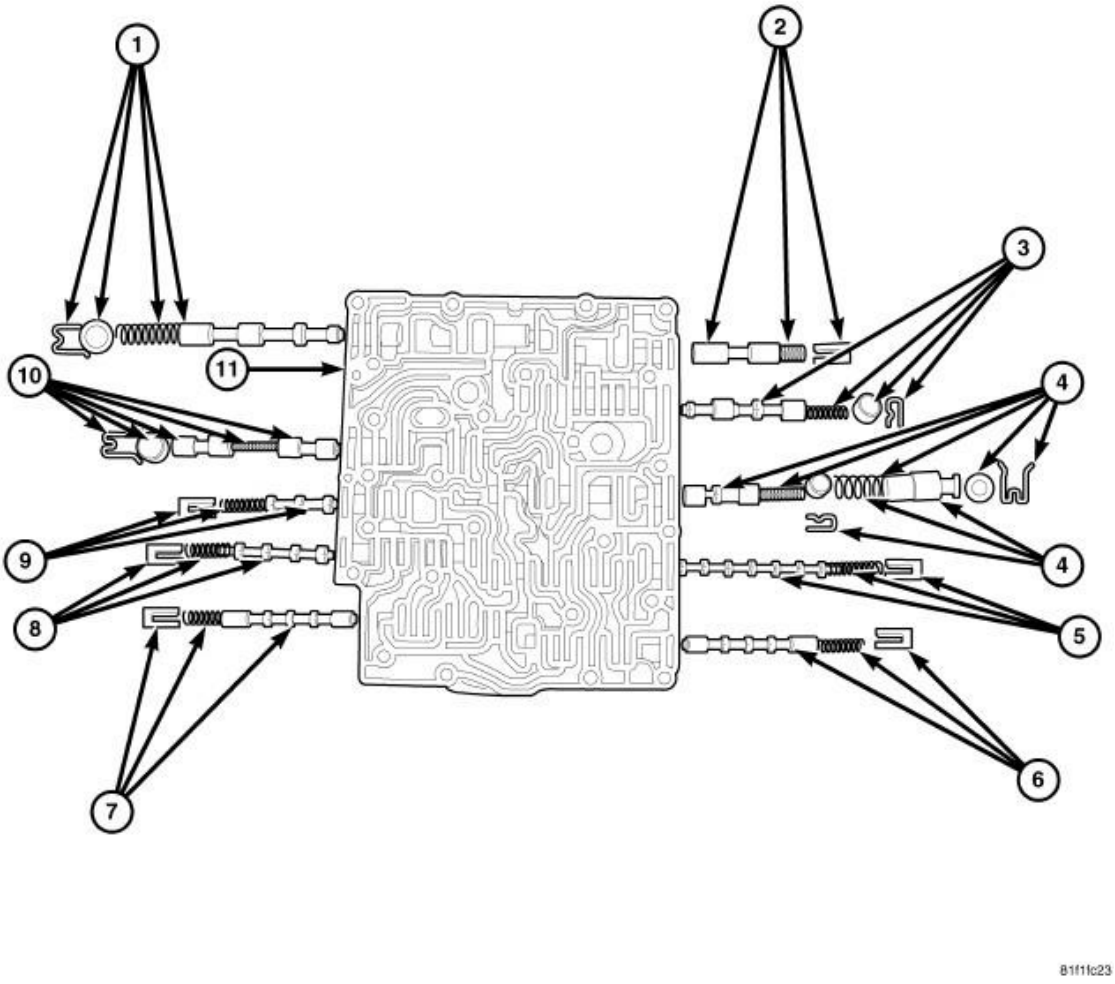


Fig. 346: Exploded View Of Valve Body Components
Courtesy of CHRYSLER LLC

1. Install retaining C-clips, valves and return springs.

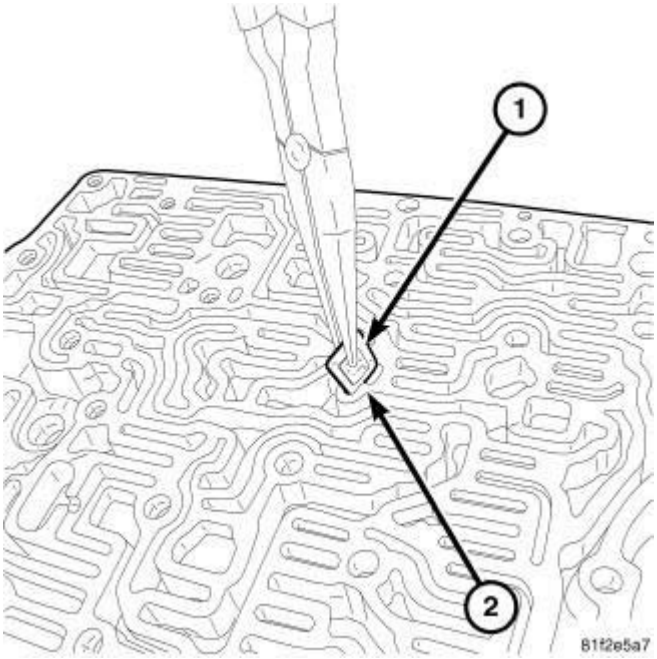


Fig. 347: SCREEN
Courtesy of CHRYSLER LLC

2. Install the screen (1).
3. Install the gasket.

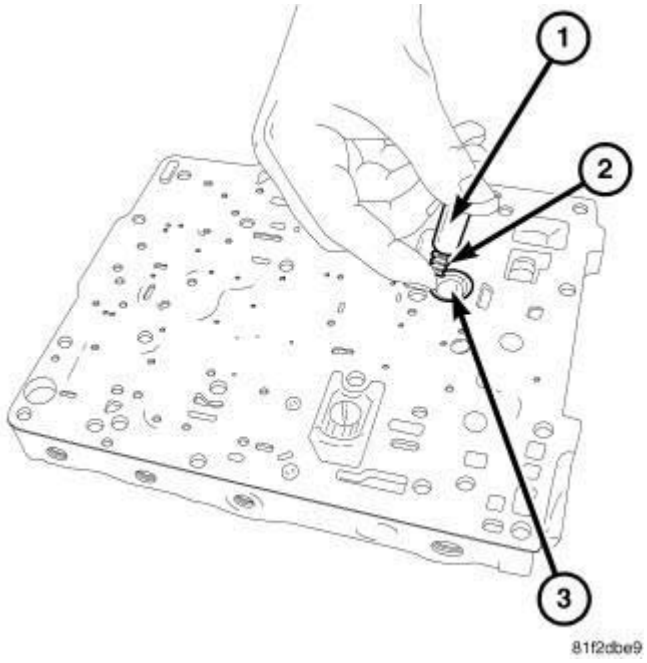


Fig. 348: Heavy Spring & Valve
Courtesy of CHRYSLER LLC

4. Install the valve (1) and heavy spring (1).

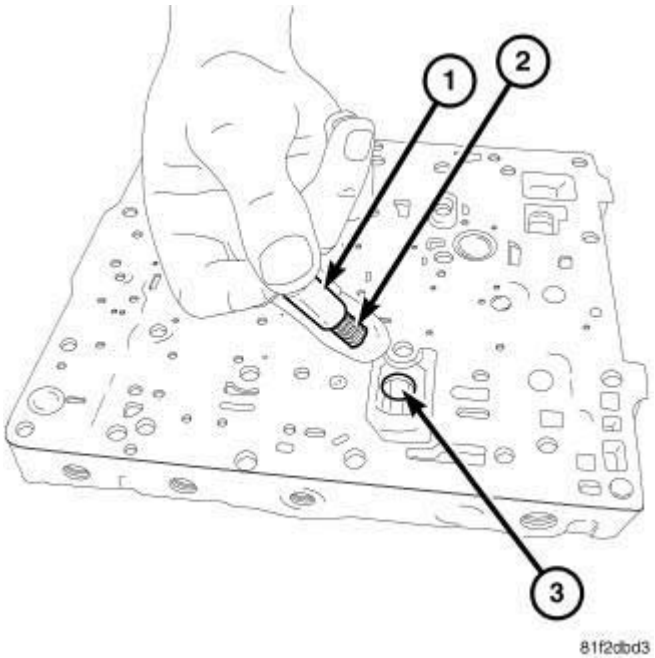


Fig. 349: Valve Body Spring And Valve
Courtesy of CHRYSLER LLC

5. Install the valve and spring.

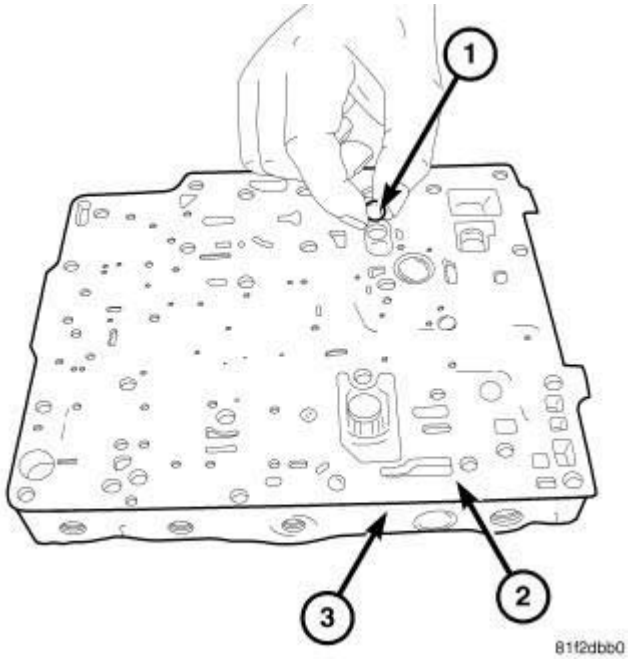


Fig. 350: PLASTIC CHECK BALL
Courtesy of CHRYSLER LLC

6. Install the plastic check ball (1).
7. Install the steel check ball and spring.

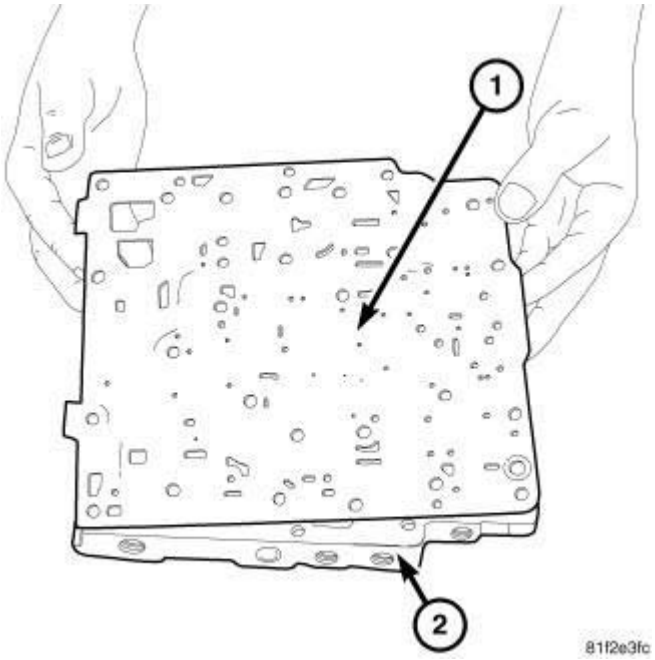


Fig. 351: Separator Plate
Courtesy of CHRYSLER LLC

8. Install the separator plate (1).

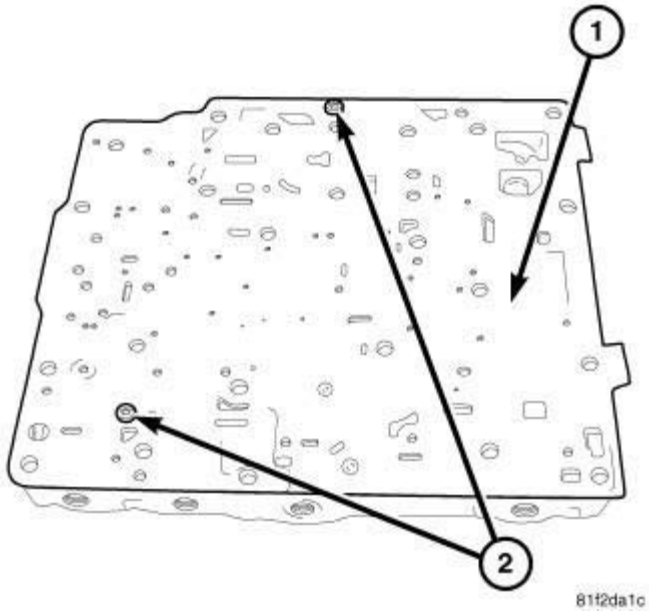


Fig. 352: Separator Plate Bolts
Courtesy of CHRYSLER LLC

9. Install the separator plate bolts (2).

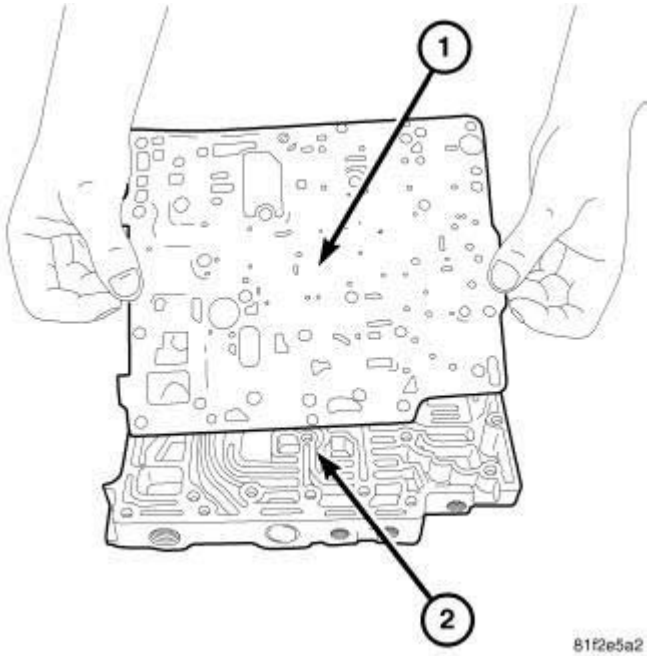


Fig. 353: Valve Body Gasket At Upper Half
Courtesy of CHRYSLER LLC

10. Install the gasket (1) to upper half of valve body.

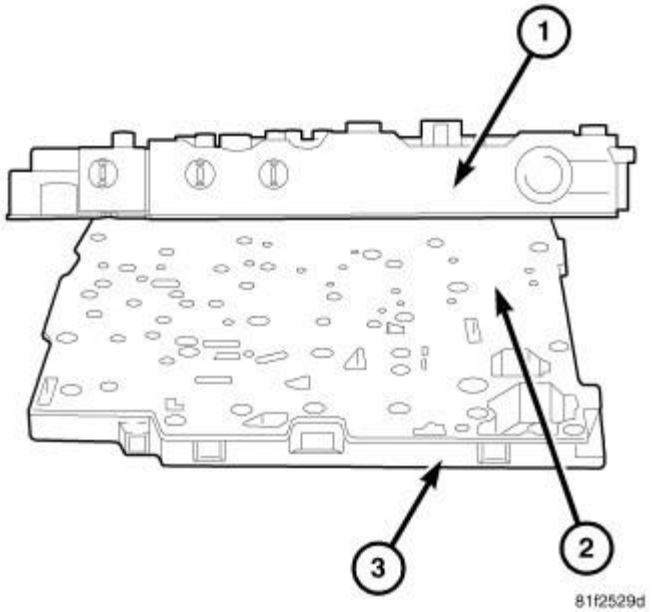


Fig. 354: Valve Body Halves
Courtesy of CHRYSLER LLC

11. Assembly the valve body halves (1) and (3).

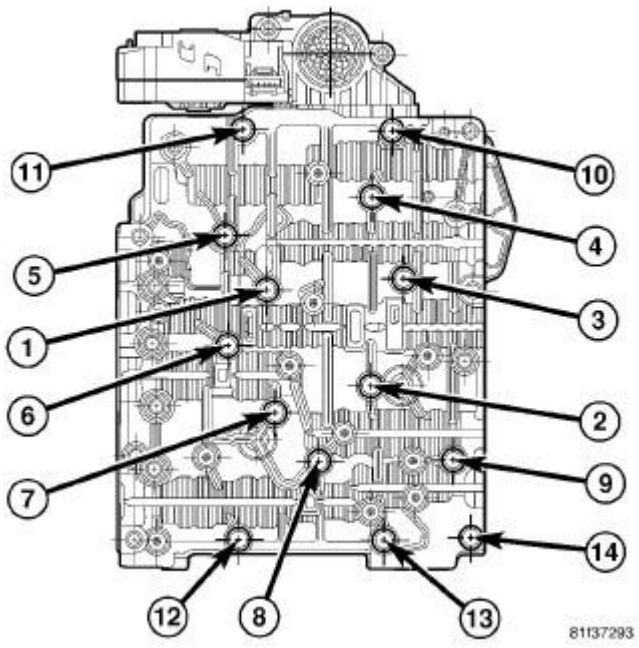


Fig. 355: Valve Body Case Half Bolts
Courtesy of CHRYSLER LLC

12. Install the 14 case half bolts in the order shown in illustration.

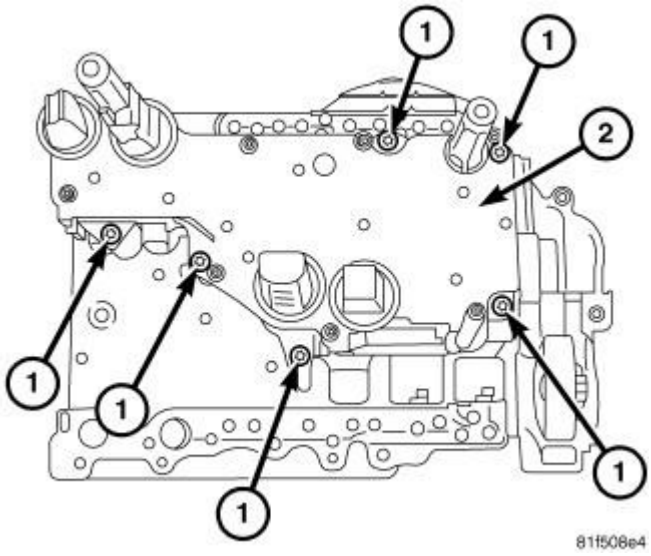


Fig. 356: TCM RANGE SENSOR
Courtesy of CHRYSLER LLC

13. Install the TCM range sensor (2), and the TCM range sensor fasteners (1).
14. Install the O-Rings.

INSTALLATION

INSTALLATION

NOTE: If the Transaxle Control Module (TCM) is being replaced, the TCM/PCM Quick Learn procedure must be performed. Refer to Electrical/Electronic Control Modules/MODULE, Powertrain Control - Standard Procedure .

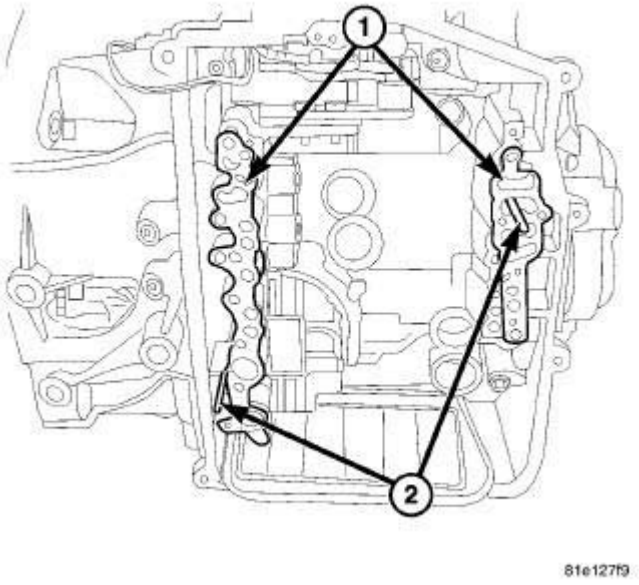


Fig. 357: VALVE BODY GASKETS
Courtesy of CHRYSLER LLC

NOTE: The valve body alignment pins are flared at the base. The narrow end is used to align the valve body during assembly.

NOTE: There are four pins, two short ones, and two long ones.

1. Install the valve body alignment pins (2) into the case in the same positions they were removed from during disassembly.
2. Clean and install the metal valve body gaskets (1).

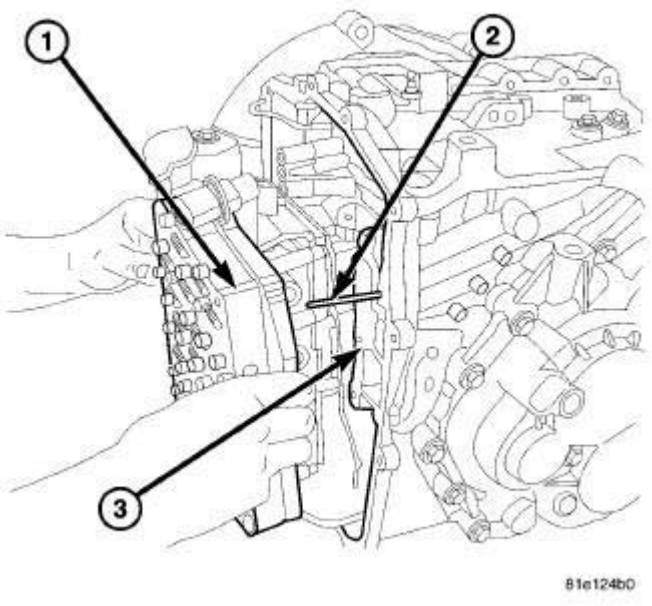


Fig. 358: Valve Body & Alignment Pins
Courtesy of CHRYSLER LLC

3. Move the manual lever to the Drive position.
4. Install new rubber seals on the four valve body towers.
5. Verify the speed sensor wire is positioned so that it will not get pinched between the valve body mounting surfaces during installation of the valve body.
6. Verify that the metal valve body gaskets are installed on the alignment posts.
7. Install a pin/drill bit into the TRS tone wheel.
8. Install the valve body (1).

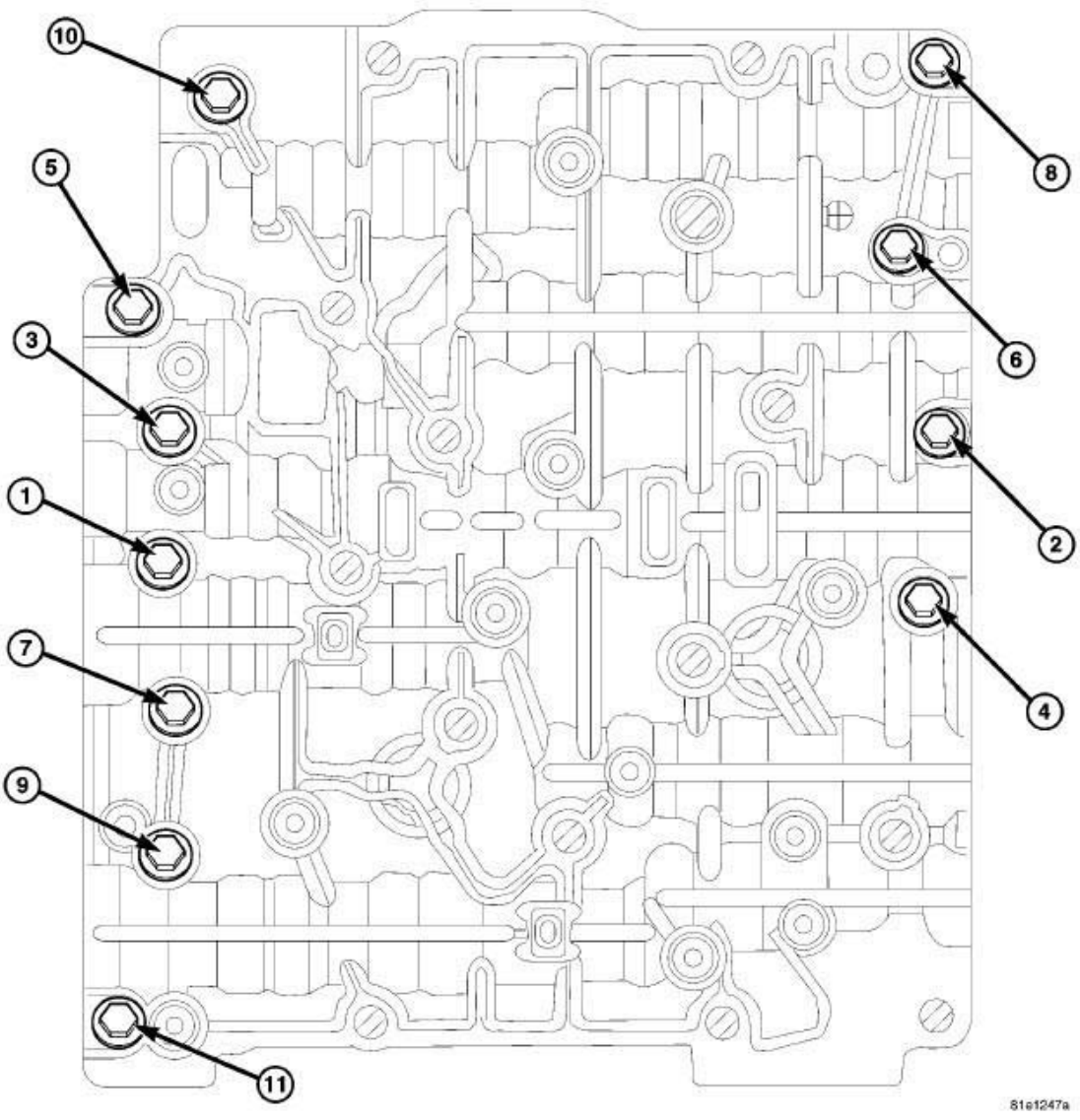


Fig. 359: VALVE BODY BOLTS
Courtesy of CHRYSLER LLC

9. Install the eleven valve body bolts and tighten in two stages in the sequence shown in illustration. In the first stage, tighten the valve body bolts 5 Nm (44 in. lbs.). In the second stage, tighten the valve body bolts to 10 N.m (88 in. lbs.).

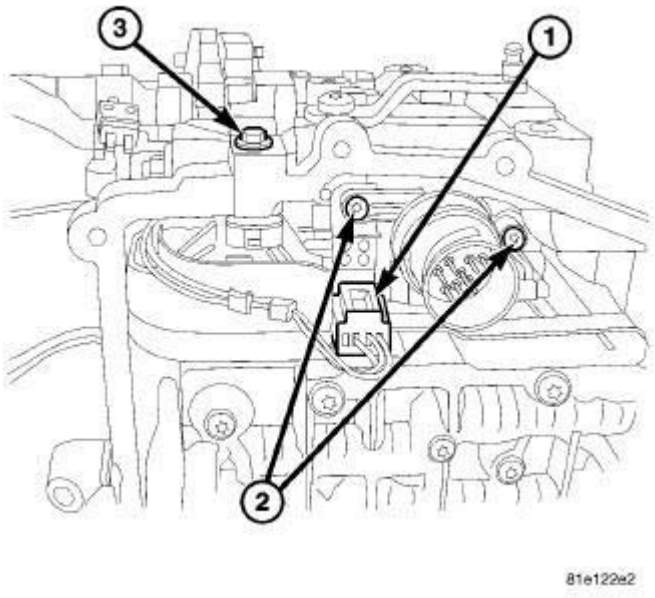


Fig. 360: TRS ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

NOTE: Maintain pin/drill bit position in the TRS hole and verify the manual lever stays in the Drive position during TRS installation.

10. Install the TRS into the case.
11. Install the screws (2) at the TRS and tighten to 6 N.m (53 in. lbs.).
12. Install the bolt (3) and a new O-ring at the TRS and tighten to 7 N.m (70 in. lbs.).
13. Remove the previously installed pin/drill bit from the TRS tone wheel.
14. Connect the speed sensor electrical connector (1) to the TRS.

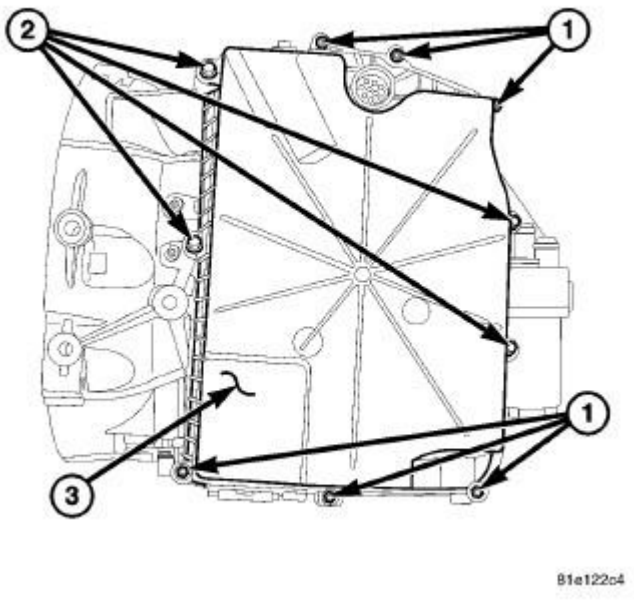


Fig. 361: Valve Body Oil Pan & Bolts
Courtesy of CHRYSLER LLC

15. Install the valve body oil pan (3).
16. Install the bolts (1 and 2) at the valve body oil pan and tighten to 8 N.m (70 in. lbs.)

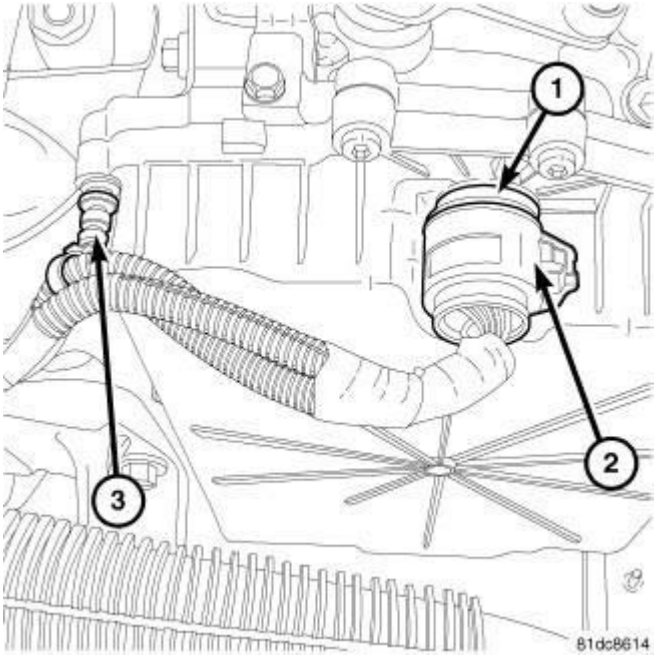


Fig. 362: Solenoid Pack Electrical Connector
Courtesy of CHRYSLER LLC

17. Install the harness retaining clip (3) to the stud at valve body cover.
18. Connect the electrical connector (2) to the TRS (1).

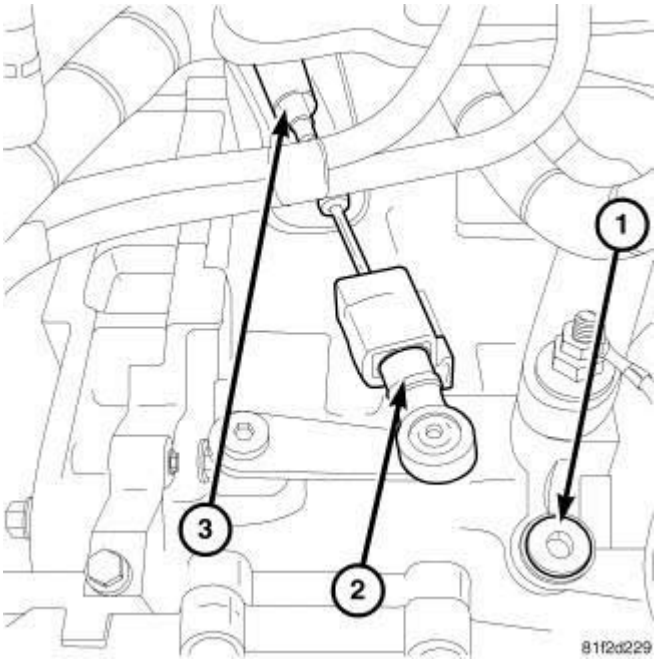


Fig. 363: FILL PLUG
Courtesy of CHRYSLER LLC

19. Lower the vehicle.
20. Remove the transaxle fill plug (1) located on the top of the transaxle.

NOTE: Use only BOT 341 fluid which is a full synthetic SAE 75W transmission fluid.

21. Add approximately 5.5 Liters of BOT 341 fluid and temporarily install the transaxle fill plug.
22. Start the vehicle and allow the engine to reach normal operating temperature This may take up to 15 minutes if the engine and transmission are cold.
23. Apply the brake and slowly cycle the gear shift through all ranges.

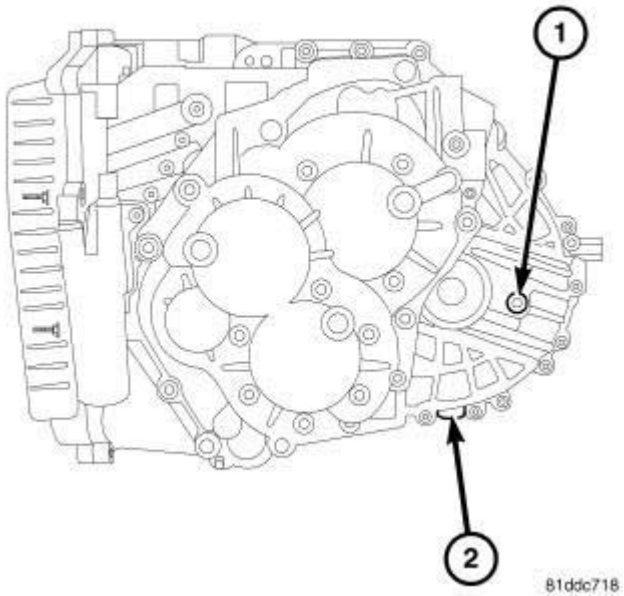


Fig. 364: DRAIN AND FILL PLUGS
Courtesy of CHRYSLER LLC

24. Shut off the engine, raise and support the vehicle and remove the transaxle fluid level check plug.
25. The fluid level should be at the top of the transaxle check hole (1) approximately 5.5 Liters. The vehicle must be level and the engine and transaxle must be warm when checking the level of the fluid. If the external transmission oil filter has been replaced, then an additional 0.1 Liter of BOT 341 fluid may be required. If the transaxle cooler and lines are empty, approximately 0.52 Liters of fluid may be required
26. When the fluid is at the correct level, install the transaxle fluid level check plug. Tighten the check plug (1) to 35 N.m (25 ft. lbs.).
27. If equipped, install the engine belly pan.

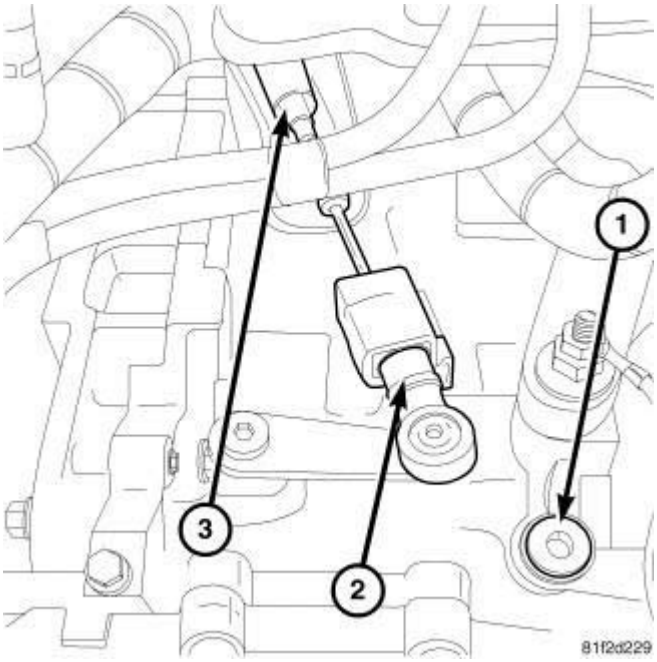


Fig. 365: FILL PLUG
Courtesy of CHRYSLER LLC

28. Lower the vehicle.
29. Install the transaxle fill plug (1) on the top of the transaxle. Tighten fill plug (1) to 35 N.m (25 ft. lbs.).
30. Install the air filter housing.
31. Reconnect the negative battery cable.

2009 MANUAL TRANSMISSION

BG6 - Service Information - Journey

DESCRIPTION

DESCRIPTION

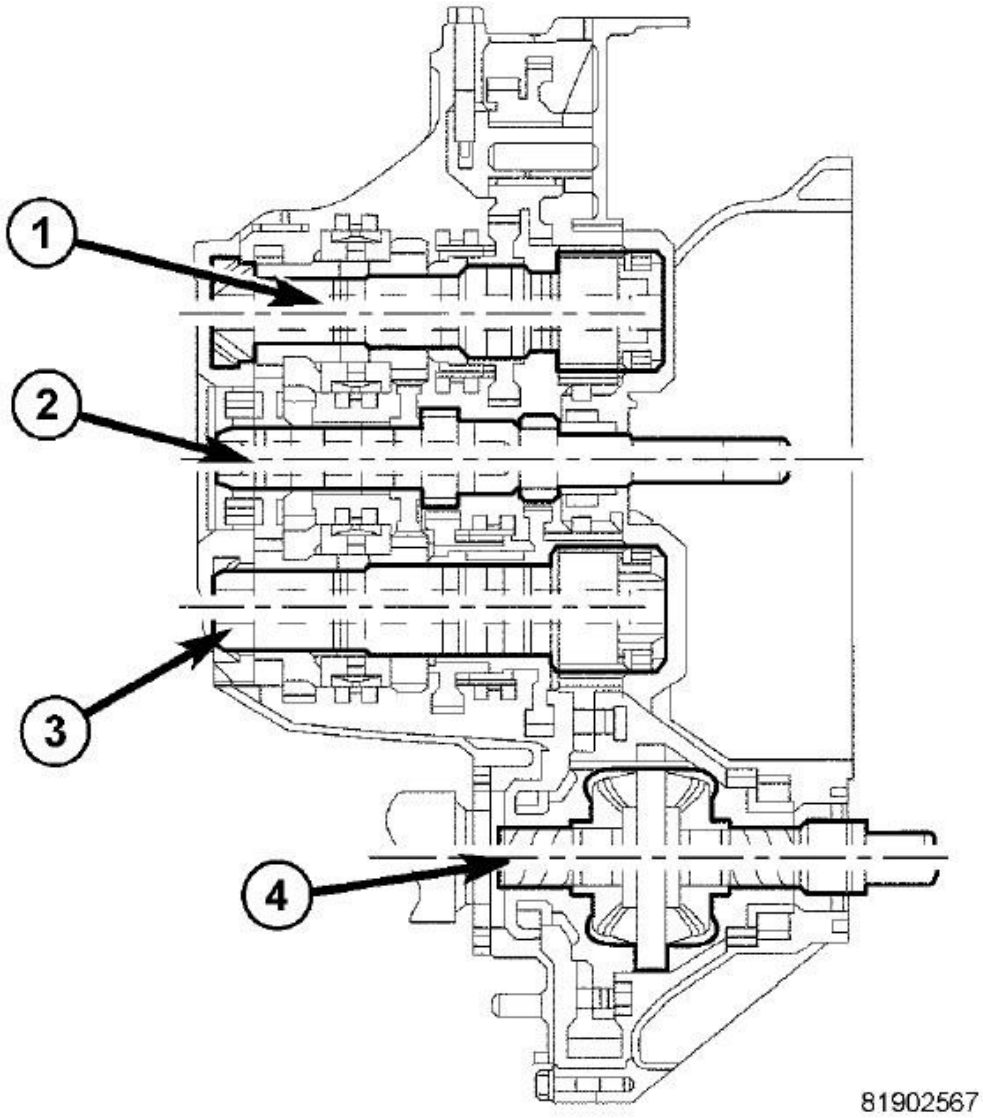


Fig. 1: BG6 Manual Transaxle
Courtesy of CHRYSLER LLC

1 - OUTPUT SHAFT #2
2 - INPUT SHAFT
3 - OUTPUT SHAFT #1
4 - DIFFERENTIAL

The Aisin BG 6 6-speed transaxle is a constant-mesh transaxle that is synchronized in all gear ranges.

The BG 6 transaxle is a three-shaft design, as opposed to the more common two shaft configuration, to reduce overall length of the unit for easier packaging in the vehicle. The extra shaft is an output shaft. Ratios 1-4 are on one output shaft (2); ratios 5, 6 and Reverse are on the second shaft (1). Each output shaft has a different final drive ratio, which is also different from most transaxles. All ratios are synchronized.

Synchronizers are mounted on the output shafts (1, 3) to reduce the size of the transaxle. Triple-cone synchronizers on 1st through 3rd and dual-cone synchronizers 4th and 5th gears ensure that the rotating masses of gears, shafts and the clutch disc can accelerate quickly for fast, smooth shifting.

The four-plane shift mechanism is cable operated and incorporates a pull-up ring on the shift lever that must be lifted to engage Reverse. This prevents unintentional selection of Reverse when attempting to select 1st gear. Rubber isolation of the shift system at the transaxle minimizes noise carried along the cables to the car's interior.

GEAR RATIOS

GEAR	RATIO
1ST	3.54
2ND	2.05
3RD	1.37
4TH	0.97
5TH	0.90
6TH	0.79
REVERSE	3.83
Final Drive Ratio (FDR)	4.06 or 3.45*
Overall Top Gear	2.73
*Gears 1-4 use the 4.06 final drive; gears 5th, 6th and Reverse use the 3.45 ratio.	

DIAGNOSIS AND TESTING

COMMON PROBLEM CAUSES

The majority of transaxle malfunctions are a result of:

- Insufficient lubrication
- Incorrect lubricant
- Misassembled or damaged internal components
- Improper operation

HARD SHIFTING

Hard shifting may be caused by a misadjusted crossover cable. If hard shifting is accompanied by gear clash, synchronizer clutch and stop rings or gear teeth may be worn or damaged.

Misassembled synchronizer components also cause shifting problems. Incorrectly installed synchronizer sleeves, struts, or springs can cause shift problems.

Worn, damaged, misassembled or leaking hydraulic clutch release system/components can also cause difficult shifting or gear clash.

NOISY OPERATION

Transaxle noise is most often a result of worn or damaged components. Chipped, broken gear or synchronizer teeth, and brinnelled, spalled bearings all cause noise.

Abnormal wear and damage to the internal components is frequently the end result of insufficient lubricant.

SLIPS OUT OF GEAR

Transaxle disengagement may be caused by misaligned or damaged shift components, or worn teeth on the drive gears or synchronizer components. Incorrect assembly also causes gear disengagement.

LOW LUBRICANT LEVEL

Insufficient transaxle lubricant is usually the result of leaks, or inaccurate fluid level check or refill method. **Vehicle must be level to accurately check fluid level.** Leakage is evident by the presence of oil around the leak point. If leakage is not evident, the condition is probably the result of an underfill.

If air-powered lubrication equipment is used to fill a transaxle, be sure the equipment is properly calibrated. Equipment out of calibration can lead to an under fill condition.

CLUTCH PROBLEMS

Worn, damaged, or misaligned clutch components can cause difficult shifting, gear clash, and noise.

A worn or damaged clutch disc, pressure plate, or a faulty slave cylinder can cause hard shifting and gear clash.

REMOVAL

REMOVAL

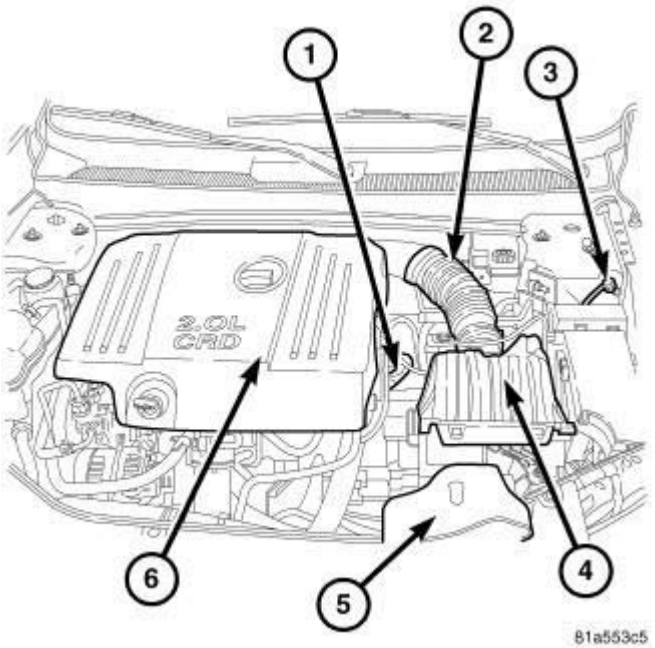


Fig. 2: Engine Cover
Courtesy of CHRYSLER LLC

Remove the engine cover.

1. Disconnect battery negative cable.
2. Remove air inlet tube (2) and air cleaner assembly (4). Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .

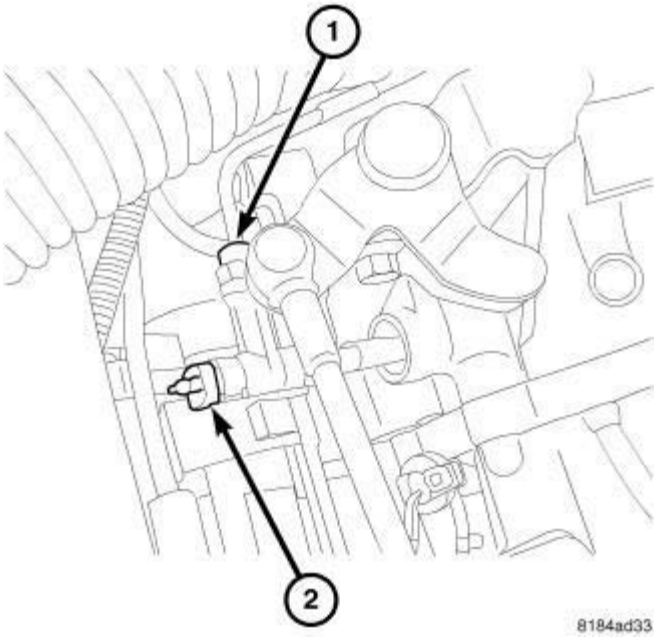


Fig. 3: Bleeder At Slave Cylinder

Courtesy of CHRYSLER LLC

3. Remove hydraulic line (1) and the bleed adaptor (2) at the slave cylinder.

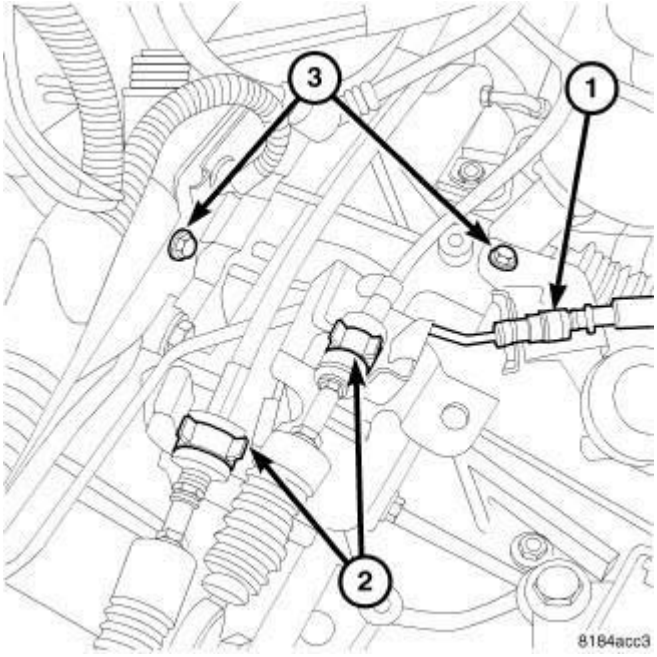


Fig. 4: Hydraulic Line
Courtesy of CHRYSLER LLC

NOTE: Do not remove the shifter cable brackets from the transmission or loosen the bolts.

4. Remove clip (1) to the hydraulic clutch slave cylinder.
5. Release clips (2) at the shift cables and lift cables out of bracket slot.
6. Remove the bolts (3) at the clutch hydraulic line and move the line out of the way.

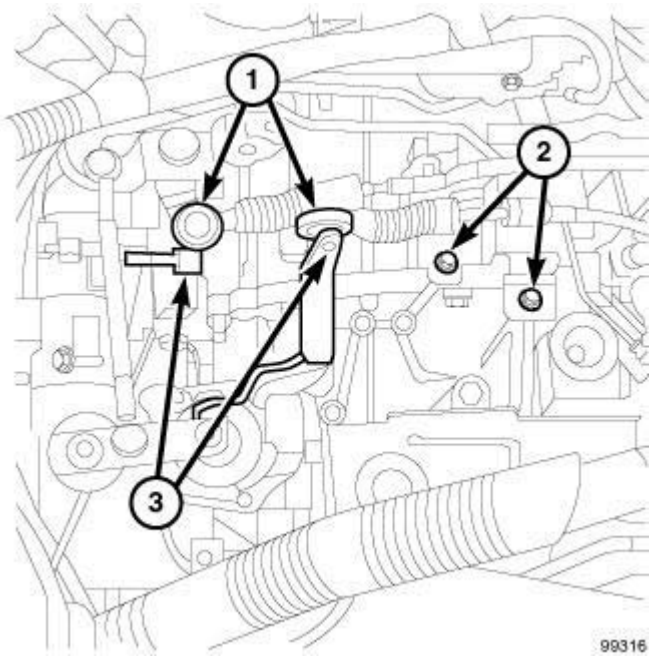


Fig. 5: Shift Cables & Bracket
Courtesy of CHRYSLER LLC

NOTE: Never loosen the shift cable bracket bolts (2) for just removal. If the transmission is disassembled, see Adjustments.

CAUTION: Insure the shift levers are not deformed when removing cables.

7. Remove shift cables from shift levers (3) by tilting cable and prying from beneath with screwdriver tip.
8. Unplug connectors and move wiring harness at the top of the transmission out of the way.

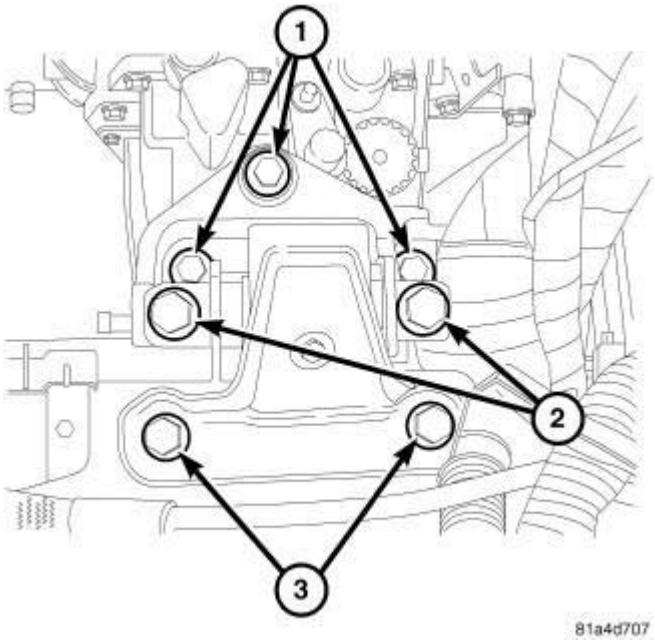


Fig. 6: Left Bracket To Transmission Bolts
Courtesy of CHRYSLER LLC

9. Support transmission with a jack.
10. Remove the bolts at the upper transmission mount (2).
11. Remove the upper bell housing bolts.
12. Remove the Jack from the transmission.

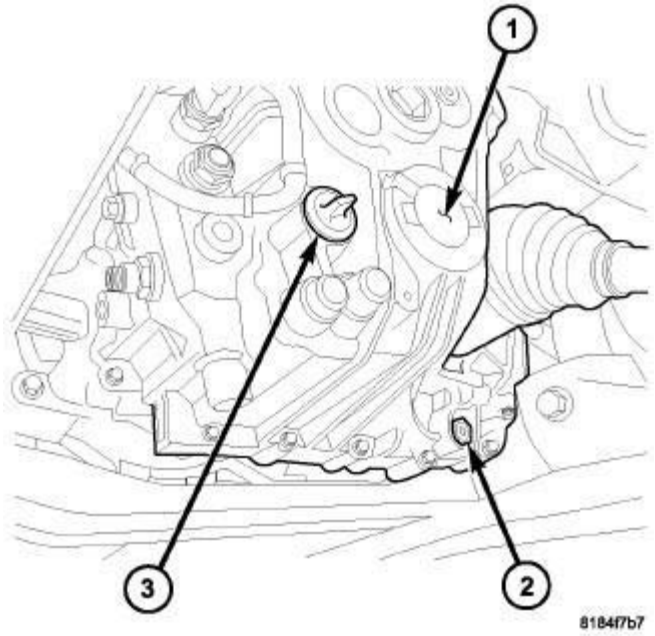


Fig. 7: Drain Plug
Courtesy of CHRYSLER LLC

13. Raise the vehicle on the hoist.
14. Remove left front and lower splash shields. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
15. Remove the drain plug (2) and drain the transmission fluid.
16. Remove both front wheels.
17. Remove the right and left halfshafts. Refer to **Differential and Driveline/Half Shaft - Removal** .

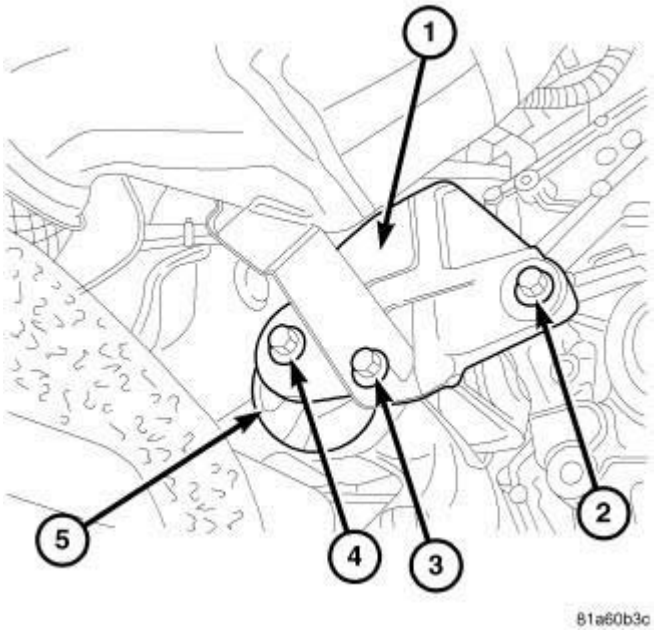


Fig. 8: Rear Mount
Courtesy of CHRYSLER LLC

18. Remove the bolt at the catalytic converter support bracket (3).
19. Support engine and transmission with a jack.
20. Support the transmission with a transmission jack and raise to gain access to mount (5).
21. Remove rear transmission mount through bolt (4).
22. Remove the front transmission mount through bolt.
23. Remove the transmission crossmember bolts. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .
24. Remove the starter. Refer to **Electrical - Engine Systems/Starting/STARTER - Removal** .
25. Remove the rear transmission mount retaining bolts from the cradle.
26. Remove the rear transmission mount bracket from cradle.

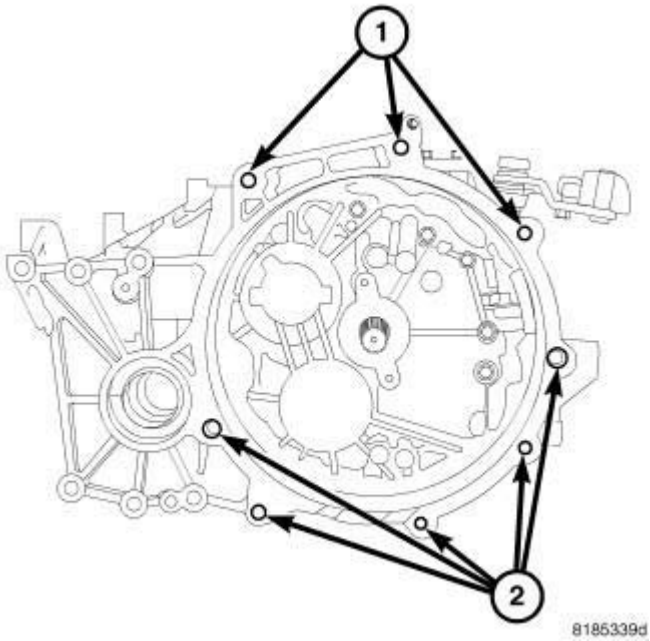


Fig. 9: Bellhousing Bolts
Courtesy of CHRYSLER LLC

27. Remove the lower transmission bellhousing bolts (2).
28. Lower the transmission.

DISASSEMBLY

DISASSEMBLY

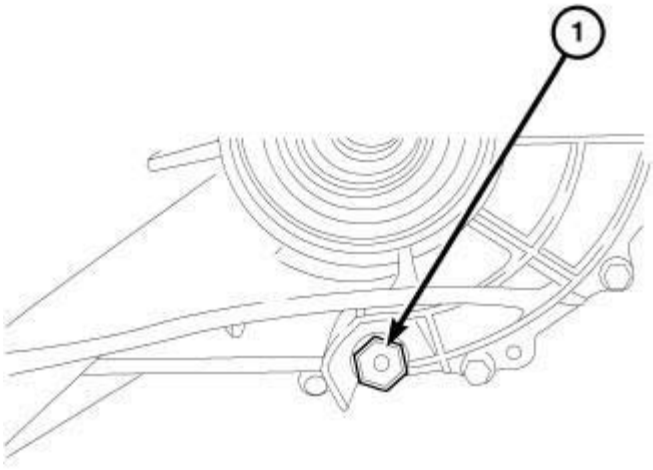


Fig. 10: Drain Plug
Courtesy of CHRYSLER LLC

1. Remove drain plug (1) and allow transmission oil to drain.

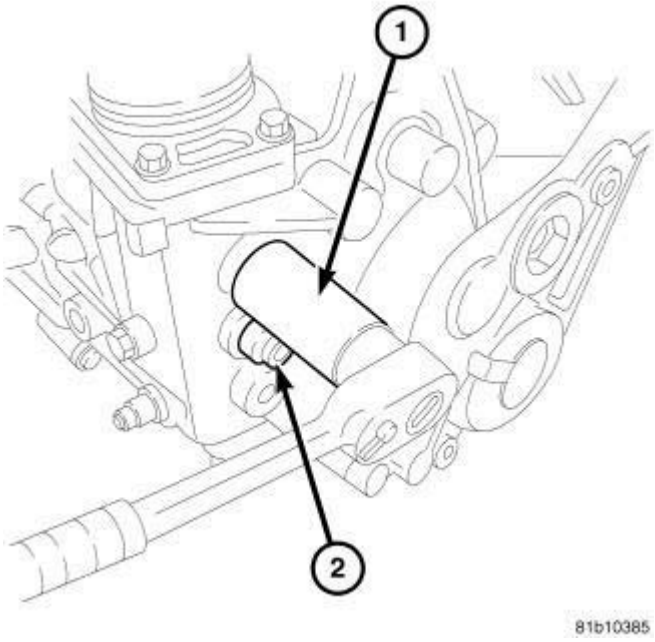


Fig. 11: Back-Up Lamp Switch
Courtesy of CHRYSLER LLC

2. Remove backup lamp switch (1).

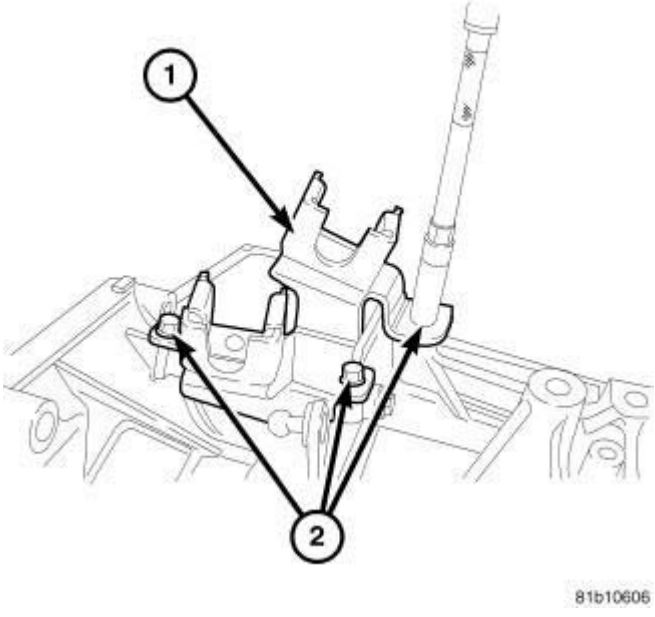


Fig. 12: Shift Cable Bracket
Courtesy of CHRYSLER LLC

3. Remove the bolts (2) holding the shift cable bracket (1) to the transmission case.
4. Remove the bracket from the transmission (1).

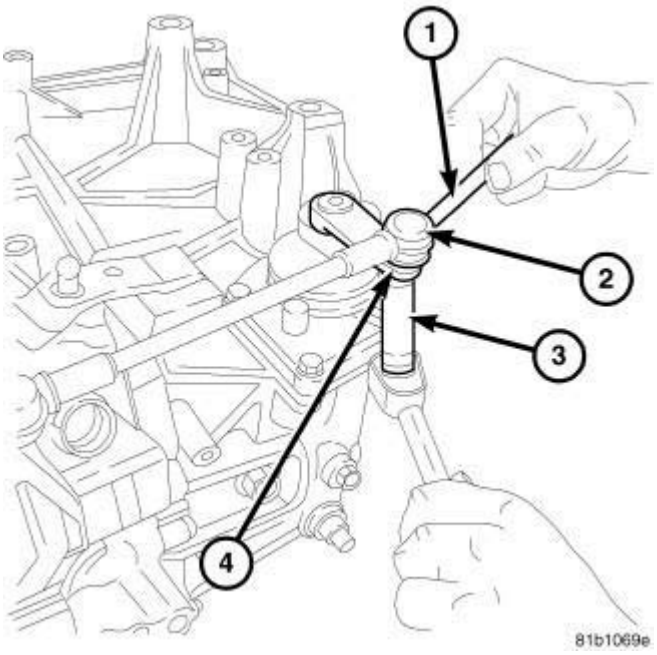


Fig. 13: Nut Crossover Rod To Shift Lever
Courtesy of CHRYSLER LLC

5. Remove the nut (4) holding the crossover rod (2) to the shift lever. Be sure to use a wrench (1) to hold the ball stud to prevent it from rotating in the shift lever.

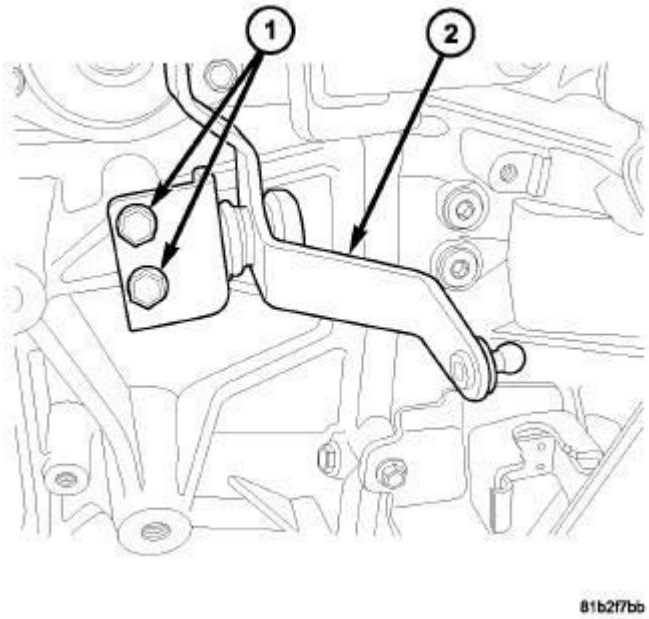


Fig. 14: Crossover Bellcrank
Courtesy of CHRYSLER LLC

6. Remove bolts (1) holding crossover bellcrank (2) to the transmission case.
7. Remove the crossover bellcrank from the transmission.

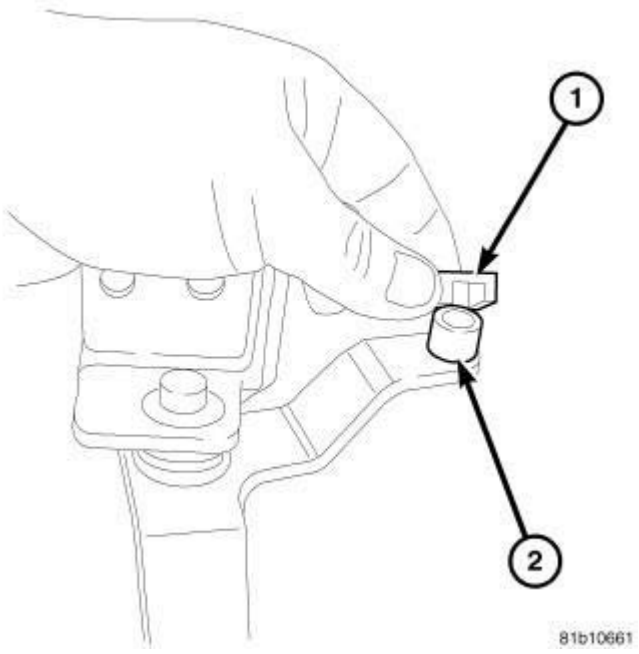


Fig. 15: Bell Crank Bushing
Courtesy of CHRYSLER LLC

8. Be sure to locate the bell crank bushing on the bell crank or the shift lever and set aside for installation.

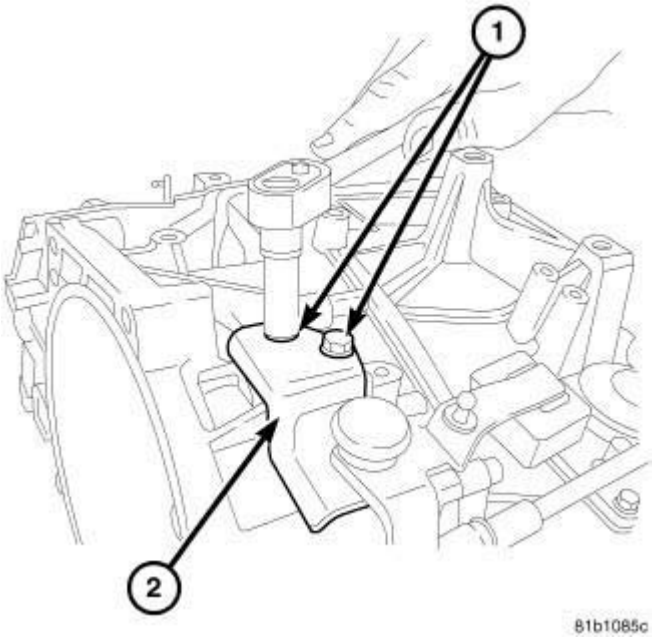


Fig. 16: Crossover Bracket
Courtesy of CHRYSLER LLC

9. Remove the bolts (1) at the shift lever bracket (2).
10. Remove the shift lever bracket (2).

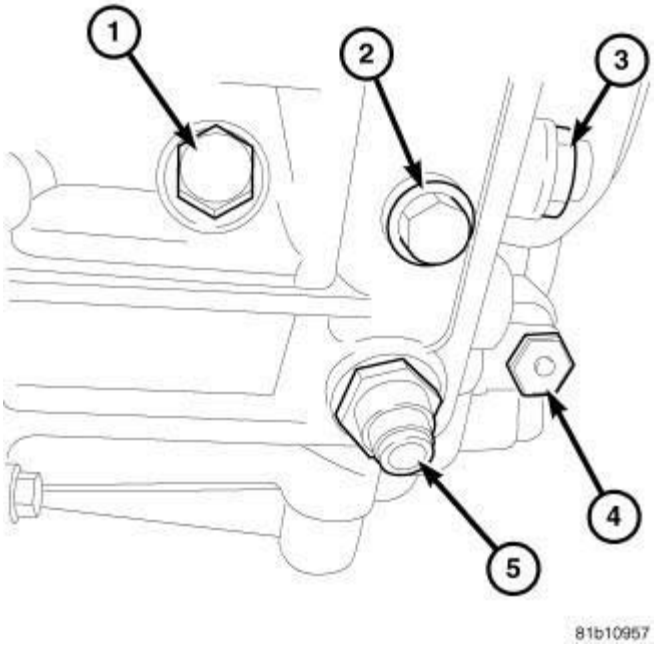


Fig. 17: Anti-Rotation Bolt
Courtesy of CHRYSLER LLC

11. Loosen and remove shift lock ball for the shift detent (5).
12. Loosen and remove shift lock ball for the select detent (3).
13. Loosen and remove shift guide pin (2).

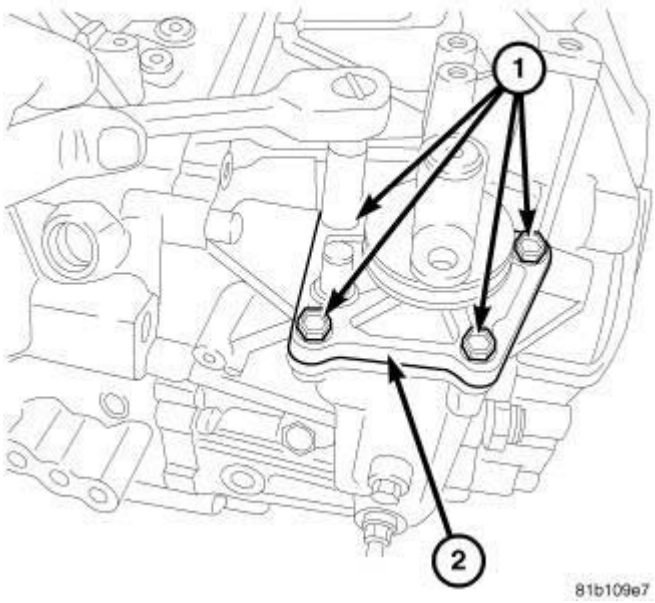


Fig. 18: Shift Lever Assembly Bolts
Courtesy of CHRYSLER LLC

14. Remove the bolts holding the shift lever assembly to the transmission.

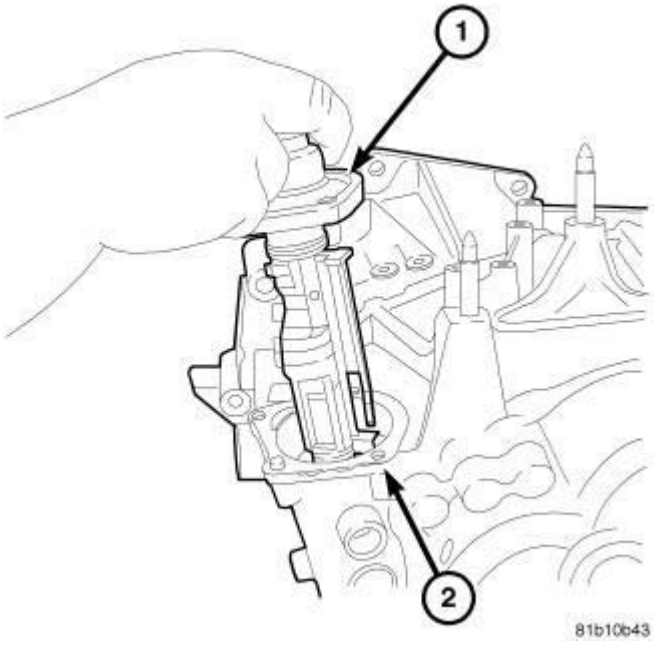


Fig. 19: Shift Lever Assembly
Courtesy of CHRYSLER LLC

15. Remove the shift lever assembly from the transmission case.

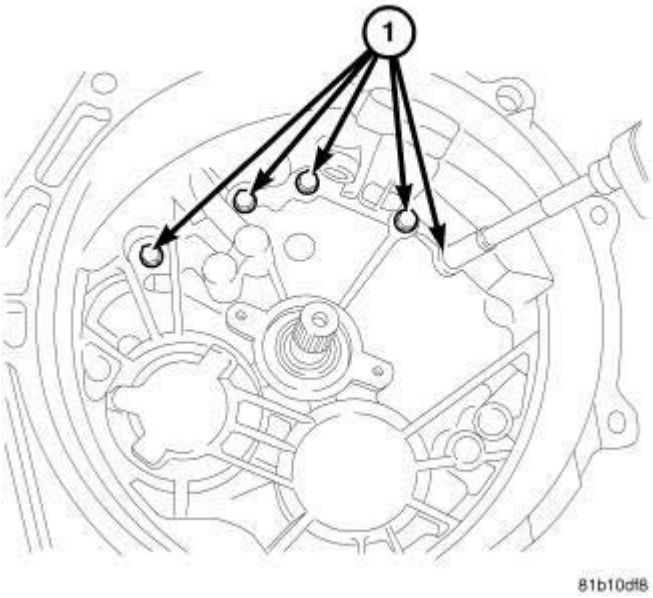


Fig. 20: Transmission Case To Clutch Housing Bolts (Inside Clutch Housing)
Courtesy of CHRYSLER LLC

16. Remove the bolts (1) holding the transmission case to the clutch housing from inside the clutch housing.

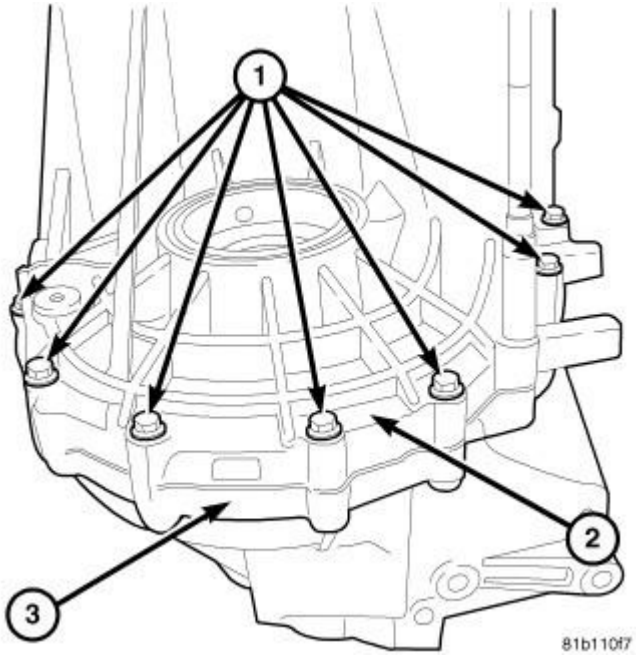


Fig. 21: Transmission Case To Clutch Housing Bolts (Transmission Case Side)
Courtesy of CHRYSLER LLC

17. Remove the bolts (1) holding the transmission case (2) to the clutch housing (3) from the transmission case side.

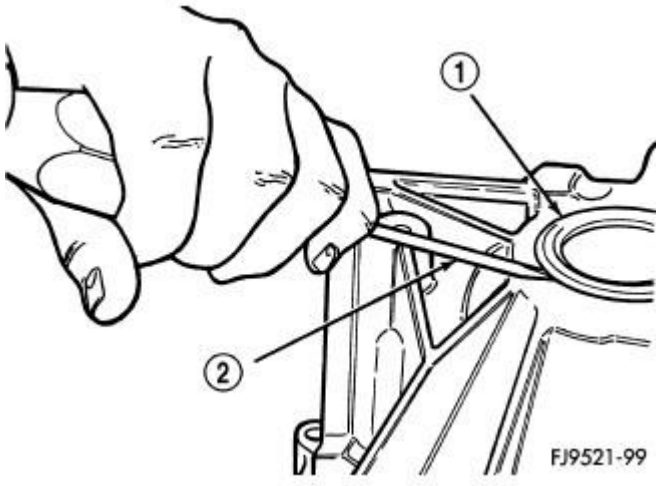


Fig. 22: Axle Shaft Seal Removal
Courtesy of CHRYSLER LLC

18. Insert a flat-blade pry tool (2) at outer edge of axle shaft seals (1).
19. Tap on the pry tool (2) with a small hammer and remove both (case and bell housing sides) axle shaft seals (1).

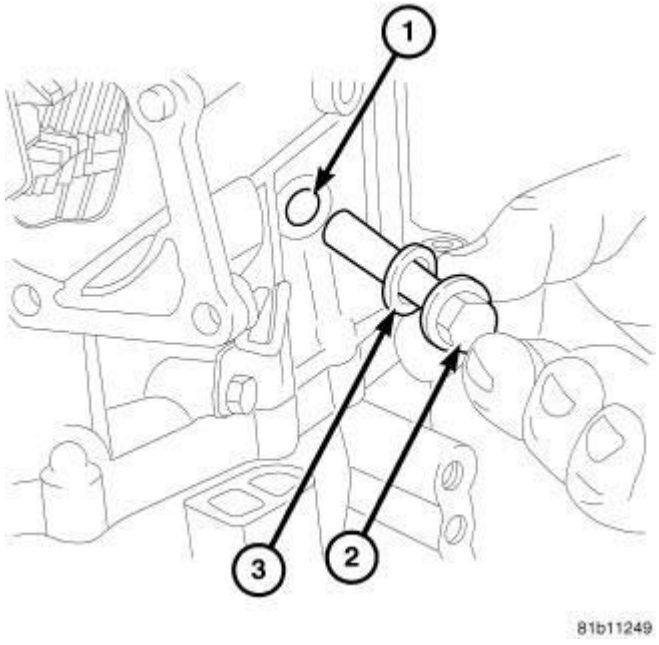


Fig. 23: Idler Shaft Anti-Rotation Bolt

Courtesy of CHRYSLER LLC

20. Remove anti-rotation bolt (2) and discard old washer a new washer will be used during assembly.

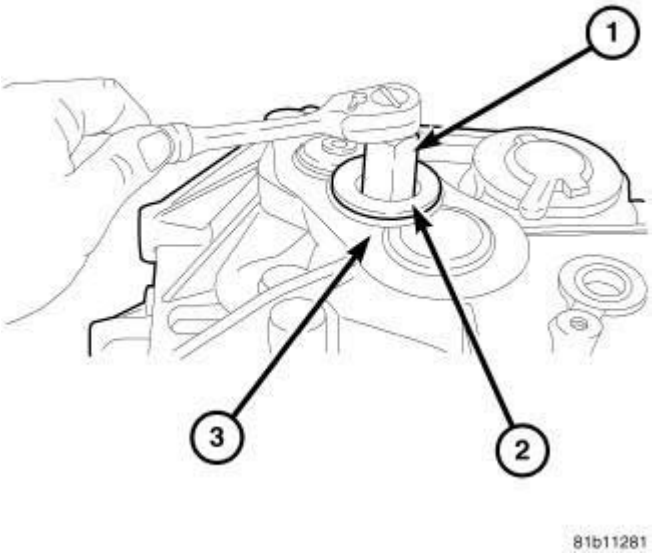


Fig. 24: 27 MM Hex Adapter For Shaft Plug
Courtesy of CHRYSLER LLC

21. Install a 27 mm (1 1/16 in.) hex adapter (1) into the shaft plug (2) at the rear of the transmission case (3).
22. Loosen and remove the shaft plug (2) in the rear of the transmission case.

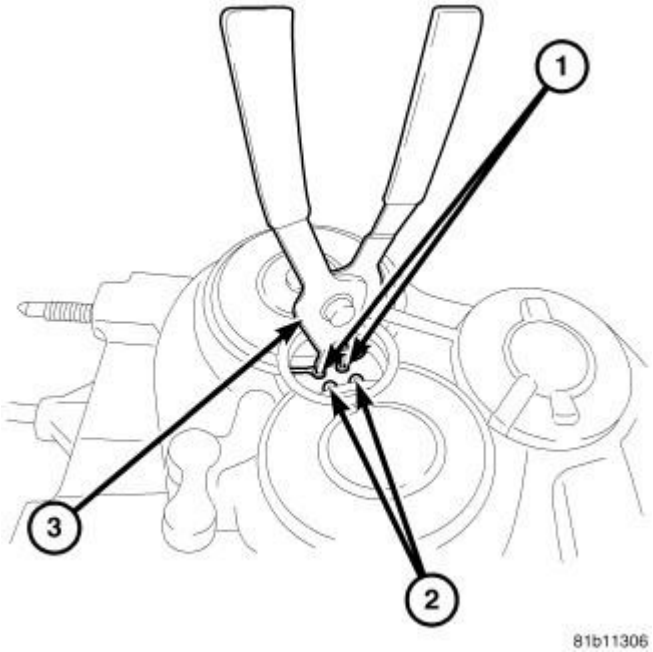


Fig. 25: Snap Rings At Rear Of Transmission Case
Courtesy of CHRYSLER LLC

23. Using suitable snap-ring pliers (3), release the transmission shaft bearing snap-rings (1, 2) at the rear of the transmission case.

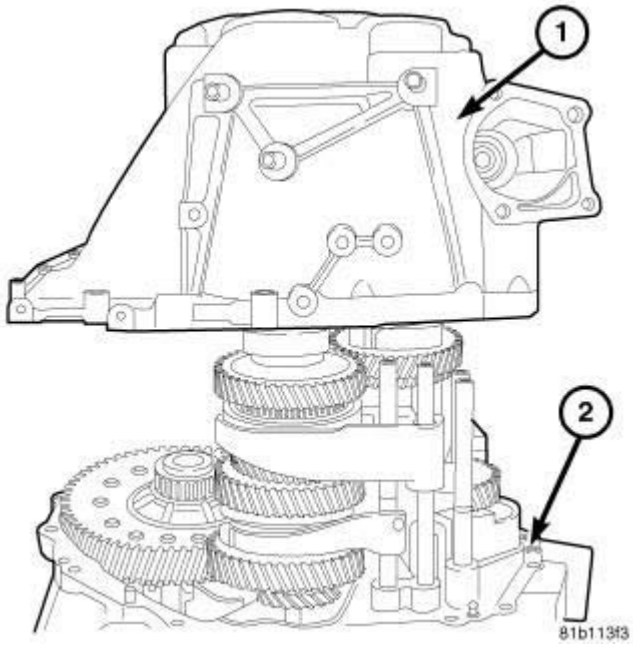


Fig. 26: Transmission Case Half & Clutch Housing
Courtesy of CHRYSLER LLC

24. Remove the transmission case half (1) from the clutch housing (2).

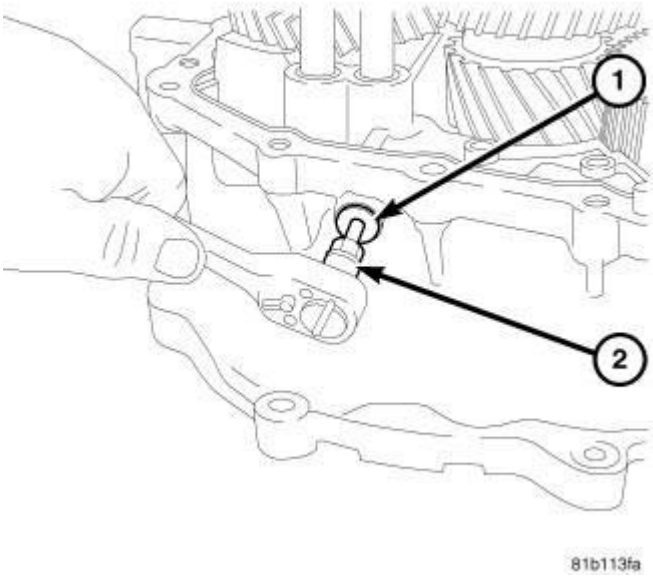


Fig. 27: Fifth & Sixth Gear Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

25. Remove fifth and sixth gear shift rail detent plug (1).

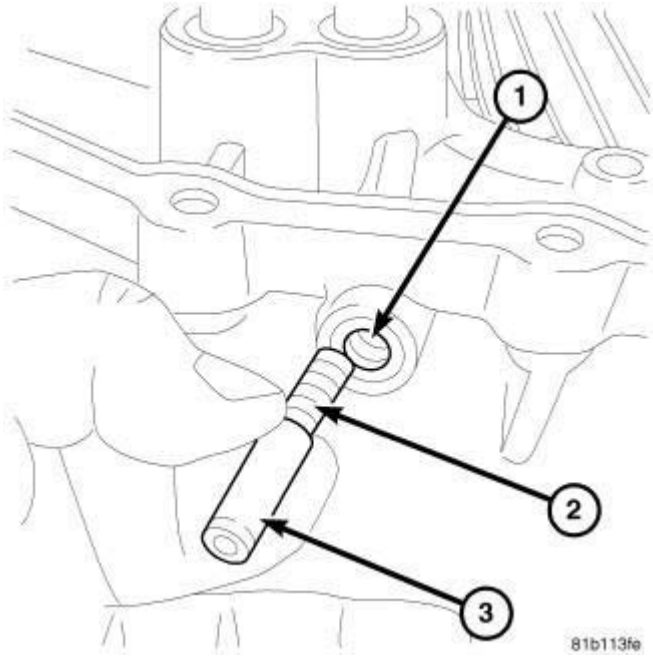


Fig. 28: Fifth & Sixth Gear Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

26. Remove fifth and sixth gear shift rail detent spacer (3) and spring (2).

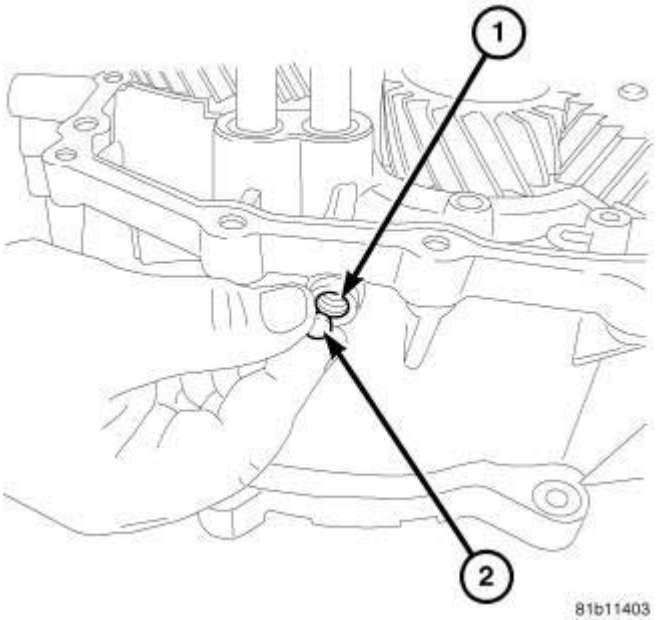


Fig. 29: Fifth & Sixth Gear Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

27. Remove fifth and sixth gear shift rail detent ball (2).

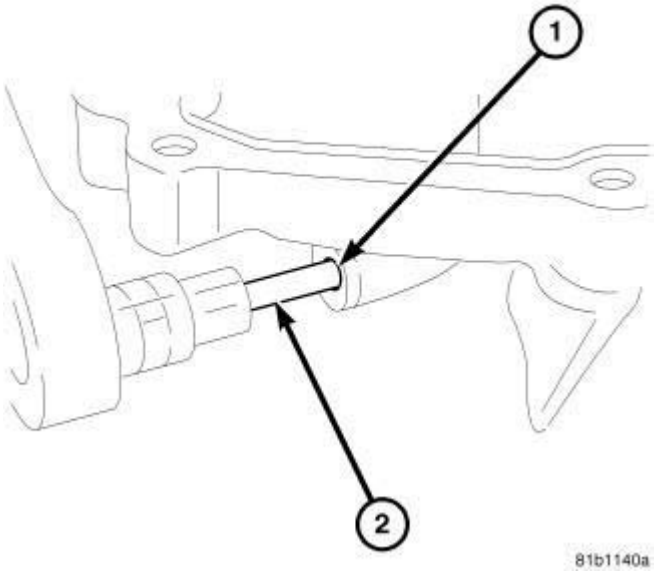


Fig. 30: Reverse Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

28. Remove reverse shift rail detent plug (1).

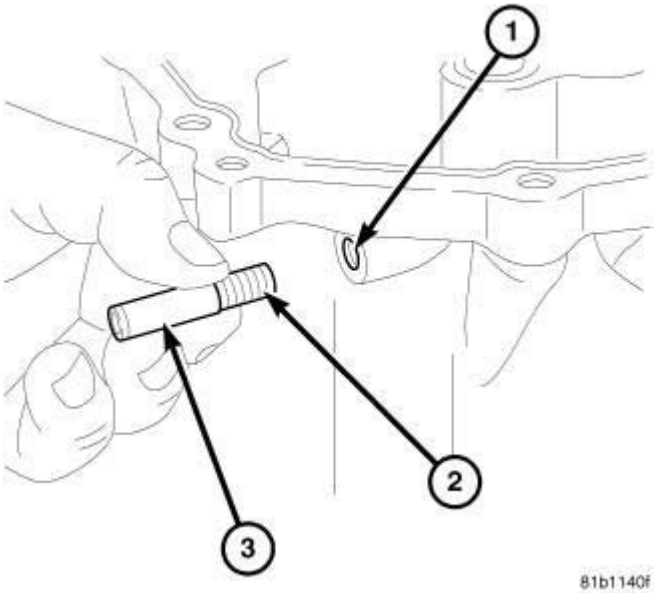


Fig. 31: Reverse Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

29. Remove the reverse shift rail detent spacer (3) and spring (2).

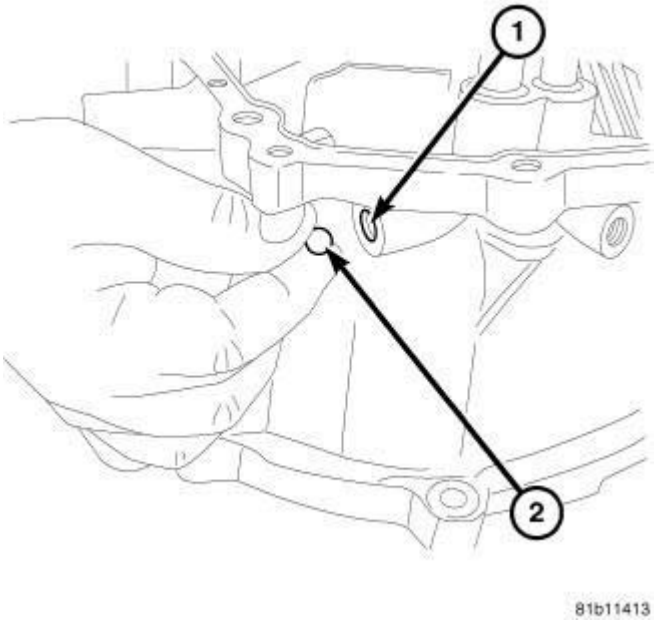


Fig. 32: Reverse Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

30. Remove the reverse shift rail detent ball (2).

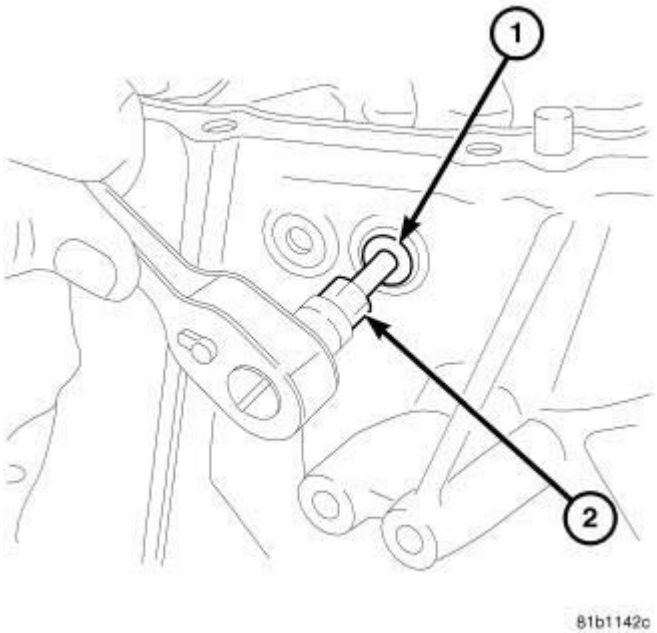


Fig. 33: Third & Fourth Gear Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

31. Remove third and fourth gear shift rail detent plug (1).

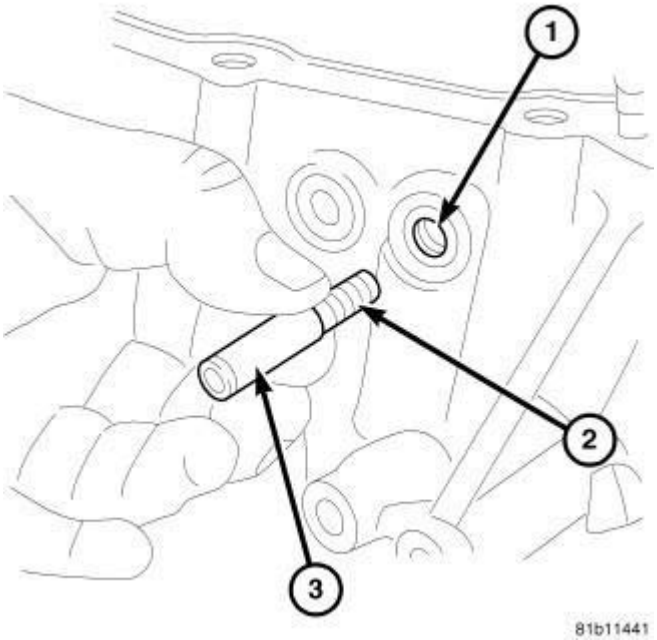


Fig. 34: Third & Fourth Gear Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

32. Remove third and fourth gear shift rail detent spacer (3) and spring (2).
33. Remove third and fourth gear shift rail detent ball.

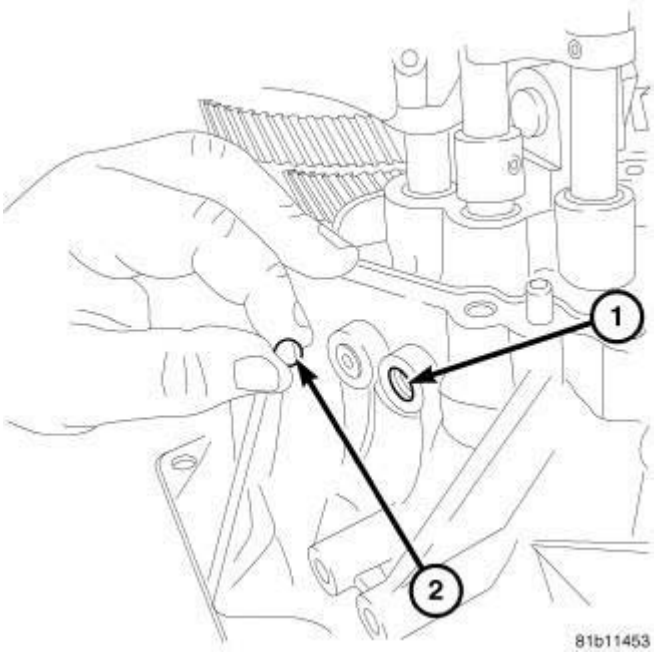


Fig. 35: Third & Fourth Gear Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

34. Remove third and fourth gear shift rail detent ball (2).

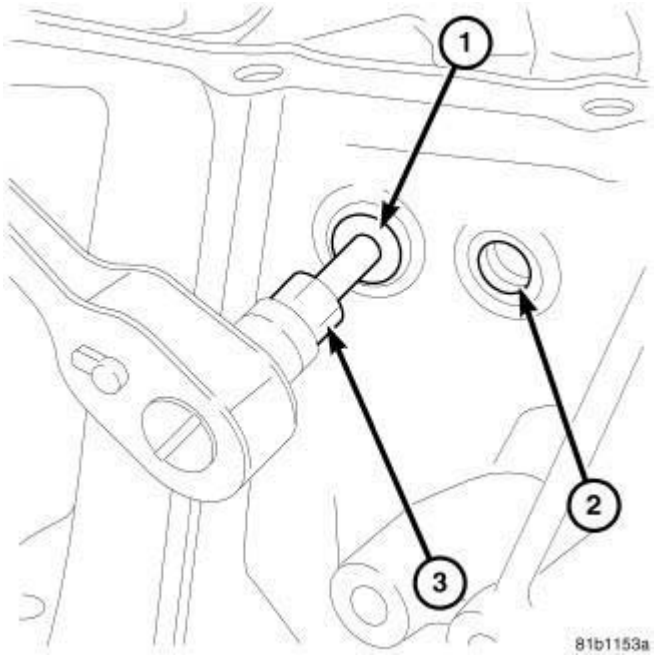


Fig. 36: First & Second Gear Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

35. Remove first and second gear shift rail detent plug (1).
36. Remove first and second gear shift rail detent spacer and spring.

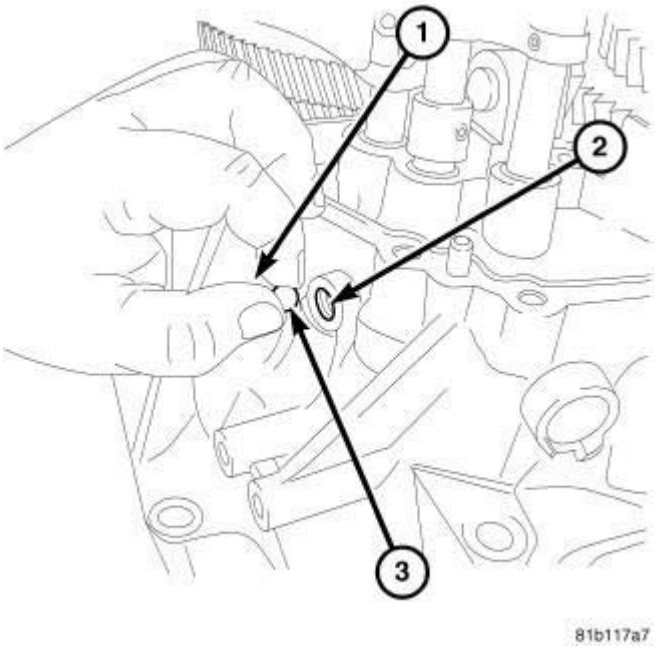


Fig. 37: First & Second Gear Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

37. Remove first and second gear shift rail detent ball (3).

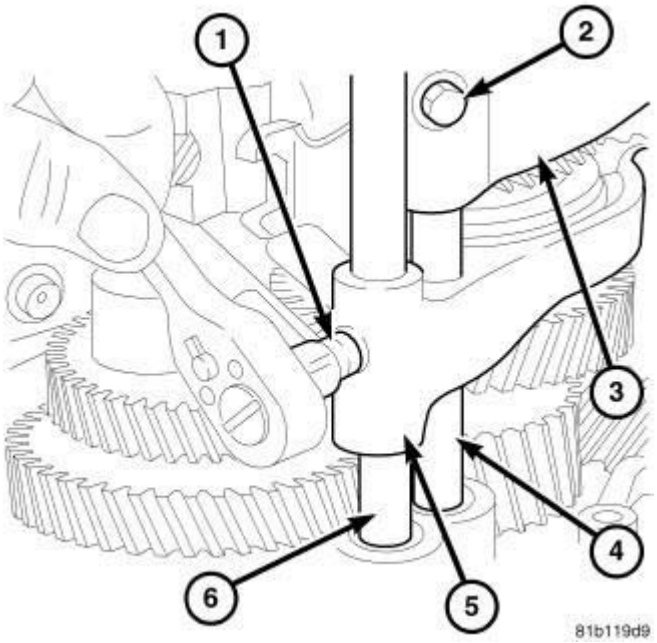


Fig. 38: Reverse Shift Fork To Shift Rail Bolt
Courtesy of CHRYSLER LLC

38. Remove the bolt (1) holding the reverse shift fork (5) to the reverse shift rail (6).

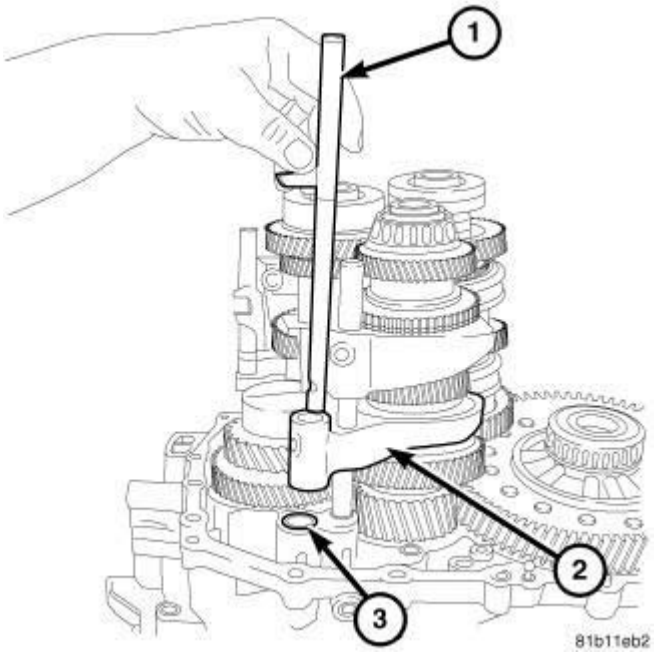


Fig. 39: Reverse Shift Rail
Courtesy of CHRYSLER LLC

39. Remove the reverse shift rail from case and shift fork.

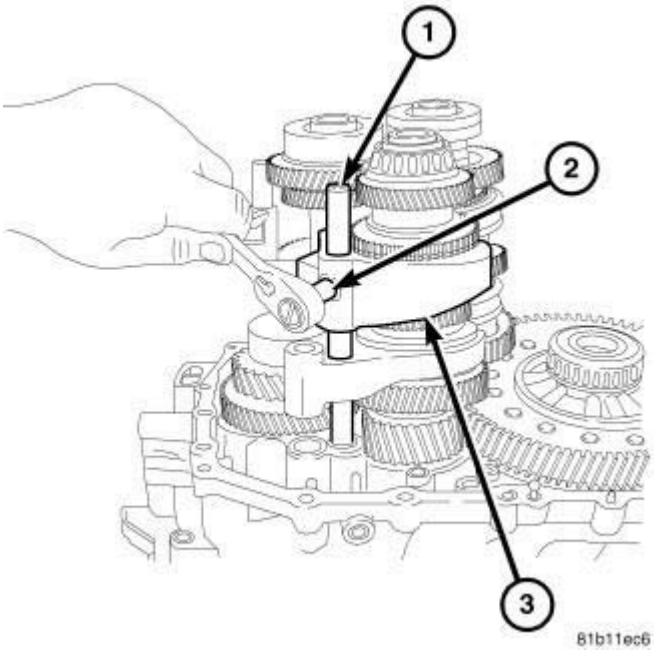


Fig. 40: Fifth & Sixth Gear Shift Fork & Shift Rail Bolt
Courtesy of CHRYSLER LLC

40. Remove the bolt (2) holding the fifth and sixth gear shift fork (3) to the fifth and sixth gear shift rail (1).

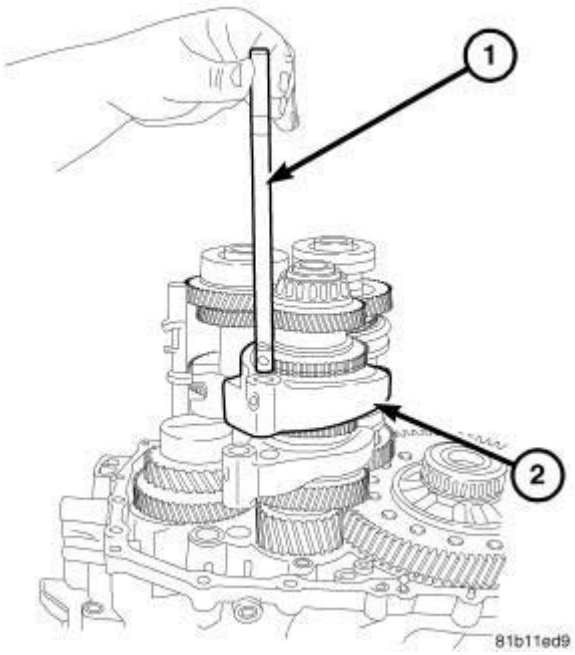


Fig. 41: Fifth & Sixth Gear Shift Rail
Courtesy of CHRYSLER LLC

41. Remove the fifth and sixth gear shift rail (1) from case and shift fork (2).

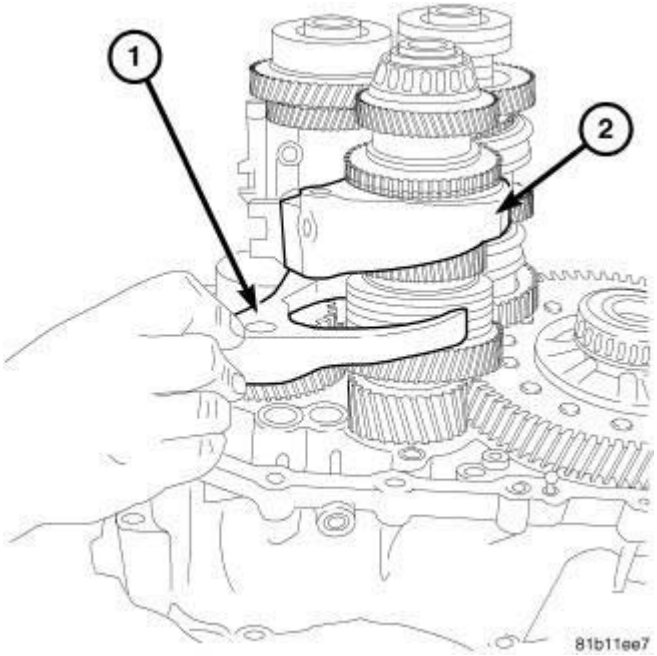


Fig. 42: Reverse Gear Shift Fork
Courtesy of CHRYSLER LLC

42. Remove the reverse gear shift fork (1).

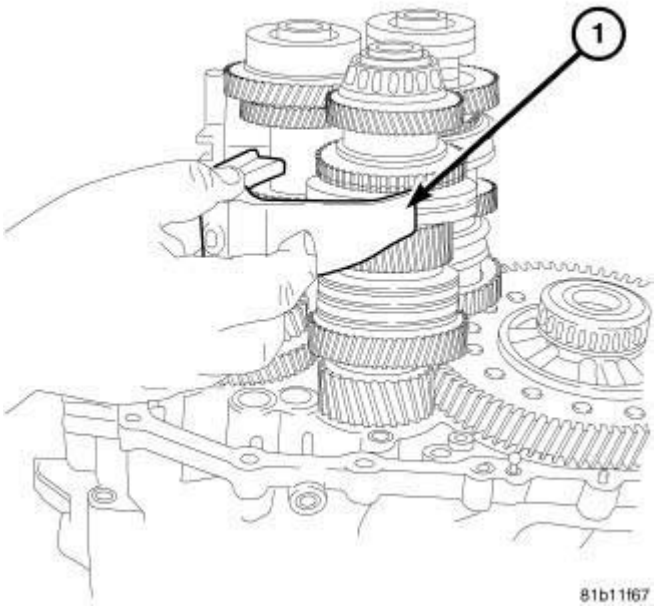


Fig. 43: Fifth & Sixth Gear Shift Fork
Courtesy of CHRYSLER LLC

43. Remove the fifth and sixth gear shift fork (2).

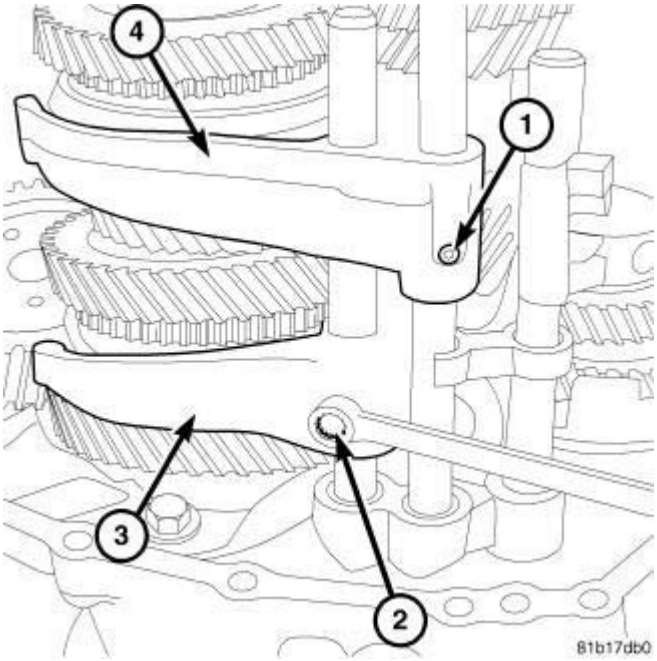


Fig. 44: First & Second Gear Shift Fork To Rail Bolt
Courtesy of CHRYSLER LLC

44. Remove the bolt (2) holding the first and second gear shift fork (3) to the rail.

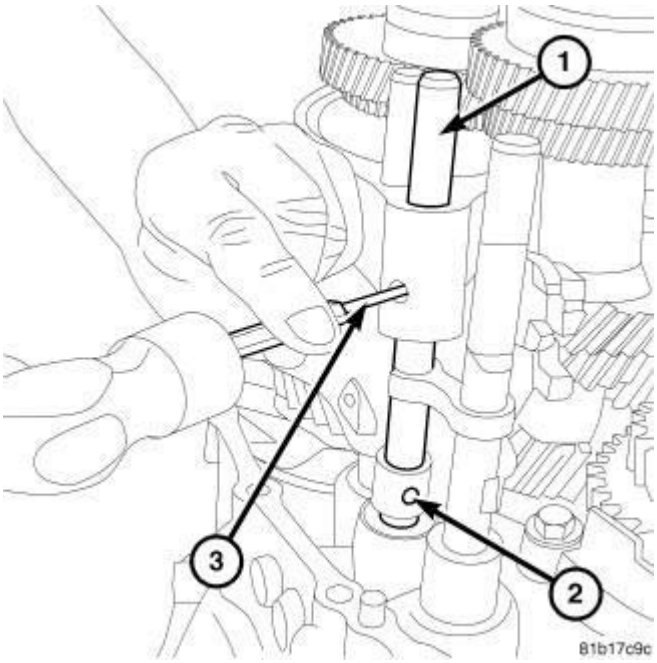


Fig. 45: Roll Pin At Third & Fourth Gear Shift Fork To Rail
Courtesy of CHRYSLER LLC

45. Using a hammer and a punch (3) remove the roll pin at the third and fourth gear shift fork to rail (1).

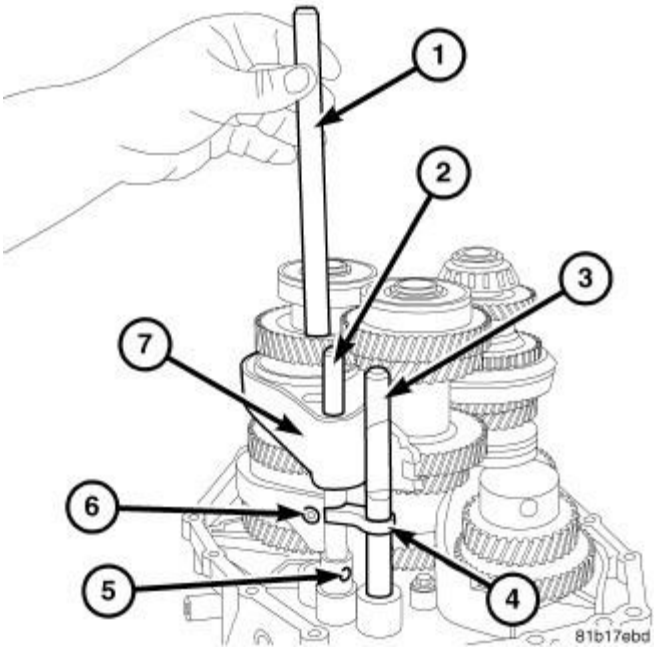


Fig. 46: First & Second Gear Shift Rail
Courtesy of CHRYSLER LLC

46. Remove the first and second gear shift rail (1).

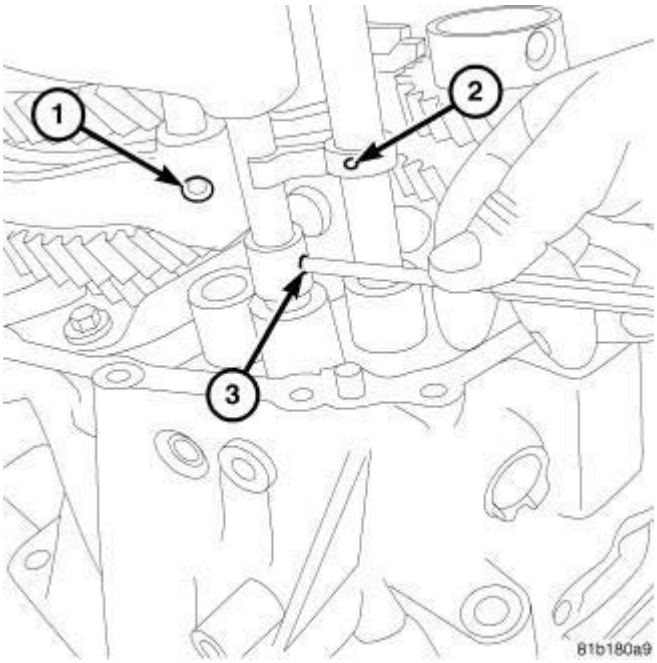


Fig. 47: Roll Pin At Third & Fourth Gear Shift Rail
Courtesy of CHRYSLER LLC

47. Using a hammer and a punch (3) remove the roll pin at the third and fourth gear shift rail.

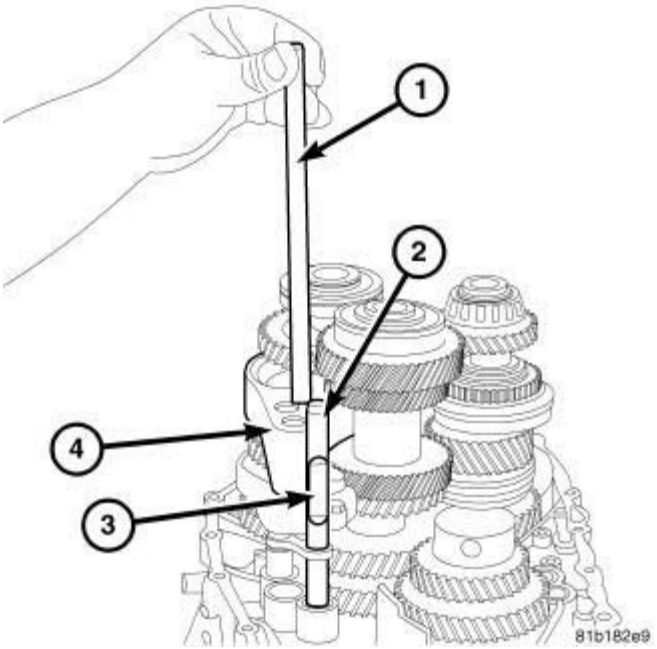


Fig. 48: Third & Fourth Gear Shift Rail
Courtesy of CHRYSLER LLC

48. Remove the third and fourth gear shift rail (1) from case and shift fork (4).

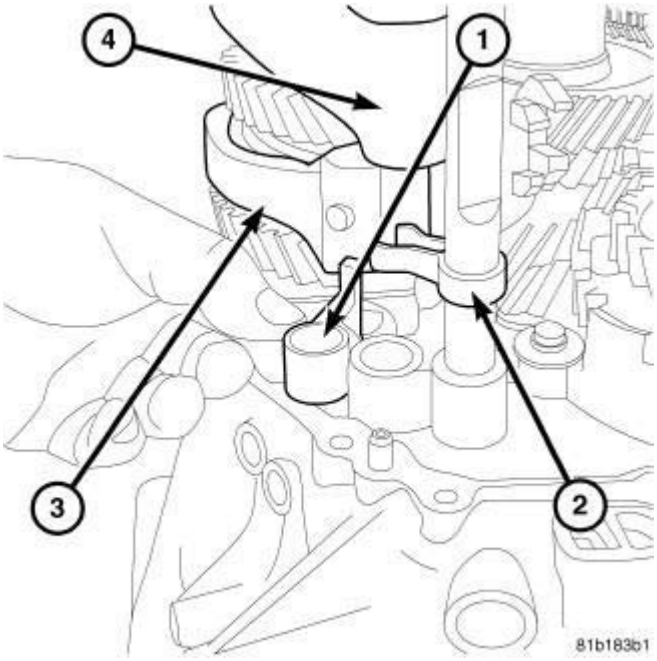


Fig. 49: Third & Fourth Gear Shift Bracket
Courtesy of CHRYSLER LLC

49. Remove the third and fourth gear shift bracket (1).

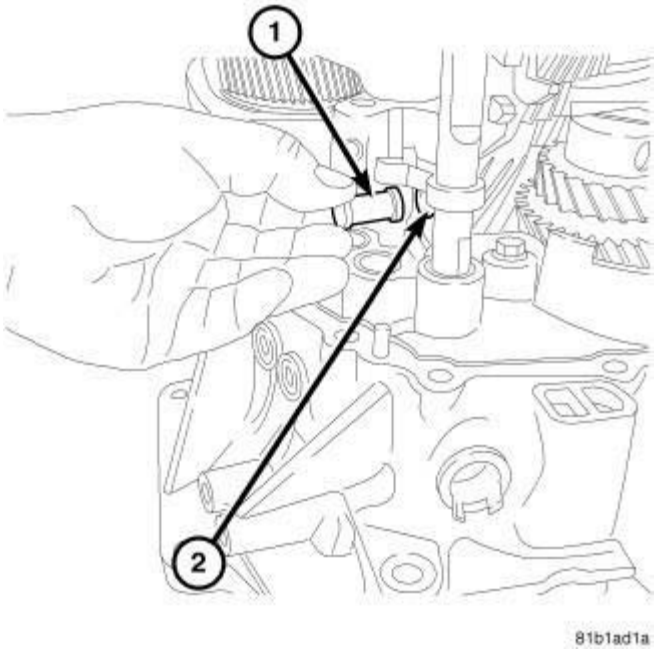


Fig. 50: Shift Rail Pin
Courtesy of CHRYSLER LLC

50. Remove the E-clip and shift rail bracket pivot pin (1).

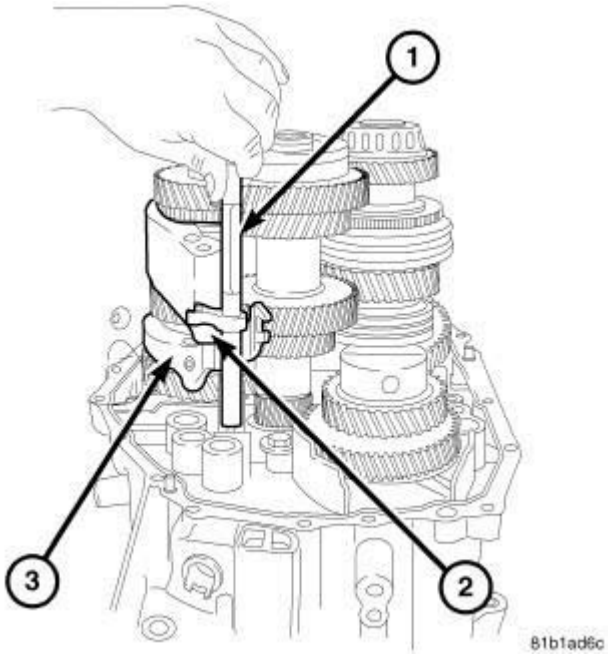


Fig. 51: Pivot Shaft
Courtesy of CHRYSLER LLC

51. Remove the pivot shaft (1) from case.

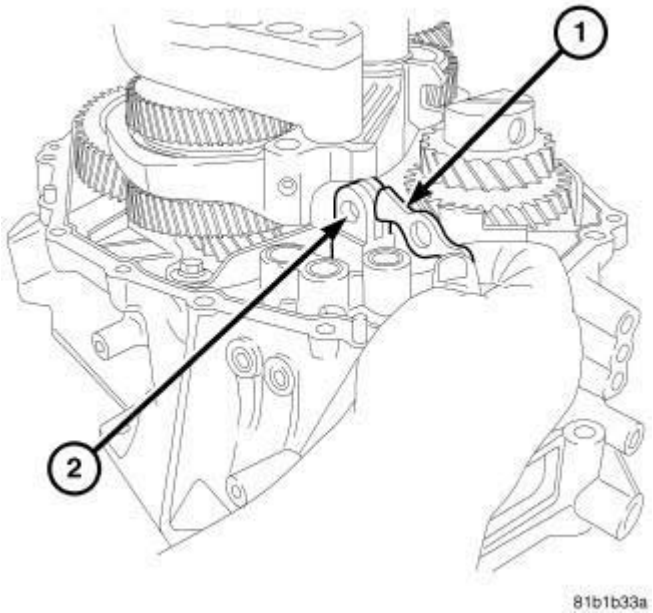


Fig. 52: Shift Rail Pivot Bracket
Courtesy of CHRYSLER LLC

52. Remove the shift rail pivot bracket (1) from the stand (2).

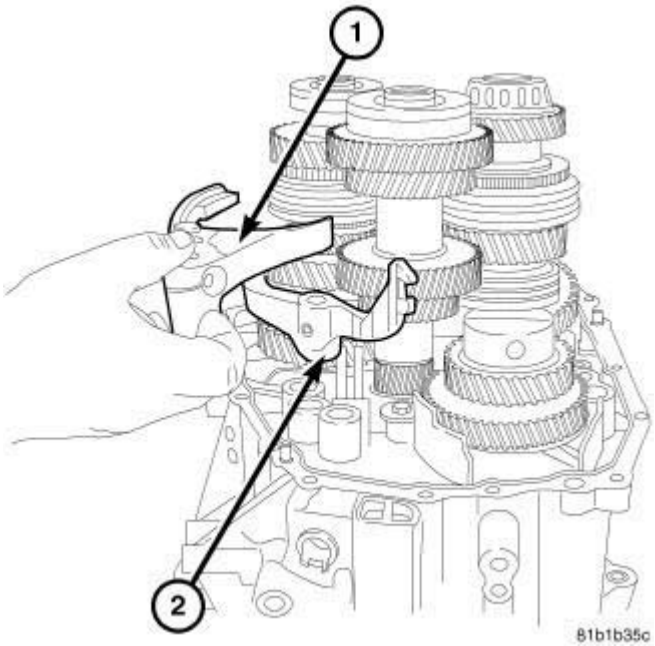


Fig. 53: Third & Fourth Gear Shift Fork & Synchronizer
Courtesy of CHRYSLER LLC

53. Remove the third and fourth gear shift fork (1) from synchronizer.

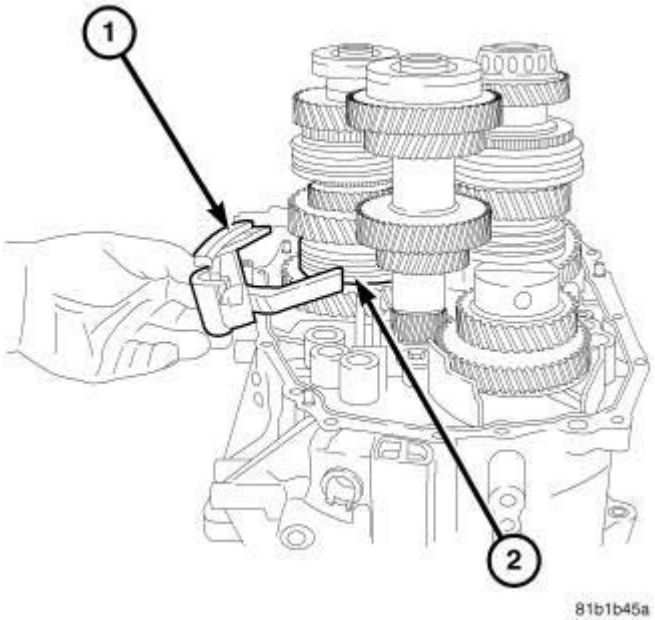


Fig. 54: First & Second Gear Shift Fork & Synchronizer
Courtesy of CHRYSLER LLC

54. Remove the first and second gear shift fork (1) from synchronizer (2).

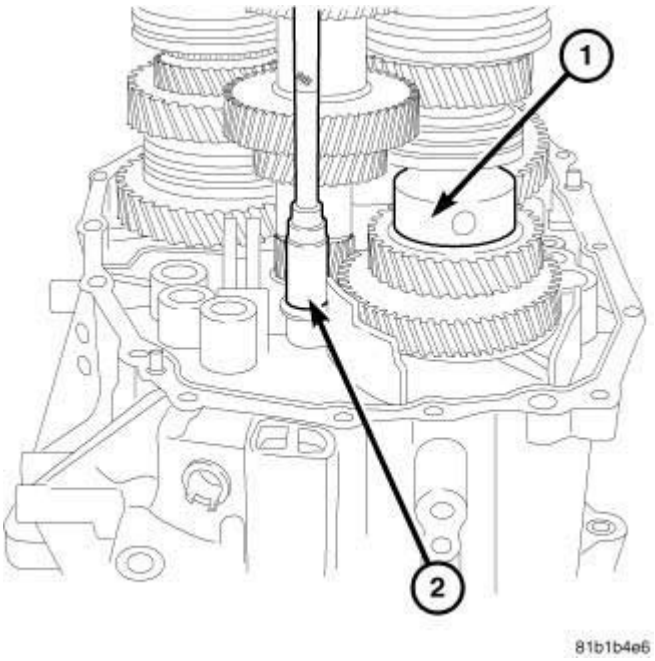


Fig. 55: Bolt At Reverse Idler Gear
Courtesy of CHRYSLER LLC

55. Remove the reverse idler gear (1) hold down bolt (2).

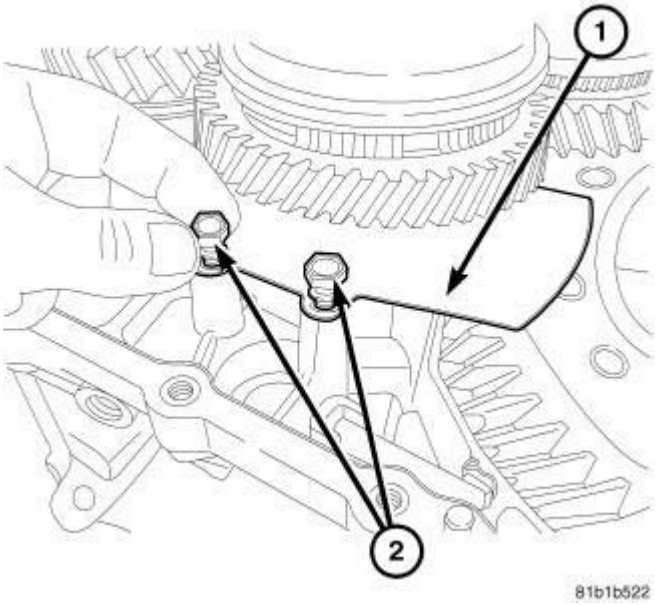


Fig. 56: Oil Slinger
Courtesy of CHRYSLER LLC

56. Remove the bolts (2) at the oil slinger (1) and remove the oil slinger.

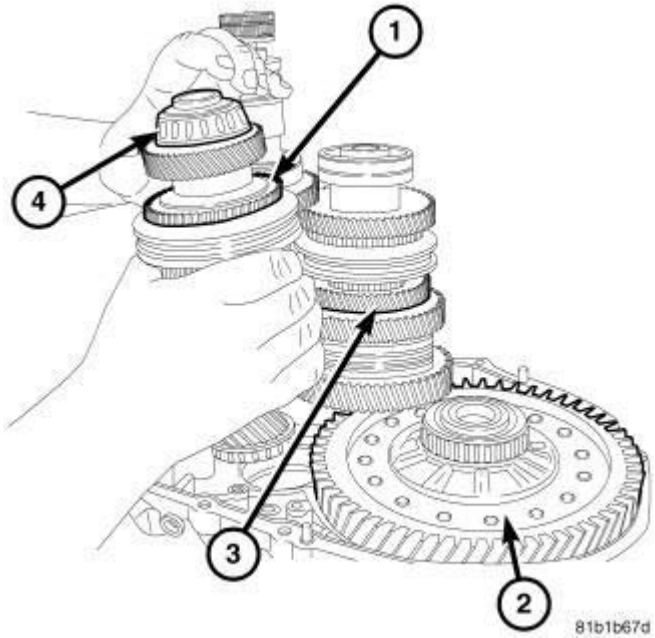


Fig. 57: Output Shaft #2
Courtesy of CHRYSLER LLC

57. Remove the output shaft #2 (1) from case.

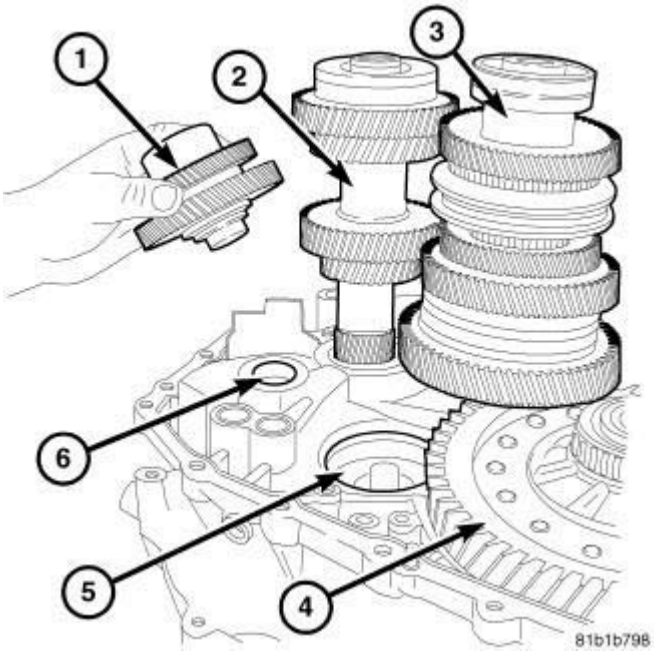


Fig. 58: Reverse Idler Gear
Courtesy of CHRYSLER LLC

58. Remove the reverse idler gear (1), shaft, bearing and thrust washer from the case.

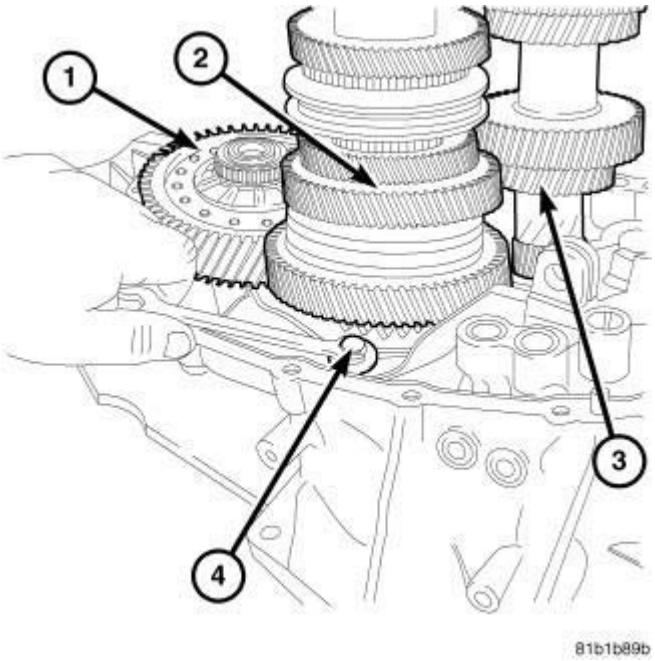


Fig. 59: Bolt At Output Shaft
Courtesy of CHRYSLER LLC

59. Remove the output shaft (2) hold down bolt (4) from the case.

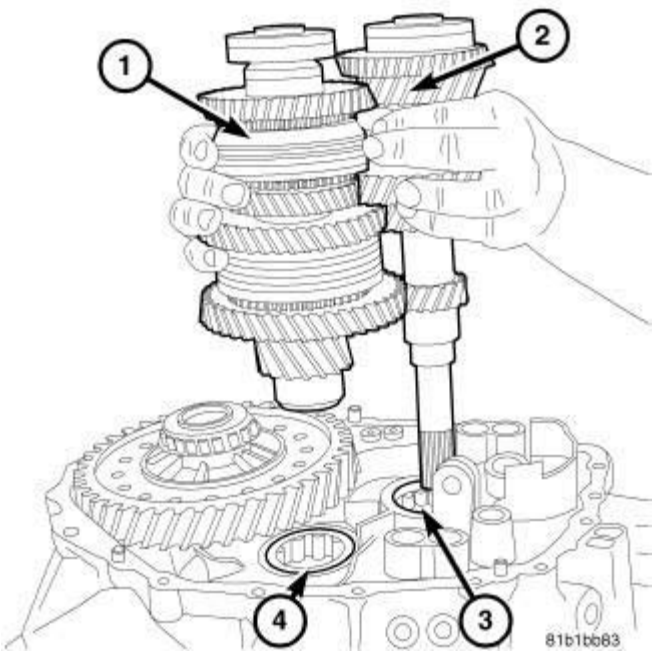


Fig. 60: Output & Input Shafts
Courtesy of CHRYSLER LLC

60. Remove the output (1) and input (2) from case together.

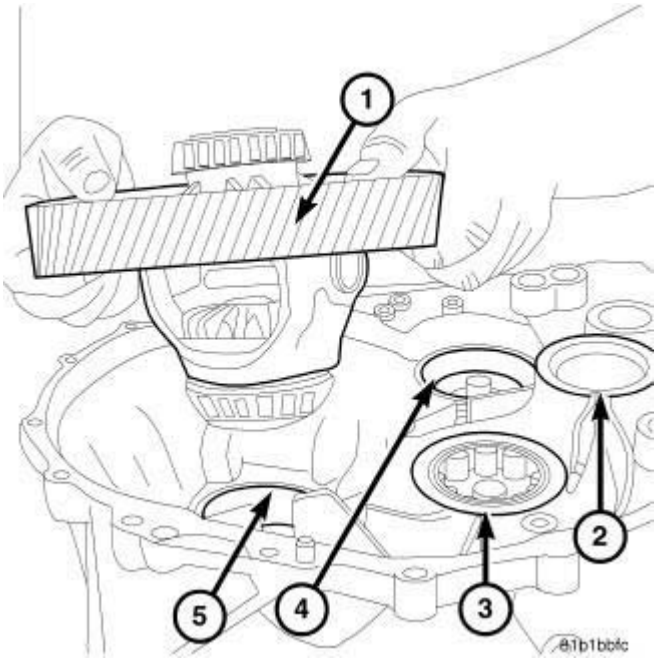


Fig. 61: Differential
Courtesy of CHRYSLER LLC

61. Remove the differential (1) from the case (5).

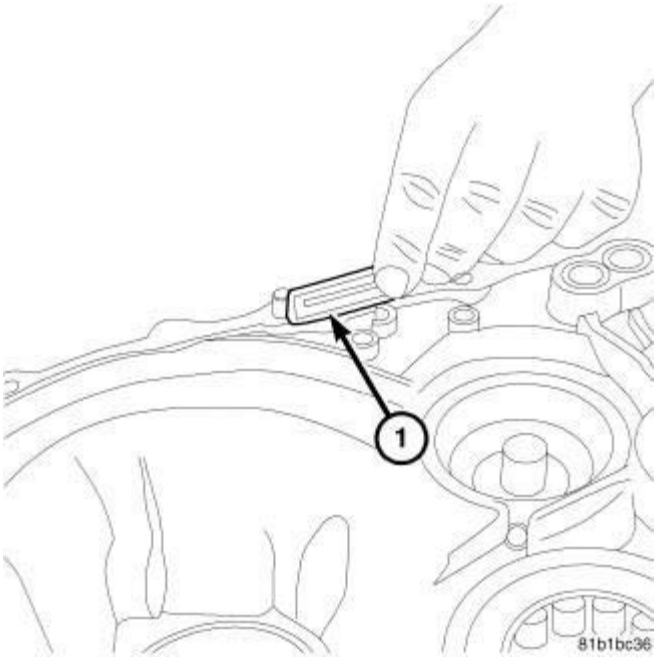


Fig. 62: Magnet
Courtesy of CHRYSLER LLC

62. Remove the magnet (1) from the case.

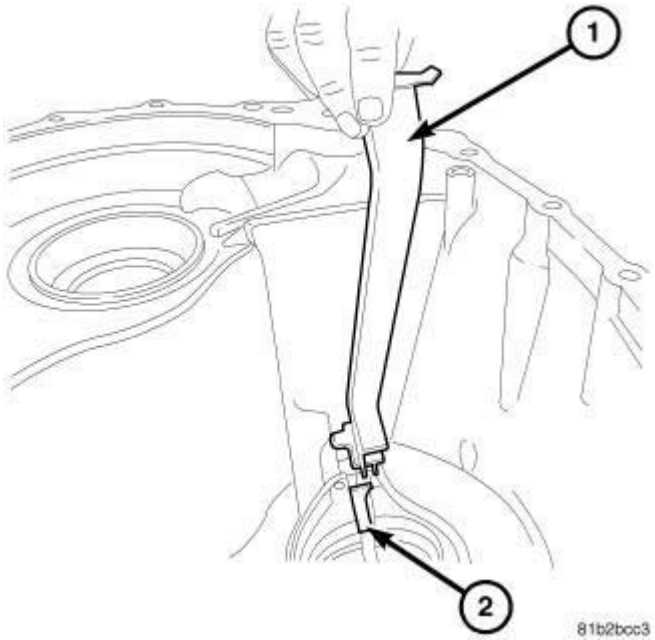


Fig. 63: Oil Feed Trough
Courtesy of CHRYSLER LLC

63. Remove the oil feed trough (1) from the case.

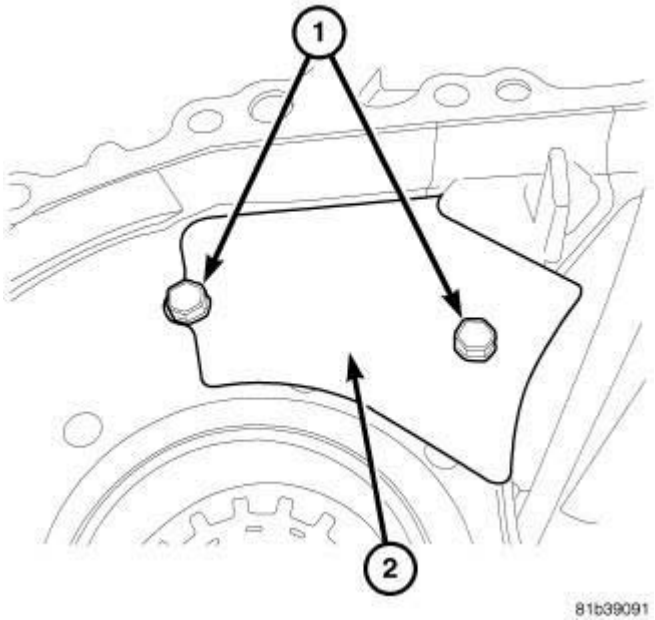


Fig. 64: Oil Baffle
Courtesy of CHRYSLER LLC

64. Remove the bolts (1) holding the oil baffle.
65. Remove the oil baffle (2).

CLEANING

CLEANING

Clean the gears, bearings, shafts, synchronizers, thrust washers, oil feeder, shift mechanism, gear case, and bellhousing. Do not use solvent to clean sealed bearings. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

INSPECTION

INSPECTION

Inspect the gears, bearings and shafts. Replace the bearings and cups if the rollers are worn, chipped, cracked, flat spotted, brinnelled, or if the bearing cage is damaged or distorted. Replace the gears if the teeth are chipped, cracked or worn thin. Inspect the synchronizers. Replace the sleeve if worn or damaged in any way. Replace the stop rings if the friction material is burned, flaking off, or worn. Check the condition of the synchro keys and springs. Replace these parts if worn, cracked, or distorted.

ASSEMBLY

ASSEMBLY

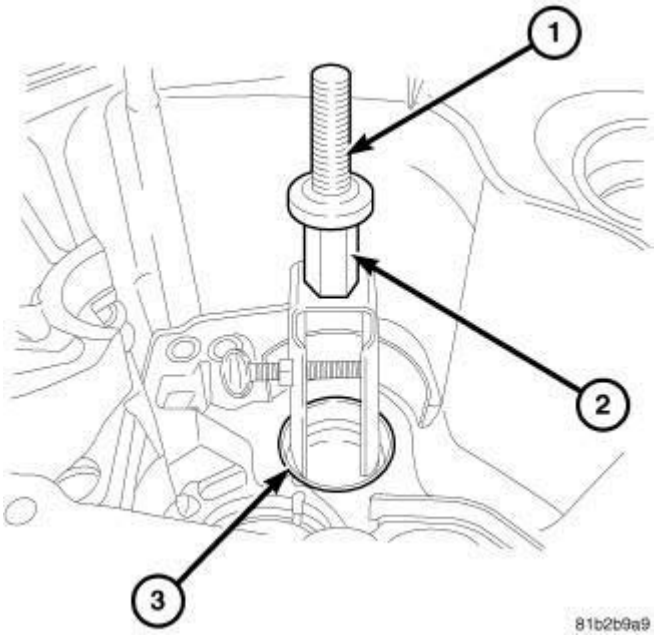


Fig. 65: Remove Input Shaft Bearing Cup
Courtesy of CHRYSLER LLC

NOTE: Always use ATF on all moving parts during this assembly procedure.

1. Use Bearing Cup Remover 9664 (2) and appropriate Slide Hammer (1) to remove the output shaft #2 tapered bearing cup (3) from the transmission rear case.

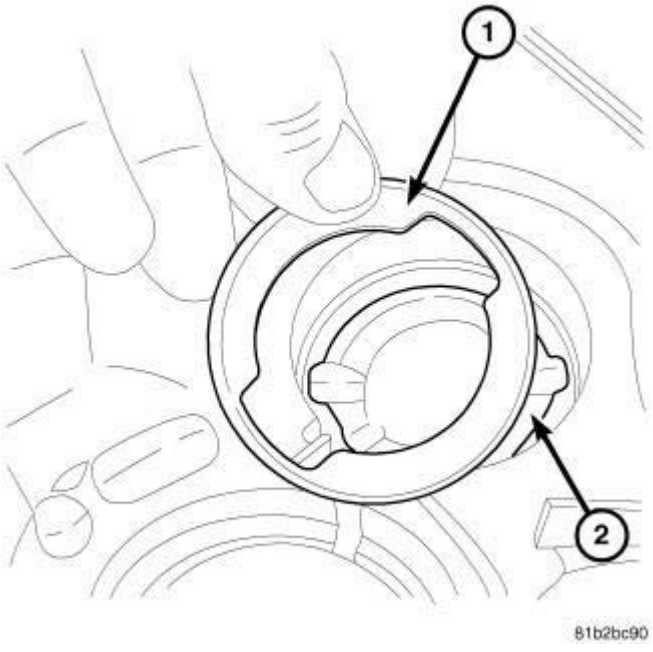


Fig. 66: Compounder Shaft Bearing Cup Shim
Courtesy of CHRYSLER LLC

2. Remove the output shaft #2 bearing cup shim (1) from the transmission rear case (2).

NOTE: A turning torque will determine the correct shim to be installed. This can be found at the end of the assembly procedure.

3. Install the correct output shaft #2 bearing cup shim into the transmission case.

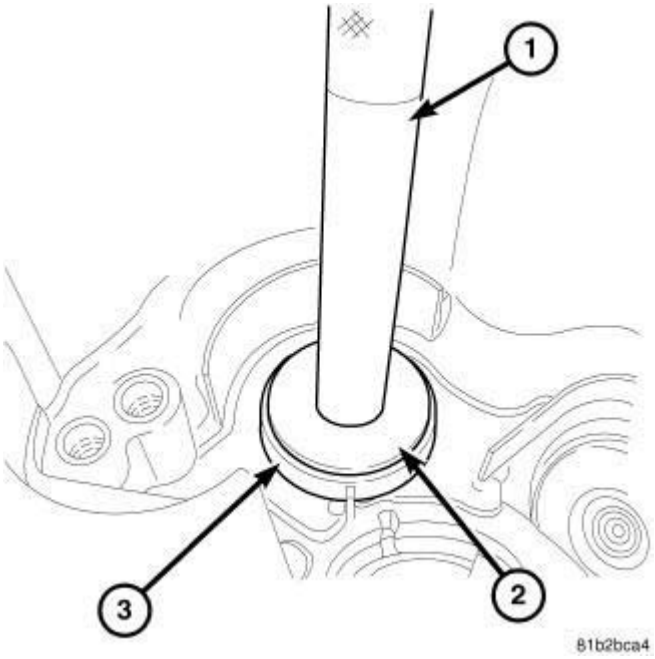


Fig. 67: Installing Output Shaft #2 Bearing Cup
Courtesy of CHRYSLER LLC

4. Install the output shaft #2 bearing cup (3) into the transmission rear case using Handle C-4171 and Seal/Cup Installer L-4520.

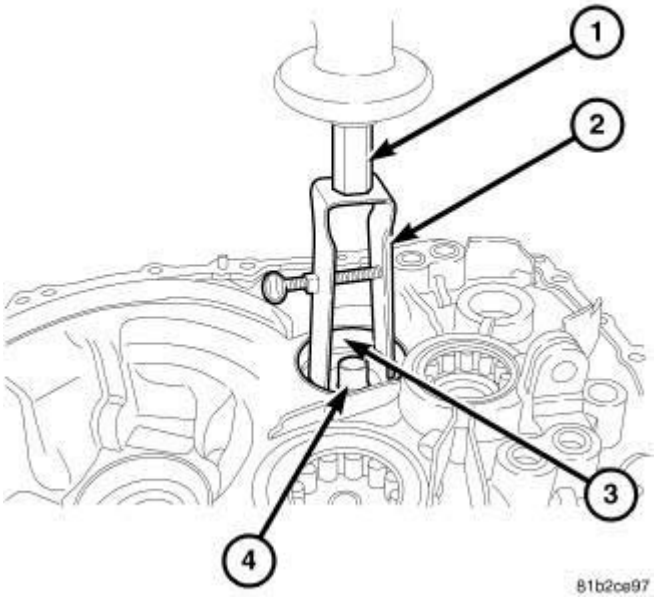


Fig. 68: Bearing Cup Remover & Output Shaft #2 Bearing Cup
Courtesy of CHRYSLER LLC

5. Remove the output shaft #2 bearing cup (3) using Bearing Cup Remover 9664 (2) and appropriate slide

hammer (1).

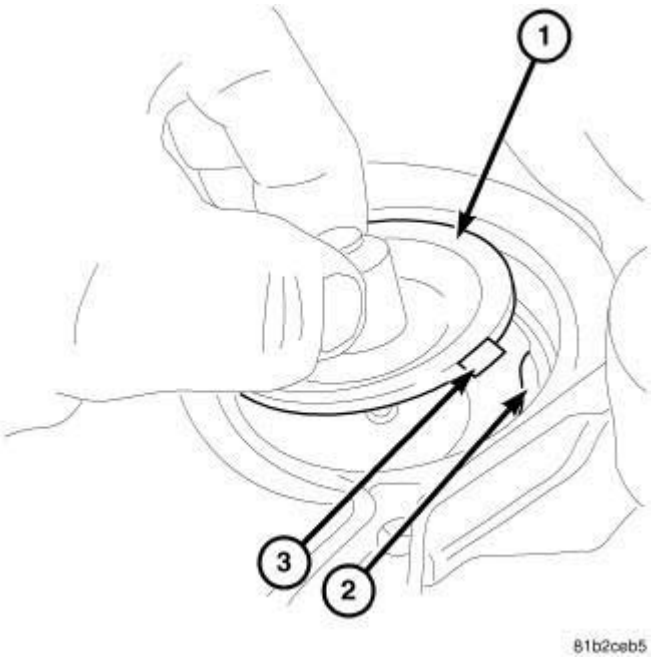


Fig. 69: Input Shaft Oil Slinger
Courtesy of CHRYSLER LLC

6. Remove the oil slinger (1) under the output shaft # 2 cup on the bellhousing side.
7. Install the oil slinger (1) in the case (2) for the compounder shaft bearing cup on the bellhousing side, insure the tab (3) is lined up with cutout in case (2).

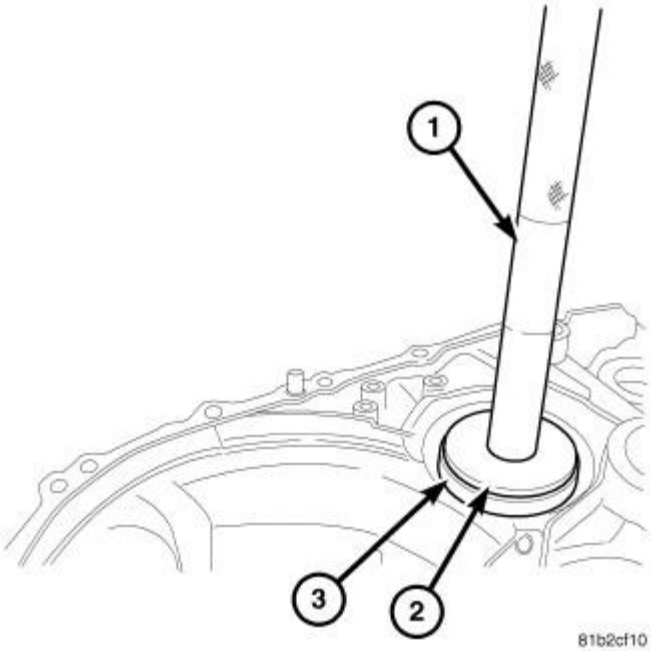


Fig. 70: Compounder Shaft Bearing Cup

Courtesy of CHRYSLER LLC

8. Use Handle C-4171 and Bearing Cup Installer D-144, inverted to install the compounder shaft cup on the bellhousing side case.

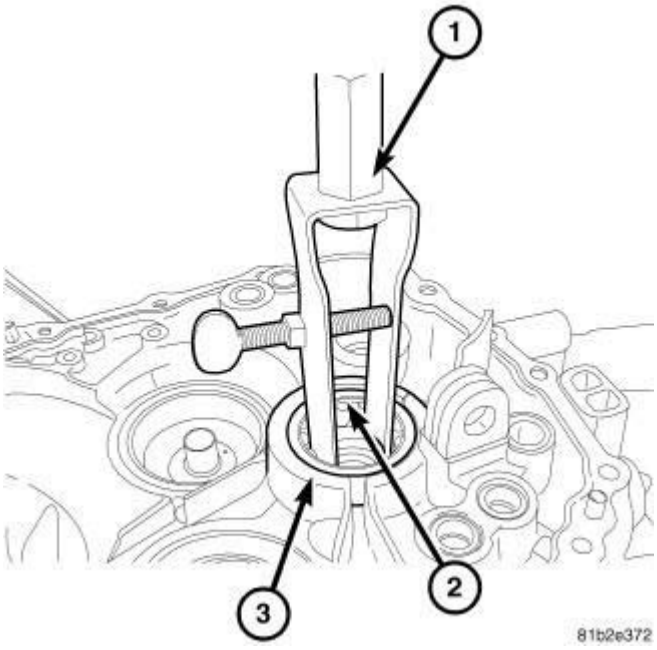


Fig. 71: Input Shaft Case Bearing & Bearing Cup Remover
Courtesy of CHRYSLER LLC

9. Remove the input shaft case bearing (3) (bellhousing side) using Bearing Cup Remover 7794-A (1) and appropriate slide hammer.

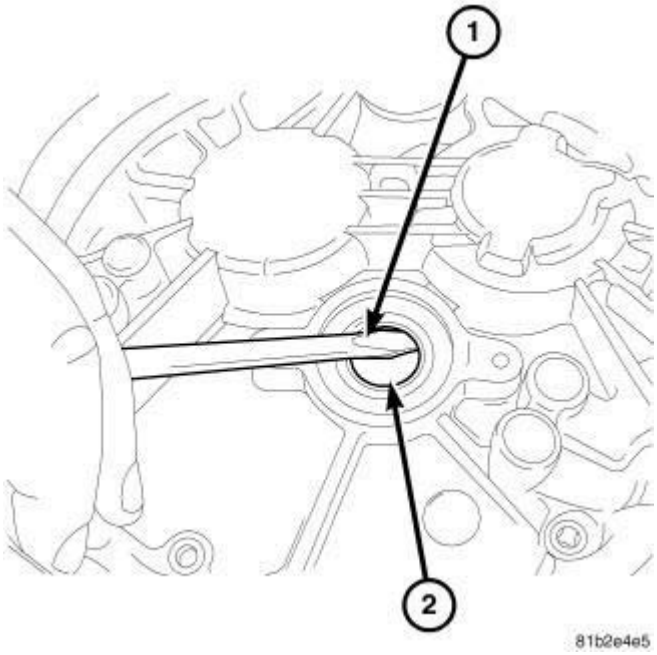


Fig. 72: Remove Input Shaft Seal
Courtesy of CHRYSLER LLC

10. Using a screwdriver (1) remove the input shaft seal (2).

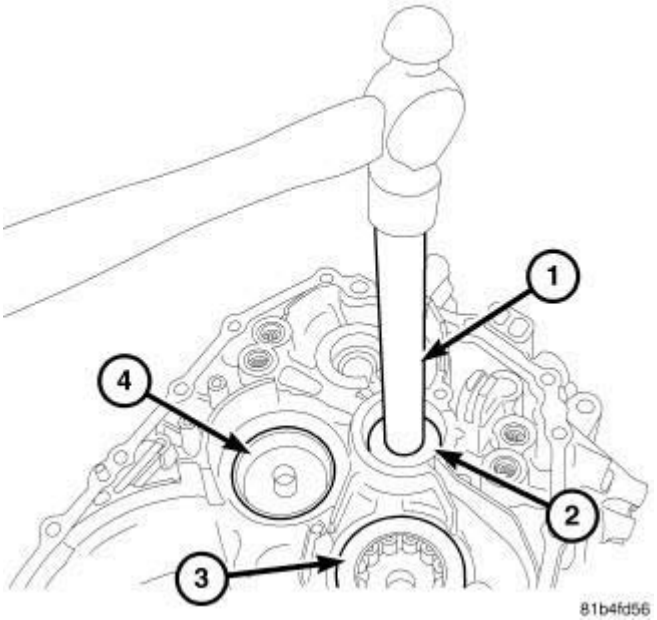


Fig. 73: Install Input Shaft Oil Seal
Courtesy of CHRYSLER LLC

11. Using handle C-4171 and Installer 9935 (2) install the **new** input shaft oil seal.

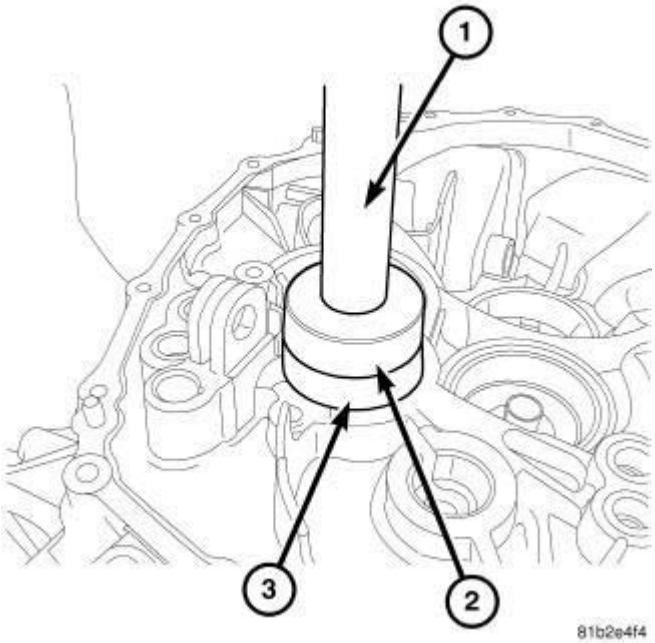


Fig. 74: Install Input Shaft Case Bearing
Courtesy of CHRYSLER LLC

12. Install the input shaft case bearing (2) using Handle C-4171 (1) and Bearing Installer C-4657 (2).

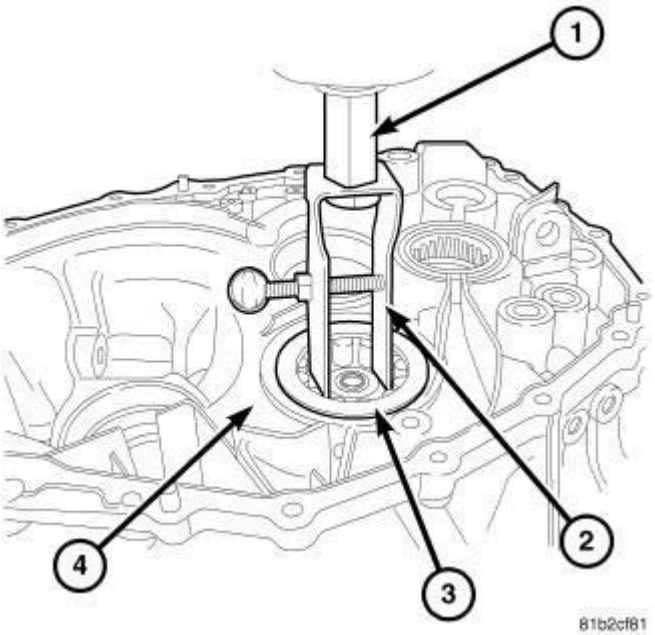


Fig. 75: Remove Output Shaft Bearing From Case
Courtesy of CHRYSLER LLC

13. Using Bearing Cup Remover 7794-A (2) and appropriate slide hammer (1) remove the output shaft #1 bearing (3) from the case (1).

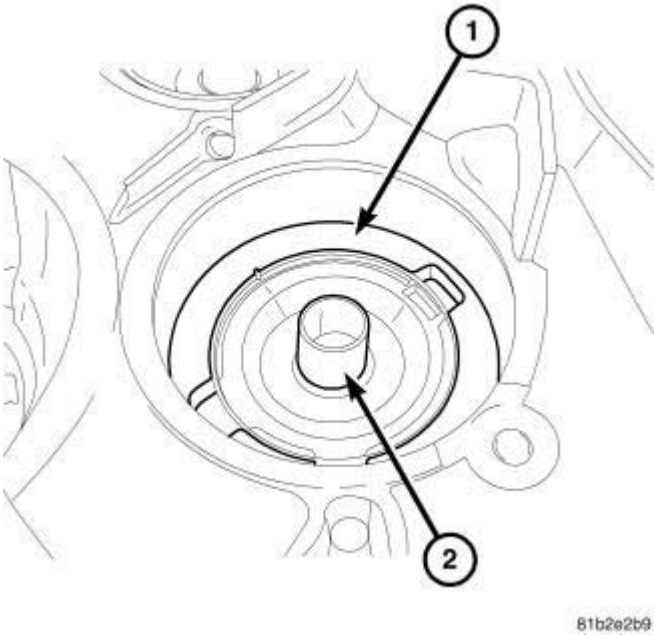


Fig. 76: Output Shaft Oil Slinger
Courtesy of CHRYSLER LLC

14. Remove the output shaft oil slinger (2) from case.
15. Install the output shaft oil slinger (2) into the case , insure the tab (3) is lined up with cutout in case (2).

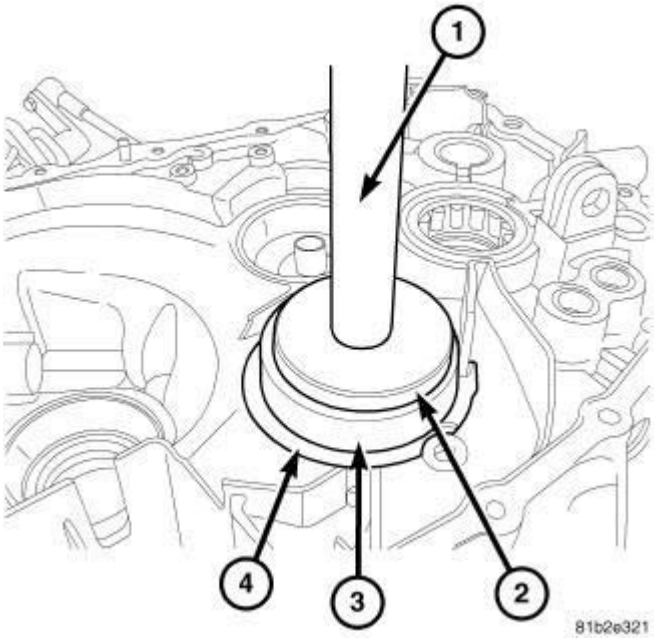


Fig. 77: Install Output Bearing To Case
Courtesy of CHRYSLER LLC

16. Using Handle C-4171 (1) and Bearing Installer C- 4308 inverted (2) install output bearing (3) to case (4).

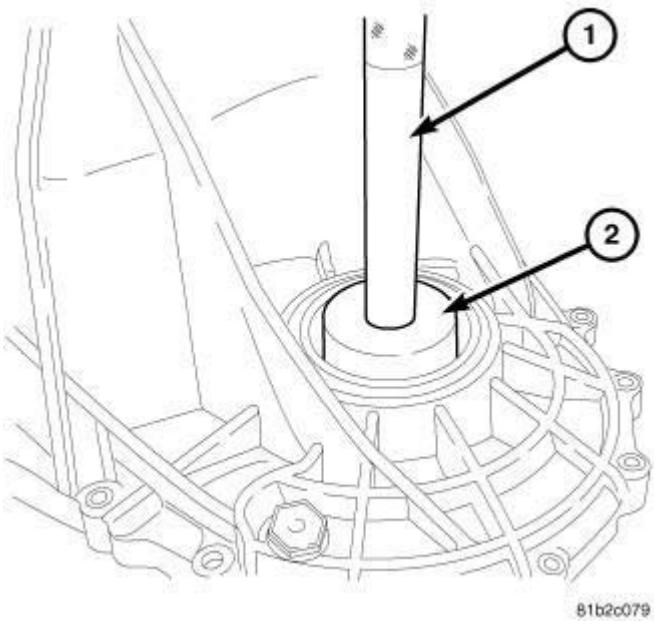


Fig. 78: Handle & Bearing Cup Installer
Courtesy of CHRYSLER LLC

17. Remove the case side differential bearing cup using Handle C-4171 (1) and Bearing Cup Installer 9589 (2), inverted.

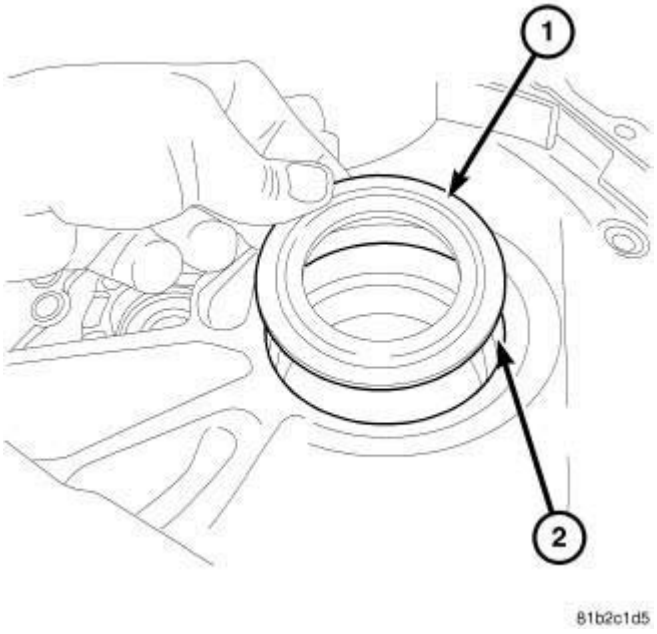


Fig. 79: Differential Bearing Cup Shim
Courtesy of CHRYSLER LLC

18. Remove the case side differential bearing cup shim (1).

NOTE: The case side differential bearing cup shim (1) will be left out to find end play then installed to check turning torque later in the assembly procedure. DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

19. Install the correct case side differential bearing cup shim (1).

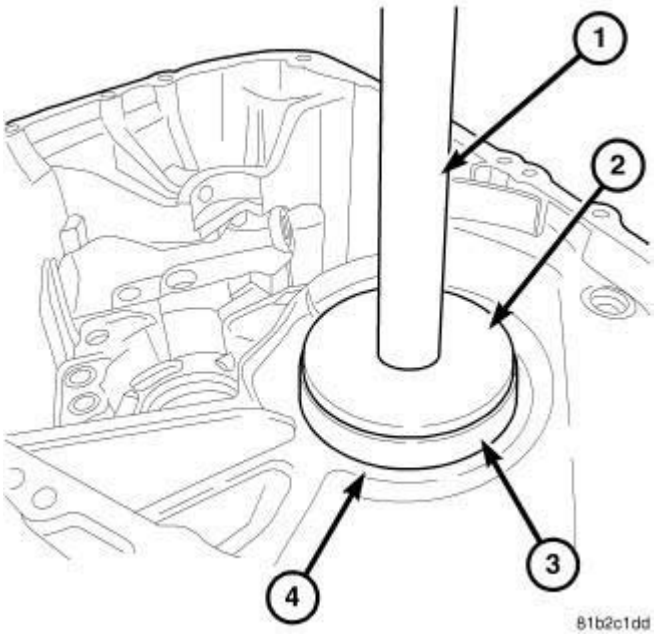


Fig. 80: Install Differential Bearing Cup
Courtesy of CHRYSLER LLC

20. Install the case side differential bearing cup (3) using Handle C-4171 (1) and Bearing Cup Installer D-111 (2).

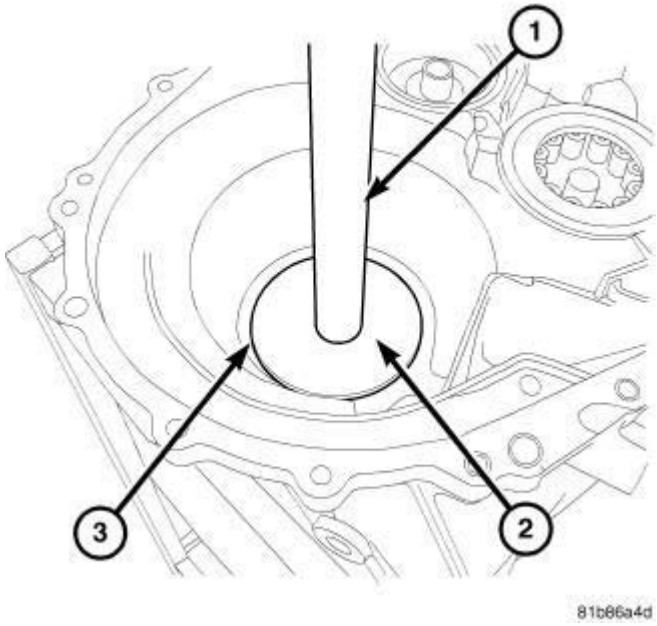


Fig. 81: Bell Housing Side Differential Bearing Cup
Courtesy of CHRYSLER LLC

21. Install the bellhousing side differential bearing cup (3) using Handle C-4171 (1) and Bearing Cup Installer D-111 (2) on FWD transmissions and Bearing Cup Installer 8151 (2) on AWD transmissions.

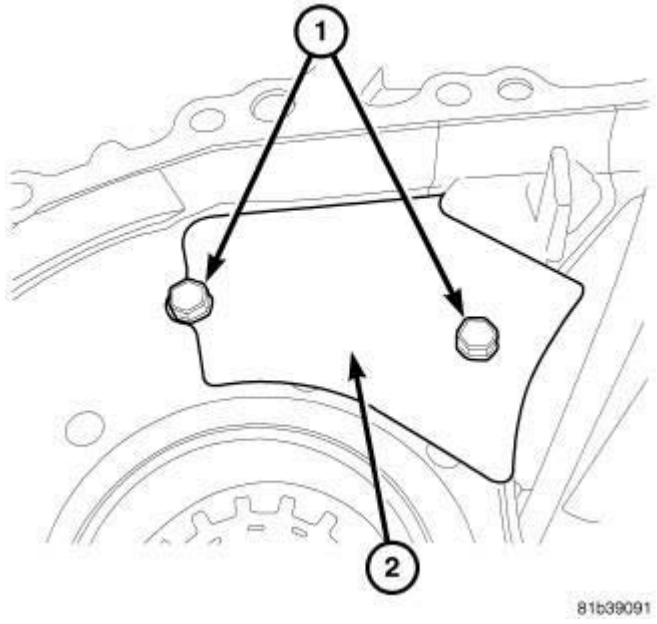


Fig. 82: Oil Baffle
Courtesy of CHRYSLER LLC

22. Install oil baffle (2) and bolts (1), tighten bolts to 9 N.m (80 in. lbs.).

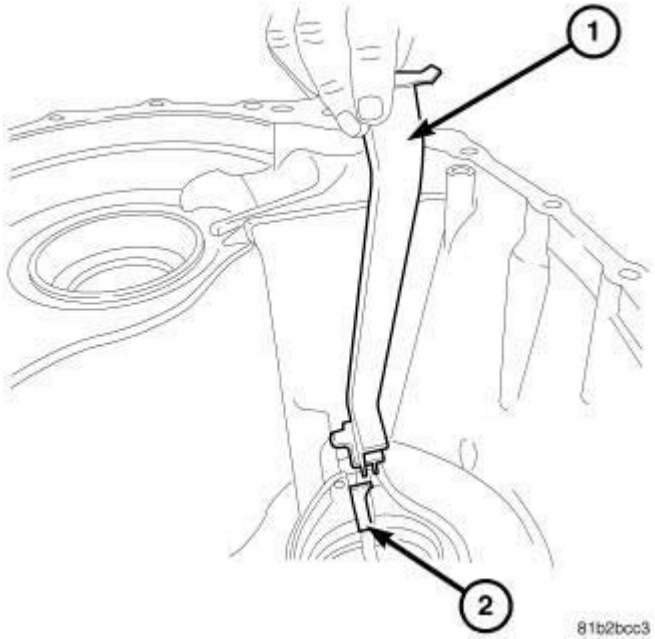


Fig. 83: Oil Feed Trough
Courtesy of CHRYSLER LLC

23. Install the oil feed trough (1) into the case (2).

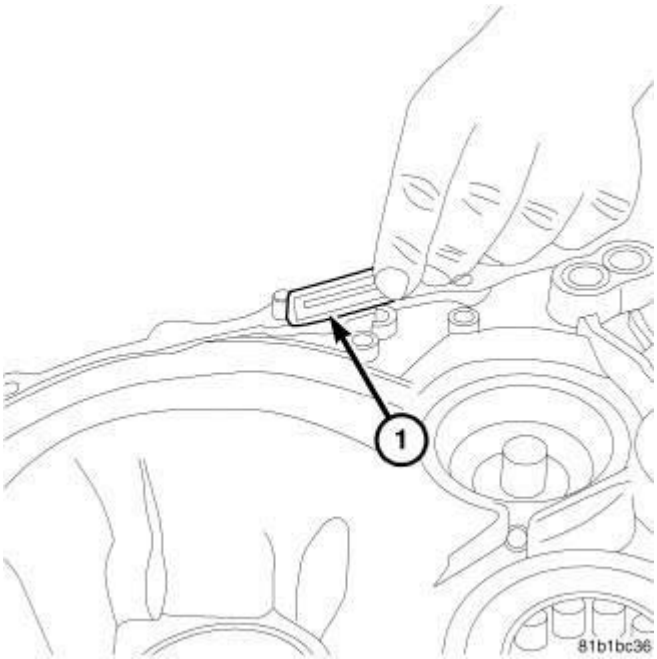


Fig. 84: Magnet
Courtesy of CHRYSLER LLC

24. Install the magnet (1) into the case.

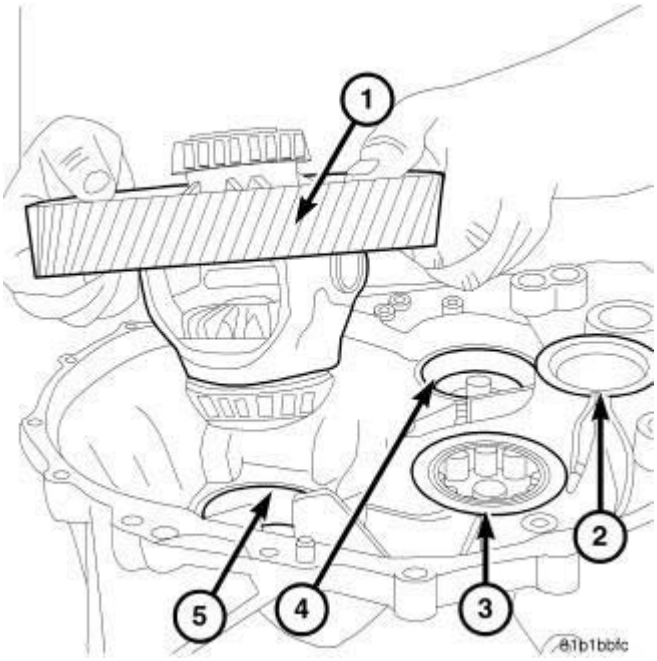


Fig. 85: Differential
Courtesy of CHRYSLER LLC

25. Install the differential (1) into the case (5).
26. Verify differential bearing preload and turning torque. Refer to **DIFFERENTIAL BEARING PRELOAD ADJUSTMENT** procedure 10.

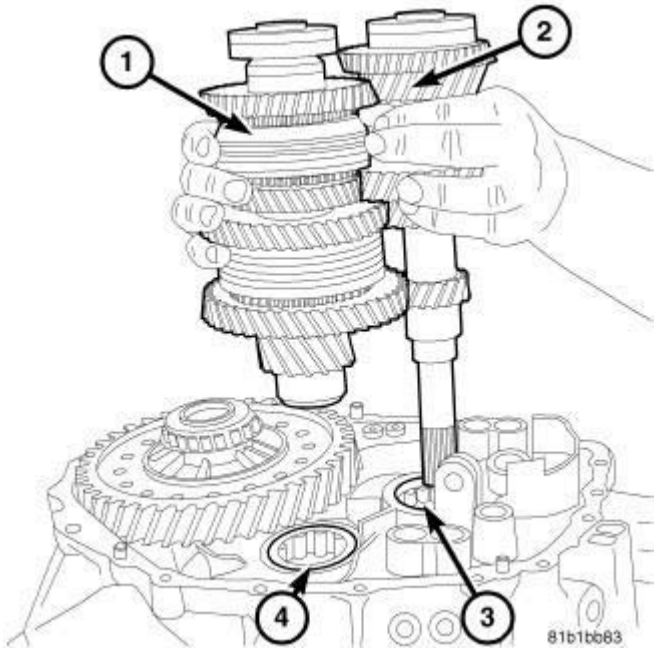


Fig. 86: Output & Input Shafts
Courtesy of CHRYSLER LLC

27. Install the output # 1 (1) and input shaft (2) into case together.

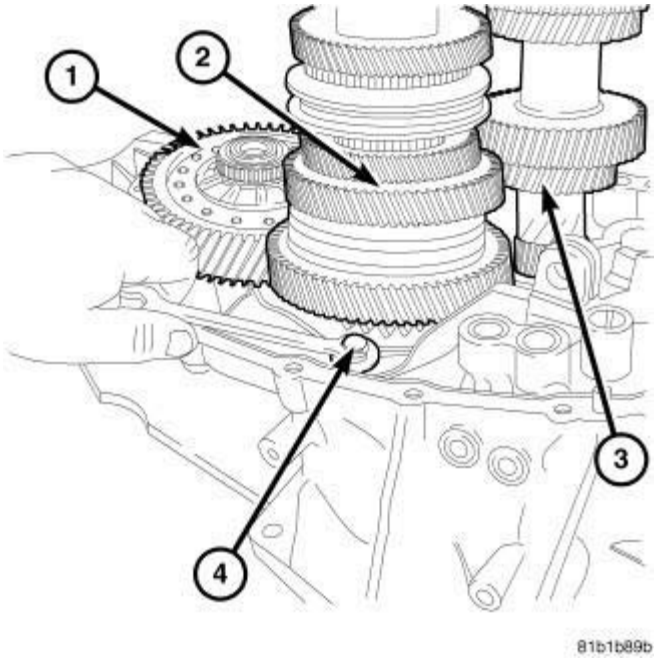


Fig. 87: Bolt At Output Shaft
Courtesy of CHRYSLER LLC

28. Install the output shaft (2) hold down bolt (4) and tighten to 11 N.m (97 in. lbs.).

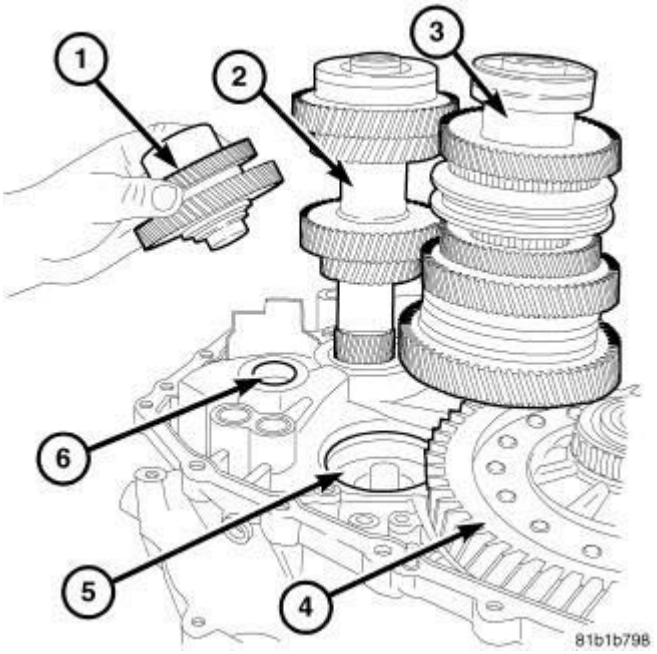


Fig. 88: Reverse Idler Gear
Courtesy of CHRYSLER LLC

29. Install the reverse idler gear assembly (1) into the case (2).

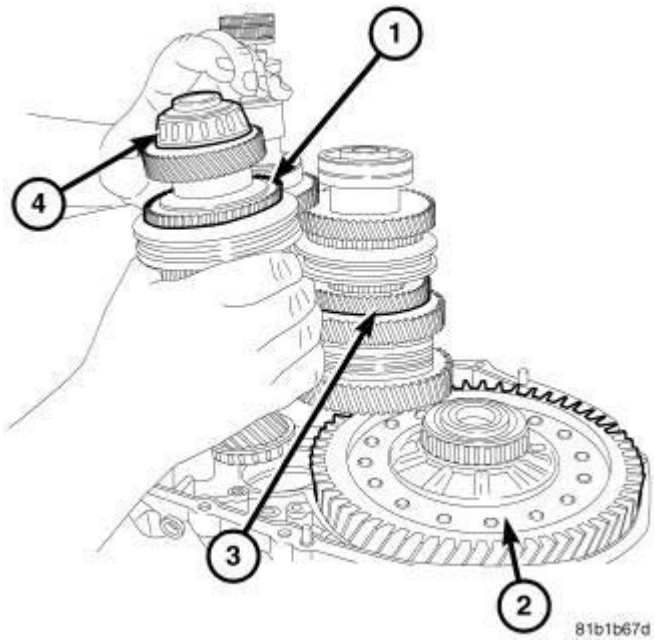


Fig. 89: Output Shaft #2
Courtesy of CHRYSLER LLC

30. Install the output shaft # 2 (4) into case.

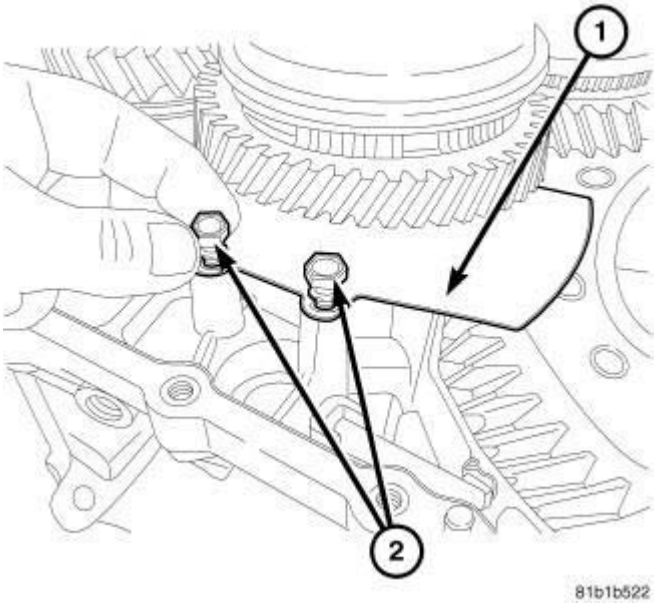


Fig. 90: Oil Slinger
Courtesy of CHRYSLER LLC

31. Install the oil slinger (1) and bolts (2) tighten the bolts to 9 N.m (80 in. lbs.).

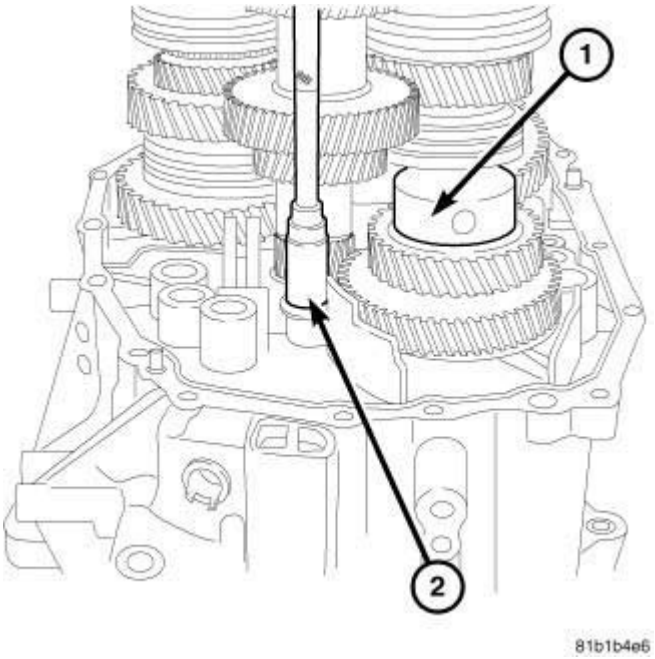


Fig. 91: Bolt At Reverse Idler Gear
Courtesy of CHRYSLER LLC

NOTE: Clock the reverse idler (1) with hole as shown in illustration for installation of anti-rotation bolt.

32. Install the reverse idler gear (1) hold down bolt (2) and tighten to 11 N.m (97 in. lbs.).

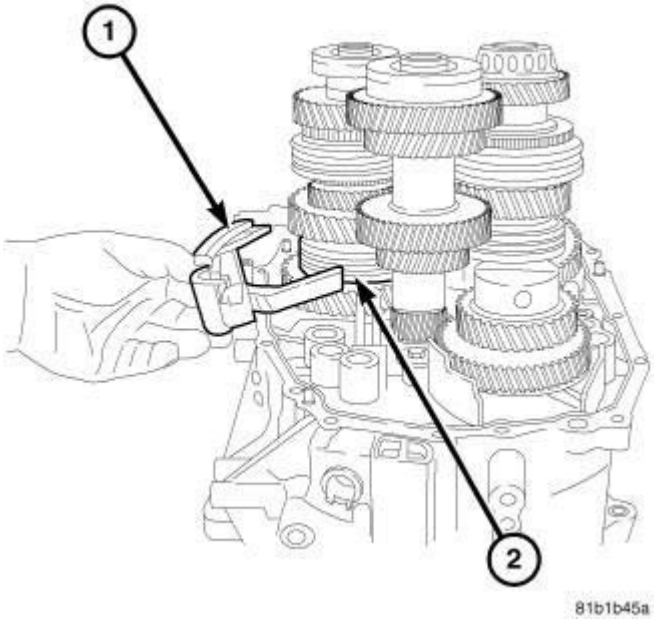


Fig. 92: First & Second Gear Shift Fork & Synchronizer
Courtesy of CHRYSLER LLC

33. Install the first and second gear shift fork (1) onto the first and second gear synchronizer (2).

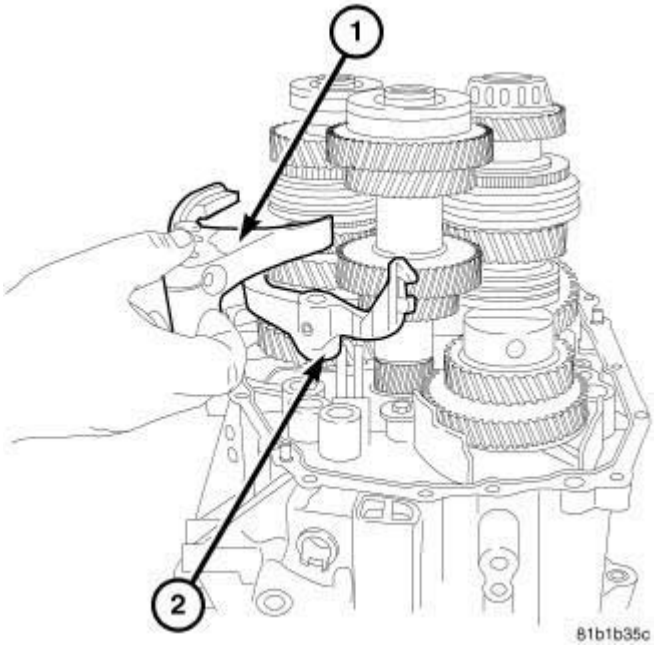


Fig. 93: Third & Fourth Gear Shift Fork & Synchronizer
Courtesy of CHRYSLER LLC

34. Install the third and fourth gear shift fork (1) onto the third and fourth gear synchronizer.

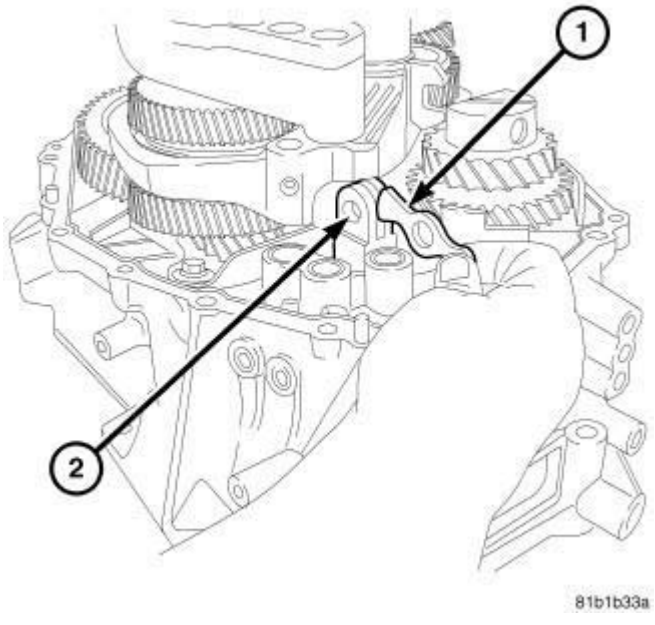


Fig. 94: Shift Rail Pivot Bracket
Courtesy of CHRYSLER LLC

35. Install the shift rail arm (1) onto the stand (2).

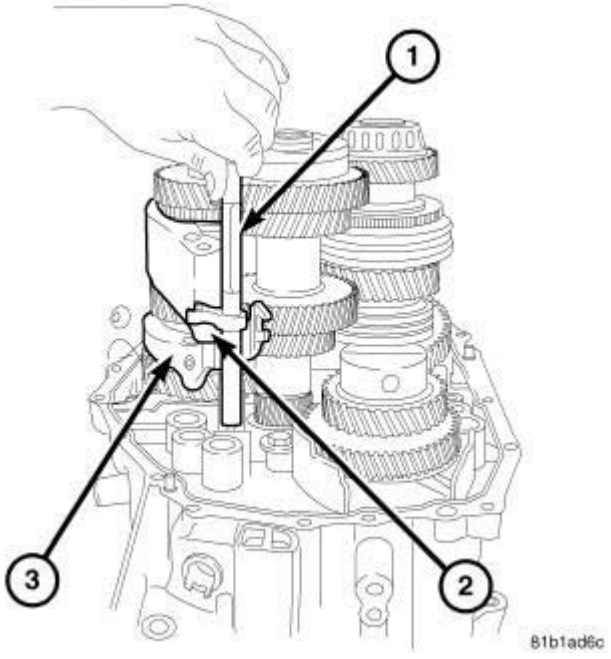


Fig. 95: Pivot Shaft
Courtesy of CHRYSLER LLC

36. Install the pivot shaft (1) into the case.

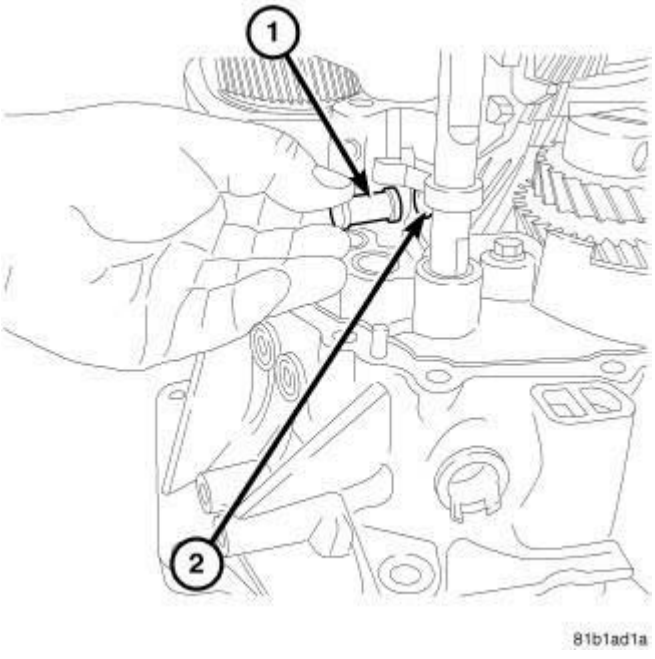


Fig. 96: Shift Rail Pin
Courtesy of CHRYSLER LLC

37. Install the shift rail bracket pivot pin (1) and the **new** pivot pin E-clip (2).

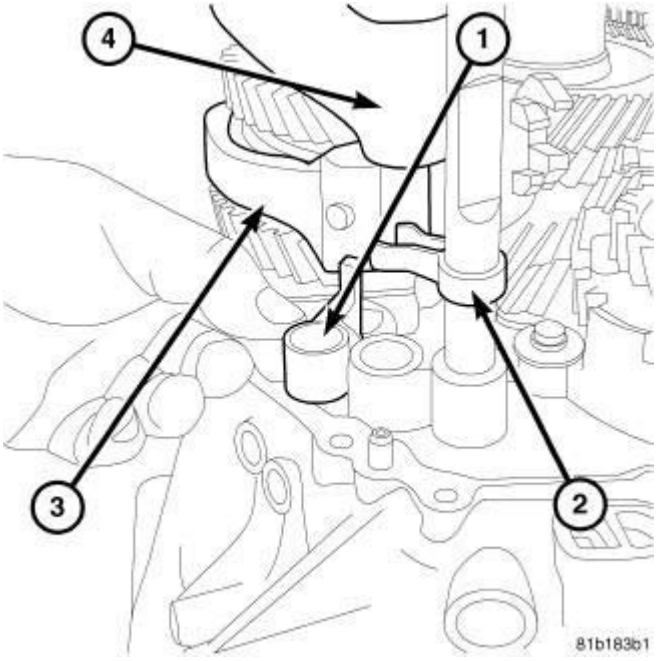


Fig. 97: Third & Fourth Gear Shift Bracket
Courtesy of CHRYSLER LLC

38. Install the third and fourth gear shift bracket (1).

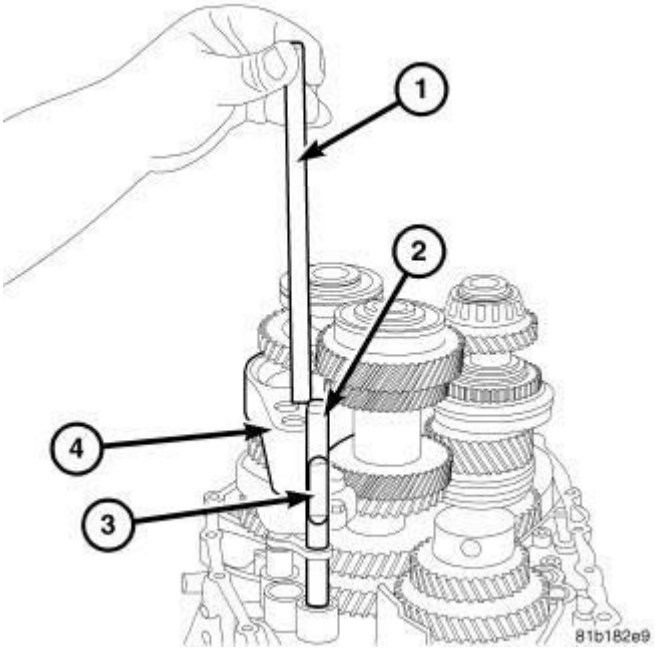


Fig. 98: Third & Fourth Gear Shift Rail
Courtesy of CHRYSLER LLC

39. Install the third and fourth gear shift rail (1) into the case and shift fork (4).

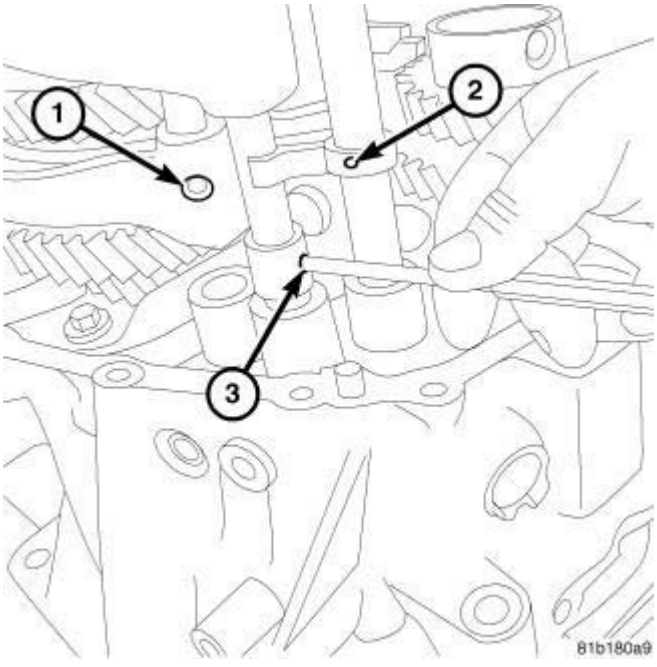


Fig. 99: Roll Pin At Third & Fourth Gear Shift Rail
Courtesy of CHRYSLER LLC

40. Install the **new** roll pin at the third and fourth gear shift rail.

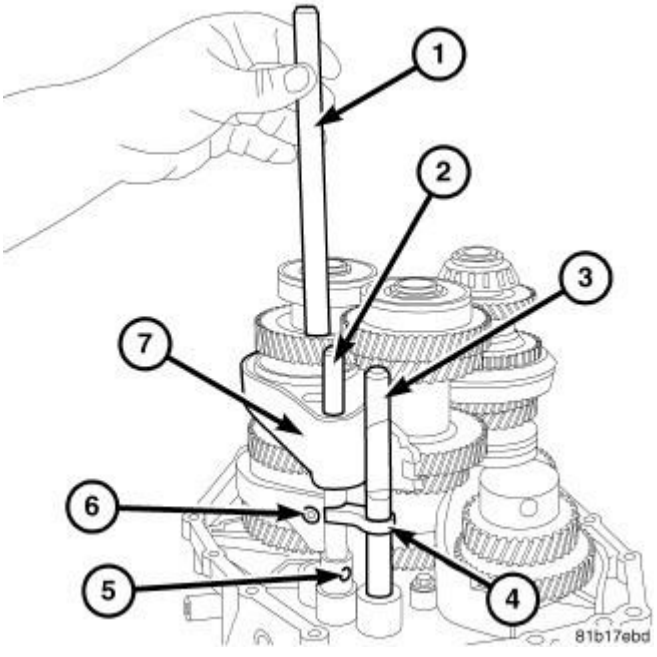


Fig. 100: First & Second Gear Shift Rail
Courtesy of CHRYSLER LLC

41. Install the first and second gear shift rail (1).

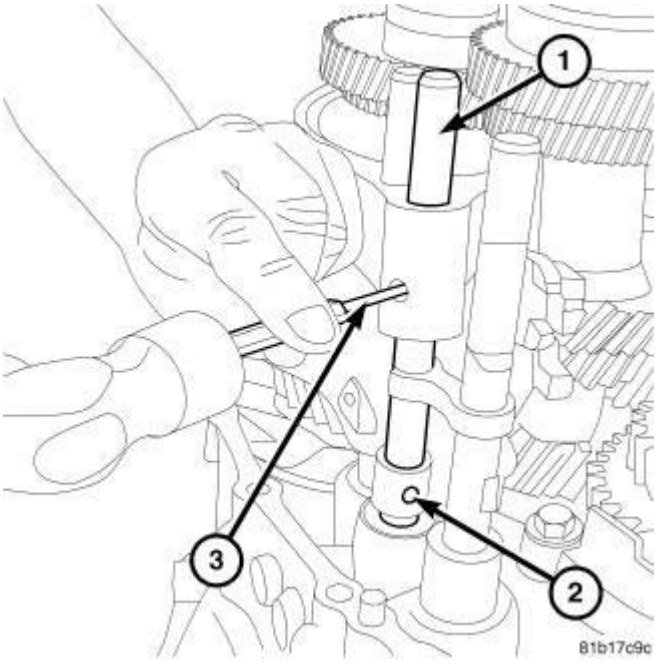


Fig. 101: Roll Pin At Third & Fourth Gear Shift Fork To Rail
Courtesy of CHRYSLER LLC

42. Install the **new** roll pin at the third and fourth gear shift fork to rail (1).

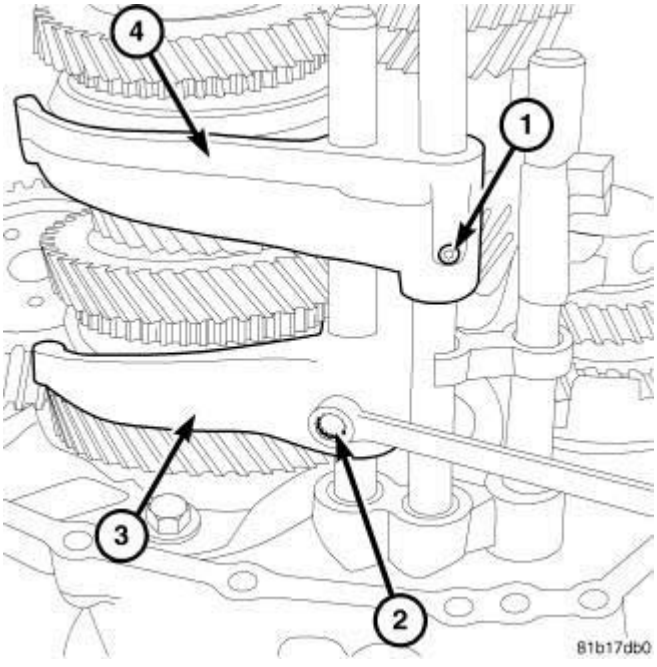


Fig. 102: First & Second Gear Shift Fork To Rail Bolt
Courtesy of CHRYSLER LLC

43. Install the **new** bolt (2) holding the first and second gear shift fork (3) to the rail and tighten to 20 N.m (177 in. lbs.).

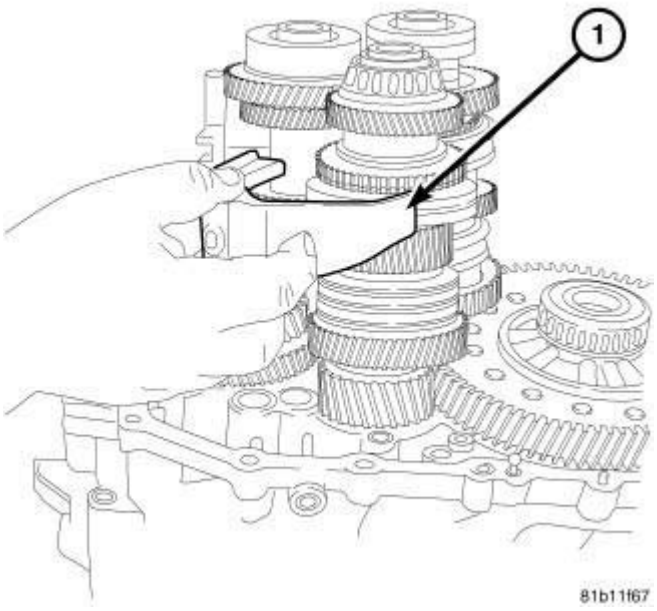


Fig. 103: Fifth & Sixth Gear Shift Fork
Courtesy of CHRYSLER LLC

44. Install the fifth and sixth gear shift fork (2).

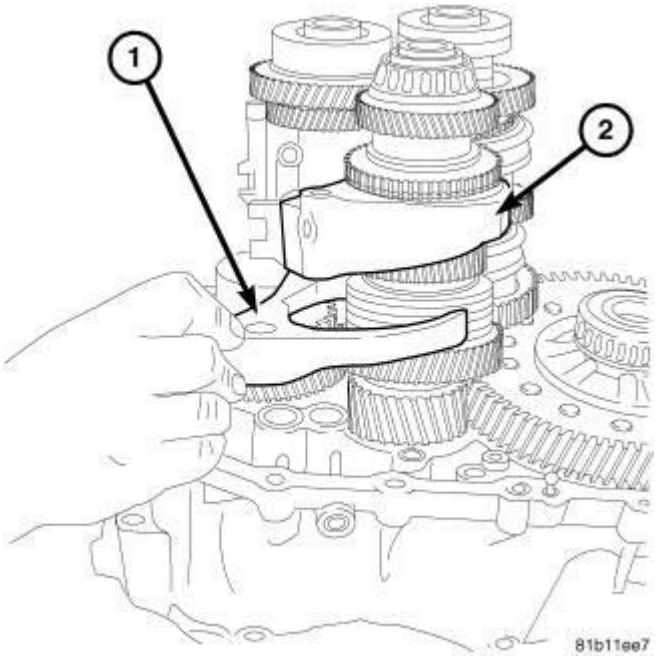


Fig. 104: Reverse Gear Shift Fork
Courtesy of CHRYSLER LLC

45. Install the reverse gear shift fork (1).

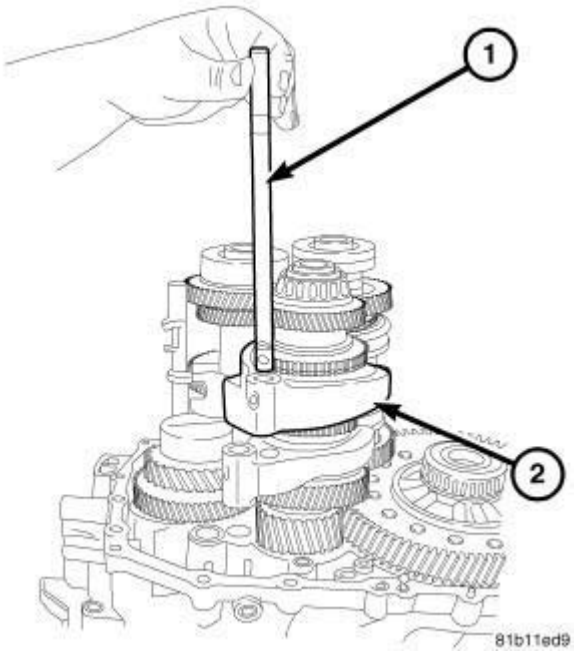


Fig. 105: Fifth & Sixth Gear Shift Rail
Courtesy of CHRYSLER LLC

46. Install the fifth and sixth gear shift rail (1) into the case and shift fork (2).

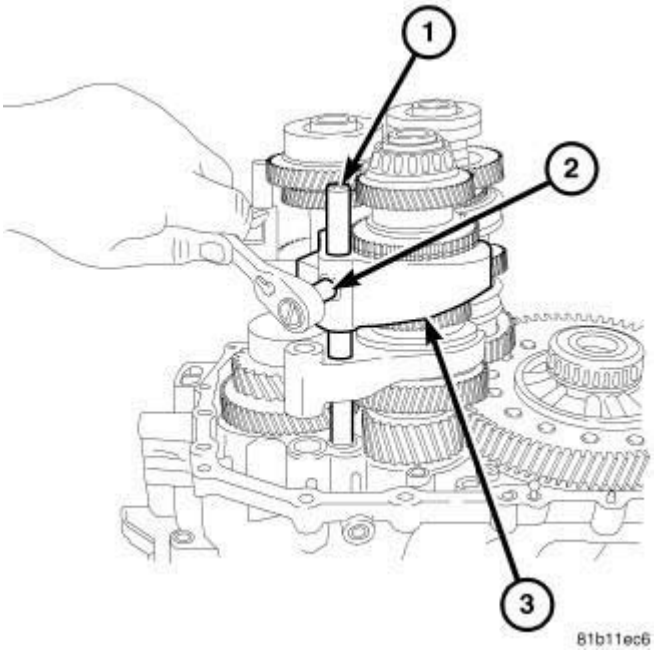


Fig. 106: Fifth & Sixth Gear Shift Fork & Shift Rail Bolt
Courtesy of CHRYSLER LLC

47. Install the **new** bolt (2) holding the fifth and sixth gear shift fork (3) to the fifth and sixth gear shift rail (1) and tighten to 20 N.m (177 in. lbs.).

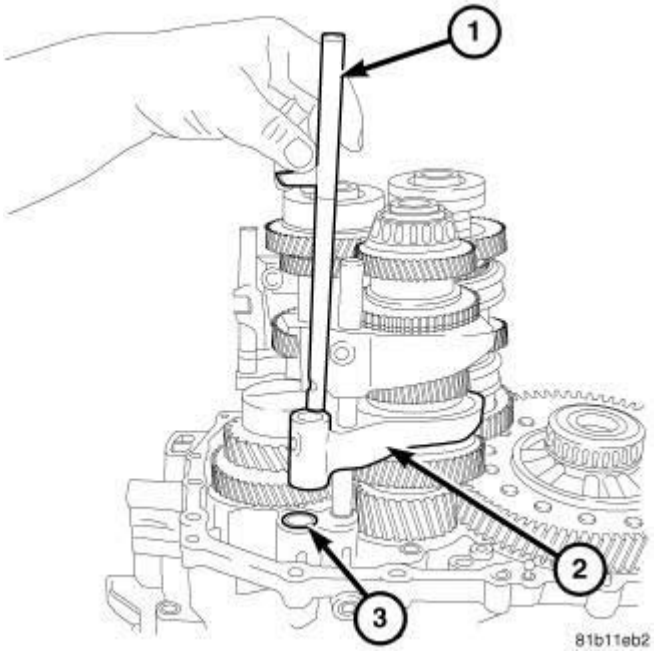


Fig. 107: Reverse Shift Rail
Courtesy of CHRYSLER LLC

48. Install the reverse shift rail (1) into the case (3) and shift fork (2).

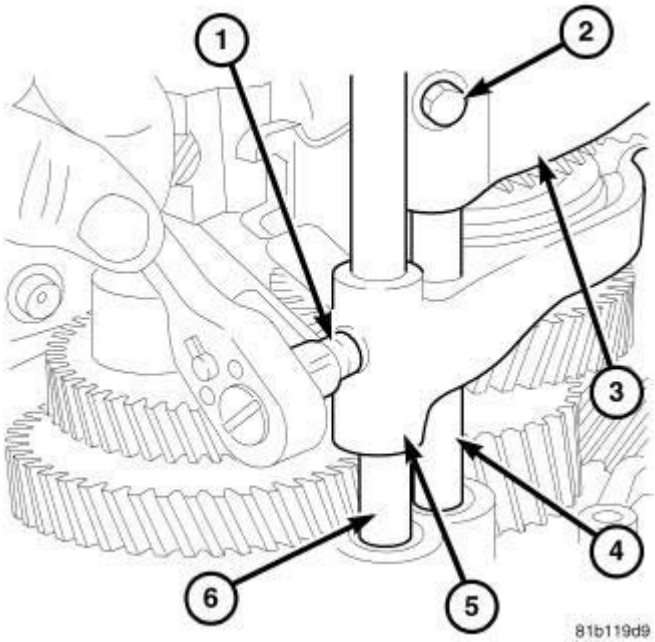


Fig. 108: Reverse Shift Fork To Shift Rail Bolt
Courtesy of CHRYSLER LLC

49. Install the **new** bolt (1) holding the reverse shift fork (5) to the reverse shift rail (6) and tighten to 20 N.m (177 in. lbs.).

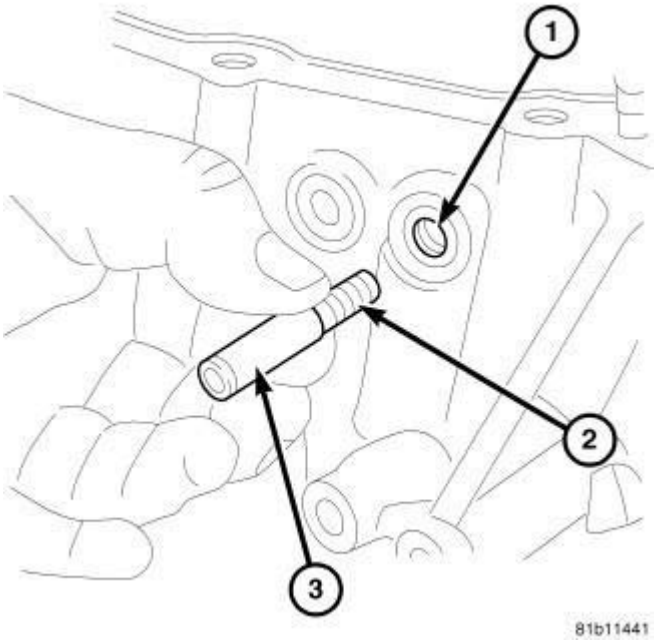


Fig. 109: Third & Fourth Gear Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

50. Install third and fourth gear shift rail detent ball.

51. Install third and fourth gear shift rail detent spacer (3) and spring (2).

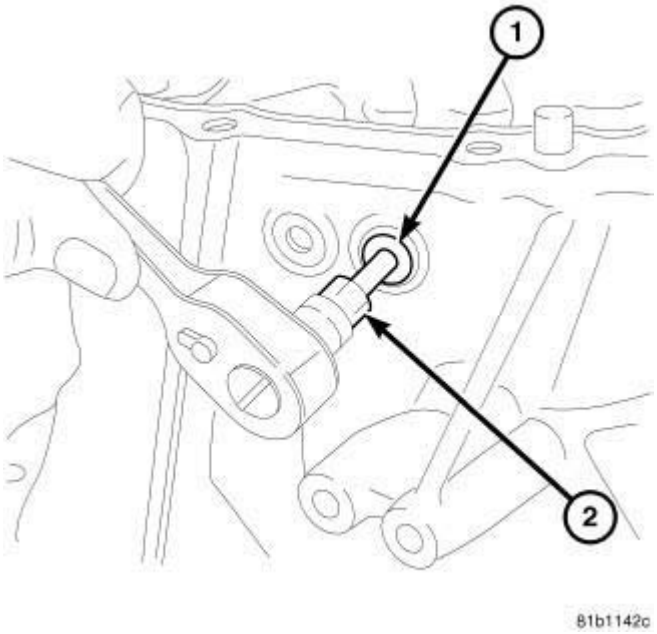


Fig. 110: Third & Fourth Gear Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

52. Install a **new** third and fourth gear shift rail detent plug (1) and tighten to 22 N.m (195 in. lbs.).

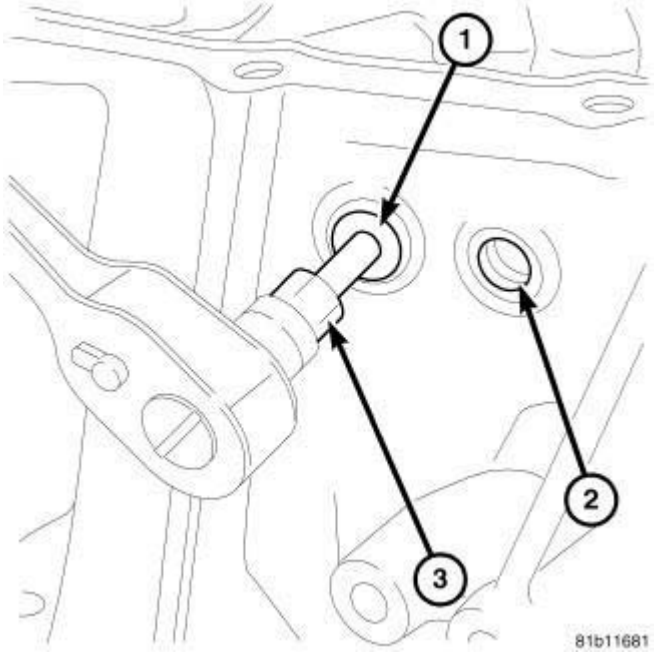


Fig. 111: First & Second Gear Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

53. Install first and second gear shift rail detent ball.
54. Install first and second gear shift rail detent spacer and spring.
55. Install a **new** first and second gear shift rail detent plug (1) and tighten to 22 N.m (195 in. lbs.).

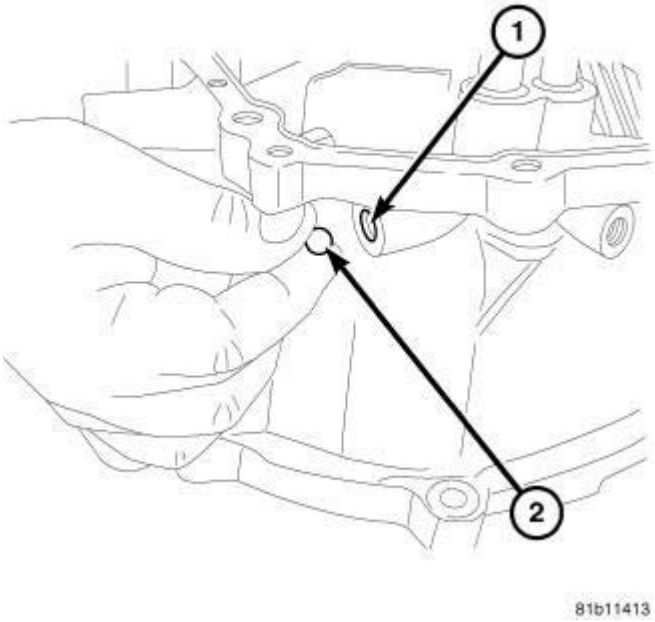


Fig. 112: Reverse Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

56. Install the reverse shift rail detent ball (2).

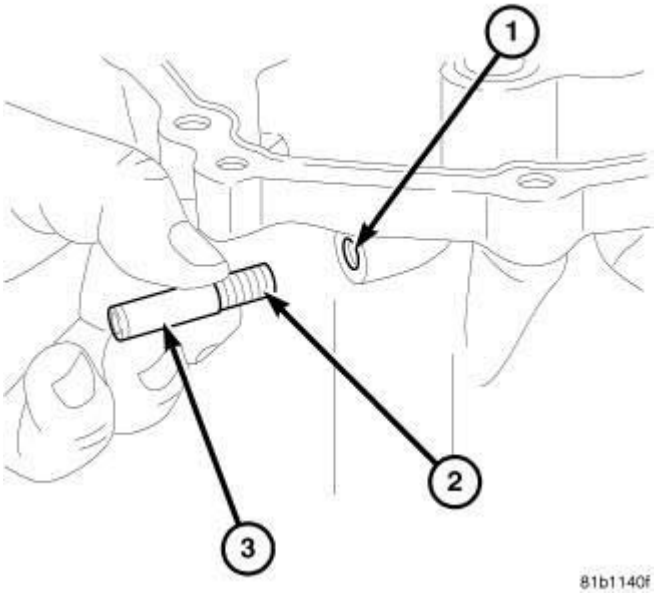


Fig. 113: Reverse Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

57. Install the reverse shift rail detent spacer (3) and spring (2).

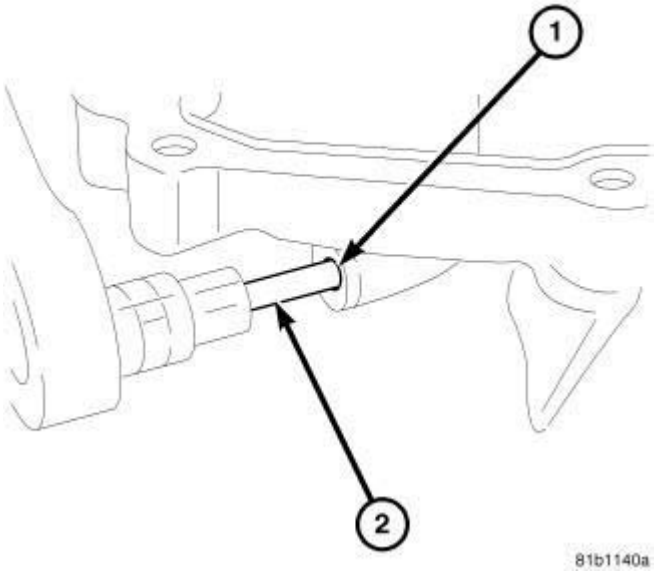


Fig. 114: Reverse Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

58. Install a **new** reverse shift rail detent plug (1) and tighten to 22 N.m (195 in. lbs.).

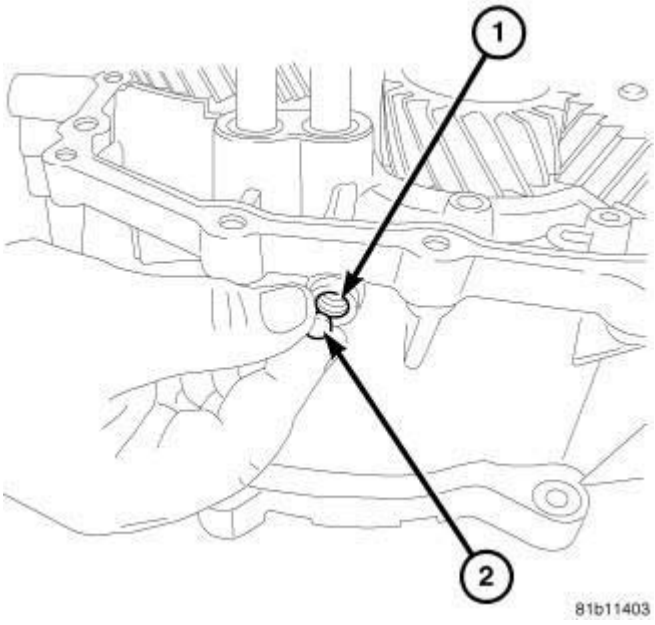


Fig. 115: Fifth & Sixth Gear Shift Rail Detent Ball
Courtesy of CHRYSLER LLC

59. Install fifth and sixth gear shift rail detent ball (2).

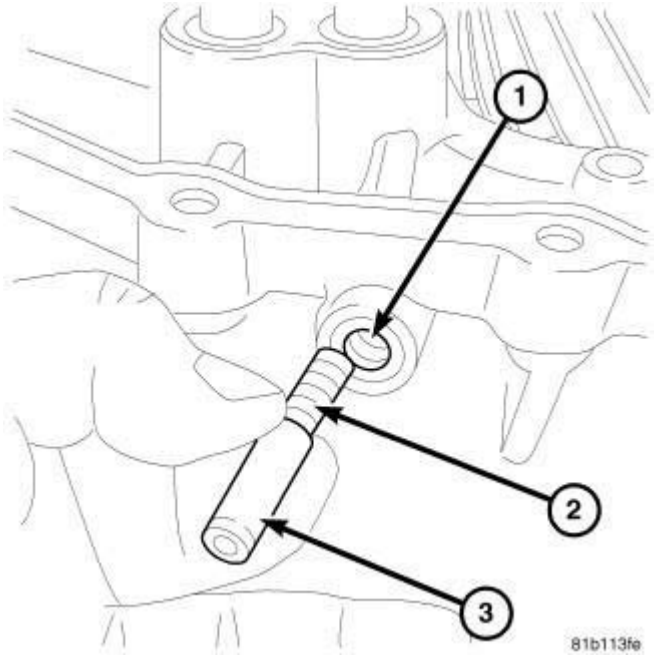


Fig. 116: Fifth & Sixth Gear Shift Rail Detent Spacer & Spring
Courtesy of CHRYSLER LLC

60. Install fifth and sixth gear shift rail detent spacer (3) and spring (2).

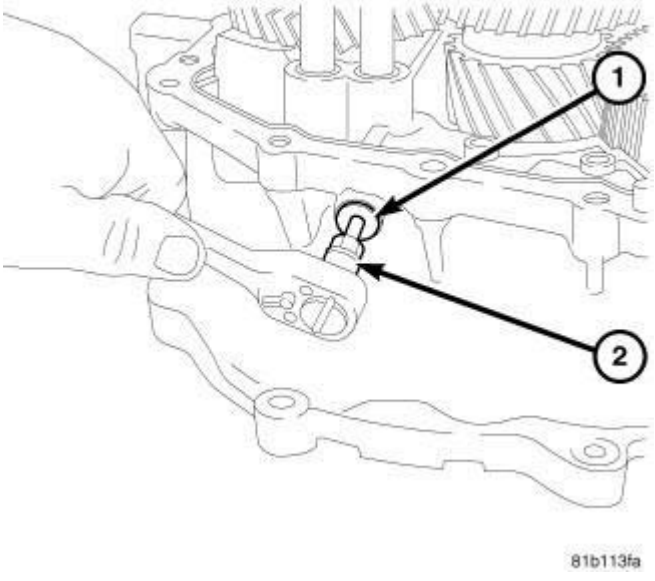


Fig. 117: Fifth & Sixth Gear Shift Rail Detent Plug
Courtesy of CHRYSLER LLC

61. Install a **new** fifth and sixth gear shift rail detent plug (1) and tighten to 22 N.m (195 in. lbs.).

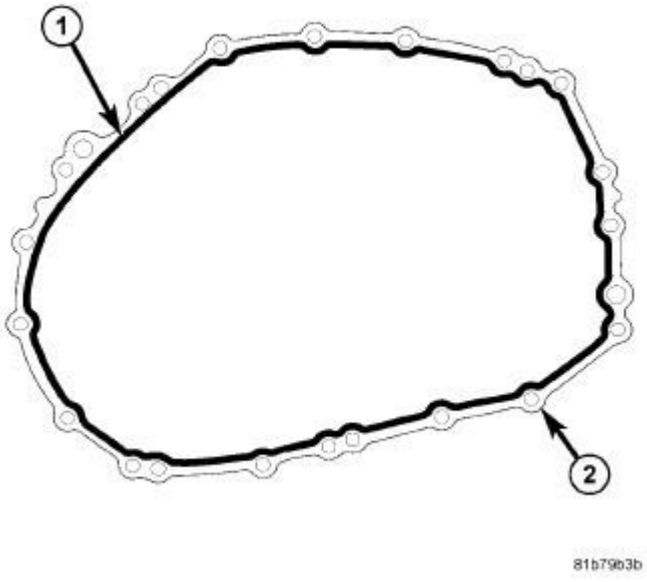


Fig. 118: Flat Surface Of Case Mating Flange
Courtesy of CHRYSLER LLC

62. If this is the final assembly draw a bead (1) of MOPAR® Gasket Maker, Loctite® 518, or equivalent, on the flat surface of the case mating flange (2).

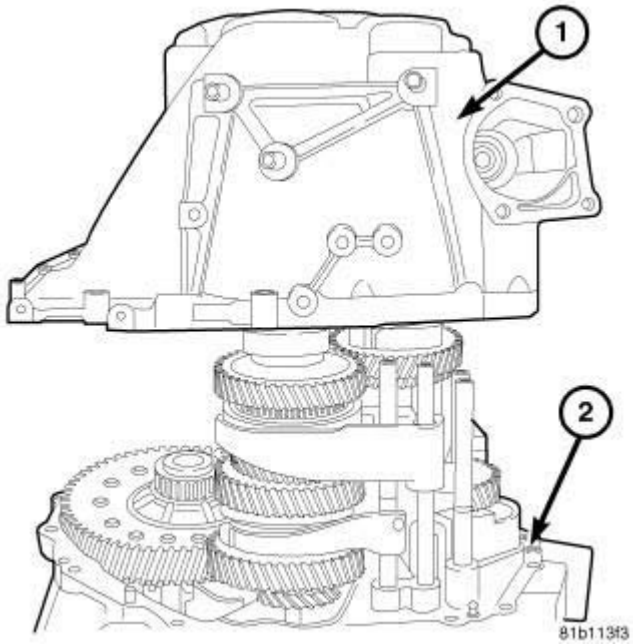


Fig. 119: Transmission Case Half & Clutch Housing
Courtesy of CHRYSLER LLC

63. Install the transmission case half (1) onto the clutch housing (2).

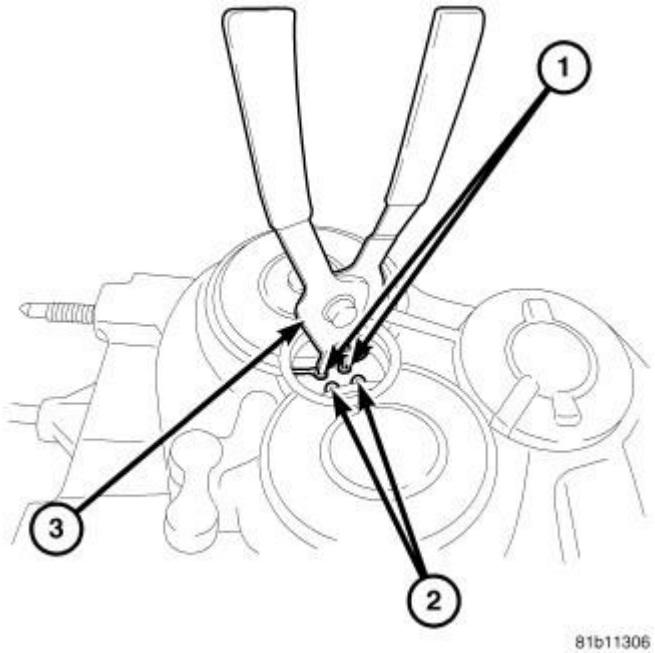


Fig. 120: Snap Rings At Rear Of Transmission Case
Courtesy of CHRYSLER LLC

CAUTION: Insure snap rings are fully seated in bearings before installing case bolts.

64. Using suitable snap-ring pliers (3), expand the transmission shaft bearing snap-rings (1, 2) at the rear of the transmission case to allow the bearings fall into place.

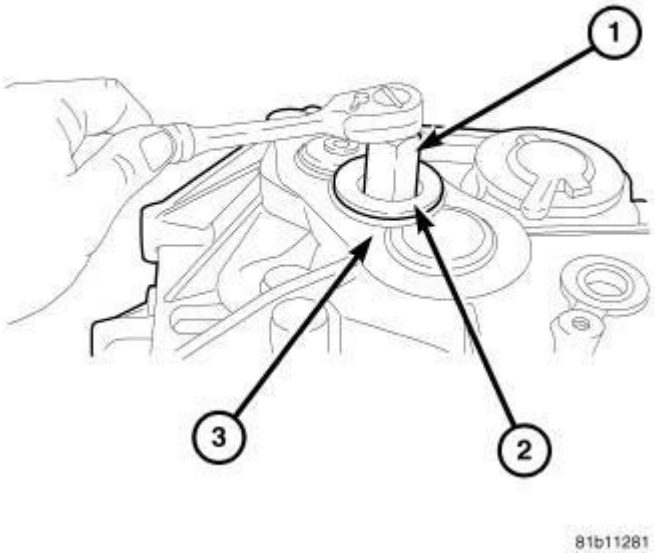


Fig. 121: 27 MM Hex Adapter For Shaft Plug
Courtesy of CHRYSLER LLC

NOTE: Always use a new washer anti-rotation bolt.

NOTE: Add MOPAR® Gasket Maker, Loctite® 518, or equivalent around inside flat of plug.

65. Install the **new** 27 mm the shaft plug (2) into the rear of the case.
66. Install a 27 mm (1 1/16 in.) hex adapter (1) into the shaft plug (2) at the rear of the transmission case (3) and tighten to 55 N.m (41 ft. lbs.).

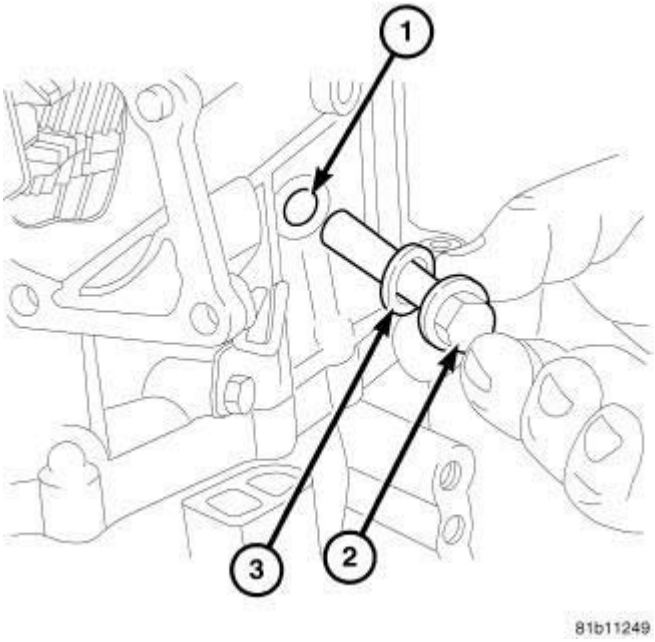


Fig. 122: Idler Shaft Anti-Rotation Bolt
Courtesy of CHRYSLER LLC

NOTE: Always use a new washer anti-rotation bolt.

NOTE: Next step only to be used on final assembly.

67. Install anti-rotation bolt (2) and washer (3) tighten to 80 N.m (59 ft. lbs.).

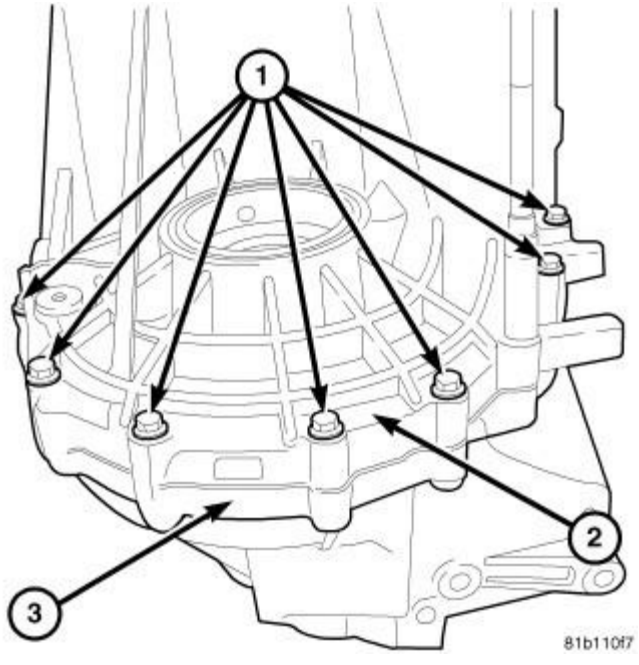


Fig. 123: Transmission Case To Clutch Housing Bolts (Transmission Case Side)

Courtesy of CHRYSLER LLC

68. Install the bolts (1) holding the transmission case (2) to the clutch housing (3) on the transmission case side and tighten to 29 N.m (257 in. lbs.).

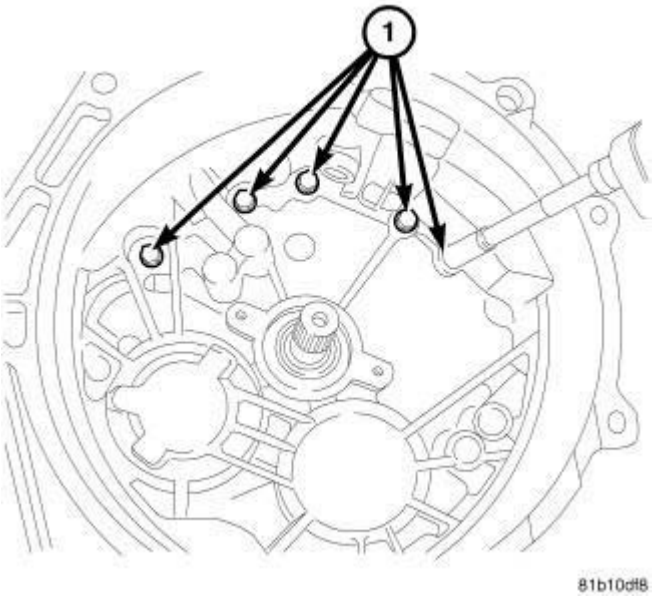


Fig. 124: Transmission Case To Clutch Housing Bolts (Inside Clutch Housing)
Courtesy of CHRYSLER LLC

69. Install the bolts (1) holding the transmission case to the clutch housing on the inside of the clutch housing and tighten to 29 N.m (257 in. lbs.).

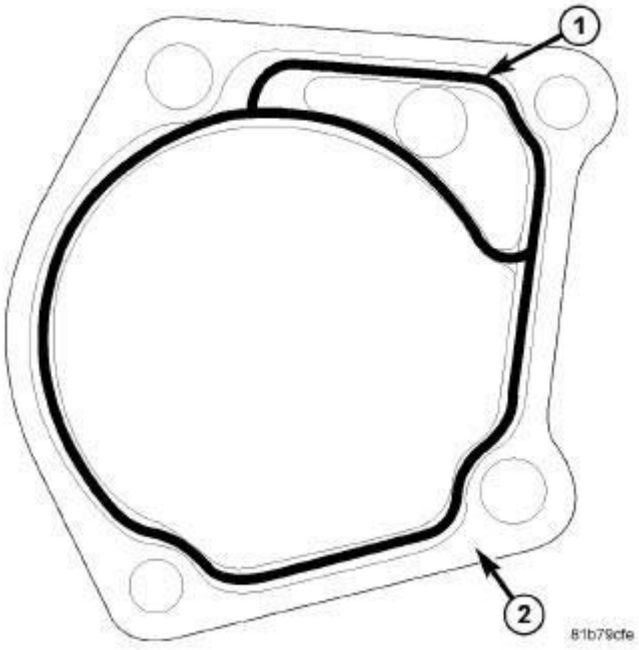


Fig. 125: Sealer
Courtesy of CHRYSLER LLC

70. Add MOPAR® Gasket Maker, Loctite® 518, or equivalent around inside of all holes and on mating flange.

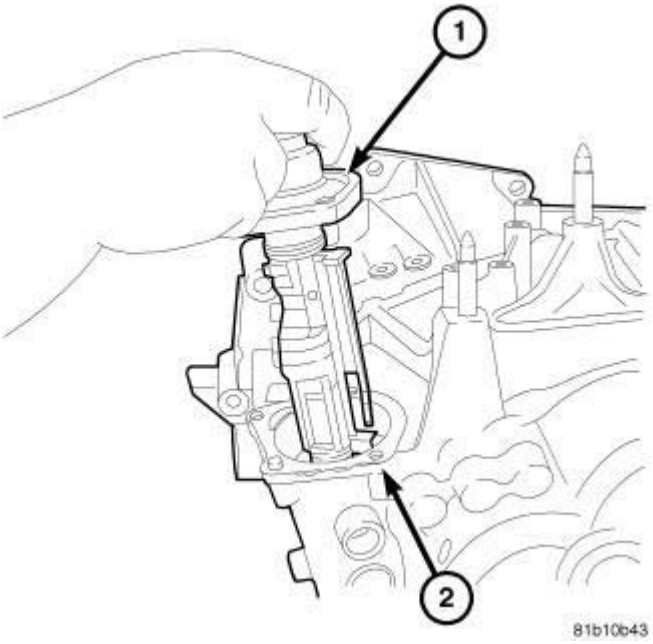


Fig. 126: Shift Lever Assembly
Courtesy of CHRYSLER LLC

71. Install the shift lever assembly (1) into the transmission case (2).

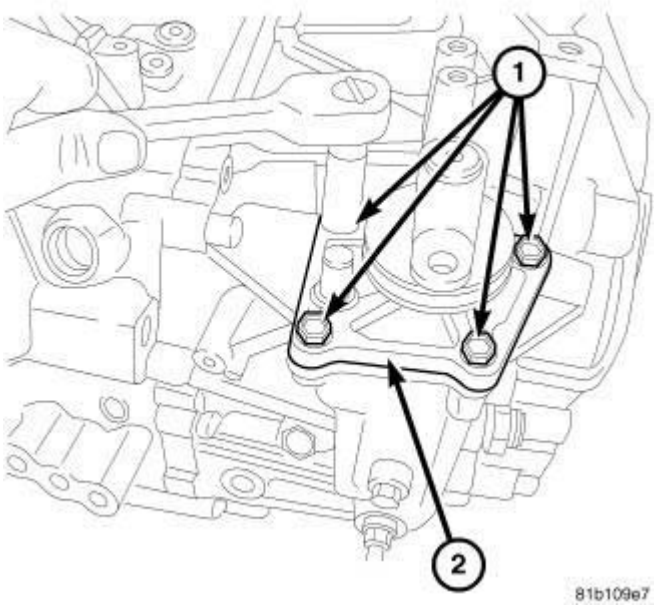


Fig. 127: Shift Lever Assembly Bolts
Courtesy of CHRYSLER LLC

72. Install the **new** bolts (1) holding the shift lever assembly (2) to the transmission and tighten to 19 N.m (168 in. lbs.)

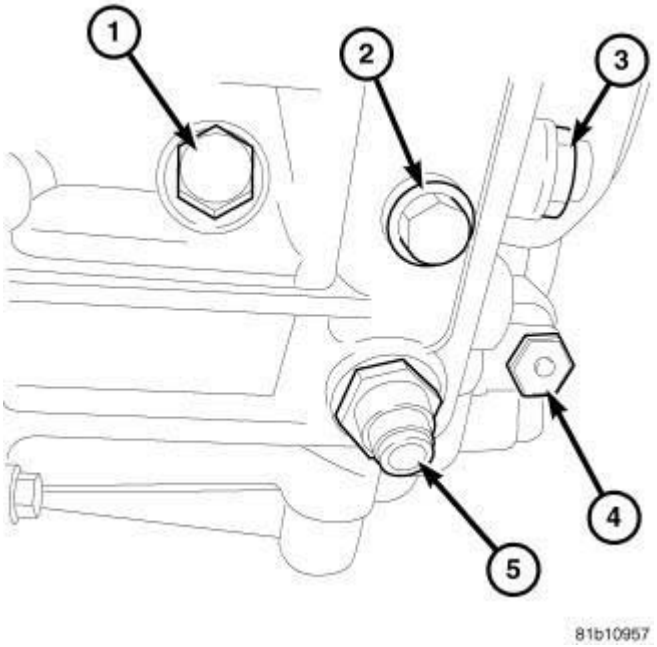


Fig. 128: Anti-Rotation Bolt
Courtesy of CHRYSLER LLC

73. Install **new** shift tower lock ball for shift detent (5) and tighten to 29 N.m (277 in. lbs.).
74. Install **new** shift lock ball for the select detent (3) and tighten to 39 N.m (29 ft. lbs.).
75. Install **new** shift tower shift guide pin (2) and tighten to 30 N.m (257 in. lbs.).

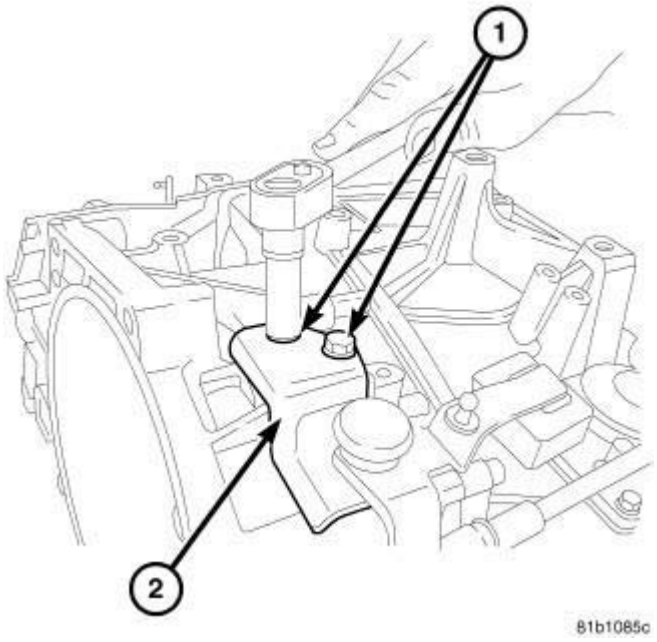


Fig. 129: Crossover Bracket
Courtesy of CHRYSLER LLC

76. Install the shift bracket (2) and bolts, tighten to 19 N.m (168 in. lbs.)

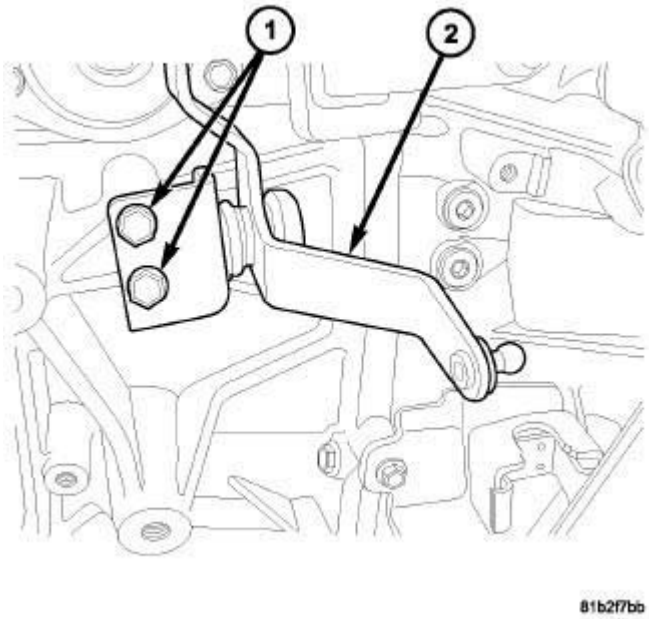


Fig. 130: Crossover Bellcrank
Courtesy of CHRYSLER LLC

77. Install the crossover (1) onto the transmission.
78. Install the crossover bolts (1) and tighten to 19 N.m (168 in. lbs.)

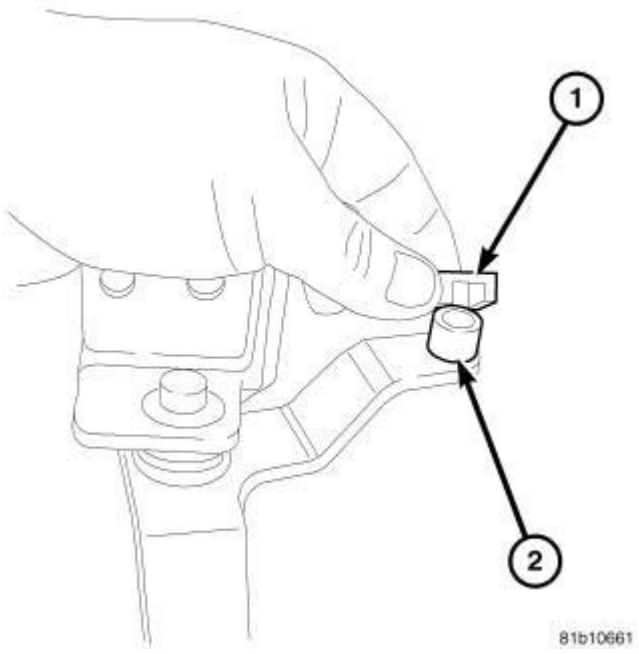


Fig. 131: Bell Crank Bushing
Courtesy of CHRYSLER LLC

79. Apply a light coating of white grease on crossover bushing (1).
80. Install the crossover bushing (1) onto the crossover shaft (2).

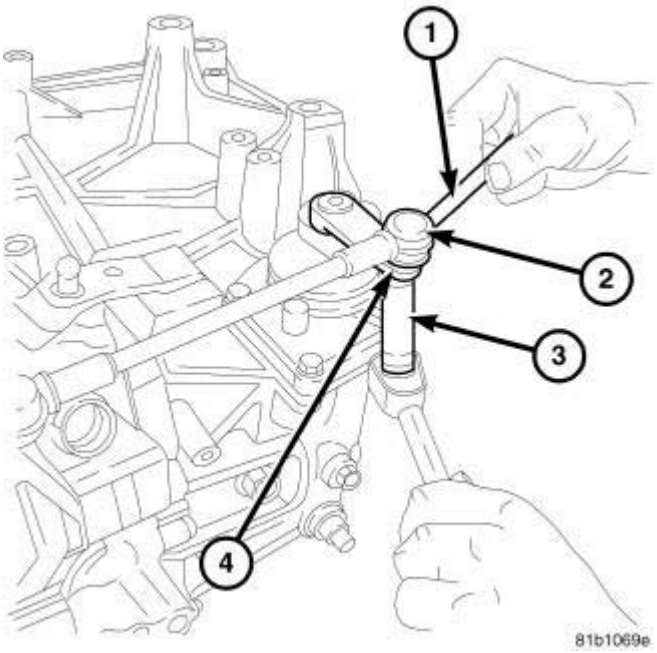


Fig. 132: Nut Crossover Rod To Shift Lever
Courtesy of CHRYSLER LLC

81. Install the nut (4) holding the crossover rod (2) to the shift lever. Be sure to use a wrench (1) to hold the ball stud to prevent it from rotating in the shift lever tighten to 12 N.m (106 in. lbs.).

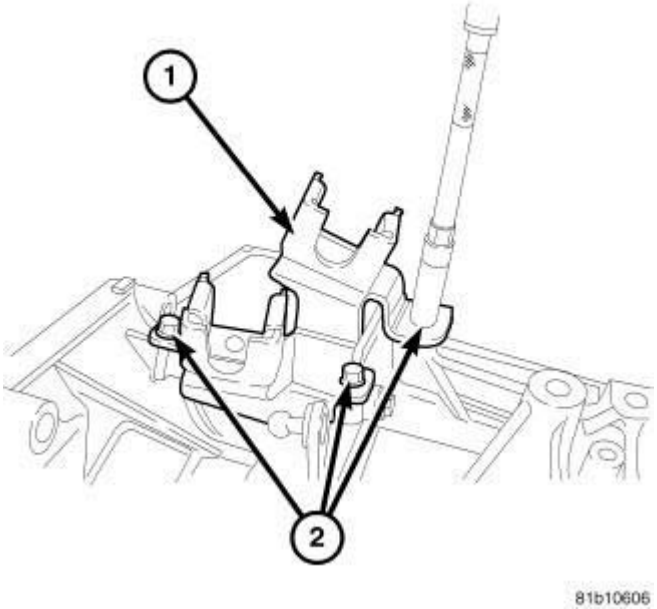


Fig. 133: Shift Cable Bracket

Courtesy of CHRYSLER LLC

CAUTION: Be sure to verify bracket position after installation. See Adjustments .

82. Install the shift cable bracket (1) to the transmission case.
83. Install the bolts (2) holding the shift cable bracket (1) to the transmission case and tighten to 19 N.m (168 in. lbs.).

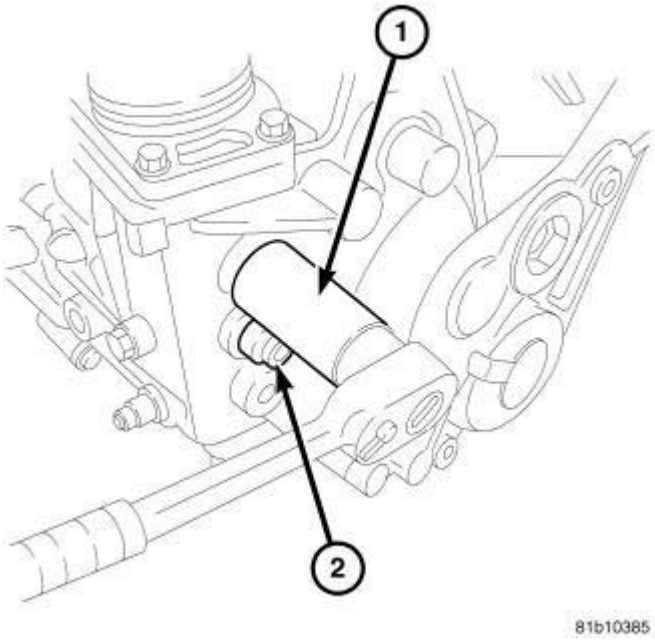


Fig. 134: Back-Up Lamp Switch
Courtesy of CHRYSLER LLC

84. Install the backup lamp switch (1) with a **new** washer and tighten to 40 N.m (29 ft. lbs.).

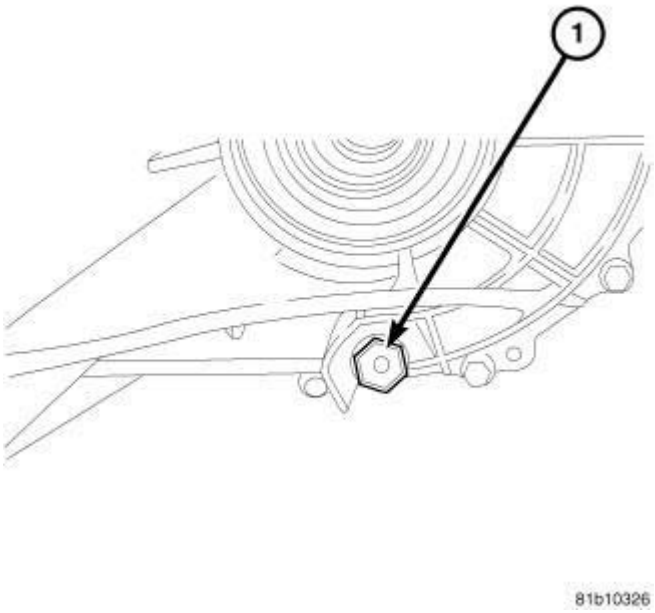


Fig. 135: Drain Plug
Courtesy of CHRYSLER LLC

85. Install the drain plug (1) with a **new** gasket and tighten to 39 N.m (29 ft. lbs.).

BEARING ADJUSTMENT PROCEDURE

1. Use extreme care when removing and installing bearing cups and cones. Use only an arbor press for installation, as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat gives a false end-play reading while gauging for proper shims. Improperly seated bearing cups and cones are subject to low mileage failures.
2. Bearing cups and cones should be replaced if they show signs of pitting or heat distress. If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.
3. Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of the original drag torque after break-in. All bearing adjustments must be made with no other component interference or gear intermesh.
4. Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.
5. Bearing cones must not be reused if removed.
6. Turning torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning torque readings can be obtained only with the geartrain removed from the case.

1. Remove bearing cup and existing shim from clutch bellhousing case.

2. Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).
3. Press in new bearing cup into gear case side.
4. Oil differential bearings with transmission fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and tighten case bolts to 29 N.m (257 in. lbs.).
5. Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator.

NOTE: The dial indicator should be parallel to T-Handle to obtain the most accurate reading.

6. Apply a medium load to differential with Torque Tool C-4995A (3) and a T-handle, in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator (2). To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth. Record end play.
7. The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18 mm (0.007 in.).** Never combine shims to obtain the required preload.
8. Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected, then press the bearing cup into clutch bellhousing.
9. Install clutch bellhousing. Install and tighten case bolts to 29 N.m (257 in. lbs.).
10. Using Torque Tool C-4995A (2) and an inch-pound torque wrench (1), check turning torque of the differential assembly. **The turning torque should be 1 to 3 N.m (9 to 22 in. lbs.) If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**
11. Recheck turning torque (1). Repeat until the proper turning torque is obtained.
12. Once proper turning torque has been established for the differential separate case halves, install output shaft # 2 assembly into case with the differential and recheck differential turning torque. **The turning torque should be 4 to 6 N.m (37 to 52 in. lbs.) If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**
13. Recheck total turning torque (1). Repeat until the proper turning torque is obtained.

    Once proper turning torque has been established, place gear case on the end plate. Draw a bead of MOPAR® Gasket Maker, Loctite® 518, or equivalent, on the flat surface of the case mating flange. Install clutch bellhousing onto gear case. Install and tighten case bolts to 29 N.m (257 in. lbs.).

14. Install axle seal (case side) on Seal Installer 9928 and Handle C-4171 and insert into axle shaft seal bore.
15. Tap seal into position until seated against transaxle case.

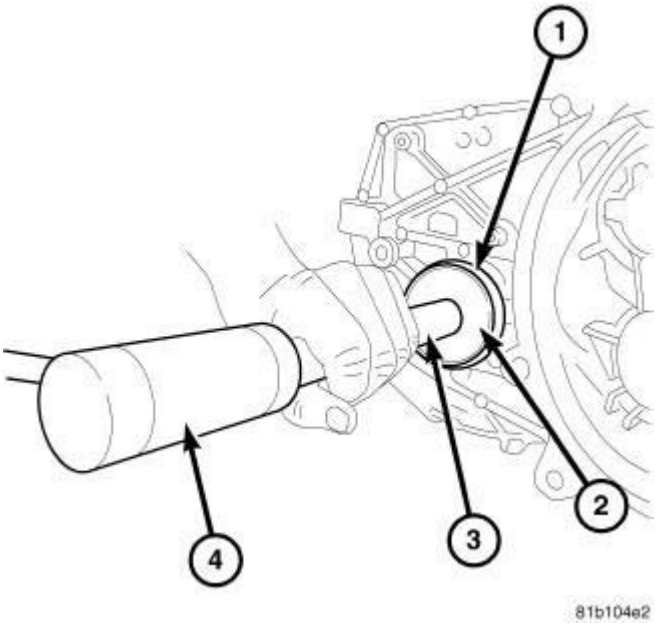


Fig. 136: Aligning Axle Shaft Seal With Axle Shaft Seal Bore
Courtesy of CHRYSLER LLC

16. Install axle seal (bellhousing side) on Seal Installer 9928 and Handle C-4171 and insert into axle shaft seal bore.
17. Tap seal into position until seated against transaxle case.

INSTALLATION

INSTALLATION

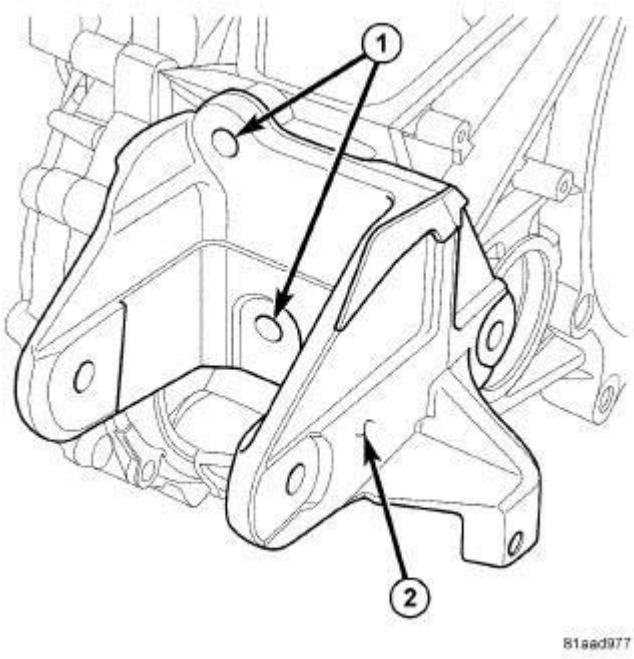


Fig. 137: Rear Mount Bracket
Courtesy of CHRYSLER LLC

1. If transmission brackets were removed or transmission was replaced install the rear mount bracket and tighten (1) to 100 N.m (74 ft. lbs.).

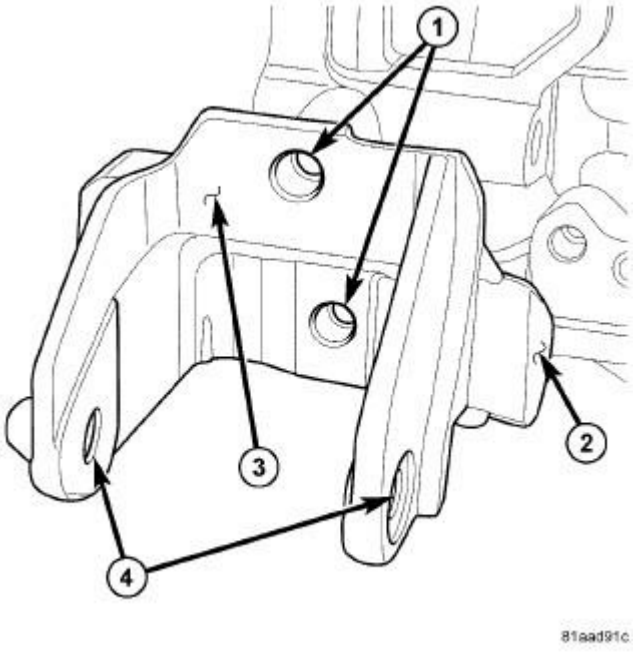


Fig. 138: Front Mount Bracket
Courtesy of CHRYSLER LLC

2. If transmission brackets were removed or transmission was replaced install the front mount bracket and tighten (1) to 100 N.m (74 ft. lbs.) and (2) to 133 N.m (98 ft. lbs.).

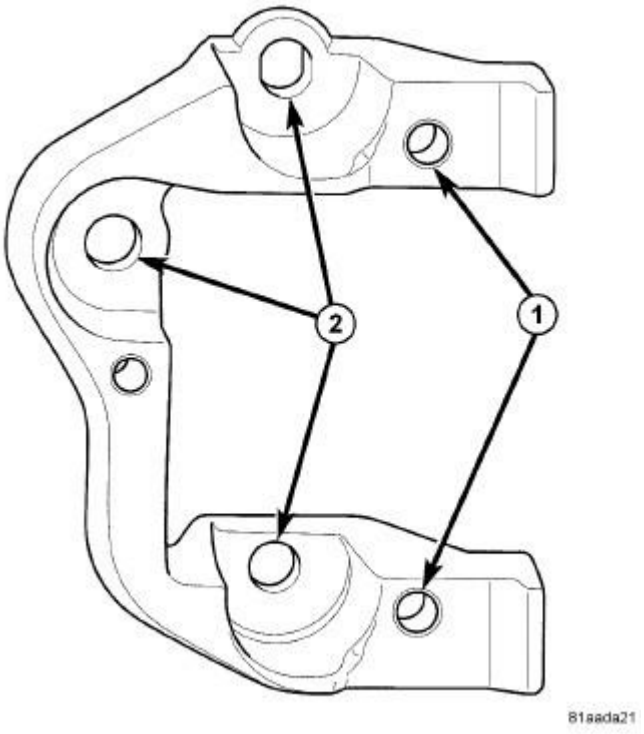


Fig. 139: Left Mount Bracket
Courtesy of CHRYSLER LLC

3. If transmission brackets were removed or transmission was replaced install the left mount bracket and tighten (1) to 100 N.m (74 ft. lbs.).

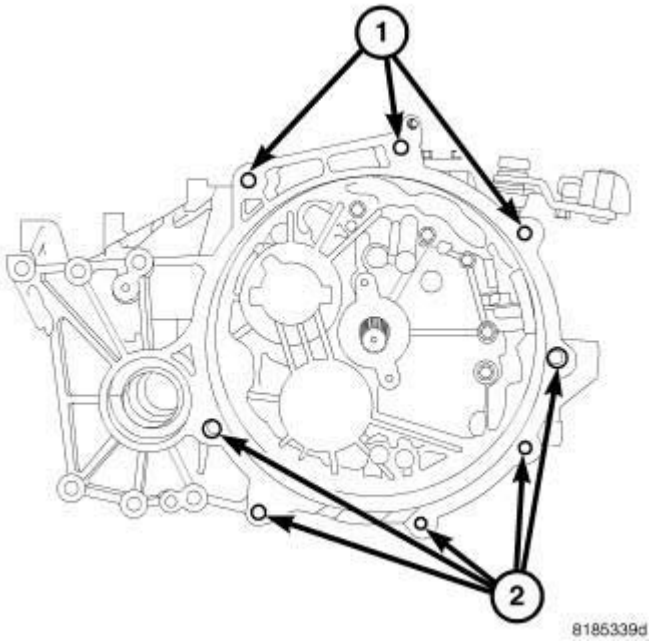


Fig. 140: Bellhousing Bolts
Courtesy of CHRYSLER LLC

4. Lift transmission into position.
5. Install the lower transmission bolts (2) and tighten to 58 N.m (43 ft. lbs.) torque.

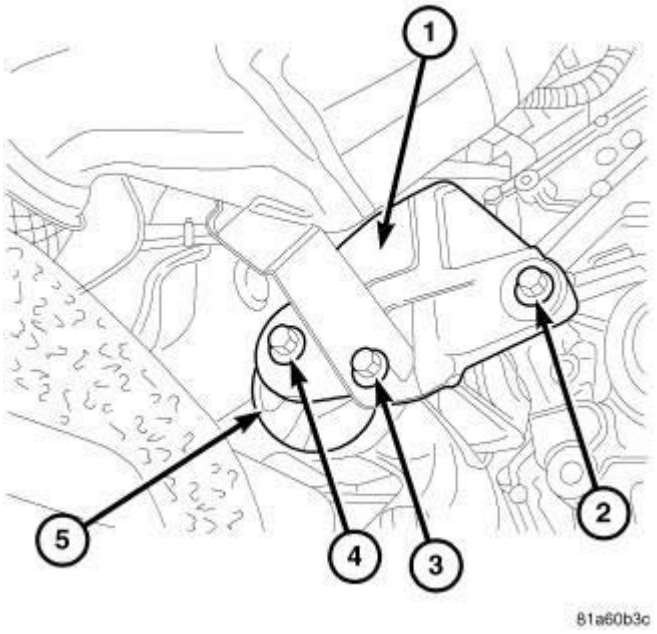


Fig. 141: Rear Mount
Courtesy of CHRYSLER LLC

6. Install the rear transmission mount (5) to cradle.

7. Install rear transmission mount bolts and tighten to 68 N.m (50 ft. lbs.).
8. Install the rear mount bracket to transmission bolts (2, 3) and tighten to 68 N.m (50 ft. lbs.).
9. Roll engine and transmission back into place.
10. Install rear mount through bolt (4) and tighten to 68 N.m (50 ft. lbs.).
11. Install the starter. Refer to **Electrical - Engine Systems/Starting/STARTER - Installation** .
12. Install the transmission cross member and tighten to 68 N.m (50 ft. lbs.).
13. Install the front transmission mount through bolt (4) at this time and tighten to 50 N.m (37 ft. lbs.). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
14. Remove the jacks.
15. Lower the vehicle.

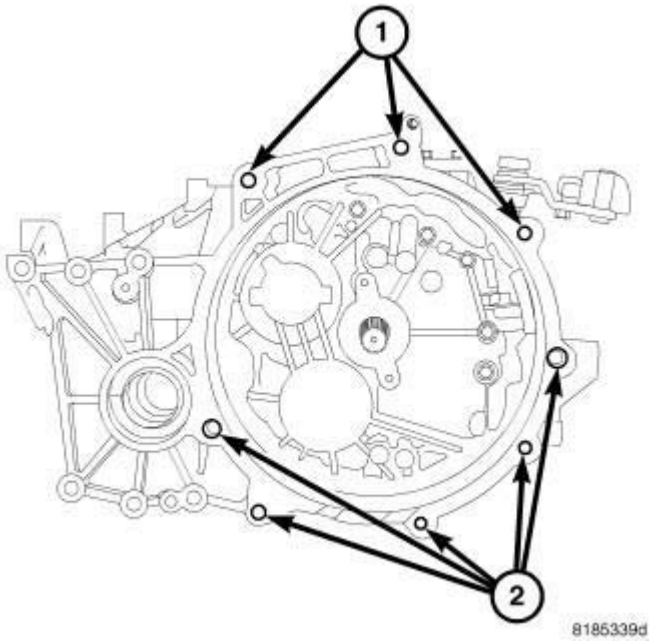


Fig. 142: Bellhousing Bolts
Courtesy of CHRYSLER LLC

16. Use a floor jack to raise transmission into position.
17. Install the upper transmission mount and tighten to 100 N.m (74 ft. lbs.).
18. Raise the vehicle on the hoist.
19. Install halfshafts. Refer to **Differential and Driveline/Half Shaft - Installation** .
20. Fill transmission fluid to proper level. See **Standard Procedure** .
21. Lower hoist.
22. Connect all wiring harness connectors and insure correct wiring harness is routed correctly.

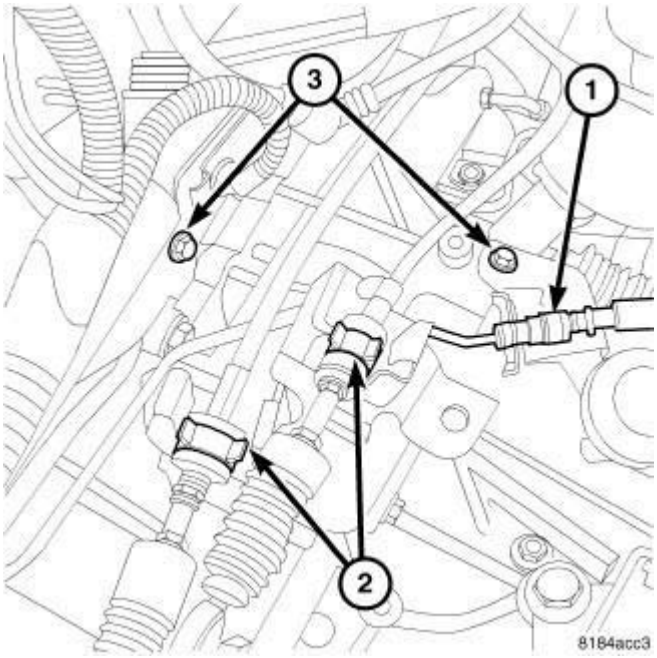


Fig. 143: Hydraulic Line
Courtesy of CHRYSLER LLC

23. Install shift cables (2) into bracket until a click is heard.
24. Snap the ball-socket end fittings onto the shift lever ball-studs.
25. Install the bolt for clutch hydraulic line (3) and tighten to 11 N.m (105 in. lbs.).
26. Install the clutch hydraulic line (1) to slave cylinder.

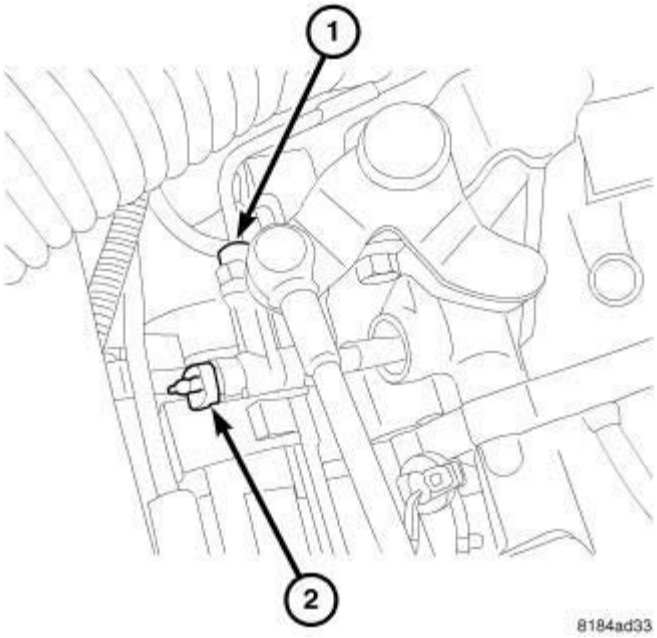


Fig. 144: Bleeder At Slave Cylinder
Courtesy of CHRYSLER LLC

27. Install hydraulic line (1), bleed adaptor (2) and clip at the slave cylinder.
28. Bleed the slave cylinder. Refer to **Clutch - Standard Procedure** .
29. Install the negative battery cable.
30. Install air cleaner assembly. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .

SPECIFICATIONS

SPECIFICATIONS

GENERAL SPECIFICATIONS

DESCRIPTION	SPECIFICATION
Transaxle Type	Constant-mesh, fully synchronized six speed with integral differential
Lubrication Method	Splash oil collected in oil troughs and distributed to mainshafts via gravity
Turning Torque for Differential	9 to 22 in. lbs.
Turning Torque for Differential and Counter shaft	37 to 52 in. lbs.

GEAR RATIOS

GEAR	RATIO
1ST	3.538
2ND	2.045
3RD	1.367
4TH	0.974
5TH	0.897
6TH	0.791
REVERSE	3.831
Final Drive Ratio (FDR)	4.059 or 3.450*
Overall Top Gear	2.728
*Gears 1-4 use the 4.059 final drive; gears 5th, 6th and Reverse use the 3.450 ratio.	

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Bolts, Concentric Slave Cylinder (CSC)-to-Bellhousing Halve	Step 1 - 2 N.m	-	Step 1 - 18 In. Lbs.
	Step 2 - 5 N.m	-	Step 2 - 44 In. Lbs.
	Step 3 - 8.4 N.m	-	Step 3 - 74 In. Lbs.
Bolt, Differential Ring Gear-to-Carrier	106	78	-
Bolt, Transmission Case - to - Clutch Housing	29	21	257
Plug, Detent	22	-	195
Plug, Transaxle			

Drain/Fill	39	29	-
Switch, Back-up Lamp	40	29	-
Bolts, Flywheel- to - Crankshaft	60 + 90*	44 + 90*	-
Bolts, Clutch cover-to-Flywheel	22	16	195
Bolts, Transaxle-to-engine	58	43	-
Bolt, Rear Mount through	50	37	-
Bolt, Front Mount through	50	37	-
Bolts, Upper Transmission Mount	100	74	-
Bolts, left Mount Bracket -to- Transmission	100	74	-
Bolts, Rear Mount Bracket -to- Transmission	100	74	-
Bolts, Front Mount Bracket -to- Transmission	100	74	-
Bolts, Front Mount Bracket -to- Transmission one side bolt	133	98	-
Bolts, Bellhousing Case halves	29	-	257
Bolts, Oil Baffle - to - Case	9	-	80
Bolt, Output Shaft Hold Down	11	-	97
Bolts, Oil slinger - to - Case	9	-	80
Bolt, Reverse Idler Gear Hold Down	11	-	97
Bolts, Shift Rail - to - Shift shaft	20	-	177
Plug, 27mm Rear Of Transmission Case	55	41	-
Bolt, Reverse Idler Gear Anti-Rotation	80	59	-
Bolt, Speed Sensor - to - transmission case	11	-	97
Bolts, Shift Lever Assembly, to Case	19	-	168
Detent, Shift	29	-	277
Detent, Select	39	-	345

Guide Pin, Shift Tower	30	-	277
Bolts, Crossover Bracket - to - Case	19	-	168
Bolts, Bellcrank - to - Case	19	-	168
Nut, Crossover Rod - to - shift lever	12	-	106
Bolts, Shift Cable Bracket - to - case	19	-	168

SPECIAL TOOLS

SPECIAL TOOLS

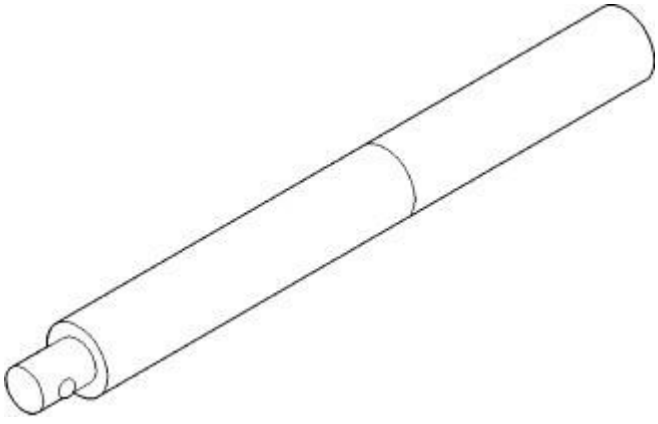


Fig. 145: Universal Handle C-4171
Courtesy of CHRYSLER LLC

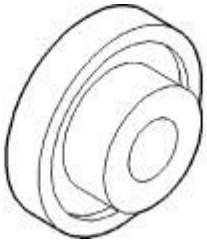


Fig. 146: Seal Installer 6709
Courtesy of CHRYSLER LLC

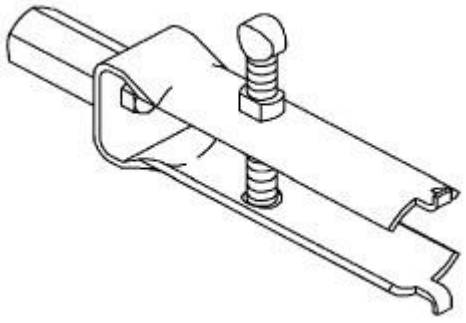


Fig. 147: Remover, 9664
Courtesy of CHRYSLER LLC

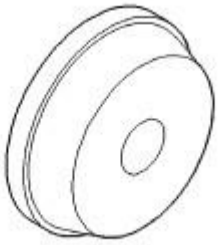


Fig. 148: Installer L-4520
Courtesy of CHRYSLER LLC

Fig. 149: Installer 9935
Courtesy of CHRYSLER LLC

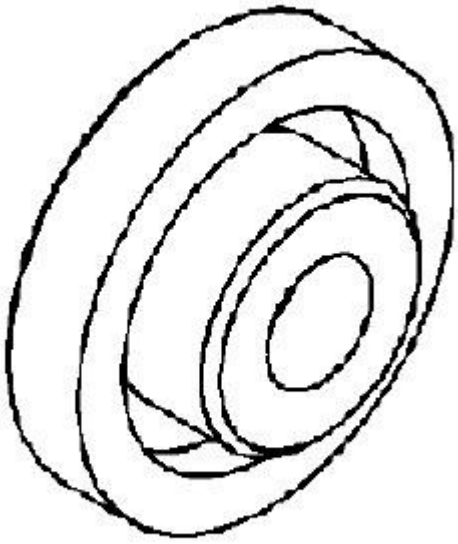


Fig. 150: Installer 9928
Courtesy of CHRYSLER LLC

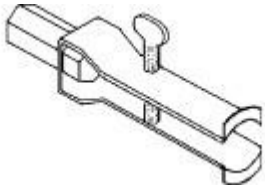


Fig. 151: Puller 7794-A
Courtesy of CHRYSLER LLC

Fig. 152: C-4657 Seal Installer
Courtesy of CHRYSLER LLC

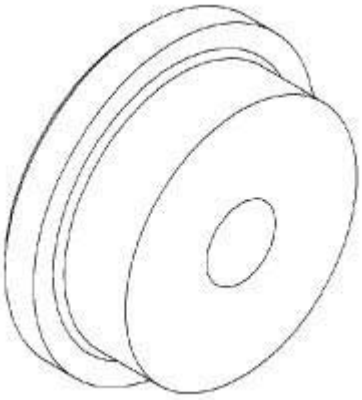


Fig. 153: Installer 9589
Courtesy of CHRYSLER LLC

Fig. 154: Installer D-111
Courtesy of CHRYSLER LLC

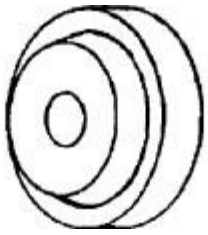


Fig. 155: Installer, Cup - D-144
Courtesy of CHRYSLER LLC

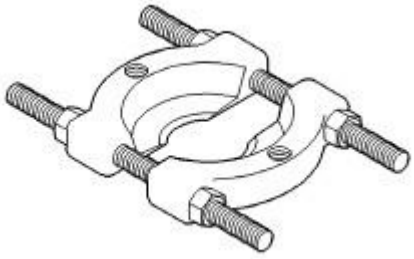


Fig. 156: Bearing Splitter, P-334
Courtesy of CHRYSLER LLC

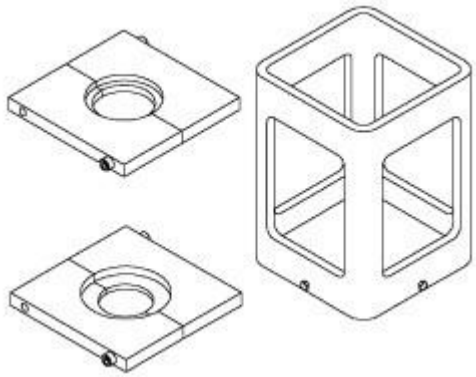


Fig. 157: Fixture, 8925
Courtesy of CHRYSLER LLC

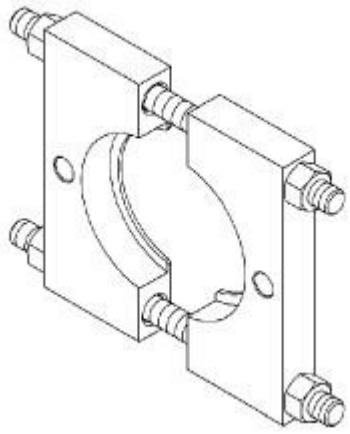


Fig. 158: Puller 9647
Courtesy of CHRYSLER LLC

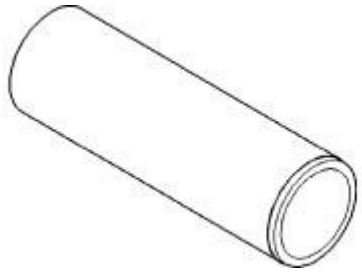


Fig. 159: Sleeve C-3717
Courtesy of CHRYSLER LLC

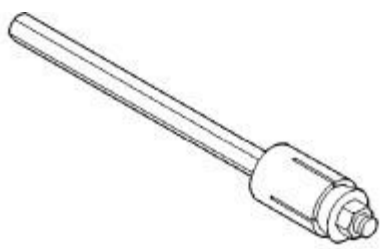


Fig. 160: Torque Tool C-4995
Courtesy of CHRYSLER LLC

CABLE, GEARSHIFT CONTROL

REMOVAL

REMOVAL

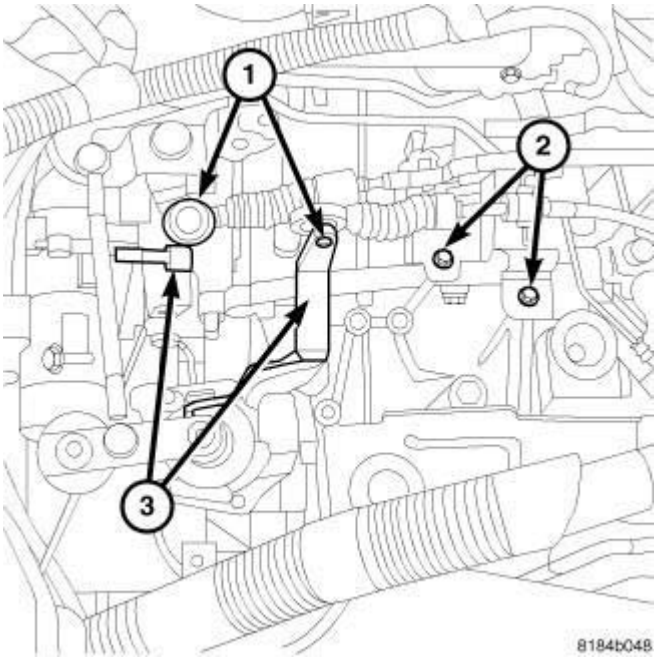


Fig. 161: Shift Cables & Bracket
Courtesy of CHRYSLER LLC

1. Remove the shifter. See **Removal** .
2. Raise hood.
3. Remove the resonator.
4. Remove engine cover.
5. Remove air cleaner assembly.
6. Disconnect negative battery cable.
7. Disconnect cables (1) from the shift levers at the transaxle.

CAUTION: Pry up with equal force on both sides of shifter cable isolator bushings to avoid damaging cable isolator bushings or damaging levers.

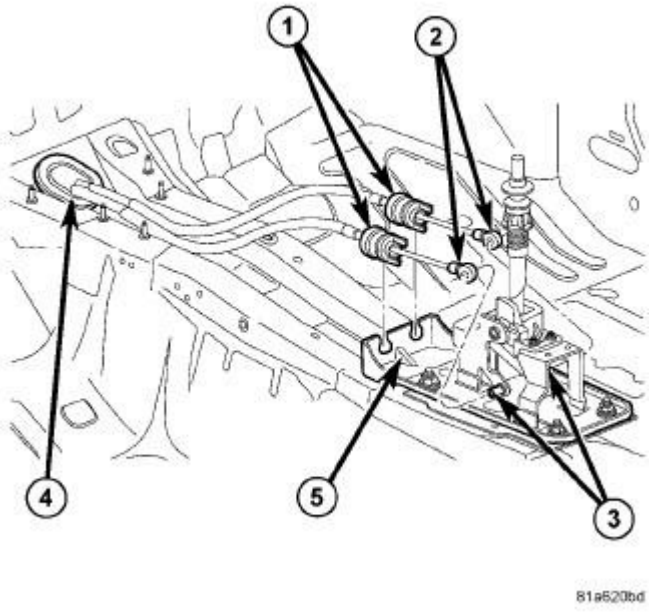


Fig. 162: Shift Cables To Shifter
Courtesy of CHRYSLER LLC

8. Remove cable retaining clips and remove cables (1) from bracket (5).
9. Remove cables at shifter.
10. Remove the Occupant Restraint Controller (ORC). Refer to **Restraints/MODULE, Occupant Restraint Controller - Installation** .
11. Remove rubber grommet (4) at floor pan.
12. Remove cable assembly (1) from vehicle.

INSTALLATION

INSTALLATION

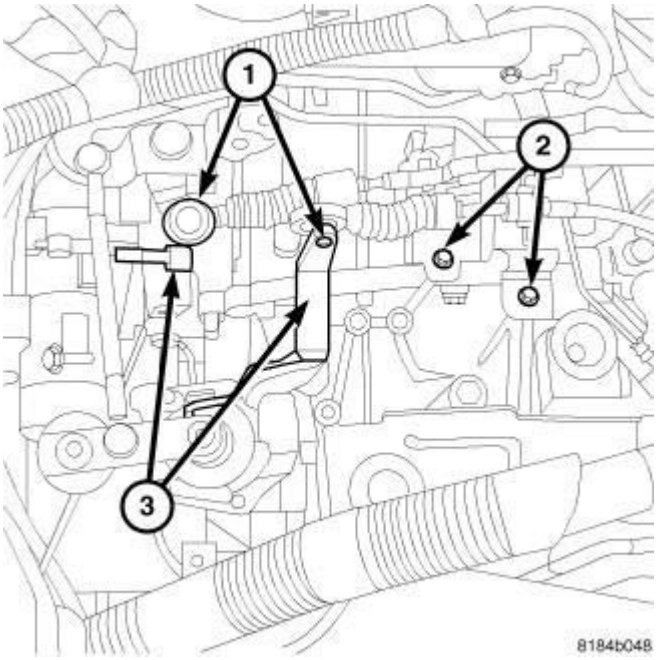


Fig. 163: Shift Cables & Bracket
Courtesy of CHRYSLER LLC

CAUTION: Gearshift cable bushings must not be lubricated or the bushings will swell and split.

1. Install cable assembly through floor pan opening until grommet is seated.
2. Route transaxle end of cable assembly into engine compartment and over transaxle assembly.
3. Connect cables (1) to the shift levers (3) at the transaxle.

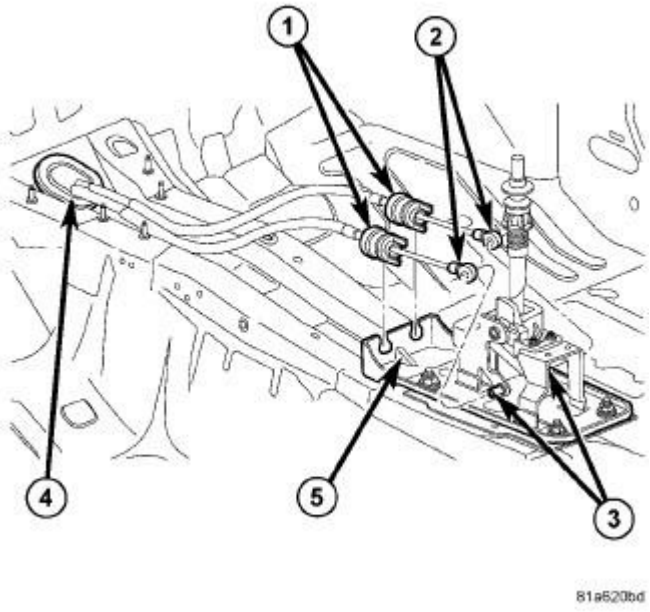


Fig. 164: Shift Cables To Shifter
Courtesy of CHRYSLER LLC

4. Install gearshift cables to mounting bracket (5) and fasten with NEW clips (2). Make sure clips are installed flush to bracket.
5. Install cables (2) to shifter levers (3).
6. Install ORC. Refer to **Restraints/MODULE, Occupant Restraint Controller - Installation** .
7. Install the air cleaner assembly.
8. Connect battery cables.

ADJUSTMENTS

ADJUSTMENT

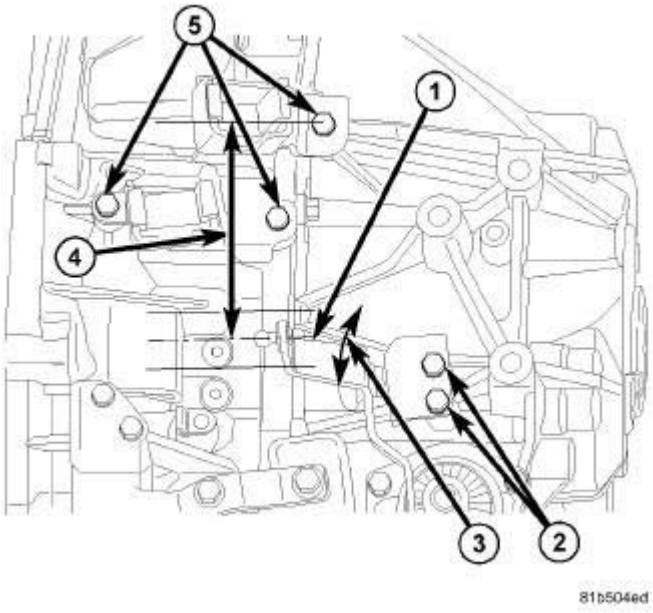


Fig. 165: Shift Adjustment
Courtesy of CHRYSLER LLC

Increase the (4) distance to eliminate 2nd gear downshift blocking condition (3-2, or 4-2 blocking).

NOTE: Must verify reverse shift after adjusting.

Decrease the distance if shifter can not engage reverse.

1. Loosen select lever bracket bolts (2).
2. Adjust gage length fore/aft by pivoting bracket and securing. Torque to 21.4 +/- 5.2 N.m.

DIFFERENTIAL, TRANSAXLE

DESCRIPTION

DESCRIPTION

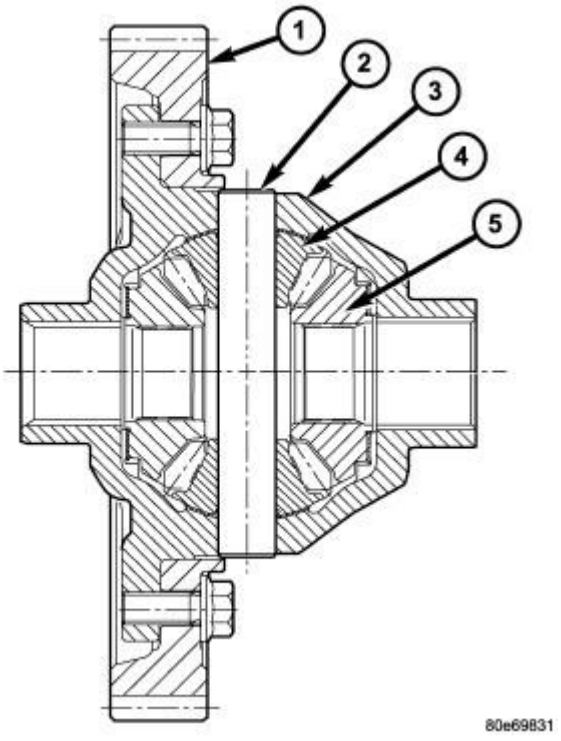


Fig. 166: Differential Assembly
Courtesy of CHRYSLER LLC

1 - RING GEAR
2 - PINION SHAFT
3 - DIFFERENTIAL CASE
4 - PINION GEAR
5 - SIDE GEAR

The BG6 differential is a conventional open design, and is integral to the transaxle. It consists of a single-piece case (3), which houses pinion (4) and side gears (5). A pinion shaft (2) is retained by the differential ring gear (1) and roll pin, The differential case is supported in the transaxle by tapered roller bearings.

OPERATION

OPERATION

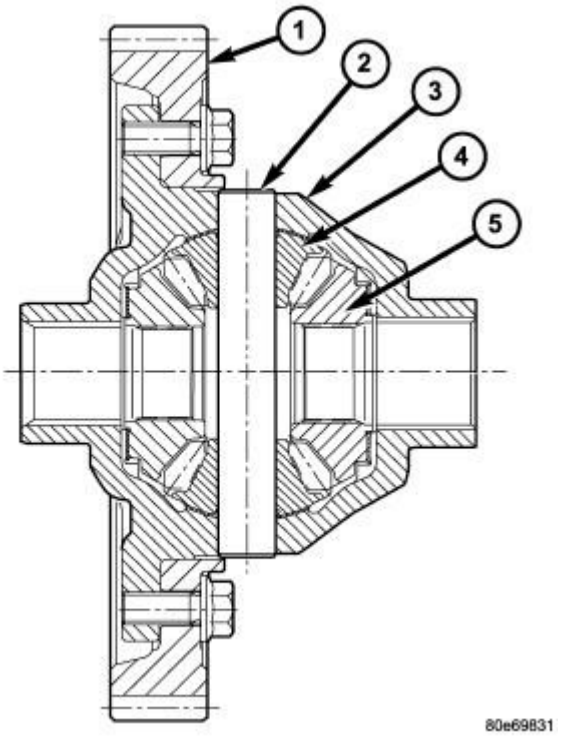


Fig. 167: Differential Assembly
Courtesy of CHRYSLER LLC

1 - RING GEAR
2 - PINION SHAFT
3 - DIFFERENTIAL CASE
4 - PINION GEAR
5 - SIDE GEAR

The differential assembly is driven by the intermediate shaft via the ring gear (1). The ring gear drives the differential case (3), and the case drives the halfshafts through the differential gears. The differential pinion (4) and side gears (5) are supported in the case by pinion shafts and thrust washers. Differential pinion (4) and side gears (5) make it possible for front wheels to rotate at different speeds while cornering.

REMOVAL

REMOVAL

1. The transaxle must be removed to gain access to and service the differential assembly. See **Removal**.
2. Disassemble transaxle and remove differential. See **Disassembly**.

DISASSEMBLY

DISASSEMBLY

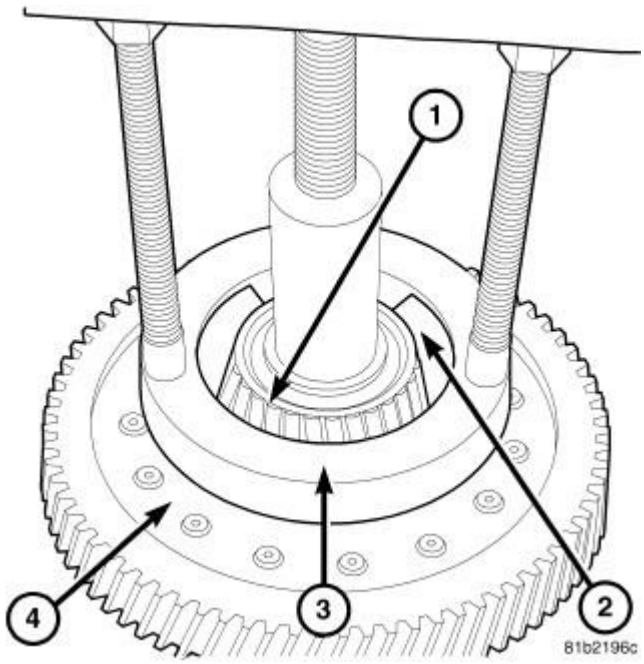


Fig. 168: Remove Differential Bearings
Courtesy of CHRYSLER LLC

1. Use Plug C-293-3, Puller/Press C-293-PA (3), and Puller Adapters 9613 (2) on ring gear side (4) to remove the pinion side bearing (1).

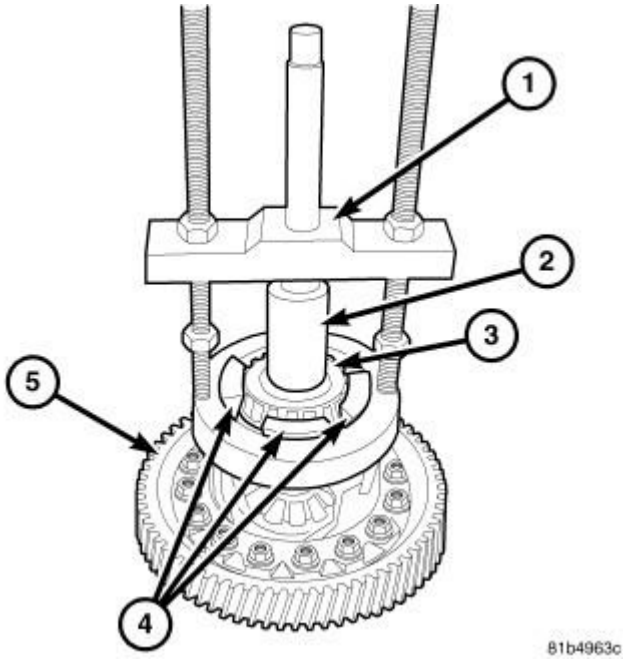


Fig. 169: Remove Differential Bearing Pinion Side
Courtesy of CHRYSLER LLC

2. Use Plug C-293-3, Puller/Press C-293-PA (1) and Adapters C-293-37 (4) on pinion side with 2WD. Use

Puller Adapters 9614 (4), Puller/Press C-293-PA (1) and Remover C-4656 as a plug on pinion side with a AWD to remove pinion side bearing (1).

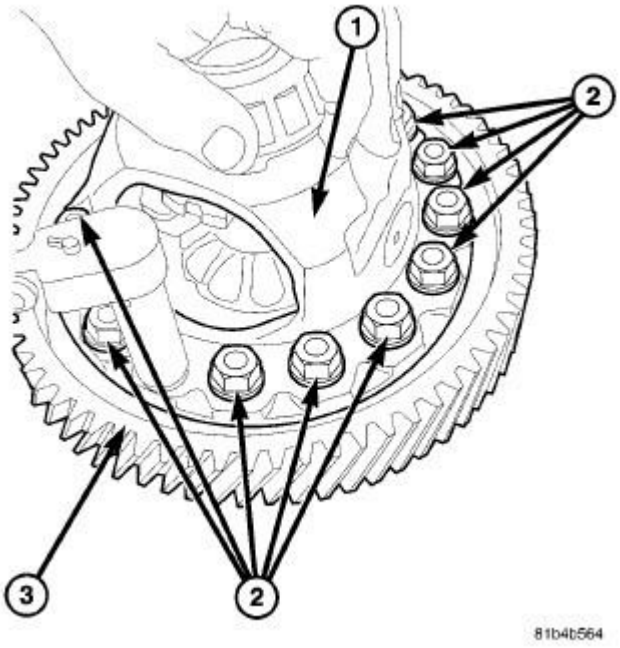


Fig. 170: Bolts At Ring Gear
Courtesy of CHRYSLER LLC

3. Remove the bolts at the ring gear.
4. Remove the ring gear by taping with a soft face hammer.

ASSEMBLY

ASSEMBLY

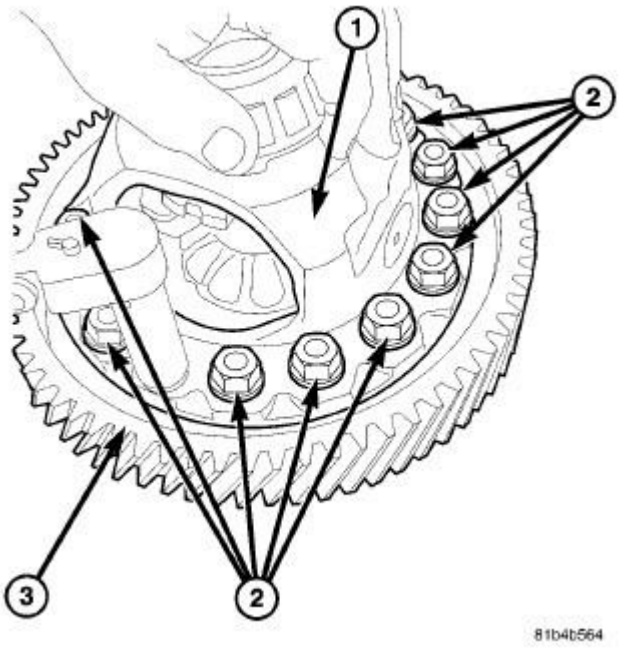


Fig. 171: Bolts At Ring Gear
Courtesy of CHRYSLER LLC

1. Install differential ring gear. Install and torque ring gear-to-case bolts to 106 N.m (78 ft. lbs.).

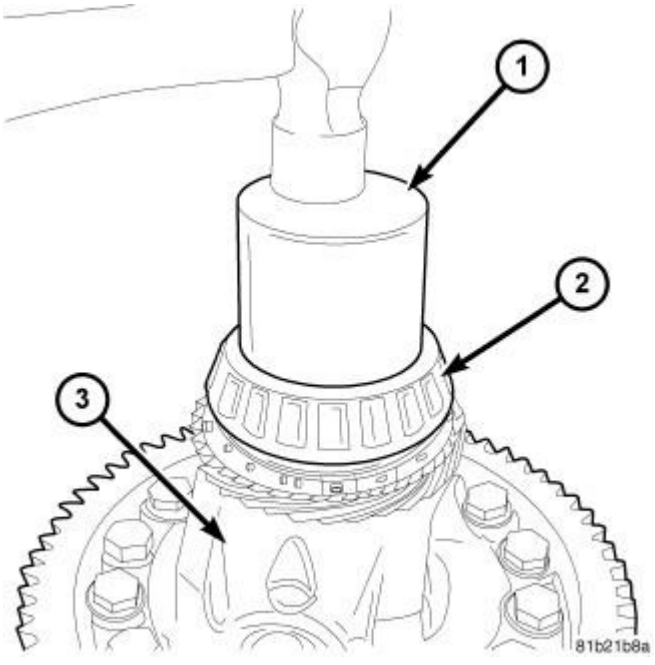


Fig. 172: Pinion Side Differential Bearing
Courtesy of CHRYSLER LLC

2. Use Compressor Field Coil Remover 9354 (1) to install the pinion side differential bearing (2).

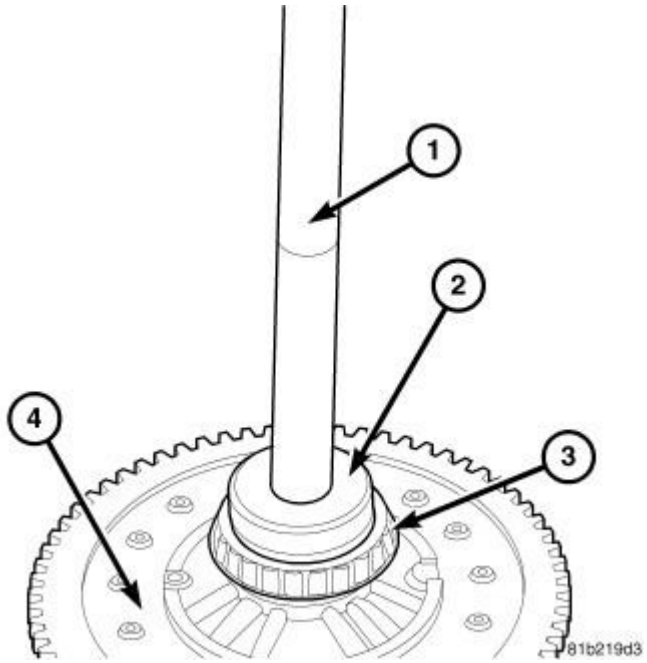


Fig. 173: Install Ring Gear Side Differential Bearing
Courtesy of CHRYSLER LLC

3. Use Universal Handle C-4171 (1) and Bearing Installer 9523 (2) to install the ring gear side differential bearing (3).

INSTALLATION

INSTALLATION

1. Differential installation is part of the transaxle assembly process. Be sure to use the same differential shim that was removed upon disassembly. See **Assembly**.

ADJUSTMENTS

ADJUSTMENT

BEARING ADJUSTMENT PROCEDURE

1. Use extreme care when removing and installing bearing cups and cones. Use only an arbor press for installation, as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat gives a false end-play reading while gauging for proper shims. Improperly seated bearing cups and cones are subject to low-mileage failure.
2. Bearing cups and cones should be replaced if they show signs of pitting or heat distress. If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.
3. Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of the original drag torque after break-in. All bearing adjustments must be made with no other component interference or gear intermesh.

4. Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.
5. Bearing cones must not be reused if removed.
6. Turning-torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning-torque readings can be obtained only with the geartrain removed from the case.

1. Remove bearing cup and existing shim from clutch bellhousing case.
2. Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).
3. Press in new bearing cup into gear case side.
4. Oil differential bearings with transmission fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and tighten case bolts to 29 N.m (257 in. lbs.).
5. Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator.

NOTE: The dial indicator should be parallel to T-Handle to obtain the most accurate reading.

6. Apply a medium load to differential with Torque Tool C-4995A (3) and a T-handle, in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator (2). To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth. Record end play.
7. The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18 mm (0.007 in.).** Never combine shims to obtain the required preload.
8. Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected, then press the bearing cup into clutch bellhousing.
9. Install clutch bellhousing. Install and tighten case bolts to 29 N.m (257 in. lbs.).
10. Using Torque Tool C-4995A (2) and an inch-pound torque wrench (1), check turning torque of the differential assembly. **The turning torque should be 9 to 22 in. lbs. If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**
11. Recheck turning torque (1). Repeat until the proper turning torque is obtained.
12. Once proper turning torque has been established for the differential separate case halves, install counter shaft assembly into case with the differential and recheck differential turning torque. **The turning torque should be 37 to 52 in. lbs. If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**
13. Recheck total turning torque (1). Repeat until the proper turning torque is obtained.

Once proper turning torque has been established, place gear case on the end plate. Draw a bead of MOPAR® Gasket Maker, Loctite® 518, or equivalent, on the flat surface of the case mating flange. Install clutch

bellhousing onto gear case. Install and tighten case bolts to 29 N.m (257 in. lbs.).

FLUID

STANDARD PROCEDURE

FLUID LEVEL CHECKING

The fluid required for this transaxle is Mopar® ATF+4 (Automatic Transmission Fluid). Use of improper or substitute fluids can cause shift problems and/or transaxle failure.

1. Insure the vehicle is level, remove the fill plug and add fluid until the fluid just starts to trickle out.

FLUID DRAIN AND FILL

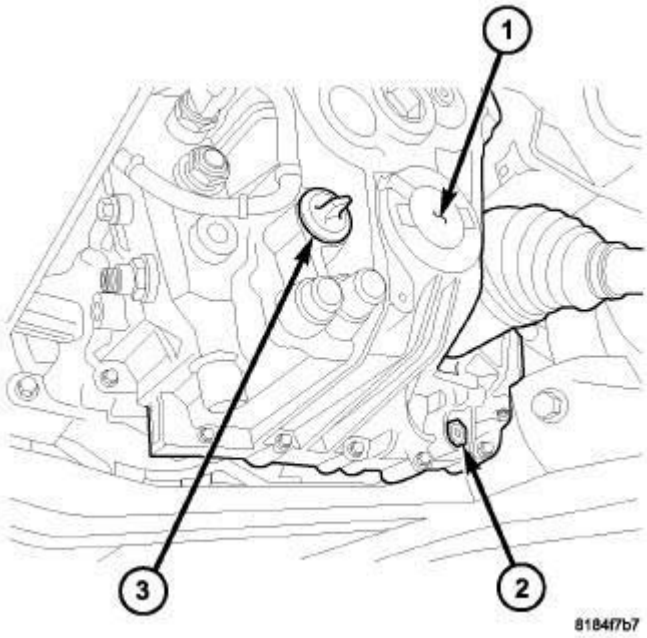


Fig. 174: Drain Plug
Courtesy of CHRYSLER LLC

NOTE: The fluid required for this transaxle is Mopar® ATF+4 (Automatic Transmission Fluid). Use of improper or substitute fluids can cause shift problems and/or transaxle failure.

1. Raise vehicle on hoist.
2. Obtain suitable fluid collection container and place under transaxle.
3. Remove transaxle drain plug (2). Allow fluid to drain into container until empty.
4. Install the drain plug (2) with a **new** gasket and tighten to 39 N.m (29 ft. lbs.).

5. Remove transaxle rubber fill plug (3).
6. Add the appropriate amount of transaxle fluid to the transaxle. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
7. Install the transaxle rubber fill plug (3).

INPUT SHAFT, TRANSMISSION

DISASSEMBLY

DISASSEMBLY

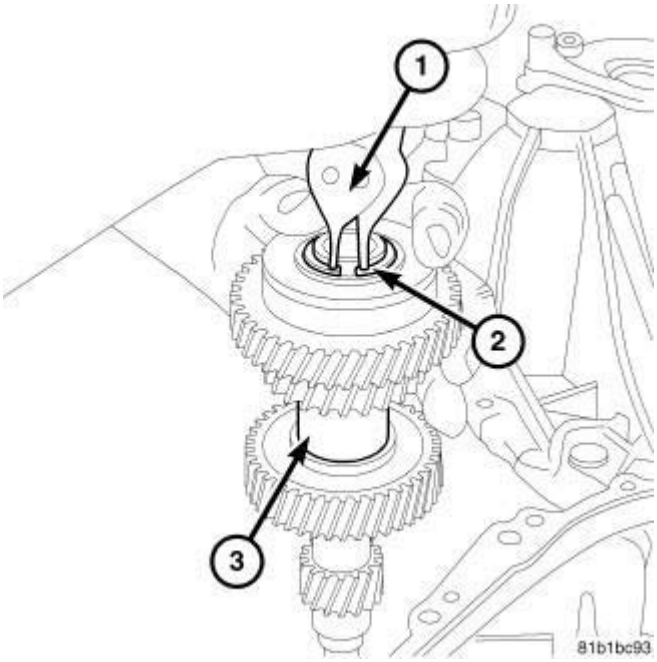


Fig. 175: Snap Ring At Input Shaft
Courtesy of CHRYSLER LLC

1. Remove the snap ring (2) that retains the input shaft bearing and sixth gear to the shaft.

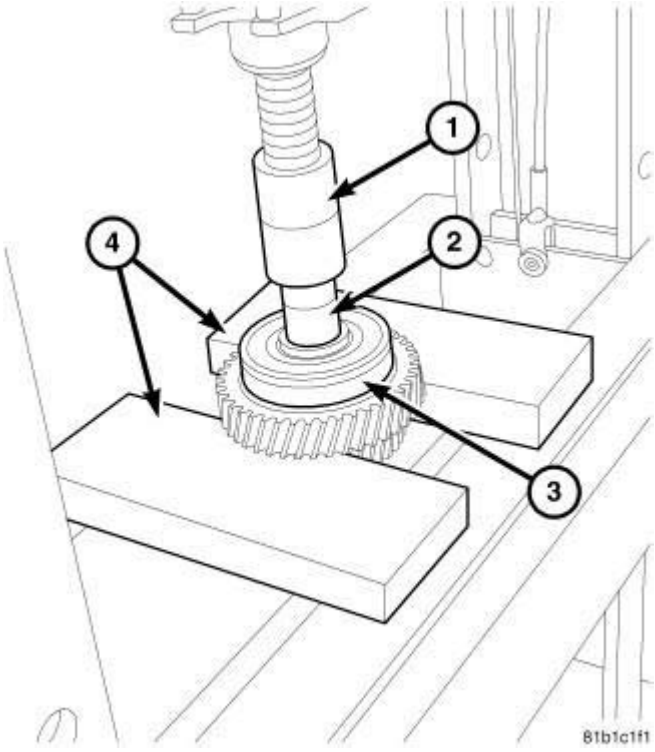


Fig. 176: Press Bearing From Input Shaft
Courtesy of CHRYSLER LLC

2. Using a press (1) and steel blocks (4) remove sixth gear and the bearing (3) from the shaft.

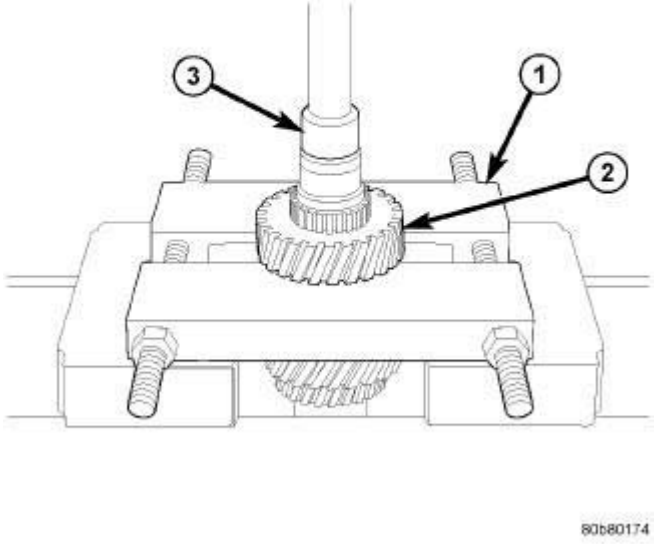


Fig. 177: Input 3rd Gear

Courtesy of CHRYSLER LLC

3. Using a Press (3) and the Bearing Splitter 1130 (1) remove third gear (2) from shaft.
4. Remove the spacer.

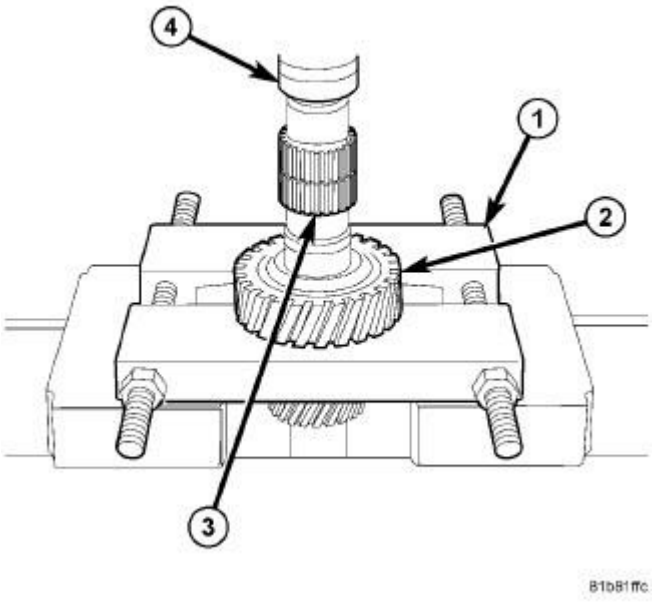


Fig. 178: Fourth Gear Off Input Shaft
Courtesy of CHRYSLER LLC

5. Using a Press (3) and the Bearing Splitter 1130 (1) remove forth gear (2) from shaft.

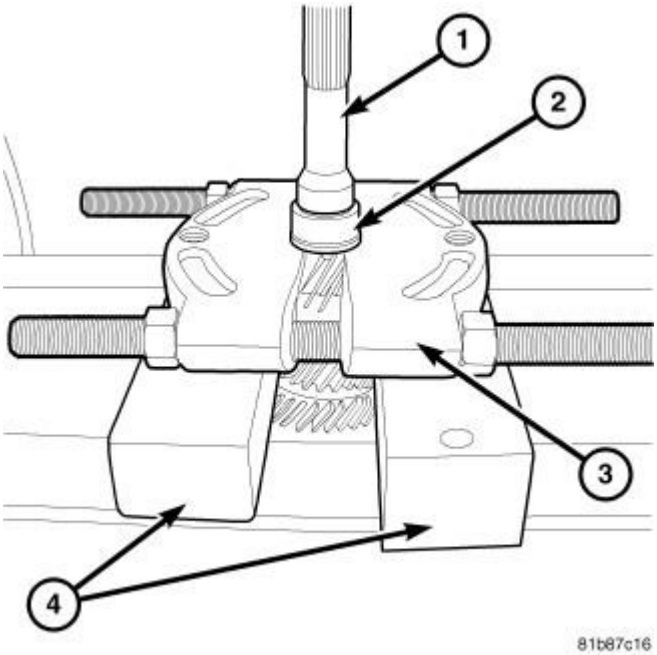


Fig. 179: Input Shaft Bearing Race
Courtesy of CHRYSLER LLC

6. Using a Press and the Bearing Splitter 1130 (3) remove the input shaft bearing race (2).

ASSEMBLY

ASSEMBLY

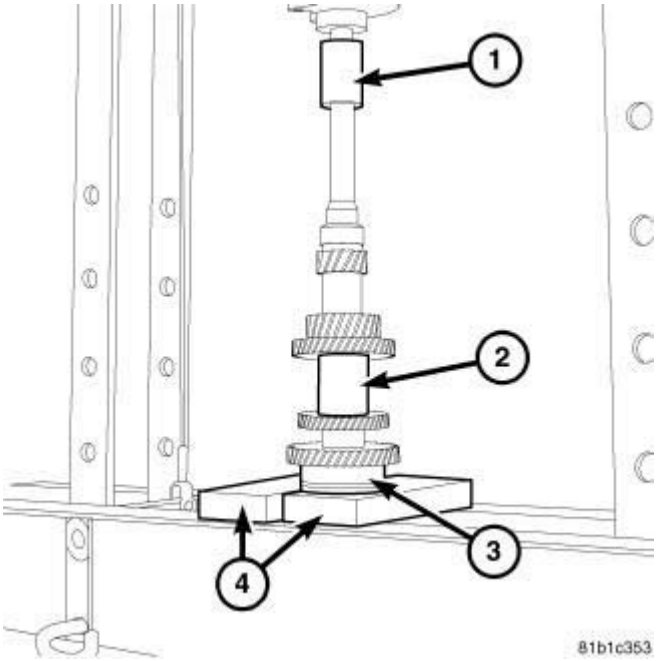


Fig. 180: Bearing On Input Shaft

Courtesy of CHRYSLER LLC

1. Using a press (1) and steel blocks (4) install third gear and the bearing (3) onto the shaft.

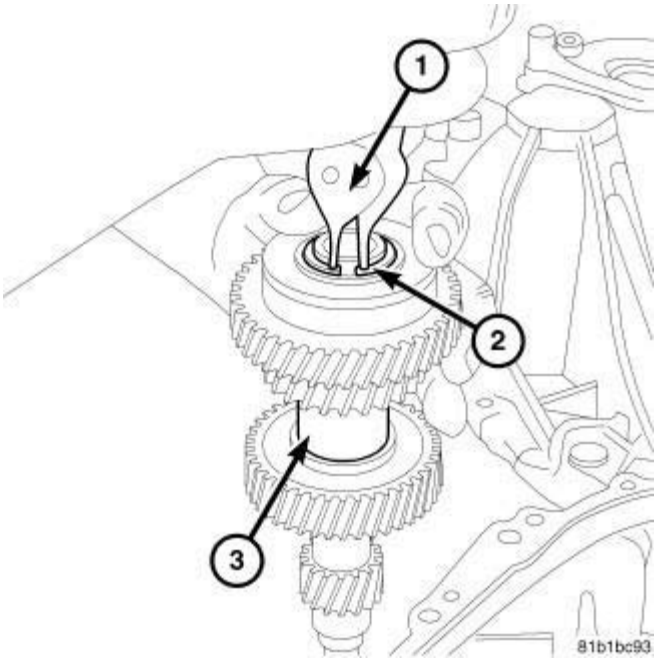


Fig. 181: Snap Ring At Input Shaft
Courtesy of CHRYSLER LLC

2. Install the **new** snap ring (2) that retains the input shaft bearing and third gear to the shaft.

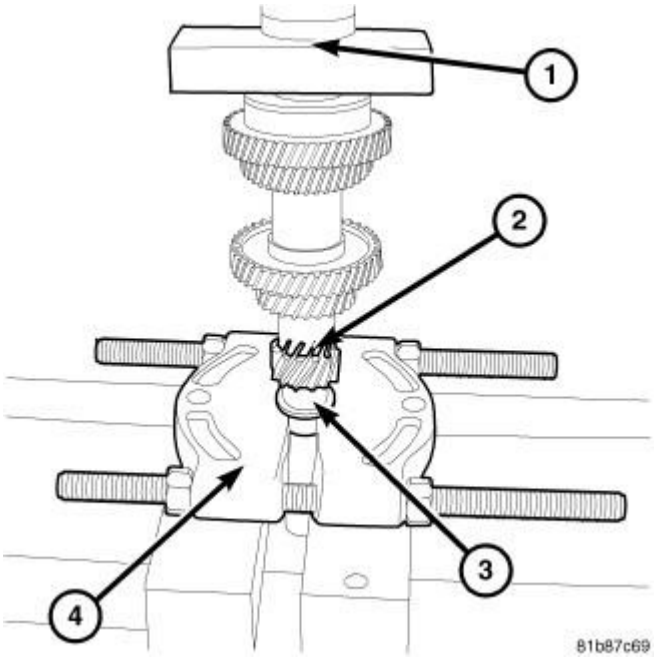


Fig. 182: Install Input Shaft Bearing Race

Courtesy of CHRYSLER LLC

3. Using Bearing Splitter 1130 (4) and a Press (1) install the input shaft bearing race (3) onto the input shaft (2).

LEVER, SHIFT

REMOVAL

REMOVAL

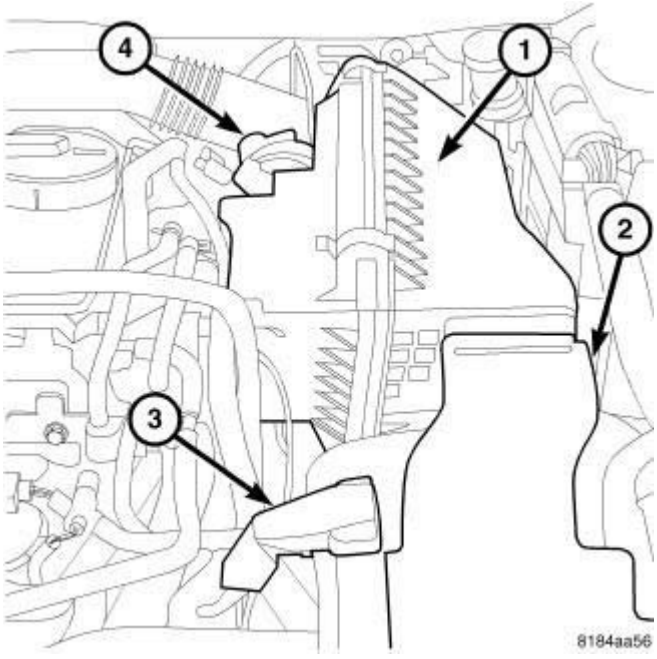


Fig. 183: Air Cleaner And Inlet Tube
Courtesy of CHRYSLER LLC

Remove the engine cover.

1. Disconnect battery negative cable.
2. Remove air inlet tube (2) and air cleaner assembly (4).

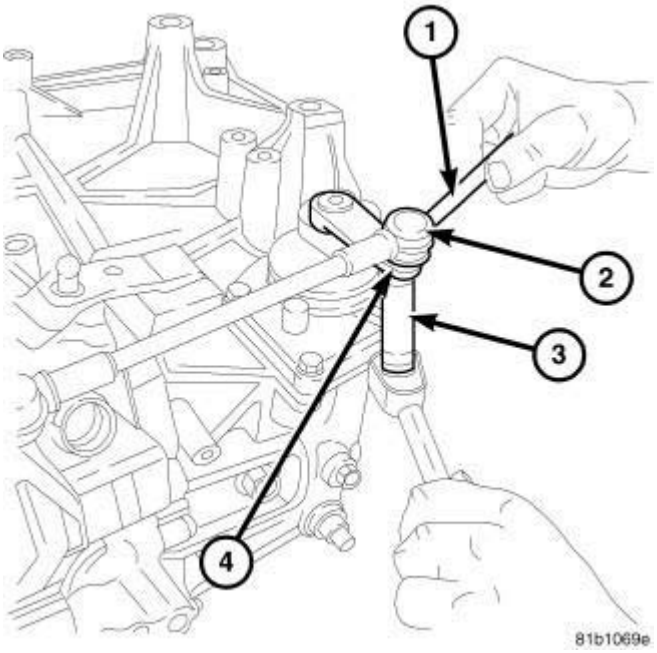


Fig. 184: Nut Crossover Rod To Shift Lever
Courtesy of CHRYSLER LLC

3. Remove the nut (4) holding the crossover rod (2) to the shift lever. Be sure to use a wrench (1) to hold the ball stud to prevent it from rotating in the shift lever.

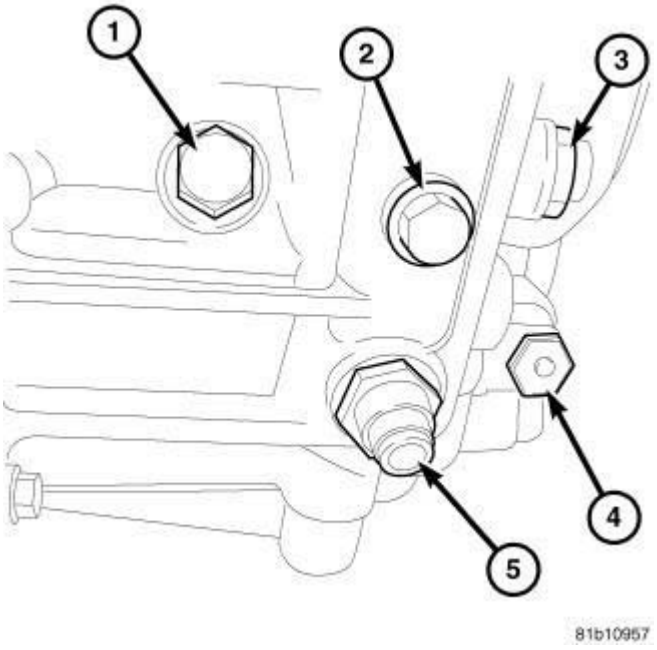


Fig. 185: Anti-Rotation Bolt
Courtesy of CHRYSLER LLC

4. Loosen and remove shift tower ball for the shift detent (5).

5. Loosen and remove shift lock ball for the select detent (3).
6. Loosen and remove shift guide pin (2).

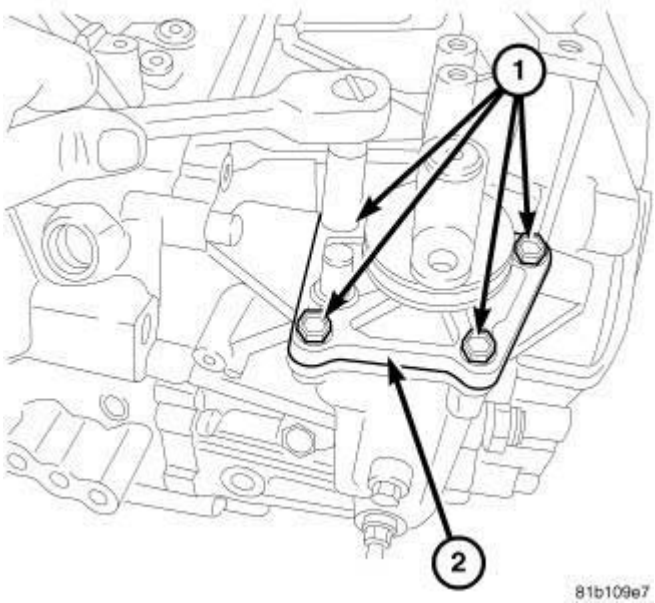


Fig. 186: Shift Lever Assembly Bolts
Courtesy of CHRYSLER LLC

7. Remove the bolts holding the shift lever assembly to the transmission.

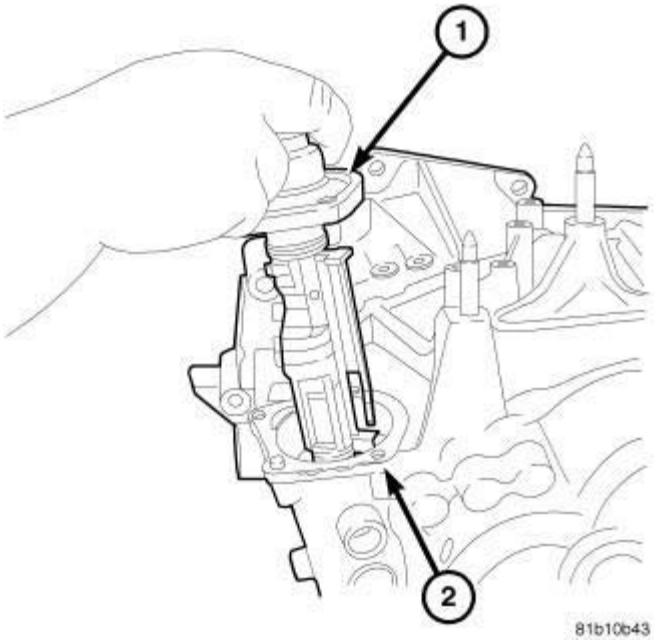


Fig. 187: Shift Lever Assembly
Courtesy of CHRYSLER LLC

8. Remove the shift lever assembly from the transmission case.

INSTALLATION

INSTALLATION

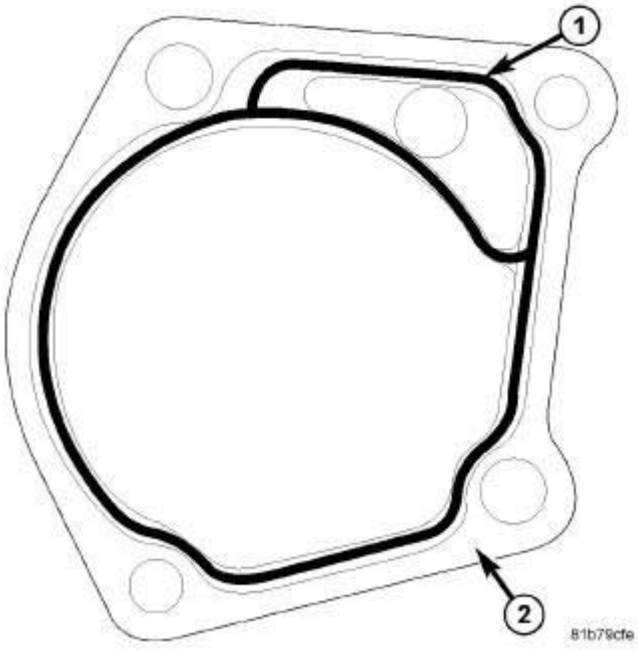


Fig. 188: Sealer
Courtesy of CHRYSLER LLC

1. Add MOPAR® Gasket Maker, Loctite® 518, or equivalent around inside of all holes and on mating flange.

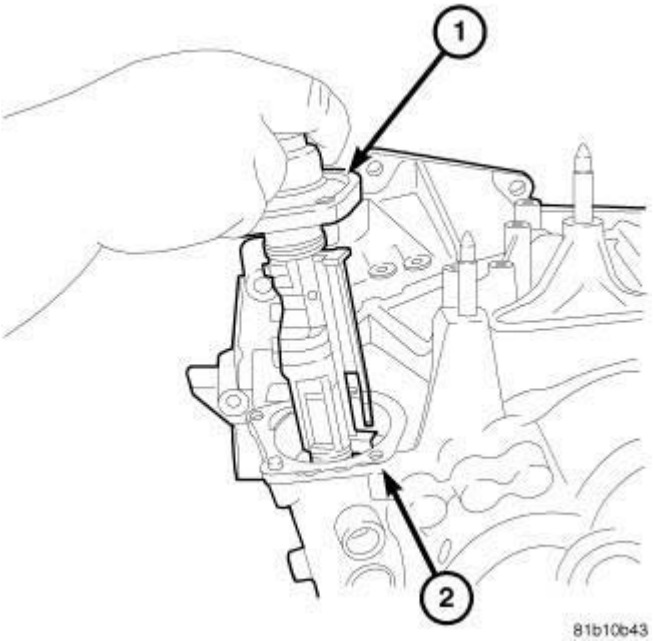


Fig. 189: Shift Lever Assembly
Courtesy of CHRYSLER LLC

2. Install the shift lever assembly (1) into the transmission case (2).

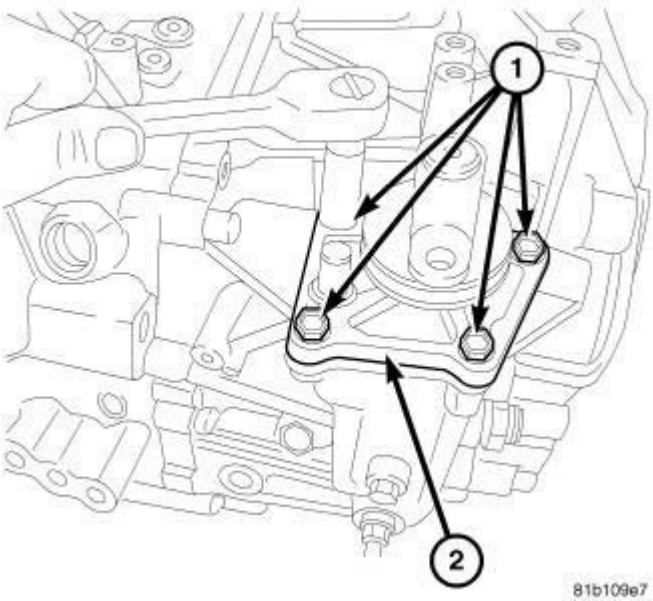


Fig. 190: Shift Lever Assembly Bolts
Courtesy of CHRYSLER LLC

3. Install the **new** bolts (1) holding the shift lever assembly (2) to the transmission and tighten to 19 N.m (168 in. lbs.)

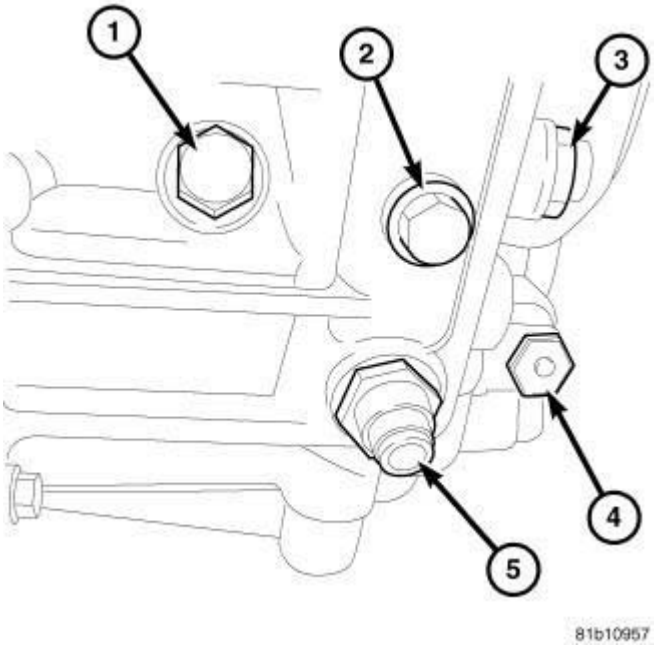


Fig. 191: Anti-Rotation Bolt
Courtesy of CHRYSLER LLC

4. Install **new** shift tower lock ball for shift detent (5) and tighten to 29 N.m (277 in. lbs.).
5. Install **new** shift lock ball for the select detent (3) and tighten to 39 N.m (345 in. lbs.).
6. Install **new** shift tower shift guide pin (2) and tighten to 30 N.m (277 in. lbs.).

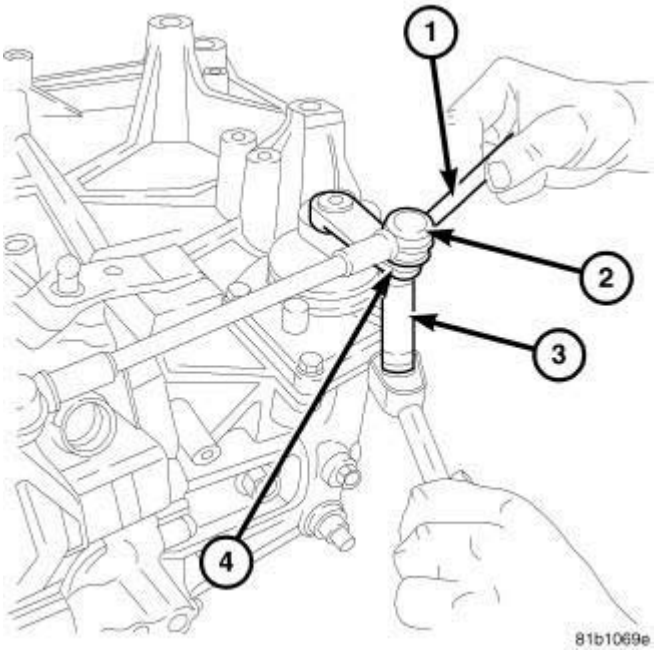


Fig. 192: Nut Crossover Rod To Shift Lever
Courtesy of CHRYSLER LLC

CAUTION: Be sure to verify bracket position after installation. See Adjustments .

7. Install the nut (4) holding the crossover rod (2) to the shift lever. Be sure to use a wrench (1) to hold the ball stud to prevent it from rotating in the shift lever tighten to 12 N.m (106 in. lbs.).

MECHANISM, GEARSHIFT

REMOVAL

REMOVAL

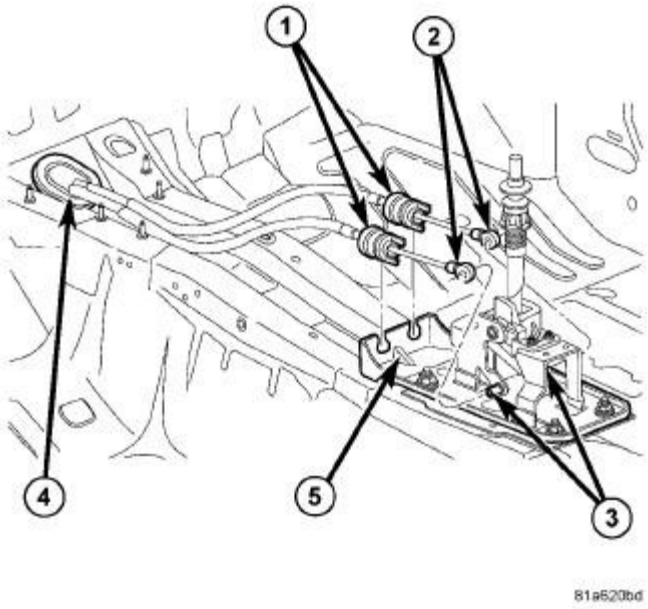


Fig. 193: Shift Cables To Shifter
Courtesy of CHRYSLER LLC

1. Detach gear shift boot from console.
2. Remove the center console assembly. Refer to **Body/Interior/HOUSING, Shifter - Removal** .
3. Remove rear power window switch (if equipped) and disconnect harness from console.
4. Remove cables (2) from shift levers (3).
5. Remove the cables (1) from the bracket (5).

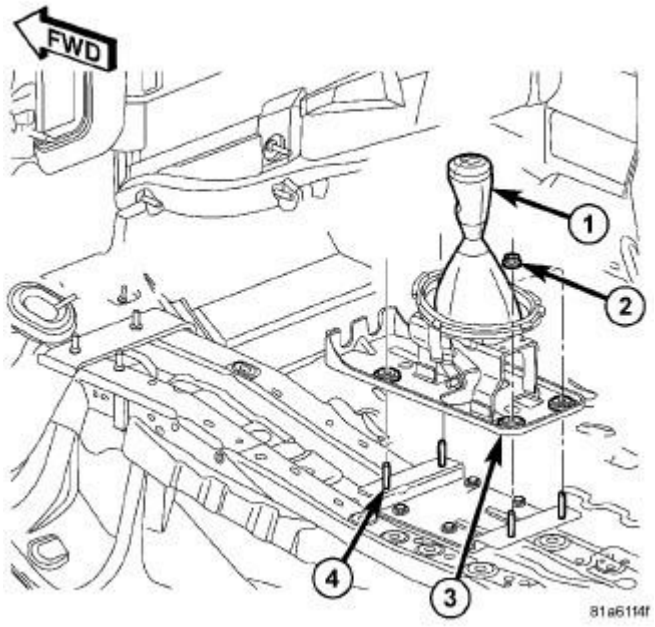


Fig. 194: Manual Transaxle Shifter
Courtesy of CHRYSLER LLC

6. Remove the shifter assembly nuts (2) and remove shifter (3) from vehicle.

INSTALLATION

INSTALLATION

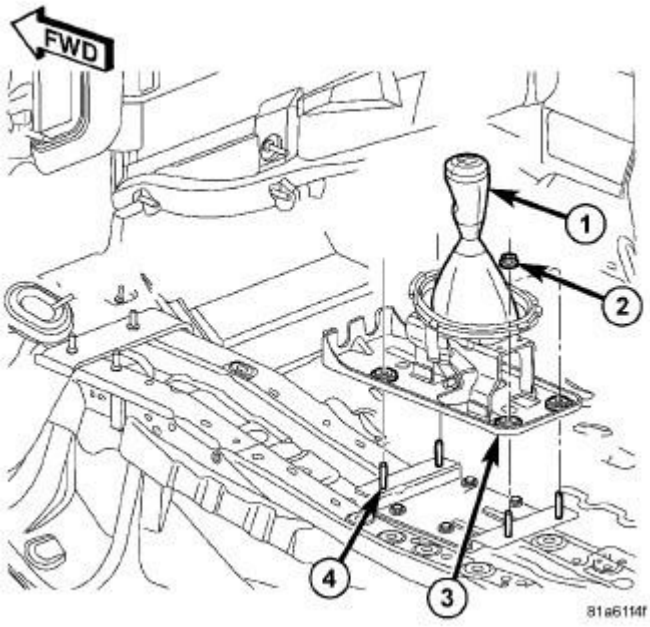


Fig. 195: Manual Transaxle Shifter
Courtesy of CHRYSLER LLC

1. Install shifter assembly (3), Install and tighten nuts (2) to 7 N.m (61 in. lbs.).

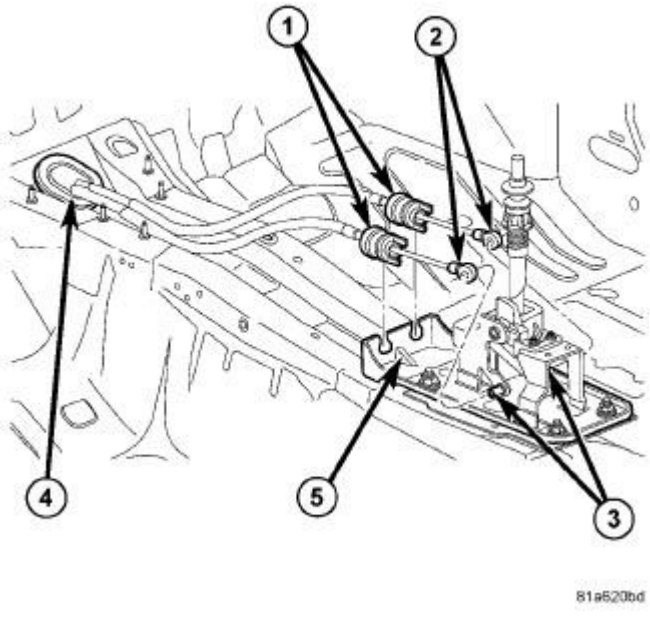


Fig. 196: Shift Cables To Shifter
Courtesy of CHRYSLER LLC

2. Install cables (2) to shifter levers (3) and secure cable to shifter bracket (5).
3. Install center console assembly. Refer to **Body/Interior/HOUSING, Shifter - Installation** .
4. Install rear power window switch (if equipped) and fasten harness to console
5. Attach gearshift boot to center console assembly.
6. Verify that shift pattern is aligned properly.

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

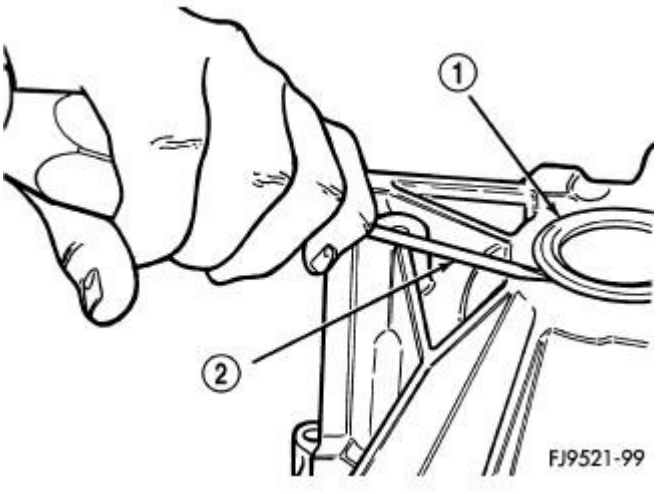


Fig. 197: Axle Shaft Seal Removal
Courtesy of CHRYSLER LLC

1. Remove axle shaft. Refer to **Differential and Driveline/Half Shaft - Removal** .
2. Insert a flat-blade pry tool (2) at outer edge of axle shaft seal (1).
3. Tap on the pry tool (2) with a small hammer and remove axle shaft seal (1).

INSTALLATION

INSTALLATION

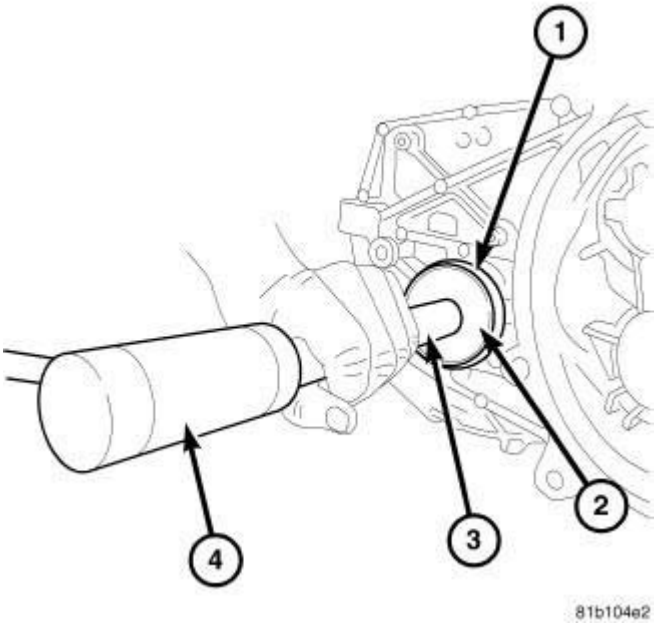


Fig. 198: Aligning Axle Shaft Seal With Axle Shaft Seal Bore
Courtesy of CHRYSLER LLC

1. Clean axle shaft seal bore of any excess sealant.
2. Align (bellhousing side) axle shaft seal with axle shaft seal bore.
3. Install axle seal on Seal Installer 9928 and Handle C-4171 and insert into axle shaft seal bore.
4. Tap seal into position until seated against transaxle case.

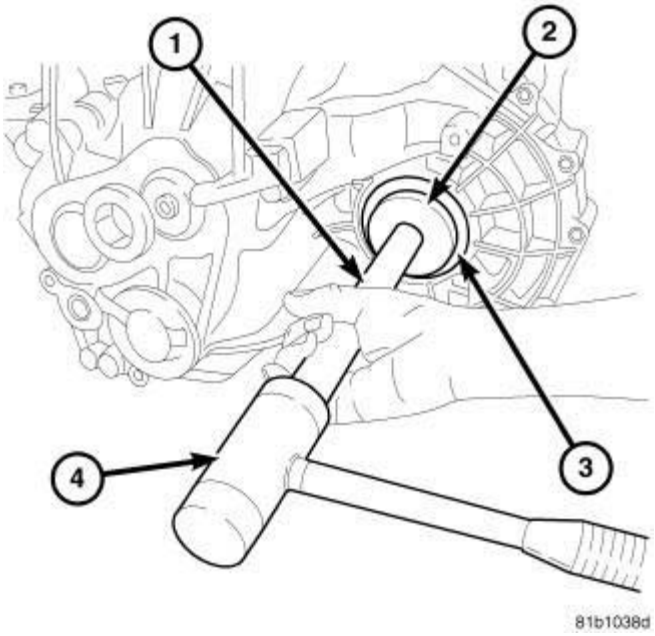


Fig. 199: Differential Side Seal
Courtesy of CHRYSLER LLC

5. Align axle shaft seal with axle shaft seal bore.
6. Install (case side) axle seal on Seal Installer 9934 and Handle C-4171 and insert into axle shaft seal bore.
7. Tap seal into position until seated against transaxle case.
8. Install axle shaft. Refer to **Differential and Driveline/Half Shaft - Installation** .
9. Check transaxle fluid level and adjust as necessary.

SHAFT, OUTPUT, NUMBER 1

DISASSEMBLY

DISASSEMBLY

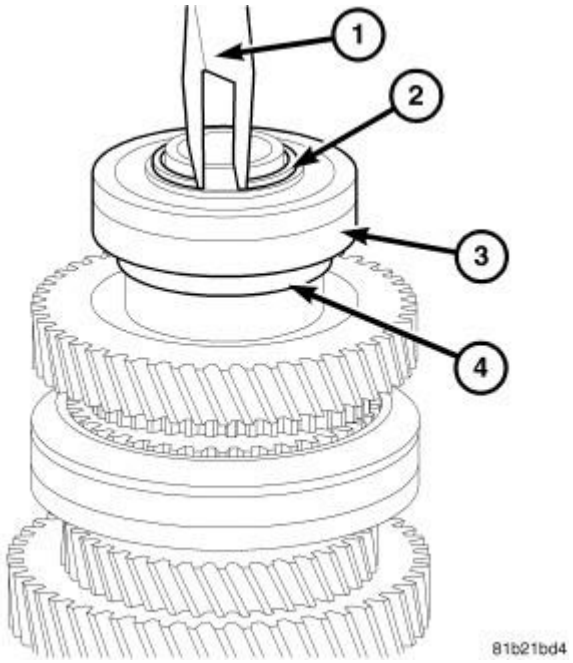


Fig. 200: Snap Ring At Output Shaft Case Bearing
Courtesy of CHRYSLER LLC

1. Remove the snap ring (2) from the output shaft.

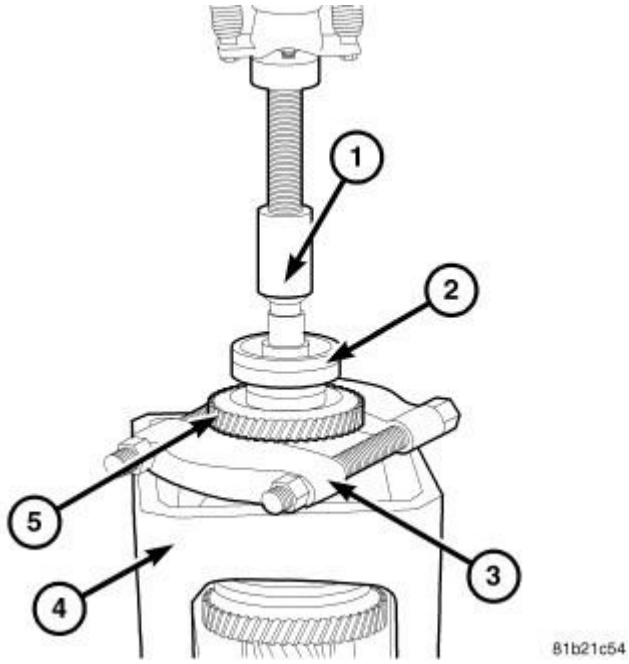


Fig. 201: Output Shaft Case Bearing And Gear
Courtesy of CHRYSLER LLC

2. Use Bearing Splitter P-334 (3), Cage 8925-3 (4) and a press (1) to remove bearing (2) and third gear (5) from output shaft.

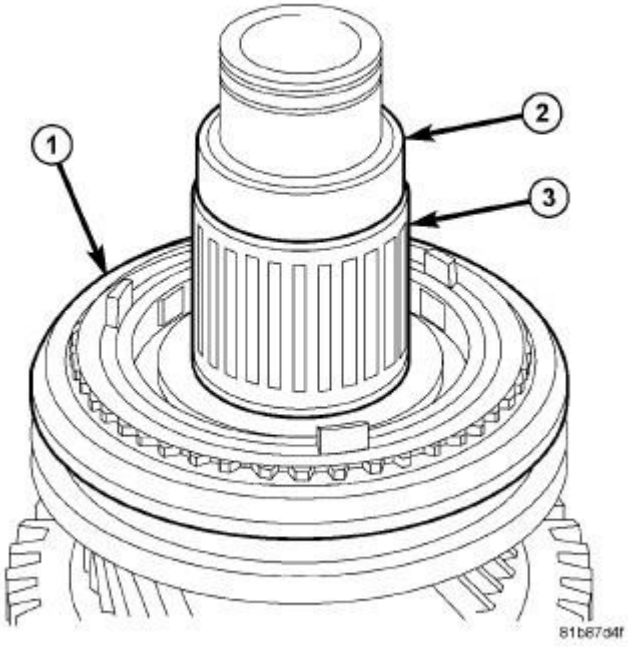


Fig. 202: Input Spacer & Bearing
Courtesy of CHRYSLER LLC

3. Remove the spacer (2), ball, needle roller bearing (3) and synchronizer ring set (1).

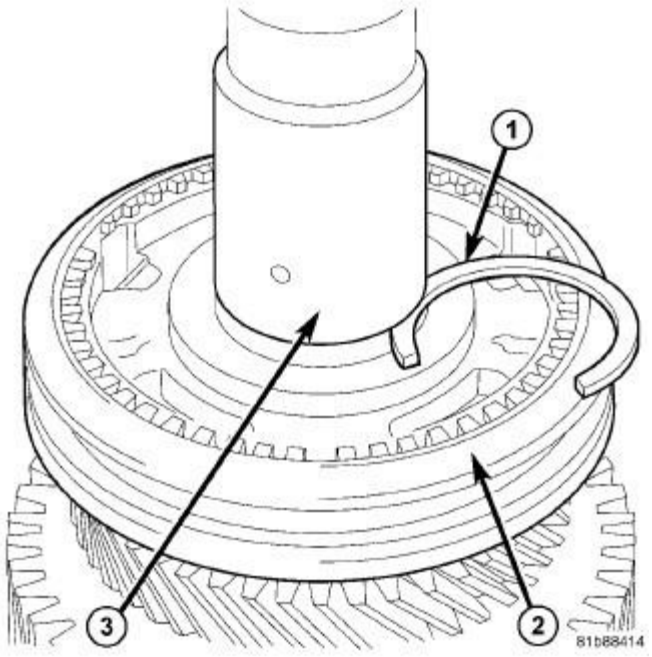


Fig. 203: Input Upper Snap Ring
Courtesy of CHRYSLER LLC

4. Remove the shaft snap ring (1).

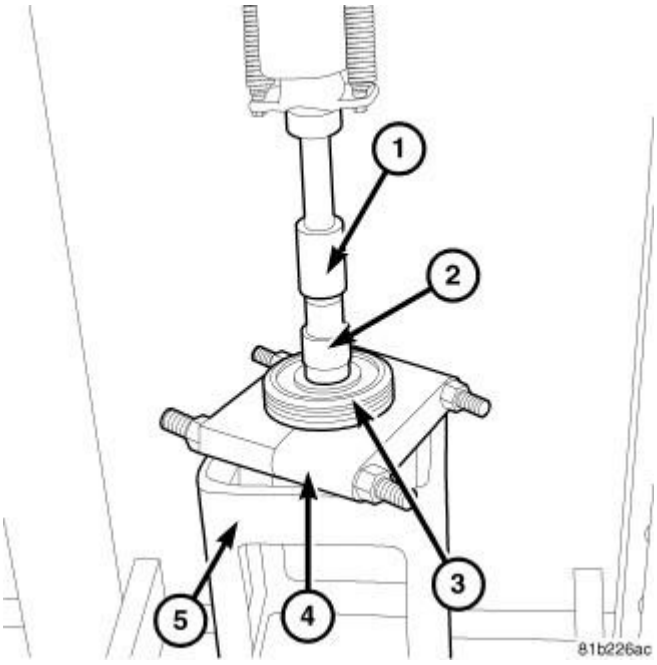


Fig. 204: Third/Fourth Gear Synchronizer & Output Shaft
Courtesy of CHRYSLER LLC

5. Use Press Plate 9647 (4) and Cage 8925-3 (5) to remove third/forth gear synchronizer (3) from output shaft (2).

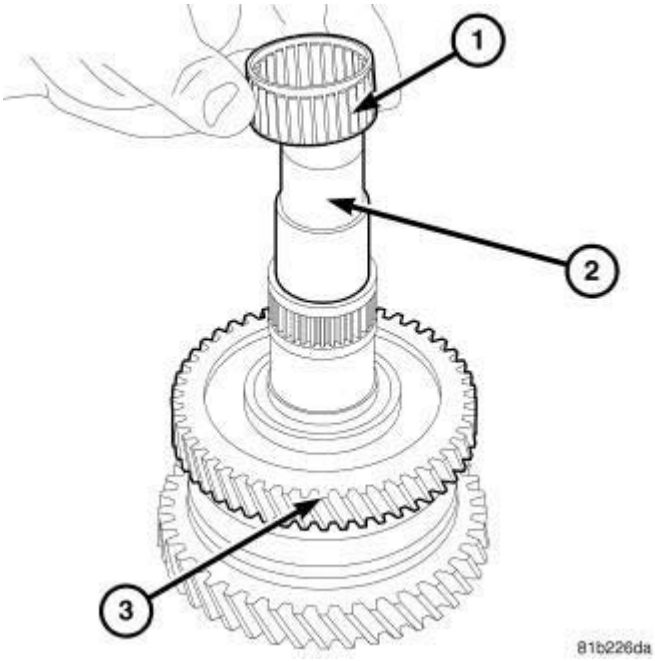


Fig. 205: Bearing & Output Shaft
Courtesy of CHRYSLER LLC

6. Remove the bearing (1) from the output shaft (2).

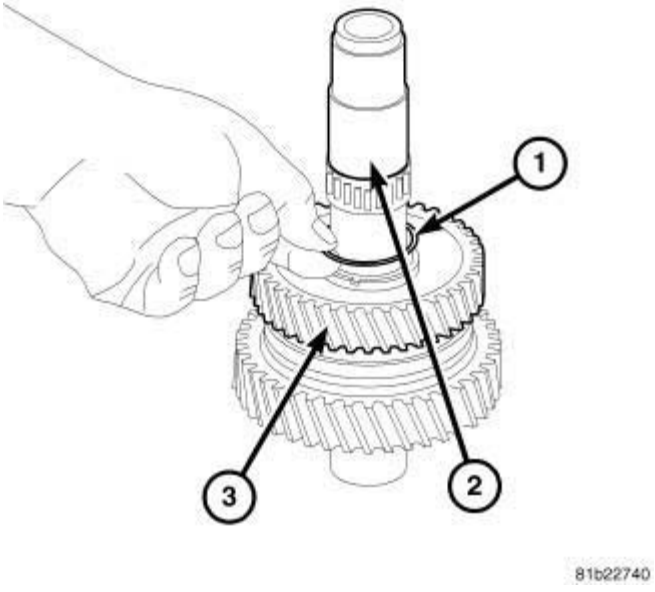


Fig. 206: Snap Ring From Output Shaft
Courtesy of CHRYSLER LLC

7. Remove the spacer and snap ring (1) from output shaft (2).

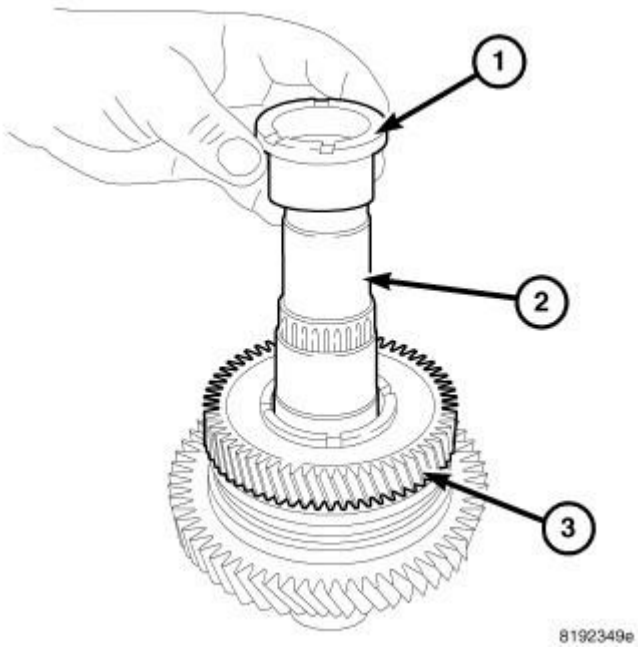


Fig. 207: Output Shaft Spacer
Courtesy of CHRYSLER LLC

8. Remove the second gear inner race (1) from the output shaft (2).

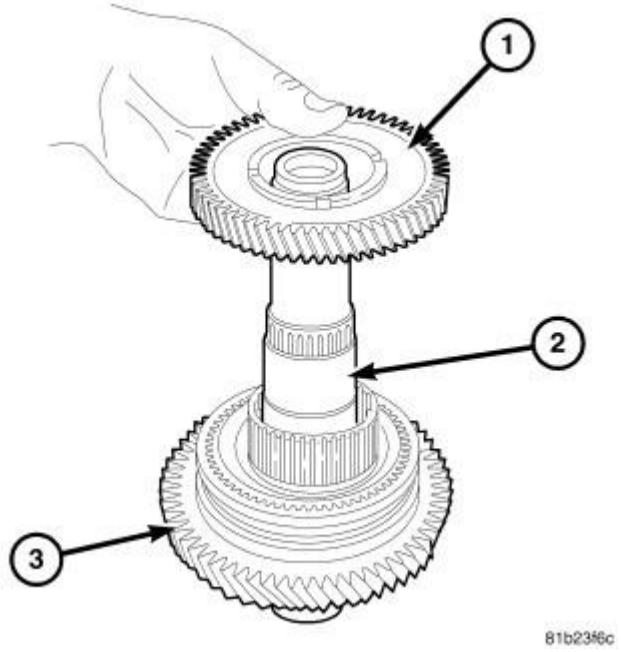


Fig. 208: Output Shaft 2nd Gear
Courtesy of CHRYSLER LLC

9. Remove second gear (1) from output shaft (2).
10. Remove the needle bearing.

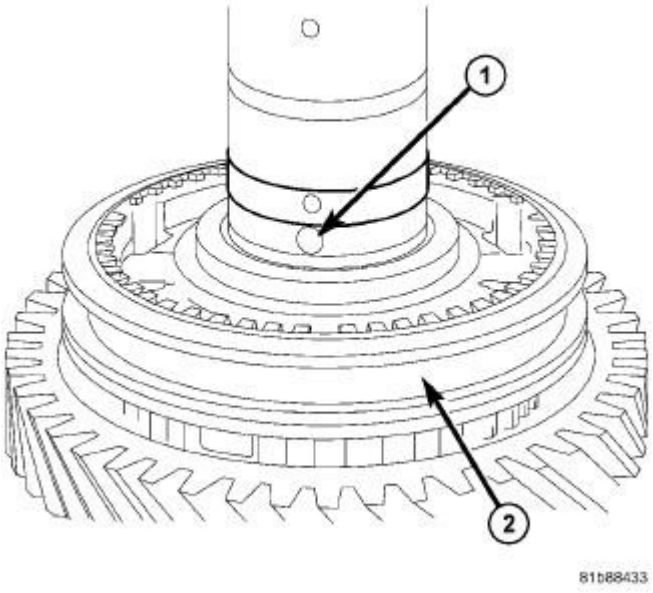


Fig. 209: Ball
Courtesy of CHRYSLER LLC

11. Remove the ball (1).

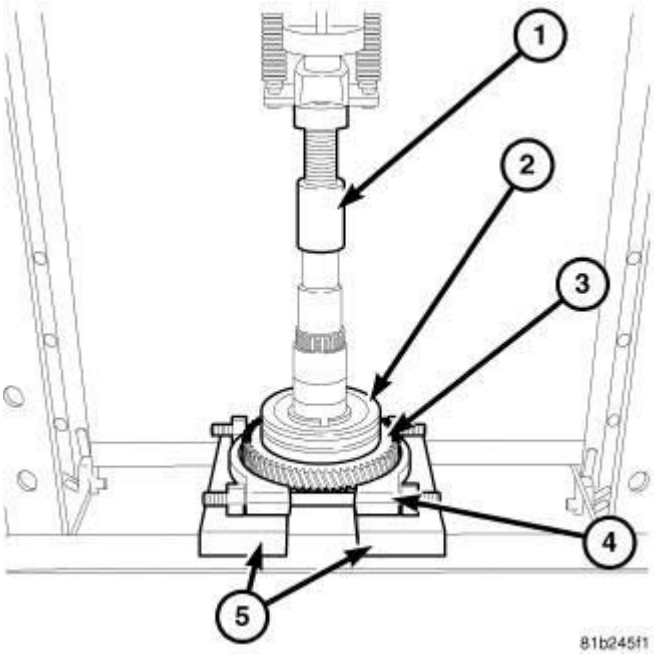


Fig. 210: First/Second Gear Synchronizer & First Gear

Courtesy of CHRYSLER LLC

12. Use Bearing Splitter P-334 (4) press off the first/second gear synchronizer (3) and first gear (3).

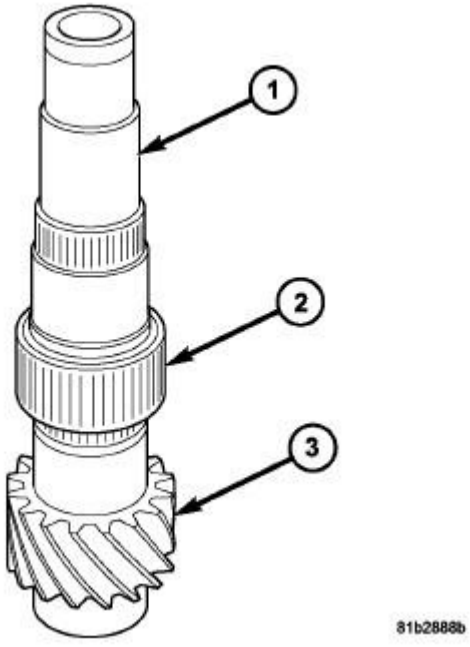


Fig. 211: First Gear Needle Bearing & Output Shaft
Courtesy of CHRYSLER LLC

13. Remove the Needle bearing (2) from the output shaft (1).

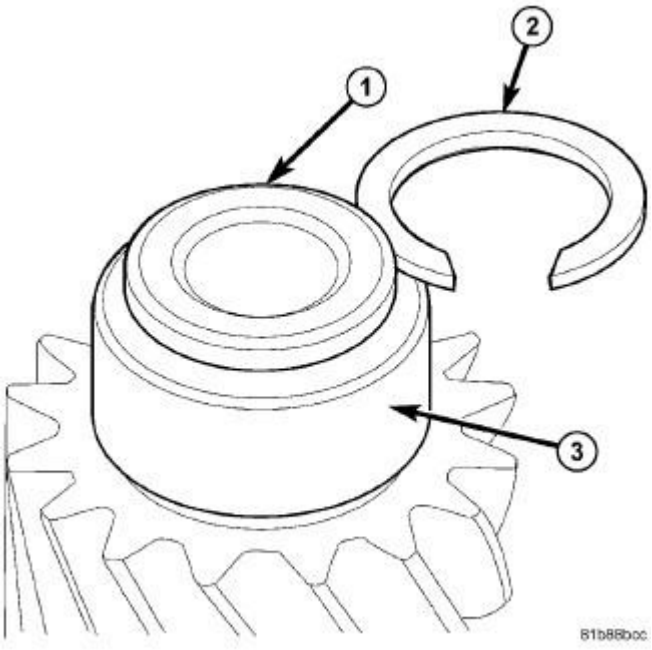


Fig. 212: Input Lower Snap Ring
Courtesy of CHRYSLER LLC

14. Remove the shaft snap ring (2).

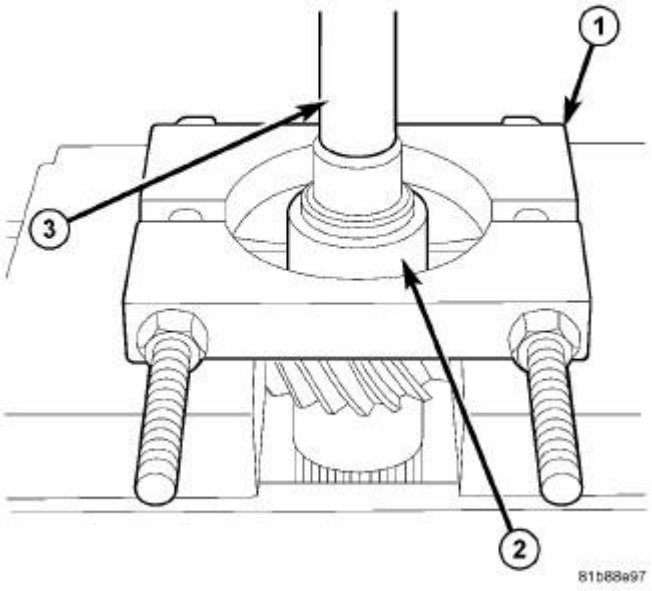


Fig. 213: Cylindrical Roller Bearing
Courtesy of CHRYSLER LLC

15. Remove the cylindrical roller bearing (2) using Bearing Splitter 1130 (1) and a Press.

ASSEMBLY

ASSEMBLY

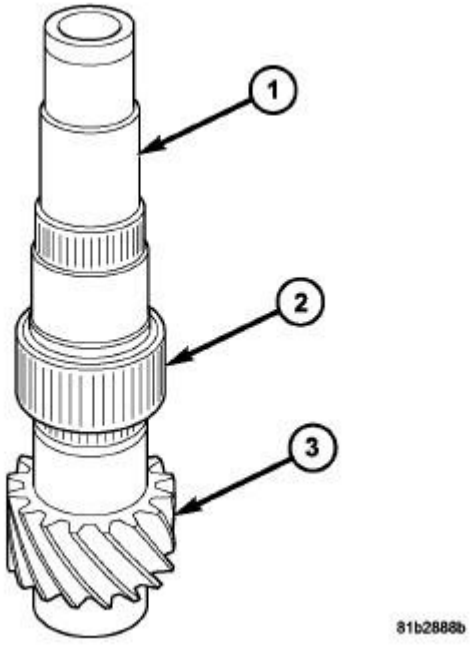


Fig. 214: First Gear Needle Bearing & Output Shaft
Courtesy of CHRYSLER LLC

NOTE: Use ATF on all parts that are to be assembled in this procedure.

1. Install the first and first gear needle bearing (2) on the output shaft (1).

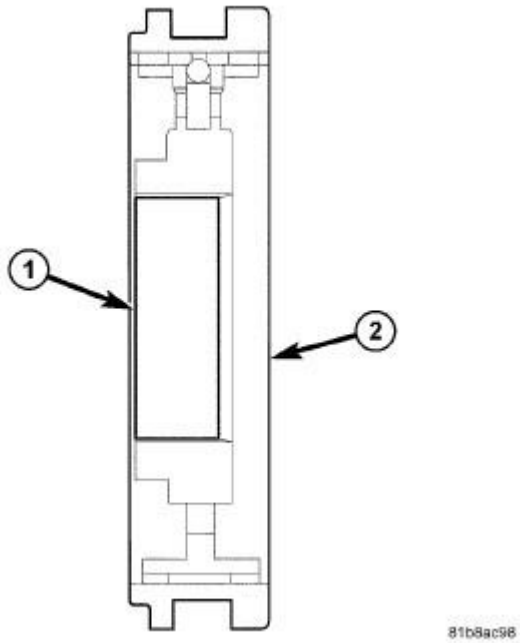


Fig. 215: Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Pay attention to the direction when inserting the 1st-2nd hub sleeve.

2. Install the 1st-2nd synchronizer onto the output shaft with (2) towards first gear.

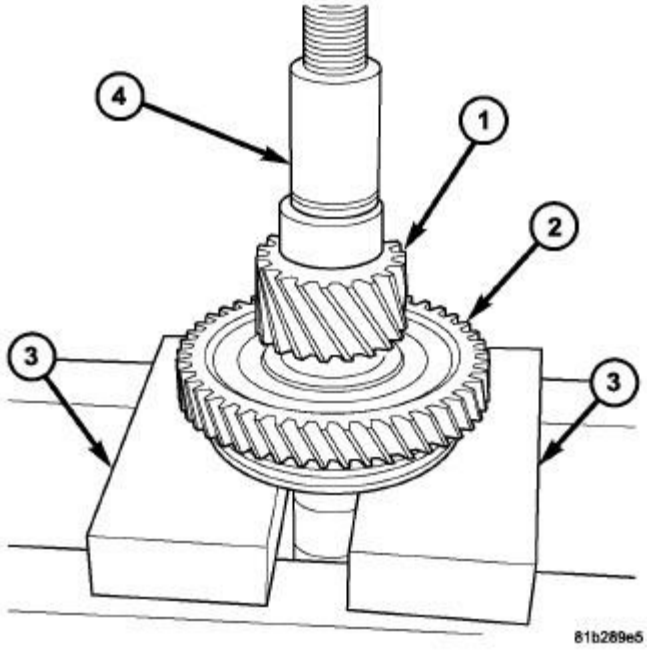


Fig. 216: First Gear & First/Second Gear Synchronizer
Courtesy of CHRYSLER LLC

3. Using a press (4), install first gear (3) and first/second gear synchronizer onto output shaft.

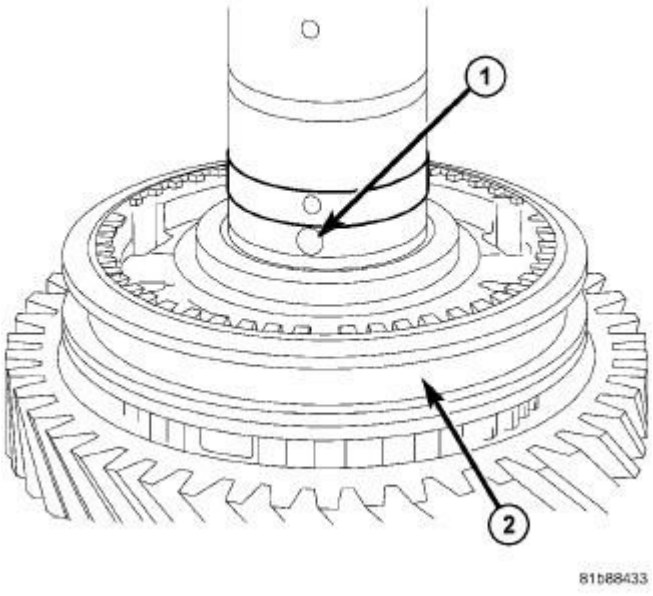


Fig. 217: Ball
Courtesy of CHRYSLER LLC

4. Install the second ball (1).

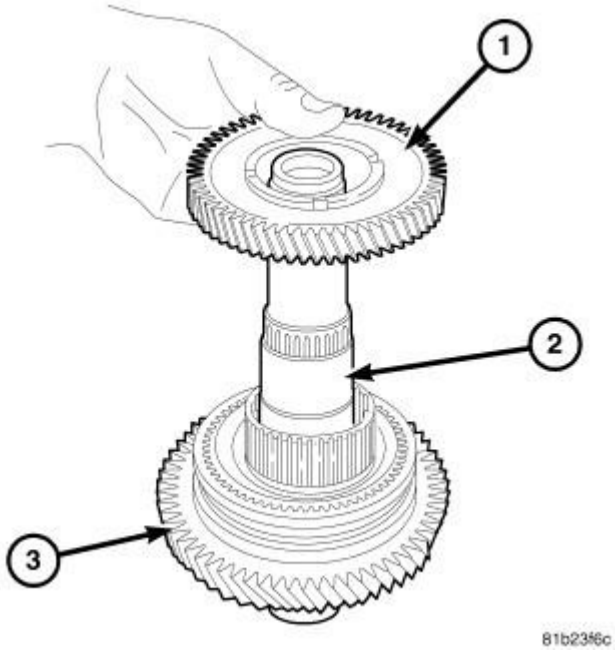


Fig. 218: Output Shaft 2nd Gear
Courtesy of CHRYSLER LLC

5. Install the needle bearing on the output shaft.
6. Install second gear (1) onto output shaft (2).

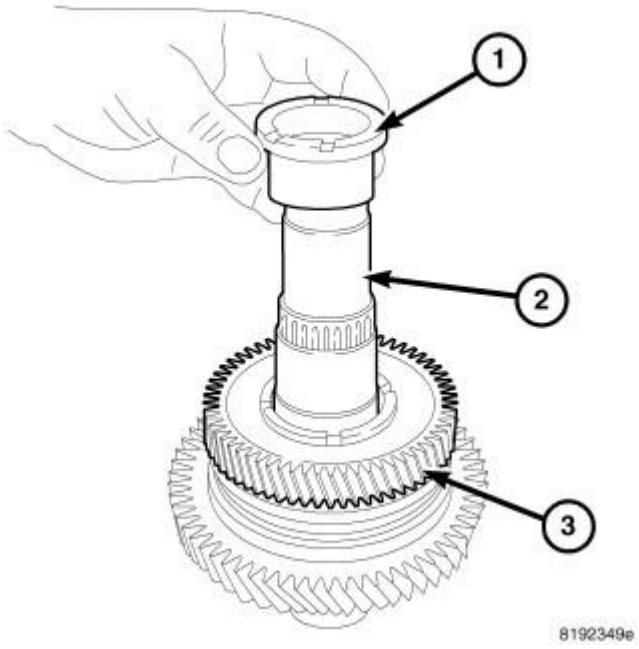


Fig. 219: Output Shaft Spacer
Courtesy of CHRYSLER LLC

7. Install the inner race (1) onto the output shaft (2).

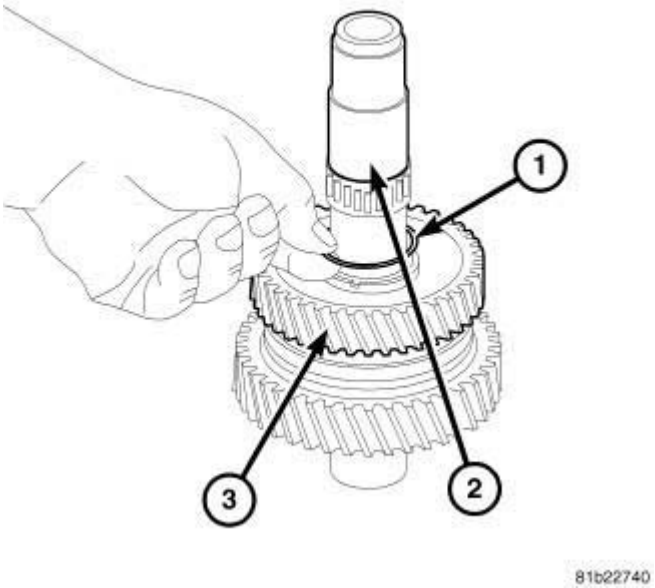


Fig. 220: Snap Ring From Output Shaft
Courtesy of CHRYSLER LLC

8. Install the **new** C- clip (1) onto output shaft (2).
9. Install the spacer.

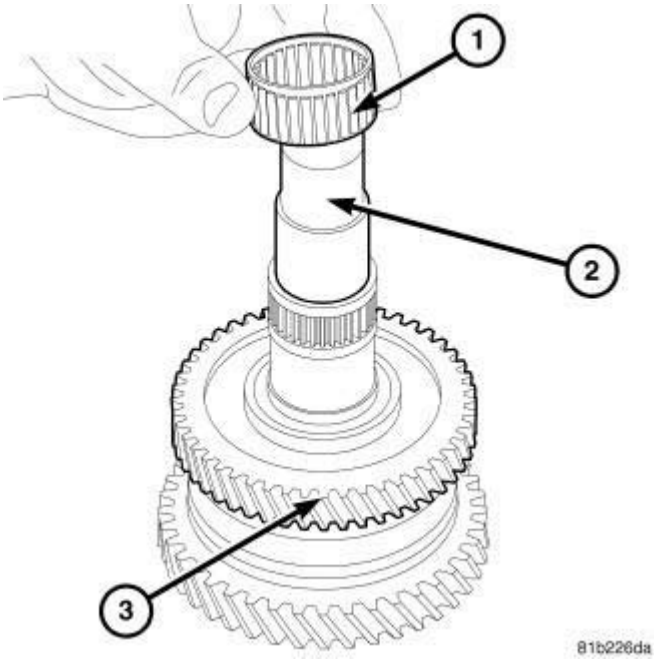


Fig. 221: Bearing & Output Shaft
Courtesy of CHRYSLER LLC

10. Install the forth bearing (1) onto the output shaft (2).

11. Install forth gear onto output shaft.

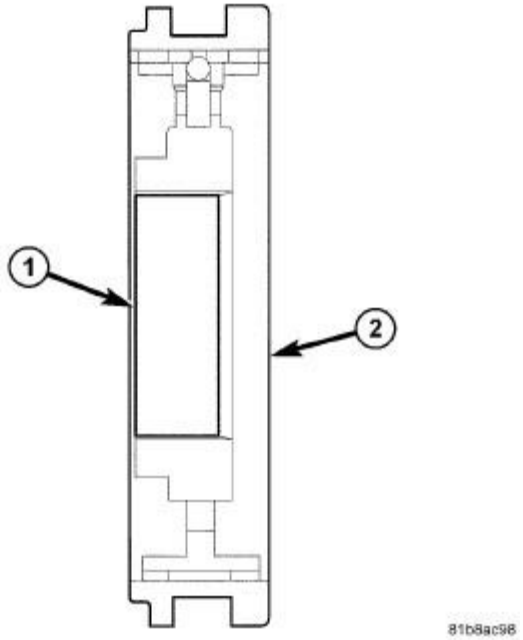


Fig. 222: Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Pay attention to the direction when inserting the 1st-2nd hub sleeve.

12. Install the third/forth gear synchronizer onto the output shaft with (2) towards forth gear.

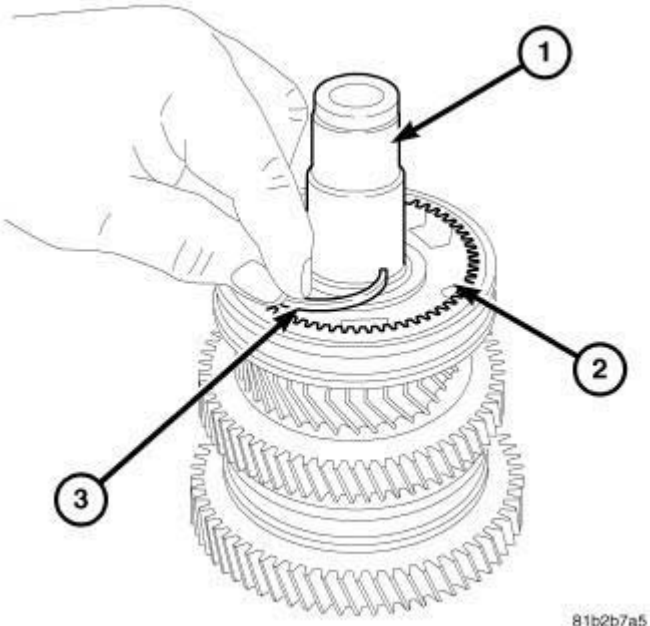


Fig. 223: Third/Fourth Gear Synchronizer
Courtesy of CHRYSLER LLC

13. Using a press install third/forth gear synchronizer (2) onto output shaft (1).

NOTE: Always use the largest snap that will fit into the grove.

14. Install a **new** snap ring (3) to hold third/forth gear synchronizer (2) onto output shaft (1).

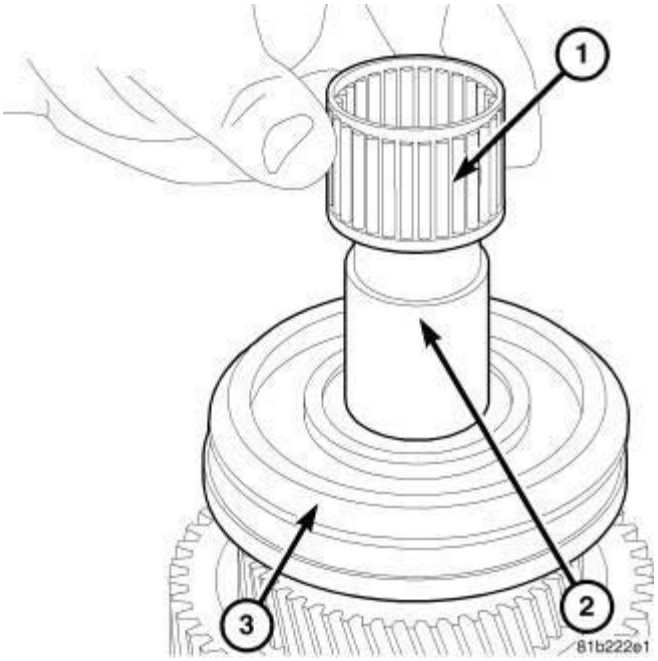


Fig. 224: Output Shaft Needle Bearing
Courtesy of CHRYSLER LLC

15. Install the third needle bearing (1) onto output shaft (2).

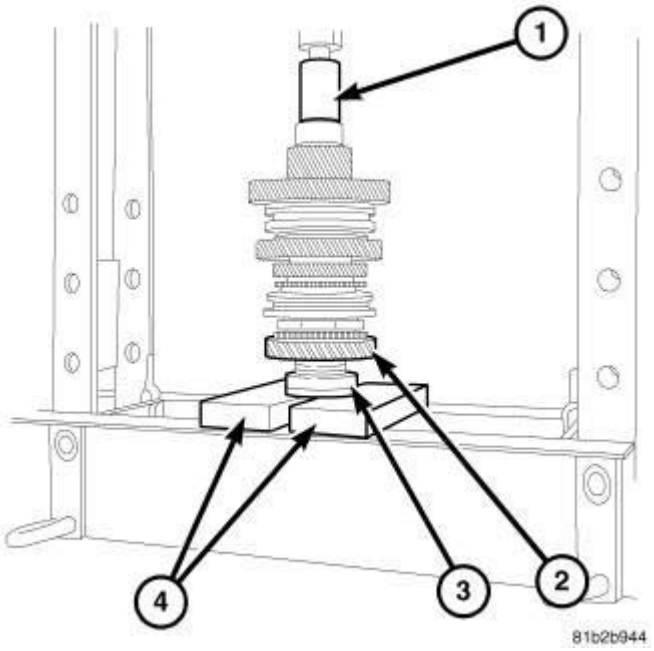


Fig. 225: 3rd Gear, Bearing & Press
Courtesy of CHRYSLER LLC

16. Install third gear (2) onto output shaft.
17. Install the ball, spacer and bearing (3) using a Press (1).

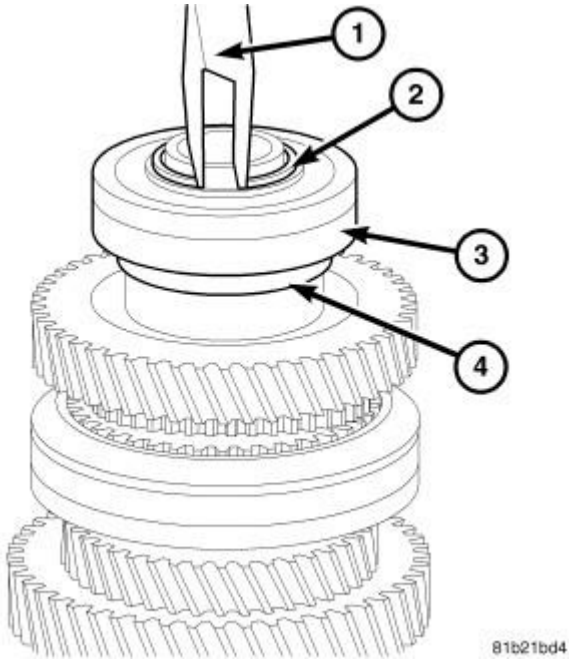


Fig. 226: Snap Ring At Output Shaft Case Bearing
Courtesy of CHRYSLER LLC

NOTE: Always use the largest snap that will fit into the grove.

18. Install the **new** snap ring (2) from the output shaft.

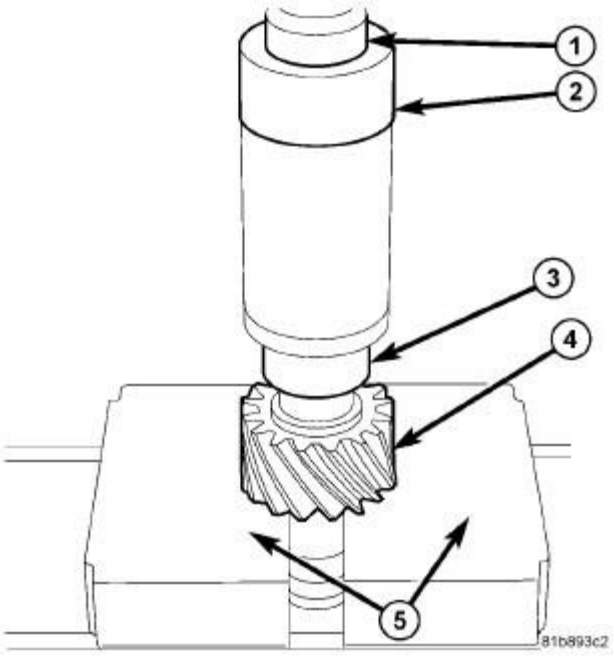


Fig. 227: Installing Cylindrical Roller Bearing Race
Courtesy of CHRYSLER LLC

19. Using installer 6052 (2) and a Press (1) install the cylindrical roller bearing race (3) on the input shaft.

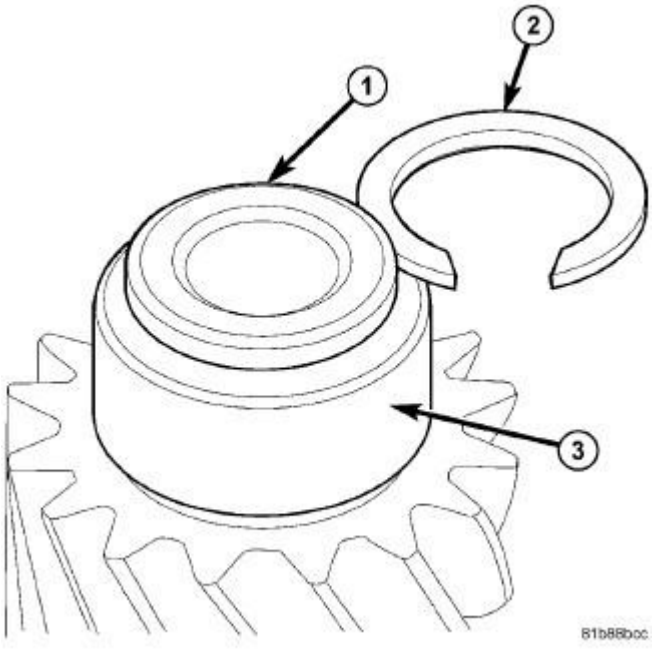


Fig. 228: Input Lower Snap Ring

Courtesy of CHRYSLER LLC

20. Install the shaft snap ring (2).

SHAFT, OUTPUT, NUMBER 2

DISASSEMBLY

DISASSEMBLY

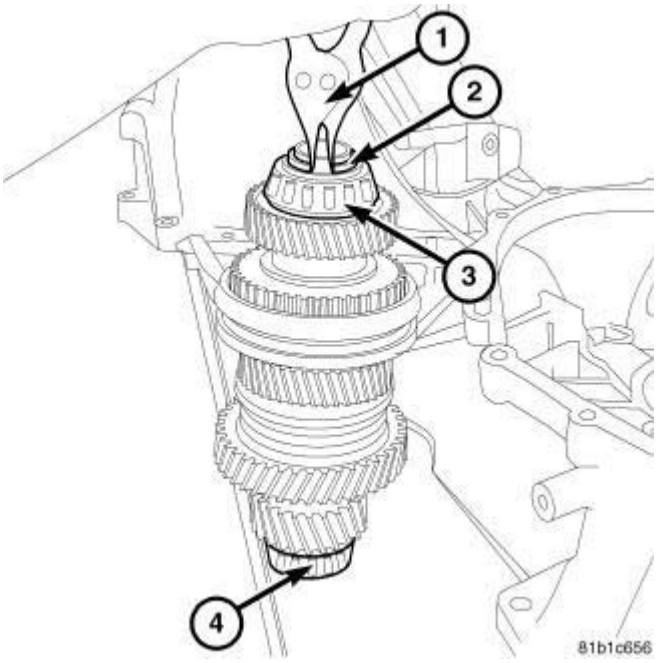


Fig. 229: Snap Ring At Output Shaft
Courtesy of CHRYSLER LLC

1. Using Snap Ring Pliers (1) remove the snap ring (2) from the output shaft # 2.

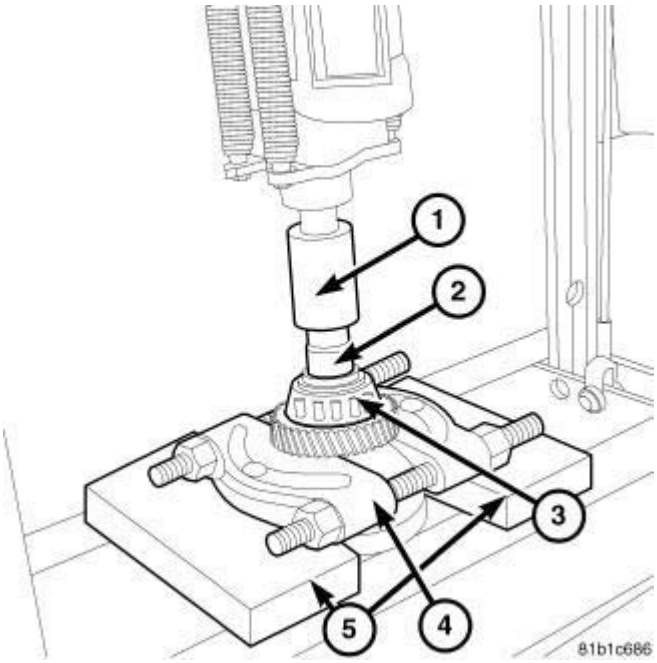


Fig. 230: Bearing From Cluster Shaft
Courtesy of CHRYSLER LLC

2. Using a press, blocks, Bearing Splitter P-334 and an appropriate spacer (2) press sixth gear and case side bearing (3) from shaft.

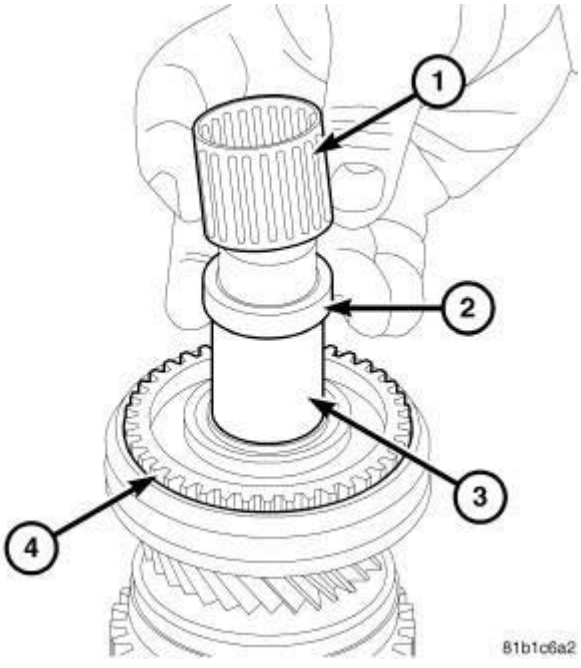


Fig. 231: Bearing Cage & Spacer Cluster
Courtesy of CHRYSLER LLC

3. Remove sixth needle bearing cage (1) and spacer (2) from output shaft # 2 (3).

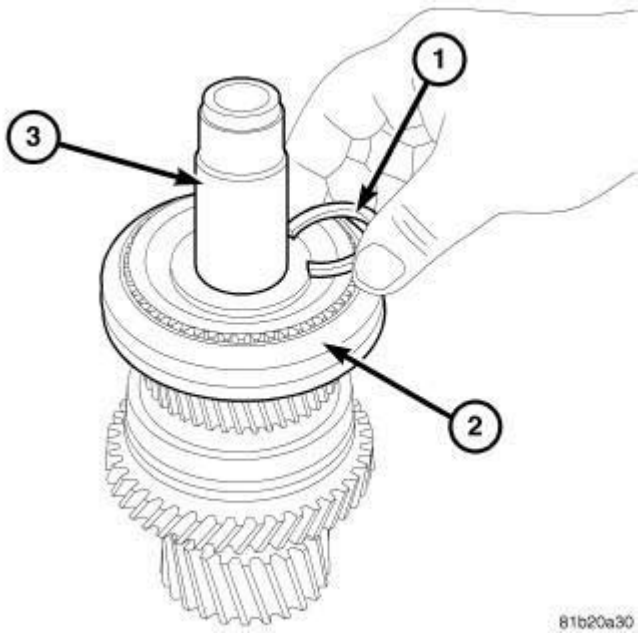


Fig. 232: Snap Ring At Output Shaft #2
Courtesy of CHRYSLER LLC

4. Remove the snap ring (1) from the output shaft # 2 (3).

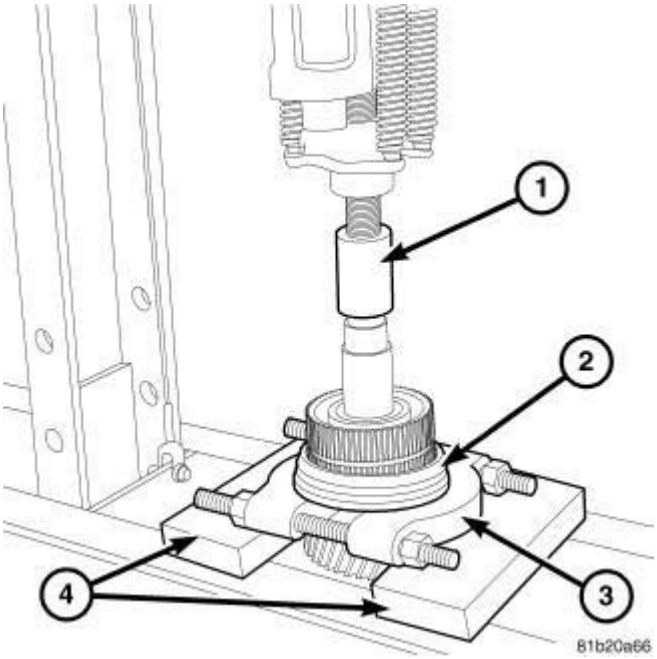


Fig. 233: Fifth Gear & Five/Six Synchronizer
Courtesy of CHRYSLER LLC

5. Use Bearing Splitter P-334 (3), Blocks (4) and a press remove fifth gear and five/six synchronizer (2).

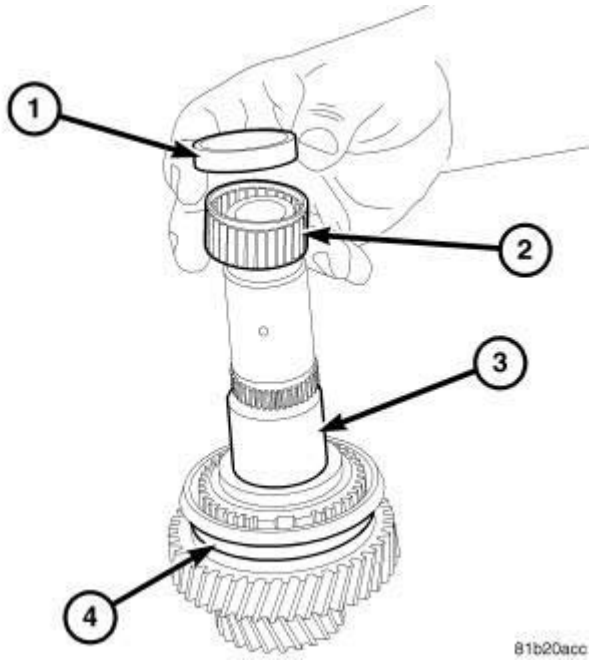


Fig. 234: #2 Bearing & Spacer
Courtesy of CHRYSLER LLC

6. Remove fifth needle bearing cage (2) and spacer (1) from output shaft (3).

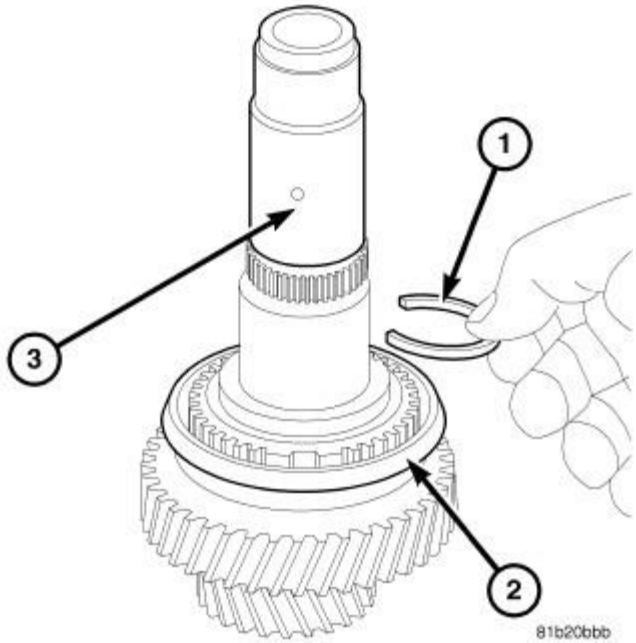


Fig. 235: Output Shaft & C-Clip
Courtesy of CHRYSLER LLC

7. Remove the C-clip (1) from the output shaft (3).

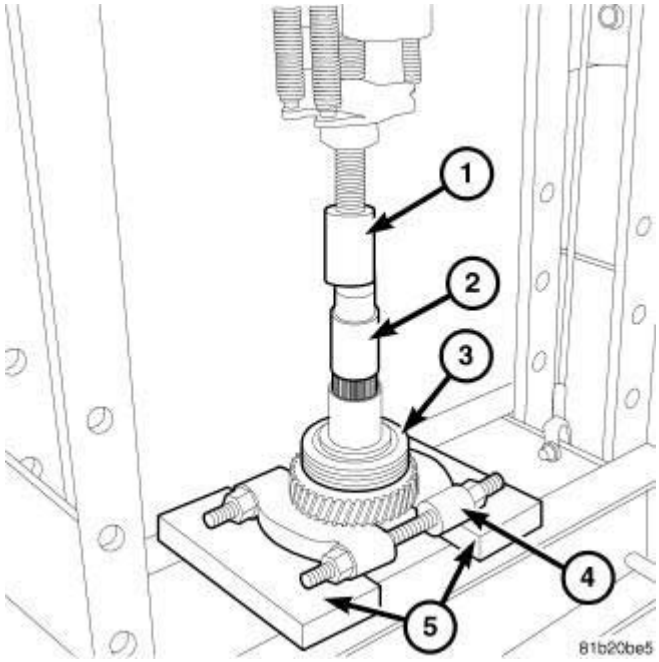


Fig. 236: Output Shaft #2 & Reverse Synchronizer
Courtesy of CHRYSLER LLC

8. Use Bearing Splitter P-334 (4), Blocks (5) and a press to remove reverse gear and reverse synchronizer (3) from the output shaft # 2.

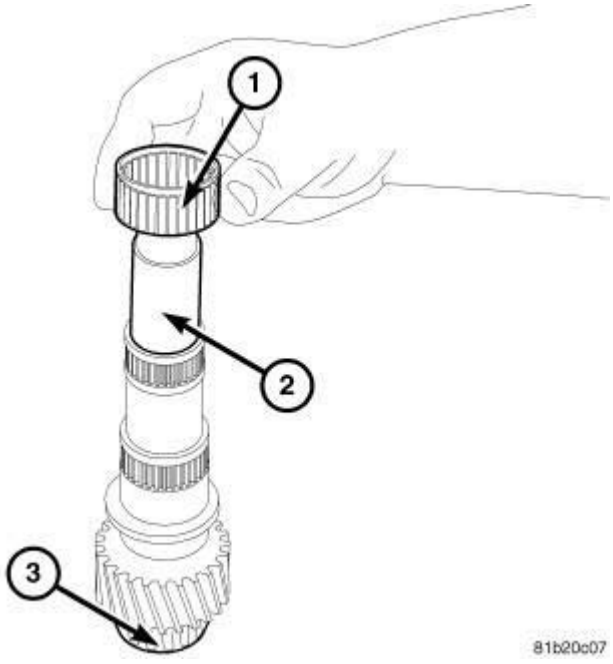


Fig. 237: Output Shaft #2 & Needle Bearing
Courtesy of CHRYSLER LLC

9. Remove the reverse needle bearing (1) from the output shaft # 2 (2).

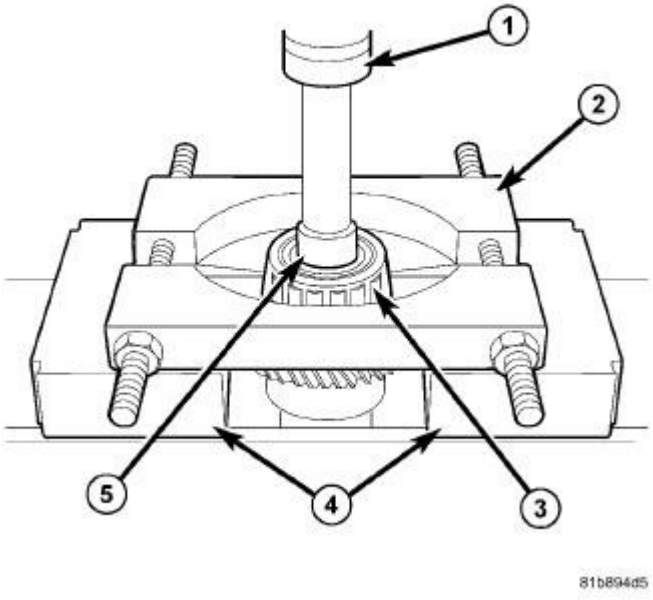


Fig. 238: Output Shaft & Bellhousing Side Bearing
Courtesy of CHRYSLER LLC

10. Using a Press (1) and Splitter 1130 (2) to remove the bellhousing side bearing (3) from the output shaft # 2(5).

ASSEMBLY

ASSEMBLY

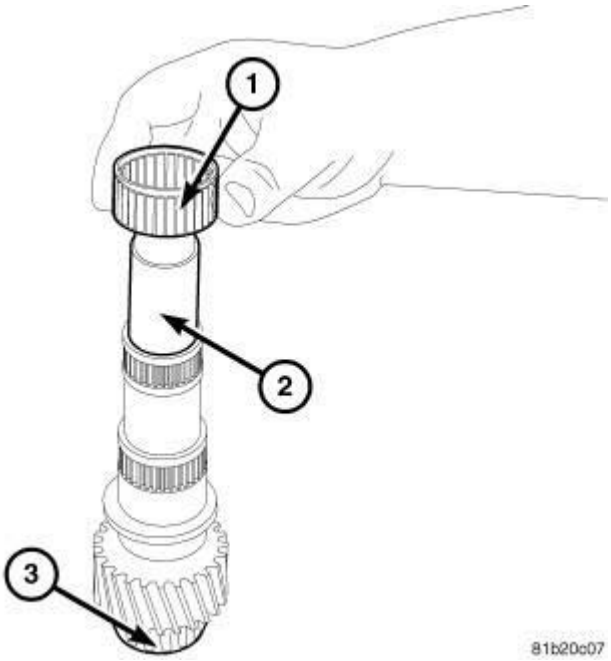


Fig. 239: Output Shaft #2 & Needle Bearing
Courtesy of CHRYSLER LLC

1. Install the reverse needle bearing (1) onto the output shaft # 2 (2).

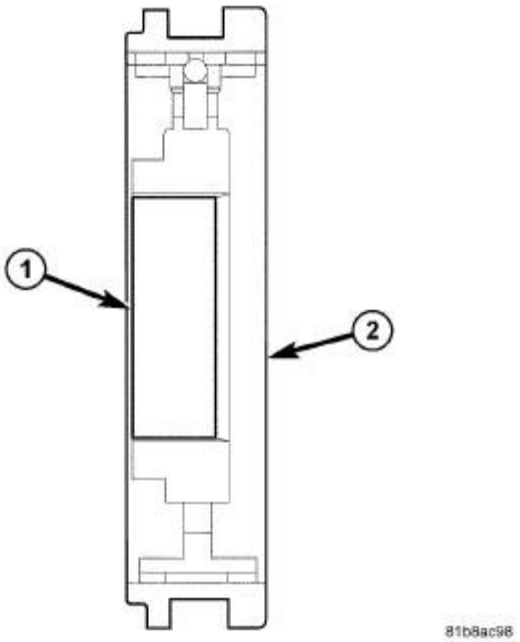


Fig. 240: Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Pay attention to the direction when inserting the reverse hub sleeve.

2. Install the reverse gear synchronizer onto the output shaft with (2) towards reverse gear.

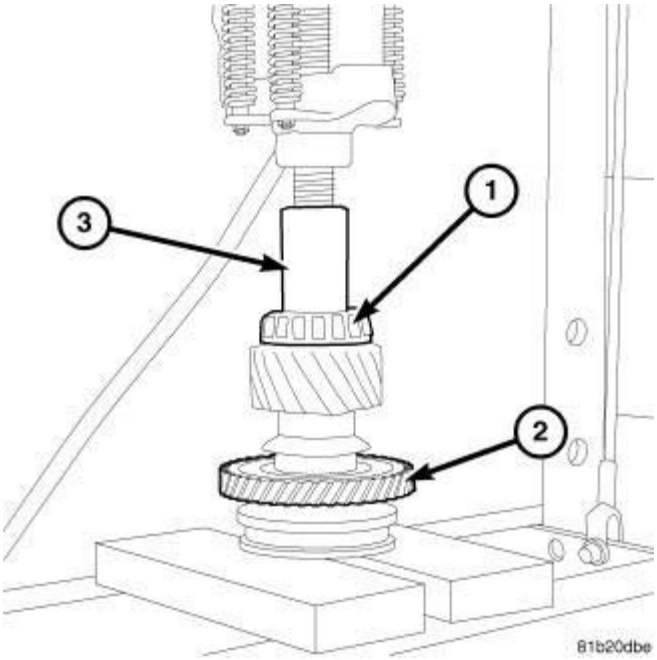


Fig. 241: Install Reverse Gear Onto Output Shaft #2
Courtesy of CHRYSLER LLC

3. Install reverse gear (2) onto output shaft # 2.
4. Install reverse gear synchronizer onto output shaft using a Press (3).

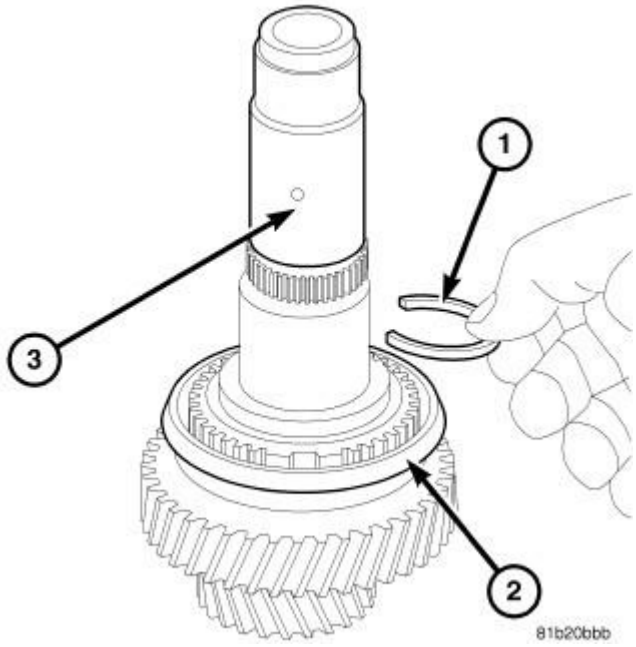


Fig. 242: Output Shaft & C-Clip
Courtesy of CHRYSLER LLC

NOTE: Always use the largest snap that will fit into the grove.

5. Install the **new** snap ring (2) from the output shaft # 2.

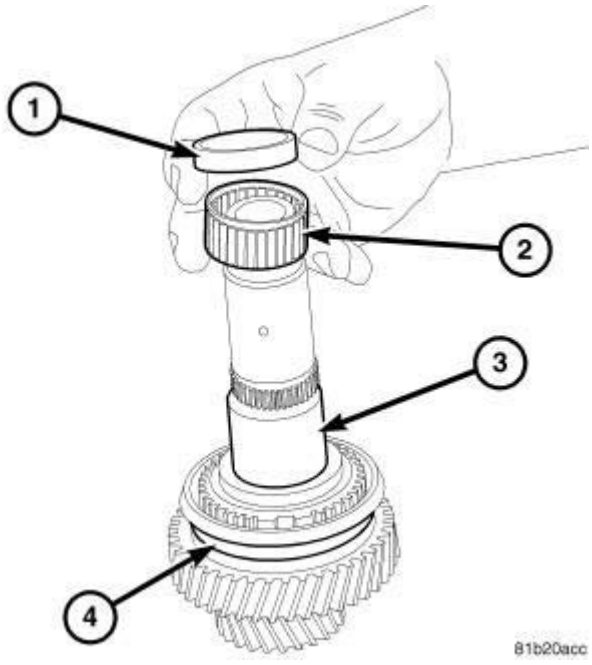


Fig. 243: #2 Bearing & Spacer
Courtesy of CHRYSLER LLC

6. Install fifth needle bearing (2) and spacer (1) onto output shaft # 2 (3).

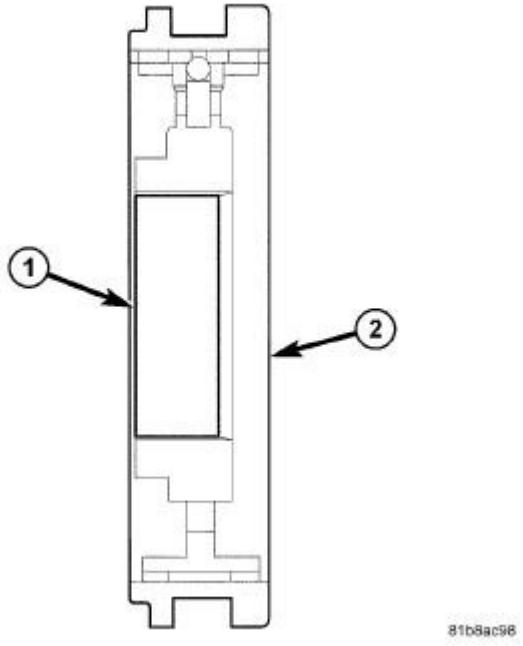


Fig. 244: Synchronizer
Courtesy of CHRYSLER LLC

NOTE: Pay attention to the direction when inserting the 5th-6th hub sleeve.

7. Install the fifth gear and fifth/sixth gear synchronizer onto the output shaft with (2) towards fifth gear.

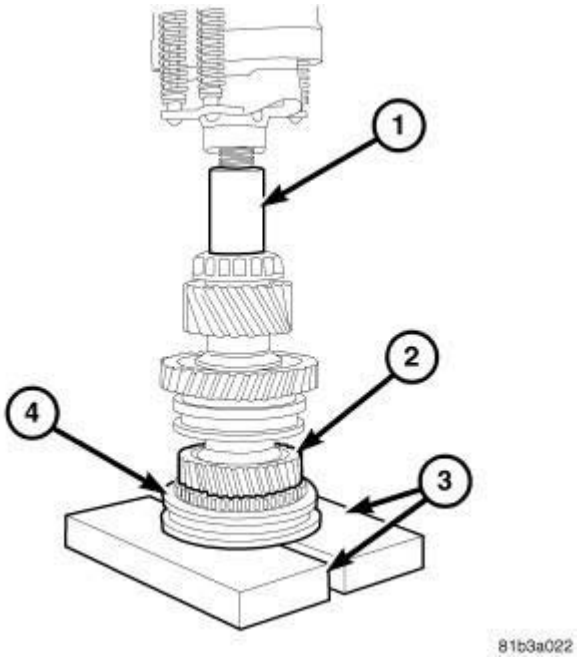


Fig. 245: 5th Gear & Synchronizer
Courtesy of CHRYSLER LLC

8. Use a press to install fifth gear and fifth/sixth gear synchronizer (2).

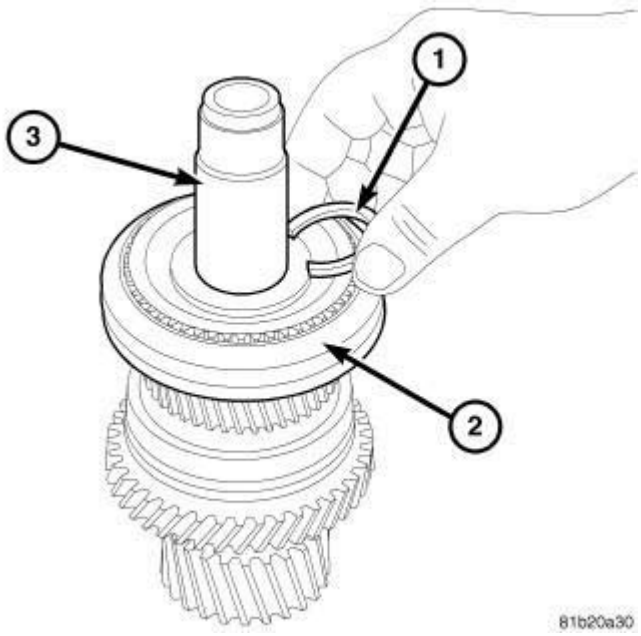


Fig. 246: Snap Ring At Output Shaft #2
Courtesy of CHRYSLER LLC

NOTE: Always use the largest snap that will fit into the grove.

9. Install the **new** snap ring (1) from the output shaft.

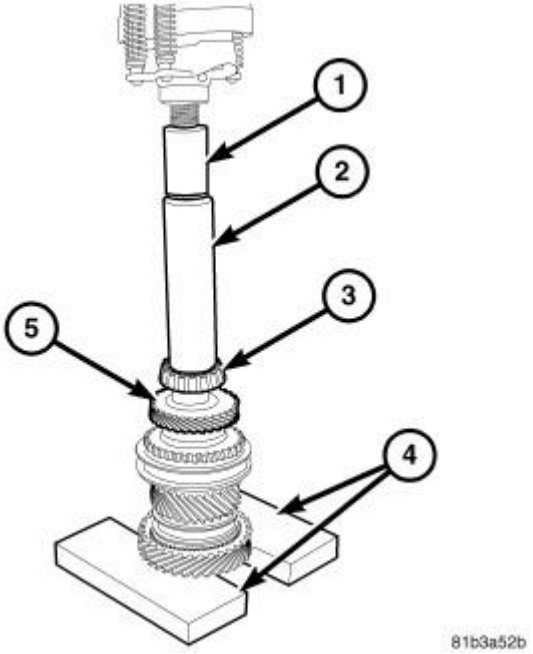


Fig. 247: Sixth Gear & Bearing
Courtesy of CHRYSLER LLC

10. Install spacer sixth needle bearing and sixth gear onto shaft
11. Use Sleeve C-3717 to press sixth gear and bearing (3) onto shaft.

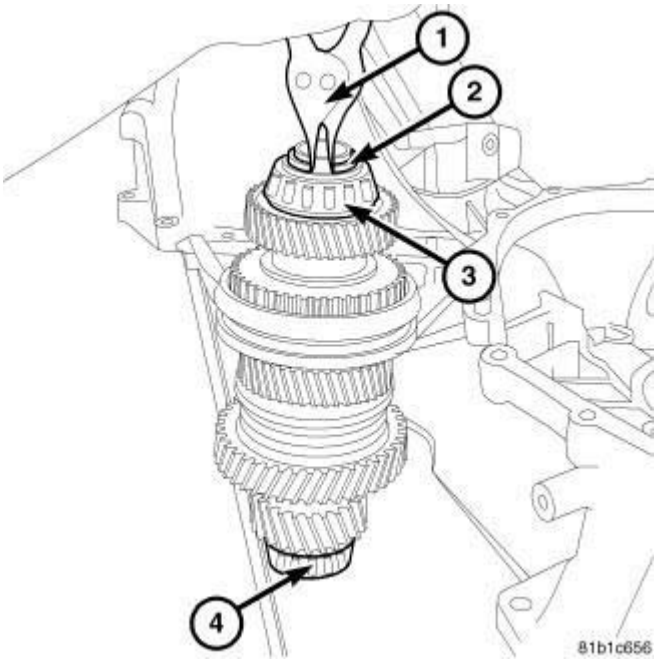


Fig. 248: Snap Ring At Output Shaft
Courtesy of CHRYSLER LLC

NOTE: Always use the largest snap that will fit into the grove.

12. Install the **new** snap ring (2) from the output shaft.

SWITCH, BACKUP LAMP

REMOVAL

REMOVAL

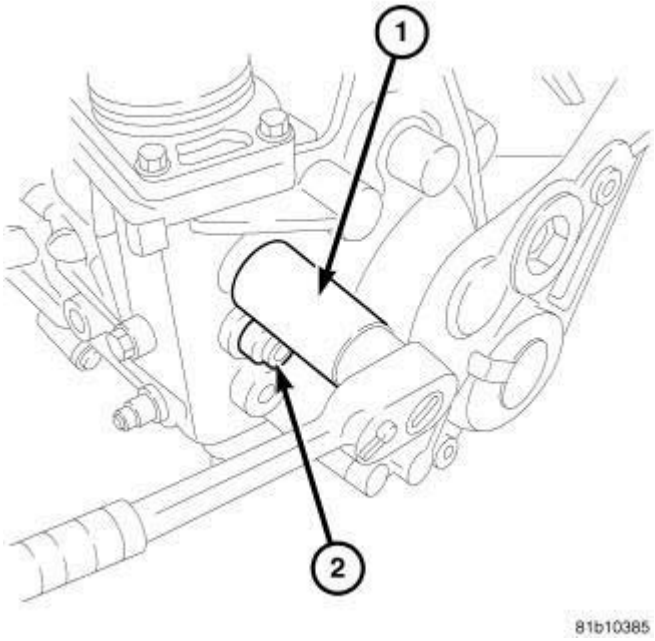


Fig. 249: Back-Up Lamp Switch
Courtesy of CHRYSLER LLC

1. Disconnect battery negative cable.
2. Raise vehicle on hoist.
3. Disconnect backup lamp switch connector.
4. Remove backup lamp switch (1).

INSTALLATION

INSTALLATION

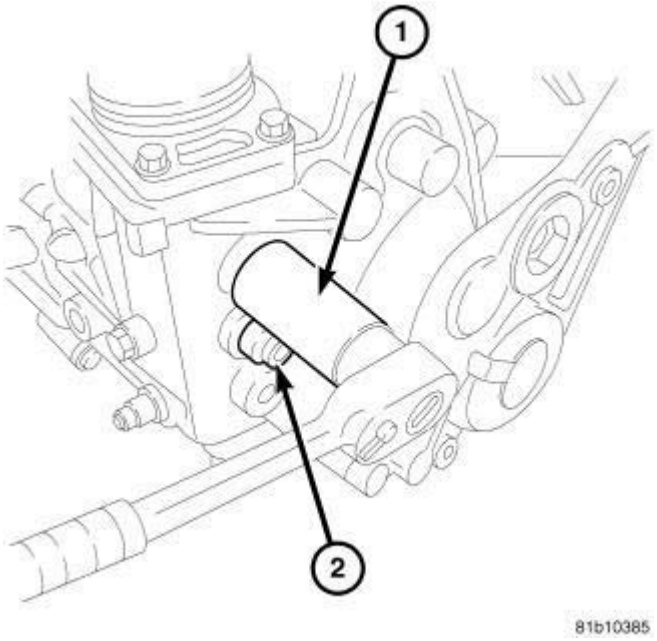


Fig. 250: Back-Up Lamp Switch
Courtesy of CHRYSLER LLC

1. Install the backup lamp switch (1) with a **new** washer and tighten to 40 N.m (29 ft. lbs.).
2. Connect backup lamp switch connector.
3. Lower vehicle.
4. Connect battery negative cable.

SYNCHRONIZER

DISASSEMBLY

DISASSEMBLY

Place synchronizer in a clean shop towel and wrap. Press on inner hub. Carefully open up shop towel and remove springs, balls, keys, hub, and sleeve.

CLEANING

CLEANING

Do not attempt to clean the blocking rings in solvent. The friction material will become contaminated. Place synchronizer components in a suitable holder and clean and air dry.

INSPECTION

INSPECTION

Proper inspection of components involve:

- Teeth, for wear, scuffed, nicked, burred, or broken teeth
- Keys, for wear or distortion
- Balls and springs, for distortion, cracks, or wear

If any of these conditions exist in these components, replace as necessary.

ASSEMBLY

ASSEMBLY

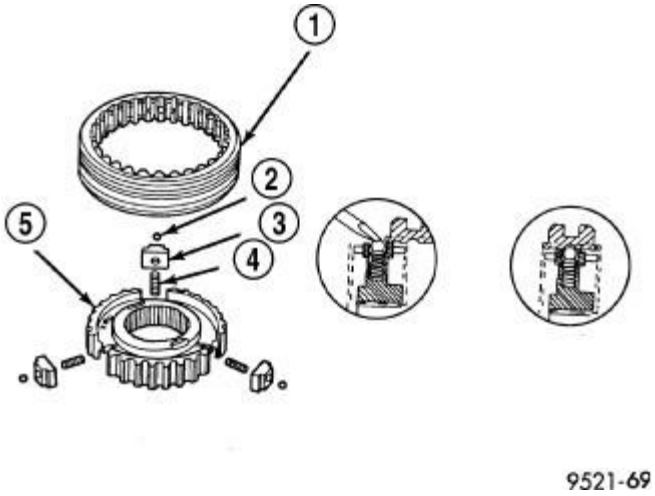


Fig. 251: Synchronizer Assembly
Courtesy of CHRYSLER LLC

1 - SLEEVE
2 - BALL
3 - KEY
4 - SPRING
5 - HUB

1. Position synchronizer hub (5) onto a suitable holding fixture (input shaft). The synchronizer hubs (5) are directional. The hubs must be installed with the **U** facing upward.
2. Install springs (4) into hub slot.

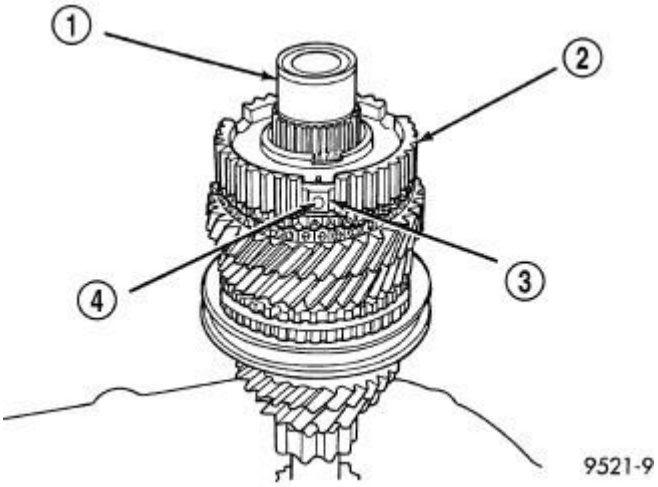


Fig. 252: Inserting Synchronizer Balls Into Keys
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - HUB
3 - KEY
4 - BALL

3. Insert key (3) into hub (2) and spring.
4. Apply petroleum jelly to the hole in the key. Insert balls (4) into each key.

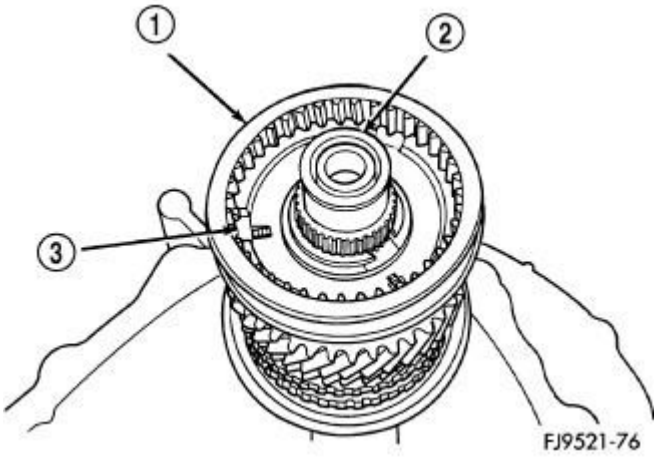


Fig. 253: Identifying Synchronizer Sleeve, Input Shaft, & Key
Courtesy of CHRYSLER LLC

1 - SLEEVE
2 - INPUT SHAFT
3 - KEY

5. Slide sleeve (1) over the hub and depress balls as you carefully slip the sleeve into position .

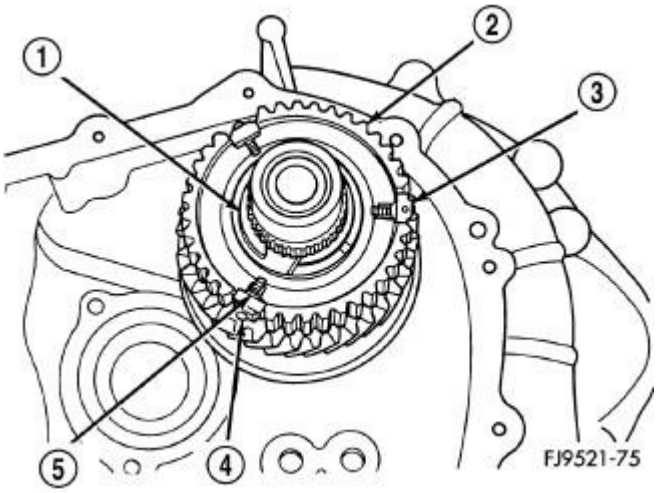


Fig. 254: Centering Synchronizer Keys & Balls By Pushing On Both Stop Rings
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - CLUTCH
3 - KEY
4 - BALL
5 - SPRING

6. Line up stop ring tang over the keys in the hub, install stop rings, center the keys (3) and balls (4) by pushing on both stop rings.

2009 MANUAL TRANSMISSION

T355 - Service Information - Journey

DESCRIPTION

DESCRIPTION

This five speed is a constant-mesh manual transaxle. All gear ranges, except reverse, are synchronized. The reverse gear utilizes a reverse brake for shifting ease. The reverse idler gear is supported on a sliding spindle idler shaft. The transaxle case is aluminum with a steel end-plate bearing cover. It is housed in a die-cast aluminum case featuring a two-piece, middle split design.

The T355 transaxle internal components can be serviced only by separating the gear case from the bellhousing case.

CAUTION: The transaxle output shaft is serviced as a unit. No disassembly and reassembly is possible. Damage to the transaxle may result.

TRANSAXLE IDENTIFICATION

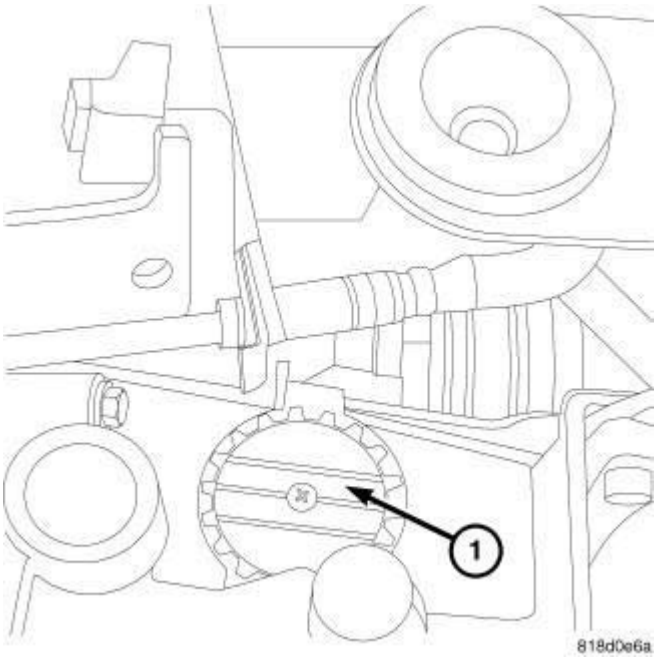


Fig. 1: Locating Transaxle ID Tag
Courtesy of CHRYSLER LLC

The transaxle model, assembly number, and build date are on a metal I.D. tag (1) that is attached to the top of the transaxle.

GEAR RATIOS

GEAR	Ratio
1st	3.77
2nd	2.16
3rd	1.41
4th	1.026
5th	0.81
REVERSE	3.4
FINAL DRIVE RATIO	4.12
REVERSE BRAKE	YES
CLUTCH RELEASE SYSTEM	HYDRAULIC

CAUTION: All gears and shafts must not be interchanged with other transaxles; they will not function correctly.

The differential is a conventional arrangement of gears that is supported by tapered roller bearings. The final output gear turns the ring gear and differential assembly, thereby turning the drive axle shafts.

GEARSHIFT PATTERN

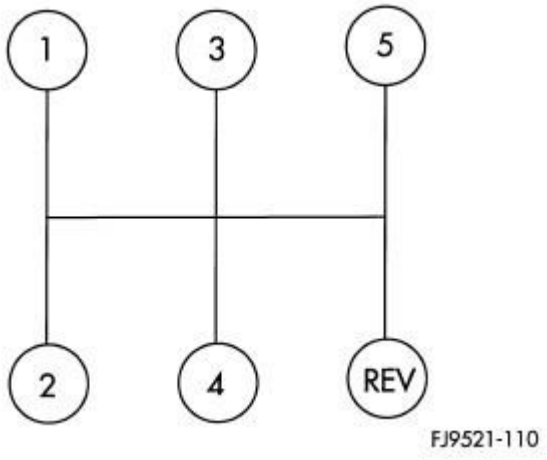


Fig. 2: T355 Transaxle Shift Pattern
Courtesy of CHRYSLER LLC

The T355 transaxle shift pattern is a modified H-pattern. Overdrive fifth and reverse gears are in-line and outboard of the first through fourth gear positions.

DIAGNOSIS AND TESTING

COMMON PROBLEM CAUSES

The majority of transaxle malfunctions are a result of:

- Insufficient lubrication
- Incorrect lubricant
- Misassembled or damaged internal components
- Improper operation

NOISY OPERATION

Transaxle noise is most often a result of worn or damaged components. Chipped, broken gear or synchronizer teeth, and brindled, spalled bearings all cause noise.

Abnormal wear and damage to the internal components is frequently the end result of insufficient lubricant.

LOW LUBRICANT LEVEL

Insufficient transaxle lubricant is usually the result of leaks, or inaccurate fluid level check or refill method. **Vehicle must be level to accurately check fluid level.** Leakage is evident by the presence of oil around the leak point. If leakage is not evident, the condition is probably the result of an underfill.

If air-powered lubrication equipment is used to add fluid to the MPS6 transaxle, be sure the equipment is properly calibrated. Equipment out of calibration can lead to an under fill condition. Refer to**Standard Procedure** for Draining and Filling in this service information .

REMOVAL

REMOVAL

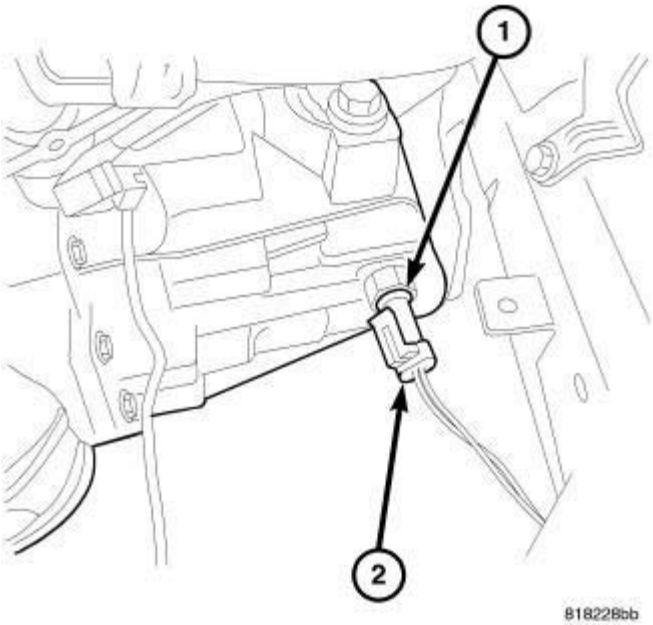


Fig. 3: Removing/Installing Back-Up Lamp Switch Connector

Courtesy of CHRYSLER LLC

1. Raise hood.
2. Remove engine cover.
3. Remove air cleaner assembly.
4. Disconnect negative battery cable.
5. Unplug the speed sensor connector (if equipped).
6. Disconnect back-up lamp switch connector (2).

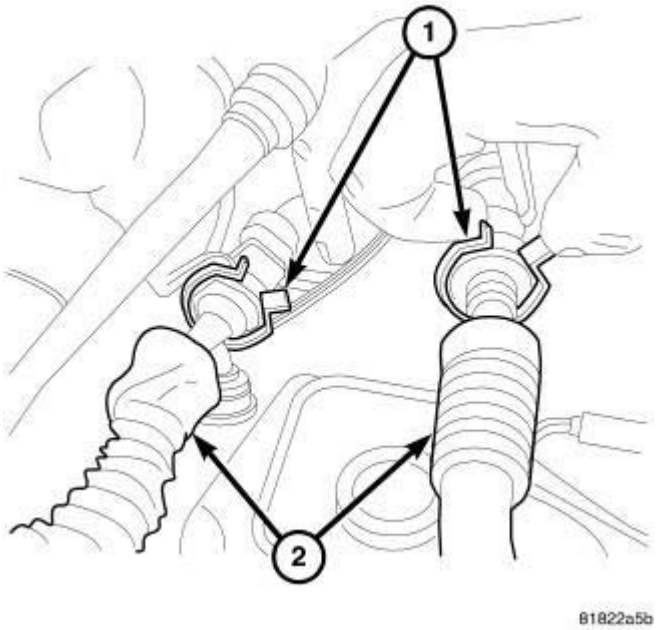


Fig. 4: Removing/Installing Shift Cable-To-Bracket Clips
Courtesy of CHRYSLER LLC

7. Remove shift cable-to-bracket clips (1).

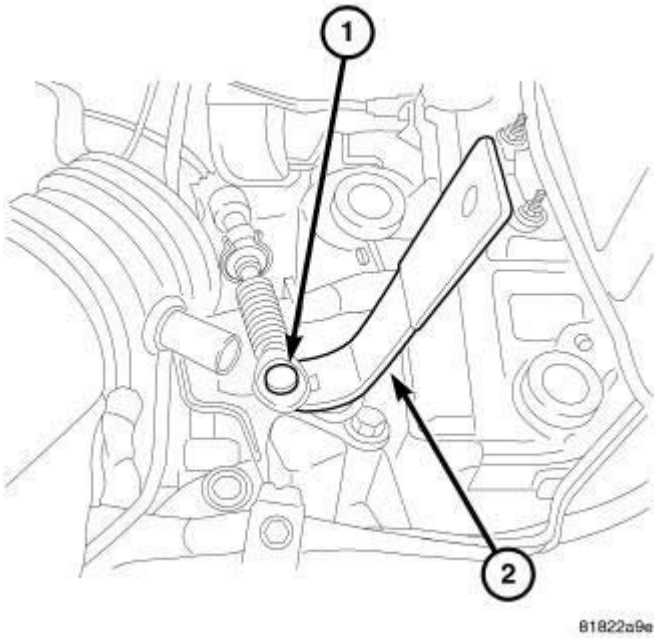


Fig. 5: Shift Selector And Crossover Cable
Courtesy of CHRYSLER LLC

8. Disconnect shift selector and crossover cable (1) from levers. Remove cables and secure out of the way.

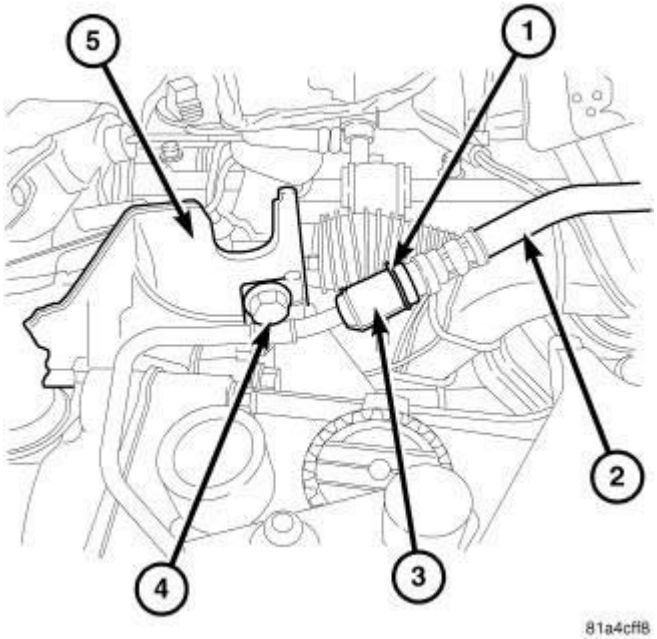


Fig. 6: Removing/Installing Clip At Hydraulic Line
Courtesy of CHRYSLER LLC

9. Remove the slave cylinder hydraulic line bolt (4) at bracket (5).
10. Remove the clip (1) at the hydraulic line and separate (2, 3) the line.

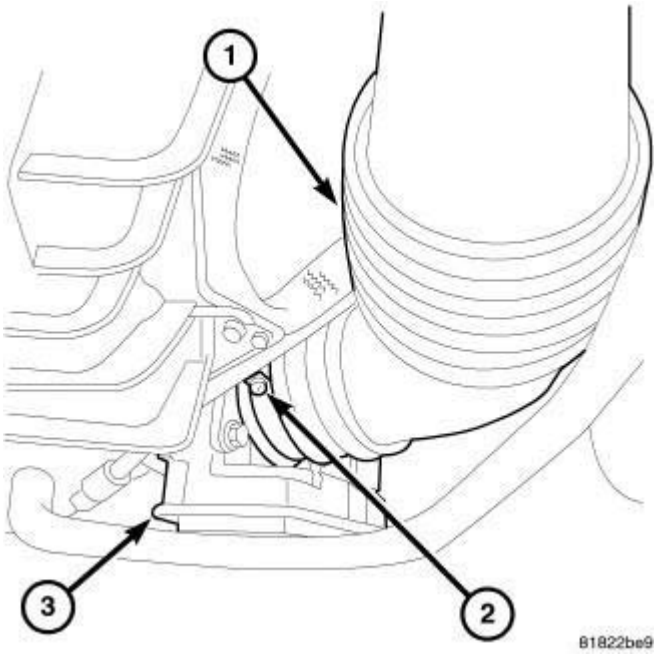


Fig. 7: Removing/Installing Air Inlet Tube At Throttle Body
Courtesy of CHRYSLER LLC

11. Remove the air inlet tube (1) by loosing the screw (2) at the throttle body (3).

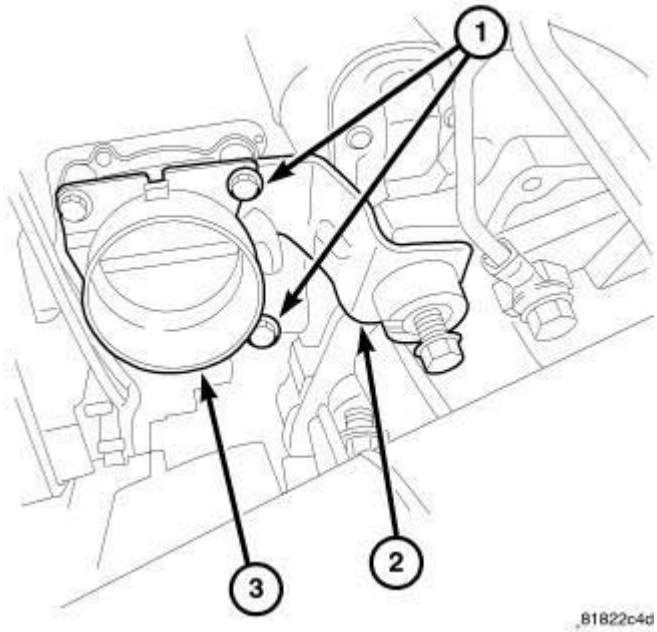


Fig. 8: Removing/Installing Throttle Body Support Bracket
Courtesy of CHRYSLER LLC

12. Remove the throttle body support bracket bolts (1).
13. Remove the throttle body support bracket (2).

14. Remove upper bell housing bolts.
15. Remove the starter bolts and slide the starter back. Refer to **Electrical - Engine Systems/Starting/STARTER - Removal** .

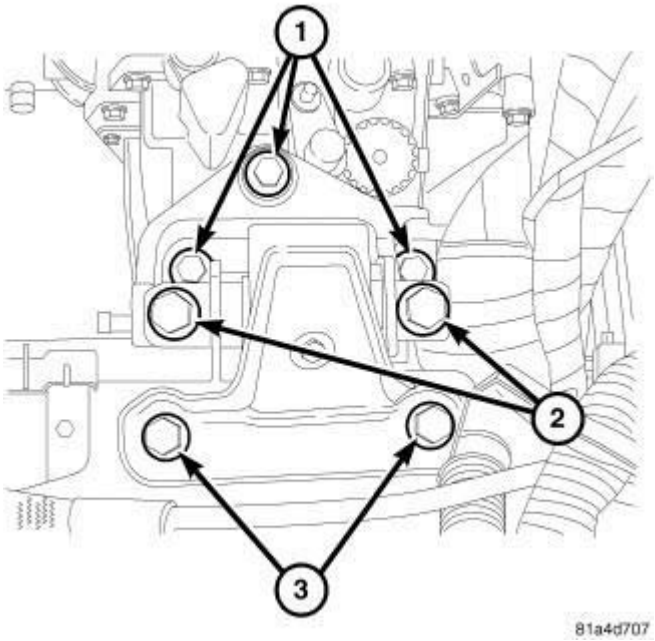


Fig. 9: Left Bracket To Transmission Bolts
Courtesy of CHRYSLER LLC

16. Remove the upper transmission mount-to-bracket bolts (1).
17. Raise vehicle on hoist.
18. Remove the splash shields. Refer to **Body/Exterior/SHIELD, Splash - Removal** .

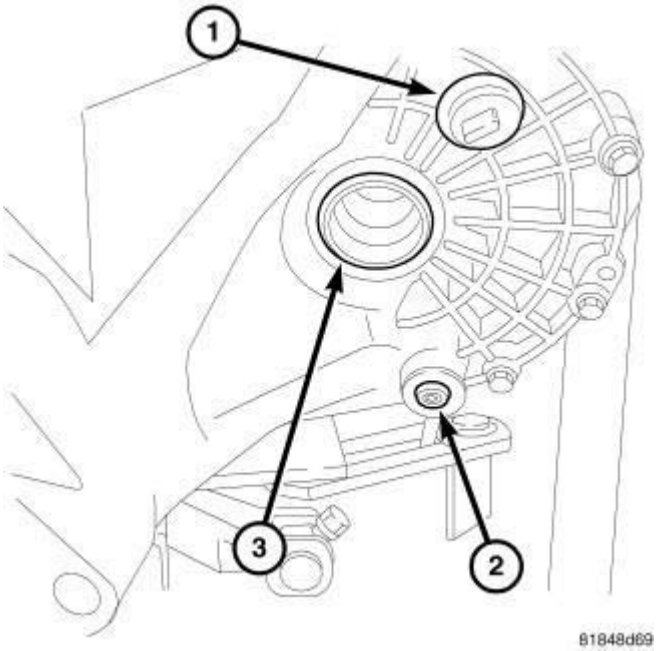


Fig. 10: Removing/Installing Transaxle Oil Drain Plug
Courtesy of CHRYSLER LLC

19. Remove transaxle oil drain plug (2) and drain oil into a suitable container. Reinstall drain plug and tighten to 14 N.m (120 in. lbs.).
20. Remove both halfshafts. Refer to **Differential and Driveline/Half Shaft - Removal** .

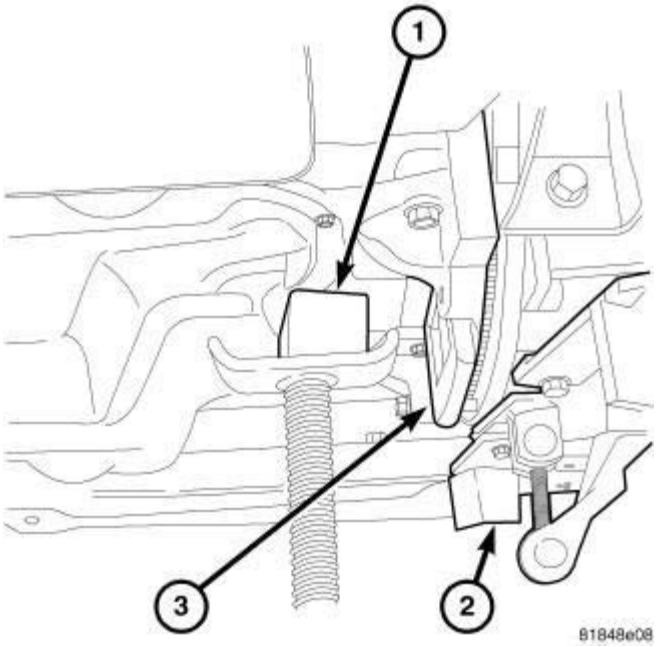


Fig. 11: Removing/Installing Bell Housing Dust Cover
Courtesy of CHRYSLER LLC

21. Support the engine with a screw jack (1).
22. Remove bell housing dust cover (3).

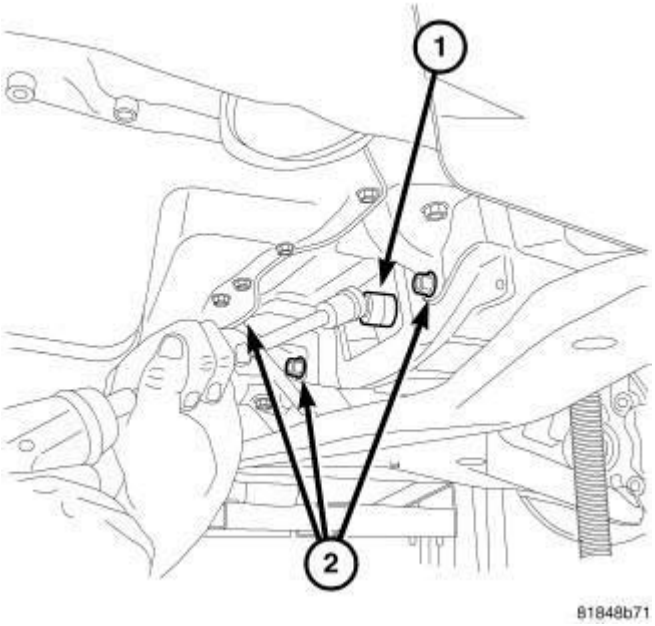


Fig. 12: Removing/Installing Modular Clutch-To-Drive Plate Bolts
Courtesy of CHRYSLER LLC

23. Remove four modular clutch-to-drive plate bolts (1). While removing bolts, one tight-tolerance (slotted) drive plate hole will be encountered. When this bolt is removed, mark drive plate and modular clutch assembly at this location, and be sure to align marks upon reassembly.
24. Remove the transmission crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

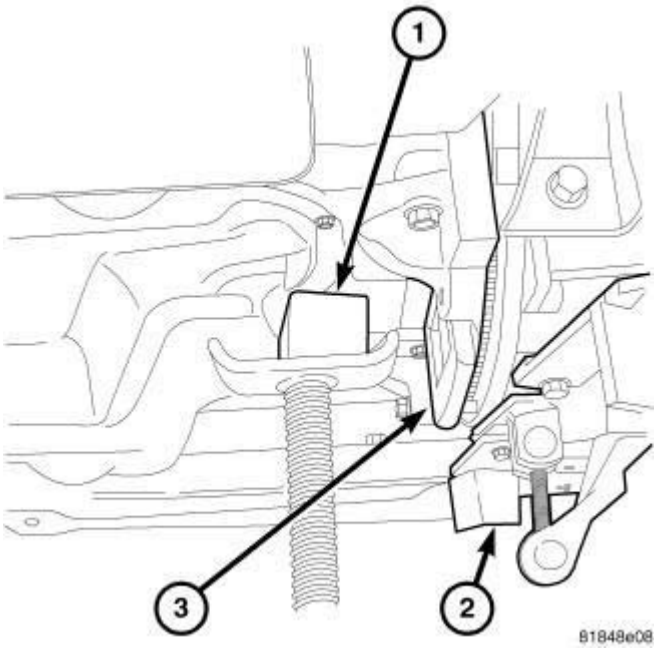


Fig. 13: Removing/Installing Bell Housing Dust Cover
Courtesy of CHRYSLER LLC

25. Install a transmission jack (2).

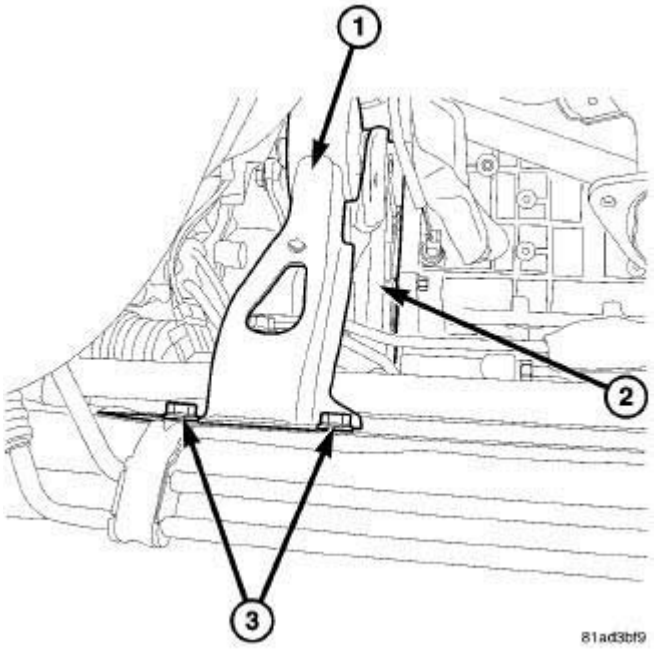


Fig. 14: Removing/Installing Rear Transmission Mount Bracket
Courtesy of CHRYSLER LLC

26. Remove the rear transmission through bolt.

27. Remove the rear transmission mount bolts (3) and mount (1) from the frame.
28. Remove the rear transmission mount bracket bolts and bracket from transmission.

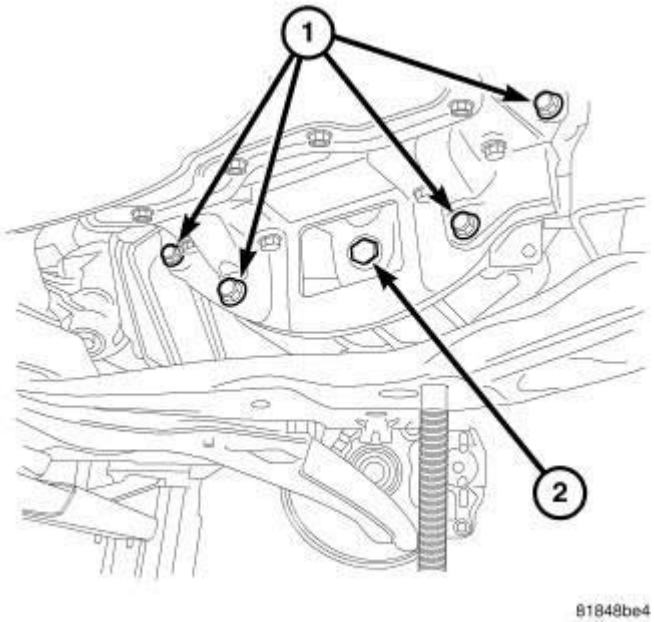


Fig. 15: Transmission Bell Housing Bolts
Courtesy of CHRYSLER LLC

29. Remove the remaining transmission bell housing bolts (1).
30. Carefully lower engine and transaxle on screw jack and transmission jack until proper removal clearance is obtained.
31. Obtain a helper to assist in holding transaxle while removing transaxle-to-engine mounting bolts.
32. Remove transaxle from vehicle.

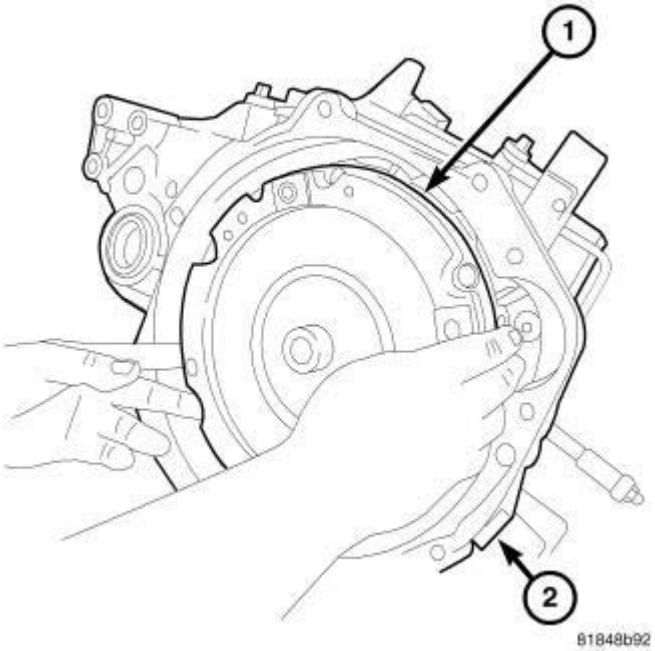


Fig. 16: Modular Clutch Assembly
Courtesy of CHRYSLER LLC

33. Remove clutch module from transaxle input shaft (1).
34. Remove front mount bracket and hydraulics from transaxle.

DISASSEMBLY

DISASSEMBLY

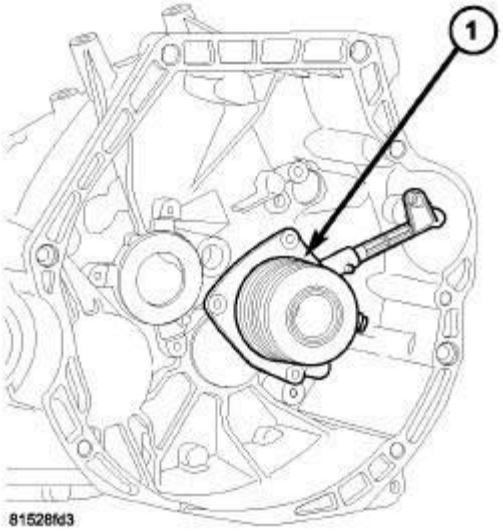


Fig. 17: Removing/Installing Slave Cylinder

Courtesy of CHRYSLER LLC

1. Remove bolts from slave cylinder-to-clutch bellhousing and remove slave cylinder (1) from transaxle.

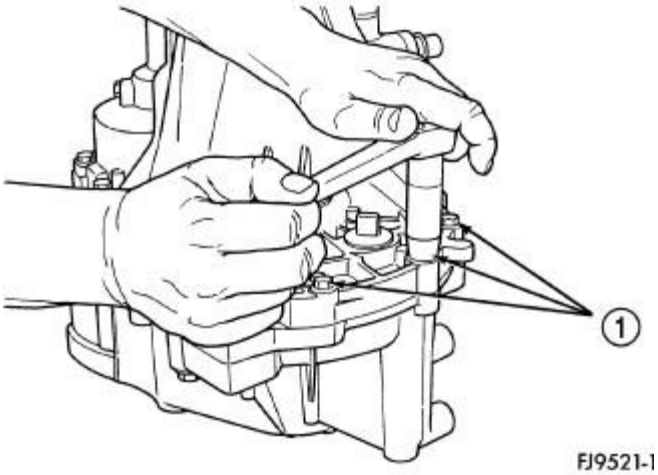


Fig. 18: Removing/Installing Transaxle Case Half Bolts
Courtesy of CHRYSLER LLC

1 - CASE BOLTS

CAUTION: The transaxle output shaft is serviced as a unit. No disassembly and reassembly is possible. Damage to the transaxle may result.

The T355 transaxle internal components can be serviced only by separating the gear case from the bellhousing case.

2. Place transaxle on bench.
3. Remove transaxle case half bolts (1).

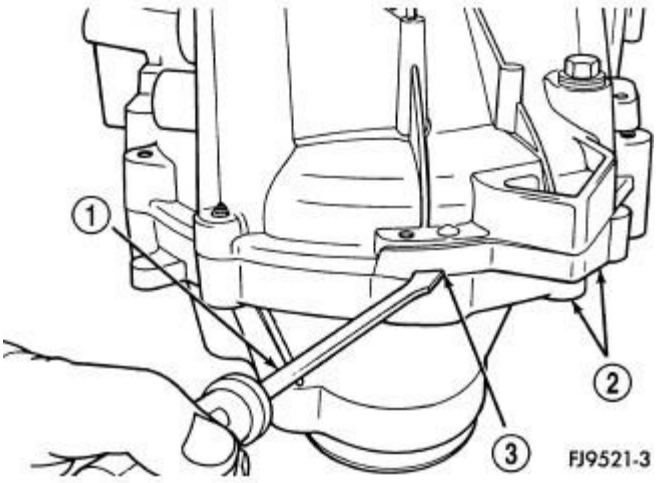


Fig. 19: Separate Case Halves
Courtesy of CHRYSLER LLC

1 - PRY TOOL
2 - CASE HALVES
3 - PRY SLOT

4. Place two screwdrivers (1) into the slots (3) provided in the case halves (2) near the dowels. Separate the case halves.

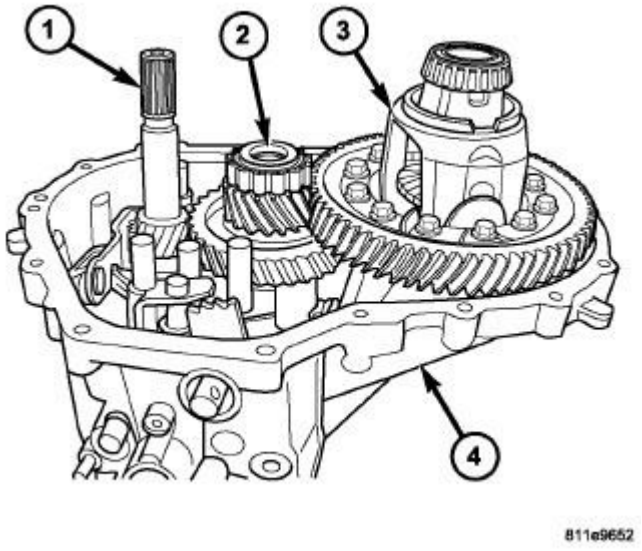


Fig. 20: Bellhousing Case Half Removed
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - OUTPUT SHAFT
3 - DIFFERENTIAL ASSEMBLY
4 - GEARTRAIN HOUSING

5. Remove bellhousing half from gear case half (4) .

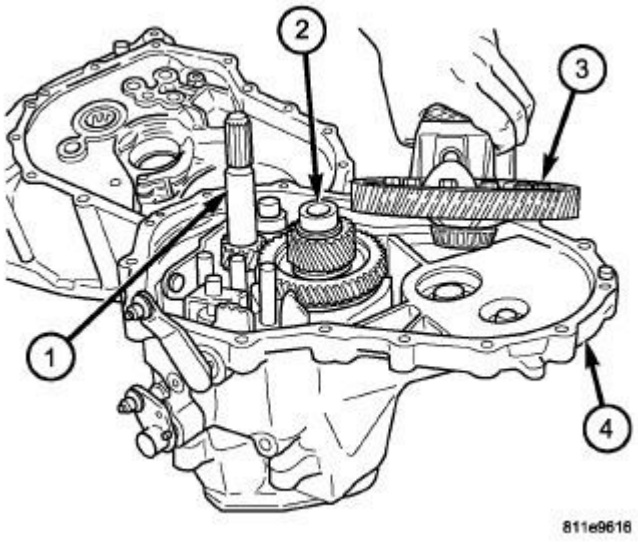


Fig. 21: Removing/Installing Differential Assembly
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - OUTPUT SHAFT
3 - DIFFERENTIAL ASSEMBLY
4 - GEARTRAIN HOUSING

6. Remove differential assembly (3) from housing (4) .

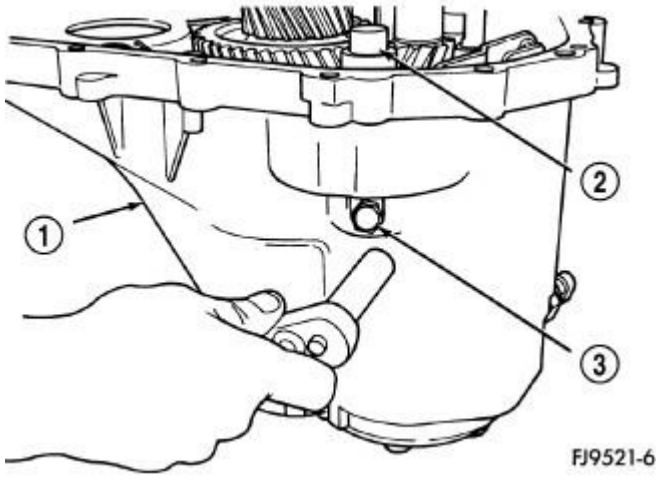


Fig. 22: Reverse Idler Shaft Bolt
Courtesy of CHRYSLER LLC

1 - CASE
2 - REVERSE IDLER SHAFT

3 - REVERSE IDLER SHAFT BOLT

7. Remove reverse idler shaft bolt (3).

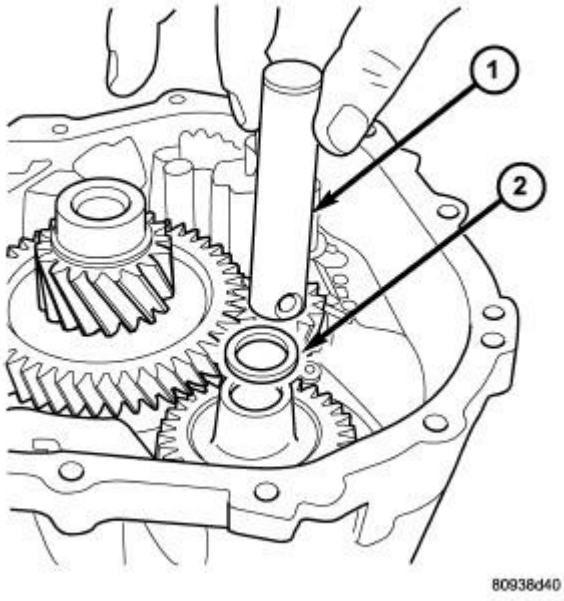


Fig. 23: Reverse Idler Shaft Removal/Installation
Courtesy of CHRYSLER LLC

1 - REVERSE IDLER SHAFT
2 - SPACER

8. Remove reverse idler shaft (1) .

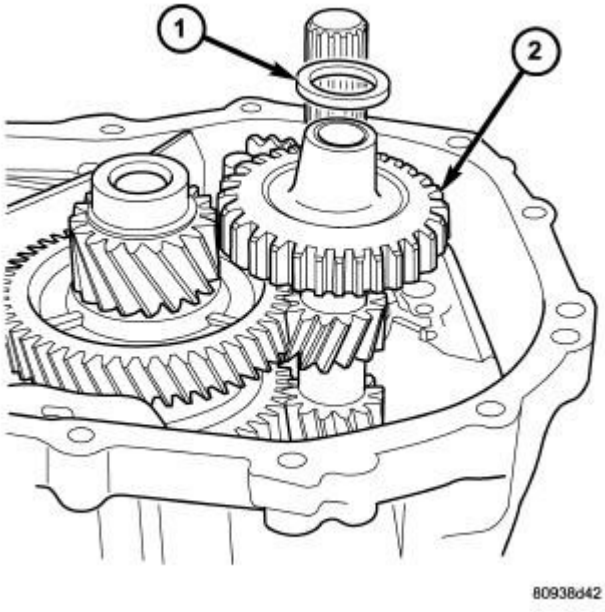


Fig. 24: Reverse Idler Gear and Spacer
Courtesy of CHRYSLER LLC

1 - SPACER
2 - REVERSE IDLER GEAR

9. Remove reverse idler gear (2) and spacer (1).

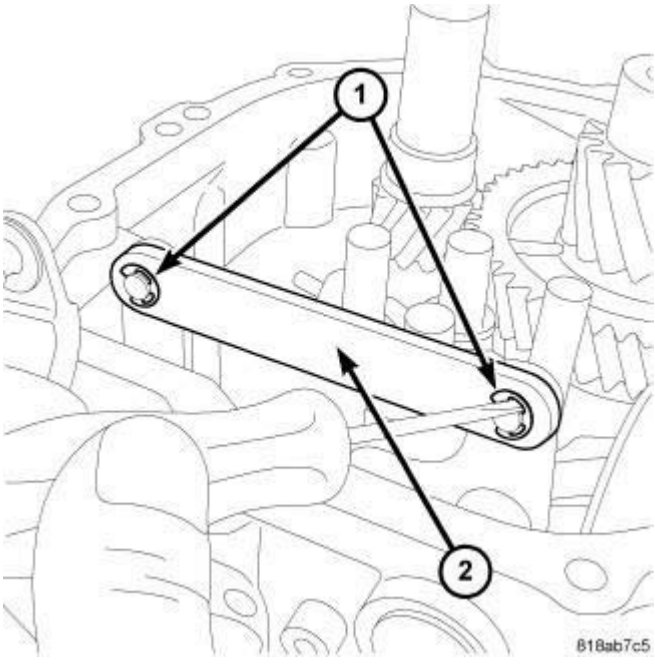


Fig. 25: Clips At Linkage Tie Bar
Courtesy of CHRYSLER LLC

10. Remove the clips (1) at the linkage tie bar (2).

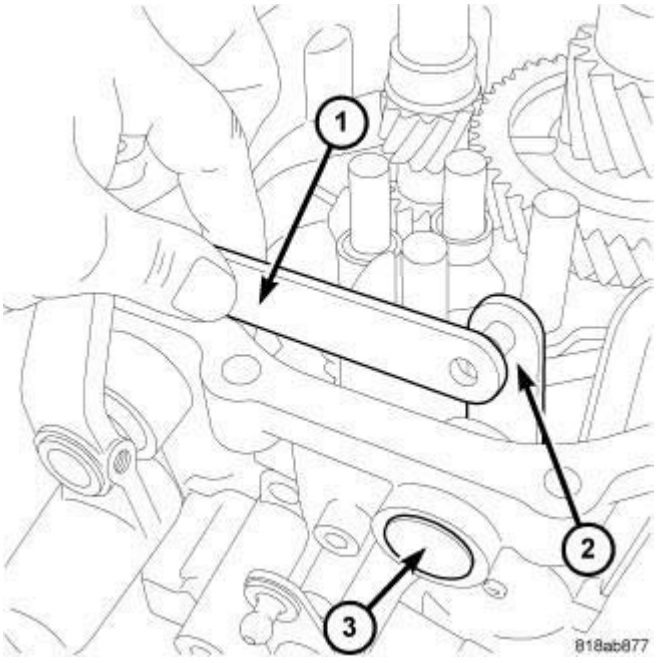


Fig. 26: Removing/Installing Plug & Linkage Tie Bar
Courtesy of CHRYSLER LLC

11. Remove the linkage tie bar (1).
12. Remove the plug (3) at the selector shaft (2).

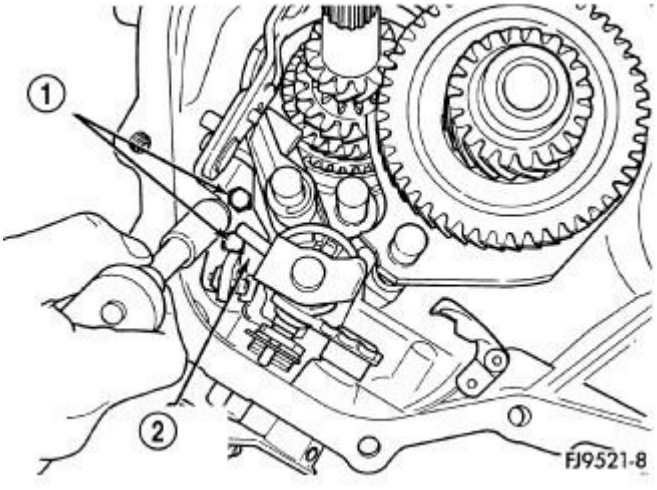


Fig. 27: Screws Retaining Reverse Fork Bracket
Courtesy of CHRYSLER LLC

1 - SCREWS (2)
2 - REVERSE FORK BRACKET

13. Remove two screws (1) retaining reverse fork bracket (2).

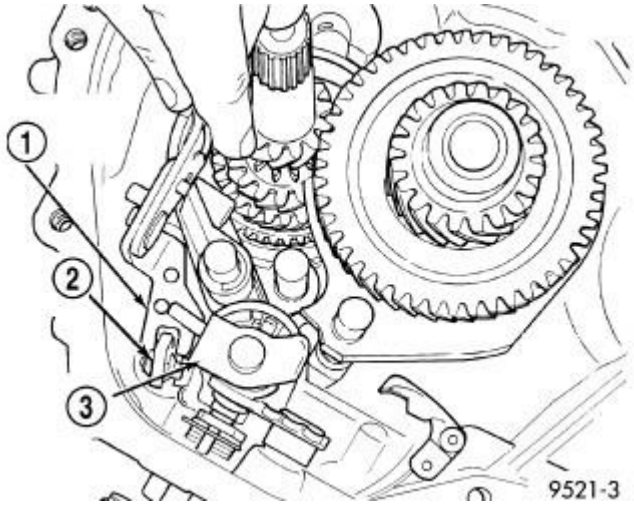


Fig. 28: Removing/Installing Reverse Fork Bracket
Courtesy of CHRYSLER LLC

1 - REVERSE FORK BRACKET
2 - REVERSE CAM BLOCKOUT
3 - SHIFT BLOCKER ASSEMBLY

14. Remove reverse fork bracket (1) and reverse cam block-out assembly (2).

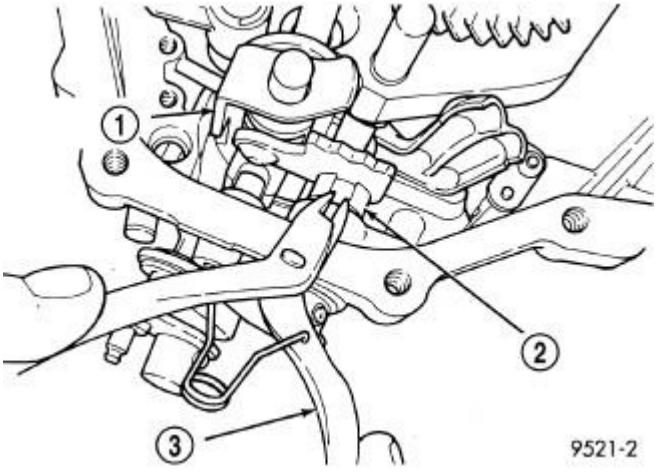


Fig. 29: Remove Selector Shaft Spacer
Courtesy of CHRYSLER LLC

1 - SHIFT BLOCKER ASSEMBLY
2 - SELECTOR SHAFT SPACER (PLASTIC)
3 - SNAP RING PLIERS

15. Using snap-ring pliers (3) , remove link shaft spacer (2).

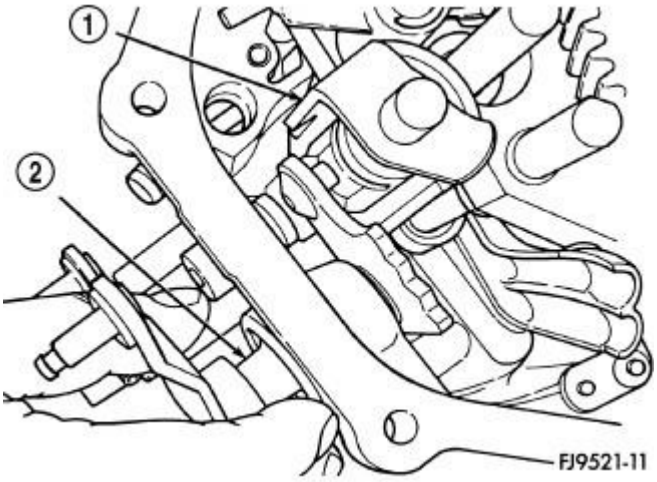


Fig. 30: Selector Shaft
Courtesy of CHRYSLER LLC

1 - SHIFT ASSEMBLY
2 - SELECTOR SHAFT

16. Pull the link shaft shift pin out of the slot in the blocker assembly. Turn selector shaft (2) up and out of the way.

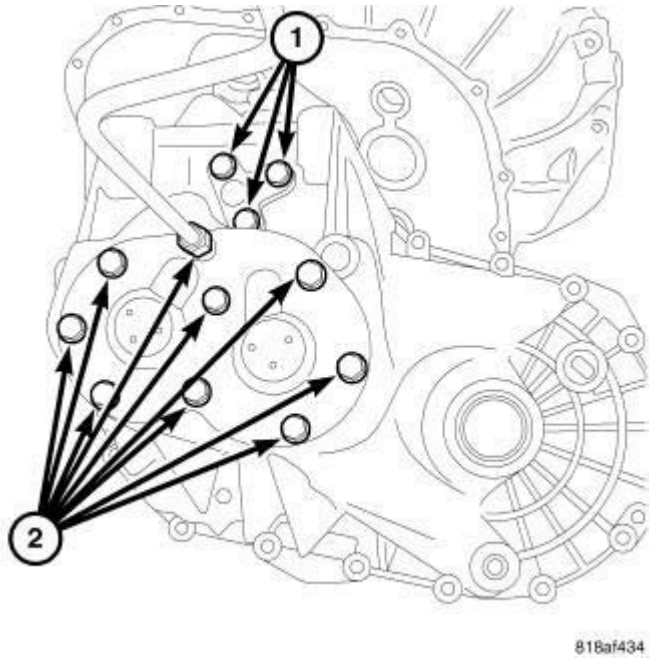


Fig. 31: Removing/Installing Transaxle End Cover Bolts & Rear Detent Assembly Bolts
Courtesy of CHRYSLER LLC

17. Remove transaxle end cover (2) and rear detent assembly bolts (1).

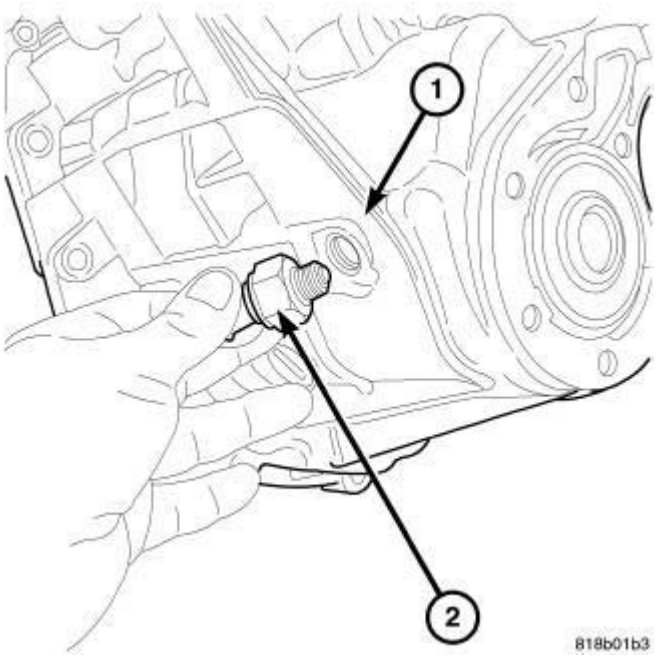


Fig. 32: Removing/Installing Backup Lamp Switch
Courtesy of CHRYSLER LLC

18. Remove the backup lamp switch (2).

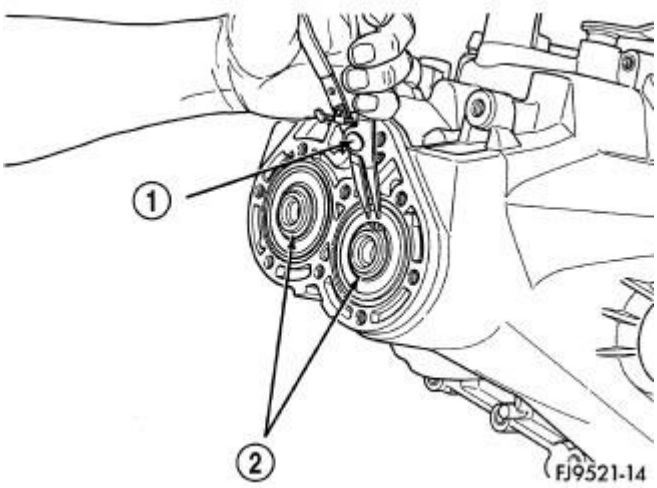


Fig. 33: Snap Rings Retaining Bearings
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS
2 - SNAP RINGS

19. Remove two snap rings (2) retaining the output shaft and the input shaft to the bearings.

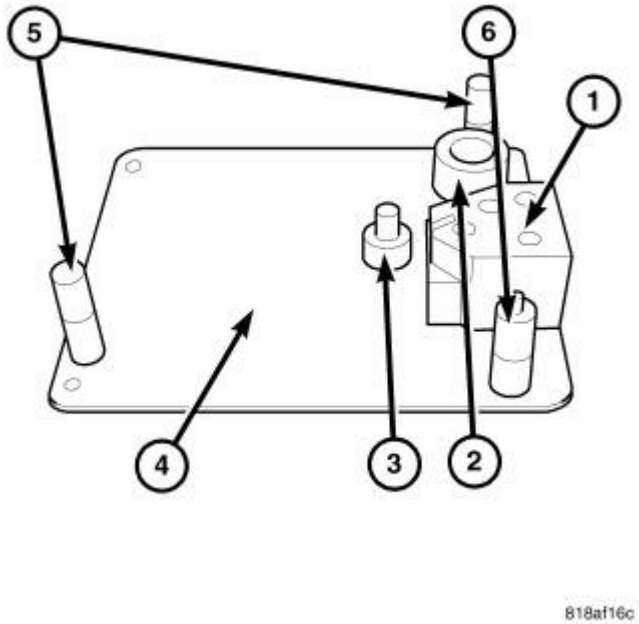


Fig. 34: Bench Fixture 6785 & Adaptors
Courtesy of CHRYSLER LLC

20. The Bench Fixture 6785 (4) and adaptors 9761-1 (1), 9761-2 (3), 9761-3 (2), 9761-6 (5) and 9761-7 (6) will be used to remove input and output shafts from the case.

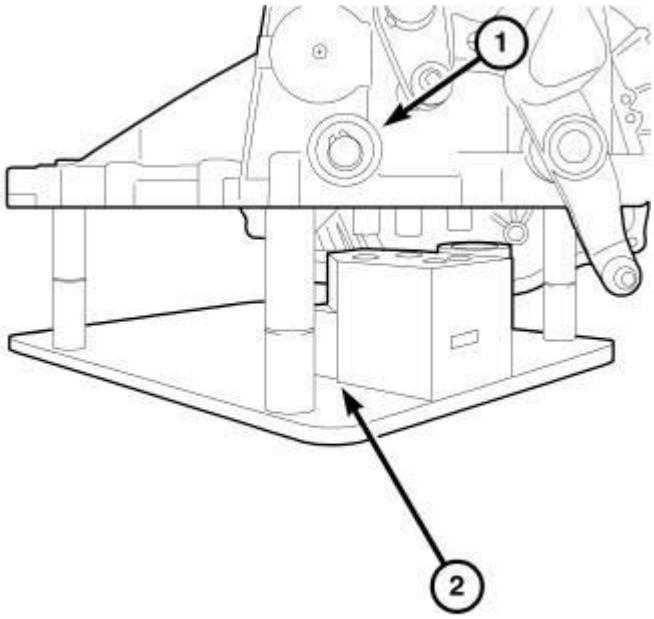


Fig. 35: Removing/Installing Transaxle At Bench Fixture 6785
Courtesy of CHRYSLER LLC

21. Turn transaxle over. Install transaxle (1) onto Bench Fixture 6785 (2). Verify shim spacers and adaptors are in position on Bench Fixture 6785. Install transaxle into shop press.

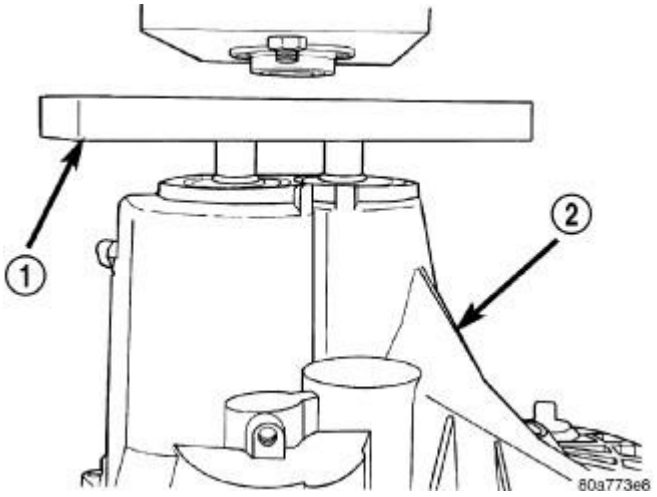


Fig. 36: Removing/Installing Bearing Remover 6768 At Transaxle End Bearings
Courtesy of CHRYSLER LLC

1 - BEARING FIXTURE
2 - TRANSAXLE CASE

22. Install Bearing Remover 6768 (1) onto transaxle end bearings. Verify tool is properly aligned to input and output shafts.

CAUTION: The oil dams in the input and output shafts can be damaged while pressing on the shafts if the bearing fixture is not used properly.

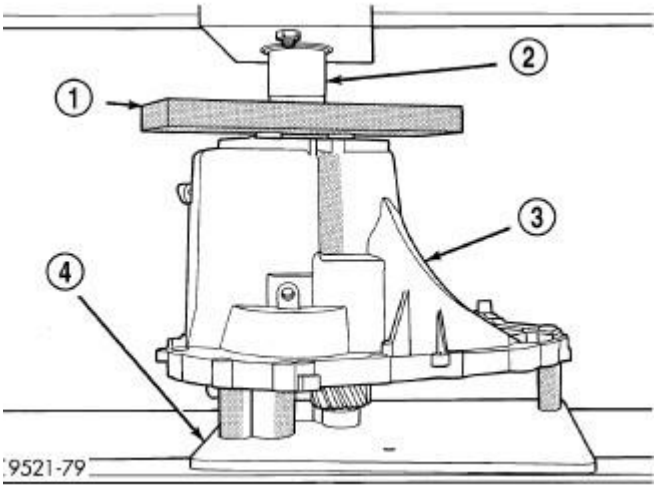


Fig. 37: Pressing Input & Output Shaft Assemblies Out Of Case
Courtesy of CHRYSLER LLC

1 - BEARING FIXTURE
2 - PRESS RAM
3 - TRANSAXLE CASE
4 - BENCH FIXTURE

23. Install transaxle gear case (3) into shop press. Press (2) output and input shaft assemblies out of case.
24. Remove transaxle from press.

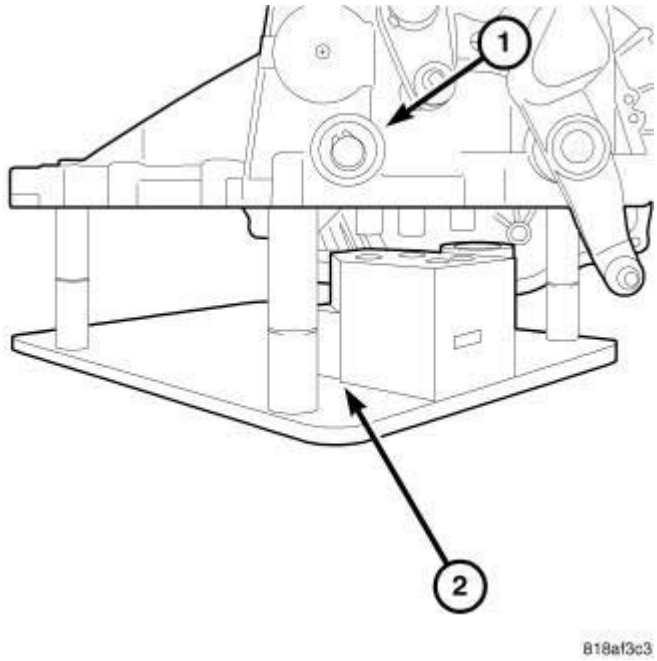


Fig. 38: Removing/Installing Transaxle At Bench Fixture 6785
Courtesy of CHRYSLER LLC

25. Carefully remove transaxle case (1) from the shaft assemblies and Bench Fixture 6785 (2).

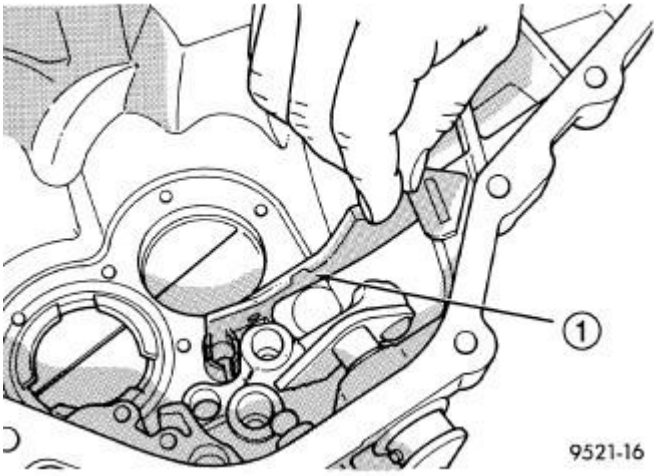


Fig. 39: Oil Feed Trough
Courtesy of CHRYSLER LLC

1 - OIL FEED TROUGH

26. Be sure the oil-feed trough (1) to the end bearings is not damaged.

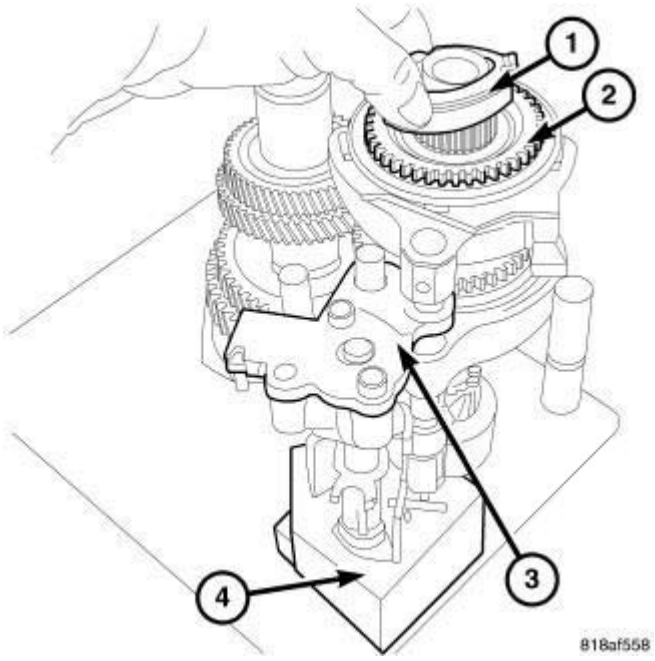


Fig. 40: Removing/Installing Reverse Brake Friction Cone & Blocking Ring At Input Shaft Assembly
Courtesy of CHRYSLER LLC

27. Remove the reverse brake friction cone (1) from the input shaft assembly.
28. Remove the blocking ring (2) from the input shaft assembly.

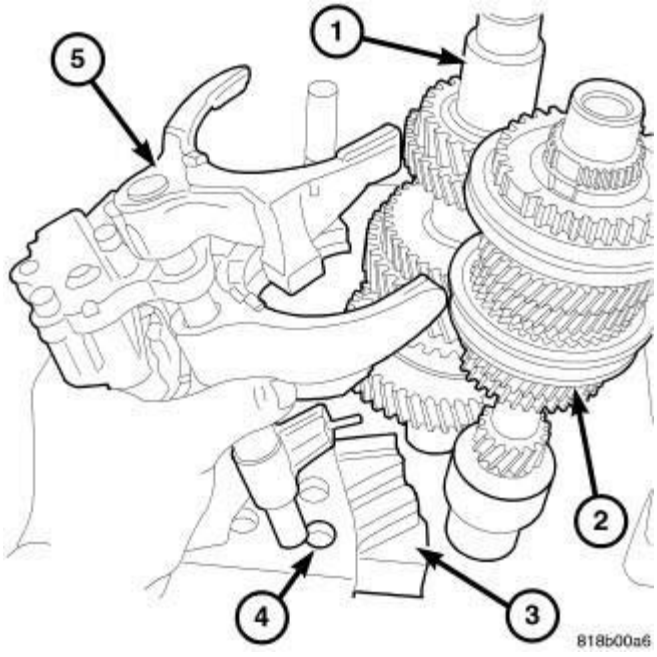


Fig. 41: Shift Blocker Assembly And Reverse Shift Fork
Courtesy of CHRYSLER LLC

29. Remove the shift blocker assembly, the reverse shift fork (5) and the detent assembly from the bench fixture (4).
30. Remove input (2) and output shaft (1) assemblies from Bench Fixture 6785.

CAUTION: The output shaft assembly is serviced as an assembly. Do not try to repair any component on the output shaft. If the 1-2 synchronizer or gear fails, it is necessary to replace the complete output shaft assembly.

CLEANING

CLEANING

Clean the gears, bearings, shafts, synchronizers, thrust washers, oil feeder, shift mechanism, gear case, and bellhousing. Do not use solvent to clean sealed bearings. Dry all parts except the bearings with compressed air. Allow the bearings to either air dry or wipe them dry with clean shop towels.

INSPECTION

INSPECTION

Inspect the gears, bearings and shafts. Replace the bearings and cups if the rollers are worn, chipped, cracked, flat spotted, brindled, or if the bearing cage is damaged or distorted. Replace the gears if the teeth are chipped, cracked or worn thin. Inspect the synchronizers. Replace the sleeve if worn or damaged in any way. Replace the stop rings if the friction material is burned, flaking off, or worn. Check the condition of the synchro keys and springs. Replace these parts if worn, cracked, or distorted.

ASSEMBLY

ASSEMBLY

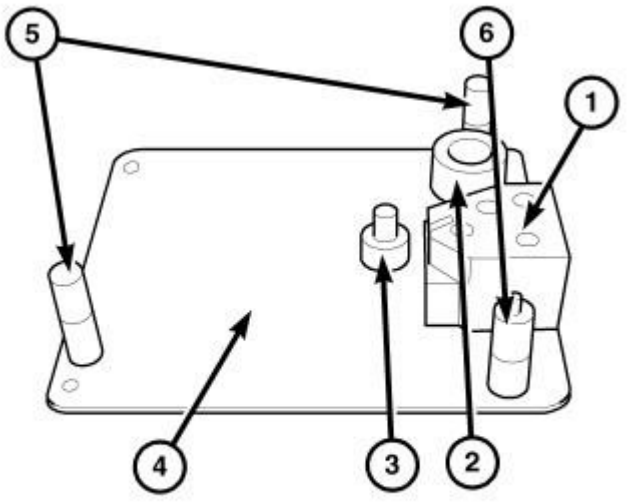


Fig. 42: Bench Fixture 6785 & Adaptors
Courtesy of CHRYSLER LLC

The T355 transaxle internal components can be serviced only by separating the gear case from the bellhousing case.

CAUTION: The transaxle output shaft is serviced as a unit. No disassembly and reassembly is possible. Damage to the transaxle may result.

The sealant used to seal the transaxle case halves is MOPAR® Gasket Maker, Loctite® 518, or equivalent. The sealant used for the bearing end plate cover is MOPAR® RTV.

NOTE: Some of the assembly adaptors are different part numbers form the disassembly adaptors.

1. Load bench fixture (4) with adaptors 9761-1 (1), 9761-2 (3), 9761-3 (2), 9761-4 (5) and 9761-5 (6).

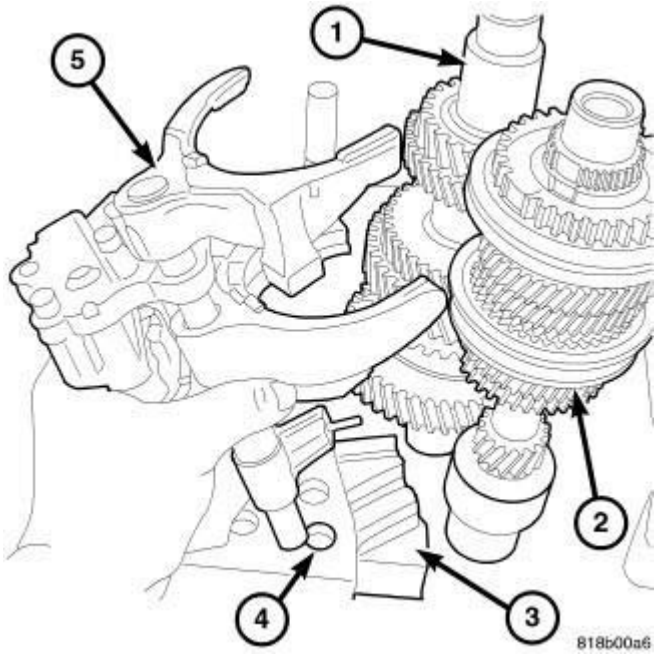


Fig. 43: Shift Blocker Assembly And Reverse Shift Fork
Courtesy of CHRYSLER LLC

2. Install the output (1) and input (2) shafts onto bench fixture 6785.
3. Install shift blocker assemblies, fork assemblies and detent assemblies all as one.

NOTE: Adaptor 9761-1 will slide shift blocker assembly and all the shift fork into the input and output shafts.

4. Align all shift forks and slide into place.

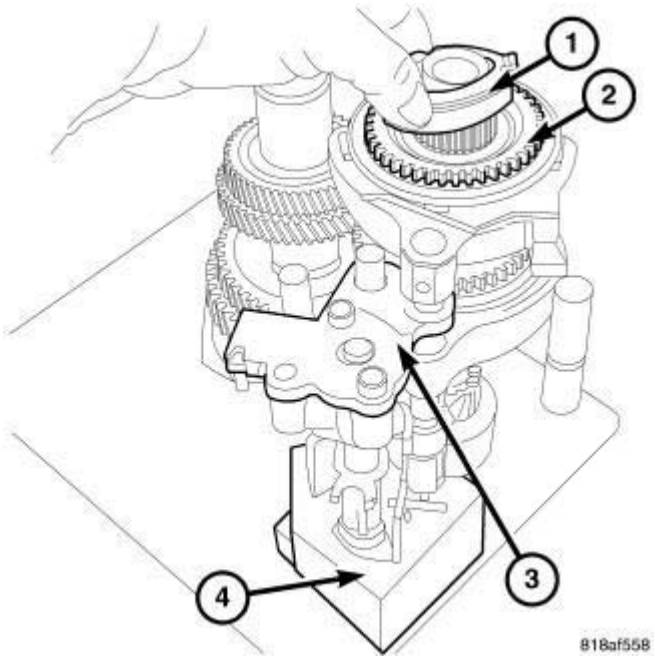


Fig. 44: Removing/Installing Reverse Brake Friction Cone & Blocking Ring At Input Shaft Assembly
Courtesy of CHRYSLER LLC

5. Install reverse brake blocking ring (2).
6. Install reverse brake friction cone (1).

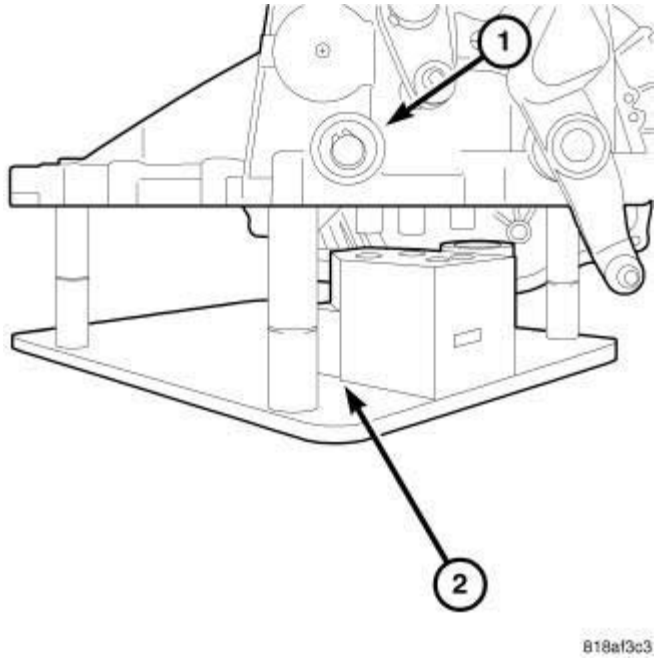


Fig. 45: Removing/Installing Transaxle At Bench Fixture 6785
Courtesy of CHRYSLER LLC

NOTE: One detent assembly bolt may need to be installed to align assembly.

NOTE: Insure that the select link is installed properly also insure that the blocker assembly catches the crossover ball stud (this can be checked by using a mirror).

7. Install gear case half (1) over bench fixture (2). Line up shift finger over 3-4 lug.
8. Line up reverse brake friction cone lugs to the slots in the gear case. Verify reverse brake shim is in position.

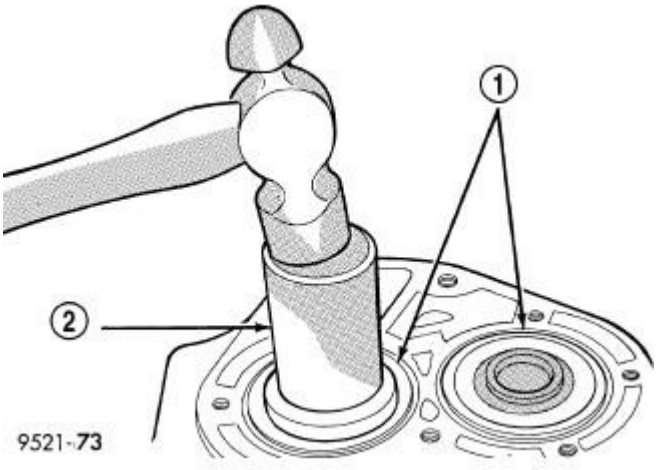


Fig. 46: Installing Input and Output Bearings
Courtesy of CHRYSLER LLC

1 - INPUT AND OUTPUT BEARINGS
2 - SEAL INSTALLER 4992-1

9. Position input and output bearings (1) on the shafts. Using Seal Installer C-4992-1 (2), install input and output shaft bearings (1) until they bottom into the case and against the shafts.

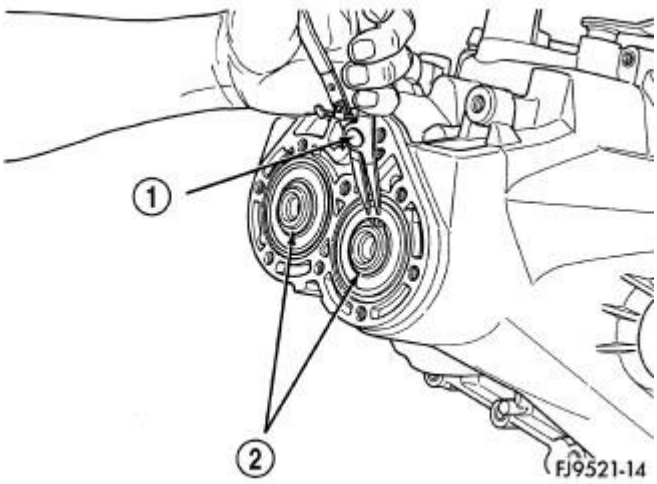


Fig. 47: Snap Rings Retaining Bearings
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS
2 - SNAP RINGS

10. Install **new** snap rings (2) at input and output bearings.

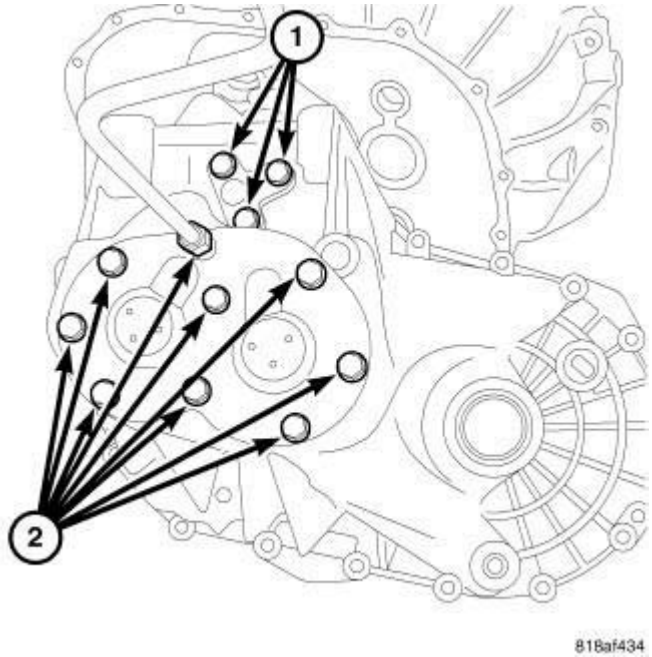


Fig. 48: Removing/Installing Transaxle End Cover Bolts & Rear Detent Assembly Bolts
Courtesy of CHRYSLER LLC

11. Apply MOPAR® RTV sealant to end cover outer edge and around bolt holes. Install end cover onto gear case. Tighten end cover bolts to 25 N.m (225 in. lbs.).

NOTE: Install new O-rings on shift blocker assembly bolts.

12. Install the three detent assembly bolts (1) and tighten to 25 N.m (225 in. lbs.).

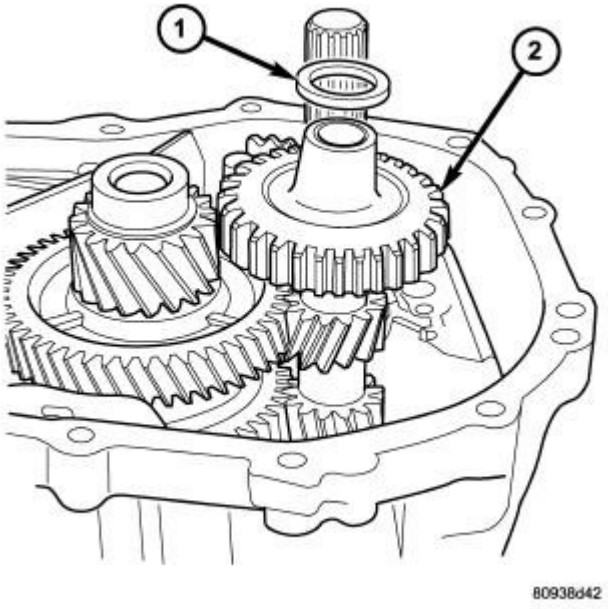


Fig. 49: Reverse Idler Gear and Spacer
Courtesy of CHRYSLER LLC

1 - SPACER
2 - REVERSE IDLER GEAR

13. Remove gear case from bench fixture.
14. Install gear case in a holding fixture with end cover facing down.
15. Turn selector link into slot on blocker assembly.
16. Push selector link spacer clip onto selector shaft.
17. Install reverse idler gear (2) and spacer (1).

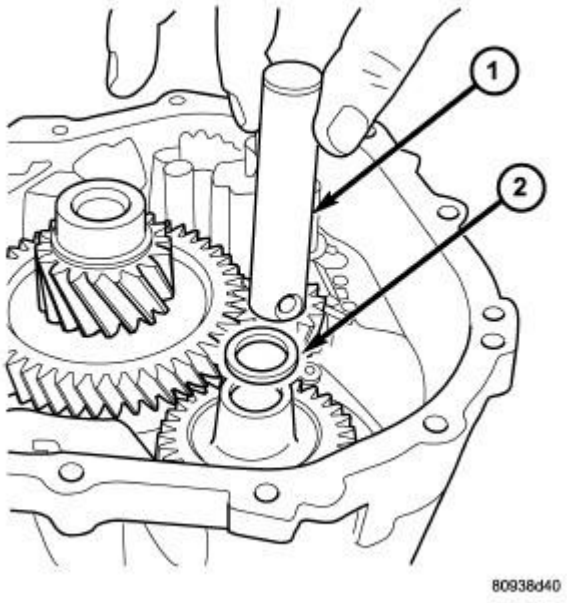


Fig. 50: Reverse Idler Shaft Removal/Installation
Courtesy of CHRYSLER LLC

1 - REVERSE IDLER SHAFT
2 - SPACER

18. Install reverse idler shaft (1) .

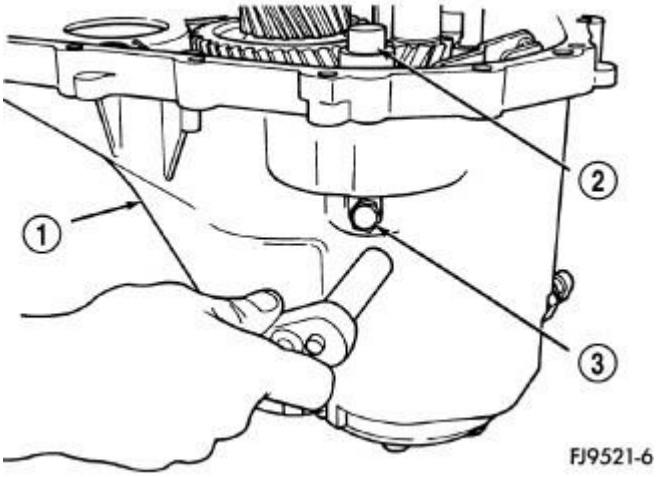


Fig. 51: Reverse Idler Shaft Bolt
Courtesy of CHRYSLER LLC

1 - CASE

2 - REVERSE IDLER SHAFT
3 - REVERSE IDLER SHAFT BOLT

19. Install bolt into reverse idler shaft (2) and tighten to 26 N.m (19 ft. lbs.).

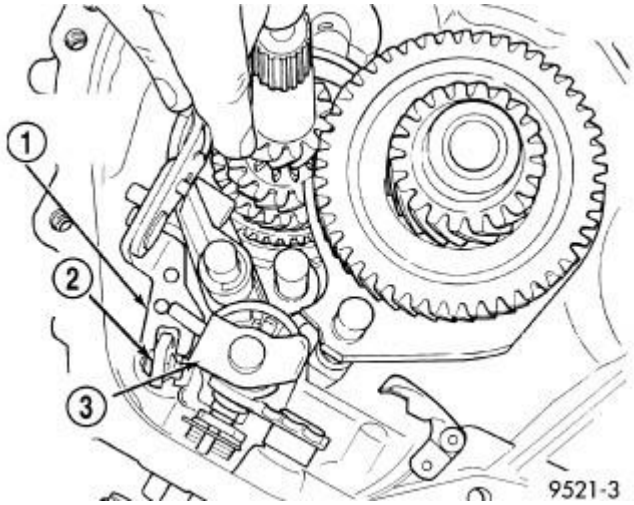


Fig. 52: Removing/Installing Reverse Fork Bracket
Courtesy of CHRYSLER LLC

1 - REVERSE FORK BRACKET
2 - REVERSE CAM BLOCKOUT
3 - SHIFT BLOCKER ASSEMBLY

20. Install fifth and reverse blocker (2).
21. Insure reverse shift linkage is properly aligned in the reverse fork.
22. Install reverse fork bracket (1).

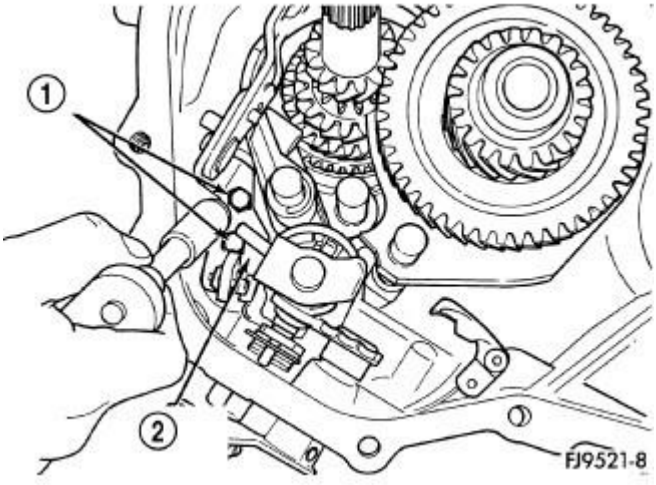


Fig. 53: Reverse Fork Screws

Courtesy of CHRYSLER LLC

1 - SCREWS (2)
2 - REVERSE FORK BRACKET

23. Tighten reverse fork bracket (1) screws to 11 N.m (96 in. lbs.).

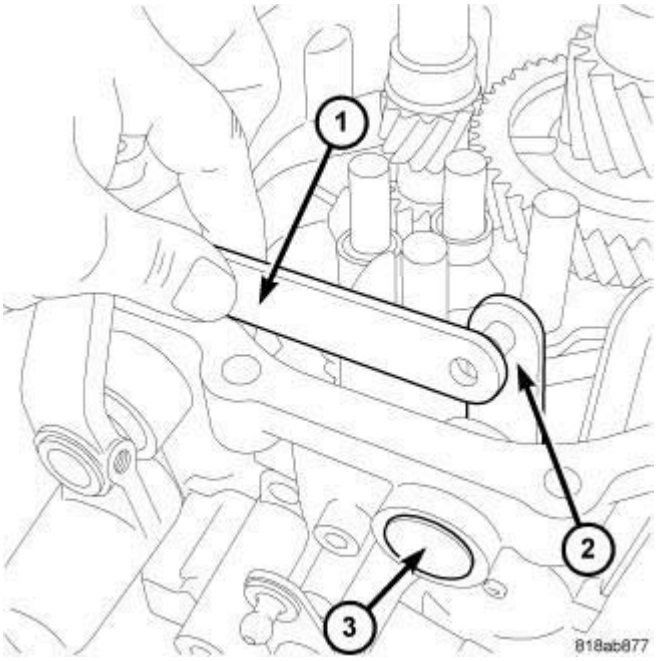


Fig. 54: Removing/Installing Plug & Linkage Tie Bar
Courtesy of CHRYSLER LLC

24. Install the linkage tie bar (1).

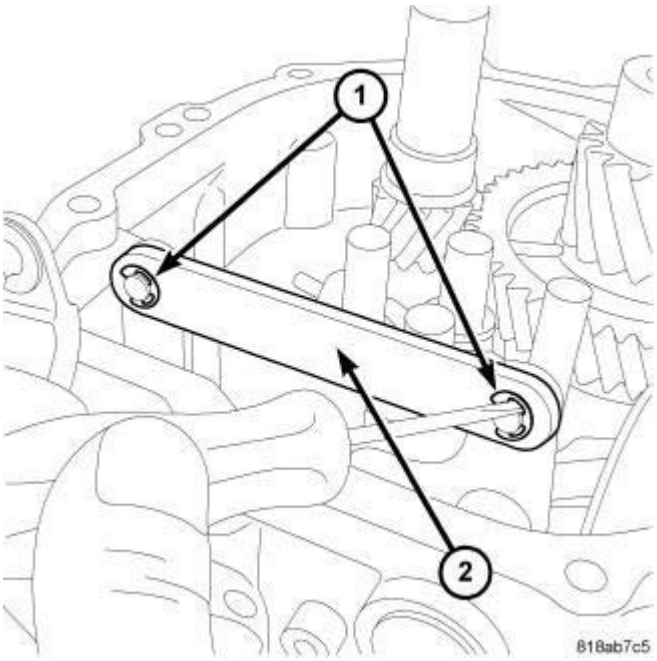


Fig. 55: Clips At Linkage Tie Bar
Courtesy of CHRYSLER LLC

25. Install the linkage tie bar clips (1).

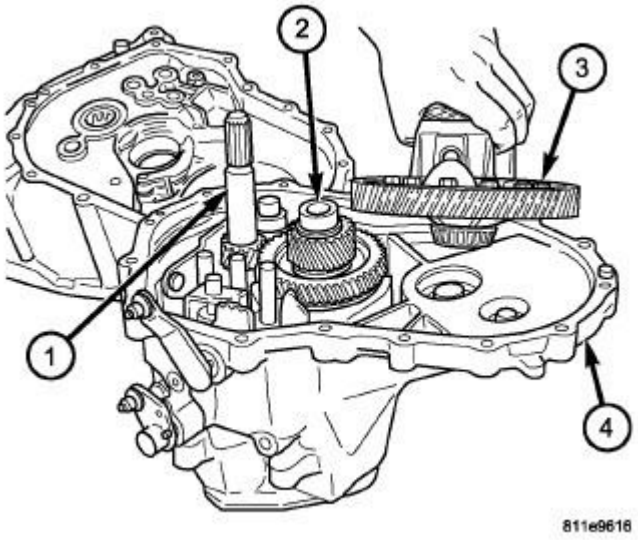


Fig. 56: Removing/Installing Differential Assembly
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - OUTPUT SHAFT
3 - DIFFERENTIAL ASSEMBLY

4 - GEARTRAIN HOUSING

26. Install differential (3) into gear case (4) .

BEARING ADJUSTMENT PROCEDURE

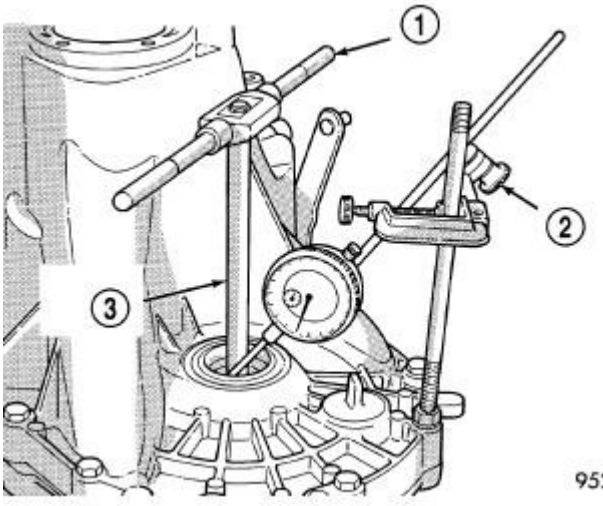


Fig. 57: Checking Differential Bearing End Play To Determine Shim Thickness
Courtesy of CHRYSLER LLC

1 - T-HANDLE
2 - DIAL INDICATOR SET
3 - TORQUE TOOL C-4995A

1. Use extreme care when removing and installing bearing cups and cones. Use only an arbor press for installation, as a hammer may not properly align the bearing cup or cone. Burrs or nicks on the bearing seat gives a false end-play reading while gauging for proper shims. Improperly seated bearing cups and cones are subject to low mileage failures.
2. Bearing cups and cones should be replaced if they show signs of pitting or heat distress. If distress is seen on either the cup or bearing rollers, both cup and cone must be replaced.
3. Bearing preload and drag torque specifications must be maintained to avoid premature bearing failures. Used (original) bearings may lose up to 50% of the original drag torque after break-in. All bearing adjustments must be made with no other component interference or gear intermesh.
4. Replace bearings as a pair: If one differential bearing is defective, replace both differential bearings, if one input shaft bearing is defective, replace both input shaft bearings.
5. Bearing cones must not be reused if removed.
6. Turning torque readings should be obtained while smoothly rotating in either direction.

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT

NOTE: True bearing turning torque readings can be obtained only with the geartrain

removed from the case.

1. Remove bearing cup and existing shim from clutch bellhousing case.
2. Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).
3. Press in new bearing cup into gear case side.
4. Oil differential bearings with transmission fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and tighten case bolts to 25 N.m (225 in. lbs.).
5. Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator.

NOTE: Position of dial indicator is for illustrative purposes only. The dial indicator should be parallel to T-Handle to obtain the most accurate reading.

6. Apply a medium load to differential with Torque Tool C-4995A (3) and a T-handle (1) , in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator (2). To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth. Record end play.

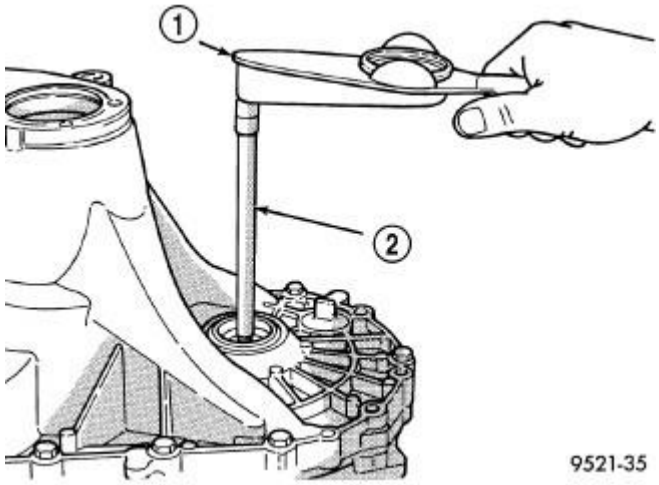


Fig. 58: Checking Differential Bearing Turning Torque
Courtesy of CHRYSLER LLC

1 - INCH-POUND TORQUE WRENCH
2 - TORQUE TOOL C-4995A

7. The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18**

mm (0.007 in.). Never combine shims to obtain the required preload.

8. Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected. Then press the bearing cup into clutch bellhousing.
9. Install clutch bellhousing. Install and tighten case bolts to 25 N.m (225 in. lbs.).

   Using Torque Tool C-4995A (2) and an inch-pound torque wrench (1), check turning torque of the differential assembly. **The turning torque should be 6 to 12 in. lbs. If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**

10. Recheck turning torque (1). Repeat until the proper turning torque is obtained.

    Once proper turning torque has been established, place gear case on the end plate. Draw a bead of MOPAR® Gasket Maker, Loctite® 518, or equivalent, on the flat surface of the case mating flange. Install clutch bellhousing onto gear case. Install and tighten case bolts to 25 N.m (225 in. lbs.).

11. Install the backup lamp switch (2), tighten switch to 23 N.m (17 ft. lbs.).

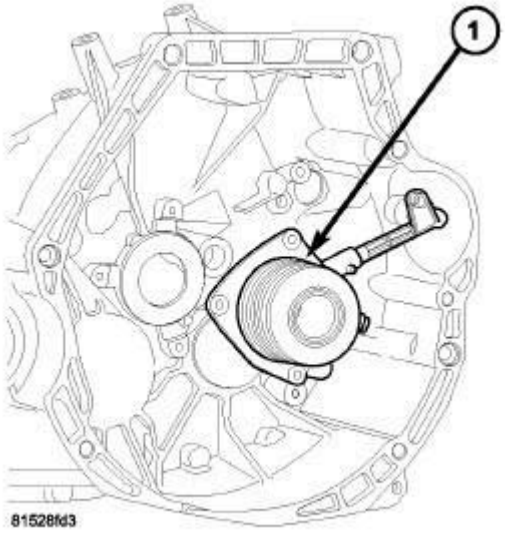


Fig. 59: Removing/Installing Slave Cylinder
Courtesy of CHRYSLER LLC

12. Install slave cylinder (1) to transaxle using new bolts. Refer to **Clutch/CYLINDER, Clutch Slave - Installation** .

INSTALLATION

INSTALLATION

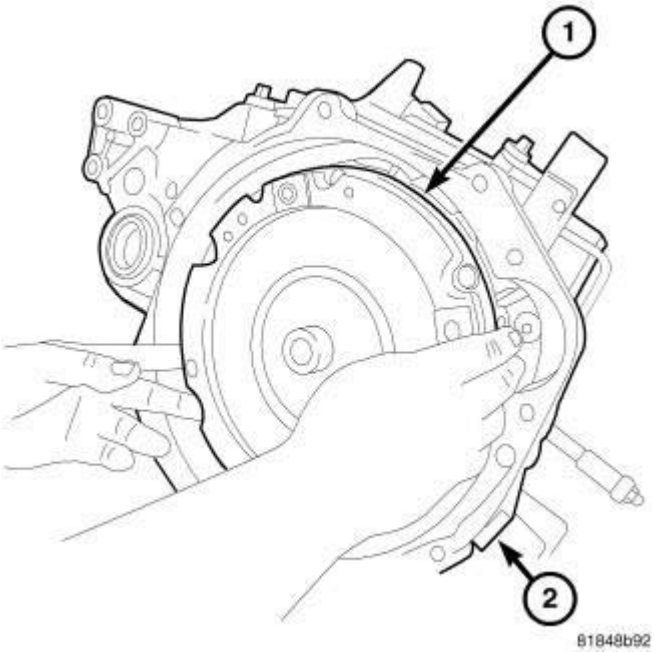


Fig. 60: Modular Clutch Assembly
Courtesy of CHRYSLER LLC

1. Install clutch module (1) (if equipped) onto input shaft.

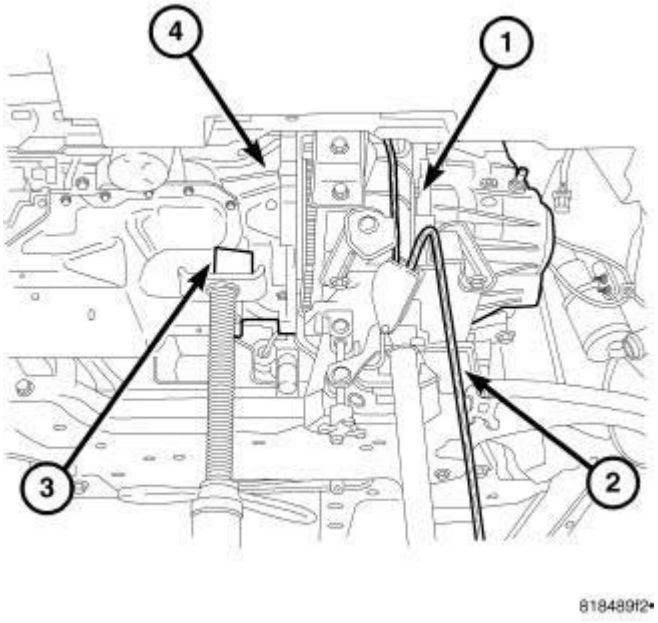


Fig. 61: Installing Transaxle Into Position
Courtesy of CHRYSLER LLC

2. Install transaxle (1) into position.
3. Install the transmission crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER -**

Removal .

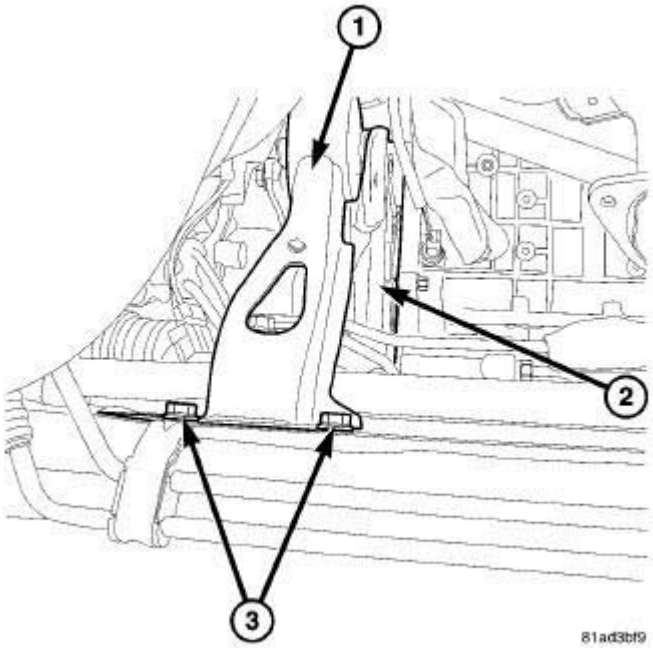


Fig. 62: Removing/Installing Rear Transmission Mount Bracket
Courtesy of CHRYSLER LLC

4. Install the rear transmission mount bracket (2) and bolts, tighten to 68 N.m (50 ft. lbs.).
5. Install the rear transmission mount (1) and bolts, tighten to 68 N.m (50 ft. lbs.).
6. Install the rear transmission mount through bolt (4) at this time and tighten to 68 N.m (50 ft. lbs.).

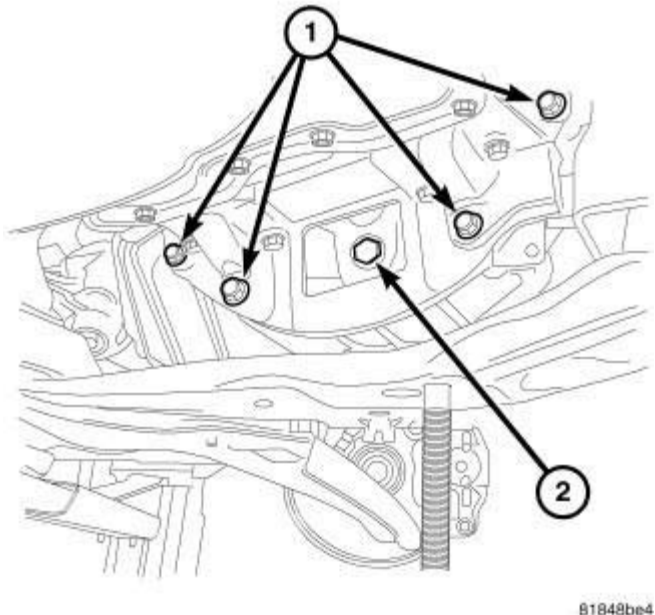


Fig. 63: Transmission Bell Housing Bolts
Courtesy of CHRYSLER LLC

7. Install transaxle-to-engine mounting bolts and tighten to 48 N.m (35 ft. lbs.).

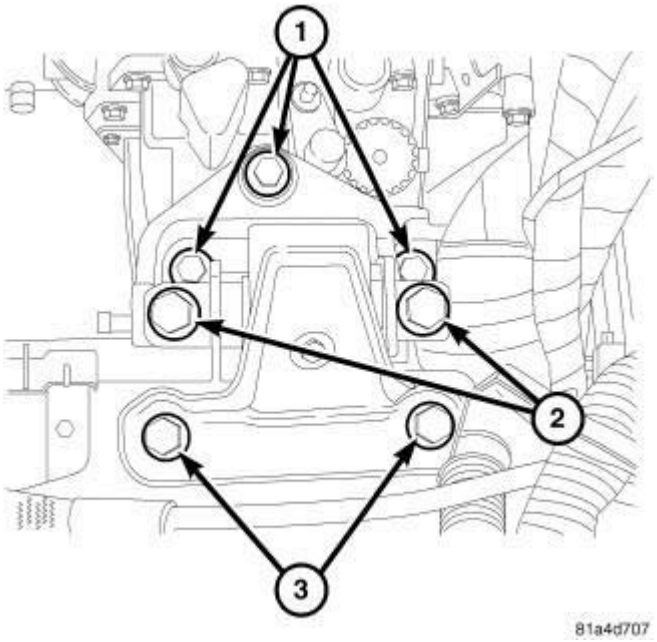


Fig. 64: Left Bracket To Transmission Bolts
Courtesy of CHRYSLER LLC

8. Raise engine and transaxle with screw jack and transmission jack until upper mount bracket aligns with upper mount. Install mount bolts (1) and tighten to 68 N.m (50 ft. lbs.).
9. Remove screw jack.

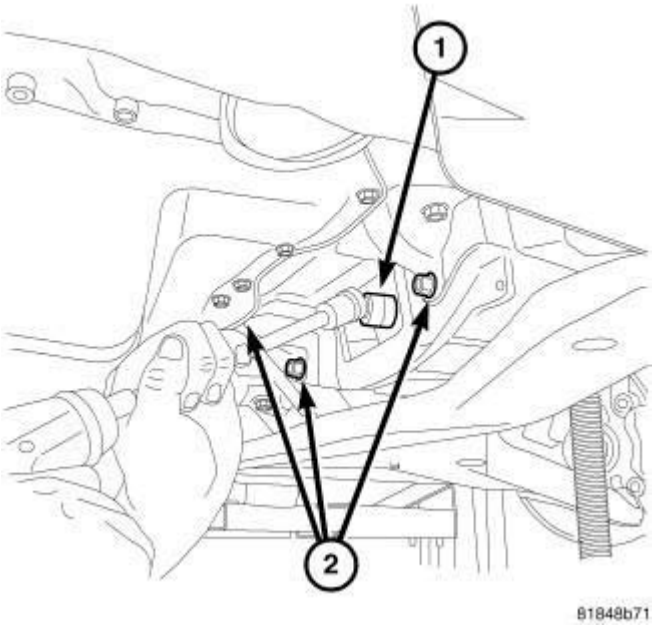


Fig. 65: Removing/Installing Modular Clutch-To-Drive Plate Bolts
Courtesy of CHRYSLER LLC

10. Install four (4) modular clutch-to-driveplate bolts (4). Align drive plate and modular clutch alignment marks placed upon disassembly. Start with tight-tolerance (slotted) hole, install and torque bolts to 88 N.m (65 ft. lbs.).
11. Install starter motor and tighten bolts to 54 N.m (40 ft. lbs.). Make sure to fasten ground cable to upper starter bolt. Refer to **Electrical - Engine Systems/Starting/STARTER - Installation** .
12. Install bell housing dust cover.
13. Install both front axle driveshafts. Refer to **Differential and Driveline/Half Shaft - Installation** .

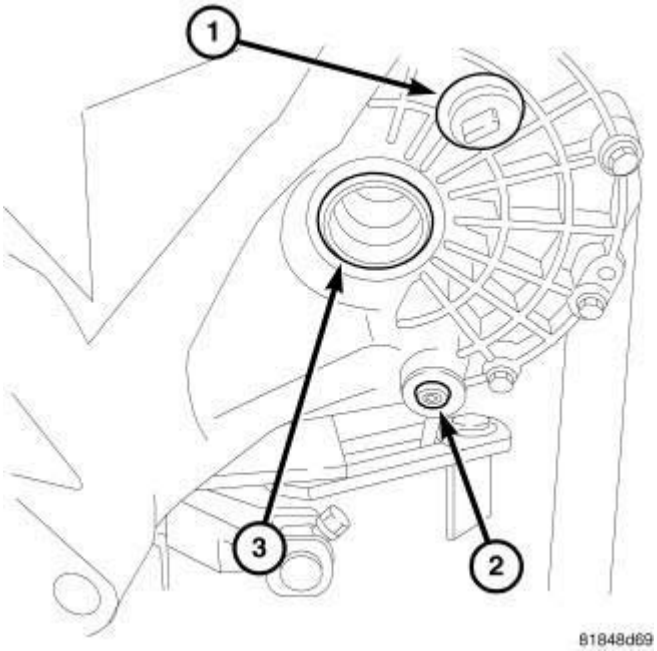


Fig. 66: Removing/Installing Transaxle Oil Drain Plug
Courtesy of CHRYSLER LLC

14. Fill transaxle with suitable amount of fluid (2.7 liters). See **Standard Procedure** .
15. Lower the vehicle.
16. Install the remaining bell housing bolts and tighten to 48 N.m (35 ft. lbs.).

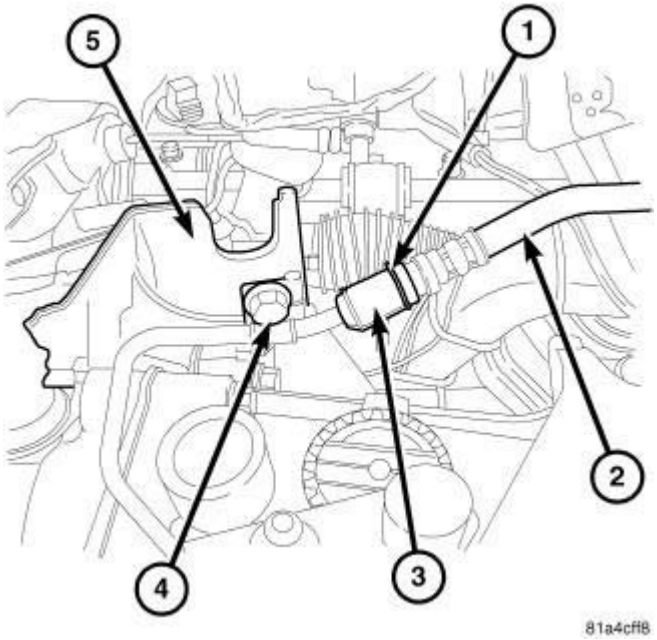


Fig. 67: Removing/Installing Clip At Hydraulic Line
Courtesy of CHRYSLER LLC

17. Connect the hydraulic clutch slave cylinder lines (2, 3) and clip (1), verify connection by pushing and pulling connection.
18. Bleed slave cylinder.

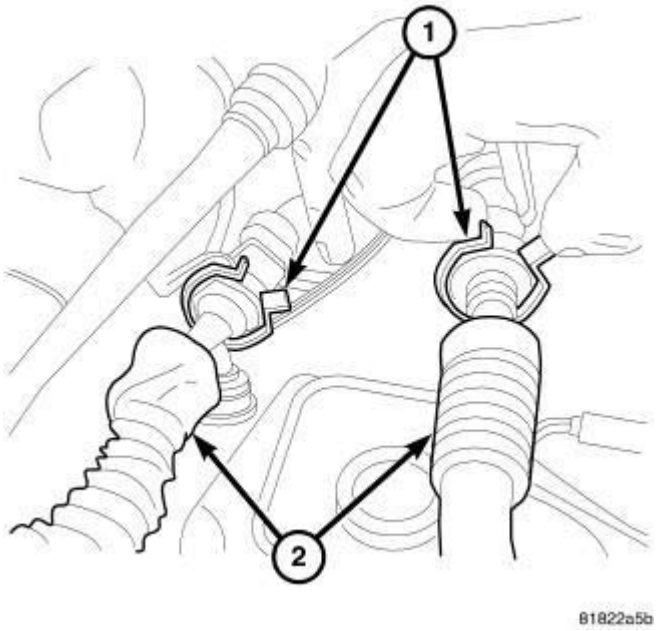


Fig. 68: Removing/Installing Shift Cable-To-Bracket Clips
Courtesy of CHRYSLER LLC

19. Connect shift and selector cables (2) to shift lever. Install cables to bracket (1).

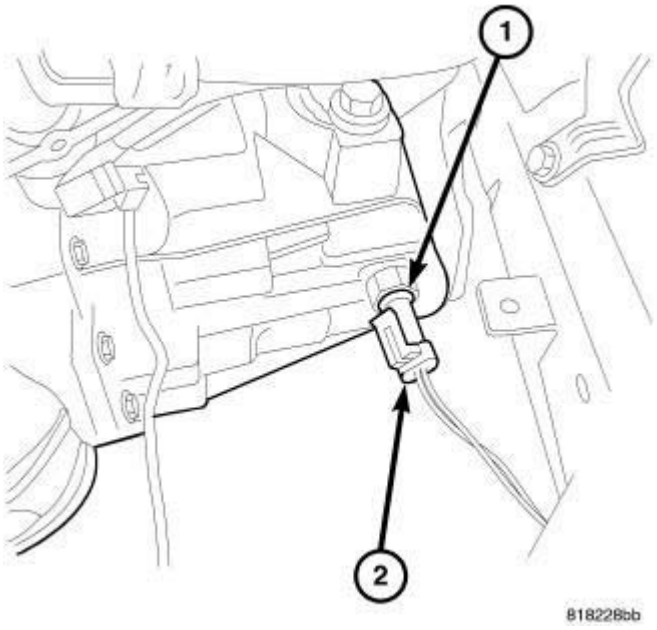


Fig. 69: Removing/Installing Back-Up Lamp Switch Connector

Courtesy of CHRYSLER LLC

20. Connect back-up lamp switch connector (1).
21. Connect the vehicle speed sensor connector if equipped.
22. Install the air cleaner assembly.
23. Connect the negative battery cable.
24. Road test vehicle and inspect for leaks.

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Back-up Lamp Switch	23	17	-
Crossover Cable Adjustment Screw	8	-	70
Drain Plug	14	-	120
Bolts, Differential Ring Gear	95	70	-
Bolts, End Plate Cover	25	-	225
Bolts, Output Bearing Race Retaining Strap	12	-	105
Bolts, Reverse Fork Bracket	11	-	96
Bolt, Reverse Idler Shaft	26	19	-
Bolts, Shift Cable Bracket to Transaxle	21	-	185
Transaxle Case Bolts	25	-	225
Bolt, Transaxle to Engine	48	35	-
Bolt, Vehicle Speed Sensor	7	-	60
Bolts, Modular Clutch-to-Driveplate	88	65	-
Bolt, Reverse Idler Shaft	29	21	-
Bolts, Shift Blocker Assembly	25	-	225
Bolts, Upper Mount - to Transaxle	68	50	-
Bolts, Shifter Assembly	7	-	61
Bolts, Crossmember - to - Frame	68	50	-
Through Bolt, Rear			

transmission mount	68	50	-

Bolts that have thread sealer or torque lock patches should not be reused. Always install new bolts in these applications.

SPECIAL TOOLS

SPECIAL TOOLS

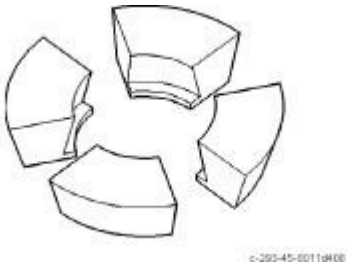


Fig. 70: Adaptor Blocks C-293-45
Courtesy of CHRYSLER LLC

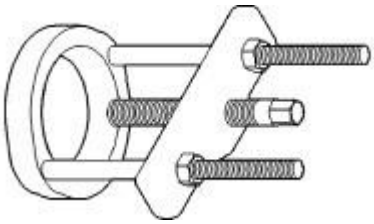


Fig. 71: Puller C-293-PA
Courtesy of CHRYSLER LLC

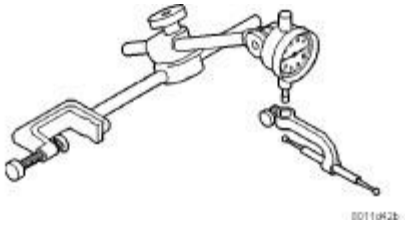


Fig. 72: Dial Indicator C-3339A
Courtesy of CHRYSLER LLC

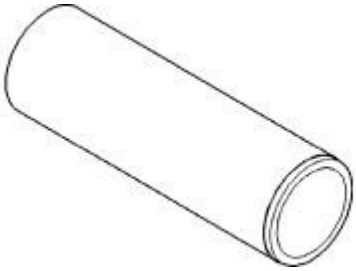


Fig. 73: Installer 6448A

Courtesy of CHRYSLER LLC

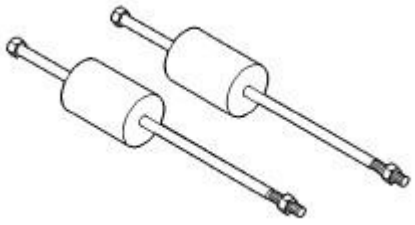


Fig. 74: Slide Hammer C-3752
Courtesy of CHRYSLER LLC

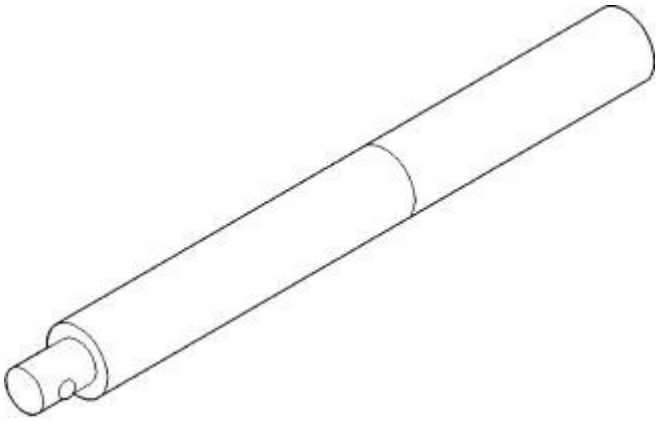


Fig. 75: Handle C-4171
Courtesy of CHRYSLER LLC

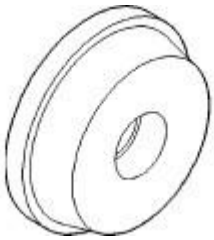


Fig. 76: Bearing Installer C-4628
Courtesy of CHRYSLER LLC

Fig. 77: Seal Remover C-4680
Courtesy of CHRYSLER LLC

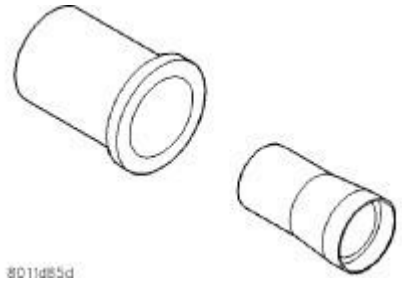


Fig. 78: Seal Installer C-4992
Courtesy of CHRYSLER LLC

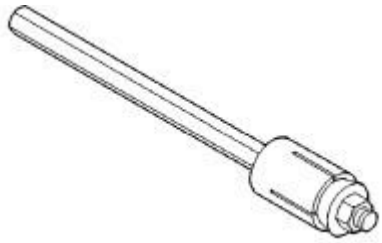


Fig. 79: Torque Tool C-4995
Courtesy of CHRYSLER LLC

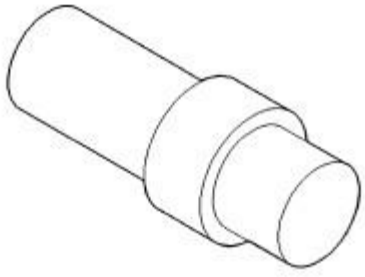


Fig. 80: Adapter C-4996
Courtesy of CHRYSLER LLC

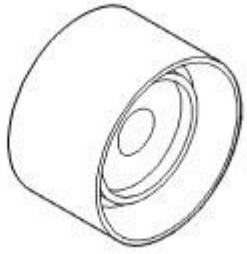


Fig. 81: Installer L-4410
Courtesy of CHRYSLER LLC

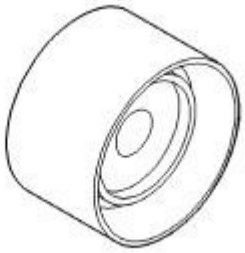


Fig. 82: Installer L-4440
Courtesy of CHRYSLER LLC

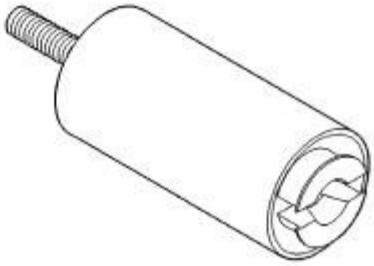


Fig. 83: Puller L-4518
Courtesy of CHRYSLER LLC

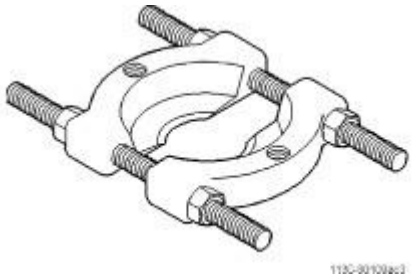


Fig. 84: Bearing Splitter 1130
Courtesy of CHRYSLER LLC

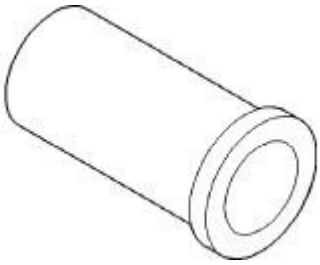


Fig. 85: Driver 6342
Courtesy of CHRYSLER LLC

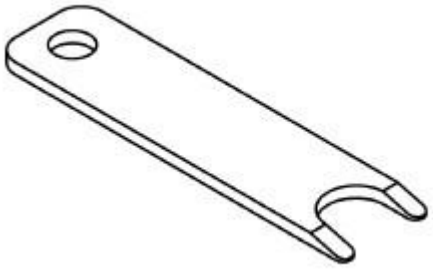


Fig. 86: Disconnect Tool 6638A
Courtesy of CHRYSLER LLC

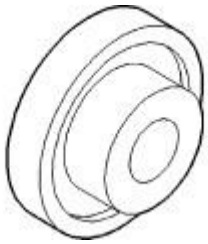


Fig. 87: Seal Installer 9928
Courtesy of CHRYSLER LLC

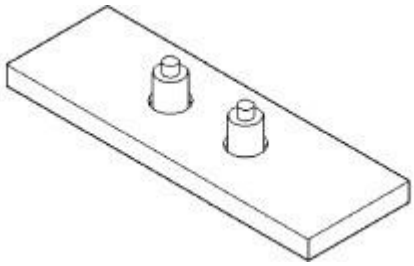


Fig. 88: Bearing Remover 6768
Courtesy of CHRYSLER LLC

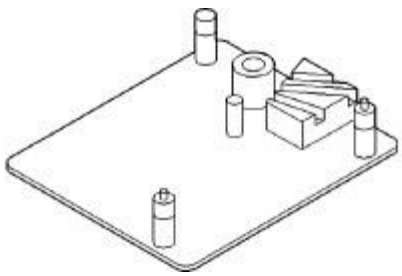


Fig. 89: Bench Fixture 6785
Courtesy of CHRYSLER LLC

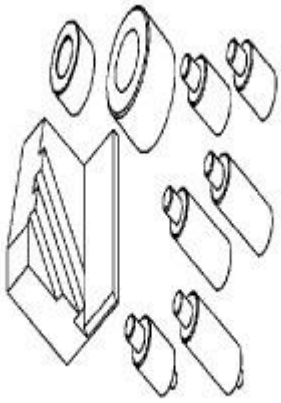


Fig. 90: Adaptors 9761
Courtesy of CHRYSLER LLC

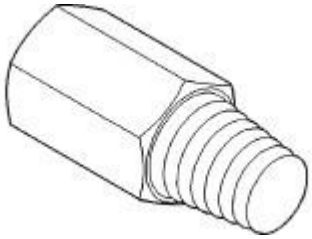


Fig. 91: Remover 6786
Courtesy of CHRYSLER LLC

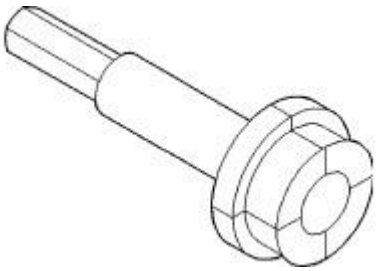


Fig. 92: Remover 6787
Courtesy of CHRYSLER LLC

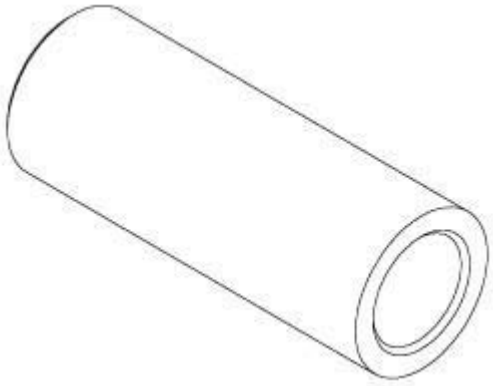


Fig. 93: Installer 8864
Courtesy of CHRYSLER LLC

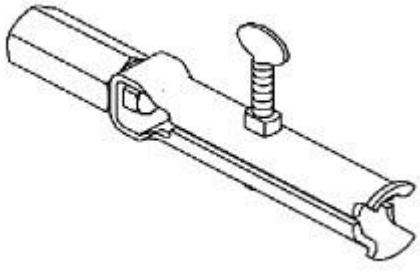


Fig. 94: Puller 9585
Courtesy of CHRYSLER LLC

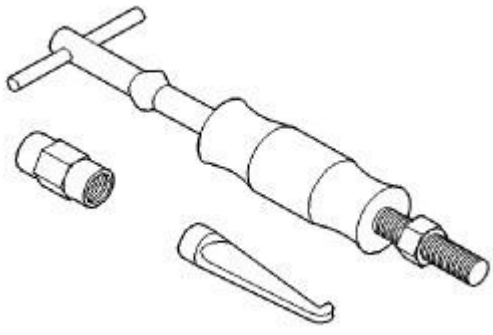


Fig. 95: Slide Hammer C-637
Courtesy of CHRYSLER LLC

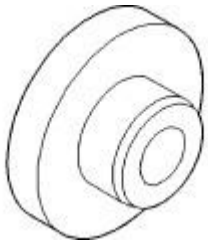


Fig. 96: Installer Bearing - 5064
Courtesy of CHRYSLER LLC

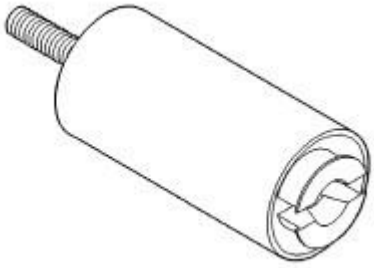


Fig. 97: Puller- L-4518
Courtesy of CHRYSLER LLC

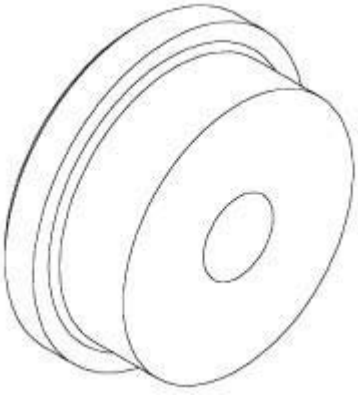


Fig. 98: Installer 8692
Courtesy of CHRYSLER LLC

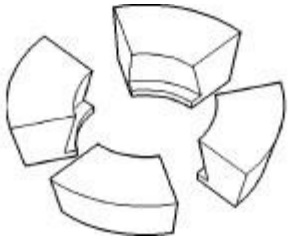


Fig. 99: Adapters C-293-37
Courtesy of CHRYSLER LLC

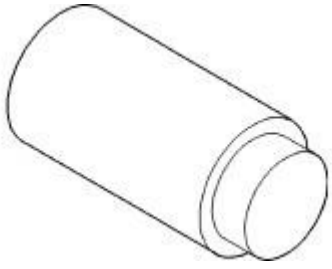


Fig. 100: Plug Or Insert 9678

Courtesy of CHRYSLER LLC

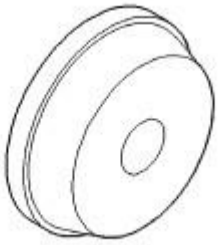


Fig. 101: Installer L-4520
Courtesy of CHRYSLER LLC

BEARING AND RACE, INPUT

REMOVAL

REMOVAL

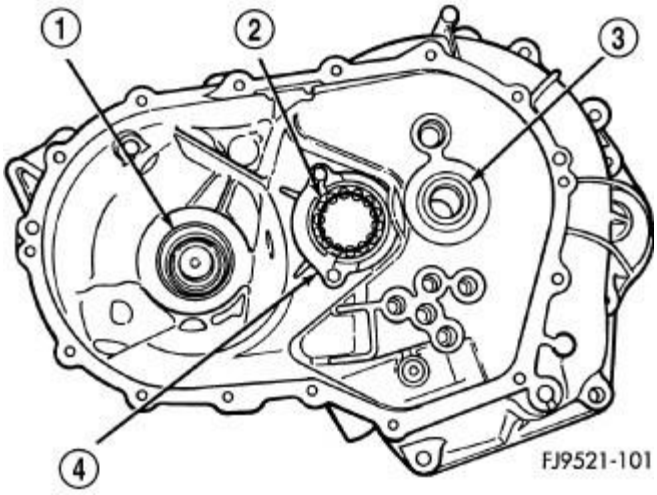


Fig. 102: Identifying Input Bearing, Differential Bearing, Output Bearing, & Bearing Retainer
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL BEARING
2 - OUTPUT BEARING
3 - INPUT BEARING
4 - BEARING RETAINER

The input bearing (3) is a one-piece bearing and sleeve unit. The sleeve is the slide point for the clutch-release bearing and lever.

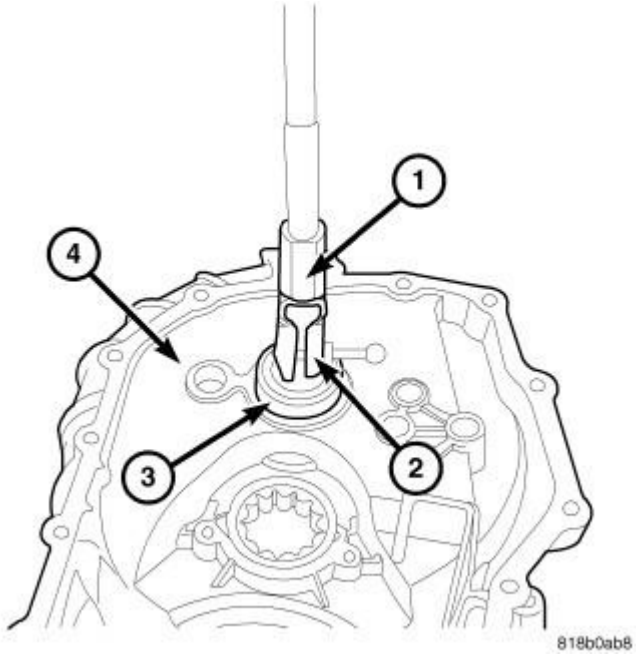


Fig. 103: Identifying Puller 9585, Slide Hammer C-637, & Input Bearing
Courtesy of CHRYSLER LLC

1. Install Puller 9585 (2) and Slide Hammer C-637 (1) over into bearing on the gear case side of the transaxle clutch housing (4).
2. Pull the input bearing (3) out of the housing.

INSTALLATION

INSTALLATION

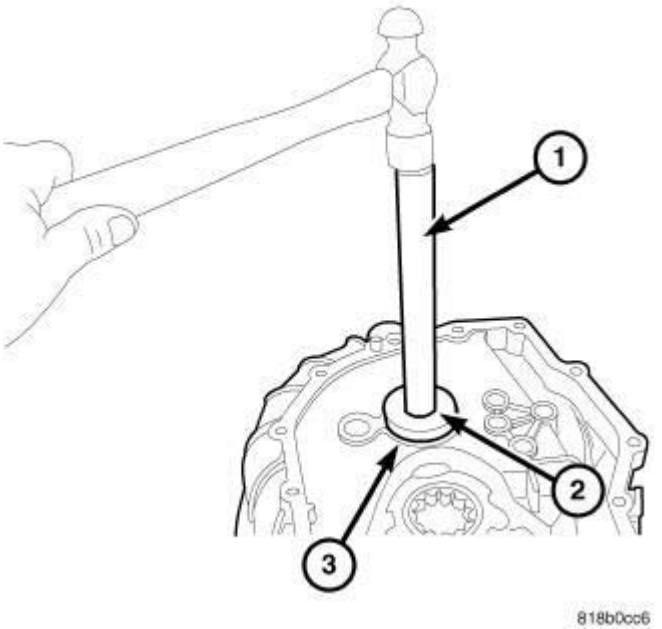


Fig. 104: Installing Input Bearing Into Bore Using Installer 5064 & Handle C-4171
Courtesy of CHRYSLER LLC

1. Apply coating of Loctite® sealant on bearing outer diameter. Position sleeve and bearing assembly at input bearing bore.
2. Using Installer 5064 (2) and Handle C-4171 (1) install input bearing (3) into bore until it is fully seated.

BEARING AND RACE, OUTPUT

REMOVAL

REMOVAL

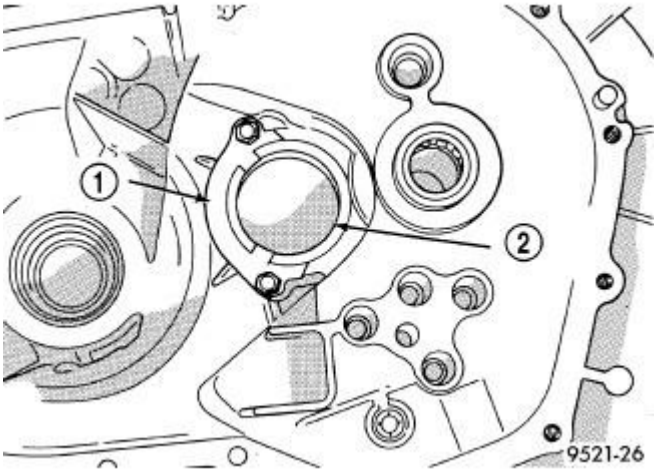


Fig. 105: Removing/Installing Output Bearing Strap

Courtesy of CHRYSLER LLC

1 - BEARING RETAINER 2 - OUTPUT BEARING RACE

1. Remove screws at output bearing retainer strap (1) .

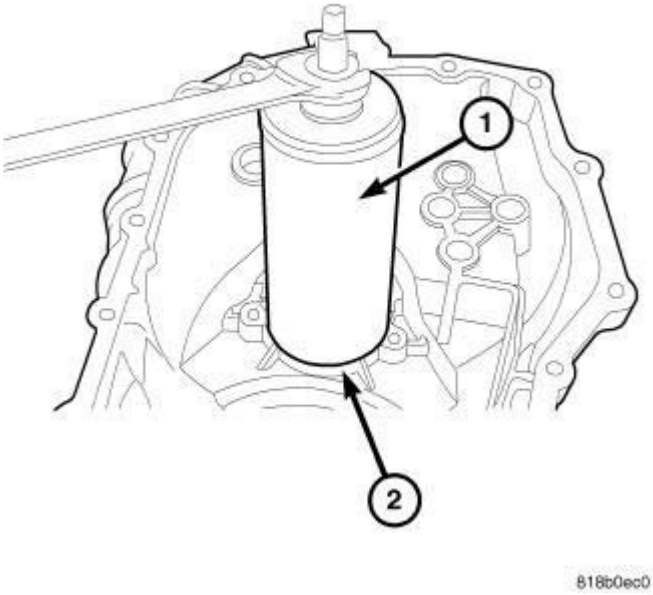


Fig. 106: Identifying Puller L-4518 & Output Bearing
Courtesy of CHRYSLER LLC

2. Install Puller L-4518 (1) and remove output bearing (2).

INSTALLATION

INSTALLATION

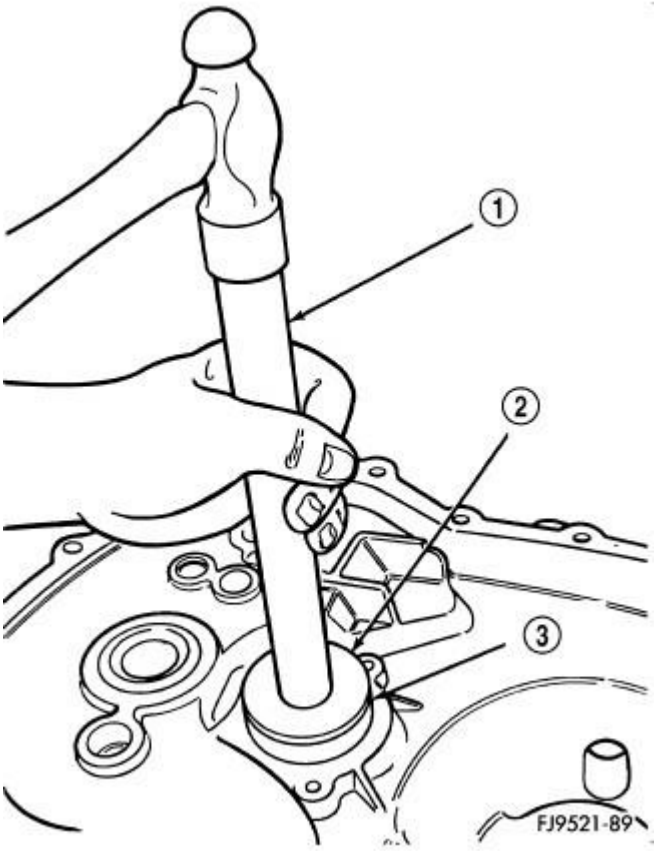


Fig. 107: Output Bearing Race Installation
Courtesy of CHRYSLER LLC

1 - HANDLE C-4171
2 - INSTALLER C-4628
3 - OUTPUT BEARING RACE

NOTE: Properly install race with tabs on lock feature.

1. Line up output bearing (3) to bore.
2. Insert tool Installer 8692 (2) with Handle C-4171 (1) onto output bearing. Tap bearing into bore. Verify that the larger diameter of the cage is facing outward. Position bearing retaining strap. Tighten bolts to 12 N.m (105 in. lbs.).

BUSHING(S), SHIFT RAIL

REMOVAL

REMOVAL

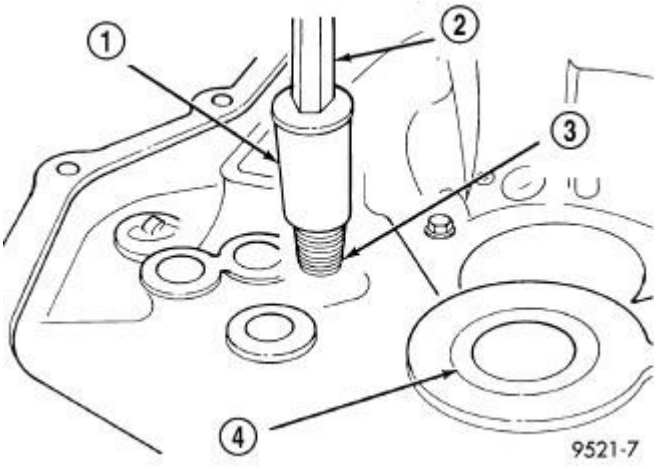


Fig. 108: Shift Rail Bushing Removal
Courtesy of CHRYSLER LLC

1 - REMOVER 6786
2 - SLIDE HAMMER C-3752
3 - SHIFTER RAIL BUSHING
4 - INPUT BEARING

1. Thread Remover 6786 (1) into shift rail bushing.
2. Install slide hammer C-3752 (2) onto tool.
3. Remove bushing (3) using slide hammer and tool assembly.

INSTALLATION

INSTALLATION

1. Line up replacement bushing in bore.
2. Using Installer MD998343, tap bushing into bore until flush with the chamfer in the case.

BUSHING(S), SHIFT SELECT SHAFT

REMOVAL

REMOVAL

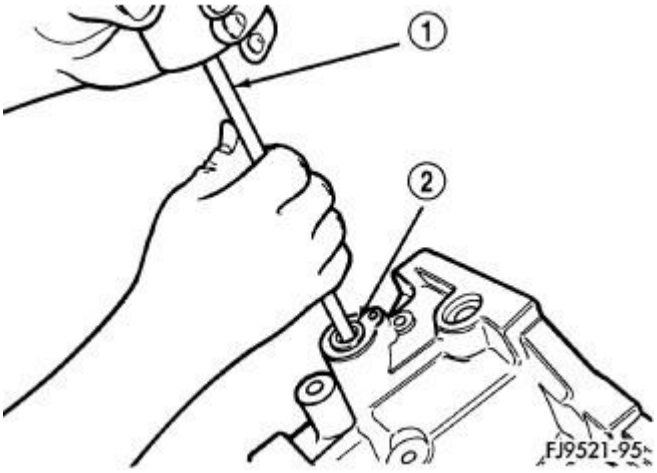


Fig. 109: Removing/Installing Shifter Shaft Bushing
Courtesy of CHRYSLER LLC

1 - SLIDE HAMMER C-3752
2 - SHIFTER SHAFT BUSHING

1. Install Slide Hammer C-3752 (1) through the select bushing.
2. Thread nut and washer onto slide hammer.
3. Using the slide hammer, remove the select shaft bushing (2).

INSTALLATION

INSTALLATION

1. Position the replacement select shaft bushing over the crossover shaft bushing bore.
2. Using an appropriate size deep-well socket, install the select shaft bushing into the bushing bore.

BUSHING(S), SHIFT SHAFT

REMOVAL

REMOVAL

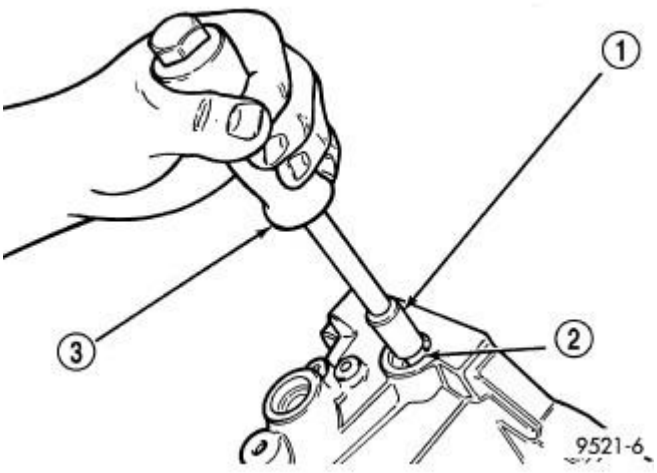


Fig. 110: Removing/Installing Shift Shaft Bushing
Courtesy of CHRYSLER LLC

1 - REMOVER 6786 2 - SHIFT SHAFT BUSHING 3 - SLIDE HAMMER C-3752

1. Remove shift shaft. Refer to **SHAFT, Shift**.
2. Thread Remover 6786 (1) into bushing.
3. Install slide hammer C-3752 (3) onto tool and remove bushing (2) using slide hammer.

INSTALLATION

INSTALLATION

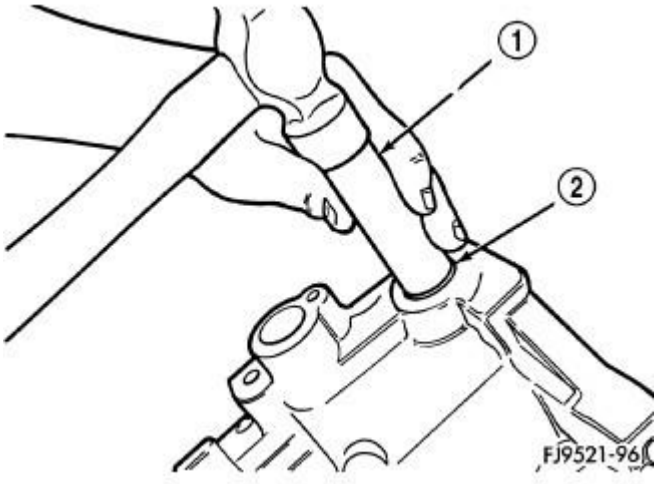


Fig. 111: Selector Shaft Bushing Installation
Courtesy of CHRYSLER LLC

1 - DEEP WELL SOCKET
2 - SHIFTER SHAFT BUSHING

1. Position replacement bushing over shift shaft bore.
2. Using an appropriate size deep-well socket (1) , install bushing (2) in selector shaft bore.

CABLE, GEARSHIFT CONTROL

REMOVAL

REMOVAL

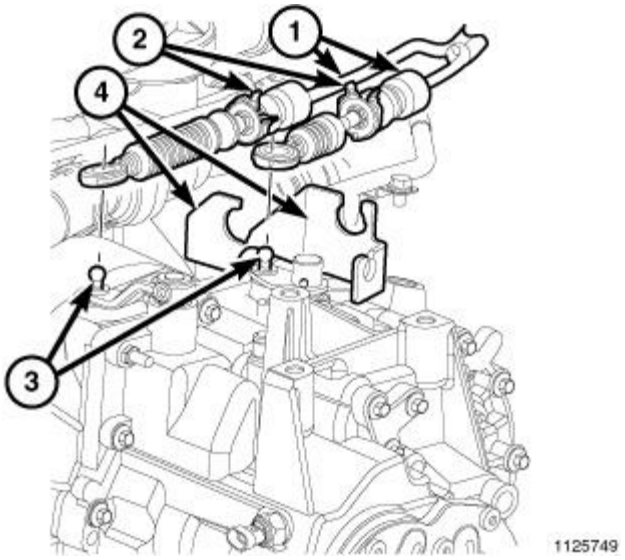


Fig. 112: Removing/Installing Cables At Shift Lever
Courtesy of CHRYSLER LLC

1. Remove the shifter. See **Removal** .
2. Raise hood.
3. Remove the resonator.
4. Remove engine cover.
5. Remove air cleaner assembly.
6. Disconnect negative battery cable.
7. Squeeze cable retaining clips (2) and remove cables from bracket (4).
8. Disconnect cables (1) from the shift levers (3) at the transaxle.

CAUTION: Pry up with equal force on both sides of shifter cable isolator bushings to avoid damaging cable isolator bushings.

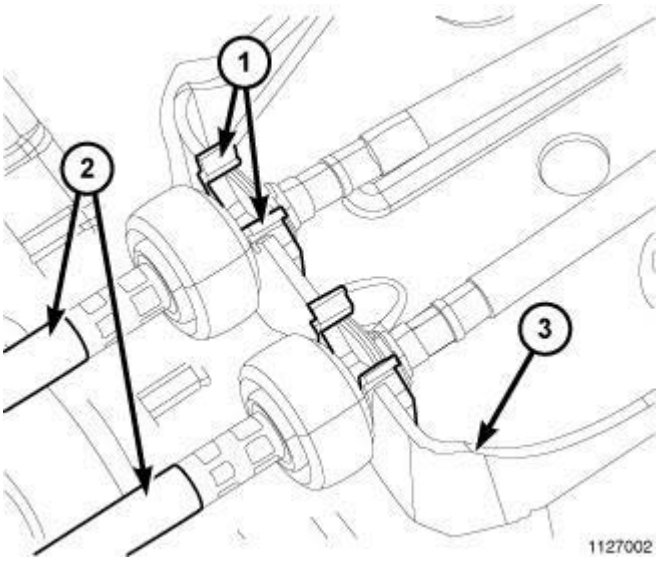


Fig. 113: Cable Retaining Clips And Cables
Courtesy of CHRYSLER LLC

9. Remove the Electronic Stability Control (ESC) Dynamics Sensor. Refer to **Brakes/Electrical/SENSOR, Dynamics - Removal** .
10. Remove the Occupant Restraint Controller (ORC). See **Removal** .

NOTE: Squeeze one side tab, roll fitting upward, then squeeze other side tab and lift cable clear of shifter.

11. Squeeze the Cable Retaining Clips (1) and remove the Cables (2) from the base of the Shifter (3).

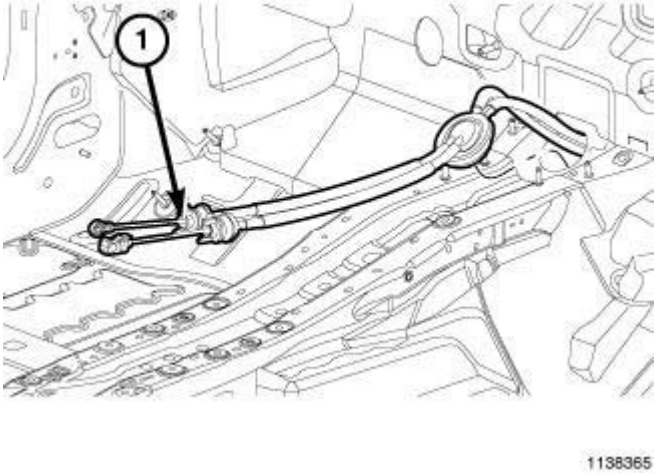


Fig. 114: Removing/Installing Cable Assembly From Vehicle
Courtesy of CHRYSLER LLC

12. Remove the Cable Assembly (1) from vehicle.

INSTALLATION

INSTALLATION

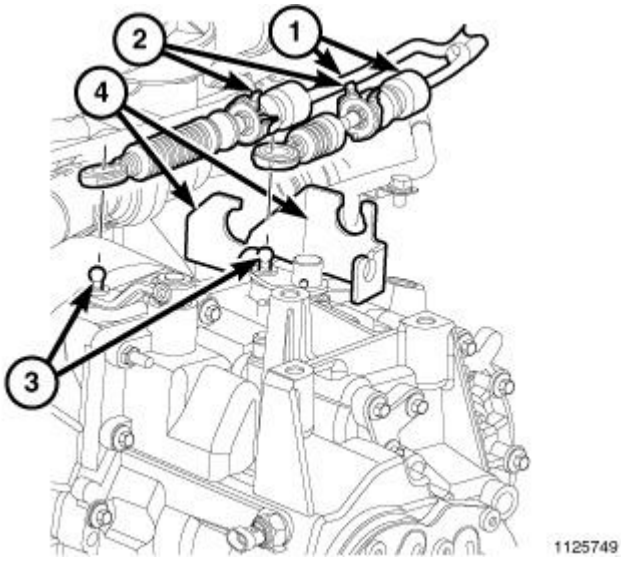


Fig. 115: Removing/Installing Cables At Shift Lever
Courtesy of CHRYSLER LLC

1. Install cable assembly through floor pan opening.
2. Route transaxle end of cable assembly into engine compartment and over transaxle assembly.

NOTE: The Cable with the white colored clip installs to the inboard side of the bracket

3. Install the Cables (2) to the Transaxle Bracket (4).
4. Connect the Cable Ends (1) to the Shift Levers (3) on the Transaxle.

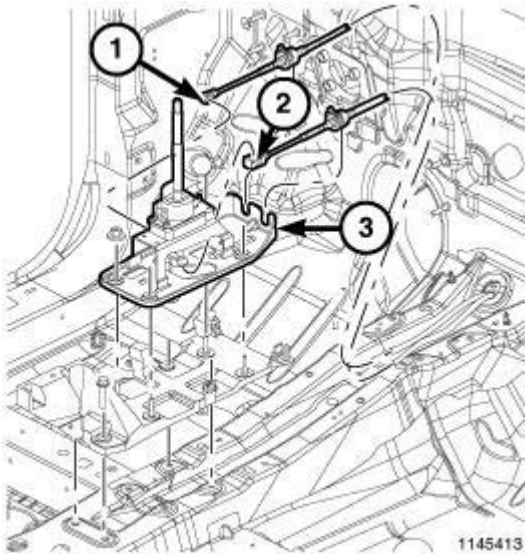


Fig. 116: Remove/Install Shifter Cables Into Shifter Base
Courtesy of CHRYSLER LLC

NOTE: Cable (1) installs with the barbed side facing up on the left side of the shifter

5. Install the Shifter Cables (1) and (2) into the Shifter Base (3).
6. Install ORC. Refer to **Restraints/MODULE, Occupant Restraint Controller - Installation** .
7. Install the Electronic Stability Control (ESC) Dynamics Sensor. Refer to **Brakes/Electrical/SENSOR, Dynamics - Installation** .
8. Install shifter. See **Installation** .
9. Install the air cleaner assembly.
10. Connect battery cable.

CUPS, DIFFERENTIAL BEARING

REMOVAL

REMOVAL

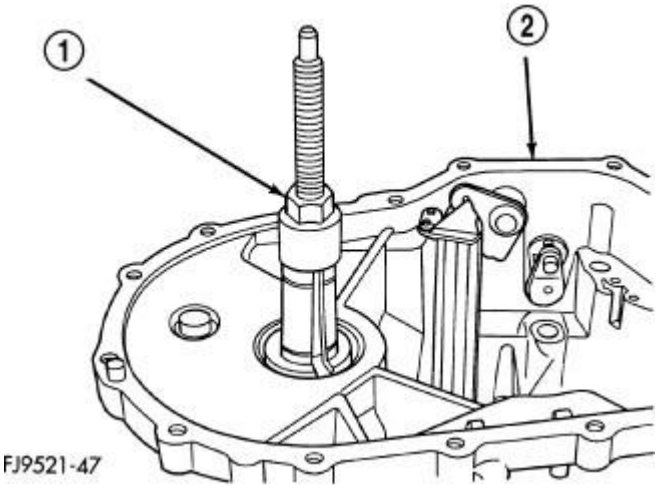


Fig. 117: Identifying Remover L-4518 & Gear Case
Courtesy of CHRYSLER LLC

1 - SPECIAL TOOL L-4518 2 - GEAR CASE

1. Remove differential assembly from gear case (2). Refer to **DIFFERENTIAL, Transaxle** p.
2. Install Remover L-4518 (1) into the differential bearing cup.

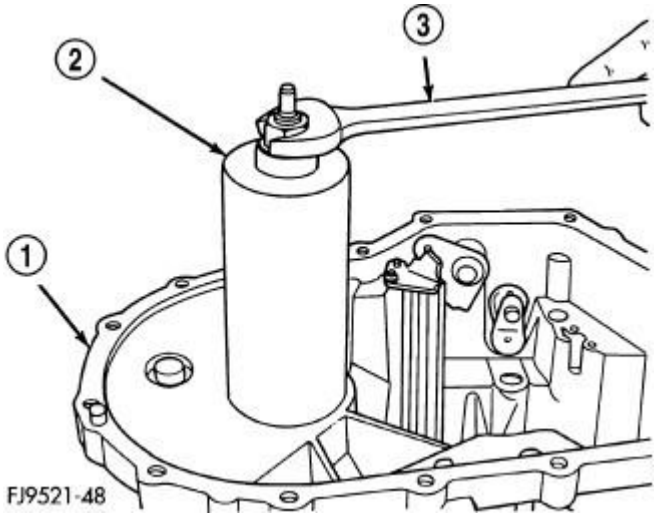


Fig. 118: Removing Differential Bearing Race
Courtesy of CHRYSLER LLC

1 - GEAR CASE 2 - SPECIAL TOOL L-4518 3 - WRENCH

3. Install the tool cup (2) over the tool.

4. Tighten the tool until the race is removed from the case.

INSTALLATION

INSTALLATION

1. Position the bearing cup into the case.
2. Install the bearing cup onto Installer L-4520.
3. Using Installer L-4520 and Universal Handle C-4171, install differential bearing cup into the transaxle case.

DIFFERENTIAL, TRANSAXLE

DISASSEMBLY

DISASSEMBLY

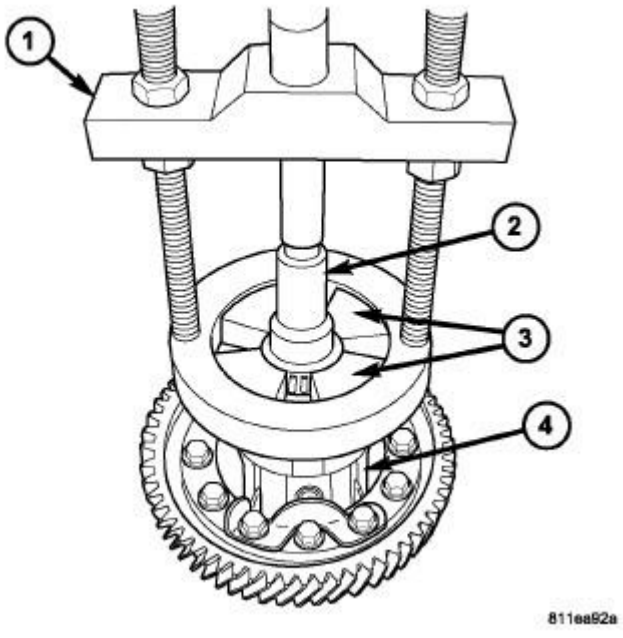


Fig. 119: Removing Differential Bearing Cones Using Puller C-293-PA & Adaptors
Courtesy of CHRYSLER LLC

1 - PULLER PRESS C-293
2 - ADAPTOR C-4996
3 - ADAPTOR BLOCKS C-293-45
4 - DIFFERENTIAL CASE

1. Remove differential bearing cones (ring gear and differential case side) using Puller C-293 - PA (1) ,

Adapter Blocks C-293-45 (3), and Adaptor C-4996 (2). If all wheel drive use Puller C-293 PA, four C-293-37 Inserts and Press Insert 9678 to remove the large carrier bearing.

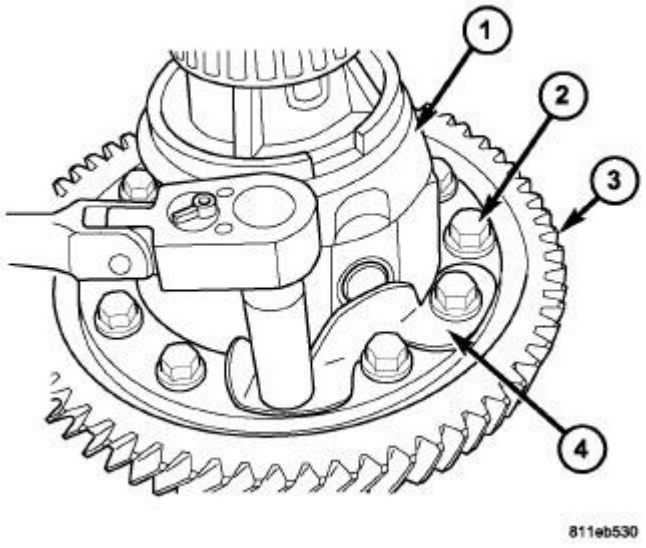


Fig. 120: Differential Ring Gear-to-Case Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE
2 - BOLT (12)
3 - RING GEAR
4 - PINION SHAFT RETAINER (2)

2. Remove the bolts holding the pinion shaft retainer (4) and the ring gear (3) to the differential case (1).

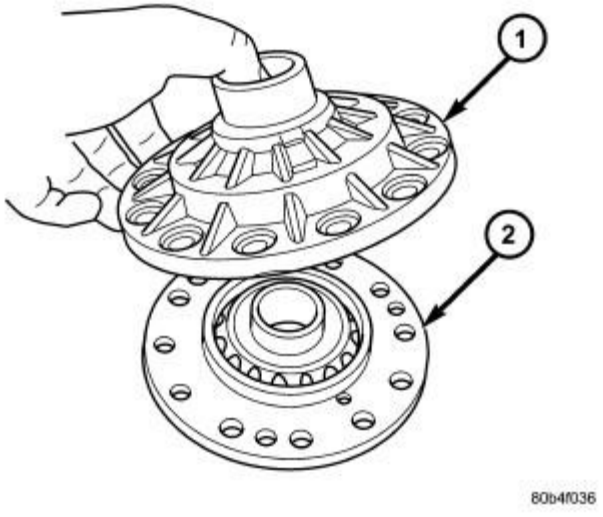


Fig. 121: Differential Support Plate
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SUPPORT PLATE 2 - DIFFERENTIAL CASE

3. Separate differential support (1) from case (2).

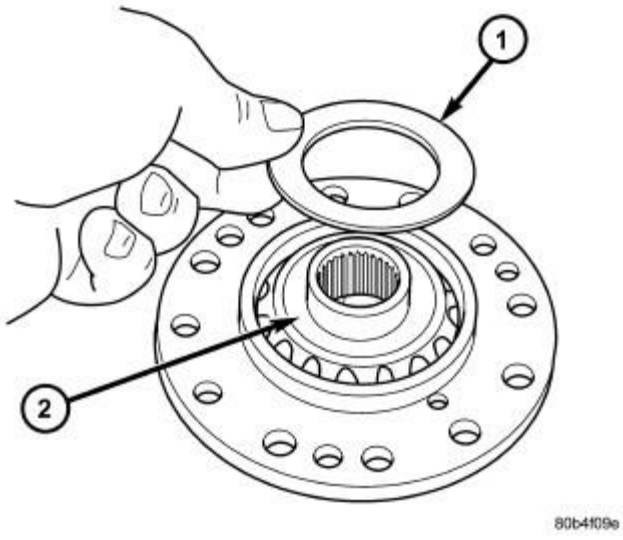


Fig. 122: Removing/Installing Side Gear Thrust Washer & Side Gear
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER 2 - DIFFERENTIAL SIDE GEAR

4. Remove the side gear thrust washer (1).
5. Remove side gear (2).

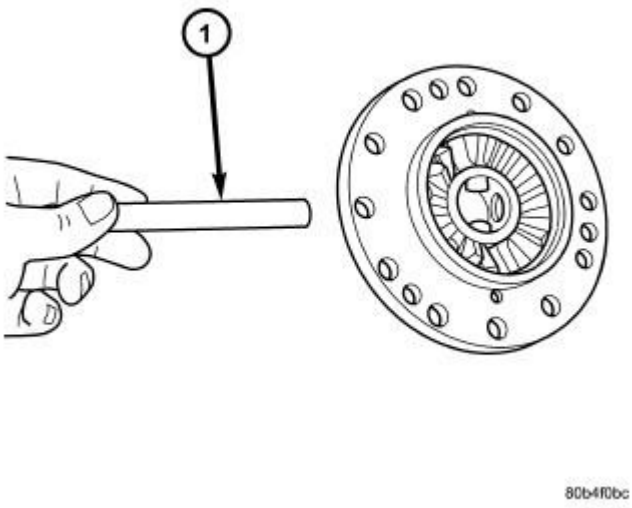


Fig. 123: Long Pinion Shaft
Courtesy of CHRYSLER LLC

1 - PINION SHAFT (LONG)

6. Remove pinion shaft (1).

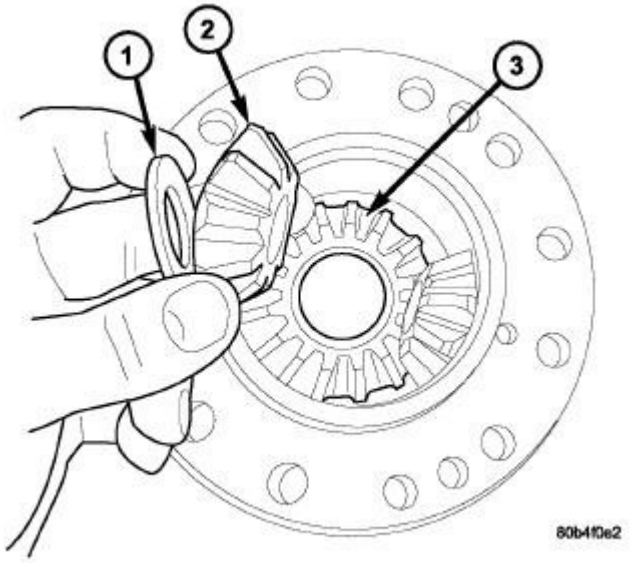


Fig. 124: Pinion Gear and Thrust Washer
Courtesy of CHRYSLER LLC

1 - THRUST WASHER (4) 2 - PINION GEAR (4)

7. Remove pinion gear (2) and thrust washers (1).

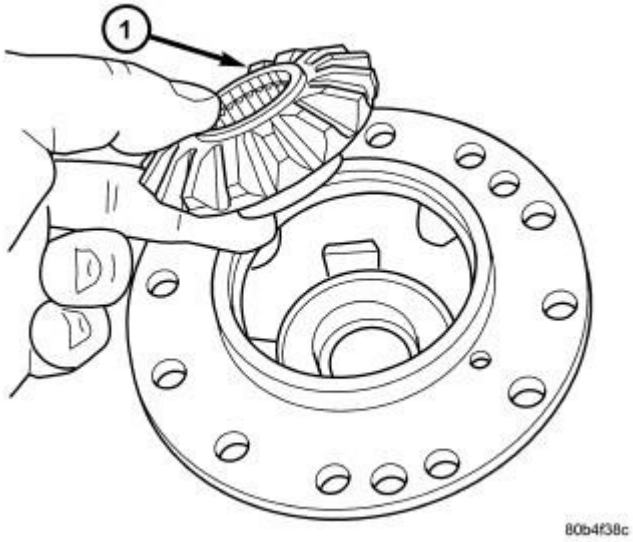


Fig. 125: Differential Side Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

8. Remove side gear (1).

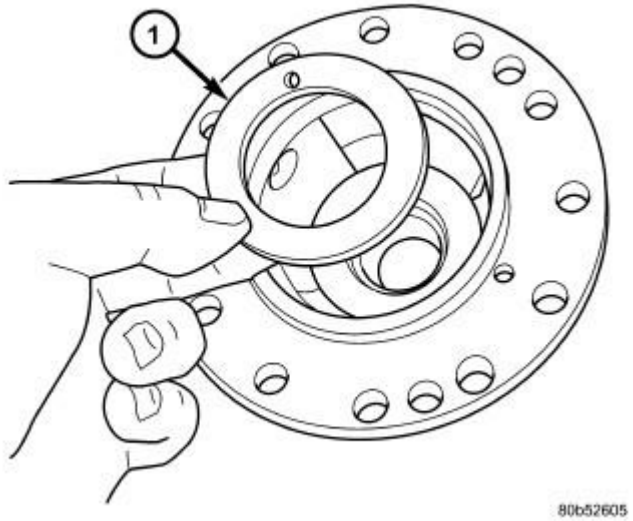


Fig. 126: Side Gear Thrust Washer
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER

9. Remove the side gears thrust washer (1).

ASSEMBLY

ASSEMBLY

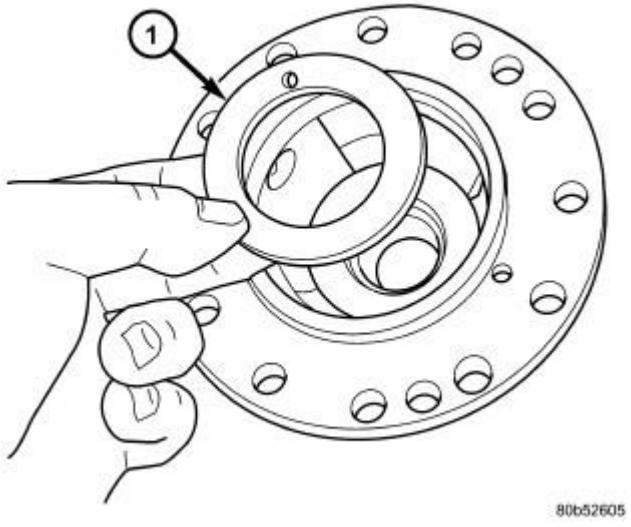


Fig. 127: Side Gear Thrust Washer
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER

1. Install side gear thrust washer (1) into case.

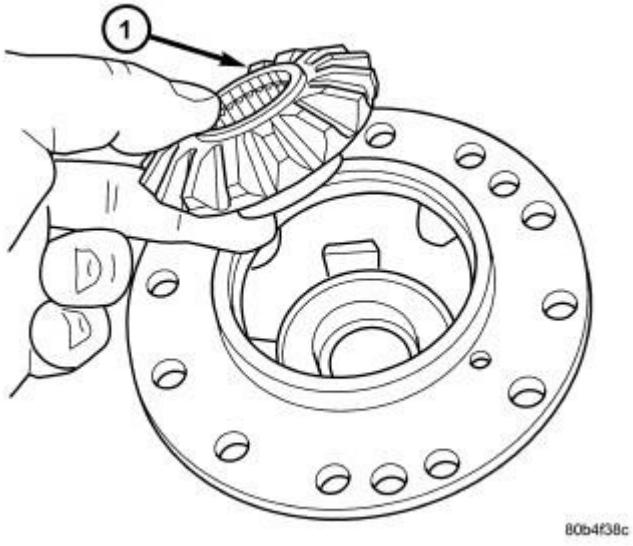


Fig. 128: Differential Side Gear
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SIDE GEAR

2. Install side gear (1).

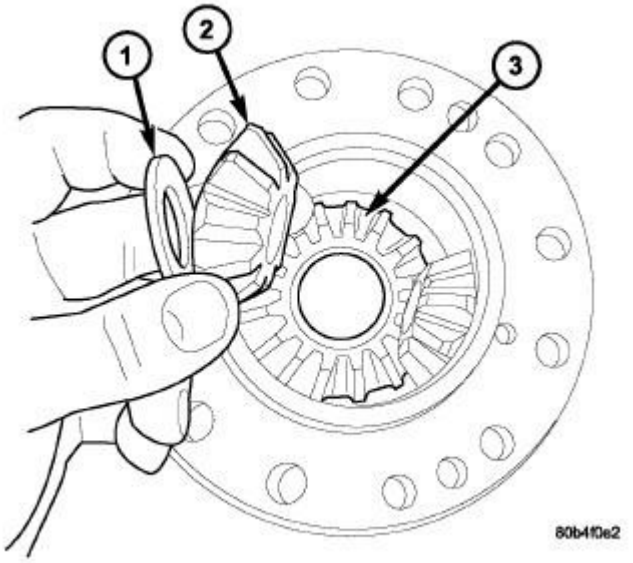


Fig. 129: Pinion Gear and Thrust Washer
Courtesy of CHRYSLER LLC

1 - THRUST WASHER (4) 2 - PINION GEAR (4)

3. Install pinion gear (2) and thrust washer (1) into case.

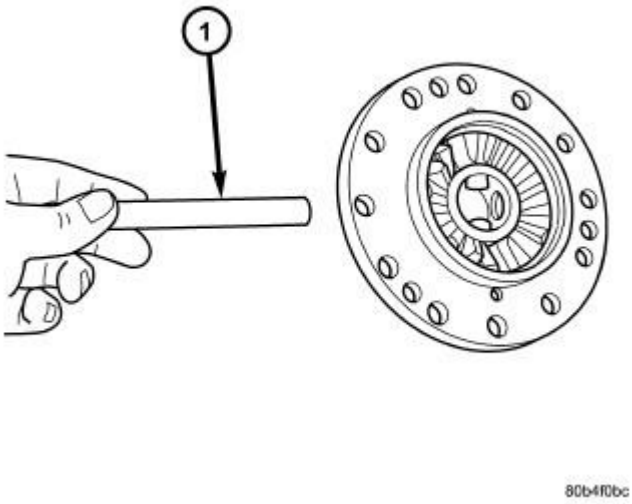


Fig. 130: Long Pinion Shaft
Courtesy of CHRYSLER LLC

1 - PINION SHAFT (LONG)

4. Install pinion shaft (1) .

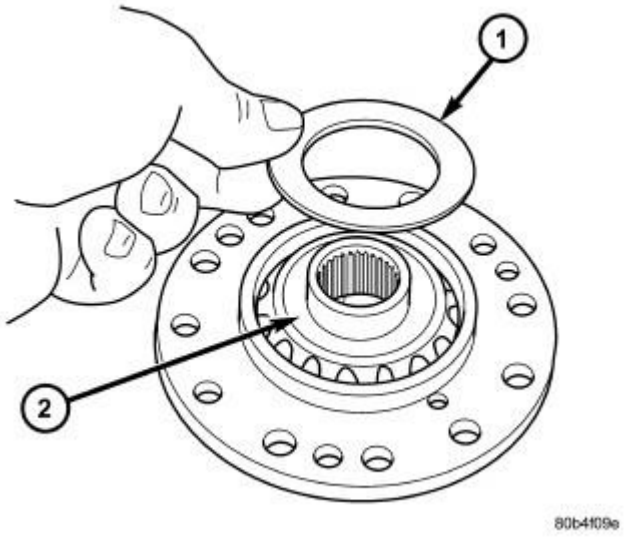


Fig. 131: Removing/Installing Side Gear Thrust Washer & Side Gear
Courtesy of CHRYSLER LLC

1 - SIDE GEAR THRUST WASHER
2 - DIFFERENTIAL SIDE GEAR

5. Install the side gear (2) and the thrust washer (1).

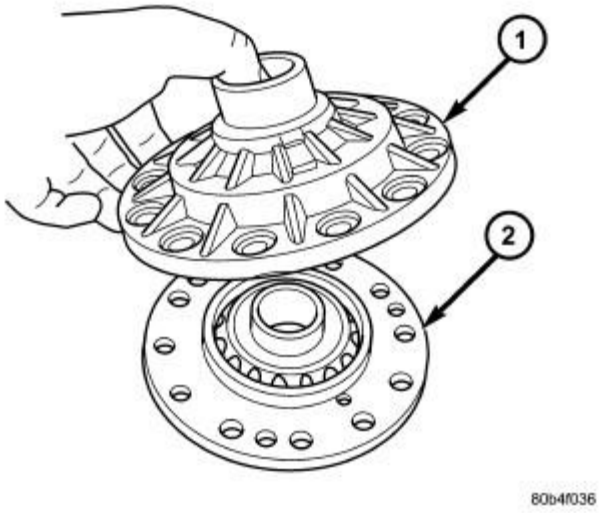


Fig. 132: Differential Support Plate
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL SUPPORT PLATE
2 - DIFFERENTIAL CASE

6. Install differential support (1) onto case (2).

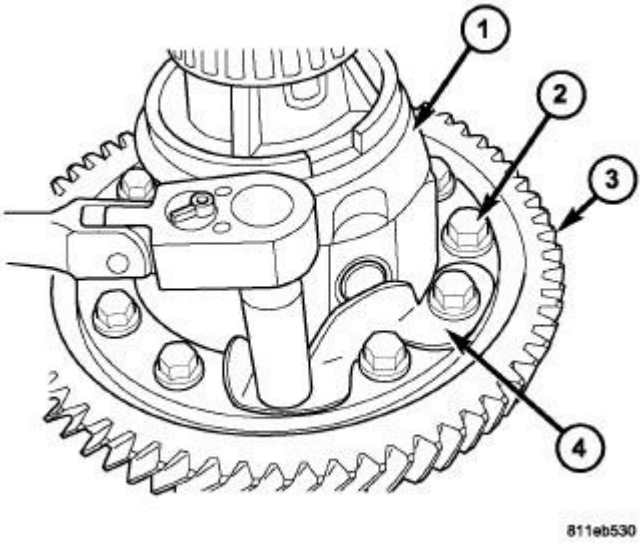


Fig. 133: Differential Ring Gear-to-Case Bolts
Courtesy of CHRYSLER LLC

1 - DIFFERENTIAL CASE
2 - BOLT (12)
3 - RING GEAR
4 - PINION SHAFT RETAINER (2)

7. Install pinion shaft retainer along with **NEW** ring gear-to-case bolts (2) tighten bolts to 95 N.m (70 ft. lbs.).

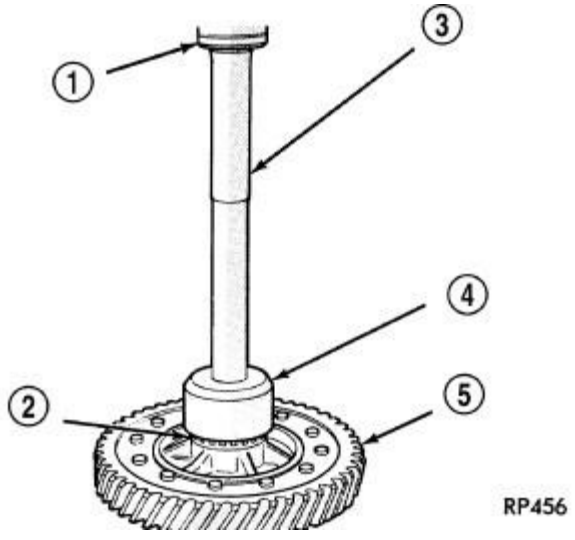


Fig. 134: Installing Differential Bearing Cone to Ring Gear Side
Courtesy of CHRYSLER LLC

1 - ARBOR PRESS RAM 2 - BEARING CONE 3 - HANDLE C-4171 4 - INSTALLER L-4410 5 - DIFFERENTIAL ASSEMBLY

8. Using an arbor press (1) , Handle C-4171 (3), and Installer L-4410 (4), install differential side bearing to ring gear side.

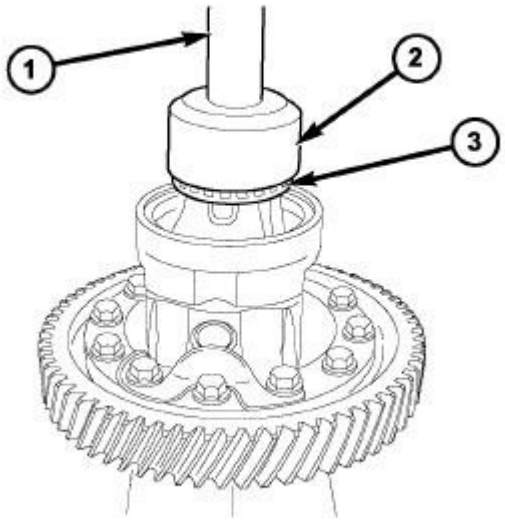


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Fig. 135: Install Bearing Cone to Differential Case Side
Courtesy of CHRYSLER LLC

1 - HANDLE C-4171 2 - INSTALLER L-4410 3 - BEARING CONE

9. Using an arbor press, Handle C-4171 (1) , and Installer L-4410 (2), install differential side bearings (3) to case side. If all wheel drive use Bearing Installer 6053 to install the large bearing.

Measure and Adjust Side Gear End-Play

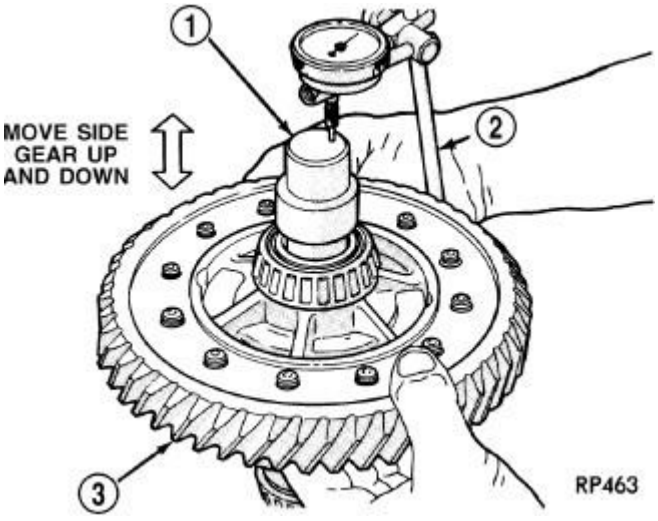


Fig. 136: Checking Side Gear End Play - Typical
Courtesy of CHRYSLER LLC

1. Rotate the assembly two full revolutions both clockwise and counterclockwise. Set up dial indicator and record end play.
2. Rotate side gear 90 degrees and take another measurement (2) . Again, rotate side gear 90 degrees and record a final measurement.
3. Using the smallest end play recorded, shim that side gear to within 0.001 to 0.013 inch. The other side gear should be checked using the same procedure.

CAUTION: Side gear end play must be within 0.001 to 0.013 inch.

ADJUSTMENTS

DIFFERENTIAL BEARING PRELOAD ADJUSTMENT/SHIM SELECTION

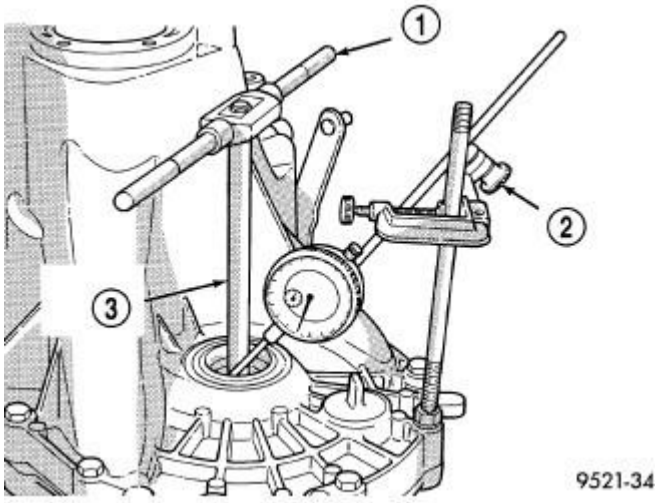


Fig. 137: Checking Differential Bearing End Play to Determine Shim Thickness
Courtesy of CHRYSLER LLC

1 - T-HANDLE
2 - DIAL INDICATOR SET
3 - TORQUE TOOL C-4995A

Measure and adjust differential side bearing preload during any transaxle service, especially when the following components are replaced:

- Transaxle gear case
- Clutch bellhousing case
- Differential case
- Differential bearings

NOTE: True bearing turning torque readings can be obtained only with the geartrain removed from the case.

1. Remove bearing cup and existing shim from clutch bellhousing case.
2. Press in new bearing cup into bellhousing case (or use a cup that has been ground down on the outer edge for ease of measurement).
3. Press in new bearing cup into gear case side.
4. Oil differential bearings with transmission fluid. Install differential assembly in transaxle gear case. Install clutch bellhousing over gear case. Install and torque case bolts to 25 N.m (225 in. lbs.).
5. Position transaxle with bellhousing facing down on workbench with C-clamps. Position dial indicator (2) .

NOTE: Indicator is set up as shown for illustrative purposes only. Indicator must be parallel to T-Handle to obtain the most accurate reading.

6. Apply a medium load to differential with Torque Tool C-4995A (3) and a T-handle (1), in the downward direction. Roll differential assembly back and forth a number of times. This will settle the bearings. Zero the dial indicator (2). To obtain end play readings, apply a medium load in an upward direction while rolling differential assembly back and forth. Record end play.

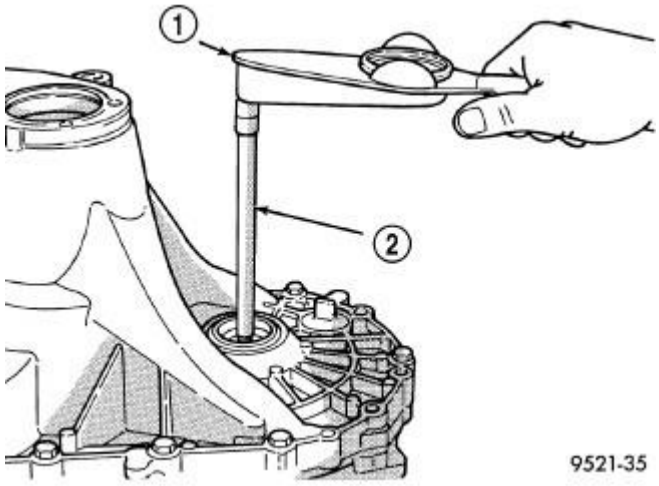


Fig. 138: Checking Differential Bearing Turning Torque
Courtesy of CHRYSLER LLC

1 - INCH-POUND TORQUE WRENCH
2 - TORQUE TOOL C-4995A

7. The shim required for proper bearing preload is the **total of end play, plus (constant) preload of 0.18 mm (0.007 in.).** Never combine shims to obtain the required preload.
8. Remove case bolts. Remove clutch bellhousing differential bearing cup. Install shim(s) selected in 7. Then press the bearing cup into clutch bellhousing.
9. Install clutch bellhousing. Install and tighten case bolts to 25 N.m (225 in. lbs.).
10. Using Torque Tool C-4995A (2) and an inch-pound torque wrenched (1) check turning torque of the differential assembly. **The turning torque should be 6 to 12 in. lbs. If the turning torque is too high, install a 0.05 mm (0.002 inch) thinner shim. If the turning torque is too low, install a 0.05 mm (0.002 inch) thicker shim.**
11. Recheck turning torque. Repeat 10 until the proper turning torque is obtained.

FLUID

STANDARD PROCEDURE

FLUID DRAIN AND FILL

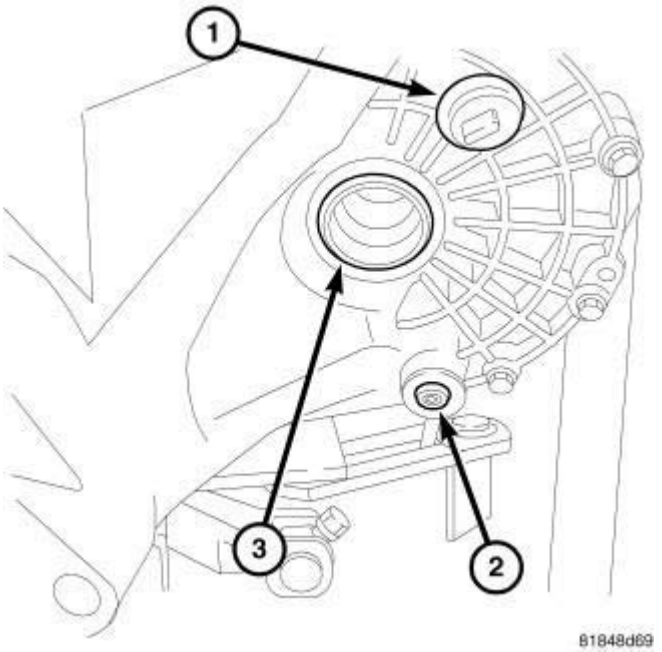


Fig. 139: Removing/Installing Transaxle Oil Drain Plug
Courtesy of CHRYSLER LLC

NOTE: All T355 Manual Transaxles require the use of ATF+4 (Automatic Transmission Fluid).

The transaxle fill plug (1) is located on the left side of the transaxle differential area. The fluid level should be within 3/16 inch from the bottom of the transaxle fill hole (vehicle must be level when checking).

The transaxle drain plug (2) is located on the lower right side of the transaxle differential housing. Tighten drain plug to 14 N.m (120 in. lbs.).

INPUT SHAFT, TRANSMISSION

DISASSEMBLY

DISASSEMBLY

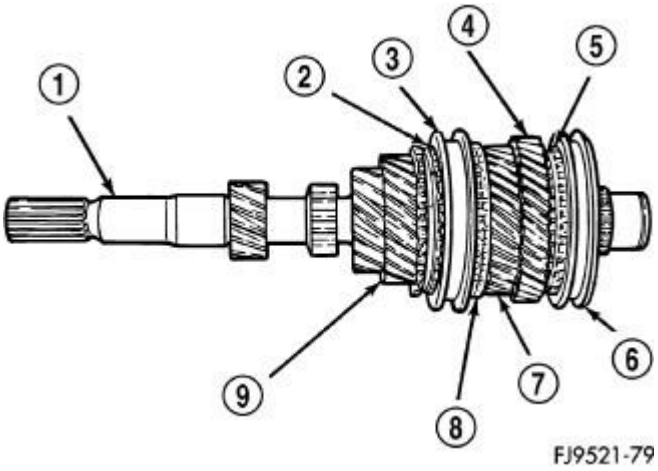


Fig. 140: Input Shaft
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - STOP RING
3 - SLEEVE
4 - 5TH SPEED GEAR
5 - STOP RING
6 - SLEEVE
7 - 4TH SPEED GEAR
8 - STOP RING
9 - 3RD SPEED GEAR

NOTE: Ring gaps must be measured with synchronizer ring biased towards gear clutching teeth on gear cone as much as possible while measuring gaps.

Before disassembly of the input shaft (1) , it is necessary to check the synchronizer stop ring gap. Use a feeler gauge to measure the gaps between the stop rings (2, 5, and 8) and the speed gears. The correct gaps are listed below:

- 3rd - 0.73-1.53 mm (0.029-0.060 in)
- 4th - 0.77-1.57 mm (0.030-0.062 in).
- 5th - 0.73-1.53 mm (0.029-0.060 in)
- Reverse Brake - 0.505-1.74 mm (0.020-0.068 in.)

The reverse brake measurement is taken between the stop ring and case.

If a stop ring gap does not fall within the specifications, it must be inspected for wear and replaced. If the 1st or 2nd synchronizer stop ring is worn beyond specifications, the complete output shaft assembly must be replaced.

The input shaft incorporates the 3rd, 4th, and 5th speed gears and synchronizers on the assembly.

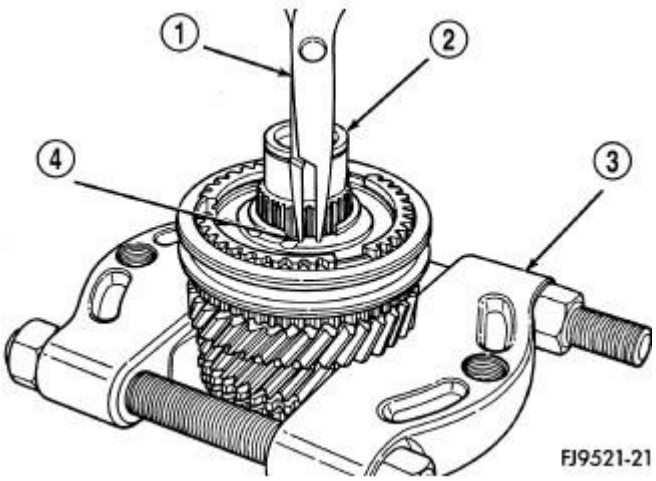


Fig. 141: Removing/Installing Snap Ring At 5th Synchronizer Hub On Input Shaft
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS 2 - INPUT SHAFT 3 - BEARING SPLITTER 4 - SNAP RING

1. Install Bearing Splitter 1130 (3) behind 5th speed gear. Remove snap ring (4) at 5th synchronizer hub on input shaft (2).

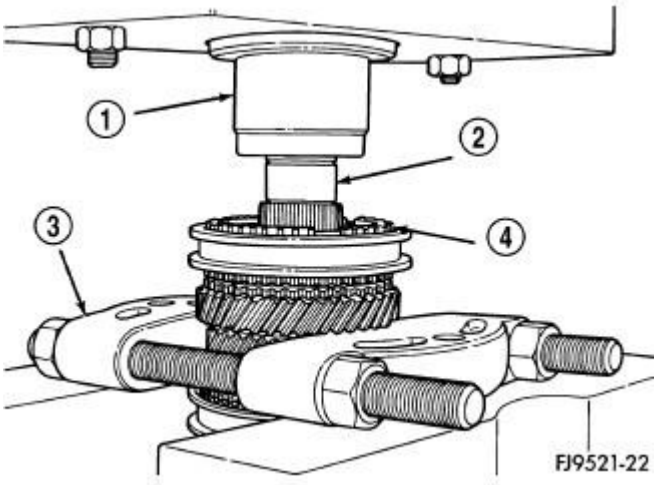


Fig. 142: Remove Synchronizer Using Shop Press
Courtesy of CHRYSLER LLC

1 - PRESS RAM 2 - INPUT SHAFT 3 - BEARING SPLITTER

4 - SYNCHRONIZER ASSEMBLY

2. Remove synchronizer (4) and gear using shop press (1).

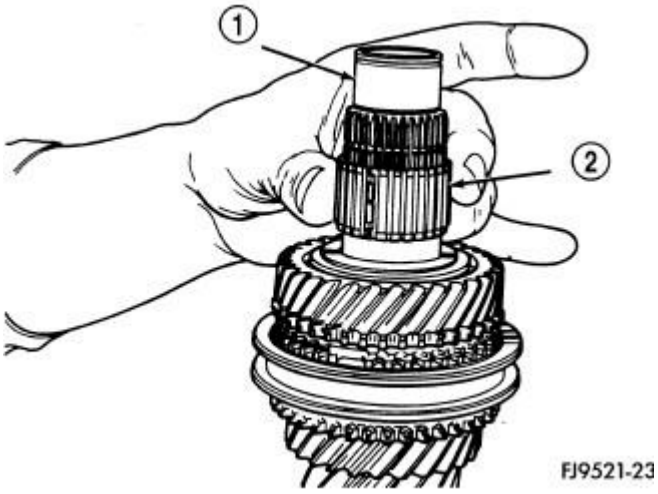


Fig. 143: Caged Needle Bearing Removal/Installation
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - CAGED NEEDLE BEARING

3. Remove caged needle bearing (2) .

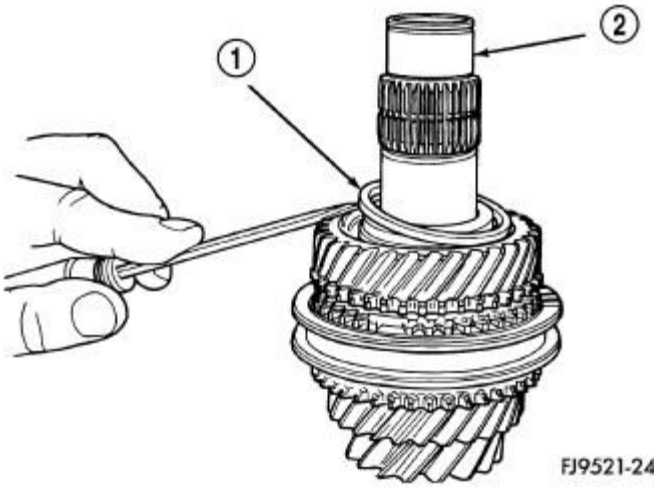


Fig. 144: Split Thrust Washer Ring
Courtesy of CHRYSLER LLC

1 - SPLIT THRUST WASHER RING
2 - INPUT SHAFT

4. Remove 4-5 gears split thrust washer ring (1) .

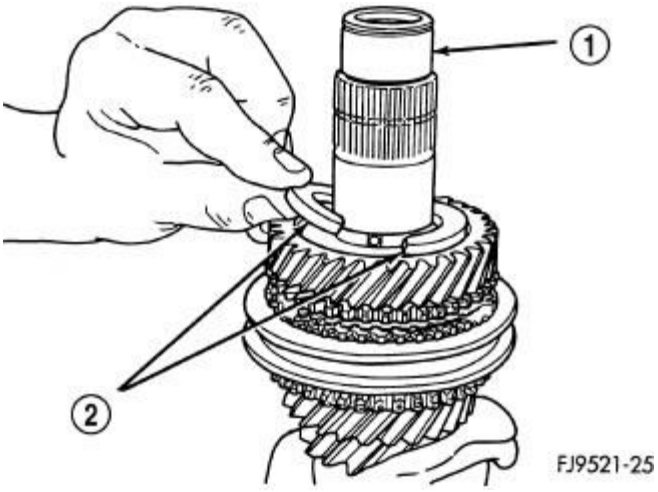


Fig. 145: Split Thrust Washer Removal/Installation
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - SPLIT THRUST WASHER

5. Remove split thrust washer (2) .

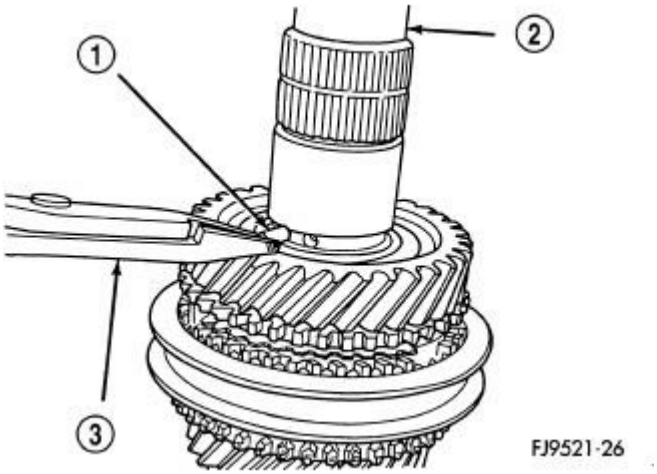


Fig. 146: Split Thrust Washer Separation Pin
Courtesy of CHRYSLER LLC

1 - SEPARATION PIN 2 - INPUT SHAFT 3 - PLIERS

6. Remove split thrust washer separation pin (1) .

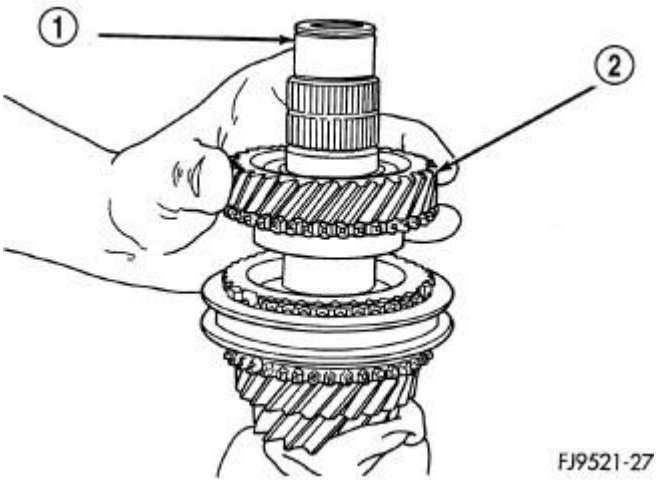


Fig. 147: 4th Gear Removal
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT

2 - 4TH GEAR

7. Remove 4th gear (2) .

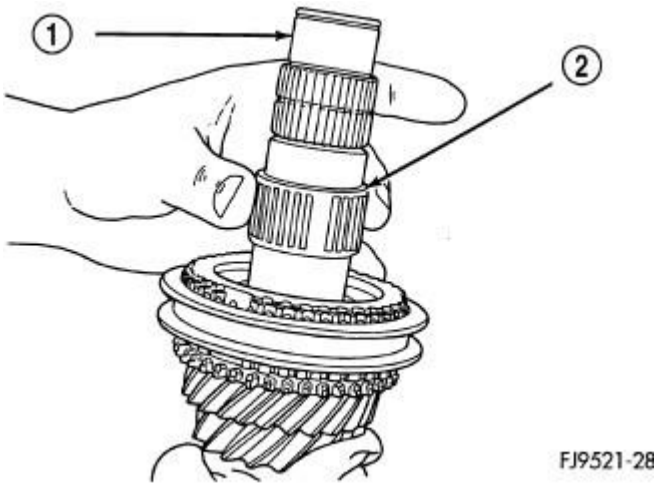


Fig. 148: Caged Needle Bearing Removal
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - CAGED NEEDLE BEARING

8. Remove 4th gear caged needle bearing (2) . Check the caged needle bearing (2) for a broken retention spring.

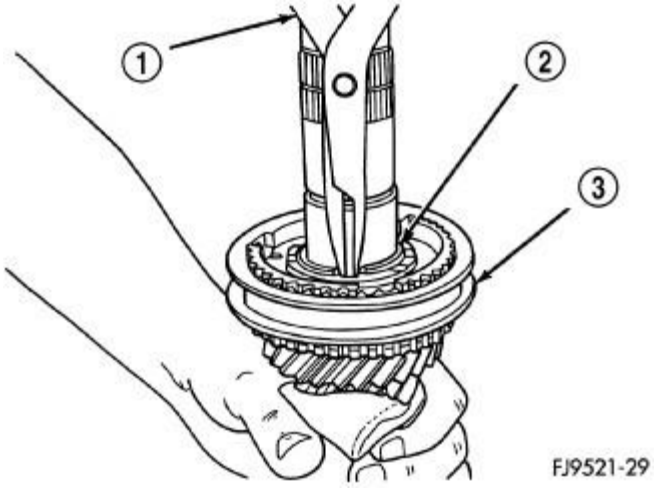


Fig. 149: 3-4 Synchronizer Hub Snap Ring

Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS
2 - SYNCHRO SNAP RING
3 - SYNCHRONIZER ASSEMBLY

9. Remove blocking ring. Remove 3-4 synchronizer hub retaining snap ring (3) .

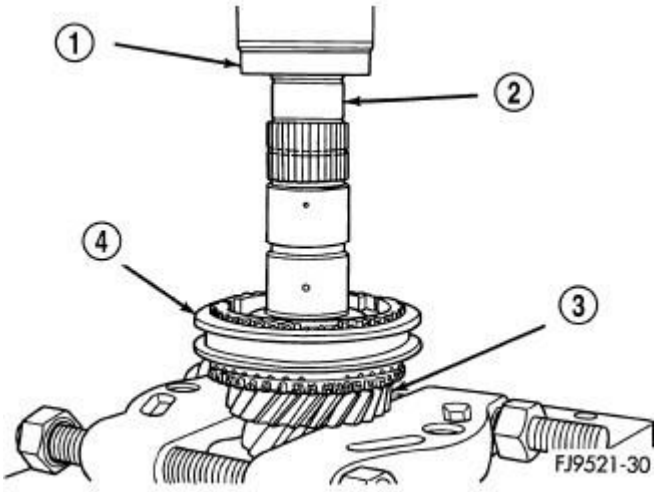


Fig. 150: 3rd Gear Removal
Courtesy of CHRYSLER LLC

1 - PRESS RAM
2 - INPUT SHAFT
3 - 3RD GEAR
4 - SYNCHRONIZER ASSEMBLY

10. Install input shaft in shop press (1) . Using Bearing Splitter 1130, remove 3-4 synchronizer and 3rd gear (3).

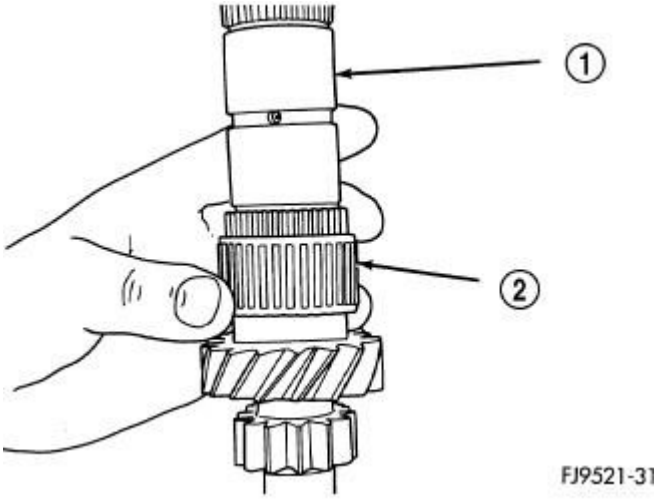


Fig. 151: Removing/Installing 3rd Gear Caged Needle Bearing
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - 3RD GEAR CAGED NEEDLE BEARING

11. Remove 3rd gear caged needle bearing (2) . Inspect needle bearing for a broken retention spring.
12. Inspect the input shaft for worn or damaged bearing races or chipped gear teeth. Replace as necessary.

ASSEMBLY

ASSEMBLY

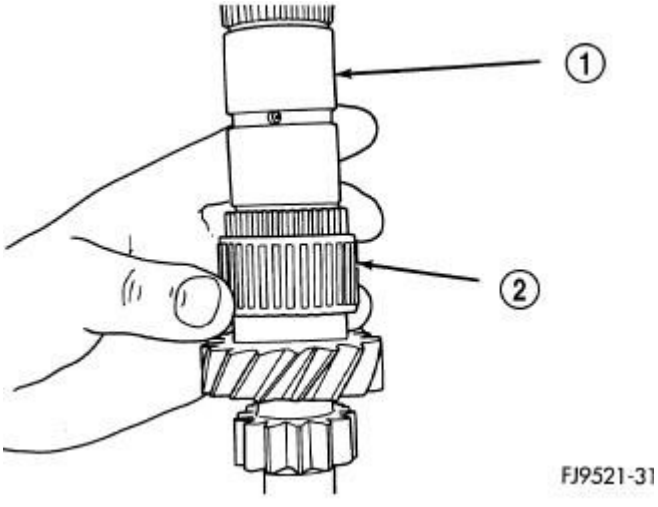


Fig. 152: Removing/Installing 3rd Gear Caged Needle Bearing
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT 2 - 3RD GEAR CAGED NEEDLE BEARING

1. Place input shaft into shop press.
2. Install 3rd gear caged needle bearing (2) .

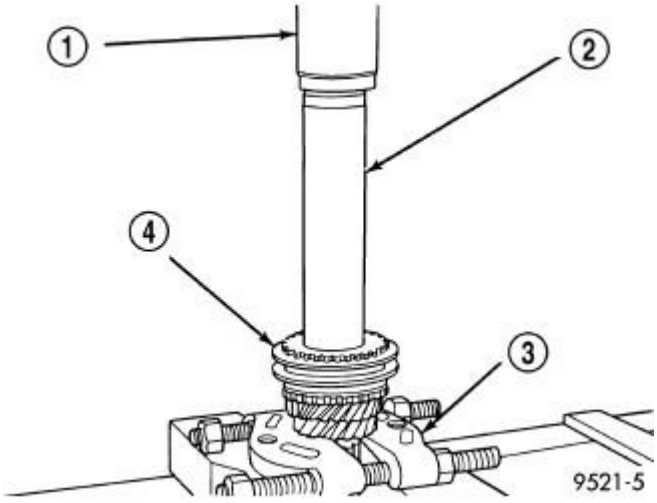


Fig. 153: 3rd Gear Synchronizer Assembly
Courtesy of CHRYSLER LLC

1 - PRESS RAM 2 - SLEEVE C-3717 3 - BEARING SPLITTER 4 - 3RD GEAR SYNCHRONIZER ASSEMBLY

3. Install 3rd gear and 3-4 synchronizer (4) onto input shaft. Position Installer 6448A (2) over input shaft and press on synchronizer hub and 3rd gear. The synchronizer hub has the letter **U** stamped on the top face of the hub. This designates that the hub must be installed with the **U** facing upward.

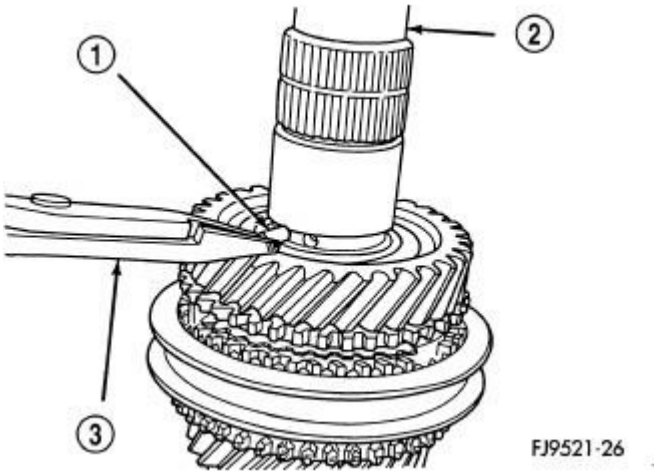


Fig. 154: Split Thrust Washer Separation Pin
Courtesy of CHRYSLER LLC

1 - SEPARATION PIN
2 - INPUT SHAFT
3 - PLIERS

4. Install a **new** 3-4 synchronizer snap ring into slot on input shaft.
5. Install blocking ring into 3-4 synchronizer. Install 4th gear caged needle bearing.
6. Install 4th gear onto input shaft.
7. Install 4-5 split thrust washer separation pin (1) .

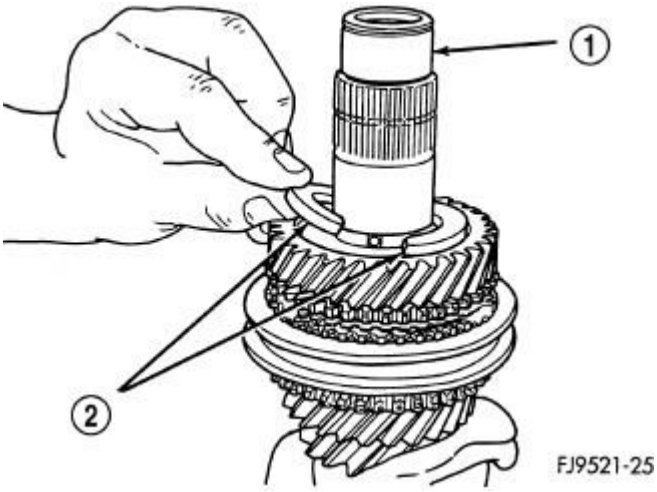


Fig. 155: Split Thrust Washer Removal/Installation
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT 2 - SPLIT THRUST WASHER

8. Install split thrust washer (2) onto input shaft (1).

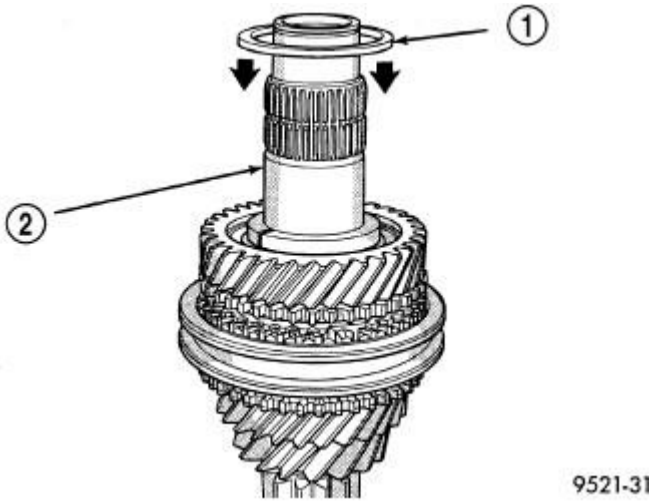


Fig. 156: Retaining Ring Installation
Courtesy of CHRYSLER LLC

1 - SPLIT THRUST WASHER RING 2 - INPUT SHAFT

9. Install split thrust washer retaining ring (1) .

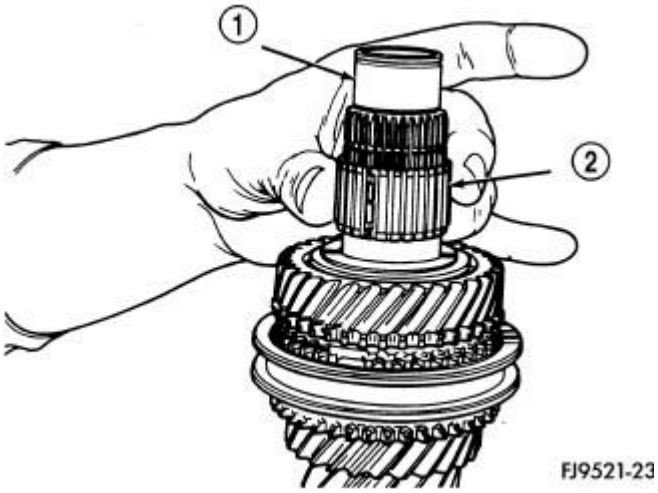


Fig. 157: Caged Needle Bearing Removal/Installation
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT 2 - CAGED NEEDLE BEARING

10. Install 5th gear caged needle bearing (2) .

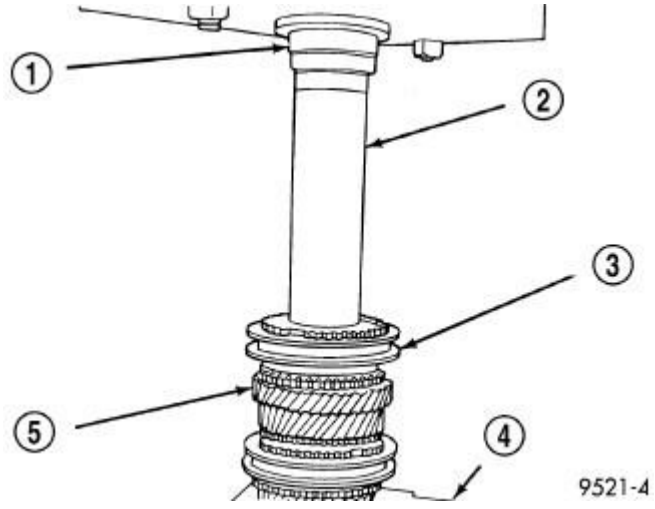


Fig. 158: 5th Speed Gear Installation
Courtesy of CHRYSLER LLC

1 - PRESS RAM 2 - SLEEVE C-3717

3 - SYNCHRONIZER ASSEMBLY 4 - BEARING SPLITTER 5 - 5TH SPEED GEAR

11. Using Installer 6448A (2) , install 5th speed gear (5) and synchronizer (3). The 5th gear synchronizer hub has the letter **S** stamped on the top face of the hub. This designates that the hub must be installed with the **S** facing upward.

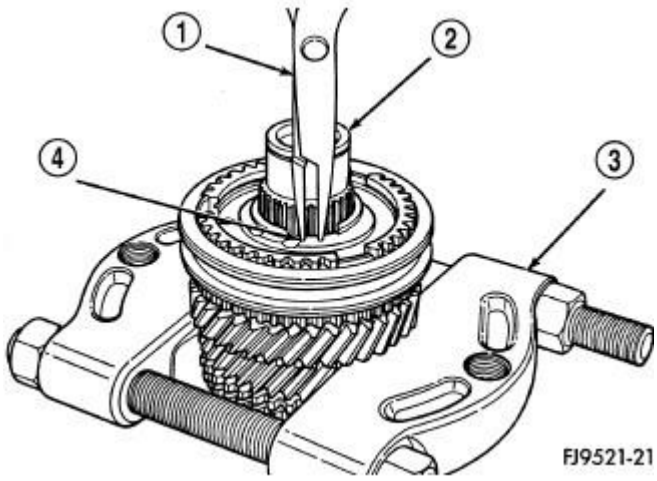


Fig. 159: Removing/Installing Snap Ring At 5th Synchronizer Hub On Input Shaft
Courtesy of CHRYSLER LLC

1 - SNAP RING PLIERS 2 - INPUT SHAFT 3 - BEARING SPLITTER 4 - SNAP RING

12. Install a **new** 5th gear synchronizer snap ring (4) .

LEVER, SHIFT

REMOVAL

REMOVAL

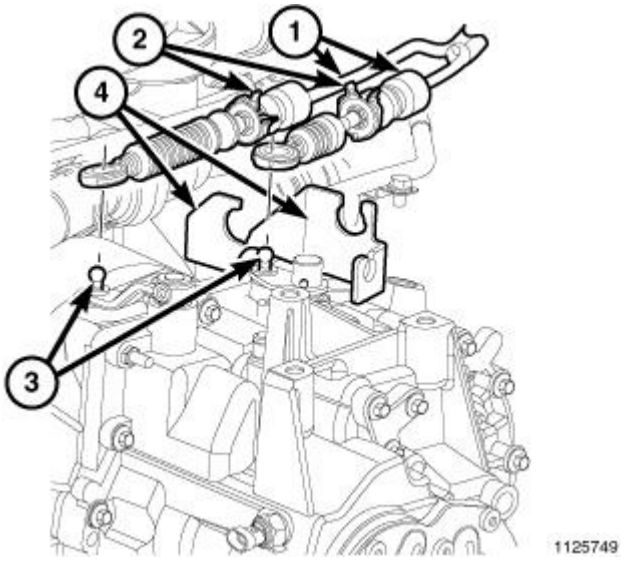


Fig. 160: Removing/Installing Cables At Shift Lever
Courtesy of CHRYSLER LLC

1. Disconnect select cable (2) from select lever (3) and cable bracket.
2. Using a pin punch, remove the select roll pin from lever.
3. Pull up and remove the select lever from the transaxle select shaft.

INSTALLATION

INSTALLATION

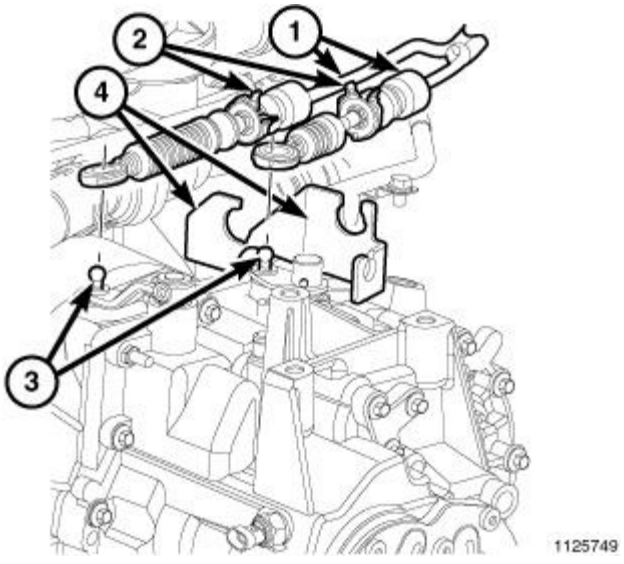


Fig. 161: Removing/Installing Cables At Shift Lever
Courtesy of CHRYSLER LLC

1. Install select lever to shaft and fasten with NEW roll pin.
2. Install select cable to bracket. Fasten with clip.
3. Install select cables (2) to select lever (3).

MECHANISM, GEARSHIFT

REMOVAL

REMOVAL

1. Detach gear shift boot from console.
2. Remove rear power window switch (if equipped) and disconnect harness from console.
3. Remove the center console assembly. Refer to **Body/Interior/CONSOLE, Center - Removal** .

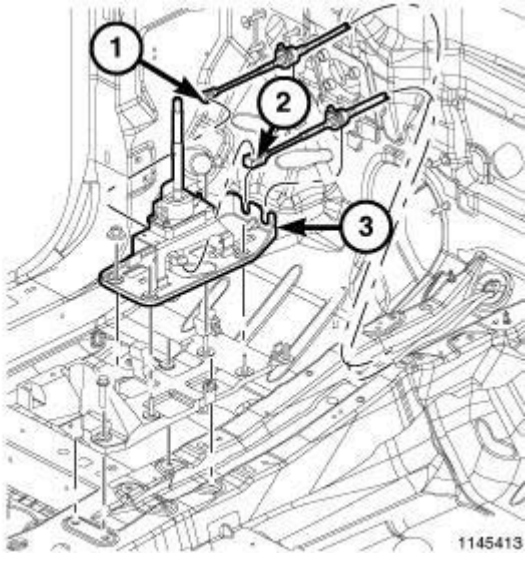


Fig. 162: Remove/Install Shifter Cables Into Shifter Base
Courtesy of CHRYSLER LLC

4. Remove the Shifter Cables (1) and (2) from the Shift Levers.

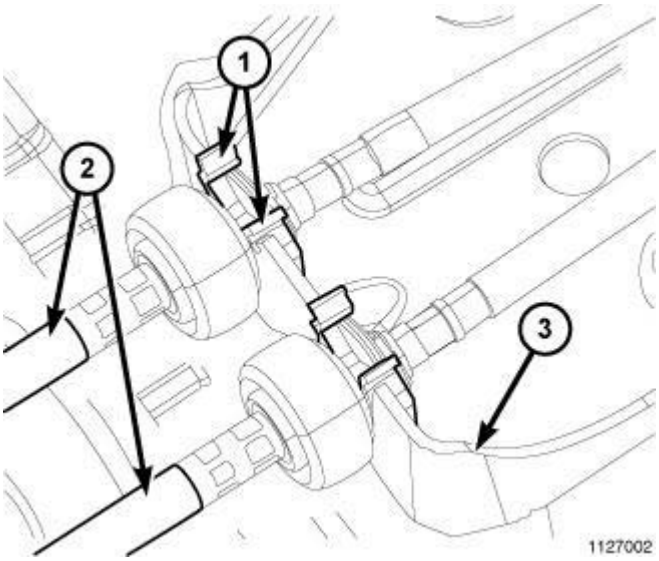


Fig. 163: Cable Retaining Clips And Cables
Courtesy of CHRYSLER LLC

NOTE: Squeeze one side tab, roll fitting upward, then squeeze other side tab, then remove cable from the Shifter Base

5. Remove the Cables (2) from the Shifter Base (3).

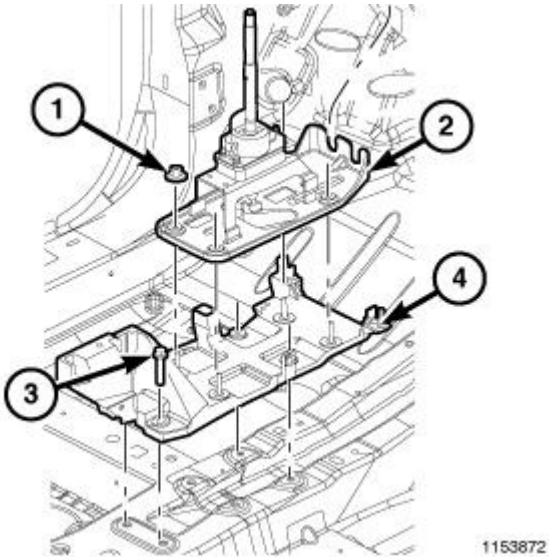


Fig. 164: Removing/Installing Shifter Assembly
Courtesy of CHRYSLER LLC

6. Remove the Shifter Assembly Nuts (1) and remove the Shifter Assembly (2).

INSTALLATION

INSTALLATION

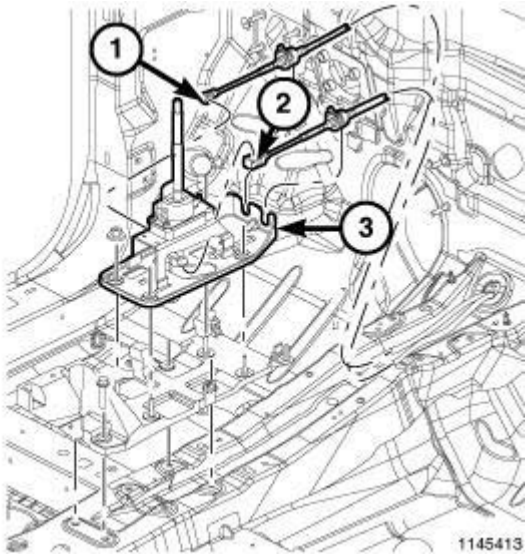


Fig. 165: Remove/Install Shifter Cables Into Shifter Base
Courtesy of CHRYSLER LLC

NOTE: The cable with the black end fitting (1) installs with the barbed side up on the left side of the shifter

1. Install the Shifter Cables (1) and (2) to the Shift Levers.

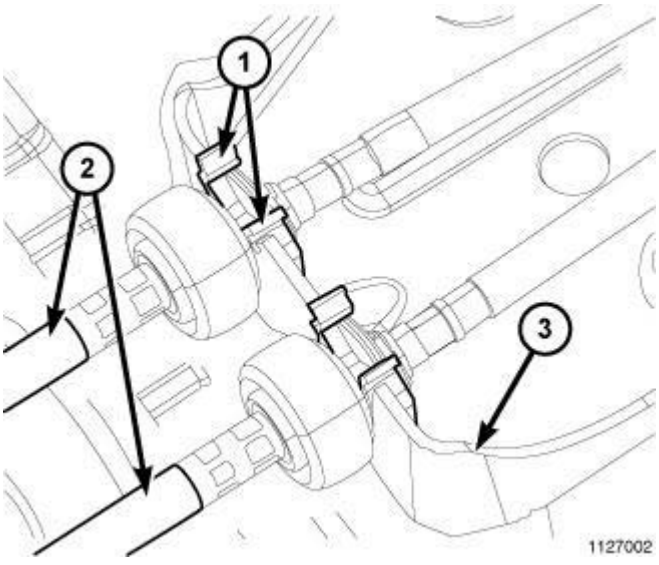


Fig. 166: Cable Retaining Clips And Cables
Courtesy of CHRYSLER LLC

2. Install the Cables (2) to the Shifter Bracket (5).

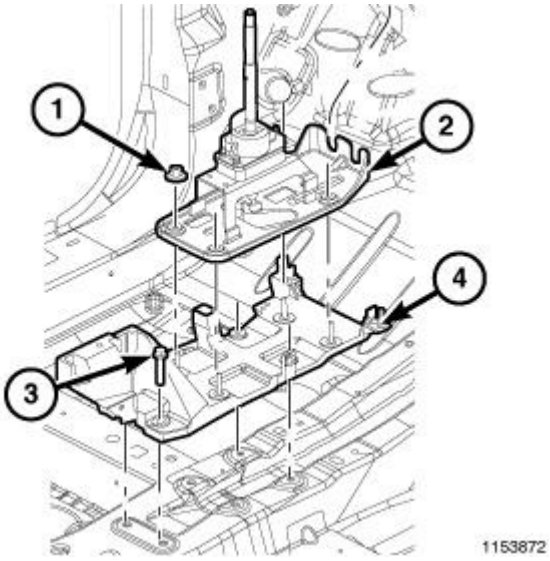


Fig. 167: Removing/Installing Shifter Assembly
Courtesy of CHRYSLER LLC

3. Install the Shifter Assembly (2) and the Shifter Assembly Nuts (1). Tighten nuts (2) to 7 N.m (61 in. lbs.).
4. Install center console assembly. Refer to **Body/Interior/CONSOLE, Center - Installation** .
5. Install rear power window switch (if equipped) and fasten harness to console
6. Attach gearshift boot to center console assembly.
7. Verify that shift pattern is aligned properly.

SEAL, AXLE DRIVE SHAFT

REMOVAL

REMOVAL

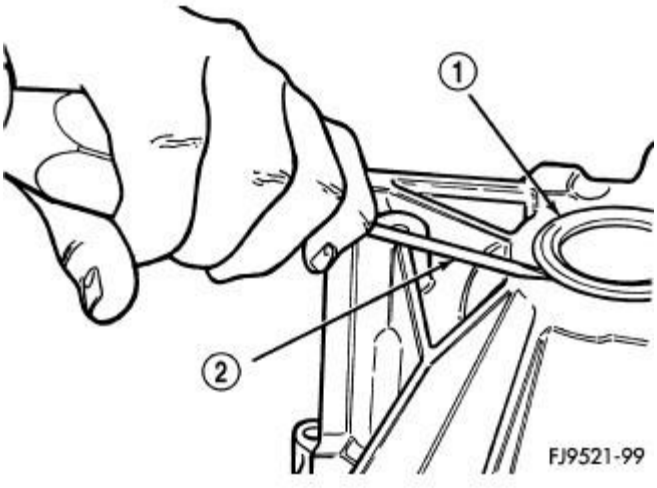


Fig. 168: Axle Shaft Seal Removal

Courtesy of CHRYSLER LLC

1. Remove axle shaft. Refer to **Differential and Driveline/Half Shaft - Removal** .
2. Insert a flat-blade pry tool (2) at outer edge of axle shaft seal (1).
3. Tap on the pry tool (2) with a small hammer and remove axle shaft seal (1).

INSTALLATION

INSTALLATION

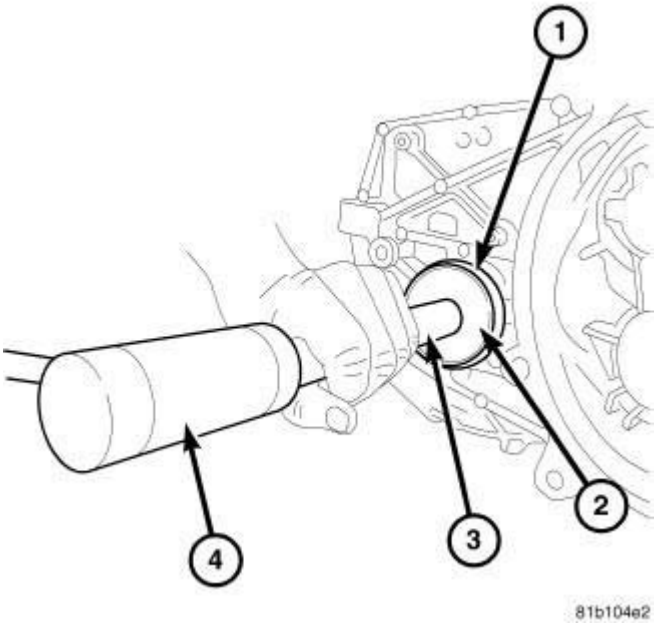


Fig. 169: Aligning Axle Shaft Seal With Axle Shaft Seal Bore
Courtesy of CHRYSLER LLC

1. Clean axle shaft seal bore of any excess sealant.
2. Align (bellhousing side) axle shaft seal with axle shaft seal bore.
3. Install axle seal on Seal Installer 9928 and Handle C-4171 and insert into axle shaft seal bore.
4. Tap seal into position until seated against transaxle case.

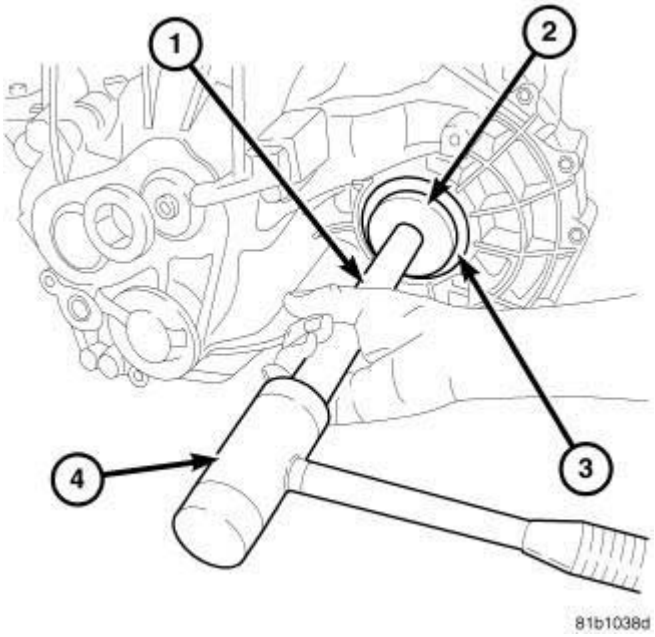


Fig. 170: Installing (Case Side) Axle Seal On Seal Installer 9934 & Handle C-4171, & Inserting Into Axle Shaft Seal Bore
Courtesy of CHRYSLER LLC

5. Align axle shaft seal with axle shaft seal bore.
6. Install (case side) axle seal on Seal Installer 9934 and Handle C-4171 and insert into axle shaft seal bore.
7. Tap seal into position until seated against transaxle case.
8. Install axle shaft. Refer to **Differential and Driveline/Half Shaft - Installation** .
9. Check transaxle fluid level and adjust as necessary.

SEAL, INPUT SHAFT

REMOVAL

REMOVAL

1. Remove the transaxle. See **Removal** .
2. Remove seal.

INSTALLATION

INSTALLATION

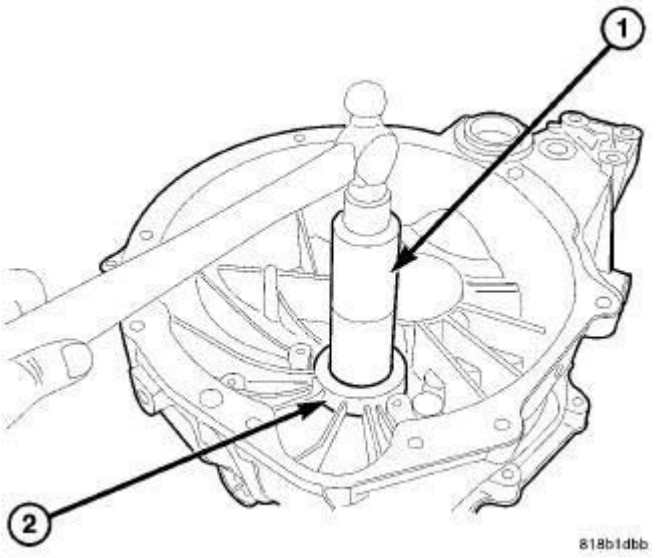


Fig. 171: Installing Input Shaft Seal Using Installer 8864
Courtesy of CHRYSLER LLC

1. Install input shaft seal (2) using installer 8864 (1).
2. Install the transaxle. See **Installation** .

SEALS, SHIFT SHAFT

REMOVAL

REMOVAL

It is not necessary to remove the shift shafts from the transaxle to service the shift shaft seals.

1. Using a pick tool, pry up on the shift shaft seal, and remove seal from bore.

INSTALLATION

INSTALLATION

1. Position new shift shaft seal into bore.
2. Install shift shaft seal into bore using an appropriate size deep-well socket.

SENSOR, VEHICLE SPEED

DESCRIPTION

DESCRIPTION

The Vehicle Speed Sensor (VSS) is a hall effect sensor mounted above the transaxle differential. The sensor is triggered by the ring gear teeth passing below it. The VSS pulse signal to the speedometer/odometer is monitored by the PCM speed control circuitry to determine vehicle speed and to maintain speed control set speed.

REMOVAL

REMOVAL

1. Open hood.
2. Remove the air cleaner housing. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .
3. Disconnect the speed sensor connector.

CAUTION: Clean area around speed sensor before removing to prevent dirt from entering the transaxle during speed sensor removal.

4. Remove speed sensor retaining bolt.
5. Remove speed sensor from transaxle.

INSTALLATION

INSTALLATION

1. Using a NEW O-ring, install the speed sensor to the transaxle.
2. Install the bolt and tighten to 7 N.m (60 in. lbs.).
3. Connect speed sensor connector.
4. Install the air cleaner housing. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .

SHAFT, OUTPUT

DISASSEMBLY

DISASSEMBLY

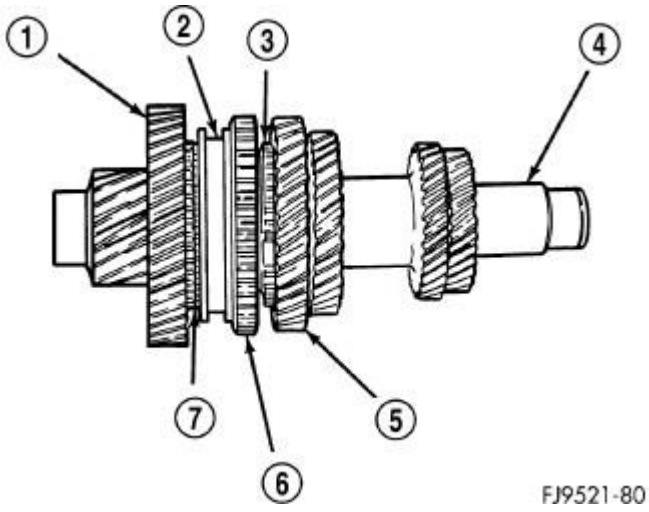


Fig. 172: Output Shaft
Courtesy of CHRYSLER LLC

1 - 1ST GEAR
2 - SLEEVE
3 - STOP RING
4 - OUTPUT SHAFT
5 - 2ND SPEED GEAR
6 - REVERSE GEAR
7 - STOP RING

CAUTION: The output shaft is serviced as an assembly. Do not try to repair any component on the output shaft. If the 1-2 synchronizer or gear fails, it is necessary to replace the output shaft assembly.

NOTE: Ring gaps must be measured with synchronizer ring biased towards gear clutching teeth on gear cone as much as possible while measuring gaps.

It is necessary to check the synchronizer stop ring gap. Use a feeler gauge to measure the gaps between the stop rings and the speed gears . The correct gaps are listed below:

- 1st - 0.522-2.208 mm (0.021-0.087 in)
- 2nd - 0.522-2.208 mm (0.021-0.087 in)

If a stop ring gap does not fall within the specifications it must be inspected for wear and replaced. If the 1st or 2nd synchronizer stop ring is worn beyond specifications, the complete output shaft assembly must be replaced.

The output shaft incorporates the 1st and 2nd gears and synchronizers on the assembly.

INSPECTION

INSPECTION

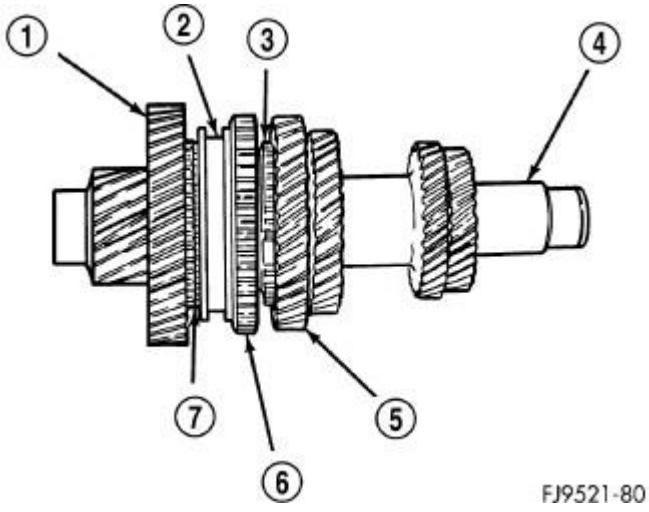


Fig. 173: Output Shaft
Courtesy of CHRYSLER LLC

1 - 1ST GEAR
2 - SLEEVE
3 - STOP RING
4 - OUTPUT SHAFT
5 - 2ND SPEED GEAR
6 - REVERSE GEAR
7 - STOP RING

CAUTION: The output shaft is serviced as an assembly. Do not try to repair any component on the output shaft. If the 1-2 synchronizer or gear fails, it is necessary to replace the output shaft assembly.

It is necessary to check the synchronizer stop ring gap. Use a feeler gauge to measure the gaps between the stop rings and the speed gears (3, 7) . The correct gaps are listed below:

- 1st - 0.522-2.208 mm (0.021-0.087 in)
- 2nd - 0.522-2.208 mm (0.021-0.087 in)

If a stop ring gap does not fall within the specifications it must be inspected for wear and replaced. If the 1st or 2nd synchronizer stop ring is worn beyond specifications, the complete output shaft assembly must be replaced.

The output shaft incorporates the 1st and 2nd gears and synchronizers on the assembly.

SHAFT, SELECT

REMOVAL

REMOVAL

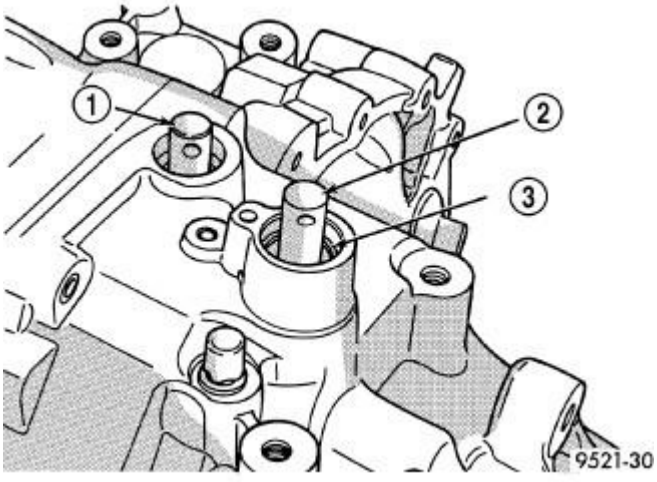


Fig. 174: Crossover Shaft Snap Ring
Courtesy of CHRYSLER LLC

1 - SELECTOR SHAFT 2 - CROSSOVER SHAFT 3 - SNAP RING

1. Disassemble transaxle.
2. With the transaxle disassembled, remove the select shaft seal.
3. Using snap-ring pliers, remove the snap ring (3) at the select shaft bore.
4. Push the select shaft (2) in the case and remove the select assembly.

INSTALLATION

INSTALLATION

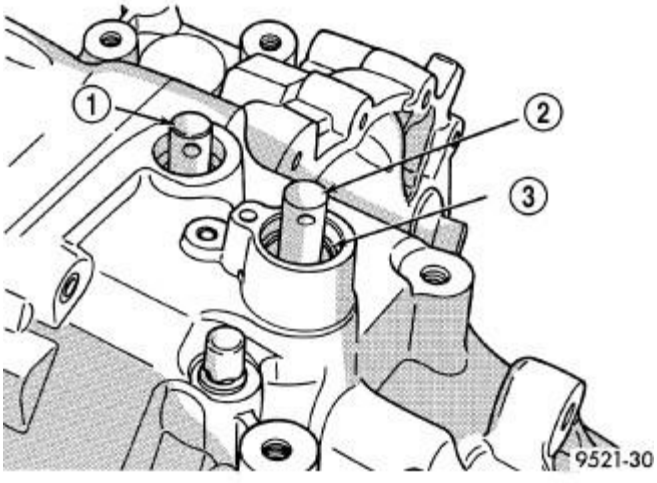


Fig. 175: Crossover Shaft Snap Ring
Courtesy of CHRYSLER LLC

1 - SELECTOR SHAFT 2 - CROSSOVER SHAFT 3 - SNAP RING

1. Install select shaft to case and install snap ring (3) .
2. Install the select shaft seal.
3. Assemble transaxle.

SHAFT, SHIFT

REMOVAL

REMOVAL

1. Disassemble transaxle.
2. With the transaxle disassembled, remove the shift shaft by pushing on the shaft from the outside. Pull shaft out from the inside.

INSTALLATION

INSTALLATION

1. Pull shift shaft into position from the outside.
2. Assemble transaxle.

SWITCH, BACKUP LAMP

REMOVAL

REMOVAL

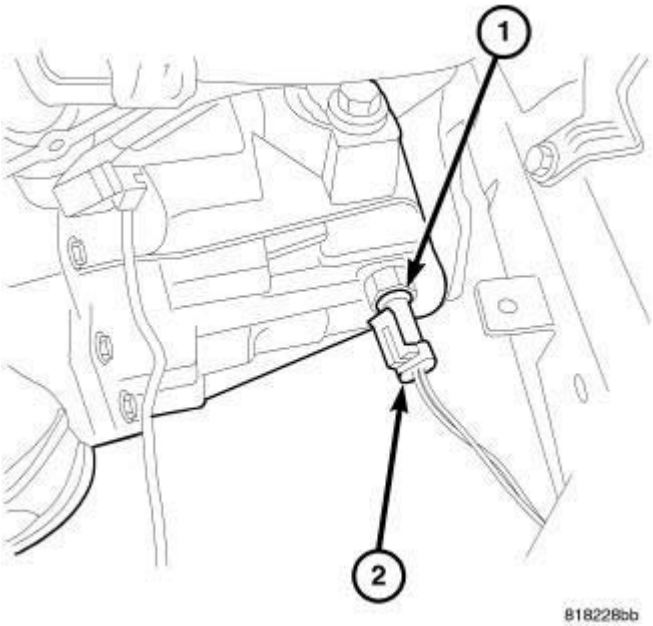


Fig. 176: Removing/Installing Back-Up Lamp Switch Connector
Courtesy of CHRYSLER LLC

1. Lift vehicle on hoist.
2. From bottom side of vehicle, disconnect back-up lamp switch connector (2).

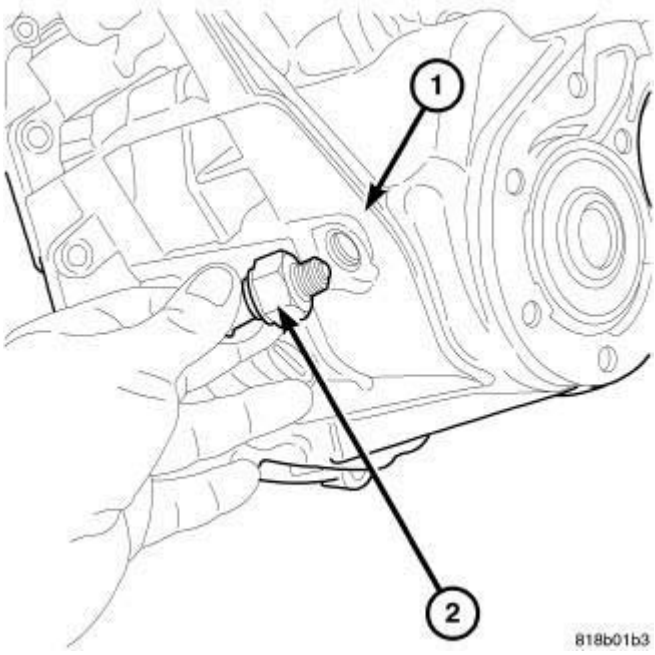


Fig. 177: Removing/Installing Backup Lamp Switch
Courtesy of CHRYSLER LLC

3. Unscrew switch (2) from transaxle.

INSTALLATION

INSTALLATION

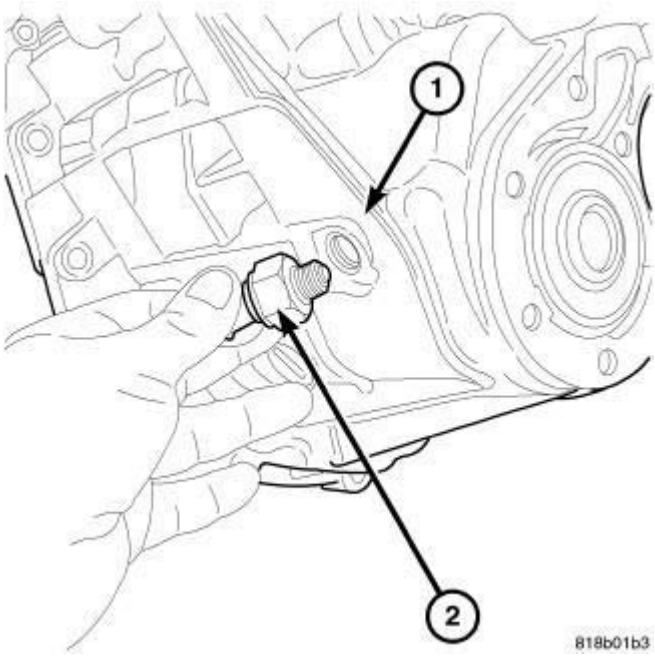


Fig. 178: Removing/Installing Backup Lamp Switch
Courtesy of CHRYSLER LLC

1. Install back-up lamp switch (2). Teflon tape or equivalent must be used on switch threads. Tighten switch to 24 N.m (18 ft. lbs.).

CAUTION: Do not overtighten switch.

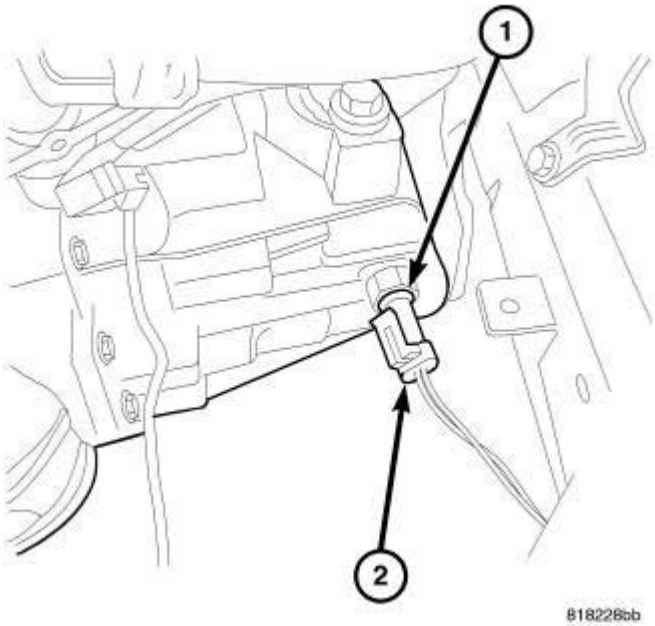


Fig. 179: Removing/Installing Back-Up Lamp Switch Connector
Courtesy of CHRYSLER LLC

2. Connect back-up lamp switch connector (2).
3. Lower vehicle.
4. Verify back-up lamp operation.

SYNCHRONIZER

DISASSEMBLY

DISASSEMBLY

Place synchronizer in a clean shop towel and wrap. Press on inner hub. Carefully open up shop towel and remove springs, balls, keys, hub, and sleeve.

CLEANING

CLEAN

Do not attempt to clean the blocking rings in solvent. The friction material will become contaminated. Place synchronizer components in a suitable holder and clean and air dry.

INSPECTION

INSPECT

Proper inspection of components involve:

- Teeth, for wear, scuffed, nicked, burred, or broken teeth
- Keys, for wear or distortion
- Balls and springs, for distortion, cracks, or wear

If any of these conditions exist in these components, replace as necessary.

ASSEMBLY

ASSEMBLY

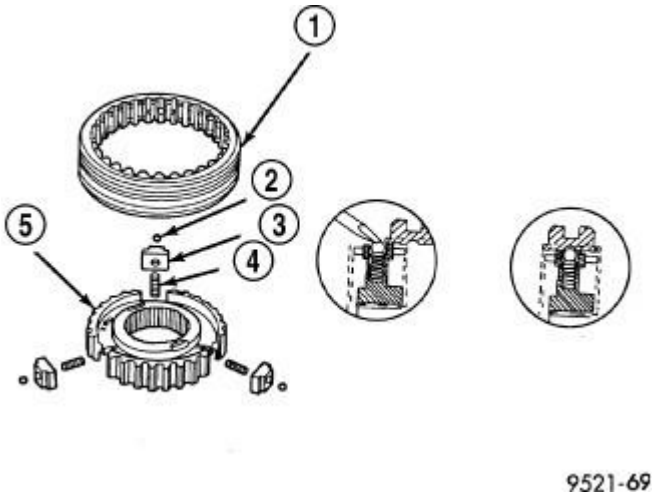


Fig. 180: Synchronizer Assembly
Courtesy of CHRYSLER LLC

1 - SLEEVE
2 - BALL
3 - KEY
4 - SPRING
5 - HUB

1. Position synchronizer hub (5) onto a suitable holding fixture (input shaft). The synchronizer hubs (5) are directional. The hubs must be installed with the **U** facing upward.
2. Install springs (4) into hub slot.

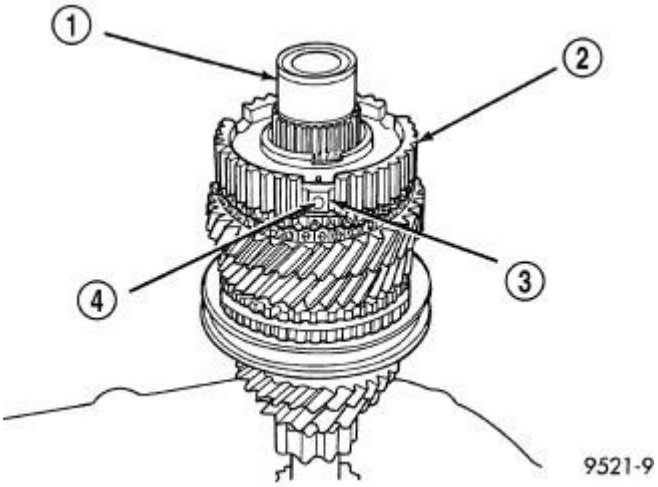


Fig. 181: Inserting Synchronizer Balls Into Keys
Courtesy of CHRYSLER LLC

1 - INPUT SHAFT
2 - HUB
3 - KEY
4 - BALL

3. Insert key (3) into hub (2) and spring.
4. Apply petroleum jelly to the hole in the key. Insert balls (4) into each key.

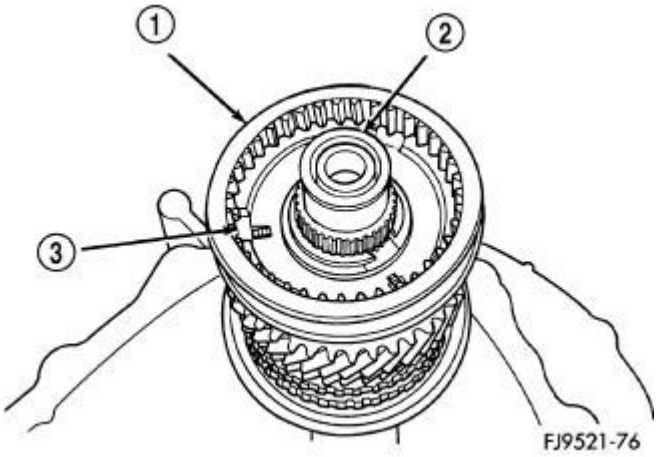


Fig. 182: Identifying Synchronizer Sleeve, Input Shaft, & Key
Courtesy of CHRYSLER LLC

1 - SLEEVE
2 - INPUT SHAFT
3 - KEY

5. Slide sleeve (1) over the hub and depress balls as you carefully slip the sleeve into position .

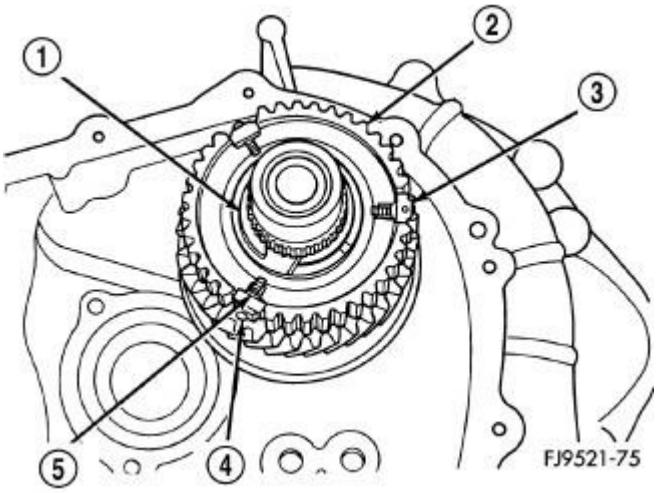


Fig. 183: Centering Synchronizer Keys & Balls By Pushing On Both Stop Rings
Courtesy of CHRYSLER LLC

1 - SNAP RING
2 - CLUTCH
3 - KEY
4 - BALL
5 - SPRING

6. Line up stop ring tang over the keys in the hub, install stop rings, center the keys (3) and balls (4) by pushing on both stop rings.

TROUGH, BEARING OIL FEED, REAR

REMOVAL

REMOVAL

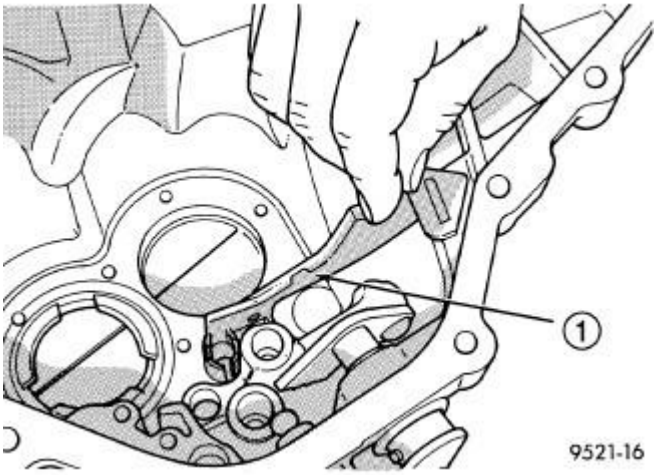


Fig. 184: Oil Feed Trough
Courtesy of CHRYSLER LLC

1 - OIL FEED TROUGH

The bearing oil feed trough (1) is retained in the case by a pin that is molded into the case and clips that are part of the trough.

1. Using light plier pressure, squeeze the clips together at the rear of the trough.
2. Slide the trough over the retaining pin that locates the trough in the case.

INSTALLATION

INSTALLATION

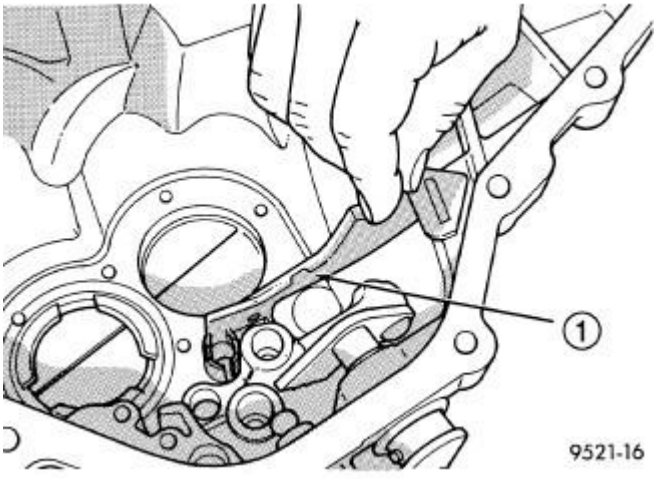


Fig. 185: Oil Feed Trough
Courtesy of CHRYSLER LLC

1 - OIL FEED TROUGH

1. Slide the trough (1) over the retaining pin that locates the trough in the case.

2009 BRAKES

Base - Service Information - Journey

DESCRIPTION

DESCRIPTION

The base brake system consists of the following components:

- Brake pedal
- Power brake booster
- Master cylinder
- Brake tubes and hoses
- Disc brakes (four-wheel)
- Brake lamp switch
- Brake fluid level switch
- Parking brakes

Antilock brakes with traction control and Electronic Stability Program (ESP) are standard equipment on this vehicle. ABS and ESP components are described in detail in ABS SERVICE INFORMATION.

For information on the brake lamp switch. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Description**

WARNING

WARNING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

CAUTION

CAUTION

CAUTION: During service procedures, grease or any other foreign material must be

kept off brake shoes and braking surfaces of brake rotor or drum, and external surfaces of hub and bearing assembly.

CAUTION: Brake rotor and caliper handling must be done in such a way as to avoid damage to the rotor, especially the machined surfaces, and scratching or nicking of the brake linings.

CAUTION: Only the recommended jacking or hoisting procedures for this vehicle are to be used whenever it is necessary to lift a vehicle. Failure to raise a vehicle utilizing the recommended lift points can result in damage to the vehicle. Refer to Vehicle Quick Reference/Hoisting - Standard Procedure .

DIAGNOSIS AND TESTING

BASE BRAKE SYSTEM

NOTE: There are three diagnosis charts following that cover the RED BRAKE WARNING INDICATOR LAMP, BRAKE NOISE and OTHER BRAKE CONDITIONS.

RED BRAKE WARNING INDICATOR LAMP

CONDITION	POSSIBLE CAUSES	CORRECTION
RED BRAKE WARNING LAMP ON	1. Parking brake lever not fully released.	1. Release parking brake lever.
	2. Parking brake warning lamp switch on parking brake lever.	2. Inspect and replace switch as necessary.
	3. Brake fluid level low in reservoir.	3. Fill reservoir. Check entire system for leaks. Repair or replace as required.
	4. Brake fluid level switch.	4. Disconnect switch wiring connector. If lamp goes out, replace switch.
	5. Mechanical instrument cluster (MIC) problem.	5. Refer to appropriate Diagnostic information.
	6. Amber ABS Warning Indicator Lamp also illuminated.	6. Refer to appropriate Diagnostic information.

BRAKE NOISE

CONDITION	POSSIBLE CAUSES	CORRECTION
CLICK OR SQUAWK ON PEDAL APPLICATION	1. Brake lamp switch.	1. Replace switch.
	2. Brake Transmission Shift Interlock Linkage.	2. Lubricate BTSI linkage.
	3. Pedal pivot bushings	3. Lubricate pivot bushings. Replace

		if necessary.
DISC BRAKE CHIRP	1. Excessive brake rotor runout. 2. Lack of lubricant on brake caliper slides. 3. Caliper/shoes not fully seated.	1. Follow brake rotor diagnosis and testing. Correct as necessary. 2. Lubricate brake caliper slides. 3. Reseat caliper/shoes.
DISC BRAKE RATTLE OR CLUNK	1. Broken or missing anti-rattle spring clips. 2. Caliper guide pins/bolts loose.	1. Replace anti-rattle spring clips. 2. Tighten guide pins/bolts.
DISC BRAKE SQUEAK AT LOW SPEED (WHILE APPLYING LIGHT BRAKE PEDAL EFFORT)	1. Brake shoe linings.	1. Replace brake shoes.
SCRAPING (METAL-TO-METAL).	1. Foreign object interference with brakes. 2. Brake shoes worn out.	1. Inspect brakes and remove foreign object. 2. Replace brake shoes. Inspect rotors. Reface or replace as necessary.

OTHER BRAKE CONDITIONS

CONDITION	POSSIBLE CAUSES	CORRECTION
BRAKES CHATTER	1. Disc brake rotor has excessive thickness variation.	1. Isolate condition as rear or front. Reface or replace brake rotors as necessary.
BRAKES DRAG (FRONT OR ALL)	1. Contaminated brake fluid. 2. Binding caliper pins or bushings. 3. Binding master cylinder. 4. Binding brake pedal. 5. Brake lamp switch not adjusted properly and mounting bracket is bent.	1. Check for swollen seals. Replace all system components containing rubber. 2. Replace pins and bushings. 3. Replace master cylinder. 4. Replace brake pedal. 5. Straighten mounting bracket and replace brake lamp switch.
BRAKES DRAG (REAR ONLY)	1. Parking brake cables binding or froze up. 2. Parking brake cable return spring not returning shoes. 3. Rear disc brake parking brake not properly adjusted.	1. Check cable routing. Replace cables as necessary. 2. Replace cables as necessary. 3. Adjust parking brake shoes.
BRAKES GRAB	1. Contaminated brake shoe linings.	1. Inspect and clean, or replace shoes. Repair source of contamination.

	2. Improper power brake booster assist.	2. Refer to **BOOSTER, Power Brake**.
EXCESSIVE PEDAL EFFORT	1. Obstruction of brake pedal. 2. Low power brake booster assist (vacuum leak). 3. Glazed brake linings. 4. Brake shoe lining transfer to brake rotor.	1. Inspect, remove or move obstruction. 2. Refer to **BOOSTER, Power Brake**. 3. Reface or replace brake rotors as necessary. Replace brake shoes. 4. Reface or replace brake rotors as necessary. Replace brake shoes.
EXCESSIVE PEDAL TRAVEL (VEHICLE STOPS OK)	1. Air in brake lines.	1. Bleed brakes.
EXCESSIVE PEDAL TRAVEL (ONE FRONT WHEEL LOCKS UP DURING HARD BRAKING)	1. One of the two hydraulic circuits to the front brakes is malfunctioning.	1. Inspect system for leaks. Check master cylinder for internal malfunction.
PEDAL PULSATES/SURGES DURING BRAKING	1. Disc brake rotor has excessive thickness variation.	1. Isolate condition as rear or front. Reface or replace brake rotors as necessary.
PEDAL IS SPONGY	1. Air in brake lines. 2. Power brake booster runout (vacuum assist).	1. Bleed brakes. 2. Check booster vacuum hose and engine tune for adequate vacuum supply. Refer to **BOOSTER, Power Brake**.
PREMATURE WHEEL LOCKUP	1. Contaminated brake shoe linings. 2. Antilock brake system function issue.	1. Inspect and clean, or replace shoes. Repair source of contamination. 2. Refer to appropriate antilock brake diagnostic information.
STOP/BRAKE LAMPS STAY ON	1. Brake lamp switch out of adjustment. 2. Brake pedal binding. 3. Obstruction in pedal linkage. 4. Power Brake Booster not allowing pedal to return completely.	1. Replace brake lamp switch. 2. Inspect and replace as necessary. 3. Remove obstruction. 4. Replace power brake booster.
VEHICLE PULLS TO RIGHT OR LEFT ON BRAKING	1. Frozen brake caliper piston. 2. Contaminated brake shoe lining. 3. Pinched brake lines.	1. Replace frozen piston or caliper. Bleed brakes. 2. Inspect and clean, or replace shoes. Repair source of contamination. 3. Replace pinched line.

	4. Leaking piston seal. 5. Suspension problem.	4. Replace piston seal or brake caliper. 5. Refer to **FRONT SUSPENSION** or **REAR SUSPENSION** .
PARKING BRAKE - EXCESSIVE LEVER TRAVEL	1. Broke cable. 2. Binding cable. 3. Damaged lever at rear brake caliper. 4. Binding/frozen rear brake caliper piston.	1. Replace broken cable. 2. Replace binding cable. 3. Replace rear brake caliper. 4. Replace rear brake caliper.

STANDARD PROCEDURE

BASE BRAKE BLEEDING

NOTE: This bleeding procedure is only for the vehicle's base brakes hydraulic system. For bleeding the antilock brakes hydraulic system. See Brakes - Standard Procedure

CAUTION: Before removing the master cylinder reservoir cap, thoroughly clean the cap and master cylinder fluid reservoir to prevent dirt and other foreign matter from dropping into the master cylinder fluid reservoir.

NOTE: The following wheel sequence should be used when bleeding the brake hydraulic system. The use of this wheel sequence will ensure adequate removal of all trapped air from the brake hydraulic system.

- Left Rear Wheel
- Right Front Wheel
- Right Rear Wheel
- Left Front Wheel

NOTE: When bleeding the brake system, some air may be trapped in the brake lines far upstream, as much as ten feet from the bleeder screw. Therefore, it is essential to have a fast flow of a large volume of brake fluid when bleeding the brakes to ensure all the air gets out.

Pressure bleeding the brakes is recommended, although the brakes may be manually bled or pressure bled. Refer to the appropriate following procedure.

PRESSURE BLEEDING PROCEDURE

Follow the pressure bleeder manufacturer's instructions for use of the pressure bleeding equipment.

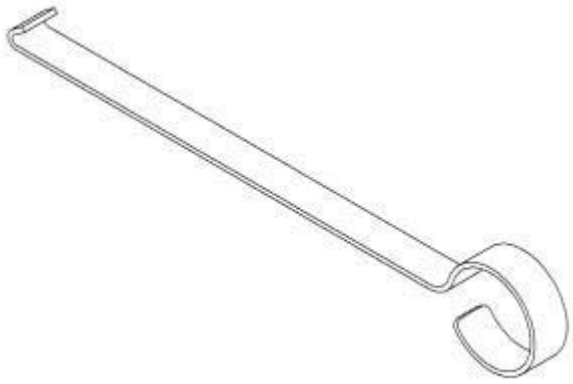


Fig. 1: BLEED HOSE SET UP
Courtesy of CHRYSLER LLC

1. Install Master Cylinder Pressure Bleed Cap, Special Tool 6921, or equivalent on the master cylinder fluid reservoir. Attach the fluid hose from the pressure bleeder to the fitting on Special Tool 6921.
2. Attach a clear plastic hose (1) to the bleeder screw and feed the hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.
3. Open the bleeder screw at least one full turn or more to obtain a steady stream of brake fluid.
4. After approximately 120-240 ml (4-8 ounces) of fluid have been bled through the brake circuit and an air-free flow is maintained in the clear plastic hose and jar, close the bleeder screw.
5. Repeat this procedure at all the remaining bleeder screws.
6. Check and adjust brake fluid level to the FULL mark on the reservoir.
7. Check brake pedal travel and feel. If pedal travel is excessive or if the pedal feels excessively spongy, some air may still be trapped in the system. Re-bleed the brakes as necessary including the IPB Caliper Brake Bleeding Procedure on the rear calipers as listed below.
8. Test drive the vehicle to verify the brakes are operating properly and pedal feel is correct.

MANUAL BLEEDING PROCEDURE

NOTE: To bleed the brakes manually, the aid of a helper will be required.

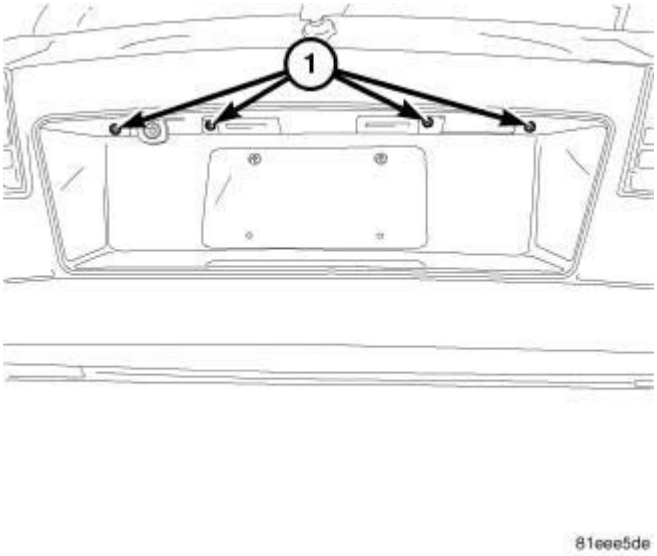


Fig. 2: BLEED HOSE SET UP
Courtesy of CHRYSLER LLC

1. Attach a clear plastic hose (1) to the bleeder screw and feed the hose into a clear jar (2) containing enough fresh brake fluid to submerge the end of the hose.
2. Have a helper pump the brake pedal three or four times and hold it in the down position.
3. With the pedal in the down position, open the bleeder screw at least one full turn.
4. Once the brake pedal has dropped, close the bleeder screw. After the bleeder screw is closed, release the brake pedal.
5. Repeat the above steps until all trapped air is removed from that wheel circuit (usually four or five times).
6. Bleed the remaining wheel circuits in the same manner until all air is removed from the brake system. Monitor the fluid level in the master cylinder reservoir to make sure it does not go dry.
7. Check and adjust brake fluid level to the FULL mark.
8. Check brake pedal travel and feel. If pedal travel is excessive or if the pedal feels excessively spongy, some air may still be trapped in the system. Re-bleed the brakes as necessary including the IPB Caliper Brake Bleeding Procedure on the rear calipers as listed below.
9. Test drive the vehicle to verify the brakes are operating properly and pedal feel is correct.

IPB CALIPER BRAKE BLEEDING PROCEDURE

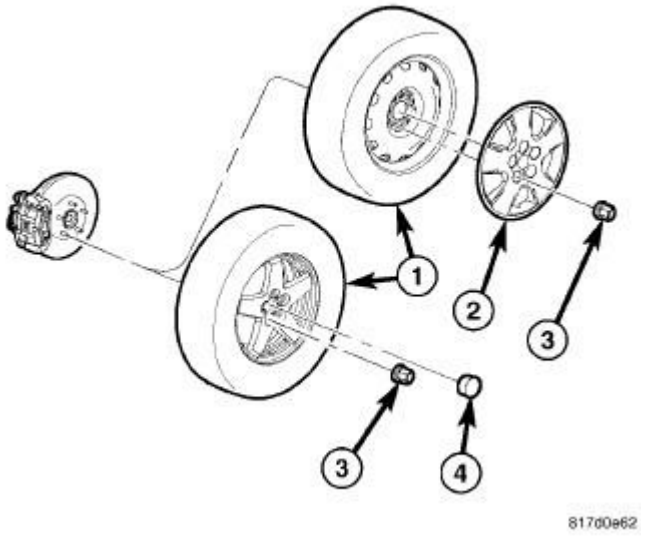


Fig. 3: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

NOTE: The following procedure is normally only necessary if a rear brake caliper has been removed and installed, or replaced.

Perform the following procedure on each rear brake caliper as necessary.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

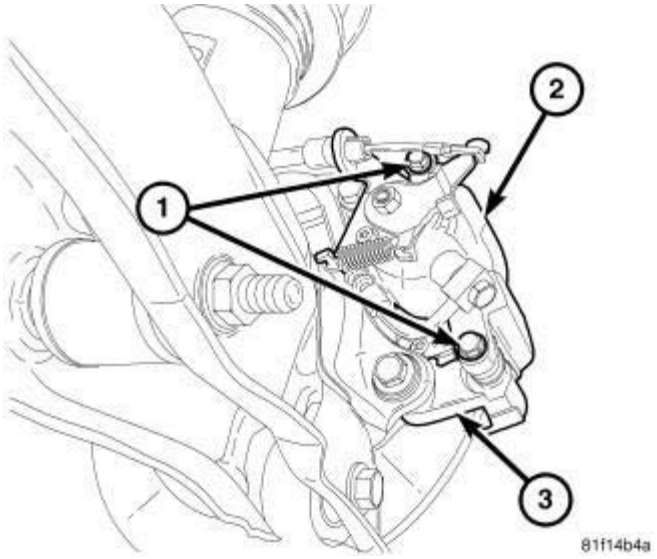


Fig. 4: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

3. Remove the brake caliper lower guide pin bolt (1).
4. Swing the caliper assembly upward, pivoting off the upper guide pin, until clear of the adapter bracket.

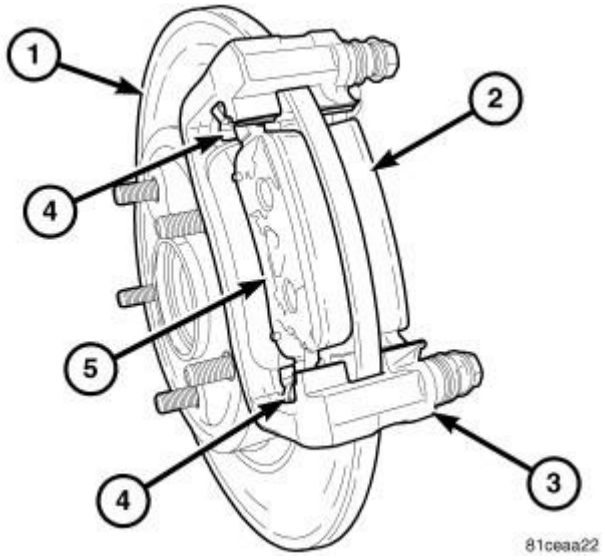


Fig. 5: REAR BRAKE PADS
Courtesy of CHRYSLER LLC

5. Remove the outboard pad (5) from the adapter bracket.
6. Return the caliper back down over the adapter bracket into mounted position and install the lower guide pin bolt finger tight.
7. Slowly pump the brake pedal until the caliper fingers touch the outboard surface of the brake rotor. Release the pedal.
8. Remove the brake caliper lower guide pin bolt.
9. Swing the caliper assembly upward, pivoting off the upper guide pin, until clear of the adapter bracket.
10. Reinstall the outboard pad in the adapter bracket.
11. Open the caliper bleeder screw at least one full turn.

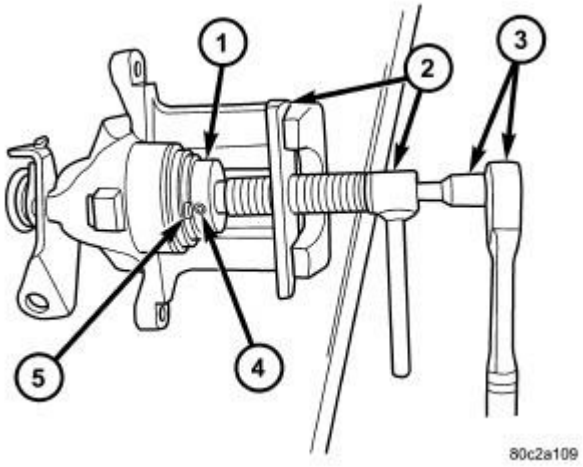


Fig. 6: SEATING PISTON WITH SPECIAL TOOL
Courtesy of CHRYSLER LLC

12. Seat (bottom) the caliper piston in the bore as follows:
    a. Assemble a 3/8 in. drive ratchet handle and an extension (3).
    b. Insert the extension through Special Tool 8807-1 (2).
    c. Place Special Tool 8807-2 (1) on the end of the extension.
    d. Insert lugs on Special Tool 8807-2 into notches in face of caliper piston (5).
    e. Thread the screw drive on 8807-1 down until it contacts the top of 8807-2 which is against the caliper piston. **Do not over tighten the screw-drive. Damage to the piston can occur.**
    f. Turn 8807-2 with the ratchet, rotating the piston in a **clockwise** direction until fully seated (bottomed) in the bore. **It may be necessary to turn 8807-1 with 8807-2 to start the process of piston retraction.**
13. Close the bleeder screw.
14. Return the caliper back down over the adapter bracket into mounted position and install the lower guide pin bolt finger tight.
15. Have a helper pump the brake pedal three or four times and hold it in the down position.
16. With the pedal in the down position, open the bleeder screw at least one full turn and let out fluid and air, if any.
17. Once the brake pedal has dropped, close the bleeder screw. Once the bleeder screw is closed, release the brake pedal.
18. Repeat the previous three steps until all trapped air is removed.
19. Tighten the guide pin bolt to 35 N.m (26 ft. lbs.).
20. Repeat the above procedure on the opposite rear brake caliper as necessary.
21. Check brake pedal travel and feel. If pedal travel is still excessive or if the pedal feels excessively spongy, repeat the entire procedure as necessary.
22. Install the tire and wheel assembly. Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts to 135 N.m (100 ft. lbs.).
23. Lower the vehicle

24. Test drive the vehicle to verify the brakes are operating properly and pedal feel is correct.

SPECIFICATIONS

BRAKE FASTENER TORQUE

BRAKE FASTENER TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
ABS ABM Mounting Screws (To HCU)	2	-	17
ABS ICU Mounting Bolt (To Bracket)	11	8	97
ABS ICU Mounting Pins	11	8	97
ABS ICU Mounting Bracket Screws (To Frame)	23	17	203
ABS ICU Mounting Bracket Screw And Nut (To Body) - Right-Hand-Drive	23	17	203
ABS Wheel Speed Sensor Head Mounting Bolt - Front	12	9	106
ABS Wheel Speed Sensor Head Mounting Bolt - Rear	6	4.5	55
ABS Wheel Speed Sensor Routing Bracket Screws - Front	20	15	177
ABS Wheel Speed Sensor Routing Bracket Screws - Rear	20	15	177
Brake Tube Nuts	17	12.5	150
Brake Hose Bracket Bolt	18	13	160
Brake Hose Caliper Banjo Bolt	26	19	230
Brake Shield Mounting Screws	8	6	71
Disc Brake Caliper Adapter Mounting Bolts - Front	169	125	-
Disc Brake Caliper Adapter Mounting Bolts - Rear	100	74	-
Disc Brake Caliper Guide Pin Bolts - Front	35	26	-
Disc Brake Caliper Guide Pin Bolts - Rear	35	26	-
Disc Brake Caliper Bleeder Screw	10	7	88
Dynamics (ESP) Sensor Mounting Nuts	9	6.5	80
Master Cylinder Mounting Nuts	25	19	225
Pedal Bracket Upper Mounting Nuts	28	21	250
Power Brake Booster Mounting Nuts	28	21	250
Parking Brake Cable Mounting Screws to Hand Lever - Front	28	21	250
Parking Brake Cable Routing Clamp Screws/Nuts	6	4.5	55
Parking Brake Cable Routing Loop Mounting Nuts	6	4.5	55
Parking Brake Lever Mounting Nuts - Foot Lever System	28	21	250
Parking Brake Lever Mounting Nuts - Hand Lever System	20	15	177
Wheel Mounting (Lug) Nuts	135	100	-

SPECIAL TOOLS

SPECIAL TOOLS

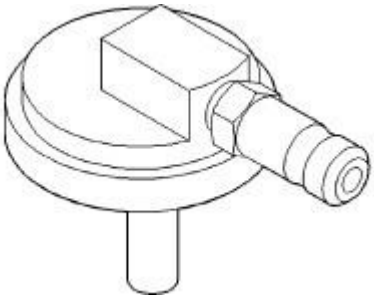


Fig. 7: Adapter, Master Cylinder Pressure Bleed Cap 6921
Courtesy of CHRYSLER LLC

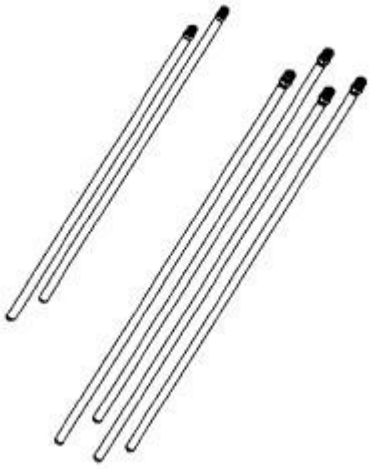


Fig. 8: Bleeder Tubes 8358A
Courtesy of CHRYSLER LLC

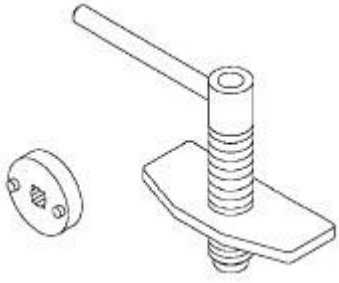


Fig. 9: Retractor, Rear Caliper Piston 8807
Courtesy of CHRYSLER LLC

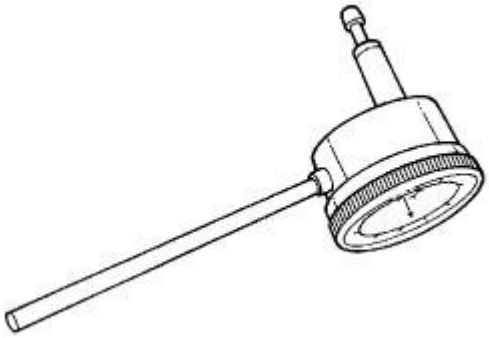


Fig. 10: Dial Indicator 9524
Courtesy of CHRYSLER LLC

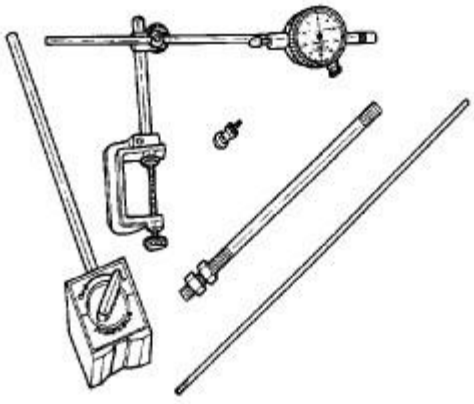


Fig. 11: Dial Indicator C-3339A
Courtesy of CHRYSLER LLC

ELECTRICAL

SWITCH, BRAKE FLUID LEVEL

Description

DESCRIPTION

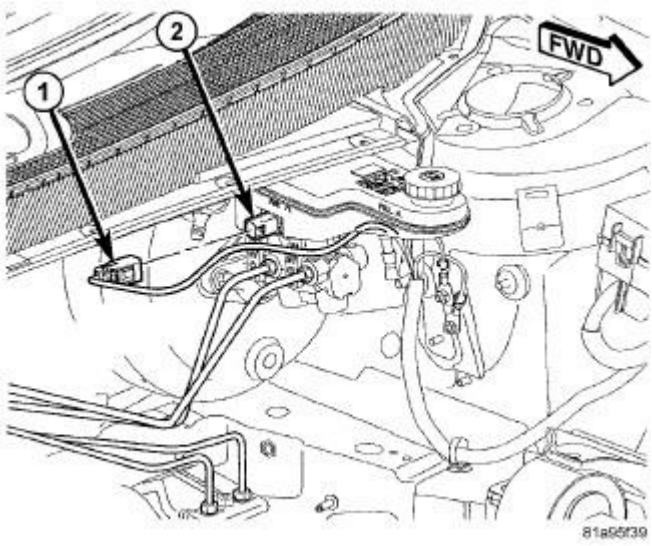


Fig. 12: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

The brake fluid level switch (2) is mounted through the center of the fluid reservoir. The switch can be serviced separately from the master cylinder fluid reservoir.

Removal

REMOVAL

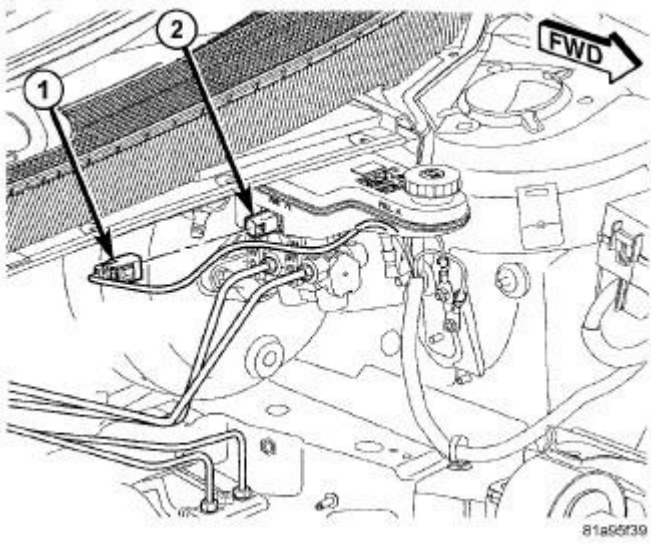


Fig. 13: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Remove the wiring harness connector (1) from the brake fluid level switch (2) in the master cylinder brake fluid reservoir.

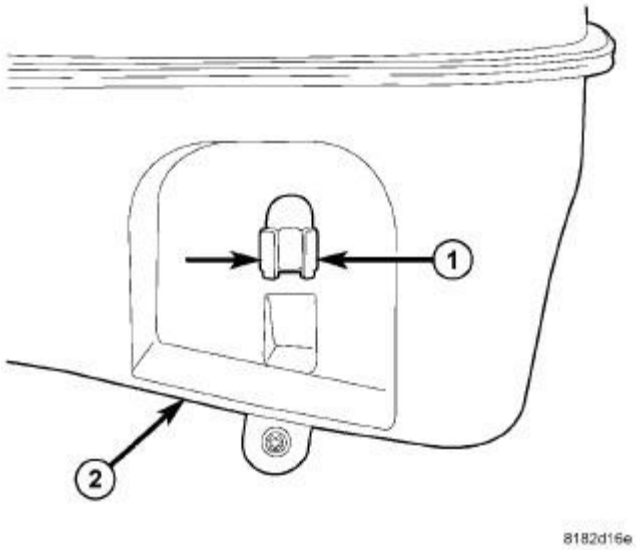


Fig. 14: LEVEL SWITCH RETAINING TABS
Courtesy of CHRYSLER LLC

2. Push together the retaining tabs (1) that hold the brake fluid level switch in place in the brake fluid reservoir (2).
3. Pull the brake fluid level switch out the right side of the reservoir.

Installation

INSTALLATION

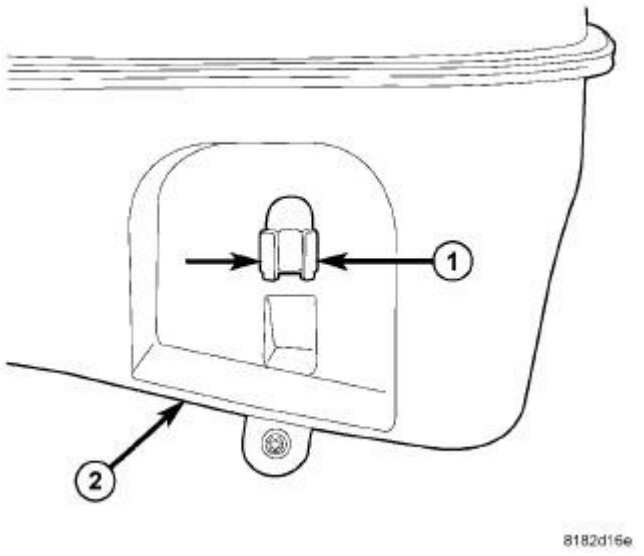


Fig. 15: LEVEL SWITCH RETAINING TABS
Courtesy of CHRYSLER LLC

1. Align the brake fluid level switch with its mounting hole on the right side of the master cylinder brake fluid reservoir. Push the switch into the fluid reservoir until the switch retaining tabs (1) are expanded on the opposite side of the reservoir (2), locking it in place.

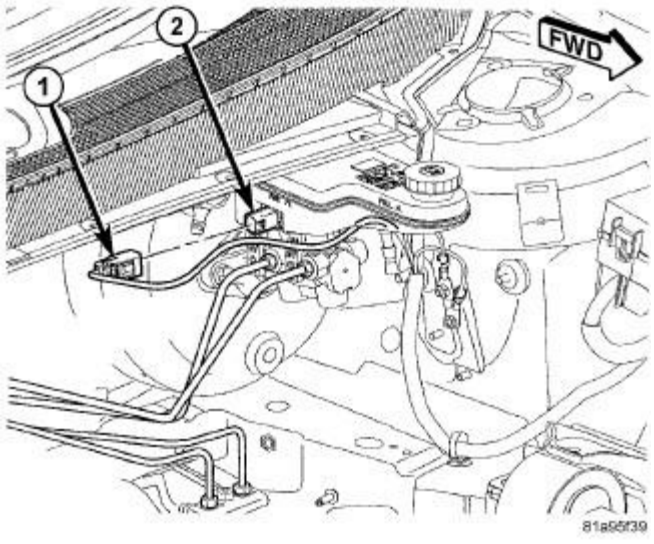


Fig. 16: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

2. Connect the wiring harness connector (1) to the switch (2).

HYDRAULIC/MECHANICAL

DESCRIPTION

DESCRIPTION

Four-wheel disc brakes are standard on this vehicle. Each disc brake assembly consists of the following major components:

- Caliper
- Caliper adapter bracket
- Pads (Shoe and lining assemblies)
- Rotor

FRONT DISC BRAKES

Each front disc brake features a single 2.6 in. (66 mm) piston floating caliper acting on a 11.9 x 1.1 in. (302 x 28 mm) vented rotor. The brake caliper is a low-drag type. The vented rotor utilizes an inverted hat construction (vent openings are on the outboard side of the rotor versus inboard side) to improve cooling and minimize high-temperature deformation for long-term smooth operation. The front brake caliper piston and seals are serviceable.

REAR DISC BRAKES

Each rear disc brake features a single 1.7 in. (43 mm) piston floating caliper acting on a 12.0 x.47 in. (305 x 12 mm) solid rotor. The brake caliper used features an Integral Parking Brake (IPB) mechanism which combines a mechanical parking brake function with a conventional rear caliper. Refer to **Parking Brake** for additional information on this feature. The rear brake caliper with integrated parking brake is not serviceable.

All brake calipers are coated in zinc nickel and dipped after machining with clear coat for excellent corrosion protection and a neat appearance. They use adapter bracket mounted guide pins for caliper slide functions.

All rotors are made from high-carbon, damped iron for quiet operation. They are fully coated with zinc dust water-soluble, environmental friendly corrosion preventive. Both the friction surfaces and the vents are coated. During initial brake applications, the brake pads scrub the coating off the friction surfaces, ensuring that the remainder will be rust free. Coating the vents also maintains their heat capacity over time.

Front disc brakes are equipped with an audible wear indicator on the left side inboard brake pad only. The right side pads do not include an audible wear indicator.

Rear disc brakes are equipped with audible wear indicators on both left side and right side inboard brake pads.

When the brake pads are replaced, only brake pads meeting the Original Equipment Manufacturer (OEM) formulation (such as Mopar® replacement parts) should be used.

BOOSTER, POWER BRAKE

Description

DESCRIPTION

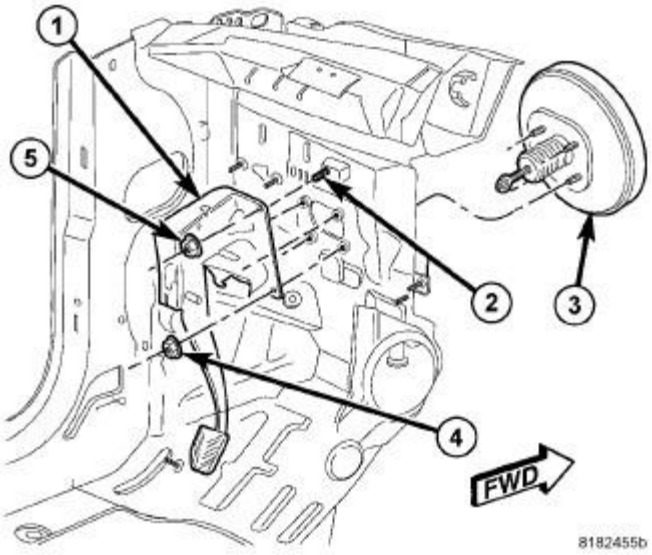


Fig. 17: PEDAL AND BOOSTER MOUNTING - LHD
Courtesy of CHRYSLER LLC

The power brake booster (3) is mounted to the engine side of the dash panel. The master cylinder is bolted to the front of the booster. A vacuum check valve is also mounted on the front of the booster. A vacuum line connects the check valve to engine source vacuum. The booster input rod extends through the dash panel and connects to the brake pedal.

This vehicle uses a tandem diaphragm, single rate vacuum power brake booster with 203 and 229 mm (8 and 9 in.) diaphragms. Power brake boosters are internally tuned differently depending on whether the vehicle is equipped with ABS or without ABS. If the power brake booster requires replacement, be sure it is replaced with the correct part.

The power brake booster can be identified by the tag attached to the body of the booster. This tag contains the following information:

- The production part number
- The date it was built, and
- The booster manufacturer.

Diagnosis and Testing

POWER BRAKE BOOSTER

BASIC TEST

1. With engine off, depress and release the brake pedal several times to purge all vacuum from the power brake booster.

2. Depress and hold the pedal with light effort (15 to 25 lbs. (6.8 to 11.3 kg) pressure), then start the engine.

   The pedal should fall slightly, then hold. Less effort should be needed to apply the pedal at this time. If the pedal fell as indicated, perform the **VACUUM LEAK TEST** listed after the **BASIC TEST**. If the pedal did not fall, continue on with this BASIC TEST.

3. Disconnect the vacuum hose at the vacuum check and tee-in a vacuum gauge.
4. Start the engine.
5. When the engine is at warm operating temperature, allow it to idle and check the vacuum at the gauge.

   If the vacuum supply is 12 inches Hg (40.5 kPa) or more, the power brake booster is defective and must be replaced. If the vacuum supply is below 12 inches Hg, continue on with this BASIC TEST.

6. Shut off the engine.
7. Connect the vacuum gauge to the vacuum reference port on the engine intake manifold.
8. Start the engine and observe the vacuum gauge.

If the vacuum is still low, check the engine tune and repair as necessary. If the vacuum is above 12 inches, the hose or check to the booster has a restriction or leak.

Once an adequate vacuum supply is obtained, repeat the BASIC TEST.

VACUUM LEAK TEST

1. Disconnect the vacuum hose at the vacuum check and tee-in a vacuum gauge.
2. Start the engine.
3. Allow the engine to warm up to normal operating temperature and engine idle.
4. Using vacuum line pliers, close off the vacuum supply hose near the booster and observe the vacuum gauge.

   If the vacuum drop exceeds 1.0 inch Hg (3.3 kPa) in one minute, repeat the above steps to confirm the reading. The vacuum loss should be less than 1.0 inch Hg in one minute time span. If the loss is more than 1.0 inch Hg, replace the power brake booster. If it is not, continue on with this test.

5. Remove the pliers from the hose temporarily.
6. Apply light effort (approximately 15 lbs. (6.8 kg) of force) to the brake pedal and hold the pedal steady. Do not move the pedal once the pressure is applied or the test results may vary.
7. Have an assistant reattach the pliers to the vacuum supply hose.
8. Allow 5 seconds for stabilization, then observe the vacuum gauge.

If the vacuum drop exceeds 3.0 inches Hg (10 kPa) in 15 seconds, repeat the above steps to confirm the reading. The vacuum loss should be less than 3.0 inches Hg in 15 seconds time span. If the loss is more than 3.0 inches Hg, replace the power brake booster. If it is not, the booster is not defective.

Removal

LEFT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

CAUTION: The vacuum in the power brake booster must be pumped down before removing the master cylinder to prevent the booster from sucking in any contamination. This can be done by pumping the brake pedal while the engine is not running until a firm brake pedal is achieved.

1. With the engine not running, pump the brake pedal 4-5 strokes until the pedal feel is firm.
2. Disconnect the negative (ground) cable from the battery and isolate the cable.

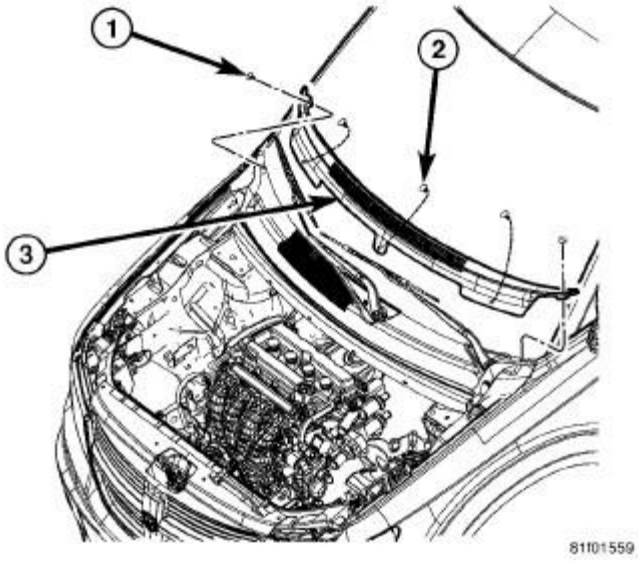


Fig. 18: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

3. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
4. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

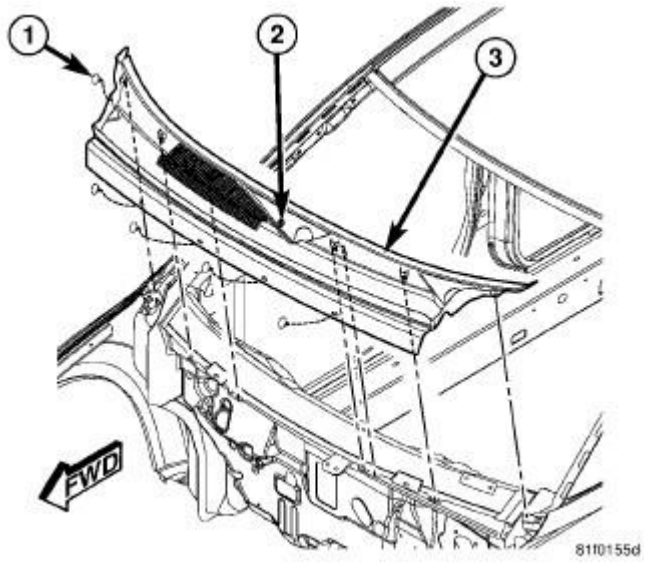


Fig. 19: COWL SCREEN
Courtesy of CHRYSLER LLC

5. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

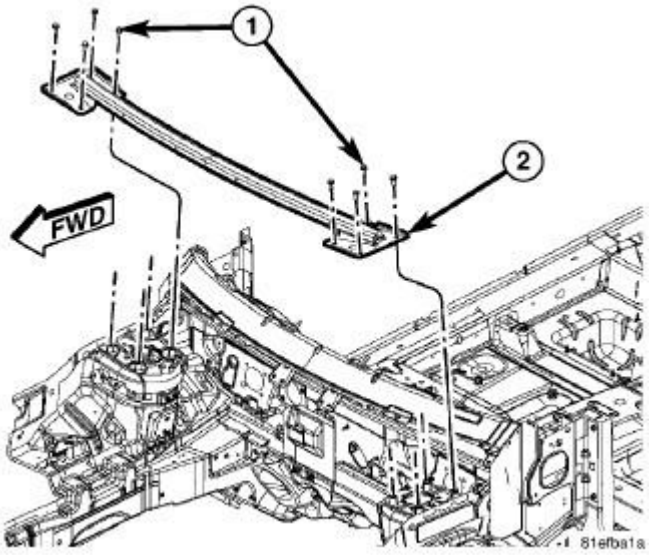


Fig. 20: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

6. Remove the eight mounting bolts (four each side) (1) securing the wheel house brace to the strut towers.
7. Remove the wheelhouse brace (2).
8. Remove the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Removal**

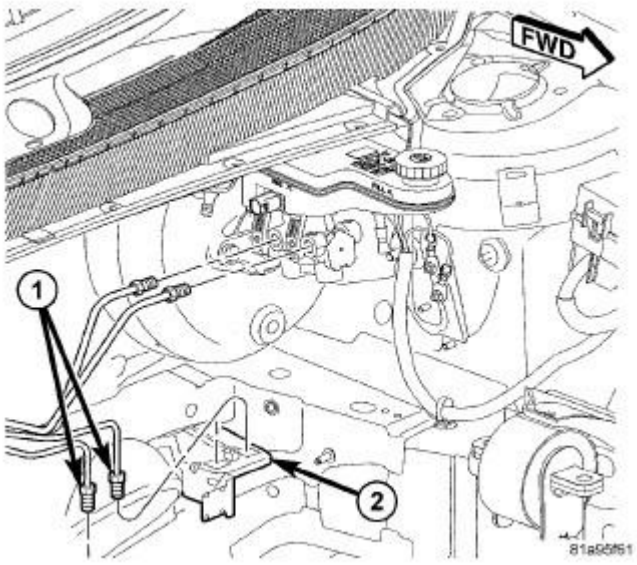


Fig. 21: REAR BRAKE TUBES AT JUNCTION BLOCK
Courtesy of CHRYSLER LLC

9. Disconnect the rear brake tubes (1) at the junction block (2). Install plugs at all of the open brake tubes.

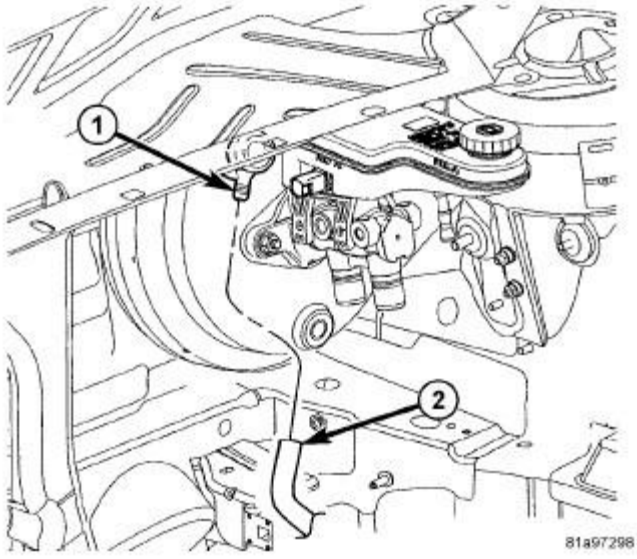


Fig. 22: VACUUM HOSE AT BOOSTER - LHD
Courtesy of CHRYSLER LLC

10. Disconnect the vacuum hose (2) from the check valve (1) on the power brake booster. **Do not remove the check valve from power brake booster.**
11. If equipped, remove the silencer pad below the steering column opening cover.

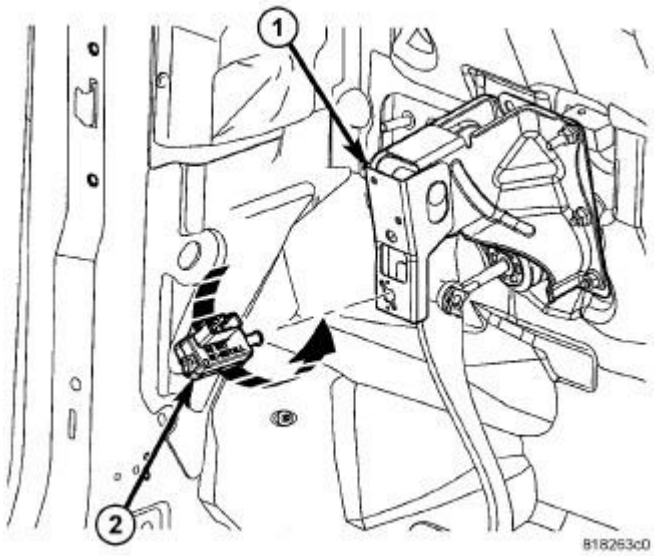


Fig. 23: STOP LAMP SWITCH REMOVAL
Courtesy of CHRYSLER LLC

12. Remove the stop lamp switch (2). **Do not reuse the stop lamp switch on vehicles built prior to July 21, 2008.** . Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Removal**

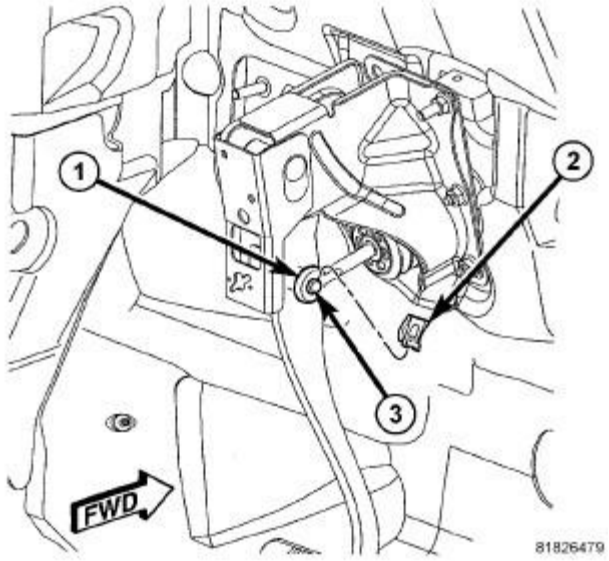


Fig. 24: BRAKE PEDAL CLIP
Courtesy of CHRYSLER LLC

13. Remove the retaining clip (2) securing the power brake booster push rod (1) to the brake pedal. To do so, position a small screwdriver under the center tang of the retaining clip, then rotate the screwdriver enough to allow the retaining clip tang to pass over the end of the brake pedal pin (3). Remove and discard the

clip. **Do not reuse the clip.**

14. Slide the booster push rod (1) off the brake pedal pin (3).

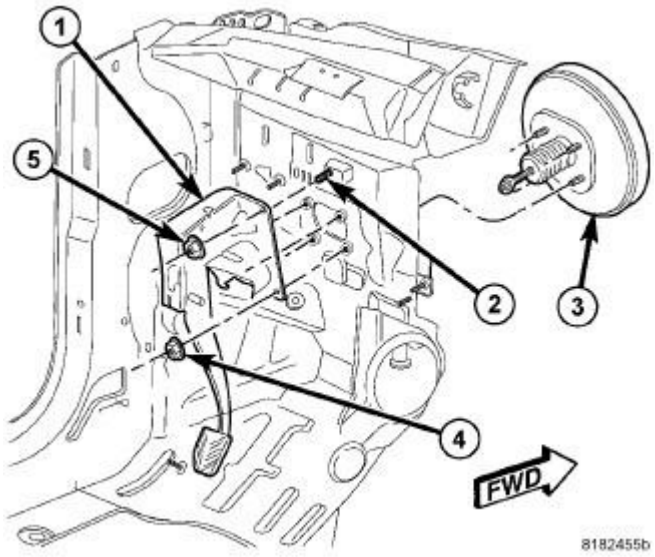


Fig. 25: PEDAL AND BOOSTER MOUNTING - LHD
Courtesy of CHRYSLER LLC

15. Remove the four nuts (4) attaching the power brake booster (3) to the dash panel.
16. Slide the power brake booster (3) forward until its mounting studs clear the dash panel, then remove it through the engine compartment.

RIGHT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

CAUTION: The vacuum in the power brake booster must be pumped down before removing the master cylinder to prevent the booster from sucking in any contamination. This can be done by pumping the brake pedal while the engine is not running until a firm brake pedal is achieved.

1. With the engine not running, pump the brake pedal 4-5 strokes until the pedal feel is firm.
2. Disconnect the negative (ground) cable from the battery and isolate the cable.
3. Remove the engine appearance cover.

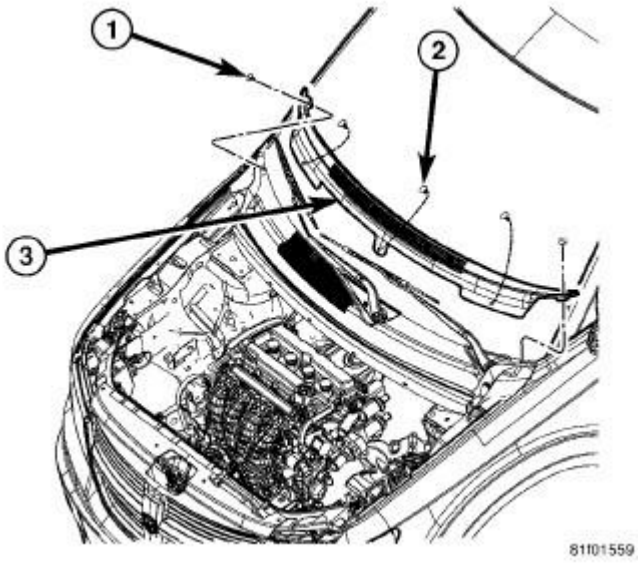


Fig. 26: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

4. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
5. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

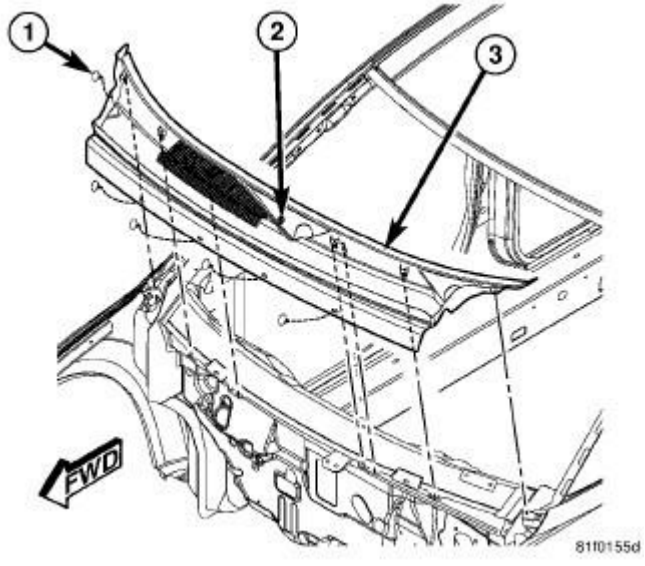


Fig. 27: COWL SCREEN
Courtesy of CHRYSLER LLC

6. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

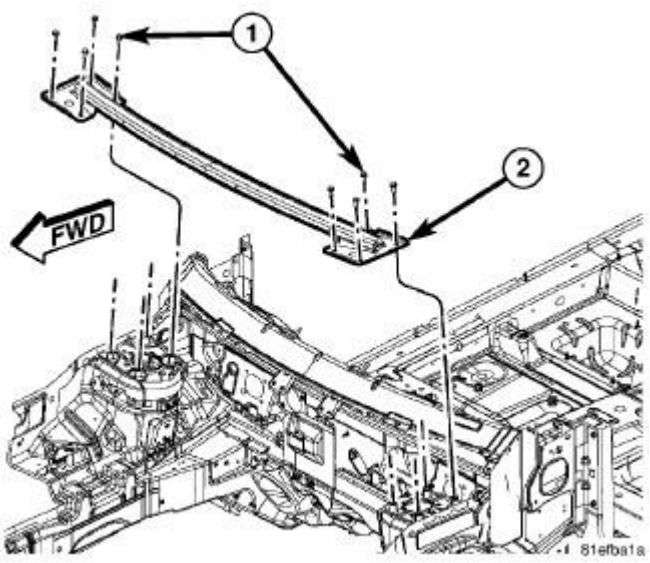


Fig. 28: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

7. Remove the eight mounting bolts (four each side) (1) securing the wheel house brace to the strut towers.
8. Remove the wheelhouse brace (2).

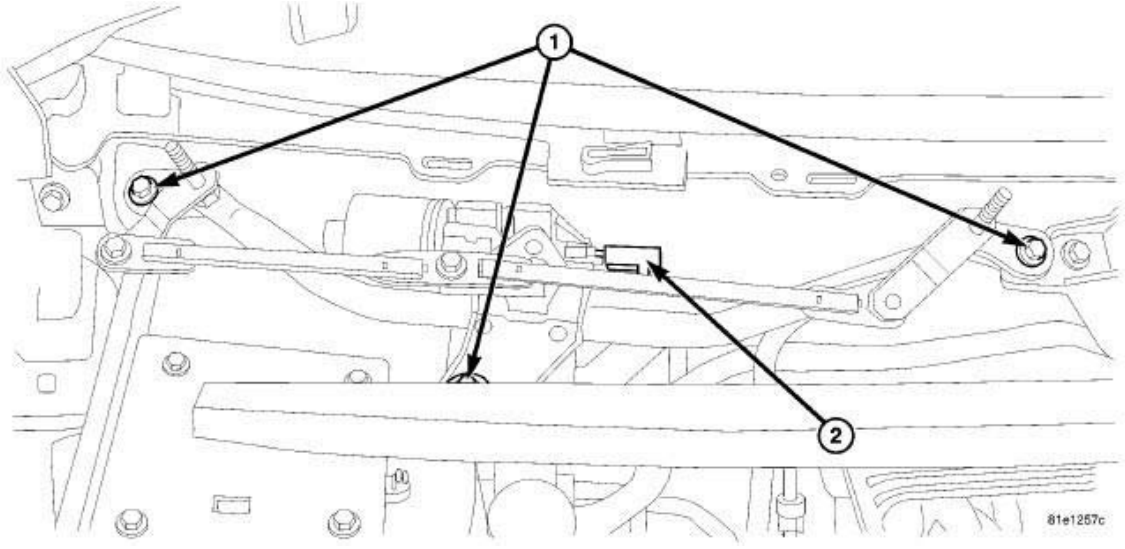


Fig. 29: MODULE -WIPER
Courtesy of CHRYSLER LLC

9. Disconnect the electrical connector (2) from the wiper motor.
10. Remove three bolts (1) from the wiper module.
11. Remove the wiper module from the vehicle.

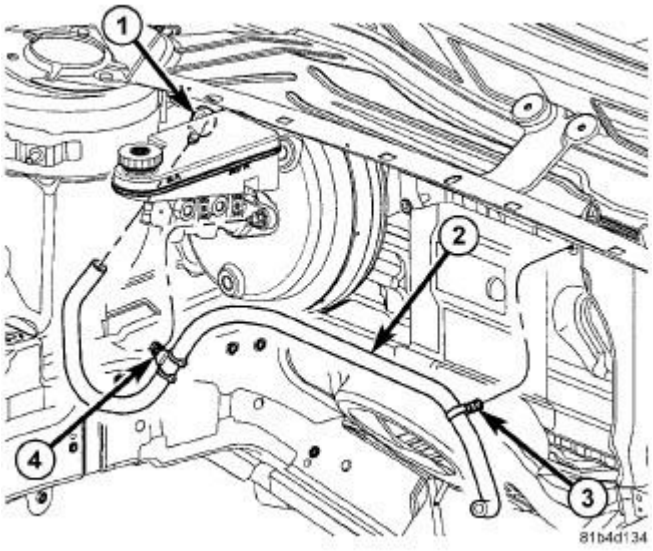


Fig. 30: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

12. Remove the booster vacuum hose routing clip (4) from the master cylinder mounting stud.
13. Remove the vacuum hose routing clip (3) from the stud on the dash panel.
14. Remove the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Removal**

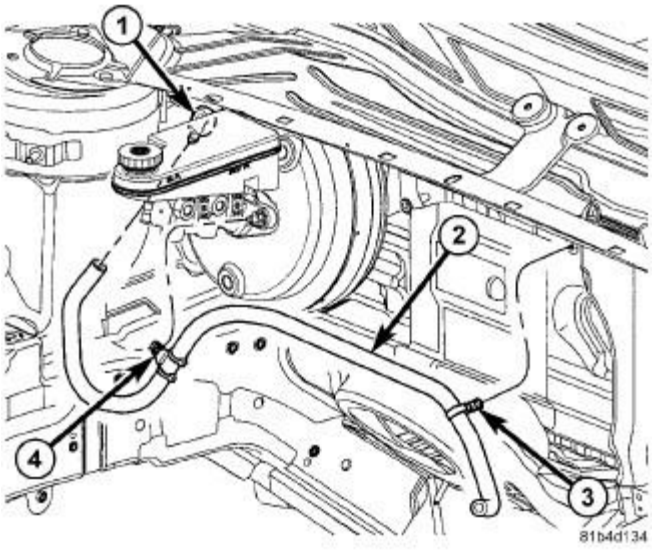


Fig. 31: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

15. Disconnect the vacuum hose (2) from the check valve (1) on the power brake booster. **Do not remove the check valve from the power brake booster.**

16. Remove both brake tube routing clips with tubes from the studs on the dash panel. Do not bend the brake tubes.

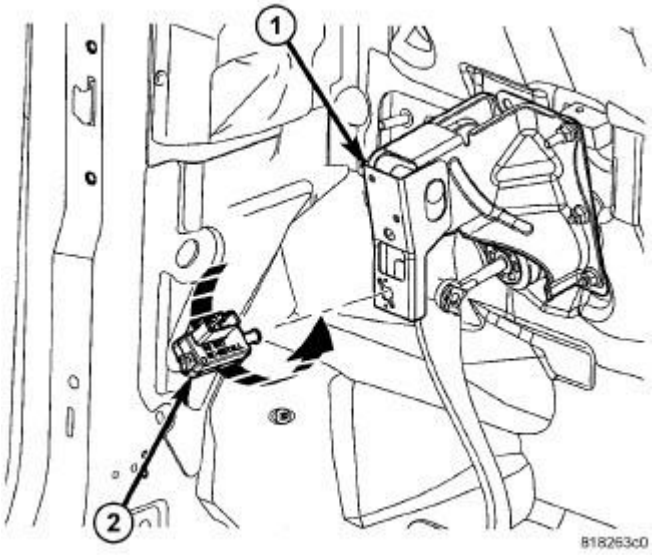


Fig. 32: STOP LAMP SWITCH REMOVAL
Courtesy of CHRYSLER LLC

17. Remove the stop lamp switch (2).**Do not reuse the stop lamp switch on vehicles built prior to July 21, 2008.** . Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Removal**

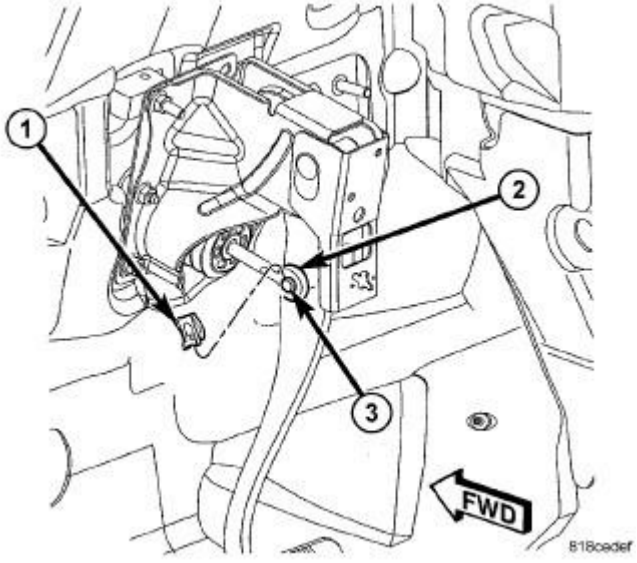


Fig. 33: BRAKE PEDAL CLIP - RHD
Courtesy of CHRYSLER LLC

18. Remove the retaining clip (1) securing the power brake booster push rod (2) to the brake pedal. To do so, position a small screwdriver under the center tang of the retaining clip, then rotate the screwdriver enough to allow the retaining clip tang to pass over the end of the brake pedal pin (3). Remove and discard the clip. **Do not reuse the clip.**
19. Slide the booster push rod (2) off the brake pedal pin (3).
20. If equipped with a manual transaxle, remove the clutch master cylinder from the pedal bracket assembly and dash panel. Refer to **Clutch/CYLINDER, Clutch Master - Removal**

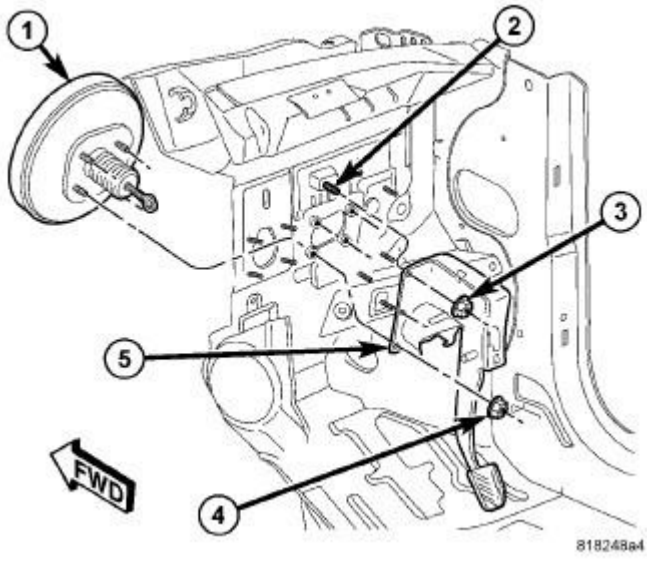


Fig. 34: PEDAL AND BOOSTER MOUNTING - RHD
Courtesy of CHRYSLER LLC

21. Remove the four nuts (4) attaching the power brake booster (1) to the dash panel.
22. Slide the power brake booster (1) forward clearing the dash panel, then remove it from the vehicle.

Installation

LEFT-HAND-DRIVE

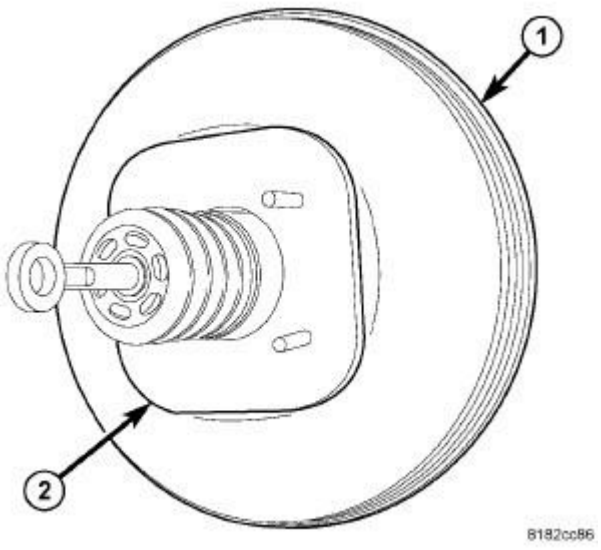


Fig. 35: BOOSTER SEAL
Courtesy of CHRYSLER LLC

NOTE: Before power brake booster (1) installation, be certain a NEW dash seal (2) is installed on the booster mounting studs.

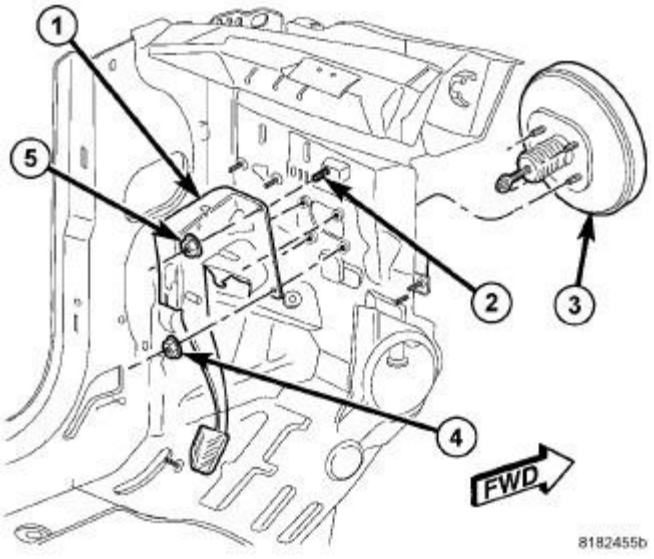


Fig. 36: PEDAL AND BOOSTER MOUNTING - LHD
Courtesy of CHRYSLER LLC

1. Install the power brake booster (3) by sliding the push rod and studs through the dash panel and into mounting position.
2. Under the instrument panel, install the four power brake booster mounting nuts (4). To tighten the nuts, refer to the following step.

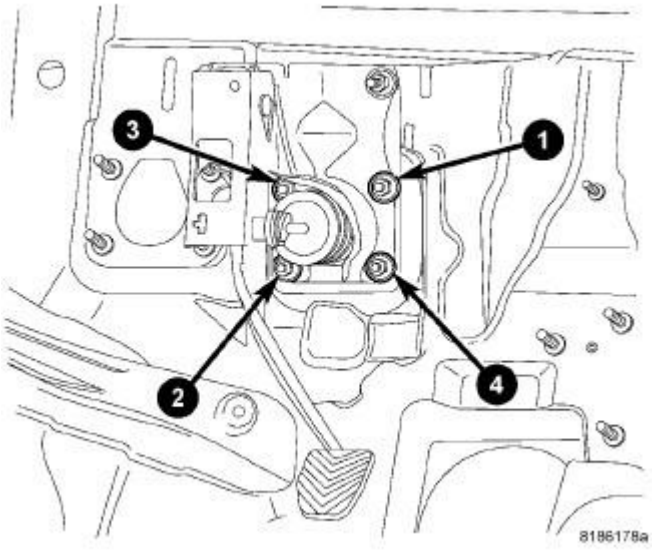


Fig. 37: MOUNTING NUT TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

CAUTION: Because of power brake booster design, it is very important to tighten the mounting nuts in the proper sequence.

3. Tighten the brake pedal/booster mounting nuts in the proper sequence to 23 N.m (17 ft. lbs.).

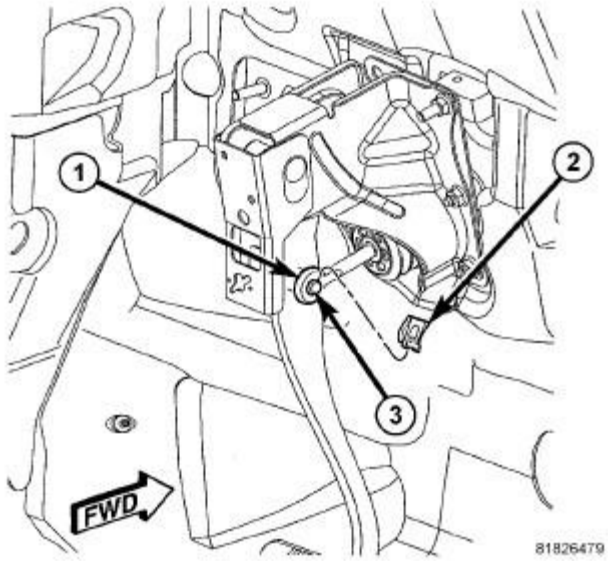


Fig. 38: BRAKE PEDAL CLIP
Courtesy of CHRYSLER LLC

4. Using Mopar® Lubriplate, or an equivalent, coat the surface of the brake pedal pin (3) where it contacts the brake booster input rod (1).

5. Install the power brake booster push rod (1) on the pin (3) mounted on the side of the brake pedal. Install a NEW retaining clip (2) on the end of the pin. **Do not reuse the old clip.**

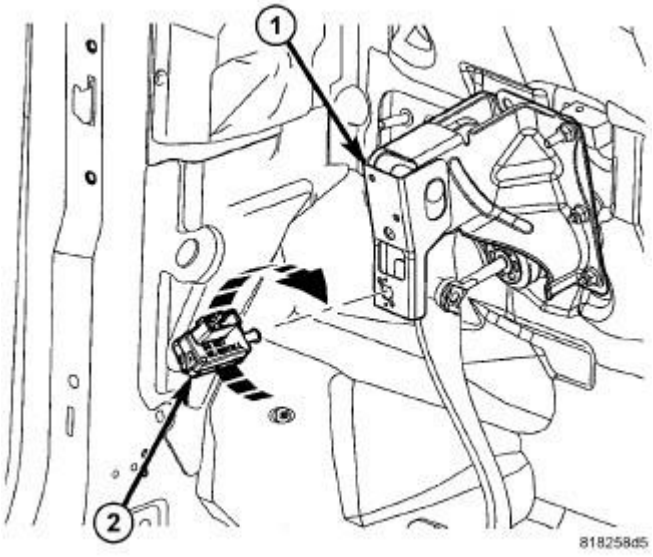


Fig. 39: STOP LAMP SWITCH AND PEDAL CLIP
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the original stop lamp switch on vehicles built prior to July 21, 2008. Anytime a switch has been removed or its position compromised, a new switch must be installed and adjusted. Do not attempt to readjust the switch. The original brake lamp switch can be reused and adjusted on vehicles built on or after July 21, 2008.

6. Install and adjust a NEW stop lamp switch (2) in the brake pedal bracket (1) on vehicle built prior to July 21, 2008. The original brake lamp switch can be reused on vehicles built on or after July 21, 2008. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Installation**
7. If equipped, install the silencer pad below the instrument panel.

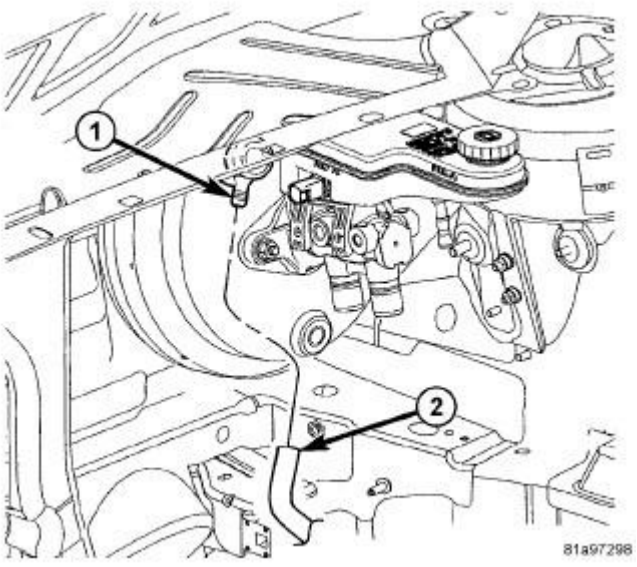


Fig. 40: VACUUM HOSE AT BOOSTER - LHD
Courtesy of CHRYSLER LLC

CAUTION: When installing the vacuum hose on the check valve (1), make sure the hose is routed properly to avoid possible contact with unfriendly surfaces.

8. Connect the vacuum hose (2) to the vacuum check valve (1).

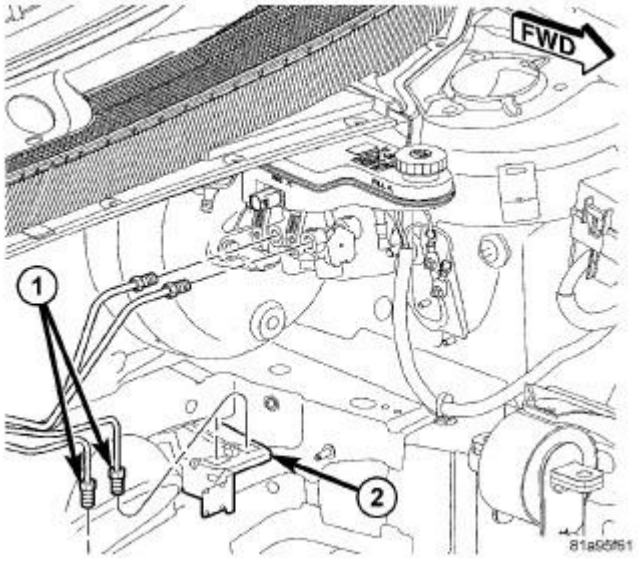


Fig. 41: REAR BRAKE TUBES AT JUNCTION BLOCK
Courtesy of CHRYSLER LLC

9. Connect the rear brake tubes (1) to the junction block (2). Tighten the tube nuts to 17 N.m (150 in. lbs.).

10. Install the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Installation**

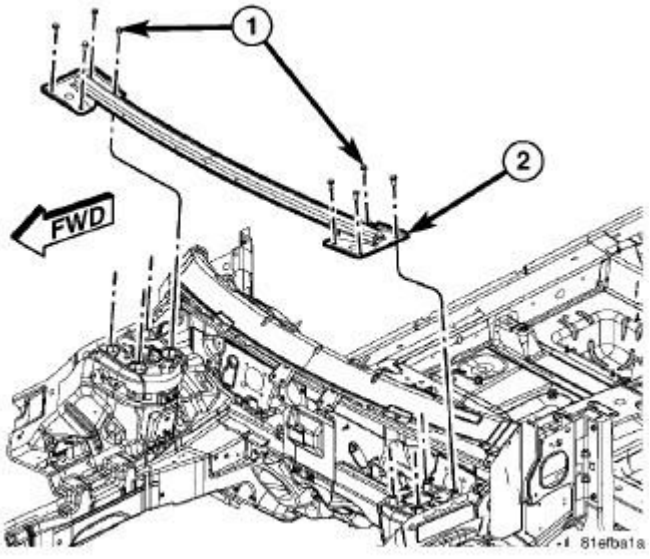


Fig. 42: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

11. Install the wheelhouse brace (2). Install and tighten the eight mounting bolts (four each side) (1) to 48 N.m (35 ft. lbs.).

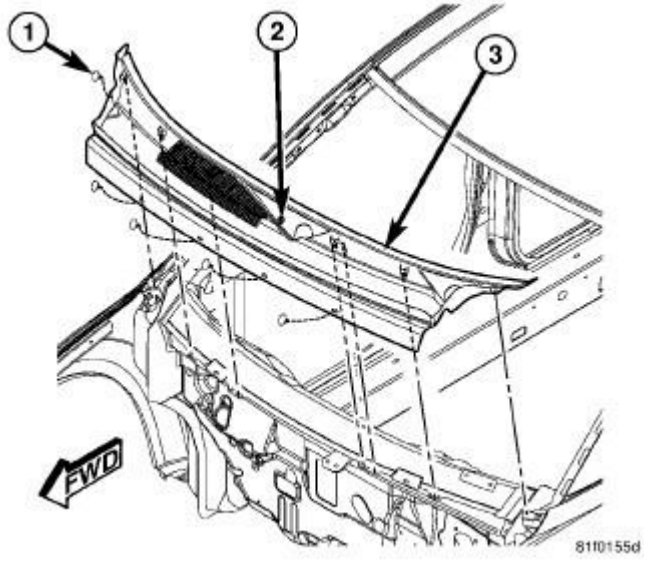


Fig. 43: COWL SCREEN
Courtesy of CHRYSLER LLC

12. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and

cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.

13. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

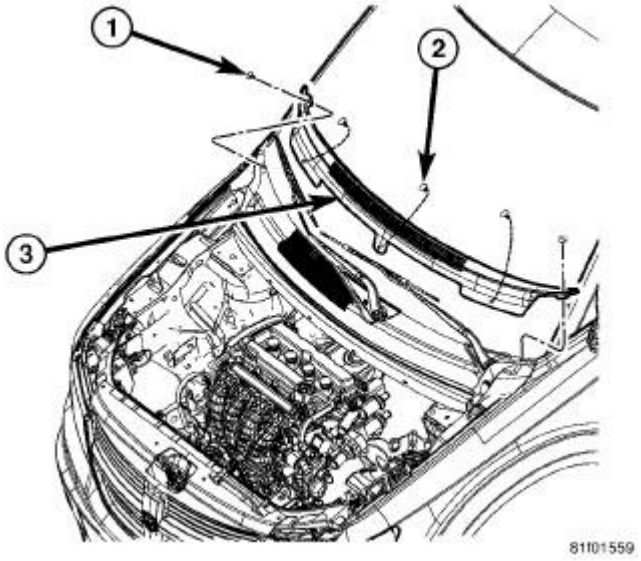


Fig. 44: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

14. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).
15. Connect the battery negative cable to its post on the battery.
16. Bleed the base brake system. See **Brakes - Standard Procedure**
17. Road test the vehicle to ensure proper operation of the brakes.

RIGHT-HAND-DRIVE

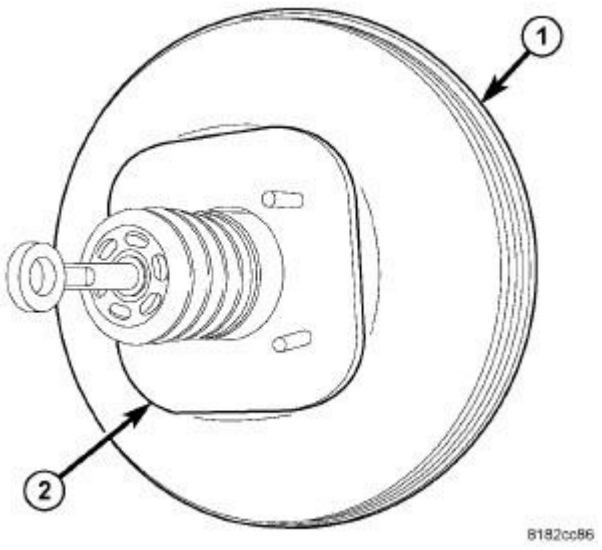


Fig. 45: BOOSTER SEAL
Courtesy of CHRYSLER LLC

NOTE: Before power brake booster (1) installation, be certain a NEW dash seal (2) is installed on the booster mounting studs.

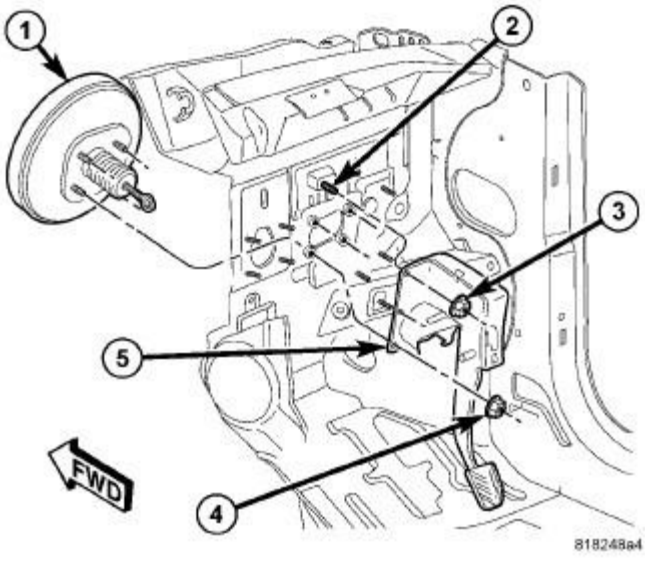


Fig. 46: PEDAL AND BOOSTER MOUNTING - RHD
Courtesy of CHRYSLER LLC

1. Install the power brake booster (1) into the engine compartment using the reverse version of how it was removed. Slide the power brake booster push rod and studs through the dash panel and into mounting position.
2. Under the instrument panel, install the four power brake booster mounting nuts (4). To tighten the nuts,

refer to the following step.

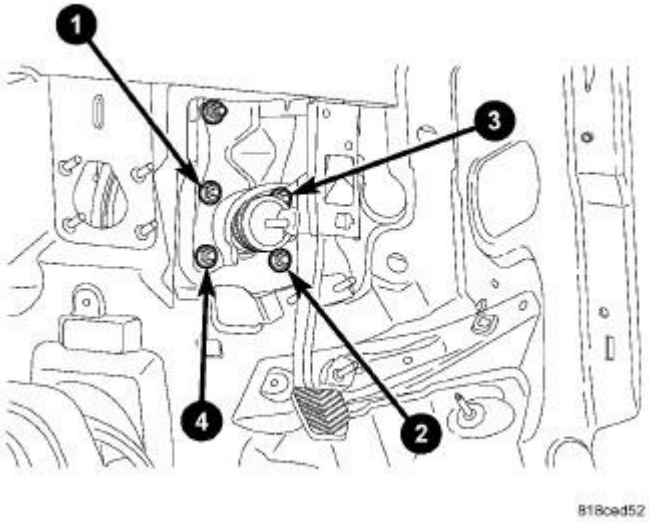


Fig. 47: MOUNTING NUT TORQUE SEQUENCE - RHD
Courtesy of CHRYSLER LLC

CAUTION: Because of power brake booster design, it is very important to tighten the mounting nuts in the proper sequence.

3. Tighten the four brake pedal/booster mounting nuts in the proper sequence to 23 N.m (17 ft. lbs.).
4. If equipped with a manual transaxle, install the clutch master cylinder on the dash panel and clutch pedal bracket assembly. Refer to **Clutch/CYLINDER, Clutch Master - Installation**

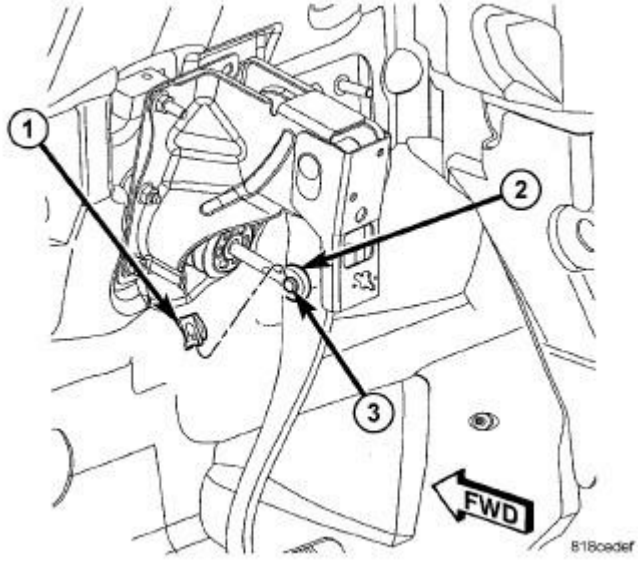


Fig. 48: BRAKE PEDAL CLIP - RHD
Courtesy of CHRYSLER LLC

5. Using Mopar® Lubriplate, or an equivalent, coat the surface of the brake pedal pin (3) where it contacts the brake booster input rod (2).
6. Install the power brake booster push rod (2) on the pin (3) mounted on the side of the brake pedal. Install a NEW retaining clip (1) on the end of the pin. **Do not reuse the old clip.**

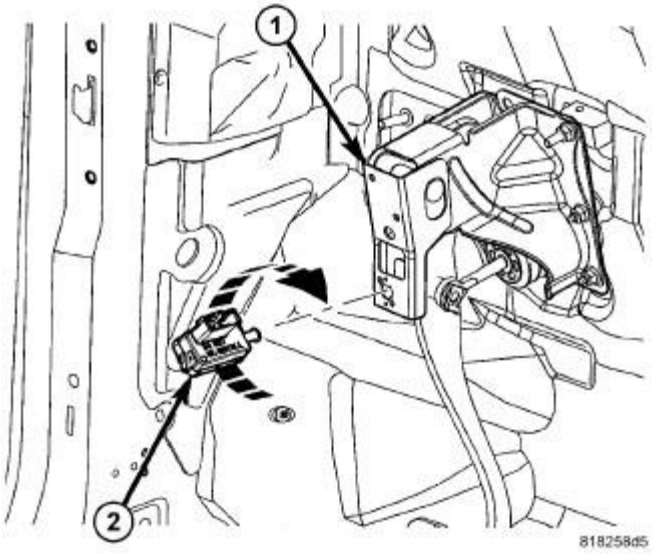


Fig. 49: STOP LAMP SWITCH AND PEDAL CLIP
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the original stop lamp switch on vehicles built prior to July 21, 2008. Anytime a switch has been removed or its position compromised, a new switch must be installed and adjusted. Do not attempt to readjust the switch. The original brake lamp switch can be reused and adjusted on vehicles built on or after July 21, 2008.

7. Install and adjust a NEW stop lamp switch (2) in the brake pedal bracket (1) on vehicle built prior to July 21, 2008. The original brake lamp switch can be reused on vehicles built on or after July 21, 2008. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Installation**
8. Install the brake tube routing clips with tubes onto the studs on the dash panel.

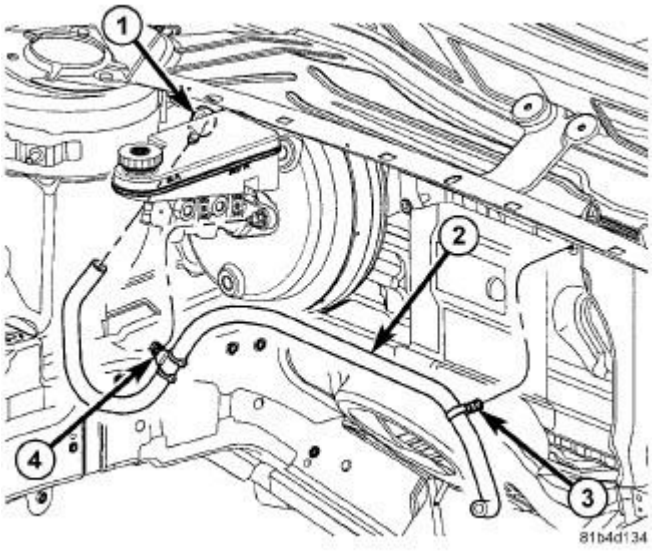


Fig. 50: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

9. Connect the vacuum hose (2) to the check valve (1) on the power brake booster.
10. Install the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Installation**

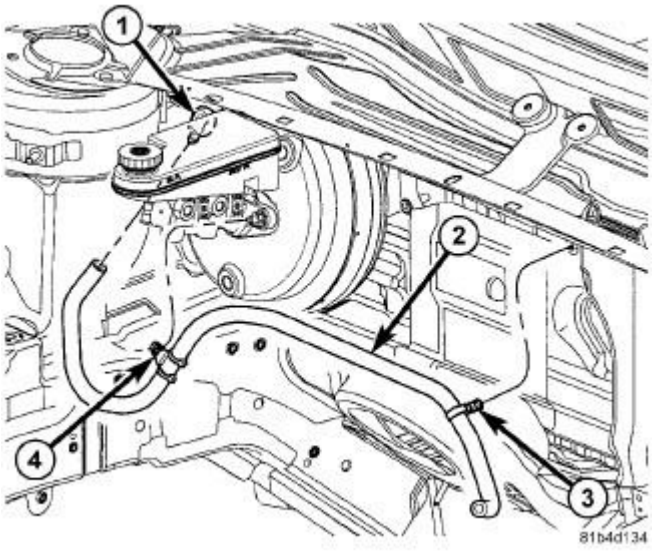


Fig. 51: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

11. Install the booster vacuum hose routing clip (4) onto the master cylinder mounting stud.
12. Install the vacuum hose routing clip (3) onto the stud on the dash panel.

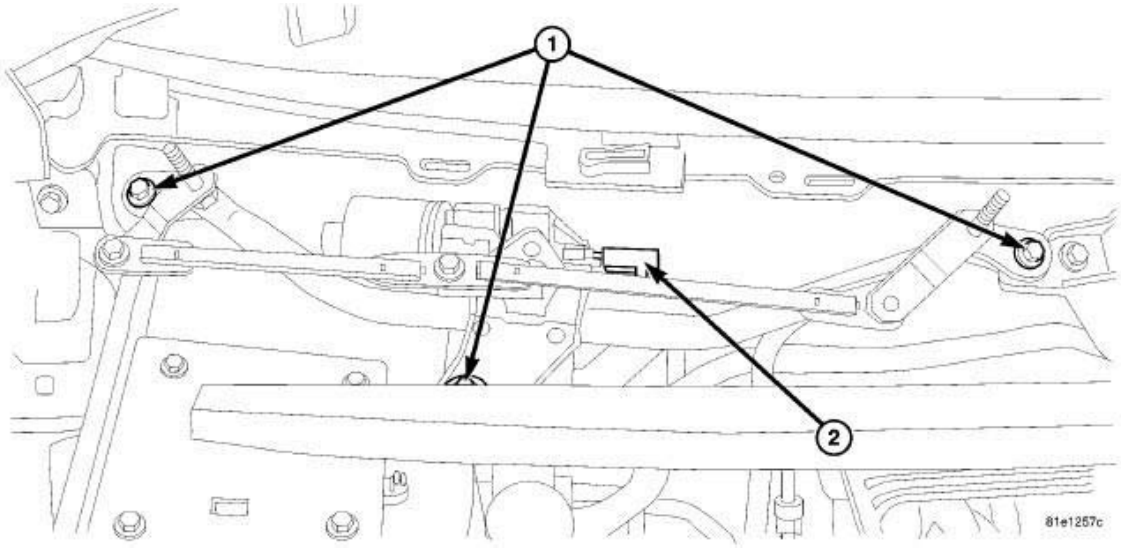


Fig. 52: MODULE -WIPER
Courtesy of CHRYSLER LLC

13. Place the wiper module into position, install the three mounting bolts (1), Tighten bolts to 11 N.m (97 in. lbs.).
14. Connect the electrical connector (2) to the wiper motor.

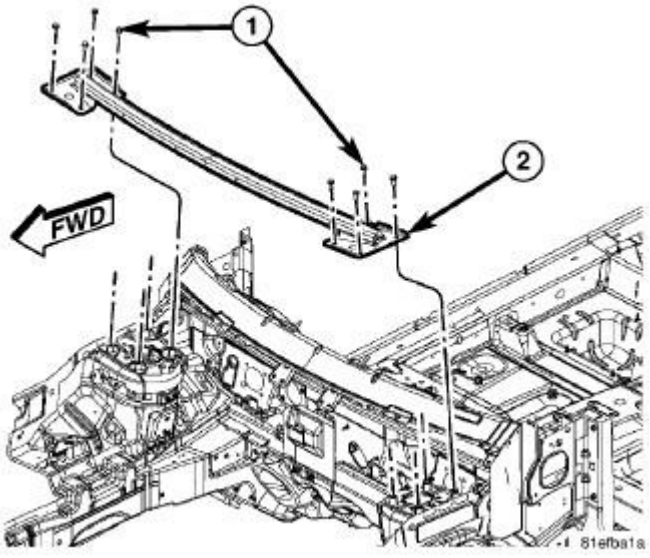


Fig. 53: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

15. Install the wheelhouse brace (2). Install and tighten the eight mounting bolts (four each side) (1) to 48 N.m (35 ft. lbs.).

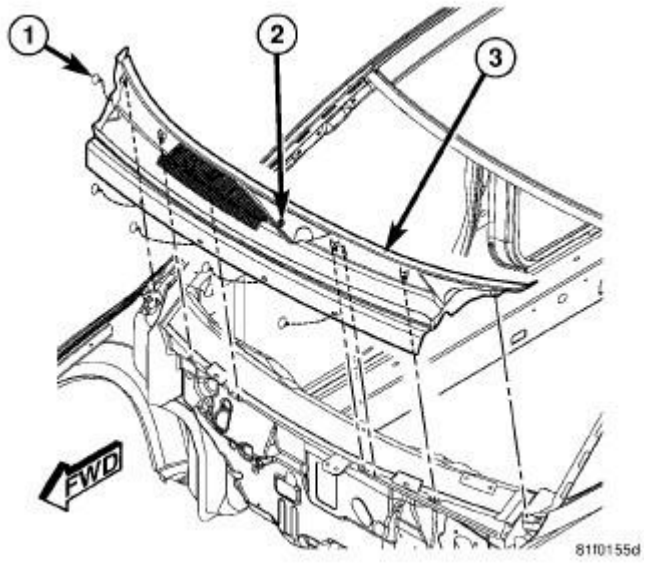


Fig. 54: COWL SCREEN
Courtesy of CHRYSLER LLC

16. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.
17. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

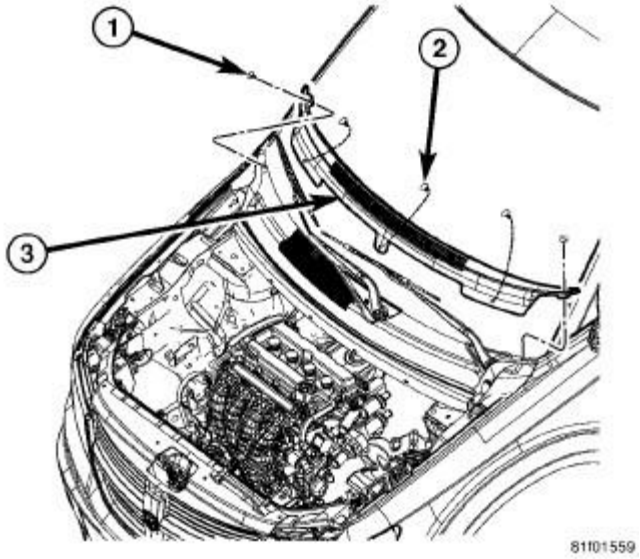


Fig. 55: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

18. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends.

Install the remaining push-pins (2).

19. Install the engine appearance cover.
20. Connect the battery negative (ground) cable to its post on the battery.
21. Bleed the base brake system as necessary. See **Brakes - Standard Procedure**

WARNING: Be certain a firm brake pedal is achieved prior to attempting to operate the vehicle.

22. Road test the vehicle to ensure proper operation of the brakes.

CALIPER, DISC BRAKE, FRONT

Removal

REMOVAL

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

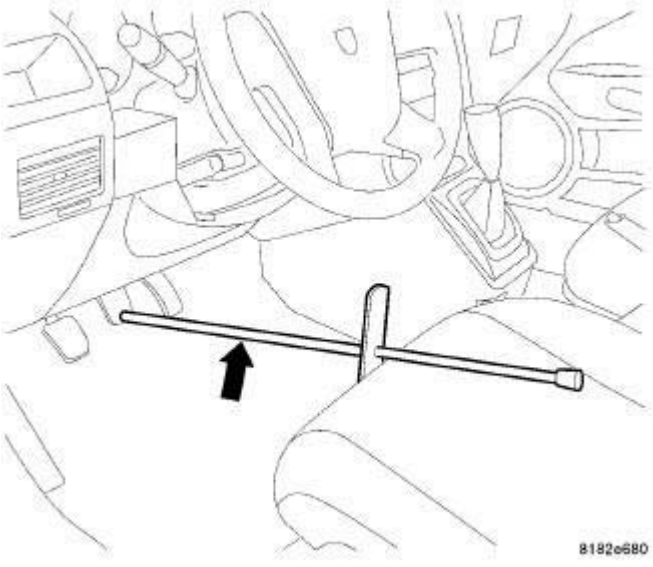


Fig. 56: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

1. Using a brake pedal holding tool as shown, depress the brake pedal past its first one inch (25 mm) of travel and hold it in this position. This will isolate the master cylinder from the brake hydraulic system and will not allow the brake fluid to drain out of the master cylinder reservoir when the lines are opened.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

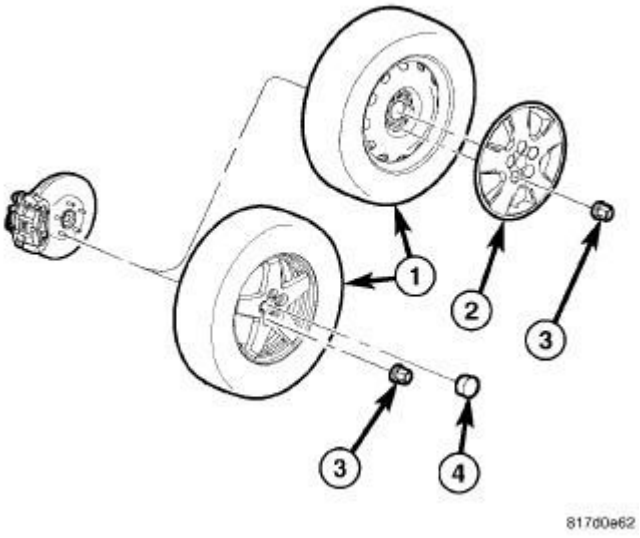


Fig. 57: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

3. Remove the wheel mounting nuts (3), then the tire and wheel assembly.

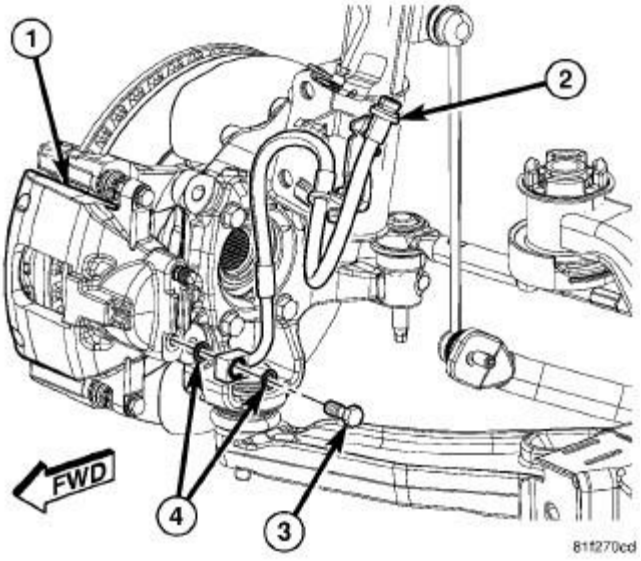


Fig. 58: BRAKE HOSE MOUNTING TO CALIPER
Courtesy of CHRYSLER LLC

4. Remove the banjo bolt (3) connecting the brake flex hose (2) to the brake caliper (1). There are two washers (4) that will come off with the banjo bolt. Discard the washers. They should not be reused.

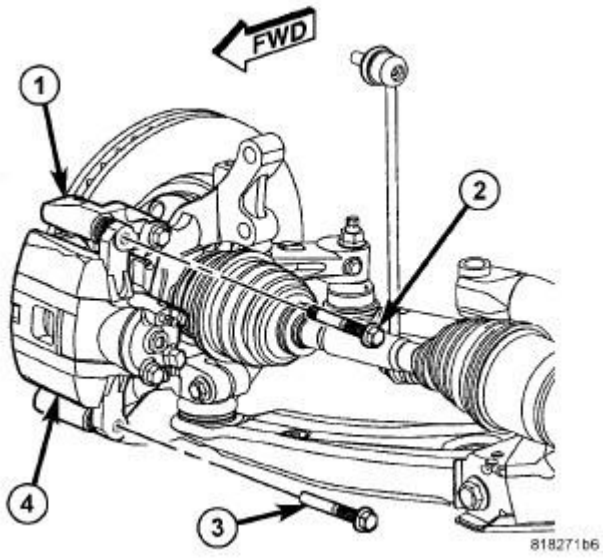


Fig. 59: CALIPER GUIDE PIN BOLTS
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

5. Remove the two brake caliper guide pin bolts (2, 3).
6. Slide the disc brake caliper (4) from the disc brake adapter bracket (1) and brake pads and remove.

Disassembly

DISASSEMBLY

NOTE: Before disassembling the brake caliper, remove it from the vehicle. See Brakes/Hydraulic/Mechanical/CALIPER, Disc Brake - Removal

NOTE: Before disassembling the brake caliper, clean and inspect it. See Brakes/Hydraulic/Mechanical/CALIPER, Disc Brake - Cleaning. See Brakes/Hydraulic/Mechanical/CALIPER, Disc Brake - Inspection

WARNING: Under no condition should high pressure air ever be used to remove a piston from a caliper bore. Personal injury could result from such a practice.

CAUTION: Do not use excessive force when clamping caliper in vise. Excessive vise pressure will cause bore distortion.

1. Mount the caliper in a vise equipped with protective jaws.

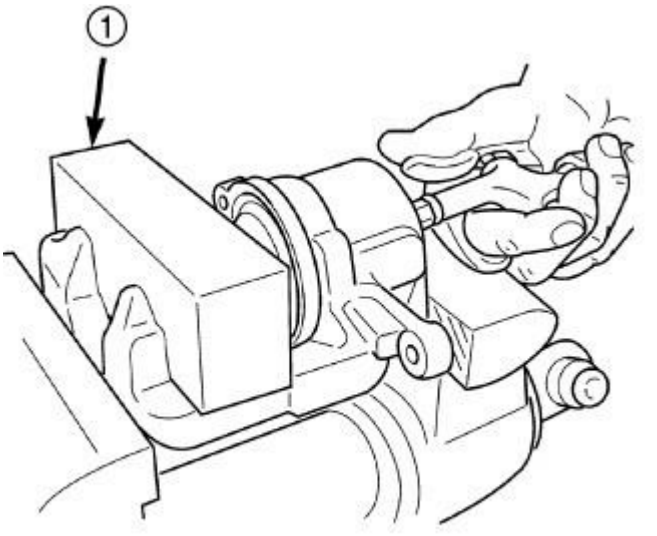


Fig. 60: Piston Removal
Courtesy of CHRYSLER LLC

1 - WOOD BLOCK

WARNING: Do not place face or hands near caliper and piston if using compressed air pressure to remove piston. Do not use high pressure.

2. Place a wooden block (1) in the caliper as shown.
3. If necessary, apply low pressure compressed air to the caliper fluid inlet in short spurts to force the piston out.
4. Remove the piston from the caliper.
5. Remove the dust boot from the piston and discard it.

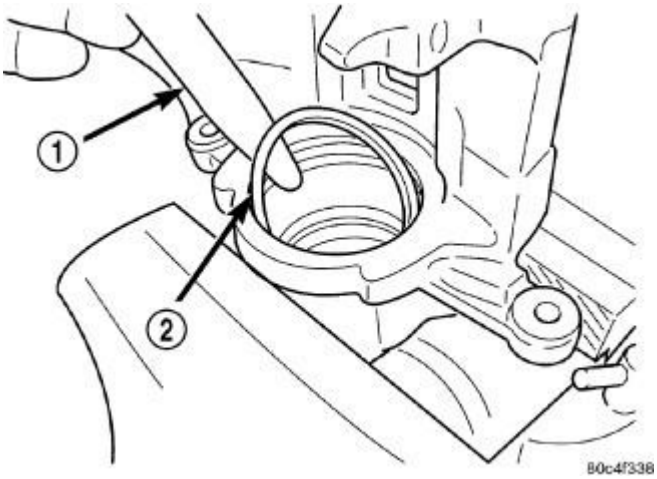


Fig. 61: Piston Seal Removal
Courtesy of CHRYSLER LLC

1 - TRIM STICK
2 - SEAL

CAUTION: Do not use a screw driver or other metal tool for seal removal. Using such tools can scratch the bore or leave burrs on the seal groove edges.

6. Using a soft tool such as a plastic trim stick (1), work the piston seal (2) out of its groove in caliper piston bore. Discard the used seal.
7. Clean the piston bore and drilled passage ways with alcohol or a suitable solvent. Wipe it dry using only a lint-free cloth.
8. Inspect both the piston and bore for scoring or pitting. Bores that show light scratches or corrosion can usually be cleared of the light scratches or corrosion using crocus cloth.

Cleaning

CLEANING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or Mopar® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing

mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

Inspection

INSPECTION

Inspect the disc brake caliper for the following:

- Brake fluid leaks in and around piston boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots.

Assembly

ASSEMBLY

NOTE: Always have clean hands when assembling a brake caliper.

NOTE: Always use fresh, clean brake fluid when assembling a brake caliper.

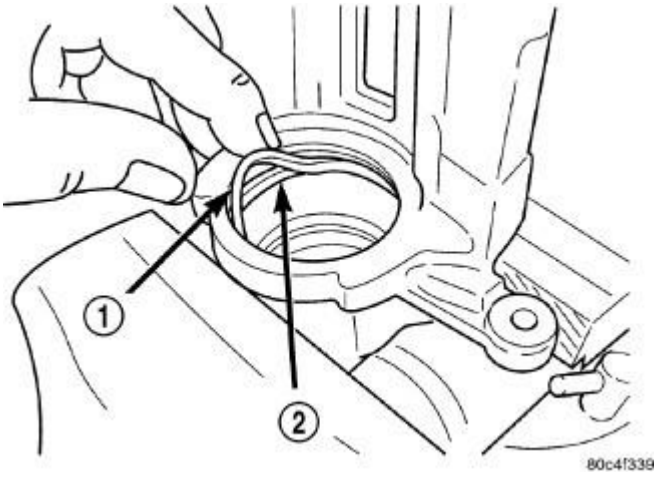


Fig. 62: New Piston Seal Installation
Courtesy of CHRYSLER LLC

1 - SEAL
2 - GROOVE

NOTE: Never use an old piston seal.

1. Dip the NEW piston seal in clean brake fluid and install it in the groove (2) of the caliper bore. The seal (1) should be started at one area of the groove and gently worked around into the groove using only your clean fingers to seat it.

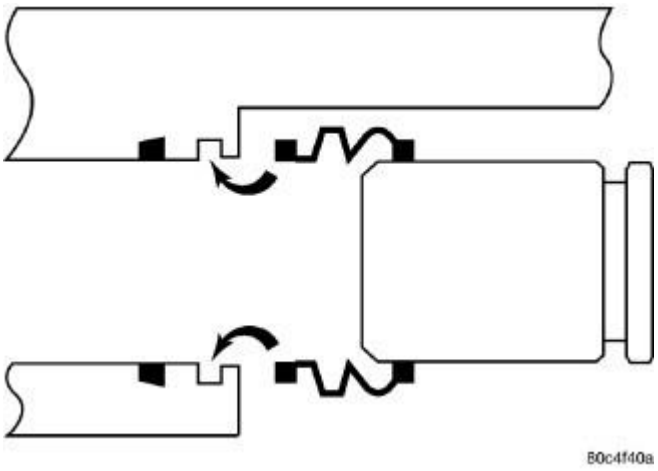


Fig. 63: Boot Installation
Courtesy of CHRYSLER LLC

2. Coat the NEW piston with clean brake fluid.
3. Coat the NEW piston boot with clean brake fluid leaving a generous amount inside the boot.
4. Position the dust boot over the lower section of the piston.
5. Extend the dust boot below the bottom of the piston and guide the lip seal into the groove in the caliper piston bore.

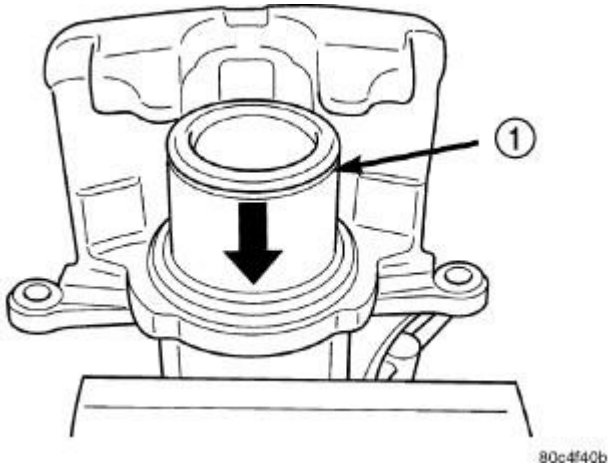


Fig. 64: Piston Installation
Courtesy of CHRYSLER LLC

1 - PISTON GROOVE

CAUTION: Force applied to the piston (1) to seat it in the bore must be applied uniformly to avoid cocking and binding of the piston.

6. Install the piston (1) into the bore, carefully pushing it past the piston seal using **hand pressure** . Push the piston in until it bottoms in the caliper bore and the dust boot lip seal falls into the groove near the top of the piston.
7. Install the caliper on the vehicle and bleed the brakes as necessary. See **Brakes/Hydraulic/Mechanical/CALIPER, Disc Brake - Installation**

Installation

INSTALLATION

1. Completely retract the caliper piston back into the bore of the caliper. Use a C-clamp to retract the piston. Place a wood block over the piston before installing the C-clamp to avoid damaging the piston.

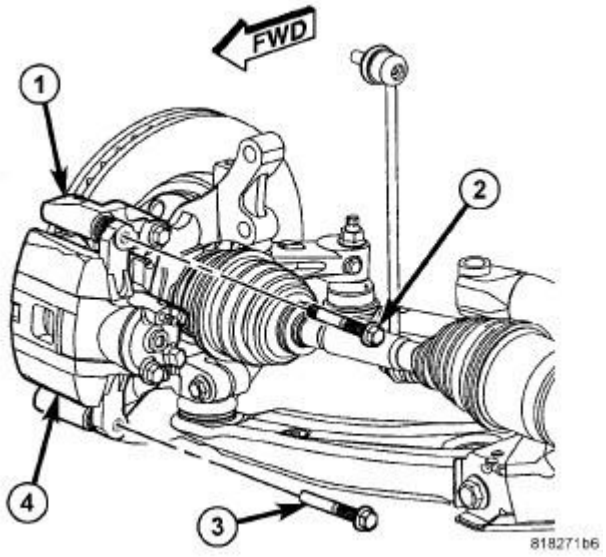


Fig. 65: CALIPER GUIDE PIN BOLTS
Courtesy of CHRYSLER LLC

CAUTION: Use care when installing the caliper (4) onto the adapter bracket (1) to avoid damaging the guide pin boots.

2. Install the disc brake caliper over the brake pads on the brake caliper adapter bracket.

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

3. Align the caliper guide pin bolt holes with the adapter bracket. Install the upper (2) and lower (3) caliper guide pin bolts. Tighten the guide pin bolts to 35 N.m (26 ft. lbs.).

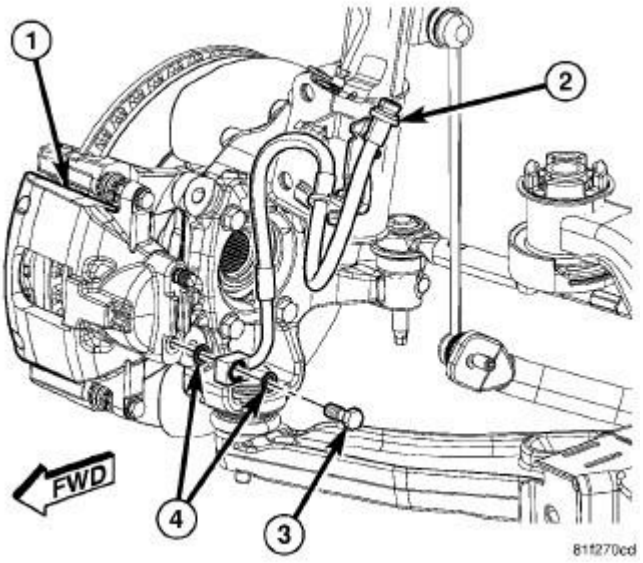


Fig. 66: BRAKE HOSE MOUNTING TO CALIPER
Courtesy of CHRYSLER LLC

4. Install the banjo bolt (3) connecting the brake flex hose (2) to the brake caliper (1). Install NEW brake hose washers (4) on each side of the hose fitting as the banjo bolt is guided through the fitting. Thread the banjo bolt into the caliper and tighten it to 26 N.m (19 ft. lbs.).

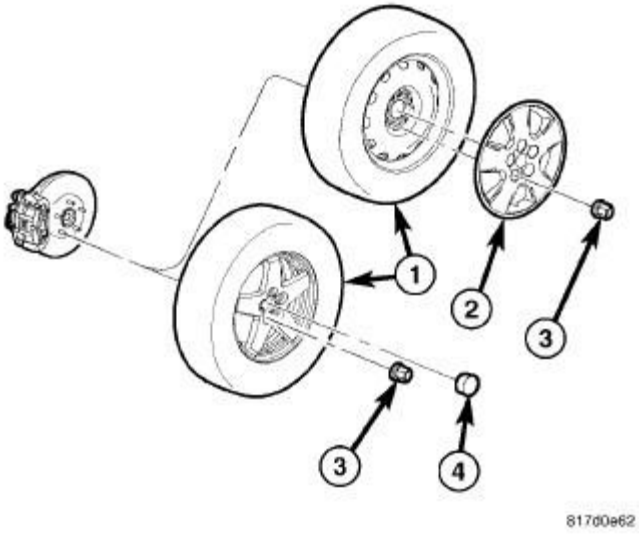


Fig. 67: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

5. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
6. Lower the vehicle.

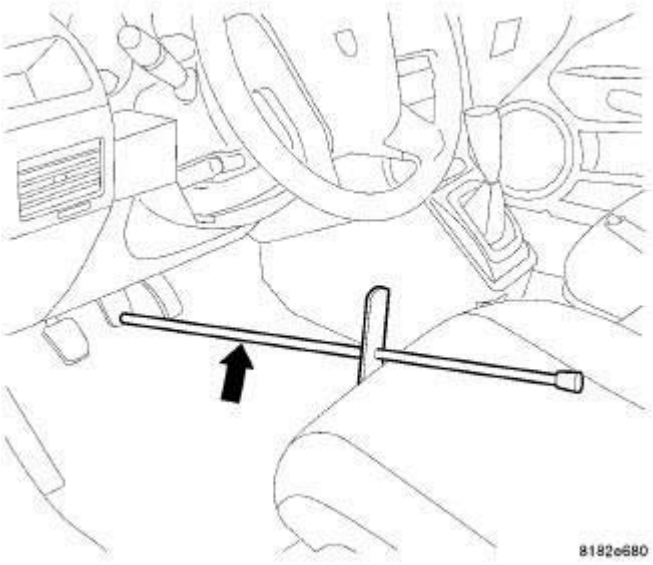


Fig. 68: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

7. Remove the brake pedal holding tool.

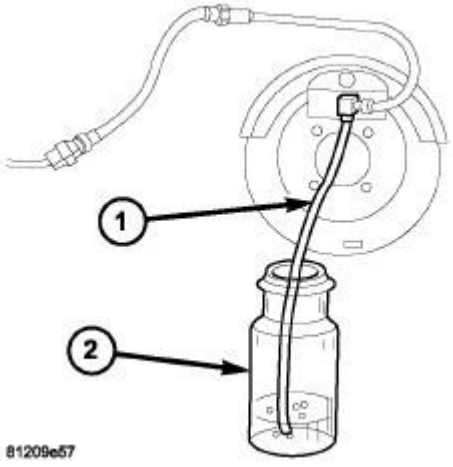


Fig. 69: BLEED HOSE SET UP
Courtesy of CHRYSLER LLC

8. Bleed the caliper as necessary. See **Brakes - Standard Procedure**
9. Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake shoes.

CALIPER, DISC BRAKE, REAR

Removal

REMOVAL

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Disconnect and isolate battery negative cable from battery post.

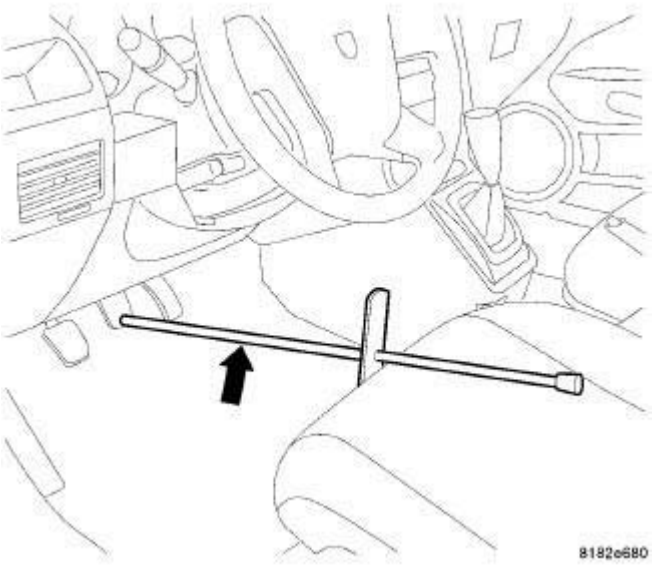


Fig. 70: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

2. Using a brake pedal holding tool as shown, depress brake pedal past its first inch of travel and hold it in this position. Holding pedal in this position will isolate master cylinder from hydraulic brake system and will not allow brake fluid to drain out of brake fluid reservoir while brake lines are open.
3. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

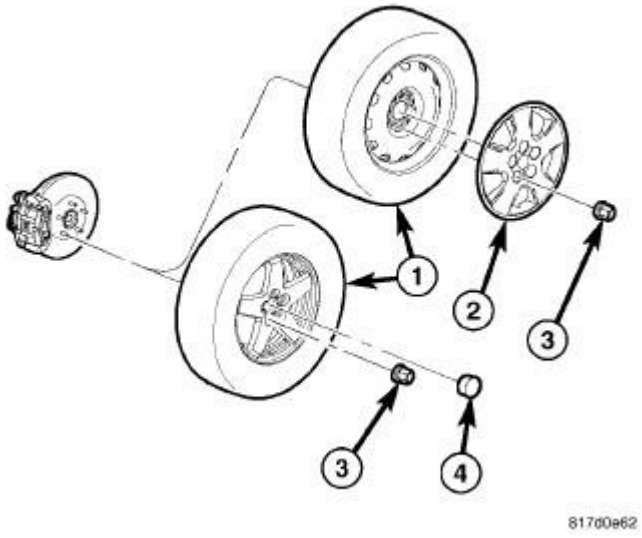


Fig. 71: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).
5. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**

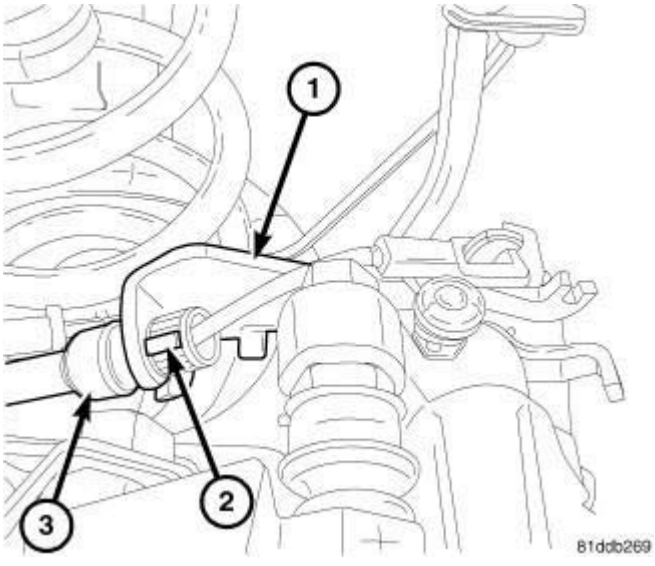


Fig. 72: PARKING BRAKE CABLE AT BRACKET
Courtesy of CHRYSLER LLC

6. Collapse the cable retainer fingers (2) at the end of the cable housing (3), then pull the cable housing out of the mounting bracket (1).

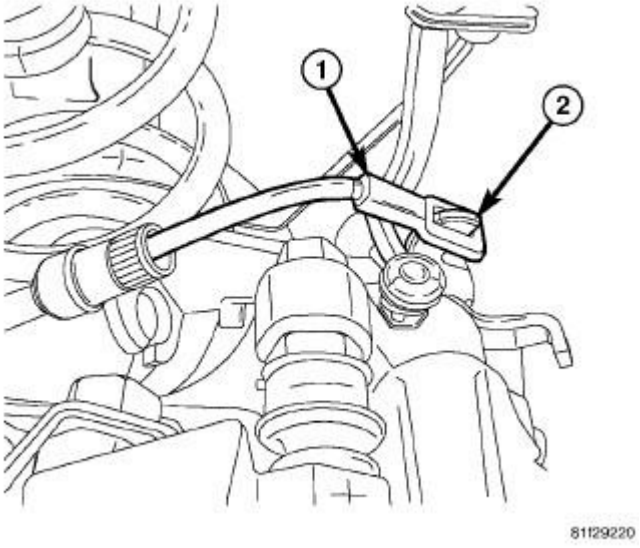


Fig. 73: PARKING BRAKE CABLE AT LEVER
Courtesy of CHRYSLER LLC

7. Slide the cable strand out of the mounting bracket, then pull the parking brake cable strand (1) upward and unhook it from the caliper lever (2).

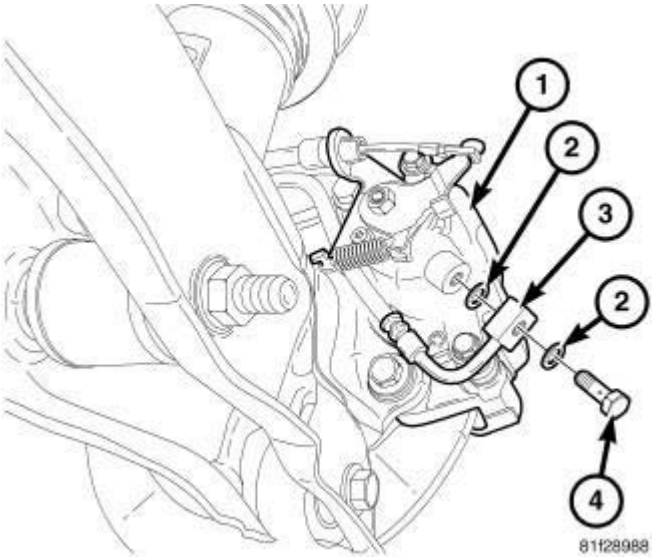


Fig. 74: BRAKE HOSE MOUNTING TO CALIPER
Courtesy of CHRYSLER LLC

8. Remove the banjo bolt (4) connecting the brake flex hose (3) to the brake caliper (1). There are two washers (2) that will come off with the banjo bolt. Discard the washers. They should not be reused.

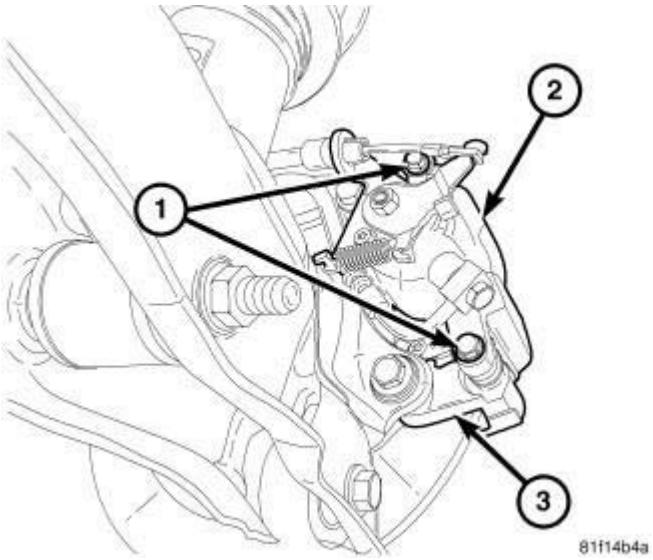


Fig. 75: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

9. Remove two caliper guide pin bolts (1).
10. Slide the disc brake caliper (2) from the disc brake adapter bracket (3) and brake pads.

Cleaning

CLEANING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

To clean or flush the internal passages of the brake caliper, use fresh brake fluid or Mopar® Non-Chlorinated Brake Parts Cleaner. Never use gasoline, kerosene, alcohol, oil, transmission fluid or any fluid containing mineral oil to clean the caliper. These fluids will damage rubber cups and seals.

Inspection

INSPECTION

Inspect the disc brake caliper for the following:

- Brake fluid leaks in and around piston boot area
- Ruptures, brittleness or damage to the piston dust boot

If caliper fails inspection, disassemble and recondition caliper, replacing the seals and dust boots.

Installation

INSTALLATION

CAUTION: When installing a NEW brake caliper it is necessary to bleed the brakes using a special procedure which has been integrated to this installation procedure.

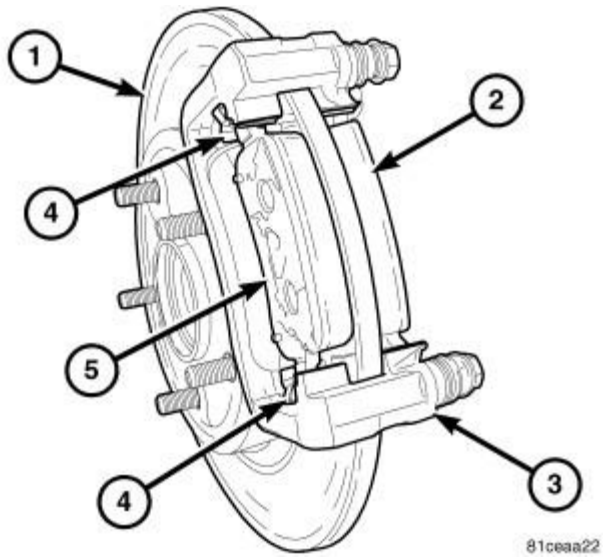


Fig. 76: REAR BRAKE PADS
Courtesy of CHRYSLER LLC

1. Remove the outboard pad (5) from the adapter bracket.

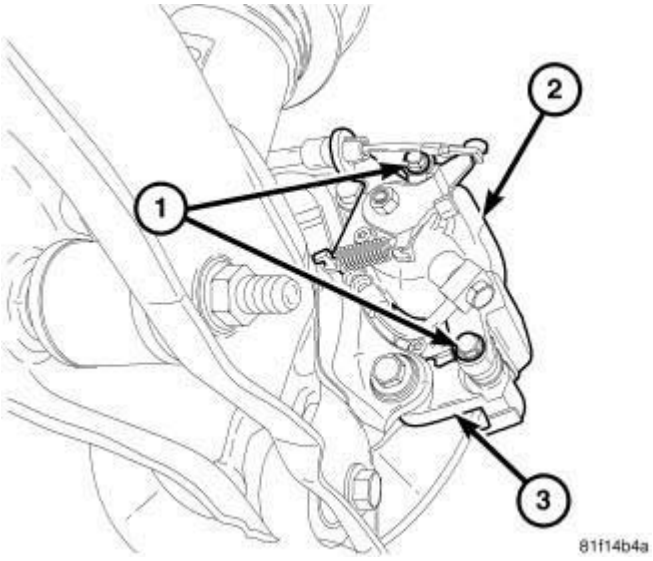


Fig. 77: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: Use care when installing the caliper (2) onto the adapter bracket to avoid damaging the guide pin boots.

2. Install the disc brake caliper (2) over the inboard brake pad on the brake caliper adapter bracket and the brake rotor.

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

3. Align the caliper guide pin bolt holes with the adapter bracket. Install the upper and lower caliper guide pin bolts (1). Lightly tighten the guide pin bolts at this time.

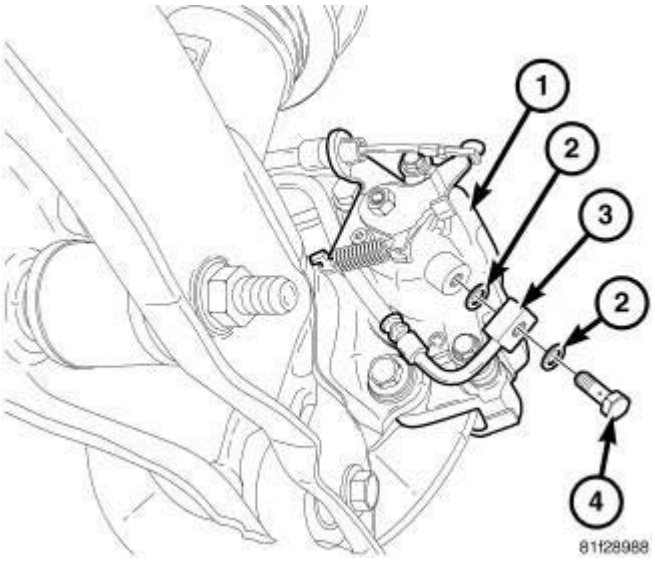


Fig. 78: BRAKE HOSE MOUNTING TO CALIPER
Courtesy of CHRYSLER LLC

4. Install the banjo bolt (4) connecting the brake flex hose (3) to the brake caliper (1). **Be sure to install a NEW brake hose washer (2) on each side of the hose fitting as the banjo bolt is guided through the fitting.** Thread the banjo bolt into the caliper and tighten it to 26 N.m (19 ft. lbs.).

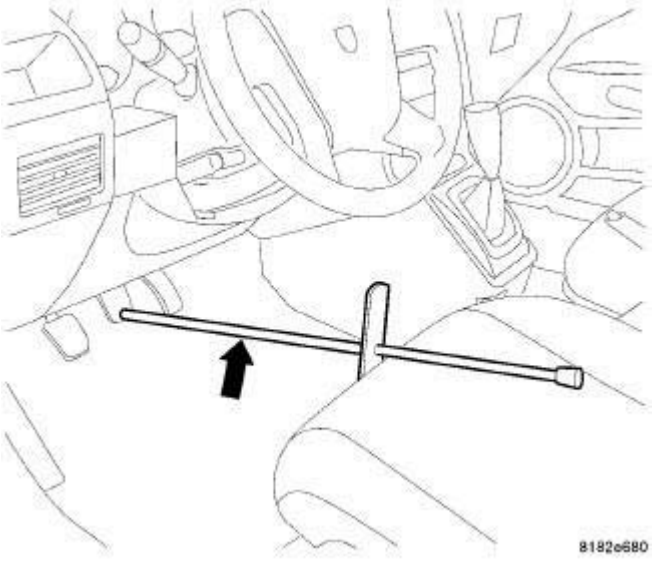


Fig. 79: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

5. Access the interior of the vehicle, remove the brake pedal holder, then slowly pump the brake pedal until the rear caliper fingers touch the outboard surface of the brake rotor where the brake pad was removed. Release the pedal.

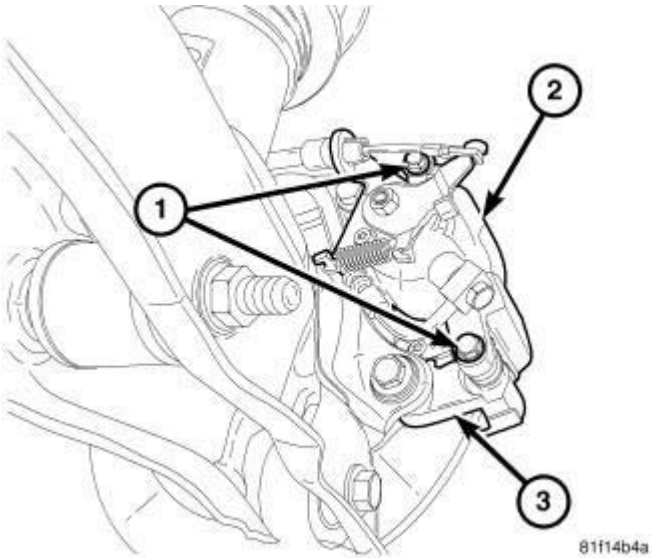


Fig. 80: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

6. Remove two caliper guide pin bolts (1).
7. Slide the disc brake caliper (2) from the disc brake adapter bracket (3).

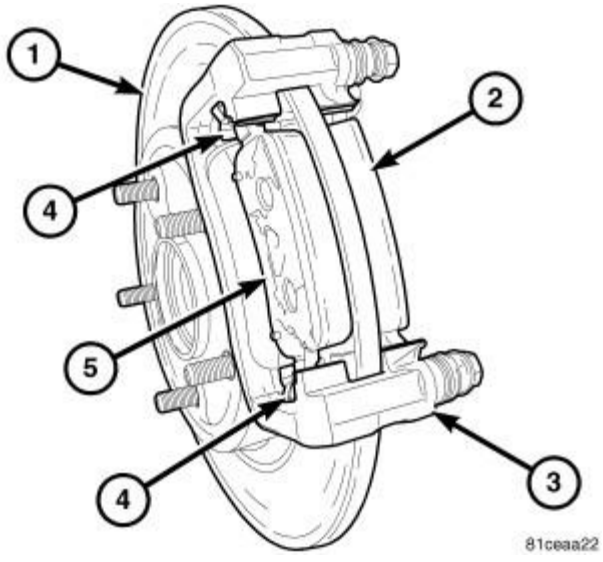


Fig. 81: REAR BRAKE PADS
Courtesy of CHRYSLER LLC

8. Reinstall the outboard pad (5) in the adapter bracket (3).

9. Open the caliper bleeder screw at least one full turn.

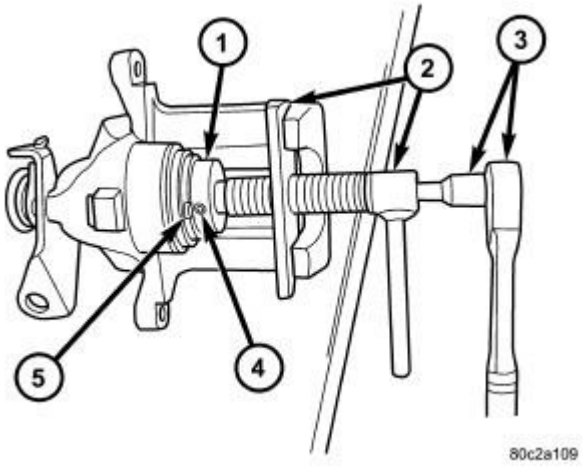


Fig. 82: SEATING PISTON WITH SPECIAL TOOL
Courtesy of CHRYSLER LLC

10. Seat (bottom) the caliper piston in the bore as follows:
    a. Assemble a 3/8 in. drive ratchet handle and an extension (3).
    b. Insert the extension through Special Tool 8807-1 (2).
    c. Place Special Tool 8807-2 (1) on the end of the extension.
    d. Insert lugs on Special Tool 8807-2 into notches in face of caliper piston (5).
    e. Thread the screw drive on 8807-1 down until it contacts the top of 8807-2 which is against the caliper piston. **Do not over tighten the screw-drive. Damage to the piston can occur.**
    f. Turn 8807-2 with the ratchet, rotating the piston in a **clockwise** direction until fully seated (bottomed) in the bore. **It may be necessary to turn 8807-1 with 8807-2 to start the process of piston retraction.**
11. Close the bleeder screw.

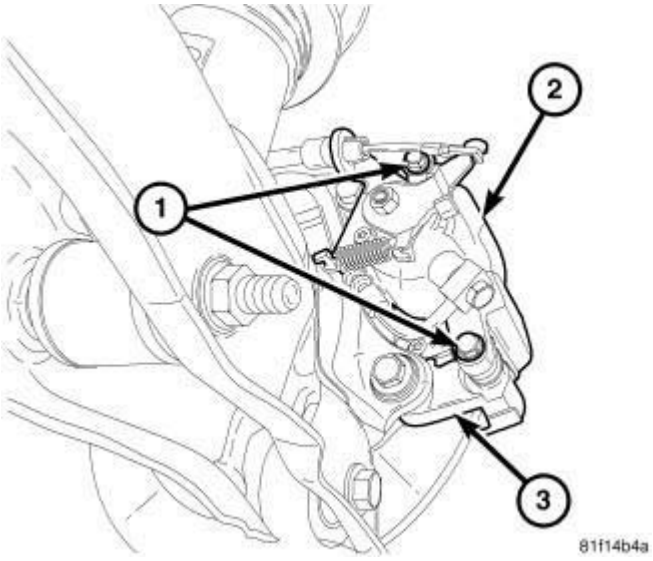


Fig. 83: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: Use care when installing the caliper onto the adapter bracket to avoid damaging the guide pin boots.

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

12. Return the brake caliper back down over the adapter bracket into mounted position and install the guide pin bolts (1). Tighten both guide pin bolts to 35 N.m (26 ft. lbs.).

NOTE: While bleeding air from the brake caliper in the following steps, be sure to monitor the fluid level in the master cylinder reservoir making sure it does not go dry.

13. Have a helper pump the brake pedal three or four times and hold it in the down position.
14. With the pedal in the down position, open the bleeder screw at least one full turn and let out fluid and air, if any.
15. Once the brake pedal has dropped, close the bleeder screw. Once the bleeder screw is closed, release the brake pedal.
16. Repeat the previous three steps as necessary until all trapped air is removed.
17. If necessary, bleed remaining wheel circuits as necessary using normal bleeding procedure. See **Brakes - Standard Procedure**

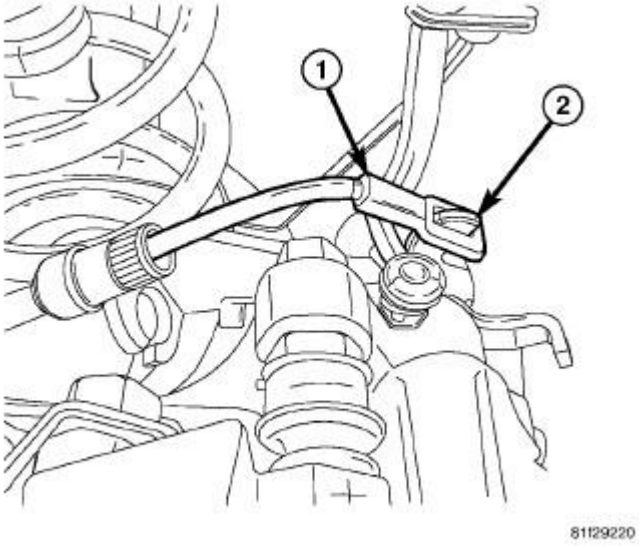


Fig. 84: PARKING BRAKE CABLE AT LEVER
Courtesy of CHRYSLER LLC

18. Pull the parking brake cable strand (1) outward from the cable housing and hook it onto the caliper lever (2).

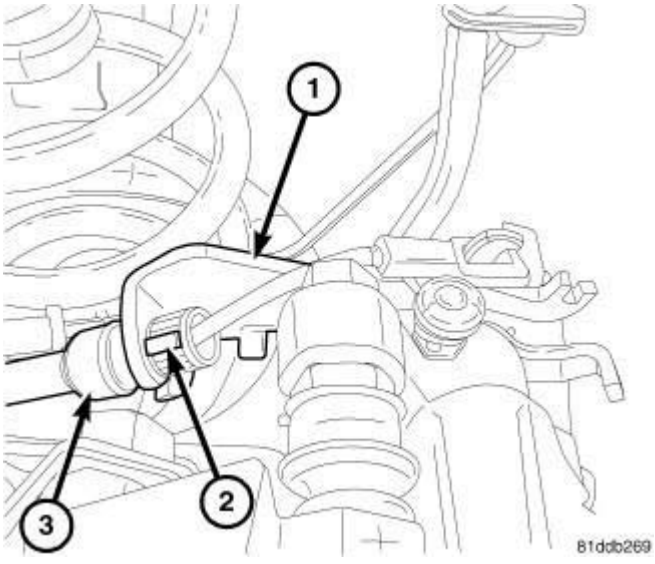


Fig. 85: PARKING BRAKE CABLE AT BRACKET
Courtesy of CHRYSLER LLC

19. Push the excess cable strand back into the cable housing, then insert the cable housing (3) into the mounting bracket (1) until the retainer fingers (2) lock into place. Make sure both fingers are engaged preventing removal of the cable from the bracket.

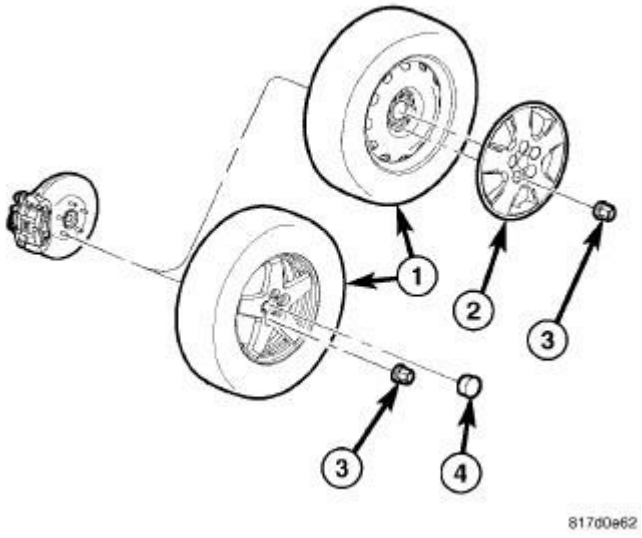


Fig. 86: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

20. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
21. Reconnect the parking brake cable equalizer and reset the cable tension. See **Brakes/Parking Brake - Standard Procedure**
22. Lower vehicle.
23. Connect battery negative (-) cable to battery post.
24. Road test vehicle making several stops to wear off any foreign material on brakes and to seat brake pads.

FLUID

Diagnosis and Testing

BRAKE FLUID CONTAMINATION

Indications of fluid contamination are swollen or deteriorated rubber parts. Swelling indicates the presence of petroleum in the brake fluid.

To test for contamination, put a small amount of drained brake fluid in clear glass jar. If the fluid separates into layers, there is mineral oil or other fluid contamination of the brake fluid.

If the brake fluid is contaminated, drain and thoroughly flush the brake system. Replace all the rubber parts or components containing rubber coming into contact with the brake fluid including: the master cylinder and reservoir; proportioning valves (non-ABS); caliper seals; wheel cylinder seals; ABS hydraulic control unit; and all hydraulic fluid hoses.

Standard Procedure

BRAKE FLUID LEVEL CHECKING

NOTE: Brake fluid level should be checked a minimum of twice a year.

Master cylinder reservoirs are marked, FULL and ADD, indicating the allowable brake fluid level range in the master cylinder fluid reservoir.

CAUTION: Use only Mopar® Brake Fluid DOT 3 Motor Vehicle or equivalent from a tightly sealed container. Do not use petroleum-based fluid because seal damage in the brake system will result. See Brakes/Hydraulic/Mechanical/FLUID - Specifications

NOTE: Although there is a range, the preferred level is FULL.

1. Remove the cap.
2. Adjust the brake fluid level to the FULL mark listed on the side of the master cylinder fluid reservoir as necessary. Do not overfill the system.
3. Install the cap.

Specifications

BRAKE FLUID

The brake fluid used in this vehicle must conform to DOT 3 specifications and SAE J1703 standards. No other type of brake fluid is recommended or approved for usage in the vehicle brake system. Use only Mopar® Brake Fluid DOT 3 Motor Vehicle or equivalent from a tightly sealed container.

CAUTION: Never use reclaimed brake fluid or fluid from a container which has been left open. An open container will absorb moisture from the air and contaminate the fluid.

CAUTION: Never use any type of a petroleum-based fluid in the brake hydraulic system. Use of such type fluids will result in seal damage of the vehicle brake hydraulic system causing a failure of the vehicle brake system. Petroleum based fluids would be items such as engine oil, transmission fluid, power steering fluid, etc.

MASTER CYLINDER, BRAKE

Description

DESCRIPTION

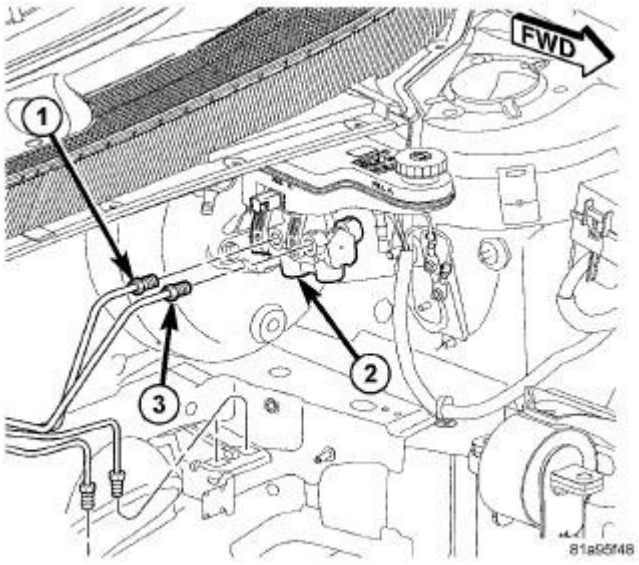


Fig. 87: PRIMARY AND SECONDARY BRAKE TUBES
Courtesy of CHRYSLER LLC

All master cylinders (2) are a two-outlet design and the brake tubes from these primary and secondary outlet ports lead directly to the Integrated Control Unit (ICU) before going to each wheel brake.

All master cylinders mount to the power brake booster in the same manner.

The master cylinder body is an anodized aluminum casting. It has a machined bore to accept the master cylinder pistons and also has threaded ports with seats for hydraulic brake tube connections.

The master cylinder has the brake fluid reservoir mounted on top of it which gravity feeds brake fluid to the master cylinder when it is required. On manual transmission model vehicles the brake fluid reservoir also feeds the clutch hydraulic circuit. The reservoir is made of see-through plastic and it houses the brake fluid level switch. A removable brake fluid level switch is mounted in the right side.

Operation

OPERATION

When the brake pedal is pressed, the master cylinder primary and secondary pistons apply brake pressure through the chassis brake tubes to each brake assembly. The brake fluid reservoir supplies the brake hydraulic system with the necessary fluid to operate properly.

The master cylinder's outlet ports supply hydraulic pressure to the Integrated Control Unit (ICU) where it is distributed to the individual wheel brakes.

The master cylinder reservoir cap diaphragm is slit to allow atmospheric pressure to equalize on both sides of the diaphragm.

Standard Procedure

MASTER CYLINDER BLEEDING

1. Clamp the master cylinder in a vise with soft-jaw caps.

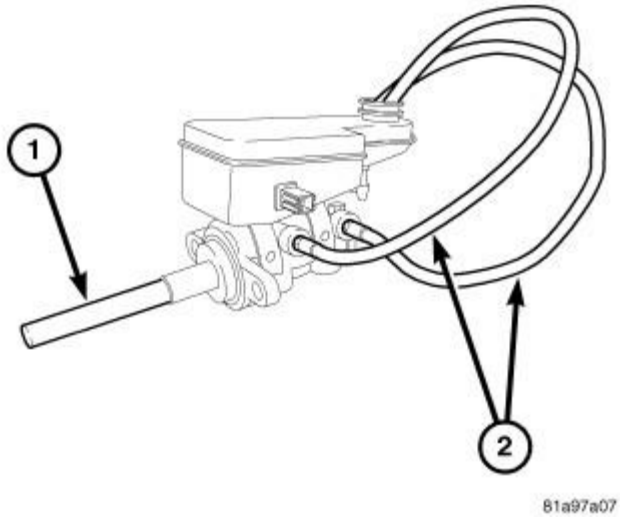


Fig. 88: BLEEDING MASTER CYLINDER WITH ABS
Courtesy of CHRYSLER LLC

2. Thread a Bleeder Tube (2), Special Tool 8358-1, into the primary and secondary ports. Tighten bleeder tube nuts to 17 N.m (150 in. lbs.).
3. Flex each Bleeder Tube and place the open ends into the neck of the master cylinder reservoir. Position the open ends of the tubes into the reservoir so their outlets are below the surface of the brake fluid in the reservoir when filled.

NOTE: Make sure the ends of the Bleeder Tubes stay below the surface of the brake fluid in the reservoir at all times during the bleeding procedure.

4. Fill the brake fluid reservoir with fresh Mopar® Brake Fluid DOT 3 Motor Vehicle, or equivalent. See **Brakes/Hydraulic/Mechanical/FLUID - Specifications**

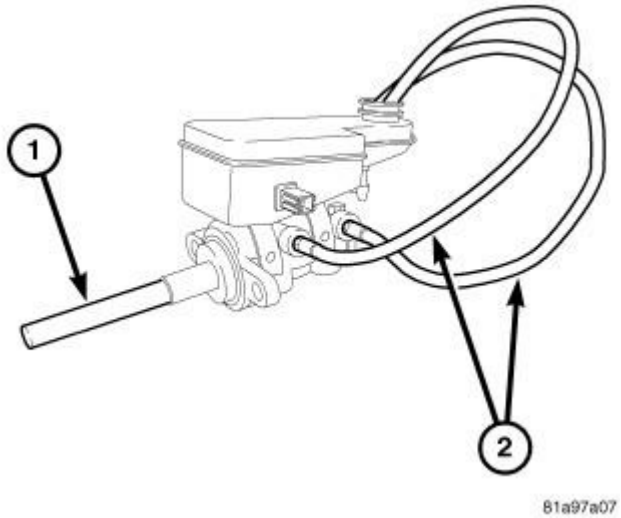


Fig. 89: BLEEDING MASTER CYLINDER WITH ABS
Courtesy of CHRYSLER LLC

5. Using an appropriately sized wooden dowel as a pushrod (1), slowly press the pistons inward discharging brake fluid through the Bleeder Tubes (2), then release the pressure, allowing the pistons to return to the released position. Repeat this several times until all air bubbles are expelled from the master cylinder bore and Bleeder Tubes.
6. Remove the Bleeder Tubes from the master cylinder and plug the master cylinder outlet ports.
7. Install the fill cap on the reservoir.
8. Remove the master cylinder from the vise.
9. Install the master cylinder on the vehicle. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Installation**

Removal

LEFT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

CAUTION: The vacuum in the power brake booster must be depleted before removing the master cylinder to avoid damaging the master cylinder and to prevent inhalation of the o-ring or any other contamination into the booster. The preferred method is to pump the brake pedal while the engine is not running until the brake pedal becomes firm. An alternative method is to remove and immediately reinstall the check valve located on the booster. If the check valve is removed, special care should be taken to ensure that the grommet is not damaged and remains seated, the check valve is dry and free of debris, and that contaminates cannot be ingested during removal.

1. With the engine not running, pump the brake pedal 4-5 strokes until the pedal feel is firm.
2. Disconnect the negative (ground) cable from the battery and isolate the cable.

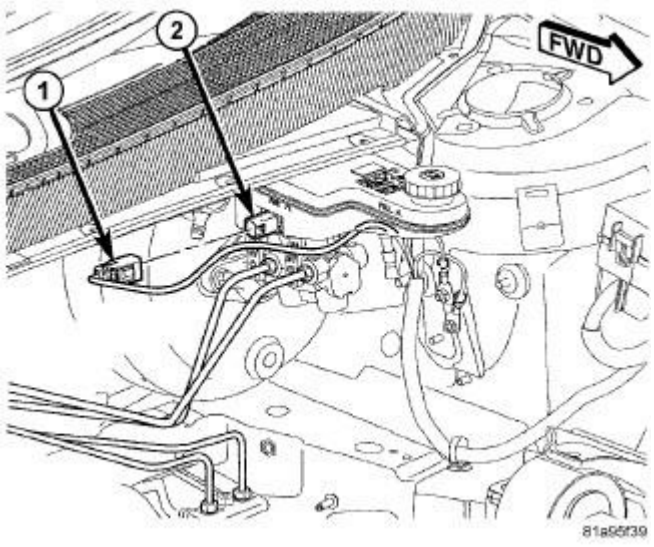


Fig. 90: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

3. Disconnect the wiring harness connector (1) from the brake fluid level switch (2) in the master cylinder brake fluid reservoir.

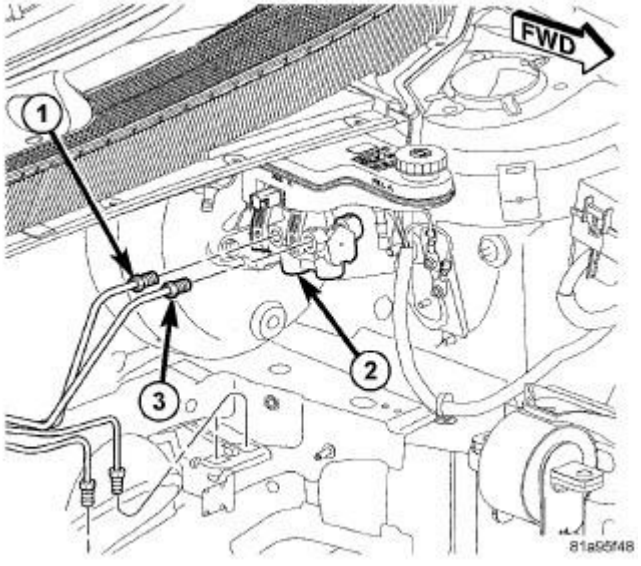


Fig. 91: PRIMARY AND SECONDARY BRAKE TUBES
Courtesy of CHRYSLER LLC

4. Disconnect the primary (1) and secondary (3) brake tubes at the master cylinder (2) outlet ports. Install

plugs at all of the open brake tube outlets on the master cylinder.

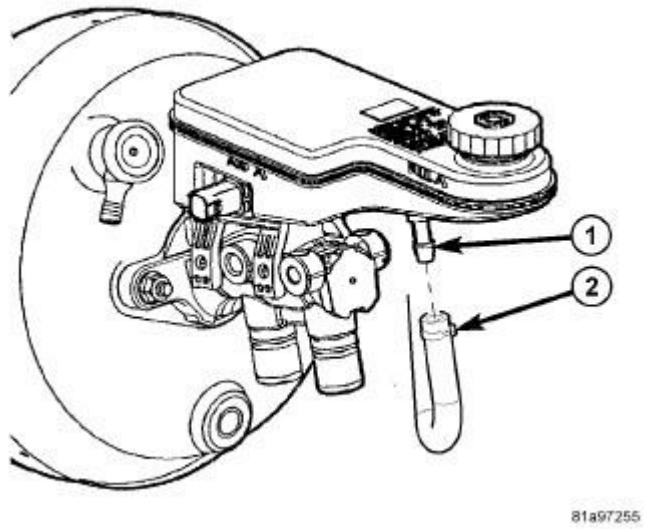


Fig. 92: CLUTCH ACTUATOR HOSE AT MASTER CYLINDER
Courtesy of CHRYSLER LLC

5. If equipped with a manual transaxle, remove the clamp and slide the clutch actuator hose (2) off the reservoir port (1).

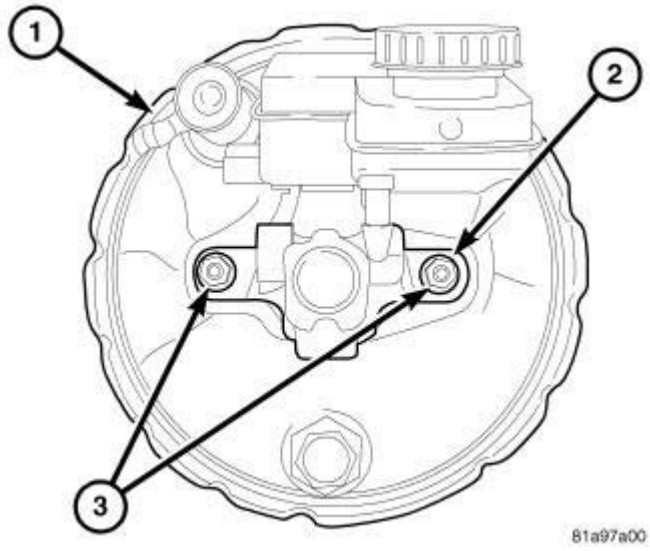


Fig. 93: MASTER CYLINDER MOUNTING NUTS
Courtesy of CHRYSLER LLC

6. Clean the area around where the master cylinder (2) attaches to the power brake booster (1) using a suitable brake cleaner such as Mopar® Brake Parts Cleaner or an equivalent.
7. Remove the two nuts (3) attaching the master cylinder (2) to the power brake booster (1).

8. Slide the master cylinder straight out of the power brake booster.

RIGHT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

CAUTION: The vacuum in the power brake booster must be depleted before removing the master cylinder to avoid damaging the master cylinder and to prevent inhalation of the o-ring or any other contamination into the booster. The preferred method is to pump the brake pedal while the engine is not running until the brake pedal becomes firm. An alternative method is to remove and immediately reinstall the check valve located on the booster. If the check valve is removed, special care should be taken to ensure that the grommet is not damaged and remains seated, the check valve is dry and free of debris, and that contaminates cannot be ingested during removal.

1. With the engine not running, pump the brake pedal 4-5 strokes until the pedal feel is firm.
2. Disconnect the negative (ground) cable from the battery and isolate the cable.
3. Remove the engine appearance cover.

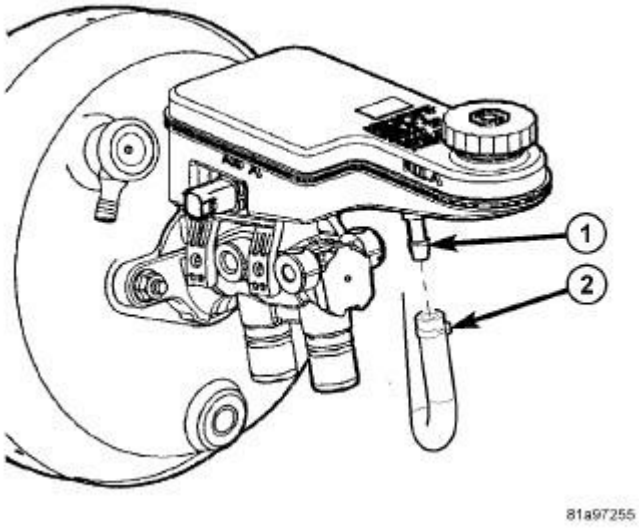


Fig. 94: CLUTCH ACTUATOR HOSE AT MASTER CYLINDER
Courtesy of CHRYSLER LLC

4. If equipped with a manual transaxle, remove the clamp and slide the clutch actuator hose (2) off the reservoir port (1).

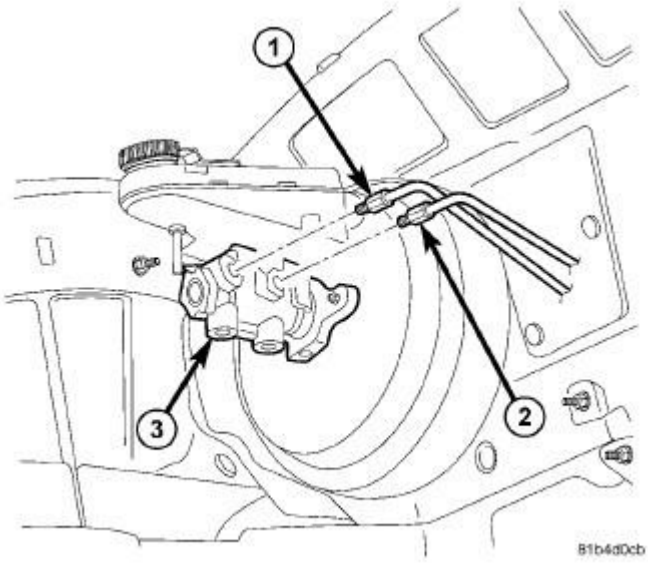


Fig. 95: PRIMARY AND SECONDARY BRAKE TUBES - RHD
Courtesy of CHRYSLER LLC

5. Disconnect the primary (2) and secondary (1) brake tubes at the master cylinder outlet ports. Install plugs at both of the open brake tube outlets on the master cylinder (3).

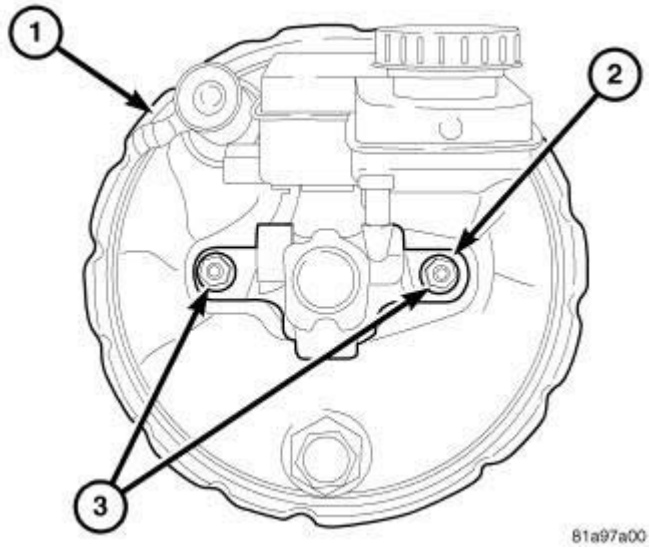


Fig. 96: MASTER CYLINDER MOUNTING NUTS
Courtesy of CHRYSLER LLC

6. Clean the area around where the master cylinder (2) attaches to the power brake booster (1) using a suitable brake cleaner such as Mopar® Brake Parts Cleaner or an equivalent.

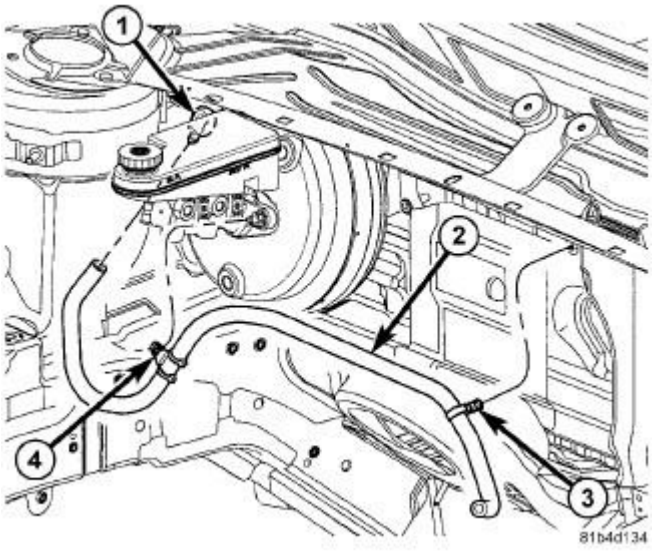


Fig. 97: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

7. Remove the booster vacuum hose routing clip (4) from the master cylinder mounting stud.

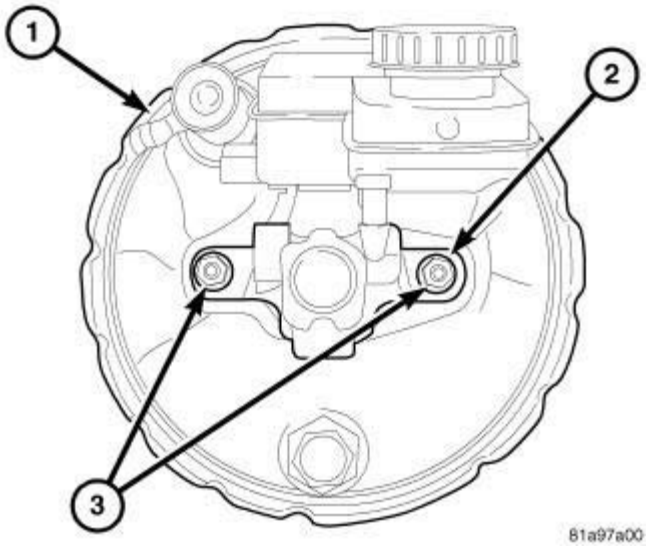


Fig. 98: MASTER CYLINDER MOUNTING NUTS
Courtesy of CHRYSLER LLC

8. Remove the two nuts (3) attaching the master cylinder (2) to the power brake booster (1).

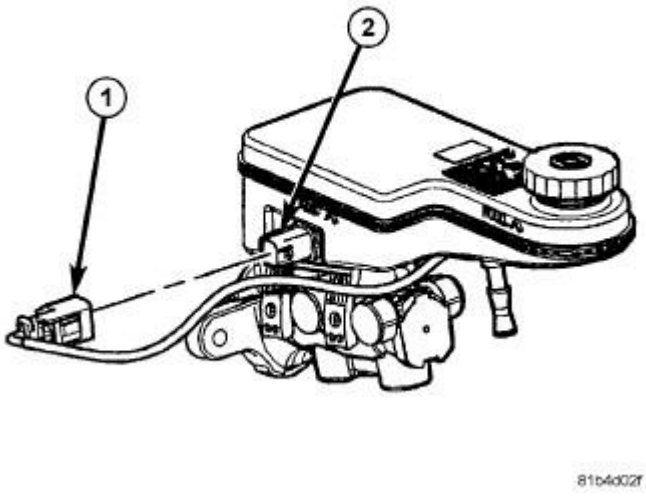


Fig. 99: BRAKE FLUID LEVEL SWITCH CONNECTOR - RHD
Courtesy of CHRYSLER LLC

9. Slide the master cylinder straight out of the power brake booster, then disconnect the wiring harness connector (1) from the brake fluid level switch (2).
10. Remove the master cylinder from the engine compartment.

Disassembly

DISASSEMBLY

NOTE: If the reservoir is being replaced, the new reservoir will come with a brake fluid level switch installed. The old fluid switch does not need to be transferred from the old reservoir to the new reservoir.

1. Clean the master cylinder housing and brake fluid reservoir. Use only Mopar® Brake Parts Cleaner or equivalent.
2. Remove the brake fluid reservoir cap. Using a syringe or equivalent type tool, empty as much brake fluid as possible from the reservoir.

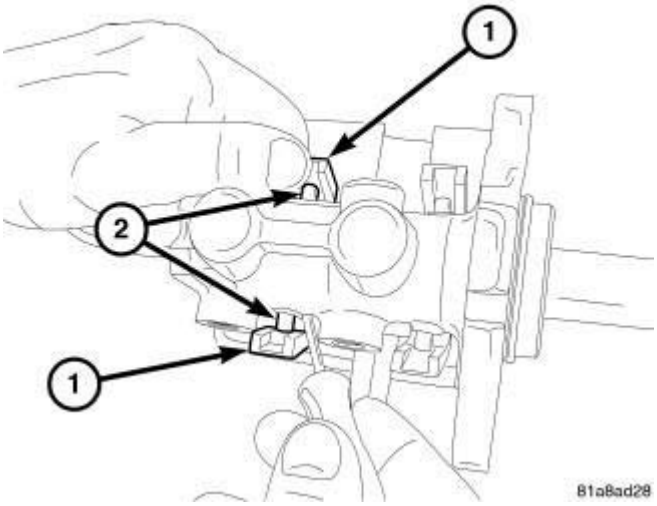


Fig. 100: REMOVING RESERVOIR FROM MASTER CYLINDER PINS
Courtesy of CHRYSLER LLC

3. Remove the four reservoir retaining tabs from the mounting posts on the master cylinder housing.
4. Pull the reservoir straight up and remove it from the grommet seals in master cylinder housing.

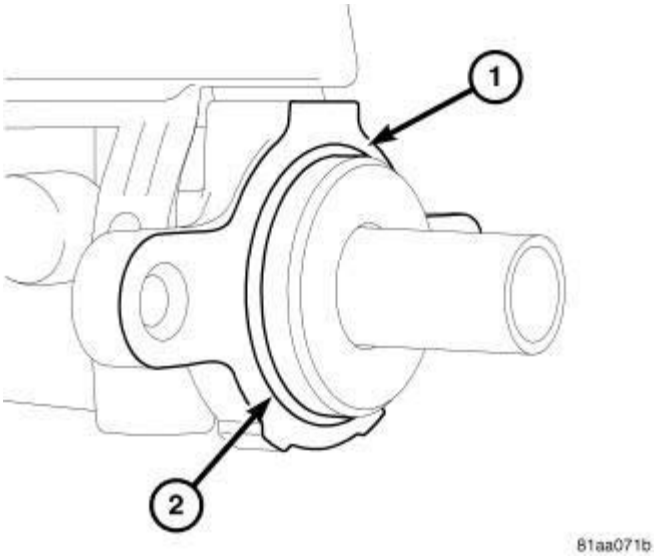


Fig. 101: SEAL ON REAR OF MASTER CYLINDER
Courtesy of CHRYSLER LLC

5. Remove the vacuum O-ring seal (2) from the master cylinder mounting flange (1).

Assembly

ASSEMBLY

NOTE: If the reservoir is being replaced, the new reservoir will come with a brake fluid level switch installed. The old fluid switch does not need to be transferred from the old reservoir to the new reservoir.

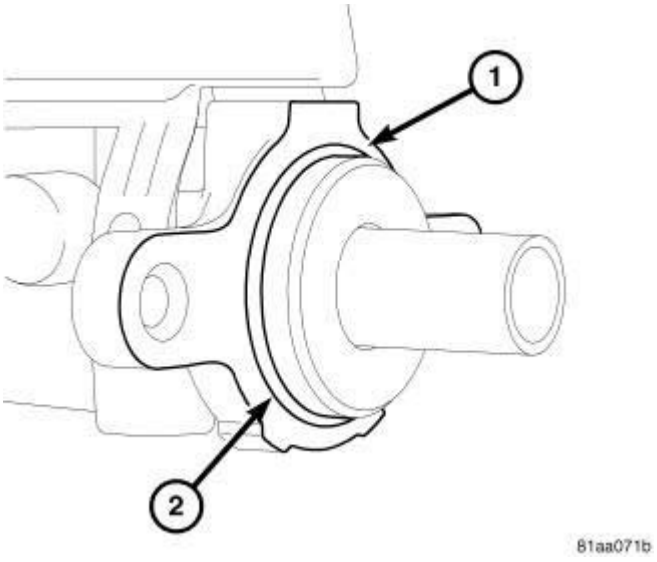


Fig. 102: SEAL ON REAR OF MASTER CYLINDER
Courtesy of CHRYSLER LLC

1. Install a NEW vacuum O-ring seal (2) on the master cylinder mounting flange (1) making sure the O-ring fits evenly against the mounting flange.

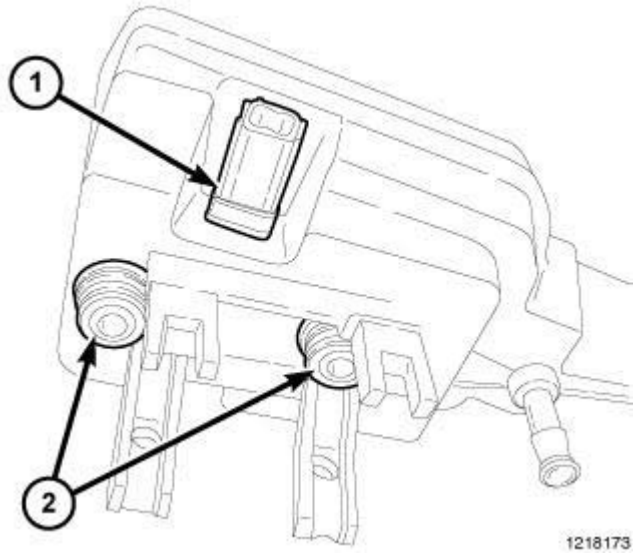


Fig. 103: Grommet Seals
Courtesy of CHRYSLER LLC

2. Lubricate the reservoir mounting area with fresh clean brake fluid. With the grommet seals (2) on the fluid reservoir spigots, place the reservoir in position over the master cylinder. Install the fluid reservoir by firmly pressing down on the fluid reservoir. Once installed, make sure the fluid reservoir is touching

the top of both grommet seals.

3. Push the reservoir retaining tabs over the mounting posts on the master cylinder housing. Make sure the retaining tabs are securely engaged.
4. Fill and thoroughly bleed the master cylinder before installing it. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Standard Procedure**
5. Install the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Installation**

Installation

LEFT-HAND-DRIVE

NOTE: The master cylinder must be bled before installing it on the vehicle.

1. Bench bleed the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Standard Procedure**
2. Wipe the face of the power brake booster clean where the vacuum seal on the rear of the master cylinder comes in contact when it's installed. Do not get any cleaner or debris inside the booster.

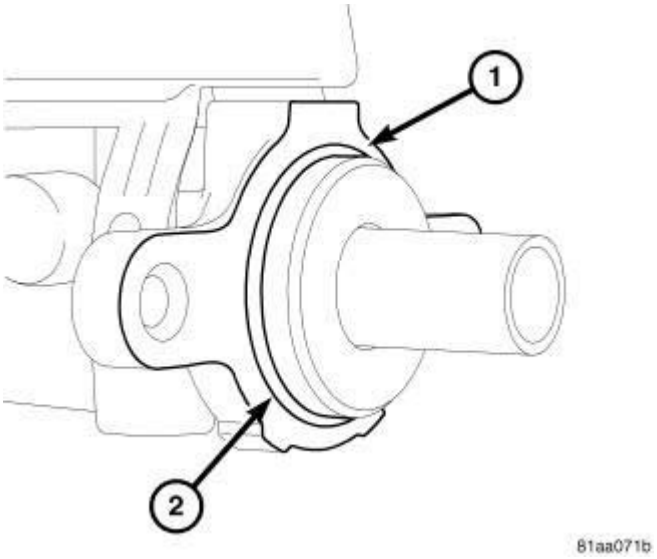


Fig. 104: SEAL ON REAR OF MASTER CYLINDER
Courtesy of CHRYSLER LLC

CAUTION: When installing a master cylinder on the vehicle, a NEW vacuum O-ring seal (2) MUST be installed on the master cylinder mounting flange (1).

3. If the master cylinder does not have a new vacuum O-ring seal (2) on the mounting flange (1), remove it. Install a NEW vacuum O-ring seal on the master cylinder mounting flange making sure the O-ring fits evenly against the mounting flange.

CAUTION: If resistance is met during master cylinder insertion into power brake booster, the master cylinder push rod may not be lined up with the booster push rod. Remove the master cylinder, realign and insert it again.

4. Line the master cylinder mounting holes up with the mounting studs on the power brake booster. Ensure the master cylinder piston push rod lines up with the booster push rod, then carefully slide the master cylinder into the power brake booster until it contacts the face of the booster.

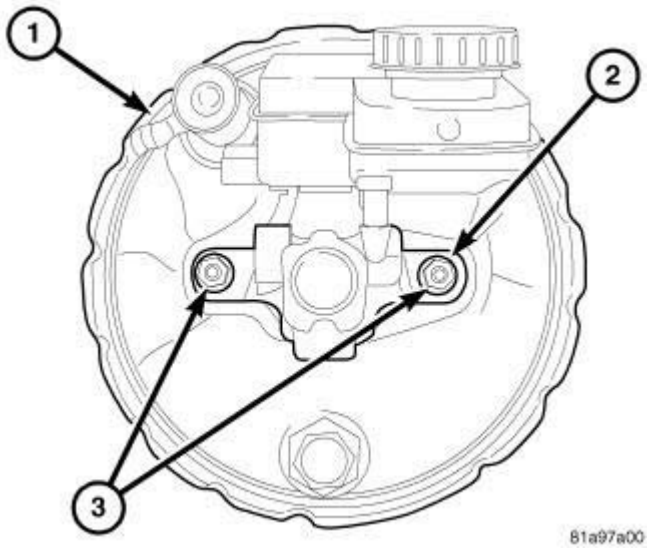


Fig. 105: MASTER CYLINDER MOUNTING NUTS
Courtesy of CHRYSLER LLC

5. Install two NEW master cylinder mounting nuts (3). Tighten each nut to 25 N.m (18 ft. lbs.).

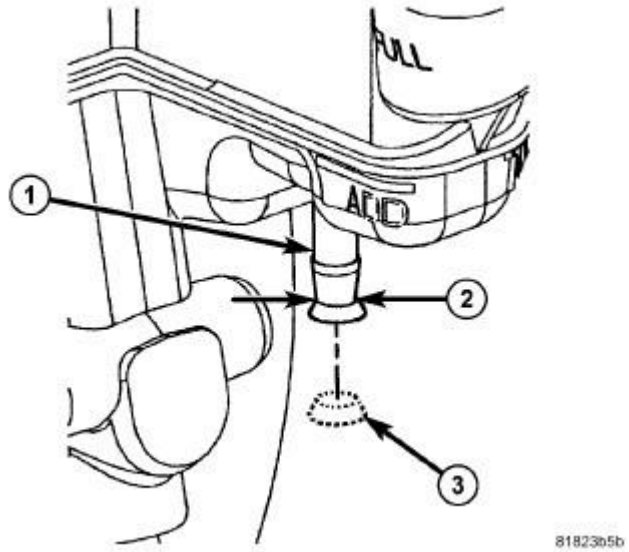


Fig. 106: CUT AND REMOVE CLUTCH PORT PLUG
Courtesy of CHRYSLER LLC

6. If equipped with a manual transaxle and a new reservoir is being installed, using an appropriate cutting tool, cut the clutch actuator port at the center of the "V" groove (2) opening the hydraulic clutch port (1). Discard the severed plug (3).

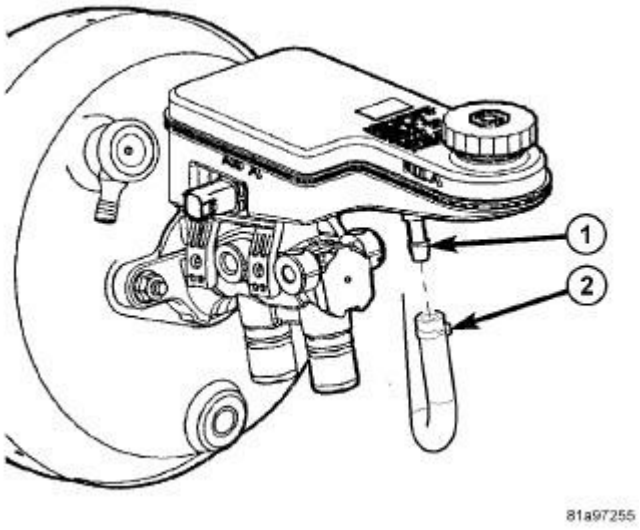


Fig. 107: CLUTCH ACTUATOR HOSE AT MASTER CYLINDER
Courtesy of CHRYSLER LLC

7. If equipped with a manual transaxle, slide the clutch actuator hose (2) onto the reservoir port (1). Install the hose clamp just past the upset bead on the port.

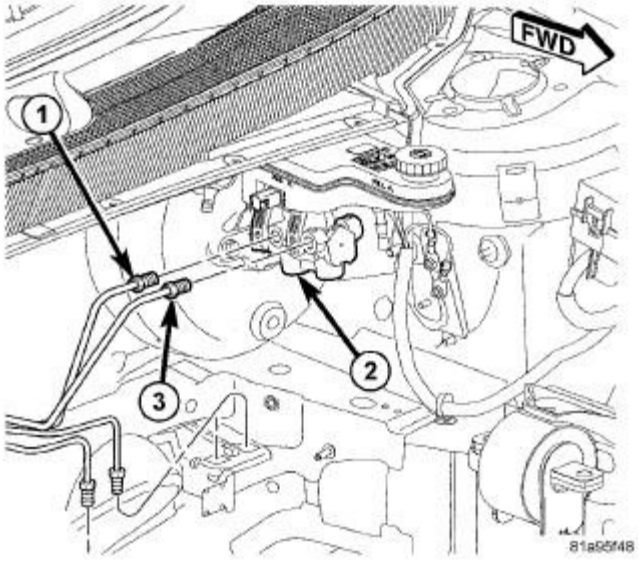


Fig. 108: PRIMARY AND SECONDARY BRAKE TUBES
Courtesy of CHRYSLER LLC

8. Connect the primary (1) and secondary (3) brake tubes to the master cylinder (2) outlet ports. Tighten the tube nuts to 17 N.m (150 in. lbs.).

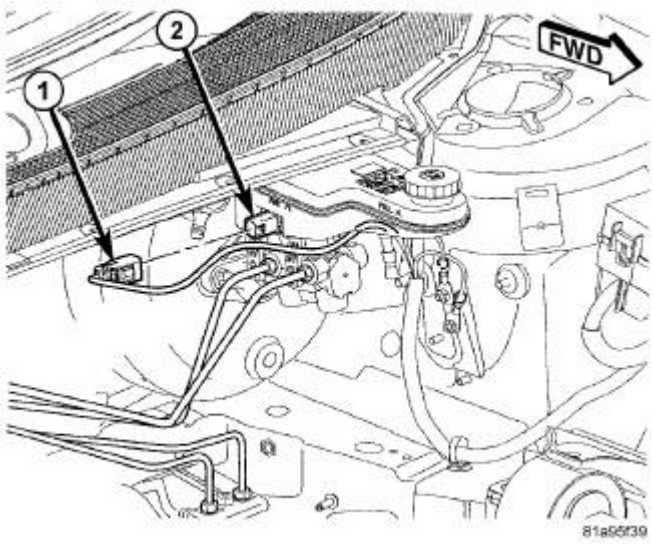


Fig. 109: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

9. Connect the wiring harness connector (1) to the brake fluid level switch (2).
10. Connect the negative (ground) cable on the battery.
11. Fill the master cylinder reservoir to the proper level. See **Brakes/Hydraulic/Mechanical/FLUID - Standard Procedure**

WARNING: Be certain a firm brake pedal is achieved prior to attempting to operate the vehicle. If a firm brake pedal cannot be achieved, bleed the brake hydraulic system and check for leaks. See Brakes - Standard Procedure

12. Road test the vehicle to ensure proper operation of the brakes.

RIGHT-HAND-DRIVE

NOTE: The master cylinder must be bled before installing it on the vehicle.

1. Bench bleed the master cylinder. See **Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Standard Procedure**
2. Wipe the face of the power brake booster clean where the vacuum seal on the rear of the master cylinder comes in contact when it's installed. Do not get any cleaner or debris inside the booster.

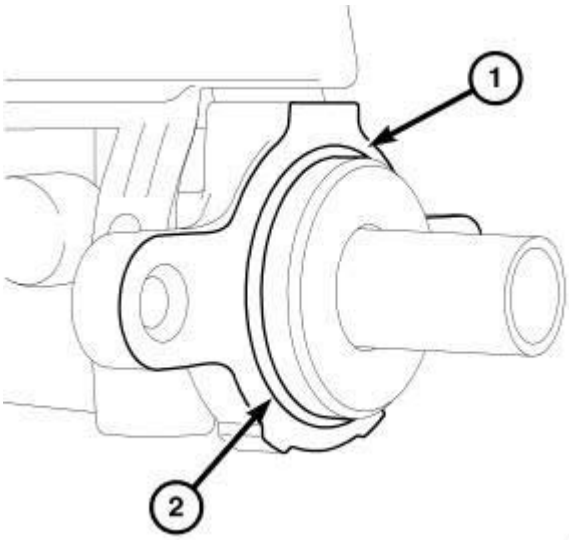


Fig. 110: SEAL ON REAR OF MASTER CYLINDER
Courtesy of CHRYSLER LLC

CAUTION: When installing a master cylinder on the vehicle, a NEW vacuum O-ring seal (2) MUST be installed on the master cylinder mounting flange (1).

3. If the master cylinder does not have a new vacuum O-ring seal (2) on the mounting flange (1), remove it. Install a NEW vacuum O-ring seal on the master cylinder mounting flange making sure the O-ring fits evenly against the mounting flange.

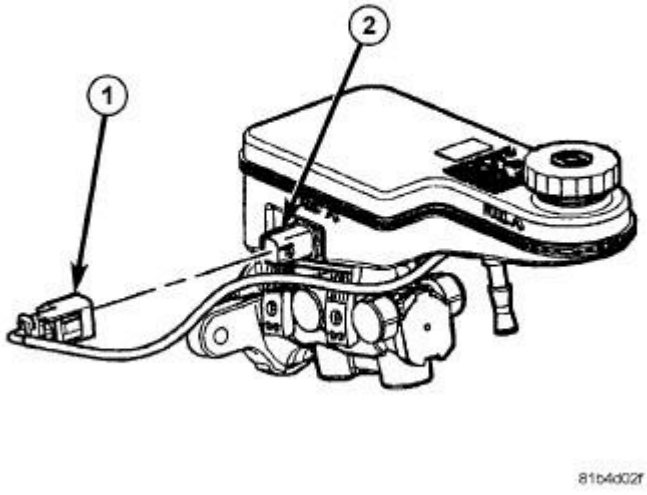


Fig. 111: BRAKE FLUID LEVEL SWITCH CONNECTOR - RHD
Courtesy of CHRYSLER LLC

4. Line the master cylinder mounting holes up with the mounting studs on the power brake booster, then connect the wiring harness connector (1) to the brake fluid level switch (2).

CAUTION: If resistance is met during master cylinder insertion into power brake booster, the master cylinder push rod may not be lined up with the booster push rod. Remove the master cylinder, realign and insert it again.

5. Ensure the master cylinder piston push rod lines up with the booster push rod, then carefully slide the master cylinder into the power brake booster until it contacts the face of the booster.

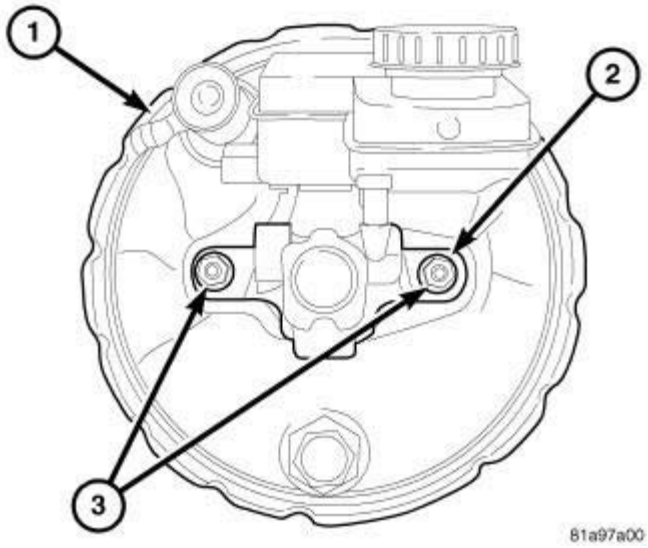


Fig. 112: MASTER CYLINDER MOUNTING NUTS
Courtesy of CHRYSLER LLC

6. Install two NEW master cylinder mounting nuts (3). Tighten each nut to 25 N.m (18 ft. lbs.).

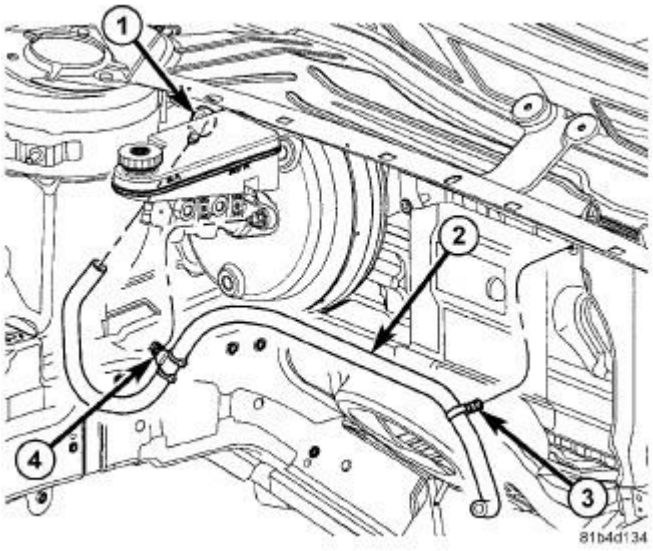


Fig. 113: VACUUM HOSE AT BOOSTER - RHD
Courtesy of CHRYSLER LLC

7. Install the booster vacuum hose routing clip (4) onto the master cylinder mounting stud.

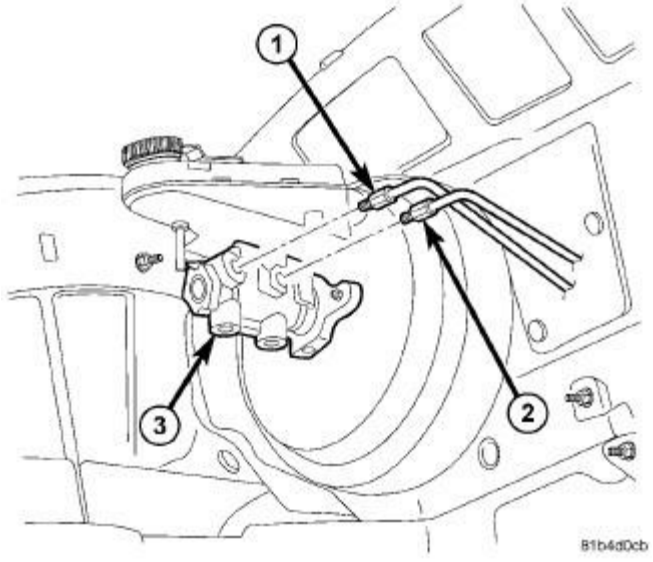


Fig. 114: PRIMARY AND SECONDARY BRAKE TUBES - RHD
Courtesy of CHRYSLER LLC

8. Connect the primary (2) and secondary (1) brake tubes to the master cylinder outlet ports. Tighten the tube nuts to 17 N.m (150 in. lbs.).

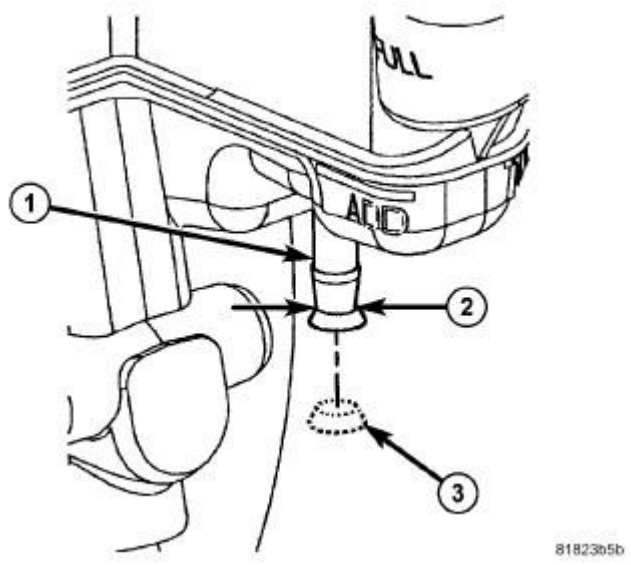


Fig. 115: CUT AND REMOVE CLUTCH PORT PLUG
Courtesy of CHRYSLER LLC

9. If equipped with a manual transaxle and a new reservoir is being installed, using an appropriate cutting tool, cut the clutch actuator port at the center of the "V" groove (2) opening the hydraulic clutch port (1). Discard the severed plug (3).

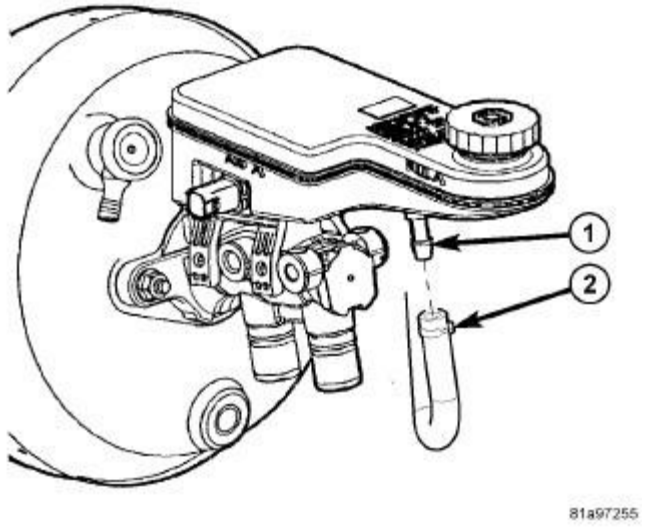


Fig. 116: CLUTCH ACTUATOR HOSE AT MASTER CYLINDER
Courtesy of CHRYSLER LLC

10. If equipped with a manual transaxle, slide the clutch actuator hose (2) onto the reservoir port (1). Install the hose clamp just past the upset bead on the port.
11. Install the engine appearance cover.

12. Connect the negative (ground) cable on the battery.
13. Fill the master cylinder reservoir to the proper level. See **Brakes/Hydraulic/Mechanical/FLUID - Standard Procedure**

WARNING: Be certain a firm brake pedal is achieved prior to attempting to operate the vehicle. If a firm brake pedal cannot be achieved, bleed the brake hydraulic system and check for leaks. See Brakes - Standard Procedure

14. Road test the vehicle to ensure proper operation of the brakes.

PADS, BRAKE, FRONT

Removal

REMOVAL

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

NOTE: Perform 2 through 5 on each side of the vehicle to complete pad set removal.

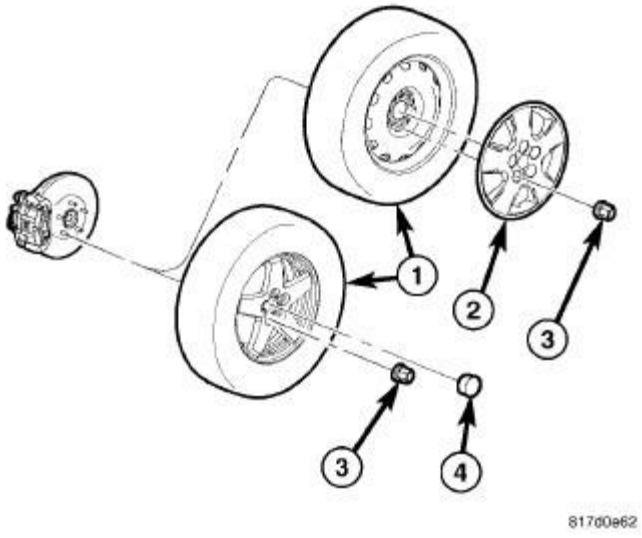


Fig. 117: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

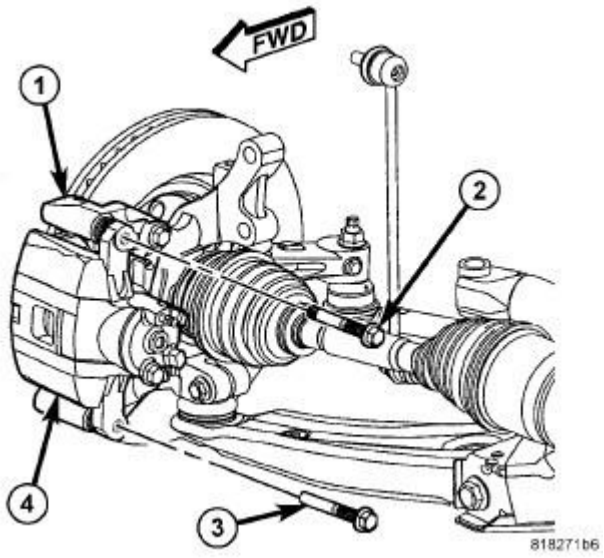


Fig. 118: CALIPER GUIDE PIN BOLTS
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

3. Remove the two brake caliper guide pin bolts (2, 3).
4. Remove the disc brake caliper (4) from the disc brake adapter bracket (1) and hang it out of the way using wire or a bungee cord. Use care not to overextend the brake hose when doing this.

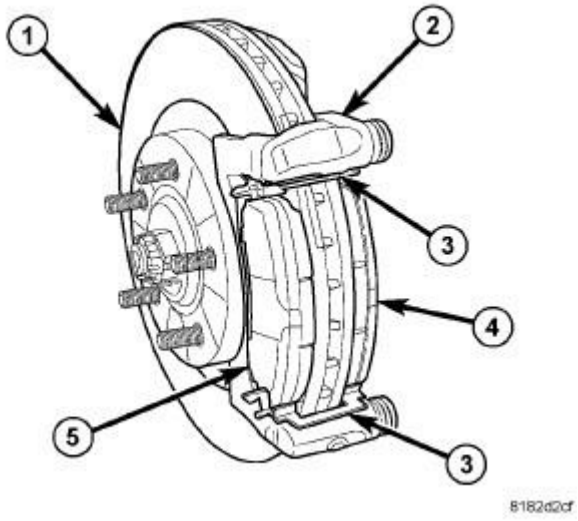


Fig. 119: FRONT BRAKE PADS

Courtesy of CHRYSLER LLC

5. Remove the brake pads (4, 5) from the caliper adapter bracket (2).

Cleaning

CLEANING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

Inspection

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

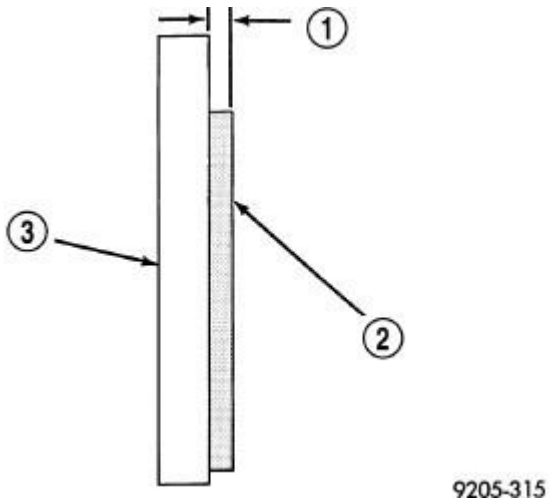


Fig. 120: Brake pad Friction Material Thickness Measurement
Courtesy of CHRYSLER LLC

1 - BRAKE SHOE ASSEMBLY FRICTION MATERIAL THICKNESS IS TO BE MEASURED AT THE THINNEST POINT.
2 - BRAKE Shoe ASSEMBLY FRICTION MATERIAL

3 - BRAKE SHOE ASSEMBLY BACKING PLATE

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: It is important to inspect both front and rear brake pads during the same inspection.

Installation

INSTALLATION

NOTE: Perform 1 through 5 on each side of the vehicle to complete pad set installation, then proceed to 6.

NOTE: Make sure that the audible wear indicator (if equipped) is placed toward the top when the inboard brake pad is installed on each side of the vehicle.

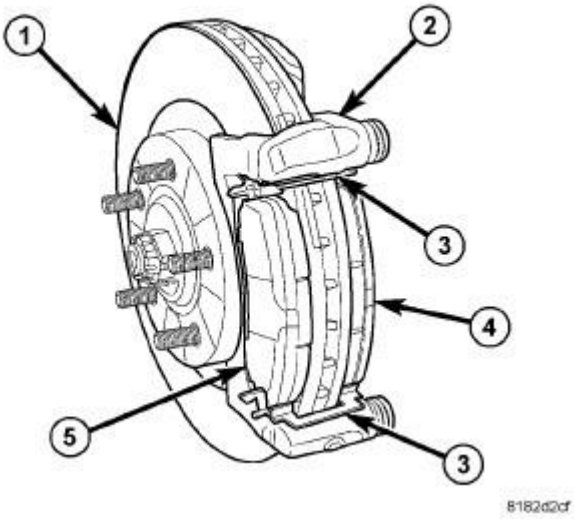


Fig. 121: FRONT BRAKE PADS
Courtesy of CHRYSLER LLC

NOTE: If the brake pads have a protective paper on the rear face of the brake pad plate,

it must be removed before pad installation.

1. Place the brake pads (4, 5) in the abutment shims (3) clipped into the disc brake caliper adapter bracket (2) as shown. Place the pad with the wear indicator (if equipped) attached on the inboard side (2).
2. Completely retract the caliper piston back into the bore of the caliper.

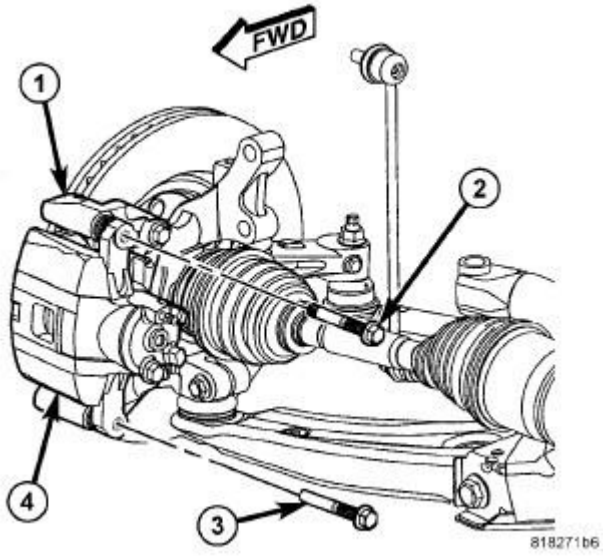


Fig. 122: CALIPER GUIDE PIN BOLTS
Courtesy of CHRYSLER LLC

CAUTION: Use care when installing the caliper (4) onto the adapter bracket (1) to avoid damaging the boots.

3. Install the disc brake caliper over the brake pads on the brake caliper adapter bracket.

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

4. Align the caliper guide pin bolt holes with the adapter bracket. Install the upper (2) and lower (3) caliper guide pin bolts. Tighten the guide pin bolts to 35 N.m (26 ft. lbs.).

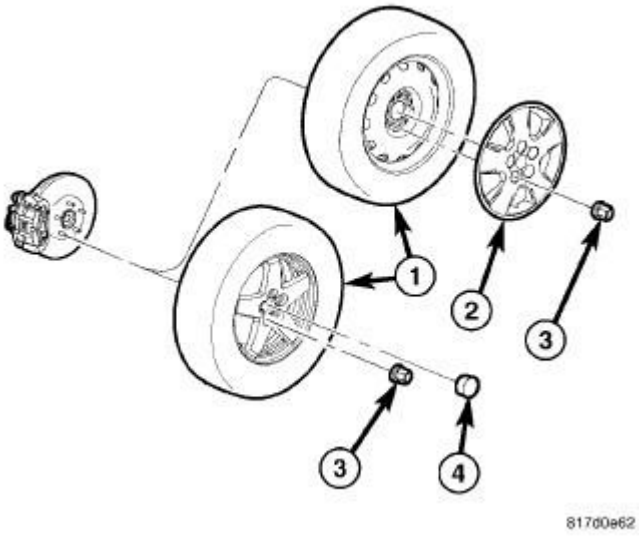


Fig. 123: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

5. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
6. Lower the vehicle.
7. Pump the brake pedal several times before moving the vehicle to set the pads to the brake rotor.
8. Check and adjust the brake fluid level in the reservoir as necessary.
9. Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake pads.

PADS, BRAKE, REAR

Removal

REMOVAL

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

NOTE: Perform 2 through 5 on each side of vehicle to complete pad set removal.

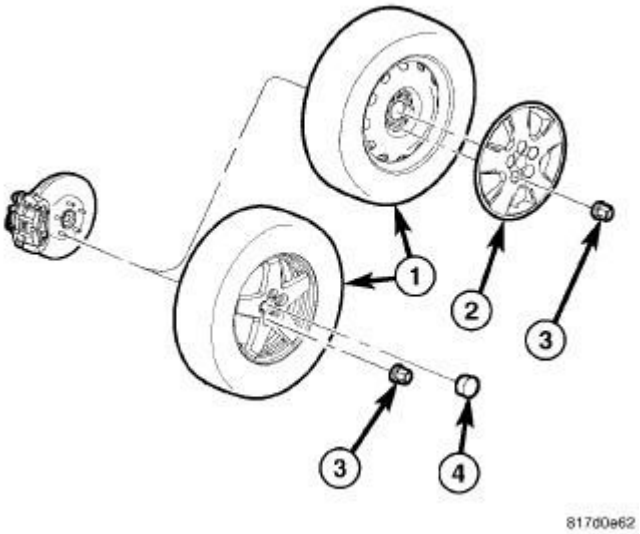


Fig. 124: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

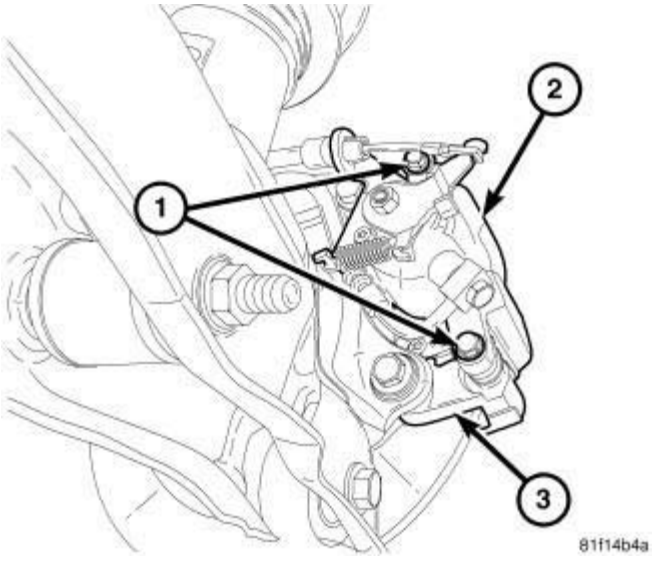


Fig. 125: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

3. Remove two caliper guide pin bolts (1).

4. Remove the disc brake caliper (2) from the disc brake adapter bracket (3) and hang it out of the way using wire or a bungee cord. Use care not to overextend the brake hose or parking brake cable when doing this.

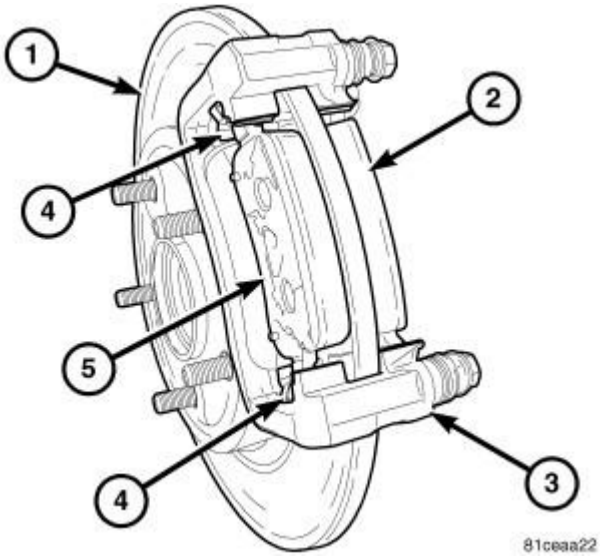


Fig. 126: REAR BRAKE PADS
Courtesy of CHRYSLER LLC

5. Remove the brake pads (2, 5) from the caliper adapter bracket (3).

Cleaning

CLEANING

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

Inspection

INSPECTION

Visually inspect brake pads for uneven lining wear. Also inspect for excessive lining deterioration. Check the clearance between the tips of the wear indicators (if equipped) on the pads and the brake rotors.

If a visual inspection does not adequately determine the condition of the lining, a physical check will be necessary. To check the amount of lining wear, remove the disc brake pads from the vehicle.

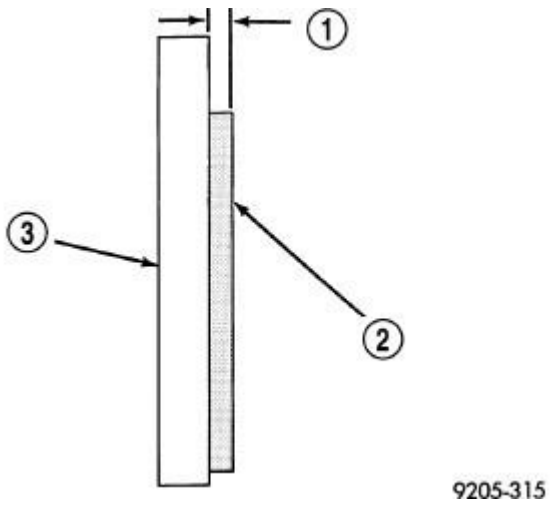


Fig. 127: Brake pad Friction Material Thickness Measurement
Courtesy of CHRYSLER LLC

1 - BRAKE SHOE ASSEMBLY FRICTION MATERIAL THICKNESS IS TO BE MEASURED AT THE THINNEST POINT.
2 - BRAKE Shoe ASSEMBLY FRICTION MATERIAL
3 - BRAKE SHOE ASSEMBLY BACKING PLATE

Measure brake pad minimum thickness (1). Brake pads must be replaced when usable material on a brake pad lining (2) measured at its **thinnest point** measures one millimeter (0.04 inches) or less.

If a brake pad fails inspection, replace **both** disc brake pads (inboard and outboard) at each caliper. It is also necessary to replace the pads on the opposite side of the vehicle as well as the pads failing inspection to maintain proper braking characteristics.

If the brake pad assemblies do not require replacement, be sure to reinstall the brake pads in the original position they were removed from.

NOTE: It is important to inspect both front and rear brake pads during the same inspection.

Installation

INSTALLATION

NOTE: Perform 1 through 6 on each side of vehicle to complete pad set installation, then proceed to 7.

CAUTION: Anytime the brake rotor or brake pads are being replaced, the rear caliper piston must be seated (bottomed) to compensate for the new brake rotor or lining. Because the parking brake self-adjuster mechanism is attached to the piston, a special seating method is required. The only acceptable

method is by rotating the piston back into the bore using Retractor, Special Tool 8807, as described below. Any other seating method will damage the self-adjuster mechanism.

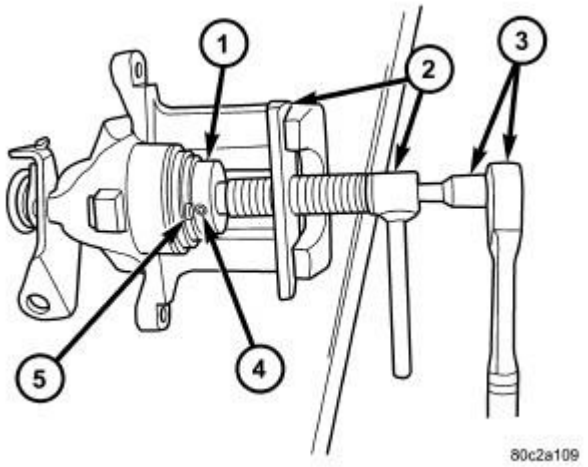


Fig. 128: SEATING PISTON WITH SPECIAL TOOL
Courtesy of CHRYSLER LLC

1. If necessary, seat (bottom) the caliper piston in the bore as follows:
   a. Assemble a 3/8 in. drive ratchet handle and an extension (3).
   b. Insert the extension through Special Tool 8807-1 (2).
   c. Place Special Tool 8807-2 (1) on the end of the extension.
   d. Insert lugs on Special Tool 8807-2 into notches in face of caliper piston (5).
   e. Thread the screw drive on 8807-1 down until it contacts the top of 8807-2 which is against the caliper piston. **Do not over tighten the screw-drive. Damage to the piston can occur.**
   f. Turn 8807-2 with the ratchet, rotating the piston in a **clockwise** direction until fully seated (bottomed) in the bore. **It may be necessary to turn 8807-1 with 8807-2 to start the process of piston retraction.**

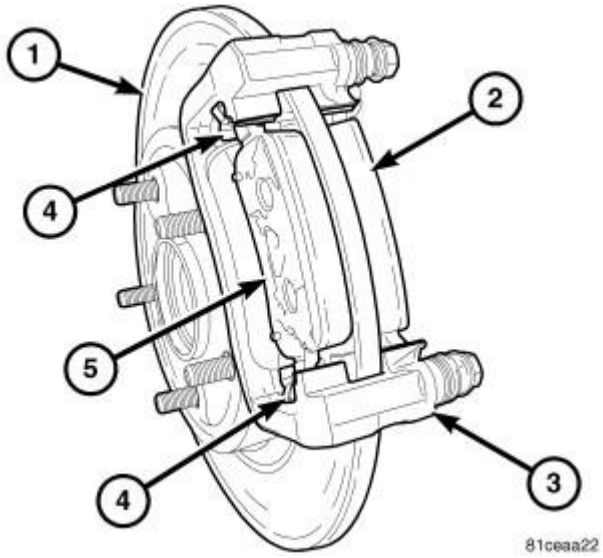


Fig. 129: REAR BRAKE PADS
Courtesy of CHRYSLER LLC

2. Make sure abutment shims (4) are in place on both upper and lower slide abutments of caliper adapter (3).

NOTE: If the brake pads have a protective paper on the rear face of the brake pad plate, it must be removed before pad installation.

3. Place the brake pads (2, 5) in the abutment shims (3) clipped into the disc brake caliper adapter bracket (3) as shown.

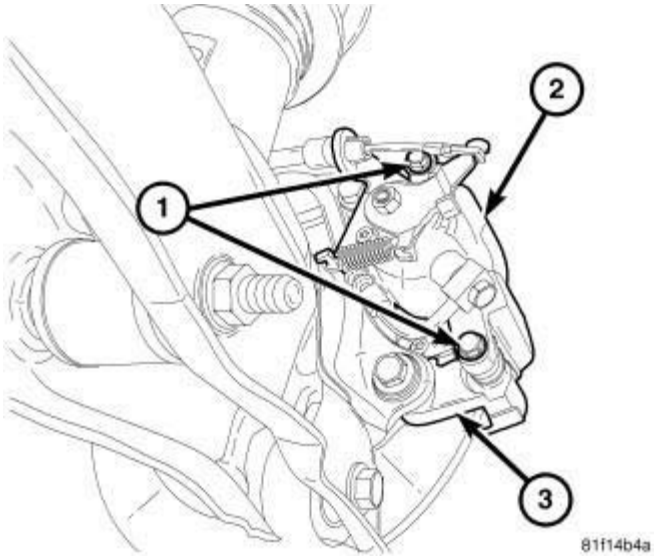


Fig. 130: REAR CALIPER MOUNTING
Courtesy of CHRYSLER LLC

CAUTION: Use care when installing the caliper (2) onto the adapter bracket to

avoid damaging the guide pin boots.

4. Install the disc brake caliper (2) over the brake pads on the brake caliper adapter bracket (3).

CAUTION: When removing or installing a caliper guide pin bolt, it is necessary to hold the guide pin stationary while turning the bolt. Hold the guide pin stationary using a wrench placed upon the pin's hex-shaped head.

5. Align the caliper guide pin bolt holes with the adapter bracket. Install the upper and lower caliper guide pin bolts (1). Tighten the guide pin bolts to 35 N.m (26 ft. lbs.).

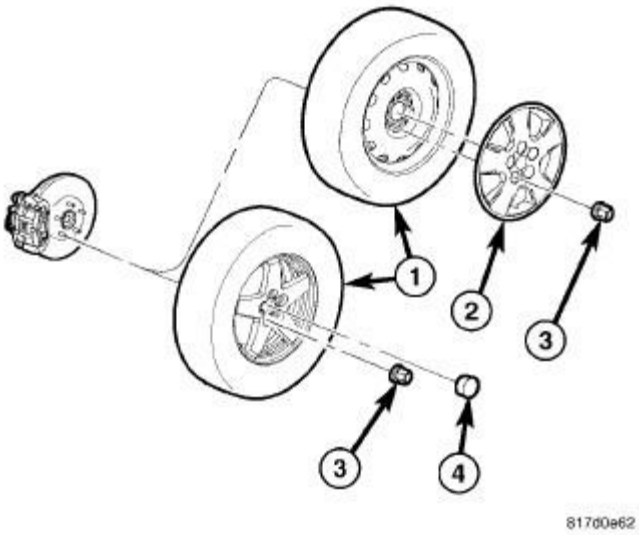


Fig. 131: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

6. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
7. Lower vehicle.
8. Pump brake pedal several times to ensure vehicle has a firm brake pedal before moving vehicle.
9. Check and adjust brake fluid level as necessary.
10. Road test vehicle and make several stops to wear off any foreign material on brakes and to seat brake pads.

PEDAL(S), BRAKE AND/OR ACCELERATOR

Removal

LEFT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Disconnect and isolate the battery negative cable from its post on the battery.
2. If equipped, remove the silencer pad below the steering column opening cover.

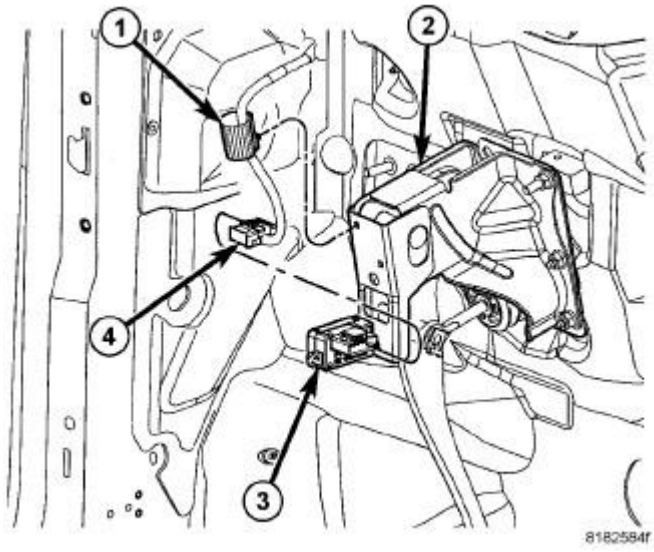


Fig. 132: STOP LAMP SWITCH WIRING CONNECTOR
Courtesy of CHRYSLER LLC

3. Disconnect the wiring connector (4) at the stop lamp switch (3).
4. Remove the stop lamp switch wiring routing clip (1) from the brake pedal bracket (2).

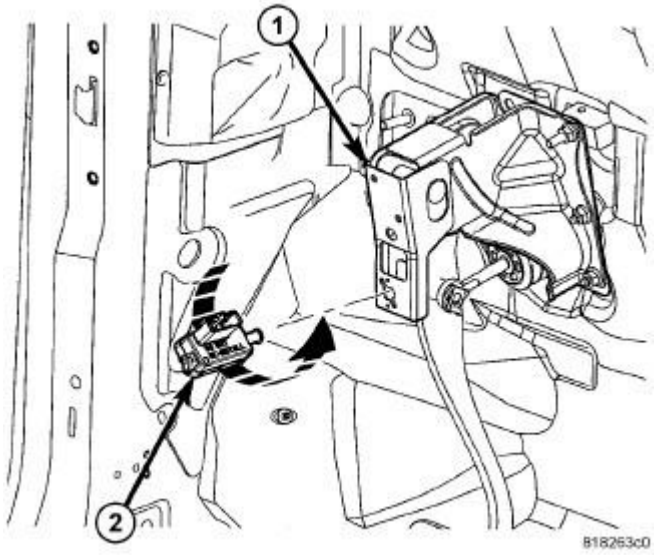


Fig. 133: STOP LAMP SWITCH REMOVAL

Courtesy of CHRYSLER LLC

5. Remove the stop lamp switch (2).**Do not reuse the stop lamp switch on vehicles built prior to July 21, 2008.** . Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Removal**

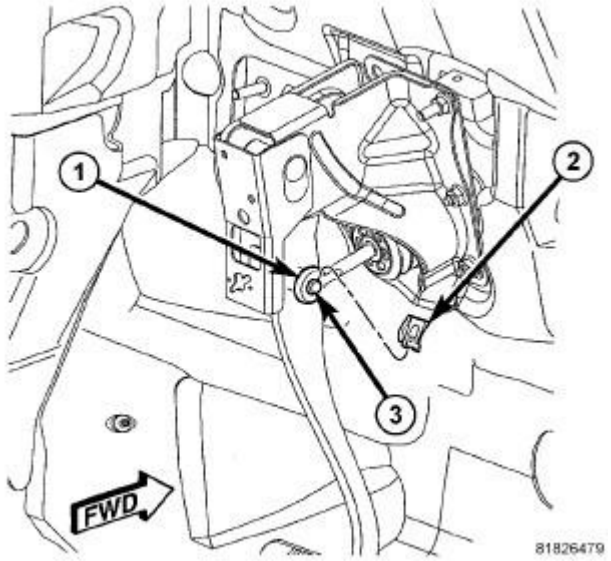


Fig. 134: BRAKE PEDAL CLIP
Courtesy of CHRYSLER LLC

6. Remove the retaining clip (2) securing the power brake booster push rod (1) to the brake pedal. To do so, position a small screwdriver under the center tang of the retaining clip, then rotate the screwdriver enough to allow the retaining clip tang to pass over the end of the brake pedal pin (3). Remove and discard the clip. **Do not reuse the clip.**
7. Slide the booster push rod (1) off the brake pedal pin (3).

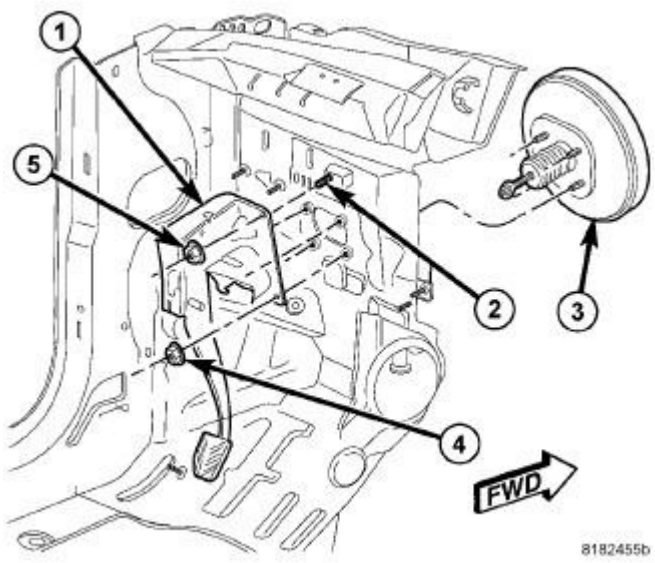


Fig. 135: PEDAL AND BOOSTER MOUNTING - LHD
Courtesy of CHRYSLER LLC

8. Remove the four nuts (4) attaching the brake pedal (1) (and power brake booster) to the dash panel.
9. Remove the remaining nut (5) attaching the brake pedal (1) to the dash panel.
10. Remove the brake pedal (1).

RIGHT-HAND-DRIVE

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Disconnect and isolate the battery negative cable from its post on the battery.
2. If equipped, remove the silencer pad below the steering column opening cover.

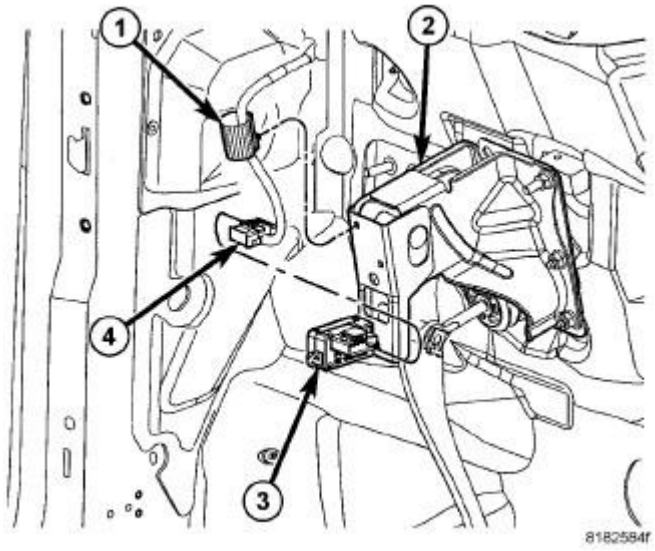


Fig. 136: STOP LAMP SWITCH WIRING CONNECTOR
Courtesy of CHRYSLER LLC

3. Disconnect the wiring connector (4) at the stop lamp switch (3).
4. Remove the stop lamp switch wiring routing clip (1) from the brake pedal bracket (2).

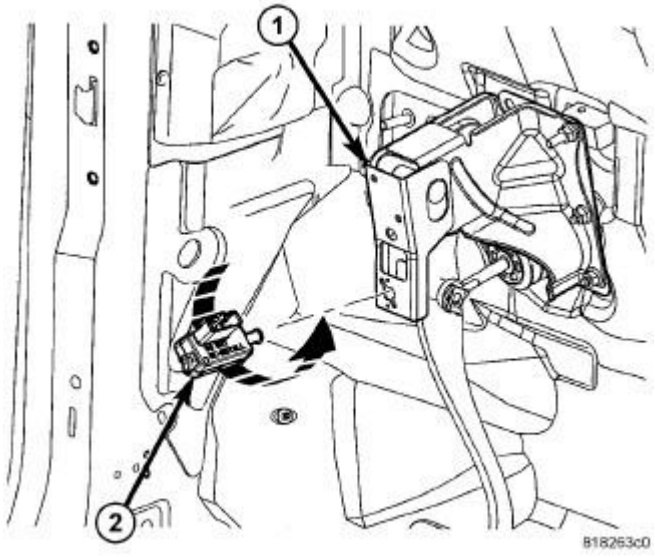


Fig. 137: STOP LAMP SWITCH REMOVAL
Courtesy of CHRYSLER LLC

5. Remove the stop lamp switch (2).**Do not reuse the stop lamp switch on vehicles built prior to July 21, 2008.** . Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Removal**

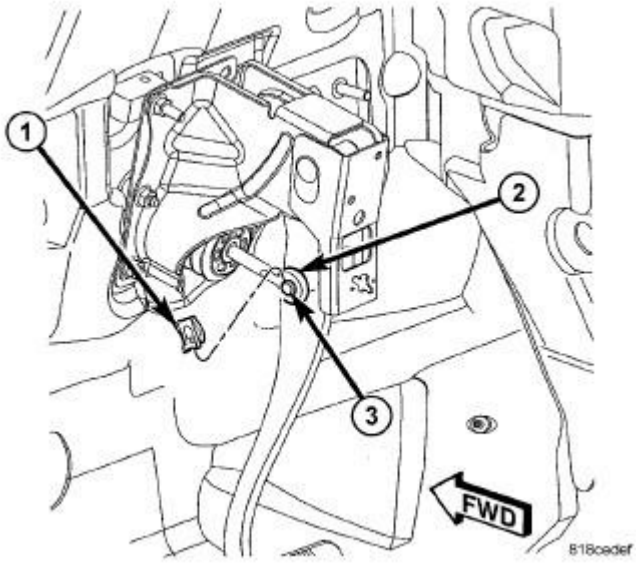


Fig. 138: BRAKE PEDAL CLIP - RHD
Courtesy of CHRYSLER LLC

6. Remove the retaining clip (1) securing the power brake booster push rod (2) to the brake pedal. To do so, position a small screwdriver under the center tang of the retaining clip, then rotate the screwdriver enough to allow the retaining clip tang to pass over the end of the brake pedal pin (3). Remove and discard the clip. **Do not reuse the clip.**
7. Slide the booster push rod (2) off the brake pedal pin (3).

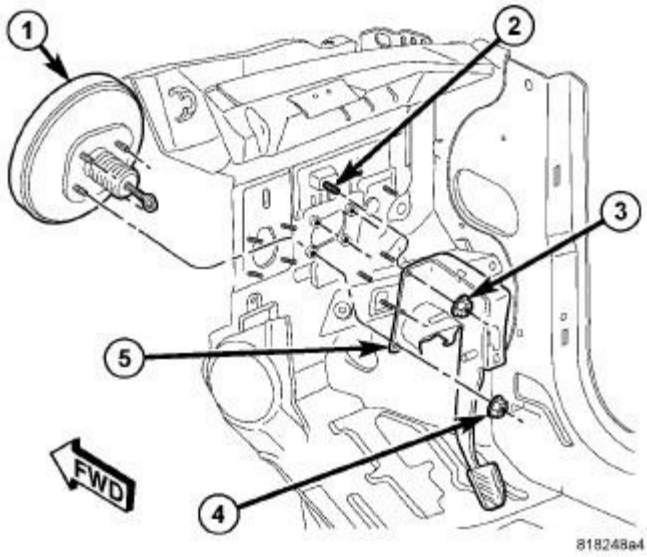


Fig. 139: PEDAL AND BOOSTER MOUNTING - RHD
Courtesy of CHRYSLER LLC

8. Remove the four nuts (4) attaching the brake pedal (5) (and power brake booster) to the dash panel.

9. Remove the remaining nut (3) attaching the brake pedal (5) to the dash panel.
10. Remove the brake pedal (5).

Installation

LEFT-HAND-DRIVE

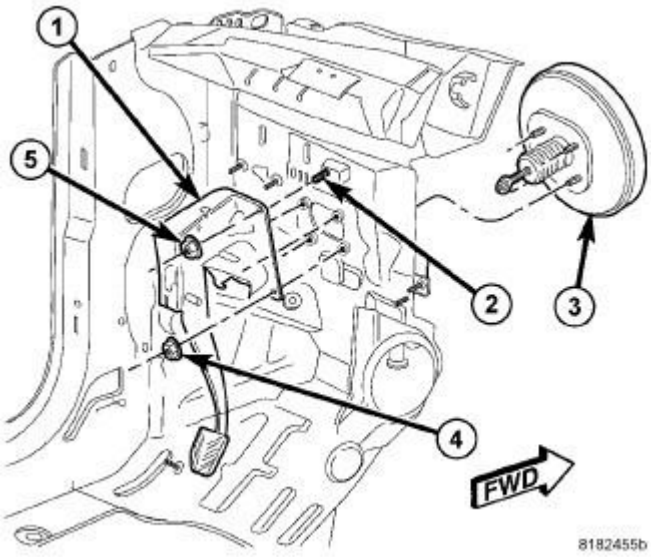


Fig. 140: PEDAL AND BOOSTER MOUNTING - LHD
Courtesy of CHRYSLER LLC

1. Carefully install the brake pedal and bracket assembly (1) in the vehicle lining up the bracket with the power brake booster mounting studs and the stud (2) on the dash panel.
2. Install the four nuts (4) attaching the brake pedal (1) (and power brake booster) to the dash panel. **Do not tighten the nuts at this time.**
3. Install the remaining nut (5) attaching the brake pedal (1) to the dash panel. To tighten this nut (and the other four from the preceding step), refer to the following step.

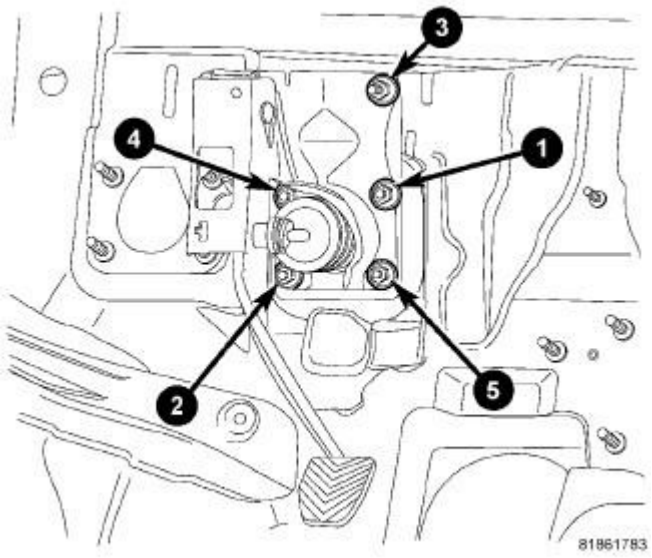


Fig. 141: MOUNTING NUT TORQUE SEQUENCE
Courtesy of CHRYSLER LLC

CAUTION: Because of power brake booster design, it is very important to tighten the mounting nuts in the proper sequence.

4. Tighten the brake pedal/booster mounting nuts in the proper sequence to 23 N.m (17 ft. lbs.).

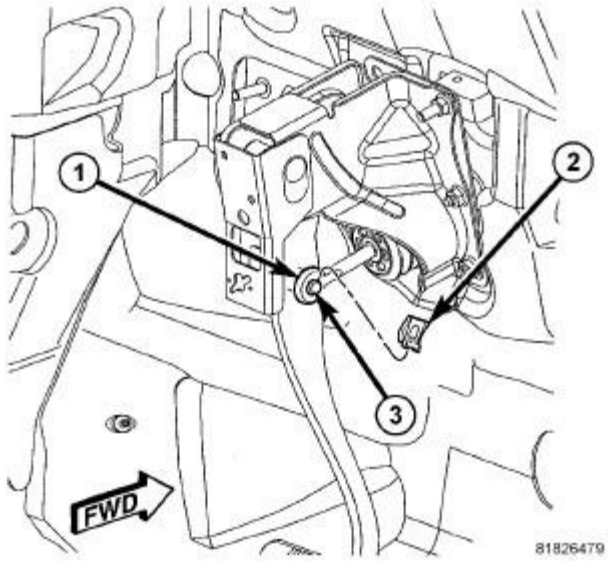


Fig. 142: BRAKE PEDAL CLIP
Courtesy of CHRYSLER LLC

5. Using Mopar® Lubriplate, or an equivalent, coat the surface of the brake pedal pin (3) where it contacts the brake booster push rod (1).

6. Install the power brake booster push rod (1) on the pin (3) mounted on the side of the brake pedal. Install a NEW retaining clip (2) on the end of the pin. **Do not reuse the old clip.**

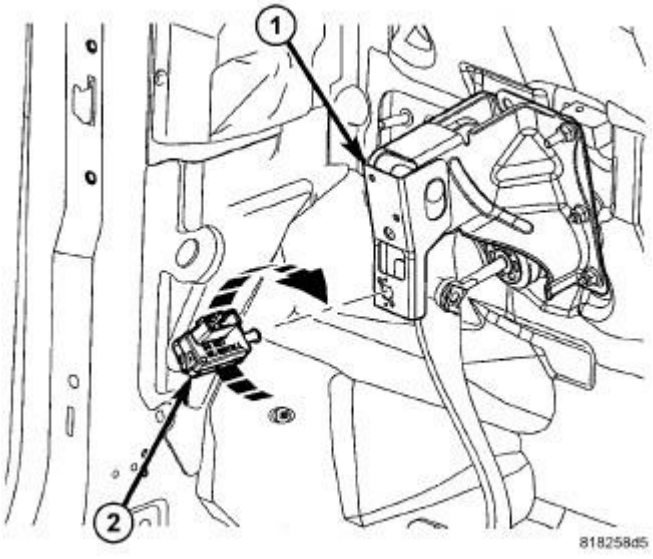


Fig. 143: STOP LAMP SWITCH AND PEDAL CLIP
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the original stop lamp switch on vehicles built prior to July 21, 2008. Anytime a switch has been removed or its position compromised, a new switch must be installed and adjusted. Do not attempt to readjust the switch. The original brake lamp switch can be reused and adjusted on vehicles built on or after July 21, 2008.

7. Install and adjust a NEW stop lamp switch (2) in the brake pedal bracket (1) on vehicle built prior to July 21, 2008. The original brake lamp switch can be reused on vehicles built on or after July 21, 2008. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Installation**

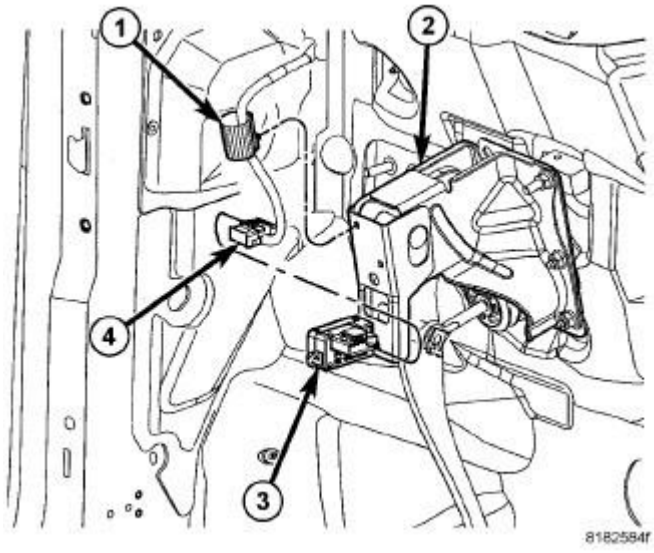


Fig. 144: STOP LAMP SWITCH WIRING CONNECTOR
Courtesy of CHRYSLER LLC

8. If not already performed, connect the wiring connector (4) at the stop lamp switch (3).
9. Attach the stop lamp switch wiring routing clip (1) at the brake pedal bracket (2).
10. If equipped, install the silencer pad below the instrument panel.
11. Connect the battery negative cable to its post on the battery.
12. Check the stop lamps to verify they are operating properly and not staying on when the pedal is in the released position.
13. Road test the vehicle to ensure proper operation of the brakes.

RIGHT-HAND-DRIVE

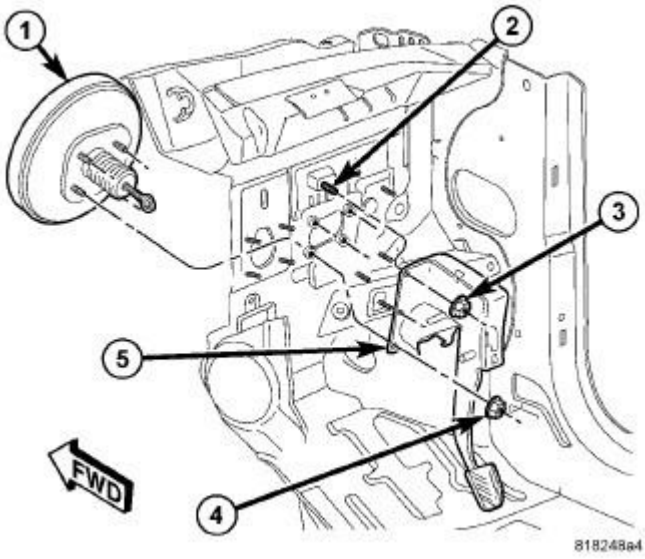


Fig. 145: PEDAL AND BOOSTER MOUNTING - RHD
Courtesy of CHRYSLER LLC

1. Carefully install the brake pedal and bracket assembly (5) in the vehicle lining up the bracket with the power brake booster mounting studs and the stud (2) on the dash panel.
2. Install the four nuts (4) attaching the brake pedal (5) (and power brake booster) to the dash panel. **Do not tighten the nuts at this time.**
3. Install the remaining nut (3) attaching the brake pedal (5) to the dash panel. To tighten these nuts, refer to the following step.

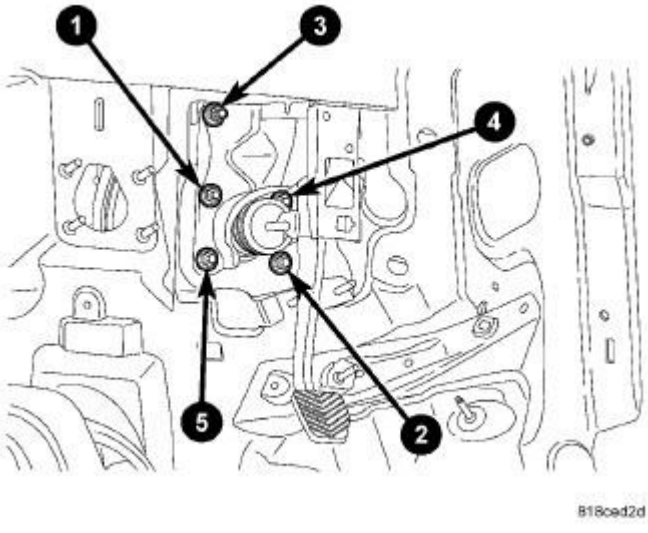


Fig. 146: MOUNTING NUT TORQUE SEQUENCE - RHD
Courtesy of CHRYSLER LLC

CAUTION: Because of power brake booster design, it is very important to tighten the mounting nuts in the proper sequence.

4. Tighten the brake pedal/booster mounting nuts in the proper sequence to 23 N.m (17 ft. lbs.).

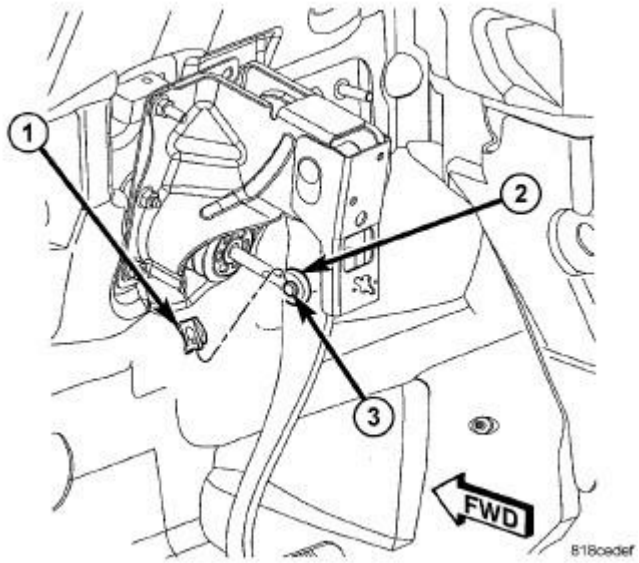


Fig. 147: BRAKE PEDAL CLIP - RHD
Courtesy of CHRYSLER LLC

5. Using Mopar® Lubriplate, or an equivalent, coat the surface of the brake pedal pin (3) where it contacts the brake booster push rod.
6. Install the power brake booster push rod (2) on the pin (3) mounted on the side of the brake pedal. Install a NEW retaining clip (1) on the end of the pin. **Do not reuse the old clip.**

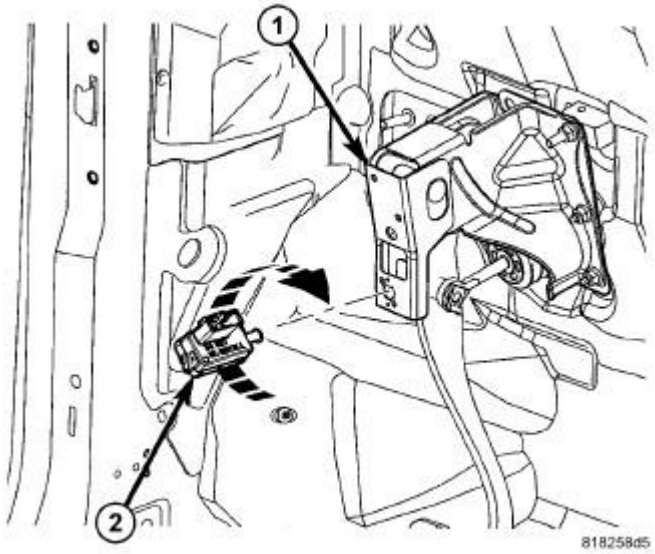


Fig. 148: STOP LAMP SWITCH AND PEDAL CLIP
Courtesy of CHRYSLER LLC

CAUTION: Do not reuse the original stop lamp switch on vehicles built prior to July 21, 2008. Anytime a switch has been removed or its position compromised, a new switch must be installed and adjusted. Do not attempt to readjust the switch. The original brake lamp switch can be reused and adjusted on vehicles built on or after July 21, 2008.

7. Install and adjust a NEW stop lamp switch (2) in the brake pedal bracket (1) on vehicle built prior to July 21, 2008. The original brake lamp switch can be reused on vehicles built on or after July 21, 2008. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Installation**

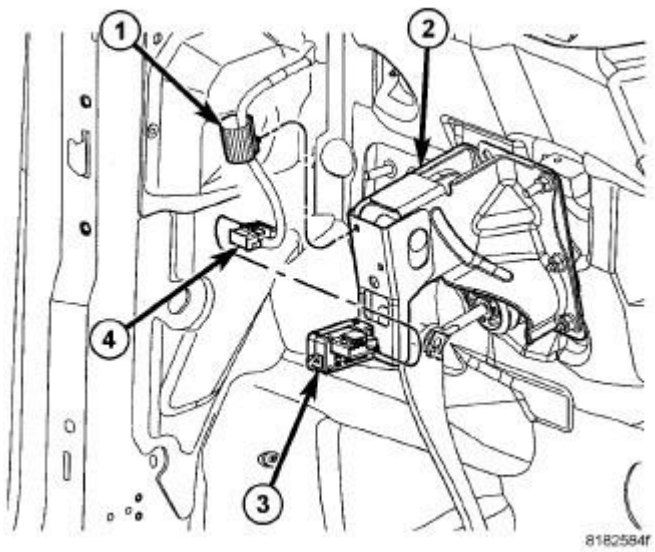


Fig. 149: STOP LAMP SWITCH WIRING CONNECTOR
Courtesy of CHRYSLER LLC

8. If not already performed, connect the wiring connector (4) at the stop lamp switch (3).
9. Attach the stop lamp switch wiring routing clip (1) at the brake pedal bracket (2).
10. If equipped, install the silencer pad below the instrument panel.
11. Connect the battery negative cable to its post on the battery.
12. Check the stop lamps to verify they are operating properly and not staying on when the pedal is in the released position.
13. Road test the vehicle to ensure proper operation of the brakes.

RESERVOIR, BRAKE MASTER CYLINDER

Removal

REMOVAL

CAUTION: If at any time the master cylinder is loosened or removed, you must perform the master cylinder installation procedure to ensure that the seal (o-ring) is still on the hub of the master cylinder. See Brakes/Hydraulic/Mechanical/MASTER CYLINDER, Brake - Installation.

NOTE: The brake fluid level switch is mounted through the center of the fluid reservoir. The switch can be serviced separately from the master cylinder fluid reservoir. See Brakes/Electrical/SWITCH, Brake Fluid Level - Removal

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

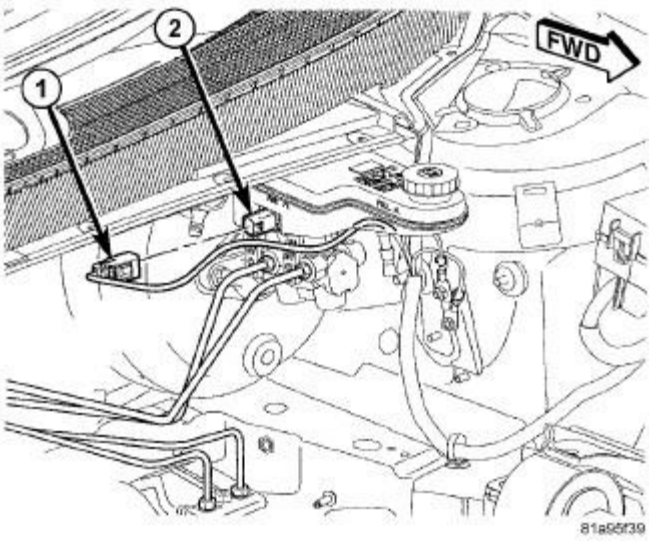


Fig. 150: BRAKE FLUID LEVEL SWITCH CONNECTOR
Courtesy of CHRYSLER LLC

1. Remove the outer and inner cowl covers. Refer to **Body/Exterior/COVER, Cowl Panel - Removal**
2. Remove the front wiper motor module. Refer to **Electrical - Wipers/Washers/Wipers/Washers/LINKAGE, Wiper Arm - Removal**
3. Clean the master cylinder housing and brake fluid reservoir. Use only Mopar® Brake Parts Cleaner or equivalent.
4. Remove the wiring harness connector (1) from the brake fluid level switch (2) in the master cylinder brake fluid reservoir.
5. Remove the brake fluid reservoir cap. Using a syringe or equivalent type tool, empty as much brake fluid as possible from the reservoir.

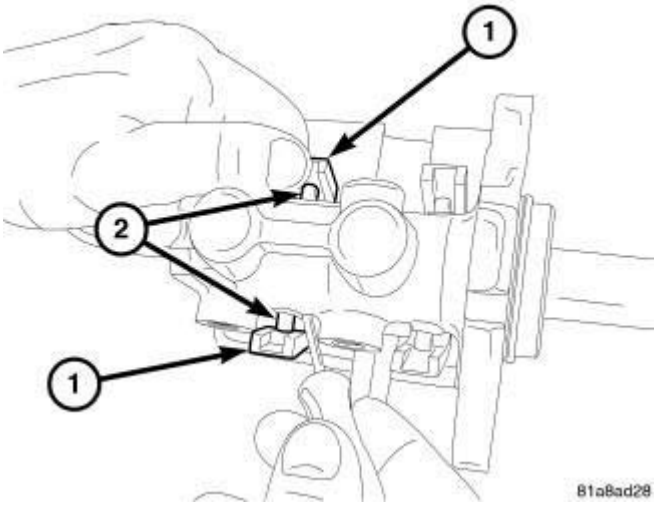


Fig. 151: REMOVING RESERVOIR FROM MASTER CYLINDER PINS
Courtesy of CHRYSLER LLC

6. Remove the four reservoir retaining tabs from the mounting posts on the master cylinder housing.
7. Pull the reservoir straight up and remove it from the grommet seals in master cylinder housing.

Installation

INSTALLATION

NOTE: The brake fluid level switch is mounted through the center of the fluid reservoir. The switch can be serviced separately from the master cylinder fluid reservoir. See Brakes/Electrical/SWITCH, Brake Fluid Level - Installation

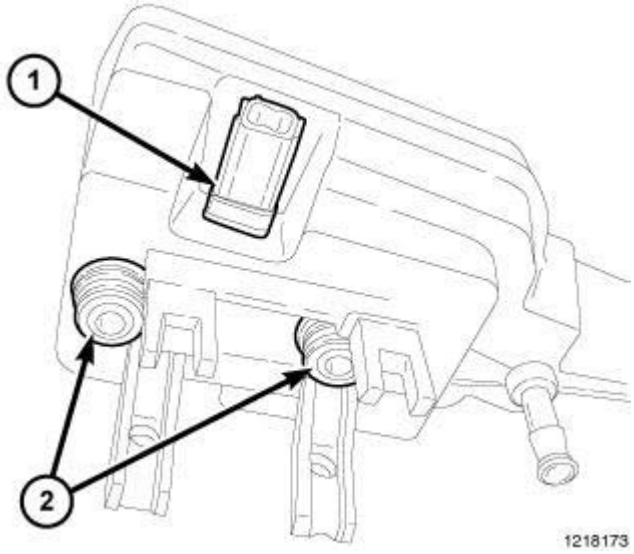


Fig. 152: Grommet Seals
Courtesy of CHRYSLER LLC

1. Lubricate the reservoir mounting area with fresh clean brake fluid. With the grommet seals (2) on the fluid reservoir spigots, place the reservoir in position over the master cylinder. Install the fluid reservoir by firmly pressing down on the fluid reservoir. Once installed, make sure the fluid reservoir is touching the top of both grommet seals.
2. Push the reservoir retaining tabs over the mounting posts on the master cylinder housing. Make sure the retaining tabs are securely engaged.
3. Fill the brake fluid reservoir with fresh Mopar® Brake Fluid DOT 3 Motor Vehicle, or equivalent. See **Brakes/Hydraulic/Mechanical/FLUID - Specifications**
4. Install the front wiper motor module. Refer to **Electrical - Wipers/Washers/Wipers/Washers/LINKAGE, Wiper Arm - Installation**
5. Install the inner and outer cowl covers. Refer to **Body/Exterior/COVER, Cowl Panel - Installation**

ROTOR, BRAKE

Diagnosis and Testing

BRAKE ROTOR

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

Excessive runout or wobble in a rotor can increase pedal travel due to piston knock-back. This increases guide pin sleeve wear due to the tendency of the caliper to follow the rotor wobble.

When diagnosing a brake noise or pulsation, the machined disc braking surface should be inspected.

BRAKING SURFACE INSPECTION

Light braking surface scoring and wear is acceptable. If heavy scoring or warping is evident, the rotor must be refaced or replaced. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Standard Procedure**.

Excessive wear and scoring of the rotor can cause improper lining contact on the rotor's braking surface. If the ridges on the rotor are not removed before new brake shoes are installed, improper wear of the shoes will result.

If a vehicle has not been driven for a period of time, the rotor's braking surface will rust in the areas not covered by the brake shoes at that time. Once the vehicle is driven, noise and chatter from the disc brakes can result when the brakes are applied.

Some discoloration or wear of the rotor surface is normal and does not require resurfacing when linings are replaced. If cracks or burned spots are evident, the rotor must be replaced.

ROTOR MINIMUM THICKNESS

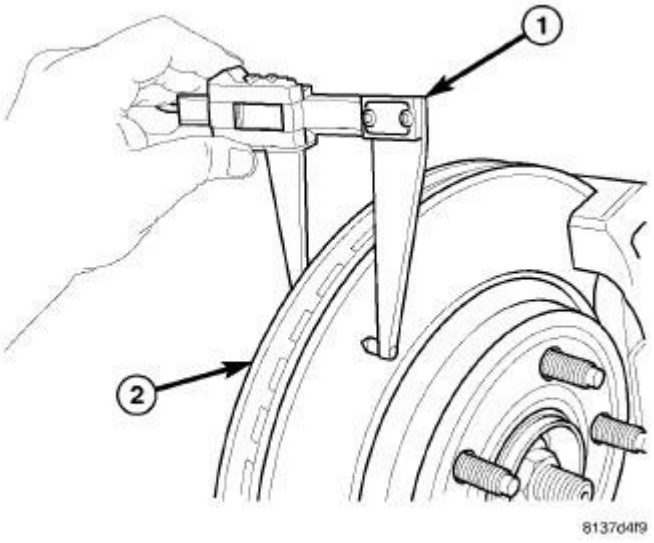


Fig. 153: MEASURING ROTOR THICKNESS
Courtesy of CHRYSLER LLC

Measure rotor thickness (1) at the center of the brake pad contact surface. Replace the rotor if it is worn below minimum thickness or if machining the rotor will cause its thickness to fall below specifications.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

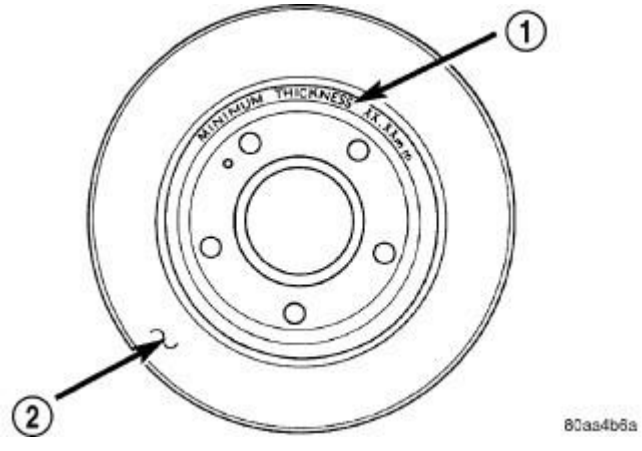


Fig. 154: Minimum
Courtesy of CHRYSLER LLC

1 - ROTOR MINIMUM THICKNESS MARKING
2 - ROTOR

Minimum thickness specifications are cast on the rotor's unmachined surface (1). Limits can also be found in **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications**

ROTOR THICKNESS VARIATION

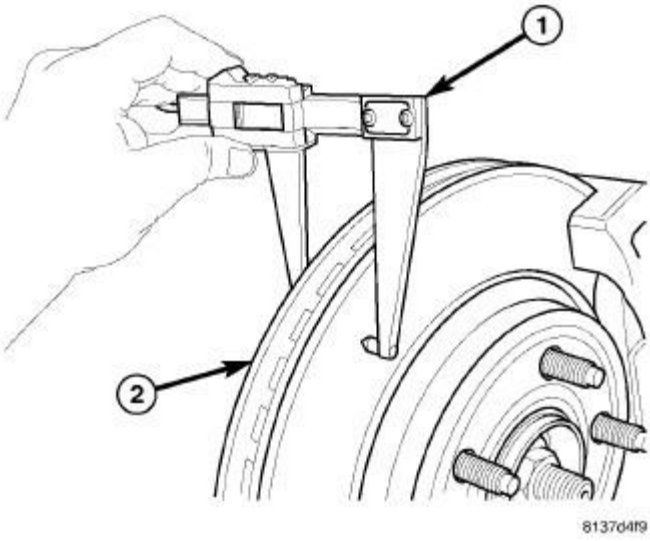


Fig. 155: MEASURING ROTOR THICKNESS
Courtesy of CHRYSLER LLC

Thickness variation in a rotor's braking surface can result in pedal pulsation, chatter and surge. This can also be caused by excessive runout in the rotor or the hub.

Rotor thickness variation measurements should be made in conjunction with measuring runout. Measure thickness of the brake rotor (2) at 12 equal points around the rotor braking surface with a micrometer (1) at a radius approximately 25 mm (1 inch) from edge of rotor. If thickness measurements vary beyond the specification listed in the specification table. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications**, the rotor should be refaced or replaced. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Standard Procedure**.

ROTOR RUNOUT

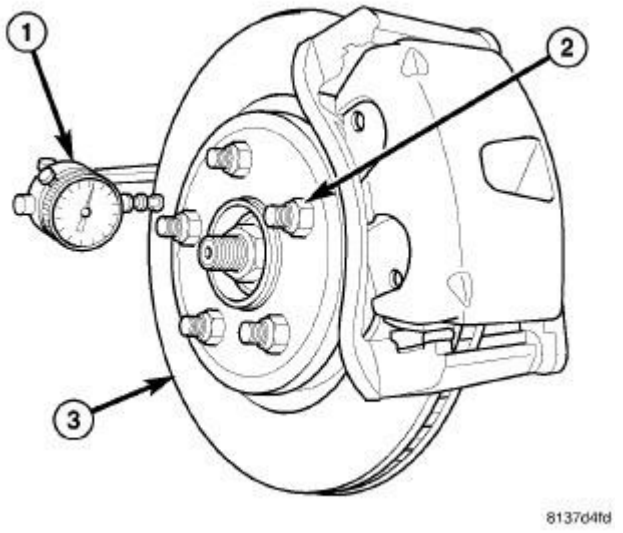


Fig. 156: MEASURING ROTOR RUNOUT
Courtesy of CHRYSLER LLC

On-vehicle rotor runout is the combination of the individual runout of the hub face and the runout of the brake rotor (hub runout can be measured separately). To measure rotor runout on the vehicle:

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
2. Remove the tire and wheel assembly. Refer to **Tires and Wheels - Removal**
3. Install standard wheel mounting nuts, flat side to rotor, on all the wheel studs (2). Progressively tighten the nuts in a crisscross (star) pattern to 135 N.m (100 ft. lbs.).

NOTE: Dial Indicator, Special Tool 9524, can be used in conjunction with C-3339A to measure in millimeters instead of inches. Dial indicator 9524 includes a finer scale to measure lower, tighter tolerances.

4. Mount Dial Indicator (1), Special Tool C-3339A, with Wheel, Special Tool 25w, or equivalent, to the knuckle. Position the dial indicator wheel to contact the rotor braking surface approximately 10 millimeters from the outer edge of the rotor (3).
5. Slowly rotate the brake rotor checking lateral runout, marking the low and high spots. Record these measurements.
6. Check and record the runout on the opposite side of the rotor in the same fashion, marking the low and high spots.
7. Compare runout measurement to specifications. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications**

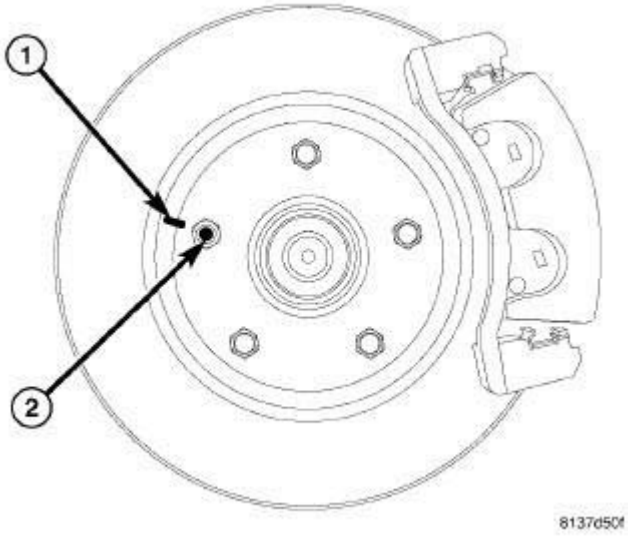


Fig. 157: WHEEL STUD AND ROTOR INDEX MARKED
Courtesy of CHRYSLER LLC

If runout is in excess of specifications, check the lateral runout of the hub face. Before removing the rotor from the hub, place a chalk mark across both the rotor (1) and the one wheel stud (2) closest to where the high runout measurement was taken. This way, the original mounting spot of the rotor on the hub is indexed.

8. Remove the rotor from the hub. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**

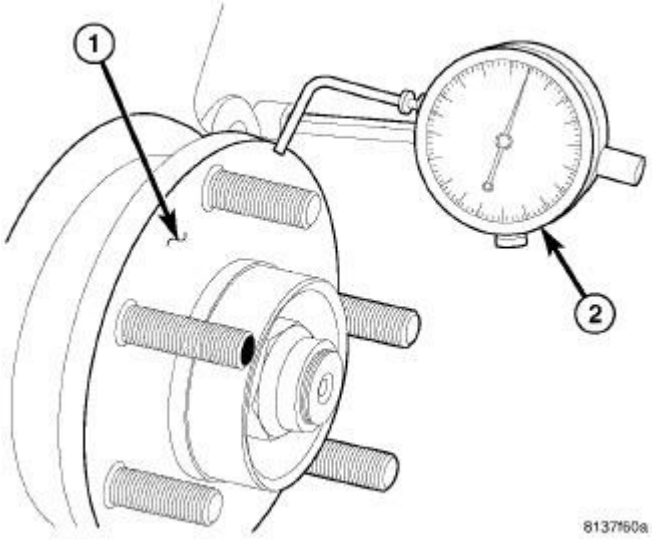


Fig. 158: MEASURING HUB RUNOUT
Courtesy of CHRYSLER LLC

NOTE: Before measuring hub runout, clean the hub face surface with an appropriate cleaner. This provides a clean surface to get an accurate indicator reading.

NOTE: Dial Indicator, Special Tool 9524, can be used in conjunction with C-3339A to measure in millimeters instead of inches. Dial indicator 9524 includes a finer scale to measure lower, tighter tolerances.

9. Mount Dial Indicator (2), Special Tool C-3339A, to the knuckle. Position the dial indicator stem so it contacts the hub face (1) near the outer diameter. Care must be taken to position the stem outside of the stud circle, but inside of the chamfer on the hub rim.
10. Slowly rotate the hub measuring runout. Hub runout should not exceed 0.01 mm (0.0004 inch). If runout exceeds this specification, the hub must be replaced. Refer to **Front Suspension/Front/KNUCKLE, Steering - Removal** . Refer to **Rear Suspension/HUB AND BEARING - Removal**

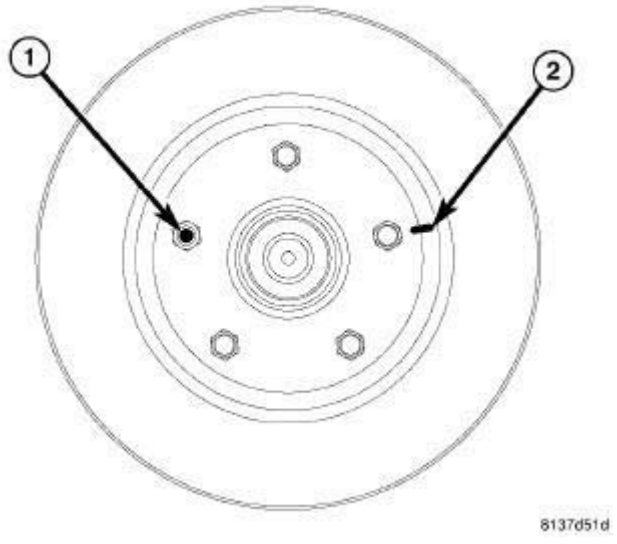


Fig. 159: ROTOR REINDEXED ON WHEEL STUDS
Courtesy of CHRYSLER LLC

11. If hub runout does not exceed this specification, install the original rotor back on the hub, aligning the chalk mark on the rotor (2) with a wheel mounting stud, two studs apart from the original stud (1).

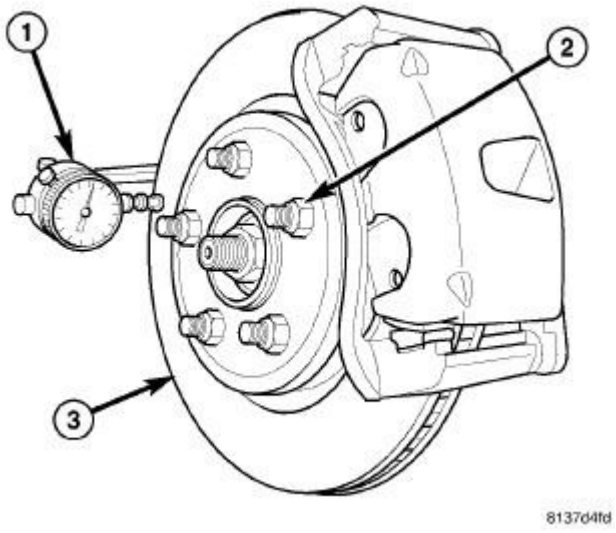


Fig. 160: MEASURING ROTOR RUNOUT
Courtesy of CHRYSLER LLC

12. Install standard wheel mounting nuts, flat side to rotor, on all the wheel studs (2). Progressively tighten the nuts in a crisscross (star) pattern to 135 N.m (100 ft. lbs.).
13. Mount the Dial Indicator (1), Special Tool C-3339A, and remeasure runout on both sides of the brake rotor as explained in earlier steps to see if runout is now within specifications. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications**
14. If runout is still not within specifications, reface or replace brake rotor. See **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Standard Procedure**

Standard Procedure

BRAKE ROTOR MACHINING

NOTE: Refacing the rotor is not required each time the brake pads are replaced, only when the need is foreseen.

Any servicing of the rotor requires extreme care to maintain the rotor within service tolerances to ensure proper brake action.

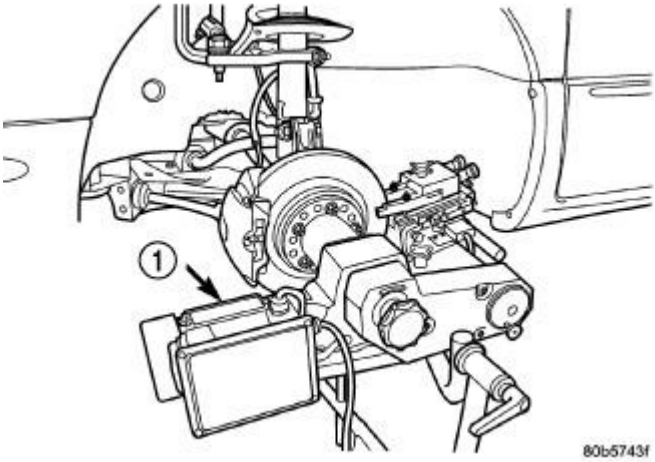


Fig. 161: On-Car Brake Lathe
Courtesy of CHRYSLER LLC

1 - ON-CAR BRAKE LATHE

If the rotor surface is deeply scored or warped, or there is a complaint of brake roughness or brake pedal pulsation, the rotor should be refaced using a hub-mounted on-car brake lathe (1), or replaced.

The use of a hub-mounted on-car brake lathe (1) is highly recommended to eliminate the possibility of excessive runout. It trues the brake rotor to the vehicle's hub and bearing.

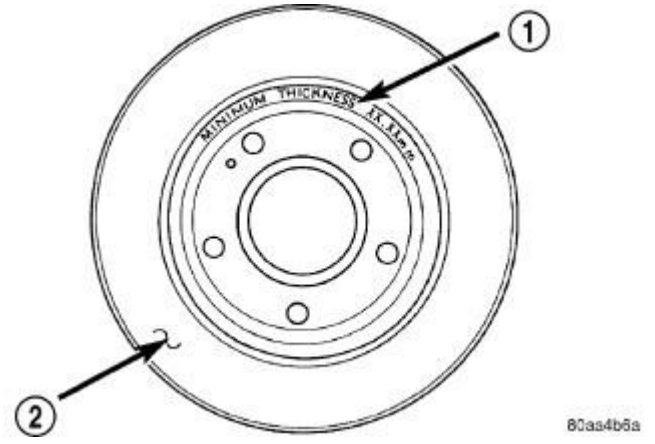


Fig. 162: Minimum Brake Rotor Thickness (Typical)
Courtesy of CHRYSLER LLC

1 - ROTOR MINIMUM THICKNESS MARKING
2 - ROTOR

NOTE: All brake rotors (2) have markings for minimum allowable thickness cast on an unmachined surface of the rotor (1) or stamped into the hat section. Minimum thickness specifications can also be found in

Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications

Minimum allowable thickness is the minimum thickness which the brake rotor machined surface may be cut to.

CAUTION: Do not machine the rotor if it will cause the rotor to fall below minimum thickness.

Before lathe installation, verify the brake rotor face and the hub adapters are free of any chips, rust, or contamination.

When mounting and using the brake lathe, strict attention to the brake lathe manufacturer's operating instructions is required.

Machine both sides of the brake rotor at the same time. Cutting both sides at the same time minimizes the possibility of a tapered or uneven cut.

When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning equipment is required. Specifications for brake rotor machining can be found in **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Specifications**

Removal

FRONT

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

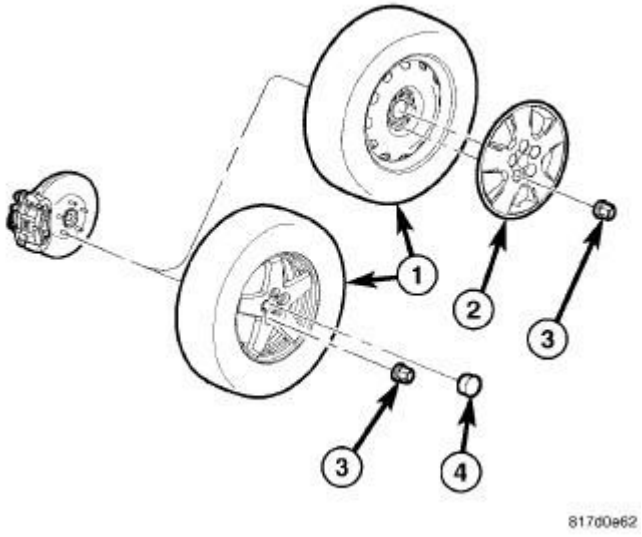


Fig. 163: TIRE AND WHEEL MOUNTING

Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

NOTE: In some cases, it may be necessary to retract the caliper piston in its bore a small amount in order to provide sufficient clearance between the pads and the rotor to easily remove the caliper from the knuckle. This can usually be accomplished before removal by grasping the inboard side of the caliper and pulling outward working with the guide pins, thus retracting the piston. Never push on the piston directly as it may get damaged.

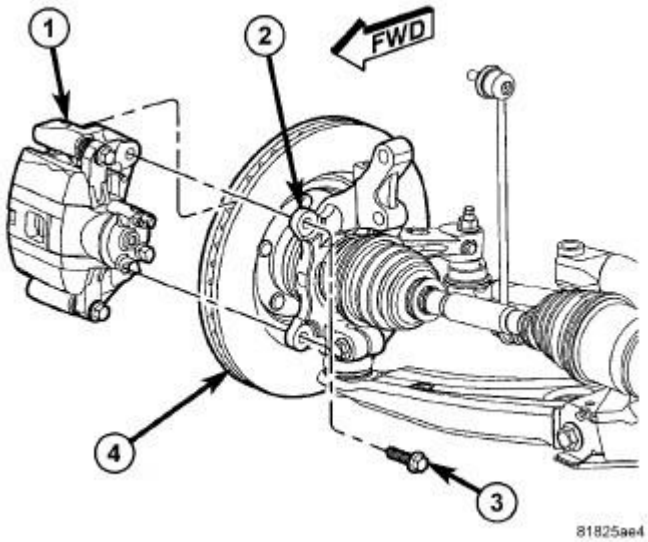


Fig. 164: CALIPER/ADAPTER MOUNTING
Courtesy of CHRYSLER LLC

3. Remove the two bolts (3) securing disc brake caliper and adapter bracket (1) to the steering knuckle (2).
4. Remove the disc brake caliper and adapter bracket (1) from the knuckle (2) and rotor (4) as an assembly. Hang the assembly out of the way using wire or a bungee cord. **Use care not to overextend the brake hose when doing this.**

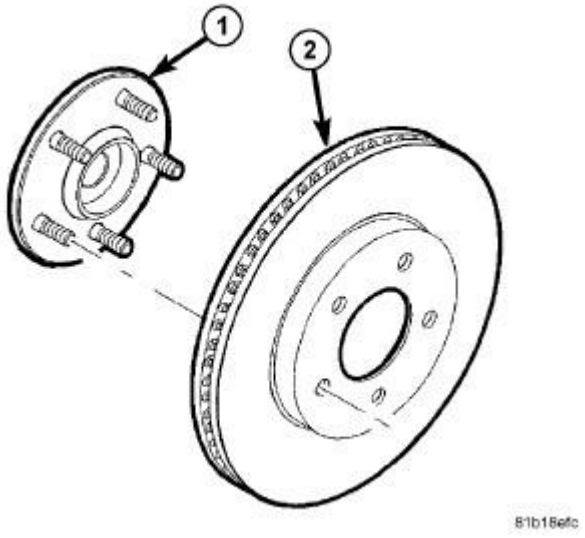


Fig. 165: VENTED BRAKE ROTOR MOUNTING
Courtesy of CHRYSLER LLC

5. Remove any clips retaining the brake rotor to the wheel mounting studs.
6. Slide the brake rotor (2) off the hub and bearing (1).

REAR

NOTE: Before proceeding. See Brakes - Warning. See Brakes - Caution.

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

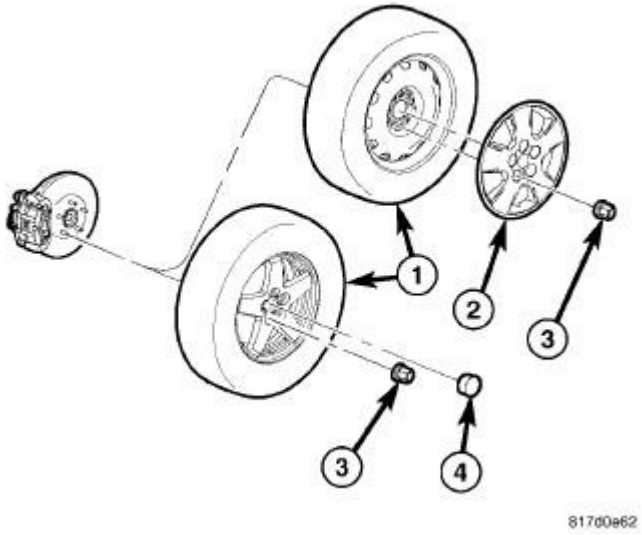


Fig. 166: TIRE AND WHEEL MOUNTING

Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

NOTE: In some cases, it may be necessary to retract the caliper piston in its bore a small amount in order to provide sufficient clearance between the pads and the rotor to easily remove the caliper from the knuckle. This can usually be accomplished before removal by grasping the inboard side of the caliper and pulling outward working with the guide pins, thus retracting the piston. Never push on the piston directly as it may get damaged.

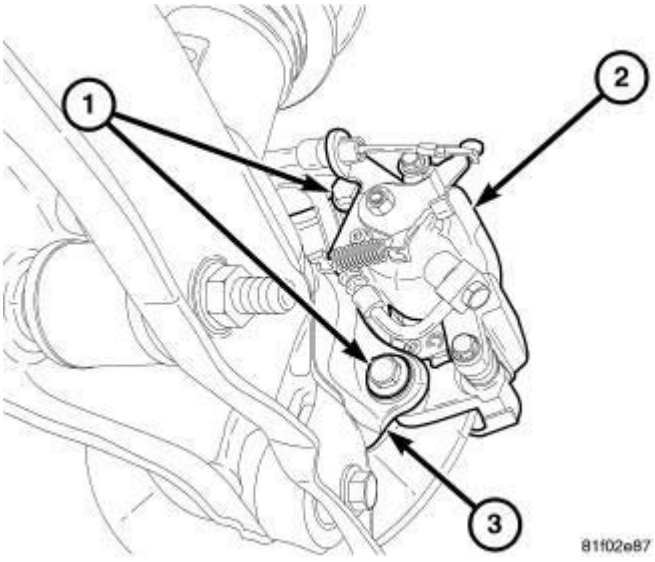


Fig. 167: REAR CALIPER ADAPTER MOUNTING
Courtesy of CHRYSLER LLC

3. Remove two bolts (1) securing the disc brake caliper and adapter bracket (2) to the knuckle (3).
4. Remove the disc brake caliper and adapter bracket (2) as an assembly from the knuckle (3) and rotor. Hang the assembly out of the way using wire or a bungee cord. Use care not to overextend the brake hose when doing this.

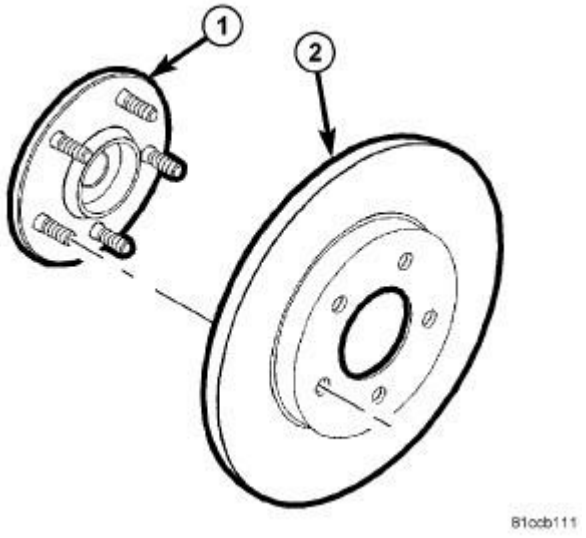


Fig. 168: SOLID BRAKE ROTOR MOUNTING
Courtesy of CHRYSLER LLC

5. Remove any retaining clips, then slide the brake rotor (2) off the hub and bearing (1).

Installation

FRONT

NOTE: Inspect disc brake pads before installation. See Brakes/Hydraulic/Mechanical/PADS, Brake - Inspection.

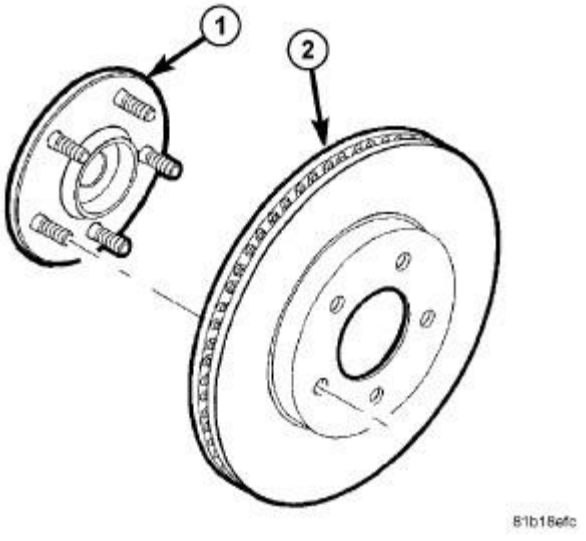


Fig. 169: VENTED BRAKE ROTOR MOUNTING

Courtesy of CHRYSLER LLC

1. Clean the hub face (1) to remove any dirt or corrosion where the rotor mounts.
2. Install the brake rotor (2) over the studs on the hub and bearing.

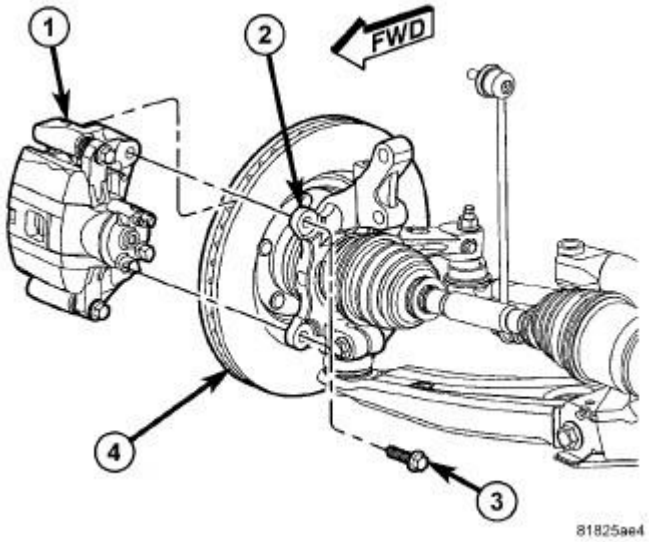


Fig. 170: CALIPER/ADAPTER MOUNTING
Courtesy of CHRYSLER LLC

3. Install the disc brake caliper and adapter bracket assembly (1) over the brake rotor (4) and knuckle (2).
4. Install the mounting bolts (3) securing the caliper adapter bracket to the knuckle (2). Tighten the bolts to 169 N.m (125 ft. lbs.).

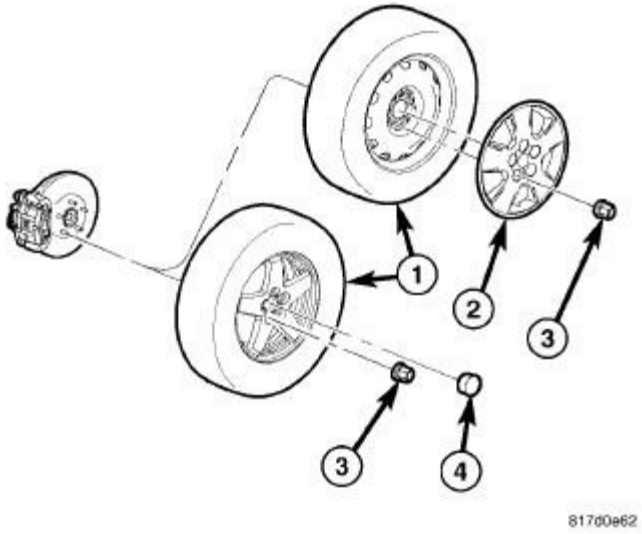


Fig. 171: TIRE AND WHEEL MOUNTING

Courtesy of CHRYSLER LLC

5. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
6. Lower the vehicle.
7. Pump the brake pedal several times before moving the vehicle to set the pads to the brake rotor.
8. Check and adjust the brake fluid level in the reservoir as necessary.
9. Road test the vehicle and make several stops to seat the brake pads to the rotor.

REAR

NOTE: Inspect disc brake pads before installation. Replace as necessary.

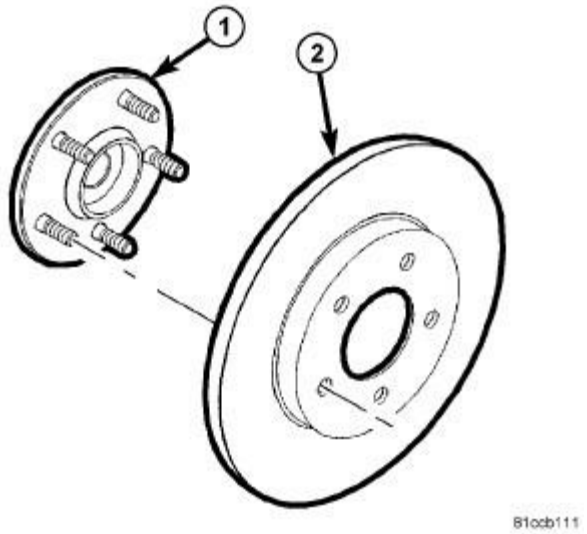


Fig. 172: SOLID BRAKE ROTOR MOUNTING
Courtesy of CHRYSLER LLC

1. Clean the rotor mounting face of the hub and bearing (1) to remove any dirt or corrosion.
2. Install the brake rotor (2) over the hub and bearing (1).

CAUTION: If the brake rotor or brake pads are being replaced, the rear caliper piston must be seated (bottomed) to compensate for the new brake rotor or lining. Because the parking brake self-adjuster mechanism is attached to the piston, a special seating method is required. The only acceptable method is by rotating the piston back into the bore using Retractor, Special Tool 8807, as described below. Any other seating method will damage the self-adjuster mechanism.

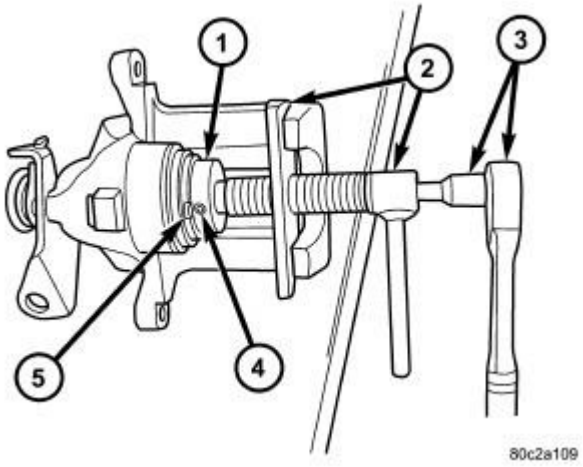


Fig. 173: SEATING PISTON WITH SPECIAL TOOL
Courtesy of CHRYSLER LLC

3. If necessary, seat (bottom) the caliper piston in the bore as follows:
   a. Assemble a 3/8 in. drive ratchet handle and an extension (3).
   b. Insert the extension through Special Tool 8807-1 (2).
   c. Place Special Tool 8807-2 (1) on the end of the extension.
   d. Insert lugs on Special Tool 8807-2 into notches in face of caliper piston (5).
   e. Thread the screw drive on 8807-1 down until it contacts the top of 8807-2 which is against the caliper piston. **Do not over tighten the screw-drive. Damage to the piston can occur.**
   f. Turn 8807-2 with the ratchet, rotating the piston in a **clockwise** direction until fully seated (bottomed) in the bore. **It may be necessary to turn 8807-1 with 8807-2 to start the process of piston retraction.**

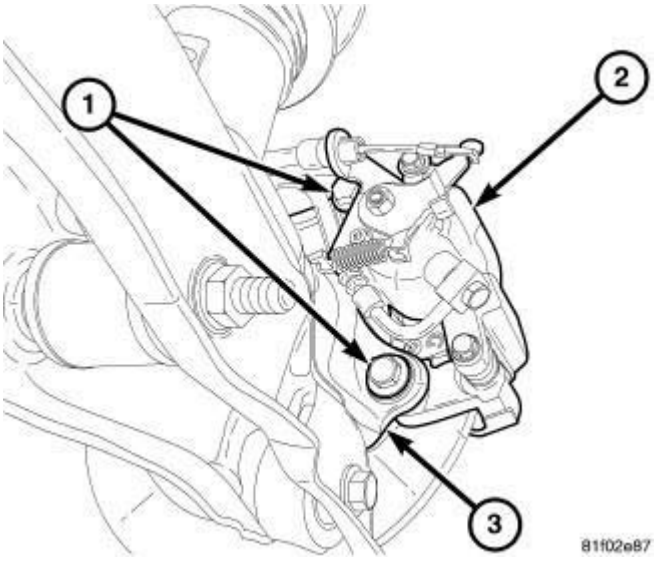


Fig. 174: REAR CALIPER ADAPTER MOUNTING
Courtesy of CHRYSLER LLC

4. Install the disc brake caliper and adapter bracket (2) over the knuckle and rotor as an assembly.
5. Install the two bolts (1) securing the disc brake caliper and adapter bracket (2) to the knuckle. Tighten the mounting bolts to 100 N.m (74 ft. lbs.).

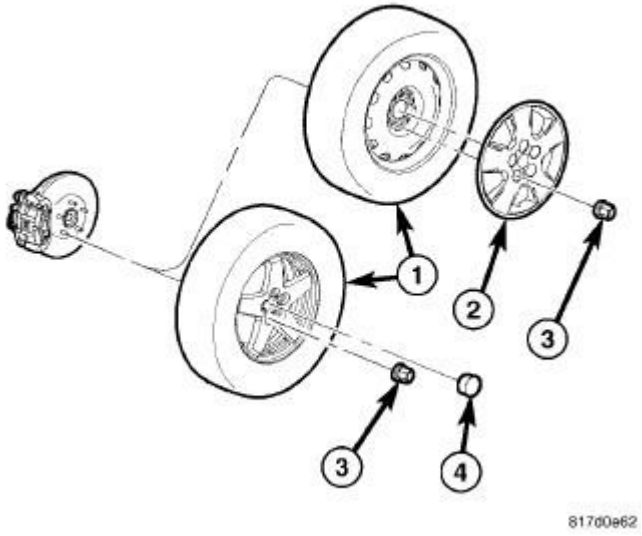


Fig. 175: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

6. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
7. Lower the vehicle.
8. Pump the brake pedal several times to ensure the vehicle has a firm brake pedal before moving vehicle.
9. Check and adjust the brake fluid level as necessary.
10. Road test the vehicle and make several stops to wear off any foreign material on the brakes and to seat the brake pads.

Specifications

SPECIFICATIONS

NOTE: When refacing a rotor, the required TIR (Total Indicator Reading) and thickness variation limits MUST BE MAINTAINED. Extreme care in the operation of rotor turning (machining) equipment is required.

LIMITS/SPECIFICATIONS

Brake Rotor	Rotor Thickness	Minimum Rotor Thickness	Rotor Thickness Variation	Rotor Runout *
Front	27.87-28.13 mm 1.097-1.107 in.	26.4 mm 1.040 in	0.009 mm 0.0004 in.	0.050 mm 0.002 in.

Rear	11.75-12.25 mm 0.463-0.482 in.	10.4 mm 0.409 in.	0.009 mm 0.0004 in.	0.050 mm 0.002 in.
* TIR Total Indicator Reading (Measured On Vehicle)				

TUBES AND HOSES, BRAKE

Description

DESCRIPTION

The brake tubes are steel with a corrosion-resistant nylon coating applied to the external surfaces.

The flex hoses used at each wheel brake are made of reinforced rubber with fittings at each end. The fitting at each brake caliper is the banjo-type and requires a special banjo bolt and copper washers.

Operation

OPERATION

The purpose of the chassis brake tubes and flex hoses is to transfer the pressurized brake fluid developed by the master cylinder to the wheel brakes of the vehicle. The flex hoses are made of rubber to allow for the movement of the vehicle's suspension.

Inspection

INSPECTION

Brake tubing should be inspected periodically for evidence of physical damage or contact with moving or hot components.

Flexible rubber hose is used at both the front and rear wheel brakes. Inspection of the flexible brake hoses should be performed whenever the brake system is serviced and every 12,000 km (7,500 miles) or 12 months, whichever comes first. Inspect hydraulic brake hoses for surface cracking, scuffing, or worn spots. If the fabric casing of the hose becomes exposed due to cracks or abrasions in the hose cover, the hose should be replaced immediately. Eventual deterioration of the hose can take place with possible burst failure. Faulty installation can cause twisting, resulting in wheel, tire, or chassis interference.

NOTE: This vehicle is equipped with more than one size (diameter) brake tube depending on location on the vehicle. If a brake tube must be replaced, always use the same size brake tubing as that being replaced. Never use under-size brake tubing.

PARKING BRAKE

DESCRIPTION

DESCRIPTION

The parking brake consists of the following components:

- Foot-operated parking brake lever *
- Cables (front, left rear, right rear)
- Cable equalizer
- Caliper with Integral Parking Brake (IPB)

* Right-Hand-Drive Export models feature a hand-operated parking brake lever.

The parking brake lever is an automatic-adjusting type that continuously applies minimal tension to the parking brake cables to keep them in adjustment at all times.

The front cable extends from the lever to the parking brake cable equalizer. The equalizer joins the front cable to the left and right rear cables that extend to the individual rear calipers with Integral Parking Brake (IPB). The parking brake cables are made of flexible steel cable.

The brake caliper used for the foundation brakes features an Integral Parking Brake (IPB) which combines a mechanical parking brake function with a conventional rear caliper.

This caliper features a lever attached to a shaft on the outside of the caliper. The lever uses a ball-ramp mechanism to mechanically apply piston clamp force to the rear rotor when the parking brake lever is applied. As the lever and shaft rotate, the ball-ramp interface causes the shaft to lift and the piston to travel toward the rotor.

The IPB includes an automatic adjuster mechanism that keeps the mechanical park brake mechanism in contact with the piston as the pads wear. The auto-adjuster is linked to the piston through a friction clutch that is used to detect pad wear.

STANDARD PROCEDURE

PARKING BRAKE CABLE TENSION RELEASE - FOOT LEVER

Use the following procedure to release the tension from the parking brake cables and the automatic adjuster in the parking brake lever (pedal) mechanism when required.

1. Release the parking brake.
2. Raise the vehicle to a comfortable working position and support. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

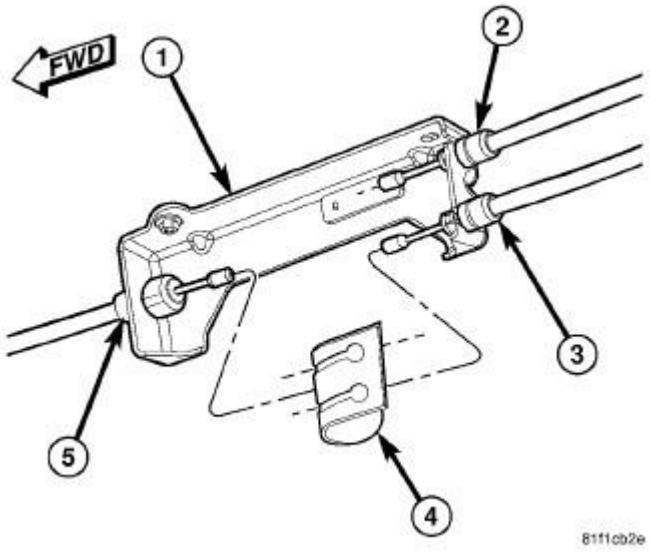


Fig. 176: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

3. Wipe the parking brake cable strands (front and both rear) clean where visible at the intermediate bracket.

CAUTION: Do not use any type of sharp instrument to hold the cable strand in place. Damage to the cable strand or coating can occur.

4. Pull rearward on the equalizer (4) until the front cable stops, then grasp the front cable (5) strand and hold it in this position. Disconnect the equalizer from the front cable strand.
5. Release the front cable strand allowing the lever automatic self-adjusting mechanism to pull the front cable strand forward. This action allows the adjuster mechanism to rotate around to its stop, removing tension from the adjuster and front parking brake cable.

PARKING BRAKE CABLE TENSION RELEASE - HAND LEVER

1. Release the parking brake.
2. Block the tire and wheel assemblies so the vehicle does not move once the parking brake lever is released.
3. Release the parking brake.

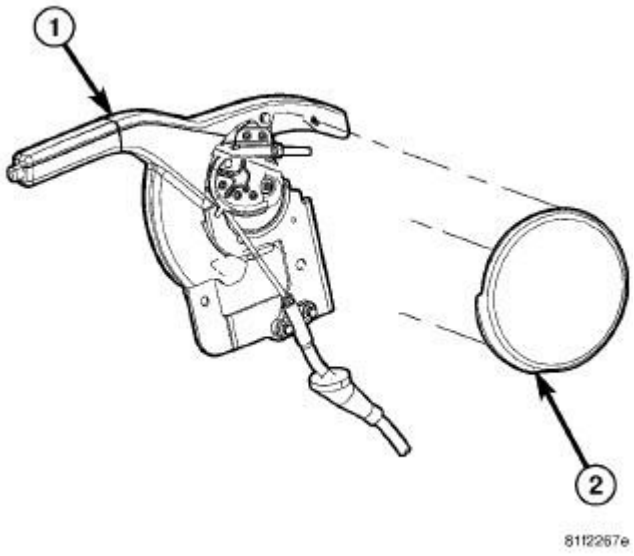


Fig. 177: HAND LEVER COVER MOUNTING
Courtesy of CHRYSLER LLC

4. Remove the cover from the side of the parking brake lever. To remove the cover, unclip it at the top and rotate it counterclockwise.

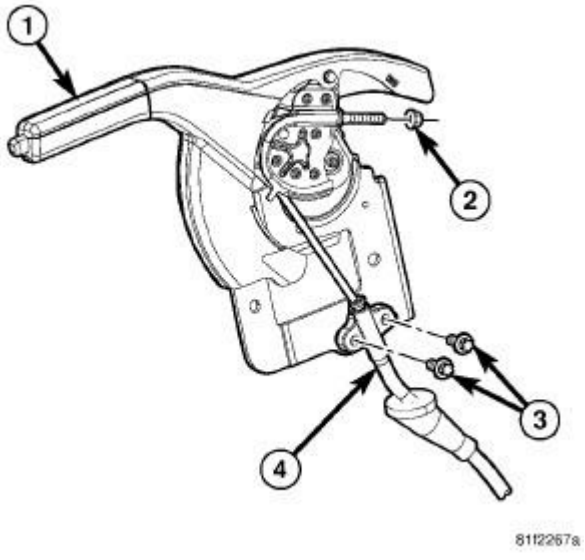


Fig. 178: CABLE MOUNTING TO HAND LEVER
Courtesy of CHRYSLER LLC

5. Place the parking brake lever (1) in the fully released (down) position.
6. Loosen the adjusting nut (2) on the end of the front parking brake cable. Back it off to the end of the cable.

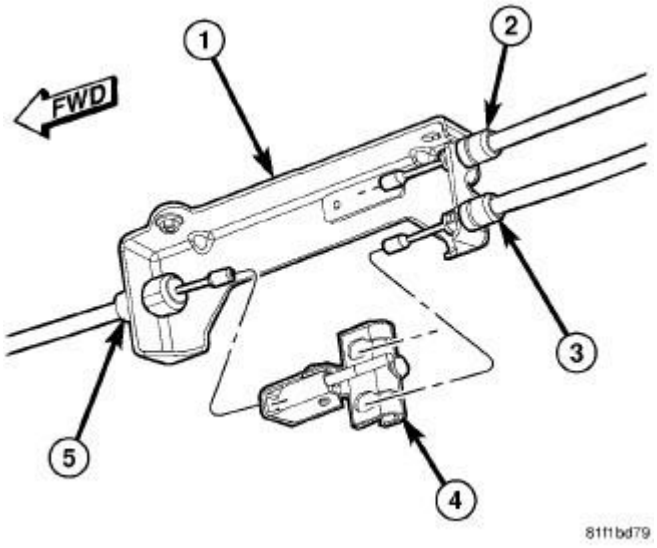


Fig. 179: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

7. If the cable equalizer/bent nail tensioner needs to be removed, perform the following:
   a. Raise the vehicle to a comfortable working position and support. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
   b. Remove the parking brake cable equalizer/bent nail tensioner (4) from the three parking brake cables (2, 3, 5).

PARKING BRAKE CABLE TENSION RESET - FOOT LEVER

1. Raise the vehicle to a comfortable working position and support. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

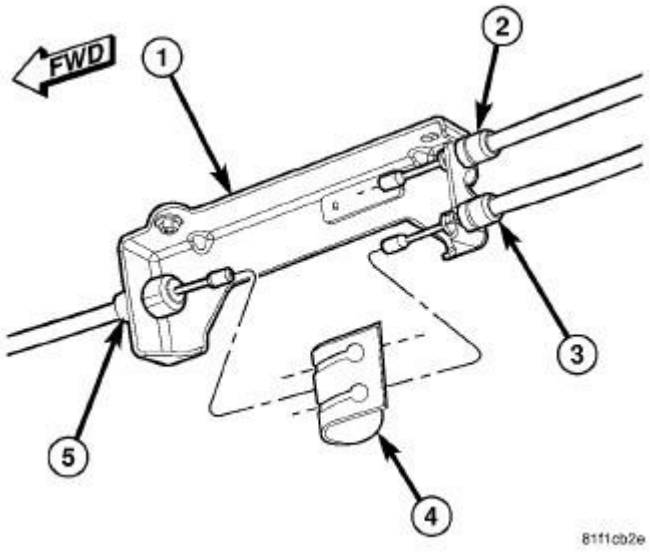


Fig. 180: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

2. Wipe the front parking brake cable strand clean at the intermediate bracket (1) area.

CAUTION: Do use any type of sharp instrument directly on the cable strand to hold it in place. Damage to the cable strand or coating can occur.

3. Clamp an appropriate pair of pliers on the front parking brake cable **button (2) only** and pull the cable stand rearward until it stops, then grasp the front cable strand and hold it in this position. Remove the pliers from the button.

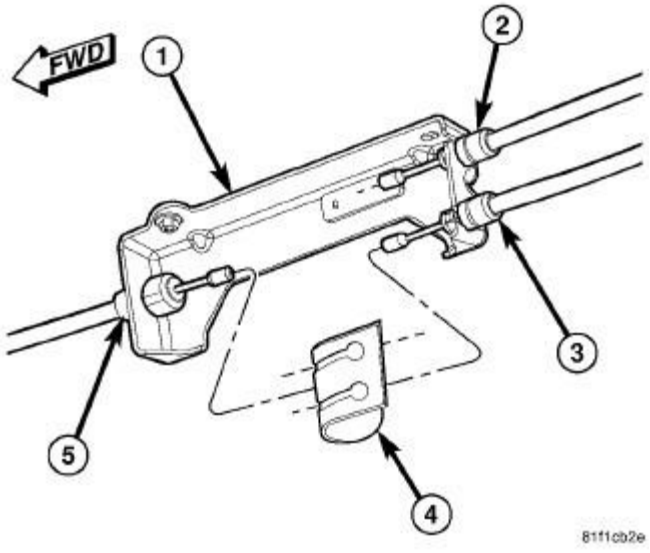


Fig. 181: PARKING BRAKE CABLE EQUALIZER

Courtesy of CHRYSLER LLC

4. While holding the front cable in this position, install the equalizer (2) (attached to both rear cables) on the front parking brake cable.
5. Release the grasp on the front parking brake cable.
6. Lower the vehicle.
7. Apply and release the parking brake lever one time. This will seat the parking brake cables and allow the auto adjuster in the parking brake lever mechanism to correctly tension the parking brake cables.

PARKING BRAKE CABLE TENSION RESET - HAND LEVER

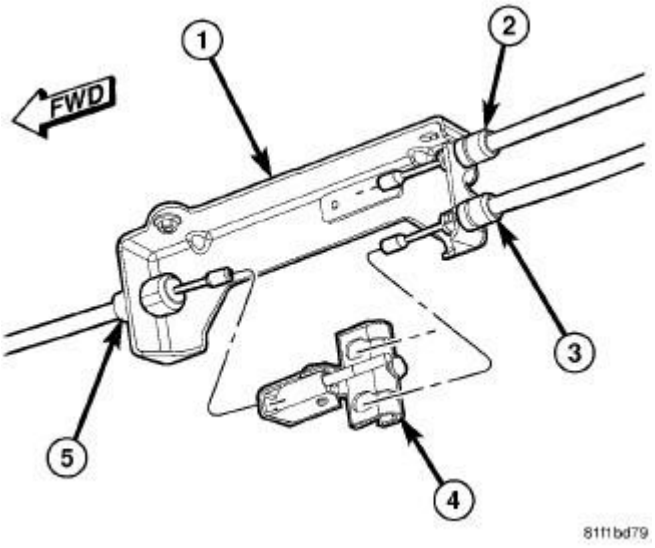


Fig. 182: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

1. If the cable equalizer/bent nail tensioner needs to be installed on the cables, perform the following:
   a. Raise the vehicle to a comfortable working position and support. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
   b. Connect the parking brake cable equalizer/bent nail tensioner (4) to the three parking brake cables (2, 3, 5).
   c. Remove any slack from the parking brake cables by pushing the front cable strand forward into the housing until slack is removed.
   d. Lower the vehicle.
2. If not installed during Step (1), make sure the parking brake cable equalizer/bent nail tensioner is attached to all three parking brake cables
3. Make sure that the front parking brake cable is properly aligned and installed on the cable track of the parking brake lever.

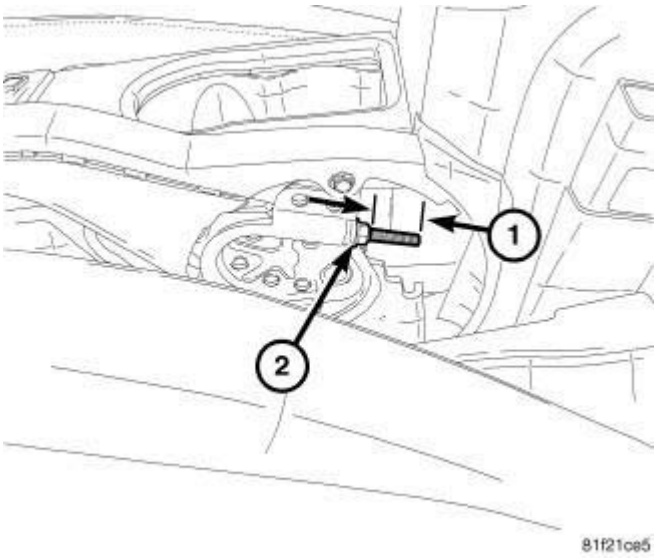


Fig. 183: CABLE STUD-TO-NUT DIMENSION
Courtesy of CHRYSLER LLC

NOTE: Actuating the parking brake lever to its fully applied position one time after tightening the adjustment nut will yield (stretch) the bent nail portion of the equalizer approximately 1/4 inch (6 mm). This process will correctly set the parking brake cable tension.

4. Adjust parking brake cable tension using the following steps:
   a. Make sure the parking brake lever in the fully released (down) position.
   b. While maintaining tension on the cable, tighten the adjusting nut (2) on the front parking brake cable until 34 millimeters (1.34 in.) of thread (1) is out past the end of the adjustment nut.
   c. Actuate the parking brake lever to its fully applied position one time, then reposition it to its fully released (down) position.
5. Raise the vehicle to a point where the rear wheels just clear the floor.
6. Check the rear wheels of the vehicle; they should rotate freely without dragging.
7. Apply the parking brake. Check the rear wheels of the vehicle. They should not rotate.
8. Return the parking brake lever to its fully released (down) position and check the rear wheels. They should rotate freely without dragging.
9. Apply the parking brake.
10. Lower the vehicle.

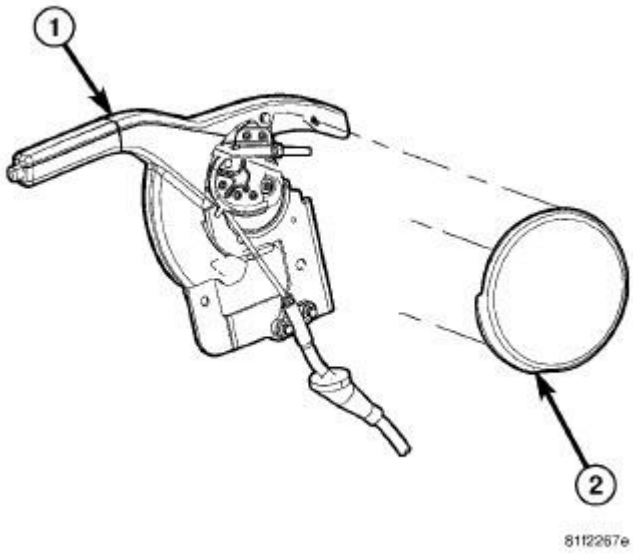


Fig. 184: HAND LEVER COVER MOUNTING
Courtesy of CHRYSLER LLC

11. Install the cover on the side of the parking brake lever.

CABLE END CLEANING AND LUBRICATION

Periodic cleaning and lubrication can be done to ensure proper operation of the parking brake cables. This procedure applies to the trailing end of all parking brake cables.

CAUTION: If a liquid cleaner is necessary, use a cleaner such as Mopar® Non-Chlorinated Brake Parts Cleaner or equivalent.

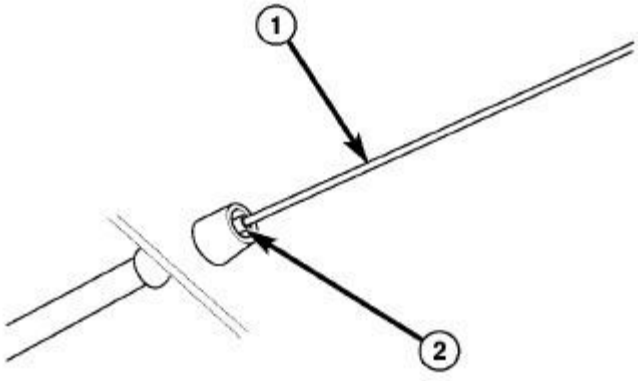


Fig. 185: Areas To Be Cleaned And Lubricated
Courtesy of CHRYSLER LLC

1 - STRAND AREA 2 - SEAL AREA

1. Using an appropriate bristle brush, clean the cable strand (1) in the area that retracts into the cable housing when the parking brake lever is applied.
2. Clean the cable seal area (2) at the end of the cable housing.
3. Lubricate the cleaned area with a general purpose grease lubricant.

CABLE, PARKING BRAKE, FRONT

Removal

WITH FOOT LEVER

1. Release the parking brake.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
3. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**

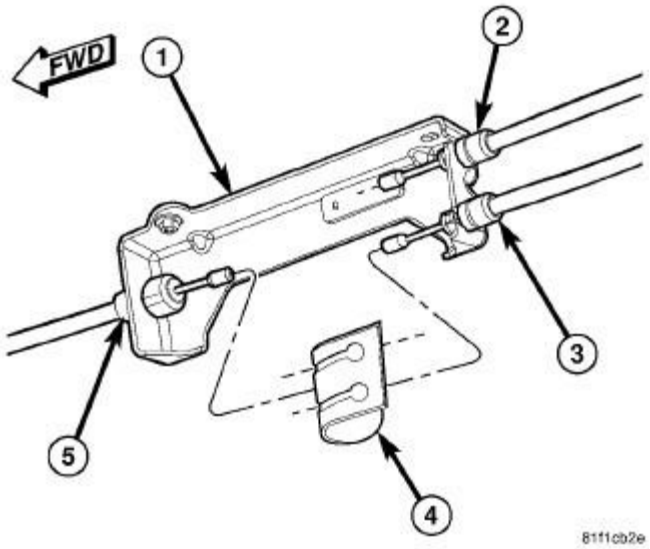


Fig. 186: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

4. Collapse the front cable retainer fingers at the end of the cable housing where it contacts the intermediate bracket (1). Pull the cable (5) forward and remove it from the intermediate bracket.
5. Push the front cable strand into the housing until it bottoms.

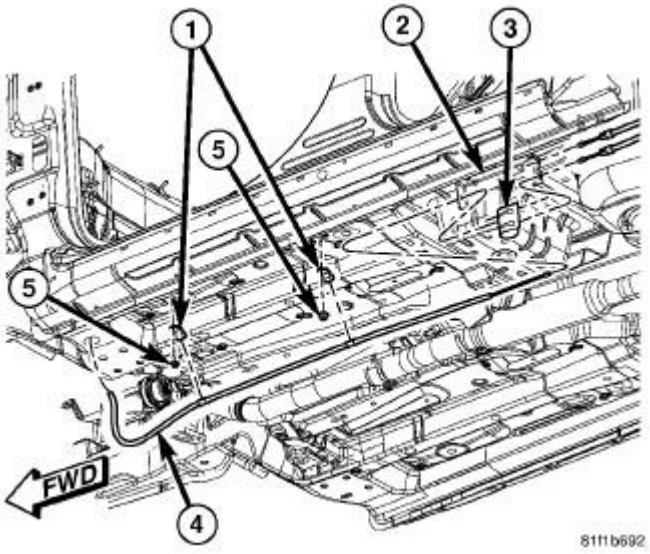


Fig. 187: CABLE MOUNTING TO UNDERBODY WITH FOOT LEVER
Courtesy of CHRYSLER LLC

6. Remove the nuts (5) securing the front cable routing clamps (1) to the underbody of the vehicle.
7. Remove the cable routing clamps (1) from the cable (4).
8. Lower the vehicle.
9. Remove the left front door opening sill scuff plate.
10. Remove the lower cowl trim.
11. Remove the steering column opening cover. Refer to **Body/Instrument Panel/COVER, Steering Column Opening - Removal** .

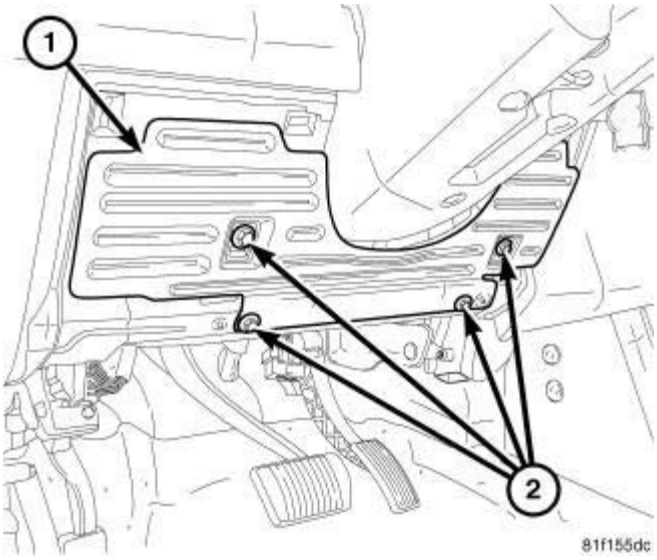


Fig. 188: STEERING COLUMN COVER REINFORCEMENT
Courtesy of CHRYSLER LLC

12. Remove the steering column cover reinforcement mounting screws (2). Remove the steering column cover reinforcement (1).
13. Pull the parking brake lever pedal up and hold it in this position.

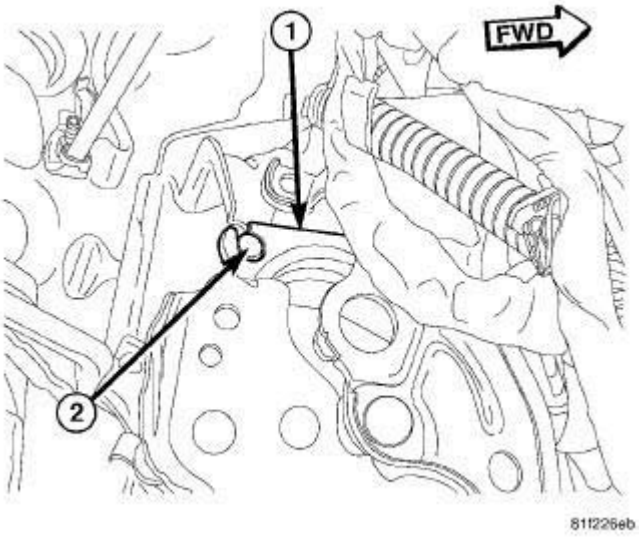


Fig. 189: CABLE BUTTON LOCATED IN LEVER
Courtesy of CHRYSLER LLC

14. Rotate the cable strand around at the lever mechanism until the strand lines up with the slot, then remove the cable end button (2) from the lever mechanism (1).

NOTE: Prior to removing cable from lever, note cable routing through lever for ease in reassembly.

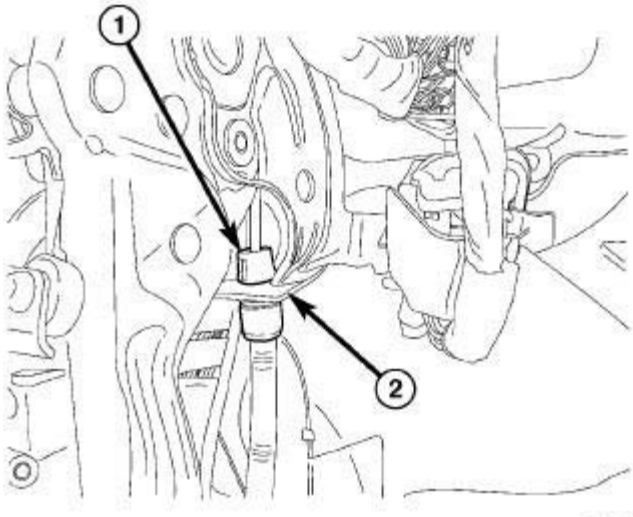


Fig. 190: CABLE HOUSING RETAINED IN LEVER
Courtesy of CHRYSLER LLC

15. Collapse the front cable retainer fingers on the end of the cable housing (1) at the lever (2).
16. Remove the cable from the parking brake lever (3).
17. Lift back the carpet and pull the cable seal loose from the floor pan.
18. Remove the front parking brake cable from the vehicle through the hole in the floor pan.

WITH HAND LEVER

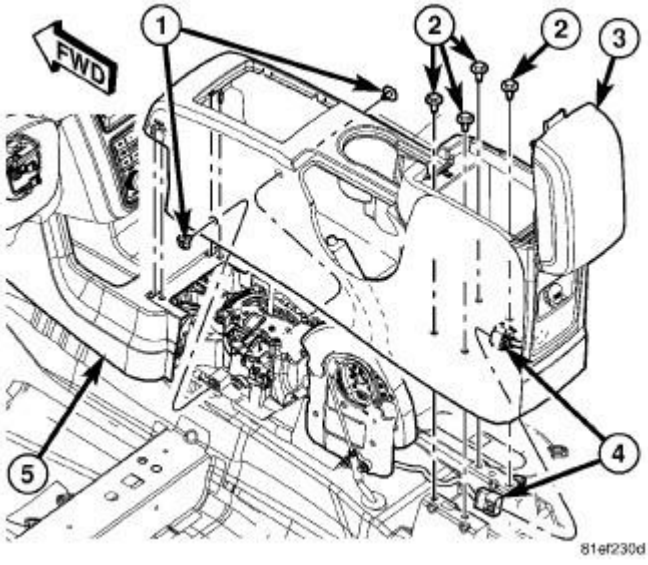


Fig. 191: CENTER CONSOLE
Courtesy of CHRYSLER LLC

1. Remove the floor center console. Refer to **Body/Interior/CONSOLE, Center - Removal**
2. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**
3. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

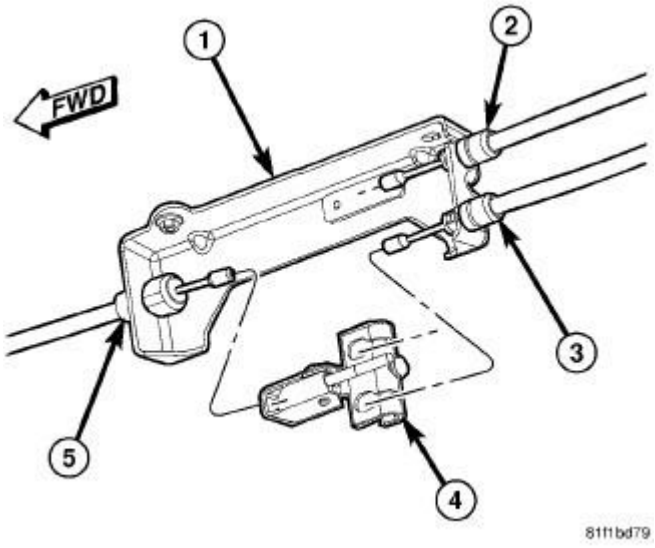


Fig. 192: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

4. Remove the parking brake cable equalizer/bent nail tensioner (4) from the three parking brake cables (2, 3, 5).
5. Collapse the front cable retainer fingers at the end of the cable housing where it contacts the intermediate bracket (1). Pull the cable (5) forward and remove it from the intermediate bracket.

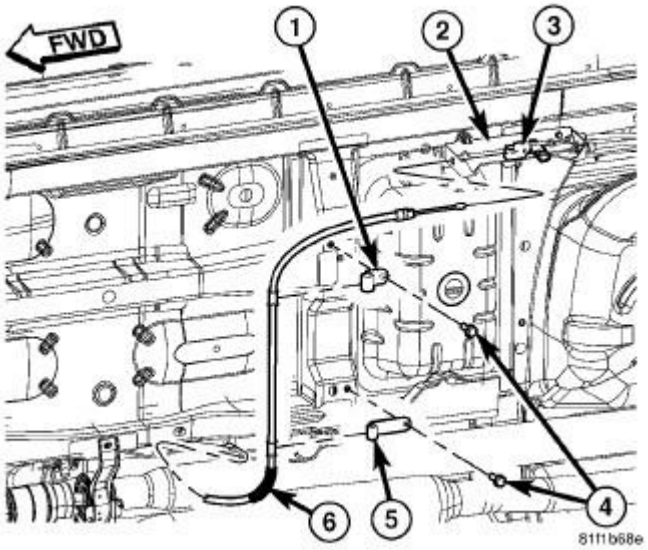


Fig. 193: CABLE MOUNTING TO UNDERBODY WITH HAND LEVER
Courtesy of CHRYSLER LLC

6. Remove the screws (4) securing the front cable routing clamps (1, 5) to the underbody of the vehicle.
7. Remove the cable routing clamps (1, 5) from the cable (6).

8. Lower the vehicle.

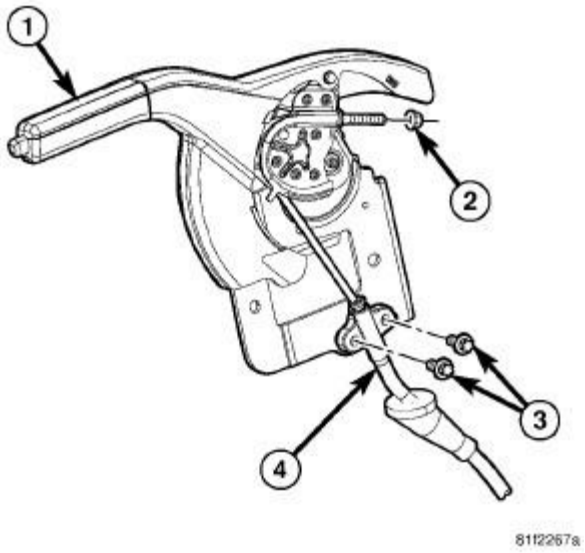


Fig. 194: CABLE MOUNTING TO HAND LEVER
Courtesy of CHRYSLER LLC

9. Remove the mounting screws (3) fastening the front cable (4) to the side of the parking brake lever (1).
10. Remove the adjusting nut (2) from the end of the front parking brake cable.
11. Remove the cable strand from the lever.
12. Pull the cable seal loose from the floor pan and remove the front parking brake cable from the vehicle through the access hole in the floor pan.

Installation

WITH FOOT LEVER

1. Pass most of the front parking brake cable down through the access hole in the floor pan from inside the vehicle.

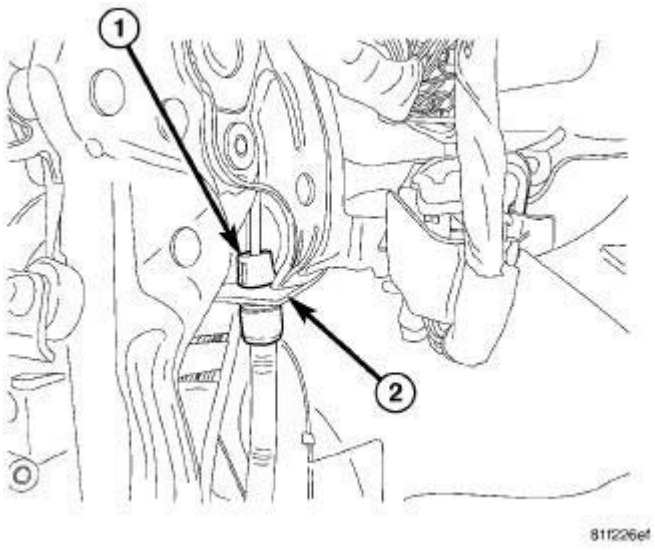


Fig. 195: CABLE HOUSING RETAINED IN LEVER
Courtesy of CHRYSLER LLC

2. Insert the lever end of the front parking brake cable through the mounting hole in the parking brake lever (2). Slide it through until the cable retainer fingers on the end of the housing (1) lock in place. Make sure all fingers are engaged preventing removal of the cable from the bracket.

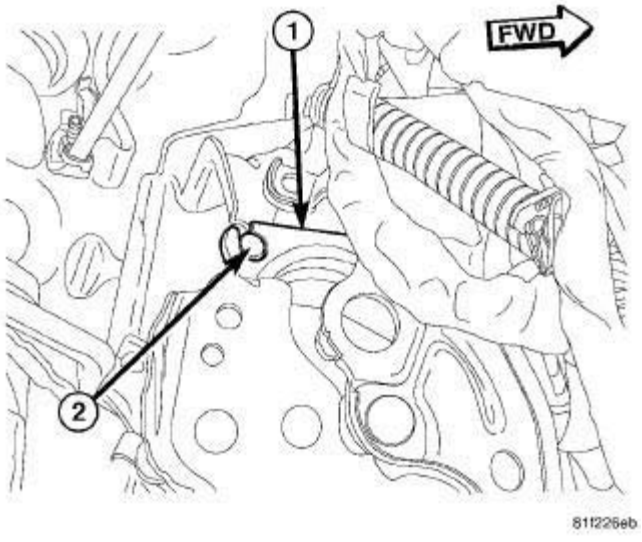


Fig. 196: CABLE BUTTON LOCATED IN LEVER
Courtesy of CHRYSLER LLC

3. Pull the button on the end of cable strand out of housing and route the strand around the cable guide, then rotate the cable strand up and align the cable with the slot in lever mechanism (1). Slide the cable button (2) into the slot and rotate the cable down into mounted position with the cable inserted into the guide on

the mechanism.

4. Slide any extra cable back into the cable housing. This can be easily done by pulling on the trailing end of the front cable strand that is now under the vehicle.
5. Install the front parking brake cable floor pan seal into the access hole in the floor pan.
6. Reposition the carpeting back down on the floor.

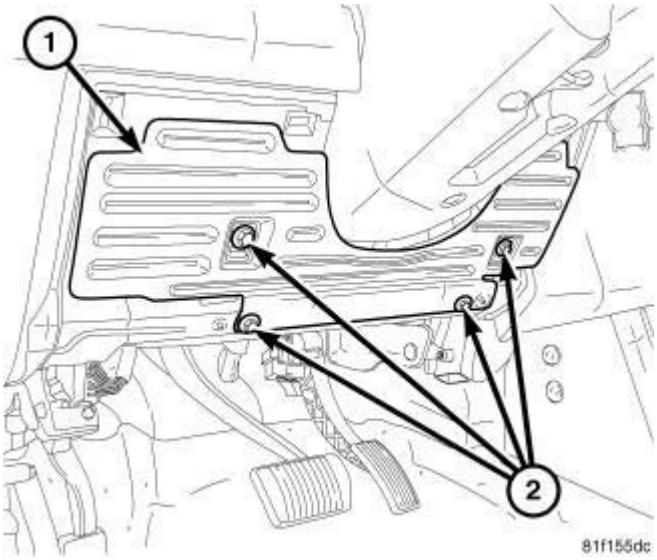


Fig. 197: STEERING COLUMN COVER REINFORCEMENT
Courtesy of CHRYSLER LLC

7. Install the steering column cover reinforcement (1) using the four mounting screws (2).
8. Install the steering column opening cover. Refer to **Body/Instrument Panel/COVER, Steering Column Opening - Installation**
9. Install the lower cowl trim.
10. Install the left front door opening sill scuff plate.
11. Raise and support the vehicle.

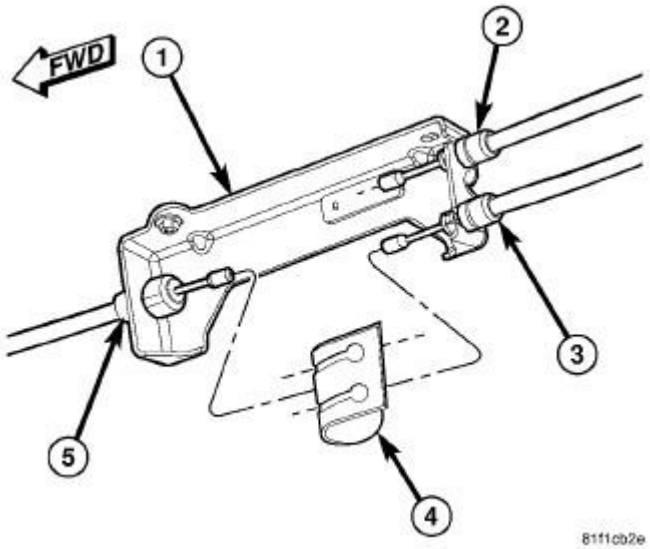


Fig. 198: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

12. Pass the end of the front cable (5) through the hole in the end of the intermediate bracket (1). Press the cable housing retainer through the hole until the fingers on the retainer lock it into place.

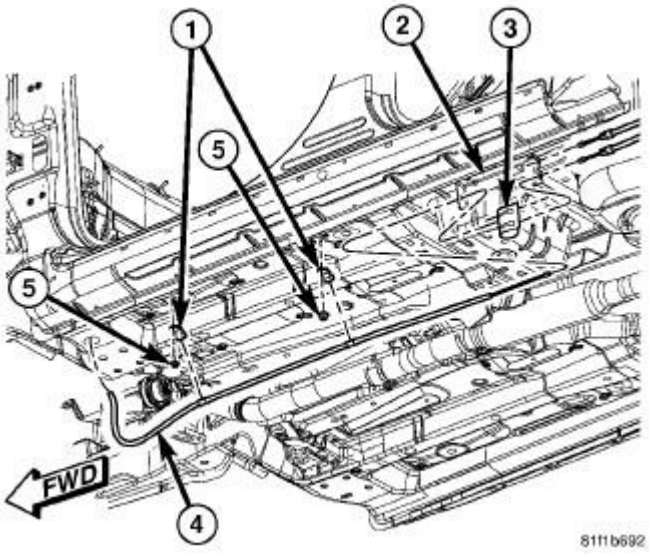


Fig. 199: CABLE MOUNTING TO UNDERBODY WITH FOOT LEVER
Courtesy of CHRYSLER LLC

13. Install the cable routing clamps (1) over the metal sleeves on the front cable (4).
14. Position the front cable routing clamps over the studs on the underbody of the vehicle and install the nuts (5). Tighten the nuts to 6 N.m (55 in. lbs.).

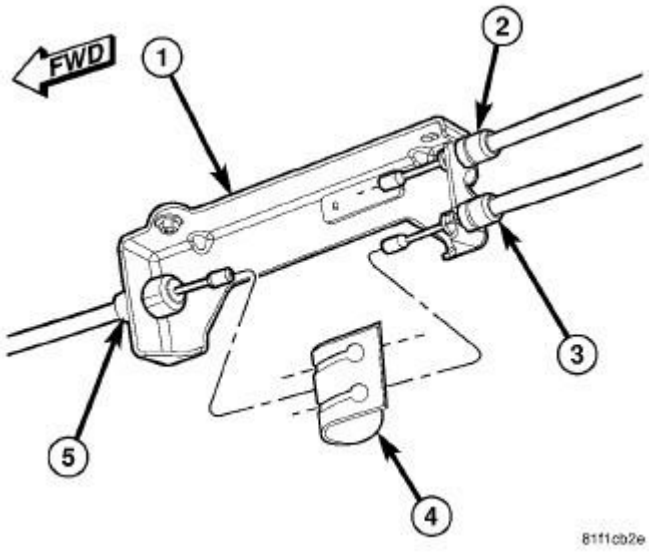


Fig. 200: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

15. Reconnect the parking brake cable equalizer (4) and reset the cable tension. See **Brakes/Parking Brake - Standard Procedure**
16. Lower the vehicle.
17. Apply and release the parking brake lever (pedal) one time. This will seat the parking brake cables.
18. Check operation of parking brakes.

WITH HAND LEVER

1. Pass most of the front parking brake cable down through the access hole in the floor pan from inside the vehicle.
2. Install the front parking brake cable floor pan seal into the access hole in the floor pan.

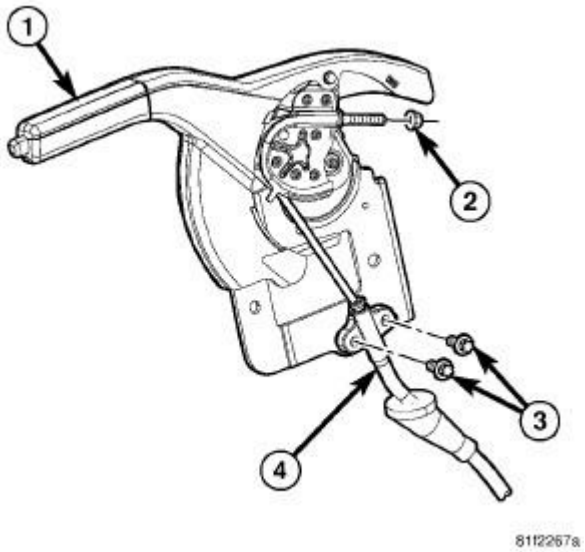


Fig. 201: CABLE MOUNTING TO HAND LEVER
Courtesy of CHRYSLER LLC

3. Install the mounting screws (3) fastening the front cable (4) to the side of the parking brake lever (1). Tighten the mounting screws to 28 N.m (21 ft. lbs.).
4. Route the cable strand around the lever cable guide and start the adjusting nut (2) on the end of the cable stud. **Do not install the nut any further than having the threads flush with the top of the nut.** Otherwise, cable equalizer/bent nail tensioner installation later in this procedure could be difficult.
5. Slide any extra cable back into the cable housing.
6. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

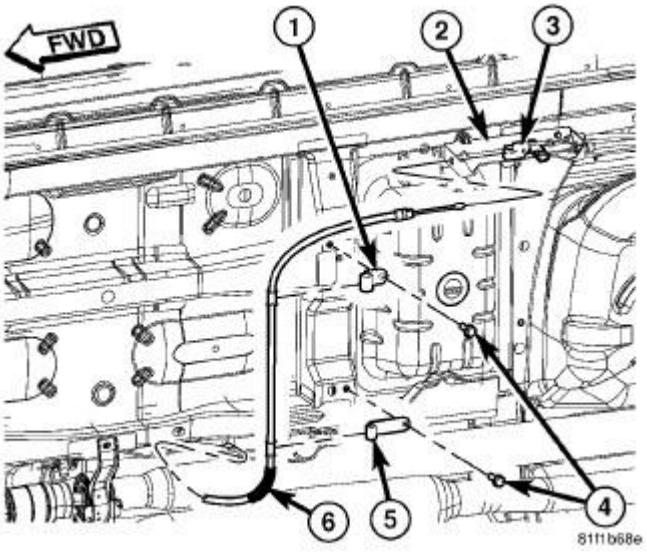


Fig. 202: CABLE MOUNTING TO UNDERBODY WITH HAND LEVER
Courtesy of CHRYSLER LLC

7. Install the cable routing clamps (1, 5) over the metal sleeves on the front cable (6). Be sure to place the correct length clamp at the appropriate location.
8. Position the front cable routing clamps over the studs on the underbody of the vehicle and install the screws (4). Tighten the screws to 6 N.m (55 in. lbs.).

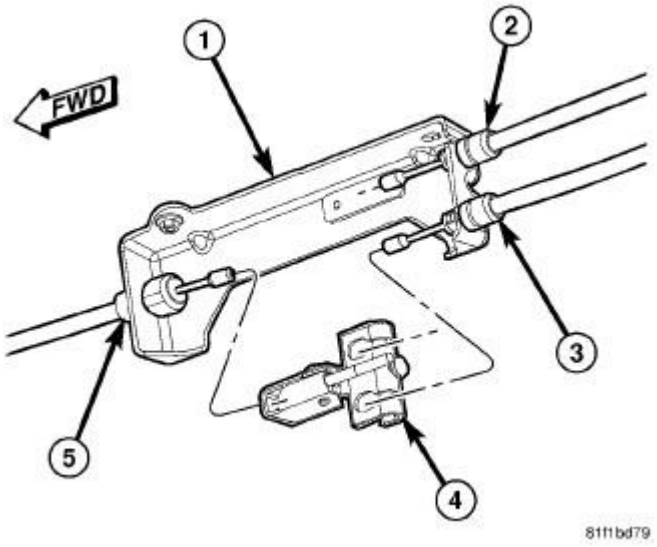


Fig. 203: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

9. Pass the end of the front cable (5) through the hole in the end of the intermediate bracket (1). Press the cable housing retainer through the hole until the fingers on the retainer lock it into place.
10. Connect the parking brake cable equalizer/bent nail tensioner (4) to the three parking brake cables (2, 3, 5).
11. Remove any slack from the parking brake cables by pushing the front cable strand forward into the housing until slack is removed.
12. Lower the vehicle.
13. Reset the hand lever cable tension and verify check operation of the parking brake. See **Brakes/Parking Brake - Standard Procedure**

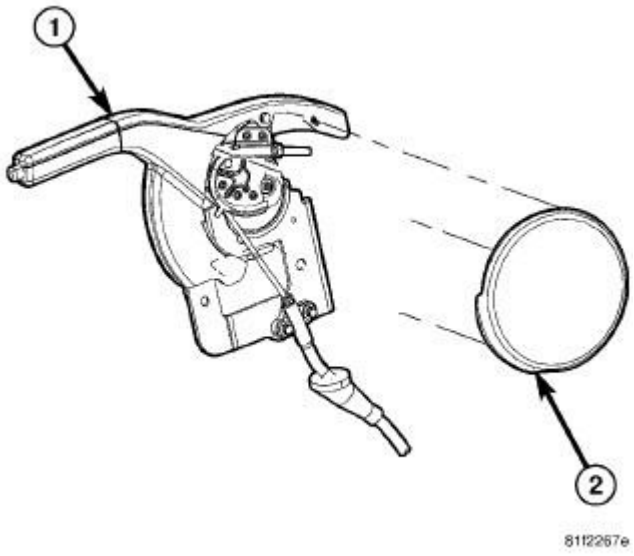


Fig. 204: HAND LEVER COVER MOUNTING
Courtesy of CHRYSLER LLC

14. Install the cover on the side of the parking brake lever.

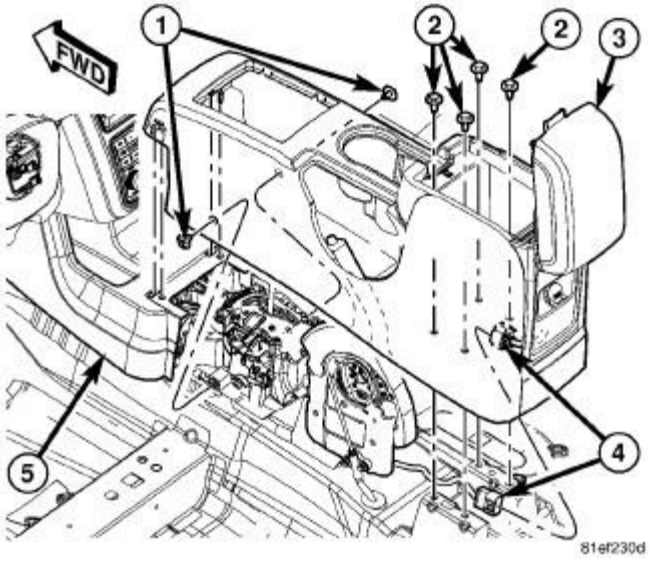


Fig. 205: CENTER CONSOLE
Courtesy of CHRYSLER LLC

15. Install the floor center console. Refer to **Body/Interior/CONSOLE, Center - Removal**

CABLE, PARKING BRAKE, REAR

Removal

REMOVAL

1. Release the parking brake.
2. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**
3. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

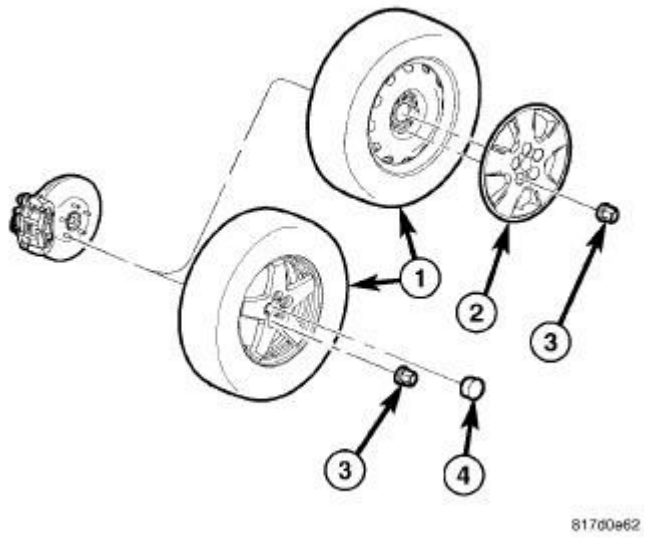


Fig. 206: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

4. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

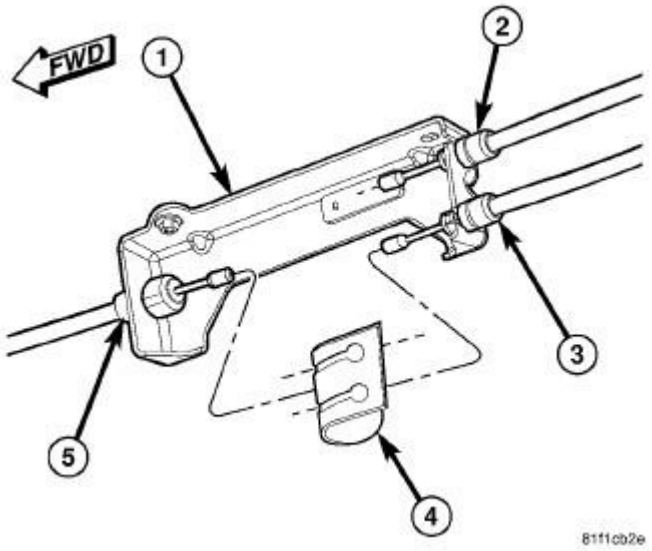


Fig. 207: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

5. If not removed, remove the cable equalizer (4) (with foot lever) or equalizer/tensioner (with hand lever) from the front and rear cables.
6. Collapse the right rear cable (3) retainer fingers at the end of the cable housing where it contacts the intermediate bracket (1). Pull the right rear cable out of the intermediate bracket.

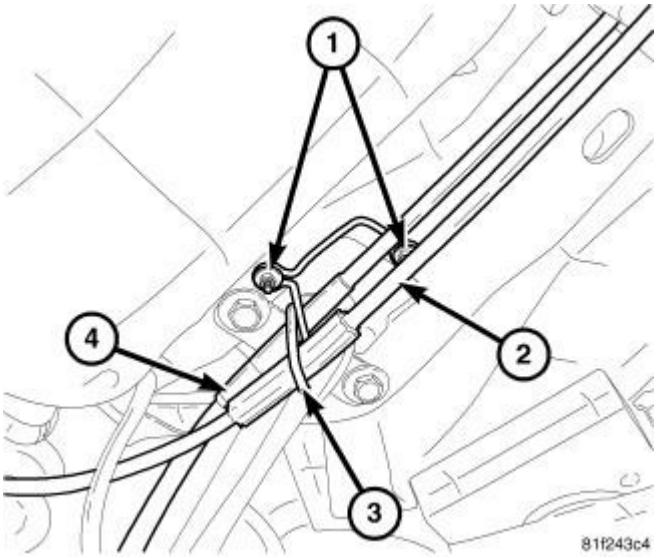


Fig. 208: PARKING BRAKE CABLE ROUTING LOOP
Courtesy of CHRYSLER LLC

7. Pull the right rear cable (2) out of the cable routing loop (3).

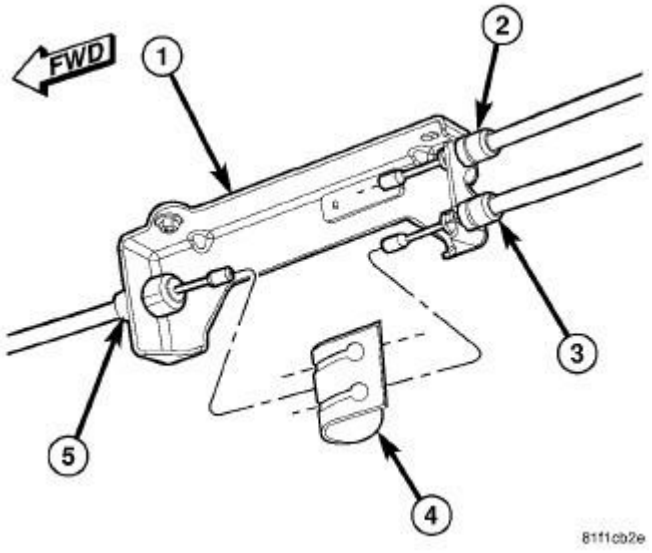


Fig. 209: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

8. If servicing the left rear cable, collapse the left rear cable (2) retainer fingers at the end of the cable

housing where it contacts the intermediate bracket (1). Pull the left rear cable out of the intermediate bracket.

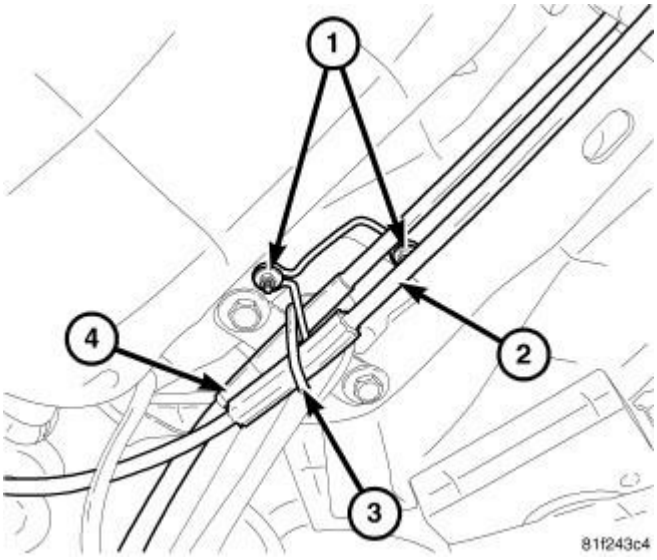


Fig. 210: PARKING BRAKE CABLE ROUTING LOOP
Courtesy of CHRYSLER LLC

9. If servicing the left rear cable, remove the nuts (1) fastening the cable routing loop (3) to the vehicle underbody near the trailing link forward mounting point.

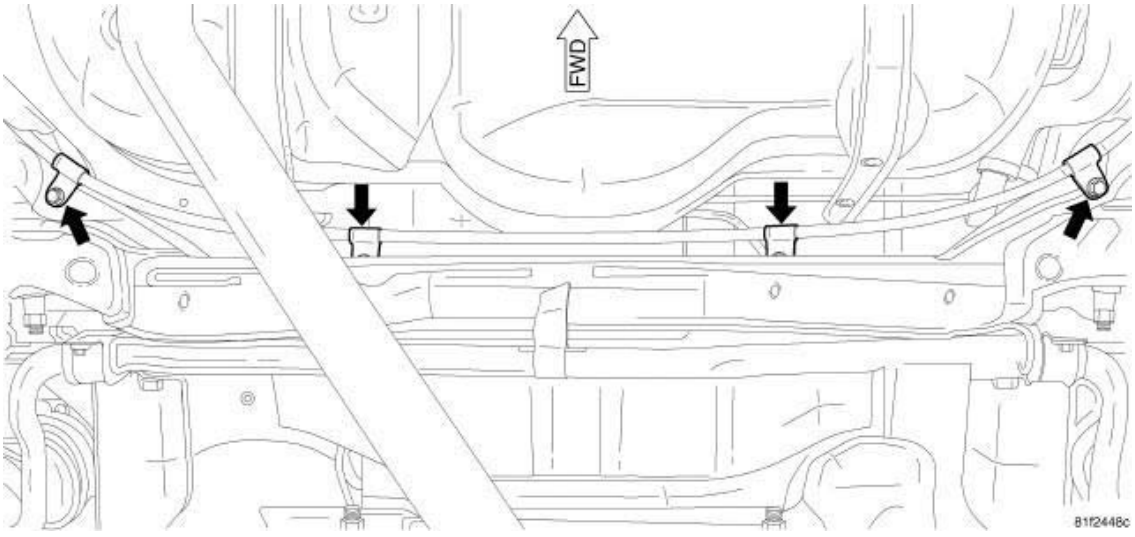


Fig. 211: RIGHT CABLE AT CROSSMEMBER
Courtesy of CHRYSLER LLC

10. If servicing the right rear cable, remove the four screws securing the right rear cable to the rear crossmember.

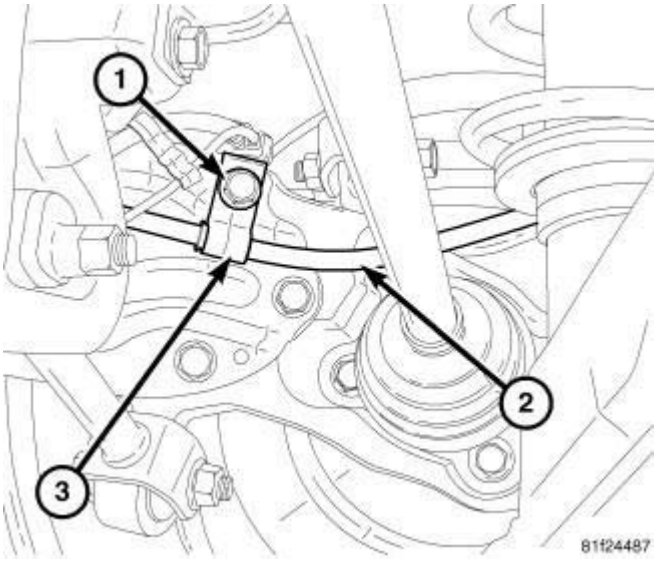


Fig. 212: CABLE AT RIGHT TRAILING LINK
Courtesy of CHRYSLER LLC

11. If servicing the right rear cable, remove the upper bolt (1) securing the knuckle to the trailing link. This bolt also fastens the cable routing clamp (3) in place.

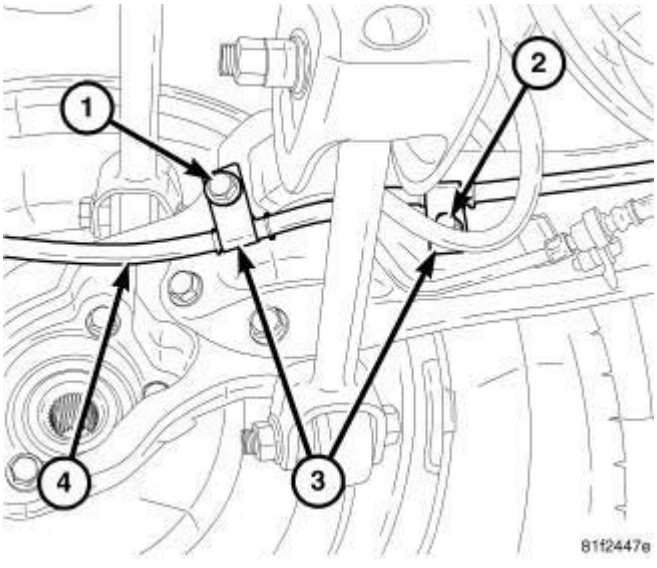


Fig. 213: CABLE AT LEFT TRAILING LINK
Courtesy of CHRYSLER LLC

12. If servicing the left rear cable:
    a. Remove the upper bolt (1) securing the knuckle to the trailing link as well as the rear cable routing clamp (3).
    b. Remove the other bolt (2) fastening the rear cable (4) to the trailing arm.

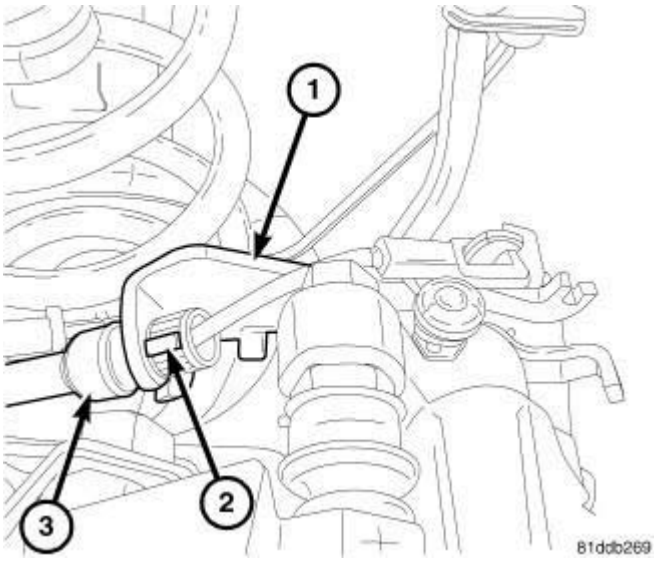


Fig. 214: PARKING BRAKE CABLE AT BRACKET
Courtesy of CHRYSLER LLC

13. Collapse the cable retainer fingers (2) at the end of the cable housing (3), then pull the cable housing out of the mounting bracket (1).

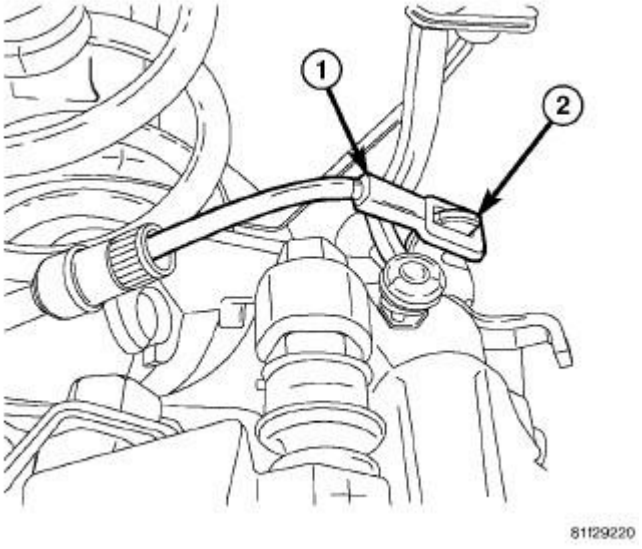


Fig. 215: PARKING BRAKE CABLE AT LEVER
Courtesy of CHRYSLER LLC

14. Slide the cable strand out of the mounting bracket, then pull the parking brake cable strand (1) upward and unhook it from the caliper lever (2).
15. Remove the cable from the vehicle.

Installation

INSTALLATION

1. Guide the trailing end of the parking brake cable along the inboard side of the axle trailing arm up to the rear brake caliper. Make sure the cable is routed between the brake line and the trailing arm.

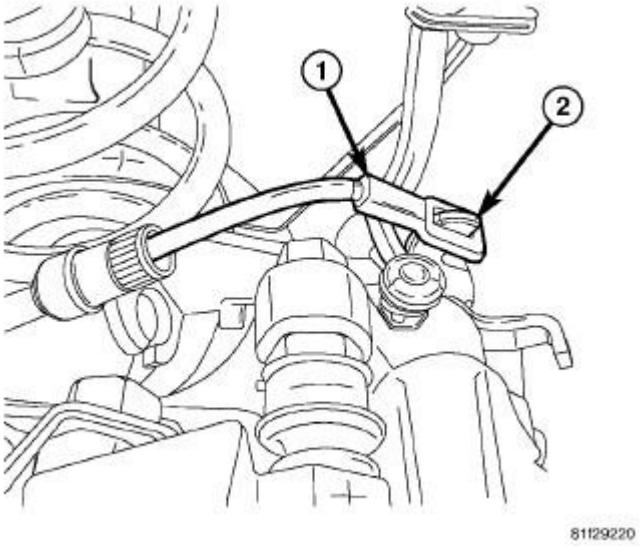


Fig. 216: PARKING BRAKE CABLE AT LEVER
Courtesy of CHRYSLER LLC

2. Pull the parking brake cable strand (1) outward from the cable housing and hook it onto the caliper lever (2).

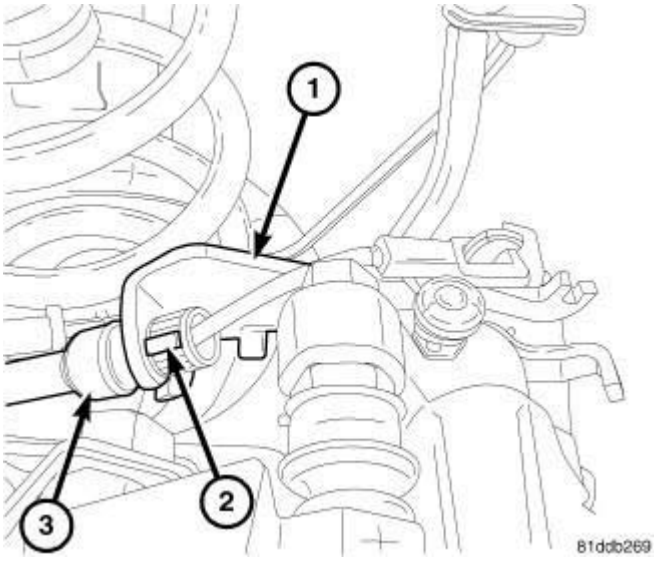


Fig. 217: PARKING BRAKE CABLE AT BRACKET
Courtesy of CHRYSLER LLC

3. Push the excess cable strand back into the cable housing, then insert the cable housing (3) into the

mounting bracket (1) until the retainer fingers (2) lock into place. Make sure both fingers are engaged preventing removal of the cable from the bracket.

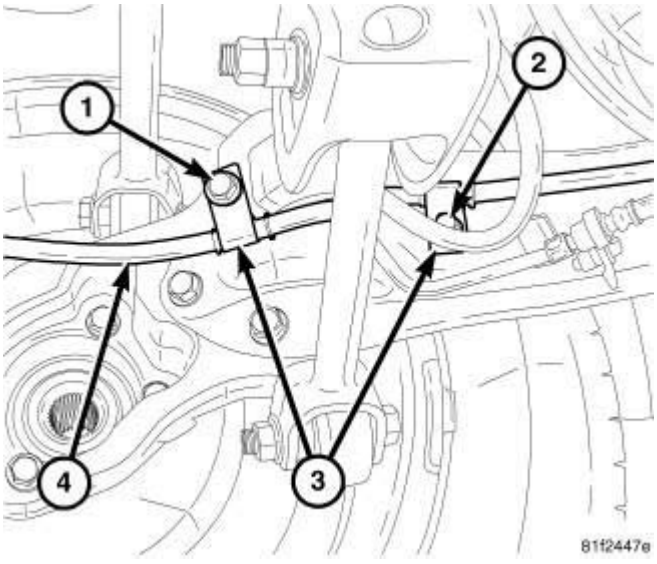


Fig. 218: CABLE AT LEFT TRAILING LINK
Courtesy of CHRYSLER LLC

CAUTION: Before installing bolt (1) in the following step, it is especially important to clean the threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

4. If servicing the left rear cable, position the cable routing clamps (3) against the axle trailing link and:
   a. Install the upper mounting bolt (1) securing the trailing link (and cable routing clamp) to the knuckle. Tighten the mounting bolt to 60 N.m (44 ft. lbs.).
   b. Install the bolt (2) attaching the other cable routing clamp to the axle trailing link. Tighten the bolt to 28 N.m (21 ft. lbs.).

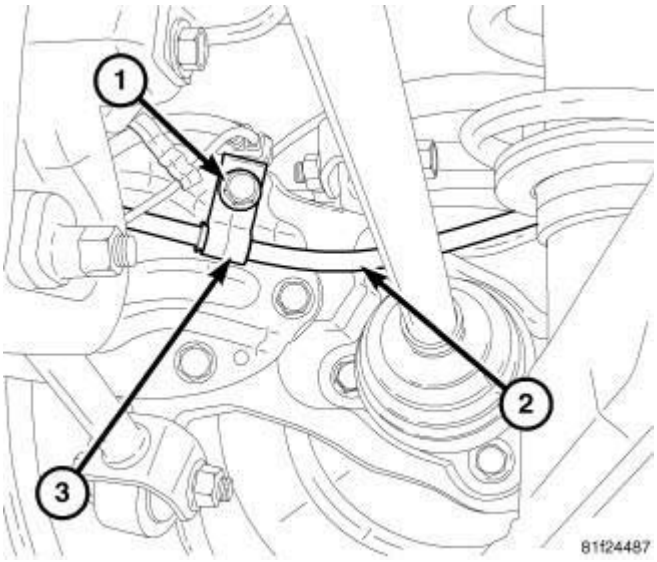


Fig. 219: CABLE AT RIGHT TRAILING LINK
Courtesy of CHRYSLER LLC

CAUTION: Before installing bolt (1) in the following step, it is especially important to clean the threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

5. If servicing the right rear cable, position the cable routing clamps (3) against the axle trailing link and install the upper mounting bolt (1) securing the trailing link (and cable routing clamp) to the knuckle. Tighten the mounting bolt to 60 N.m (44 ft. lbs.).

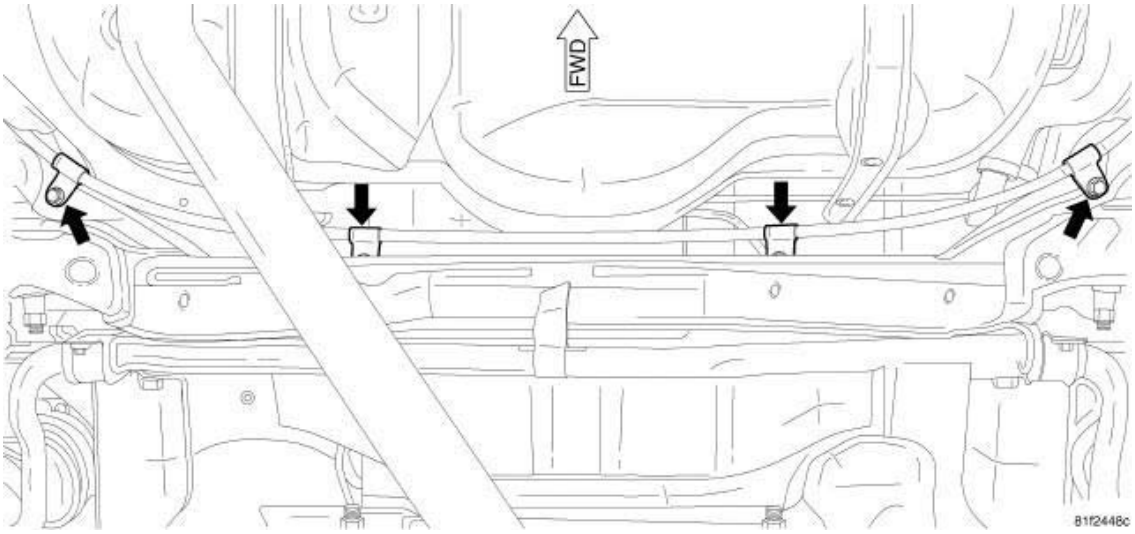


Fig. 220: RIGHT CABLE AT CROSSMEMBER
Courtesy of CHRYSLER LLC

6. If servicing the right rear cable, route the cable over the rear axle (if equipped with AWD) along the front of the rear suspension crossmember. Position the four routing clamps on the rear crossmember and install

the screws. Tighten the screws to 6 N.m (55 in. lbs.).

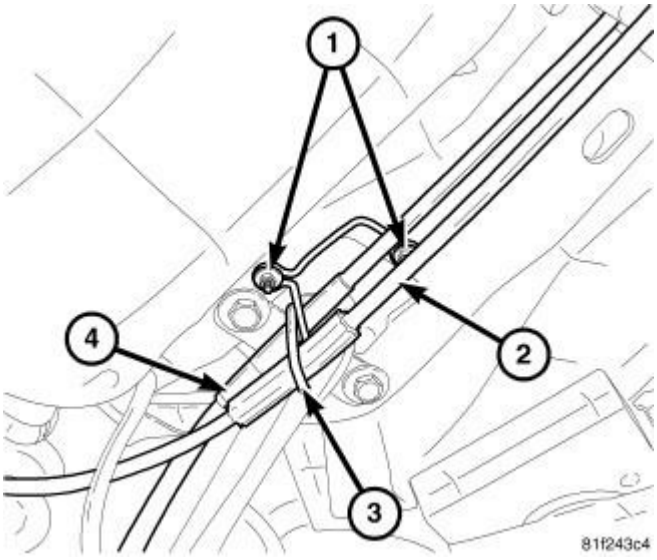


Fig. 221: PARKING BRAKE CABLE ROUTING LOOP
Courtesy of CHRYSLER LLC

7. If servicing the left rear cable, place the routing loop (3) over the studs on the vehicle underbody near the trailing link forward mounting point and install the mounting nuts. Tighten the nuts to 6 N.m (55 in. lbs.).
8. Insert the right rear cable (2) through the lower loop of the cable routing loop (3).

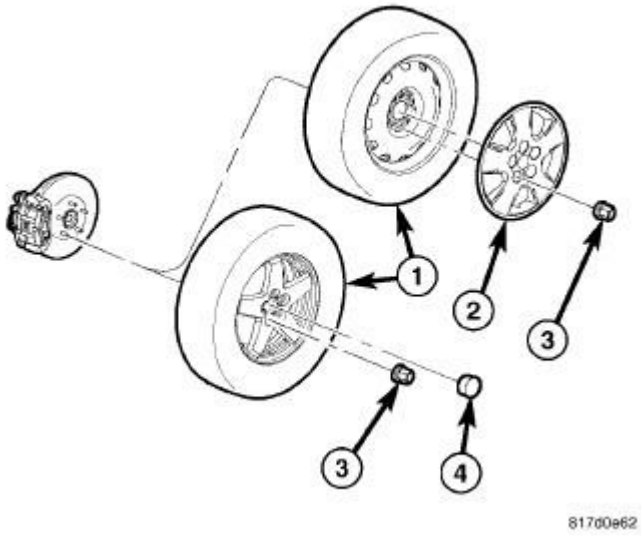


Fig. 222: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

9. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).

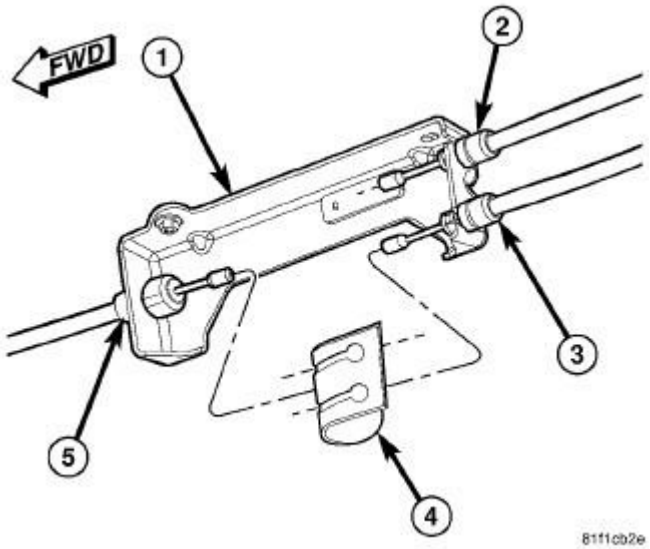


Fig. 223: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

10. If servicing the left rear cable, pass the leading end of the left rear cable (2) through the upper hole in the intermediate bracket (1). Press the cable housing through the hole until the fingers on the retainer lock it into place.
11. If servicing a vehicle equipped with a foot lever:
    a. Connect the parking brake cable equalizer (4) to the three parking brake cables (2, 3, 5) and reset the cable tension. See **Brakes/Parking Brake - Standard Procedure**
    b. Lower the vehicle.

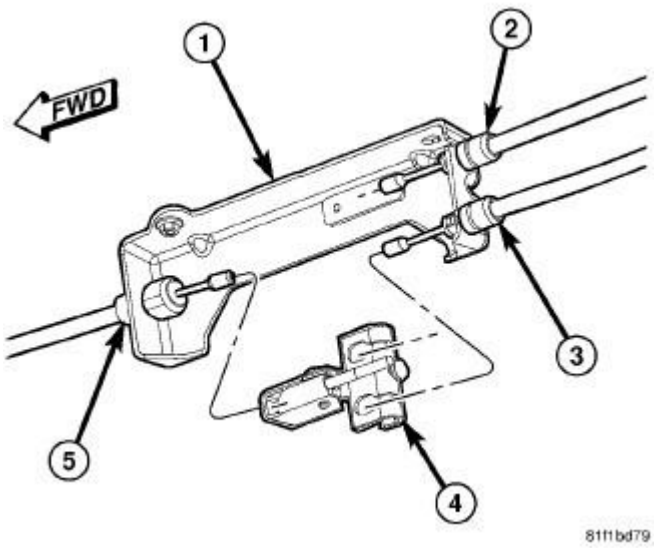


Fig. 224: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

12. If servicing a vehicle equipped with a hand lever:
    a. Connect the parking brake cable equalizer/bent nail tensioner (4) to the three parking brake cables (2, 3, 5).
    b. Remove any slack from the parking brake cables by pushing the front cable strand forward into the housing until slack is removed.
    c. Lower the vehicle.
    d. Reset the hand lever cable tension and verify check operation of the parking brake. See **Brakes/Parking Brake - Standard Procedure**
13. Check operation of parking brakes.

LEVER, PARKING BRAKE

Removal

FOOT OPERATED PARKING BRAKE LEVER

1. Release the parking brake.
2. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
3. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**
4. Push the front cable strand into the housing until it bottoms.
5. Lower the vehicle.
6. Remove the left front door opening sill scuff plate.
7. Remove the lower cowl trim.
8. Remove the steering column opening cover. Refer to **Body/Instrument Panel/COVER, Steering Column Opening - Removal** .

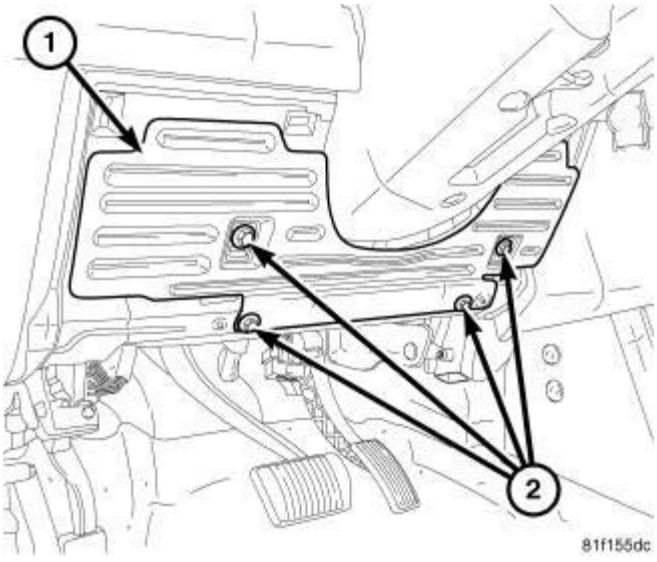


Fig. 225: STEERING COLUMN COVER REINFORCEMENT
Courtesy of CHRYSLER LLC

9. Remove the steering column cover reinforcement mounting screws (2). Remove the steering column cover reinforcement (1).
10. Pull the parking brake lever pedal up and hold it in this position.

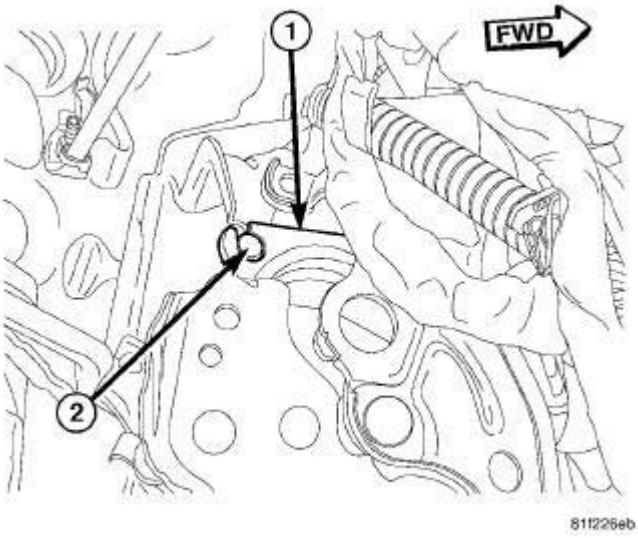


Fig. 226: CABLE BUTTON LOCATED IN LEVER
Courtesy of CHRYSLER LLC

11. Rotate the cable strand around at the lever mechanism until the strand lines up with the slot, then remove the cable end button (2) from the lever mechanism (1).

NOTE: Prior to removing cable from lever, note cable routing through lever for ease in reassembly.

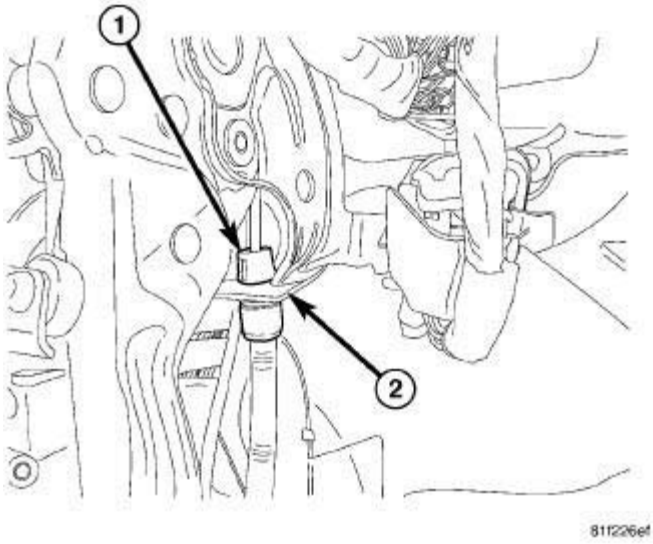


Fig. 227: CABLE HOUSING RETAINED IN LEVER
Courtesy of CHRYSLER LLC

12. Collapse the front cable retainer fingers on the end of the cable housing (1) at the lever (2).
13. Remove the cable from the parking brake lever (3).

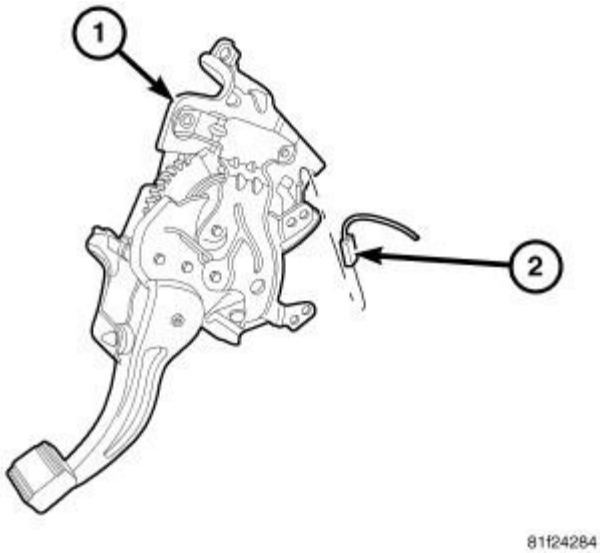


Fig. 228: WIRING AT PARKING BRAKE LEVER
Courtesy of CHRYSLER LLC

14. Disconnect the wiring connector (2) at parking brake indicator lamp switch.

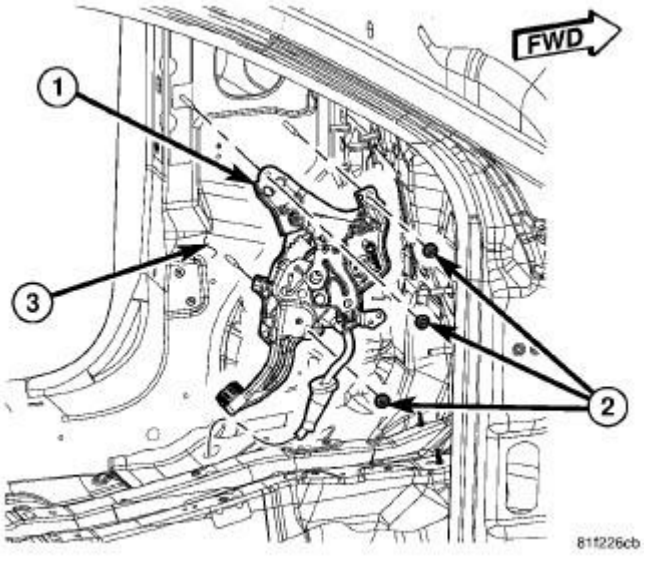


Fig. 229: FOOT LEVER MOUNTING
Courtesy of CHRYSLER LLC

15. Remove the three mounting nuts (2), then remove the parking brake lever (1) from the cowl (3).

HAND OPERATED PARKING BRAKE LEVER

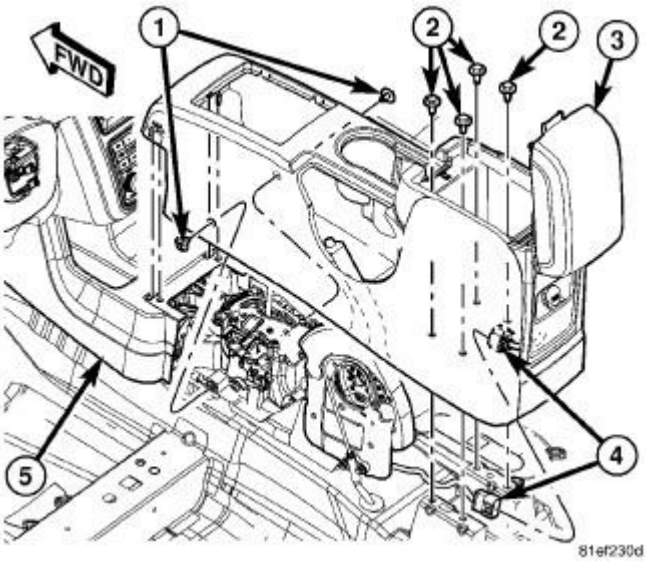


Fig. 230: CENTER CONSOLE
Courtesy of CHRYSLER LLC

1. Remove the floor center console. Refer to **Body/Interior/CONSOLE, Center - Removal**
2. Manually release the parking brake cable tension. See **Brakes/Parking Brake - Standard Procedure**

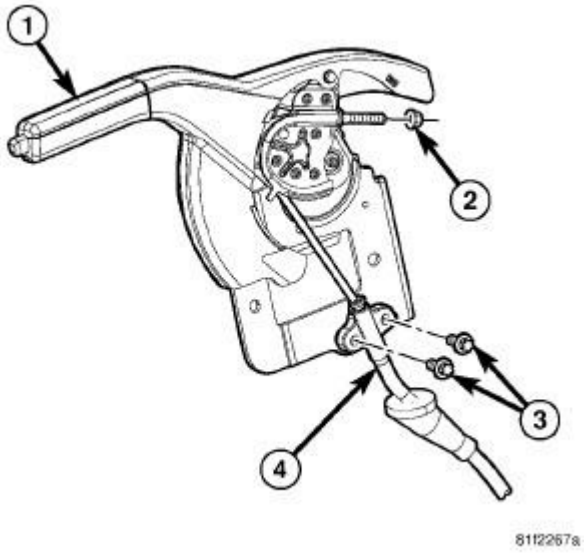


Fig. 231: CABLE MOUNTING TO HAND LEVER
Courtesy of CHRYSLER LLC

3. Remove the mounting screws (3) fastening the front cable (4) to the side of the parking brake lever (1).
4. Remove the adjusting nut (2) from the end of the front parking brake cable.
5. Remove the cable strand from the lever.

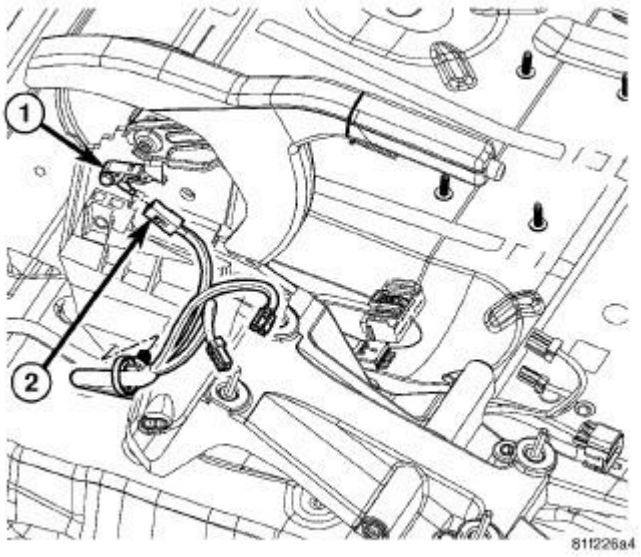


Fig. 232: HAND LEVER PARKING BRAKE SWITCH
Courtesy of CHRYSLER LLC

6. Disconnect the wiring connector (2) at parking brake indicator lamp switch (1).

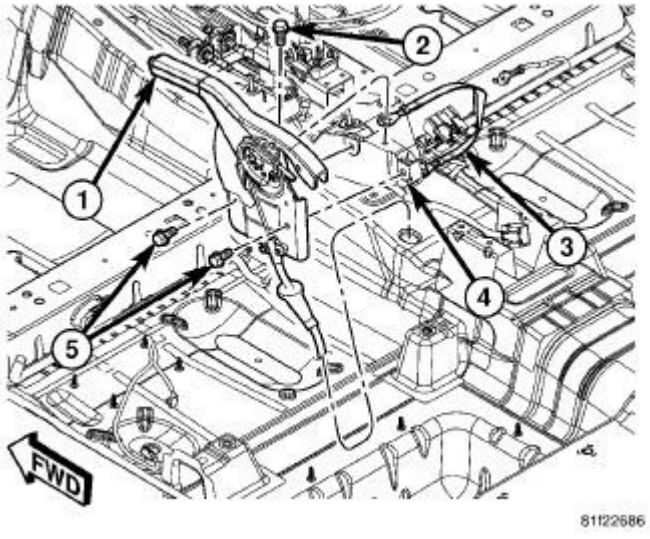


Fig. 233: HAND LEVER MOUNTING
Courtesy of CHRYSLER LLC

7. Remove the two horizontal (5) and one vertical (2) mounting bolts, then remove the parking brake lever (1) from the shifter bracket (4).

Installation

FOOT OPERATED PARKING BRAKE LEVER

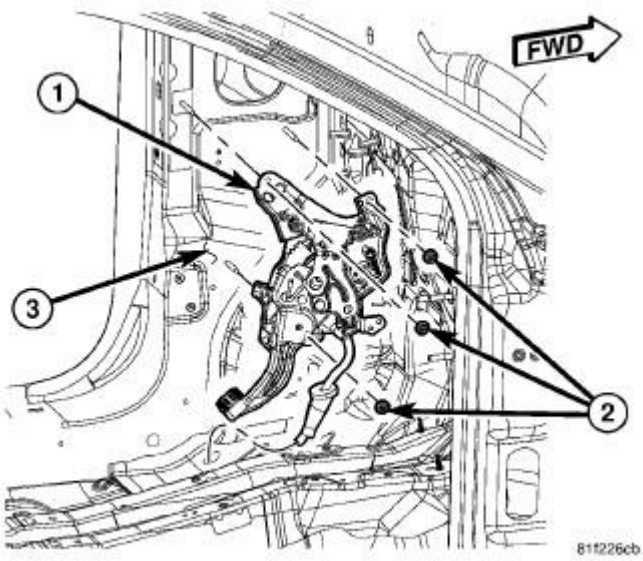


Fig. 234: FOOT LEVER MOUNTING
Courtesy of CHRYSLER LLC

1. Position the parking brake lever (1) over the mounting studs, against the left lower cowl (3).
2. Install the three mounting nuts (2). Tighten the nuts to 28 N.m (21 ft. lbs.).

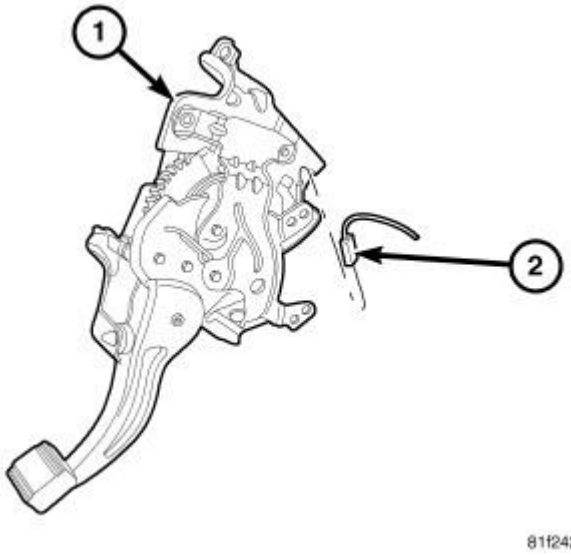


Fig. 235: WIRING AT PARKING BRAKE LEVER

Courtesy of CHRYSLER LLC

3. Connect the wiring connector (2) at the parking brake indicator lamp switch on the parking brake lever (1).

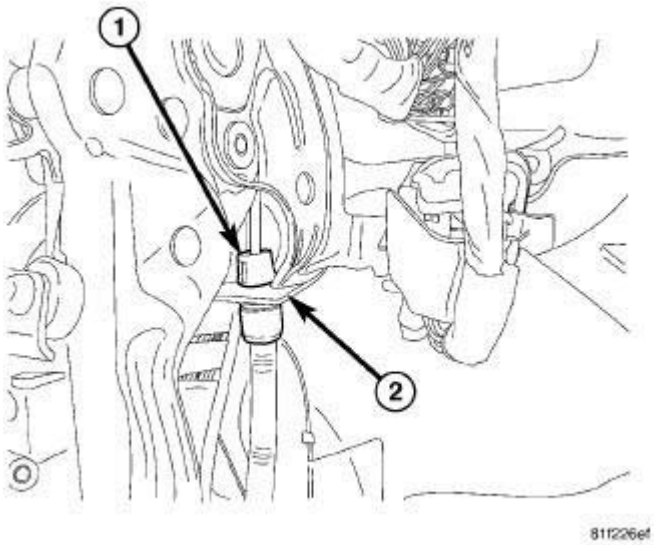


Fig. 236: CABLE HOUSING RETAINED IN LEVER
Courtesy of CHRYSLER LLC

4. Insert the lever end of the front parking brake cable through the mounting hole in the parking brake lever (2). Slide it through until the cable retainer fingers on the end of the housing (1) lock in place. Make sure all fingers are engaged preventing removal of the cable from the bracket.

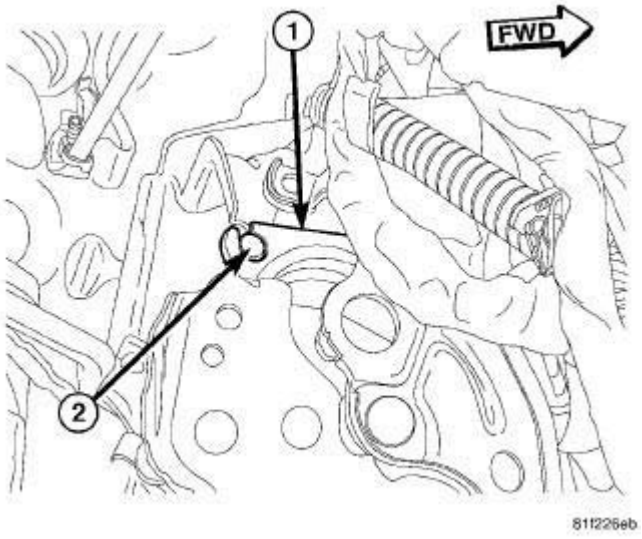


Fig. 237: CABLE BUTTON LOCATED IN LEVER

Courtesy of CHRYSLER LLC

5. Pull the button on the end of cable strand out of housing and route the strand around the cable guide, then rotate the cable strand up and align the cable with the slot in lever mechanism (1). Slide the cable button (2) into the slot and rotate the cable down into mounted position with the cable inserted into the guide on the mechanism.
6. Slide any extra cable back into the cable housing. This can be easily done by pulling on the trailing end of the front cable strand that is now under the vehicle.
7. Install the front parking brake cable floor pan seal into the access hole in the floor pan.
8. Reposition the carpeting back down on the floor.

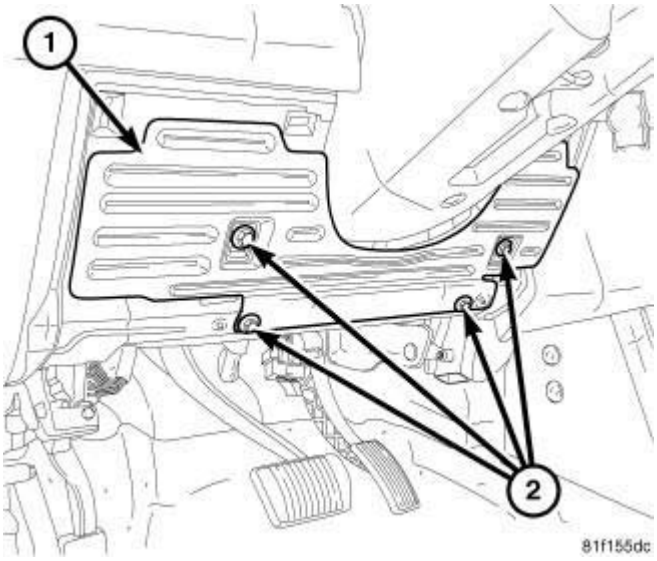


Fig. 238: STEERING COLUMN COVER REINFORCEMENT
Courtesy of CHRYSLER LLC

9. Install the steering column cover reinforcement (1) using the four mounting screws (2).
10. Install the steering column opening cover. Refer to **Body/Instrument Panel/COVER, Steering Column Opening - Installation**
11. Install the lower cowl trim.
12. Install the left front door opening sill scuff plate.
13. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

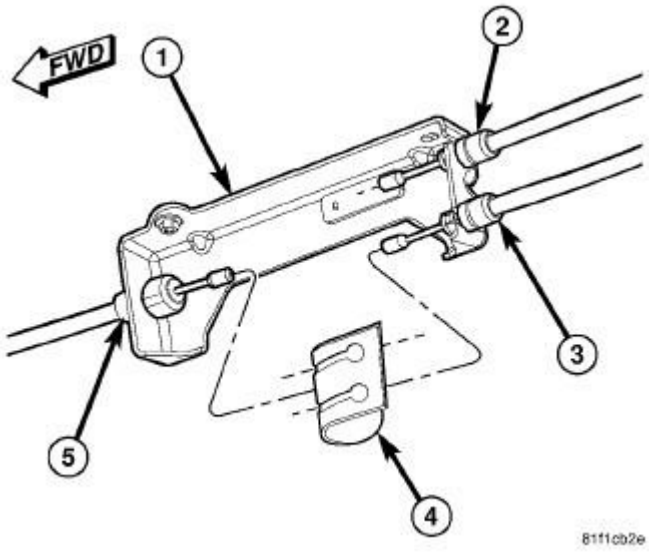


Fig. 239: PARKING BRAKE CABLE EQUALIZER
Courtesy of CHRYSLER LLC

14. If the original parking brake lever is being reinstalled, reconnect the parking brake cable equalizer (4) and reset the cable tension. See **Brakes/Parking Brake - Standard Procedure**
15. If a NEW parking brake lever is being installed, connect the parking brake cable equalizer to the cables, then remove the pin locking the lever mechanism spring tension at the lever.
16. Lower the vehicle.
17. Apply and release the parking brake lever (pedal) one time. This will seat the parking brake cables.
18. Check operation of parking brake lever and parking brakes.

HAND OPERATED PARKING BRAKE LEVER

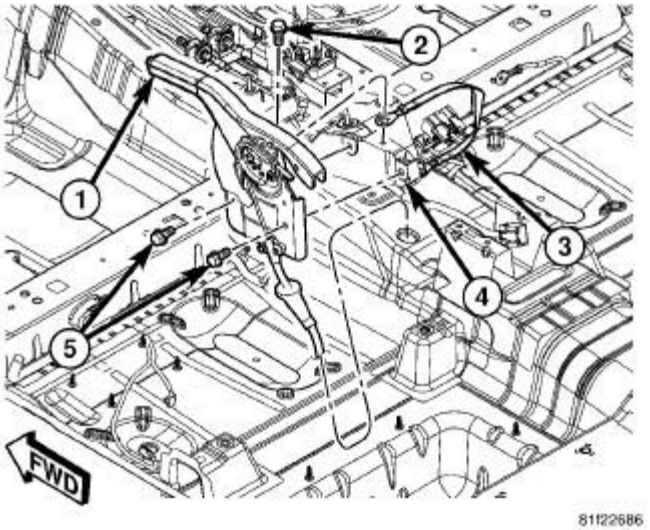


Fig. 240: HAND LEVER MOUNTING
Courtesy of CHRYSLER LLC

1. Position the parking brake lever (1) on the shifter bracket (4).

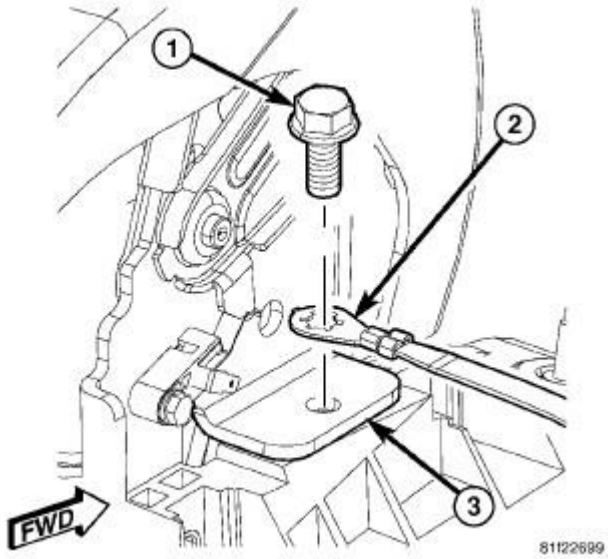


Fig. 241: HAND LEVER MOUNTING VERTICAL BOLT
Courtesy of CHRYSLER LLC

NOTE: When installing the vertical mounting bolt in the following step make sure to capture the ground strap (2) with the mounting bolt (1) before installation.

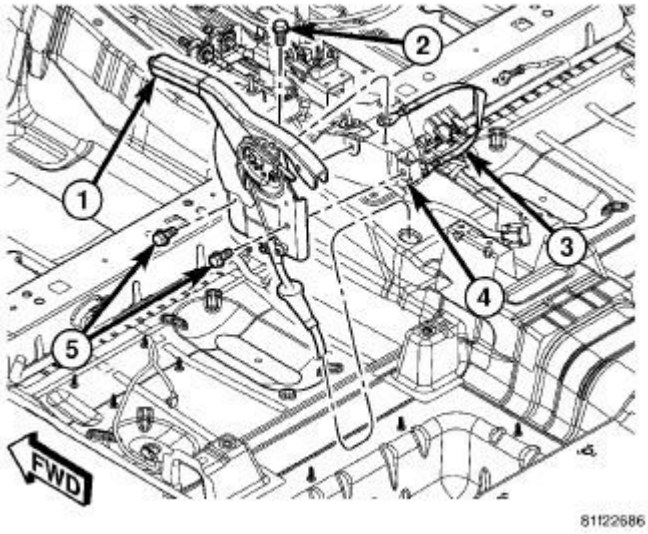


Fig. 242: HAND LEVER MOUNTING

Courtesy of CHRYSLER LLC

2. Install the two horizontal (5) and one vertical (2) mounting bolts. Tighten the nuts to 20 N.m (15 ft. lbs.).

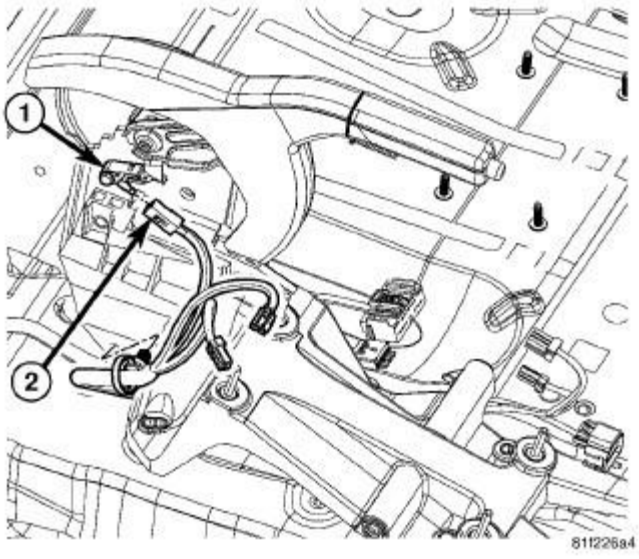


Fig. 243: HAND LEVER PARKING BRAKE SWITCH
Courtesy of CHRYSLER LLC

3. Connect the wiring connector (2) at the parking brake indicator lamp switch (1).

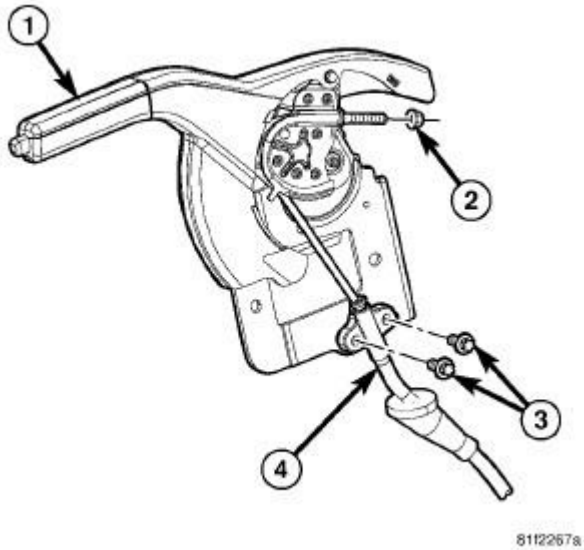


Fig. 244: CABLE MOUNTING TO HAND LEVER
Courtesy of CHRYSLER LLC

4. Install the mounting screws (3) fastening the front cable (4) to the side of the parking brake lever (1).

Tighten the mounting screws to 28 N.m (21 ft. lbs.).

5. Route the cable strand around the lever cable guide and start the adjusting nut (2) on the end of the cable stud. **Do not install the nut any further than having the threads flush with the top of the nut before the next step is performed.**

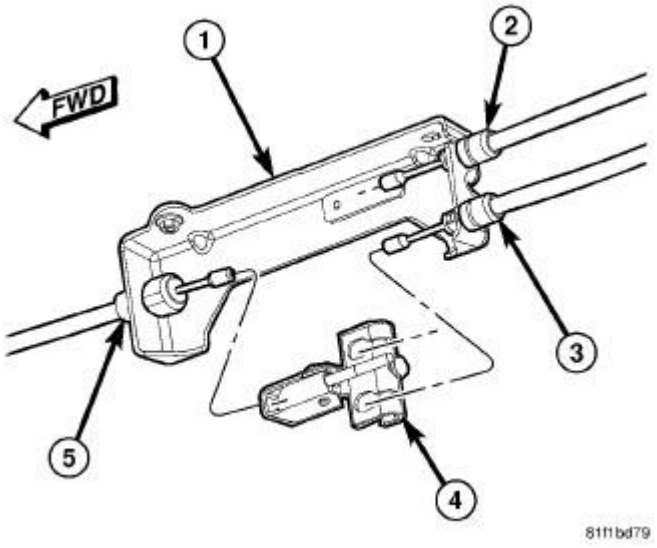


Fig. 245: CABLE EQUALIZER/TENSIONER
Courtesy of CHRYSLER LLC

6. Make sure the cables (2, 3, 5) are connected to the cable equalizer/bent nail tensioner (4) at the intermediate bracket (1) under the vehicle.
7. Reset the hand lever cable tension and verify check operation of the parking brake. See **Brakes/Parking Brake - Standard Procedure**

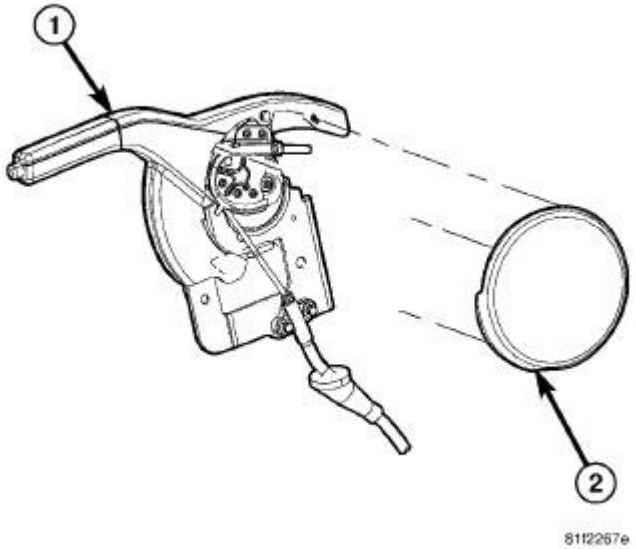


Fig. 246: HAND LEVER COVER MOUNTING
Courtesy of CHRYSLER LLC

8. Install the cover on the side of the parking brake lever.

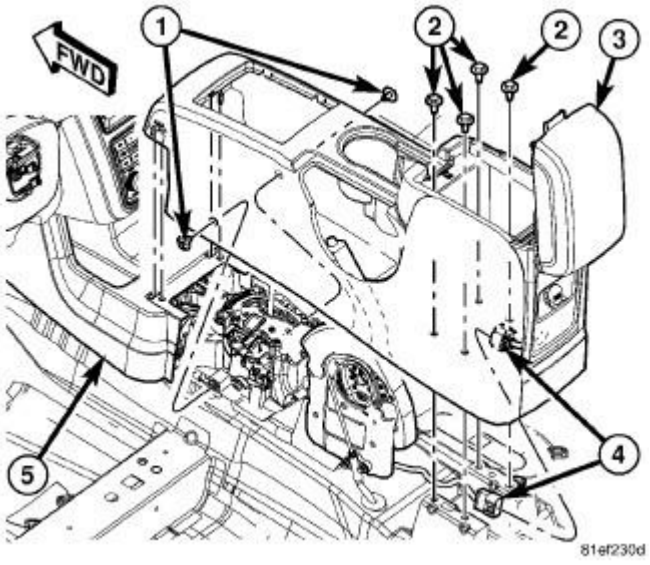


Fig. 247: CENTER CONSOLE
Courtesy of CHRYSLER LLC

9. Install the floor center console. Refer to **Body/Interior/CONSOLE, Center - Removal**

2009 BRAKES

ABS - Service Information - Journey

DESCRIPTION

ANTILOCK BRAKE SYSTEM WITH ELECTRONIC STABILITY PROGRAM

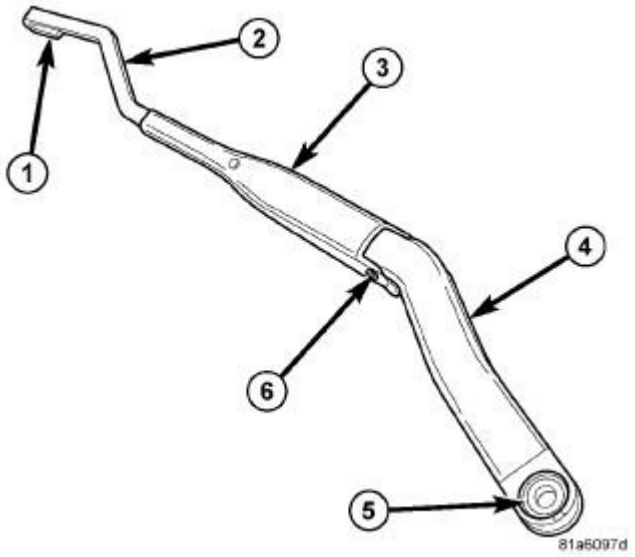


Fig. 1: Integrated Control Unit
Courtesy of CHRYSLER LLC

This vehicle uses the Continental Mk25e electronic brake control system. The system includes ABS (Anti-lock Brake System), EVBP (Electronic Variable Brake Proportioning), TCS (Traction Control System), BAS (Brake Assist System), Electronic Roll Mitigation (ERM) and ESP (Electronic Stability Program). These systems work together to enhance vehicle stability and control in various driving conditions and are commonly referred to as ESP. ESP is standard on this vehicle.

This electronic brake control system uses the following components to operate:

- Integrated Control Unit (ICU) - Hydraulic Control Unit (HCU) (2) and Antilock Brake Module (ABM) (1)
- Wheel Speed Sensors (WSS) - Four sensors (one sensor at each wheel)
- Dynamics Sensor - The Dynamics Sensor includes the Yaw Rate Sensor and the lateral Acceleration Sensor.
- Steering Angle Sensor (SAS) - The steering angle sensor is located in the Steering Column Control Module (SCCM) mounted on the steering column.
- Brake Pressure Sensor - The brake pressure sensor is located in the HCU and is not serviceable separate from the HCU.

ABS

The purpose of the Antilock Brake System (ABS) is to prevent wheel lockup under braking conditions on virtually any type of road surface. Antilock braking is desirable because a vehicle that is stopped without locking the wheels retains directional stability and some steering capability. This allows the driver to retain greater control of the vehicle during braking.

All vehicles equipped with ABS use Electronic Variable Brake Proportioning (EVBP) to balance front-to-rear braking when the brakes are applied in the partial braking range.

ALL-SPEED TRACTION CONTROL

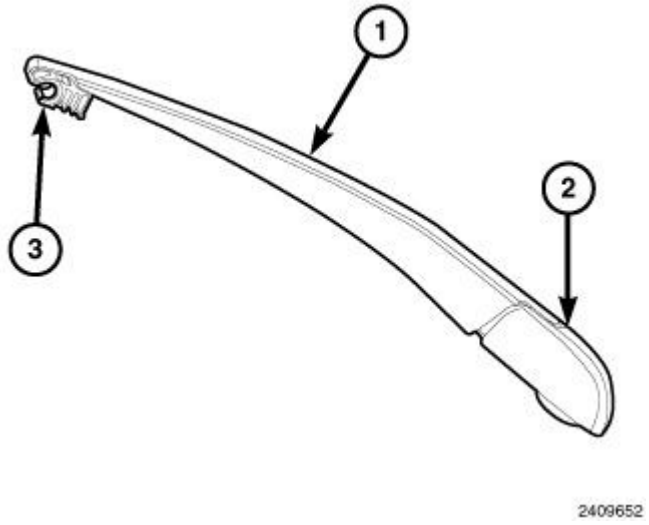


Fig. 2: Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

The traction control system (TCS) is an all-speed traction control. All-Speed Traction Control enhances mobility and prevents wheel slip when accelerating on slippery surfaces. It also provides a measure of directional stability control. Using the wheel-speed sensors, it can detect excessive yaw and help keep the car on the intended course, as for instance, when accelerating around a curve.

All-Speed Traction Control is effective up to 85 mph (137 km/h).

The traction control system may be turned off or on by depressing the ESP Off switch button (2) located in the instrument panel switch pod located in center of the instrument panel.

ELECTRONIC STABILITY PROGRAM

The Electronic Stability Program (ESP) enhances control and stability of the vehicle under various driving conditions. ESP corrects for over/under steering of the vehicle by applying the brake of the appropriate wheel to assist in counteracting the over/under steer condition. Engine power may also be reduced to help the vehicle maintain the desired path. ESP uses sensors in the vehicle to determine the vehicle path intended by the driver and compares it to the actual path of the vehicle. When the actual path does not match the intended path, ESP

applies the brake of the appropriate wheel to assist in counteracting the oversteer or understeer condition.

- Oversteer - When the vehicle is turning more that appropriate for the steering wheel position.
- Understeer - When the vehicle is turning less than appropriate for the steering wheel position.

The "ESP/TCS" indicator light located in the instrument cluster starts to flash as soon as the tires lose traction and the ESP system becomes active. The "ESP/TCS" indicator light also flashes when the TCS is active.

The ESP® default mode is Full-On with every key-on. Pressing the ESP Off button once activates what is referred to as Partial mode. In Partial mode, Traction Control is deactivated and ESP® operates at a higher threshold, therefore, it will not come on as aggressively as in the Full-On mode. The system can be returned to "normal" Full-On mode by pressing and releasing the ESP Off switch. The ESP function lamp is illuminated in the cluster whenever the ESP system is turned off.

ELECTRONIC ROLL MITIGATION

Electronic Roll Mitigation (ERM) is a software feature in addition to ESP control that focuses on preventing wheel lift in NHTSA Fish Hook maneuvers. These very extreme situations are well out of normal everyday driving, but if by chance an extreme dynamic maneuver occurs, ERM can help reestablish vehicle stability and return control to the driver. ERM determines when a vehicle is in a potential roll over condition and applies the appropriate braking force to reduce the likelihood that such an event will occur. ERM will not aid vehicle stability in "trip" situations, such as when a vehicle slides sideways into a curb, etc. which could still cause the wheels opposite the curb to lift and the vehicle to roll.

HILL START ASSIST

The Hill Start Assist (HSA) system is designed to assist the driver when starting a vehicle from a stop on a hill. HSA will maintain the level of brake pressure the driver applied for a short period of time after the driver takes his foot off of the brake pedal.

TRAILER SWAY CONTROL

Trailer Sway Control (TSC) is safety feature made possible by ESP. TSC does not require driver input; it activates once the yaw sensor recognizes the unique vehicle motion associated with trailer sway and no steering input. It becomes clear that this motion has to be from a trailer and thus activates the brakes to eliminate the trailer sway.

BRAKE ASSIST SYSTEM

The Brake Assist System (BAS) is designed to optimize the vehicle's braking capability during emergency braking maneuvers. The system detects an emergency braking situation by sensing the rate and amount of brake application and then applies optimum pressure to the brakes. This can help reduce braking distances. The BAS complements the antilock brake system (ABS). Applying the brakes very quickly results in the best BAS assistance.

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Electronic Variable Brake Proportioning (EVBP) is used to balance front-to-rear braking in place of a traditional rear proportioning valve. The EVBP system uses the ABS system to control the slip of the rear wheels in partial braking range. The braking force of the rear wheels is controlled electronically by using the inlet and outlet valves located in the integrated control unit (ICU).

EVBP activation is nearly invisible to the customer since there is no pump motor noise and minimal brake pedal feedback.

OPERATION

ANTILOCK BRAKE SYSTEM WITH ELECTRONIC STABILITY PROGRAM

ABS

There are a few performance characteristics of the Antilock Brake System (ABS) that may at first seem abnormal, but in fact are normal. These characteristics are described below.

NORMAL BRAKING

Under normal braking conditions, the ABS functions the same as a standard base brake system with a diagonally split master cylinder and conventional vacuum assist.

ABS BRAKING

ABS operation is available at all vehicle speeds above 3-5 mph (5-8 km/h) If a wheel locking tendency is detected during a brake application, the brake system enters the ABS mode. During ABS braking, hydraulic pressure in the four wheel circuits is modulated to prevent any wheel from locking. Each wheel circuit is designed with a set of electric solenoids to allow modulation. Wheel lockup may be perceived at the very end of an ABS stop and is considered normal.

During an ABS event, the Integrated Control Unit (ICU) regulates hydraulic pressure at all four of the vehicle's wheels.

The hydraulic pressure at each wheel is controlled independently (relative to the amount of slip at each wheel) in order to maximize the braking force generated by the front brakes.

The system can build and release pressure at each wheel, depending on signals generated by the Wheel Speed Sensors (WSS) at each wheel and received at the Antilock Brake Module (ABM).

NOISE AND BRAKE PEDAL FEEL

During ABS braking, some brake pedal movement may be felt. In addition, ABS braking will create ticking, popping, or groaning noises heard by the driver. This is normal and is due to pressurized fluid being transferred between the master cylinder and the brakes. If ABS operation occurs during hard braking, some pulsation may be felt in the vehicle body due to fore and aft movement of the suspension as brake pressures are modulated.

At the end of an ABS stop, ABS is turned off when the vehicle is slowed to a speed of 3-4 mph (5-6 km/h).

There may be a slight brake pedal drop anytime that the ABS is deactivated, such as at the end of the stop when the vehicle speed is less than 3 mph (5 km/h) or during an ABS stop where ABS is no longer required. These conditions exist when a vehicle is being stopped on a road surface with patches of ice, loose gravel, or sand on it. Also, stopping a vehicle on a bumpy road surface activates ABS because of the wheel hop caused by the bumps.

TIRE NOISE AND MARKS

Although the ABS system prevents complete wheel lockup, some wheel slip is desired in order to achieve optimum braking performance. Wheel slip is defined as follows: 0 percent slip means the wheel is rolling freely and 100 percent slip means the wheel is fully locked. During brake pressure modulation, wheel slip is allowed to reach up to 25-30 percent. This means that the wheel rolling velocity is 25-30 percent less than that of a free rolling wheel at a given vehicle speed. This slip may result in some tire chirping, depending on the road surface. This sound should not be interpreted as total wheel lockup.

Complete wheel lockup normally leaves black tire marks on dry pavement. The ABS will not leave dark black tire marks since the wheel never reaches a fully locked condition. However, tire marks may be noticeable as light patched marks.

START-UP AND DRIVE-OFF CYCLES

When the ignition is turned on, a popping sound and a slight brake pedal movement may be noticed. The ABS warning lamp will also be on for up to 5 seconds after the ignition is turned on.

When the vehicle is first driven off, a humming may be heard or felt by the driver at approximately 12-25 mph (20-40 km/h). All of these conditions are a normal function of ABS as the system is performing a diagnosis check.

PREMATURE ABS CYCLING

Symptoms of premature ABS cycling include: clicking sounds from the solenoid valves; pump/motor running; and pulsations in the brake pedal. Premature ABS cycling can occur at any braking rate of the vehicle and on any type of road surface. Neither the red BRAKE indicator lamp, nor the amber ABS indicator lamp, illuminate and no faults are stored in the ABM.

Premature ABS cycling is a condition that needs to be correctly assessed when diagnosing problems with the antilock brake system. It may be necessary to use a scan tool to detect and verify premature ABS cycling.

Check the following common causes when diagnosing premature ABS cycling: damaged wheel bearings (causing tone wheel issues); damaged wheel speed sensor mounting bosses; damaged teeth on the sensor tone wheel; and loose wheel speed sensor mounting screws.

After diagnosing the defective component, repair or replace it as required. When the component repair or replacement is completed, test drive the vehicle to verify that premature ABS cycling has been corrected.

ALL-SPEED TRACTION CONTROL

Traction control systems sense impending wheel spin based on a model of the rate of change of wheel speed

under normal traction conditions. The All-Speed Traction Control uses signals from the same wheel speed sensors as ABS to determine when to apply the brakes to one or more wheels and when to reduce engine torque output using the electronic throttle control (ETC) to prevent wheel slip during acceleration. Throttle control makes the vehicle less reliant on brake application alone to maintain traction, increasing the operating speed range and more closely modulates speed, resulting in smoother operation. With All-Speed Traction Control reducing engine torque as well as applying the brakes, it is possible to achieve almost seamless torque application at the wheels.

If the wheel slip is severe enough to require throttle intervention, All-Speed Traction Control will reduce engine torque and sometimes upshift the transmission to avoid the condition. In milliseconds, All-Speed Traction Control interrogates the engine control system to determine the current torque output, determines how much the torque output the current conditions will allow, and signals this requirement to the engine control system, which reduces the torque by partially closing the throttle. With execution of the torque reduction, the brake system reduces brake pressure to make the transition smooth, while maintaining forward progress. By reducing engine power, braking effectiveness is maintained and the system can operate throughout the normal vehicle speed range. That is why the system is identified as providing "all-speed" traction control.

The traction control system is enabled at each ignition cycle. It may be turned off by depressing the ESP OFF switch button. The ESP/TCS function indicator lamp illuminates immediately upon depressing the button. Pressing this button again or turning off and restarting the vehicle will enable the traction control system.

ELECTRONIC STABILITY PROGRAM

To determine whether the car is responding properly to cornering commands, ESP® uses steering wheel angle, yaw (turning) rate and lateral acceleration sensors (combined into Dynamics Sensor). Using signals from these sensors, in addition to individual wheel speed sensor signals, the system determines appropriate brake and throttle actions. Once initiated, ESP® operates much like All-Speed Traction Control, except that the goal is directional stability. If the vehicle yaw response, or rate of turning, is inconsistent with the steering angle and vehicle speed indications, the ESP® system applies the brakes and, if necessary closes the throttle, to restore control. This occurs whether the vehicle is turning too rapidly (oversteering) or not rapidly enough (understeering).

ELECTRONIC ROLL MITIGATION

Typically when a vehicle makes a sudden turn, the outside tires provide the majority of cornering force. In order for the vehicle to make a turn, a significant amount of grip must exist at the tire contact patch. The body tilt that occurs during this event increases the weight on the outside tires. These conditions, plus the lateral acceleration of the vehicle, combined with the center of gravity position in the vehicle can cause the two inside wheels to lift in the turn and the vehicle rolls over the outside tires. ERM uses the principle that a slipping tire creates less cornering force than one that has full grip by applying enough brake pressure to intentionally make the outside tires slip close to the point of lockup. This reduces the cornering force of the outside tires and increases the turning radius. This straighter path reduces the amount of lateral acceleration and transfers some of the weight back to the inside tires, thus preventing a rollover.

HILL START ASSIST

Hill Start Assist (HSA) will maintain the level of brake pressure the driver applied for a short period of time after the driver takes his foot off of the brake pedal. If the driver does not apply the throttle during this short

period of time the system will release brake pressure and the vehicle may roll down the hill. The system will release brake pressure in proportion to the amount of throttle applied as the vehicle starts to move in the intended direction of travel.

TRAILER SWAY CONTROL

Programmed into the ESP, Trailer Sway Control will be activated once critical amplitude and frequency of oscillation of the vehicle-trailer system is reached. TSC builds up pressure to decelerate the vehicle-trailer system to below the critical speed. Depending on the oscillation conditions, TSC software can build up an additional asymmetric pressure to counter the trailer oscillation. The ESP function lamp will flash when TSC is activated.

HYDRAULIC BRAKE ASSIST

Brake Assist is programmed into the ESP® system. During a panic stop, a pressure sensor determines when the driver is doing so by measuring the brake pedal pressure application rate. A high rate of pedal pressure application causes the ESP® system to apply maximum available pressure to the brakes and the vehicle stops as quickly as available traction will allow.

ELECTRONIC VARIABLE BRAKE PROPORTIONING

Upon entry into EVBP the inlet valve for the rear brake circuit is switched on so that the fluid supply from the master cylinder is shut off. In order to decrease the rear brake pressure, the outlet valve for the rear brake circuit is pulsed. This allows fluid to enter the low pressure accumulator (LPA) in the hydraulic control unit (HCU) resulting in a drop in fluid pressure to the rear brakes. In order to increase the rear brake pressure, the outlet valve is switched off and the inlet valve is pulsed. This increases the pressure to the rear brakes. This back-and-forth process will continue until the required slip difference is obtained. At the end of EVBP braking (brakes released) the fluid in the LPA drains back to the master cylinder by switching on the Electronic Shuttle Valve.

The EVBP will remain functional during many ABS fault modes. If both the red BRAKE and amber ABS warning indicators are illuminated, the EVBP may not be functioning.

CAUTION

CAUTION

The antilock brake system uses an electronic control module known as the Antilock Brake Module (ABM). This module is designed to withstand normal current draws associated with vehicle operation. Care must be taken to avoid overloading the circuits.

CAUTION: In testing for open or short circuits, do not ground or apply voltage to any of the circuits unless instructed to do so for a diagnostic procedure.

CAUTION: These circuits should only be tested using a high impedance multi-meter or the designated scan tool as described in this service information . Power should never be removed or applied to any control module with the

ignition in the ON position. Before removing or connecting battery cables, fuses, or connectors, always turn the ignition to the OFF position.

CAUTION: The ABM 47-way connector should never be connected or disconnected with the ignition switch in the ON position.

CAUTION: This vehicle utilizes active wheel speed sensors. Do not apply voltage to wheel speed sensors at any time.

CAUTION: Use only factory wiring harnesses. Do not cut or splice wiring to the brake circuits. The addition of aftermarket electrical equipment (car phone, radar detector, citizen band radio, trailer lighting, trailer brakes, etc.) on a vehicle equipped with antilock brakes may affect the function of the antilock brake system.

CAUTION: When performing any service procedure on a vehicle equipped with ABS, do not apply a 12-volt power source to the ground circuit of the pump motor in the HCU. Doing this will damage the pump motor and will require replacement of the entire HCU.

CAUTION: An attempt to remove or disconnect certain system components may result in improper system operation. Only those components with approved removal and installation procedures in this service information should be serviced.

CAUTION: If welding work is to be performed on the vehicle using an electric arc welder, the ABM connector should be disconnected during the welding operation.

CAUTION: Many components of the ABS are not serviceable and must be replaced as an assembly. Do not disassemble any component which is not designed to be serviced.

CAUTION: Brake fluid will damage painted surfaces. If brake fluid is spilled on any painted surface, wash off with water immediately.

CAUTION: Only the recommended jacking or hoisting positions for this vehicle are to be used whenever it is necessary to lift a vehicle.

DIAGNOSIS AND TESTING

INSPECTION AND ROAD TEST

1. Visually inspect the ABS for damaged or disconnected components and connectors.
2. Verify the brake lamps are operational. If they are not, repair them prior to continuing.

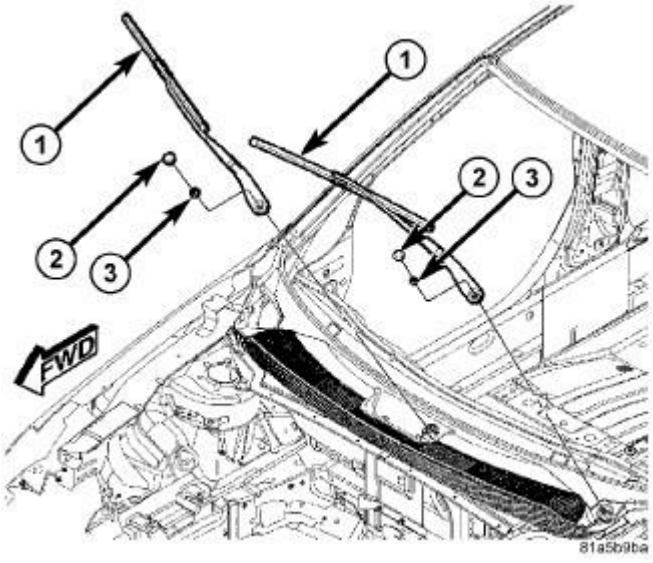


Fig. 3: Locating Data Link Connector
Courtesy of CHRYSLER LLC

3. Connect a scan tool to the Data Link Connector located under the instrument panel to the left of the steering column (1). If the scan tool does not power-up, check the power and ground supplies to the connector.
4. Turn the ignition key to the ON position.
5. Using the scan tool, read and record any Diagnostic Trouble Codes (DTCs). If any DTCs are present, refer to the appropriate diagnostic service information.

   If no problems are observed, it will be necessary to road test the vehicle.

   Many ABS conditions judged to be a problem by the driver may be normal operating conditions. To become familiarized with the normal operating characteristics of this antilock brake system. See **Operation** .

   Before road testing a brake complaint vehicle, note whether the red BRAKE warning indicator lamp, amber ABS warning indicator lamp, or both are turned on. If it is the red BRAKE warning indicator, there is a brake hydraulic problem that must be corrected before driving the vehicle. See **Diagnosis and Testing** .

   If the amber ABS warning indicator is on, road test the vehicle as described below. While only the amber ABS warning indicator is on, the ABS is not functional. The ability to stop the car using the base brake system should not be affected.

6. Turn the key to the OFF position and then back to the ON position. Note whether the amber ABS warning

indicator lamp continues to stay on.

7. If the amber ABS warning indicator lamp stays on, shift into gear and drive the car to a speed of approximately 25 km/h (15 mph) to complete the ABS Start-Up and Drive-Off Cycles. See **Operation** . If at this time the amber ABS warning indicator lamp stays on, refer to the appropriate diagnostic service information.
8. If the amber ABS warning indicator lamp goes out at any time, drive the vehicle a short distance. Accelerate the vehicle to a speed of at least 64 km/h (40 mph). Bring the vehicle to a complete stop, braking hard enough to cause the ABS to cycle. Repeat this action several times. Using the scan tool, read and record any Diagnostic Trouble Codes (DTCs). If any DTCs are present, refer to the appropriate diagnostic service information.

STANDARD PROCEDURE

ANTILOCK BRAKE SYSTEM BLEEDING

The base brake's hydraulic system must be bled anytime air enters the hydraulic system. The ABS must always be bled anytime it is suspected that the HCU has ingested air.

Brake systems with ABS must be bled as two independent braking systems. The non-ABS portion of the brake system with ABS is to be bled the same as any non-ABS system.

The ABS portion of the brake system must be bled separately. Use the following procedure to properly bleed the brake hydraulic system including the ABS.

NOTE: During the brake bleeding procedure, be sure the brake fluid level remains close to the FULL level in the master cylinder fluid reservoir. Check the fluid level periodically during the bleeding procedure and add Mopar® DOT 3 brake fluid as required.

BLEEDING

When bleeding the ABS system, the following bleeding sequence must be followed to insure complete and adequate bleeding.

1. Make sure all hydraulic fluid lines are installed and properly torqued.
2. Connect the scan tool to the diagnostics connector. The diagnostic connector is located under the lower steering column cover to the left of the steering column.
3. Using the scan tool, check to make sure the ABM does not have any fault codes stored. If it does, clear them.

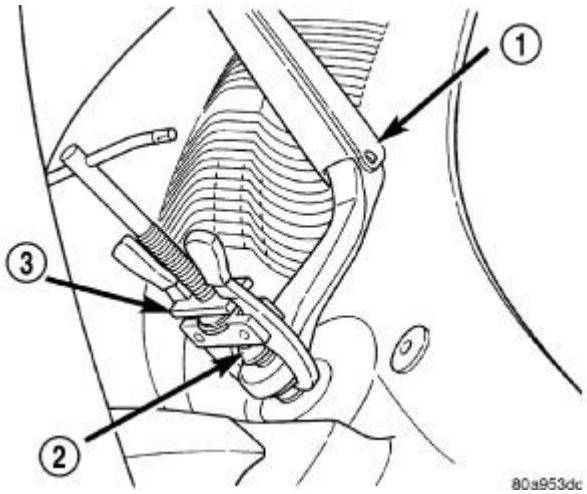


Fig. 4: Bleed Hose Set Up
Courtesy of CHRYSLER LLC

WARNING: When bleeding the brake system wear safety glasses. A clear bleed tube (1) must be attached to the bleeder screws and submerged in a clear container filled part way with clean brake fluid (2). Direct the flow of brake fluid away from yourself and the painted surfaces of the vehicle. Brake fluid at high pressure may come out of the bleeder screws when opened.

NOTE: Pressure bleeding is recommended to bleed the base brake system to ensure all air is removed from system. Manual bleeding may also be used, but additional time is needed to remove all air from system.

4. Bleed the base brake system. See **Standard Procedure**
5. Using the scan tool, select ECU VIEW, followed by ABS MISCELLANEOUS FUNCTIONS to access bleeding. Follow the instructions displayed. When finished, disconnect the scan tool and proceed.
6. Bleed the base brake system a second time. Check brake fluid level in the reservoir periodically to prevent emptying, causing air to enter the hydraulic system.
7. Fill the master cylinder fluid reservoir to the FULL level.
8. Test drive the vehicle to be sure the brakes are operating correctly and that the brake pedal does not feel spongy.

SPECIFICATIONS

BRAKE FASTENER TORQUE

BRAKE FASTENER TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
ABS ABM Mounting Screws (To HCU)	2	-	17
ABS ICU Mounting Bolt (To Bracket)	11	8	97

ABS ICU Mounting Pins	11	8	97
ABS ICU Mounting Bracket Screws (To Frame)	23	17	203
ABS ICU Mounting Bracket Screw And Nut (To Body) - Right-Hand-Drive	23	17	203
ABS Wheel Speed Sensor Head Mounting Bolt - Front	12	9	106
ABS Wheel Speed Sensor Head Mounting Bolt - Rear	6	4.5	55
ABS Wheel Speed Sensor Routing Bracket Screws - Front	20	15	177
ABS Wheel Speed Sensor Routing Bracket Screws - Rear	20	15	177
Brake Tube Nuts	17	12.5	150
Brake Hose Bracket Bolt	18	13	160
Brake Hose Caliper Banjo Bolt	26	19	230
Brake Shield Mounting Screws	8	6	71
Disc Brake Caliper Adapter Mounting Bolts - Front	169	125	-
Disc Brake Caliper Adapter Mounting Bolts - Rear	100	74	-
Disc Brake Caliper Guide Pin Bolts - Front	35	26	-
Disc Brake Caliper Guide Pin Bolts - Rear	35	26	-
Disc Brake Caliper Bleeder Screw	10	7	88
Dynamics (ESP) Sensor Mounting Nuts	9	6.5	80
Master Cylinder Mounting Nuts	25	19	225
Pedal Bracket Upper Mounting Nuts	28	21	250
Power Brake Booster Mounting Nuts	28	21	250
Parking Brake Cable Mounting Screws to Hand Lever - Front	28	21	250
Parking Brake Cable Routing Clamp Screws/Nuts	6	4.5	55
Parking Brake Cable Routing Loop Mounting Nuts	6	4.5	55
Parking Brake Lever Mounting Nuts - Foot Lever System	28	21	250
Parking Brake Lever Mounting Nuts - Hand Lever System	20	15	177
Wheel Mounting (Lug) Nuts	135	100	-

ELECTRICAL

SENSOR, DYNAMICS

Description

DESCRIPTION

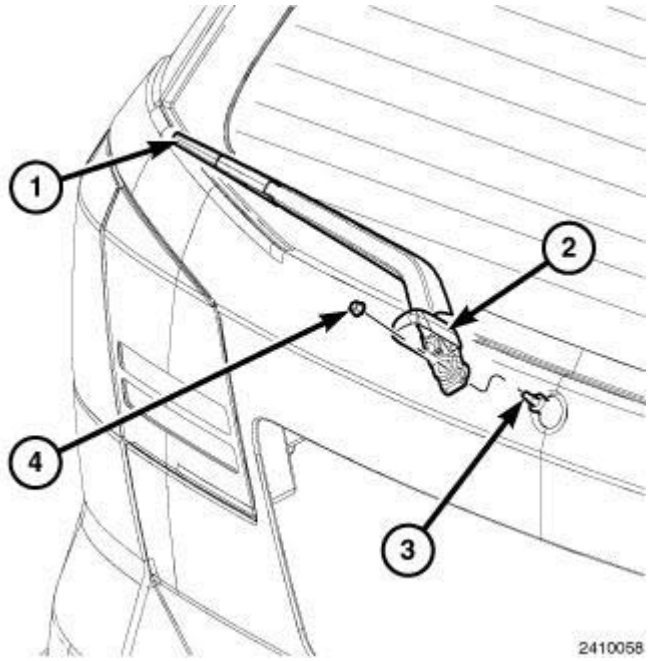


Fig. 5: Dynamics Sensor Location
Courtesy of CHRYSLER LLC

The Yaw Rate and Lateral Acceleration Sensors are housed into one unit known as the Dynamics Sensor (1). The sensor is used to measure side-to-side (Lateral) motion and vehicle rotational sensing (how fast the vehicle is turning - Yaw).

The Dynamics Sensor (1) is located on the floor tunnel just forward of the center floor console (2), below the instrument panel.

Yaw and Lateral Acceleration Sensors cannot be serviced separately. The entire Dynamics Sensor must be replaced when necessary.

Removal

REMOVAL

1. Disconnect and isolate the battery negative cable from the battery post.

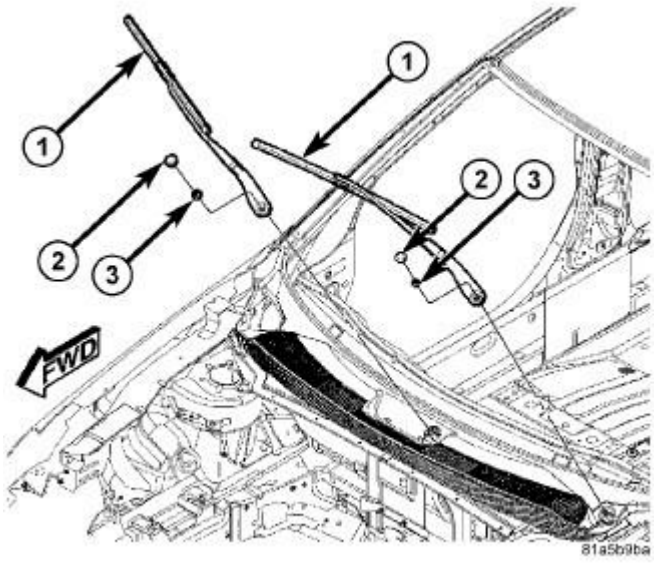


Fig. 6: Lower Instrument Panel Silencer
Courtesy of CHRYSLER LLC

2. Remove the lower instrument panel trim on each side of console below instrument panel.

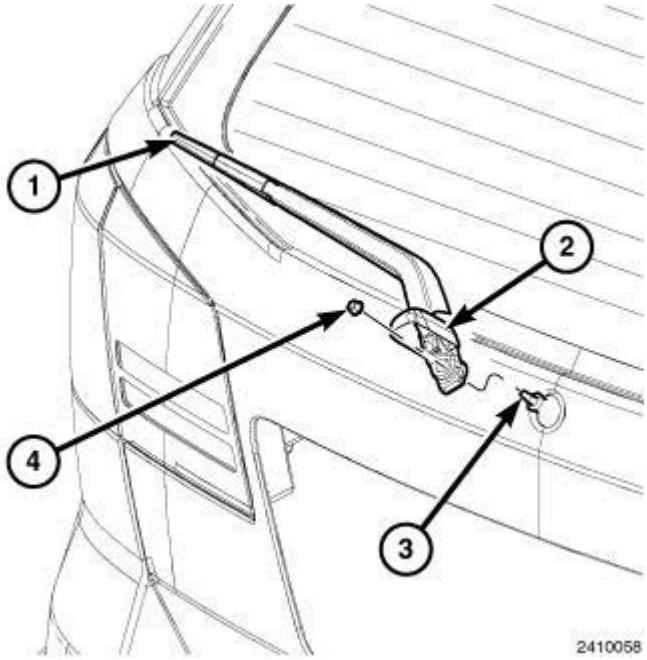


Fig. 7: Dynamics Sensor
Courtesy of CHRYSLER LLC

3. Disconnect the wiring harness connector (3) at the dynamics sensor (1).
4. Working on each side of the floor tunnel, remove the nuts (2) mounting the dynamics sensor to the floor pan tunnel (4).

5. Remove the dynamics sensor (1).

Installation

INSTALLATION

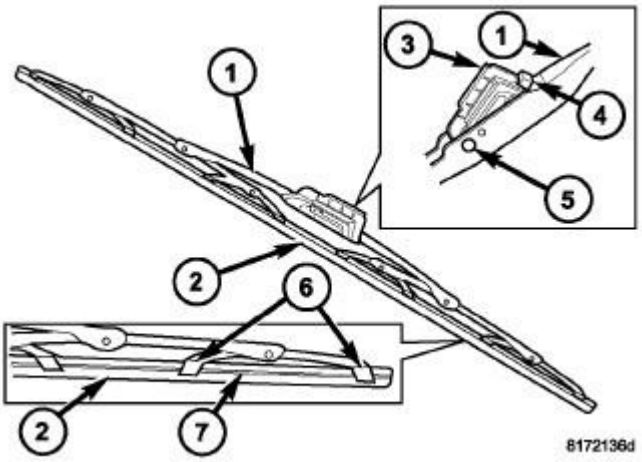


Fig. 8: Dynamics Sensor
Courtesy of CHRYSLER LLC

1. Install the dynamics sensor (1) over the studs mounted to the floor pan tunnel (4).
2. Working on each side of the floor pan tunnel (4), install the two mounting nuts (2). Tighten the nuts to 9 N.m (80 in. lbs.).
3. Connect the wiring harness connector (3) to the dynamics sensor (1).

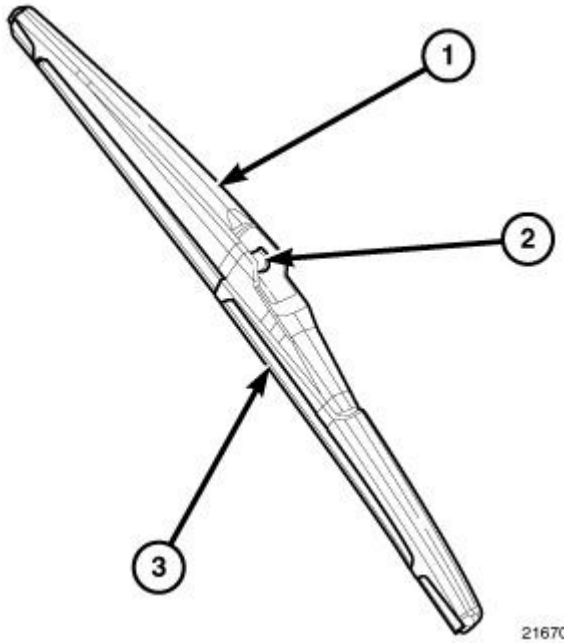


Fig. 9: Lower Instrument Panel Silencer
Courtesy of CHRYSLER LLC

4. Install the lower instrument panel trim on each side of console below the instrument panel.
5. Connect the battery negative cable to the battery post. It is important that this be performed properly. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure**
6. Perform the Verification Test and clear any faults. See **Standard Procedure**

SENSOR, STEERING WHEEL ANGLE

Description

DESCRIPTION

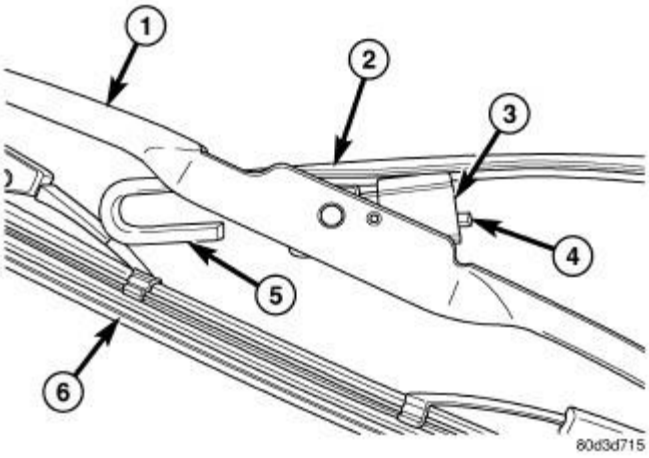


Fig. 10: Steering Control Module
Courtesy of CHRYSLER LLC

The steering angle sensor is an integral part of the clockspring (3) mounted on the steering column. Refer to **Restraints/CLOCKSPRING - Description**

SENSOR, WHEEL SPEED, FRONT

Description

DESCRIPTION

The antilock brake system uses two-wire wheel speed sensors, known as active wheel speed sensors. The sensors use an electronic principle known as magnetoresistive to help increase performance and durability. The sensors convert wheel speed into a small digital signal. A Wheel Speed Sensor (WSS) is used at each wheel. A magnetic pole encoder serves as the trigger mechanism for each sensor. At each wheel of the vehicle there is one wheel speed sensor and one encoder.

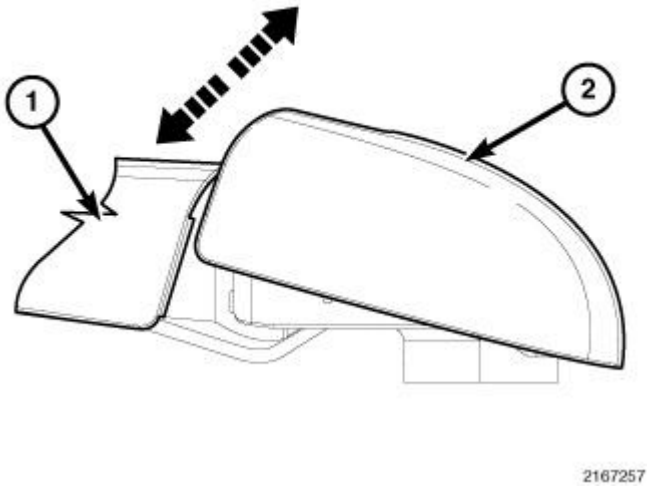


Fig. 11: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

A front wheel speed sensor (2) is attached to a mounting boss on each front knuckle (3). The encoder is an integral part of the hub and bearing.

WSS air gaps are not adjustable.

Operation

OPERATION

The ABM sends 12 volts to power an Integrated Circuit (IC) in the sensor. The IC supplies a constant 7 mA power supply to the ABM. The relationship of the magnetic pole encoder to the permanent magnet in the sensor, signals the IC to enable a second 7 mA power supply. The output of the sensor, sent to the ABM, is a DC voltage signal with changing voltage and current levels. The ground for the IC and the current sense circuit is provided by the ABM.

When a pole is properly aligned with the sensor, the voltage signal is approximately 0.8 volts and a constant 7 mA current is sent to the ABM. As the magnetic pole encoder rotates, the encoder shifts the magnetic field and the IC enables a second 7 mA current source. The ABM senses a voltage signal of approximately 1.6 volts and 14 mA. The ABM measures the amperage of the digital signal for each wheel. The resulting signal is interpreted by the ABM as the wheel speed.

Removal

REMOVAL

NOTE: Before proceeding. Refer to Brakes - Warning . See Caution .

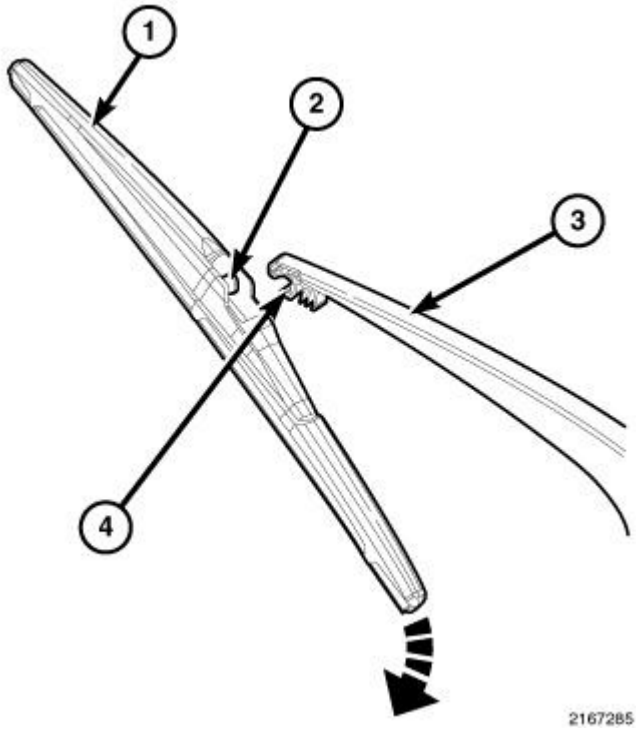


Fig. 12: Front Wheel Speed Sensor Wiring Connector
Courtesy of CHRYSLER LLC

1. Open the hood.
2. Disconnect the wheel speed sensor cable connector (2) from the wiring harness connector (3) on top of the frame rail (1) to the inside of the strut tower.
3. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

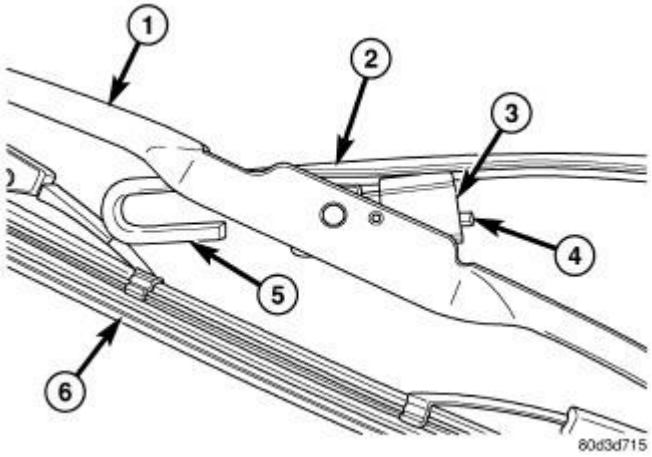


Fig. 13: Front Wheel Speed Sensor Mounting To Body
Courtesy of CHRYSLER LLC

4. Remove the grommet (1) from the hole in the body (7) and pull the wheel speed sensor cable out of the hole.
5. Remove the speed sensor cable routing clip (2) from the outside frame rail (6).
6. Remove the screw fastening the cable routing clamp (3) to the outside frame rail (6).

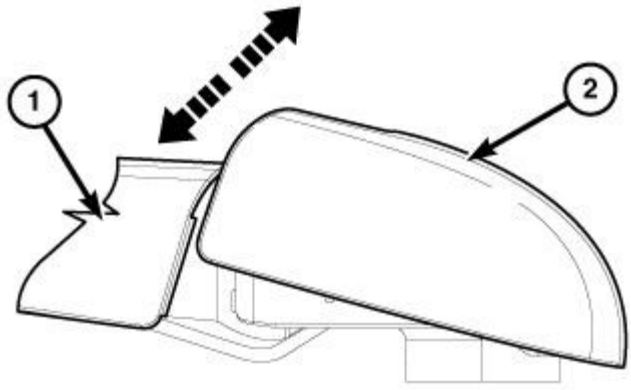


Fig. 14: Wheel Speed Sensor Routing & Brake Flex Hose Bracket
Courtesy of CHRYSLER LLC

7. Remove the screw (2) securing the wheel speed sensor routing bracket (3) to the brake flex hose bracket (4).
8. Remove the routing clip (1) securing wheel speed sensor cable to the knuckle (5).

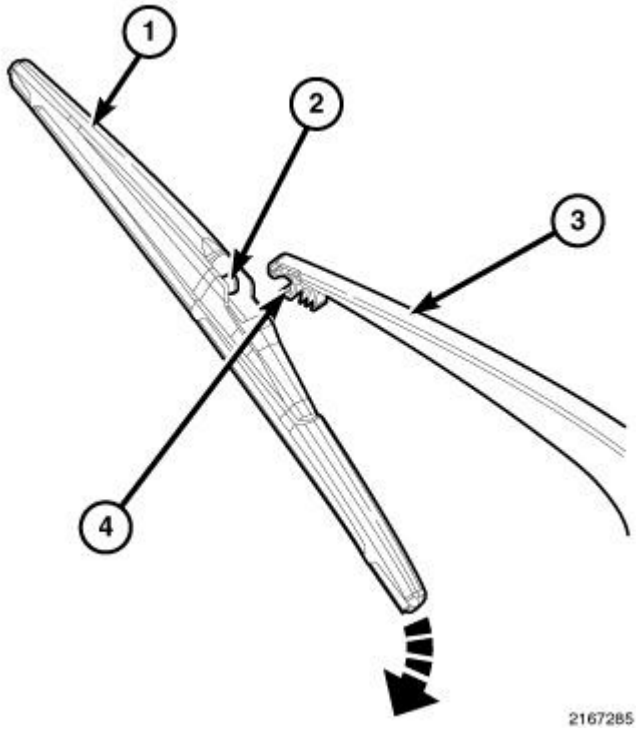


Fig. 15: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

9. Remove the mounting screw (1) fastening the wheel speed sensor head (2) to the knuckle (3). Pull the sensor head out of the knuckle and remove the sensor from the vehicle.

Installation

INSTALLATION

CAUTION: Failure to install speed sensor cables properly may result in contact with moving parts or an over extension of cables causing an open circuit. Be sure that cables are installed, routed, and clipped properly.

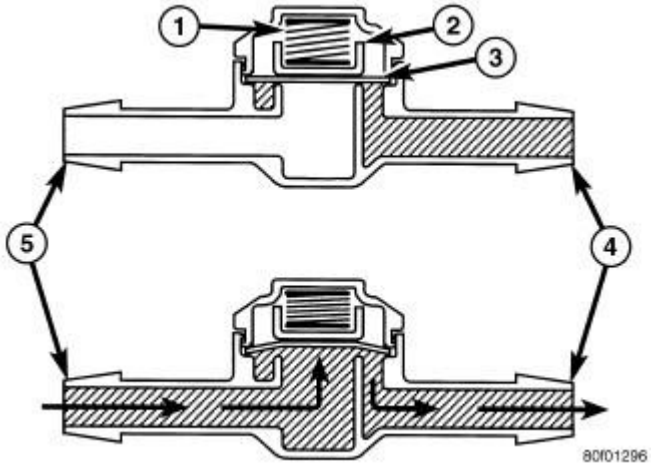


Fig. 16: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

1. Install the wheel speed sensor head (2) into the knuckle (3). Install the mounting screw (1) and tighten it to 12 N.m (106 in. lbs.).

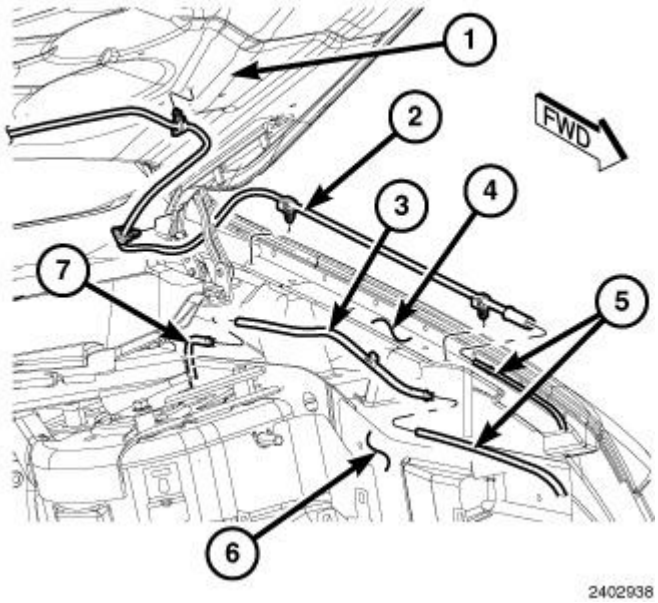


Fig. 17: Wheel Speed Sensor Routing & Brake Flex Hose Bracket
Courtesy of CHRYSLER LLC

2. Install the routing clip (1) securing the wheel speed sensor cable to the knuckle (5).
3. Position the wheel speed sensor routing bracket (3) on the brake flex hose bracket (4) and install the mounting screw (2). Tighten the mounting screw to 20 N.m (15 ft. lbs.).

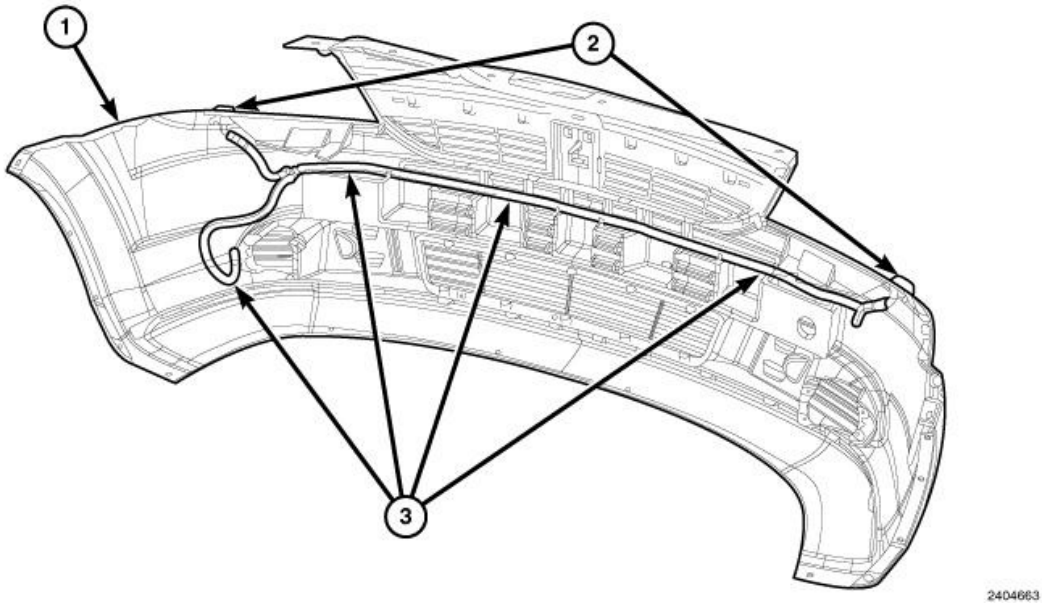


Fig. 18: Front Wheel Speed Sensor Mounting To Body
Courtesy of CHRYSLER LLC

4. Position the wheel speed sensor cable routing clamp (4) on the outside frame rail (6) and install the mounting screw (3). Tighten the mounting screw to 20 N.m (15 ft. lbs.).
5. Install the speed sensor cable routing clip (2) on the outside frame rail (6).
6. Insert the wheel speed sensor cable through the hole in the body (7) and install the grommet (1) in the hole.

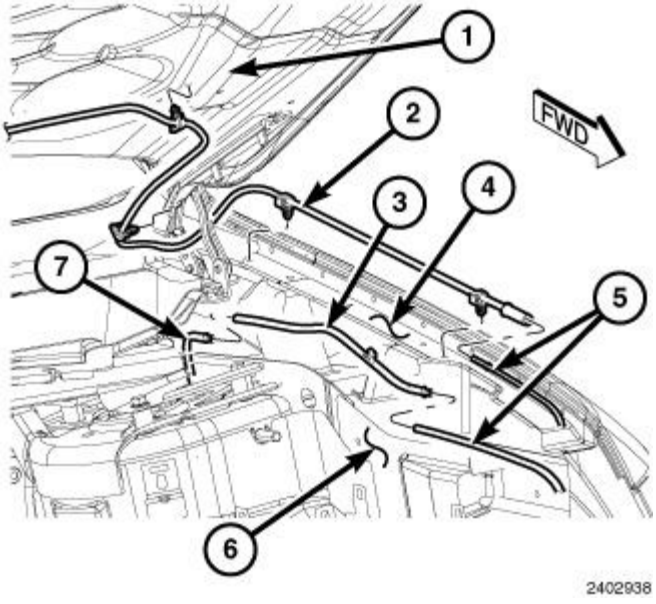


Fig. 19: Front Wheel Speed Sensor Wiring Connector
Courtesy of CHRYSLER LLC

7. Lower the vehicle.
8. Connect the wheel speed sensor cable connector (2) to the wiring harness connector (3) on top of the frame rail (1).
9. Perform the Diagnostic Verification Test and clear any faults. See **Standard Procedure**

SENSOR, WHEEL SPEED, REAR

Description

DESCRIPTION

The antilock brake system uses two-wire wheel speed sensors, known as active wheel speed sensors. The sensors use an electronic principle known as magnetoresistive to help increase performance and durability. The sensors convert wheel speed into a small digital signal. A Wheel Speed Sensor (WSS) is used at each wheel. A magnetic pole encoder serves as the trigger mechanism for each sensor. At each wheel of the vehicle there is one wheel speed sensor and one encoder.

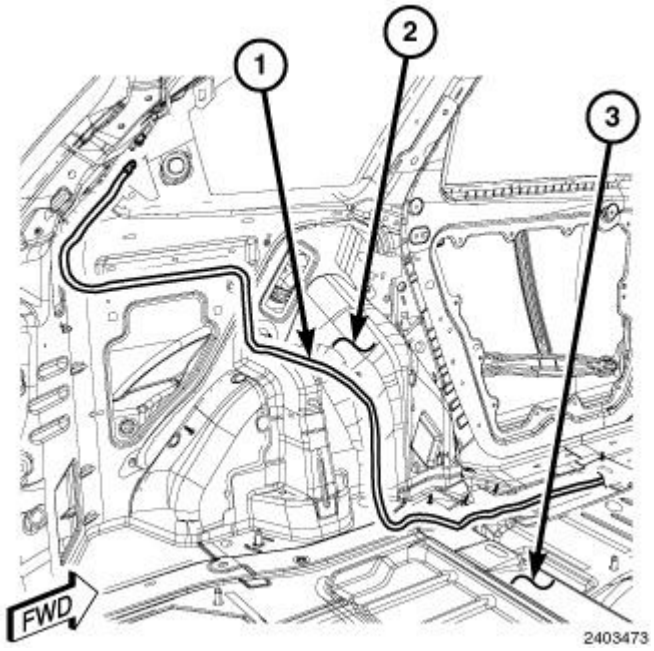


Fig. 20: Hub And Bearing
Courtesy of CHRYSLER LLC

The rear wheel speed sensor (2) head is mounted to the rear hub and bearing (1). The encoder is integral to the hub and bearing assembly. The encoder is serviced as part of the rear hub and bearing.

WSS air gaps are not adjustable.

Operation

OPERATION

The ABM sends 12 volts to power an Integrated Circuit (IC) in the sensor. The IC supplies a constant 7 mA power supply to the ABM. The relationship of the magnetic pole encoder to the permanent magnet in the sensor, signals the IC to enable a second 7 mA power supply. The output of the sensor, sent to the ABM, is a DC voltage signal with changing voltage and current levels. The ground for the IC and the current sense circuit is provided by the ABM.

When a pole is properly aligned with the sensor, the voltage signal is approximately 0.8 volts and a constant 7 mA current is sent to the ABM. As the magnetic pole encoder rotates, the encoder shifts the magnetic field and the IC enables a second 7 mA current source. The ABM senses a voltage signal of approximately 1.6 volts and 14 mA. The ABM measures the amperage of the digital signal for each wheel. The resulting signal is interpreted by the ABM as the wheel speed.

Removal

REMOVAL

1. Access and remove the rear brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**

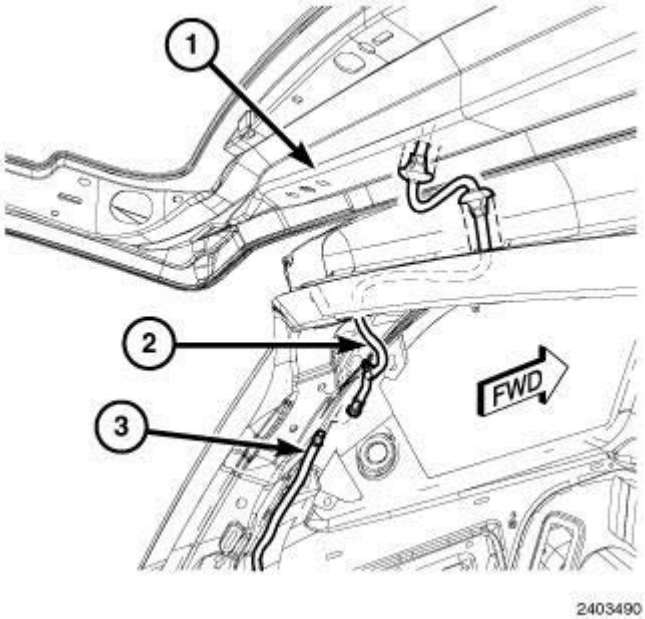


Fig. 21: Hub And Bearing
Courtesy of CHRYSLER LLC

CAUTION: Prior to removal, clean area around sensor head to help prevent contaminants from entering bearing when sensor head is removed.

2. Remove the screw (3) fastening the speed sensor head (2) to the hub and bearing (1).

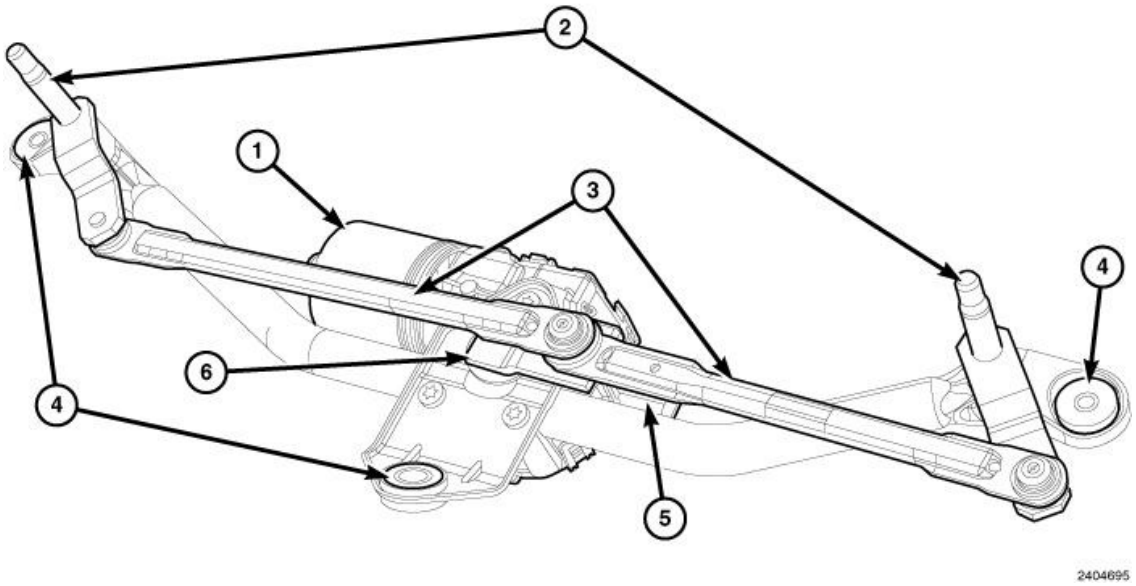


Fig. 22: Brake Tube Routing Bracket
Courtesy of CHRYSLER LLC

3. Remove the wheel speed sensor routing clip (4) from the brake tube routing bracket (1).
4. Remove the wheel speed sensor cable from the routing clips (3) above the trailing arm.

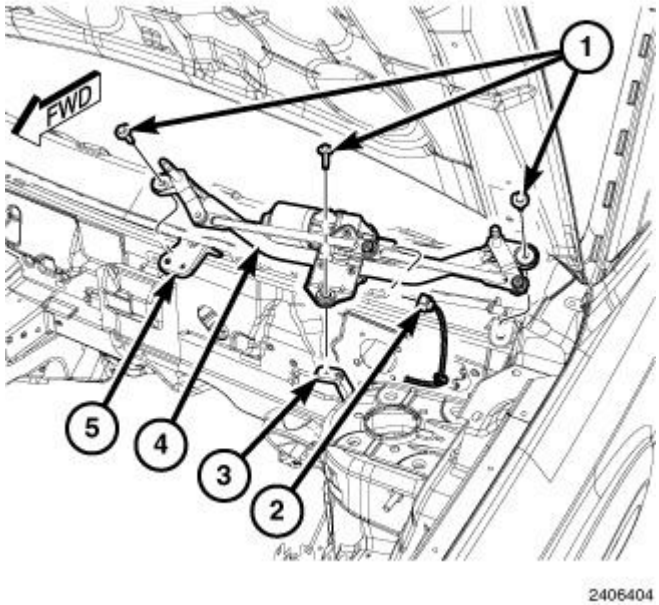


Fig. 23: Hub And Bearing
Courtesy of CHRYSLER LLC

5. Remove the wheel speed sensor head (2) from the hub and bearing (1), then pass it through the brake shield.

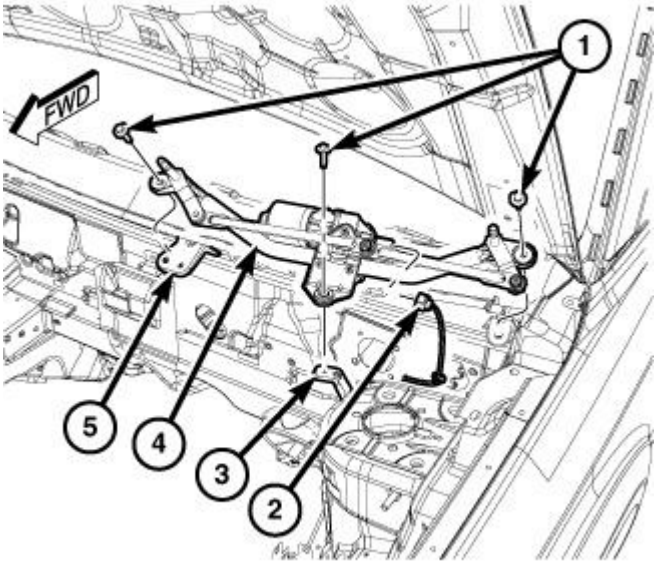


Fig. 24: Wheel Speed Sensor Routing Clamp
Courtesy of CHRYSLER LLC

6. Remove the screw (1) fastening the wheel speed sensor routing clamp (2) to the rear suspension crossmember (3).

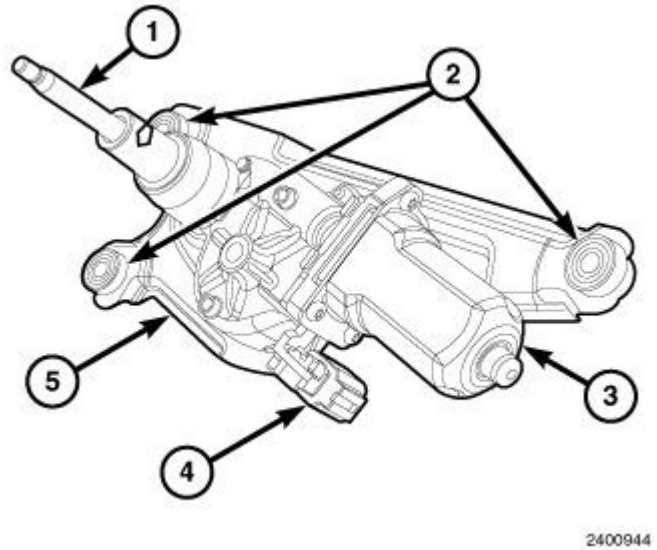


Fig. 25: Brake Flex Hose And Tube Bracket
Courtesy of CHRYSLER LLC

7. Remove the screw (2) securing the wheel speed sensor routing clamp (1) to the trailing link.

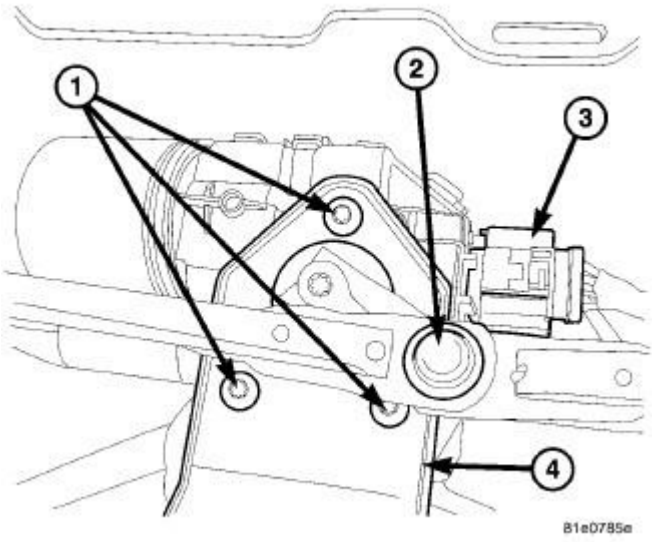


Fig. 26: Wheel Speed Sensor Wiring Connector
Courtesy of CHRYSLER LLC

8. Disconnect the vehicle wiring harness (3) from the wheel speed sensor connector (2) on the body (1).
9. Disengage the wheel speed sensor connector from the routing clip fastened to the body using a screwdriver. Pull the connector forward off the routing clip. Or, if a NEW routing clip is available, remove the routing clip from the body with the connector attached.
10. Remove the wheel speed sensor from the vehicle.

Installation

INSTALLATION

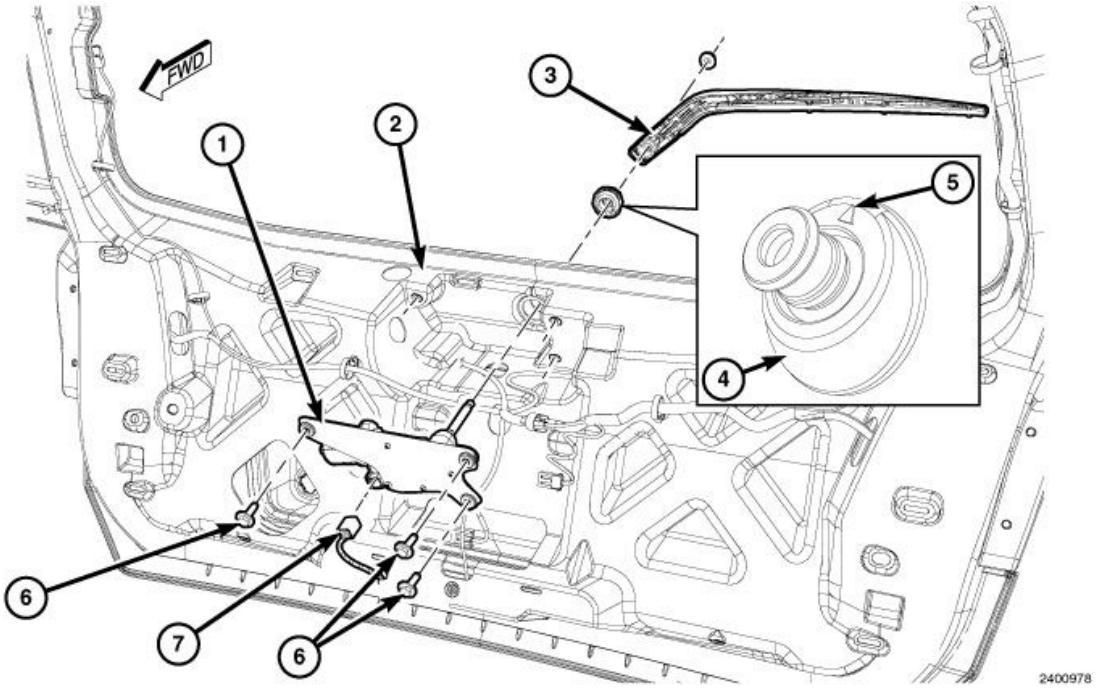


Fig. 27: Wheel Speed Sensor Wiring Connector
Courtesy of CHRYSLER LLC

1. Slide the wheel speed sensor wiring connector (2) onto the routing clip mounted on the body until it locks into place or if a NEW routing clip is attached to the connector, push it into the mounting holes on the body.
2. Connect the vehicle wiring harness (3) to the wheel speed sensor connector (2).

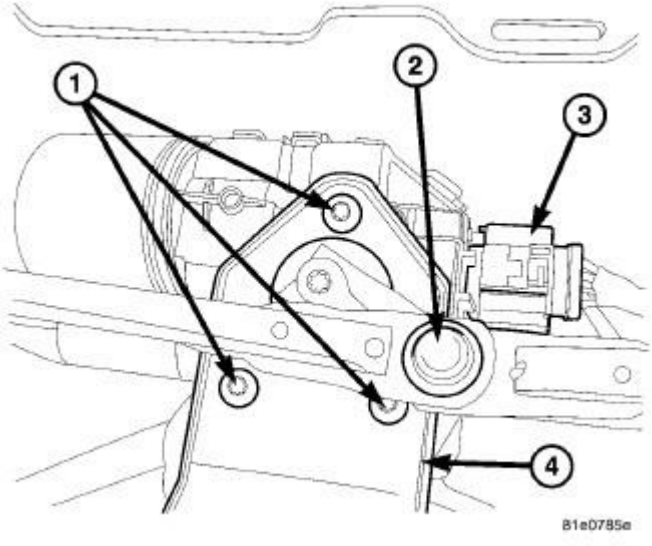


Fig. 28: Wheel Speed Sensor Routing Clamp
Courtesy of CHRYSLER LLC

3. Attach the wheel speed sensor routing clamp (2) to the rear suspension crossmember (3) using the mounting screw (1). Tighten the mounting screw to 20 N.m (15 ft. lbs.).

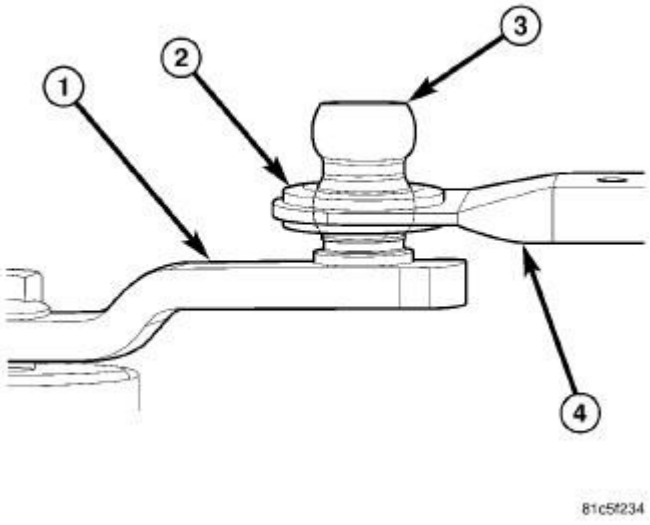


Fig. 29: Brake Flex Hose And Tube Bracket
Courtesy of CHRYSLER LLC

4. Attach the wheel speed sensor routing clamp (1) to the trailing link using the mounting screw (2). Tighten the mounting screw to 20 N.m (15 ft. lbs.).

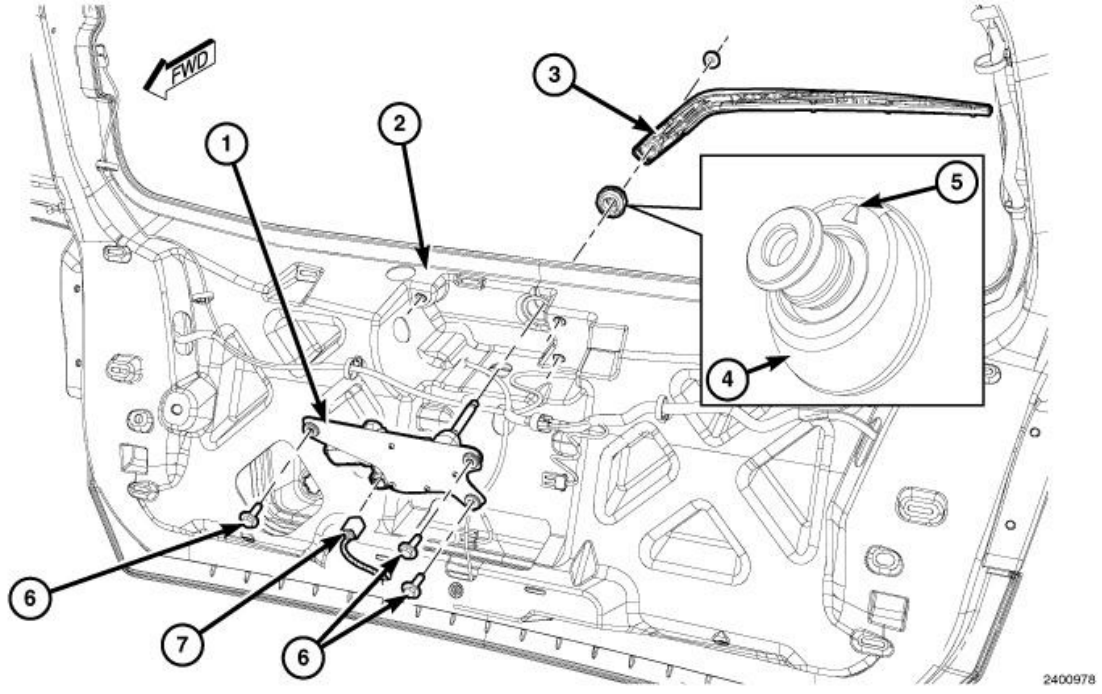


Fig. 30: Hub And Bearing
Courtesy of CHRYSLER LLC

5. Apply bearing grease (supplied with part) to sensor head shaft and O-ring.

CAUTION: Ensure that sensor mounting surface on bearing is clean before sensor installation.

6. Pass the wheel speed sensor head through the hole in the brake shield, then push it into the mounting hole in hub and bearing (3) and align the mounting screw hole.
7. Install a NEW mounting screw (2). Tighten the mounting screw to 6 N.m (55 in. lbs.).

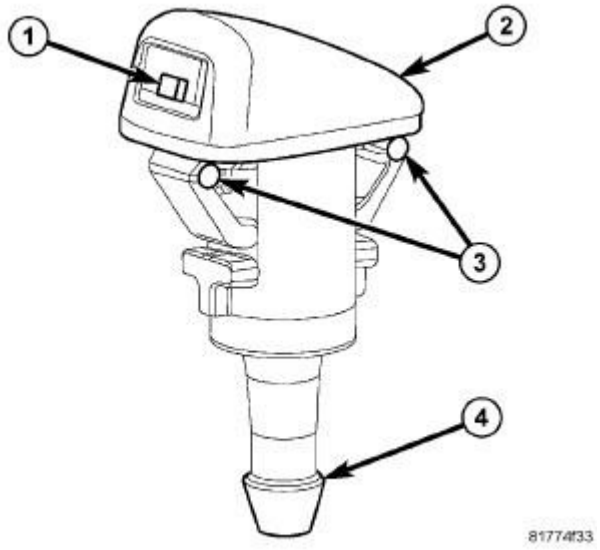


Fig. 31: Brake Tube Routing Bracket
Courtesy of CHRYSLER LLC

8. Install the wheel speed sensor routing clip (4) in the brake tube routing bracket (1).
9. Install the wheel speed sensor cable into the routing clips (3) above the trailing arm.
10. Install brake rotor as well as all components necessary to access it. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation**
11. Perform the ABS Verification Test and clear any faults. Refer to **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

SWITCH, ELECTRONIC STABILITY PROGRAM (ESP)

Description

DESCRIPTION

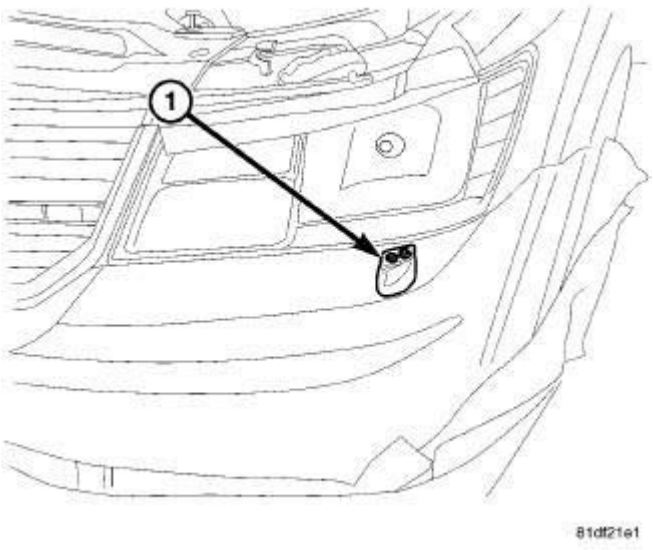


Fig. 32: Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

The ESP Off Switch (2) is part of the accessory switch bank module located in the center bezel (2) on the instrument panel above the radio. The ESP Off switch turns the Electronic Stability Program off whenever the switch is depressed. Depressing the switch a second time turns the ESP® back on. The switch resets itself each time the ignition is cycled.

When the ESP Off switch is depressed and released, turning ESP® off, it does not completely turn the system off. The ESP® system reduces torque management to a lesser amount, but ESP® function can still occur if the system perceives the need.

The ESP Off switch is serviced as part of the accessory switch bank. There are different accessory switch banks available based on the option content of the vehicle. Ensure the accessory switch bank being installed matches the vehicle options.

Removal

REMOVAL

NOTE: The ESP Off switch is integral to the accessory switch bank and cannot be serviced separately.

1. Disconnect and isolate the negative battery cable.
2. Remove the center bezel from the instrument panel and place it on a work bench. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the screws that secure the accessory switch bank to the back of the center bezel and remove the accessory switch bank.

Installation

INSTALLATION

NOTE: The ESP Off switch is serviced as part of the accessory switch bank.

NOTE: There are different instrument panel accessory switch banks available based on the option content of the vehicle. Ensure the accessory switch bank being installed matches the vehicle options.

1. Position the accessory switch bank onto the back of the instrument panel center bezel.
2. Install the screws that secure the accessory switch bank to the center bezel. Tighten the screws to 2 N.m (17 in. lbs.).
3. Install the center bezel onto the instrument panel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Reconnect the negative battery cable.
5. Perform the ABS Verification Test and make sure the ESP Off switch operates properly. See **Standard Procedure**
6. Verify proper operation of all components controlled by the switch bank.

HYDRAULIC/MECHANICAL

HYDRAULIC CONTROL UNIT (HCU)

Description

DESCRIPTION

The Hydraulic Control Unit (HCU) is mounted to the Antilock Brake Module (ABM) as part of the Integrated Control Unit (ICU). The HCU controls the flow of brake fluid to the brakes using a series of valves and accumulators. A pump/motor is mounted on the HCU to supply build pressure to the brakes during TCS and ESP events and to empty the low pressure accumulators during ABS events.

NOTE: The HCU is not serviceable from the ICU for vehicles equipped with Hill Start Assist (HSA).

For more information. See **Description**)

Removal

REMOVAL

NOTE: The HCU is not serviceable from the ICU for vehicles equipped with Hill Start Assist (HSA).

To remove the HCU, the ICU must be removed and disassembled. See **Removal**). See **Disassembly**)

Installation

INSTALLATION

To install the HCU, assemble and install the ICU. See **Assembly**). See **Installation**)

INTEGRATED CONTROL UNIT (ICU)

Description

DESCRIPTION

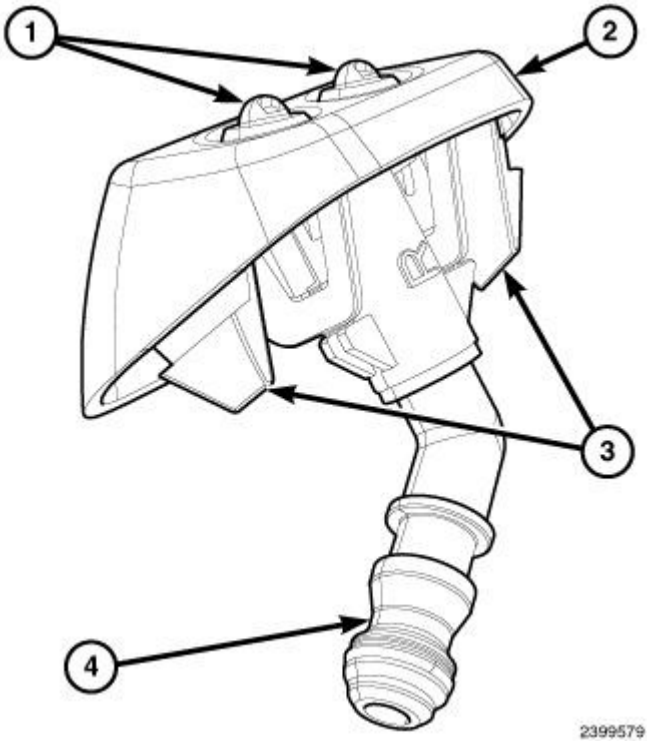


Fig. 33: Integrated Control Unit
Courtesy of CHRYSLER LLC

1 - ANTILOCK BRAKE MODULE (ABM) 2 - HYDRAULIC CONTROL UNIT (HCU) 3 - PUMP/MOTOR

The Hydraulic Control Unit (HCU) (2) and the Antilock Brake Module (ABM) (1) used with this antilock brake system are combined (integrated) into one unit, which is called the Integrated Control Unit (ICU).

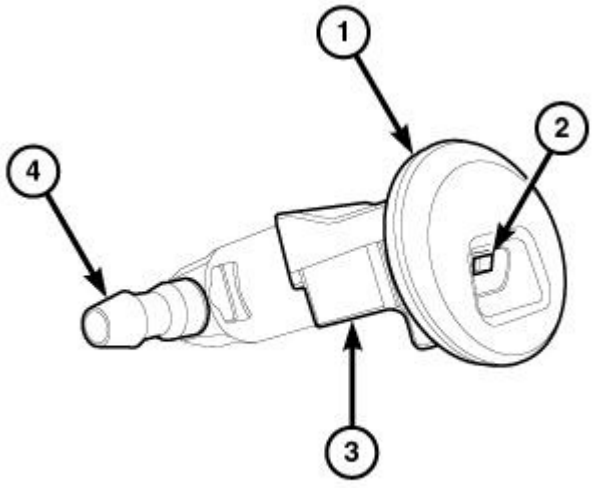


Fig. 34: Locating Integrated Control Unit (ICU)
Courtesy of CHRYSLER LLC

The ICU (1) is located in the engine compartment, mounted to the right side body frame rail near the strut tower.

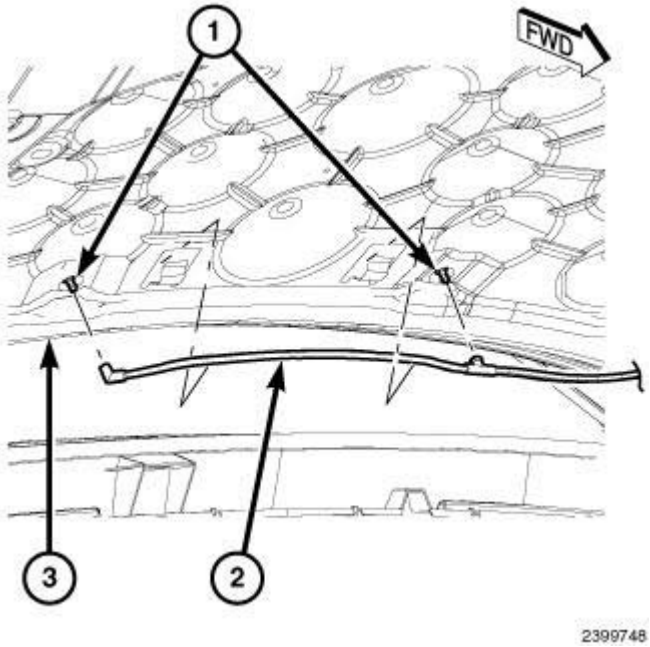


Fig. 35: Integrated Control Unit Mounting - RHD
Courtesy of CHRYSLER LLC

On Right-Hand-Drive vehicles, the ICU (1) is located in the engine compartment, mounted to the left side body frame rail and strut tower.

The ABS with ESP® and All-Speed Traction Control ICU consists of the following components: the ABM, 8

(build/decay) solenoid valves, two traction control solenoid valves, two electronic shuttle valves, valve block, fluid accumulators, a pump, and an electric pump/motor.

NOTE: The HCU and the ABM are not serviceable separately from the ICU for vehicles equipped with Hill Start Assist (HSA).

The replaceable components of the ICU are the HCU and the ABM. No attempt should be made to service any components of the HCU or ABM. The ABM can be serviced without removing the entire assembly from the vehicle.

For additional information on the ABM. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Anti-Lock Brake System - Description** . For additional information on the HCU. See **Description**).

Operation

OPERATION

For operation of the ICU, refer to the individual components of the ICU.

- ANTILOCK BRAKE MODULE (ABM). Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Anti-Lock Brake System - Description**
- HYDRAULIC CONTROL UNIT (HCU)

Removal

LEFT-HAND-DRIVE

NOTE: Before proceeding. Refer to Brakes - Warning . See Caution .

NOTE: If servicing the ABM only. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Anti-Lock Brake System - Removal

1. Disconnect and isolate battery negative cable from battery post.

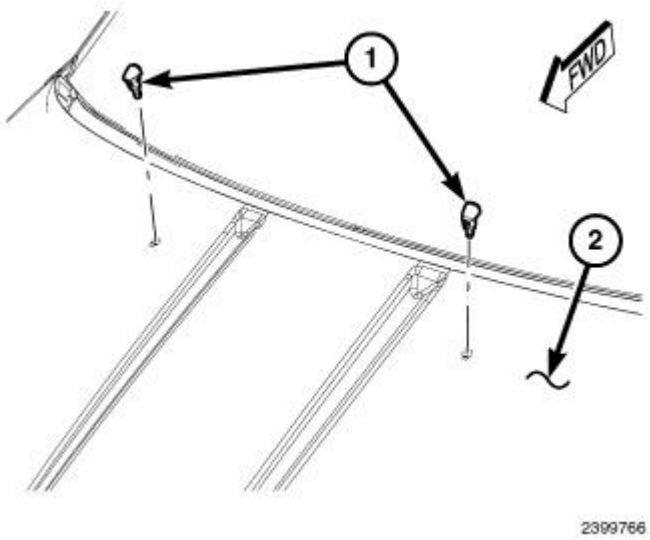


Fig. 36: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

2. Using a brake pedal holding tool as shown in illustration, depress the brake pedal past its first 25 mm (1 inch) of travel and hold it in this position. This will isolate the master cylinder from the brake hydraulic system and will not allow the brake fluid to drain out of the master cylinder reservoir while the lines are disconnected.
3. Remove the engine appearance cover.

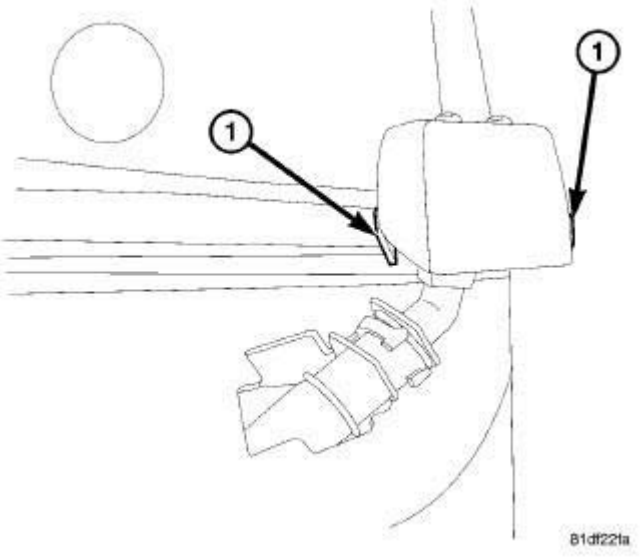


Fig. 37: Cowl Top Screen
Courtesy of CHRYSLER LLC

4. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).

5. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

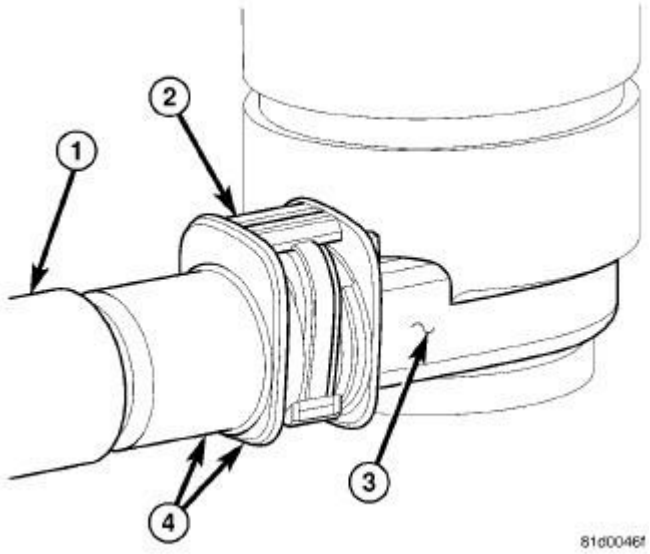


Fig. 38: Cowl Screen
Courtesy of CHRYSLER LLC

6. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

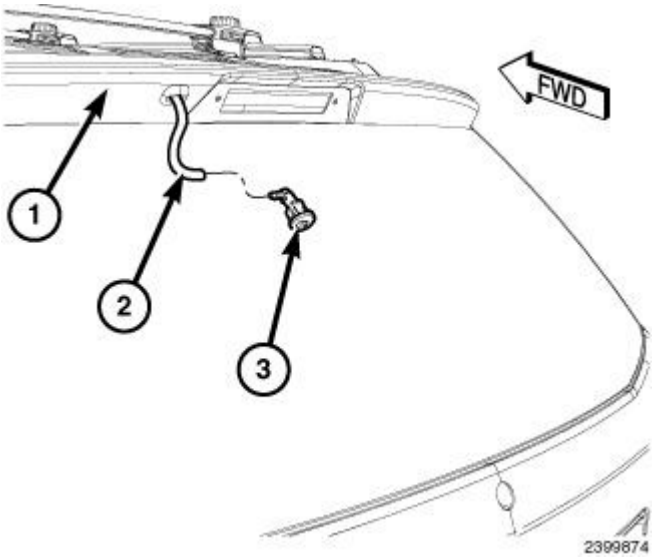


Fig. 39: Wheelhouse Brace
Courtesy of CHRYSLER LLC

7. Remove the eight mounting bolts (four each side) (1) securing the wheel house brace to the strut towers.
8. Remove the wheelhouse brace (2).

9. Remove two screws, then remove the fresh air plenum.
10. Pull the brake tube bundle routing clips (with tubes) loose from studs on the dash panel.

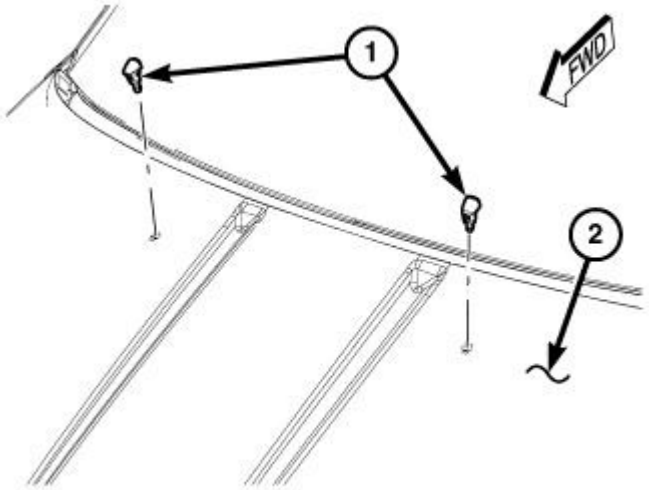


Fig. 40: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

11. Remove the primary (4) and secondary (1) brake tubes (from master cylinder) at the hydraulic control unit (7).
12. Remove the remaining brake tubes (2, 3, 5, 6) at the hydraulic control unit (7).

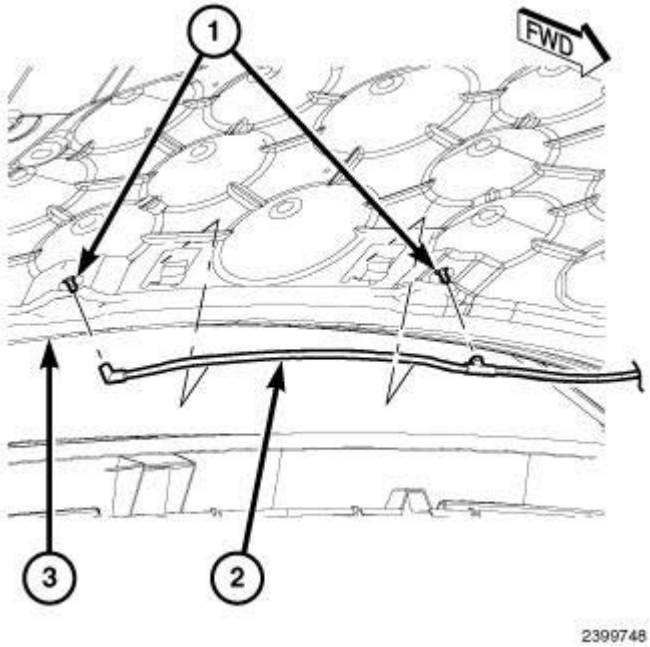


Fig. 41: ABM Connector Release Tabs
Courtesy of CHRYSLER LLC

NOTE: Use this figure in the following step to release the ABM harness connector cover. It shows the location of the release tabs.

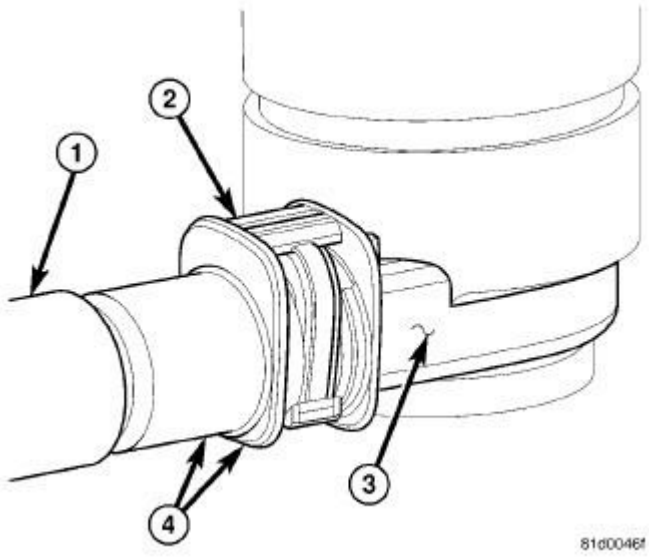


Fig. 42: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

13. Disconnect the ABM harness connector from the Antilock Brake Module (ABM). To do so:
    a. Depress the tabs on each side of the connector cover, then
    b. Pull outward and upward on the lower half of the cover until it locks into position pointing straight outward (2). The connector can then be pulled straight outward off the ABM (1).

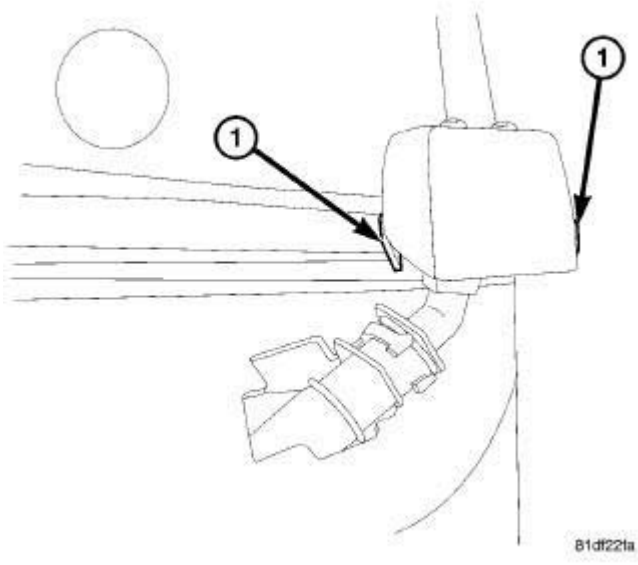


Fig. 43: Locating Integrated Control Unit (ICU)
Courtesy of CHRYSLER LLC

14. Loosen, but do not remove, the two mounting screws (2) attaching the ICU (1) mounting bracket to the body.
15. Lift the ICU and mounting bracket (1) off the mounting screws (2).
16. Move the brake tubes around as necessary without bending them and remove the ICU with bracket.

NOTE: The HCU and the ABM are not serviceable separately from the ICU for vehicles equipped with Hill Start Assist (HSA).

17. To separate the ABM from the HCU. See **Disassembly**) .

RIGHT-HAND-DRIVE

NOTE: Before proceeding. Refer to Brakes - Warning . See Caution .

NOTE: If servicing the ABM only. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Anti-Lock Brake System - Removal

1. Disconnect and isolate battery negative cable from battery post.

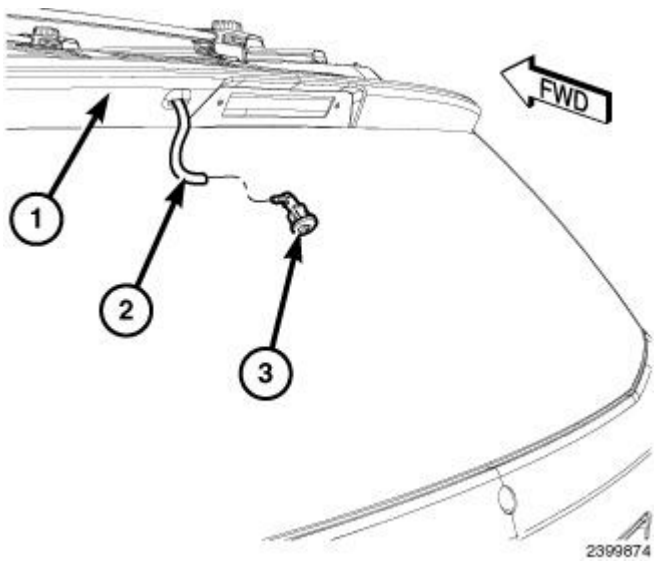


Fig. 44: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

2. Using a brake pedal holding tool as shown in illustration, depress the brake pedal past its first 25 mm (1 inch) of travel and hold it in this position. This will isolate the master cylinder from the brake hydraulic system and will not allow the brake fluid to drain out of the master cylinder reservoir while the lines are disconnected.
3. Remove the engine appearance cover.

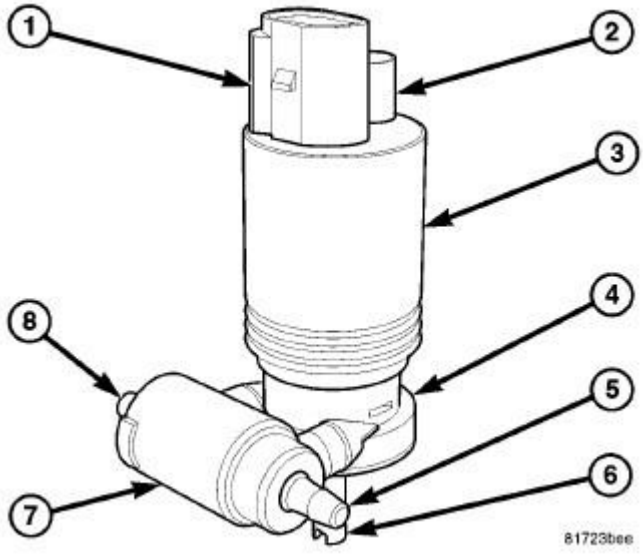


Fig. 45: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

4. Remove the primary (4) and secondary (1) brake tubes (from master cylinder) at the Hydraulic Control Unit (HCU) (7).

5. Remove the remaining brake tubes (2, 3, 5, 6) at the HCU (7).

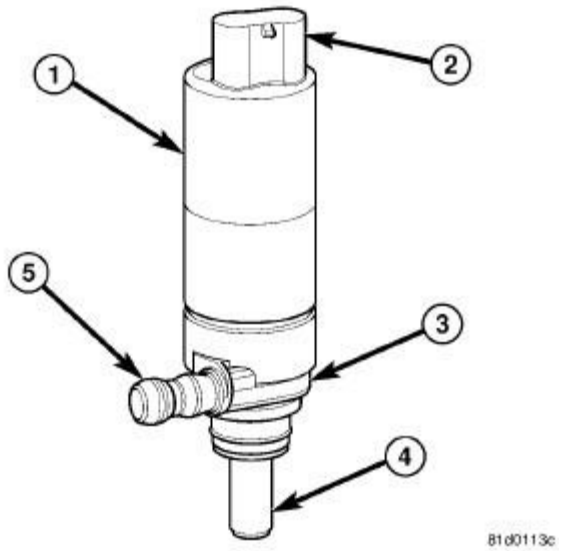


Fig. 46: ABM Connector Release Tabs
Courtesy of CHRYSLER LLC

NOTE: Use illustration in the following step to release the Antilock Brake Module (ABM) harness connector cover. It shows the location of the release tabs.

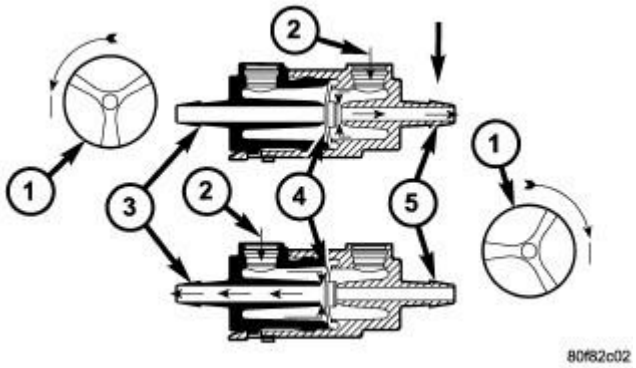


Fig. 47: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

6. Disconnect the ABM harness connector from the Antilock Brake Module (ABM). To do so:
   a. Depress the tabs on each side of the connector cover, then
   b. Pull outward and upward on the lower half of the cover until it locks into position pointing straight

outward (2). The connector can then be pulled straight outward off the ABM (1).

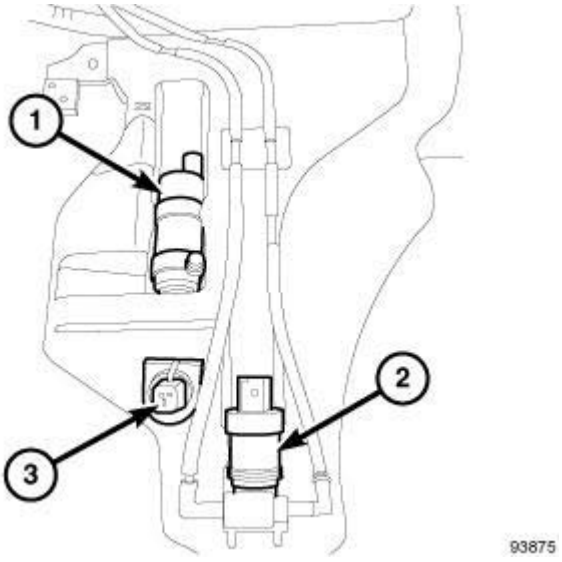


Fig. 48: Integrated Control Unit Mounting - RHD
Courtesy of CHRYSLER LLC

7. Loosen, but do not remove, the mounting nut (2) and screw (3) attaching the Integrated Control Unit (ICU) (1) mounting bracket to the body.
8. Lift the ICU and mounting bracket (1) off the mounting stud and screw.

NOTE: The HCU and the ABM are not serviceable separately from the ICU for vehicles equipped with Hill Start Assist (HSA).

9. To separate the ABM from the HCU. See **Disassembly**).

Disassembly

DISASSEMBLY

NOTE: The HCU and the ABM are not serviceable separately from the ICU for vehicles equipped with Hill Start Assist (HSA).

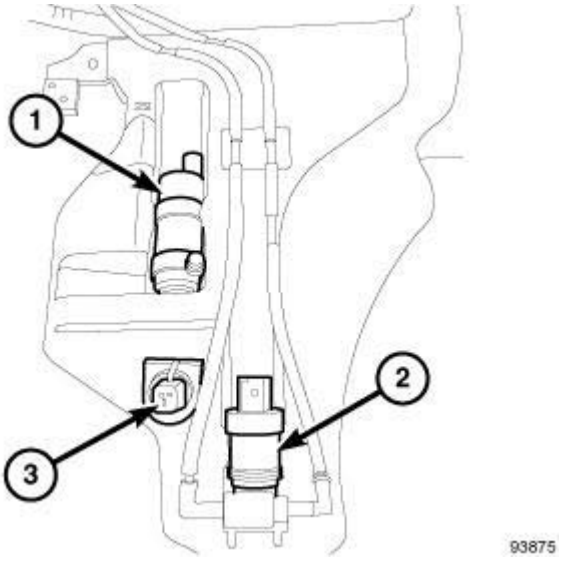


Fig. 49: ICU Mounting Pins
Courtesy of CHRYSLER LLC

1. If necessary, remove the mounting pins from the ICU.

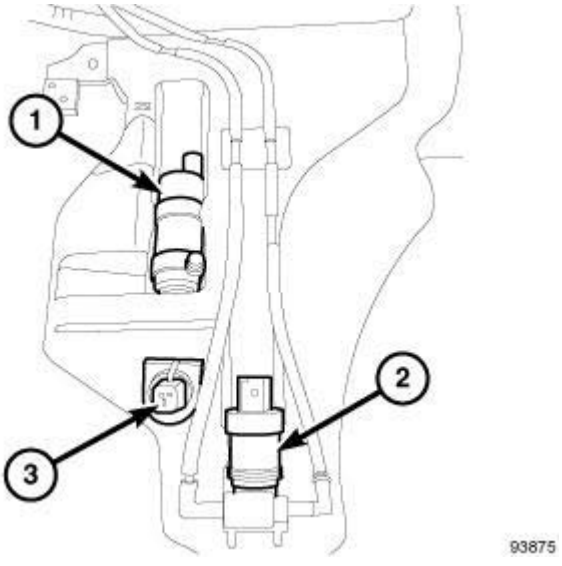


Fig. 50: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER LLC

1 - MOUNTING SCREWS 2 - ABM

2. Remove the four screws (1) attaching the ABM (2) to the HCU.

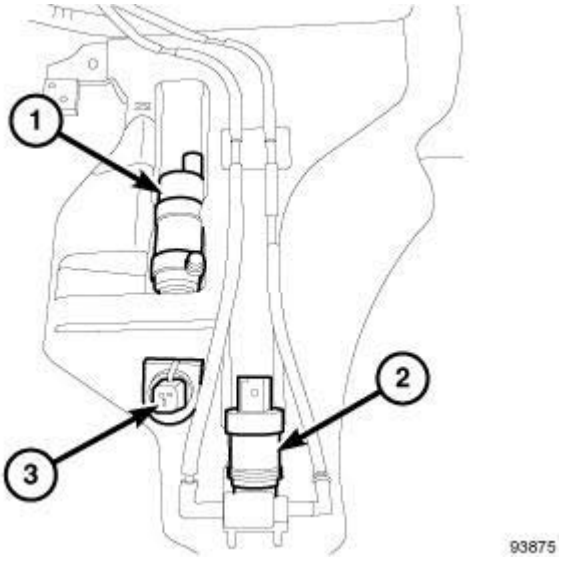


Fig. 51: Identifying ABM, HCU, & Solenoid Valve Stem
Courtesy of CHRYSLER LLC

1 - ABM
2 - HCU
3 - SOLENOID VALVE STEM

3. Separate the ABM (1) from the HCU (2).

Assembly

ASSEMBLY

1. Clean any debris off the mating surfaces of the HCU and ABM.

CAUTION: When installing new O-rings or solenoid valve stem seals, do not use any type of lubricant.

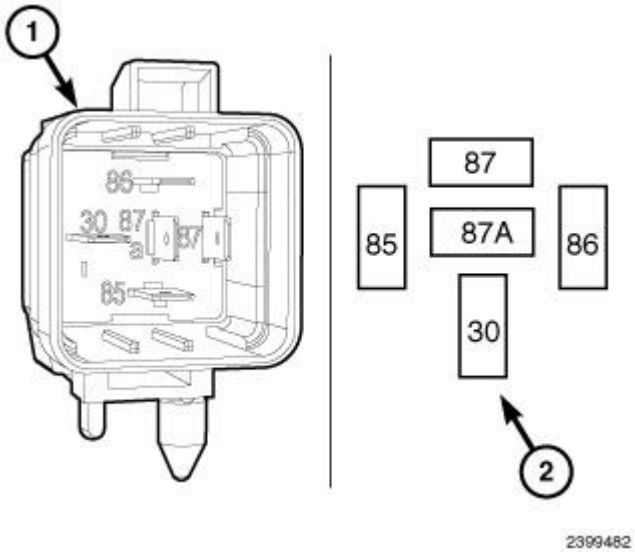


Fig. 52: Solenoid Valve Seal
Courtesy of CHRYSLER LLC

1 - SEAL 2 - SOLENOID VALVE STEM

2. If the seals (1) on the solenoid valve stems (2) are not new, replace them all. Each of the solenoid valve stem seals must be new to keep out moisture and debris;**do not reuse solenoid valve stem seals.**

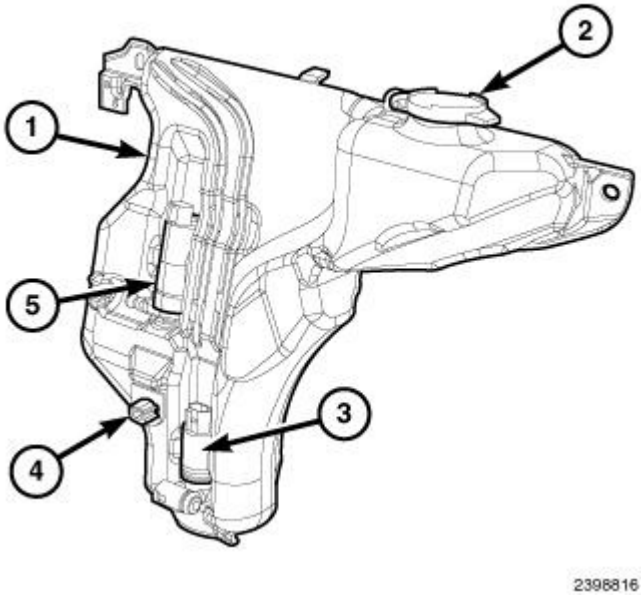


Fig. 53: Internal Pump Connector O-Ring
Courtesy of CHRYSLER LLC

1 - O-RING 2 - O-RING MOUNTING GROOVE

3. Replace the pump/motor connector O-ring (1) if it is not new. Be sure the O-ring is properly seated in the mounting groove (2).

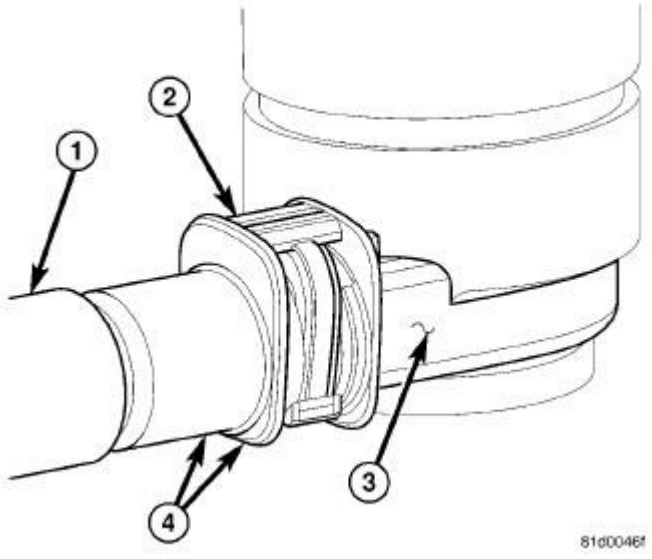


Fig. 54: Identifying ABM, HCU, & Solenoid Valve Stem
Courtesy of CHRYSLER LLC

1 - ABM 2 - HCU 3 - SOLENOID VALVE STEM

4. Align components and install the ABM (1) on the HCU (2).

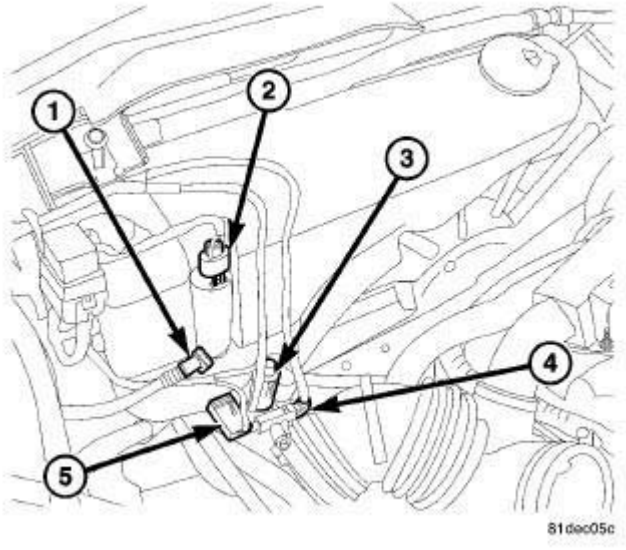


Fig. 55: ABM Mounting Screws - With Traction Control
Courtesy of CHRYSLER LLC

1 - MOUNTING SCREWS 2 - ABM

5. Install the four screws (1) attaching the ABM (2) to the HCU. Tighten the mounting screws to 2 N.m (17 in. lbs.).

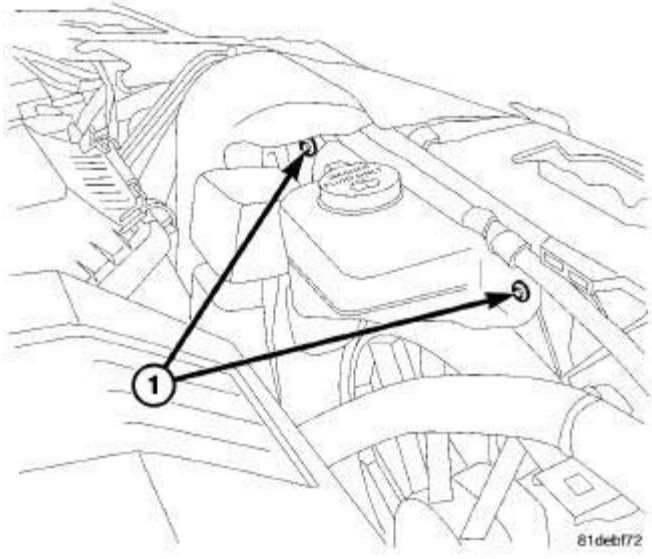


Fig. 56: ICU Mounting Pins
Courtesy of CHRYSLER LLC

6. If necessary, install the mounting pins (1) in the ICU (2) and tighten to 11 N.m (97 in. lbs.).

7. Install the ICU in the vehicle. See **Installation**)

Installation

LEFT-HAND-DRIVE

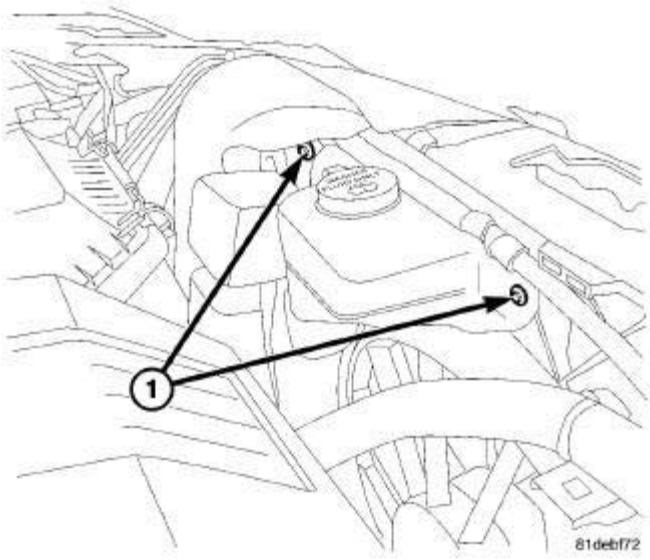


Fig. 57: Locating Integrated Control Unit (ICU)
Courtesy of CHRYSLER LLC

1. Install the ICU with bracket (1) through the opening between the A/C lines and the exhaust manifold using the opposite of how it was removed.
2. Place the mounting bracket for the ICU (1) over the mounting screws (2) and hang the assembly in place. Tighten the two mounting screws (2) to 23 N.m (17 ft. lbs.).

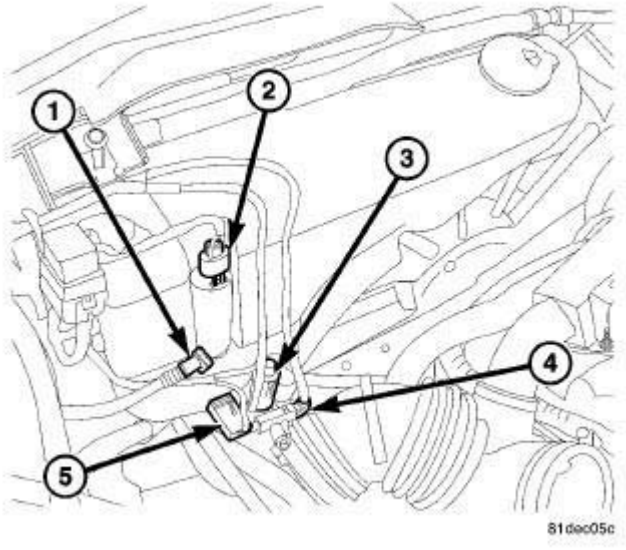


Fig. 58: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

CAUTION: Before installing the ABM harness connector on the ABM, be sure the seal is properly installed in the connector.

3. Insert the ABM wiring harness connector (2) into the socket of the ABM (1) and close the cover, locking the connector in place.

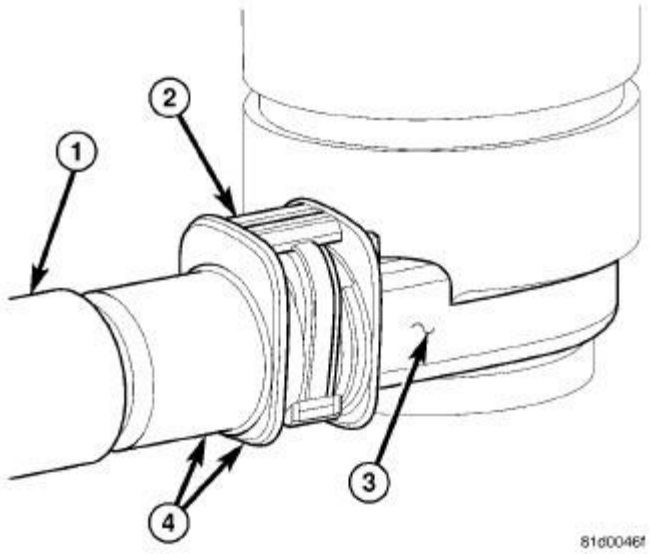


Fig. 59: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

CAUTION: The brake tubes must be routed to the correct ports. Improper routing can lead to degraded or undesirable system performance including external brake fluid leaks.

- **(1) Master Cylinder Secondary**
- **(2) Front Left**
- **(3) Front Right**
- **(4) Master Cylinder Primary**
- **(5) Rear Left**
- **(6) Rear Right**

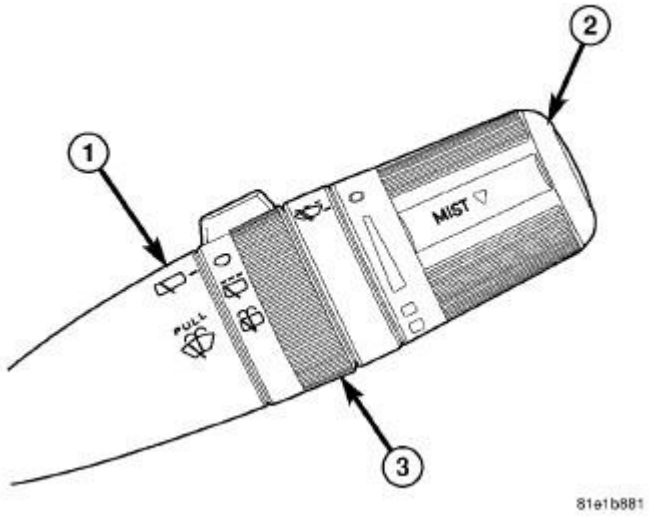


Fig. 60: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

4. Install the four chassis brake tubes (2, 3, 5, 6) at the ICU hydraulic control unit (7). Tighten the tube nuts to 17 N.m (150 in. lbs.).
5. Install the primary (4) and secondary (1) brake tubes at the ICU hydraulic control unit (7). Tighten the tube nuts to 17 N.m (150 in. lbs.).
6. Push the brake tube bundle routing clips (with tubes) onto the studs on the dash panel.
7. Position the fresh air plenum and install the two mounting screws.

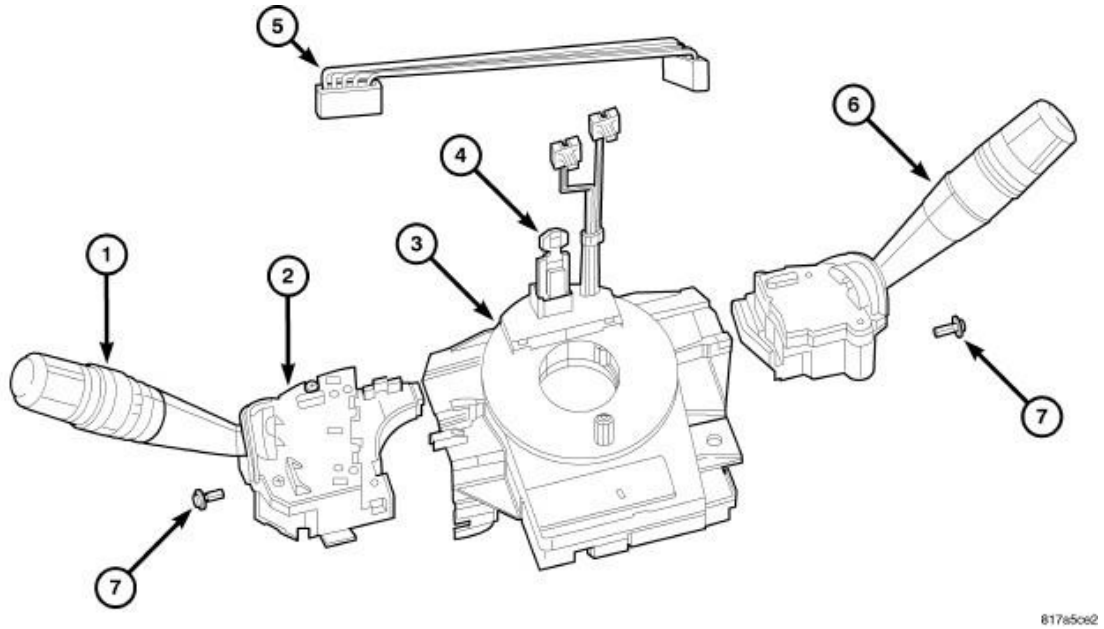


Fig. 61: Wheelhouse Brace
Courtesy of CHRYSLER LLC

8. Install the wheelhouse brace (2). Install and tighten the eight mounting bolts (four each side) (1) to 48 N.m (35 ft. lbs.).

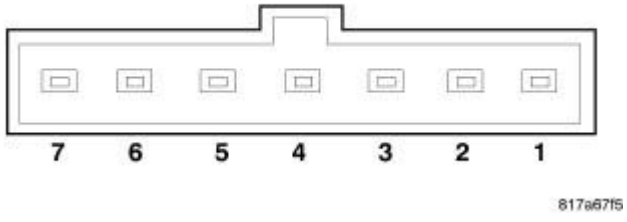


Fig. 62: Cowl Screen
Courtesy of CHRYSLER LLC

9. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.
10. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

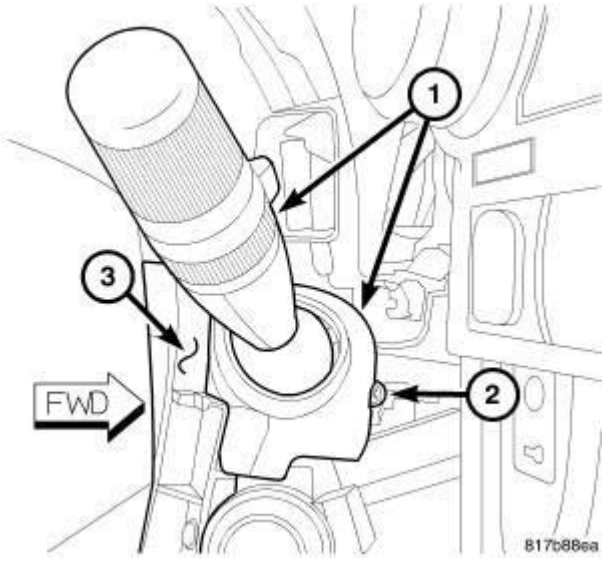


Fig. 63: Cowl Top Screen
Courtesy of CHRYSLER LLC

11. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).
12. Install the engine appearance cover.

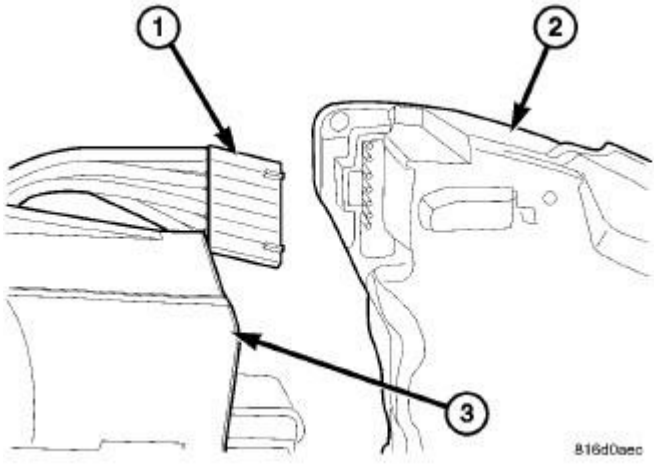


Fig. 64: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

13. Remove the brake pedal holding tool.
14. Connect the battery negative cable to the battery post. It is important that this be performed properly. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure**

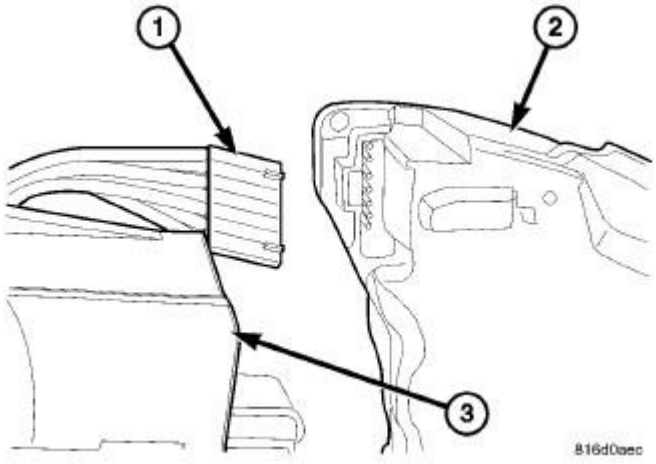


Fig. 65: Bleed Hose Set Up
Courtesy of CHRYSLER LLC

15. Hook up the scan tool to initialize the ABM and perform the following:
    a. Clear any faults.
    b. Fill the master cylinder to the proper fill level and bleed the base and ABS hydraulic systems. See **Standard Procedure**
    c. Check for leaks.
    d. Perform the ABS Verification Test and road test the vehicle. Refer to **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

RIGHT-HAND-DRIVE

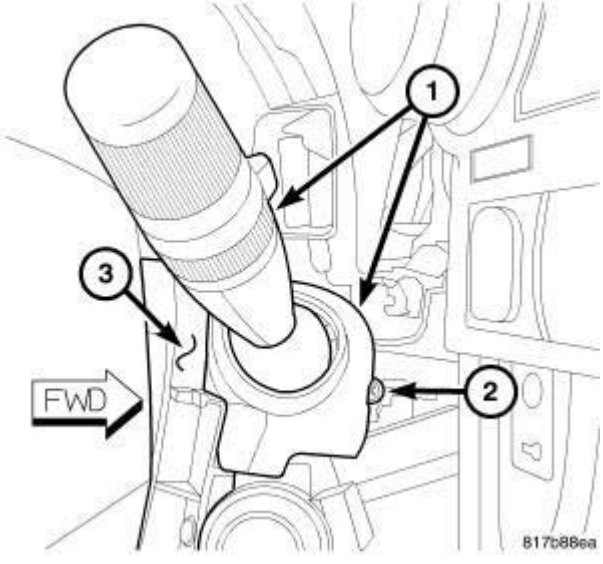


Fig. 66: Integrated Control Unit Mounting - RHD
Courtesy of CHRYSLER LLC

1. Install the ICU with bracket (1) through the opening between the A/C lines and the exhaust manifold using the opposite of how it was removed.
2. Install the ICU with bracket (1) into the engine compartment. Place the mounting bracket for the ICU (1) over the mounting stud and screw (3) and hang the assembly in place. Tighten the mounting nut (2) and mounting screw (3) to 23 N.m (17 ft. lbs.).

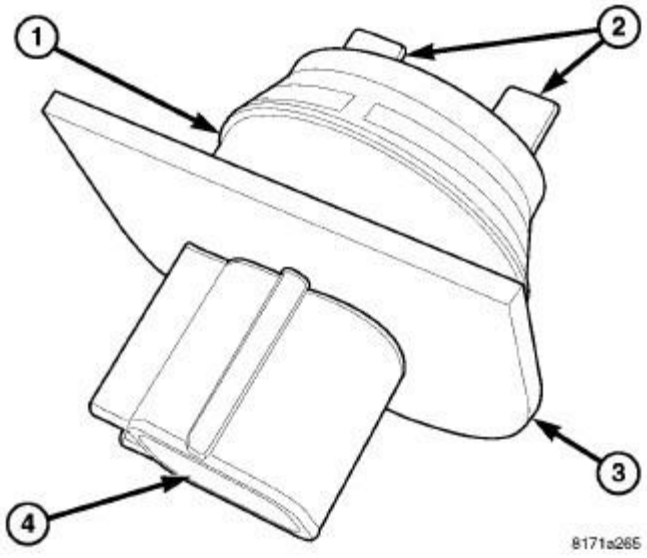


Fig. 67: Wiring Harness Connector At ABM
Courtesy of CHRYSLER LLC

1 - ABM (PART OF ICU)
2 - WIRING HARNESS CONNECTOR

CAUTION: Before installing the ABM harness connector on the ABM, be sure the seal is properly installed in the connector.

3. Insert the ABM wiring harness connector (2) into the socket of the ABM (1) and close the cover, locking the connector in place.

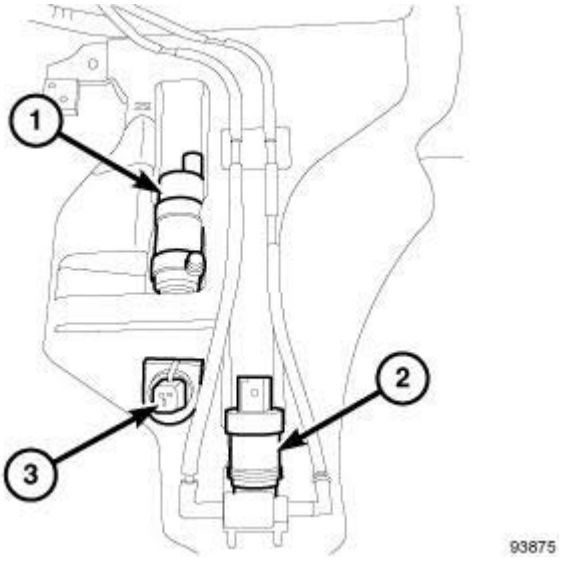


Fig. 68: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

CAUTION: The brake tubes must be routed to the correct ports. Improper routing can lead to degraded or undesirable system performance including external brake fluid leaks.

- **(1) Master Cylinder Secondary**
- **(2) Front Left**
- **(3) Front Right**
- **(4) Master Cylinder Primary**
- **(5) Rear Left**
- **(6) Rear Right**

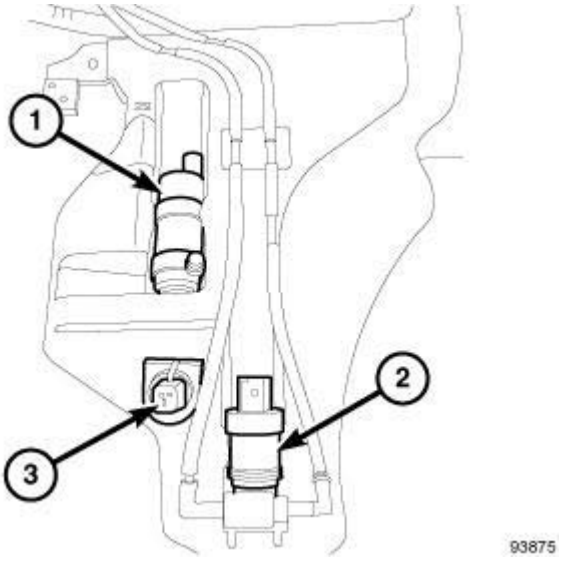


Fig. 69: Identifying Brake Tubes At Hydraulic Control Unit
Courtesy of CHRYSLER LLC

4. Install the four chassis brake tubes (2, 3, 5, 6) at the ICU hydraulic control unit (7). Tighten the tube nuts to 17 N.m (150 in. lbs.).
5. Install the primary (4) and secondary (1) brake tubes at the ICU hydraulic control unit (7). Tighten the tube nuts to 17 N.m (150 in. lbs.).

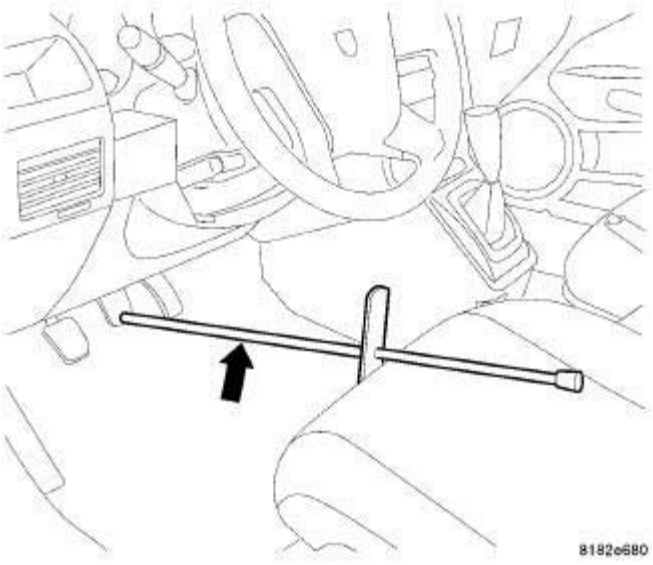


Fig. 70: BRAKE PEDAL HOLDING TOOL
Courtesy of CHRYSLER LLC

6. Remove the brake pedal holding tool.
7. Install the engine appearance cover.
8. Connect the battery negative cable to the battery post. It is important that this be performed properly. Refer to **Electrical - Engine Systems/Battery System - Standard Procedure**

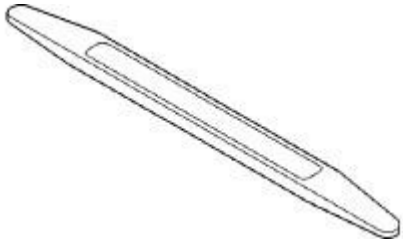


Fig. 71: Bleed Hose Set Up
Courtesy of CHRYSLER LLC

9. Hook up the scan tool to initialize the ABM and perform the following:
   a. Clear any faults.
   b. Fill the master cylinder to the proper fill level and bleed the base and ABS hydraulic systems. See

Standard Procedure

c. Check for leaks.

d. Perform the ABS Verification Test and road test the vehicle. Refer to **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

2009 BRAKES

ABS - Electrical Diagnostics - Journey

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
C100A	LEFT FRONT WHEEL SPEED SENSOR CIRCUIT
C1011	LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C1014	LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE
C1015	RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT
C101C	RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C101F	RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE
C1020	LEFT REAR WHEEL SPEED SENSOR CIRCUIT
C1027	LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C102A	LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE
C102B	RIGHT REAR WHEEL SPEED SENSOR CIRCUIT
C102C	RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE
C1032	RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE
C1035	RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE
C1041	LEFT FRONT TONE WHEEL PERFORMANCE
C1042	RIGHT FRONT TONE WHEEL PERFORMANCE
C1043	LEFT REAR TONE WHEEL PERFORMANCE
C1044	RIGHT REAR TONE WHEEL PERFORMANCE
C1046	LEFT FRONT WHEEL PRESSURE PHASE MONITORING
C1047	RIGHT FRONT WHEEL PRESSURE PHASE MONITORING
C1048	LEFT REAR WHEEL PRESSURE PHASE MONITORING
C1049	RIGHT REAR WHEEL PRESSURE PHASE MONITORING
C1073	ABS PUMP MOTOR CONTROL CIRCUIT
C1078	TIRE REVOLUTIONS RANGE PERFORMANCE
C107C	BRAKE PEDAL SWITCH 1/2 STUCK
C107D	BRAKE PEDAL SWITCH 1/2 CORRELATION
C1090	ABS BRAKE LAMP CONTROL CIRCUIT LOW
C1091	ABS BRAKE LAMP CONTROL CIRCUIT HIGH
C1210	G SENSOR INPUT CIRCUIT PERFORMANCE
C1219	STEERING ANGLE SENSOR ERRATIC PERFORMANCE
C121A	STEERING ANGLE SENSOR NOT INITIALIZED
C121C	TORQUE REQUEST SIGNAL DENIED
C121D	BRAKE PRESSURE SENSOR CIRCUIT
C121E	BRAKE PRESSURE SENSOR COMPARATIVE PERFORMANCE

C1231	DRIVE TEST: STEERING ANGLE SENSOR
C1232	DRIVE TEST: PRESSURE SENSOR
C1234	DRIVE TEST: SENSOR CLUSTER INSTALLATION
C1238	DRIVE TEST: UNSUCCESSFUL
C1239	EMISSIONS ROLLS TEST ACTIVE
C123A	ESP SYSTEM SENSORS CALIBRATION
C123B	ESP SYSTEM CONTROL TOO LONG
C123C	DYNAMICS SENSOR MOUNTING/INSTALLATION PERFORMANCE
C123F	STEERING ANGLE SENSOR COMPARATIVE PERFORMANCE
C1240	STEERING ANGLE SENSOR OVERTRAVEL PERFORMANCE
C1243	G SENSOR NOT INITIALIZED
C2100	BATTERY VOLTAGE LOW
C2101	BATTERY VOLTAGE HIGH
C2111	ANTI-LOCK BRAKE MODULE INTERNAL
C2114	DYNAMICS SENSOR SUPPLY VOLTAGE LOW
C2115	DYNAMICS SENSOR SUPPLY VOLTAGE HIGH
C2116	ABS PUMP MOTOR SUPPLY LOW VOLTAGE
C2202	ORIGINAL VIN MISMATCH/MISSING
C2205	STEERING ANGLE SENSOR INTERNAL
C2206	VEHICLE CONFIGURATION MISMATCH
U0100	LOST COMMUNICATION WITH ECM/PCM
U0101	LOST COMMUNICATION WITH TCM
U0125	LOST COMMUNICATION WITH DYNAMICS SENSOR
U0126	LOST COMMUNICATION WITH STEERING ANGLE SENSOR
U0141	LOST COMMUNICATION WITH FRONT CONTROL MODULE (TIPM)
U0401	IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM
U0402	IMPLAUSIBLE DATA RECEIVED FROM TCM
U0429	IMPLAUSIBLE DATA RECEIVED FROM SCM
U1003	ESP CAN C BUS PERFORMANCE
U1004	CAN C BUS TRANSMIT PERFORMANCE
U1104	CAN C BUS CRC PERFORMANCE
U140E	IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED
U1501	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM PCM
U1502	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TCM
U1503	IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TIPM

DIAGNOSIS AND TESTING

C100A-LEFT FRONT WHEEL SPEED SENSOR CIRCUIT

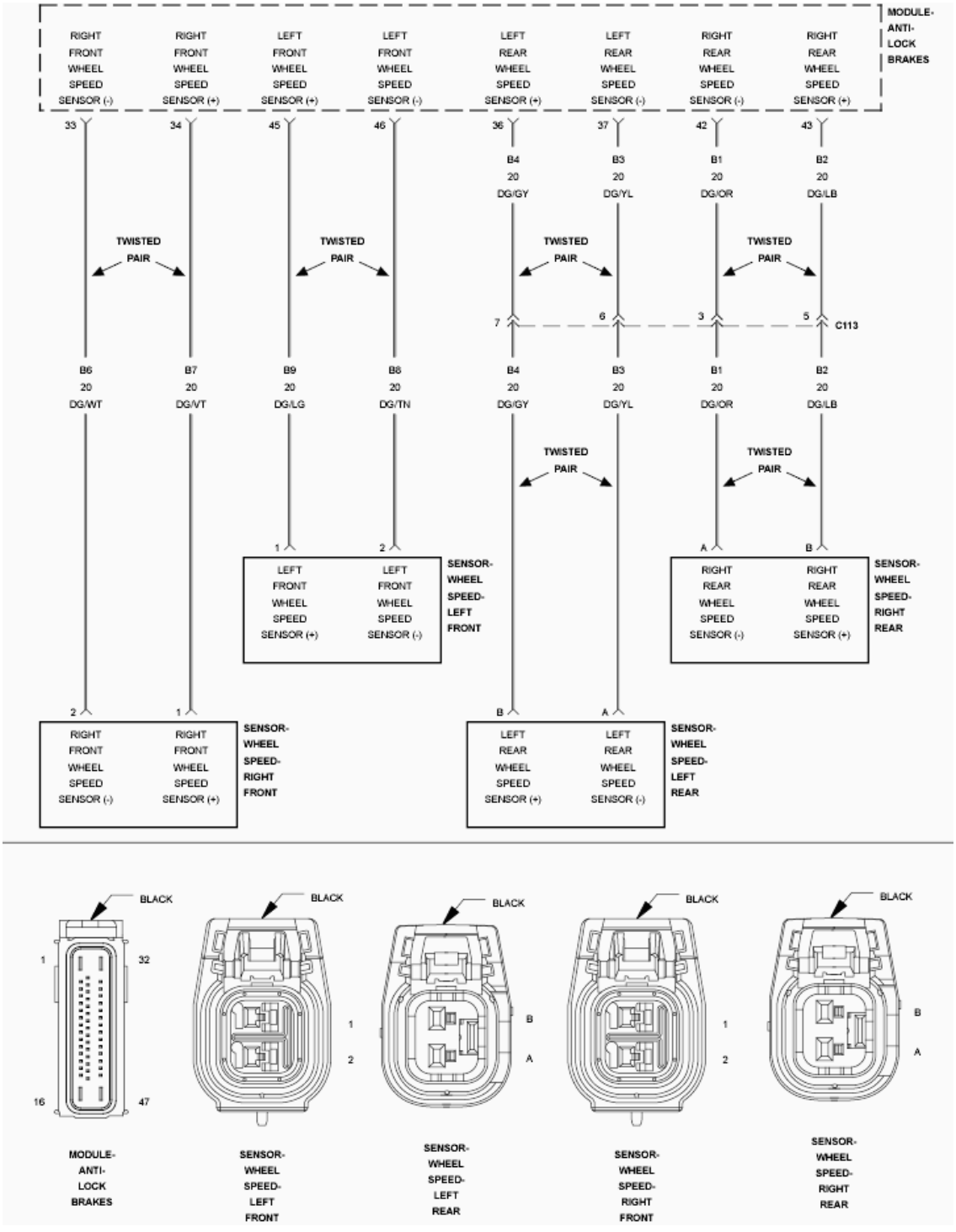


Fig. 1: Left Front Wheel Speed Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  When the Left Front Wheel Speed Sensor circuit fails the diagnostic test.

Possible Causes
CONNECTOR/TERMINAL DAMAGE
(B9) LEFT FRONT WSS SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND OR OPEN
(B8) LEFT FRONT WSS SIGNAL CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B8) LEFT FRONT WSS SIGNAL CIRCUIT AND (B9) LEFT FRONT WSS SUPPLY CIRCUIT SHORTED TOGETHER
LEFT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C100A LEFT FRONT WHEEL SPEED SENSOR CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

      Does the scan tool display: C100A LEFT FRONT WHEEL SPEED SENSOR CIRCUIT?

      Yes

      - Go to step 2

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

   1. Turn the ignition off.

2. Inspect the Anti-Lock Brake Module harness connector, Left Front WSS, and Left Front WSS harness connector.

   Is the Left Front WSS or any of the connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK (B9) LEFT FRONT WSS SUPPLY CIRCUIT VOLTAGE**

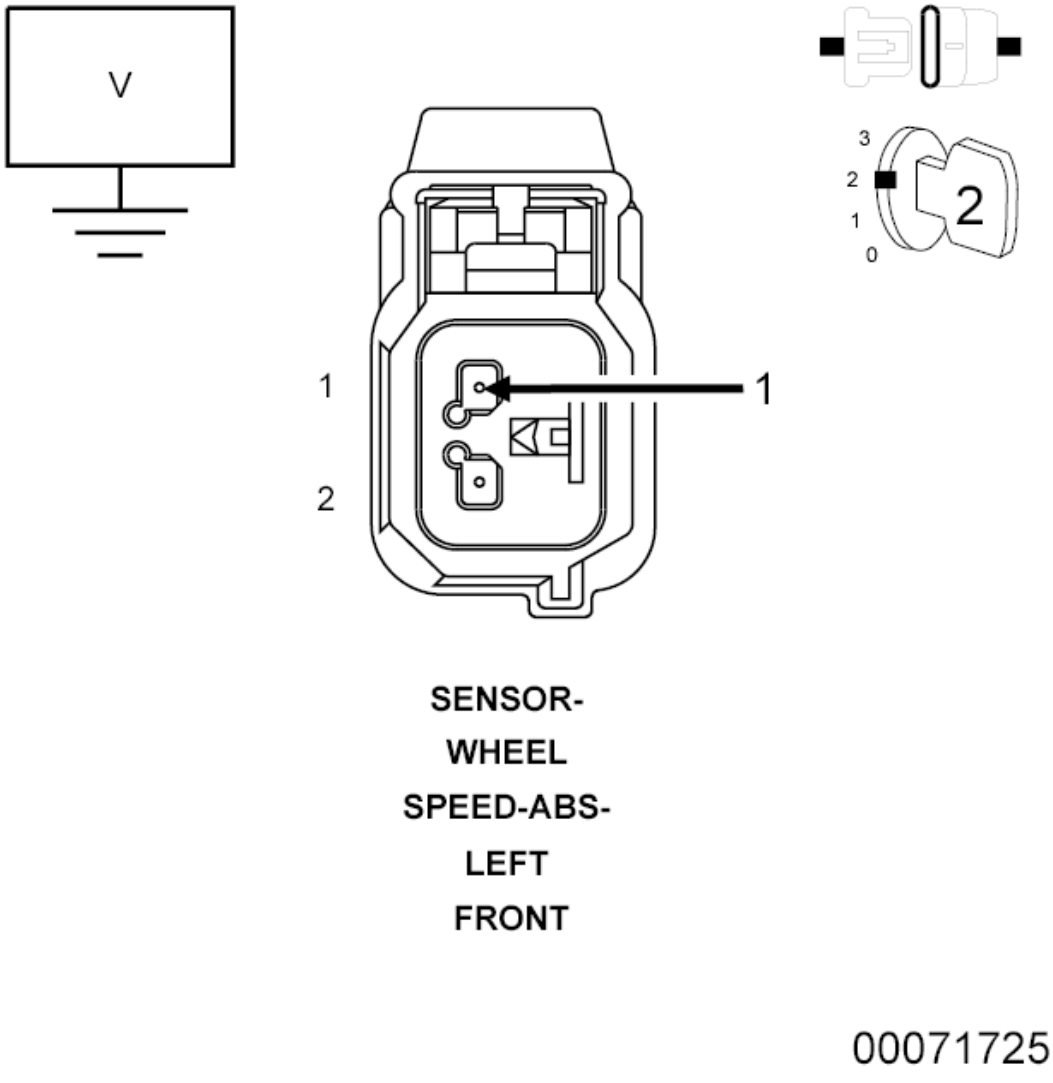


Fig. 2: Checking Left Front Wheel Speed Sensor Supply Circuit Voltage
Courtesy of CHRYSLER LLC

1. Disconnect the Left Front WSS harness connector.
2. Turn the ignition on.
3. Measure the voltage between the (B9) Left Front WSS Supply circuit and ground.

   Is the voltage above 10 volts?

   Yes

   - Go to step 6

   No

- Go to step 4

4. **CHECK (B9) LEFT FRONT WSS SUPPLY CIRCUIT SHORT TO GROUND**

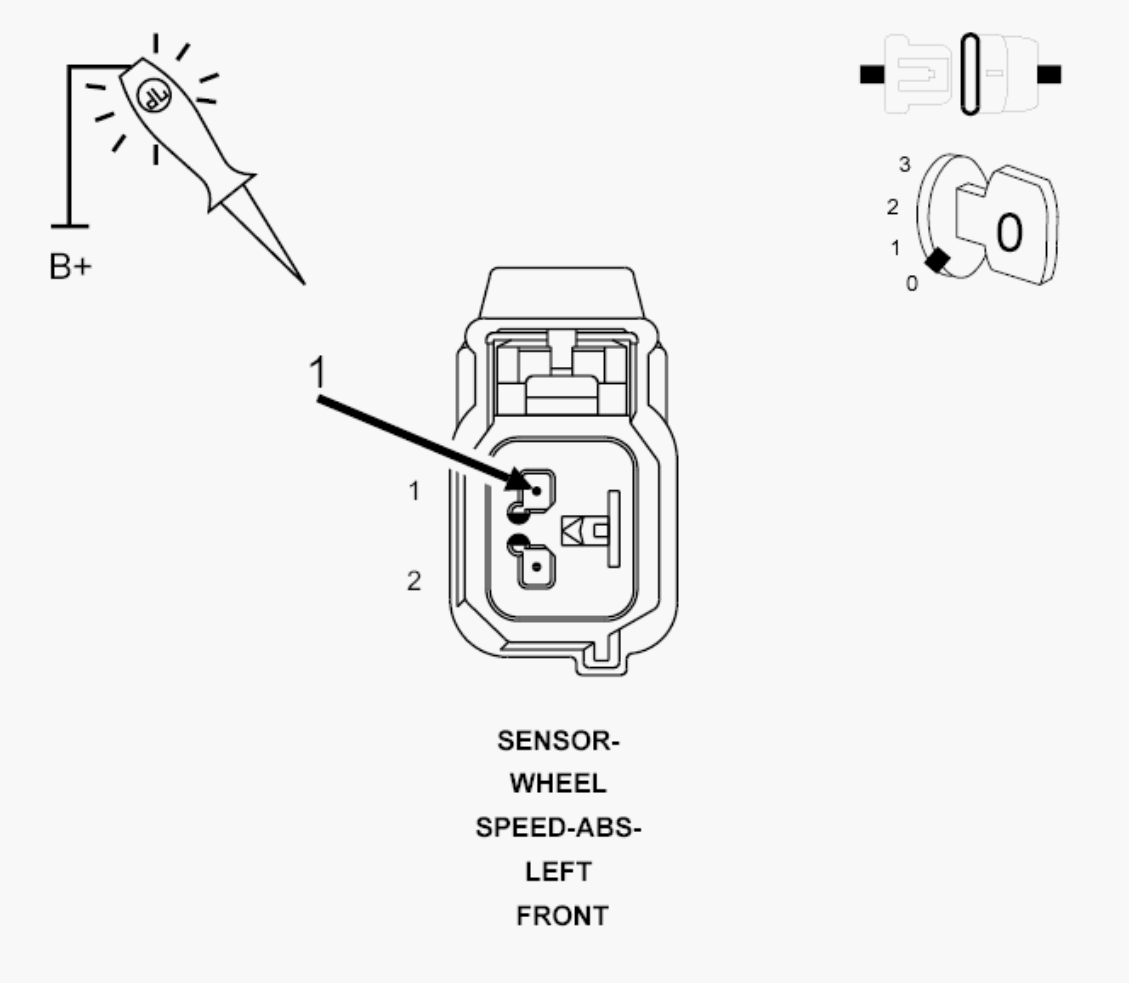


Fig. 3: Checking Left Front Wheel Speed Sensor Supply Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Disconnect the Anti-Lock Brake Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (B9) Left Front WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B9) Left Front WSS Supply circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

- Go to step 5

5. **CHECK (B9) LEFT FRONT WSS SUPPLY CIRCUIT OPEN**

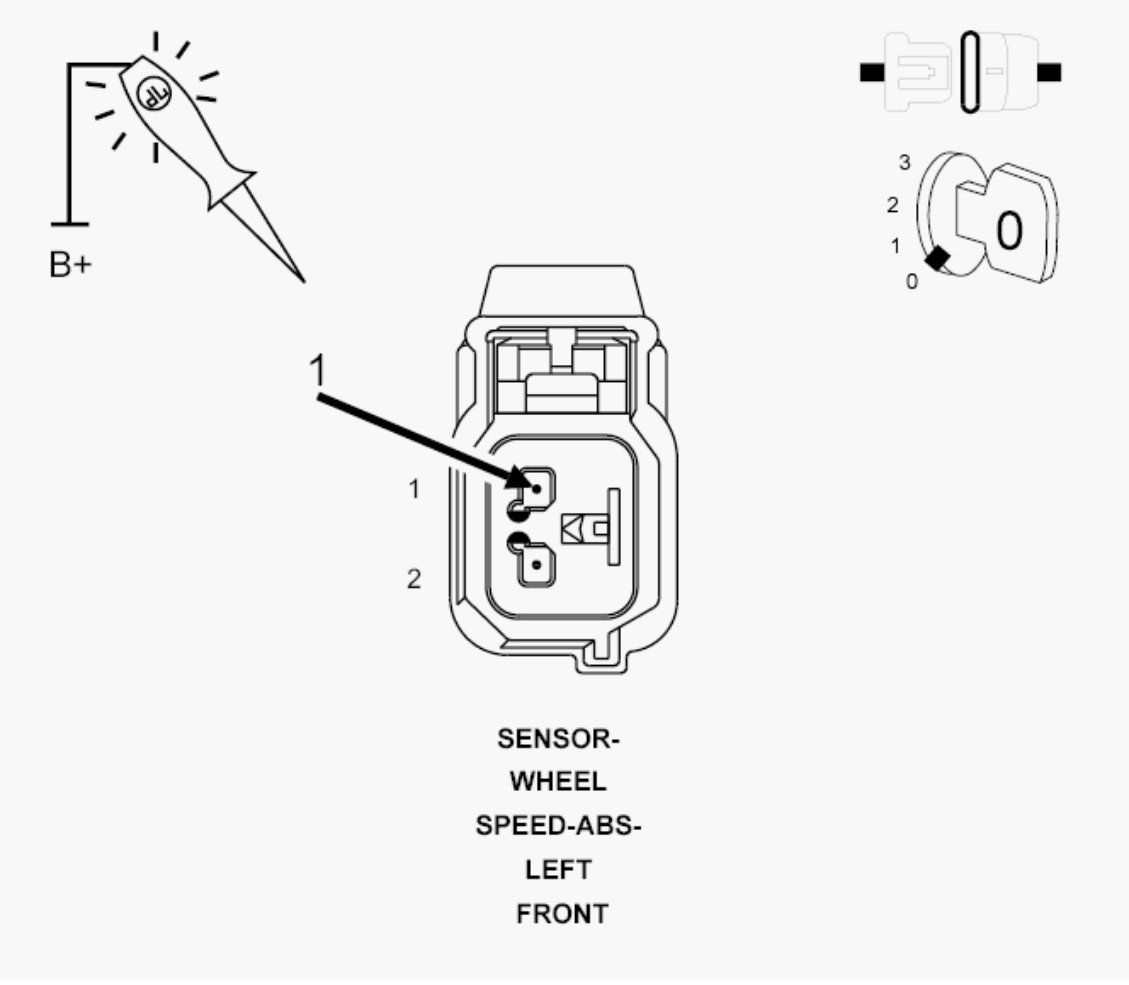


Fig. 4: Checking Left Front Wheel Speed Sensor Supply Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B9) Left Front WSS Supply circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (B9) Left Front WSS Supply circuit.

   Does the test light illuminate brightly

   Yes

   - Go to step 6

   No

   - Repair the (B9) Left Front WSS Supply circuit for an open

- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK (B8) LEFT FRONT WSS SIGNAL CIRCUIT SHORT TO VOLTAGE**

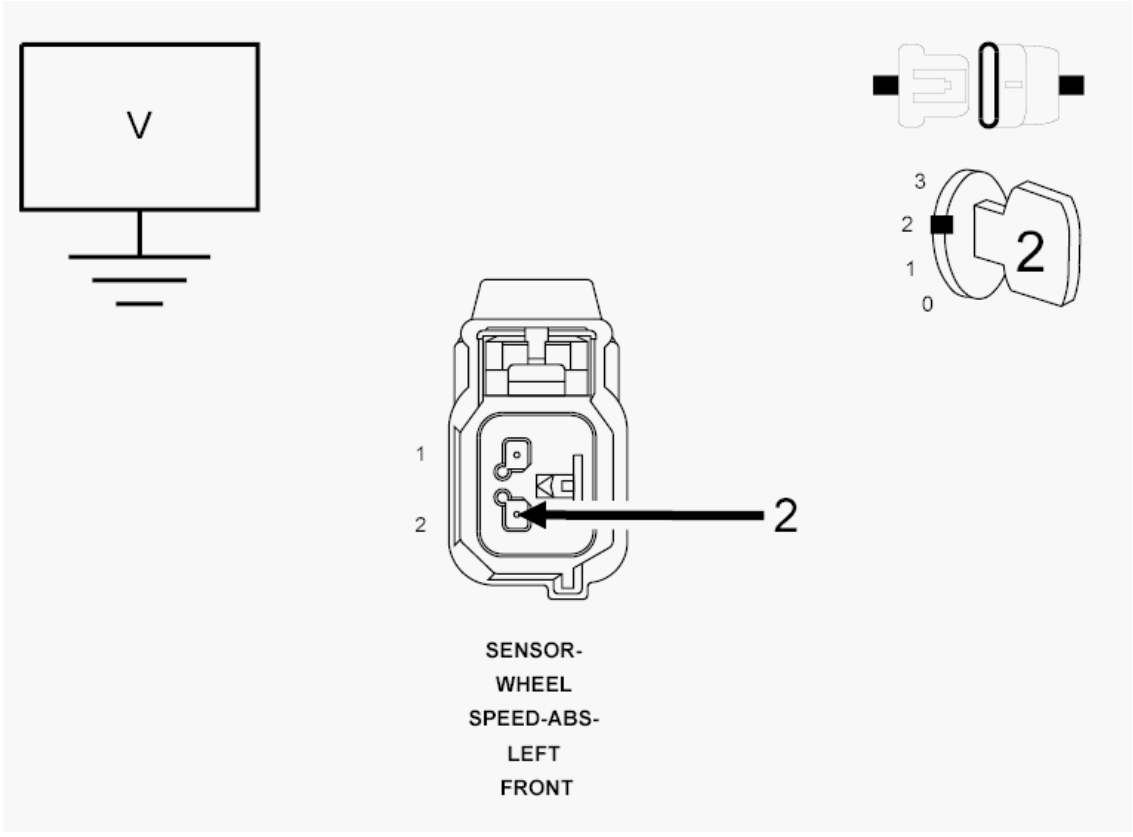


Fig. 5: Checking Left Front Wheel Speed Sensor Signal Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage between the (B8) Left Front WSS Signal circuit and ground.

   Is the voltage above 1 volt?

   Yes

   - Repair the (B8) Left Front WSS Signal circuit for a short to voltage.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK (B8) LEFT FRONT WSS SIGNAL CIRCUIT SHORT TO GROUND**

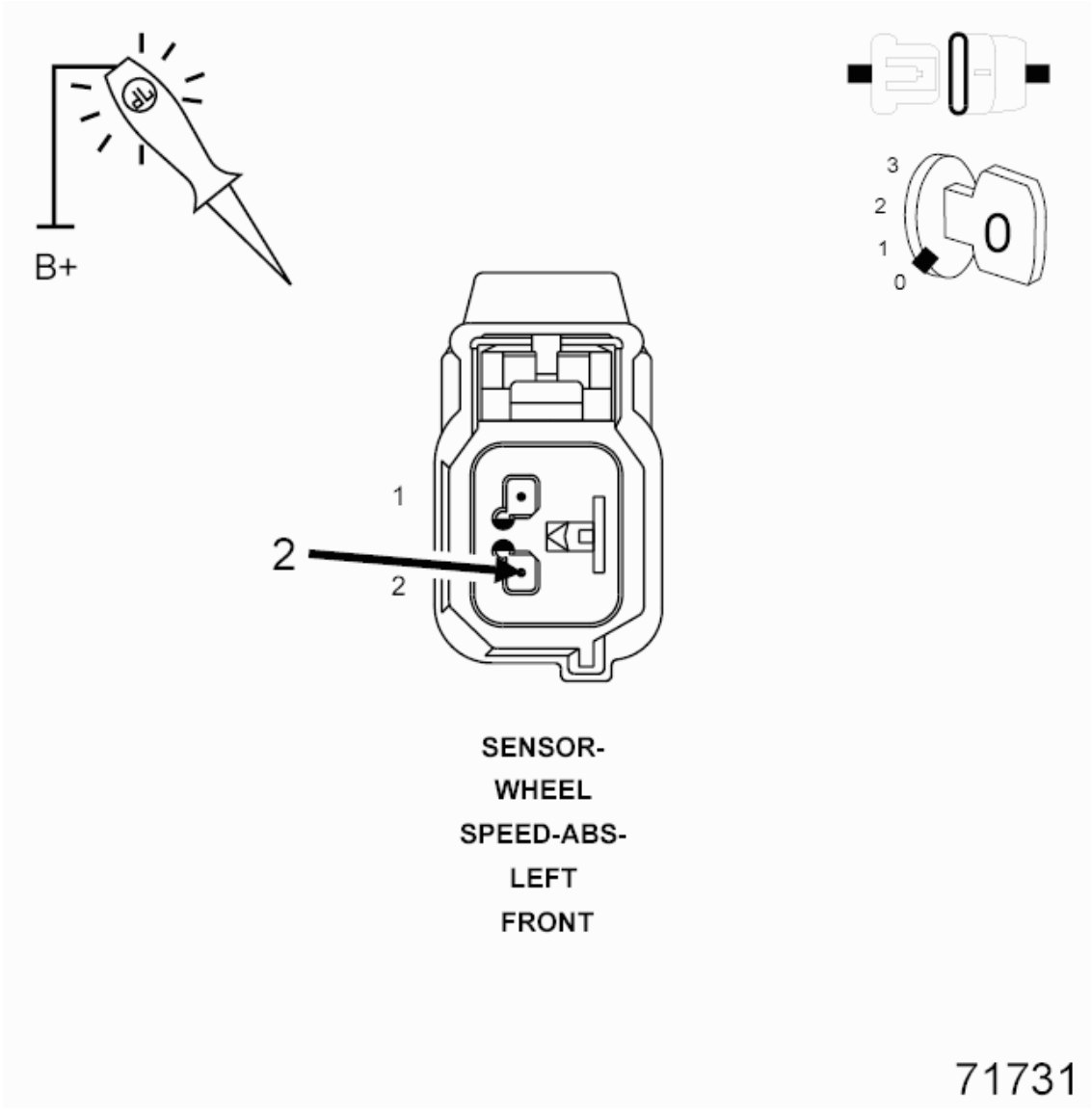


Fig. 6: Checking Left Front Wheel Speed Sensor Signal Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. If not done previously, disconnect the Anti-Lock Brake Module harness connector.
3. Using a 12-volt test light connected to 12-volts, probe the (B8) Left Front WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B8) Left Front WSS Signal circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 8

8. **CHECK (B8) LEFT FRONT WSS SIGNAL CIRCUIT OPEN**

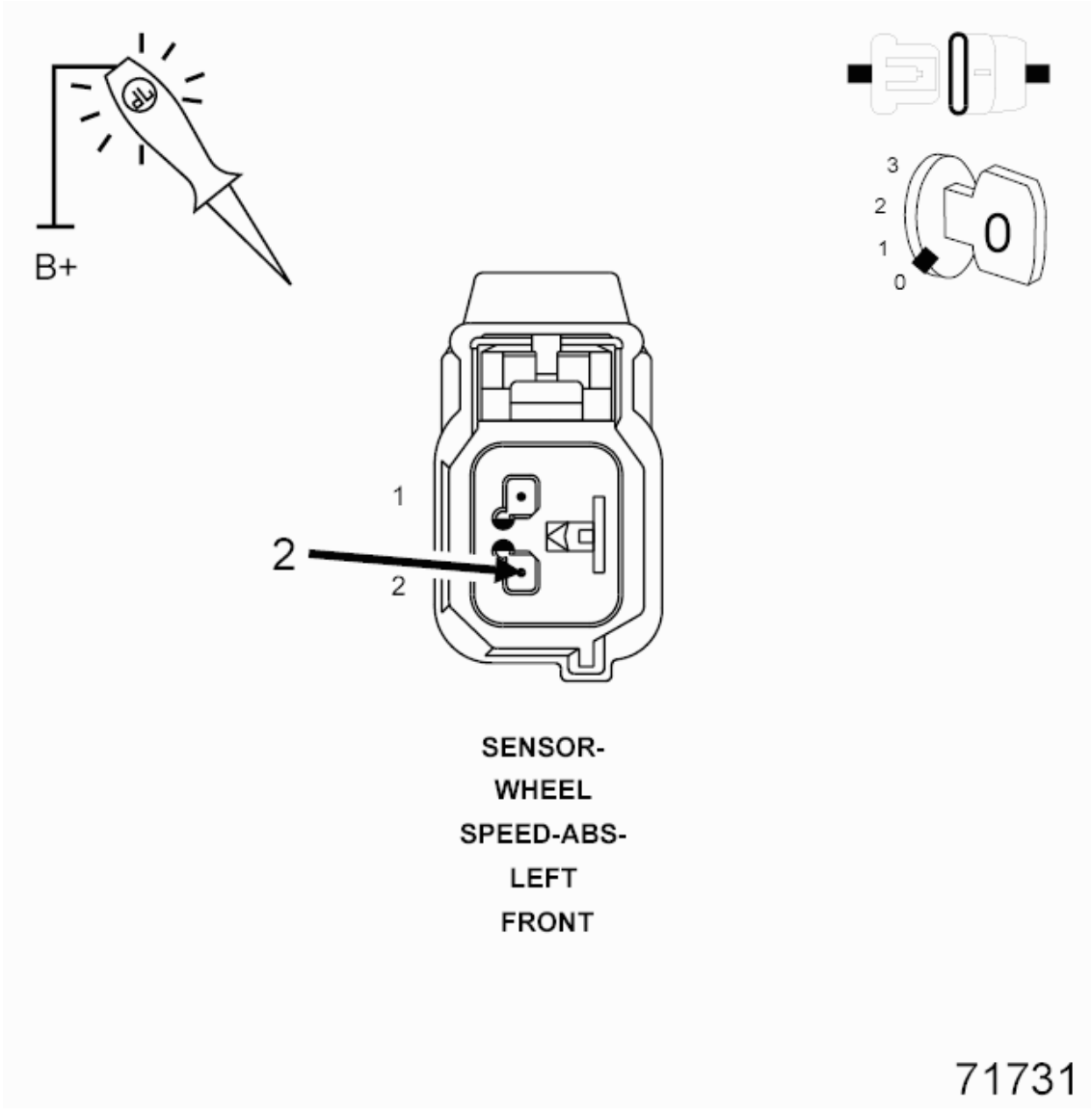


Fig. 7: Checking Left Front Wheel Speed Sensor Signal Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B8) Left Front WSS Signal circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (B8) Left Front WSS Signal circuit.

   Does the test light illuminate brightly?

Yes

- Go to step 9

No

- Repair the (B8) Left Front WSS Signal circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

9. **CHECK (B8) LEFT FRONT WSS SIGNAL CIRCUIT AND (B9) LEFT FRONT WSS SUPPLY CIRCUIT SHORT TOGETHER**

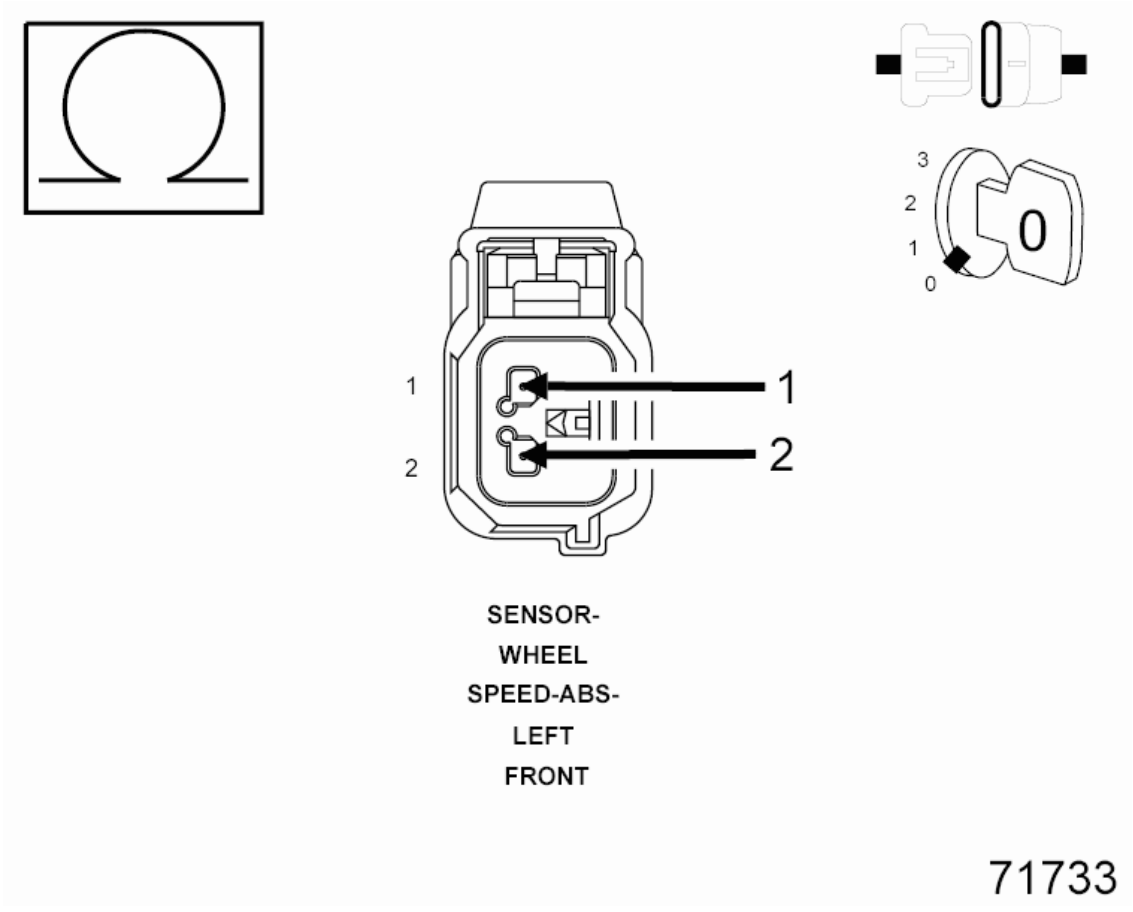


Fig. 8: Checking Left Front Wheel Speed Sensor Signal Circuit & Left Front Wheel Speed Sensor Supply Circuit Short Together
Courtesy of CHRYSLER LLC

1. Remove all jumper wires.
2. Measure the resistance between the (B8) Left Front WSS Signal circuit and the (B9) Left Front WSS Supply circuit.

   Is the resistance above 5.0 Ohms?

Yes

- Go to step 10

No

- Repair the (B8) Left Front WSS Signal circuit and the (B9) Left Front WSS Supply circuit for a short together.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **LEFT FRONT WHEEL SPEED SENSOR**
    1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information.
    2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       CAUTION: Make sure brake capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Did DTC C100A LEFT FRONT WHEEL SPEED SENSOR CIRCUIT reset?

       Yes

       - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
       - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       No

       - Test Complete.

C1011-LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Left Front Wheel Speed Sensor (WSS) Signal is intermittently missing while vehicle speed is above 40 km/h (25 mph) or erratic wheel speed signal during acceleration or sensed wheel speed is different from other wheels.

Possible Causes
LEFT FRONT WSS LOOSE - B8, B9 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
LEFT FRONT TONE WHEEL DAMAGE
LEFT FRONT WHEEL/ BEARING DAMAGE
IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES
LEFT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1011-LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   NOTE: If DTC C100A Left Front Wheel Speed Sensor Circuit is present it must be repaired before continuing.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Start the engine.

      CAUTION: Ensure brake capability is available before road testing.

   6. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   7. With the scan tool, read DTCs.

      Does the scan tool display: C1011-LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE active?

Yes

- Go to step 3

No

- Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Left Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - Refer to the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Left Front Tire improperly inflated or mismatched tires on vehicle?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

      No

- Go to step 4

4. **CHECK LEFT FRONT WSS LOOSENESS, INSPECT B8, B9 CIRCUITS/TERMINALS FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Left Front WSS, and Left Front WSS harness connector
2. Inspect the Left Front WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B8) Left Front WSS Signal and (B9) Left Front WSS Supply circuits between the Left Front WSS and Anti-Lock Brake Module for damage.

Is the Left Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK LEFT FRONT WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Left Front Wheel Speed Sensor
   2. Inspect the Left Front Wheel Speed Sensor face for damage.

Is the Left Front Wheel Speed Sensor damaged?

Yes

- Replace sensor and hub assembly.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 6

6. **CHECK LEFT FRONT TONE WHEEL/BEARING FOR DAMAGE**
   1. Inspect the Left Front Tone Wheel/Bearing for damage, missing teeth, cracks, corrosion or looseness.

NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

Is the Left Front Tone Wheel/Bearing damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 7

7. **CHECK LEFT FRONT WHEEL BEARING FOR DAMAGE**
   1. Inspect the Left Front wheel bearing for excessive runout or clearance. Refer to **Front Suspension/Front/HUB AND BEARING - Diagnosis and Testing**

      Is the Left Front Wheel Bearing Damaged?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 8
8. **LEFT FRONT WHEEL SPEED SENSOR**
   1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C1011-LEFT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE reset?

      Yes

      - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock**

Brake (ABS) - Standard Procedure.

No

- Test Complete.

C1014-LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Left Front Wheel Speed Sensor (WSS) Signal reading is different from the readings received from the other WSS's at a vehicle speed above 40 km/h (25 mph). The Anti-Lock Brake Module compares WSS readings from side-to-side on an axle and front-to-rear.

Possible Causes
LEFT FRONT WSS LOOSE - B8, B9 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES
LEFT FRONT TONE WHEEL/BEARING DAMAGE
LEFT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1014-LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

4. With the scan tool, read DTCs.

   Does the scan tool display: C1014-LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE active?

   Yes

   - Go to step 3

   No

   - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Left Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Left Front Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK LEFT FRONT WSS LOOSENESS, INSPECT B8, B9 CIRCUITS/TERMINALS FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Left Front WSS, and Left Front WSS harness connector.
2. Inspect the Left Front WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B8) Left Front WSS Signal and (B9) Left Front WSS Supply circuits between the Left Front WSS and Anti-Lock Brake Module for damage.

Is the Left Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK LEFT FRONT WHEEL SPEED SENSOR FOR DAMAGE**

1. Remove the Left Front Wheel Speed Sensor
2. Inspect the Left Front Wheel Speed Sensor face for damage.

Is the Left Front Wheel Speed Sensor damaged?

Yes

- Replace sensor and hub assembly.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 6

6. **CHECK LEFT FRONT TONE WHEEL/BEARING FOR DAMAGE**
   1. Inspect the Left Front Tone Wheel/Bearing for damage, missing teeth, cracks, corrosion or looseness.

      NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

      Is the Left Front Tone Wheel/Bearing damaged?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 7

7. **LEFT FRONT WHEEL SPEED SENSOR**
   1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C1014-LEFT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE reset?

      Yes

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Test Complete.

C1015-RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT

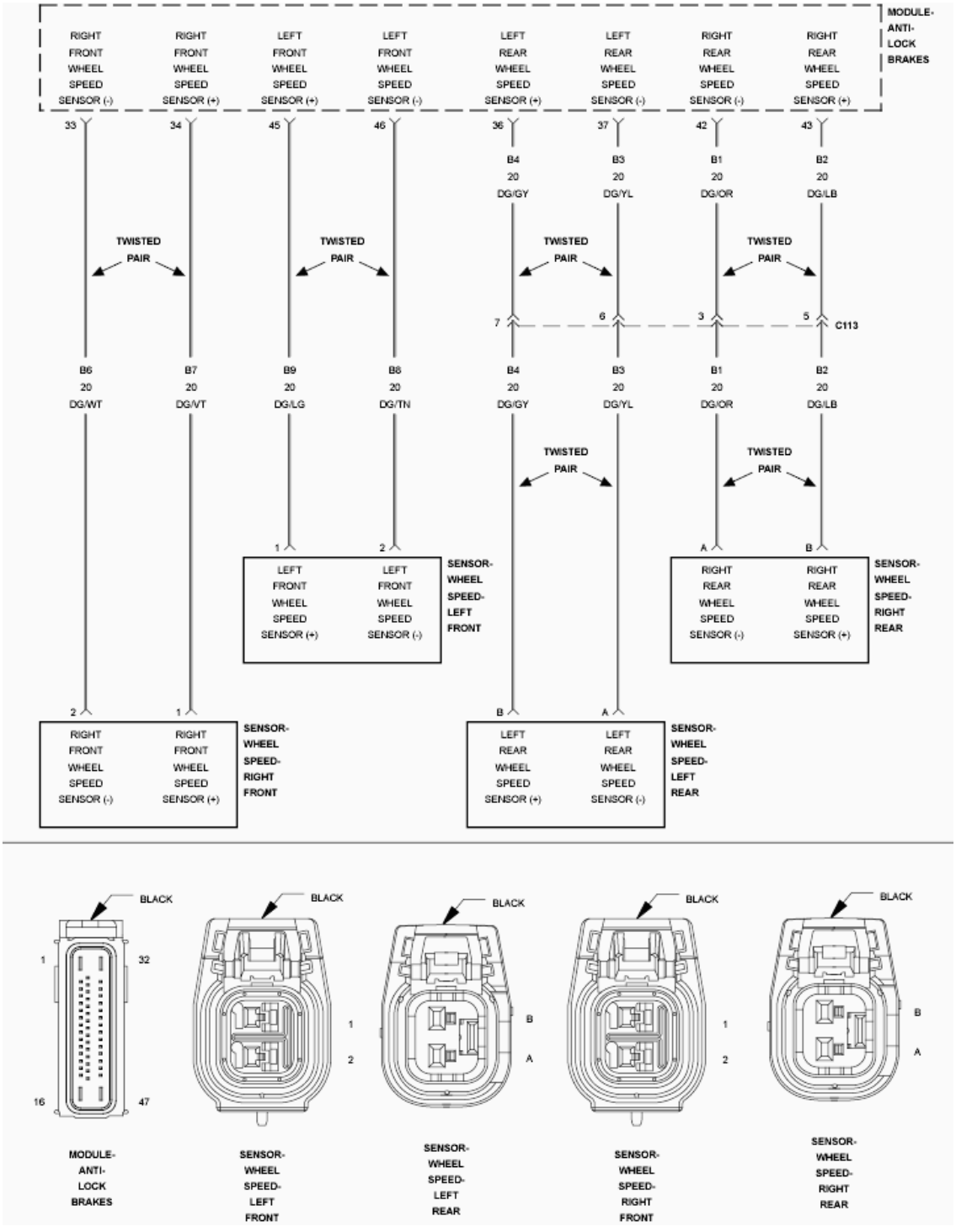


Fig. 9: Left Front Wheel Speed Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  If the Right Front Wheel Speed Sensor circuit fails the diagnostic test.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B6) RIGHT FRONT WSS SIGNAL CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B6) RIGHT FRONT WSS SIGNAL CIRCUIT SHORTED TO THE (B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT
RIGHT FRONT WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR DTC C1015-RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

      Does the scan tool display: C1015-RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT?

      Yes

      - Go to step 2

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

1. Turn the ignition off.
2. Inspect the Anti-Lock Brake Module harness connector, Right Front WSS, and Right Front WSS harness connector.

   Is the Right Front WSS or any of the connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK (B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT VOLTAGE**

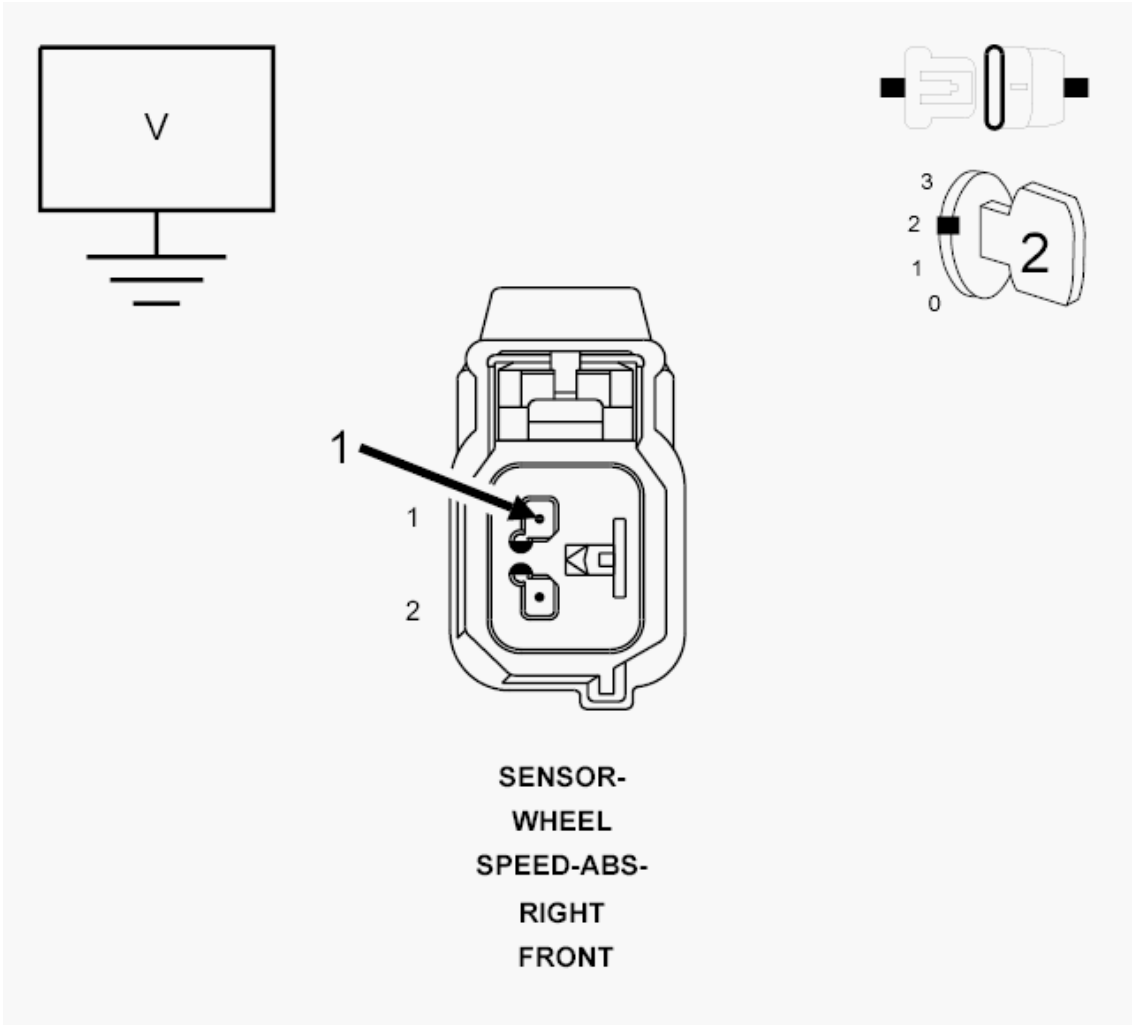


Fig. 10: Checking Right Front Wheel Speed Sensor 12 Volt Supply Circuit Voltage
Courtesy of CHRYSLER LLC

1. Disconnect the Right Front WSS harness connector.
2. Turn the ignition on.
3. Measure the voltage of the (B7) Right Front WSS 12 Volt Supply circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Go to step 6

   No

   - Go to step 4
4. **CHECK (B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT FOR A SHORT TO GROUND**

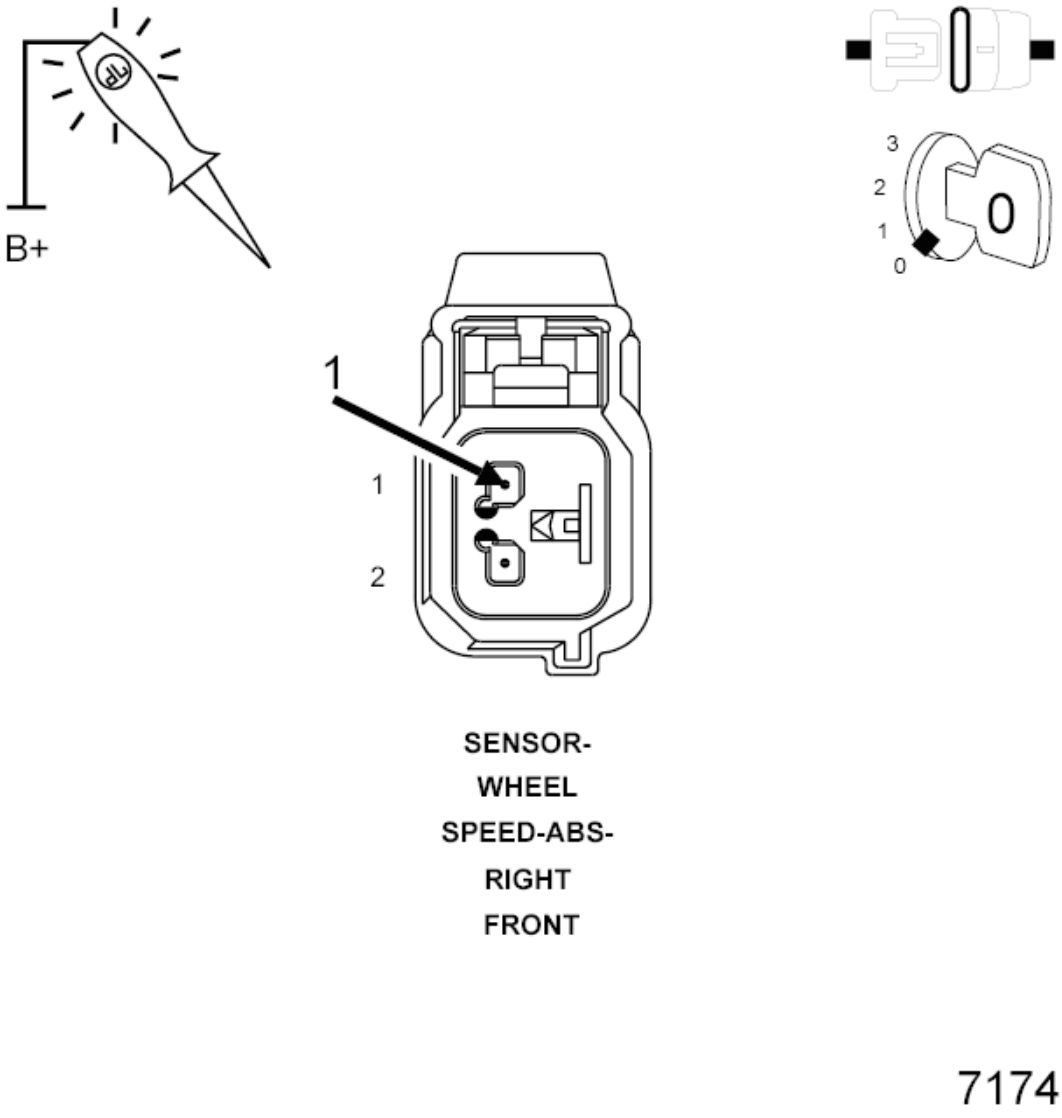


Fig. 11: Checking Right Front Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Right Front WSS harness connector.
3. Disconnect the Anti-Lock Brake Module harness connector.
4. Using a 12-volt test light connected to 12-volts, probe the (B7) Right Front WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B7) Right Front WSS Supply circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE,**

Antilock Brake (ABS) - Standard Procedure.

No

- Go to step 5

5. **CHECK (B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT FOR AN OPEN**

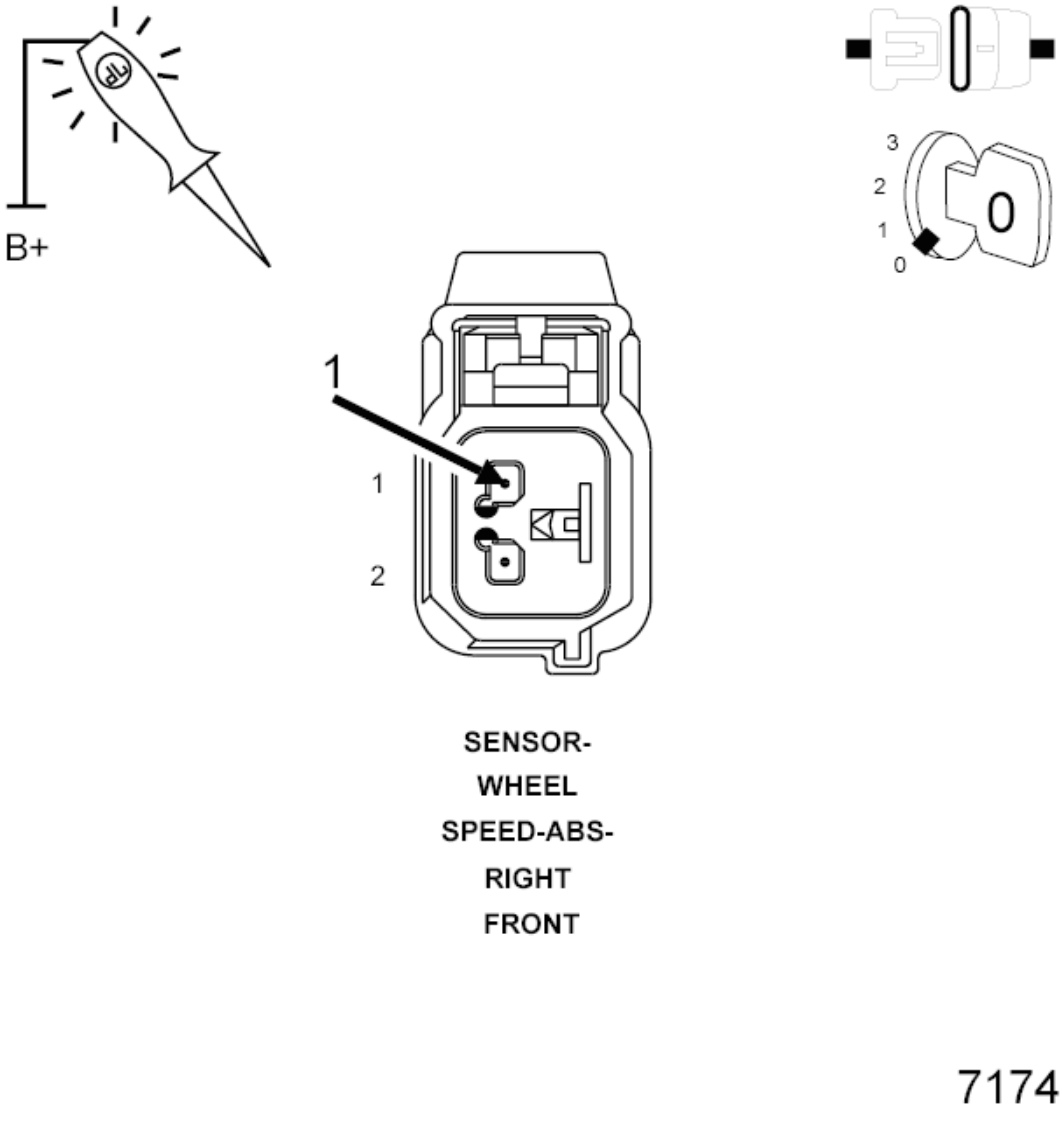


Fig. 12: Checking Right Front Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B7) Right Front WSS Supply circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (B7) Right Front WSS Supply circuit.

   Does the test light illuminate brightly?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Repair the (B7) Right Front WSS Supply circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK (B6) RIGHT FRONT WSS SIGNAL CIRCUIT SHORT TO GROUND**

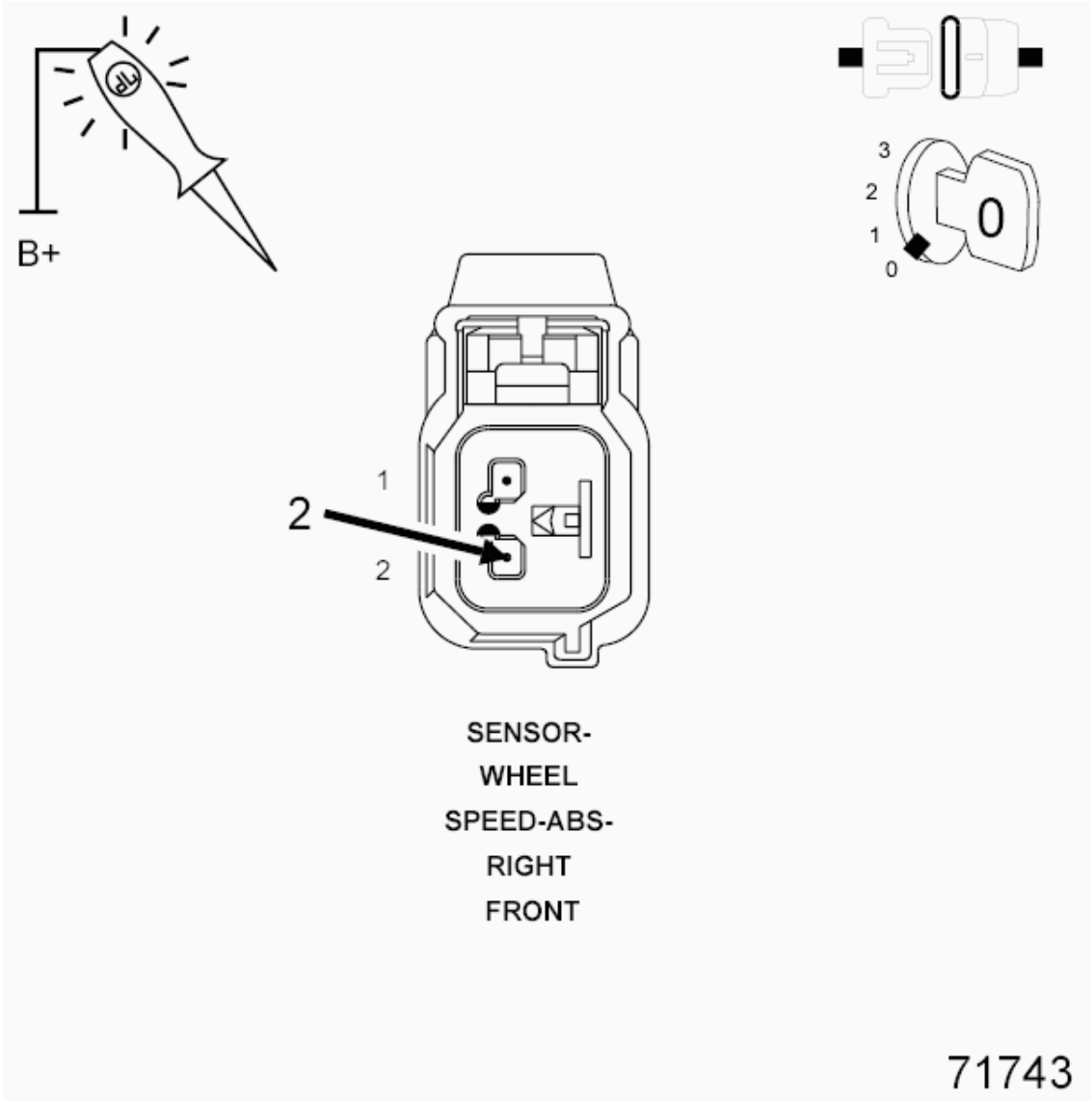


Fig. 13: Checking Right Front Wheel Speed Sensor Signal Circuit Short To Ground

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. If not done previously, disconnect the Anti-Lock Brake Module harness connector.
3. Using a 12-volt test light connected to 12-volts, probe the (B6) Right Front WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B6) Right Front WSS Signal circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK (B6) RIGHT FRONT WSS SIGNAL CIRCUIT OPEN**

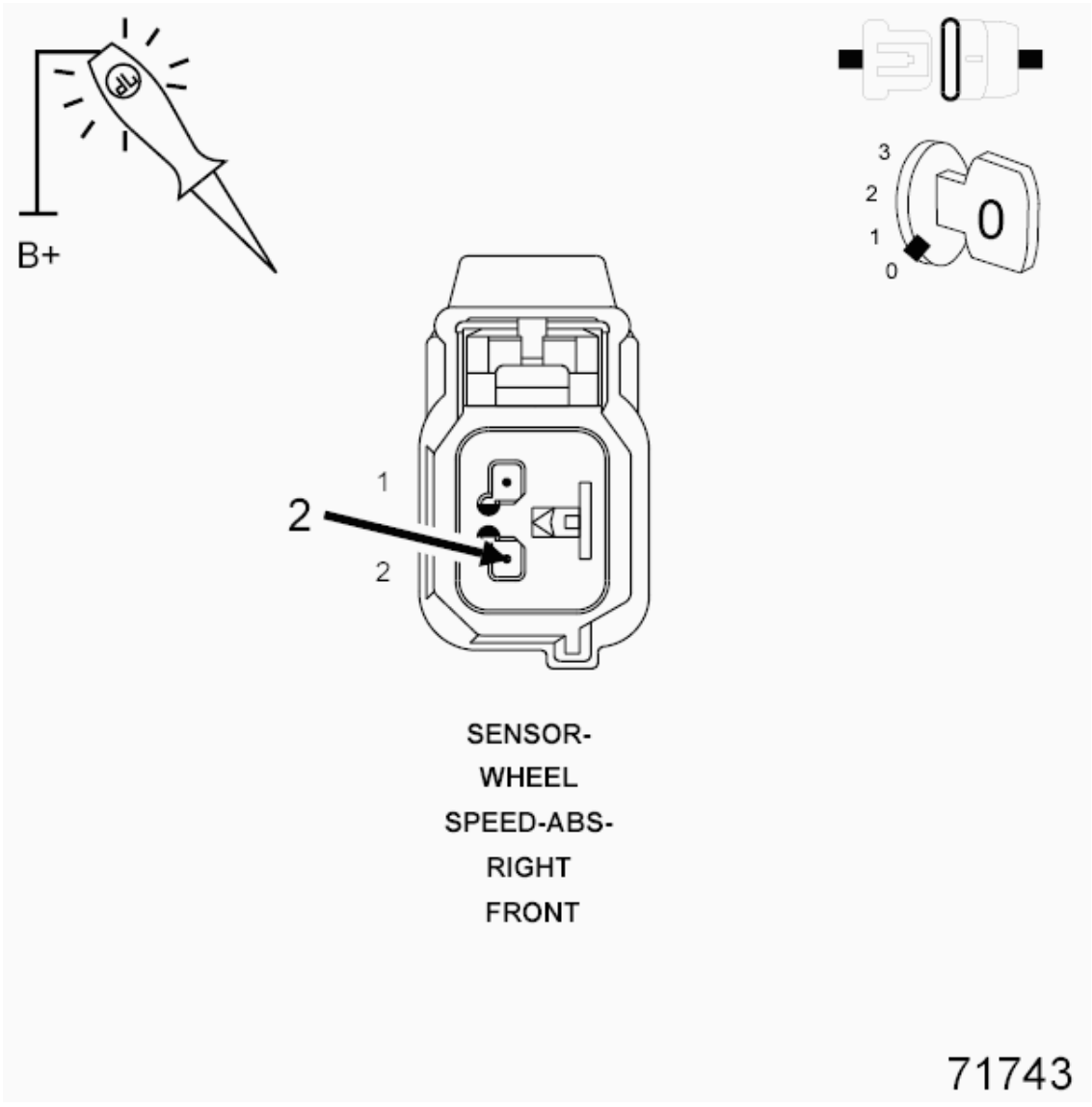


Fig. 14: Checking Right Front Wheel Speed Sensor Signal Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B6) Right Front WSS Signal circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (B6) Right Front WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Go to step 8

   No

- Repair the (B6) Right Front WSS Signal circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

8. **CHECK (B6) RIGHT FRONT WSS SIGNAL CIRCUIT FOR AN SHORT TO VOLTAGE**

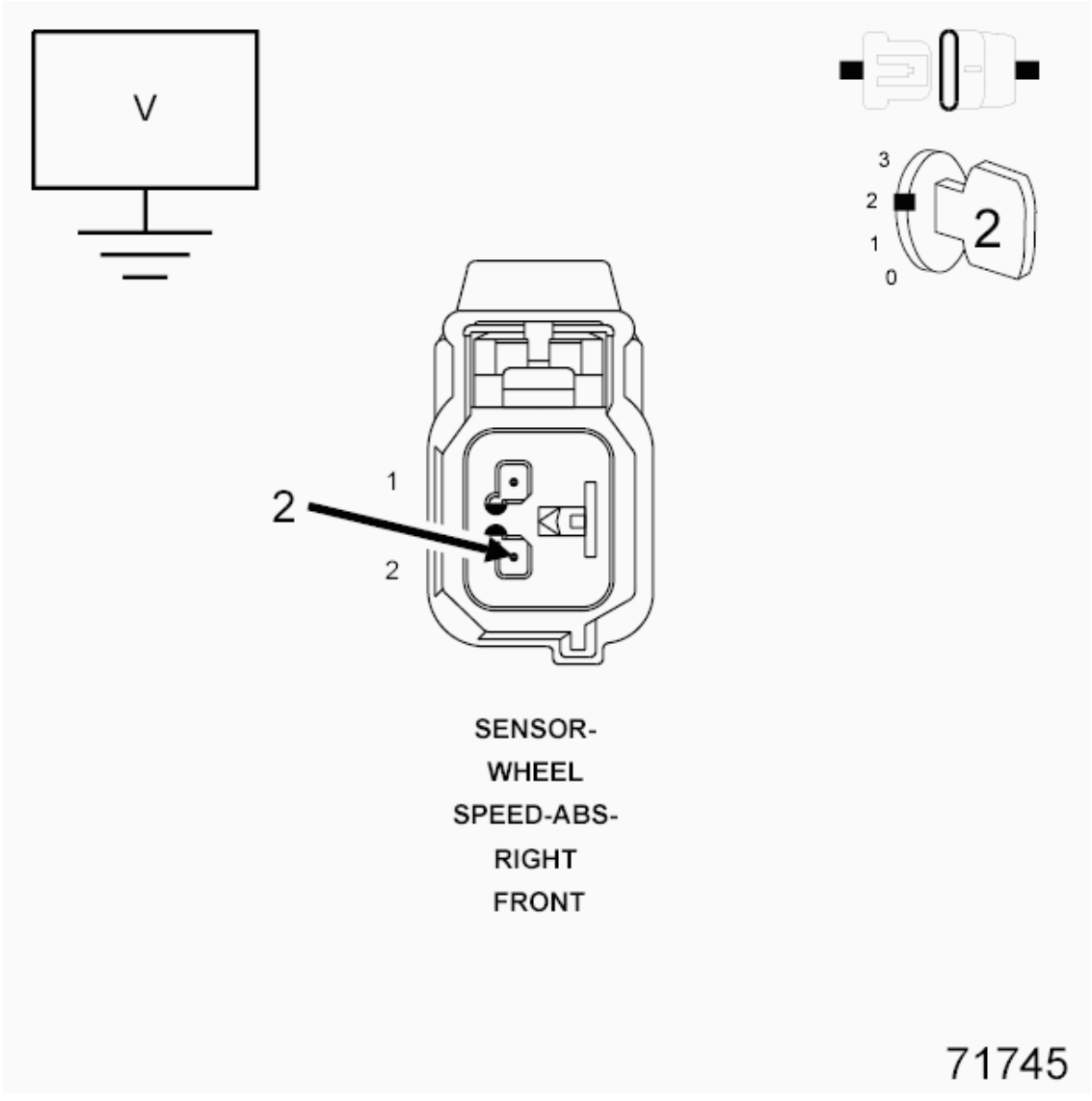


Fig. 15: Checking Right Front Wheel Speed Sensor Signal Circuit For An Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Remove all jumper wires.
3. Measure the voltage between the (B6) Right Front WSS Signal circuit and ground.

   Is the voltage above 1 volt?

Yes

- Repair the (B6) Right Front WSS Signal circuit for a short to voltage.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 9

9. **CHECK (B6) RIGHT FRONT WSS SIGNAL CIRCUIT AND (B7) RIGHT FRONT WSS 12 VOLT SUPPLY CIRCUIT SHORTED TOGETHER**

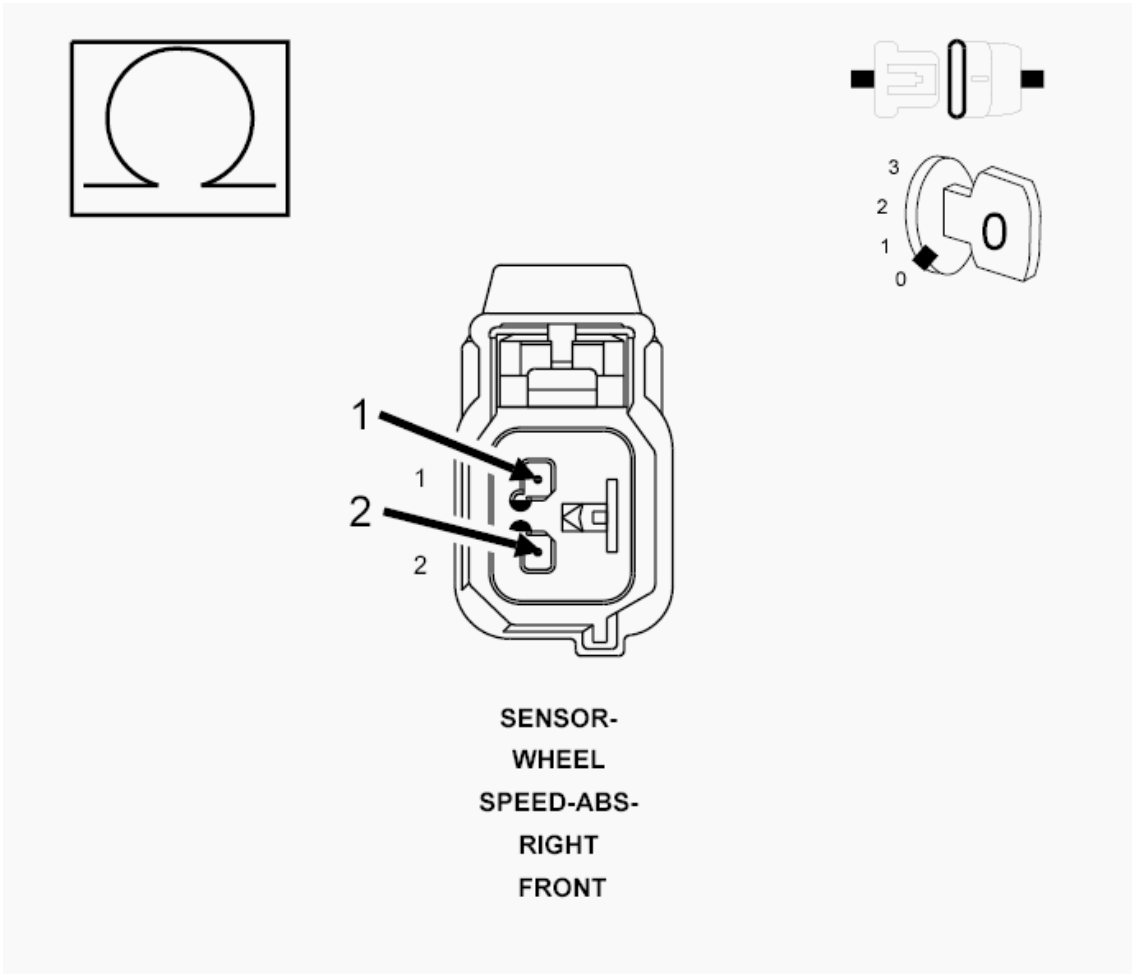


Fig. 16: Checking Right Front Wheel Speed Sensor Signal Circuit & Right Front Wheel Speed Sensor 12 Volt Supply Circuit Shorted Together
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (B6) Right Front WSS Signal circuit and the (B7) Right Front WSS Supply circuit.

Is the resistance above 5.0 Ohms?

Yes

- Go to step 10

No

- Repair the (B6) Right Front WSS Signal circuit and the (B7) Right Front WSS Supply circuit for a short together.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **RIGHT FRONT WHEEL SPEED SENSOR**
    1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information.
    2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

       CAUTION: Make sure brake capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Did DTC C1015-RIGHT FRONT WHEEL SPEED SENSOR CIRCUIT reset?

       Yes

       - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
       - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       No

       - Test Complete.

C101C-RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  When the Right Front Wheel Speed Sensor (WSS) Signal is intermittently missing while vehicle speed is above 40 km/h (25 mph) or erratic wheel speed signal during acceleration or sensed wheel speed is different from other wheels.

Possible Causes
RIGHT FRONT WSS LOOSE - B6, B7 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
RIGHT FRONT TONE WHEEL DAMAGE
RIGHT FRONT WHEEL/BEARING DAMAGE
IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES
RIGHT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C101C-RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   NOTE: If DTC C1015-Right Front Wheel Speed Sensor Circuit is present it must be repaired before continuing.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read DTCs.

      Does the scan tool display: C101C-RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE active?

      Yes

- Go to step 3

No

- Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Right Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Right Front Tire improperly inflated or mismatched tires on vehicle?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 4

4. **CHECK RIGHT FRONT WSS LOOSENESS, INSPECT B6, B7 CIRCUITS/TERMINALS FOR**

DAMAGE

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Right Front WSS, and Right Front WSS harness connector
2. Inspect the Right Front WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B6) Right Front WSS Signal and (B7) Right Front WSS Supply circuits between the Right Front WSS and Anti-Lock Brake Module for damage.

   Is the Right Front WSS loose or any of the wiring/connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Right Front Wheel Speed Sensor
   2. Inspect the Right Front Wheel Speed Sensor face for damage.

      Is the Right Front Wheel Speed Sensor damaged?

      Yes

      - Replace sensor and hub assembly.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 6

6. **CHECK RIGHT FRONT TONE WHEEL/BEARING FOR DAMAGE**
   1. Inspect the Right Front Tone Wheel/Bearing for damage, missing teeth, cracks, corrosion or looseness.

      NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

      Is the Right Front Tone Wheel/Bearing damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 7

7. **CHECK RIGHT FRONT WHEEL BEARING FOR DAMAGE**
   1. Inspect the Right Front wheel bearing for excessive runout or clearance.

      NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications. Refer to Front Suspension/Front/HUB AND BEARING - Diagnosis and Testing .

      Is the Right Front Wheel Bearing Damaged?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 8

8. **RIGHT FRONT WHEEL SPEED SENSOR**
   1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C101C-RIGHT FRONT WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE reset?

      Yes

      - Replace the Anti-Lock Brakes Module in accordance with the Service Information.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C101F-RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Right Front Wheel Speed Sensor (WSS) reading is different from the readings received from the other sensors at a vehicle speed above 40 km/h (25 mph). The Anti-Lock Brake Module compares WSS readings from side-to-side on an axle and front-to-rear.

Possible Causes
RIGHT FRONT WSS LOOSE B6, B7 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES
RIGHT FRONT TONE WHEEL/BEARING DAMAGE
RIGHT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C101F-RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

4. With the scan tool, read DTCs.

   Does the scan tool display: C101F-RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE active?

   Yes

   - Go to step 3

   No

   - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Right Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Refer to the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Right Front Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK RIGHT FRONT WSS LOOSENESS, INSPECT B6, B7 CIRCUITS/TERMINALS FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Right Front WSS, and Right Front WSS harness connector.
2. Inspect the Right Front WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B6) Right Front WSS Signal and (B7) Right Front WSS Supply circuits between the Right Front WSS and Anti-Lock Brake Module for damage.

Is the Right Front WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK RIGHT FRONT WHEEL SPEED SENSOR FOR DAMAGE**

1. Remove the Right Front Wheel Speed Sensor
2. Inspect the Right Front Wheel Speed Sensor face for damage.

Is the Right Front Wheel Speed Sensor damaged?

Yes

- Replace sensor and hub assembly.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 6

6. **CHECK RIGHT FRONT TONE WHEEL/BEARING FOR DAMAGE**
   1. Inspect the Right Front Tone Wheel/Bearing for damage, missing teeth, cracks, corrosion or looseness.

      NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

      Is the Right Front Tone Wheel/Bearing damaged?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 7

7. **RIGHT FRONT WHEEL SPEED SENSOR**
   1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C101F-RIGHT FRONT WHEEL SPEED COMPARATIVE PERFORMANCE reset?

      Yes

      - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Test Complete.

C1020-LEFT REAR WHEEL SPEED SENSOR CIRCUIT

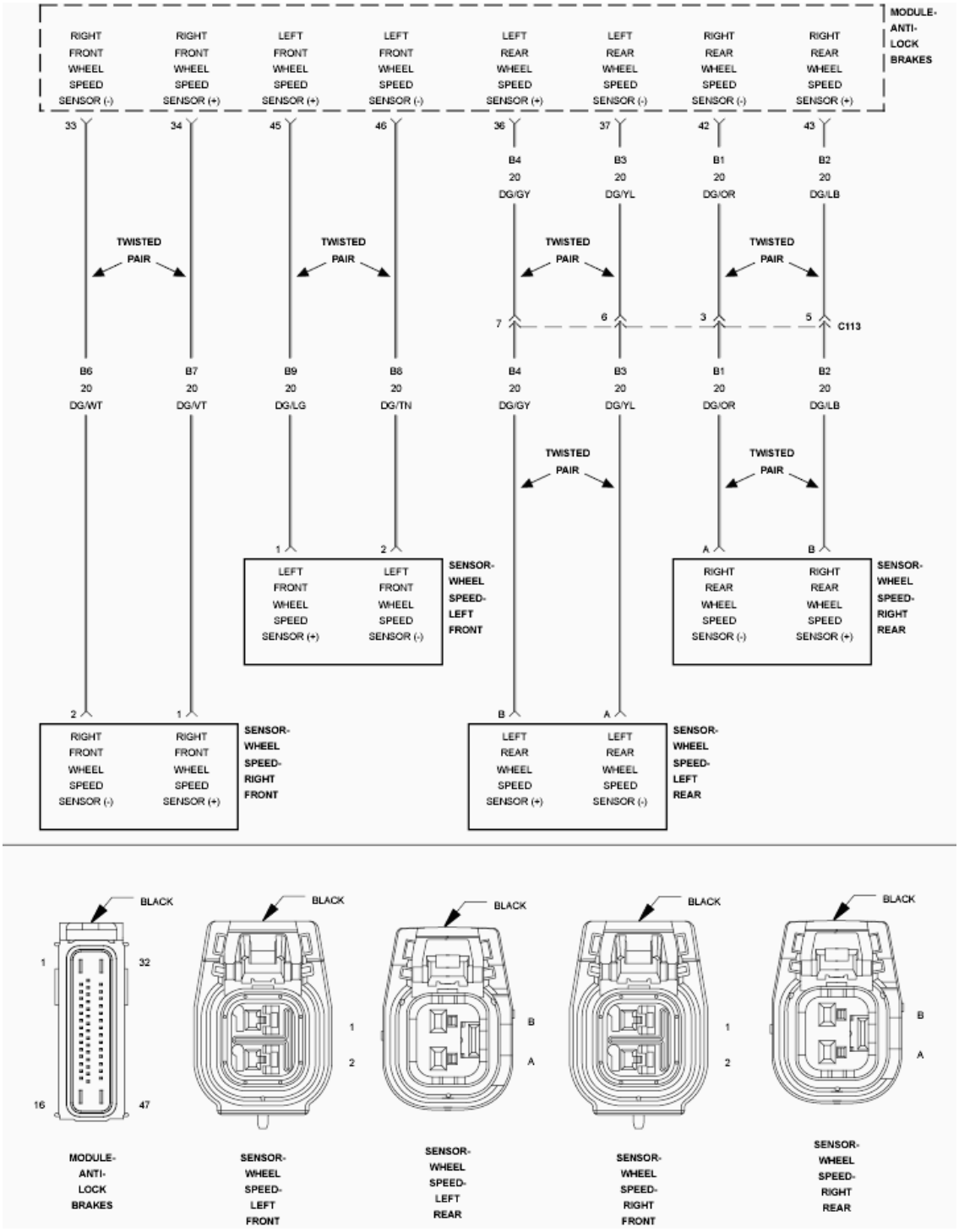


Fig. 17: Left Front Wheel Speed Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  If the Left Rear Wheel Speed Sensor circuit fails the diagnostic test.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B3) LEFT REAR WSS SIGNAL CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B3) LEFT REAR WSS SIGNAL CIRCUIT SHORTED TO THE (B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT
LEFT REAR WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR DTC C1020 LEFT REAR WHEEL SPEED SENSOR CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

      Does the scan tool display: C1020-LEFT REAR WHEEL SPEED SENSOR CIRCUIT?

      Yes

      - Go to step 2

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

1. Turn the ignition off.
2. Inspect the Anti-Lock Brake Module harness connector, Left Rear WSS, and Left Rear WSS harness connector.

   Is the Left Rear WSS or any of the connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK (B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT VOLTAGE**

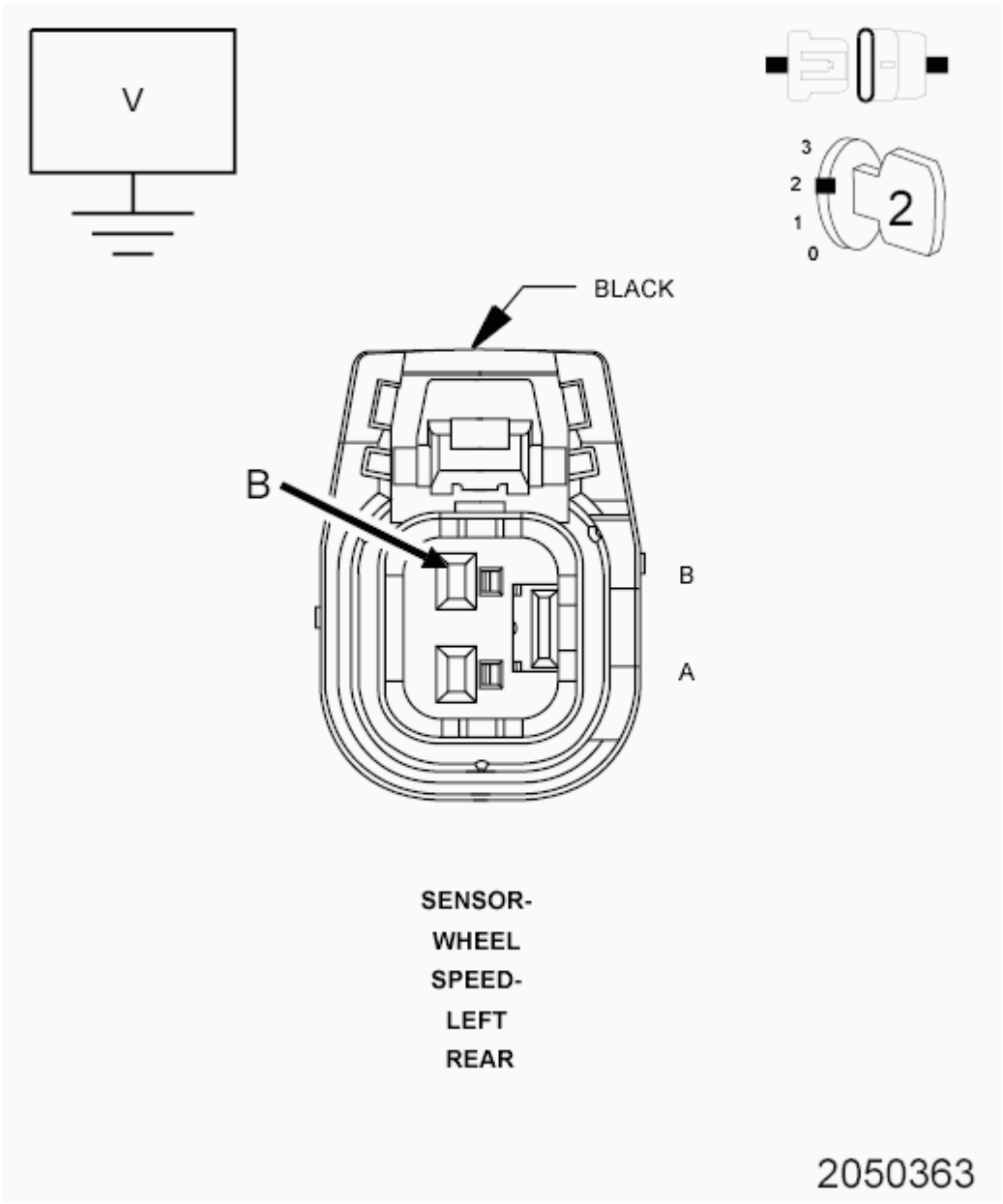


Fig. 18: Checking Left Rear Wheel Speed Sensor 12 Volt Supply Circuit Voltage
Courtesy of CHRYSLER LLC

1. Disconnect the Left Rear WSS harness connector.
2. Turn the ignition on.
3. Measure the voltage of the (B4) Left Rear WSS 12 Volt Supply circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Go to step 6

No

- Go to step 4

4. **CHECK (B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR A SHORT TO GROUND**

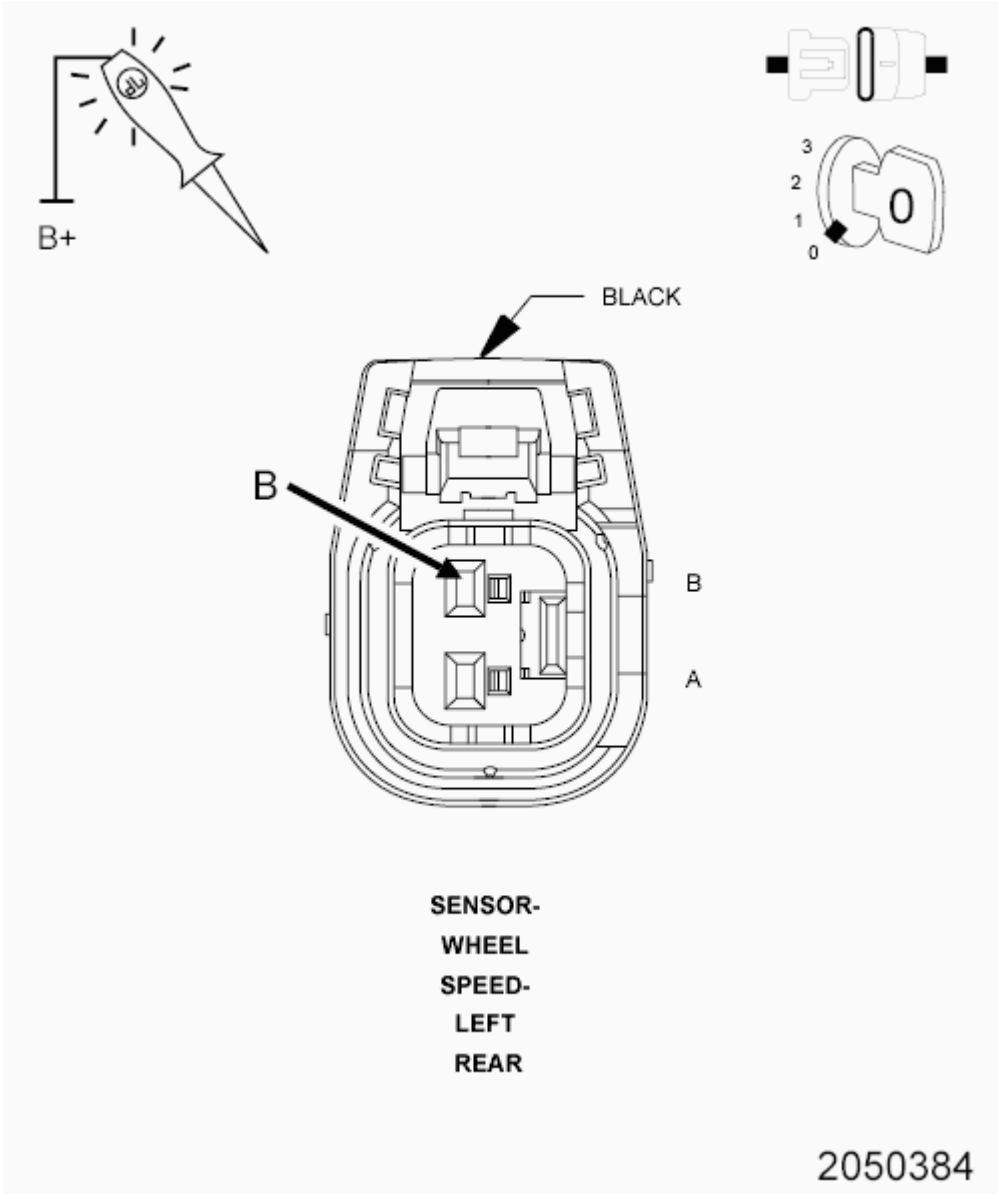


Fig. 19: Checking Left Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Left Rear WSS harness connector.
3. Disconnect the Anti-Lock Brake Module harness connector.
4. Using a 12-volt test light connected to 12 volts, probe the (B4) Left Rear WSS Supply circuit.

Does the test light illuminate brightly?

Yes

- Repair the (B4) Left Rear WSS Supply circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK (B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR AN OPEN**

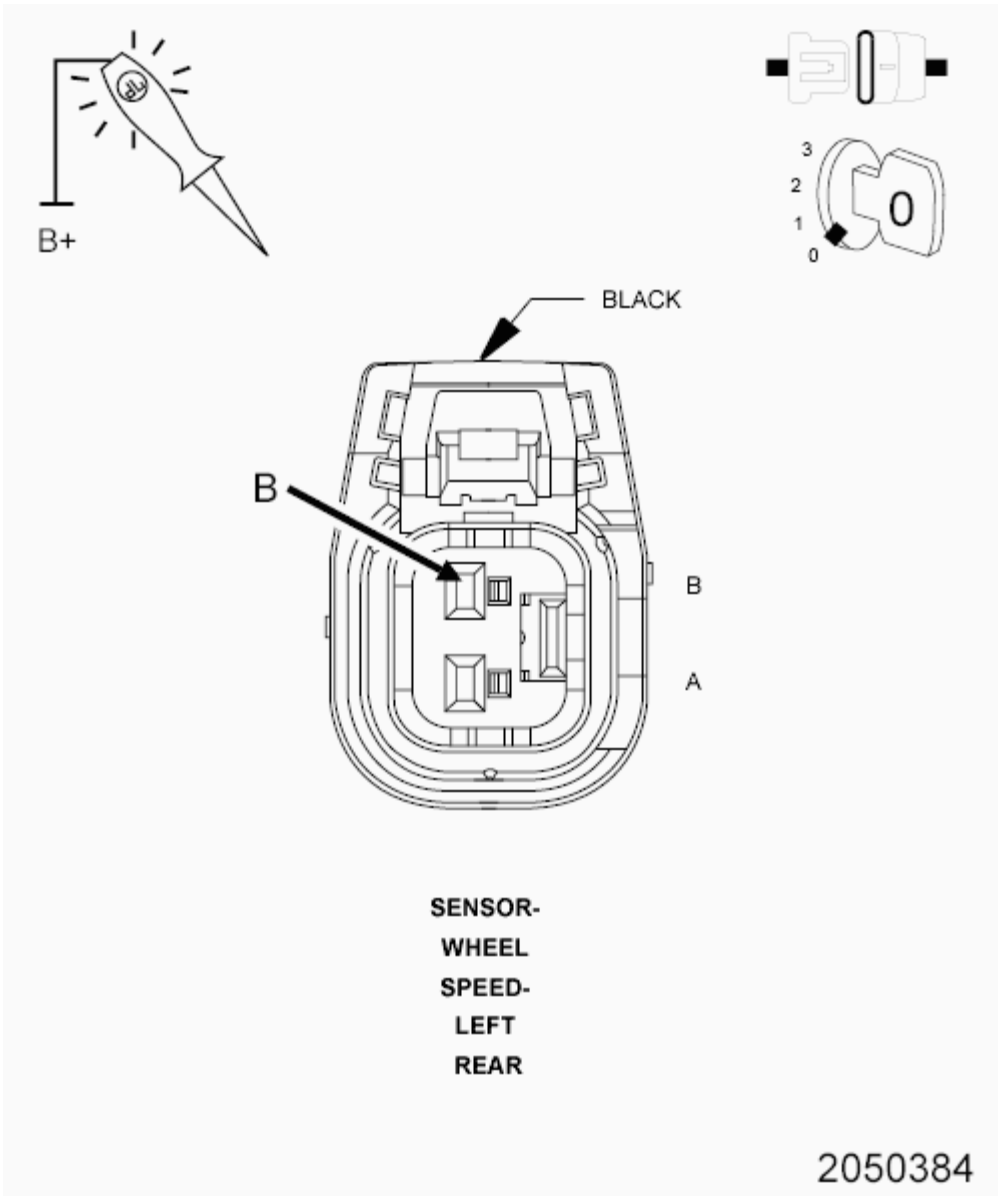


Fig. 20: Checking Left Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B4) Left Rear WSS Supply circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B4) Left Rear WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the (B4) Left Rear WSS Supply circuit for an open.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK (B3) LEFT REAR WSS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

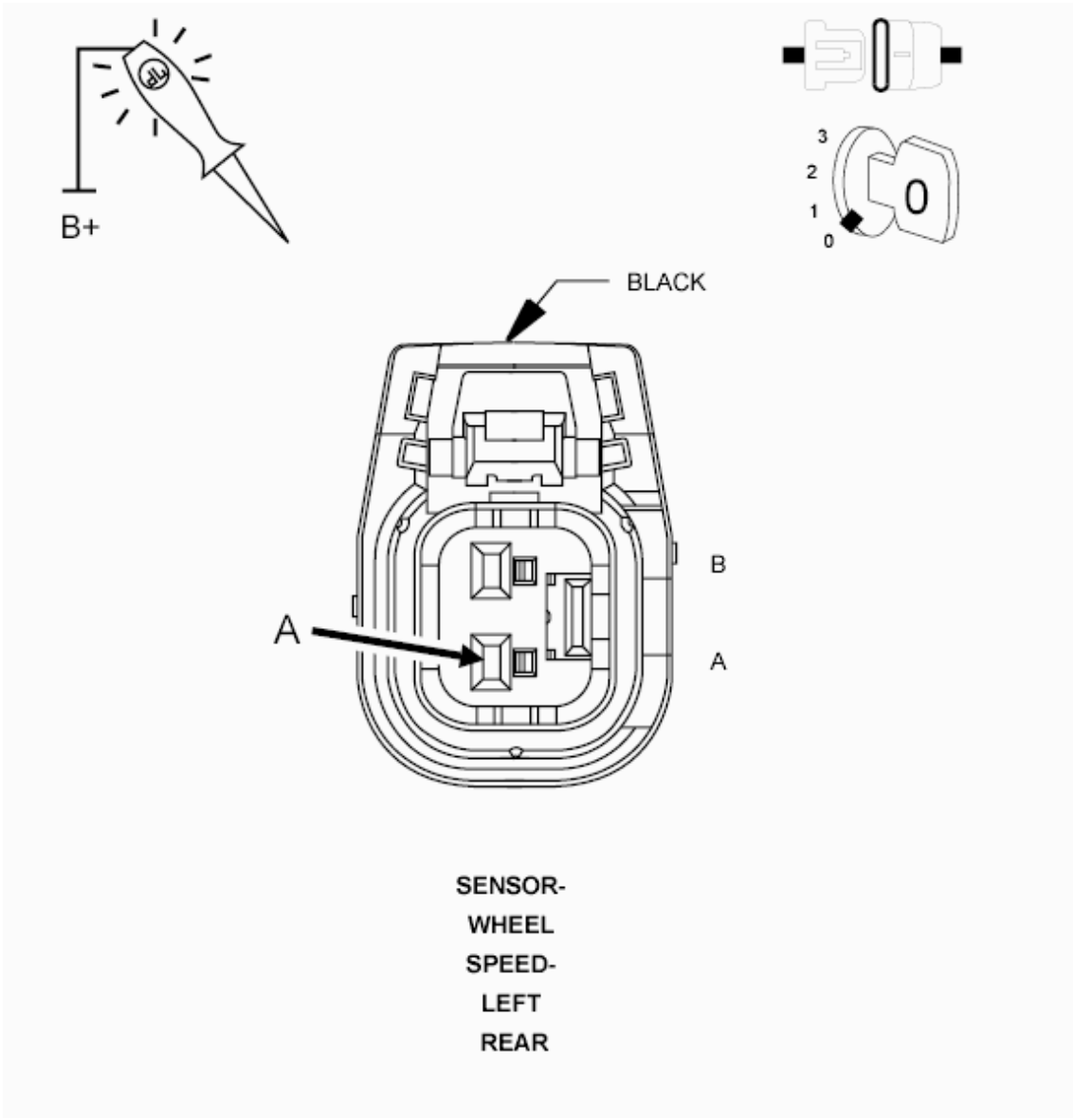


Fig. 21: Checking Left Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. If not done previously, disconnect the Anti-Lock Brake Module harness connector.
3. Using a 12-volt test light connected to 12 volts, probe the (B3) Left Rear WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B3) Left Rear WSS Signal circuit for a short to ground.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE,**

Antilock Brake (ABS) - Standard Procedure.

No

- Go to step 7

7. **CHECK (B3) LEFT REAR WSS SIGNAL CIRCUIT FOR AN OPEN**

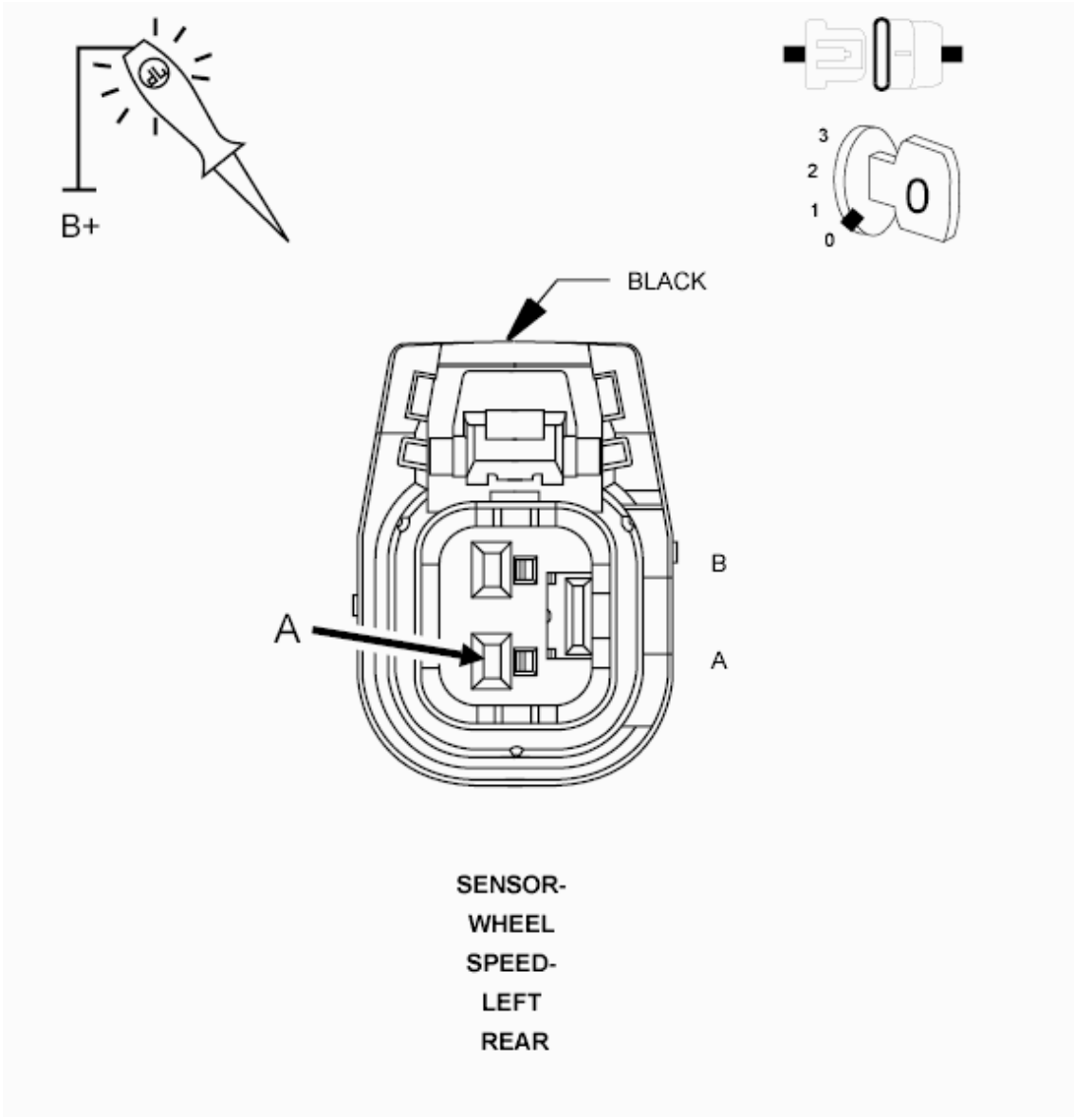


Fig. 22: Checking Left Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B3) Left Rear WSS Signal circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B3) Left Rear WSS Signal circuit.

Does the test light illuminate brightly?

Yes

- Go to step 8

No

- Repair the (B3) Left Rear WSS Signal circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

8. **CHECK (B3) LEFT REAR WSS SIGNAL CIRCUIT SHORT TO VOLTAGE**

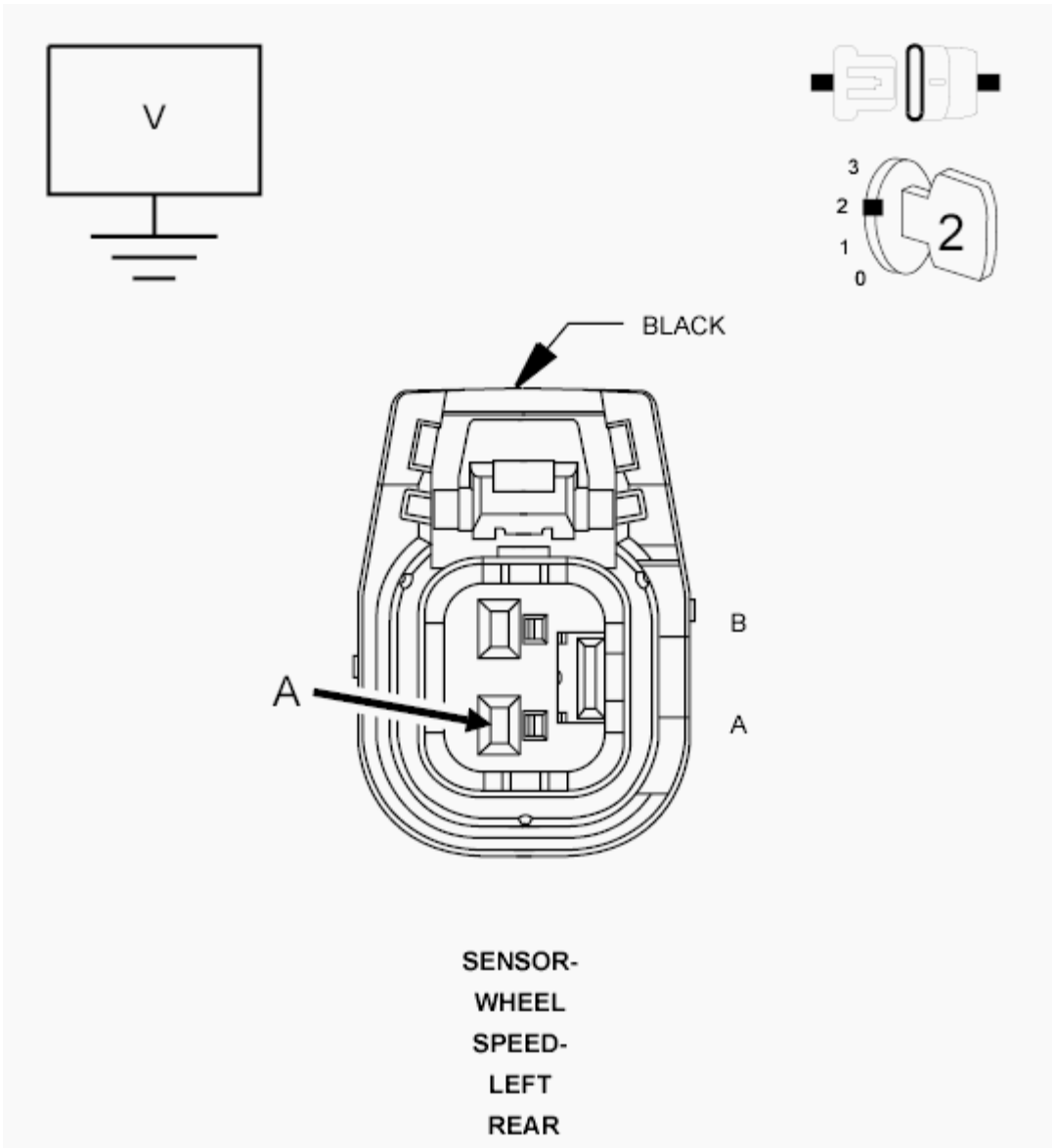


Fig. 23: Checking Left Rear Wheel Speed Sensor Signal Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Remove all jumper wires.
3. Measure the voltage between the (B3) Left Rear WSS Signal circuit and ground.

   Is the voltage above 1 volt?

   Yes

   - Repair the (B3) Left Rear WSS Signal circuit for a short to voltage.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 9

9. **CHECK (B3) LEFT REAR WSS SIGNAL CIRCUIT AND (B4) LEFT REAR WSS 12 VOLT SUPPLY CIRCUIT SHORTED TOGETHER**

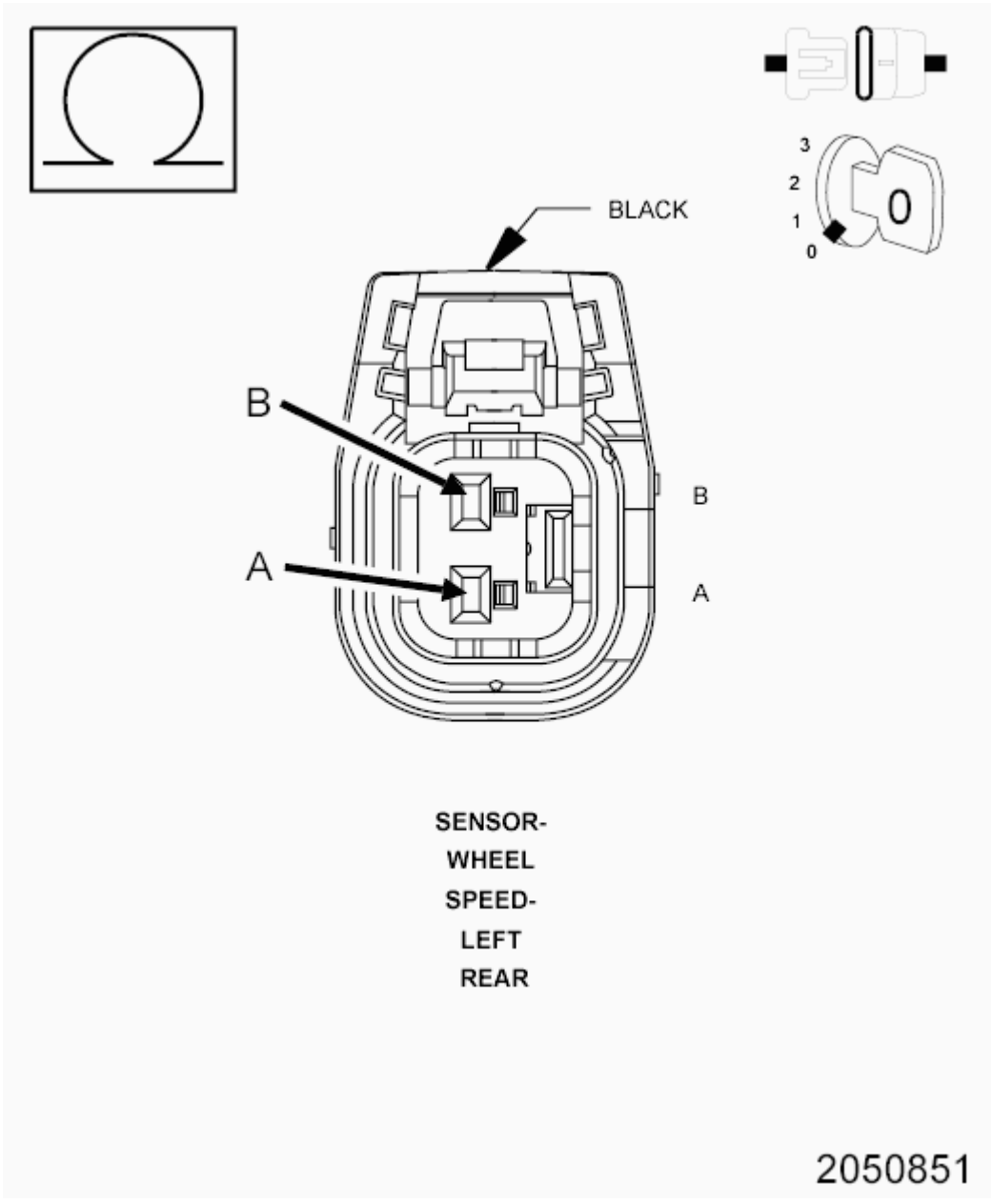


Fig. 24: Checking Left Rear Wheel Speed Sensor Signal Circuit & Left Rear Wheel Speed Sensor 12 Volt Supply Circuit Shorted Together
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (B3) Left Rear WSS Signal circuit and the (B4) Left Rear WSS Supply circuit.

   Is the resistance above 5.0 Ohms?

   Yes

- Go to step 10

No

- Repair the (B3) Left Rear WSS Signal circuit and the (B4) Left Rear WSS Supply circuit for a short together.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **LEFT REAR WHEEL SPEED SENSOR**
    1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information.
    2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       CAUTION: Make sure brake capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Did DTC C1020-LEFT REAR WHEEL SPEED SENSOR CIRCUIT reset?

       Yes

       - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
       - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       No

       - Test Complete.

C1027-LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

When the Left Rear Wheel Speed Sensor (WSS) Signal is intermittently missing while vehicle speed is above 40 km/h (25 mph) or erratic wheel speed signal during acceleration or sensed wheel speed is different from other wheels.

Possible Causes
LEFT REAR WSS LOOSE - B3, B4 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
LEFT REAR TONE WHEEL DAMAGE
LEFT REAR WHEEL BEARING DAMAGE
AXLE SHAFT FASTENER HARDWARE
IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES
LEFT REAR WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1027-LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read DTCs.

      Does the scan tool display: C1027-LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE active?

      Yes

      - Go to step 3

      No

      - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**

1. Turn the ignition on.
2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Is the Left Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

   Yes

   - Go to step 3

   No

   - Refer to the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Rear Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Left Rear Tire improperly inflated or mismatched tires on vehicle?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

      Was the Axle Shaft fastener loose?

      Yes

- Repair as necessary.

No

- Go to step 5

5. **CHECK LEFT REAR WSS LOOSENESS, INSPECT B3, B4 CIRCUITS/TERMINALS FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Left Rear WSS, and Left Rear WSS harness connector
2. Inspect the Left Rear WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B3) Left Rear WSS Signal and (B4) Left Rear WSS Supply circuits between the Left Rear WSS and Anti-Lock Brake Module for damage.

Is the Left Rear WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 6

6. **CHECK LEFT REAR WHEEL SPEED SENSOR FOR DAMAGE**

1. Remove the Left Rear Wheel Speed Sensor
2. Inspect the Left Rear Wheel Speed Sensor face for damage.

Is the Left Rear Wheel Speed Sensor damaged?

Yes

- Replace sensor and hub assembly.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 7

7. **CHECK LEFT REAR TONE WHEEL FOR DAMAGE**

1. Inspect the Left Rear Tone Wheel for damage, missing teeth, cracks, corrosion or looseness

NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

Is the Left Rear Tone Wheel damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 8

8. **CHECK LEFT REAR WHEEL BEARING FOR DAMAGE**
   1. Inspect the Left Rear wheel bearing for excessive runout or clearance.

      NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications. Refer to Front Suspension/Front/HUB AND BEARING - Diagnosis and Testing

      Is the Left Rear Wheel Bearing Damaged?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 9

9. **LEFT REAR WHEEL SPEED SENSOR**
   1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C1027-LEFT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE reset?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C102A-LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Left Rear Wheel Speed Sensor (WSS) reading is different from the readings received from the other sensors at a vehicle speed above 40 km/h (25 mph). The Anti-Lock Brake Module compares WSS readings from side-to-side on an axle and front-to-rear.

Possible Causes
LEFT REAR WSS LOOSE - B3, B4 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES
LEFT REAR TONE WHEEL DAMAGE
AXLE SHAFT FASTENER HARDWARE
LEFT REAR WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C102A-LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

   CAUTION: Ensure brake capability is available before road testing.

3. Road test the vehicle over 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

4. With the scan tool, read DTCs.

Does the scan tool display: C102A-LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE active?

Yes

- Go to step 3

No

- Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

Is the Left Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

Yes

- Go to step 3

No

- The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Rear Tire pressure.

3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

Is the Left Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

   Was the Axle Shaft fastener loose?

   Yes

   - Repair as necessary.

   No

   - Go to step 5
5. **CHECK LEFT REAR WSS LOOSENESS, INSPECT B3, B4 CIRCUITS/TERMINALS FOR DAMAGE**

NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

1. Inspect the Anti-Lock Brake Module harness connector, Left Rear WSS, and Left Rear WSS harness connector.
2. Inspect the Left Rear WSS for looseness, excessive corrosion and not properly fastened.
3. Inspect the (B3) Left Rear WSS Signal and (B4) Left Rear WSS Supply circuits between the Left Rear WSS and Anti-Lock Brake Module for damage.

Is the Left Rear WSS loose or any of the wiring/connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock**

Brake (ABS) - Standard Procedure.

No

- Go to step 6

6. **CHECK LEFT REAR WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Left Rear Wheel Speed Sensor
   2. Inspect the Left Rear Wheel Speed Sensor face for damage.

   Is the Left Rear Wheel Speed Sensor damaged?

   Yes

   - Replace sensor and hub assembly.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7
7. **CHECK LEFT REAR TONE WHEEL FOR DAMAGE**
   1. Inspect the Left Rear Tone Wheel for damage, missing teeth, cracks, corrosion or looseness.

   NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

   Is the Left Rear Tone Wheel damaged?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 8
8. **LEFT REAR WHEEL SPEED SENSOR**
   1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to

be met.

4. With the scan tool, read ABS DTCs.

   Did DTC C102A-LEFT REAR WHEEL SPEED COMPARATIVE PERFORMANCE reset?

   Yes

   - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Test Complete.

C102B-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT

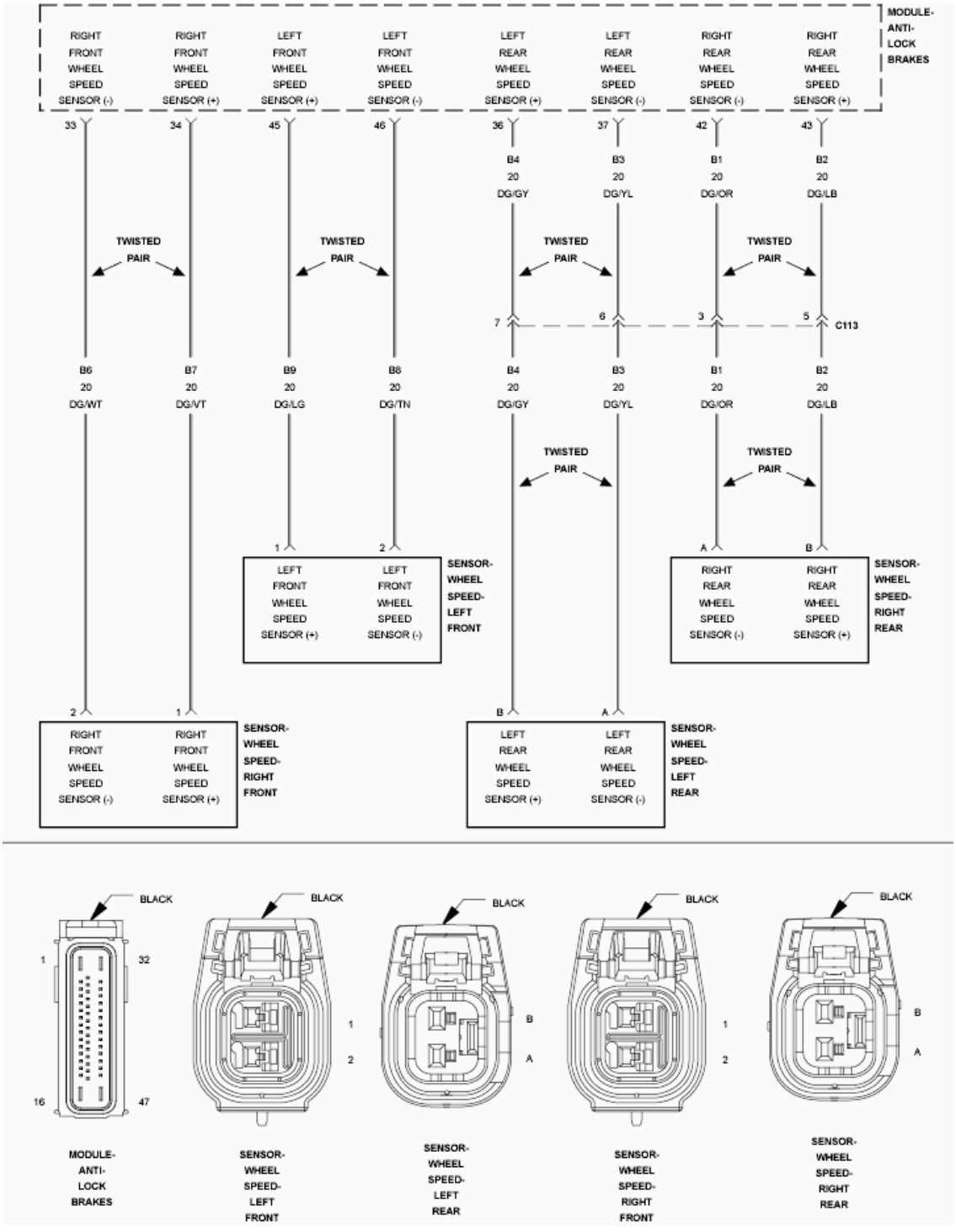


Fig. 25: Left Front Wheel Speed Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  If the Right Rear Wheel Speed Sensor circuit fails the diagnostic test.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORTED TO (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT
RIGHT REAR WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR DTC C102B-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Does the scan tool display: C102B-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT?

   Yes

   - Go to step 2

   No

   - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
   - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

1. Turn the ignition off.
2. Inspect the Anti-Lock Brake Module harness connector, Right Rear WSS, and Right Rear WSS harness connector.

   Is the Right Rear WSS or any of the connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT VOLTAGE**

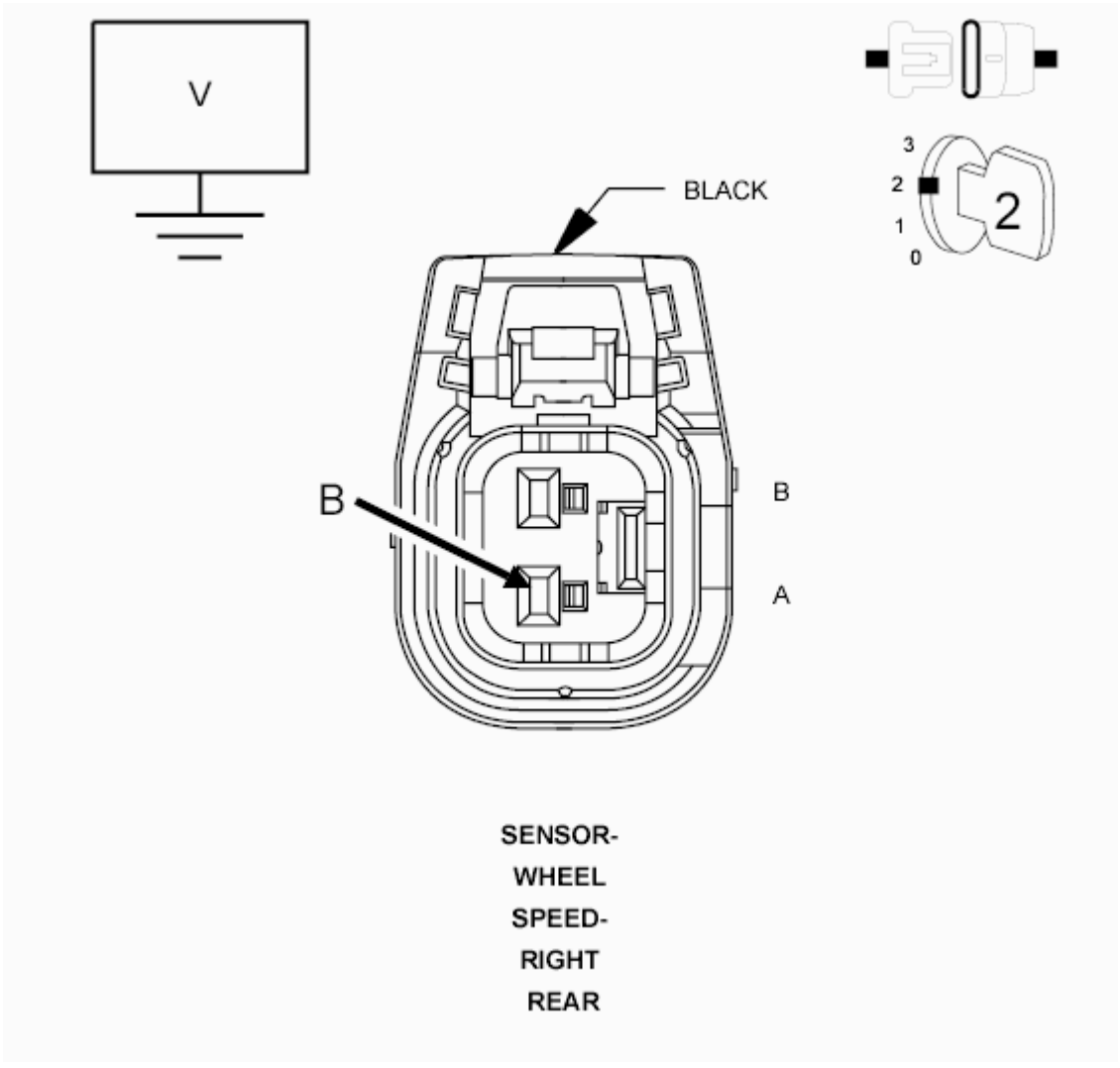


Fig. 26: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit Voltage
Courtesy of CHRYSLER LLC

1. Disconnect the Right Rear WSS harness connector.
2. Turn the ignition on.
3. Measure the voltage of the (B2) Right Rear WSS 12 Volt Supply circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Go to step 6

   No

   - Go to step 4

4. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR A SHORT TO GROUND**

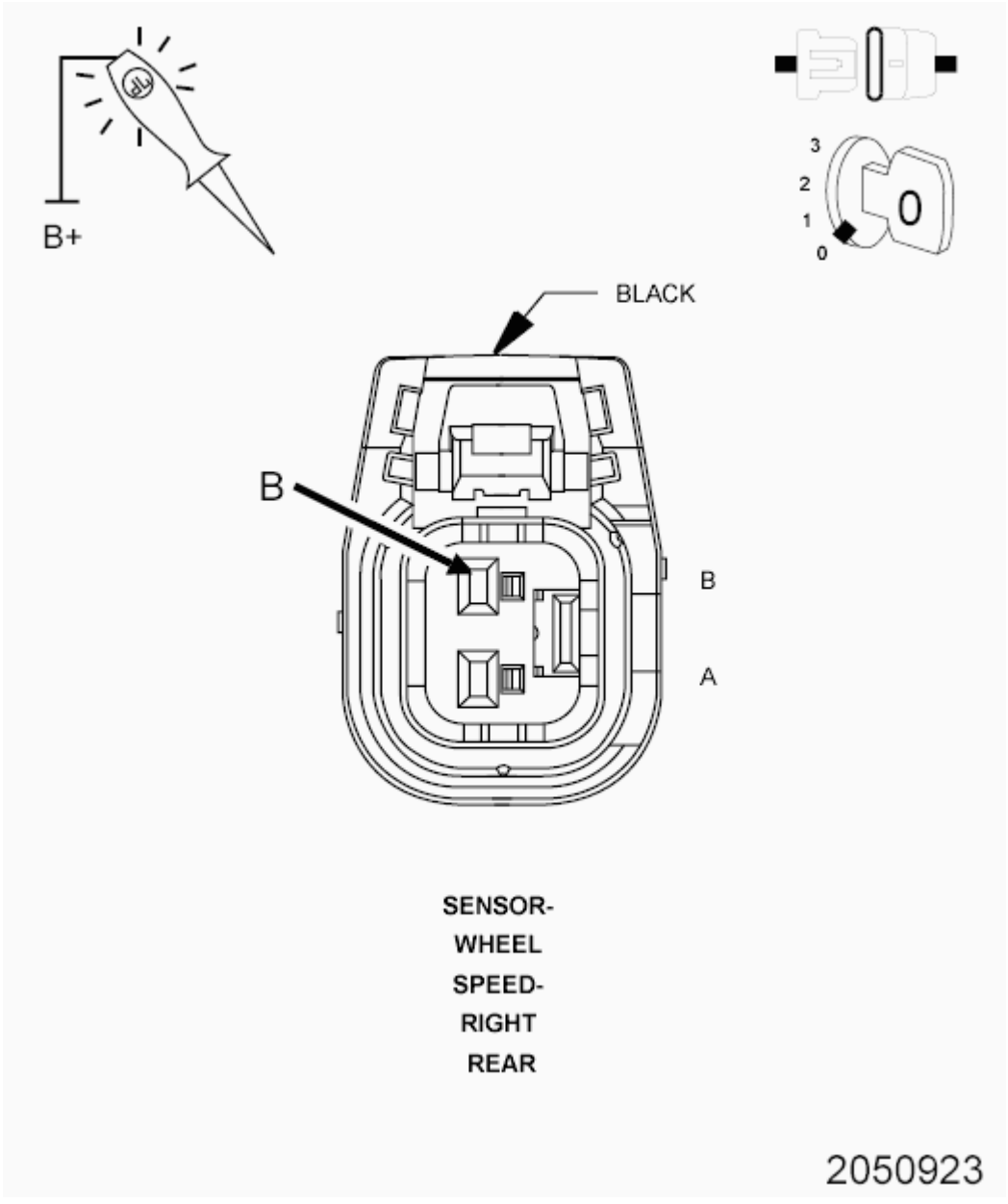


Fig. 27: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Right Rear WSS harness connector.
3. Disconnect the Anti-Lock Brake Module harness connector.
4. Using a 12-volt test light connected to 12 volts, probe the (B2) Right Rear WSS Supply circuit.

   Does the test light illuminate brightly?

Yes

- Repair the (B2) Right Rear WSS Supply circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR AN OPEN**

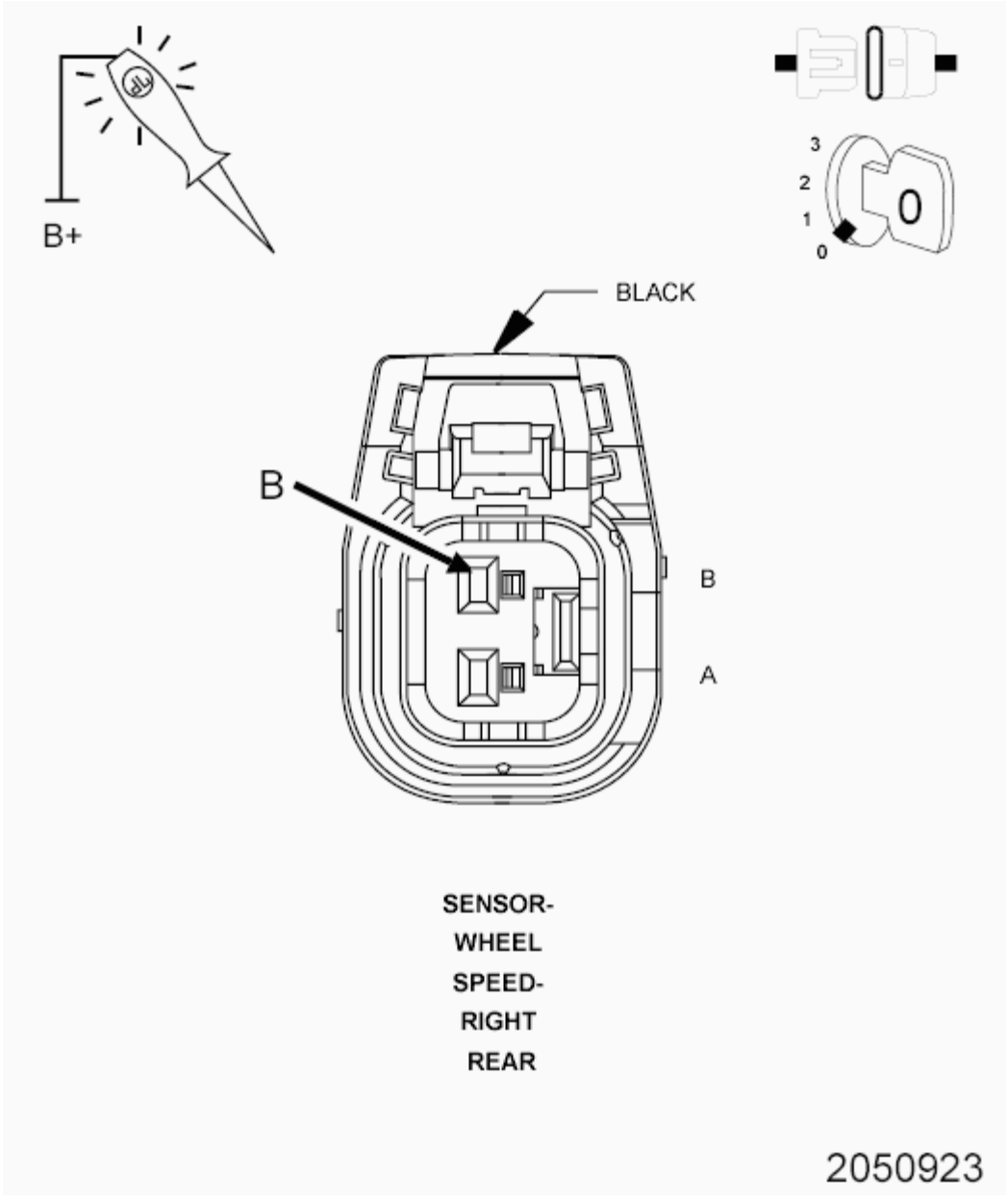


Fig. 28: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground

Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B2) Right Rear WSS Supply circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B2) Right Rear WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the (B2) Right Rear WSS Supply circuit for an open.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

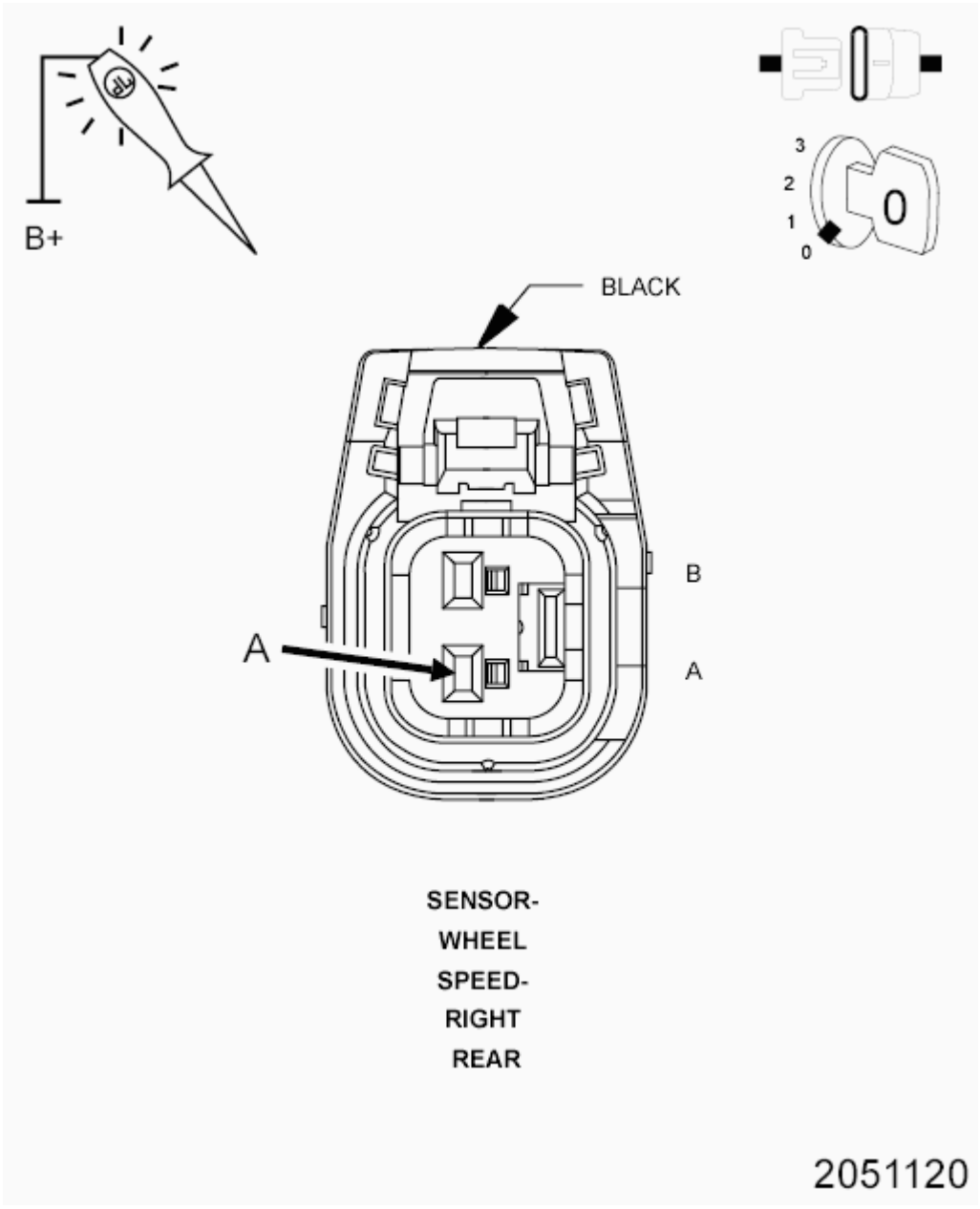


Fig. 29: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. If not done previously, disconnect the Anti-Lock Brake Module harness connector.
3. Using a 12-volt test light connected to 12 volts, probe the (B1) Right Rear WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

- Repair the (B1) Right Rear WSS Signal circuit for a short to ground.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 7

7. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR AN OPEN**

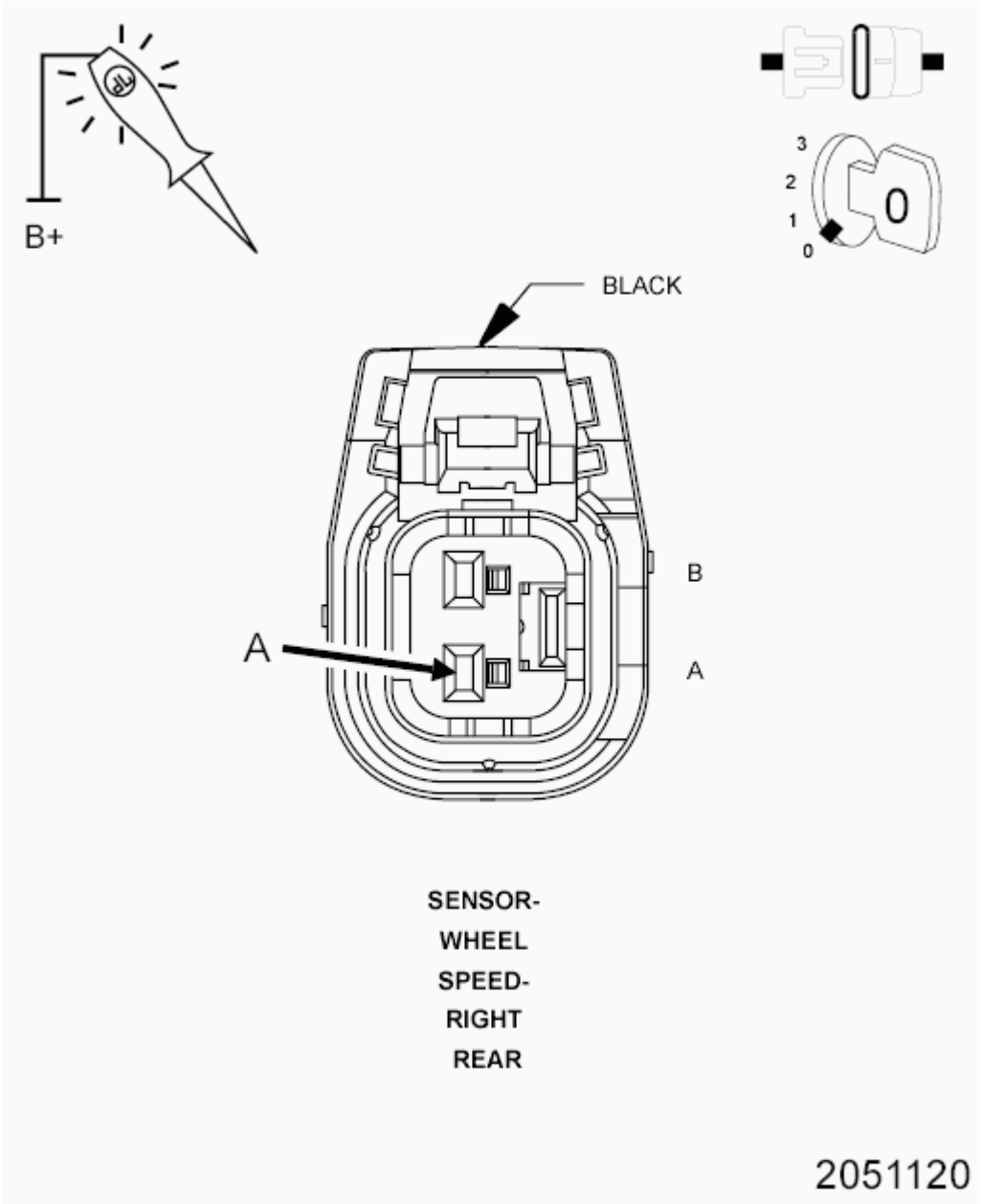


Fig. 30: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B1) Right Rear WSS Signal circuit in the Anti-Lock Brakes Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B1) Right Rear WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Go to step 8

   No

   - Repair the (B1) Right Rear WSS Signal circuit for an open.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

8. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORT TO VOLTAGE**

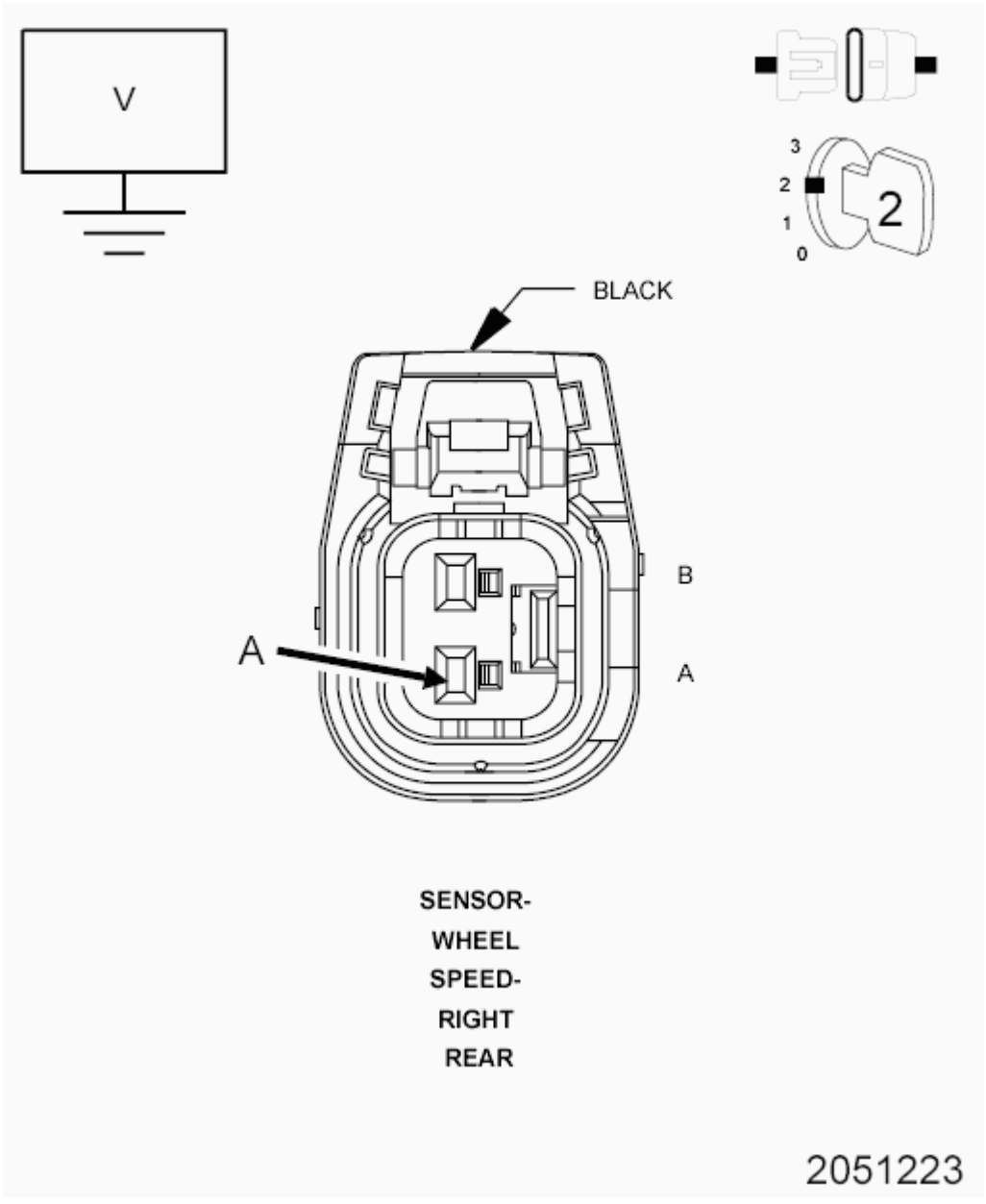


Fig. 31: Checking Right Rear Wheel Speed Sensor Signal Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Remove all jumper wires.
3. Measure the voltage between the (B1) Right Rear WSS Signal circuit and ground.

   Is the voltage above 1 volt?

   Yes

   - Repair the (B1) Right Rear WSS Signal circuit for a short to voltage.

- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 9

9. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR A SHORT TO (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT**

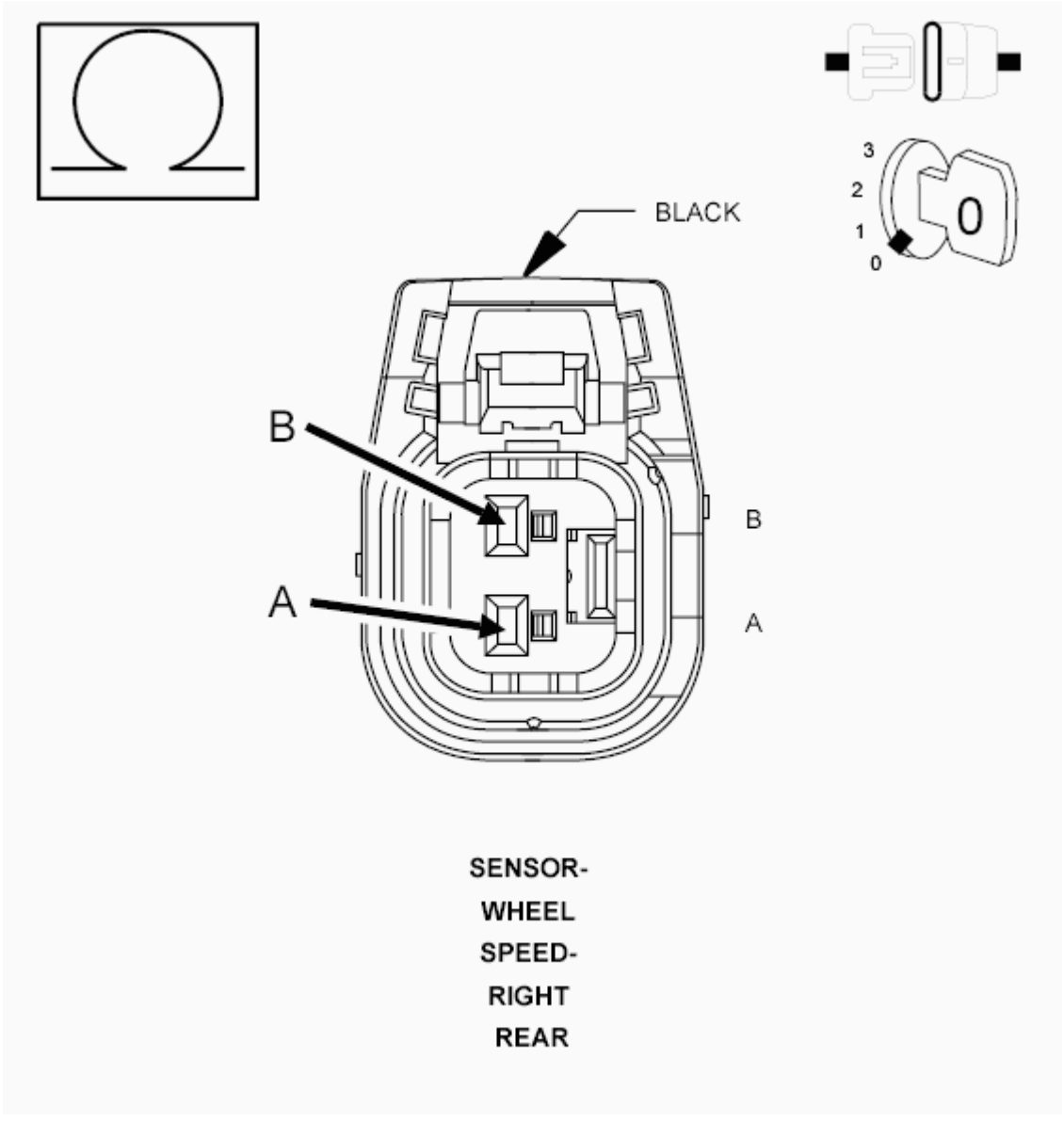


Fig. 32: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Right Rear Wheel Speed Sensor 12 Volt Supply Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (B1) Right Rear WSS Signal circuit and the (B2) Right Rear WSS Supply circuit.

   Is the resistance above 5.0 Ohms?

   Yes

   - Go to step 10

   No

   - Repair the (B1) Right Rear WSS Signal circuit and the (B2) Right Rear WSS Supply circuit for a short together.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **RIGHT REAR WHEEL SPEED SENSOR**
    1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information.
    2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

       CAUTION: Make sure brake capability is available before road testing.

    3. Road test the vehicle over 40 km/h (25 mph).

       NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Did DTC C102B-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT reset?

       Yes

       - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
       - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       No

       - Test Complete.

C102C-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE

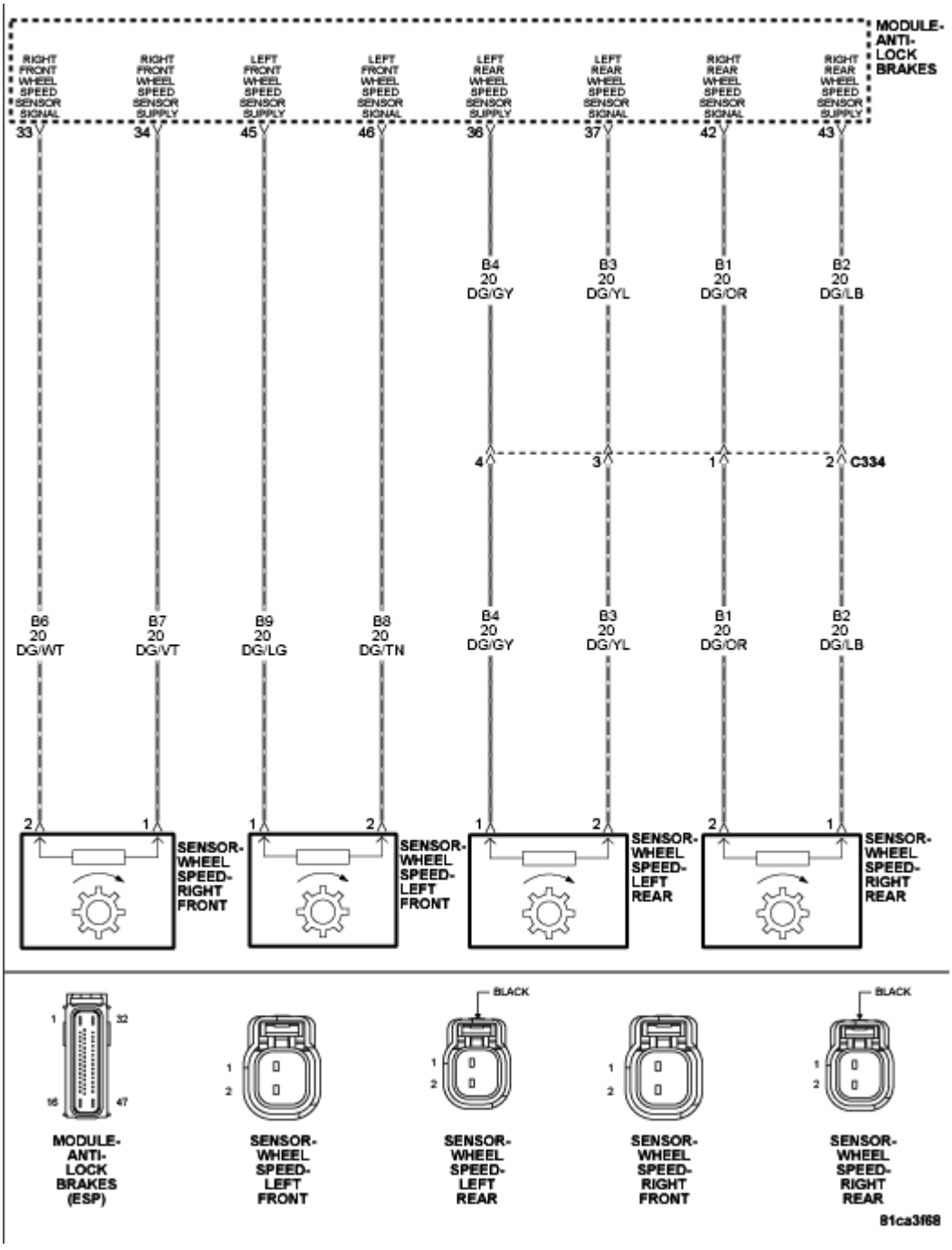


Fig. 33: Right Rear Wheel Speed Sensor 12 Volt Supply Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Right Rear Wheel Speed Sensor circuit fails the diagnostic test.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORTED TO (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT
RIGHT REAR WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C102C-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Does the scan tool display: C102C-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE?

   Yes

   - Go to step 2

   No

   - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
   - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

1. Turn the ignition off.
2. Inspect the Anti-Lock Brake Module harness connector, Right Rear WSS, and Right Rear WSS harness connector.

   Is the Right Rear WSS or any of the connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT VOLTAGE**

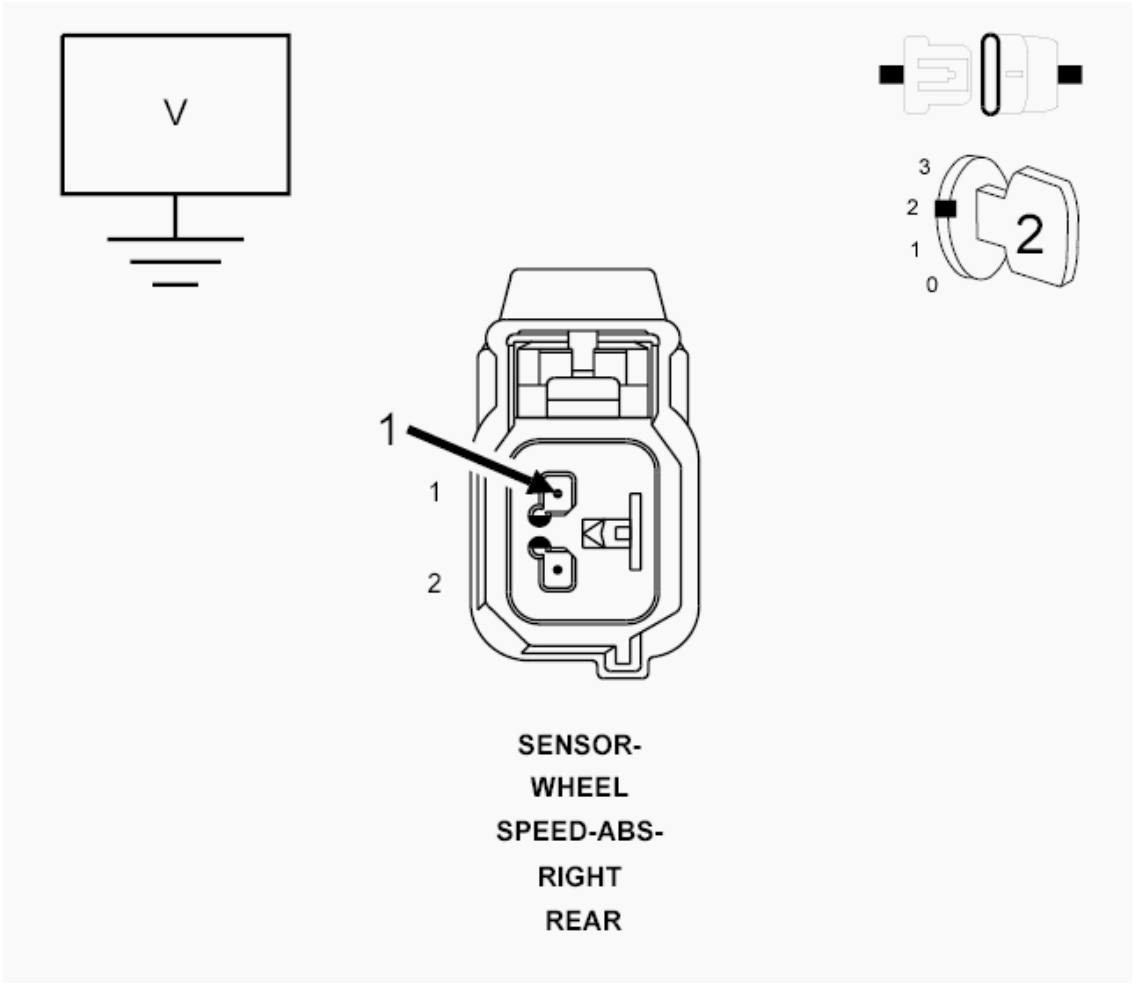


Fig. 34: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit Voltage

Courtesy of CHRYSLER LLC

1. Disconnect the Right Rear WSS harness connector.
2. Turn the ignition on.
3. Measure the voltage of the (B2) Right Rear WSS 12 Volt Supply circuit.

   Is the voltage above 10.0 volts?

   Yes

   - Go to step 6

   No

   - Go to step 4
4. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR A SHORT TO GROUND**

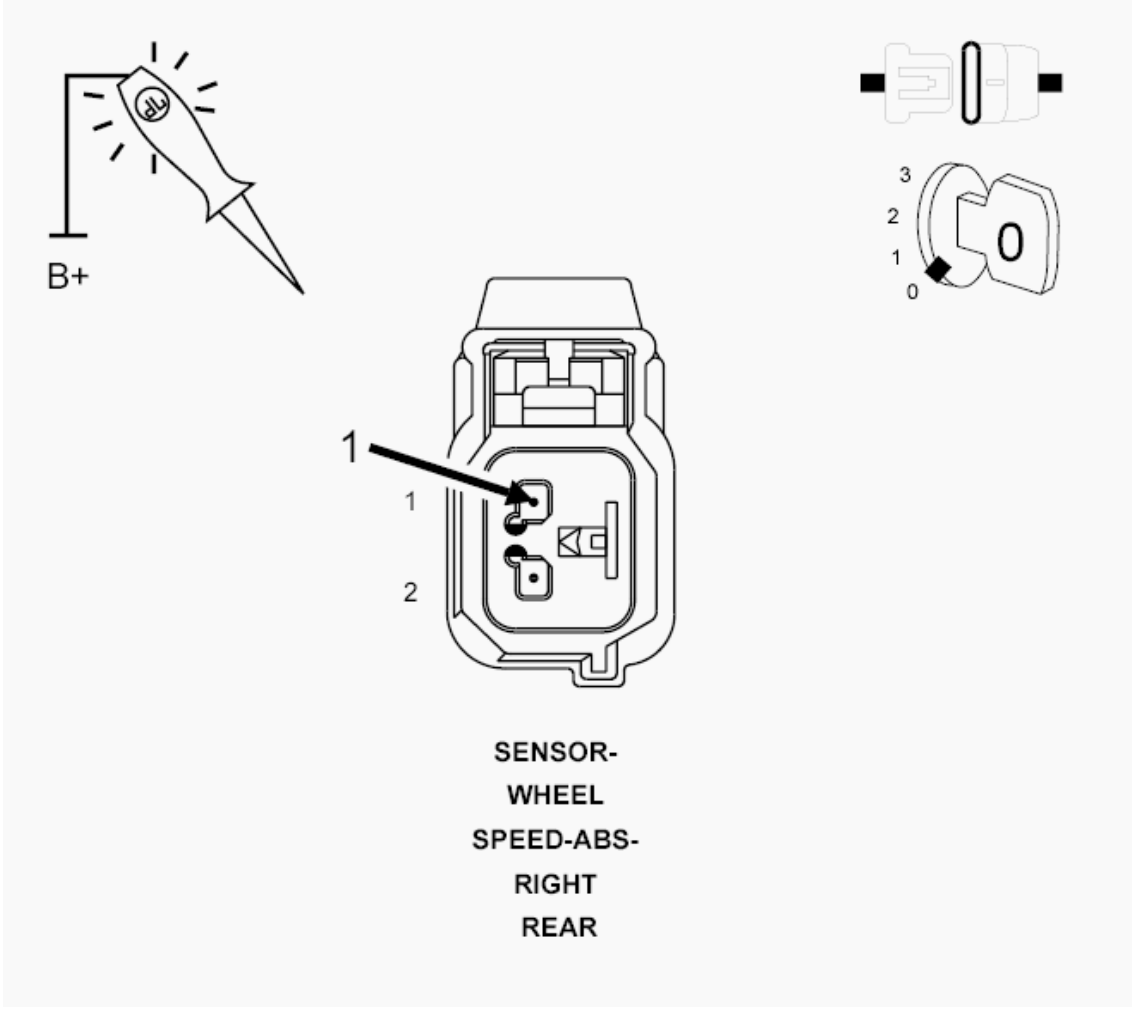


Fig. 35: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Right Rear WSS harness connector.
3. Disconnect the Anti-Lock Brake Module harness connector.
4. Using a 12-volt test light connected to 12 volts, probe the (B2) Right Rear WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B2) Right Rear WSS Supply circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT FOR AN OPEN**

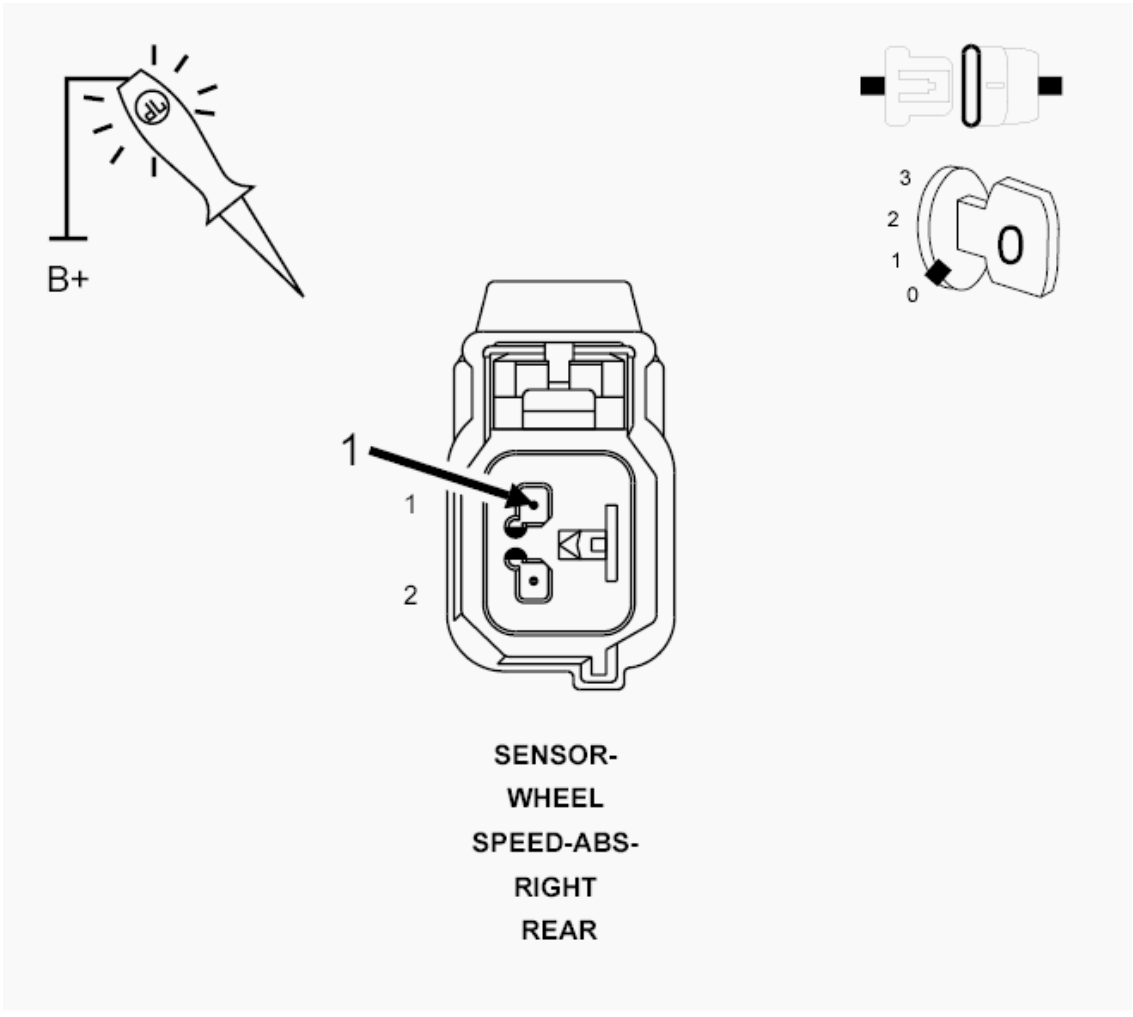


Fig. 36: Checking Right Rear Wheel Speed Sensor 12 Volt Supply Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B2) Right Rear WSS Supply circuit in the Anti-Lock Brake Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B2) Right Rear WSS Supply circuit.

   Does the test light illuminate brightly?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the (B2) Right Rear WSS Supply circuit for an open.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

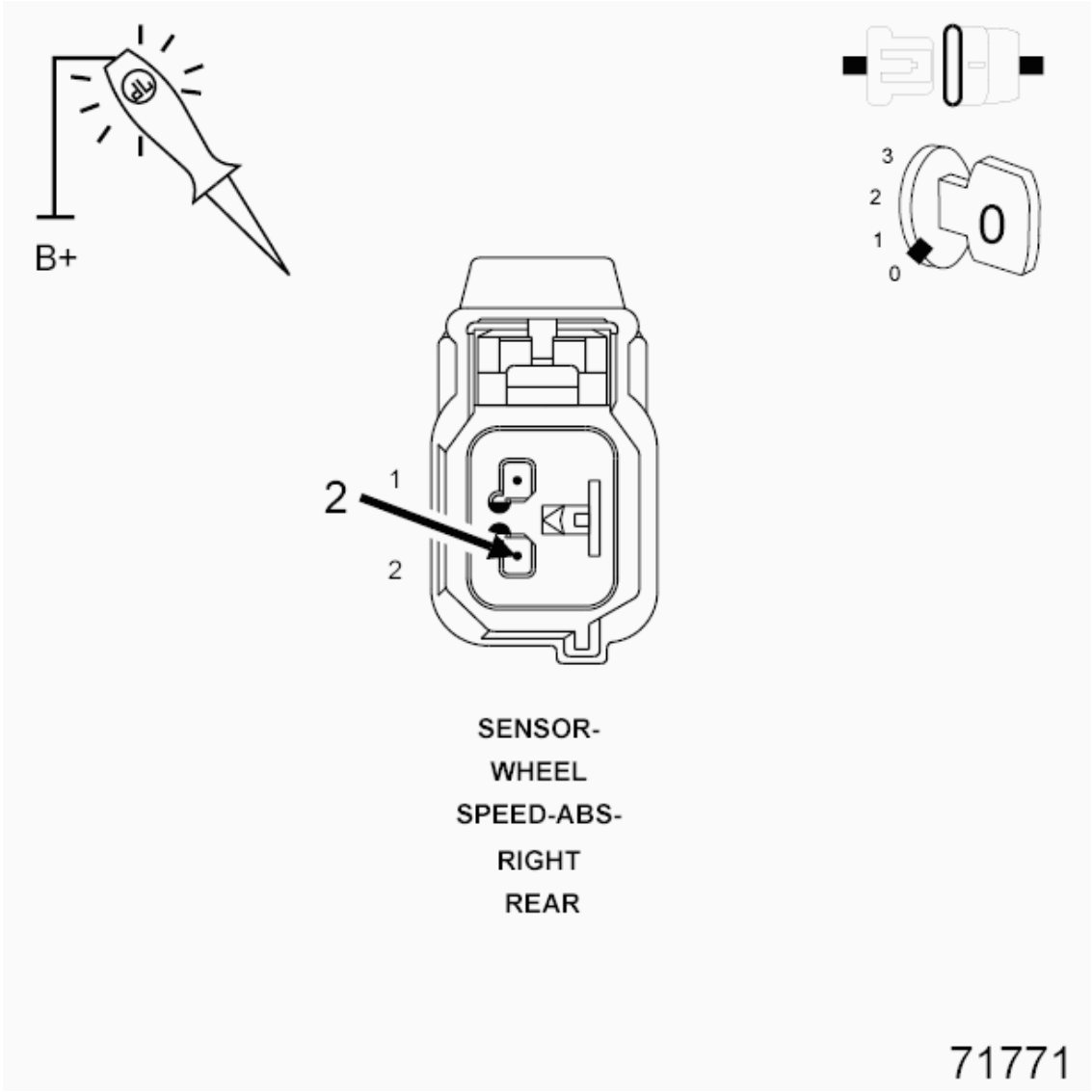


Fig. 37: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Using a 12-volt test light connected to 12 volts, probe the (B1) Right Rear WSS Signal circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (B1) Right Rear WSS Signal circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock**

Brake (ABS) - Standard Procedure.

No

- Go to step 7

7. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR AN OPEN**

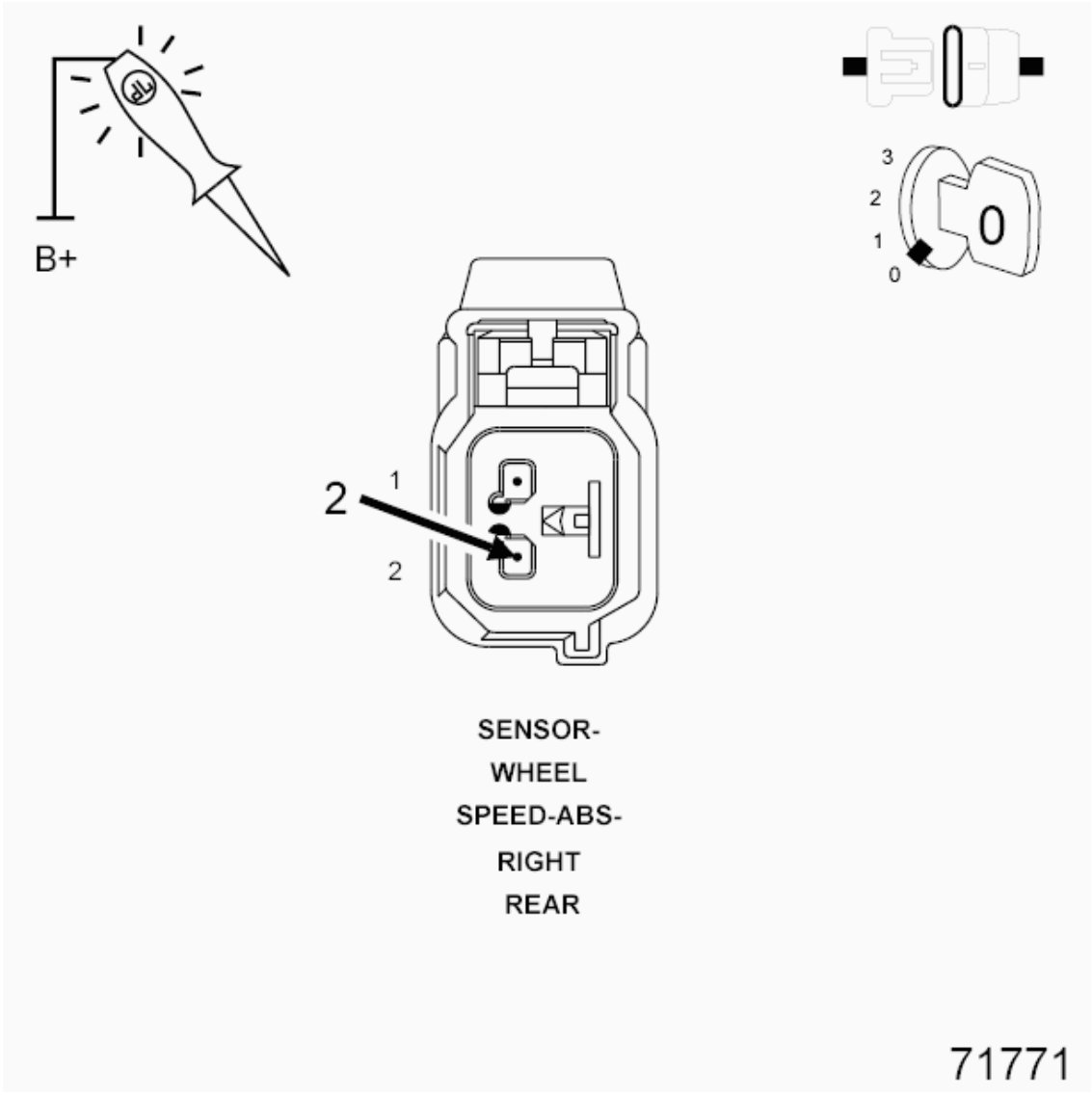


Fig. 38: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Connect a jumper wire between ground and the (B1) Right Rear WSS Signal circuit in the Anti-Lock Brake Module harness connector.
2. Using a 12-volt test light connected to 12 volts, probe the (B1) Right Rear WSS Signal circuit.

   Does the test light illuminate brightly?

Yes

- Go to step 8

No

- Repair the (B1) Right Rear WSS Signal circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

8. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT SHORT TO VOLTAGE**

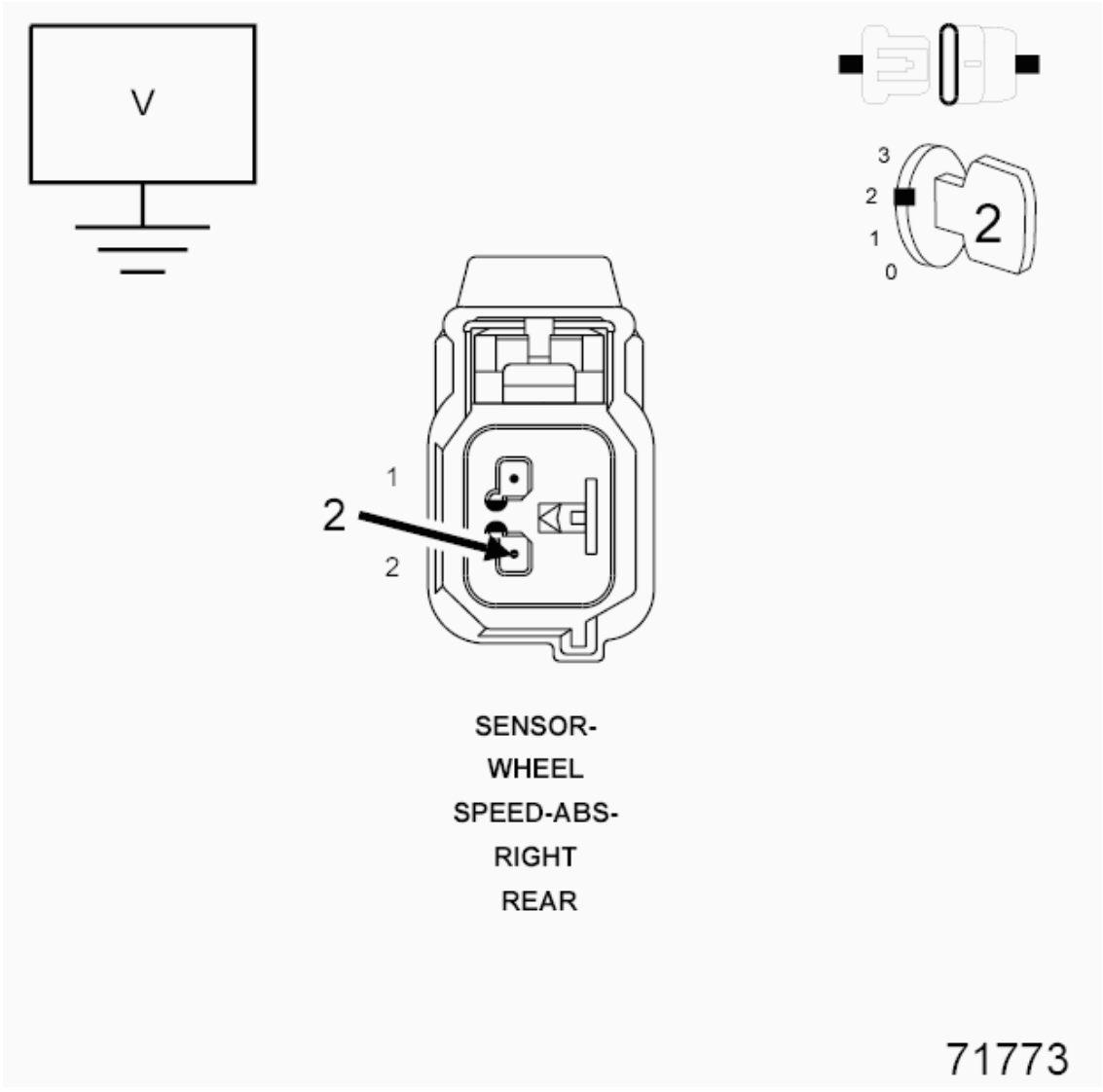


Fig. 39: Checking Right Rear Wheel Speed Sensor Signal Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.

2. Remove all jumper wires.
3. Measure the voltage between the (B1) Right Rear WSS Signal circuit and ground.

   Is the voltage above one volt?

   Yes

   - Repair the (B1) Right Rear WSS Signal circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 9

9. **CHECK (B1) RIGHT REAR WSS SIGNAL CIRCUIT FOR A SHORT TO (B2) RIGHT REAR WSS 12 VOLT SUPPLY CIRCUIT**

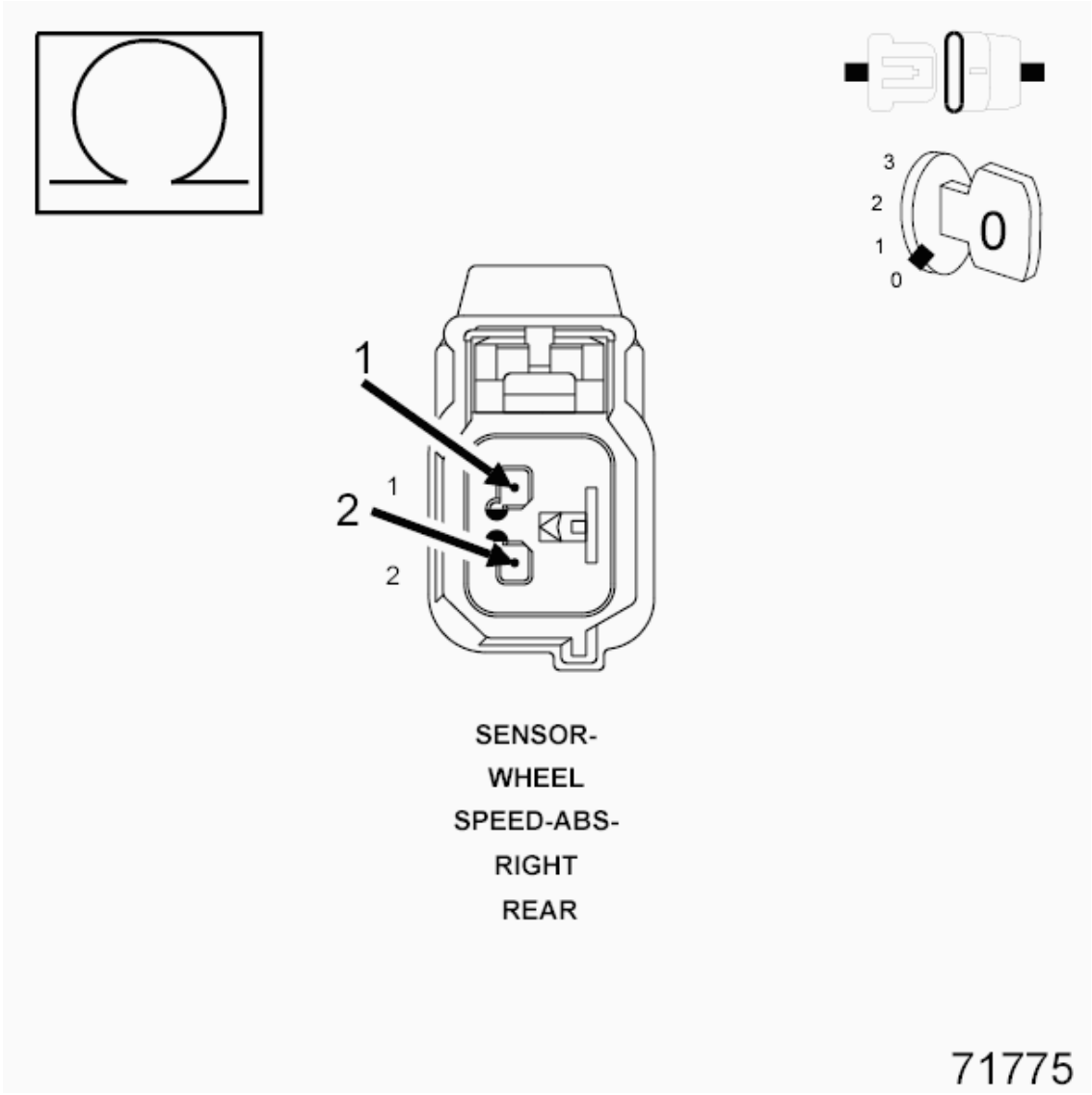


Fig. 40: Checking Right Rear Wheel Speed Sensor Signal Circuit For A Short To Right Rear Wheel Speed Sensor 12 Volt Supply Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (B1) Right Rear WSS Signal circuit and the (B2) Right Rear WSS Supply circuit.

   Is the resistance above 5.0 ohms?

   Yes

   - Go to step 10

   No

- Repair the (B1) Right Rear WSS Signal circuit and the (B2) Right Rear WSS Supply circuit for a short together.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **RIGHT REAR WHEEL SPEED SENSOR**
    1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information.
    2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       CAUTION: Ensure brake capability is available before road testing.

    3. Road test the vehicle over 25 mph (40 km/h).

       NOTE: Vehicle must be driven above 25 mph (40 km/h) for set conditions to be meet.

    4. With the scan tool, read ABS DTCs.

       Did DTC C102C-RIGHT REAR WHEEL SPEED SENSOR CIRCUIT PERFORMANCE reset?

       Yes

       - Replace the Anti-Lock Brake Module in accordance with the Service Information.
       - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       No

       - Test complete.

C1032-RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Right Rear Wheel Speed Sensor (WSS) Signal is intermittently missing while vehicle speed is above 40 km/h (25 mph) or erratic wheel speed signal during acceleration or sensed wheel speed is different from other wheels.

Possible Causes
RIGHT REAR WSS LOOSE - B1, B2 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
RIGHT REAR TONE WHEEL DAMAGE
RIGHT REAR WHEEL BEARING DAMAGE
AXLE SHAFT FASTENER HARDWARE
IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES
RIGHT REAR WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1032-RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read DTCs.

      Does the scan tool display: C1032-RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE active?

      Yes

      - Go to step 3

      No

      - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

   Is the Right Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

   Yes

   - Go to step 3

   No

   - Perform the INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Rear Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

      Is the Right Rear Tire improperly inflated or mismatched tires on vehicle?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

      Was the Axle Shaft fastener loose?

      Yes

      - Repair as necessary.

      No

- Go to step 5

5. **CHECK RIGHT REAR WSS LOOSENESS, INSPECT B1, B2 CIRCUITS/TERMINALS FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

   1. Inspect the Anti-Lock Brake Module harness connector, Right Rear WSS, and Right Rear WSS harness connector.
   2. Inspect the Right Rear WSS for looseness, excessive corrosion and not properly fastened.
   3. Inspect the (B1) Right Rear WSS Signal and (B2) Right Rear WSS Supply circuits between the Right Rear WSS and Anti-Lock Brake Module for damage.

   Is the Right Rear WSS loose or any of the wiring/connectors/terminals damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 6

6. **CHECK RIGHT REAR WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Right Rear Wheel Speed Sensor.
   2. Inspect the Right Rear Wheel Speed Sensor face for damage.

   Is the Right Rear Wheel Speed Sensor damaged?

   Yes

   - Replace sensor and hub assembly.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK RIGHT REAR TONE WHEEL FOR DAMAGE**
   1. Inspect the Right Rear Tone Wheel for damage, missing teeth, cracks, corrosion or looseness.

   NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

Is the Right Rear Tone Wheel damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 8

8. **CHECK RIGHT REAR WHEEL BEARING FOR DAMAGE**
   1. Inspect the Right Rear wheel bearing for excessive runout or clearance.

      NOTE: Refer to the appropriate service information, if necessary, for procedures or specifications. Refer to Front Suspension/Front/HUB AND BEARING - Diagnosis and Testing

      Is the Right Rear Wheel Bearing Damaged?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 9

9. **RIGHT REAR WHEEL SPEED SENSOR**
   1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

      Did DTC C1032-RIGHT REAR WHEEL SPEED SENSOR SIGNAL ERRATIC PERFORMANCE reset?

      Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C1035-RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Right Rear Wheel Speed Sensor (WSS) reading is different from the readings received from the other sensors at a vehicle speed above 40 km/h (25 mph). The Anti-Lock Brake Module compares WSS readings from side-to-side on an axle and front-to-rear.

Possible Causes
RIGHT REAR WSS LOOSE - B1, B2 CIRCUITS/CONNECTOR/TERMINAL DAMAGE
IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES
RIGHT REAR TONE WHEEL/BEARING DAMAGE
AXLE SHAFT FASTENER HARDWARE
RIGHT REAR WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1035-RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

4. With the scan tool, read DTCs.

   Does the scan tool display: C1035-RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE active?

   Yes

   - Go to step 3

   No

   - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Right Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
3. **CHECK FOR IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Rear Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

Is the Right Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

      Was the Axle Shaft fastener loose?

      Yes

      - Repair as necessary.

      No

      - Go to step 5
5. **CHECK RIGHT REAR WSS LOOSENESS, INSPECT B1, B2 CIRCUITS/TERMINALS FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals

   1. Inspect the Anti-Lock Brake Module harness connector, Right Rear WSS, and Right Rear WSS harness connector
   2. Inspect the Right Rear WSS for looseness, excessive corrosion and not properly fastened.
   3. Inspect the (B1) Right Rear WSS Signal and (B2) Right Rear WSS Supply circuits between the Right Rear WSS and Anti-Lock Brake Module for damage.

      Is the Right Rear WSS loose or any of the wiring/connectors/terminals damaged?

      Yes

      - Repair as necessary.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

- Go to step 6

6. **CHECK RIGHT REAR WHEEL SPEED SENSOR FOR DAMAGE**
   1. Remove the Right Rear Wheel Speed Sensor.
   2. Inspect the Right Rear Wheel Speed Sensor face for damage.

   Is the Right Rear Wheel Speed Sensor damaged?

   Yes

   - Replace sensor and hub assembly.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK RIGHT REAR TONE WHEEL/BEARING FOR DAMAGE**
   1. Inspect the Right Rear Tone Wheel/Bearing for damage, missing teeth, cracks, corrosion or looseness.

   NOTE: The Tone Wheel teeth should be perfectly square, not bent, or nicked.

   Is the Right Rear Tone Wheel/Bearing damaged?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 8

8. **RIGHT REAR WHEEL SPEED SENSOR**
   1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Road test the vehicle over 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be met.

   4. With the scan tool, read ABS DTCs.

Did DTC C1035-RIGHT REAR WHEEL SPEED COMPARATIVE PERFORMANCE reset?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C1041-LEFT FRONT TONE WHEEL PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects periodic drops of a WSS signal.

Possible Causes
LEFT FRONT TONE WHEEL/ BEARING DAMAGE
IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES
DIRTY TONE WHEEL/SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C1041-LEFT FRONT TONE WHEEL PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid. If DTC C100A Left Front Wheel Speed Sensor Circuit is present it must be repaired before continuing.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch off then on.

CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

7. With the scan tool, read DTCs.

   Does the scan tool display: C1041-LEFT FRONT TONE WHEEL PERFORMANCE?

   Yes

   - Go to step 3

   No

   - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Left Front WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Front Tire pressure.
   3. Check and adjust all other tire pressures.

4. Inspect for mismatched tires on vehicle.

   Is the Left Front Tire improperly inflated or mismatched tires on vehicle?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE LEFT FRONT TONE WHEEL/BEARING FOR DAMAGE**

   NOTE: Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.

   1. Check the Left Front Tone Wheel/Bearing for damage.
   2. Check the Left Front Tone Wheel for dirt.

      Was the tone wheel dirty?

      Yes

      - Clean tone wheel and sensor. Clear codes and retest.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Replace the Left Front Tone Wheel/Bearing in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1042-RIGHT FRONT TONE WHEEL PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

When the Anti-Lock Brake Module detects periodic drops of a WSS signal.

Possible Causes
RIGHT FRONT TONE WHEEL/BEARING DAMAGE
IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES
DIRTY TONE WHEEL/SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C1042-RIGHT FRONT TONE WHEEL PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid. If DTC C1015 Right Front Wheel Speed Sensor Circuit is present it must be repaired before continuing.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch off then on.

      CAUTION: Ensure brake capability is available before road testing.

   6. Test drive the vehicle in a straight line to 25 mph (40 km/h).

      NOTE: Vehicle must be driven above 25 mph (40 km/h) for set conditions to be meet.

   7. With the scan tool, read DTCs.

      Does the scan tool display: C1042-RIGHT FRONT TONE WHEEL PERFORMANCE?

      Yes

      - Go to step 3

      No

      - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.

2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

   NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

3. Slowly accelerate as straight as possible from a stop to 25 mph (40 km/h).

   Is the Right Front WSS speed showing 0 mph (0 km/h) or not matching other wheels or showing erratic behavior?

   Yes

   - Go to step 3

   No

   - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER RIGHT FRONT TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Right Front Tire pressure.
   3. Check and adjust all other tire pressures.
   4. Inspect for mismatched tires on vehicle.

   Is the Right Front Tire improperly inflated or mismatched tires on vehicle?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE RIGHT FRONT TONE WHEEL/BEARING FOR DAMAGE**

   NOTE: Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.

   1. Check the Right Front Tone Wheel/Bearing for damage.
   2. Check the Right Front Tone Wheel for dirt.

Was the tone wheel dirty?

Yes

- Clean tone wheel and sensor. Clear codes and retest.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Replace the Right Front Tone Wheel/Bearing in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1043-LEFT REAR TONE WHEEL PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects periodic drops of a WSS signal.

Possible Causes
LEFT REAR TONE WHEEL/BEARING DAMAGE
IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES
AXLE SHAFT FASTENER HARDWARE
DIRTY TONE WHEEL/SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C1043-LEFT REAR TONE WHEEL PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch off then on.

CAUTION: Ensure brake capability is available before road testing.

6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

   NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

7. With the scan tool, read DTCs.

   Does the scan tool display: C1043-LEFT REAR TONE WHEEL PERFORMANCE?

   Yes

   - Go to step 3

   No

   - Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
   1. Turn the ignition on.
   2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

      NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

   3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Is the Left Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

      Yes

      - Go to step 3

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHECK FOR IMPROPER LEFT REAR TIRE PRESSURE/MISMATCHED TIRES**
   1. Turn the ignition off.
   2. Check and adjust the Left Rear Tire pressure.

3. Check and adjust all other tire pressures.
4. Inspect for mismatched tires on vehicle.

Is the Left Rear Tire improperly inflated or mismatched tires on vehicle?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

No

- Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

   Was the Axle Shaft fastener loose?

   Yes

   - Repair as necessary.

   No

   - Go to step 5
5. **CHECK THE LEFT REAR TONE WHEEL FOR DAMAGE**

NOTE: Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.

1. Check the Left Rear Tone Wheel for damage.
2. Check the Left Rear Tone Wheel for dirt.

Was the tone wheel dirty?

Yes

- Clean tone wheel and sensor. Clear codes and retest.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Replace the Left Rear Tone Wheel in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1044-RIGHT REAR TONE WHEEL PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects periodic drops of a WSS signal.

Possible Causes
RIGHT REAR TONE WHEEL/BEARING DAMAGE
IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES
AXLE SHAFT FASTENER HARDWARE
DIRTY TONE WHEEL/SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C1044-RIGHT REAR TONE WHEEL PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read DTCs.
   3. Record DTC and Freeze Frame information.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch off then on.

      CAUTION: Ensure brake capability is available before road testing.

   6. Test drive the vehicle in a straight line to 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

   7. With the scan tool, read DTCs.

Does the scan tool display: C1044-RIGHT REAR TONE WHEEL PERFORMANCE?

Yes

- Go to step 3

No

- Go to step 2

2. **CHECK WHEEL SPEED SENSOR SIGNALS**
    1. Turn the ignition on.
    2. With the scan tool, monitor and graph ALL the WSS speeds and compare graph while an assistant drives the vehicle.

    NOTE: If graph shows periodic dropouts pay close attention to the tone wheel.

    3. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

    Is the Right Rear WSS speed showing 0 km/h (0 mph) or not matching other wheels or showing erratic behavior?

    Yes

    - Go to step 3

    No

    - Refer to the INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

3. **CHECK FOR IMPROPER RIGHT REAR TIRE PRESSURE/MISMATCHED TIRES**
    1. Turn the ignition off.
    2. Check and adjust the Right Rear Tire pressure.
    3. Check and adjust all other tire pressures.
    4. Inspect for mismatched tires on vehicle.

    Is the Right Rear Tire improperly inflated or mismatched tires on vehicle?

    Yes

    - Repair as necessary.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

No

- Go to step 4

4. **CHECK AXLE SHAFT FASTENER HARDWARE FOR LOOSENESS**
   1. Inspect the axle shaft fastener for looseness, and not properly fastened. Tighten fastener to proper specification as required.

      Was the Axle Shaft fastener loose?

      Yes

      - Repair as necessary.

      No

      - Go to step 5

5. **CHECK THE RIGHT REAR TONE WHEEL FOR DAMAGE**

   NOTE: Check the tone wheel teeth for missing teeth, cracks, or looseness. Teeth should be perfectly square, not bent, or nicked.

   1. Check the Right Rear Tone Wheel for damage.
   2. Check the Right Rear Tone Wheel for dirt.

      Was the tone wheel dirty?

      Yes

      - Clean tone wheel and sensor. Clear codes and retest.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

      No

      - Replace the Right Rear Tone Wheel in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

C1046-LEFT FRONT WHEEL PRESSURE PHASE MONITORING

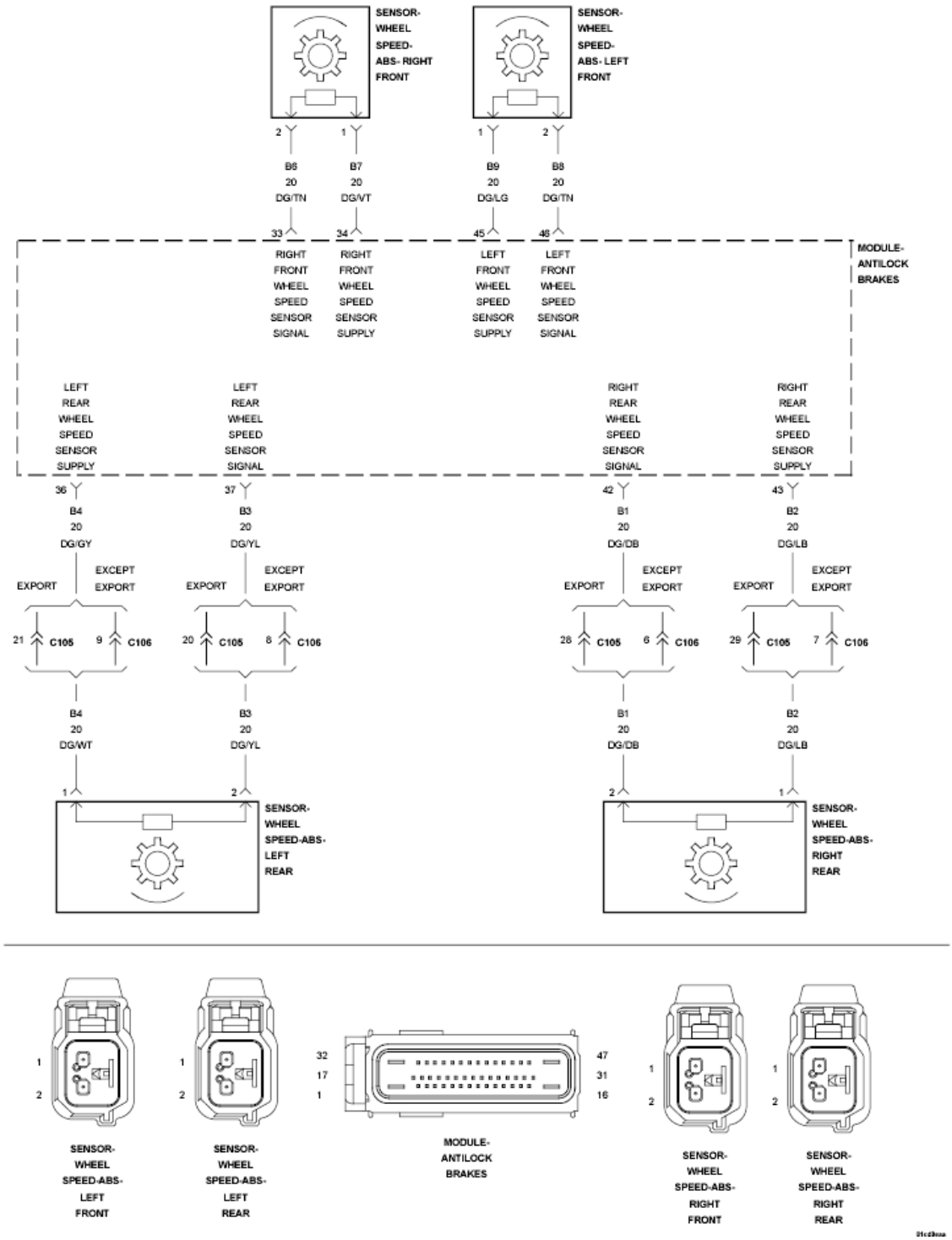


Fig. 41: Rear Wheel Speed Sensor Signal/Supply Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

During active ABS control.

- **Set Condition:**

  If the Anti-Lock Brake Module detects a pressure reduction phase and the following pressure hold phase is too long.

Possible Causes
LEFT FRONT TONE WHEEL/BEARING DAMAGED
WHEEL SPEED SIGNALS SWAPPED
LEFT FRONT WSS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Ensure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 25 mph (40 km/h).

      Does the Left Front WSS speed differ from the other WSS speeds by 5 mph (8 km/h) or show NO speed?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **CHECKING INSIDE WHEEL SPEED**
   1. Slowly accelerate as straight as possible from a stop to 25 mph (40 km/h) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

      Was the inside wheel slower than outside?

      Yes

      - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

- Go to step 3

3. **INSPECT TONE WHEEL/BEARING**
   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
   3. Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 4

4. **CHECK WHEEL SPEED SENSOR WIRING**
   1. Check the Anti-Lock Brake Module and Wheel Speed Sensors harness connectors for incorrectly wired connectors.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 5

5. **LEFT FRONT WHEEL SPEED SENSOR**
   1. Replace the Left Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 25 mph (40 km/h).

NOTE: Vehicle must be driven above 25 mph (40 km/h) for set conditions to be meet.

4. With the scan tool, read ABS DTCs.

NOTE: The Anti-Lock Brake Module must sense ALL 4 wheels at 7.5 mph (12 km/h) before it will extinguish the ABS indicators.

Did DTC C1046 LEFT FRONT WHEEL PRESSURE PHASE MONITORING reset?

Yes

- Replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test complete.

C1047-RIGHT FRONT WHEEL PRESSURE PHASE MONITORING

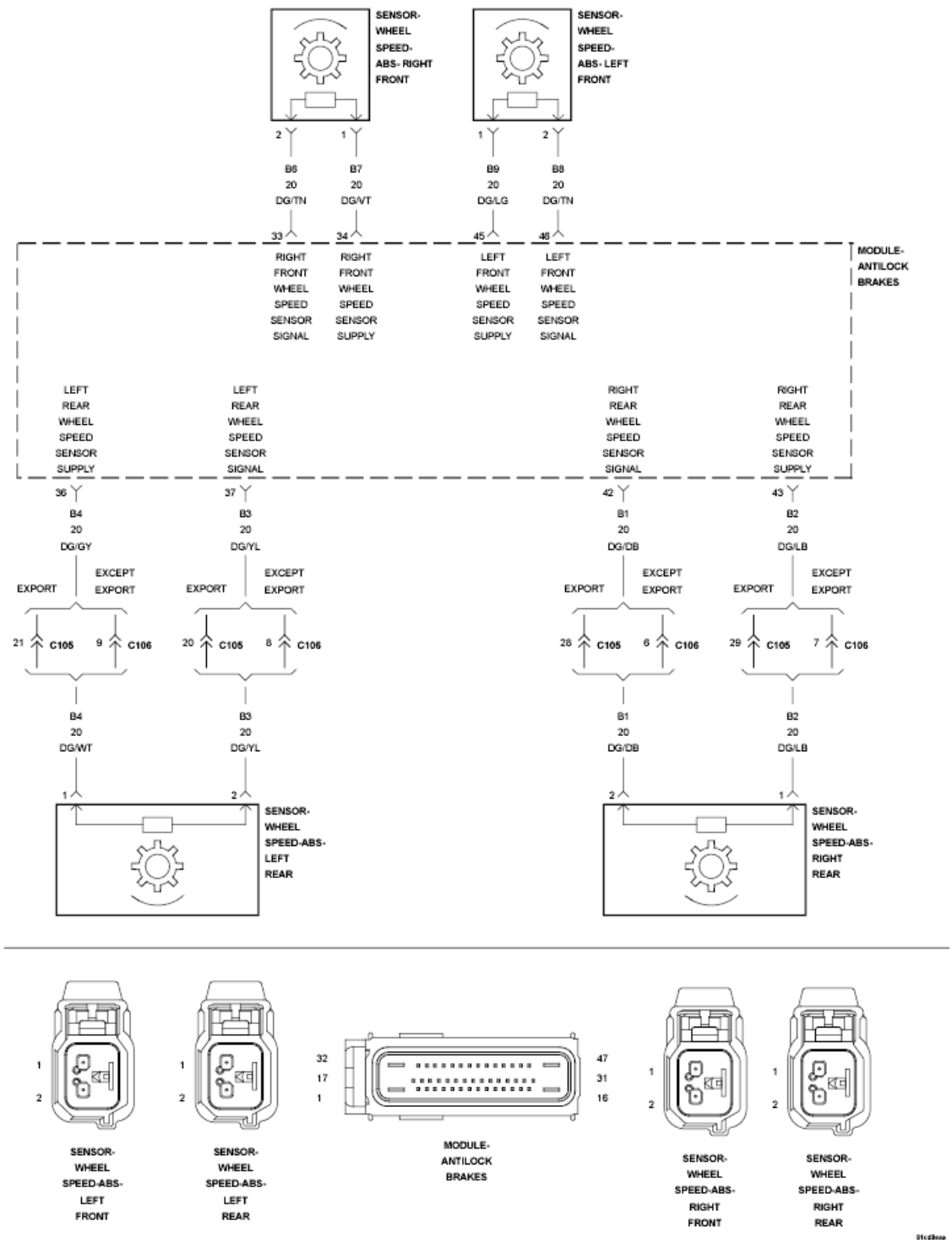


Fig. 42: Rear Wheel Speed Sensor Signal/Supply Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

During active ABS control.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects a pressure reduction phase and the following pressure hold phase is too long.

Possible Causes
RIGHT FRONT TONE WHEEL DAMAGED
WHEEL SPEED SIGNALS SWAPPED
RIGHT FRONT WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Ensure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Does the Right Front WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **CHECKING INSIDE WHEEL SPEED**
   1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

      Was the inside wheel slower than outside?

      Yes

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

      No

- Go to step 3

3. **INSPECT TONE WHEEL/BEARING**
   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
      - Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK WHEEL SPEED SENSOR WIRING**
   1. Check the Anti-Lock Brakes Module and Wheel Speed Sensors harness connectors for incorrectly wired connectors.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **RIGHT FRONT WHEEL SPEED SENSOR**
   1. Replace the Right Front Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

4. With the scan tool, read ABS DTCs.

NOTE: The Anti-Lock Brake Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

Did DTC C1047 RIGHT FRONT WHEEL PRESSURE PHASE MONITORING reset?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C1048-LEFT REAR WHEEL PRESSURE PHASE MONITORING

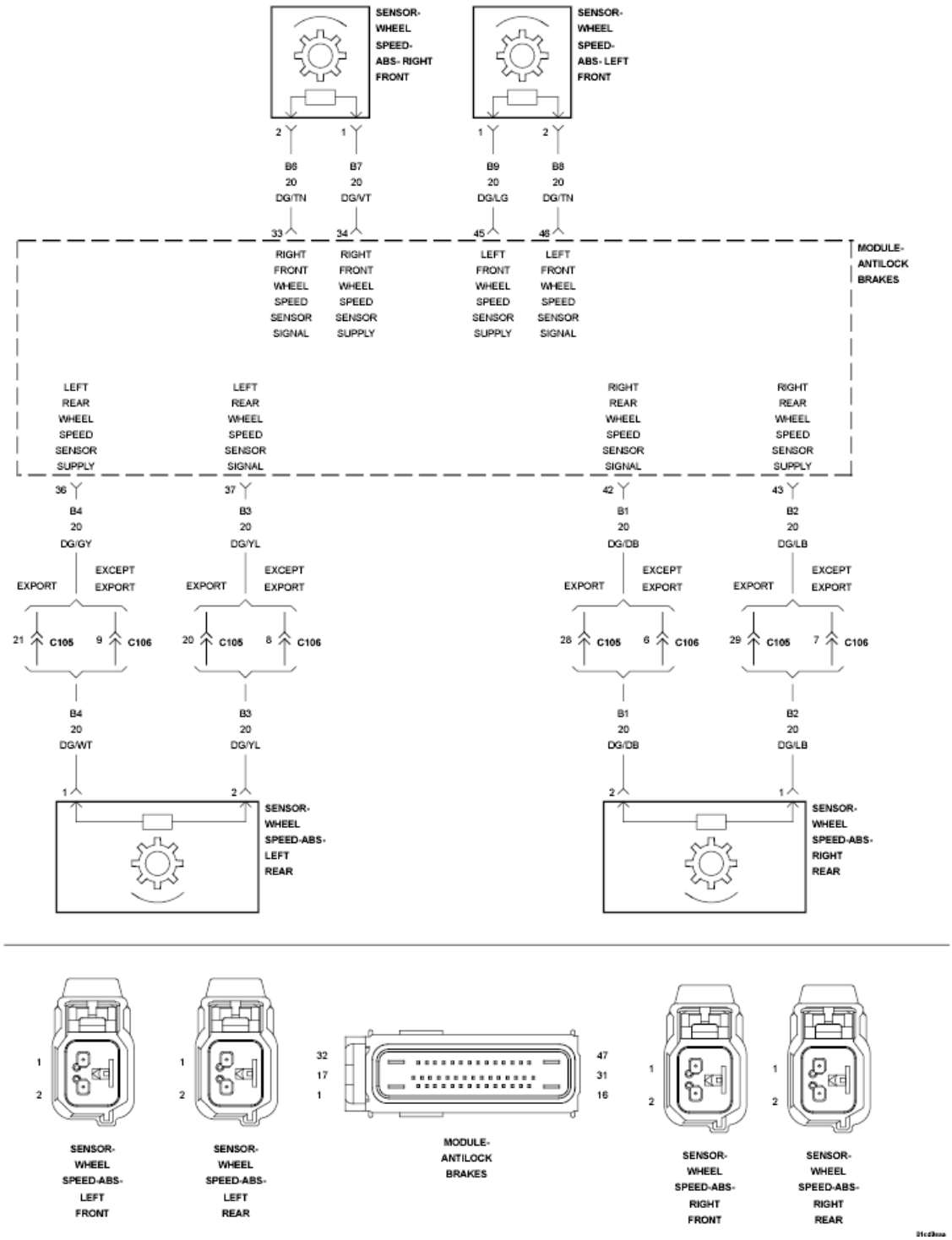


Fig. 43: Rear Wheel Speed Sensor Signal/Supply Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

During active ABS control.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects a pressure reduction phase and the following pressure hold phase is too long.

Possible Causes
LEFT REAR TONE WHEEL/WHEEL BEARING
WHEEL SPEED SIGNALS SWAPPED
LEFT REAR WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Ensure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Does the Left Rear WSS speed differ from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **CHECKING INSIDE WHEEL SPEED**
   1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

      Was the inside wheel slower than outside?

      Yes

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

- Go to step 3

3. **INSPECT TONE WHEEL/BEARING**
   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
      - Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK WHEEL SPEED SENSOR WIRING**
   1. Check the Anti-Lock Brakes Module and Wheel Speed Sensors harness connectors for incorrectly wired connectors.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **LEFT REAR WHEEL SPEED SENSOR**
   1. Replace the Left Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

4. With the scan tool, read ABS DTCs.

NOTE: The Anti-Lock Brake Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

Did DTC C1048 LEFT REAR WHEEL PRESSURE PHASE MONITORING reset?

Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C1049-RIGHT REAR WHEEL PRESSURE PHASE MONITORING

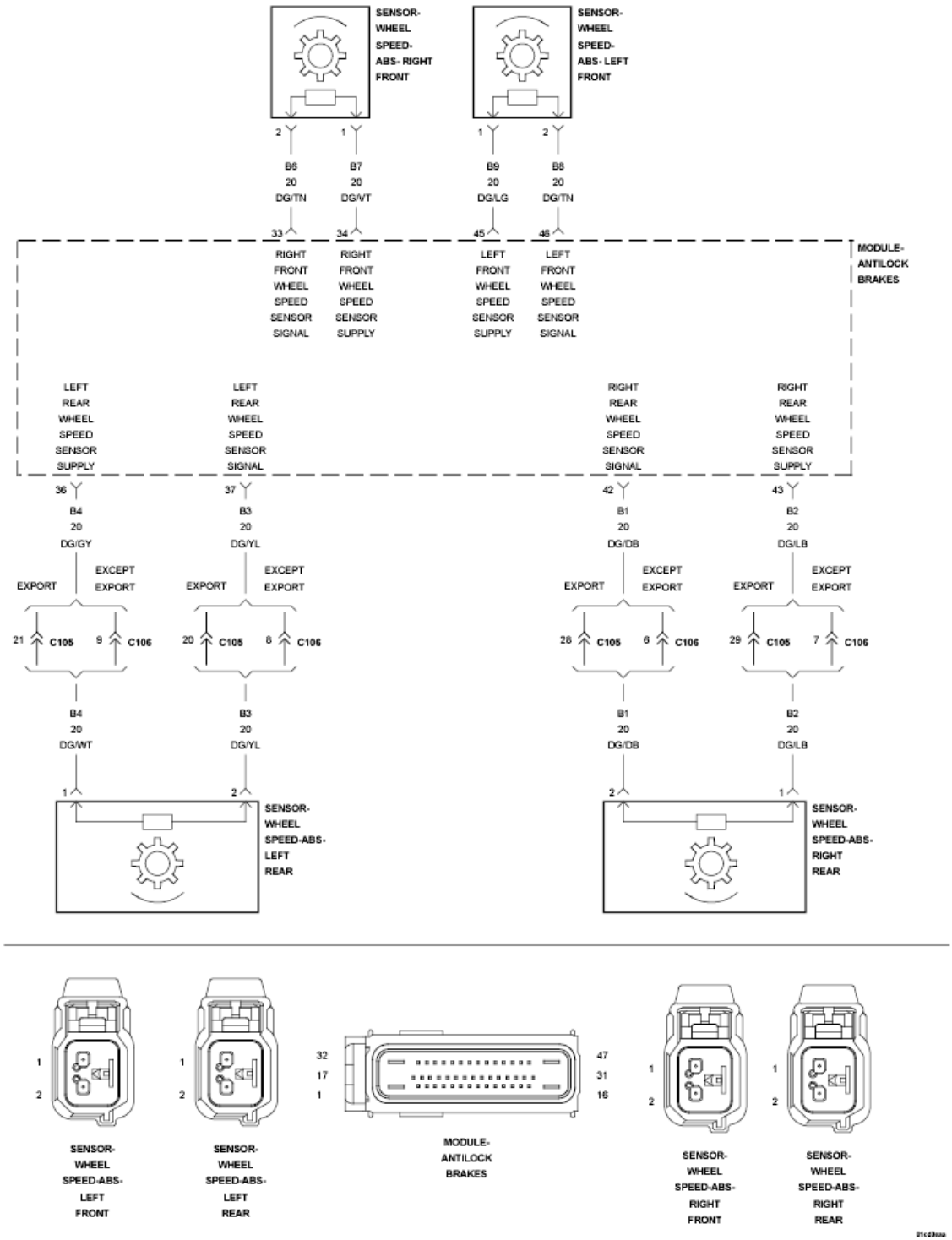


Fig. 44: Rear Wheel Speed Sensor Signal/Supply Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

During active ABS control.

- **Set Condition:**

  When the Anti-Lock Brakes Module detects a pressure reduction phase and the following pressure hold phase is too long.

Possible Causes
RIGHT REAR TONE WHEEL DAMAGED
WHEEL SPEED SIGNALS SWAPPED
RIGHT REAR WSS
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **COMPARE WHEEL SPEED SENSOR SIGNALS**

   WARNING: Ensure brake capability is available before road testing.

   1. With the scan tool, monitor ALL the WSS speeds while an assistant drives the vehicle.
   2. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph).

      Does the Right Rear WSS speed from the other WSS speeds by 8 km/h (5 mph) or show NO speed?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **CHECKING INSIDE WHEEL SPEED**
   1. Slowly accelerate as straight as possible from a stop to 40 km/h (25 mph) and perform a 90 degree turn while monitoring if inside wheel is slower than outside.

      Was the inside wheel slower than outside?

      Yes

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

- Go to step 3

3. **INSPECT TONE WHEEL/BEARING**
   1. Turn the ignition off.
   2. Visually inspect the tone wheel and bearing for damage.
      - Check the tone wheel teeth for missing teeth, cracks, and looseness. The teeth must be perfectly square, not bent, or nicked. Check the wheel bearing for worn/looseness.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK WHEEL SPEED SENSOR WIRING**
   1. Check the Anti-Lock Brakes Module and Wheel Speed Sensors harness connectors for incorrectly wired connectors.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **RIGHT REAR WHEEL SPEED SENSOR**
   1. Replace the Right Rear Wheel Speed Sensor in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      CAUTION: Ensure brake capability is available before road testing.

   3. Road test the vehicle over 40 km/h (25 mph).

NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

4. With the scan tool, read ABS DTCs.

NOTE: The Anti-Lock Brake Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

Did DTC C1049 RIGHT REAR WHEEL PRESSURE PHASE MONITORING reset?

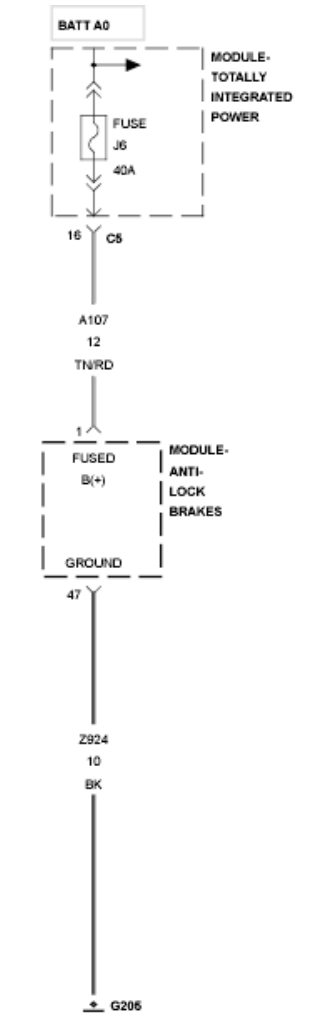
Yes

- Replace the Anti-Lock Brakes Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Test Complete.

C1073-ABS PUMP MOTOR CONTROL CIRCUIT



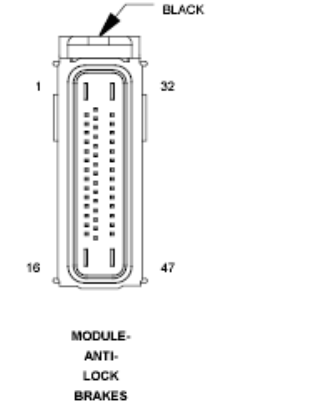


Fig. 45: Fused B+ Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  The ABM detects low pump motor feedback voltage with actuation of the pump motor relay.

Possible Causes
BLOWN PUMP FUSE
HIGH RESISTANCE IN B+ CIRCUITS
HIGH RESISTANCE IN GROUND CIRCUITS
INTEGRATED CONTROL UNIT

Diagnostic Test

1. **CHECK FOR A DTC C1073-ABS PUMP MOTOR CONTROL CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid. If present, diagnose and repair DTC C2116-ABS PUMP MOTOR SUPPLY LOW VOLTAGE before diagnosing this DTC.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. Road test the vehicle over 40 km/h (25 mph).

      NOTE: Vehicle must be driven above 40 km/h (25 mph) for set conditions to be meet.

   5. With the scan tool, read DTCs.

      NOTE: The Anti-Lock Brake Module must sense ALL 4 wheels at 12 km/h (7.5 mph) before it will extinguish the ABS indicators.

      Does the scan tool display: C1073-ABS PUMP MOTOR CONTROL CIRCUIT?

      Yes

      - Go to step 2

      No

      - Perform the INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based**

Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure.

2. **CHECK THE ABS PUMP MOTOR FUSED B+ FOR AN OPEN**
    1. Turn the ignition off.
    2. Remove and visually inspect the ABS Pump Motor B+ fuse.

    Is the ABS Pump Motor B+ fuse open?

    Yes

    - Go to step 3

    No

    - Go to step 5
3. **CHECK THE (A107) FUSED B(+) FOR A SHORT TO GROUND**

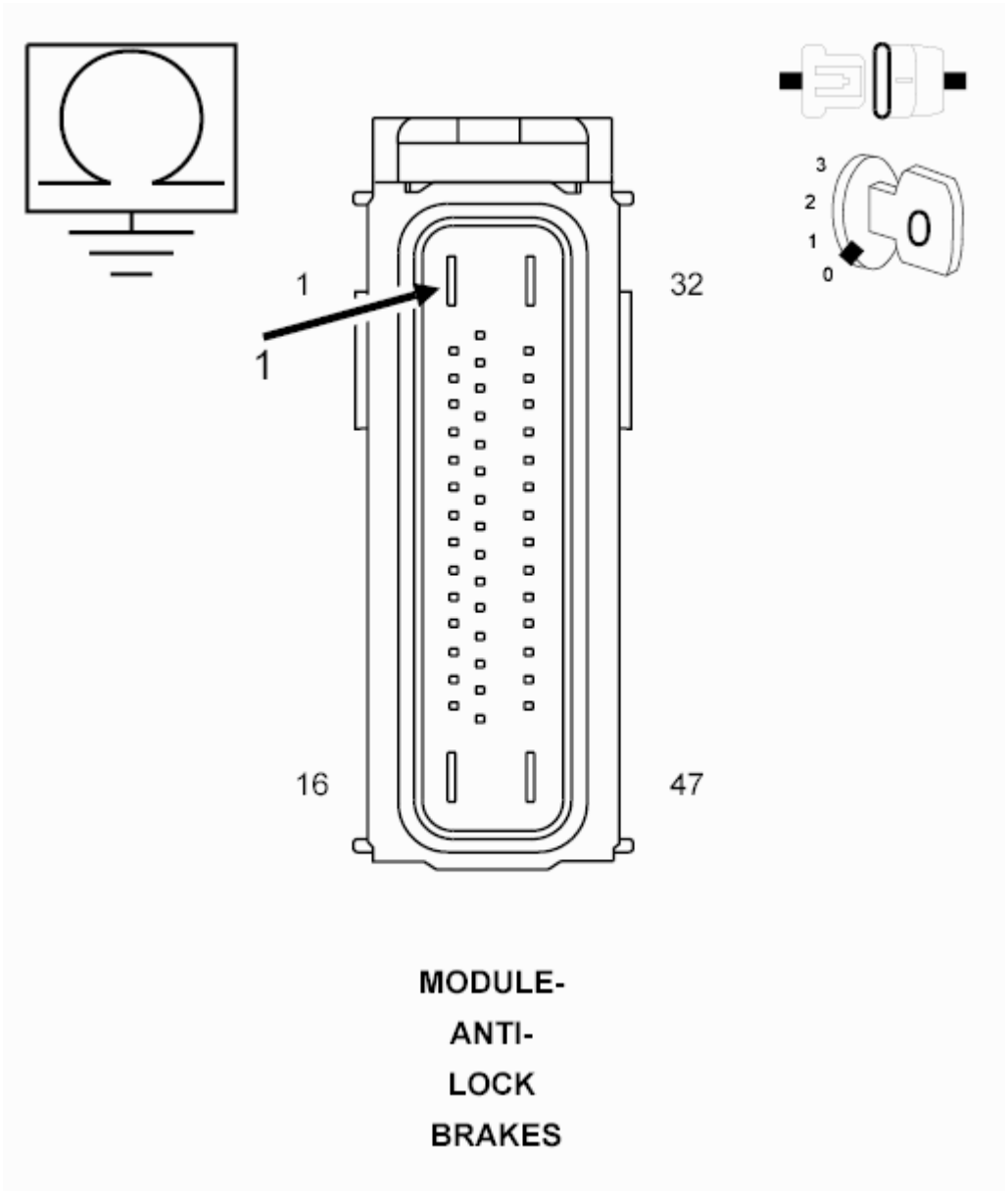


Fig. 46: Checking Fused B(+) For A Short To Ground
Courtesy of CHRYSLER LLC

1. Disconnect the Anti-Lock Brake Module harness connector.
2. Using a 12-volt test light connected to 12-volts, probe the (A107) Fused B+ circuit.

   Does the test light illuminate brightly?

   Yes

   - Repair the (A107) Fused B(+) circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

No

- Go to step 4

4. **CHECK THE (A107) FUSED B(+) CIRCUIT**
   1. Visually inspect the (A107) Fused B(+) circuit in the wiring harness.
   2. Look for any signs of intermittent short to ground.

   Is the wiring harness OK?

   Yes

   - Go to step 5

   No

   - Repair the (A107) Fused B(+) circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
5. **CHECK THE VOLTAGE ON THE (A107) FUSED B(+) CIRCUIT**

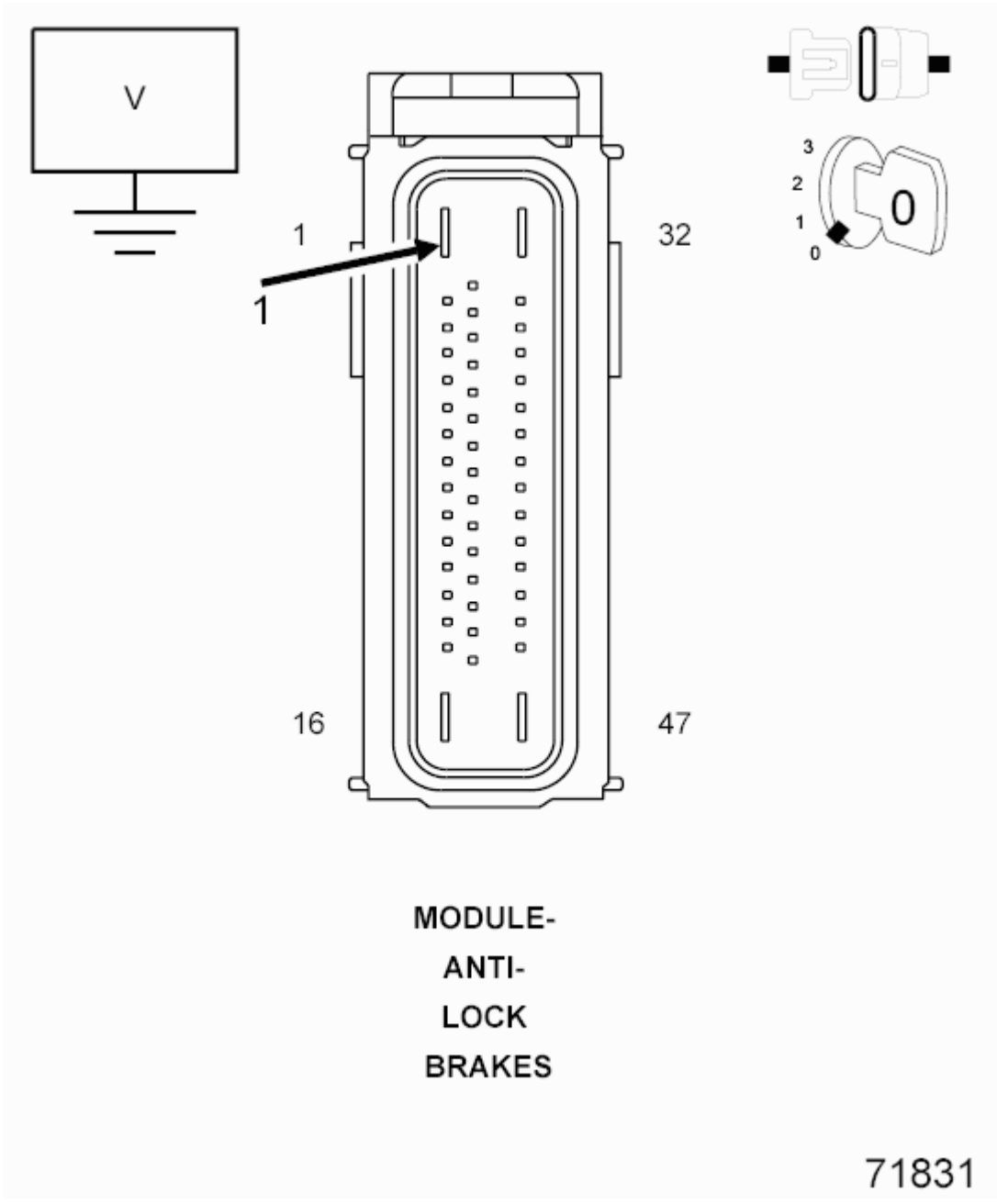


Fig. 47: Checking Voltage On Fused B(+) Circuit
Courtesy of CHRYSLER LLC

1. Disconnect the Anti-Lock Brake Module harness connector.
2. Measure the voltage of the (A107) Fused B(+) circuit in the Anti-Lock Brake Module harness connector.

   Is the voltage above 10 volts?

   Yes

- Go to step 6

No

- Repair the (A107) Fused B(+) circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK THE (Z924) GROUND CIRCUIT FOR AN OPEN**

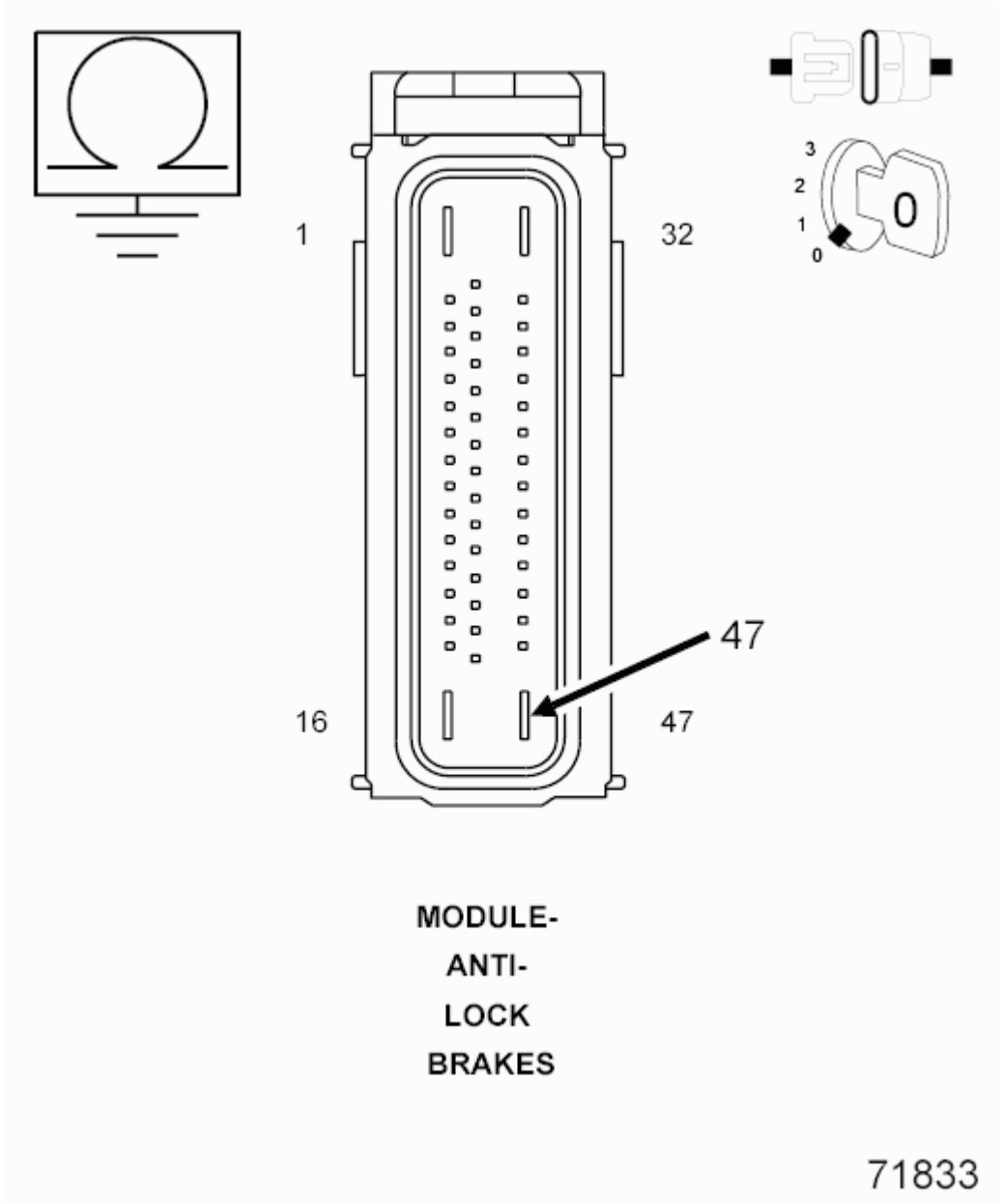


Fig. 48: Checking Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (Z924) Ground circuit between the Anti-Lock Brake Module harness connector and ground

   Is the resistance below 5.0 ohms?

   Yes

   - Replace the ICU per service information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the high resistance in the affected circuit.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1078-TIRE REVOLUTIONS RANGE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuous.

- **Set Condition:**

  Programmed value for tire size is not within acceptable range.

Possible Causes
INCORRECT VALUE PROGRAMMED INTO TOTALLY INTEGRATED POWER MODULE

Diagnostic Test

1. **INCORRECT VALUE PROGRAMMED INTO TIPM**

TIRE SIZE	BODY STYLE	ENGINE SIZE	SALES CODE	TIRE CIRCUMFERENCE (MM PER REV)
P225/70R 16 ALL SEASON	JC	ALL	TRD	2206
225/65R 17 BSW TOURING	JC	ALL	TRF	2220
225/65R 16 BSW THREE SEASON	JC	ALL	TUJ	2130

P225/65R 17 BSW A/S TOURING	JC	ALL	TVK	2230
225/55R 19 BSW THREE SEASON	JC	ALL	TWC	2250
P225//55R 19 BSW AS TOURING	JC	ALL	TWV	2270

1. Verify the correct tire/wheel information is programmed in the TIPM.

   Is the correct value programmed in the TIPM according to the chart?

   Yes

   - Test complete.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

   No

   - Program the correct Tire/Wheel information in the TIPM.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

C107C-BRAKE PEDAL SWITCH 1/2 STUCK

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **POWERTRAIN CONTROL MODULE (PCM) or ENGINE CONTROL MODULE (ECM) DTCS PRESENT**
   1. With the scan tool, read ECM/PCM Brake DTCs.

      Are there any ECM/PCM Brake DTCs present?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** for gas engine applications or **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Diagnosis and Testing** for diesel engine applications.

      No

      - Using the schematics as a guide, check the ECM/PCM terminals for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits.

- Perform the appropriate VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** for gas engine applications or **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** for diesel engine applications.

C107D-BRAKE PEDAL SWITCH 1/2 CORRELATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **POWERTRAIN CONTROL MODULE (PCM) or ENGINE CONTROL MODULE (ECM) DTCS PRESENT**
   1. With the scan tool, read ECM/PCM Brake DTCs.

      Are there any ECM/PCM Brake DTCs present?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** for gas engine applications or **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Diagnosis and Testing** for diesel engine applications.

      No

      - Using the schematics as a guide, check the ECM/PCM terminals for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits.
      - Perform the appropriate VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** for gas engine applications or **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** for diesel engine applications.

C1090-ABS BRAKE LAMP CONTROL CIRCUIT LOW

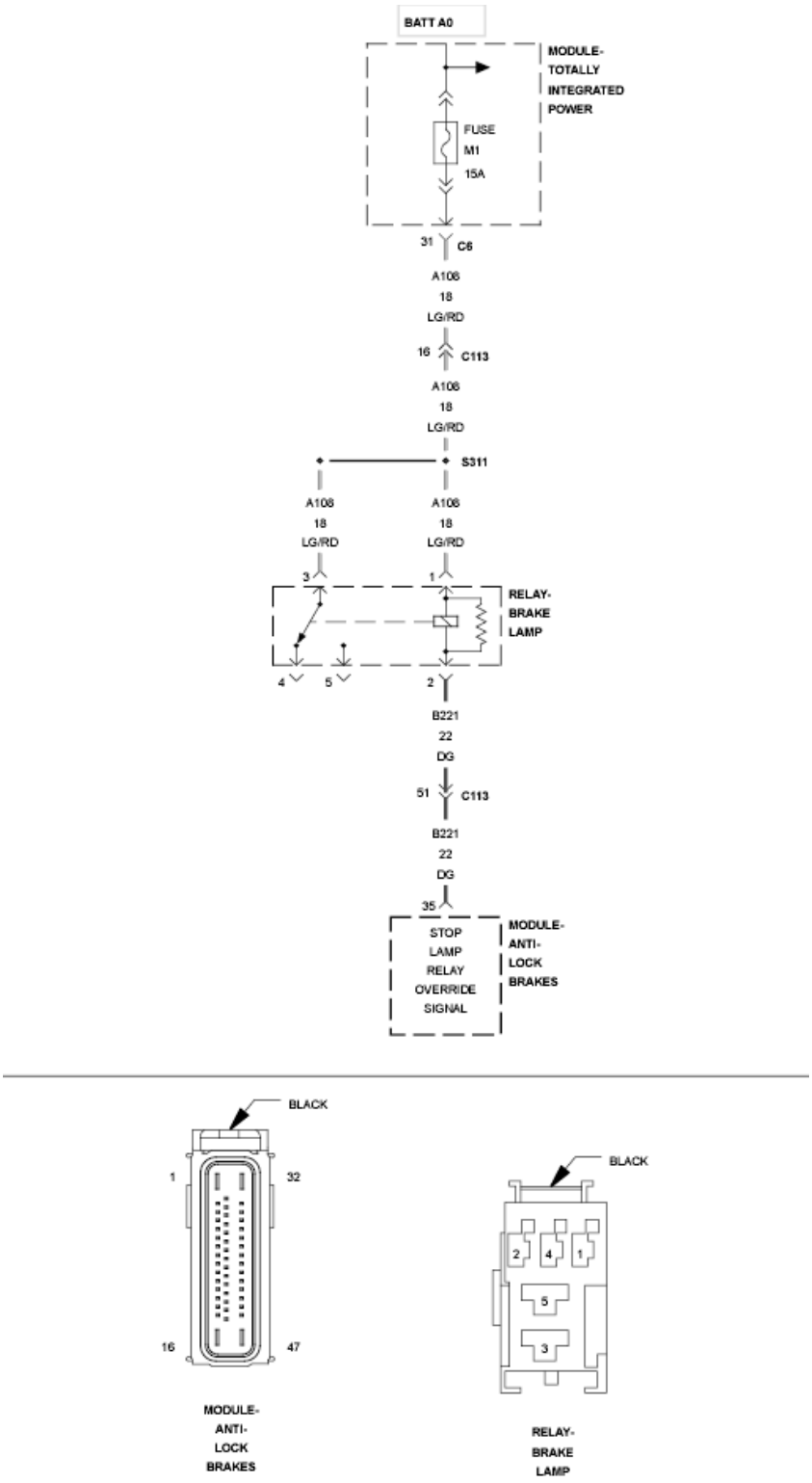


Fig. 49: Stop Lamp Relay Override Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When monitoring the Stop Lamp Relay Override Signal circuit the module detects a short to ground.

Possible Causes
(B221) STOP LAMP RELAY OVERRIDE SIGNAL OPEN OR SHORTED TO GROUND
BLOWEN FUSE
BRAKE LAMP RELAY
ANTI-LOCK BRAKE MODULE (ABM)

Diagnostic Test

1. **CHECK FOR DTC C1090-ABS BRAKE LAMP CONTROL CIRCUIT LOW**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Start the engine.
   4. Apply pressure to the brake pedal firmly with at least 80 bar (1160 psi.).
   5. With the scan tool, read the DTCs.

      Does the scan tool display: C1090-ABS BRAKE LAMP CONTROL CIRCUIT LOW?

      Yes

      - Go to step 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out or corroded terminals.

   1. Turn the ignition off.
   2. Inspect the Anti-Lock Brake Module harness connector and the Brake Lamp Relay harness connector.

Is the Anti-Lock Brake Module or any of the connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 3

3. **CHECK (B221) STOP LAMP RELAY OVERRIDE SIGNAL SHORTED TO GROUND**

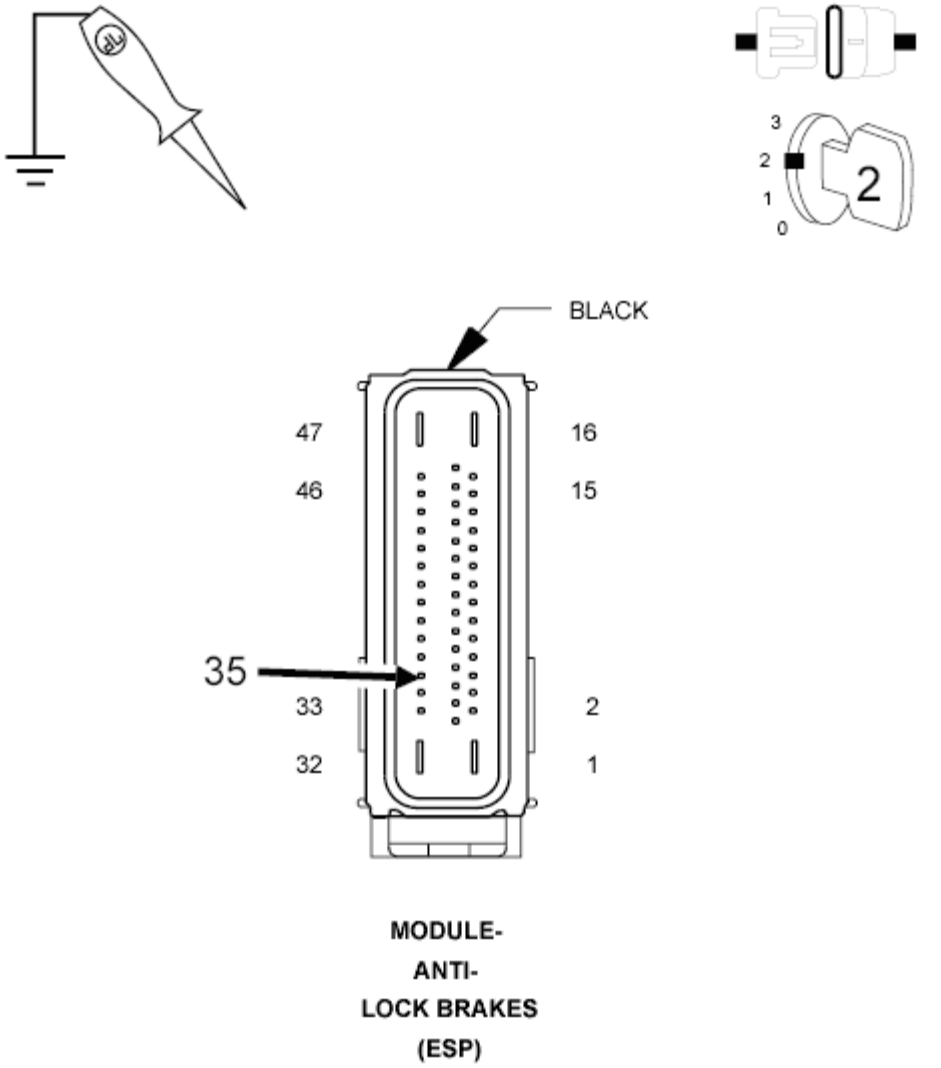


Fig. 50: Checking Stop Lamp Relay Override Signal Shorted To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module
3. Turn the key on.
4. Using a 12-volt test light connected to ground, probe the (B221) Stop Lamp Relay Override Signal circuit at the Anti-Lock Brake Module harness connector.

   Does the test light illuminate?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the service information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK (A108) FUSED B+**

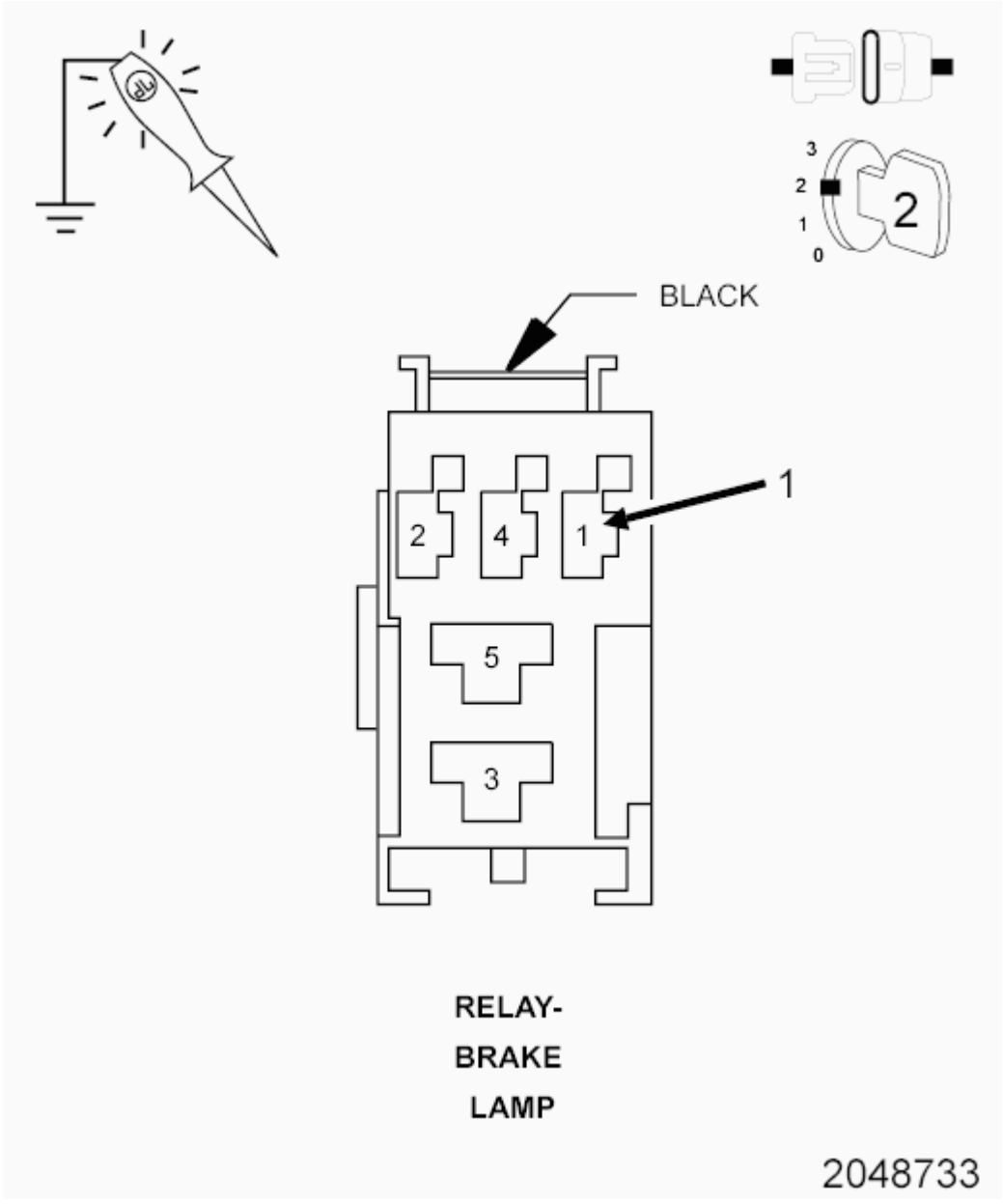


Fig. 51: Checking Brake Lamp Relay
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Brake Lamp Relay.
3. Turn the key on.
4. Using a 12-volt test light connected to ground, probe the (A108) Fused B+ circuit at the Brake Lamp Relay harness connector.

   Does the test light illuminate brightly?

   Yes

- Go to step 5

No

- Check for open fuse, if OK repair open or short to ground in the (A108) Fused B+ circuit.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **BRAKE LAMP RELAY**

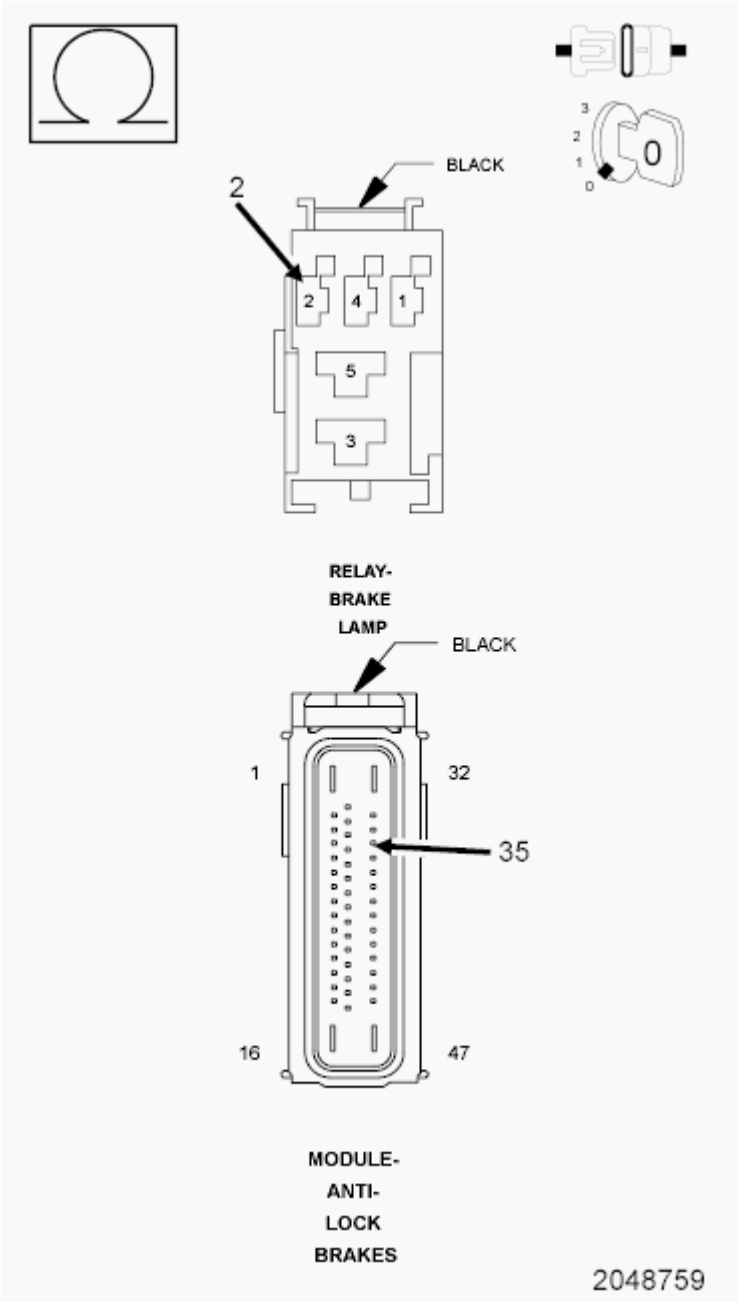


Fig. 52: Measuring Resistance Of Stop Lamp Relay Override Signal Circuit

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (B221) Stop Lamp Relay Override Signal Circuit between the Brake Lamp Relay and the Anti-Lock Brake Module.

   Is the resistance below 5 Ohms?

   Yes

   - Replace the Brake Lamp Relay in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair open in the (B221) Brake Lamp Inhibit Relay Control circuit.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1091-ABS BRAKE LAMP CONTROL CIRCUIT HIGH

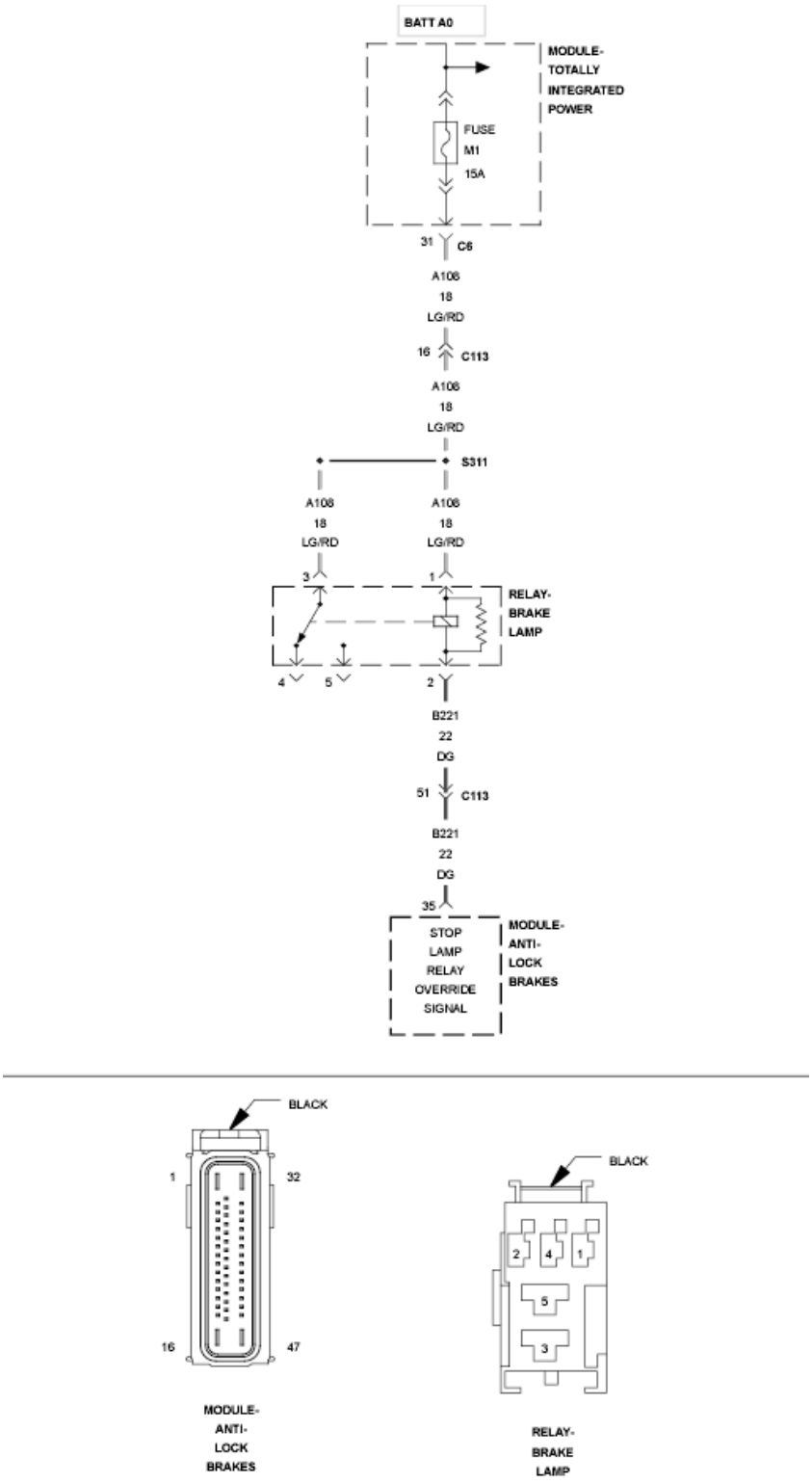


Fig. 53: Stop Lamp Relay Override Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **When Set:**

  When monitoring the Stop Lamp Relay Override Signal circuit the module detects a short to B+.

Possible Causes
(B221) STOP LAMP RELAY OVERRIDE SIGNAL SHORTED TO VOLTAGE
BRAKE LAMP RELAY
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC C1091-ABS BRAKE LAMP CONTROL CIRCUIT HIGH**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Start the engine.
   4. Apply brake pedal firmly with at least 80 bar (1160 psi.).
   5. With the scan tool, read DTCs.

   Does the scan tool display: C1091-ABS BRAKE LAMP CONTROL CIRCUIT HIGH?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK CONNECTOR/TERMINAL FOR DAMAGE**

   NOTE: Check all terminals for broken, bent, pushed out, or corroded terminals.

   1. Turn the ignition off.
   2. Inspect the Anti-Lock Brake Module harness connector and the Brake Lamp Relay harness connector.

   Is the Anti-Lock Brake Module or any of the connectors/terminals damaged?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 3

3. **CHECK (B221) STOP LAMP RELAY OVERRIDE SIGNAL SHORTED TO VOLTAGE**

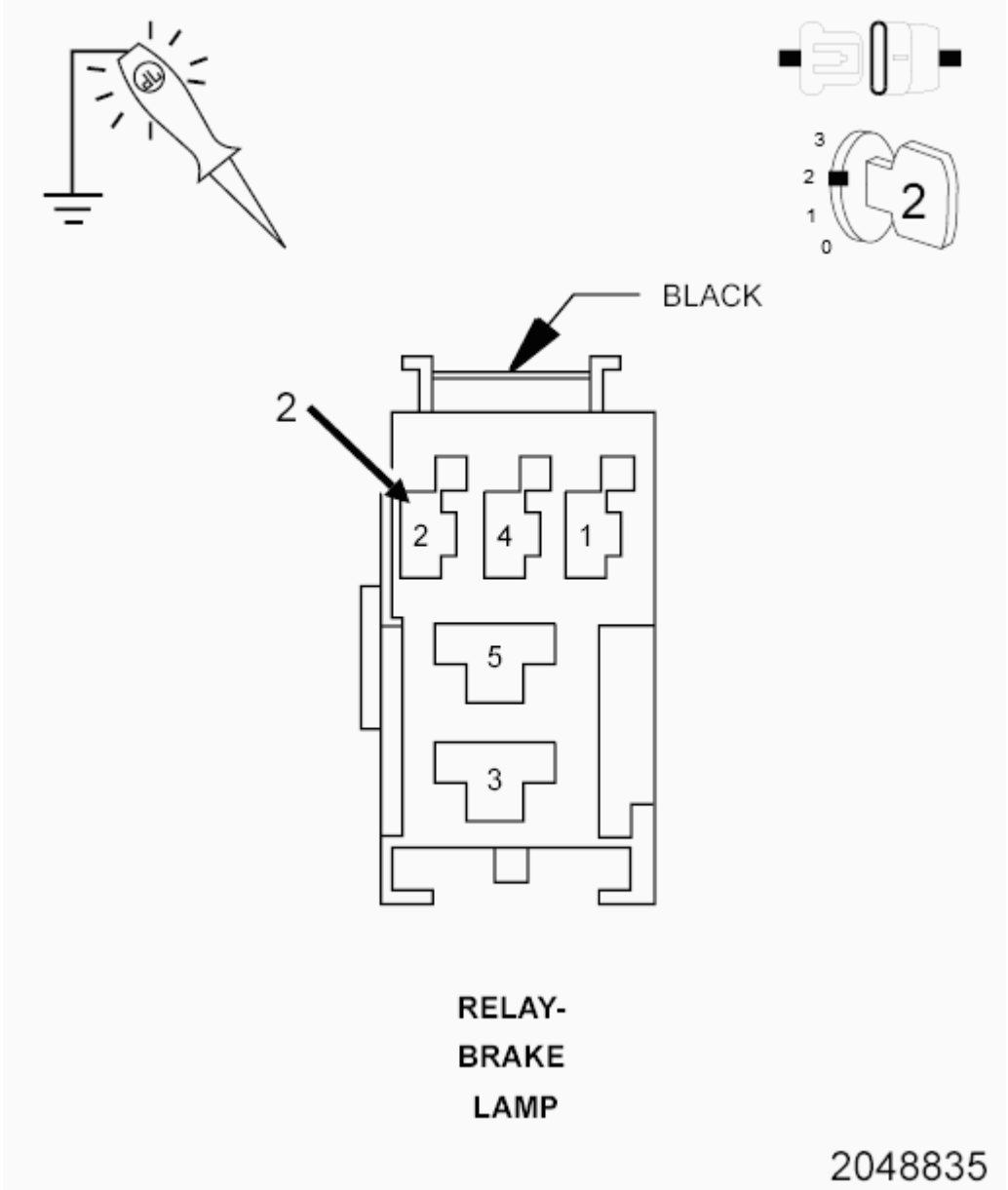


Fig. 54: Checking Stop Lamp Relay Override Signal Shorted To Voltage

Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module.
3. Disconnect the Brake Lamp Relay.
4. Turn the ignition on.
5. Using a 12-volt test light connected to ground, probe the (B221) Stop Lamp Relay Override Signal circuit at the Brake Lamp Relay harness connector.

   Does the test light illuminate brightly?

   Yes

   - Repair the short to voltage in the (B221) Stop Lamp Relay Override Signal circuit.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **BRAKE LAMP RELAY**

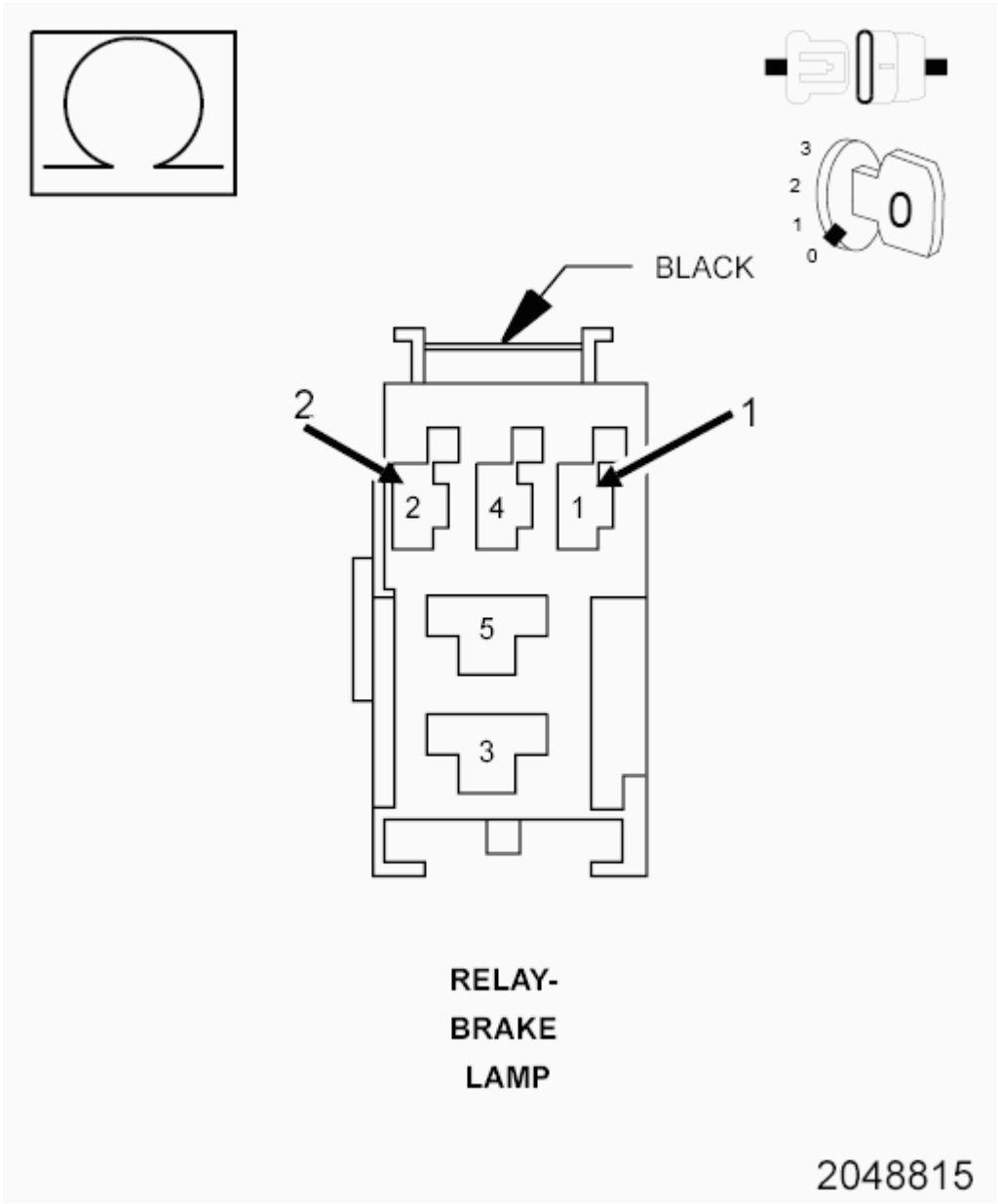


Fig. 55: Measuring Resistance Across Relay Between Stop Lamp Relay Override Signal Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance across the relay between the (B221) Stop Lamp Relay Override Signal circuit and the (A103) Fused B+ circuit.

   Is the resistance 75 ± 5 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the service information.

- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Replace the Brake Lamp Relay in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1210-G SENSOR INPUT CIRCUIT PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously, with ignition on, until vehicle speed exceeds 20 km/h (12.4 mph) for the first time, but not if the sensor voltage is out of range.

  Or, during diagnostic mode.

  Or, if the monitoring was inhibited by a corresponding diagnostics command.

- **Set Condition:**

  If the measured acceleration signal is higher than 0.8 g for longer than the specified detection time.

Possible Causes
DYNAMICS SENSOR INSTALLATION
DYNAMICS SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C1210-G SENSOR INPUT CIRCUIT PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record information.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C1210-G SENSOR INPUT CIRCUIT PERFORMANCE?

Yes

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Perform the INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1219-STEERING ANGLE SENSOR ERRATIC PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuous monitoring.

- **Set Condition:**

  If the Anti-Lock Brake Module detects that the calculated steering wheel angle and the actual steering angle disagree.

Possible Causes
VEHICLE DAMAGE
STEERING COLUMN / INTERMEDIATE SHAFT DAMAGE
STEERING ANGLE SENSOR LOOSE
CLOCKSPRING (SAS)

Diagnostic Test

1. **PERFORM TEST DRIVE AND VERIFY DTC IS STILL ACTIVE**

   NOTE: If present, diagnose and repair DTC C123F-STEERING ANGLE SENSOR COMPARATIVE PERFORMANCE before diagnosing this DTC.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. Perform ECU initialization with drive test. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

5. Test drive the vehicle by driving straight at a velocity between 10 and 25 km/hr (6 and 15 mph.) for 1 minute.
6. Park the vehicle.
7. Turn the steering wheel from stop to stop.
8. With the scan tool, read ABS DTCs.

Does this DTC reset?

Yes

- Go to step 2

No

- The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK STEERING ANGLE SENSOR OUTPUT**
   1. Start the engine.
   2. Center the steering wheel.
   3. With the scan tool, read the Steering Angle Sensor Position.

   Is the Steering Angle Sensor Position within ±15°?

   Yes

   - Go to step 3

   No

   - Go to step 4
3. **INSPECT VEHICLE, STEERING COLUMN, AND INTERMEDIATE SHAFT FOR DAMAGE**

NOTE: If possible, check vehicle repair history for collision damage. ABS module must be reinitializes after repair.

1. Turn the ignition off.
2. Inspect the vehicle for damage causing tracking problems.

3. Inspect the steering column and intermediate shaft for damage.

   Were any problems found?

   Yes

   - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK CLOCKSPRING (SAS) INSTALLATION**

   WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

   NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

   1. Verify that the Clockspring (SAS) is properly installed.

      Is the Steering Angle Sensor properly installed?

      Yes

      - Replace the Clockspring (SAS) in accordance with the Service Information and clear offsets by initializing ECU with wheels pointing straight ahead.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C121A-STEERING ANGLE SENSOR NOT INITIALIZED

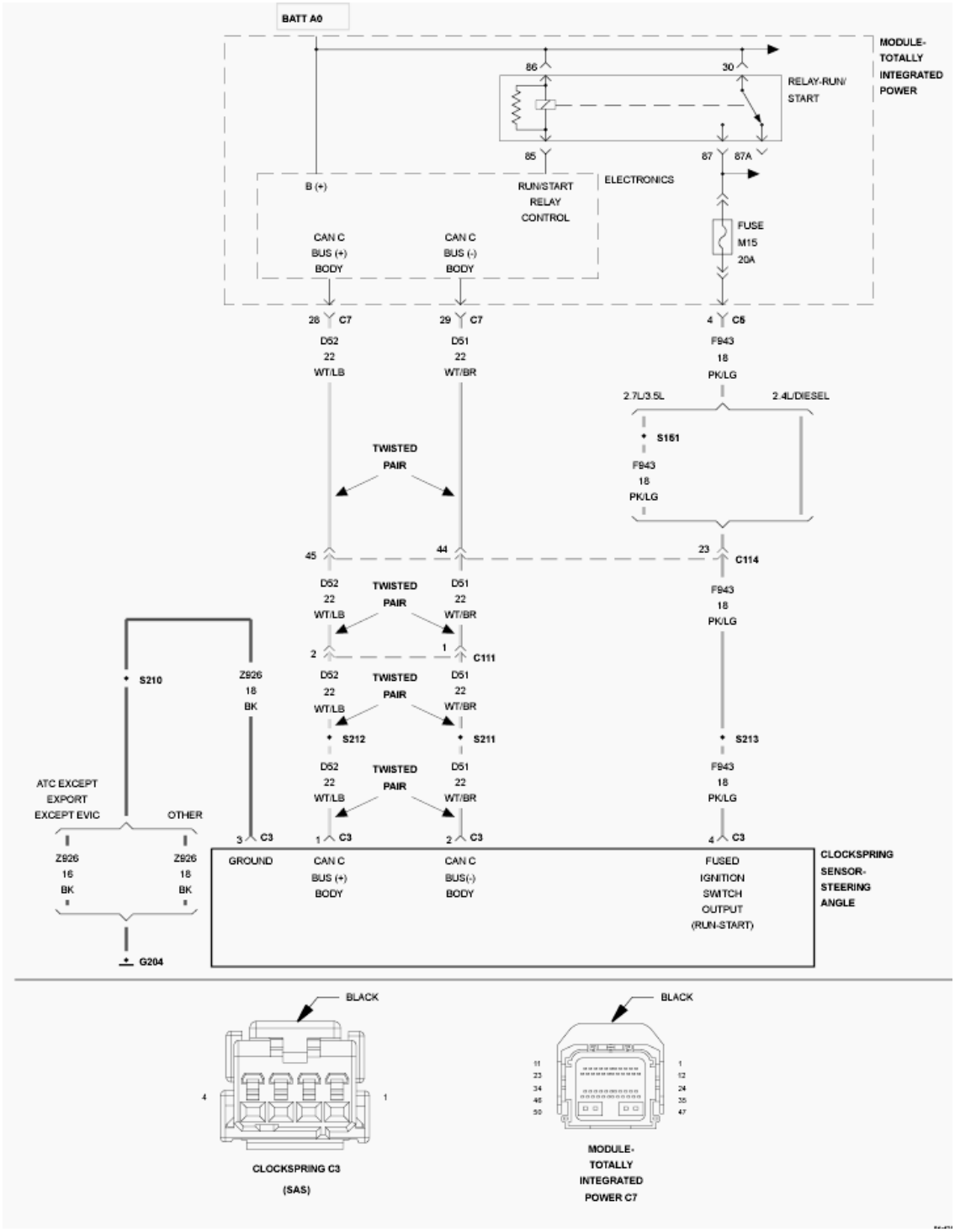


Fig. 56: Fused Ignition Switch Output Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects a low voltage at the Steering Angle Sensor or Steering Angle Sensor failure.

Possible Causes
TERMINAL/CONNECTOR/WIRING HARNESS DAMAGE
(F943) FUSED IGNITION SWITCH OUTPUT CIRCUIT OPEN
(Z926) GROUND CIRCUIT OPEN
CLOCKSPRING (SAS)

Diagnostic Test

1. **CHECK FOR A DTC C121A-STEERING ANGLE SENSOR NOT INITIALIZED**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 25 km/hr (6 and 15 m.p.h.) for 1 minute.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C121A-STEERING ANGLE SENSOR NOT INITIALIZED?

   Yes

   - Go to step 2

   No

   - Perform the ABS-NTERMITTENT CONDITION diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE TERMINALS/CONNECTORS/WIRING HARNESS FOR DAMAGE**

   WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service.

Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

1. Check the Clockspring (SAS) installation.
2. Check all related wiring for bruised, chafed, pierced, or partially broken wires.
3. Check all related connectors for broken, bent, pushed out, or corroded terminals.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE VOLTAGE ON THE (F943) FUSED IGNITION SWITCH OUTPUT CIRCUIT**

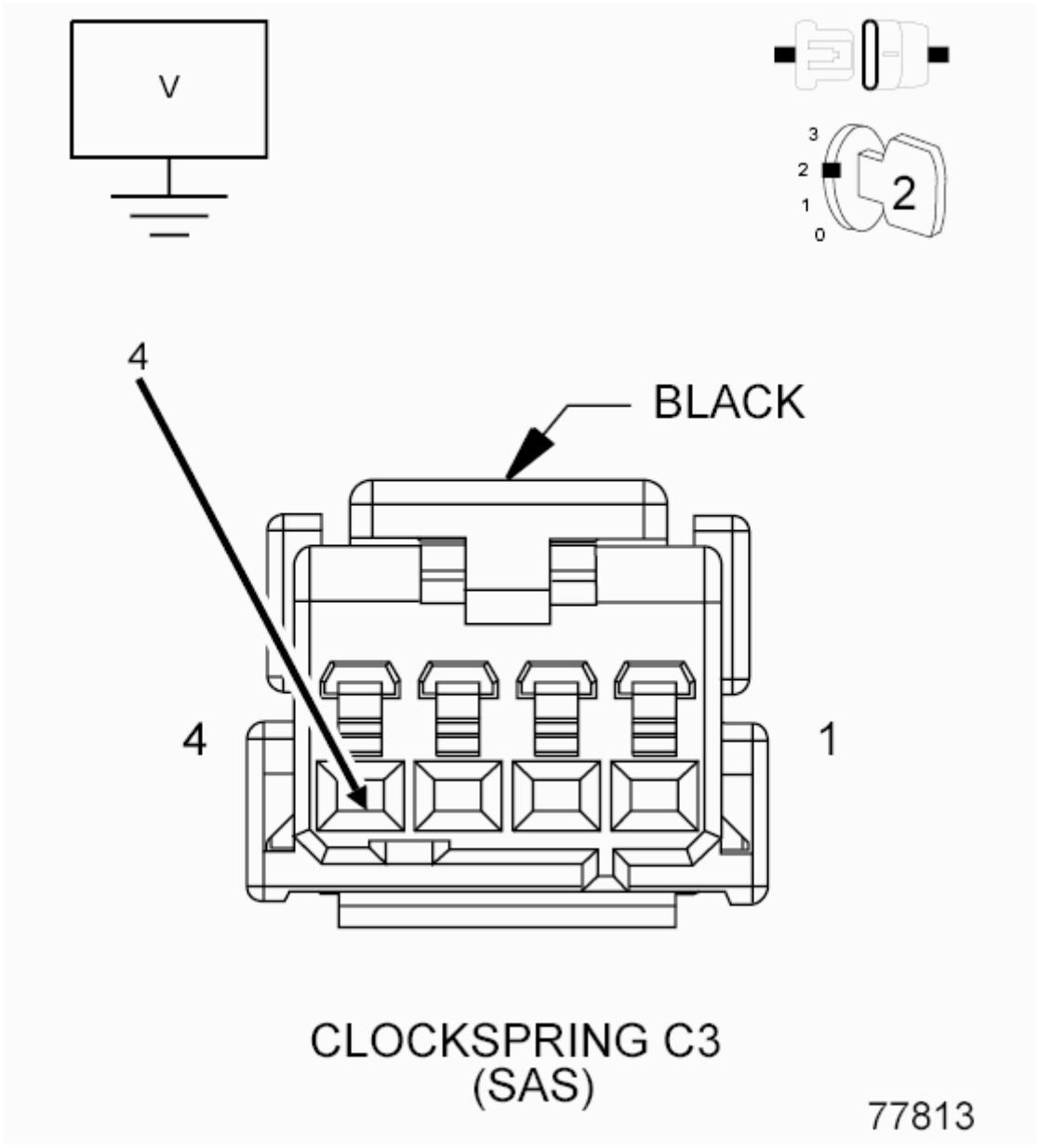


Fig. 57: Checking Voltage On Fused Ignition Switch Output Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Clockspring C3 (SAS) harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (F943) Fused Ignition Switch Output circuit.

   Is the voltage above 10 volts?

   Yes

- Go to step 4

No

- Repair the (F943) Fused Ignition Switch Output circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

4. **CHECK THE RESISTANCE OF THE (Z926) GROUND CIRCUIT**

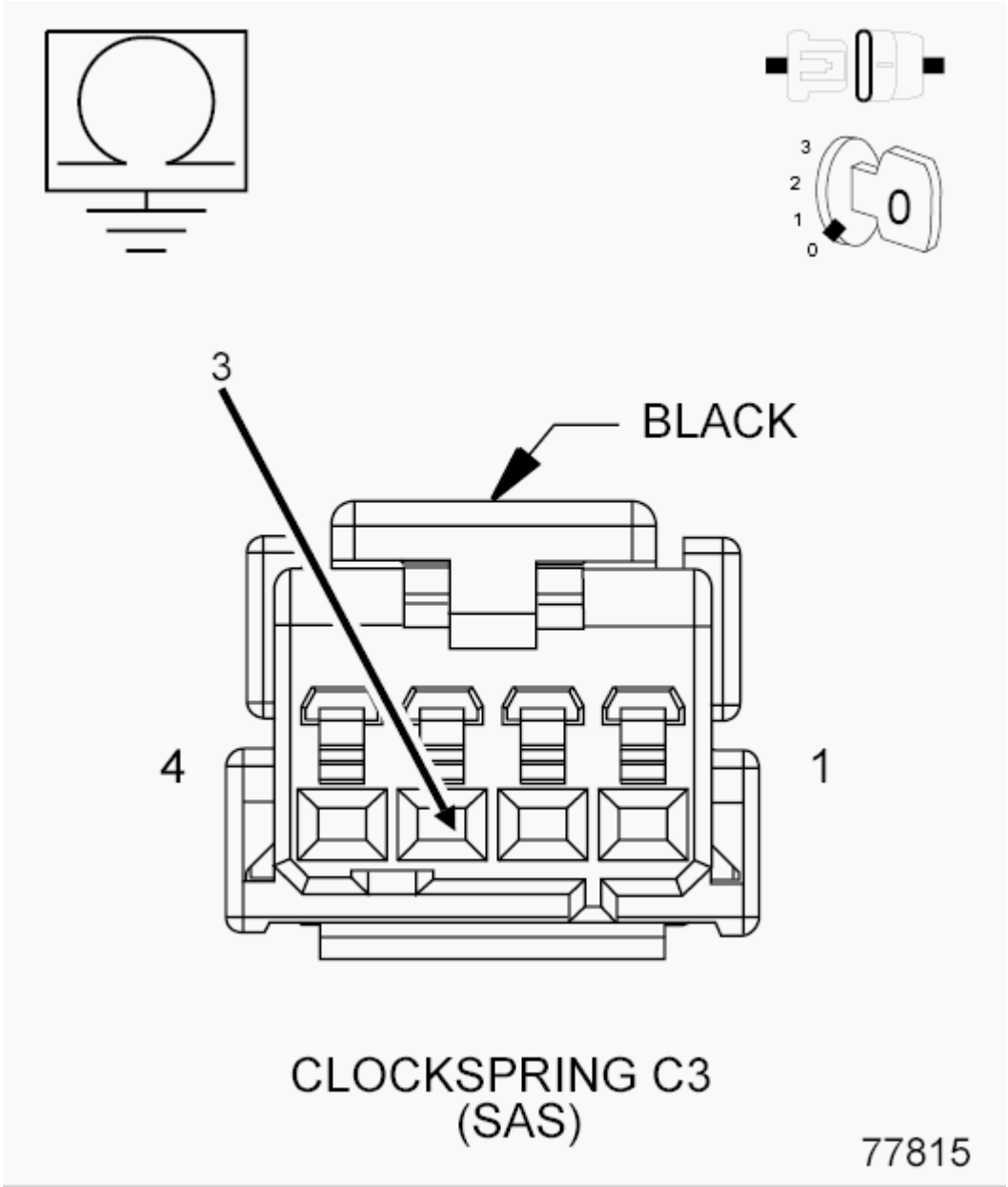


Fig. 58: Checking Resistance Of Ground Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (Z926) Ground circuit and ground.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the (Z926) Ground circuit for an open.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C121C-TORQUE REQUEST SIGNAL DENIED

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the engine running.

- **Set Condition:**

  When the Powertrain Control Module indicates, for an extended period of time, that engine management relevant for Automatic Yaw Control/Traction Control System control can not be accomplished.

Possible Causes
ANTI-LOCK BRAKE MODULE POWERTRAIN CONTROL MODULE

Diagnostic Test

1. **CHECK FOR A DTC C121C-TORQUE REQUEST SIGNAL DENIED**

   NOTE: This DTC must be active for the results of this test to be valid and this DTC may set while driving under severe load conditions.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the

DTC was set.

4. With the scan tool, erase DTCs.
5. Cycle the ignition switch from off to on.
6. Start Engine.
7. With the scan tool, read and record DTCs and monitor ESP Torque Request status.

   Does the scan tool display: C121C-TORQUE REQUEST SIGNAL DENIED?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE POWERTRAIN DTCS**
   1. With the scan tool, read and record Powertrain DTCs.

      Were any Powertrain related DTCs found?

      Yes

      - Repair the Powertrain Diagnostics. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** .

      No

      - Go to step 3

3. **ESP TORQUE REQUEST SIGNAL**
   1. Engine started.
   2. With the scan tool, read the Allow ESP Torque Request status bit.

      Was the Allow ESP Torque Request showing NOT set?

      Yes

      - Replace the Powertrain Module in accordance with the Service Information.
      - Perform POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

      No

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C121D-BRAKE PRESSURE SENSOR CIRCUIT

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates that the Brake Pressure Sensor Signal is out of range.

Possible Causes
AIR IN BRAKE SYSTEM/WORN MECHANICAL COMPONENTS
ECU INTERNAL FAILURE
HCU INTERNAL FAILURE

Diagnostic Test

1. **CHECK FOR A DTC C121D-BRAKE PRESSURE SENSOR CIRCUIT**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Start the engine.
   6. Slowly depress and release the brake pedal.
   7. With the scan tool, read and record DTCs.

   Does the scan tool display: C121D-BRAKE PRESSURE SENSOR CIRCUIT?

   Yes

   - Go to step 2

   No

   - Perform the INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based**

Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure.

2. **HCU/ECU ISOLATION**
    1. Turn the ignition off.
    2. Separate the ECU from the HCU.
    3. With the scan tool, monitor brake pressure.

    Does the scan tool display brake pressure above 218 bar (3162 psi)?

    Yes

    - Replace the HCU in accordance with the Service Information.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

    No

    - Replace the ECU in accordance with the Service Information.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C121E-BRAKE PRESSURE SENSOR COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates that the Brake Pressure Sensor Signal is out of range.

Possible Causes
ECU INTERNAL FAILURE HCU INTERNAL FAILURE

Diagnostic Test

1. **CHECK FOR A DTC C121E-BRAKE PRESSURE SENSOR COMPARATIVE PERFORMANCE**

    NOTE: This DTC must be active for the results of this test to be valid.

    1. Turn the ignition on.
    2. With the scan tool, read and record the DTCs.

3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
4. With the scan tool, erase the DTCs.
5. Start the engine.
6. Slowly press and release the brake pedal.
7. With the scan tool, read and record the DTCs.

   Does the scan tool display: C121E-BRAKE PRESSURE SENSOR COMPARATIVE PERFORMANCE?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **HCU/ECU ISOLATION**
   1. Turn the ignition off.
   2. Separate the ECU from the HCU.
   3. Turn the ignition on.
   4. With the scan tool, monitor the brake pressure.

      Does the scan tool display brake pressure above 218 bar (3162 psi)?

      Yes

      - Replace the HCU in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Replace the ECU in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1231-DRIVE TEST: STEERING ANGLE SENSOR

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

During the Drive Test.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects implausible Steering Angle Sensor data.

Possible Causes
CLOCKSPRING INSTALLATION
CLOCKSPRING (SAS)
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR A DTC C1231 DRIVE TEST: STEERING ANGLE SENSOR**

   NOTE: This DTC must be active for the results of this test to be valid.

   NOTE: If any of the following DTCs are present they must be repaired before continuing.

   - **DTC C1219-STEERING ANGLE SENSOR ERRATIC PERFORMANCE**
   - **DTC C121A-STEERING ANGLE SENSOR NOT INITIALIZED**

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Freeze Frame information.
   4. Perform ECU initialization with drive test. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**
   5. **NOTE: The drive test requires a 90° turn.**
   6. Start the engine.
   7. With the scan tool, read and record DTCs.

   Does the scan tool display: C1231 DRIVE TEST: STEERING ANGLE SENSOR?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **VERIFY THAT THE STEERING ANGLE SENSOR IS ACTIVE ON THE BUS**

1. With the scan tool, select ECU View.
2. Verify that the Steering Angle Sensor is active on the bus.

   Is the Steering Angle Sensor active on the bus?

   Yes

   - Go to step 3

   No

   - Perform the appropriate diagnostic procedure. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

3. **CHECK STEERING ANGLE**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool check steering angle.

      Is the Steering Angle reading within 15°?

      Yes

      - Go to step 4

      No

      - Go to step 5

4. **CHECK STEERING ANGLE CHANGE**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool check steering angle.
   3. Rotate steering wheel to the right and the degrees will decrease and rotating steering wheel to the left the degrees will increase.

      Did the steering angle change accordingly?

      Yes

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Replace the Clockspring (SAS) in accordance with the Service Information and clear offsets by initializing ECU with wheels pointing straight ahead.

- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **CHECK CLOCKSPRING INSTALLATION**

WARNING: To avoid possible serious or fatal injury, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

1. Turn the ignition off.
2. Verify that the Clockspring (SAS) is properly installed. Refer to **Restraints/CLOCKSPRING - Installation** .

   Is the Clockspring (SAS) properly installed?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1232-DRIVE TEST: PRESSURE SENSOR

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  During the Drive Test.

- **Set Condition:**

If the Pressure Sensor fails to activate.

Possible Causes
HYDRAULIC / BRAKE SYSTEM COMPONENT INSTALLATION
INTEGRATED CONTROL UNIT
PRESSURE SENSOR (HYDRAULIC CONTROL UNIT)

Diagnostic Test

1. **CHECK FOR A DTC C1232 DRIVE TEST: PRESSURE SENSOR**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Freeze Frame information.
   4. Perform ECU initialization with drive test. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   5. Start the engine and apply the brake firmly.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C1232 DRIVE TEST: PRESSURE SENSOR?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK HYDRAULIC SYSTEM AND BRAKE SYSTEM COMPONENT INSTALLATION AND FUNCTION**
   1. Verify that the Anti-Lock Brakes Module and Hydraulic Control Unit are properly installed.
   2. Verify that the hydraulic system is properly filled and bled.
   3. Verify that the brake system components are installed and functioning properly.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE,**

Antilock Brake (ABS) - Standard Procedure.

No

- Clean contacts in HCU first if problem reoccurs replace the Integrated Control Unit in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1234-DRIVE TEST: SENSOR CLUSTER INSTALLATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  During the Drive Test.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects implausible Dynamics Sensor data.

Possible Causes
DYNAMICS SENSOR INSTALLATION
DYNAMICS SENSOR
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR A DTC C1234 DRIVE TEST: SENSOR CLUSTER INSTALLATION**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Freeze Frame information.
   4. Perform ECU initialization with drive test. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   5. **NOTE: The drive test requires a 90° turn.**
   6. Start the engine.
   7. With the scan tool, read and record DTCs.

   Does the scan tool display: C1234 DRIVE TEST: SENSOR CLUSTER INSTALLATION?

   Yes

- Go to step 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE DYNAMICS SENSOR INSTALLATION**

NOTE: Dynamics Sensor installation and mounting bolt torque is crucial for proper operation.

1. Turn the ignition off.
2. Check the Dynamics Sensor for damaged, modified, and bent mounting brackets.
3. Check the Dynamics Sensor mounting bolts for a loose or over tightened condition.

Were any problems found?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1238-DRIVE TEST: UNSUCCESSFUL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  During the Drive Test.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects a fault with the Steering Angle Sensor, the Pressure Sensor, or the Dynamics Sensor.

Possible Causes
STEERING ANGLE SENSOR

PRESSURE SENSOR
DYNAMICS SENSOR
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **DIAGNOSE AND REPAIR ALL DTCs**

   Repair

   - Diagnose and repair all DTCs.

C1239-EMISSIONS ROLLS TEST ACTIVE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The functional effects are that the output signal for all wheel speeds mimic the wheel with the highest wheel speed.

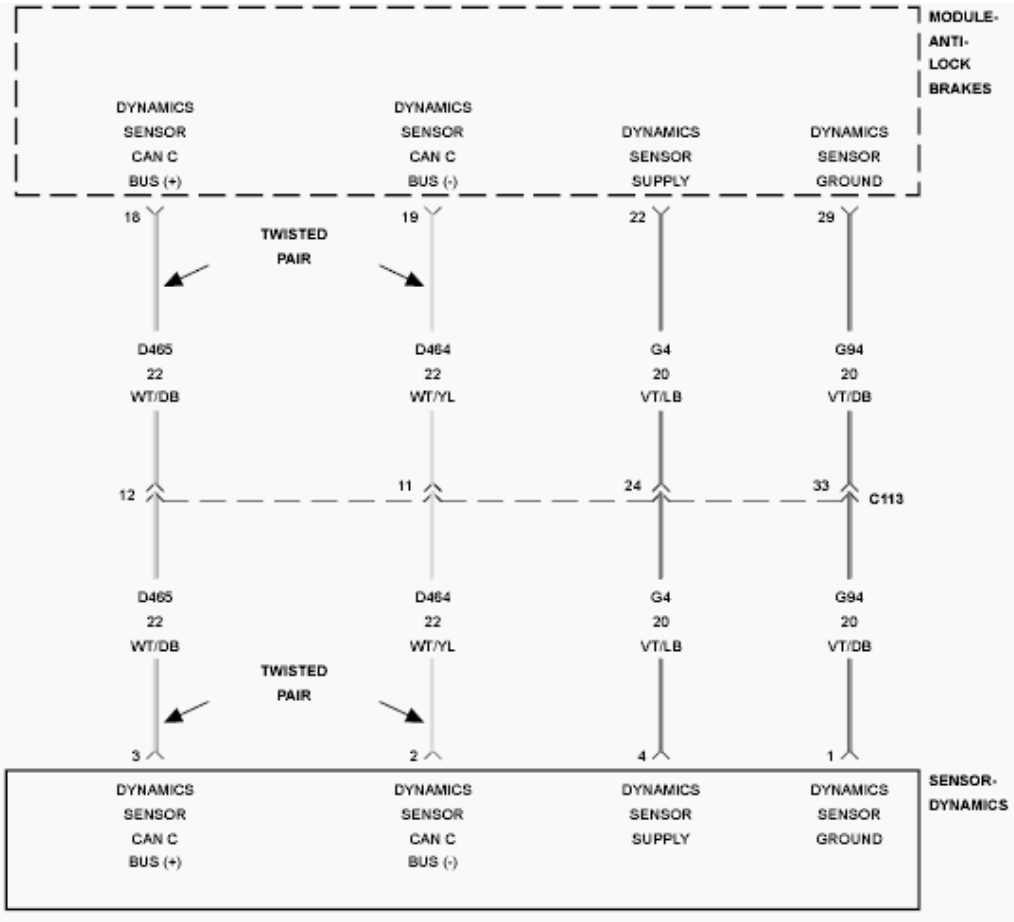
This DTC sets when the Emissions Rolls Test is active.

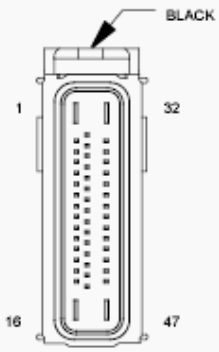
Close out the Emissions Rolls Test though the TIPM.

C123A-ESP SYSTEM SENSORS CALIBRATION

2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





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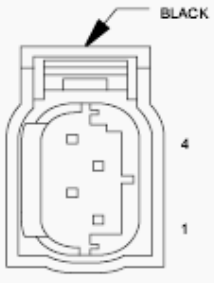


SENSOR-
DYNAMICS

Fig. 59: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Once per ignition cycle.

- **Set Condition:**

  If the calculated checksum does not match the stored checksum.

Possible Causes
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **INITIALIZE ANTI-LOCK BRAKES MODULE**
   1. Initialize ECU refer to ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

      Does this DTC reset?

      Yes

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**

      No

      - Test complete.

C123B-ESP SYSTEM CONTROL TOO LONG

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates ESP control lasting longer the 10 seconds.

Possible Causes
HYDRAULIC/BRAKE ISSUE
DYNAMICS SENSOR
INTEGRATED CONTROL MODULE
STEERING ANGLE SENSOR
WHEEL ALIGNMENT

Diagnostic Test

1. **CHECK FOR A DTC C123B-ESP SYSTEM CONTROL TOO LONG**

   NOTE: If other DTCs are set they must be repaired before continuing. To help in the service of the ESP System, it is recommend speaking to the customer to find out what type of environment they were driving in when the ESP concern took place, heavy rain, snow or ice. This should be considered normal operation and no repair is necessary. This DTC may set while driving under excessive driving conditions.

   1. Turn the ignition on.
   2. Perform ECU initialization with drive test. Refer to Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      NOTE: Drive test must be performed correctly for ECU to initialize.

   3. Cycle the ignition switch from off to on.

      Did the ECU initialization/drive test pass?

      Yes

      - Go to step 2

      No

      - Refer to associated drive test diagnostic procedure.
      - Refer to the DTC list. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Diagnosis and Testing**

2. **CHECK STEERING ANGLE SIGNAL**
   1. Turn steering wheel so wheels point in a straight ahead position.
   2. With scan tool read Steering Angle Sensor Signal.

      Is the Steering Angle reading within ±6 degrees?

      Yes

- Go to step 4

No

- Go to step 3

3. **CHECK STEERING ANGLE INSTALLATION AND WHEEL ALIGNMENT**

NOTE: Proper Steering Angle Sensor installation is crucial for proper operation.

1. Turn the ignition off.
2. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.
3. Inspect the steering column and intermediate shaft for damage.
4. Verify that the Steering Angle Sensor is properly installed.

Were any problems found?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Replace the Steering Angle Sensor in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

4. **CHECK HYDRAULIC SYSTEM AND BRAKE SYSTEM COMPONENT INSTALLATION AND FUNCTION**

1. Verify that the Anti-Lock Brakes Module and Hydraulic Control Unit are properly installed.
2. Verify that the hydraulic system is properly filled and bled.
3. Verify that the brake system components are installed and functioning properly.

Were any problems found?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **REPLACE THE INTEGRATED CONTROL MODULE AND VERIFY IF THE DTC IS STILL ACTIVE**
   1. Replace the Integrated Control Module in accordance with the Service Information.
   2. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   3. Connect all previously disconnected components and connectors.
   4. Turn the ignition on.
   5. With the scan tool, erase ABS DTCs.
   6. Cycle the ignition switch.

WARNING: Ensure brake capability is available before road testing.

   7. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 20 km/h (6 and 12 mph).
   8. Park the vehicle.
   9. With the scan tool, read ABS DTCs.

   Does this DTC reset?

   Yes

   - Replace the Dynamics Sensor in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

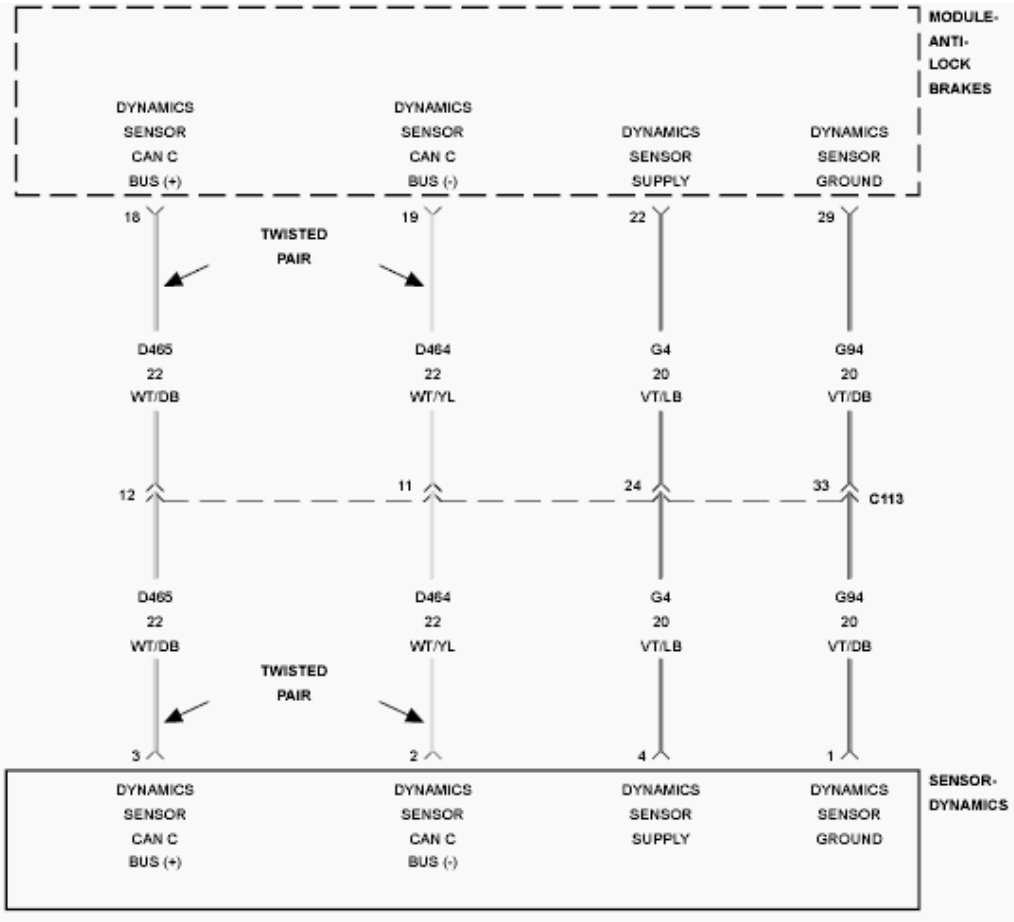
   No

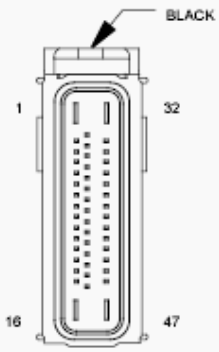
   - Test complete.

C123C-DYNAMICS SENSOR MOUNTING/INSTALLATION PERFORMANCE

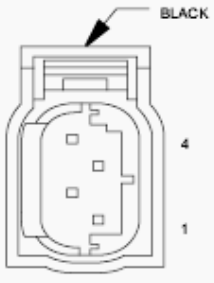
2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





MODULE-
ANTI-



SENSOR-
DYNAMICS

Fig. 60: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates the Dynamics Sensor values are invalid.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
IMPROPERLY INSTALLED SENSOR CLUSTER
(G94) DYNAMICS SENSOR GROUND CIRCUIT OPEN
DYNAMICS SENSOR

Diagnostic Test

1. **CHECK FOR A DTC C123C-SENSOR CLUSTER MOUNTING/INSTALLATION PERFORMANCE**

   NOTE: The Sensor Cluster is the same as the Dynamics Sensor.

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C123C-SENSOR CLUSTER MOUNTING/INSTALLATION PERFORMANCE?

   Yes

   - Go to step 2

   No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**
   1. Turn ignition off.
   2. Visually inspect the related wiring harness. Look for any bruised, chafed, pierced, or partially broken wires.
   3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK THE DYNAMICS SENSOR INSTALLATION**

   NOTE: Dynamics Sensor installation and mounting bolt torque is crucial for proper operation.

   1. Check the Dynamics Sensor for damaged, modified or bent mounting bracket.
   2. Check the Dynamics Sensor mounting bolts for loose or over tightened mounting bolts.

   Were any problems found?

   Yes

   - Repair as needed.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE RESISTANCE BETWEEN THE (G94) DYNAMICS SENSOR GROUND CIRCUIT AND GROUND**

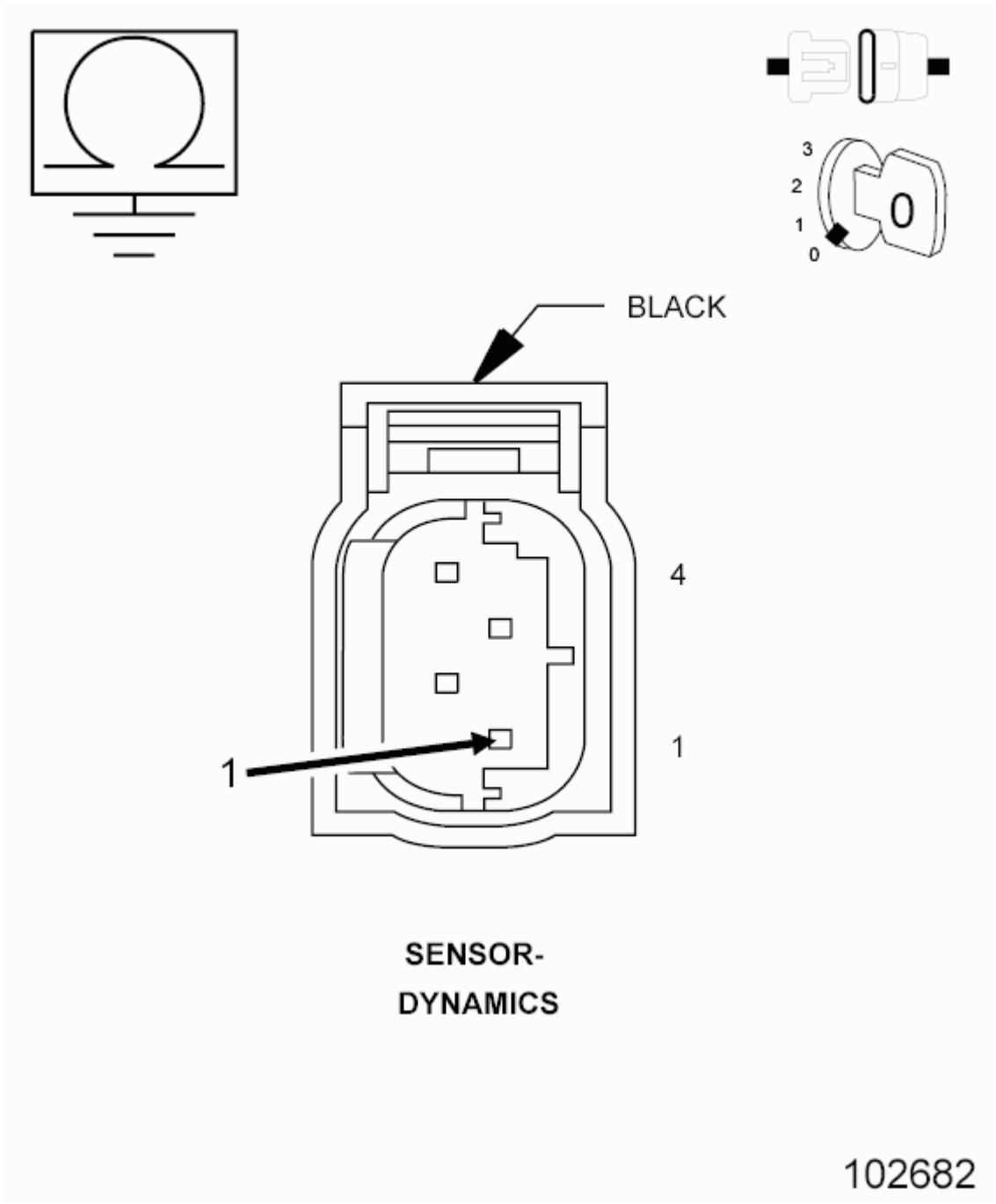


Fig. 61: Checking Resistance Between Dynamics Sensor Ground Circuit & Ground
Courtesy of CHRYSLER LLC

1. Disconnect the Dynamics Sensor harness connector.
2. Measure the resistance between the (G94) Dynamics Sensor Ground circuit and ground.

   Is the resistance below 5.0 ohm?

   Yes

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Repair the (G94) Dynamics Sensor Ground circuit for an open circuit.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C123F-STEERING ANGLE SENSOR COMPARATIVE PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With ignition on, but not if a checksum failure of the stored offset values is detected.

  Or, a CAN time-out failure is detected.

  Or, a failure is detected by the Steering Angle Sensor.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects that either the calculated steering wheel angle offset or the steering wheel angle signal measured output is out of range.

Possible Causes
VEHICLE DAMAGE
STEERING COLUMN / INTERMEDIATE SHAFT DAMAGE
STEERING WHEEL ALIGNMENT
STEERING ANGLE SENSOR LOOSE
CLOCKSPRING (SAS) IMPROPERLY INSTALLED (WRONG MOUNTING POSITION)
CLOCKSPRING (SAS)
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **PERFORM TEST DRIVE AND VERIFY DTC IS STILL ACTIVE**

   NOTE: If present, diagnose and repair DTC C1219-STEERING ANGLE SENSOR ERRATIC PERFORMANCE, C121A-STEERING ANGLE SENSOR NOT INITIALIZED, or C1240-STEERING ANGLE SENSOR OVERTRAVEL PERFORMANCE before diagnosing this DTC.

1. Turn the ignition on.
2. With the scan tool, erase ABS DTCs.
3. Cycle the ignition switch.

WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

4. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 25 km/hr (6 and 15 m.p.h.).
5. Park the vehicle.
6. With the scan tool, read ABS DTCs.

Does this DTC reset?

Yes

- Go to step 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK STEERING ANGLE SENSOR OUTPUT**
   1. Start the engine.
   2. Turn the steering wheel so wheels point in a straight ahead position.
   3. With the scan tool, read the Steering Angle Sensor position.

   Is the Steering Angle Sensor Position within 15° degrees?

   Yes

   - Go to step 5

   No

   - Go to step 3

3. **INSPECT VEHICLE, STEERING COLUMN, AND INTERMEDIATE SHAFT FOR DAMAGE**

NOTE: If possible, check vehicle repair history for collision damage.

1. Turn the ignition off.
2. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.

3. Inspect the steering column and intermediate shaft for damage.

   Were any problems found?

   Yes

   - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK CLOCKSPRING (SAS) INSTALLATION**

   WARNING: To avoid possible serious or fatal injury, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

   NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

   1. Verify that the Clockspring (SAS) is properly installed.

      Is the Clockspring (SAS) properly installed?

      Yes

      - Go to step 5

      No

      - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **RE-INITIALIZE THE ESP MODULE**
   1. Perform ECU initialization with drive test to clear offsets. Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

Is DTC C123F STEERING ANGLE SENSOR COMPARATIVE PERFORMANCE still active?

Yes

- Go to step 6

No

- Sensor was probably loose or calibrated with wheels not centered to vehicle. Test complete.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK STEERING ANGLE SENSOR OUTPUT WHILE ROTATING THE STEERING WHEEL**
   1. With the scan tool, read the Steering Angle Sensor position while rotating the steering wheel to the right and then to the left. The Steering Angle position should decrease when rotating the steering wheel to the right and increase when rotating the steering wheel to the left.

      Did the steering angle change accordingly?

      Yes

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Replace the Clockspring (SAS) in accordance with the Service Information and clear offsets by initializing ECU with wheels pointing straight ahead.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1240-STEERING ANGLE SENSOR OVERTRAVEL PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With ignition on, but not if a CAN time out failure is detected.

  Or, if a fault is detected by the Steering Angle Sensor.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects that the absolute value of the measured steering wheel angle is

greater than 720 degrees.

Possible Causes
VEHICLE DAMAGE
STEERING COLUMN / INTERMEDIATE SHAFT DAMAGE
STEERING WHEEL ALIGNMENT
STEERING ANGLE SENSOR LOOSE
CLOCKSPRING IMPROPERLY INSTALLED (WRONG MOUNTING POSITION)
CLOCKSPRING (SAS)

Diagnostic Test

1. **PERFORM TEST DRIVE AND VERIFY DTC IS STILL ACTIVE**
    1. Turn the ignition on.
    2. With the scan tool, erase ABS DTCs.
    3. Cycle the ignition switch.
    4. Turn steering wheel from lock to lock.
    5. With the scan tool, read ABS DTCs.

    Does this DTC reset?

    Yes

    - Go to step 2

    No

    - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
2. **CHECK STEERING ANGLE SENSOR OUTPUT**
    1. Start the engine.
    2. Center the steering wheel.
    3. With the scan tool, read the Steering Angle Sensor Position.

    Is the Steering Angle Sensor Position within 15" ?

    Yes

    - Go to step 4

    No

    - Go to step 3

3. **INSPECT VEHICLE, STEERING COLUMN, AND INTERMEDIATE SHAFT FOR DAMAGE**

NOTE: If possible, check vehicle repair history for collision damage.

1. Turn the ignition off.
2. Inspect the vehicle for damage causing tracking problems or steering wheel misalignment.
3. Inspect the steering column and intermediate shaft for damage.
4. Center the steering wheel.
5. With the scan tool, read the Steering Angle Sensor Position.

Is the Steering Angle Sensor Position within 15" ?

Yes

- Repair as necessary.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK STEERING ANGLE CHANGE**

1. Turn steering wheel so wheels point in a straight ahead position.
2. With scan tool check steering angle if reading travels to 720 degrees while rotating wheel from lock to lock.

NOTE: Sensor damage can occur if wheel is turned over 720 degrees.

3. Rotate steering wheel to the right and the degrees will decrease and rotate steering wheel to the left and the degrees will increase.

Did the steering angle change accordingly and display less than 720 degrees from lock to lock?

Yes

- Go to step 5

No

- Replace the Clockspring (SAS) in accordance with the Service Information and clear offsets by initializing ECU with wheels pointing straight ahead.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **CHECK CLOCKSPRING INSTALLATION**

WARNING: To avoid possible or fatal injury, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Proper Clockspring (SAS) installation is crucial for proper operation.

1. Verify that the Clockspring is properly installed in accordance with the service information.

   Is the Clockspring properly installed?

   Yes

   - Replace the Clockspring (SAS) and clear offsets by initializing ECU with wheels pointing straight ahead, in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair as necessary and clear offsets by initializing ECU with wheels pointing straight ahead.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C1243-G SENSOR NOT INITIALIZED

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Once after ignition on.

- **Set Condition:**

  If the stored zero point calibration value of the longitudinal acceleration sensor is invalid.

Possible Causes

DYNAMICS SENSOR NOT CALIBRATED
DYNAMICS SENSOR
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **PERFORM ECU INITIALIZATION**
    1. Turn the ignition on.
    2. With the scan tool, erase ABS DTCs.
    3. Cycle the ignition switch.

        WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

    4. Perform ECU initialization with drive test refer to ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

        NOTE: The ECU Initialization process must include driving the vehicle into a 90° turn.

    5. Park the vehicle.
        - Go to step 2
2. **VERIFY IF DTC IS STILL ACTIVE**
    1. Cycle the ignition switch.

        WARNING: To avoid possible serious or fatal injury, check brake capability is available before road testing.

    2. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 25 km/h (6 and 15 mph).
    3. Park the vehicle.
    4. With the scan tool, read ABS DTCs.

        Does this DTC reset?

        Yes

        NOTE: Vehicles without a Dynamics Sensor replace Anti-Lock Brake Module.

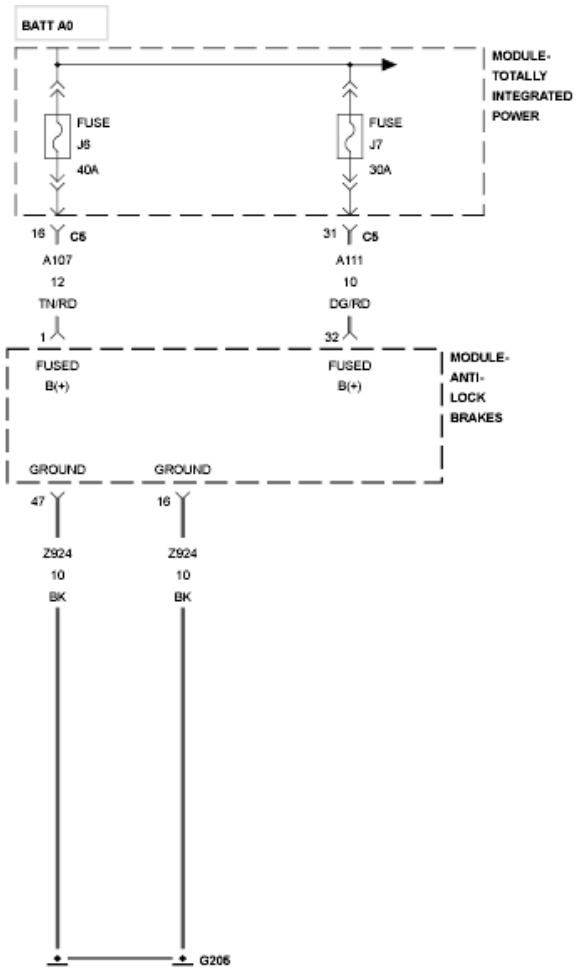
        - Replace the Dynamics Sensor or Anti-Lock Brake Module in accordance with the Service Information.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2100-BATTERY VOLTAGE LOW



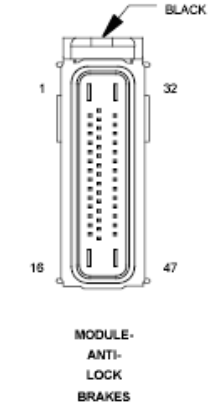


Fig. 62: Fused B+ Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects system voltage is below 7.5 volts.

Possible Causes
ECM OR PCM DTCs PRESENT
VEHICLE BATTERY/CHARGING SYSTEM
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **DTCS IN THE PCM**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs from the PCM.
   3. With the scan tool, read and record Freeze Frame information.
   4. With the scan tool, erase DTCs.
   5. Start the engine.
   6. With the scan tool, read and record DTCs.
   7. With the scan tool read DTCs from the PCM.

      Are any charging system codes present?

      Yes

      - Repair the charging system DTC in the PCM.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 2

2. **CHARGING SYSTEM FAILURE**
   1. Start the engine.
   2. Connect voltmeter to vehicle battery.

      Is the vehicle battery voltage under 8.2 volts?

No

- Go to step 3

Yes

- Repair the charging system per service information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

3. **CHARGING POWER SUPPLY VOLTAGE**
   1. With a scan tool read Power Supply Voltage.

      Is Power Supply Voltage under 8.2 volts?

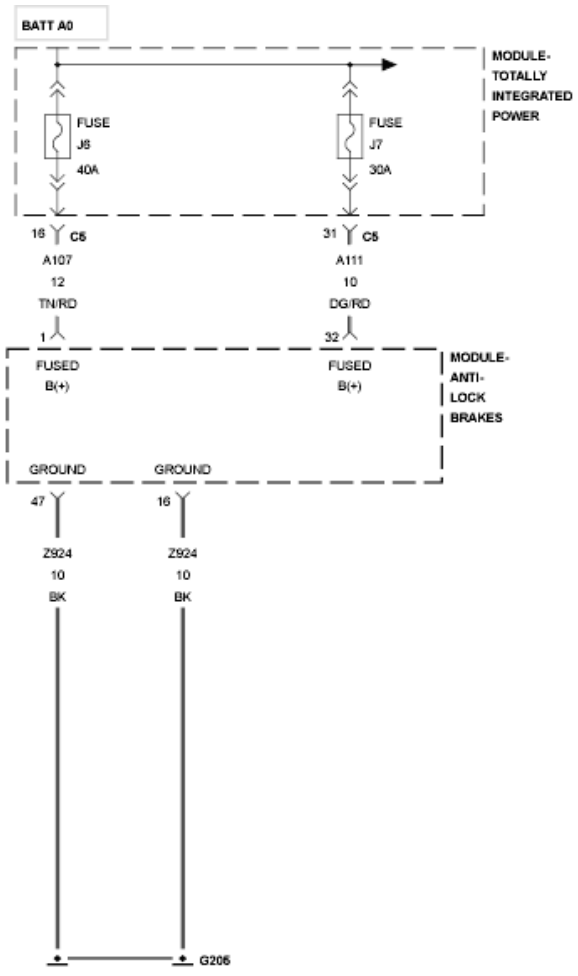
      No

      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      Yes

      - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2101-BATTERY VOLTAGE HIGH



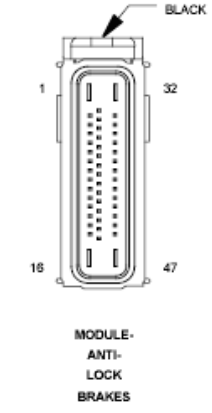


Fig. 63: Fused B+ Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Anti-Lock Brakes Module detects system voltage is above 17 volts.

Possible Causes
ECM/PCM DTCs PRESENT
VEHICLE BATTERY / CHARGING SYSTEM
ANTI-LOCK BRAKES MODULE

Diagnostic Test

NOTE: This DTC must be active for the results of this test to be valid.

1. Turn the ignition on.
2. With the scan tool, read and record DTCs from the ECM/PCM.
3. With the scan tool, read and record Freeze Frame information.
4. With the scan tool, erase DTC's.
5. Start the engine.
6. With the scan tool, read and record DTCs.
7. With the scan tool read DTCs from the PCM.

   Are any charging system codes present?

   Yes

   - Repair the charging system DTC in the ECM/PCM.
   - Perform the POWERTRAIN VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   No

   - Go to step 1

1. **CHARGING SYSTEM FAILURE**
   1. Start the engine.
   2. Connect voltmeter to vehicle battery.

      Is the vehicle battery voltage over 16.8 volts?

No

- Go to step 2

Yes

- Repair the charging system per service information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHARGING POWER SUPPLY VOLTAGE**
    1. With a scan tool read Power Supply Voltage.

       Is Power Supply Voltage over 16.8 volts?

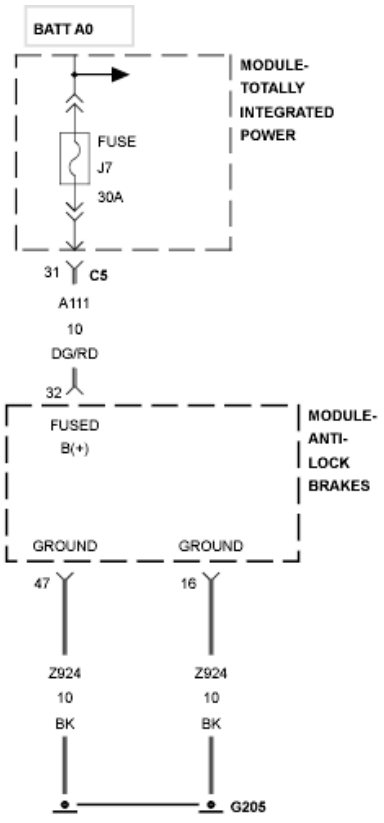
       No

       - Perform ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

       Yes

       - Replace the Anti-Lock Brakes Module in accordance with the Service Information.
       - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2111-ANTI-LOCK BRAKE MODULE INTERNAL



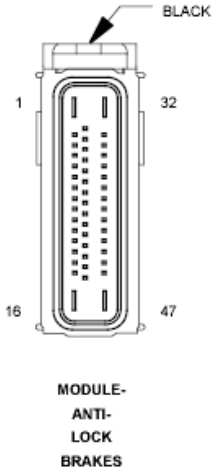


Fig. 64: Fused B+ Circuit Shorted To Ground, Voltage Or Open Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an internal fault, the DTC is set.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
FUSED B+ CIRCUIT(S) SHORTED TO GROUND, VOLTAGE, OR OPEN
GROUND CIRCUIT(S) OPEN
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR A DTC C2111-ANTI-LOCK BRAKE MODULE INTERNAL**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read and record DTCs

      Does the scan tool display: C2111-ANTI-LOCK BRAKE MODULE INTERNAL?

      Yes

      - Go to step 2

      No

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**
   1. Turn the ignition off.
   2. Visually inspect the related wiring harness. Look for any bruised, chafed, pierced, or partially broken wires.
   3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or

corroded terminals.

Were any problems found?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 3

3. **FUSED B+ CIRCUIT(S) OPEN OR HIGH RESISTANCE**

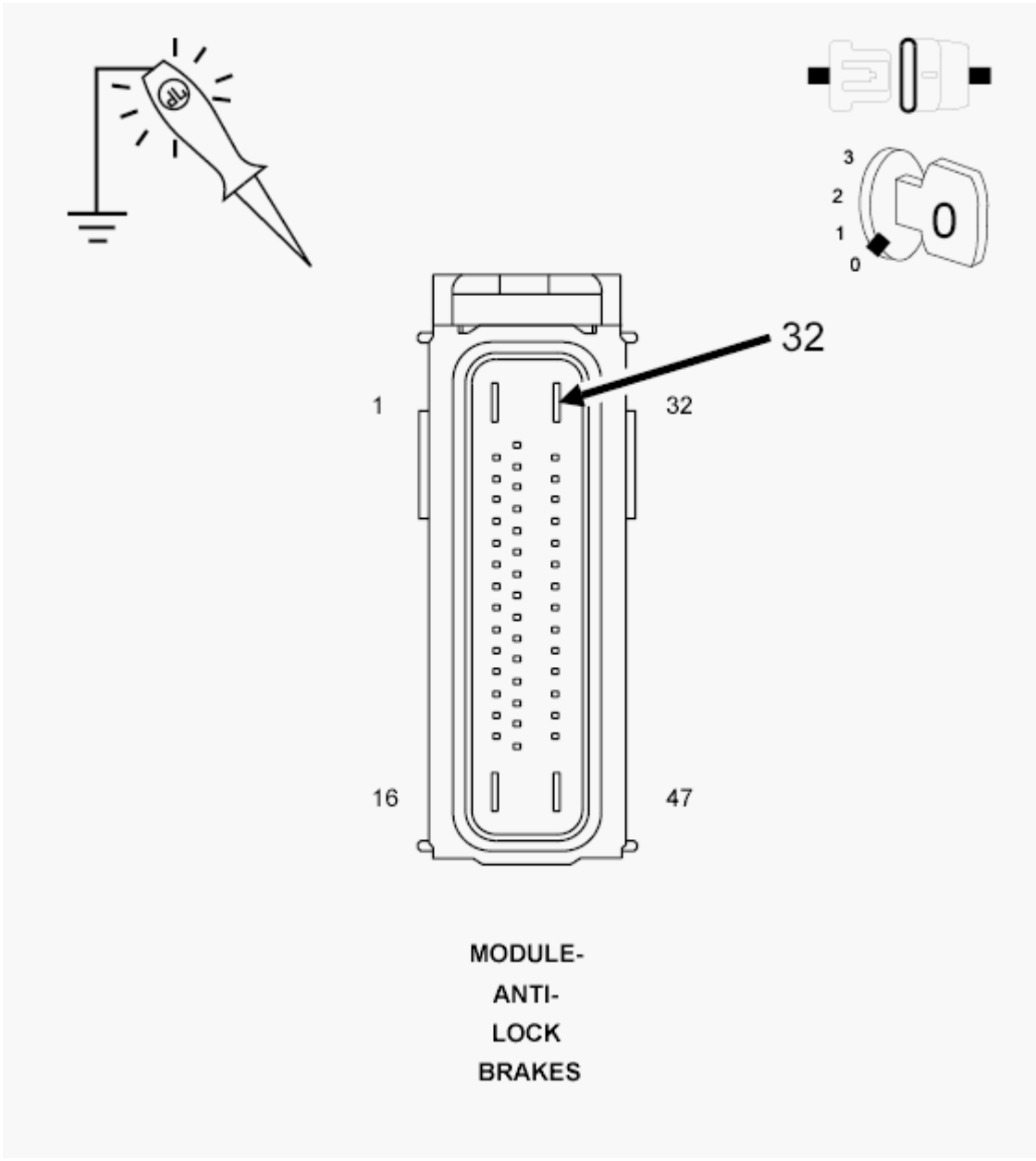


Fig. 65: Checking Anti-Lock Brake Module Harness Connector
Courtesy of CHRYSLER LLC

1. Disconnect the Anti-Lock Brake Module harness connector.
2. Using a 12-volt test light connected to ground, check the (A111) Fused B+ circuit.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 4

No

- Repair the Fused B+ circuit(s) for an open circuit or high resistance.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

4. **GROUND CIRCUIT OPEN OR HIGH RESISTANCE**

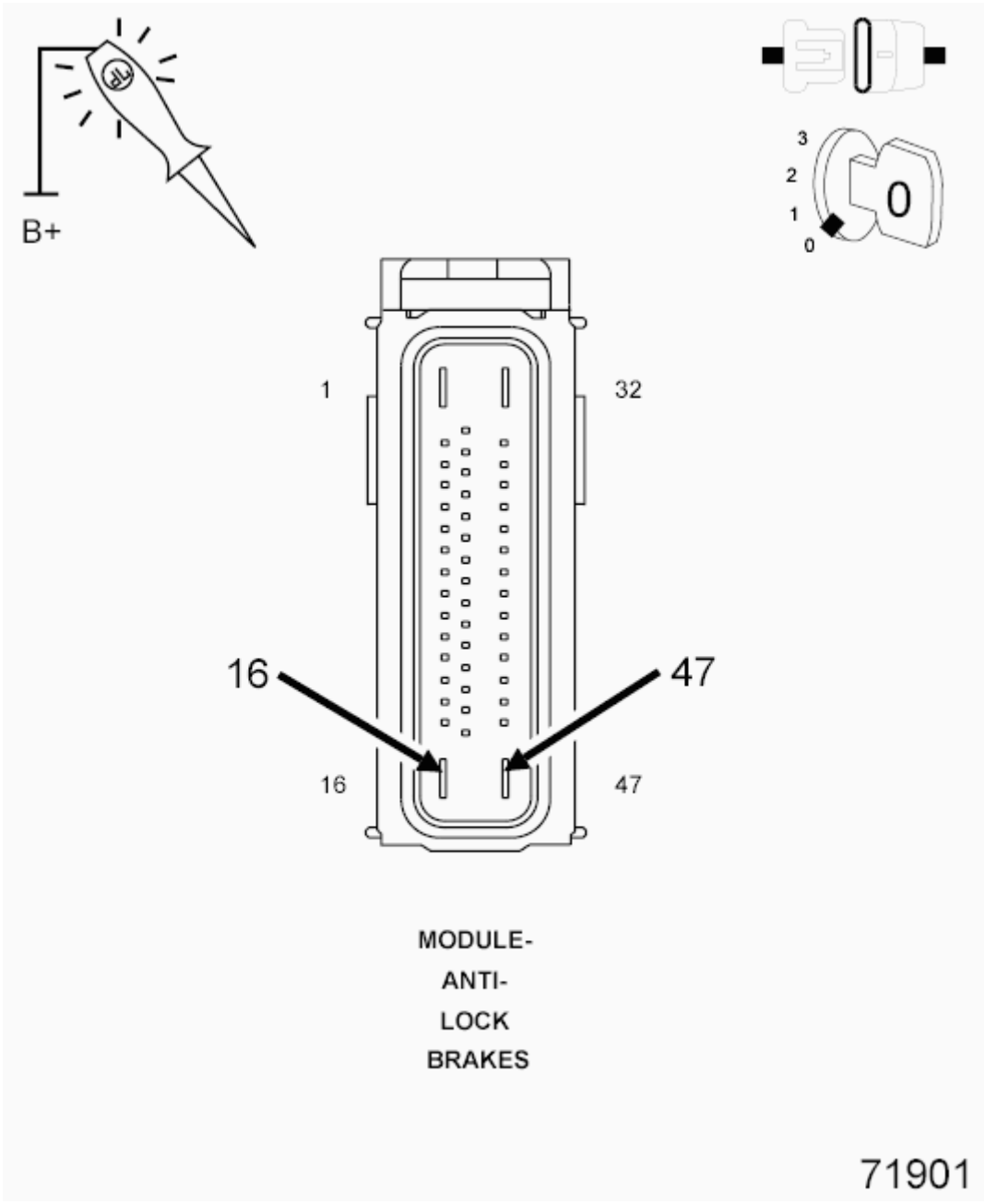


Fig. 66: Checking Ground Circuit Open Or High Resistance
Courtesy of CHRYSLER LLC

1. Using a 12-volt test light connected to 12-volts, check the (Z924) Ground circuits.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

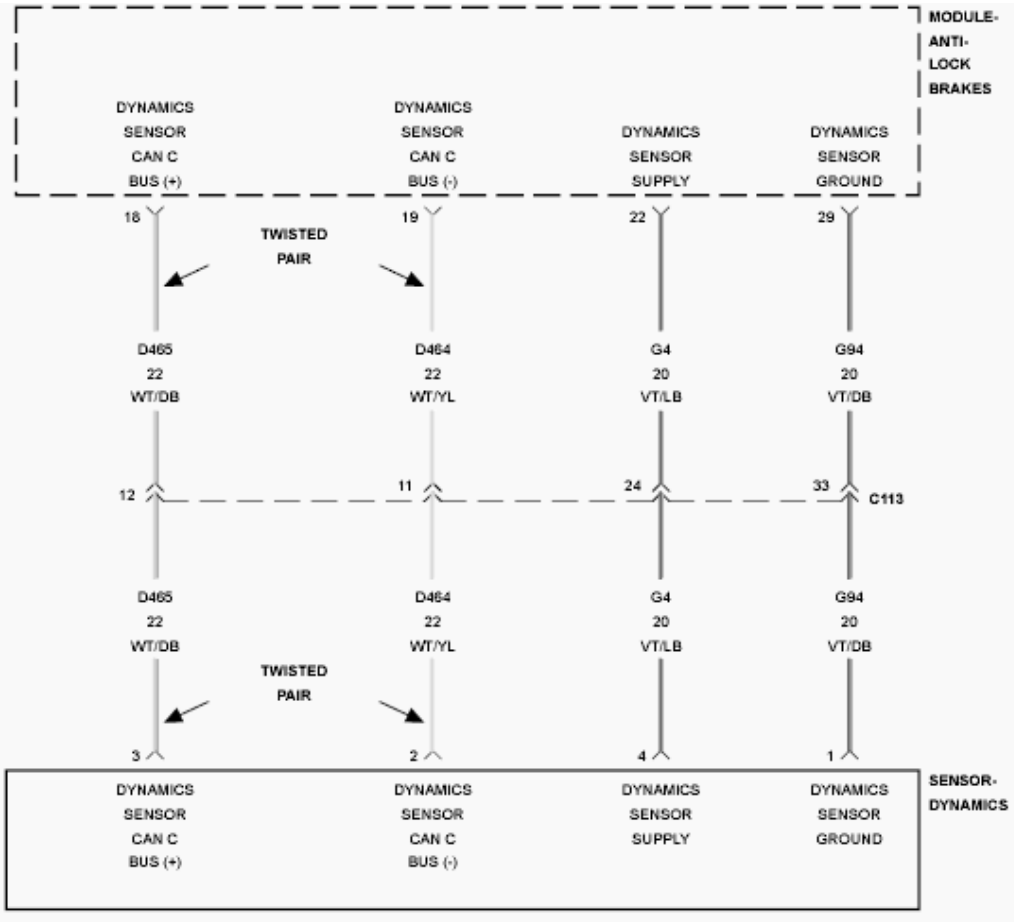
No

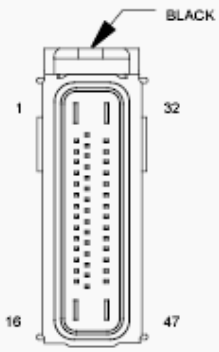
- Repair the Ground circuit(s) for an open circuit or high resistance.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2114-DYNAMICS SENSOR SUPPLY VOLTAGE LOW

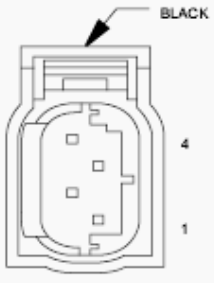
2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





MODULE-
ANTI-



SENSOR-
DYNAMICS

Fig. 67: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Dynamics Sensor status changes from initialized to not initialized due to low voltage on the (G4) Dynamics Sensor Supply circuit.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT HIGH RESISTANCE
(G94) DYNAMICS SENSOR GROUND CIRCUIT HIGH RESISTANCE
DYNAMICS SENSOR
ANTI-LOCK BRAKES MODULE

Diagnostic Test

1. **CHECK FOR A DTC C2114-DYNAMICS SENSOR SUPPLY VOLTAGE LOW**

   NOTE: The Sensor Cluster is the same as the Dynamics sensor.

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, read and record the Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.

      NOTE: Attempt to operate the vehicle under conditions similar to which the DTC was set. It may be necessary to test drive the vehicle within the DTC monitoring and set conditions, in order for this DTC to set.

   6. With the scan tool, read and record the DTCs.

      Does the scan tool display: C2114-DYNAMICS SENSOR SUPPLY VOLTAGE LOW?

Yes

- Go to step 2

No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**
   1. Check the Dynamics Sensor installation and torque of the mounting bolts.
   2. Visually inspect the related wiring harness. Look for any bruised, chafed, pierced or partially broken wires.
   3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out or corroded terminals.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3
3. **CHECK THE VOLTAGE ON THE (G4) DYNAMICS SENSOR SUPPLY CIRCUIT**

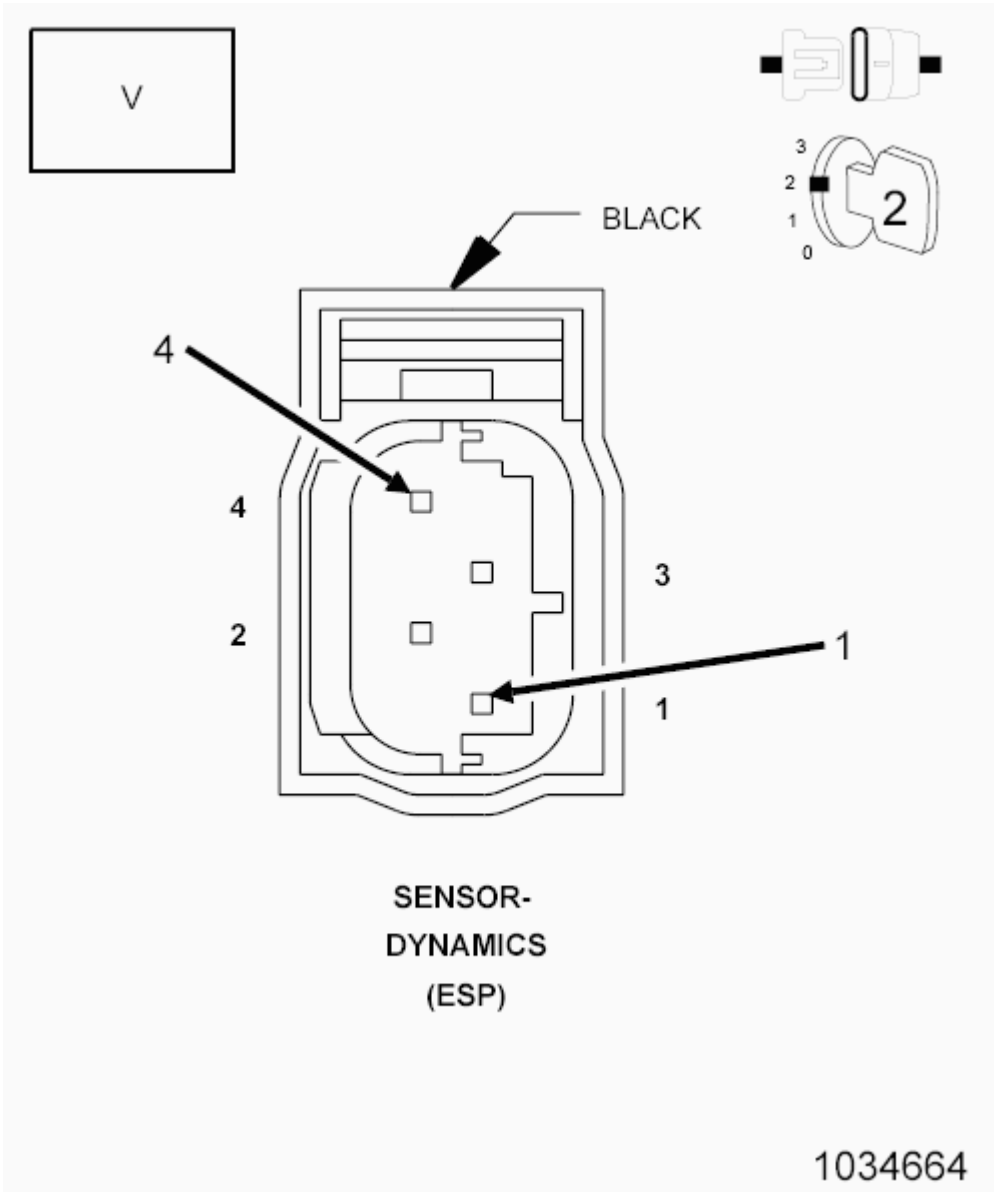


Fig. 68: Checking Voltage On Dynamics Sensor Supply Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Dynamics Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage across the (G4) Dynamics Sensor Supply Circuit and the (G94) Dynamics Sensor Ground Circuit.

   Is the voltage above 10 volts?

   Yes

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK (G4) DYNAMICS SENSOR SUPPLY CIRCUIT FOR HIGH RESISTANCE**

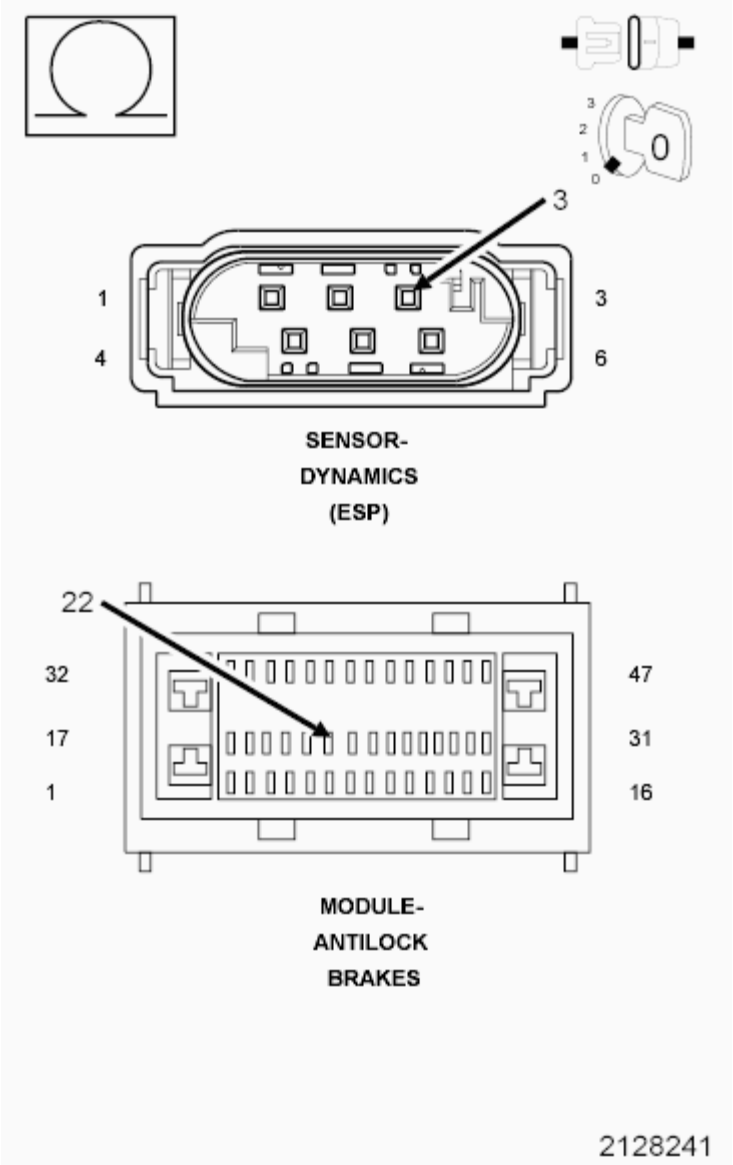


Fig. 69: Checking Dynamics Sensor Supply Circuit For High Resistance
Courtesy of CHRYSLER LLC

1. Turn the ignition off.

2. Disconnect the Anti-Lock Brakes Module harness connector.
3. Measure the resistance of the (G4) Dynamics Sensor Supply circuit between the Dynamics Sensor harness connector and the Anti-Lock Brake Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 5

   No

   - Repair the (G4) Dynamics Sensor Supply circuit for high resistance.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **CHECK (G94) DYNAMICS SENSOR GROUND CIRCUIT FOR HIGH RESISTANCE**

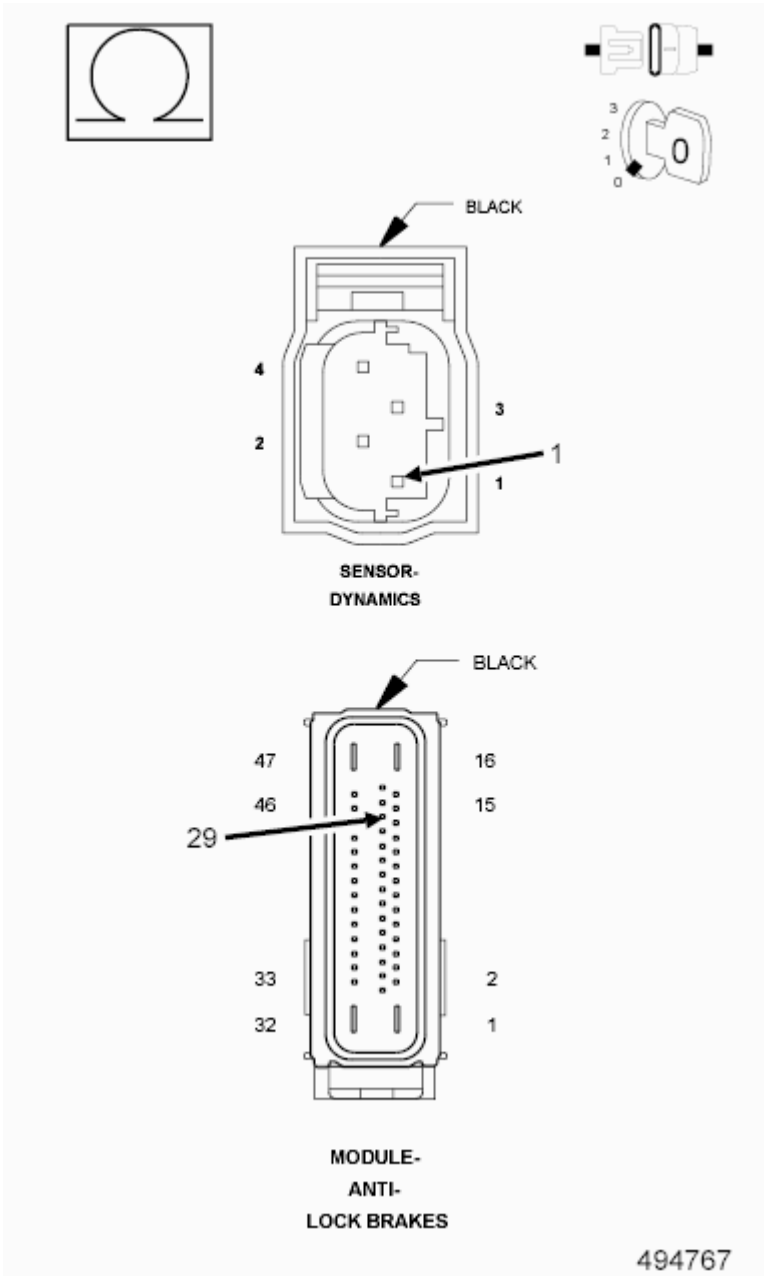


Fig. 70: Checking Dynamics Sensor Ground Circuit For High Resistance
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (G94) Dynamics Sensor Ground circuit between the Dynamics Sensor harness connector and the Anti-Lock Brake Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.

- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

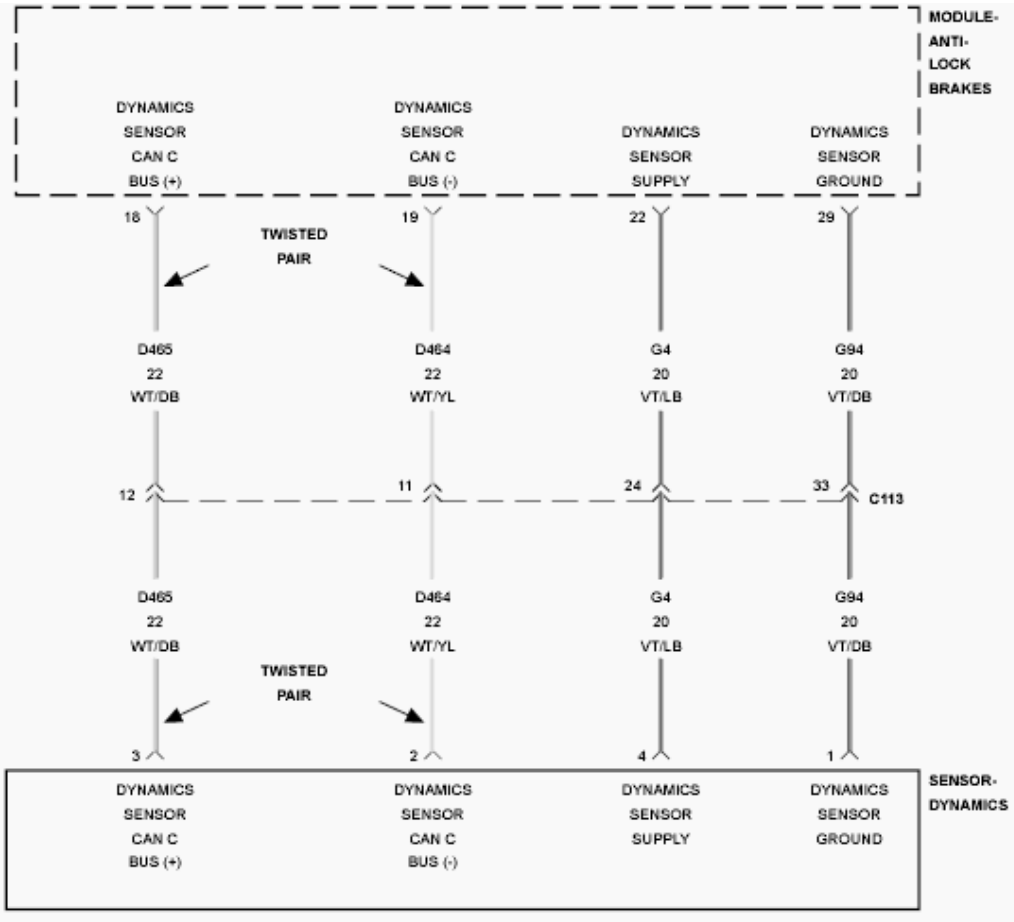
No

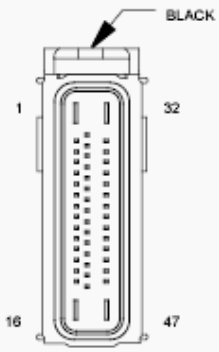
- Repair the (G94) Dynamics Sensor Ground circuit for high resistance.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2115-DYNAMICS SENSOR SUPPLY VOLTAGE HIGH

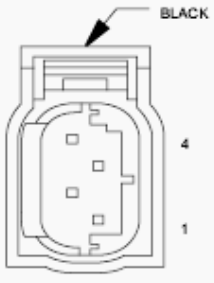
2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





MODULE-
ANTI-



SENSOR-
DYNAMICS

Fig. 71: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates the operating voltage is out of specified range.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
CHARGING SYSTEM
(G4) SENSOR CLUSTER SUPPLY CIRCUIT SHORTED TO GROUND OR VOLTAGE
(G94) SENSOR CLUSTER GROUND CIRCUIT SHORTED TO VOLTAGE OR OPEN
SENSOR CLUSTER
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR A DTC C2115-SENSOR CLUSTER SUPPLY VOLTAGE HIGH**

   NOTE: The Sensor Cluster is the same as the Dynamics sensor.

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition from off to on.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C2115-SENSOR CLUSTER SUPPLY VOLTAGE HIGH?

   Yes

   - Go to step 2

   No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**
   1. Turn ignition off.
   2. Check all related wiring for bruised, chafed, pierced, or partially broken wires.
   3. Check all related connectors for broken, bent, pushed out, or corroded terminals.

   Were any problems found?

   Yes

   - Repair as necessary.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 3
3. **CHECK THE VOLTAGE ON THE (G4) SENSOR CLUSTER SUPPLY CIRCUIT**

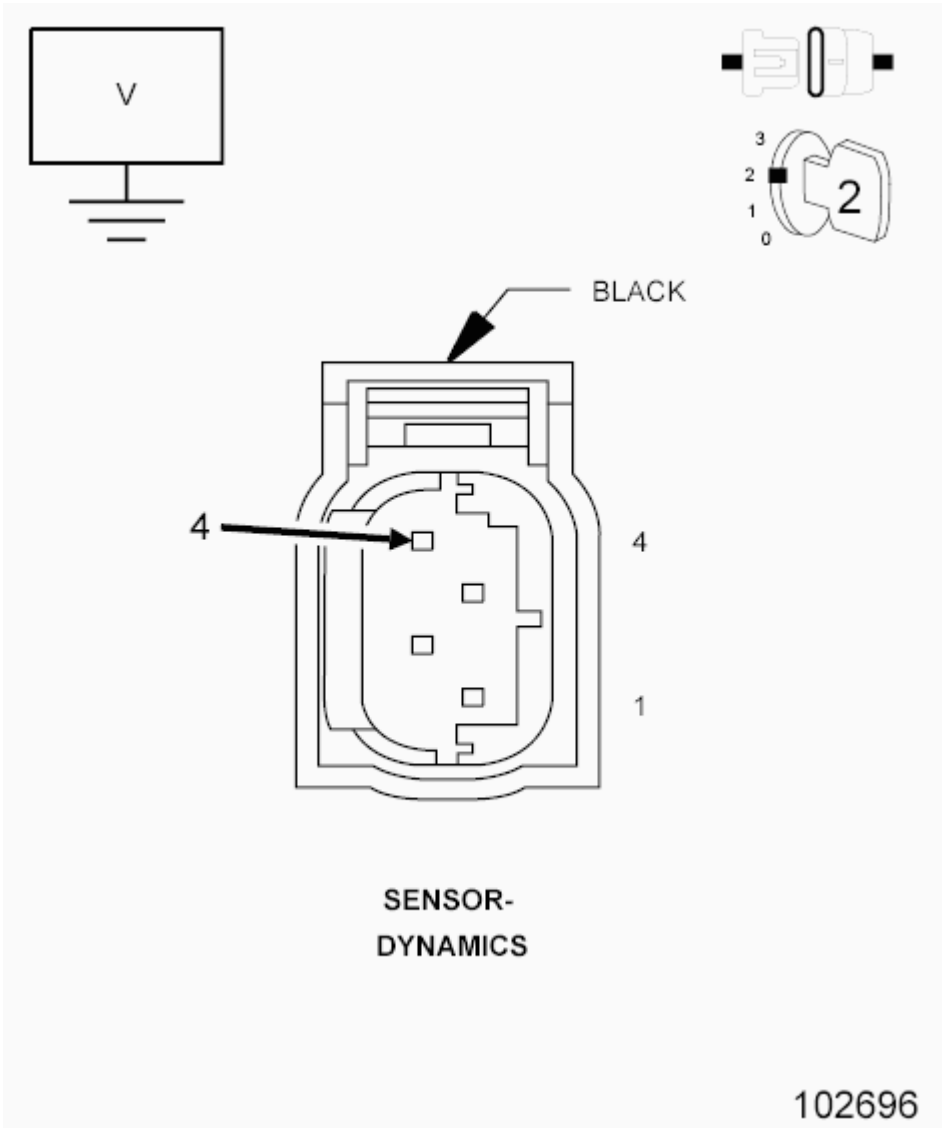


Fig. 72: Checking Voltage On Sensor Cluster Supply Circuit
Courtesy of CHRYSLER LLC

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Disconnect the Sensor Cluster harness connector.
2. Start the engine.
3. Raise engine speed above 1800 RPM.
4. Measure the voltage of the (G4) Sensor Cluster Supply Circuit.

   Is the voltage above 17 volts?

Yes

- Go to step 4

No

- Go to step 7

4. **CHECK THE VOLTAGE ON THE FUSED B(+) CIRCUITS**

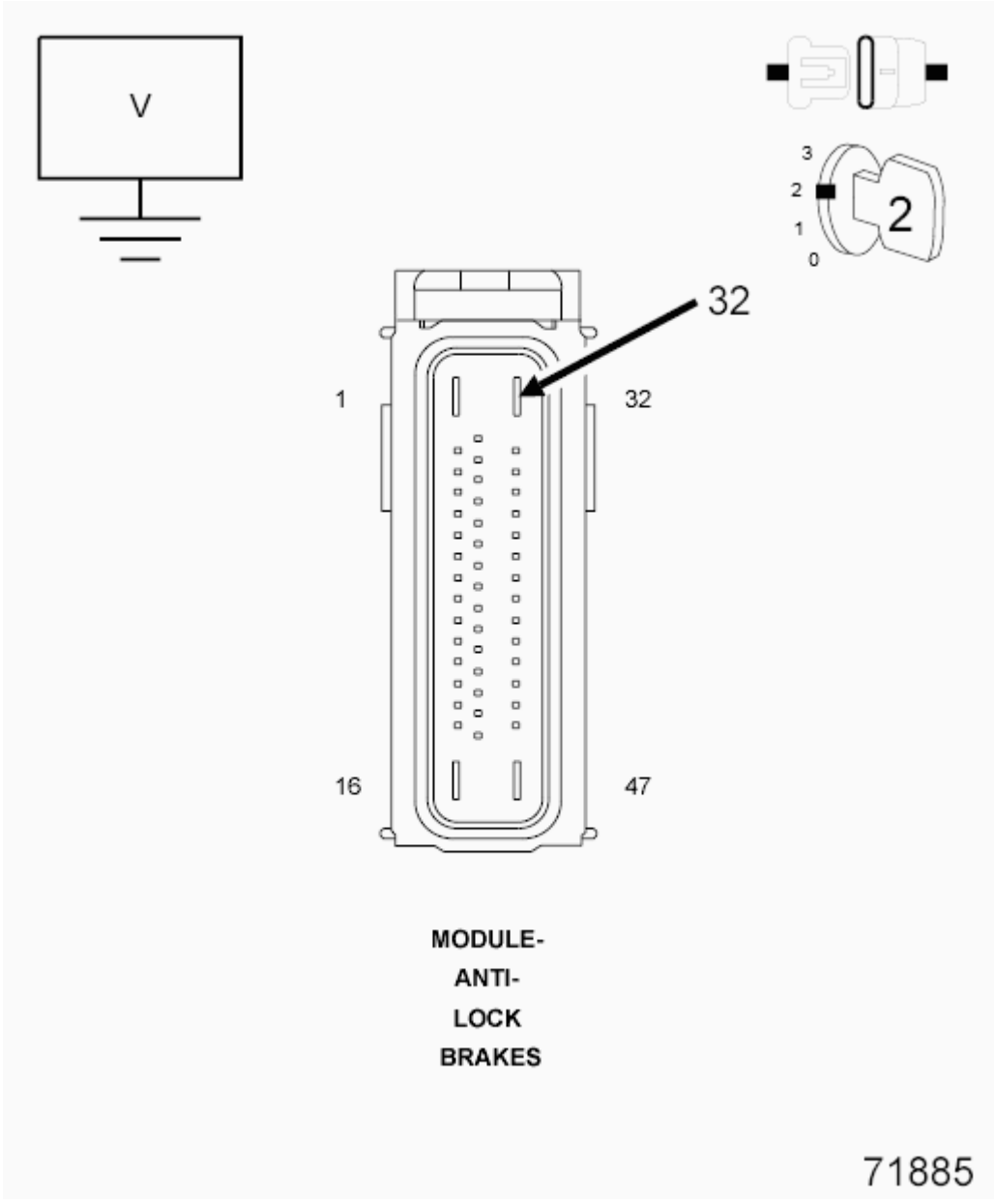


Fig. 73: Checking Voltage On Fused B(+) Circuits
Courtesy of CHRYSLER LLC

WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.
3. Start the engine.
4. Raise engine speed above 1800 RPM.
5. Measure the voltage of the (A107) and the (A200) Fused B(+) circuits.

   Is the voltage above 17 volts?

   Yes

   - Refer to appropriate Service Information for Charging System testing and repair.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **(G4) SENSOR CLUSTER SUPPLY CIRCUIT SHORT TO GROUND**

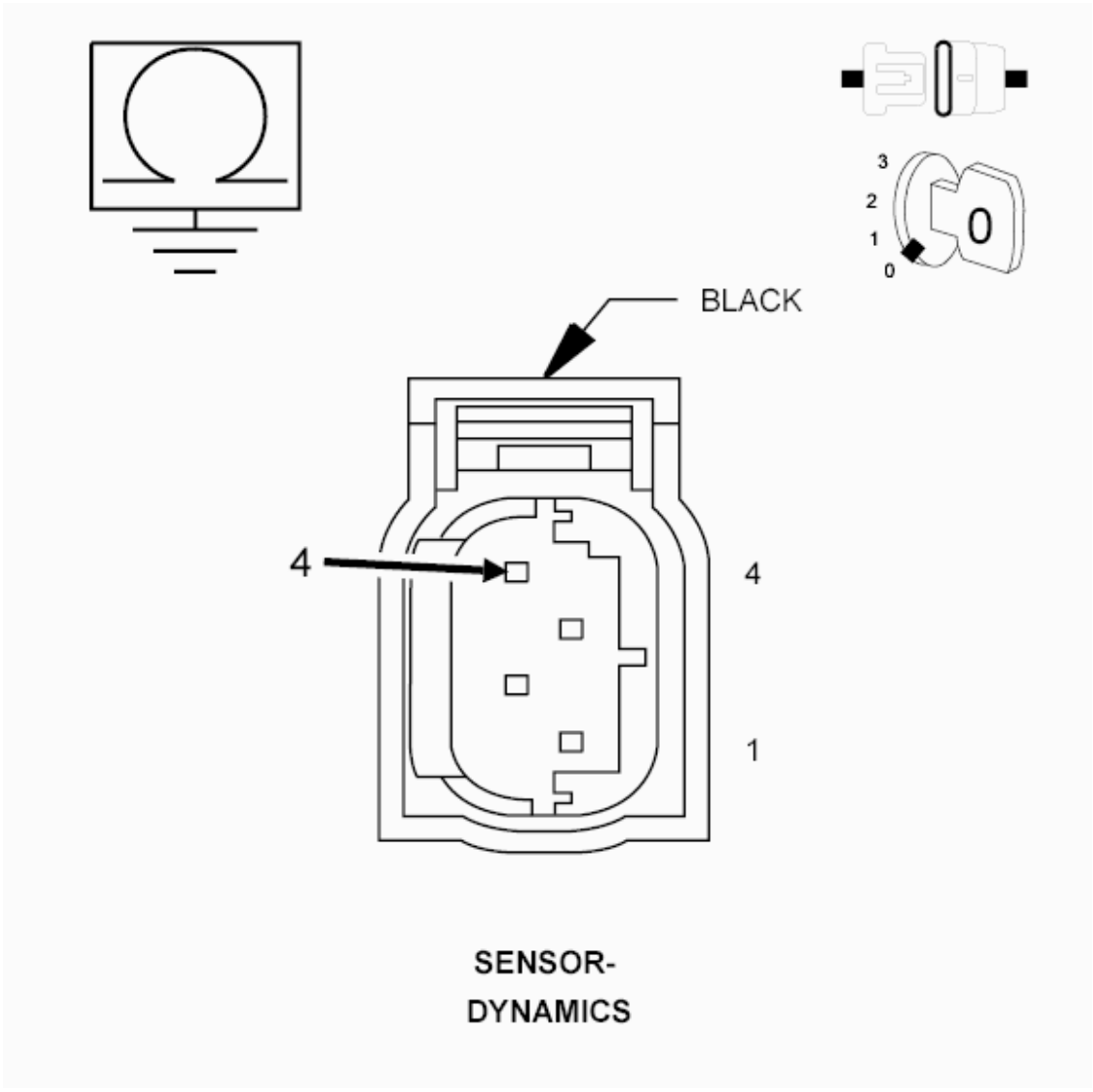


Fig. 74: Checking Sensor Cluster Supply Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (G4) Sensor Cluster Supply circuit.

   Is the resistance below 5.0 ohms?

   Yes

   - Repair the (G4) Sensor Cluster Supply circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

- Go to step 6

6. **(G4) SENSOR CLUSTER SUPPLY CIRCUIT SHORT TO VOLTAGE**

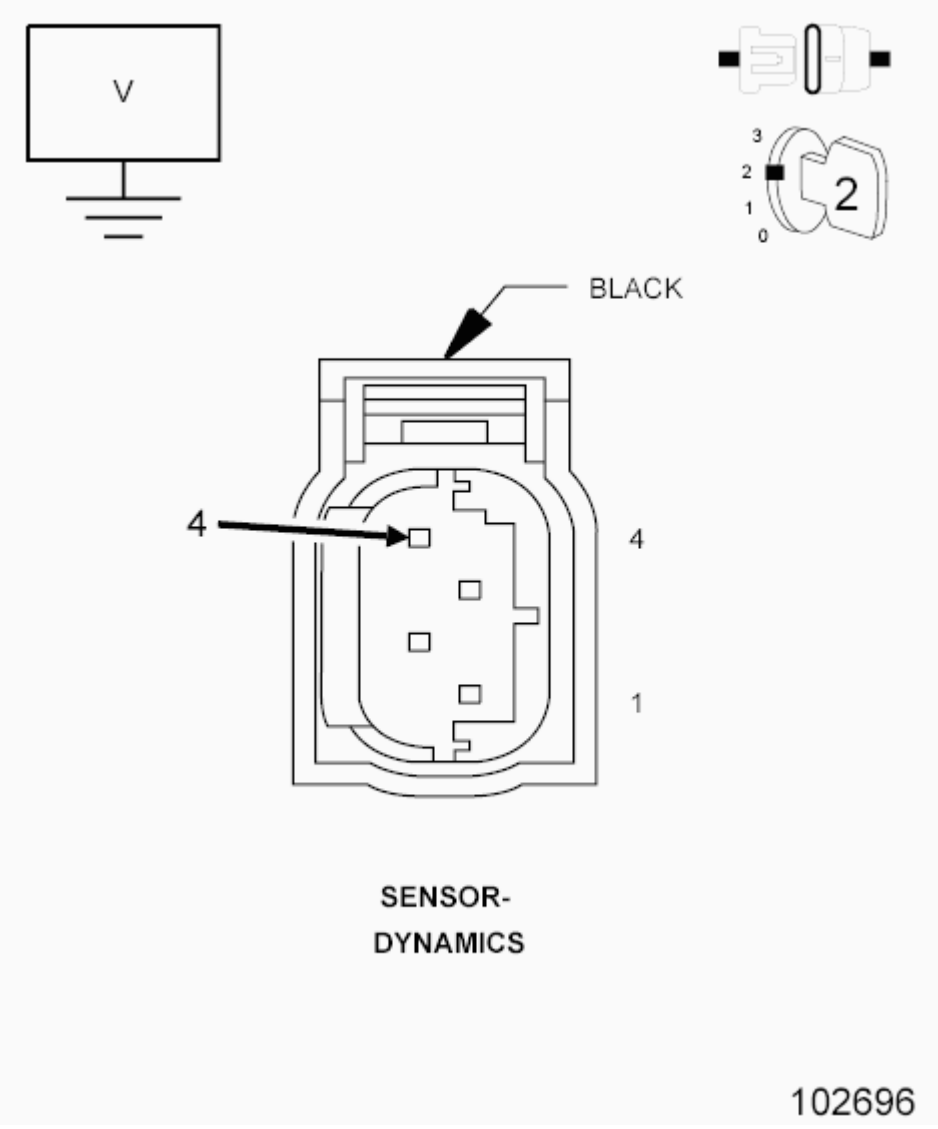


Fig. 75: Checking Voltage On Sensor Cluster Supply Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage of the (G4) Sensor Cluster Supply circuit.

   Is there any voltage present?

   Yes

   - Repair the (G4) Sensor Cluster Supply circuit for a short to voltage.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 7

7. **SENSOR CLUSTER**

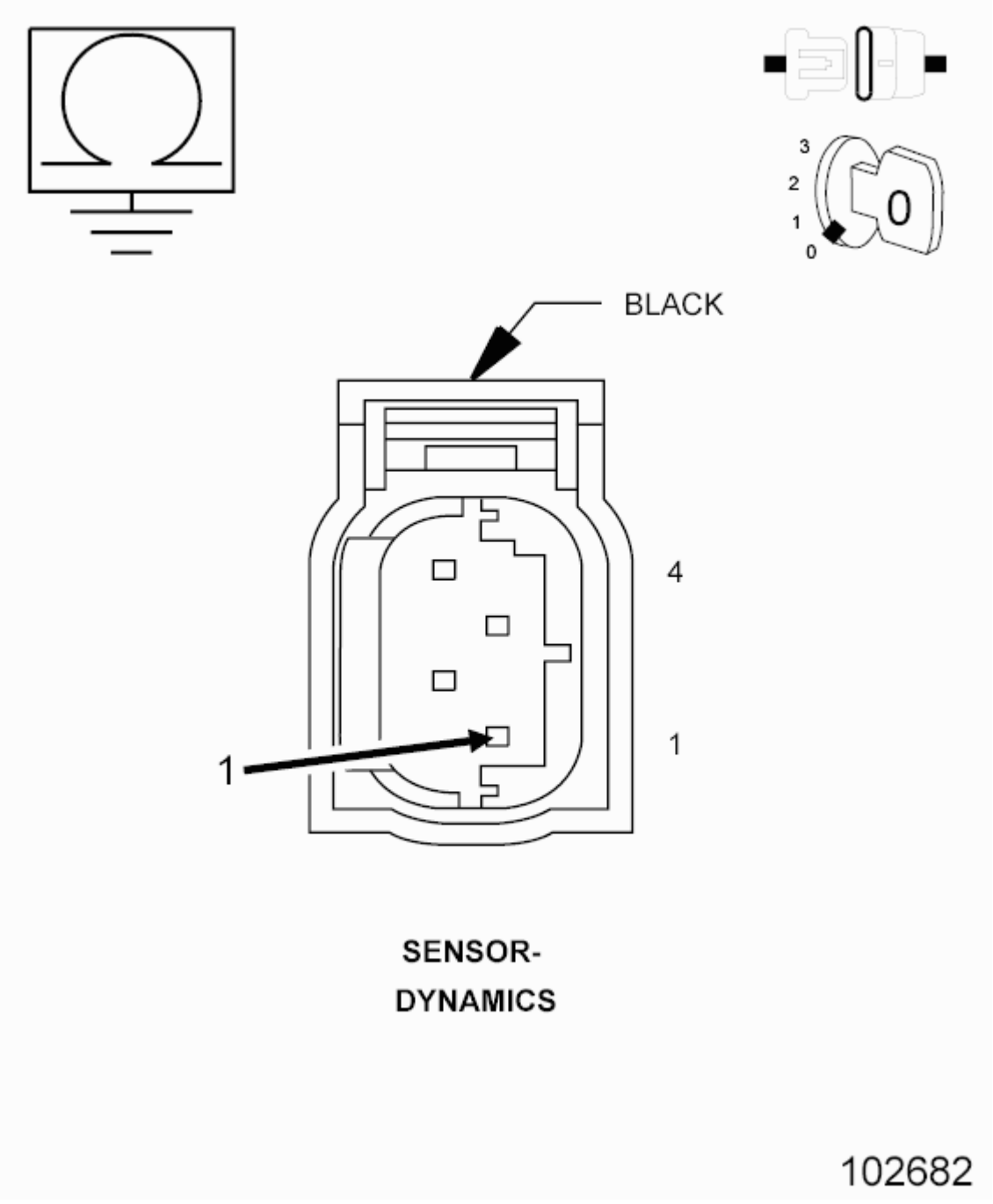


Fig. 76: Checking Resistance Between Dynamics Sensor Ground Circuit & Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. If necessary, disconnect the Sensor Cluster harness connector.
3. If necessary, connect the Anti-Lock Brake Module harness connector.
4. Measure the resistance between the (G94) Sensor Cluster Ground Circuit at the Sensor Cluster harness connector and ground.

   Is the resistance below 5.0 ohms?

   Yes

   - Replace the Sensor Cluster in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 8

8. **(G94) SENSOR CLUSTER GROUND CIRCUIT SHORT TO VOLTAGE**

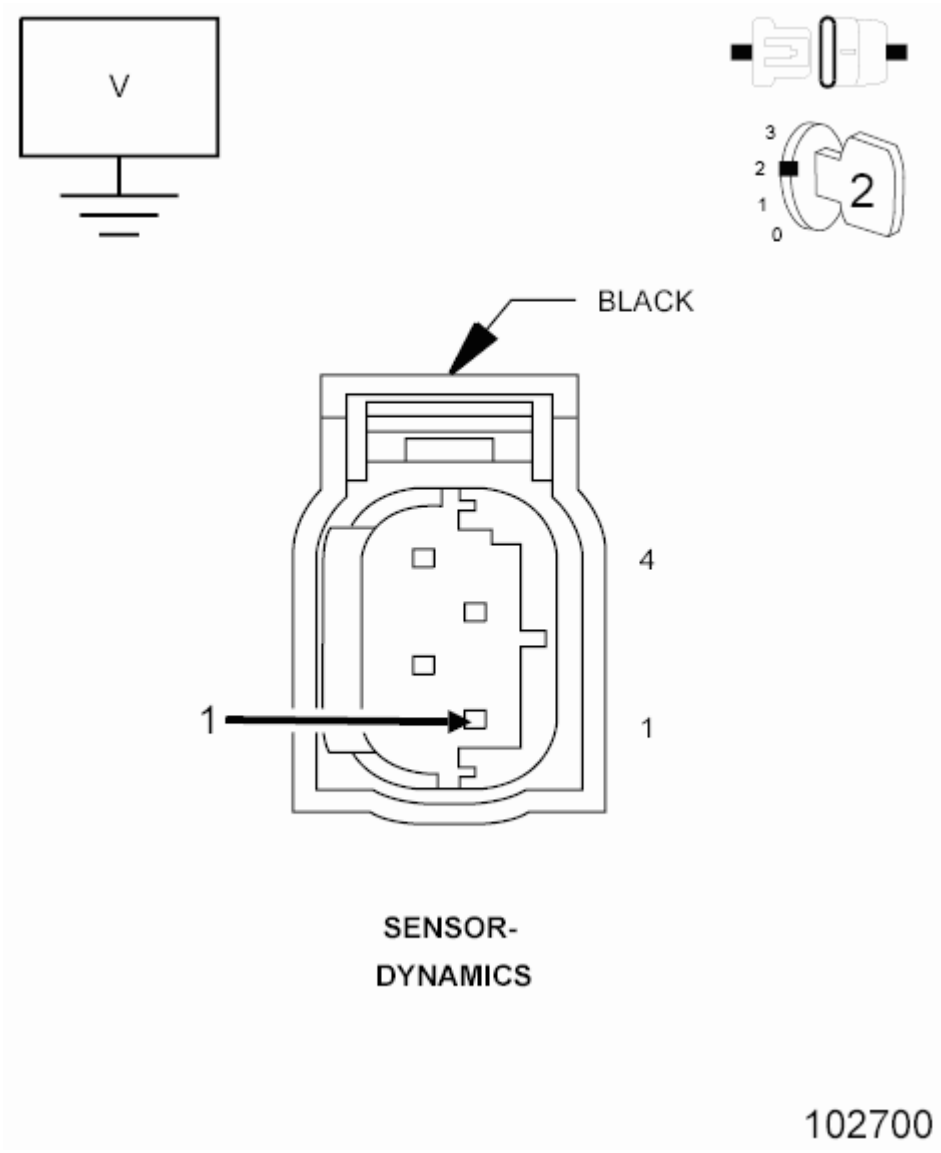


Fig. 77: Checking Sensor Cluster Ground Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage of the (G94) Sensor Cluster Ground circuit.

   Is there any voltage present?

   Yes

   - Repair the (G94) Sensor Cluster Ground circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 9

9. **(G94) SENSOR CLUSTER GROUND CIRCUIT OPEN**

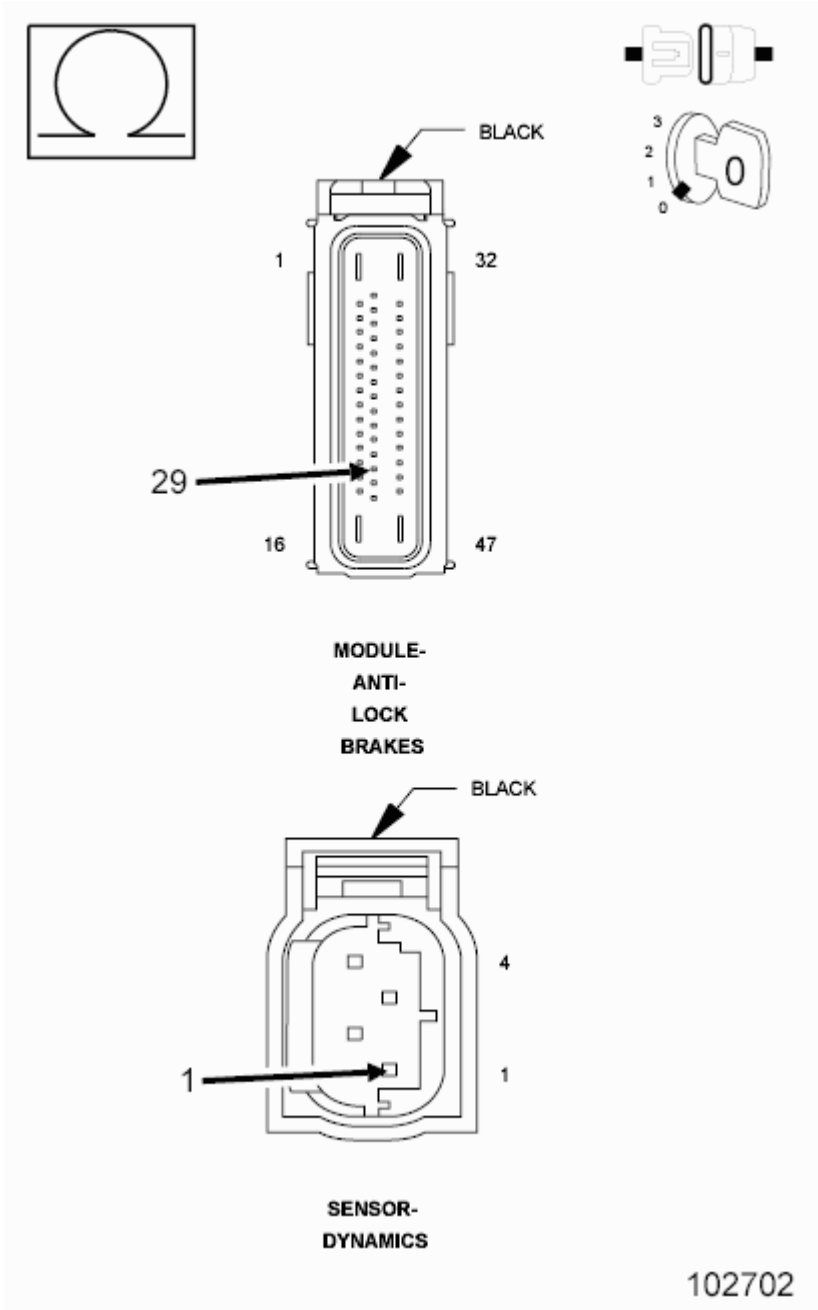


Fig. 78: Checking Sensor Cluster Ground Circuit Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (G94) Sensor Cluster Ground circuit

Is the resistance below 5.0 ohms?

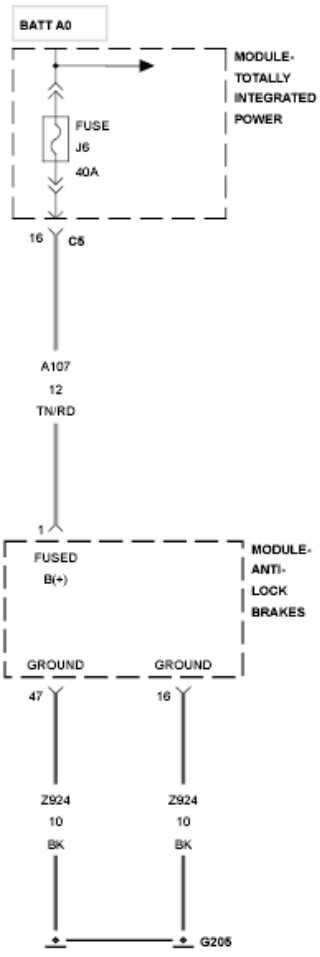
Yes

- Replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Repair the (G94) Sensor Cluster Ground circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2116-ABS PUMP MOTOR SUPPLY LOW VOLTAGE



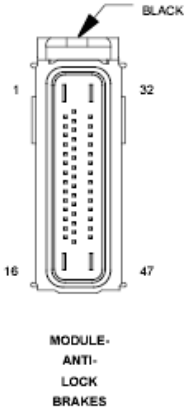


Fig. 79: ABS Pump Motor Fuse & Fused B(+) Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on and the ABS pump motor deactivated.

- **Set Condition:**

  When the Anti-Lock Brake Module indicates the ABS Pump Motor supply voltage is below 6.0 volts, the circuit fails the diagnostic test.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
ABS PUMP MOTOR FUSE OPEN
(A107) FUSED B(+) CIRCUIT SHORTED TO GROUND OR OPEN
(Z924) GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR A DTC C2116-ABS PUMP MOTOR SUPPLY LOW VOLTAGE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.

      CAUTION: Make sure braking capability is available before road testing.

   5. Drive the vehicle over 40 Km/h (25 mph).
   6. Park the vehicle and cycle the ignition switch from off to on.
   7. With the scan tool, read and record DTCs

      Does the scan tool display: C2116-ABS PUMP MOTOR SUPPLY LOW VOLTAGE?

      Yes

      - Go to step 2

      No

- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK ABS PUMP OPERATION WITH SCAN TOOL**
   1. Cycle ignition switch off to on.
   2. With the scan tool, actuate the ABS Pump Motor.

      Did the ABS Pump Motor operate?

      Yes

      - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 3
3. **CHECK THE ABS PUMP MOTOR FUSE FOR AN OPEN**
   1. Turn the ignition off.
   2. Remove and inspect the ABS Pump Motor fuse.

      Is the ABS Pump Motor fuse open?

      Yes

      - Go to step 4

      No

      - Go to step 5
4. **CHECK THE (A107) FUSED B(+) FOR A SHORT TO GROUND**
   1. Turn the ignition off.
   2. Check the (A107) Fused B(+) circuit in the wiring harness for a short to ground.

      Is the (A107) Fused B(+) circuit in the wiring harness OK?

      Yes

      - Go to step 5

      No

      - Repair the (A107) Fused B(+) circuit as necessary. Replace the fuse.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**

   NOTE: Check all related wiring for bruised, chafed, pierced, or partially broken wires. Check all related connectors for broken, bent, pushed out, or corroded terminals.

   1. Inspect the Anti-Lock Brake Module harness connector and (A107) Fused B(+) circuit in the wiring harness.

      Were any problems found?

      Yes

      - Repair as necessary.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Go to step 6

6. **(A107) FUSED B(+) CIRCUIT OPEN**

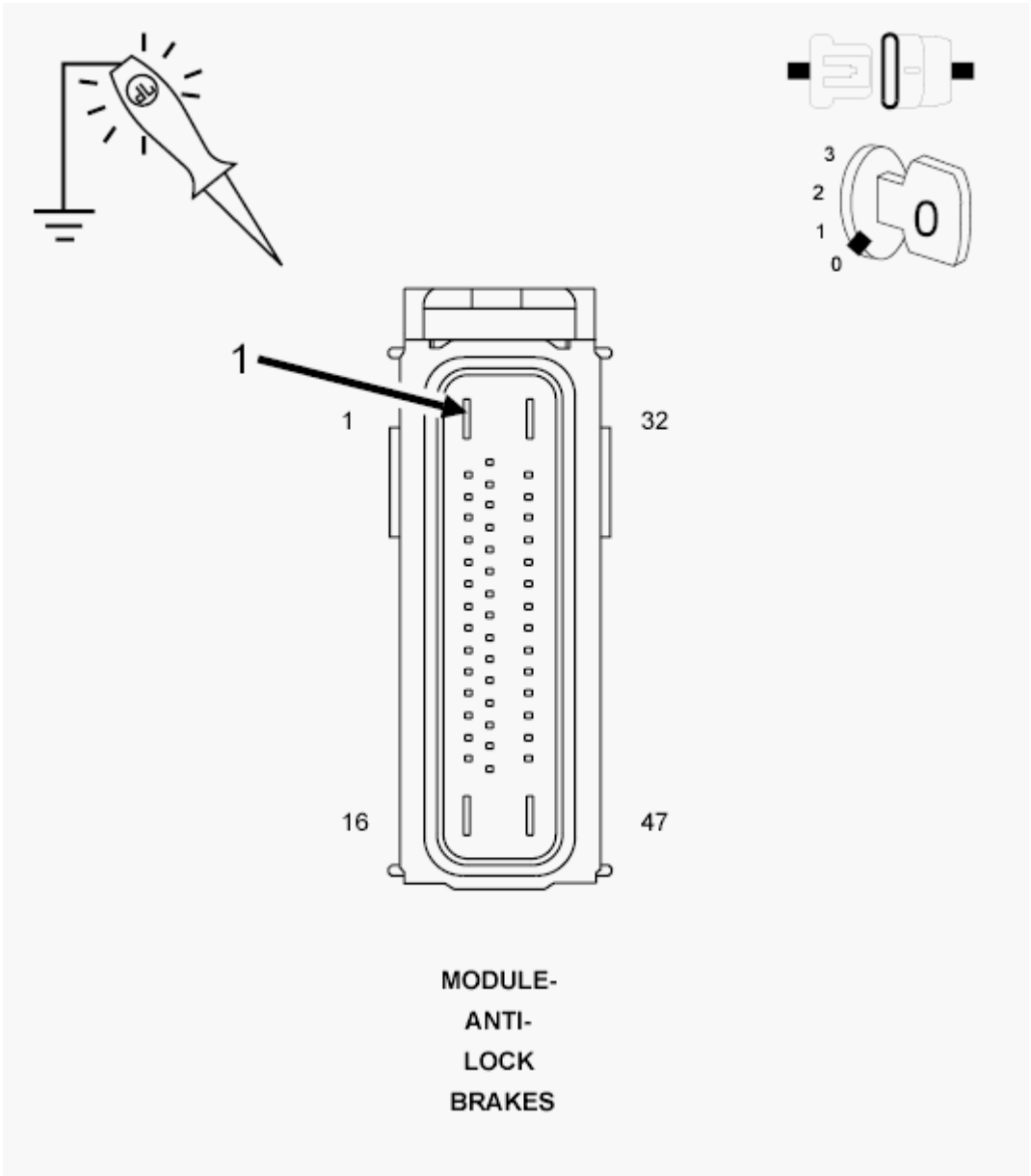


Fig. 80: Checking Anti-Lock Brake Module Harness Connector
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.
3. Using a 12-volt test light connected to ground, check the (A107) Fused B(+) circuit in the Anti-Lock Brake Module harness connector.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Go to step 7

No

- Repair the (A107) Fused B(+) circuit for an open circuit or high resistance.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

7. **GROUND CIRCUIT(S) OPEN OR HIGH RESISTANCE**

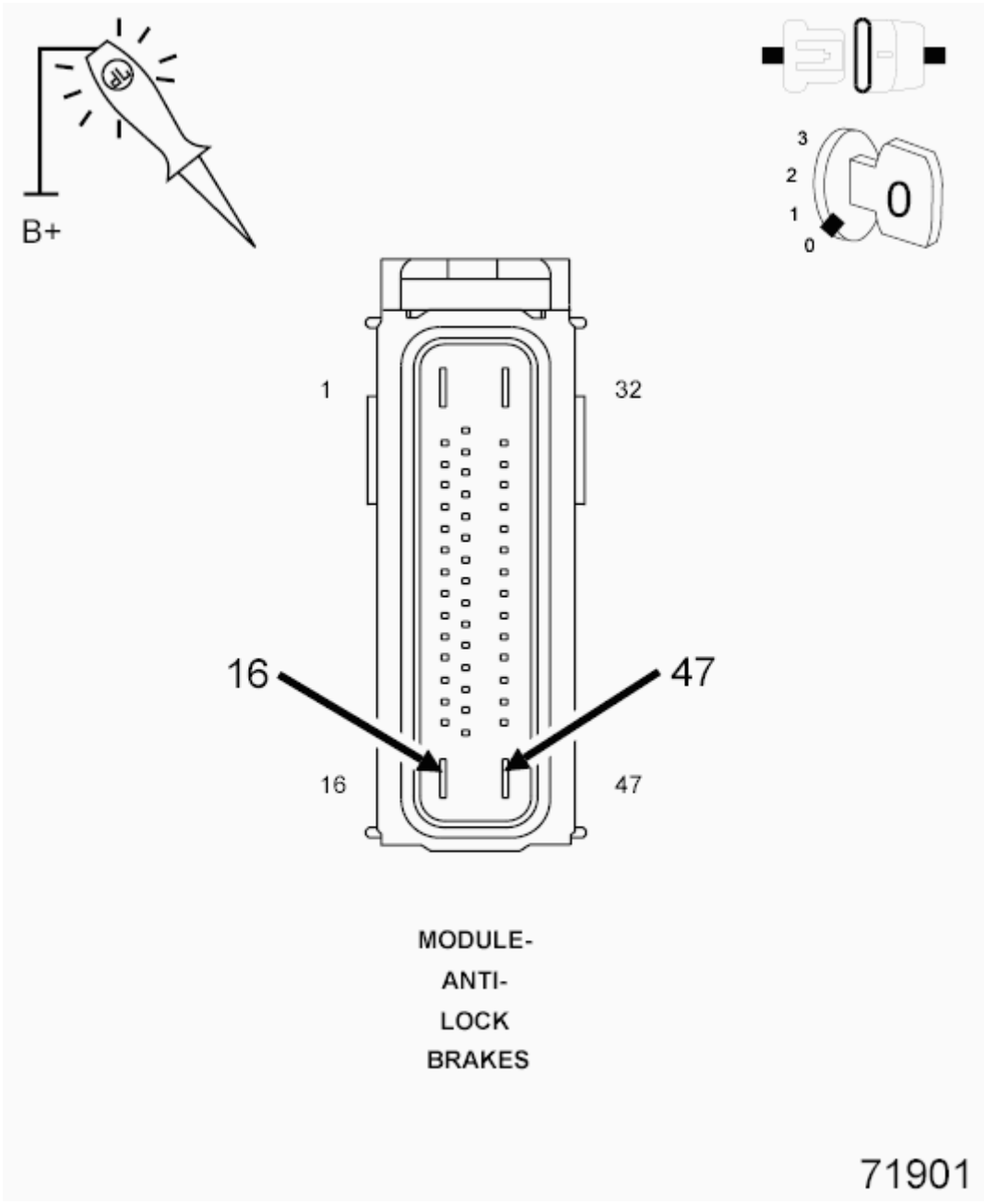


Fig. 81: Checking Ground Circuit Open Or High Resistance
Courtesy of CHRYSLER LLC

1. Using a 12-volt test light connected to 12-volts, check the (Z924) Ground circuits.

NOTE: The test light should be illuminated and bright. Compare the brightness to that of a direct connection to the battery.

Is the test light illuminated and bright?

Yes

- Replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Repair the Ground circuit(s) for an open circuit or high resistance.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2202-ORIGINAL VIN MISMATCH/MISSING

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  At power up, VIN is read off the CAN bus.

- **Set Condition:**

  The VIN stored in the ABM does not match the VIN read off of the CAN bus.

Possible Causes
ABM MOVED FROM DIFFERENT VEHICLE WRONG VIN PROGRAMMED INTO VEHICLE

Diagnostic Test

1. **CHECK FOR A DTC C2202-ORIGINAL VIN MISMATCH/MISSING**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. Perform ECU initialization with drive test. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.
   5. Start the engine.
   6. With the scan tool, read and record DTCs.

   Does the scan tool display: C2202-ORIGINAL VIN MISMATCH/MISSING?

Yes

- Go to step 2

No

- ABM has learned new VIN.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **WRONG VIN PROGRAMMED INTO VEHICLE**

   Is the VIN stored in the ABM and PCM the same?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Reprogram the VIN per service information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2204-DYNAMICS SENSOR INTERNAL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously, with ignition on, until vehicle speed exceeds 12.4 mph (20 km/h) for the first time, but not if the sensor voltage is out of range.

- **Set Condition:**

  If the Anti-Lock Brake Module detects that the Yaw or Lateral Sensor signal is out of range.

Possible Causes
DYNAMICS SENSOR INSTALLATION
DYNAMICS SENSOR

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

NOTE: If present, diagnose and repair DTC C123C-DYNAMICS SENSOR MOUNTING/INSTALLATION PERFORMANCE before diagnosing this DTC.

1. Turn the ignition on.
2. With the scan tool, read and record the ABS DTCs.
3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
4. With the scan tool, erase the ABS DTCs.
5. Cycle the ignition switch.

WARNING: Make sure brake capability is available before road testing.

NOTE: Attempt to operate the vehicle under conditions similar to which the DTC was set. It may be necessary to test drive the vehicle within the DTC monitoring and set conditions in order for this DTC to set.

6. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 6 and 12 mph (10 and 20 km/h).
7. Park the vehicle.
8. With the scan tool, read the ABS DTCs.

Does this DTC reset?

Yes

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2205-STEERING ANGLE SENSOR INTERNAL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With ignition on, but not if supply voltage faults are detected.

- **Set Condition:**

If the Anti-Lock Brake Module detects that the Steering Angle Sensor sends an internal failure message.

Possible Causes
CLOCKSPRING (SAS)

Diagnostic Test

1. **CHECK FOR A DTC C2205-STEERING ANGLE SENSOR INTERNAL**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.

   WARNING: Ensure brake capability is available before road testing.

   5. Start the vehicle and turn the wheel from lock to lock.
   6. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 10 and 25 km/h (6 and 15 mph).
   7. Park the vehicle.
   8. With the scan tool, read and record DTCs.

   Does the scan tool display: C2205-STEERING ANGLE SENSOR INTERNAL?

   Yes

   - Replace the Clockspring (SAS) in accordance with the Service Information.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Perform the ABS-INTERMITTENT CONDITION diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

C2206-VEHICLE CONFIGURATION MISMATCH

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects the signal from the gateway module relevant for vehicle characteristic is missing for a period greater than the specified fault duration.

Possible Causes
VEHICLE CONFIGURATION MISMATCH

Diagnostic Test

1. **CHECK FOR A DTC C2206-VEHICLE CONFIGURATION MISMATCH**

   NOTE: This DTC must be active for the results of this test to be valid. Diagnose and repair any communication DTCs in the Front Control Module (FCM) before continuing with this test.

   NOTE: Diagnose and repair any system under voltage or over voltage DTCs before continuing with this test.

   1. Turn the ignition on.
   2. With the scan tool, read the DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Cycle the ignition switch off then on.
   6. With the scan tool, read the DTCs.

   Does the scan tool display: C2206-VEHICLE CONFIGURATION MISMATCH?

   Yes

   - With the scan tool select FCM under ECU selection then Misc Functions and Restore Vehicle Configuration.

   No

   - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0100-LOST COMMUNICATION WITH ECM/PCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 volts.

  IOD fuse installed.

  TIPM is configured correctly.

- **Set Condition:**

  Bus messages not received from the Engine Control Module/Powertrain Control Module (ECM/PCM) for approximately 2 to 5 seconds.

Possible Causes
(D64) CAN C BUS (-) CIRCUIT SHORTED TO VOLTAGE
(D65) CAN C BUS (+) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
ECM/PCM POWER AND GROUND
ECM/PCM
MODULE THAT SET THIS DTC

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: Ensure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.

   1. With the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

      No

      - Perform the appropriate Stored Lost Communication test procedure. Refer to **Non-DTC**

Diagnostics/Communication - Diagnosis and Testing .

U0101-LOST COMMUNICATION WITH TCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 volts.

  IOD fuse installed.

  TIPM is configured correctly.

- **Set Condition:**

  Bus messages not received from the Transmission Control Module (TCM) for approximately 2 to 5 seconds.

Possible Causes
(D64) CAN C BUS (-) CIRCUIT SHORTED TO VOLTAGE
(D65) CAN C BUS (+) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
TCM POWER AND GROUND
TCM
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: Ensure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.

   1. With the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

No

- Refer to the Stored Lost Communication test procedure. Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**
   1. With the scan tool, read all active DTCs from all modules.

      NOTE: Check for TIPM configuration, CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

      Does the scan tool display any active DTCs to the conditions listed above?

      Yes

      - Diagnose and repair the DTC. Check the Index for a complete list of the symptoms.

      No

      - Go to step 3

3. **VERIFY THAT THE TCM IS ACTIVE ON THE BUS**
   1. Turn the ignition on.
   2. With the scan tool, select Network Diagnostics.
   3. Verify that the TCM is active on the bus.

      Is the TCM active on the bus?

      Yes

      - Go to step 4

      No

      - Refer to the No Response test procedure. Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** .

4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS**
   1. With the scan tool, select Network Diagnostics.

      Is there more than one module with active DTCs "Logged Against" the TCM?

      Yes

      - Replace/update the Transmission Control Module in accordance with the service information.
      - Perform the TRANSMISSION VERIFICATION TEST. Refer to **DTC-Based**

Diagnostics/MODULE, Transmission Control (TCM) - Standard Procedure .

No

- Go to step 5

5. **CLEAR DTC IN MODULE SETTING FAULT**
   1. With the scan tool, select the module setting the DTC against the TCM.
   2. Clear active DTCs.

   Is this DTC still active?

   Yes

   - Replace/update the module that set this DTC in accordance with the service information.
   - Perform the appropriate VERIFICATION TEST.

   No

   - Go to step 6
6. **CYCLE IGNITION**
   1. Cycle the ignition from RUN to OFF three times ending with the key in the RUN position.

   Does this DTC become active?

   Yes

   - Go to step 7

   No

   - The condition is not present at this time. Using the **SYSTEM WIRING DIAGRAMS** as a guide, inspect the wiring for chafed, pierced, pinched, and partially broken wires and the wiring harness connectors for broken, bent, pushed out, and corroded terminals.
   - Perform the appropriate VERIFICATION TEST.
7. **CHECK FOR ADDITIONAL LOST COMMUNICATION FAULTS**
   1. With the scan tool, select Network Diagnostics.

   Does the TIPM and other CAN C BUS modules show Lost Communication with the remaining CAN C BUS modules?

   Yes

   - Go to step 8

No

- Replace/update the module that set this DTC in accordance with the service information.
- Perform the appropriate VERIFICATION TEST.

8. **(D64) CAN C BUS (-) CIRCUIT SHORTED TO VOLTAGE**
   1. Measure the voltage between the (D64) CAN C Bus (-) circuit and ground.

      Is the voltage above 5 volts?

      Yes

      - Repair the (D64) CAN C Bus (-) circuit for a short to voltage.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

      No

      - Go to step 9

9. **(D65) CAN C BUS (+) CIRCUIT SHORTED TO GROUND**
   1. Turn the ignition off.
   2. Measure the resistance between ground and the (D65) CAN C Bus (+) circuit.

      Is the resistance below 10K Ohms?

      Yes

      - Repair the (D65) CAN C Bus (+) circuit for a short to ground.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

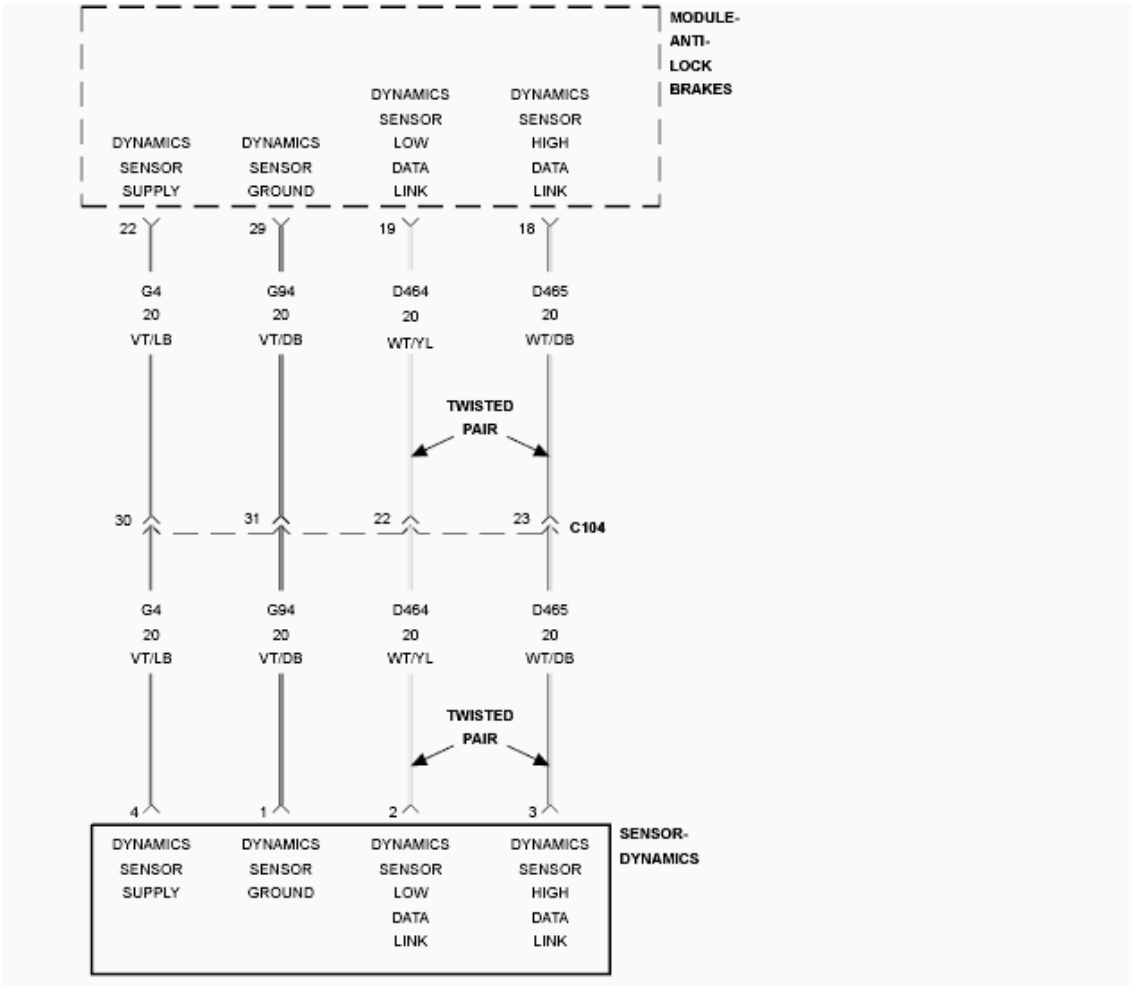
      No

      - Replace the Anti-Lock Brake Module in accordance with the service information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0125-LOST COMMUNICATION WITH DYNAMICS SENSOR

2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey



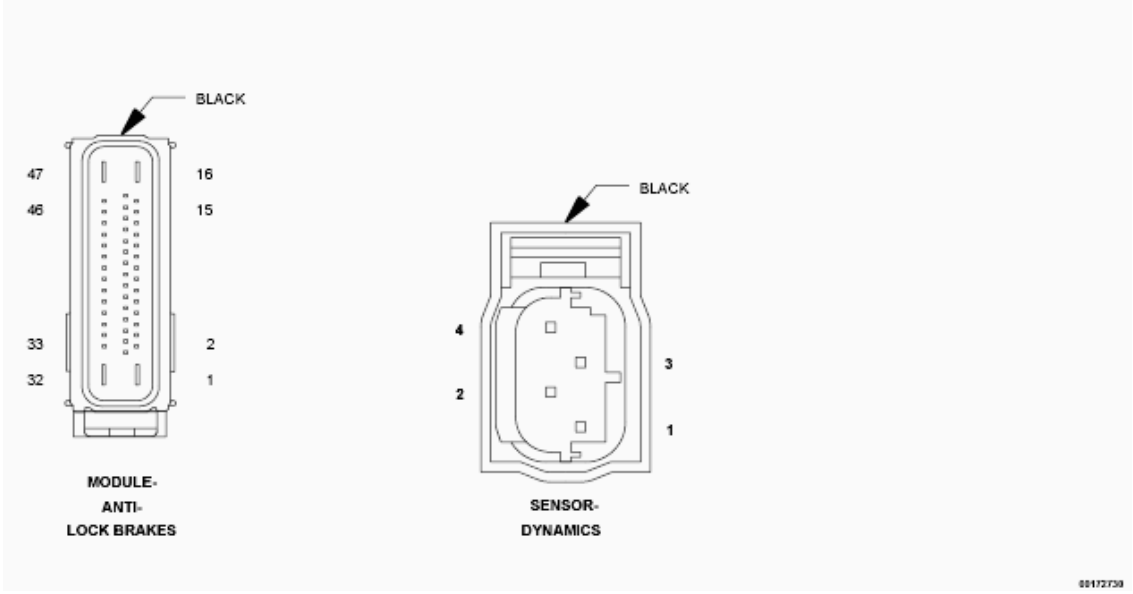


Fig. 82: Dynamics Sensor Data Link Voltage Low Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Anti-Lock Brake Module fails to receive bus messages from the Dynamics Sensor.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(G94) DYNAMICS SENSOR GROUND CIRCUIT SHORTED TO VOLTAGE, GROUND, OR OPEN
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO GROUND, SHORTED TO VOLTAGE, OR OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND, SHORTED TO VOLTAGE, OR OPEN
DYNAMICS SENSOR
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: If present, diagnose and repair DTC C2114-DYNAMICS SENSOR SUPPLY VOLTAGE LOW or DTC C2115-DYNAMICS SENSOR SUPPLY VOLTAGE HIGH before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read and record the ABS DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the ABS DTCs.
   5. Start the engine.

      NOTE: Attempt to operate the vehicle under conditions similar to which the DTC was set. It may be necessary to test drive the vehicle within the DTC monitoring and set conditions in order for this DTC to set.

   6. With the scan tool, read the ABS DTCs.

Does this DTC reset?

Yes

- Go to step 2

No

- The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
- Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **INSPECT RELATED WIRING HARNESS, TERMINALS, AND CONNECTORS**
    1. Visually inspect the related wiring harness. Look for any pinched, chafed, pierced, and partially broken wires.
    2. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, and corroded terminals.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

    No

    - Go to step 3
3. **CHECK THE VOLTAGE ON THE (G4) DYNAMICS SENSOR SUPPLY CIRCUIT**

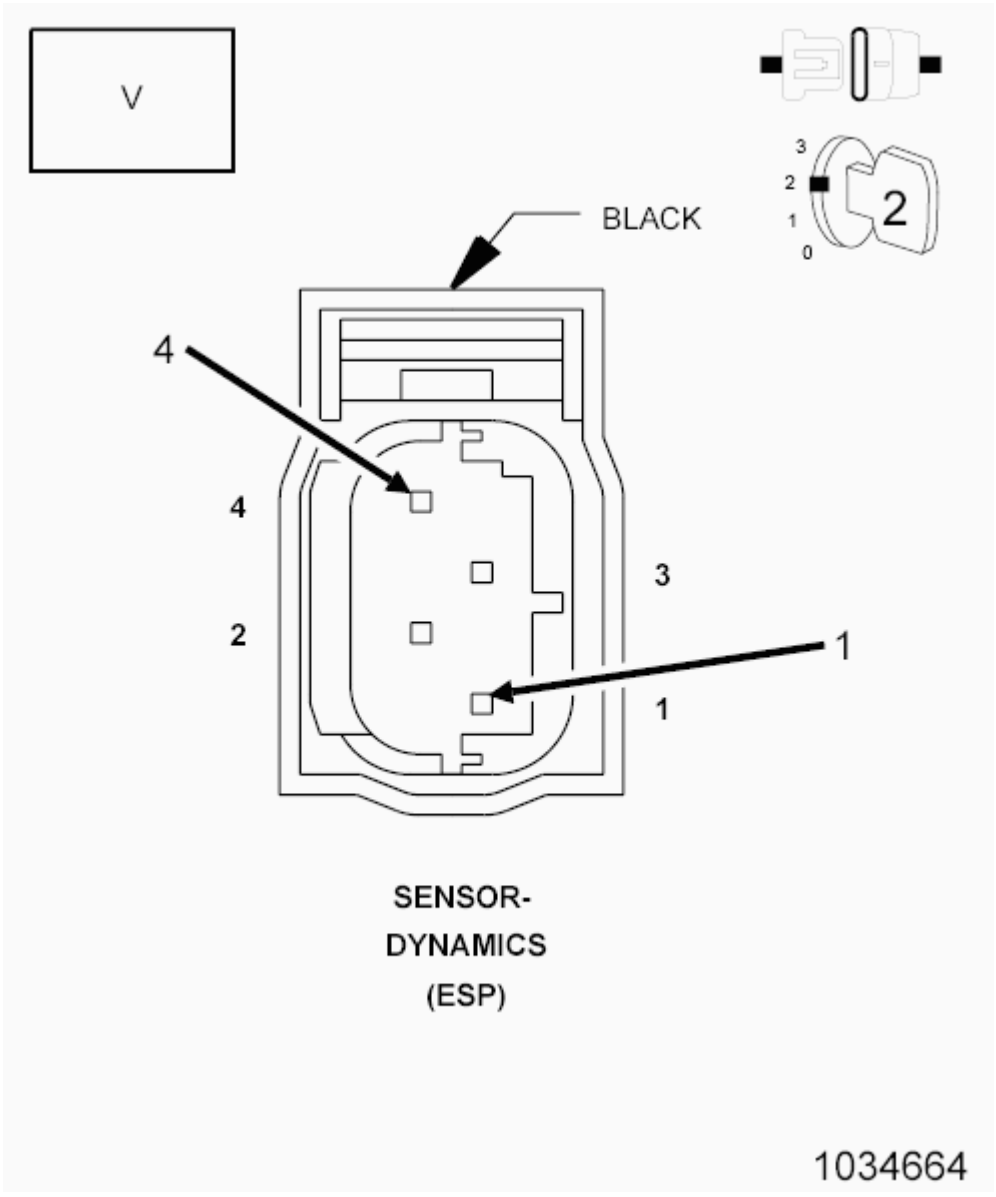


Fig. 83: Checking Voltage On Dynamics Sensor Supply Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Dynamics Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage across (G4) Dynamics Sensor Supply Circuit and (G94) Dynamics Sensor Ground Circuit.

   Is the voltage above 10 volts?

   Yes

- Go to step 10

No

- Go to step 4

4. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORT TO GROUND**

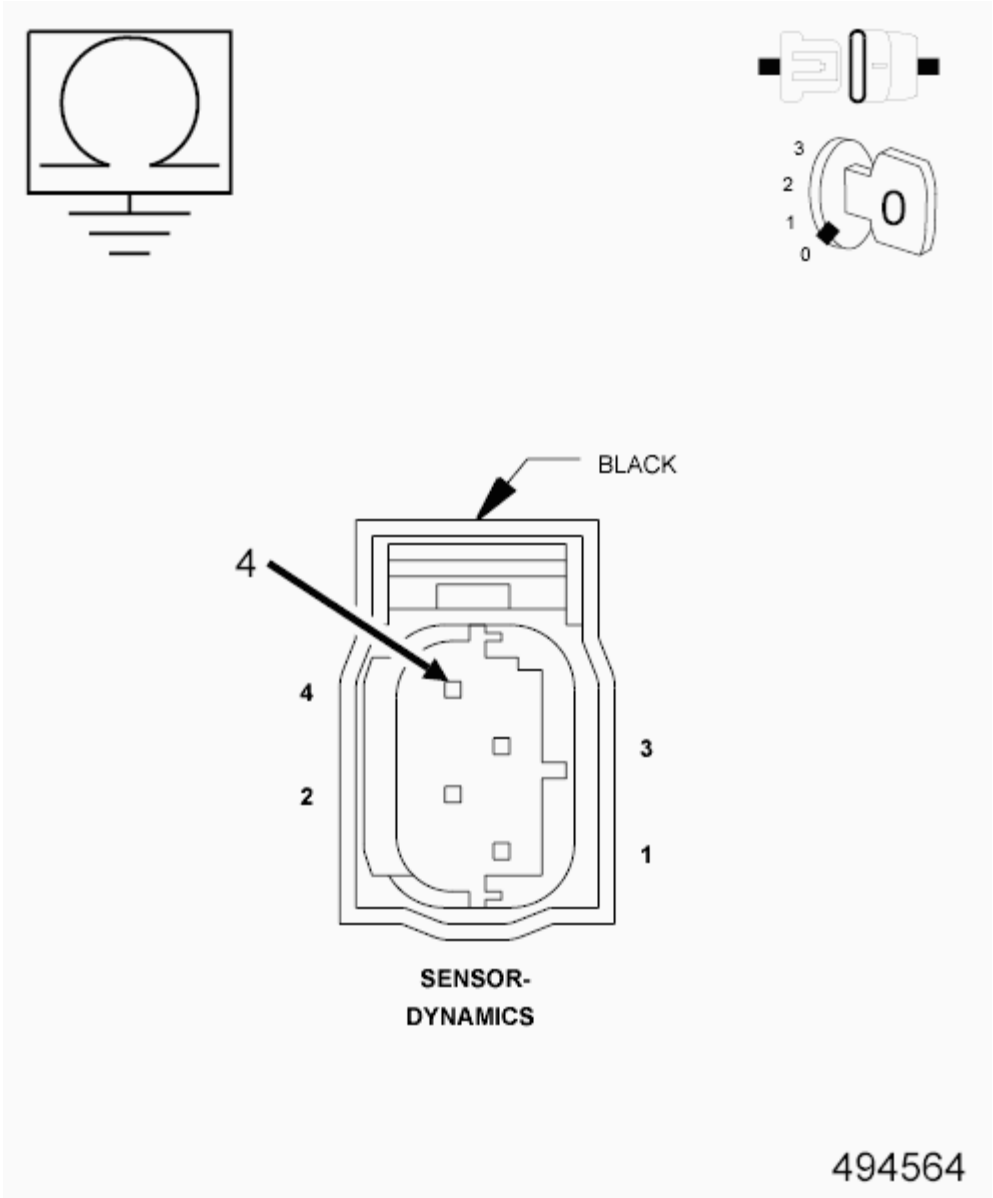


Fig. 84: Checking Dynamics Sensor Supply Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.

3. Measure the resistance between ground and the (G4) Dynamics Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (G4) Dynamics Sensor Supply circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT SHORT TO VOLTAGE**

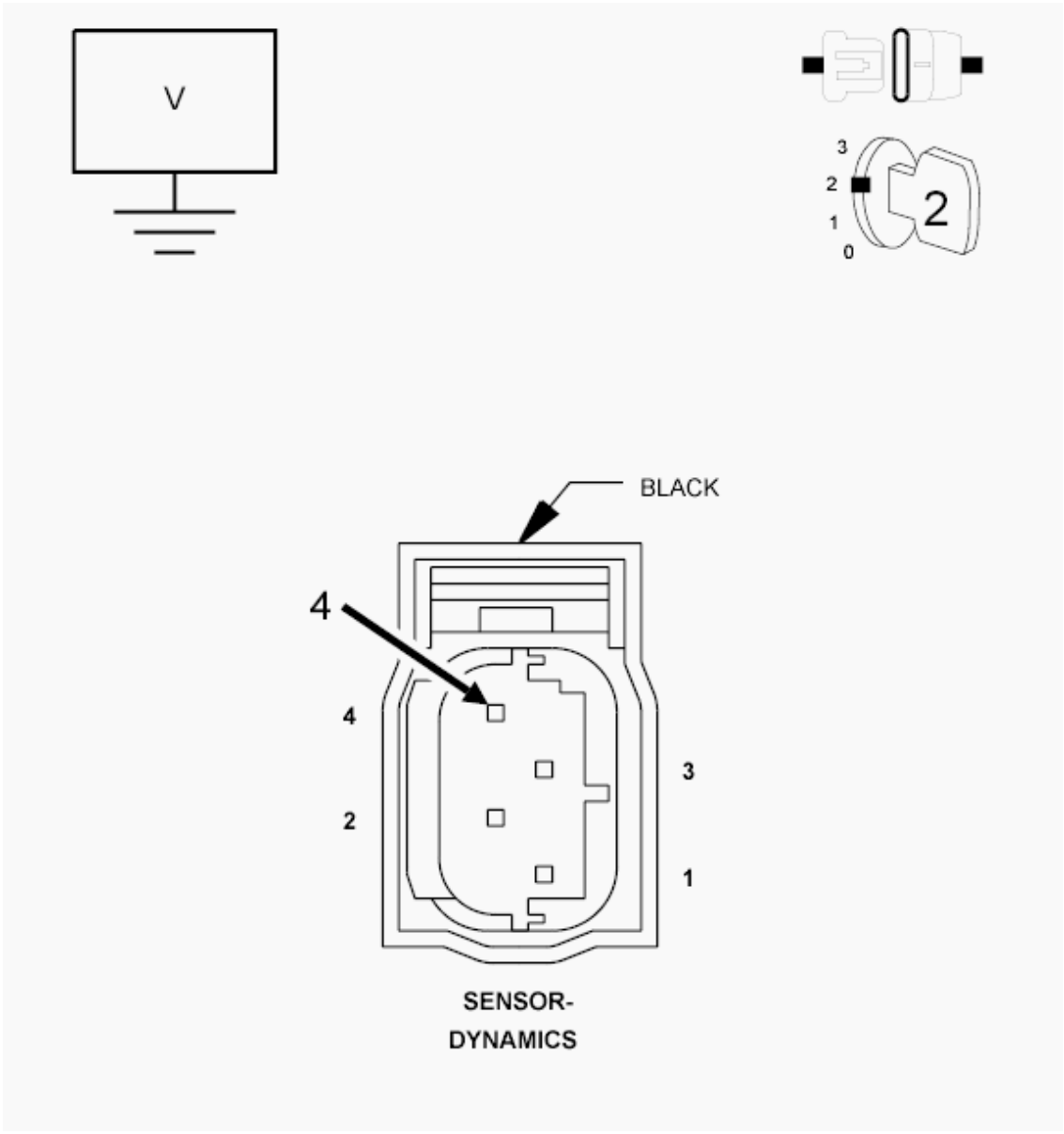


Fig. 85: Checking Dynamics Sensor Supply Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage of the (G4) Dynamics Sensor Supply circuit.

   Is there any voltage present?

   Yes

   - Repair the (G4) Dynamics Sensor Supply circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 6

6. **(G4) DYNAMICS SENSOR SUPPLY CIRCUIT OPEN**

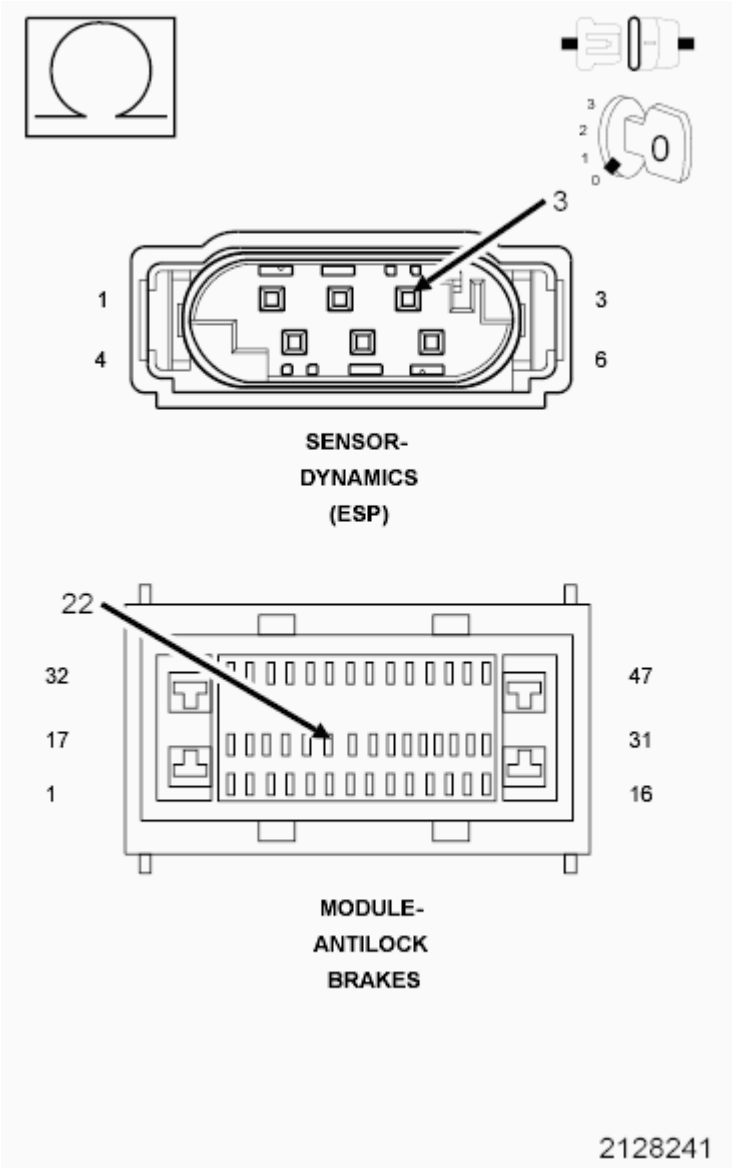


Fig. 86: Checking Dynamics Sensor Supply Circuit For High Resistance
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (G4) Dynamics Sensor Supply circuit.

   Is the resistance below 5.0 Ohms?

   Yes

- Go to step 7

No

- Repair the (G4) Dynamics Sensor Supply circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

7. **CHECK THE RESISTANCE BETWEEN THE (G94) DYNAMICS SENSOR GROUND CIRCUIT AND GROUND**

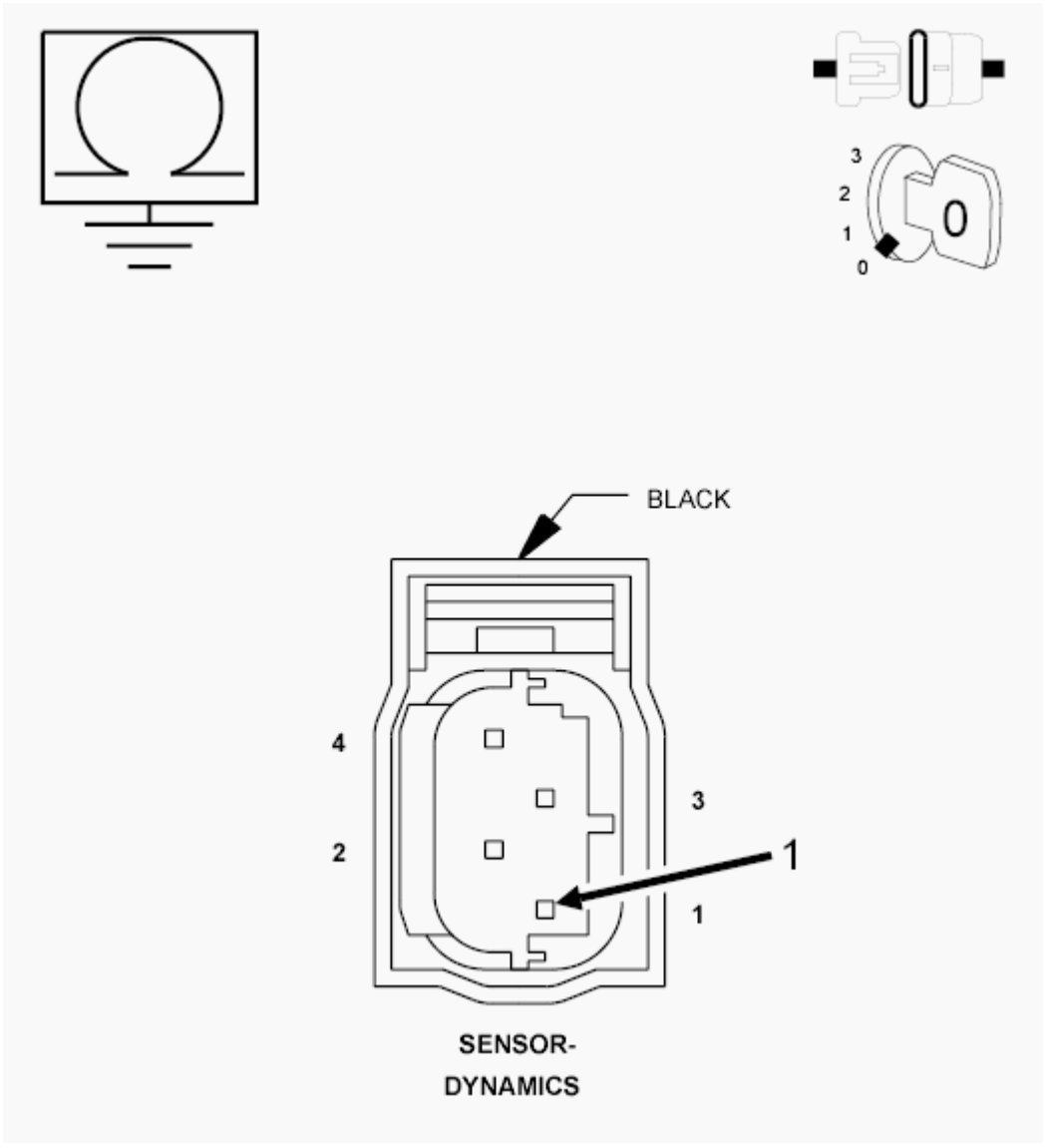


Fig. 87: Checking Resistance Between Dynamics Sensor Ground Circuit & Ground
Courtesy of CHRYSLER LLC

1. Disconnect the Dynamics Sensor harness connector.

2. Measure the resistance between the (G94) Dynamics Sensor Ground Circuit and Ground.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 8

8. **(G94) DYNAMICS SENSOR GROUND CIRCUIT SHORT TO VOLTAGE**

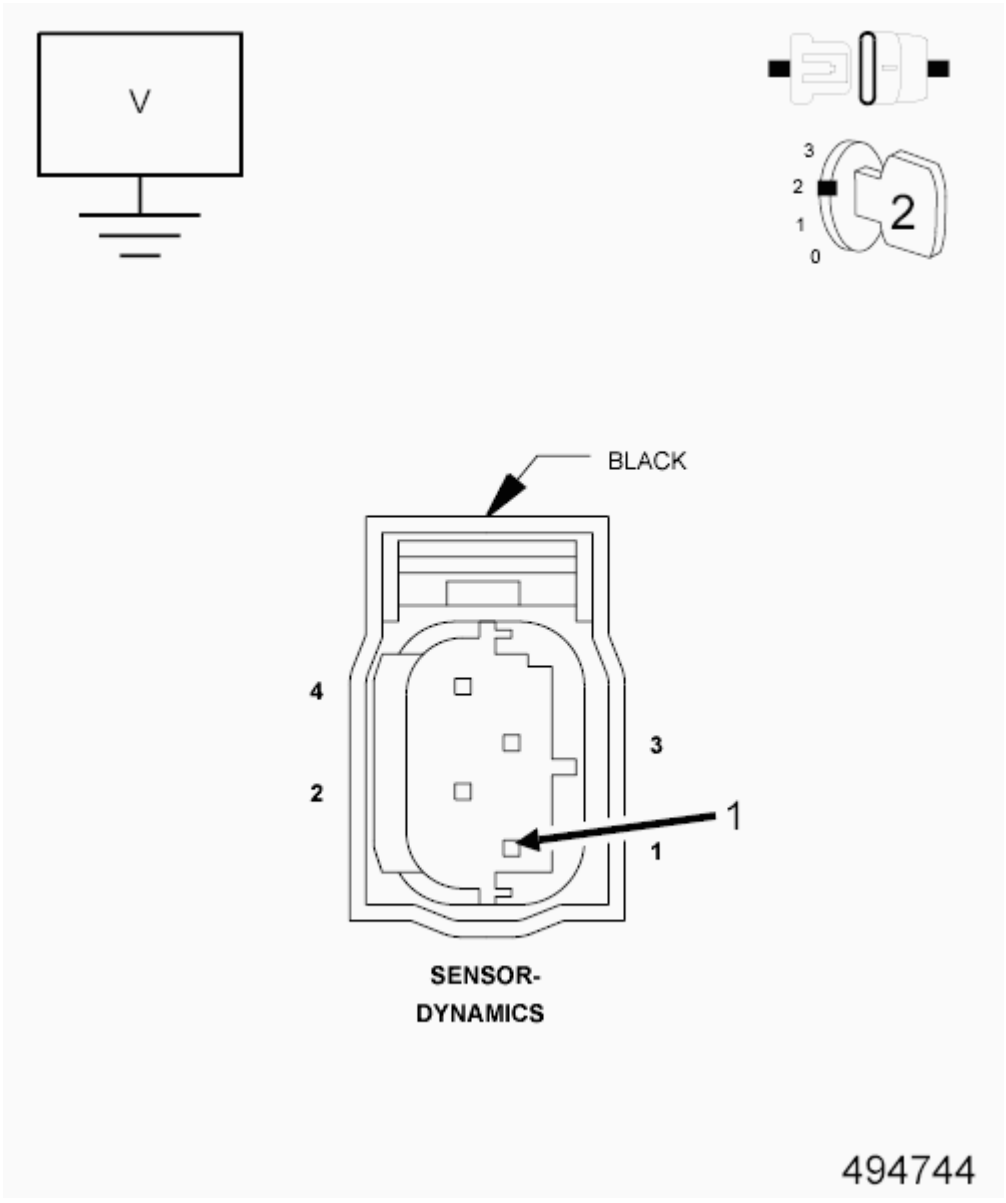


Fig. 88: Checking Dynamics Sensor Ground Circuit Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (G94) Dynamics Sensor Ground circuit.

   Is there any voltage present?

   Yes

   - Repair the (G94) Dynamics Sensor Ground circuit for a short to voltage.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 9

9. **(G94) DYNAMICS SENSOR GROUND CIRCUIT OPEN**

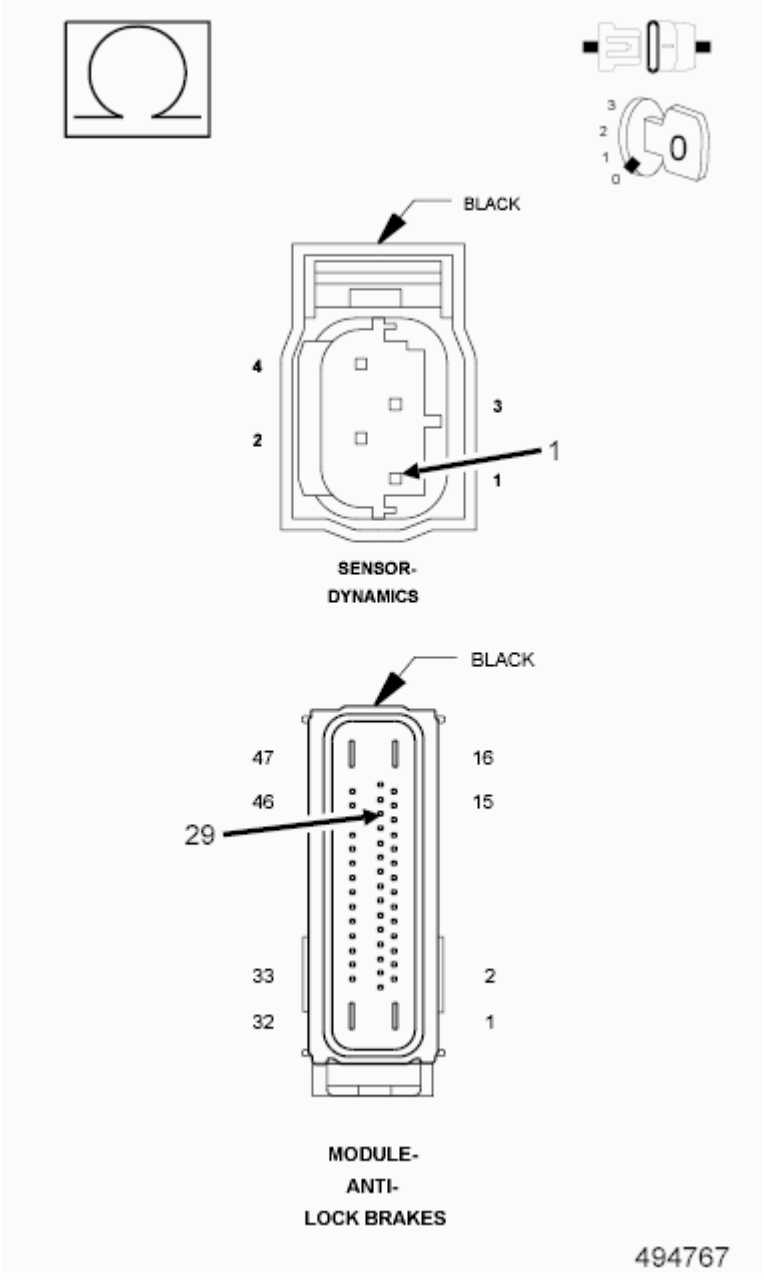


Fig. 89: Checking Dynamics Sensor Ground Circuit For High Resistance
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (G94) Dynamics Sensor Return circuit between the Dynamics Sensor and the Anti-Lock Brake Module.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Repair the (G94) Dynamics Sensor Ground circuit for an open.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

10. **CHECK THE DATA LINK OUTPUT**

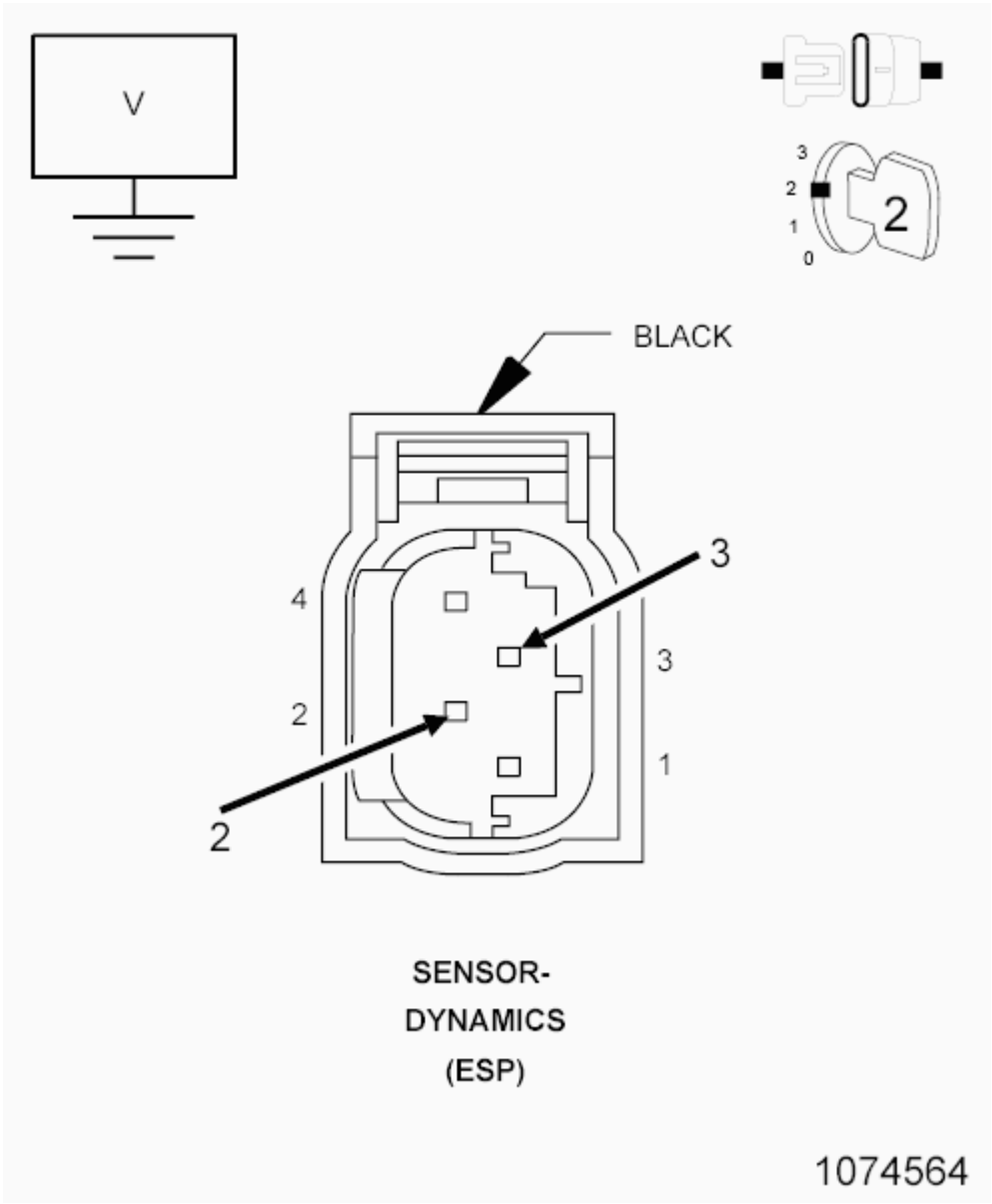


Fig. 90: Checking Data Link Output
Courtesy of CHRYSLER LLC

1. Measure the voltage of the Data Links Circuits the (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT will measure a minimum of 3 volts and the (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT will measure a minimum of 2 volts

   Is the voltage within specifications?

   Yes

   - Replace the Dynamic Sensor in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock**

Brake (ABS) - Standard Procedure.

No

- Go to step 11

11. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

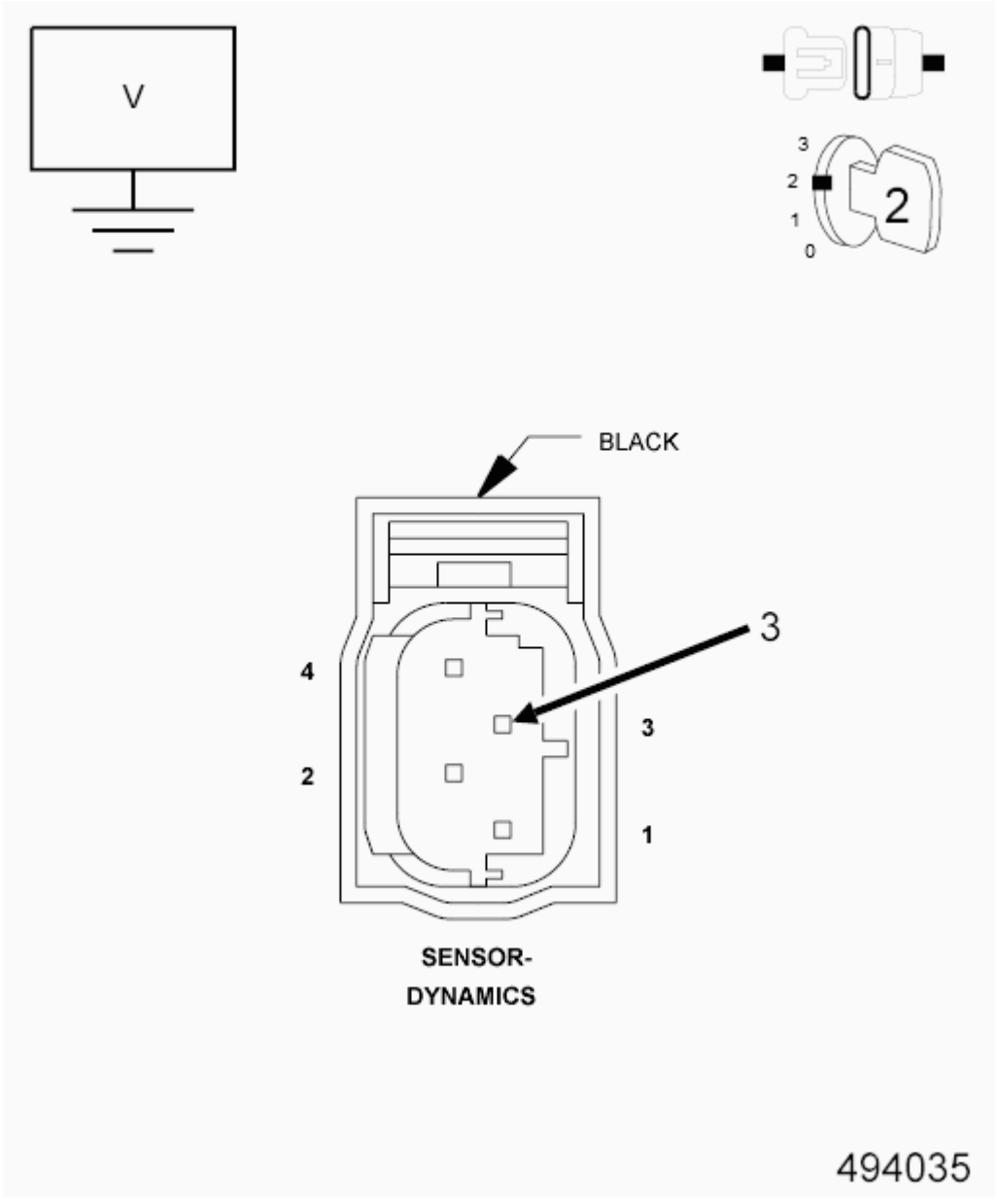


Fig. 91: Checking Dynamics Sensor High Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Disconnect the Anti-Lock Brakes Module harness connector.

2. Disconnect the Dynamics Sensor harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (D465) Dynamics Sensor High Data Link circuit.

   Is there any voltage present?

   Yes

   - Repair the (D465) Dynamics Sensor High Data Link circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 12

12. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO GROUND**

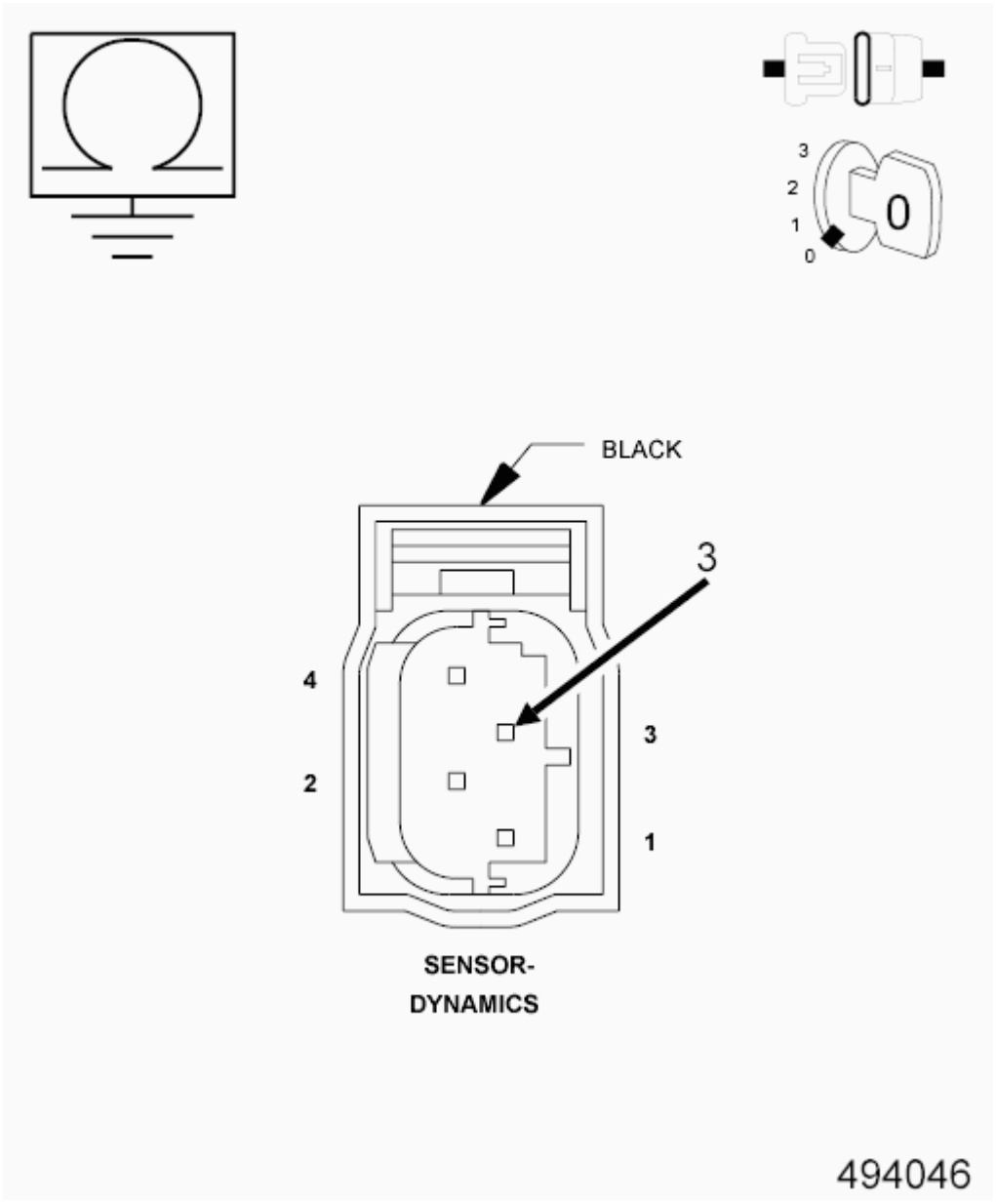


Fig. 92: Checking Dynamics Sensor High Data Link Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between ground and the Dynamics Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (D465) Dynamics Sensor High Data Link circuit for a short to ground.

- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 13

13. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR AN OPEN**

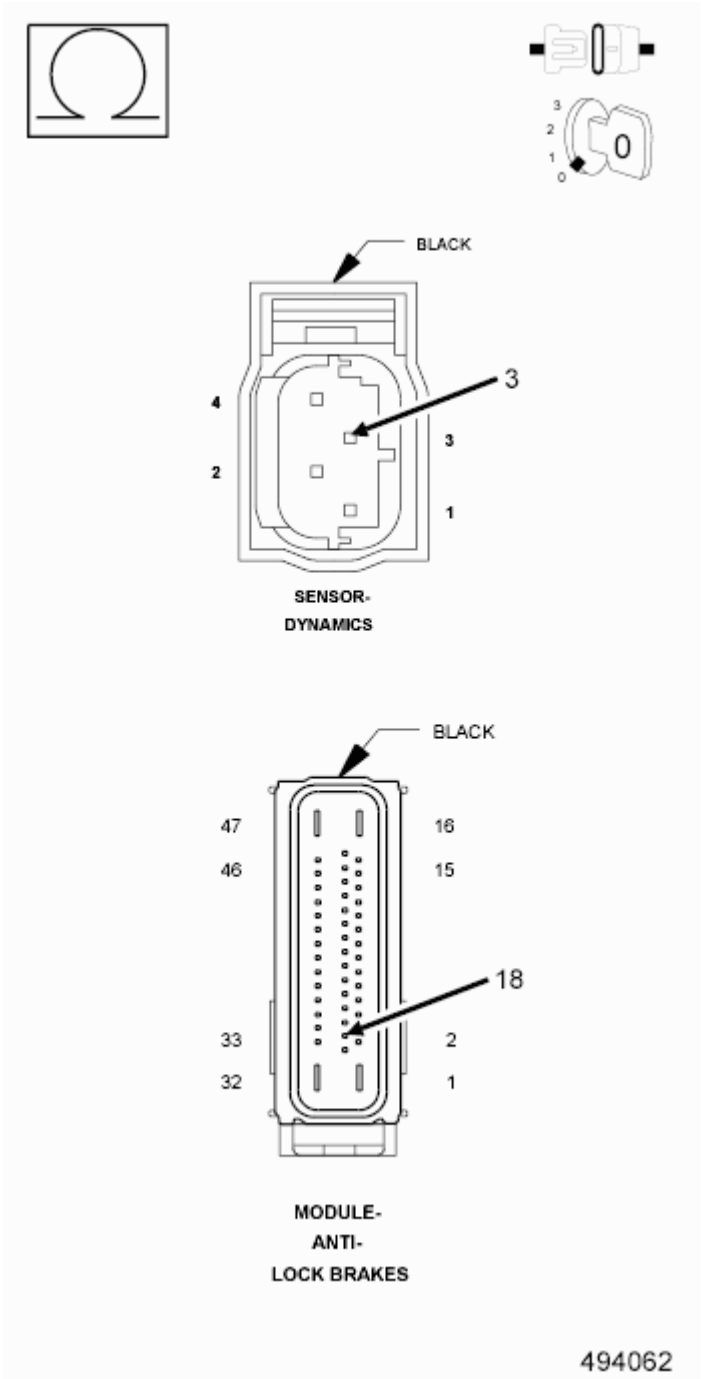


Fig. 93: Checking Dynamics Sensor High Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit between the Dynamics Sensor harness connector and the Anti-Lock Brakes Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 14

   No

   - Repair the (D465) Dynamics Sensor High Data Link circuit for an open.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

14. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

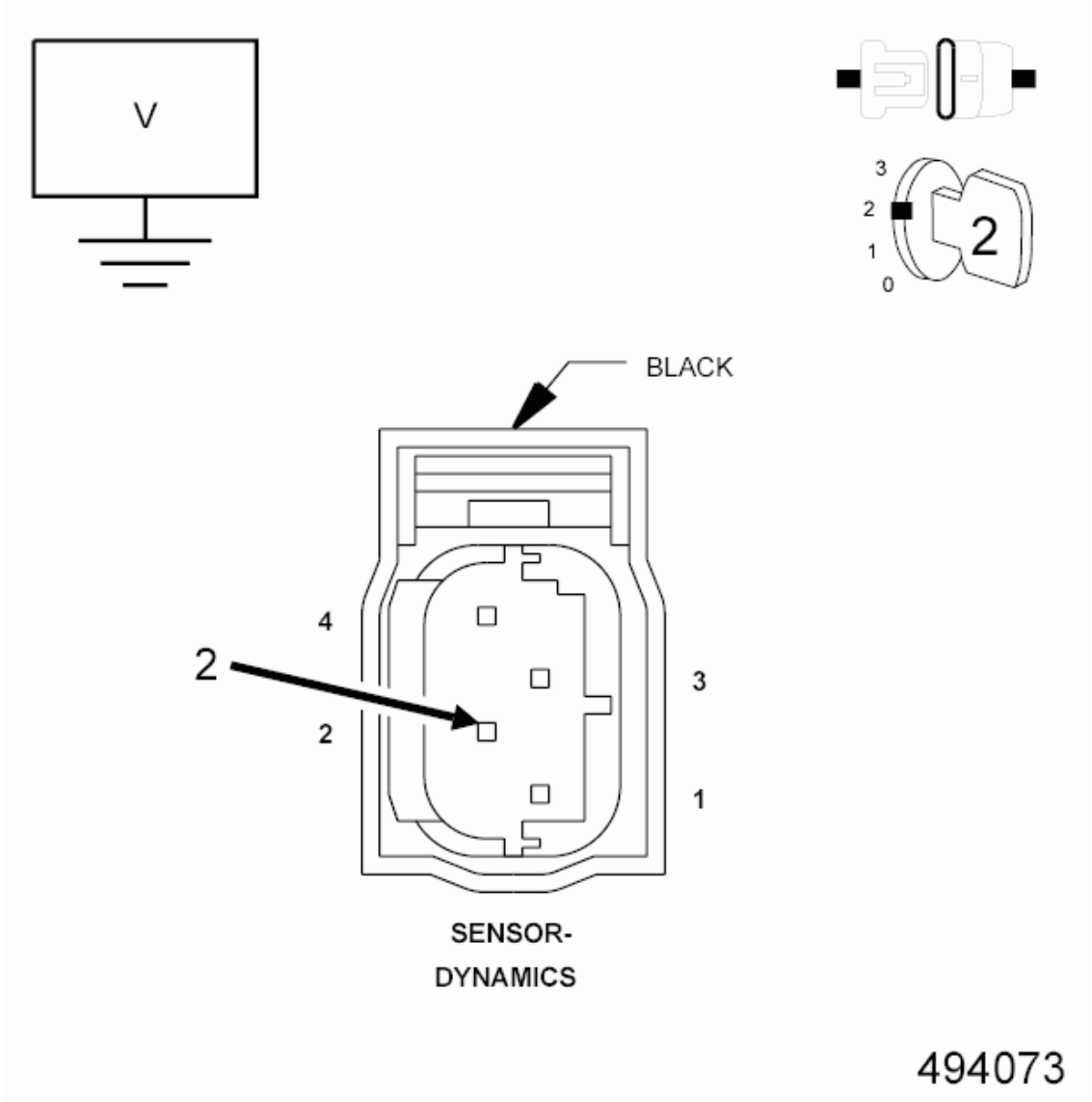


Fig. 94: Checking Dynamics Sensor Low Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage of the (D464) Dynamics Sensor Low Data Link circuit.

   Is there any voltage present?

   Yes

   - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 15

15. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO GROUND**

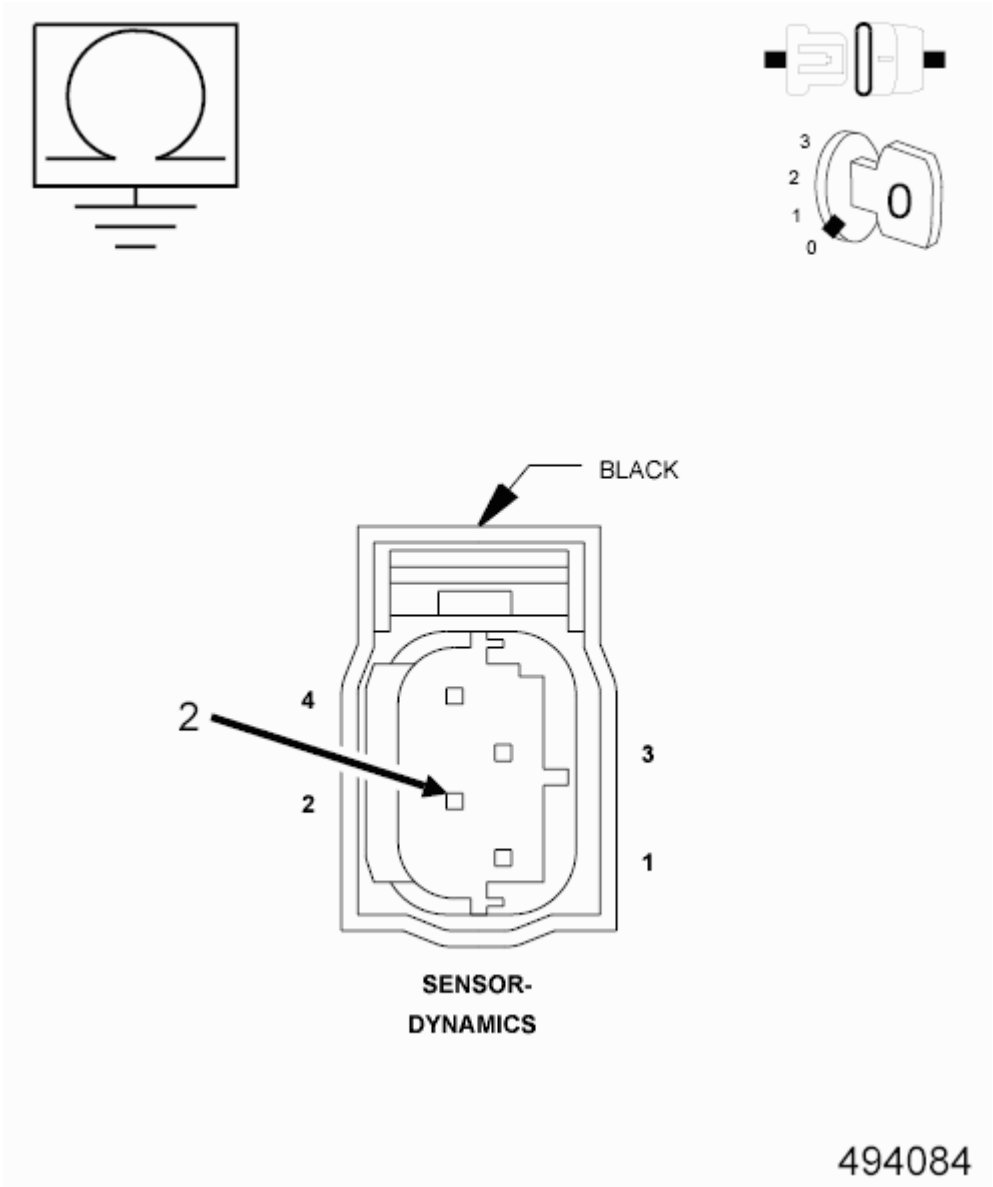


Fig. 95: Checking Dynamics Sensor Low Data Link Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between ground and the Dynamics Sensor harness connector.

Is the resistance below 5.0 Ohms?

Yes

- Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to ground.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 16

16. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR AN OPEN**

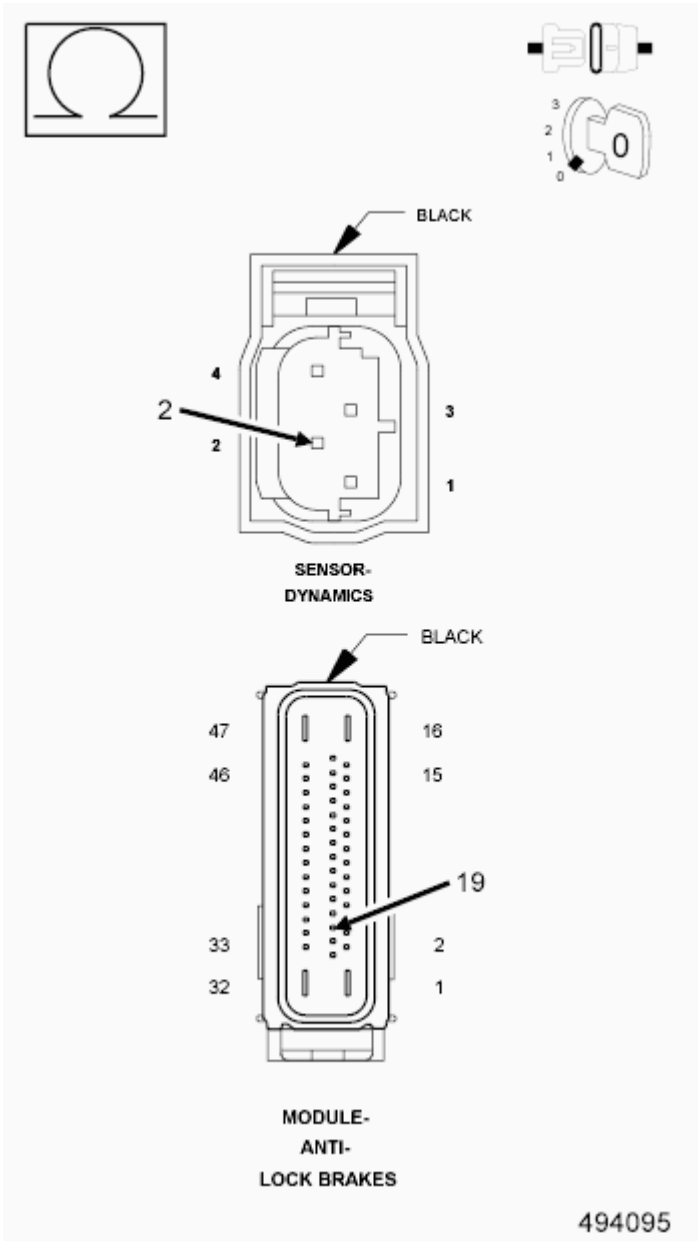


Fig. 96: Checking Dynamics Sensor Low Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit between the Dynamics Sensor harness connector and the Anti-Lock Brake Module harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Replace the Anti-Lock Brake Module in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock**

Brake (ABS) - Standard Procedure.

No

- Repair the (D464) Dynamics Sensor Low Data Link circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0126-LOST COMMUNICATION WITH STEERING ANGLE SENSOR

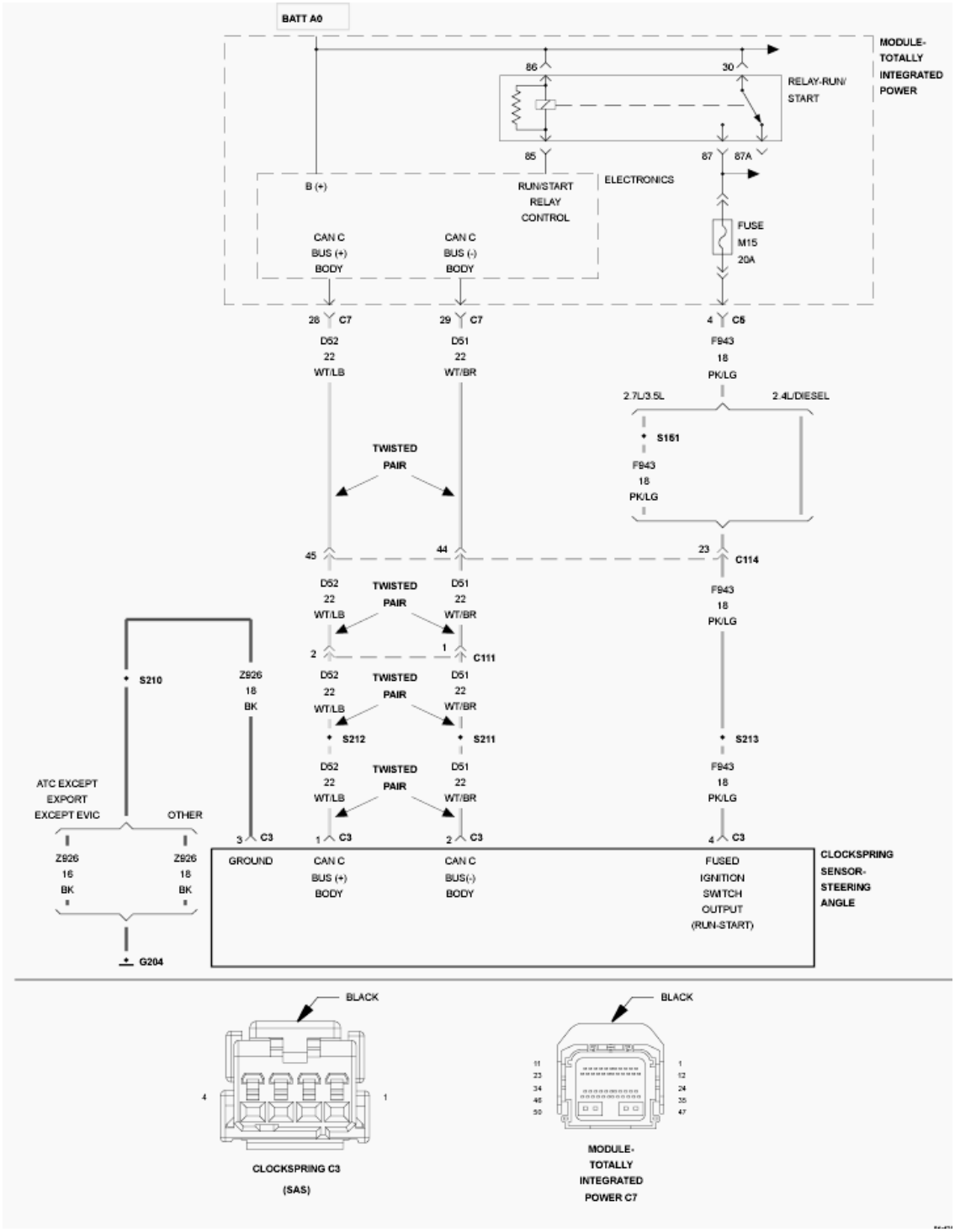


Fig. 97: Fused Ignition Switch Output Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

- With the ignition on
- Battery voltage between 10 and 16 volts
- Ignition Off Draw (IOD) fuse installed

- **Set Condition:**

  If the Anti-Lock Brake Module fails to receive bus messages from the Steering Angle Sensor for approximately 100 ms.

Possible Causes
DTCs RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
CAN C BUS CIRCUITS OPEN OR SHORTED
STEERING ANGLE SENSOR POWER AND GROUND
CLOCKSPRING (SAS)

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.

   1. Turn the ignition on.
   2. With the scan tool, read and record ABS DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase ABS DTCs.
   5. Cycle the ignition switch.
   6. With the scan tool, read ABS DTCs.

   Does this DTC reset?

   Yes

   - Go to step 2

   No

   - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
   - Perform the ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCs**

1. With the scan tool, read all active DTCs from all CAN C Bus modules.

   NOTE: Check for CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

   Does the scan tool display any active DTCs related to the conditions listed above?

   Yes

   - Diagnose and repair the DTC(s). Refer to **DIAGNOSTIC CODE INDEX**.

   No

   - Go to step 3

3. **CHECK THE VOLTAGE ON THE (F943) FUSED IGNITION SWITCH OUTPUT CIRCUIT**

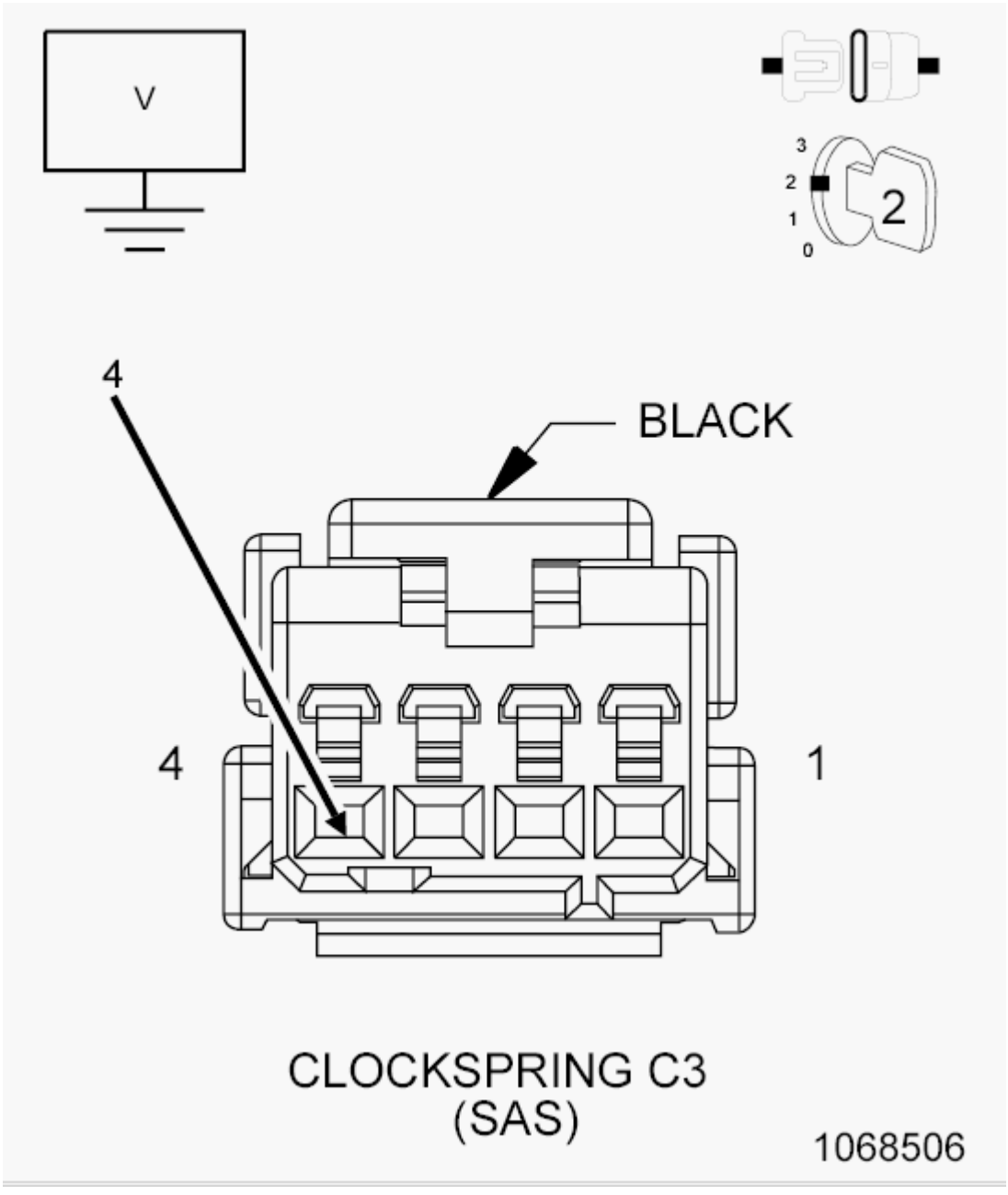


Fig. 98: Checking Clockspring Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Clockspring C3 (SAS) harness connector.
3. Turn the ignition on.
4. Measure the voltage of the (F943) Fused Ignition Switch Output circuit.

   Is the voltage above 10 volts?

Yes

- Go to step 4

No

- Repair the (F943) Fused Ignition Switch Output circuit for an open.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

4. **CHECK THE RESISTANCE OF THE (Z926) GROUND CIRCUIT**

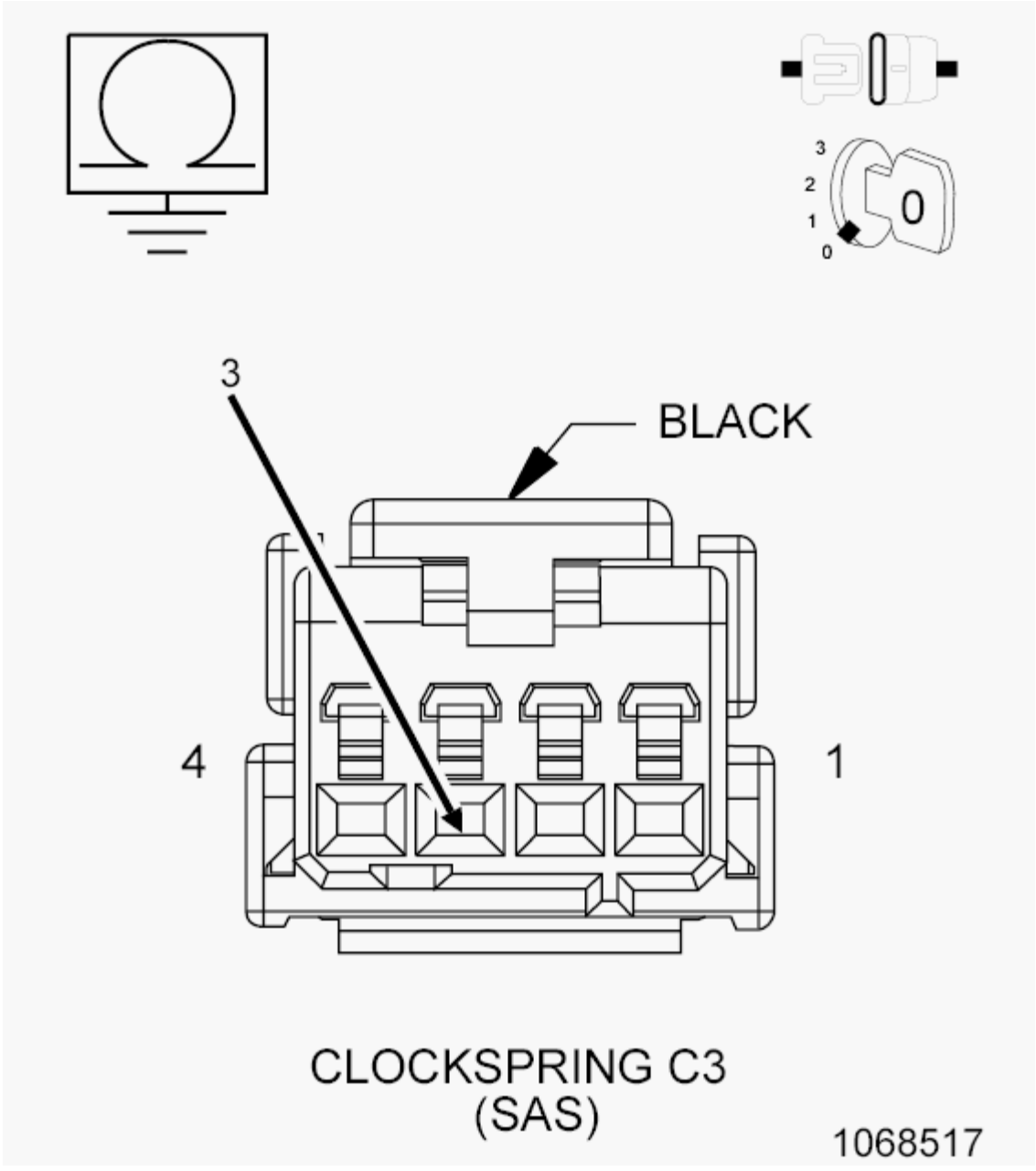


Fig. 99: Checking Clockspring Circuit
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between the (Z926) Ground circuit and ground.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 5

   No

   - Repair the (Z926) Ground circuit for an open.
   - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

5. **VERIFY THAT THE STEERING ANGLE SENSOR IS ACTIVE ON THE BUS**
   1. With the scan tool, select ECU View.
   2. Verify that the Steering Angle Sensor is active on the bus.

      Is the Steering Angle Sensor active on the bus?

      Yes

      - Replace the Clockspring (SAS) in accordance with the service information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0141-LOST COMMUNICATION WITH FRONT CONTROL MODULE (TIPM)

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**
  - With the ignition on
  - Battery voltage between 10 and 16 volts
  - IOD fuse installed
  - TIPM is configured correctly
- **Set Condition:**

Bus messages not received from the TIPM for approximately 2 to 5 seconds.

Possible Causes
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
TOTALLY INTEGRATED POWER MODULE
TOTALLY INTEGRATED POWER MODULE POWER AND GROUND
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: Verify the IOD fuse is installed and battery voltage is between 10 and 16 volts before proceeding.

   1. With the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Perform the appropriate Stored Lost Communication test procedure. Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** .

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCS**
   1. With the scan tool, read all active DTCs from all modules.

      NOTE: Check for TIPM configuration, CAN B or C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

      Does the scan tool display any active DTCs to the conditions listed above?

      Yes

      - Perform the appropriate diagnostic procedure. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

      No

      - Go to step 3

3. **VERIFY THAT THE TIPM IS ACTIVE ON THE BUS**
    1. Turn the ignition on.
    2. With the scan tool, select Network Diagnostics.
    3. Verify that the TIPM is active on the bus.

    Is the TIPM active on the bus?

    Yes

    - Go to step 4

    No

    - For No Response diagnostic procedures. Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** .
4. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCS**
    1. With the scan tool, select Network Diagnostics.

    Is there more than one module with active DTCs Logged Against the TIPM?

    Yes

    - Replace/update the Totally Integrated Power Module in accordance with the service information.
    - Perform BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

    No

    - Replace the Anti-Lock Brake Module in accordance with the service information
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0401-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on, one valid CAN message received at least once, and no U0002-CAN C Bus Off Performance DTC present.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Powertrain Control

Module (PCM) or Engine Control Module (ECM).

Possible Causes
ABM CAN BUS DTCS
ENGINE DTCS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR DTC U0401-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, record and erase DTCs.
   3. Cycle the ignition switch from off to on.
   4. With the scan tool, read DTCs.

   Does the scan tool display: U0401-IMPLAUSIBLE DATA RECEIVED FROM ECM/PCM?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK IF TIPM CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read TIPM DTCs.

   Are there any TIPM CAN BUS DTCs present?

   Yes

   - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedures.

   No

   - Go to step 3

3. **POWERTRAIN CONTROL MODULE (PCM) or ENGINE CONTROL MODULE (ECM) DTCS ARE PRESENT**
   1. With the scan tool, read PCM or ECM DTCs.

Are there any PCM or ECM DTCs present?

Yes

- Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Diagnosis and Testing** for diesel engine applications or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** for gas engine applications and perform the appropriate diagnostic procedure.

No

- Using the schematics as a guide, check the Anti-Lock Brake Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0402-IMPLAUSIBLE DATA RECEIVED FROM TCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on, one valid CAN message received at least once, and no U0002-CAN C Bus Off Performance DTC present.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Transmission Control Module (TCM).

Possible Causes
TIPM CAN BUS DTCS
TRANSMISSION DTCS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK IF TIPM CAN BUS DTCS ARE PRESENT**
   1. With the scan tool, read TIPM DTCs.

      Are there any TIPM CAN BUS DTCs present?

      Yes

- Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

No

- Go to step 2

2. **CHECK IF TRANSMISSION DTCS ARE PRESENT**
   1. With the scan tool, read Transmission DTCs.

      Are there any Transmission DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Transmission Control (TCM) - Diagnosis and Testing** .

      No

      - Using the schematics as a guide, check the Anti-Lock Brake Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U0429-IMPLAUSIBLE DATA RECEIVED FROM SCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on, one valid CAN message received at least once, and no U0002-CAN C Bus Off Performance DTC present.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Clockspring (steering angle sensor or SAS) for approximately 200 mSec.

Possible Causes
CLOCKSPRING (SAS) ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK IF STEERING ANGLE SENSOR DTCS ARE PRESENT**
    1. With the scan tool, read Steering Angle Sensor DTCs.

       Are there any Steering Angle Sensor DTCs present?

       Yes

       - Perform the appropriate diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Diagnosis and Testing**.

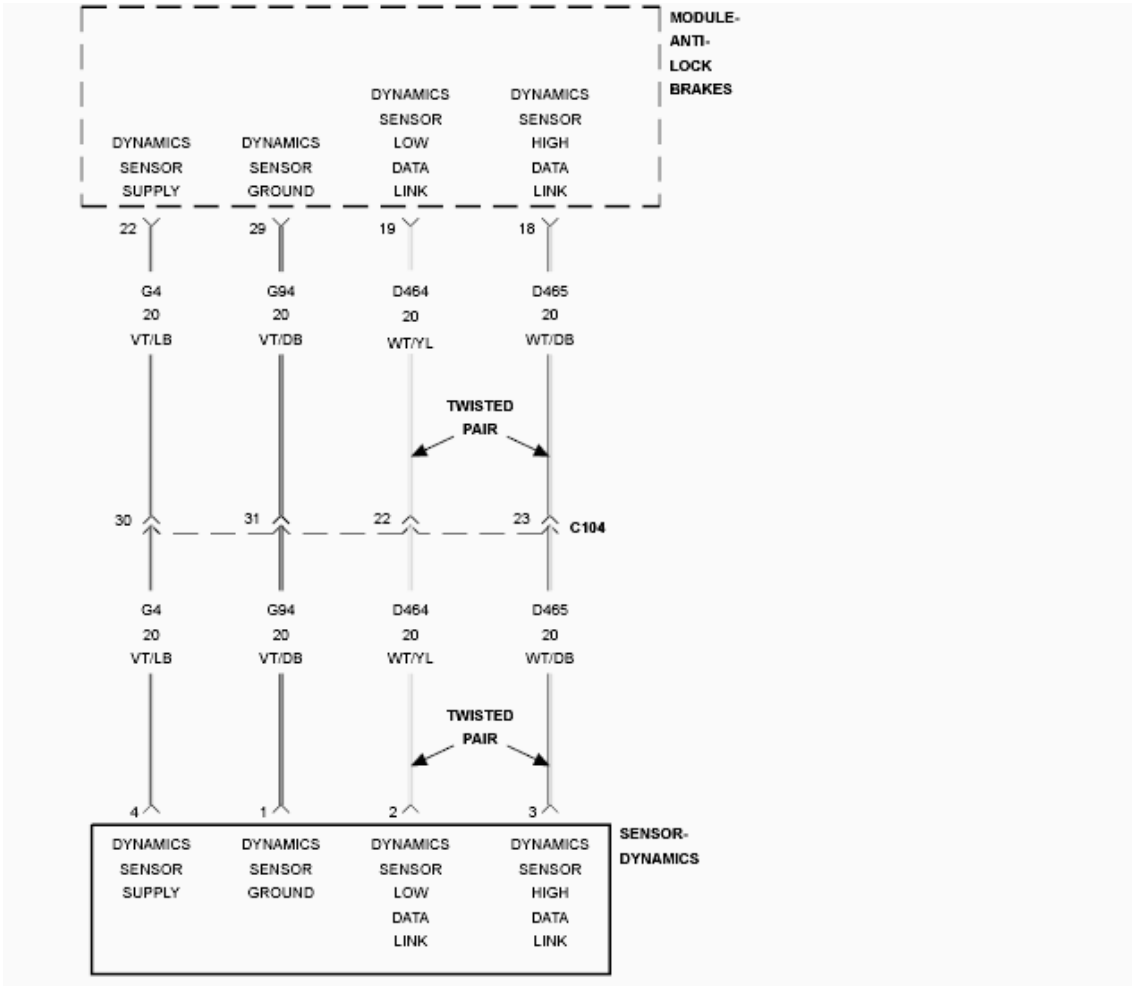
       No

       - Replace the Anti-Lock Brake Module in accordance with the Service Information.
       - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U1003-ESP CAN C BUS PERFORMANCE

2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey



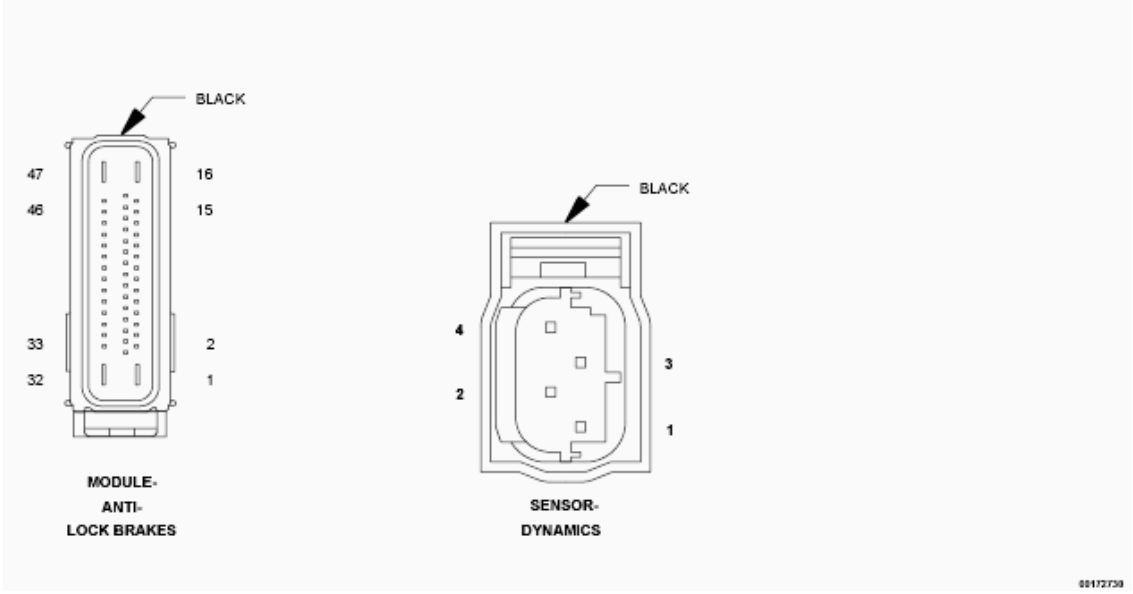


Fig. 100: Dynamics Sensor Data Link Voltage Low Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Anti-Lock Brake Module detects too many CAN Bus off events on the Dynamics Sensor Data Link circuits.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO GROUND, VOLTAGE, OR OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND, VOLTAGE, OR OPEN
DYNAMICS SENSOR
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK FOR A DTC U1003-ESP CAN C BUS PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   NOTE: If present, diagnose and repair DTC U0125-LOST COMMUNICATION WITH DYNAMICS SENSOR before diagnosing this DTC.

   1. Turn the ignition on.
   2. With the scan tool, read and record the DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase the DTCs.
   5. Start the engine.

      NOTE: Attempt to operate the vehicle under conditions similar to which the DTC was set. It may be necessary to test drive the vehicle within the DTC monitoring and set conditions in order for this DTC to set.

   6. With the scan tool, read and record the DTCs

Does the scan tool display: U1003-ESP CAN C BUS PERFORMANCE?

Yes

- Go to step 2

No

- Perform ABS INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**

NOTE: The Sensor Cluster is the same as the Dynamics sensor.

1. Check the Dynamics Sensor installation and torque of the mounting bolts.
2. Visually inspect the related wiring harness. Look for any bruised, chafed, pierced, or partially broken wires.
3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.

Were any problems found?

Yes

- Repair as necessary.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

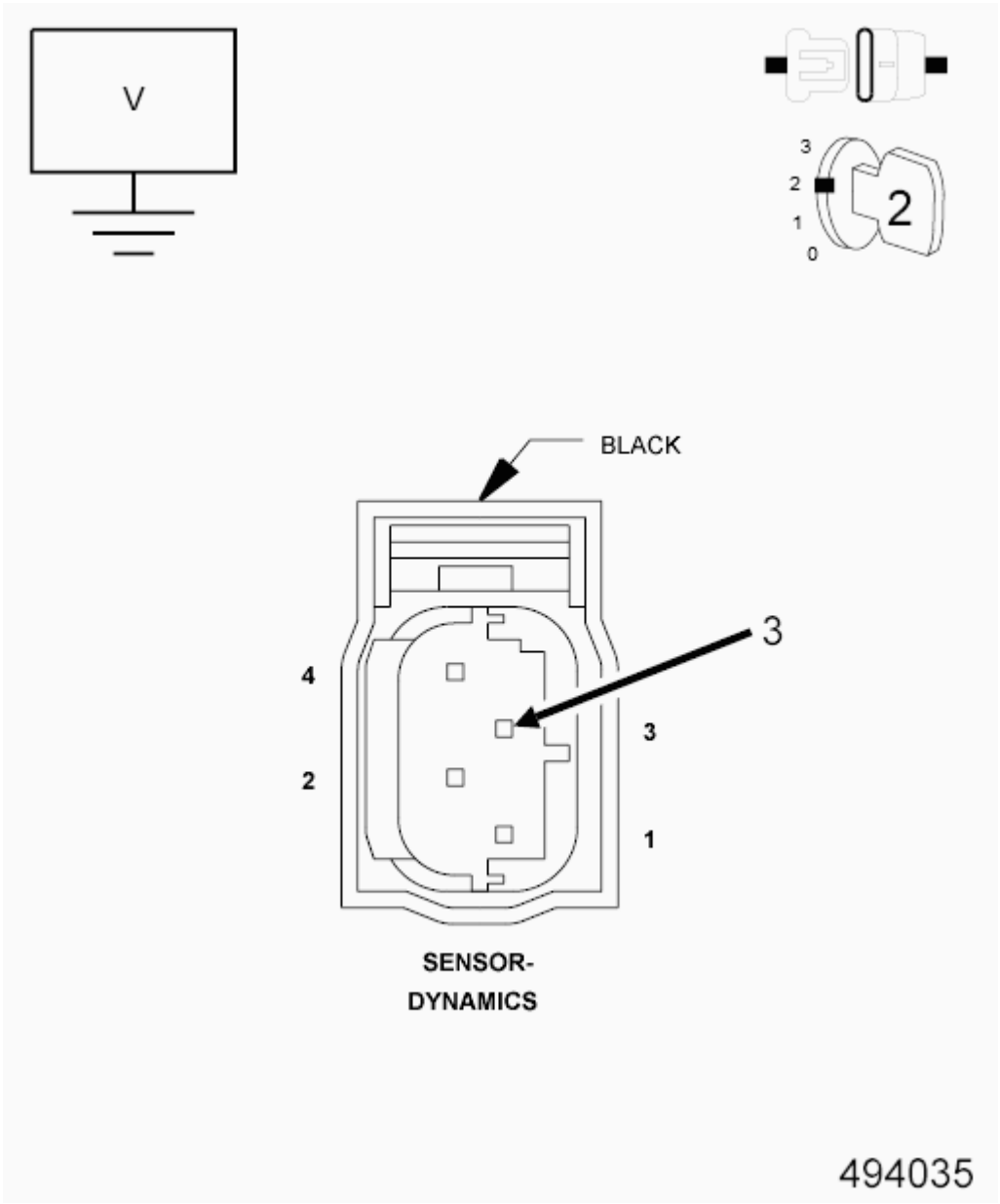


Fig. 101: Checking Dynamics Sensor High Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.
3. Disconnect the Dynamics Sensor harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D465) Dynamics Sensor High Data Link circuit.

   Is there any voltage present?

   Yes

- Repair the (D465) Dynamics Sensor High Data link circuit for a short to voltage.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO GROUND**

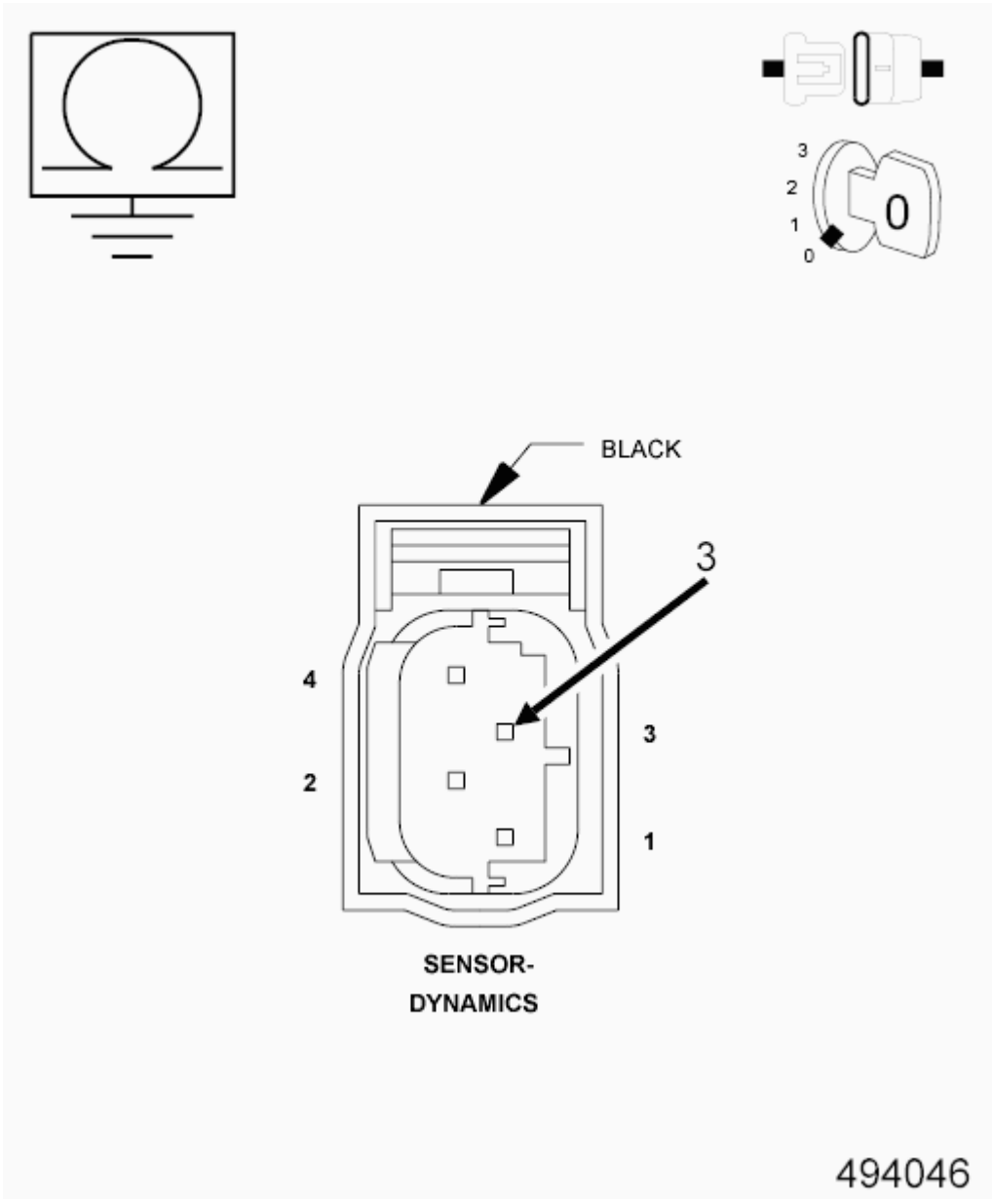


Fig. 102: Checking Dynamics Sensor High Data Link Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Anti-Lock Brake Module harness connector.
3. Disconnect the Dynamics Sensor harness connector.
4. Measure the resistance between ground and the (D465) Dynamics Sensor High Data Link circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (D465) Dynamics Sensor High Data link circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR AN OPEN**

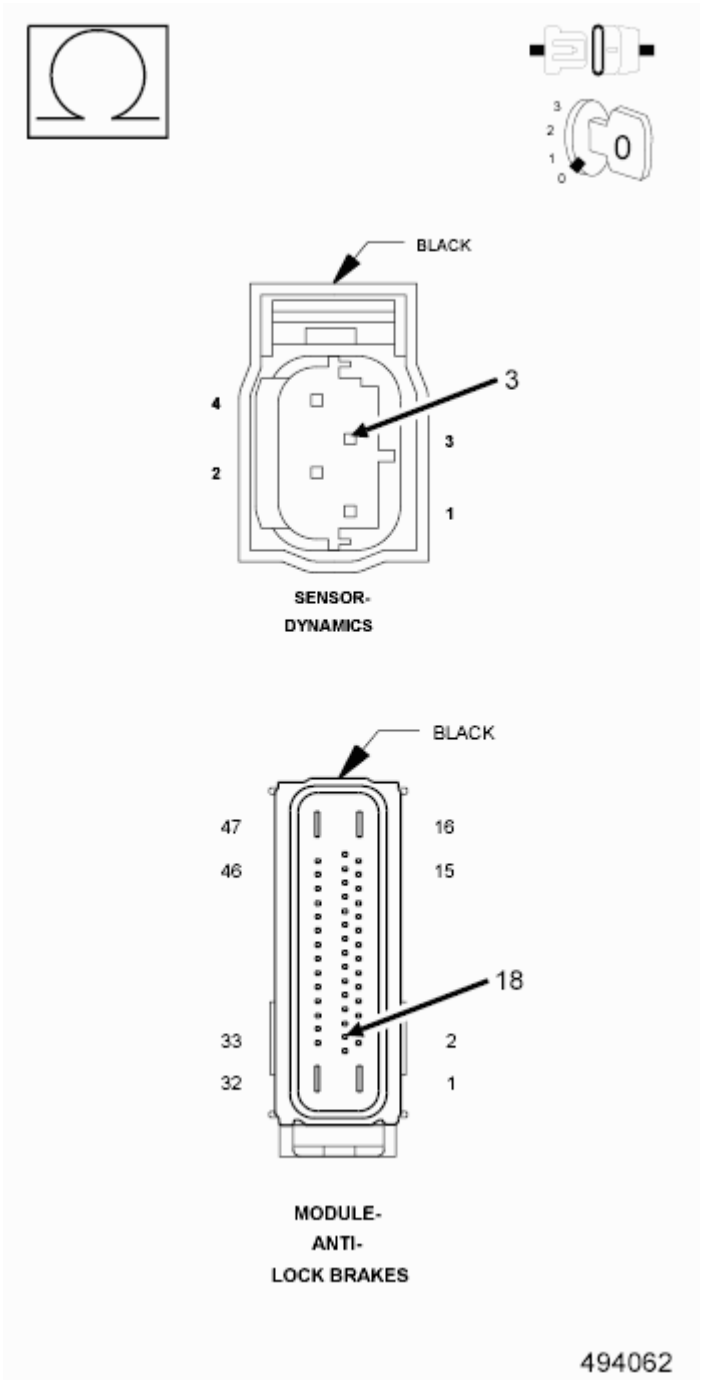


Fig. 103: Checking Dynamics Sensor High Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit.

   Is the resistance below 5.0 Ohms?

   Yes

- Go to step 6

No

- Repair the (D465) Dynamics Sensor High Data link circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

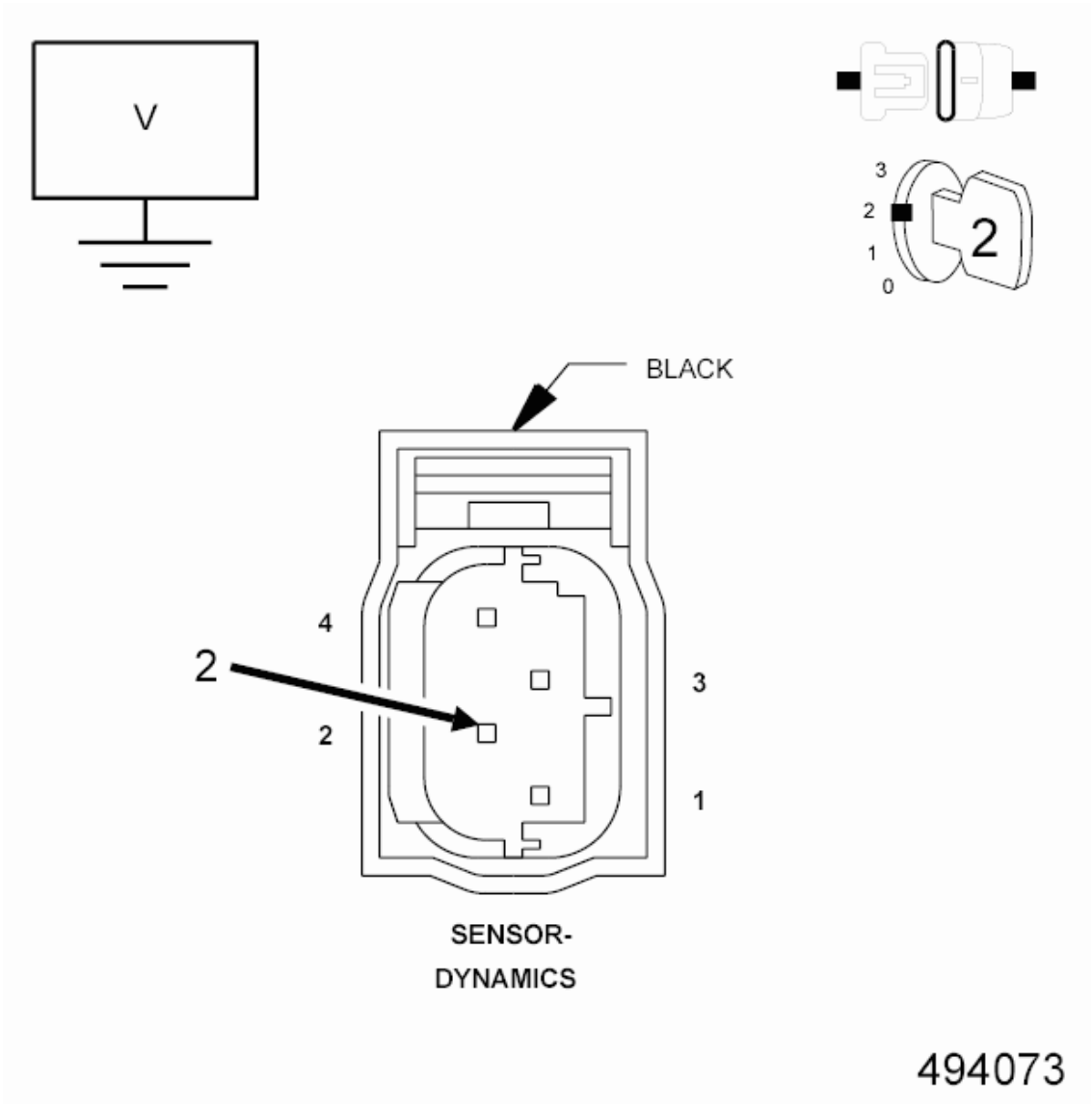


Fig. 104: Checking Dynamics Sensor Low Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.

2. Measure the voltage of the (D464) Dynamics Sensor Low Data Link circuit.

   Is there any voltage present?

   Yes

   - Repair the (D464) Dynamics Sensor Low Data link circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO GROUND**

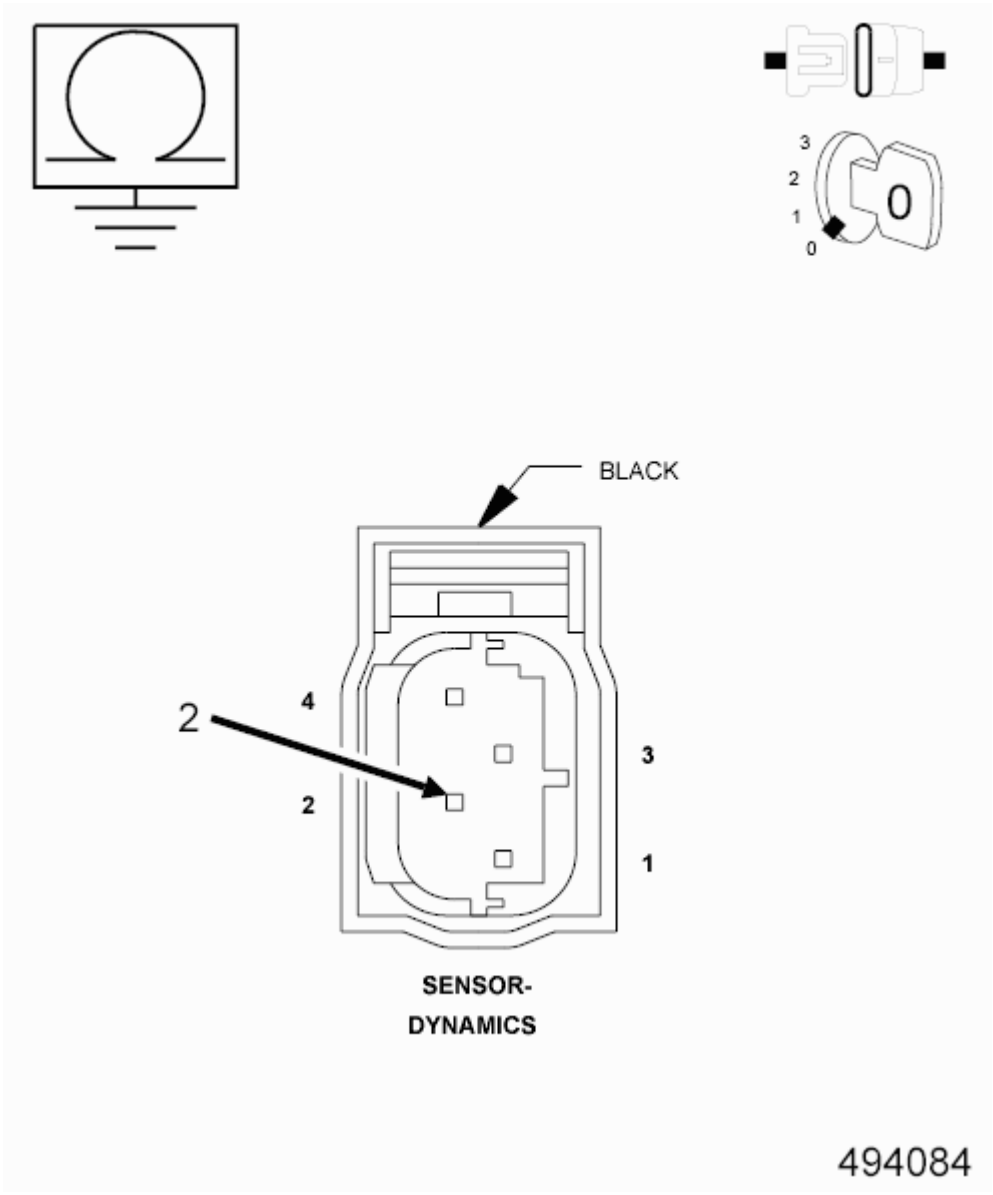


Fig. 105: Checking Dynamics Sensor Low Data Link Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (D464) Dynamics Sensor Low Data Link circuit.

   Is the resistance below 5.0 Ohms?

   Yes

   - Repair the (D464) Dynamics Sensor Low Data link circuit for a short to ground.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 8

8. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR AN OPEN**

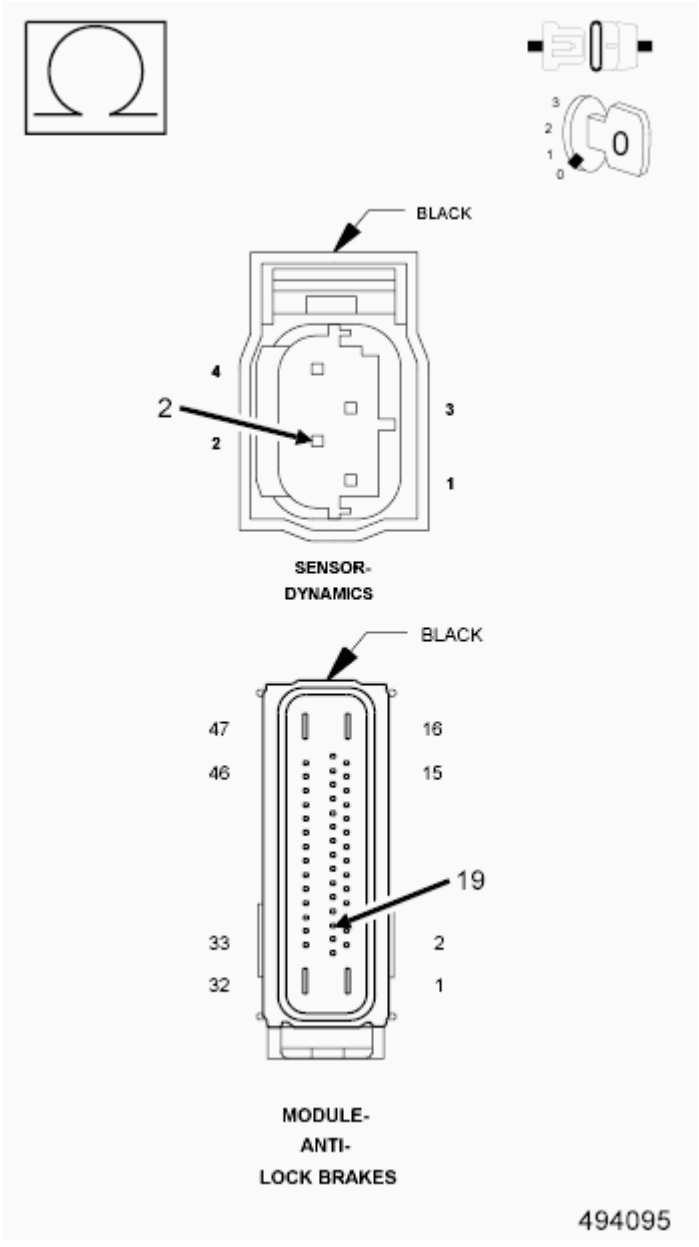


Fig. 106: Checking Dynamics Sensor Low Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D464) Dynamics Sensor Low Data link circuit.

   Is the resistance below 5.0 Ohms?

Yes

- Go to step 9

No

- Repair the (D464) Dynamics Sensor Low Data link circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

9. **REPLACE DYNAMICS SENSOR & VERIFY IF DTC IS STILL ACTIVE**
    1. Replace the Dynamics Sensor in accordance with the Service Information. Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**
    2. Test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 6 and 15 mph (10 and 25 km/h).
    3. Park the vehicle. With the scan tool, read ABS DTCs.

    Does this DTC reset?

    Yes

    - Replace the Anti-Lock Brake Module in accordance with the Service Information.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

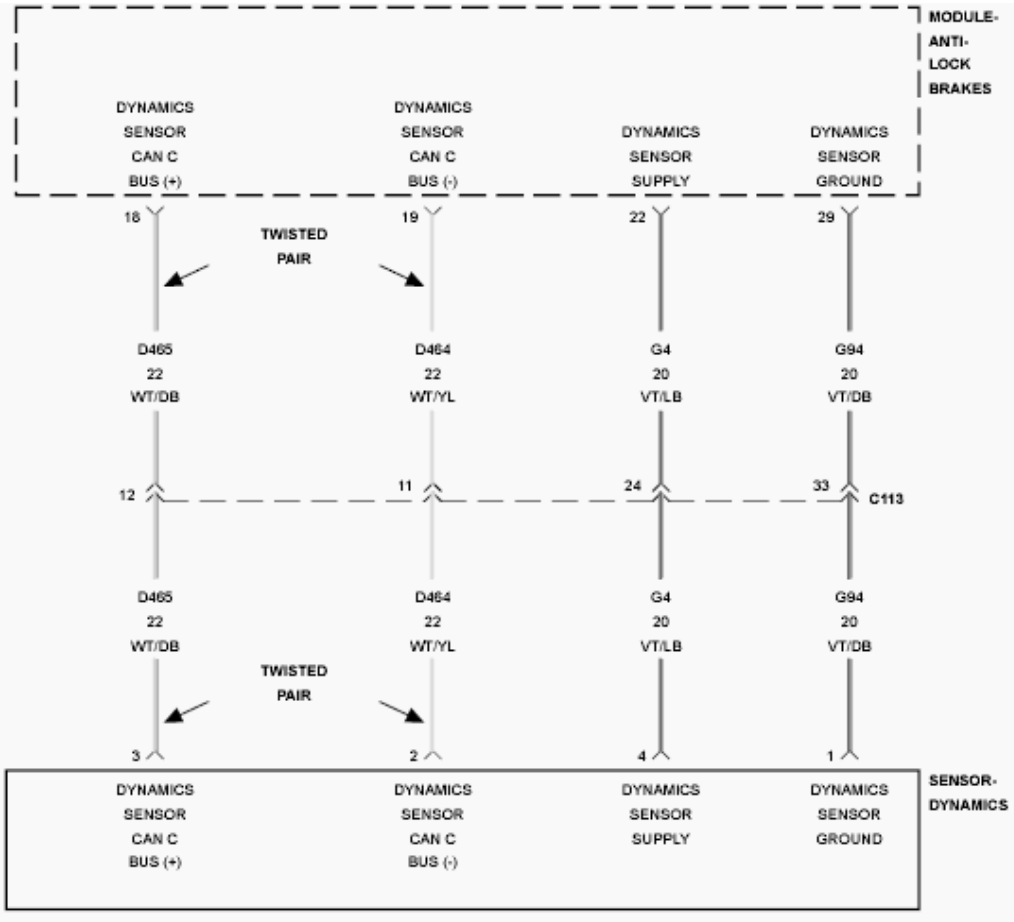
    No

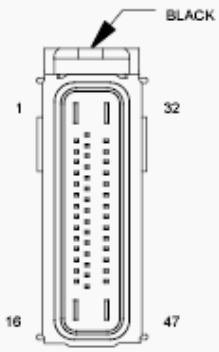
    - Test complete.

U1004-CAN C BUS TRANSMIT PERFORMANCE

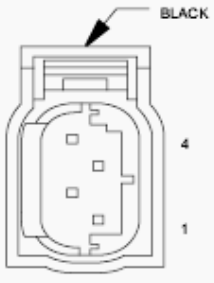
2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





MODULE-
ANTI-



SENSOR-
DYNAMICS

Fig. 107: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects invalid CAN message from the Dynamics Sensor.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORTED TO GROUND, VOLTAGE, OR OPEN
(D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT SHORTED TO GROUND, VOLTAGE, OR OPEN
DYNAMICS SENSOR

Diagnostic Test

1. **CHECK FOR A DTC U1004-CAN C BUS TRANSMIT PERFORMANCE**

   NOTE: This DTC must be active for the results of this test to be valid.

   1. Turn the ignition on.
   2. With the scan tool, read and record DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase DTCs.
   5. Cycle the ignition switch from off to on.
   6. With the scan tool, read and record DTCs

   Does the scan tool display: U1004-CAN C BUS TRANSMIT PERFORMANCE?

   Yes

   - Go to step 2

   No

   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based**

Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure.

2. **CHECK THE WIRING HARNESS, TERMINALS, AND CONNECTORS**
    1. Check the Dynamic Sensor installation and torque of the mounting bolts.
    2. Visually inspect the related wiring harness. Look for any bruised, chafed, pierced, or partially broken wires.
    3. Visually inspect the related wiring harness connectors. Look for broken, bent, pushed out, or corroded terminals.

    Were any problems found?

    Yes

    - Repair as necessary.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

    No

    - Go to step 3
3. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

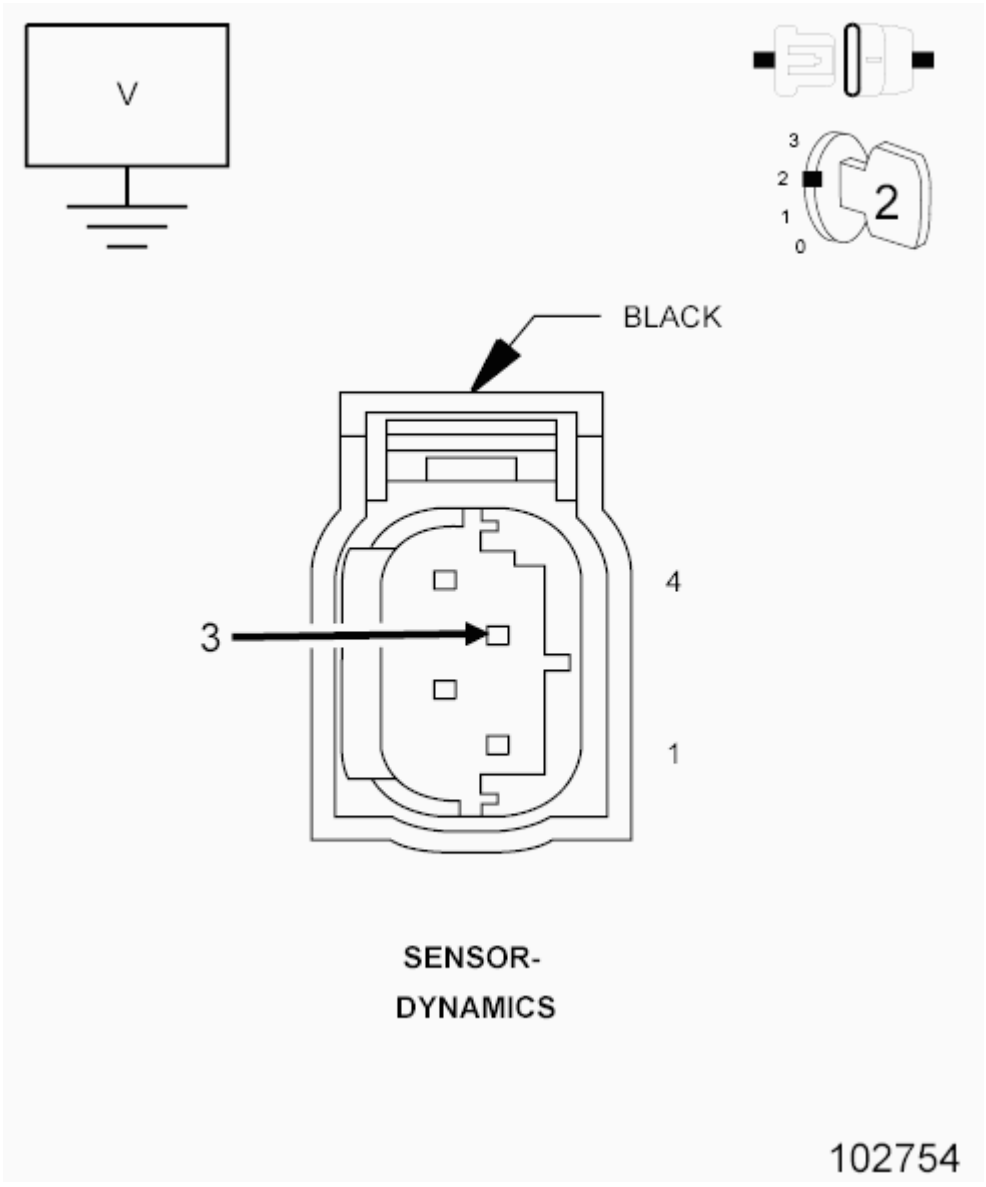


Fig. 108: Checking Dynamics Sensor High Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the Dynamics Sensor harness connector.
3. Disconnect the Anti-Lock Brake Module harness connector.
4. Turn the ignition on.
5. Measure the voltage of the (D465) Dynamics Sensor High Data Link circuit.

   Is there any voltage present?

   Yes

- Repair the (D465) Dynamics Sensor High Data Link circuit for a short to voltage.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 4

4. **(D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT SHORT TO GROUND**

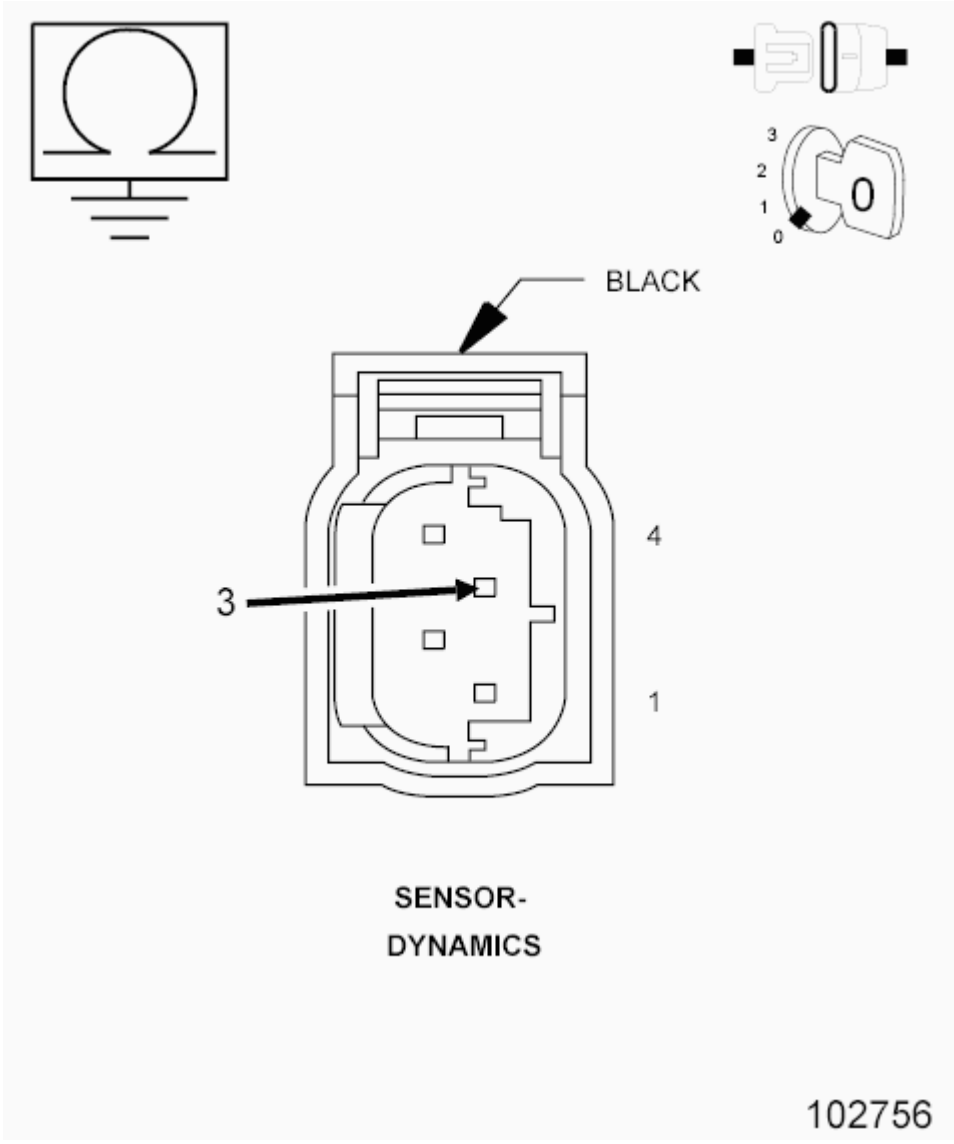


Fig. 109: Checking Dynamics Sensor High Data Link Circuit Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (D465) Dynamics Sensor High Data Link circuit.

Is the resistance below 5.0 ohms?

Yes

- Repair the (D465) Dynamics Sensor High Data Link circuit for a short to ground.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (D465) DYNAMICS SENSOR HIGH DATA LINK CIRCUIT FOR AN OPEN**

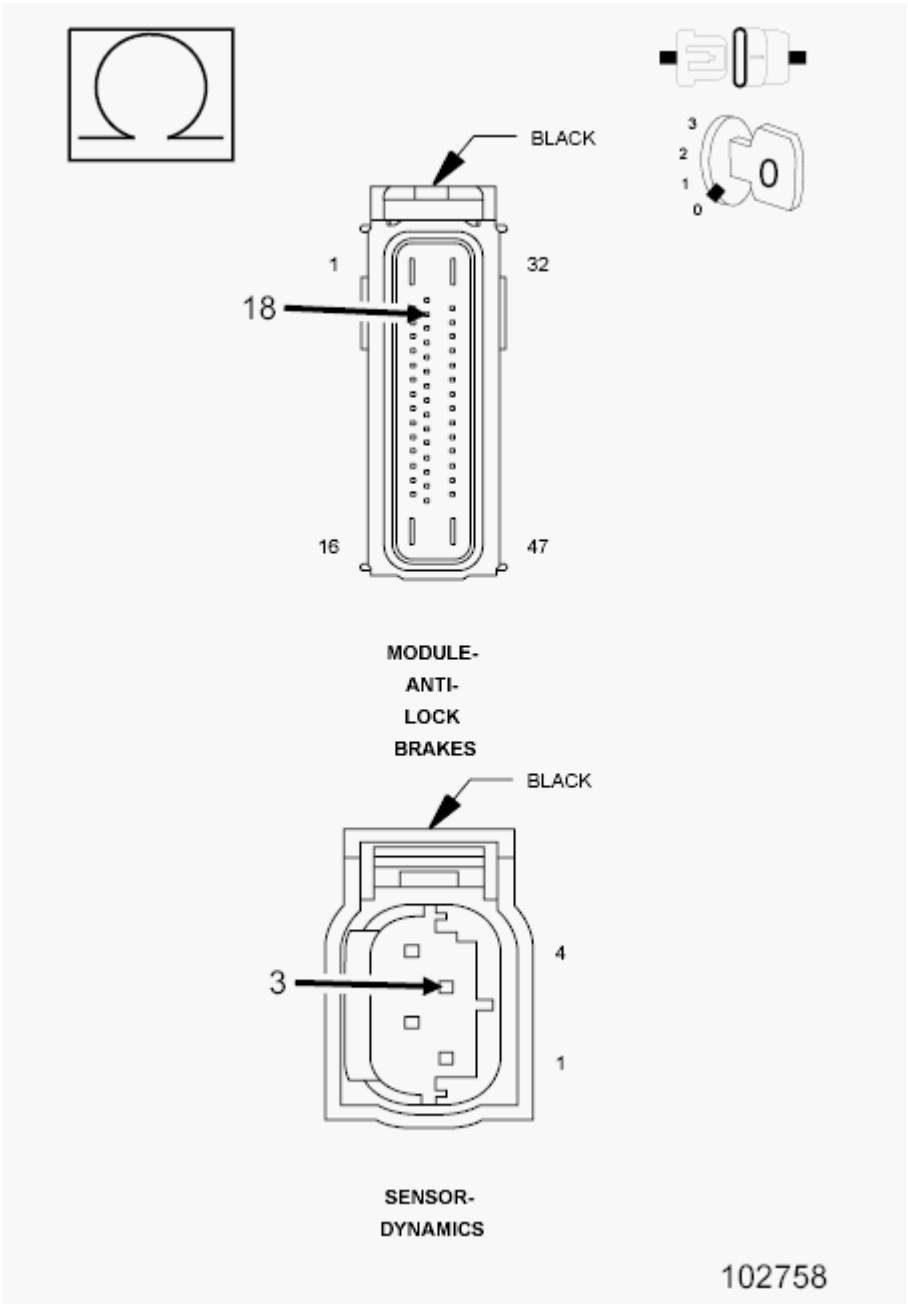


Fig. 110: Checking Dynamics Sensor High Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D465) Dynamics Sensor High Data Link circuit.

   Is the resistance below 5.0 ohms?

   Yes

   - Go to step 6

No

- Repair the (D465) Dynamics Sensor High Data Link circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

6. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO VOLTAGE**

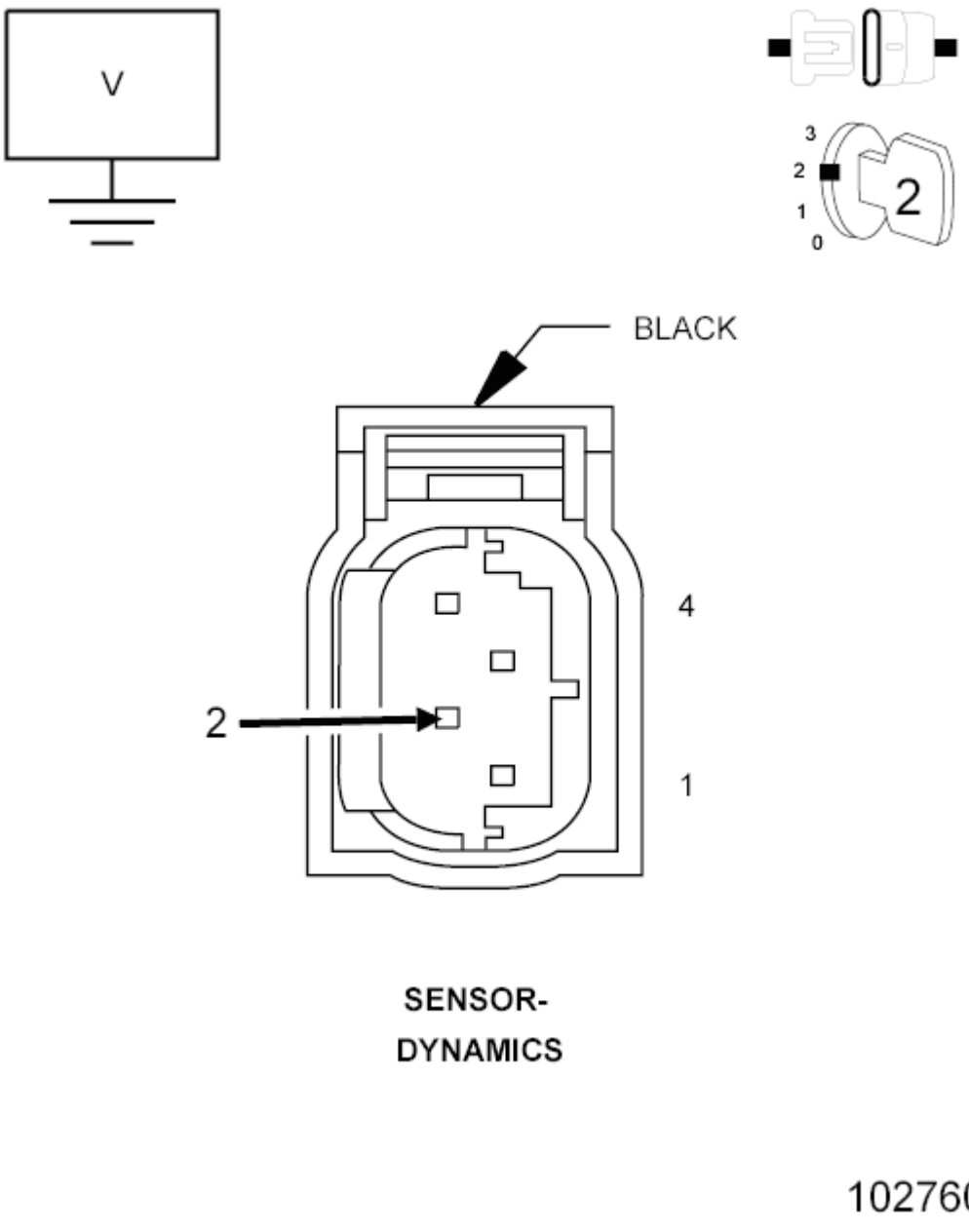


Fig. 111: Checking Dynamics Sensor Low Data Link Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition on.
2. Measure the voltage of the (D464) Dynamics Sensor Low Data Link circuit.

   Is there any voltage present?

   Yes

   - Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to voltage.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR A SHORT TO GROUND**

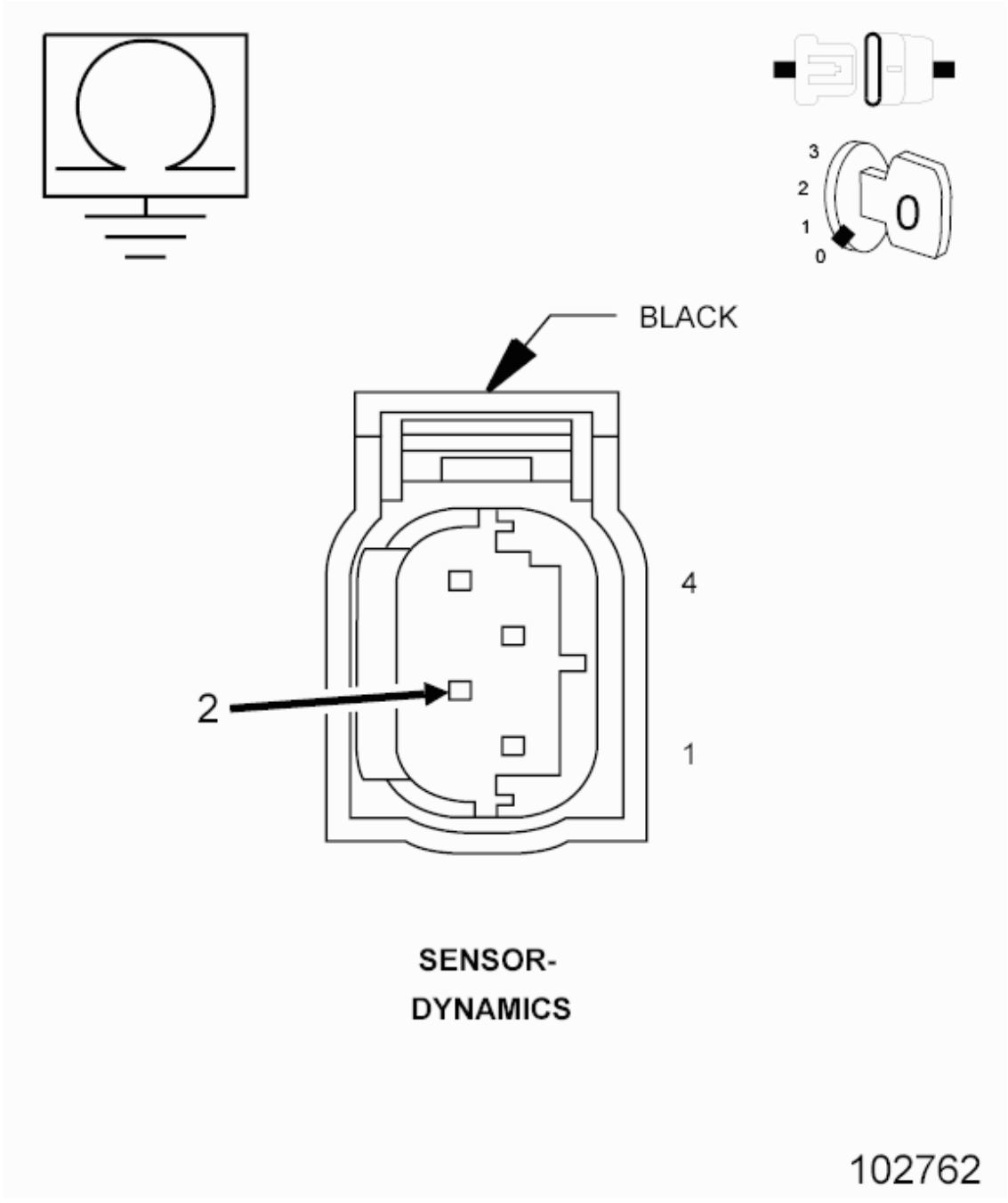


Fig. 112: Checking Dynamics Sensor Low Data Link Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Measure the resistance between ground and the (D464) Dynamics Sensor Low Data Link circuit.

   Is the resistance below 5.0 ohms?

   Yes

- Repair the (D464) Dynamics Sensor Low Data Link circuit for a short to ground.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

No

- Go to step 8

8. **CHECK THE (D464) DYNAMICS SENSOR LOW DATA LINK CIRCUIT FOR AN OPEN**

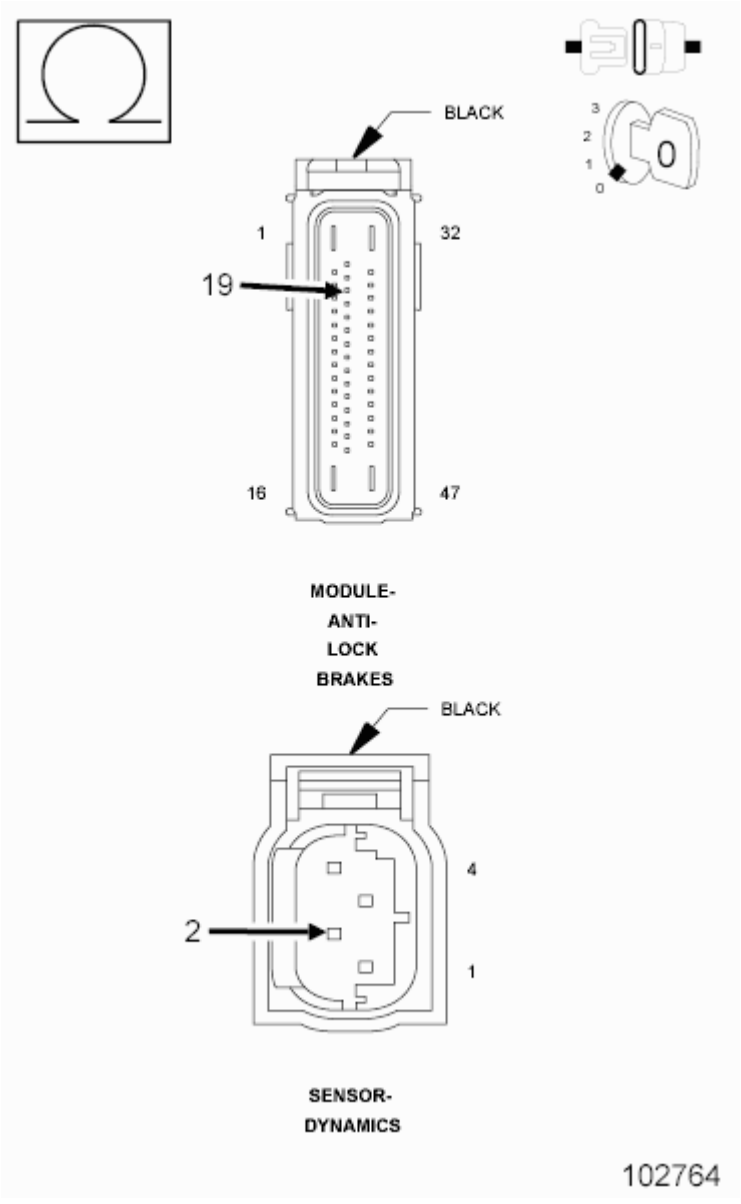


Fig. 113: Checking Dynamics Sensor Low Data Link Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (D464) Dynamics Sensor Low Data Link circuit.

Is the resistance below 5.0 ohms?

Yes

- Replace the Dynamics Sensor in accordance with the Service Information.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

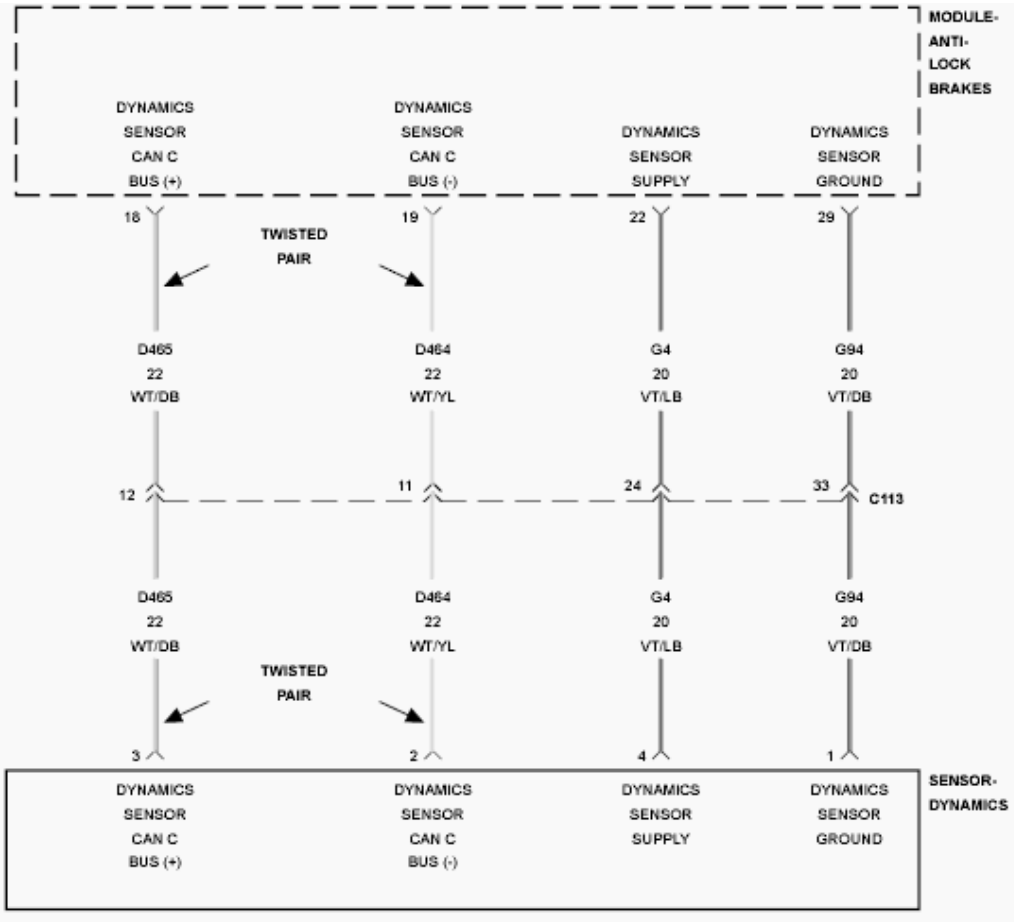
No

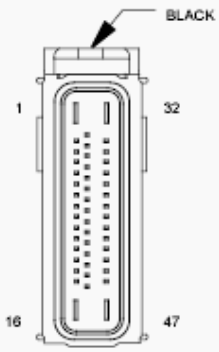
- Repair the (D464) Dynamics Sensor High Data Link circuit for an open.
- Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U1104-CAN C BUS CRC PERFORMANCE

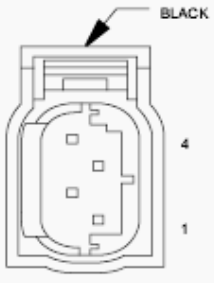
2009 Dodge Journey SE

2009 BRAKES ABS - Electrical Diagnostics - Journey





MODULE-
ANTI-



SENSOR-
DYNAMICS

Fig. 114: Dynamics Sensor Supply/Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Anti-Lock Brake Module detects an invalid CAN message from the Dynamics Sensor.

Possible Causes
DYNAMICS SENSOR

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**
   1. Turn the ignition on.
   2. With the scan tool, read and record ABS DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase ABS DTCs.
   5. Cycle the ignition switch.
   6. With the scan tool, read ABS DTCs.

   Does this DTC reset?

   Yes

   - Replace the Dynamics Sensor in accordance with the Service Information.
   - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

   No

   - The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
   - Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U140E-IMPLAUSIBLE VEHICLE CONFIGURATION DATA RECEIVED

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Once per ignition cycle, but not during cranking.

  Or, if low supply voltage faults are detected.

- **Set Condition:**

  If the Anti-Lock Brake Module either fails to receive vehicle configuration data from the Engine Control Module (ECM), Powertrain Control Module (PCM), Totally Integrated Power Module (TIPM), or the configuration data it receives from the ECM, PCM, and TIPM is invalid.

Possible Causes
WIRING HARNESS, TERMINAL, CONNECTOR DAMAGE
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
CAN C BUS CIRCUITS OPEN OR SHORTED
ECM OR PCM DTCs PRESENT
ECM OR PCM NOT PROGRAMMED OR PROGRAMMED WITH INCORRECT VIN
TIPM NOT PROGRAMMED OR PROGRAMMED WITH INCORRECT INFORMATION
ECM OR PCM
TOTALLY INTEGRATED POWER MODULE (TIPM)
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **VERIFY DTC IS ACTIVE**

   NOTE: This DTC must be active for the results of this test to be valid. If DTC C2206-VEHICLE CONFIGURATION MISMATCH is present it must be repaired before continuing.

   1. Turn the ignition on.
   2. With the scan tool, read and record ABS DTCs.
   3. With the scan tool, read and record Environmental Data to help identify the conditions in which the DTC was set.
   4. With the scan tool, erase ABS DTCs.
   5. Cycle the ignition switch.
   6. With the scan tool, read ABS DTCs.

   Does this DTC reset?

   Yes

- Go to step 2

No

- The condition that caused the symptom is currently not present. Inspect the related wiring for a possible intermittent condition. Look for any chafed, pierced, pinched, or partially broken wires.
- Perform the ABS-INTERMITTENT CONDITION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

2. **CHECK FOR ANY OF THE FOLLOWING ACTIVE DTCs**
   1. With the scan tool, read all active DTCs from all CAN C Bus modules.

      NOTE: Check for CAN C hardware electrical, VIN Missing/Mismatch, battery or ignition related DTCs.

      Does the scan tool display any active DTCs related to the conditions listed above?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 3

3. **VERIFY CORRECT TIPM CONFIGURATION**
   1. With the scan tool, verify that the TIPM part number is correct for the vehicle and programmed correctly by selecting TIPM from ECU view then Misc Functions and Restore Vehicle Configuration

      Is the correct TIPM installed in the vehicle?

      No

      - Replace and program the TIPM in accordance with the Service Information.
      - Perform the BODY VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Standard Procedure** .

      Yes

      - Go to step 4

4. **CHECK IF ECM OR PCM DTCs ARE PRESENT**
   1. With the scan tool, read ECM or PCM DTCs.

Are any DTCs present?

Yes

- Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Diagnosis and Testing** for diesel engine applications or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** for gas engine applications and perform the appropriate diagnostic procedure.

No

- Go to step 5

5. **VERIFY CORRECT ECM OR PCM IS INSTALLED IN THE VEHICLE**
   1. With the scan tool, verify that the ECM or PCM part number is correct for the vehicle.

   Is the correct ECM or PCM installed in the vehicle?

   No

   - Replace and program the ECM or PCM in accordance with the Service Information.
   - Perform appropriate VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   Yes

   - Go to step 6
6. **VERIFY ECM OR PCM IS PROGRAMMED WITH CORRECT VIN**
   1. With the scan tool, verify that the ECM or PCM is programmed with the correct VIN.

   Is the ECM or PCM programmed with the correct VIN?

   No

   - Using the scan tool, perform ECM/PCM Replaced to update the VIN in the ECM/PCM.
   - Perform appropriate VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

   Yes

   - Go to step 7
7. **CHECK FOR ADDITIONAL COMMUNICATION RELATED DTCs**
   1. With the scan tool, select Network View and select Advanced.

Is there more than one module with active DTCs Logged Against the ECM or PCM?

Yes

- Replace/update the ECM or PCM in accordance with the service information.
- Perform appropriate VERIFICATION TEST. Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Standard Procedure** or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Standard Procedure** .

No

- Using the schematics as a guide, check the Anti-Lock Brake Module pins, terminals, and connectors for corrosion, damage, and terminal push out. Pay particular attention to all Communication circuits. If no problems are found, replace the Anti-Lock Brake Module in accordance with the Service Information.
- Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U1501-IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM PCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Powertrain Control Module (PCM) Engine Control Module (ECM).

Possible Causes
TIPM CAN BUS DTCS
ENGINE DTCS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK IF TIPM CAN BUS DTCs ARE PRESENT**
   1. With the scan tool, read TIPM DTCs.

      Are there any TIPM CAN BUS DTCs present?

      Yes

- Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 2

2. **POWERTRAIN CONTROL MODULE (PCM) or ENGINE CONTROL MODULE (ECM) DTCS ARE PRESENT**
   1. With the scan tool, read PCM or ECM DTCs.

      Are there any PCM or ECM DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Engine Control (ECM) - Diagnosis and Testing** for diesel engine applications or **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** for gas engine applications and perform the appropriate diagnostic procedure.

      No

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform the ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U1502-IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TCM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Transmission Control Module (TCM).

Possible Causes
TIPM CAN BUS DTCS
TRANSMISSION DTCS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK IF TIPM CAN BUS DTCS ARE PRESENT**
    1. With the scan tool, read TIPM DTCs.

       Are there any TIPM CAN BUS DTCs present?

       Yes

       - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

       No

       - Go to step 2
2. **CHECK IF TRANSMISSION DTCS ARE PRESENT**
    1. With the scan tool, read Transmission DTCs.

       Are there any Transmission DTCs present?

       Yes

       - Refer to **DTC-Based Diagnostics/MODULE, Transmission Control (TCM) - Diagnosis and Testing** .

       No

       - Using the schematics as a guide, check the Anti-Lock Brake Module pins, terminals, and connectors for corrosion, damage, or terminal push out. Pay particular attention to all power and ground circuits. If no problems are found, replace the Anti-Lock Brake Module in accordance with the Service Information.
       - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

U1503-IMPLAUSIBLE MESSAGE DATA LENGTH RECEIVED FROM TIPM

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  When the Anti-Lock Brake Module detects an incorrect CAN message from the Totally Integrated Power Module (TIPM).

Possible Causes
TIPM CAN BUS DTCS
ANTI-LOCK BRAKE MODULE

Diagnostic Test

1. **CHECK IF TIPM CAN BUS DTCs ARE PRESENT**
   1. With the scan tool, read TIPM DTCs.

      Are there any TIPM CAN BUS DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** .

      No

      - Replace the Anti-Lock Brake Module in accordance with the Service Information.
      - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

STANDARD PROCEDURE

ABS INTERMITTENT CONDITION TEST

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Diagnostic Test

1. **PERFORM ABS INTERMITTENT CONDITION TEST**

   NOTE: If the conditions that set the DTC are not present at this time, the following list may help in identifying an intermittent condition.

   WARNING: When the engine is operating, do not stand in direct line with the fan. Do not put your hands near the pulleys, belts or fan. Do not wear loose clothing. Failure to follow these instructions may result in possible serious or fatal injury.

   1. Refer to any Technical Service Bulletins (TSBs) that may apply.
   2. Review the scan tool Environmental Data information. If possible, try to duplicate the conditions under which the DTC set.
   3. Turn the ignition off.

4. Visually inspect the related wire harness. Disconnect all the related harness connectors. Look for any chafed, pierced, pinched, partially broken wires and broken, bent, pushed out, or corroded terminals.
5. Wiggle the wires while checking for shorts and open circuits.
6. Perform a voltage drop test on the related circuits between the suspected faulty component and the Anti-Lock Brake Module.
7. Inspect and clean all PCM, ABS, engine, and chassis grounds that are related to the most current DTC.
8. If numerous trouble codes were set, use a wire schematic and look for any common ground or supply circuits
9. For any Relay DTCs, actuate the Relay with the scan tool and wiggle the related wire harness to try to interrupt the actuation.
10. Use the scan tool to perform a System Test if one applies to the failing component.
11. A co-pilot, data recorder, and/or lab scope should be used to help diagnose intermittent conditions.

    Were any problems found during the above inspections?

    Yes

    - Perform the necessary repairs.
    - Perform ABS VERIFICATION TEST. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Standard Procedure**.

    No

    - Test Complete.

ABS VERIFICATION TEST

Diagnostic Test

1. **Perform ABS Verification Test**

   WARNING: Ensure braking capability is available before road testing.

   NOTE: If the ABM (Anti-Lock Brake Module), SAS (Steering Angle Sensor), Dynamics Sensor was replaced, or if any mounting problems with SAS or Dynamics Sensor, ABM must be initialized using the scan tool. If not initialized, the ABS indicator will flash continuously with no DTCs. To initialize the ABM and clear offsets have wheels pointing straight ahead and follow the directions on the scan tool. The drive test requires a 90? turn. If the Dynamics Sensor was replaced, test drive the vehicle by turning the vehicle left or right in a curving manner at a velocity between 6

and 15 mph (10 and 25 km/h).

1. Turn the ignition off.
2. Connect all previously disconnected components and connectors.
3. Ensure all accessories are turned off and the battery is fully charged.
4. Ensure that the ignition is on, with the scan tool, erase all Diagnostic Trouble Codes from All modules. Start the engine and allow it to run for two minutes and fully operate the system that was malfunctioning.
5. Turn the ignition off and wait five seconds. Turn the ignition on and using the scan tool, read DTCs from all modules.
6. If any Diagnostic Trouble Codes are present, return to DTC list and perform the appropriate diagnostic procedure.

NOTE: For Sensor Signal and Pump Motor faults, the ABM must sense all 4 wheels at 7.5 mph (12 km/h) before it will extinguish the ABS indicator.

7. If there are no DTCs present after turning ignition on, road test the vehicle for at least five minutes. Perform several anti-lock braking stops.
8. Again, with the scan tool read DTCs. If any DTCs are present, refer to **DIAGNOSTIC CODE INDEX** for the diagnostic test procedure and perform the appropriate diagnostic procedure.
9. If there are no Diagnostic Trouble Codes (DTCs) present, and the customer's concern can no longer be duplicated, the repair is complete.

Are any DTCs present or is the original concern still present?

Yes

- Repair is not complete, perform the appropriate diagnostic procedure. See **DTC-Based Diagnostics/MODULE, Antilock Brake (ABS) - Diagnosis and Testing**.

No

- Repair is complete.

2009 ACCESSORIES AND EQUIPMENT

Body - Journey

DESCRIPTION

VEHICLE IDENTIFICATION

Throughout this part, references to the Chrysler Corporation vehicle family identification code are used when describing a procedure that is unique to that vehicle. Refer to **Vehicle Data/Vehicle Information/Vehicle Identification Number - Description** . If a procedure is common to all vehicles covered in this article, no reference will be made to a vehicle family code.

WARNING

WARNINGS

WARNINGS

Disconnect the battery negative cable when servicing electrical components that are live when the ignition is OFF.

Wait two minutes for the airbag system reserve capacitor to discharge before beginning any airbag system or component service. Failure to do so may result in accidental airbag deployment, or potentially serious or fatal injury.

Use an OSHA approved breathing filter when spraying paint or solvents in a confined area. Serious or fatal injury can result.

Avoid prolonged skin contact with petroleum or alcohol-based cleaning solvents. Serious or fatal injury can result.

Do not stand under a hoisted vehicle that is not properly supported on safety stands. Serious or fatal injury can result.

Do not weld exterior panels unless combustible material on the interior of vehicle is removed from the repair area. Serious or fatal injury can result.

SAFETY PRECAUTIONS

Disconnect the battery negative cable from servicing electrical components that are live when the ignition is OFF.

When holes must be drilled or punched in an inner body panel, verify depth of space to the outer body panel, electrical wiring, or other components.

Do not weld exterior panels unless combustible material on the interior of vehicle is removed from the

repair area.

Always have a fire extinguisher ready for use when welding.

Do not use harsh alkaline-based cleaning solvents on painted or upholstered surfaces.

DIAGNOSIS AND TESTING

WATER LEAKS

Water leaks can be caused by poor sealing, improper body component alignment, body seam porosity, missing plugs, or blocked drain holes. Centrifugal and gravitational force can cause water to drip from a location away from the actual leak point, making leak detection difficult. All body sealing points should be water tight in normal wet-driving conditions. Water flowing downward from the front of the vehicle should not enter the passenger or luggage compartment. Moving sealing surfaces will not always seal water tight under all conditions. At times, side glass or door seals will allow water to enter the passenger compartment during high pressure washing or hard driving rain (severe) conditions. Overcompensating on door or glass adjustments to stop a water leak that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After completing a repair, water test vehicle to verify leak has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE WATER LEAK TESTS

Verify that floor and body plugs are in place, body drains are clear, and body components are properly aligned and sealed. If component alignment or sealing is necessary, refer to the appropriate part for proper procedures.

WATER LEAK TESTS

> **WARNING: Do not use electric shop lights or tools in water test area. Serious or fatal injury can result.**

When the conditions causing a water leak have been determined, simulate the conditions as closely as possible.

- If a leak occurs with the vehicle parked in a steady light rain, flood the leak area with an open-ended garden hose.
- If a leak occurs while driving at highway speeds in a steady rain, test the leak area with a reasonable velocity stream or fan spray of water. Direct the spray in a direction comparable to actual conditions.
- If a leak occurs when the vehicle is parked on an incline, hoist the end or side of the vehicle to simulate this condition. This method can be used when the leak occurs when the vehicle accelerates, stops or turns. If the leak occurs on acceleration, hoist the front of the vehicle. If the leak occurs when braking, hoist the back of the vehicle. If the leak occurs on left turns, hoist the left side of the vehicle. If the leak occurs on right turns, hoist the right side of the vehicle. For hoisting recommendations. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

WATER LEAK DETECTION

To detect a water leak point-of-entry, do a water test and watch for water tracks or droplets forming on the inside of the vehicle. If necessary, remove interior trim covers or panels to gain visual access to the leak area. If the hose cannot be positioned without being held, have someone help do the water test.

Some water leaks must be tested for a considerable length of time to become apparent. When a leak appears, find the highest point of the water track or drop. The highest point usually will show the point of entry. After leak point has been found, repair the leak and water test to verify that the leak has stopped.

Locating the entry point of water that is leaking into a cavity between panels can be difficult. The trapped water may splash or run from the cavity, often at a distance from the entry point. Most water leaks of this type become apparent after accelerating, stopping, turning, or when on an incline.

MIRROR INSPECTION METHOD

When a leak point area is visually obstructed, use a suitable mirror to gain visual access. A mirror can also be used to deflect light to a limited-access area to assist in locating a leak point.

BRIGHT LIGHT LEAK TEST METHOD

Some water leaks in the luggage compartment can be detected without water testing. Position the vehicle in a brightly lit area. From inside the darkened luggage compartment inspect around seals and body seams. If necessary, have a helper direct a drop light over the suspected leak areas around the luggage compartment. If light is visible through a normally sealed location, water could enter through the opening.

PRESSURIZED LEAK TEST METHOD

When a water leak into the passenger compartment cannot be detected by water testing, pressurize the passenger compartment and soap test exterior of the vehicle. To pressurize the passenger compartment, close all doors and windows, start engine, and set heater control to high blower in HEAT position. If engine can not be started, connect a charger to the battery to ensure adequate voltage to the blower. With interior pressurized, apply dish detergent solution to suspected leak area on the exterior of the vehicle. Apply detergent solution with spray device or soft bristle brush. If soap bubbles occur at a body seam, joint, seal or gasket, the leak entry point could be at that location.

WIND NOISE

Wind noise is the result of most air leaks. Air leaks can be caused by poor sealing, improper body component alignment, body seam porosity, or missing plugs in the engine compartment or door hinge pillar areas. All body sealing points should be airtight in normal driving conditions. Moving sealing surfaces will not always seal airtight under all conditions. At times, side glass or door seals will allow wind noise to be noticed in the passenger compartment during high cross winds. Over compensating door or glass adjustments to stop wind noise that occurs under severe conditions can cause premature seal wear and excessive closing or latching effort. After a repair procedure has been performed, test vehicle to verify noise has stopped before returning vehicle to use.

VISUAL INSPECTION BEFORE TESTS

Verify that floor and body plugs are in place and body components are aligned and sealed. If component

alignment or sealing is necessary, refer to the appropriate part for proper procedures.

ROAD TESTING WIND NOISE

1. Drive the vehicle to verify the general location of the wind noise.
2. Apply 50 mm (2 in.) masking tape in 150 mm (6 in.) lengths along weatherstrips, weld seams or moldings. After each length is applied, drive the vehicle. If noise goes away after a piece of tape is applied, remove tape, locate, and repair defect.

POSSIBLE CAUSE OF WIND NOISE

- Moldings standing away from body surface can catch wind and whistle.
- Gaps in sealed areas behind overhanging body flanges can cause wind-rushing sounds.
- Misaligned movable components.
- Missing or improperly installed plugs in pillars.
- Weld burn through holes.

STANDARD PROCEDURE

BODY LUBRICATION

Lubrication Requirements

Locks and all body pivot points, including such items as seat tracks, door hinge pivot points and rollers , liftgate, tailgate, sliding doors and hood hinges, should be lubricated periodically with a lithium based grease such as Mopar ® Spray White Lube to ensure quiet, easy operation and to protect against rust and wear. Prior to the application of any lubricant, wipe the parts clean, to remove dust and grit. After lubricating, excess oil and grease should be removed. Particular attention should also be given to hood latching components to make sure they function properly. When performing other underhood services, clean and lubricate the hood latch release mechanism and safety catch.

The external lock cylinders should be lubricated twice a year, preferably in the fall and spring. Apply a small amount of a high quality lubricant such as Mopar ® Lock Cylinder Lubricant directly into the lock cylinder.

Lubricant Application

Door Lock Cylinders

1. Apply a small amount of lubricant directly into the lock cylinder.
2. Apply a small amount of lubricant to the key.
3. Insert key into lock cylinder and cycle the mechanism from the locked to the unlocked position.

NOTE: Do not add more lubricant.

4. Cycle the lock cylinder mechanism several times to allow the lubricant to flow throughout the cylinder.

5. Wipe all lubricant from exterior of lock cylinder and key.

All Other Body Mechanisms

1. Clean component as described above.
2. Apply specified lubricant to all pivoting and sliding contact areas of component.

Lubricant Usage

Engine Oil

- door hinges - hinge pin and pivot contact areas
- hood hinges - pivot points
- liftgate hinges

Mopar ® Spray White Lube or Equivalent

- door check straps
- liftgate latches
- liftgate prop pivots
- ash receiver
- fuel filler door remote control latch mechanism
- parking brake mechanism
- sliding seat tracks
- liftgate latch

Mopar ® Multipurpose Grease or Equivalent

- all other hood mechanisms

Mopar ® Lock Cylinder Lubricant or Equivalent

- door lock cylinders
- liftgate lock cylinder

BUZZ, SQUEAKS AND RATTLES

Buzz, Squeaks and Rattles (BSR's) may be caused by any one or more of the following and may be corrected as indicated:

- Loose fasteners should be tightened to specifications.
- Damaged or missing clips should be replaced.
- Damaged trim panels should be replaced.

- Incorrectly installed trim panels should be reinstalled properly.

Many BSR complaints such as loose trim, can be serviced using various tapes or lubricants. Tapes including foam, flock and anti-squeak, can be used to eliminate noises caused by metal, plastic and vinyl components. Long life lubricants and greases can also be used on a variety of components. Refer to the **BUZZ, SQUEAKS AND RATTLES** table for materials and usage.

BUZZ, SQUEAKS AND RATTLES

ITEM	FEATURES	APPLICATIONS	SERVICE TEMP
ITCH AND SQUEAK TAPE	An abrasion resistant material thin enough to conform to most irregular surfaces. Stops most itches and squeaks.	Between metal and metal, metal and plastic, metal and vinyl, vinyl and plastic. Interior. Examples: Trim panels and bezels.	-40° to 107° C (-40° to 225° F)
BLACK NYLON FLOCK	Nylon Flock with an aggressive acrylic adhesive. Provides for cushioning and compression fit, also isolates components. Water-resistant.	Between metal and metal, metal and plastic, vinyl and plastic. Examples: Pull cups, bezels, clips, ducts, top cover to glass, cowl panel.	-40° to 82° C (-40° to 180° F)
HIGH DENSITY URETHANE FOAM	Tear resistant, highly resilient and durable.	Between metal and metal, metal and plastic. Water-resistant. Examples: I/P, heavy metal rattles, isolating brackets.	-40° to 82° C (-40° to 180° F)
OPEN CELL FOAM TAPE	Soft foam conforms to irregular surfaces.	Wire harness and connector wrap. Examples: Seals, gasket, wiring, heat ducts.	-40° to 82° C (-40° to 180° F)
CLOSED CELL LOW DENSITY FOAM TAPE	Soft, conformable. Water-resistant.	Wherever bulk is needed. Prevents closing flutters and rattles when applied to door watershield. Examples: Door, I/P.	-40° to 82° C (-40° to 180° F)
NYE® GREASE 880	Long life.	Suspensions. Examples: Strut bushings, sway bars.	-40° to 200° C (-40° to 390° F)
KRYTOX® OIL	Long life. Will not dry out or harm plastics or rubber.	When access is not possible, oil will migrate to condition. Vinyl, rubber, plastic, metal. Examples: Convertible top bushings, pull cups trim panel inserts.	-34° to 205° C (-30° to 400° F)
KRYTOX® GREASE	Long life. Will not dry out or harm plastics or rubber.	Vinyl, rubber, plastic, metal, glass.	-34° to 205° C (-30° to 400° F)

		Examples: Weatherstrips, backlight and windshield moldings.	

PLASTIC BODY PANEL REPAIR

There are many different types of plastics used in today's automotive environment. We group plastics in three different categories: Rigid, Semi-Rigid, and Flexible. Any of these plastics may require the use of an adhesion promoter for repair. These types of plastic are used extensively on Chrysler Motors vehicles. Always follow repair material manufacturer's plastic identification and repair procedures.

Rigid Plastics:

Examples of rigid plastic use: Fascias, Hoods, Doors, and other Body Panels, which include SMC, ABS, and Polycarbonates.

Semi-Rigid Plastics:

Examples of semi-rigid plastic use: Interior Panels, Under Hood Panels, and other Body Trim Panels.

Flexible Plastics:

Examples of flexible plastic use: Fascias, Body Moldings, and upper and lower Fascia Covers.

Repair Procedure:

The repair procedure for all three categories of plastics is basically the same. The one difference is the material used for the repair. The materials must be specific for each substrate, rigid repair material for rigid plastic repair, semi-rigid repair material for semi-rigid plastic repair and flexible repair material for flexible plastic repair.

Adhesion Promoter/Surface Modifier:

Adhesion Promoters/Surface Modifiers are required for certain plastics. All three categories may have plastics that require the use of adhesion promoter/surface modifiers. Always follow repair material manufacturer's plastic identification and repair procedures.

SAFETY PRECAUTION AND WARNINGS

WARNING:

- **Eye protection should be used when servicing components. Personal injury can result.**
- **Use an OSHA approved breathing mask when mixing epoxy, grinding, and spraying paint or solvents in a confined area. Personal injury can result.**
- **Avoid prolonged skin contact with resin, petroleum, or alcohol based solvents. Personal injury can result.**

- **Do not venture under a hoisted vehicle that is not properly supported on safety stands. Personal injury can result.**

NOTE:

- **When holes must be drilled or cut in body panels, verify locations of internal body components and electrical wiring. Damage to vehicle can result.**
- **Do not use abrasive chemicals or compounds on undamaged painted surfaces around repair areas. Damage to finish can result.**

RIGID, SEMI-RIGID, AND FLEXIBLE PLASTIC PARTS TYPES

CODE	FAMILY NAME	COMMON TRADE NAME	TYPICAL APPLICATION
ASA	Acrylonitrile Styrene Acrylite	Lurans	Consoles, Grilles
ABS	Acrylonitrile Butadiene Styrene	Terluran	"A" Pillars, Consoles, Grilles
ABS/PC	ABS/PC Alloy	Pulse, Proloy, Bayblend	Doors, Instrument Panels
ABS/PVC	ABS/PV Alloy	Proloy, Pulse, Lustran, Cyclovin	Door Panels, Grilles, Trim
BMC	Bulk Molding Compound	BMC	Fender Extensions
EMA	Ehtylene Methyl Acrylate/Ionomer	Surlyn, EMA, Ionomer	Bumper Guards, Pads
METTON	Metton	Metton	Grilles, Kick Panels, Running Boards
MPPO	Modified Polyphenylene Oxide	MPPO	Spoiler Assembly
PA	Polyamid	Zytel, Vydyne, PA, Minlon	Fenders, Quarter Panels
PET	Thermoplastic Polyester	Rynite	Trim
PBT/PPO	PBT/PPO Alloy	Germax	Claddings
PBTP	Polybutylene Therepthalate	PBT, PBTP, Pocan, Valox	Wheel Covers, Fenders, Grilles
PBTP/EEBC	Polybutylene Therepthalate/EEBC Alloy	Bexloy, "M", PBTP/EEBC	Fascias, Rocker Panel, Moldings
PC	Polycarbonate	Lexan, Merlon, Calibre, Makrolon PC	Tail Light Lenses, I/P Trim, Valance Panels
PC/ABS	PC/ABS Alloy	Germax, Bay Blends, Pulse	Doors, Instrument Panels
PPO	Polyphenylene Oxide	Azdel, Hostalen, Marlex, Prfax, Noryl, GTX, PPO	Interior Trim, Door Panels, Splash Shields, Steering Column Shroud
PPO/PA	Polyphenylene/Polyamid	PPO/PA, GTX 910	Fenders, Quarter Panels
PR/FV	Fiberglass Reinforced Plastic	Fiberglass, FV, PR/FV	Body Panels
PS	Polystyrene	Lustrex, Styron, PS	Door Panels, Dash Panels

RTM	Resin Transfer Molding Compound	RTM	Body Panels
SMC	Sheet Molded Compound	SMC	Body Panels
TMC	Transfer Molding Compound	TMC	Grilles
UP	Unsaturated Polyester (Thermosetting)	SMC, BMC, TMC, ZMC, IMC, XSMC, UP	Grille Opening Panel, Liftgates, Flareside Fenders, Fender Extensions
EEBC	Ether/Ester Blocked Co-Polymer	EEBC	Bumpers
EEBC/PBTP	EEBC/Polybutylene Terepthalate	EEBC, PBTP, BEXLOY	Bumper, Rocker Panels
EMPP	Ethylene Modified Polypropylene	EMPP	Bumper Covers
EPDM	Ethylene/Propropylene Diene Monomer	EPDM, Nordel, Vistalon	Bumpers
EPM	Ethylene/Propropylene Co-Polymer	EPM	Fenders
MPU	Foam Polyurethane	MPU	Spoilers
PE	Polyethylene	Alathon, Dylan, Lupolen, Marlex	-
PP	Polypropylene (Blends)	Noryl, Azdel, Marlox, Dylon, Pravex	Inner Fender, Spoilers, Kick Panels, A-Pillars, Door Panels, B-Pillars, Quarter Panels, Sport Bar Trim, Liftgate Trim, Decklid Trim Scuff Plates, Kick Panels, Consoles
PP/EPDM	PP/EPDM Alloy	PP/EPDM	Spoilers, Grilles
PUR	Polyurethane	Colonels, PUR, PU	Fascias, Bumpers
PUR/PC	PUR/PC Alloy	Texin	Bumpers
PVC	Polyvinyl Chloride	Apex, Geon, Vinylite	Body Moldings, Wire Insulation, Steering Wheels
RIM	Reaction Injected Molded Polyurethane	RIM, Bayflex	Front Fascias, Modular Windows
RRIM	Reinforced Reaction Injected Molded	PUR, RRIM	Fascias, Body Panels, Body Trims
TPE	Thermo Polyethylene	TPE, Hytrel, Bexloy-V	Fascias, Bumpers, Claddings
TPO	Thermopolyolefin	Polytrope, Renflex, Santoprene, Visaflex, ETA, Apex, TPO, Shields, Claddings	Bumpers, End Caps, Telcar, Rubber, Strips, Sight, Interior B-Pillar
TPP	Thermo-Polypropylene	TPP	Bumpers
TPU	Thermopolyurethane,	TPU, Hytrel, Texin, Estane	Bumpers, Body Side,

	Polyester		Moldings, Fenders, Fascias

PANEL SECTIONING

If it is required to section a large panel for a plastic repair, it will be necessary to reinforce the panel. To bond two plastic panels together, a reinforcement must overlap both panels. The panels must be "V'd" at a 20 degree angle. The area to be reinforced should be washed, then sanded. Be sure to wipe off any excess soap and water when finished. Lightly sand or abrade the plastic with an abrasive pad or sandpaper. Blow off any dust with compressed air or wipe with a clean dry rag.

When bonding plastic panels, Follow repair material manufacturers recommendations. Be sure that enough adhesive has been applied to allow squeeze out and to fill the full bond line. Once the pieces have been brought together, do not move them until the adhesive is cured. The assembly can be held together with clamps, rivets, etc. A faster cure can be obtained by heating with a heat lamp or heat gun. After the parts have been bonded and have had time to cure, rough sand the seam and apply the final adhesive filler to the area being repaired. Smooth the filler with a spreader, wooden tongue depressor, or squeegee. For fine texturing, a small amount of water can be applied to the filler surface while smoothing. The cured filler can be sanded as necessary and, as a final step, cleanup can be done with soapy water. Wipe the surface clean with a dry cloth allowing time for the panel to dry before moving on with the repair.

PANEL REINFORCEMENT

Structural repair procedures for rigid panels with large cracks and holes will require a reinforcement backing. Reinforcements can be made with several applications of glass cloth saturated with structural adhesive. Semi-rigid or flexible repair materials should be used for semi-rigid or flexible backing reinforcement. Open meshed fiberglass dry wall tape can be used to form a reinforcement. The dry wall tape allows the resin to penetrate through and make a good bond between the panel and the adhesive. Structurally, the more dry wall tape used, the stronger the repair.

Another kind of repair that can be done to repair large cracks and holes is to use a scrap piece of similar plastic and bond with structural adhesive. The reinforcement should cover the entire break and should have a generous amount of overlap on either side of the cracked or broken area.

When repairing plastic, the damaged area is first "V'd" out, or beveled. Large bonding areas are desirable when repairing plastic because small repairs are less likely to hold permanently. Beveling the area around a crack at a 20 degree angle will increase the bonding surface for a repair. It is recommended that sharp edges be avoided because the joint may show through after the panel is refinished.

- Panel repair for both flexible and rigid panels are basically the same. The primary difference between flexible panel repair and rigid panel repair is in the adhesive materials used.
- The technician should first decide what needs to be done when working on any type of body panel. One should determine if it is possible to return the damage part to its original strength and appearance without exceeding the value of the replacement part.
- When plastic repairs are required, it is recommended that the part be left on the vehicle when ever possible. That will save time, and the panel will remain stationary during the repair. Misalignment can

cause stress in the repair areas and can result in future failure.

VISUAL INSPECTION

Composite materials can mask the severity of an accident. Adhesive bond lines, interior structure of the doors, and steel structures need to be inspected carefully to get a true damage assessment. Close inspection may require partial removal of interior trim or inner panels.

Identify the type of repair: Puncture or Crack - Damage that has penetrated completely through the panel. Damage is confined to one general area; a panel section is not required. However, a backer panel, open fiberglass tape, or matted material must be bonded from behind.

PANEL SURFACE PREPARATION

If a body panel has been punctured, cracked, or crushed, the damaged area must be removed from the panel to achieve a successful repair. All spider web cracks leading away from a damaged area must be stopped or removed. To stop a running crack in a panel, drill a 6 mm (0.250 in.) hole at the end of the crack farthest away from the damage. If spider web cracks can not be stopped, the panel would require replacement. The surfaces around the damaged area should be stripped of paint and freed from wax and oil. Scuff surfaces around repair area with 360 grit wet/dry sandpaper, or equivalent, to assure adhesion of repair materials.

PATCHING PANELS

An panel that has extensive puncture type damage can be repaired by cutting out the damaged material. Use a suitable reciprocating saw or cut off wheel to remove the section of the panel that is damaged. The piece cut out can be used as a template to shape the new patch. It is not necessary to have access to the back of the panel to install a patch. Bevel edges of cutout at 20 degrees to expose a larger bonding area on the outer side. This will allow for an increased reinforcement areas.

PANEL PATCH FABRICATIONS

A patch can be fabricated from any rigid fiberglass panel that has comparable contour with the repair area. Lift gates and fenders can be used to supply patch material. If existing material is not available or compatible, a patch can be constructed with adhesive and reinforcement mesh (dry wall tape). Perform the following operation if required:

1. Cover waxed paper or plastic with adhesive backed nylon mesh (dry wall tape) larger than the patch required.
2. Tape waxed paper or plastic sheet with mesh to a surface that has a compatible contour to the repair area.
3. Apply a liberal coat of adhesive over the reinforcement mesh. If necessary apply a second or third coat of adhesive and mesh after first coat has cured. The thickness of the patch should be the same as the repair area.
4. After patch has cured, peel waxed paper or plastic from the back of the patch.
5. If desired, a thin film coat of adhesive can be applied to the back of the patch to cover mesh for added strength.

PANEL PATCH INSTALLATION

1. Make a paper or cardboard pattern the size and shape of the cutout hole in the panel.
2. Trim 3 mm (0.125 in.) from edges of pattern so patch will have a gap between connecting surfaces.
3. Using the pattern as a guide, cut the patch to size.
4. Cut scrap pieces of patch material into 50 mm (2 in.) squares to use as patch supports to sustain the patch in the cutout.
5. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) in from edge of cutout hole.
6. Drill 4 mm (0.160 in.) holes 13 mm (0.5 in.) away from edge of patch across from holes drilled around cutout.
7. Drill 3 mm (0.125 in.) holes in the support squares 13 mm (0.5 in.) from the edge in the center of one side.
8. Scuff the backside of the body panel around the cutout hole with a scuff pad or sandpaper.
9. Mix enough adhesive to cover one side of all support squares.
10. Apply adhesive to cover one side of all support squares.
11. Using number 8 sheet metal screws, secure support squares to back side of body panel with adhesive sandwiched between the panel and squares.
12. Position patch in cutout against support squares and adjust patch until the gap is equal along all sides.
13. Drill 3 mm (0.125 in.) holes in the support squares through the pre-drilled holes in the patch.
14. Apply a coat of adhesive to the exposed ends of the support squares.
15. Install screws to hold the patch to support squares. Tighten screws until patch surface is flush with panel surface.
16. Allow adhesive to cure, and remove all screws.
17. Using a 125 mm (5 in.) 24 grit disc grinder, grind a 50 mm (2 in.) to 75 mm (3 in.) wide and 2 mm (0.080 in.) deep path across the gaps around the patch. With compressed air, blow dust from around patch.
18. Apply adhesive backed nylon mesh (dry wall tape) over gaps around patch.
19. Mix enough adhesive to cover the entire patch area.
20. Apply adhesive over the mesh around patch, and smooth epoxy with a wide spreader to reduce finish grinding. Use two to three layers of mesh and adhesive to create a stronger repair.

PATCHED PANEL SURFACING

After patch panel is installed, the patch area can be finished using the same methods as finishing other types of body panels. If mesh material is exposed in the patched area, grind surface down, and apply a coat of high quality rigid plastic body filler. Prime, block sand, and paint as required.

HEAT STAKING

1. Remove trim panel.
2. Bend or move the trim panel components at the heat staked joints. Observe the heat staked locations and/or component seams for looseness.
3. Heat stake the components.
    a. If the heat staked or component seam location is loose, hold the two components tightly together

and using a soldering gun with a flat tip, melt the material securing the components together. Do not over heat the affected area, damage to the exterior of the trim panel may occur.

b. If the heat staked material is broken or missing, use a hot glue gun to apply new material to the area to be repaired. The panels that are being heat staked must be held together while the applying the glue. Once the new material is in place, it may be necessary to use a soldering gun to melt the newly applied material. Do not over heat the affected area, damage to the exterior of the trim panel may occur.

4. Allow the repaired area to cool and verify the repair.
5. Install trim panel.

SPECIFICATIONS

TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Front Seat Track To Floor Pan Bolts	61	45	-
Front Seat Inboard Pivot Bolt	40	30	-
Front Seat Recliner To Seat Cushion Frame	12	9	-
Front Seat Track To Cushion Frame Bolts	12	9	-
Front Seat Back	45	34	-
Front Seat Back Recliner To Seat Back	12	9	-
Front Seat Belt Buckle Anchor Nut	40	29	-
Front Seat Belt Retractor Bolt	38	28	-
Front Seat Belt Buckle Anchor Bolt	40	29	-
Front Door Striker	15	-	133
Front Door Pin Assembly JS27	8	-	71
Front Door Carrier Plate	6	49	-
Front Door Hinge To Door Nuts	28	20	-
Front Door Latch Striker	28	20	-
Front Seat Rear Outboard Seat Track To Floor Pan Bolts	28	20	-
Hood Hinge Bolts	15	11	-
Hood Latch Bolts	28	20	-
Decklid Latch Striker	22	16	-
Rear Door Glass To Regulator Bolt	9	-	97
Rear Door Carrier Plate Fasteners	8	-	70
Rear Door Exterior Handle	7	62	-
Rear Door Latch Striker	20	15	-
Rear Door Nuts To Hinge	13	-	115
Rear Door Latch Striker	28	20	-
Rear Door Glass Run Fastener To Division Post	6	-	53
Rear Door Hinge	28	21	-

Rear Seat Back Outer Bracket Nuts	61	45	-
Sunroof Module To Roof Panel	11	-	100

SPECIAL TOOLS

BODY

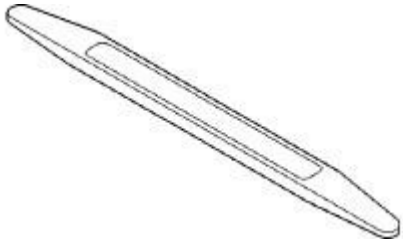


Fig. 1: Trim Stick C-4755
Courtesy of CHRYSLER LLC

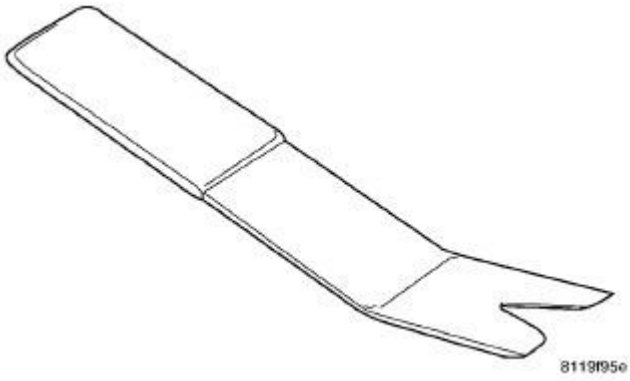


Fig. 2: Remover, Moldings C-4829-A
Courtesy of CHRYSLER LLC

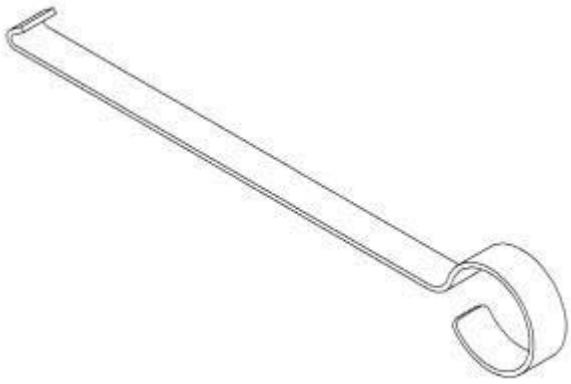


Fig. 3: Remover, Outer Door Belt Molding 9093
Courtesy of CHRYSLER LLC

DECKLID/HATCH/LIFTGATE/TAILGATE

HANDLE, EXTERIOR, LIFTGATE

Removal

REMOVAL

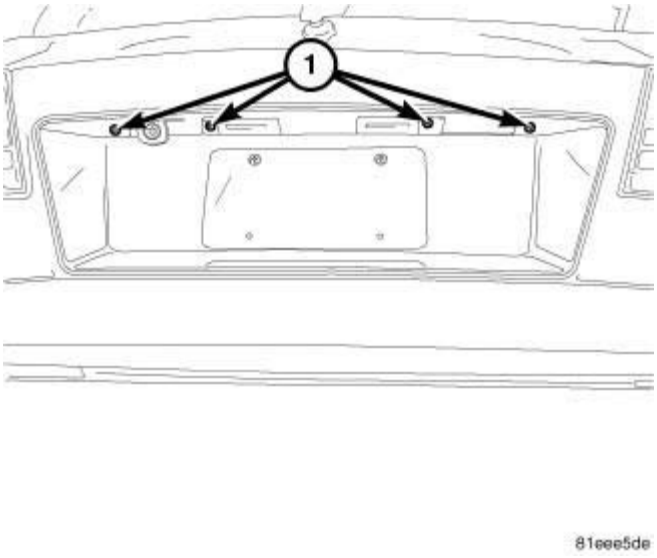


Fig. 4: Liftgate Handle Rear Mounting Nut
Courtesy of CHRYSLER LLC

1. Remove the liftgate trim panel. See **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Removal**.
2. Remove the liftgate handle rear mounting nut.
3. Place the liftgate in the closed position.
4. Remove the mounting fasteners on the front of the liftgate handle.
5. Disconnect the liftgate handle latch cable.
6. Disconnect the electrical connectors and remove the liftgate handle.

Installation

INSTALLATION

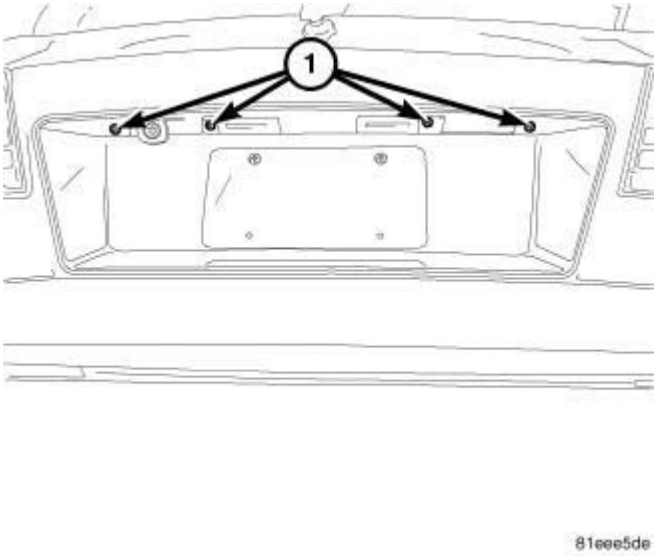


Fig. 5: Liftgate Handle Rear Mounting Nut
Courtesy of CHRYSLER LLC

1. Connect the liftgate handle latch cable.
2. Connect electrical connectors and seat the liftgate handle into position.
3. Install the front liftgate handle fasteners.
4. Place the liftgate in the up position.
5. Install the rear liftgate handle fastener.
6. Install the liftgate trim panel. See **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Installation**.

HINGE, LIFTGATE

Removal

REMOVAL

NOTE: It is not necessary to remove the liftgate to replace one or both hinges. The hinges can be replaced one at a time.

NOTE: A suitable body sealant should be used when removing or moving the hinges.

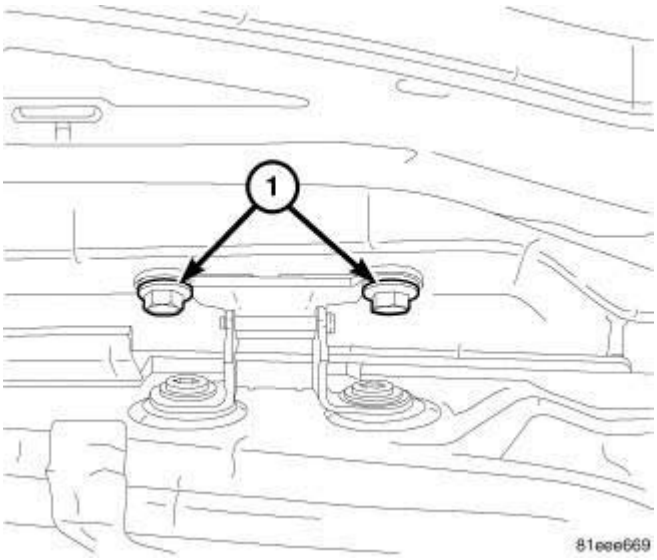


Fig. 6: Upper Hinge Bolts
Courtesy of CHRYSLER LLC

1. Place the liftgate in the full up position.
2. Support liftgate on a suitable lifting device.
3. Using a trim stick C-4755 or equivalent, remove the upper rear headliner trim.
4. Mark outline of hinge on the inside of liftgate to aid in installation.
5. Remove the upper hinge bolts (1).

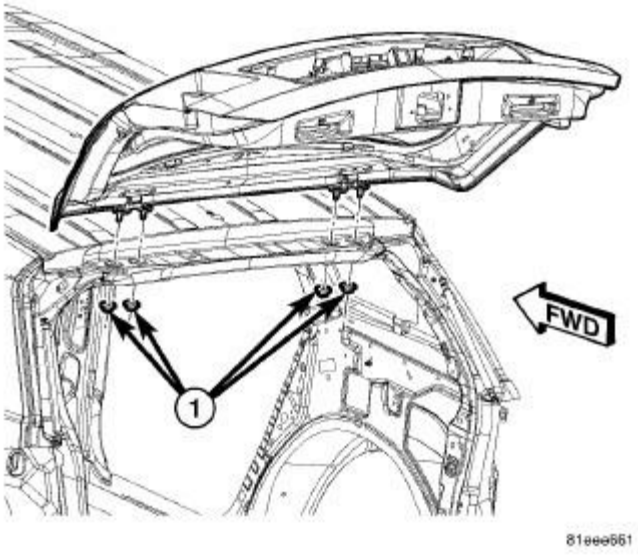


Fig. 7: Lower Hinge Bolts
Courtesy of CHRYSLER LLC

6. Remove the lower hinge bolts (1).

7. Remove hinge from vehicle.

Installation

INSTALLATION

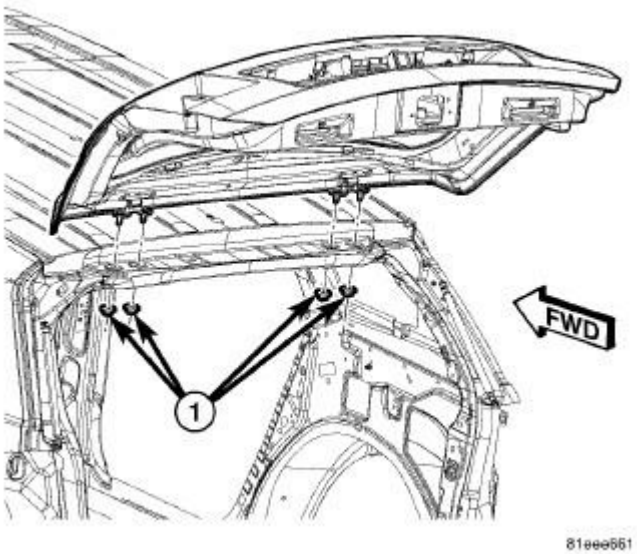


Fig. 8: Lower Hinge Bolts
Courtesy of CHRYSLER LLC

1. Position hinge to the vehicle.
2. Install the lower hinge bolts (1). Tighten the hinge bolts to 28 N.m (21 ft. lbs.).

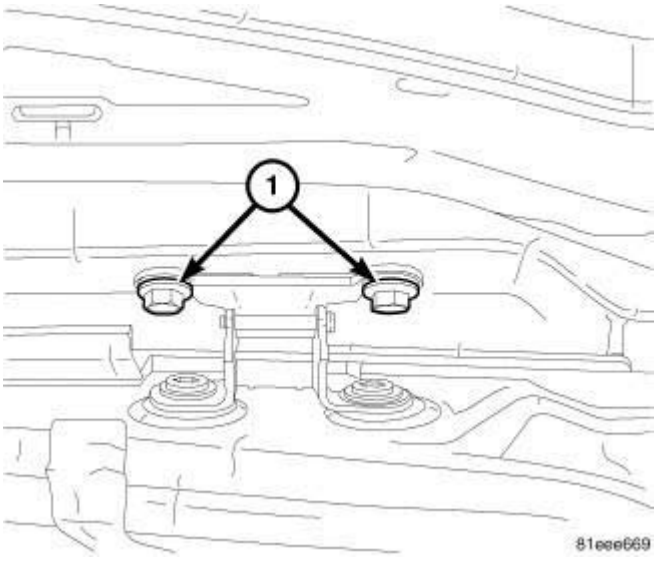


Fig. 9: Upper Hinge Bolts
Courtesy of CHRYSLER LLC

3. Align the hinge to the previously made markings.
4. Install the upper hinge bolts (1). Tighten the hinge bolts to 28 N.m (21 ft. lbs.).
5. Install the upper rear headliner trim.
6. Close the liftgate and verify proper operation. See **Body/Decklid/Hatch/Liftgate/Tailgate/LIFTGATE - Adjustments**.

LATCH, LIFTGATE

Removal

REMOVAL

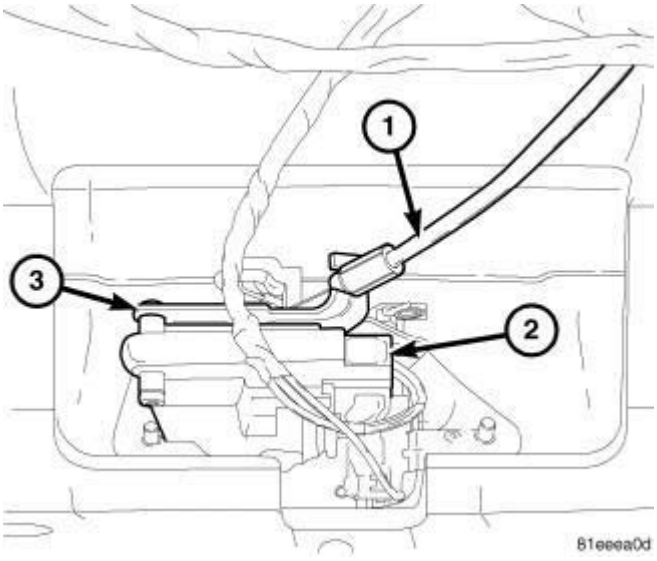


Fig. 10: Liftgate Latch Cable
Courtesy of CHRYSLER LLC

1. Remove the liftgate trim panel. See **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Removal**.
2. Disconnect the electrical connector (2) from the latch (3).
3. Disconnect the liftgate latch cable (1).
4. Lower the liftgate to mid position and remove the latch mounting bolts.
5. Remove the liftgate latch from the vehicle.

Installation

INSTALLATION

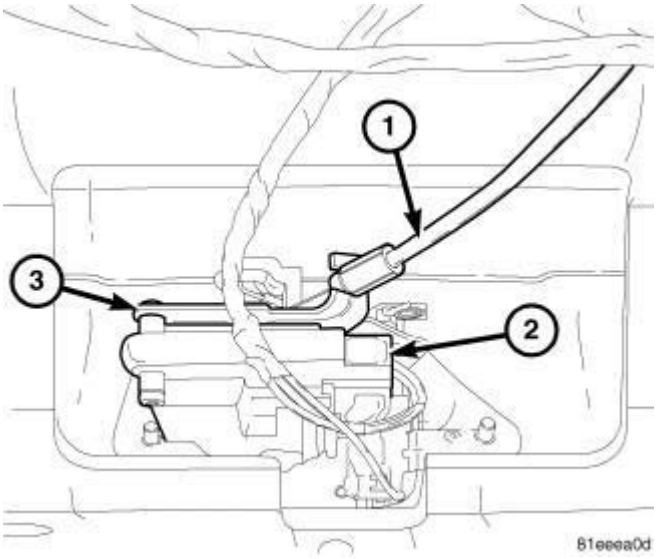


Fig. 11: Liftgate Latch Cable
Courtesy of CHRYSLER LLC

1. Position the liftgate latch to the liftgate.
2. Install the mounting fasteners. Tighten the bolts to 28 N.m (21 ft. lbs.).
3. Connect the liftgate latch cable.
4. Connect the electrical connector to the latch.
5. Install the liftgate trim panel. See **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Installation**.
6. Close the liftgate and verify proper operation. See **Body/Decklid/Hatch/Liftgate/Tailgate/LIFTGATE - Adjustments**.

LIFTGATE

Removal

REMOVAL

WARNING: Do not disconnect the support rod cylinders with the liftgate closed. The support rod pistons are operated by high pressure gas. This pressure could cause damage and/or personal injury if they are removed while the pistons are compressed.

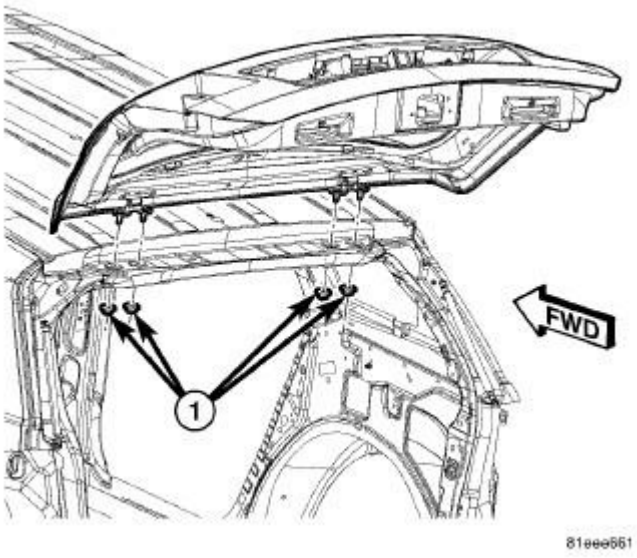


Fig. 12: Lower Hinge Bolts
Courtesy of CHRYSLER LLC

1. Open and support the liftgate.
2. Using a trim stick C-4755 or equivalent, remove the upper rear headliner trim.
3. Remove the support cylinders from the liftgate. See **Body/Decklid/Hatch/Liftgate/Tailgate/PROP, Gas - Removal**.
4. Disconnect the wire harnesses and the washer hose.
5. Using a grease pencil or equivalent, mark the hinge location.
6. Remove the liftgate to body fasteners (1) and remove liftgate from vehicle.

Installation

INSTALLATION

NOTE: A suitable body sealant should be used when removing or moving the hinges.

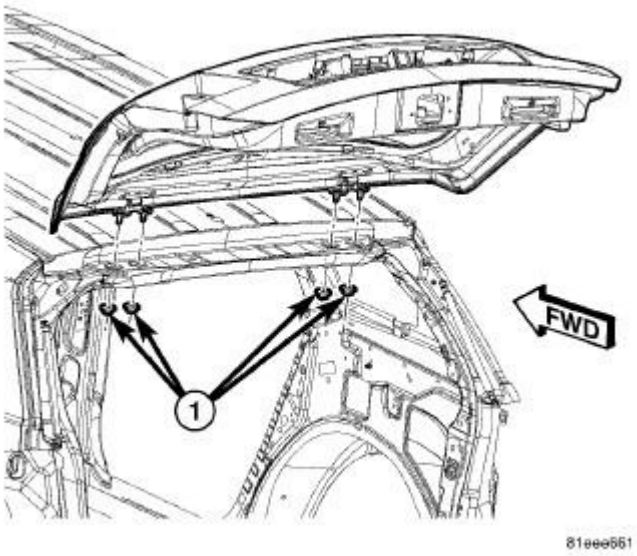


Fig. 13: Lower Hinge Bolts
Courtesy of CHRYSLER LLC

1. Position the liftgate onto the vehicle using the reference marks made during the Removal procedure and install the body fasteners (1).
2. Tighten the bolts to 28 N.m (21 ft. lbs.).
3. Connect the wire harness and washer hose.
4. Install the support struts. See **Body/Decklid/Hatch/Liftgate/Tailgate/PROP, Gas - Installation**.
5. Install the upper rear headliner trim.
6. Close the liftgate and verify proper operation. See **Body/Decklid/Hatch/Liftgate/Tailgate/LIFTGATE - Adjustments**.

Adjustments

ADJUSTMENTS

NOTE: The position of the liftgate can be adjusted upward or downward by the use of slots in the hinge. An inward or outward adjustment is achieved by use of slots in the body. If an inward or outward adjustment is needed, use a body sealer on the hinge to body mating surface.

In/out

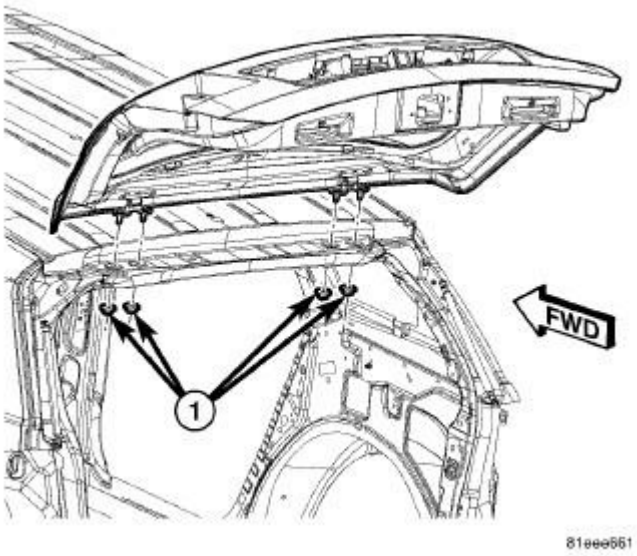


Fig. 14: Lower Hinge Bolts
Courtesy of CHRYSLER LLC

1. Using a trim stick C-4755 or equivalent, remove the upper rear headliner trim.
2. For the upper lift gate adjustments, loosen the six hinge to header bolts (1) and adjust to specifications. See **Body/Body Structure/Gap and Flush - Specifications**
3. Tighten the hinge bolts to 28 N.m (21 ft. lbs.).

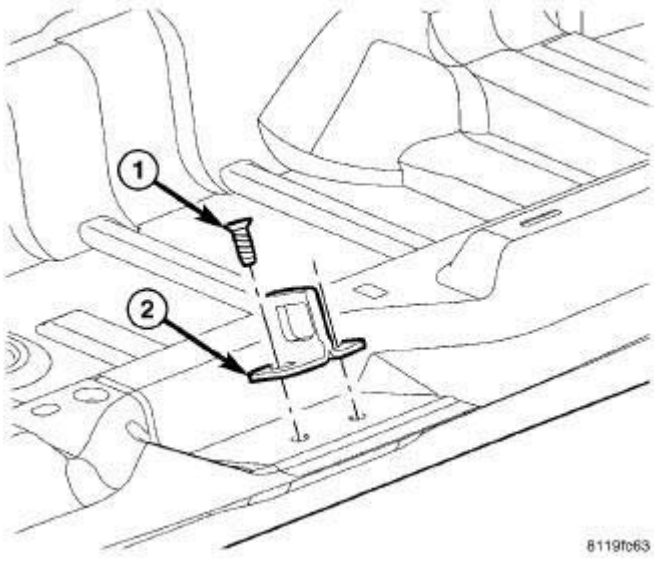


Fig. 15: Striker Screws
Courtesy of CHRYSLER LLC

4. For the lower lift gate adjustments, loosen the striker screws (1) and adjust to specifications. See **Body/Body Structure/Gap and Flush - Specifications**

5. Tighten the striker screws to 28 N.m (21 ft. lbs.).
6. Position the upper rear headliner trim and seat fully.

Up/Down and Left/Right

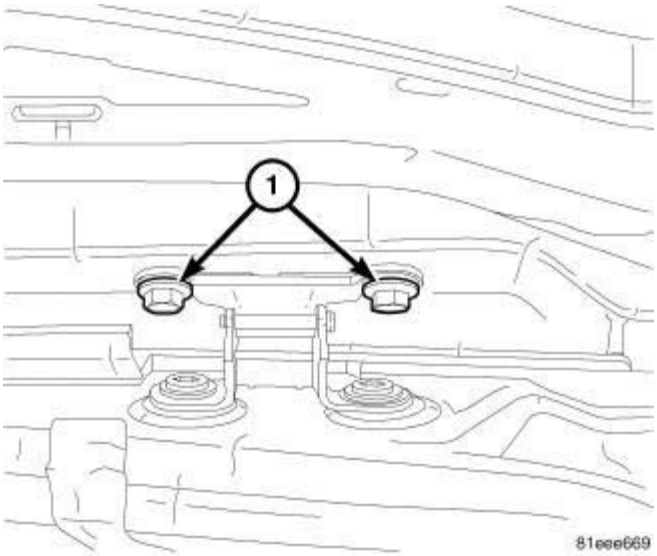


Fig. 16: Upper Hinge Bolts
Courtesy of CHRYSLER LLC

1. Loosen the hinge to liftgate bolts (2).

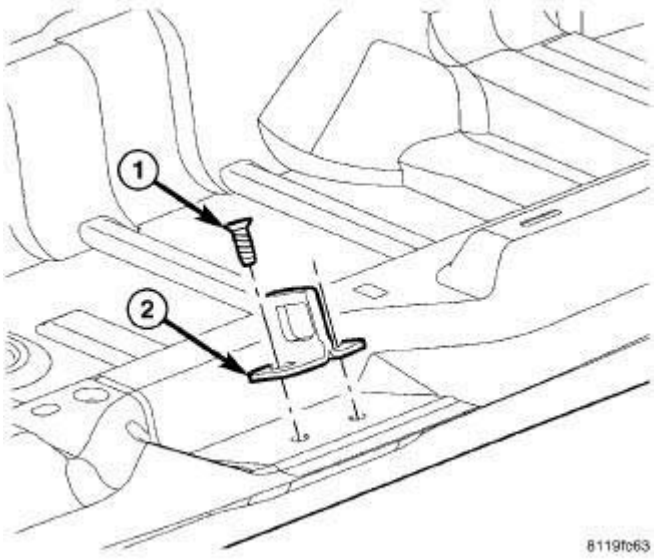


Fig. 17: Striker Screws
Courtesy of CHRYSLER LLC

2. Loosen the striker screws (1).

3. Adjust the liftgate up/down position and tighten the hinge bolts to 28 N.m (21 ft. lbs.). See **Body/Body Structure/Gap and Flush - Specifications**
4. Confirm the lower liftgate in/out position and tighten the striker screws to 28 N.m (21 ft. lbs.).

PANEL, TRIM, LIFTGATE

Removal

REMOVAL

1. Remove the left and right side trim panels.
2. Using a trim stick C-4829A or equivalent, separate the push-pin fasteners and remove the upper trim panel.
3. Remove the two lower screws.
4. Remove the lower trim panel and disconnect the electrical connector.

Installation

INSTALLATION

1. Connect the electrical connector and install the lower trim panel.
2. Install the two lower screws.
3. Install the left and right side trim panels.
4. Position the upper trim into place and seat the push pin fasteners fully.

PROP, GAS, LIFTGATE

Removal

REMOVAL

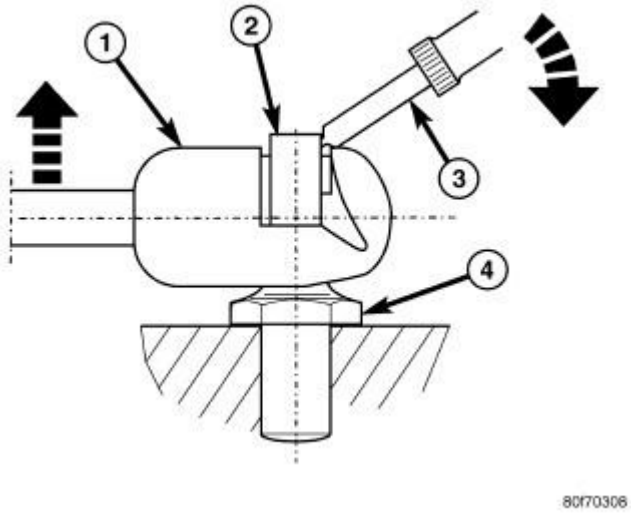


Fig. 18: SUPPORT CYLINDER REMOVAL
Courtesy of CHRYSLER LLC

1. Open liftgate.
2. Using a small flat bladed tool or equivalent, release the retaining clips while pulling the ball socket away from the ball stud.

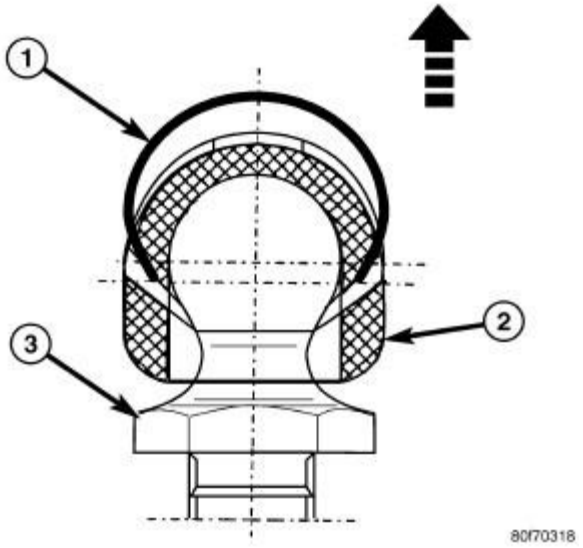


Fig. 19: SUPPORT CYLINDER RETAINING CLIP
Courtesy of CHRYSLER LLC

3. Remove the gas prop-rod lock caps.
4. Remove the support cylinder.

Installation

INSTALLATION

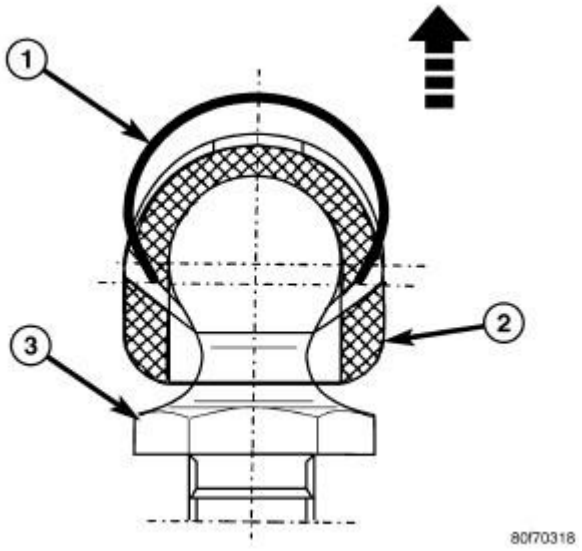


Fig. 20: SUPPORT CYLINDER RETAINING CLIP
Courtesy of CHRYSLER LLC

1. Make sure the retaining clips are seated into the ball socket (2) fully.
2. Install the support cylinder over the ball studs with the thin end connected to the liftgate and the retaining clips snapping into place.

STRIKER, LIFTGATE LATCH

Removal

REMOVAL

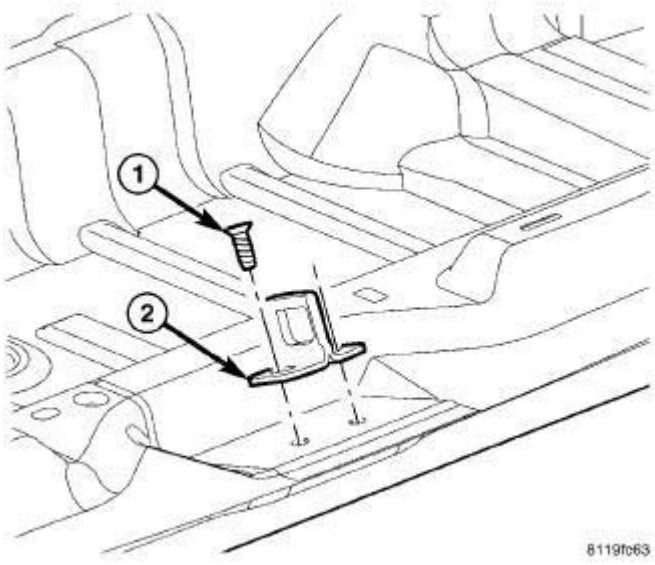


Fig. 21: Striker Screws
Courtesy of CHRYSLER LLC

1. Open the liftgate.
2. Remove screws attaching liftgate striker to floor pan (1) and remove the striker.

Installation

INSTALLATION

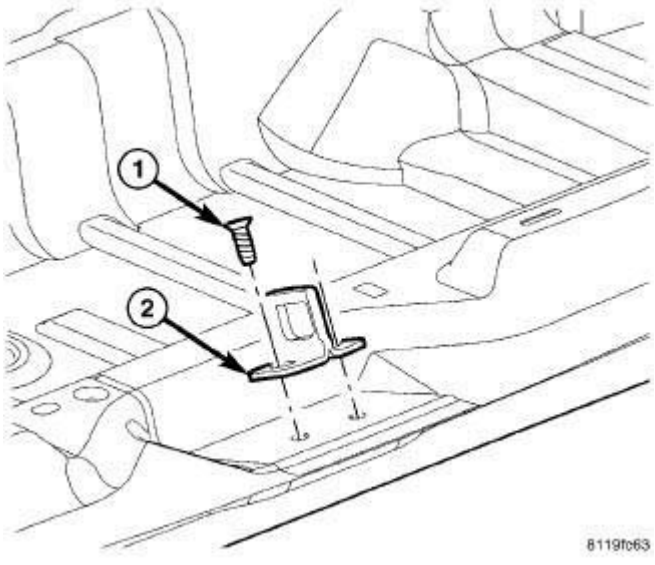


Fig. 22: Striker Screws
Courtesy of CHRYSLER LLC

1. Install the striker (2) and install the bolts (1).
2. Tighten the bolts to 28 N.m (21 ft. lbs.).
3. Adjust the striker if needed. See **Body/Decklid/Hatch/Liftgate/Tailgate/STRIKER - Adjustments**.

Adjustments

ADJUSTMENT

1. Using a grease pencil or equivalent, mark the position of the striker to aid in adjustment.
2. Loosen the striker bolts.
3. Change the striker position to adjust the lower liftgate gap and flush measurement. See **Body/Body Structure/Gap and Flush - Specifications**
4. Tighten the bolts to 28 N.m (21 ft. lbs.).

DOOR - FRONT

DOOR

Removal

REMOVAL

1. Open and support door on a suitable lifting device.
2. Mark hinges attachment locations with a grease pencil or other suitable device to aid installation.
3. Disengage wire connector at hinge A-pillar.
4. Remove the nuts attaching the door to the door hinges and remove the door from the vehicle.

Installation

INSTALLATION

1. Position door onto the door hinges and install the nuts. Tighten nuts to 13 N.m (115 in.lbs.)
2. Connect wire connector at hinge pillar.
3. Verify door fit and operation. Adjust the door for flushness and parallel gaps as necessary. See **Body/Door - Front/DOOR - Adjustments**.

Adjustments

ADJUSTMENTS-FRONT DOOR

1. Align door to achieve equal spacing to surrounding body panels.
2. Panels should be flush across all gaps. See **Body/Body Structure/Gap and Flush - Specifications**.
3. If door needs to be adjusted Fore/Aft loosen A-pillar to hinge bolts.
4. If door needs to be adjusted In/Out loosen door to hinge nuts.

5. If in/out alignment can not be achieved, it may be necessary to enlarge (drill) the hinge/door flange holes to 12.5 mm (1/2 inch) maximum.
6. This may allow extra movement to achieve the proper alignment.
7. Remove door and hinge as necessary.

GLASS, DOOR

Removal

REMOVAL

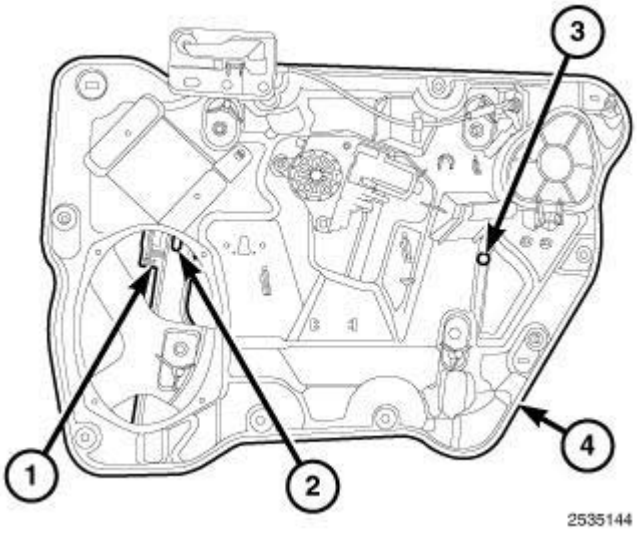


Fig. 23: Door Trim Panel & Window Switches
Courtesy of CHRYSLER LLC

1. Remove door trim panel and re-install the window switches, if equipped. See **Body/Door - Front/PANEL, Door Trim - Removal**
2. Remove the interior window trim molding. See **Body/Door - Front/MOLDING - Removal**
3. Remove the door speaker. Refer to **Electrical - Audio and Video/Audio and Video/SPEAKER - Removal**
4. Drill a hole large enough to get a small punch through into the carrier plate (3).
5. Lower glass to approximately mid position and line up the glass lift plates (1) with the holes (2 and 3).
6. Using a punch or equivalent, press tabs releasing glass from window regulator (2 and 3).

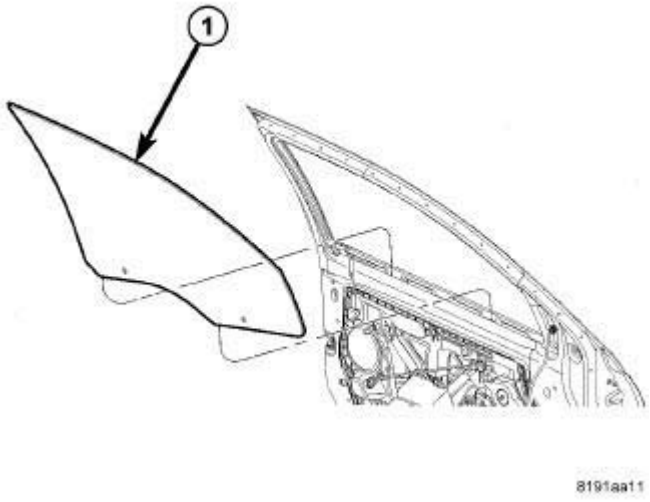


Fig. 24: GLASS HOLES
Courtesy of CHRYSLER LLC

7. Remove glass from channel.
8. Raise glass (1) upward and out of the opening at top of door.

Installation

INSTALLATION

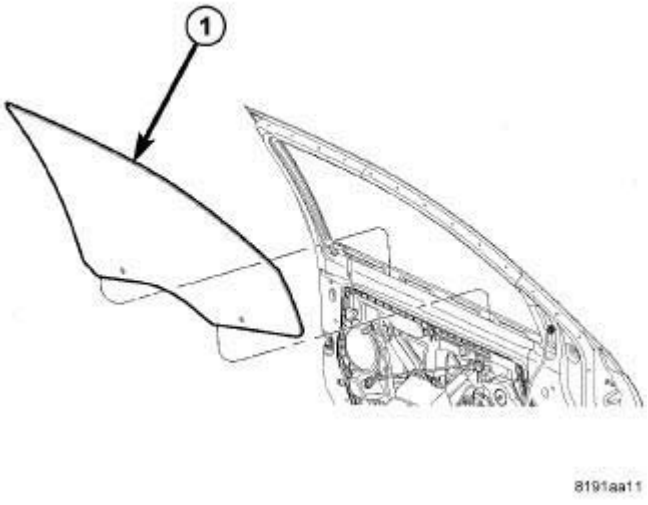


Fig. 25: Glass Holes
Courtesy of CHRYSLER LLC

1. Lower glass (1) down and in the opening at top of door.
2. Slide glass downward making sure the glass holes properly lock into snaps (1).
3. Install the interior window trim molding. See **Body/Door - Front/MOLDING - Installation**
4. Install the door speaker. Refer to **Electrical - Audio and Video/Audio and Video/SPEAKER - Installation**
5. Install door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.

HANDLE, EXTERIOR

Removal

REMOVAL

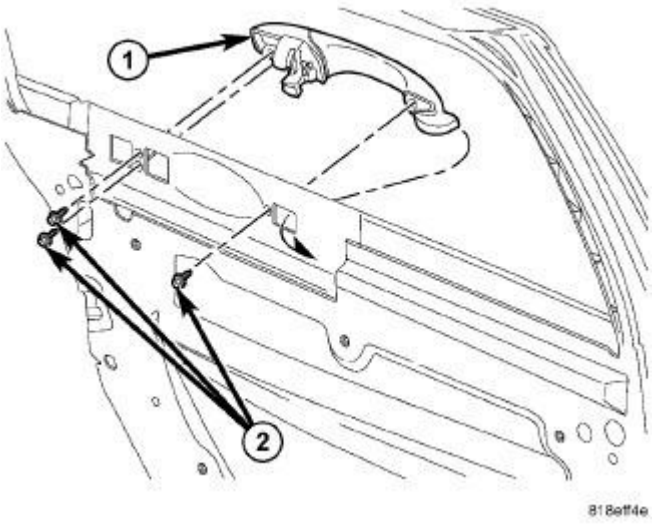


Fig. 26: DOOR HANDLE
Courtesy of CHRYSLER LLC

1. Place the door glass in the full up position.
2. Remove door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
3. Disconnect latch rods.
4. Remove fasteners (2) attaching door handle (1) to outer door panel.
5. Remove outside door handle from door.

Installation

INSTALLATION

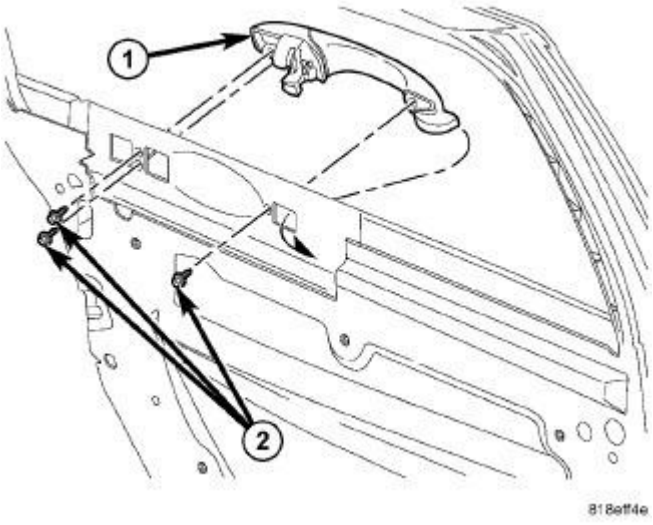


Fig. 27: DOOR HANDLE
Courtesy of CHRYSLER LLC

1. Insert tip of handle (1) towards front of door through handle opening in door outer.
2. Pull handle at rear as if to open to swing handle into opening.
3. Install fasteners (2) into sheet metal and into rear side of door handle.
4. Tighten to 7 N.m (62 in. lbs.)
5. Install door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.
6. Verify door handle operation. Adjust door latch as necessary. See **Body/Door - Front/LATCH, Door - Adjustments**.

HANDLE, INTERIOR

Removal

REMOVAL

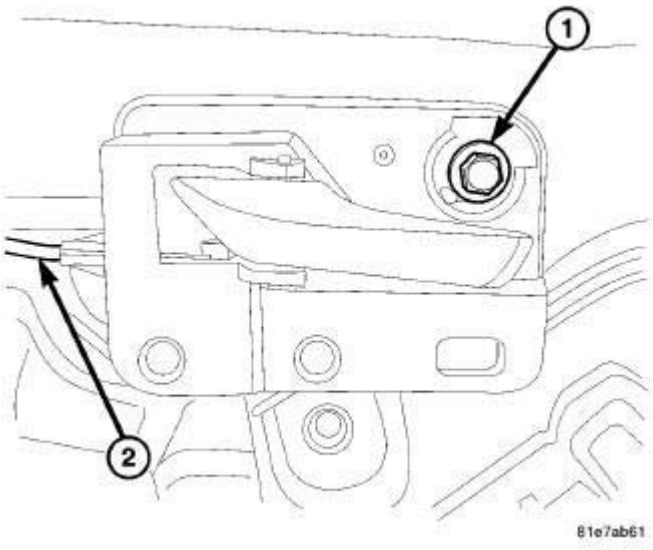


Fig. 28: Door Handle Cable
Courtesy of CHRYSLER LLC

1. Remove trim panel from door. See **Body/Door - Front/PANEL, Door Trim - Removal**
2. Remove mounting fastener (1).
3. Remove the interior door handle from door module.
4. Disconnect the door handle cable (2).

Installation

INSTALLATION

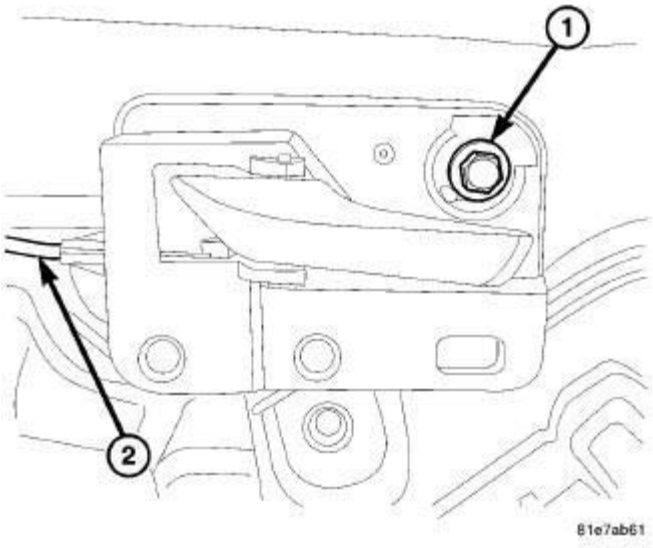


Fig. 29: Door Handle Cable

Courtesy of CHRYSLER LLC

1. Connect the interior handle cable (2) to the handle.
2. Position the handle to the door module ensuring that the handle is aligned correctly.
3. Install the mounting fastener (1).
4. Install the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.

HINGE, DOOR

Removal

REMOVAL

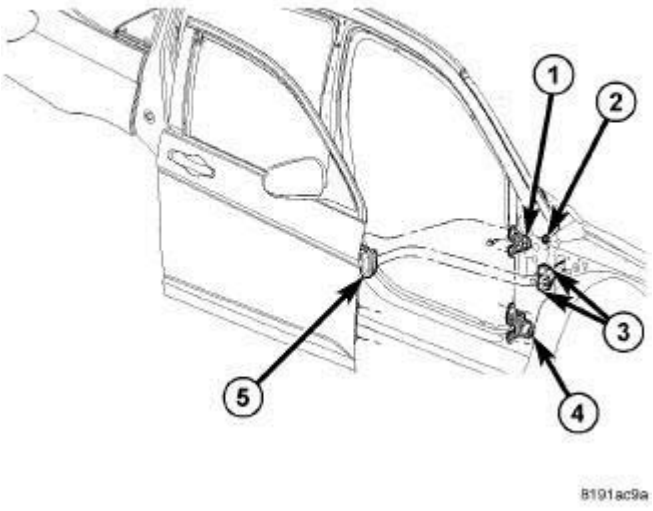


Fig. 30: Hinge
Courtesy of CHRYSLER LLC

1. Remove front door from vehicle. See **Body/Door - Front/DOOR - Removal**
2. Transfer door to bench.
3. Mark position of upper hinge (3) and lower hinge (4) on the upper A-pillar and lower A-pillar with a grease pencil or other suitable device to ease installation.
4. Remove bolts attaching hinge to door the upper A-pillar and lower A-pillar frame and remove the hinge.

Installation

INSTALLATION

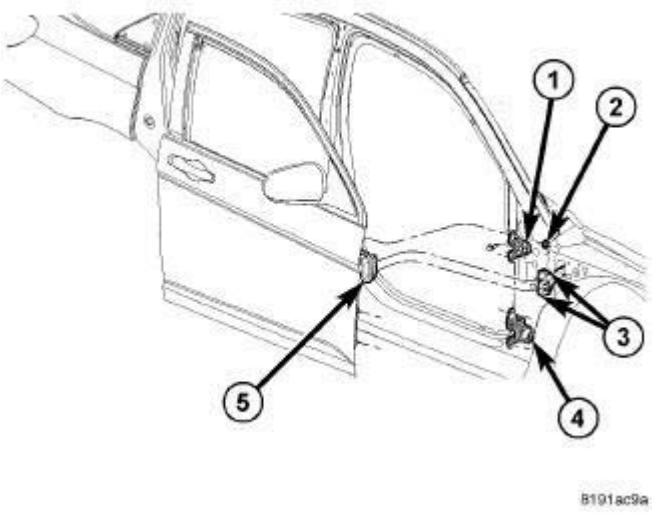


Fig. 31: Hinge
Courtesy of CHRYSLER LLC

1. If necessary, paint new door hinge prior to installation.
2. Loosely install bolts attaching hinge to lower A-pillar.
3. Align hinges to marks made previously and tighten all bolts. Tighten bolts to 28 N.m (21 ft. lbs.) torque.
4. Install the front door. See **Body/Door - Front/DOOR - Installation**.
5. Verify door fit and operation. Adjust door hinge for proper door alignment, if necessary. See **Body/Door - Front/DOOR - Adjustments**.

LATCH, DOOR

Removal

REMOVAL

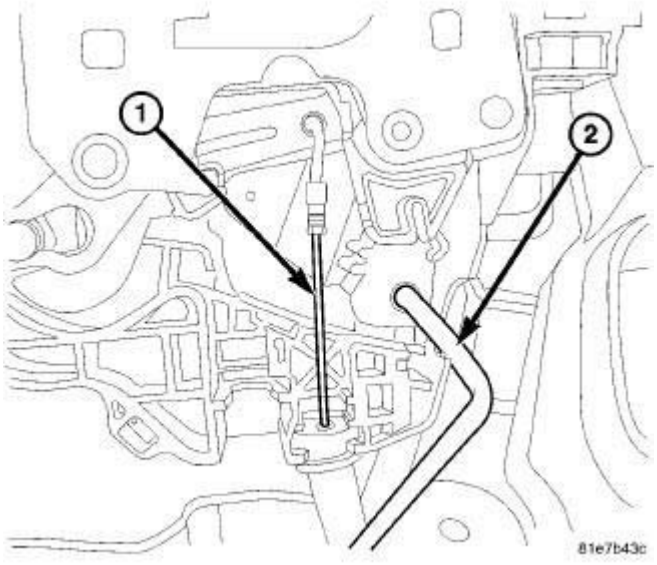


Fig. 32: Latch Cable & Rods
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
2. Remove the door module. See **Body/Door - Front/PLATE, Carrier - Removal**.
3. Remove the latch assembly from the rear of the door module by disengaging the clips.
4. Disconnect the latch cable (1) and rods (2) from the latch assembly.

Installation

INSTALLATION

CAUTION: Do not close door before adjusting the door latch. Door may fail to reopen.

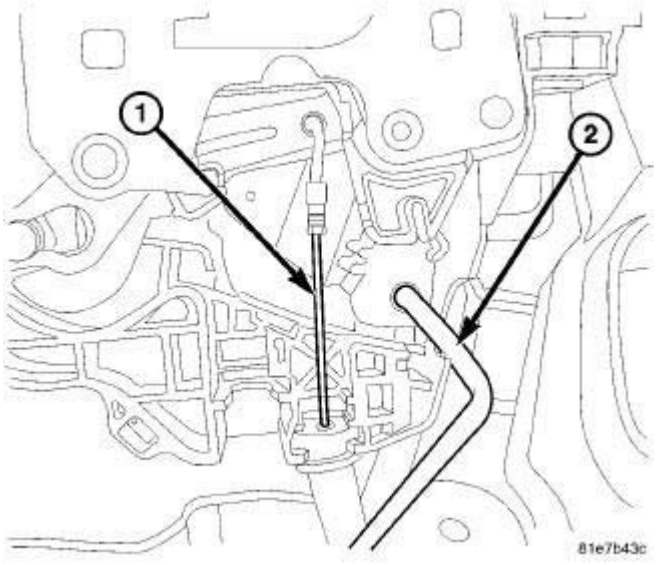


Fig. 33: Latch Cable & Rods
Courtesy of CHRYSLER LLC

1. Position the latch assembly to the door module.
2. Connect the latch cable (1) and rods (2) to the latch assembly.
3. Snap the latch assembly into place onto the door module.
4. Install the door module. See **Body/Door - Front/PLATE, Carrier - Installation**.
5. Install the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.

Adjustments

ADJUSTMENTS

1. Insert a suitable Allen wrench through the elongated slot in door end frame and loosen bolt 1/2 to one full turn.
2. Cycle outside door handle twice.
3. Tighten adjusting screw.
4. Verify latch operation.

MOLDING, INTERIOR WINDOW TRIM

Removal

REMOVAL

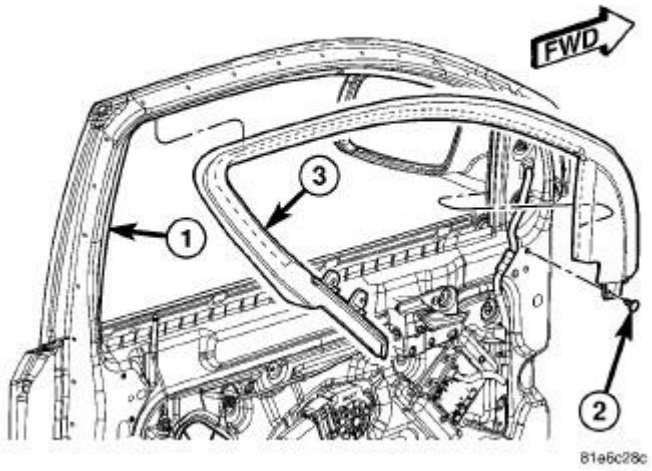


Fig. 34: Push-Pin Style Retainers From Interior Window Trim Molding
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
2. Remove the push-pin style retainers (2) from the front and rear of the interior window trim molding (3).
3. Remove the molding from the vehicle.

Installation

INSTALLATION

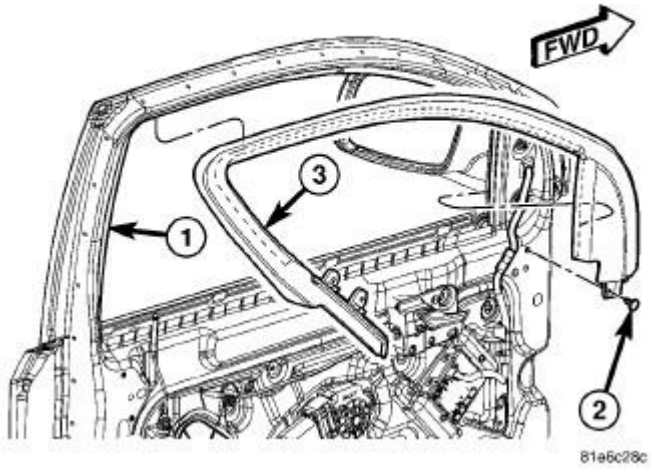


Fig. 35: Push-Pin Style Retainers From Interior Window Trim Molding
Courtesy of CHRYSLER LLC

1. Position the interior window trim molding (3) to the door (1).
2. Install the push-pin style fasteners (2) to the front and rear of the molding.
3. Install the door trim panel.

MOLDING, OUTER BELT

Removal

REMOVAL

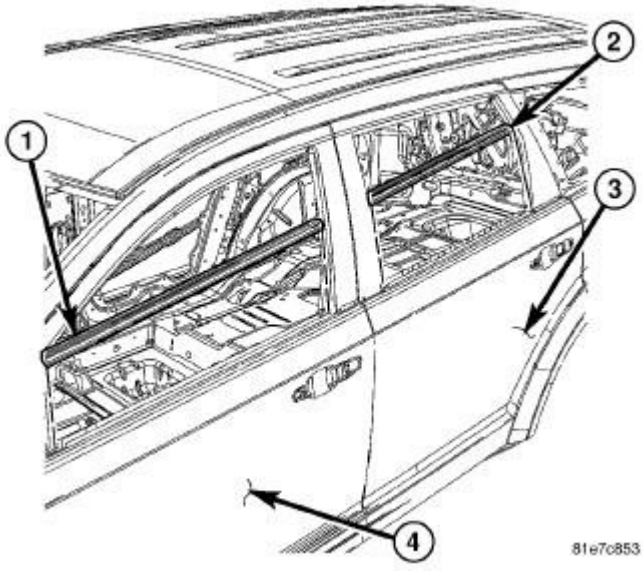


Fig. 36: Front Door Belt Molding
Courtesy of CHRYSLER LLC

1. Lower the window to the full down position.
2. Remove the front door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
3. Remove the rear mounting fastener.
4. Remove the front door belt molding (1) by carefully pulling up on the molding and remove from the front door (4).

Installation

INSTALLATION

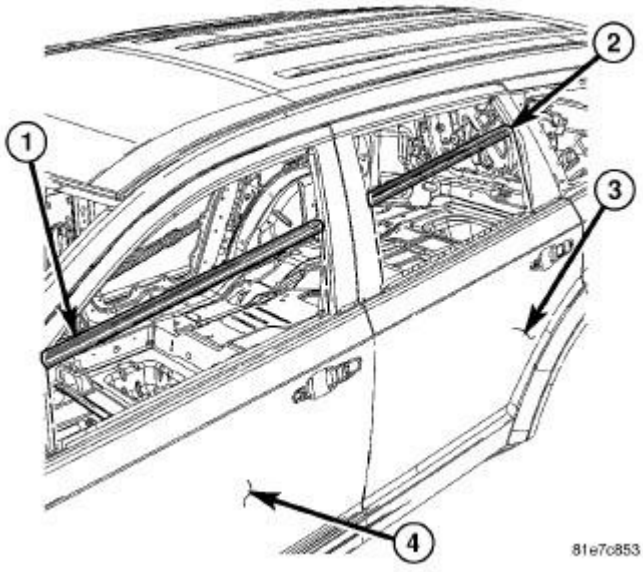


Fig. 37: Front Door Belt Molding
Courtesy of CHRYSLER LLC

1. Install the front door belt molding (1) to the front door (4).
2. Install the rear mounting fastener.
3. Install the front door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.
4. Verify proper window operation.

PANEL, DOOR TRIM

Removal

REMOVAL

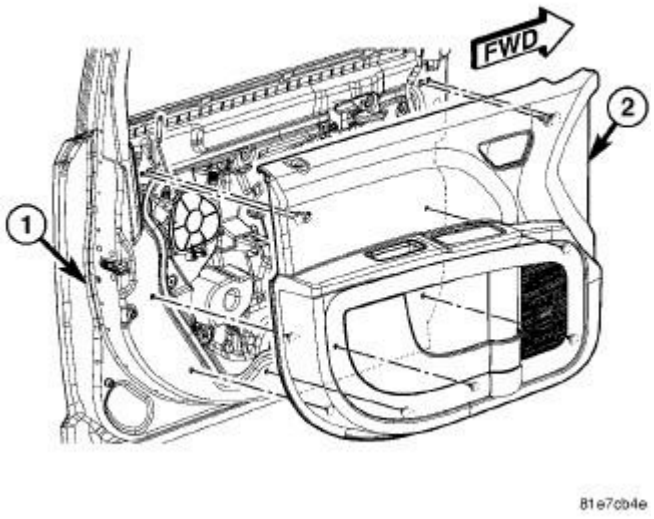


Fig. 38: Trim Panel On Door
Courtesy of CHRYSLER LLC

1. Remove pull handle screw.
2. Remove screw from inside door handle.
3. Remove the power window controls. Refer to **Electrical - Power Systems/Power Windows/SWITCH, Power Window - Removal** .
4. Using trim stick C-4755, pry trim panel from door (1).
5. Transfer trim panel (2) to bench

Installation

INSTALLATION

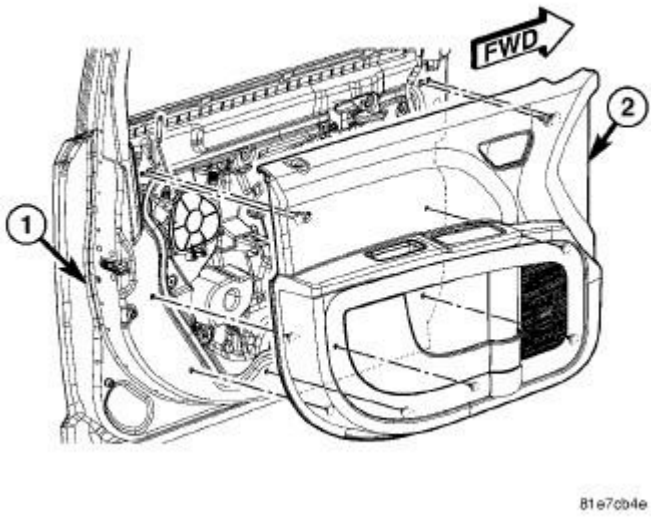


Fig. 39: Trim Panel On Door
Courtesy of CHRYSLER LLC

1. Position door trim panel near to door.
2. Raise trim panel such that the backside of trim edge can be engaged with inner belt molding.
3. Press downward on top edge of trim panel while rotating bottom edge of panel towards door.
4. Position the locators at the top of the backside of the trim panel into the corresponding sheet metal holes ensuring fit.
5. Install the screw to the interior handle cover.
6. Install the screw to the pull handle.
7. Snap screw covers closed.
8. Install the power window controls. Refer to **Electrical - Power Systems/Power Windows/SWITCH, Power Window - Installation** .
9. Close door window.

PLATE, CARRIER

Removal

REMOVAL

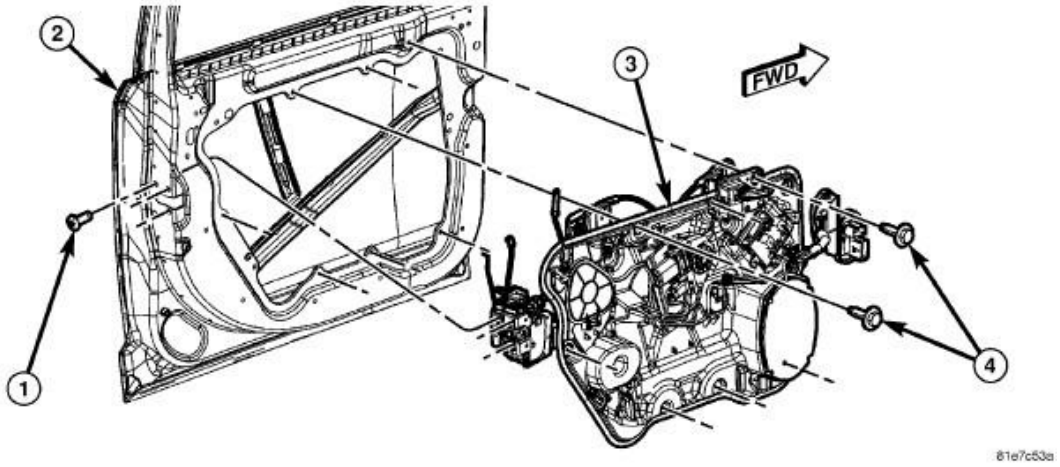


Fig. 40: Door Module & Door Latch Assembly
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
2. Remove the front door window. See **Body/Door - Front/GLASS, Door - Removal**.
3. Disconnect the electrical connectors on the door module and the door latch assembly.
4. Remove the wiring harness from the door module.
5. Disconnect the exterior door handle connecting rods.
6. Remove the door latch fasteners (1).
7. Remove the door module mounting fasteners (4).
8. Carefully remove the door module (3) by raising the front and lowering the rear of the door module while pulling away from the door.

Installation

INSTALLATION

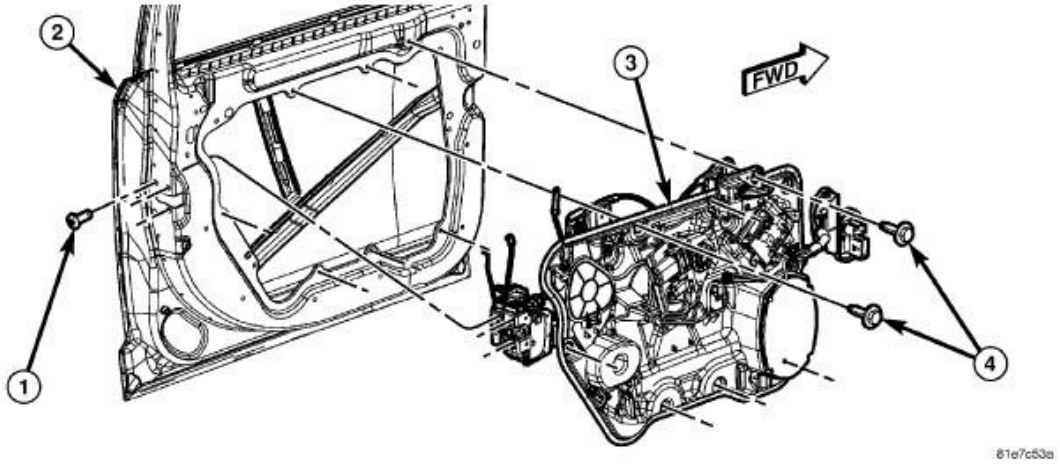


Fig. 41: Door Module & Door Latch Assembly
Courtesy of CHRYSLER LLC

1. Position the door module (3) into the door (2).
2. Install the door module mounting fasteners (4).
3. Install the door latch fasteners (1).
4. Connect the exterior door handle connecting rods.
5. Install the wiring harness to the door module and connect all electrical connectors.
6. Install the front door window. See **Body/Door - Front/GLASS, Door - Installation**.
7. Install the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.
8. Verify latch adjustments and adjust as necessary. See **Body/Door - Front/LATCH, Door - Adjustments**.

REGULATOR, WINDOW

Removal

REMOVAL

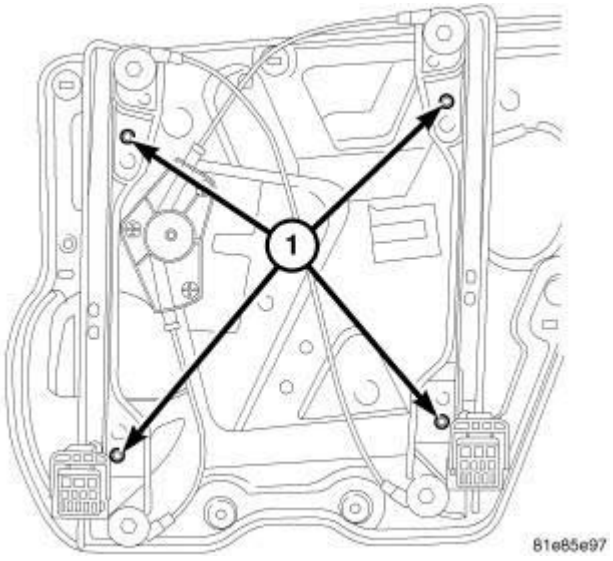


Fig. 42: Regulator Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Remove door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
2. Remove the door module assembly. See **Body/Door - Front/PLATE, Carrier - Removal**.
3. Remove the power window lift motor. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Removal** .
4. Remove the regulator mounting fasteners.
5. Remove regulator from door module assembly.

Installation

INSTALLATION

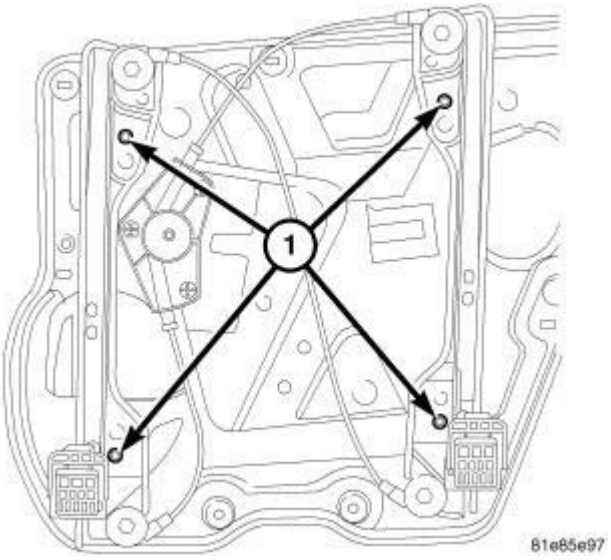


Fig. 43: Regulator Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Position regulator on door module assembly and install mounting fasteners.
2. Install the power window motor. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Installation** .
3. Install the door module assembly. See **Body/Door - Front/PLATE, Carrier - Installation**.
4. Install door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.

STRIKER, DOOR LATCH

Removal

REMOVAL

NOTE: Be sure to check for any shims between door latch striker and B-pillar. If any shims are found, they must be reinstalled with the new door latch striker to maintain proper door operation.

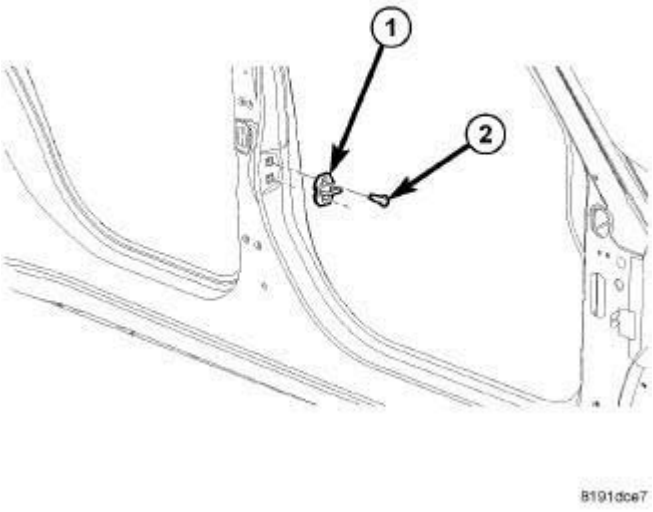


Fig. 44: Latch Striker
Courtesy of CHRYSLER LLC

1. Mark outline of door latch striker on B-pillar to aid in installation.
2. Remove mounting fasteners attaching door latch striker to B-pillar.
3. Remove latch striker from vehicle.

Installation

INSTALLATION

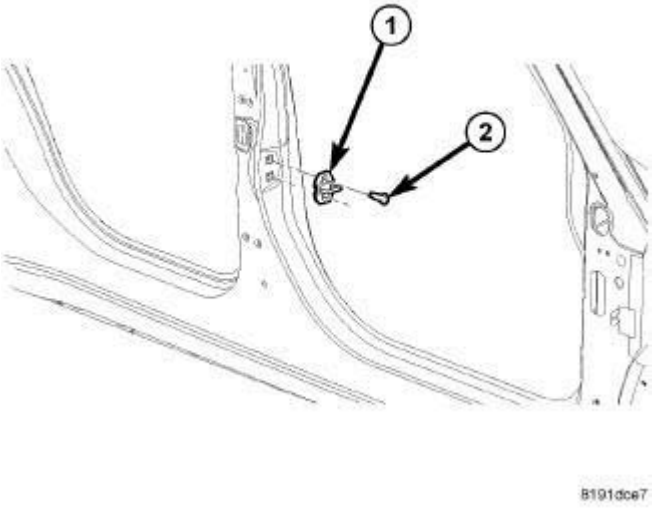


Fig. 45: Latch Striker
Courtesy of CHRYSLER LLC

1. Position door latch striker and any shims on vehicle.
2. Loosely install mounting fasteners attaching latch striker to B-pillar.
3. Align latch striker to marks on B-pillar made previously.
4. Tighten all fasteners.
5. Verify door fit and operation. Adjust door latch striker as necessary. See **Body/Door - Front/LATCH, Door - Adjustments**.

DOORS - REAR

DOOR, REAR

Removal

REMOVAL

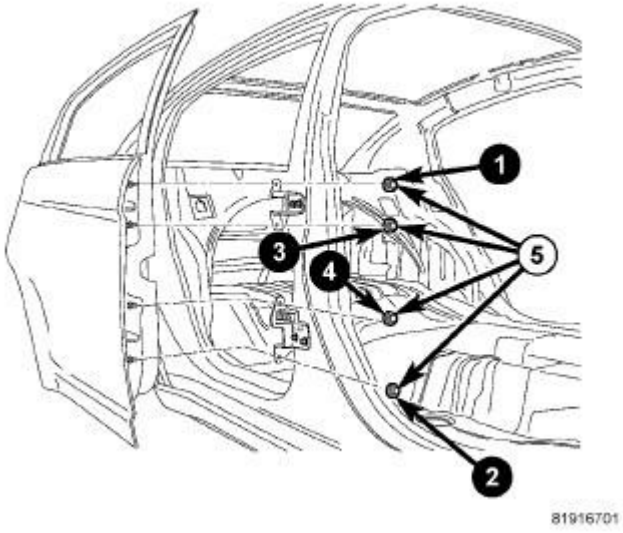


Fig. 46: Door Fasteners
Courtesy of CHRYSLER LLC

1. Open and support door on a suitable lifting device.
2. Mark hinges attachment locations with a grease pencil or other suitable device to aid installation.
3. Disengage wire connector at hinge B-pillar.
4. Remove the nuts attaching the door to the door hinges and remove the door from the vehicle.

Installation

INSTALLATION

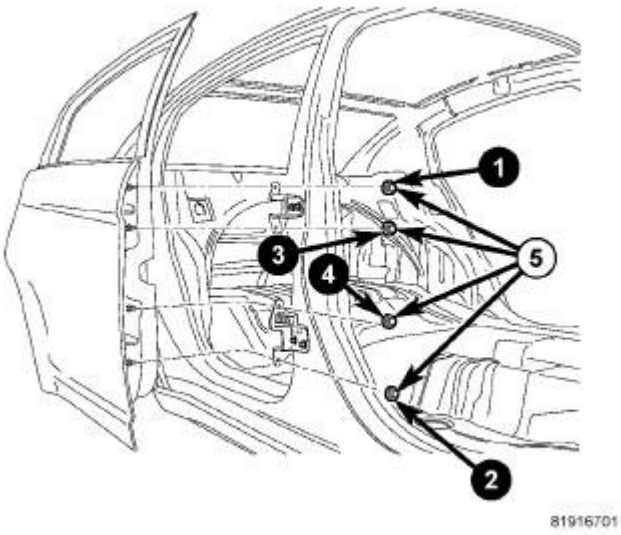


Fig. 47: DOOR FASTENERS
Courtesy of CHRYSLER LLC

1. Position door onto the door hinges and install the nuts. Tighten nuts to 13 N.m (115 in.lbs.)
2. Connect wire connector at hinge pillar.
3. Verify door fit and operation. Adjust the door for flushness and parallel gaps as necessary. See **Body/Door - Front/DOOR - Adjustments**.

Adjustments

REAR DOOR

1. Align door to achieve equal spacing to surrounding body panels.
2. Panels should be flush across all gaps. See **Body/Body Structure/Gap and Flush - Specifications**.
3. If door needs to be adjusted Fore/Aft loosen B-pillar to hinge bolts.
4. If door needs to be adjusted In/Out loosen door to hinge nuts.
5. If door alignment can not be achieved, it maybe necessary to enlarge (drill) the hinge flange holes to 12.5 mm (1/2 inch).
6. This may allow extra movement to achieve the proper alignment.
7. Remove door and hinge as necessary.

GLASS, DOOR

Removal

REMOVAL

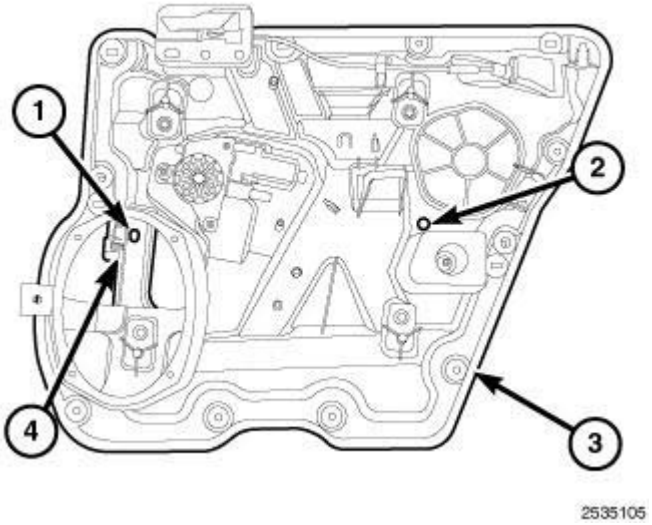


Fig. 48: Glass Lift Plates
Courtesy of CHRYSLER LLC

1. Remove door trim panel and re-install the window switches, if equipped. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**
2. Remove the interior window trim molding. See **Body/Doors - Rear/MOLDING - Removal**
3. Remove the door speaker. Refer to **Electrical - Audio and Video/Audio and Video/SPEAKER - Removal**
4. Drill a hole large enough to get a small punch through into the carrier plate (2).
5. Lower glass to approximately mid position and line up the glass lift plates (4) with the holes (1 and 2).
6. Using a punch or equivalent, press tabs releasing glass from window regulator (1 and 2).
7. Remove glass from channel by rotating the front of the glass up 90° and carefully pulling the glass up and out of the door.

Installation

INSTALLATION

1. With the front of the glass in the up position, carefully lower the glass into the door.
2. Slowly rotate the front of the glass downward 90° as the glass is being lowered into the glass run channels, making sure the glass is seated properly into the window weatherstrips.
3. Slide glass downward make sure the glass holes properly lock into snaps.
4. Install the interior window trim molding. See **Body/Doors - Rear/MOLDING - Installation**
5. Install the door speaker. Refer to **Electrical - Audio and Video/Audio and Video/SPEAKER - Installation**
6. Install door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**

HANDLE, EXTERIOR

Removal

REMOVAL

1. Move the glass to the full up position.
2. Remove the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
3. Disconnect the link rod from the door handle.
4. Remove the mounting fasteners.
5. Remove the handle from the door.

Installation

INSTALLATION

1. Place the door handle into position in the door.
2. Install the mounting fasteners.
3. Connect the link rod to the door handle.
4. Install the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**.
5. Verify proper operation.

HANDLE, INTERIOR

Removal

REMOVAL

1. Remove the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
2. Remove the mounting fastener.
3. Disconnect the door handle cable from the interior handle.
4. Remove the handle.

Installation

INSTALLATION

1. Connect the interior door handle cable.
2. Align the handle to the door module assembly.
3. Install the mounting fastener.
4. Install the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**.
5. Verify proper operation.

HINGE, DOOR

Removal

REMOVAL

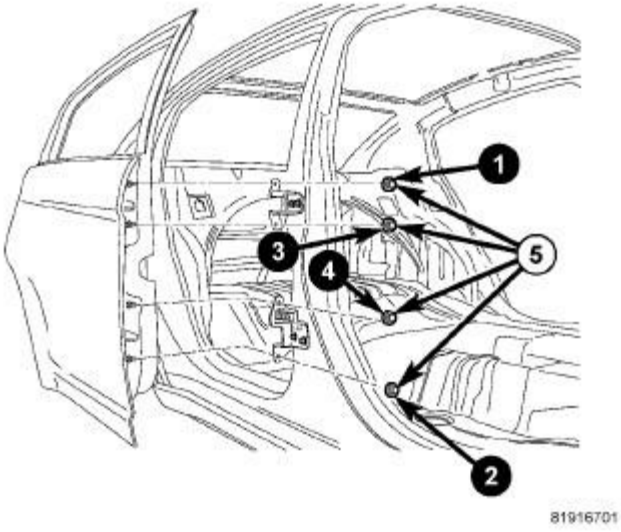


Fig. 49: Door Fasteners
Courtesy of CHRYSLER LLC

1. Remove the door. See **Body/Doors - Rear/DOOR, Rear - Removal**.
2. Mark hinge attachment locations with a grease pencil or other suitable device on the B-pillar.
3. Remove the nuts and remove the hinges.

Installation

INSTALLATION

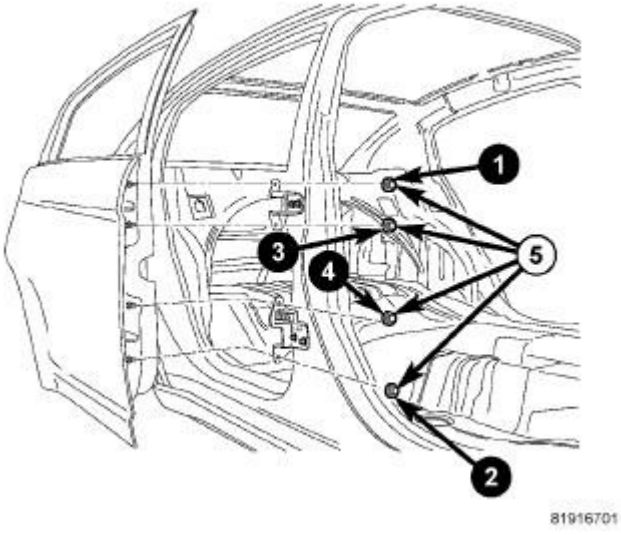


Fig. 50: Door Fasteners
Courtesy of CHRYSLER LLC

NOTE: If necessary, paint new door hinge prior to installation.

1. Loosely install bolts attaching hinge to lower B-pillar.
2. Align hinge to marks made previously and tighten bolts and nuts to 28 N.m (20 ft. lbs.).
3. Install the rear door. See **Body/Doors - Rear/DOOR, Rear - Installation**.
4. Verify door fit and operation. Adjust door hinge for proper door alignment, as necessary. See **Body/Doors - Rear/DOOR, Rear - Adjustments**.

LATCH, DOOR

Removal

REMOVAL

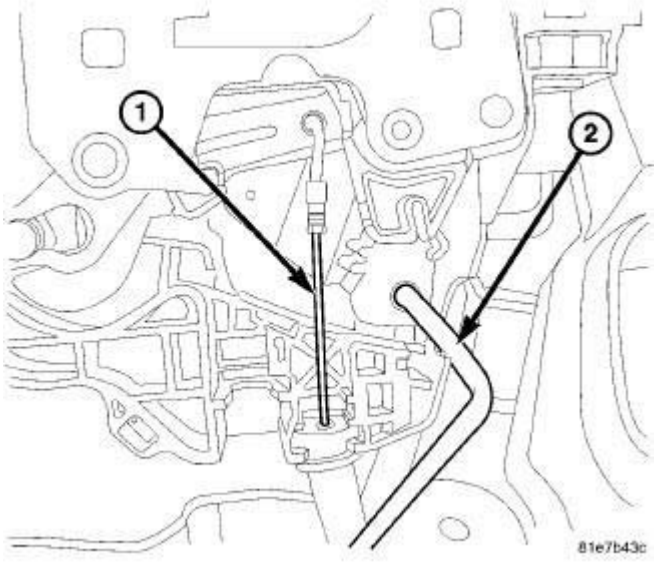


Fig. 51: Latch Cable & Rods
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
2. Remove the door module assembly.
3. Remove the latch assembly from the rear of the door module by disengaging the clips.
4. Disconnect the latch cable and rods from the latch assembly.

Installation

INSTALLATION

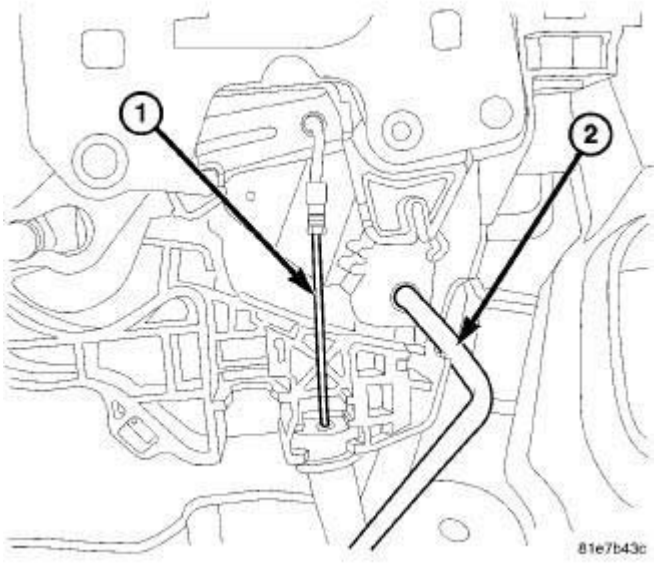


Fig. 52: Latch Cable & Rods
Courtesy of CHRYSLER LLC

1. Position the latch assembly to the door module.
2. Connect the latch cable and rods to the latch assembly.
3. Snap the latch assembly into place onto the door module.
4. Install the door module.
5. Install the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**.
6. Verify proper operation and adjust as necessary. See **Body/Doors - Rear/LATCH, Door - Adjustments**.

Adjustments

ADJUSTMENTS

1. Insert a suitable Allen wrench through the elongated slot in door end frame and loosen bolt 1/2 to one full turn.
2. Cycle outside door handle twice.
3. Tighten adjusting screw.
4. Verify latch operation.

MOLDING, INTERIOR WINDOW TRIM

Removal

REMOVAL

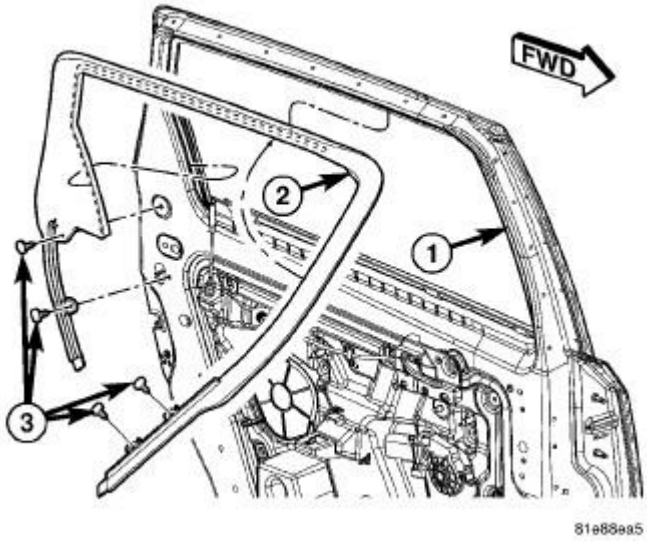


Fig. 53: Interior Window Trim Molding
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
2. Remove the push-pin style retainers (3) from the front and rear of the interior window trim molding (2).
3. Remove the window trim molding from the rear door (1).

Installation

INSTALLATION

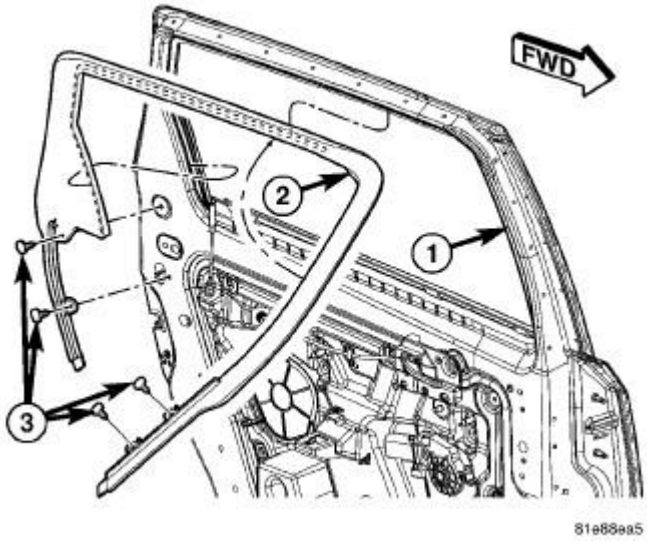


Fig. 54: Interior Window Trim Molding
Courtesy of CHRYSLER LLC

1. Position the interior window trim molding (2) to the door (1).
2. Install the push-pin style fasteners (3) to the front and rear of the molding.
3. Install the door trim panel.

MOLDING, OUTER BELT

Removal

REMOVAL

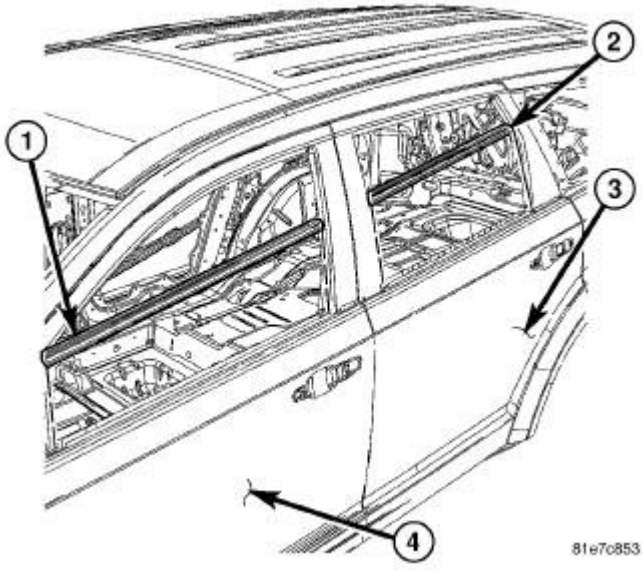


Fig. 55: Front Door Belt Molding
Courtesy of CHRYSLER LLC

1. Lower the window to the full down position.
2. Remove the rear door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
3. Remove the front and rear mounting fasteners.
4. Remove the rear door belt molding (2) by carefully pulling up on the molding and remove from the rear door (3).

Installation

INSTALLATION

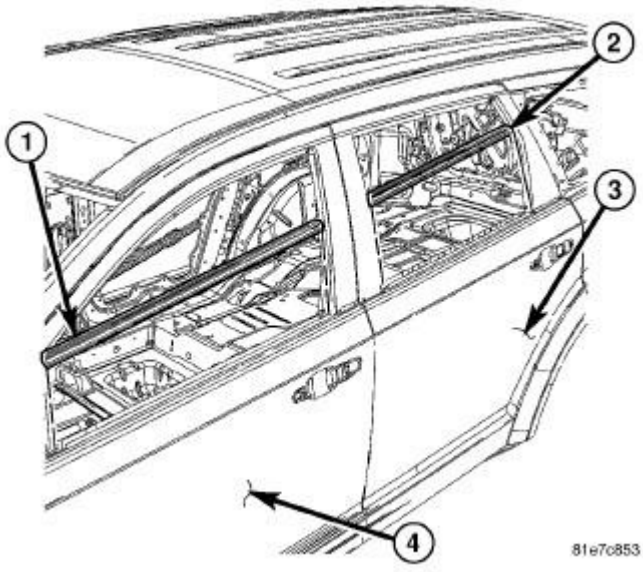


Fig. 56: Front Door Belt Molding
Courtesy of CHRYSLER LLC

1. Install the rear door belt molding (2) to the rear door (3).
2. Install the front and rear mounting fasteners.
3. Install the rear door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**.
4. Verify proper window operation.

PANEL, REAR DOOR TRIM

Removal

REMOVAL

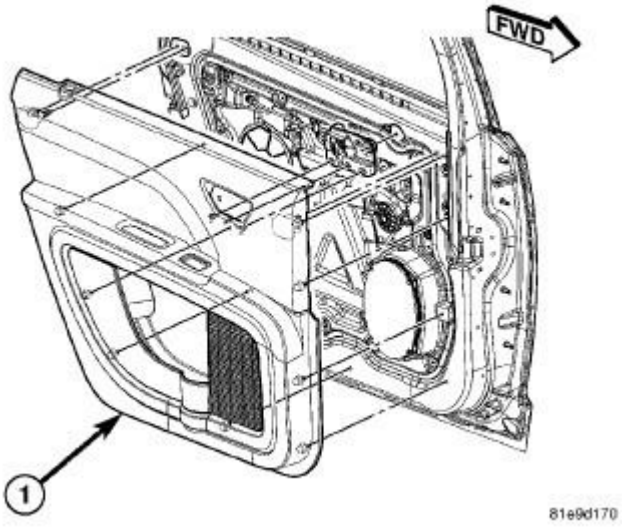


Fig. 57: Trim Panel From Door Assembly
Courtesy of CHRYSLER LLC

1. Remove fastener located in pull handle.
2. Remove fastener near inside door handle.
3. Using trim stick C-4755 or equivalent, gently pry upward on door trim panel (1) disengaging trim panel from door run.
4. Disconnect the power window switch if equipped.
5. Remove trim panel from door assembly.

Installation

INSTALLATION

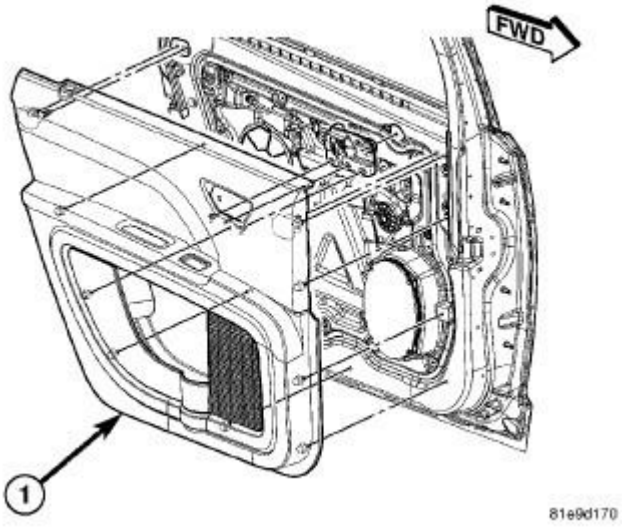


Fig. 58: Trim Panel From Door Assembly
Courtesy of CHRYSLER LLC

1. Install trim panel (1) to door assembly.
2. Connect the power window switch if equipped.
3. Install fastener located in pull handle.
4. Install fastener near inside door handle.

PLATE, CARRIER

Removal

REMOVAL

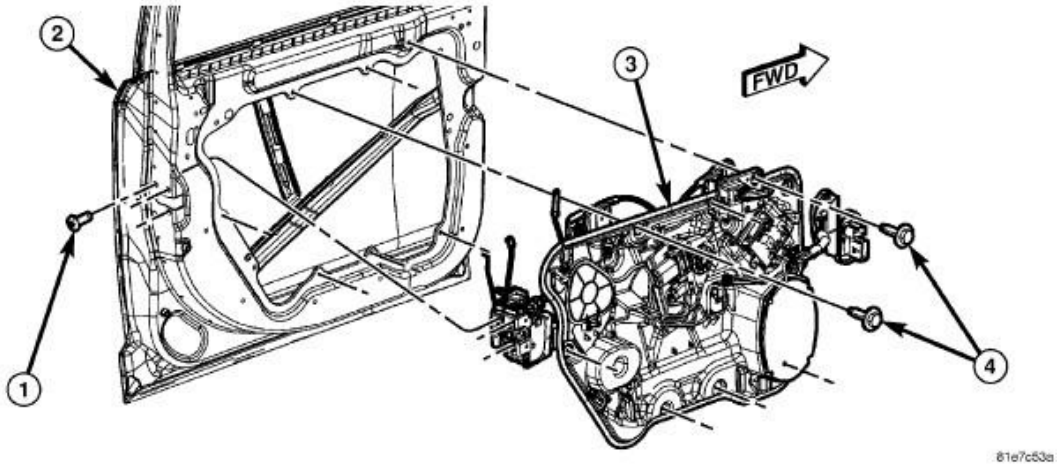


Fig. 59: Door Module & Door Latch Assembly
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
2. Remove the rear door window. See **Body/Doors - Rear/GLASS, Door - Removal**.
3. Disconnect the electrical connectors on the door module and the door latch assembly.
4. Remove the wiring harness from the door module.
5. Disconnect the exterior door handle connecting rods.
6. Remove the door latch fasteners (1).
7. Remove the door module mounting fasteners (4).
8. Carefully remove the door module (3) by raising the front and lowering the rear of the door module while pulling away from the door.

Installation

INSTALLATION

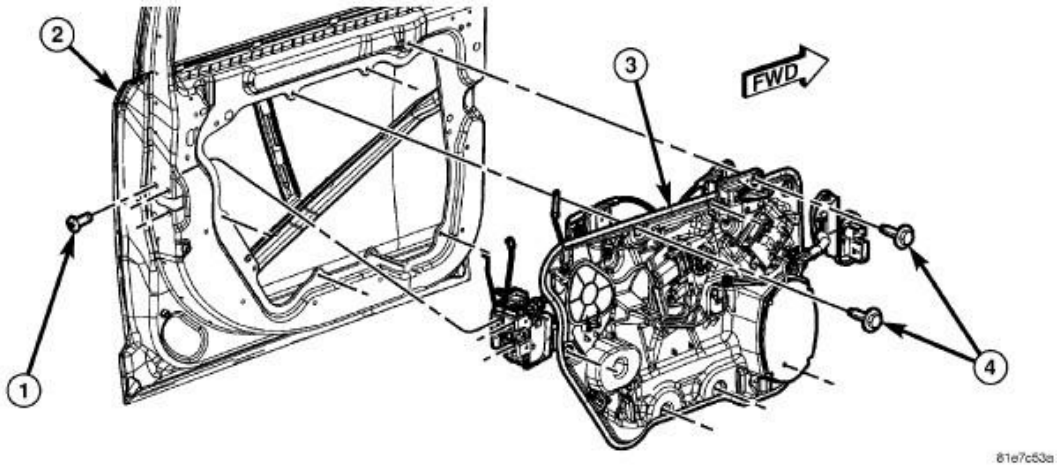


Fig. 60: Door Module & Door Latch Assembly
Courtesy of CHRYSLER LLC

1. Position the door module (3) into the door (2).
2. Install the door module mounting fasteners (4).
3. Install the door latch fasteners (1).
4. Connect the exterior door handle connecting rods.
5. Install the wiring harness to the door module and connect all electrical connectors.
6. Install the rear door window. See **Body/Doors - Rear/GLASS, Door - Installation**.
7. Install the door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Installation**.
8. Verify latch adjustments and adjust as necessary. See **Body/Door - Front/LATCH, Door - Adjustments**.

REGULATOR, WINDOW

Removal

REMOVAL

1. Remove door trim panel. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
2. Remove the door module assembly. See **Body/Doors - Rear/PANEL, Rear Door Trim - Removal**.
3. Remove the power window lift motor. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Removal**
4. Remove the regulator mounting fasteners.
5. Remove regulator from door module assembly.

Installation

INSTALLATION

1. Install regulator to door module assembly.
2. Install the regulator mounting fasteners.
3. Install the power window lift motor. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Removal** .
4. Install the door module assembly. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Removal** .
5. Install door trim panel. Refer to **Electrical - Power Systems/Power Windows/MOTOR, Window Regulator - Removal** .
6. Verify Proper operation of the window.

STRIKER, DOOR LATCH

Removal

REMOVAL

NOTE: Be sure to check for any shims between door latch striker and C-pillar. If any shims are found, they must be reinstalled with the new door latch striker to maintain proper door operation.

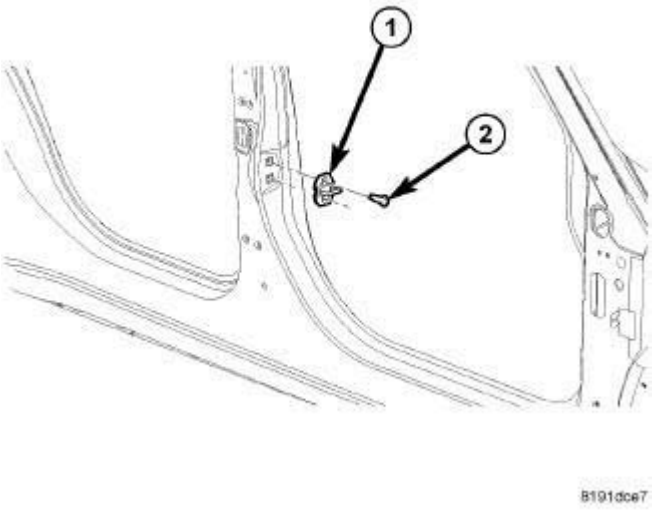


Fig. 61: Latch Striker
Courtesy of CHRYSLER LLC

1. Mark outline of door latch striker on C-pillar.
2. Remove bolts attaching door latch striker to C-pillar.
3. Remove door latch striker from vehicle.

Installation

INSTALLATION

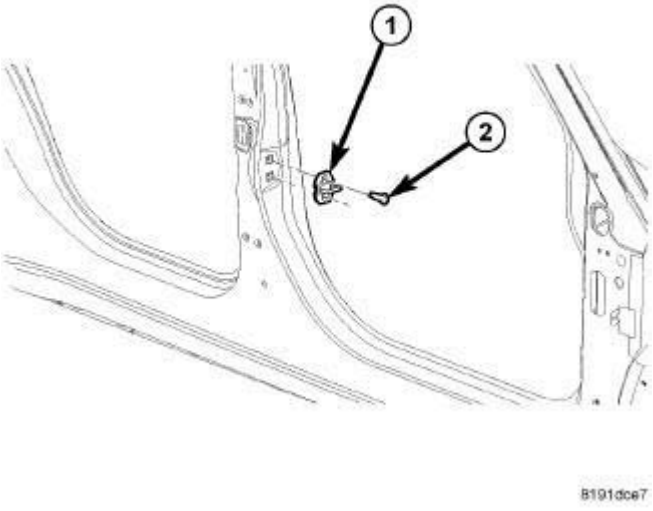


Fig. 62: Latch Striker
Courtesy of CHRYSLER LLC

1. Position door latch striker and any shims on vehicle.
2. Loosely install screws attaching latch striker to C-pillar.
3. Align latch striker to marks on C-pillar and tighten bolts to 20 N.m (14.8 ft. lbs.).
4. Verify door fit and operation. Adjust door latch striker as necessary. See **Body/Doors - Rear/LATCH, Door - Adjustments**

EXTERIOR

BRACE, WHEELHOUSE

Removal

REMOVAL

1. Open the hood.

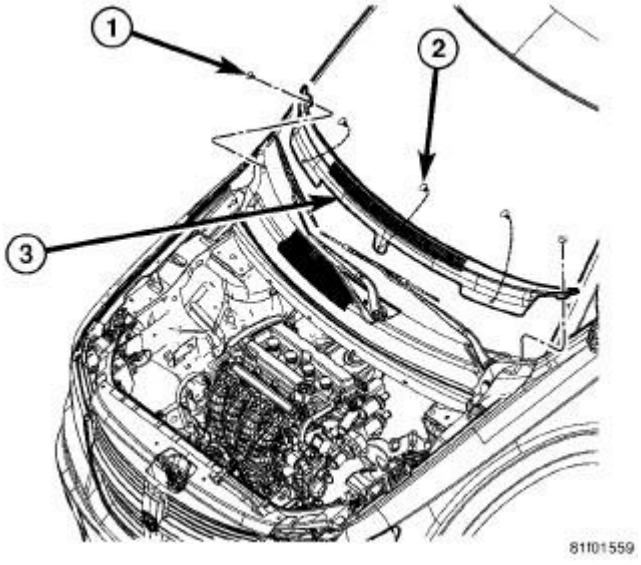


Fig. 63: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

2. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
3. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

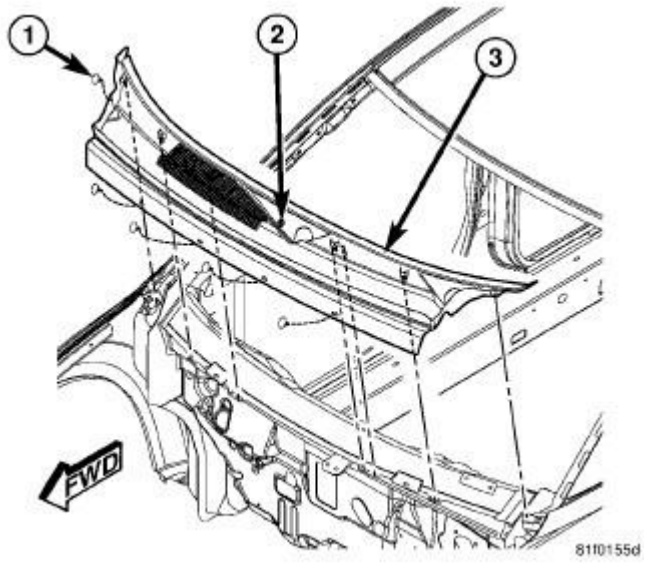


Fig. 64: COWL SCREEN
Courtesy of CHRYSLER LLC

4. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

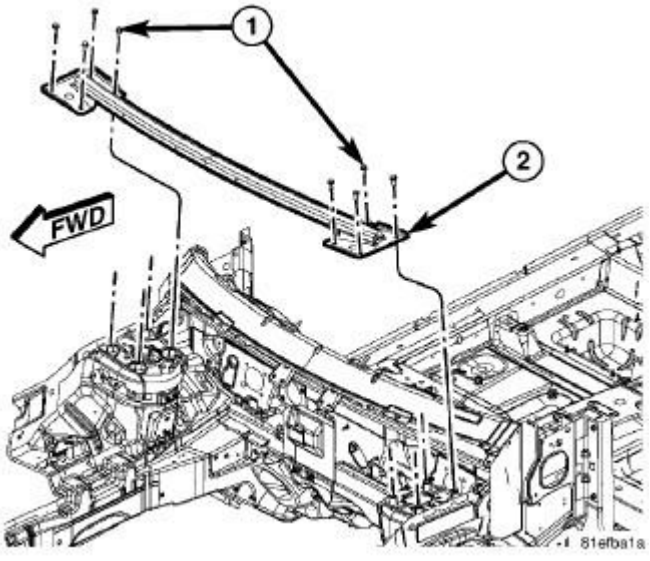


Fig. 65: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

5. Remove the eight mounting bolts (four each side) (1) securing the wheel house brace to the strut towers.
6. Remove the wheelhouse brace (2).

Installation

INSTALLATION

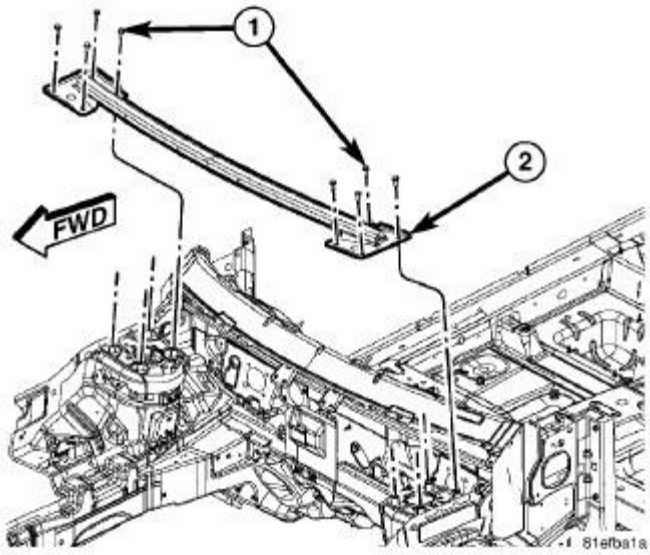


Fig. 66: WHEELHOUSE BRACE
Courtesy of CHRYSLER LLC

1. Install the wheelhouse brace (2). Install and tighten the eight mounting bolts (four each side) (1) to 48 N.m (35 ft. lbs.).

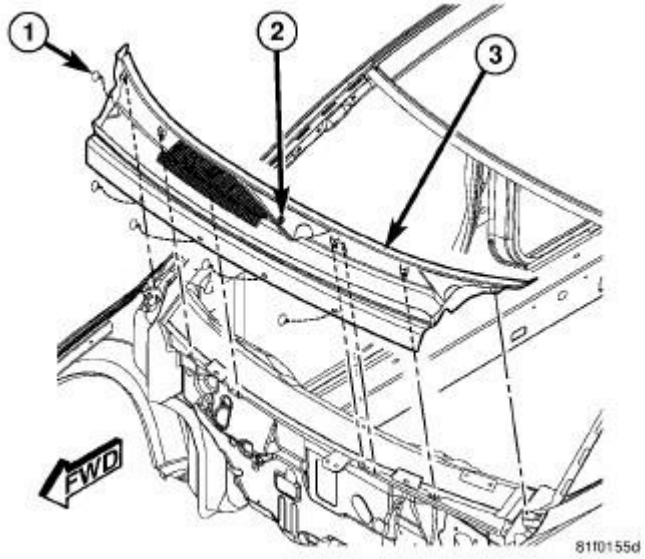


Fig. 67: COWL SCREEN
Courtesy of CHRYSLER LLC

2. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in

place.

3. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

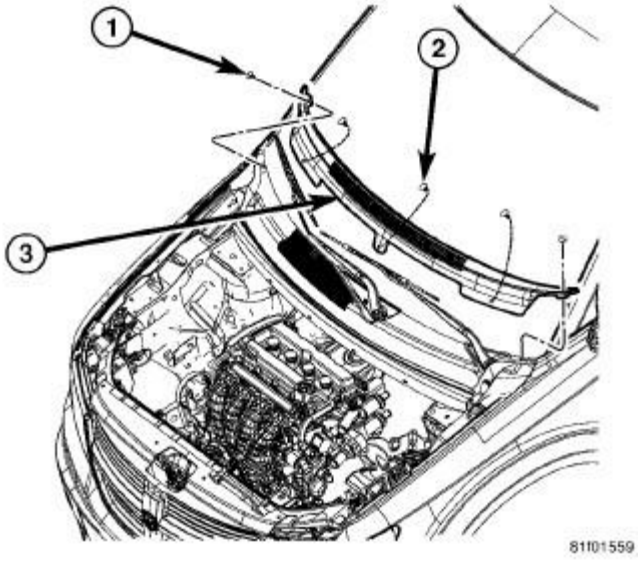


Fig. 68: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

4. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).

CLADDING, BODY

Removal

REMOVAL

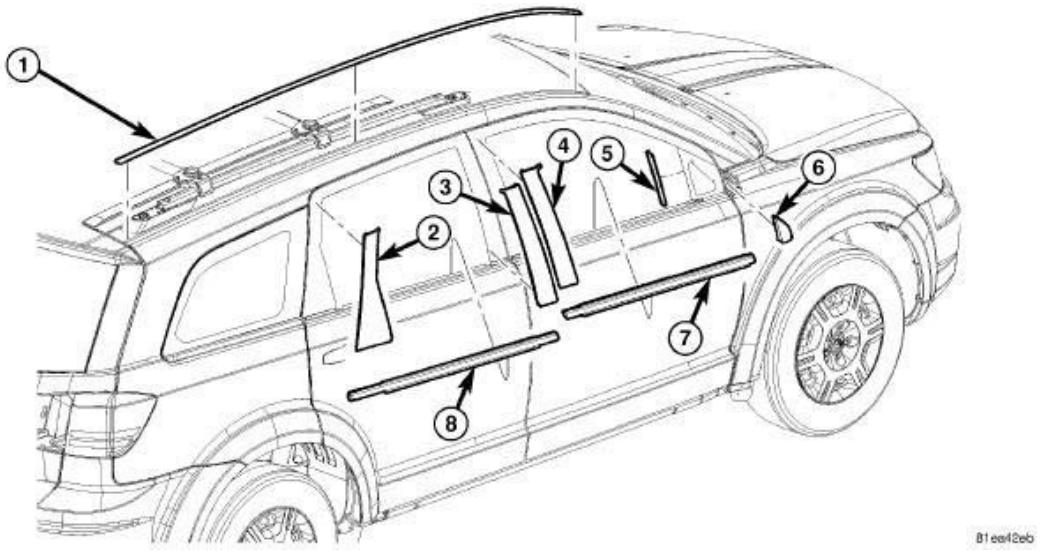


Fig. 69: Body Cladding
Courtesy of CHRYSLER LLC

1. Molding, Roof	5. Tape, A-pillar Molding
2. Tape, C-pillar Molding	6. Applique, Exterior Mirror
3. Tape, B-pillar Rear Molding	7. Molding, Front Window Belt
4. Tape, B-pillar Front Molding	8. Molding, Rear Window Belt

1. Warm the effected adhesive type molding and body metal to approximately 38°C (100°F) using a suitable heat lamp or heat gun.
2. Pull stick-on molding from painted surface.

Installation

INSTALLATION

1. Clean body surface with MOPAR® Super Kleen solvent or equivalent. Wipe surface dry with lint free cloth.
2. Remove protective cover from tape on back of molding. Apply molding to body below the masking tape guide.
3. Remove masking tape guide and firmly press molding to body surface to assure adhesion.

COVER, COWL PANEL, INNER

Removal

REMOVAL

1. Open the hood.

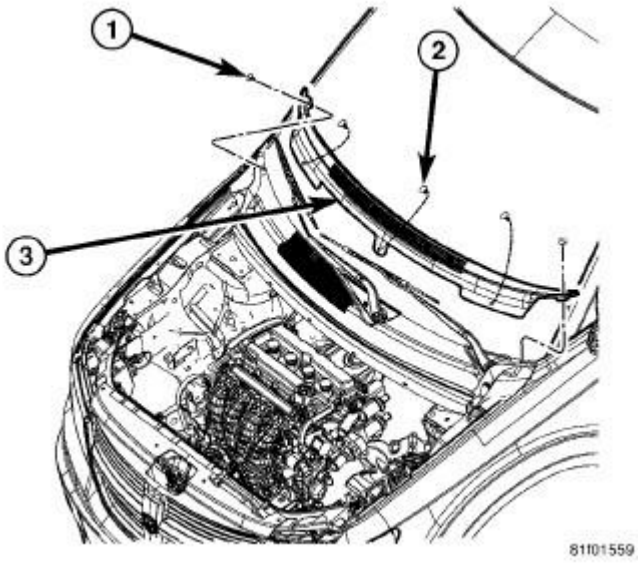


Fig. 70: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

2. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
3. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

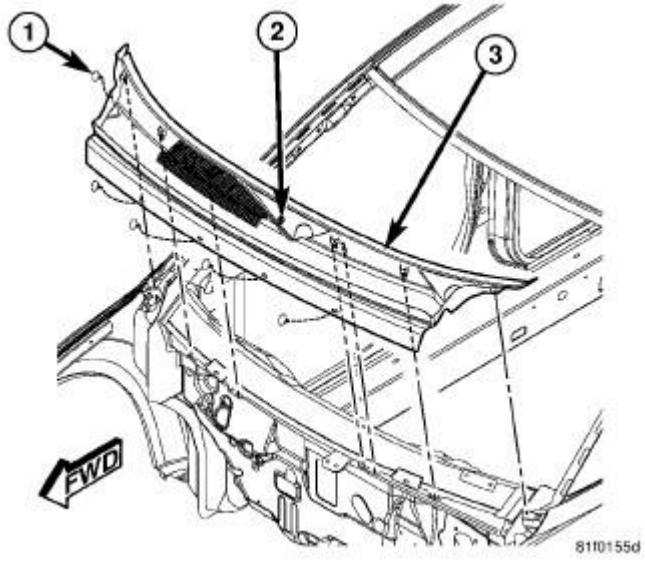


Fig. 71: COWL SCREEN
Courtesy of CHRYSLER LLC

4. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen.

5. Remove the cowl screen (3).

Installation

INSTALLATION

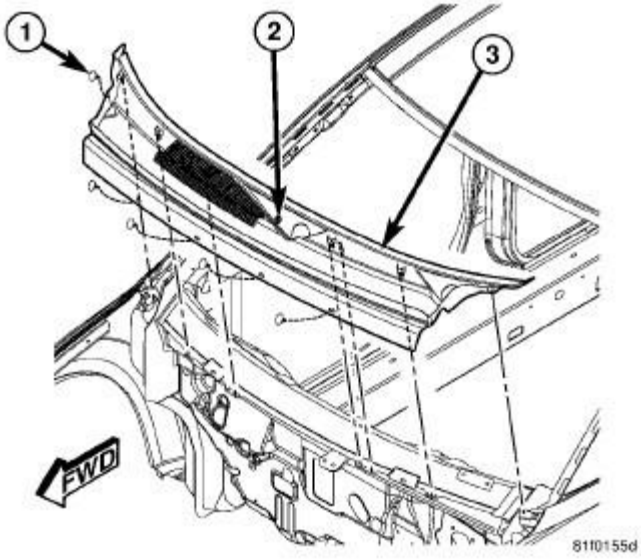


Fig. 72: COWL SCREEN
Courtesy of CHRYSLER LLC

1. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.
2. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

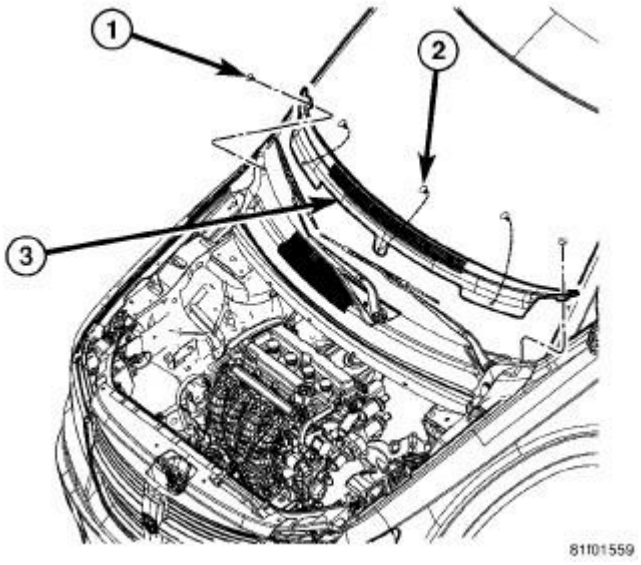


Fig. 73: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

3. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).

COVER, COWL PANEL, OUTER

Removal

REMOVAL

1. Open the hood.

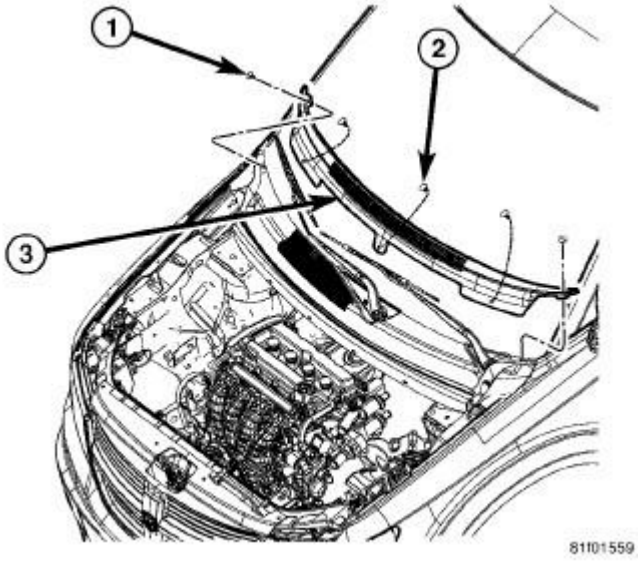


Fig. 74: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

2. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2).
3. Remove the cowl top screen (3).

Installation

INSTALLATION

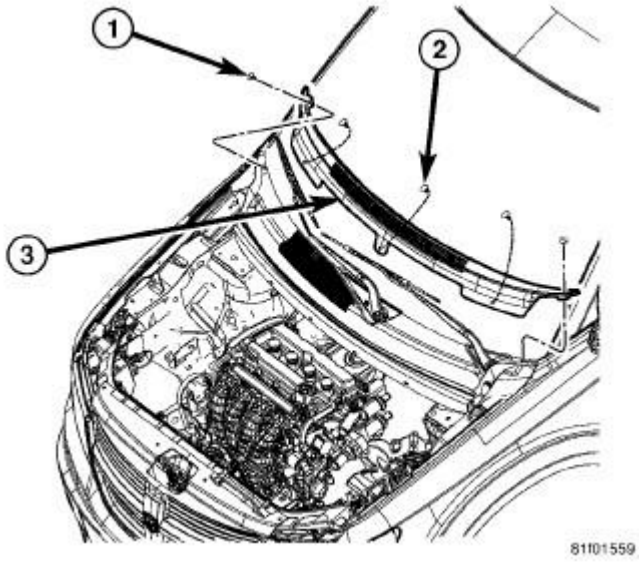


Fig. 75: COWL TOP SCREEN
Courtesy of CHRYSLER LLC

1. Position the cowl top screen (3).
2. Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).

DOOR, FUEL FILL

Removal

REMOVAL

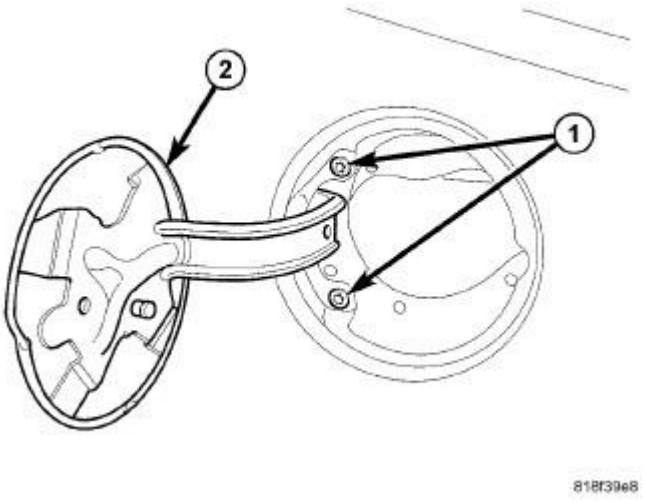


Fig. 76: FUEL FILLER DOOR
Courtesy of CHRYSLER LLC

1. Open fuel filler door (2).
2. Remove the two Torx screws (1).
3. Remove fuel filler door (2) from vehicle.

Installation

INSTALLATION

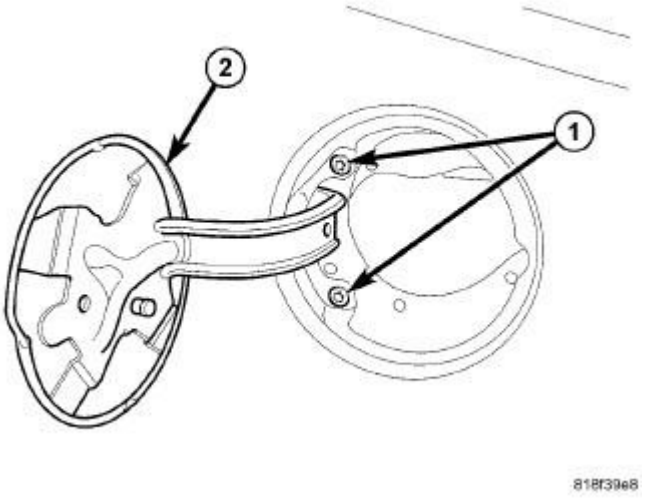


Fig. 77: FUEL FILLER DOOR
Courtesy of CHRYSLER LLC

1. Place fuel filler door (2) into position.
2. Install the two Torx screws (1).
3. Ensure that door operates properly.

FENDER, FRONT

Removal

REMOVAL

1. Remove fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal**
2. Remove headlamp assembly. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/UNIT, Front Lamp - Removal** .
3. Remove inner splash shield. See **Body/Exterior/SHIELD, Splash - Removal**.

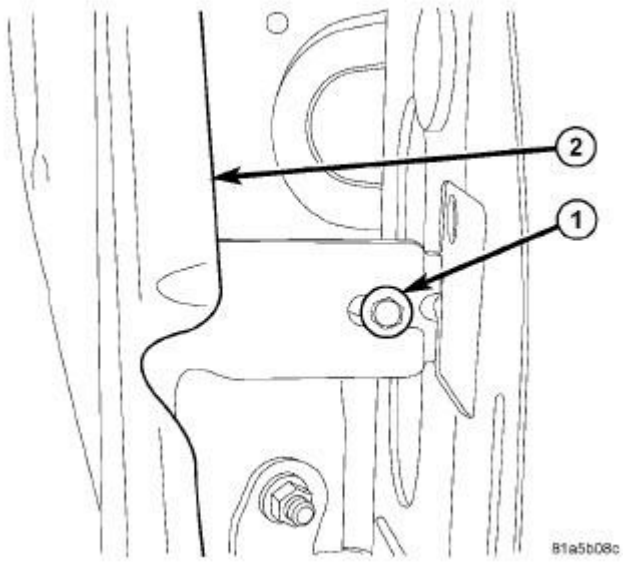


Fig. 78: FENDER DOG LEG TO BODY
Courtesy of CHRYSLER LLC

4. Remove fender (2) dogleg to body fastener (1).

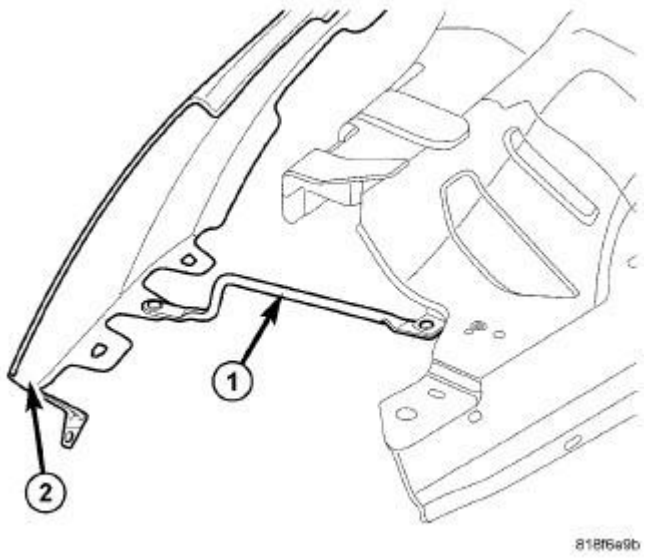


Fig. 79: FENDER SUPPORT BRACKET
Courtesy of CHRYSLER LLC

5. Remove fender brace (1).
6. Remove fender fastener to lower rocker panel.

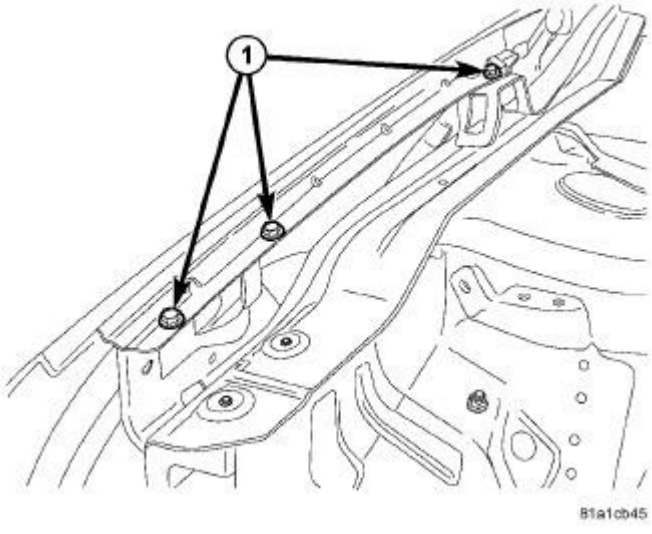


Fig. 80: UPPER FENDER FASTENERS
Courtesy of CHRYSLER LLC

7. Remove fasteners attaching fender to upper rail.
8. Remove fender from vehicle.

Installation

INSTALLATION

1. Place fender in position on vehicle.

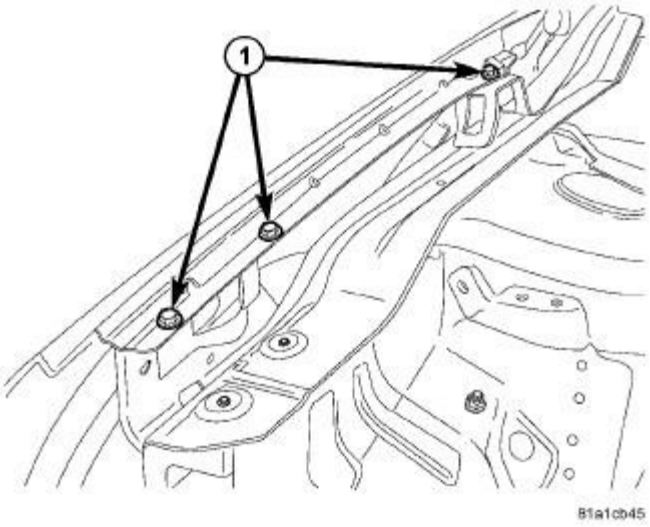


Fig. 81: UPPER FENDER FASTENERS
Courtesy of CHRYSLER LLC

2. From inside engine compartment, start the center upper rail bolt. Install all the fasteners (1) attaching fender to upper rail and tighten.

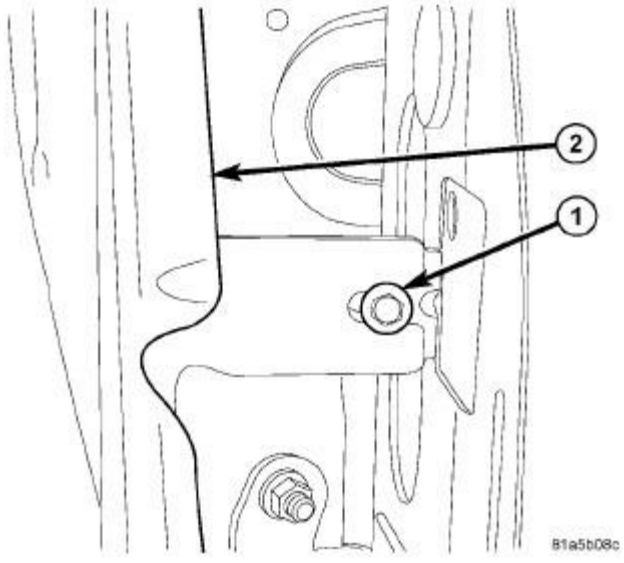


Fig. 82: FENDER DOG LEG TO BODY
Courtesy of CHRYSLER LLC

3. Install fender to lower cowl panel bolt.
4. Install fender to rocker panel bolt.
5. Place fascia into position.

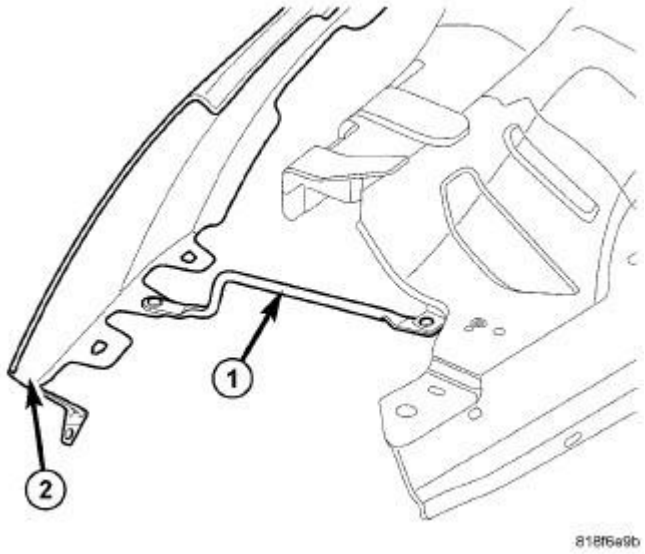


Fig. 83: FENDER SUPPORT BRACKET
Courtesy of CHRYSLER LLC

6. Install fender to fascia brace (1) fastener.
7. Install inner splash shields. See **Body/Exterior/SHIELD, Splash - Installation**.
8. Install headlamp assembly. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/UNIT, Front Lamp - Installation** .
9. Check fender for flush and gap.
10. Continue to install fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation** .

GRILLE

Description

DESCRIPTION

The grille is removed as part of the front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .

MIRROR, OUTSIDE REARVIEW

Removal

REMOVAL

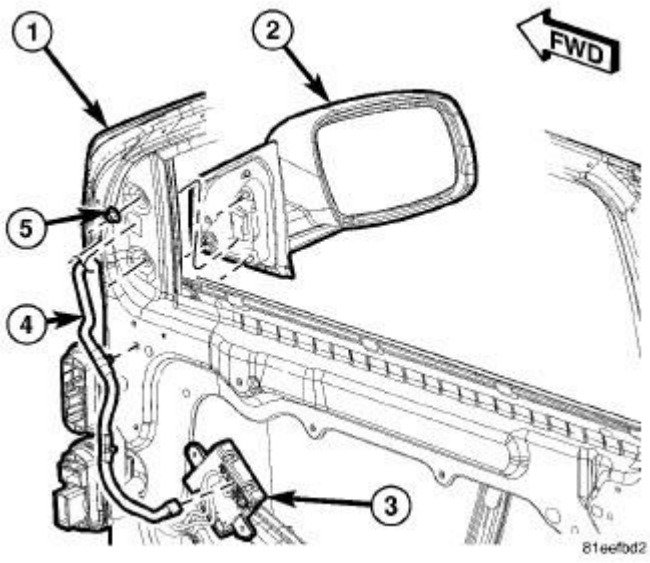


Fig. 84: Rearview Outside Mirror
Courtesy of CHRYSLER LLC

1. Remove the door trim panel. See **Body/Door - Front/PANEL, Door Trim - Removal**.
2. Remove the interior window trim molding as necessary to gain access to the mounting fasteners. See **Body/Door - Front/MOLDING - Removal**.
3. Disconnect power window mirror motor wire connector, if so equipped.
4. Disconnect manual mirror adjuster from side mirror cover, if so equipped.
5. Remove nuts attaching side view mirror to mirror flag.
6. Remove side view mirror from vehicle.

Installation

INSTALLATION

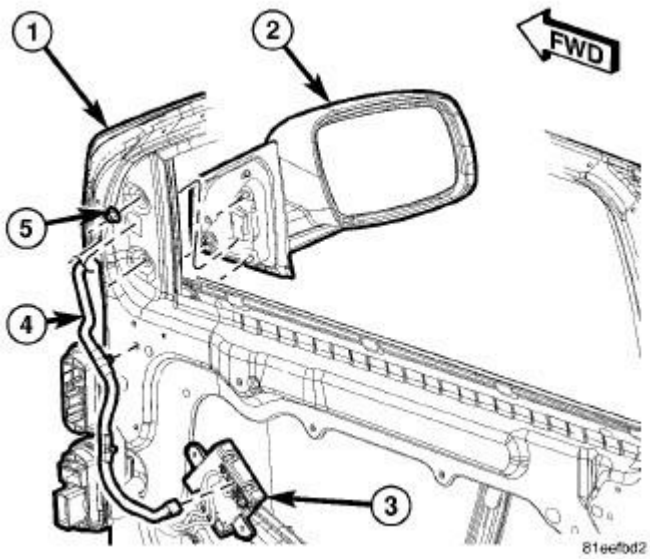


Fig. 85: Rearview Outside Mirror
Courtesy of CHRYSLER LLC

1. Feed power mirror wire harness through hole in mirror flag and seat grommet. Do not pull on wire harness to seat grommet, if so equipped.
2. Position side view mirror to vehicle.
3. Install nuts attaching side view mirror to mirror flag.
4. Engage push in fastener attaching power mirror wire connector to inner door panel, if so equipped.
5. Engage power mirror motor wire connector.
6. Install the interior window trim molding.
7. Install door trim panel. See **Body/Door - Front/PANEL, Door Trim - Installation**.

MIRROR, OUTSIDE REARVIEW, GLASS

Removal

REMOVAL

WARNING: Always wear eye and hand protection when servicing the mirror assembly. Failure to observe these warnings may result in personal injury from broken glass.

1. Carefully pull/pry the broken glass holder from the mirror assembly.
2. Disconnect the heated mirror electrical connectors from the terminals on the mirror glass holder, if equipped.

Installation

INSTALLATION

CAUTION: It is important to make sure the motor is square to the glass holder (attaching fingers) prior to glass holder attachment, otherwise the glass holder could be installed incorrectly causing poor retention and possible repeat failure.

1. Position the new mirror glass holder to the mirror assembly.

NOTE: Position the mirror glass holder so that the moisture drain hole on the mirror glass holder assembly is facing downward.

2. Align the mirror glass holder's attaching fingers to the mirror motor housing.

NOTE: Ensure that the protective rubber cover of the mirror motor housing is positioned correctly around the bottom of the fingers area.

3. Using one hand, firmly press the mirror glass holder assembly into place while at the same time supporting the housing assembly from the backside with the other hand.

NOTE: Pressure must be applied equally over the center portion of the mirror to engage the mirror glass holder's attaching fingers to the corresponding fingers on the housing assembly. One or more clicks may be heard when finger engagement takes place.

4. Verify retention of the mirror glass holder assembly by gently pulling outward on the mirror glass holder.

NAMEPLATE

Removal

REMOVAL

NOTE: Exterior nameplates are attached to body panels with adhesive tape.

1. Apply a length of masking tape on the body, parallel to the top edge of the nameplate to use as a guide, if necessary.
2. If temperature is below 21°C (70°F) warm emblem with a heat lamp or gun. Do not exceed 52°C (120°F) when heating emblem.
3. Insert a plastic trim stick or a hard wood wedge behind the emblem to separate the adhesive backing from the body.
4. Clean adhesive residue from body with MOPAR® Super Kleen solvent or equivalent.

Installation

INSTALLATION

1. Remove carrier from adhesive tape on back of emblem.
2. Position emblem properly on body.
3. Press emblem firmly to body with palm of hand.
4. If temperature is below 21°C (70°F) warm emblem with a heat lamp or gun to assure adhesion. Do not exceed 52°C (120°F) when heating emblem.

RACK, LUGGAGE

Removal

REMOVAL

1. Remove the luggage rack crossbars.
2. Remove the front and rear covers of the luggage rack rails.
3. Remove the mounting fasteners.
4. Carefully remove the luggage rack rails from the top of the vehicle.

Installation

INSTALLATION

1. Carefully install the luggage rack rails to the top of the vehicle.
2. Install the mounting fasteners.
3. Install the front and rear covers of the luggage rack rails.
4. Install the luggage rack crossbars.

SHIELD, SPLASH, FRONT WHEELHOUSE

Removal

REMOVAL

NOTE: The front splash shields are a two piece assembly.

1. Remove the appropriate front wheel. Refer to **Tires and Wheels - Removal**
2. Remove push pins.
3. Remove fasteners.
4. Remove splash shield from wheel well.

Installation

INSTALLATION

1. Place splash shield up to wheelhouse opening.

2. Install push pins.
3. Install fasteners.
4. Install the front wheel. Refer to **Tires and Wheels - Installation** .

SHIELD, SPLASH, REAR WHEELHOUSE

Removal

REMOVAL

1. Remove the appropriate rear wheel. Refer to **Tires and Wheels - Removal** .
2. Remove push pins.
3. Remove fasteners.
4. Remove splash shield from wheel well.

Installation

INSTALLATION

1. Place splash shield up to wheelhouse opening.
2. Install push pins.
3. Install fasteners.
4. Install the rear wheel. Refer to **Tires and Wheels - Installation** .

HOOD

CABLE, HOOD RELEASE

Removal

REMOVAL

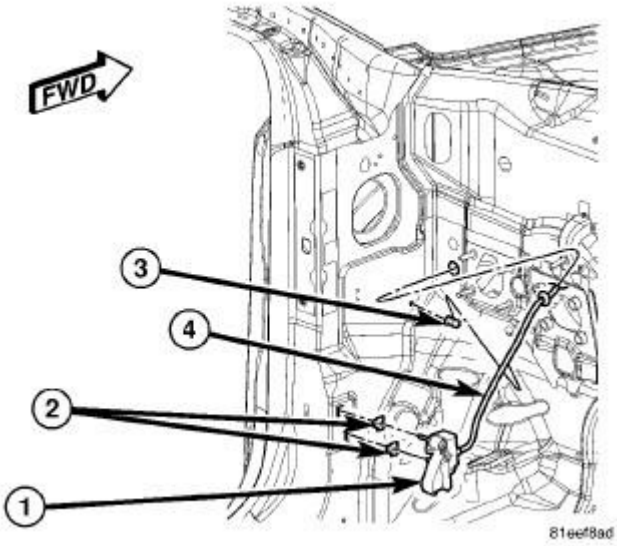


Fig. 86: Hood Release Handle
Courtesy of CHRYSLER LLC

1. Remove left front cowl trim panel.
2. Remove screws (2) attaching hood release handle (1) to inner cowl panel.
3. Disconnect the hood release cable from the latch handle.
4. Disengage rubber grommet at lower dash panel.
5. Disengage push-in fastener (3) attaching hood release cable (4) to dash panel.

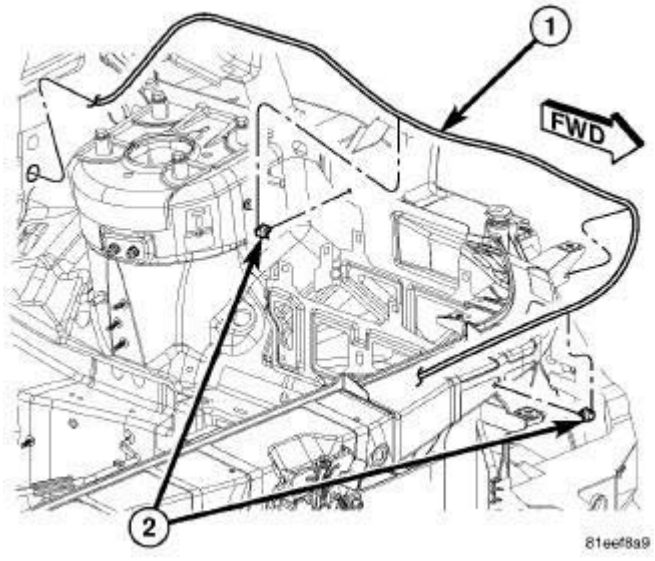


Fig. 87: Hood Release Cable
Courtesy of CHRYSLER LLC

6. Remove hood latch. See **Body/Hood/LATCH, Hood - Removal**.
7. Release clips (2) attaching hood release cable to left inner frame rail.
8. Remove hood release cable (1) from vehicle.

Installation

INSTALLATION

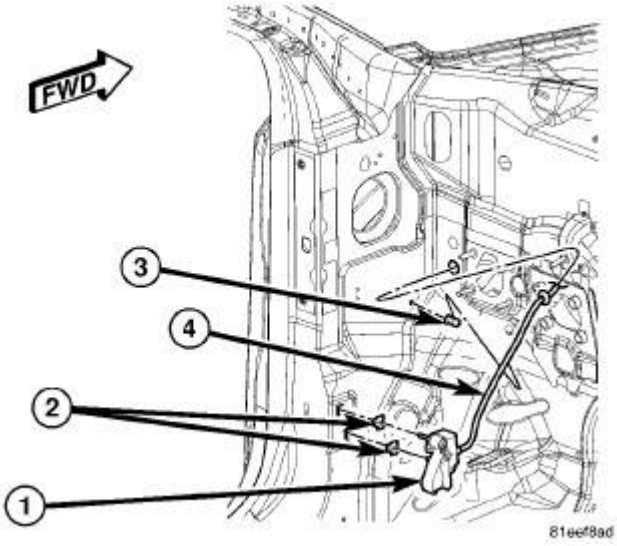


Fig. 88: Hood Release Handle
Courtesy of CHRYSLER LLC

1. Route hood release cable (4) through hole in lower dash panel and along inner frame rail.
2. Engage rubber grommet to lower dash panel.
3. Engage push-in fastener (3) attaching hood release cable to lower dash panel.
4. Install screws attaching hood release cable handle (1) to inner cowl panel.
5. Tighten screws (2) to 1.8 N.m (16 in. lbs.) torque.
6. Install left front cowl trim panel.

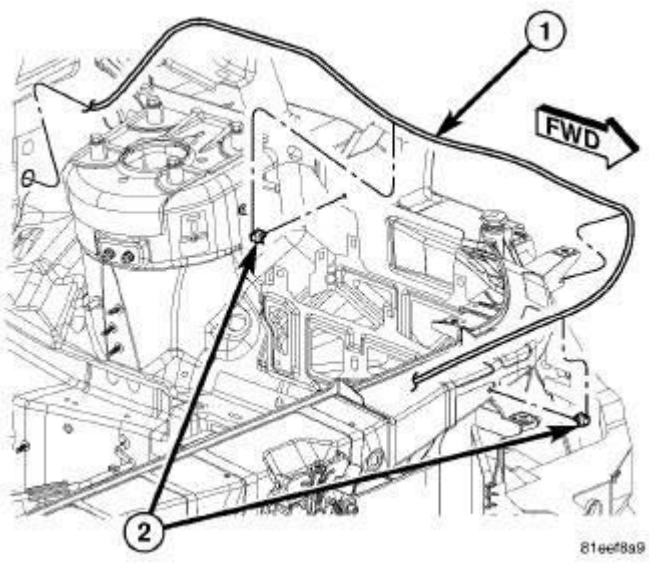


Fig. 89: Hood Release Cable
Courtesy of CHRYSLER LLC

7. Engage hood release cable into clips (2) along inner frame rail.
8. Install hood latch. See **Body/Hood/LATCH, Hood - Installation**.

HINGE, HOOD

Removal

REMOVAL

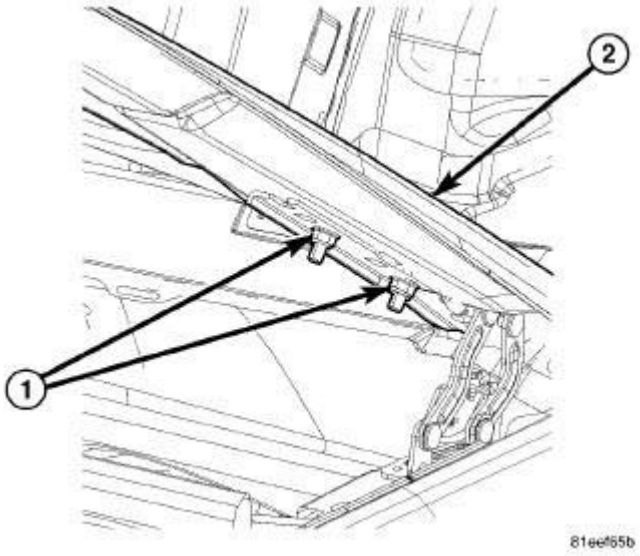


Fig. 90: Bolts Attaching Hood Hinge To Load Beam Inner

Courtesy of CHRYSLER LLC

1. Support hood on the side that requires hinge replacement.
2. Mark hinge attachment locations with a grease pencil or other suitable device to aid installation.
3. Remove cowl cover. See **Body/Exterior/COVER, Cowl Panel - Removal**.
4. Remove bolts attaching hood to hinge.
5. Remove bolts attaching hood hinge to load beam inner and remove hinge from vehicle.

Installation

INSTALLATION

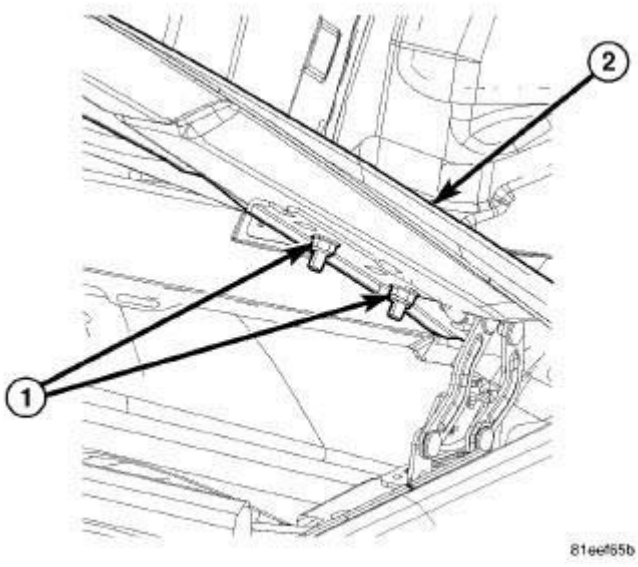


Fig. 91: Bolts Attaching Hood Hinge To Load Beam Inner
Courtesy of CHRYSLER LLC

1. If necessary, paint new hinge before installation.
2. Place hinge in position on vehicle.
3. Install bolts to attach hood hinge to load beam inner.
4. Install bolts to attach hood to hinge.
5. Align all marks and secure bolts.
6. Tighten bolts to 28 N.m (20 ft. lbs.) torque.
7. The hood should be aligned to 4 mm (0.160 in.) gap to the front fenders and flush across the top surfaces along fenders. Shims can be added or removed under hood hinge to achieve proper hood height.
8. Install cowl cover. See **Body/Exterior/COVER, Cowl Panel - Installation**.
9. Verify hood latch operation. Adjust as necessary.

HOOD

Removal

REMOVAL

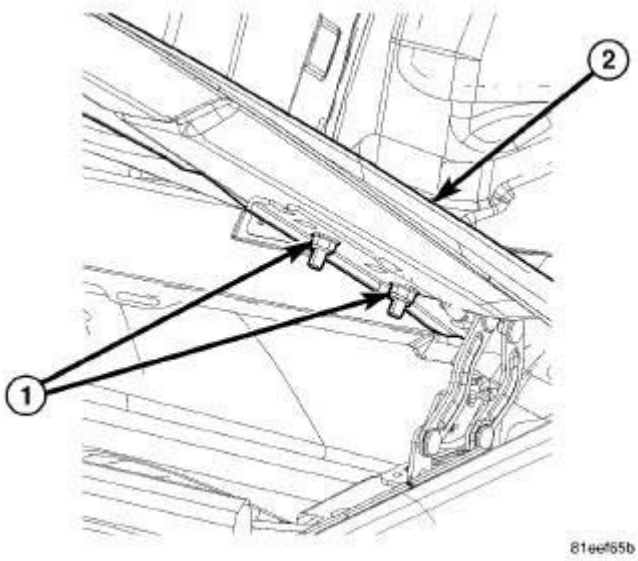


Fig. 92: Bolts Attaching Hood Hinge To Load Beam Inner
Courtesy of CHRYSLER LLC

1. Open hood (2).
2. Mark outline of hinges on inside of hood to aid installation.
3. Disconnect under hood lamp wire connector to engine compartment wire harness if equipped.
4. Disconnect windshield washer hose from hood.
5. Remove the top bolts attaching hood to hinge and loosen the bottom fasteners (1) until they can be removed by hand.
6. With assistance from a helper at the opposite side of the vehicle to support the hood, remove bottom fasteners attaching hood to hinge.
7. Remove the hood from the vehicle.
8. Transfer parts as necessary.

Installation

INSTALLATION

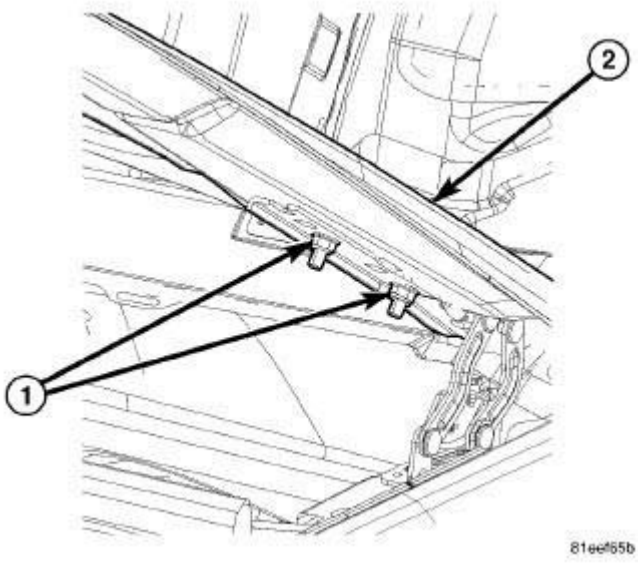


Fig. 93: Bolts Attaching Hood Hinge To Load Beam Inner
Courtesy of CHRYSLER LLC

1. With assistance from a helper, place hood (2) in position on vehicle.
2. Install bottom fasteners (1) to attach hood to hinge finger tight.
3. Install top fasteners to attach hood to hinge finger tight.
4. Position bolts at outline marks and tighten bolts (3) to 20 N.m (15 ft. lbs.). The hood should be aligned to 4 mm (0.160 in.) gap to the front fenders and flush across the top surfaces along fenders.
5. Connect under hood lamp wire connector to engine compartment wire harness, if equipped.
6. Route and connect windshield washer hose to hood.
7. Verify hood latch operation and alignment. Adjust as necessary.

LATCH, HOOD

Removal

REMOVAL

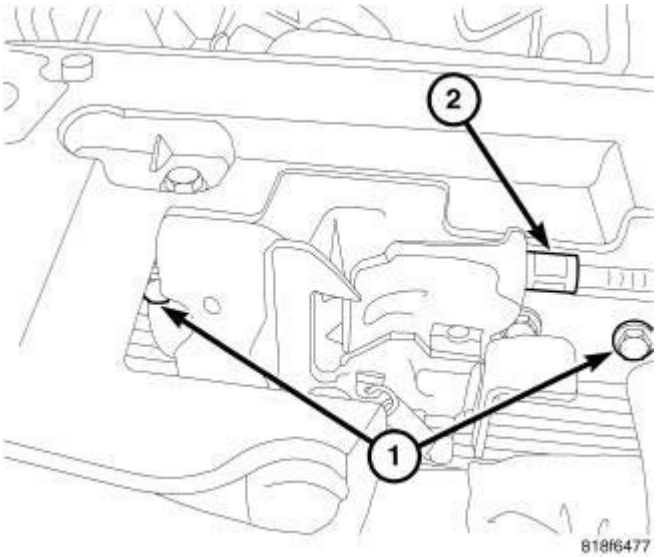


Fig. 94: Latch
Courtesy of CHRYSLER LLC

1. Release hood latch and open hood.
2. Support hood on prop rod.
3. Mark outline of hood latch on radiator support crossmember with a grease pencil or other suitable device to aid installation.
4. Remove nuts (1) attaching hood latch to upper radiator support crossmember.
5. Remove hood latch from vehicle.
6. Disengage remote release cable (2) from hood latch. See **Body/Hood/CABLE, Hood Release - Removal**

Installation

INSTALLATION

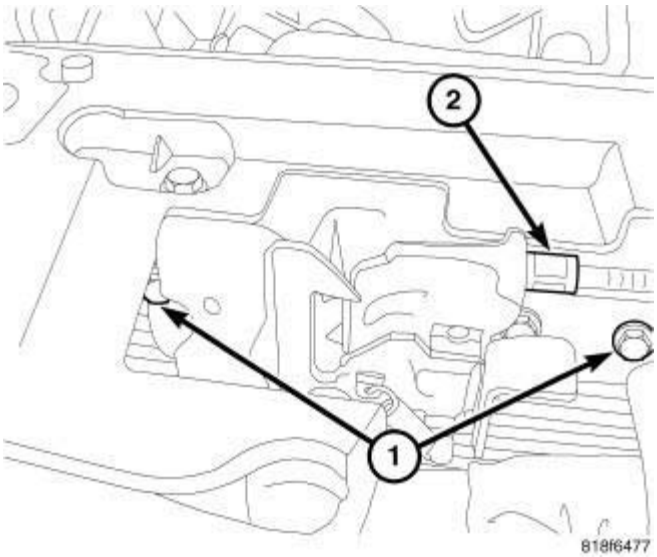


Fig. 95: Latch
Courtesy of CHRYSLER LLC

1. Engage remote release cable into hood latch.
2. Position hood latch on vehicle.
3. Install nuts attaching hood latch onto upper radiator support crossmember.
4. Tighten nut to 28 N.m (20 ft.lbs.) torque.
5. Verify operation. Adjust as necessary.

INSTRUMENT PANEL

BEZEL, INSTRUMENT CLUSTER

Removal

REMOVAL

1. Remove the left instrument panel air outlet. Refer to **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal** .
2. Using a trim stick special tool C-4755 or equivalent, disengage clips holding the cluster bezel to instrument panel.
3. Remove cluster bezel from vehicle.

Installation

INSTALLATION

1. Position the cluster bezel in place and align the spring retainers with the instrument panel.
2. Hand tap cluster bezel in place ensuring proper seat.
3. Install the left instrument panel air outlet. Refer to **Heating and Air Conditioning/Distribution/OUTLET, Air - Installation** .

BEZEL, INSTRUMENT PANEL, CENTER

Removal

REMOVAL

1. Using a trim stick special tool C-4755 or equivalent, disengage clips holding the center bezel to instrument panel.
2. Remove center bezel from vehicle.

Installation

INSTALLATION

1. Position the center bezel in place and align the spring retainers with the instrument panel.
2. Hand tap center bezel in place ensuring proper seat.

BIN, INSTRUMENT PANEL, BEVERAGE COOLER

Removal

REMOVAL

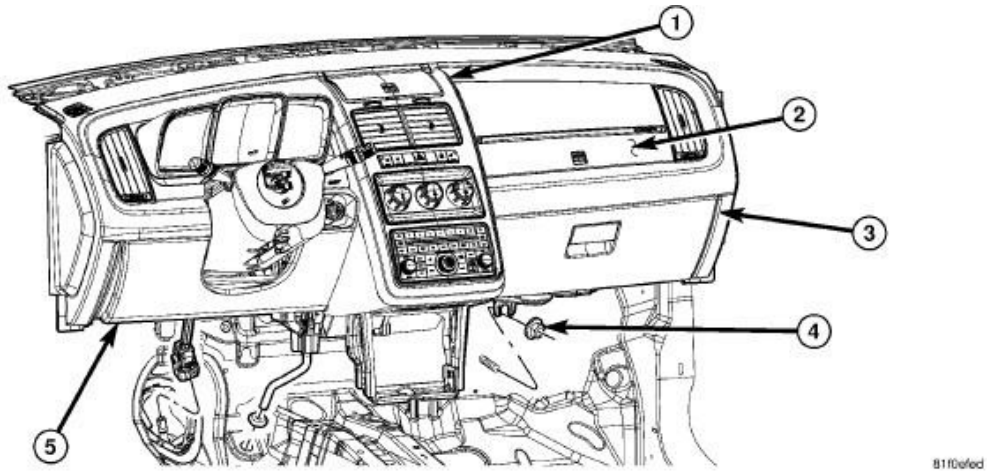


Fig. 96: Storage Bin Door
Courtesy of CHRYSLER LLC

1. Open the storage bin (3) door.
2. Remove the interior liner.
3. Remove the air outlet. Refer to **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal** .
4. Carefully remove the cooling vent inside the storage bin.
5. Remove the cooling hose attached to vent.
6. Using a trim stick special tool C-4755 or equivalent, disengage clips holding the storage bin to instrument panel.
7. Remove the storage bin from the vehicle.

Installation

INSTALLATION

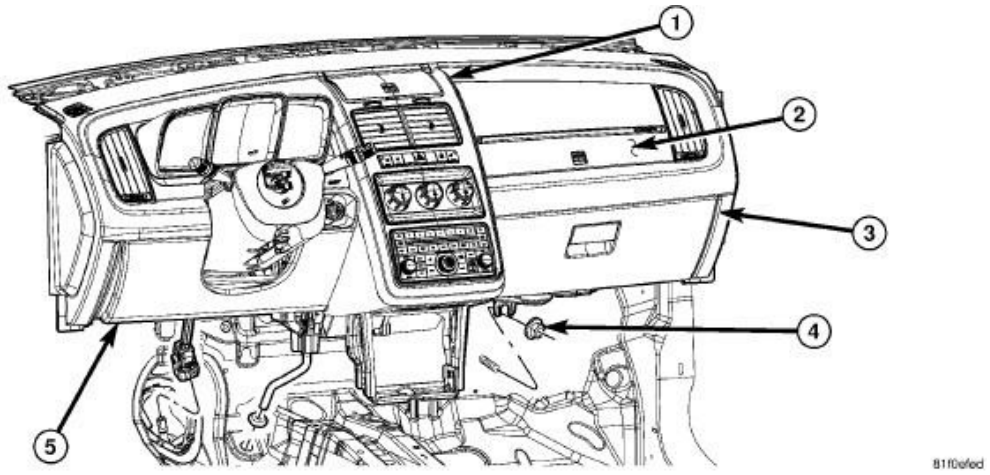


Fig. 97: Storage Bin Door
Courtesy of CHRYSLER LLC

1. Install the storage bin (3) from the vehicle.
2. Engage clips securing the storage bin to instrument panel.
3. Install the cooling hose to vent.
4. Install the cooling vent inside the storage bin.
5. Install the air outlet. Refer to **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal** .
6. Install the interior liner.

BIN, INSTRUMENT PANEL, LOWER

Removal

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the center console. See **Body/Interior/CONSOLE, Center - Removal**.
3. Remove the push-pin retainers by pressing the center inward to release then prying the retainer out of the storage bin.
4. Remove the lower storage bin from the vehicle.

Installation

INSTALLATION

1. Install the lower storage bin to the vehicle.
2. Install the push-pin retainers.
3. Install the center console. See **Body/Interior/CONSOLE, Center - Installation**.
4. Connect the battery negative cable.

CAP, INSTRUMENT PANEL END

Removal

REMOVAL

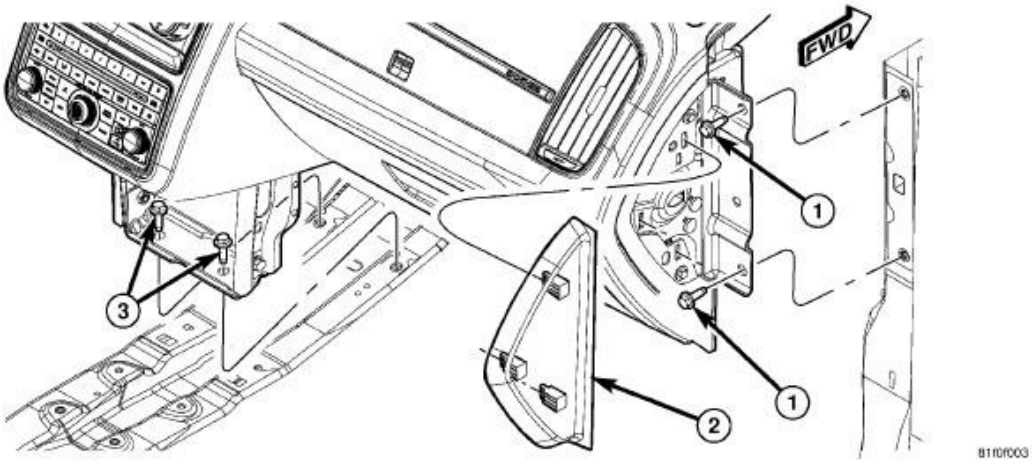


Fig. 98: Clips Holding End Cover
Courtesy of CHRYSLER LLC

1. Open front door.
2. Using a trim stick special tool C-4755 or equivalent, disengage clips holding end cover (2) to instrument panel.

Installation

INSTALLATION

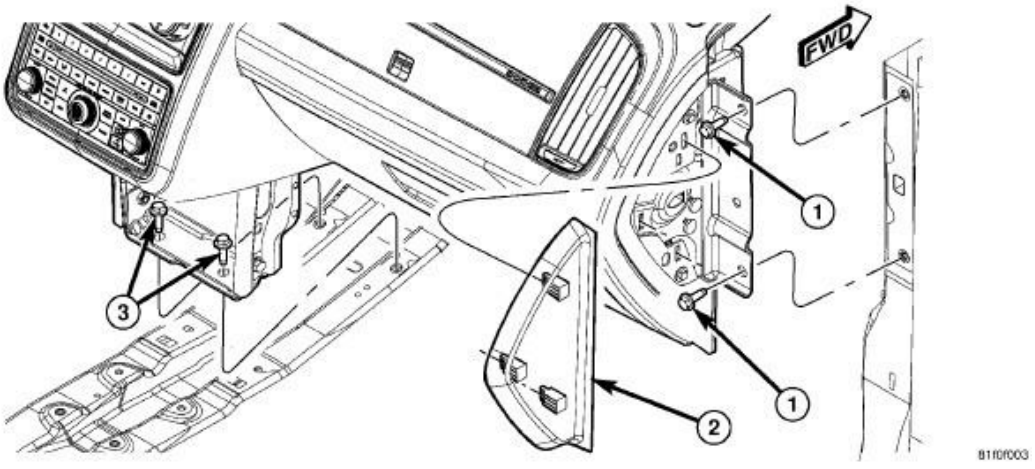


Fig. 99: Clips Holding End Cover
Courtesy of CHRYSLER LLC

1. Position end cover (2) over retaining slots and firmly snap into place.

2. Close front door.

COVER, STEERING COLUMN OPENING

Removal

REMOVAL

1. Using trim stick C-4755 or equivalent, pry steering column cover disengaging tabs.
2. Remove steering column cover from instrument panel.

Installation

INSTALLATION

1. Place steering column cover in position.
2. Firmly press steering column cover into place engaging clips ensuring proper seat.

GLOVE BOX, INSTRUMENT PANEL

Removal

REMOVAL

1. Open glove box.
2. Push in on sides of glove box bin and lower door.
3. Pivot glove box downward and disengage hinge hooks from instrument panel.
4. Remove glove box.

Installation

INSTALLATION

1. Place glove box in position.
2. Engage hinge hooks into instrument panel and pivot glove box upward.
3. Push in sides of glove box bin and snap glove box assembly into instrument panel.
4. Close glove box door.

GRILLE, DEFROSTER

Removal

REMOVAL

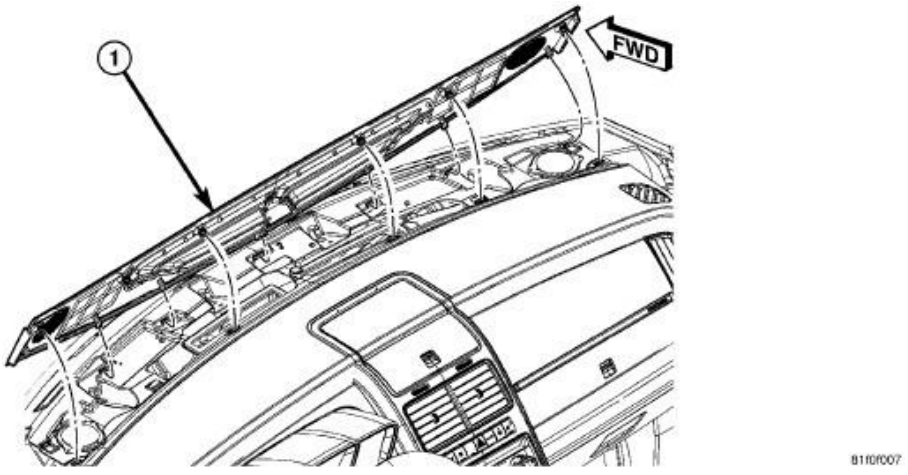


Fig. 100: Defroster Grille
Courtesy of CHRYSLER LLC

1. Remove the left and right A-pillar trim panels. See **Body/Interior/PANEL, A-Pillar Trim - Removal**.
2. Using trim stick C4755 or equivalent, pry up on defroster grille disengaging clips.
3. Remove defroster grille from vehicle.

Installation

INSTALLATION

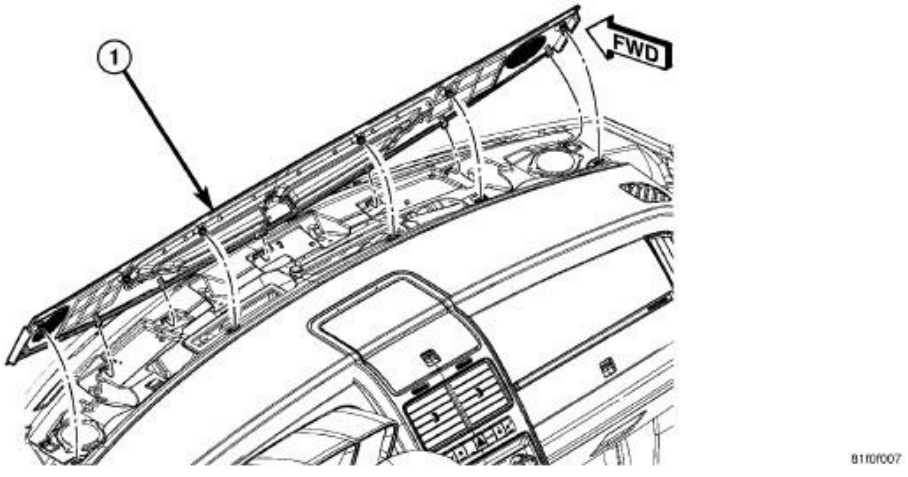


Fig. 101: Defroster Grille
Courtesy of CHRYSLER LLC

1. Position the defroster grille in place and align the spring retainers with the instrument panel.
2. Hand tap defroster grille in place ensuring proper seat.
3. Install the left and right A-pillar trim panels. See **Body/Interior/PANEL, A-Pillar Trim - Installation**.

KNEEBLOCKER

Removal

REMOVAL

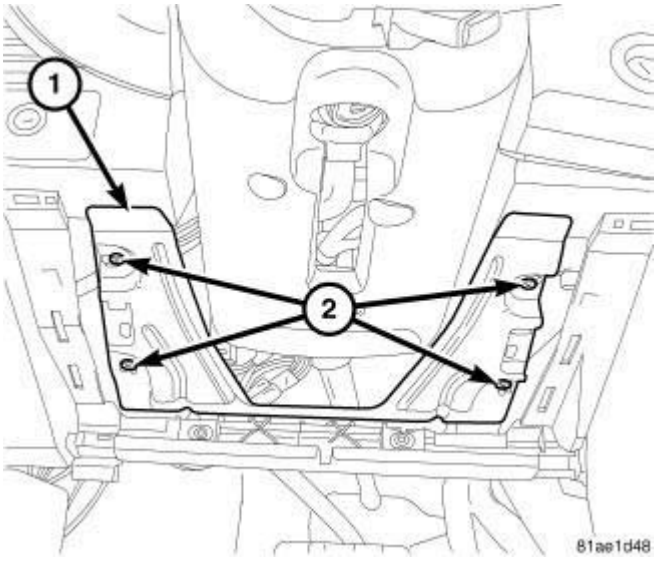


Fig. 102: Identifying Steering Column Cover Reinforcement
Courtesy of CHRYSLER LLC

1. Remove the steering column cover. See **Body/Instrument Panel/COVER, Steering Column Opening - Removal**.
2. Remove mounting fasteners.
3. Remove knee bolster from instrument panel.

Installation

INSTALLATION

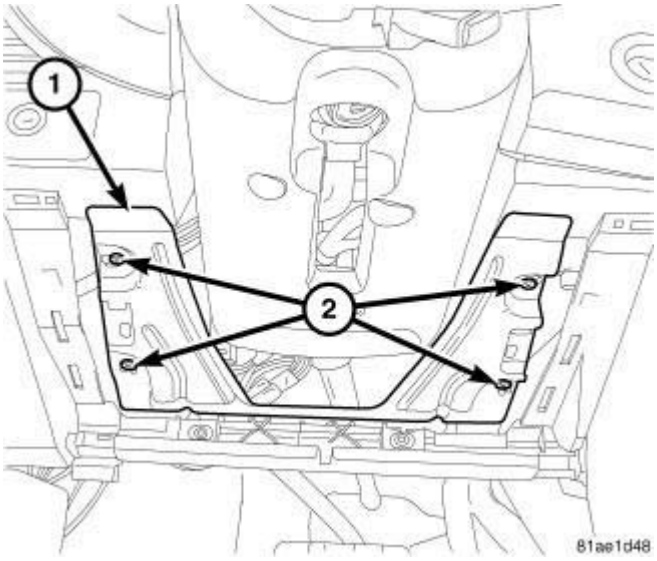


Fig. 103: Identifying Steering Column Cover Reinforcement
Courtesy of CHRYSLER LLC

1. Place knee bolster into position.
2. Install the mounting fasteners.
3. Install the steering column cover. See **Body/Instrument Panel/COVER, Steering Column Opening - Installation**.

LATCH, GLOVE BOX DOOR

Removal

REMOVAL

1. Open the glove box.
2. Remove the three glove box latch screws.
3. Separate the latch from the glove box assembly.

Installation

INSTALLATION

1. Install the latch onto the glove box assembly.
2. Install the glove box latch screws.
3. Close glove box door.

PAD, INSTRUMENT PANEL

Removal

REMOVAL

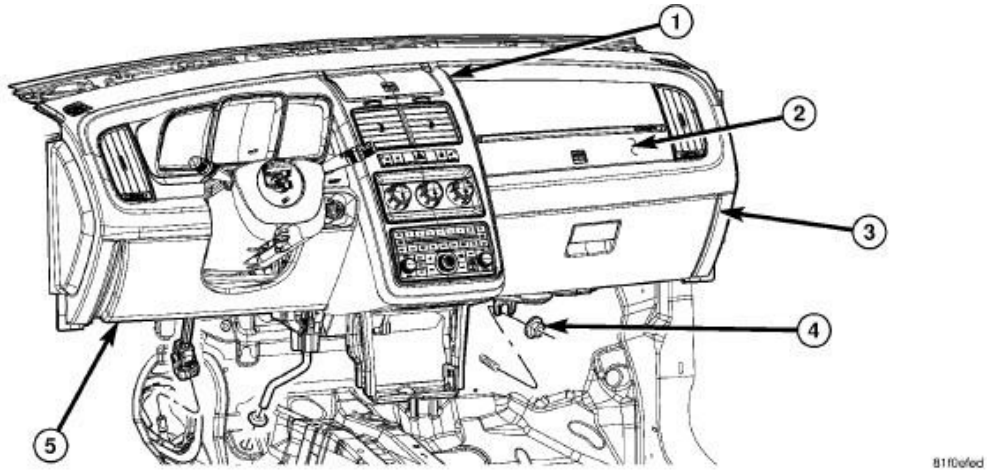


Fig. 104: Storage Bin Door

Courtesy of CHRYSLER LLC

1. Remove the A-pillar trim panels.
2. Remove the defroster grille. See **Body/Instrument Panel/GRILLE, Defroster - Removal**.
3. Remove the lower instrument panel storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Removal**.
4. Remove the instrument panel end caps using a trim stick or equivalent.
5. Remove the glove box by pressing the sides of the glove box and pull down on the glove box.
6. Remove the steering column. Refer to **Steering/Column - Removal** .
7. Remove the instrument panel center bezel using a trim stick or equivalent.
8. Remove the knee bolster. See **Body/Instrument Panel/KNEEBLOCKER - Removal**.
9. Remove the instrument cluster. Refer to **Electrical/Instrument Cluster - Removal** .
10. Remove the radio fasteners.
11. Disconnect the electrical connectors and remove from the instrument panel.
12. Remove the beverage cooler storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Removal**.
13. Remove the passenger air bag and mounting fasteners. Refer to **Restraints/AIR BAG, Passenger - Removal** .
14. Remove the top pad mounting fasteners.

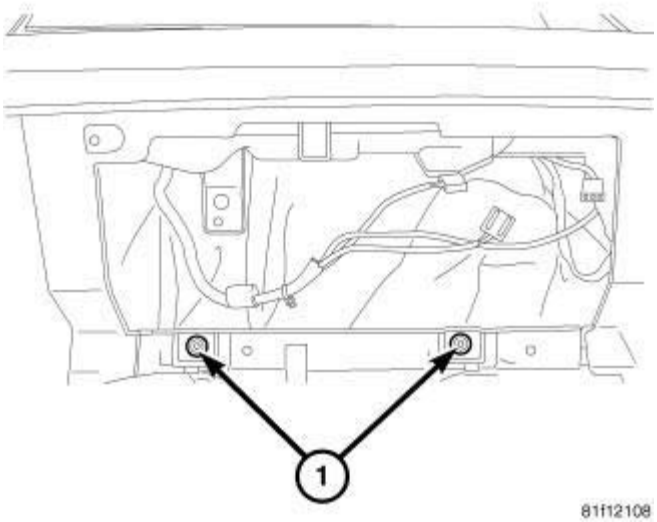


Fig. 105: Fasteners Located At Bottom Of Glove Box Opening
Courtesy of CHRYSLER LLC

15. Remove the fasteners (1) located at the bottom of the glove box opening.
16. Remove the fasteners that secure the defrost ducts to the top pad.

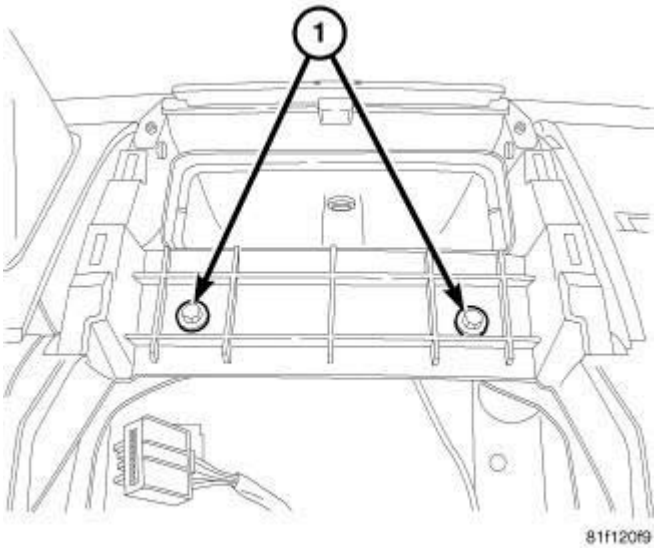


Fig. 106: Mounting Fasteners At Center Of Instrumental Panel
Courtesy of CHRYSLER LLC

17. Remove the mounting fasteners (1) at the center of the IP above the radio mounting area.

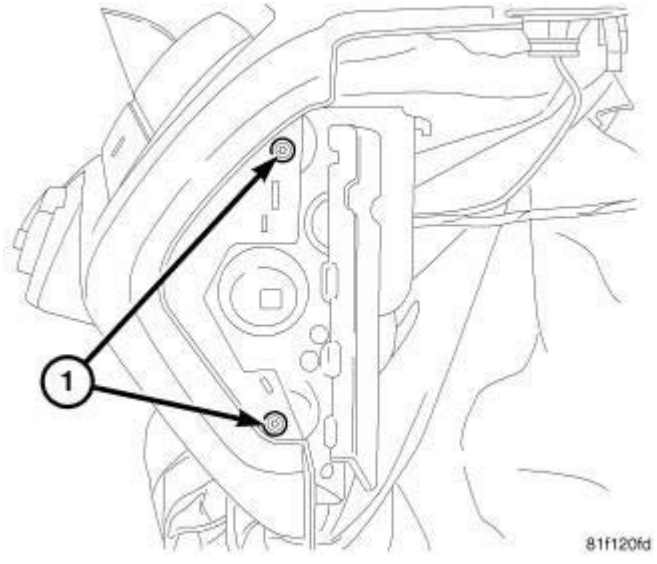


Fig. 107: Mounting Fasteners At End Caps Of Instrument Panel
Courtesy of CHRYSLER LLC

18. Remove the mounting fasteners at the end caps of the instrument panel.
19. Remove the top pad from the instrument panel assembly.

Installation

INSTALLATION

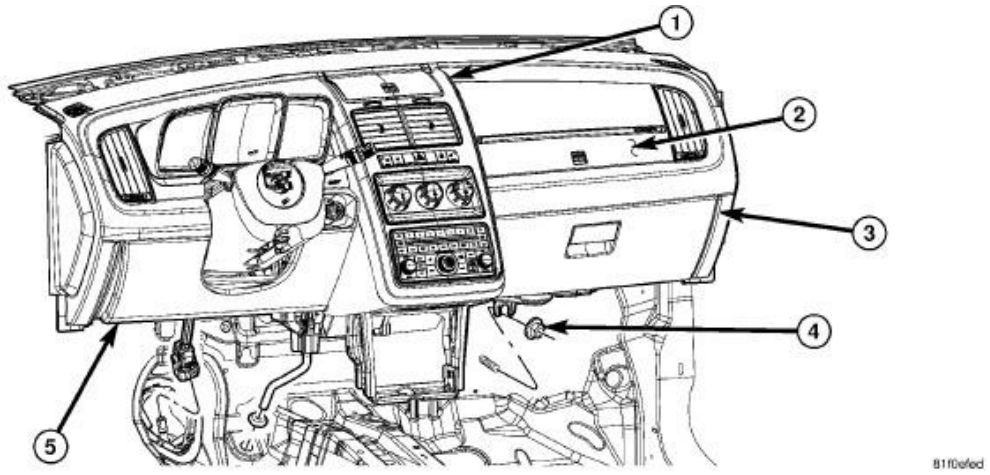


Fig. 108: Storage Bin Door
Courtesy of CHRYSLER LLC

1. Install the top pad to the instrument panel assembly.

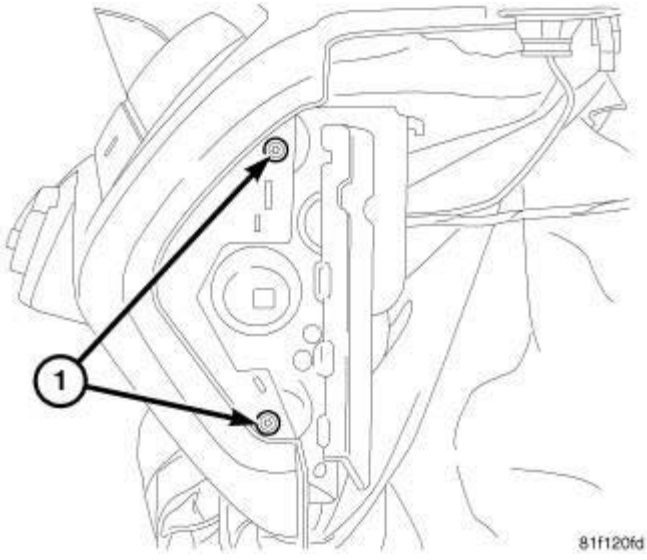


Fig. 109: Mounting Fasteners At End Caps Of Instrument Panel
Courtesy of CHRYSLER LLC

2. Install the mounting fasteners at the end caps of the instrument panel.

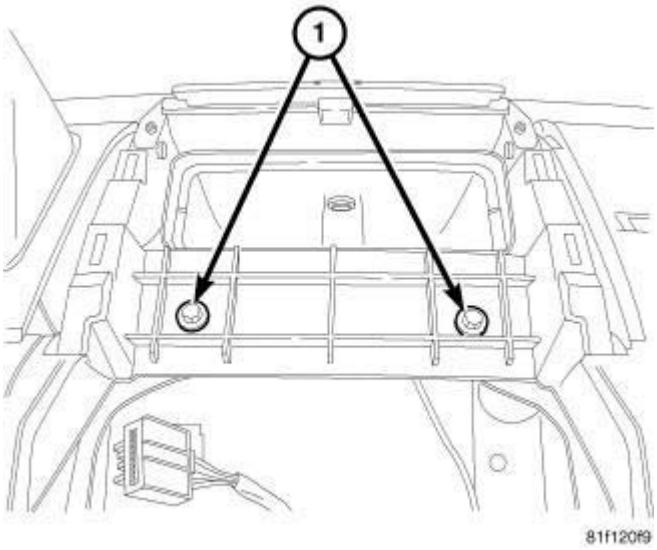


Fig. 110: Mounting Fasteners At Center Of Instrumental Panel
Courtesy of CHRYSLER LLC

3. Install the mounting fasteners (1) at the center of the IP above the radio mounting area.
4. Install the fasteners that secure the defrost ducts to the top pad.

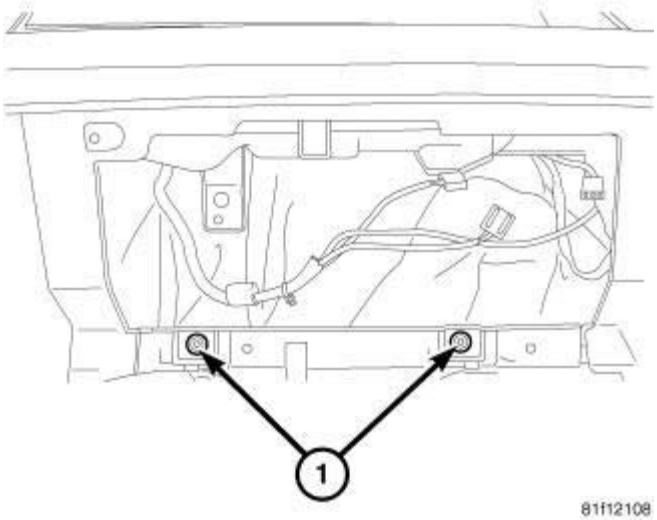


Fig. 111: Fasteners Located At Bottom Of Glove Box Opening
Courtesy of CHRYSLER LLC

5. Install the fasteners (1) located at the bottom of the glove box opening.
6. Install the top pad mounting fasteners.
7. Install the passenger air bag and mounting fasteners. Refer to **Restraints/AIR BAG, Passenger - Installation** .
8. Install the beverage cooler storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Installation**.

9. Connect the electrical connectors and install the radio to the instrument panel.
10. Install the radio fasteners.
11. Install the instrument cluster. Refer to **Electrical/Instrument Cluster - Installation** .
12. Install the knee bolster. See **Body/Instrument Panel/KNEEBLOCKER - Installation**.
13. Install the left and right cowl trim panels.
14. Install the glove.
15. Install the instrument panel end caps using a trim stick or equivalent.
16. Install the lower instrument panel storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Installation**
17. Install the defroster grille. See **Body/Instrument Panel/GRILLE, Defroster - Installation**.
18. Install the A-pillar trim panels.
19. Connect the battery negative cable.

PANEL, INSTRUMENT

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustrations. RHD model similar.

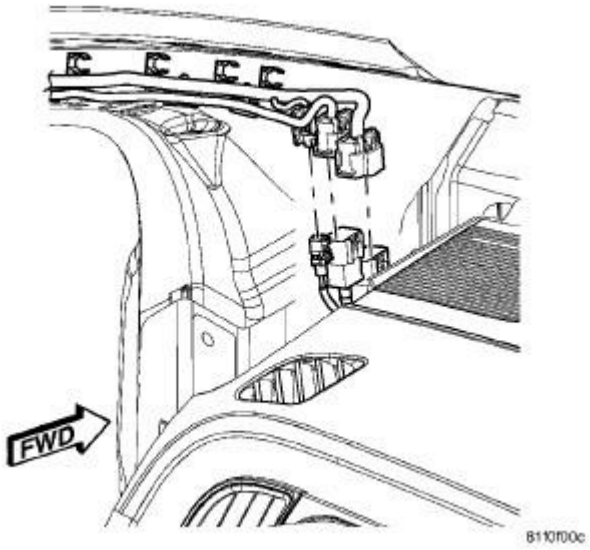


Fig. 112: Electrical Connectors Located At Left & Right A-Pillar
Courtesy of CHRYSLER LLC

NOTE: Left side shown. Right side similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the A-pillar trim panels. See **Body/Interior/PANEL, A-Pillar Trim - Removal**.
3. Disconnect the electrical connectors located at the left and right A-pillar.

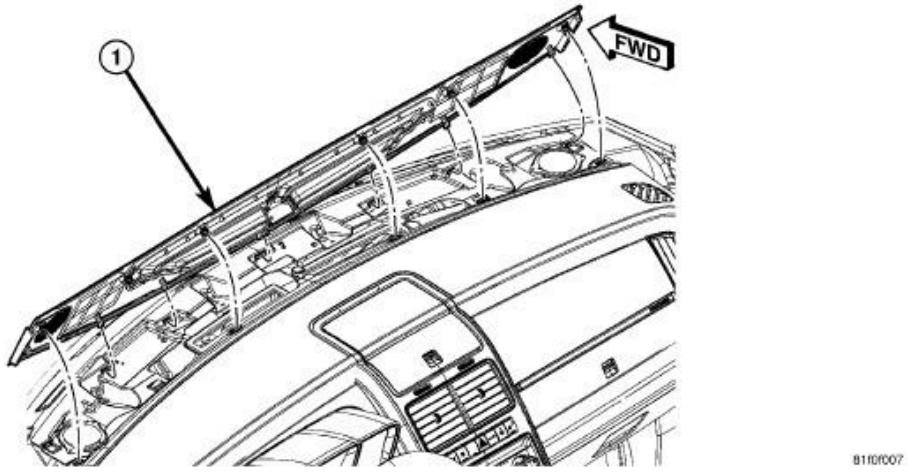


Fig. 113: Defroster Grille
Courtesy of CHRYSLER LLC

4. Using Trim Stick C-4755 or equivalent, disengage the clips that secure the defroster grille (1) to the top of the instrument panel and remove the grille.

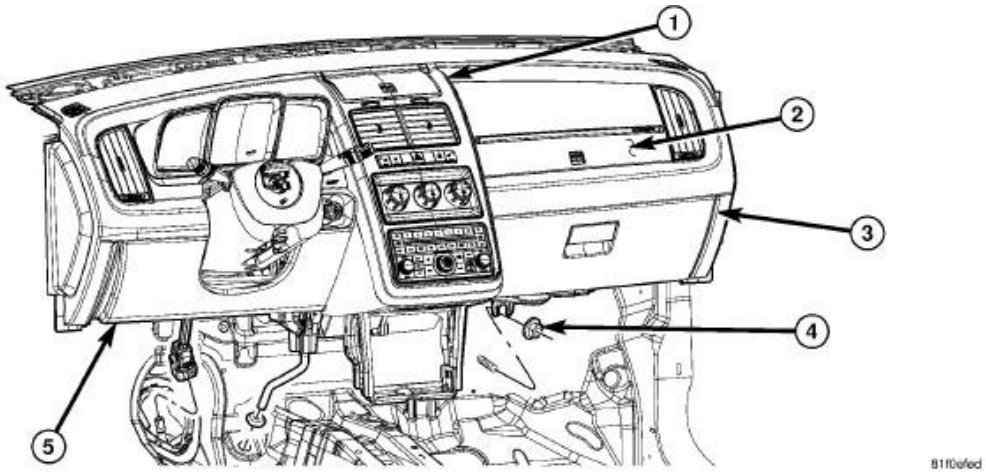


Fig. 114: Storage Bin Door
Courtesy of CHRYSLER LLC

5. Using Trim Stick C-4755 or equivalent, disengage the clips that secure the steering column cover (5) to the instrument panel (2) and remove the cover.
6. Remove the steering column. Refer to **Steering/Column - Removal** .
7. Using Trim Stick C-4755 or equivalent, disengage the clips that secure the instrument panel center bezel (1) to the instrument panel and remove the center bezel.
8. Remove the glove box (3).
9. Remove the nut (4) that secures the instrument panel to the stud located near the blower motor.

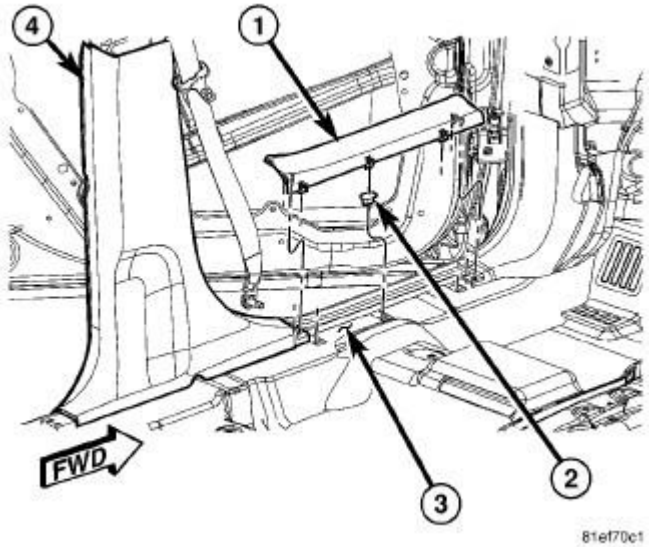


Fig. 115: Front Door Sill Scuff Plates
Courtesy of CHRYSLER LLC

NOTE: Left side shown. Right side similar.

10. Using trim stick C-4755 or equivalent, disengage the clips (2) that secure the left and right front door sill scuff plates (1) to the door sills (3) and remove the scuff plates.

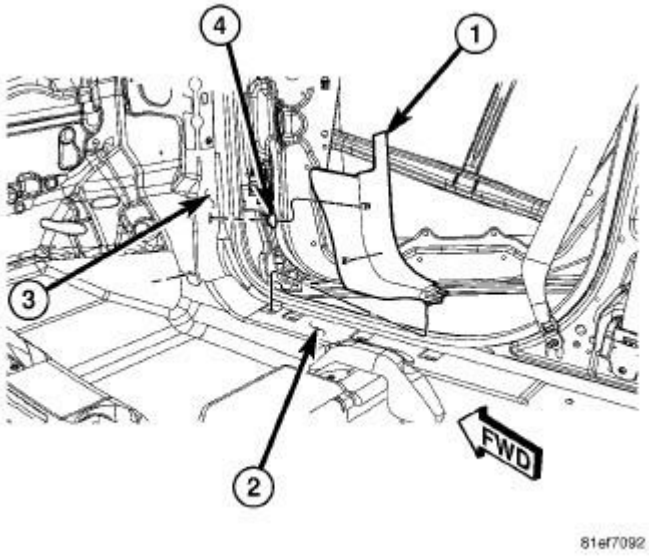


Fig. 116: Cowl Trim Panels
Courtesy of CHRYSLER LLC

NOTE: Right side shown. Left side similar.

11. Using Trim Stick C-4755 or equivalent, disengage the clips (4) that secure the left and right cowl trim panels (1) to the door sills (2) and cowl (3) and remove the trim panels.

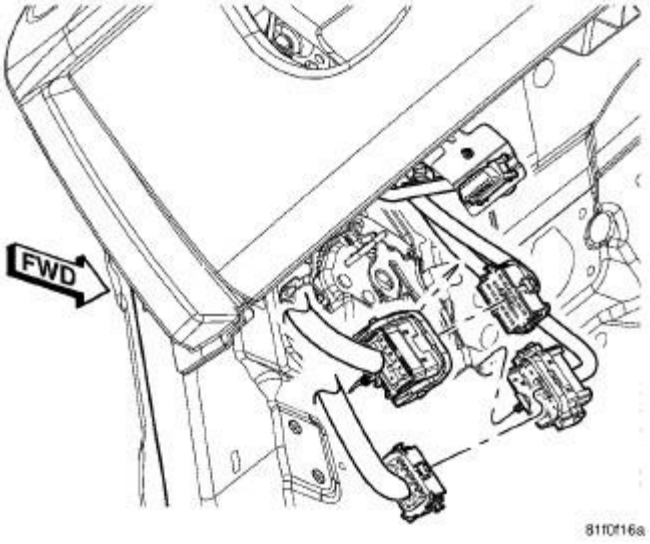


Fig. 117: Instrument Panel Electrical Connectors
Courtesy of CHRYSLER LLC

12. Disconnect the instrument panel electrical connectors.
13. Disconnect the HVAC electrical connectors.

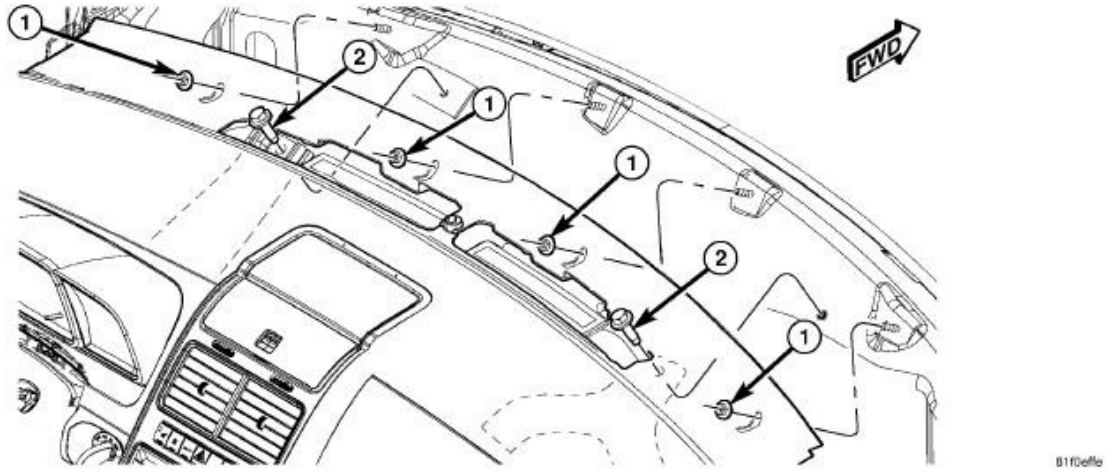


Fig. 118: Windshield Fence Nuts & Bolts
Courtesy of CHRYSLER LLC

14. Remove the windshield fence nuts (1) and bolts (2).

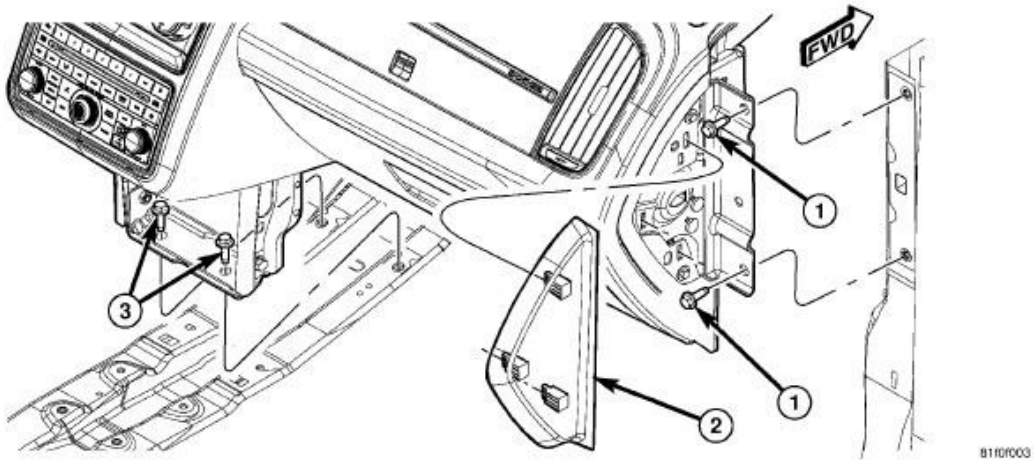


Fig. 119: Clips Holding End Cover
Courtesy of CHRYSLER LLC

NOTE: Right side shown. Left side similar.

15. Remove the center floor console. See **Body/Interior/CONSOLE, Center - Removal**.
16. Remove the lower instrument panel storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Removal**.
17. Remove the two lower instrument panel bolts (3).
18. Using Trim Stick C-4755 or equivalent, remove the left and right end caps (2).
19. Remove the two bolts (1) located on each end of the instrument panel and remove the panel from the

vehicle.

Installation

INSTALLATION

NOTE: LHD model shown in illustrations. RHD model similar.

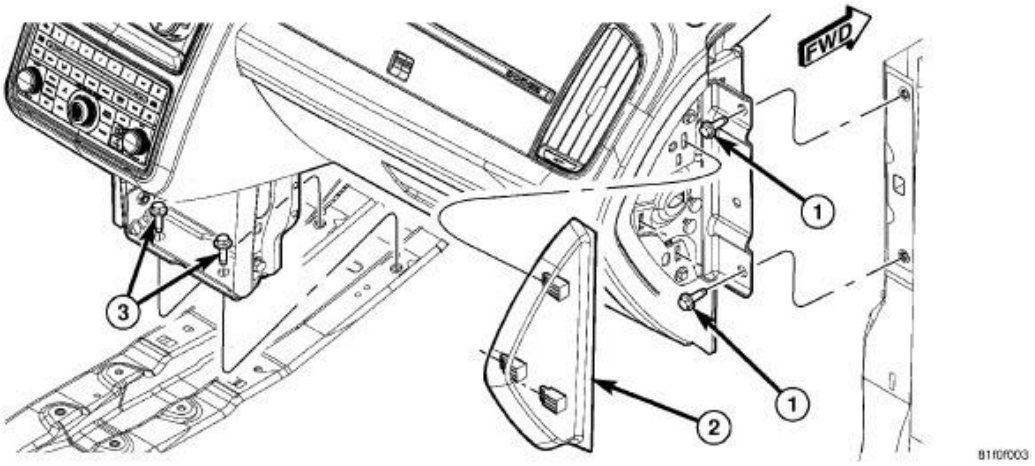


Fig. 120: Clips Holding End Cover
Courtesy of CHRYSLER LLC

NOTE: Right side shown. Left side similar.

1. Position the instrument panel into the vehicle and engage the alignment pins located on each end of the panel to the body.
2. Install the two bolts (1) to each end of the instrument panel. Tighten the bolts to 21 N.m (15 ft. lbs.).
3. Install the left and right end caps (2). Make sure the retaining clips are fully engaged.
4. Install the two lower instrument panel bolts (3). Tighten the bolts to 21 N.m (15 ft. lbs.).
5. Install the lower instrument panel storage bin. See **Body/Instrument Panel/BIN, Instrument Panel - Installation**.
6. Install the center floor console. See **Body/Interior/CONSOLE, Center - Installation**.

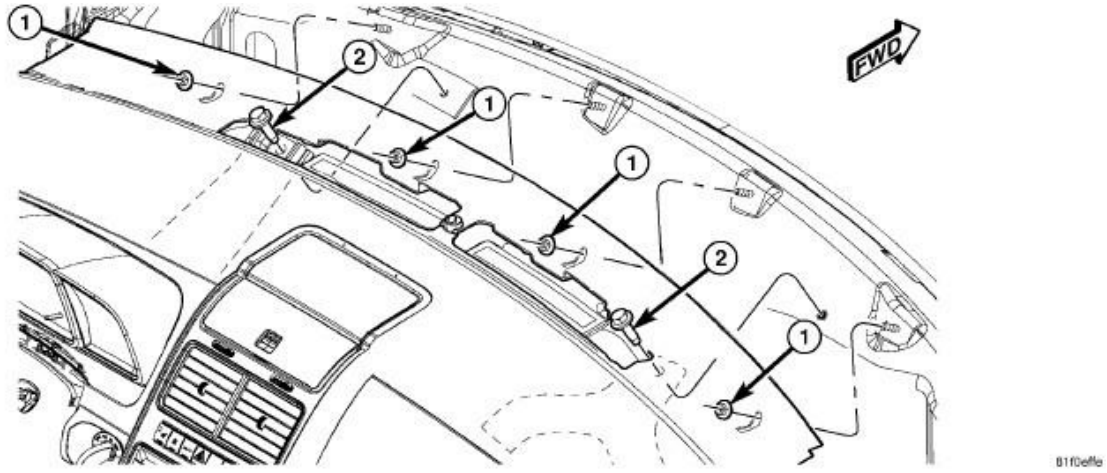


Fig. 121: Windshield Fence Nuts & Bolts
Courtesy of CHRYSLER LLC

7. Install the windshield fence nuts (1) and bolts (2). Tighten the nuts and bolts securely.

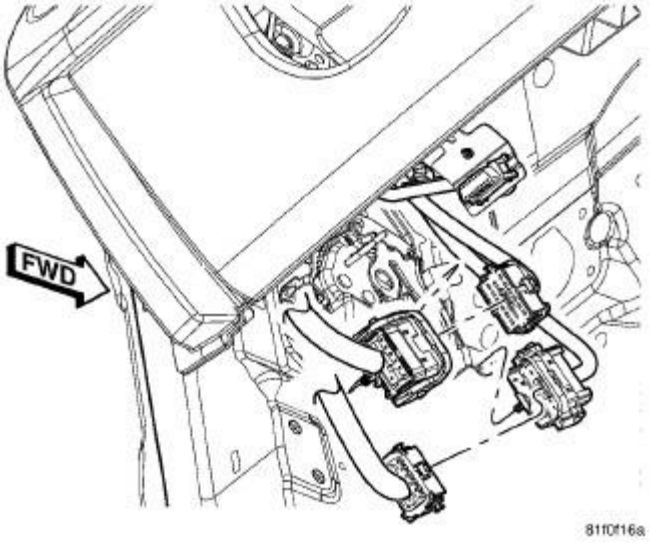


Fig. 122: Instrument Panel Electrical Connectors
Courtesy of CHRYSLER LLC

8. Connect the instrument panel electrical connectors.
9. Connect the HVAC electrical connectors.

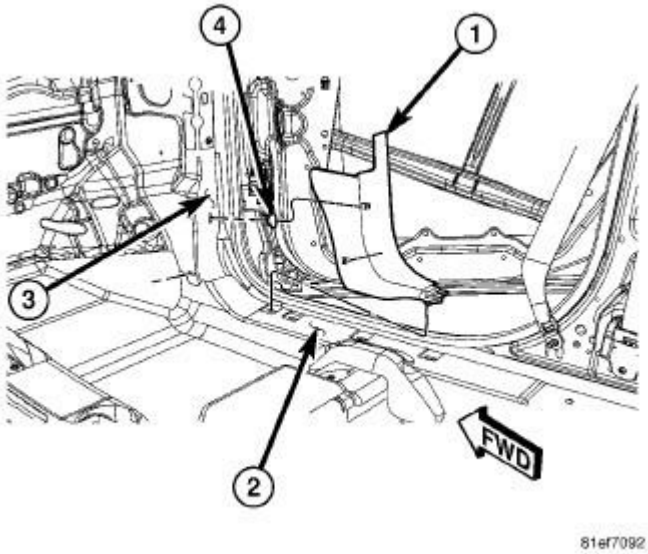


Fig. 123: Cowl Trim Panels
Courtesy of CHRYSLER LLC

NOTE: Right side shown. Left side similar.

10. Install the left and right cowl trim panels (1) to the door sills (2) and cowl (3). Make sure the retaining clips (4) are fully engaged.

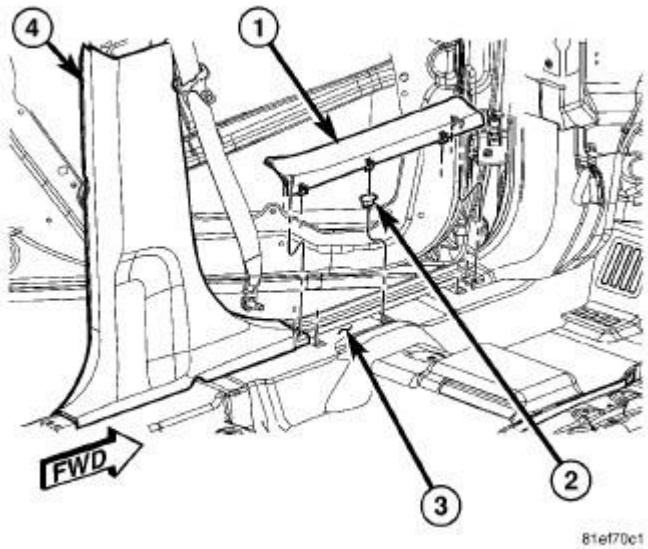


Fig. 124: Front Door Sill Scuff Plates
Courtesy of CHRYSLER LLC

NOTE: Left side shown. Right side similar.

11. Install the left and right front door sill scuff plates (1) to the door sills (3). Make sure the retaining clips (2) are fully engaged.

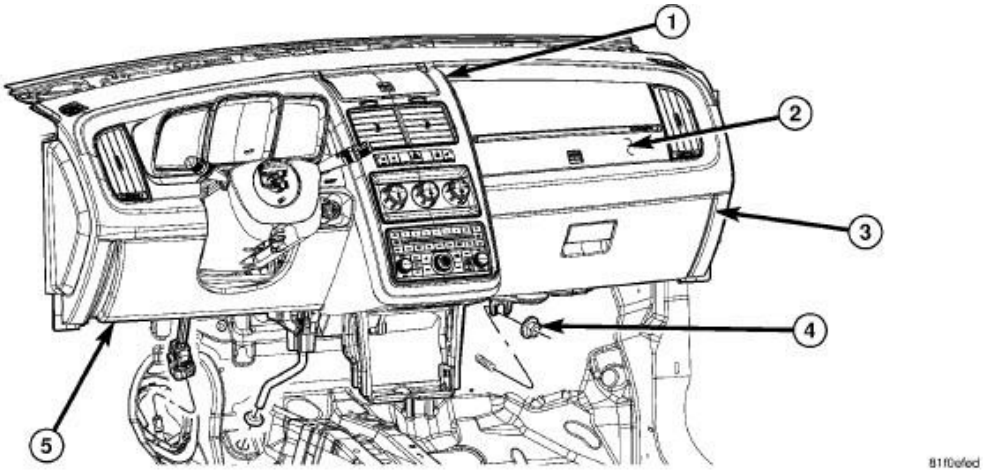


Fig. 125: Storage Bin Door
Courtesy of CHRYSLER LLC

12. Install the nut (4) that secures the instrument panel (2) to the stud located near the blower motor. Tighten the nut securely
13. Install the glove box (3).
14. Install the instrument panel center bezel (1). Make sure the retaining clips are fully engaged.
15. Install the steering column. Refer to **Steering/Column - Installation** .
16. Install the steering column cover (5). Make sure the retaining clips are fully engaged.

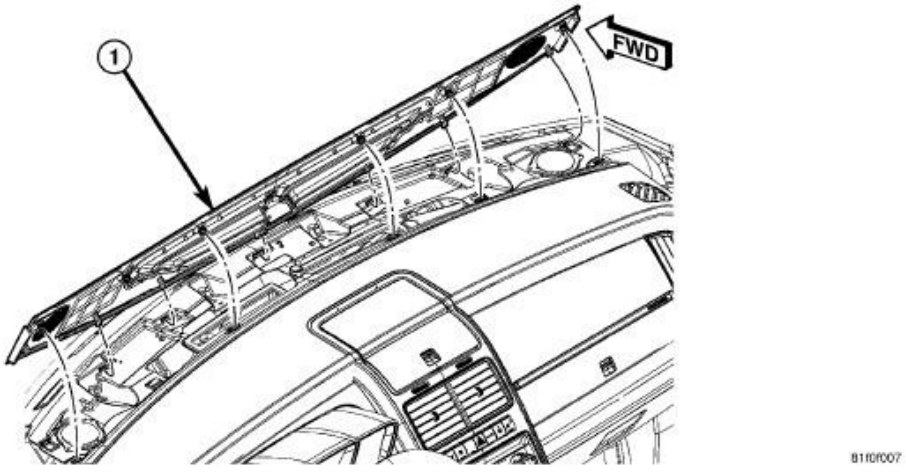


Fig. 126: Defroster Grille
Courtesy of CHRYSLER LLC

17. Install the defroster grille (1). Make sure the retaining clips are fully engaged.

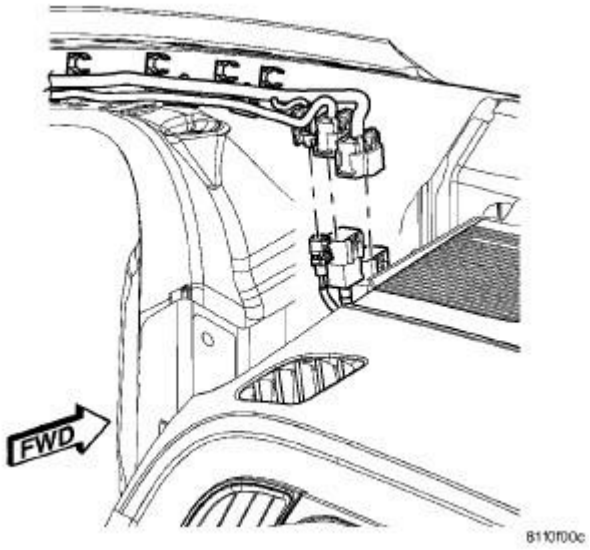


Fig. 127: Electrical Connectors Located At Left & Right A-Pillar
Courtesy of CHRYSLER LLC

NOTE: Left side shown. Right side similar.

18. Connect the electrical connectors located at the left and right A-pillar.
19. Install the A-pillar trim panels. See **Body/Interior/PANEL, A-Pillar Trim - Installation**.
20. Reconnect the negative battery cable.

PANEL, SILENCER, LOWER

Removal

REMOVAL

1. Remove closeout panels push pins fastening closeout panels to the bottom of the instrument panel assembly.
2. Remove closeout panels from instrument panel assembly.

Installation

INSTALLATION

1. Position closeout panels to the bottom of the instrument panel assembly.
2. Install push pins fastening closeout panels to instrument panel.

INTERIOR

BIN, STORAGE, SECOND ROW

Removal

REMOVAL

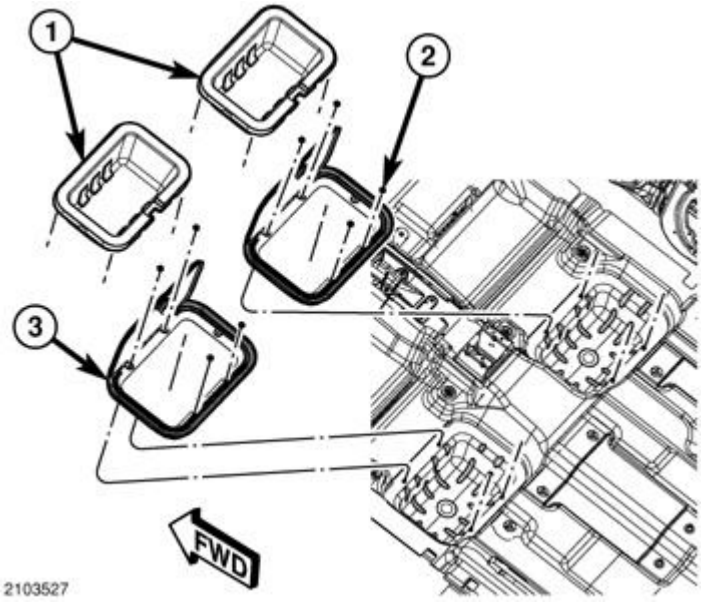


Fig. 128: Mounting Fasteners Securing Storage Bin To Floor
Courtesy of CHRYSLER LLC

1. Open the lid to the second row storage bin and remove the inner liner.
2. Remove the mounting fasteners securing the storage bin to the floor.
3. Remove the storage bin from the vehicle.

Installation

INSTALLATION

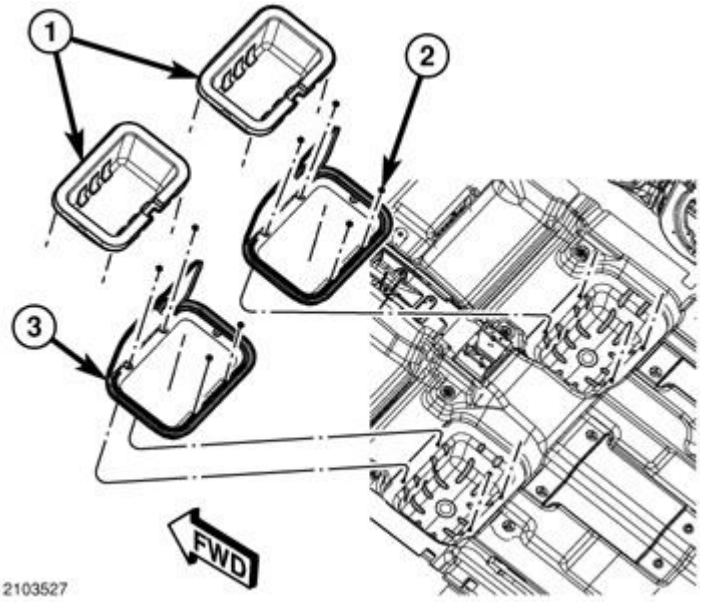


Fig. 129: Mounting Fasteners Securing Storage Bin To Floor
Courtesy of CHRYSLER LLC

1. Place the storage bin into position in the vehicle.
2. Install the mounting fasteners that secure the storage bin to the floor.
3. Install the liner and close the lid.

BIN, STORAGE, REAR

Removal

REMOVAL

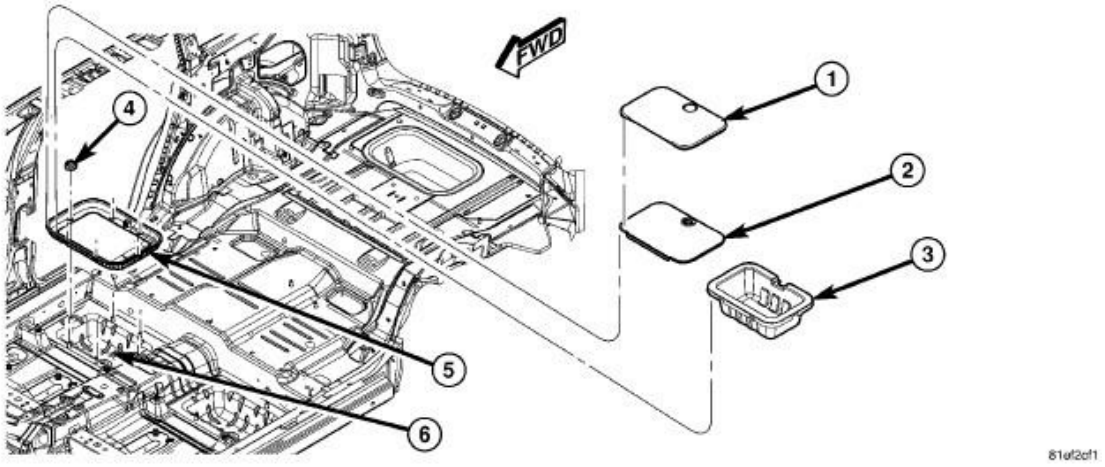


Fig. 130: Storage Bin Liner
Courtesy of CHRYSLER LLC

1. Remove the carpet (1) covering the storage bin

2. Remove the storage bin liner (3).
3. Remove the mounting fasteners (4).
4. Remove the storage bin (5) from the vehicle.

Installation

INSTALLATION

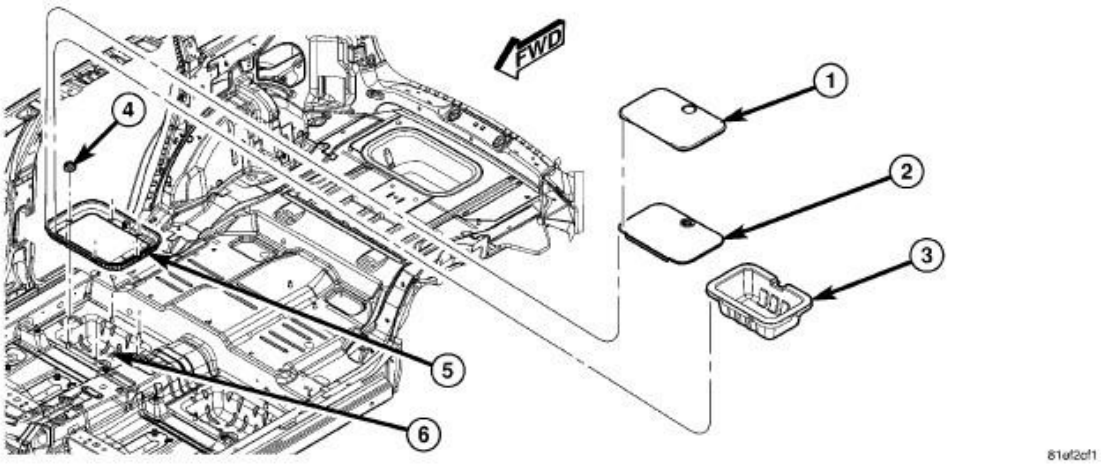


Fig. 131: Storage Bin Liner
Courtesy of CHRYSLER LLC

1. Install the storage bin (5) to the vehicle.
2. Install the mounting fasteners (4).
3. Install the storage bin liner (3).
4. Install the carpet (1) covering the storage bin.

BOX, STORAGE, REAR

Removal

REMOVAL

STORAGE BOX - 5 PASSENGER

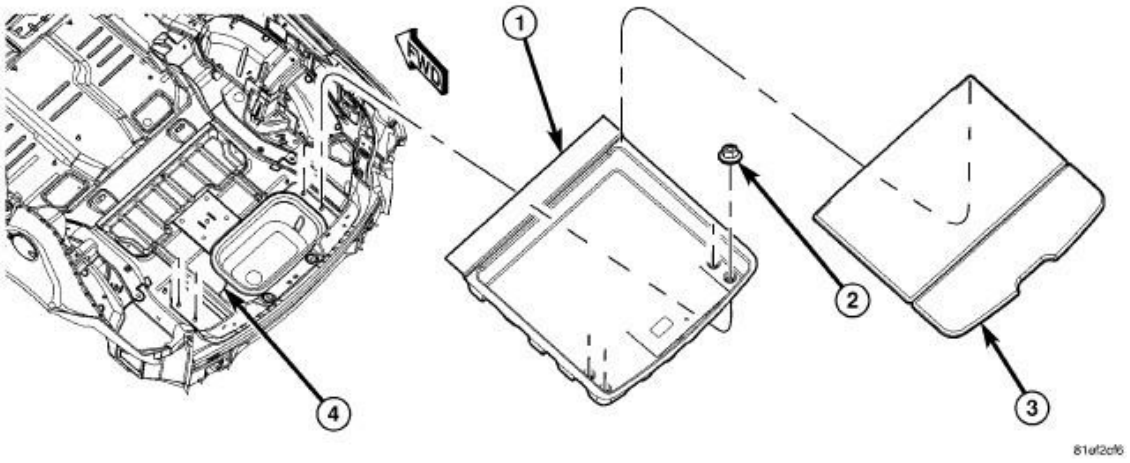


Fig. 132: Storage Box Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Remove the mat covering the storage box.
2. Remove the load floor assembly (3).
3. Remove the storage box mounting fasteners (2).
4. Remove the storage box (1) from the vehicle.

STORAGE BOX - 7 PASSENGER

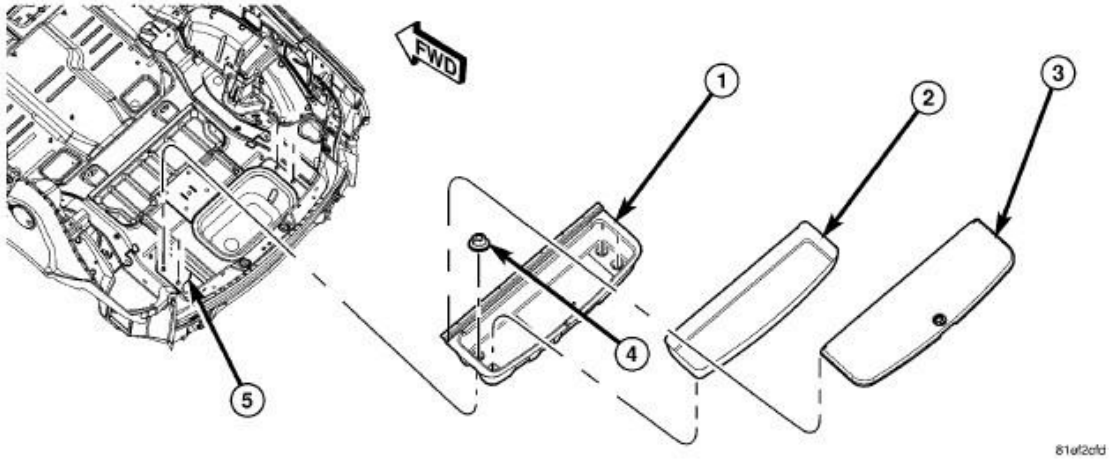


Fig. 133: Storage Box Liner
Courtesy of CHRYSLER LLC

1. Remove the retainers on the seat back gap hider to the rear storage box.
2. Open the storage bin lid.
3. Remove the storage box liner (2), if equipped.
4. Remove the storage box mounting fasteners (4).
5. Remove the storage box (1) from the vehicle.

Installation

INSTALLATION

STORAGE BOX - 5 PASSENGER

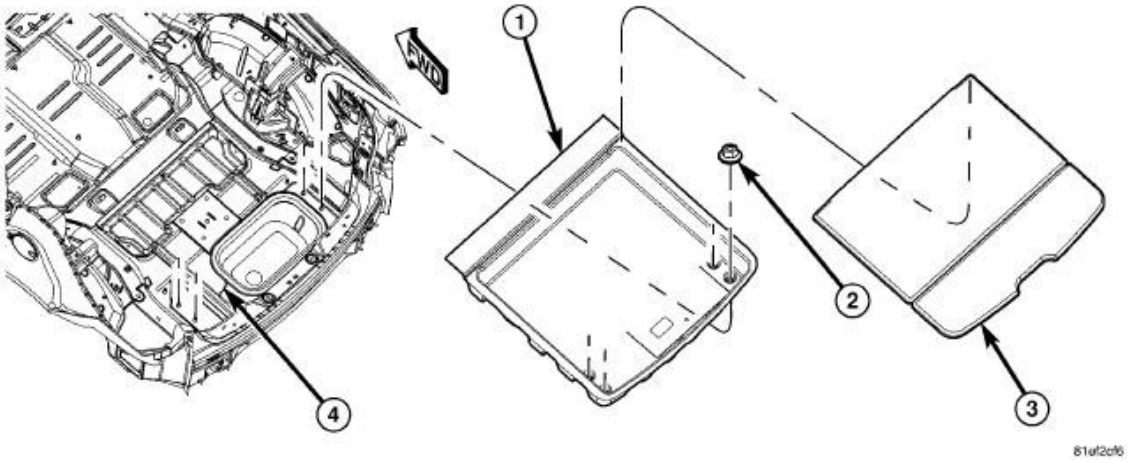


Fig. 134: Storage Box Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Install the storage box (1) to the vehicle.
2. Install the storage box mounting fasteners (2).
3. Install the load floor assembly (3).
4. Install the mat covering the storage box.

STORAGE BOX - 7 PASSENGER

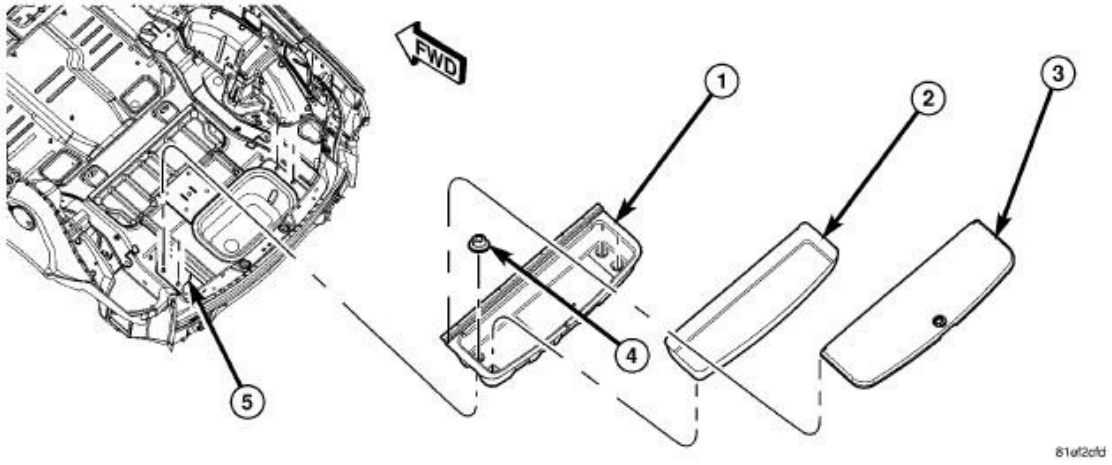


Fig. 135: Storage Box Liner
Courtesy of CHRYSLER LLC

1. Install the storage box (1) to the vehicle.

2. Install the storage box mounting fasteners (4).
3. Install the storage box liner (2).
4. Install the seat back gap hider retainers to the rear storage box.

CARPET, FLOOR

Removal

REMOVAL

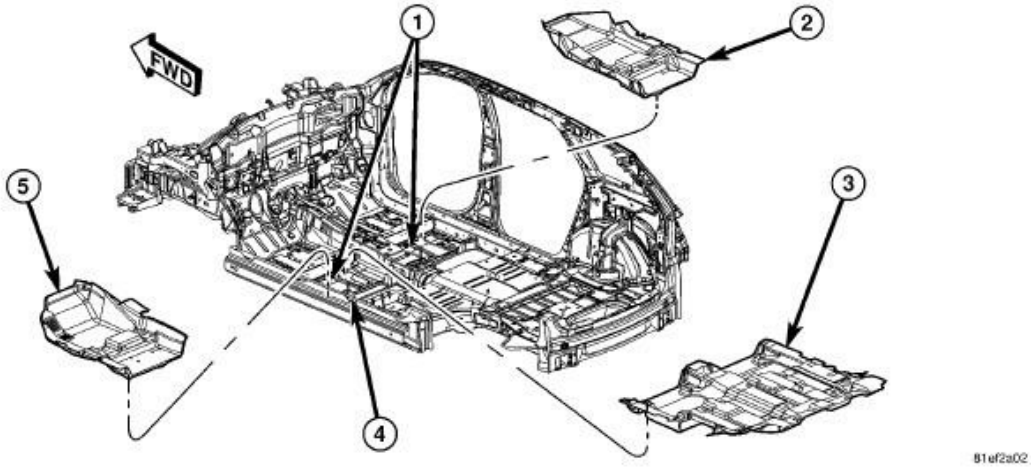


Fig. 136: Floor Carpet Assembly
Courtesy of CHRYSLER LLC

1. Remove door sill trim. See **Body/Interior/PLATE, Scuff - Removal**
2. Remove front seats. See **Body/Seats/SEAT - Removal**.
3. Remove the second row seats. See **Body/Seats/SEAT - Removal**
4. Remove the third row seats, if equipped. See **Body/Seats/SEAT - Removal**.
5. Remove B-pillar trim panels as necessary to clear carpet.
6. Remove cowl trim panels. See **Body/Interior/PANEL, Cowl Trim - Removal**
7. Remove center console. See **Body/Interior/CONSOLE, Center - Removal**
8. Remove the rear storage bin. See **Body/Interior/BIN, Storage - Removal**.
9. Remove the rear storage box. See **Body/Interior/BOX, Storage - Removal**.
10. Pull carpet from behind brake pedal, accelerator pedal and remove the front left carpet (5).
11. Pull carpet from behind the HVAC and remove the front right carpet (2).
12. Remove the rear carpet from the vehicle (3).

Installation

INSTALLATION

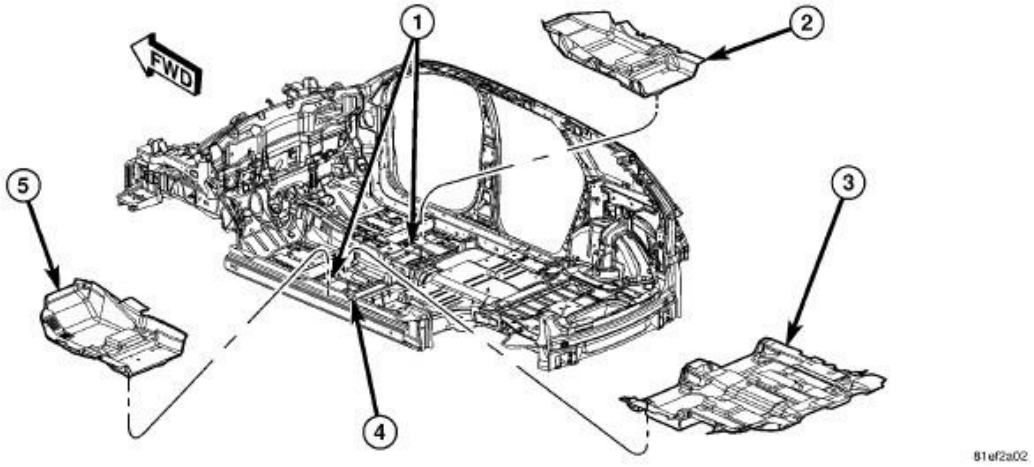


Fig. 137: Floor Carpet Assembly
Courtesy of CHRYSLER LLC

1. Install the rear carpet to the vehicle (3).
2. Install the front right carpet (2) and push the carpet behind the HVAC.
3. Install the front left carpet (5) and push the carpet behind brake pedal and accelerator pedal.
4. Install the rear storage box. See **Body/Interior/BOX, Storage - Installation**.
5. Install the rear storage bin. See **Body/Interior/BIN, Storage - Installation**.
6. Install center console. See **Body/Interior/CONSOLE, Center - Installation**.
7. Install cowl trim panels. See **Body/Interior/PANEL, Cowl Trim - Installation**.
8. Install B-pillar trim panels as necessary to clear carpet.
9. Install the third row seats, if equipped. See **Body/Seats/SEAT - Installation**.
10. Install the second row seats. See **Body/Seats/SEAT - Installation**.
11. Install front seats. See **Body/Seats/SEAT - Installation**
12. Install door sill trim. See **Body/Interior/PLATE, Scuff - Installation**.

CONSOLE, CENTER

Removal

REMOVAL

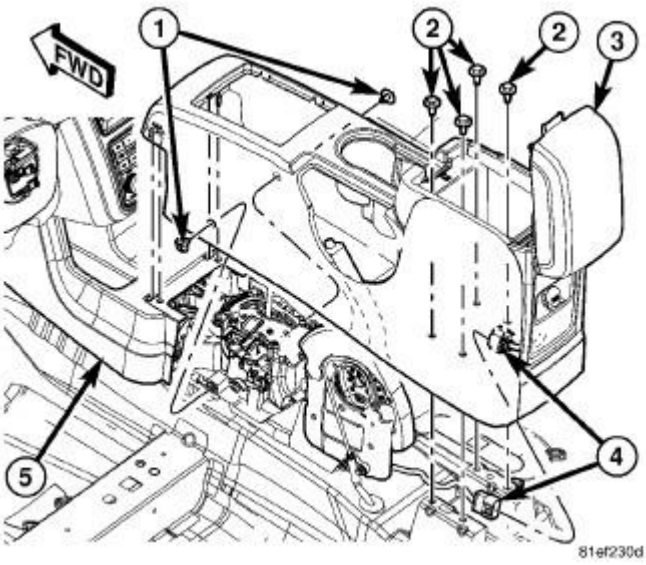


Fig. 138: CENTER CONSOLE
Courtesy of CHRYSLER LLC

1. Remove the shifter bezel and shifter knob.
2. Place the parking brake handle (6) in the up position.
3. Remove the side mounting fasteners (1).
4. Open the console lid (3) and remove the four mounting fasteners (2).
5. Carefully pry up on the front of the center console until the retainers disengage from the instrument panel center console (5).
6. Disconnect the electrical connector (4) at the back of the center floor console.
7. Remove the center floor console from the vehicle.

Installation

INSTALLATION

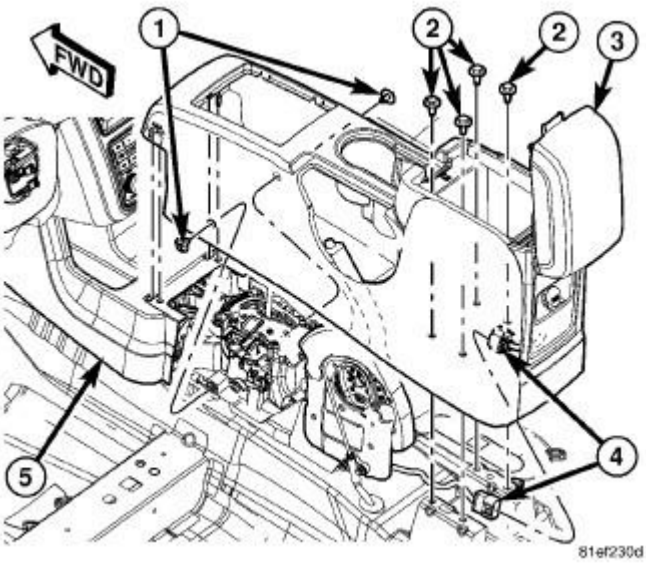


Fig. 139: CENTER CONSOLE
Courtesy of CHRYSLER LLC

1. Install the center floor console into position to the vehicle.
2. Connect the electrical connector (4) at the back of the center floor console.
3. Carefully depress the front of the center console until the retainers engage to the instrument panel center console (5).
4. Install the four mounting fasteners (2) located in the storage bin area.
5. Install the side mounting fasteners (1).
6. Install the shifter bezel and shifter knob.
7. Lower the parking brake handle (6).

HEADLINER

Removal

REMOVAL

NOTE: Do not remove the headliner from the vehicle, unless replacing with a new headliner or it is absolutely necessary.

1. Remove the sun visors by removing the mounting fasteners and disconnect the electrical connector, if equipped.
2. Remove the sun visor support mounting fasteners and remove the support from the headliner.
3. Remove the A-pillar trim panel. See **Body/Interior/PANEL, A-Pillar Trim - Removal**.
4. Remove the B-pillar trim panel. See **Body/Interior/PANEL, B-Pillar Trim - Removal**.
5. Remove the C-pillar trim panel. See **Body/Interior/PANEL, B-Pillar Trim - Removal**

6. Remove the D-pillar trim panel. See **Body/Interior/PANEL, D-Pillar Trim - Removal**.
7. Remove the overhead console. Refer to **Electrical - Message Systems/Overhead Console - Removal** .
8. Remove the header trim panel by carefully pulling down on the trim disengaging the retainers.
9. Remove the mounting fasteners and remove the grab handles and coat hooks.
10. Remove the left quarter trim panel. See **Body/Interior/PANEL, Quarter Trim - Removal**.
11. Remove the seat belt mounting bracket from the right D-pillar.
12. Lower the first and second row seats as far as possible removing the headrests as necessary.
13. Disconnect electrical connectors.
14. Remove the push-pin retainers at the rear of the headliner.
15. Carefully disengage retaining clips and lower headliner.
16. With the help of an assistant(s), remove the headliner from the vehicle through the lift gate opening.

Installation

INSTALLATION

1. With the help of an assistant(s), carefully install the headliner into the vehicle through the rear liftgate opening. Do not over flex the headliner and be carefully not to crack or mar the headliner.
2. Raise the headliner into position and engage the retainers.
3. Connect the electrical connectors.
4. Install the grab handles and coat hooks. Install the mounting fasteners.
5. Install the overhead console. Refer to **Electrical - Message Systems/Overhead Console - Installation** .
6. Install the D-pillar trim panel. See **Body/Interior/PANEL, D-Pillar Trim - Installation**.
7. Install the C-pillar trim panel. See **Body/Interior/PANEL, C-Pillar Trim - Installation**.
8. Install the B-pillar trim panel. See **Body/Interior/PANEL, B-Pillar Trim - Installation**.
9. Install the A-pillar trim panel. See **Body/Interior/PANEL, A-Pillar Trim - Installation**.
10. Install the quarter trim panel to the vehicle. See **Body/Interior/PANEL, Quarter Trim - Installation**.
11. Install the sun visor support and mounting fasteners.
12. Install the sun visors and mounting fasteners.

HOUSING, SHIFTER

Removal

REMOVAL

AUTOMATIC

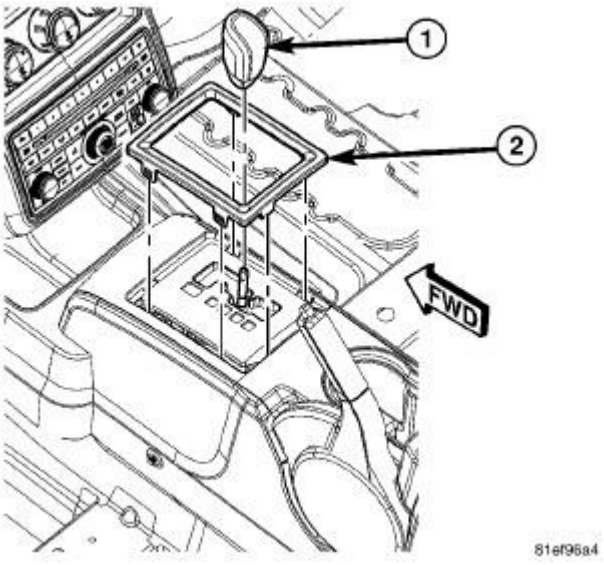


Fig. 140: Lower Cover Of Shift Knob - Automatic
Courtesy of CHRYSLER LLC

1. Disengage the lower cover of the shift knob (1) to access set screw.
2. Remove set screw and remove shift knob.
3. Carefully pry up the shift bezel (2) and remove.

MANUAL

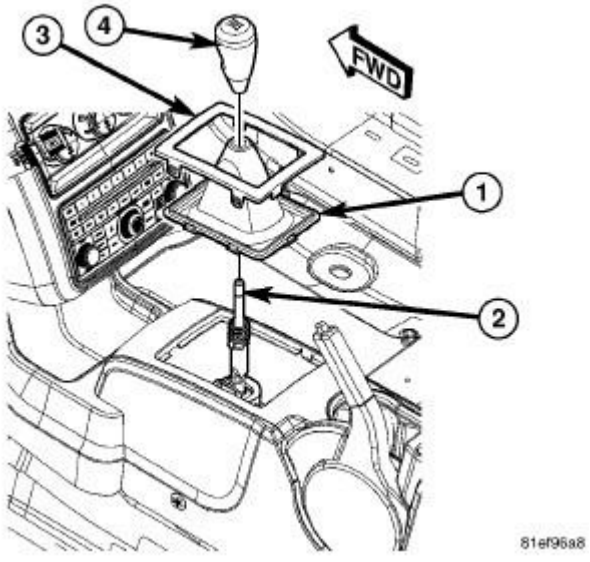


Fig. 141: Lower Cover Of Shift Knob - Manual
Courtesy of CHRYSLER LLC

1. Disengage the lower cover of the shift knob (4) to access set screw.

2. Remove set screw and remove shift knob.
3. Carefully pry up the shift bezel (3) and remove.
4. Carefully pry up on the shift boot (1) and remove from shift shaft (2).

Installation

INSTALLATION

AUTOMATIC

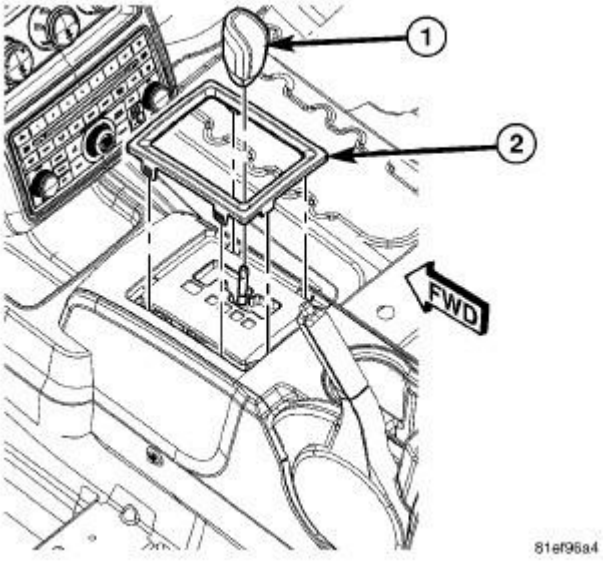


Fig. 142: Lower Cover Of Shift Knob - Automatic
Courtesy of CHRYSLER LLC

1. Install the shift bezel (2).
2. Remove set screw and remove shift knob (1).
3. Install the lower cover.

MANUAL

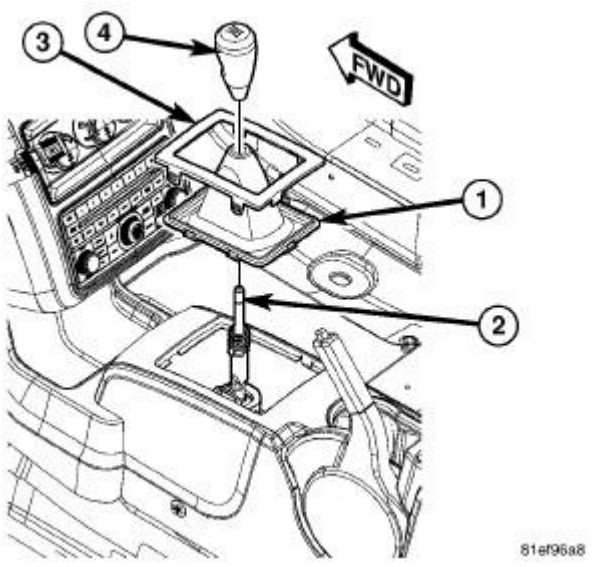


Fig. 143: Lower Cover Of Shift Knob - Manual
Courtesy of CHRYSLER LLC

1. Install the shift boot (1).
2. Install the shift bezel (3).
3. Install the shift knob (4) and install the set screw.
4. Install the lower cover.

MIRROR, REARVIEW

Removal

REMOVAL

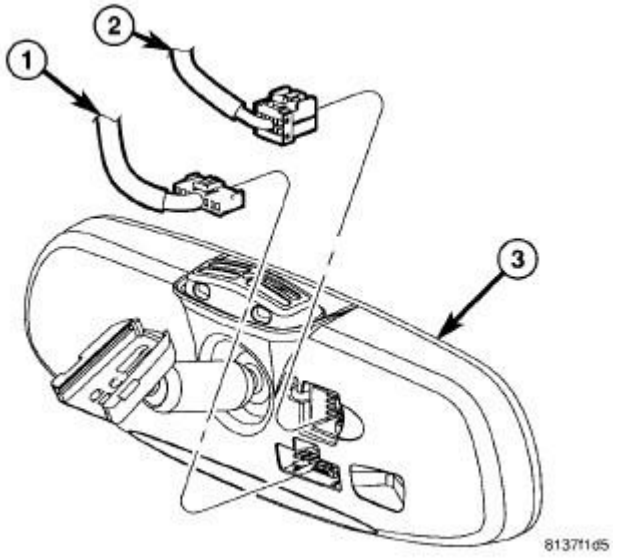


Fig. 144: Inside Rearview Mirror
Courtesy of CHRYSLER LLC

1. If the vehicle is equipped with either the electrochromic (automatic dimming) or the telematic (hands-free phone) mirror option, disconnect and isolate the battery negative cable.
2. If the vehicle is so equipped, disconnect the electrochromic mirror takeout and connector (1) and/or the telematic mirror takeout and connector (2) of the headliner wire harness from the connector receptacle on the back (windshield side) of the mirror housing (3).

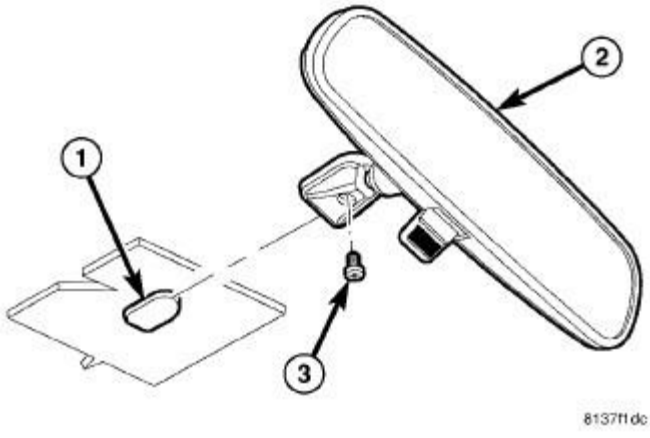


Fig. 145: Removing/Installing Inside Rearview Mirror
Courtesy of CHRYSLER LLC

3. Remove the set screw (3) that secures the rear view mirror (2) to the support bracket/button (1) on the inside of the windshield glass.
4. Slide the rear view mirror upward far enough to disengage it from the support bracket/button.

Installation

MIRROR

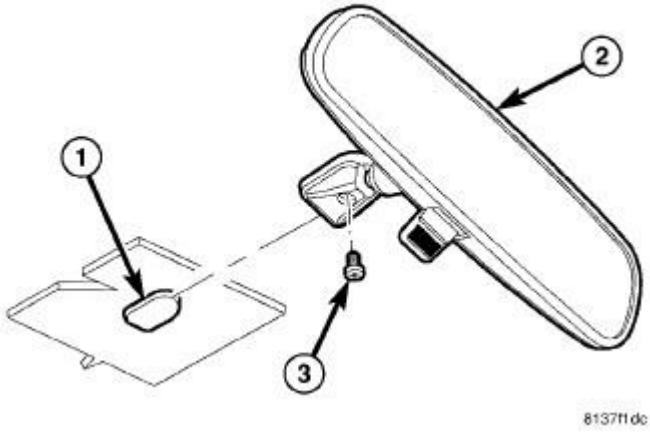


Fig. 146: Removing/Installing Inside Rearview Mirror
Courtesy of CHRYSLER LLC

1. Position and slide the rear view mirror (2) downward over the support bracket/button (1) on the inside of the windshield glass.
2. Install and tighten the set screw (3) that secures the rear view mirror to the support bracket/button. Tighten the screw to 2 N.m (17 in. lbs.).

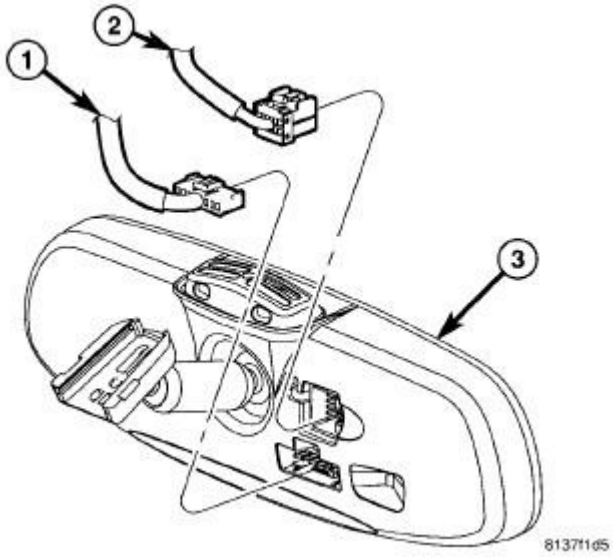


Fig. 147: Inside Rearview Mirror
Courtesy of CHRYSLER LLC

3. If the vehicle is so equipped, route the electrochromic (automatic dimming) mirror takeout and connector

(1) and/or the telematic (hands-free phone) mirror takeout and connector (2) of the headliner wire harness to the left of the mirror support bracket and reconnect it to the connector receptacle on the back (windshield side) of the mirror housing (3).

4. If the vehicle is equipped with either the electrochromic or the telematic mirror option, reconnect the battery negative cable.

REAR VIEW MIRROR BUTTON

NOTE: The rear view mirror button is permanently bonded to the inside of the windshield glass. If the button should become separated from the glass, it may be re-bonded using the following procedure. This procedure requires the use of a Rear View Mirror Adhesive kit that is available through Mopar® in single application packages that include a two-part adhesive and an accelerant with applicator.

1. Mark the proper position for the mirror button on the outside of the windshield glass with a wax pencil. The residual adhesive on the inside of the glass from the prior mirror button installation can be used as a guide.
2. Clean the button contact area on the inside of the glass. Use a mild powdered cleanser on a cloth saturated with rubbing alcohol. Finally, clean the glass with a paper towel dampened with alcohol.
3. Sand the bonding surface (the smaller side) of the support button with fine grit-sandpaper. Wipe the button surface clean with a paper towel.
4. Apply accelerant to the bonding surface of the button according to the following instructions:
   - Crush the accelerant vial to saturate the felt applicator.
   - Remove the paper sleeve.
   - Apply accelerant to the bonding surface of the button.
   - Allow the accelerant to dry for five minutes.
   - Do not touch the button bonding surface after the accelerant has been applied.
5. Apply adhesive accelerant to the button contact area on the inside of the windshield glass. Allow the accelerant to dry for one minute. Do not touch the button contact area of the glass after the accelerant has been applied.
6. Install the button according to the following instructions:
   - Apply one drop of adhesive at the center of the button contact area on the inside of the windshield glass.
   - Apply an even coat of adhesive to the bonding surface of the button.
   - Align the button with the marked position on the windshield glass.
   - Press and hold the button in place for at least one minute.

NOTE: Verify that the mirror button is correctly aligned, because the adhesive will cure rapidly.

7. Allow the adhesive to cure for 8-10 minutes. Remove any excess adhesive with an alcohol-dampened cloth.

8. Allow the adhesive to cure for an additional 8-10 minutes before reinstalling the mirror.

PANEL, A-PILLAR TRIM

Removal

REMOVAL

CAUTION: If the high-retention snap clip (3) is removed from the sheet metal, it will be damaged and must be replaced with a new tether and snap clip unit. Also, if the rosebud on the plastic tether is damaged due to misalignment and does not engage, it must be replaced with a new plastic tether.

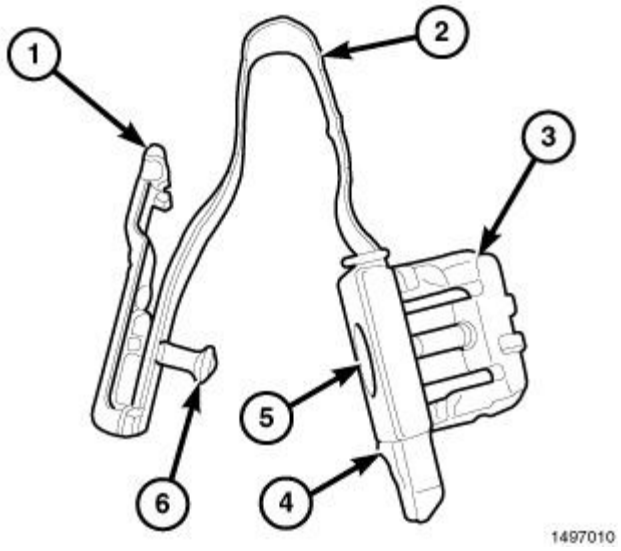


Fig. 148: Rosebud Retainer
Courtesy of CHRYSLER LLC

1. Carefully pull the upper end of the trim away from the A-pillar far enough to disengage the rosebud retainer (6) and unfold the tether (2).
2. Using a screwdriver or equivalent, carefully disengage the tether clip (1) and slide from housing on the A-pillar trim panel.

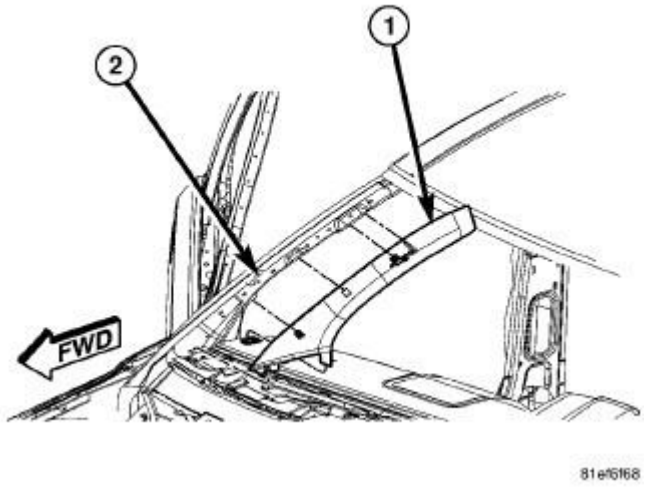


Fig. 149: A-Pillar Trim
Courtesy of CHRYSLER LLC

3. Carefully pull the bottom end of the trim away from the A-pillar to disengage the spring clip retainer.
4. Remove A-pillar trim from vehicle.

Installation

INSTALLATION

CAUTION: If the high-retention snap clip (3) is removed from the sheet metal, it will be damaged and must be replaced with a new tether and snap clip unit. Also, if the rosebud on the plastic tether is damaged due to misalignment and does not engage, it must be replaced with a new plastic tether.

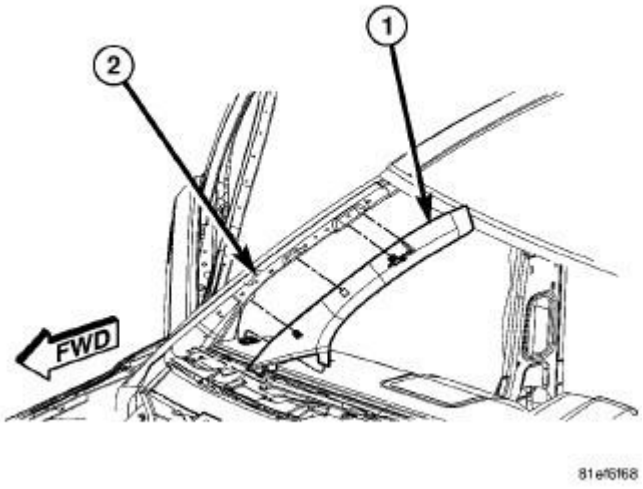


Fig. 150: A-Pillar Trim
Courtesy of CHRYSLER LLC

1. Place A-pillar trim (1) into position.
2. Carefully push the bottom end of the trim onto the A-pillar to engage the spring clip retainer.

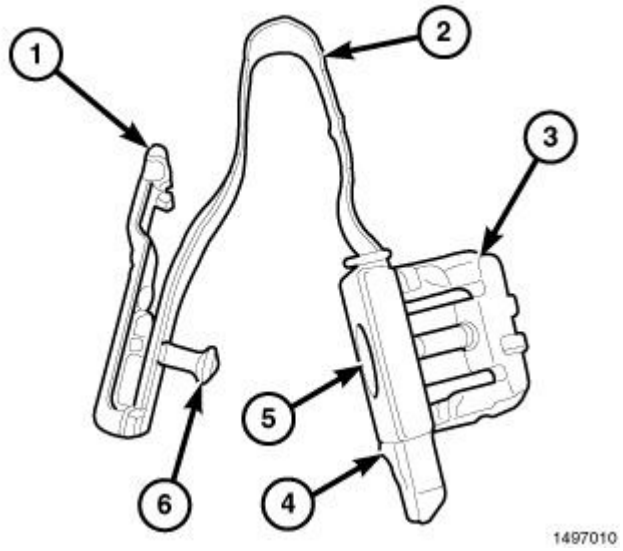


Fig. 151: Rosebud Retainer
Courtesy of CHRYSLER LLC

3. Carefully slide the tether (2) into the housing on the A-pillar trim panel and engage the tether clip (1).
4. Carefully engage the rosebud retainer (6) and push the upper end of the trim to the A-pillar and engage the spring clip retainer.

PANEL, B-PILLAR TRIM

Removal

REMOVAL

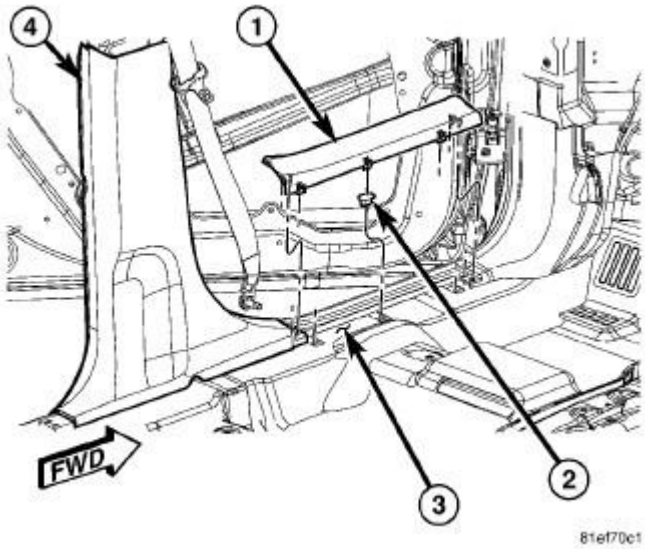


Fig. 152: Front Door Sill Scuff Plates
Courtesy of CHRYSLER LLC

1. Remove sill trim panel. See **Body/Interior/PLATE, Scuff - Removal**
2. Remove seat belt anchor. Refer to **Restraints/RETRACTOR, Seat Belt - Removal**
3. Remove the lower B-pillar trim panel.
4. Using trim stick C-4755, remove SRS airbag cover located at top of B-pillar.

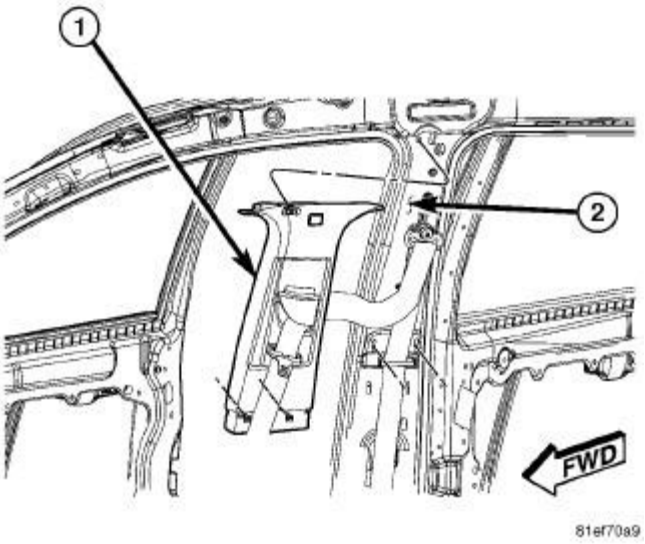


Fig. 153: B-Pillar Trim

Courtesy of CHRYSLER LLC

5. Move seat belt adjuster all the way down exposing the B-pillar screw. Remove B-pillar screw.
6. Using trim stick C-4755, pry up B-pillar and route seat belt through B-pillar trim. Remove B-pillar bottom first and remove trim from B-pillar.

Installation

INSTALLATION

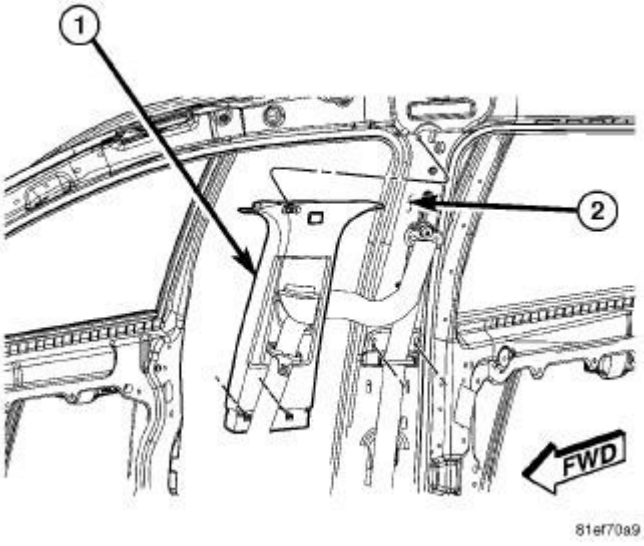


Fig. 154: B-Pillar Trim
Courtesy of CHRYSLER LLC

1. Insert top of B-pillar trim locator into position.
2. Before hinging B-pillar upward into place, route seat belt anchor through seat belt adjuster opening.
3. Fasten seat belt anchor to seat. Refer to **Restraints/ADJUSTER, Seat Belt Turning Loop - Installation**
4. Hinge B-pillar trim downward, engaging clips ensuring proper seat.
5. Install B-pillar screw into B-pillar.

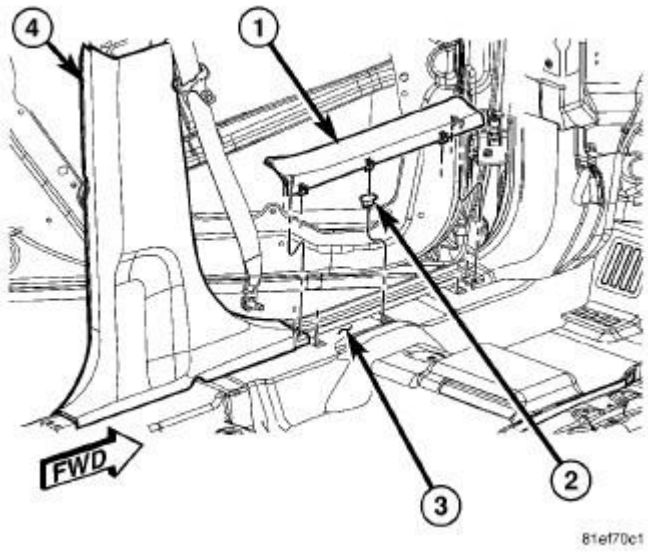


Fig. 155: Front Door Sill Scuff Plates
Courtesy of CHRYSLER LLC

6. Snap SRS airbag anchor cover into place ensuring proper seat.
7. Install the lower B-pillar trim panel.
8. Install the sill trim panel. See **Body/Interior/PLATE, Scuff - Installation**.

PANEL, C-PILLAR TRIM

Removal

REMOVAL

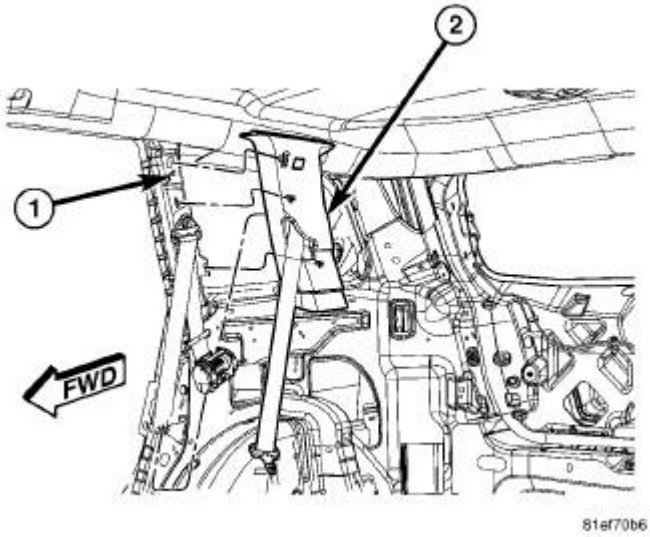


Fig. 156: C-Pillar Trim Panel
Courtesy of CHRYSLER LLC

1. Remove the quarter trim panel. See **Body/Interior/PANEL, Quarter Trim - Removal**.
2. Remove seat belt anchor bolt. Refer to **Restraints/RETRACTOR, Seat Belt - Removal** .
3. Remove the access hole cover and remove the mounting fastener.
4. Using trim stick C-4755, carefully pry the C-pillar out disengaging the retaining clips.
5. Route seat belt through opening and remove C-pillar trim panel from vehicle.

Installation

INSTALLATION

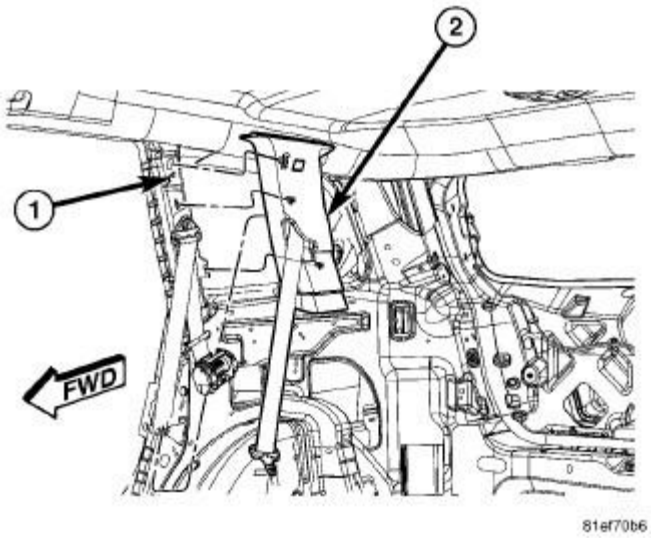


Fig. 157: C-Pillar Trim Panel
Courtesy of CHRYSLER LLC

1. Place upper C-pillar trim into position.
2. Route seat belt through opening in C-Pillar Trim
3. Firmly seat the retaining clips to the C-pillar.
4. Install the mounting fastener and access hole cover.
5. Install bolt attaching seat belt lower anchor to floor. Refer to **Restraints/RETRACTOR, Seat Belt - Installation** .
6. Install quarter panel trim. See **Body/Interior/PANEL, Quarter Trim - Installation**.

PANEL, COWL TRIM

Removal

REMOVAL

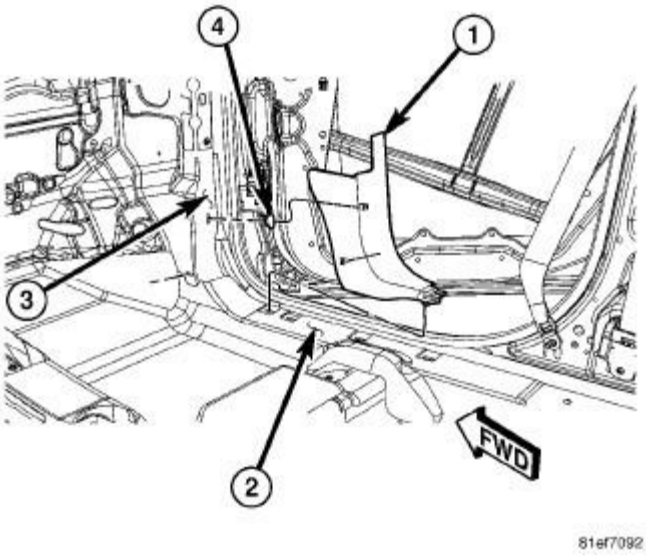


Fig. 158: Cowl Trim Panels
Courtesy of CHRYSLER LLC

1. Remove door sill trim panel. See **Body/Interior/PLATE, Scuff - Removal**.
2. Using trim stick C-4755, disengage cowl trim panel clips from the corresponding locations in the sheet metal.
3. Remove cowl trim panel from vehicle.

Installation

INSTALLATION

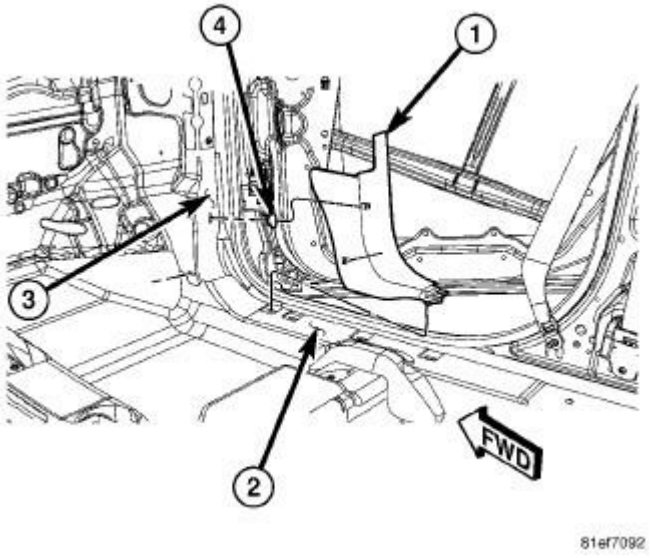


Fig. 159: Cowl Trim Panels
Courtesy of CHRYSLER LLC

1. Ensure plastic retaining nut (3) is installed.
2. Position cowl trim panel (1) to vehicle.
3. Hand press cowl trim panel to corresponding holes in sheet metal.
4. Install door sill trim panel. See **Body/Interior/PLATE, Scuff - Installation**.

PANEL, D-PILLAR TRIM

Removal

REMOVAL

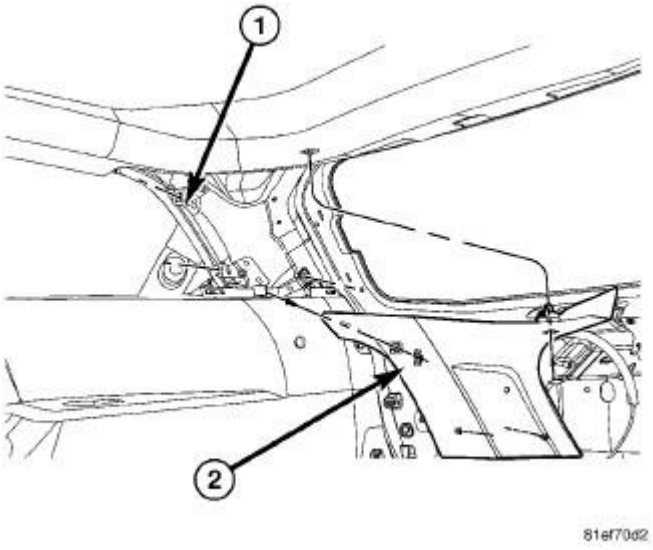


Fig. 160: D-Pillar Trim Panel
Courtesy of CHRYSLER LLC

1. Remove the rear header trim panel.
2. Remove the access hole covers and remove the mounting fasteners.
3. Using trim stick C-4755, carefully pry the D-pillar out disengaging the retaining clips.
4. Remove the D-pillar from the vehicle.

Installation

INSTALLATION

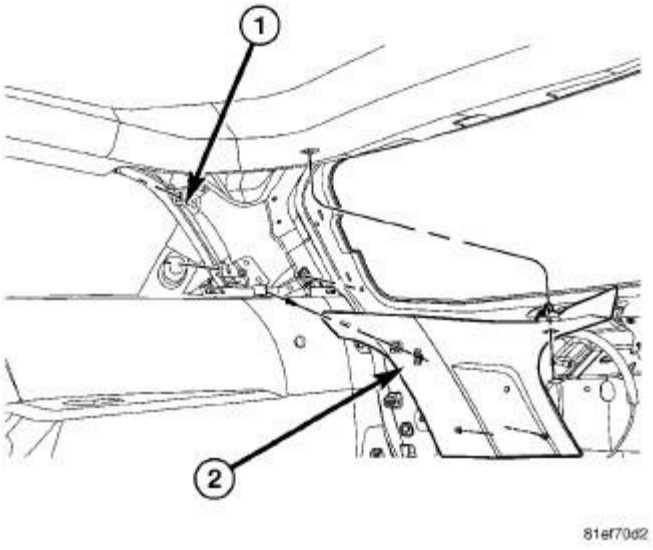


Fig. 161: D-Pillar Trim Panel

Courtesy of CHRYSLER LLC

1. Position the D-pillar into position.
2. Firmly seat the retaining clips securing the D-pillar.
3. Install mounting fasteners and access hole covers.
4. Install the rear header trim panel.

PANEL, QUARTER TRIM

Removal

REMOVAL

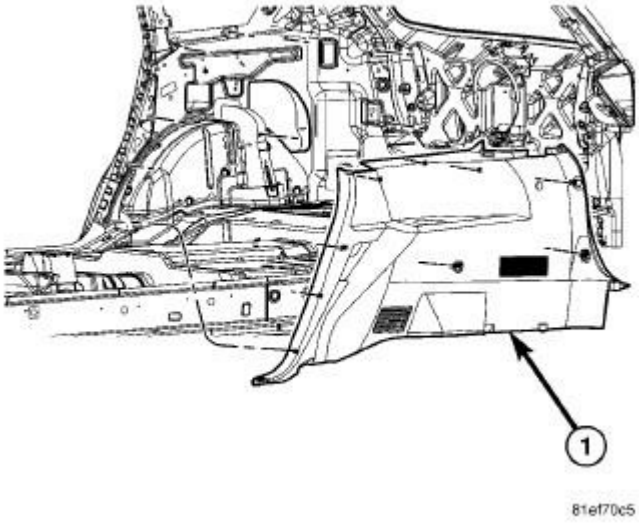


Fig. 162: Quarter Trim Panel
Courtesy of CHRYSLER LLC

1. Remove the second row seats. See **Body/Seats/SEAT - Removal**.
2. Remove the third row seats, if equipped. See **Body/Seats/SEAT - Removal**
3. Remove the storage box, if equipped. See **Body/Interior/BOX, Storage - Removal**.
4. Remove the door sill plate. See **Body/Interior/PLATE, Scuff - Removal**.
5. Remove the D-pillar trim panel. See **Body/Interior/PANEL, D-Pillar Trim - Removal**.
6. Remove the mounting fasteners.
7. Using trim stick C-4755, carefully pry the quarter trim panel out disengaging the retaining clips.

Installation

INSTALLATION

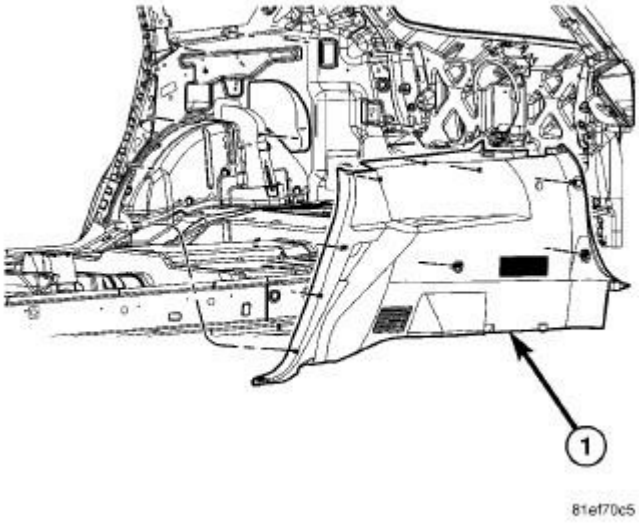


Fig. 163: Quarter Trim Panel
Courtesy of CHRYSLER LLC

1. Install the quarter trim panel.
2. Install the mounting fasteners.
3. Install the door sill plate. See **Body/Interior/PLATE, Scuff - Installation**.
4. Install the D-pillar trim panel. See **Body/Interior/PANEL, D-Pillar Trim - Installation**.
5. Install the storage box, if equipped. See **Body/Interior/BOX, Storage - Installation**.
6. Install the third row seats, if equipped. See **Body/Seats/SEAT - Installation**.
7. Install the second row seats. See **Body/Seats/SEAT - Installation**.

PLATE, SCUFF, DOOR SILL

Removal

REMOVAL

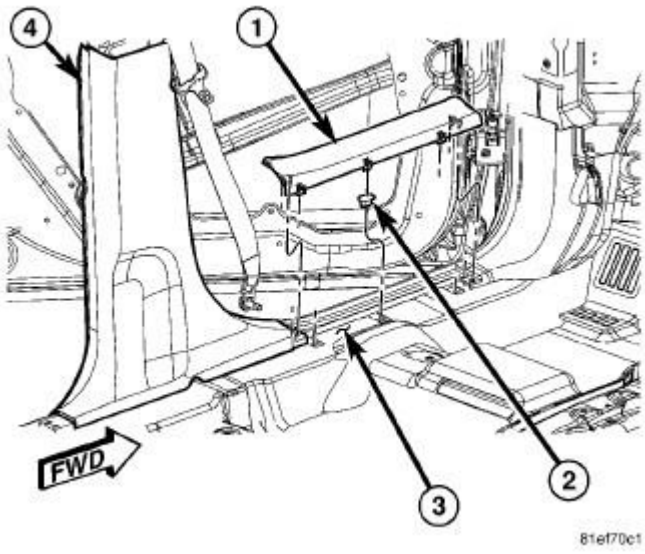


Fig. 164: Front Door Sill Scuff Plates
Courtesy of CHRYSLER LLC

1. Using trim stick C-4755 disengage clips holding door sill scuff panel and to door sill.
2. Starting at forward end of door sill scuff panel, pull upward on sill scuff panel in order to disengage clips attaching sill scuff panel to door opening flange.
3. Remove door sill scuff panel from vehicle.

Installation

INSTALLATION

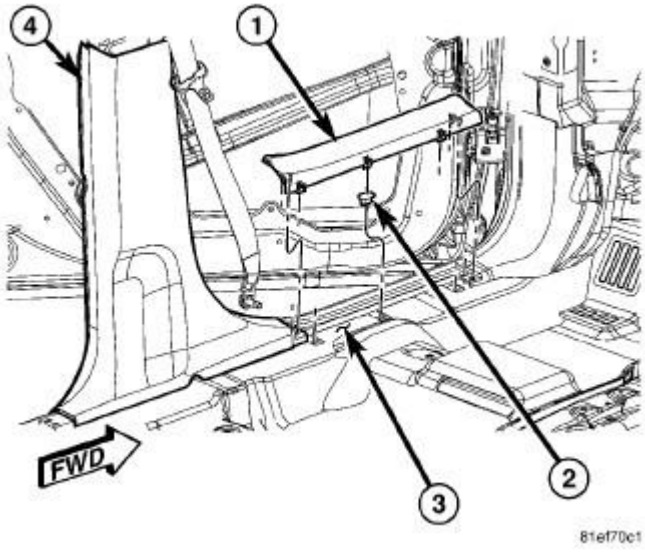


Fig. 165: Front Door Sill Scuff Plates

Courtesy of CHRYSLER LLC

1. Place door sill trim panel into position.
2. Ensure plastic retaining nut is installed.
3. Pushing downward on sill trim panel to engage tabs and attaching clips to the door sill.

PLATE, SCUFF, LIFTGATE SILL

Removal

REMOVAL

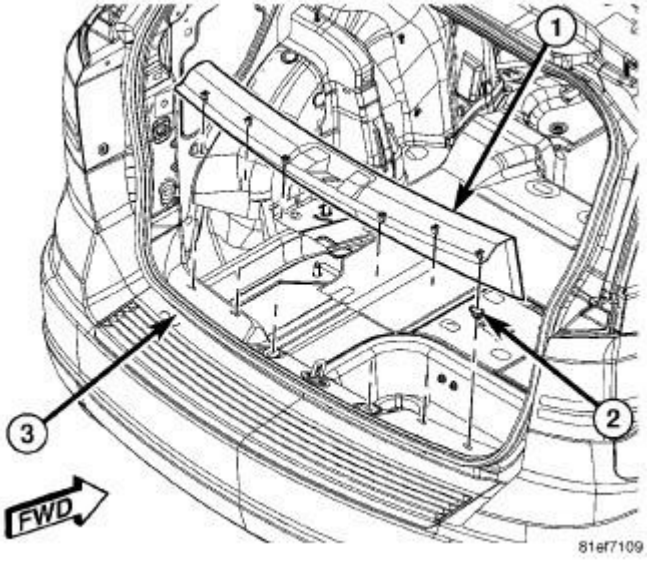


Fig. 166: LIFTGATE SILL TRIM PANEL
Courtesy of CHRYSLER LLC

1. Open the liftgate.
2. Using trim stick C-4755, carefully pry the liftgate sill plate out disengaging the retaining clips.
3. Remove the liftgate sill plate from the vehicle.

Installation

INSTALLATION

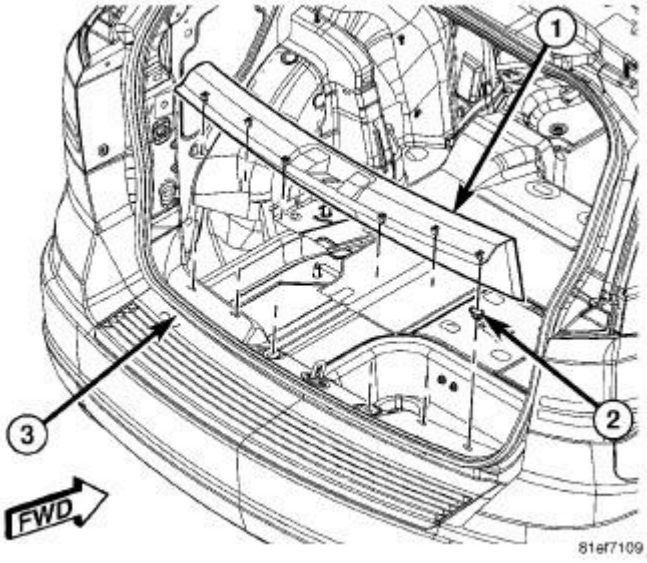


Fig. 167: LIFTGATE SILL TRIM PANEL
Courtesy of CHRYSLER LLC

1. Position the liftgate sill plate into the vehicle.
2. Firmly press the sill plate downward securing the retaining clips.
3. Close the liftgate.

SUPPORT, VISOR

Removal

REMOVAL

1. Disengage sun visor from center support.
2. Remove mounting fasteners attaching support to roof header,
3. Remove support from vehicle.

Installation

INSTALLATION

1. Place support into position.
2. Install mounting fasteners attaching support to roof header,
3. Engage sun visor to center support.

VISOR

Removal

REMOVAL

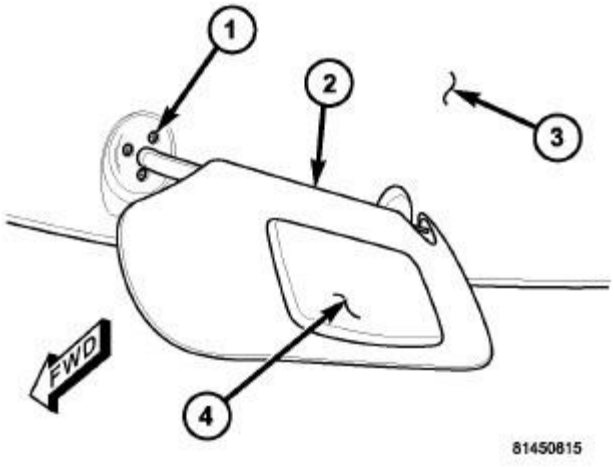


Fig. 168: Sun Visor
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing the screws (1), be certain to avoid any wiring or drain tube interference.

1. Remove the three screws (1) that secure each sun visor (2) to the roof panel and remove the visor from the headliner (3).
2. If equipped, disconnect the wire harness connector for the illuminated vanity mirror (4).

Installation

INSTALLATION

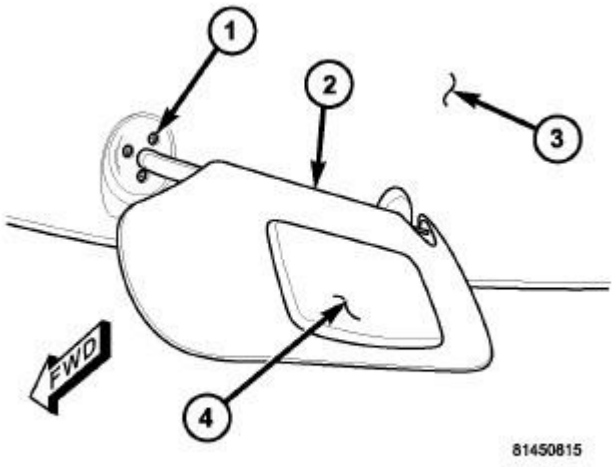


Fig. 169: Sun Visor
Courtesy of CHRYSLER LLC

CAUTION: When removing or installing the screws (1), be certain to avoid any wiring or drain tube interference.

1. If equipped, connect the wire harness connector for the illuminated vanity mirror (4).
2. Position the sun visor (2) onto the headliner (3).
3. Install the three screws (1) that secure each sun visor to the roof panel. Tighten the screws to 2.2 N.m (20 in. lbs.).

PAINT

SPECIFICATIONS

PAINT CODES

EXTERIOR COLORS

EXTERIOR COLOR	CHRYSLER CODE
Inferno Red Crystal Pearl Coat	ARH
White Gold Metallic Clearcoat	HWL
Deep Water Blue Pearl Coat	GBS
Silver Steel Metallic Clearcoat	DA4
Bright Silver Metallic Clearcoat	WS2
Brilliant Black Crystal Pearl Coat	AXR
Stone White Clearcoat	SW1

INTERIOR COLORS

INTERIOR COLOR	CHRYSLER CODE
V = Dark Slate Gray	DV
B = Dark Pebble Beige/Pastel Pebble Beige	KA

BASECOAT/CLEARCOAT FINISH

Description

DESCRIPTION

On most vehicles a two-part paint application (basecoat/clearcoat) is used. Color paint that is applied to primer is called basecoat. The clearcoat protects the basecoat from ultraviolet light and provides a durable high-gloss finish.

CAUTION: Do not use abrasive chemicals or compounds on painted surfaces. Damage to finish can result.

Do not use harsh alkaline based cleaning solvents on painted surfaces. Damage to finish or color can result.

FINESSE SANDING, BUFFING, AND POLISHING

Description

DESCRIPTION

Minor acid etching, orange peel, or smudging in clearcoat or single-stage finishes can be reduced with light finesse sanding, hand buffing, and polishing.**If the finish has been finesse sanded in the past, it cannot be repeated. Finesse sanding operation should be performed by a trained automotive paint technician.**

CAUTION: Do not remove clearcoat finish, if equipped. Basecoat paint must retain clearcoat for durability.

PAINT CODE

Description

DESCRIPTION

The paint code is identified on the Vehicle Safety Certification Label which is located on the drivers door shut face. The first digit of the paint code listed on the vehicle indicates the sequence of application, i.e.: P = primary coat, Q = secondary coat. The codes listed in the Color Code Chart are used for manufacturing purposes.

PAINT TOUCH-UP

Description

DESCRIPTION

When a painted metal surface has been scratched or chipped, it should be touched up as soon as possible to avoid corrosion. For best results, use Mopar® Scratch Filler/Primer, Touch Up Paints and Clear Top Coat. For a description of the paint codes. See **Body/Paint - Specifications**.

WARNING: Use an OSHA approved respirator and safety glasses when spraying paint or solvents in a confined area. Personal injury can result.

TOUCH UP PROCEDURE

1. Scrape loose paint and corrosion from inside scratch or chip.
2. Clean affected area with Mopar® Tar/Road Oil Remover, and allow to dry.
3. Fill the inside of the scratch or chip with a coat of filler/primer. Do not overlap primer onto good surface finish. The applicator brush should be wet enough to puddle-fill the scratch or chip without running. Do not stroke brush applicator on body surface. Allow the filler/primer to dry hard.
4. Cover the filler/primer with color touch up paint. Do not overlap touch up color onto the original color coat around the scratch or chip. Butt the new color to the original color, if possible. Do not stroke applicator brush on body surface. Allow touch up paint to dry hard.
5. On vehicles without clearcoat, the touch up color can be lightly finesse sanded (1500 grit) and polished with rubbing compound.
6. On vehicles with clearcoat, apply clear top coat to touch up paint with the same technique as described in 4. Allow clear top coat to dry hard. If desired, 5 can be performed on clear top coat.

WARNING: Avoid prolonged skin contact with petroleum or alcohol - based cleaning solvents. Personal injury can result.

SEATS, FRONT

ADJUSTER, SEAT, FRONT

Removal

POWER ADJUSTER

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Remove front seat from vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the seat back from the seat cushion. See **Body/Seats/SEAT BACK - Removal**.
3. Remove the seat cushion. See **Body/Seats/COVER, Seat Cushion - Removal**.
4. Remove the seat wiring harness (37).

5. Remove the STPS sensor (32), if equipped.
6. Remove the wiring bracket fastener (35) and bracket (33).

MANUAL ADJUSTER

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Remove the front seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the seat back. See **Body/Seats/SEAT BACK - Removal**.
3. Remove the seat cushion. See **Body/Seats/COVER, Seat Cushion - Removal**.
4. Remove the wiring harness (30) from the seat frame.
5. Remove the STPS sensor (32).
6. Remove the wiring bracket fastener (29) and bracket (28).

Installation

POWER ADJUSTER

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Install the wiring bracket fastener (35) and bracket (33).
2. Install the STPS sensor (32), if equipped.
3. Install the seat wiring harness (37).
4. Install the seat cushion. See **Body/Seats/COVER, Seat Cushion - Installation**.
5. Install the seat back to the seat cushion assembly. See **Body/Seats/SEAT BACK - Installation**.
6. Install front seat to vehicle. See **Body/Seats/SEAT - Installation**.

MANUAL ADJUSTER

1. Install the wiring bracket (28) and fastener (29).
2. Install the STPS sensor (32).
3. Install the wiring harness (30) to the seat frame.
4. Install the seat cushion. See **Body/Seats/COVER, Seat Cushion - Installation**.
5. Install the seat back. See **Body/Seats/SEAT BACK - Installation**.
6. Install the front seat to the vehicle. See **Body/Seats/SEAT - Installation**.

BIN, UNDER SEAT STORAGE

Removal

REMOVAL

NOTE: Refer to the fold flat passenger seat exploded view for illustration. See Body/Seats/SEAT - Description.

1. Remove the seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the seat side shields. See **Body/Seats/SIDE SHIELDS, Seat Cushion - Removal**.
3. Remove the wiring harness (28) anchors from the seat bottom.
4. Remove the anchors securing the recliner cable (19) from the seat bottom.
5. Remove the seat cover and cushion. See **Body/Seats/COVER, Seat Cushion - Removal**.
6. Fold the seat back forward completely.
7. Remove the front biteline pad (41).
8. Remove the inner left shield (21).
9. Remove the inner right shield (33).
10. Fully recline the seat back.
11. Remove the storage bin (2) from the seat frame.

Installation

INSTALLATION

NOTE: Refer to the fold flat passenger seat exploded view for illustration. See Body/Seats/SEAT - Description.

1. With the seat back fully reclined, install the storage bin (2) to the seat frame.
2. Fold the seat back completely forward.
3. Install the inner right shield (33).
4. Install the inner left shield (21).
5. Install the front biteline pad (41).
6. Install the seat cushion and cover. See **Body/Seats/COVER, Seat Cushion - Installation**.
7. Install the anchors securing the recliner cable (19) to the seat bottom.
8. Install the wiring harness (28) anchors to the seat bottom.
9. Install the seat side shields. See **Body/Seats/SIDE SHIELDS, Seat Cushion - Installation**.
10. Install the seat into vehicle. See **Body/Seats/SEAT - Installation**.

COVER, SEAT BACK

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

NOTE: All call outs are in reference to the Driver Power exploded view unless otherwise noted.

1. Remove the seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the seat back. See **Body/Seats/SEAT BACK - Removal**.
3. Remove the lumbar handle cover (23).
4. Remove the retaining fastener (22) and remove the handle (21).
5. Remove the back panel from the seat back. See **Body/Seats/PANEL, Seat Back - Removal**.
6. Remove the J-clips and pushpins on the seat back cover from the frame.
7. Remove the side airbag (SAB) mounting nuts.
8. Disconnect the SAB wiring connector.
9. Remove the SAB from the seat cover.
10. Remove the inner inboard shield (41).
11. Remove the inner outboard shield (28).
12. Remove the headrest guides (12). See **Body/Seats/SLEEVE, Headrest - Removal**.
13. Starting from the bottom rear of the seat back, carefully pull seat cover off seat cushion to expose hog rings.
14. Cut hog rings and discard.
15. Remove the cover from the seat back assembly.
16. Remove the seat cushion foam, if required.

Installation

INSTALLATION

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

NOTE: Do not reuse the recliner assembly attaching bolts.

1. Position cover on the top of seat back.
2. Carefully roll cover down to the area that hog rings are to be installed.
3. Install the side airbag (SAB) to the seat back cover.
4. Connect the SAB wiring connector.
5. Install the SAB mounting fasteners.
6. Engage the J-clip retainers to the back frame assembly.
7. Install hog rings.
8. Roll cover downward.
9. Engage the J-clip retainer to the seat frame.
10. Install lumbar handle, if equipped.
11. Install the seat back panel. See **Body/Seats/PANEL, Seat Back - Installation**

12. Install headrest guides. See **Body/Seats/SLEEVE, Headrest - Installation**.
13. Install seat back to seat cushion. See **Body/Seats/SEAT BACK - Installation**.
14. Install the seat to the vehicle. See **Body/Seats/SEAT - Installation**.
15. Check seat back and headrest operation.

COVER, SEAT CUSHION

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Remove seat from vehicle. See **Body/Seats/SEAT - Removal**
2. Remove the wiring harness from the seat pan.

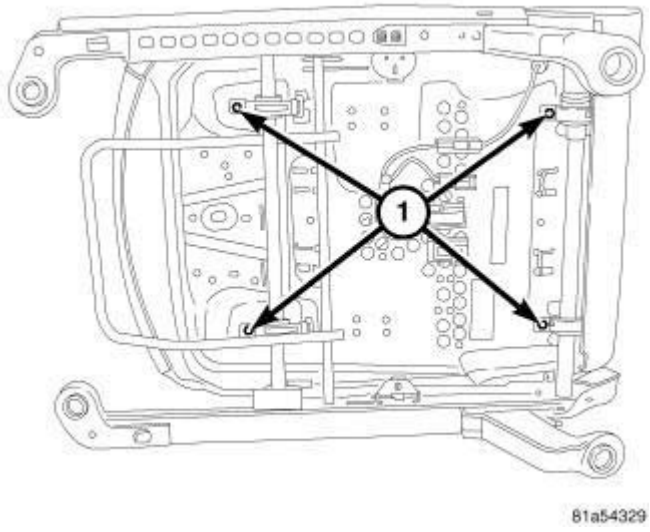


Fig. 170: SEAT PAN FASTENERS
Courtesy of CHRYSLER LLC

3. Remove four seat pan fasteners (1).
4. Remove the seat pan from the adjuster assembly.
5. Remove the J-clips securing the seat cover to the seat pan, if required.

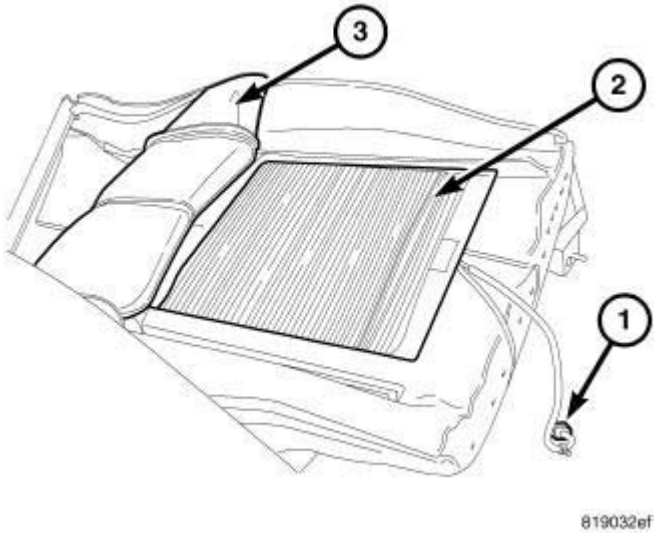


Fig. 171: HEATED SEAT ELEMENT
Courtesy of CHRYSLER LLC

6. Starting at the rear of the seat cushion, carefully pull seat cover (3) down towards the front.
7. Cut and discard hog rings.
8. Remove the seat cover from the foam.

Installation

INSTALLATION

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

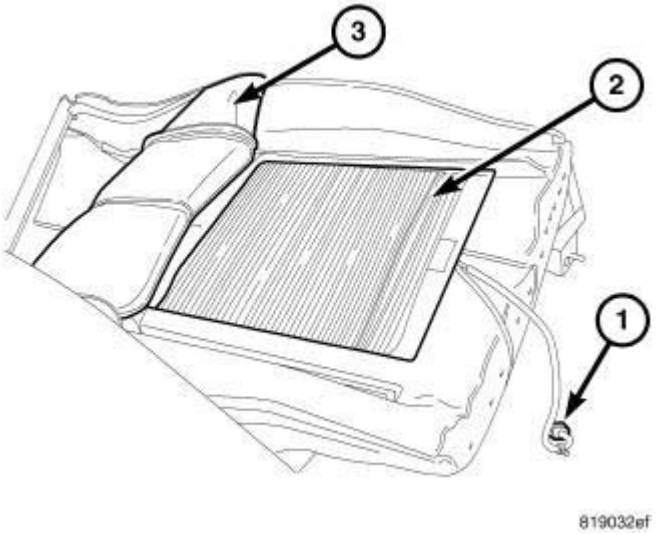


Fig. 172: HEATED SEAT ELEMENT
Courtesy of CHRYSLER LLC

1. Install the heated seat element (2) to the seat cushion, if required.
2. Slide the seat cover (3) over the front of the cushion.
3. Install hog rings as the cover is slid over the cushion.

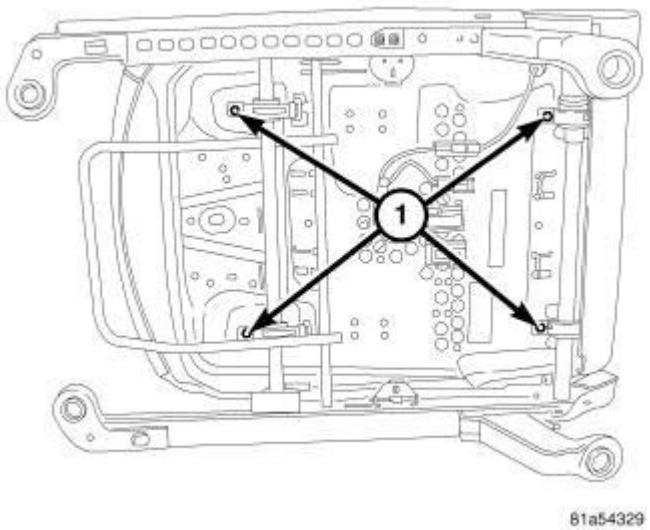


Fig. 173: SEAT PAN FASTENERS
Courtesy of CHRYSLER LLC

4. Place the seat cushion into position on the seat pan.
5. Install the J-clips securing the seat cushion to the seat pan.
6. Install the seat pan and cushion to the adjuster assembly.
7. Install the mounting fasteners and torque to 12.5 N-m (9 ft. lbs.).
8. Install the seat to the vehicle. See **Body/Seats/SEAT - Installation**.

PANEL, SEAT BACK, FRONT

Removal

REMOVAL

FOLD FLAT SEAT

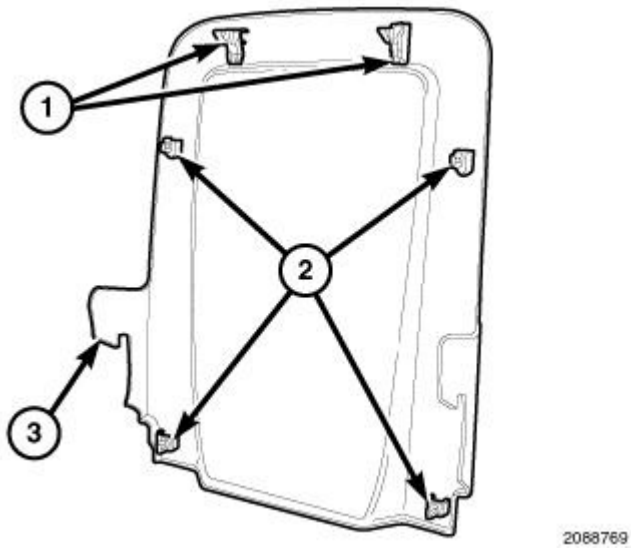


Fig. 174: Seat Back Retainers
Courtesy of CHRYSLER LLC

1. Carefully disengage the clip retainers (2) by pulling up on the bottom and sides of the back panel.
2. Slide the back panel up to disengage the side retainers (3).
3. While lifting the bottom of the panel, slide the panel down and remove from the seat back disengaging the upper retainers (1).

NON-FOLD FLAT SEAT

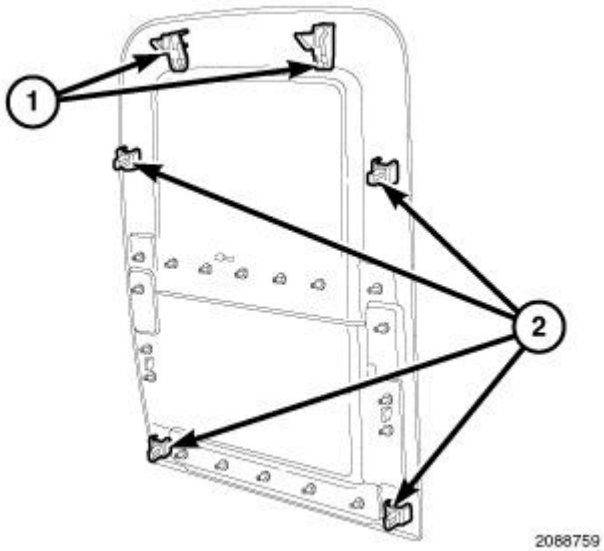


Fig. 175: Non-Fold Flat Seat Retainers
Courtesy of CHRYSLER LLC

1. Carefully pull the bottom and sides of the panel upwards to disenge the lower clip retainers (2).
2. While lifting the bottom of the back panel, disengage the upper retainers (1) and remove the panel from

the seat back.

Installation

INSTALLATION

FOLD FLAT SEAT

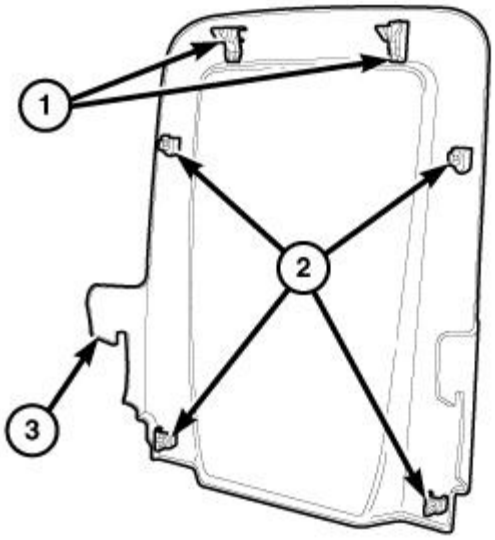


Fig. 176: Seat Back Retainers
Courtesy of CHRYSLER LLC

1. While lifting the bottom of the panel up, engage the upper retainers (1) to the seat back.
2. Engage the side retainers (3) to the seat and slide the back panel down into position.
3. Firmly seat the clip retainers (2) securing the back panel to the seat back.

NON-FOLD FLAT SEAT

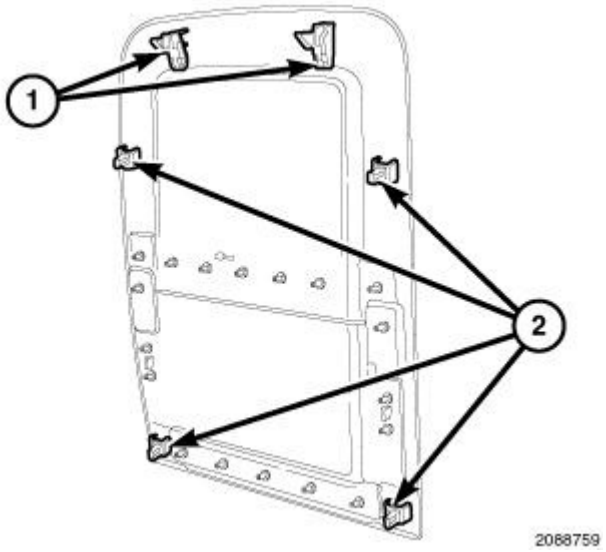


Fig. 177: Non-Fold Flat Seat Retainers
Courtesy of CHRYSLER LLC

1. While lifting the bottom of the back panel, engage the upper retainers (1) to the seat back.
2. Firmly seat the lower clip retainers (2) securing the back panel to the seat back.

SEAT BACK, FRONT

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for detailed exploded views.

NOTE: All call outs are in reference to the Driver Power exploded view unless otherwise noted.

1. Remove the seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the lift handle cover and mounting fasteners, if equipped.
3. Remove the lift handle, if equipped.
4. Carefully pry the side shield away from the recliner handle (26) and remove the retaining clip.
5. Remove the recliner handle.
6. Remove the rear fastener (31) from the outboard shield (25).
7. Starting at the rear of the outboard shield, carefully pry the side shield until the retainers disengage and slide the shield forward to remove.
8. Remove the seat buckle bolt and buckle (40).
9. Remove the rear fastener (31) from the inboard shield (42).
10. Starting at the rear of the inboard shield, carefully pry the side shield until the retainers disengage and

slide the shield forward to remove.

11. Remove the airbag wiring harness (24) from the seat bottom, ensure the harness is completely removed from the bracket (26) and through recliner mechanism.
12. Remove the outboard and inboard seat back bolts (30).
13. Remove the seat back from the seat cushion assembly.

Installation

INSTALLATION

NOTE: See Body/Seats/SEAT - Description for detailed exploded views.

NOTE: All call outs are in reference to the Driver Power exploded view unless otherwise noted.

1. Install the seat back to the seat cushion assembly.
2. Install the outboard and inboard seat back bolts and torque to 40 N-m (29 ft. lbs.).
3. Install the airbag wiring harness to the seat bottom.
4. Install the inboard shield.
5. Install the rear fastener to the inboard shield.
6. Install the seat buckle bolt and buckle. Tighten to 45 N-m (33 ft. lbs.).
7. Install the outboard shield.
8. Install the rear fastener to the outboard shield.
9. Install the recliner handle retaining clip.
10. Install the recliner handle.
11. Install the lift handle, if equipped.
12. Install the mounting fasteners and lift handle cover, if equipped.
13. Install the seat to the vehicle. See **Body/Seats/SEAT - Removal**.

SEAT, FRONT

Description

DESCRIPTION

WARNING: Discard and replace the seat back bolts with new bolts when servicing. Installing used bolts may result in the loosening of the seat back bolts after repair. Failure to follow these instructions may result in serious or fatal injury.

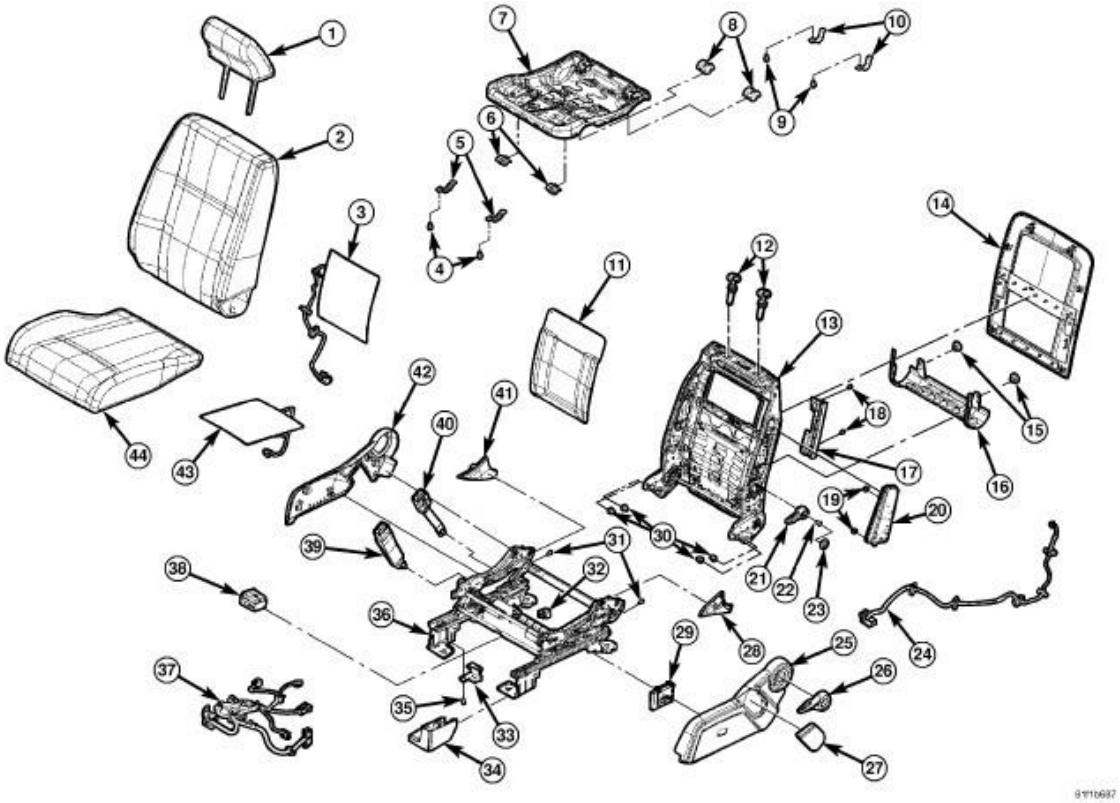


Fig. 178: Front Seat - Driver Power
Courtesy of CHRYSLER LLC

1. HEADRES	23. CAP, LUMBER HANDLE
2. CUSHION/COVER, SEAT BACK	24. HARNESS, AIRBAG WIRING
3. BACK, HEATER PAD	25. SHIELD, SIDE
4. SCREW	26. HANDLE, RECLINER
5. CLAMP BAND, FRONT	27. COVER, SEAT BELT ANCHOR
6. BRACKET, FRONT PAN	28. FLANGE, OUTBOARD RETURN
7. CUSHION PAN, FRONT	29. SWITCH, POWER SEAT
8. BRACKET, REAR PAN	30. SCREW
9. SCREW	31. SCREW
10. CLAMP BAND, REAR	32. SENSOR, STPS
11. BAG, ANTI-SQUEAK	33. BRACKET, WIRING
12. GUIDES, HEADREST	34. COVER, RISER
13. FRAME, SEAT BACK	35. SCREW
14. PANEL, BACK W/MAP POCKET	36. ASSEMBLY, TRACK
15. TREE CLIP, SUB PANEL	37. HARNESS, WIRING
16. BASE, SUB PANEL	38. MODULE, HEATED SEAT
17. BRACKET, SIDE AIRBAG	39. BUCKLE, SEAT (INTERNATIONAL)
18. PIN, PUSH	40. BUCKLE, SEAT

19. NUT, LOCK	41. FLANGE, INNER RETURN
20. AIRBAG, SIDE	42. SHIELD, SIDE
21. HANDLE, LUMBER	43. CUSHION, HEATER PAD
22. SCREW	44. CUSHION/COVER, SEAT

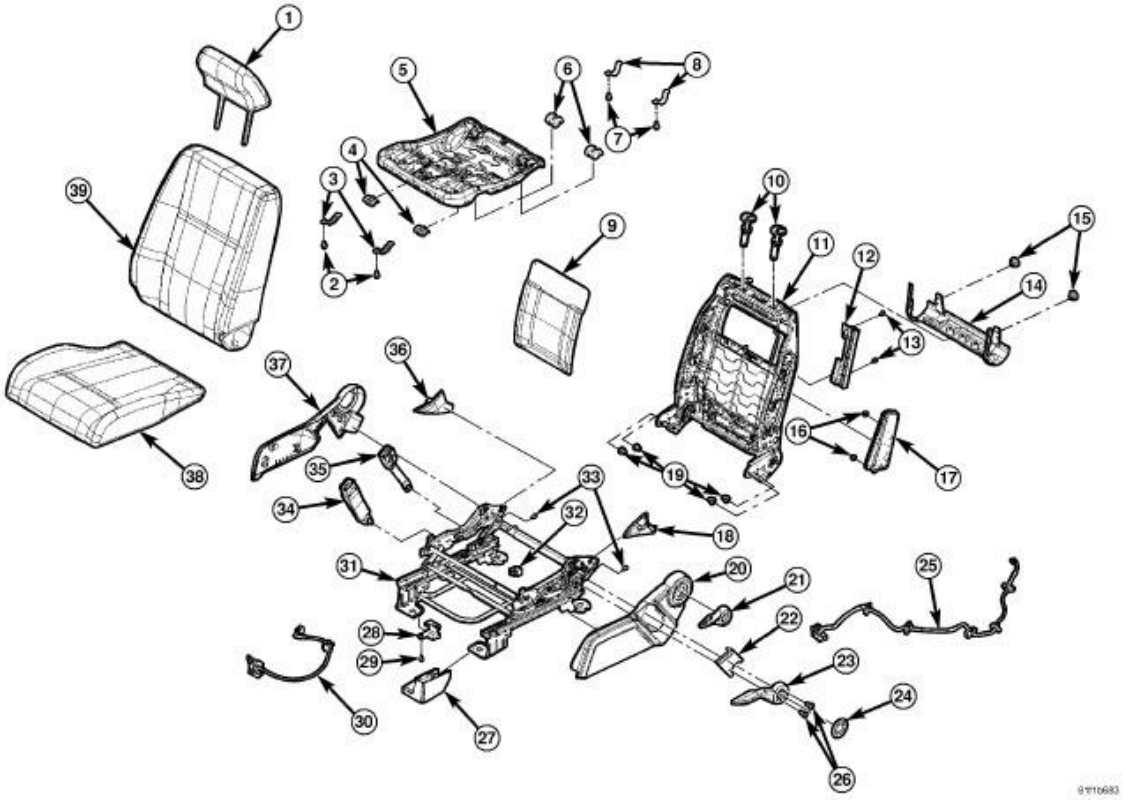


Fig. 179: Front Seat - Driver Manual
Courtesy of CHRYSLER LLC

1. HEADREST	21. HANDLE, RECLINER
2. SCREW	22. COVER, SEAT BELT ANCHOR
3. CLAMP BAND, FRONT	23. HANDLE, LIFT
4. BRACKET, FRONT PAN	24. CAP, LIFT HANDLE
5. CUSHION PAN, FRONT	25. HARNESS, AIRBAG
6. BRACKET, REAR PAN	26. SCREW
7. SCREW	27. COVER, RISER
8. CLAMP BAND, REAR	28. BRACKET, WIRING
9. BAG, ANTI-SQUEAK	29. SCREW
10. GUIDES, HEADREST	30. HARNESS, WIRING
11. FRAME, SEAT BACK	31. ASSEMBLY, TRACK
12. BRACKET, SIDE AIRBAG	32. SENSOR, STPS.
13. PIN, PUSH	33. SCREW

14. BASE, SUB PANEL	34. BUCKLE, SEAT (INTERNATIONAL)
15. TREE CLIP, SUB PANEL	35. BUCKLE, SEAT DOMESTIC
16. NUT, LOCK	36. FLANGE, INNER RETURN
17. AIRBAG, SIDE	37. SHIELD, SIDE
18. FLANGE, OUTBOARD RETURN	38. CUSHION/COVER, SEAT
19. BOLTS, SEAT BACK	39. CUSHION/COVER, SEAT BACK
20. SHIELD, SIDE	-

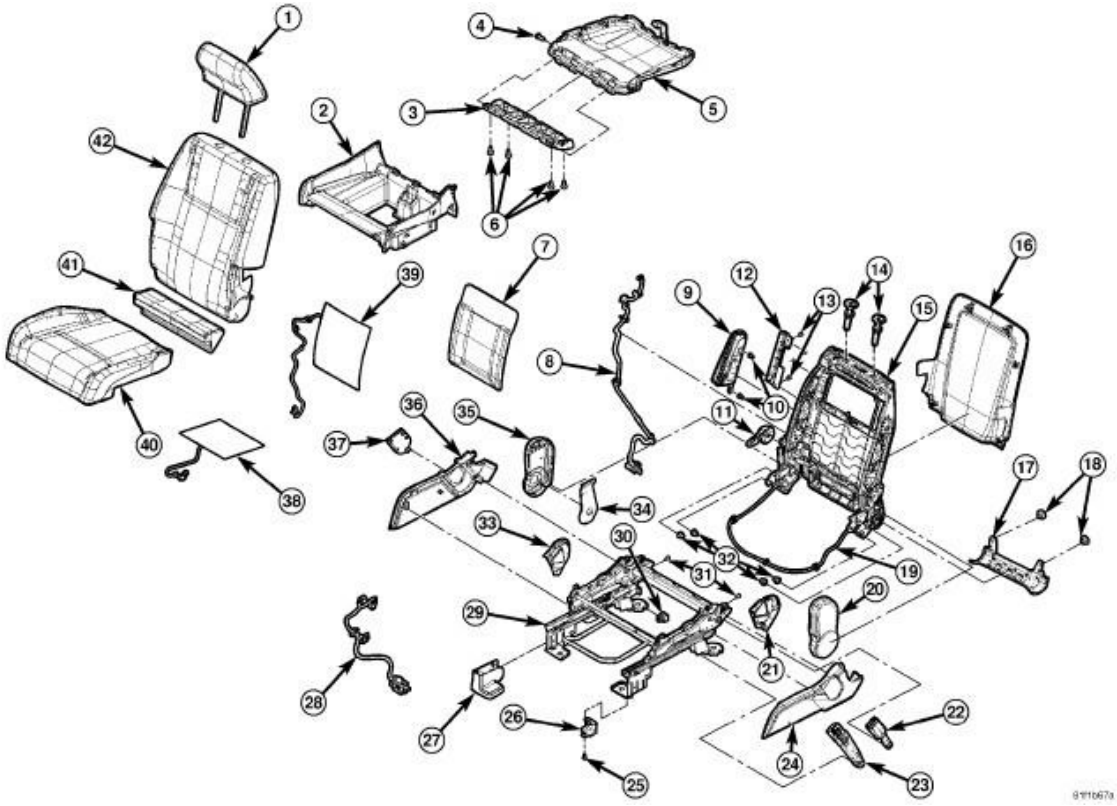


Fig. 180: Front Seat - 2 Way Passenger-Fold Flat
Courtesy of CHRYSLER LLC

1. HEADREST	22. BUCKLE, SEAT DOMESTIC
2. BIN, STORAGE	23. BUCKLE, SEAT INTERNATIONAL
3. BRACKET, FRONT MOUNTING	24. SHIELD, SIDE INBOARD
4. BOLT, PIVOT	25. SCREW
5. FRAME, CUSHION	26. BRACKET, WIRING
6. SCREW	27. COVER, RISER
7. BAG, ANTI-SQUEAK	28. HARNESS, WIRING
8. HARNESS, AIRBAG WIRING	29. ASSEMBLY, TRACK
9. AIRBAG, SIDE	30. SENSOR, STPS
10. NUT, LOCK	31. SCREW

11. HANDLE, RECLINER	32. SCREW
12. BRACKET, SIDE AIRBAG	33. SHIELD, INNER RIGHT
13. PIN, PUSH	34. PLATE, WIRE
14. GUIDES, HEADREST	35. SHIELD, UPPER OUTBOARD
15. FRAME, SEAT BACK	36. SHIELD, SIDE OUTBOARD
16. ASSEMBLY, BACK PANEL	37. COVER, SEAT BELT ANCHOR
17. BASE, SUB PANEL	38. HEAT PAD, CUSHION
18. TREE CLIP, SUB PANEL	39. HEAT PAD, SEAT BACK
19. CABLE ASSEMBLY, FOLD FLAT	40. CUSHION/COVER, SEAT
20. SHIELD, UPPER INBOARD	41. PAD, FRONT BITELINE
21. SHIELD, INNER LEFT	42. CUSHION/COVER, SEAT BACK

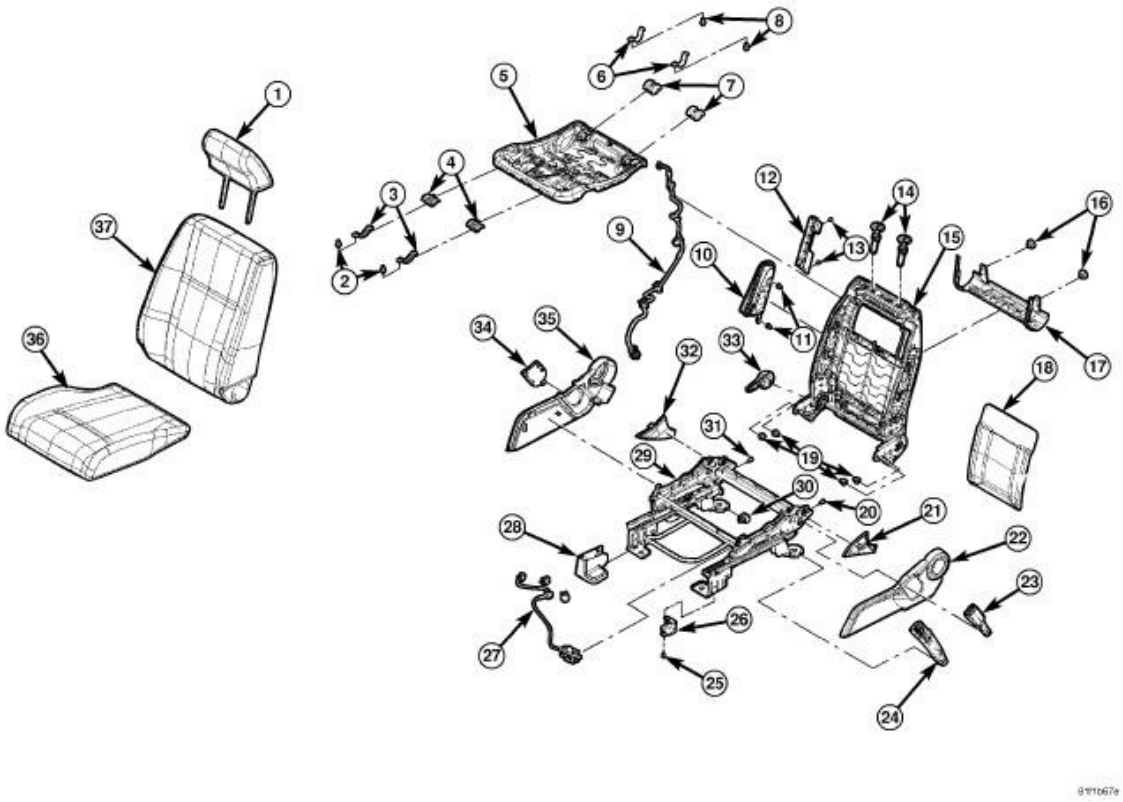


Fig. 181: Front Seat - 2 Way Passenger
Courtesy of CHRYSLER LLC

1. HEADREST	20. SCREW
2. SCREW	21. SHIELD, INNER LEFT
3. CLAMP BAND, FRONT	22. SHIELD, SIDE INBOARD
4. BRACKET, FRONT PAN	23. BUCKLE, SEAT DOMESTIC
5. CUSHION PAN, FRONT	24. BUCKLE, SEAT INTERNATIONAL
6. CLAMP BAND, REAR	25. SCREW

7. BRACKET, REAR PAN	26. BRACKET, WIRING
8. SCREW	27. HARNESS, WIRING
9. HARNESS, AIRBAG WIRING	28. COVER, RISER
10. AIRBAG, SIDE	29. ASSEMBLY, TRACK
11. NUT, LOCK	30. SENSOR, STPS
12. BRACKET, SIDE AIRBAG	31. SCREW
13. PIN, PUSH	32. SHIELD, INNER RIGHT
14. GUIDES, HEADREST	33. HANDLE, RECLINER
15. FRAME, SEAT BACK	34. COVER, SEAT BELT ANCHOR
16. TREE CLIP, SUB PANEL	35. SHIELD, SIDE OUTBOARD
17. BASE, SUB PANEL	36. CUSHION/COVER, SEAT
18. BAG, ANTI-SQUEAK	37. CUSHION/COVER, SEAT BACK
19. SCREW	-

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Remove the headrest.
2. Slide seat forward.
3. Using a trim stick C-4755 or equivalent, remove the seat belt anchor trim.
4. Remove both rear seat adjuster bolts.
5. Remove seat belt anchor bolt attaching seat belt to seat.
6. Slide seat rearward.
7. Disconnect and isolate the negative battery cable.
8. Remove both front seat adjuster bolts.
9. Disconnect all electrical connectors.

CAUTION: Caution should be taken not to handle seat by adjuster release bar when removing spring loaded seat from vehicle.

10. Remove front seat from vehicle.

Installation

INSTALLATION

CAUTION: Do not handle by seat adjuster release bar.

NOTE: Ensure that the seat tracks are rearward. Ensure the seat tracks on the right and left are in equal latch positions.

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Place front seat in position in vehicle.
2. Connect front seat wire harness connector to body harness connector.
3. Install bolts to attach front of seat adjuster to the floor. Tighten bolts to 65 N.m (48 ft. lbs.).
4. Slide seat forward and install bolts attaching rear of seat track to the floor. Tighten bolts to 65 N.m (48 ft. lbs.).
5. Install seat belt anchor bolt through seat belt and snap seat belt anchor cover to seat cover side shield.
6. Connect the battery negative cable.
7. Verify front seat operation.

SIDE SHIELDS, SEAT CUSHION, FRONT

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for detailed exploded views.

NOTE: All call outs are in reference to the Driver Power exploded view unless otherwise noted.

1. Remove the seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the lift handle cover and mounting fasteners, if equipped.
3. Remove the lift handle, if equipped.
4. Remove the recliner handle retainer and handle.
5. Remove the seat belt buckle bolt and buckle.
6. Remove the rear fastener on the outboard shield.
7. Remove the rear fastener on the inboard shield.
8. Remove the appropriate side shield.

Installation

INSTALLATION

NOTE: See Body/Seats/SEAT - Description for detailed exploded views.

NOTE: All call outs are in reference to the Driver Power exploded view unless otherwise noted.

1. Install the side shield.
2. Install the rear fastener on the inboard shield.
3. Install the rear fastener on the outboard shield.
4. Install the seat belt buckle bolt and buckle.
5. Install the recliner handle retainer and handle.
6. Install the lift handle, if equipped.
7. Install the lift handle cover and mounting fasteners, if equipped.
8. Install the seat to the vehicle. See **Body/Seats/SEAT - Removal**.

SLEEVE, HEADREST

Removal

REMOVAL

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Remove the headrest.
2. If equipped, remove the back panel (14) or unzip the seat back cover.
3. Remove the J-clip from the bottom rear of the seat back.
4. Squeeze the detents at the bottom of the headrest guides then lightly tap the headrest guides (12) until the retaining clips disengage from the seat frame.
5. Remove the headrest guides from the seat back.

Installation

INSTALLATION

NOTE: See Body/Seats/SEAT - Description for a detailed exploded view of the seats.

1. Install the headrest guides to the seat back.
2. Lightly tap the headrest guides (12) until the retaining clips engage the seat frame.
3. Zip the seat back cover.
4. Install the J-clip to the bottom rear of the seat back.
5. Install the back panel (14), if equipped.
6. Install the headrest.

SEATS, SECOND ROW

ADJUSTER, SEAT TRACK, SECOND ROW

Removal

REMOVAL

1. Remove the seat cushion. See **Body/Seats/COVER, Seat Cushion - Removal**.
2. Remove the rear plastic shield fasteners and shields.
3. Remove the bottom plastic shield by carefully prying up on the shield until the retainers disengage.
4. Remove the cables and cable assemblies.
5. Remove the frame to adjuster fasteners and separate.
6. Remove the adjuster latch mounting nuts and remove the latch.

Installation

INSTALLATION

1. Install the adjuster latch mounting nuts and install the latch.
2. Position the frame to the adjuster assembly.
3. Install the frame to adjuster fasteners. Tighten to 30 N-m (22 ft. lbs.).
4. Install the cables and cable assemblies.
5. Install the bottom plastic shield ensuring the retainers engage.
6. Install the rear plastic shield shields and fasteners.
7. Install the seat cushion and cover. See **Body/Seats/COVER, Seat Cushion - Installation**.

ARMREST, SECOND ROW

Removal

REMOVAL

1. Position the 40 split seat with back folded flat, to the full forward position.
2. Partially remove the armrest side shield and remove the mounting fastener.
3. With the armrest folded down, remove the two mounting fasteners located on the inside of the armrest bracket.
4. Remove the armrest from the vehicle.

NOTE: Only perform the following steps if the cover or foam replacement is required.

5. Remove the armrest plastic cover, by carefully prying up until the retainers disengage.
6. If equipped, remove the headrest.
7. Remove the headrest sleeves, if equipped.
8. Carefully pull the seat cover off of the armrest and remove the cover.
9. Remove the foam as required.

Installation

INSTALLATION

1. Install the foam, if required.
2. Carefully install the seat cover to the armrest.
3. If equipped, install the headrest sleeves to the armrest.
4. Install the headrest, if equipped.
5. Install the armrest plastic cover, ensuring the retainers engage.
6. Position the armrest to the vehicle.
7. With the armrest folded down, install the two mounting fasteners located on the inside of the armrest bracket. Tighten to 40 N-m (29 ft. lbs.).
8. Install the outboard armrest mounting fastener. Tighten to 30 N-m (22 ft. lbs.).

COVER, SEAT BACK

Removal

REMOVAL

1. Remove the folding seat handle cover, mounting fasteners and handle from the seat back.
2. Remove the seat belt trim, if required.
3. Remove the headrest and headrest guides.
4. Fold the seat back down flat.
5. For the 60 split seat only, remove the seat belt anchor bolt.
6. Remove the back panel from the seat back. See **Body/Seats/PANEL, Seat Back - Removal**.
7. Release the seat cover clips from the seat back.
8. Carefully pull the seat cover and foam away from the seat back frame.
9. If required, feed the seat belt through the seat cover.
10. Carefully pull the cover off of the foam, cutting any hog rings and discarding.

Installation

INSTALLATION

1. Carefully install the cover to the foam, installing any hog rings.
2. If required, feed the seat belt through the seat cover.
3. Position the seat cover and foam to the seat back frame.
4. Install the seat cover clips to the seat back.
5. Install the seat back panel. See **Body/Seats/PANEL, Seat Back - Installation**.
6. For the 60 split seat only, install the seat belt anchor bolt. Tighten to 49 N-m (36 ft. lbs.).
7. Fold the seat back up.
8. Install the headrest guides and headrest.

9. Install the seat belt trim, if required.
10. Install the folding seat handle, mounting fasteners and cover to the seat back.

COVER, SEAT CUSHION, SECOND ROW

Removal

REMOVAL

NOTE: Only the 40 split seat must be removed to replace the seat cushion.

1. For the 40 split seat only, remove the seat from the vehicle. See **Body/Seats/SEAT - Removal**.
2. Remove the seat recliner handle cover and fastener.
3. Remove the seat recliner handle.
4. Remove the seat adjuster handle cover and fastener.
5. Remove the seat adjuster handle.
6. Remove the seat side shields.
7. Remove the outboard seat bolt securing the seat cushion to the seat frame.
8. For the 40 split seat only, remove the inboard seat cushion mounting fastener.
9. Pull the release latch and push up on seat cushion to separate from the seat frame.
10. Remove the cable assembly from the seat cushion.
11. Remove the gas strut from the seat cushion, if equipped.
12. Remove the cushion from the seat frame.
13. Unzip the cover from the cushion.
14. Carefully pull the seat cover off of the seat cushion, cutting any hog rings and discarding them, if required.

Installation

INSTALLATION

1. Carefully pull the seat cover over the seat foam, installing any hog rings, if required.
2. Zip the cover on to the foam.
3. Install the cushion to the seat frame.
4. Install the gas strut to the seat cushion, if equipped.
5. Install the cable assembly to the seat cushion.
6. Ensure the seat cushion is latched into the seat frame.
7. Install the outboard seat bolt securing the seat cushion to the seat frame. Tighten to 30 N-m (22 ft. lbs.).
8. Install the inboard seat bolt, if required.
9. Install the seat side shields.
10. Install the seat recliner handle.

11. Install the seat recliner handle fastener and cover.
12. Install the seat adjuster handle.
13. Install the seat adjuster handle fastener and cover.
14. Install the seat to the vehicle, if required. See **Body/Seats/SEAT - Installation**.

PANEL, SEAT BACK, SECOND ROW

Removal

REMOVAL

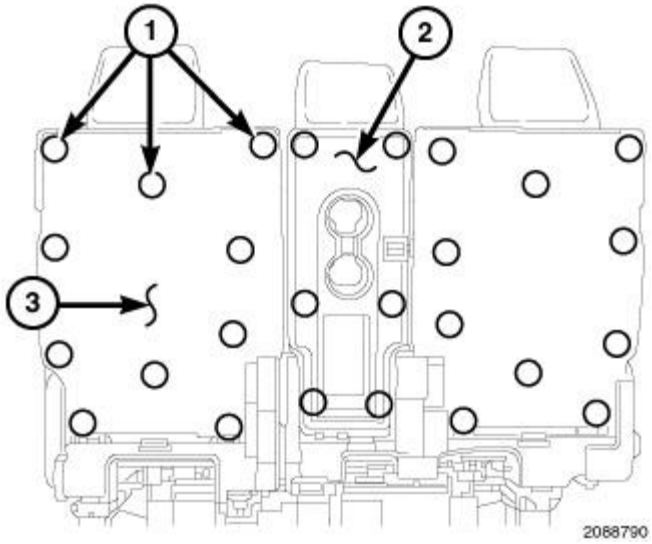


Fig. 182: Retainers On Seat Back Panels & Armrest
Courtesy of CHRYSLER LLC

1. Note the locations (1) of the retainers on the seat back panels (3) and armrest (2).

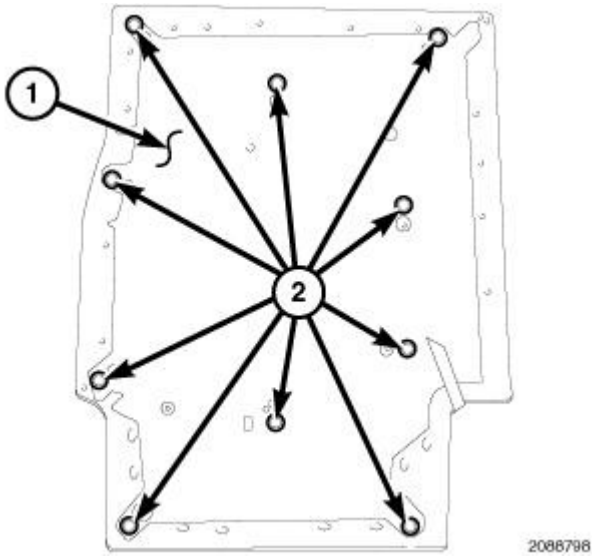


Fig. 183: Seat Back Panel Retainers
Courtesy of CHRYSLER LLC

CAUTION: Use care when removing the pushpins on the back panel from the seat back. Failure to do so will result in damage to the back panel.

2. Using a clip removal tool or equivalent, carefully disengage the retainers (2) that secure the seat back panel (1).
3. Remove the back panel from the seat.

Installation

INSTALLATION

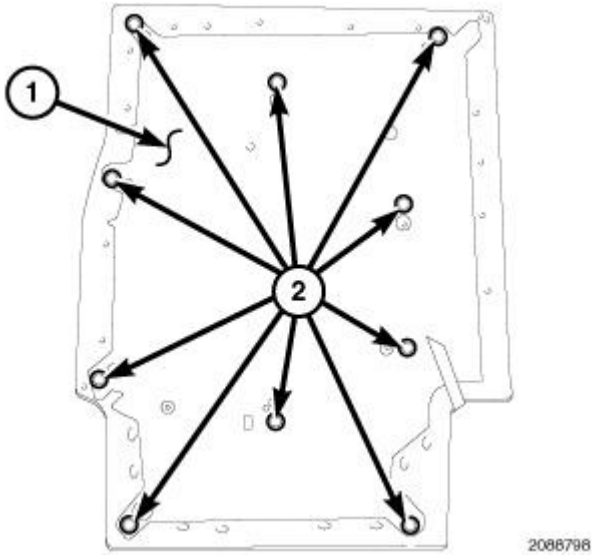


Fig. 184: Seat Back Panel Retainers

Courtesy of CHRYSLER LLC

1. Place the back panel (1) into position on the seat.
2. Engage the retainers (2) that secure the back panel to the seat.

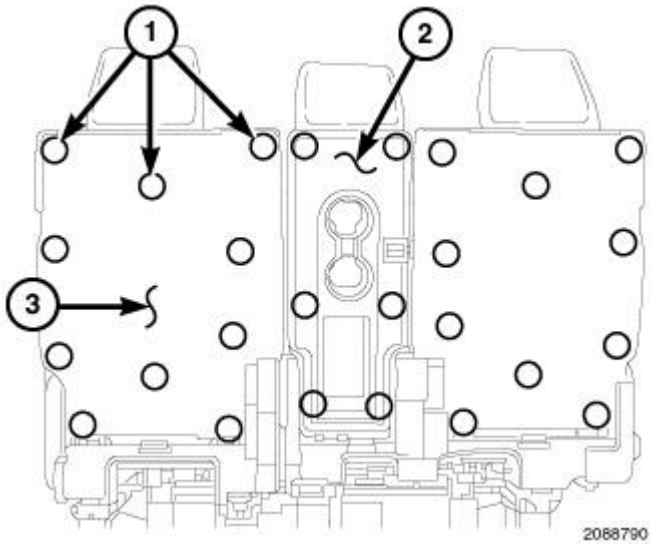


Fig. 185: Retainers On Seat Back Panels & Armrest
Courtesy of CHRYSLER LLC

3. Press firmly on the retainer locations (1), as shown above, to ensure proper engagement.

SEAT

Description

DESCRIPTION

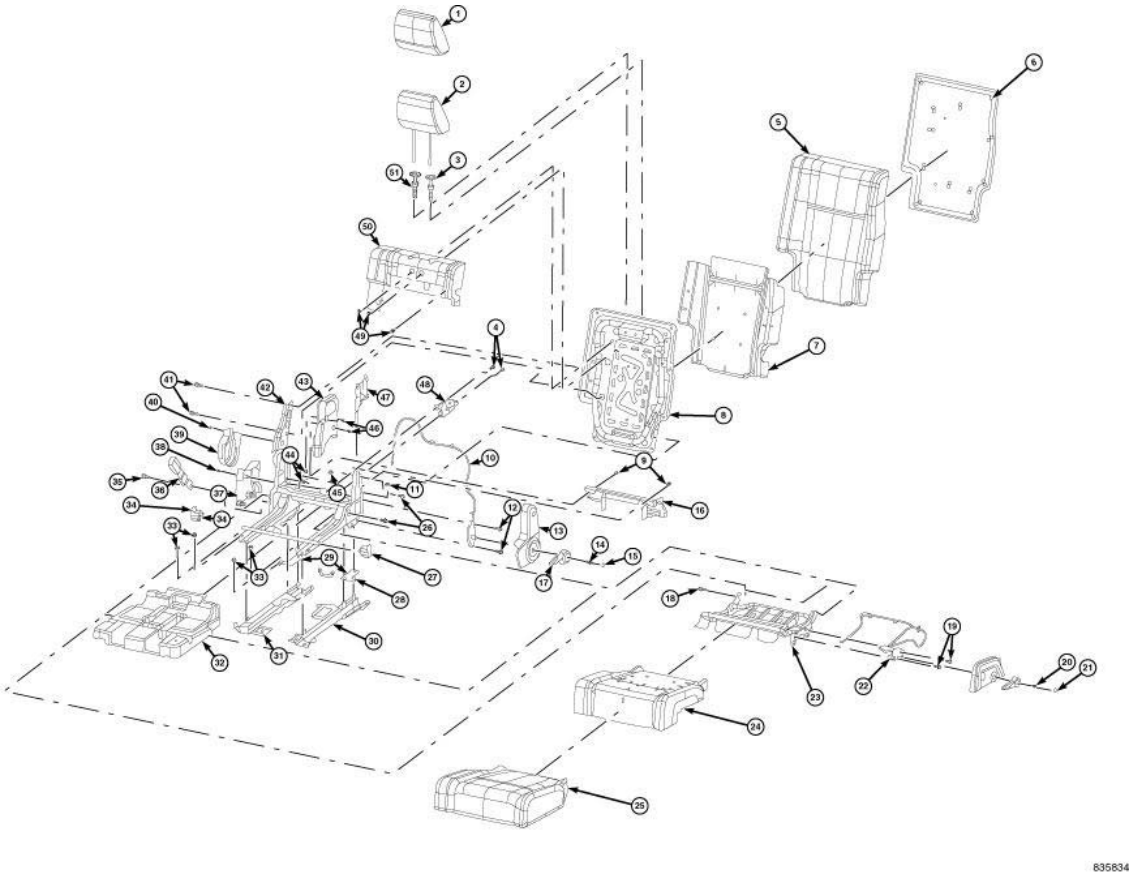


Fig. 186: Seat - 5 Passenger - 40% Seat Exploded View
Courtesy of CHRYSLER LLC

Item	Description	Item	Description
1	Cover, Headrest	27	Bumper
2	Foam, Headrest	28	Cover, Rear Track
3	Sleeve, Headrest	29	Spacer
4	Screw	30	Assembly, Outboard Track
5	Cover, Seat Back	31	Assembly, Inboard Track
6	Shield, Seat Back	32	Shield, Cushion Latch
7	Foam, Seat Back	33	Nut, Lock
8	Frame, Seat Back	34	Bumper
9	Screw	35	Screw
10	Cable, Recliner Release	36	Buckle, Seatbelt
11	Nut, Lock	37	Shield, Lower Outer
12	Screw	38	Screw
13	Shield, Upper Recliner LH	39	Shield, Upper Recliner RH
14	Screw	40	Screw
15	Cover, Release Handle	41	Bumper
16	Shield, Rear	42	Assembly, Lower Structure

17	Handle, Recliner	43	Shield, Lower Recliner
18	Screw	44	Nut, Plastic
19	Screw	45	Nut, Lock
20	Screw	46	Screw
21	Cover, Release Handle	47	Shield, Upper Inner
22	Cable, Track Release	48	Assembly, Cushion Latch
23	Frame, Seat Cushion	49	Screw
24	Foam, Seat Cushion	50	Shield, Upper Seat Back Inner
25	Cover, Seat Cushion	51	Sleeve, Headrest
26	Screw	-	-

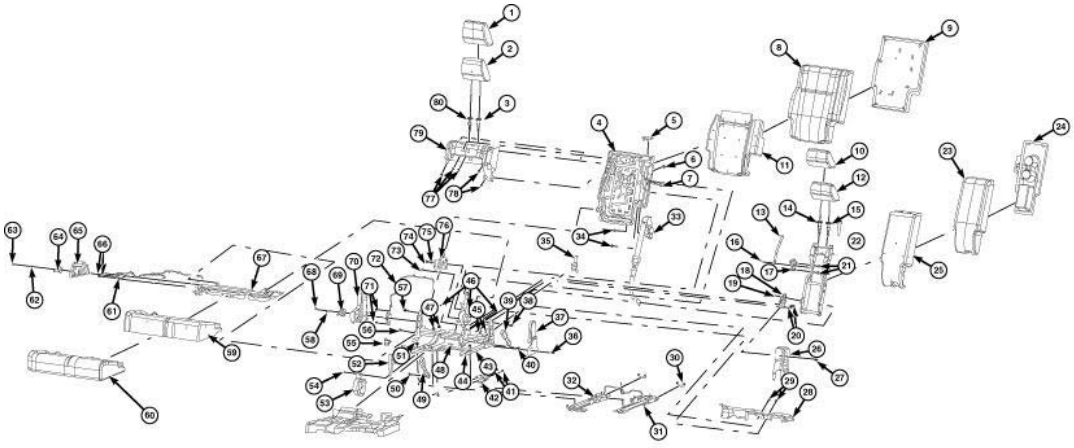


Fig. 187: Seat - 5 Passenger - 60% Seat Exploded View
Courtesy of CHRYSLER LLC

Item	Description	Item	Description
1	Cover, Headrest	41	Screw
2	Foam, Headrest	42	Sleeve, Headrest
3	Sleeve, Headrest	43	Frame, Seat
4	Frame, Seat Back	44	Nut
5	Bezel, Seat Belt	45	Nut
6	Screw	46	Screw
7	Cover, Striker	47	Nut
8	Cover, Seat Back	48	Cushion, Bumper
9	Shield, Seat Back	49	Buckle, Seat Belt

10	Cover, Headrest	50	Screw
11	Foam, Seat Back	51	Nut
12	Foam, Headrest	52	Cover, Lower Outer
13	Strap, Release	53	Cover, Upper Recliner
14	Sleeve, Headrest	54	Screw
15	Sleeve, Headrest	55	Bumper
16	Nut	56	Screw
17	Latch, Armrest	57	Screw
18	Bracket, Armrest Pivot	58	Screw
19	Screw	59	Foam, Seat Cushion
20	Screw	60	Cover, Seat Cushion
21	Nut	61	Cable, Track Release
22	Frame, Armrest	62	Screw
23	Cover, Armrest	63	Cap, Handle
24	Panel, Armrest Cover	64	Handle, Seat Adjust
25	Foam, Armrest	65	Shield, Lower Side
26	Cover, Pivot Bracket	66	Screw
27	Screw	67	Frame, Seat Cushion
28	Shield, Rear	68	Cap, Handle
29	Screw	69	Handle, Recliner
30	Cover, Rear Track	70	Shield, Upper Side
31	Assembly, Outboard Track	71	Screw
32	Assembly, Inboard Track	72	Cable, Recliner Release
33	Retractor, Seat Belt	73	Pin, Push
34	Screw	74	Screw
35	Cover, Inner Pivot	75	Nut
36	Pin, Push	76	Cover, Lower Recliner
37	Shield, Upper Recliner LH	77	Screw
38	Screw	78	Screw
39	Buckle, Seat Belt	79	Shield, Upper Seat Back Inner
40	Screw	80	Sleeve, Headrest

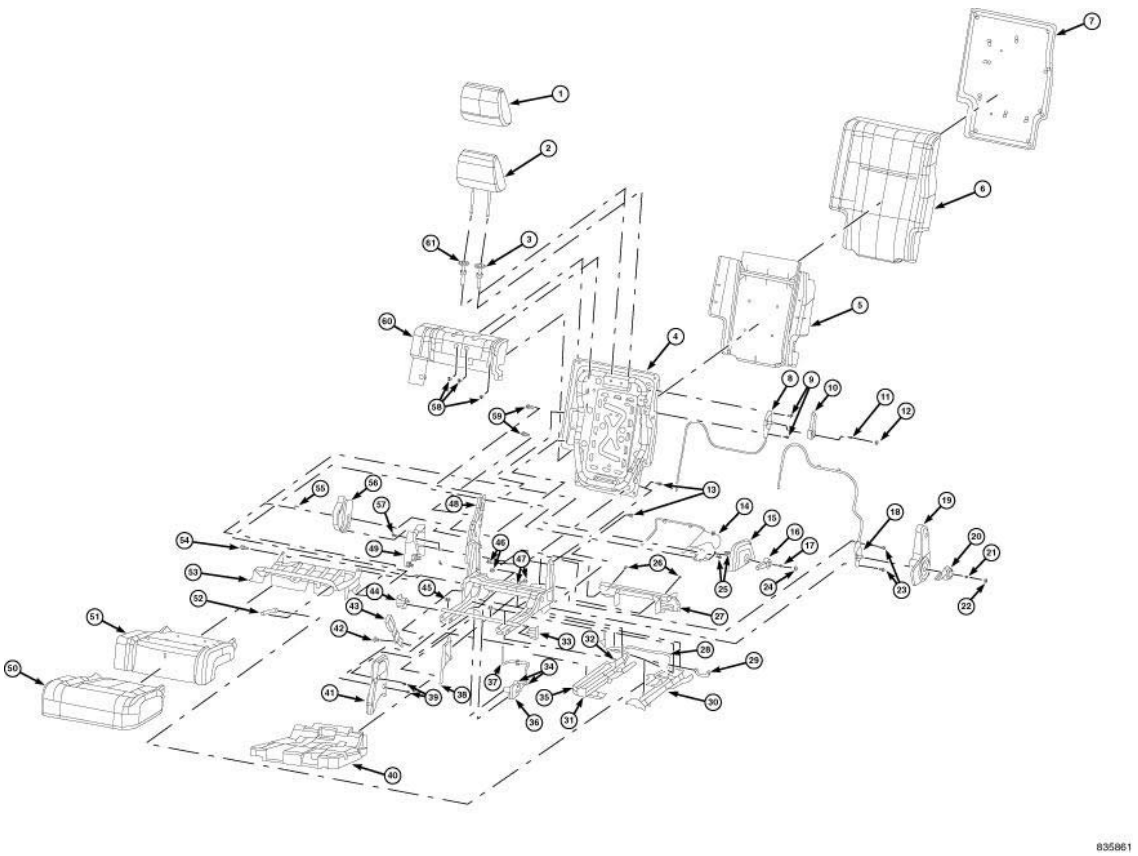


Fig. 188: Seat - 7 Passenger - 40% Seat Exploded View
Courtesy of CHRYSLER LLC

Item	Description	Item	Description
1	Cover, Headrest	32	Spacer
2	Sleeve, Headrest	33	Bumper
3	Sleeve, Headrest	34	Screw
4	Frame, Seat Back	35	Spring, Assist
5	Foam, Seat Back	36	Sleeve, Headrest
6	Cover, Seat Back	37	Cable, Release
7	Panel, Seat Back	38	Shield, Upper Inner
8	Cable, Release	39	Screw
9	Screw	40	Cover, Cushion Latch
10	Handle, Easy Entry	41	Cover, Lower Recliner
11	Screw	42	Screw
12	Cap, Handle	43	Buckle, Seat Belt
13	Screw	44	Bumper
14	Cable, Release	45	Nut
15	Shield, Lower RH	46	Nut
16	Handle, Seat Adjust	47	Nut

17	Screw	48	Frame, Seat
18	Cable, Release	49	Cover, Lower Outer
19	Shield, Lower LH	50	Cover, Seat Cushion
20	Handle, Recliner	51	Foam, Seat Cushion
21	Screw	52	Strut, Gas
22	Cap, Handle	53	Frame, Seat Cushion
23	Screw	54	Screw
24	Cap, Handle	55	Screw
25	Screw	56	Cover, Upper Recliner
26	Screw	57	Screw
27	Cover, Rear	58	Screw
28	Cable, Release	59	Screw
29	Cover, Rear Track	60	Shield, Upper Seat Back Inner
30	Track, Inboard	61	Sleeve, Headrest
31	Track, Outboard	-	-

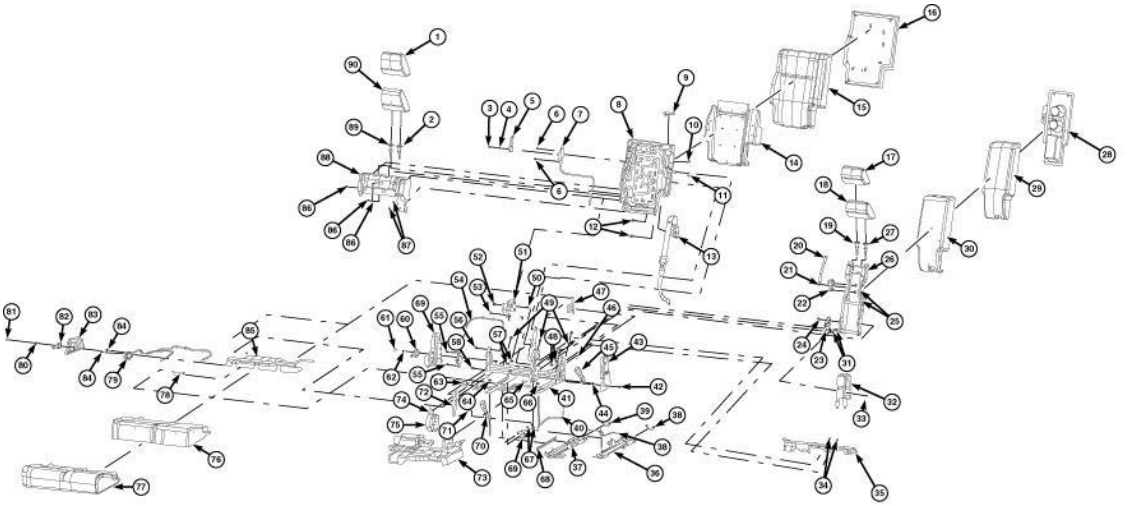


Fig. 189: Seat - 7 Passenger - 60% Seat Exploded View
Courtesy of CHRYSLER LLC

Item	Description	Item	Description
1	Cover, Headrest	46	Screw
2	Sleeve, Headrest	47	Cover, Inner Pivot
3	Cap, Handle	48	Nut

4	Screw	49	Screw
5	Handle, Easy Entry	50	Nut
6	Screw	51	Cover, Lower Recliner
7	Cable, Release	52	Screw
8	Frame, Seat Back	53	Pin, Push
9	Bezel, Seat Belt	54	Cable, Release
10	Screw	55	Screw
11	Cover, Striker	56	Screw
12	Screw	57	Nut
13	Retractor, Seat Belt	58	Screw
14	Foam, Seat Back	59	Shield, Upper Side
15	Cover, Seat Back	60	Handle, Recliner
16	Shield, Seat Back	61	Cap, Handle
17	Cover, Headrest	62	Screw
18	Foam, Headrest	63	Bumper
19	Sleeve, Headrest	64	Nut
20	Strap, Release	65	Cushion, Bumper
21	Nut	66	Nut
22	Latch, Armrest	67	Screw
23	Bracket, Armrest Pivot	68	Spring
24	Screw	69	Sleeve, Headrest
25	Nut	70	Buckle, Seat Belt
26	Frame, Armrest	71	Screw
27	Sleeve, Headrest	72	Cover, Lower Outer
28	Panel, Armrest Cover	73	Cover, Cushion Latch
29	Cover, Armrest	74	Screw
30	Foam, Armrest	75	Cover, Upper Recliner
31	Screw	76	Foam, Seat Cushion
32	Cover, Pivot Bracket	77	Cover, Seat Cushion
33	Screw	78	Strut, Gas
34	Screw	79	Cable, Release
35	Shield, Rear	80	Screw
36	Track, Inboard	81	Cap, Handle
37	Track, Outboard	82	Handle, Seat Adjust
38	Cable, Release	83	Shield, Lower Side
39	Cover, Rear Track	84	Screw
40	Cable, Release	85	Frame, Seat Cushion
41	Frame, Seat	86	Screw
42	Pin, Push	87	Screw
43	Shield, Upper Recliner LH	88	Shield, Upper Seat Back Inner
44	Screw	89	Sleeve, Headrest

	Buckle, Seat Belt	90	Foam, Headrest

Removal

REMOVAL

1. Remove the headrest.
2. Slide seat forward.
3. Remove both rear seat adjuster bolts.
4. Slide seat rearward.
5. While pulling the release tab located under the seat, pull the seat up and remove the plastic covers to gain access to the front adjuster bolts.
6. Remove both front seat adjuster bolts.
7. Remove front seat from vehicle.

Installation

INSTALLATION

1. Place seat in position in vehicle. Make sure tracks are in time and locked in place. In time means that both tracks are in the same fore/aft position, same locking window on each track.
2. Install bolts to attach front of seat adjuster to the floor. Tighten bolts to 95 N.m (70 ft. lbs.).
3. Slide seat forward and then push back on the seat to ensure that both tracks are locked into position. Ensure tracks are still in time before tightening bolts and install bolts attaching rear of seat track to the floor. Tighten bolts to 95 N.m (70 ft. lbs.).
4. Verify seat operation.

SEAT BACK, SECOND ROW

Removal

REMOVAL

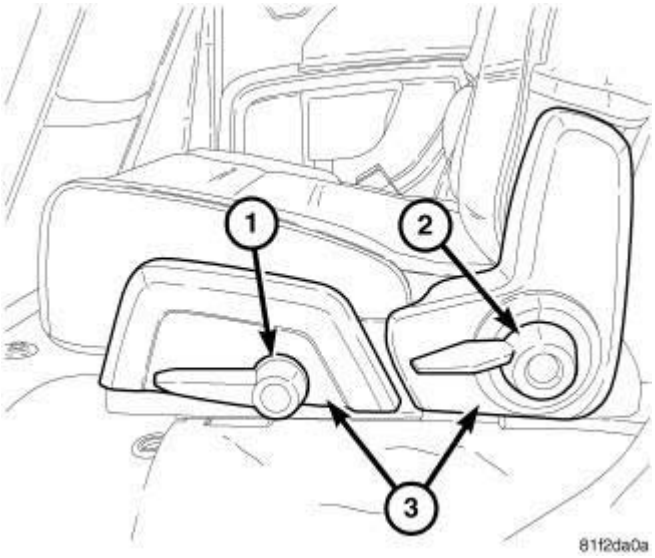


Fig. 190: Recliner Handle Cover & Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Remove the recliner handle cover and mounting fasteners.
2. Remove the recliner handle
3. Remove the folding seat handle cover, mounting fasteners and handle, if equipped.
4. Remove the outboard shield.
5. Remove the headrest and headrest guides.
6. Fold the seat flat and remove the seat back panel by carefully prying up on the panel until the retainers disengage.
7. For the 60 split seat only, remove the seat belt anchor mounting fastener.
8. Remove the seat cover clips and pull back to expose the inboard seat back mounting fasteners.

NOTE: On the 40 split seat, the inboard mounting fasteners are located on the outside of the seat back frame. On the 60 split seat, they are located on the inside of the seat back frame which will require the seat back cushion/cover to be removed. See Body/Seats/SEAT BACK - Removal.

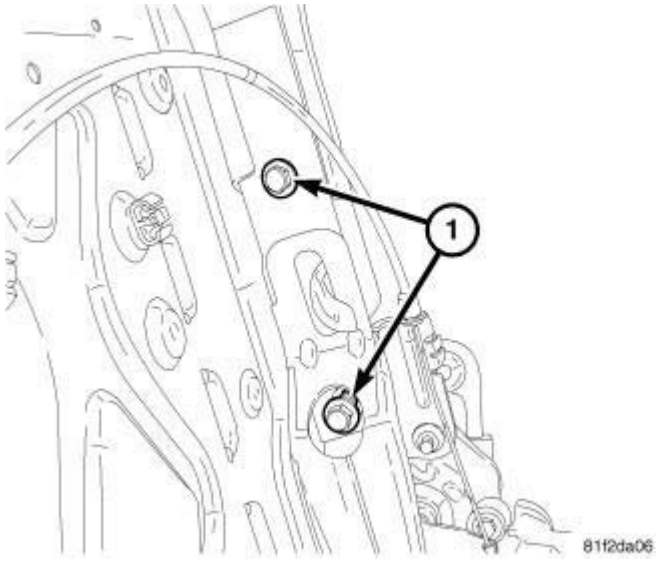


Fig. 191: SEAT BACK BOLTS
Courtesy of CHRYSLER LLC

9. Remove the inboard seat back mounting fasteners.
10. Remove the outboard seat back mounting fasteners.
11. Remove the cable attachment from the back steel panel.
12. Remove the seat back from the vehicle.

Installation

INSTALLATION

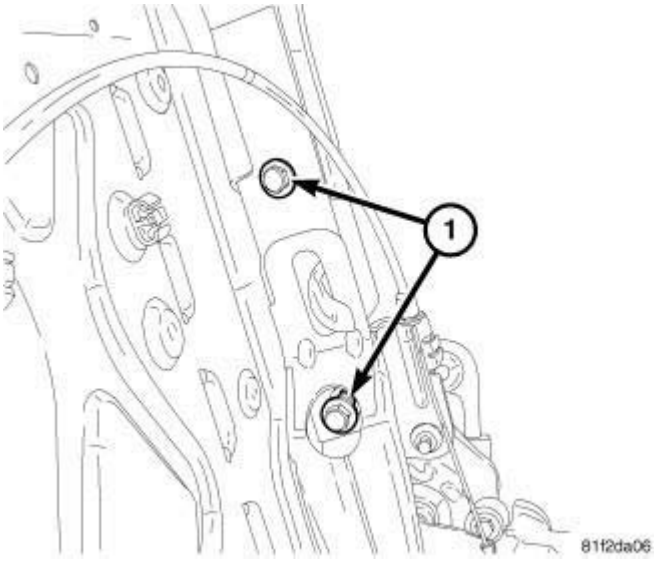


Fig. 192: SEAT BACK BOLTS
Courtesy of CHRYSLER LLC

1. Position the seat back frame to the seat adjuster assembly.
2. For the 40% seat back, install the inboard mounting fasteners. Tighten to 55 N-m (40 ft. lbs.).
3. For the 40% seat back, install the outboard mounting fasteners. Tighten to 30 N-m (22 ft. lbs.).
4. For the 60% seat back, install the inboard mounting fasteners. Tighten to 60 N-m (44 ft. lbs.).
5. For the 60% seat back, install the outboard mounting fasteners. Tighten to 30 N-m (22 ft. lbs.).
6. Install the seat back cushion/cover, if required. See **Body/Seats/SEAT BACK - Installation**.
7. For the 60% seat back, place the seat belt and seat buckle into position. Tighten the mounting fastener to 49 N-m (36 ft. lbs.).
8. Install the cable attachment to the back steel panel.

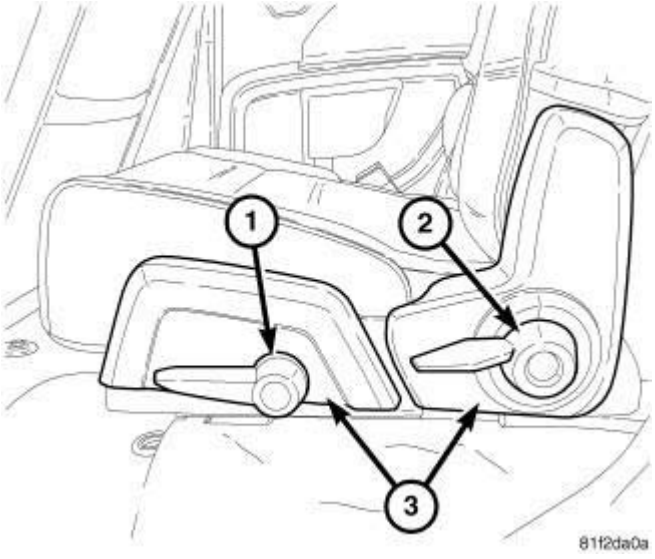


Fig. 193: Recliner Handle Cover & Mounting Fasteners
Courtesy of CHRYSLER LLC

9. Install the outboard shield.
10. Install the recliner handle
11. Install the recliner handle mounting fasteners and cover.
12. Install the folding seat handle, mounting fasteners and cover, if equipped.
13. Install the headrest guides and headrest.

SEAT, CHILD

Removal

REMOVAL

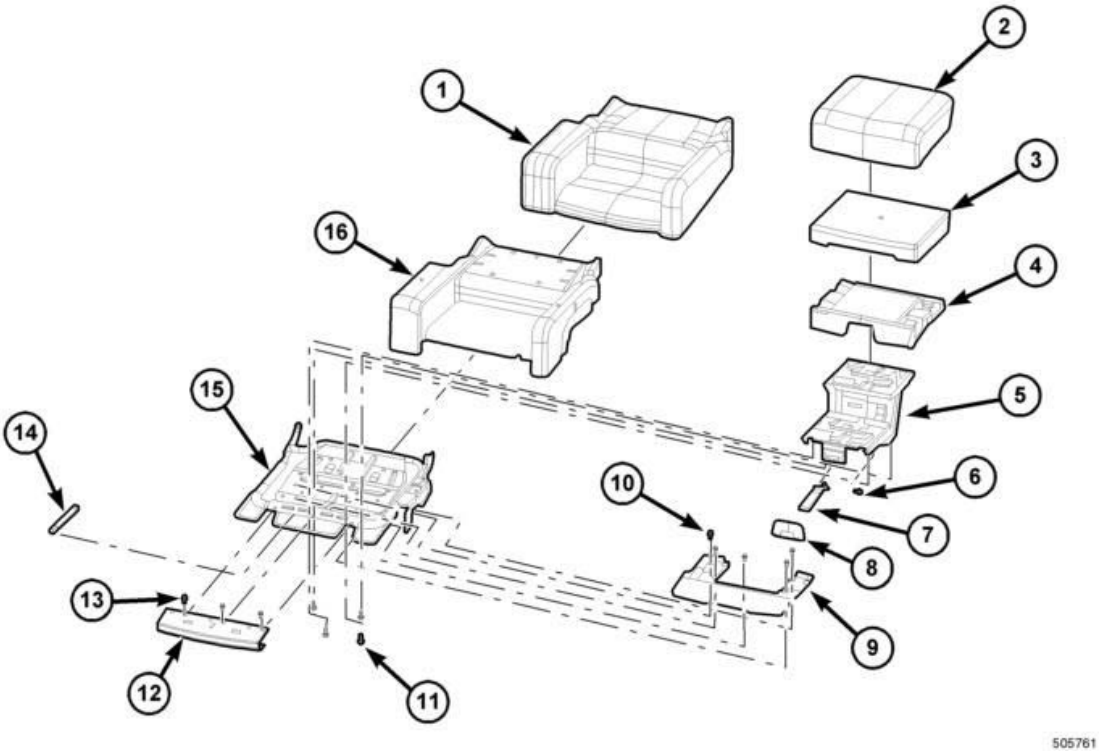


Fig. 194: Child Seat
Courtesy of CHRYSLER LLC

1. COVER, BOOSTER SEAT FOAM	9. ASSEMBLY, BOOSTER SEAT FOOT PLATE
2. COVER, BOOSTER SEAT FOAM	10. SCREW
3. FOAM, BOOSTER SEAT	11. SCREW
4. SUPPORT BASE, BOOSTER SEAT	12. FRONT SUPPORT, BOOSTER SEAT
5. ASSEMBLY, BOOSTER SEAT	13. SCREW
6. SCREW	14. STRUT, GAS
7. STRAP, BOOSTER	15. FRAME, FOAM BOOSTER SEAT
8. BEZEL, PULL STRAP	16. PAD, FOAM

1. Remove the appropriate seat cushion and place on a bench. See **Body/Seats/COVER, Seat Cushion - Removal**.
2. Unzip the seat cover.
3. Partially remove the seat cushion cover to gain access to the booster seat fasteners.
4. Remove the booster seat mounting fasteners.
5. Unlatch the booster seat and carefully place in the upright position.
6. Disengage the booster seat cover trim clips.
7. Remove the booster seat from the seat cushion.
8. If required, disengage the seat cover clips and carefully pull the booster seat cover off the foam.

Installation

INSTALLATION

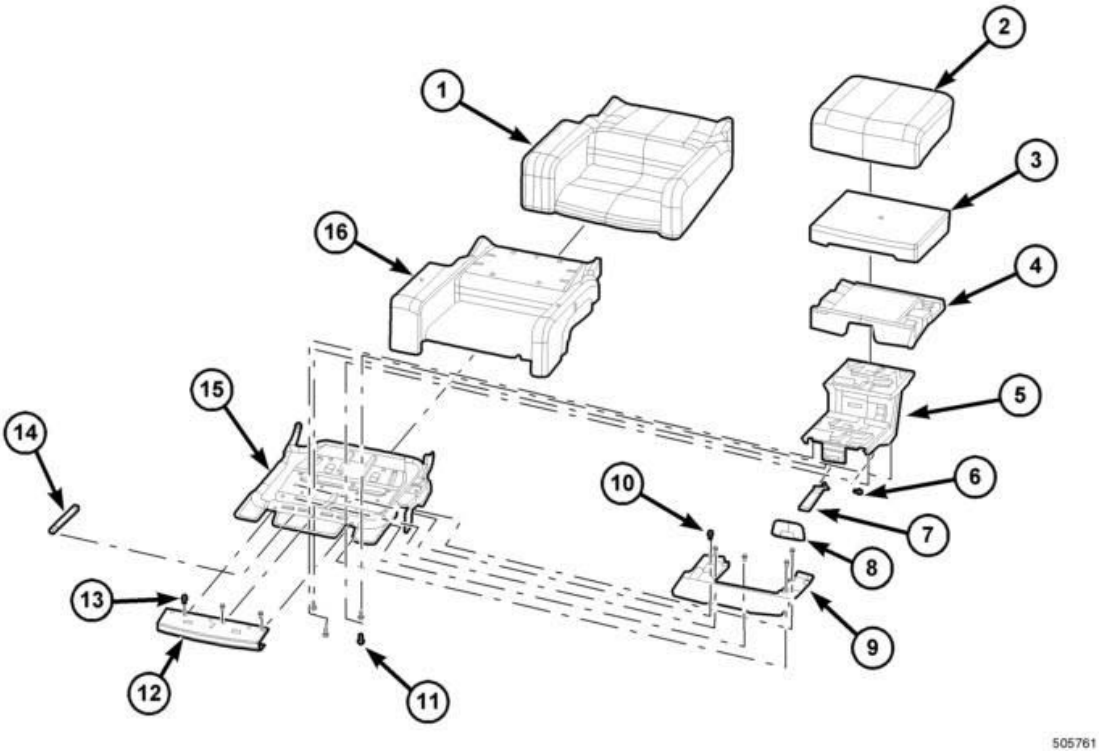


Fig. 195: Child Seat
Courtesy of CHRYSLER LLC

1. COVER, BOOSTER SEAT FOAM	9. ASSEMBLY, BOOSTER SEAT FOOT PLATE
2. COVER, BOOSTER SEAT FOAM	10. SCREW
3. FOAM, BOOSTER SEAT	11. SCREW
4. SUPPORT BASE, BOOSTER SEAT	12. FRONT SUPPORT, BOOSTER SEAT
5. ASSEMBLY, BOOSTER SEAT	13. SCREW
6. SCREW	14. STRUT, GAS
7. STRAP, BOOSTER	15. FRAME, FOAM BOOSTER SEAT
8. BEZEL, PULL STRAP	16. PAD, FOAM

1. If required, carefully pull the booster seat cover over the foam and engage the booster seat cover clips.
2. Install the booster seat to the seat cushion.
3. Engage the booster seat cover trim clips.
4. Latch the booster seat.
5. Install the booster seat mounting fasteners. Tighten to 13 N-m (10 ft. lbs.).
6. Install the seat cushion cover.
7. Zip the seat cover.

8. Install the seat cushion. See **Body/Seats/COVER, Seat Cushion - Installation**.

SEATS, THIRD ROW

COVER, SEAT CUSHION

Removal

REMOVAL

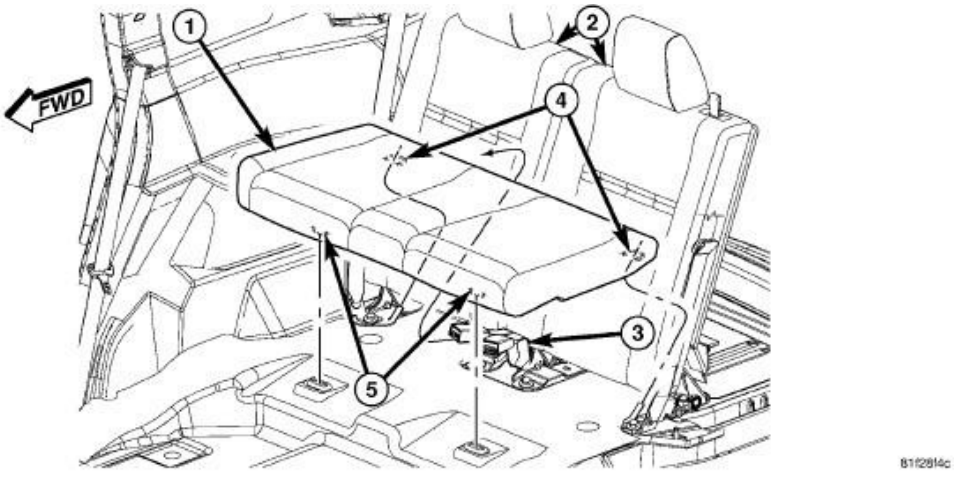


Fig. 196: Seat Cushion Cover
Courtesy of CHRYSLER LLC

1. Remove the rear storage box. See **Body/Interior/BOX, Storage - Removal**.
2. Lift front edge of the third row seat until retainers (5) disengage.
3. With the help of an assistant, carefully pry up on the hooks (4) while the seat cushion is being pressed towards the seat back.
4. While lifting up on the hooks, pull the seat cushion out towards the front of the vehicle and remove the seat cushion.
5. Disengage J-clips from seat cushion.
6. Carefully remove the seat cover from the cushion, removing any hog rings and discarding.

Installation

INSTALLATION

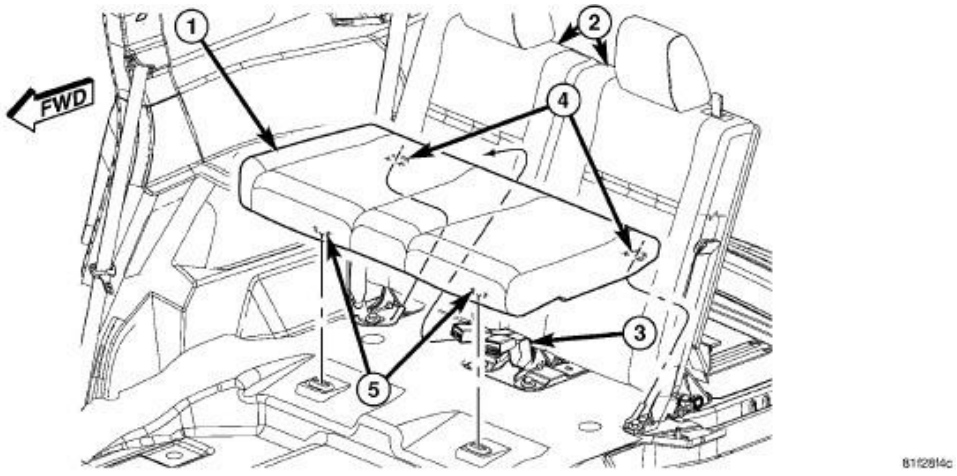


Fig. 197: Seat Cushion Cover
Courtesy of CHRYSLER LLC

1. Carefully install the seat cover to the cushion, installing any hog rings required.
2. Engage J-clips to seat cushion.
3. Place the third row seat cushion (1) into position.
4. Press the seat cushion back (2) and under the seat back.
5. Ensure the seat retaining hooks (4) slide under the body side hooks.
6. Firmly depress the front of the seat cushion down, ensuring that the seat retainers (5) engage.
7. Install the rear storage box. See **Body/Interior/BOX, Storage - Installation**

SEAT BACK, THIRD ROW

Removal

REMOVAL

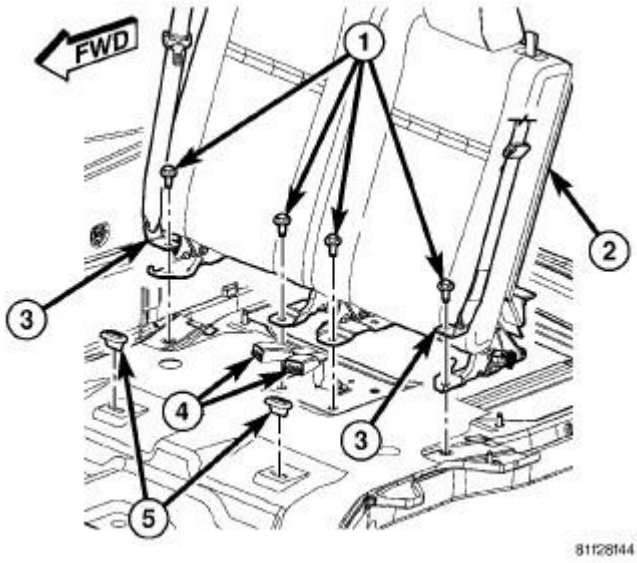


Fig. 198: Front Seat Back Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Remove the seat cover and cushion. See **Body/Seats/COVER, Seat Cushion - Removal**.
2. Remove the retainers on the seat back gap hider from the rear storage box.
3. Remove the front seat back mounting fasteners (1).

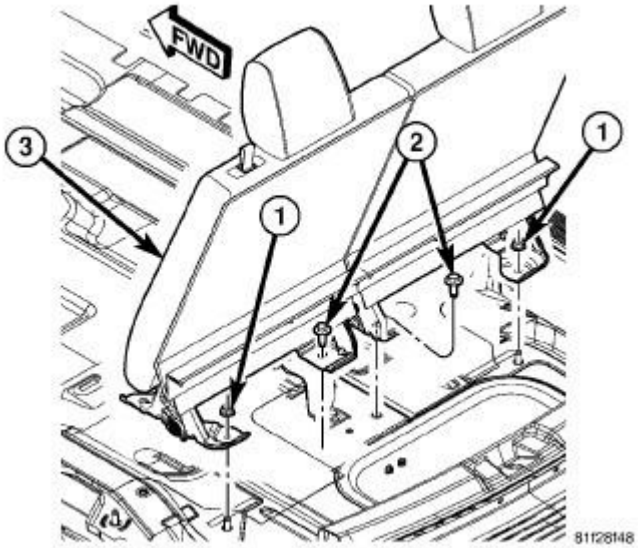


Fig. 199: Rear Seat Back Mounting Fasteners
Courtesy of CHRYSLER LLC

4. Remove the rear seat back mounting fasteners (1 and 2).
5. Remove the seat back from the vehicle.

Installation

INSTALLATION

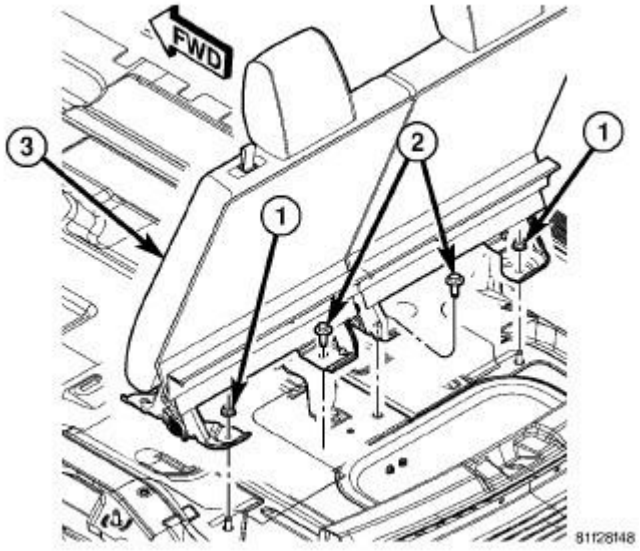


Fig. 200: Rear Seat Back Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Place the seat back into position in the vehicle. Make sure that the seat belts are position correctly.
2. Install the rear mounting fasteners (1 and 2). Tighten to 95 N.m (70 ft. lbs.).

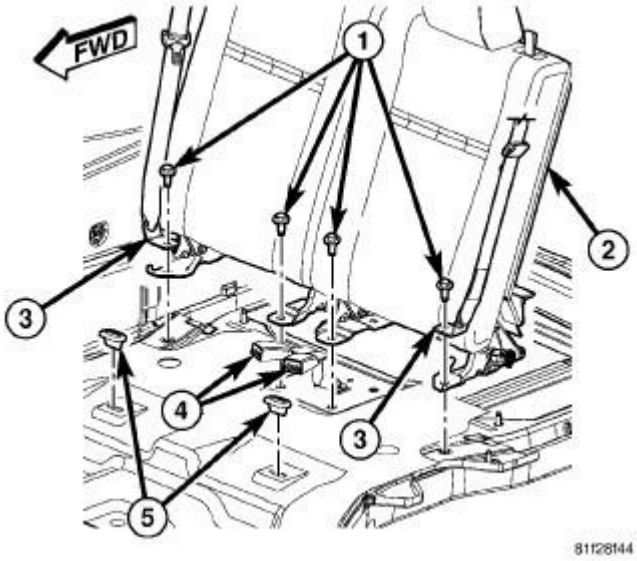


Fig. 201: Front Seat Back Mounting Fasteners
Courtesy of CHRYSLER LLC

3. Install the front mounting fasteners (1). Tighten to 95 N.m (70 ft. lbs.).
4. Install the retainers on the seat back gap hider to the rear storage box.
5. Install the seat cushion and cover. See **Body/Seats/COVER, Seat Cushion - Installation**.

STATIONARY GLASS

WARNING

WINDSHIELD SAFETY PRECAUTIONS

WARNING: Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly in an accident.

- **Urethane adhesives are applied as a system. Use glass cleaner, glass prep solvent, glass primer, PVC (vinyl) primer and pinch weld (fence) primer provided by the adhesive manufacturer. If not, structural integrity could be compromised.**
- **Chrysler does not recommend glass adhesive by brand. Technicians should review product labels and technical data sheets, and use only adhesives that their manufactures warrant will restore a vehicle to the requirements of FMVSS 212. Technicians should also insure that primers and cleaners are compatible with the particular adhesive used.**
- **Be sure to refer to the urethane manufacturer's directions for curing time specifications, and do not use adhesive after its expiration date.**
- **Vapors that are emitted from the urethane adhesive or primer could cause personal injury. Use them in a well-ventilated area.**
- **Skin contact with urethane adhesive should be avoided. Personal injury may result.**
- **Always wear eye and hand protection when working with glass.**

CAUTION: Protect all painted and trimmed surfaces from coming in contact with urethane or primers.

Be careful not to damage painted surfaces when removing moldings or cutting urethane around windshield.

GLASS, LIFTGATE

Removal

REMOVAL

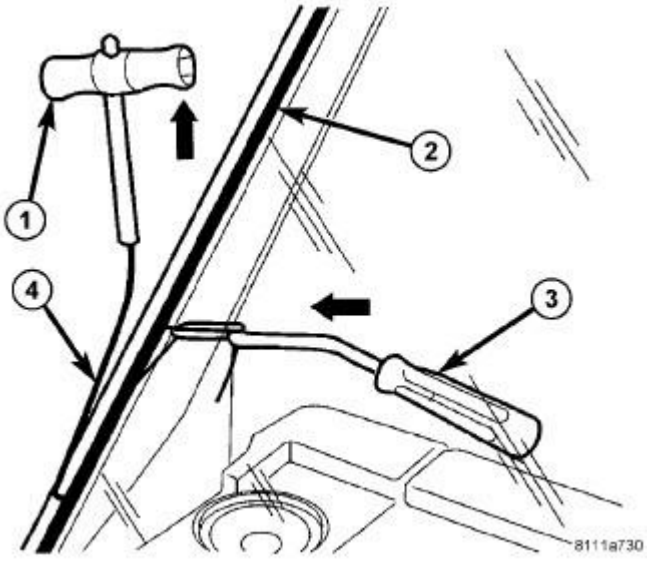


Fig. 202: ADHESIVE SEPARATION
Courtesy of CHRYSLER LLC

1 - T-HANDLE
2 - WINDSHIELD ADHESIVE
3 - COUNTER SUPPORT
4 - CUTTING WIRE

NOTE: Windshield removal shown, backlight similar.

1. Before proceeding with the following repair procedure, review all warnings and cautions. See **Body/Stationary Glass - Warning**
2. Remove liftgate trim panels. See **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Removal**
3. Remove rear window wiper arm, if equipped. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**
4. Disconnect the heated backlight electrical connectors, if equipped.
5. Using a windshield cut-out wire or other suitable tool, separate the adhesive.
6. Carefully remove backlight.

Installation

INSTALLATION

WARNING: Allow the urethane at least 24 hours to cure before returning the vehicle to use.

CAUTION: Roll down the left and right front door glass and open the rear glass slider

(if available) before installing backlight to avoid pressurizing the passenger compartment if a door is slammed before urethane is cured. Water leaks can result.

NOTE: The backlight fence should be cleaned of most of its old urethane bonding material. A small amount of old urethane, approximately 1-2 mm in height, should remain on the fence. Do not grind off or completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected. Support spacers should be replaced with new parts. Replace any missing or damaged spacers around the perimeter of the liftgate opening.

Glass Preparation - Installing A Previously Installed Backlight

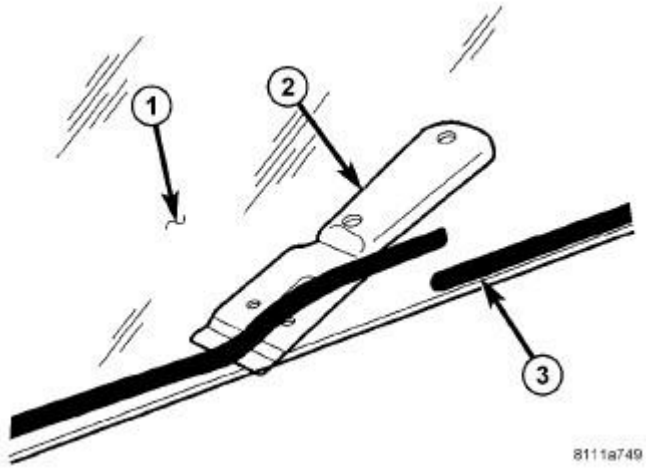


Fig. 203: WINDSHIELD ADHESIVE PREPARATION
Courtesy of CHRYSLER LLC

1 - WINDSHIELD
2 - SCRAPER
3 - OLD ADHESIVE

1. Before proceeding with the following repair procedure, review all warnings and cautions. See **Body/Stationary Glass - Warning**
2. Level old bead of backlight adhesive (3) to a thickness of approximately 1 mm (0.04 in.) and remove loose adhesive.

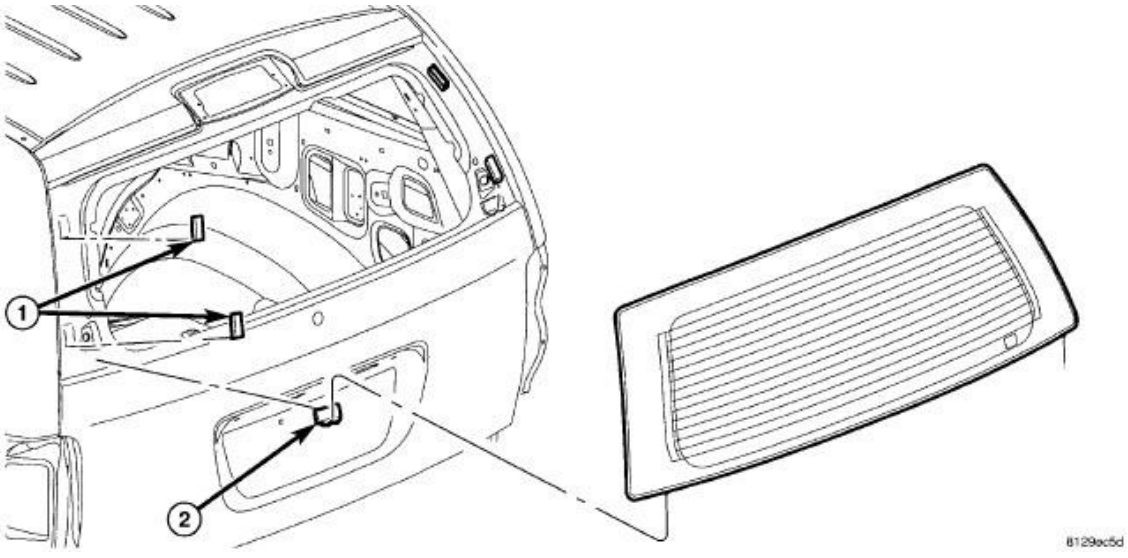


Fig. 204: Spacers To Liftgate Frame & Backlight
Courtesy of CHRYSLER LLC

3. Apply four new spacers (1) to the liftgate frame and place them 55 mm in from the window opening; 70 mm from the upper edge and 150 mm from the lower edge.
4. Install the lower spacers (2) to the backlight approximately 25 mm (1.0 in) from each side of the glass.

NOTE: Remove the lower spacers 2 hours after installation of the glass.

5. Position backlight in center of liftgate opening and resting on the side and lower spacers.

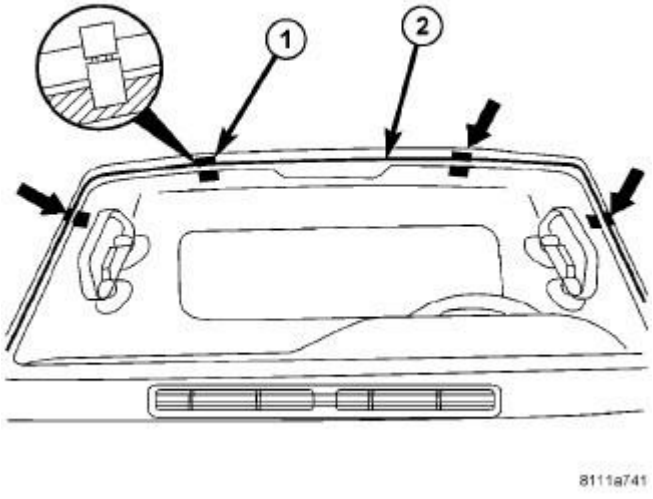


Fig. 205: WINDSHIELD POSITIONING
Courtesy of CHRYSLER LLC

1 - TAPE
2 - WINDSHIELD FRAME

6. Apply adhesive tape strips (1) around the perimeter of the liftgate opening to aid in installation.

NOTE: Windshield installation shown, backlight similar.

7. Verify the backlight gap is parallel to with the liftgate opening.
8. Cut tape with a sharp knife and remove backlight.

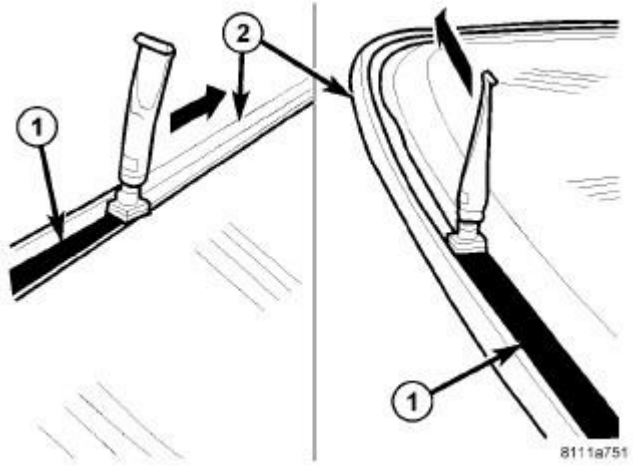


Fig. 206: WINDSHIELD PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER
2 - WINDSHIELD SEAL

NOTE: Typical primer installation shown.

9. Clean and dry area of glass (2) to be re-glued with a suitable glass preparation solvent and rag.
10. Using a flash light, verify that glass primer is without damage.
11. Re-prime any damaged area. If old adhesive has been exposed for more than 12 hours, entire adhesive area needs to be re-primed.

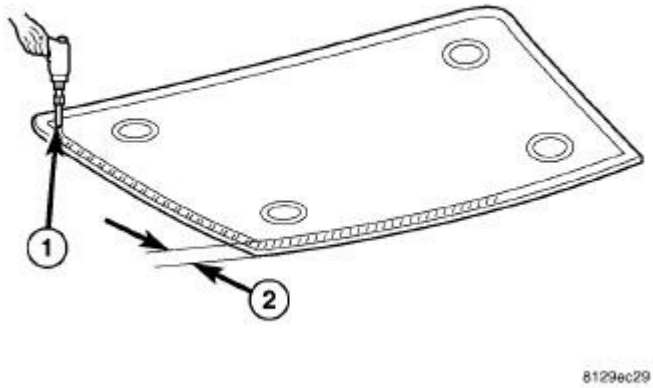


Fig. 207: PRIMER INSTALLATION
Courtesy of CHRYSLER LLC

12. Apply primer (1) around the perimeter of the glass to a width of 15 mm (0.5 in.) (2).
13. Allow primer to air dry for at least 10 minutes.
14. Using a flash light, verify that glass primer is without damage.

Glass Preparation - Installing A New Backlight

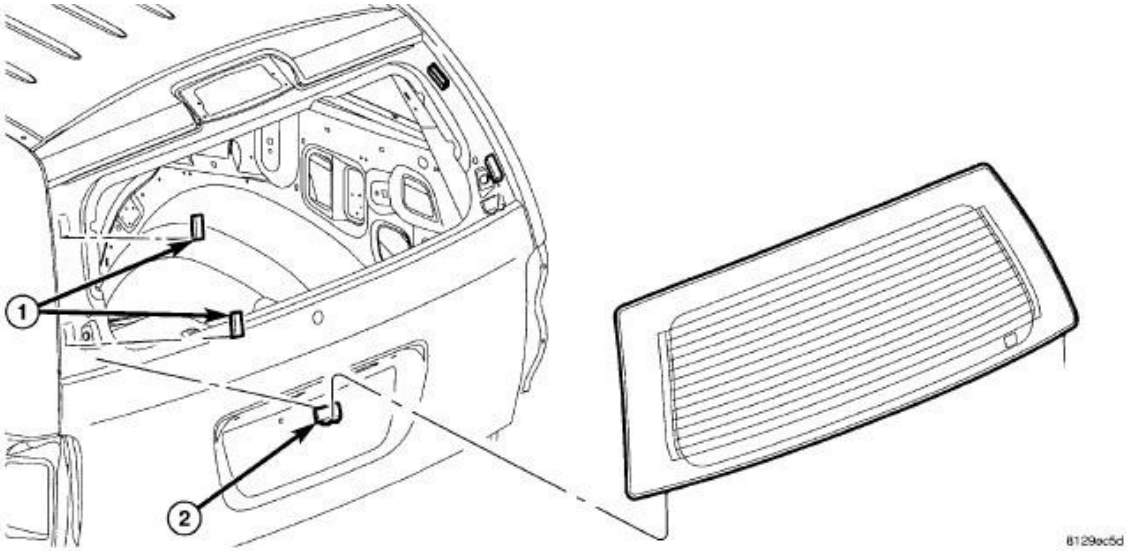


Fig. 208: Spacers To Liftgate Frame & Backlight
Courtesy of CHRYSLER LLC

1. Apply four new spacers (1) to the liftgate frame and place them 55 mm in from the window opening; 70 mm from the upper edge and 150 mm from the lower edge.
2. Install the lower spacers (2) to the backlight approximately 36 cm (1.0 in) from each side of the glass.

NOTE: Remove the lower spacers 2 hours after installation of the glass.

3. Position backlight in center of liftgate opening and resting on the side and lower spacers.

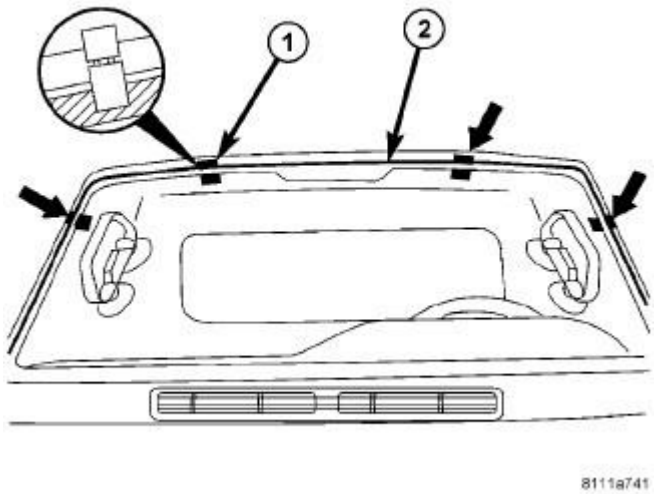


Fig. 209: WINDSHIELD POSITIONING
Courtesy of CHRYSLER LLC

1 - TAPE
2 - WINDSHIELD FRAME

4. Apply adhesive tape strips (1) around the perimeter of the liftgate opening to aid in installation.

NOTE: Windshield installation shown, backlight similar.

5. Verify the backlight gap is parallel to with the liftgate opening.
6. Cut tape with a sharp knife and remove backlight.

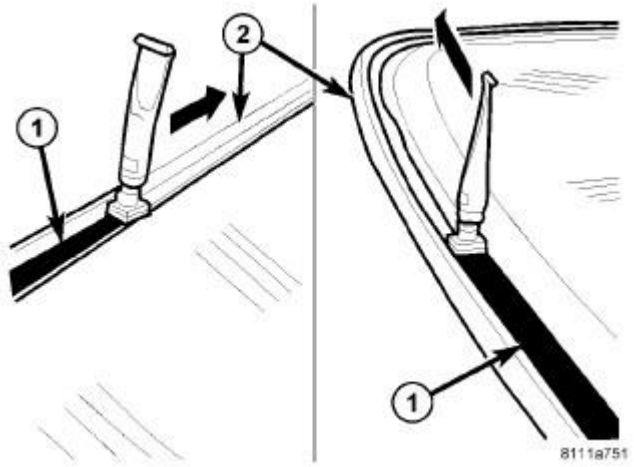


Fig. 210: WINDSHIELD PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER
2 - WINDSHIELD SEAL

NOTE: Typical primer installation shown.

7. Clean and dry area of glass (2) to be re-glued with a suitable glass preparation solvent and rag.
8. Apply primer to gluing surface at backlight seal.

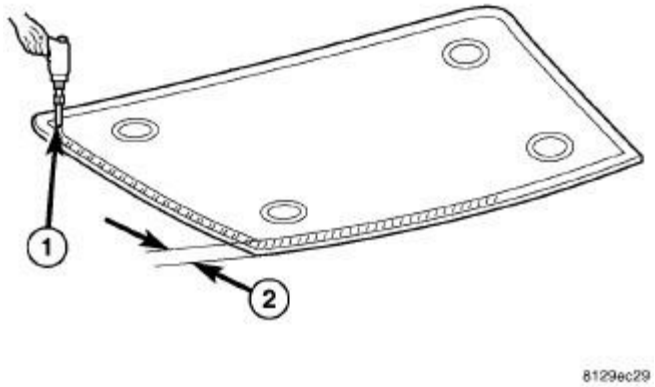


Fig. 211: PRIMER INSTALLATION
Courtesy of CHRYSLER LLC

9. Apply primer (1) around the perimeter of the glass to a width of 15 mm (0.5 in.) (2).
10. Allow primer to air dry for at least 10 minutes.
11. Using a flash light, verify that glass primer is without damage.

Liftgate Opening Preparation

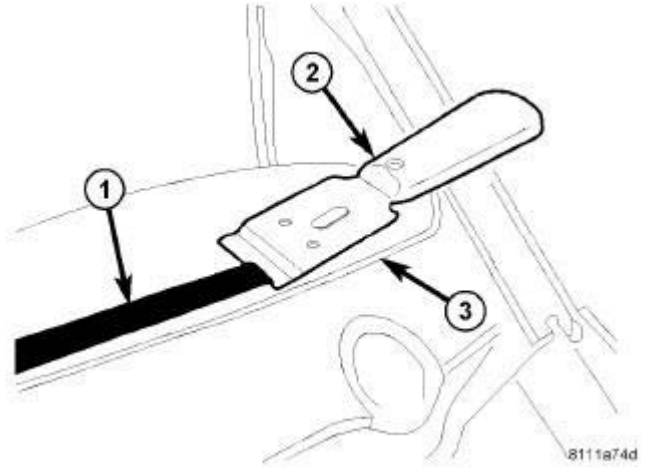


Fig. 212: WINDSHIELD OPENING PREPARATION
Courtesy of CHRYSLER LLC

1 - OLD ADHESIVE
2 - SCRAPER
3 - WINDSHIELD OPENING

NOTE: Windshield opening shown, liftgate opening similar.

1. Clean and vacuum liftgate opening.
2. Level old bead of liftgate opening adhesive (1) to a thickness of approximately 1 mm (0.04 in.) and remove loose adhesive.

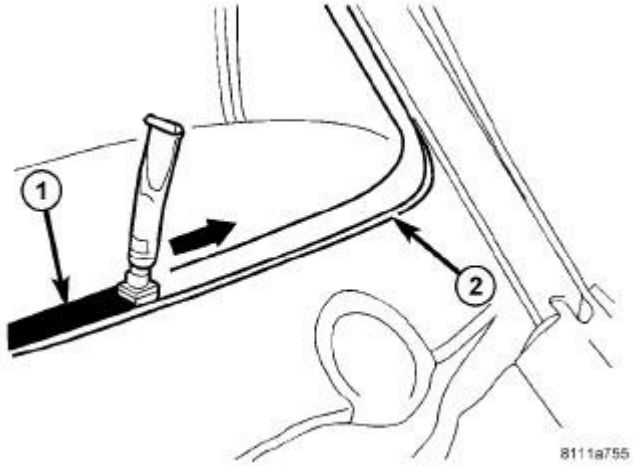


Fig. 213: WINDSHIELD OPENING PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER
2 - WINDSHIELD OPENING

NOTE: Windshield opening shown, liftgate opening similar.

3. Clean and dry area of liftgate opening to be re-glued with a suitable glass preparation solvent and rag.
4. Re-prime any damaged area. If old adhesive has been exposed for more than 12 hours, entire adhesive area needs to be re-primed.
5. Allow primer to air dry for at least 10 minutes.

Backlight Installation

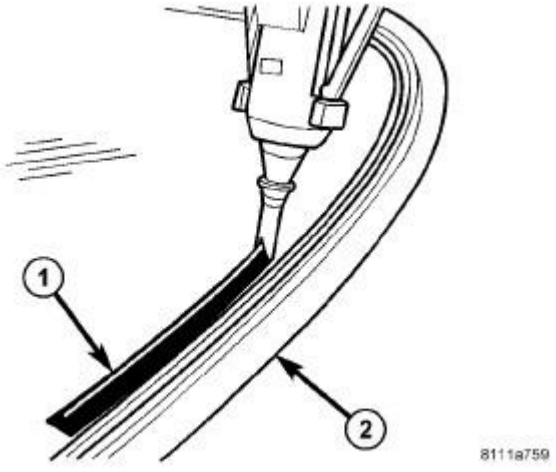


Fig. 214: WINDSHIELD ADHESIVE APPLICATION
Courtesy of CHRYSLER LLC

1 - ADHESIVE BEAD
2 - WINDSHIELD SEAL

1. Apply bead of adhesive (1) with a triangular nozzle directly to the backlight seal starting at bottom in center of the backlight.

CAUTION: Always apply bead of adhesive to the backlight. Always install the backlight within 5 minutes after applying adhesive.

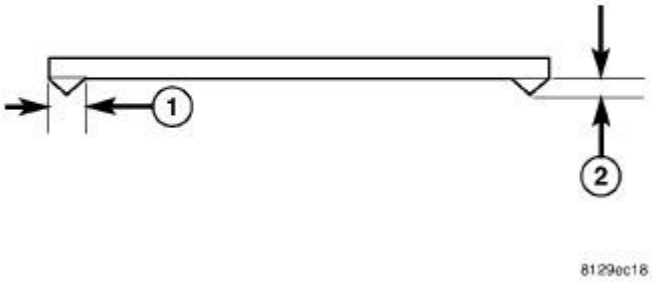


Fig. 215: BEAD DIMENSIONS
Courtesy of CHRYSLER LLC

1 - ADHESIVE WIDTH 9.5 mm (0.375 in)
2 - ADHESIVE HEIGHT 12.7 mm (0.50 in)

2. Bead dimensions should be approximately 9.5 mm wide (1) by 12.7 mm in height (2).

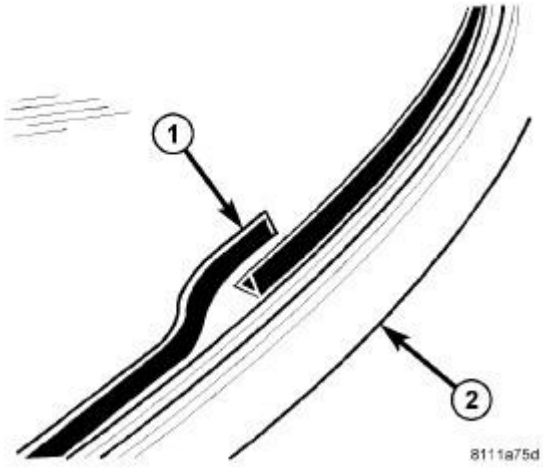


Fig. 216: WINDSHIELD ADHESIVE OVERLAP
Courtesy of CHRYSLER LLC

1 - ADHESIVE BEAD
2 - WINDSHIELD SEAL

3. Allow end of adhesive bead (1) to run out parallel to the start of the bead and smooth ends flush.

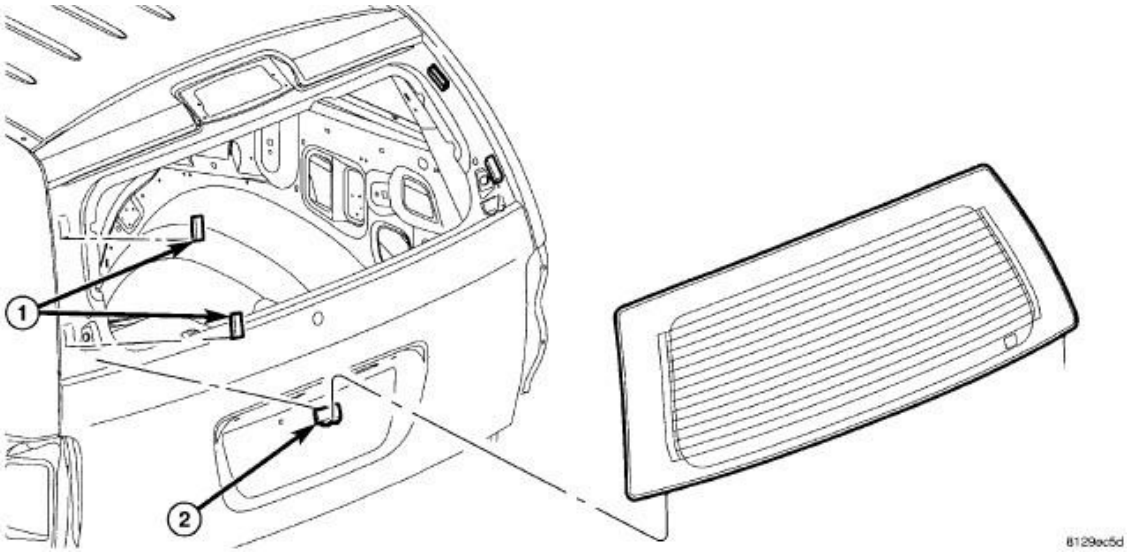


Fig. 217: Spacers To Liftgate Frame & Backlight
Courtesy of CHRYSLER LLC

4. Lift backlight into place in the center of the liftgate opening and use the tape as a guide to aid installation of the backlight into the center of the cutout.
5. Carefully lay down the backlight and press on.

CAUTION: It is no longer possible to move the backlight after installation. The backlight should never be pressed into place by more than one person, because the backlight can break if pressed simultaneously on both sides.

CAUTION: Roll down the left and right front door glass and open the rear glass slider (if available) before installing backlight to avoid pressurizing the passenger compartment if a door is slammed before urethane is cured. Water leaks can result.

6. Install the rear wiper arm, if equipped. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**
7. Install the liftgate trim panels.

GLASS, QUARTER

Removal

REMOVAL

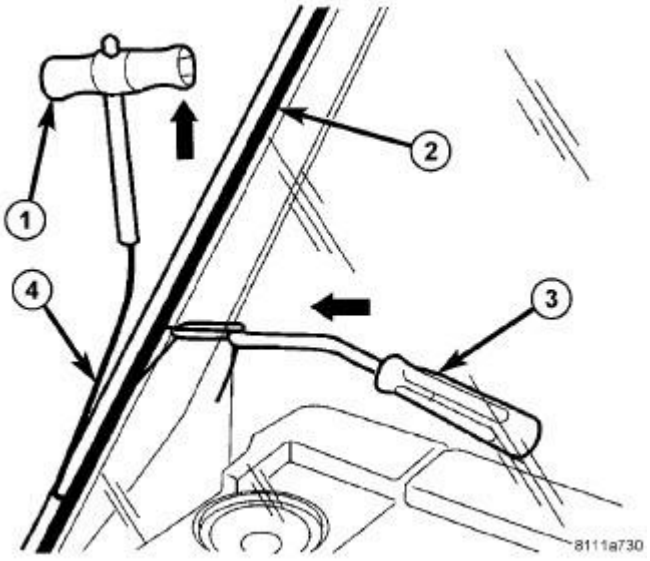


Fig. 218: ADHESIVE SEPARATION
Courtesy of CHRYSLER LLC

1 - T-HANDLE
2 - WINDSHIELD ADHESIVE
3 - COUNTER SUPPORT
4 - CUTTING WIRE

1. Before proceeding with the following repair procedure, review all warnings and cautions. See **Body/Stationary Glass - Warning**.
2. Remove quarter panel trim. See **Body/Interior/PANEL, Quarter Trim - Removal**.

NOTE: Windshield removal shown, quarter glass similar.

3. Using a windshield cut-out wire (4) or other suitable tool, separate the adhesive (2).
4. Release the tabs and the tabs on the alignment pin and carefully remove the quarter glass.

Installation

INSTALLATION

WARNING: Allow the urethane at least 24 hours to cure before returning the vehicle to use.

CAUTION: Roll down the left and right front door glass and open the rear glass slider (if available) before installing quarter glass to avoid pressurizing the passenger compartment if a door is slammed before urethane is cured. Water leaks can result.

NOTE: The quarter glass fence should be cleaned of most of its old urethane bonding material. A small amount of old urethane, approximately 1-2 mm in height, should remain on the fence. Do not grind off or completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected.

Glass Preparation - Installing A Previously Installed Quarter Glass

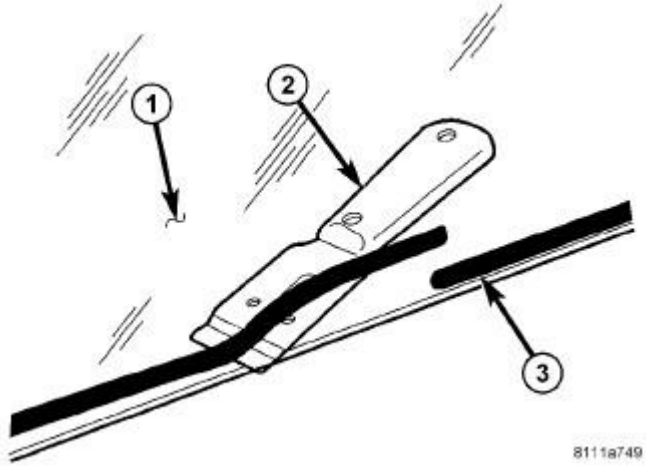


Fig. 219: WINDSHIELD ADHESIVE PREPARATION
Courtesy of CHRYSLER LLC

1 - WINDSHIELD
2 - SCRAPER
3 - OLD ADHESIVE

1. Before proceeding with the following repair procedure, review all warnings and cautions. See **Body/Stationary Glass - Warning**
2. Level old bead of quarter glass adhesive (3) to a thickness of approximately 1 mm (0.04 in.) and remove loose adhesive.

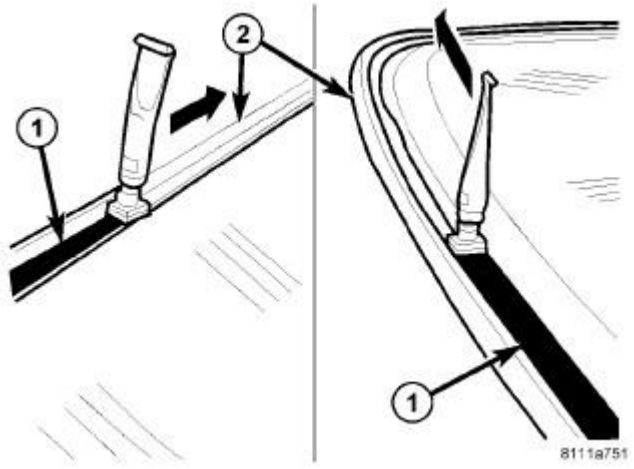


Fig. 220: WINDSHIELD PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER 2 - WINDSHIELD SEAL

NOTE: Typical primer installation shown.

3. Clean and dry area of glass (2) to be re-glued with a suitable glass preparation solvent and rag.
4. Using a flash light, verify that glass primer is without damage.
5. Re-prime any damaged area. If old adhesive has been exposed for more than 12 hours, entire adhesive area needs to be re-primed.
6. Apply primer (1) around the perimeter of the glass to a width of 15 mm (0.5 in.).

NOTE: Make sure the primer does not touch the locating pins and tabs.

7. Allow primer to air dry for at least 10 minutes.
8. Using a flash light, verify that glass primer is without damage.

Glass Preparation - Installing A New Quarter Glass

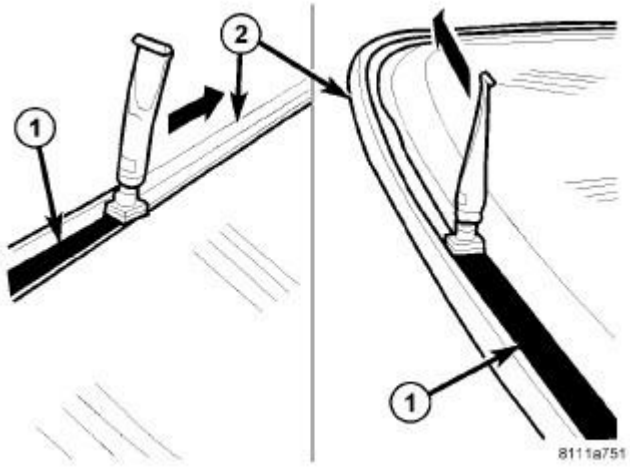


Fig. 221: WINDSHIELD PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER 2 - WINDSHIELD SEAL

NOTE: Typical primer installation shown.

1. Clean and dry area of glass (2) to be re-glued with a suitable glass preparation solvent and rag.
2. Apply primer to gluing surface at quarter glass seal.
3. Apply primer (1) around the perimeter of the glass to a width of 15 mm (0.5 in.) (3).

NOTE: Make sure the primer does not touch the locating pins and tabs (2, 4).

4. Allow primer to air dry for at least 10 minutes.
5. Using a flash light, verify that glass primer is without damage.

Quarter Glass Opening Preparation

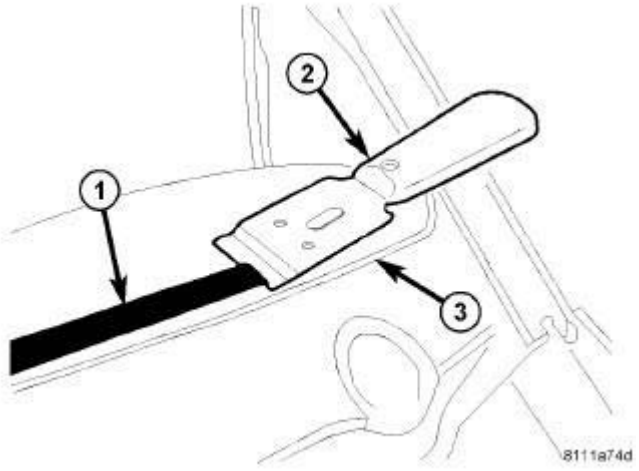


Fig. 222: WINDSHIELD OPENING PREPARATION
Courtesy of CHRYSLER LLC

1 - OLD ADHESIVE
2 - SCRAPER
3 - WINDSHIELD OPENING

NOTE: Windshield opening shown, quarter glass opening similar.

1. Clean and vacuum quarter glass opening.
2. Level old bead of quarter glass opening adhesive (1) to a thickness of approximately 1 mm (0.04 in.) and remove loose adhesive.

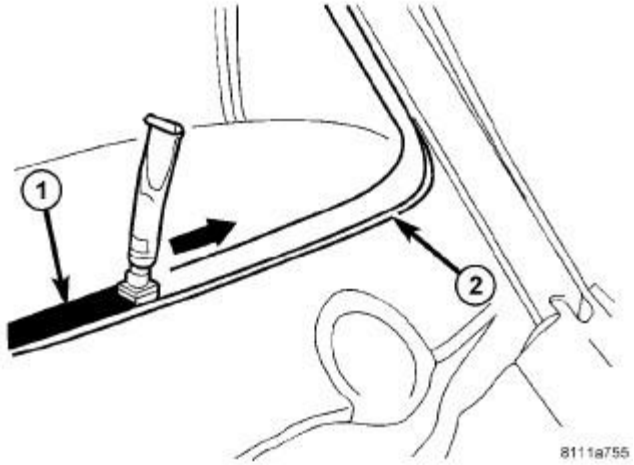


Fig. 223: WINDSHIELD OPENING PRIMER
Courtesy of CHRYSLER LLC

1 - PRIMER

2 - WINDSHIELD OPENING

NOTE: Windshield opening shown, quarter glass opening similar.

3. Clean and dry area of quarter glass opening to be re-glued with a suitable glass preparation solvent and rag.
4. Re-prime any damaged area. If old adhesive has been exposed for more than 12 hours, entire adhesive area needs to be re-primed.

NOTE: Make sure the primer does not touch the locating pins and tabs.

5. Allow primer to air dry for at least 10 minutes.

Quarter Glass Installation

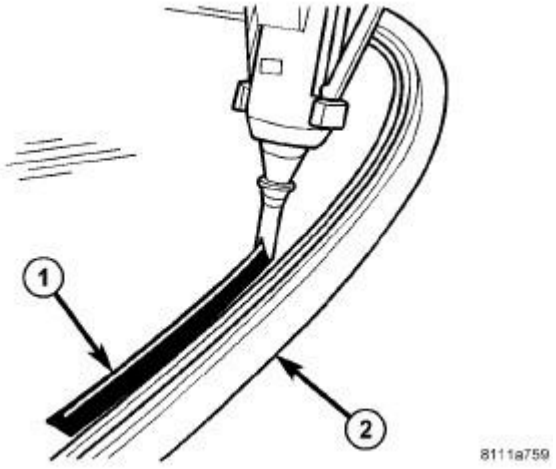


Fig. 224: WINDSHIELD ADHESIVE APPLICATION
Courtesy of CHRYSLER LLC

1 - ADHESIVE BEAD 2 - WINDSHIELD SEAL

1. Apply bead of adhesive (1) with a triangular nozzle directly to the quarter glass seal starting at bottom in center of the quarter glass.

CAUTION: Always apply bead of adhesive to the quarter glass. Always install the quarter glass within 5 minutes after applying adhesive.

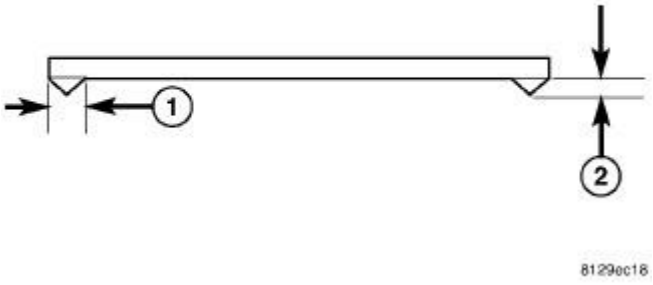


Fig. 225: BEAD DIMENSIONS
Courtesy of CHRYSLER LLC

1 - ADHESIVE WIDTH 9.5 mm (0.375 in)
2 - ADHESIVE HEIGHT 12.7 mm (0.50 in)

2. Bead dimensions should be approximately 9.5 mm wide (1) by 12.7 mm in height (2).

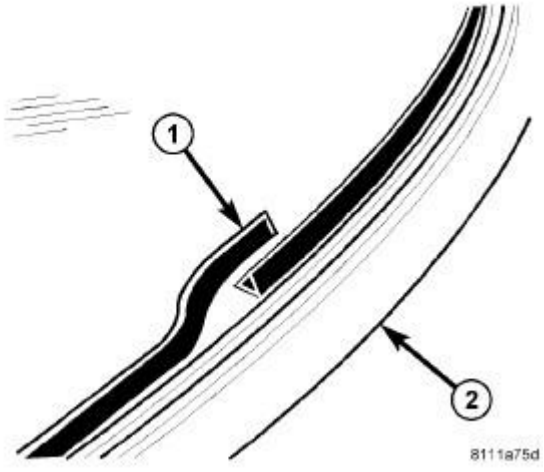


Fig. 226: WINDSHIELD ADHESIVE OVERLAP
Courtesy of CHRYSLER LLC

1 - ADHESIVE BEAD
2 - WINDSHIELD SEAL

3. Allow end of adhesive bead (1) to run out parallel to the start of the bead and smooth ends flush.
4. Lift quarter glass into place in the center of the quarter glass opening and install over the alignment tabs and pin.
5. Carefully lay down the quarter glass and press on.

CAUTION: It is no longer possible to move the quarter glass after installation.

The quarter glass should never be pressed into place by more than one person, because the quarter glass can break if pressed simultaneously on both sides.

CAUTION: Roll down the left and right front door glass and open the rear glass slider (if available) before installing quarter glass to avoid pressurizing the passenger compartment if a door is slammed before urethane is cured. Water leaks can result.

6. Install quarter panel trim. See **Body/Interior/PANEL, Quarter Trim - Installation**

WINDSHIELD

Description

DESCRIPTION

The windshield is attached to the window frame (fence) with urethane adhesive. The urethane adhesive is applied cold and seals the surface area between the window opening and the glass. The primer adheres the urethane adhesive to the windshield.

It is difficult to salvage a windshield during the removal operation. The windshield is part of the structural support for the roof. The urethane bonding used to secure the windshield to the fence is difficult to cut or clean from any surface. If the rubber seals are set in urethane, it would also be unlikely they could be salvaged. Before removing the windshield, check the availability of the windshield and seals from the parts supplier.

Removal

REMOVAL

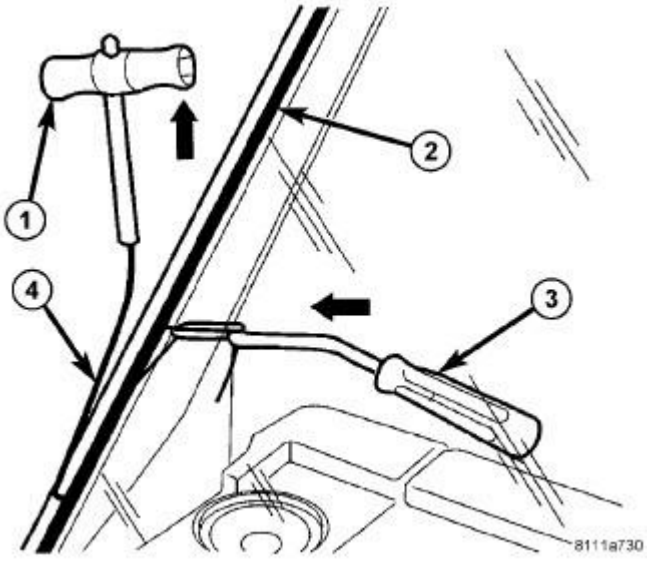


Fig. 227: ADHESIVE SEPARATION
Courtesy of CHRYSLER LLC

1. Before proceeding with the following repair procedure, review all warnings and cautions. See **Body/Stationary Glass - Warning**.
2. Remove the rear view mirror. See **Body/Interior/MIRROR, Rearview - Removal**.
3. Remove the cowl grille. See **Body/Exterior/COVER, Cowl Panel - Removal**

CAUTION: Be careful not to damage painted surfaces when removing moldings or cutting urethane around the windshield.

4. Using an assistant and a wire-type windshield cut-out tool (1, 3 and 4), cut and separate the urethane adhesive (2) securing the windshield to the windshield fence.
5. Carefully remove the windshield from the vehicle.
6. Remove molding from the sides of the windshield.

Installation

INSTALLATION

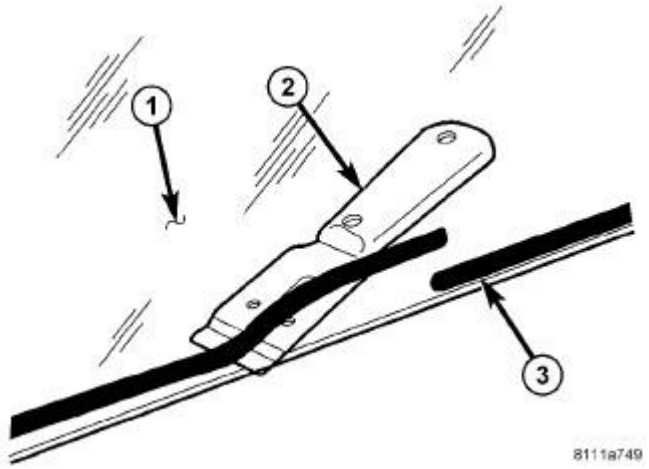


Fig. 228: Glass Adhesive Preparation
Courtesy of CHRYSLER LLC

WARNING: Do not operate the vehicle within 24 hours of windshield installation. It takes at least 24 hours for urethane adhesive to cure. If it is not cured, the windshield may not perform properly if the vehicle is in an accident.

CAUTION: To help prevent water leaks, partially roll down the left and right door glass before installing the windshield. This avoids pressurizing the passenger compartment if a door is slammed before the urethane is cured.

1. If the windshield (1) is being reused, remove as much of the original urethane (3) as possible from the glass surface using a razor knife (2).

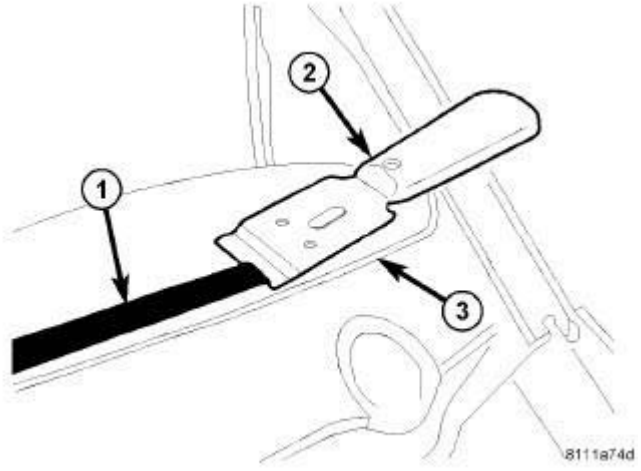


Fig. 229: WINDSHIELD OPENING PREPARATION
Courtesy of CHRYSLER LLC

CAUTION: To prevent corrosion, do not damage paint on windshield fence when removing original urethane.

CAUTION: The windshield fence should be cleaned of most of its old urethane adhesive. A small amount of old urethane, approximately 1 mm (.039 in.) in height should remain on the fence. Do not completely remove all old urethane from the fence, the paint finish and bonding strength will be adversely affected.

CAUTION: Support spacers located near the cowl at the bottom of the windshield fence should be replaced with new spacers. Replace any missing or damaged spacers around the perimeter of the windshield fence.

2. Using a razor knife (2), level the original bead of urethane (1) on the windshield fence (3) to a thickness of approximately 1 mm (0.04 in.) and remove any damaged adhesive backed spacers.
3. Install new adhesive backed spacers along the windshield fence as required.
4. Install a new rubber seal along the sides of the windshield.
5. Using an assistant, position the windshield into the windshield opening and against the windshield fence and spacers.
6. Verify the windshield lays evenly against the fence at the top, bottom and sides of the opening. If not, the fence must be formed to the shape of the windshield.
7. Mark the windshield and the windshield fence with a grease pencil or pieces of masking tape to use as a reference for installation.

8. Using an assistant, remove the windshield from the windshield opening and place it on a suitable padded work surface.

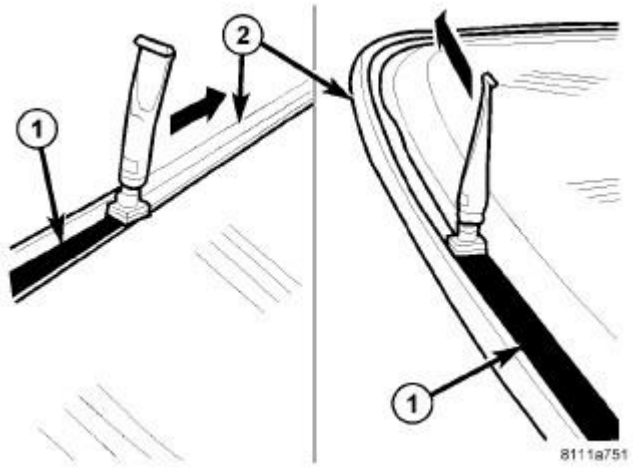


Fig. 230: WINDSHIELD PRIMER
Courtesy of CHRYSLER LLC

WARNING: Do not use solvent based glass cleaners to clean the windshield before applying glass prep and primer or poor glass adhesion may result.

9. Clean the inside of the windshield with an ammonia based glass cleaner and a lint-free cloth.
10. Apply glass prep adhesion promoter 25 mm (1 in.) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in.) from the edge of the glass and wipe dry with a clean lint-free cloth until no streaks are visible.
11. Apply glass primer 25 mm (1 in.) wide (1) around the perimeter of the windshield (2) and 5 mm (0.2 in.) from the edge of the glass. Allow at least three minutes drying time.
12. Using a flashlight, verify that the primer is completely and evenly installed along the perimeter of the windshield.
13. Re-prime any area that is not fully and evenly primed.

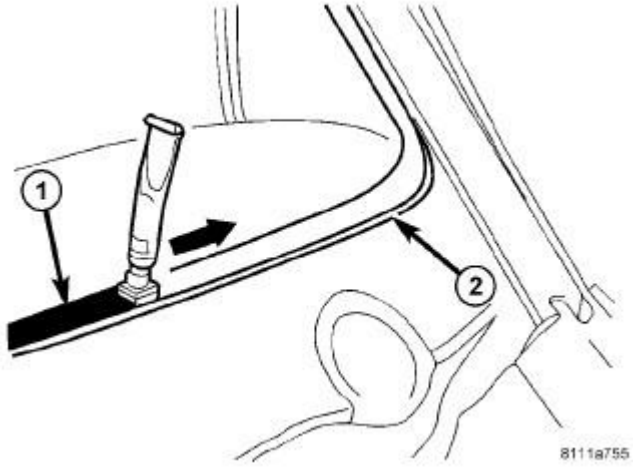


Fig. 231: WINDSHIELD OPENING PRIMER
Courtesy of CHRYSLER LLC

14. Clean the windshield fence with an ammonia based glass cleaner and a lint-free cloth.
15. Apply pinch weld primer 15 mm (0.75 in.) wide (1) around the windshield fence (2). Allow at least three minutes drying time.
16. Using a flashlight, verify that the primer is completely and evenly installed along the windshield fence.
17. Re-prime any area that is not fully and evenly primed.

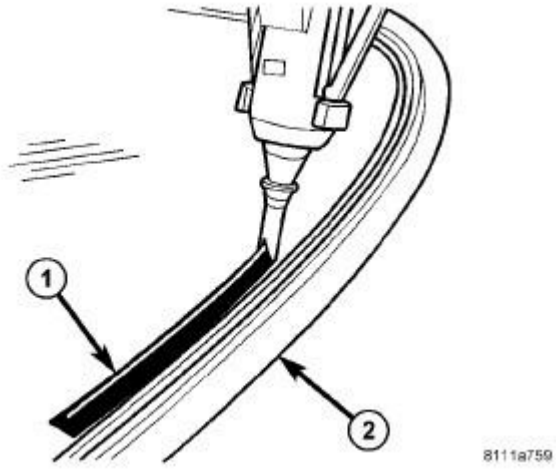


Fig. 232: WINDSHIELD ADHESIVE APPLICATION
Courtesy of CHRYSLER LLC

CAUTION: Always apply the bead of adhesive to the windshield. Always install the windshield within 5 minutes after applying the adhesive.

NOTE: If the original urethane adhesive has been exposed for more than 12 hours, the entire adhesive area will need to be re-primed prior to installing

new adhesive.

18. Apply approximately a 10 mm (0.4 in.) wide bead of adhesive (1) with a triangular nozzle approximately 6 mm (0.230 in.) from the edge of the glass (2) starting at the bottom center of the windshield.

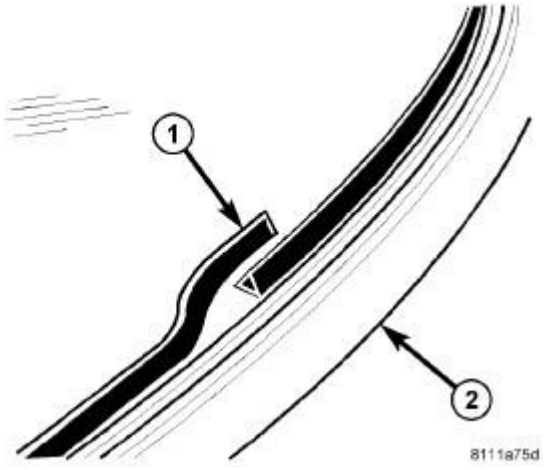


Fig. 233: WINDSHIELD ADHESIVE OVERLAP
Courtesy of CHRYSLER LLC

19. Run the end of the adhesive bead (1) on the windshield (2) parallel to the start of the bead and smooth the ends flush.
20. Using an assistant, position the windshield over the windshield opening.
21. Using the grease pencil marks or tape as reference points, align the windshield to the windshield opening.
22. Carefully lower the windshield into the windshield opening. Guide the windshield and the rubber seals on the sides of the windshield into its proper location.

CAUTION: It is not possible to move the windshield after installation. The windshield should never be pressed into place by more than one person, because the windshield can break if pressed simultaneously on both sides.

23. Push the windshield inward until the windshield comes into contact with the spacers ocated on each side and the bottom of the windshield fence.
24. Install the cowl grill. See **Body/Exterior/COVER, Cowl Panel - Removal**.
25. Install the rear view mirror onto the windshield. See **Body/Interior/MIRROR, Rearview - Installation**.

SUNROOF

DESCRIPTION

DESCRIPTION

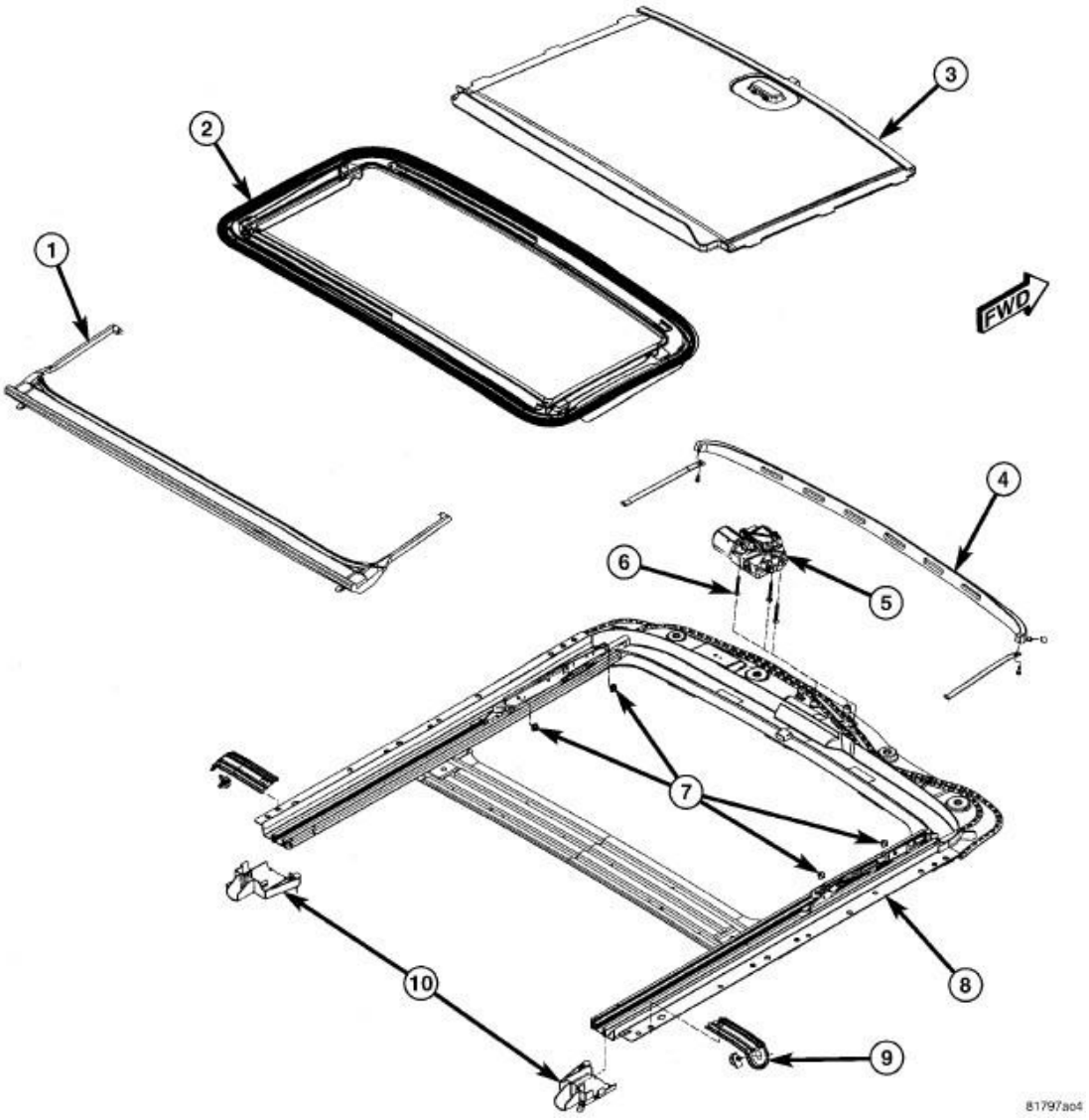


Fig. 234: Exploded View Of Sunroof
Courtesy of CHRYSLER LLC

SUNROOF ASSEMBLY BREAKDOWN

1 - DRAIN TROUGH	6 - MOTOR SCREWS (3) 3 N.m (26 in. lbs.)
2 - GLASS ASSEMBLY	7 - GLASS ASSEMBLY SCREWS (4) 3.5 N.m (31 in. lbs.)
3 - SUN SHADE	8 - FRAME ASSEMBLY
4 - WIND DEFLECTOR	9 - BRACKETS
5 - MOTOR	10 - END CAPS

WARNING: Keep fingers and other body parts out of sunroof opening at all times.

The sunroof features a power sliding glass panel and a sunshade which can be manually positioned anywhere along its travel, rearward of glass panel front edge.

DIAGNOSIS AND TESTING

WATER DRAINAGE AND WIND NOISE

The sliding glass panel is designed to seal water entry with a snug fit between the roof and the seal. The fit can be checked by inserting a piece of paper between the roof and the seal. The piece of paper should have some resistance when pulled out when the glass panel is in the closed position. The sunroof housing will drain off a minimum amount of water. Excessive wind noise could result if the gap clearances are exceeded. The sunroof glass panel may need to be adjusted. See **Body/Sunroof/GLASS, Sunroof - Adjustments**.

Adequate drainage is provided by a drain trough in the sunroof housing which encircles the sliding glass panel and leads to drain hoses. If a wet headliner or other water leak complaints are encountered, before performing any adjustments, first ensure that the drainage system is not plugged or disconnected. Use a pint container to pour water into the sunroof housing drain trough. If water flow is restricted, use compressed air to blow out any material plugging the drain system. Retest system again.

To further check for a disconnected drain hose:

1. Remove A-pillar trim, sun visors, and map lamps/mini console.
2. Lower headliner as necessary to gain access to sunroof housing drain tubes. See **Body/Interior/HEADLINER - Removal**.
3. Repair as necessary.
4. Install headliner. See **Body/Interior/HEADLINER - Installation**.

DEFLECTOR, WIND

Removal

REMOVAL

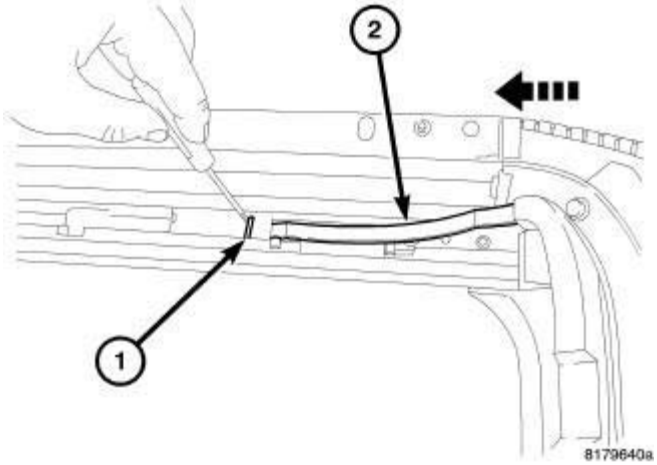


Fig. 235: Wind Deflector Spring Lock
Courtesy of CHRYSLER LLC

1. Open the sunroof glass to the full open position.
2. Press the spring lock (1) with a small flat bladed tool and push the wind deflector (2) reward to release from the car top opening.
3. Repeat the previous step on the opposite side.

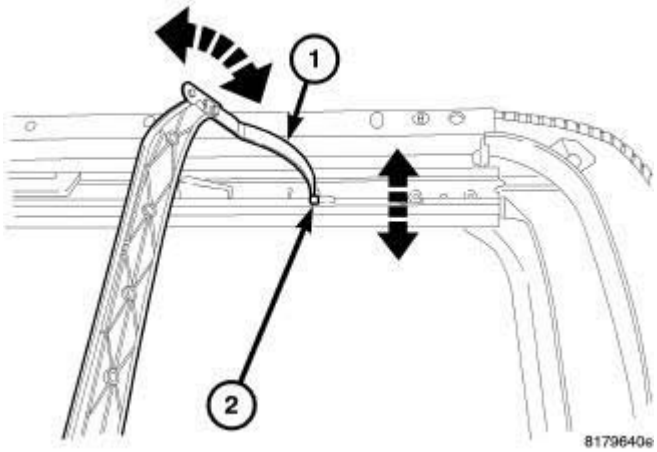


Fig. 236: Wind Deflector Springs
Courtesy of CHRYSLER LLC

4. Rotate the wind deflector (1) up and release from the mounting hole (2) in the sunroof frame.

Installation

INSTALLATION

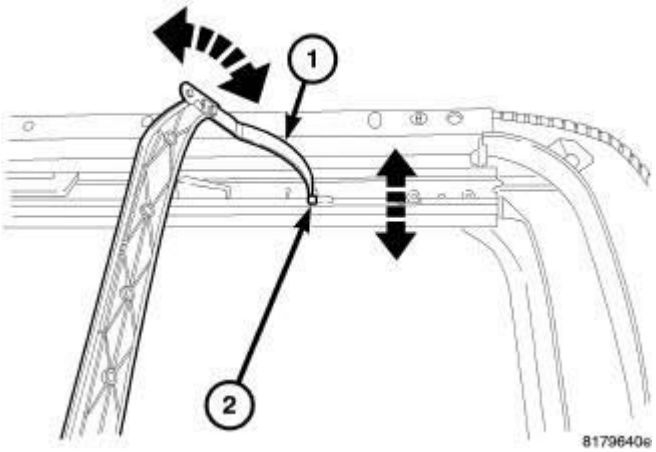


Fig. 237: Wind Deflector Springs

Courtesy of CHRYSLER LLC

1. Position the wind deflector springs (1) into the mounting holes (2) in the sunroof frame.
2. Rotate forward and down into position.

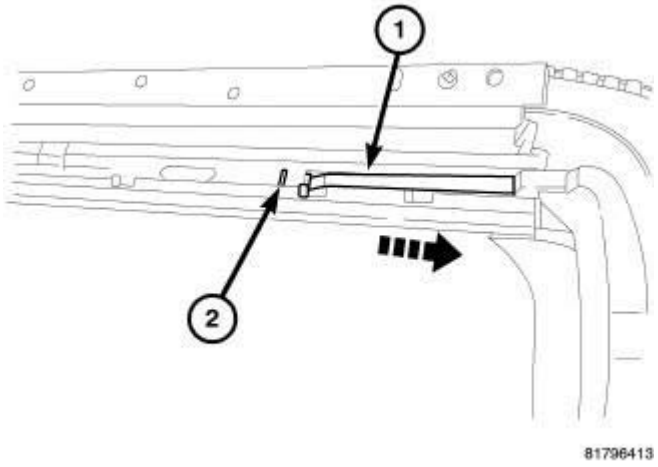


Fig. 238: Sliding Wind Deflector & Spring Forward
Courtesy of CHRYSLER LLC

3. Slide the wind deflector and spring (1) forward under the car top lip and make sure the spring lock snaps into place (2) fully.

GLASS, SUNROOF

Removal

REMOVAL

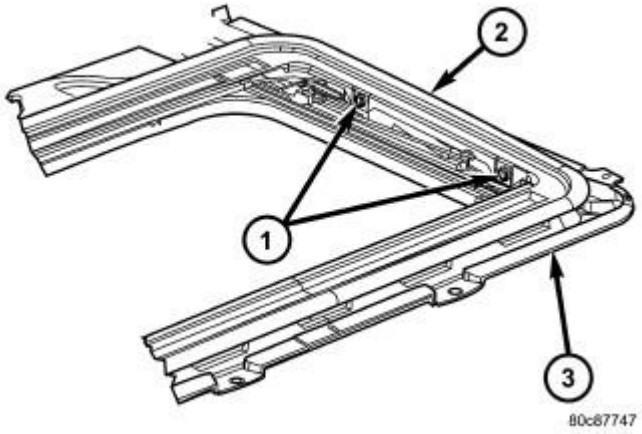


Fig. 239: GLASS PANEL
Courtesy of CHRYSLER LLC

1. Slide sunshade rearward to the open position.
2. Move the glass panel to the closed position.
3. Remove the four glass panel screws (1).
4. Lift off glass panel and remove from vehicle.

Installation

INSTALLATION

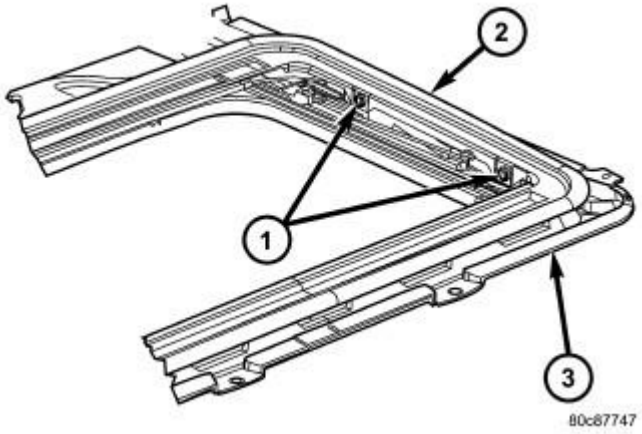


Fig. 240: GLASS PANEL
Courtesy of CHRYSLER LLC

1. Position glass panel (2) on to mechanism lift arm.
2. Start the four attaching screws (1).
3. Center glass in opening by running a business card around the glass.
4. Adjust glass panel. See **Body/Sunroof/GLASS, Sunroof - Adjustments**.

Adjustments

GLASS PANEL

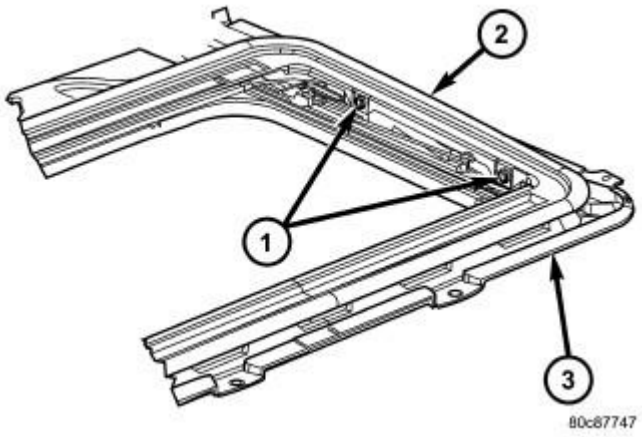


Fig. 241: GLASS PANEL
Courtesy of CHRYSLER LLC

1. Move the sunshade rearward to the open position.
2. Move the sunroof glass panel to the fully closed position.
3. Adjust the glass one corner at a time.
    a. Loosen four glass screws (1).
    b. Lift glass assembly and align the top of the glass panel to the top of the roof panel.
    c. Tighten screw to 3 N.m (26 in. lbs.).
    d. Repeat steps a. and b. for each corner of the glass panel.
    e. When properly adjusted, the front of the glass panel is 1.0 mm (0.04 in.) to 2.0 mm (0.08 in.) lower than the roof surface and the rear edge of the glass panel is 1.0 mm (0.04 in.) to 2.0 mm (0.08 in.) higher than the roof surface.

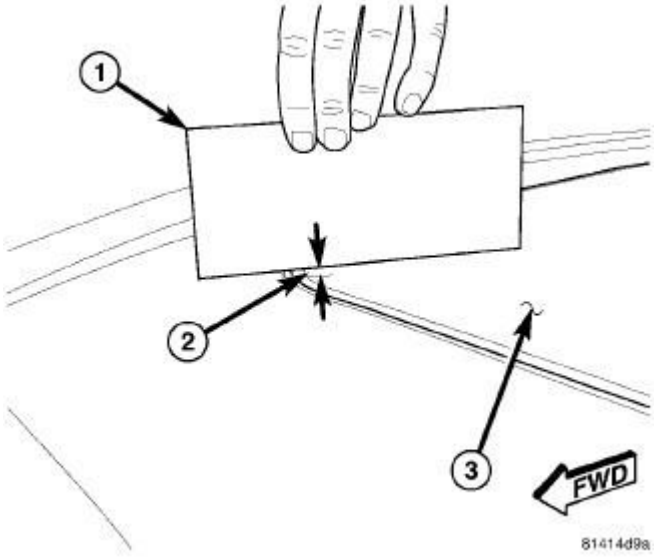


Fig. 242: FRONT ADJUST
Courtesy of CHRYSLER LLC

NOTE: When properly adjusted, the front of the glass panel (3) is 1.0 mm (0.04 in.) to 2.0 mm (0.08 in.) lower than the roof surface (2).

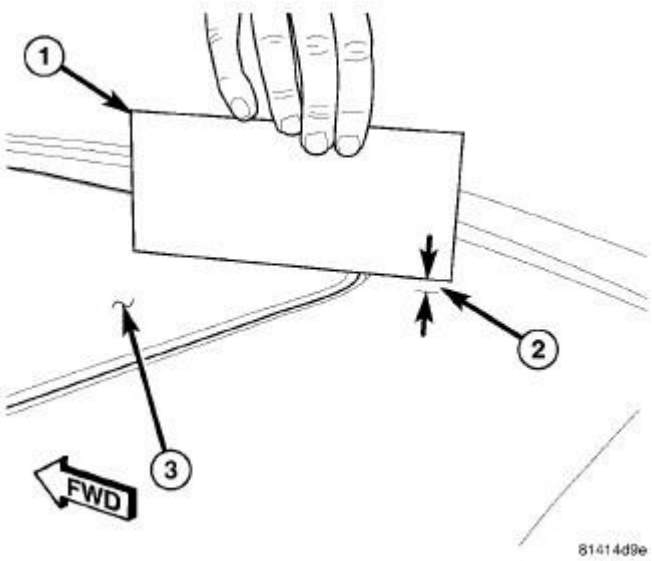


Fig. 243: REAR ADJUST
Courtesy of CHRYSLER LLC

NOTE: When properly adjusted, the rear edge of the glass panel (3) is 1.0 mm (0.04 in.) to 2.0 mm (0.08 in.) higher than the roof surface (2).

4. Verify sunroof operation and alignment. Check fit and re-adjust as necessary.

MOTOR, SUNROOF, WITH CONTROL UNIT

Standard Procedure

DRIVE MOTOR TEACH PROCEDURE

REPLACEMENT DRIVE MOTOR

1. Press and hold the sunroof switch open until the sunroof glass fully opens, automatically reverses direction, and stops at a position just forward of the full open position.
2. Release sunroof switch.
3. Within five seconds of releasing sunroof switch, press and hold the sunroof switch open again until the sunroof glass closes, goes into vent position, and then finally stops in the closed position.
4. Release sunroof switch. Sunroof will now operate normally.

ORIGINAL DRIVE MOTOR

1. Press and hold sunroof switch open until the sunroof glass opens and stops.
2. Release sunroof switch.
3. Press and hold sunroof switch open once again for at least 10 seconds. After 10 seconds of pressing the switch open, the sunroof glass will automatically move and stop at a new location.
4. Release sunroof switch.
5. Within five seconds of releasing the sunroof switch, press and hold the switch open again until the sunroof glass closes, goes into vent position, and then finally stops in the closed position.
6. Release sunroof switch. The sunroof will now operate normally.

Removal

REMOVAL

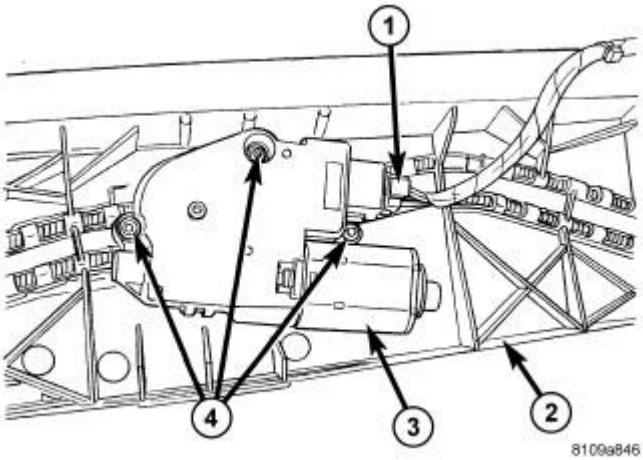


Fig. 244: DRIVE MOTOR
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR
2 - MODULE ASSEMBLY
3 - DRIVE MOTOR
4 - MOUNTING SCREWS

1. Drop headliner to dash. See **Body/Interior/HEADLINER - Removal**
2. Disconnect the electrical connector (1).
3. Remove three motor assembly attaching screws (4) from bottom side of motor assembly (3) and remove motor assembly from the motor bracket.

Installation

INSTALLATION

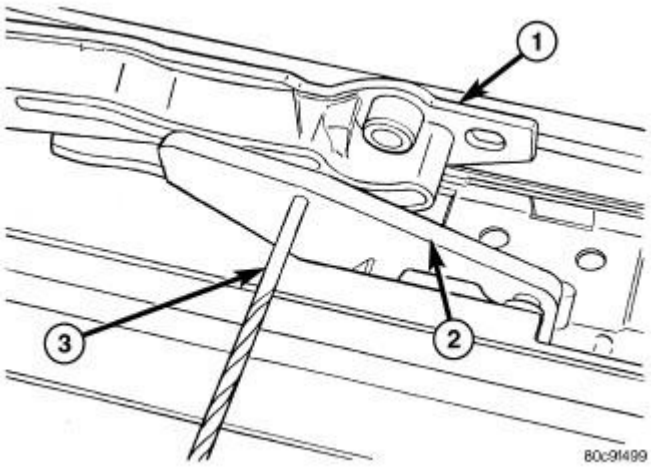


Fig. 245: LIFT ARM POSITIONING
Courtesy of CHRYSLER LLC

1 - LIFTER ARM 2 - TROLLEY 3 - ALIGNMENT PIN

1. If sunroof was open when drive motor was removed, carefully move glass panel into closed position and remove glass panel. See **Body/Sunroof/GLASS, Sunroof - Removal**
2. Set lifter arm timing by manually sliding the mechanisms (1) in the track until timing holes in the trollies are aligned with the timing holes in the lifter arm cams (2) and insert pins (3) into the mechanisms to hold mechanisms in closed position.

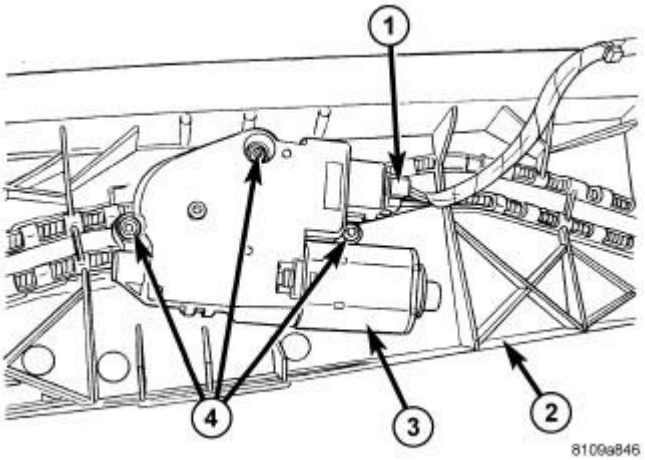


Fig. 246: DRIVE MOTOR
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR

2 - MODULE ASSEMBLY 3 - DRIVE MOTOR 4 - MOUNTING SCREWS

3. Place motor (3) into position and install screws (4) attaching motor to bracket (2).
4. Tighten the screws (4) to 3 N.m (26 in. lbs.).
5. If sunroof glass panel was removed previously, remove the timing pins and install the sunroof glass panel. See **Body/Sunroof/GLASS, Sunroof - Installation**
6. Partially install the headliner and connect the sunroof wiring electrical connectors. See **Body/Interior/HEADLINER - Installation**
7. Temporarily install sunroof switch and perform the sunroof motor teach procedure. See **Body/Sunroof/MOTOR, Sunroof - Standard Procedure**
8. Test sunroof operation, adjust glass as necessary. See **Body/Sunroof/GLASS, Sunroof - Adjustments**
9. Raise headliner to roof. Complete the headliner installation. See **Body/Interior/HEADLINER - Installation**

SEAL, SUNROOF GLASS

Removal

REMOVAL

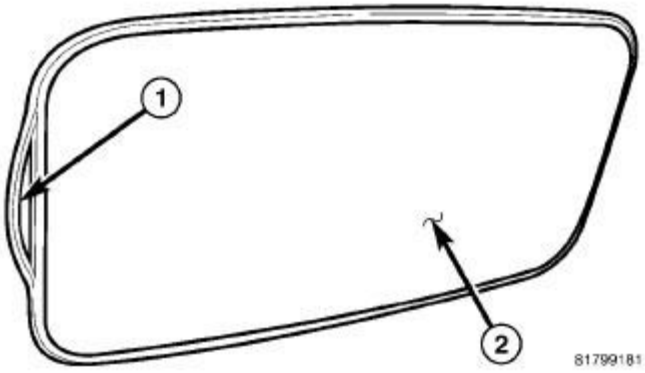


Fig. 247: GLASS SEAL
Courtesy of CHRYSLER LLC

1. Remove sunroof glass panel. See **Body/Sunroof/GLASS, Sunroof - Removal**.
2. Place glass panel on clean work area with the top side up. Support the glass assembly from underside to avoid bending or otherwise damaging the mounting tabs.
3. Grasp the seal (1) and pull seal away from the glass panel (2). The seal is a one piece seal.

Installation

INSTALLATION

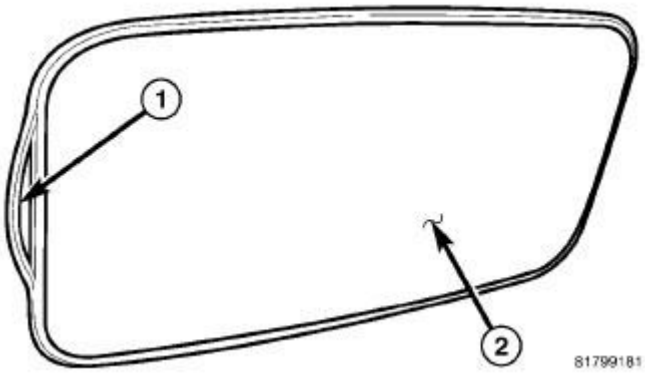


Fig. 248: GLASS SEAL
Courtesy of CHRYSLER LLC

NOTE: Always position seal seam on center of the passenger side of glass panel.

1. Place seal (1) into position.
2. Seat the seal into the glass channel fully. Using care working the seal around the glass (2), being careful not to over stretch the seal while installing.
3. Install the glass panel. See **Body/Sunroof/GLASS, Sunroof - Installation**.

SUNROOF

Removal

REMOVAL

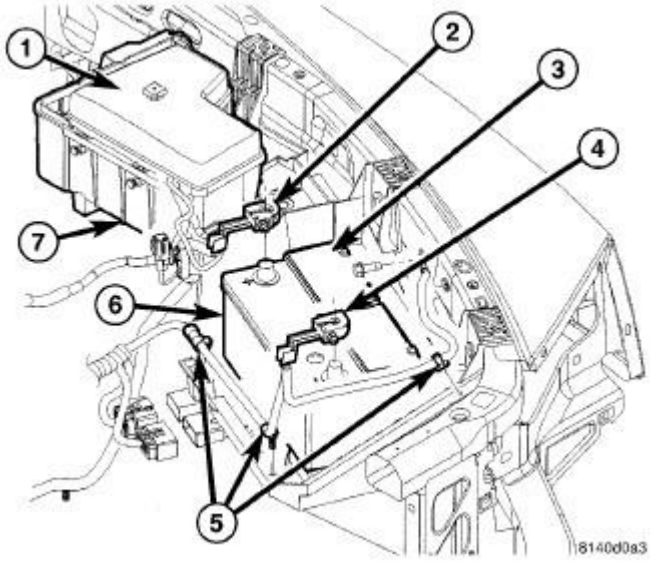


Fig. 249: BATTERY SYSTEM COMPONENTS
Courtesy of CHRYSLER LLC

1. Move glass panel to fully closed position.
2. Disconnect and isolate negative battery cable (4).
3. Remove control switch. Refer to **Electrical/Power Top/SWITCH, Sunroof - Removal** .
4. Drop headliner to seat. See **Body/Interior/HEADLINER - Removal**.

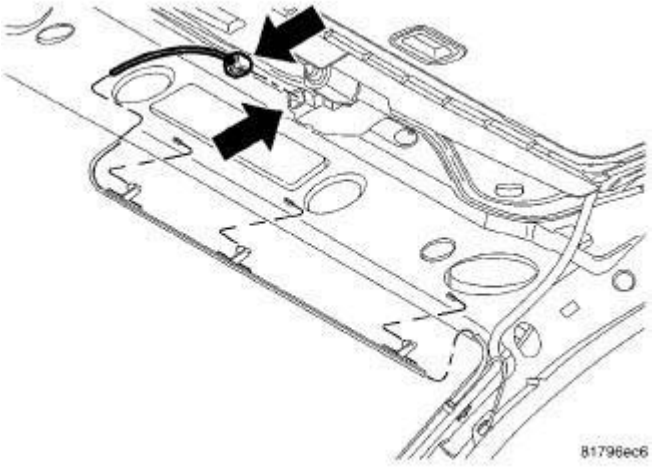


Fig. 250: ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

5. Disconnect the electrical connector.

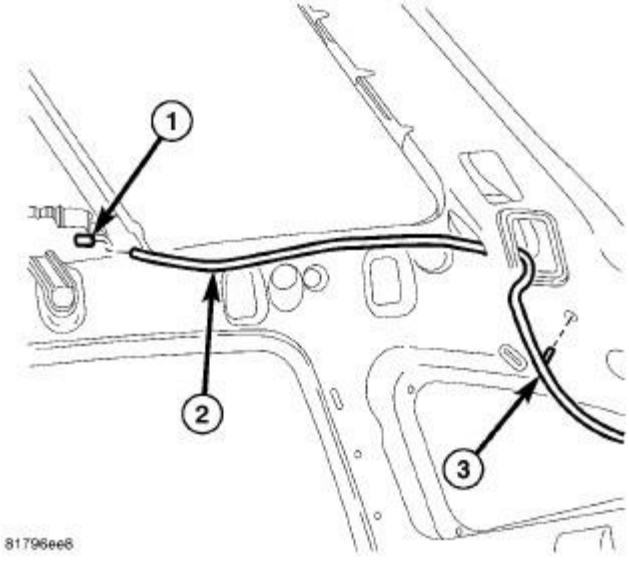


Fig. 251: Drain Tubes From Sunroof Housing
Courtesy of CHRYSLER LLC

6. Disconnect drain tubes (2) from sunroof housing (1).

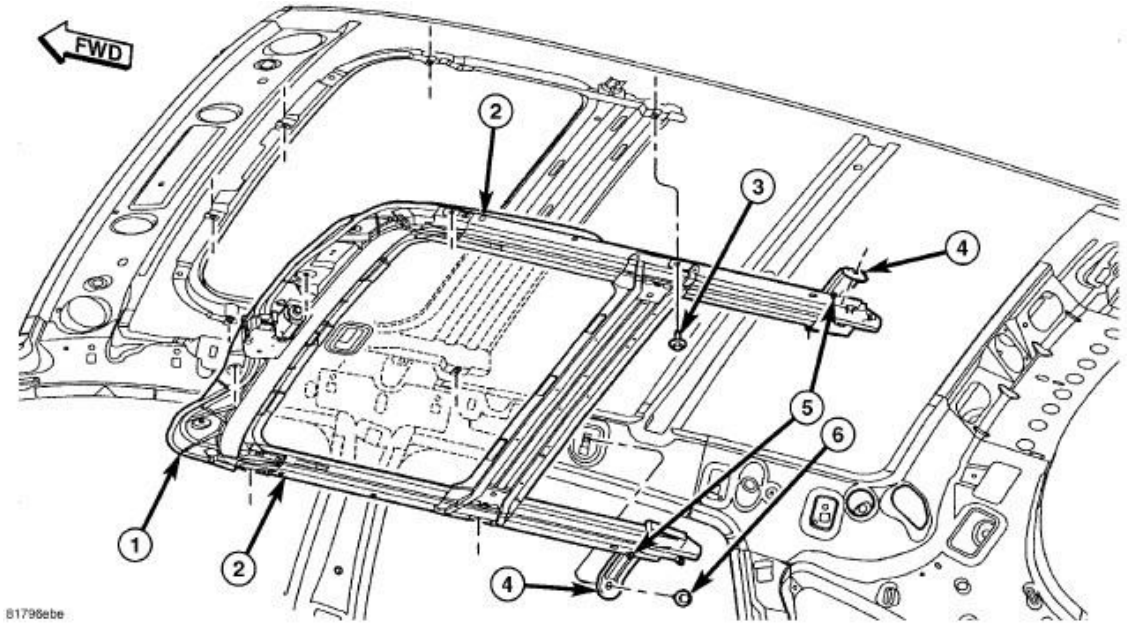


Fig. 252: Sunroof Module Assembly
Courtesy of CHRYSLER LLC

7. Remove two module side bracket (4) bolts (6) and loosen the six remaining fasteners (3).
8. Remove the six (3) fasteners attaching sunroof module assembly (1) to roof panel.
9. Remove the glass panel. See **Body/Sunroof/GLASS, Sunroof - Removal**.
10. Remove the sunshade. See **Body/Sunroof/SUNSHADE, Sunroof - Removal**.
11. Remove the drive motor. Refer to **Electrical/Power Top/MOTOR, Sunroof - Removal** .
12. Remove the wire harness.
13. Remove the trough guides. See **Body/Sunroof/TROUGH, Sunroof - Removal**

Installation

INSTALLATION

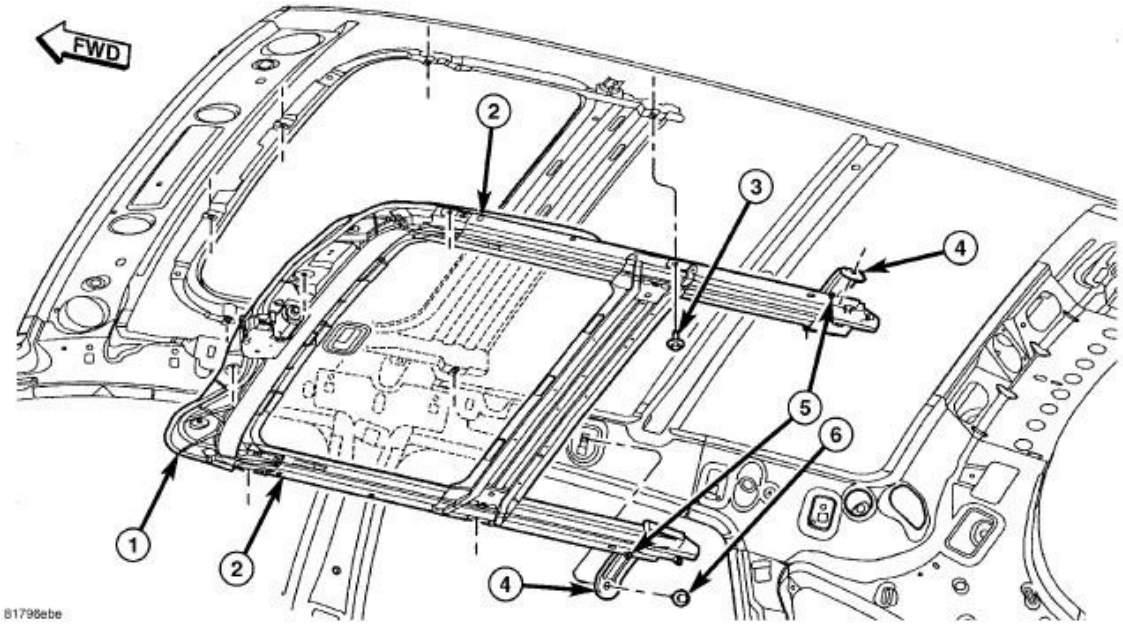


Fig. 253: Sunroof Module Assembly
Courtesy of CHRYSLER LLC

1. Install the trough guides. See **Body/Sunroof/TROUGH, Sunroof - Installation**.
2. Install the drive motor. Refer to **Electrical/Power Top/MOTOR, Sunroof - Installation** .
3. Install the sunshade. See **Body/Sunroof/SUNSHADE, Sunroof - Installation**.
4. Install the glass panel. See **Body/Sunroof/GLASS, Sunroof - Installation**.
5. Raise rear end of sunroof module assembly (1) and guide into position and start the six fasteners (3).
6. Visually line up the alignment guide holes (2) with the guide holes in the roof of the vehicle.
7. Tighten the six fasteners (3) to 9 N.m (80 in. lbs.).
8. Tighten the two side bracket fasteners (6) to 9 N.m (80 in. lbs.).

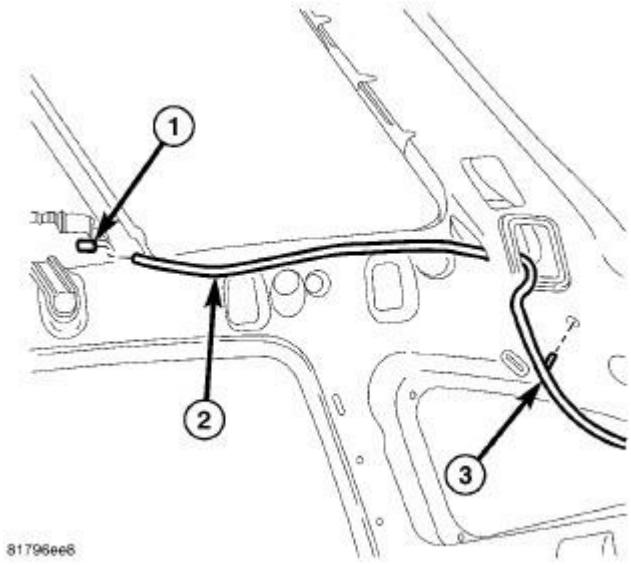


Fig. 254: Drain Tubes From Sunroof Housing
Courtesy of CHRYSLER LLC

9. Connect the drain tubes (2) to the assembly (1).

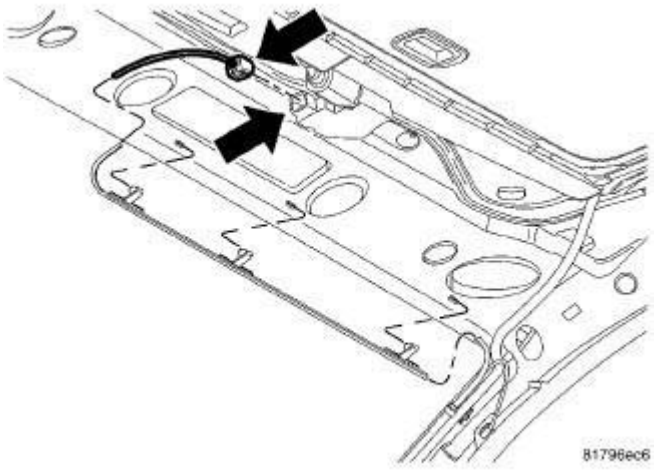


Fig. 255: ELECTRICAL CONNECTOR
Courtesy of CHRYSLER LLC

10. Connect the electrical connector.
11. Connect the battery negative cable.
12. Test sunroof operation, adjust glass as necessary. See **Body/Sunroof/GLASS, Sunroof - Adjustments**.
13. Partially install the headliner and connect the sunroof wiring electrical connectors. See **Body/Interior/HEADLINER - Installation**.
14. Temporarily install sunroof switch and perform the sunroof motor teach procedure. See **Body/Sunroof/MOTOR, Sunroof - Standard Procedure**.

15. Install the headliner. See **Body/Interior/HEADLINER - Installation**.
16. Verify correct sunroof operation.

SUNSHADE, SUNROOF

Removal

REMOVAL

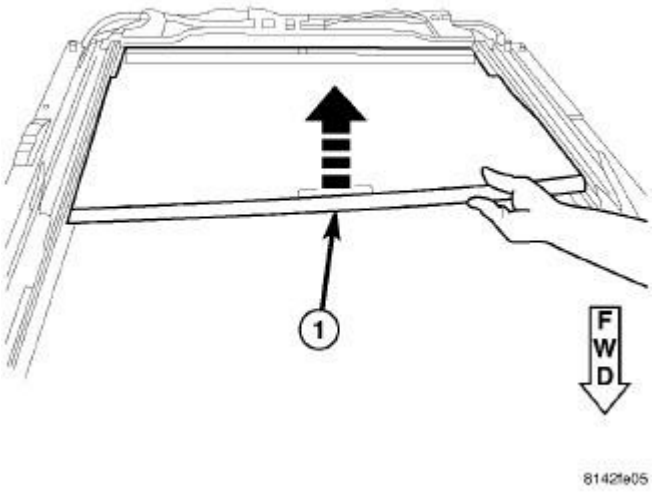


Fig. 256: Front Center Of Sunshade
Courtesy of CHRYSLER LLC

1. Remove the drain trough. See **Body/Sunroof/TROUGH, Sunroof - Removal**
2. Push up the front center of the sunshade (1) to pop out the front two feet.

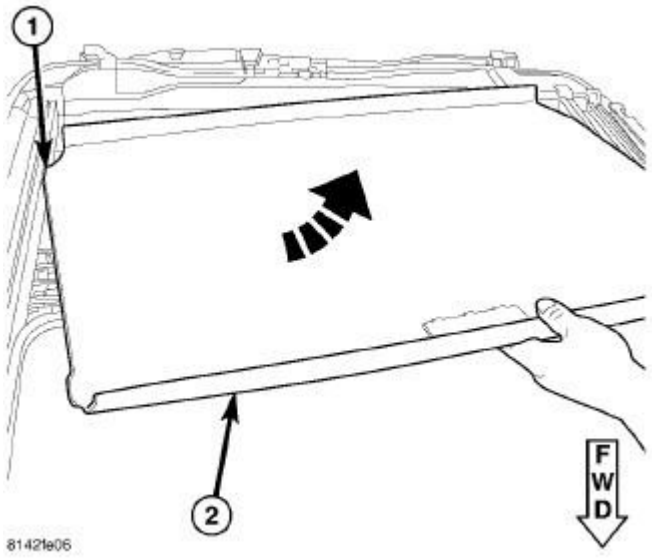


Fig. 257: Rotating Sunshade So That Other Feet Are Removed From Guide Track
Courtesy of CHRYSLER LLC

3. Rotate the sunshade (2) so that the other feet (1) are removed from the guide track.

Installation

INSTALLATION

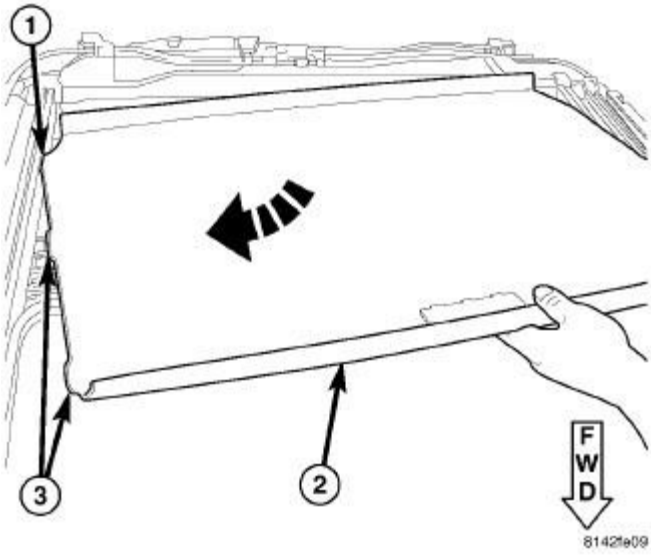


Fig. 258: Rotating Sunshade So Other Rear Foot Is In Track As Well As Other Feet On Same Side As First Foot
Courtesy of CHRYSLER LLC

1. Verify the sunshade track is free of obstructions like the trim lace/ring

2. Start with sunshade (2) at an angle with one foot (1) in the track.
3. Rotate the sunshade so the other rear foot is in the track as well as the 2 other feet (3) on the same side as the first foot.

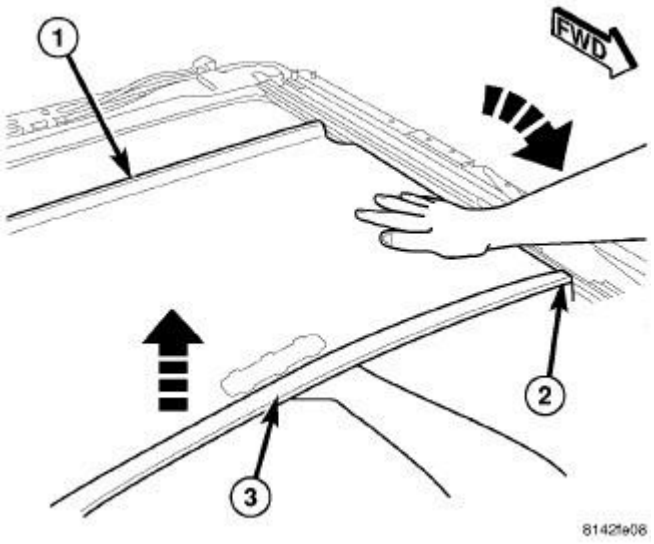


Fig. 259: Insertingmaining Two Feet Apply Force To Middle Front Of Sunshade
Courtesy of CHRYSLER LLC

4. To insert the remaining two feet (2) apply force to the middle front of sunshade (3) and guide them into the track.
5. Check that all the feet are in the right track and verify sunshade operation.
6. Install the drain trough. See **Body/Sunroof/TROUGH, Sunroof - Installation**

TROUGH, SUNROOF

Removal

REMOVAL

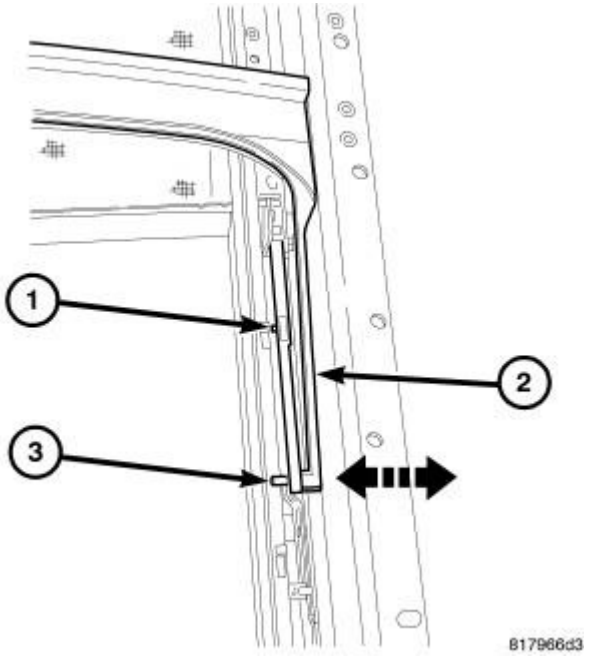


Fig. 260: Trough Pins From Glass Lift Mechanisms
Courtesy of CHRYSLER LLC

1. Remove the glass. See **Body/Sunroof/GLASS, Sunroof - Removal**.
2. Separate the trough pins (3) from the glass lift mechanisms (1).

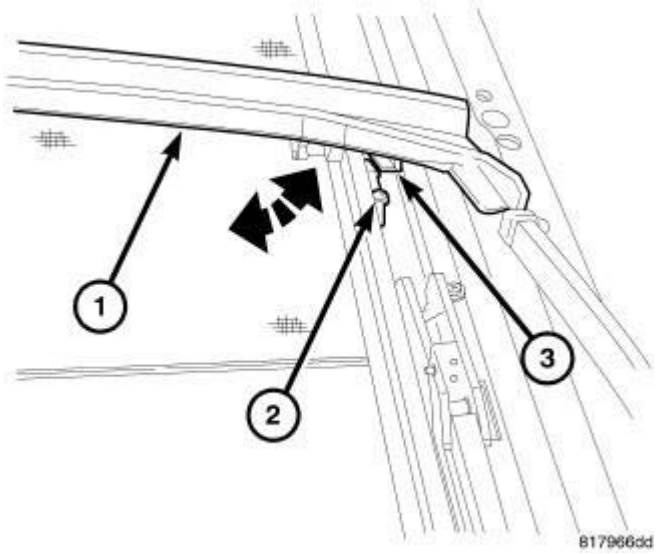


Fig. 261: Guide Shoe Tab
Courtesy of CHRYSLER LLC

3. Slide trough (1) to one side and push down on the center of the trough until the guide shoe tab (3) releases from the track (2).
4. Slide the trough in the opposite direction to release the other shoe and lift the trough out of the sunroof opening.

Installation

INSTALLATION

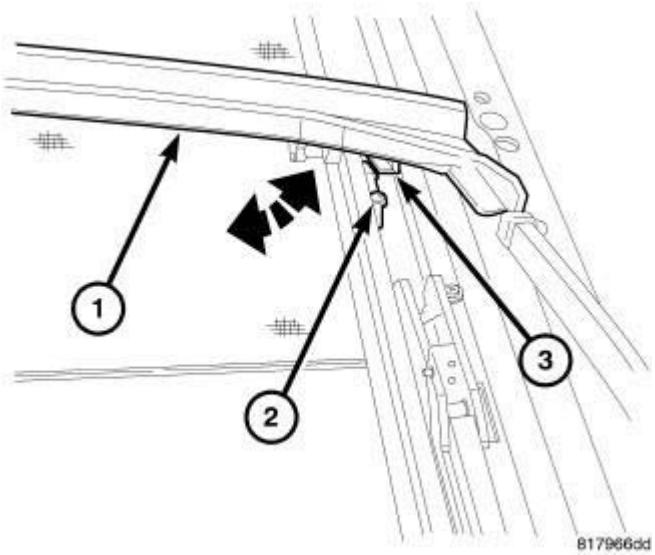


Fig. 262: Guide Shoe Tab
Courtesy of CHRYSLER LLC

1. Insert one of the trough guides (3) and guide shoe (2) into the track.
2. Push down on the center of the trough (1) to flatten it out and install the remaining trough guide (3) and guide shoe (2) into the track.

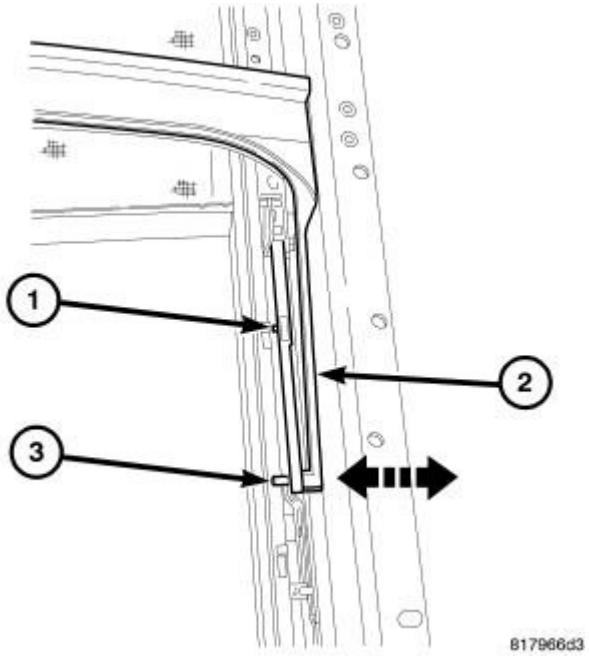


Fig. 263: Trough Pins From Glass Lift Mechanisms
Courtesy of CHRYSLER LLC

3. Install the trough guide pins into the glass lift mechanism (3) and seat fully.
4. Install the glass. See **Body/Sunroof/GLASS, Sunroof - Installation**.

TUBE, SUNROOF DRAIN

Removal

REMOVAL

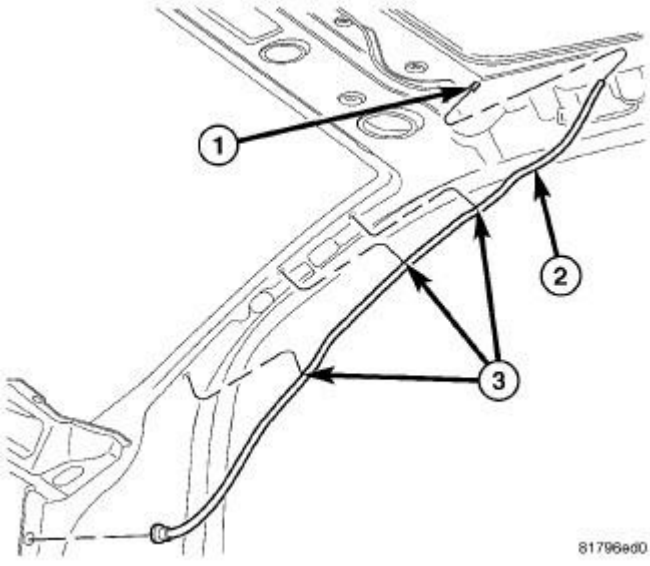


Fig. 264: FRONT HOSE
Courtesy of CHRYSLER LLC

1. Drop down the headliner as necessary to gain access to the drain hoses. See **Body/Interior/HEADLINER - Removal**.
2. Disconnect the front hoses (2) from the sunroof assembly (1).
3. Release the support clips (3) and disconnect the lower grommet and remove the hose.

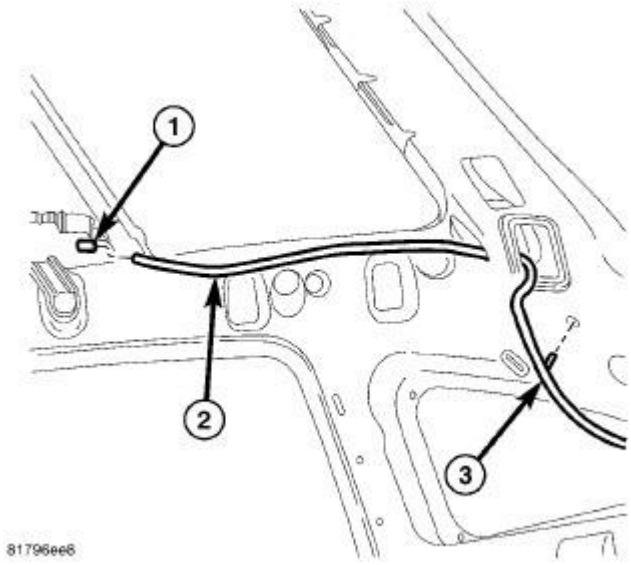


Fig. 265: Drain Tubes From Sunroof Housing
Courtesy of CHRYSLER LLC

4. Disconnect the rear hoses (2) from the sunroof assembly (1) and release the support clips (3).

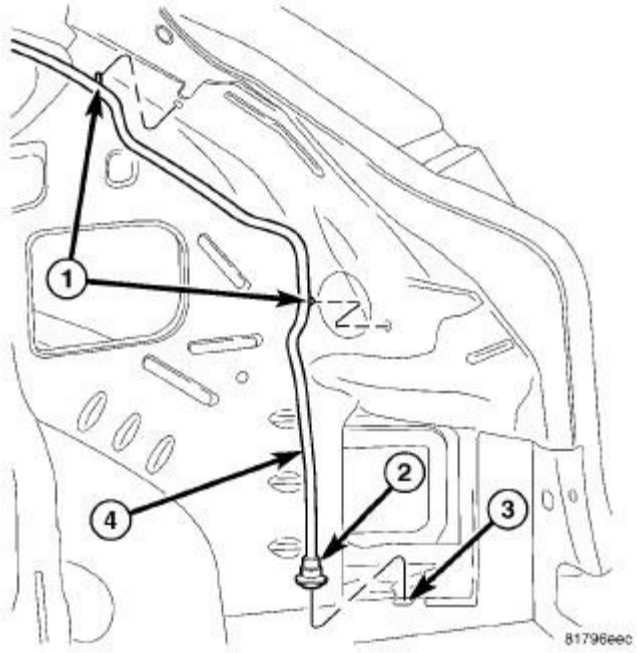


Fig. 266: Support Clips
Courtesy of CHRYSLER LLC

5. Separate the remaining support clips (1).
6. Disconnect the grommet (2) from the body (3) and remove the rear hoses as necessary.

Installation

INSTALLATION

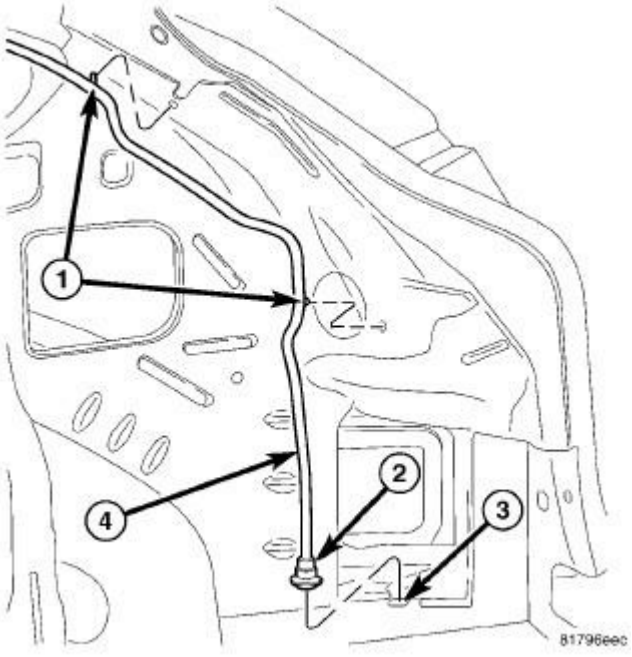


Fig. 267: Support Clips
Courtesy of CHRYSLER LLC

1. Install the rear hoses (4) and connect the grommets (2) to the body (3).
2. Connect the support clips (1).

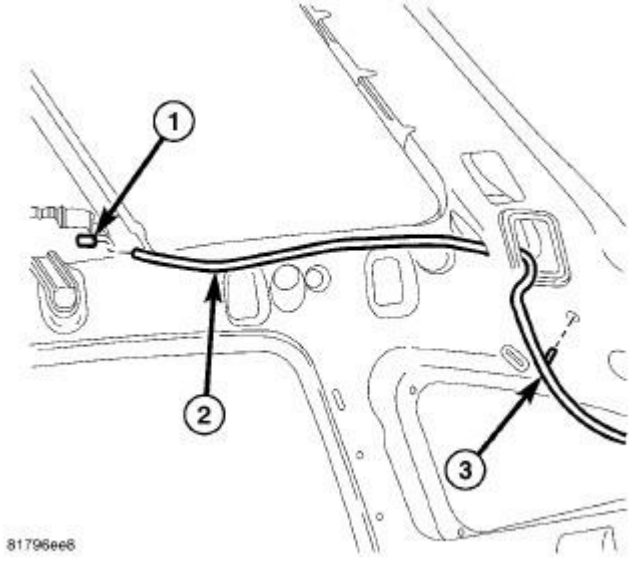


Fig. 268: Drain Tubes From Sunroof Housing

Courtesy of CHRYSLER LLC

3. Route the hose as required and connect the remaining support clips (3).
4. Connect the hoses (2) to the sunroof assembly (1).

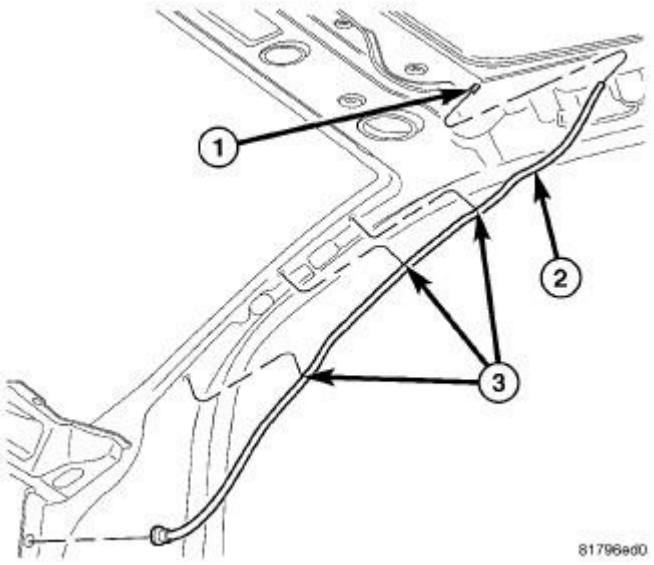


Fig. 269: FRONT HOSE
Courtesy of CHRYSLER LLC

5. Connect the front hose lower grommet to the body.
6. Connect the front hose (2) to the sunroof assembly (1) and connect the support clips (3).

BODY STRUCTURE

GAP AND FLUSH

Specifications

GAP AND FLUSH

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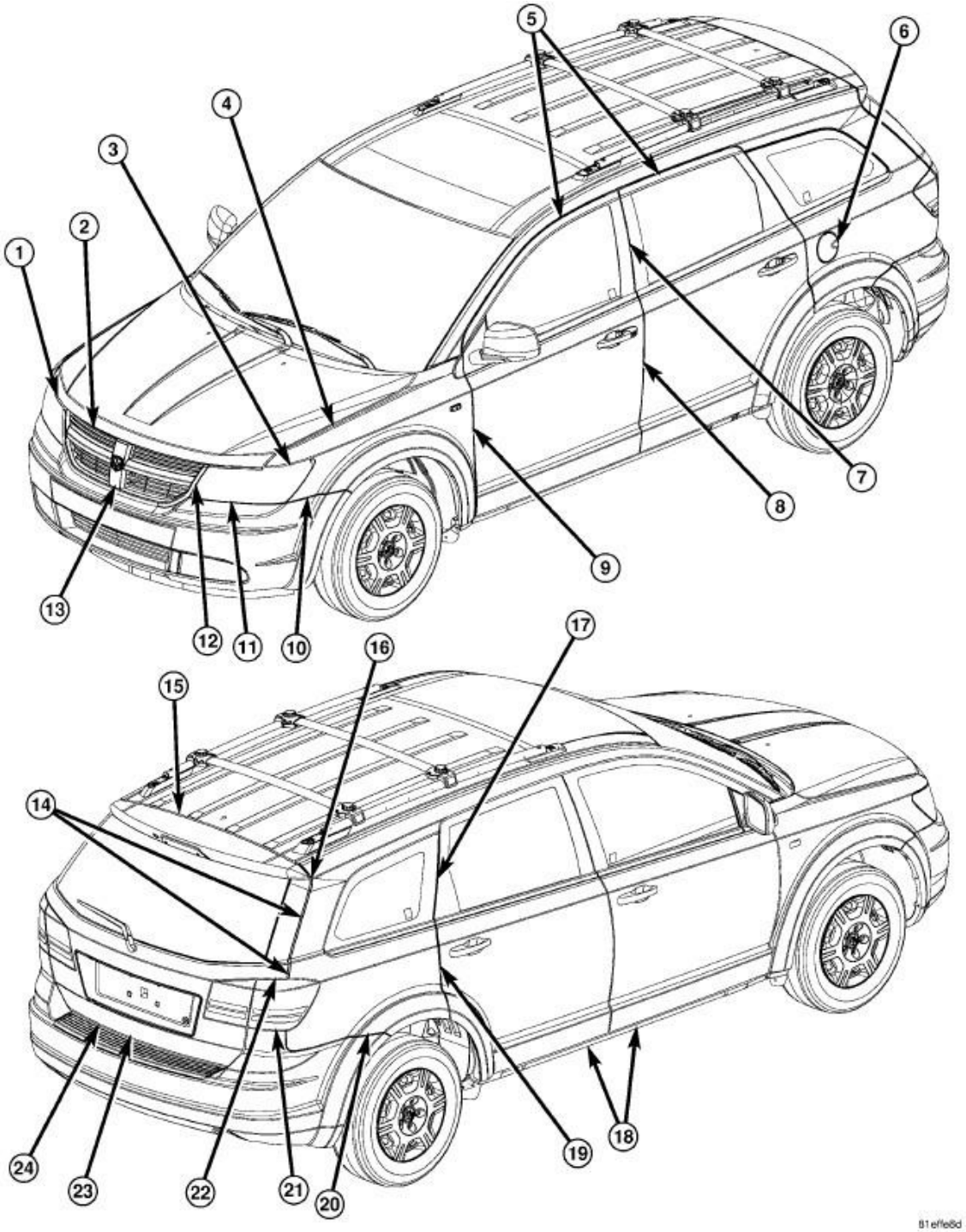

Fig. 270: GAP & FLUSH
Courtesy of CHRYSLER LLC

NOTE: All dimensions are in millimeters.

- **O/F = Over Flush**

- **U/F = Under Flush**
- **U/D = Up/Down**
- **F/A = Fore/Aft**

DIMENSION	DESCRIPTION	GAP	FLUSH
1	Headlamp to Hood	8.0 +/- 2.0 Parallel within 1.5	Headlamp U/F 2.5@Y= +/- 525 Headlamp U/F 3.5@Y=+/- 675 Consistent within 2.0
2	Hood to Grille	8.0 +/- 2.0	Grille U/F 1.8 +/- 2.0
3	Headlamp to Fender	2.0 +/- 1.5 Parallel within 2.0	Top: Headlamp U/F 2.0 @ Y = +/-725 2.5 @ Y = +/- 575 Side: Headlamp U/F 1.0 +/- 2.0 Consistent within 2.0
4	Fender to Hood	4.0 +/- 1.5 Parallel within 1.5 Symmetrical within 1.5 LH to RH 4.5 @ 10mm From Rear	Fender O/F 1.0 +/- 1.5 Consistent within 1.5
5	Front AND Rear Door Header to Body Side Aperture	4.0 +/- 1.5 Parallel within 1.5	Door U/F -1.6 +/- 1.5 Consistent within 1.5
6	Fuel Filler Door to Body Side Aperture	3.2 +/- 1.0 Parallel within 1.0	Door U/F 0.5 +/- 1.0 Consistent within 1.0
7	Front Door to Rear Door (Above Belt)	4.0 +/- 1.5 Parallel within 1.5	0.0 +/- 1.5 Consistent within 1.5
8	Front Door to Rear Door (Below Belt	4.0 +/- 1.5 Parallel within 1.5	Front Door O/F 1.0 +/-1.5 Consistent within 1.0
9	Fender to Front Door	4.25 +/- 1.5 Parallel within 1.0	Fender O/F 1.0 +/- 1.5 Consistent within 1.5
10	Fascia to Fender	Net to 1.0	Fascia U/F 1.0 +/- 1.0 Consistent within 1.5
11	Headlamp to Fascia	2.0 +/- 2.0 Parallel within 2.0	-
12	Headlamp to Grille	2.0 +/- 2.0 Parallel within 2.0	0.0 +/- 2.0 Consistent within 2.0
13	Grille to Fascia	2.0 +/- 2.0 Parallel within 2.0	-
			Lift Gate (Above Belt) U/F 2.0

14	Body Side Aperture to Lift Gate	5.0 +/- 1.5 Parallel within 1.5	Lift Gate (Below Belt U/F 1.0 +/- 1.5 Consistent within 1.5
15	Lift Gate to Roof	6.2 +/- 1.5 Parallel within 1.5	Lift Gate U/F 2.0 +/- 1.5 Consistent within 1.5
16	Lift Gate to Body Side Aperture	6.2 +/- 1.5 Parallel within 1.5	Lift Gate U/F 2.0 +/- 1.5 Consistent within 1.5
17	Quarter Glass to Rear Door	4.0 +/- 2.0 Parallel within 2.0	Glass U/F 2.0 @ Z = 1150 Glass U/F 1.5 @ Z = 900 +/- 2.0 Consistent within 2.0
18	Front AND Rear Door to Body Side Aperture Sill	6.0 +/- 2.5 Parallel within 2.0	-
19	Rear Door to Body Side Aperture	4.0 +/- 1.5 Parallel within 1.5	Rear Door O/F 1.0 +/- 1.5 Consistent within 1.5
20	Fascia to Body Side Aperture	Net to 1.0	Fascia U/F 1.0 +/- 1.0 Consistent within 1.5
21	Body Side Aperture Tail Lamp to Fascia	2.0 +/- 2.0 Parallel within 2.0	Tail Lamp U/F 0.0 to 1.5 +/- 2.0 Consistent within 2.0
22	Body Side Aperture Tail Lamp to Lift Gate	3.7 +/- 2.0 Parallel within 1.0	Lift Gate O/F 1.0 +/- 2.0 Consistent within 1.0
23	Lift Gate to Fascia	U/D 8.0 +/- 2.0 Parallel within 2.0	-
24	Lift Gate to Fascia	Cross/Car 4.2 +/- 1.5 Parallel within 2.0	Liftgate U/F 1.0 +/- 1.5 Consistent within 2.0

OPENING DIMENSIONS

Specifications

BODY OPENING DIMENSIONS

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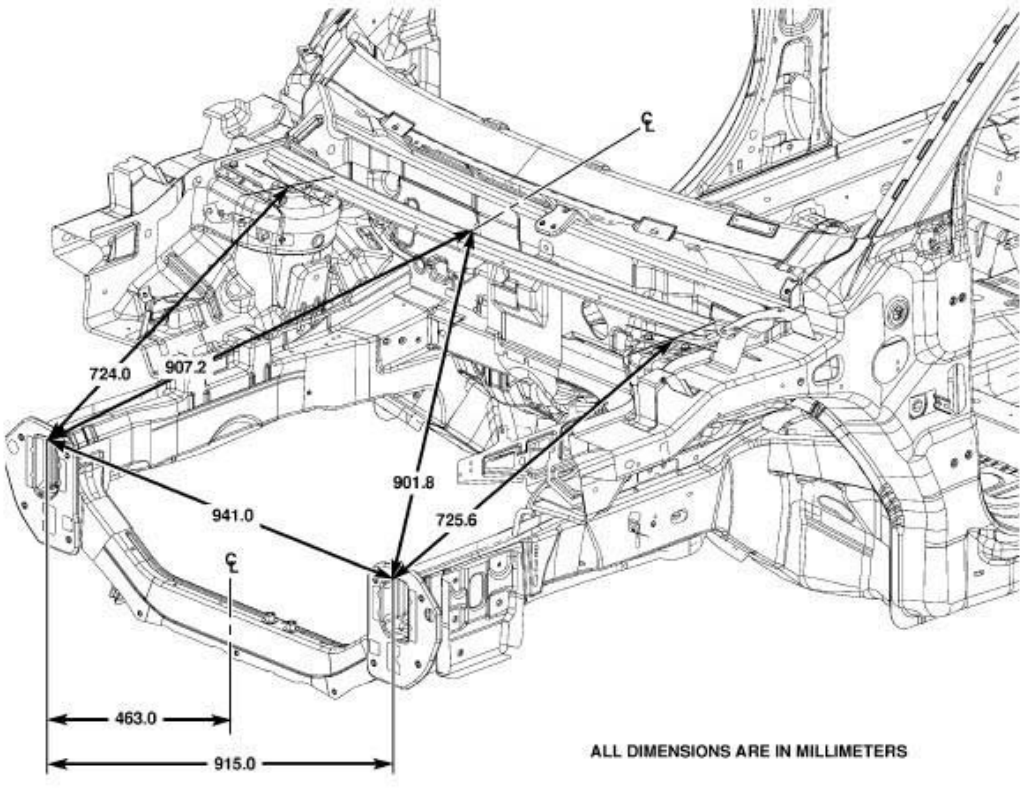

Fig. 271: ENGINE BOX
Courtesy of CHRYSLER LLC

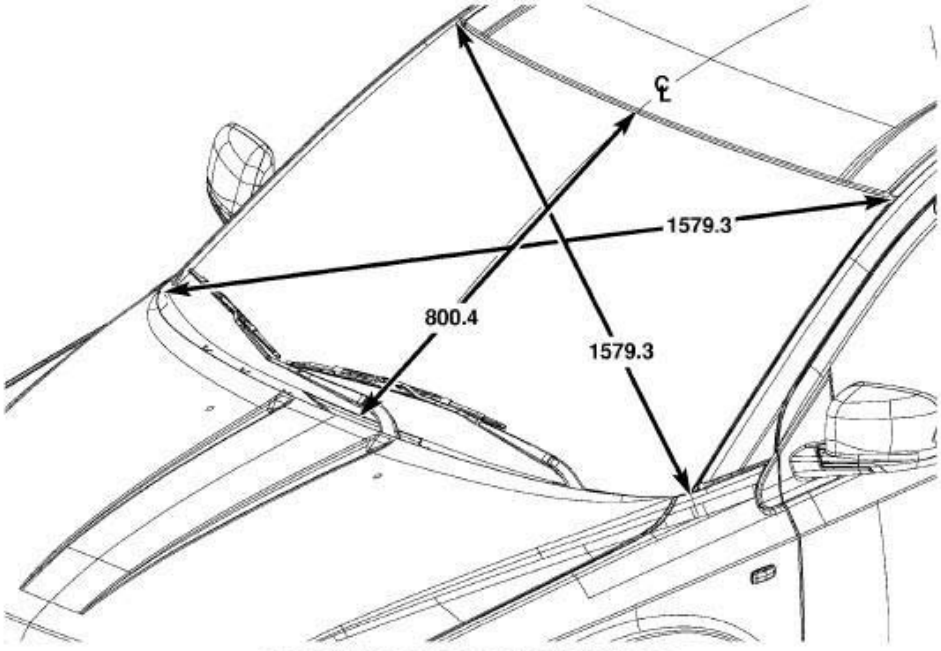

Fig. 272: WINDSHIELD
Courtesy of CHRYSLER LLC

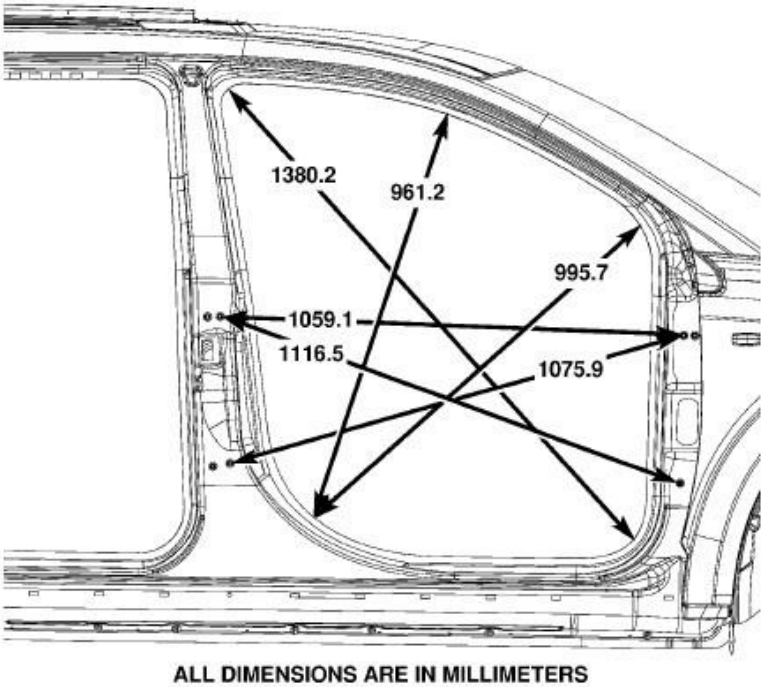

Fig. 273: FRONT DOOR
Courtesy of CHRYSLER LLC

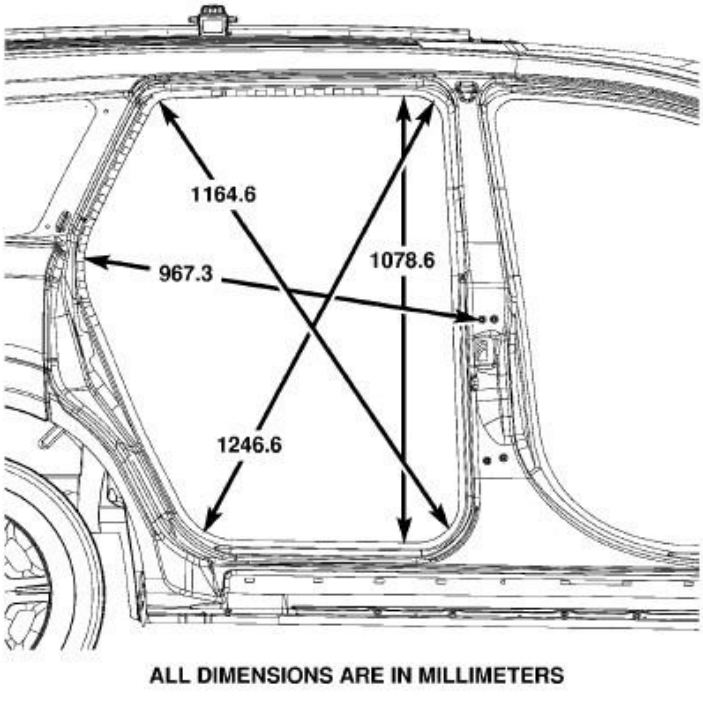

Fig. 274: REAR DOOR

Courtesy of CHRYSLER LLC

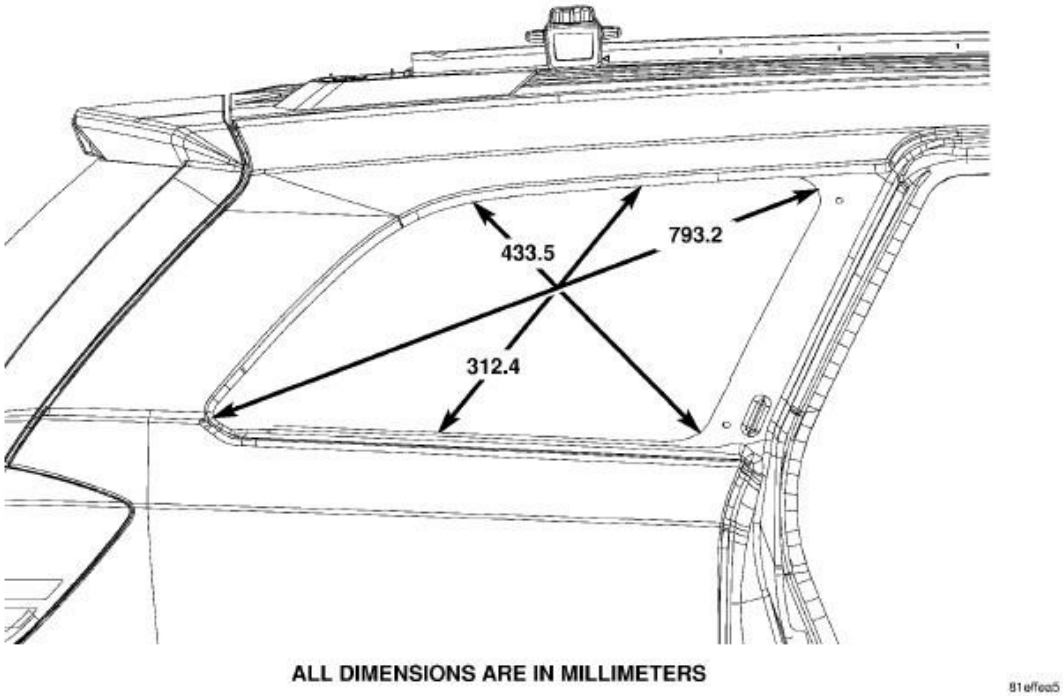

Fig. 275: REAR QUARTER WINDOW
Courtesy of CHRYSLER LLC

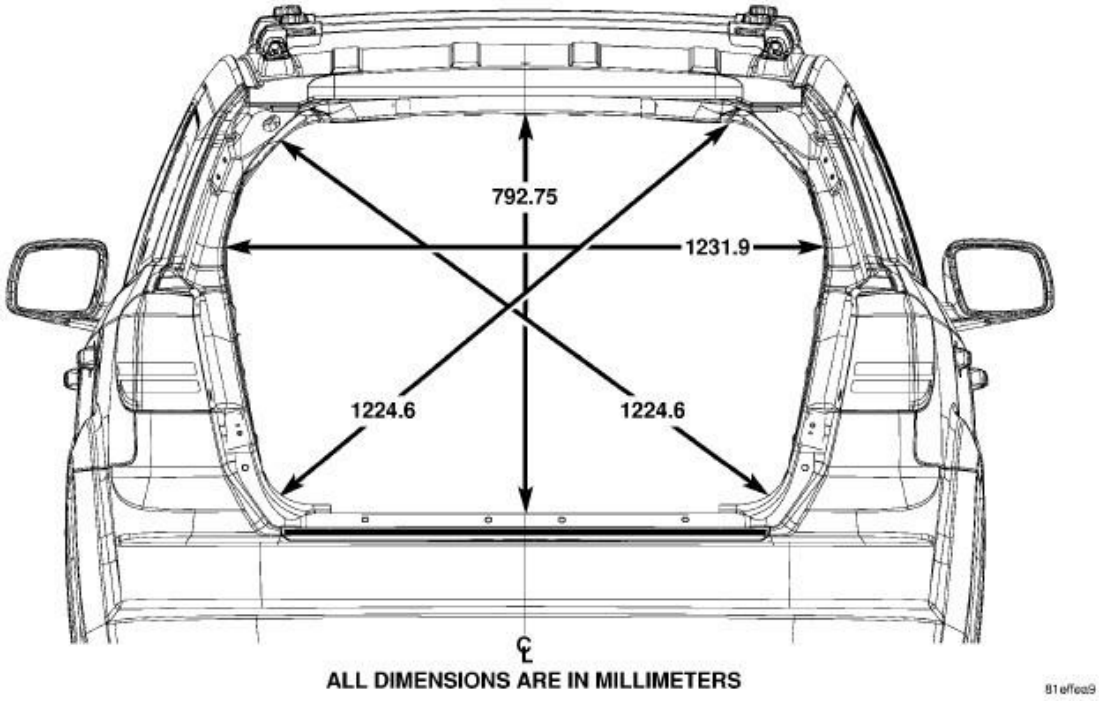

Fig. 276: LIFTGATE
Courtesy of CHRYSLER LLC

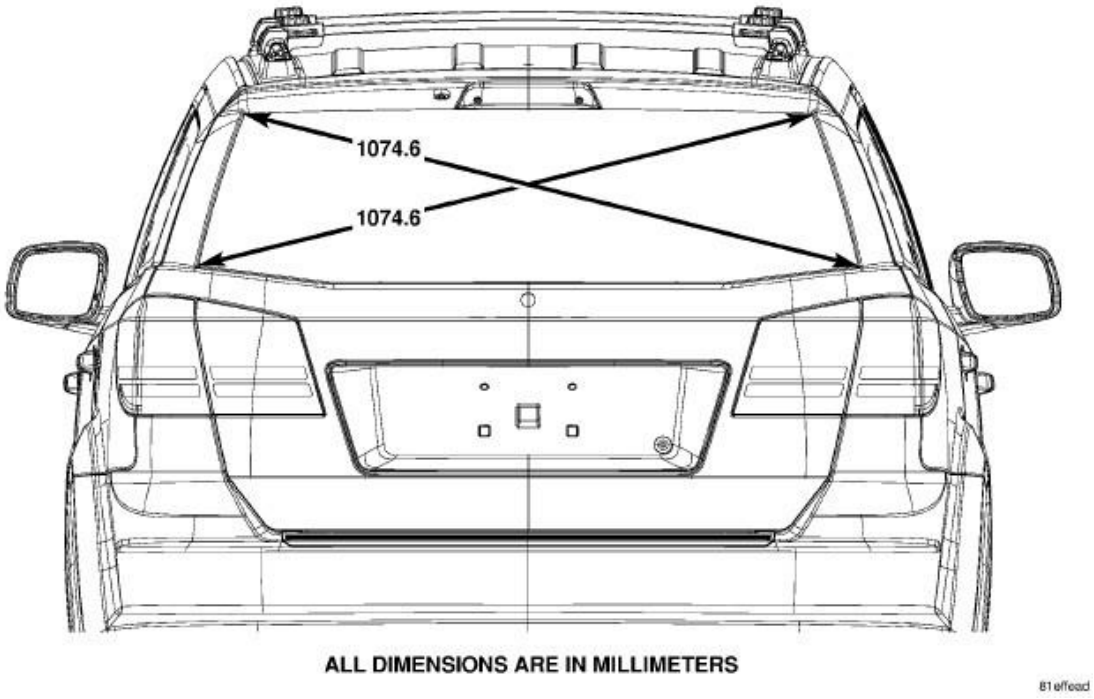

Fig. 277: LIFTGATE WINDOW
Courtesy of CHRYSLER LLC

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Specifications

BODY SEALER LOCATIONS

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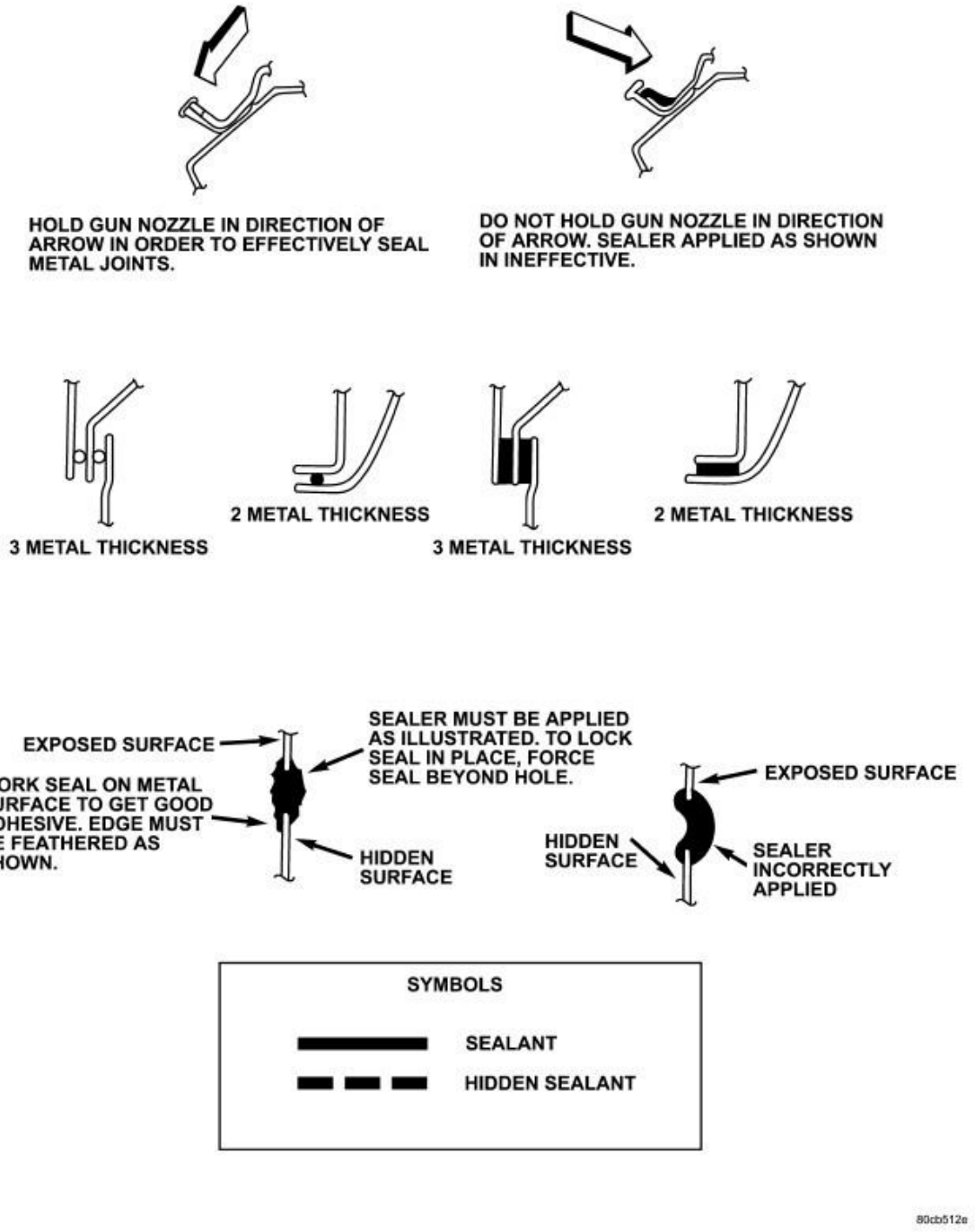

Fig. 278: APPLICATION METHODS
Courtesy of CHRYSLER LLC

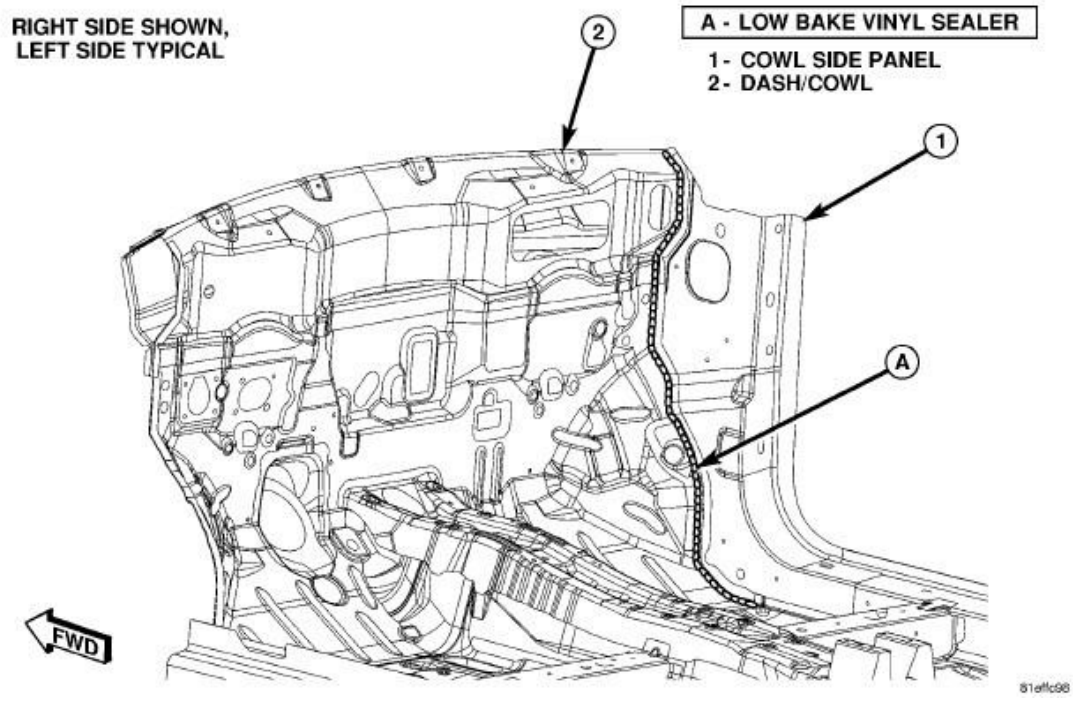

Fig. 279: COWL SIDE TO DASH PANEL
Courtesy of CHRYSLER LLC

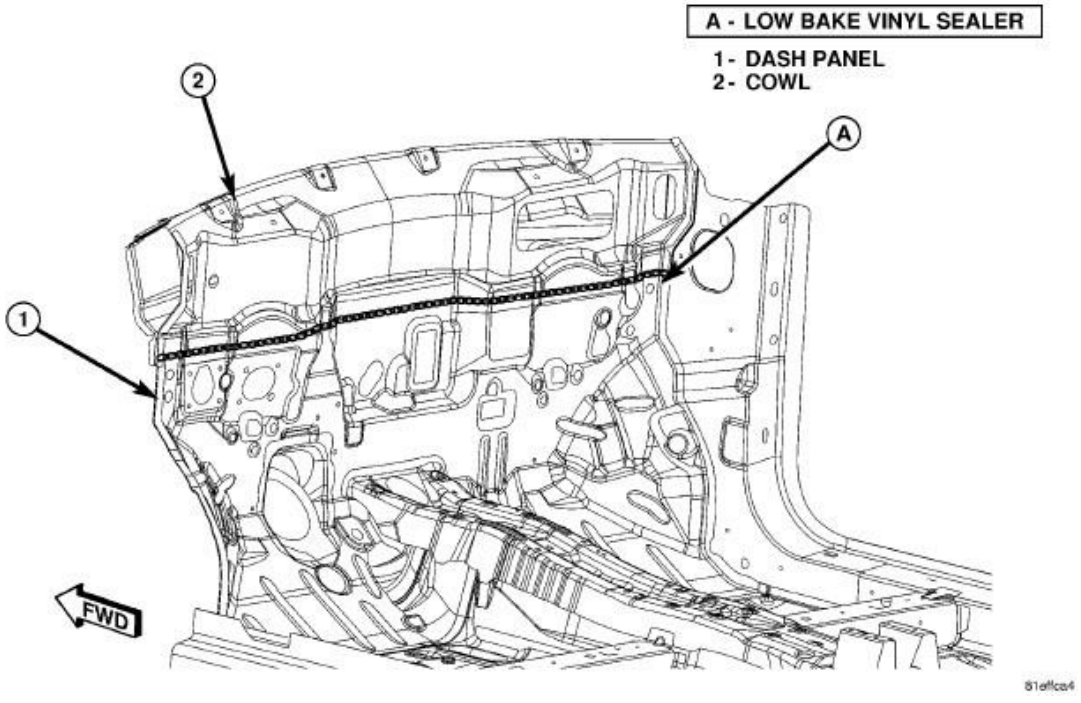

Fig. 280: DASH TO COWL
Courtesy of CHRYSLER LLC

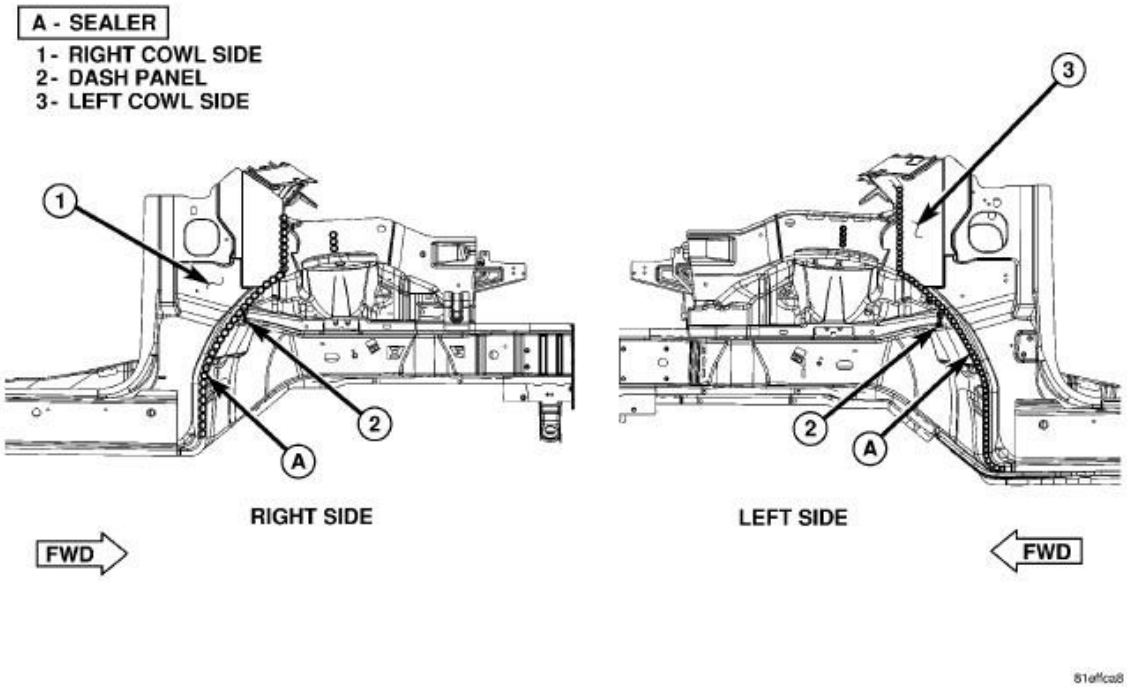

Fig. 281: COWL SIDE TO DASH PANEL
Courtesy of CHRYSLER LLC

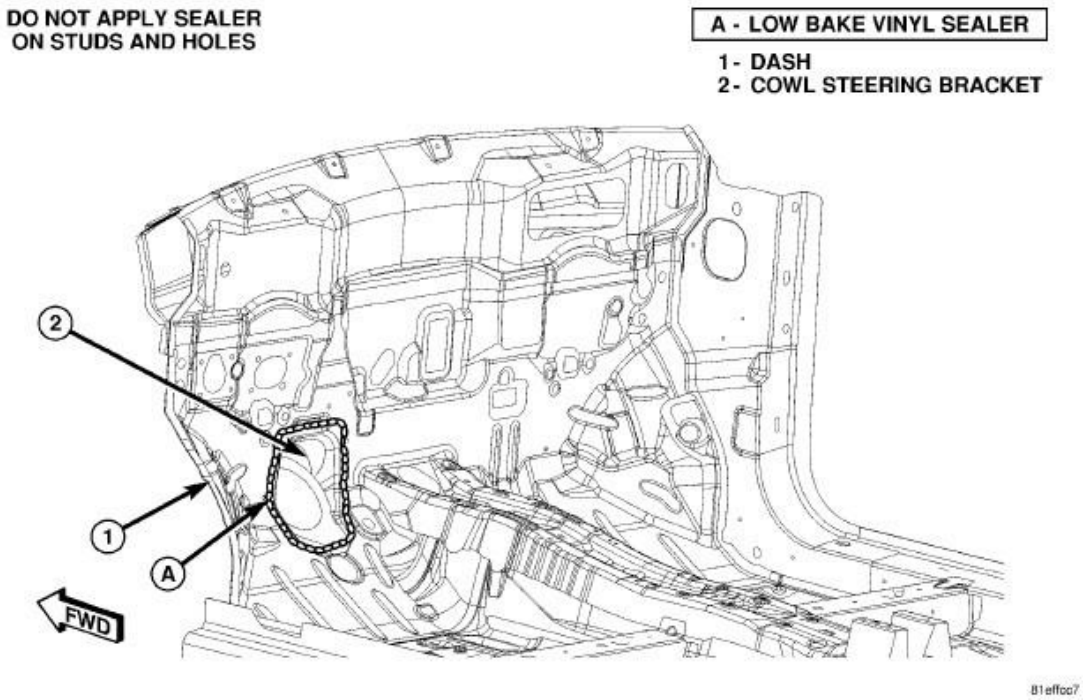

Fig. 282: DASH TO COWL STEERING BRACKET
Courtesy of CHRYSLER LLC

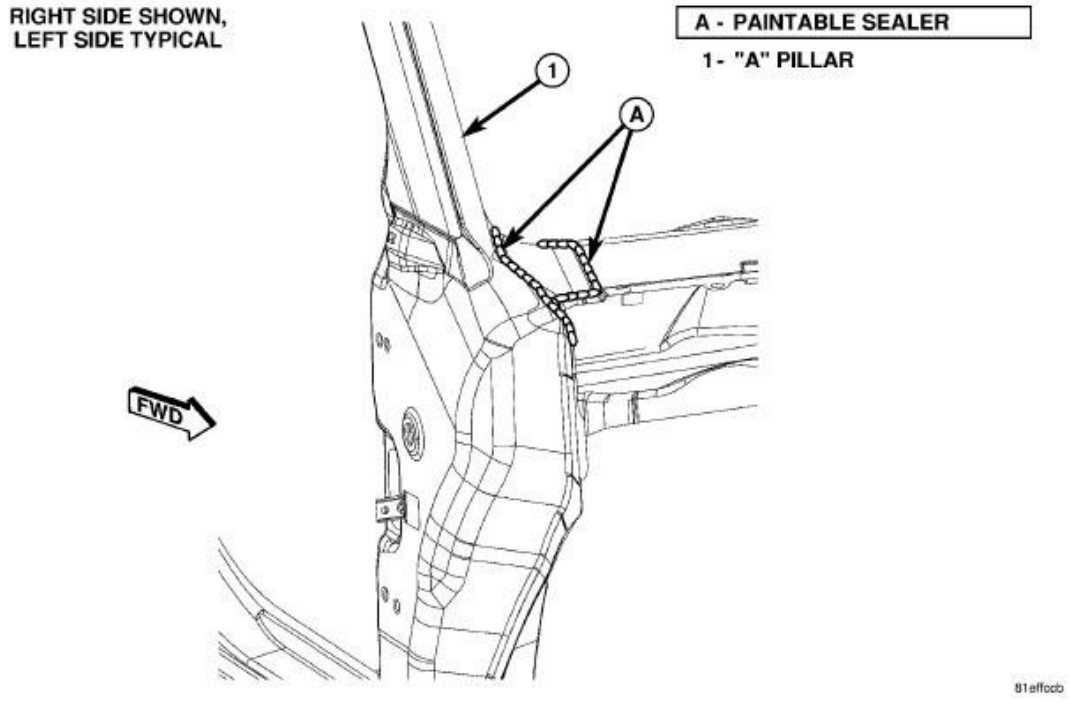

Fig. 283: A-PILLAR
Courtesy of CHRYSLER LLC

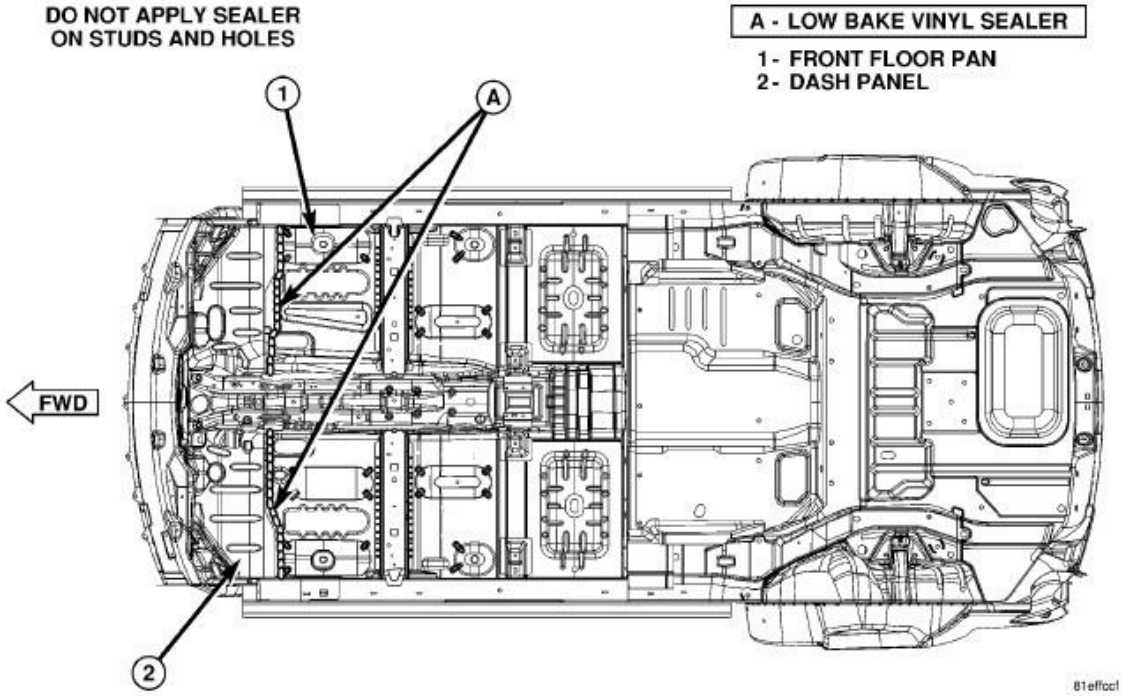

Fig. 284: FRONT FLOOR PAN TO DASH
Courtesy of CHRYSLER LLC

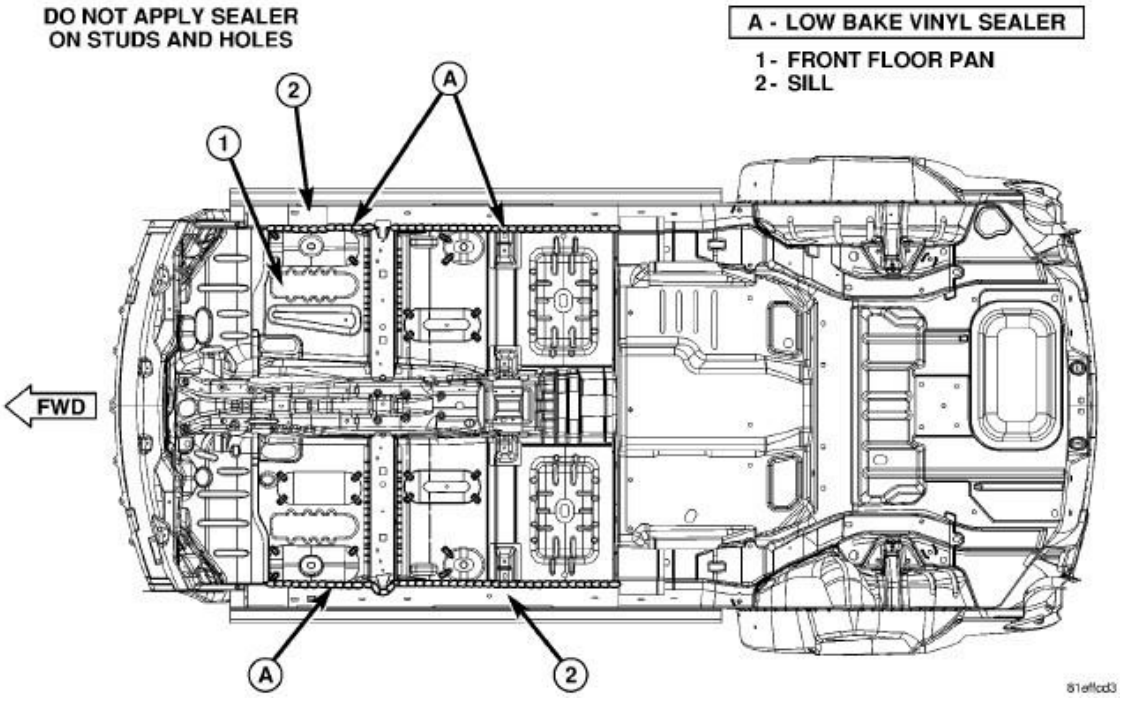

Fig. 285: FRONT FLOOR PAN TO SILL
Courtesy of CHRYSLER LLC

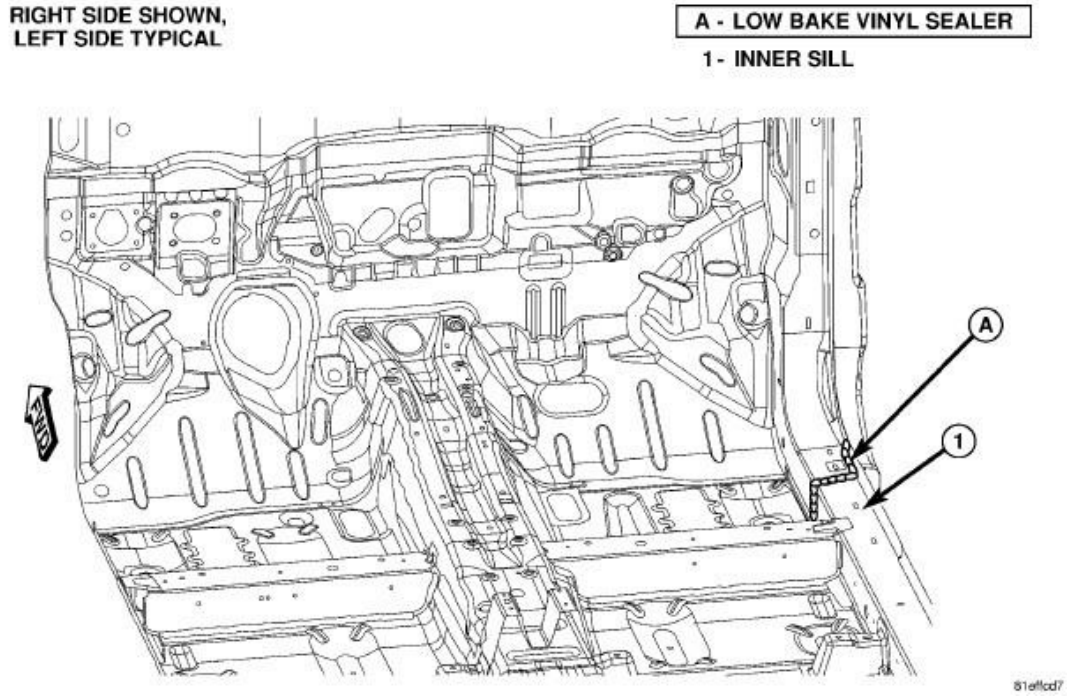

Fig. 286: INNER SILL
Courtesy of CHRYSLER LLC

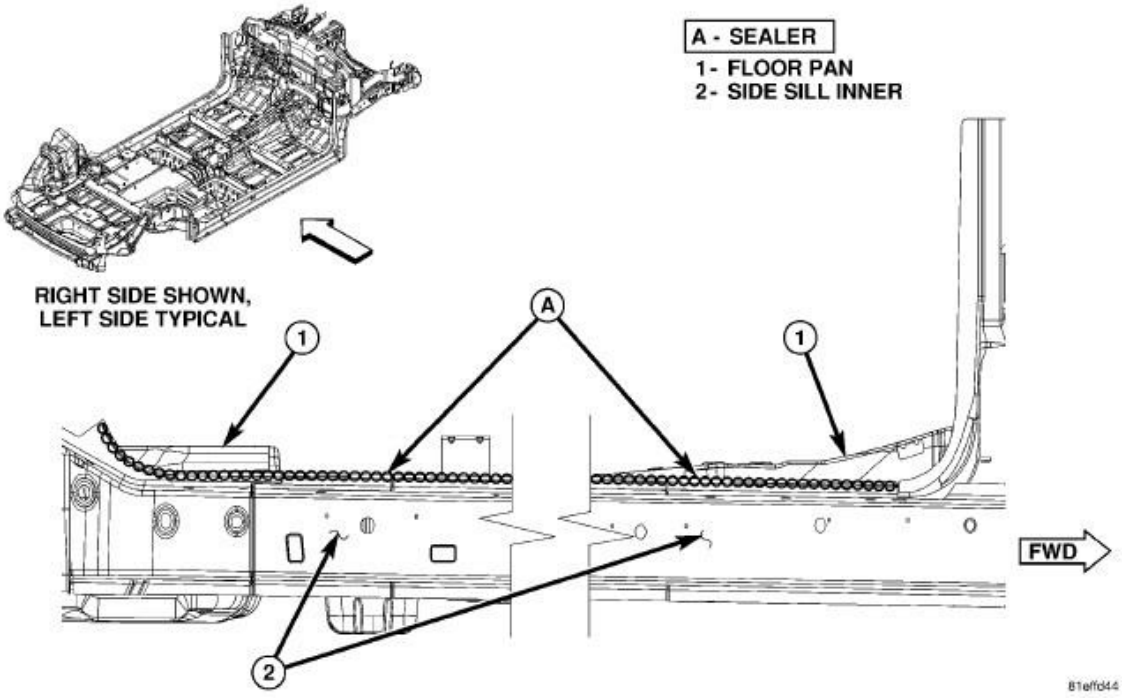

Fig. 287: SIDE SILL TO FLOOR PAN
Courtesy of CHRYSLER LLC

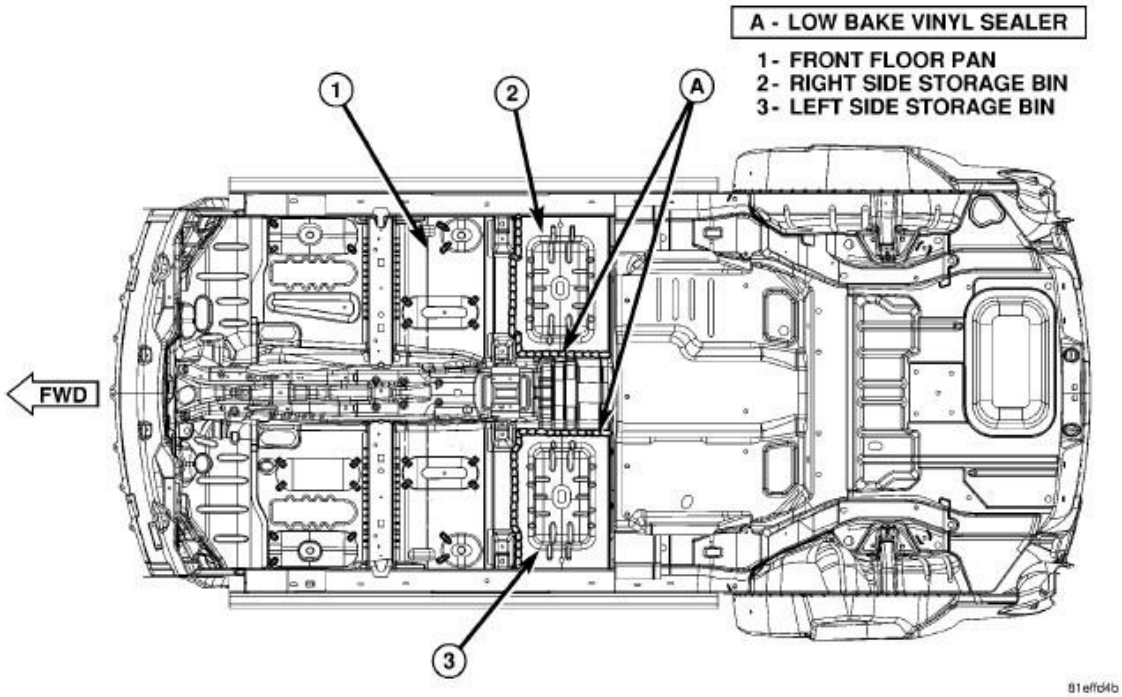

Fig. 288: FRONT FLOOR TO STORAGE BINS
Courtesy of CHRYSLER LLC

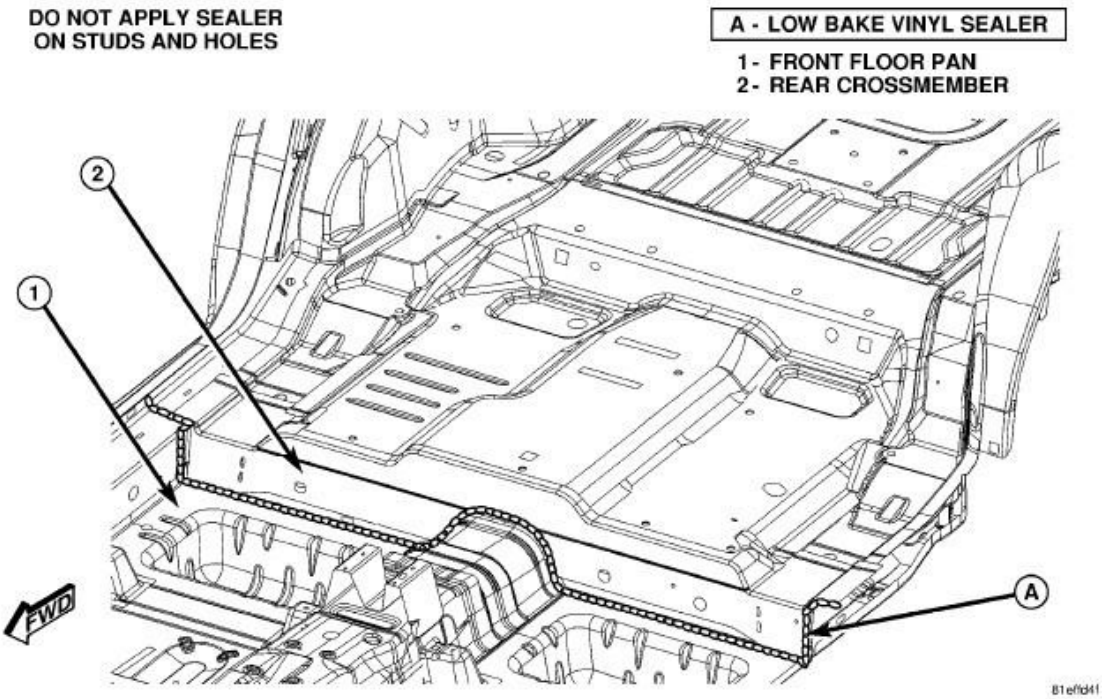

Fig. 289: FRONT FLOOR PAN TO REAR CROSSMEMBER
Courtesy of CHRYSLER LLC

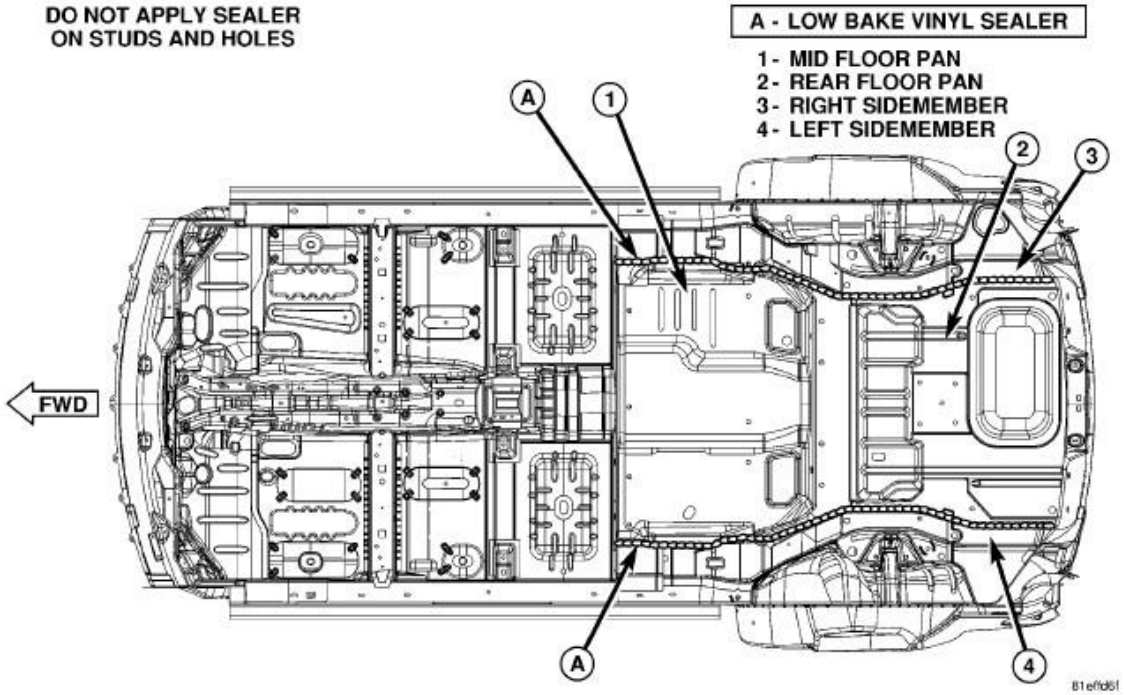

Fig. 290: MID FLOOR/REAR FLOOR PAN TO SIDEMEMBER
Courtesy of CHRYSLER LLC

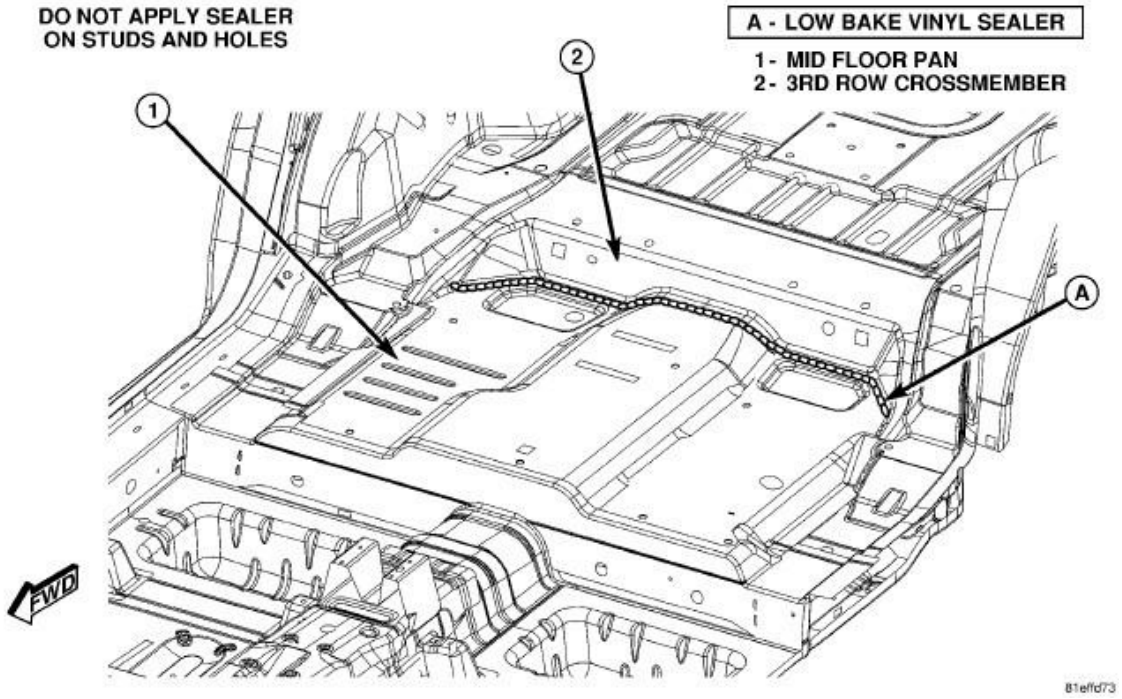

Fig. 291: MID FLOOR PAN TO 3RD ROW CROSSMEMBER
Courtesy of CHRYSLER LLC

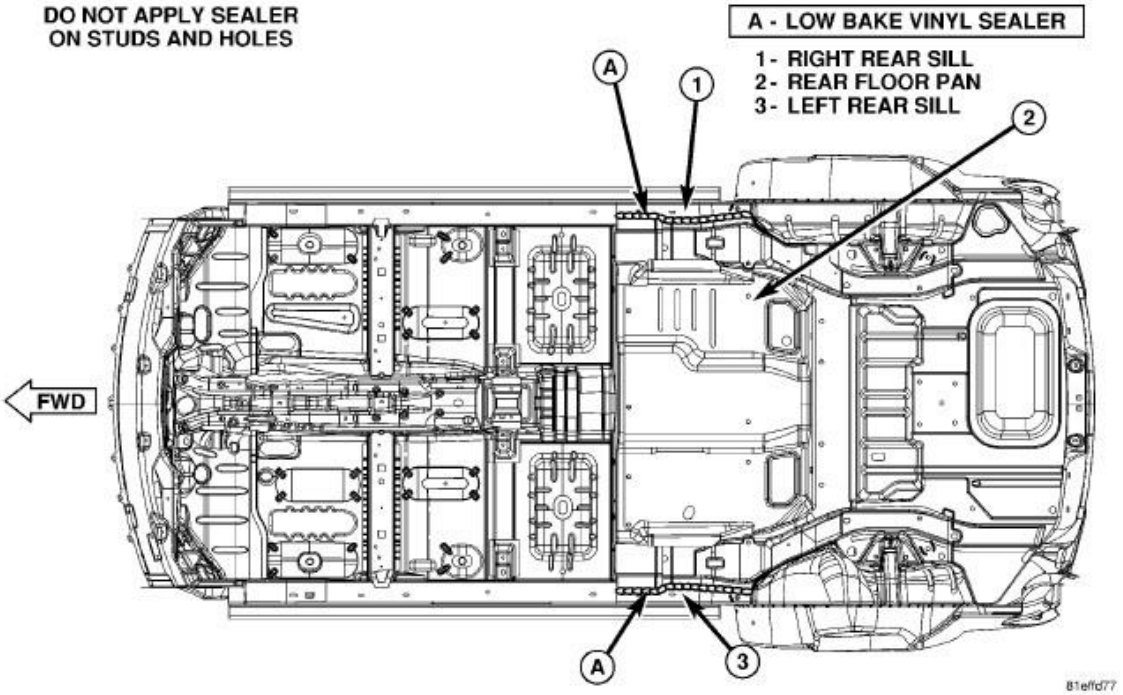

Fig. 292: REAR SILL TO REAR FLOOR PAN
Courtesy of CHRYSLER LLC

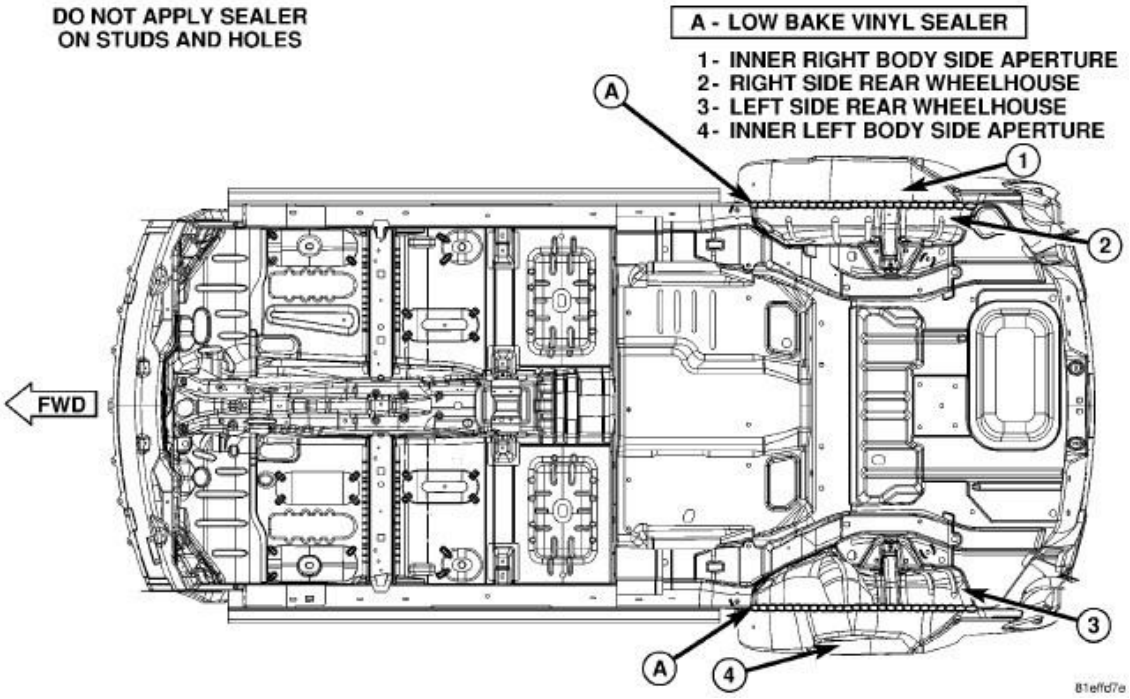

Fig. 293: REAR WHEEL HOUSE TO BODY SIDE APERTURE INNER
Courtesy of CHRYSLER LLC

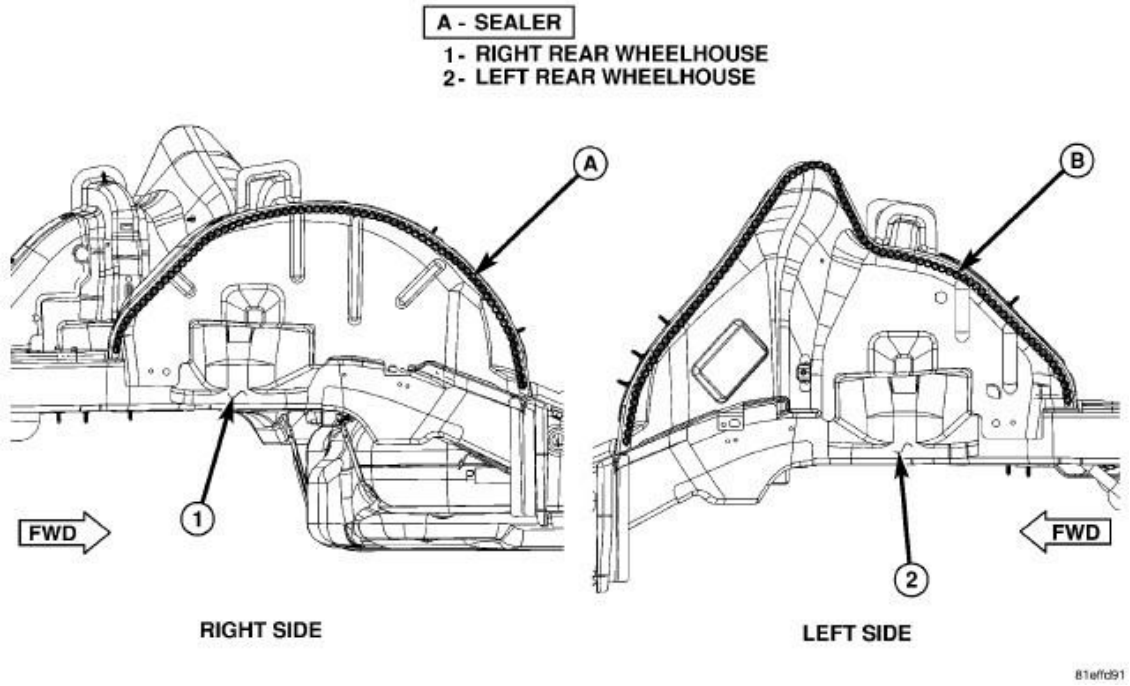

Fig. 294: INNER WHEELHOUSE TO INNER BODY SIDE APERTURE
Courtesy of CHRYSLER LLC

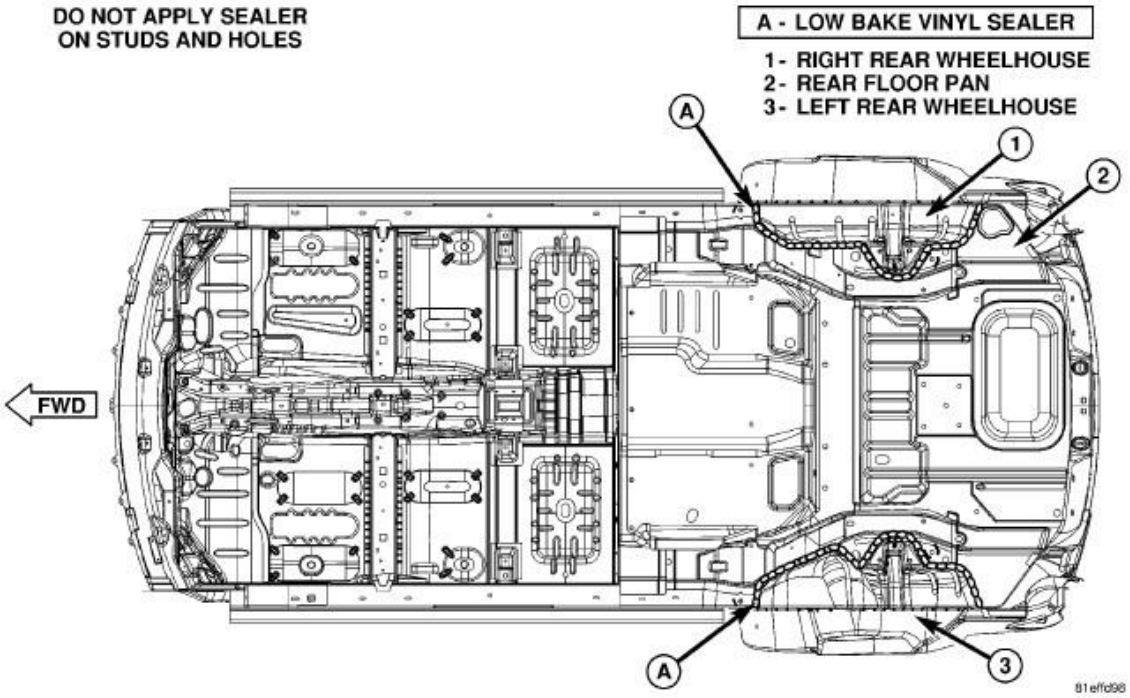

Fig. 295: REAR WHEELHOUSE TO REAR FLOOR PAN
Courtesy of CHRYSLER LLC

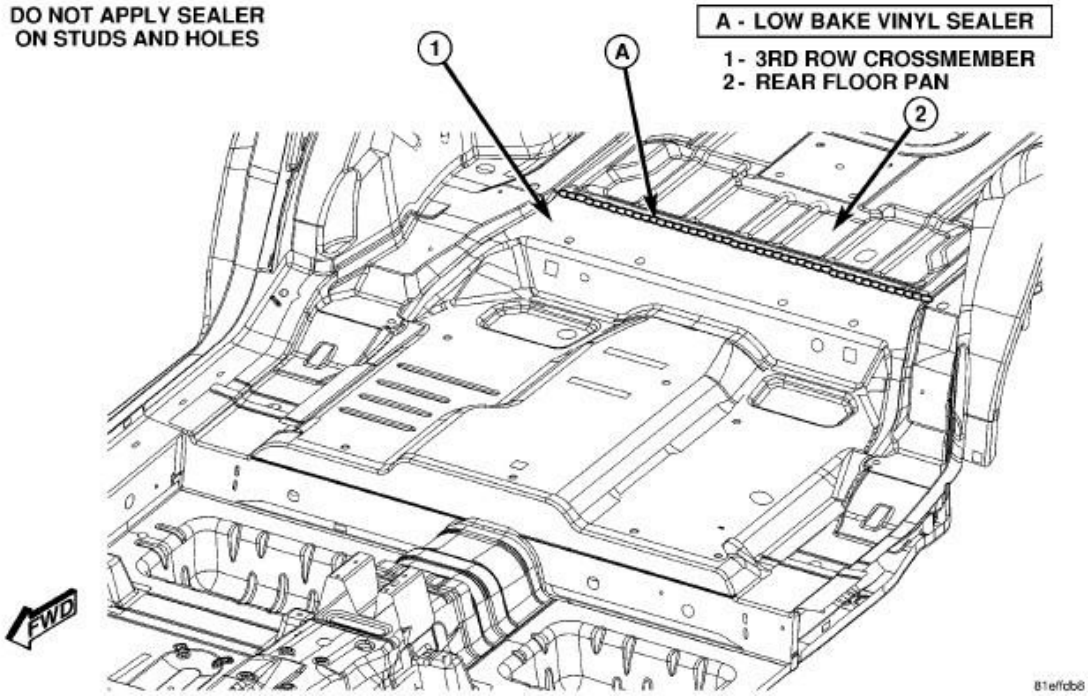

Fig. 296: 3RD ROW CROSSMEMBER TO REAR FLOOR PAN
Courtesy of CHRYSLER LLC

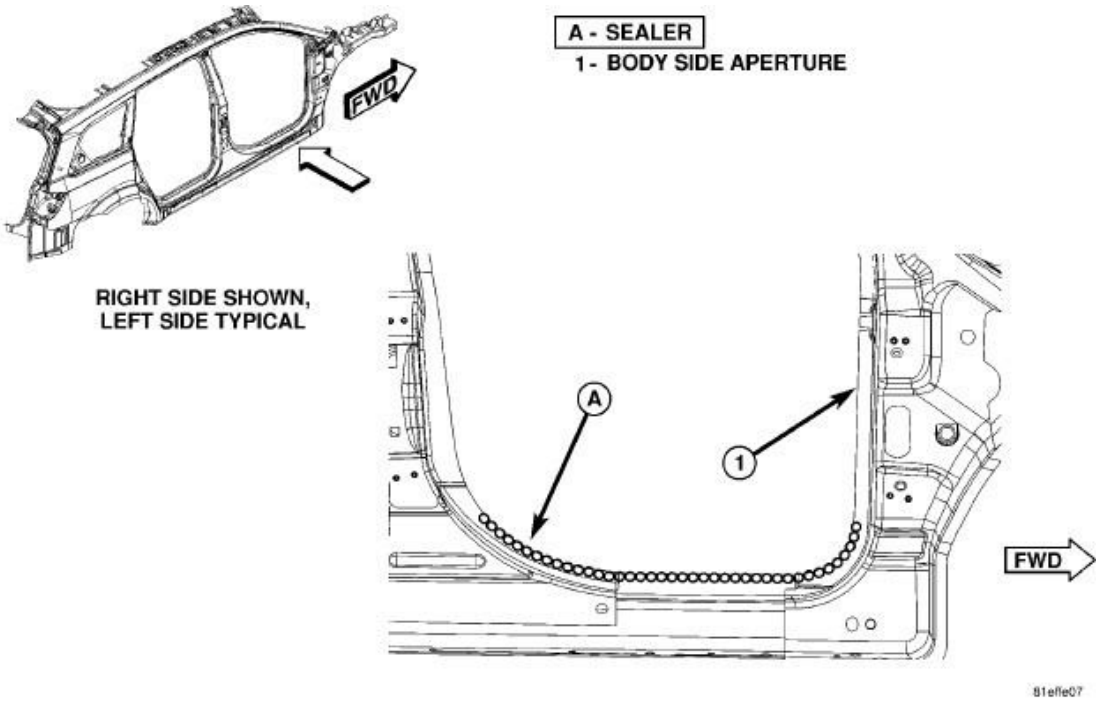

Fig. 297: BODY SIDE APERTURE - LOWER FRONT DOOR OPENING
Courtesy of CHRYSLER LLC

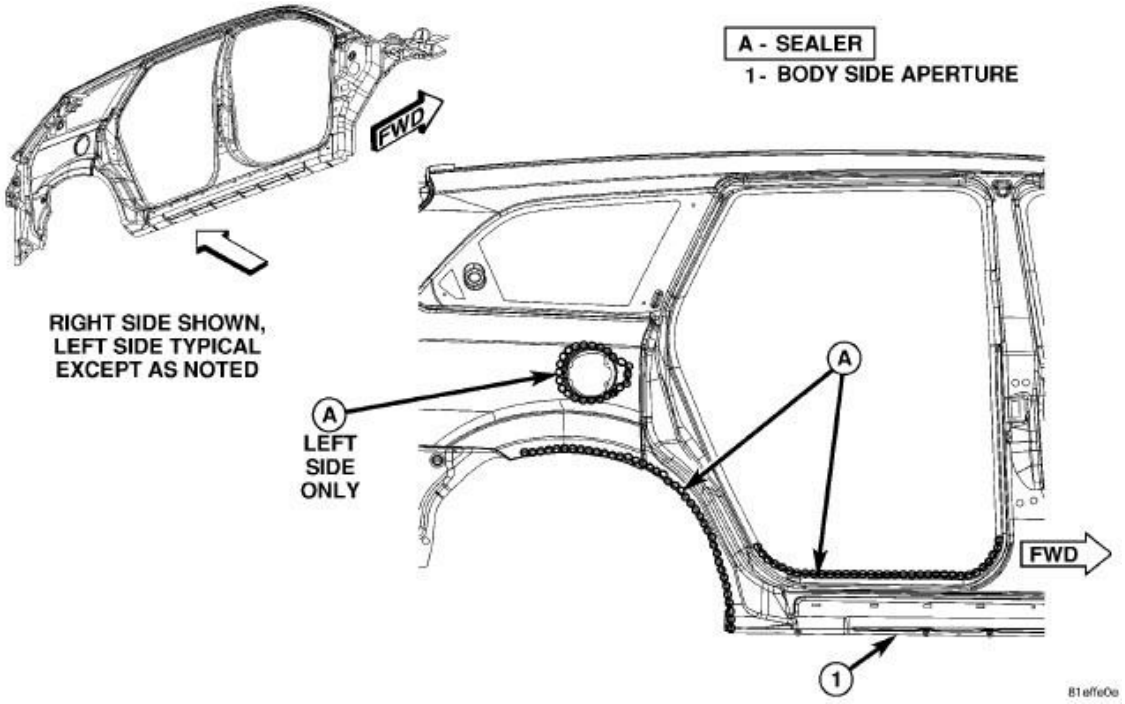

Fig. 298: BODY SIDE APERTURE - REAR
Courtesy of CHRYSLER LLC

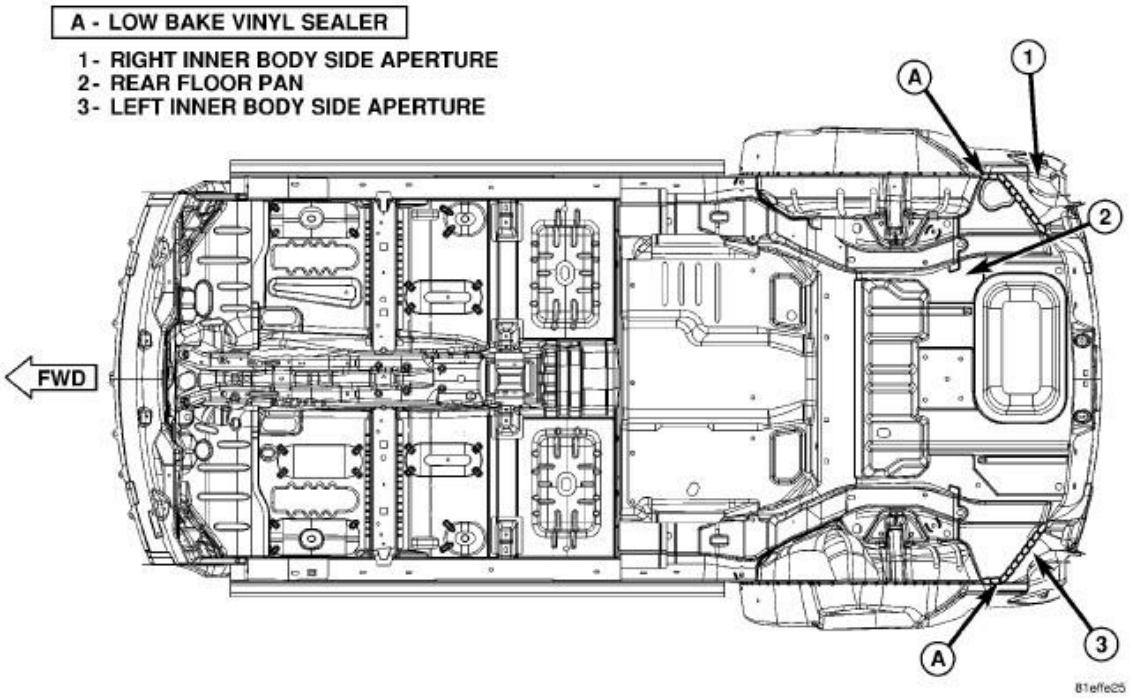

Fig. 299: REAR FLOOR PAN TO BODY SIDE APERTURE INNER
Courtesy of CHRYSLER LLC

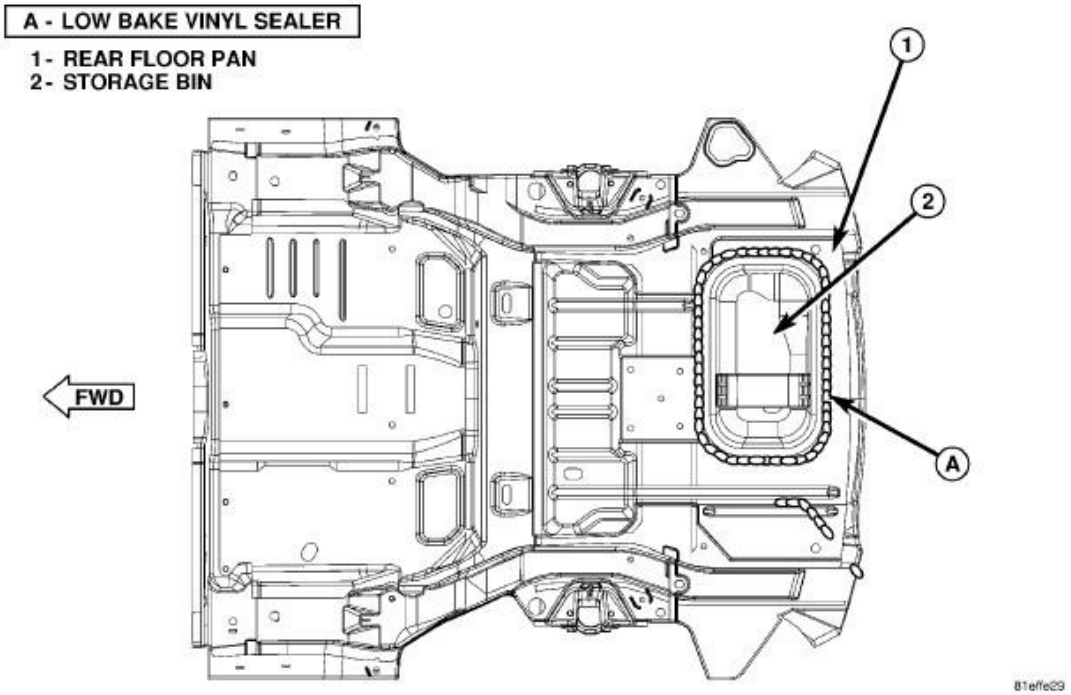

Fig. 300: STORAGE BIN REAR FLOOR
Courtesy of CHRYSLER LLC

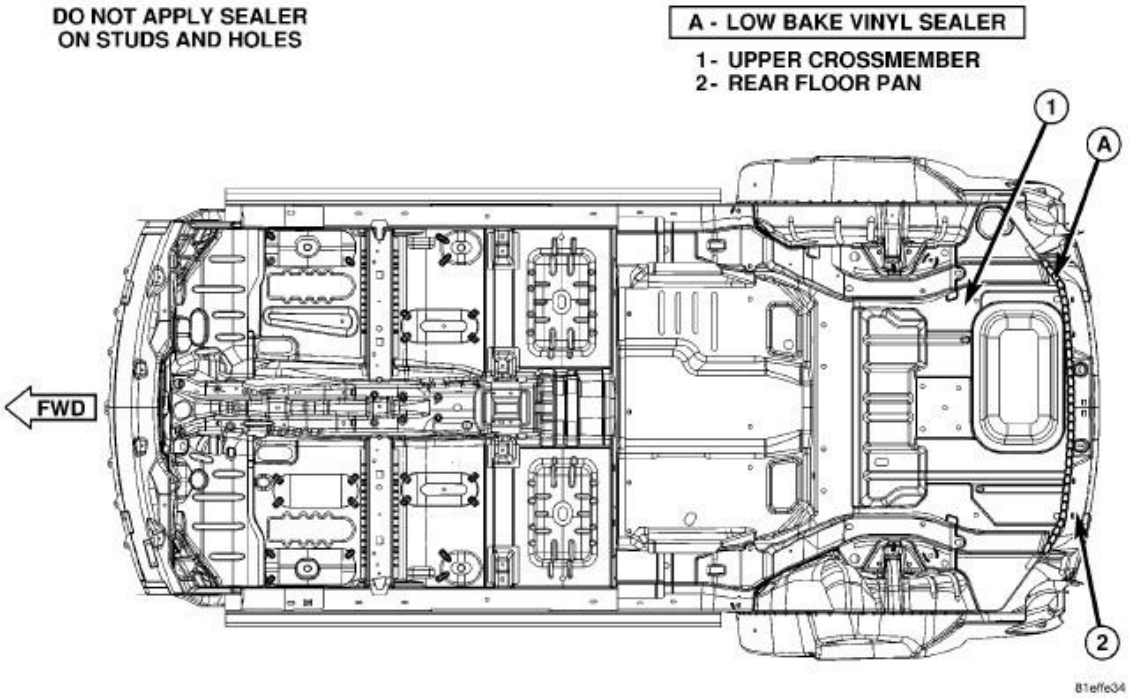

Fig. 301: UPPER CROSSMEMBER TO REAR FLOOR PAN
Courtesy of CHRYSLER LLC

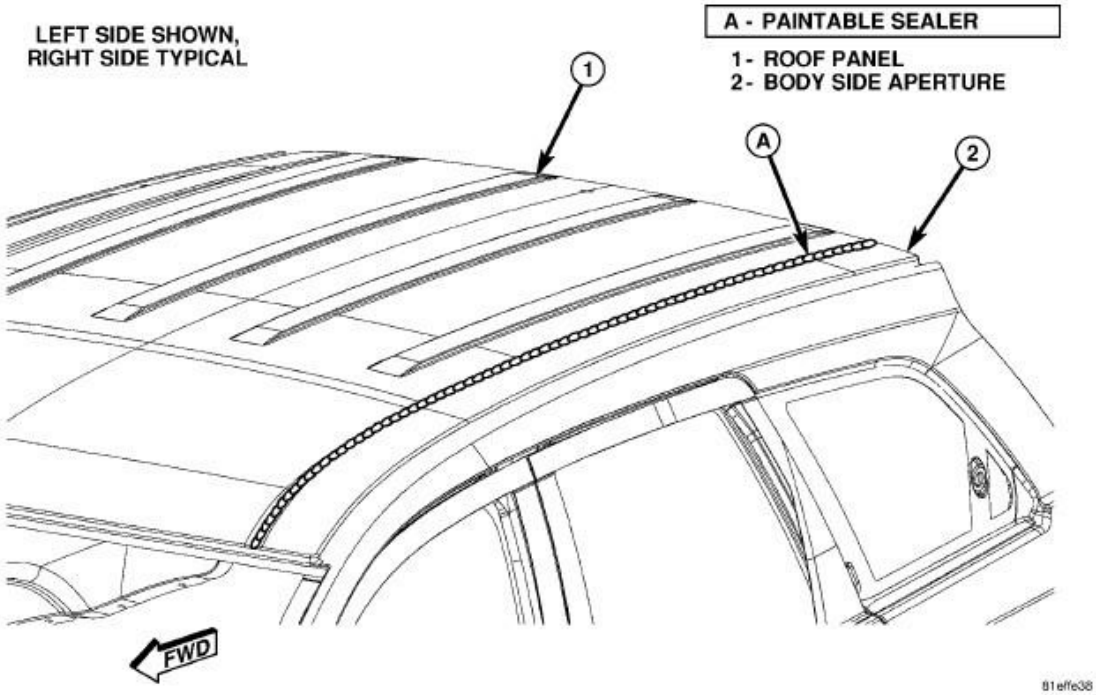

Fig. 302: BODY SIDE APERTURE TO ROOF PANEL
Courtesy of CHRYSLER LLC

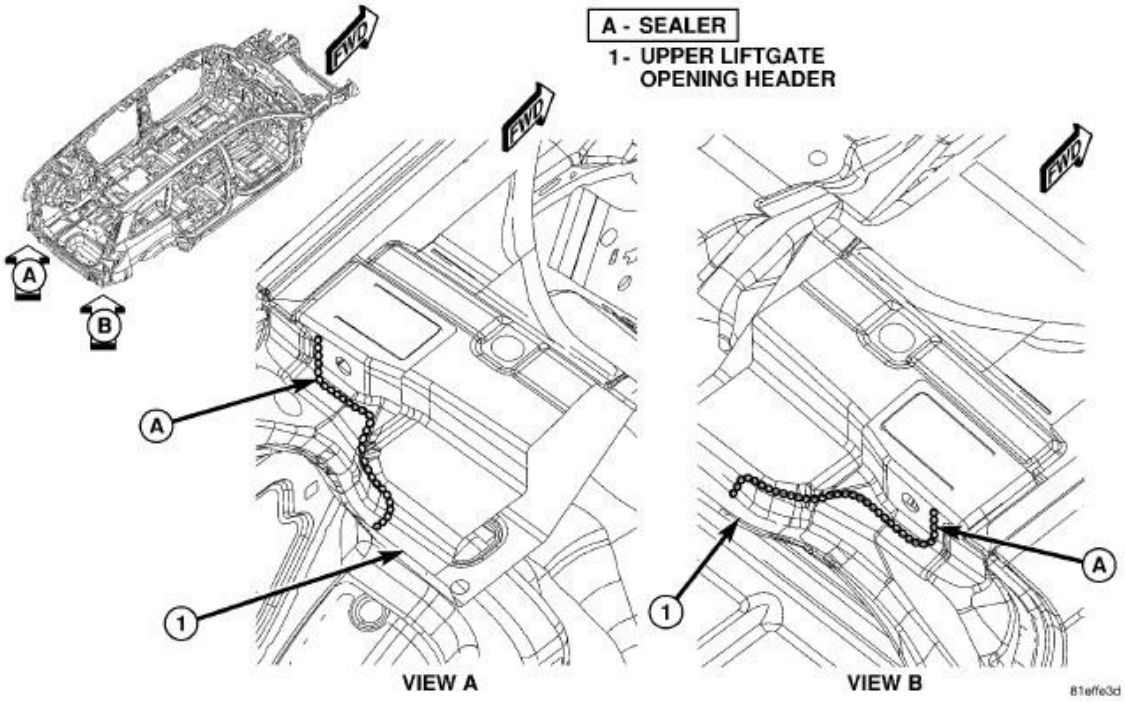

Fig. 303: UPPER LIFTGATE OPENING
Courtesy of CHRYSLER LLC

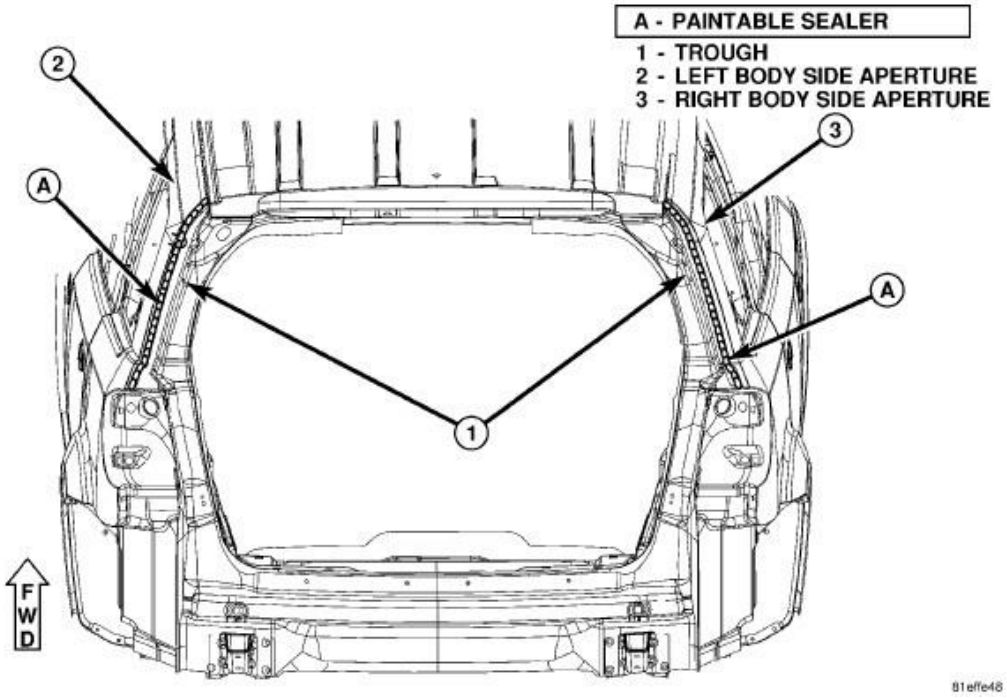

Fig. 304: BODY SIDE APERTURE TO DRAIN CHANNEL
Courtesy of CHRYSLER LLC

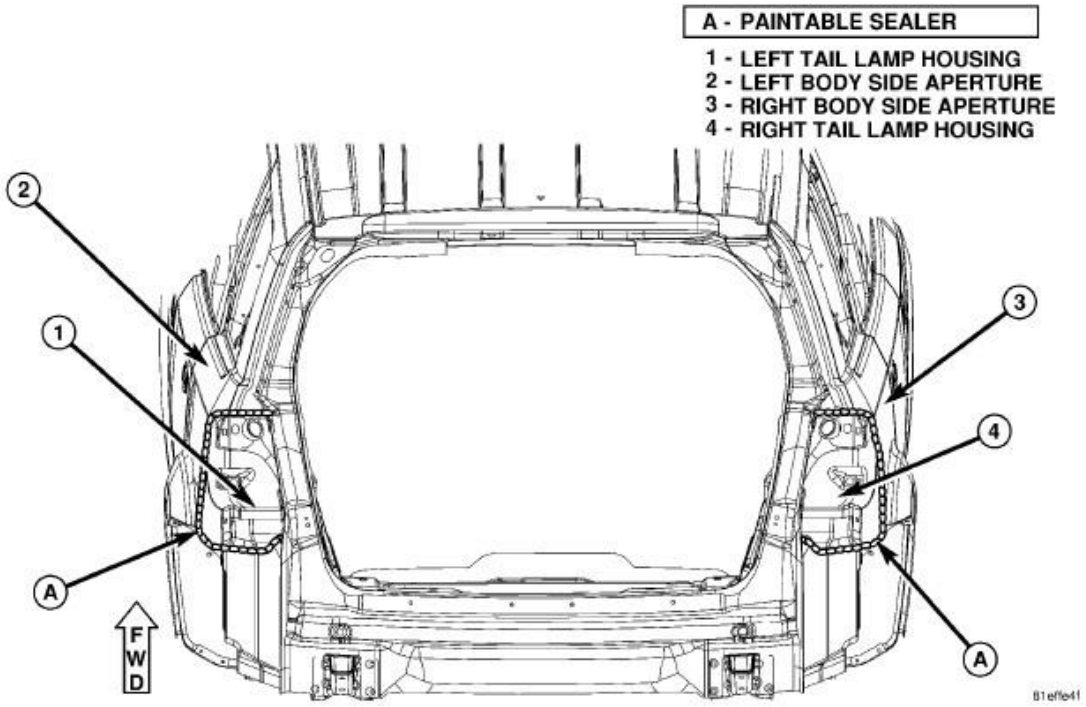

Fig. 305: BODY SIDE APERTURE TO TAIL LAMP HOUSING PANEL
Courtesy of CHRYSLER LLC

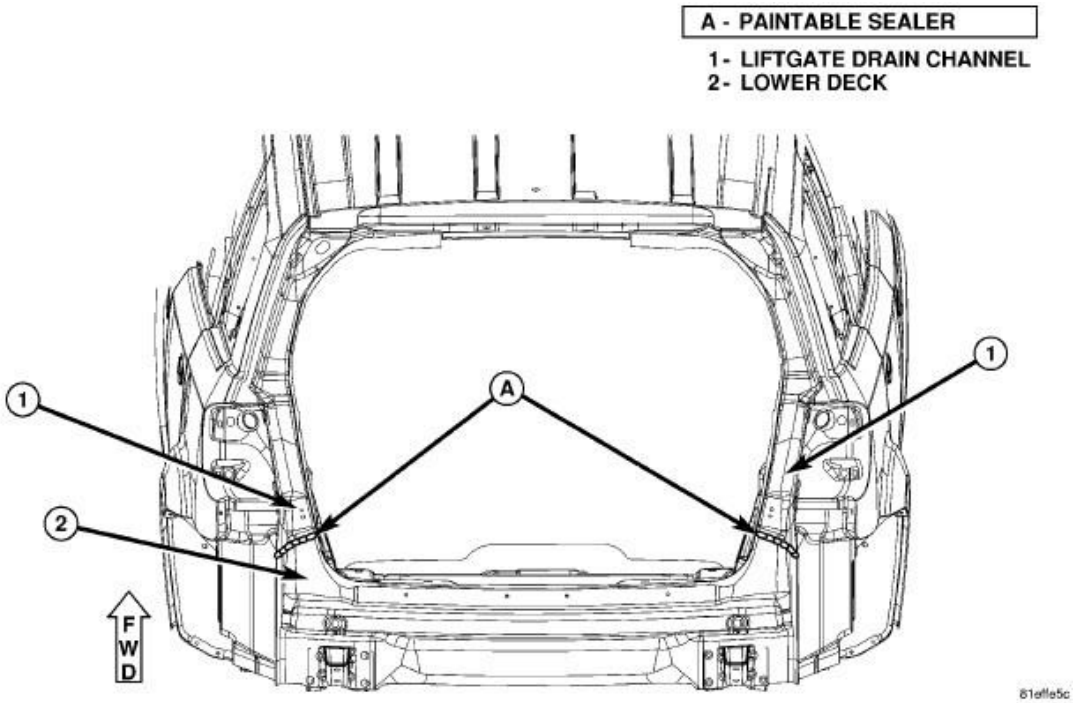

Fig. 306: LIFTGATE DRAIN CHANNEL TO LOWER DECK
Courtesy of CHRYSLER LLC

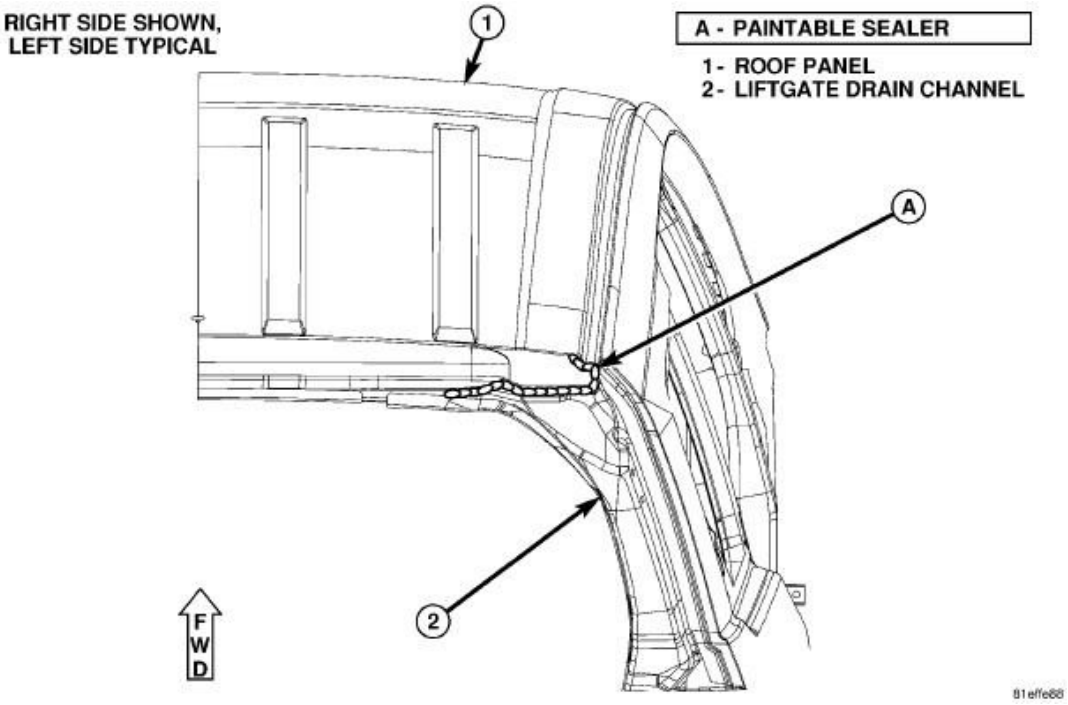

Fig. 307: ROOF TO LIFTGATE DRAIN CHANNEL
Courtesy of CHRYSLER LLC

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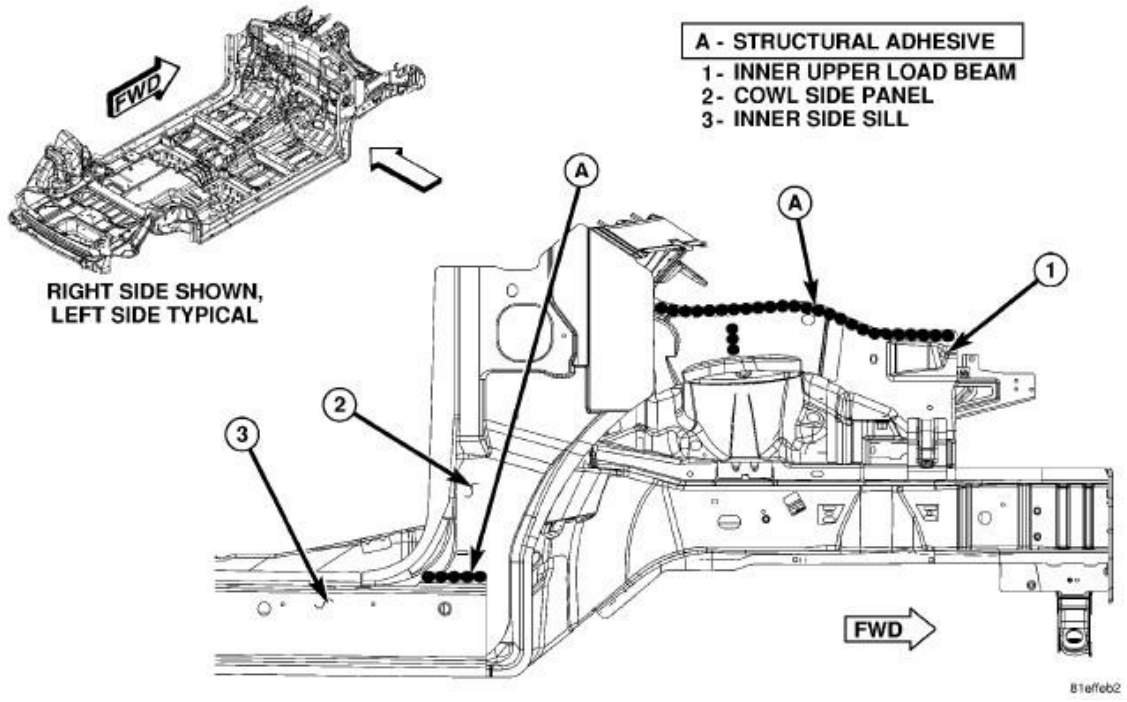

Fig. 308: COWL SIDE/ENGINE BOX
Courtesy of CHRYSLER LLC

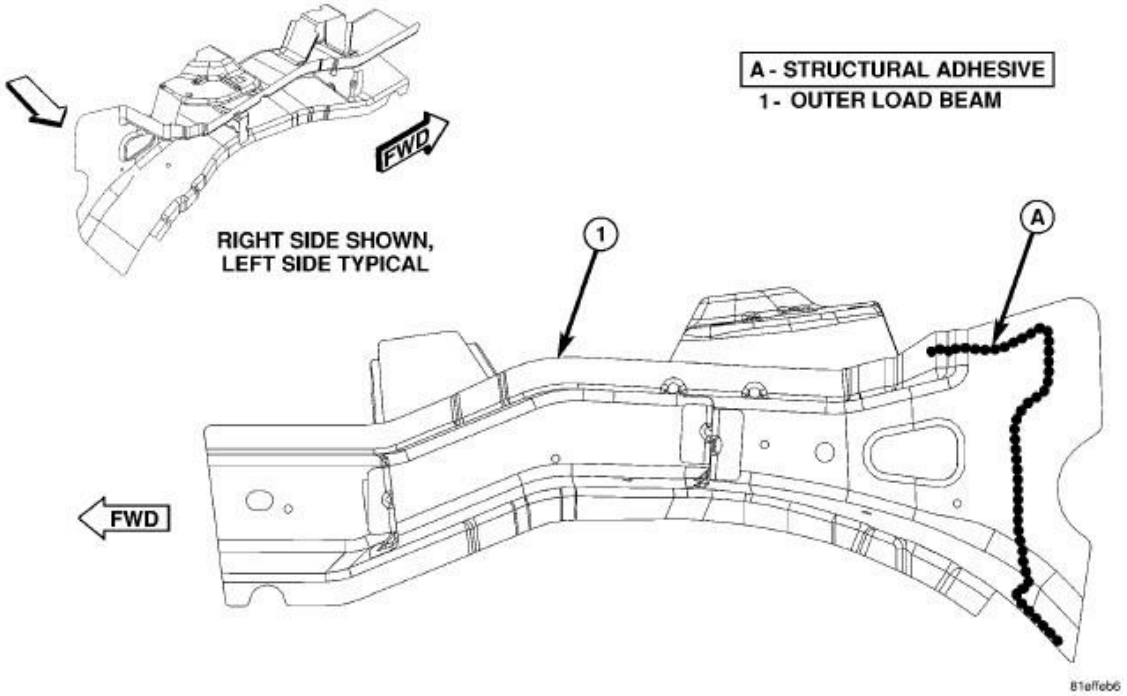

Fig. 309: LOAD BEAM
Courtesy of CHRYSLER LLC

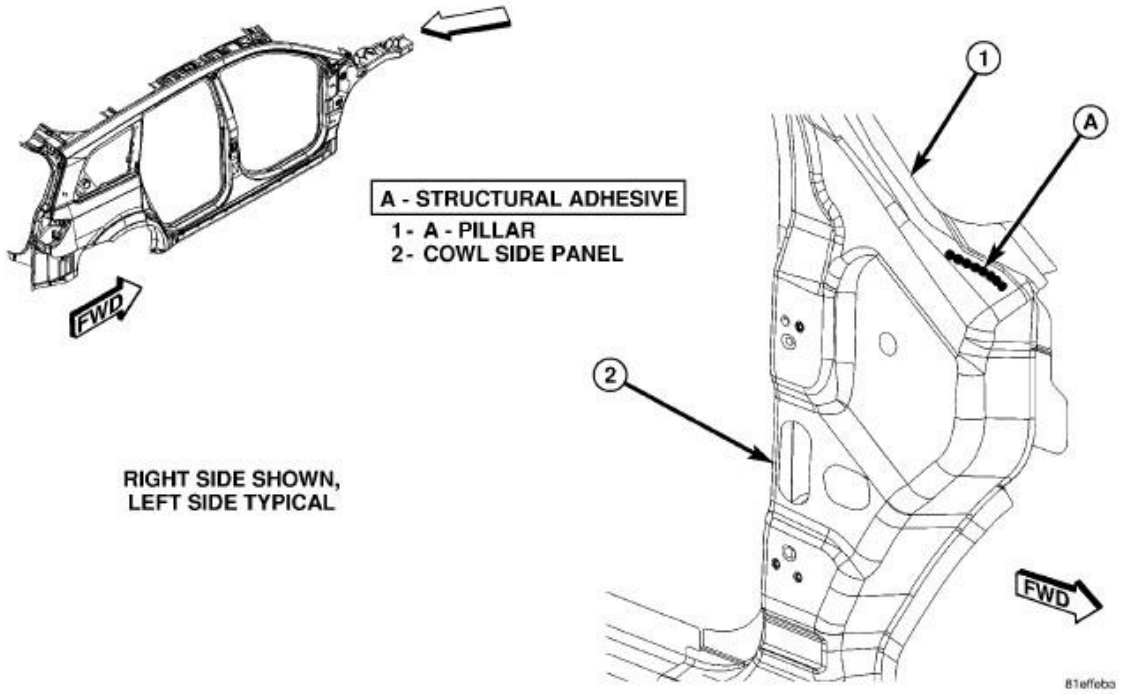

Fig. 310: COWL SIDE PANEL
Courtesy of CHRYSLER LLC

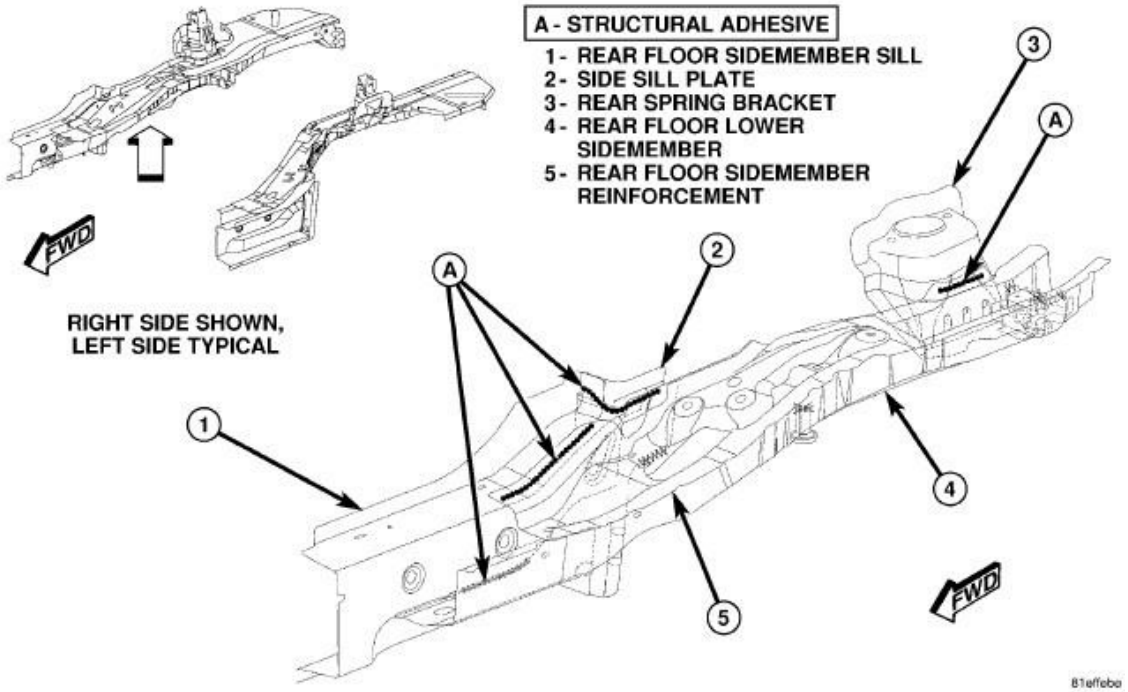

Fig. 311: SIDEMEMBER (1 OF 2)
Courtesy of CHRYSLER LLC

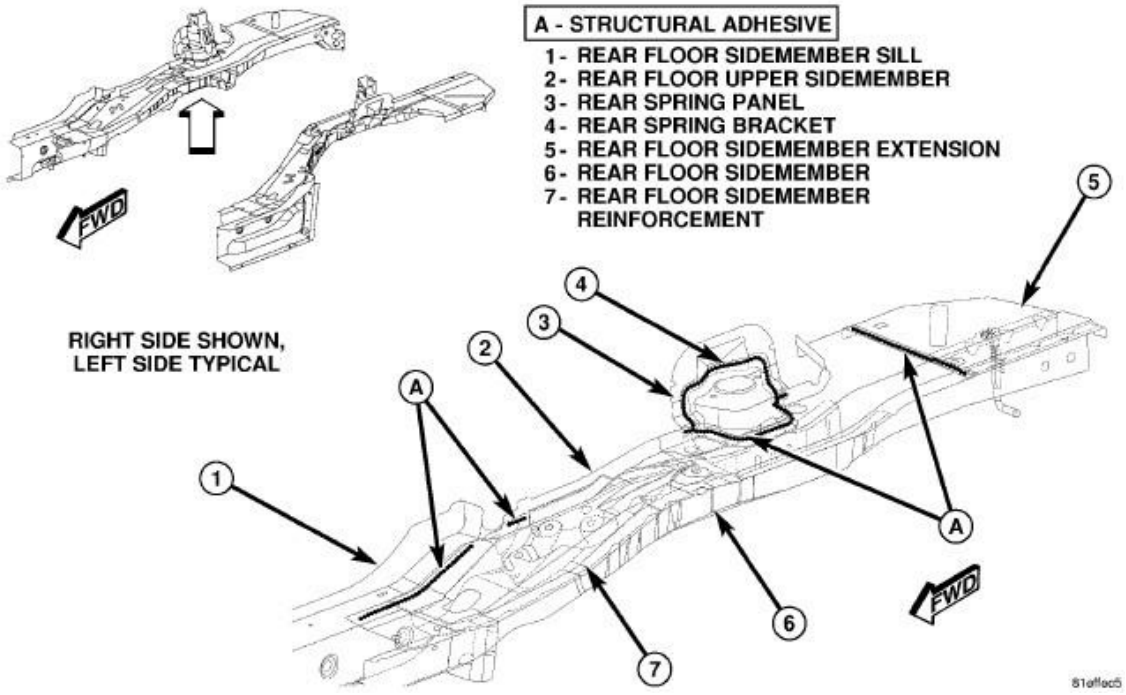

Fig. 312: SIDEMEMBER (2 OF 2)
Courtesy of CHRYSLER LLC

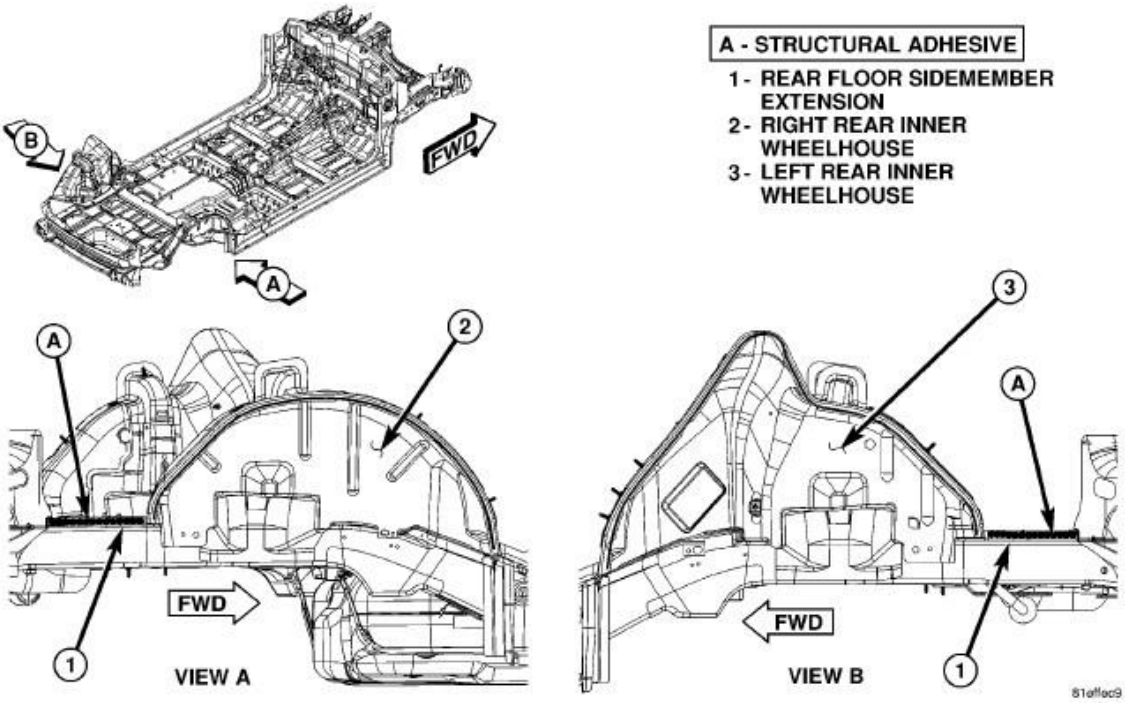

Fig. 313: REAR FLOOR/BODY SIDE APERTURE
Courtesy of CHRYSLER LLC

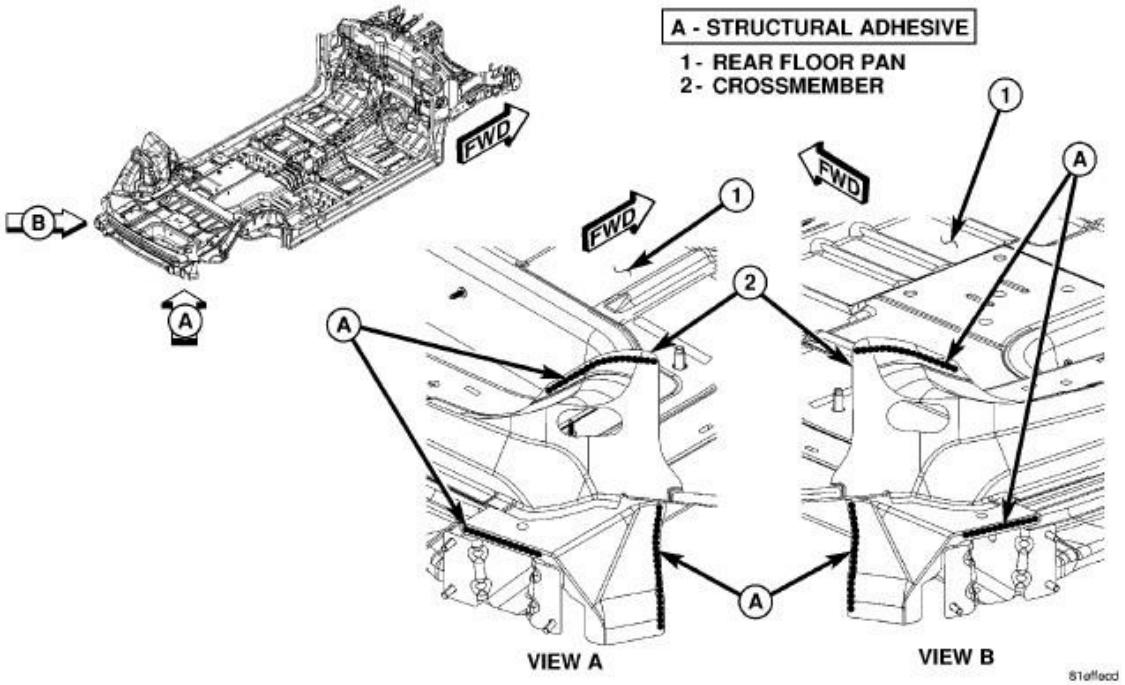

Fig. 314: REAR FLOOR/CROSSMEMBER LOWER LIFTGATE OPENING
Courtesy of CHRYSLER LLC

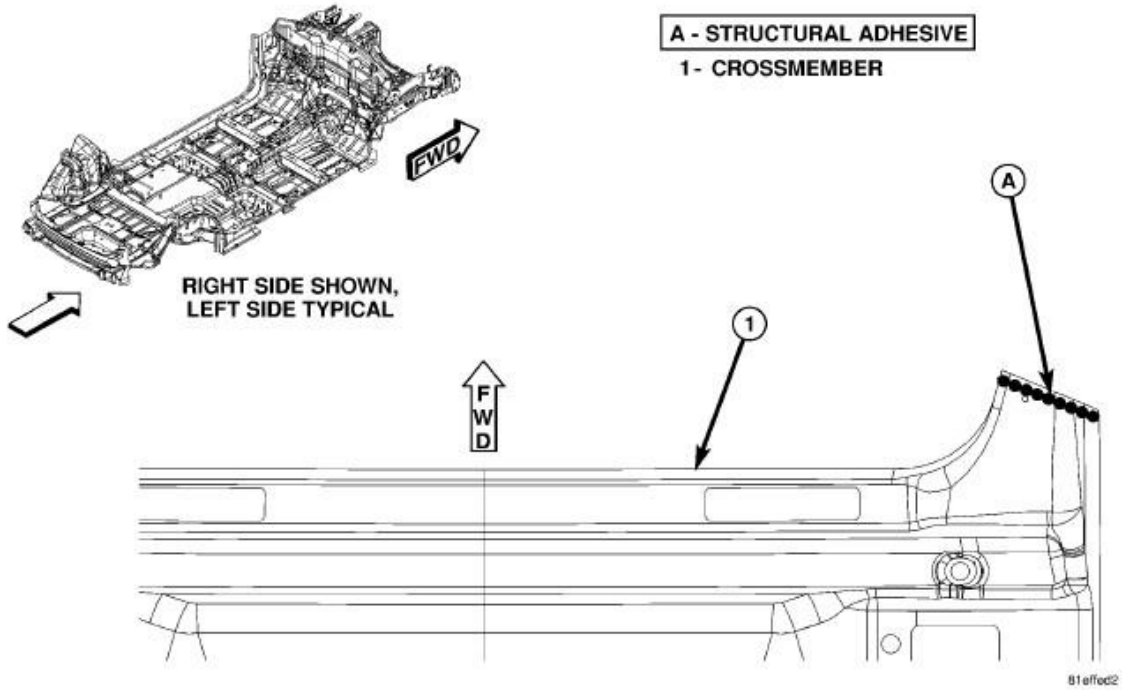

Fig. 315: LOWER LIFTGATE OPENING CROSSMEMBER
Courtesy of CHRYSLER LLC

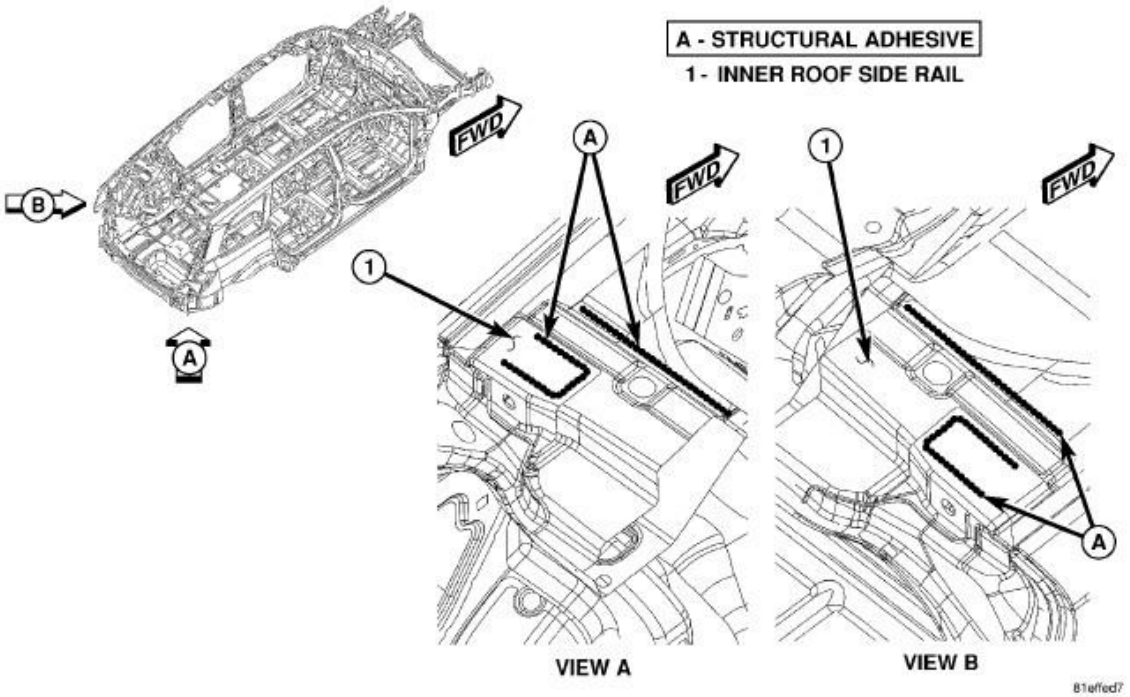

Fig. 316: BODY SIDE APERTURE/UPPER LIFTGATE OPENING CROSSMEMBER
Courtesy of CHRYSLER LLC

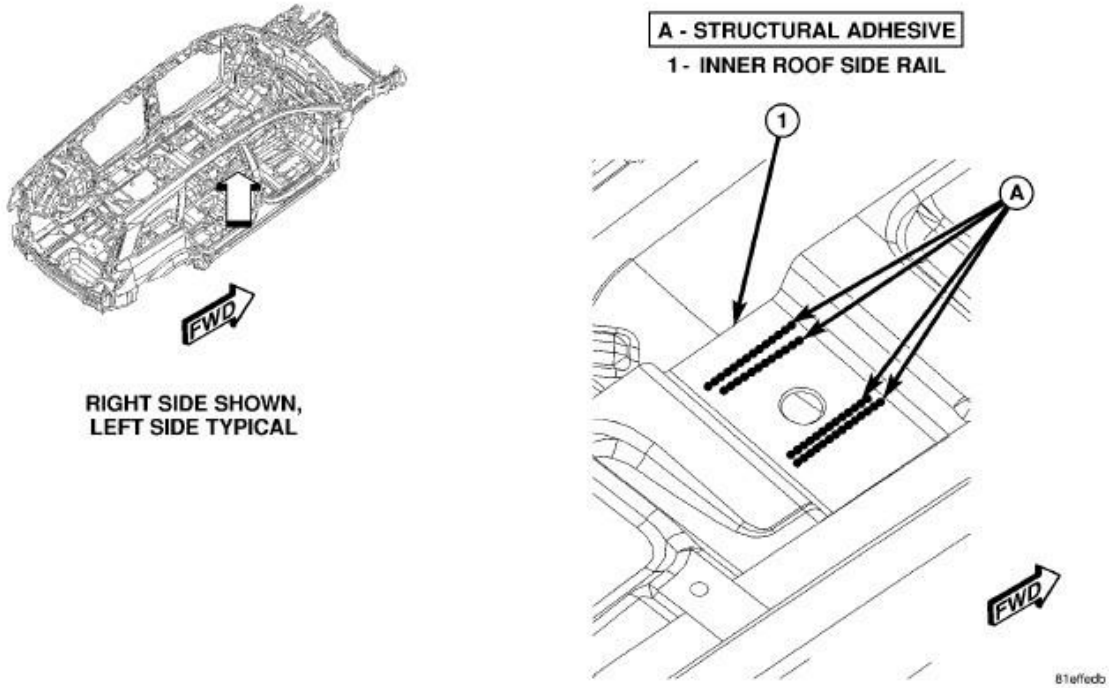

Fig. 317: BODY SIDE APERTURE/ROOF BOW (TYPICAL)
Courtesy of CHRYSLER LLC

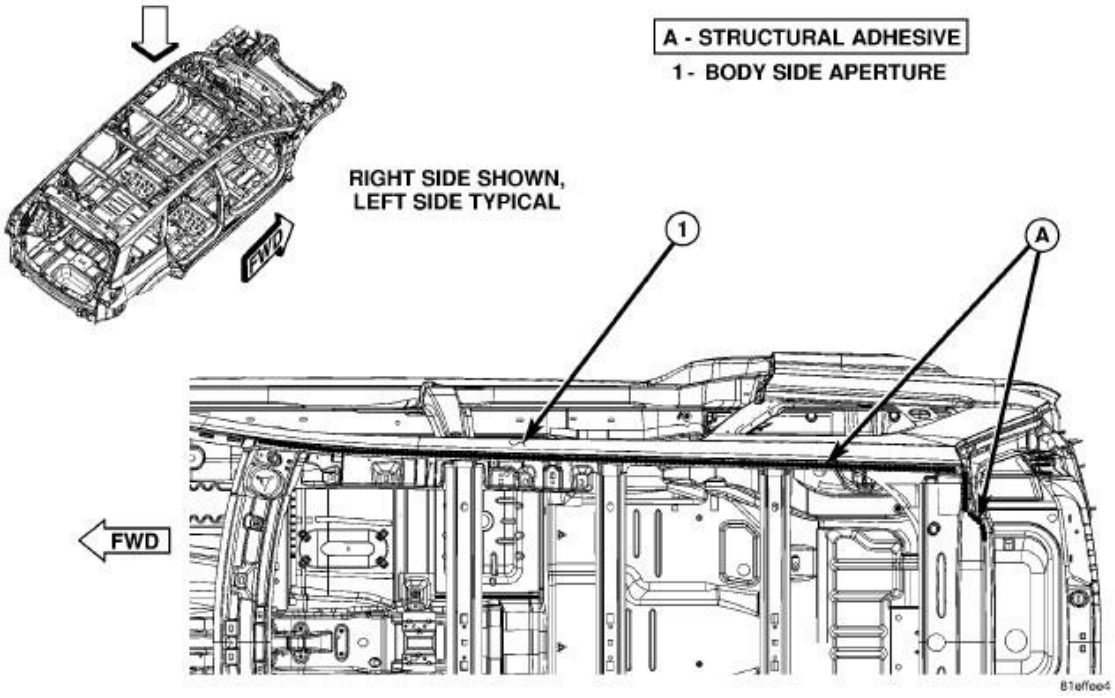

Fig. 318: BODY SIDE APERTURE/ROOF PANEL
Courtesy of CHRYSLER LLC

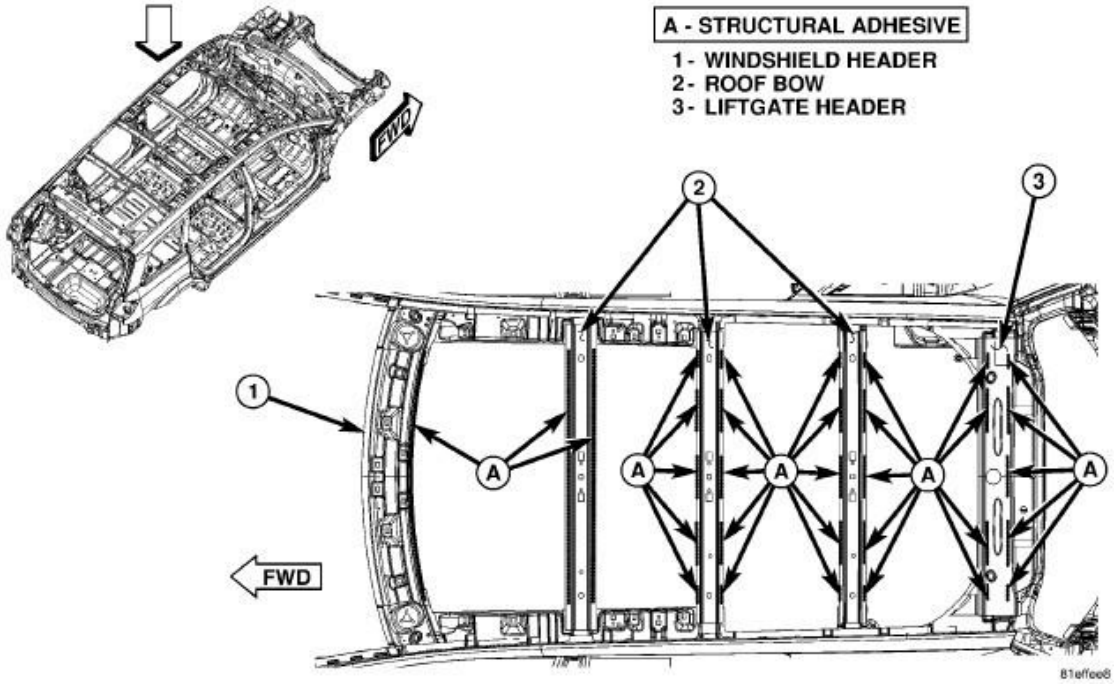

Fig. 319: ROOF BOWS/ROOF PANEL
Courtesy of CHRYSLER LLC

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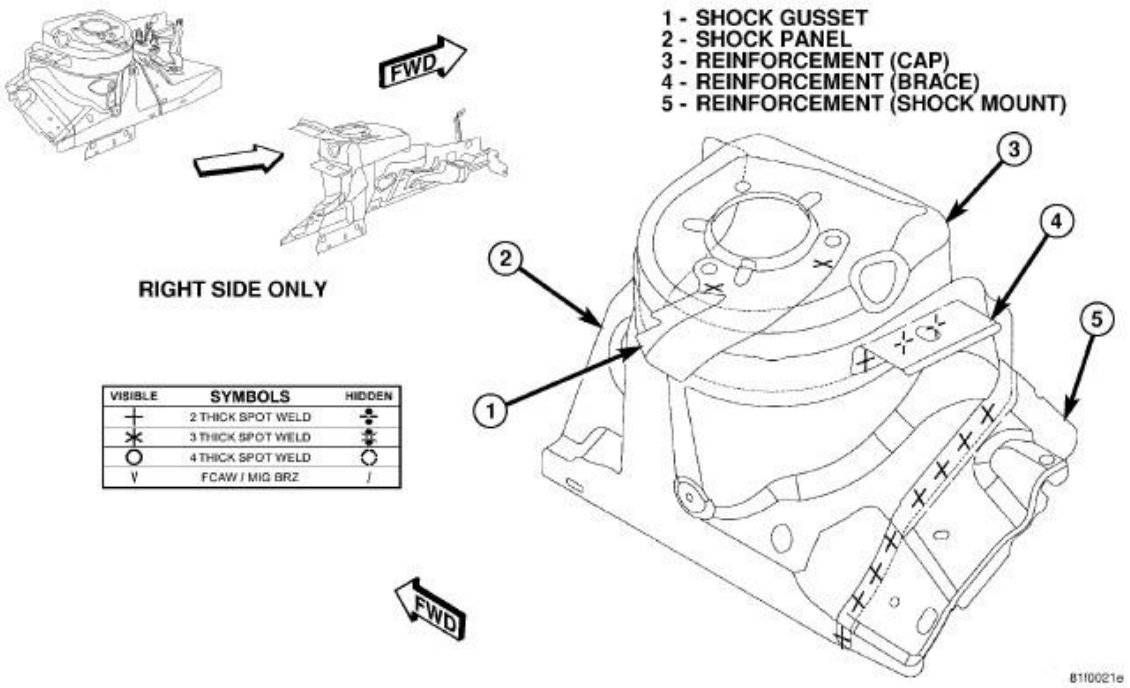

Fig. 320: FRONT WHEELHOUSE (1 OF 6)
Courtesy of CHRYSLER LLC

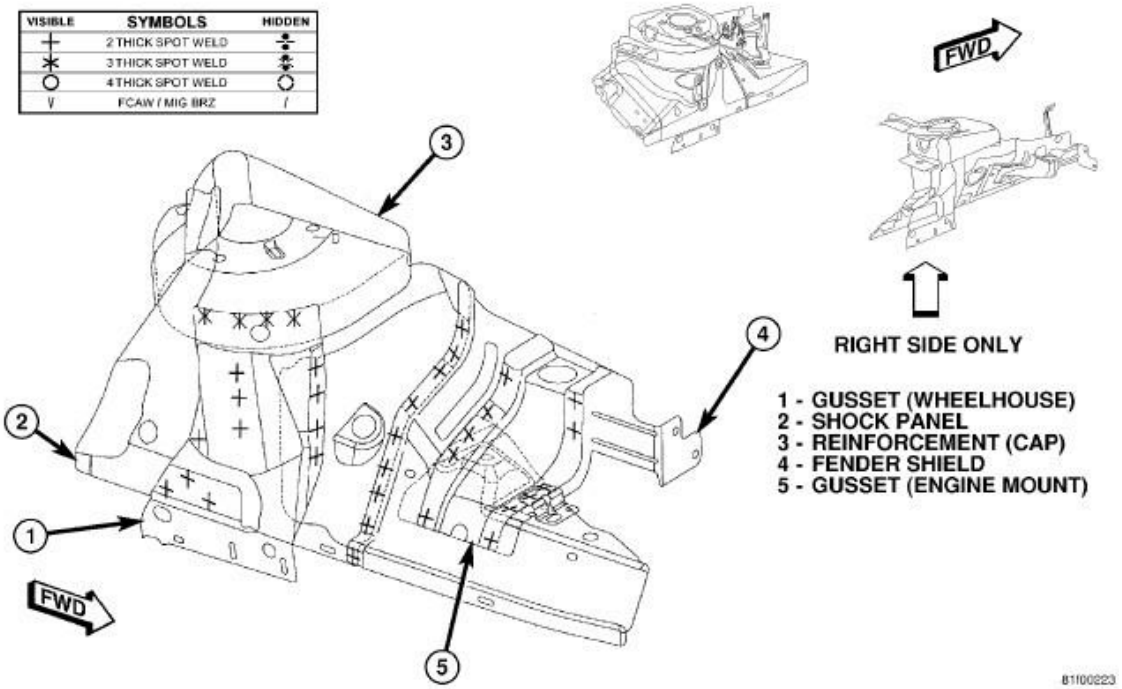

Fig. 321: FRONT WHEELHOUSE (2 OF 6)
Courtesy of CHRYSLER LLC

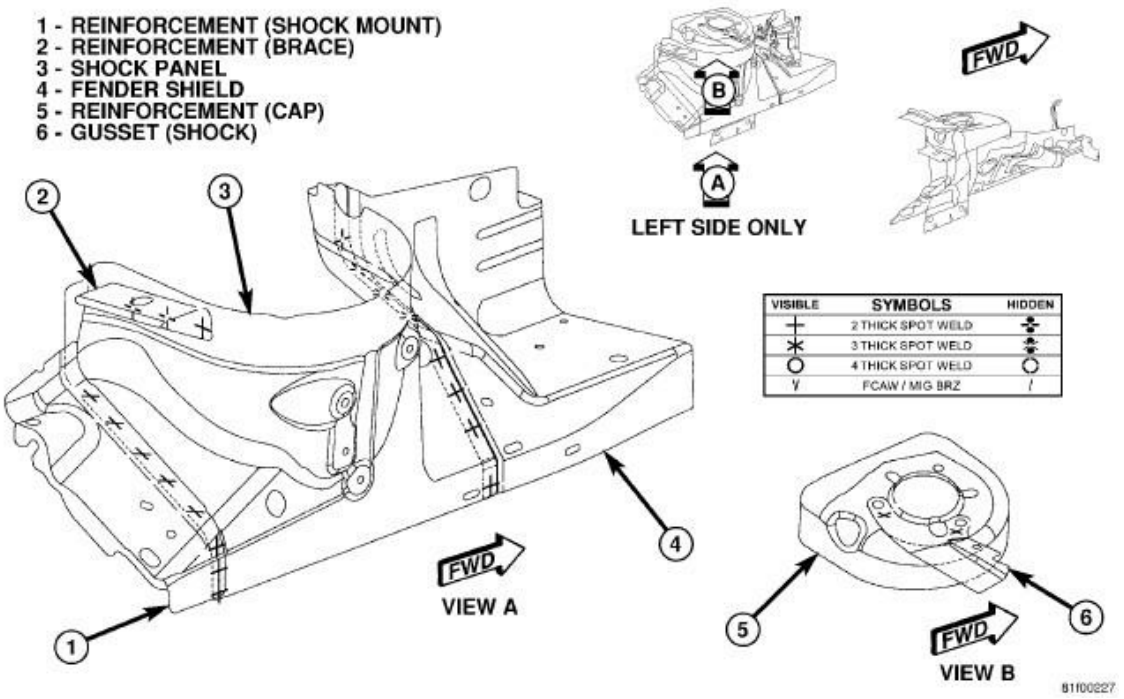

Fig. 322: FRONT WHEELHOUSE (3 OF 6)
Courtesy of CHRYSLER LLC

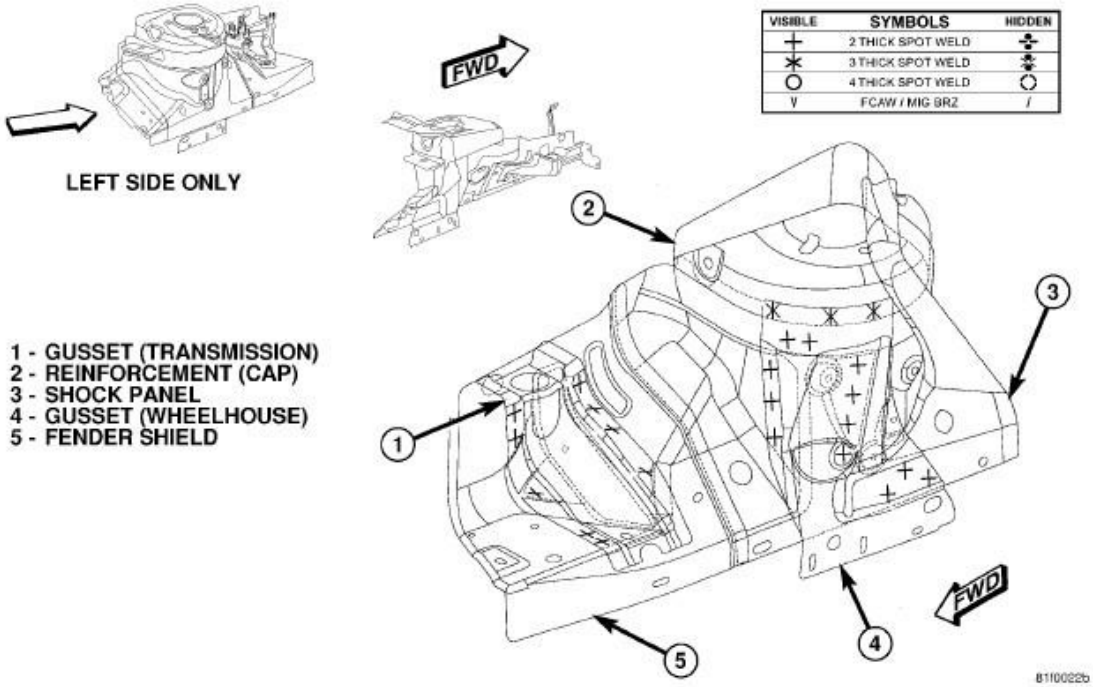

Fig. 323: FRONT WHEELHOUSE (4 OF 6)
Courtesy of CHRYSLER LLC

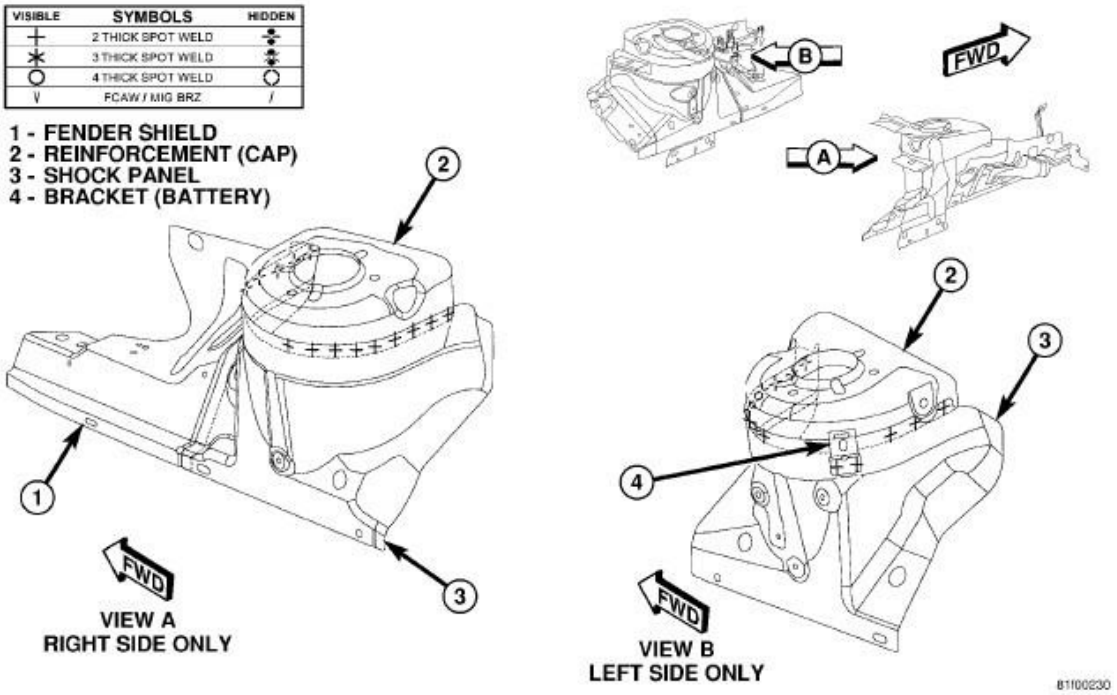

Fig. 324: FRONT WHEELHOUSE (5 OF 6)
Courtesy of CHRYSLER LLC

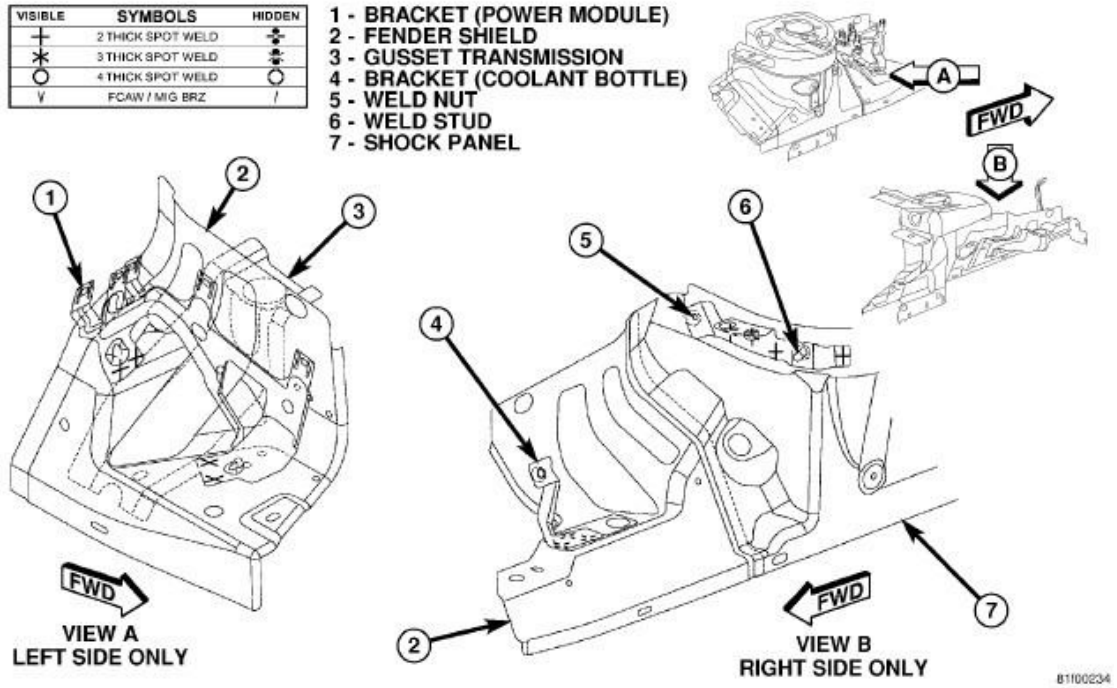

Fig. 325: FRONT WHEELHOUSE (6 OF 6)
Courtesy of CHRYSLER LLC

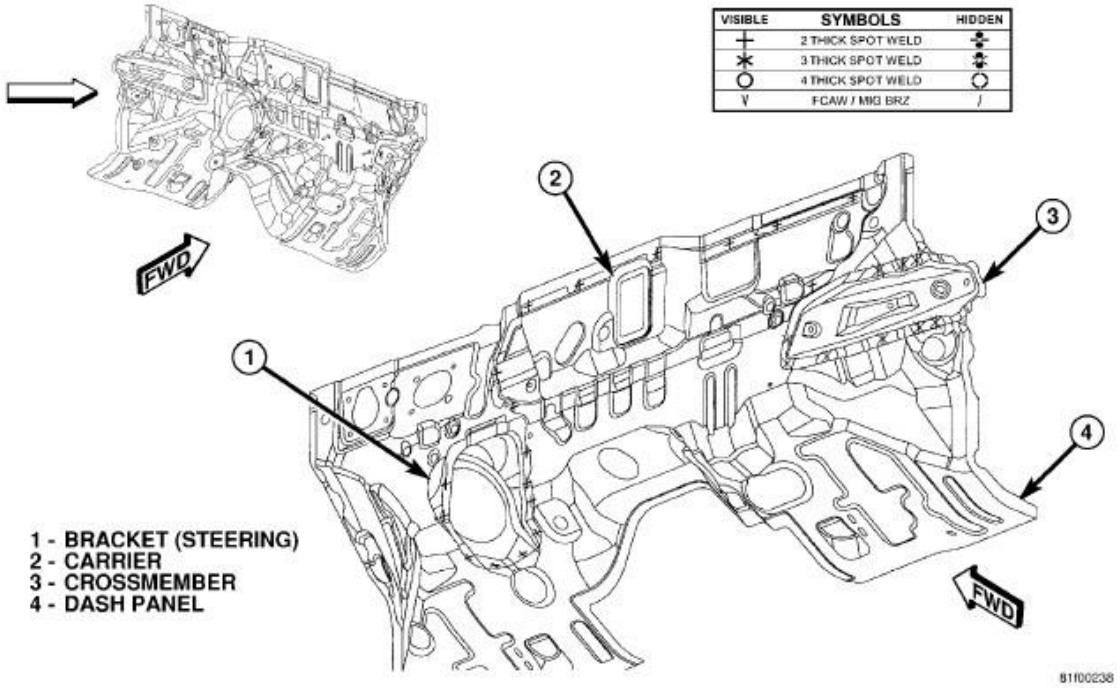

Fig. 326: DASH (1 OF 3)
Courtesy of CHRYSLER LLC

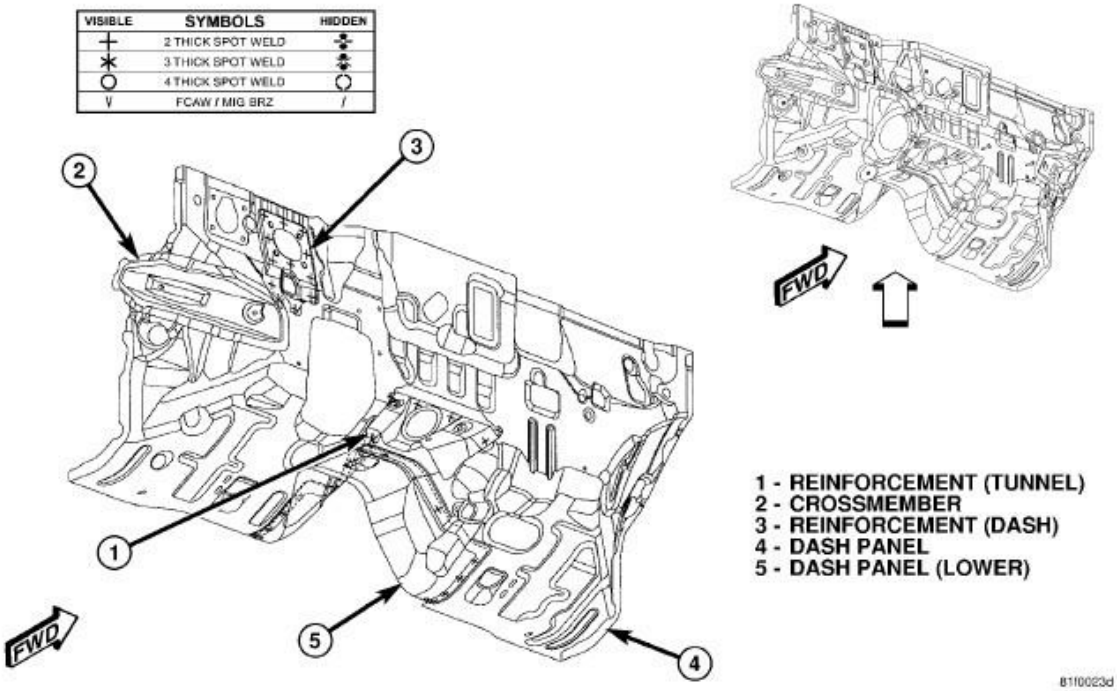

Fig. 327: DASH (2 OF 3)
Courtesy of CHRYSLER LLC

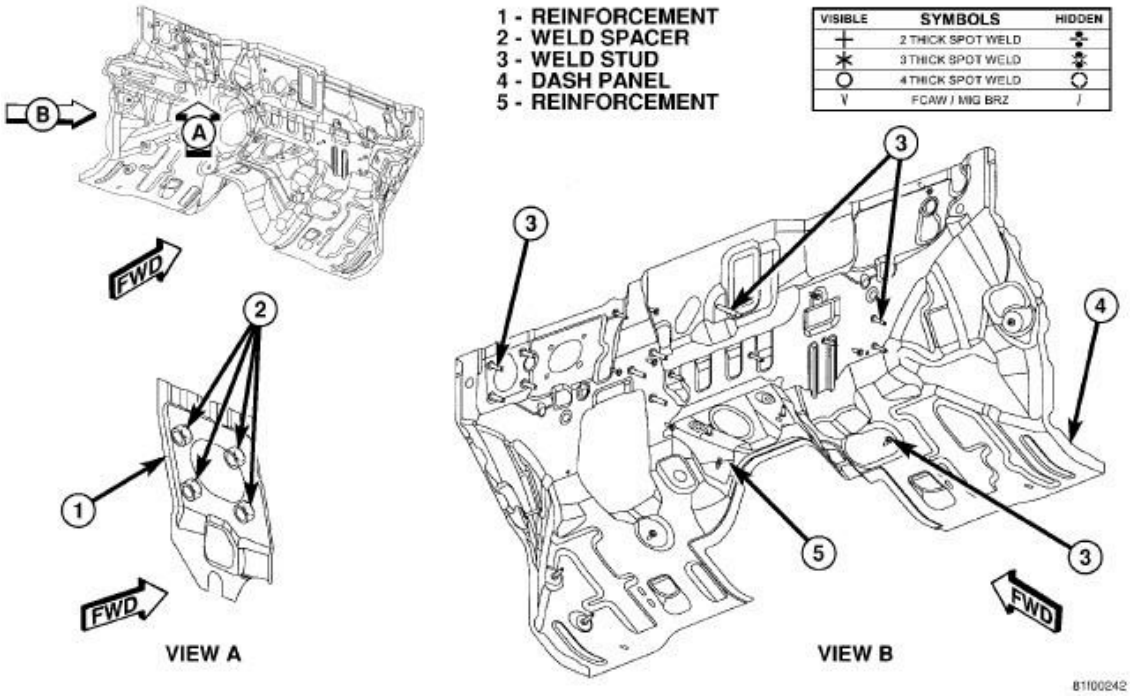

Fig. 328: DASH (3 OF 3)
Courtesy of CHRYSLER LLC

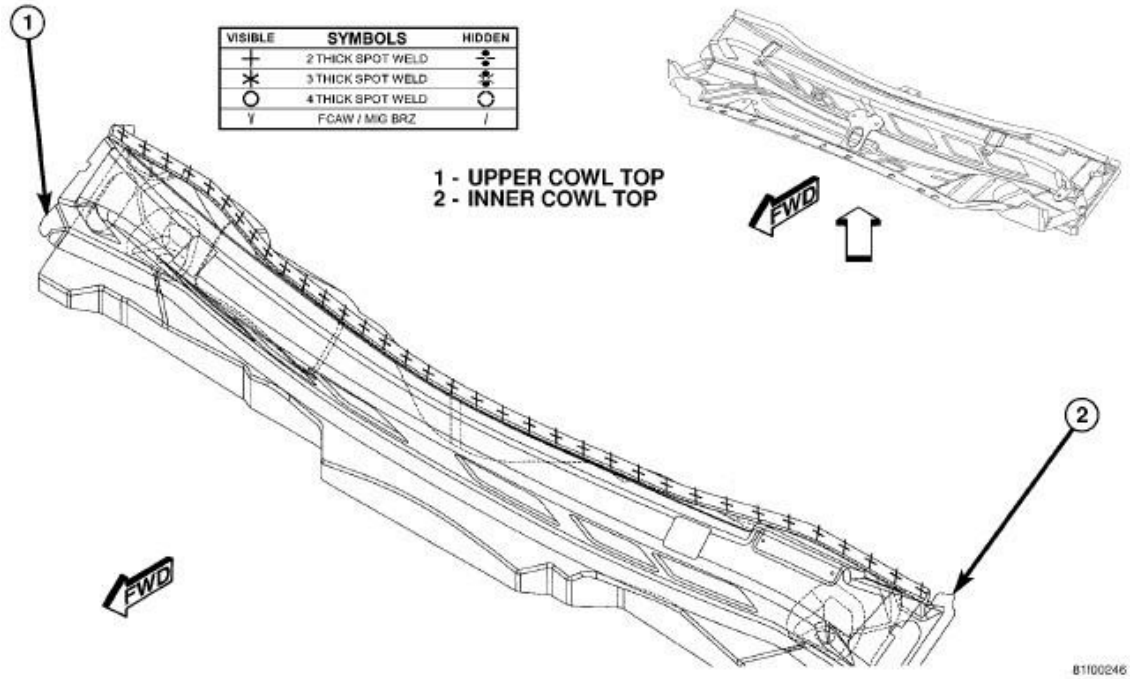

Fig. 329: PLENUM/COWL (1 OF 7)
Courtesy of CHRYSLER LLC

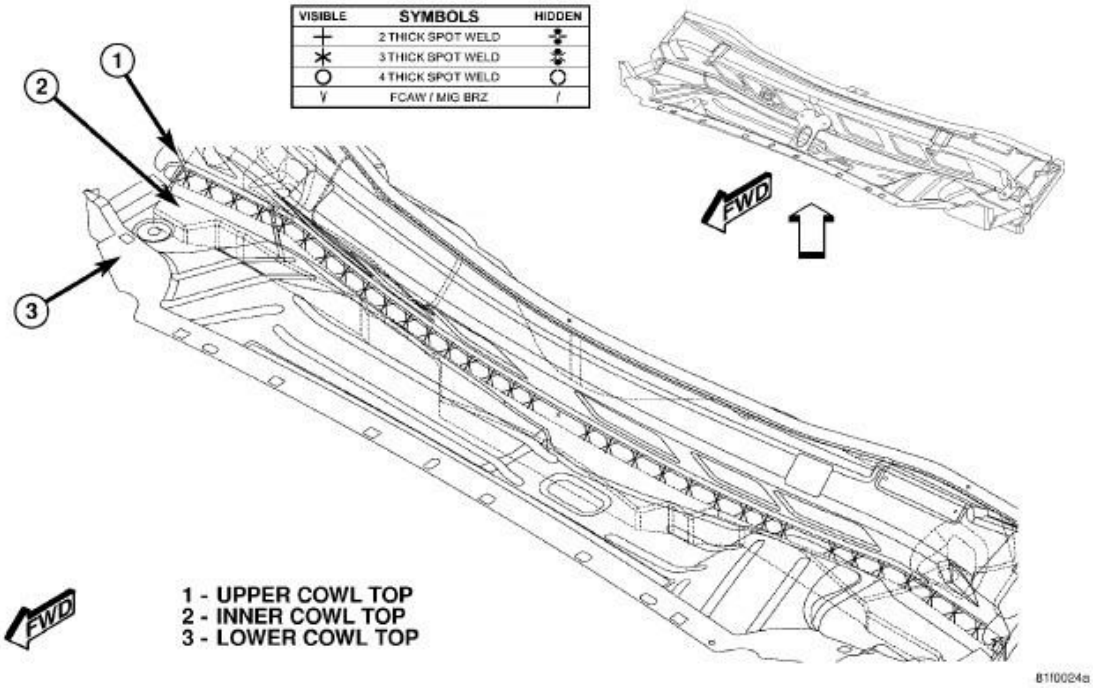

Fig. 330: PLENUM/COWL (2 OF 7)
Courtesy of CHRYSLER LLC

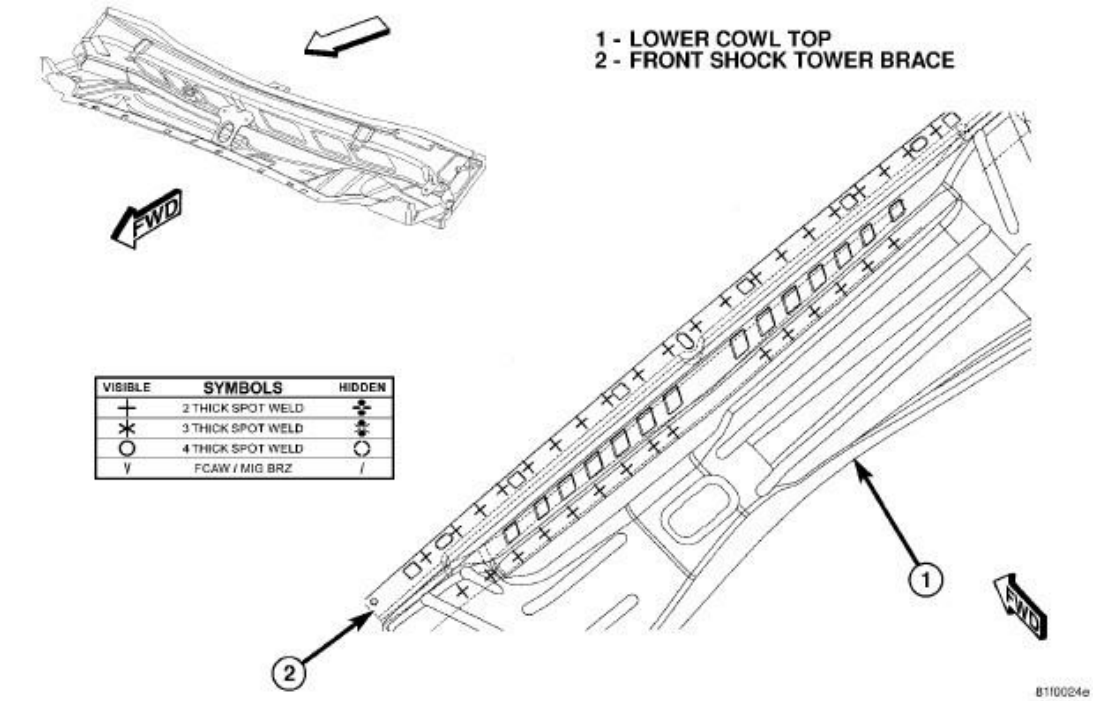

Fig. 331: PLENUM/COWL (3 OF 7)
Courtesy of CHRYSLER LLC

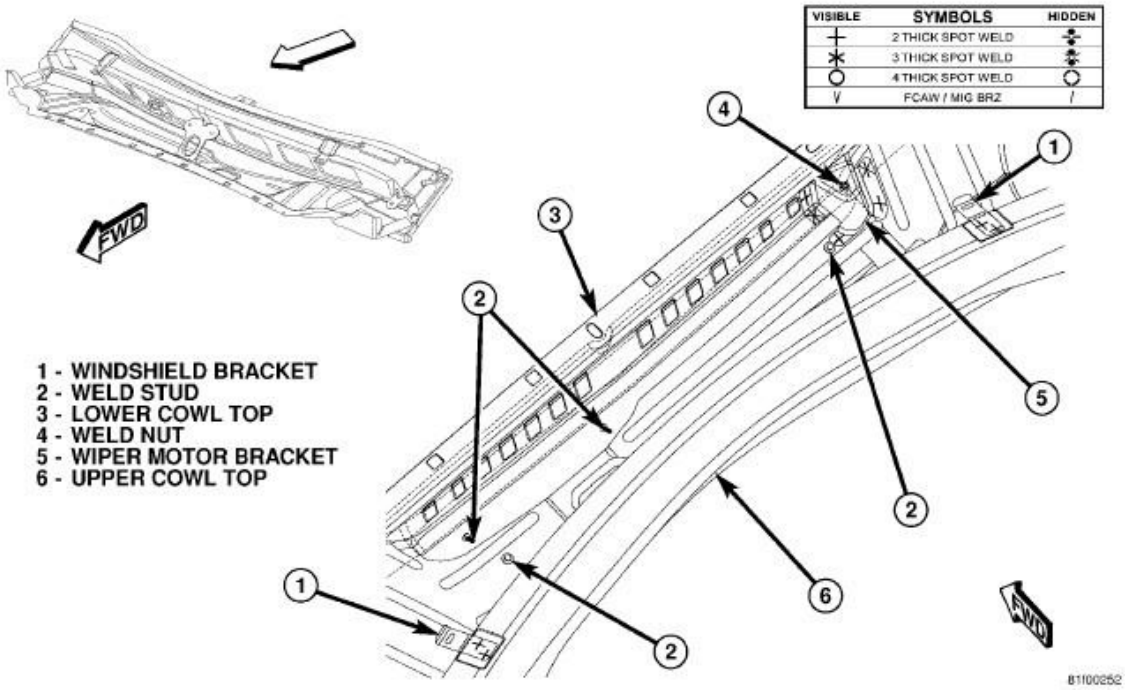

Fig. 332: PLENUM/COWL (4 OF 7)
Courtesy of CHRYSLER LLC

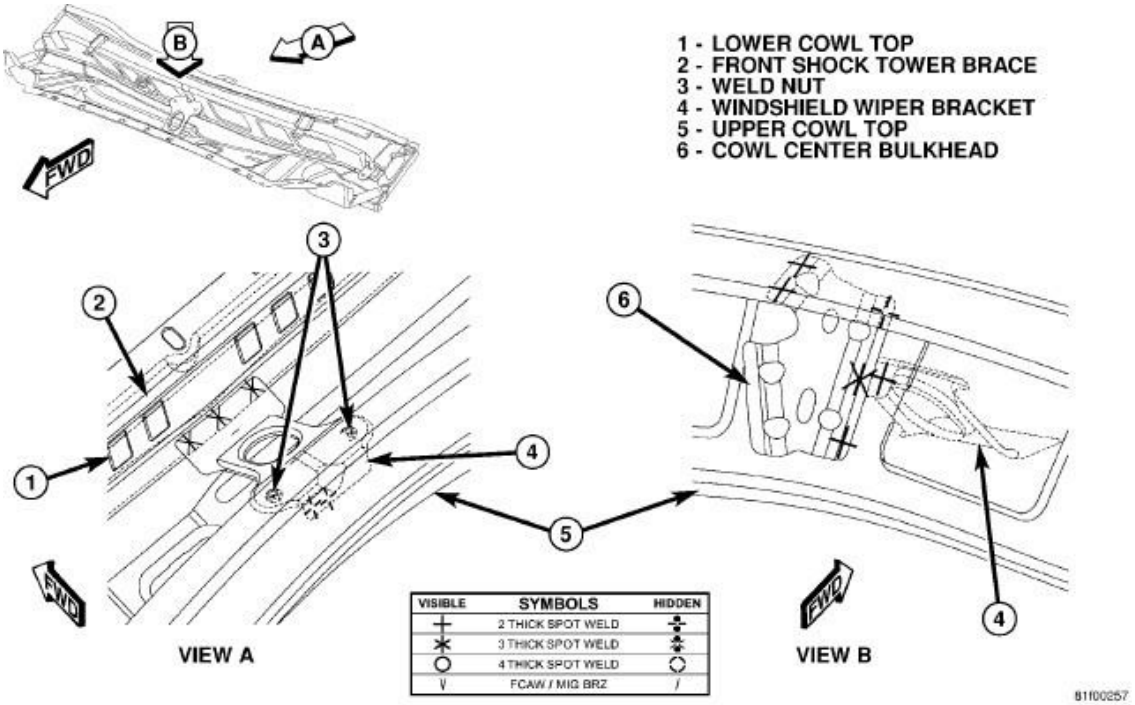

Fig. 333: PLENUM/COWL (5 OF 7)
Courtesy of CHRYSLER LLC

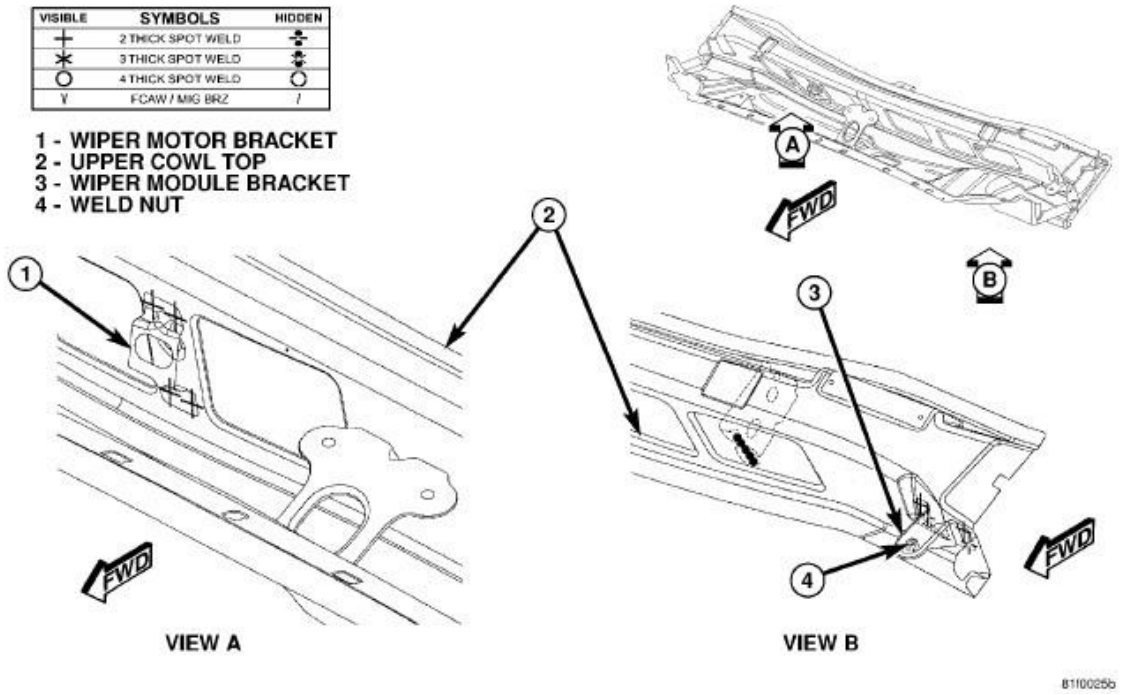

Fig. 334: PLENUM/COWL (6 OF 7)
Courtesy of CHRYSLER LLC

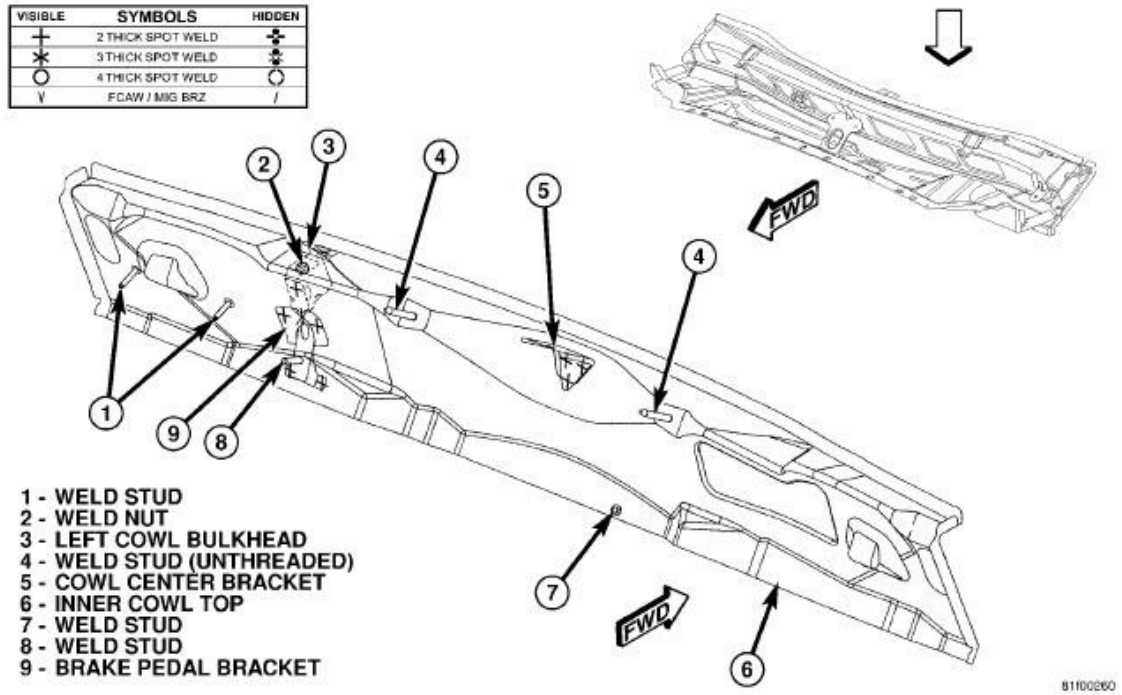

Fig. 335: PLENUM/COWL (7 OF 7)
Courtesy of CHRYSLER LLC

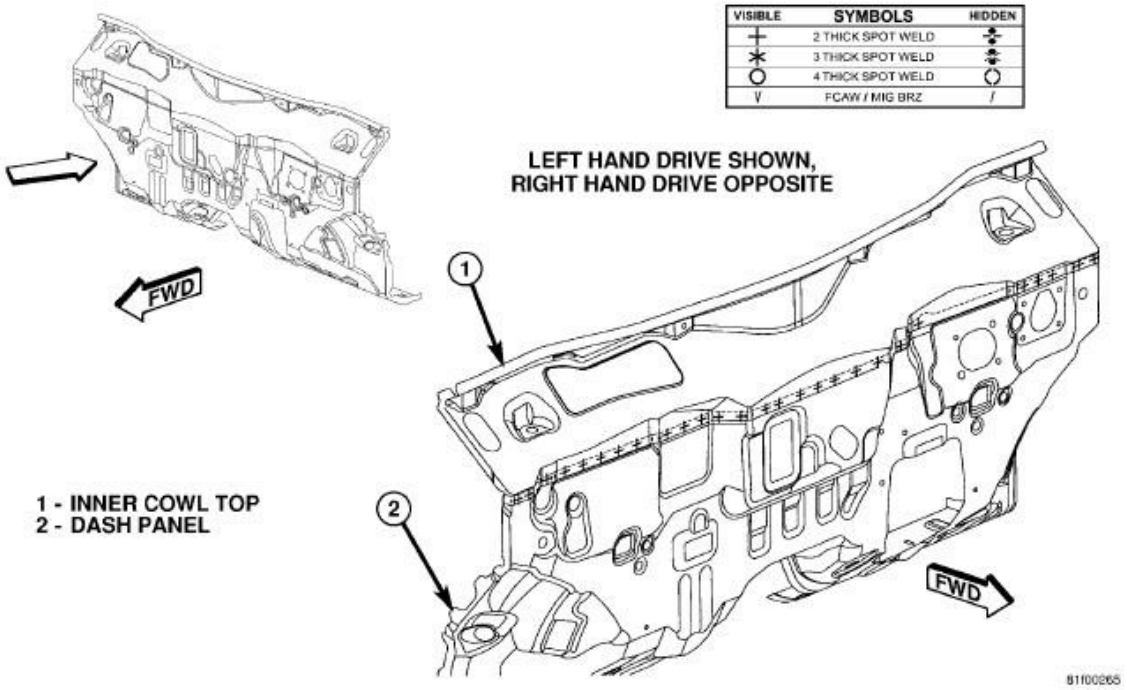

Fig. 336: PLENUM/DASH (1 OF 2)
Courtesy of CHRYSLER LLC

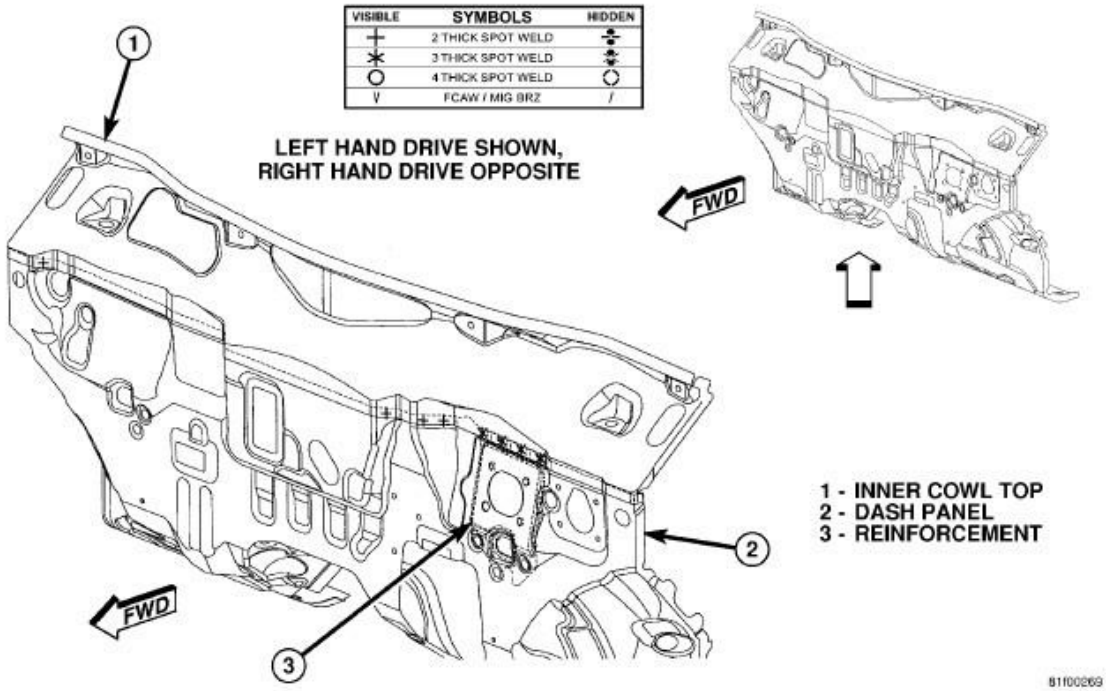

Fig. 337: PLENUM/DASH (2 OF 2)
Courtesy of CHRYSLER LLC

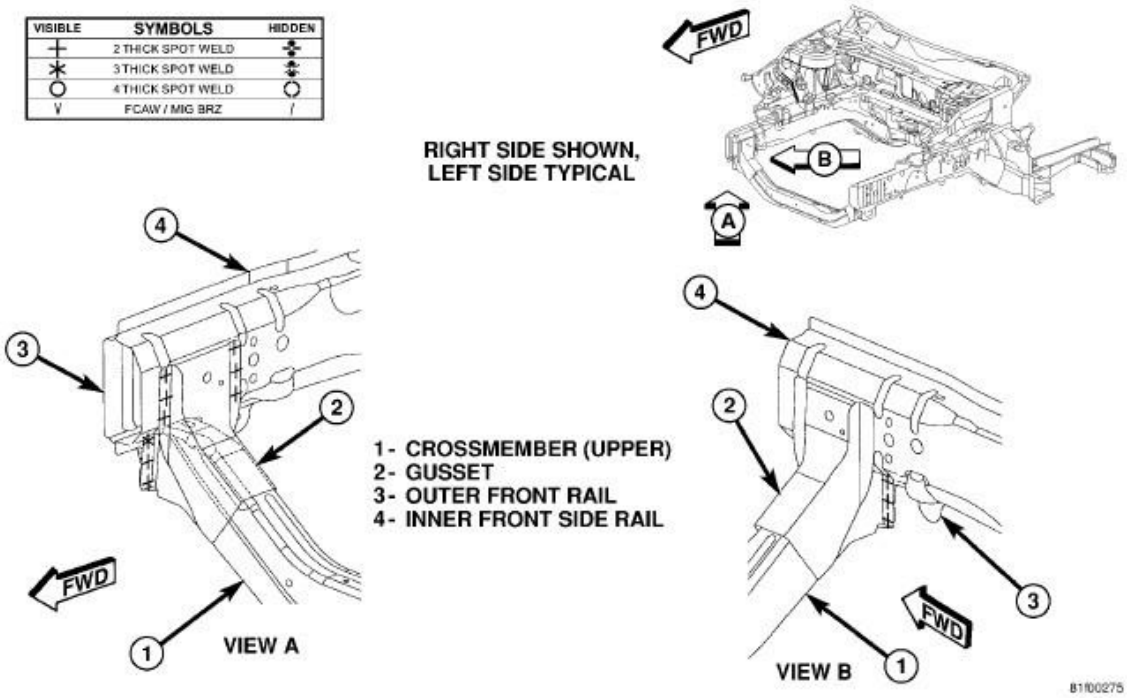

Fig. 338: ENGINE BOX (1 OF 17)
Courtesy of CHRYSLER LLC

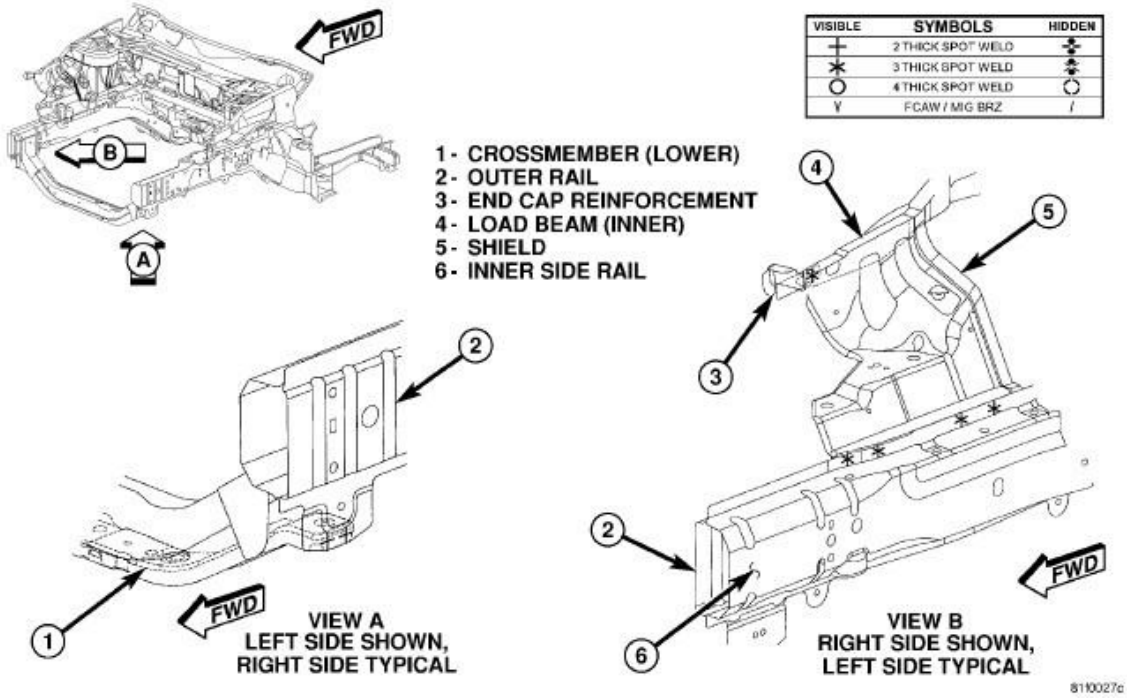

Fig. 339: ENGINE BOX (2 OF 17)
Courtesy of CHRYSLER LLC

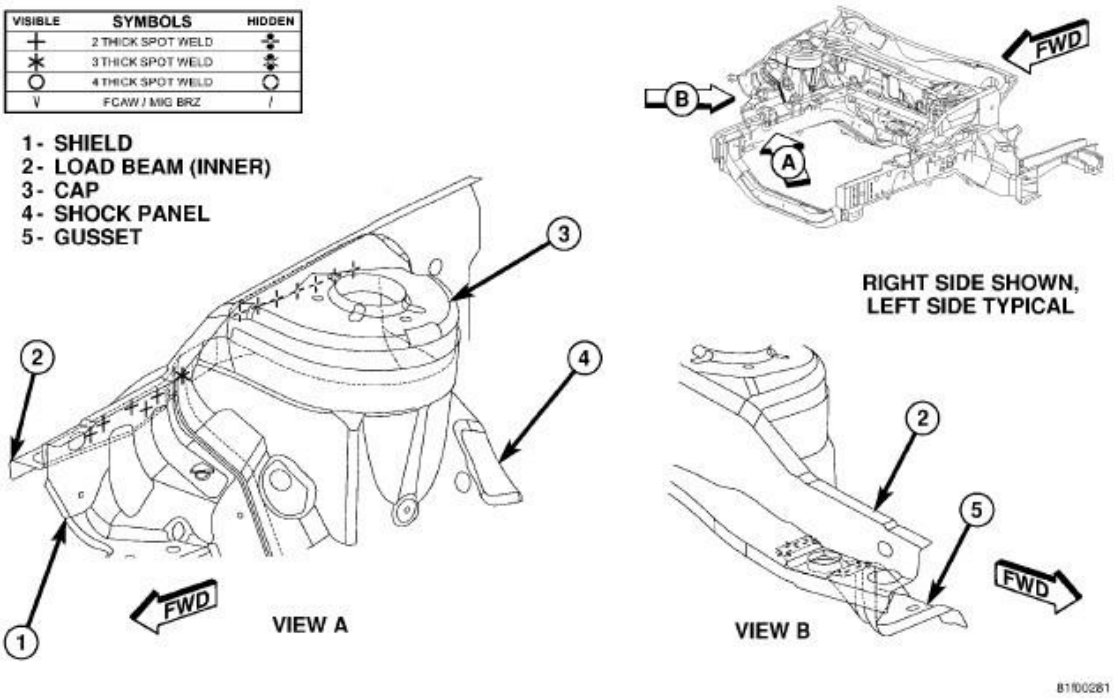

Fig. 340: ENGINE BOX (3 OF 17)
Courtesy of CHRYSLER LLC

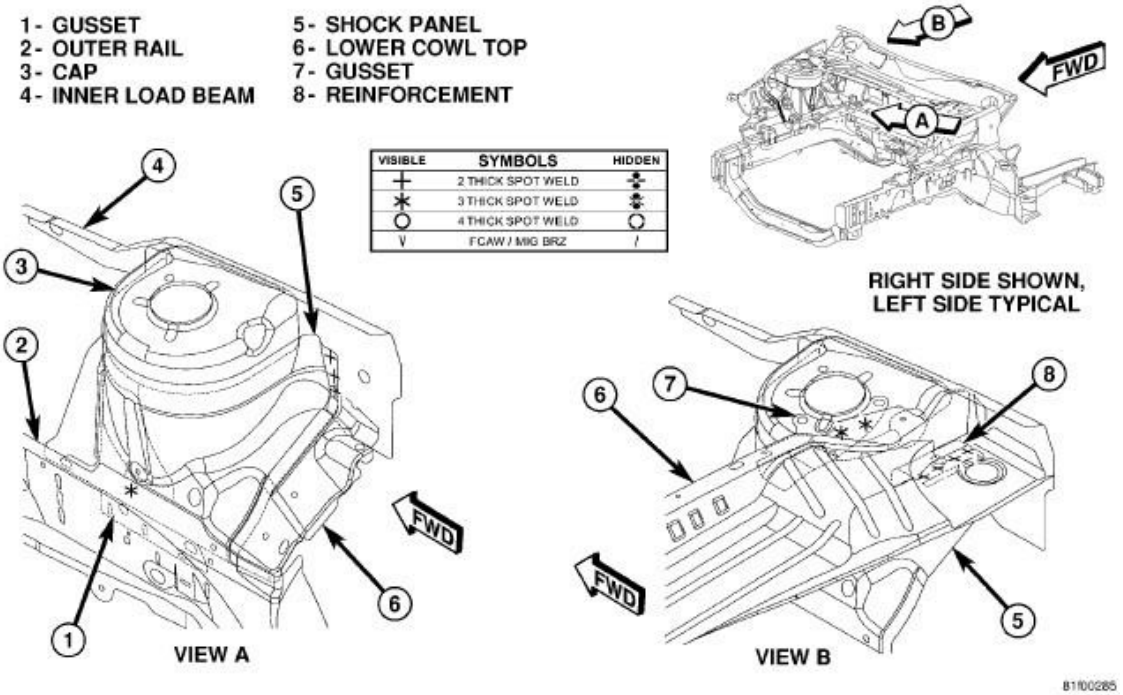

Fig. 341: ENGINE BOX (4 OF 17)
Courtesy of CHRYSLER LLC

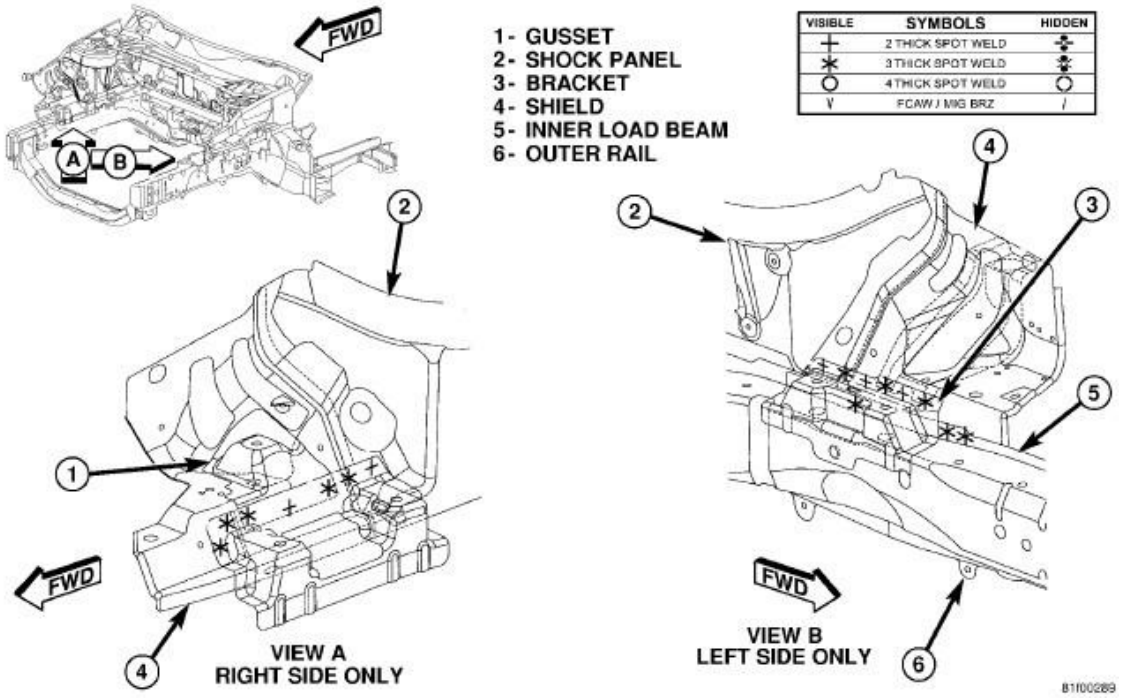

Fig. 342: ENGINE BOX (5 OF 17)
Courtesy of CHRYSLER LLC

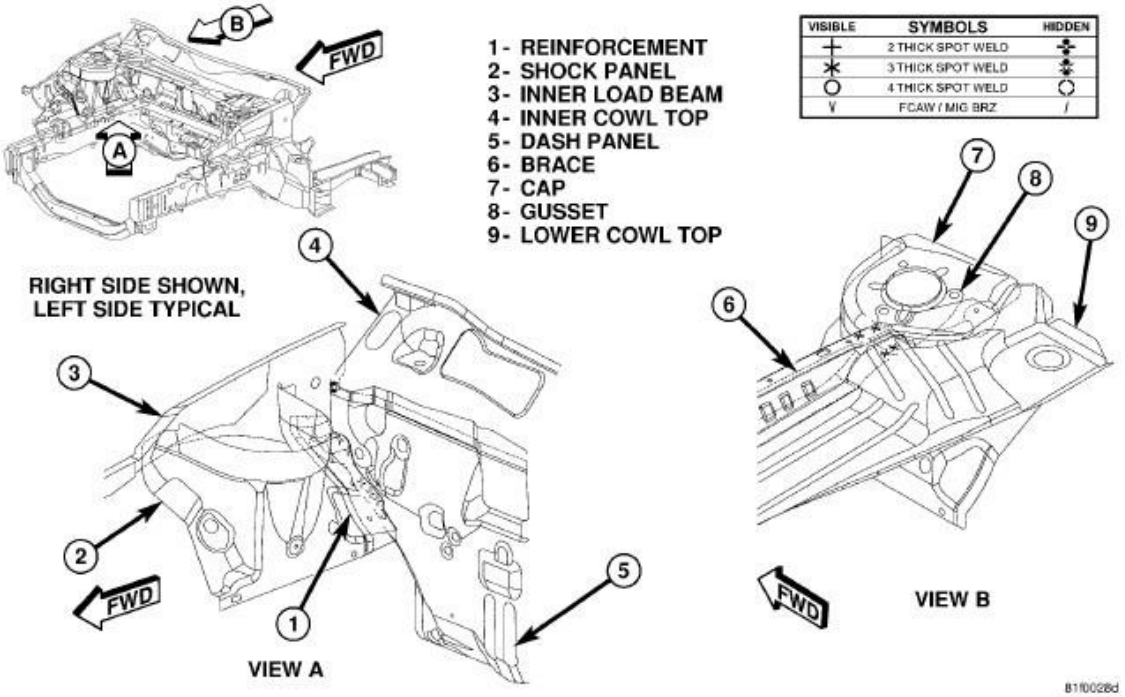

Fig. 343: ENGINE BOX (6 OF 17)
Courtesy of CHRYSLER LLC

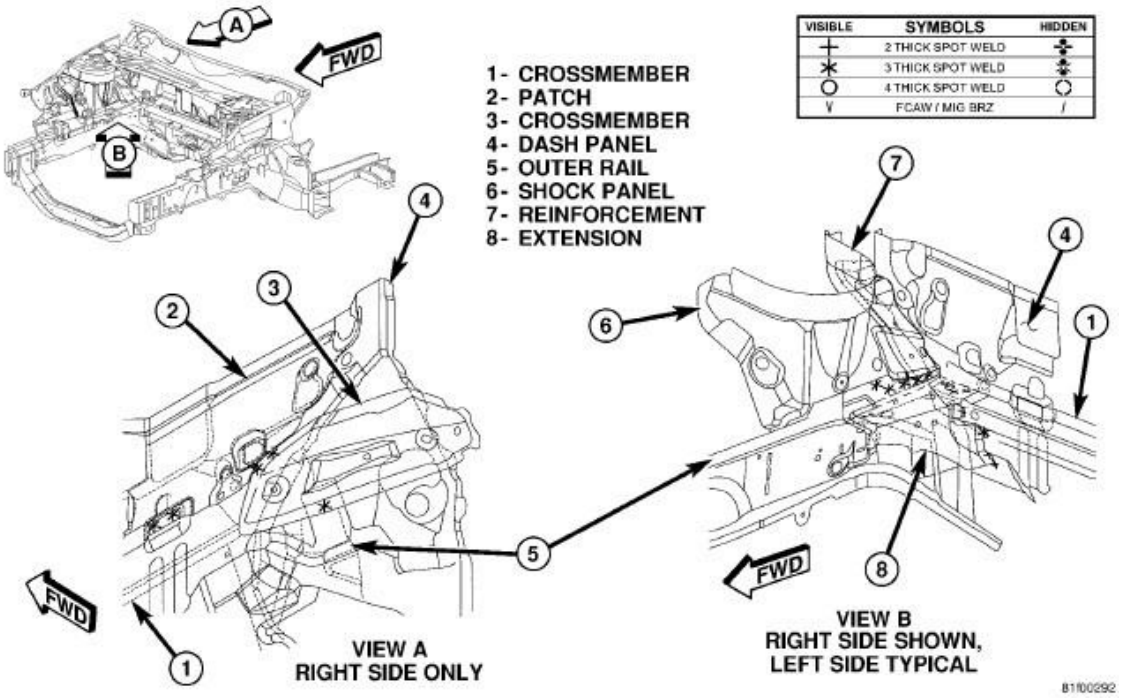

Fig. 344: ENGINE BOX (7 OF 17)
Courtesy of CHRYSLER LLC

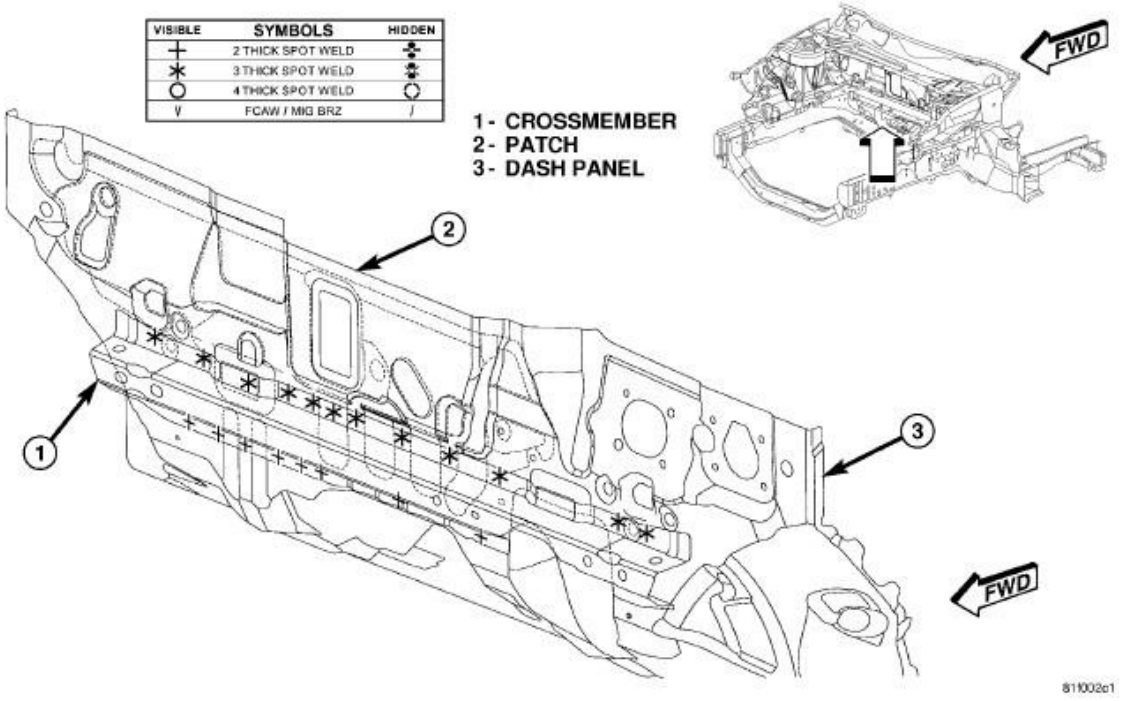

Fig. 345: ENGINE BOX (8 OF 17)
Courtesy of CHRYSLER LLC

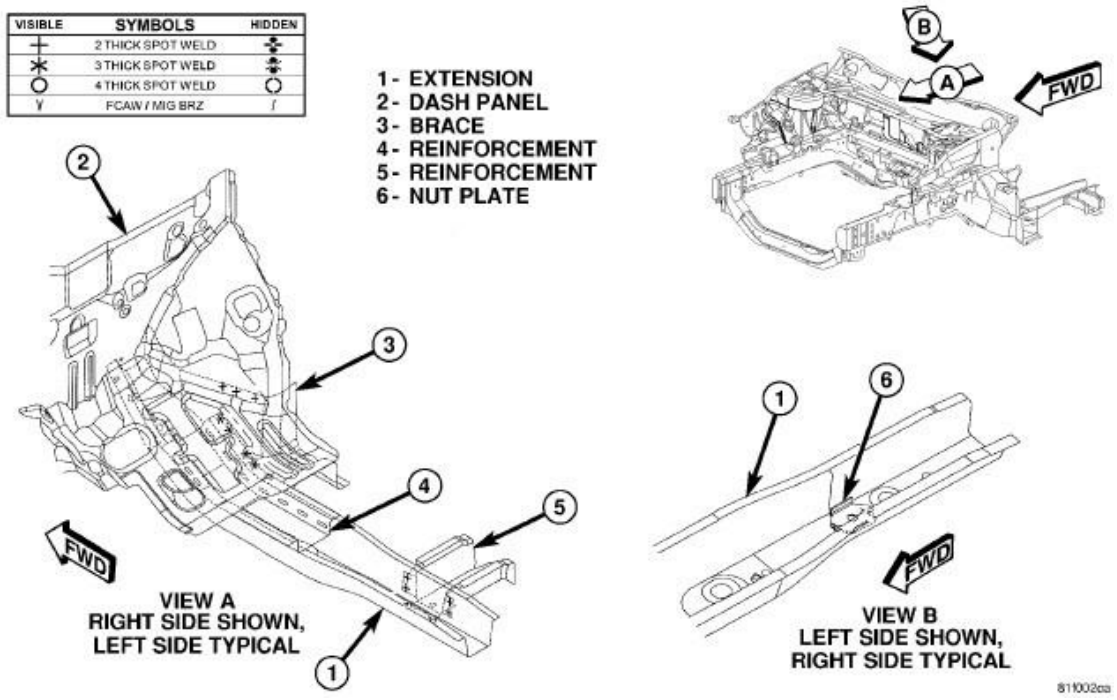

Fig. 346: ENGINE BOX (9 OF 17)
Courtesy of CHRYSLER LLC

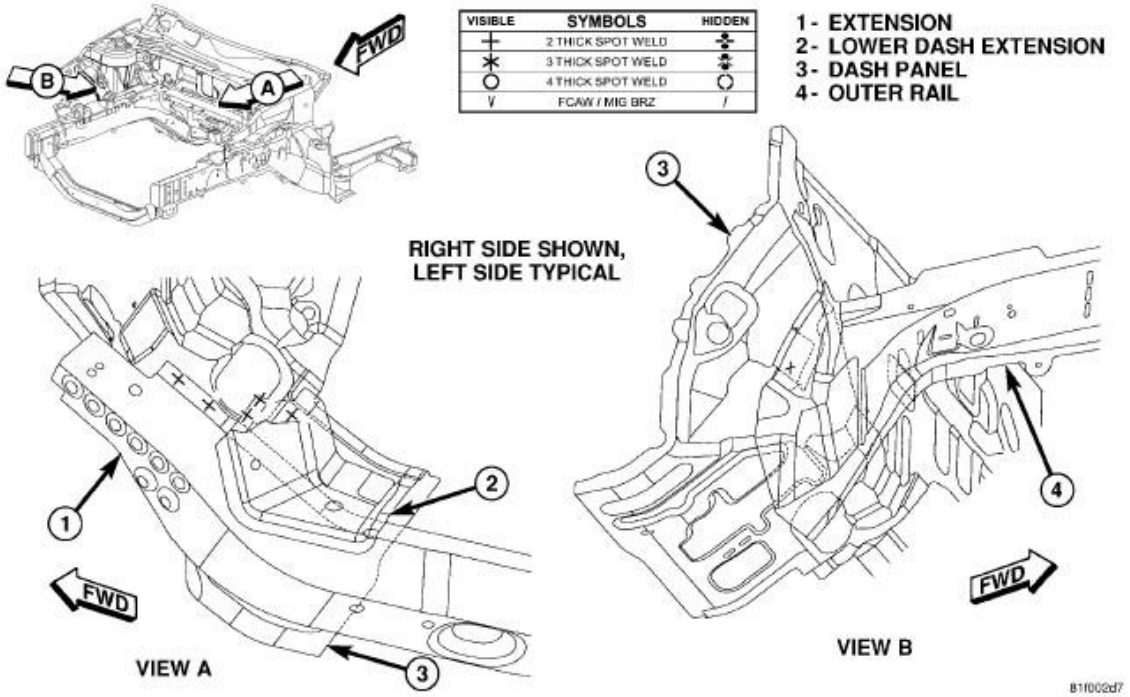

Fig. 347: ENGINE BOX (10 OF 17)
Courtesy of CHRYSLER LLC

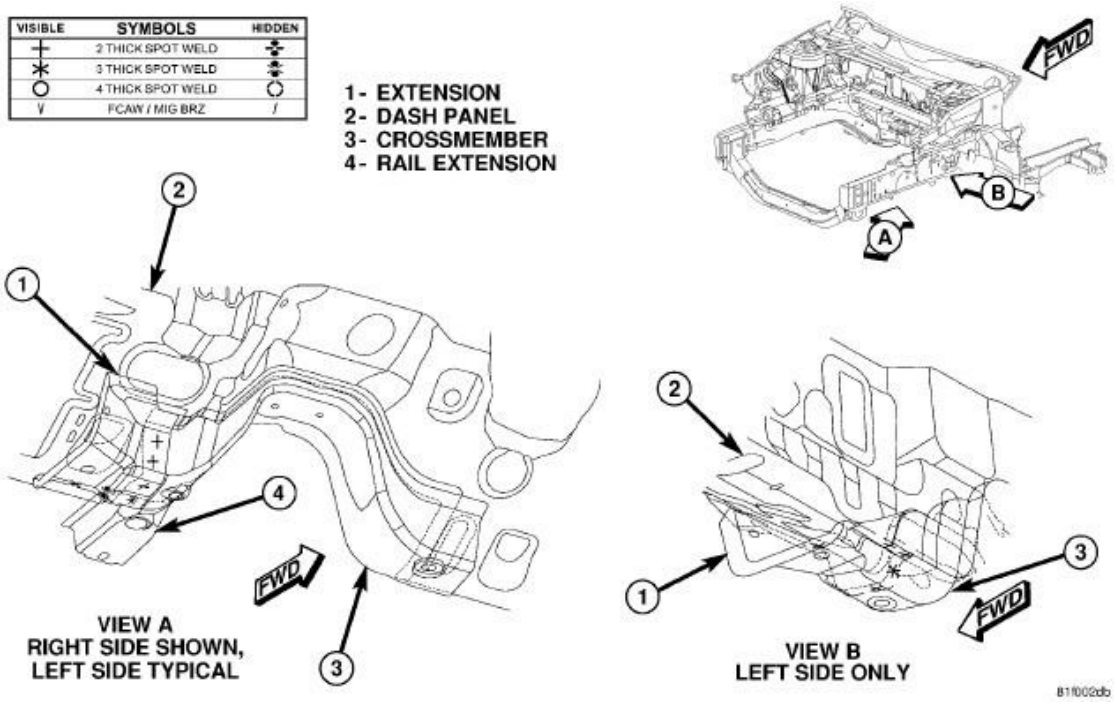

Fig. 348: ENGINE BOX (11 OF 17)
Courtesy of CHRYSLER LLC

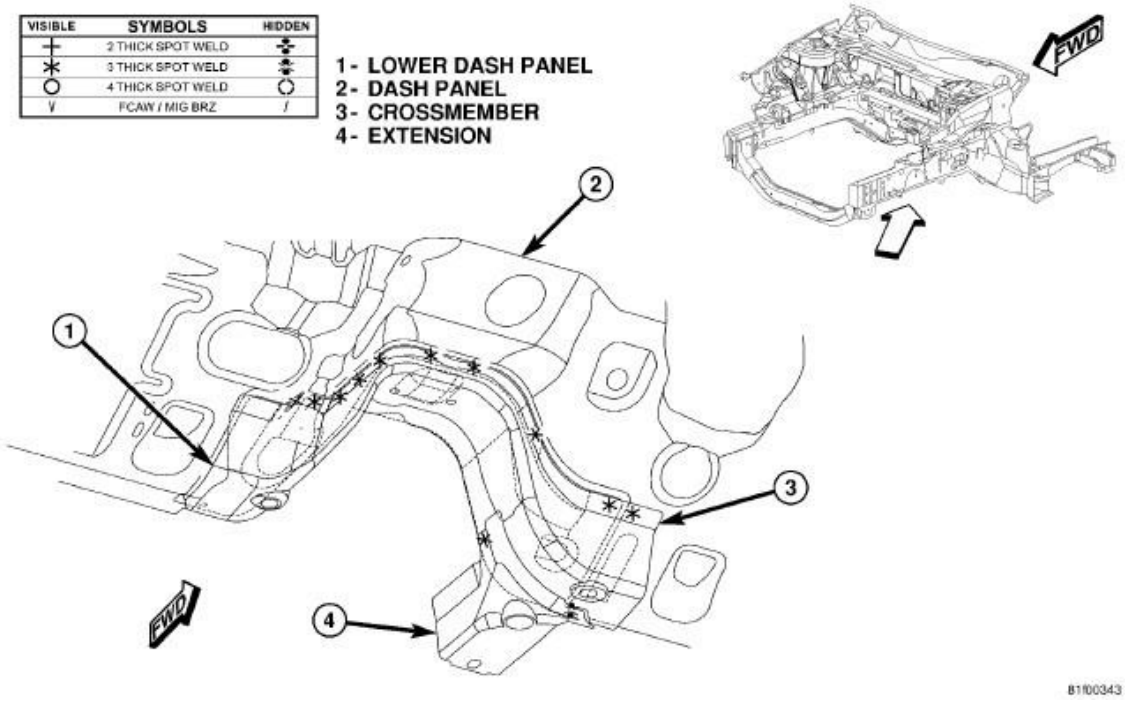

Fig. 349: ENGINE BOX (12 OF 17)
Courtesy of CHRYSLER LLC

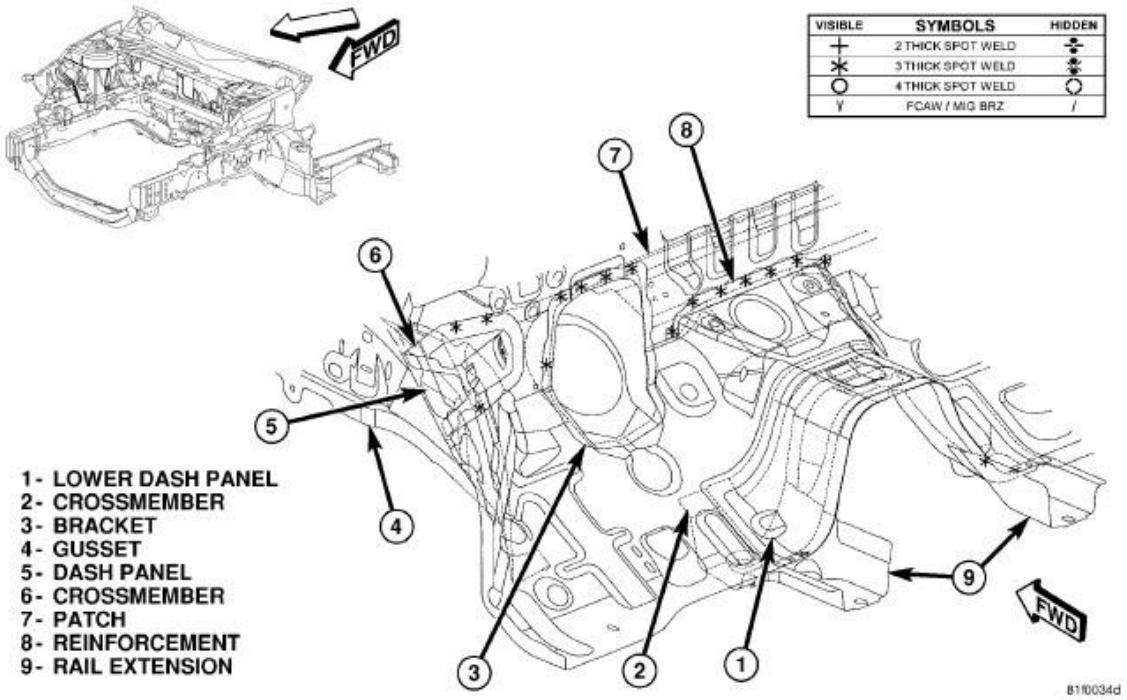

Fig. 350: ENGINE BOX (13 OF 17)
Courtesy of CHRYSLER LLC

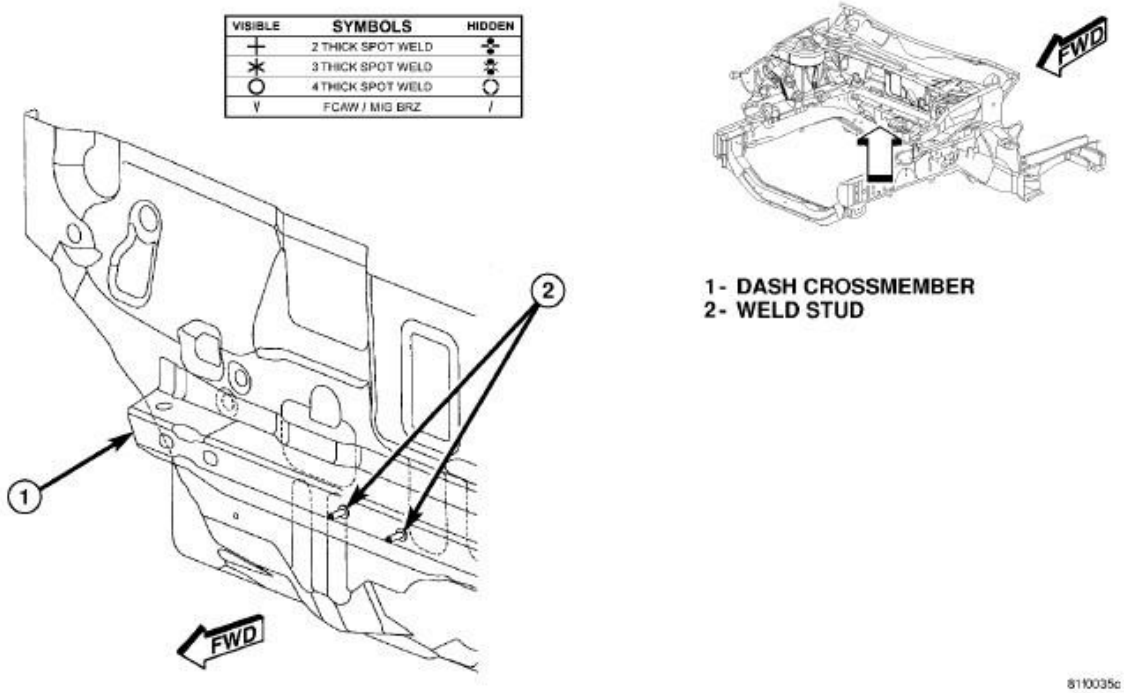

Fig. 351: ENGINE BOX (14 OF 17)
Courtesy of CHRYSLER LLC

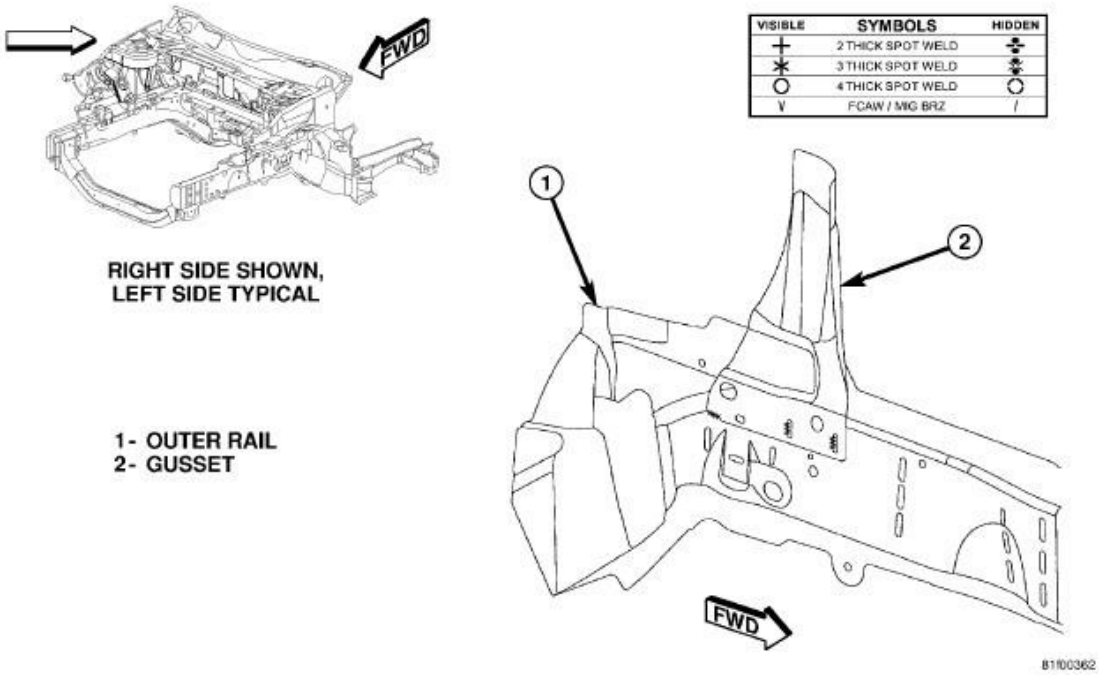

Fig. 352: ENGINE BOX (15 OF 17)
Courtesy of CHRYSLER LLC

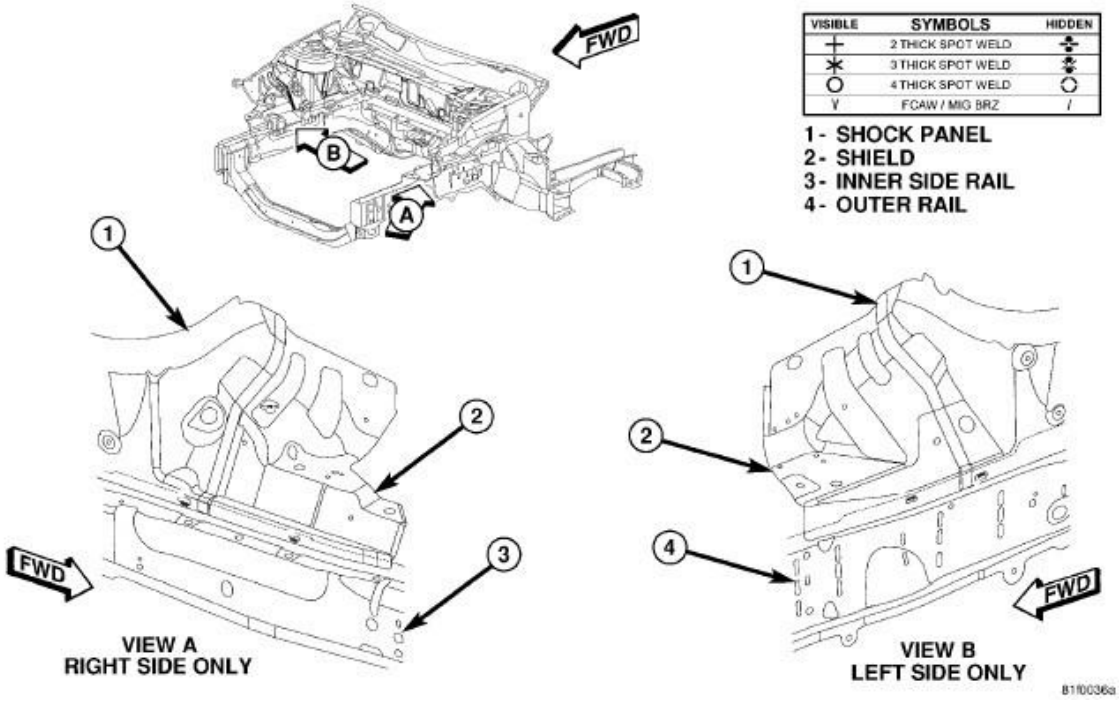

Fig. 353: ENGINE BOX (16 OF 17)
Courtesy of CHRYSLER LLC

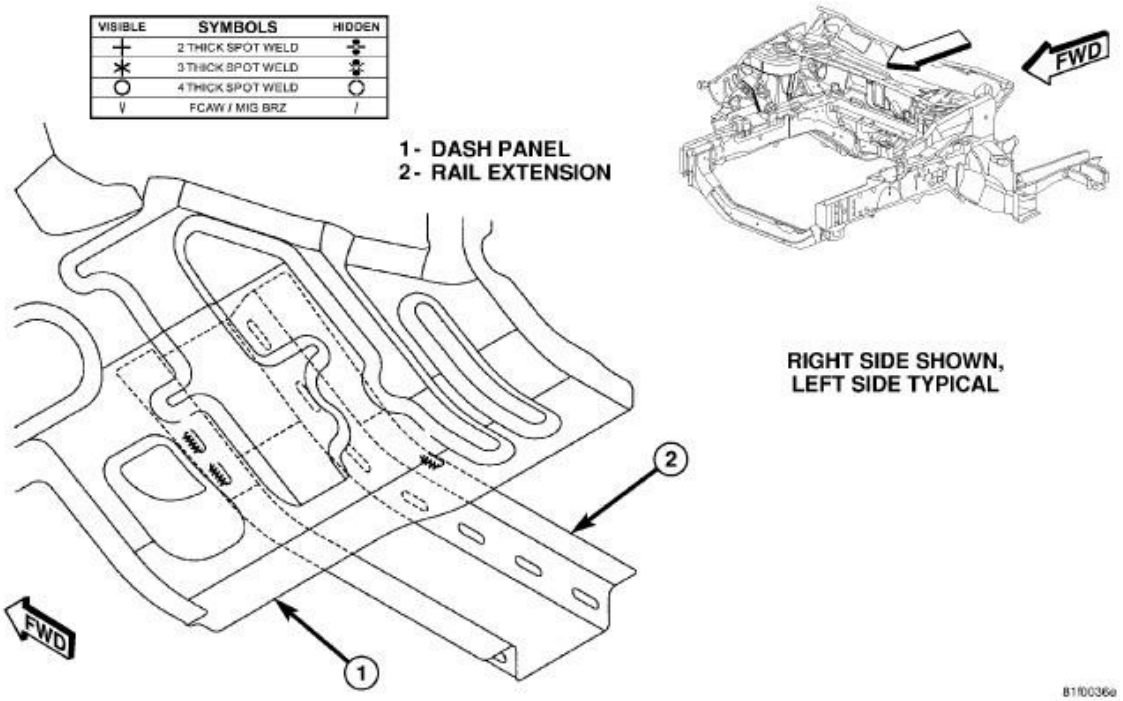

Fig. 354: ENGINE BOX (17 OF 17)
Courtesy of CHRYSLER LLC

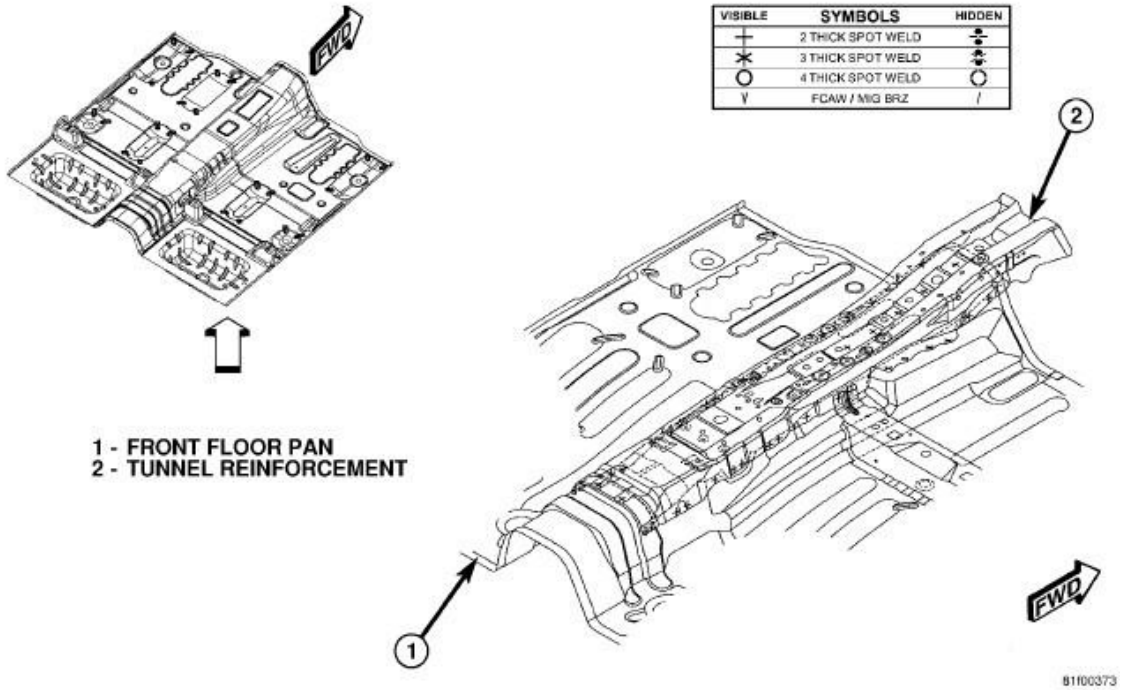

Fig. 355: FRONT FLOOR (1 OF 7)
Courtesy of CHRYSLER LLC

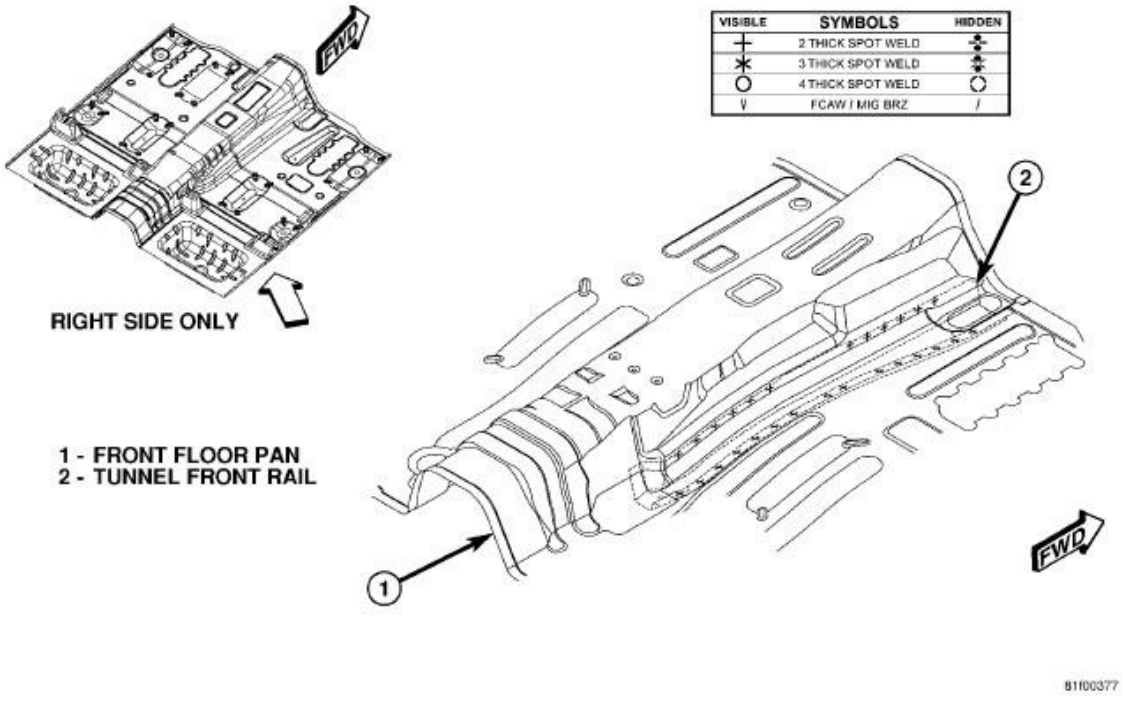

Fig. 356: FRONT FLOOR (2 OF 7)
Courtesy of CHRYSLER LLC

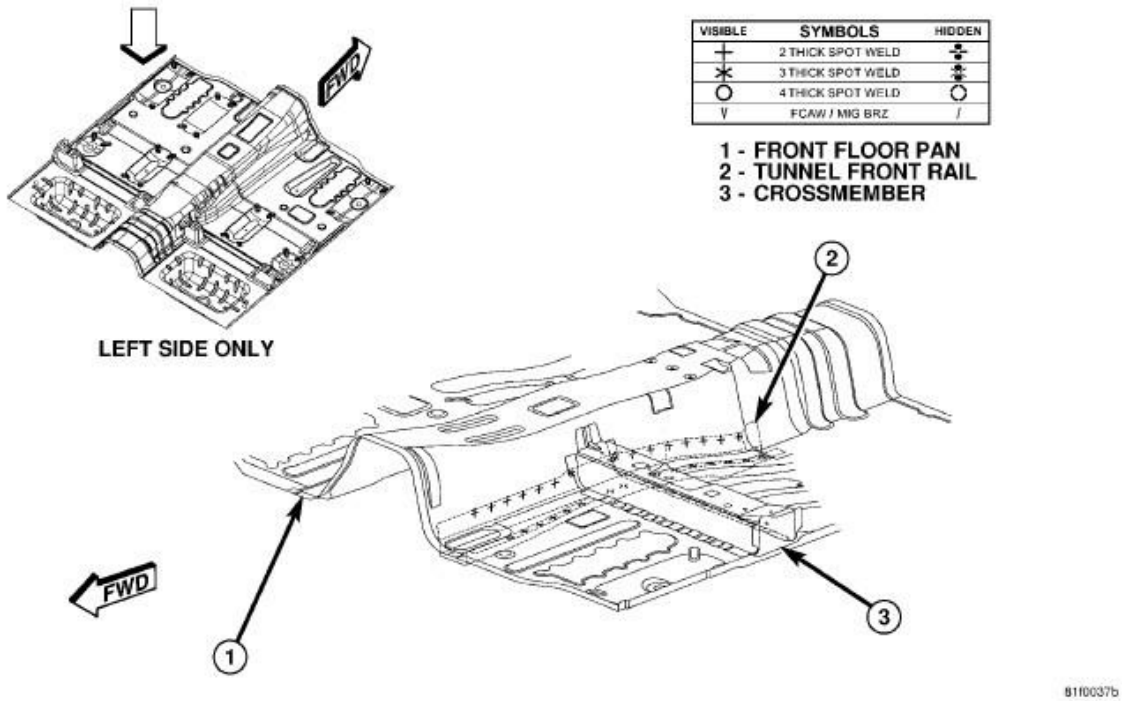

Fig. 357: FRONT FLOOR (3 OF 7)
Courtesy of CHRYSLER LLC

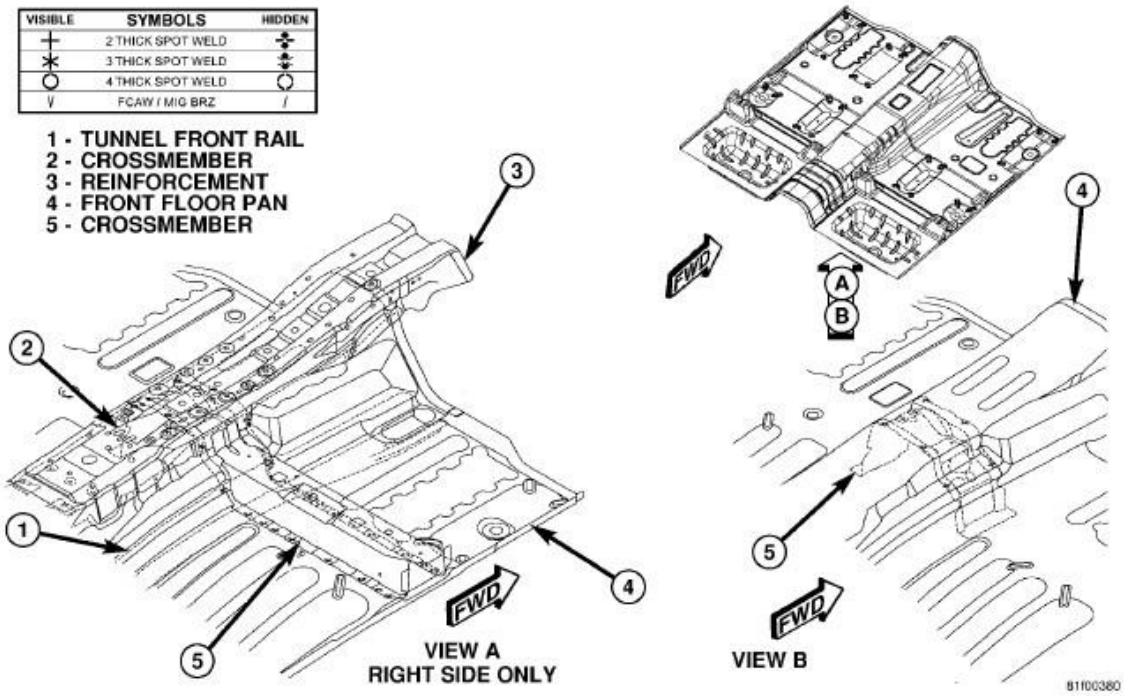

Fig. 358: FRONT FLOOR (4 OF 7)
Courtesy of CHRYSLER LLC

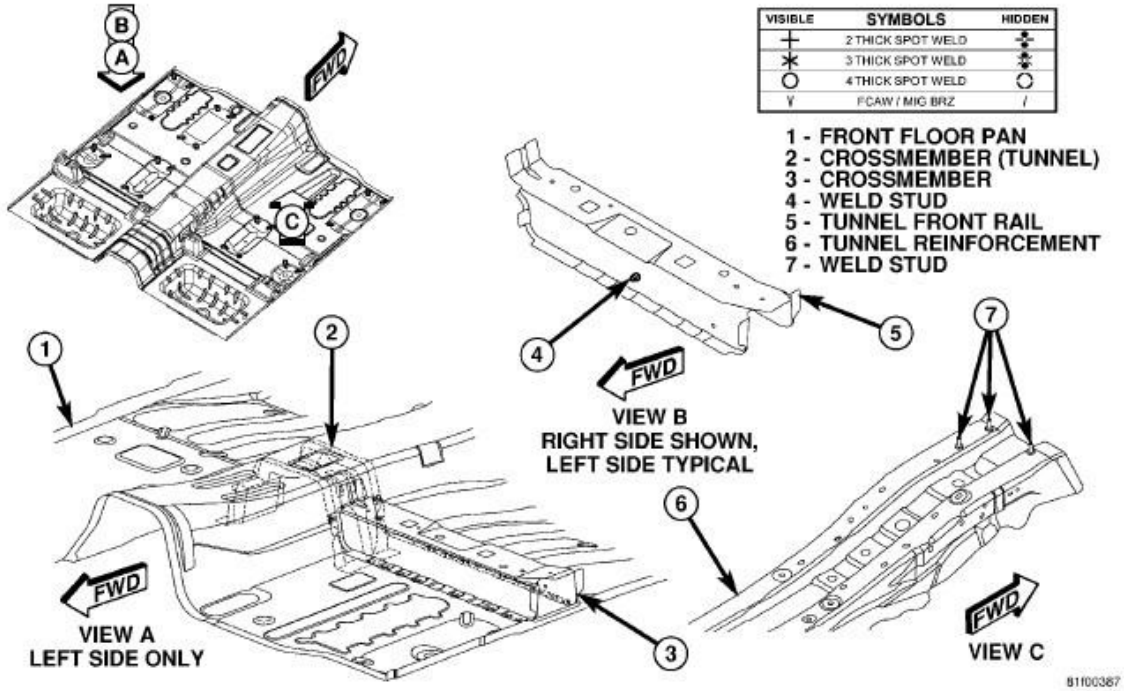

Fig. 359: FRONT FLOOR (5 OF 7)
Courtesy of CHRYSLER LLC

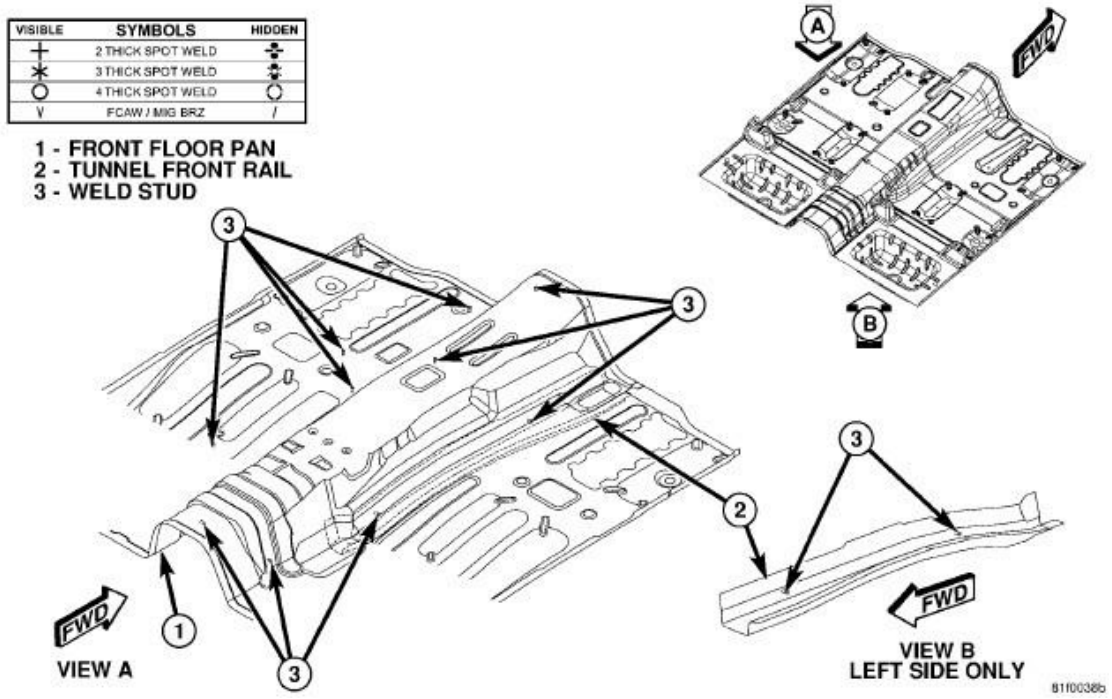

Fig. 360: FRONT FLOOR (6 OF 7)
Courtesy of CHRYSLER LLC

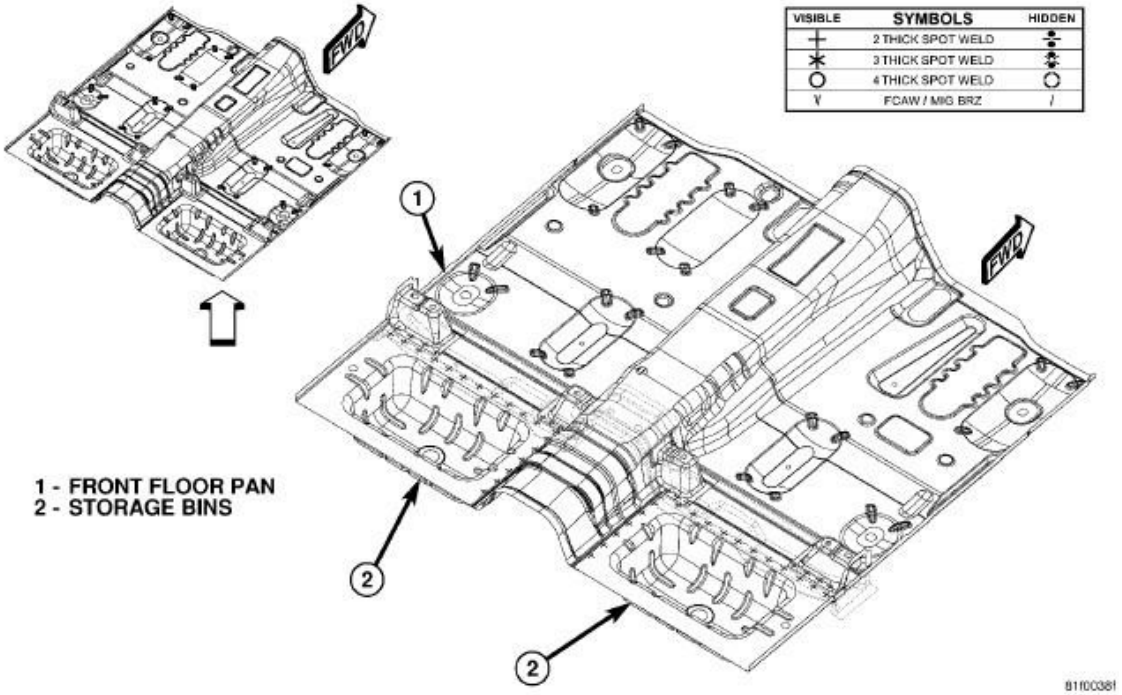

Fig. 361: FRONT FLOOR (7 OF 7)
Courtesy of CHRYSLER LLC

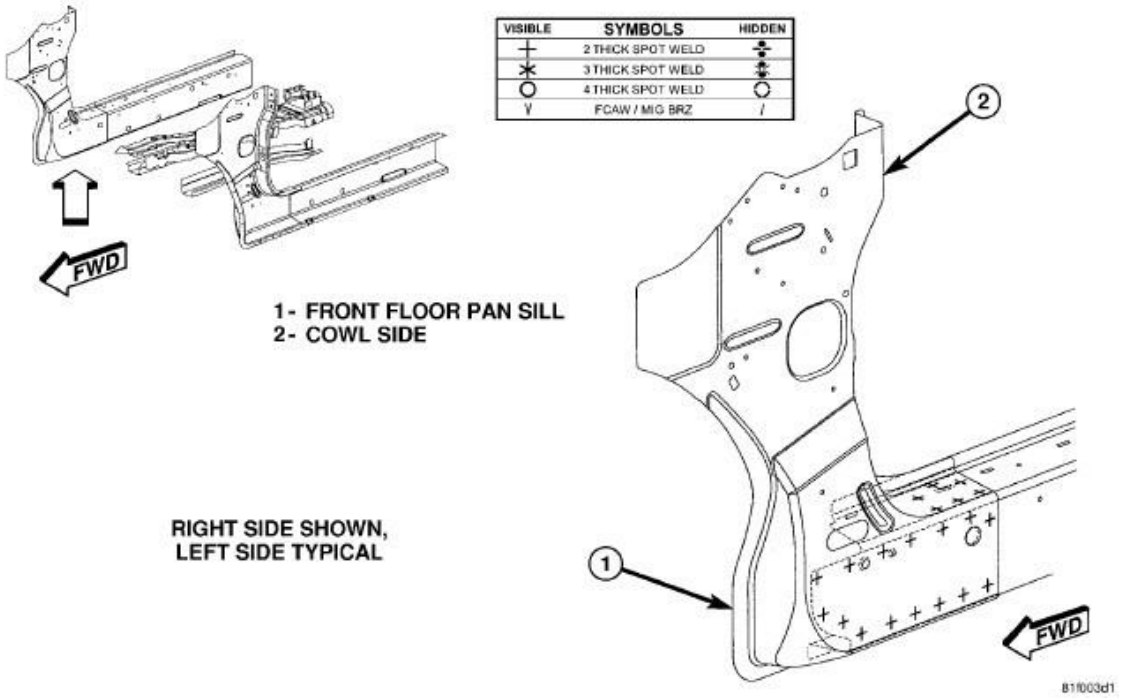

Fig. 362: UNDERBODY (1 OF 5)
Courtesy of CHRYSLER LLC

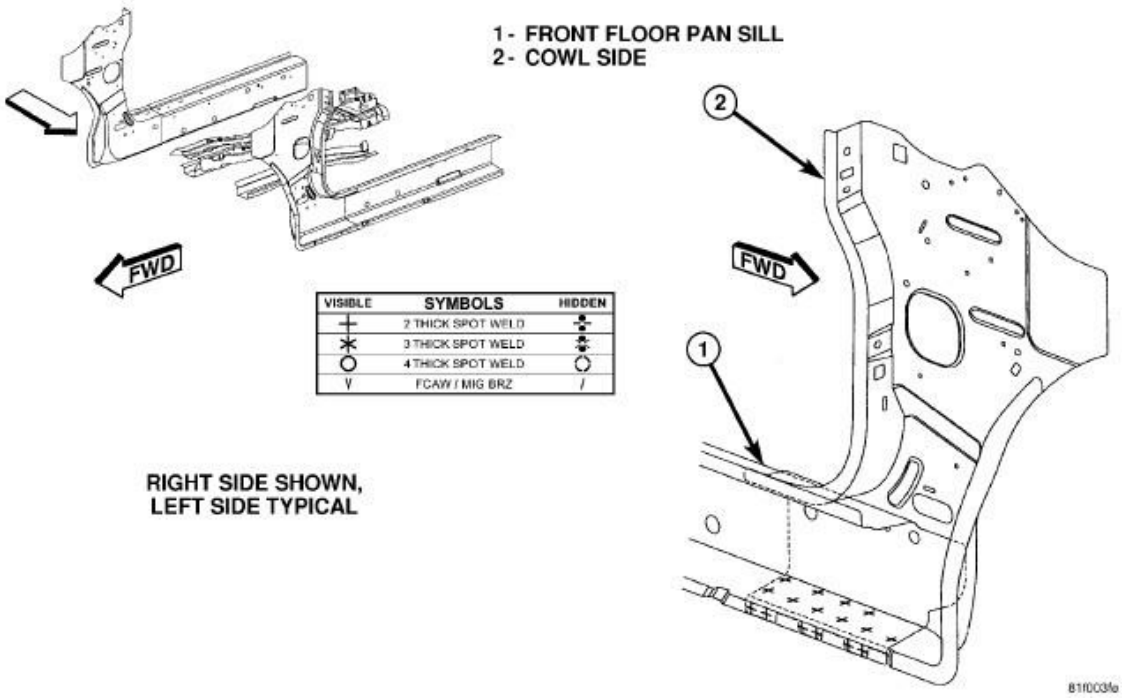

Fig. 363: UNDERBODY (2 OF 5)
Courtesy of CHRYSLER LLC

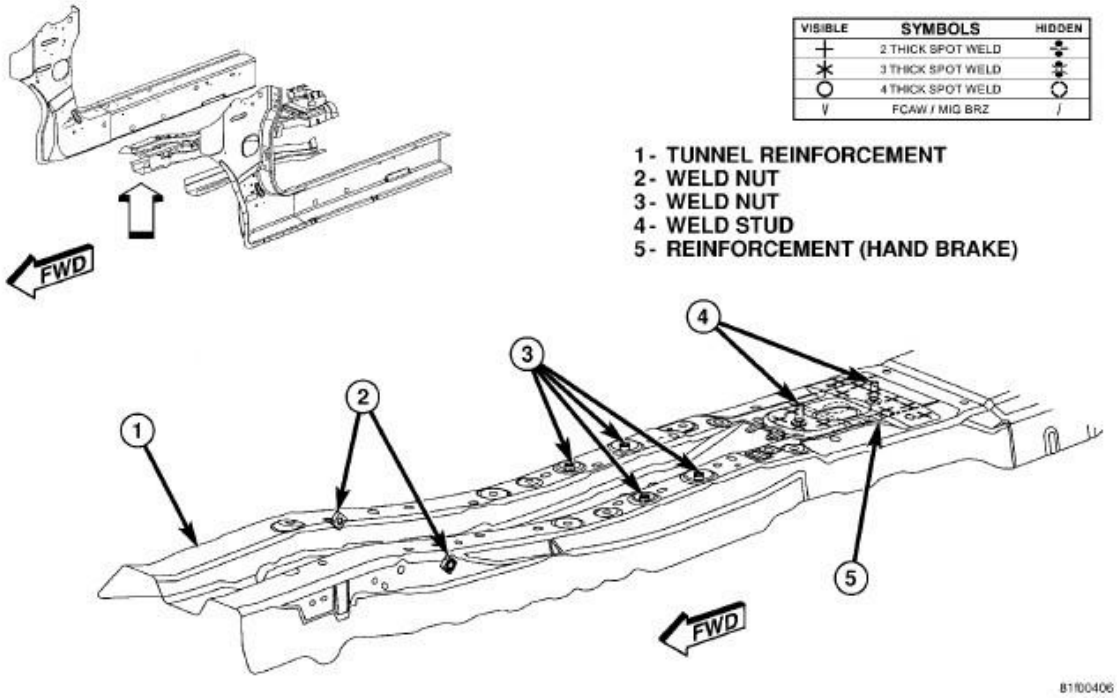

Fig. 364: UNDERBODY (3 OF 5)
Courtesy of CHRYSLER LLC

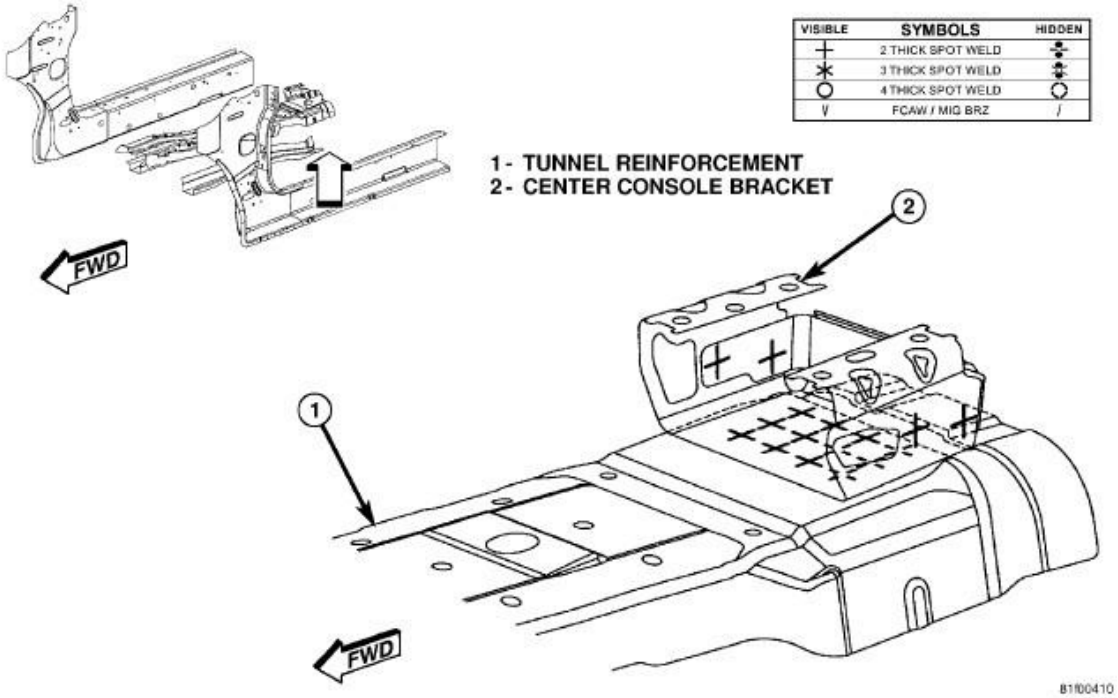

Fig. 365: UNDERBODY (4 OF 5)
Courtesy of CHRYSLER LLC

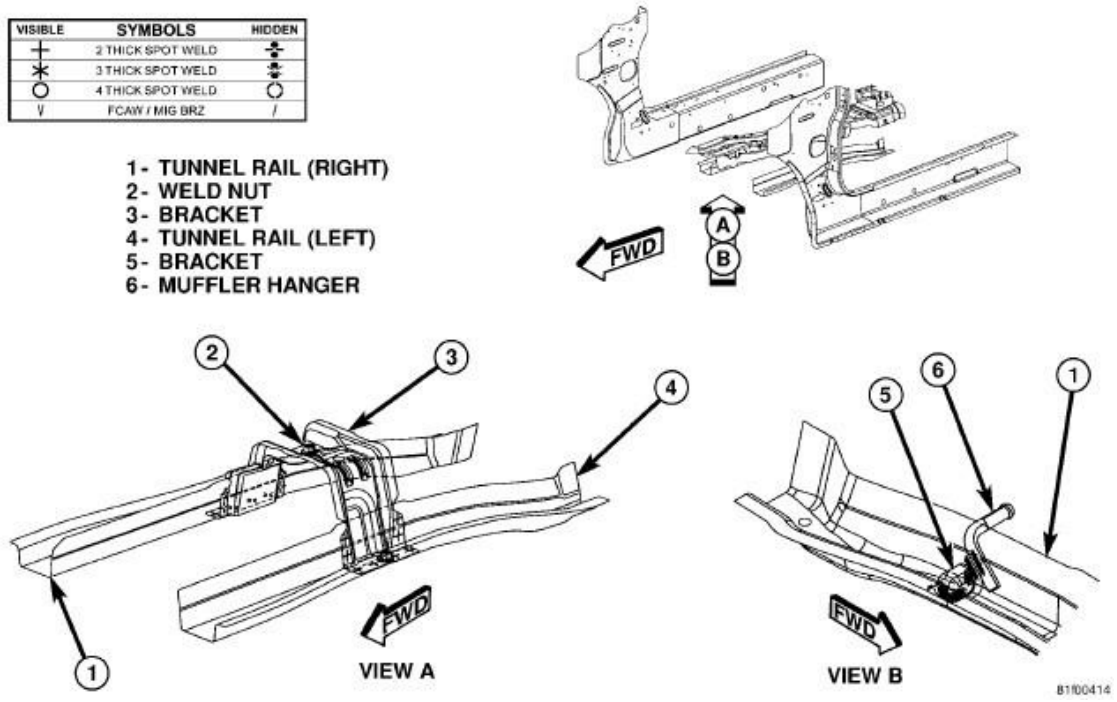

Fig. 366: UNDERBODY (5 OF 5)
Courtesy of CHRYSLER LLC

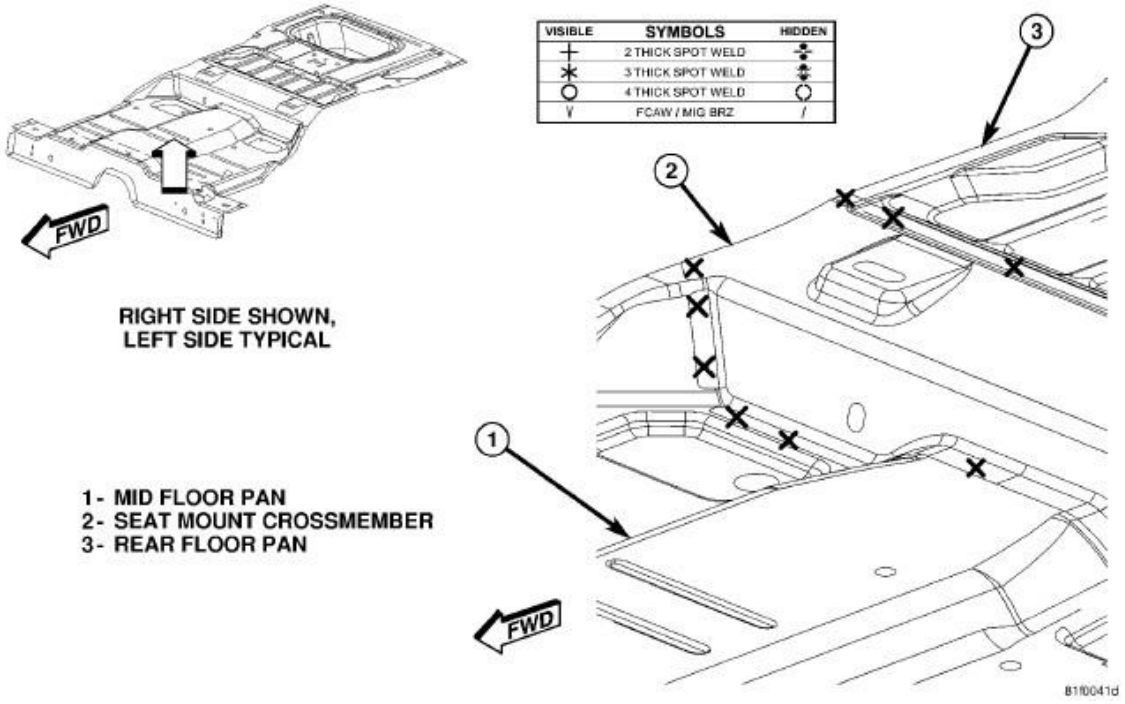

Fig. 367: UNDERBODY REAR (1 OF 4)
Courtesy of CHRYSLER LLC

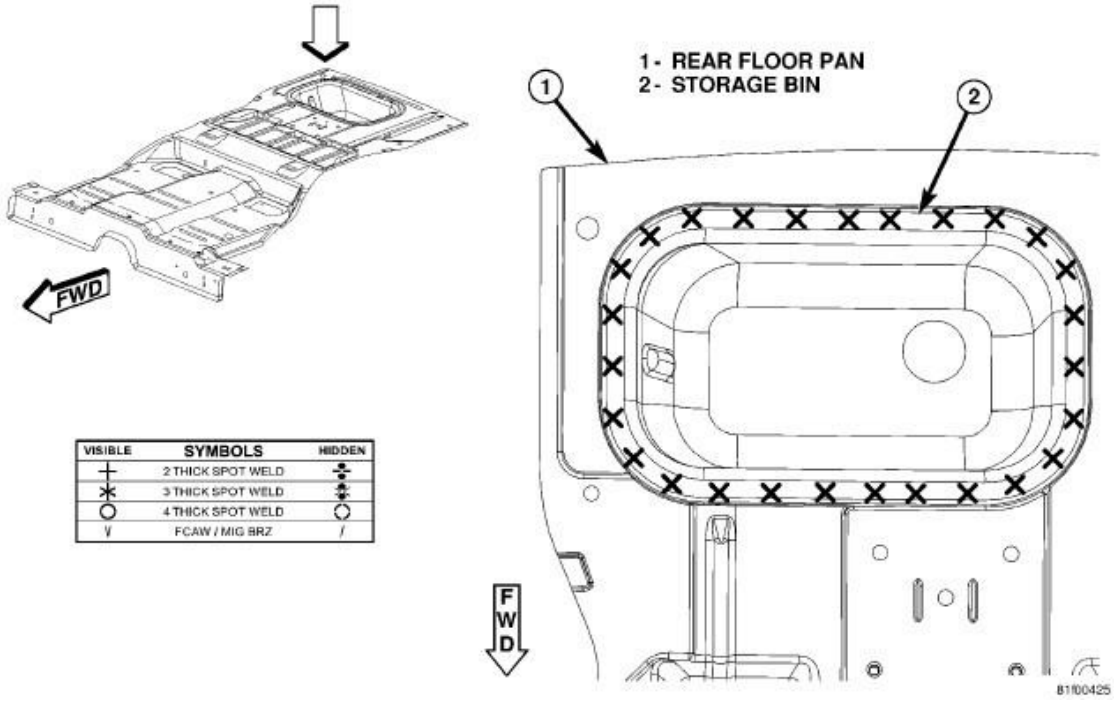

Fig. 368: UNDERBODY REAR (2 OF 4)
Courtesy of CHRYSLER LLC

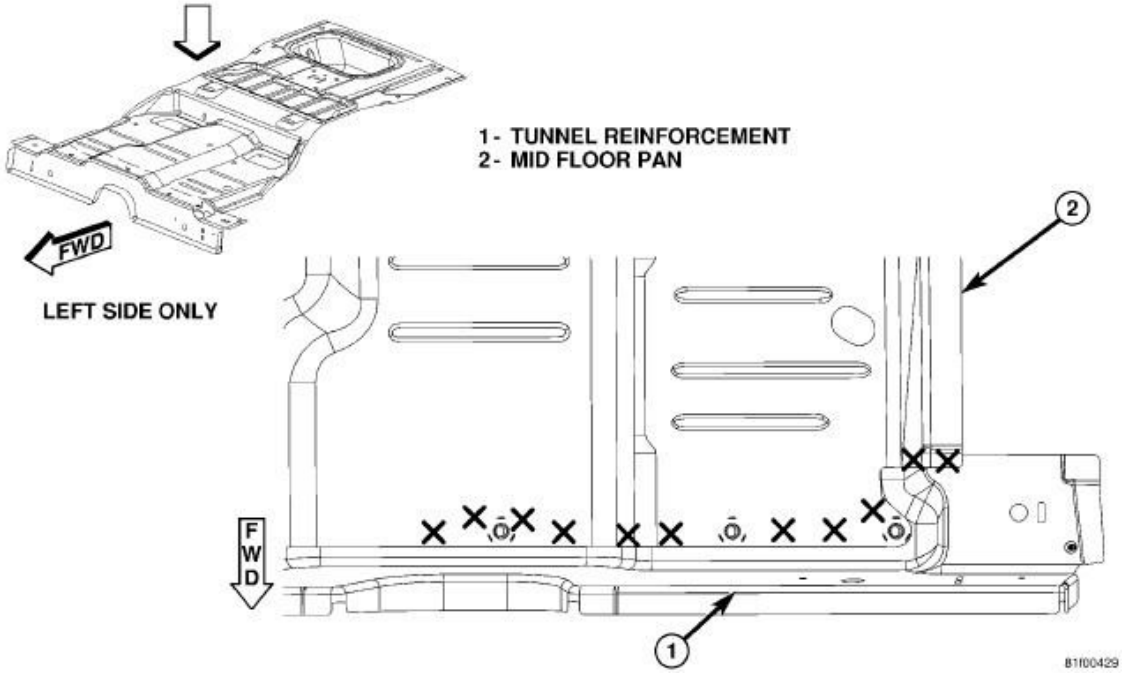

Fig. 369: UNDERBODY REAR (3 OF 4)
Courtesy of CHRYSLER LLC

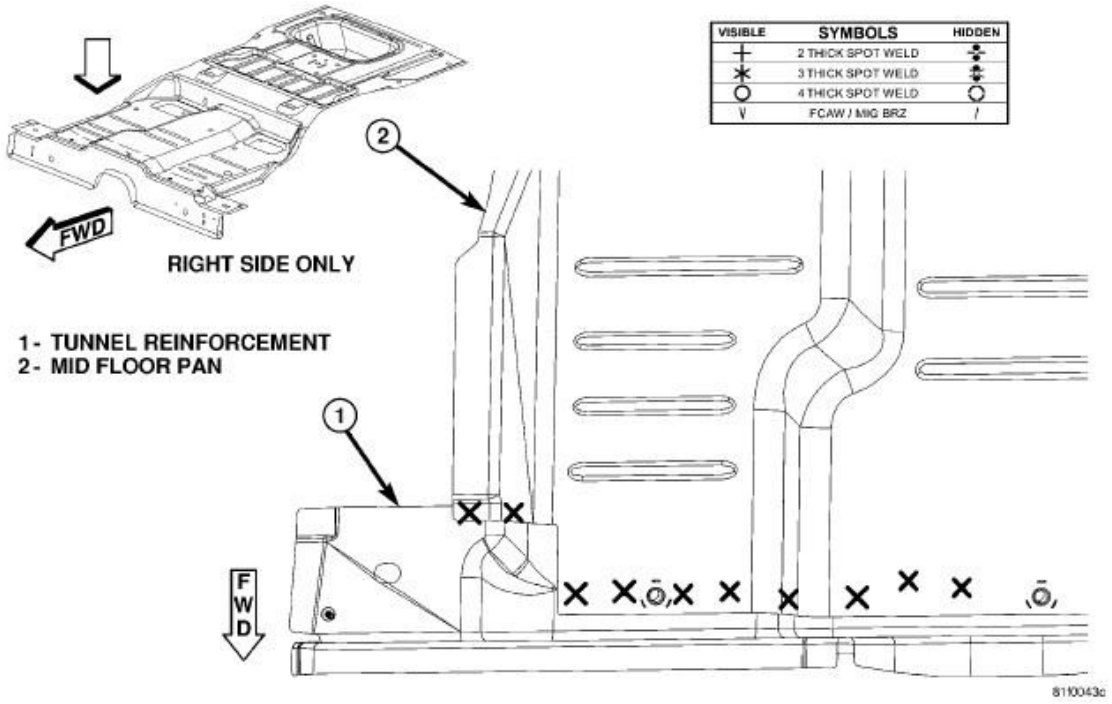

Fig. 370: UNDERBODY REAR (4 OF 4)
Courtesy of CHRYSLER LLC

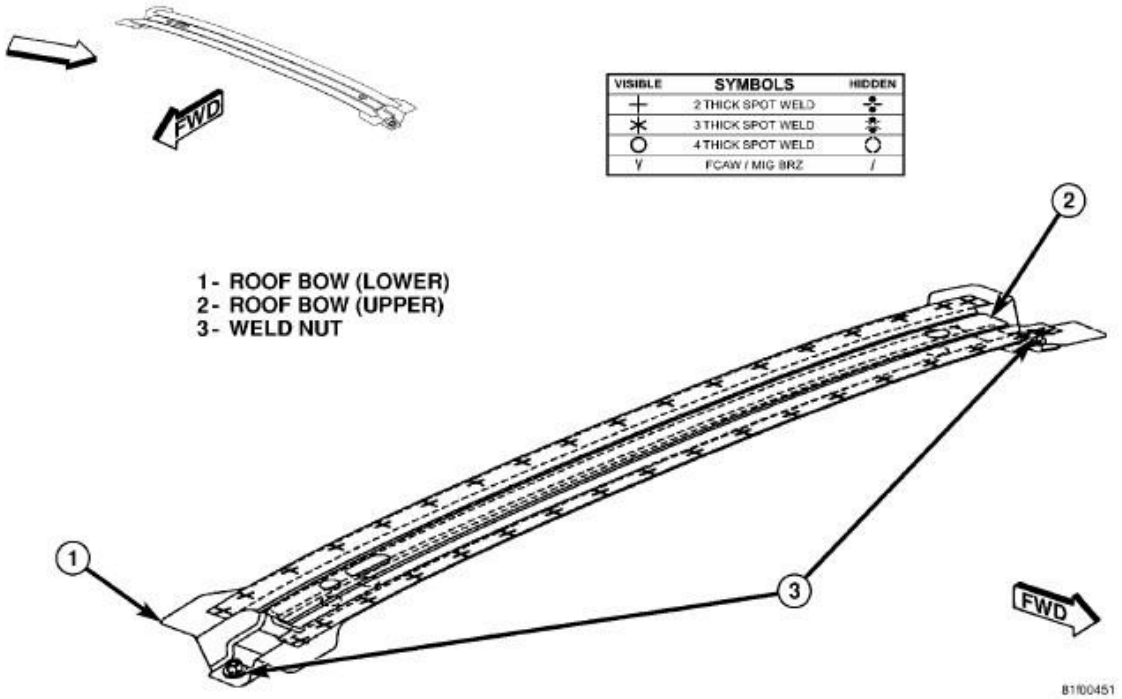

Fig. 371: MISCELLANEOUS BODY
Courtesy of CHRYSLER LLC

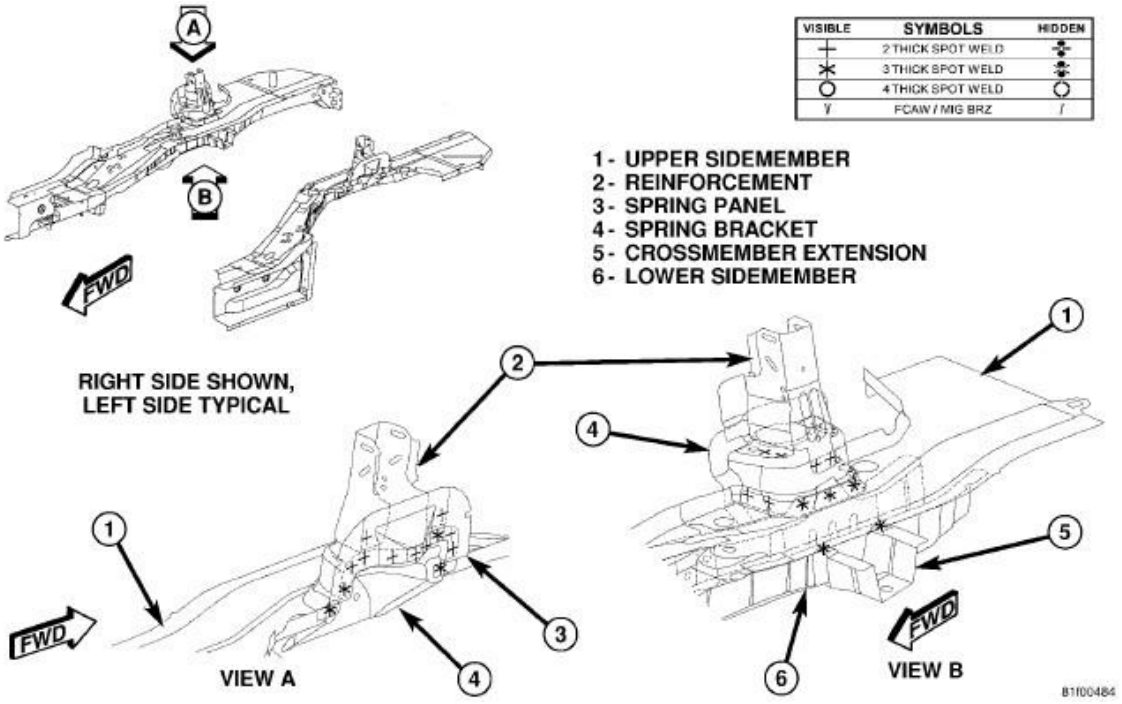

Fig. 372: SIDEMEMBER (1 OF 16)
Courtesy of CHRYSLER LLC

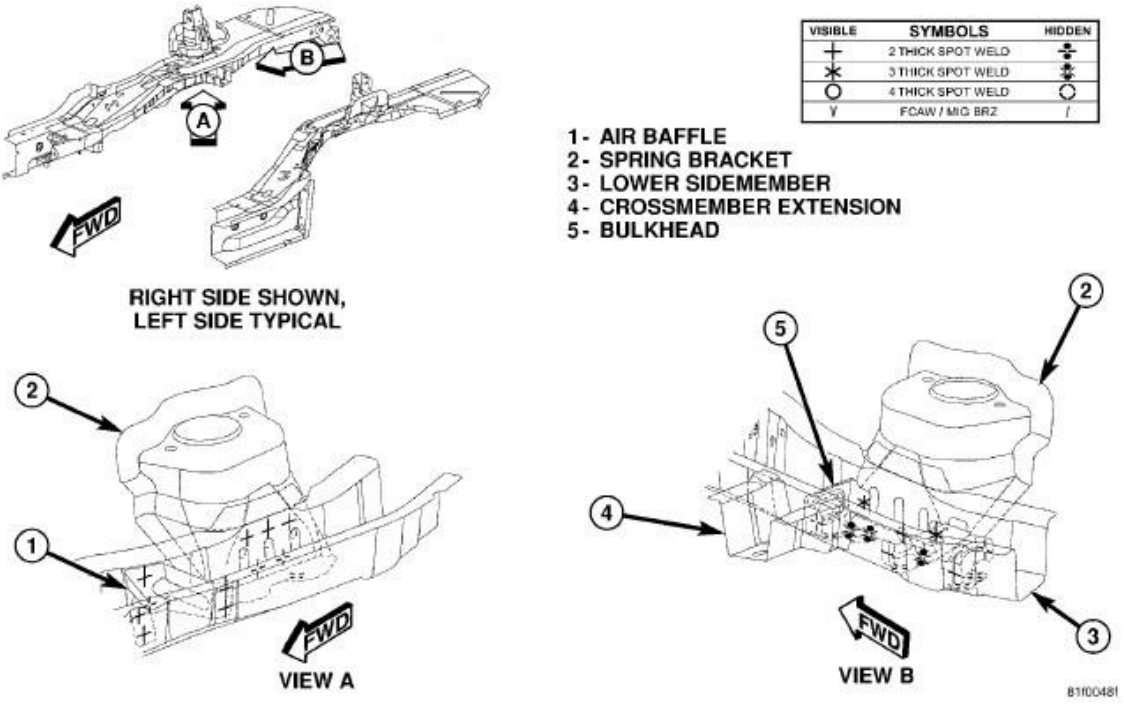

Fig. 373: SIDEMEMBER (2 OF 16)
Courtesy of CHRYSLER LLC

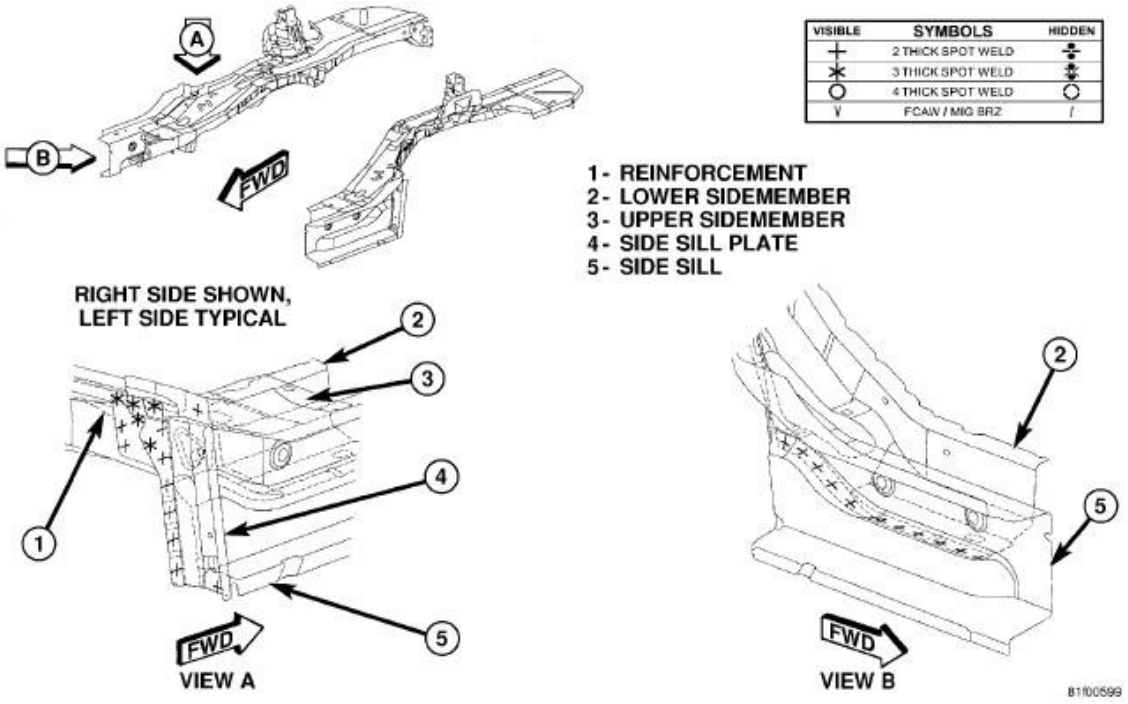

Fig. 374: SIDEMEMBER (3 OF 16)
Courtesy of CHRYSLER LLC

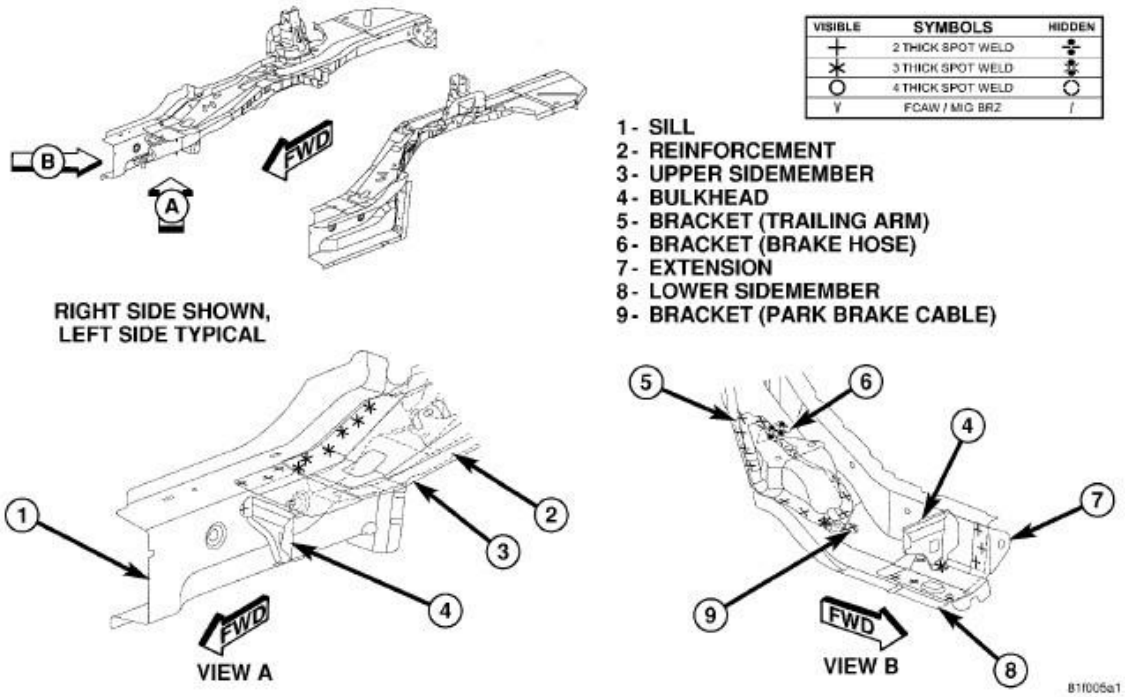

Fig. 375: SIDEMEMBER (4 OF 16)
Courtesy of CHRYSLER LLC

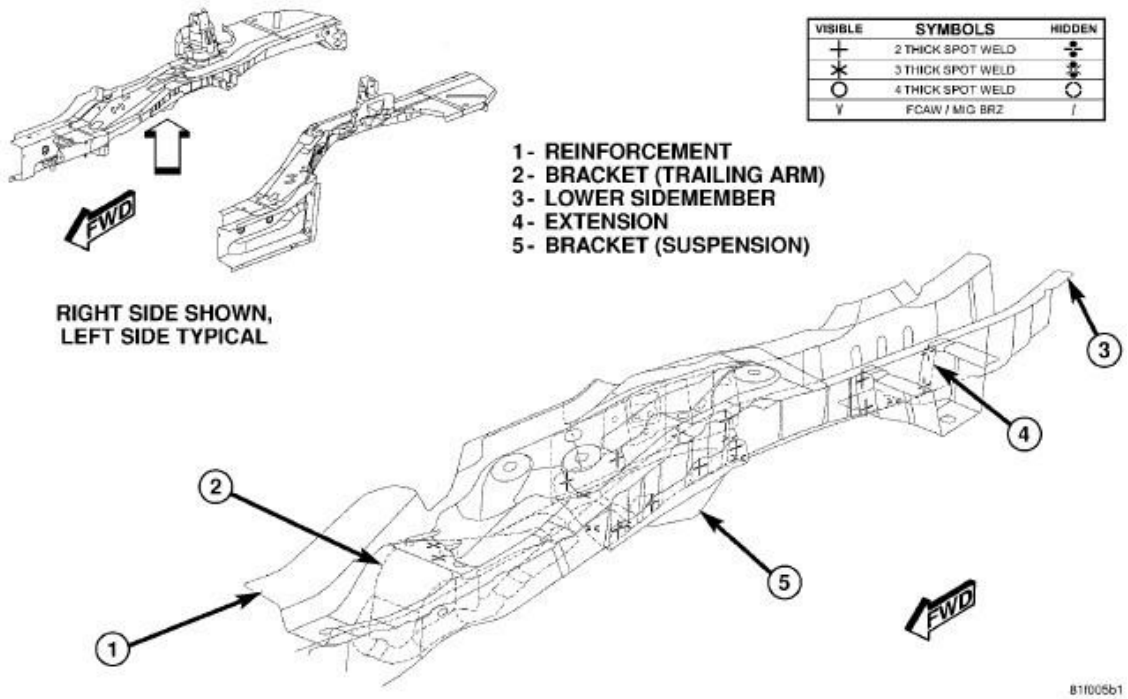

Fig. 376: SIDEMEMBER (5 OF 16)
Courtesy of CHRYSLER LLC

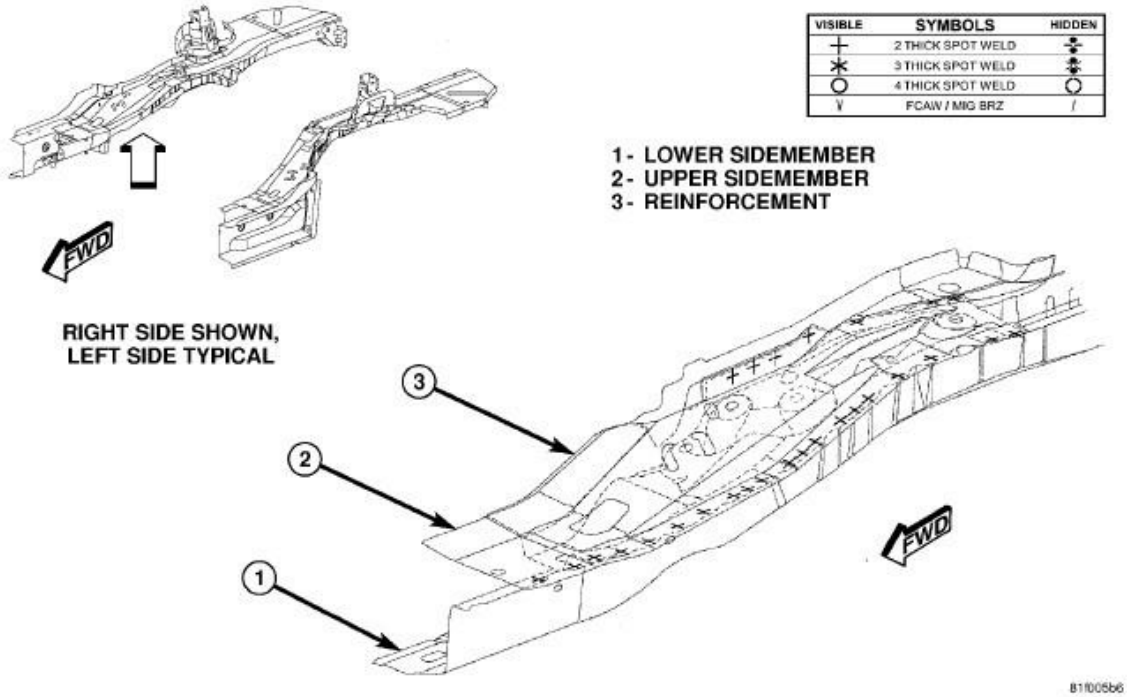

Fig. 377: SIDEMEMBER (6 OF 16)
Courtesy of CHRYSLER LLC

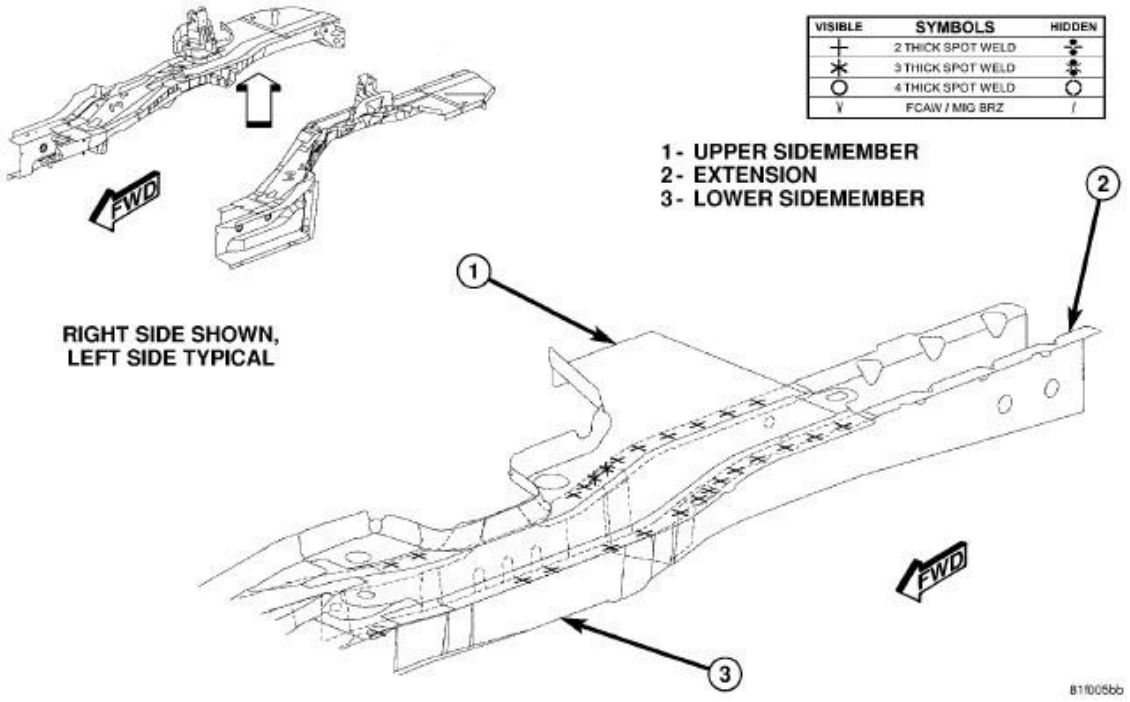

Fig. 378: SIDEMEMBER (7 OF 16)
Courtesy of CHRYSLER LLC

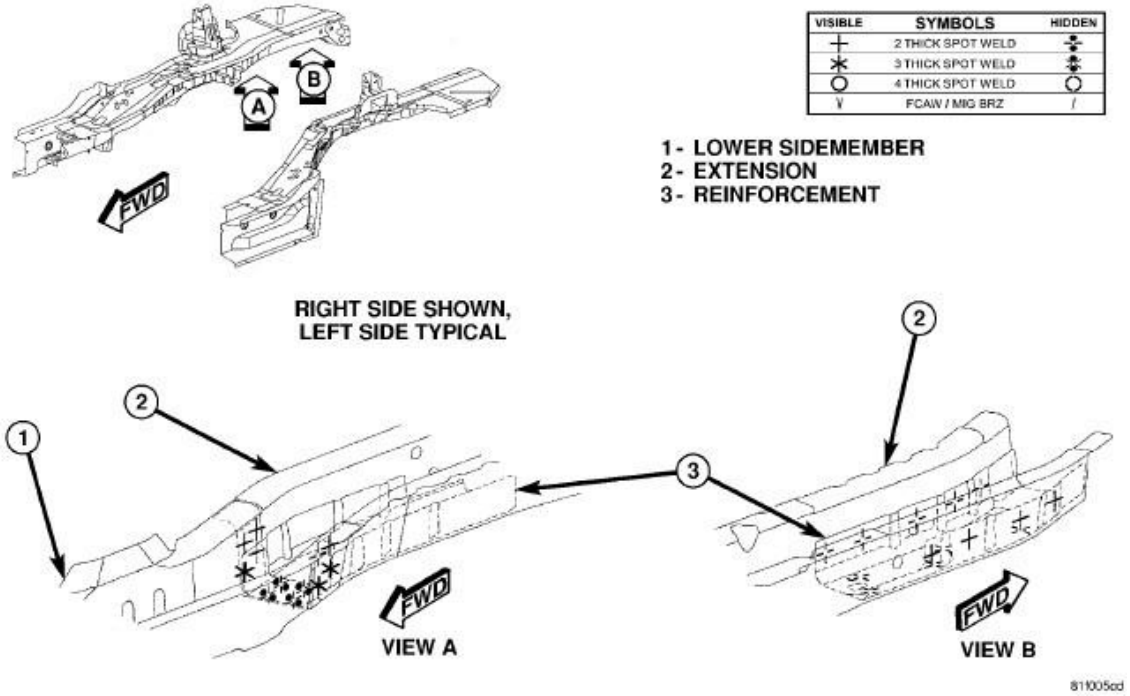

Fig. 379: SIDEMEMBER (8 OF 16)
Courtesy of CHRYSLER LLC

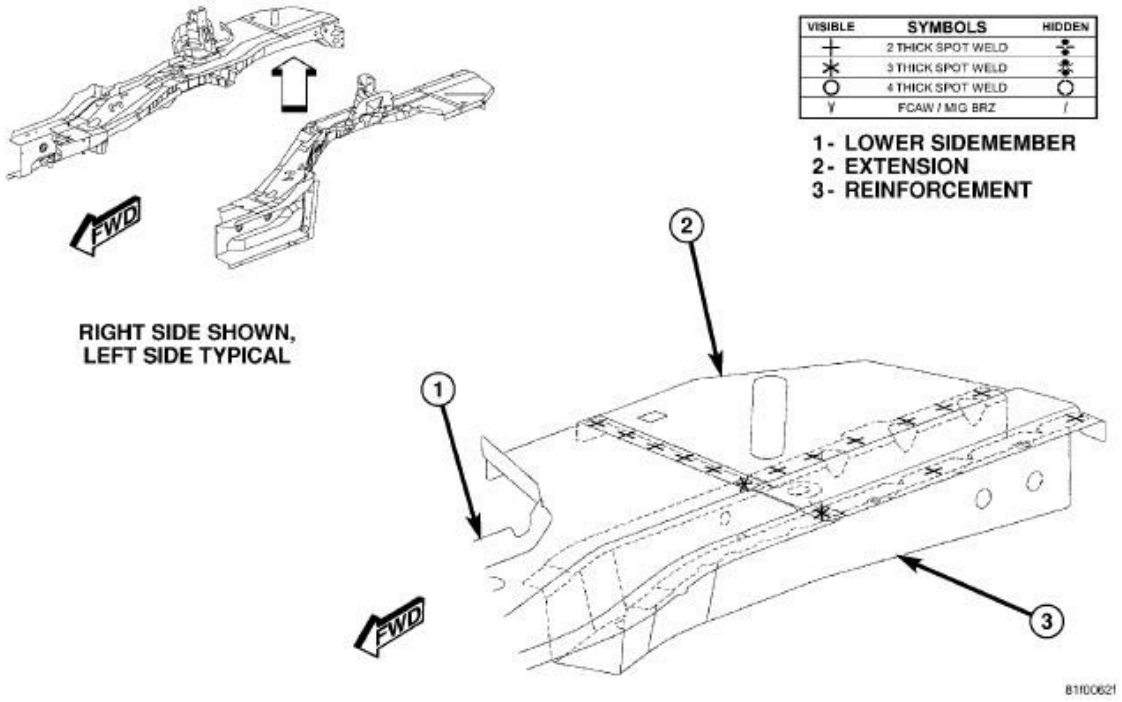

Fig. 380: SIDEMEMBER (9 OF 16)
Courtesy of CHRYSLER LLC

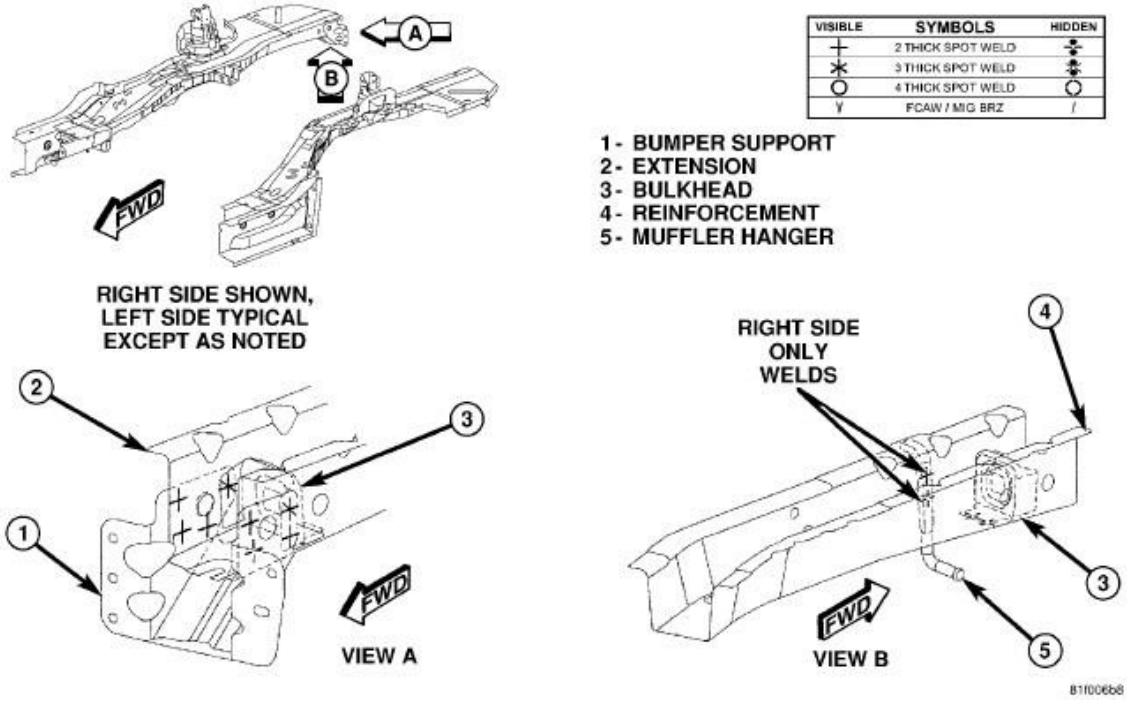

Fig. 381: SIDEMEMBER (10 OF 16)
Courtesy of CHRYSLER LLC

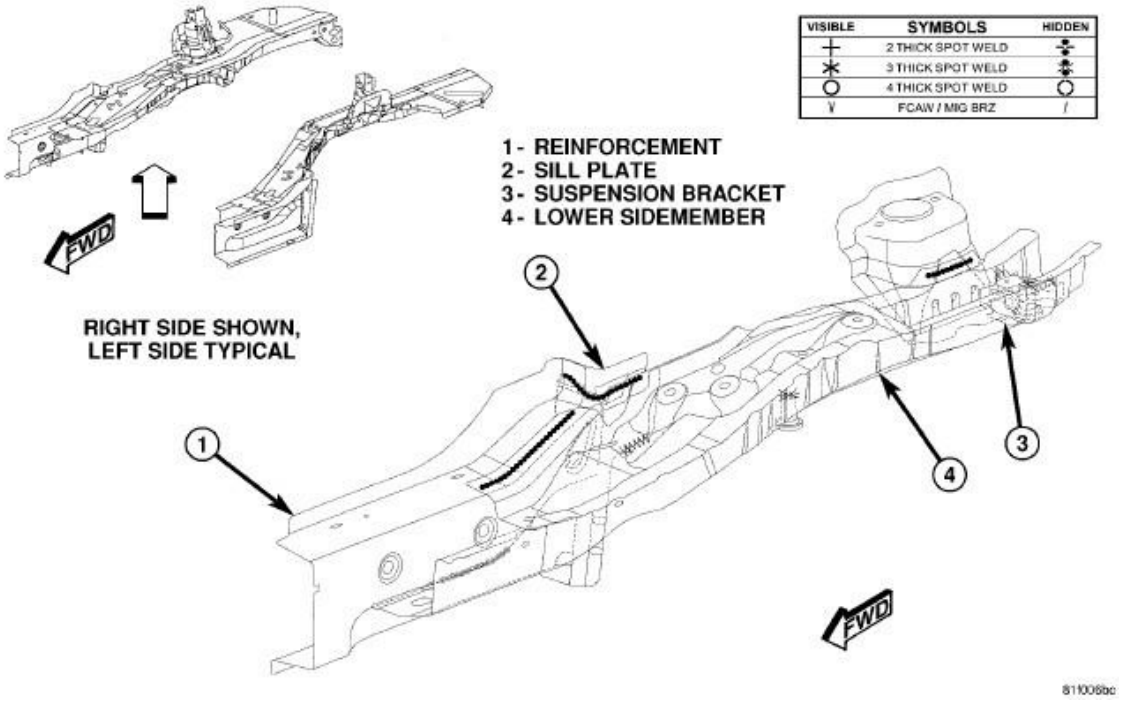

Fig. 382: SIDEMEMBER (11 OF 16)
Courtesy of CHRYSLER LLC

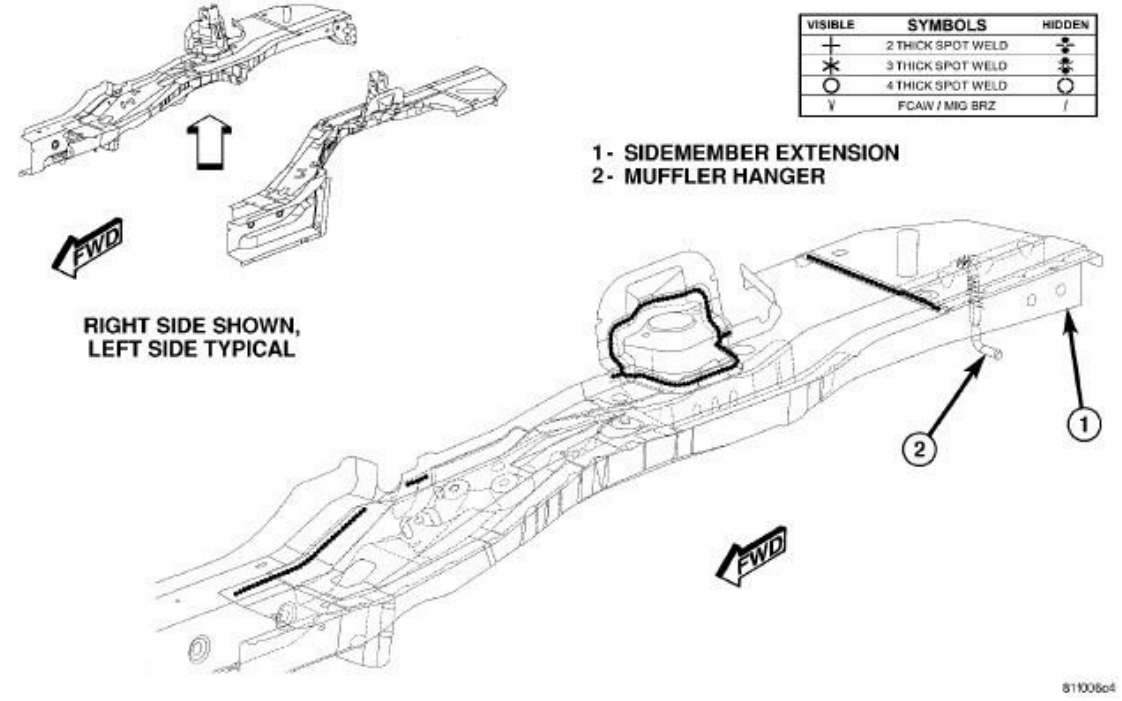

Fig. 383: SIDEMEMBER (12 OF 16)
Courtesy of CHRYSLER LLC

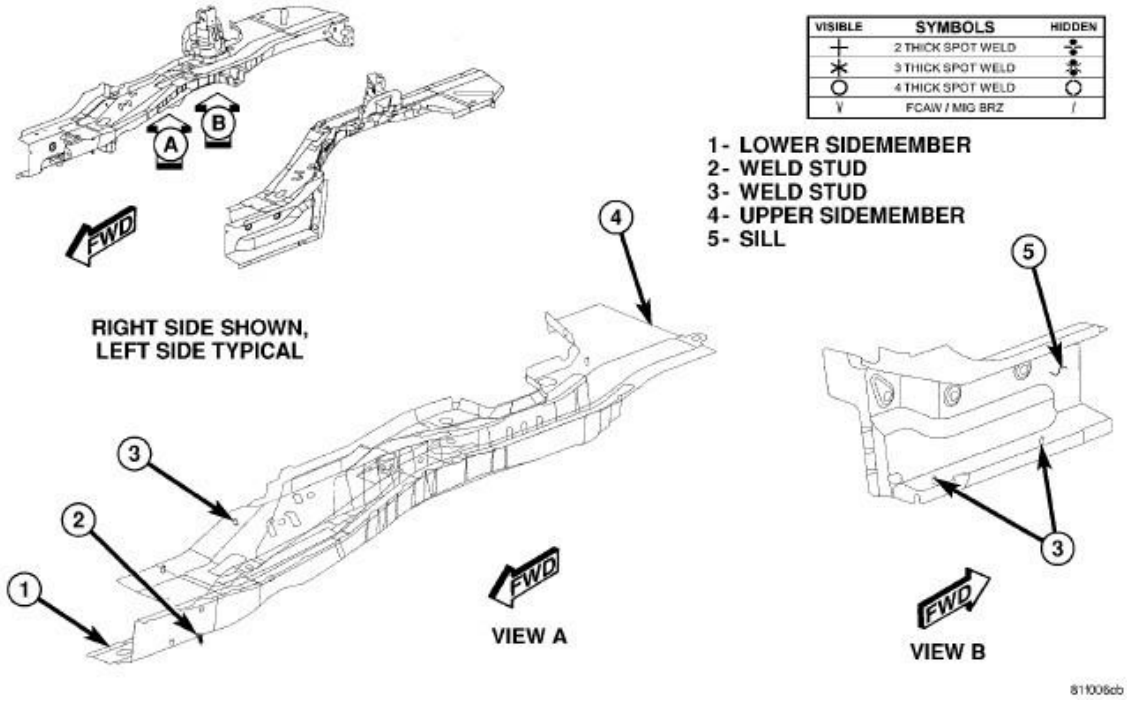

Fig. 384: SIDEMEMBER (13 OF 16)
Courtesy of CHRYSLER LLC

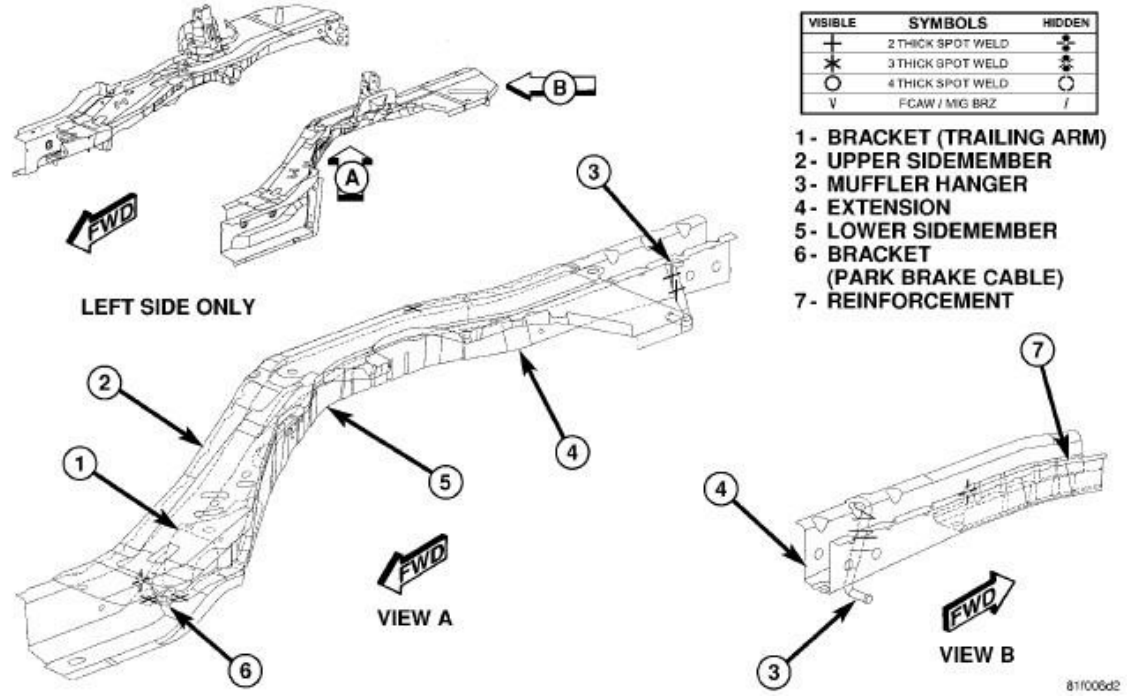

Fig. 385: SIDEMEMBER (14 OF 16)
Courtesy of CHRYSLER LLC

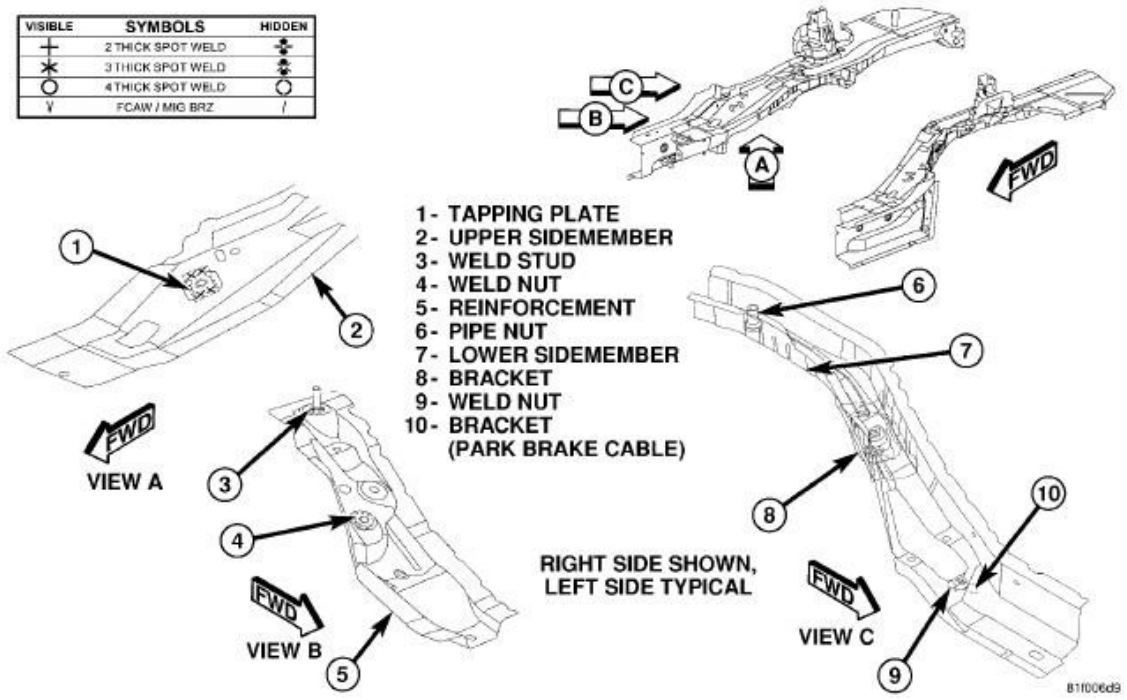

Fig. 386: SIDEMEMBER (15 OF 16)
Courtesy of CHRYSLER LLC

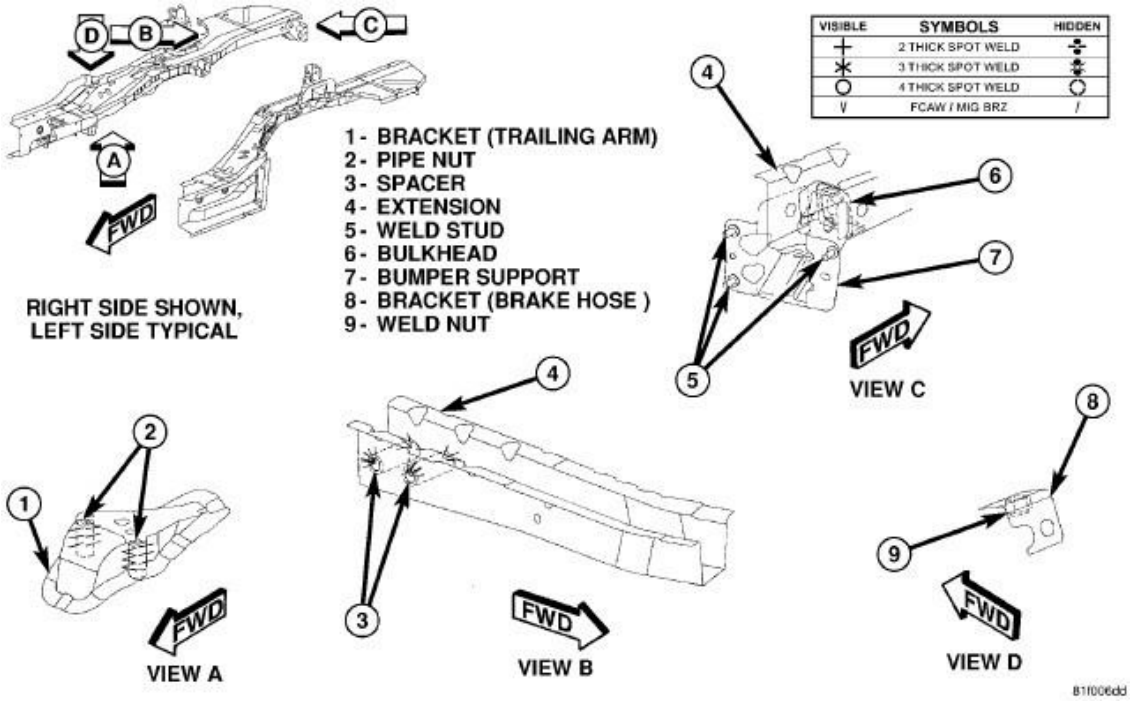

Fig. 387: SIDEMEMBER (16 OF 16)
Courtesy of CHRYSLER LLC

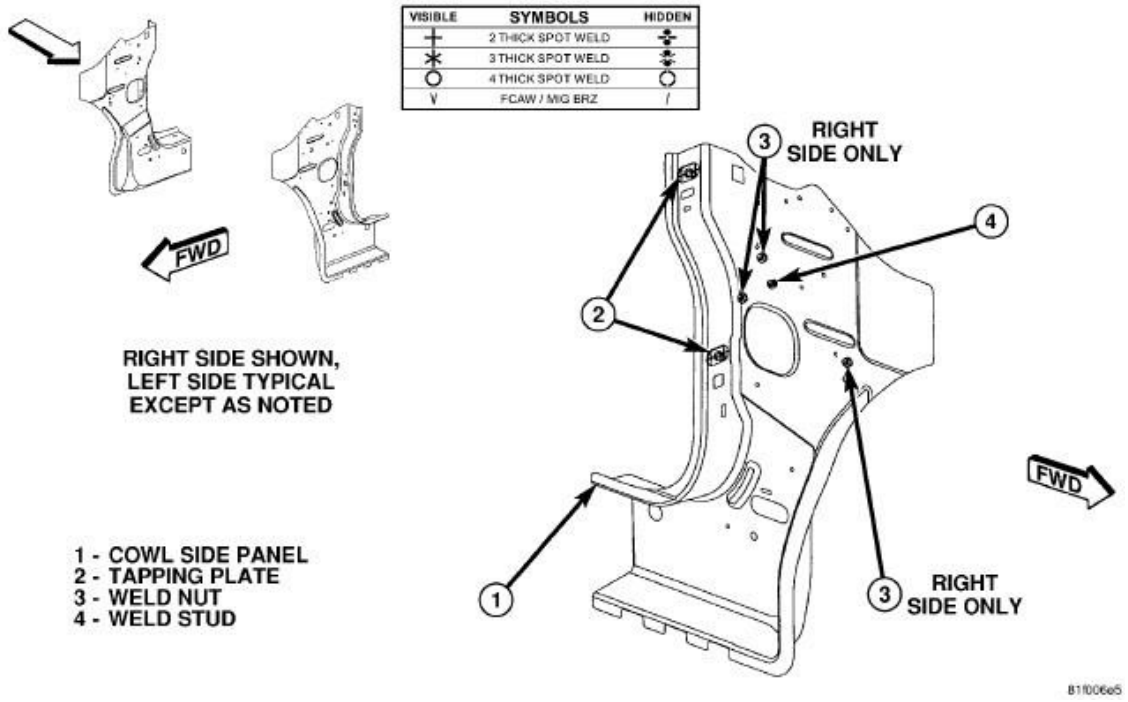

Fig. 388: MISCELLANEOUS COWL/FLOOR (1 OF 3)
Courtesy of CHRYSLER LLC

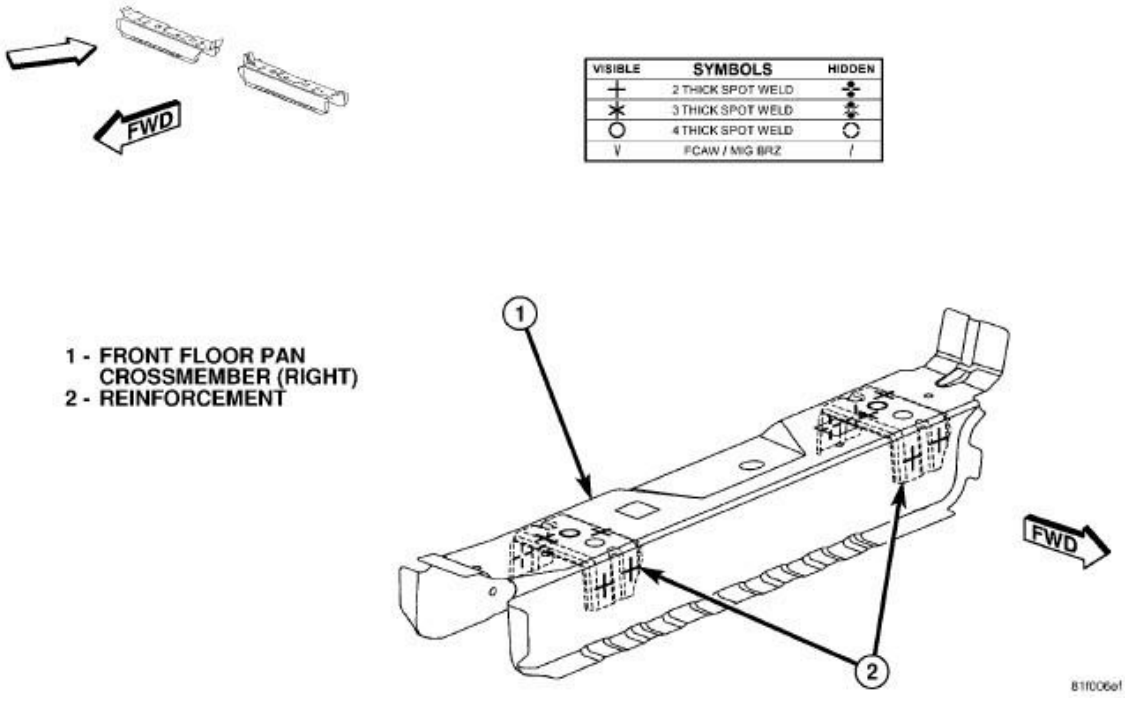

Fig. 389: MISCELLANEOUS COWL/FLOOR (2 OF 3)
Courtesy of CHRYSLER LLC

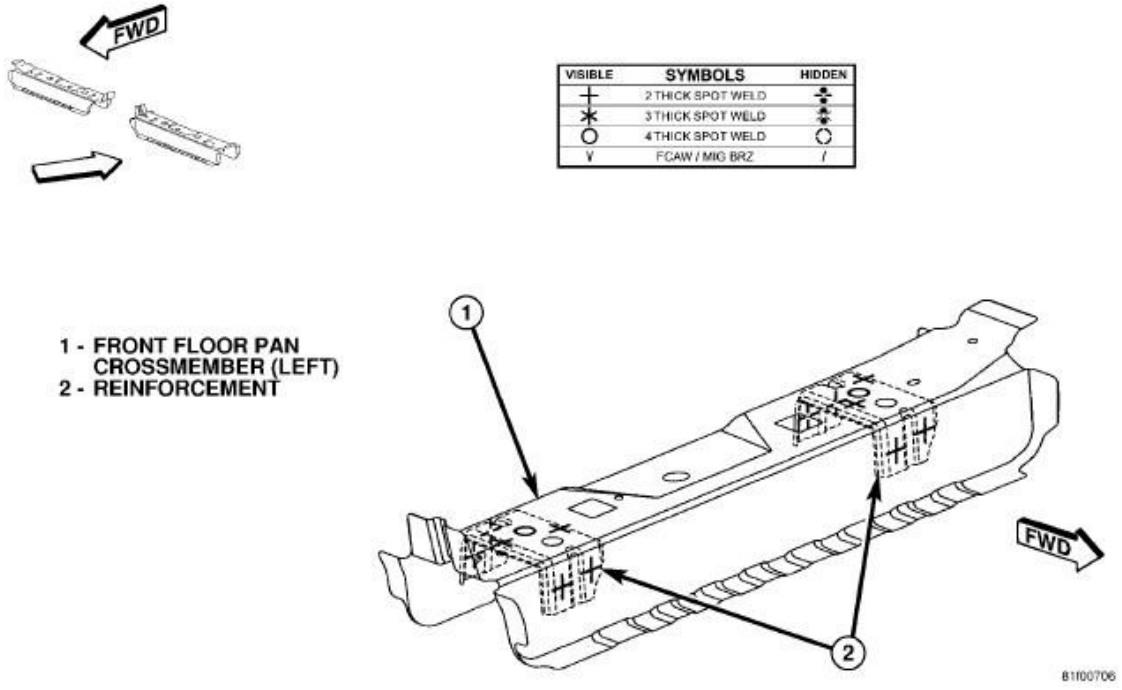

Fig. 390: MISCELLANEOUS COWL/FLOOR (3 OF 3)
Courtesy of CHRYSLER LLC

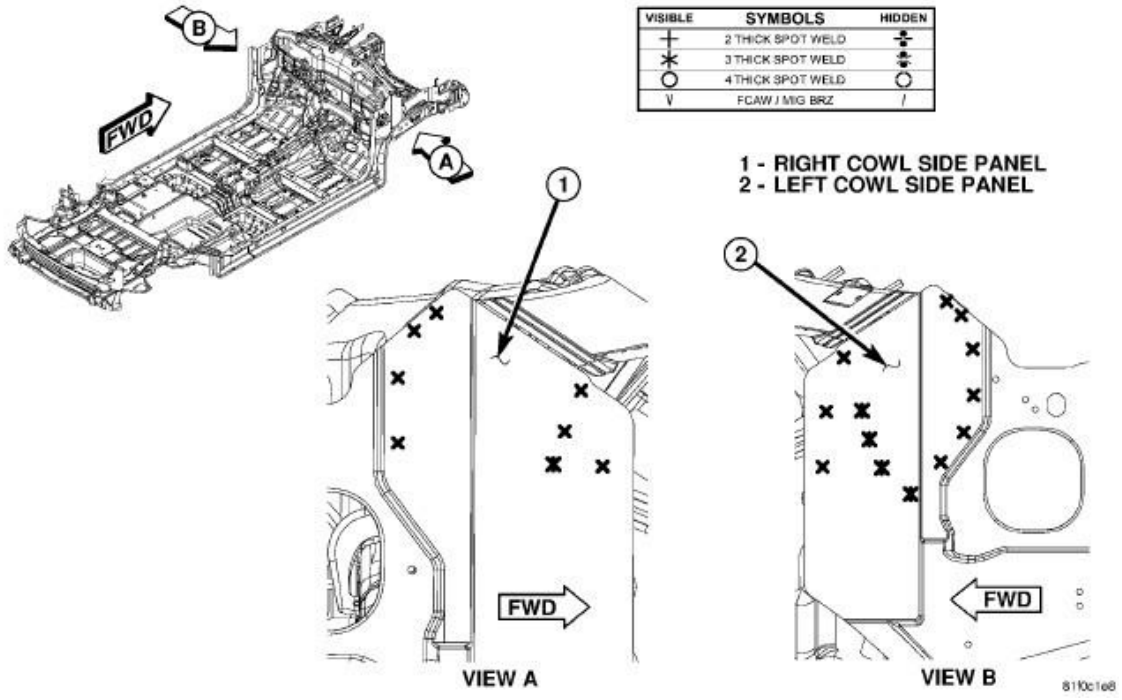

Fig. 391: UNDERBODY COMPLETE (1 OF 21)
Courtesy of CHRYSLER LLC

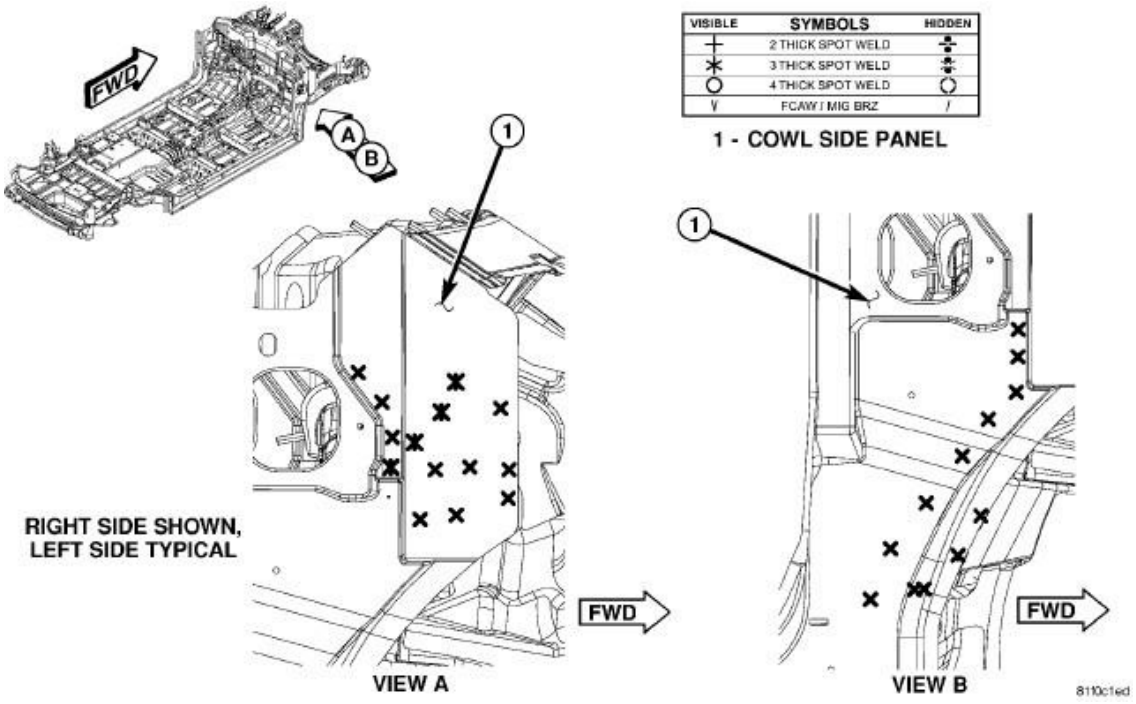

Fig. 392: UNDERBODY COMPLETE (2 OF 21)
Courtesy of CHRYSLER LLC

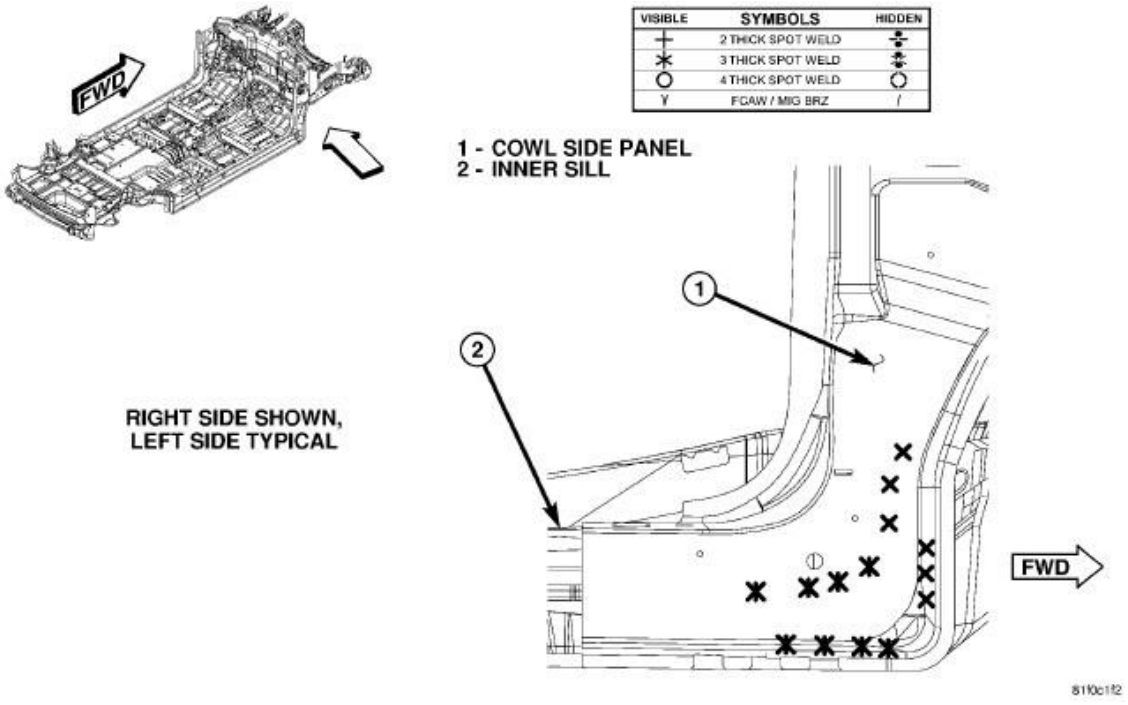

Fig. 393: UNDERBODY COMPLETE (3 OF 21)
Courtesy of CHRYSLER LLC

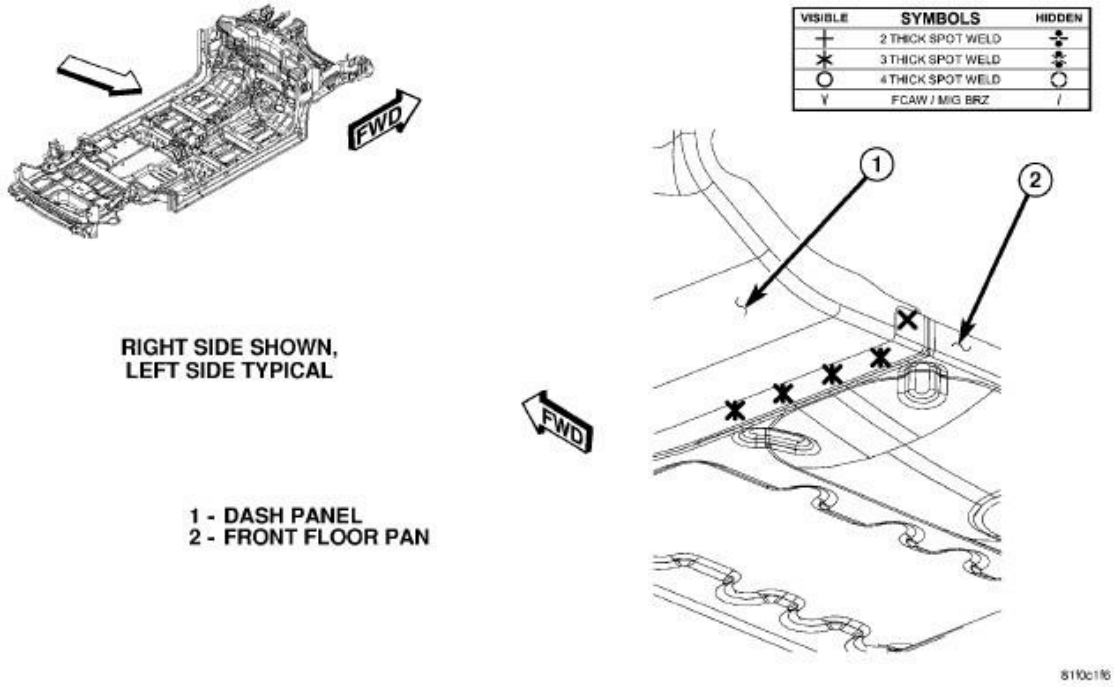

Fig. 394: UNDERBODY COMPLETE (4 OF 21)
Courtesy of CHRYSLER LLC

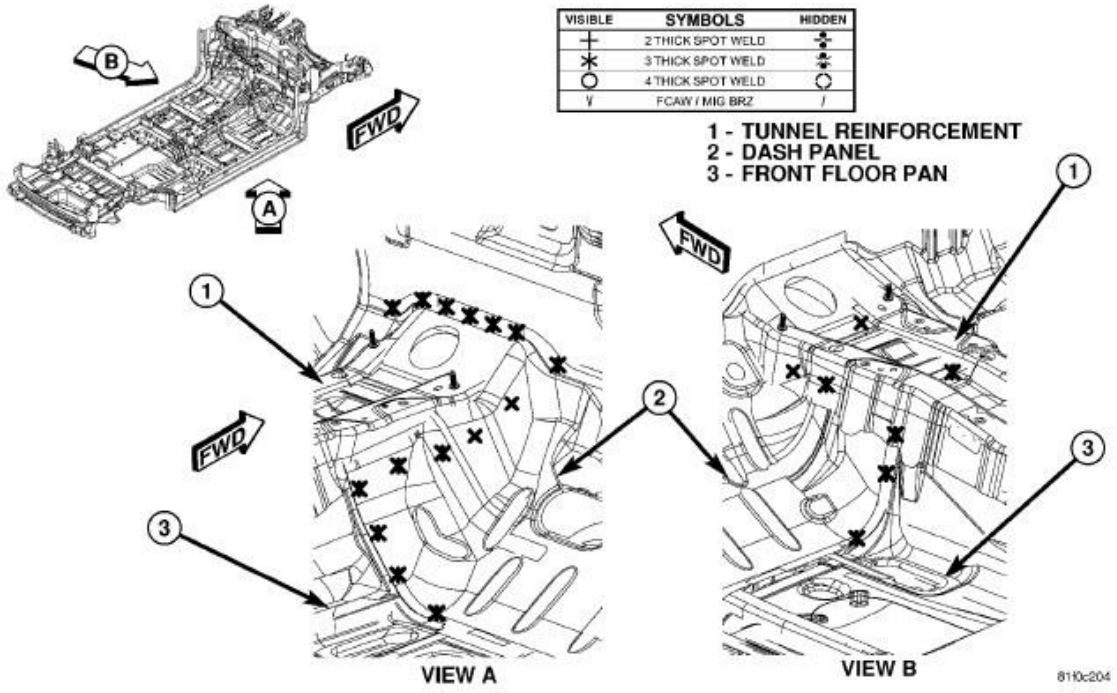

Fig. 395: UNDERBODY COMPLETE (5 OF 21)
Courtesy of CHRYSLER LLC

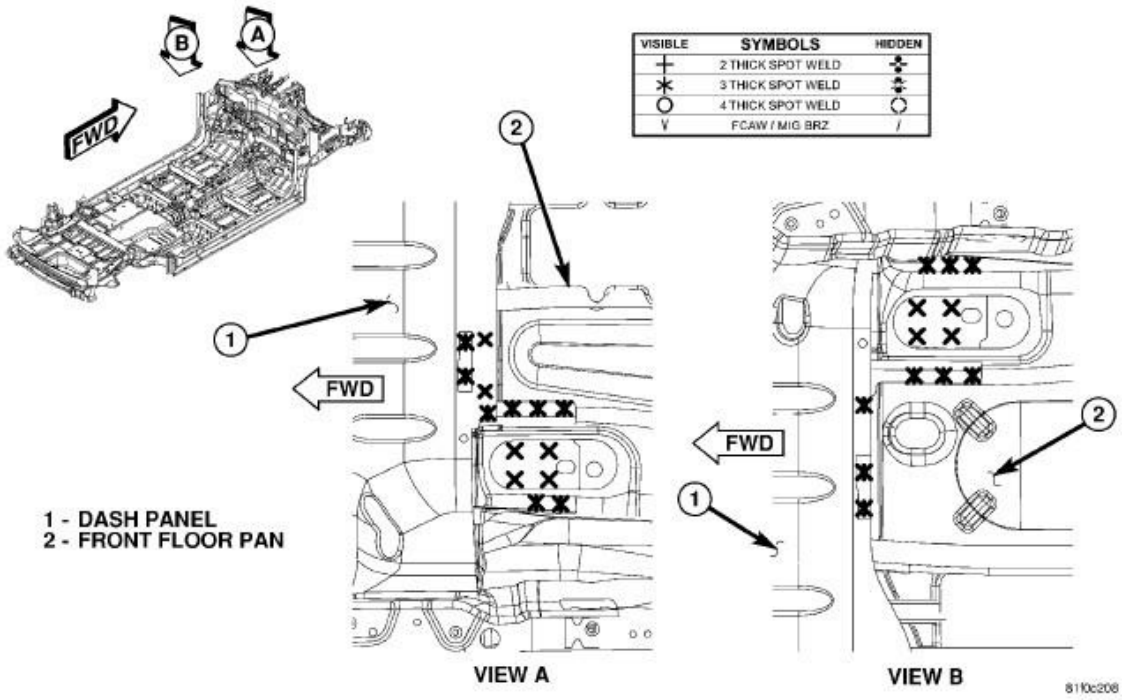

Fig. 396: UNDERBODY COMPLETE (6 OF 21)
Courtesy of CHRYSLER LLC

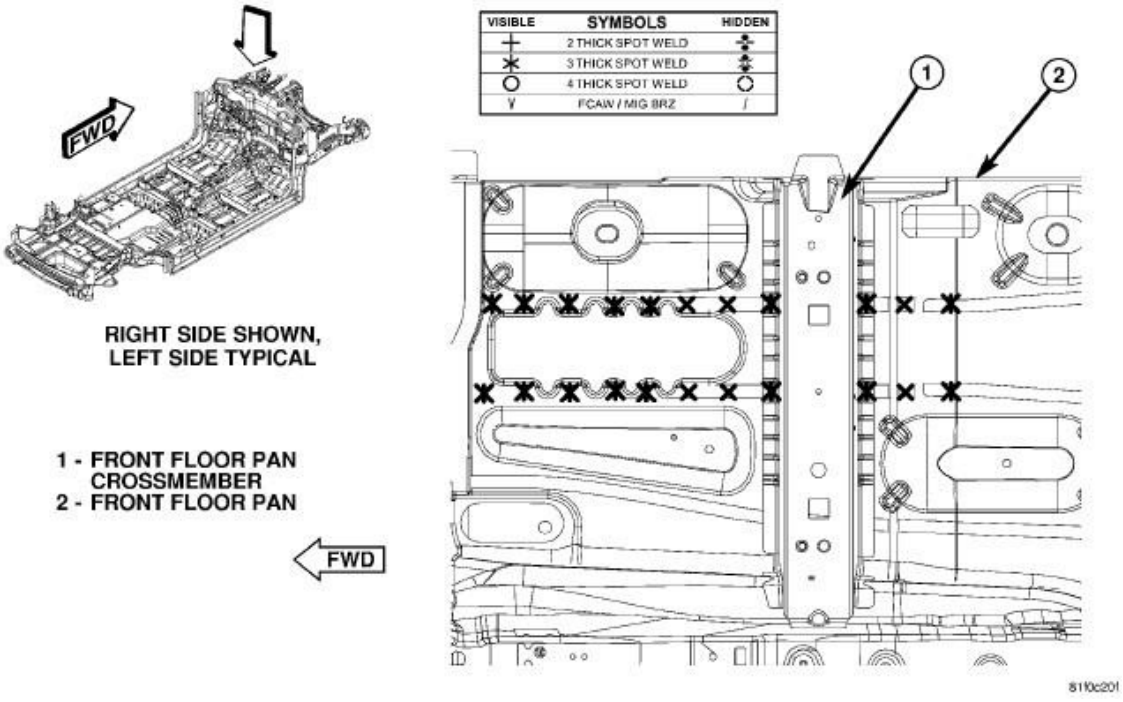

Fig. 397: UNDERBODY COMPLETE (7 OF 21)
Courtesy of CHRYSLER LLC

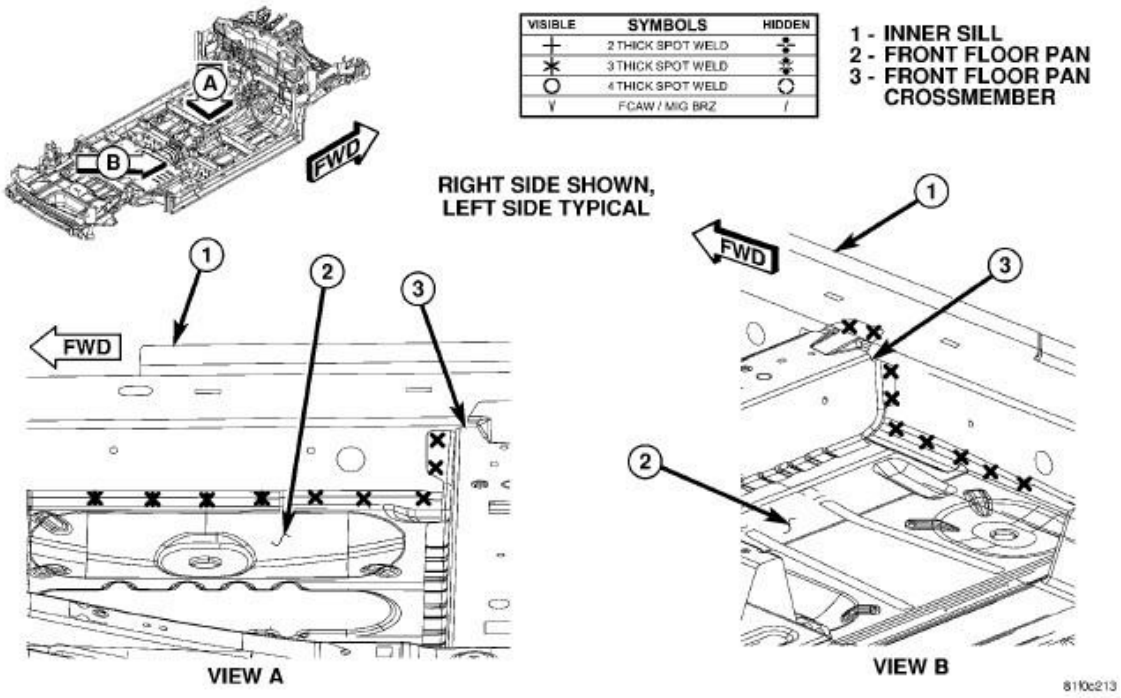

Fig. 398: UNDERBODY COMPLETE (8 OF 21)
Courtesy of CHRYSLER LLC

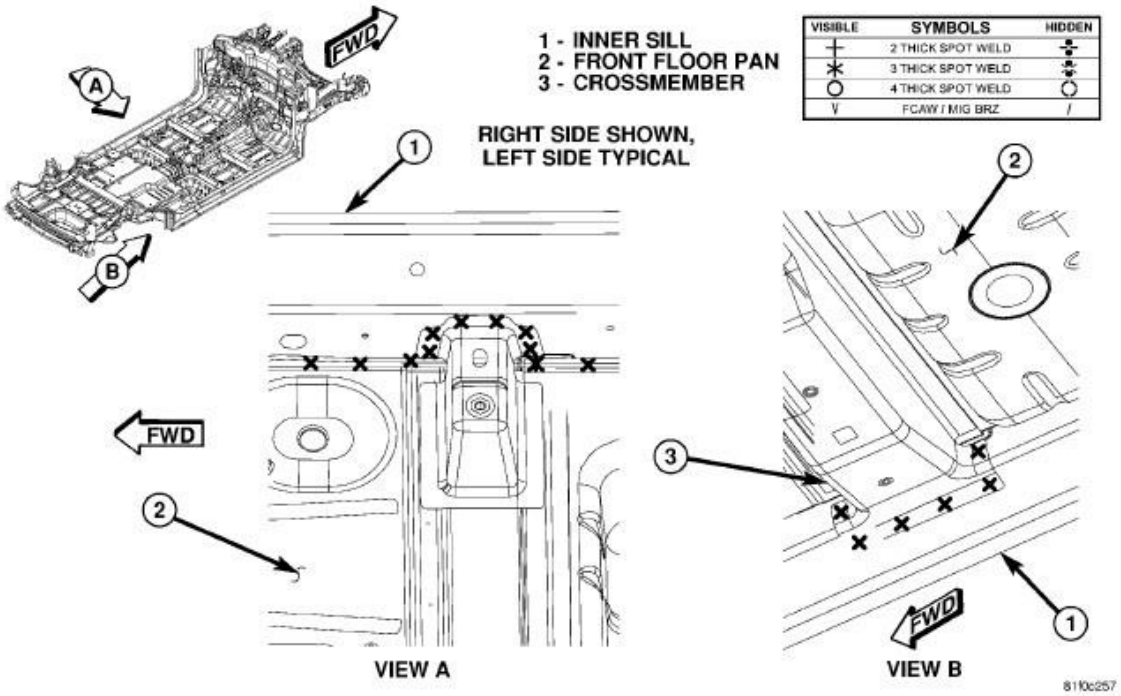

Fig. 399: UNDERBODY COMPLETE (9 OF 21)
Courtesy of CHRYSLER LLC

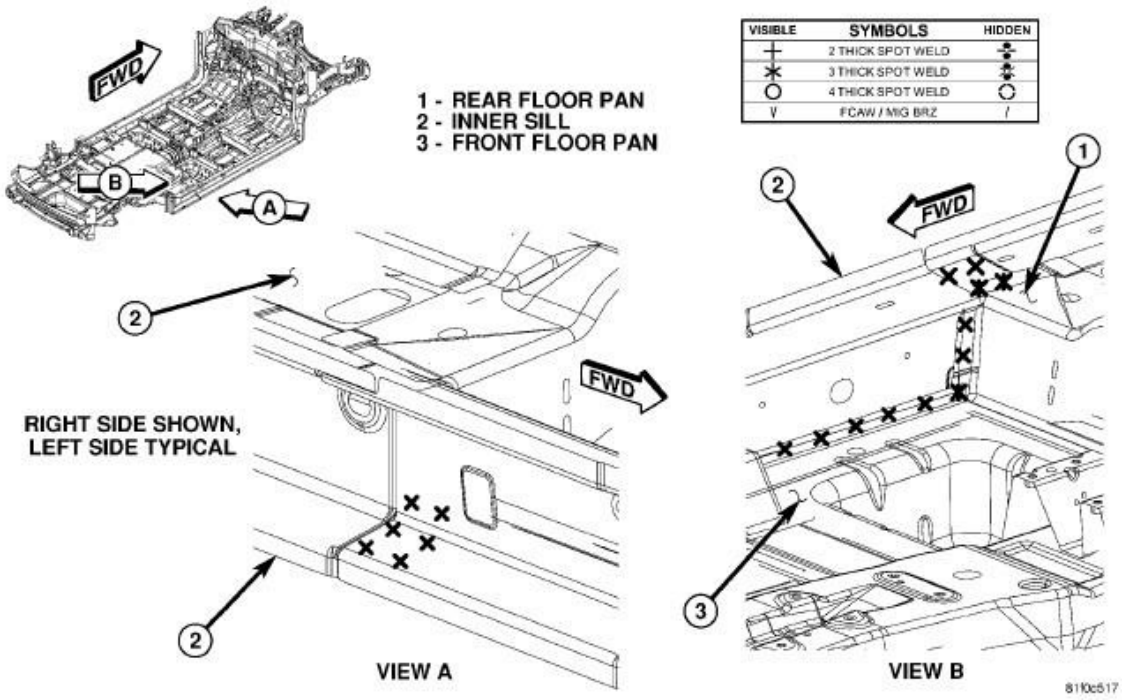

Fig. 400: UNDERBODY COMPLETE (10 OF 21)
Courtesy of CHRYSLER LLC

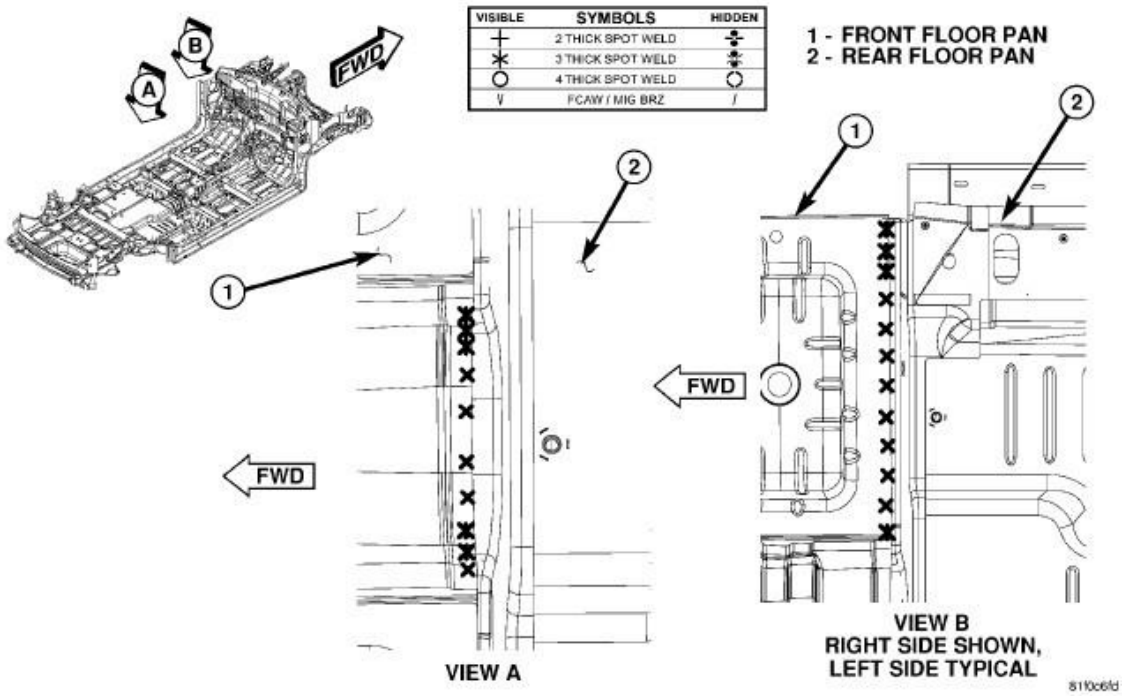

Fig. 401: UNDERBODY COMPLETE (11 OF 21)
Courtesy of CHRYSLER LLC

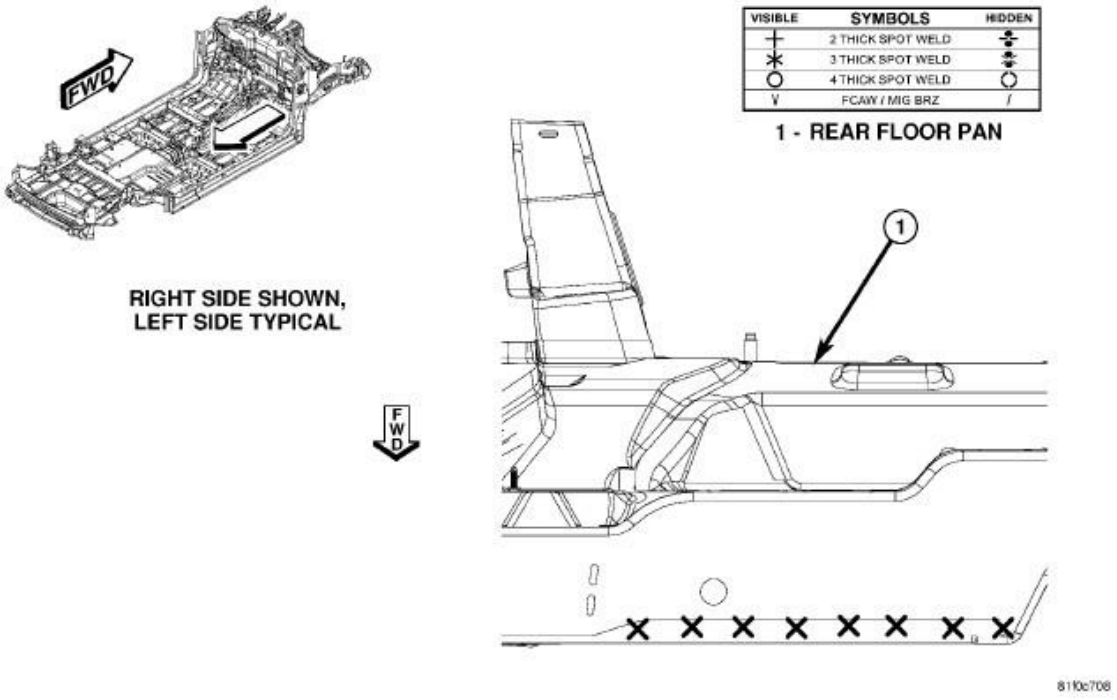

Fig. 402: UNDERBODY COMPLETE (12 OF 21)
Courtesy of CHRYSLER LLC

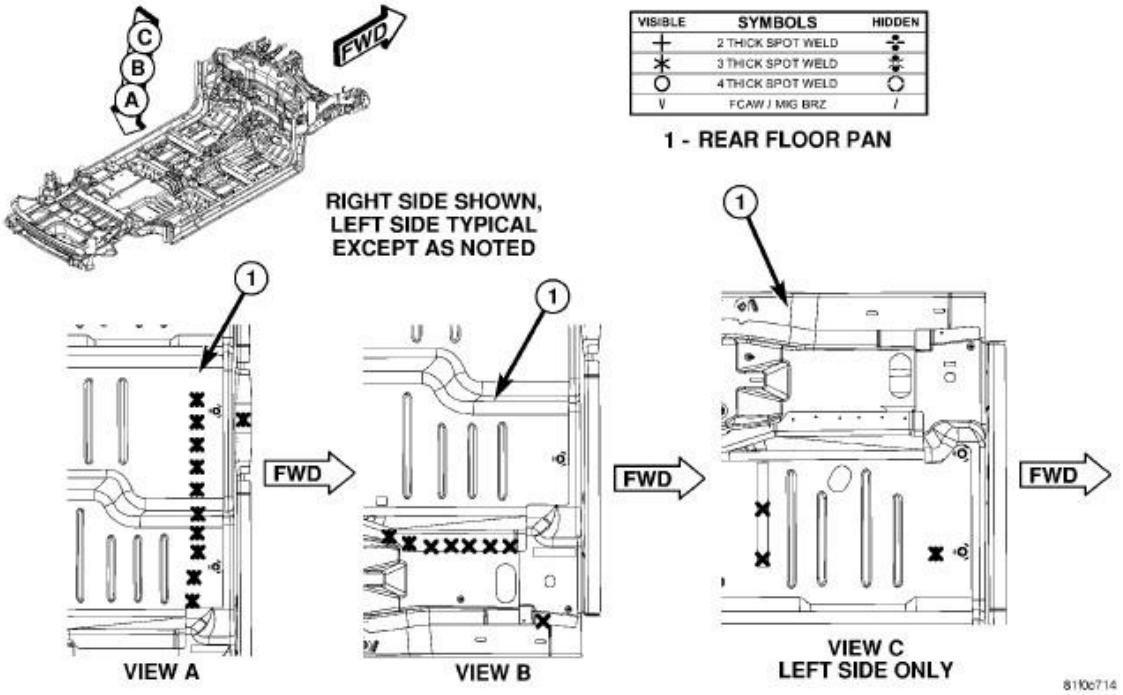

Fig. 403: UNDERBODY COMPLETE (13 OF 21)
Courtesy of CHRYSLER LLC

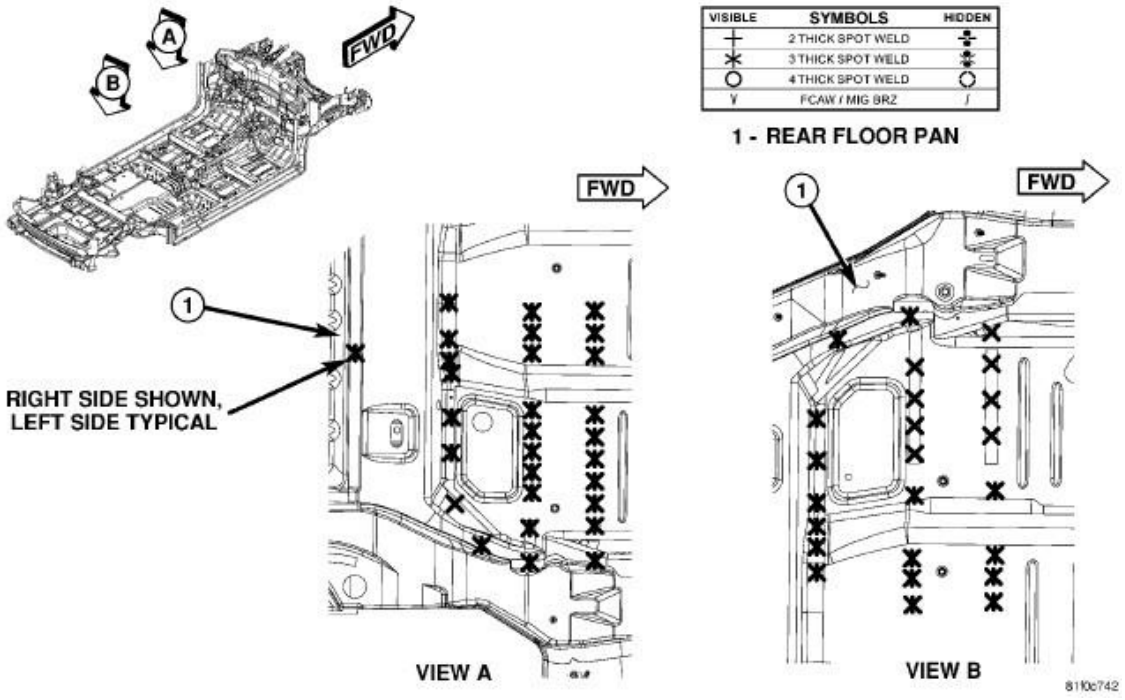

Fig. 404: UNDERBODY COMPLETE (14 OF 21)
Courtesy of CHRYSLER LLC

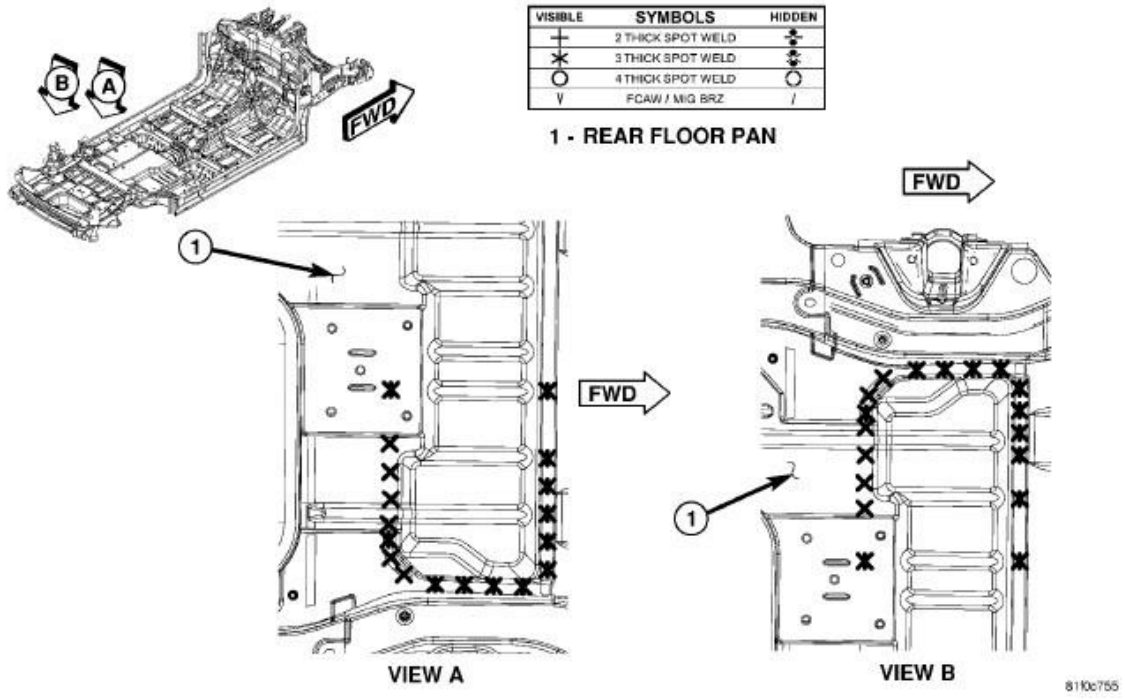

Fig. 405: UNDERBODY COMPLETE (15 OF 21)
Courtesy of CHRYSLER LLC

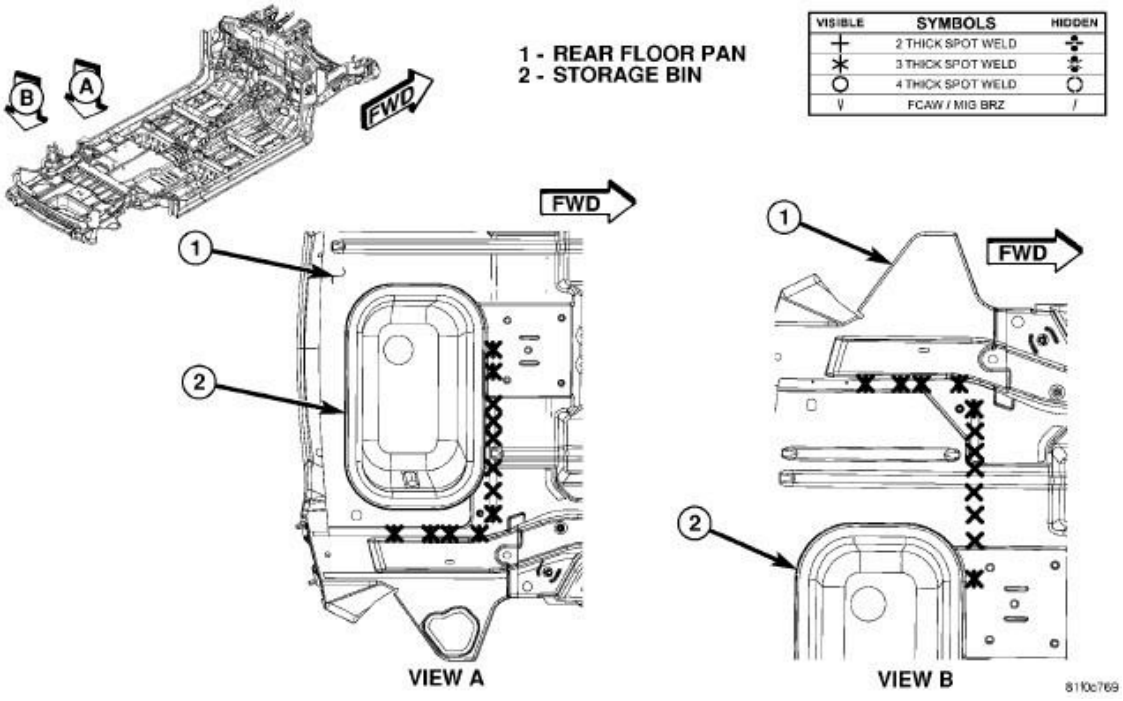

Fig. 406: UNDERBODY COMPLETE (16 OF 21)
Courtesy of CHRYSLER LLC

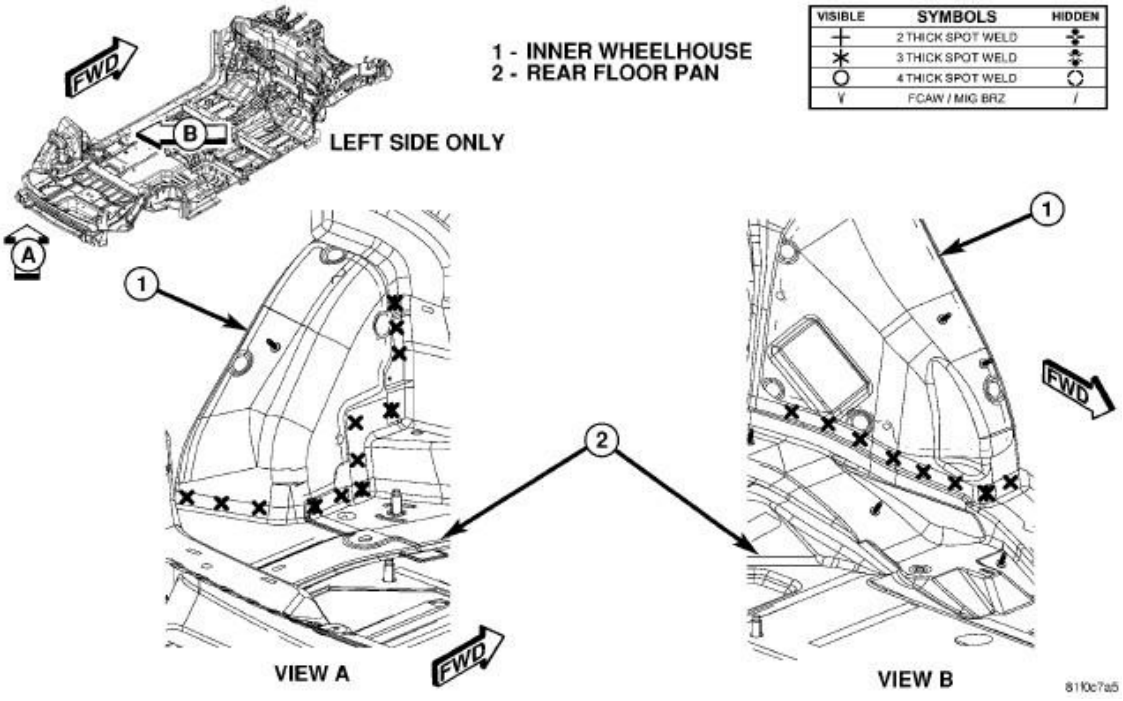

Fig. 407: UNDERBODY COMPLETE (17 OF 21)
Courtesy of CHRYSLER LLC

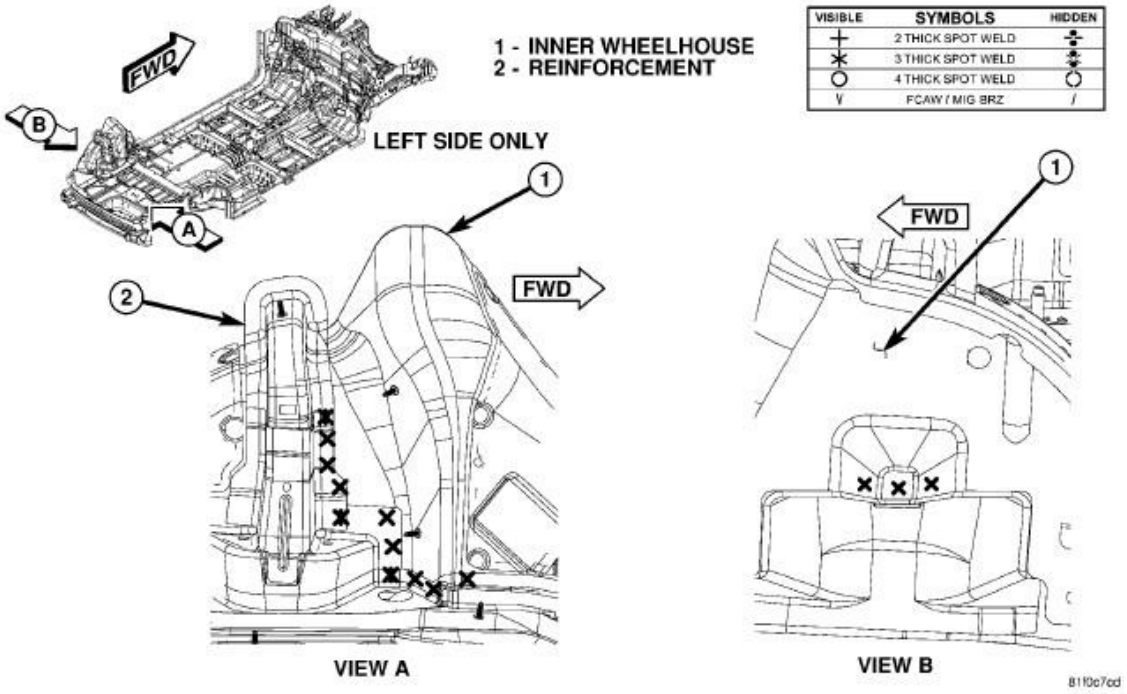

Fig. 408: UNDERBODY COMPLETE (18 OF 21)
Courtesy of CHRYSLER LLC

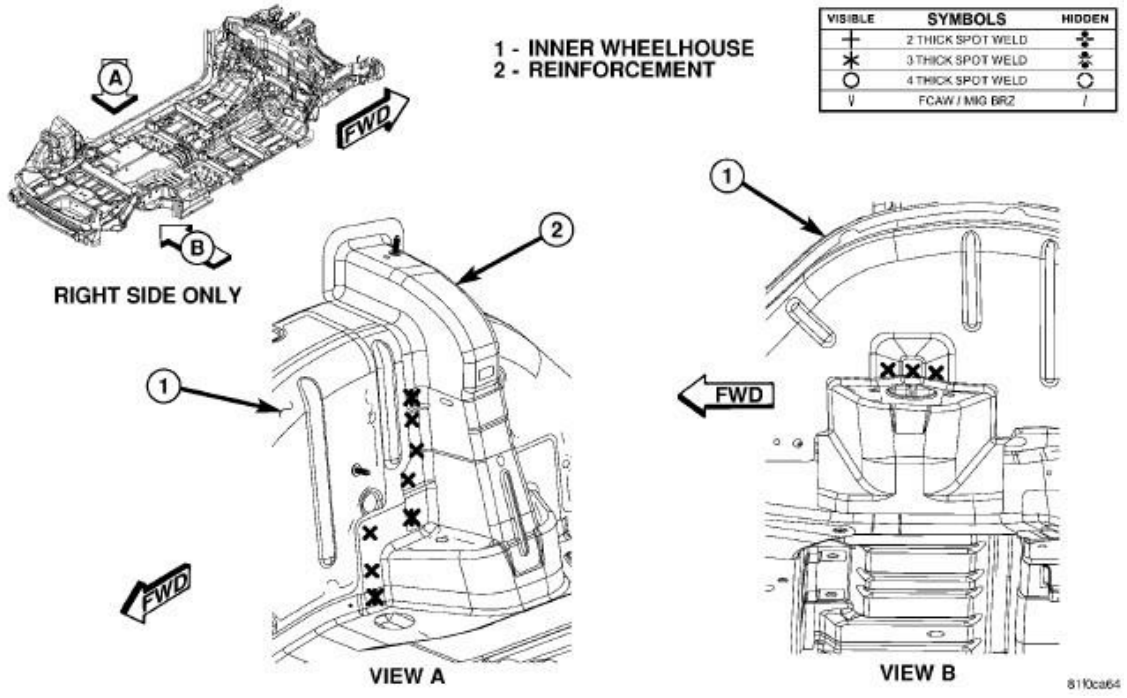

Fig. 409: UNDERBODY COMPLETE (19 OF 21)
Courtesy of CHRYSLER LLC

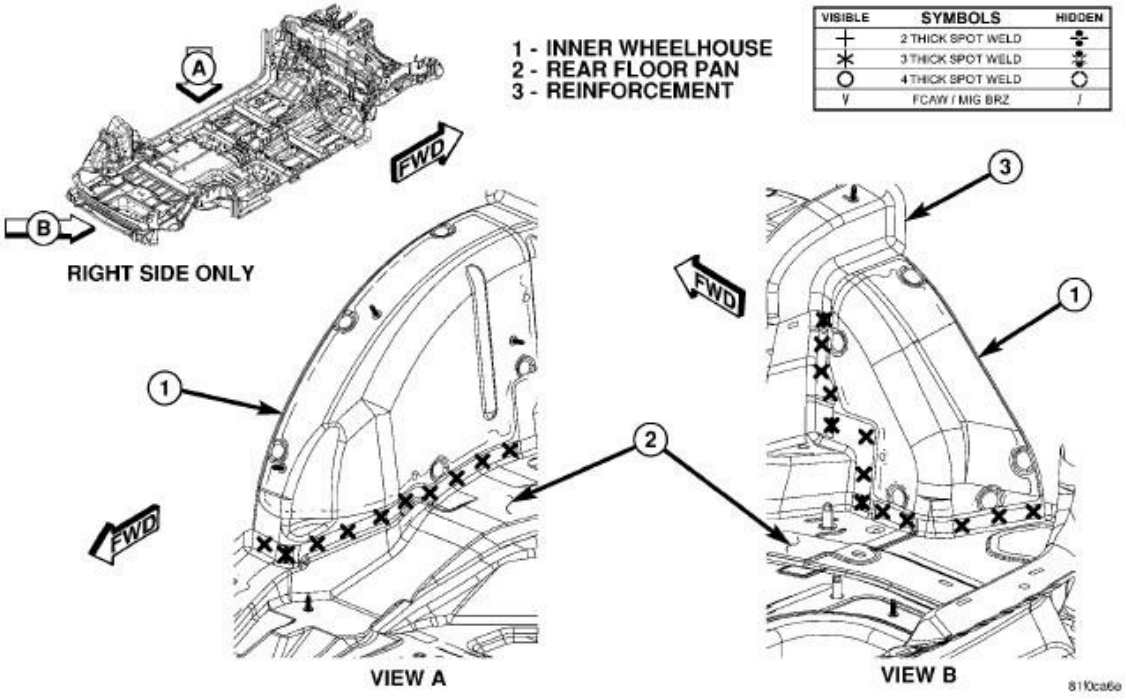

Fig. 410: UNDERBODY COMPLETE (20 OF 21)
Courtesy of CHRYSLER LLC

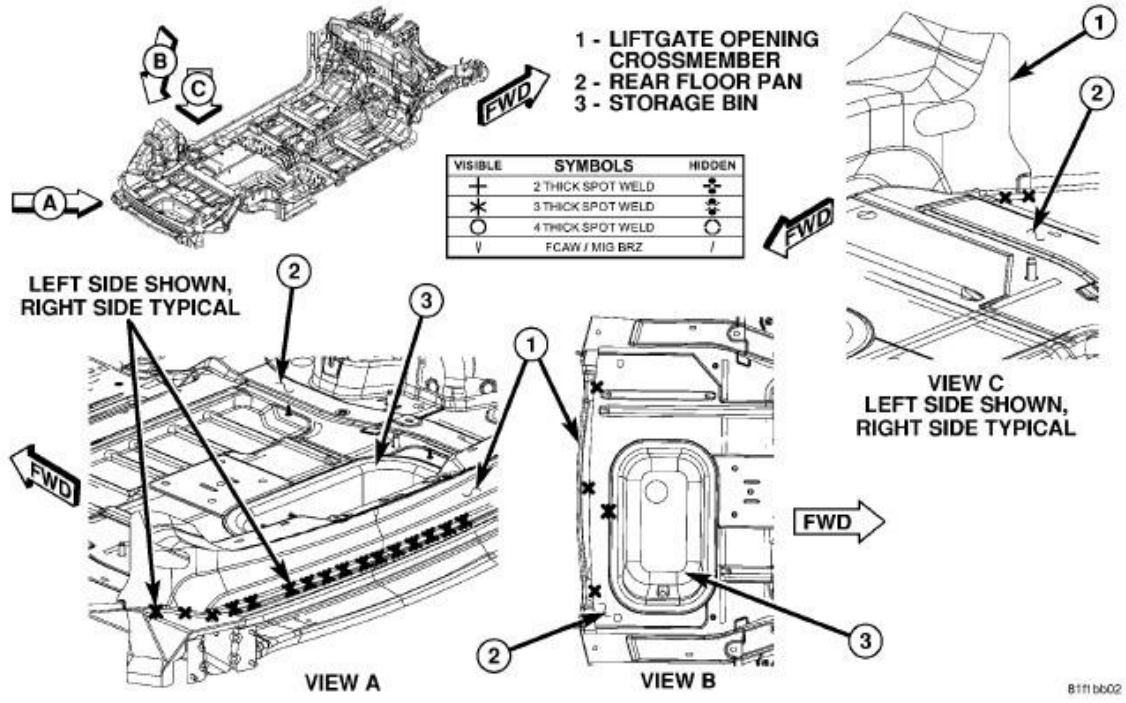

Fig. 411: UNDERBODY COMPLETE (21 OF 21)
Courtesy of CHRYSLER LLC

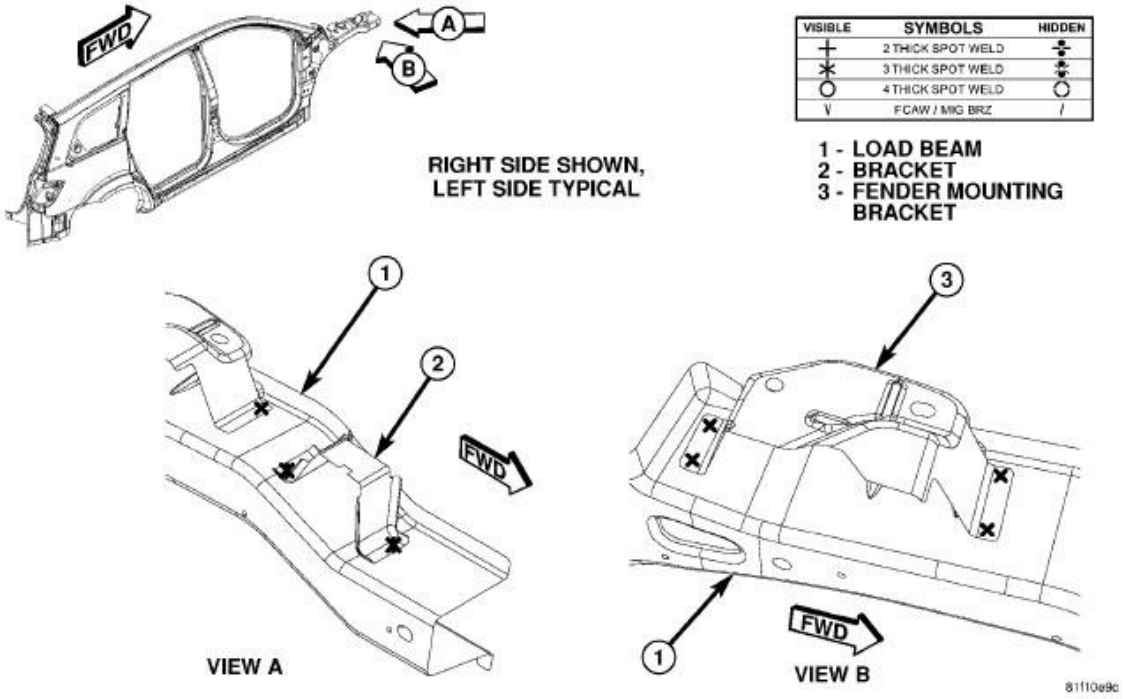

Fig. 412: BODY SIDE APERTURE (1 OF 14)
Courtesy of CHRYSLER LLC

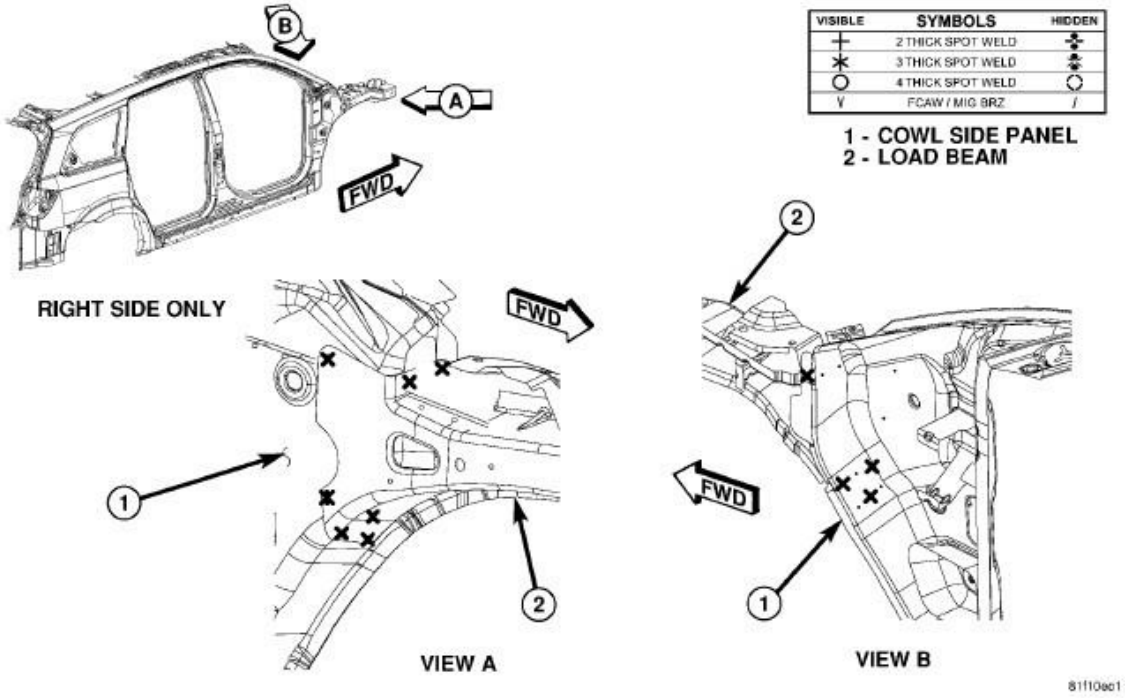

Fig. 413: BODY SIDE APERTURE (2 OF 14)
Courtesy of CHRYSLER LLC

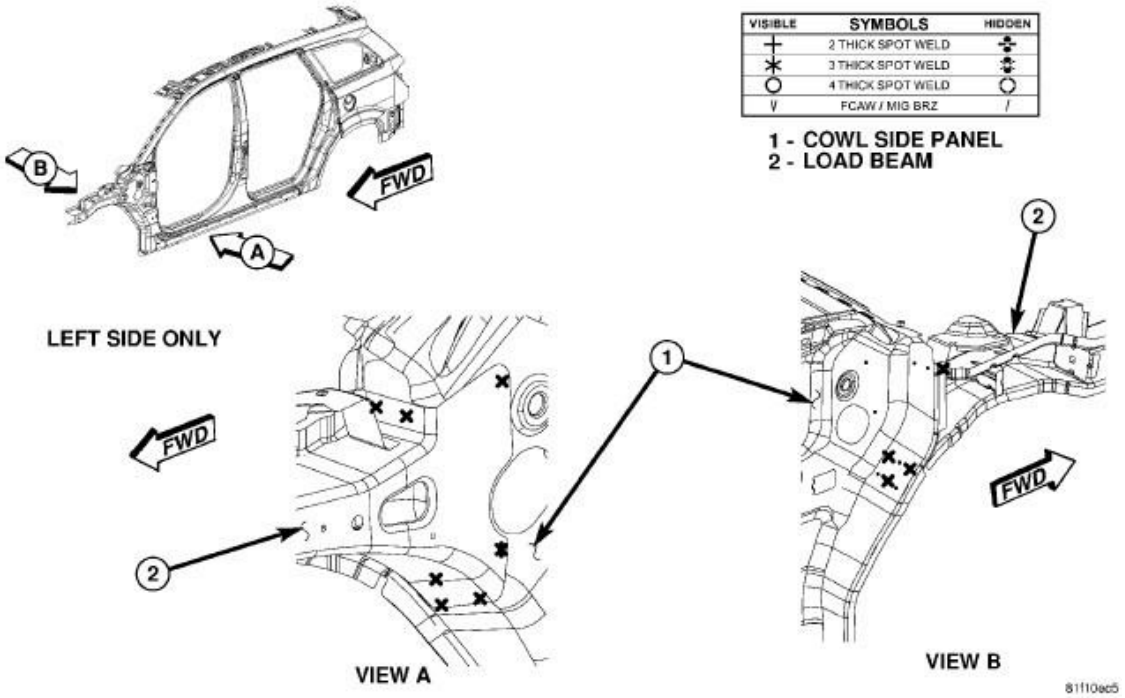

Fig. 414: BODY SIDE APERTURE (3 OF 14)
Courtesy of CHRYSLER LLC

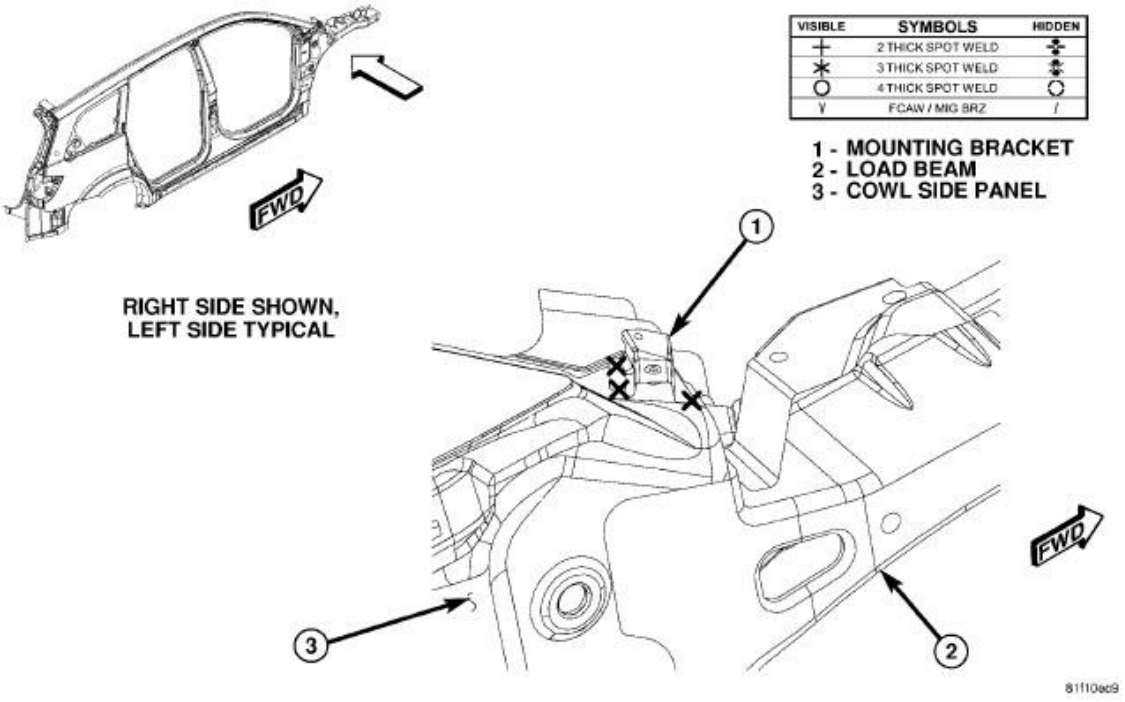

Fig. 415: BODY SIDE APERTURE (4 OF 14)
Courtesy of CHRYSLER LLC

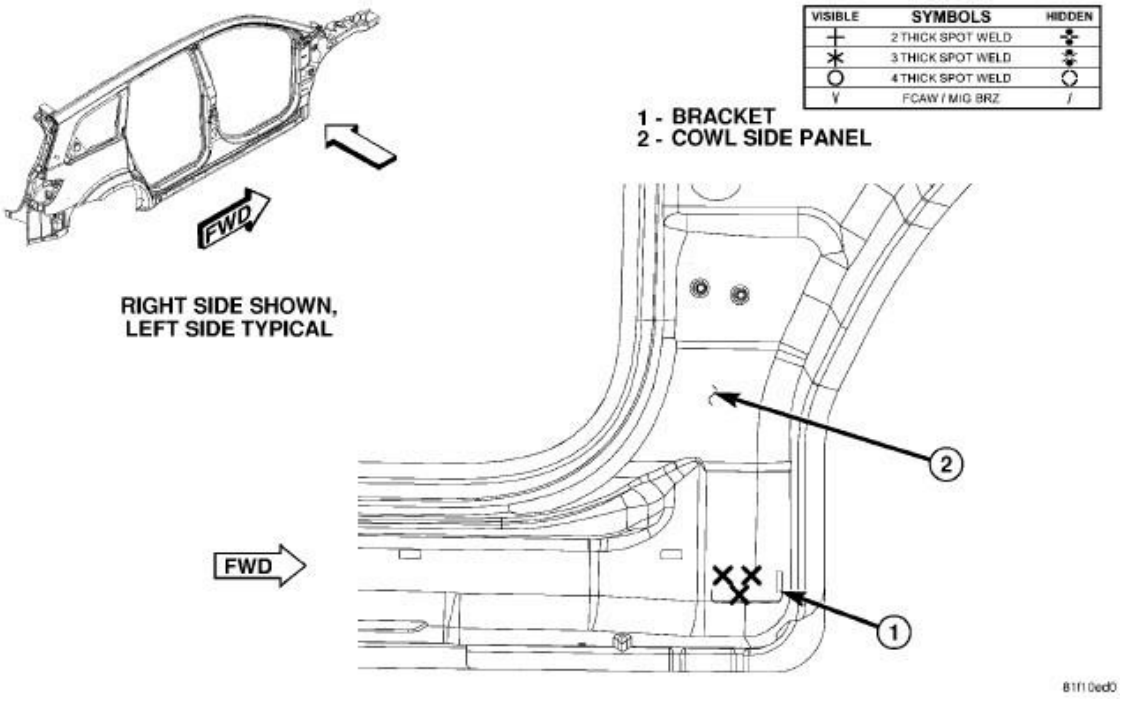

Fig. 416: BODY SIDE APERTURE (5 OF 14)
Courtesy of CHRYSLER LLC

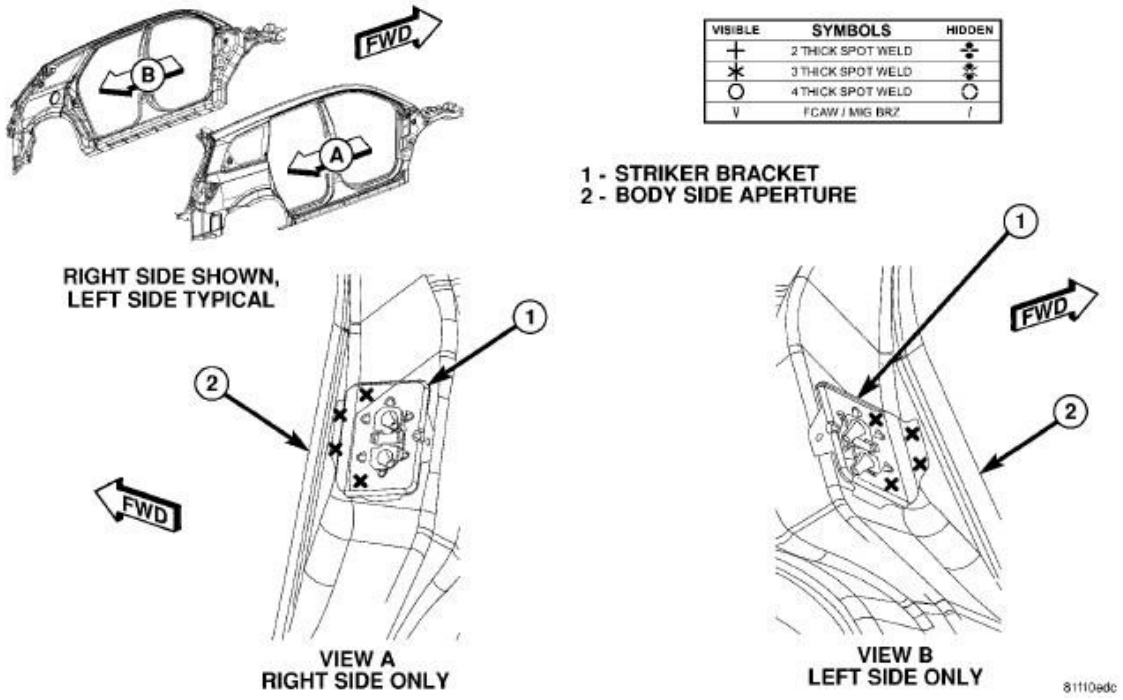

Fig. 417: BODY SIDE APERTURE (6 OF 14)
Courtesy of CHRYSLER LLC

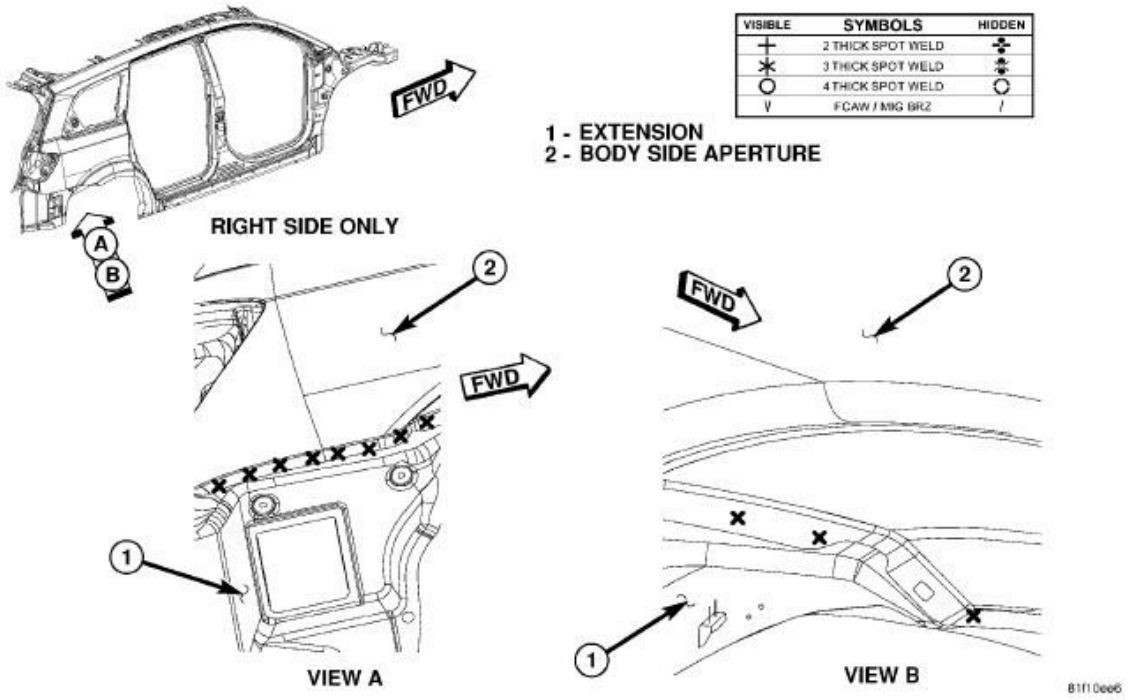

Fig. 418: BODY SIDE APERTURE (7 OF 14)
Courtesy of CHRYSLER LLC

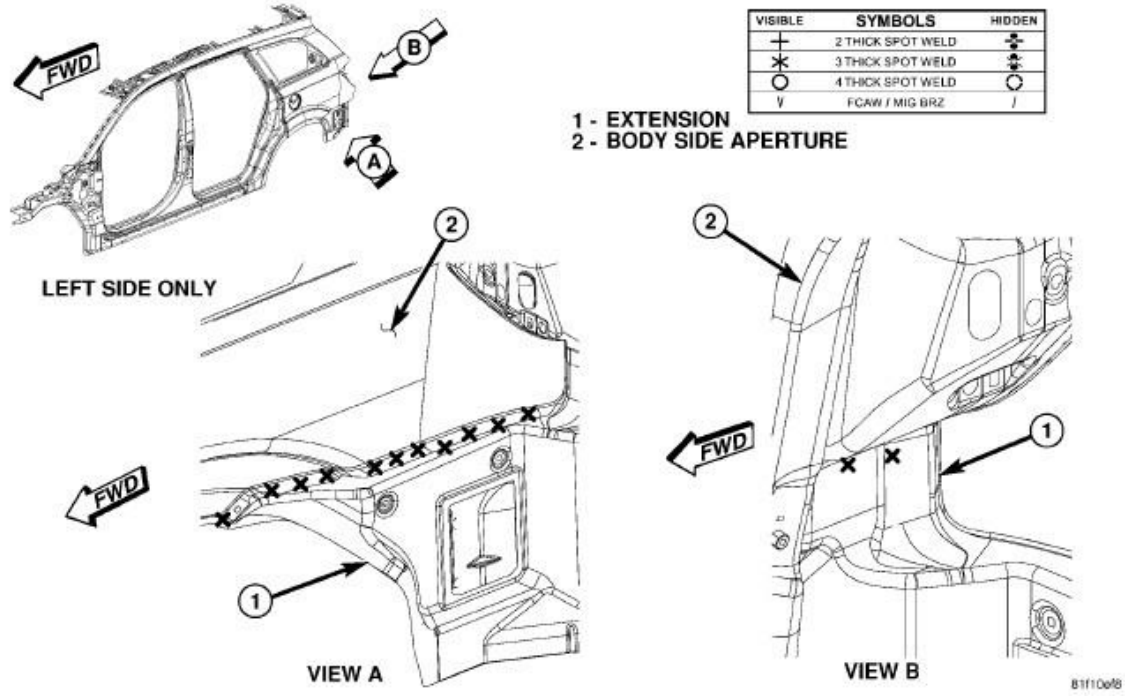

Fig. 419: BODY SIDE APERTURE (8 OF 14)
Courtesy of CHRYSLER LLC

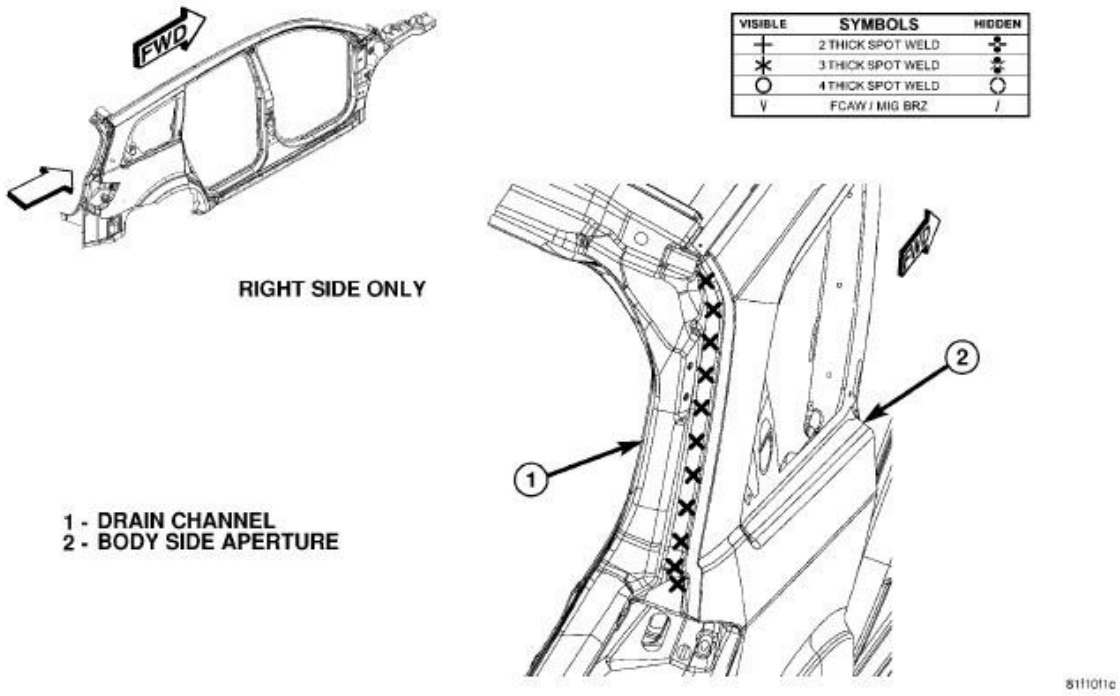

Fig. 420: BODY SIDE APERTURE (9 OF 14)
Courtesy of CHRYSLER LLC

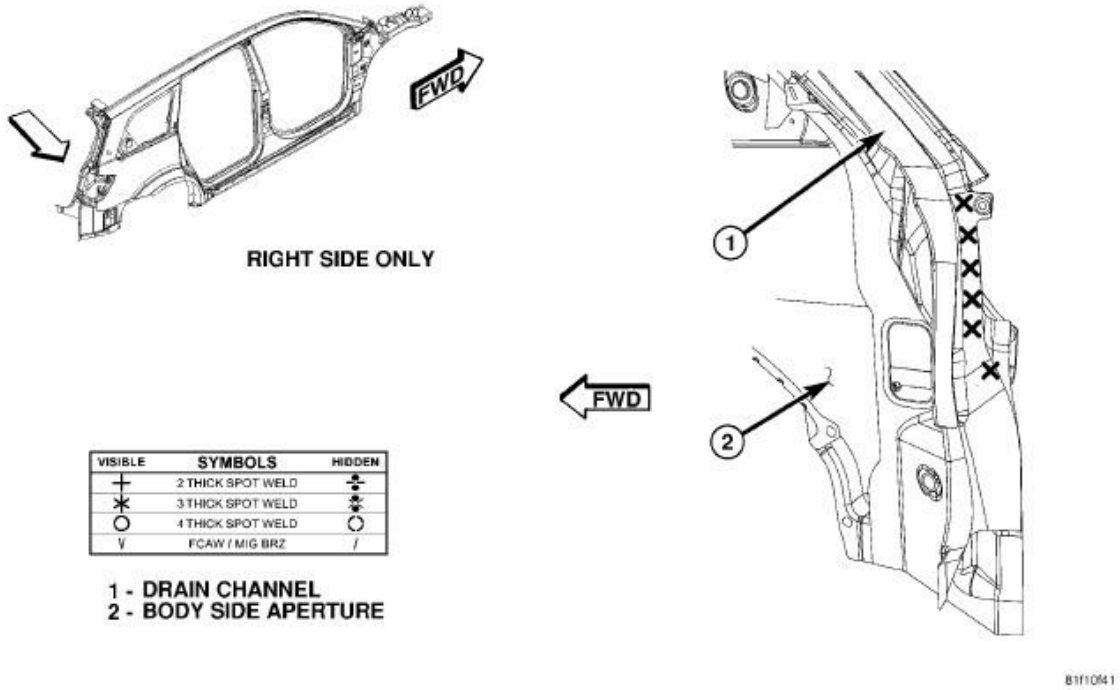

Fig. 421: BODY SIDE APERTURE (10 OF 14)
Courtesy of CHRYSLER LLC

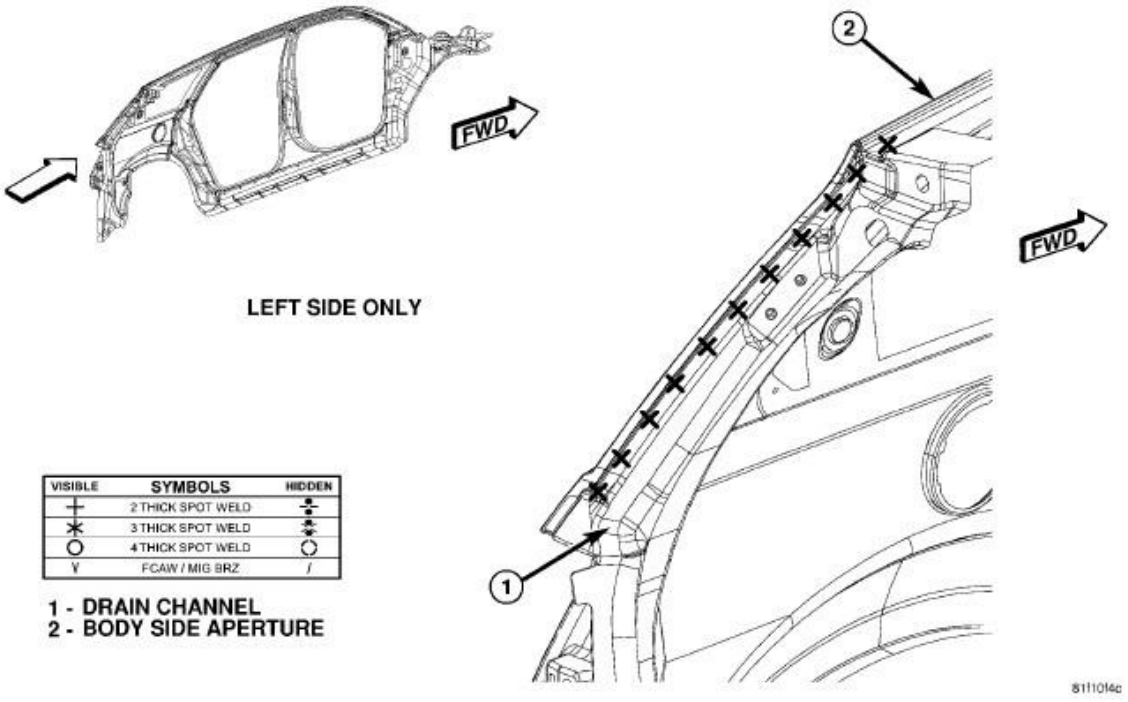

Fig. 422: BODY SIDE APERTURE (11 OF 14)
Courtesy of CHRYSLER LLC

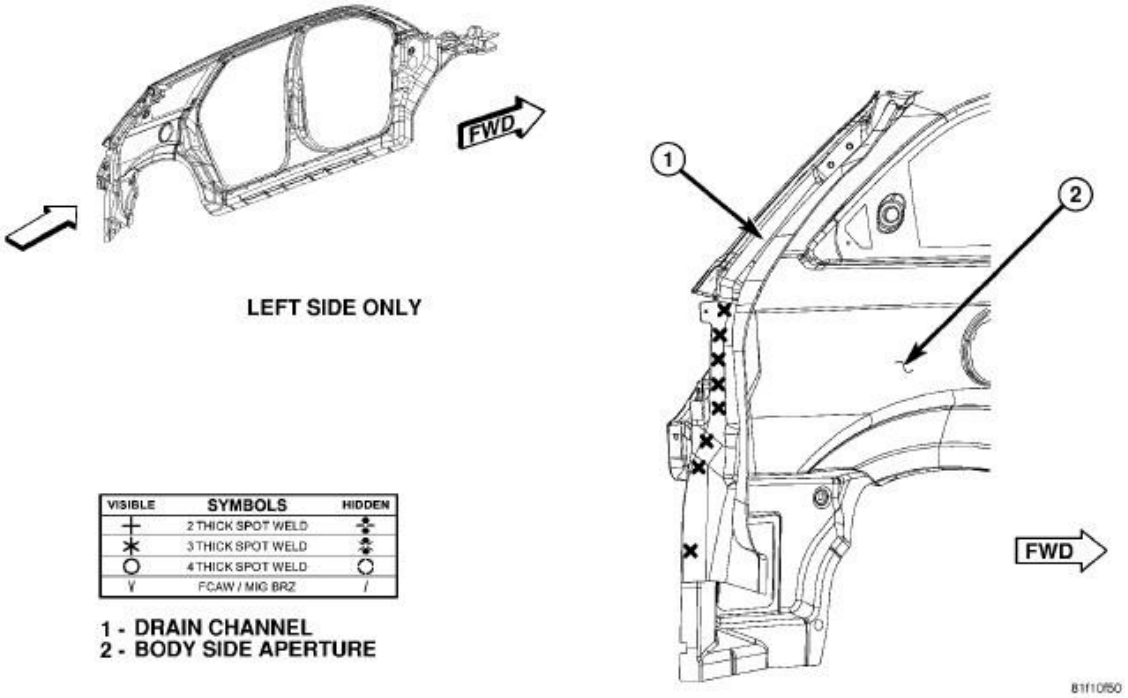

Fig. 423: BODY SIDE APERTURE (12 OF 14)
Courtesy of CHRYSLER LLC

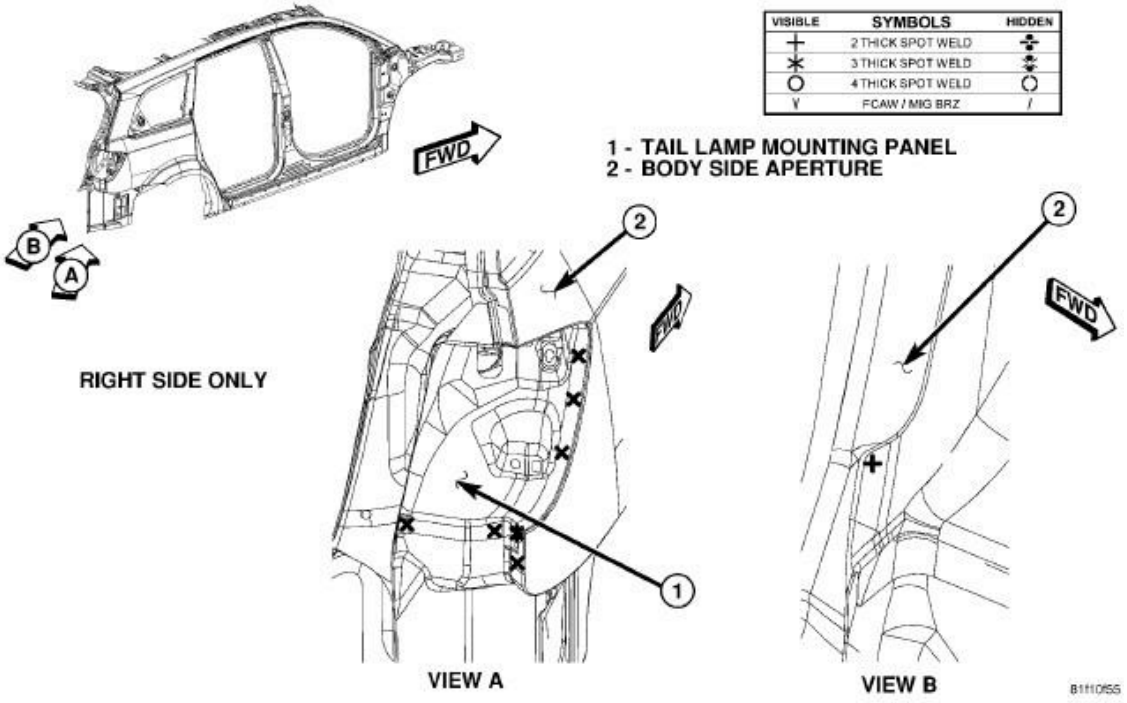

Fig. 424: BODY SIDE APERTURE (13 OF 14)
Courtesy of CHRYSLER LLC

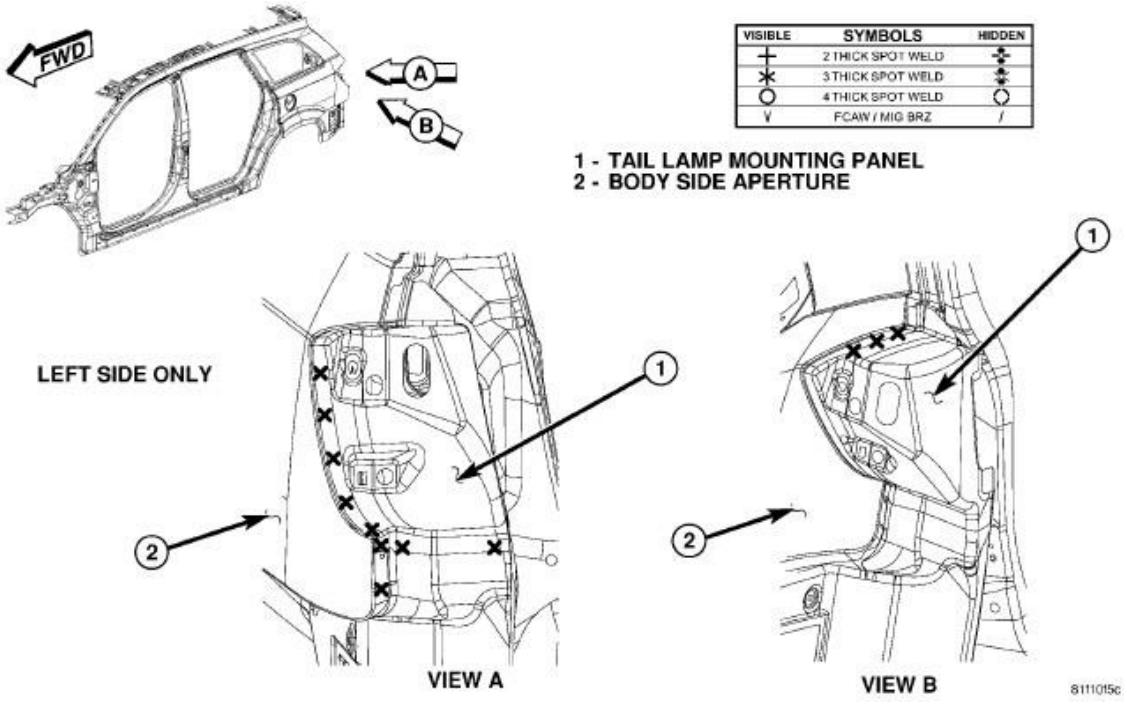

Fig. 425: BODY SIDE APERTURE (14 OF 14)
Courtesy of CHRYSLER LLC

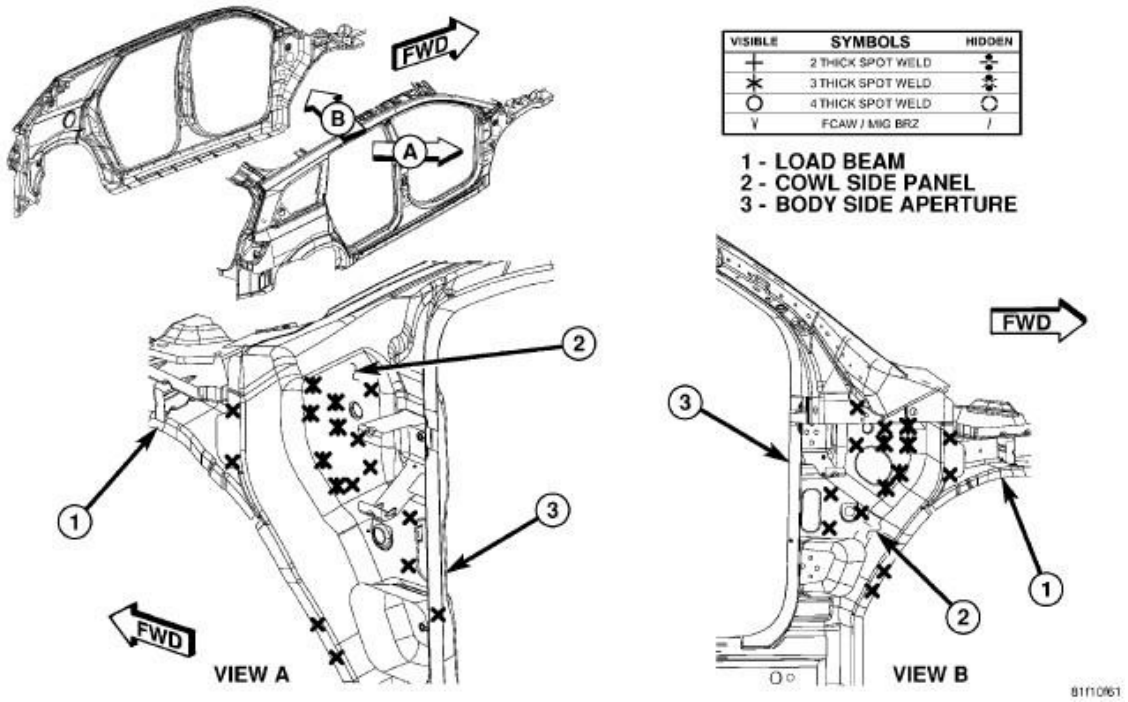

Fig. 426: BODY SIDE APERTURE COMPLETE (1 OF 18)
Courtesy of CHRYSLER LLC

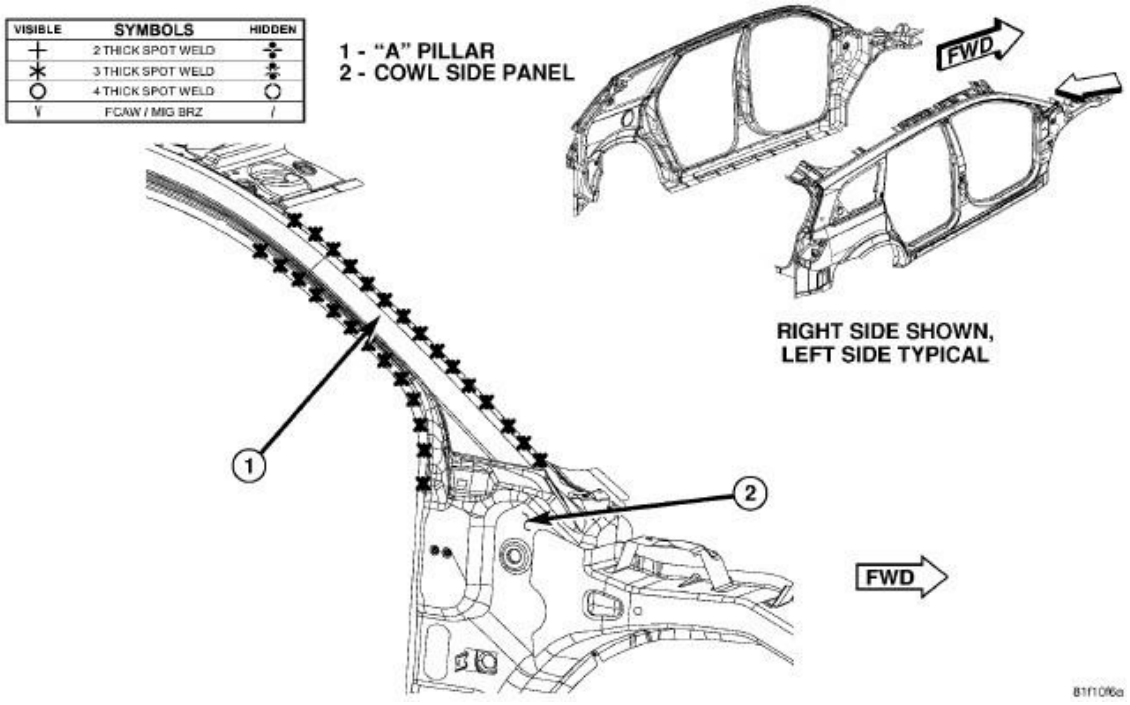

Fig. 427: BODY SIDE APERTURE COMPLETE (2 OF 18)
Courtesy of CHRYSLER LLC

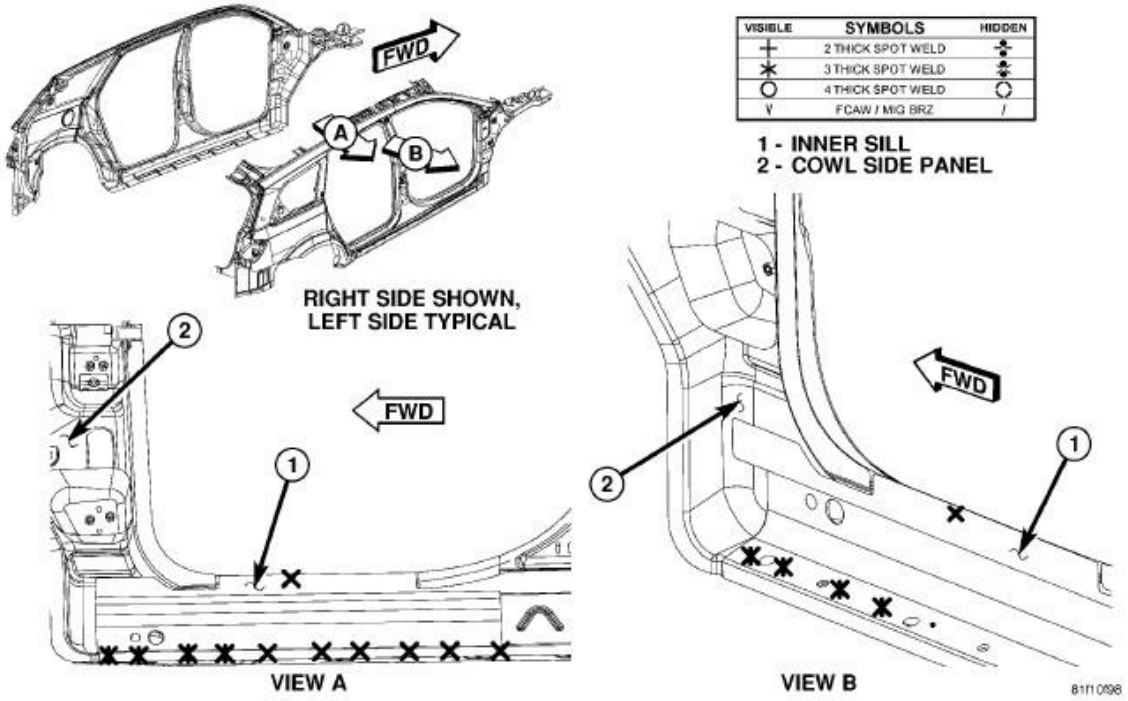

Fig. 428: BODY SIDE APERTURE COMPLETE (3 OF 18)
Courtesy of CHRYSLER LLC

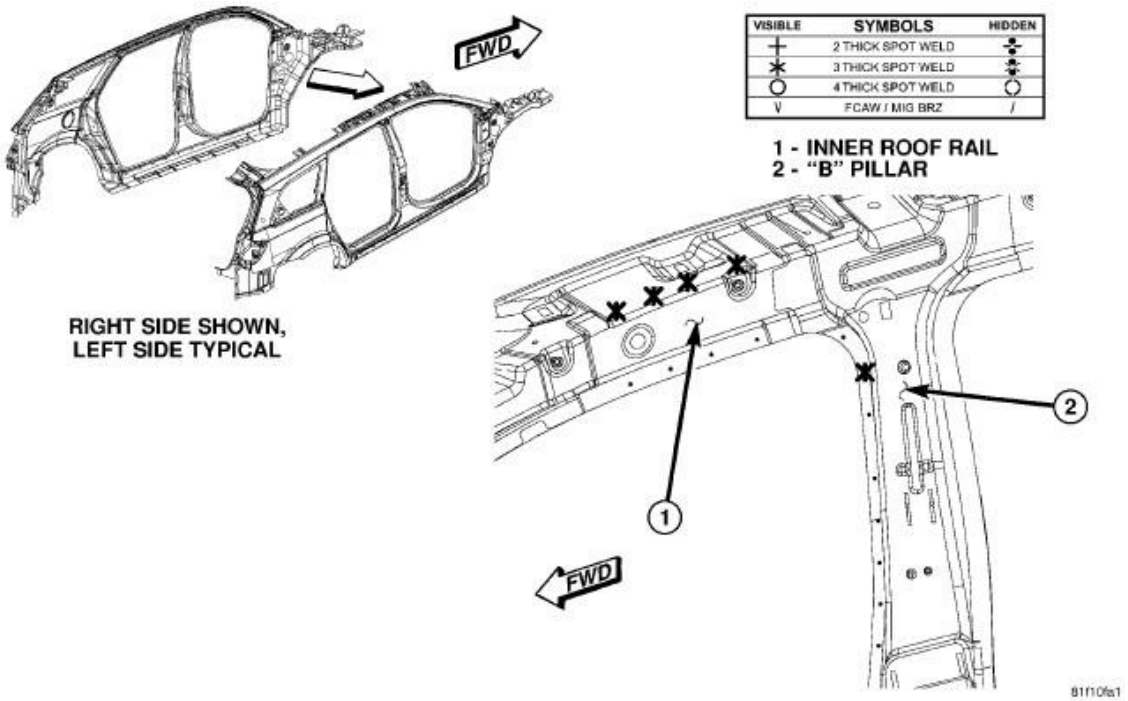

Fig. 429: BODY SIDE APERTURE COMPLETE (4 OF 18)
Courtesy of CHRYSLER LLC

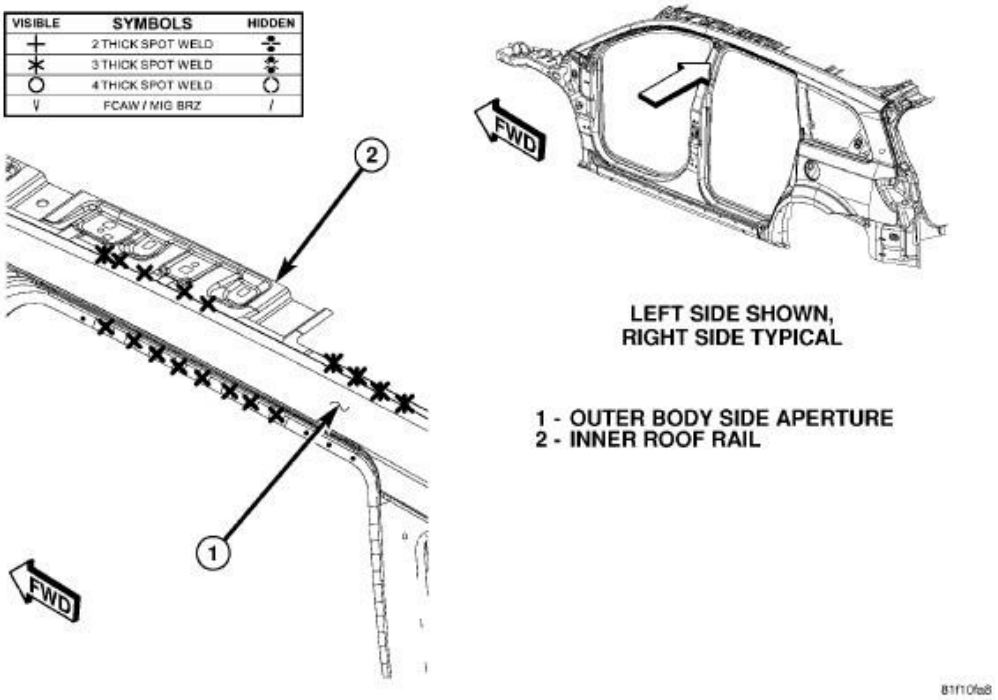

Fig. 430: BODY SIDE APERTURE COMPLETE (5 OF 18)
Courtesy of CHRYSLER LLC

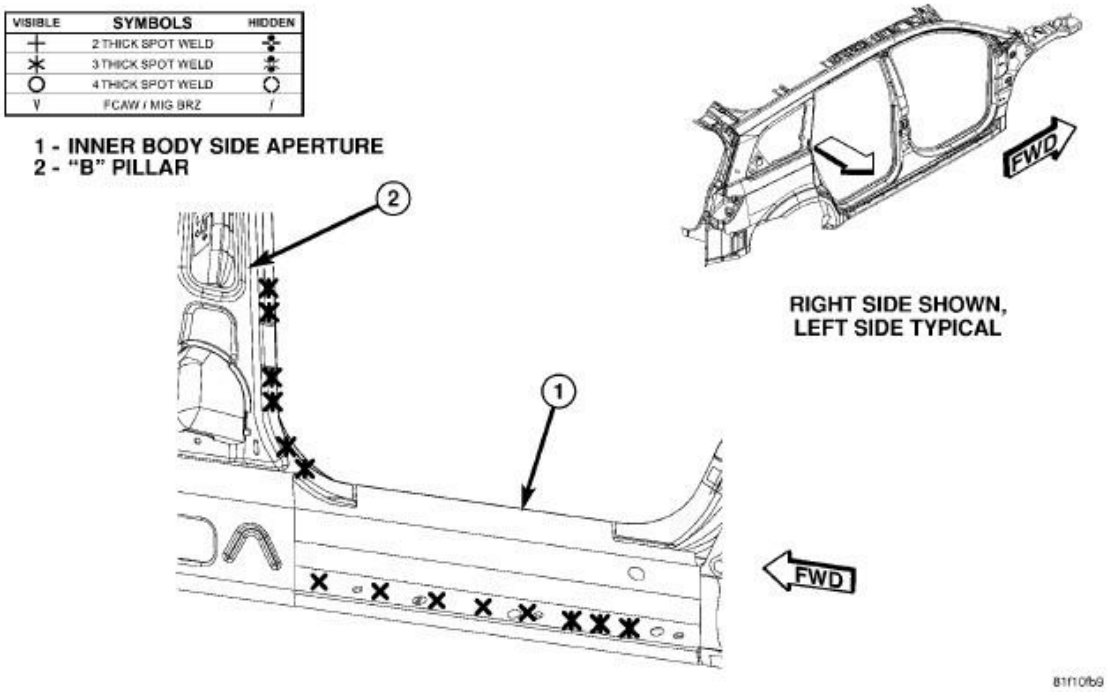

Fig. 431: BODY SIDE APERTURE COMPLETE (6 OF 18)
Courtesy of CHRYSLER LLC

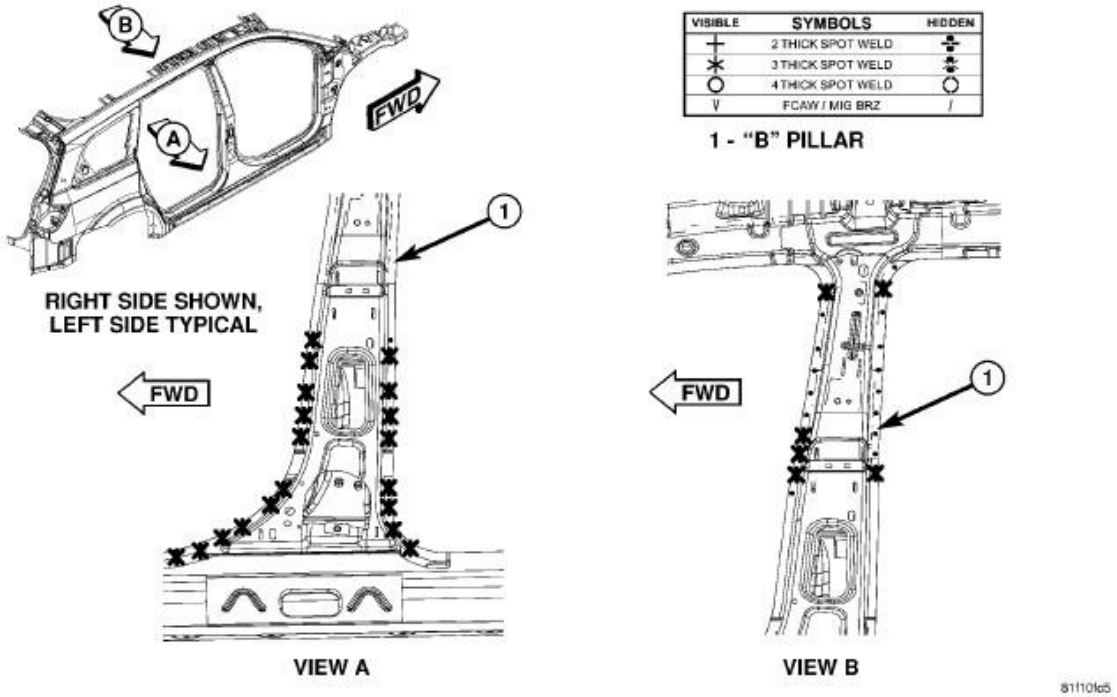

Fig. 432: BODY SIDE APERTURE COMPLETE (7 OF 18)
Courtesy of CHRYSLER LLC

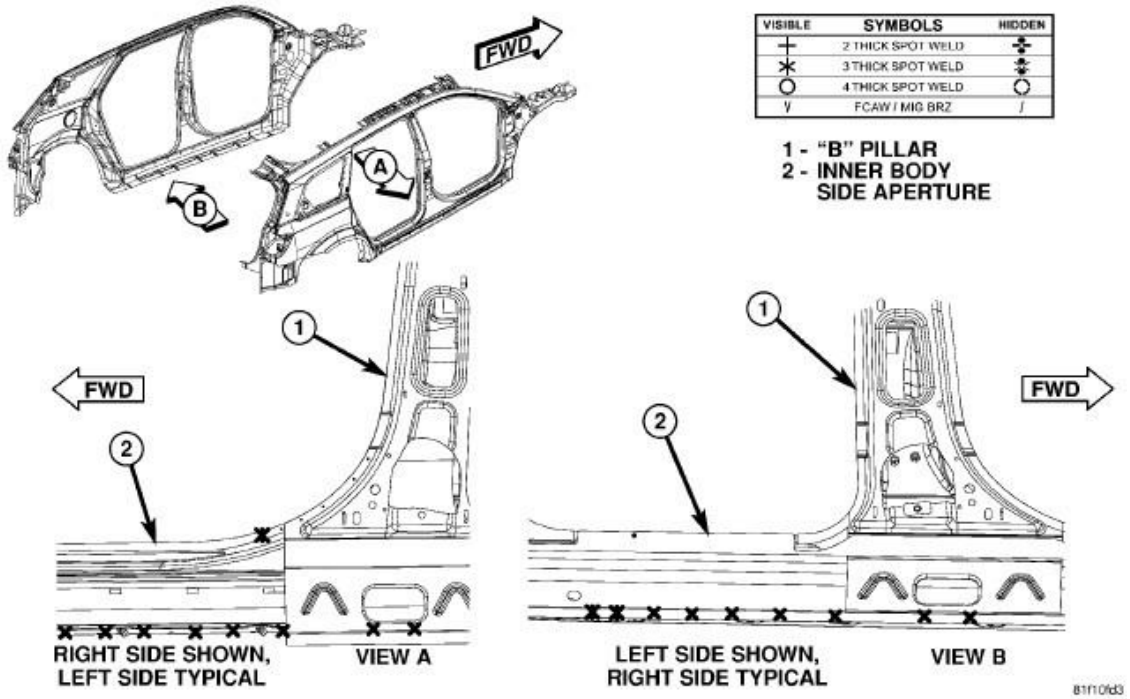

Fig. 433: BODY SIDE APERTURE COMPLETE (8 OF 18)
Courtesy of CHRYSLER LLC

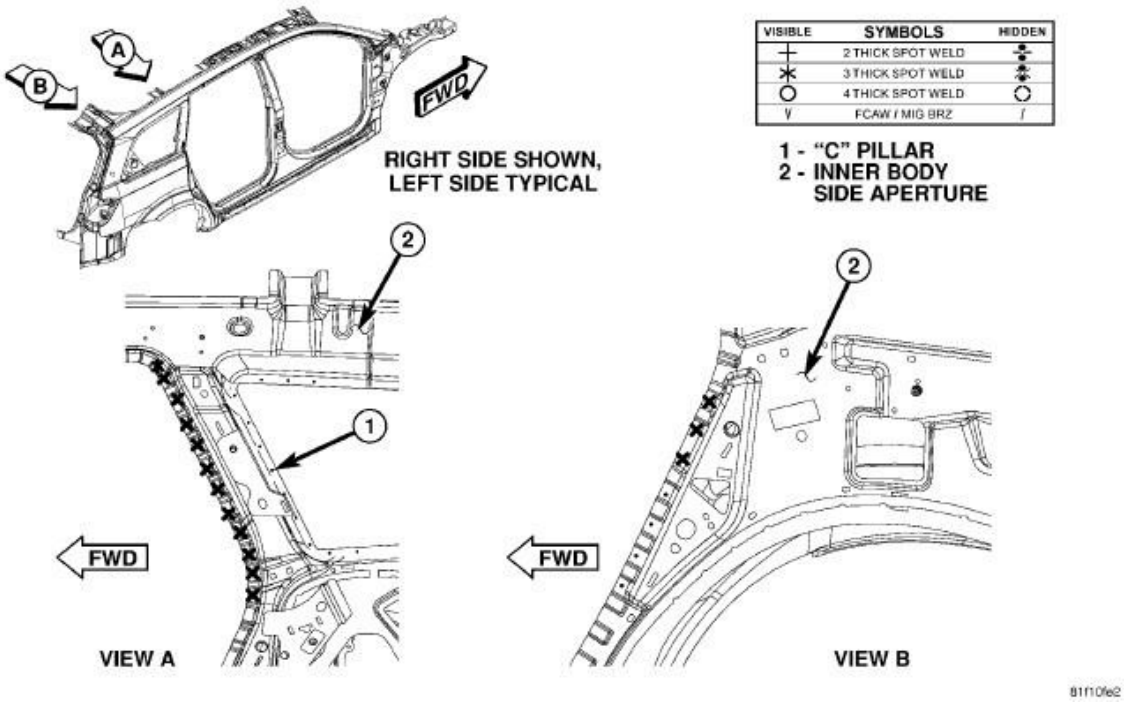

Fig. 434: BODY SIDE APERTURE COMPLETE (9 OF 18)
Courtesy of CHRYSLER LLC

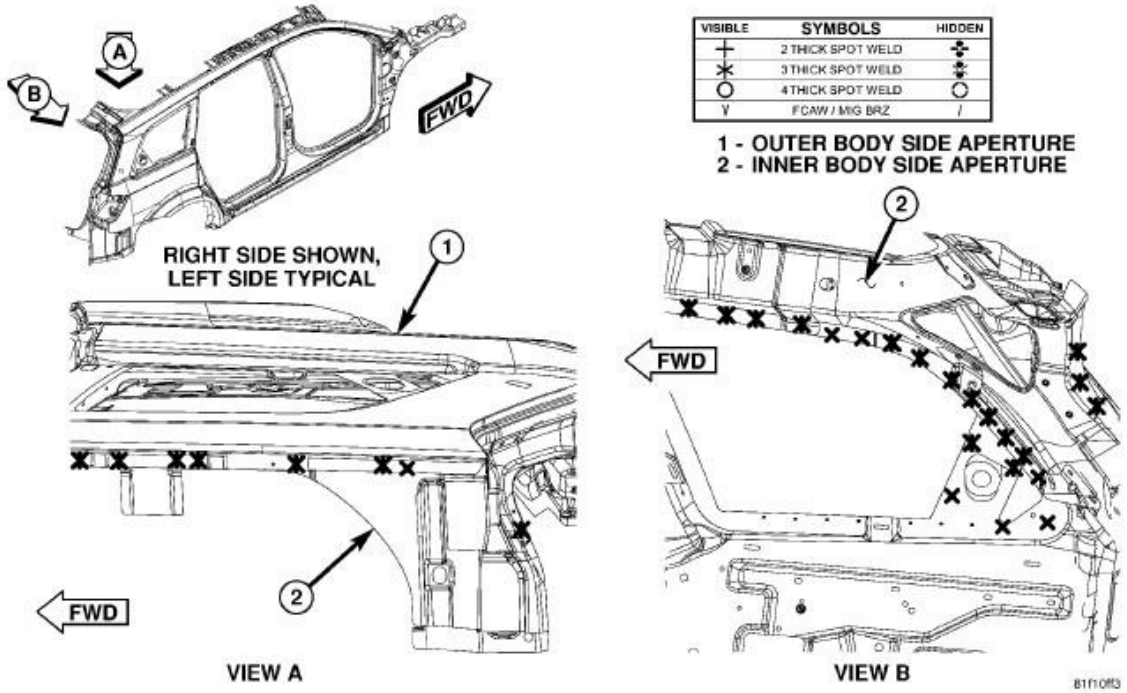

Fig. 435: BODY SIDE APERTURE COMPLETE (10 OF 18)
Courtesy of CHRYSLER LLC

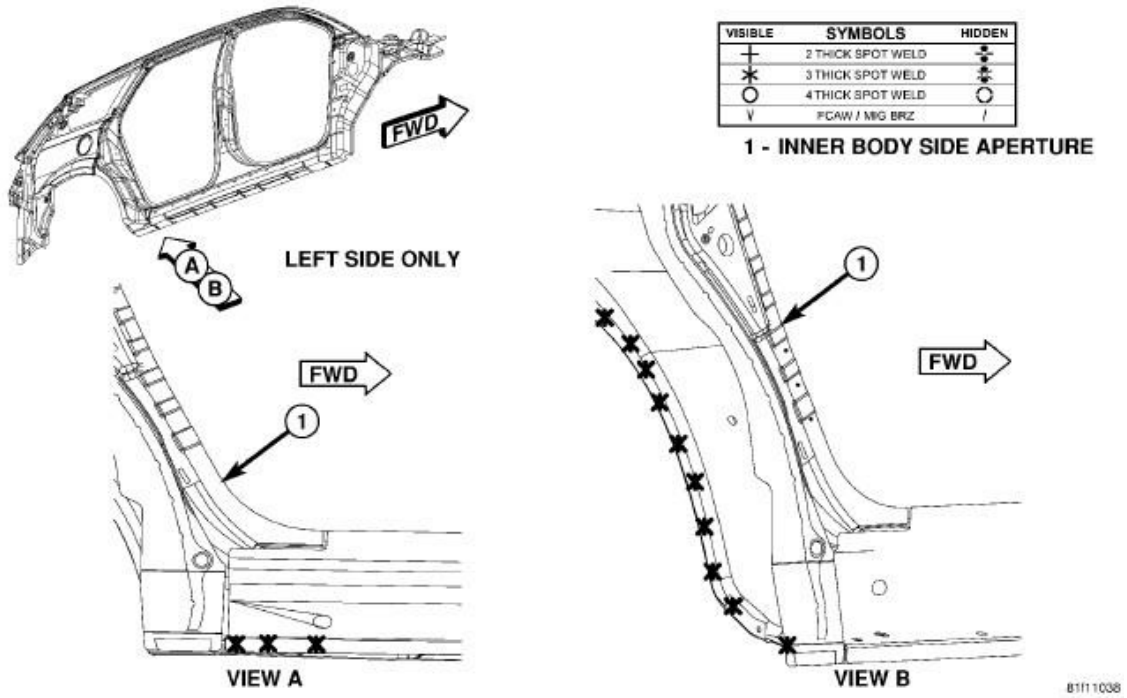

Fig. 436: BODY SIDE APERTURE COMPLETE (11 OF 18)
Courtesy of CHRYSLER LLC

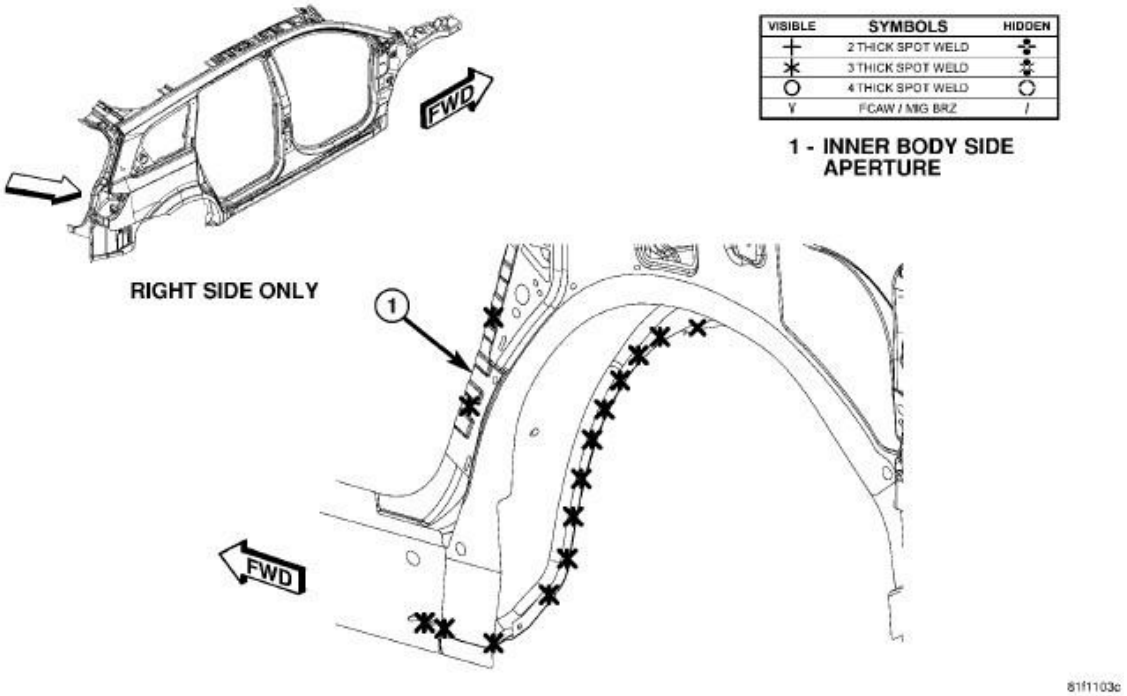

Fig. 437: BODY SIDE APERTURE COMPLETE (12 OF 18)
Courtesy of CHRYSLER LLC

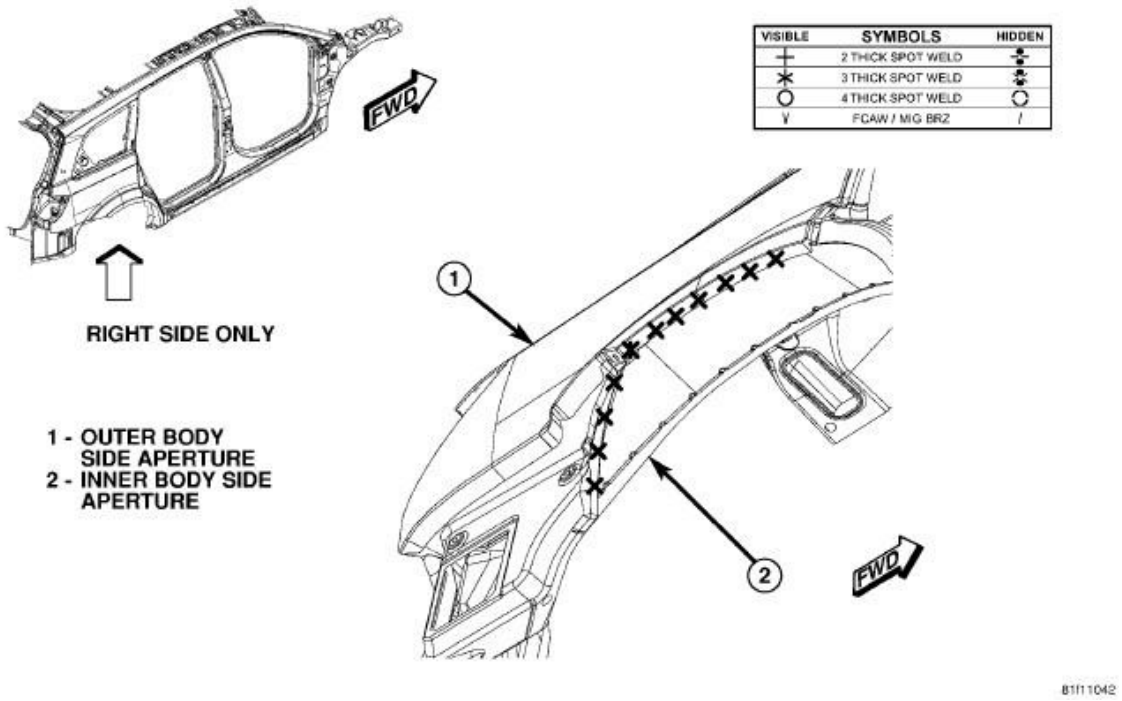

Fig. 438: BODY SIDE APERTURE COMPLETE (13 OF 18)
Courtesy of CHRYSLER LLC

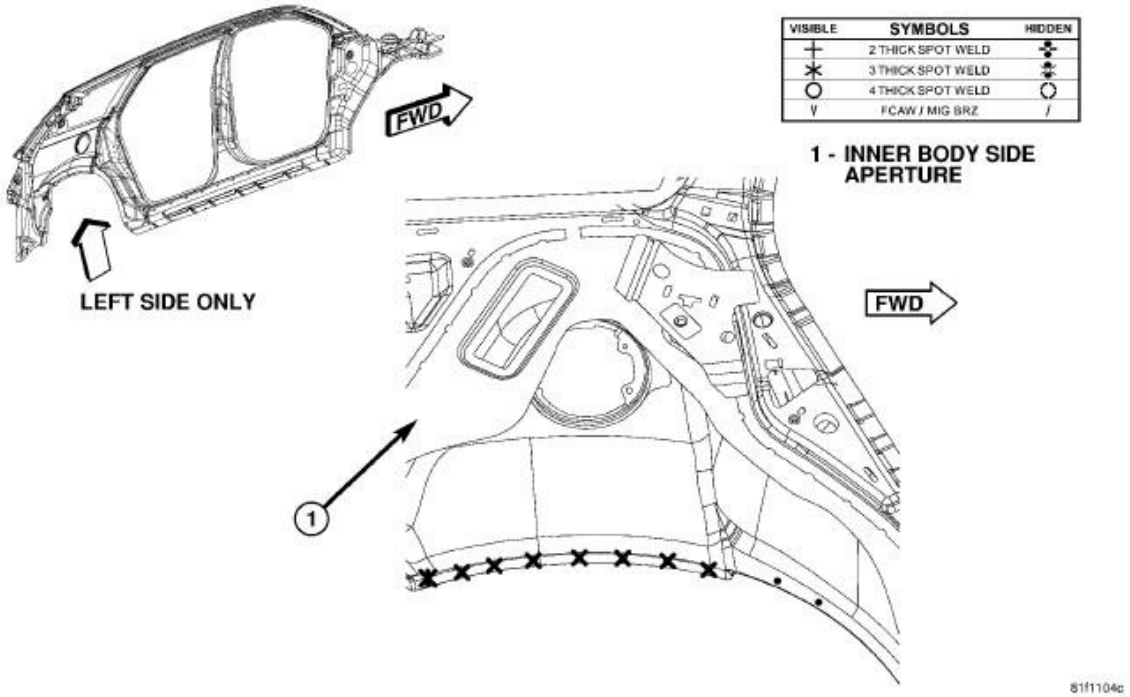

Fig. 439: BODY SIDE APERTURE COMPLETE (14 OF 18)
Courtesy of CHRYSLER LLC

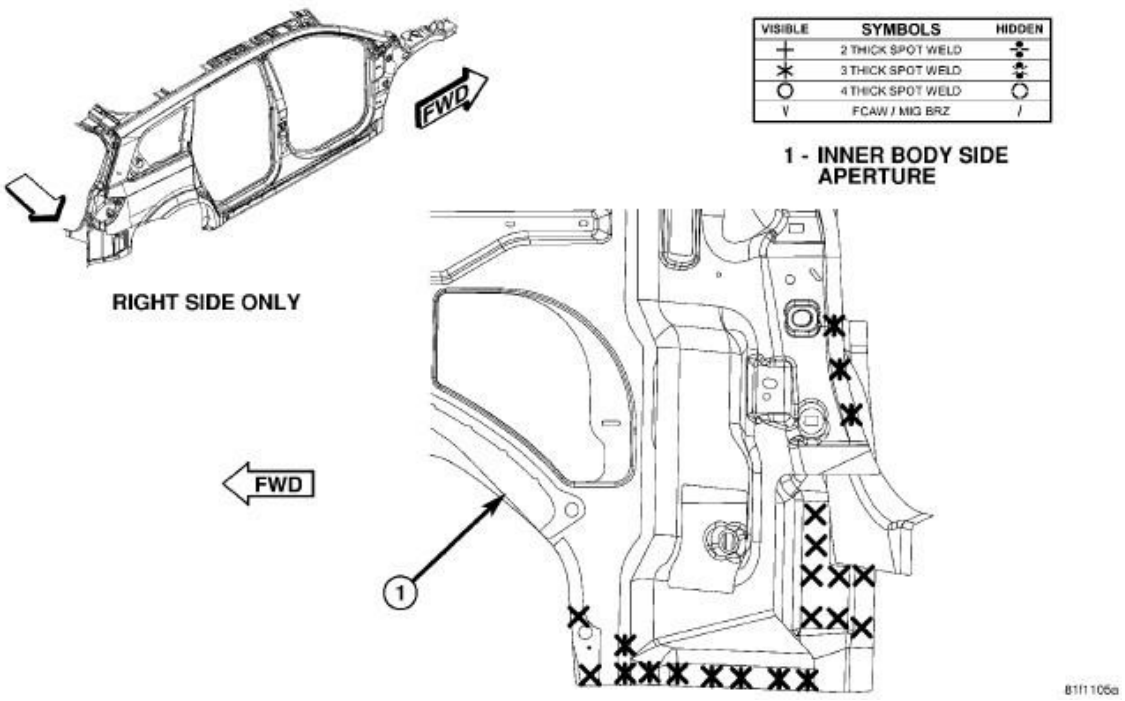

Fig. 440: BODY SIDE APERTURE COMPLETE (15 OF 18)
Courtesy of CHRYSLER LLC

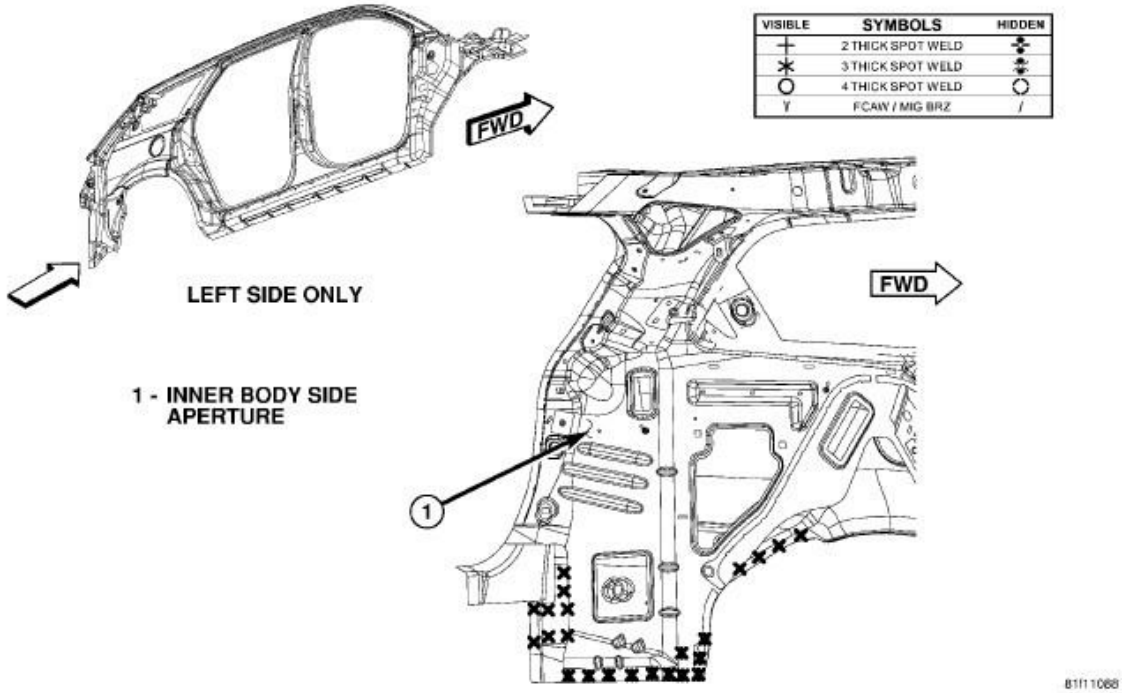

Fig. 441: BODY SIDE APERTURE COMPLETE (16 OF 18)
Courtesy of CHRYSLER LLC

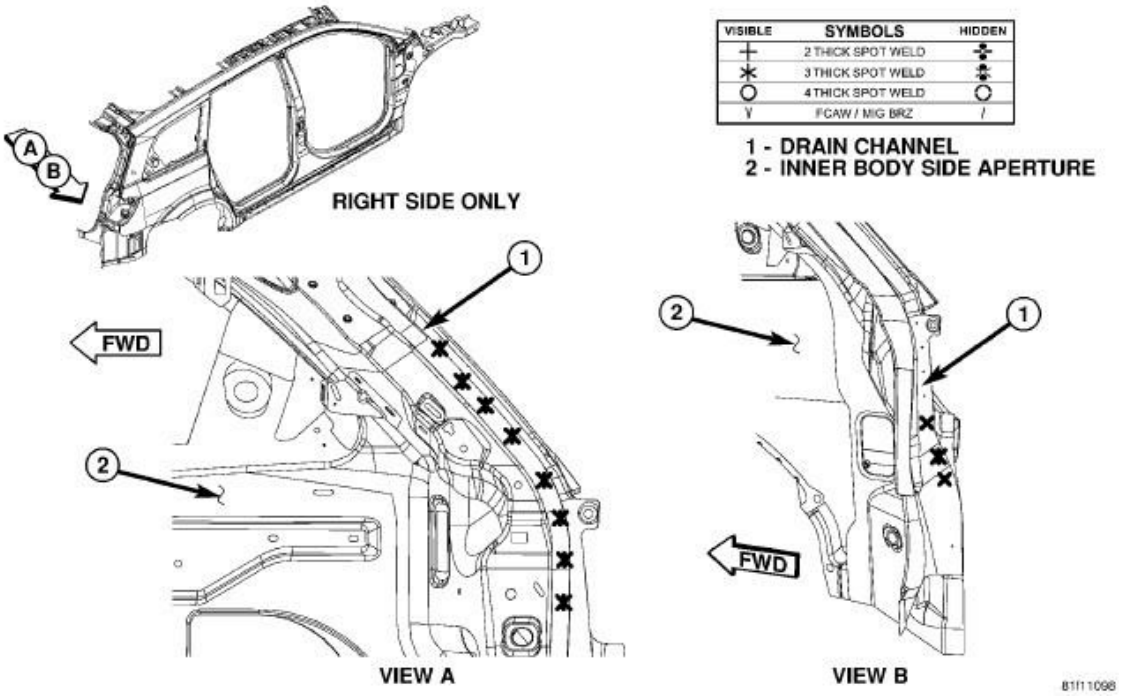

Fig. 442: BODY SIDE APERTURE COMPLETE (17 OF 18)
Courtesy of CHRYSLER LLC

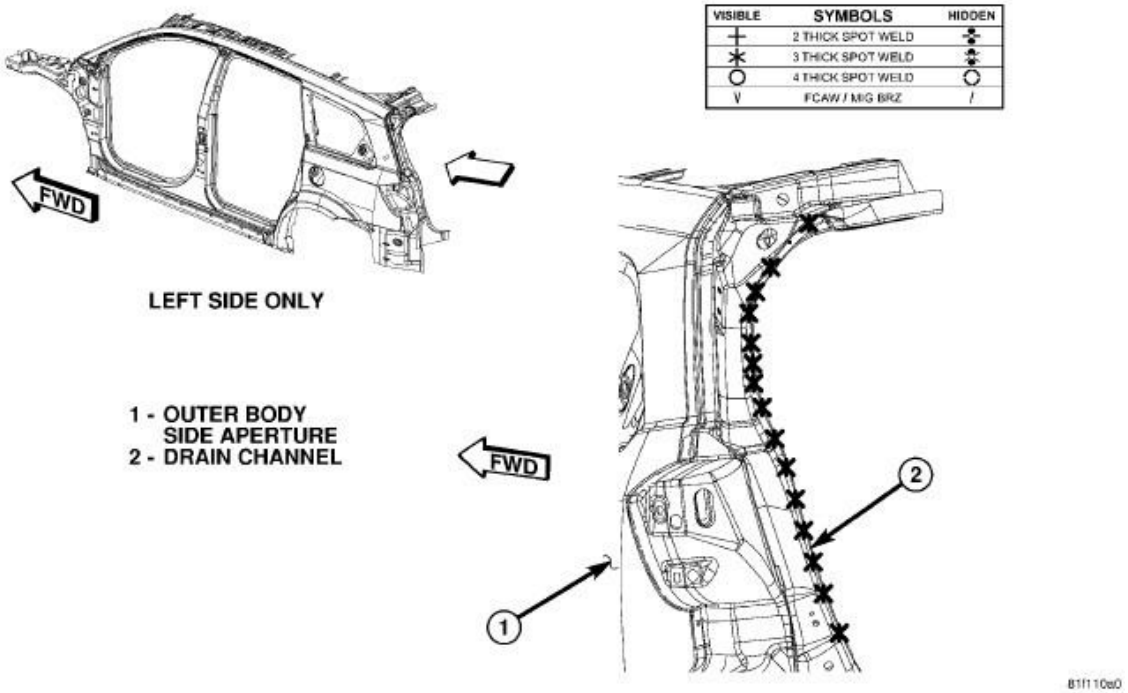

Fig. 443: BODY SIDE APERTURE COMPLETE (18 OF 18)
Courtesy of CHRYSLER LLC

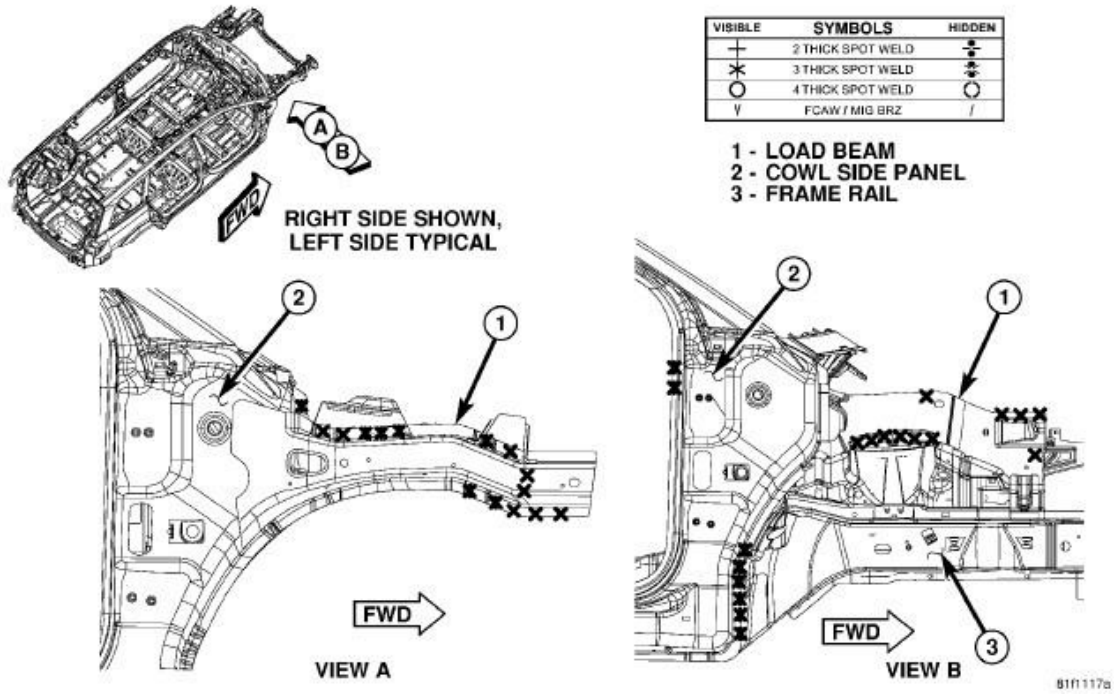

Fig. 444: BODY IN WHITE (1 OF 6)
Courtesy of CHRYSLER LLC

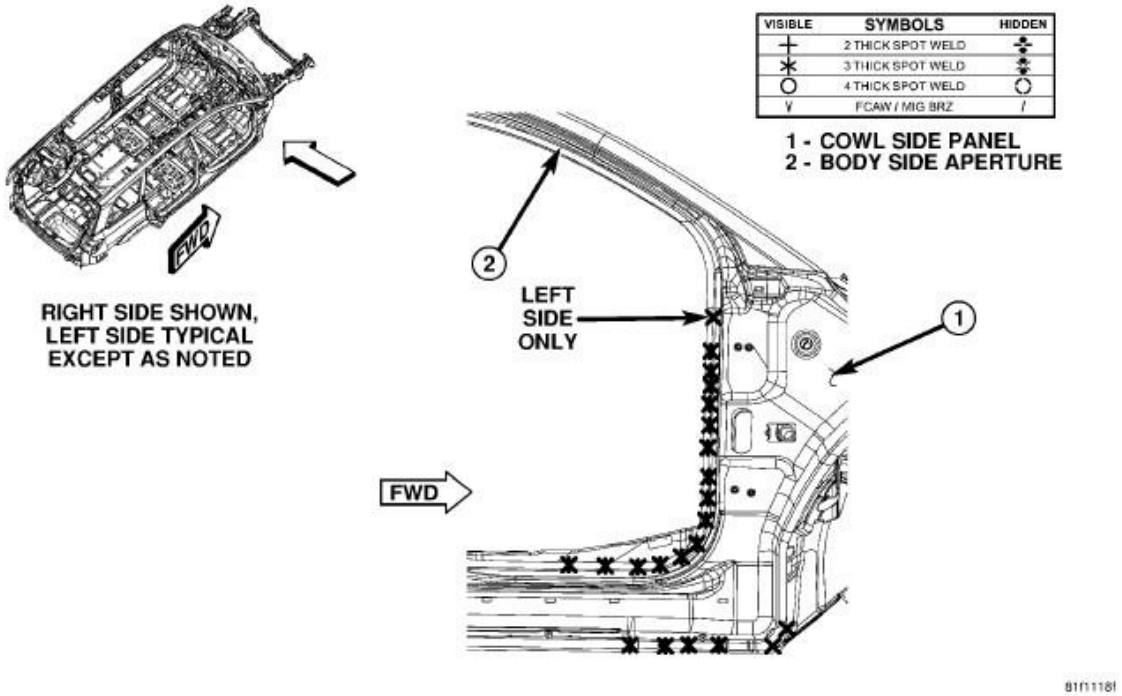

Fig. 445: BODY IN WHITE (2 OF 6)
Courtesy of CHRYSLER LLC

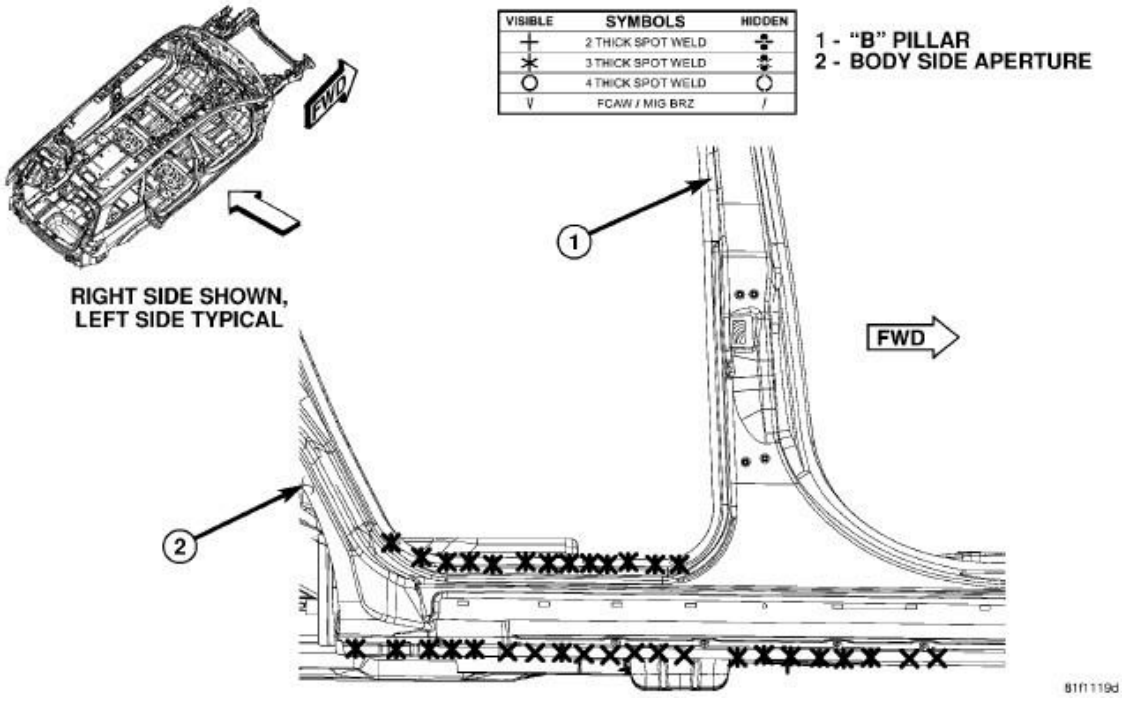

Fig. 446: BODY IN WHITE (3 OF 6)
Courtesy of CHRYSLER LLC

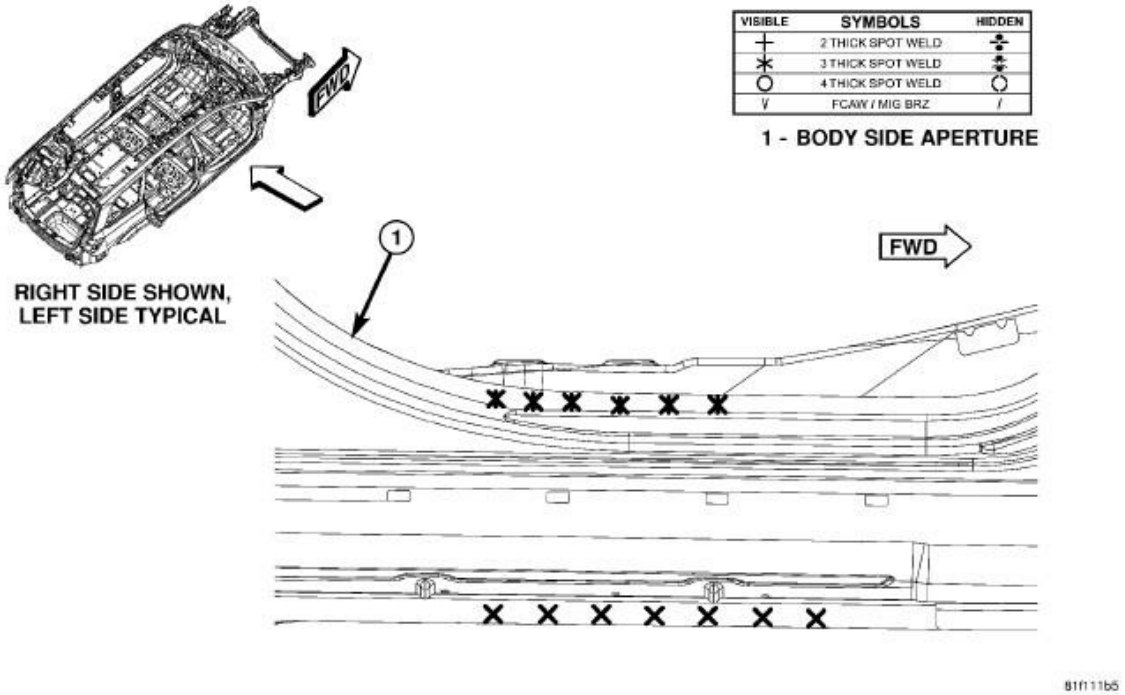

Fig. 447: BODY IN WHITE (4 OF 6)
Courtesy of CHRYSLER LLC

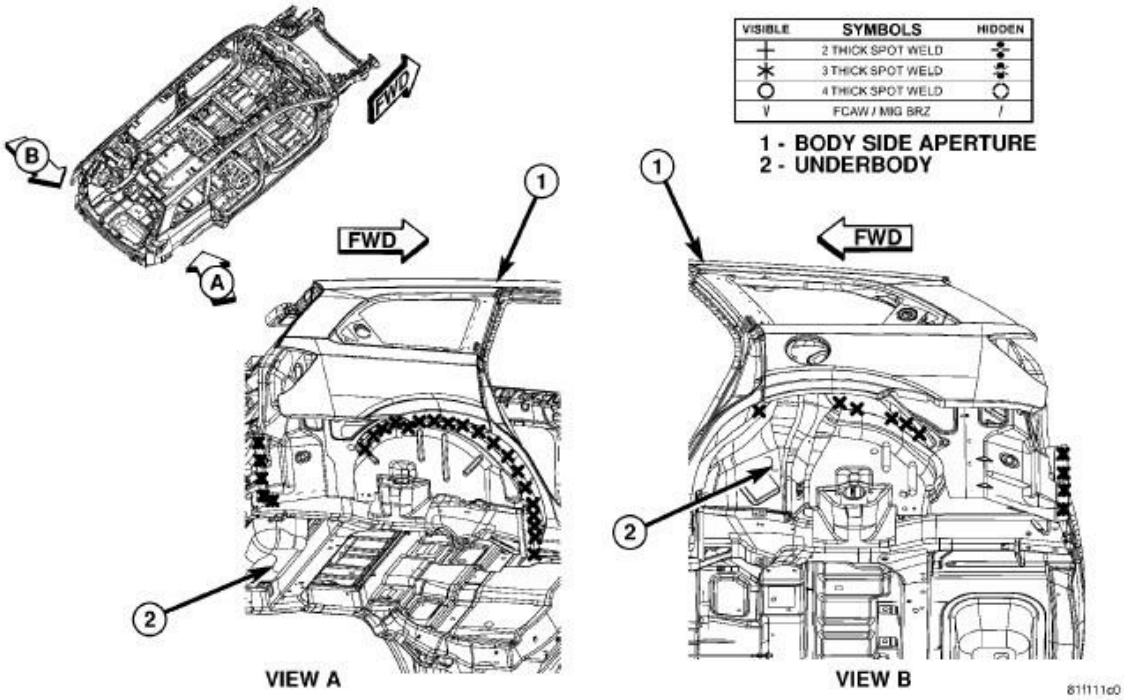

Fig. 448: BODY IN WHITE (5 OF 6)
Courtesy of CHRYSLER LLC

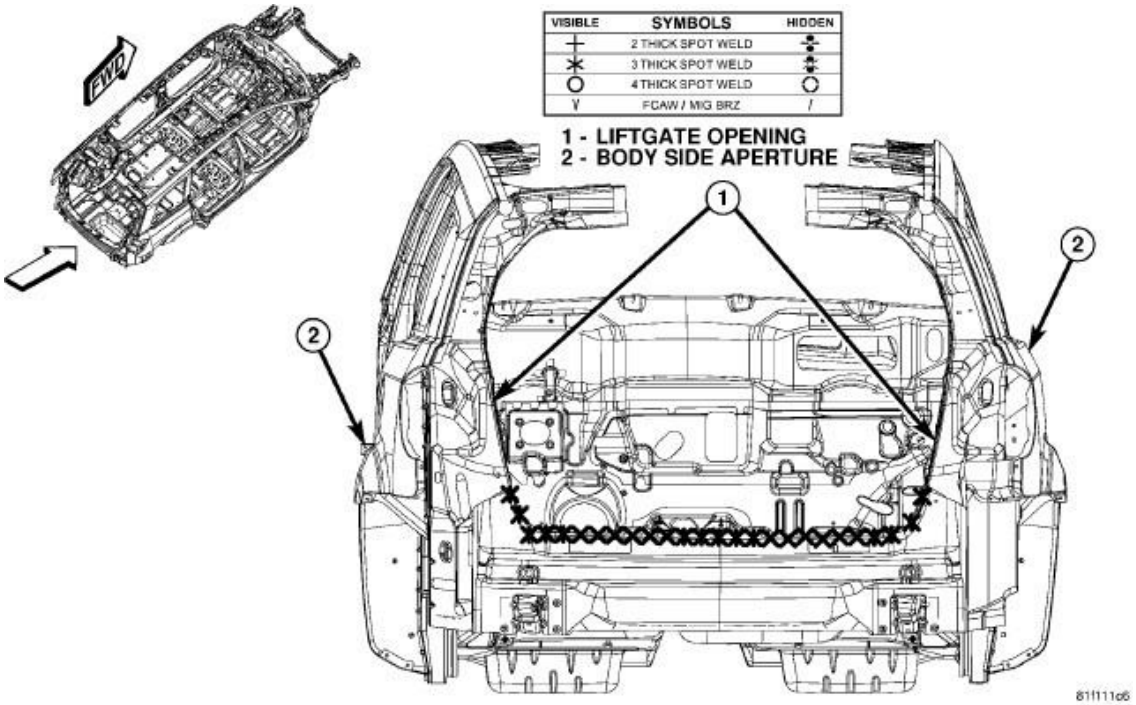

Fig. 449: BODY IN WHITE (6 OF 6)
Courtesy of CHRYSLER LLC

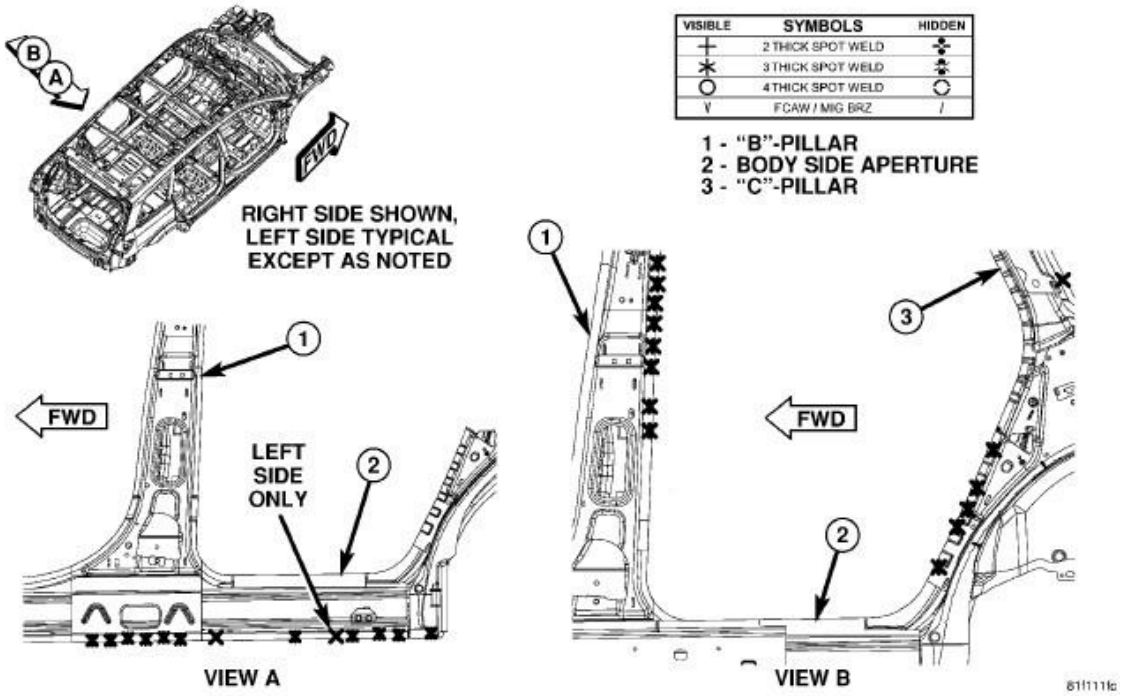

Fig. 450: BODY IN WHITE COMPLETE (1 OF 6)
Courtesy of CHRYSLER LLC

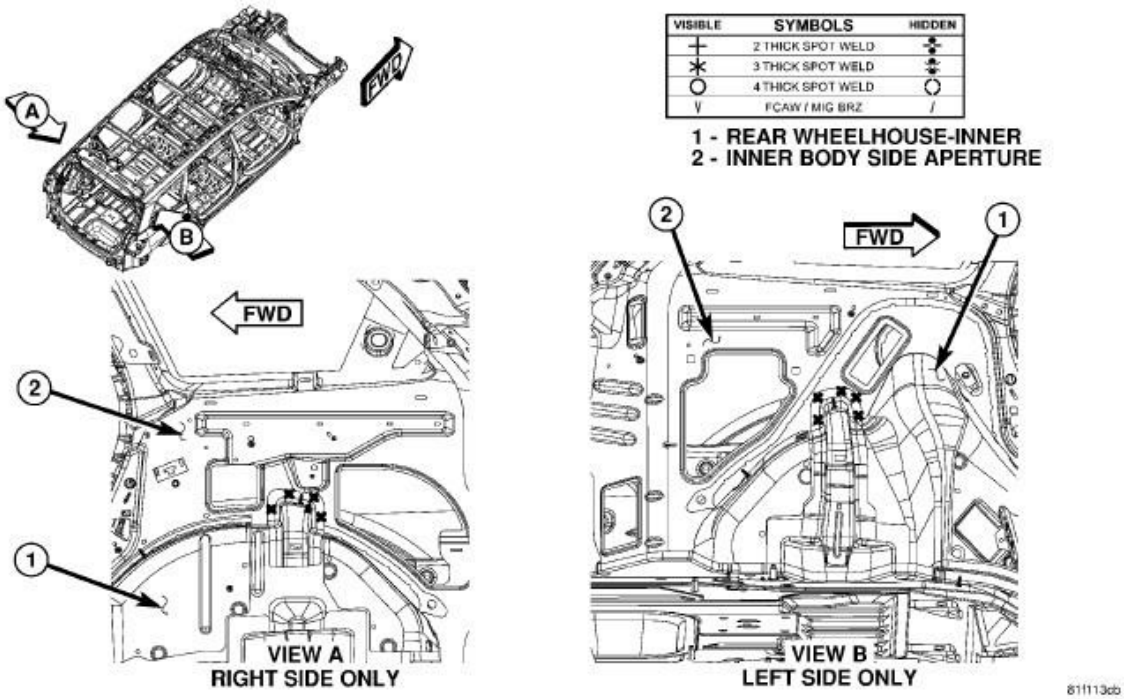

Fig. 451: BODY IN WHITE COMPLETE (2 OF 6)
Courtesy of CHRYSLER LLC

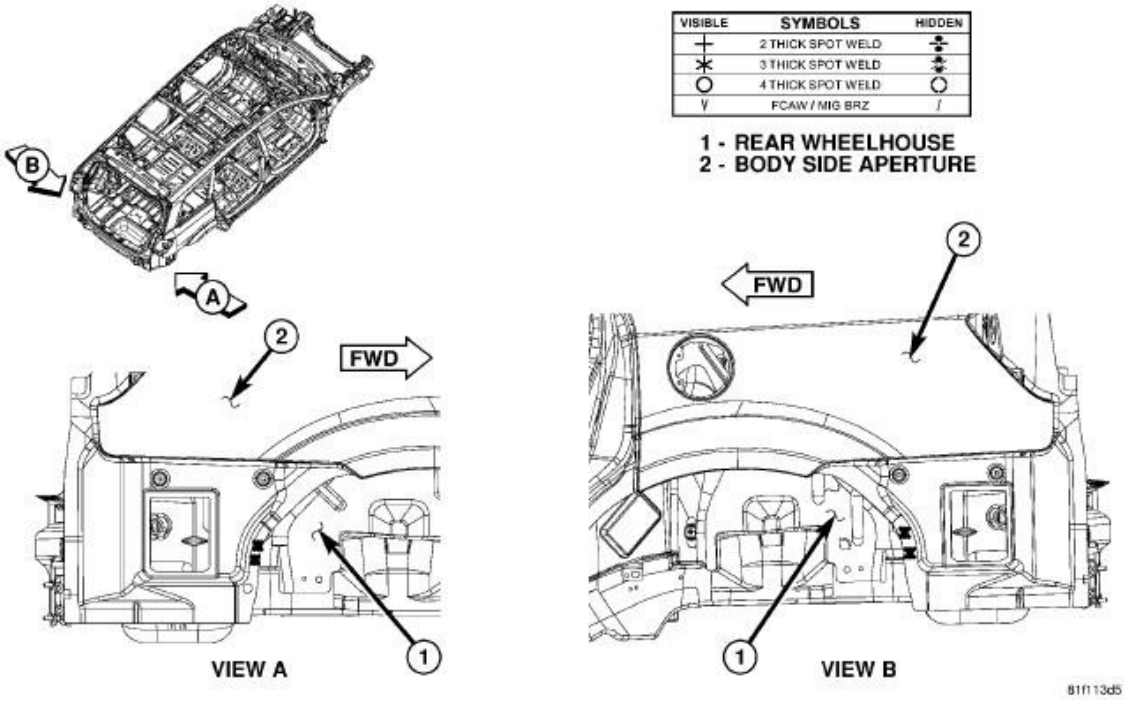

Fig. 452: BODY IN WHITE COMPLETE (3 OF 6)
Courtesy of CHRYSLER LLC

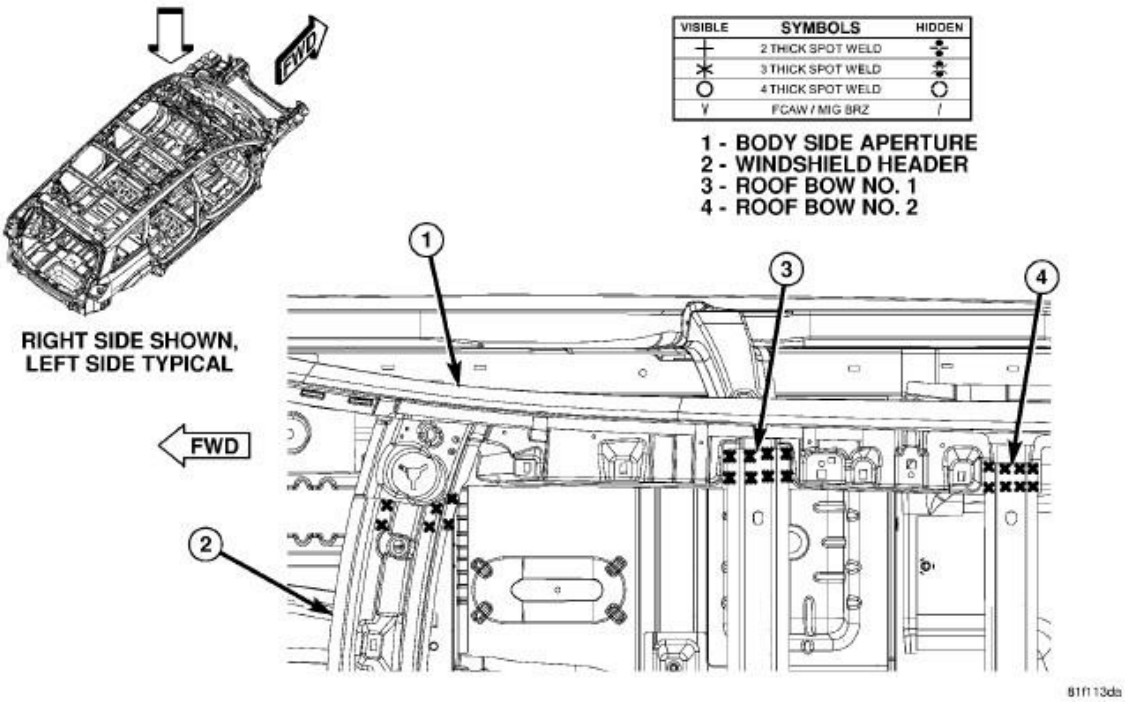

Fig. 453: BODY IN WHITE COMPLETE (4 OF 6)
Courtesy of CHRYSLER LLC

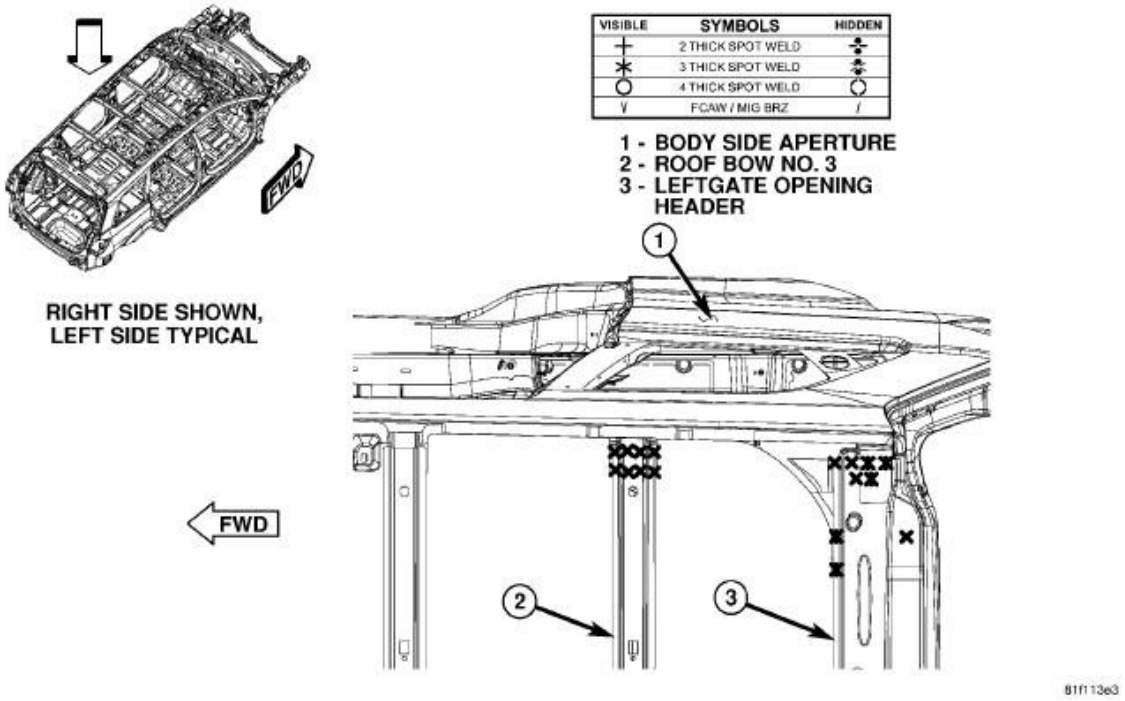

Fig. 454: BODY IN WHITE COMPLETE (5 OF 6)
Courtesy of CHRYSLER LLC

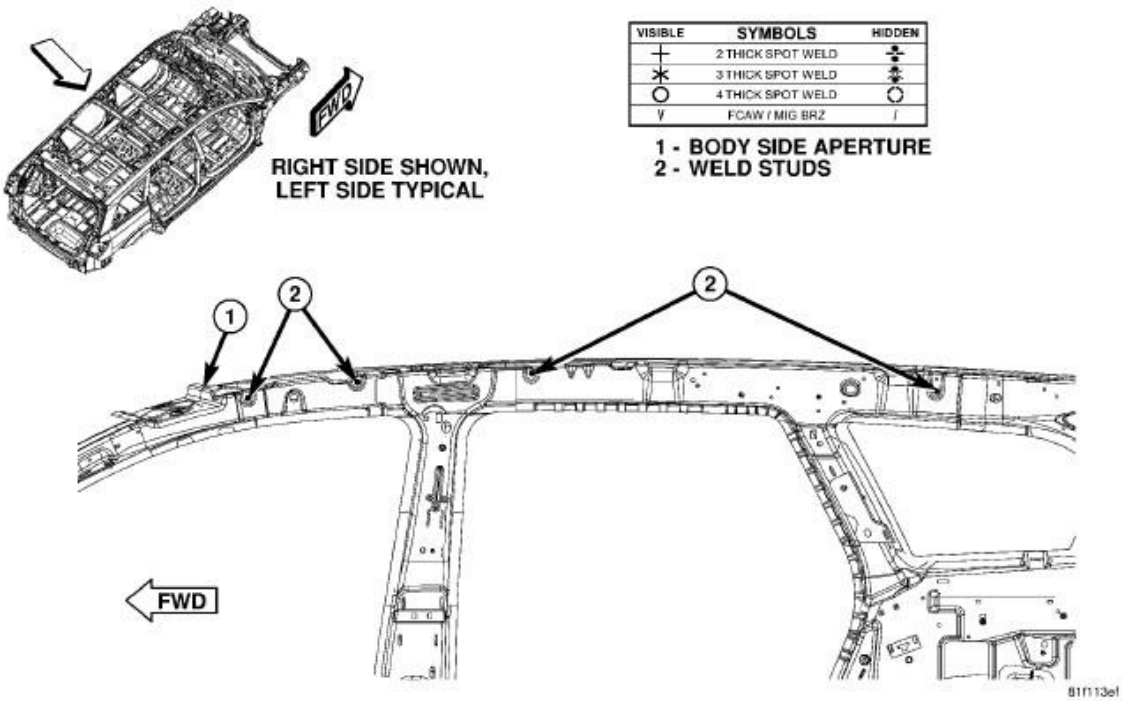

Fig. 455: BODY IN WHITE COMPLETE (6 OF 6)
Courtesy of CHRYSLER LLC

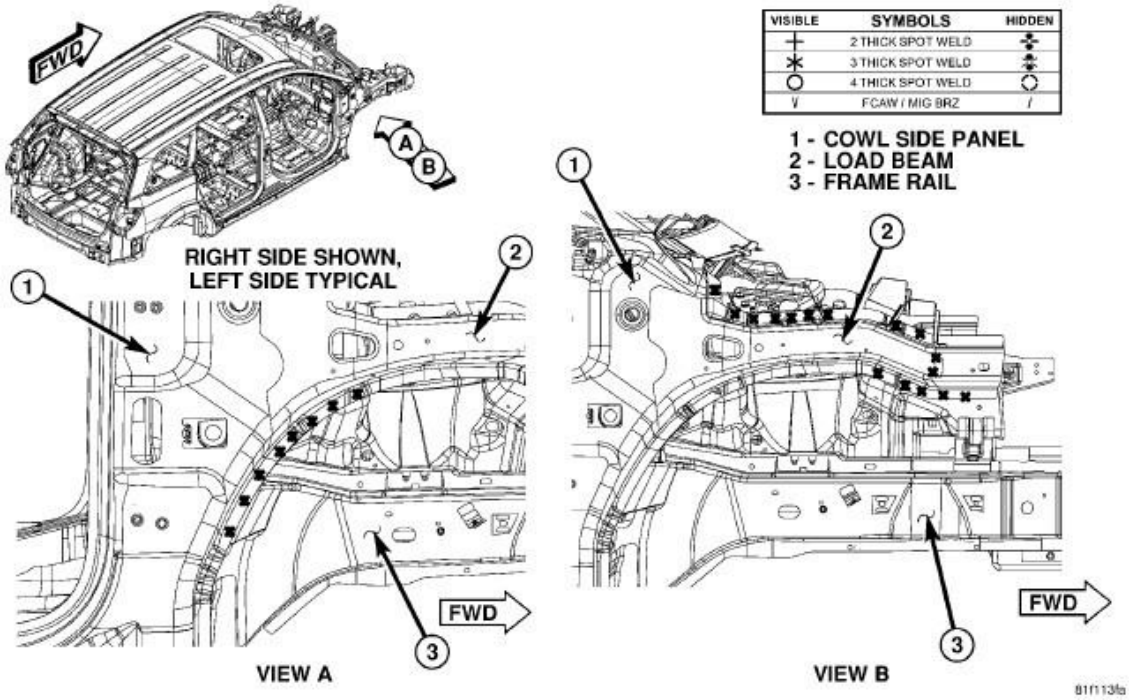

Fig. 456: BODY IN WHITE COMPLETE W/ROOF (1 OF 10)
Courtesy of CHRYSLER LLC

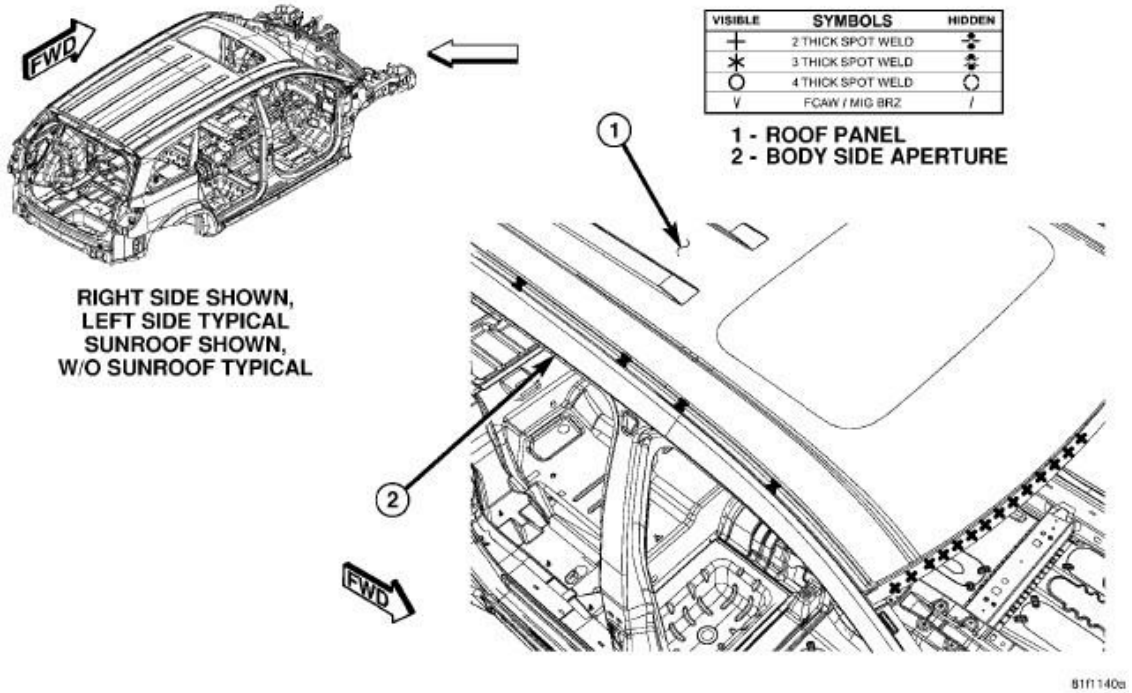

Fig. 457: BODY IN WHITE COMPLETE W/ROOF (2 OF 10)
Courtesy of CHRYSLER LLC

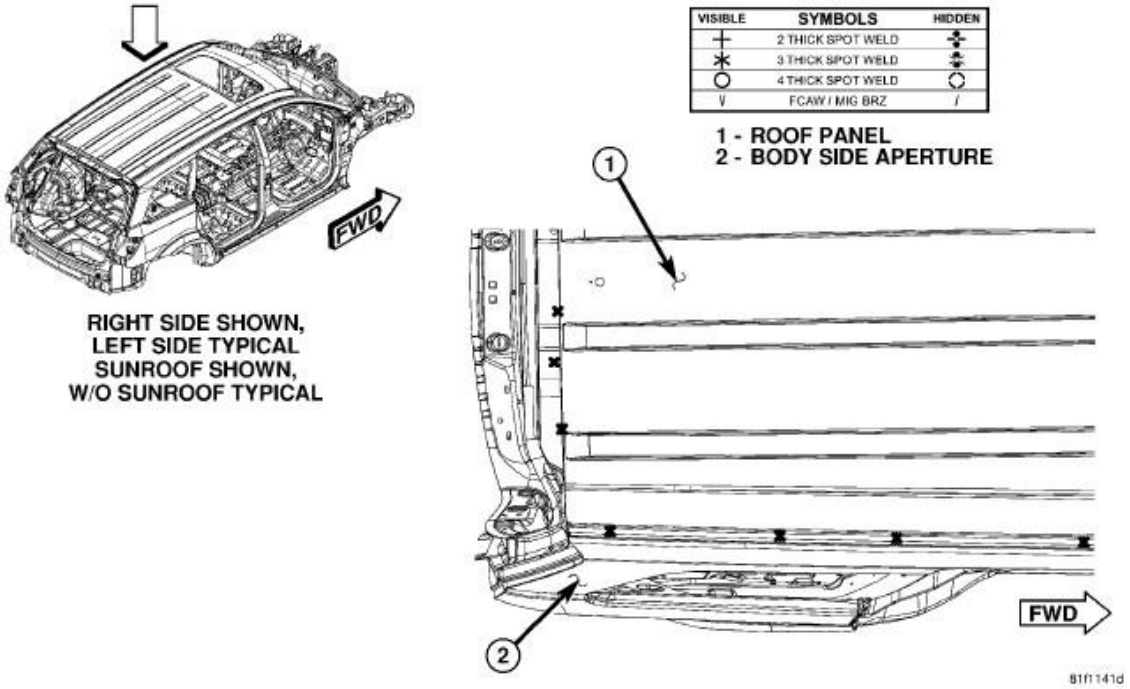

Fig. 458: BODY IN WHITE COMPLETE W/ROOF (3 OF 10)
Courtesy of CHRYSLER LLC

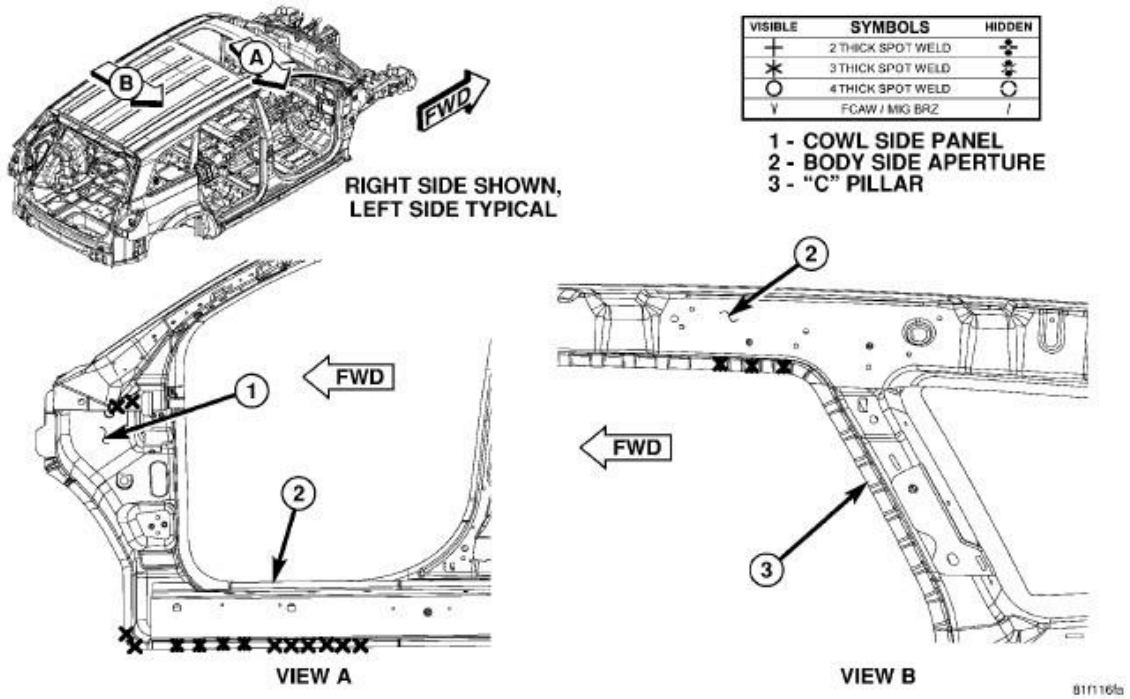

Fig. 459: BODY IN WHITE COMPLETE W/ROOF (4 OF 10)
Courtesy of CHRYSLER LLC

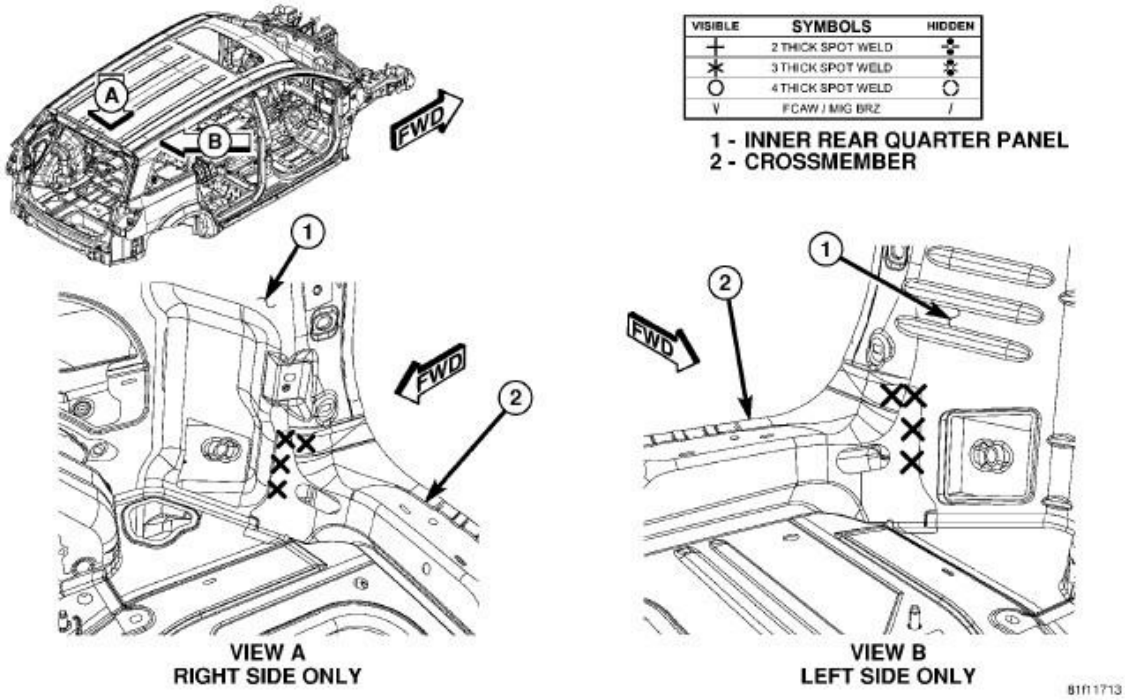

Fig. 460: BODY IN WHITE COMPLETE W/ROOF (5 OF 10)
Courtesy of CHRYSLER LLC

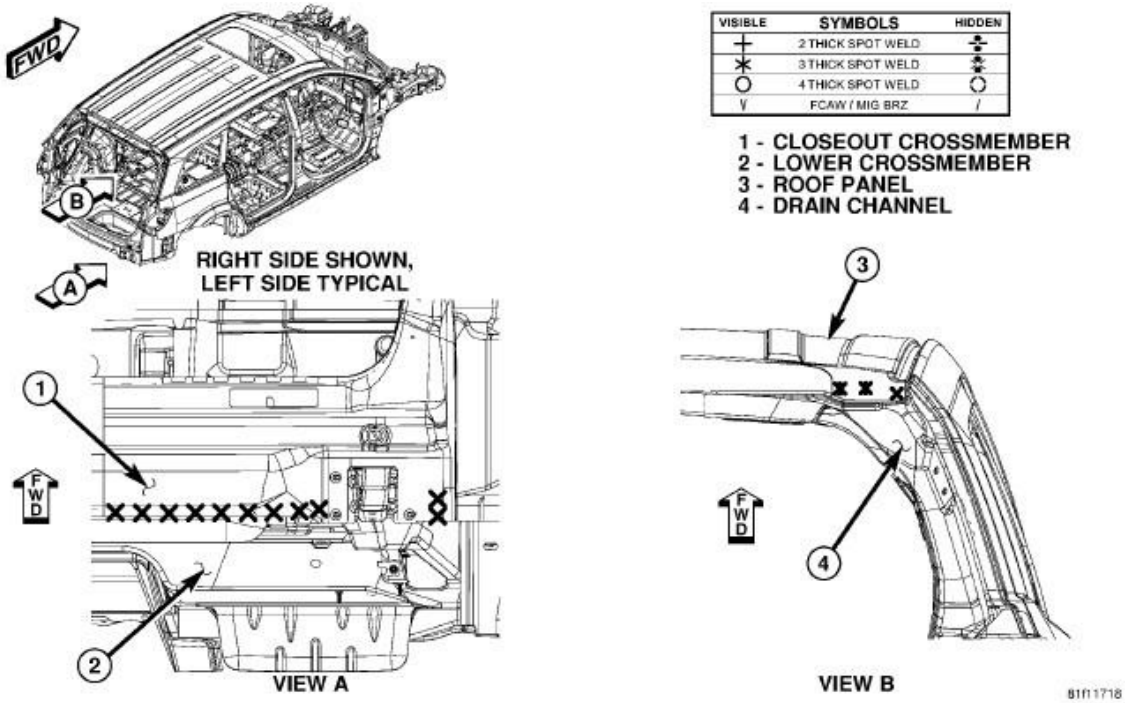

Fig. 461: BODY IN WHITE COMPLETE W/ROOF (6 OF 10)
Courtesy of CHRYSLER LLC

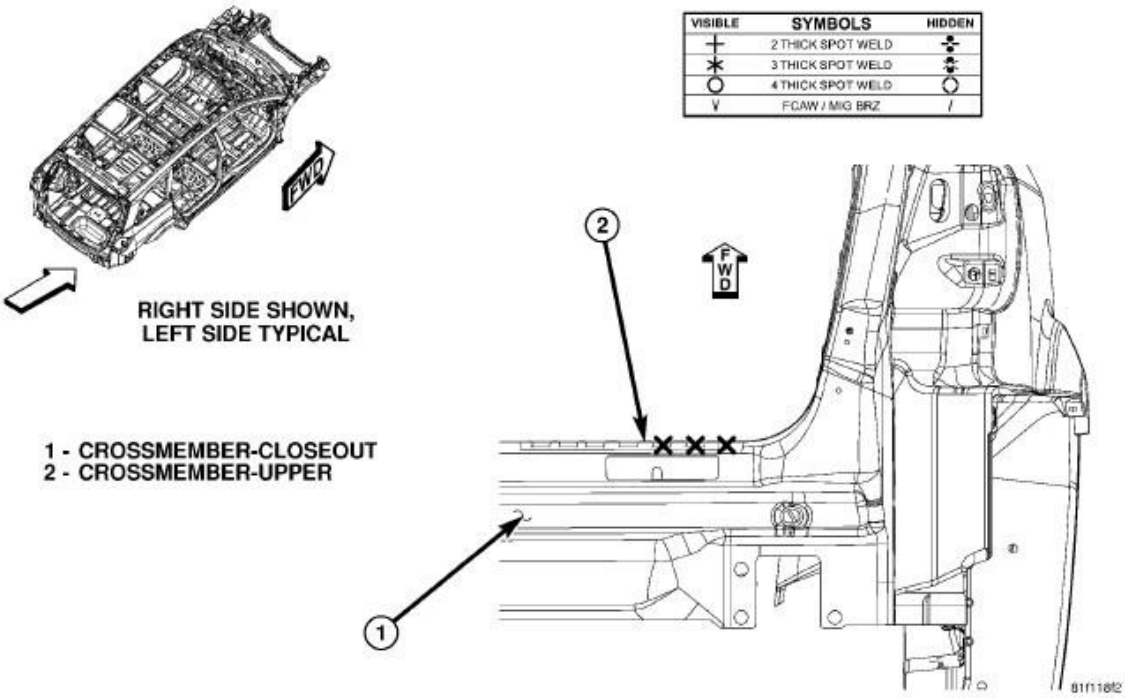

Fig. 462: BODY IN WHITE COMPLETE W/ROOF (7 OF 10)
Courtesy of CHRYSLER LLC

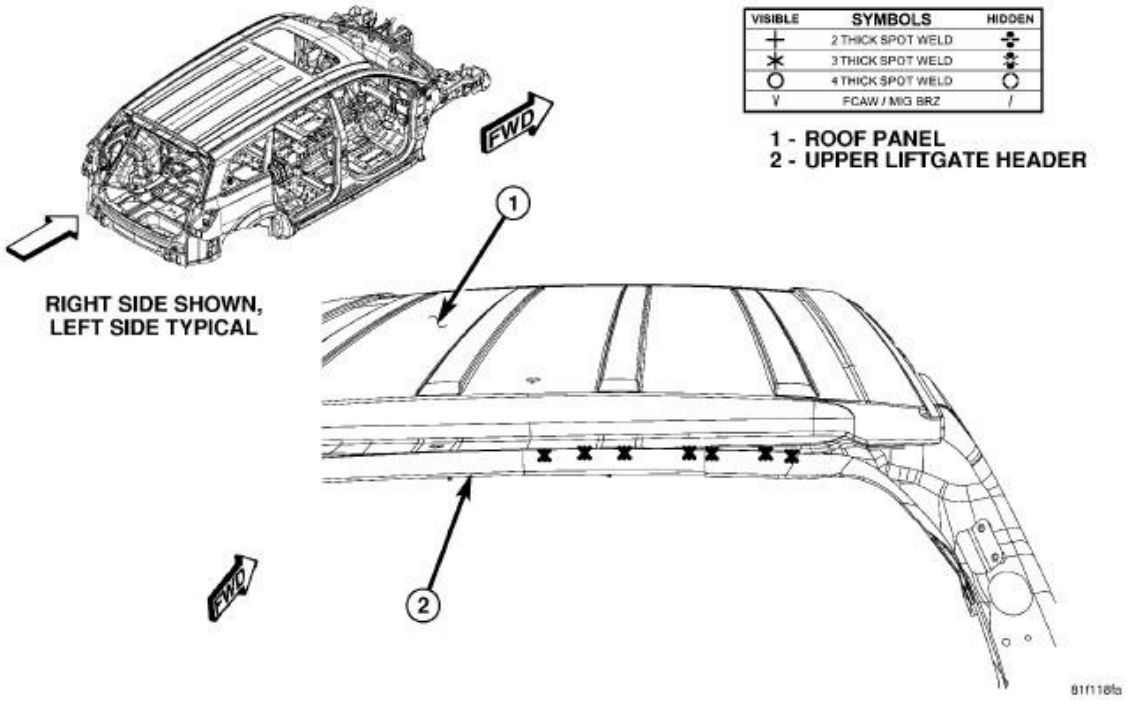

Fig. 463: BODY IN WHITE COMPLETE W/ROOF (8 OF 10)
Courtesy of CHRYSLER LLC

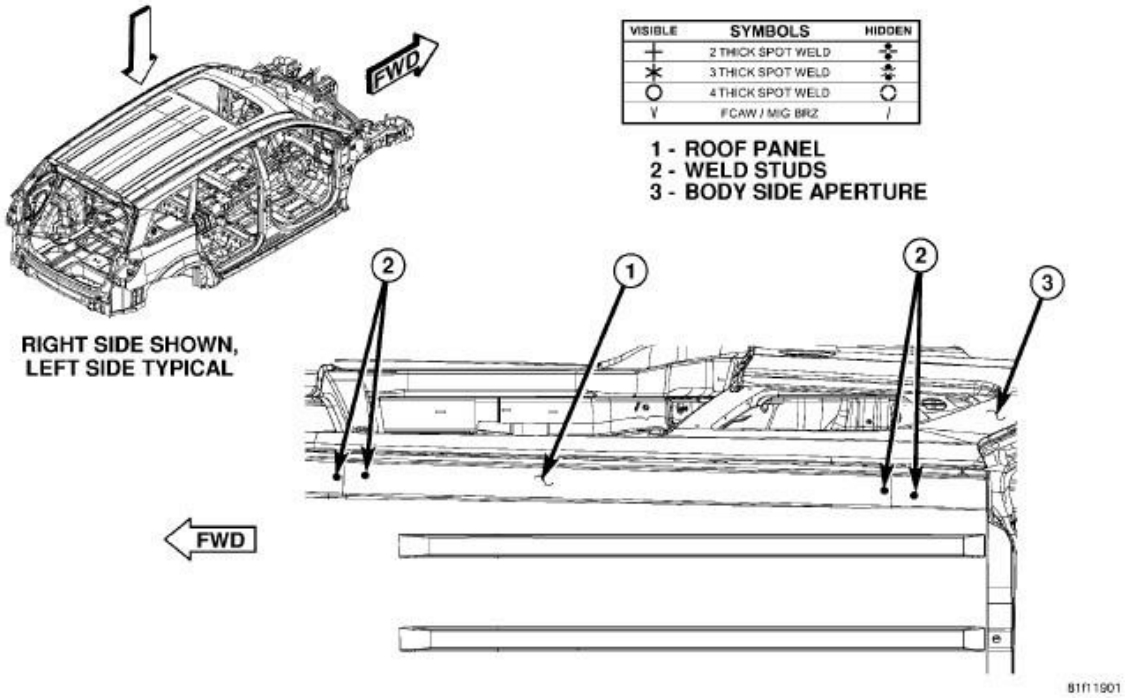

Fig. 464: BODY IN WHITE COMPLETE W/ROOF (9 OF 10)
Courtesy of CHRYSLER LLC

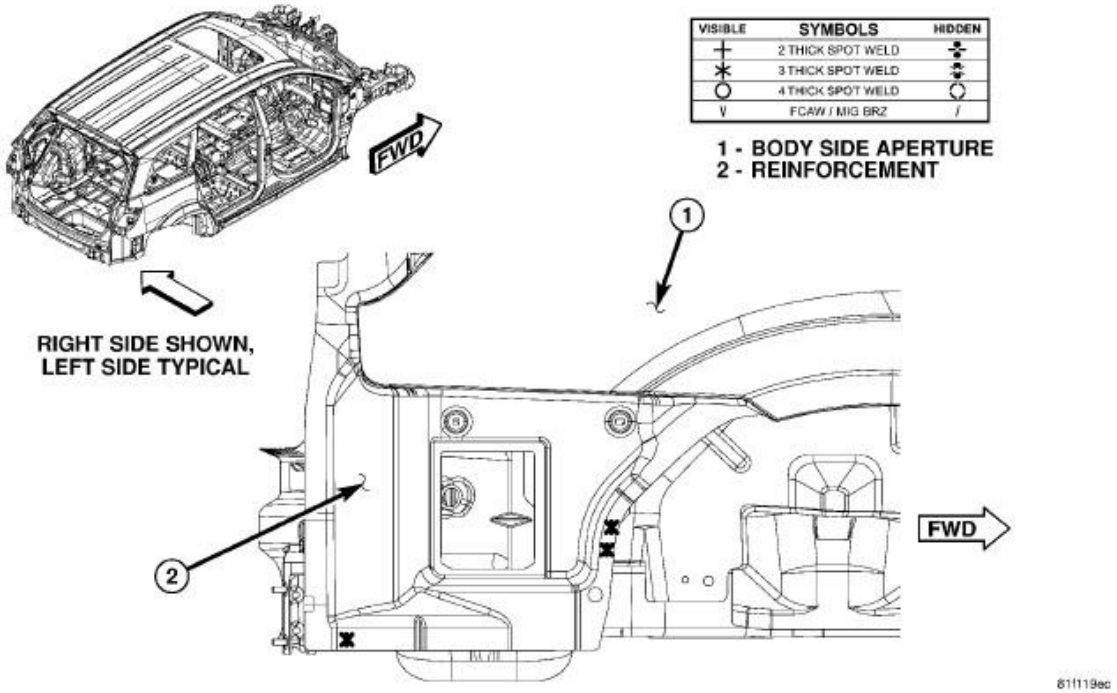

Fig. 465: BODY IN WHITE COMPLETE W/ROOF (10 OF 10)
Courtesy of CHRYSLER LLC

2009 ACCESSORIES AND EQUIPMENT

Audio and Video - Service Information - Journey

DESCRIPTION

DESCRIPTION

Several combinations of radio receivers and speaker systems are offered. The audio system uses an ignition switched source of battery current so that the system will only operate when the ignition switch is in the RUN or ACCESSORY positions.

The audio system includes the following components:

- Antenna (Radio and Satellite)
- Power amplifier (with premium speaker system only)
- Radio noise suppression components
- Radio receiver
- Remote radio switches (if equipped)
- Satellite Receiver (integrated within the radio)
- Speakers

OPERATION

OPERATION

The audio system components are designed to provide audio entertainment and information through the reception, tuning and amplification of locally broadcast radio signals in both the Amplitude Modulating (AM) and Frequency Modulating (FM) commercial frequency ranges.

The audio system components operate on battery current received through a fuse in the Power Distribution Center (PDC) (Diesel Only) or the Totally Integrated Control Module (TIPM) on a fused ignition switch output (run-acc) circuit so that the system will only operate when the ignition switch is in the Run or Accessory positions.

DIAGNOSIS AND TESTING

VIDEO

VIDEO SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
NO VIDEO (DVD PLAYER WILL NOT	1. Fuse inoperative.	1. Check fuses. Replace fuses if required.
	2. Loose or damaged	2. Check for loose or corroded DVD player connector

LOAD OR EJECT)	DVD player connector	(16 pin). Repair or replace as required.
	3. Loose or damaged wiring/DVD player inoperative	3. Check pin 1 (b+) and pin 9 (ground) of the 16 pin connector, then check pin 1 (b+) and pin 7 (ground) of the 12 pin connector. If the 16 pin connector does not show voltage, the 12 pin connector will not show voltage (the 12 pin is fed from the 16 pin). If voltage is ok on the 16 pin, but not present on the 12 pin, unplug the 12 pin harness from the player and check the connector pins on the back of the player. If voltage is present on the 12 pin connector, the screen or the 12 pin harness should be replaced. If there is still no voltage on the 12 pin connector, the DVD player should be replaced.
	4. Ground connection damaged	4. Check for continuity between DVD player and a known good ground. There should be continuity. Repair ground if required.
	5. DVD player damaged	5. Exchange or replace DVD player if required.
-	6. DVD damaged. **NOTE:** **Avoid using CD's or DVD's that have adhesive type labels, as they may cause the disc to become jammed.**	6. Insert known good DVD and test operation.
NO DISPLAY. AUDIO HEARD THROUGH SPEAKERS	1. Loose or damaged connectors	1. Check for loose or corroded DVD player connector (12 pin). Check for loose or corroded video screen connector. Repair if required. Check for loose or damaged in-line connector.
-	2. Wiring damaged	2. With harness connected, check for video signal voltage at DVD player and at video screen harness. Place known good DVD into DVD player. Place positive lead of voltmeter on pin 5 (video signal) of the 12 pin connector. Place negative lead on pin 6 (video ground). Readings should be between 0.1v to 2v dc.
-	3. Video screen damaged	3. Exchange or replace video screen if required.
WHITE DISPLAY	1. Low voltage	1. Check for battery voltage (9v-16v) at DVD player 12 pin connector (pin 1-battery, pin 7-ground). Display will be white if voltage drops below 6v.
-	2. Video screen damaged	2. Exchange or replace video screen if required.

DARK OR BRIGHT SPOTS ON SCREEN	1. Brightness setting requires adjustment.	1. Adjust brightness setting of video screen by pressing buttons on side of video screen until desired level is reached. Start with a black screen, then press button up 16-20 times. There are 64 total steps of brightness.
BRIGHT OR DARK DISPLAY	1. Video screen display pixel defect.	1. The acceptable level of dots on the screen is (green-1, red-2) or a total (green+red+blue+white+black) = 8. Replace or exchange video screen if necessary.
VIDEO SELECTIONS DO NOT APPEAR FULL SCREEN WIDTH -	1. Aspect ratio is set incorrectly.	1. Using mode button, adjust until video appears correctly.
	2. Some DVD's are two sided. One side is wide screen format and the other is full screen or there may be a wide screen or standard screen format on the disc.	2. Ensure that DVD is inserted correctly.
BUTTONS ON VIDEO SCREEN INOPERATIVE	1. Video screen damaged.	1. Place known good DVD into DVD player. Once image appears on video screen, press top button on side of video screen to adjust width of display. Press bottom buttons to adjust brightness. Once DVD menu appears on video screen, press middle button on video screen. Highlighted selection will begin to play. If any of the buttons do not function, replace or exchange video screen.

AUDIO

Any diagnosis of the Audio system should begin with the use of the scan tool. For information on the use of the scan tool, refer to the appropriate Diagnostic Service information.

For complete circuit diagrams, refer to SYSTEM WIRING DIAGRAMS .

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

AUDIO SYSTEM DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
NO AUDIO AT ALL SPEAKERS - RADIO DISPLAY AND CONTROLS ARE OPERATIONAL	1. Amplifier fuse faulty, if equipped.	1. Check and replace fuses, if required.
-	2. Radio faulty.	2. Exchange or replace radio, if required.
-	3. Wiring to amplifier faulty, if equipped.	3. Verify radio on/off input to amplifier and verify battery and ground connections. Repair wiring as necessary.
-	4. Amplifier faulty, if equipped.	4. Replace amplifier.
NO AUDIO AT SOME SPEAKERS - RADIO DISPLAY AND CONTROLS ARE OPERATIONAL	1. Radio faulty.	1. Exchange or replace radio, if required.
-	2. Speaker(s) faulty.	2. Refer to speaker diagnostics.
-	3. Wiring faulty between radio and speaker.	3. Check wiring for open or short, repair wiring as necessary.
-	4. Wiring faulty between radio and amplifier.	4. Refer to speaker diagnostics. Repair wiring as necessary.
-	5. Wiring faulty between amplifier and speaker.	5. Repair wiring as necessary.
-	6. Amplifier faulty.	6. Replace amplifier.
POOR AUDIO AT ALL SPEAKERS - RADIO DISPLAY AND CONTROLS ARE OPERATIONAL	1. Radio faulty.	1. Exchange or replace radio, if required.
-	2. Power/ground wiring open or shorted.	2. Repair wiring as necessary.
-	3. Amplifier faulty.	3. Replace amplifier.
-	4. Power/ground wiring to amplifier open or shorted.	4. Repair wiring as necessary.
POOR AUDIO AT SOME SPEAKERS - RADIO DISPLAY AND CONTROLS ARE OPERATIONAL	1. Radio faulty.	1. Exchange or replace radio, if required.
-	2. Speakers faulty.	2. Refer to speaker diagnostics.
-	3. Wiring faulty between radio and speaker.	3. Check wiring for open or short, repair wiring as necessary.
-	4. Wiring faulty between radio and amplifier.	4. Refer to speaker diagnostics. Repair wiring as necessary.
-	5. Wiring faulty between amplifier and speaker.	5. Wiring faulty between amplifier and speaker.
-	6. Amplifier faulty.	6. Replace amplifier.

SOUND DISTORTION (VIBRATION FROM SPEAKER AREA, BUZZING - HUMMING)	1. Door trim panel loose or missing fasteners.	1. Inspect door trim panel and correct as necessary. Replace any missing fasteners.
-	2. Water shield loose or misaligned.	2. Inspect water shield and adjust as required.
-	3. Items placed in door trim panel map pockets vibrating or moving from side to side.	3. Remove items from door trim panel. Ensure that vibration is no longer present.
NO RADIO DISPLAY - AUDIO AND CONTROLS ARE OPERATIONAL	1. Radio faulty.	1. Exchange or replace radio, if required.
NO RADIO DISPLAY - AUDIO AND CONTROLS ARE NOT OPERATIONAL	1. Fuse faulty.	1. Check radio fuse and Ignition-Off Draw (IOD) fuse in Junction Block (JB). Replace fuses, if required.
-	2. Radio connector faulty.	2. Check for loose or corroded radio connector. Repair, if required.
CLOCK WILL NOT KEEP SET TIME	1. Radio connector faulty.	1. Check for loose or corroded radio connector. Repair, if required.
-	2. WIN connector faulty.	2. Check for loose or corroded WIN connector. Repair, if required.
-	3. WIN module faulty.	3. Replace WIN, if required. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/RECEIVER, Wireless Ignition Node - Removal** .
-	4. Radio faulty.	4. Exchange or replace radio, if required.
POOR RADIO RECEPTION WITH KEY IN ACCESSORY OR IGNITION ON POSITION	1. Antenna faulty.	1. **BODY AND CABLE, Antenna** .
-	2. Radio ground faulty.	2. Check for continuity between radio chassis and a known good ground. There should be continuity. Repair ground, if required.
-	3. Radio noise suppression faulty.	3. Repair or replace ground strap as necessary.
-	4. Radio faulty.	4. Exchange or replace radio, if required.
-	5. Faulty rear window defogger.	5. Verify that the rear defogger grid is functioning properly, repair as necessary. Refer to **Electrical - Heated/Cooled Systems/Heated Glass - Diagnosis and Testing**
NO COMPACT DISC OPERATION	1. Faulty CD.	1. Insert known good CD and test operation.

-	2. Foreign material on CD.	2. Clean CD and test operation.
-	3. Condensation on CD or optics.	3. Allow temperature of vehicle interior to stabilize and test operation.
-	4. Faulty CD player.	4. Exchange or replace radio, if required.

AMPLIFIER

DESCRIPTION

DESCRIPTION

The optional premium speaker system includes a separate audio power amplifier. The amplifier is an eight channel unit. The amplifier is located behind the right cowl trim panel.

OPERATION

OPERATION

The power amplifier electronically increases the frequency response of the normal audio signal output from the radio amplifier in order to improve the acoustic performance of the speakers. On vehicles equipped with an amplifier, the amplifier information of the radio becomes a pre-amplifier.

The amplifier receives audio signal inputs for speaker channels from the radio, then sends amplified audio outputs through eight separate channels with dedicated feed and return circuits to the individual speakers.

REMOVAL

REMOVAL

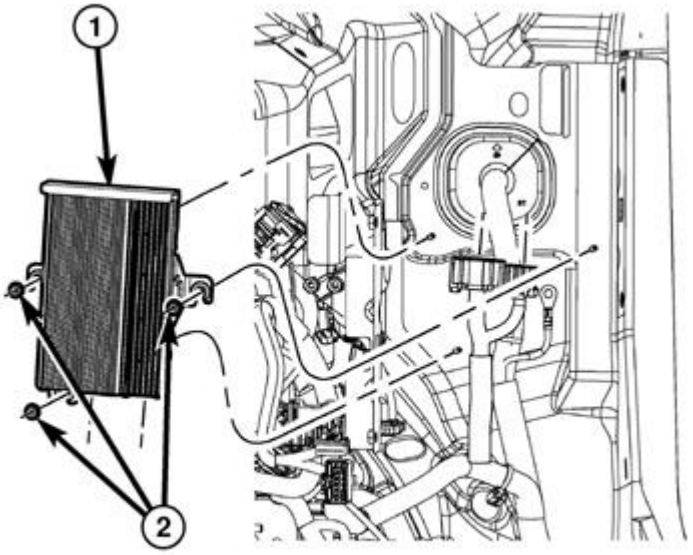

Fig. 1: Amplifier
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Lower the glove box as necessary to gain access to the amplifier.
3. Disconnect the electrical connectors.
4. Loosen the mounting fasteners and remove the amplifier and bracket.
5. Remove the amplifier from the bracket.

INSTALLATION

INSTALLATION

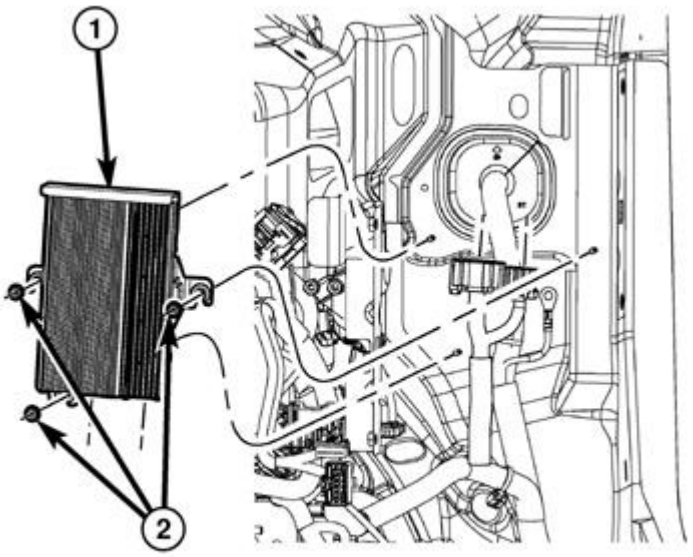

Fig. 2: Amplifier
Courtesy of CHRYSLER LLC

1. Install the amplifier to the mounting bracket.
2. Install amplifier. Tighten the forward screw to 3 N.m (26.5 in. lbs.) and the rear nut to 2 N.m (18 in. lbs.).
3. Connect the electrical connectors.
4. Raise the glove box.
5. Connect the battery negative cable.

ANTENNA, SATELLITE, AUDIO

DESCRIPTION

DESCRIPTION

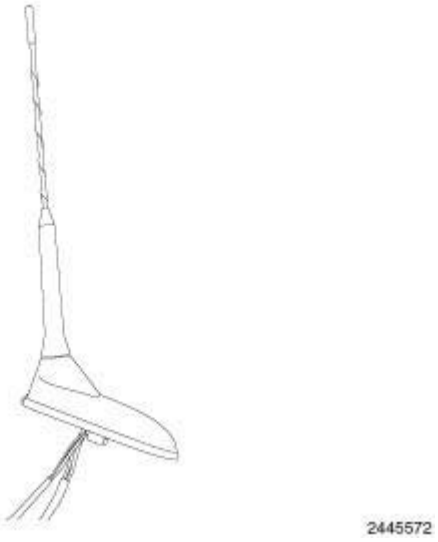

Fig. 3: Satellite Audio
Courtesy of CHRYSLER LLC

If the vehicle is equipped with satellite audio, a combined antenna for AM/FM and satellite is used. For removal. See **Removal** and for installation, see **Installation** .

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Lower the appropriate portion of the headliner as necessary to access the underside of the antenna. Refer to **Body/Interior/HEADLINER - Removal** .
3. Disconnect the antenna electrical connectors.
4. Remove the fastener and retainer.
5. From inside the vehicle, using a flat bladed tool, depress one of the retaining tabs on the antenna. Push one side of the antenna connector through the roof panel. Depress the other side of the connector and remove the antenna.

INSTALLATION

INSTALLATION

1. Insert the antenna electrical connector through the hole in the roof panel.
2. Press the antenna into position until both retainers snap into place. Tighten to 9 N.m (80 in. lbs.).
3. Connect the antenna electrical connector to the antenna.
4. Install headliner. Refer to **Body/Interior/HEADLINER - Installation** .
5. Connect negative battery cable.

ANTENNA, SATELLITE, VIDEO

DESCRIPTION

DESCRIPTION

The satellite video antenna cable connects the roof mounted antenna to the satellite receiver. It has two connectors at each end and is routed above the headliner, then down the right side A-pillar to the cowl area.

OPERATION

OPERATION

The satellite video antenna receives signals from orbiting satellites and sends these signals to the satellite receiver module. The satellite video antenna must have open space in which to operate. Items carried on the roof, parking inside etc. can have an effect on the antenna's ability to receive signals.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Lower the appropriate portion of the headliner as necessary, to access the underside of the antenna.
3. Disconnect the electrical connectors from the antenna.
4. Remove the fastener and retainer.
5. From inside the vehicle, using a flat bladed tool, depress one of the retaining tabs on the antenna. Push up one side of the antenna connector through the roof panel. Depress the other side of the connector and remove the antenna.

INSTALLATION

INSTALLATION

1. From inside the vehicle, using a flat bladed tool, depress one of the retaining tabs on the antenna. Push up one side of the antenna connector through the roof panel. Depress the other side of the connector and remove the antenna.
2. Connect the electrical connector to the antenna.
3. Install the headliner. Refer to **Body/Interior/HEADLINER - Installation** .
4. Connect battery negative cable.

BODY AND CABLE, ANTENNA

REMOVAL

REMOVAL

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

SATELLITE AUDIO ONLY

1. Disconnect and isolate the battery negative cable
2. Lower the rear portion of the headliner as necessary to gain access to the audio antenna. Refer to **Body/Interior/HEADLINER - Removal** .
3. Disconnect the antenna cable(s).
4. Remove antenna mast by unscrewing mast from antenna body.
5. Remove the fastener from the mounting bracket.
6. Remove the antenna bracket.
7. Remove the antenna base from the roof of the vehicle.
8. Remove the passenger side quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
9. Remove the passenger side C-pillar. Refer to **Body/Interior/PANEL, C-Pillar Trim - Removal** .
10. Remove the passenger side scuff plates. Refer to **Body/Interior/PLATE, Scuff - Removal** .
11. Remove the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Removal** .
12. Remove the glove box. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
13. Remove the radio. See **Removal** .

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

14. Disconnect the antenna.

SATELLITE AUDIO AND VIDEO

AUDIO CABLE TO MODULE

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Disconnect and isolate the battery negative cable.
2. Lower the rear portion of the headliner as necessary to gain access to the audio antenna. Refer to **Body/Interior/HEADLINER - Removal** .
3. Disconnect the antenna cable(s).
4. Remove antenna mast by unscrewing mast from antenna body.
5. Remove the fastener from the mounting bracket.
6. Remove the antenna bracket.
7. Remove the antenna base from the roof of the vehicle.

8. Remove the passenger side quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
9. Remove the passenger side C-pillar. Refer to **Body/Interior/PANEL, C-Pillar Trim - Removal**
10. Remove the passenger side scuff plates. Refer to **Body/Interior/PLATE, Scuff - Removal** .
11. Position the passenger seat forward.

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

12. Disconnect the audio antenna from the module.

VIDEO CABLE TO MODULE

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Disconnect and isolate the battery negative cable.
2. Lower the front portion of the headliner as necessary to gain access to the video antenna. Refer to **Body/Interior/HEADLINER - Removal** .
3. Disconnect the antenna cable(s).
4. Remove antenna mast by unscrewing mast from antenna body.
5. Remove the fastener from the mounting bracket.
6. Remove the antenna bracket.
7. Remove the antenna base from the roof of the vehicle.
8. Remove the passenger side front scuff plate. Refer to **Body/Interior/PLATE, Scuff - Removal** .
9. Remove the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Removal** .
10. Position the passenger seat forward.

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

11. Disconnect the video antenna from the module.

SIGNAL (RADIO FEED) ANTENNA CABLE FROM MODULE TO COWL

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Disconnect and isolate the battery negative cable.
2. Remove the passenger side front scuff plate. Refer to **Body/Interior/PLATE, Scuff - Removal** .
3. Remove the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Removal** .

4. Position the passenger seat forward.

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

5. Disconnect the signal (radio feed) antenna from the module.
6. Disconnect the antenna cable from the instrument panel antenna cable in the cowl area.

SIGNAL (RADIO FEED) ANTENNA FROM COWL TO RADIO

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Disconnect and isolate the battery negative cable.
2. Remove the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Removal** .
3. Remove the glove box. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
4. Remove the radio. See **Removal** .

CAUTION: Pulling the antenna cable straight out of the radio without pulling on the locking antenna connector could damage the cable or radio.

5. Disconnect the antenna from the radio.

INSTALLATION

INSTALLATION

SATELLITE AUDIO ONLY

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Route the cable behind the glove box, up to the radio and secure.
2. Connect the antenna to the radio.
3. Install the radio. See **Installation** .
4. Install the glove box. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
5. Route the antenna cable along the path of the old antenna wiring harness, securing where necessary.
6. Install the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Installation** .
7. Install the passenger side quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
8. Install the passenger side scuff plates. Refer to **Body/Interior/PLATE, Scuff - Installation** .

9. Install the passenger side C-pillar. Refer to **Body/Interior/PANEL, C-Pillar Trim - Installation** .
10. Install the antenna base to the roof of the vehicle.
11. Install the antenna bracket and mounting fastener.
12. Install the antenna cable(s).
13. Install the headliner. Refer to **Body/Interior/HEADLINER - Installation** .
14. Connect the battery negative cable.

SATELLITE AUDIO AND VIDEO

AUDIO CABLE TO MODULE

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Connect the antenna cable to the module located under the front passenger seat.
2. Route the antenna cable along the path of the old audio antenna wiring harness, securing where necessary.
3. Install the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Installation** .
4. Install the passenger side quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
5. Install the passenger side scuff plates. Refer to **Body/Interior/PLATE, Scuff - Installation** .
6. Install the passenger side C-pillar. Refer to **Body/Interior/PANEL, C-Pillar Trim - Installation** .
7. Install the antenna base to the roof of the vehicle.
8. Install the antenna bracket and mounting fastener.
9. Install the antenna cable(s).
10. Install the headliner. Refer to **Body/Interior/HEADLINER - Installation** .
11. Position the passenger seat to its original position.
12. Connect the battery negative cable.

VIDEO CABLE TO MODULE

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Connect the antenna cable to the module located under the passenger seat.
2. Route the antenna cable along the path of the old audio antenna wiring harness, securing where necessary.
3. Install the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Installation** .
4. Install the front passenger side scuff plate. Refer to **Body/Interior/PLATE, Scuff - Installation** .
5. Install the antenna base to the roof of the vehicle.
6. Install the antenna bracket and mounting fastener.
7. Install the antenna cable(s).

8. Install the headliner. Refer to **Body/Interior/HEADLINER - Installation** .
9. Position the passenger seat to its original position.
10. Connect the battery negative cable.

SIGNAL (RADIO FEED) ANTENNA CABLE FROM MODULE TO COWL

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Connect the antenna cable to the instrument panel antenna cable in the cowl area.
2. Route the antenna cable along the path of the old audio antenna wiring harness, securing where necessary.
3. Connect the antenna cable to the module.
4. Install the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Installation** .
5. Install the front passenger side scuff plate. Refer to **Body/Interior/PLATE, Scuff - Installation** .
6. Position the passenger seat to its original position.
7. Connect the battery negative cable.

SIGNAL (RADIO FEED) ANTENNA FROM COWL TO RADIO

NOTE: The antenna cables are integrated into the body wiring harnesses. New antenna cables is overlaid on the body wiring harness.

1. Connect the antenna to the radio.
2. Route the antenna cable along the path of the old audio antenna wiring harness, securing where necessary.
3. Install the radio. See **Installation** .
4. Install the glove box. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
5. Install the passenger side cowl panel. Refer to **Body/Interior/PANEL, Cowl Trim - Installation** .
6. Connect the battery negative cable.

CAMERA

DESCRIPTION

DESCRIPTION

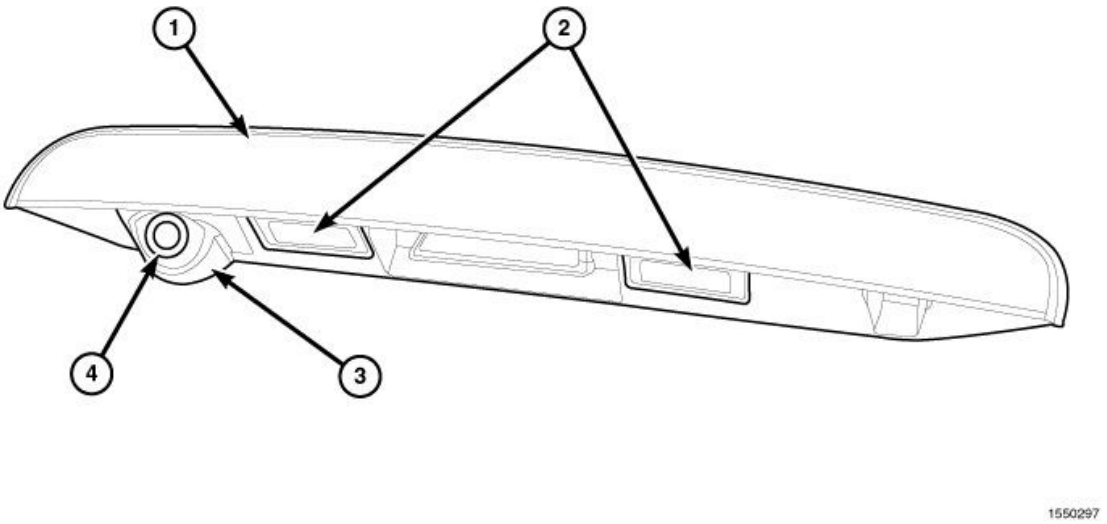

Fig. 4: Rear View Camera
Courtesy of CHRYSLER LLC

The Rear View Camera (RVC) (4) (also known as ParkView™), is a camera on chip device utilizing Complementary Metal Oxide Semiconductor (CMOS) technology. CMOS technology is used for a wide variety of digital or analog circuits. In this application, it supports the analog image sensor of the RVC. The RVC function is to provide a wide angle video image of the area behind the vehicle, including areas that might not be normally visible from the seated position of the vehicle operator, only while the transaxle gear selector is in the Reverse position. This video image then displays to the vehicle operator within the display screen of the audio system receiver unit near the center of the instrument panel.

The RVC is intended to be an auxiliary viewing aid and is not promoted as an obstacle detection or safety device. It does not remove vehicle operator responsibility to recognize and obey official traffic laws or regulations or to take sensible precautions and care to avoid pedestrians, other vehicle traffic or both fixed and moving obstacles through the habitual use of safe and defensive driving techniques.

The RVC is located on the underside of the light bar (1) mounted above the license plate tub on the vehicle liftgate. The camera lens is visible just to the left of the vehicle center line, while the body of the camera and the camera connections are concealed within the light bar above a camera mounting bracket (3), to which the camera is secured with three screws. The camera mounting bracket secures to the light bar assembly to the left of the left license plate lamp (2) with two additional screws. A light bar wire harness routes through a rubber grommet into the interior of the liftgate where it connects the RVC and both license plate lamps to the vehicle electrical system through a dedicated take out and connector of the liftgate wire harness.

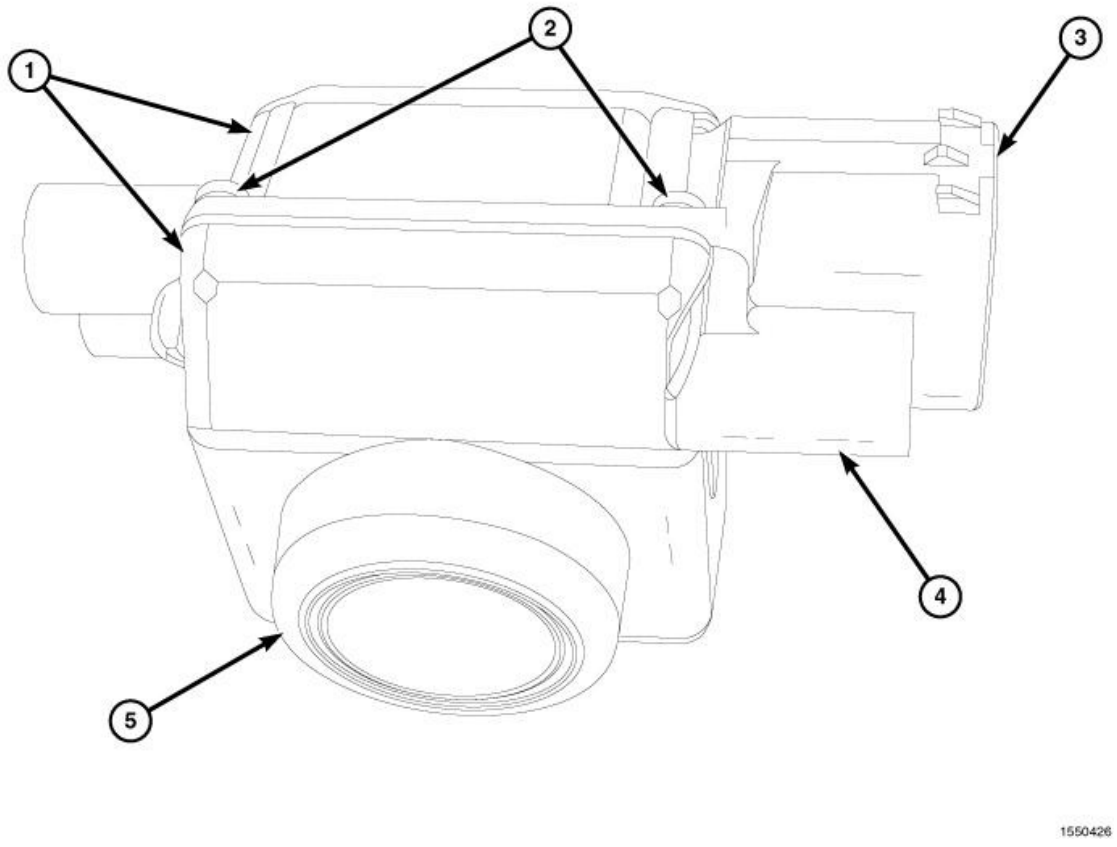

Fig. 5: Camera Image Sensor & Electronics
Courtesy of CHRYSLER LLC

The camera image sensor and electronics are sealed and protected within a two-piece die cast zinc housing (1), held together by four screws (2). The camera lens (5) extends from the lower surface of the housing and an integral connector receptacle (3) containing five terminal pins that extends from the right side of the housing. Additionally, there are three mounting bosses (4) integral to the camera housing, two on the left side and one on the right. The mounting bosses receive the three self-tapping screws securing the unit to the camera bracket.

Hardwired circuitry connects the RVC to the electrical system of the vehicle. These hardwired circuits are integral to several wire harnesses, which routes throughout the vehicle and retained by many different methods. These circuits may be connected to each other and to the vehicle electrical system through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

The RVC cannot be adjusted or repaired. If the RVC is damaged or ineffective, it must be replaced.

OPERATION

OPERATION

The Rear View Camera (RVC) is powered by a battery feed received through the backup lamp switch output circuit from the Totally Integrated Power Module (TIPM) so that is only active when the transaxle is shifted into the REVERSE position. In addition, the radio receiver monitors messages on the Controller Area Network (CAN) data bus to determine the selected transaxle gear and overrides any other display to show the RVC video output, whenever it detects that the transaxle is in REVERSE. A momentary blank video display screen immediately following the gearshift transition into the REVERSE position is considered normal operation. The camera electronics receive a path to ground at all times through a takeout and eyelet terminal of the liftgate wire harness that is secured by a ground screw to the right side of the liftgate inner panel.

The output of the camera is a video signal compatible to the National Television System Committee (NTSC) standard composite video M format, or NTSC-M. The video signal is delivered to the radio video display unit through the entire length of the vehicle by camera signal and the camera return circuits that are arranged as a twisted pair, with an additional grounded foil jacket to protect the video signal from corruption due to stray radiated signals within the vehicle environment. The ground shield is terminated only at the video display (radio) end, not at the camera. Portions of these video signal wires are contained within the liftgate lightbar wire harness, the liftgate wire harness, the body wire harness and a jumper harness located between the radio and the body harness connector below the instrument panel at the right cowl side inner panel.

DIAGNOSIS AND TESTING

Rear Camera

The hardwired circuits of the Rear View Camera (RVC) and those between the RVC and the radio receiver may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the RVC or the radio receiver. The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to radio receiver operation, as well as the retrieval or erasure of a DTC requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: Be certain to confirm both of the following prior to attempting any further diagnosis or testing of the RVC. Use a diagnostic scan tool to confirm the rear view camera is setup in the vehicle configuration. From the initial start up

screen of the diagnostic scan tool, navigate to ECU VIEW , select TIPMCGW CENTRAL GATEWAY , MORE OPTIONS , ECU DETAILS and then CONFIG INFO . Verify that REAR CAMERA PRESET - - - - SET is present. If not, the Sales Code XAC (Park View Rear Back-Up Camera) will have to be added to the vehicle configuration to enable the RVC, in vehicles equipped with a MyGIG multimedia entertainment system (Sales Codes RE1, REN, REP, RER, REU, REW, REX or REZ), be certain that the RVC is set to ENABLED using the CAMERA SETUP option in the MyGIG system settings.

CONDITION	POSSIBLE CAUSES	CORRECTION
NO VIDEO DISPLAY IN RADIO - DOES NOT DISPLAY **CHECK ENTIRE SURROUNDINGS** MESSAGE BRIEFLY AFTER SHIFTING INTO REVERSE	1. Incorrect radio software.	1. Check to be certain that the radio has the latest software update installed. Install the radio software update if required.
	2. Ineffective radio fuse.	2. Test and replace the radio fuses if required.
	3. Ineffective radio ground circuit.	3. Check for loose or damaged wiring connections at the radio. Test and repair the open radio ground circuit if required.
	4. Ineffective radio feed circuit.	4. Check for loose or damaged wiring connections at the radio. Test and repair the open radio feed circuit if required.
	5. Ineffective radio inputs or outputs.	5. Use a diagnostic scan tool to test the radio inputs and outputs including those received over the CAN data bus. Refer to the appropriate diagnostic information.
	6. Ineffective radio.	6. Use a diagnostic scan tool to test the radio. Refer to the appropriate diagnostic information.
NO CAMERA IMAGE IN RADIO VIDEO DISPLAY AND NO BACKUP LAMPS IN REVERSE	1. Left backup lamp inoperative, right backup lamp okay.	1. Test and repair the open backup lamp switch output circuit between the right and left tail lamps if required.
	2. Both backup lamps inoperative.	2. Test and repair the open backup lamp switch output circuit between the Totally Integrated Power Module (TIPM) and the tail lamps if required.
	3. Ineffective TIPM inputs or outputs.	3. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
NO CAMERA IMAGE IN RADIO	1. Ineffective camera	1. Check for loose or damaged

VIDEO DISPLAY - DOES DISPLAY **CHECK ENTIRE SURROUNDINGS** MESSAGE BRIEFLY AFTER SHIFTING INTO REVERSE AND BACKUP LAMPS DO OPERATE	ground circuit.	wiring connections at the camera, liftgate light bar and liftgate. Test and repair the open camera ground circuit if required.
	2. Ineffective camera feed (backup lamp switch output) circuit.	2. Check for loose or damaged wiring connections at the camera, liftgate light bar and upper liftgate opening header. Test and repair the open camera feed (backup lamp switch output) circuit if required.
	3. Ineffective camera shield circuit.	3. Check for loose or damaged wiring connections at the camera, liftgate light bar, upper liftgate opening header, right cowl side inner panel and radio. Test and repair the open or shorted camera shield circuit if required.
	4. Ineffective camera return circuit.	4. Check for loose or damaged wiring connections at the camera, liftgate light bar, upper liftgate opening header, right cowl side inner panel and radio. Test and repair the open or shorted camera feed circuit if required.
	5. Ineffective camera signal circuit.	5. Check for loose or damaged wiring connections at the camera, liftgate light bar, upper liftgate opening header, right cowl side inner panel and radio. Test and repair the open or shorted camera signal circuit if required.
	6. Ineffective camera.	6. Replace the ineffective camera if required.

REMOVAL

REMOVAL

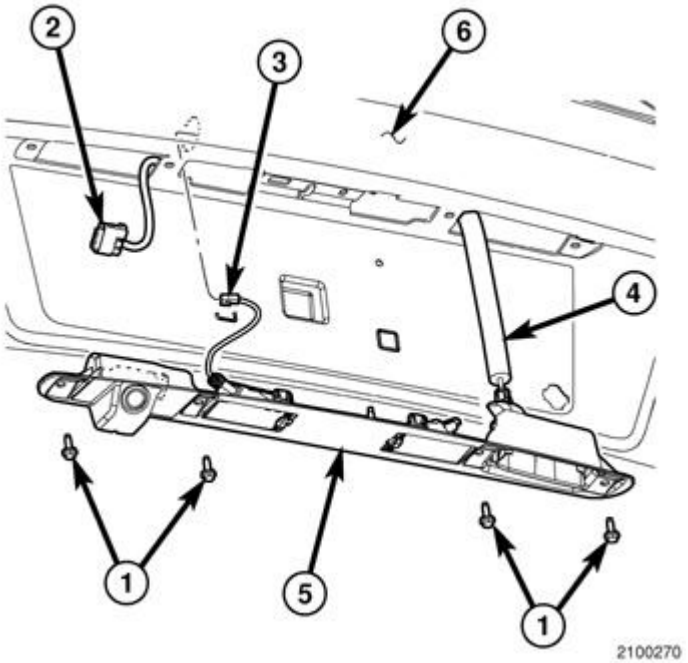

Fig. 6: Backup Camera & Liftgate & Lights
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the four retainers (1) holding the lightbar (5) to the liftgate (6).
3. Using a trim stick or equivalent, release the lightbar (5) from the clips.
4. Disconnect the electrical connectors from the backup camera (2) and the lights (3).
5. Disconnect the liftgate release cable (4) from the lightbar (5).
6. Remove the retainer from the back of the camera.
7. Unclip the camera cover from the lightbar.
8. Remove the camera mounting retainers.
9. Remove the camera from the lightbar.

INSTALLATION

INSTALLATION

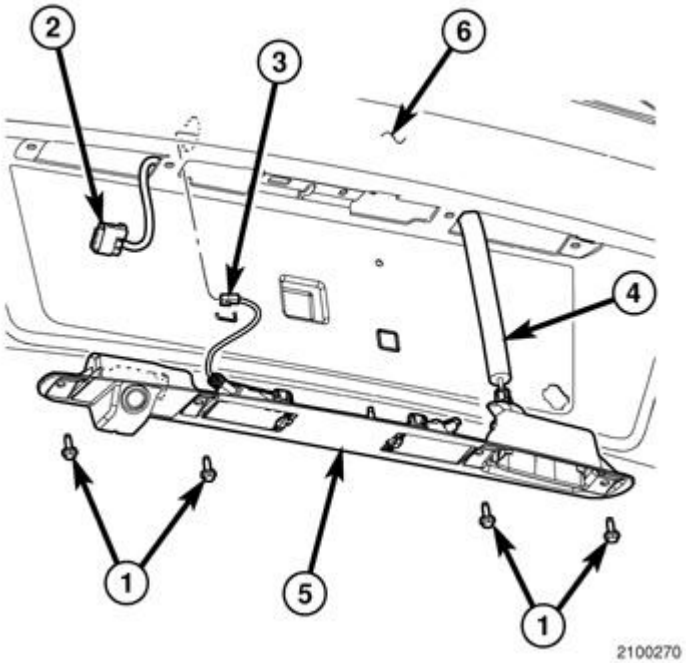

Fig. 7: Backup Camera & Liftgate & Lights
Courtesy of CHRYSLER LLC

1. Install the camera to the lightbar.
2. Install the camera mounting retainers.
3. Clip the camera cover to the lightbar.
4. Install the retainer to the back of the camera.
5. Connect the liftgate release cable (4) to the lightbar (5).
6. Connect the electrical connectors to the backup camera (2) and the lights (3).
7. Install the lightbar to the tailgate.
8. Install the four retainers (1) holding the lightbar (5) to the liftgate (6).
9. Connect the negative battery cable.

MODULE, SATELLITE VIDEO

REMOVAL

REMOVAL

1. Disconnect and isolate the negative battery cable.
2. Move the front passenger seat to the most forward position.

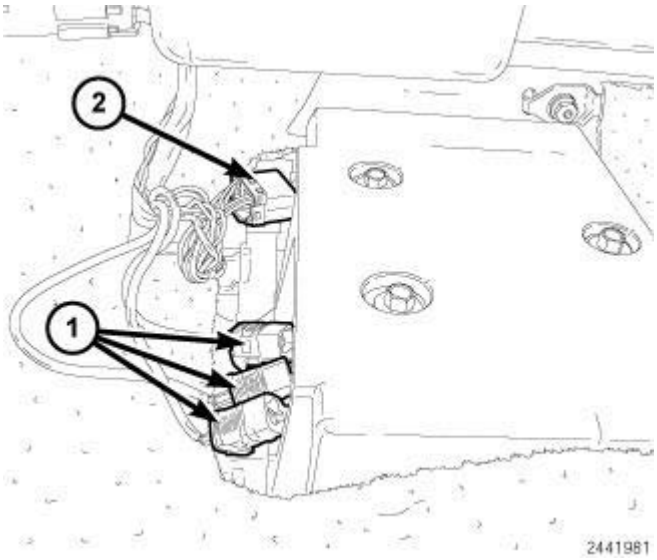

Fig. 8: Antenna & Electrical Connectors
Courtesy of CHRYSLER LLC

3. Disconnect the three antenna connectors (1) and the electrical connector (2).

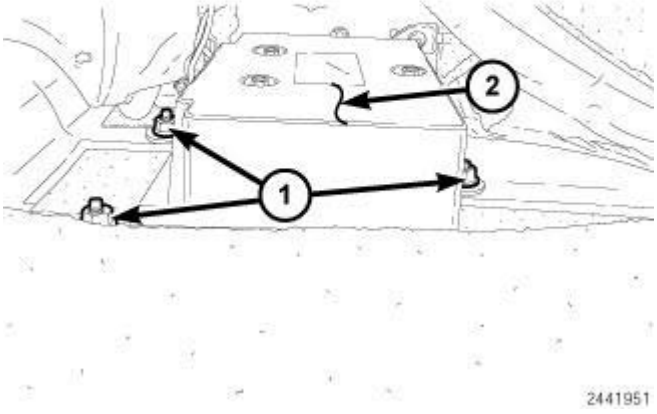

Fig. 9: Retainers & Video Module Housing
Courtesy of CHRYSLER LLC

4. Remove the three retainers (1) securing the video module housing (2) to the floor, remove video housing and module from vehicle.

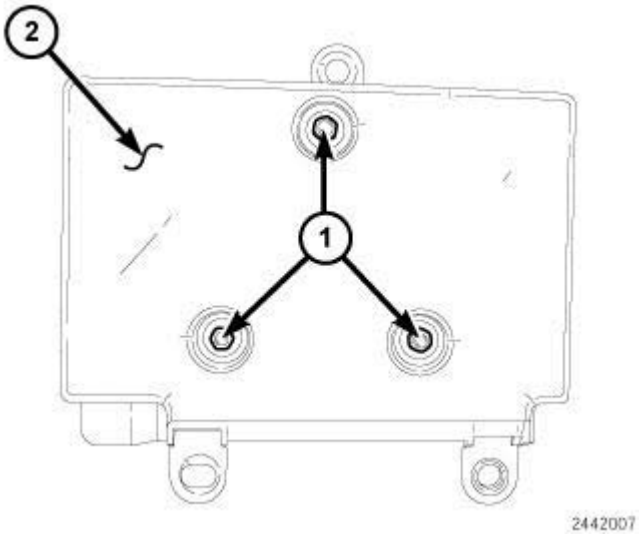

Fig. 10: Video Module Retainers & Video Module Housing
Courtesy of CHRYSLER LLC

5. Remove the video module retainers (1) to the video module housing (2).

INSTALLATION

INSTALLATION

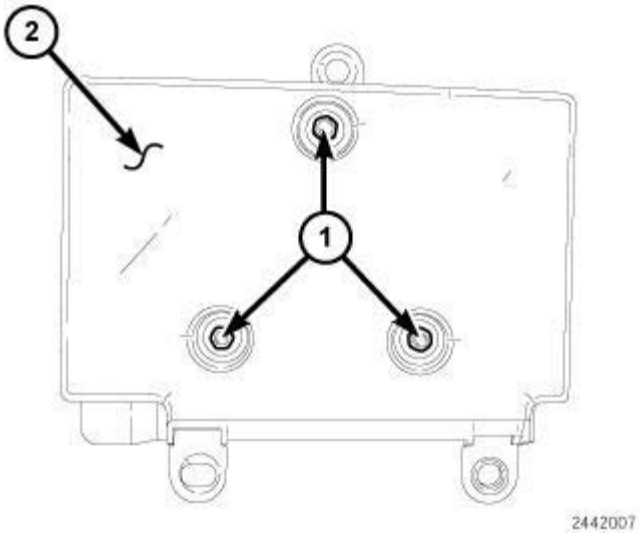

Fig. 11: Video Module Retainers & Video Module Housing
Courtesy of CHRYSLER LLC

1. Install the video module to the housing.

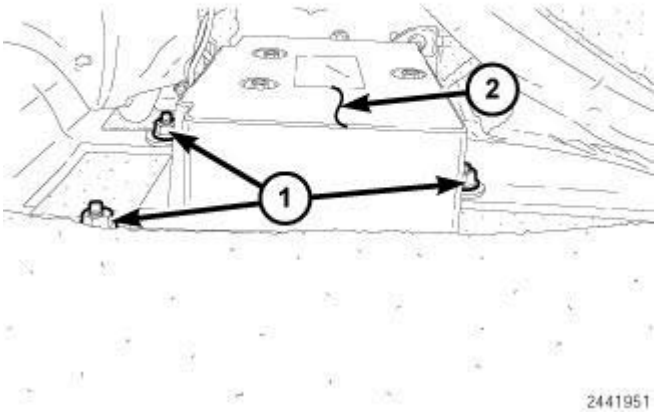

Fig. 12: Retainers & Video Module Housing
Courtesy of CHRYSLER LLC

2. Install the video module into the vehicle and Install the three retainers (1) securing the video module housing (2) to the floor.

   Tighten to 6 N.m (53 in. lbs.).

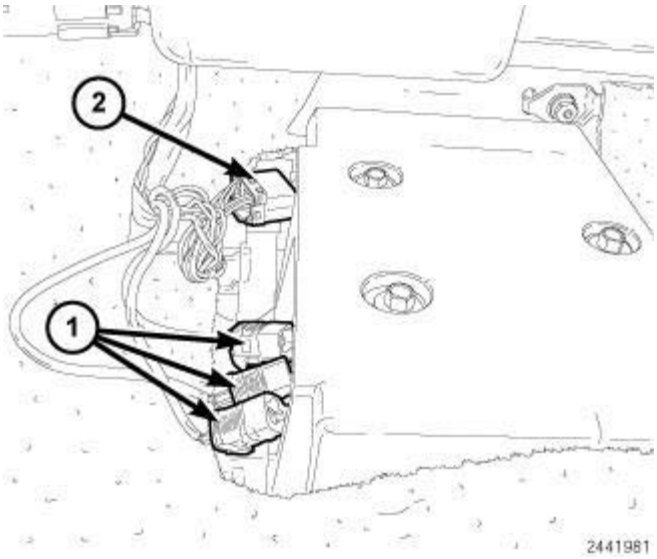

Fig. 13: Antenna & Electrical Connectors
Courtesy of CHRYSLER LLC

3. Connect the three antenna connectors (1) and the electrical connector (2).
4. Move the front passenger seat back to the original position.
5. Connect the battery negative cable.

MONITOR, MEDIA SYSTEM

REMOVAL

REMOVAL

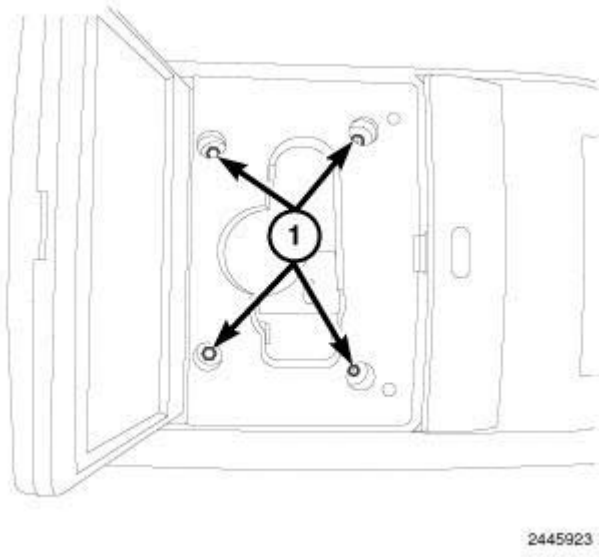

Fig. 14: Removing / Installing Mounting Fasteners
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Open the video screen to access the mounting fasteners.
3. Remove the mounting fasteners.

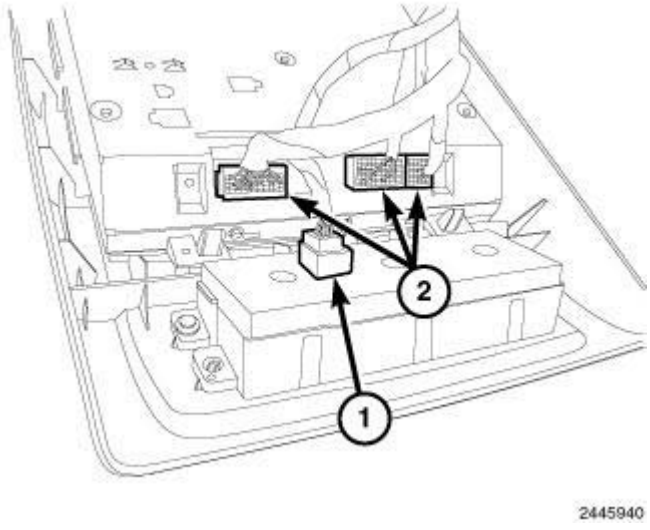

Fig. 15: Removing/Installing Video Monitor Connectors
Courtesy of CHRYSLER LLC

4. If equipped, disconnect the rear heat control connector (1).
5. Disconnect the video monitor connectors (2) and remove the assembly from the vehicle.

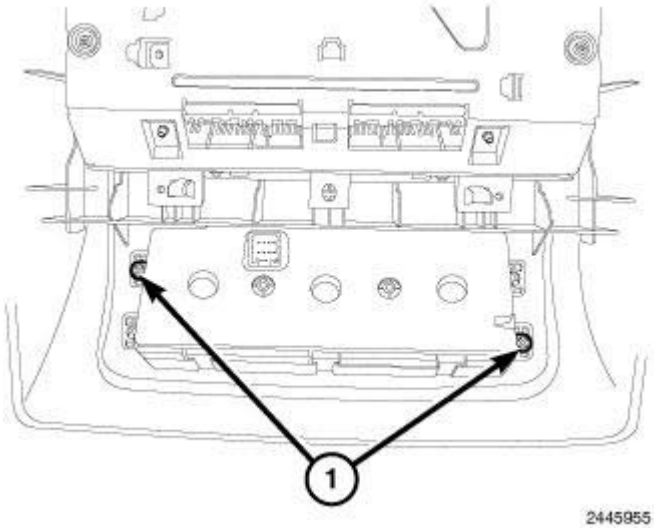

Fig. 16: Fasteners
Courtesy of CHRYSLER LLC

6. Remove the fasteners (1) and remove the rear A/C and heater control.

INSTALLATION

INSTALLATION

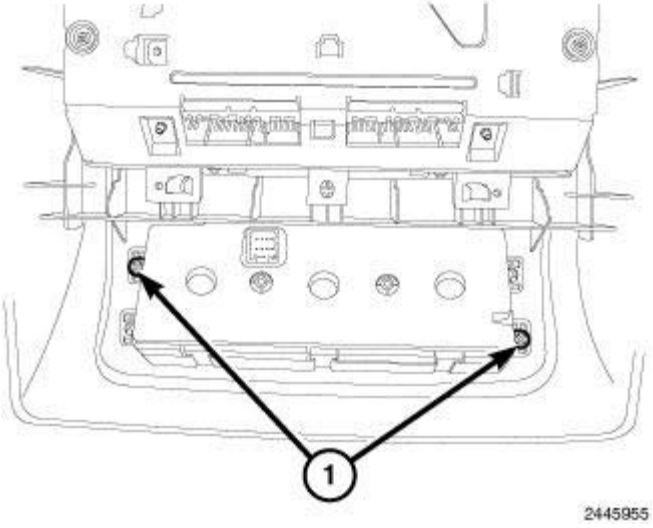

Fig. 17: Fasteners
Courtesy of CHRYSLER LLC

1. Install the rear A/C and heater control and the fasteners (1).

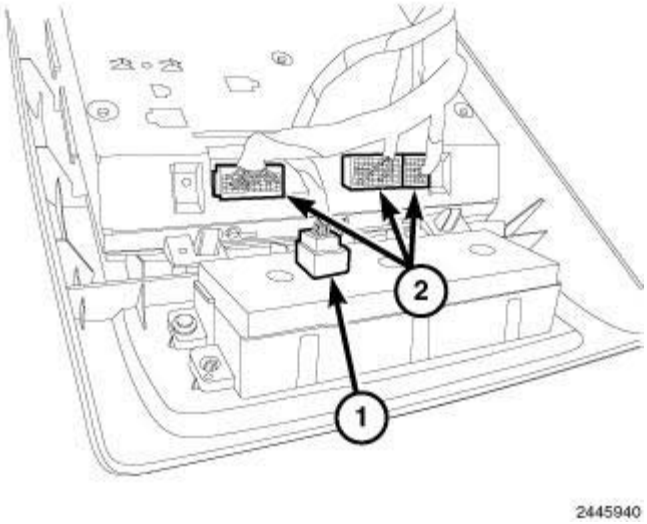

Fig. 18: Removing/Installing Video Monitor Connectors
Courtesy of CHRYSLER LLC

2. If equipped, connect the rear A/C and heater control connector (1).
3. Connect the video monitor connectors (2).

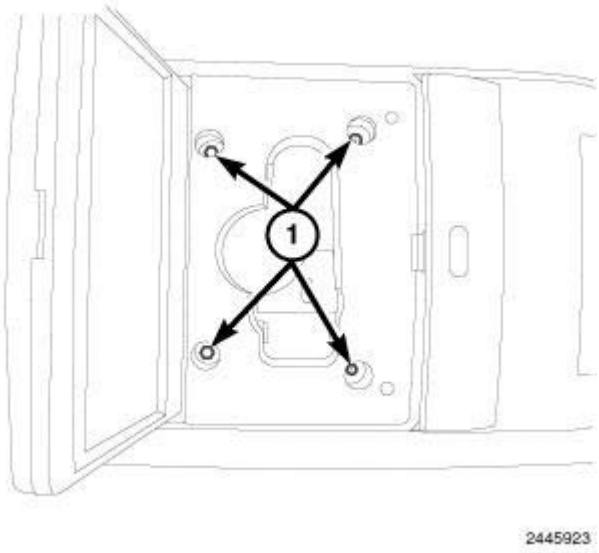

Fig. 19: Removing / Installing Mounting Fasteners
Courtesy of CHRYSLER LLC

4. Install the mounting fasteners.
5. Connect the battery negative cable.

RADIO

STANDARD PROCEDURE

RADIO BACKUP

The radio hard disk drive (HDD) can be backed up to save customer data in the event that a radio replacement is required. This procedure can only be done with all radios with a hard disk drive. All other radios do not have a HDD.

1. Turn the ignition to RUN, engine OFF.
2. Power on the external HDD.
3. Connect the external HDD to the radio using the USB (Universal Serial Bus) cable. The radio display will change to the "Manage My Files" screen.
4. Connect the scan tool and preform the following steps to place the radio into "Dealership Mode":
   - ECU View
   - Radio
   - Misc. Functions
   - Service Mode
   - Start
   - Next
5. Follow the on screen instructions on the radio to back up the radio HDD.

REMOVAL

REMOVAL

REMOVAL

RADIO/RADIO HEAD	Refer to the **RADIO/RADIO HEAD** for removal procedures.
REMOTE RADIO DISPLAY	Refer to the **REMOTE RADIO DISPLAY** for removal procedures.

NOTE: REQ radios only must be put into "Transportation Mode" before removal. With Ignition in RUN or ACCESSORY, press SET and DISC simultaneously until the radio displays "TRANSPORTATION" on the display or for 5 seconds.

RADIO/RADIO HEAD

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the radio mounting fasteners.
4. Carefully pull the radio out as necessary and disconnect the electrical connectors and antenna cables.
5. Remove the radio from the vehicle.

REMOTE RADIO DISPLAY

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the radio display mounting fasteners.
4. Carefully pull the radio display out as necessary and disconnect the electrical connectors and antenna cables.
5. Remove the radio display from the vehicle.

INSTALLATION

INSTALLATION

INSTALLATION

RADIO/RADIO HEAD	Refer to the **RADIO/RADIO HEAD** installation procedures.
REMOTE RADIO DISPLAY	Refer to the **REMOTE RADIO DISPLAY** installation procedures.

RADIO/RADIO HEAD

1. Connect the electrical connectors and antenna cables.
2. Firmly seat the radio into position and install the mounting fasteners.
3. Install the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Connect the battery negative cable.

REMOTE RADIO DISPLAY

1. Connect the electrical connectors.
2. Seat the display into position and install the mounting fasteners.
3. Install the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Connect the battery negative cable.

NOTE: REQ RADIO , After installation of the radio, remove the radio from "Transportation Mode" by pulling the IOD fuse or using the scan tool and perform a battery reset.

SPEAKER

OPERATION

OPERATION

Two wires connected to each speaker, one feed circuit (+) and one return circuit (-), allow the audio output

signal electrical current to flow through the voice coil. For complete circuit diagrams, refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

DIAGNOSIS AND TESTING

SPEAKER

Any diagnosis of the Audio system should begin with the use of the scan tool. For information on the use of the scan tool, refer to the appropriate Diagnostic Service information.

For complete circuit diagrams, refer to SYSTEM WIRING DIAGRAMS .

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

CAUTION: The speaker output of the radio is a "floating ground" system. Do not allow any speaker lead to short to ground, as damage to the radio may result.

1. If all speakers are inoperative, check the radio fuses in the Totally Integrated Power Module (TIPM). If OK, go to Step 2. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.
2. Check the amplifier fuse (if equipped) in the TIPM. If OK, go to Step 3. If not OK, repair the shorted circuit or component as required and replace the faulty fuse.
3. Turn the ignition switch to the ON position. Turn the radio receiver ON. Adjust the balance and fader control controls to check the performance of each individual speaker. Note the speaker locations that are not performing correctly. Go to Step 4.
4. Turn the radio receiver OFF. Turn the ignition OFF. Disconnect and isolate the battery negative cable. If vehicle is **not** equipped with a amplifier, remove the radio receiver. If vehicle is equipped with an amplifier. disconnect wire harness connector at output side of amplifier. Go to Step 5.
5. Check both the speaker feed (+) circuit and return (-) circuit cavities for the inoperative speaker at the radio receiver wire harness connector for continuity to ground. There should be no continuity. If OK, go to Step 6. If not OK, repair the shorted speaker feed (+) and/or return (-) circuit(s) to the speaker as required.
6. Disconnect wire harness connector at the inoperative speaker. Check for continuity between the speaker feed (+) circuit cavities of the radio receiver wire harness connector or if equipped, the amplifier wire harness connector and the speaker wire harness connector. Repeat the check between the speaker return (-

) circuit cavities of the radio receiver wire harness connector and the speaker wire harness connector. In each case, there should be continuity. If OK, replace the faulty speaker. If not OK, repair the open speaker feed (+) and/or return (-) circuit(s) as required.

REMOVAL

REMOVAL

REMOVAL

DOOR SPEAKER	Refer to the **DOOR SPEAKER** removal procedure.
INSTRUMENT PANEL SPEAKER	Refer to the **INSTRUMENT PANEL SPEAKER** removal procedure.
SUBWOOFER	Refer to the **SUBWOOFER** removal procedure.

DOOR SPEAKER

1. Disconnect and isolate the battery negative cable.
2. Remove the door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Removal** .
3. Remove the mounting fasteners.
4. Disconnect the electrical connector and remove the speaker from the vehicle.

INSTRUMENT PANEL SPEAKER

1. Disconnect and isolate the battery negative cable.
2. Remove the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Removal** .
3. Remove the mounting fasteners.
4. Disconnect the electrical connector and remove the speaker from the vehicle.

SUBWOOFER

1. Disconnect and isolate the battery negative cable.
2. Remove the left rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
3. Remove the subwoofer mounting fasteners.
4. Disconnect the electrical connectors and remove the subwoofer from the vehicle.

INSTALLATION

INSTALLATION

INSTALLATION

DOOR SPEAKER	Refer to the **DOOR SPEAKER** installation procedure.
INSTRUMENT PANEL SPEAKER	Refer to the **INSTRUMENT PANEL SPEAKER** installation procedure.
SUBWOOFER	Refer to the **SUBWOOFER** installation procedure.

DOOR SPEAKER

1. Install the speaker and connect the electrical connector.
2. Install the mounting fasteners.
3. Install the door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Installation** .
4. Connect the battery negative cable.

INSTRUMENT PANEL SPEAKER

1. Install the speaker and connect the electrical connector.
2. Install the mounting fasteners.
3. Install the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Installation** .
4. Connect the battery negative cable.

SUBWOOFER

1. Install the subwoofer and connect the electrical connector.
2. Install the mounting fasteners.
3. Install the left rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
4. Connect the battery negative cable.

SWITCH, REMOTE RADIO

DESCRIPTION

DESCRIPTION

Remote radio control switches are rocker-type switch units are mounted in the upper spoke covers of the rear (instrument panel side) steering wheel trim cover. The switch unit on the left side is the seek switch and has seek up, seek down, and preset station advance switch functions. The switch unit on the right side is the volume control switch and has volume up, volume down, and mode advance switch functions.

The two remote radio switch units are each retained in a mounting hole located on opposite sides of the rear steering wheel trim cover by four integral snap features. A plastic bracket on the back of each switch unit provides additional support for the unit by extending towards the center of the steering wheel where it is clamped between the steering wheel armature and the steering wheel rear trim cover mounting boss by the trim cover mounting screw.

The two remote radio switch units share a common steering wheel wire harness with the vehicle speed control switches. The steering wheel wire harness is connected to the instrument panel wire harness through the clockspring.

DIAGNOSIS AND TESTING

REMOTE SWITCHES

Any diagnosis of the Audio system should begin with the use of the scan tool. For information on the use of the scan tool, refer to the appropriate Diagnostic Service information.

For complete circuit diagrams, refer to SYSTEM WIRING DIAGRAMS .

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

1. Disconnect and isolate the battery negative cable. Remove the remote radio switch(es) from the steering wheel.
2. Use an ohmmeter to check the switch resistances as shown in **REMOTE RADIO SWITCH TEST**. If the remote radio switch resistances check OK , go to 3. If not OK, replace the faulty switch.

REMOTE RADIO SWITCH TEST

Switch	Switch Position	Minimum Resistance	Nominal Resistance	Maximum Resistance
Right (White)	Volume Up	6.732 ohms	6.8 ohms	6.868 ohms
Right (White)	Volume Down	14.850 ohms	15 ohms	15.151 ohms
Right (White)	Mode Advance	0 ohms	0 ohms	0 ohms
Left (Black)	Seek Up	1.188 ohms	1.2 ohms	1.212 ohms
Left (Black)	Seek Down	3.267 ohms	3.3 ohms	3.333 ohms
Left (Black)	Pre-Set Station Advance	465 ohms	47 ohms	474 ohms

3. Reconnect the battery negative cable. Turn the ignition switch to the ON position. Check for 5 volts at the radio control circuit cavities of the steering wheel wire harness connectors for both remote radio switches. If OK, refer to **BODY** . If not OK, repair the circuit as required.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering

column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

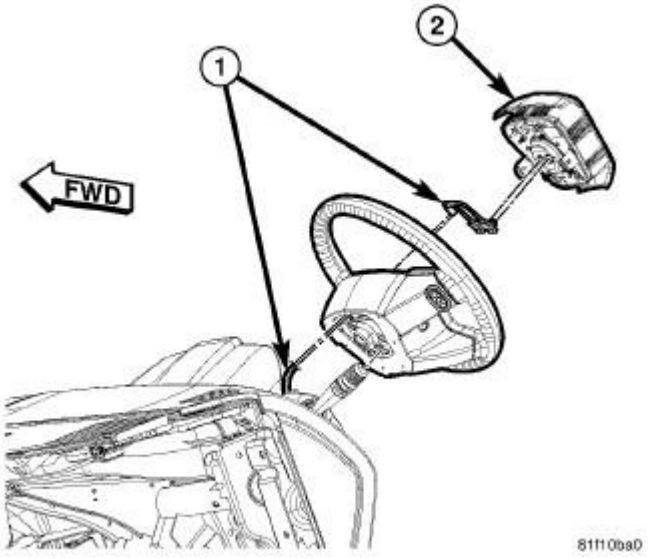

Fig. 20: Removing / Installing Driver Side Airbag Module
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver side airbag module from the steering wheel. Refer to **Restraints/AIR BAG, Driver - Removal** .

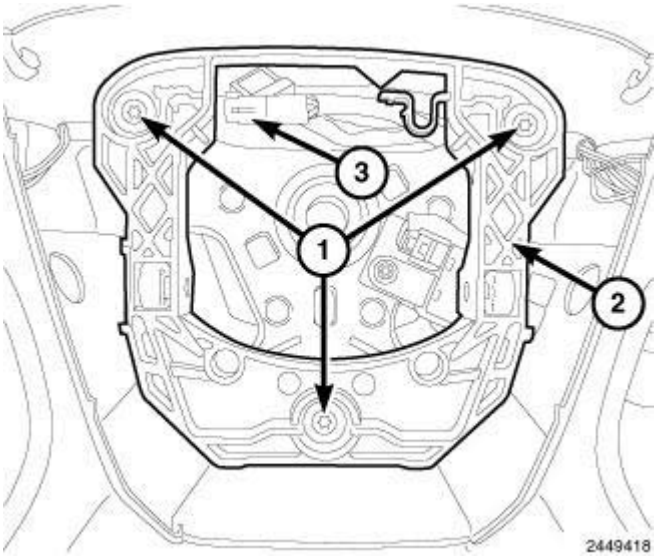

Fig. 21: Retainers, Horn Connector And Button Assembly
Courtesy of CHRYSLER LLC

3. Disconnect the horn connector (3).
4. Remove retainers (1) and remove the horn button assembly (2).

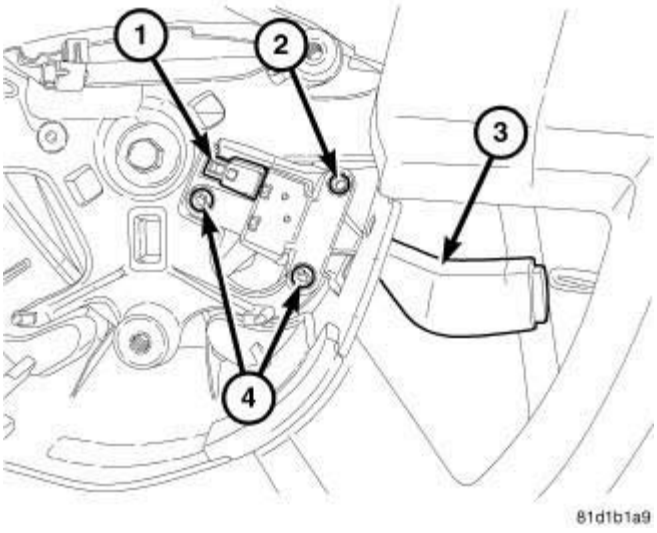

Fig. 22: Speed Control Switch
Courtesy of CHRYSLER LLC

5. Remove the speed control switch (3). Refer to **Electrical/8P - Speed Control/Speed Control/SWITCH, Speed Control - Removal** .

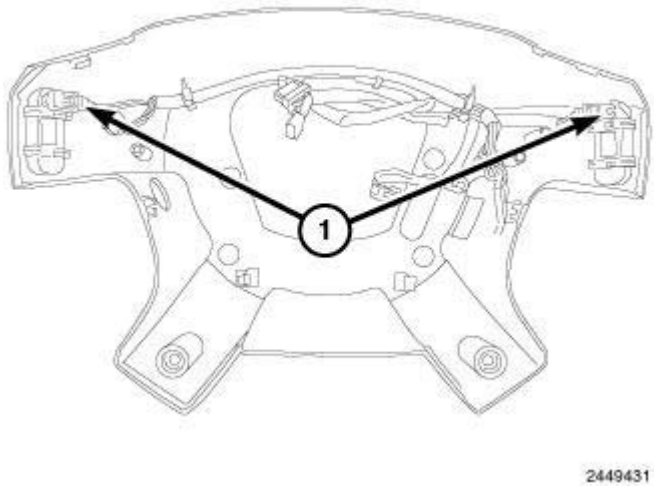

Fig. 23: Radio Switches
Courtesy of CHRYSLER LLC

6. Disconnect the radio switches (1).
7. From the inside of the steering wheel rear trim cover, press firmly and evenly outward on the back of the switch to disengage the four snap features that secure the switch to the inside of the mounting hole.
8. From the outside of the steering wheel rear trim cover, remove the remote radio switch from the trim cover mounting hole.

INSTALLATION

INSTALLATION

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

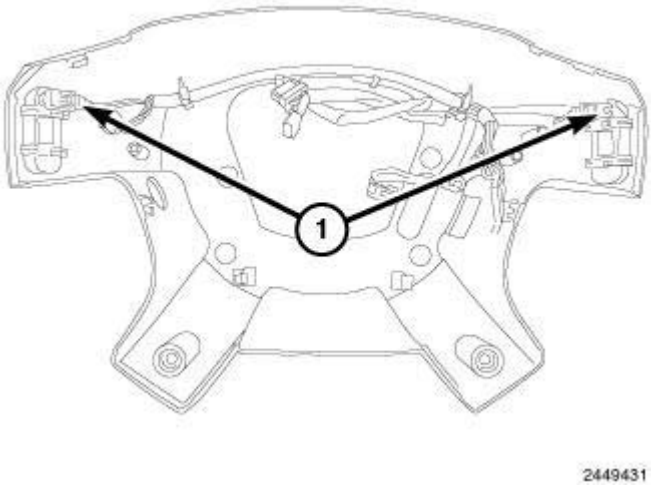

Fig. 24: Radio Switches
Courtesy of CHRYSLER LLC

1. Position the remote radio switch to the mounting hole on the outside of the steering wheel rear trim cover. Be certain that the connector receptacle is oriented toward the bottom of the switch and pointed toward the center of the steering wheel.
2. Press firmly and evenly on the remote radio switch until each of the switch snap features is fully engaged in the mounting hole of the steering wheel rear trim cover.
3. Reconnect the steering wheel wire harness connector to the connector receptacle of the remote radio switch (1).

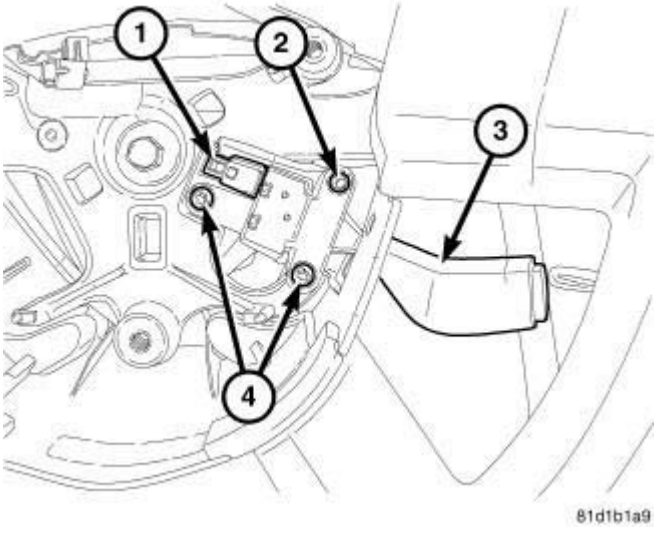

Fig. 25: Speed Control Switch
Courtesy of CHRYSLER LLC

4. Install the speed control switch (3). Refer to **Electrical/8P - Speed Control/Speed Control/SWITCH,**

Speed Control - Installation .

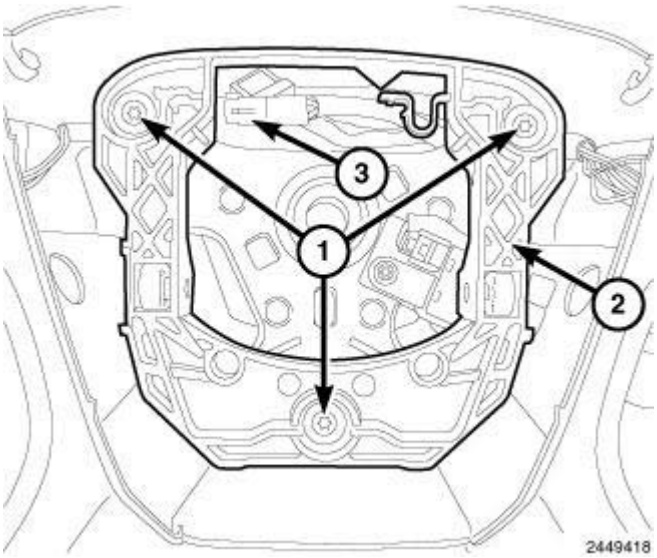

Fig. 26: Retainers, Horn Connector And Button Assembly
Courtesy of CHRYSLER LLC

5. Install the horn button assembly (2) and install the three retainers (1).
6. Connect the horn connector (3).

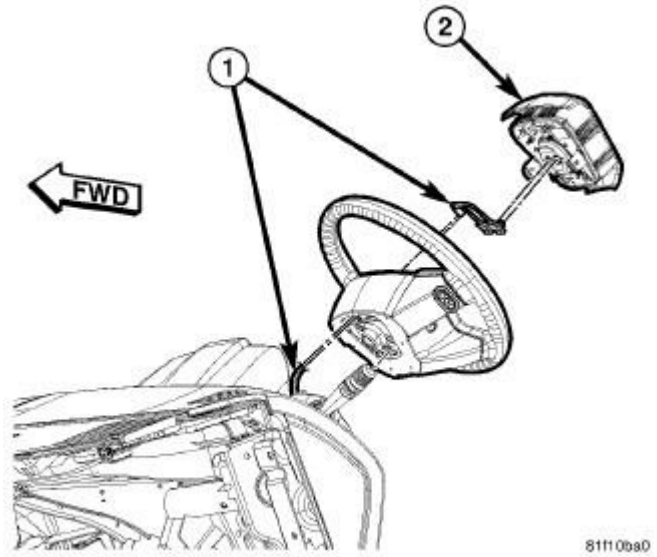

Fig. 27: Removing / Installing Driver Side Airbag Module
Courtesy of CHRYSLER LLC

7. Install the driver side airbag module to the steering wheel. Refer to **Restraints/AIR BAG, Driver - Installation** .
8. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Frame and Bumpers - Journey

BUMPERS

SPECIFICATIONS

FASTENER TORQUE

FASTENER TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Rear bumper reinforcement attaching nut	28	21	-
Front Crossmember to cradle bolts (3)	50	41	-
Front suspension crossmember frame rail torque boxes attaching bolts	135	100	-
Front suspension crossmember attaching front and rear	55	41	-
Fore/Aft crossmember anti roll through bolt	50	37	-
Radiator support crossmember attaching bolts	115	85	-
Shear bracket fasteners	55	41	-

FASCIA, FRONT

Removal

REMOVAL

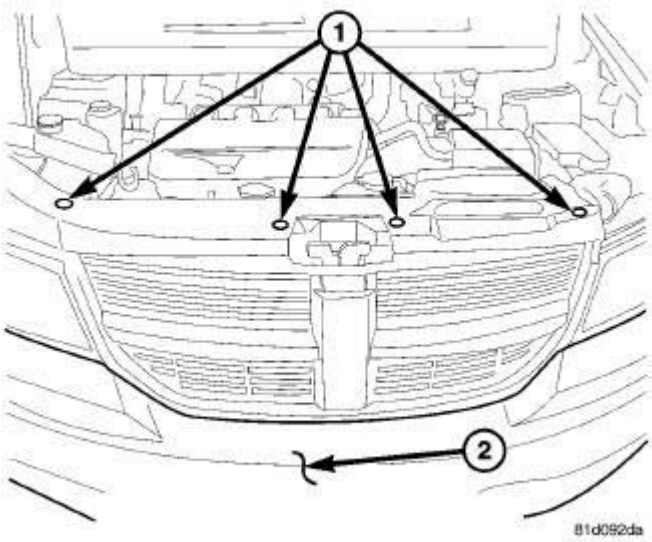

Fig. 1: Pushpins
Courtesy of CHRYSLER LLC

1. Release hood latch and open hood.
2. Remove the pushpins for the fascia (2) at the radiator support.

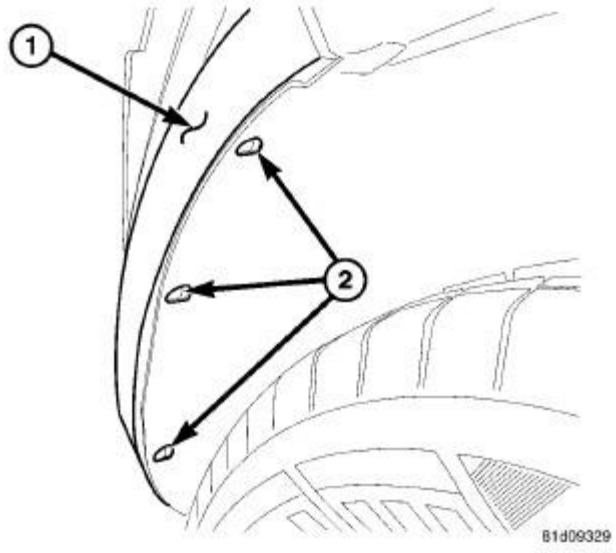

Fig. 2: Pop Rivets
Courtesy of CHRYSLER LLC

3. Hoist and support vehicle on safety stands. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** for proper hoisting and jacking procedures.
4. Remove the pop rivets (2) at the wheel well opening.

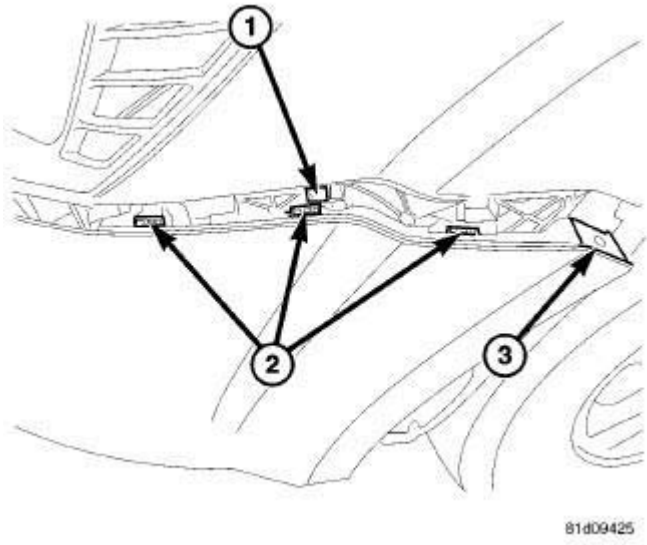

Fig. 3: Fascia Tabs & Bracket
Courtesy of CHRYSLER LLC

5. Remove the Torx® screw (3) at the wheel well housing.
6. Separate the fascia tabs (2) at the bracket (1).

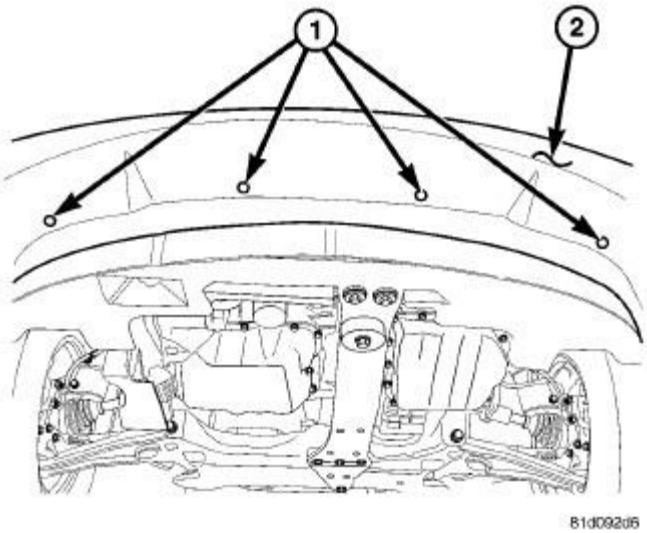

Fig. 4: Lower Pushpins
Courtesy of CHRYSLER LLC

7. Remove the pushpins (1) for the fascia (2) at the lower closeout panel.

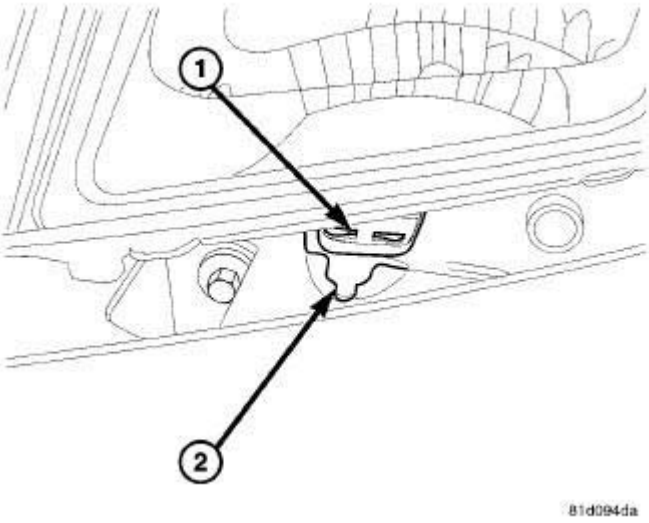

Fig. 5: Fascia & Mounting Tab
Courtesy of CHRYSLER LLC

8. Slide the fascia (2) out from the mounting tab (1) under the headlamp.
9. Disengage fog lamp wire connector and side marker connector from body harness, if equipped.
10. Disengage the ambient temp sensor wire connector, if equipped.
11. Remove fascia from vehicle.

Installation

INSTALLATION

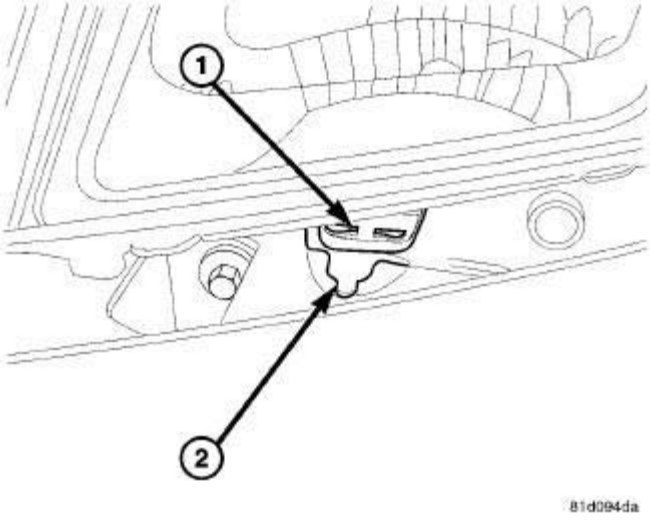

Fig. 6: Fascia & Mounting Tab
Courtesy of CHRYSLER LLC

1. Install the fascia to the vehicle.
2. Reconnect the ambient temp sensor wire connector, if equipped.
3. Reconnect the fog lamp wire connector and side marker connector from body harness, if equipped.
4. Slide the fascia (2) into the mounting tab (1) under the headlamp.

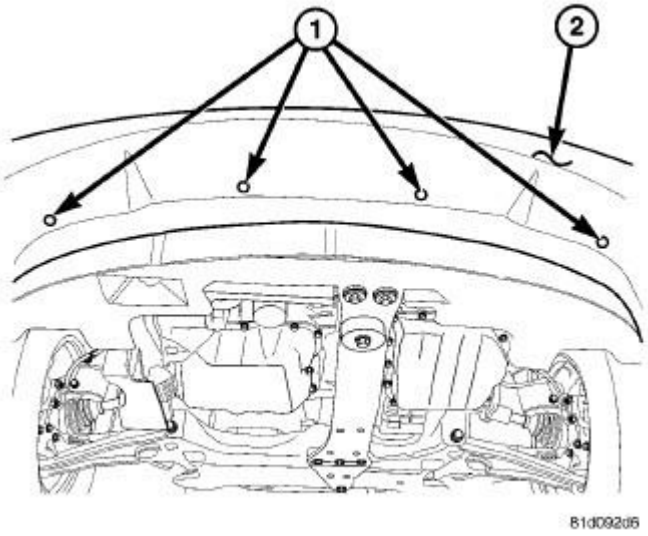

Fig. 7: Lower Pushpins
Courtesy of CHRYSLER LLC

5. Install the pushpins (1) for the fascia (2) at the lower closeout panel.

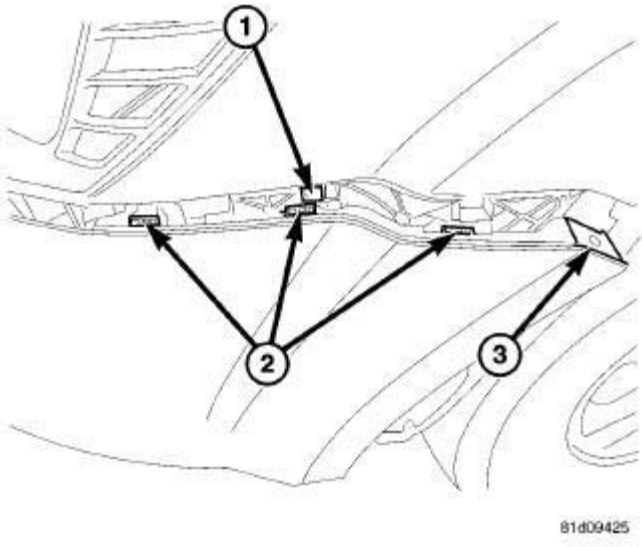

Fig. 8: Fascia Tabs & Bracket
Courtesy of CHRYSLER LLC

6. Insert and snap into place the fascia tabs (2) at the bracket (1).
7. Install the Torx® screw (3) at the wheel well housing.

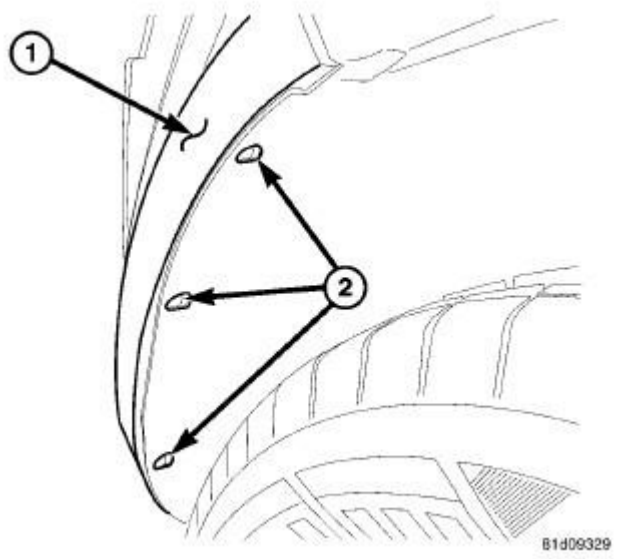

Fig. 9: Pop Rivets
Courtesy of CHRYSLER LLC

8. Install the pop rivets (2) at the wheel well opening.
9. Lower the vehicle.

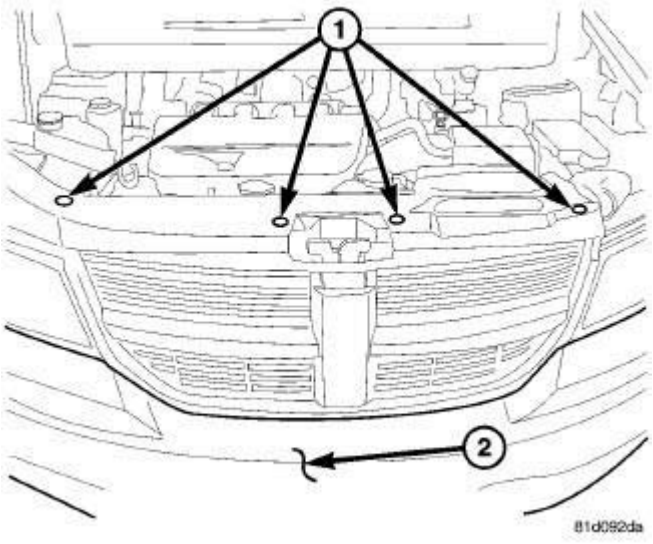

Fig. 10: Pushpins
Courtesy of CHRYSLER LLC

10. Install the pushpins for the fascia (2) at the radiator support.
11. close the hood and check for proper fit.

FASCIA, FRONT LOWER, CLOSEOUT

Removal

REMOVAL

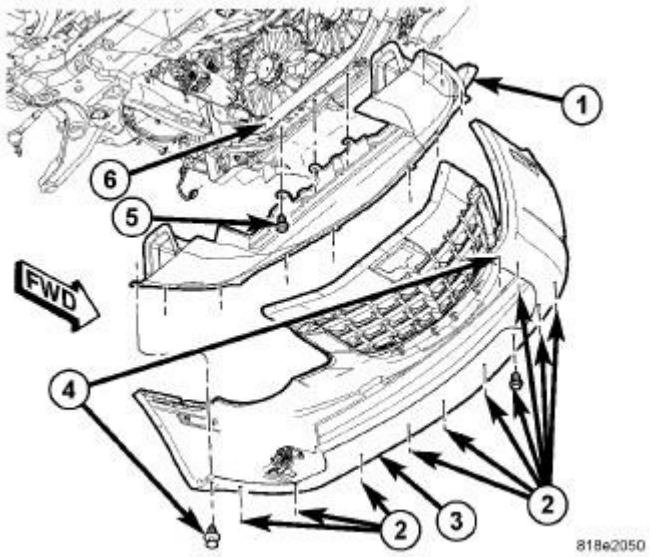

Fig. 11: Lower Fascia
Courtesy of CHRYSLER LLC

1. Remove fasteners (5) to lower closeout.

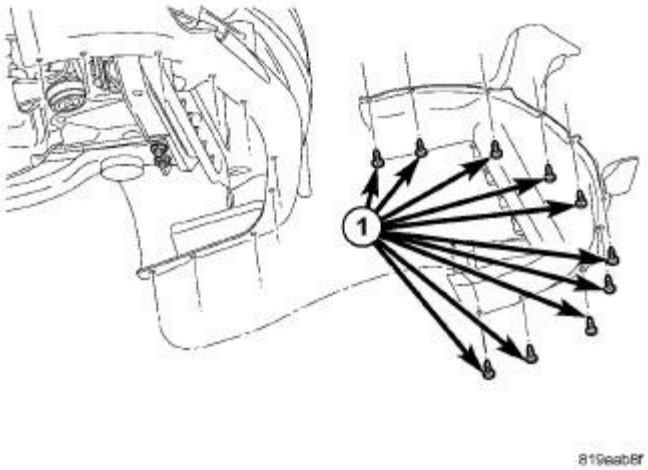

Fig. 12: Push Pins - Front Lower Fascia
Courtesy of CHRYSLER LLC

2. Remove push pins (1) to lower closeout.

3. Remove the front lower fascia.

Installation

INSTALLATION

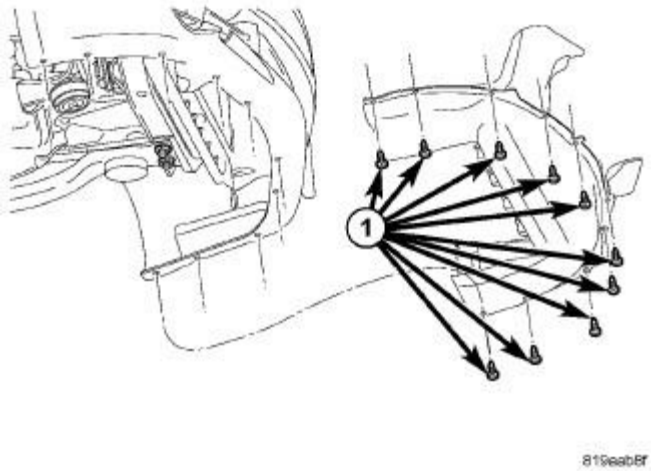

Fig. 13: Push Pins - Front Lower Fascia
Courtesy of CHRYSLER LLC

1. Install the front lower fascia.
2. Install the push pins (1) to lower closeout.

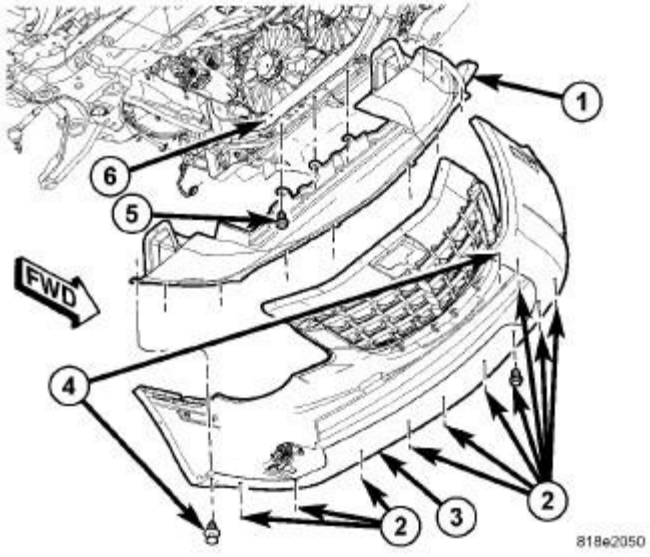

Fig. 14: Lower Fascia

Courtesy of CHRYSLER LLC

3. Install the fasteners (5) to lower closeout.

FASCIA, REAR

Removal

REMOVAL

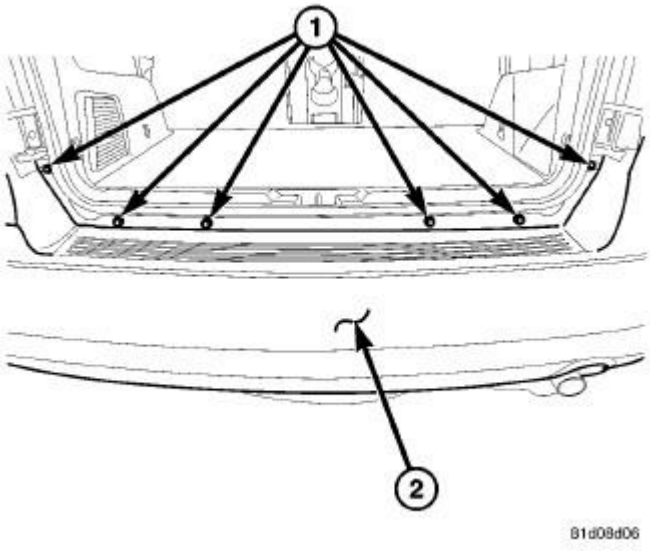

Fig. 15: Push Pins
Courtesy of CHRYSLER LLC

1. Open the hatch.
2. Remove the 6 pushpins (1) securing the fascia (2).

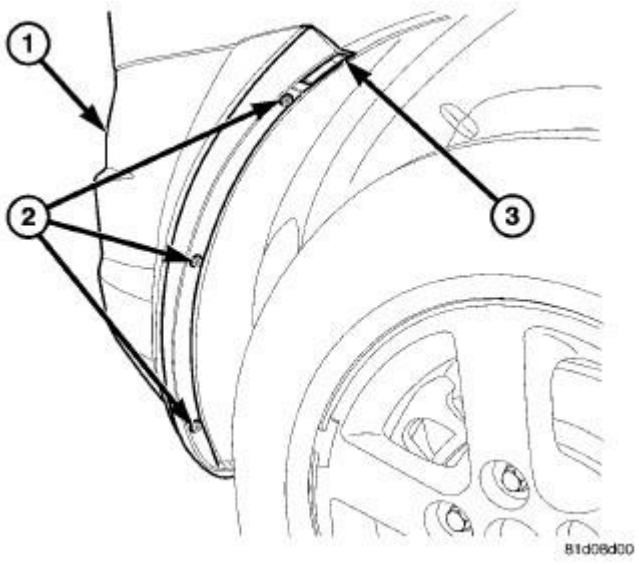

Fig. 16: Rivets
Courtesy of CHRYSLER LLC

3. Remove the rivets (2) and the Torx® screw (3) around the wheel well for the fascia (1).

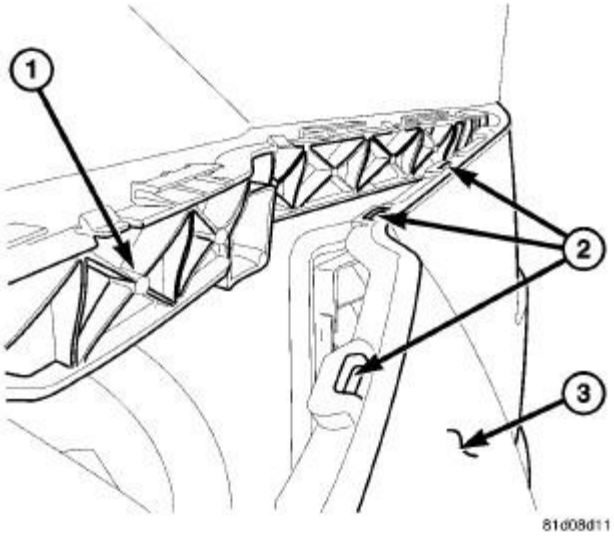

Fig. 17: Tabs, Fascia & Bracket
Courtesy of CHRYSLER LLC

4. Separate the tabs (2) securing the fascia (3) to the bracket (1).

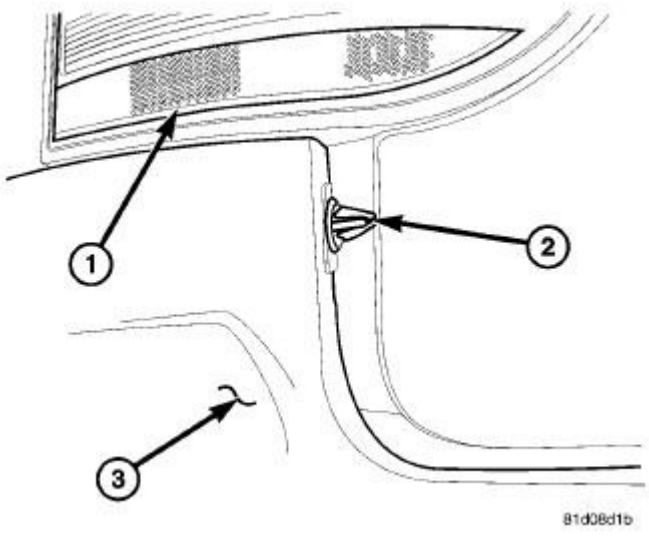

Fig. 18: Tail Light Push Pin
Courtesy of CHRYSLER LLC

5. Remove the push pin (2) under the taillight (1) to the fascia (3).
6. Remove fascia (3) from vehicle.

Installation

INSTALLATION

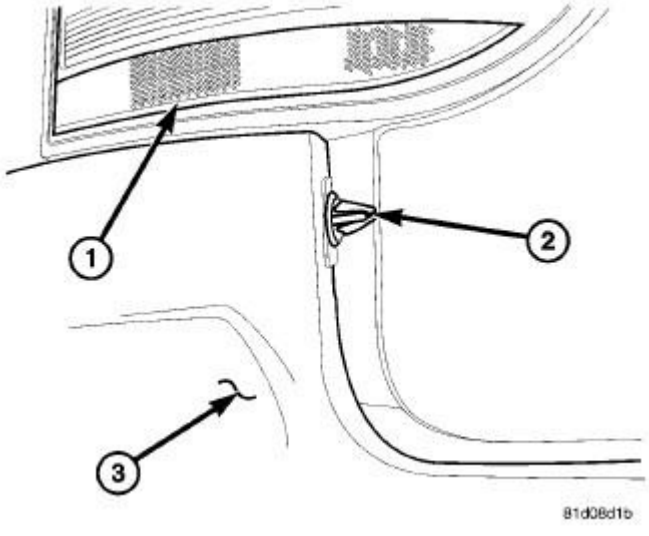

Fig. 19: Tail Light Push Pin
Courtesy of CHRYSLER LLC

1. Install the fascia (3) to the vehicle and install the pushpin (2) at the tailight (1) to the body.

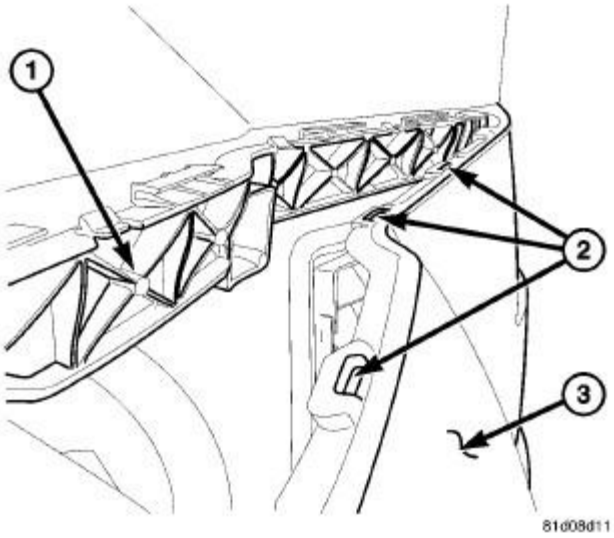

Fig. 20: Tabs, Fascia & Bracket
Courtesy of CHRYSLER LLC

2. Clip the fascia (3) into the tabs (2) to the bracket (1).

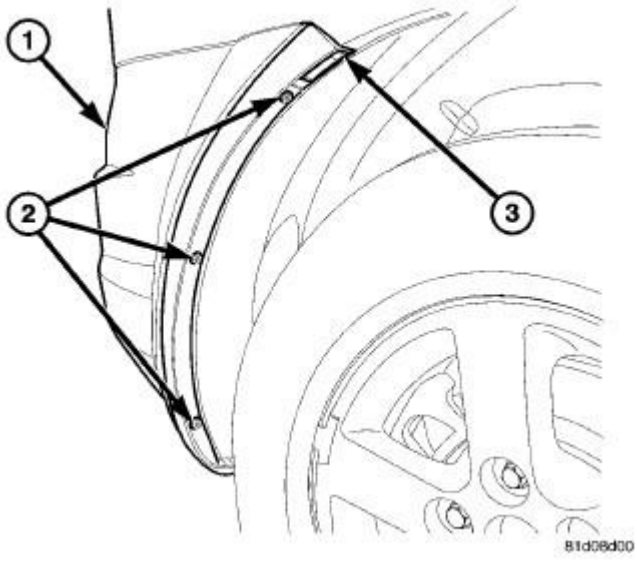

Fig. 21: Rivets
Courtesy of CHRYSLER LLC

3. Install the Torx® screw (3) for the fascia top the wheel opening and then install the pop rivets (2).

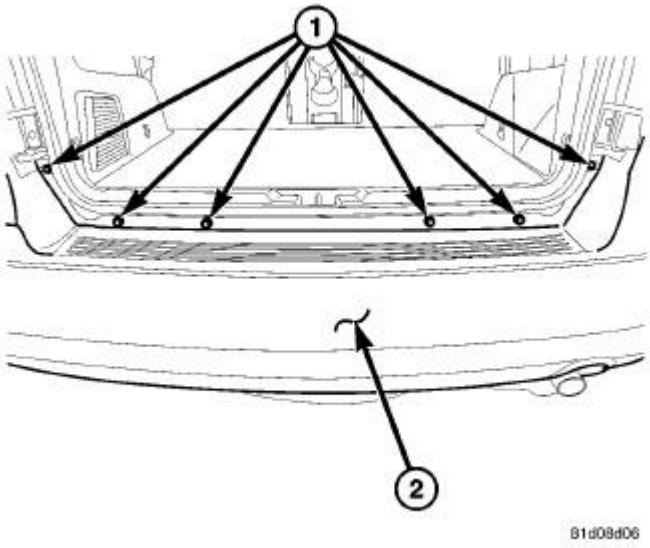

Fig. 22: Push Pins
Courtesy of CHRYSLER LLC

4. Install the 6 push pins (1) to secure the fascia (2) to the body.
5. Close the hatch and check for fit.

REINFORCEMENT, BUMPER, FRONT

Removal

REMOVAL

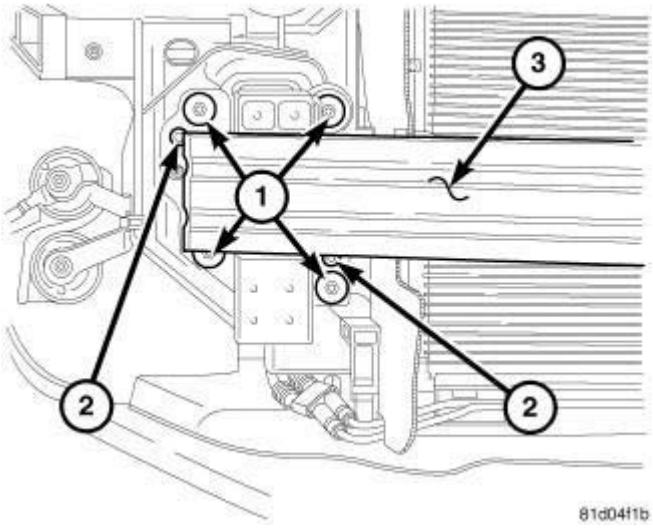

Fig. 23: Front Bumper Reinforcement
Courtesy of CHRYSLER LLC

1. Remove the front fascia. See **Removal** .
2. Support bumper reinforcement (3) on a suitable lifting device.
3. Mark the position of the bolts (1) on frame rail to aid in installation.
4. Remove the smaller bolts (2) attaching bumper reinforcement (3) to frame rail.
5. Remove the larger bolts (1) attaching bumper reinforcement (3) to frame rail.
6. Remove bumper reinforcement (3) from vehicle.

Installation

INSTALLATION

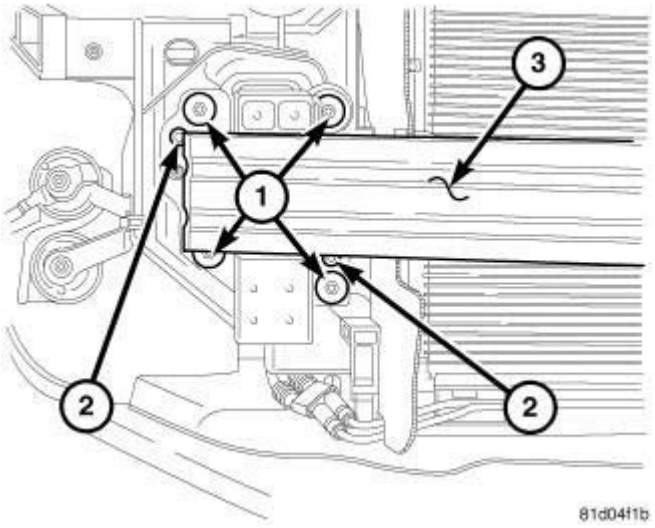

Fig. 24: Front Bumper Reinforcement
Courtesy of CHRYSLER LLC

1. Position the bumper reinforcement (3) on vehicle.

NOTE: Use marks made previously to properly position bumper reinforcement

2. Install the larger bolts (1) attaching bumper reinforcement (3) to frame rail. Tighten bolts (1) to 28 N.m (250 in. lbs.).
3. Install the smaller bolts (2) attaching bumper reinforcement (3) to frame rail.
4. Install front fascia. See **Installation** .

REINFORCEMENT, BUMPER, REAR

Removal

REMOVAL

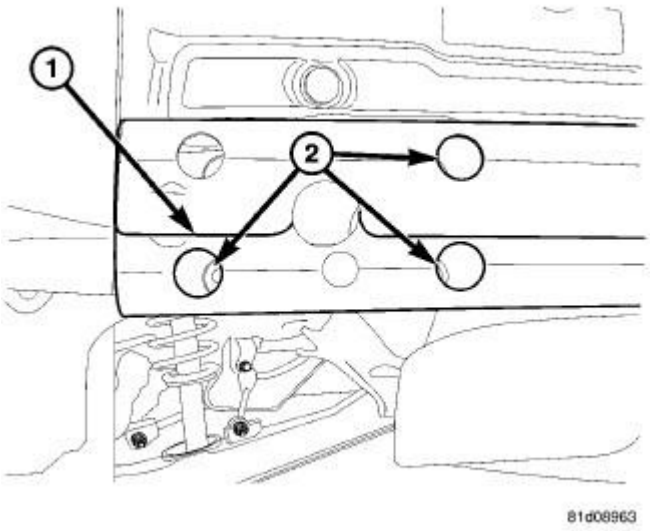

Fig. 25: Rear Bumper Reinforcement
Courtesy of CHRYSLER LLC

1. Remove rear fascia. See **Removal** .
2. Support bumper reinforcement (1) on a suitable lifting device.
3. Mark position of bolts (2) on frame rail to aid in installation.
4. Remove bolts (2) attaching rear bumper reinforcement (1) to frame rail.
5. Remove bumper reinforcement (1) from vehicle.

Installation

INSTALLATION

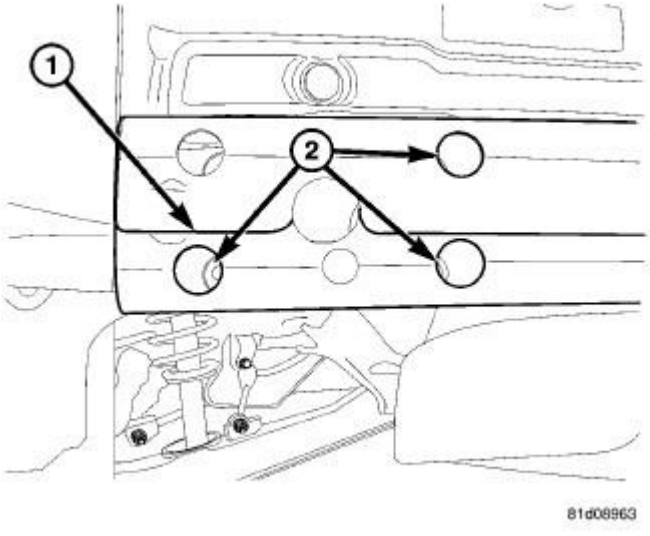

Fig. 26: Rear Bumper Reinforcement
Courtesy of CHRYSLER LLC

1. Position rear bumper reinforcement (1) on vehicle.
2. Install bolts (2) attaching bumper reinforcement to frame rail. Use marks made previously to properly position bumper reinforcement.
3. Tighten bolts (2) to 28 N.m (250 in. lbs.).
4. Install rear fascia. See **Installation** .

FRAME

SPECIFICATIONS

FRAME DIMENSIONS

Frame dimensions are listed in metric scale. All dimensions are from center to center of Principal Locating Point (PLP), or from center to center of PLP and fastener location.

VEHICLE PREPARATION

Position the vehicle on a level work surface. Using screw or bottle jacks, adjust the vehicle PLP heights to the specified dimension above a level work surface. Vertical dimensions can be taken from the work surface to the locations indicated were applicable.

VEHICLE PREPARATION INDEX

DESCRIPTION	FIGURE
FRAME DIMENSIONS - SIDE VIEW	**Fig. 27**
FRAME DIMENSIONS - BOTTOM VIEW	**Fig. 28**

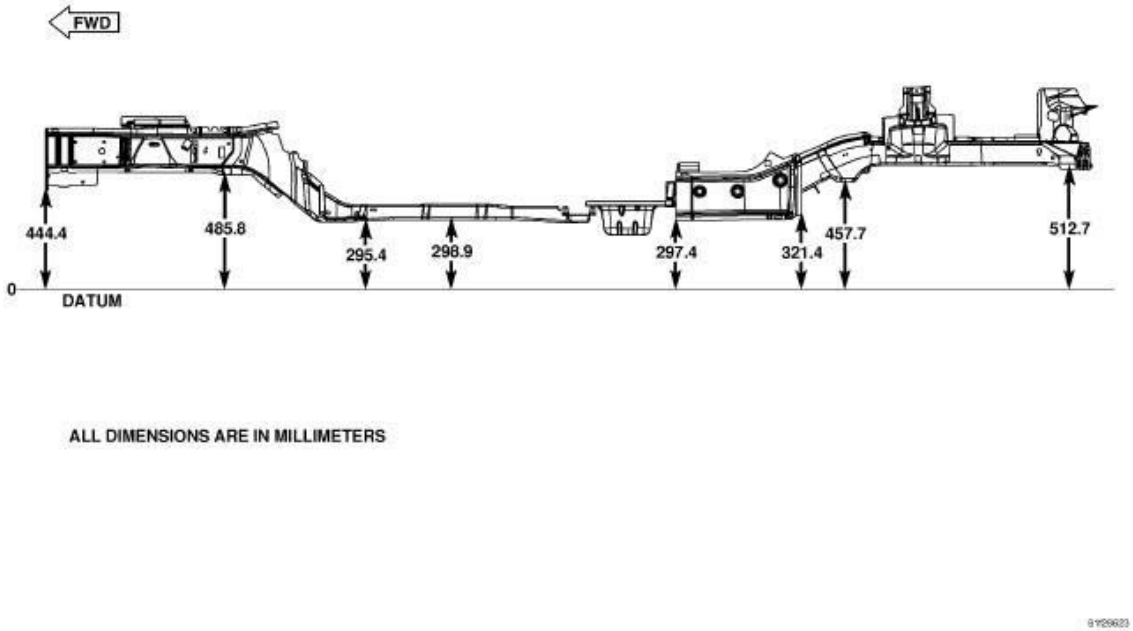

Fig. 27: Frame Dimensions - Side View
Courtesy of CHRYSLER LLC

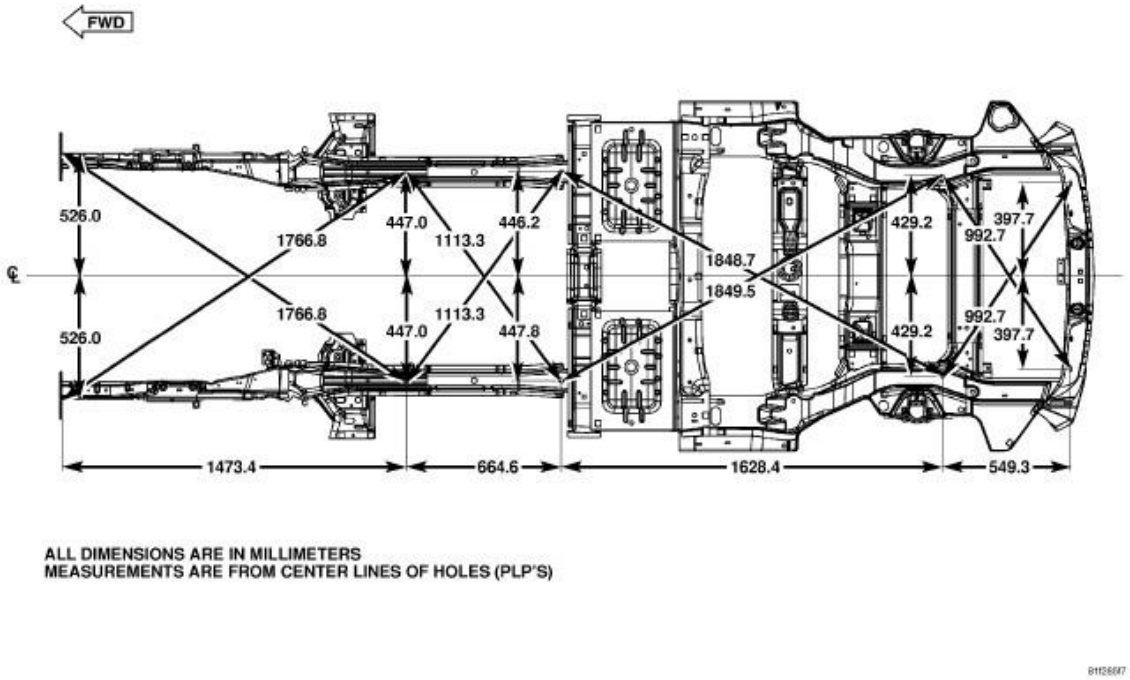

Fig. 28: Frame Dimensions - Bottom View
Courtesy of CHRYSLER LLC

FASTENER TORQUE

FASTENER TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Front Engine Mount Crossmember Mounting Bolts	50	37	-
Front Fore/Aft Crossmember Forward Mounting Bolts	55	41	-
Front Fore/Aft Crossmember Rearward Mounting Bolts	55	41	-
Front Suspension Crossmember Mounting Bolts	135	100	-
Front Suspension Crossmember Reinforcement Bracket Mounting Screws	55	41	-
Rear Suspension Crossmember Mounting Bolts	95	70	-
Rear Suspension Crossmember Reinforcement Bracket Mounting Nuts	50	37	-
Rear Suspension Crossmember Reinforcement Bracket Mounting Screws	55	41	-

CROSSMEMBER, FRONT FORE AND AFT

Removal

REMOVAL

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
2. If equipped, remove the engine belly pan.

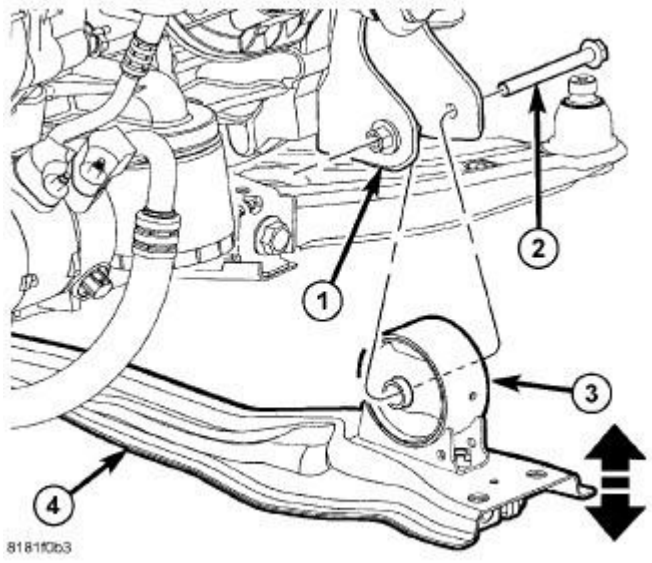

Fig. 29: Removing/Installing Fore/Aft Crossmember
Courtesy of CHRYSLER LLC

3. Remove the front engine mount thru-bolt (2).

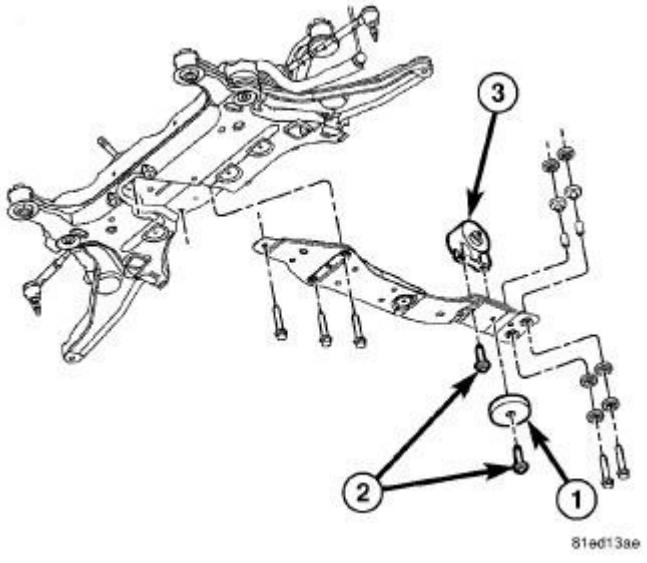

Fig. 30: Fore-Aft Crossmember Forward Mounting Bolts
Courtesy of CHRYSLER LLC

4. Remove the fore-aft crossmember forward mounting bolts at the radiator support.
5. Remove the fore-aft crossmember rearward mounting bolts at the crossmember.
6. Remove the fore-aft crossmember.
7. Remove the front engine mount mounting bolts (2) and damper (1). Remove the mount (3) from the crossmember.

Installation

INSTALLATION

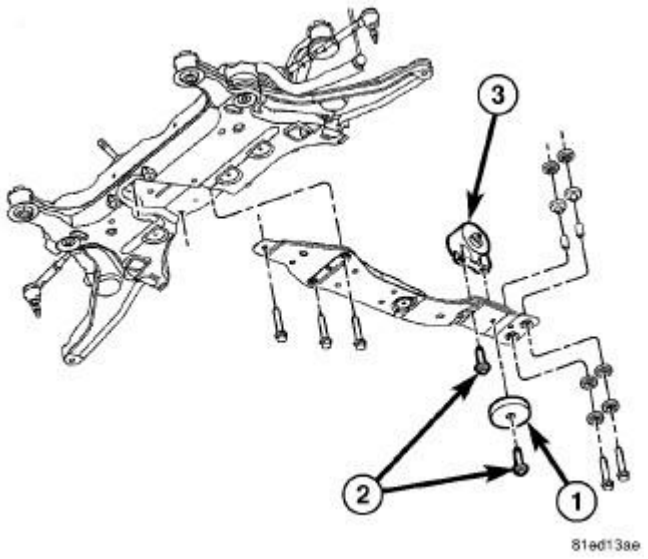

Fig. 31: Fore-Aft Crossmember Forward Mounting Bolts
Courtesy of CHRYSLER LLC

1. Install the front engine mount (3) on the crossmember. Install the mounting bolts (2) and damper (1). Tighten the bolts to 50 N.m (37 ft. lbs.).
2. Position the fore-aft crossmember in the engine compartment and install the mounting bolts. Tighten the forward mounting bolts at the radiator support to 55 N.m (41 ft. lbs.). Tighten the rearward mounting bolts at the suspension crossmember to 55 N.m (41 ft. lbs.).

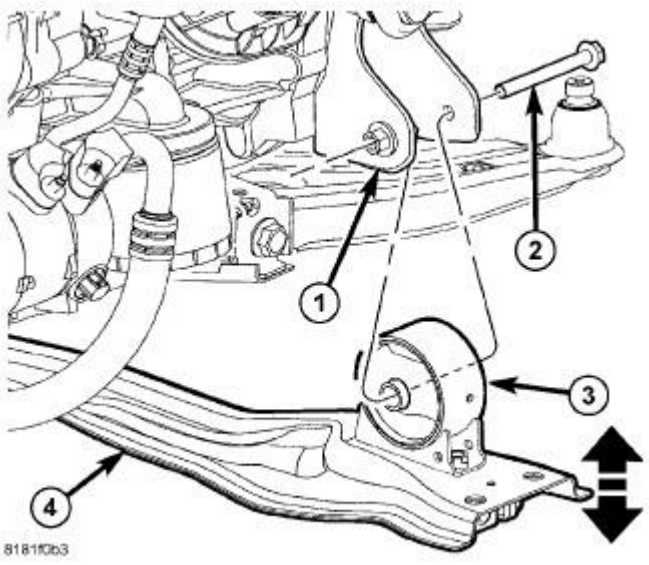

Fig. 32: Removing/Installing Fore/Aft Crossmember
Courtesy of CHRYSLER LLC

3. Install the front engine mount thru-bolt (4). Tighten the bolt to 60 N.m (44 ft. lbs.).
4. If equipped, install the engine belly pan.
5. Lower the vehicle.

CROSSMEMBER, FRONT SUSPENSION

Removal

REMOVAL

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

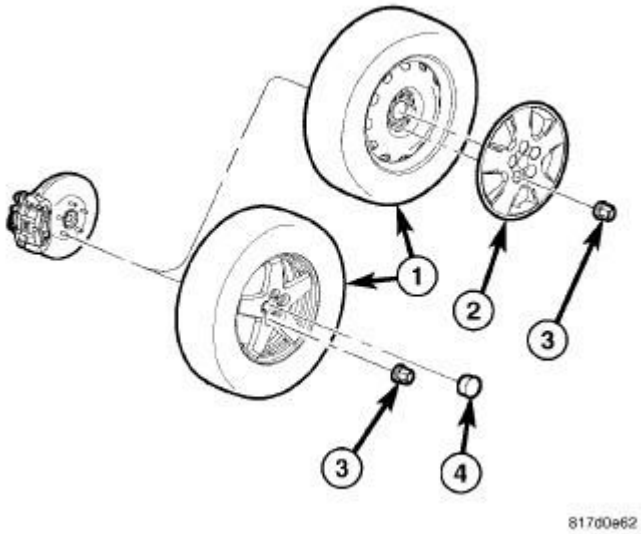

Fig. 33: Tire And Wheel Mounting
Courtesy of CHRYSLER LLC

2. On each side of the vehicle, remove the wheel mounting nuts (3), then the front tire and wheel assembly (1).

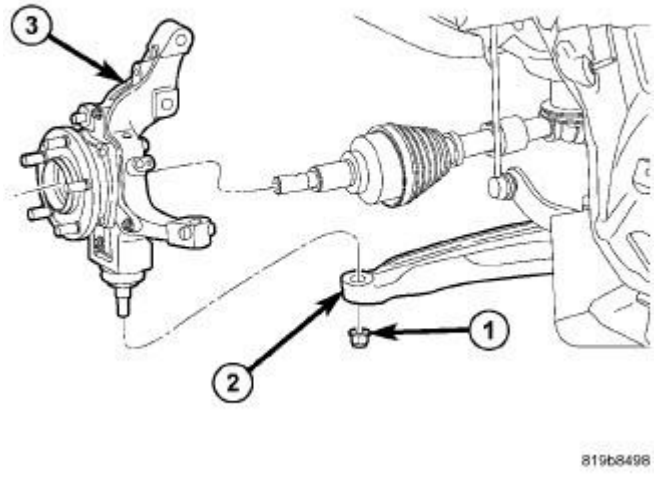

Fig. 34: Lower Ball Joint To Control Arm
Courtesy of CHRYSLER LLC

3. On each side of the vehicle, remove the nut (1) attaching the lower ball joint to the lower control arm (2).

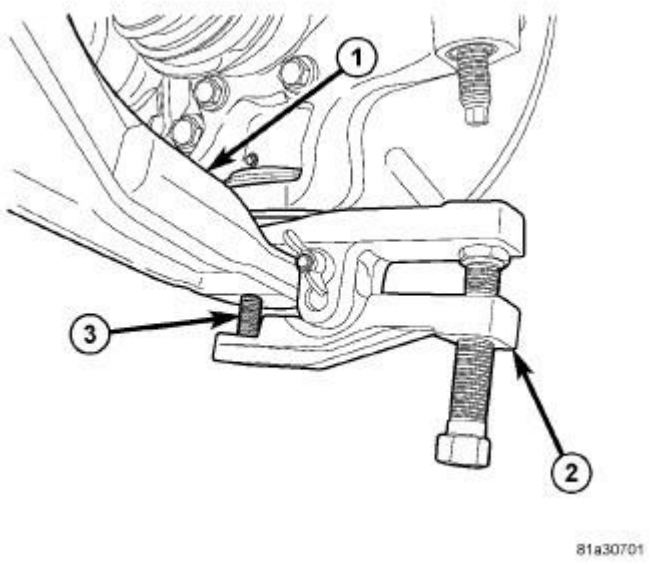

Fig. 35: Using 9360 On Lower Ball Joint
Courtesy of CHRYSLER LLC

4. On each side of the vehicle, release the lower ball joint (3) from the lower control arm (1) using Remover (2), Special Tool 9360. Do not lift the knuckle out of the lower control arm at this time.
5. If equipped, remove the engine belly pan.
6. Remove the fore/aft crossmember. See **Removal**.
7. Remove the rear engine mount. Refer to **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal** .

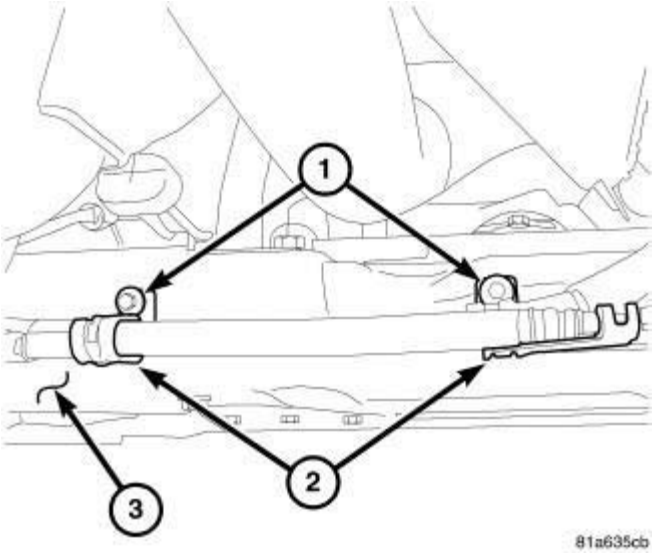

Fig. 36: Hoses At Rear Of Crossmember
Courtesy of CHRYSLER LLC

8. Remove the screws (1) securing the power steering hose routing clamps (2) to the rear of the

crossmember.

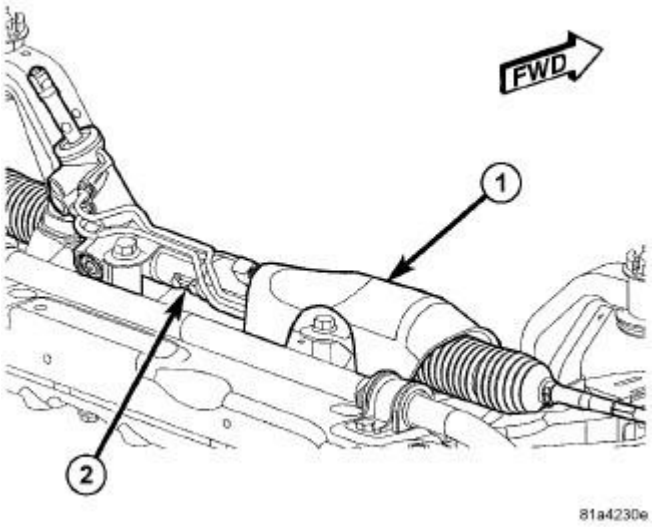

Fig. 37: Heat Shield Over Gear
Courtesy of CHRYSLER LLC

9. Remove the screws and push-pins securing the heat shield (1) over the right side of the steering gear (2).

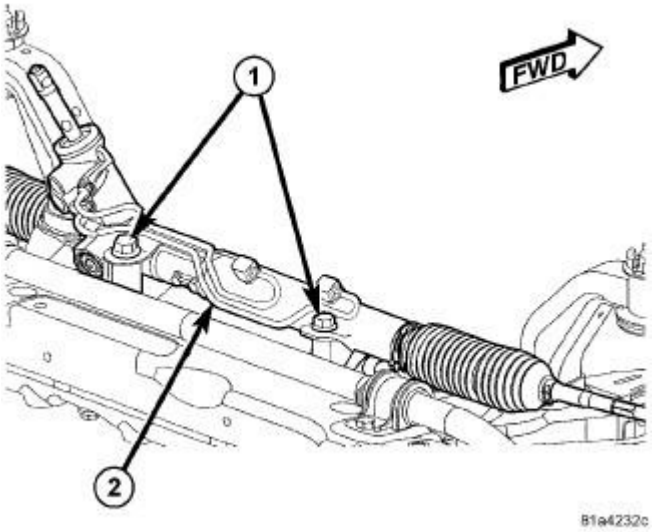

Fig. 38: Steering Gear Mounting
Courtesy of CHRYSLER LLC

10. Remove the two bolts (1) securing the steering gear (2) to the crossmember.
11. Support the steering gear using a bungee cord or other to keep the steering gear from lowering when the crossmember is lowered.

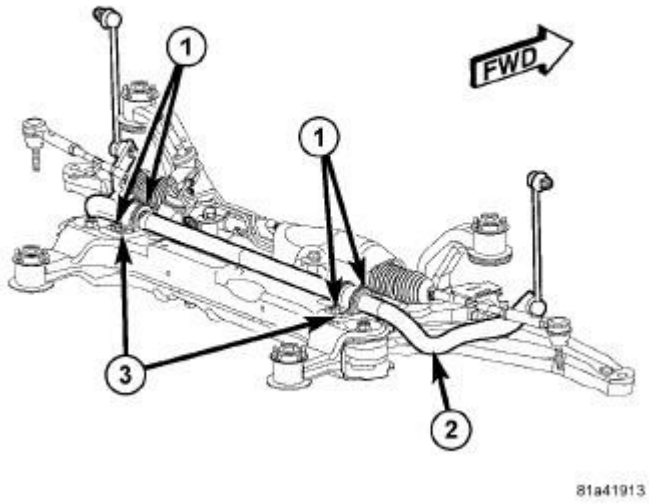

Fig. 39: Stabilizer Bar Mounting
Courtesy of CHRYSLER LLC

12. Remove the screws (1) securing the stabilizer bushing retainers (3) to the crossmember.

NOTE: Before lowering the front suspension crossmember, the location of the crossmember must be marked on the body of the vehicle. Do this so the crossmember can be relocated, upon reinstallation, against the body of vehicle in the same location as before removal. If the front suspension crossmember is not reinstalled in exactly the same location as before removal, the preset front wheel alignment settings (caster and camber) may be lost.

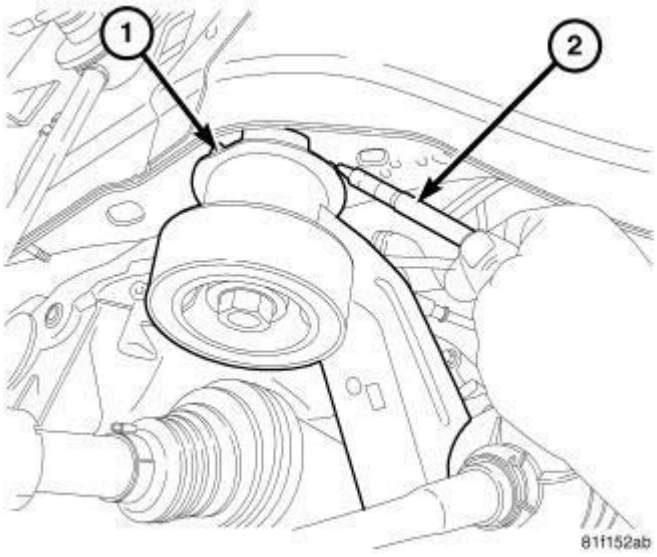

Fig. 40: Marking Location Of Crossmember

Courtesy of CHRYSLER LLC

13. Using a crayon or marker (2) that will not break the paint surface, mark the location of the front crossmember (1) on the body near each mounting bolt. **Do not use any type of sharp instrument that will damage the underbody of the vehicle.**

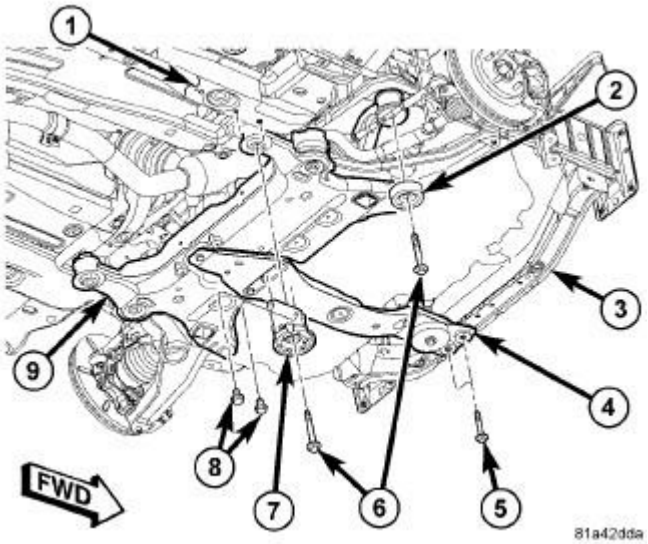

Fig. 41: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

14. Support the crossmember (9) with a transmission jack. Secure the crossmember to the jack.
15. Remove the four mounting bolts (6) securing the front crossmember (9) to the body.
16. Remove the mounting screws (8) securing the front crossmember reinforcement brackets (7) (one each side of vehicle) to the body (1). Remove the brackets.
17. Slowly lower the crossmember and control arms to a comfortable working height using the jack.

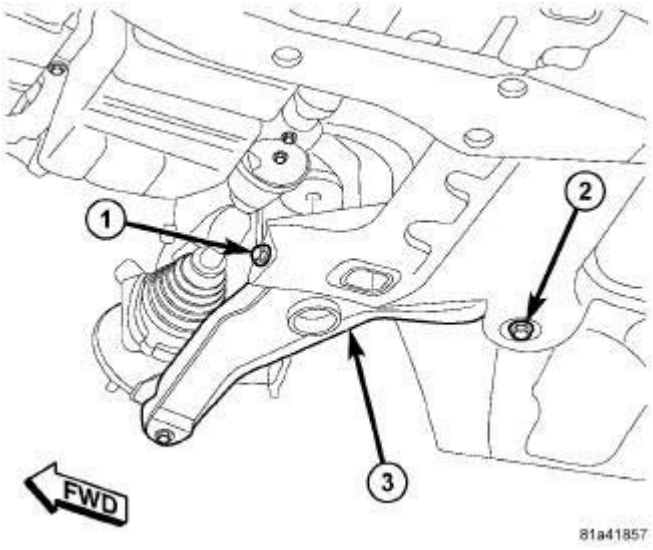

Fig. 42: Lower Control Arm Mounting
Courtesy of CHRYSLER LLC

18. To remove each lower control arm:
    a. Remove the front bolt (1) attaching the lower control arm (3) to the front suspension crossmember.
    b. Remove the nut on the rear bolt (2) attaching the lower control arm (3) to the front suspension crossmember. Remove the bolt.
    c. Remove the lower control arm (3) from the crossmember.

Installation

INSTALLATION

1. Support the crossmember with a transmission jack. Secure the crossmember to the jack.

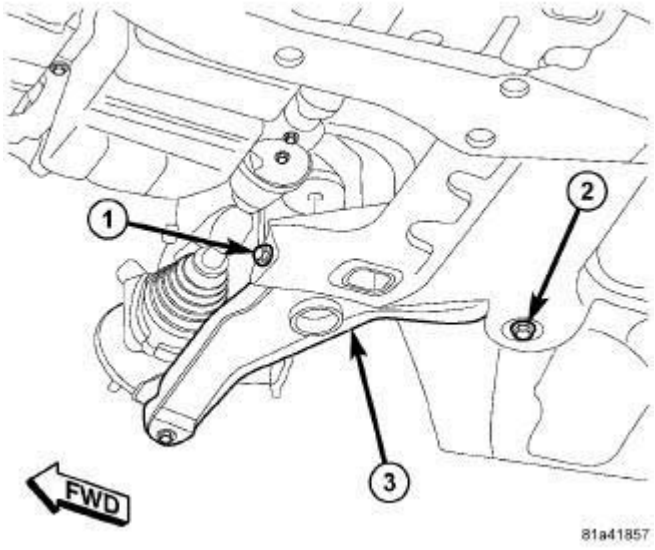

Fig. 43: Lower Control Arm Mounting
Courtesy of CHRYSLER LLC

2. To install each lower control arm on the crossmember:
   a. Place the lower control arm (3) into the front suspension crossmember.
   b. Insert the rear bolt (2) up through the crossmember and lower control arm (3). Install the nut on the top-end of the bolt, but do not tighten it at this time.
   c. Install, but do not fully tighten, the front bolt (1) attaching the lower control arm (3) to the crossmember.
   d. With no weight or obstruction on the lower control arm, tighten the lower control arm **front** mounting bolt (2) to 145 N.m (107 ft. lbs.).
   e. With no weight or obstruction on the lower control arm, tighten the lower control arm **rear** mounting bolt nut to 145 N.m (107 ft. lbs.).

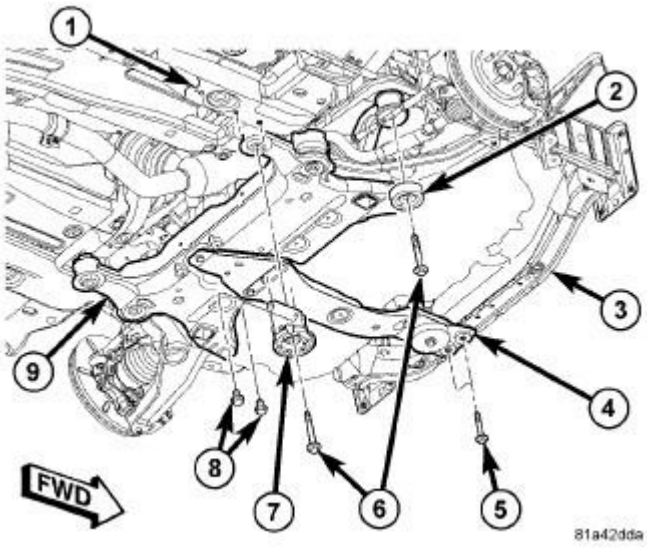

Fig. 44: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

3. Slowly raise the crossmember (9) into mounted position using the transmission jack matching the crossmember to the marked locations on the body made during removal. As the crossmember is raised, guide the lower ball joints into the mounting holes in the lower control arms. Also, make sure the stabilizer bar is properly positioned on the crossmember.
4. Position the front crossmember reinforcement brackets (7) (one each side of vehicle) over the crossmember rear mounting bushings and install the mounting screws (8), but do not tighten at this time.

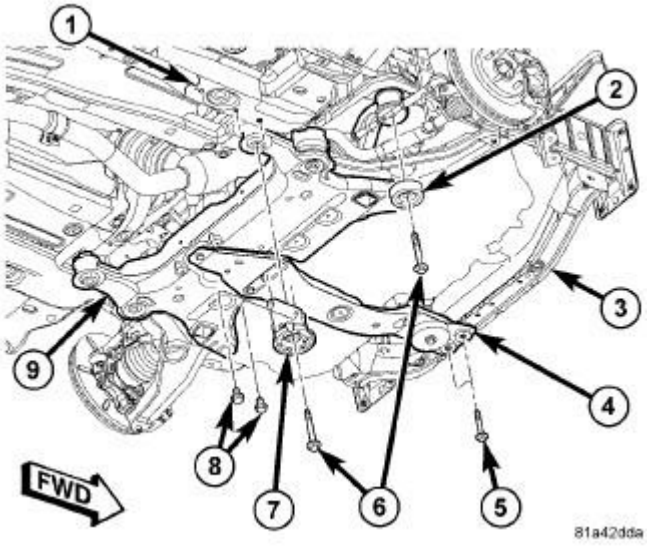

Fig. 45: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

5. Install the four mounting bolts (6) securing the front crossmember (1) to the body. Tighten the crossmember mounting bolts to 135 N.m (100 ft. lbs.).
6. Tighten the crossmember reinforcement bracket mounting screws (8) to 55 N.m (41 ft. lbs.).
7. Remove the transmission jack.

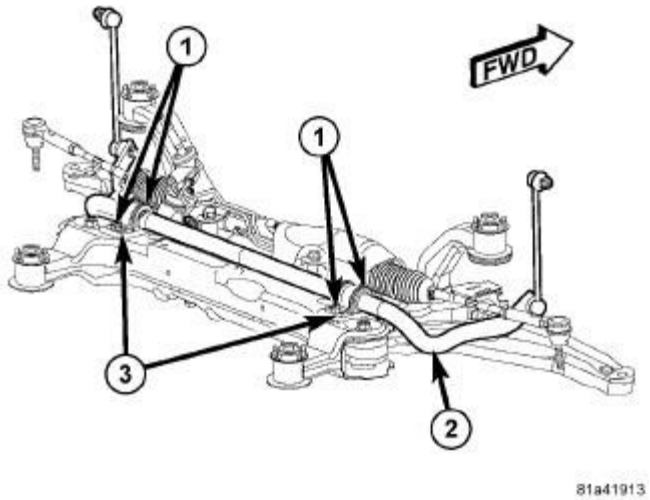

Fig. 46: Stabilizer Bar Mounting
Courtesy of CHRYSLER LLC

8. Position both stabilizer bar bushing retainers and install the screws (1) securing the stabilizer bushing retainers (3) to the crossmember. Tighten all four stabilizer bar cushion retainer screws to 60 N.m (44 ft. lbs.).

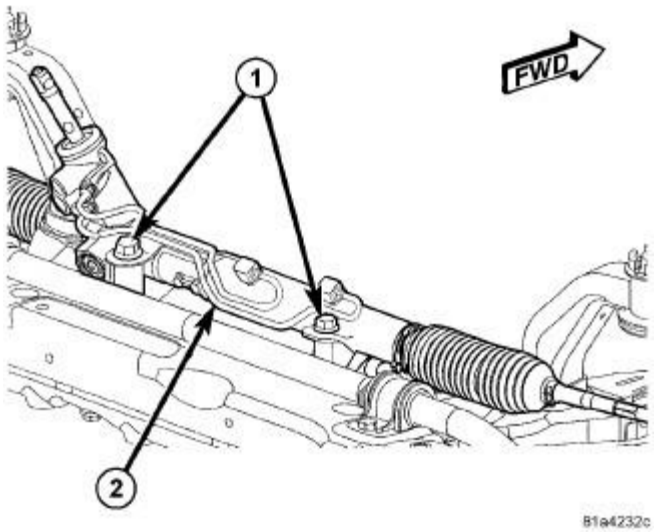

Fig. 47: Steering Gear Mounting

Courtesy of CHRYSLER LLC

9. Remove the bungee cord or other supporting the steering gear (2).
10. Install the two bolts (1) securing the steering gear (2) to the crossmember. Tighten the steering gear mounting bolts to 100 N.m (74 ft. lbs.).

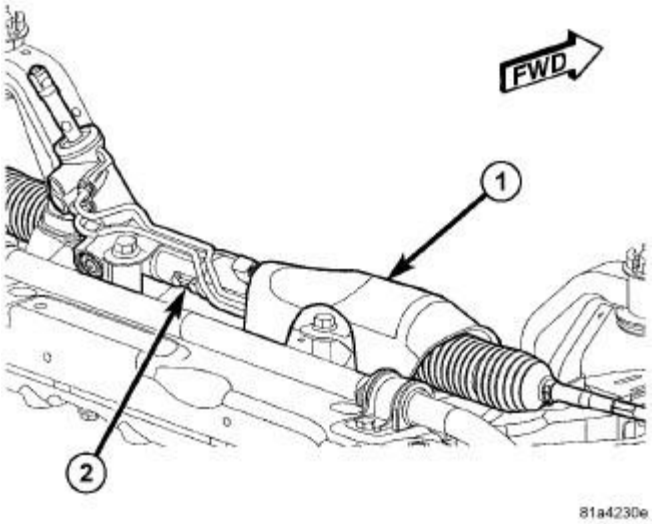

Fig. 48: Heat Shield Over Gear
Courtesy of CHRYSLER LLC

11. Position the heat shield (1) over the steering gear (2). Install the mounting screws and push-pins. Tighten the screws to 6 N.m (53 in. lbs.).

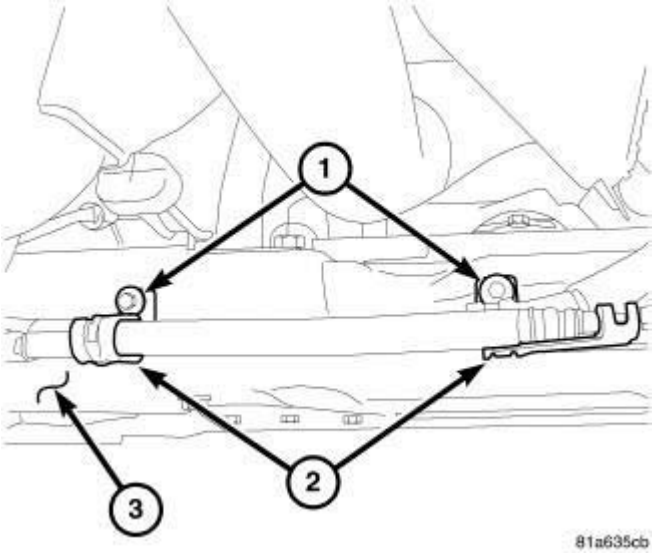

Fig. 49: Hoses At Rear Of Crossmember
Courtesy of CHRYSLER LLC

12. Position the power steering hose routing clamps (2) on the crossmember. Install and tighten the screws to 8 N.m (71 in. lbs.).
13. Install the rear engine mount. Refer to appropriate Engine SERVICE INFORMATION article.
14. Install the fore/aft crossmember. See **Installation**.
15. If equipped, install the engine belly pan.

NOTE: If a new or cleaned lower control arm is being installed, it is important to have a film of general purpose grease around the ball joint mounting hole on the lower control arm to avoid any future corrosion issues. Make sure the grease does not get inside the ball joint mounting hole or on the ball joint stud during installation.

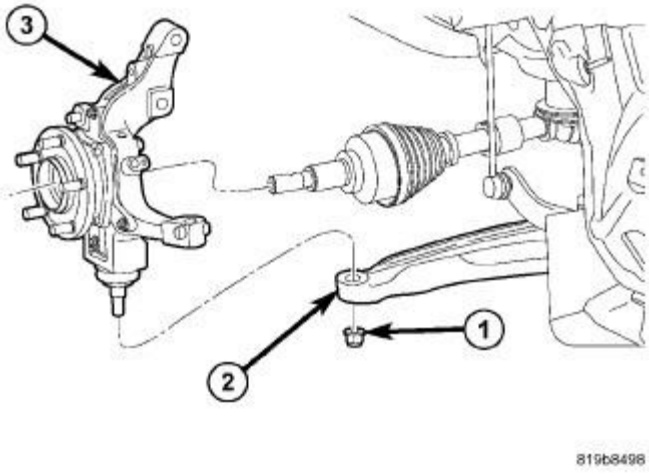

Fig. 50: Lower Ball Joint To Control Arm
Courtesy of CHRYSLER LLC

16. On each side of the vehicle, install a NEW ball joint stud nut (1). Tighten the nut to 95 N.m (70 ft. lbs.).

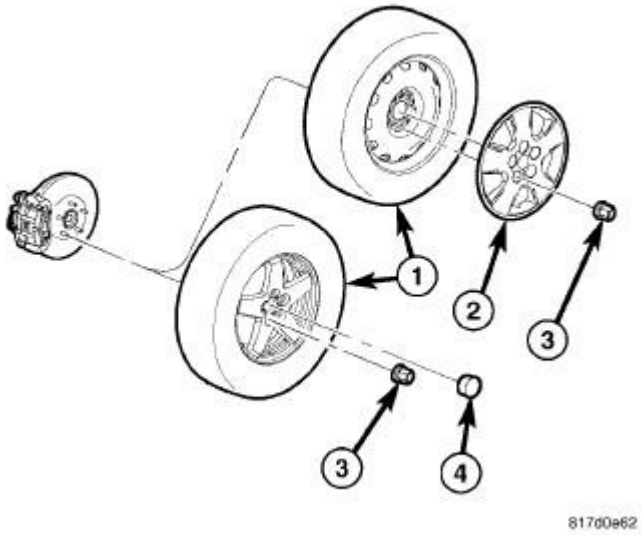

Fig. 51: Tire And Wheel Mounting
Courtesy of CHRYSLER LLC

17. On each side of the vehicle, install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
18. Lower the vehicle.
19. Perform wheel alignment as necessary. Refer to **Front Suspension/Wheel Alignment - Standard Procedure** .

CROSSMEMBER, REAR SUSPENSION

Removal

REMOVAL

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

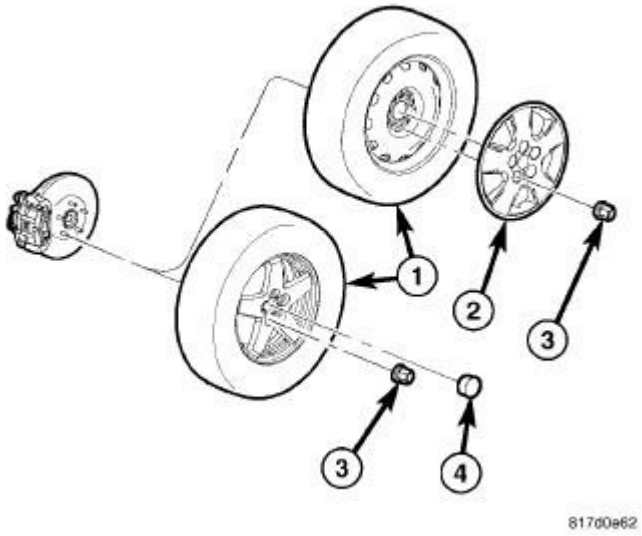

Fig. 52: Tire And Wheel Mounting
Courtesy of CHRYSLER LLC

2. On each side of the vehicle, remove the wheel mounting nuts (3), then the front tire and wheel assembly (1).

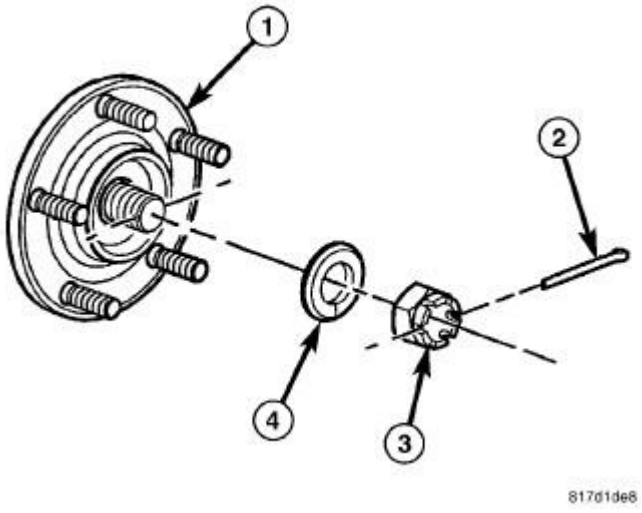

Fig. 53: Hub Nut And Washer
Courtesy of CHRYSLER LLC

3. If equipped with all-wheel-drive, remove the cotter pin (2) from the hub nut (3) on the end of the axle half shaft. While a helper applies the brakes to keep the hub (1) from rotating, remove the hub nut (3) and washer (4) from the axle half shaft.

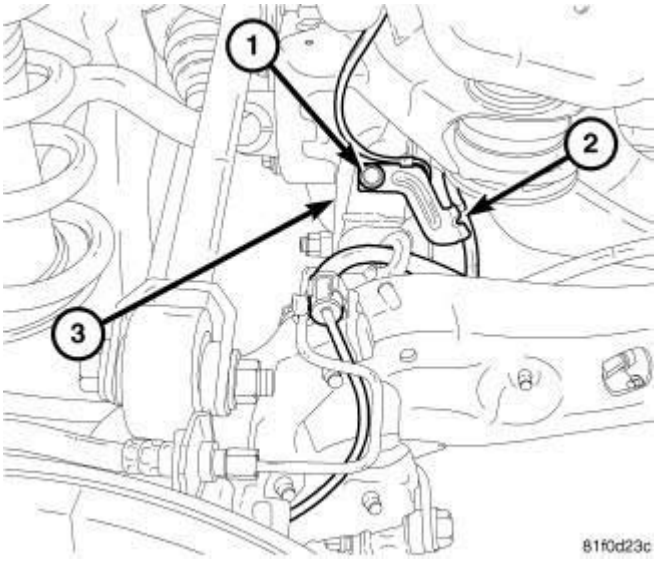

Fig. 54: Wheel Speed Sensor Routing Clamp
Courtesy of CHRYSLER LLC

4. On each side of the vehicle, remove the screw (1) fastening the wheel speed sensor routing clamp (2) to the rear suspension crossmember (3).
5. Remove the exhaust system from the vehicle. Refer to **Exhaust System/PIPE, Exhaust - Removal** .

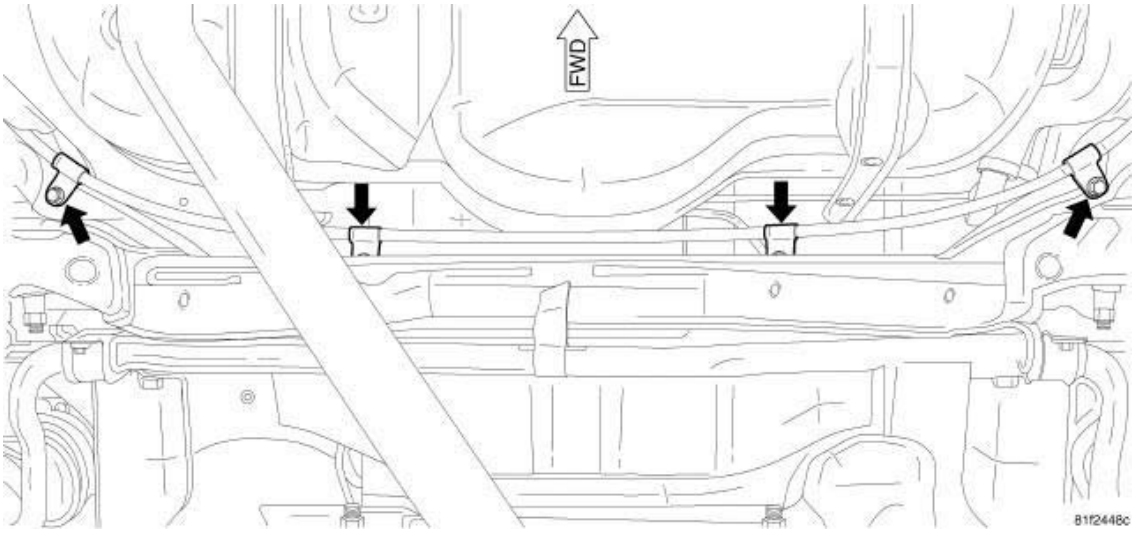

Fig. 55: Right Cable At Crossmember
Courtesy of CHRYSLER LLC

6. Remove the screws securing the four right rear parking brake cable routing clamps to the rear crossmember.

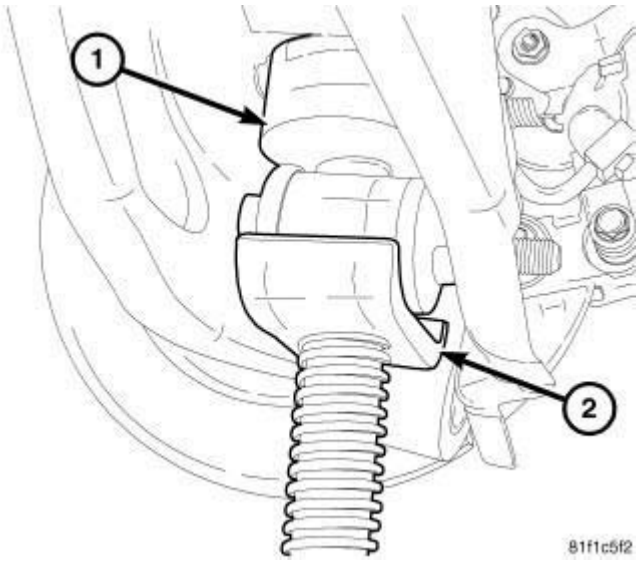

Fig. 56: Supporting Rear Shock
Courtesy of CHRYSLER LLC

7. On each side of the vehicle, if equipped with load-leveling shocks, support the lower shock (1) with a jack (2) using just enough force to allow easy removal of the lower shock mounting bolt in the following step. Lower the jack following bolt removal.

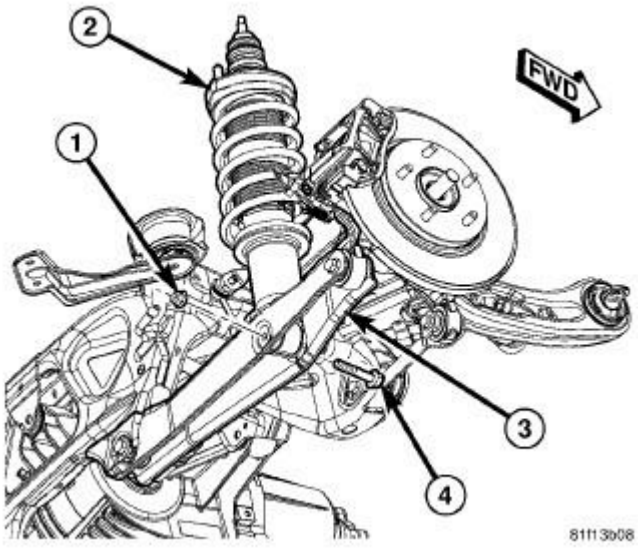

Fig. 57: Rear Lower Shock Mounting
Courtesy of CHRYSLER LLC

8. On each side of the vehicle, remove the lower shock mounting nut (1) and bolt (4).
9. If equipped with all-wheel-drive, remove the rear driveline module, but instead of using a drive-on hoist, place jacks under the outboard ends of the lower control arms and adjust the rear suspension height at the hub and bearings to simulate curb riding height. Refer to **Differential and Driveline/Rear Driveline**

Module - Removal . Once the rear driveline module is removed, remove the jacks.

10. If equipped with all-wheel-drive, slide the half shaft out of the hub and bearing on each side of the vehicle and remove it.

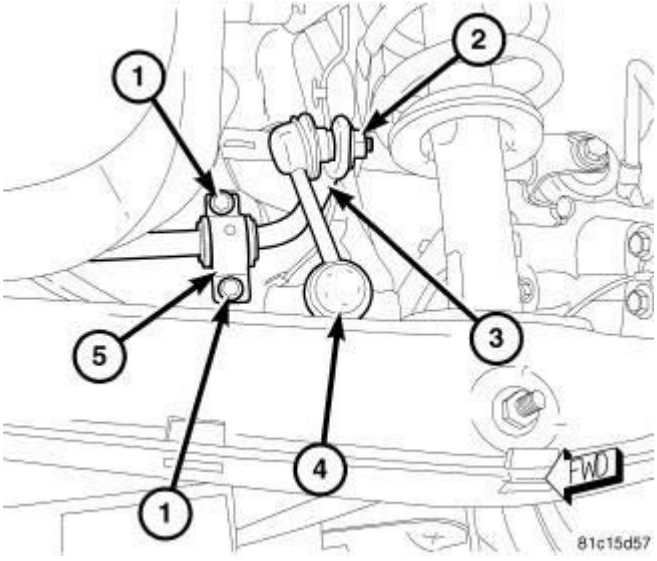

Fig. 58: Rear Stabilizer Bar Retainer
Courtesy of CHRYSLER LLC

11. On each side of the vehicle, while holding the stabilizer bar link upper stud stationary, remove the nut (2) securing the link (4) to the stabilizer bar (3).
12. On each side of the vehicle, remove the screws (1) securing the stabilizer bar retainer (5) to the crossmember.
13. Remove the stabilizer bar (3) from the vehicle.

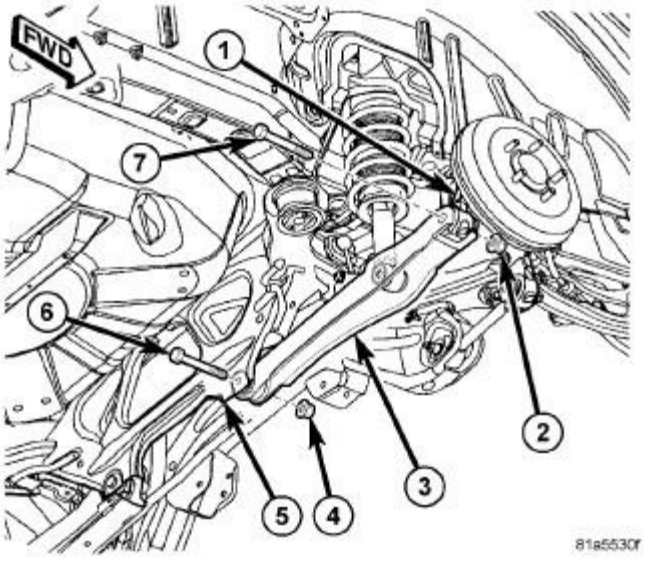

Fig. 59: Rear Lower Control Arm Mounting

Courtesy of CHRYSLER LLC

14. On each side of the vehicle:
    a. Loosen (do not remove) the nut (2) and bolt (7) securing the lower control arm (3) to the knuckle (1).
    b. Remove the nut (4) and bolt (6) securing the lower control arm (3) to the rear crossmember (5).
    c. Swing the lower control arm down away from the rear crossmember.

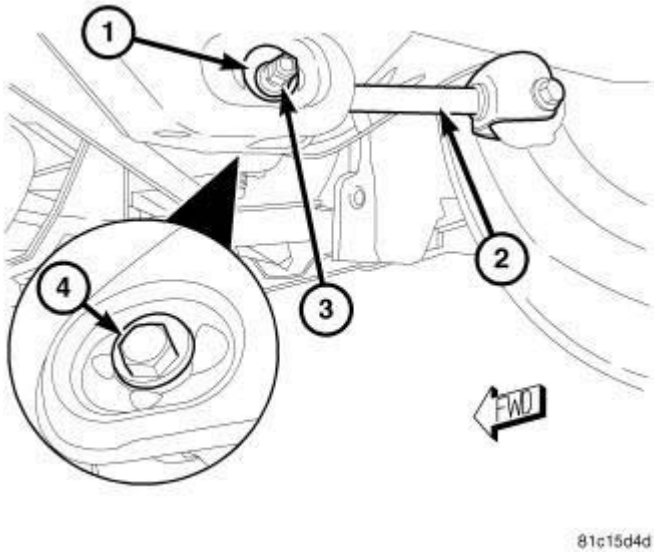

Fig. 60: Rear Toe Adjustment Cam Bolt
Courtesy of CHRYSLER LLC

15. On each side of the vehicle:
    a. Mark the position of the cam bolt (4) cams on the crossmember using a paint marker or crayon. Do not use any type marker that will scratch or damage the surface of the crossmember.
    b. While holding the cam bolt (4) head stationary, loosen and remove the toe link mounting cam bolt nut (3) and washer (1). Remove the cam bolt.

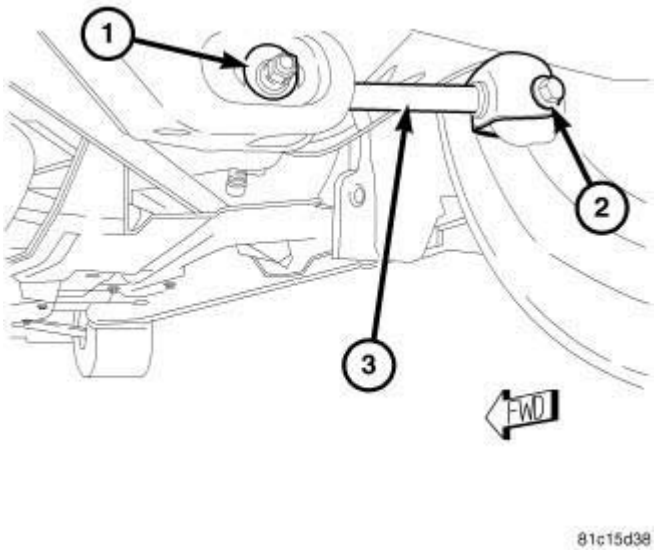

Fig. 61: Toe Link
Courtesy of CHRYSLER LLC

16. On each side of the vehicle, loosen (do not remove) the mounting bolt (2) and nut securing the toe link (3) to the knuckle.

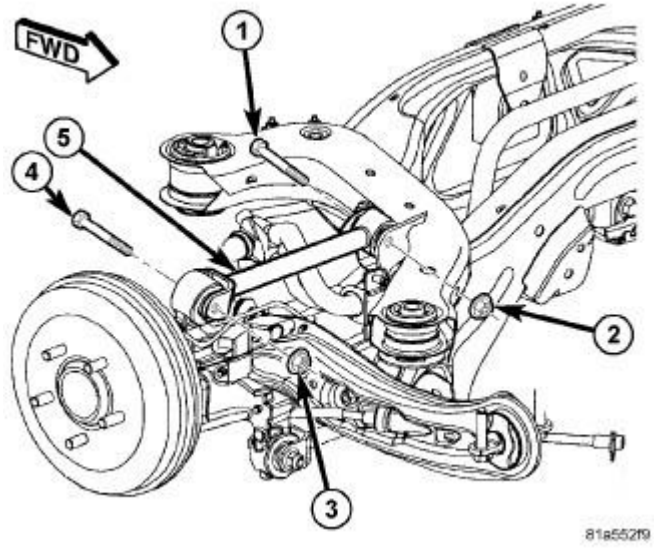

Fig. 62: Upper Control Arm Mounting
Courtesy of CHRYSLER LLC

17. On each side of the vehicle:
    a. Loosen (do not remove) the nut (3) and bolt (4) securing the upper control arm (5) to the knuckle.
    b. Remove the nut (2) and bolt (1) securing the upper control arm (5) to the crossmember.
18. On each side of the vehicle, using wire or a bungee cord, support the knuckle to keep it from sagging.

NOTE: Before lowering the rear suspension crossmember, the location of the crossmember must be marked on the body of the vehicle. Do this so the crossmember can be relocated, upon reinstallation, against the body of vehicle in the same location as before removal. If the crossmember is not reinstalled in exactly the same location as before removal, the rear wheel alignment settings may be lost.

19. Using a crayon or marker that will not break the paint surface, mark the location of the rear suspension crossmember on the body near each mounting bolt. **Do not use any type of sharp instrument that will damage the underbody of the vehicle.**
20. Support the crossmember with a transmission jack. Secure the crossmember to the jack.
21. Remove the two mounting screws securing each crossmember reinforcement bracket (one each side of vehicle) to the body.
22. Remove the mounting nuts securing the crossmember reinforcement brackets to the crossmember rear mounting bolts. Remove the brackets.
23. Remove the four mounting bolts securing the crossmember to the body.
24. Slowly lower the crossmember using the jack.

Installation

INSTALLATION

1. Support the rear suspension crossmember with a transmission jack. Secure the crossmember to the jack.
2. Slowly raise the crossmember into mounted position using the transmission jack matching the crossmember to the marked locations on the body made during removal. As the crossmember is raised, guide the rear suspension components into place.
3. Install the four mounting bolts (rear bolts have stud heads) securing the crossmember to the body. Tighten the crossmember mounting bolts to 95 N.m (70 ft. lbs.).
4. Position the crossmember reinforcement brackets (one each side of vehicle) over the crossmember rear mounting bolt head-studs and install the mounting nuts, but do not tighten at this time.
5. Install the mounting screws securing the crossmember reinforcement brackets to the body. Tighten the screws to 55 N.m (41 ft. lbs.).
6. Tighten the mounting nuts securing the reinforcement brackets to the rear crossmember mounting bolts to 50 N.m (37 ft. lbs.).
7. Remove the transmission jack.

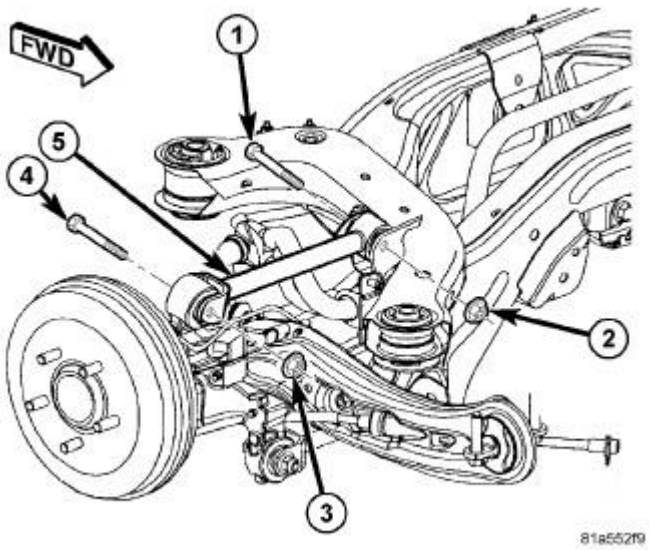

Fig. 63: Upper Control Arm Mounting
Courtesy of CHRYSLER LLC

8. On each side of the vehicle, position the upper control arm (5) and install the bolt (1) and nut (2) securing the arm to the crossmember. Do not tighten either upper control arm mounting bolts at this time.

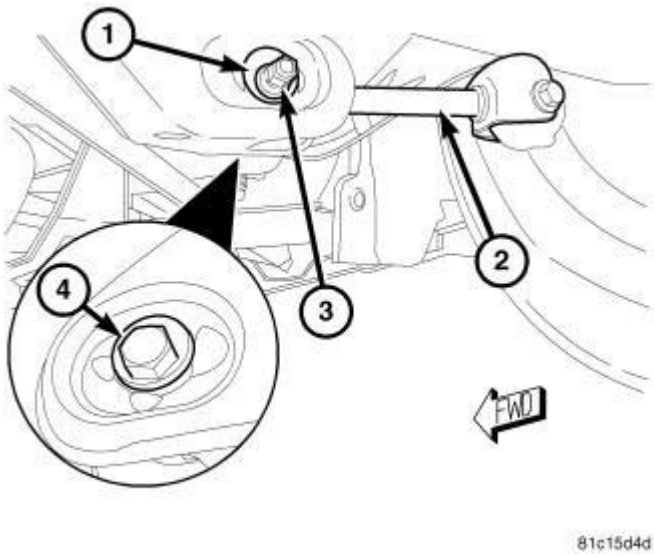

Fig. 64: Rear Toe Adjustment Cam Bolt
Courtesy of CHRYSLER LLC

CAUTION: When installing the cam bolt (4) and washer make sure the cams stay inside the abutments built into the crossmember. Failure to do so can damage the abutments and make toe adjustment difficult.

9. On each side of the vehicle:

a. Position the toe link (2) and install the cam bolt (4) from the front through the crossmember and link. Match the cam on the bolt to the marks made during removal or position the top of the cam to the 12 O'clock position if not available.
b. Install the cam washer (1) and nut (3) securing the toe link (2) to the crossmember. Do not tighten at this time.

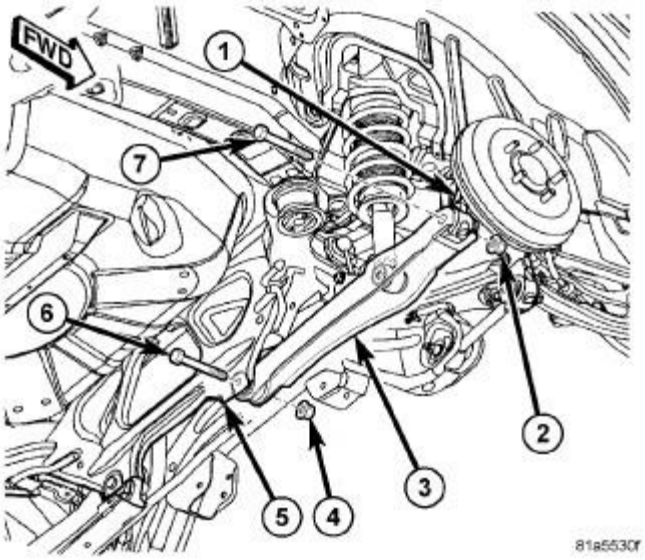

Fig. 65: Rear Lower Control Arm Mounting
Courtesy of CHRYSLER LLC

10. On each side of the vehicle, position the lower control arm (3) and install the bolt (6) and nut (4) securing the lower control arm to the crossmember (5). Do not tighten nut and bolt at crossmember or knuckle at this time.

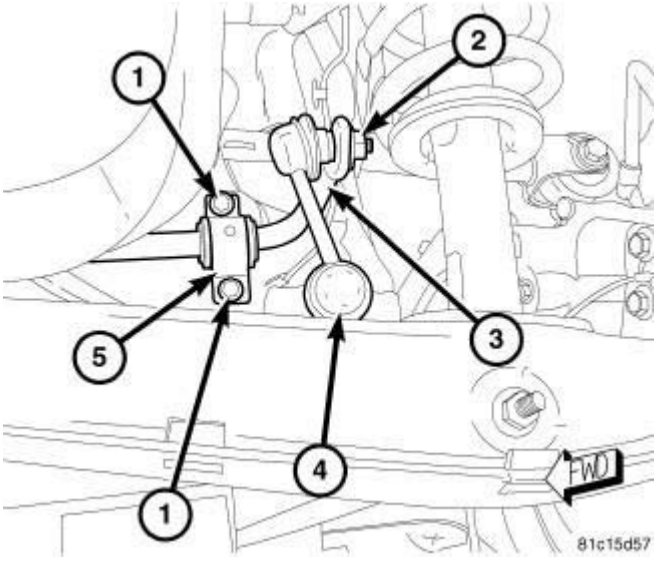

Fig. 66: Rear Stabilizer Bar Retainer

Courtesy of CHRYSLER LLC

NOTE: When installing the stabilizer bar on a vehicle with all-wheel-drive, position the bar so that the bar loops over the axle half shafts once installed, not under the axle half shafts.

11. Position the stabilizer bar (3) on the rear crossmember.

CAUTION: Before installing the screws in the following step, it is especially important to clean the threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

12. Install the two retainers (5 - right side shown in illustration) over the cushions at the mounting holes and install the retainer screws (1). Do not tighten the screws at this time.

CAUTION: Before installing the nut in the following step, it is especially important to clean the threads and apply Mopar® Lock AND Seal Adhesive or equivalent.

13. On each side of the vehicle, install the stabilizer link (4) upper stud in the end of the stabilizer bar (3). Install the nut (2) on the upper stud and while holding the stabilizer link stud stationary, tighten the nut to 48 N.m (35 ft. lbs.).
14. On each side of the vehicle, tighten the stabilizer bar retainer screws (1) to 25 N.m (18 ft. lbs.).

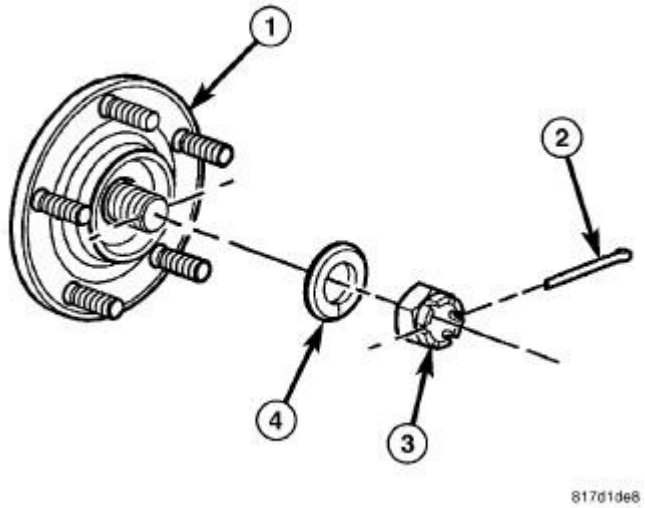

Fig. 67: Hub Nut And Washer
Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only

and should be discarded when removed.

15. If equipped with all-wheel-drive, slide the half shaft into the hub and bearing on each side of the vehicle and hand-start the washer and hub nut (3) Support the shafts to keep them from overextending the joints.
16. If equipped with all-wheel-drive, install the rear driveline module. In place of using a drive-on hoist, place jacks under the outboard ends of the lower control arms and adjust the rear suspension height at the hub and bearings to simulate curb riding height. Refer to **Differential and Driveline/Rear Driveline Module - Removal** . Once the rear driveline module is installed, remove the jacks.

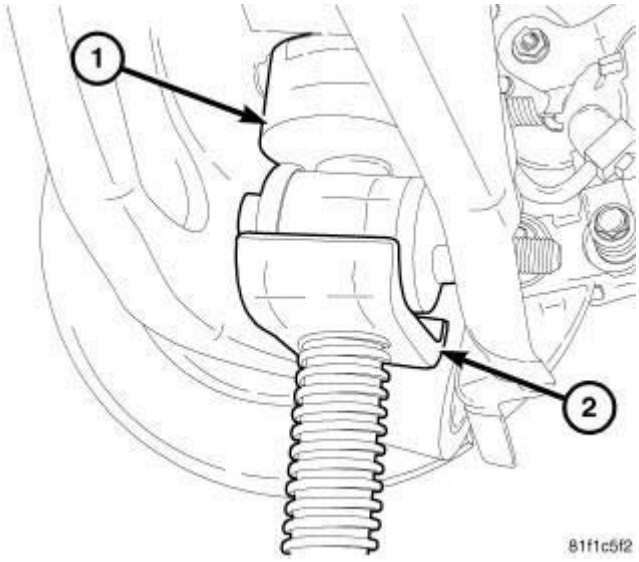

Fig. 68: Supporting Rear Shock
Courtesy of CHRYSLER LLC

17. On each side of the vehicle, if equipped with load-leveling shocks, place a jack (2) against the lower shock eye and support the lower end of the shock assembly (1). Lift the shock assembly using the jack until the hole in the lower shock eye lines up with that in the lower control arm.

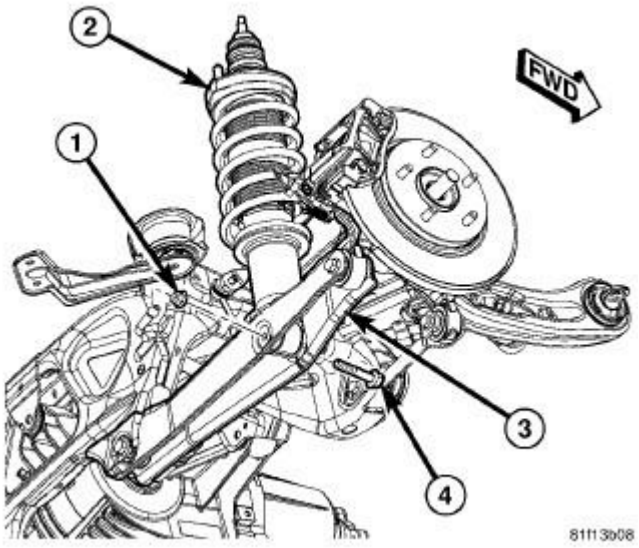

Fig. 69: Rear Lower Shock Mounting
Courtesy of CHRYSLER LLC

18. On each side of the vehicle, install the mounting bolt (4) and nut (1) fastening the shock assembly (2) to the lower control arm (3). Do not tighten at this time.

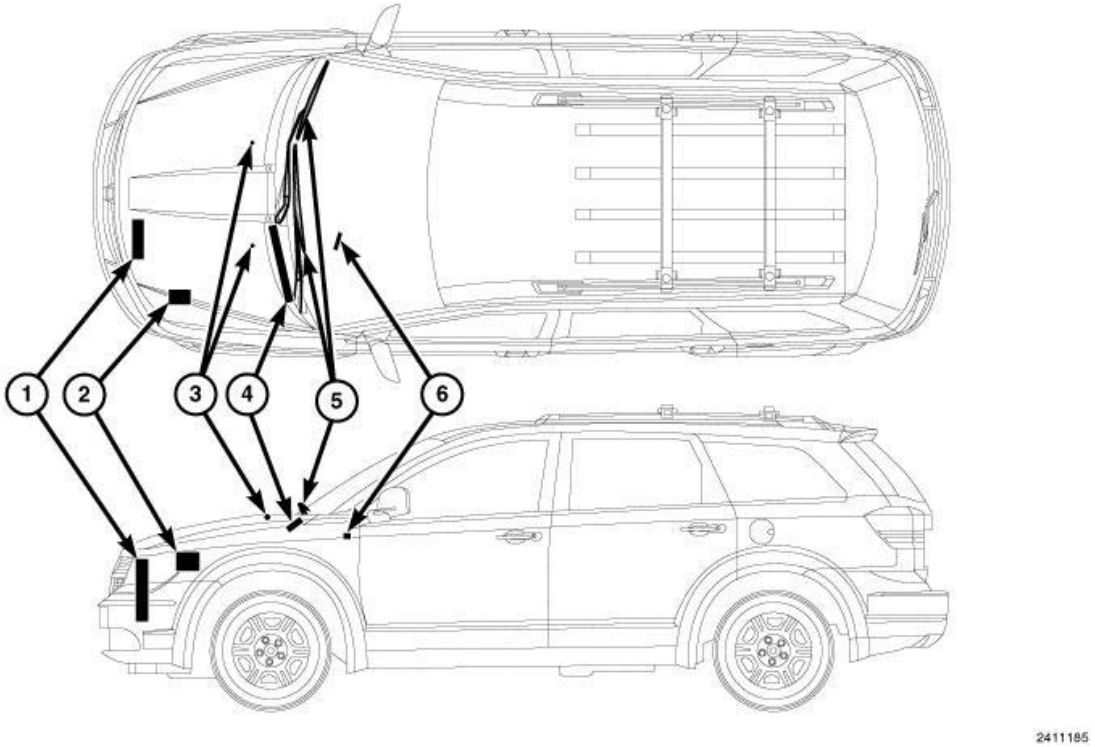

Fig. 70: Right Cable At Crossmember
Courtesy of CHRYSLER LLC

19. Position the four parking brake cable routing clamps along the front of the rear crossmember and install the screws. Tighten the screws to 6 N.m (55 in. lbs.).
20. Install the exhaust system. Refer to **Exhaust System/PIPE, Exhaust - Installation** .

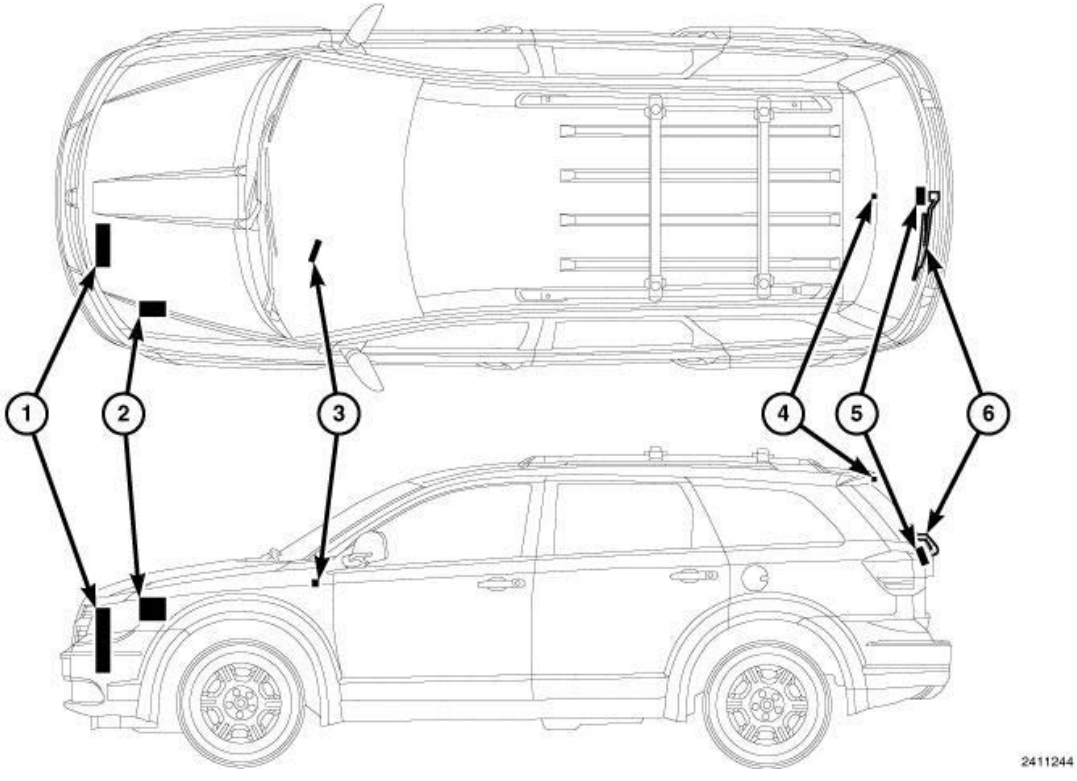

Fig. 71: Wheel Speed Sensor Routing Clamp
Courtesy of CHRYSLER LLC

21. On each side of the vehicle, attach the wheel speed sensor routing clamp (2) to the rear suspension crossmember (3) using the mounting screw (1). Tighten the mounting screw to 20 N.m (15 ft. lbs.).

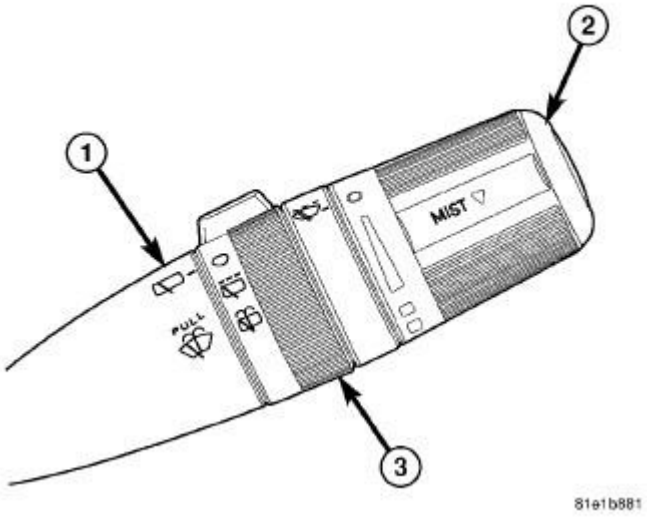

Fig. 72: Hub Nut And Washer
Courtesy of CHRYSLER LLC

22. While a helper applies the brakes to keep the hub (1) from rotating, on each side of the vehicle:
    a. Tighten the hub nut (3) to 245 N.m (181 ft. lbs.).
    b. Insert the cotter pin (2) through the notches in the nut and the hole in half shaft. If the notches in the nut do not line up with the hole in the half shaft, continue to tighten the nut until they do. **Do not loosen the nut.**
    c. Wrap the cotter pin (2) ends tightly around the lock nut.

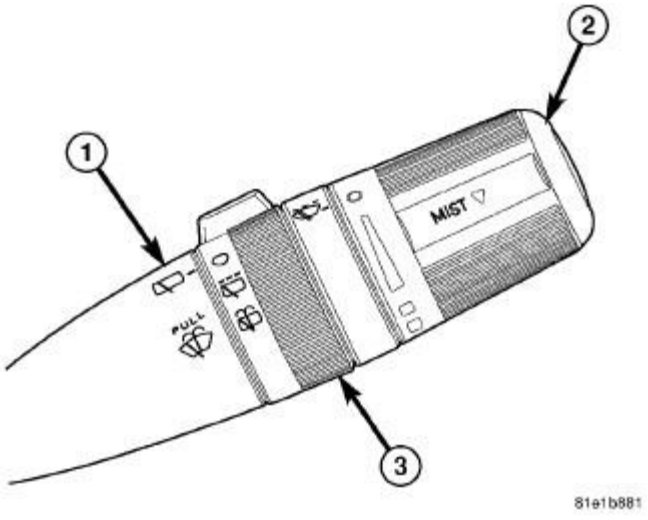

Fig. 73: Tire And Wheel Mounting
Courtesy of CHRYSLER LLC

23. On each side of the vehicle, install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
24. Lower the vehicle.
25. Position the vehicle on an alignment rack/drive-on lift. Raise the vehicle as necessary to access mounting bolts and nuts.
26. Tighten the lower control arm mounting bolt nut at the crossmember to 105 N.m (77 ft. lbs.).
27. Tighten the lower control arm mounting bolt nut at the knuckle to 105 N.m (77 ft. lbs.).
28. Tighten the shock assembly lower mounting bolt nut to 99 N.m (73 ft. lbs.).
29. Tighten the upper control arm mounting bolt nut at the crossmember to 105 N.m (77 ft. lbs.).
30. Tighten the upper control arm mounting bolt nut at the knuckle to 105 N.m (77 ft. lbs.).
31. Tighten the toe link mounting bolt nut at the knuckle to 105 N.m (77 ft. lbs.).
32. Perform wheel alignment as necessary. Refer to **Front Suspension/Wheel Alignment - Standard Procedure** .

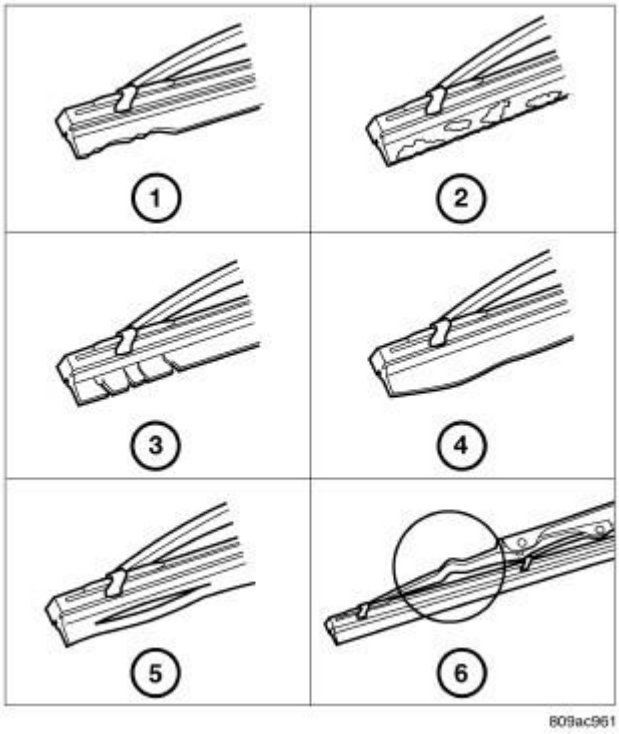

Fig. 74: Rear Toe Adjustment Cam Bolt
Courtesy of CHRYSLER LLC

33. Once rear toe is set, while holding the cam bolt (4) head stationary, tighten the toe link mounting cam bolt nut (3) to 100 N.m (74 ft. lbs.).

2009 ACCESSORIES AND EQUIPMENT

Navigation/Telecommunication - Service Information - Journey

DESCRIPTION

DESCRIPTION

TELECOMMUNICATIONS

The hands-free cellular system on this vehicle uses Bluetooth™ technology to provide wireless communication between the operator's compatible cellular telephone and the vehicle's on-board receiver.

The system uses voice recognition technology to control operation. The incoming voice is broadcast through the vehicle's radio speakers, automatically overriding any other audio signals on the front speakers when the hands-free system is in use. A microphone in the rearview mirror picks up vehicle occupant's voices. If a call is in progress when the ignition is switched off, the call will be transferred to the hand-held telephone.

The system will communicate with a telephone that is anywhere within the vehicle. However, covering the hand held phone or the hands-free phone module with a metal object may block the signal. The system will recognize up to seven telephones, each of which is given a spoken identification by the user during the setup process. The system includes Spanish and French voice recognition in addition to English.

The hands free module is contained within the radio for premium systems. With the low line radio, the hands free module is located on the left side of the instrument panel to the left of the steering column.

NAVIGATION

The navigation system offers several new customer features for expanded usability and convenience with hands-free voice-activated operation in addition to the touch screen buttons. The navigation system uses the Bluetooth microphone in the rear view mirror. Navigation routes can be based on a variety of formats including some of the following:

- Destination entry by street intersection, city, zip code, street name, street address and number, state/province/country and phone number
- Stop/change route
- Save current position
- Personal menu, including Guide Me Home (Go Home), Trip Itinerary, List of Saved Locations, Favorite Points of Interest (from a data base), Manage Personal User and Choose User
- Personal Interests including recent routes, address book, Where Am I Now, Emergency (police stations, Dodge dealerships, fire stations, hospitals and emergency care centers), Trail and geo- coordinates
- Route options include shortest, quickest, maximize freeways, minimize freeways, avoid toll roads and avoid ferries
- Navigation can be put into DEMO mode to enhance trip planning

This navigation system will support Traffic Messaging. Traffic Messaging displays voice and pop up warning messages for medium and high priority situations on the route such as road closures due to accidents/hazardous situations and it can even generate a traffic detour for a traffic event located on the route.

OPERATION

OPERATION

TELECOMMUNICATION

Two buttons on the rearview mirror, identified with ISO icons, control the system: A "phone" button turns the system on and off; a "voice recognition" (or voice command) button prompts the hands-free system to listen for a voice command. The system includes the following features:

- Phone book - Stores telephone numbers for later recall by name or other verbal identification, called a voice tag, and memory location.
- Four memory locations - Home, Work, Mobile, and Pager. A maximum of 32 unique names or voice tags may be stored at the same time, with a different number in each of the four memory locations.
- Voice tag dialing - Dials the number associated with a voice tag and memory location.
- Digit dialing - Dials the telephone number by recognizing the names of the digits as they are spoken.
- Receiving calls - A voice prompt notifies the user of an incoming call. Pressing the UConnect button accepts or rejects the call.
- Privacy Mode - Switches the call to the handheld telephone and the hands-free system and back again using the "voice recognition" (or "voice command") button and a voice command, if desired.

NAVIGATION

The navigation system collects data from GPS satellites in orbit around the Earth. This information is sent to the radio to be processed and provides the user with present location and is used to provide the route planing and guidance as the vehicle is driven.

ANTENNA, NAVIGATION

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the radio. Refer to **Electrical - Audio and Video/Audio and Video/RADIO - Removal** .
4. Remove the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Removal** .
5. Remove the GPS antenna mounting fasteners and remove the antenna.

INSTALLATION

INSTALLATION

1. Install the GPS antenna and mounting fasteners.
2. Install the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Installation** .
3. Install the radio. Refer to **Electrical - Audio and Video/Audio and Video/RADIO - Installation** .
4. Install the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
5. Connect the battery negative cable.

MODULE, HANDS FREE (HFM)

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the knee bolster. Refer to **Body/Instrument Panel/KNEEBLOCKER - Removal** .
3. Remove the hands free module mounting fasteners.
4. Disconnect the electrical connectors and remove the module.

INSTALLATION

INSTALLATION

1. Connect the electrical connectors and install the hands free module.
2. Install the hands free module mounting fasteners.
3. Install the knee bolster. Refer to **Body/Instrument Panel/KNEEBLOCKER - Installation** .
4. Connect the battery negative cable.

2009 Suspension

Front Suspension - Journey

DIAGNOSIS AND TESTING

SUSPENSION AND STEERING

CONDITION	POSSIBLE CAUSES	POTENTIAL CORRECTIONS
Front End Whine On Turns	1. Defective Wheel Bearing	1. Replace Wheel Bearing
	2. Incorrect Wheel Alignment	2. Check And Reset Wheel Alignment
	3. Worn Tires	3. Replace Tires
	4. Low Power Steering Fluid Level	4. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid)
Front End Growl Or Grinding On Turns	1. Defective Wheel Bearing	1. Replace Wheel Bearing
	2. Engine Mount Grounding Against Frame Or Body Of Vehicle.	2. Check For Motor Mount Hitting Frame Rail And Reposition Engine As Required
	3. Worn Or Broken C/V Joint	3. Replace C/V Joint
	4. Loose Wheel Lug Nuts	4. Verify Wheel Lug Nut Torque
	5. Incorrect Wheel Alignment	5. Check And Reset Wheel Alignment
	6. Worn Tires	6. Replace Tires
Front End Clunk Or Snap On Turns	1. Loose Wheel Lug Nuts	1. Verify Wheel Lug Nut Torque
	2. Worn Or Broken C/V Joint	2. Replace C/V Joint
	3. Worn Or Loose Tie Rod Or Ball Joint	3. Tighten Or Replace Tie Rod End Or Ball Joint
	4. Worn Control Arm Bushing	4. Replace Control Arm
	5. Loose Sway Bar Or Upper Strut Attachment	5. Tighten Sway Bar Or Upper Strut Attachment To Specified Torque
Front End Popping/Clicking/Snapping During Acceleration After Drive-To-Reverse Shift,	1. Insufficient grease on mating surface of	1. Separate half shaft from hub and bearing and wipe mating

Reverse-To-Drive Shift Or While Turning	axle half shaft outer C/V joint mating surface to wheel hub/bearing.	surfaces clean. Apply light coating of wheel bearing grease to C/V joint mating surface and reassemble. Tighten hub nut to specified torque.
Front End Whine With Vehicle Going Straight At A Constant Speed	1. Defective Wheel Bearing 2. Incorrect Wheel Alignment 3. Worn Tires	1. Replace Wheel Bearing 2. Check And Reset Wheel Alignment 3. Replace Tires
Front End Growl Or Grinding With Vehicle Going Straight At A Constant Speed	1. Engine Mount Grounding 2. Worn Or Broken C/V Joint	1. Reposition Engine As Required 2. Replace C/V Joint
Front End Whine When Accelerating Or Decelerating	1. Worn Or Defective Transaxle Gears Or Bearings	1. Replace Transaxle Gears Or Bearings
Front End Clunk When Accelerating Or Decelerating	1. Loose Wheel Lug Nuts 2. Worn Or Broken Engine Mount 3. Worn Or Defective Transaxle Gears Or Bearings 4. Worn Or Broken C/V Joint 5. Worn Or Loose Ball Joint 6. Worn Or Loose Control Arm Bushing 7. Loose Crossmember Bolts	1. Verify Wheel Lug Nut Torque 2. Replace Engine Mounts 3. Replace Transaxle Gears Or Bearing 4. Replace C/V Joint 5. Tighten Or Replace Ball Joint 6. Tighten To Specified Torque Or Replace Control Arm 7. Tighten Crossmember Bolts To Specified Torque
Road Wander	1. Incorrect Tire Pressure 2. Incorrect Front Or Rear Wheel Toe 3. Worn Wheel Bearings 4. Worn Control Arm Bushings 5. Excessive Friction In Steering Gear 6. Excessive Friction In Steering Shaft Coupling	1. Inflate Tires To Recommended Pressure 2. Check And Reset Front Wheel Toe 3. Replace Wheel Bearing 4. Replace Control Arm 5. Replace Steering Gear 6. Replace Steering Coupler

	7. Excessive Friction In Strut Upper Bearing	7. Replace Strut Bearing
Lateral Pull	1. Unequal Tire Pressure	1. Inflate All Tires To Recommended Pressure
	2. Radial Tire Lead	2. Rotate or Cross-switch tires - Refer To **TIRES/WHEELS - SERVICE INFORMATION**
	3. Incorrect Front Wheel Camber	3. Check And Reset Front Wheel Camber
	4. Power Steering Gear Imbalance	4. Replace Power Steering Gear
	5. Wheel Braking	5. Correct Braking Condition Causing Lateral Pull
	6. Excessive Cross-Caster	6. Check wheel alignment and adjust as necessary
Excessive Steering Free Play	1. Incorrect Steering Gear Adjustment	1. Adjust Or Replace Steering Gear
	2. Worn Or Loose Tie Rod Ends	2. Replace Or Tighten Tie Rod Ends
	3. Loose Steering Gear Mounting Bolts	3. Tighten Steering Gear Bolts To The Specified Torque
	4. Loose Or Worn Steering Shaft Coupler	4. Replace Steering Shaft Coupler
Excessive Steering Effort	1. Low Tire Pressure	1. Inflate All Tires To Recommended Pressure
	2. Lack Of Lubricant In Steering Gear	2. Replace Steering Gear
	3. Low Power Steering Fluid Level	3. Fill Power Steering Fluid Reservoir To Correct Level
	4. Loose Power Steering Pump Belt	4. Check and replace automatic belt tensioner as necessary. If drive belt is worn or glazed, replace belt.
	5. Lack Of Lubricant In Steering Ball Joints	5. Lubricate Or Replace Steering Ball Joints
	6. Steering Gear Malfunction	6. Replace Steering Gear
	7. Lack Of Lubricant In Steering Coupler	7. Replace Steering Coupler

STANDARD PROCEDURE

LUBRICATION

There are no serviceable lubrication points on the front or rear suspension. The ball joints and tie rod ends are

sealed for life and require no maintenance.

FRONT

DESCRIPTION

DESCRIPTION

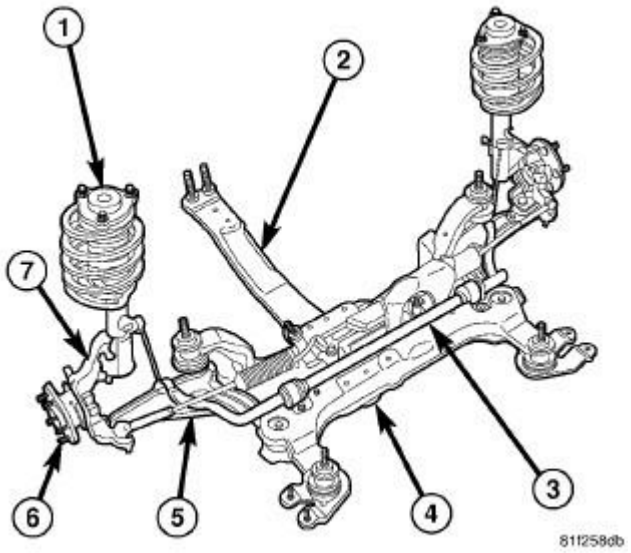

Fig. 1: Front Suspension Components
Courtesy of CHRYSLER LLC

This vehicle has a gas pressurized MacPherson strut type front suspension design.

Each side of the front suspension consists of these major components:

- (1) Strut Assembly
- (2) Fore/Aft Crossmember
- (3) Stabilizer Bar
- (4) Front Suspension Crossmember
- (5) Lower Control Arm
- (6) Hub And Bearing
- (7) Knuckle

Service procedures for the front suspension crossmember and fore/aft crossmember can be found in the **FRAME AND BUMPERS** .

WARNING

WARNINGS AND CAUTIONS

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

WARNING: Do not remove the strut rod nut while strut assembly is installed in vehicle, or before the coil spring is compressed with a compression tool. The spring is held under high pressure.

CAUTION: At no time when servicing a vehicle can a sheet metal screw, bolt, or other metal fastener be installed in the shock tower to take the place of an original plastic clip. It may come into contact with the strut or coil spring.

CAUTION: Wheel bearing damage will result if after loosening the axle hub nut, the vehicle is rolled on the ground or the weight of the vehicle is allowed to be supported by the tires for any length of time.

SPECIFICATIONS

SPECIFICATIONS

SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Brake Shield	10	7	89
Crossmember Mounting Bolts	135	100	-
Crossmember Reinforcement Bracket Mounting Screws	50	37	-
Hub And Bearing Mounting Bolts	82	60	-
Hub Nut	132	97	-
Lower Ball Joint Stud Nut	95	70	-
Lower Control Arm Front Pivot Bolt	200	148	-
Lower Control Arm Rear Pivot Bolt Nut	145	107	-
Stabilizer Bar Cushion Retainer Screws	60	44	-
Stabilizer Bar Link Nuts	48	35	-
Strut Clevis-to-Knuckle Nuts	140	103	-
Strut Rod Nut	60	44	-
Strut-to-Tower Nuts	55	41	-
Tie Rod Adjuster Jam Nut	75	55	-

Tie Rod End Knuckle Nut	85	63	-
Wheel Mounting (Lug) Nuts	135	100	-

SPECIAL TOOLS

SPECIAL TOOL

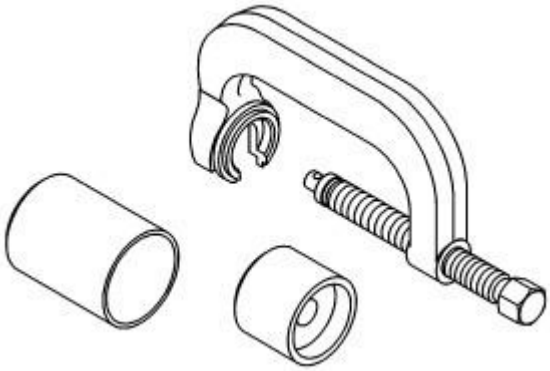

Fig. 2: Remover/Installer 8441
Courtesy of CHRYSLER LLC

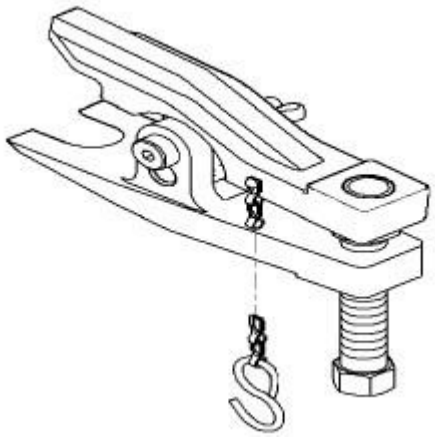

Fig. 3: Remover, Ball Joint 9360
Courtesy of CHRYSLER LLC

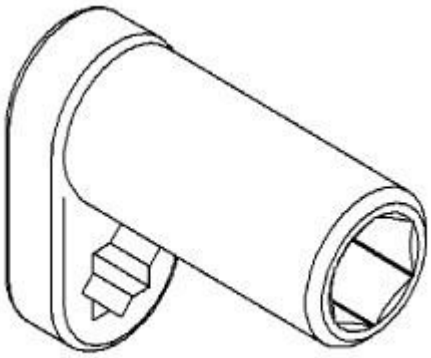

Fig. 4: Wrench, Strut Nut 9362
Courtesy of CHRYSLER LLC

Fig. 5: Remover/Installer 9964
Courtesy of CHRYSLER LLC

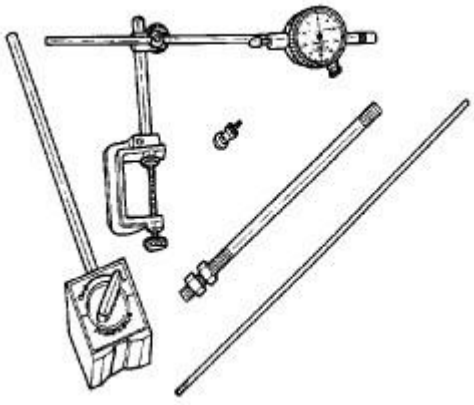

Fig. 6: Dial Indicator C-3339A
Courtesy of CHRYSLER LLC

ARM, LOWER CONTROL

Diagnosis and Testing

LOWER CONTROL ARM

Inspect the lower control arm for signs of damage from contact with the ground or road debris. If the lower control arm shows any sign of damage, look for distortion. Do not attempt to repair or straighten a broken or bent lower control arm. If damaged, the lower control arm is serviced only as a complete component.

Inspect both lower control arm isolator bushings for severe deterioration and replace the lower control arm as required.

Removal

REMOVAL

NOTE: Before proceeding. See WARNINGS AND CAUTIONS .

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

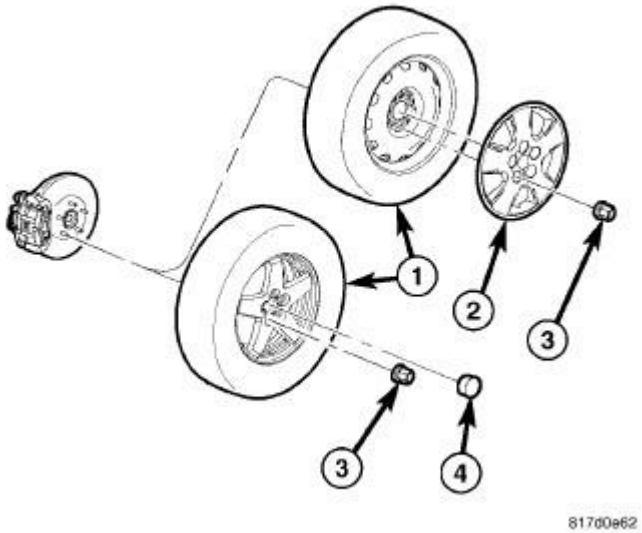

Fig. 7: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

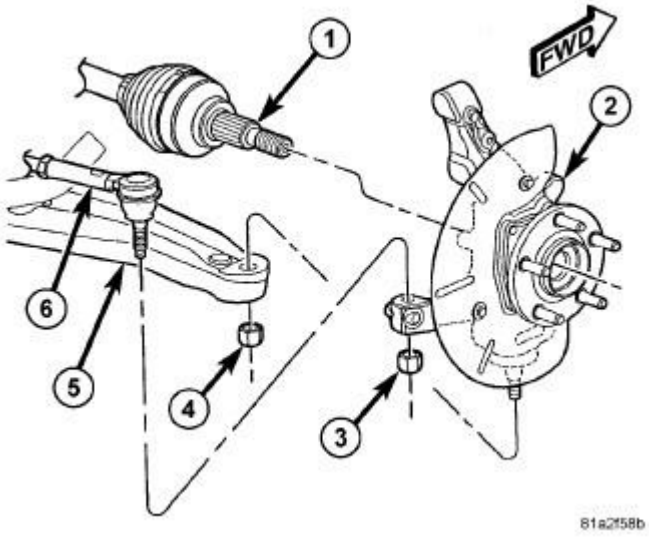

Fig. 8: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

3. Remove the nut (4) attaching the lower ball joint to the lower control arm (5).

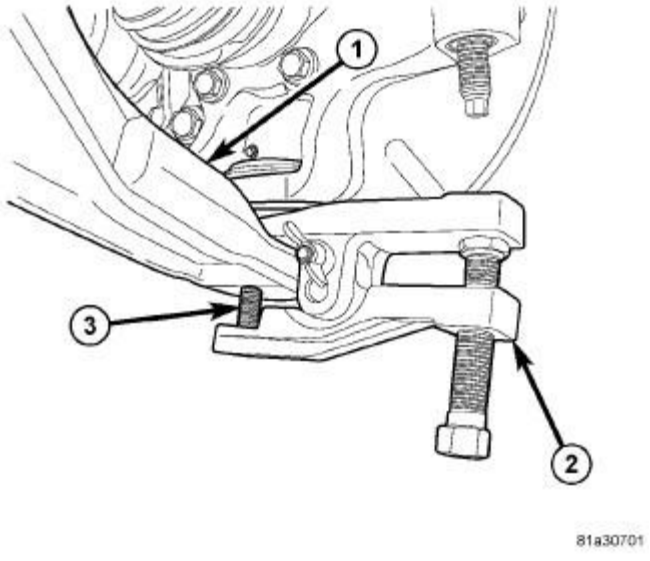

Fig. 9: Using 9360 On Lower Ball Joint
Courtesy of CHRYSLER LLC

4. Release the lower ball joint (3) from the lower control arm (1) using Remover (2) 9360. Do not lift the knuckle out of the lower control arm at this time.

CAUTION: Upon removing the knuckle from the ball joint stud, do not pull outward on the knuckle. Pulling the knuckle outward at this point can

separate the inner C/V joint on the half shaft thus damaging it.

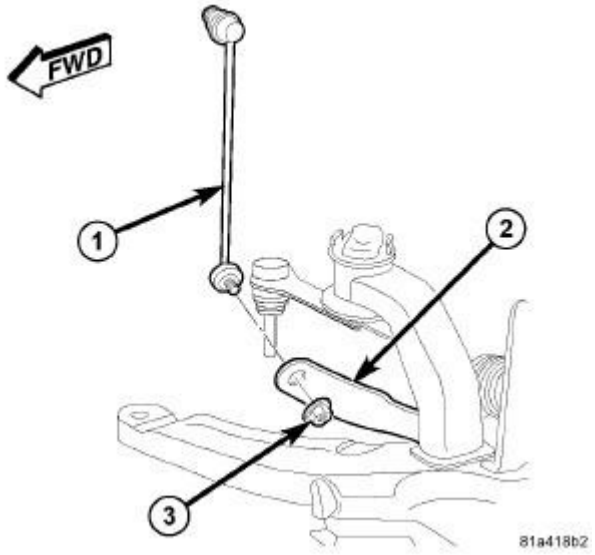

Fig. 10: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

5. At each end of the stabilizer bar, while holding the stabilizer bar link (1) lower stud stationary, remove the nut (3) securing the link to the stabilizer bar (2).
6. Rotate the ends of the stabilizer bar (2) upward away from the lower control arm.

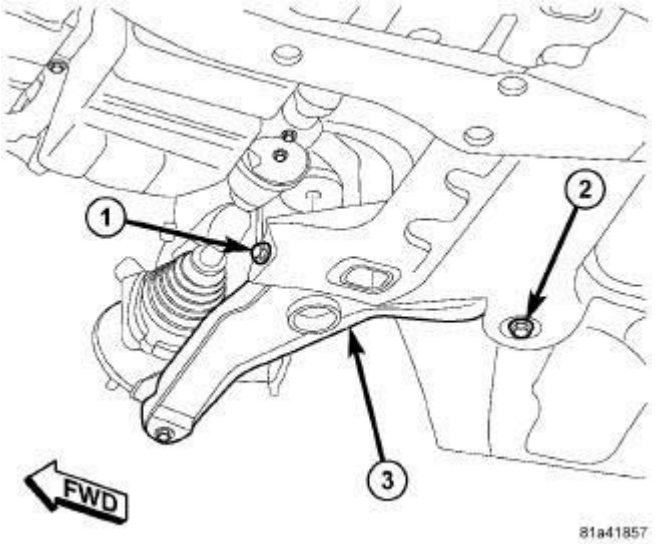

Fig. 11: Lower Control Arm Mounting
Courtesy of CHRYSLER LLC

7. Remove the front bolt (1) attaching the lower control arm (3) to the front suspension crossmember.

8. Remove the nut on the rear bolt (2) attaching the lower control arm (3) to the front suspension crossmember. Remove the bolt.
9. Remove the lower control arm (3) from the crossmember.

Installation

INSTALLATION

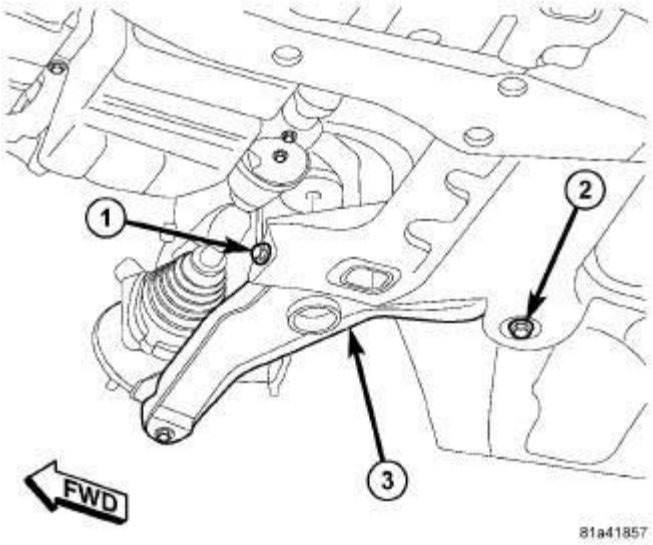

Fig. 12: Lower Control Arm Mounting
Courtesy of CHRYSLER LLC

1. Place the lower control arm (3) into the front suspension crossmember.
2. Insert the rear bolt (2) up through the crossmember and lower control arm (3). Install the nut on the top-end of the bolt, but do not tighten it at this time.
3. Install, but do not fully tighten, the front bolt (1) attaching the lower control arm (3) to the crossmember.
4. With no weight or obstruction on the lower control arm, tighten the lower control arm **front** mounting bolt (1) to 200 N.m (148 ft. lbs.).
5. With no weight or obstruction on the lower control arm, tighten the lower control arm **rear** mounting bolt nut to 145 N.m (107 ft. lbs.).

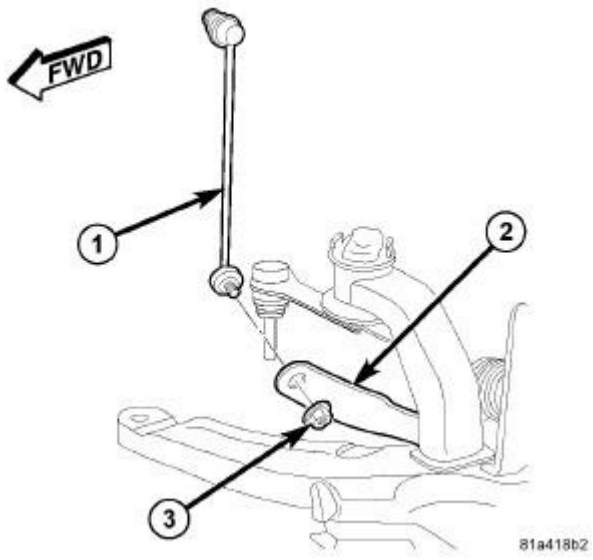

Fig. 13: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

6. Attach the stabilizer bar link (1) at each end of the stabilizer bar (2). At each link, install and tighten the nut (3) while holding the stabilizer bar link lower stud stationary. Tighten the nuts to 48 N.m (35 ft. lbs.).

NOTE: If a new or cleaned lower control arm is being installed, it is important to have a film of general purpose grease around the ball joint mounting hole on the lower control arm to avoid any future corrosion issues. Make sure the grease does not get inside the ball joint mounting hole or on the ball joint stud during installation.

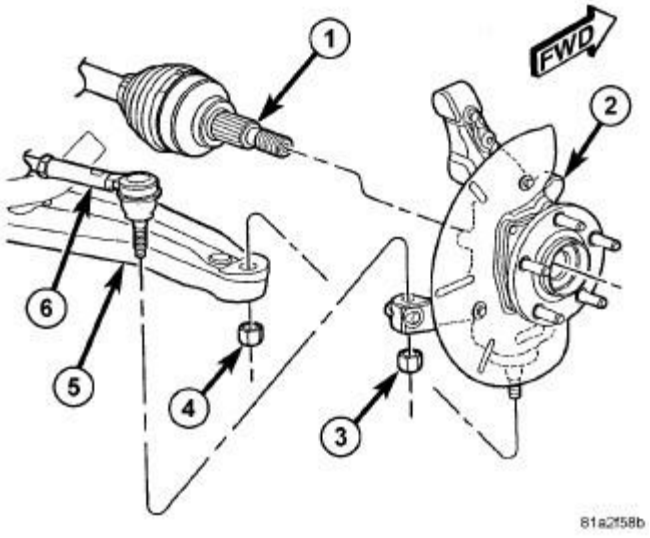

Fig. 14: Front Knuckle Mounting

Courtesy of CHRYSLER LLC

7. Insert the lower ball joint stud into the mounting hole in the lower control arm (5).
8. Install a NEW ball joint stud nut (4). Tighten the nut to 95 N.m (70 ft. lbs.).

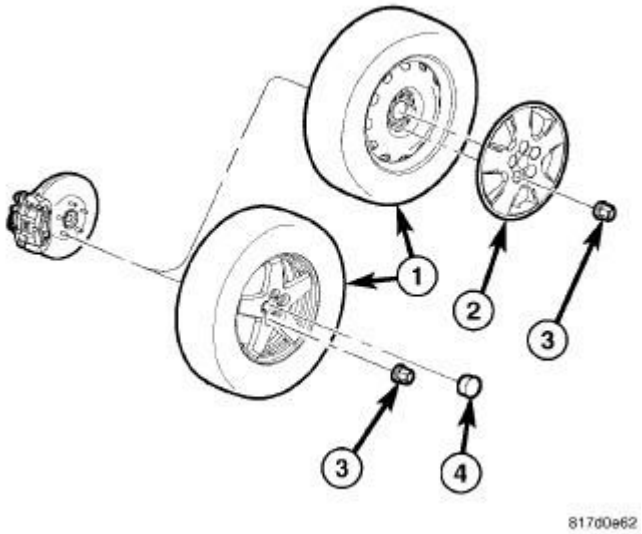

Fig. 15: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

9. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
10. Lower the vehicle.
11. Perform wheel alignment as necessary. See **Standard Procedure**

BALL JOINT, SUSPENSION, LOWER

Diagnosis and Testing

LOWER BALL JOINT

1. Raise the vehicle allowing the front suspension to hang.
2. Remove the tire and wheel assembly.
3. Using Dial Indicator C-3339A, or equivalent, attach the dial indicator mount to the knuckle and align the dial indicator's plunger with the direction of the stud axis, touching the end of the ball joint stud in the lower control arm.
4. Push up on the lower control arm and zero the dial indicator.

NOTE: Use care when applying load to the knuckle as to avoid damaging the ball joint seal boot.

5. From the front of the vehicle, insert a pry bar between the knuckle and lower control arm, resting it on the lower control arm. Use lever principle to push the knuckle up from the lower control arm. Apply the load until the needle of the dial indicator no longer moves.
6. Record the ball joint movement. The end play is acceptable if no more than 1.0 mm (0.039 in.) of end play is achieved back-to-back.
7. Perform this procedure on each side of the vehicle as necessary.

Removal

REMOVAL

NOTE: Before proceeding, review all Warnings and Cautions. See WARNINGS AND CAUTIONS

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

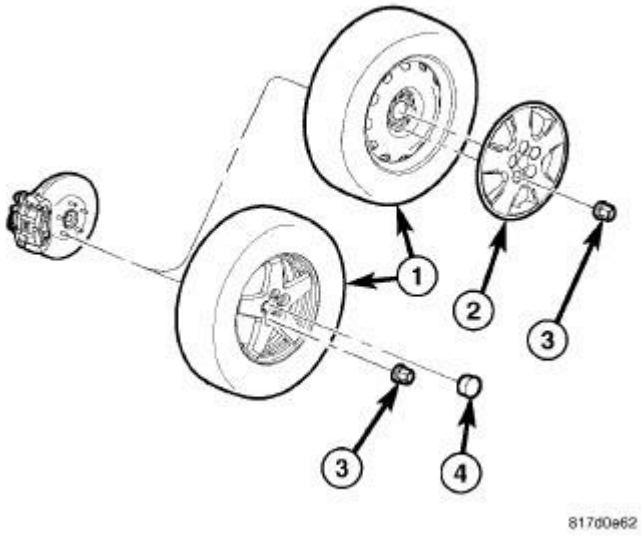

Fig. 16: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

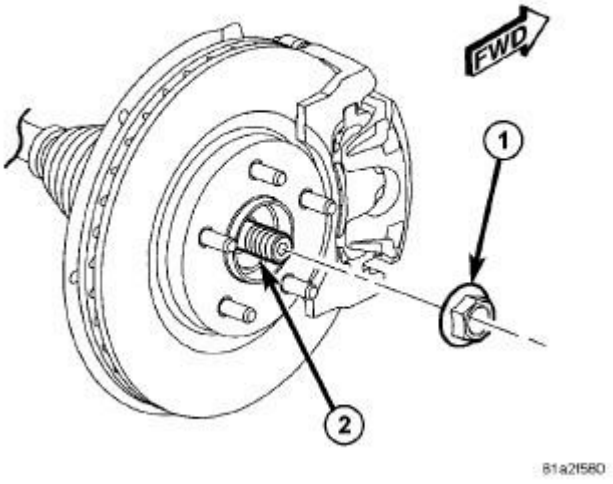

Fig. 17: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

3. While a helper applies the brakes to keep the hub from rotating, remove the hub nut (1) from the axle half shaft (2).
4. Access and remove the front brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**

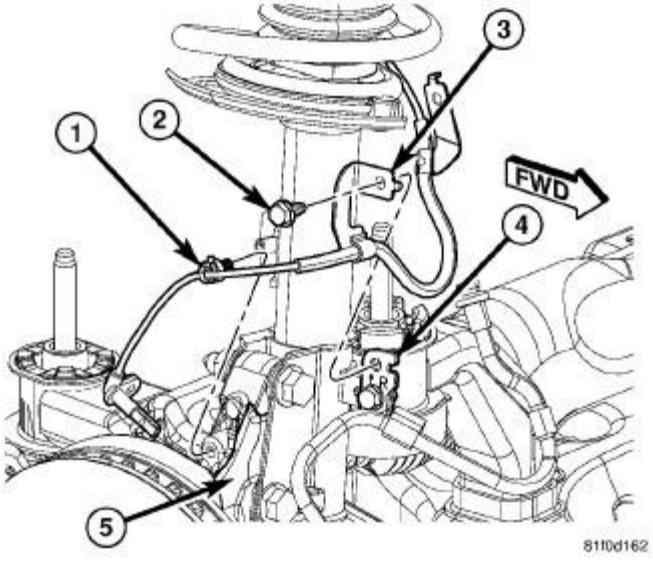

Fig. 18: Wheel Speed Sensor Routing & Brake Flex Hose Bracket
Courtesy of CHRYSLER LLC

5. Remove the routing clip (1) securing wheel speed sensor cable to the knuckle (5).

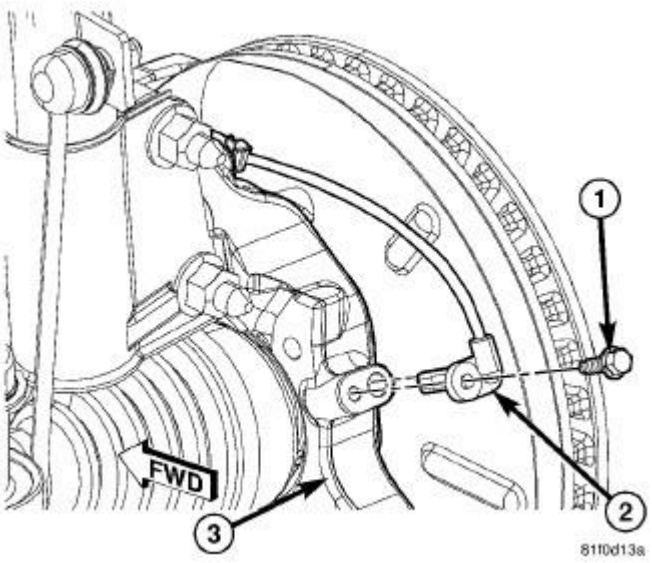

Fig. 19: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

6. Remove the screw (1) fastening the wheel speed sensor head (2) to the knuckle (3). Pull the sensor head out of the knuckle.

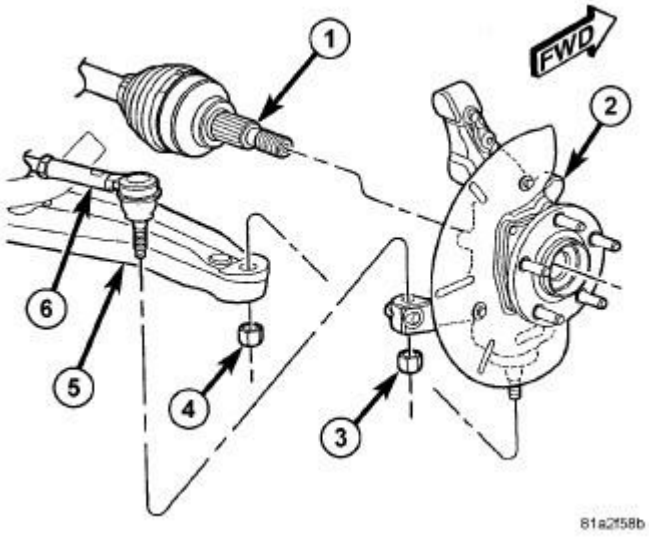

Fig. 20: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

7. Remove the nut (4) attaching the lower ball joint to the lower control arm (5).

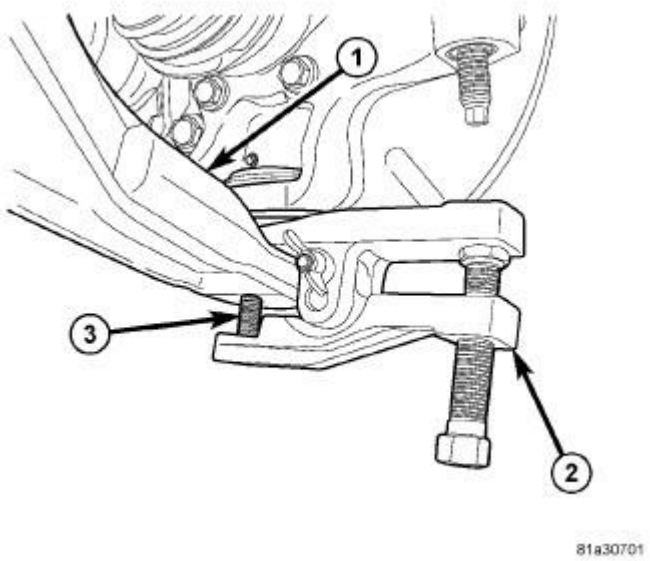

Fig. 21: Using 9360 On Lower Ball Joint
Courtesy of CHRYSLER LLC

8. Release the lower ball joint (5) from the lower control arm (1) using Remover (2) 9360. Do not lift the knuckle out of the lower control arm at this time.

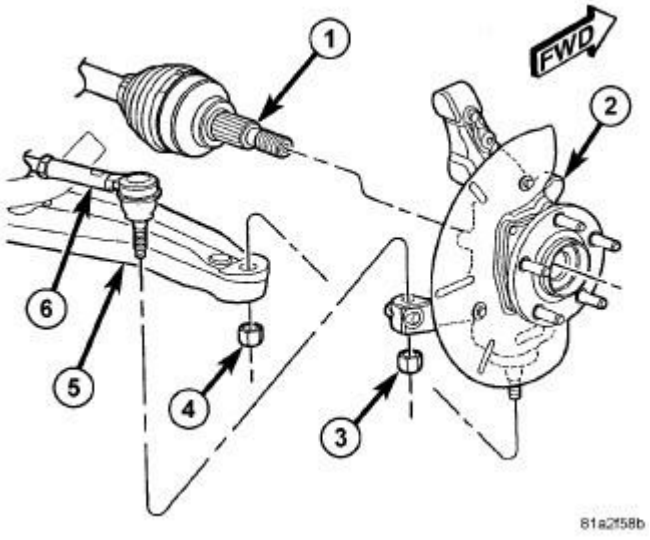

Fig. 22: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

9. Lift the knuckle (2) out of the lower control arm (5).

NOTE: Do not allow the half shaft (1) to hang by the inner C/V joint; it must be supported to keep the joint from separating during this operation.

10. Pull the knuckle (2) off the axle half shaft (1) outer C/V joint splines and support the half shaft.

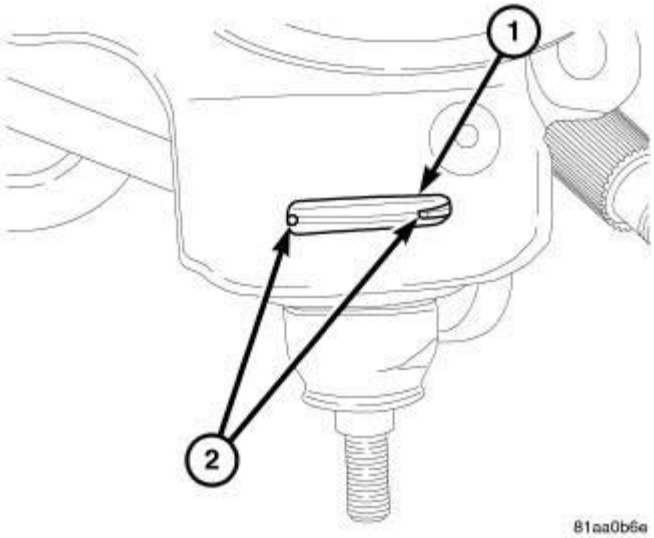

Fig. 23: Snap Ring
Courtesy of CHRYSLER LLC

11. Through the access hole (1) in the knuckle, tap the ends of the snap-ring (2) with a drift punch and remove it from the ball joint.

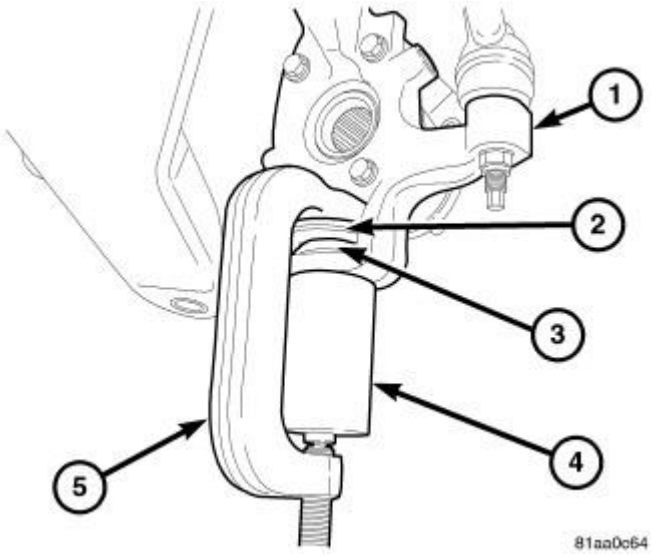

Fig. 24: Ball Joint Removal
Courtesy of CHRYSLER LLC

12. Install Remover (2) 9964-3, and Remover (4), Special Tool 9964-4 on Remover/Installer (5), Special Tool 8441-1. Place the tools over the ball joint (3) as shown in illustration, then hand tighten the screw-drive.
13. Using hand-tools, tighten the screw-drive forcing the ball joint (3) out of the knuckle (1).

14. Loosen the screw-drive and remove the tools and ball joint.

Installation

INSTALLATION

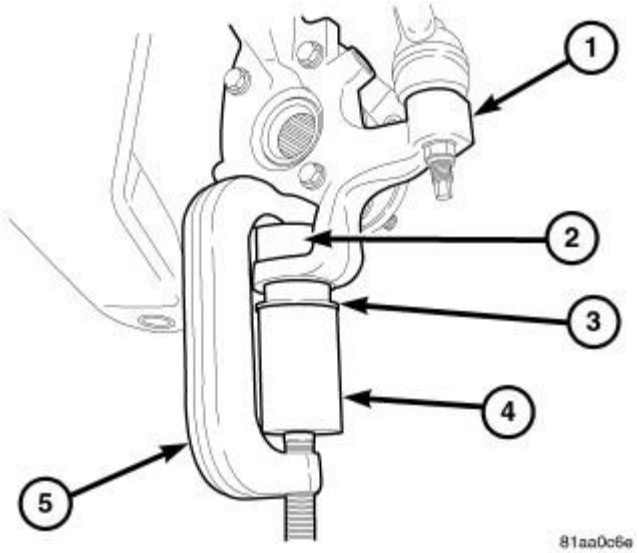

Fig. 25: Ball Joint Installation
Courtesy of CHRYSLER LLC

1. Install Installer (2), Special Tool 9964-1, and Installer (4), Special Tool 9964-2 on Remover/Installer (5), Special Tool 8441-1. Place a new ball joint (stem down) into Installer 9964-2.
2. Position the assembly onto the knuckle as shown in illustration, then hand tighten the screw-drive.
3. Using hand-tools, tighten the screw-drive forcing the ball joint (3) into the knuckle (1). Continue to install the ball joint until the flange on the ball joint comes to a stop against the bottom of the knuckle.
4. Loosen the screw-drive and remove the tools.
5. Install a NEW snap-ring into the groove in the ball joint using a drift punch.

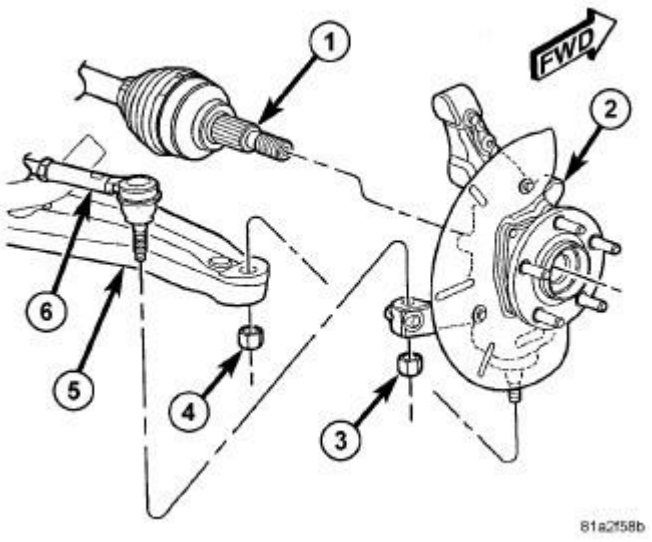

Fig. 26: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

6. Slide the hub and bearing in the knuckle (2) onto the splines of the half shaft outer C/V joint (1).
7. Insert the lower ball joint stud into the mounting hole in the lower control arm.
8. Install a NEW ball joint stud nut (4). Tighten the nut to 95 N.m (70 ft. lbs.).

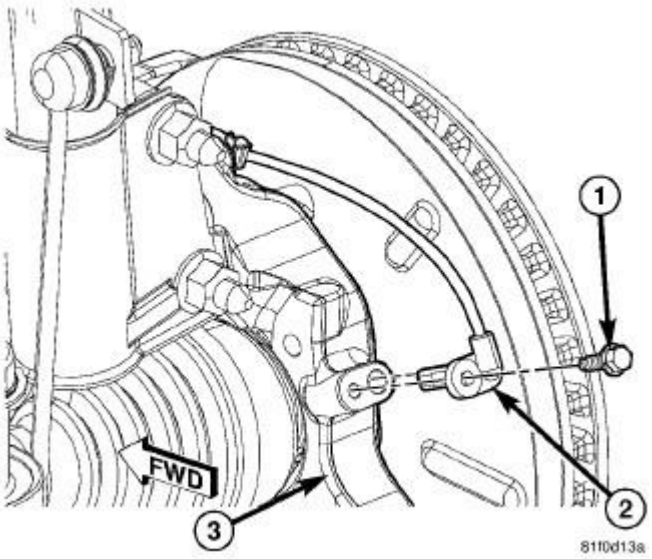

Fig. 27: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

9. Install the wheel speed sensor head (2) into the knuckle (3). Install the mounting screw (1) and tighten it to 12 N.m (106 in. lbs.).

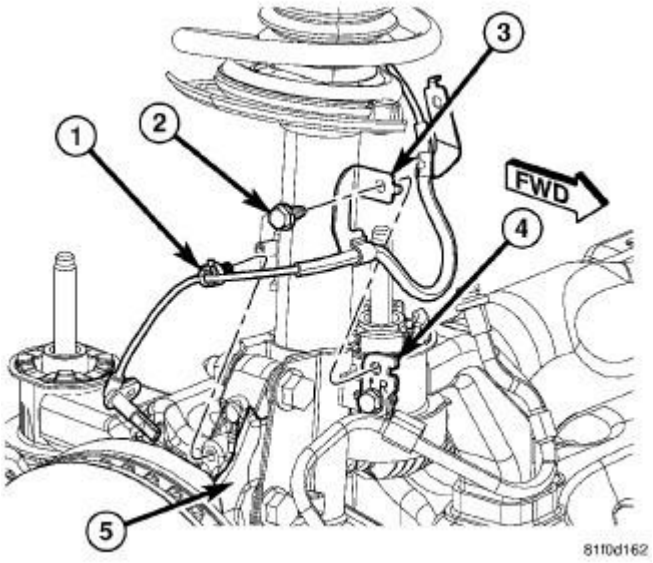

Fig. 28: Wheel Speed Sensor Routing & Brake Flex Hose Bracket
Courtesy of CHRYSLER LLC

10. Install the routing clip (1) securing the wheel speed sensor cable to the knuckle (5).
11. Install the brake rotor, disc brake caliper and adapter. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation**

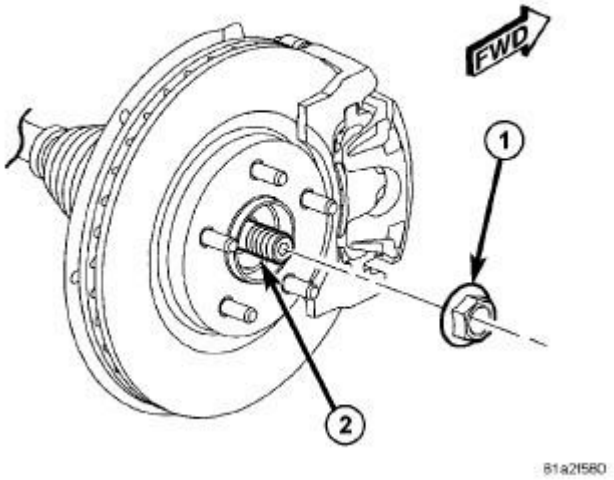

Fig. 29: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

12. Clean all foreign matter from the threads of the half shaft outer C/V joint.
13. Install the hub nut (1) on the end of the half shaft (2) and snug it.
14. While a helper applies the brakes to keep the hub from rotating, tighten the hub nut (3) to 132 N.m (97 ft. lbs.).

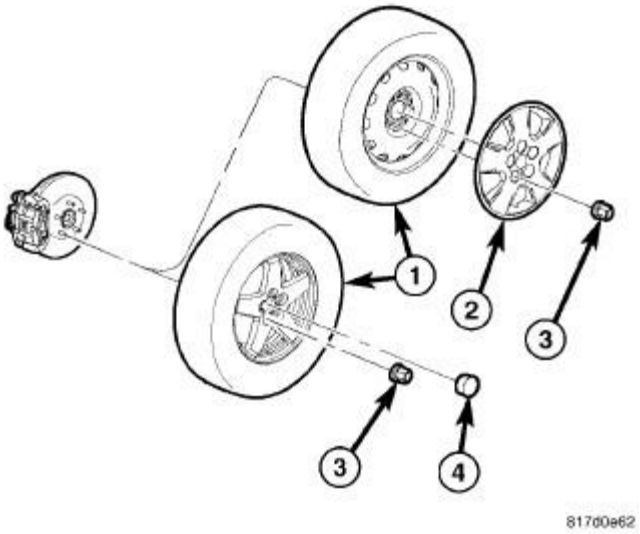

Fig. 30: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

15. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
16. Lower the vehicle.
17. Perform wheel alignment as necessary. See **Standard Procedure**

HUB AND BEARING

Description

DESCRIPTION

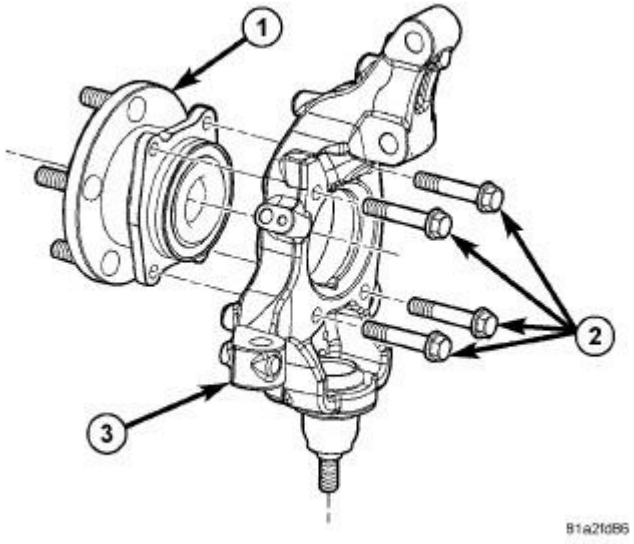

Fig. 31: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

The front wheel bearing and wheel hub of this vehicle are a one piece sealed unit or hub and bearing unit type assembly.

The hub and bearing (1) is mounted to the knuckle using four mounting bolts (2) and to the axle half shaft using a retaining nut. The center of the hub and bearing is splined to match the outer joint of the axle half shaft.

Each front hub and bearing has five wheel mounting studs on the hub flange for mounting the wheel to the vehicle. The wheel mounting studs are the only replaceable components of the hub and bearing. Otherwise, the hub and bearing is serviced as a complete assembly.

Diagnosis and Testing

HUB AND BEARING

NOTE: The wheel bearing is designed to last for the life of the vehicle and requires no type of periodic maintenance.

The following procedure may be used for diagnosing the condition of the hub and bearing.

1. Remove the wheel and tire assembly, disc brake caliper and brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**
2. Rotate the wheel hub checking for resistance or roughness.

Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions, the hub bearing will require replacement. **Do not attempt to disassemble the bearing for repair.** If the wheel bearing is disassembled for any reason, it must be replaced.

Damaged bearing seals and the resulting excessive grease loss may also require hub and bearing replacement. Moderate grease weeping from the bearing is considered normal and should not require replacement of the hub and bearing.

To diagnose a bent hub, measure hub runout. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Diagnosis and Testing**

Removal

REMOVAL

NOTE: Before proceeding, review all Warnings and Cautions. See WARNINGS AND CAUTIONS

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

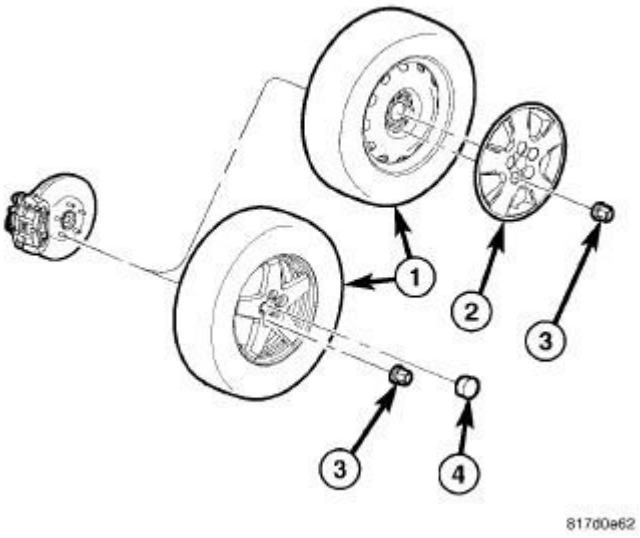

Fig. 32: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

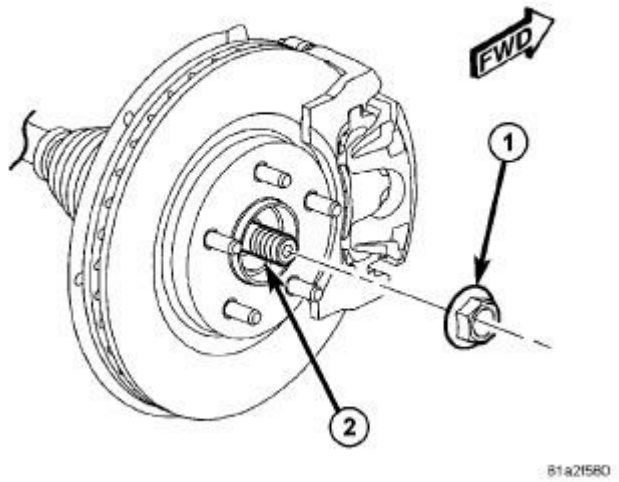

Fig. 33: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

3. While a helper applies the brakes to keep the hub from rotating, remove the hub nut (1) from the axle half shaft (2).
4. Access and remove the front brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**

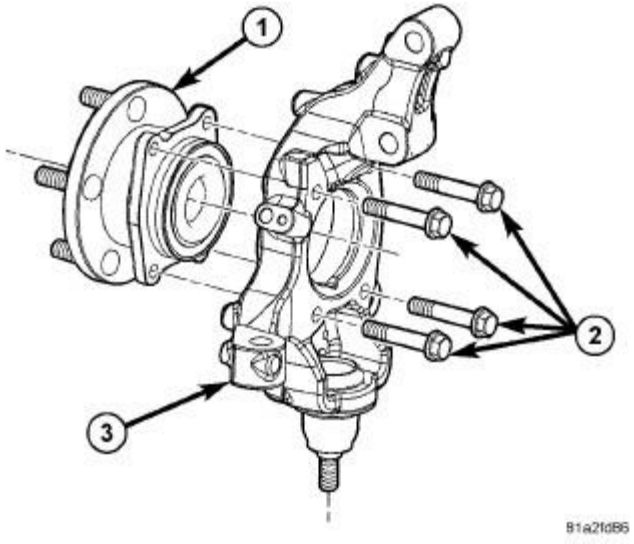

Fig. 34: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

5. Remove the four bolts (2) fastening the hub and bearing to the knuckle (3).
6. Slide the hub and bearing (1) off the half shaft and out of the knuckle.

Installation

INSTALLATION

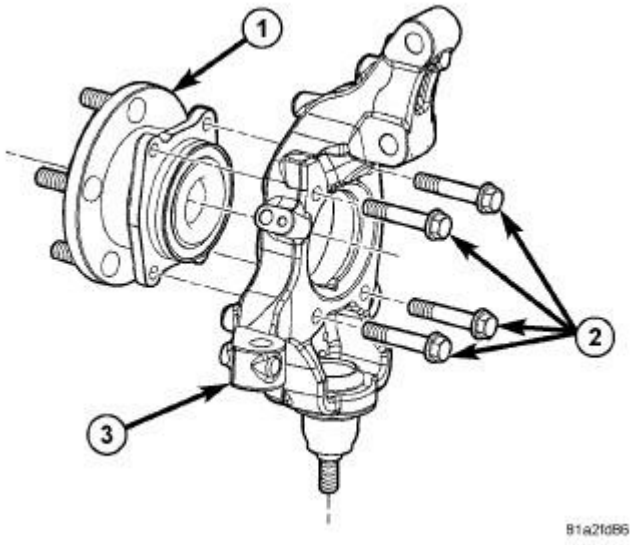

Fig. 35: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

1. Install the hub and bearing (1) by sliding it over the half shaft and into the knuckle.
2. Install the four bolts (2) fastening the hub and bearing (1) to the knuckle (3). Tighten the four bolts to 82 N.m (60 ft. lbs.).
3. Install the brake rotor, disc brake caliper and adapter. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation**

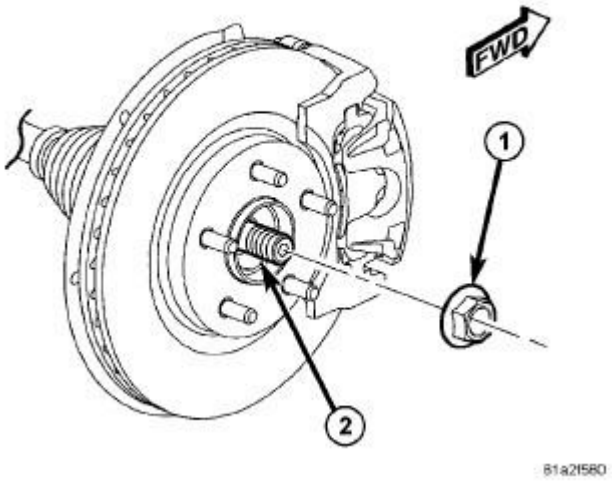

Fig. 36: View Of Hub Nut & Axle Shaft

Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

4. Clean all foreign matter from the threads of the half shaft outer C/V joint.
5. Install the hub nut (1) on the end of the half shaft (2) and lightly tighten it.
6. While a helper applies the brakes to keep the hub from rotating, tighten the hub nut (1) to 132 N.m (97 ft. lbs.).

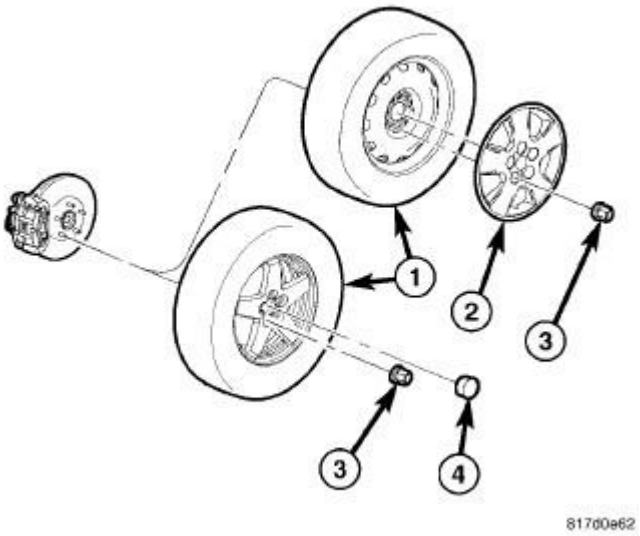

Fig. 37: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

7. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
8. Lower the vehicle.

KNUCKLE, STEERING

Description

DESCRIPTION

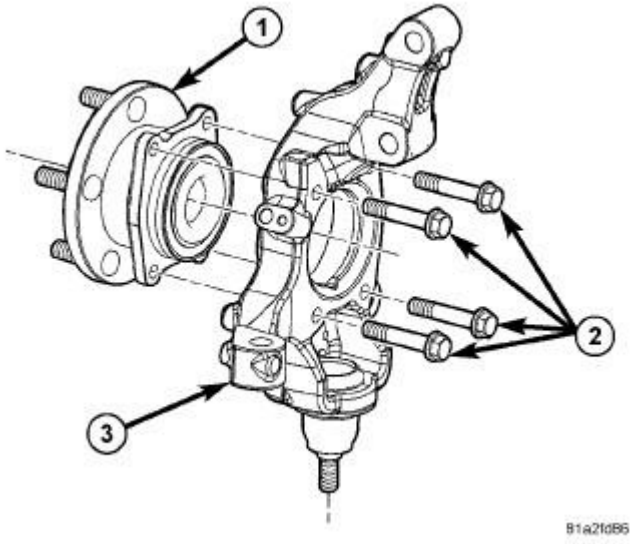

Fig. 38: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

The knuckle (3) is a single casting with legs machined for attachment to the front strut assembly on the top and steering linkage on the trailing end. A ball joint is located on the bottom of the knuckle which attaches to the lower control arm. The knuckle also has two machined, drilled legs on the leading end casting to support and align the front disc brake caliper adapter.

The knuckle supports the hub and bearing (1). A shield (not shown in illustration) is fastened to the knuckle.

Diagnosis and Testing

KNUCKLE

The front suspension knuckle is not a repairable component of the front suspension. It must be replaced if found to be damaged in any way. If it is determined that the knuckle is bent when servicing the vehicle, no attempt is to be made to straighten the knuckle.

Inspect the lower ball joint per the inspection procedure in this Service Information . The lower ball joint can be replaced separately from the knuckle.

Removal

REMOVAL

NOTE: Before proceeding, review all Warnings and Cautions. See WARNINGS AND CAUTIONS

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

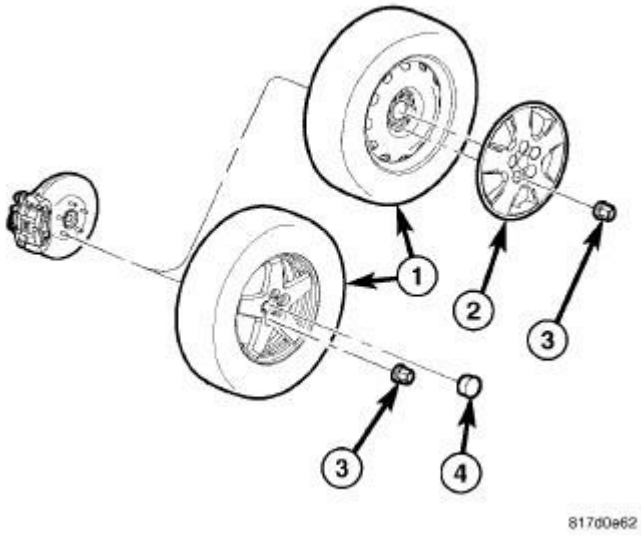

Fig. 39: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

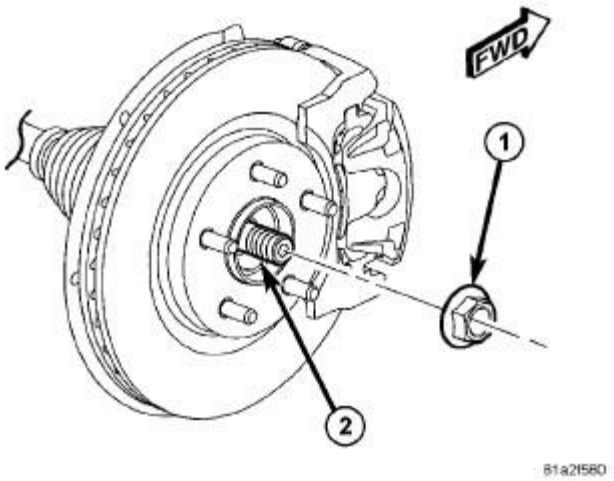

Fig. 40: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

3. While a helper applies the brakes to keep the hub from rotating, remove the hub nut (1) from the axle half shaft (2).
4. Access and remove the front brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal**

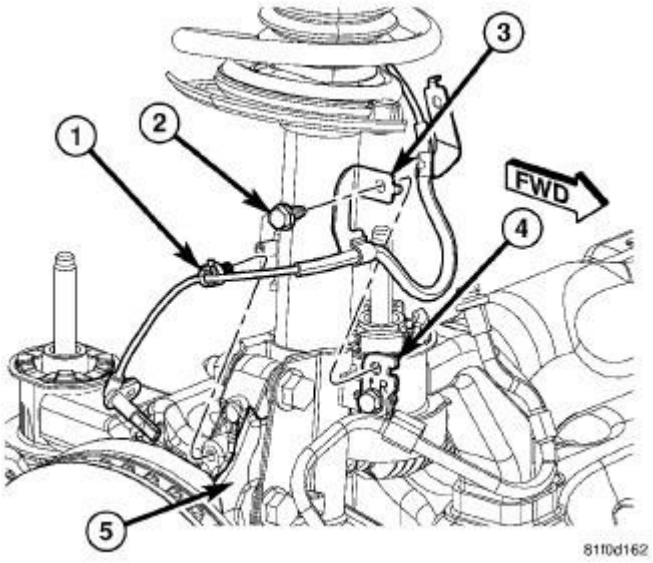

Fig. 41: Wheel Speed Sensor Routing & Brake Flex Hose Bracket
Courtesy of CHRYSLER LLC

5. Remove the routing clip (1) securing wheel speed sensor cable to the knuckle (5).

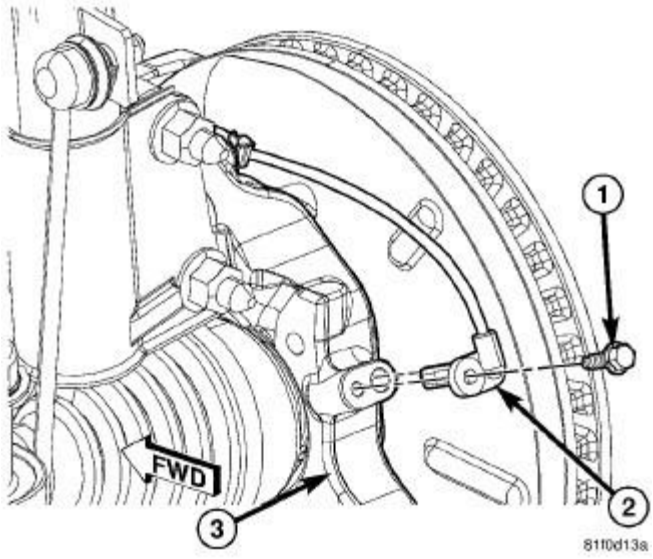

Fig. 42: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

6. Remove the screw (1) fastening the wheel speed sensor head (2) to the knuckle (3). Pull the sensor head out of the knuckle.

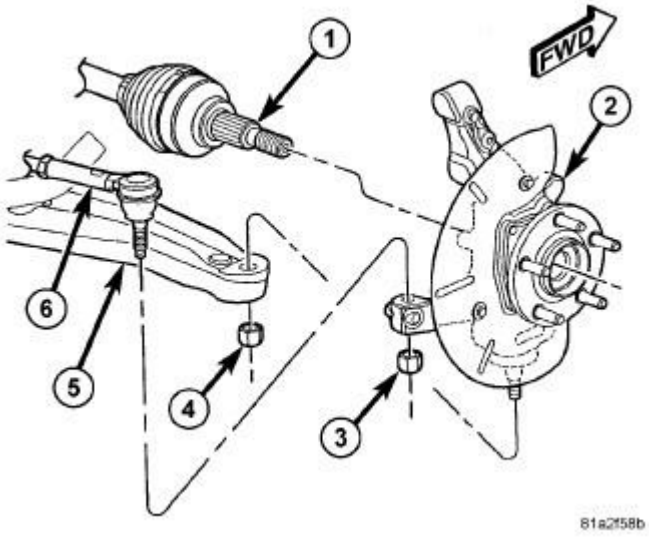

Fig. 43: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

7. Remove the nut (3) attaching the outer tie rod (6) to the knuckle (2). To do this it might be necessary to hold the tie rod end stud with a wrench while loosening and removing the nut with a standard wrench or crowfoot wrench.

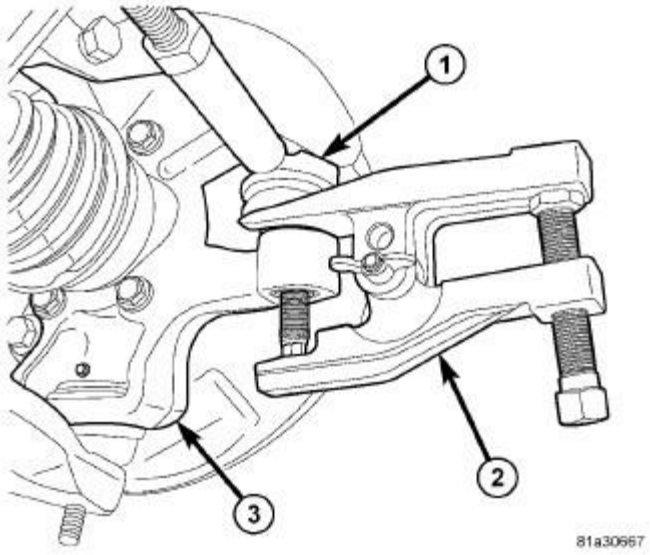

Fig. 44: Using 9360 On Tie Rod End
Courtesy of CHRYSLER LLC

8. Release the outer tie rod end (1) from the knuckle (3) using Remover (2), Special Tool 9360.
9. Remove the outer tie rod from the knuckle.

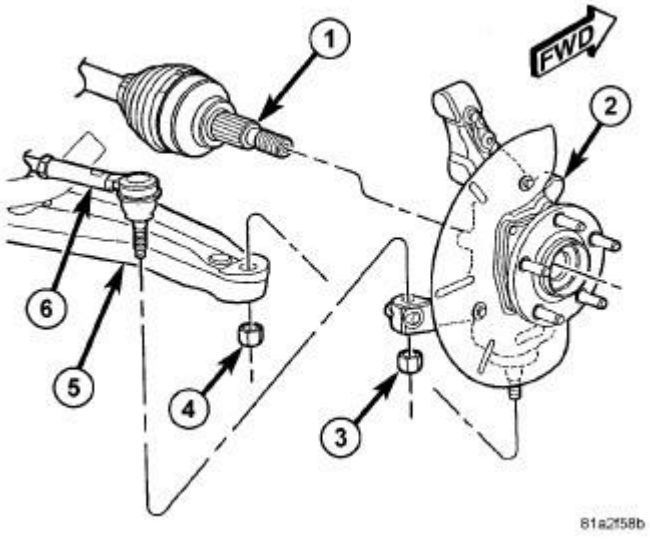

Fig. 45: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

10. Remove the nut (4) attaching the lower ball joint to the lower control arm (5).

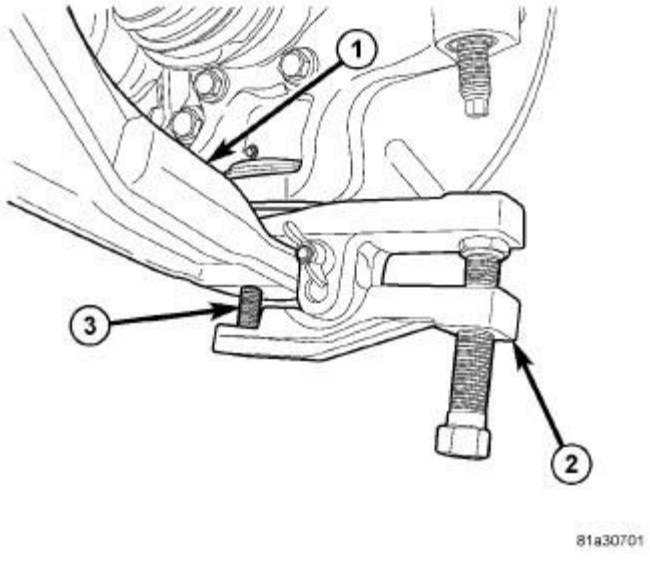

Fig. 46: Using 9360 On Lower Ball Joint
Courtesy of CHRYSLER LLC

11. Release the lower ball joint (3) from the lower control arm (1) using Remover (2), Special Tool 9360. Do not lift the knuckle out of the lower control arm at this time.

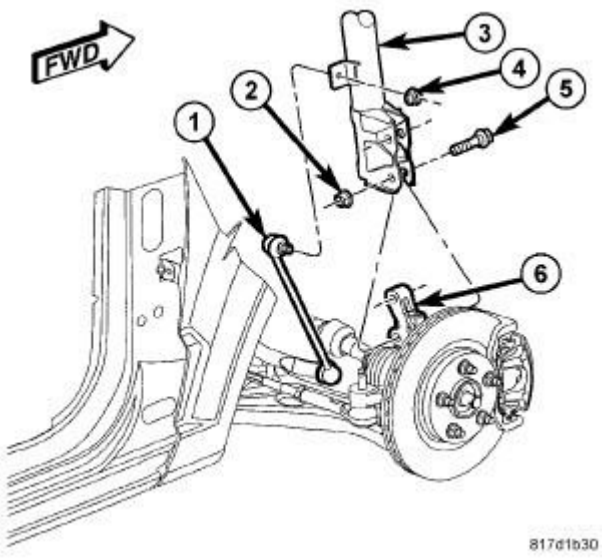

Fig. 47: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

CAUTION: The strut assembly-to-knuckle attaching bolts (5) are serrated and must not be turned during removal. Proper removal is required. Refer to the following steps for the correct method.

12. While holding the bolt heads stationary, remove the two nuts (2) from the bolts (5) attaching the strut (3) to the knuckle (6).
13. Remove the two bolts (5) attaching the strut (3) to the knuckle (6) using a pin punch.

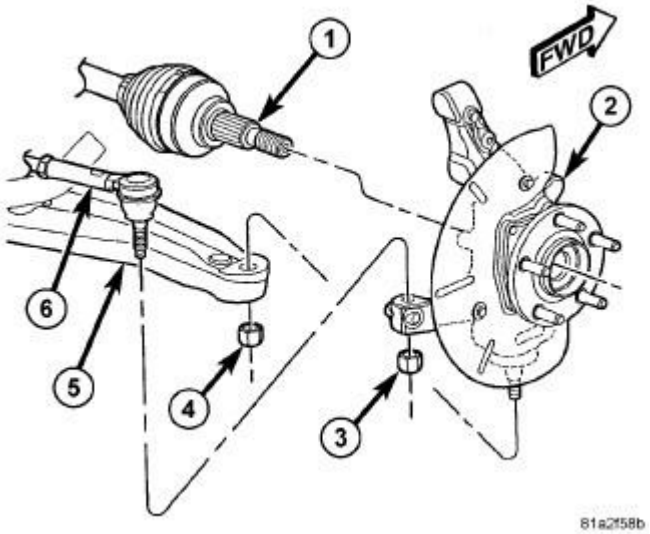

Fig. 48: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

NOTE: Do not allow the half shaft (1) to hang by the inner C/V joint; it must be supported to keep the joint from separating during this operation.

14. Pull the knuckle (2) off the half shaft (1) outer C/V joint splines and remove the knuckle from the vehicle.

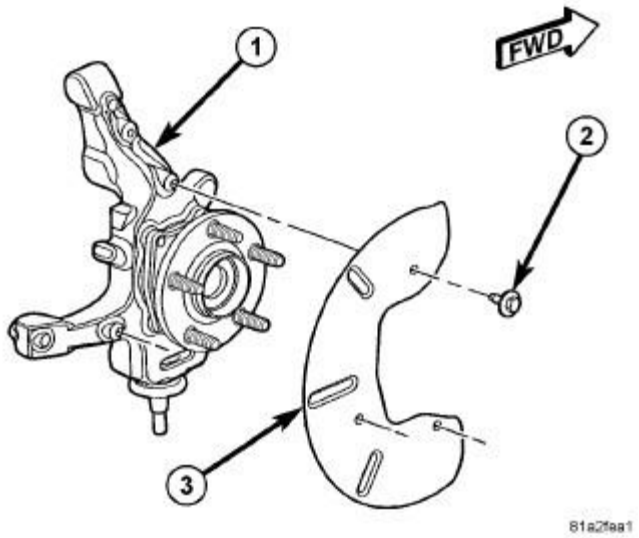

Fig. 49: Shield Mounting
Courtesy of CHRYSLER LLC

15. If required, remove the three screws (2) fastening the shield (3) to the knuckle (1). Remove the shield.

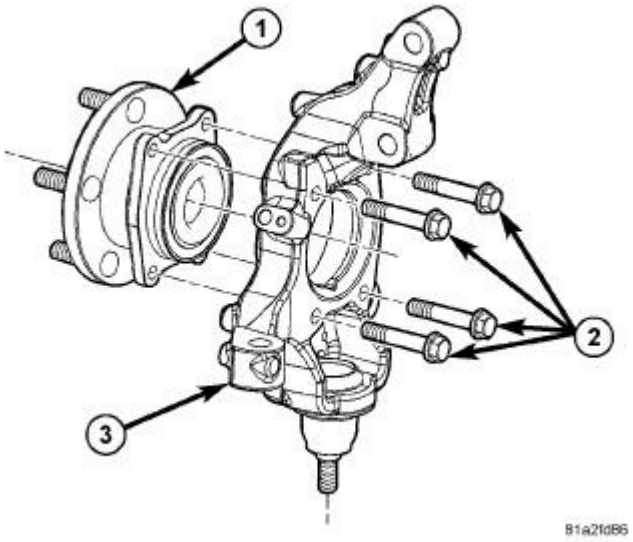

Fig. 50: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

16. If required, remove the four bolts (2) fastening the hub and bearing (1) to the knuckle (3).
17. If required, slide the hub and bearing (1) out of the knuckle.

Installation

INSTALLATION

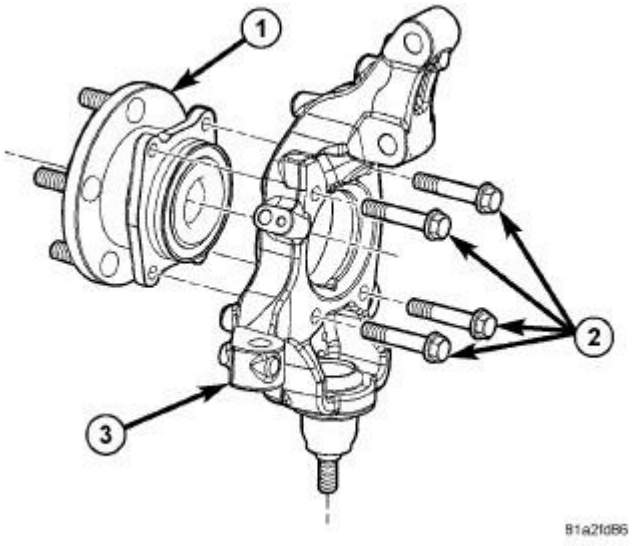

Fig. 51: Front Hub And Bearing Mounting
Courtesy of CHRYSLER LLC

1. If required, install the hub and bearing (1) by sliding it into the knuckle.
2. If installing hub and bearing, install the four bolts (2) fastening the hub and bearing (1) to the knuckle (3). Tighten the four bolts to 82 N.m (60 ft. lbs.).

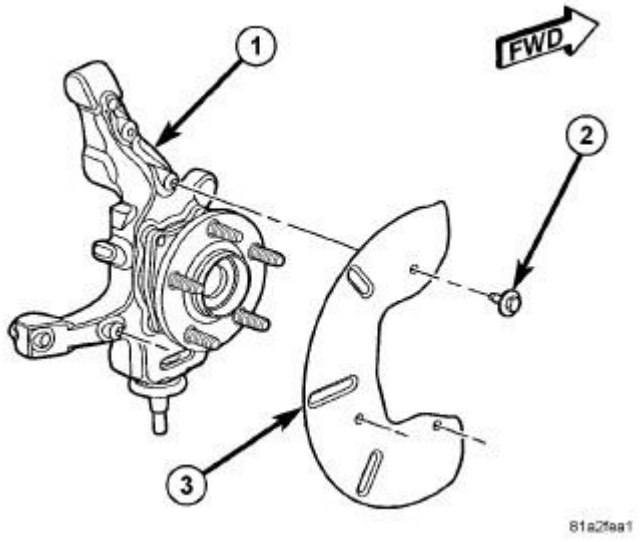

Fig. 52: Shield Mounting
Courtesy of CHRYSLER LLC

3. If required, install the shield on the knuckle. Install and tighten the three mounting screws (2) to 10 N.m (89 in. lbs.).

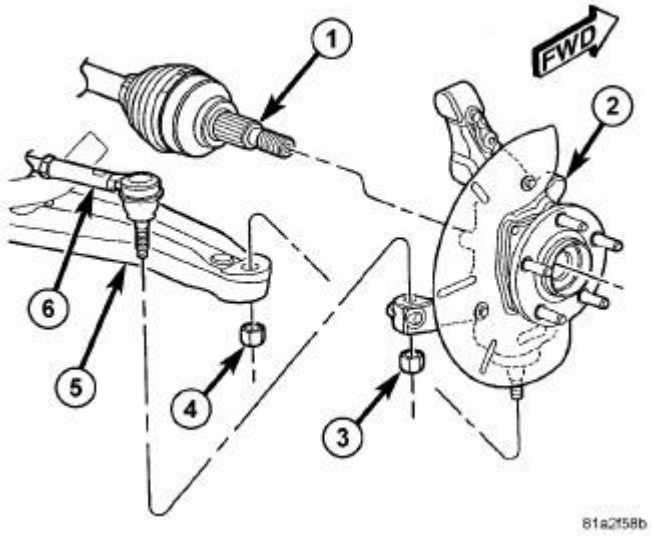

Fig. 53: Front Knuckle Mounting
Courtesy of CHRYSLER LLC

4. Slide the hub and bearing in the knuckle (2) onto the splines of the half shaft outer C/V joint (1).
5. Insert the lower ball joint stud into the mounting hole in the lower control arm.
6. Install a NEW ball joint stud nut (4). Tighten the nut to 95 N.m (70 ft. lbs.).

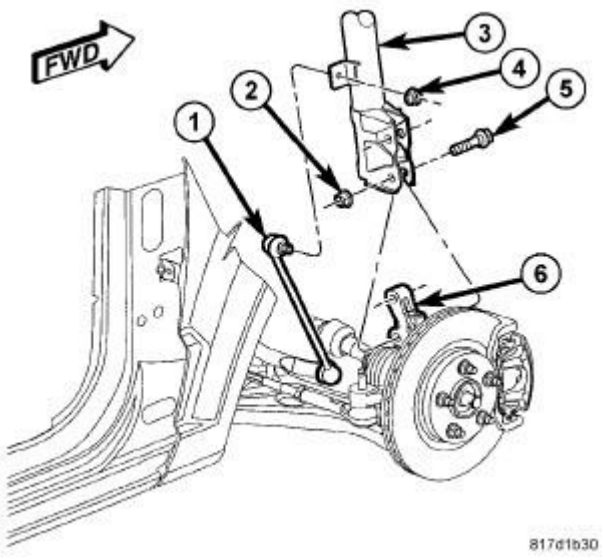

Fig. 54: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

CAUTION: The strut clevis-to-knuckle bolts (5) are serrated and must not be turned during installation. Install the nuts while holding the bolts stationary in the steering knuckle. Refer to the following step.

7. Position the lower end of the strut assembly (3) in line with the upper end of the knuckle (6), aligning the mounting holes. Install the two mounting bolts (5).
8. Install the nuts (2) on the two bolts (5). While holding the bolts in place, tighten the nuts to 140 N.m (103 ft. lbs.).

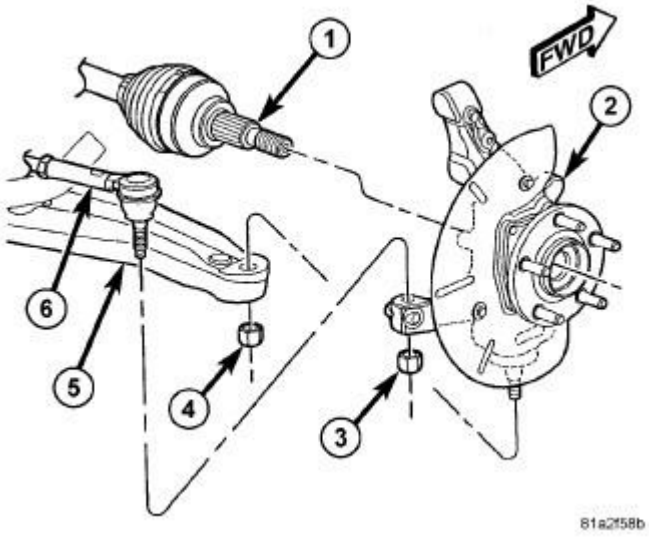

Fig. 55: Front Knuckle Mounting

Courtesy of CHRYSLER LLC

9. Install the outer tie rod (6) ball stud into the hole in the knuckle (2) arm. Start the tie rod end-to-knuckle nut (4) onto the stud. While holding the tie rod end stud with a wrench, tighten the nut with a wrench or crowfoot wrench to 85 N.m (63 ft. lbs.).

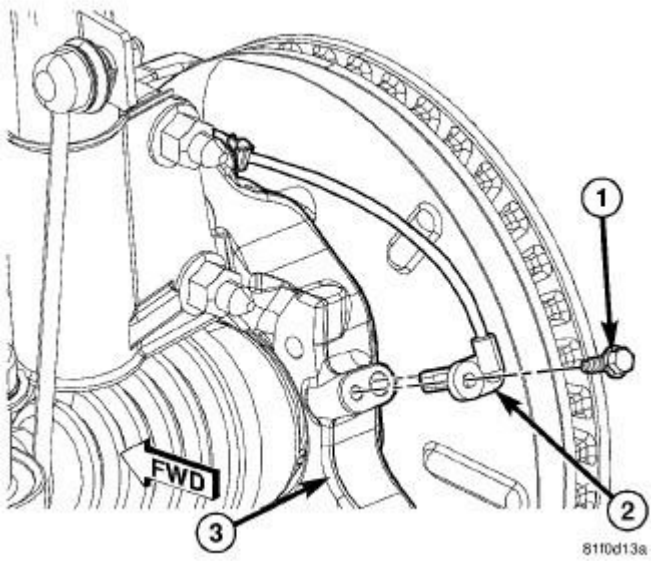

Fig. 56: Front Wheel Speed Sensor
Courtesy of CHRYSLER LLC

10. Install the wheel speed sensor head (2) into the knuckle (3). Install the mounting screw (1) and tighten it to 12 N.m (106 in. lbs.).

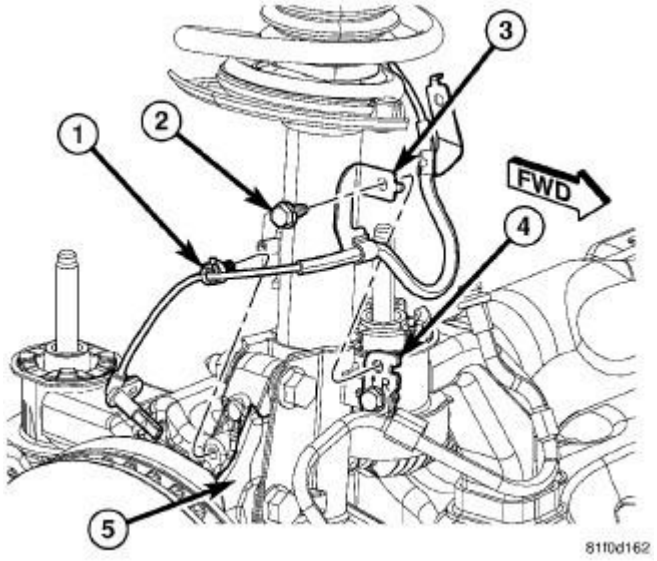

Fig. 57: Wheel Speed Sensor Routing & Brake Flex Hose Bracket

Courtesy of CHRYSLER LLC

11. Install the routing clip (1) securing the wheel speed sensor cable to the knuckle (5).
12. Install the brake rotor, disc brake caliper and adapter. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation**

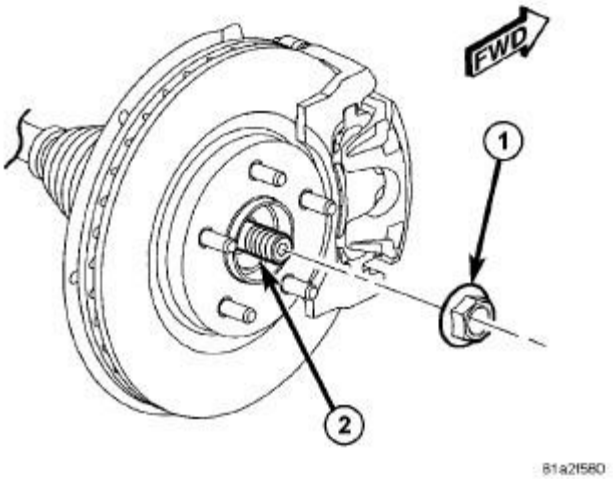

Fig. 58: View Of Hub Nut & Axle Shaft
Courtesy of CHRYSLER LLC

NOTE: Always install a new hub nut. The original hub nut is one-time use only and should be discarded when removed.

13. Clean all foreign matter from the threads of the half shaft outer C/V joint.
14. Install the hub nut (1) on the end of the half shaft (2) and snug it.
15. While a helper applies the brakes to keep the hub from rotating, tighten the hub nut (3) to 132 N.m (97 ft. lbs.).

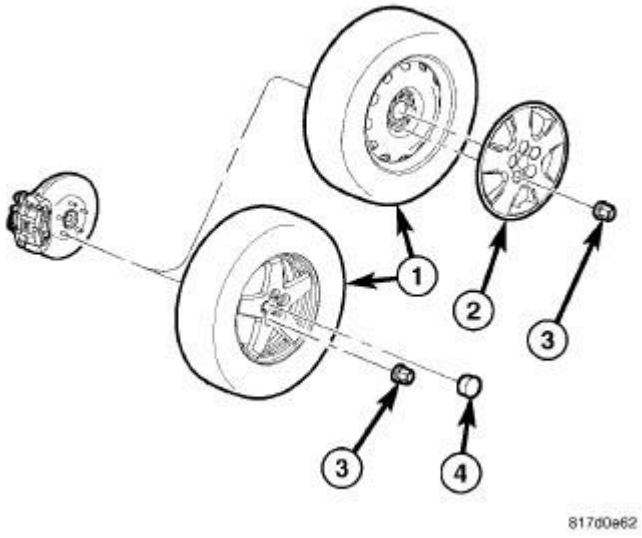

Fig. 59: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

16. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
17. Lower the vehicle.
18. Perform wheel alignment as necessary. See **Standard Procedure**

LINK, STABILIZER BAR

Removal

REMOVAL

NOTE: Before proceeding. See WARNINGS AND CAUTIONS .

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

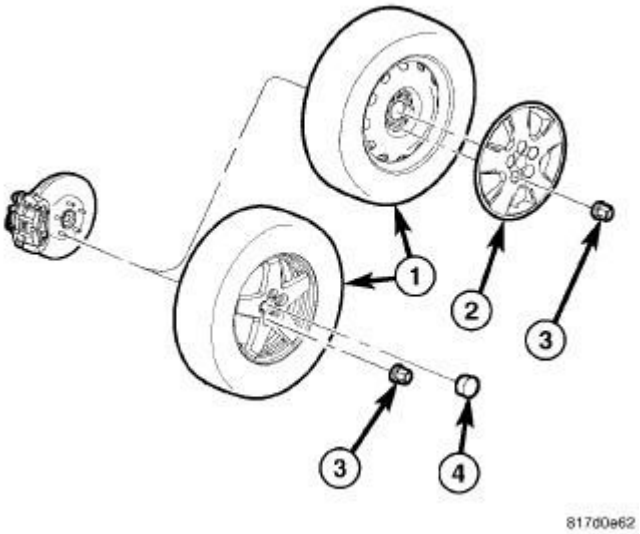

Fig. 60: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

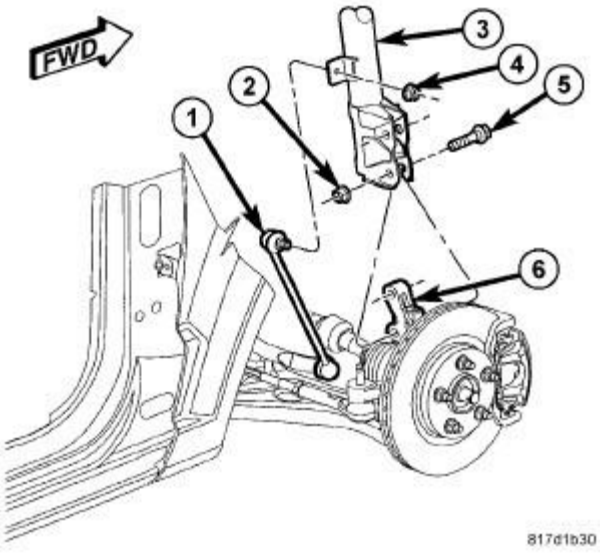

Fig. 61: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

3. While holding the stabilizer bar link (1) stud stationary, remove the nut (4) securing the link to the strut (3).

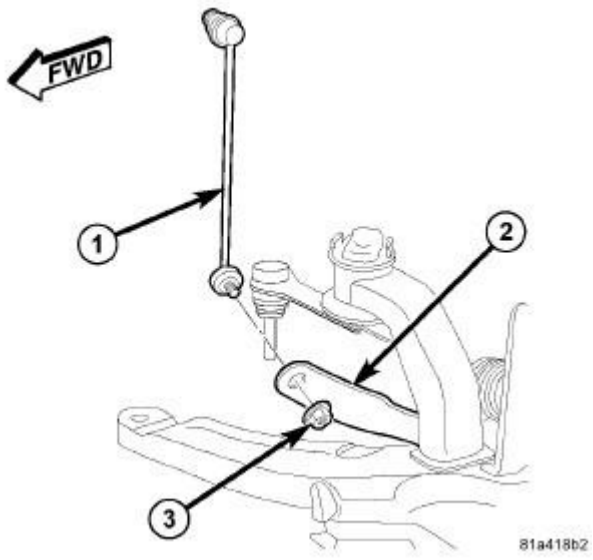

Fig. 62: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

4. While holding the stabilizer bar link (1) lower stud stationary, remove the nut (3) securing the link to the stabilizer bar (2).
5. Remove the stabilizer bar link (1).

Installation

INSTALLATION

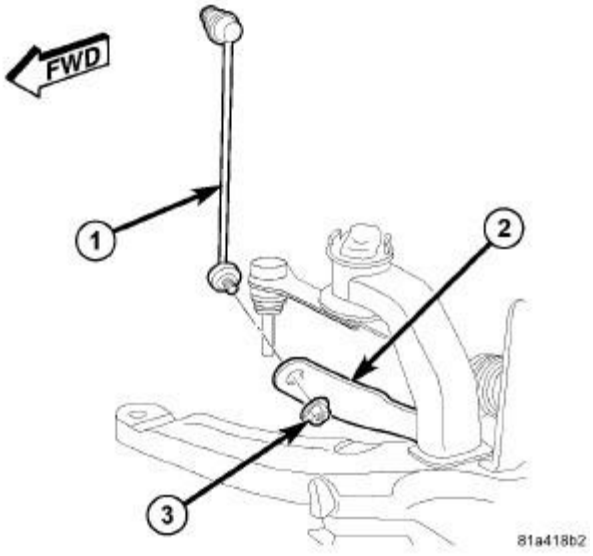

Fig. 63: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

1. Attach the stabilizer bar link (1) to the stabilizer bar (2). Install and tighten the nut (3) while holding the stabilizer bar link lower stud stationary. Tighten the nut to 48 N.m (35 ft. lbs.).

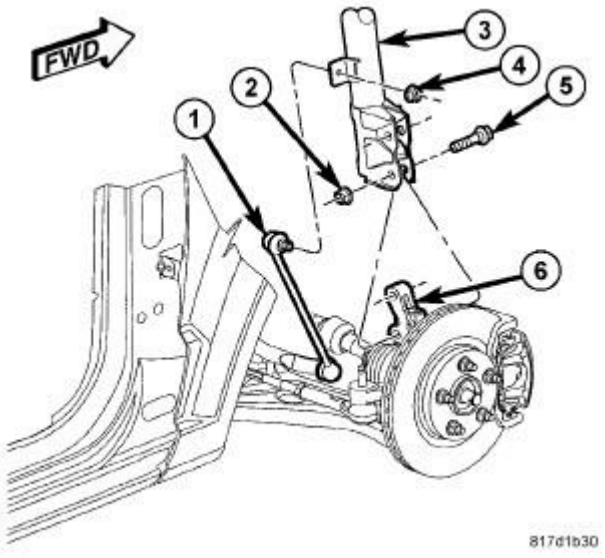

Fig. 64: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

2. Attach the stabilizer bar link (1) to the strut (3). Install and tighten the nut (4) while holding the stabilizer bar link stud stationary. Tighten the nut to 48 N.m (35 ft. lbs.).

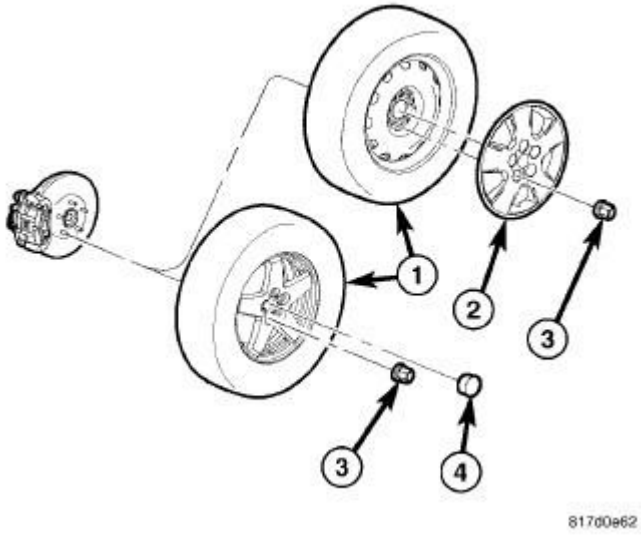

Fig. 65: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

3. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel

mounting nuts (3) to 135 N.m (100 ft. lbs.).

4. Lower the vehicle.

STABILIZER BAR, FRONT

Removal

REMOVAL

NOTE: Before proceeding. See WARNINGS AND CAUTIONS .

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**
2. If equipped, remove the engine belly pan.
3. Remove the rear engine mount. Refer to ENGINE MOUNTING in appropriate Engine article.
4. Remove the front engine mount through-bolt.

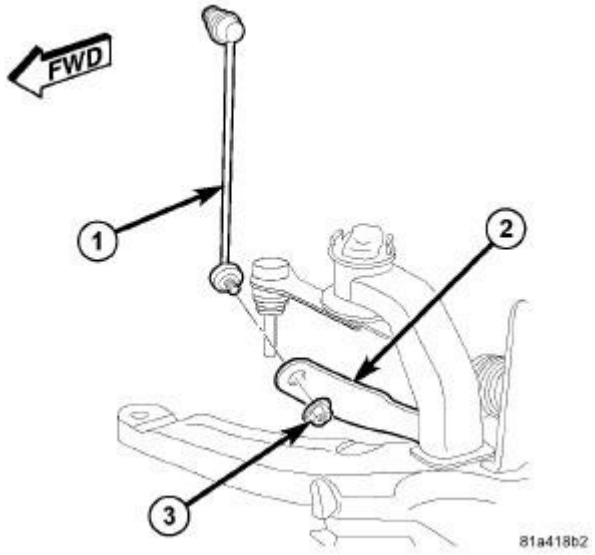

Fig. 66: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

5. At each end of the stabilizer bar, while holding the stabilizer bar link (1) lower stud stationary, remove the nut (3) securing the link to the stabilizer bar (2).

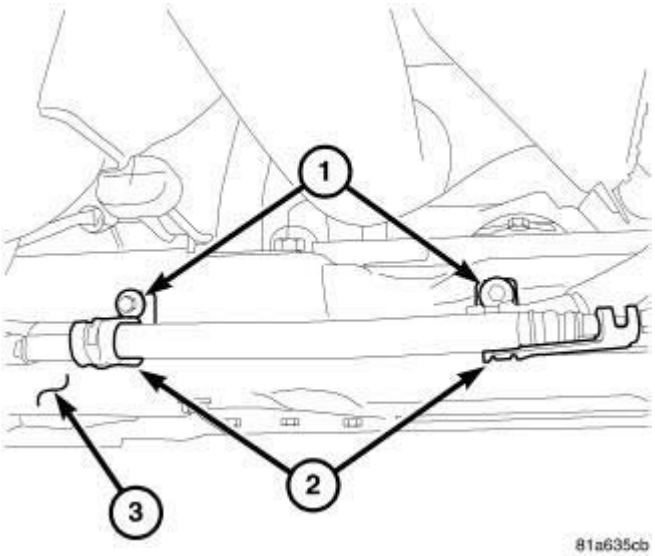

Fig. 67: Hoses At Rear Of Crossmember
Courtesy of CHRYSLER LLC

6. Remove the screws (1) securing the power steering hose routing clamps (2) to the rear of the crossmember.

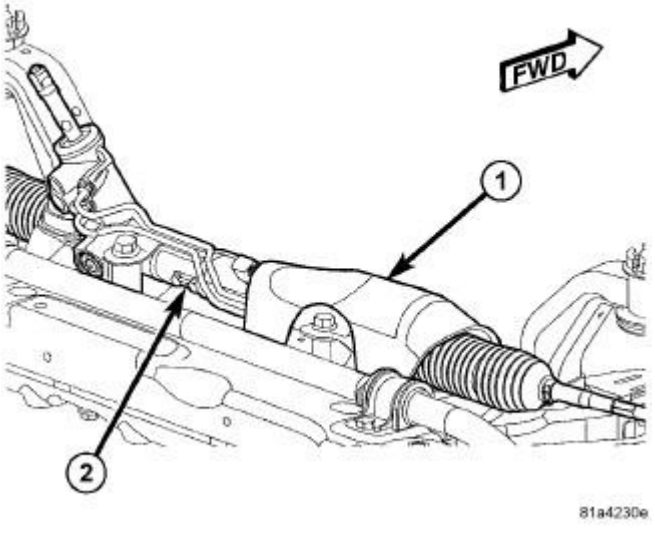

Fig. 68: Heat Shield
Courtesy of CHRYSLER LLC

7. Remove the screws and push-pins securing the heat shield (1) over the right side of the steering gear (2).

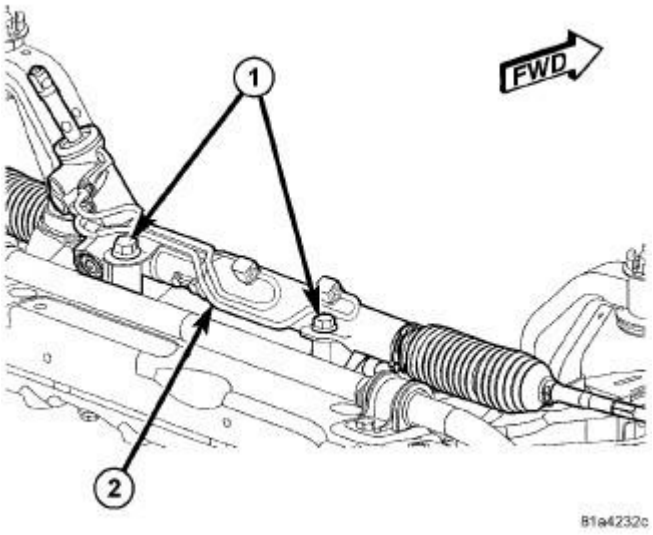

Fig. 69: Identifying Steering Gear Mounting
Courtesy of CHRYSLER LLC

8. Remove the two bolts (1) securing the steering gear (2) to the crossmember.
9. Support the steering gear using a bungee cord or other to keep the steering gear from lowering when the crossmember is lowered.

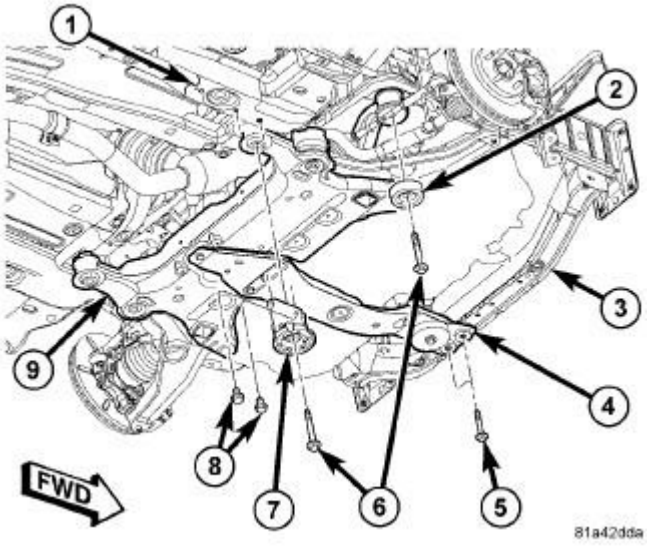

Fig. 70: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

NOTE: Before removing the front suspension crossmember from the vehicle, the location of the crossmember must be marked on the body of the vehicle. Do this so the crossmember can be relocated, upon reinstallation, against

the body of vehicle in the same location as before removal. If the front suspension crossmember is not reinstalled in exactly the same location as before removal, the preset front wheel alignment settings (caster and camber) may be lost.

10. Mark the location of the front crossmember (9) on the body near each mounting bolt.
11. Support the crossmember (9) with a transmission jack.
12. Remove the four mounting bolts (6) securing the front crossmember (9) to the body.
13. Remove the mounting screws (8) securing the front crossmember reinforcement brackets (7) (one each side of vehicle) to the body (1). Remove the brackets.
14. Slowly lower the crossmember using the jack until there is enough space present to remove the stabilizer bar between the rear of the crossmember and the body. Due to the fact that the fore-and-aft crossmember is still attached, do not lower crossmember any more than necessary to remove the stabilizer bar.

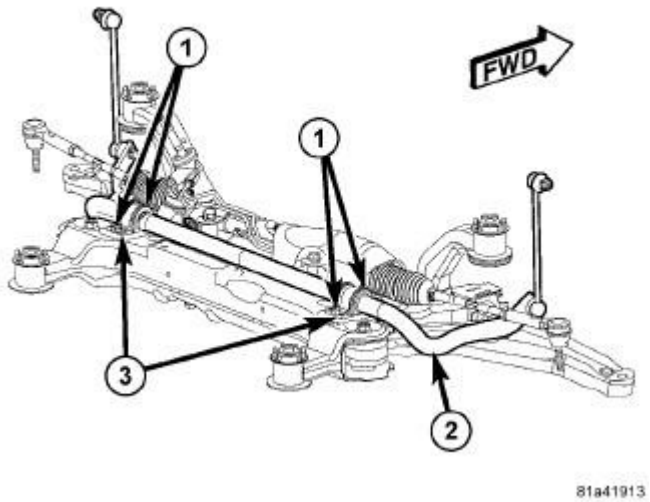

Fig. 71: Stabilizer Bar Mounting
Courtesy of CHRYSLER LLC

15. Remove the screws (1) securing the stabilizer bushing retainers (3) to the crossmember.
16. Remove the two stabilizer bushing retainers (3).
17. Utilizing the slit cut into the cushions (bushings), remove the two cushions from the stabilizer bar.
18. Remove the stabilizer bar (2) from the vehicle.

Installation

INSTALLATION

NOTE: Before stabilizer bar installation, inspect the cushions and links for excessive wear, cracks, damage and distortion. Replace any pieces failing inspection.

NOTE: Before installing the stabilizer bar, make sure the bar is not upside-down. The stabilizer bar must be installed so that when in mounted position, the ends of the bar curve under the steering gear tie rods, up to the links.

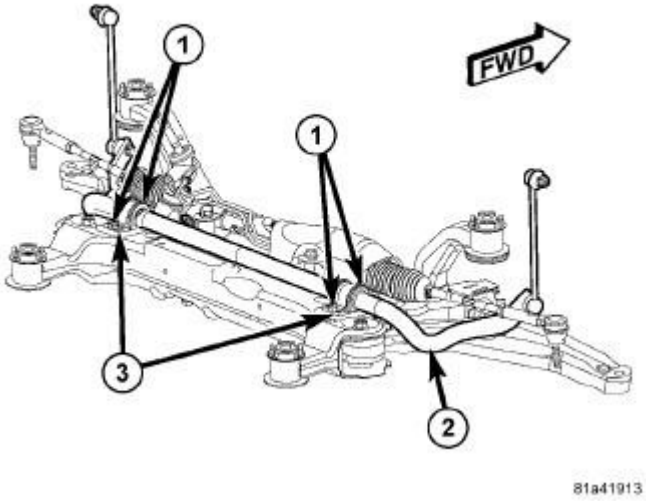

Fig. 72: Stabilizer Bar Mounting
Courtesy of CHRYSLER LLC

1. Install the stabilizer bar, link ends first, from the rear over top of the crossmember. Curve the ends of the bar (2) under the steering gear.
2. Install the two cushions (bushings) on the stabilizer bar utilizing the slit cut into the cushion sides.
3. Install the two stabilizer bushing retainers (3) over the cushions.
4. Install the screws (1) securing the stabilizer bushing retainers (3) to the crossmember. Tighten all four stabilizer bar cushion retainer screws to 60 N.m (44 ft. lbs.).

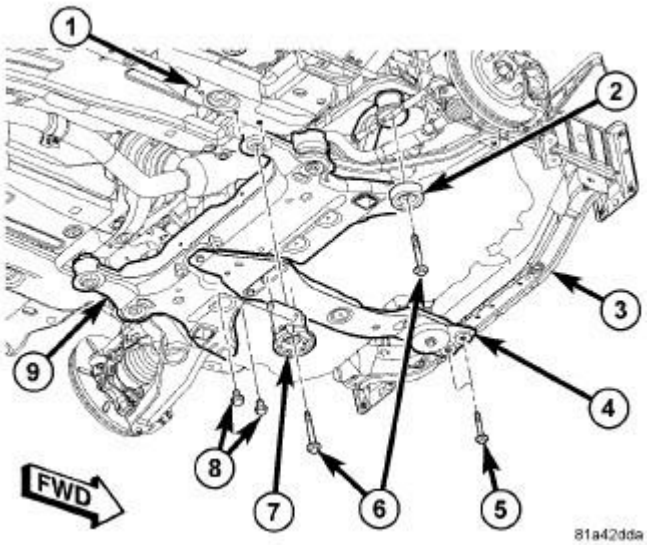

Fig. 73: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

5. Slowly raise the crossmember (9) into mounted position using the transmission jack matching the crossmember to the marked locations on the body made during removal.
6. Position the front crossmember reinforcement brackets (7) (one each side of vehicle) over the crossmember rear mounting bushings and install the mounting screws (8), but do not tighten at this time.

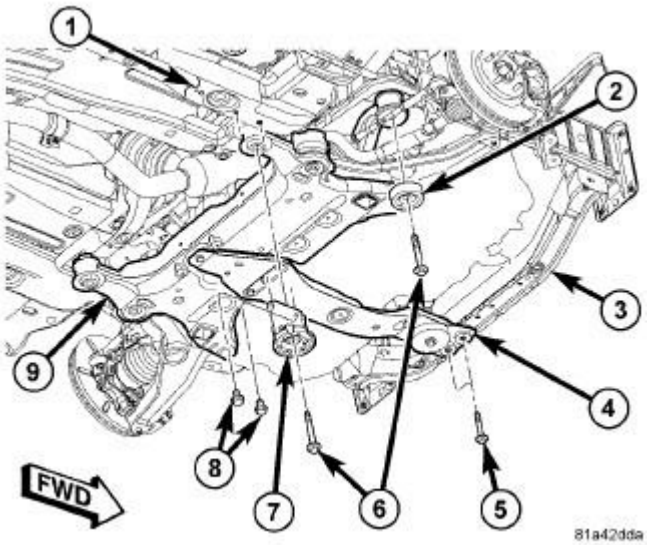

Fig. 74: Front Crossmember Mounting
Courtesy of CHRYSLER LLC

7. Install the four mounting bolts (6) securing the front crossmember (1) to the body. Tighten the crossmember mounting bolts to 135 N.m (100 ft. lbs.).

8. Tighten the crossmember reinforcement bracket mounting screws (8) to 50 N.m (37 ft. lbs.).
9. Remove the transmission jack.

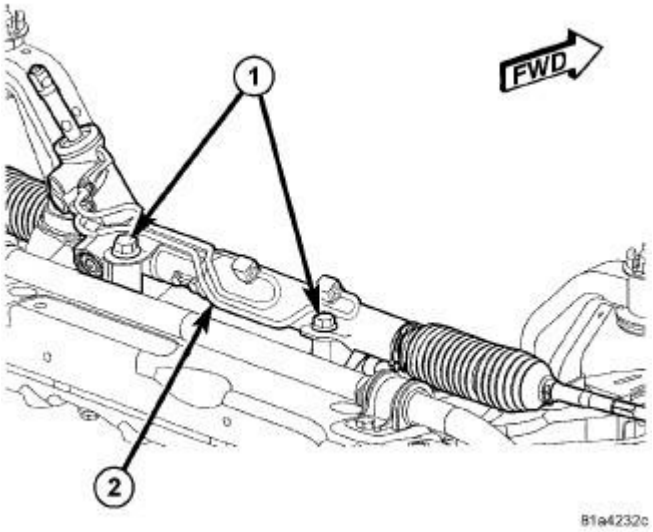

Fig. 75: Identifying Steering Gear Mounting
Courtesy of CHRYSLER LLC

10. Remove the bungee cord or other supporting the steering gear (2).
11. Install the two bolts (1) securing the steering gear (2) to the crossmember. Tighten the steering gear mounting bolts to 100 N.m (74 ft. lbs.).

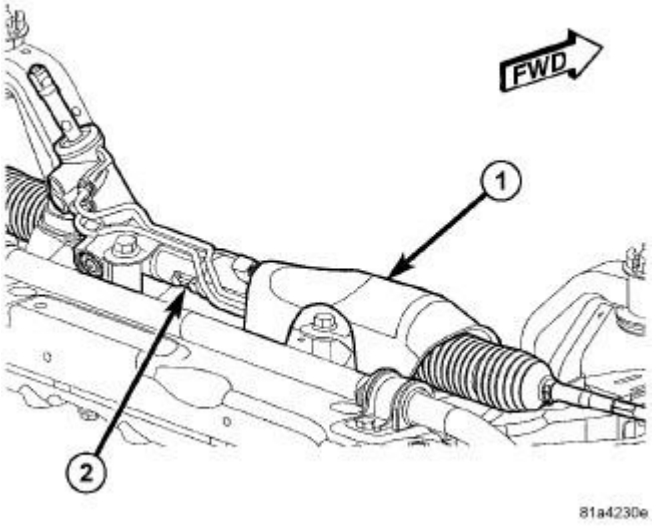

Fig. 76: Heat Shield
Courtesy of CHRYSLER LLC

12. Position the heat shield (1) over the steering gear (2). Install the mounting screws and push-pins. Tighten the screws to 6 N.m (53 in. lbs.).

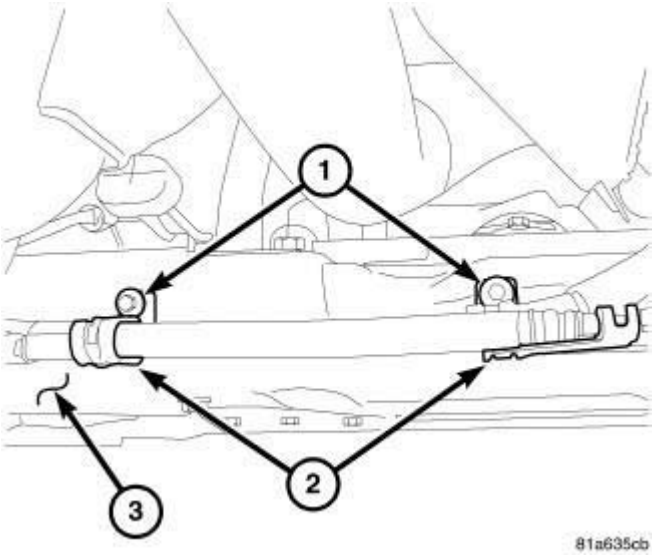

Fig. 77: Hoses At Rear Of Crossmember
Courtesy of CHRYSLER LLC

13. Position the power steering hose routing clamps (2) on the crossmember. Install and tighten the screws to 8 N.m (71 in. lbs.).

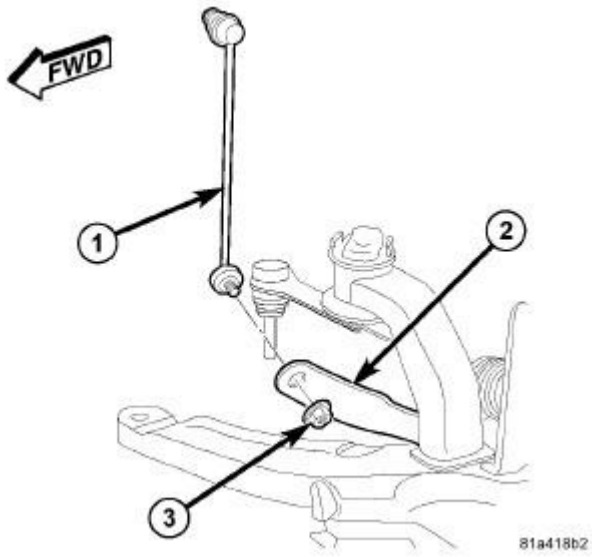

Fig. 78: Stabilizer Link Mounting To Bar
Courtesy of CHRYSLER LLC

14. Attach the stabilizer bar link (1) at each end of the stabilizer bar (2). At each link, install and tighten the nut (3) while holding the stabilizer bar link lower stud stationary. Tighten the nuts to 48 N.m (35 ft. lbs.).

15. Install the rear engine mount. Refer to ENGINE MOUNTING in appropriate Engine article.
16. Install the front engine mount through-bolt.
17. If equipped, install the engine belly pan.
18. Lower the vehicle.

STRUT, SUSPENSION, ASSEMBLY

Description

DESCRIPTION

A Macpherson type design strut assembly is used in place of the traditional front suspension upper control arm and upper ball joint. The bottom of the strut mounts directly to the steering knuckle using two attaching bolts and nuts going through the strut clevis bracket and knuckle. The top of the strut mounts directly to the strut tower of the vehicle using the three threaded studs on the strut assembly's upper mount.

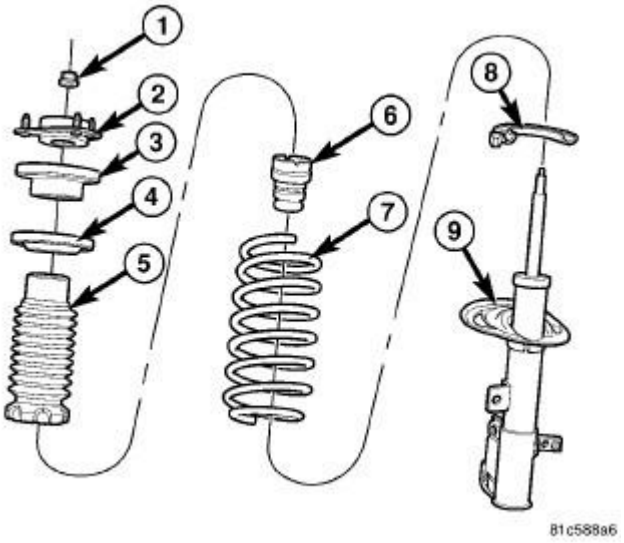

Fig. 79: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

The strut assembly includes the following components:

- Upper mount (2)
- Bearing and upper spring seat (3)
- Upper spring isolator (4)
- Dust shield (5)
- Jounce bumper (6)
- Coil spring (7)
- Lower spring isolator (8)

- Strut (damper) (9)

Each component is serviced by removing the strut assembly from the vehicle and disassembling it.

Coil springs are rated separately for each corner or side of the vehicle depending on optional equipment and type of vehicle service. If a coil spring requires replacement, be sure that it is replaced with a spring meeting the correct load rating for the vehicle and its specific options.

Operation

OPERATION

The strut assembly cushions the ride of the vehicle, controlling vibration, jounce and rebound of the suspension.

The coil spring controls ride quality and maintains proper ride height.

The spring isolators isolate the coil spring at the top and bottom from coming into metal-to-metal contact with the upper mounting seat and the strut.

The jounce bumper limits suspension travel and metal-to-metal contact under full jounce condition.

The strut dampens jounce and rebound motions of the coil spring and suspension.

Diagnosis and Testing

STRUT ASSEMBLY

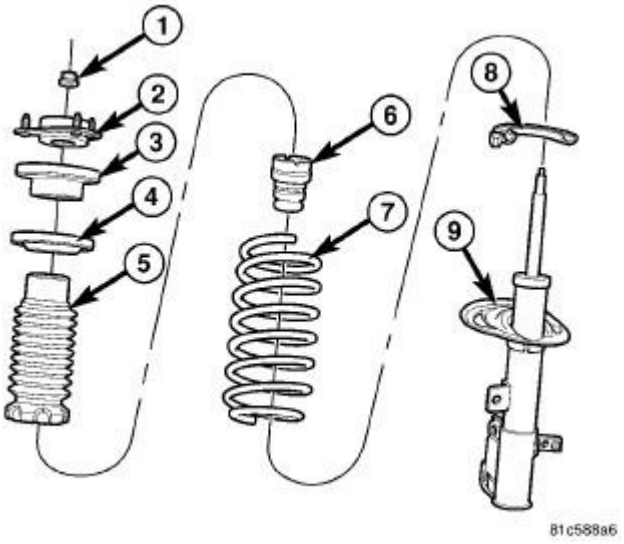

Fig. 80: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

Inspect the strut assembly for the following conditions:

- Inspect for a damaged or broken coil spring (7).
- Inspect for a torn or damaged dust shield (5).
- Inspect for torn or deteriorated spring isolators (4, 8).
- Lift the dust shield and inspect the strut assembly for evidence of fluid running from the upper end of the strut fluid reservoir. (Actual leakage will be a stream of fluid running down the side and dripping off lower end of unit). A slight amount of seepage between the strut shaft and strut shaft seal is not unusual and does not affect performance of the strut assembly.
- Inspect the jounce bumper (6) for signs of damage or deterioration.
- Inspect the clearance between the shock tower and the coil spring. Make sure no fasteners are protruding through the shock tower possibly contacting the coil spring and strut. Because of the minimum clearance in this area, installation of metal fasteners could damage the coil spring coating and lead to a corrosion failure of the spring.

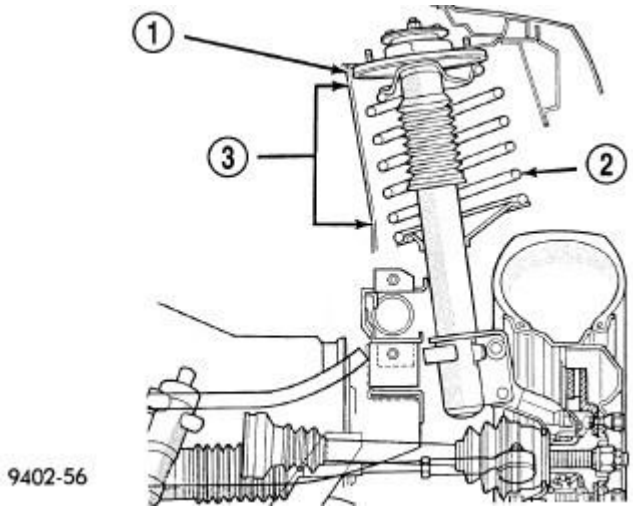

Fig. 81: Shock Tower Area (Typical)
Courtesy of CHRYSLER LLC

CAUTION: At no time when servicing a vehicle can a sheet metal screw, bolt or other metal fastener be installed into the strut tower (1) to take the place of an original plastic clip. Also, do not drill holes into the front strut tower for the installation of any metal fasteners into the shock tower area indicated (3).

Removal

REMOVAL

NOTE: Before proceeding. See WARNINGS AND CAUTIONS .

1. Remove the engine appearance cover.

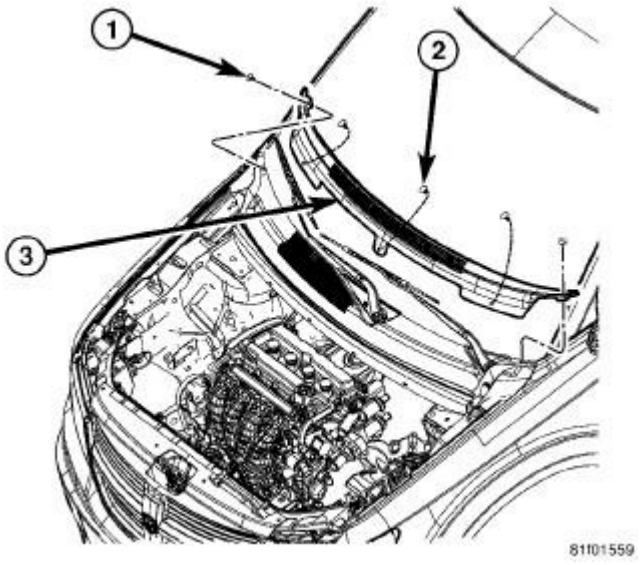

Fig. 82: Cowl Top Screen
Courtesy of CHRYSLER LLC

2. Remove the two push-pins (1) securing the cowl top screen at the ends. Remove the remaining push-pins (2). Remove the cowl top screen (3).
3. Remove the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**

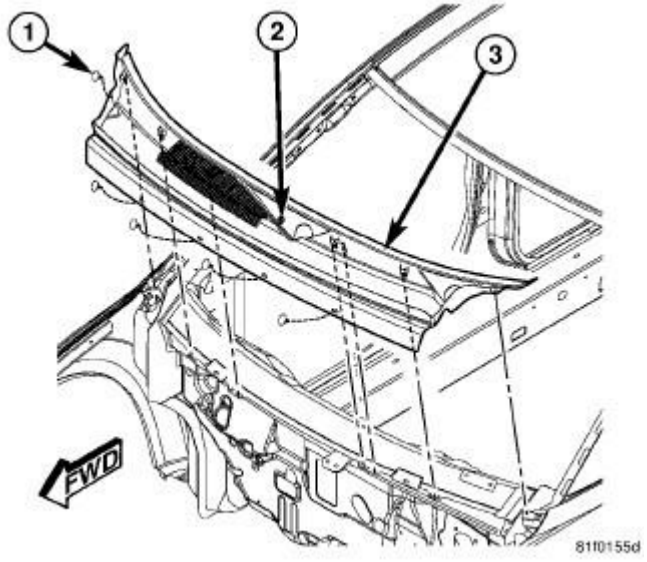

Fig. 83: Cowl Screen
Courtesy of CHRYSLER LLC

4. Remove the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° clockwise to release the screen. Remove the cowl screen (3).

5. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

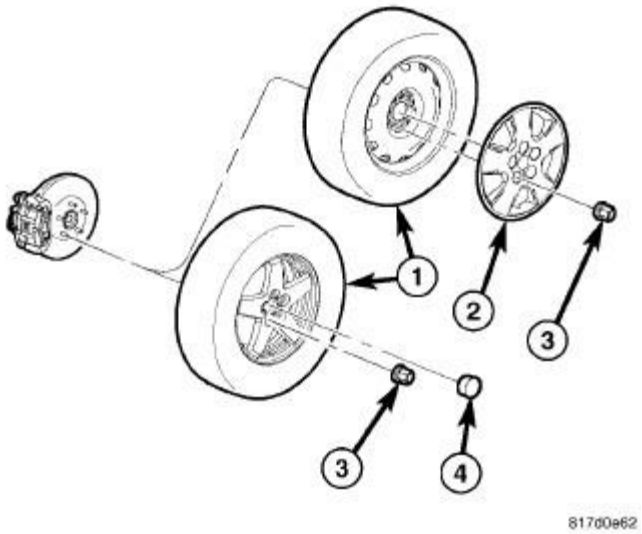

Fig. 84: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

6. Remove the wheel mounting nuts (3), then the tire and wheel assembly (1).

NOTE: **If both strut assemblies are to be removed, mark the strut assemblies right or left and keep the parts separated to avoid mix-up. Not all parts of the strut assembly are interchangeable side-to-side.**

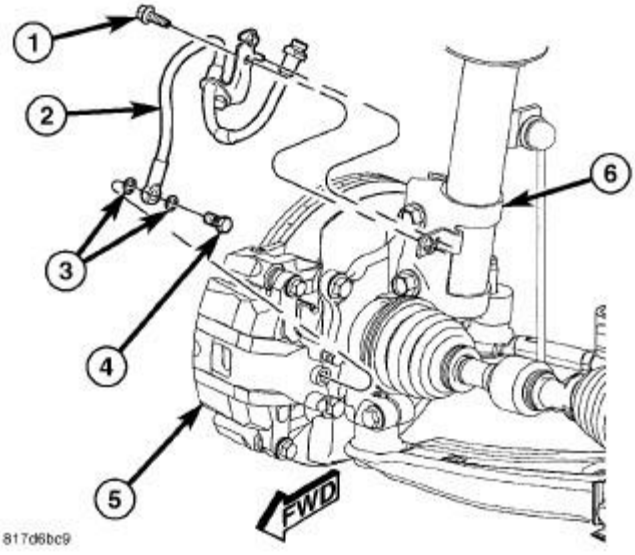

Fig. 85: Brake Hose Mounting To Strut
Courtesy of CHRYSLER LLC

7. Remove the screw (1) securing the flex hose (2) routing bracket to the strut (6).

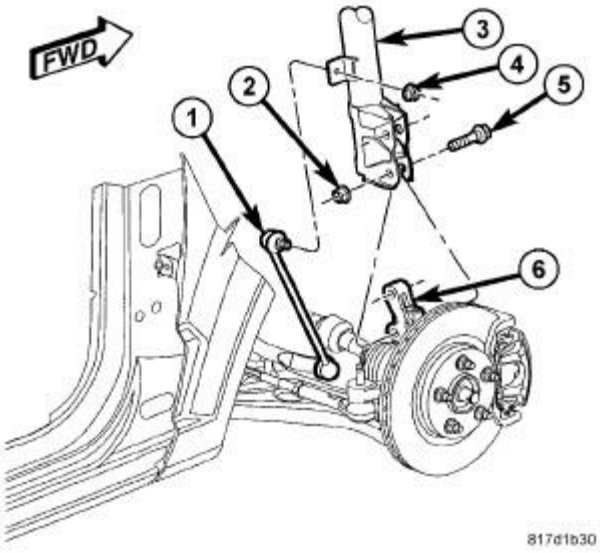

Fig. 86: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

8. While holding the stabilizer bar link (1) stud stationary, remove the nut (4) securing the link to the strut (3).

CAUTION: The strut assembly-to-knuckle attaching bolts (5) are serrated and must not be turned during removal. Hold the bolts stationary in the knuckle while removing the nuts, then tap the bolts out using a pin punch.

9. While holding the bolt heads stationary, remove the two nuts (2) from the bolts (5) attaching the strut (3) to the knuckle (6).
10. Remove the two bolts (5) attaching the strut (3) to the knuckle (6) using a pin punch.
11. Lower the vehicle just enough to open the hood without allowing the tires to touch the floor.

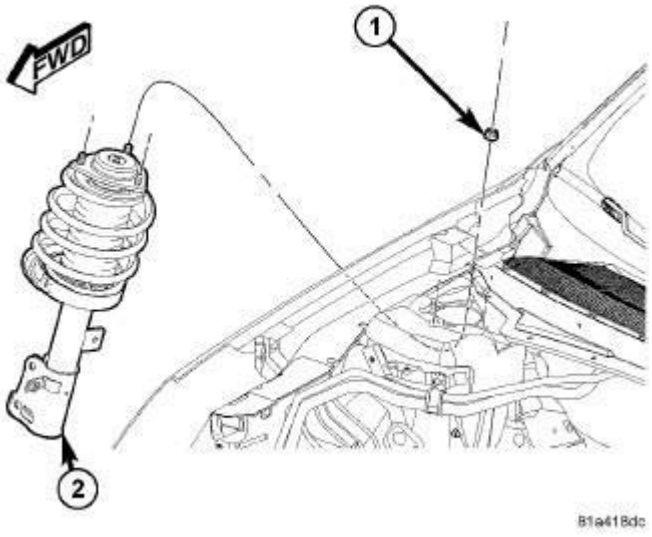

Fig. 87: Strut Upper Mounting Nuts
Courtesy of CHRYSLER LLC

12. Remove the three nuts (1) attaching the strut assembly (2) upper mount to the strut tower.
13. Remove the strut assembly (2) from the vehicle.
14. For disassembly. See **Disassembly** .

Disassembly

DISASSEMBLY

NOTE: The strut assembly must be removed from the vehicle for it to be disassembled and assembled. See Removal

For the disassembly and assembly of the strut assembly, use strut spring compressor, team PSE tool 223-7400, or the equivalent, to compress the coil spring. Follow the manufacturer's instructions closely.

WARNING: Do not remove the strut rod nut before the coil spring is properly compressed. The coil spring is held under pressure. The coil spring must be compressed, removing spring tension from the upper mount and bearing, before the strut rod nut is removed.

1. If both struts are being serviced at the same time, mark both the coil spring and strut assembly according to which side of the vehicle the strut is being removed from.

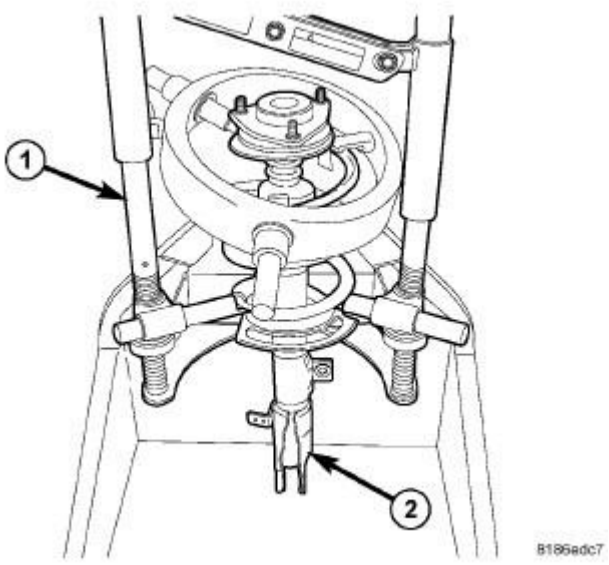

Fig. 88: Identifying Strut Assembly Positioned In Strut Coil Spring Compressor
Courtesy of CHRYSLER LLC

2. Position the strut assembly (2) in the strut coil spring compressor (1) following the manufacturer's instructions and set the lower and upper hooks of the compressor on the coil spring. Position the strut clevis bracket (2) straight outward, away from the compressor.
3. Compress the coil spring until all coil spring tension is removed from the upper mount and bearing.

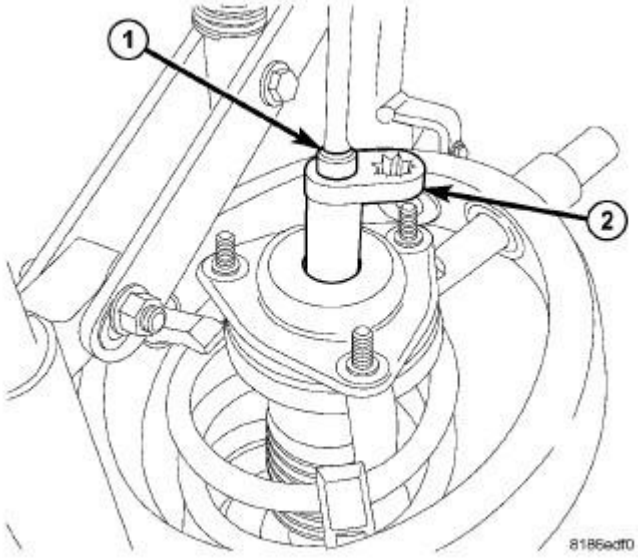

Fig. 89: Special Tools On Strut Rod Nut
Courtesy of CHRYSLER LLC

CAUTION: Never use impact or high speed tools to remove the strut rod nut. Damage to the strut internal bearings can occur.

4. Once the spring is sufficiently compressed, install Strut Nut Wrench (2) 9362, on the strut rod nut. Next, install a deep socket (1) on the end of the strut rod. While holding the strut rod from turning, remove the nut using the strut nut wrench.

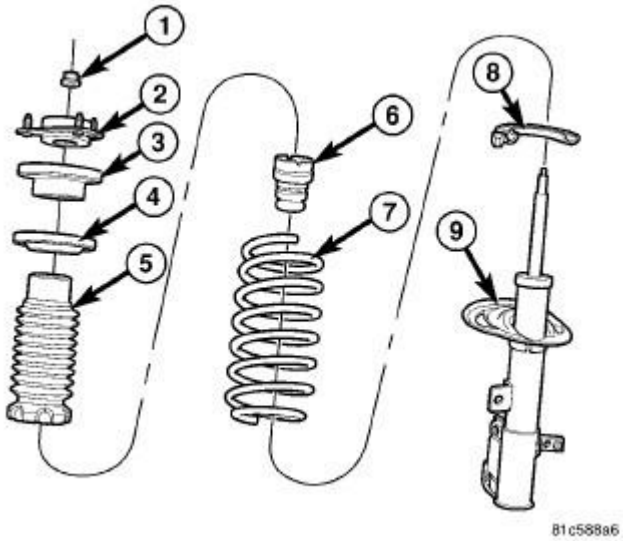

Fig. 90: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

5. Remove the clamp (if installed) from the bottom of the coil spring and remove the strut (damper) (9) out through the bottom of the coil spring.
6. Remove the lower spring isolator (8) from the strut seat.
7. remove the dust shield (5) and jounce bumper (6).
8. Remove the upper strut mount (2) from the top of the bearing and upper spring seat (3).
9. Remove the upper spring seat (3) and isolator (4) from the top of the coil spring (5).

NOTE: If the coil spring needs to be serviced, proceed with the next step, otherwise, proceed with 11.

10. Release the tension from the coil spring by backing off the compressor drive completely. Push back the compressor hooks and remove the coil spring.

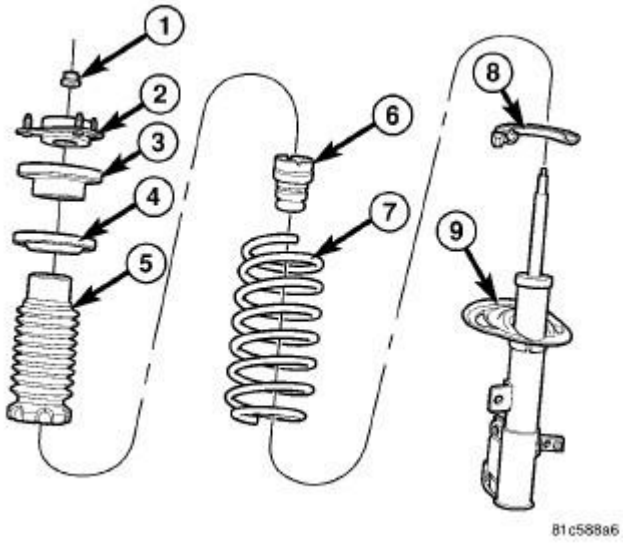

Fig. 91: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

11. Inspect the strut assembly components for the following and replace as necessary:

NOTE: For reassembly. See Assembly .

- Inspect the strut (damper) (9) for shaft binding over the full stroke of the shaft.
- Inspect the jounce bumper (6) for cracks and signs of deterioration.
- Inspect the dust shield (5) for cracks and tears.
- Check the upper mount (2) for cracks and distortion and its retaining studs for any sign of damage.
- Check the bearing and upper spring seat (3) for any binding.
- Inspect the upper and lower spring isolators (4, 8) for material deterioration and distortion.
- Inspect the coil spring (7) for any sign of damage to the coating.

Assembly

ASSEMBLY

NOTE: If the coil spring has been removed from the spring compressor, proceed with the next step, otherwise, proceed with 3.

NOTE: To determine the flat coil end of the coil spring for the following step, attempt to stand the coil spring on-end on a flat, level surface. If the coil spring stands on end, the end on the flat surface is the flat coil end. If the coil spring falls over, the end on the flat surface is not the flat coil end. Stand the coil spring on the opposite end to verify.

1. Place the coil spring flat coil end upward (see above note) in the spring compressor following the manufacturer's instructions. Before compressing the spring, rotate the spring so the end of the bottom coil is at approximately the 9 o'clock position as viewed above (or to where the spring was when removed from the compressor). This action will allow the strut (damper) clevis bracket to be positioned outward, away from the compressor once installed.
2. Slowly compress the coil spring until enough room is available for strut assembly reassembly.

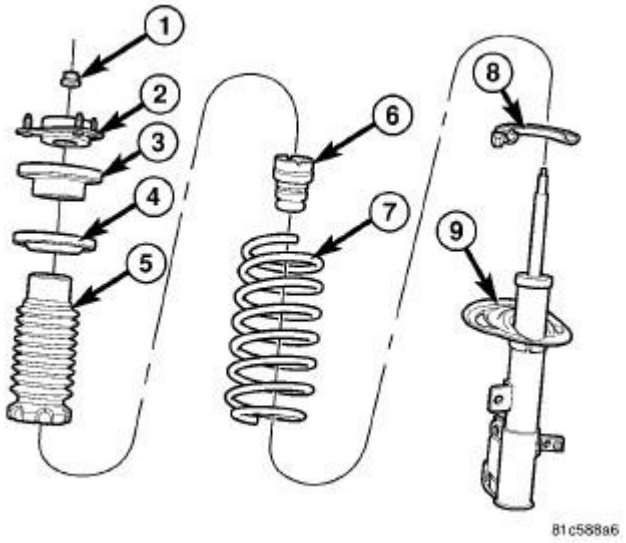

Fig. 92: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

3. Install the bearing and upper spring seat (3), and isolator (4) on top of the coil spring (7).
4. Install the upper mount (2) on top of the bearing and upper spring seat (3).
5. Install the lower spring isolator (8) on the spring seat on the strut (damper) (9).
6. Slide the jounce bumper (6) and dust shield (5) onto the strut rod.

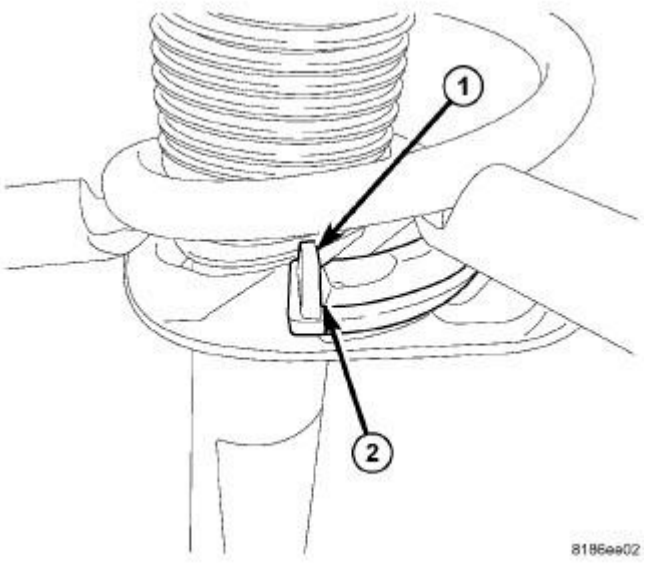

Fig. 93: Coil Spring Against Stop
Courtesy of CHRYSLER LLC

7. Install the strut up through the bottom of the coil spring and upper spring seat, mount, and bearing until the lower spring seat contacts the lower end of the coil spring. Rotate the strut as necessary until the end of the bottom coil (2) comes in contact with the stop (1) built into the lower spring isolator.

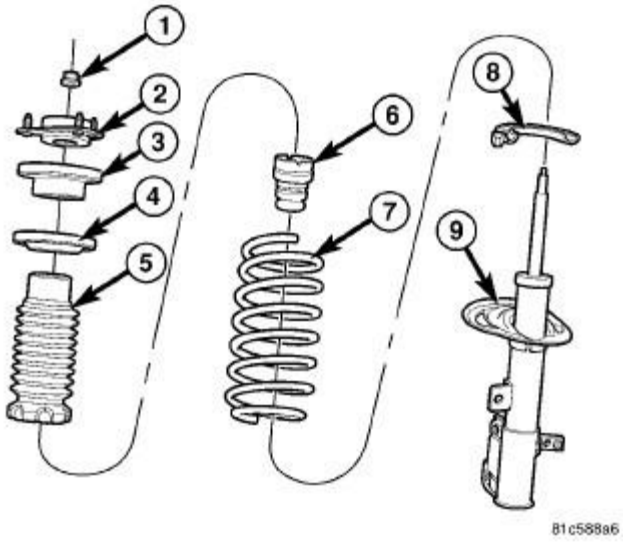

Fig. 94: Strut Assembly (Exploded)
Courtesy of CHRYSLER LLC

8. While holding the strut in position, install the nut (1) on the end of the strut rod.

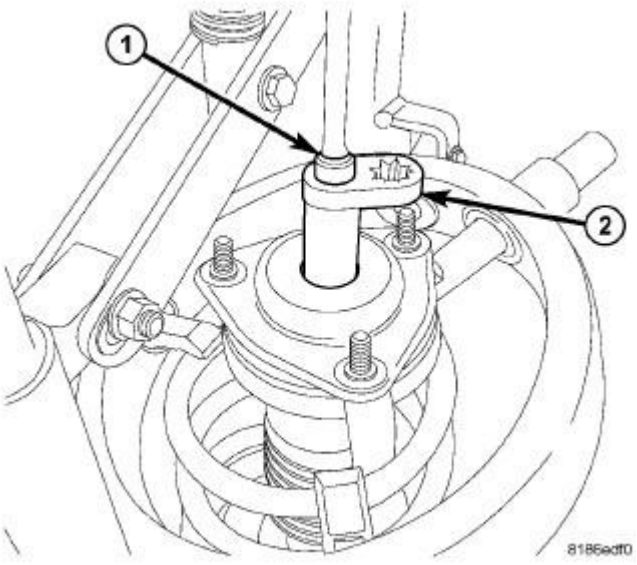

Fig. 95: Special Tools On Strut Rod Nut
Courtesy of CHRYSLER LLC

CAUTION: Never use impact or high speed tools to remove the strut rod nut. Damage to the strut internal bearings can occur.

9. Install Strut Nut Wrench (2) 9362, on the strut rod nut. Next, install a deep socket (1) on the end of the strut rod. While holding the strut rod from turning, tighten the strut rod nut to 60 N.m (44 ft. lbs.) using a torque wrench on the end of Strut Nut Wrench (2) 9362.

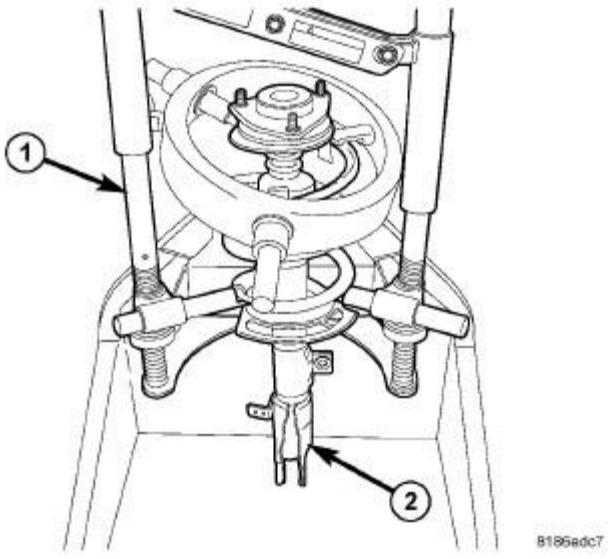

Fig. 96: Identifying Strut Assembly Positioned In Strut Coil Spring Compressor
Courtesy of CHRYSLER LLC

10. Slowly release the tension from the coil spring by backing off the compressor (1) drive completely. As the tension is relieved, make sure the upper mount and bearing align properly. Verify the upper mount does not bind when rotated.
11. Remove the strut assembly from the spring compressor.
12. Install the strut assembly on the vehicle. See **Installation**

Installation

INSTALLATION

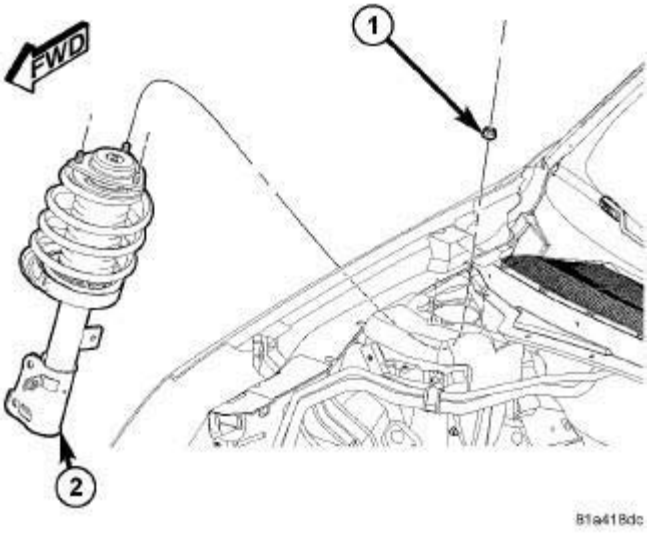

Fig. 97: Strut Upper Mounting Nuts
Courtesy of CHRYSLER LLC

1. Raise the strut assembly (2) into the strut tower, aligning the three studs on the strut assembly upper mount with the holes in strut tower. Install the three mounting nuts (1) on the studs. Tighten the three nuts to 55 N.m (41 ft. lbs.).

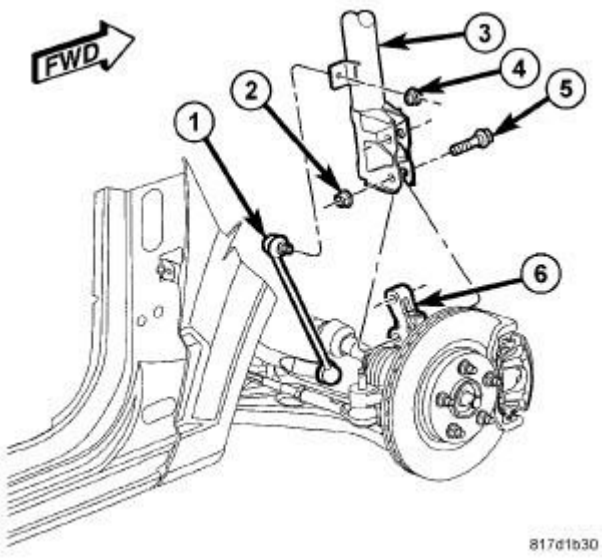

Fig. 98: Strut Mounting To Knuckle
Courtesy of CHRYSLER LLC

CAUTION: The strut clevis-to-knuckle bolts (5) are serrated and must not be turned during installation. Install the nuts while holding the bolts stationary in the knuckle.

2. Position the lower end of the strut assembly (3) in line with the upper end of the knuckle (6), aligning the mounting holes. Install the two attaching bolts (5). Install the nuts (2). While holding the bolts in place, tighten the nuts to 140 N.m (103 ft. lbs.).
3. Attach the stabilizer bar link (1) to the strut (3). Install and tighten the nut (4) while holding the stabilizer bar link stud stationary. Tighten the nut to 48 N.m (35 ft. lbs.).

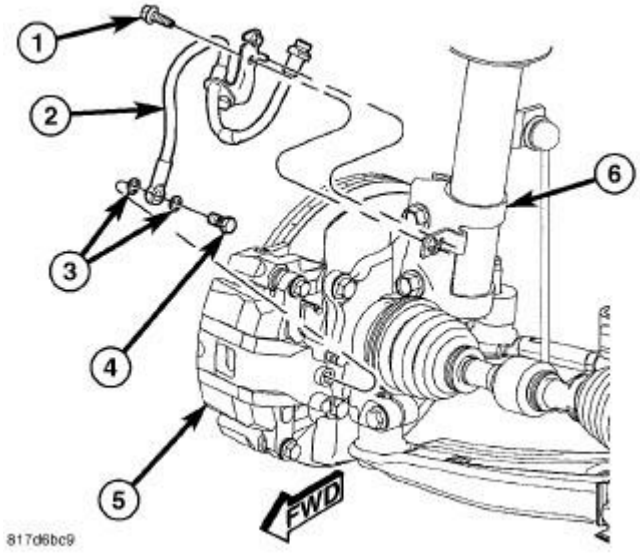

Fig. 99: Brake Hose Mounting To Strut
Courtesy of CHRYSLER LLC

4. Secure the flex hose (2) routing bracket to the strut (6) with the mounting screw (1). Tighten the mounting screw to 13 N.m (120 in. lbs.).

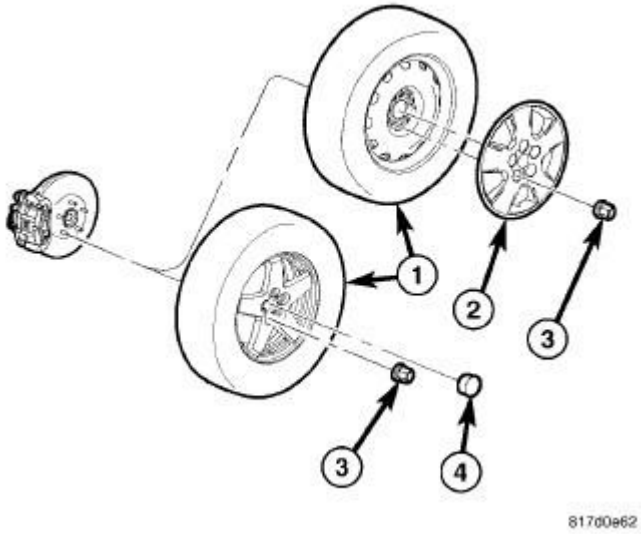

Fig. 100: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

5. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
6. Lower the vehicle.

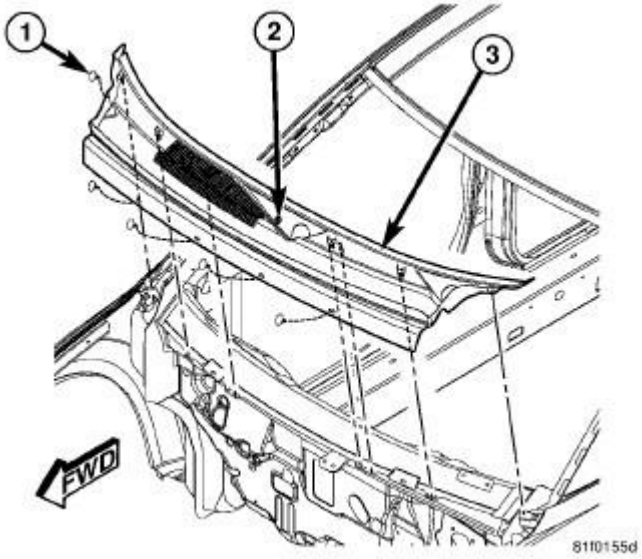

Fig. 101: Cowl Screen
Courtesy of CHRYSLER LLC

7. Install the cowl screen. Install the push-pins (1) securing the cowl screen to the wheelhouse brace and cowl. Rotate the screw (2) in the center of the cowl screen 90° counterclockwise to lock the screen in place.
8. Install the wiper arms. Refer to **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**

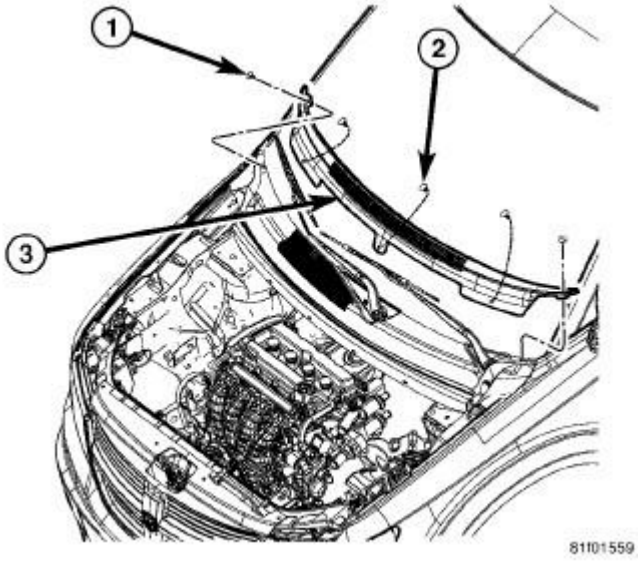

Fig. 102: Cowl Top Screen
Courtesy of CHRYSLER LLC

9. Install the cowl top screen (3). Install the two push-pins (1) securing the cowl top screen at the ends. Install the remaining push-pins (2).
10. Install the engine appearance cover.

WHEEL ALIGNMENT

DESCRIPTION

DESCRIPTION

Vehicle wheel alignment is the positioning of all interrelated front and rear suspension angles. These angles affect the handling and steering of the vehicle when it is in motion. Proper wheel alignment is essential for efficient steering, good directional stability, and proper tire wear.

The method of checking a vehicle's front and rear wheel alignment varies depending on the manufacturer and type of equipment used. The manufacturer's instructions should always be followed to ensure accuracy of the alignment, except when Chrysler Corporation's wheel alignment specifications differ.

On this vehicle, the suspension angles that can be adjusted are as follows:

Front

- Camber (with cradle shift or service adjustment bolt package)
- Caster (limited adjustment with cradle shift)
- Toe

Rear

- Toe

Check the wheel alignment and make all wheel alignment adjustments with the vehicle standing at its proper curb height specification. Curb height is the normal riding height of the vehicle. It is measured from a certain point on the vehicle to the ground or a designated area while the vehicle is sitting on a flat, level surface. Refer to **CURB HEIGHT MEASUREMENT** in this service information for additional information.

Typical wheel alignment angles and measurements are described in the following paragraphs.

CAMBER

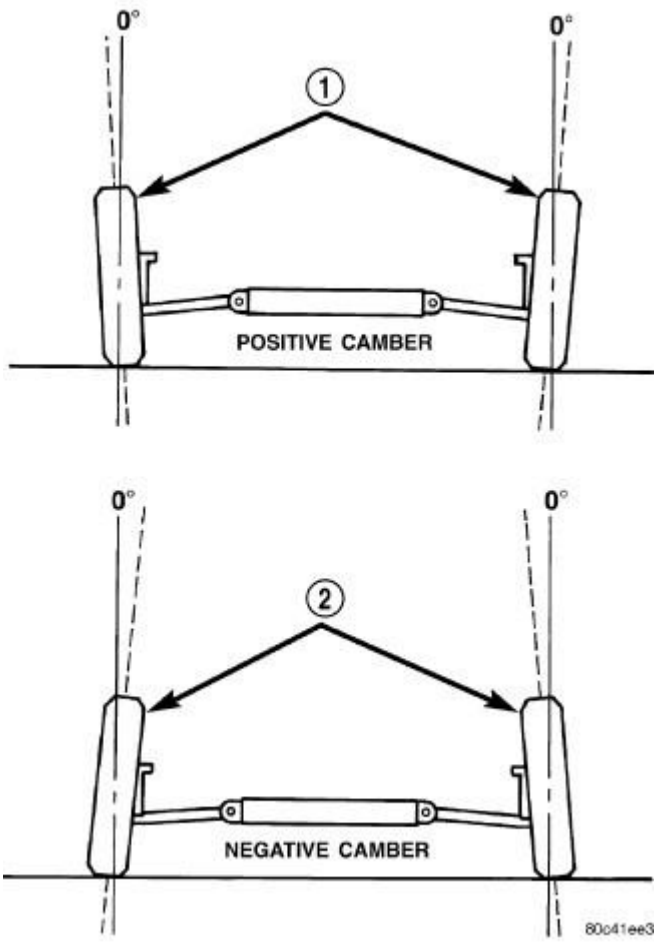

Fig. 103: Camber
Courtesy of CHRYSLER LLC

1 - WHEELS TILTED OUT AT TOP
2 - WHEELS TILTED IN AT TOP

Camber is the inward or outward tilt of the top of the tire and wheel assembly. Inward tilt (2) is known as negative camber. Outward tilt (1) is known as positive camber. Camber is measured in degrees of angle relative to a true vertical line. Camber is a tire wearing angle.

- Excessive negative camber will cause tread wear at the inside of the tire.
- Excessive positive camber will cause tread wear on the outside of the tire.

CROSS CAMBER

Cross camber is the difference between left and right camber. To achieve the cross camber reading, subtract the right side camber reading from the left. For example, if the left camber is -0.7° and the right camber is -0.5°, the cross camber would be -0.2° (-0.7 - (-0.5) = -0.7 + 0.5 = -0.2).

CASTER

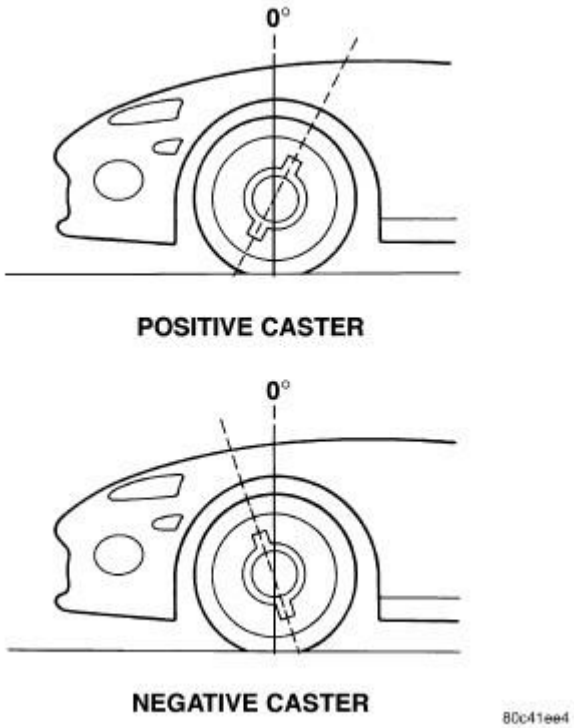

Fig. 104: Caster
Courtesy of CHRYSLER LLC

Caster is the forward or rearward tilt of the steering knuckle in reference to the position of the upper and lower ball joints. Caster is measured in degrees of angle relative to a true vertical center line. This line is viewed from the side of the tire and wheel assembly.

- Forward tilt (upper ball joint ahead of lower) results in a negative caster angle.
- Rearward tilt (upper ball joint trailing lower) results in a positive caster angle.

Although caster does not affect tire wear, a caster imbalance between the two front wheels may cause the vehicle to lead to the side with the least positive caster.

CROSS CASTER

Cross caster is the difference between left and right caster. To achieve the cross caster reading, subtract the right side caster reading from the left. For example, if the left caster is 2.5° and the right caster is 2.7°, the cross caster would be -0.2° (2.5 - 2.7 = -0.2).

TOE

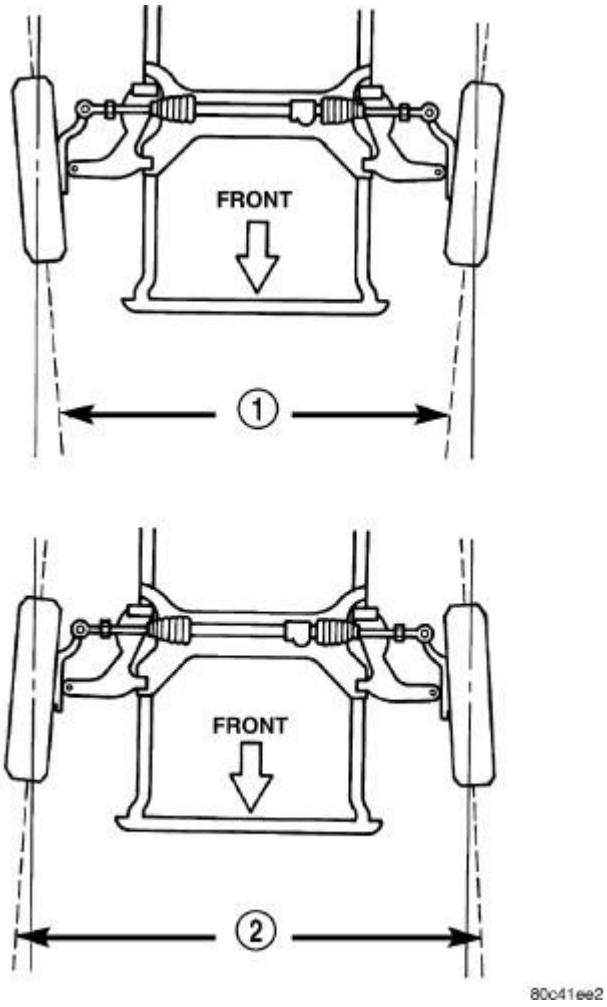

Fig. 105: Toe
Courtesy of CHRYSLER LLC

1 - TOE-IN
2 - TOE-OUT

Toe is the inward or outward angle of the wheels as viewed from above the vehicle.

- Toe-in (1) is produced when the front edges of the wheels on the same axle are closer together than the rear edges.
- Toe-out (2) is produced when the front edges of the wheels on the same axle are farther apart than the rear edges.

Toe-in and toe-out can occur at the front wheels and the rear wheels.

Toe is measured in degrees or inches. The measurement identifies the amount that the front of the wheels point inward (toe-in) or outward (toe-out). Toe is measured at the spindle height. Zero toe means the front and rear edges of the wheels on the same axle are equal distant.

TOE-OUT ON TURNS

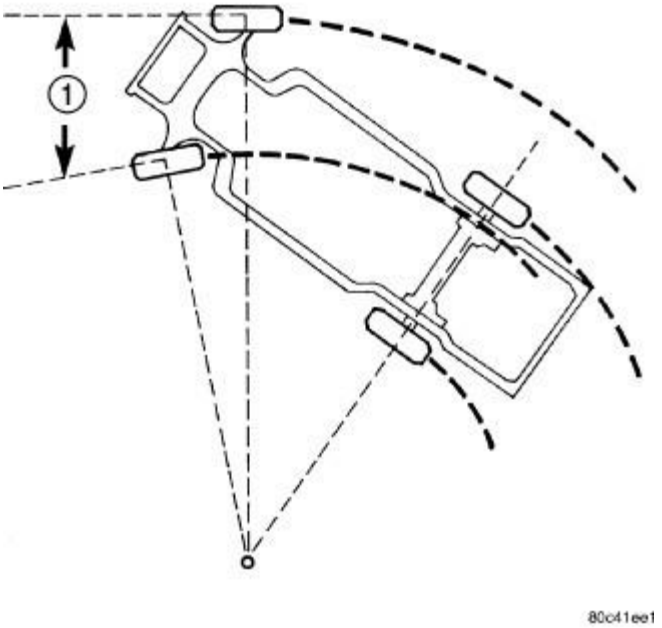

Fig. 106: Toe-Out On Turns
Courtesy of CHRYSLER LLC

1 - TOE-OUT ON TURNS

Toe-out on turns (1), sometimes referred to as Ackerman Steering, is the relative positioning of the front wheels while steering through a turn. This compensates for each front wheel's turning radius. As the vehicle encounters a turn, the outboard wheel must travel in a larger radius circle than the inboard wheel. The steering system is designed to make each wheel follow its particular radius circle. To accomplish this, the front wheels must progressively toe outward as the steering is turned from center. This eliminates tire scrubbing and undue tire wear when steering a vehicle through a turn.

DYNAMIC TOE PATTERN

Dynamic toe pattern is the inward and outward toe movement of the front and rear tires through the suspension's jounce and rebound travel. As the vehicle's suspension moves up and down, the toe pattern varies. Toe pattern is critical in controlling the directional stability of the vehicle while in motion. Front and rear dynamic toe pattern is preset by the factory at the time the vehicle is assembled.

It is not necessary to check or adjust front or rear dynamic toe pattern when doing a normal wheel alignment. The only time dynamic toe pattern needs to be checked or adjusted is if the frame of the vehicle has been damaged.

STEERING AXIS INCLINATION (S.A.I.)

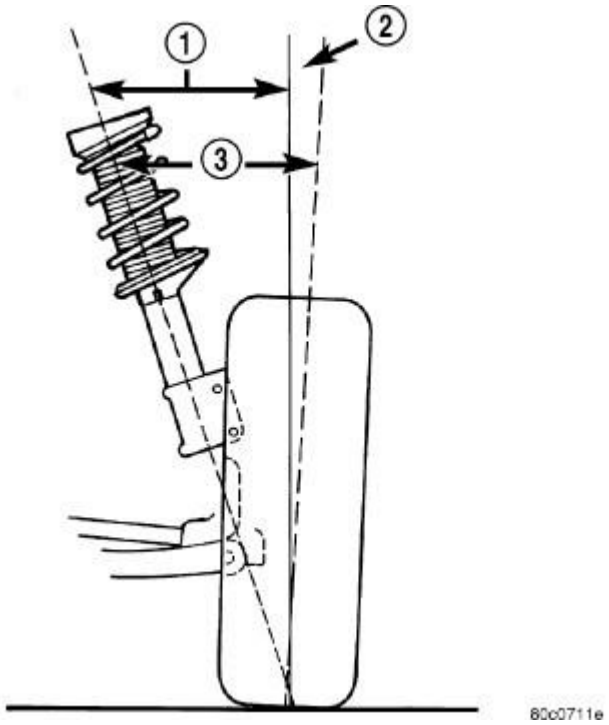

Fig. 107: Identifying Steering Axis Inclination, Included Angle, & Camber
Courtesy of CHRYSLER LLC

1 - S.A.I.
2 - CAMBER
3 - I.A.

Steering axis inclination (1) is the angle between a true vertical line starting at the center of the tire at the road contact point and a line drawn through the center of the upper ball joint (or strut) and the lower ball joint. S.A.I. is built into the vehicle and is not an adjustable angle. If S.A.I. is not within specifications, a bent or damaged suspension component may be the cause.

INCLUDED ANGLE (I.A.)

Included angle (3) is the sum of the S.A.I. angle (1) plus or minus the camber angle (2), depending on whether or not the wheel has positive or negative camber. If camber is positive, add the camber angle to the S.A.I angle. If camber is negative, subtract the camber angle from the S.A.I. angle. Included angle is not adjustable, but can be used to diagnose a frame misalignment or bent suspension component (spindle, strut).

THRUST ANGLE

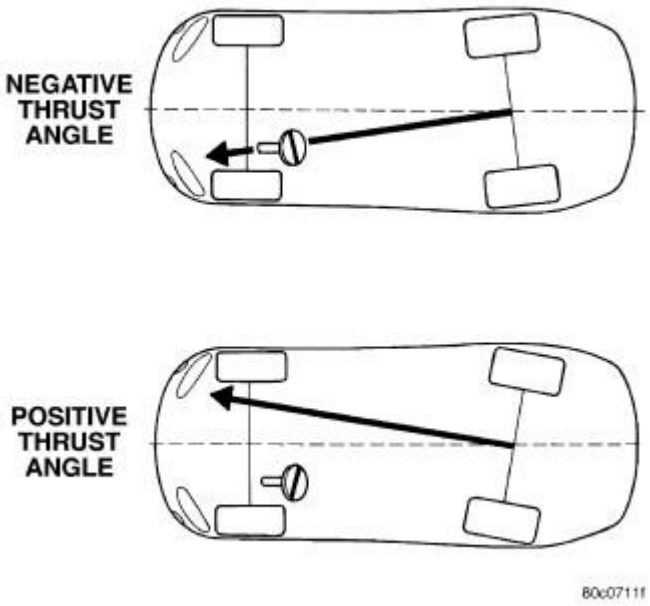

Fig. 108: Thrust Angle
Courtesy of CHRYSLER LLC

Thrust angle is the averaged direction the rear wheels are pointing in relation to the vehicle's center line. The presence of negative or positive thrust angle causes the rear tires to track improperly to the left or right of the front tires (dog tracking).

- Negative thrust angle means the rear tires are tracking to the left of the front tires.
- Positive thrust angle means the rear tires are tracking to the right of the front tires.

Improper tracking can cause undue tire wear, a lead or pull and a crooked steering wheel. Excessive thrust angle can usually be corrected by adjusting the rear wheel toe so that each wheel has one-half of the total toe measurement.

STANDARD PROCEDURE

CURB HEIGHT MEASUREMENT

The wheel alignment is to be checked and all alignment adjustments made with the vehicle at its required curb height specification.

Vehicle height is to be checked with the vehicle on a flat, level surface, preferably a vehicle alignment rack. The tires are to be inflated to the recommended pressure. All tires are to be the same size as standard equipment. **Vehicle height is checked with the fuel tank full of fuel, and no passenger or luggage compartment load.**

Vehicle height is not adjustable. If the measurement is not within specifications, inspect the vehicle for bent or weak suspension components. Compare the parts tag on the suspect coil spring(s) to the parts book and the

vehicle sales code, checking for a match. Once removed from the vehicle, compare the coil spring height to a correct new or known good coil spring. The heights should vary if the suspect spring is weak.

NOTE: Prior to reading the curb height measurement, the front and rear of the vehicle must be jounced to settle the suspension. Induce jounce by pushing down on the center of the bumper (fascia), using care not to damage the vehicle, moving the vehicle up and down, gradually increasing the suspension travel with each stroke. Release the bumper at the bottom of each stroke, repeating this action several times. Perform this to both front and rear suspensions an equal amount of times.

Measure curb height as follows:

1. Jounce the vehicle. Refer to above note.

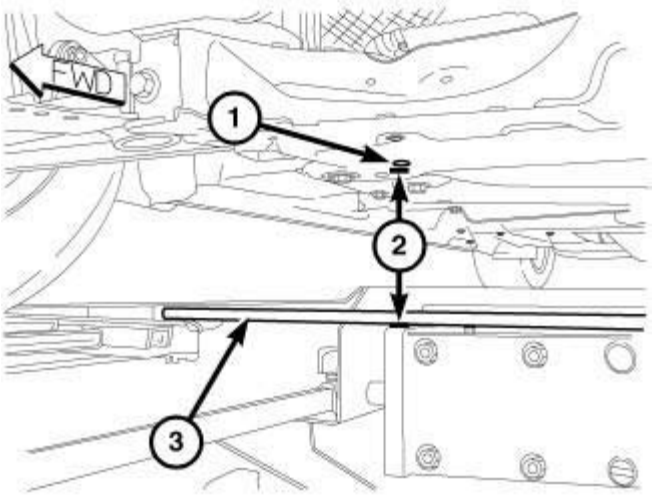

Fig. 109: Front Curb Height Measurement
Courtesy of CHRYSLER LLC

NOTE: On some vehicles it may be necessary to remove an engine belly pan in order to gain access to the lower control arm pivot bolt.

2. Front - On each side of the vehicle, measure the distance (2) from the flat surface behind the PLP hole (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge (3), placed from lift runway to runway, to get an accurate measurement.

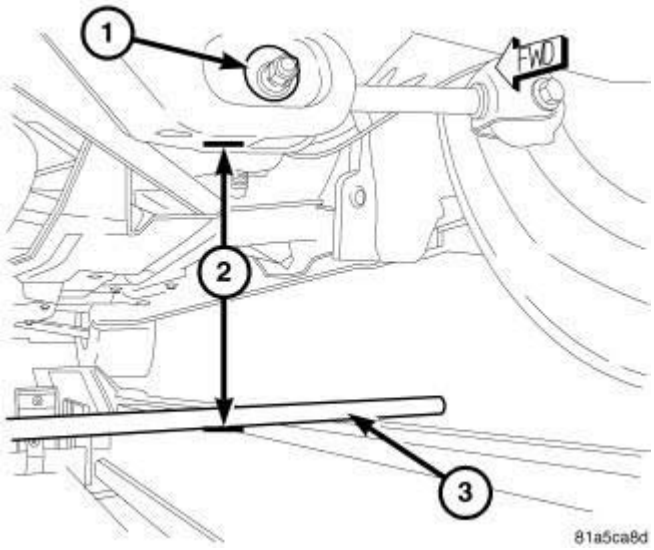

Fig. 110: Rear Curb Height Measurement
Courtesy of CHRYSLER LLC

3. Rear - On each side of the vehicle, measure the distance (2) from the flat surface below the rear toe adjustment cam bolt (1) to the floor or alignment rack/lift runway surface. It may be necessary to measure to the bottom of a straight edge (3), placed from lift runway to runway, to get an accurate measurement.
4. Compare the measurements to specifications listed in the following **CURB HEIGHT SPECIFICATIONS** chart. Maximum left-to-right differential is not to exceed 12.5 mm (0.5 in.).
5. If curb height is found to be out of specification and there is no sign of excessive body damage, curb height can be changed by replacing the applicable spring with a spring offering a different check load. See **Removal**

CURB HEIGHT SPECIFICATIONS

WHEEL SIZE	FRONT	REAR
16 INCH	201 mm ± 12 mm 7.91 in. ± 0.47 in.	232 mm ± 12 mm 9.13 in. ± 0.47 in.
17 INCH	200 mm ± 12 mm 7.87 in. ± 0.47 in.	230 mm ± 12 mm 9.06 in. ± 0.47 in.
19 INCH	205 mm ± 12 mm 8.07 in. ± 0.47 in.	235 mm ± 12 mm 9.25 in. ± 0.47 in.

CURB HEIGHT SPECIFICATIONS - EXPORT

WHEEL SIZE	FRONT	REAR
16 INCH	184 mm ± 12 mm 7.25 in. ± 0.47 in.	216 mm ± 12 mm 8.50 in. ± 0.47 in.
17 INCH	198 mm ± 12 mm 7.80 in. ± 0.47 in.	228 mm ± 12 mm 8.98 in. ± 0.47 in.
19 INCH	203 mm ± 12 mm 8.00 in. ± 0.47 in.	233 mm ± 12 mm 9.17 in. ± 0.47 in.

WHEEL ALIGNMENT

PRE-WHEEL ALIGNMENT INSPECTION

Before any attempt is made to change or correct the wheel alignment, the following inspection and necessary corrections must be made to the vehicle to ensure proper alignment.

1. Verify the fuel tank is full of fuel. If the fuel tank is not full, the reduction in weight will affect the curb height of the vehicle and the alignment specifications.
2. The passenger and luggage compartments of the vehicle should be free of any load that is not factory equipment.
3. Check the tires on the vehicle. The tires are to be inflated to the recommended air pressure. All tires must be the same size and in good condition with approximately the same tread wear.
4. Check the front tire and wheel assemblies for excessive radial runout.
5. Inspect all suspension component fasteners for looseness and proper torque.
6. Inspect the lower front ball joints and all steering linkage for looseness and any sign of wear or damage.
7. Inspect the rubber bushings on all the suspension components for signs of wear or deterioration. If any bushings show signs of wear or deterioration, they should be replaced prior to aligning the vehicle.
8. Check vehicle curb height to verify it is within specifications. See **Standard Procedure**

WHEEL ALIGNMENT SETUP

1. Position the vehicle on an alignment rack.
2. Install all required alignment equipment on the vehicle, per the alignment equipment manufacturer's instructions. On this vehicle, a four-wheel alignment is recommended.

NOTE: Prior to reading the vehicle's alignment readouts, the front and rear of vehicle should be jounced. Induce jounce (rear first, then front) by grasping the center of the bumper and jouncing each end of vehicle an equal number of times. The bumper should always be released when vehicle is at the bottom of the jounce cycle.

3. Read the vehicle's current front and rear alignment settings. Compare the vehicle's current alignment settings to the vehicle specifications for camber, caster and toe-in. See **Specifications**

REAR CAMBER

Rear camber settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as Net Build. The result is no required adjustment of camber after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, rear camber is not considered an adjustable angle.

CAUTION: Do not attempt to adjust the vehicle's wheel alignment by heating or bending any of the suspension components.

FRONT CAMBER AND CASTER

Front camber and caster settings on this vehicle are determined at the time the vehicle is designed, by the location of the vehicle's suspension components. This is referred to as Net Build. The result is no required adjustment of camber and caster after the vehicle is built or when servicing the suspension components. Thus, when performing a wheel alignment, caster and camber are not normally considered adjustable angles but some adjustment can be made. Camber and caster should be checked to ensure they meet vehicle specifications. See **Specifications**

If individual front camber or caster is found not to meet alignment specifications, each can be adjusted by shifting the front crossmember or by using an available service adjustment bolt package. If an adjustment bolt package installation is necessary, inspect the suspension components for any signs of damage or bending first.

CAUTION: Do not attempt to adjust the vehicle's wheel alignment by heating or bending any of the suspension components.

ADJUSTMENT BY SHIFTING CROSSMEMBER

CAUTION: Always use care when shifting crossmember to avoid damaging other components on the vehicle.

1. Loosen the four bolts fastening the front crossmember to the frame just enough to allow movement of the crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal**
2. Loosen the bolts fastening the fore/aft crossmember to the frame just enough to allow movement of the crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal**

CAUTION: When shifting the front crossmember, keep in mind that the front and rear engine mounts are attached to the front crossmember and fore/aft crossmember and should be inspected following the crossmember shift to make sure they are properly aligned.

3. Shift front crossmember as necessary (See following tables) to bring camber or caster into specifications. When shifting crossmember, use care not to move other angles (camber or caster) that are within specifications, out of specifications.

FRONT CAMBER ADJUSTMENT BY SHIFTING CROSSMEMBER*	
Left Camber Below Specification	Move crossmember to the right
Left Camber Above Specification	Move crossmember to the left
Right Camber Below Specification	Move crossmember to the left
Right Camber Above Specification	Move crossmember to the right
Cross Camber Below Specification	Move crossmember to the right
Cross Camber Above Specification	Move crossmember to the left
* For every move to adjust one side of the vehicle, a countermove on the opposite side will occur.	

FRONT CASTER ADJUSTMENT BY SHIFTING CROSSMEMBER	
Left Caster Below Specification	Move left side of crossmember forward
Left Caster Above Specification	Move left side of crossmember rearward
Right Caster Below Specification	Move right side of crossmember forward
Right Caster Above Specification	Move right side of crossmember rearward
Cross Caster Below Specification	Move left side of crossmember forward and right side rearward
Cross Caster Above Specification	Move left side of crossmember rearward and right side forward

4. Tighten all previously loosened fasteners (bolts) securing the crossmember to the vehicle to specifications. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation**
5. Jounce the rear, then front of the vehicle an equal amount of times.
6. Measure camber and caster. If camber and caster are within specifications, proceed to **TOE**TOE. If camber cannot be brought into specifications, perform **CAMBER ADJUSTMENT BOLT PACKAGE INSTALLATION**.

CAMBER ADJUSTMENT BOLT PACKAGE INSTALLATION

1. Raise the vehicle until its tires are not supporting the weight of the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure**

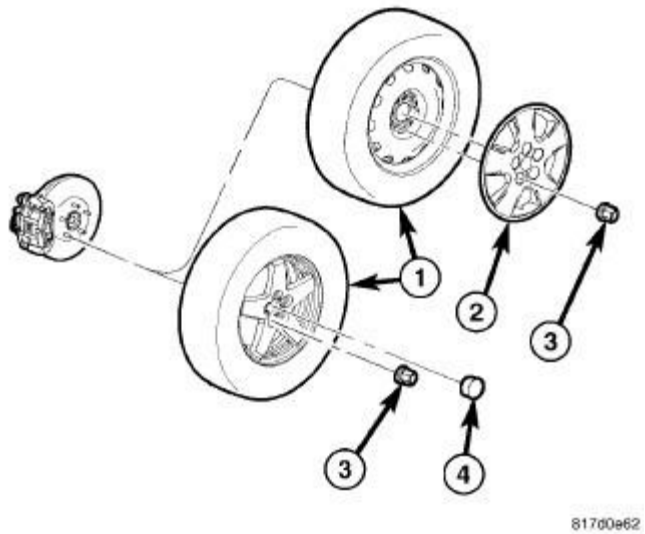

Fig. 111: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

2. Remove the wheel mounting nuts (3), then the front tire and wheel assembly (1).

CAUTION: The strut clevis-to-knuckle attaching bolt shanks are serrated and must not be turned during removal. Remove the nuts while holding the bolts stationary, then tap the bolts out using a punch.

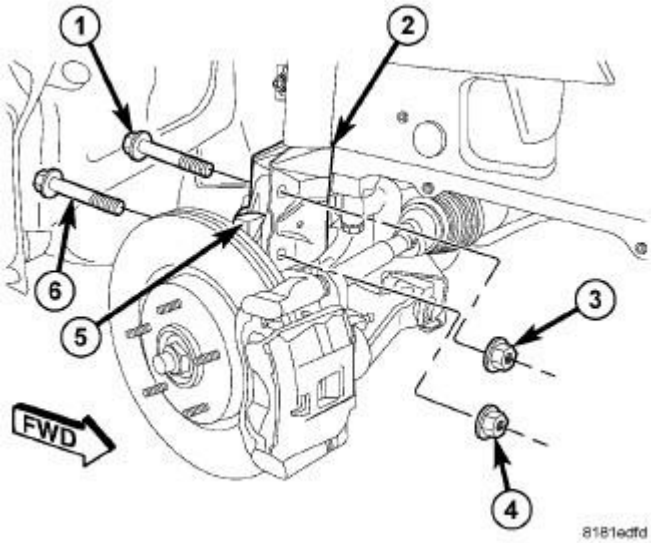

Fig. 112: Strut Clevis Bracket
Courtesy of CHRYSLER LLC

3. Remove the original nuts (3, 4) and upper (1) and lower (6) bolts attaching the strut clevis bracket (2) to the knuckle (5).
4. Separate the knuckle (5) from the strut clevis bracket (2) and position knuckle so it is out of the way of the strut. Use care not to overextend the brake flex hose or axle half shaft.

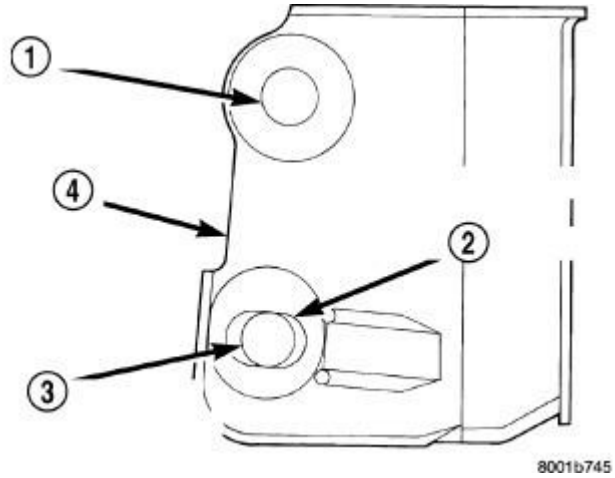

Fig. 113: Strut Clevis Bracket Bolt Hole Grinding Area
Courtesy of CHRYSLER LLC

CAUTION: When slotting the bottom mounting hole (3) on the strut clevis bracket (4), do not enlarge the hole beyond the indentations (2) on the sides of the strut clevis bracket.

5. Using an appropriate grinder and grinding wheel, slot the bottom hole (3) in both sides of the strut clevis

bracket (4).

CAUTION: After slotting the strut clevis bracket hole, do not install the original attaching bolts. Only the service package bolts and dog bone washers must be used to attach the knuckle to the strut once the mounting hole is slotted.

6. Position the strut clevis bracket in line with the upper end of the knuckle, aligning the mounting holes. Install the two service package bolts. **Be sure to place the bolt with the eccentric cam in the bottom (slotted) hole on strut clevis bracket.**
7. Install the dog bone washers provided in the service package and nuts on the replacement bolts. Tighten each nut just enough to hold the knuckle in position while adjusting camber, but still allows the knuckle to move in the clevis bracket.

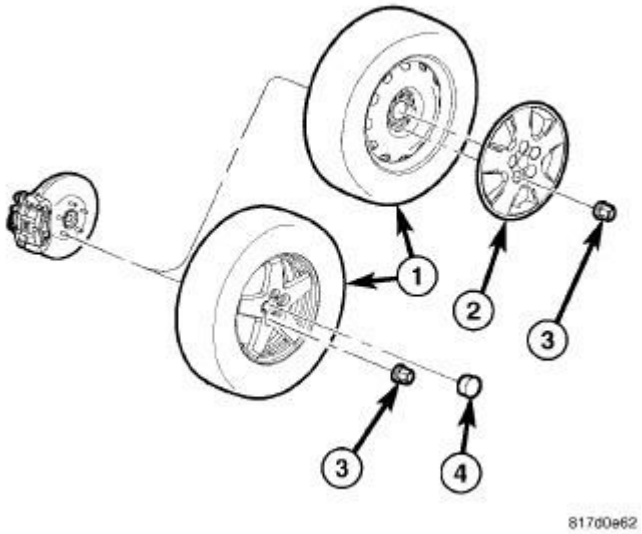

Fig. 114: TIRE AND WHEEL MOUNTING
Courtesy of CHRYSLER LLC

8. Install the tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten the wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
9. Perform the above procedure to opposite side strut as required.
10. Lower the vehicle and jounce the front and rear of the vehicle.
11. Adjust the front camber to the preferred setting using the cam bolt in the lower mounting hole. Once camber is set to specifications, tighten the upper and lower strut service package bolt nuts to 140 N.m (103 ft. lbs.). Again jounce the front and rear of the vehicle, then verify the camber settings.
12. Once camber is within specifications, adjust toe to meet the preferred specification setting. Refer to **TOE** within this wheel alignment service procedure.

TOE

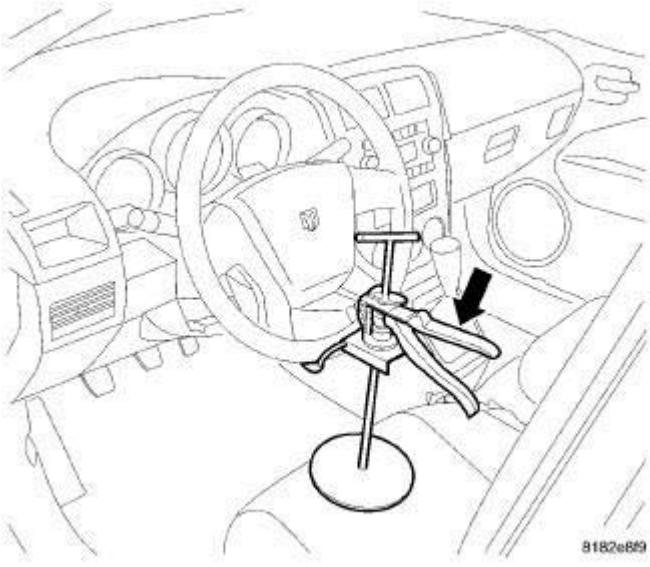

Fig. 115: Steering Wheel Holding Tool
Courtesy of CHRYSLER LLC

1. Center the steering wheel and lock it in place using a steering wheel clamp.

NOTE: When setting toe, make sure to set rear toe to the preferred specifications before setting front toe to the preferred specifications

NOTE: Perform the following at each rear wheel as necessary.

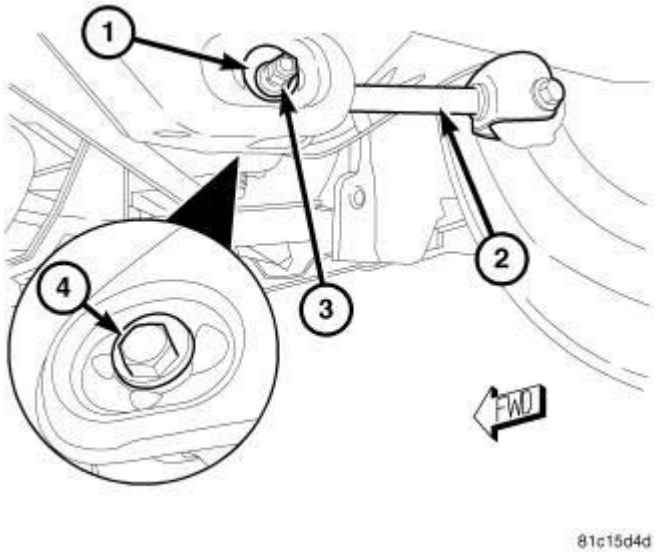

Fig. 116: Rear Toe Adjustment Cam Bolt
Courtesy of CHRYSLER LLC

NOTE: Perform the following at each front wheel as necessary.

CAUTION: Do not twist the inner tie rod-to-steering gear boot (bellows) while turning the inner tie rod during front toe adjustment. It may be necessary to remove the clamp where the boot meets the inner tie rod.

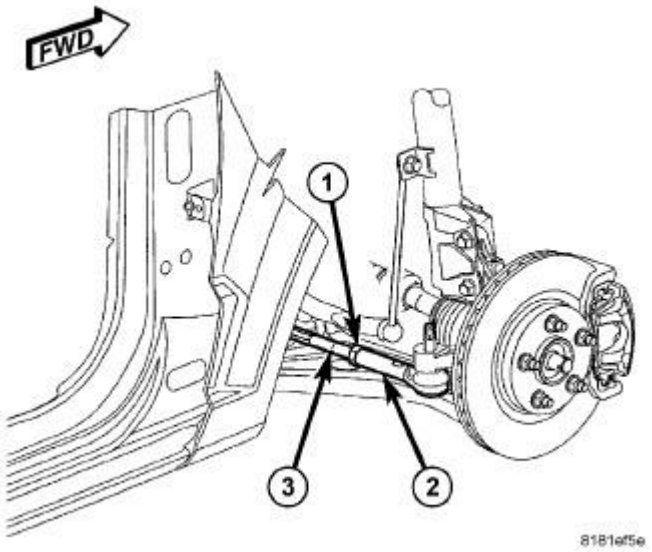

Fig. 117: Tie Rod Jam Nut
Courtesy of CHRYSLER LLC

REAR TOE

NOTE: Perform the following at each rear wheel as necessary.

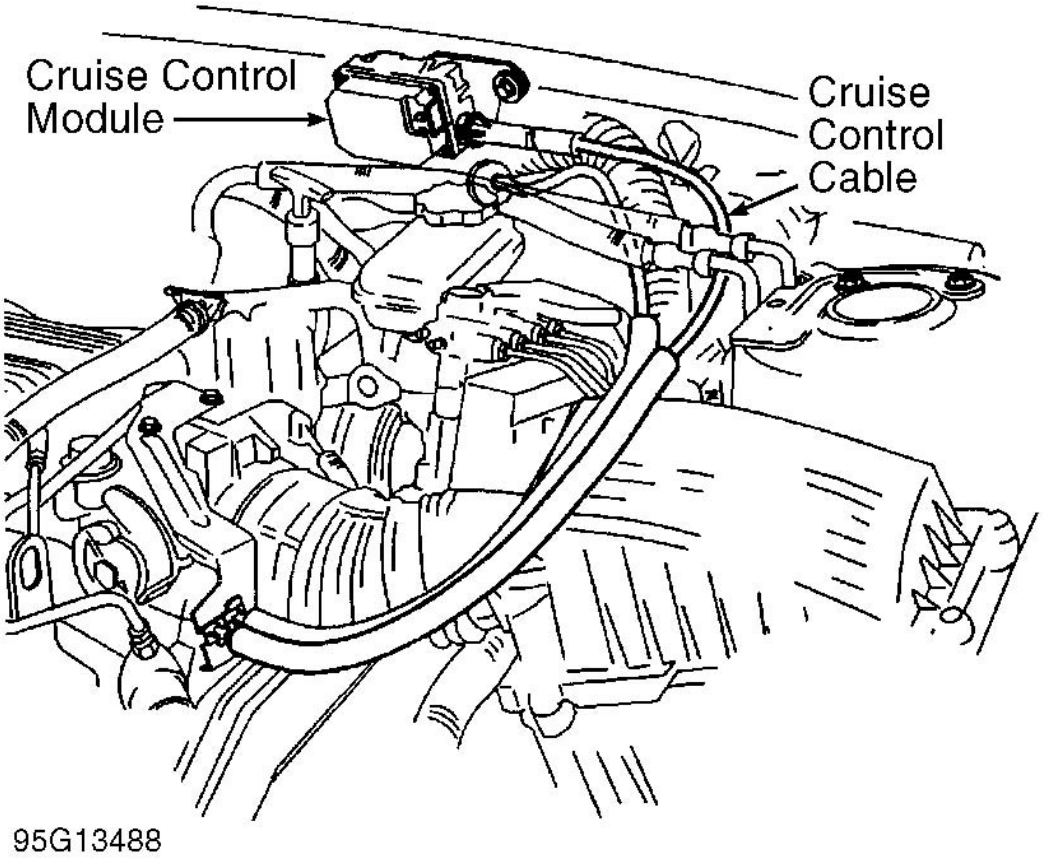

Fig. 118: Rear Toe Adjustment Cam Bolt
Courtesy of CHRYSLER LLC

2. While holding the cam bolt head (4) stationary, loosen the toe link mounting cam bolt nut (3).
3. Rotate the cam bolt head (4) left or right until the rear wheel toe for that rear wheel is set to the preferred specification. See **Specifications**
4. While holding the cam bolt head (4) stationary, tighten the toe link mounting cam bolt nut (3) to 100 N.m (74 ft. lbs.).

FRONT TOE

NOTE: Perform the following at each front wheel as necessary.

CAUTION: Do not twist the inner tie rod-to-steering gear boot (bellows) while turning the inner tie rod during front toe adjustment. It may be necessary to remove the clamp where the boot meets the inner tie rod.

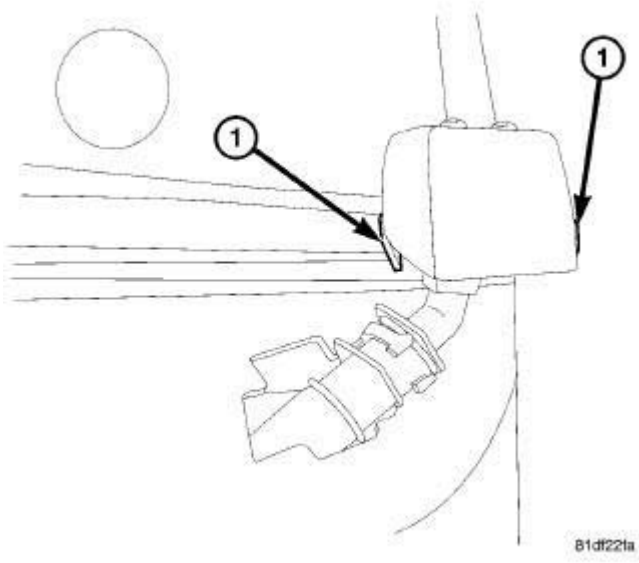

Fig. 119: Tie Rod Jam Nut
Courtesy of CHRYSLER LLC

5. Loosen the tie rod adjusting jam nut (1). Grasp the inner tie rod (3) and rotate it one way or the other until the front wheel toe is set to the preferred specification. See **Specifications**
6. Tighten the tie rod adjusting jam nut to of 75 N.m (55 ft. lbs.).
7. Make sure the inner tie rod-to-steering gear boot is not twisted. If removed, reinstall the clamp where the boot meets the inner tie rod.

ALL

8. Remove the steering wheel clamp.
9. Remove the alignment equipment.
10. Road test the vehicle to verify the steering wheel is straight and the vehicle does not pull or wander.

SPECIFICATIONS

WHEEL ALIGNMENT

NOTE: All specifications are given in degrees.

NOTE: All wheel alignments are to be set with the vehicle at curb height. See Standard Procedure

NOTE: Curb (ride) height specifications can be found in the Curb Height Measurement procedure. See Standard Procedure

ALL EXCEPT EXPORT

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.10°	-0.65° to +0.45°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
CASTER	+3.00°	+2.00° to +4.00°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	-0.50° to +0.50°
TOE - TOTAL*	+0.10°	-0.25° to +0.45°
Notes: * TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe (+) is toe-in and negative toe (-) is toe-out.		

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.60°	-1.25° to +0.05°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.90° to +0.90°
TOE - INDIVIDUAL	0.00°	-0.15° to +0.15°
TOE - TOTAL*	0.00°	-0.30° to +0.30°
THRUST ANGLE	0.00°	-0.15° to +0.15°
Notes: * TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe (+) is toe-in and negative toe (-) is toe-out.		

EXPORT

FRONT WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE
CAMBER	-0.13°	-0.68° to +0.42°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.80° to +0.80°
CASTER	+3.00°	+2.00° to +4.00°
Cross Caster (Maximum Side-To-Side Difference)	0.00°	-0.50° to +0.50°
TOE - TOTAL*	+0.10°	-0.25° to +0.45°
Notes: * TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe. Positive toe (+) is toe-in and negative toe (-) is toe-out.		

REAR WHEEL ALIGNMENT	PREFERRED SETTING	ACCEPTABLE RANGE

CAMBER	-0.40°	-1.05° to +0.25°
Cross Camber (Maximum Side-To-Side Difference)	0.00°	-0.90° to +0.90°
TOE - INDIVIDUAL	0.00°	-0.15° to +0.15°
TOE - TOTAL*	0.00°	-0.30° to +0.30°
THRUST ANGLE	0.00°	-0.15° to +0.15°

Notes:
* TOTAL TOE is the sum of both the left and right wheel toe settings. TOTAL TOE should be equally split between each wheel on the same axle to ensure the steering wheel is centered after setting toe.
Positive toe (+) is toe-in and negative toe (-) is toe-out.

2009 SUSPENSION

Rear Suspension - Grand Caravan, Town & Country

DESCRIPTION

DESCRIPTION

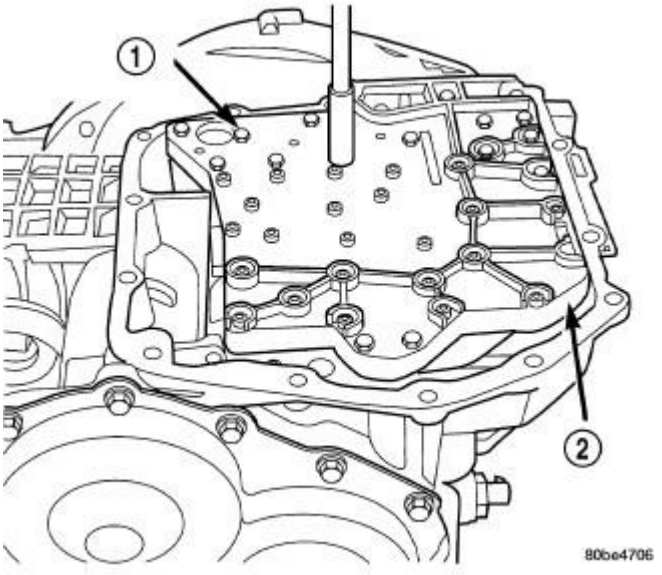

Fig. 1: Identifying Rear Suspension Components
Courtesy of CHRYSLER LLC

The rear suspension design used on this vehicle is a twist beam trailing axle type with vertically mounted coil springs.

The rear suspension consists of these major components:

- Axle (3)
- Coil spring (2 per vehicle) (1)
- Hub and bearing (2 per vehicle)
- Jounce bumper (2 per vehicle)
- Shock absorber (2 per vehicle) (4)
- Track bar (2)

The rear axle has a tubular torsion tube running through the center of its width. It also has two trailing arms, one extending from each end of the axle forward. Each trailing arm has a rubber pivot bushing pressed into it. The bushings can be serviced separately.

The springs used on the rear suspension are the coil type. They are mounted straight above the rear axle beam in

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line with the rear wheels. Both ends of the coil spring are identical. Either end of the spring can be the top or the bottom. Coil springs come in various heights and weight loads; be sure the correct spring is in use.

WARNING

WARNINGS AND CAUTIONS

WARNING: Chrysler LLC does not manufacture any vehicles or replacement parts that contain asbestos. Aftermarket products may or may not contain asbestos. Refer to aftermarket product packaging for product information.

Whether the product contains asbestos or not, dust and dirt can accumulate on brake parts during normal use. Follow practices prescribed by appropriate regulations for the handling, processing and disposing of dust and debris.

CAUTION: Only frame contact or wheel lift hoisting equipment can be used on this vehicle. It cannot be hoisted using equipment designed to lift a vehicle by the rear axle. If this type of hoisting equipment is used, damage to rear suspension components will occur.

NOTE: If a rear suspension component becomes bent, damaged or fails, no attempt should be made to straighten or repair it. Always replace it with a new component.

SPECIFICATIONS

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Axle Parking Brake Cable Bracket Bolts	6	-	55
Axle Trailing Arm Bracket-to-Body Bolts	54	40	-
Axle Trailing Arm Pivot Thru-Bolt	175	129	-
Brake Caliper Adapter Mounting Bolts	100	74	-
Hub And Bearing Mounting Bolts	55	41	-
Shock Absorber Lower Mounting Bolt	75	55	-
Shock Absorber Upper Mounting Bolt	75	55	-
Track Bar Mounting Bolt Nut	81	60	-
Wheel Mounting (Lug) Nuts	135	100	-

SPECIAL TOOLS

SPECIAL TOOLS

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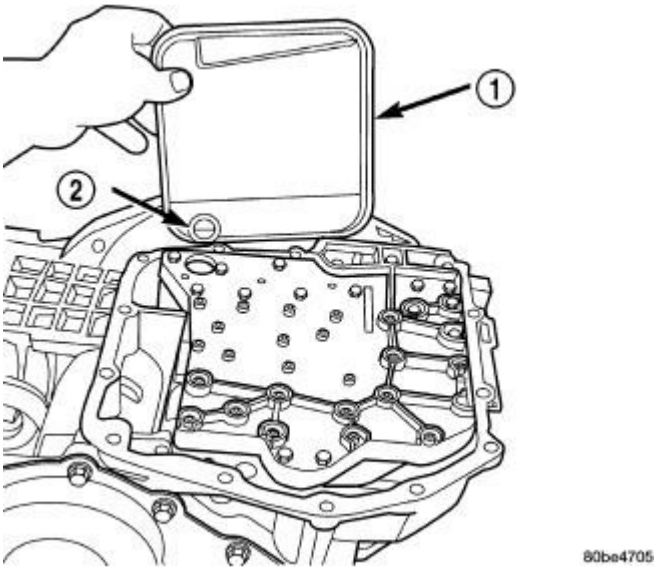

Fig. 2: Ball Joint Press C-4212F
Courtesy of CHRYSLER LLC

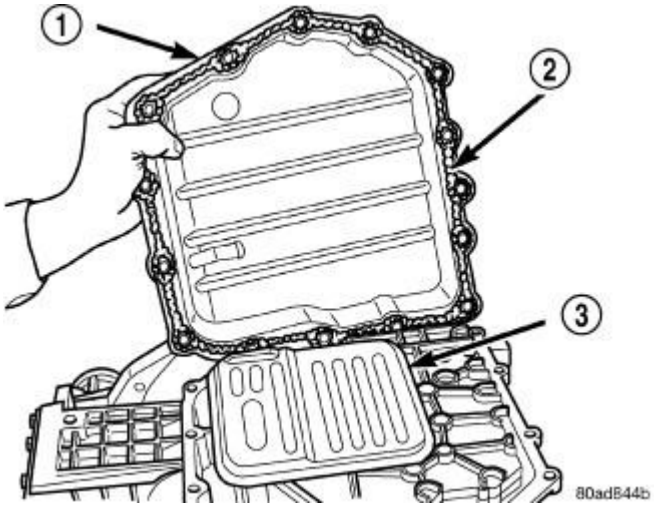

Fig. 3: Remover/Installer 10106
Courtesy of CHRYSLER LLC

AXLE ASSEMBLY, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

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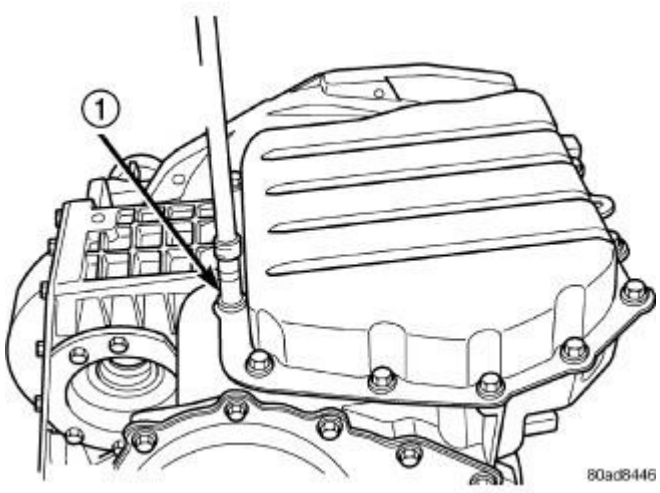

Fig. 4: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

2. On each side of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

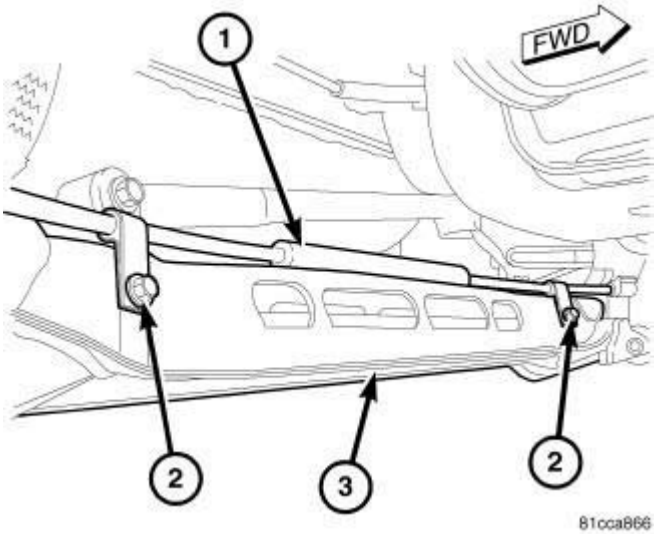

Fig. 5: Removing/Installing Right Rear Parking Brake Cable Screws At Front Of Axle
Courtesy of CHRYSLER LLC

3. Remove screw securing left rear parking brake cable to left axle trailing arm.
4. Remove screws (2) securing right rear parking brake cable (1) to front of axle (3).

NOTE: Perform Steps 5 through 12 on each side of the vehicle.

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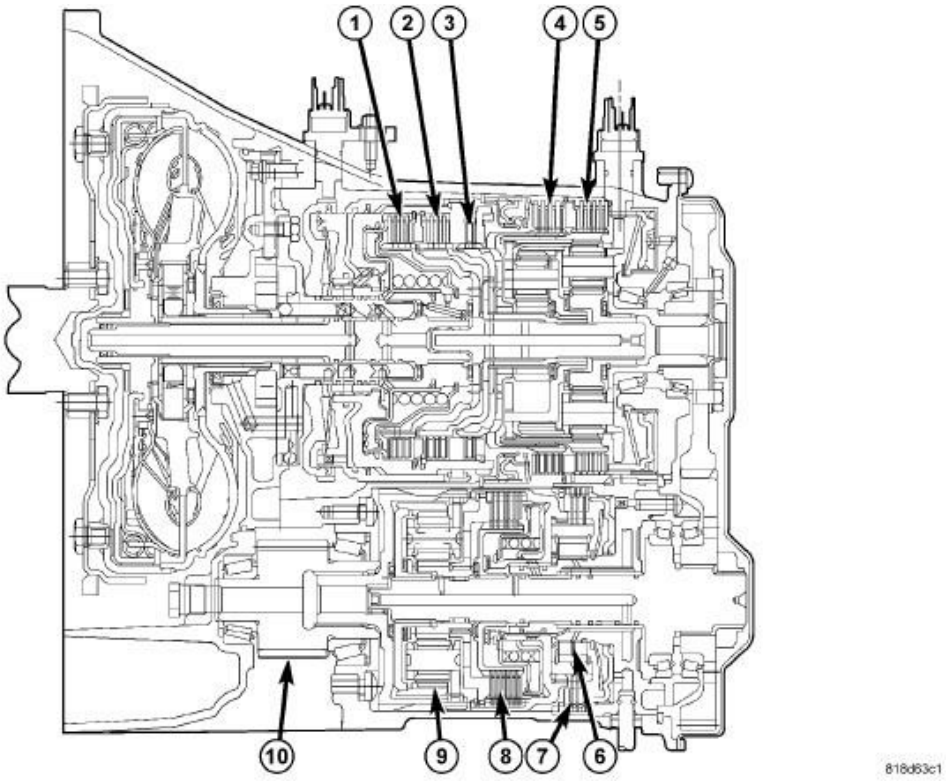

Fig. 6: Removing/Installing Disc Brake Caliper & Adapter Bracket
Courtesy of CHRYSLER LLC

5. Remove screw (3) securing parking brake cable routing bracket to axle.
6. Remove two bolts (2) securing disc brake caliper and adapter bracket (1) to axle.
7. Remove disc brake caliper and adapter bracket (1) from axle and rotor (4) as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

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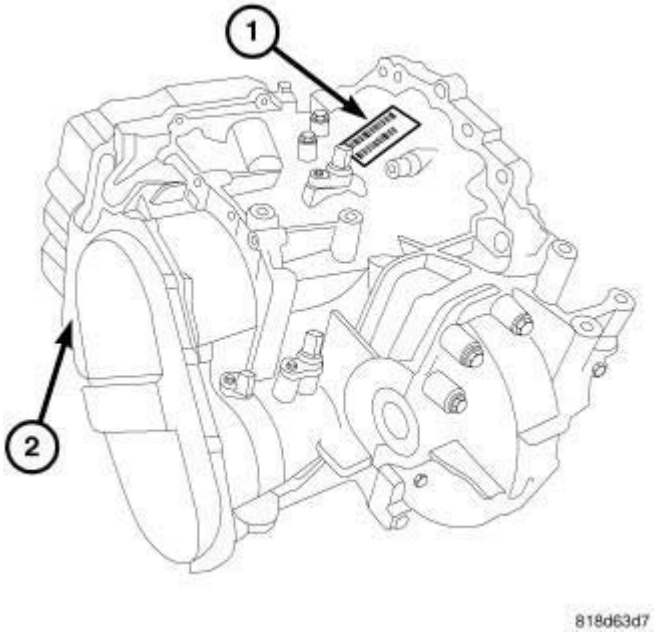

Fig. 7: Identifying Brake Rotor & Wheel Bearing
Courtesy of CHRYSLER LLC

8. Remove any retaining clips, then slide brake rotor (2) off hub and bearing (1).

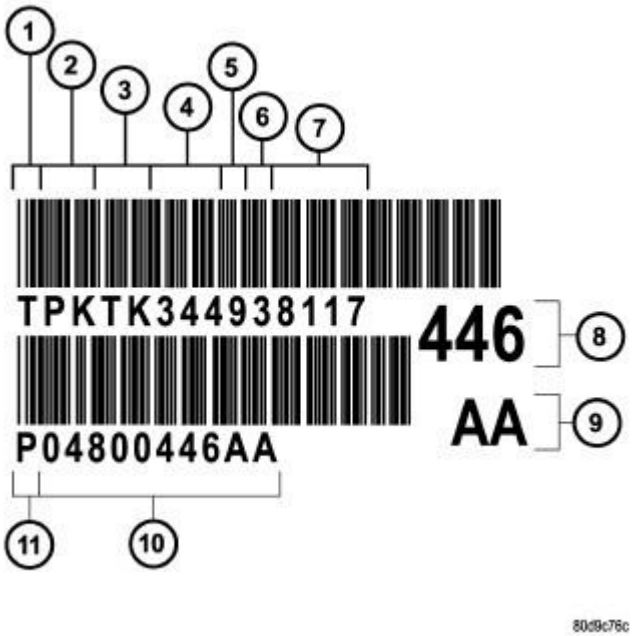

Fig. 8: Identifying Wheel Speed Sensor Routing Clip
Courtesy of CHRYSLER LLC

9. Remove wheel speed sensor routing clip (2) from rear axle.

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CAUTION: Prior to removal, clean area around sensor head to help prevent contaminants from entering bearing when sensor head is removed.

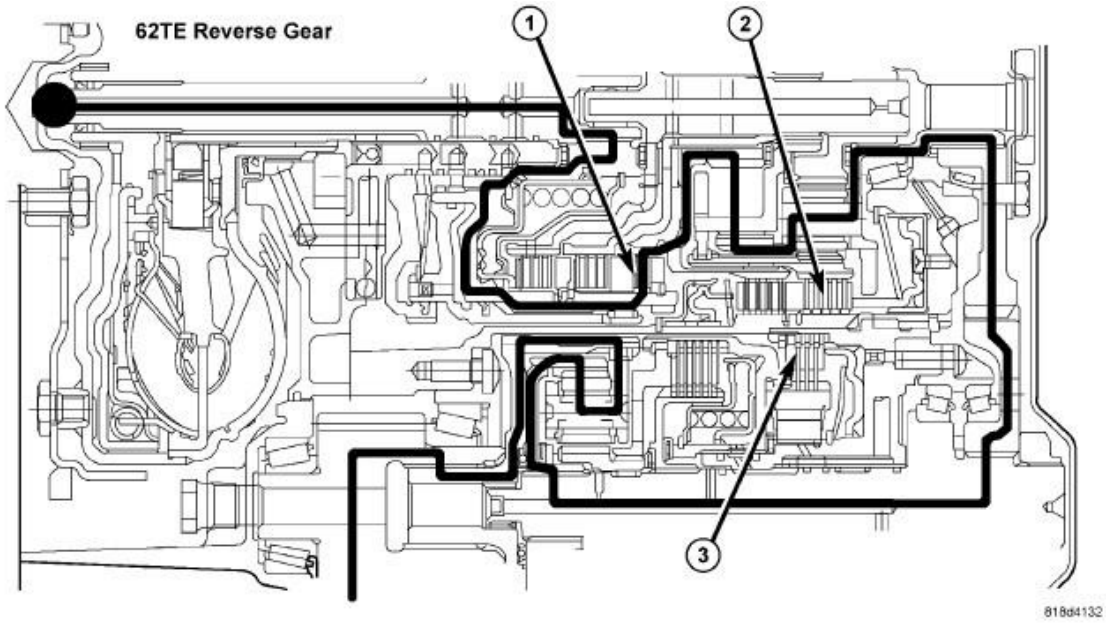

Fig. 9: Removing/Installing Wheel Speed Sensor
Courtesy of CHRYSLER LLC

10. Remove screw (2) fastening speed sensor head (1) to hub and bearing (3).
11. Remove wheel speed sensor from hub and bearing.

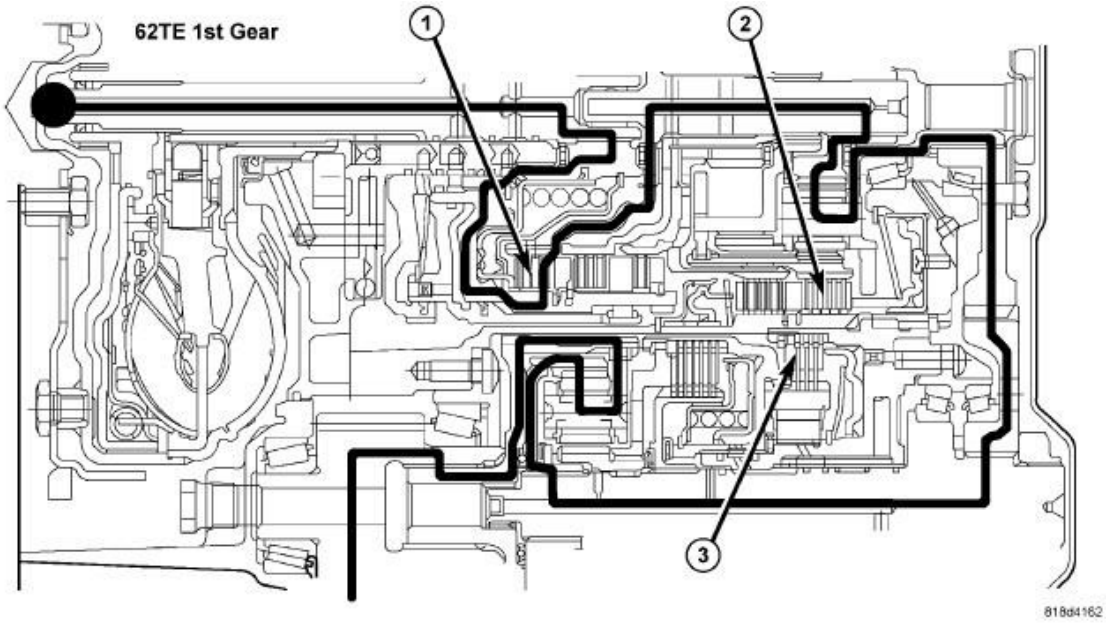

Fig. 10: Removing/Installing Rear Hub & Bearing
Courtesy of CHRYSLER LLC

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12. Remove bolts (2) securing hub and bearing (1) to axle (3). Remove hub and bearing and brake shield.
13. Position transmission jack or equivalent under center of axle raising it enough to support axle.

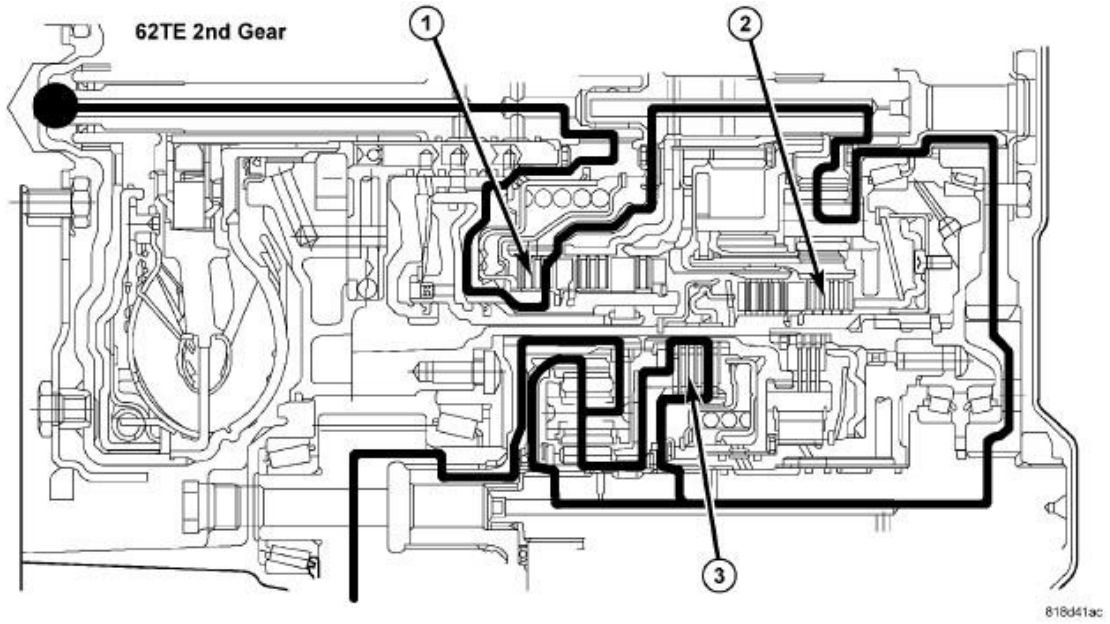

Fig. 11: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

14. Remove bolt (3) and nut securing track bar (2) to axle (4).

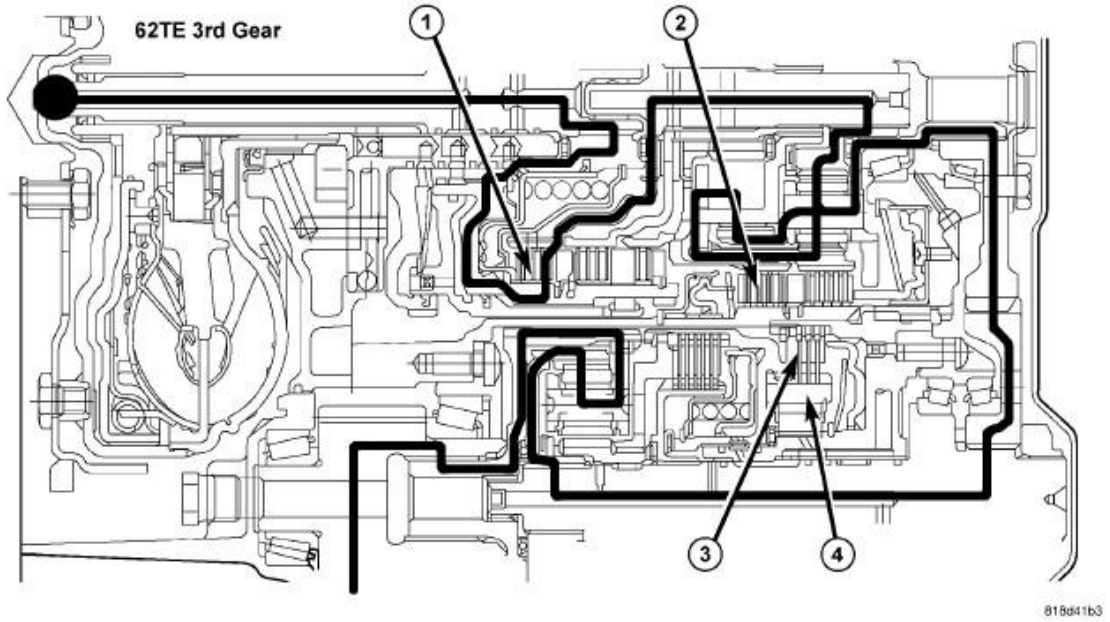

Fig. 12: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

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15. On each side of vehicle, remove lower mounting bolt (4) and nut (3) securing shock absorber (5) to axle.

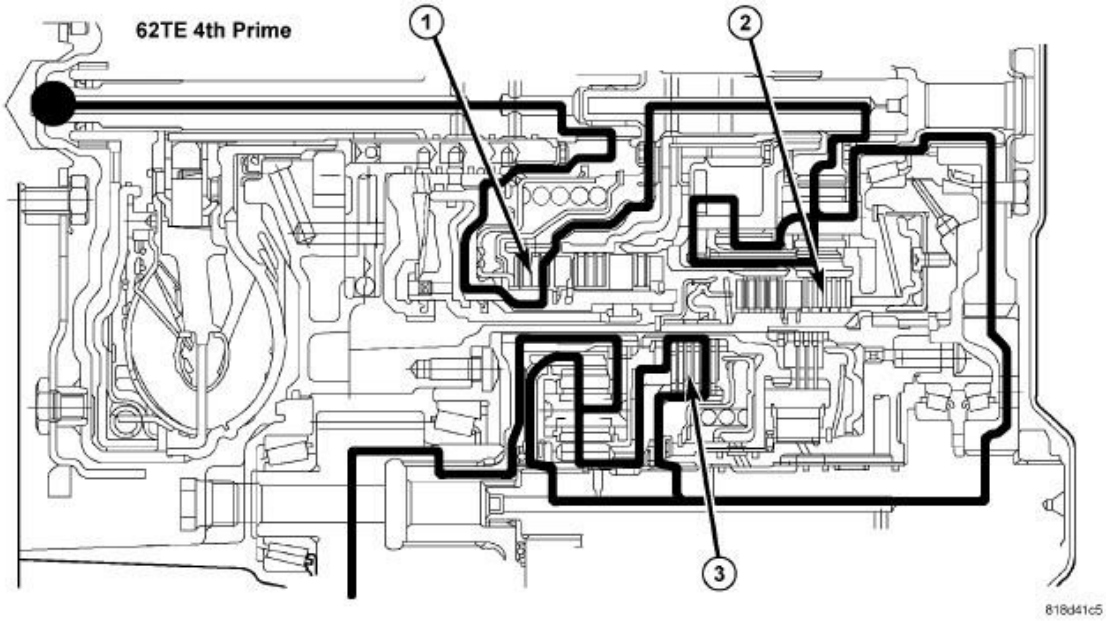

Fig. 13: Removing/Installing Coil Springs, Jounce Bumpers, & Lower Isolators
Courtesy of CHRYSLER LLC

16. Lower jack until each coil spring (1) can be removed from axle.
17. Remove both coil springs (1), jounce bumpers (2) and lower isolators (3).

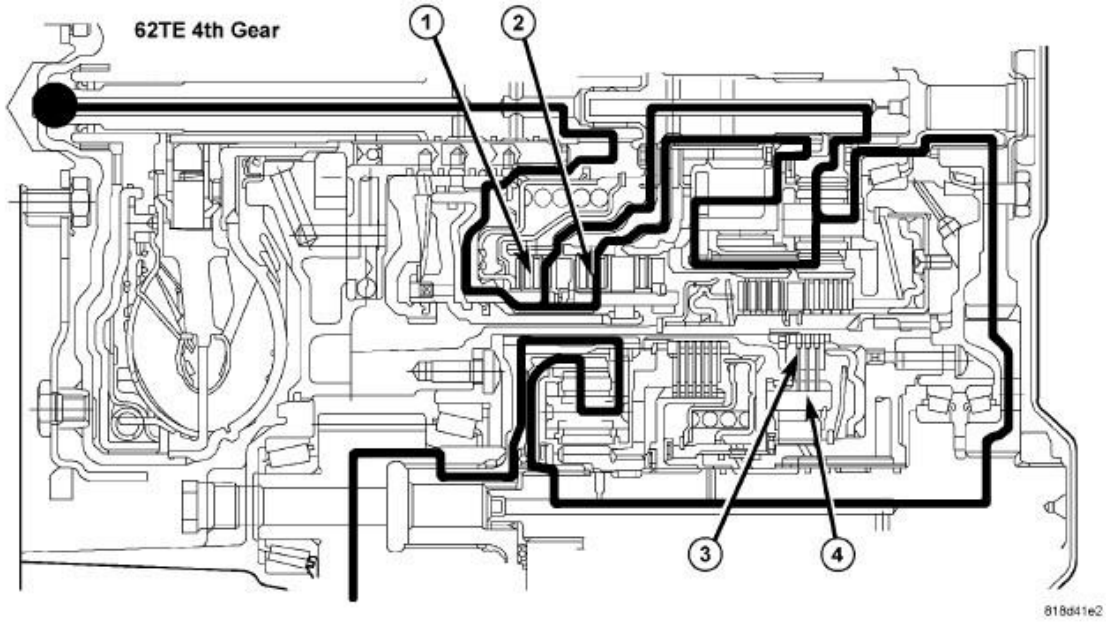

Fig. 14: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt
Courtesy of CHRYSLER LLC

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18. On each side of vehicle, remove nut (1) and thru-bolt (3) fastening axle trailing arm (2) to forward mounting bracket (4) on body.
19. Lower jack and remove axle from vehicle.

INSPECTION

INSPECTION

Verify proper torque of all axle fasteners.

Inspect the axle looking for damage or bending. If damage is evident, the axle must be replaced.

Inspect for broken or cracked welds at each end of the twist beam within the axle. Inspect for broken or cracked welds at each axle trailing arm bushing bore. If a problem is present, the axle must be replaced.

Inspect the bushings at the leading ends of the axle trailing arms. Look for damage or deterioration of the bushings. Make sure the bushings are centered side-to-side in their bore. If a problem exists, the bushings must be replaced. They can be replaced separately from the axle.

INSTALLATION

INSTALLATION

1. Center the axle beam on a transmission jack or equivalent standing at axle removal height.

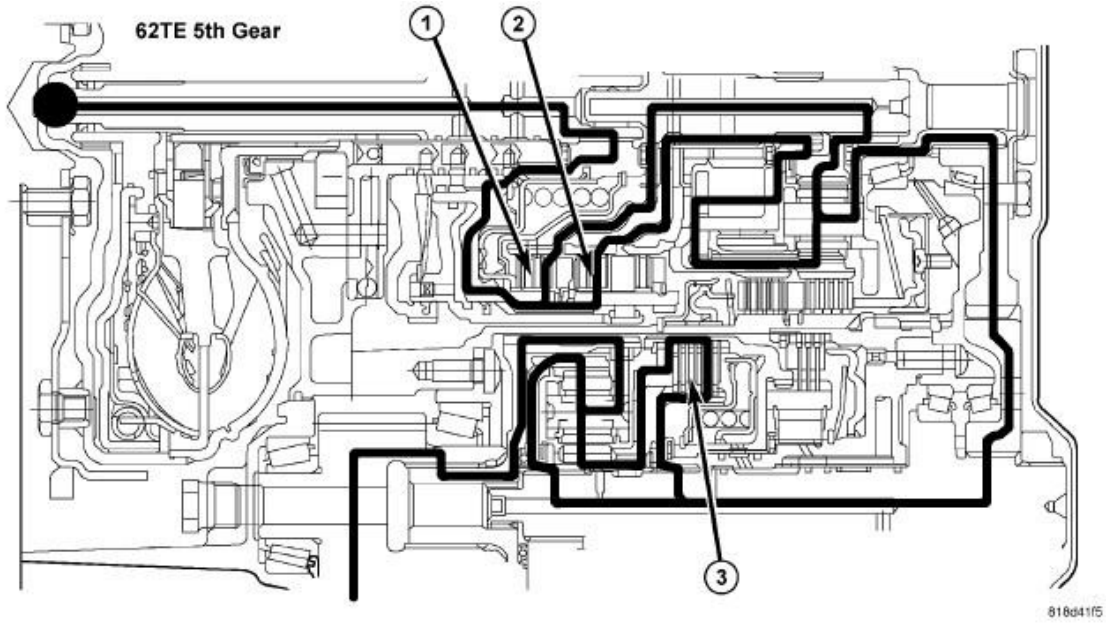

Fig. 15: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt
Courtesy of CHRYSLER LLC

2. Raise jack as necessary, then swing the axle trailing arms (2) upward aligning bushings with brackets (4)

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mounted on body.

3. At each trailing arm (2), install a thru-bolt (3) through mounting bracket (4) and bushing. Install a nut (1) on end of each thru-bolt. Do not tighten at this time.

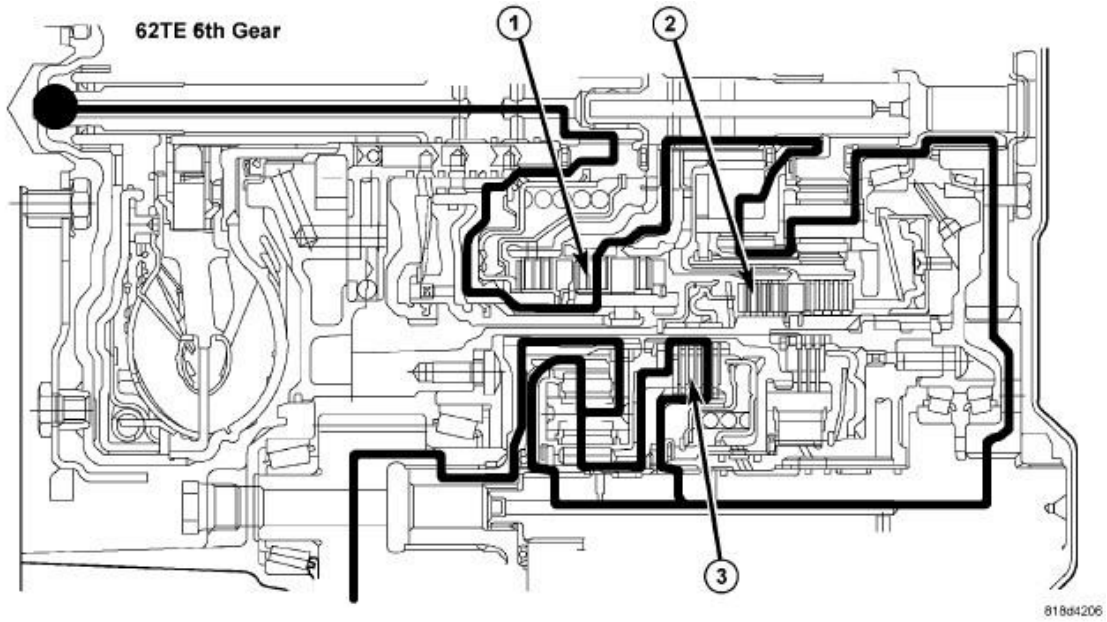

Fig. 16: Removing/Installing Coil Springs, Jounce Bumpers, & Lower Isolators
Courtesy of CHRYSLER LLC

NOTE: Although both ends of the coil spring may appear identical, they are not. Be sure to place the end with the tag upward.

4. Install a lower isolator (3) and jounce bumper (2) on end of each coil spring.
5. Place coil spring (2) between body perch and axle at each end of axle. Be sure to place jounce bumper (2) at top.

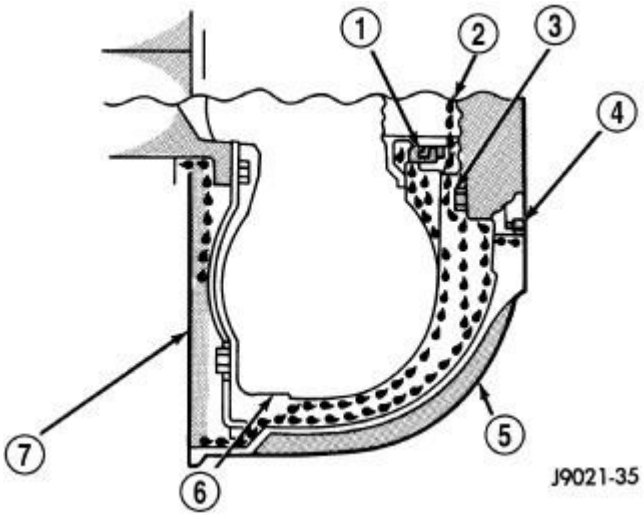

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Fig. 17: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

6. Raise jack guiding the coil springs into mounted position. Continue to raise jack until shock absorber lower mounting bolts can be installed though the axle brackets and shock absorber lower mounting eyes.
7. At each shock absorber, install lower mounting bolt (4) and nut (3). Do not tighten at this time.

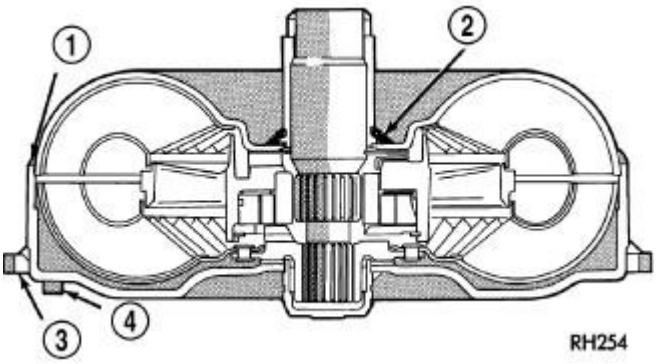

Fig. 18: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

8. Install bolt (3) and nut securing track bar (2) to axle (4). Do not tighten at this time.
9. Remove jack from under axle.

NOTE: Perform Steps 10 through 17 on each side of the vehicle.

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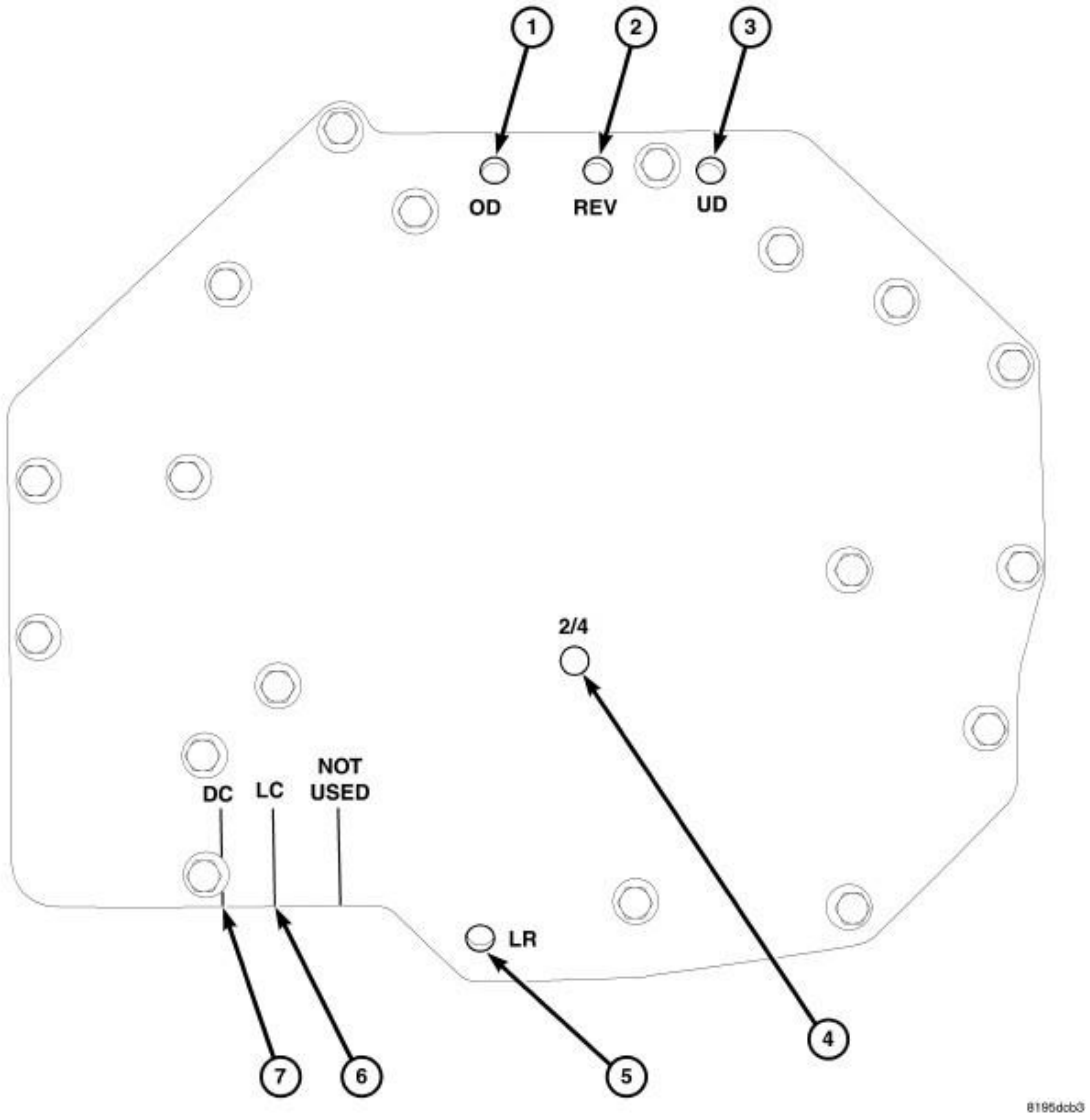

Fig. 19: Removing/Installing Rear Hub & Bearing
Courtesy of CHRYSLER LLC

10. Install hub and bearing and brake shield onto end of axle. Install mounting bolts (2) securing hub and bearing (1) to axle (3). Tighten the mounting bolts to 55 N.m (41 ft. lbs.).

CAUTION: Ensure that wheel speed sensor mounting surface on bearing is clean before sensor installation.

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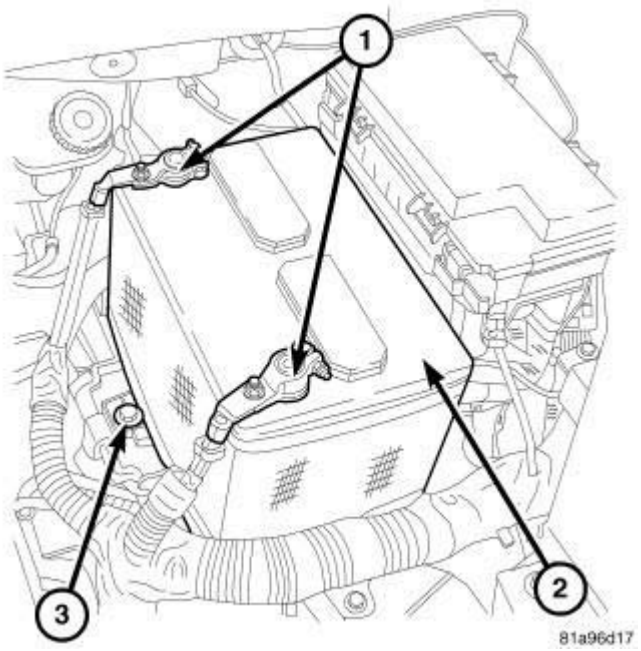

Fig. 20: Removing/Installing Wheel Speed Sensor
Courtesy of CHRYSLER LLC

11. Push wheel speed sensor head (1) into mounting hole in hub and bearing (3) and align mounting screw hole.
12. Install NEW mounting screw (2). Tighten mounting screw to 6 N.m (55 in. lbs.).

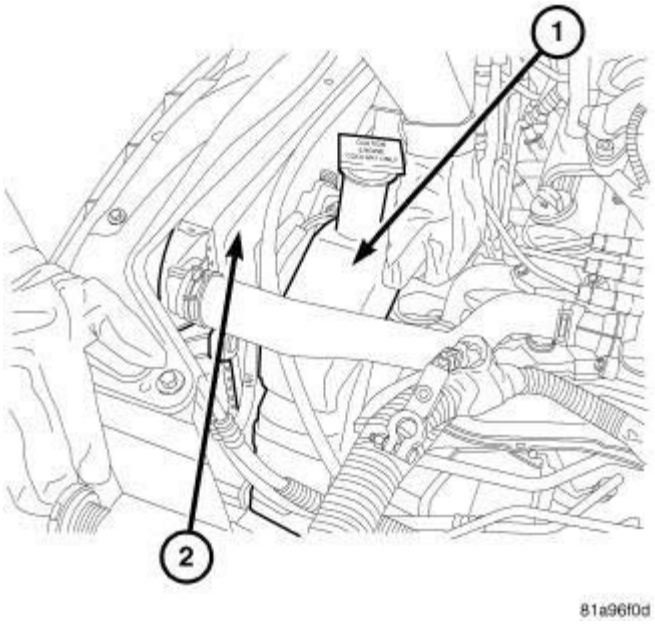

Fig. 21: Identifying Wheel Speed Sensor Routing Clip
Courtesy of CHRYSLER LLC

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13. Install wheel speed sensor routing clip (2) into hole in rear axle.

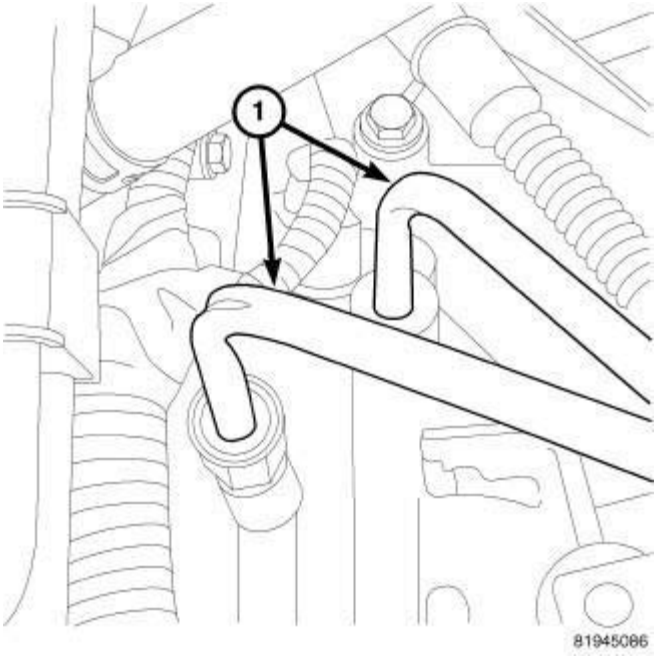

Fig. 22: Identifying Brake Rotor & Wheel Bearing
Courtesy of CHRYSLER LLC

14. Install brake rotor (2) over hub and bearing (1). Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation** .

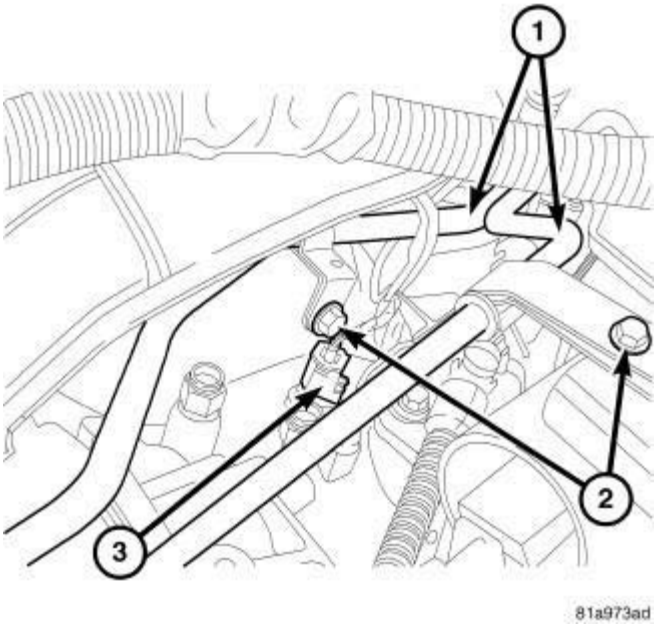

Fig. 23: Removing/Installing Disc Brake Caliper & Adapter Bracket
Courtesy of CHRYSLER LLC

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15. Install disc brake caliper and adapter bracket (1) over axle and rotor as an assembly.
16. Install two bolts (2) securing disc brake caliper and adapter bracket (1) to axle. Tighten mounting bolts to 100 N.m (74 ft. lbs.).
17. Position parking brake cable routing bracket to axle and install screw securing it in place. Tighten screw to 6 N.m (55 in. lbs.).

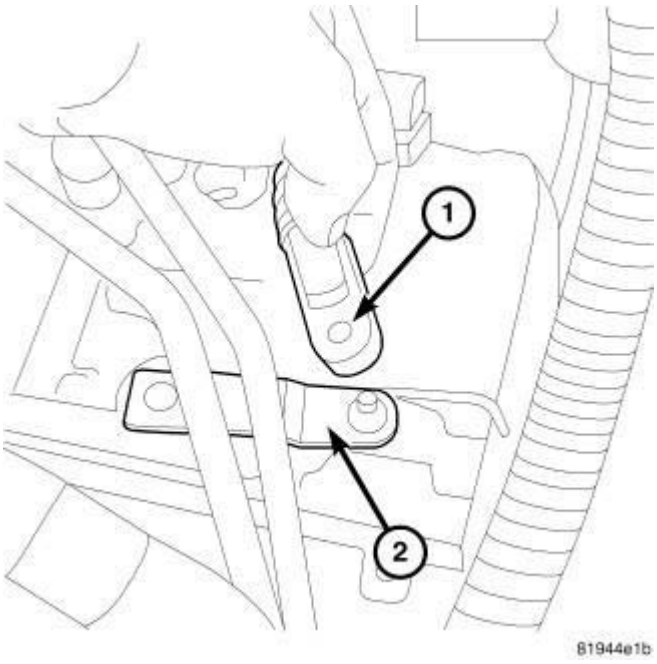

Fig. 24: Removing/Installing Right Rear Parking Brake Cable Screws At Front Of Axle
Courtesy of CHRYSLER LLC

18. Position right rear parking brake cable (1) in front of axle (3) and install screws (2) securing cable in place. Tighten screws to 6 N.m (55 in. lbs.).
19. Position left rear parking brake cable routing clamp at left axle trailing arm. Tighten screw to 6 N.m (55 in. lbs.).

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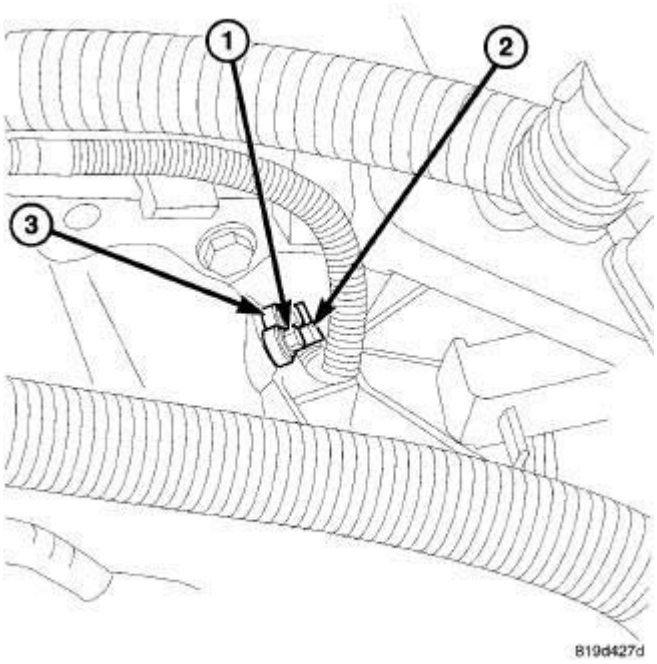

Fig. 25: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

20. On each side of vehicle, install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
21. Lower vehicle.
22. Pump the brake pedal several times to ensure the vehicle has a firm brake pedal before moving the vehicle.
23. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access the rear suspension while keeping vehicle at curb (riding) height.

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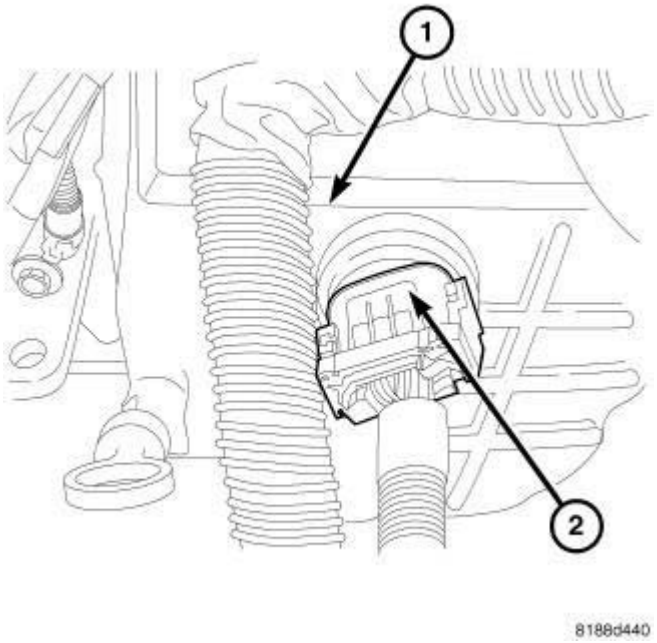

Fig. 26: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt
Courtesy of CHRYSLER LLC

24. Tighten both trailing arm mounting bracket pivot thru-bolts (3) to 175 N.m (129 ft. lbs.).

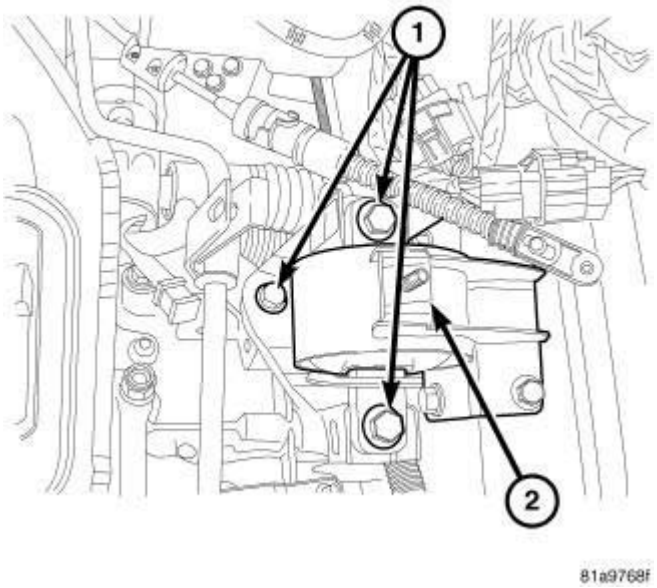

Fig. 27: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

25. Tighten shock absorber lower mounting bolt nut (1) to 75 N.m (55 ft. lbs.).

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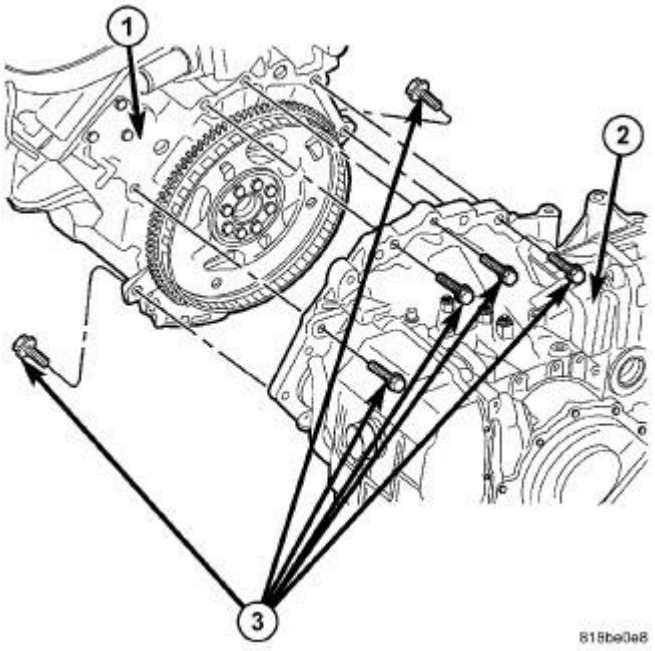

Fig. 28: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

26. Tighten track bar lower mounting bolt nut (3) to 81 N.m (60 ft. lbs.).

BUMPER, JOUNCE

REMOVAL

REMOVAL

The jounce bumper is removed with the coil spring. See **Rear Suspension/SPRING(S) - Removal**.

INSTALLATION

INSTALLATION

The jounce bumper is installed with the coil spring. See **Rear Suspension/SPRING(S) - Installation**.

BUSHING(S), AXLE TRAILING ARM

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

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1. Raise and support vehicle. Be sure not to place frame contact hoist rear lift arms in position that will hinder axle trailing arm bushing access. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

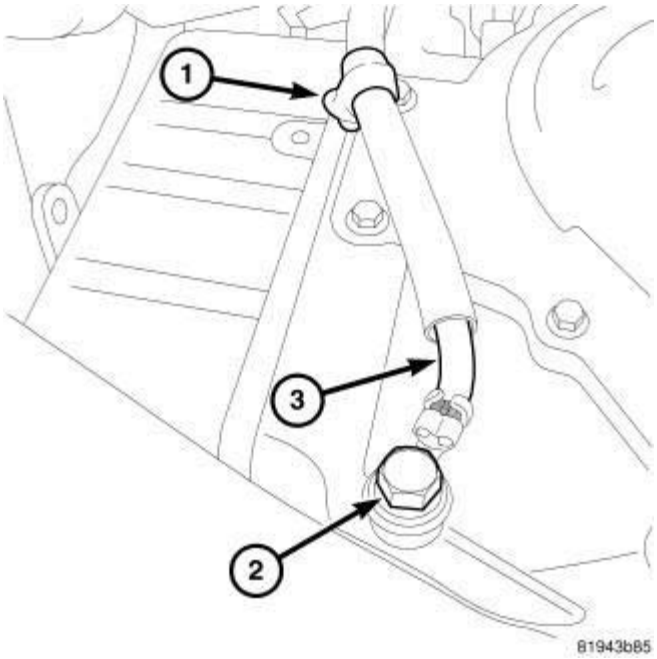

Fig. 29: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

2. On each side of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).

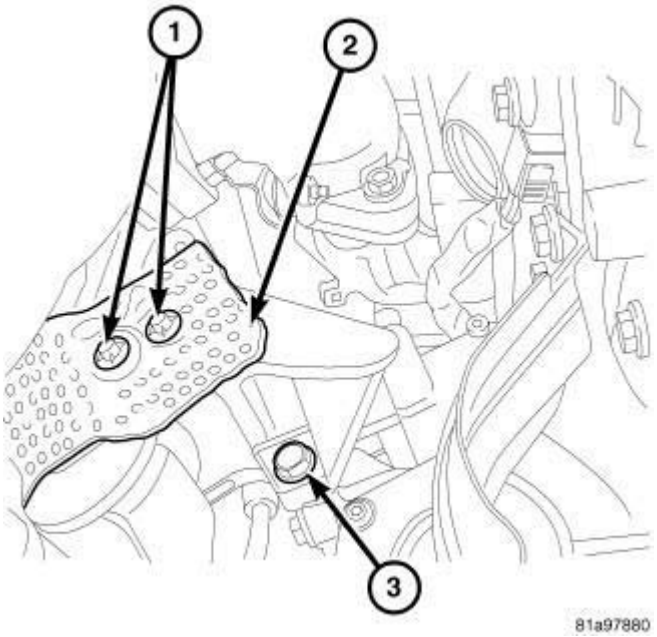

Fig. 30: Identifying Axle Trailing Arms & Mounting Brackets

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Courtesy of CHRYSLER LLC

3. Support each side of axle at coil springs. Place just enough load on jack stands to support axle at rear.

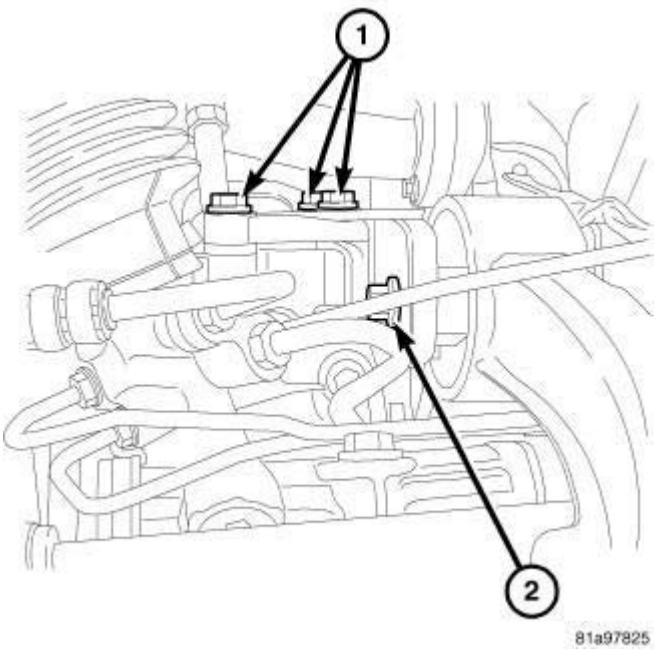

Fig. 31: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt
Courtesy of CHRYSLER LLC

4. On each side of vehicle, remove nut (1) and thru-bolt (3) fastening axle trailing arm (2) to forward mounting bracket (4) on body.

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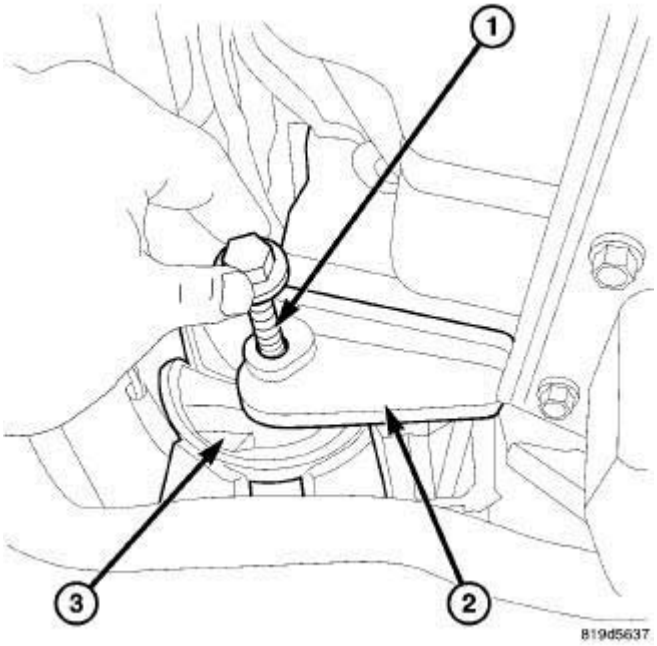

Fig. 32: Identifying Axle Trailing Arms & Mounting Brackets
Courtesy of CHRYSLER LLC

5. Pull forward end of axle trailing arms (2) downward just enough for bushings to clear mounting brackets (1). It may be necessary to place a wood block between arms and underbody to keep arms in this position.

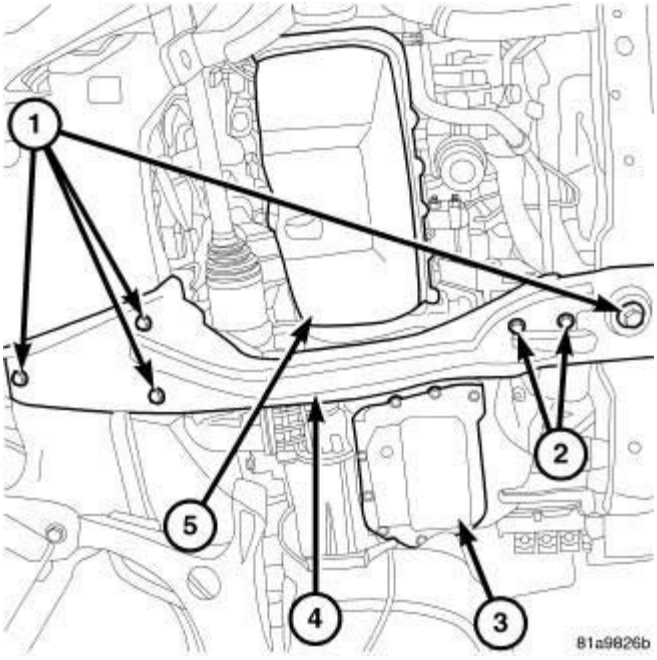

Fig. 33: Removing Bushing Using Special Tools
Courtesy of CHRYSLER LLC

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6. Assemble special tools Remover 10106-3 (1) and Receiver 10106-4 (3) on Press C-4212F (4).
7. Place special tool assembly over bushing (2) and trailing arm (5) as shown in **Fig. 33**. When properly installed, Press screw-drive will be toward outside of vehicle.

NOTE: Notch in Receiver 10106-4 (3) (notch not shown in illustration) should be placed straight back toward rear axle once installed.

8. Tighten Press (4) screw-drive, pressing bushing (2) out of trailing arm (5) into Receiver.
9. Remove tools and bushing from trailing arm. Discard used bushing.
10. If opposite side trailing arm bushing needs to be removed, repeat 6 through 9 on opposite side bushing.

INSTALLATION

INSTALLATION

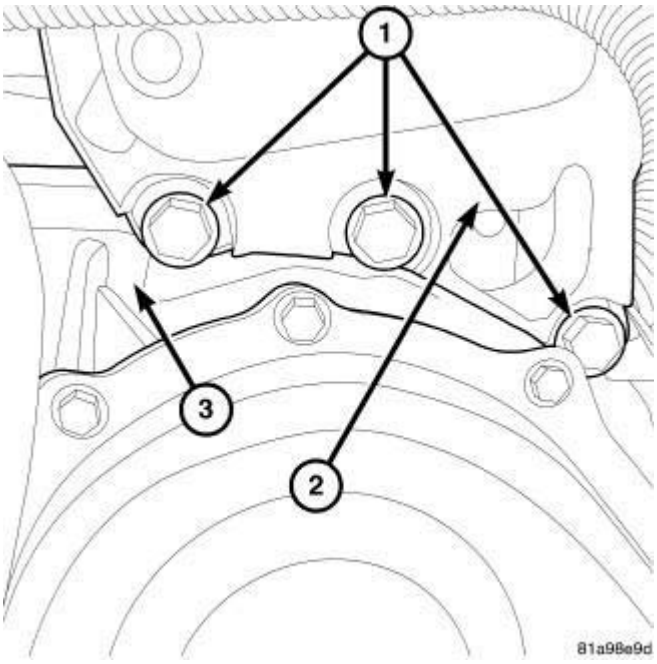

Fig. 34: Positioning Bushing By Lining Up Notches
Courtesy of CHRYSLER LLC

CAUTION: Bushing must be correctly positioned in axle trailing arm to insure proper operation. If bushing orientation is off by more than 10 degrees in either direction, NVH issues can occur.

1. Position NEW bushing in axle trailing arm bore from outboard side as shown in **Fig. 34**. Line up notches (1) as shown to point directly toward rear of arm.

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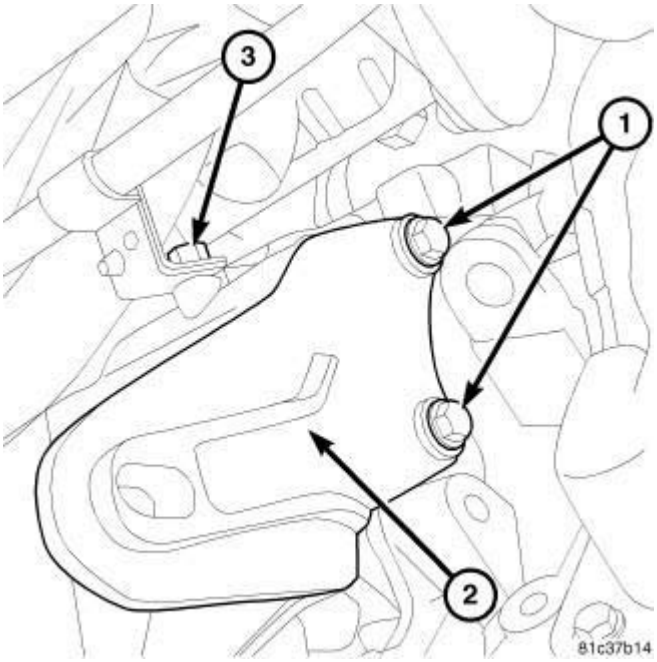

Fig. 35: Installing Bushing Using Special Tools
Courtesy of CHRYSLER LLC

2. Assemble special tools Receiver 10106-2 (1) and Installer 10106-1 (3) on Press C-4212F (4).
3. Place special tool assembly over bushing (2) and trailing arm (5) as shown in **Fig. 35**. Use care not to rotate bushing when installing special tools. When properly installed, Press screw-drive will be toward outside of vehicle.
4. Using hand tools, slowly tighten Press (4) screw-drive, pressing bushing into trailing arm. Tighten Press screw-drive until integrated stop is met. Do not overtighten.
5. Remove tools from axle trailing arm and inspect bushing making sure it is positioned as requested in 1.
6. If the opposite side bushing needs to be installed, repeat 1 through 5 on that side of the vehicle.

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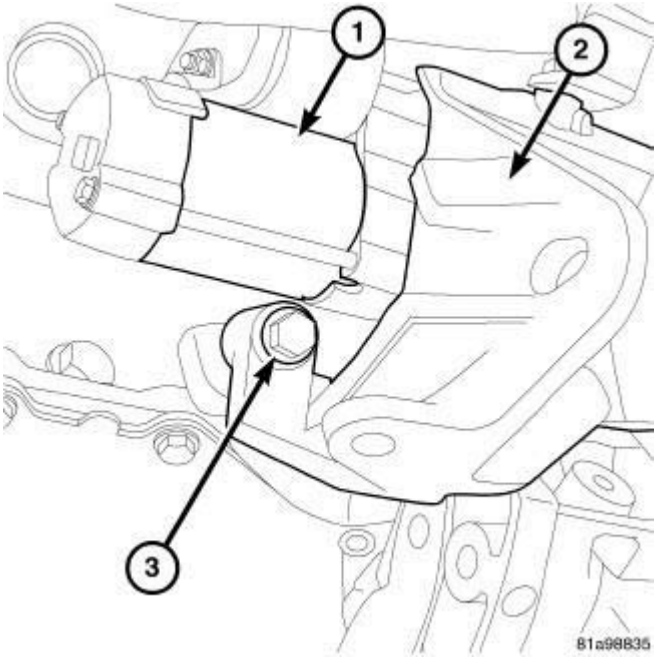

Fig. 36: Identifying Axle Trailing Arms & Mounting Brackets
Courtesy of CHRYSLER LLC

7. Reposition forward ends of axle trailing arms (2) downward into mounting brackets (1).

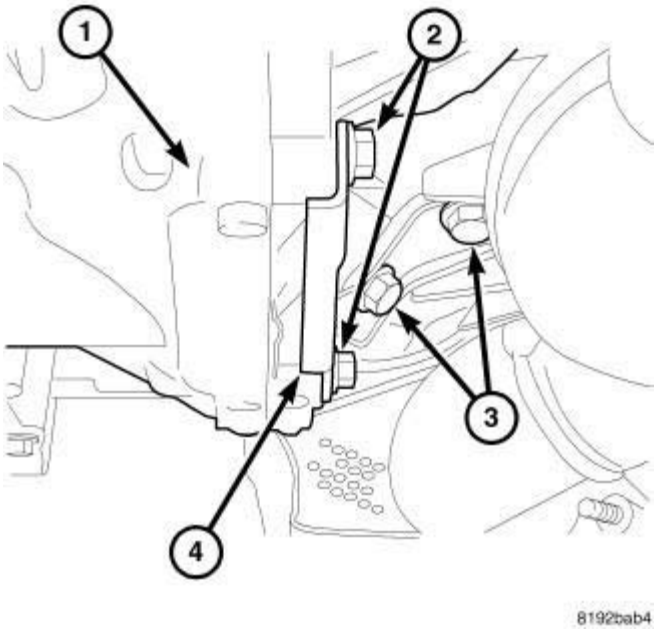

Fig. 37: Holding Bushing In Place Using Screwdriver Or Drift Punch
Courtesy of CHRYSLER LLC

8. Due to track bar mounting, it will be easiest to locate right side pivot thru-bolt mounting hole first. Once located, insert a screwdriver or drift punch through hole in right forward mounting bracket and bushing to

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temporarily hold it in place.

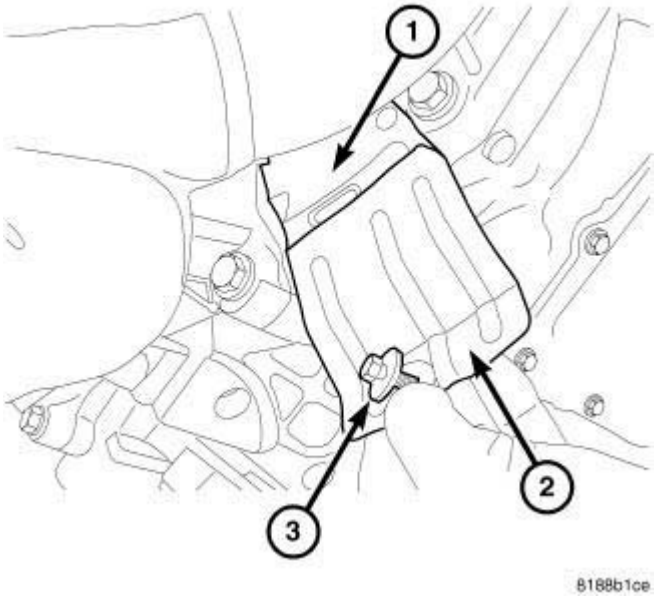

Fig. 38: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt
Courtesy of CHRYSLER LLC

9. On left side of vehicle, Insert thru-bolt (3) through mounting bracket (4) and bushing. Install nut (1) on end of thru-bolt. Do not tighten at this time.
10. On right side of vehicle, remove previously installer screwdriver or drift punch and Insert thru-bolt (3) through mounting bracket (4) and bushing. Install nut (1) on end of thru-bolt. Do not tighten at this time.
11. Remove jack stands from under rear axle.

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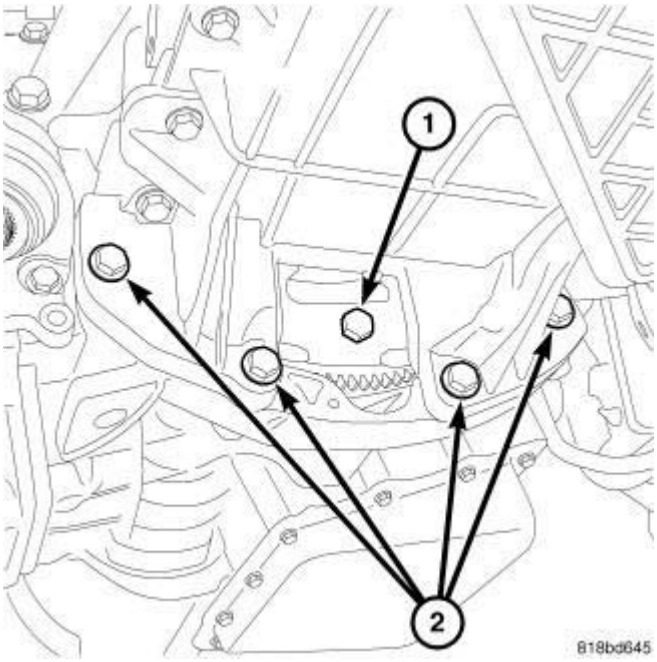

Fig. 39: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

12. On each side of vehicle, install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
13. Lower vehicle.
14. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access the rear suspension while keeping vehicle at curb (riding) height.

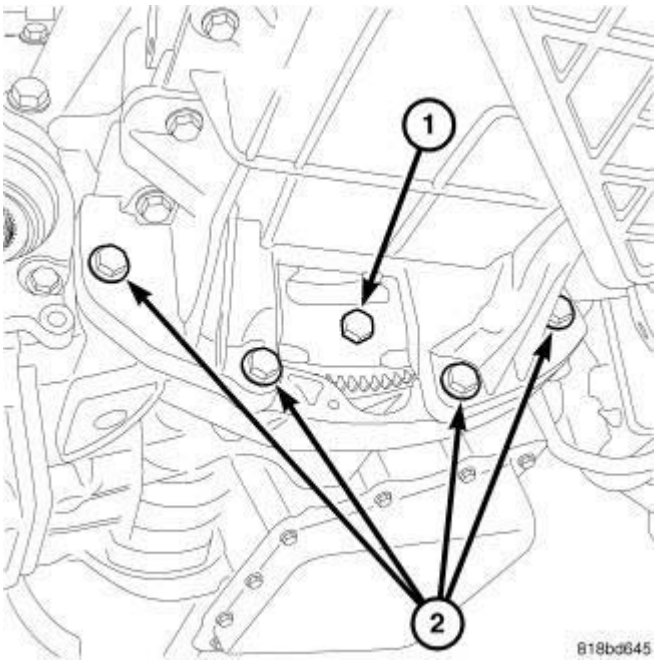

Fig. 40: Identifying Axle Trailing Arm, Forward Mounting Bracket, Nut, & Thru-Bolt

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Courtesy of CHRYSLER LLC

15. Tighten both trailing arm mounting bracket pivot thru-bolts (3) to 175 N.m (129 ft. lbs.).

HUB AND BEARING

DIAGNOSIS AND TESTING

HUB AND BEARING

NOTE: The wheel bearing is designed to last for the life of the vehicle and requires no type of periodic maintenance.

The following procedure may be used for diagnosing the condition of the wheel bearing and hub.

1. Remove the wheel and tire assembly, disc brake caliper and brake rotor. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Removal** .
2. Rotate the wheel hub checking for resistance or roughness.

Any roughness or resistance to rotation may indicate dirt intrusion or a failed hub bearing. If the bearing exhibits any of these conditions, the hub and bearing will require replacement. Do not attempt to disassemble the bearing for repair. If the wheel bearing is disassembled for any reason, it must be replaced.

Damaged bearing seals and the resulting excessive grease loss may also require bearing replacement. Moderate grease weepage from the bearing is considered normal and should not require replacement of the wheel bearing.

To diagnose a bent hub, measure hub runout. Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Diagnosis and Testing** .

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

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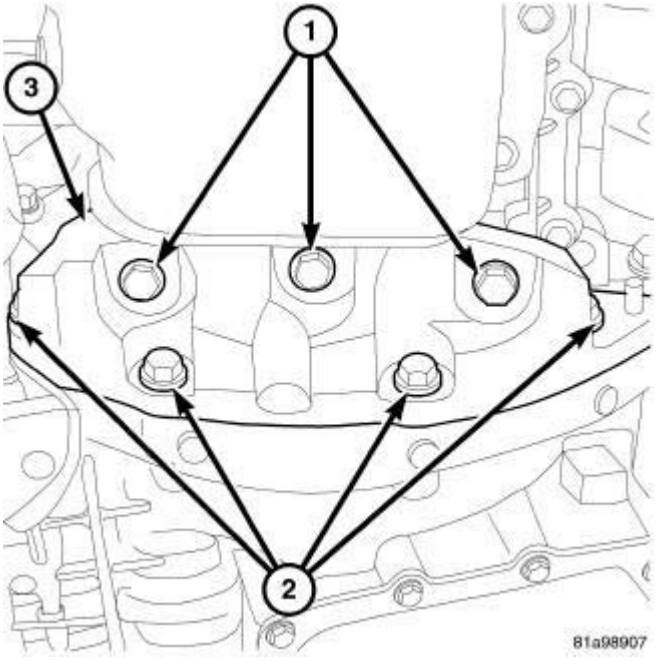

Fig. 41: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

2. Remove wheel mounting nuts (3), then rear tire and wheel assembly.
3. Right side only - Remove exhaust heat shield above exhaust system covering wheel speed sensor wiring connector.

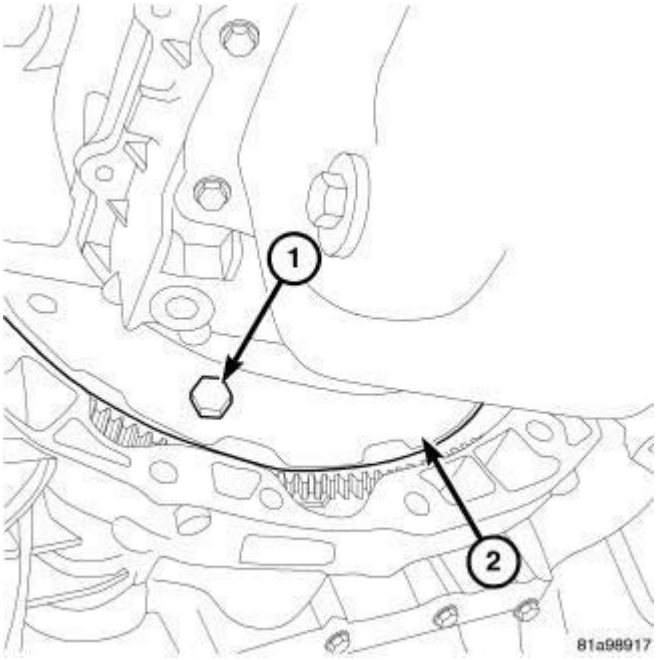

Fig. 42: Identifying Wheel Speed Sensor & Wiring Harness
Courtesy of CHRYSLER LLC

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4. Disconnect vehicle wiring harness (2) from wheel speed sensor (1) connector.
5. Remove wheel speed sensor (1) from routing clips along underbody of vehicle.

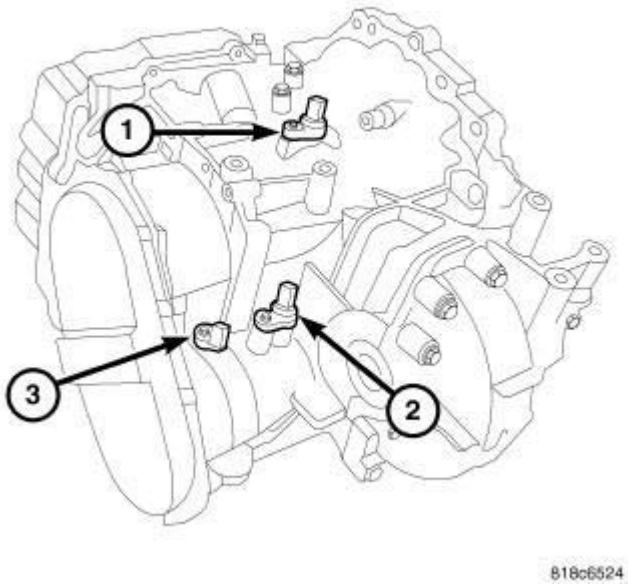

Fig. 43: Identifying Wheel Speed Sensor Routing Clip
Courtesy of CHRYSLER LLC

6. Remove wheel speed sensor (3) from routing clips (1) along brake flex hose.
7. Remove wheel speed sensor routing clip (2) from rear axle.

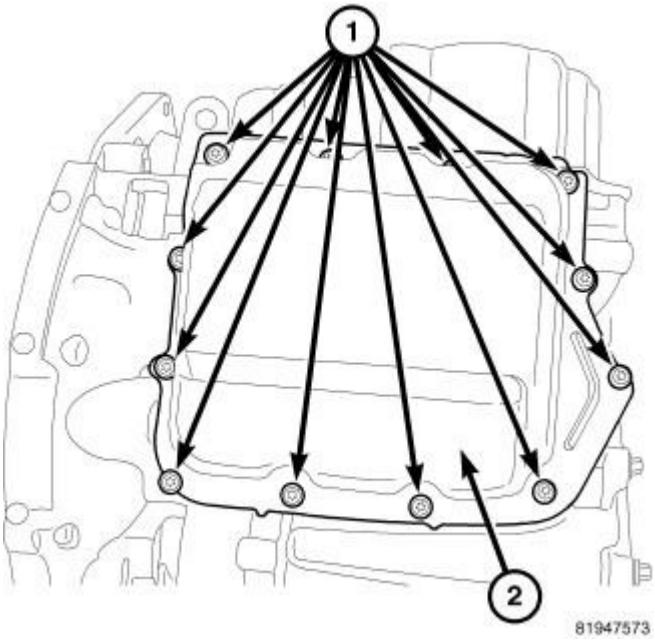

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Fig. 44: Removing/Installing Disc Brake Caliper & Adapter Bracket
Courtesy of CHRYSLER LLC

8. Remove screw (3) securing parking brake cable routing bracket to axle.
9. Remove two bolts (2) securing disc brake caliper and adapter bracket (1) to axle.
10. Remove disc brake caliper and adapter bracket (1) from axle and rotor (4) as an assembly. Hang assembly out of way using wire or a bungee cord. Use care not to overextend brake hose when doing this.

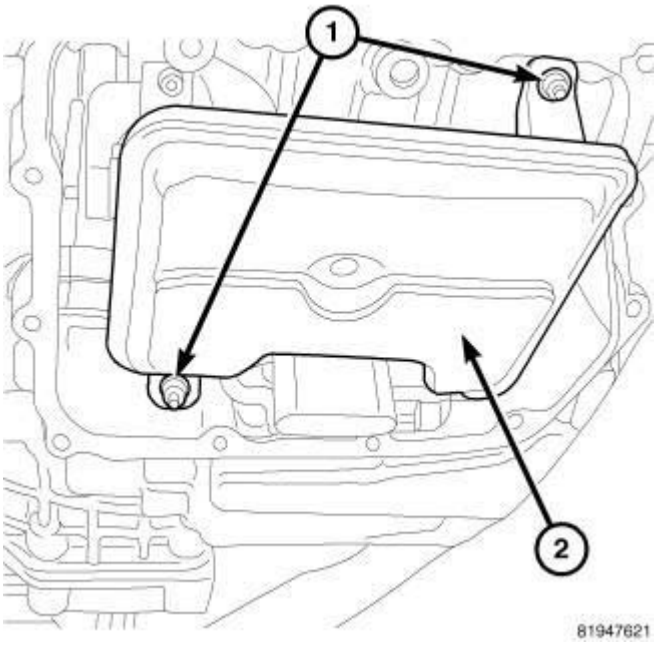

Fig. 45: Identifying Brake Rotor & Wheel Bearing
Courtesy of CHRYSLER LLC

11. Remove any retaining clips, then slide brake rotor (2) off hub and bearing (1).

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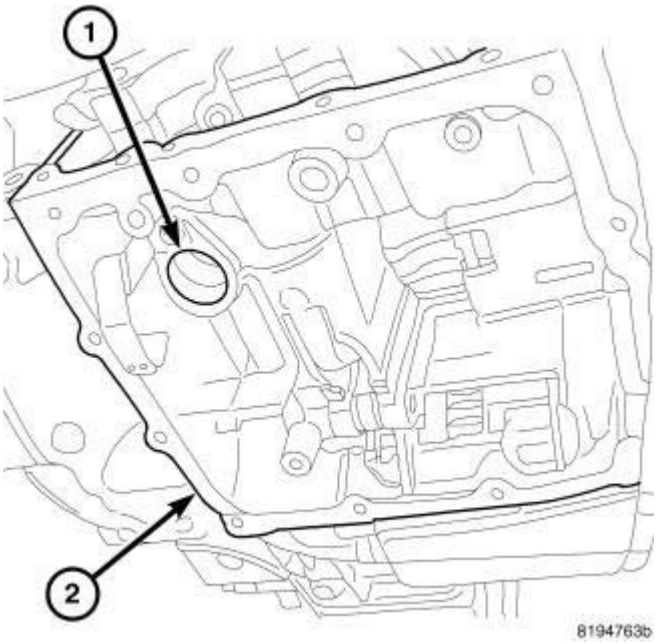

Fig. 46: Removing/Installing Rear Hub & Bearing
Courtesy of CHRYSLER LLC

12. Remove bolts (2) securing hub and bearing (1) to axle (3). Remove hub and bearing with wheel speed sensor attached and brake shield.
13. Separate brake shield from hub and bearing.

INSTALLATION

INSTALLATION

CAUTION: Hub and bearing mounting surfaces on axle and brake shield must be smooth and completely free of foreign material or nicks prior to installing hub and bearing assembly.

1. Position brake shield on wheel speed sensor and route wheel speed sensor cable through access hole in shield.

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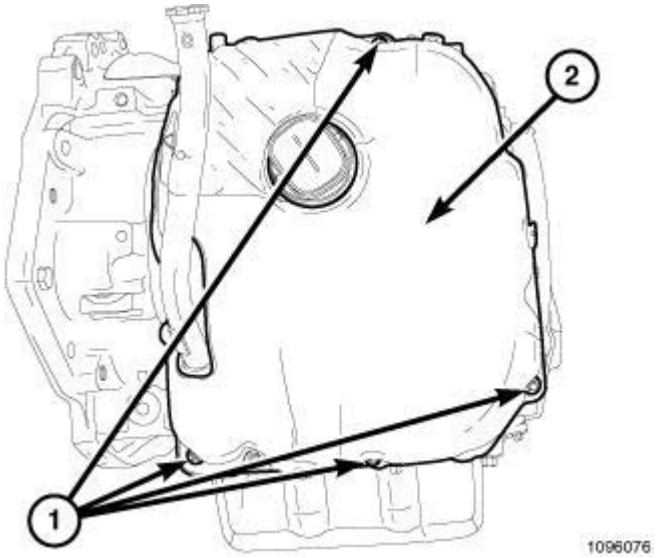

Fig. 47: Removing/Installing Rear Hub & Bearing
Courtesy of CHRYSLER LLC

2. Install hub and bearing with wheel speed sensor attached and brake shield squarely onto end of axle. Make sure wheel speed sensor is positioned toward rear of vehicle. Install mounting bolts (2) securing hub and bearing (1) to axle (3). Tighten the mounting bolts to 55 N.m (41 ft. lbs.).

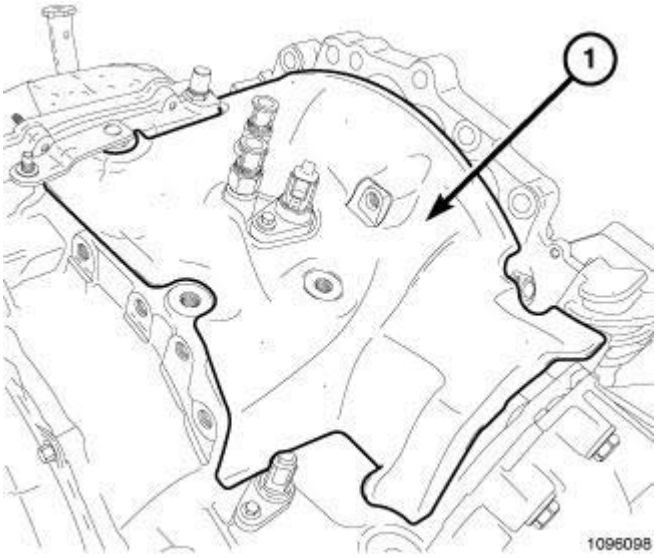

Fig. 48: Identifying Brake Rotor & Wheel Bearing
Courtesy of CHRYSLER LLC

3. Install brake rotor (2) over hub and bearing (1). Refer to **Brakes/Hydraulic/Mechanical/ROTOR, Brake - Installation** .

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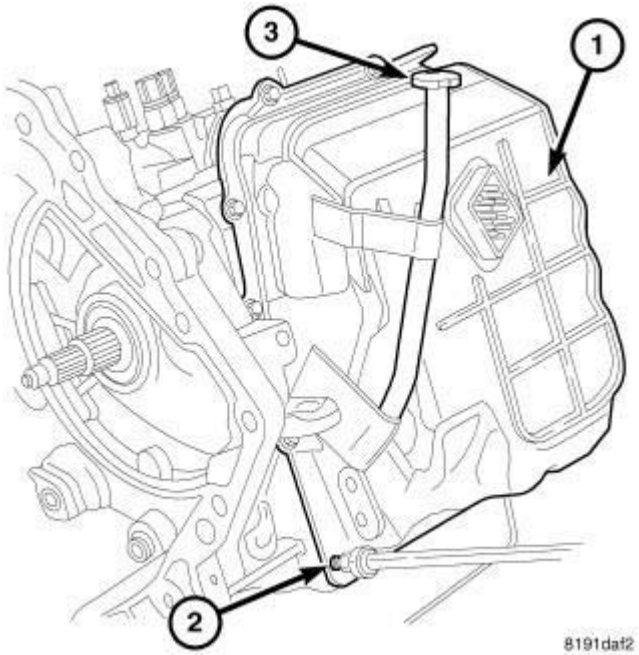

Fig. 49: Removing/Installing Disc Brake Caliper & Adapter Bracket
Courtesy of CHRYSLER LLC

4. Install disc brake caliper and adapter bracket (1) over axle and rotor as an assembly.
5. Install two bolts (2) securing disc brake caliper and adapter bracket (1) to axle. Tighten mounting bolts to 100 N.m (74 ft. lbs.).
6. Position parking brake cable routing bracket to axle and install screw securing it in place. Tighten screw to 6 N.m (55 in. lbs.).

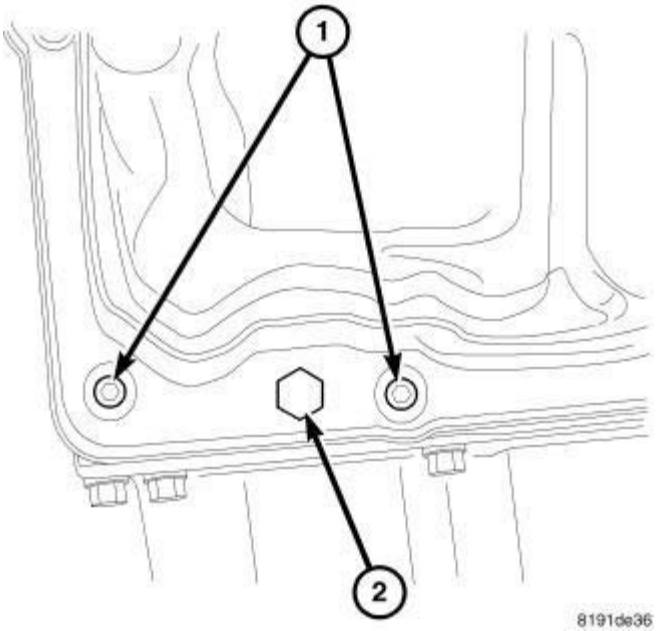

Fig. 50: Identifying Wheel Speed Sensor Routing Clip

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Courtesy of CHRYSLER LLC

7. Install wheel speed sensor routing clip (2) into hole in rear axle.
8. Install wheel speed sensor (3) into routing clips (1) along brake flex hose.

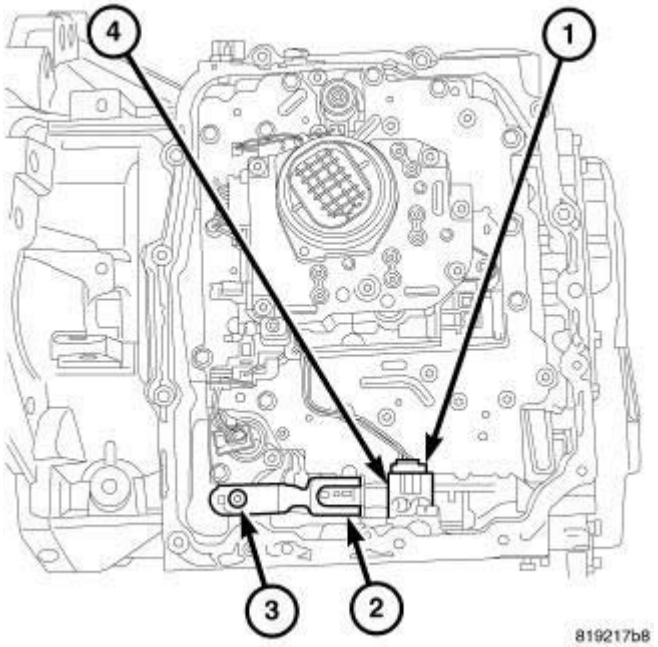

Fig. 51: Identifying Wheel Speed Sensor & Wiring Harness
Courtesy of CHRYSLER LLC

9. Install wheel speed sensor (1) into routing clips along underbody of vehicle.
10. Connect vehicle wiring harness (2) to wheel speed sensor connector.
11. Right side only - Install exhaust heat shield above exhaust system covering wheel speed sensor wiring connector.

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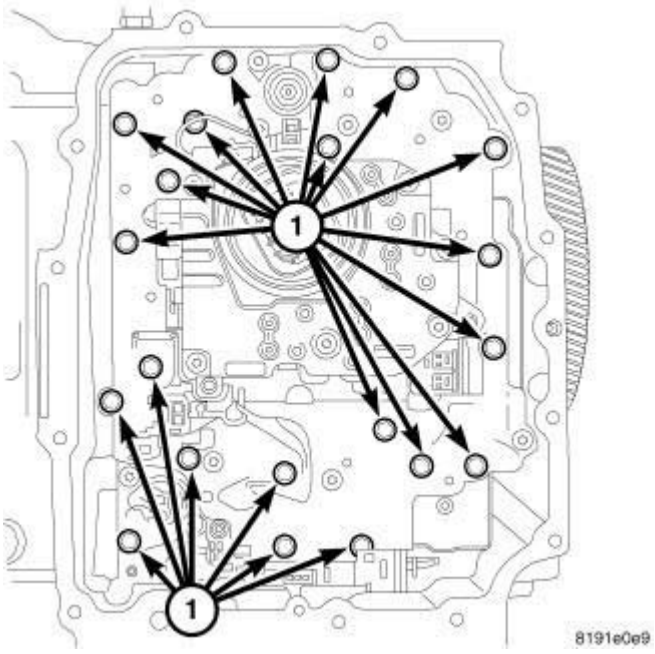

Fig. 52: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

12. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
13. Lower vehicle.
14. Pump the brake pedal several times to ensure the vehicle has a firm brake pedal before moving the vehicle.

SHOCK ABSORBER, SUSPENSION

DIAGNOSIS AND TESTING

SHOCK ABSORBER

Inspect the shock absorber for damage and evidence of fluid running from the upper end of the fluid reservoir. (Actual leakage will be a stream of fluid running down the side of the reservoir tube and dripping off lower end of unit). A slight amount of seepage between the shaft and shaft seal is not unusual and does not affect performance of the shock absorber.

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

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2. Position transmission jack or equivalent under axle near shock absorber to be serviced, raising it enough to support axle.

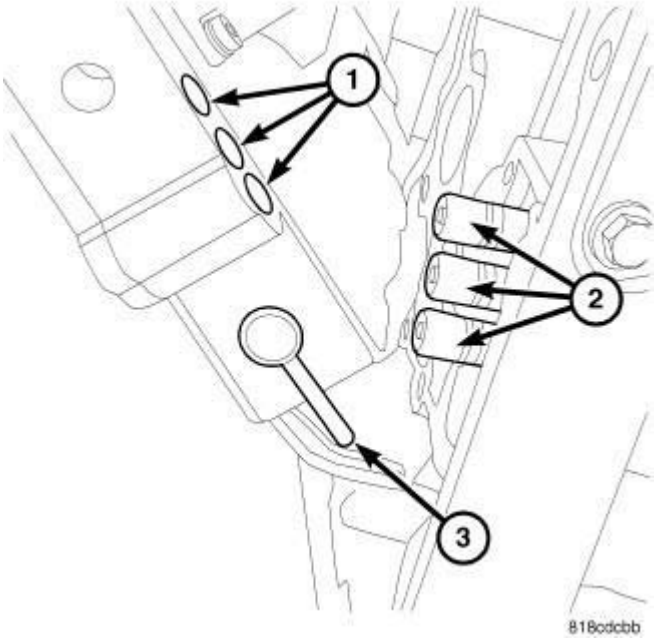

Fig. 53: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

3. Remove the shock absorber lower mounting bolt (4) and nut (3) at axle.
4. Remove the shock absorber upper mounting bolt (2) and nut (1) at body bracket, then remove shock absorber (5) from vehicle.

INSTALLATION

INSTALLATION

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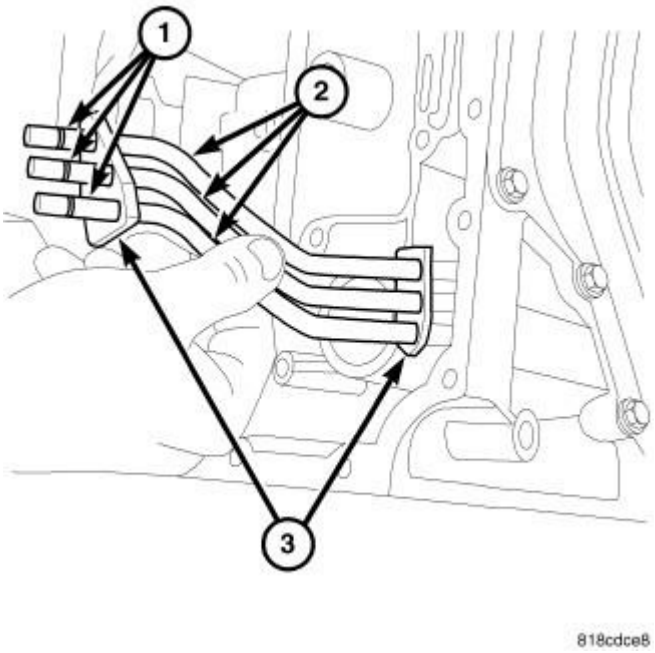

Fig. 54: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

1. Position shock absorber (5) at body bracket and install upper mounting bolt (2) and nut (1). Do not bolt at this time.
2. Raise or lower rear axle using jack as necessary until the shock absorber lower mounting bolt (4) can be inserted through the axle flange and shock absorber lower mounting eye.
3. Install nut (3) on the lower mounting bolt (4). Do not bolt at this time.
4. Remove jack.
5. Lower vehicle.
6. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access the rear suspension while keeping vehicle at curb (riding) height.
7. Tighten shock absorber upper and lower mounting bolt nuts to 75 N.m (55 ft. lbs.).

SPRING(S)

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

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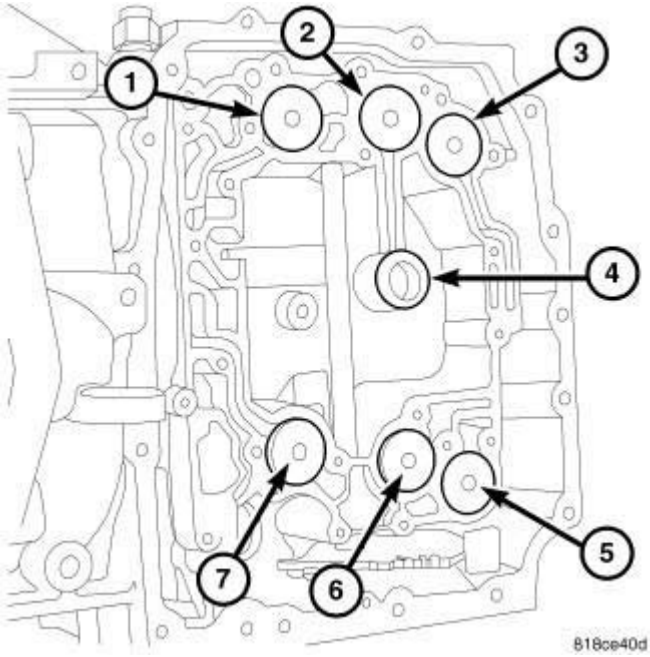

Fig. 55: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

2. On each side of vehicle, remove wheel mounting nuts (3), then rear tire and wheel assembly (1).
3. Position transmission jack or equivalent under center of axle raising it enough to support axle.

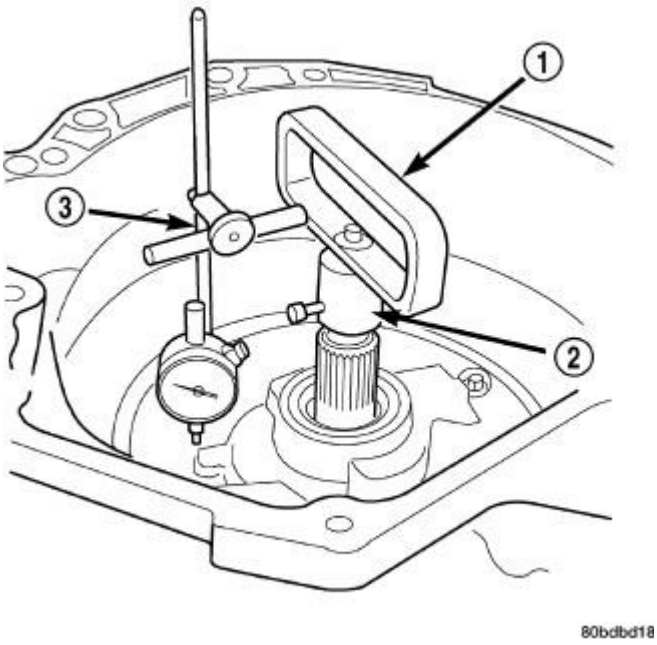

Fig. 56: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

4. Remove bolt (3) and nut securing track bar (2) to axle (4).

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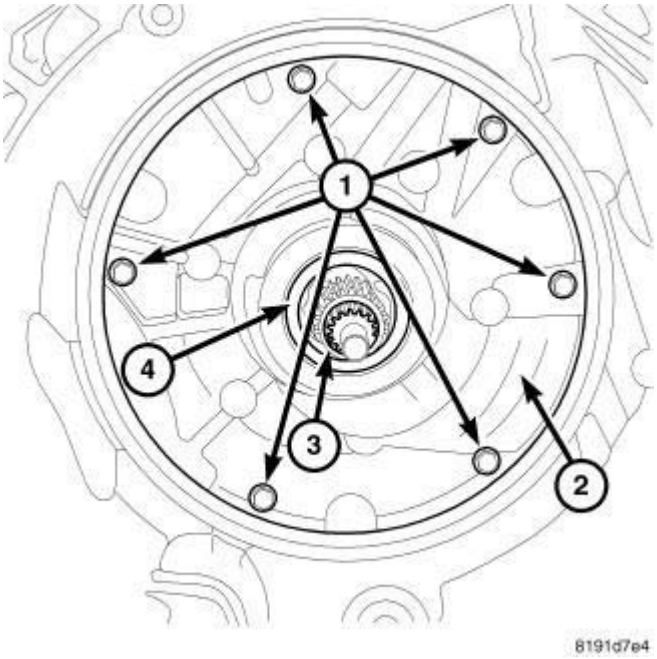

Fig. 57: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

5. On each side of vehicle, remove lower mounting bolt (4) and nut (3) securing shock absorber (5) to axle.
6. On each side of vehicle, remove screw fastening rear brake flex hose bracket to frame rail. Allow bracket to hang free, but do not bend it downward, overextending flex in brake tubing.

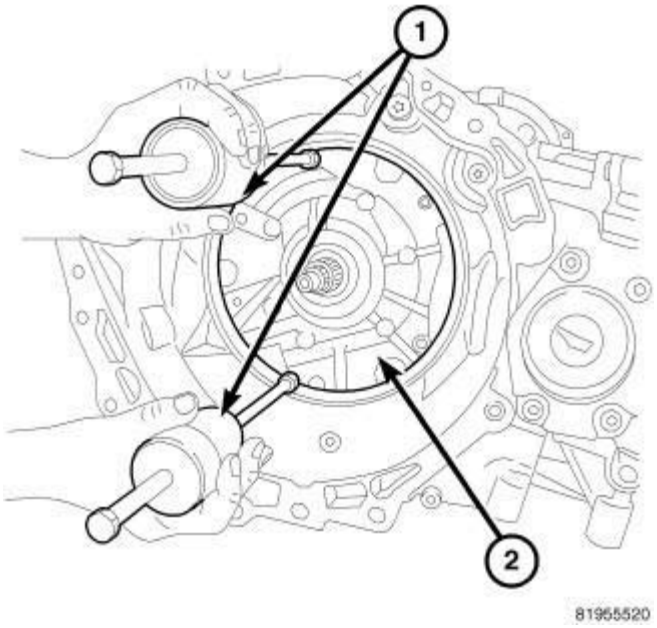

Fig. 58: Removing/Installing Coil Springs, Jounce Bumpers, & Lower Isolators
Courtesy of CHRYSLER LLC

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7. Lower jack until each coil spring (1) can be removed from axle.
8. Remove one side or both coil springs (1), jounce bumpers (2) and lower isolators (3).
9. Remove jounce bumper (2) and lower isolator (3) from spring as necessary.

INSTALLATION

INSTALLATION

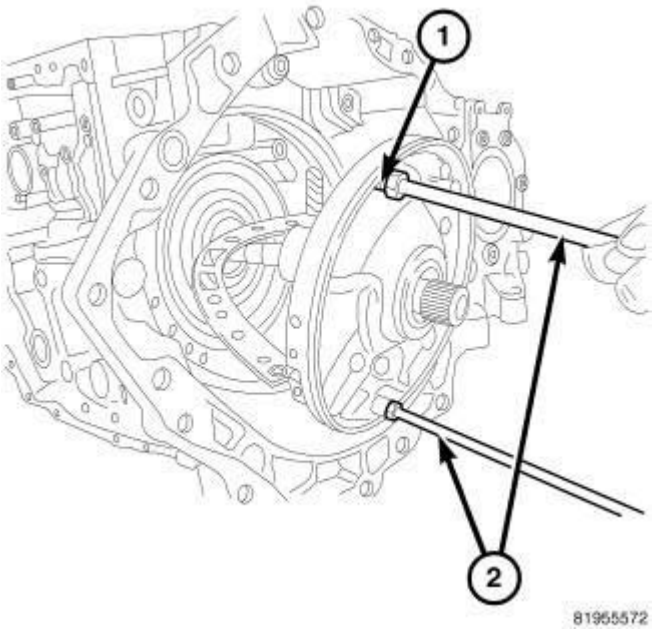

Fig. 59: Removing/Installing Coil Springs, Jounce Bumpers, & Lower Isolators
Courtesy of CHRYSLER LLC

NOTE: Although both ends of the coil spring may appear identical, they are not. Be sure to place the end with the tag upward.

1. Install a lower isolator (3) and jounce bumper (2) on end of coil spring (1) as necessary.
2. Place coil spring(s) (2) between body perch and axle at end of axle. Be sure to place jounce bumper (2) end at top.

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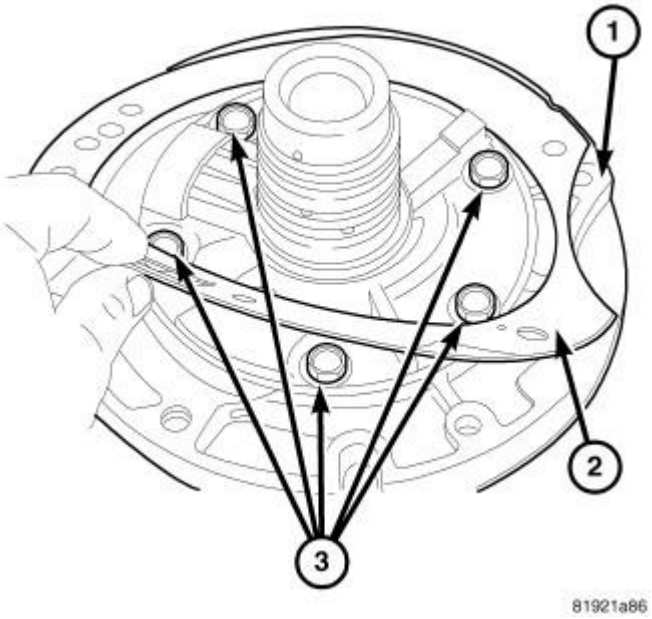

Fig. 60: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

3. Raise jack guiding the coil springs into mounted position. Continue to raise jack until shock absorber lower mounting bolts can be installed though the axle brackets and shock absorber lower mounting eyes.
4. At each shock absorber, install lower mounting bolt (4) and nut (3). Do not tighten at this time.

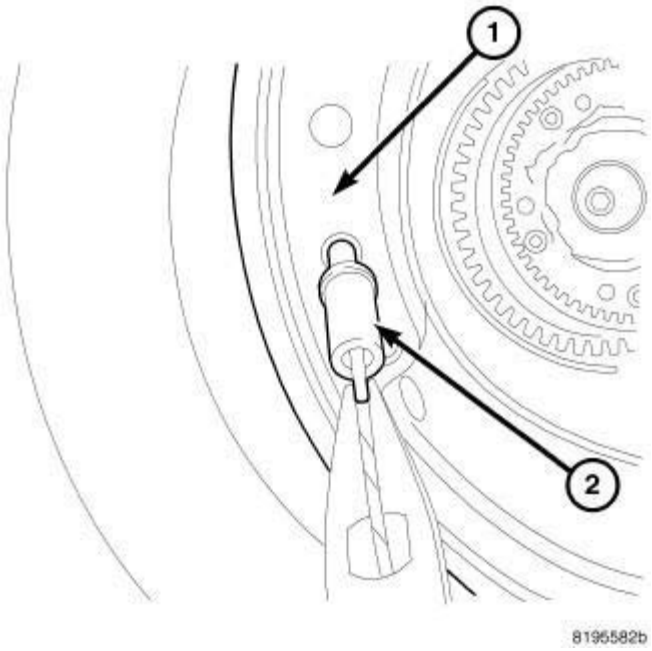

Fig. 61: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

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5. Install bolt (3) and nut securing track bar (2) to axle (4). Do not tighten at this time.
6. Remove jack from under axle.
7. On each side of vehicle, fasten rear brake flex hose bracket to frame rail.

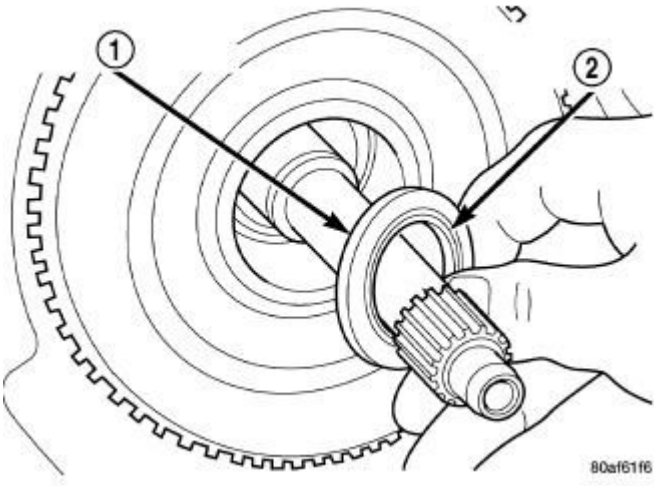

Fig. 62: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

8. On each side of vehicle, install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
9. Lower vehicle.
10. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access the rear suspension while keeping vehicle at curb (riding) height.
11. Check for proper vehicle curb height. Refer to **Front Suspension/Wheel Alignment - Standard Procedure** .

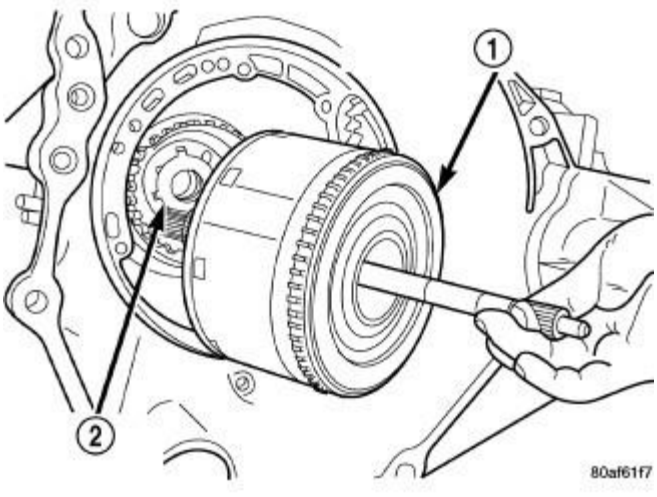

Fig. 63: Removing/Installing Rear Shock Absorber
Courtesy of CHRYSLER LLC

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12. Tighten shock absorber lower mounting bolt nuts (1) to 75 N.m (55 ft. lbs.).

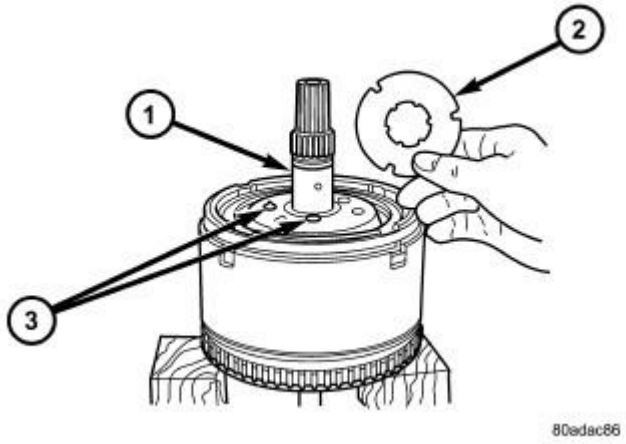

Fig. 64: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

13. Tighten track bar lower mounting bolt nut (3) to 81 N.m (60 ft. lbs.).

TRACK BAR, REAR

REMOVAL

REMOVAL

NOTE: Before proceeding, see Rear Suspension - Warning.

1. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
2. Position transmission jack or equivalent under center of axle raising it enough to support axle.

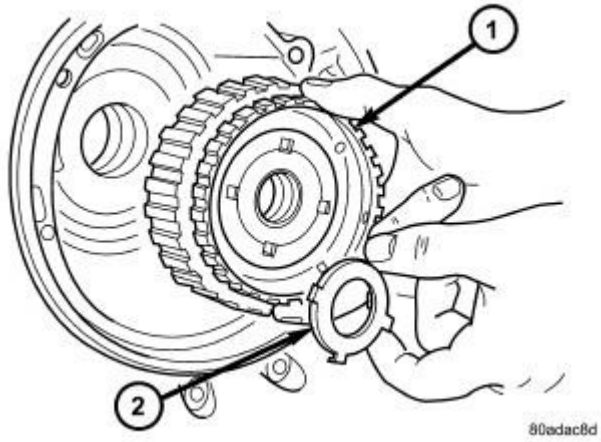

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Fig. 65: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

3. Remove bolt (3) and nut securing track bar (2) to axle (4).
4. Remove bolt (1) and nut securing track bar (2) to frame mounted bracket (5).
5. Remove track bar.

INSTALLATION

INSTALLATION

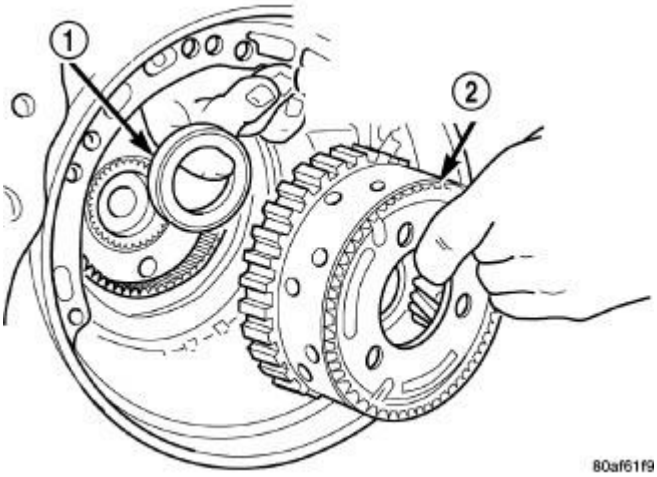

Fig. 66: Removing/Installing Track Bar Bolt At Axle
Courtesy of CHRYSLER LLC

1. Position track bar in mounting brackets, then install bolt (1) and nut securing track bar (2) to frame mounted bracket (5). Do not tighten at this time.
2. Install bolt (3) and nut securing track bar (2) to axle (4). Do not tighten at this time.
3. Remove jack from under axle.
4. Lower vehicle.
5. Position vehicle on alignment rack/drive-on lift. Raise lift as necessary to access the rear suspension while keeping vehicle at curb (riding) height.
6. Tighten track bar mounting bolt nuts to 81 N.m (60 ft. lbs.).

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2009 ELECTRICAL

Fuses & Circuit Breakers - Journey

IDENTIFICATION

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle.

TOTALLY INTEGRATED POWER MODULE

For integrated power module location, see **Fig. 1**.

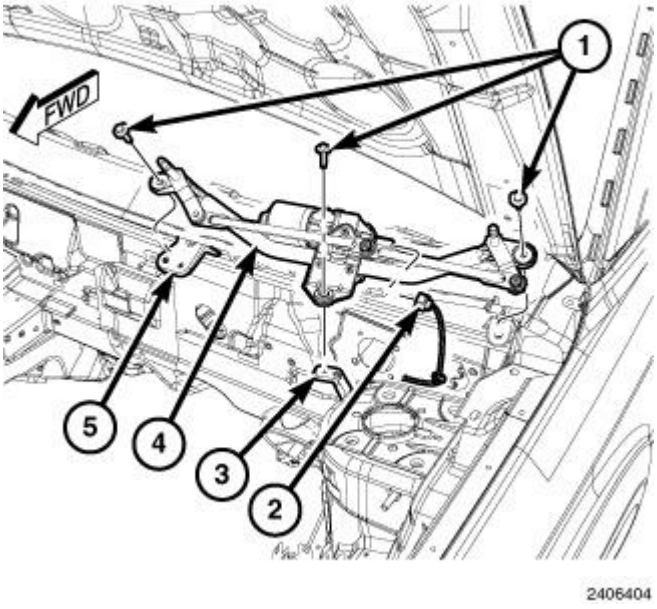


Fig. 1: Locating Totally Integrated Power Module
Courtesy of CHRYSLER CORP.

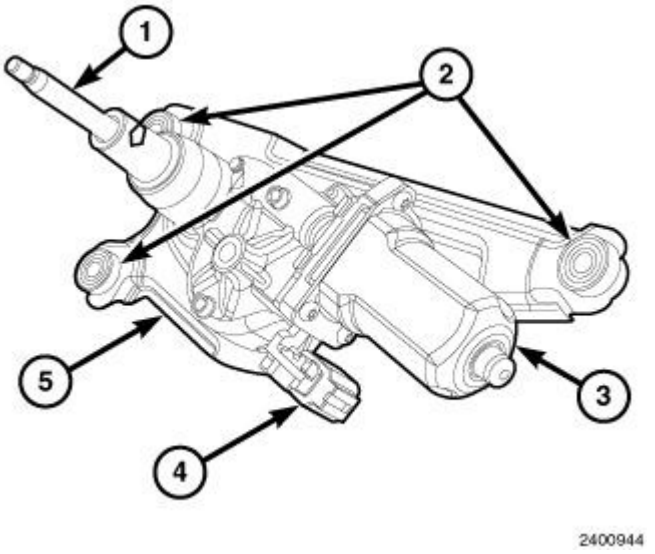


Fig. 2: Identifying Totally Integrated Power Module Components
Courtesy of CHRYSLER CORP.

Totally Integrated Power Module Fuses

FUSE NO.	AMPS	FUNCTION
J1	40A	Power Folding Seat
J2	30A	Transfer Case Module - If Equipped
J3	40A	Rear Door Module
J4	25A	Driver Door Node
J5	25A	Passenger Door Node
J6	40A	Anti-Lock Brake System (ABS) Pump/Electronic Stability Program (ESP)
J7	30A	Anti-Lock Brake System (ABS) Valve/Electronic Stability Program (ESP)
J8	40A	Power Memory Seat - If Equipped
J9	40A	PZEV Motor/Flex Fuel - If Equipped
J10	30A	Headlamp Wash Relay - If Equipped/Manual Turning Valve
J11	30A	Sway Bar - If Equipped/Thatchum Security (BUX)/Power Sliding Door
J13	60A	Ignition Off Draw (IOD) - Main
J14	40A	Electric Back Light (EBL)
J15	30A	Rear Blower - If Equipped
J17	40A	Starter Solenoid
J18	20A	NGC (Powertrain Control Module)/Trans Range
J19	60A	Radiator Fan Motor
J20	30A	Front Wiper LO/HI
J21	20A	Front/Rear Washer
J22	25A	Sunroof Module - If Equipped

M1	15A	Center High Mounted Stop Light (CHMSL)/Brake Switch
M2	20A	Trailer Lighting - If Equipped
M3	20A	Front/Rear Axle
M4	10A	Trailer Tow - If Equipped
M5	25A	Power Inverter - If Equipped
M6	20A	Power Outlet #1/Accessory (ACC) Rain Sensor
M7	20A	Power Outlet #2 (BATT/ACC SELECT)
M8	20A	Front Heated Seats - If Equipped
M9	20A	Rear Heated Seats - If Equipped
M10	20A	Vanity Lamps/Hands-Free Module (HFM) - If Equipped, Remote Display - If Equipped, Satellite Digital Audio Receiver (SDARS) - If Equipped, Universal Garage Door Opener (UGDO) - If Equipped, Vanity Light, Video Entertainment System (VES) - If Equipped
M11	10A	Automatic Temperature Control (ATC) - If Equipped, Underhood Light
M12	30A	Radio, Amplifier (AMP)
M13	20A	Cabin Compartment Node (IOD-CCN), Siren Module/Multifunction Switch
M14	20A	Trailer Tow (BUX) - If Equipped
M15	20A	Auto Dim Rear View Mirror - If Equipped, Infrared Sensor - If Equipped, Multifunction Switch, Tire Pressure Monitor (TPM) - If Equipped, Transfer Case Module - If Equipped
M16	10A	Occupant Restraint Controller/Occupant Classification Module (ORC/OCM)
M17	15A	Left Park/Side Marker/Running/Tail Lights, License Lights
M18	15A	Right Park/Side Marker/Running/Tail Lights
M19	25A	Auto Shut Down (ASD #1 & #2)
M20	15A	Electronic Vehicle Information Center (EVIC) - If Equipped, Interior Lighting, Steering Wheel Switches - If Equipped, Switch Bank
M21	20A	Auto Shut Down (ASD #3)
M22	10A	Right Horn
M23	10A	Left Horn
M24	25A	Rear Wiper
M25	20A	Fuel Pump, Diesel Lift Pump
M26	10A	Power Mirrors Switch, Driver Window Switch
M27	10A	Steering Column Lock, Wireless Ignition Node (WIN)
M28	10A	NGC (Powertrain Control Module)/Transmission Feed
M29	10A	Occupant Classification Module (OCM)
M30	15A	Rear Wiper Module, Power Folding Mirror
M31	20A	Back-Up Lamps
M32	10A	Occupant Restraint Controller (ORC)
M33	10A	NGC (Powertrain Control Module) Battery Feed

M34	10A	Park Assist Module, HVAC Module, Headlamp Washers, Compass Module - If Equipped, Flashlight - If Equipped
M35	10A	Heated Mirrors - If Equipped
M36	20A	Power Outlet #3 (BATT)
M37	10A	Anti-Lock Brake System (ABS), Electronic Stability Program (ESP), Stop Light Switch
M38	25A	Lock/Unlock Motors

2009 ACCESSORIES AND EQUIPMENT

Heated Glass - Service Information - Journey

DESCRIPTION

DESCRIPTION

CAUTION: Grid lines can be damaged or scraped off with sharp instruments. Care should be taken in cleaning glass or removing foreign materials, decals or stickers. Normal glass cleaning solvents or hot water used with rags or toweling is recommended.

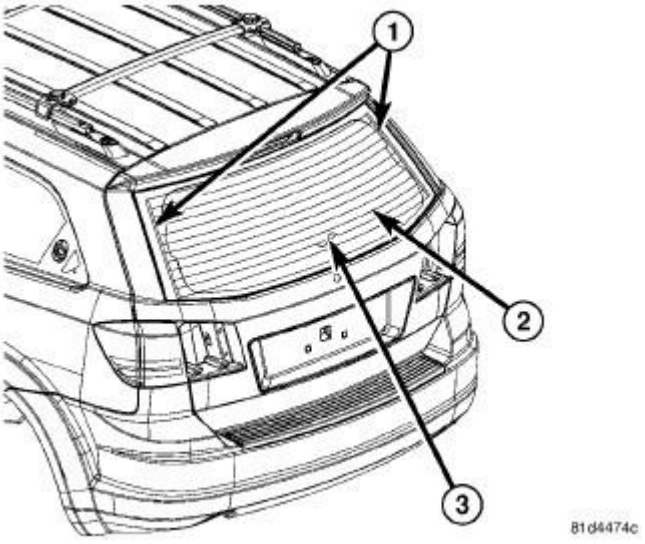


Fig. 1: EBL System
Courtesy of CHRYSLER LLC

The rear window defogger system, also known as electric backlight (EBL), consists of two vertical bus bars (1) and a series of grid lines (2) fired onto the inside surface of the rear window (3).

The EBL system is turned on or off by a push-button switch located in the A/C-heater control. Refer to **Heating and Air Conditioning/Controls/CONTROL, A/C and Heater - Description** .

OPERATION

OPERATION

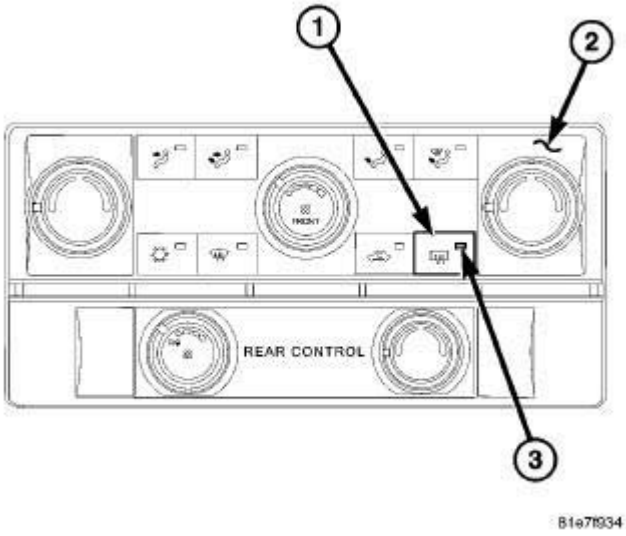


Fig. 2: EBL Switch (MTC)
Courtesy of CHRYSLER LLC

NOTE: Manual tri-zone temperature A/C-heater control shown in illustration. Other A/C-heater controls similar.

The electric backlight (EBL) system is controlled by a momentary push-button switch (1) located on the A/C-heater control (2) in center of the instrument panel. When the rear window defogger switch is pressed to ON with the ignition switch in RUN, the switch sends a request signal on the CAN-B Bus to the totally integrated power module (TIPM) to energize the internal EBL high side driver. When energized, the EBL high side driver provides battery current to the rear window defogger grid lines and the heated side view mirrors (when equipped). The grid lines heat the glass to help clear the rear window and side mirror surfaces of fog or frost.

An amber indicator (3) will illuminate to indicate when the EBL system is turned on.

NOTE: The EBL system turns off automatically after 10 minutes of initial operation. Each following activation cycle of the EBL system will last 5 minutes.

The EBL system will automatically turn off after an initial programmed time interval of about 10 minutes as long as the ignition switch is in RUN. After the initial time interval has expired, if the rear window defogger switch is pressed to ON again during the same ignition cycle, the EBL system will automatically turn off after about 5 minutes. The EBL system will also turn off if the ignition switch is turned to any position other than RUN or by manually pressing the rear window defogger switch a second time.

Repair of the rear window defogger grid lines, bus bars, terminals or pigtail wires can be accomplished using the Mopar® Rear Window Defogger Repair Kit (Part Number 04549275) or equivalent. See **Standard Procedure** .

The EBL control system is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing**

DIAGNOSIS AND TESTING

ELECTRIC BACKLIGHT (EBL) SYSTEM

NOTE: Illumination of the defogger switch indicator lamp does not necessarily mean that electrical current is reaching the rear window glass and/or the outside rear view mirror heating grids (when equipped).

NOTE: See appropriate wiring information for circuit descriptions and diagrams of the rear window defogger (EBL) and heated mirror systems.

Operation of the electrical backlight (EBL) system can be confirmed by the following:

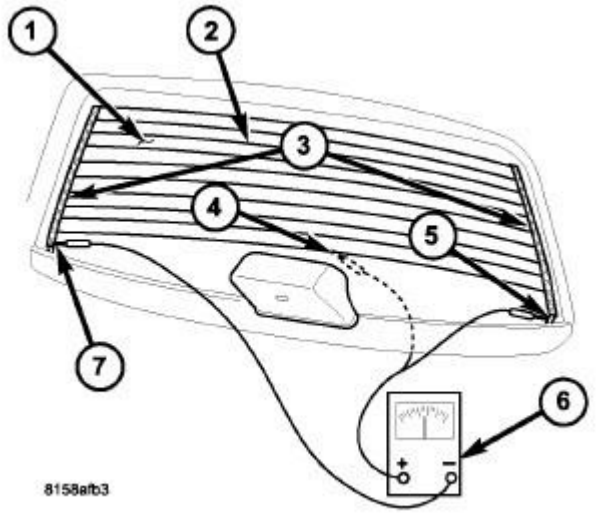


Fig. 3: Rear Window Glass Grid Test
Courtesy of CHRYSLER LLC

NOTE: Typical heated rear window glass shown in illustration.

1. Use a scan tool and check for diagnostic trouble codes (DTCs) related to the rear window defogger switch and the totally integrated power module (TIPM). If no DTCs are found, go to step 2. If any DTCs are found, repair as required, then proceed to step 2.
2. Turn the ignition switch to RUN. Set the rear window defogger switch to ON. Rear window defogger operation can be checked by feeling the rear window glass (1), or the heated outside rear view mirror glass when equipped with heated mirrors. A distinct difference in temperature between the grid lines (2) and the adjacent clear glass or the heated mirror glass should be detected within 3 to 4 minutes of operation.
3. If a temperature difference is not detected, use a 12-volt DC voltmeter (6) and contact the rear glass heating grid terminal A (5) with the positive lead, and terminal B (7) with the negative lead. The

voltmeter should read battery voltage. If the voltmeter does not read battery voltage, check the following:

- Confirm the ignition switch is in RUN.
- Confirm the rear window defogger switch is ON.
- Confirm the EBL feed wire is connected to the heating grid positive terminal and that there is continuity between the TIPM and the heating grid.
- Confirm the EBL ground wire is connected to the heating grid negative terminal and that there is continuity to ground.
- When diagnosing a heated mirror concern, check the heated mirror circuit fuse located in the TIPM. The fuse must be in the receptacle and all electrical connections must be secure.

4. If broken defogger grid lines or bus bars (3) are suspected, use a 12-volt DC voltmeter and contact terminal B with the negative lead and each rear glass heating grid line at its mid-point C (4) with the positive lead. The voltmeter should read approximately 6 volts at each grid line mid-point. If the voltmeter does not read approximately 6 volts, repair the open grid line(s) or bus bar(s). See **Standard Procedure** .
5. If EBL system operation has been verified but the rear window defogger indicator does not illuminate, replace the A/C-heater control. Refer to **Heating and Air Conditioning/Controls/CONTROL, A/C and Heater - Removal** .

GRID, DEFOGGER, REAR

STANDARD PROCEDURE

GRID LINE AND TERMINAL REPAIR

WARNING: Materials contained in the Repair Kit (Part Number 04549275) may cause skin or eye irritation. The kit contains epoxy resin and amine type hardener, which are harmful if swallowed. Avoid contact with the skin and eyes. For skin contact, wash the affected areas with soap and water. For contact with the eyes, flush with plenty of water. Do not take internally. If taken internally, induce vomiting and call a physician immediately. Use with adequate ventilation. Do not use near fire or flame. Contains flammable solvents. Keep out of the reach of children. Failure to follow these instructions may result in serious or fatal injury.

Repair of the rear glass heating grid lines, bus bars, terminals or pigtail wires can be accomplished using the Mopar® Rear Window Defogger Repair Kit (Part Number 04549275) or equivalent.

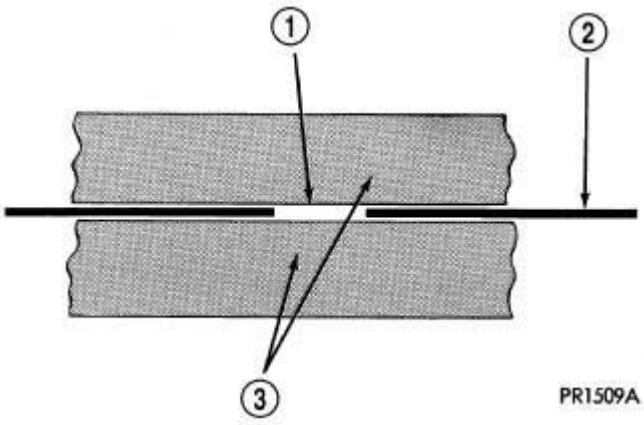


Fig. 4: Grid Line Repair - Typical
Courtesy of CHRYSLER LLC

1. Mask the repair area with masking tape (3) so that the conductive epoxy can be applied neatly. Extend the epoxy application onto the grid line (2) or the bus bar on each side of the break (1).
2. Follow the instructions in the repair kit for preparing the damaged area.
3. Remove the package separator clamp and mix the two conductive epoxy components thoroughly within the packaging. Fold the package in half and cut the center corner to dispense the epoxy.
4. Apply the epoxy through the slit in the masking tape or template. Overlap both ends of the break by at least 19 millimeters (0.75 inch).
5. For a terminal or pigtail wire replacement, mask the adjacent areas so the epoxy can be extended onto the adjacent grid line as well as the bus bar. Apply a thin layer of epoxy to the area where the terminal or pigtail wire was fastened and onto the adjacent grid line.
6. Apply a thin layer of conductive epoxy to the terminal or bare wire end of the pigtail and place it in the proper location on the bus bar. To prevent the terminal or pigtail wire from moving while the epoxy is curing, it must be wedged or clamped.
7. Carefully remove the masking tape or template.

CAUTION: Do not allow the glass surface to exceed 204° C (400° F) when using a heat gun, or the glass may fracture.

8. Allow the epoxy to cure 24 hours at room temperature or carefully use a heat gun for 15 minutes. When using a heat gun, hold it approximately 25.4 centimeters (10 inches) from the repair and do not allow the glass surface to exceed 204° C (400° F).
9. After the conductive epoxy is properly cured, remove the wedge or clamp from the terminal or pigtail wire.
10. Connect the wire harness leads to the grid terminals or pigtail wires and verify EBL operation.

SWITCH, DEFOGGER, REAR

DESCRIPTION

DESCRIPTION

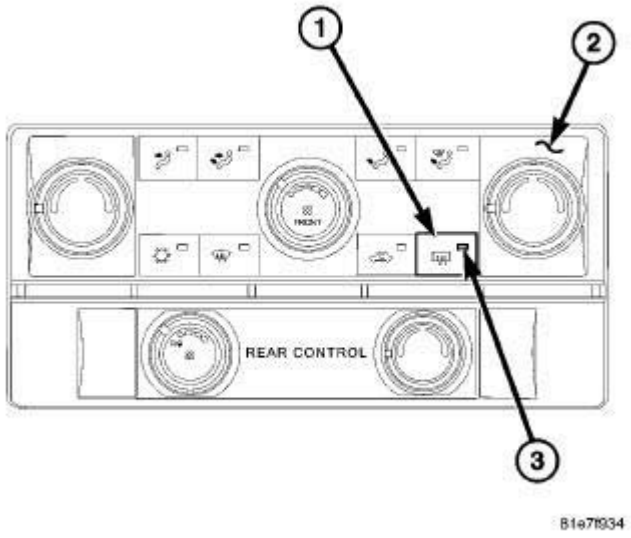


Fig. 5: EBL Switch (MTC)
Courtesy of CHRYSLER LLC

NOTE: Manual tri-zone temperature A/C-heater control shown in illustration. Other A/C-heater controls similar.

The momentary push-button switch (1) for the rear window defogger (EBL) system is located in the A/C-heater control (2) in the center of the instrument panel. An amber indicator (3) will illuminate to indicate when the EBL system is turned on.

OPERATION

OPERATION

An amber indicator will illuminate when the rear window defogger switch is activated. When activated, the switch sends a request signal to the totally integrated power module (TIPM) to energize the internal EBL high side driver to provide battery current to the rear window defogger grid lines and to the heated side view mirrors, when equipped.

NOTE: The EBL system turns off automatically after 10 minutes of initial operation. Each following activation cycle of the EBL system will last 5 minutes.

The EBL system will automatically turn off after an initial programmed time interval of about 10 minutes as long as the ignition switch is in RUN. After the initial time interval has expired, if the rear window defogger switch is pressed to ON again during the same ignition cycle, the EBL system will automatically turn off after about 5 minutes. The EBL system will also turn off if the ignition switch is turned to any position other than RUN or by manually pressing the rear window defogger switch a second time.

The rear window defogger switch is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The rear window defogger switch and indicator cannot be adjusted or repaired. The A/C-heater control must be replaced if the rear window defogger switch or indicator is inoperative or damaged. Refer to **Heating and Air Conditioning/Controls/CONTROL, A/C and Heater - Removal** .

2009 ACCESSORIES AND EQUIPMENT

Heated Mirrors - Service Information - Journey

DESCRIPTION

DESCRIPTION

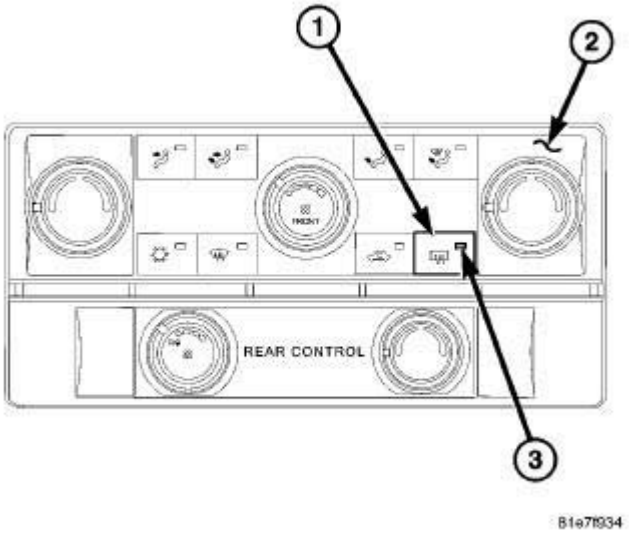


Fig. 1: Rear Window Defogger (EBL) System
Courtesy of CHRYSLER LLC

NOTE: Manual tri-zone temperature A/C-heater control shown. Other A/C-heater controls similar.

When equipped, the heated mirror system operates in concert with the rear window defogger (EBL) system and is controlled by the rear window defogger switch (1) located in the A/C-heater control (2) in the center of the instrument panel. An amber indicator lamp (3) in the rear window defogger switch will illuminate to indicate when the heated mirror system is turned on.

The heated mirror system will be automatically turned off after an initial programmed time interval of about 10 minutes as long as the ignition switch is in RUN. After the initial time interval has expired, if the rear window defogger switch is pressed to ON again during the same ignition cycle, the heated mirror system will automatically turn off after about 5 minutes. The heated mirror system will also turn off if the ignition switch is turned to any position other than RUN or by manually pressing the rear window defogger switch a second time.

Circuit protection for the heated mirror system is provided by a fuse located in the totally integrated power module (TIPM).

OPERATION

OPERATION

When equipped, the heated mirror system is activated when the rear window defogger (EBL) system is turned on. Refer to **Electrical - Heated/Cooled Systems/Heated Glass - Operation** . When the heated mirror system is activated, an electric heater grid located behind the glass of each outside rear view mirror becomes energized and produces heat to help clear the mirror of ice, snow, or fog.

If the outside mirror heating grids are both inoperative. Refer to **Electrical - Heated/Cooled Systems/Heated Glass - Diagnosis and Testing** .

The heating grid behind each outside mirror glass cannot be repaired and the mirror assembly must be replaced if the heating grid is found inoperative or damaged. Refer to **Body/Exterior/MIRROR, Outside Rearview - Removal** .

2009 ACCESSORIES AND EQUIPMENT

Heated Seats - Service Information - Journey

DESCRIPTION

DESCRIPTION

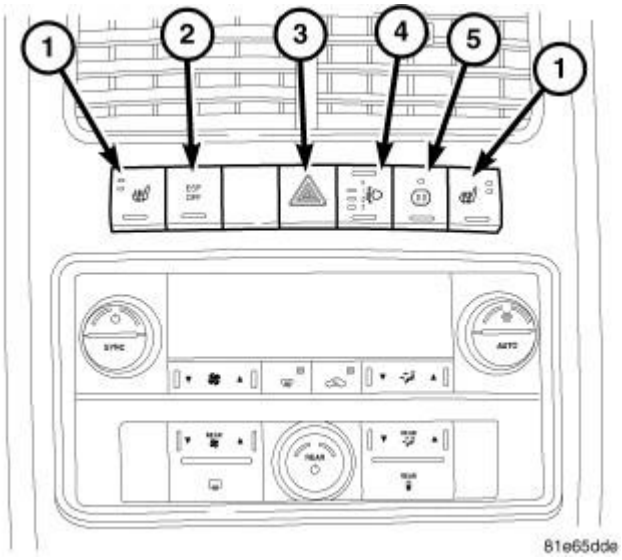


Fig. 1: Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

Vehicles with the heated seat option can be visually identified by the two heated seat switches (1) located in the center stack of the instrument panel. The switches are located on the outer edges of the Accessory Switch Bank Module (ASBM). The ASBM is located just below the vents and just above the heater and air conditioner controls in the center stack area of the instrument panel.

The heated seat system allows the driver and front seat passenger to select from two different levels of electrical seat heating (HI/LO). The heated seat system includes the following major components:

- **Heated Seat Elements** - Four heated seat elements are used per vehicle. Two heated seat elements are integral to each seat, one in the seat back and the other in the seat cushion.
- **Heated Seat Module** - One heated seat module is used per vehicle. The Heated Seat Module is mounted under the Driver front seat. This module contains the control logic and software for the front heated seat system. The module communicates on the Local Interface Network (LIN) data bus.
- **Heated Seat Switches** - Two heated seat switches are used per vehicle, one for each heated seat. Both switches are integral to the ASBM mounted in the instrument panel center stack.
- **Instrument Cluster (CCN)** - The instrument cluster, sometimes referred to as the Cab Compartment Node (CCN) utilizes integrated software and information carried on the LIN data bus. The CCN serves as the link between the heated seat switches and the heated seat module.

OPERATION

OPERATION

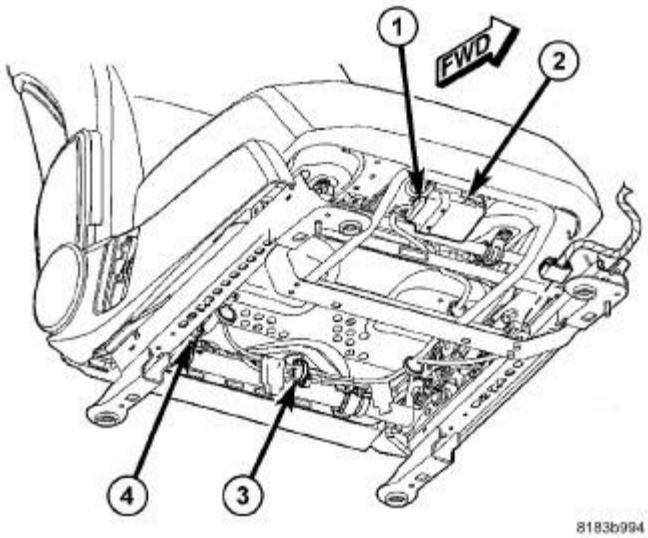


Fig. 2: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

The heated seat system operates on battery current received through a fuse in the Totally Integrated Power Module (TIPM). Fused ignition switch output (Run) circuits are used, so that the heated seat system will only operate when the ignition switch is in the ON position. The heated seat system will turn Off automatically whenever the ignition switch is turned to any position except ON.

A Heated Seat Module (2) is used to control the heated seat system. The module is located under the driver front seat mounted to the seat pan (4). The heated seat module responds to heated seat switch messages and ignition switch status inputs by controlling the 12v output to the front seat heating elements through integral solid-state relays.

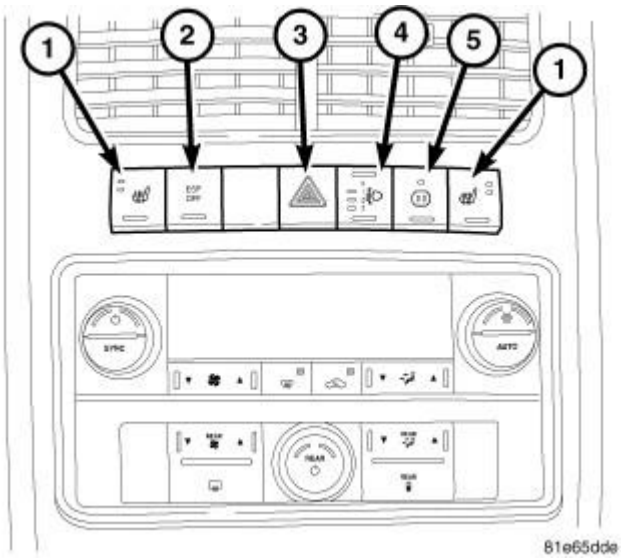


Fig. 3: Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

When either of the heated seat switches (1) are depressed a switch status message is sent to the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN), via the Local Interface Network (LIN) data bus. The CCN then sends a message via the LIN data bus to the heated seat module, signaling the module to energize the heating element for the selected seat. Amber Light Emitting Diodes (LEDs) in the top portion of each switch indicate the level of heat in use: Two LEDs are illuminated for high, one for low, and none for off. The heated seat module sends the LED illumination message to the CNN via the LIN data bus. The CNN then sends the LED illumination message to the accessory switch bank so that the appropriate LEDs are illuminated for any given heating level. Pressing the switch once will select high-level heating. Pressing the switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

The heated seat module energizes an integral solid-state relay, which supplies battery current to the heating elements. When high-temperature heating is selected, the heaters provide a boosted heat level during the first four minutes of operation after heating is activated. The heat output then drops to the normal high-temperature level. If high-level heating is selected, the control system will automatically switch to the low level after 26 minutes of continuous operation. At that time, the number of illuminated LEDs changes from two to one, indicating the change. Operation on the low setting also turns off automatically after 30 minutes.

The module will automatically turn off the heating elements if it detects an OPEN or LOW short in the heating element circuit.

DIAGNOSIS AND TESTING

HEATED SEAT SYSTEM

In order to obtain conclusive testing, the heated seat system and the Local Interface Network (LIN) data bus circuit must be checked. **Any diagnosis of the heated seat system should begin with, the use of a scan tool and the appropriate diagnostic service information.**

Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

NOTE: Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle voltage is below 11.7v or above 15.5v. Be certain to check the vehicle electrical system for proper voltage anytime the power seat system appears inoperative.

Before any testing of the heated seat system is attempted, the battery should be fully-charged.

MODULE, HEATED SEAT

DESCRIPTION

DESCRIPTION

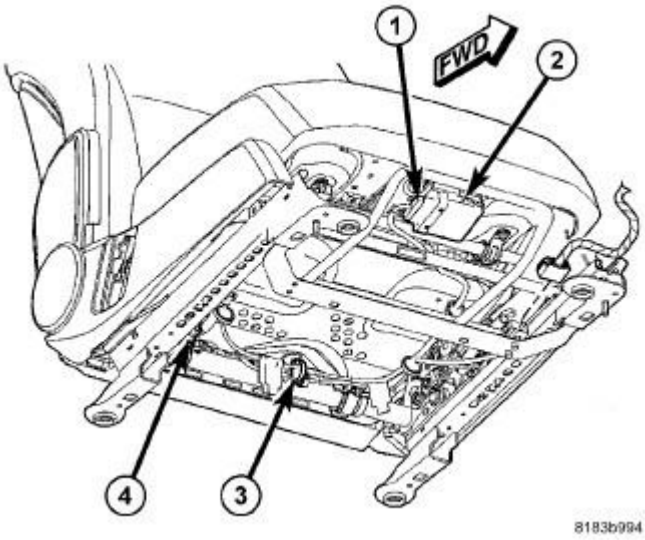


Fig. 4: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

The heated seat module (2) is located under the driver front seat. It has a single electrical connector (1) and a push pin style retainer that secures it to the seat pan (4). The module can be accessed from under the Driver seat with the seat in the full back and up position.

The heated seat module is a microprocessor designed to use the Local Interface Network (LIN) data bus messages from the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN). The CCN receives inputs from the heated seat switches and in turn signals the heated seat module to operate the heated seat elements for both front seats.

OPERATION

OPERATION

The heated seat module operates on fused battery current received from the ignition switch. The module is grounded to the body at all times through the electrical connector. Inputs to the module include Local Interface Network (LIN) data bus messages and standard hardwired 12 volt power and ground. In response to the LIN inputs the heated seat module will control the battery current to the appropriate heated seat elements.

When a heated seat switch LIN data bus signal is received by the heated seat module, the module energizes the selected heated seat element. The Low heat set point is about 38° C (100.4° F), and the High heat set point is about 42° C (107.6° F).

In addition to operating the heated seat elements, the heated seat module sends LED illumination messages to the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN) via the LIN data bus. The CCN then sends the LED illumination message to the accessory switch bank so that the appropriate LEDs are illuminated for any given heating level. Pressing the switch once will select high-level heating. Pressing the switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

If the heated seat module detects a heated seat element OPEN or SHORT circuit, it will record and store the appropriate Diagnostic Trouble Code (DTC).

DIAGNOSIS AND TESTING

HEATED SEAT MODULE

In order to obtain conclusive testing, the heated seat system and the Local Interface Network (LIN) data bus circuit must be checked. **Any diagnosis of the heated seat system should begin with, the use of a scan tool and the appropriate diagnostic service information.**

Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

NOTE: Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle voltage is below 11.7v or above 15.5v. Be certain to check the vehicle electrical system for proper voltage anytime the power seat system appears inoperative.

Before any testing of the heated seat system is attempted, the battery should be fully-charged.

REMOVAL

REMOVAL

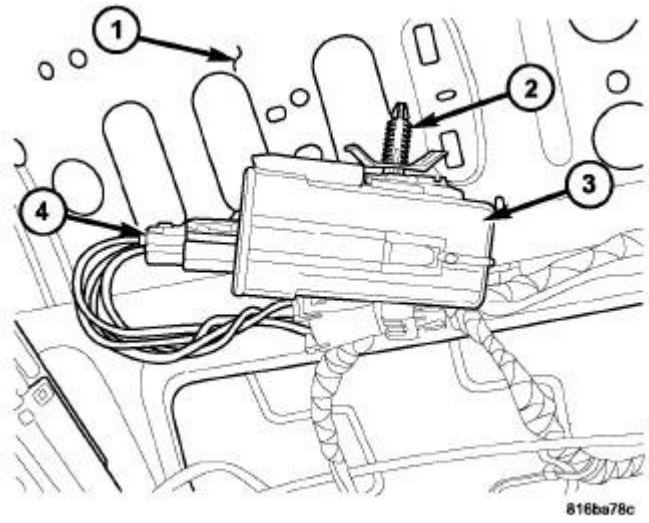


Fig. 5: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

CAUTION: The Heated Seat Module mounting tab can be damaged during module removal and installation. Use care to properly align tab to prevent binding that could result in tab breakage.

1. Position the driver front seat to the full rearward position.
2. Disconnect and isolate the battery negative cable.
3. Disconnect the wire harness connector (4) from the heated seat module (3).
4. Unsnap the heated seat module retaining tab (2) from the seat pan (1).
5. Remove the heated seat module (3) from the vehicle.

INSTALLATION

INSTALLATION

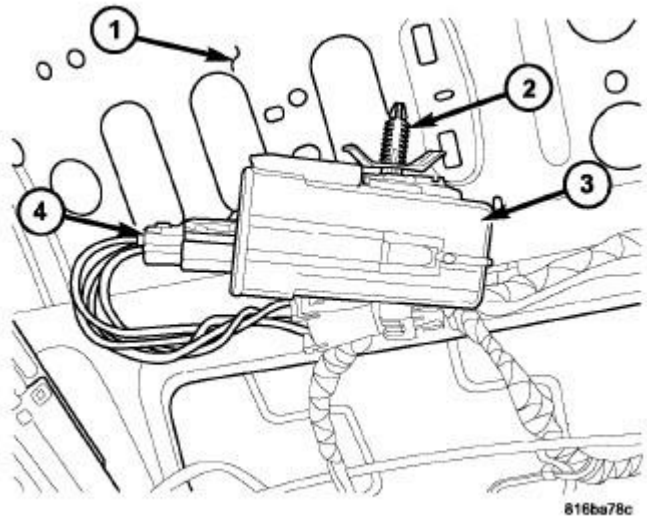


Fig. 6: Locating Heated Seat Module
Courtesy of CHRYSLER LLC

CAUTION: The Heated Seat Module mounting tab can be damaged during module removal and installation. Use care to properly align tab to prevent binding that could result in tab breakage.

1. Install the heated seat module (3) into the vehicle.
2. Position the retaining tab (2) with the mounting hole in the seat pan (1). Firmly apply even pressure to the module (3) until the mounting tab is fully seated.
3. Connect the wire harness connector (4) to the heated seat module (3).
4. Connect the battery negative cable.
5. Check for proper heated seat system operation.

PAD, HEATER

DESCRIPTION

DESCRIPTION

Vehicles equipped with the optional heated seat system have two carbon fiber heated seat elements located in each front seat. One heating element is used for each seat cushion and another for each seat back.

Each of the heated seat elements consist of multiple heating circuits operating in parallel throughout the carbon fiber element. The heated seat elements are captured between the leather trim cover and the seat cushion assembly. If a malfunction occurs in one or more of the individual carbon fiber circuits, the others will continue to provide heat.

The heated seat elements cannot be repaired. If found to be damaged or inoperative, a new heating element

assembly must be installed.

OPERATION

OPERATION

One end of the heated seat element is connected to ground at all times through a splice under the seat. Battery current is directed to the other end of the heated seat element by the heated seat module. The heated seat module will energize the heated seat element when the heated seat switch is depressed in the LOW or HIGH position.

As electrical current passes through the heated seat element, the resistance of the wire used in the element disperses some of the electrical current in the form of heat. The heat produced by the heated seat element then radiates through the underside of the seat cushion and seat back trim covers, warming the seat cover and its occupant.

DIAGNOSIS AND TESTING

HEATED SEAT ELEMENT

Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

The wire harness connectors for the heating elements are located under the seat.

NOTE: When checking heated seat elements for continuity, be certain to move the heating element being checked. Moving the element, such as sitting in the seat will eliminate the possibility of an intermittent open in the element which would only be evident if the element was in a certain position. Failure to check the element in various positions could result in an incomplete test.

1. Locate and disconnect the seat element electrical connector.
2. Check the resistance between the circuit leading in and out of the suspect heated seat element. The resistance should be between 3.0 - 5.5 ohms for a seat cushion element and 4.0 - 6.0 ohms for a seat back element. If OK, see **Diagnosis and Testing** . If not OK, replace the inoperative heated seat element.

REMOVAL

REMOVAL

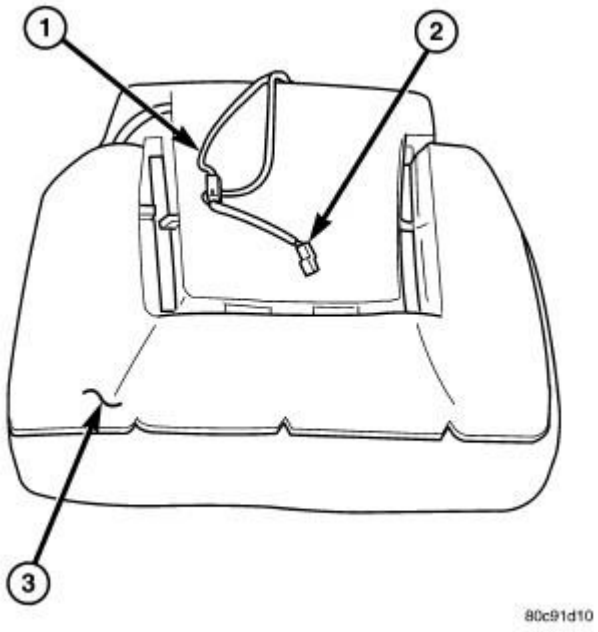


Fig. 7: Removing/Installing Heated Seat Element
Courtesy of CHRYSLER LLC

NOTE: The factory installed heating element can be removed from foam cushion by carefully peeling the element off along the adhesive lines.

NOTE: Heated seat cushion shown in illustration. Heated seat back similar.

1. Disconnect and isolate the battery negative cable.
2. Remove the appropriate seat cushion trim cover or seat back trim cover. Refer to **Body/Seats/COVER, Seat Cushion - Removal** . Refer to **Body/Seats/COVER, Seat Back - Removal** .
3. Disconnect the inoperative heated seat cushion or seat back element electrical connectors (2).
4. Peel the heater element off the foam pad, being careful not to remove excessive foam in the process.

INSTALLATION

INSTALLATION

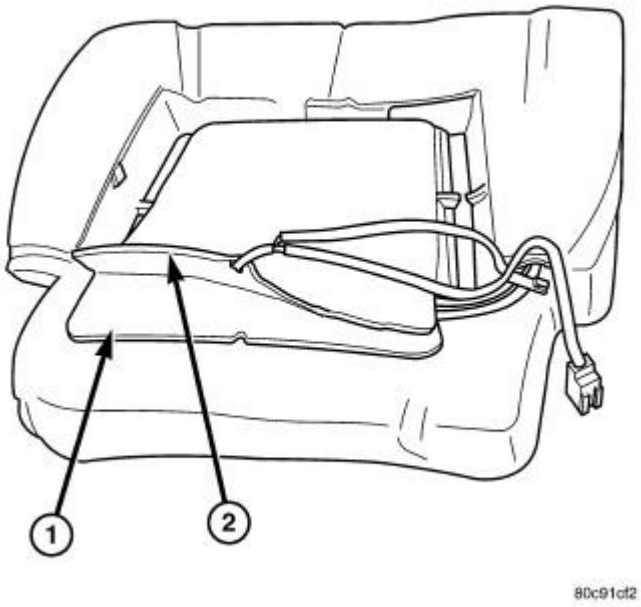


Fig. 8: Identifying Replacement Heating Element And Factory Installed Heating Element
Courtesy of CHRYSLER LLC

CAUTION: During the installation of the replacement heating element, be careful not to fold or crease the element assembly. Folds or creases will cause premature failure.

NOTE: Heated seat cushion shown in illustration. Heated seat back similar.

1. Peel off the adhesive backing on the back of the replacement heating element (2) and stick on foam pad directly where the original element was placed (there will be adhesive marks on the foam outlining factory installed element) (1).

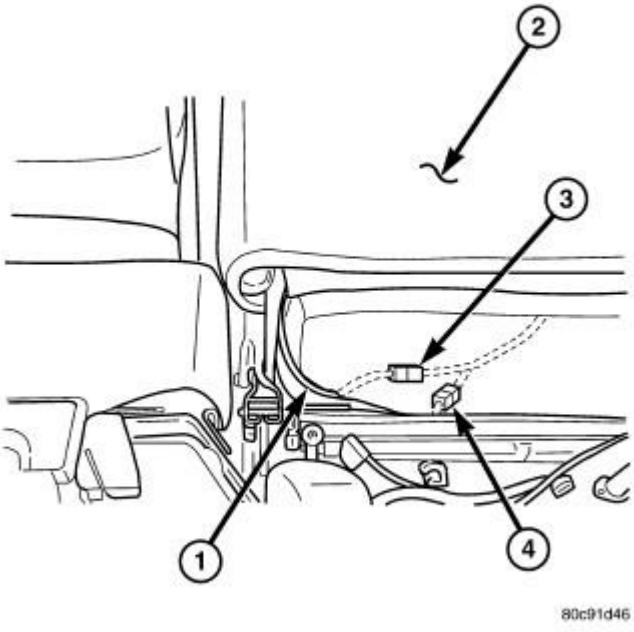


Fig. 9: Connecting New Heating Element Electrical Connectors
Courtesy of CHRYSLER LLC

2. Connect the new heating element electrical connectors (3 AND 4).
3. Connect the battery negative cable.
4. Verify heated seat system operation.
5. Install the appropriate seat cushion trim cover or seat back trim cover. Refer to **Body/Seats/COVER, Seat Cushion - Installation** . Refer to **Body/Seats/COVER, Seat Back - Installation** .

NOTE: Make certain the seat wire harness is correctly routed through the seat and seat back. The excess wire between the cushion and back elements should be securely tucked between the rear of the cushion foam and the rear carpet flap of the trim cover. The factory installed heater element should be completely removed from the system and discarded.

SWITCH, HEATED SEAT

DESCRIPTION

DESCRIPTION

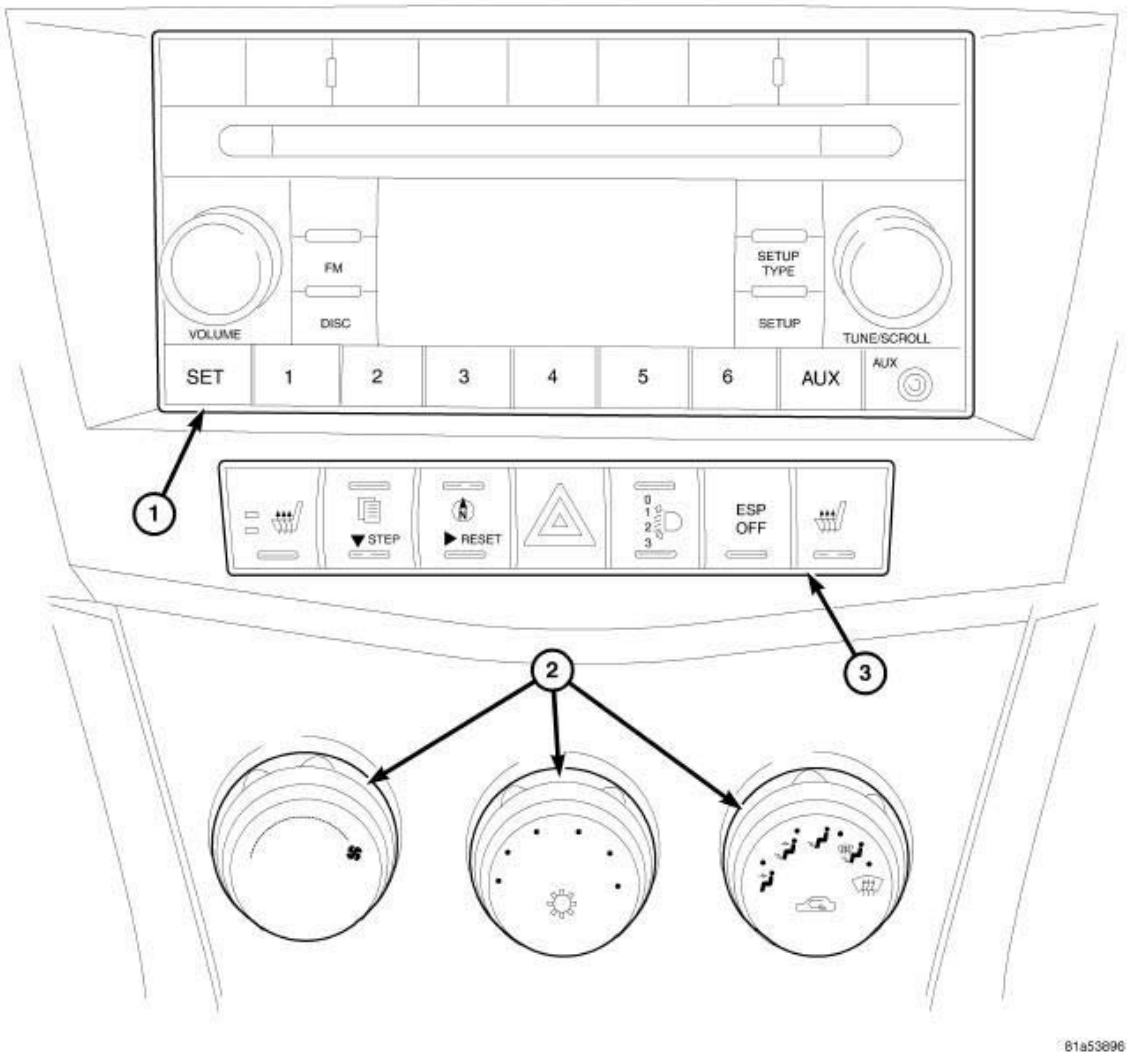


Fig. 10: Locating Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

Two heated seat switches are located in the center stack of the instrument panel. The switches are located on the outer edges of the Accessory Switch Bank Module (ASBM). The ASBM (3) is located just below the radio (1) and just above the heater and air conditioner controls (2) in the center stack area of the instrument panel. If either of the switches is damaged or inoperative the complete ASBM assembly must be replaced.

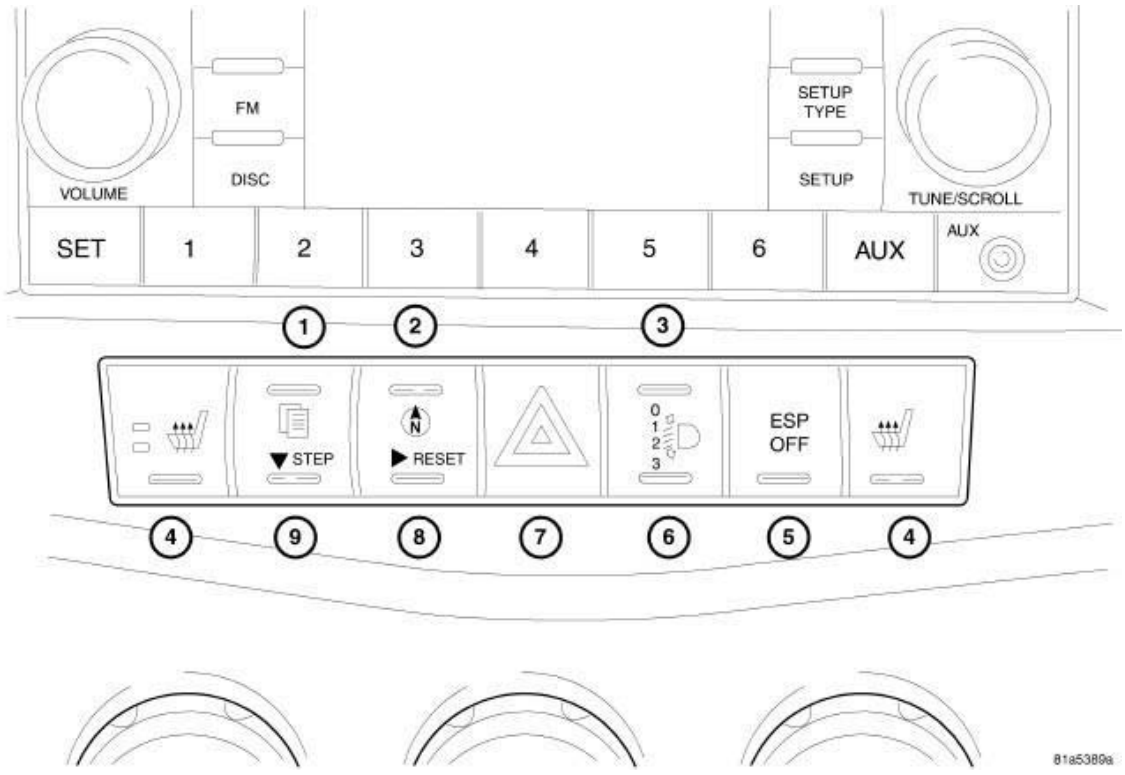


Fig. 11: Identifying Assembly Switch Bank Module Callouts
Courtesy of CHRYSLER LLC

Each heated seat switch (4) provides a resistor-multiplexed signal to the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN). Amber Light Emitting Diodes (LEDs) on the outside edge of each switch indicate the level of heat in use: Two LEDs are illuminated for high, one for low, and none for off. Pressing the switch once will select high-level heating. Pressing the switch a second time will select low-level heating. Pressing the switch a third time will shut the heating elements off.

The LED indicator lamps in each heated seat switch cannot be repaired. If the LED lamps are inoperative or damaged, or the switch is inoperative or damaged the complete ASBM assembly must be replaced. See **Removal** .

OPERATION

OPERATION

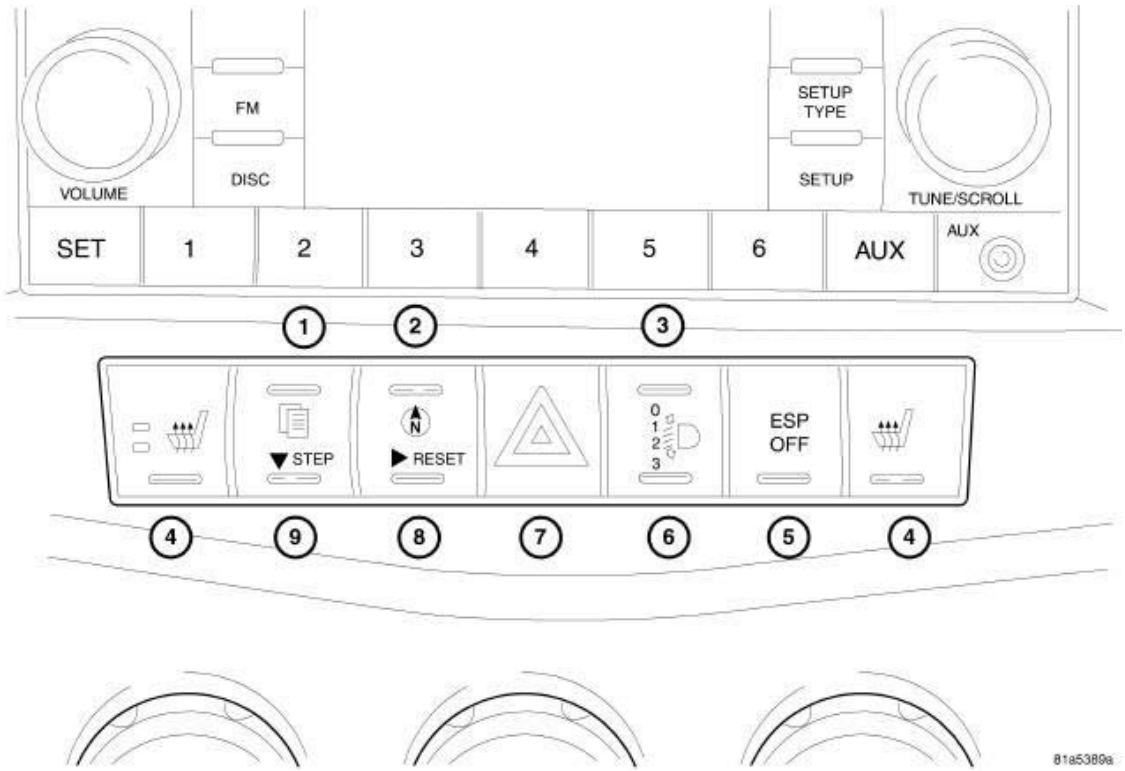


Fig. 12: Identifying Assembly Switch Bank Module Callouts
Courtesy of CHRYSLER LLC

The heated seat switches (4) are active any time the Local Interface Network (LIN) data bus is active. Depressing the heated seat switch provides a switch status message to the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN), via the LIN data bus. The CCN is responsible for supplying the LIN data bus message to the heated seat module, signaling the module to power the heated seat element of the selected seat and maintain the temperature setting. If the heated seat switch is depressed to a different position (Low or High) than the currently selected state, the CCN will go through the process again to change the temperature setting.

DIAGNOSIS AND TESTING

HEATED SEAT SWITCH

In order to obtain conclusive testing, the heated seat system and the Local Interface Network (LIN) data bus circuit must be checked. **Any diagnosis of the heated seat system should begin with, the use of a scan tool and the appropriate diagnostic service information.**

Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

NOTE: Vehicles equipped with the heated seat option utilize a low voltage cut-off feature. This feature turns off power to the heated seat system anytime vehicle voltage is below 11.7v or above 15.5v. Be certain to check the vehicle electrical

system for proper voltage anytime the power seat system appears inoperative.

Before any testing of the heated seat system is attempted, the battery should be fully-charged.

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The heated seat switches are integral to the Accessory Switch Bank Module (ASBM) and cannot be serviced separately. The complete ASBM assembly must be replaced.

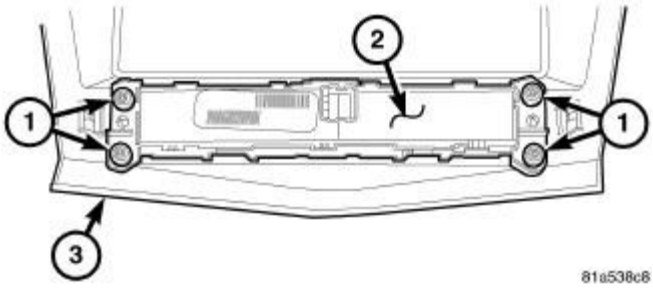


Fig. 13: Removing/Installing Assembly Switch Bank Module (ASBM)
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the center bezel from the instrument panel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the four screws (1) that secure the ASBM (2) to the back of the instrument panel center bezel (3) and remove the ASBM.

INSTALLATION

INSTALLATION

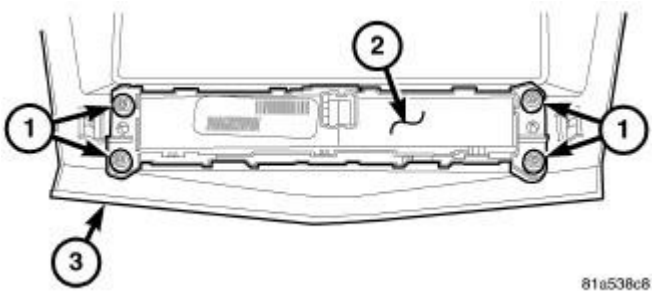


Fig. 14: Removing/Installing Assembly Switch Bank Module (ASBM)
Courtesy of CHRYSLER LLC

NOTE: There are different Accessory Switch Bank Module (ASBM) configurations available based on the option content of the vehicle. Ensure the ASBM being installed matches the vehicle options.

1. Position the ASBM (2) onto the back of the instrument panel center bezel (3).
2. Install the four screws (1) that secure the ASBM to the center bezel. Tighten the screws to 2 N.m (17 in. lbs.).
3. Install the center bezel onto the instrument panel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Connect the battery negative cable.
5. Verify heated seat system operation.

2009 ACCESSORIES AND EQUIPMENT

Horn System - Service Information - Journey

DESCRIPTION

DESCRIPTION

The dual-note horn system features two electromagnetic horn units. The horn system includes the following major components:

- **Horn** - The two horns are located at the front center of the vehicle, behind the grille.
- **Horn Switch** - The horn switch is mounted under the driver airbag. It consists of four pads that make contact when the horn is pressed.

Vehicles with an optional Electronic Vehicle Information Center (EVIC) and steering wheel mounted switches (except LX) have a unique horn switch electrical architecture. For more information on the EVIC. Refer to **Electrical - Message Systems/Message Center/CENTER, Electronic Vehicle Information - Description** .

OPERATION

OPERATION

The horn system operates on battery current received through a fuse located in the Totally Integrated Power Module (TIPM). The horn system circuit is designed so that the system will remain operational, regardless of the ignition switch position.

On vehicles equipped with an optional Electronic Vehicle Information Center (EVIC), the right EVIC switch is also a Local Interface Network (LIN) bus slave, sharing a LIN input circuit with the Steering Control Module (SCM) within the left multifunction switch, to the CCN (LIN master). Both the right and left EVIC switches also share an IOD feed and a ground feed in common with the SCM.

On vehicles with an EVIC, the right EVIC switch microprocessor is connected to and monitors the outputs of the left EVIC switch. The right EVIC switch also is connected to the horn switch and the remote radio switches through a common sensor signal circuit. The right EVIC switch monitors the horn switch state through a dedicated return circuit and monitors the resistor multiplexed remote radio switches through a second dedicated return circuit. Finally, the right EVIC microprocessor communicates the status of each and every one of these switches to the CCN over the LIN data bus.

DIAGNOSIS AND TESTING

HORN SYSTEM

The most reliable, efficient, and accurate means to diagnose the horn system requires the use of a scan tool and the proper Diagnostic Procedures information.

Refer to the appropriate wiring information.

In most cases, any problem involving continually sounding horns can be quickly alleviated by removing the horn fuse from the Totally Integrated Power Module (TIPM).

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

HORN SYSTEM TEST TABLE

CONDITION	POSSIBLE CAUSE	CORRECTION
HORN SOUNDS CONTINUOUSLY. NOTE: IMMEDIATELY UNPLUG HORN	1. Horn control circuit shorted to ground.	1. Find the short and repair as necessary.
-	2. Pinched horn switch wire under driver airbag module.	2. Replace the horn switch.
-	3. Inoperative horn switch	3. Replace the horn switch.
HORN SOUND INTERMITTENTLY AS THE STEERING WHEEL IS TURNED.	1. Pinched horn switch wire under driver airbag.	1. Replace the horn switch.
-	2. Inoperative horn switch.	2. Replace the horn switch.
HORN DOES NOT SOUND	1. Blown fuses in the TIPM.	1. Replace fuses 22 and 23 in the TIPM.
-	2. No voltage at horn and fuse is OK.	2. Repair TIPM or circuit x2 as necessary.
-	3. Open circuit from TIPM to horn switch.	3. Repair circuit x3 as necessary.
-	4. Inoperative or damaged horn.	4. Replace horn.
-	5. Inoperative horn switch	5. Replace the horn switch.
	6 Inoperative Right EVIC switch.	6. Replace the Right EVIC switch.
FUSE BLOWS WHEN THE HORN SWITCH IS PRESSED	1. Short circuit in horn or horn wiring	1. Check for shorted horn or horn wiring. Disconnect horn wire harness to isolate short and repair as necessary.
FUSE BLOWS WITHOUT PRESSING	1. Short circuit within	1. Check for short and repair as

THE HORN SWITCH NOTE: FOR WIRING REPAIRS REFER TO THE APPROPRIATE WIRE DIAGRAMS.	the TIPM -	necessary. -

HORN

REMOVAL

REMOVAL

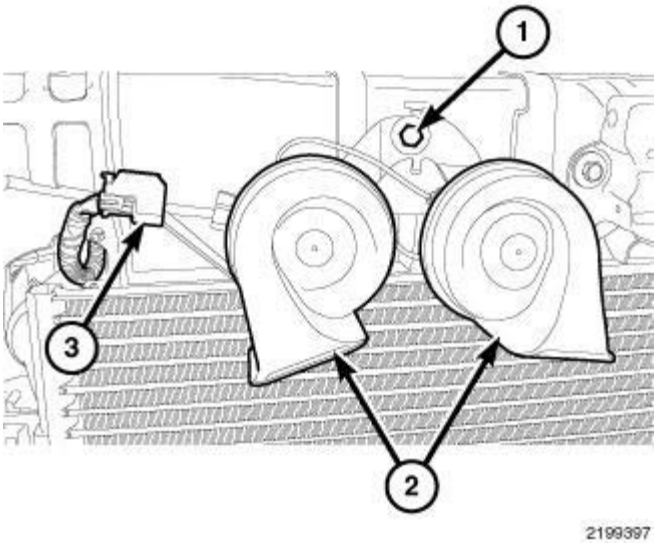


Fig. 1: Removing / Installing Horns
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the push pin type retainers along the top of the grille assembly and position the grille aside.
3. Disconnect the wire harness connectors (3) from the horns (2).
4. Remove mounting bolt (1) securing the horn bracket and remove horns.

INSTALLATION

INSTALLATION

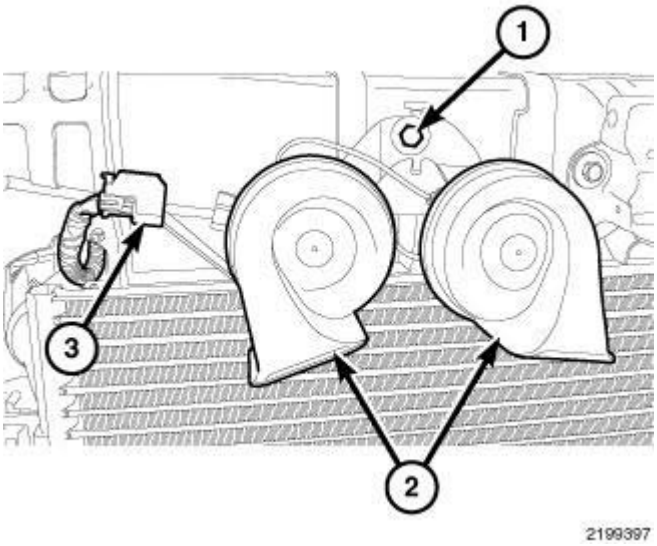


Fig. 2: Removing / Installing Horns
Courtesy of CHRYSLER LLC

1. Install the horn assemblies (2).
2. Install the horn mounting bolt (1).
3. Connect the wire harness connector (3).
4. Position the grille and install the retainers.
5. Connect the negative battery cable.

SWITCH, HORN

REMOVAL

REMOVAL

WARNING: On vehicles equipped with an airbag, refer to Restraint SERVICE INFORMATION article for warnings and cautions before servicing the horn switch.

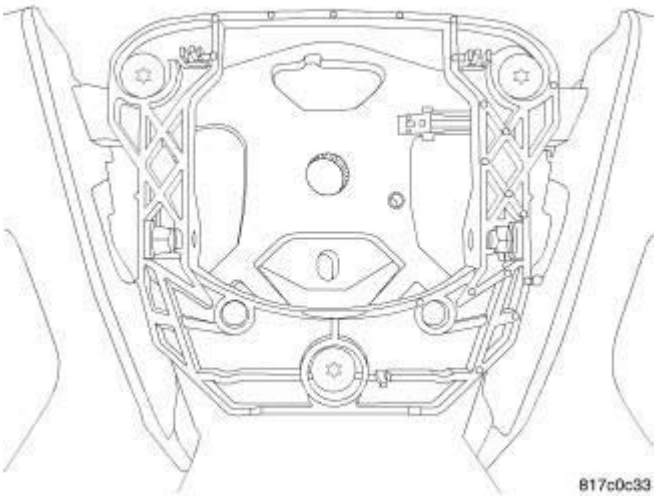


Fig. 3: Removing Horn Switch
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver airbag. Refer to **Restraints/AIR BAG, Driver - Removal** .
3. Disconnect the connector from the clockspring.
4. Remove the three mounting fasteners.
5. Remove the horn switch.

INSTALLATION

INSTALLATION

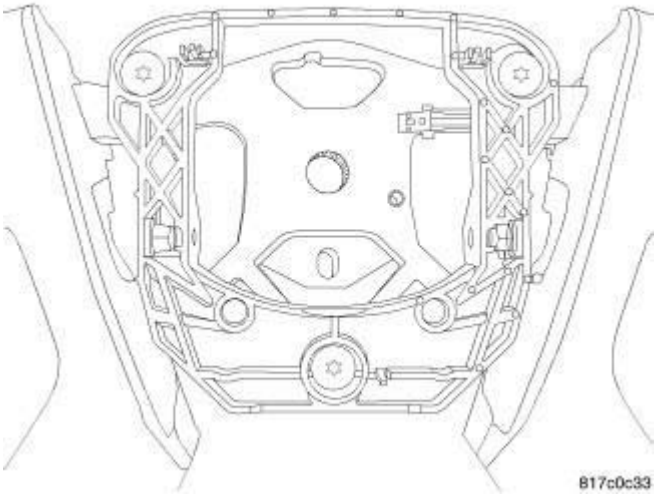


Fig. 4: Installing Horn Switch
Courtesy of CHRYSLER LLC

1. Install the horn switch.
2. Install the three mounting fasteners.
3. Connect the electrical connector to the clockspring.
4. Install the driver airbag. Refer to **Restraints/AIR BAG, Driver - Installation**
5. Connect the battery negative cable.

2009 HVAC

Heating & Air Conditioning (MTC) - Electrical Diagnostics - Journey

DIAGNOSTIC CODE INDEX

DIAGNOSTIC CODE INDEX

DTC	Description
B1000	A/C SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1009	RECIRCULATION SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1015	REAR DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE
B1031	EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW
B1032	EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH
B1040	PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B1043	PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN
B1044	PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL
B1045	PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE
B1058	RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE
B105B	RECIRCULATION DOOR CONTROL CIRCUIT OPEN
B105C	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10A2	LEFT BLEND DOOR 1 CONTROL CIRCUIT/PERFORMANCE
B10A5	LEFT BLEND DOOR CONTROL CIRCUIT OPEN
B10A6	LEFT BLEND DOOR 1 TRAVEL TOO SMALL
B10A7	LEFT BLEND DOOR TRAVEL TOO LARGE
B10B2	A/C COOL DOWN TEST PERFORMANCE
B160F	TWILIGHT/AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT/PERFORMANCE
B1610	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT LOW
B1611	AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT HIGH
B210A	SYSTEM VOLTAGE LOW
B210B	SYSTEM VOLTAGE HIGH
B2214	(HVAC) CLIMATE CONTROL INTERNAL
U0010	CAN INTERIOR BUS
U0019	CAN B BUS
U0141	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0151	LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)
U0155	LOST COMMUNICATION WITH CLUSTER/CCN
U0167	LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE
U0168	LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIN)

U0184	LOST COMMUNICATION WITH RADIO
U0186	LOST COMMUNICATION WITH AUDIO AMPLIFIER
U0197	LOST COMMUNICATION WITH HANDS FREE PHONE MODULE
U0203	LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT
U0249	LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW
B1000-92	A/C SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1009-92	RECIRCULATION SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1015-92	EBL / REAR DEFROST SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B1030-11	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO GROUND
B1030-12	EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO BATTERY
B1058-11	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO GROUND
B1058-12	RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B1058-13	RECIRCULATION DOOR CONTROL - CIRCUIT OPEN
B1058-92	RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B105C-00	RECIRCULATION DOOR TRAVEL RANGE TOO SMALL
B105D-00	RECIRCULATION DOOR TRAVEL RANGE TOO LARGE
B10B2-00	A/C COOL DOWN TEST PERFORMANCE
B11C2-11	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO GROUND
B11C2-12	FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO BATTERY
B11C2-13	FRONT MODE DOOR 1 CONTROL - CIRCUIT OPEN
B11C2-92	FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11C3-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL
B11C4-00	FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE
B11CB-11	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO GROUND
B11CB-12	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO BATTERY
B11CB-13	MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN
B11CB-92	MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION
B11CC-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL
B11CD-00	MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE
B11D9-92	BLOWER SPEED KNOB REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION
B160F-11	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND

B160F-12	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO BATTERY
B160F-92	TWILIGHT/AMBIENT LIGHT SENSOR INPUT - PERFORMANCE OR INCORRECT OPERATION
B210A-84	SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210B-85	SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B210D-84	BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE
B210E-85	BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE
B2214-00	(HVAC) CLIMATE CONTROL INTERNAL
B222A-00	VEHICLE LINE MISMATCH
U0010-00	CAN INTERIOR BUS
U0141-00	LOST COMMUNICATION WITH IPM (FCM/TIPM)
U0155-00	LOST COMMUNICATION WITH CLUSTER/CCN

DIAGNOSIS AND TESTING

B1000-A/C SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the status changes when the switch button or knob is pushed or turned. An active Diagnostic trouble Code (DTC) indicates that the switch is stuck in an On position. A stored DTC indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the A/C On/Off Control Switch is stuck in an On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
    1. Inspect the A/C Heater Control for an object or debris holding the A/C On/Off Control Switch in an On position.

        NOTE: Using the scan tool you can read the On/Off status of the control switch.

        Is the A/C On/Off control switch being held in or stuck On?

        Yes

        - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

        No

        - Go to step 2
2. **A/C HEATER CONTROL**
    1. Turn the ignition on.
    2. Using the scan tool, erase HVAC DTCs.
    3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
    4. Using the scan tool, read HVAC DTCs.

        Does the scan tool display this DTC as Active or is the status of the switch reading On?

        Yes

        - Replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

        No

        - Test complete.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B1009-RECIRCULATION SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the status changes when the switch button or knob is pushed or turned. An active DTC indicates that the switch is stuck in an On position. A stored Diagnostic trouble Code (DTC) indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Recirculation mode switch is stuck in a On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
   1. Inspect the A/C Heater Control for an object or debris holding the Recirculation mode switch in an On position.

      NOTE: Using the scan tool you can read the On/Off status of the control switch.

      Is the Recirculation mode switch being held in or stuck On?

      Yes

      - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 2

2. **A/C HEATER CONTROL**
    1. Turn the ignition on.
    2. Using the scan tool, erase HVAC DTCs.
    3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
    4. Using the scan tool, read HVAC DTCs.

    Does the scan tool display this DTC as Active or is the status of the switch reading On?

    Yes

    - Replace and program the A/C Heater Control in accordance with the Service Information.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B1015-REAR DEFROST SWITCH REQUEST INPUT CIRCUIT/PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the status changes when the switch button or knob is pushed or turned. An active DTC indicates that the switch is stuck in an On position. A stored Diagnostic Trouble Code (DTC) indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Electric Back light (EBL) Electronic Rear Defrost switch is stuck in an On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
    1. Inspect the A/C Heater Control for an object or debris holding the (EBL) Electronic Rear Defrost switch in an On position.

        NOTE: Using the scan tool you can read the On/Off status of the control switch.

        Is the (EBL) Electronic Rear Defrost switch being held in or stuck in an On?

        Yes

        - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

        No

        - Go to step 2
2. **A/C HEATER CONTROL**
    1. Turn the ignition on.
    2. Using the scan tool, erase HVAC DTCs.
    3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
    4. Using the scan tool, read HVAC DTCs.

        Does the scan tool display this DTC as Active or is the status of the switch reading On?

        Yes

        - Replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B1031-EVAPORATOR TEMPERATURE SENSOR CIRCUIT LOW

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  The Evaporator Temperature Sensor voltage input to the A/C Heater Control is equal to or below 0.01 volts for a continuous period of five seconds. If the A/C Heater Control detects a valid voltage, the Diagnostic Trouble Code (DTC) will change from active to stored and will stay stored for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORT TO GROUND
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO THE (C121) SENSOR GROUND CIRCUIT
EVAPORATOR TEMPERATURE SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs after 60 seconds.

      Is this DTC active?

      Yes

      - Go to step 2

      No

- Go to step 5

2. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**

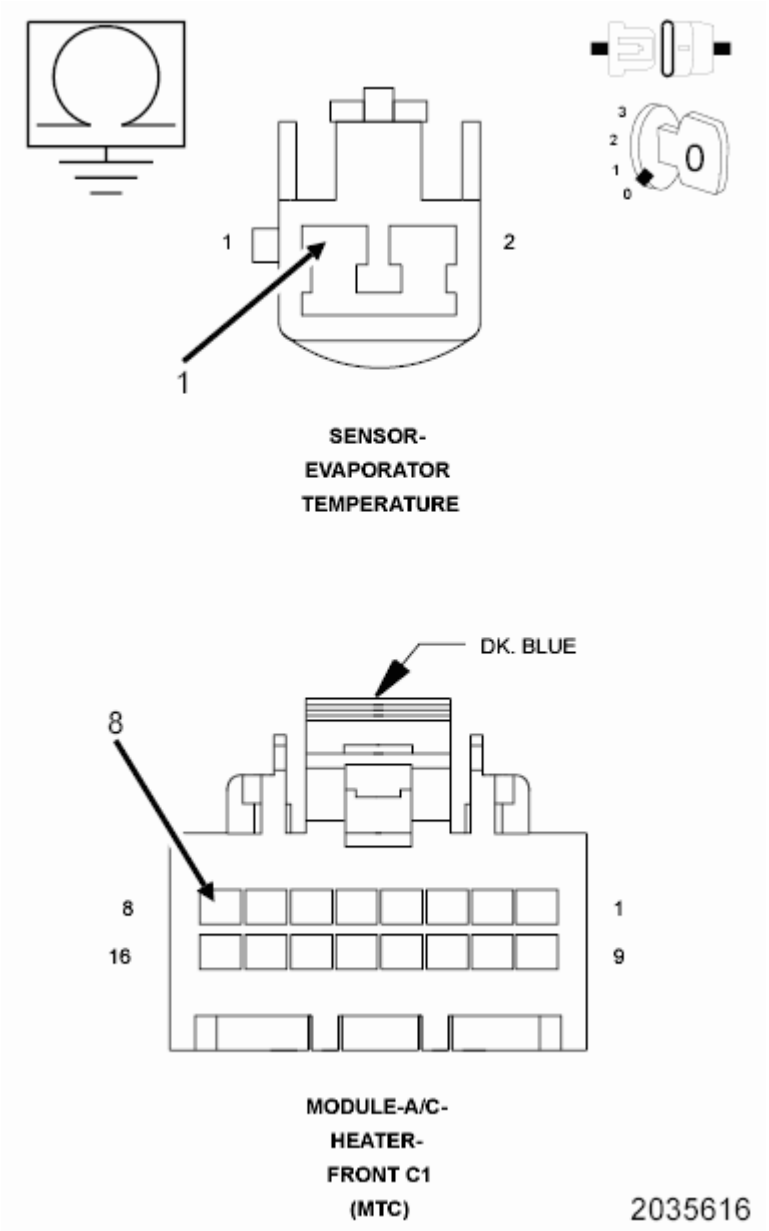


Fig. 1: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Evaporator Temperature Sensor harness connector.
4. Measure the resistance between ground and the (C21) Evaporator Temperature Sensor Signal

circuit.

Is the resistance below 100k Ohms?

Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO THE (C121) SENSOR GROUND CIRCUIT**

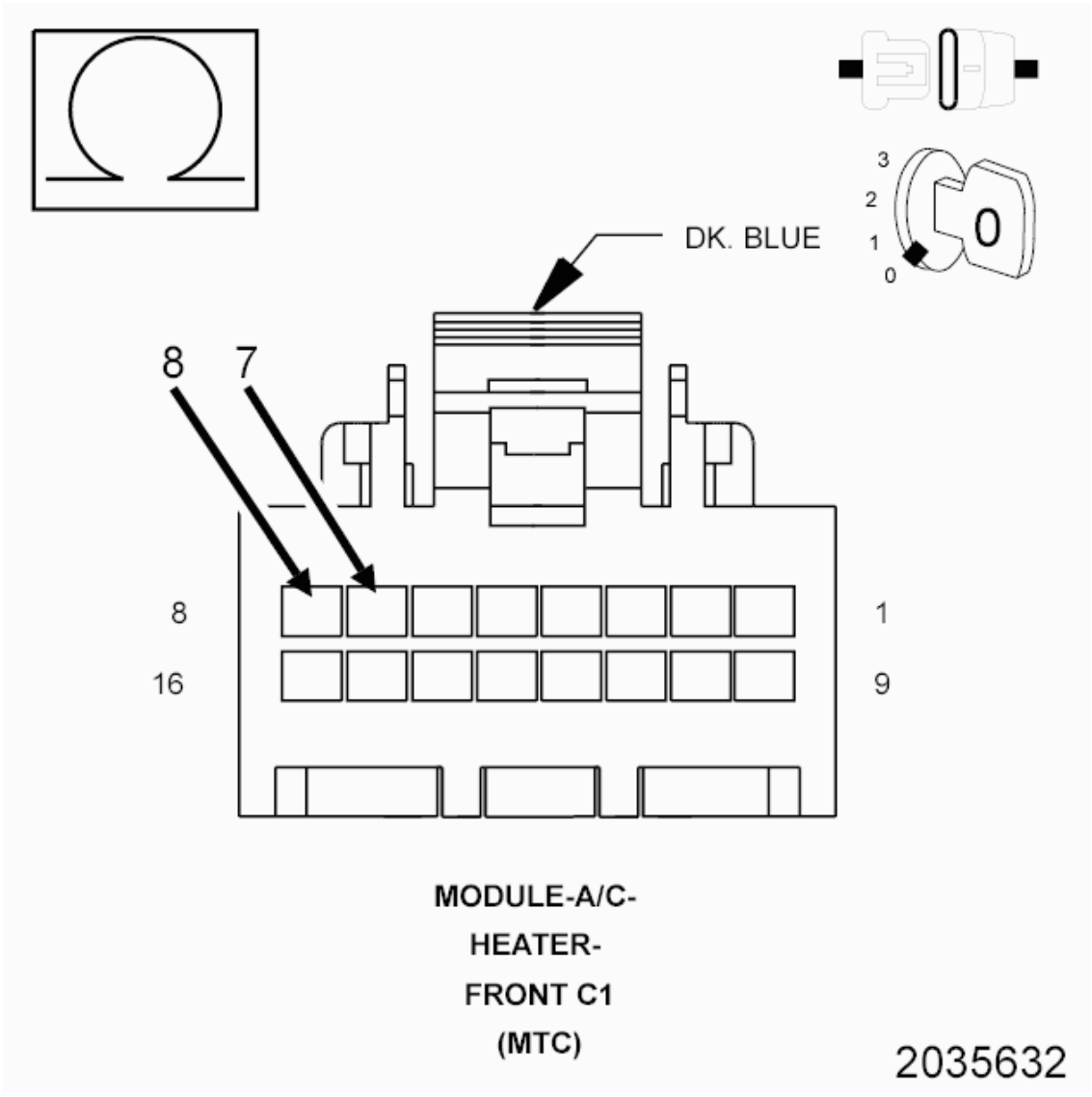


Fig. 2: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Sensor Ground Circuit
Courtesy of CHRYSLER LLC

1. Measure the resistance between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to (C121) Sensor Ground circuit.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
   1. Replace the Evaporator Temperature Sensor in Accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
   3. Cycle the ignition off for 30 seconds then back on and wait a minimum of 5 seconds.
   4. With the scan tool read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   3. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   4. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   5. Wiggle the wiring and connectors while checking for shorted and open circuits.
   6. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.

   Were there any problems found?

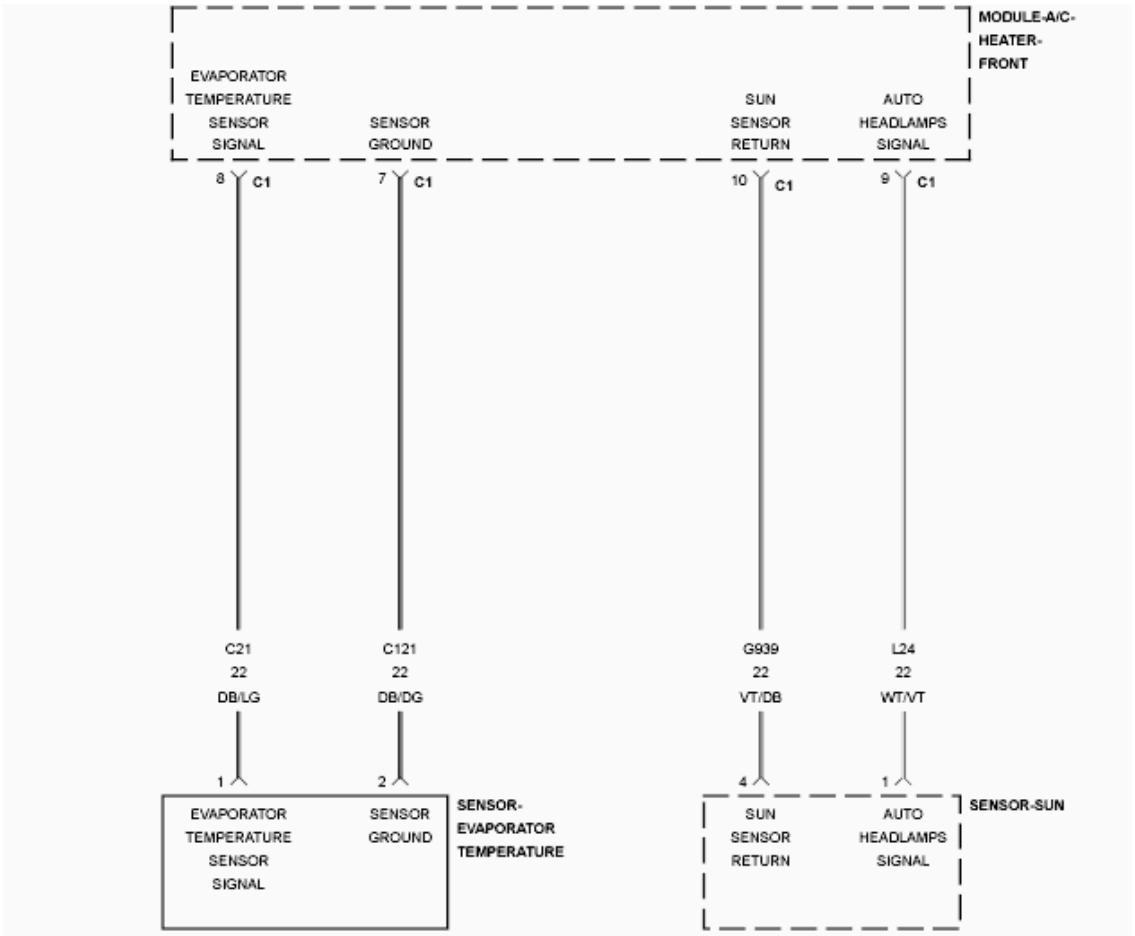
   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B1032-EVAPORATOR TEMPERATURE SENSOR CIRCUIT HIGH



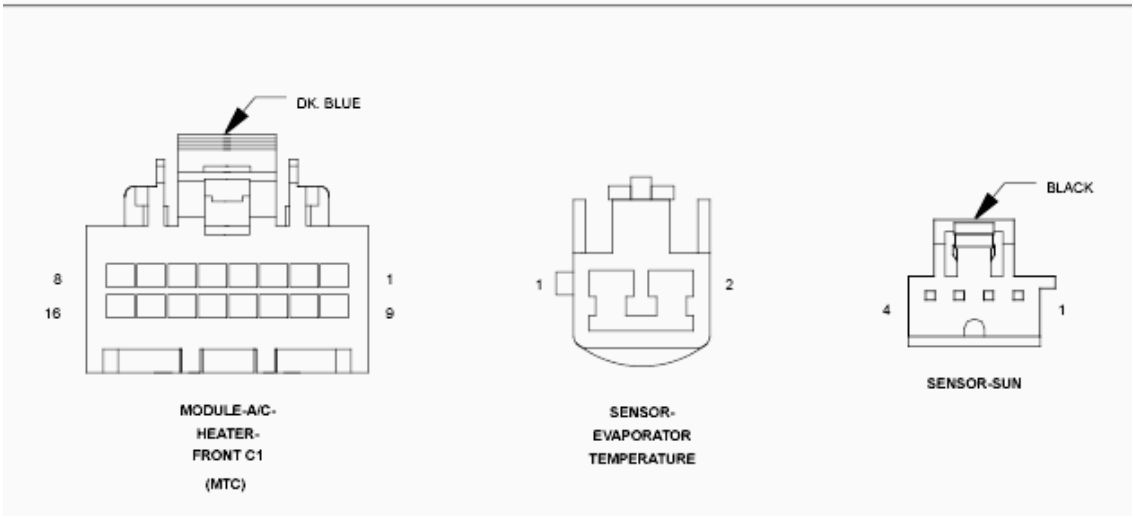


Fig. 3: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The Evaporator Temperature Sensor resistance changes in conjunction to temperature. The sensor thermistor forms the lower half of a voltage divider and the upper half of the voltage divider is provided by a 9.09K pull up resistor to 5.0 volts.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  The Evaporator Temperature Sensor voltage input to the A/C Heater Control is equal to or above 4.9 volts for a continuous period of five seconds. If the A/C Heater Control detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORT TO VOLTAGE
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT OPEN
(C121) SENSOR GROUND CIRCUIT OPEN
EVAPORATOR TEMPERATURE SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT VOLTAGE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs after 10 seconds.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 7

2. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT VOLTAGE**

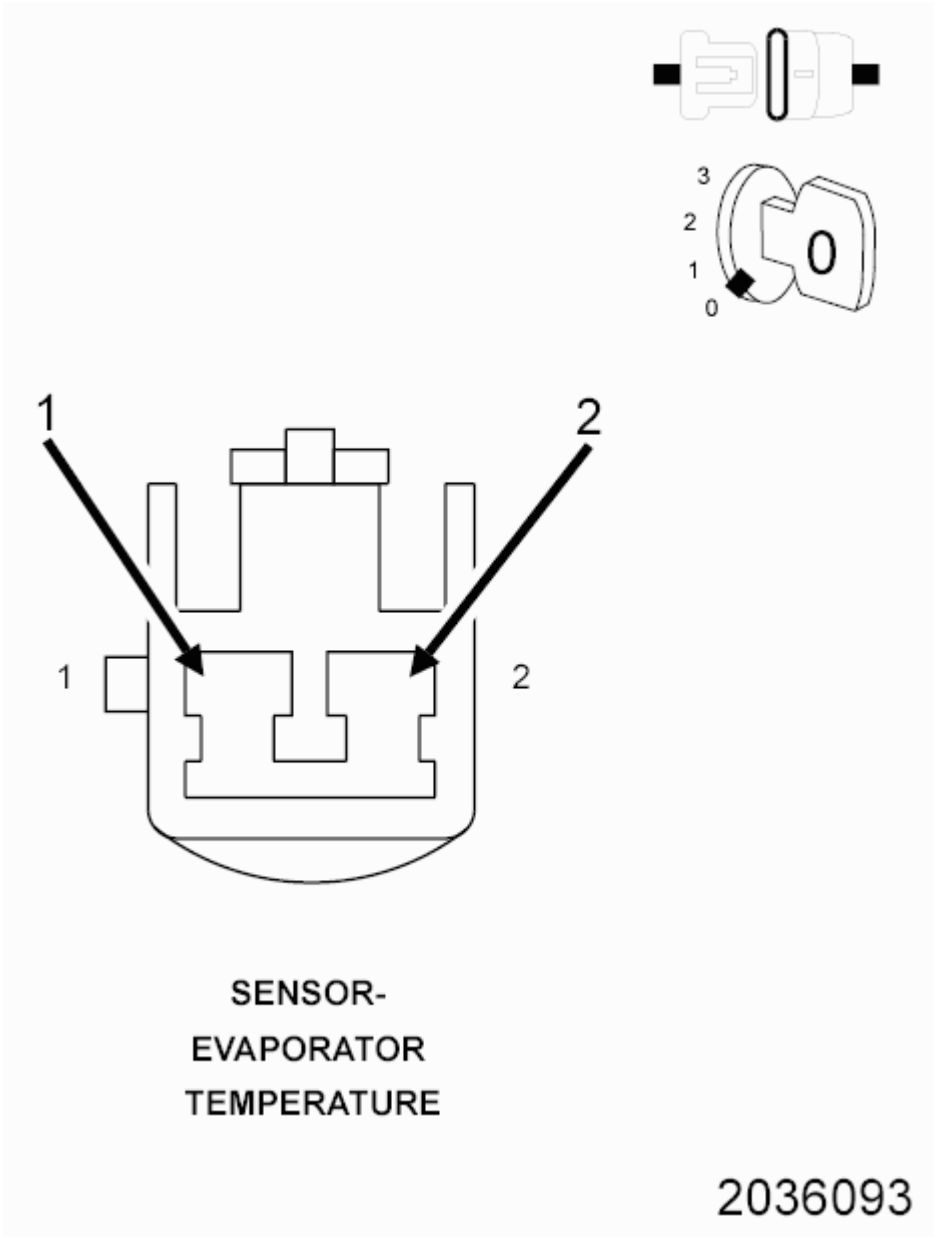


Fig. 4: Checking Evaporator Temperature Sensor Signal Circuit Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Evaporator Temperature Sensor harness connector.

NOTE: Due to the small terminal and pin size of the Evaporator Temperature Sensor and harness connector, make sure to not damage the terminals in this process.

3. Connect a jumper wire between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit in the Evaporator Temperature Sensor harness connector.
4. Ignition on, engine not running.
5. With the scan tool, read the Evaporator Temperature Sensor voltage.

   Is the voltage below 0.1 volt?

   Yes

   - Replace the Evaporator Temperature Sensor in accordance with the Service Information.
   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**

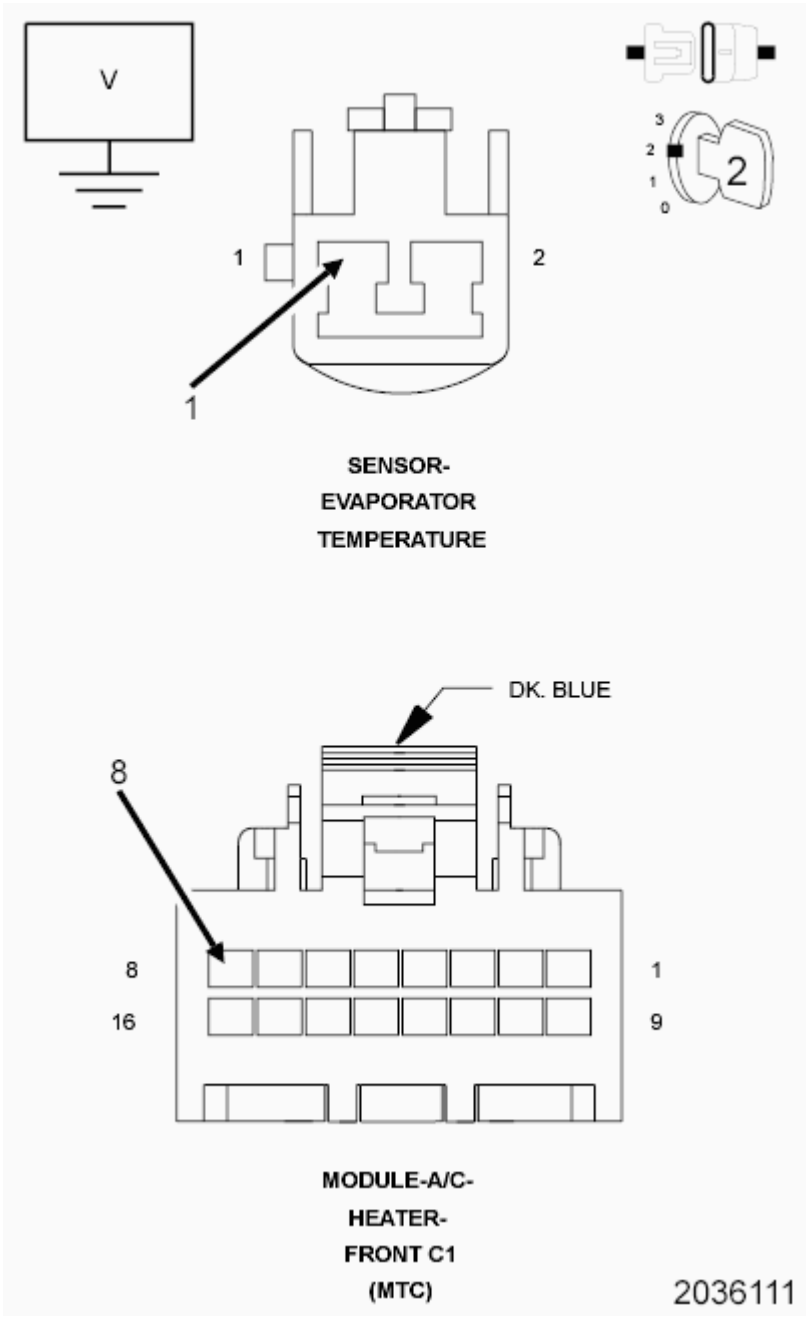


Fig. 5: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the jumper wire from the Evaporator Temperature Sensor harness connector.
3. Disconnect the A/C Heater Control C1 harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C21) Evaporator Temperature Sensor Signal circuit

Is there any voltage present?

Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to voltage.
- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN**

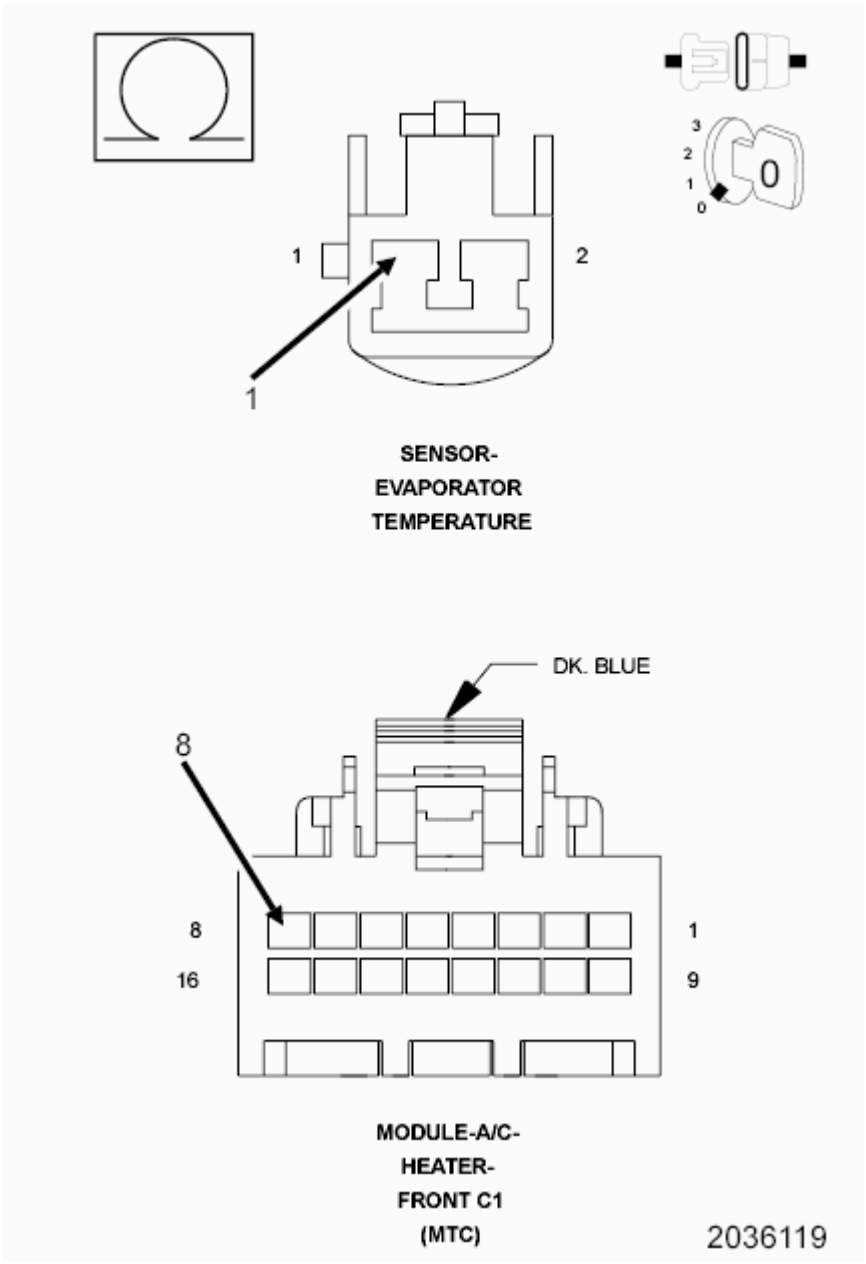


Fig. 6: Checking Evaporator Temperature Sensor Signal Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance of the (C21) Evaporator Temperature Sensor Signal circuit between the A/C Heater Control C1 harness connector and the Evaporator Temperature Sensor harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C21) Evaporator Temperature Sensor Signal circuit for an open or high

resistance.

- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (C121) SENSOR GROUND CIRCUIT FOR AN OPEN**

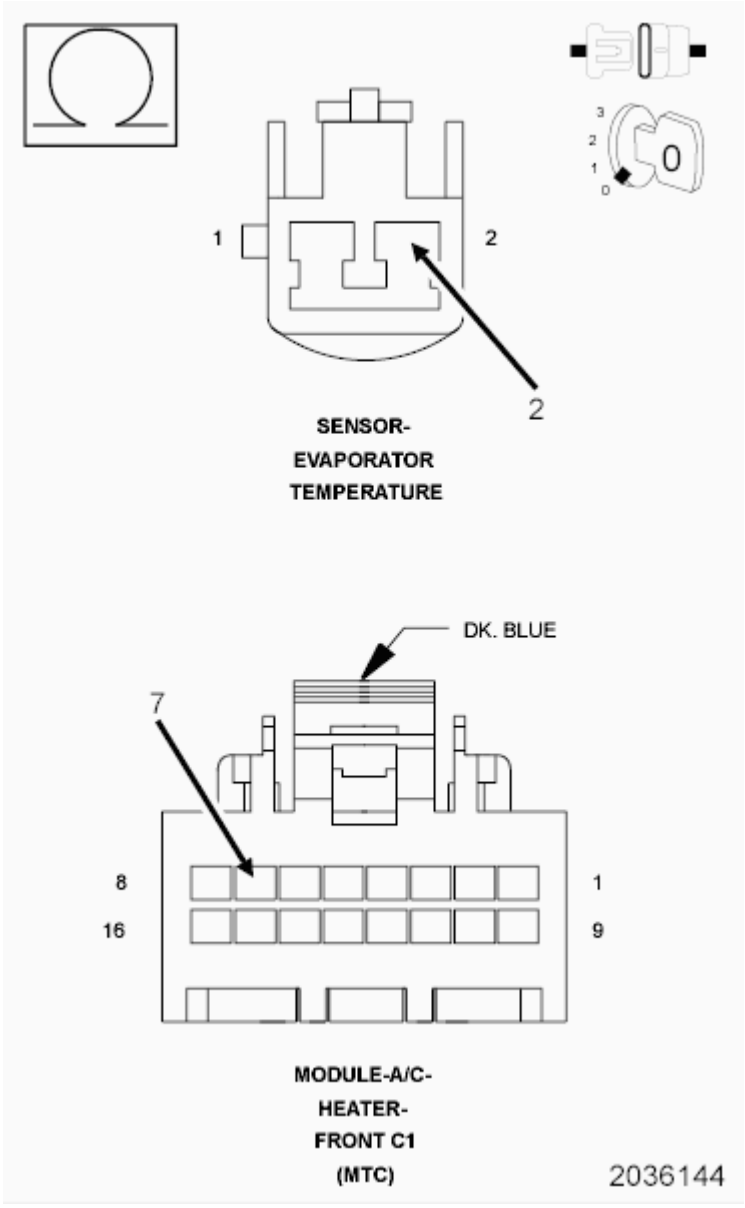


Fig. 7: Checking Sensor Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C121) Sensor Ground circuit between the A/C Heater Control C1

harness connector and the Evaporator Temperature Sensor harness connector.

Is the resistance above 1.0 Ohm?

Yes

- Repair the (C121) Sensor Ground circuit for an open.
- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
   1. Replace the Evaporator Temperature Sensor in Accordance with the Service Information.
   2. Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
   3. Cycle the ignition off for 30 seconds then back on and wait a minimum of 5 seconds.
   4. With the Scan tool read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   3. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   4. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   5. Wiggle the wiring and connectors while checking for shorted and open circuits.
   6. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.

   Were there any problems found?

Yes

- Repair as necessary.
- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1040-PANEL MODE DOOR 1 CONTROL CIRCUIT/PERFORMANCE

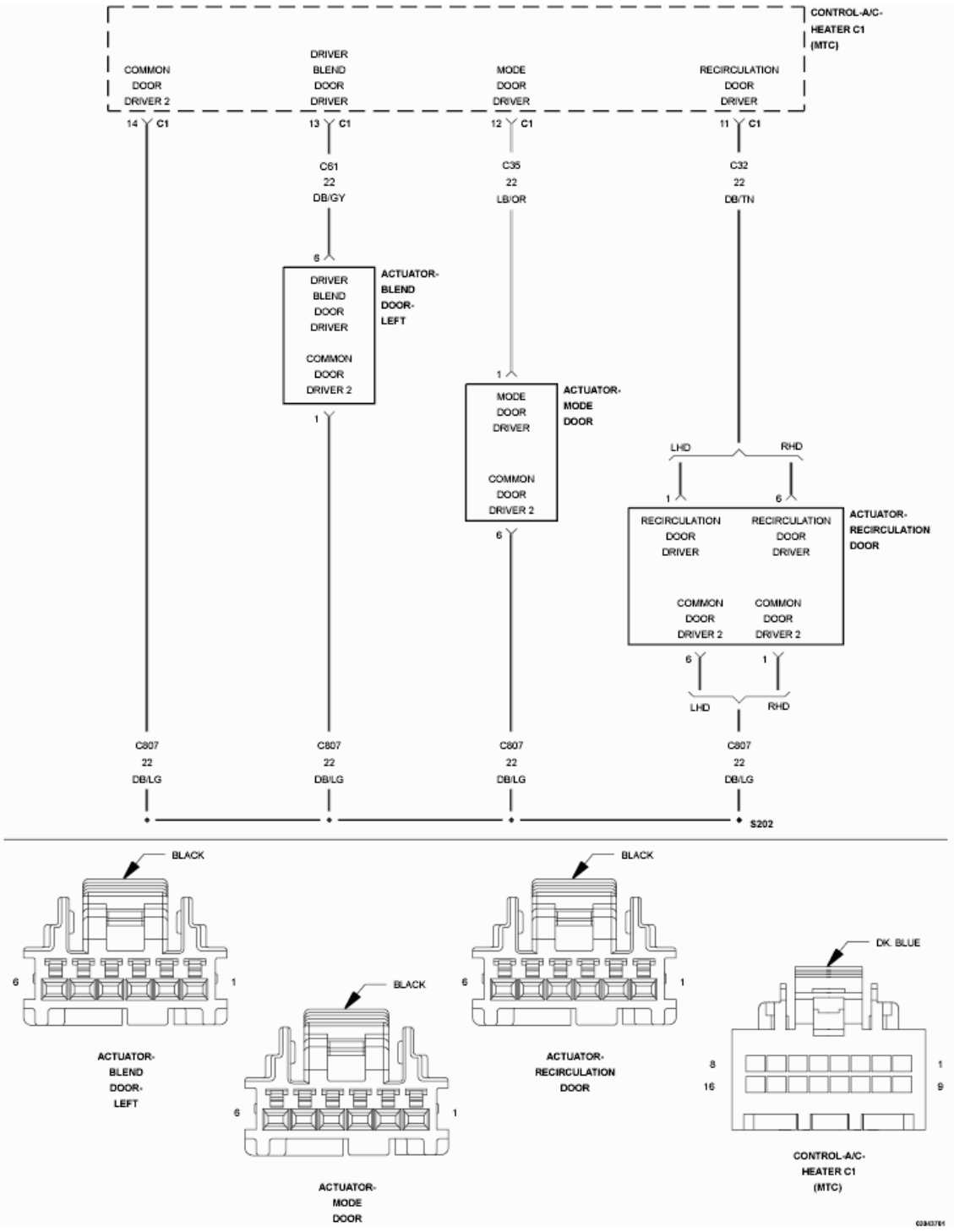


Fig. 8: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and an overcurrent condition is detected in either clockwise or counterclockwise movement for the period of five seconds. If the A/C Heater Control detects valid current draw for 10 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
MODE DOOR BINDING
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

- Go to step 2

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

      Yes

      - Go to step 3

      No

      - Go to step 9
3. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

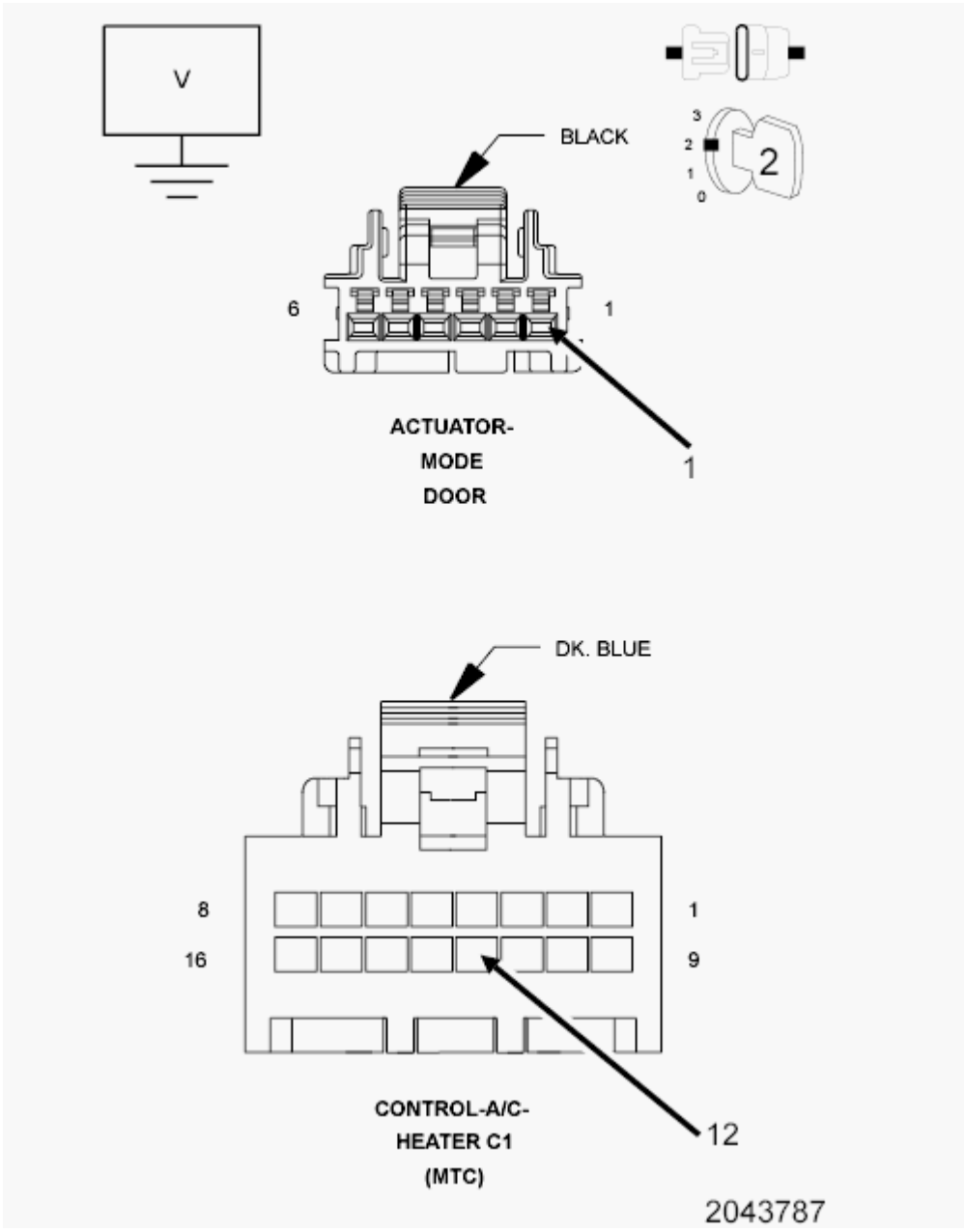


Fig. 9: Checking Mode Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Mode Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C35) Mode Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C35) Mode Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

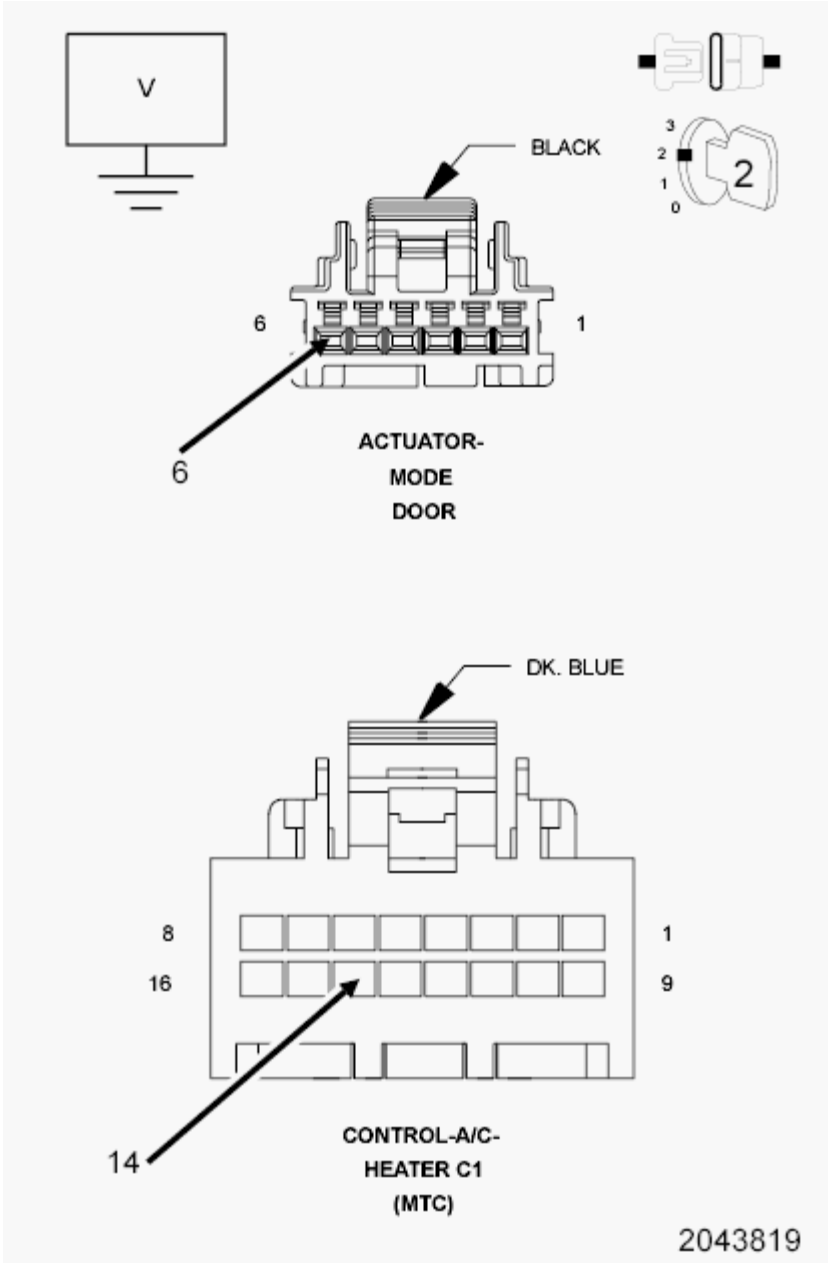


Fig. 10: Checking Common Door Driver 2 Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

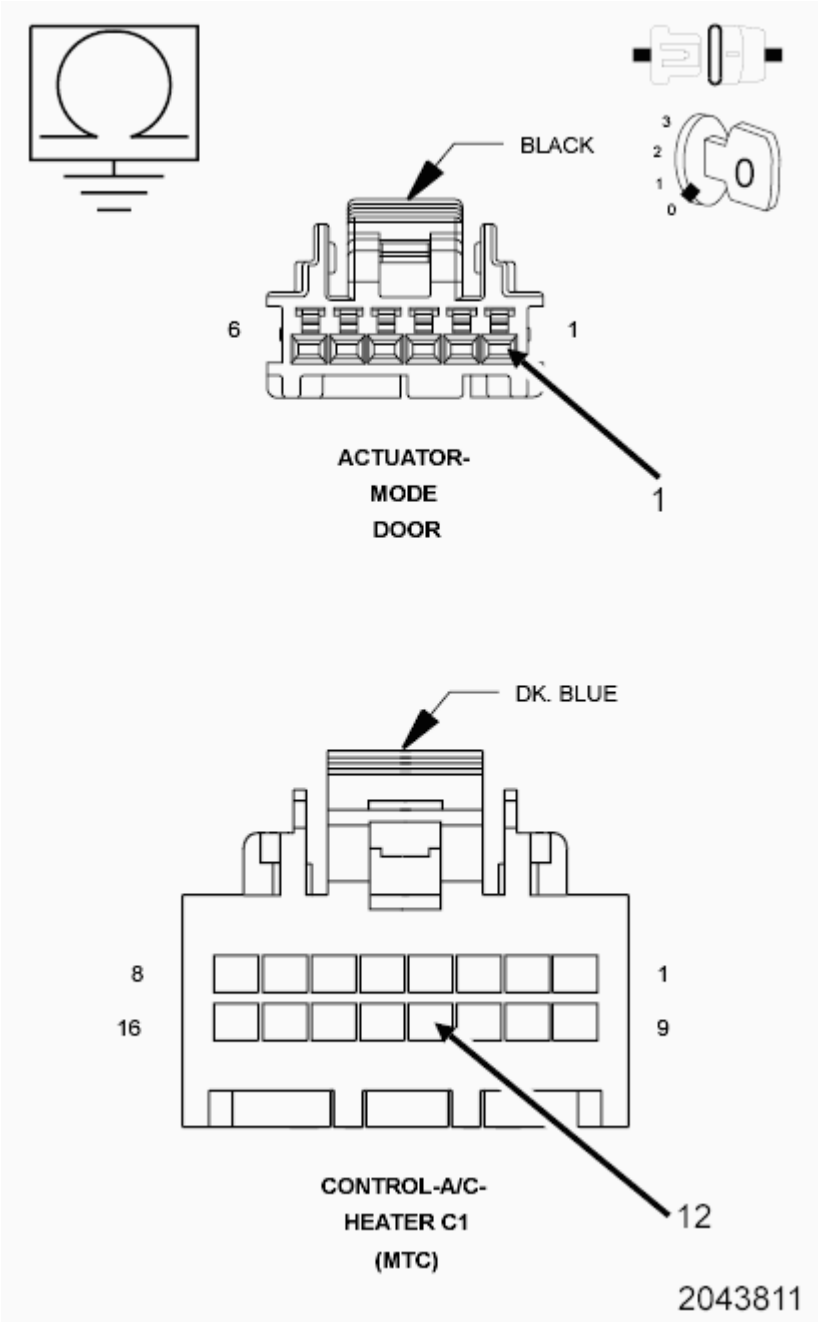


Fig. 11: Checking Mode Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C35) Mode Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C35) Mode Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

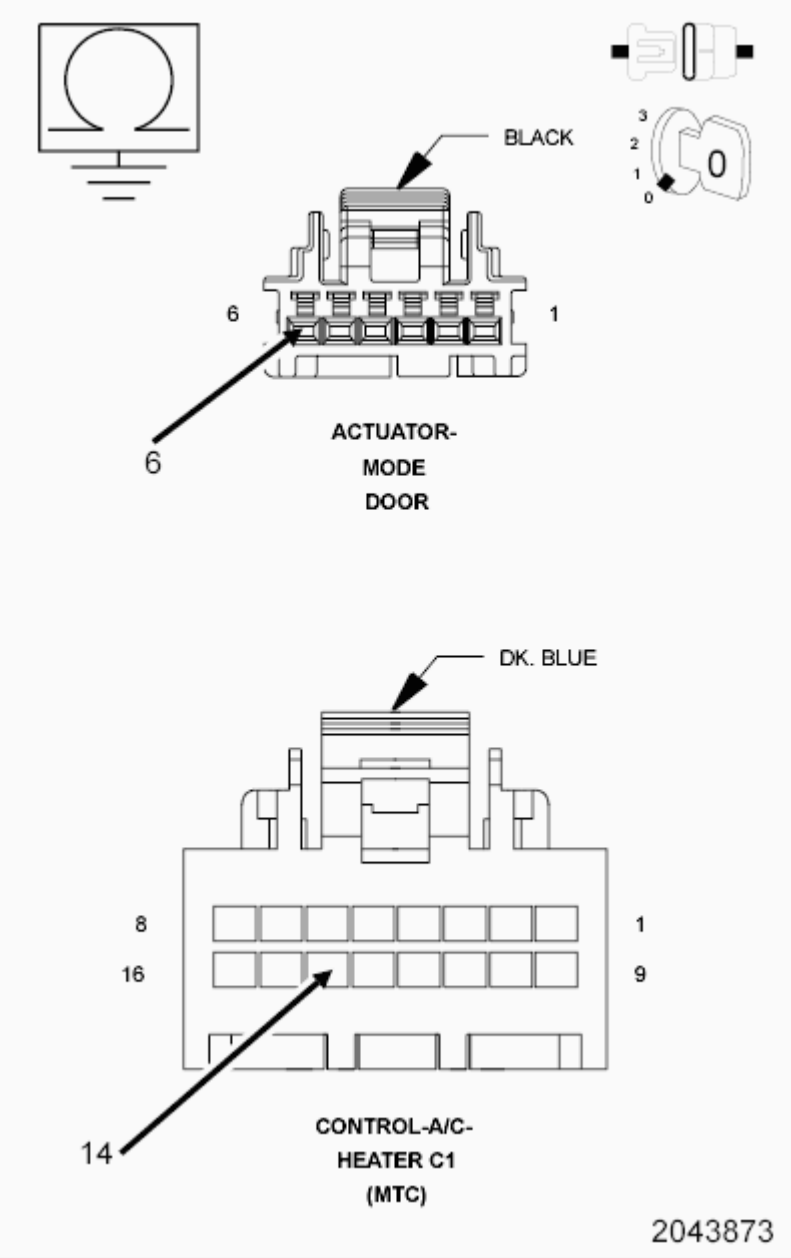


Fig. 12: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC System Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
    4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
    5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
    6. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B1043-PANEL MODE DOOR 1 CONTROL CIRCUIT OPEN

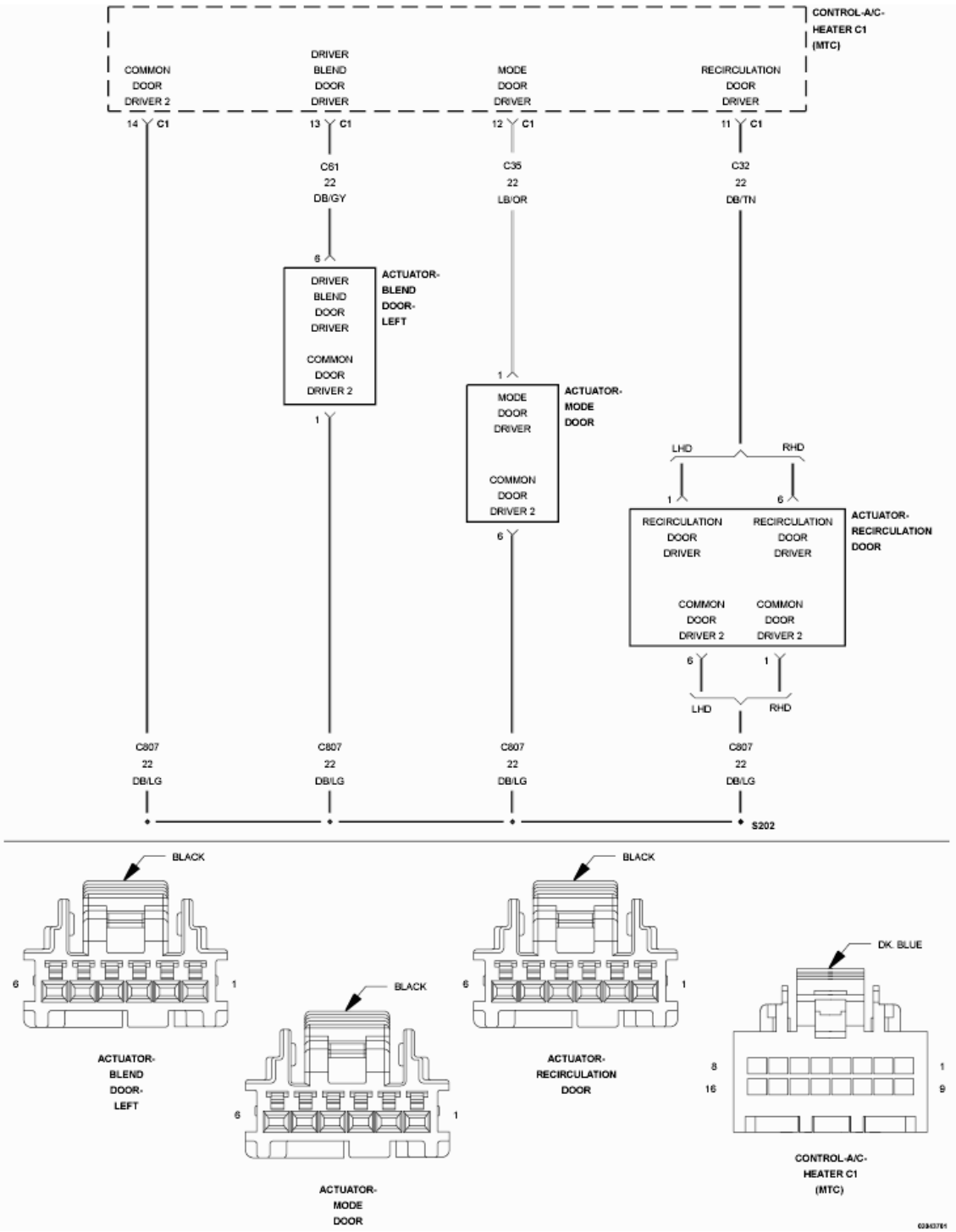


Fig. 13: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and when a HVAC Actuator Calibration Test is performed.

- **Set Condition:**

  If an HVAC Actuator Calibration Test is performed the A/C Heater Control detects there are no feedback pulses detected in that direction, the controller commands the actuator in the opposite direction. If no feedback pulses are detected in either direction this DTC will set. If the A/C Heater Control detects a valid pulse feedback in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR OTHER DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is there more than one Door Control Circuit Open DTC present?

      Yes

      - Repair the (C807) Common Door Driver 2 circuit for an open.

        NOTE: Due to the common shared driver circuit, probable area of concern is the splice, or from the splice to the A/C Heater Control harness connector. Make sure to check all inline connectors.

No

- Go to step 2

2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go to step 4

    No

    - Go to step 7

4. **CHECK THE MODE DOOR ACTUATOR**

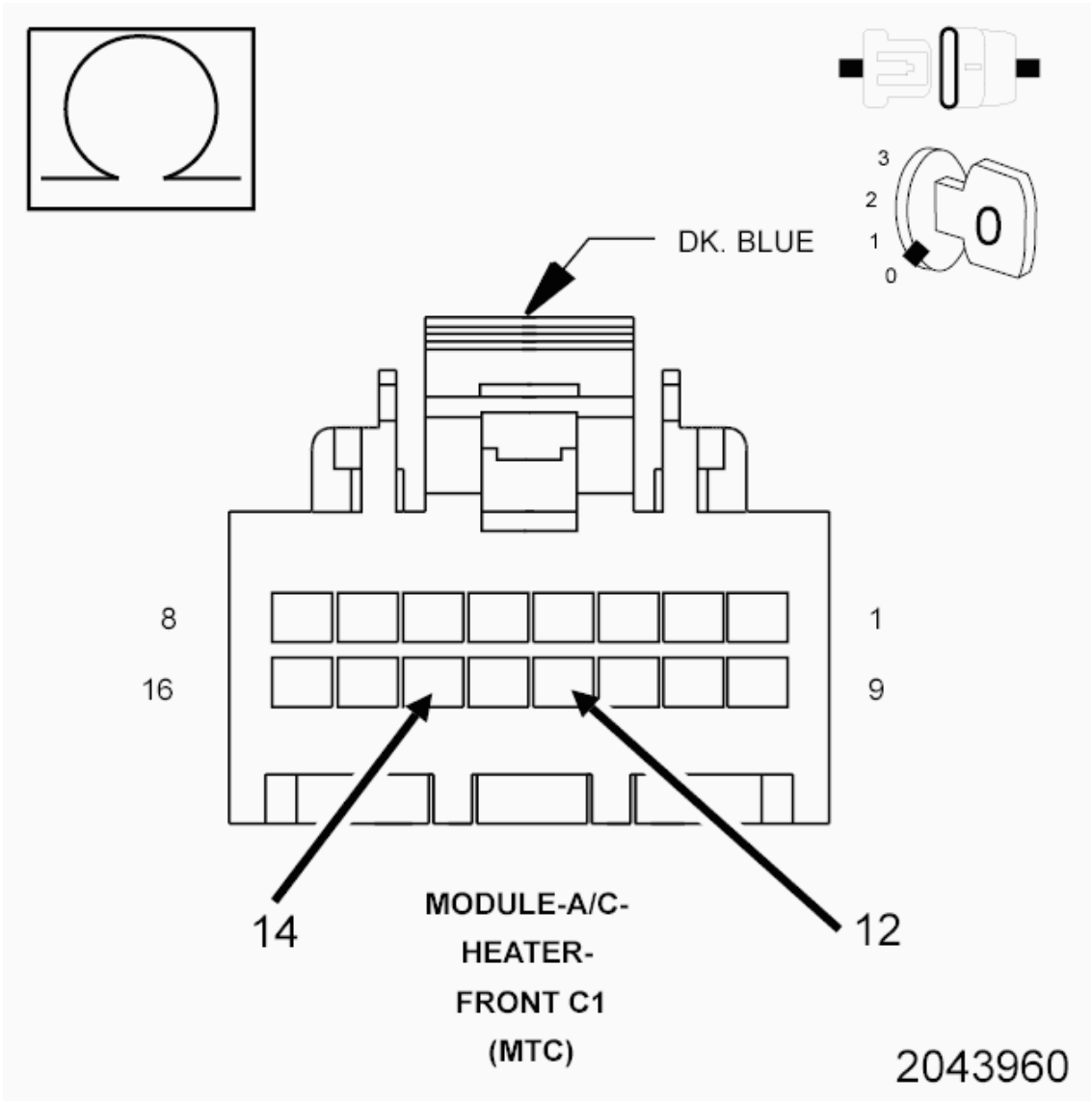


Fig. 14: Checking Mode Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C35) Mode Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard**

Procedure.

No

- Go to step 5

5. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR AN OPEN**

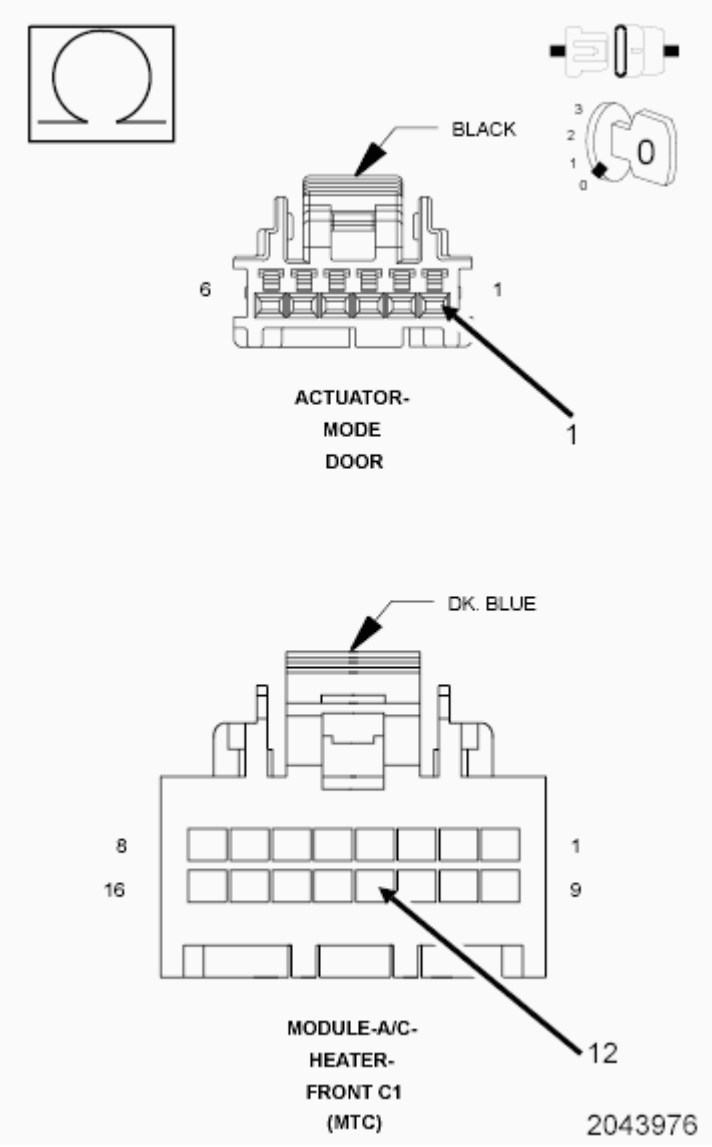


Fig. 15: Checking Mode Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Mode Door Actuator harness connector.
3. Measure the resistance of the (C35) Mode Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door Actuator harness connector.

Is the resistance above 1.0 Ohm?

Yes

- Repair the (C35) Mode Door Driver circuit for an open or high resistance.
- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

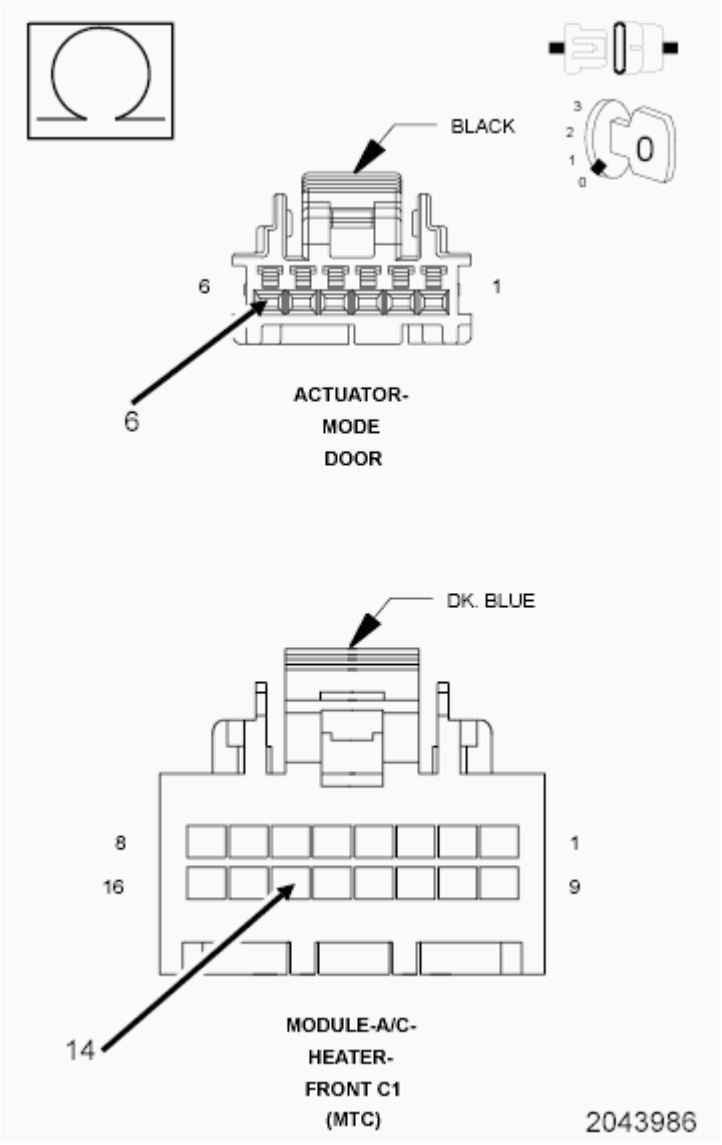


Fig. 16: Checking Common Door Driver 2 Circuit For An Open

Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Mode Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.

     NOTE: Probable location is the wiring harness splice or the wiring between the splice and the door actuator.

   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Replace the Mode Door Actuator in accordance with the Service Information.
   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B1044-PANEL MODE DOOR 1 TRAVEL RANGE TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
MODE DOOR BINDING
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Are there any Door Control Circuit Open or Door Control Performance DTCs present?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 2

2. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 4

      No

      - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. Using the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

      Yes

      - Go to step 4

      No

      - Go to step 6
4. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE MODE DOOR ACTUATOR**

1. Replace the Mode Door Actuator in accordance with the Service Information.
2. Using the scan tool, erase HVAC DTCs.
3. Using the scan tool, perform the HVAC Actuator Calibration Test.

   Did this DTC reset during HVAC Actuator Calibration Test?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B1045-PANEL MODE DOOR 1 TRAVEL RANGE TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode

door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  During normal operation or when ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
MODE DOOR STOPS
MODE DOOR
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Are there any Door Control Circuit Open or Door Control Performance DTCs present?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2

2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

       Is this DTC active?

       Yes

       - Go to step 4

       No

       - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC System Test?

       Yes

       - Go to step 4

       No

       - Go to step 6
4. **CHECK THE MODE DOOR**
    1. Remove the Mode Door Actuator and check the Mode Door stops, linkage (stripped or cracked) and door.

       Were there any problems found?

       Yes

       - Repair or replace the Mode Door as necessary in accordance with the Service Information.
       - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

       No

       - Go to step 5
5. **CHECK THE MODE DOOR ACTUATOR**
    1. Replace the Mode Door Actuator in accordance with the Service Information.
    2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

Did this DTC reset?

Yes

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B1058-RECIRCULATION DOOR CONTROL CIRCUIT/PERFORMANCE

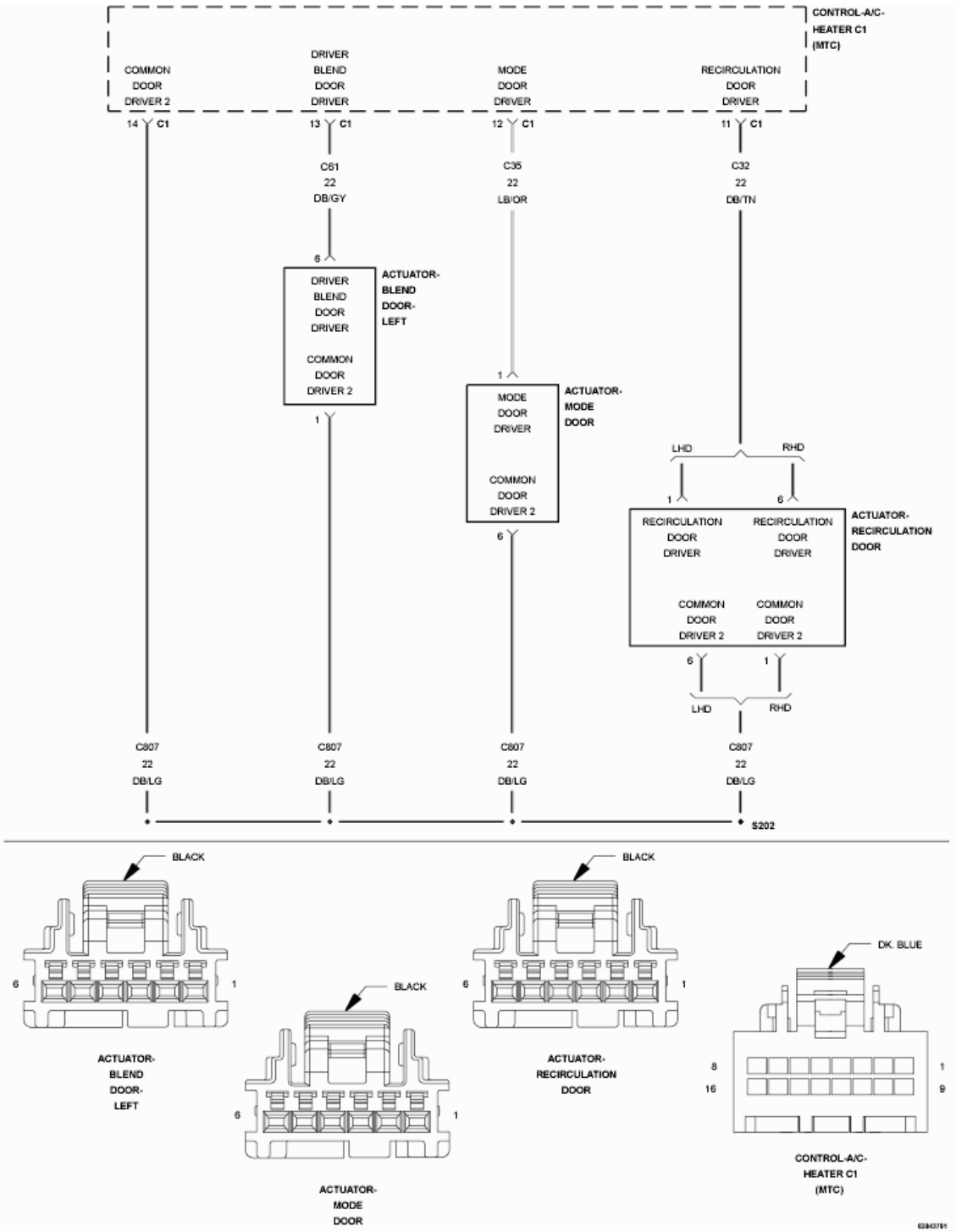


Fig. 17: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and an overcurrent condition is detected in either clockwise or counterclockwise movement for the period of five seconds. If the A/C Heater Control detects valid current draw for 10 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

- Go to step 2

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

      Yes

      - Go to step 3

      No

      - Go to step 9
3. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

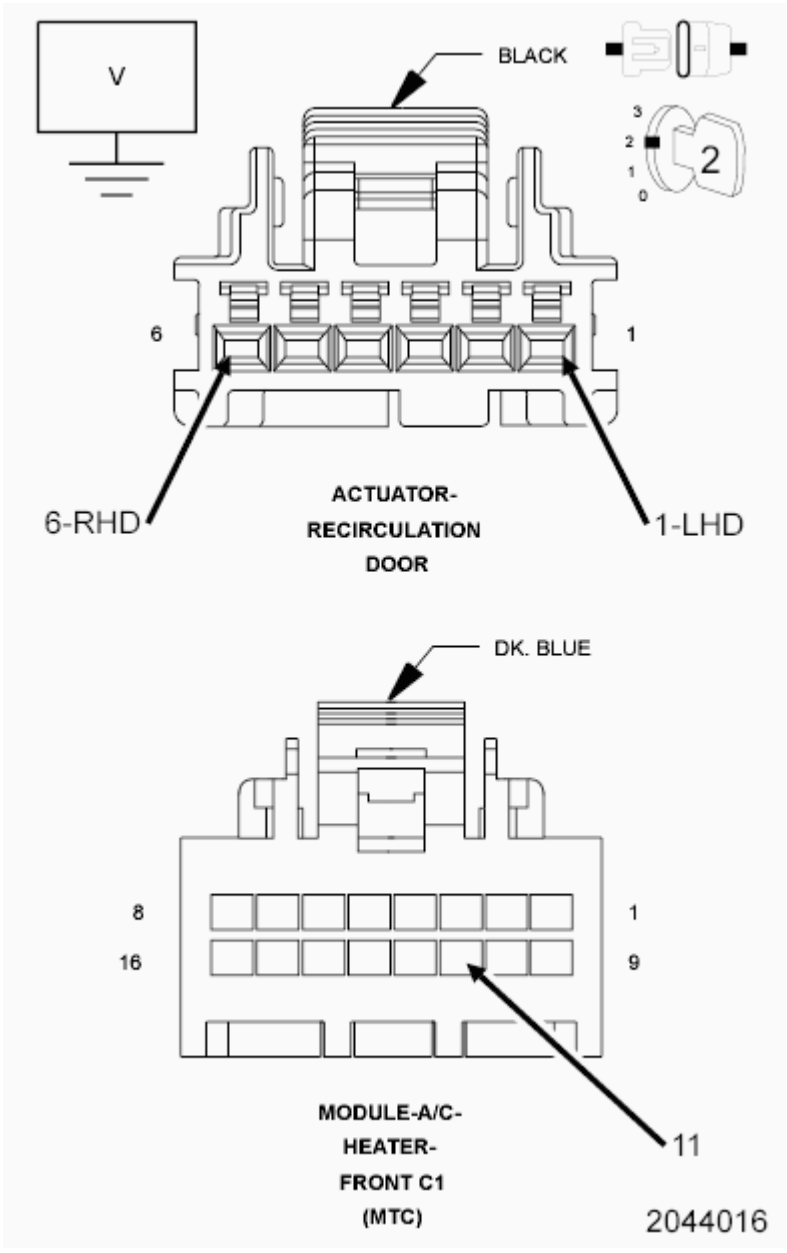


Fig. 18: Checking Recirculation Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Recirculation Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C32) Recirculation Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

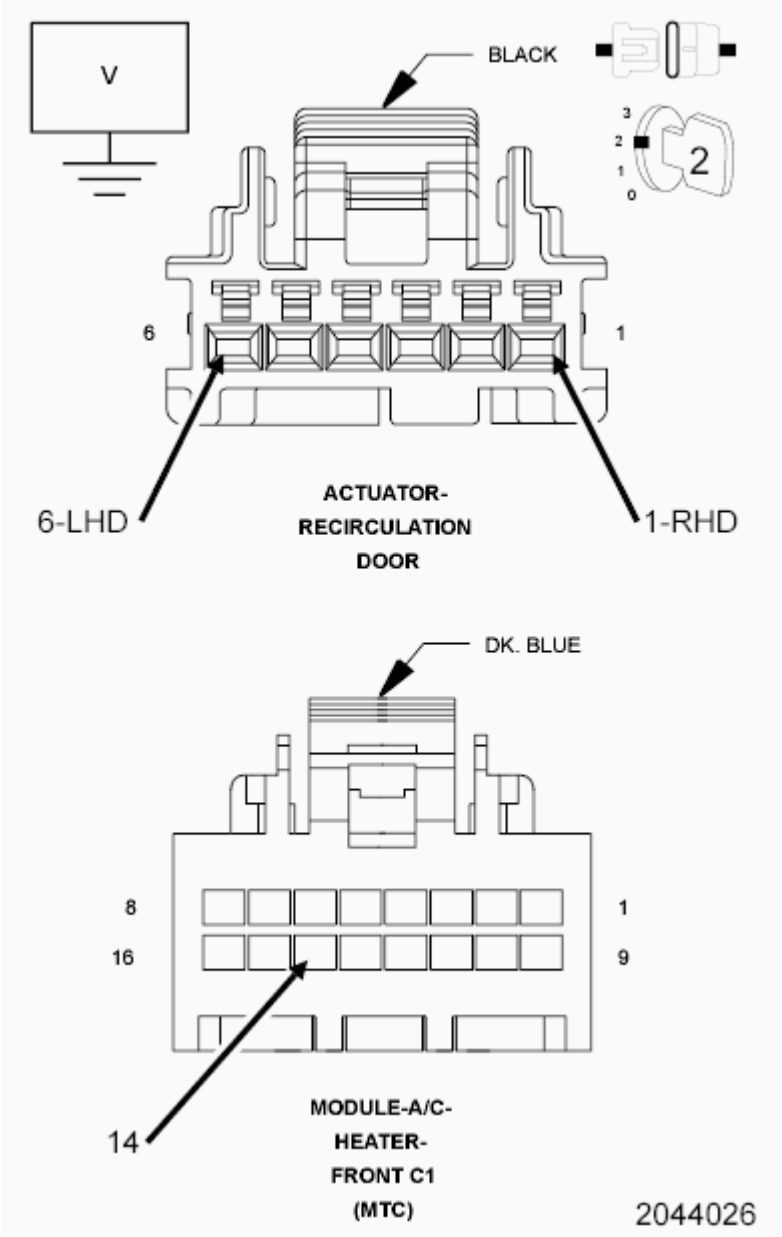


Fig. 19: Checking Common Door Driver 2 Circuit For A Short To Voltage

Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

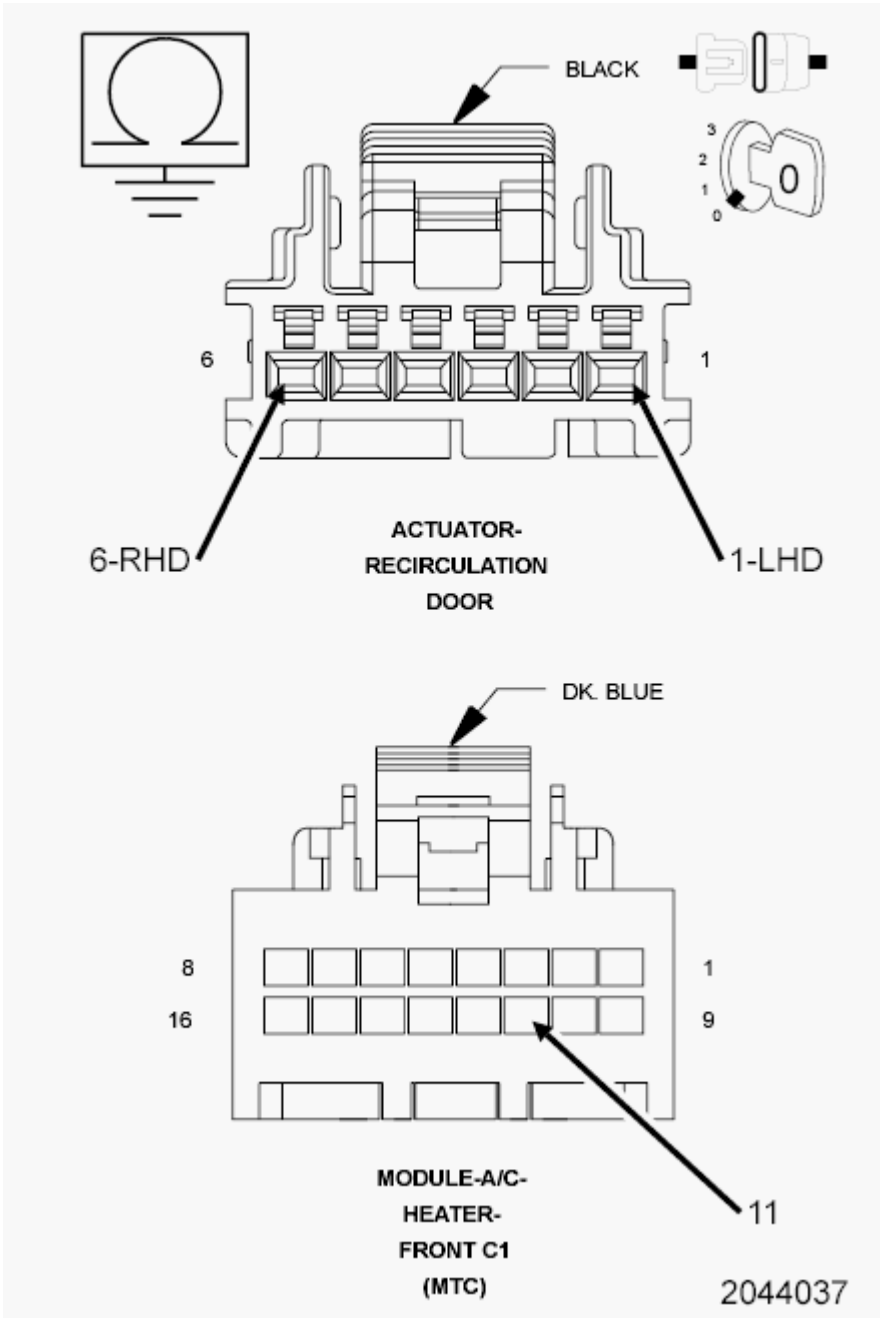


Fig. 20: Checking Recirculation Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C32) Recirculation Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

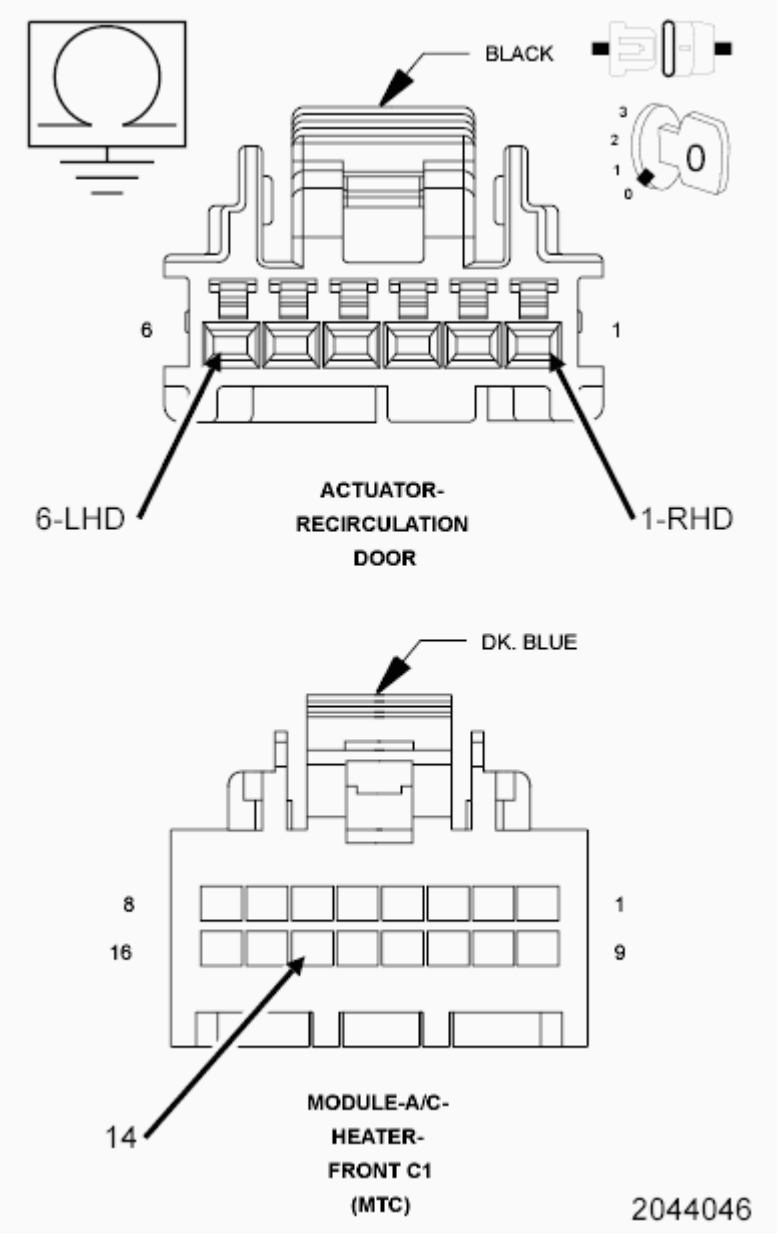


Fig. 21: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
    4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
    5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
    6. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B105B-RECIRCULATION DOOR CONTROL CIRCUIT OPEN

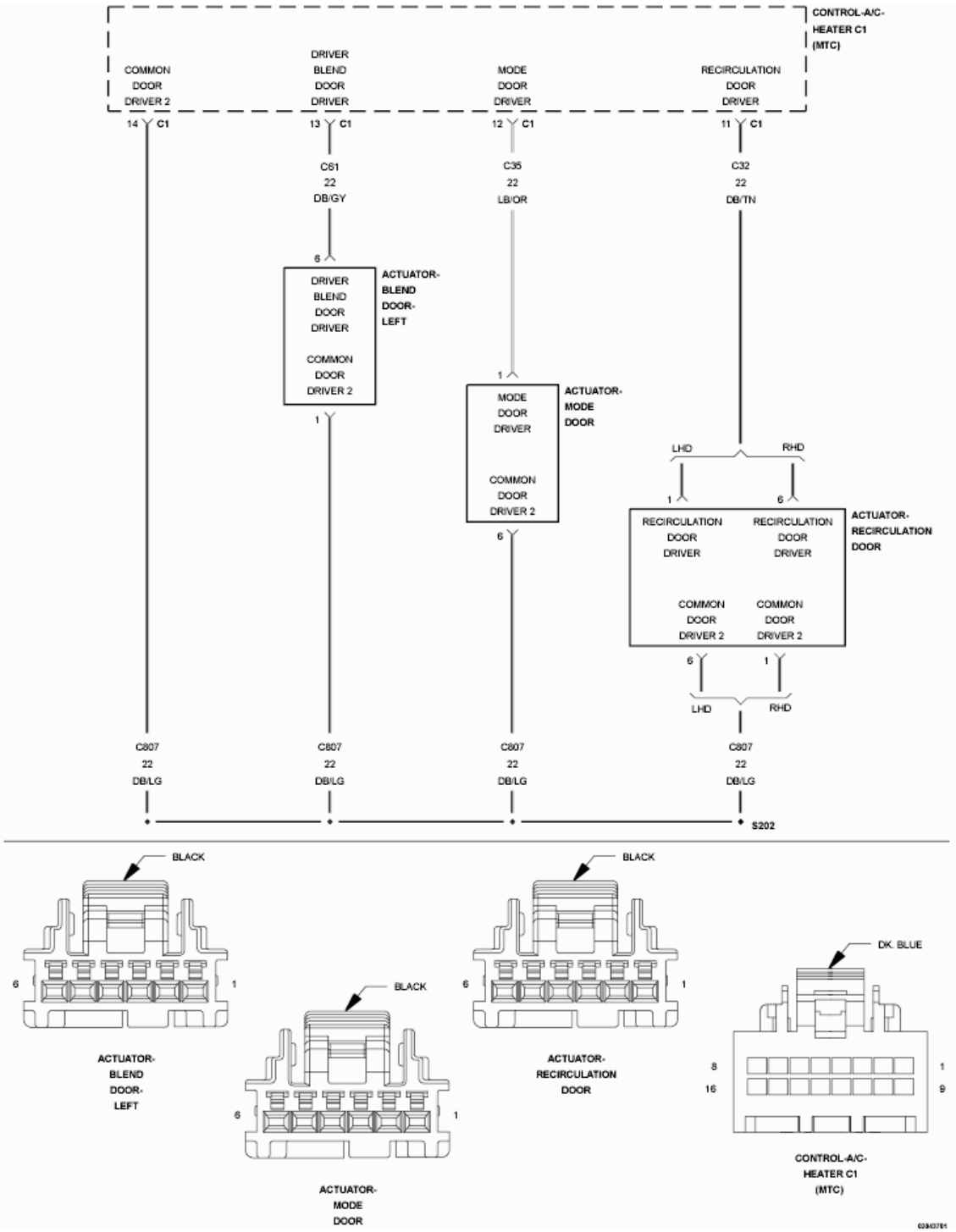


Fig. 22: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and when a HVAC Actuator Calibration Test is performed.

- **Set Condition:**

  If an HVAC Actuator Calibration Test is performed the A/C Heater Control detects there are no feedback pulses detected in that direction, the controller commands the actuator in the opposite direction. If no feedback pulses are detected in either direction this DTC will set. If the A/C Heater Control detects a valid pulse feedback in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR OTHER DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is there more than one Door Control Circuit Open DTC present?

      Yes

      - Repair the (C807) Common Door Driver 2 circuit for an open.

        NOTE: Due to the common shared driver circuit, probable area of concern is the splice, or from the splice to the A/C Heater Control harness connector. Make sure to check all inline connectors.

No

- Go to step 2

2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go to step 4

    No

    - Go to step 7

4. **CHECK THE RECIRCULATION DOOR ACTUATOR**

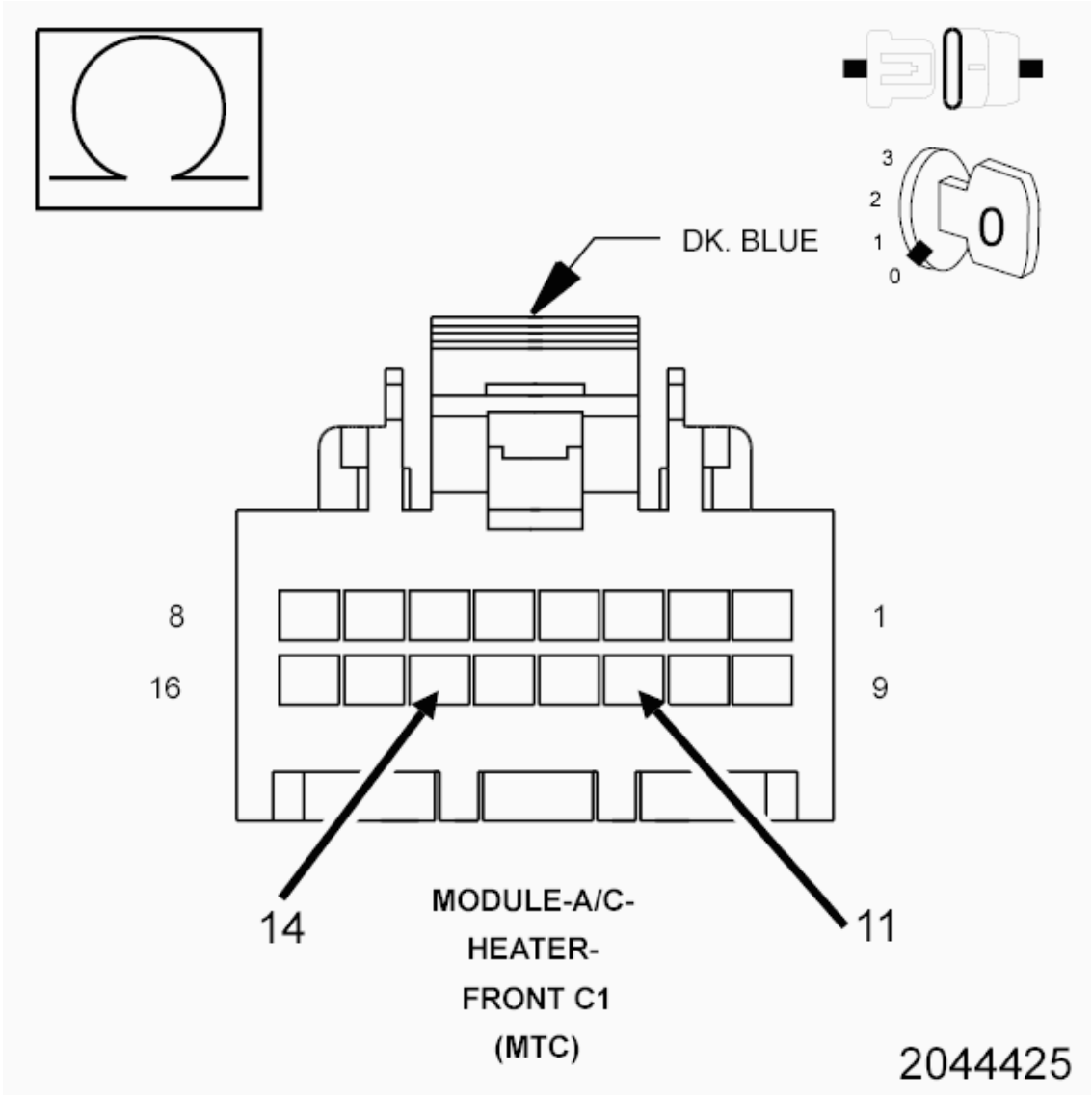


Fig. 23: Checking Recirculation Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

No

- Go to step 5

5. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR AN OPEN**

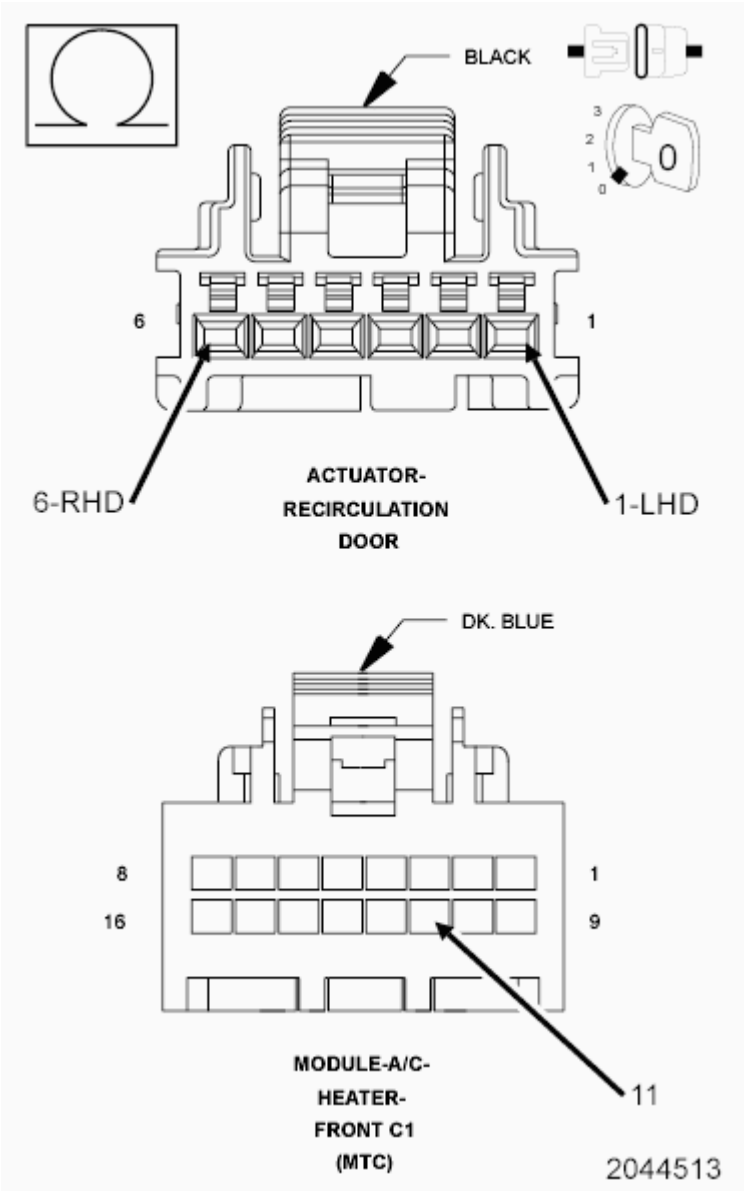


Fig. 24: Checking Recirculation Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Recirculation Door Actuator harness connector.
3. Measure the resistance of the (C32) Recirculation Door Driver circuit between the A/C Heater

Control C1 harness connector and the Recirculation Door Actuator harness connector.

Is the resistance above 1.0 Ohm?

Yes

- Repair the (C32) Recirculation Door Driver circuit for an open or high resistance.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

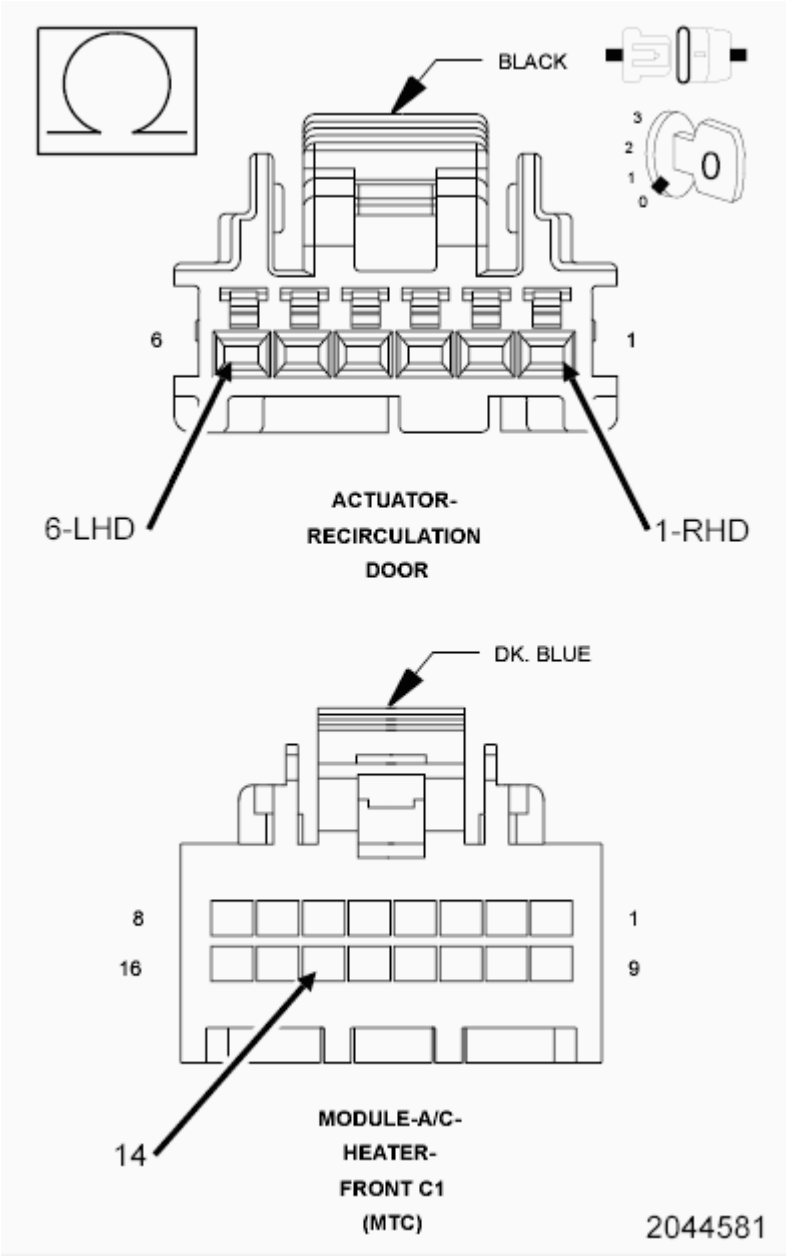


Fig. 25: Checking Common Door Driver 2 Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.

NOTE: Probable location is the wiring harness splice or the wiring between the splice and the door actuator.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Replace the Recirculation Door Actuator in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B105C-RECIRCULATION DOOR TRAVEL RANGE TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the

malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Are there any Door Control Circuit Open or Door Control Performance DTCs present?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

Yes

- Go to step 4

No

- Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

       Yes

       - Go to step 4

       No

       - Go to step 6
4. **CHECK THE RECIRCULATION DOOR**
    1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel.

       Were there any problems found?

       Yes

       - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
       - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

       No

       - Go to step 5
5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
    1. Replace the Recirculation Door Actuator in accordance with the Service Information.
    2. Using the scan tool, erase HVAC DTCs.
    3. Using the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC reset during HVAC Actuator Calibration Test?

       Yes

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B105D-RECIRCULATION DOOR TRAVEL RANGE TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

During normal operation or when ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR STOPS
RECIRCULATION DOOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Are there any Door Control Circuit Open or Door Control Performance DTCs present?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

- Go to step 4

No

- Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC System Test?

      Yes

      - Go to step 4

      No

      - Go to step 6
4. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door stops, linkage (stripped or cracked) and door.

      Were there any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B10A2-LEFT BLEND DOOR 1 CONTROL CIRCUIT/PERFORMANCE

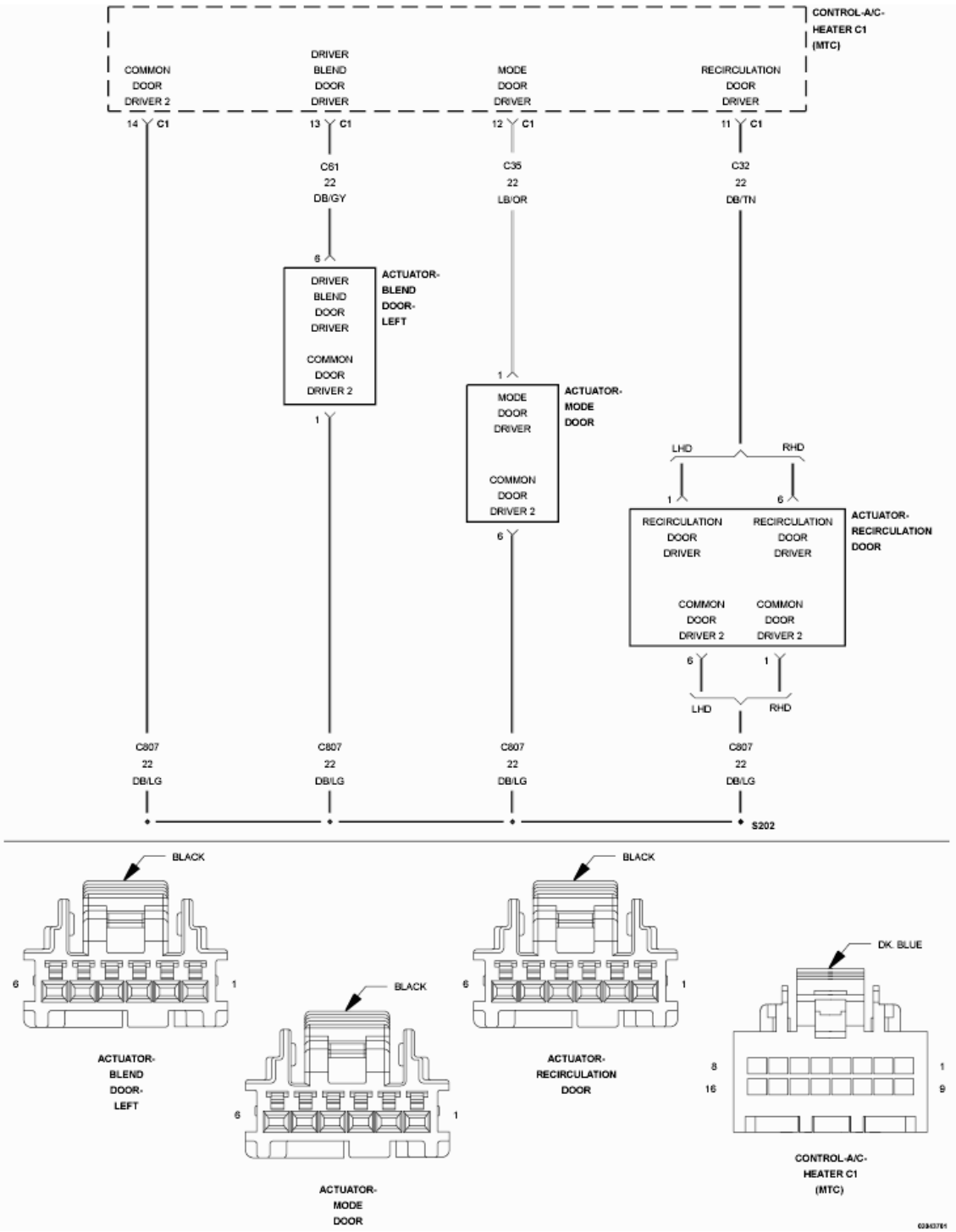


Fig. 26: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and an overcurrent condition is detected in either clockwise or counterclockwise movement for the period of five seconds. If the A/C Heater Control detects valid current draw for 10 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
BLEND DOOR BINDING
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

No

- Go to step 2

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

       Yes

       - Go to step 3

       No

       - Go to step 9
3. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

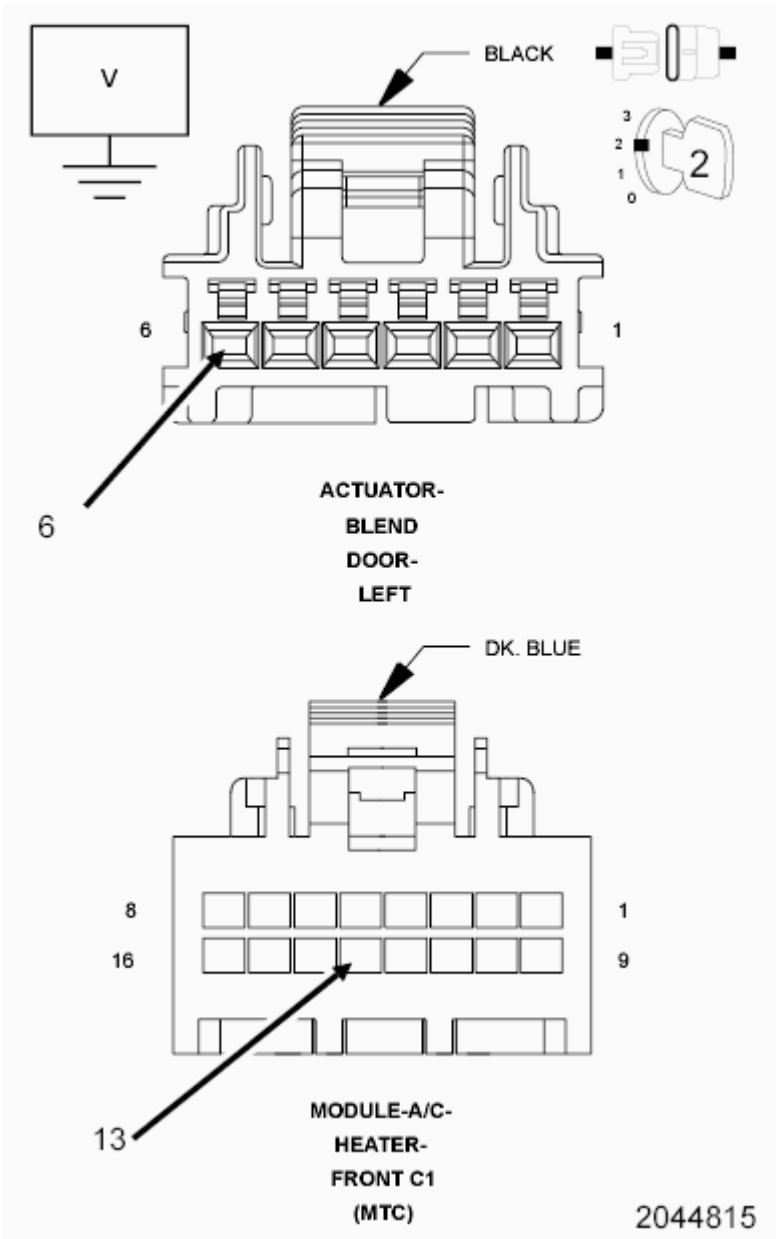


Fig. 27: Checking Blend Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Blend Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C61) Blend Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C61) Blend Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

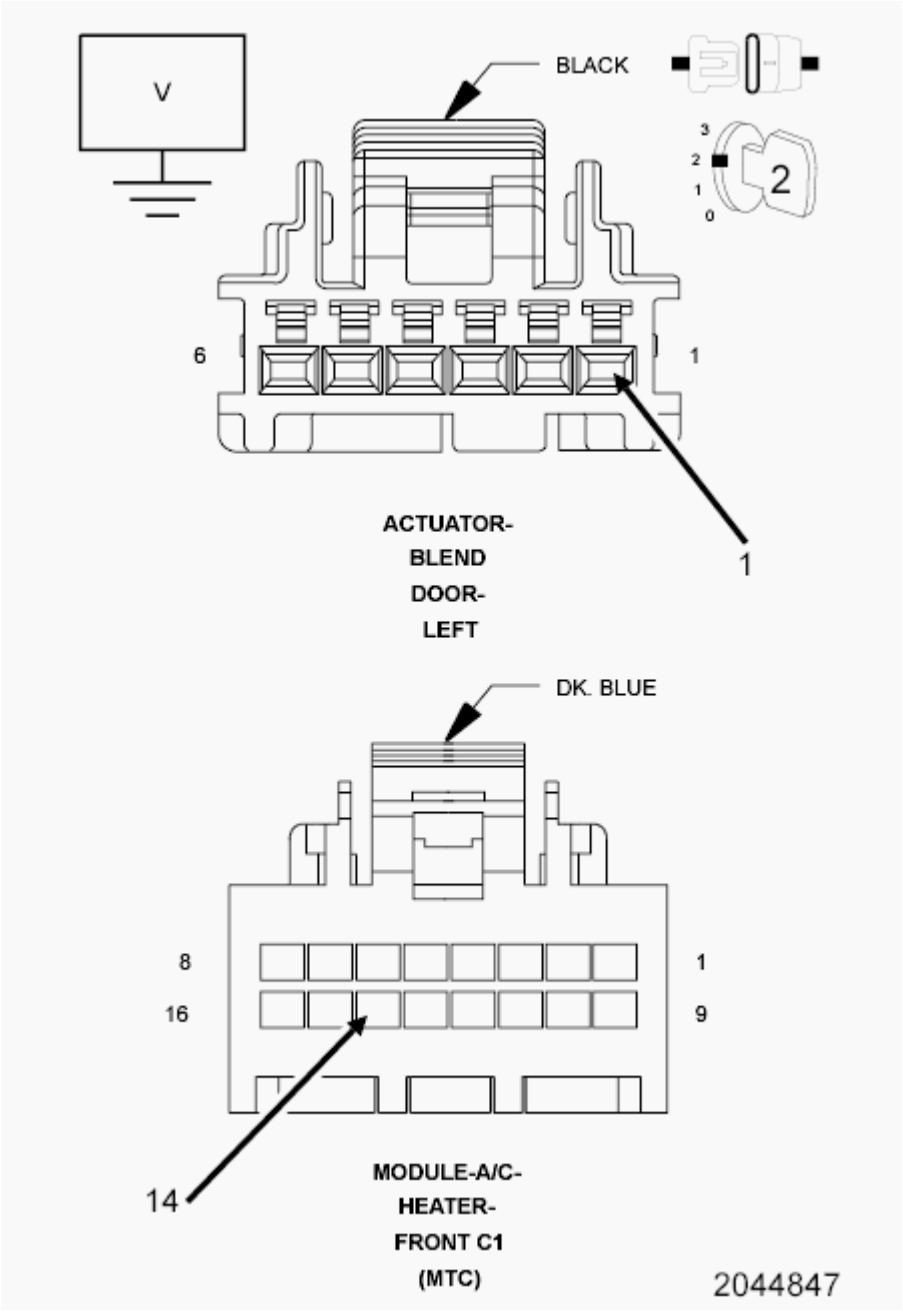


Fig. 28: Checking Common Door Driver 2 Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

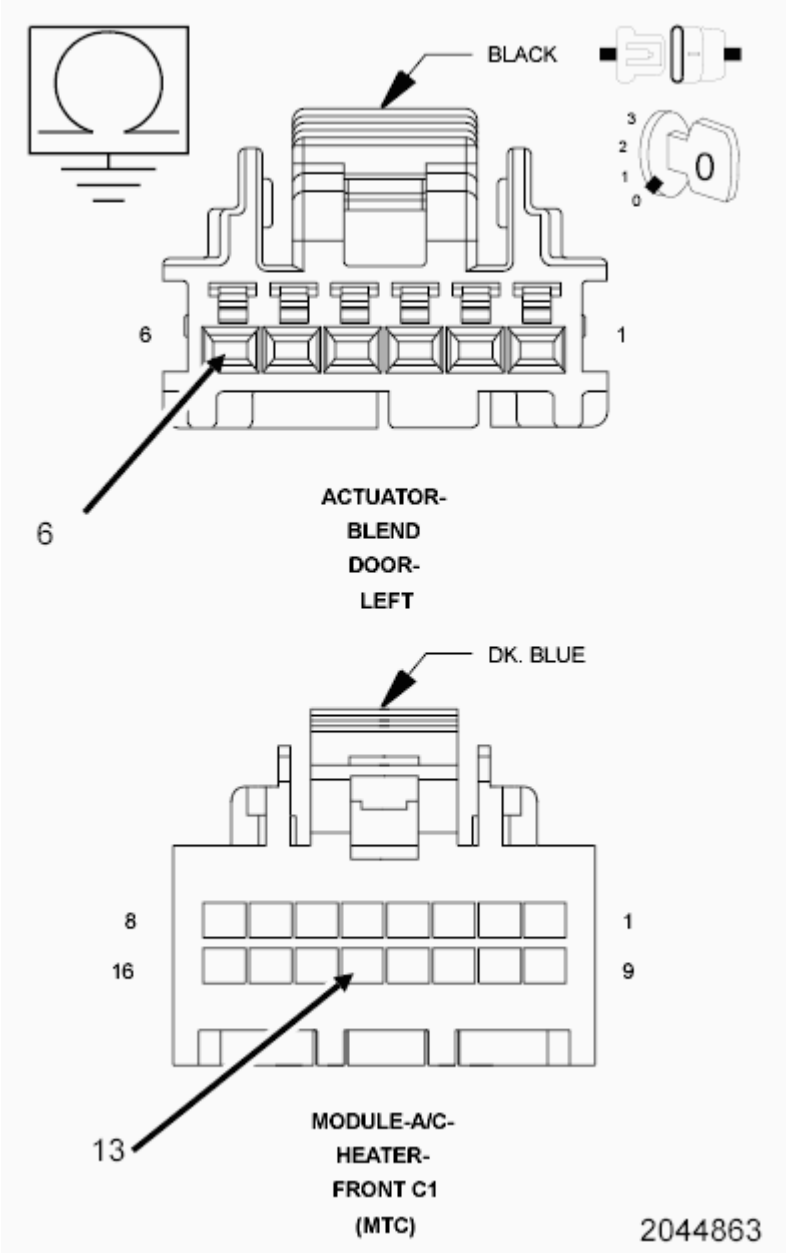


Fig. 29: Checking Blend Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C61) Blend Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C61) Blend Door Driver circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

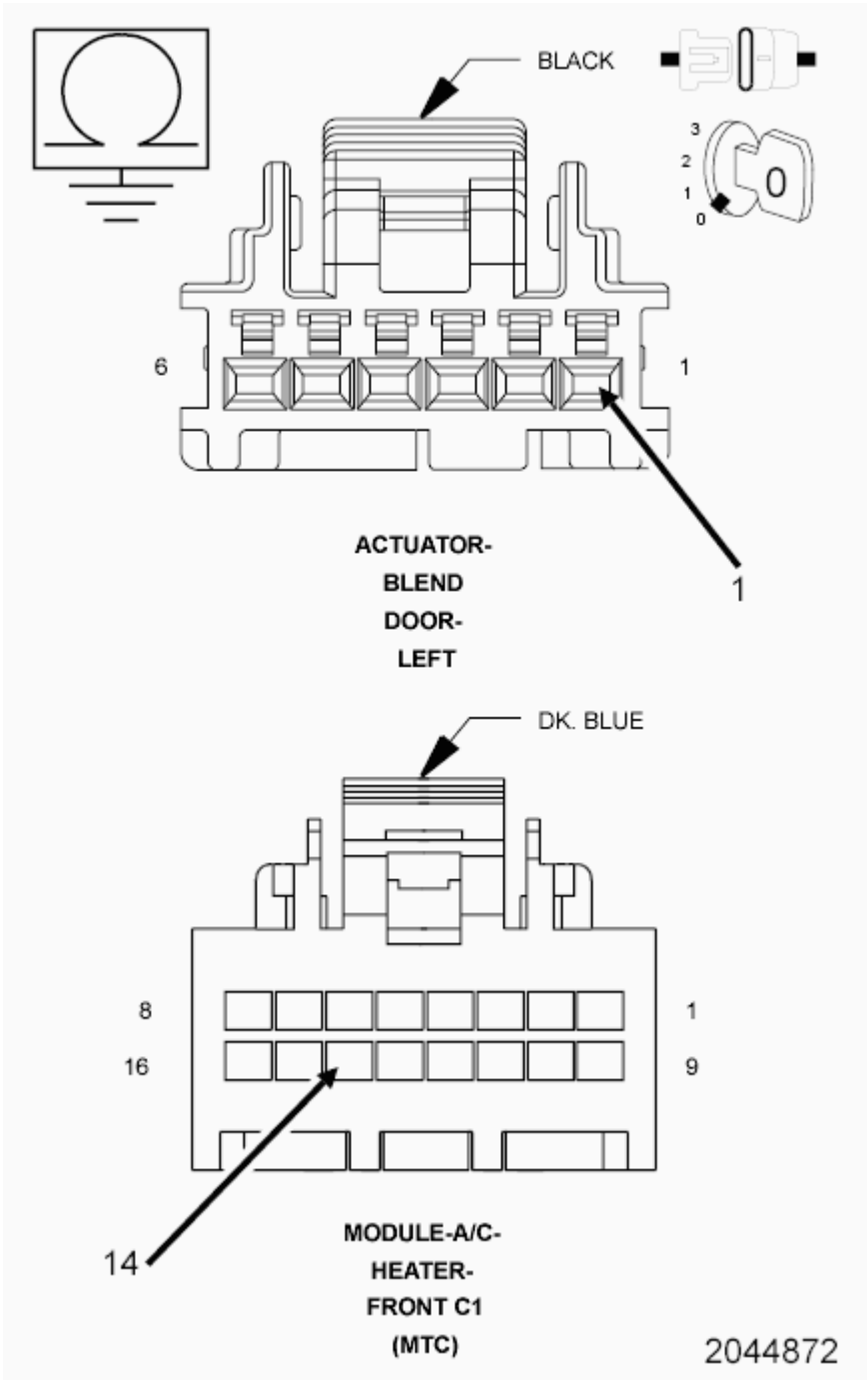


Fig. 30: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C807) Common Door Driver 2 circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 7

7. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.

4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B10A5-LEFT BLEND DOOR CONTROL CIRCUIT OPEN

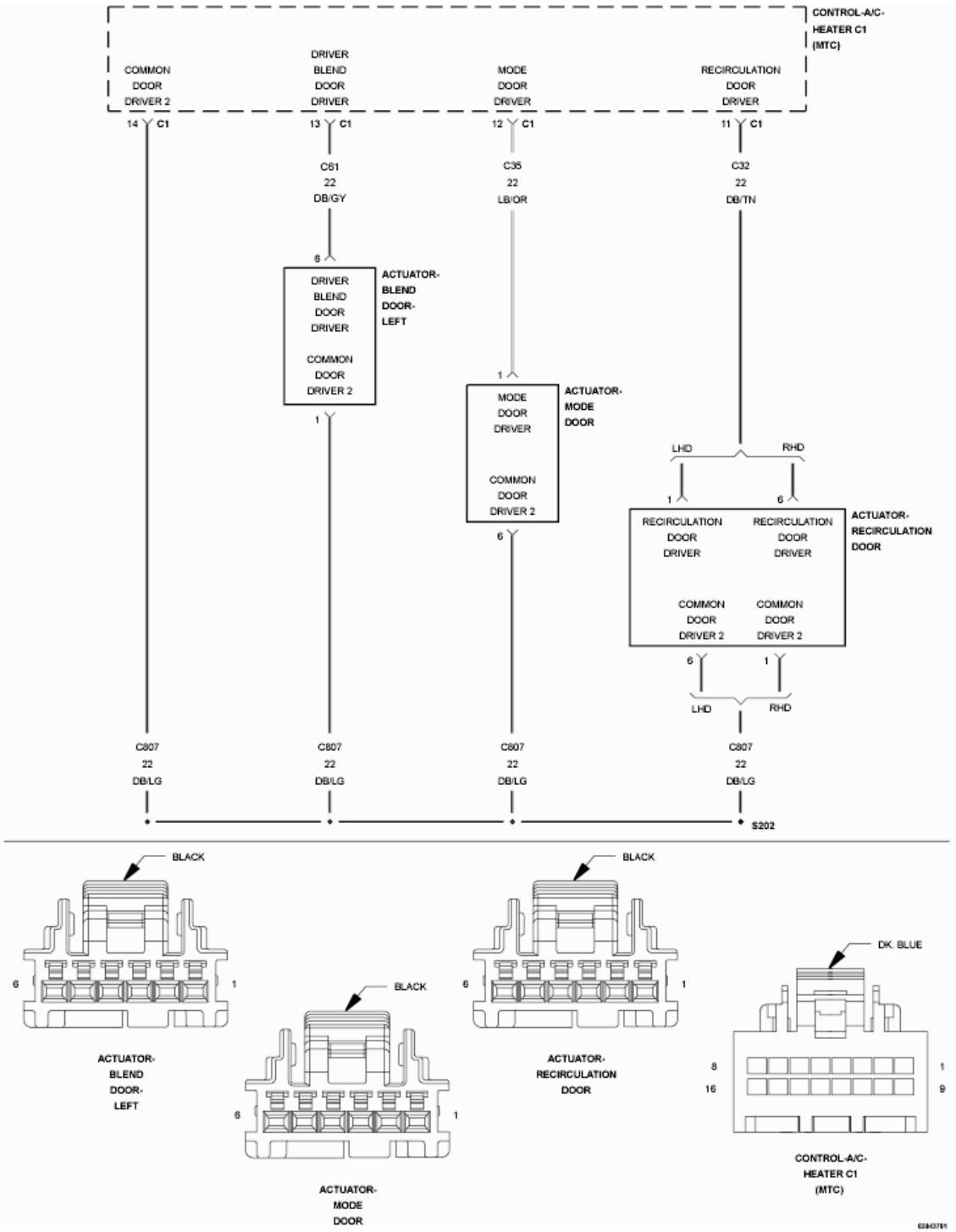


Fig. 31: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and when a HVAC Actuator Calibration Test is performed.

- **Set Condition:**

  If an HVAC Actuator Calibration Test is performed the A/C Heater Control detects there are no feedback pulses detected in that direction, the controller commands the actuator in the opposite direction. If no feedback pulses are detected in either direction this DTC will set. If the A/C Heater Control detects a valid pulse feedback in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR OTHER DTCS**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is there more than one Door Control Circuit Open DTC present?

      Yes

      - Repair the (C807) Common Door Driver 2 circuit for an open.

        NOTE: Due to the common shared driver circuit, probable area of concern is the splice, or from the splice to the A/C Heater Control harness connector. Make sure to check all inline

connectors.

No

- Go to step 2

2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. Using the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

    Yes

    - Go to step 4

    No

    - Go to step 7
4. **CHECK THE BLEND DOOR ACTUATOR**

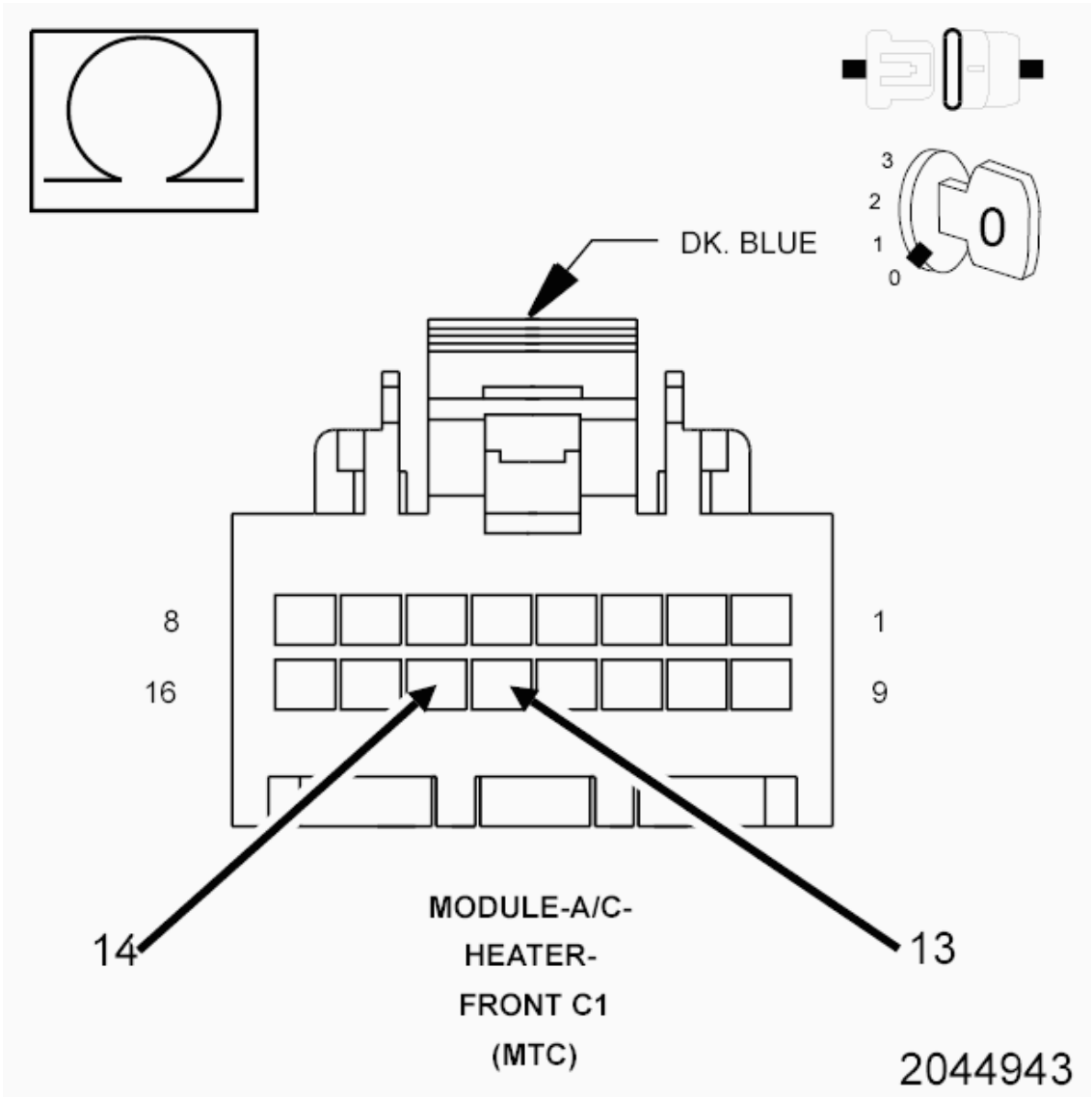


Fig. 32: Checking Blend Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C61) Blend Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

No

- Go to step 5

5. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR AN OPEN**

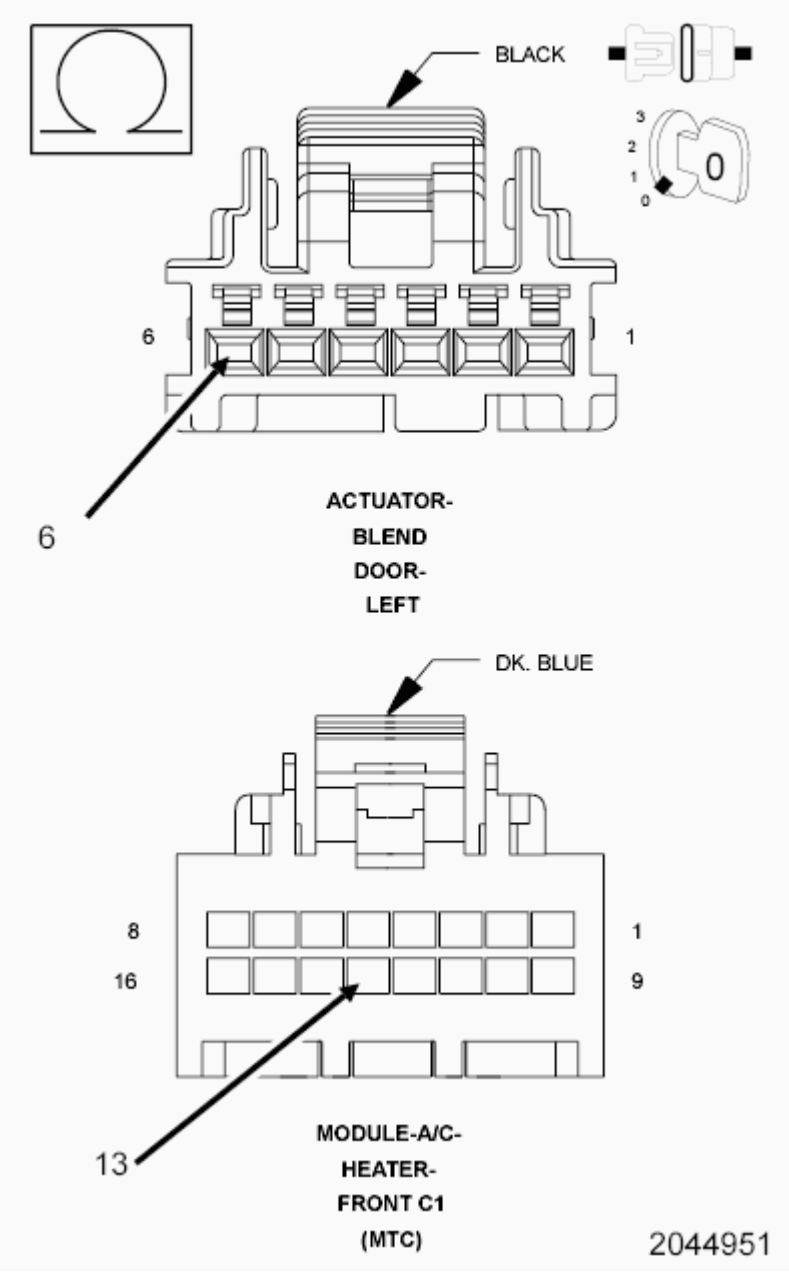


Fig. 33: Checking Blend Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.

2. Disconnect the Blend Door Actuator harness connector.
3. Measure the resistance of the (C61) Blend Door Driver circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C61) Blend Door Driver circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

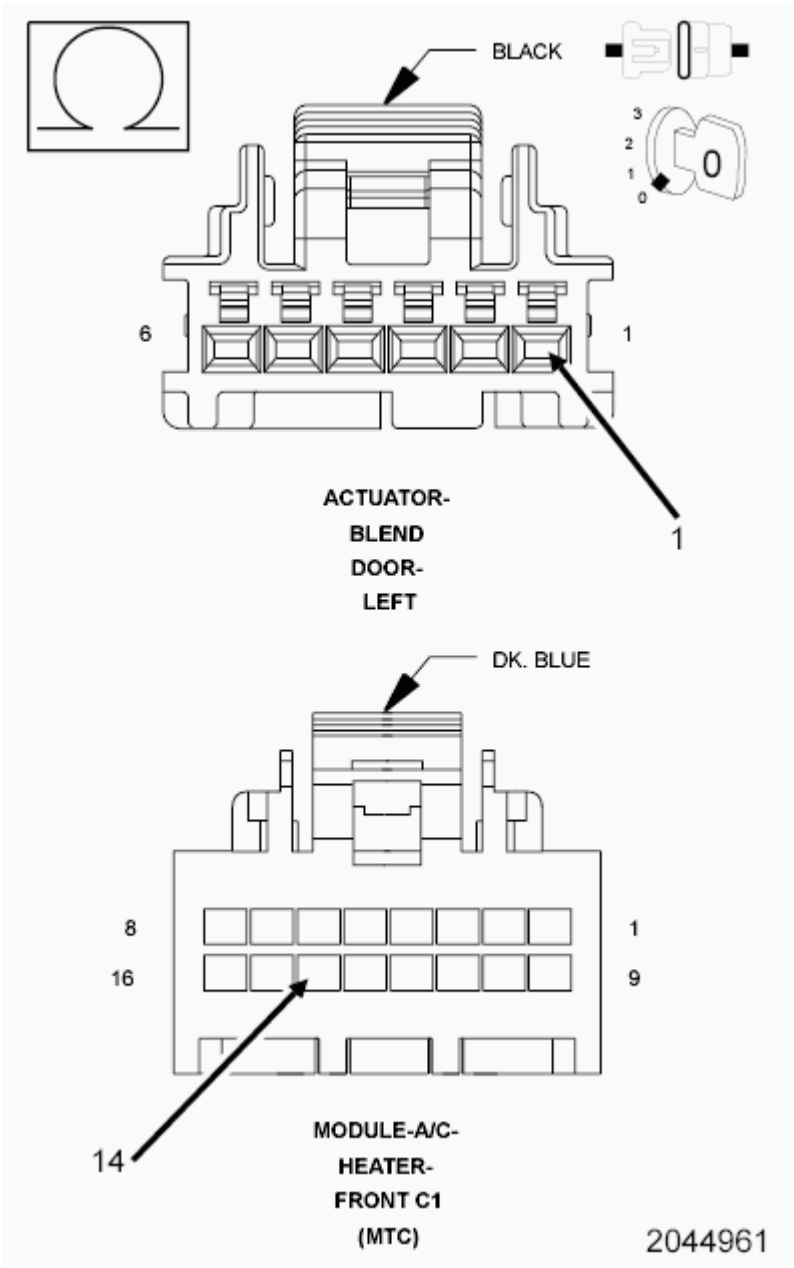


Fig. 34: Checking Common Door Driver 2 Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.

NOTE: Probable location is the wiring harness splice or the wiring between the splice and the door actuator.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Replace the Blend Door Actuator in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B10A6-LEFT BLEND DOOR 1 TRAVEL TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
BLEND DOOR BINDING
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Are there any Door Control Circuit Open or Door Control Performance DTCs present?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

- Go to step 4

No

- Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

      Yes

      - Go to step 4

      No

      - Go to step 6
4. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs.
   3. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC reset during HVAC Actuator Calibration Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B10A7-LEFT BLEND DOOR TRAVEL TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar DTCs can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  During normal operation or when ever an Actuator Calibration Test is performed.

- **Set Condition:**

The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
BLEND DOOR STOPS
BLEND DOOR
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Open or Door Control Performance DTCs present?

    Yes

    - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

    No

    - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

- Go to step 3

3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC change from Stored to Active while performing the HVAC System Test?

      Yes

      - Go to step 4

      No

      - Go to step 6
4. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door stops, linkage (stripped or cracked) and door.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

6. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
    4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
    5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
    6. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B10B2-A/C COOL DOWN TEST PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Controller has software to enable it to perform an A/C Cool Down Test by a command using a scan tool. This test checks for evaporator temperature drop over a predetermined time. If the test fails, this DTC will set. However, certain test conditions are required to perform this test. Failure to run this test within those parameters can result in failure of the test.

- **When Monitored:**

  With ever an A/C Cool Down Test is performed.

- **Set Condition:**

  This DTC is set whenever the A/C Cool Down Test is performed and the desired temperature drop is not achieved by the system. The DTC will go to stored after a successful A/C Cool Down Test.

Possible Causes

A/C SYSTEM WORKING IMPROPERLY

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CONDITIONS FOR A/C COOL DOWN TEST**
    1. The following condition must be met before running the A/C Cool Down test.
    - No Powertrain Control Module (PCM) DTCs present.
    - Condenser cooling fan working properly.
    - No active HVAC evaporator temperature sensor, sun sensor, recirculation, mode, or blend door actuator DTCs present.
    - The refrigerant system must be fully charged.
    - The blower motor must operate correctly in all speeds.
    - The evaporator temperature must be above 12.7° C (55° F).
    - The A/C compressor must be turned off.
    - Blower must be on high.

B160F-TWILIGHT/AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT/PERFORMANCE

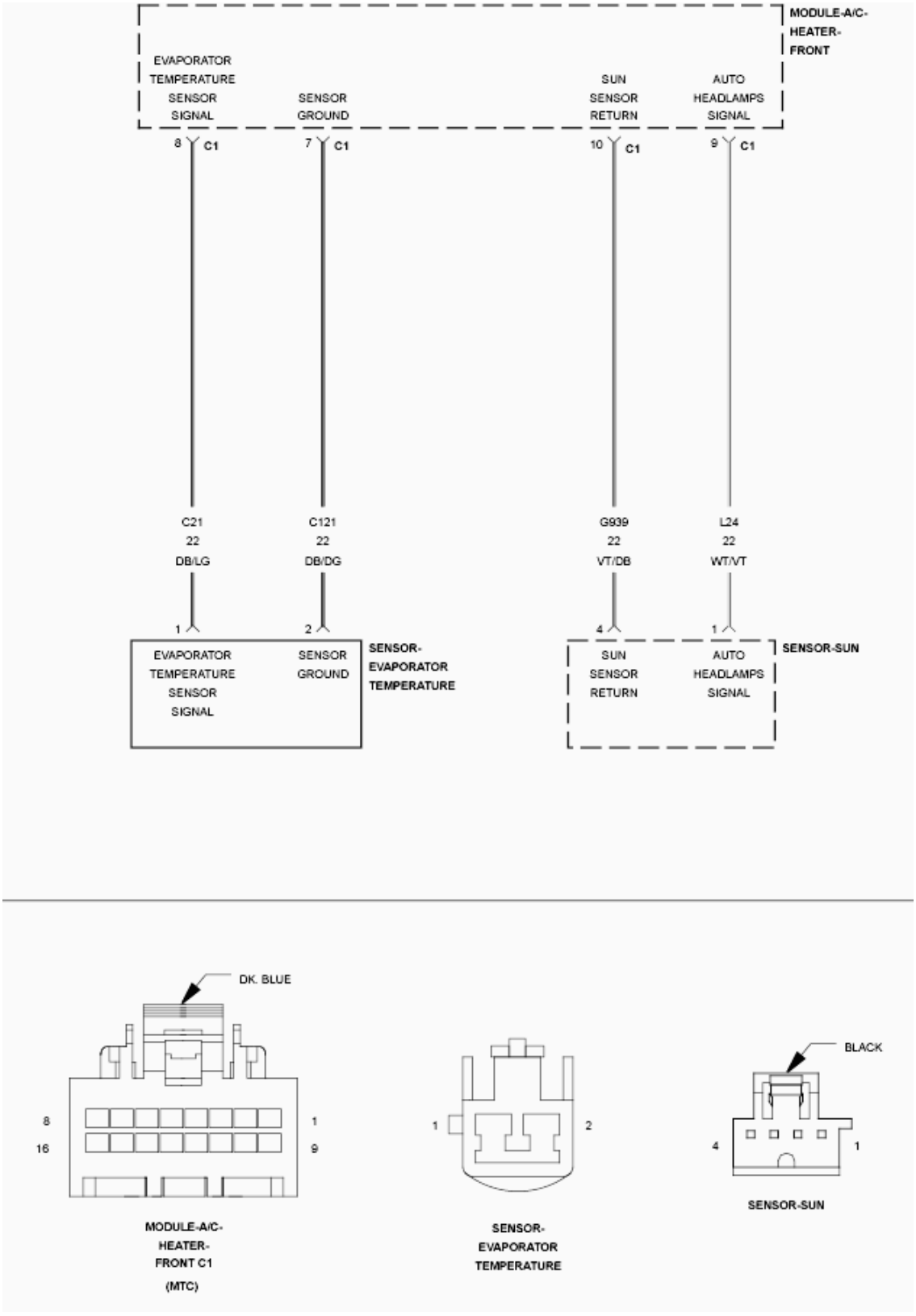


Fig. 35: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  If the Auto Headlamps Signal input voltage is less than 1.9 Volts and greater than 0.5 of a Volt for period of five seconds. This DTC has a de-maturing time of 10 seconds. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT TO GROUND
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 4
2. **CHECK (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

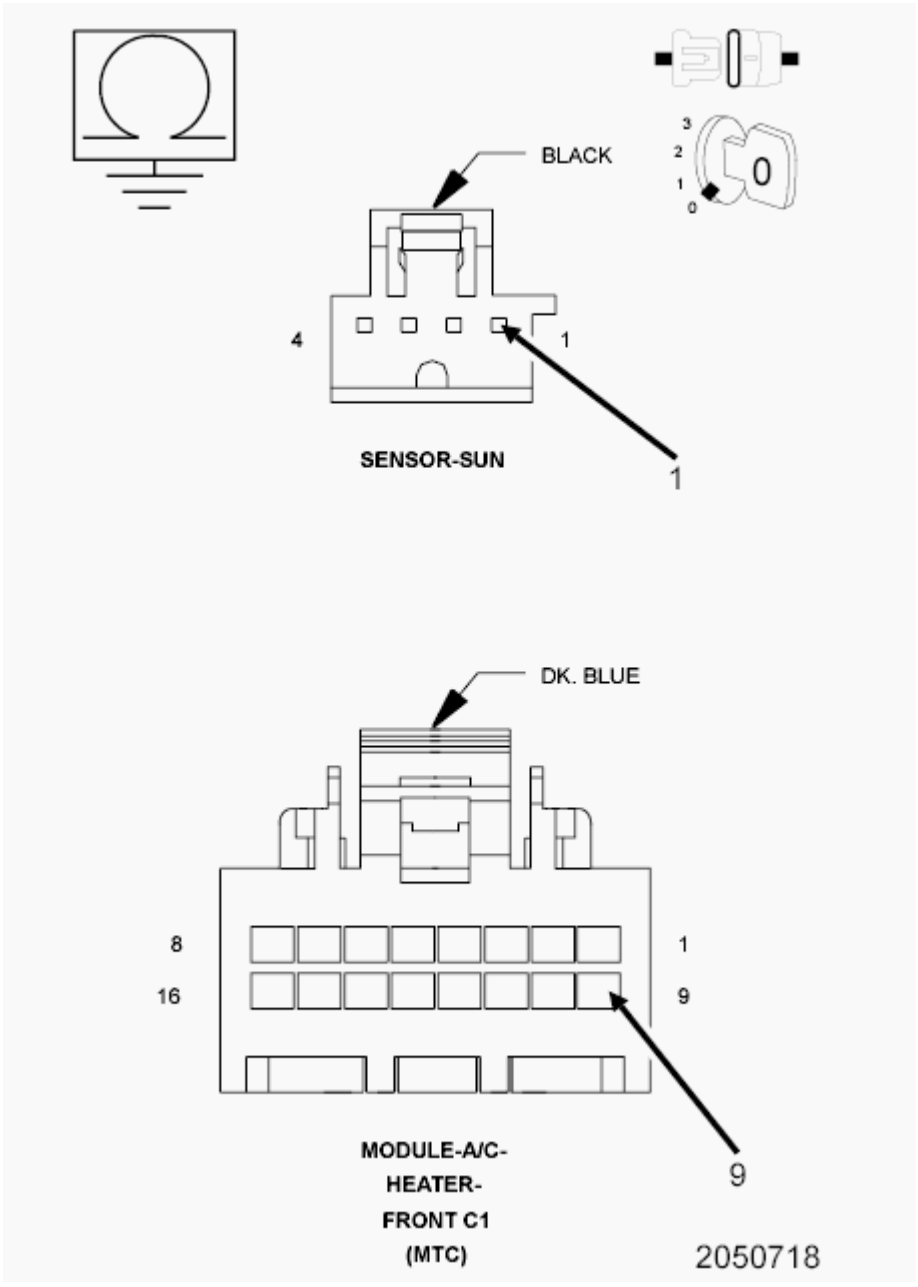


Fig. 36: Checking Auto Headlamps Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Sun Sensor harness connector.
4. Measure the resistance between ground and he (L24) Auto Headlamps Signal circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (L24) Auto Headlamps Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      Did this DTC reset while performing the HVAC Verification Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   3. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   4. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   5. Wiggle the wiring and connectors while checking for shorted and open circuits.
   6. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1610-AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT LOW

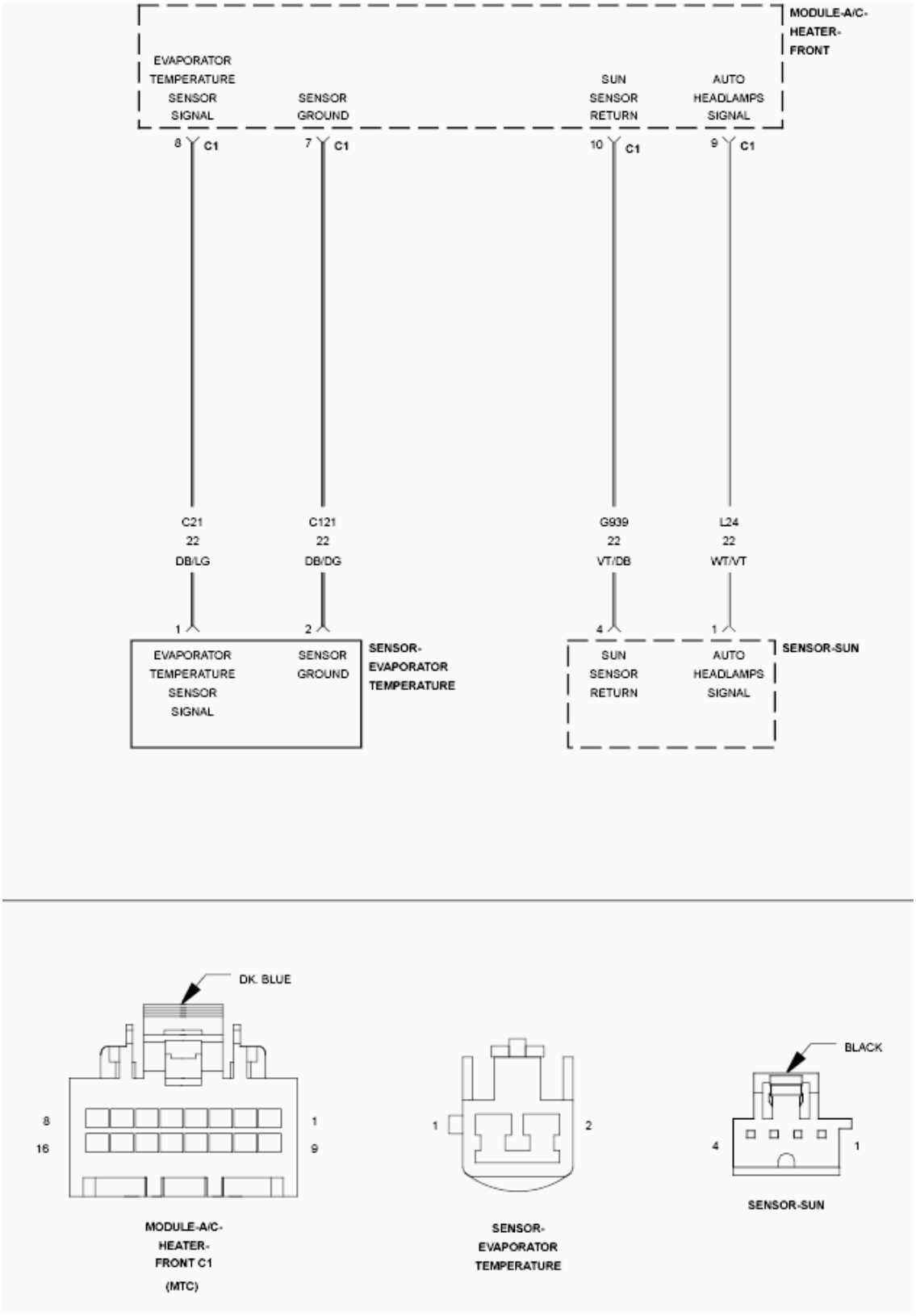


Fig. 37: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Twilight or Ambient Light Sensor input voltage is less than 0.5 of a Volt for period of five seconds.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORTED TO GROUND
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 4
2. **CHECK (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

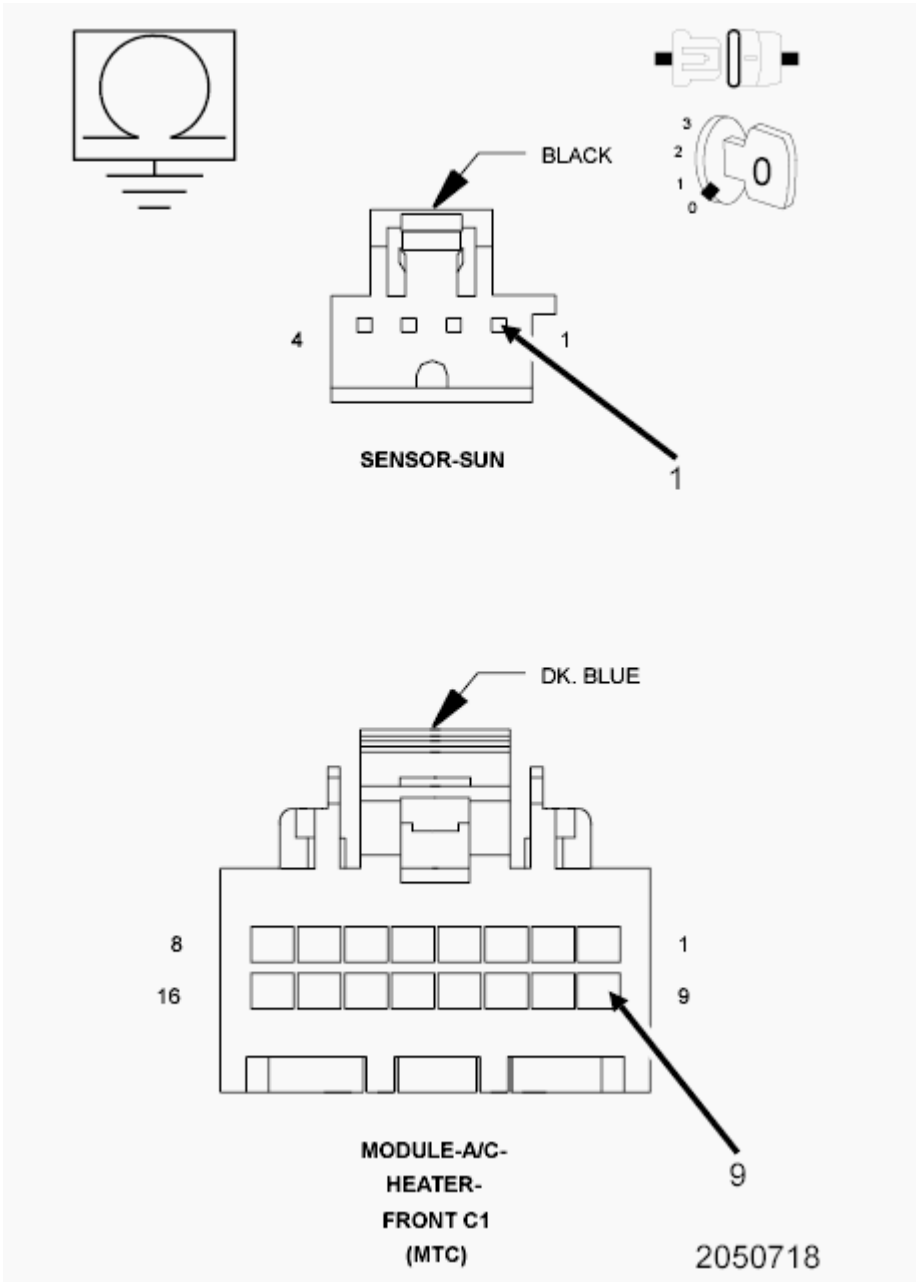


Fig. 38: Checking Auto Headlamps Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C2 harness connector.
3. Disconnect the Sun Sensor harness connector.
4. Measure the resistance between ground and he (L24) Auto Headlamps Signal circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (L24) Auto Headlamps Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      Did this DTC reset while performing the HVAC Verification Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   3. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   4. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   5. Wiggle the wiring and connectors while checking for shorted and open circuits.
   6. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1611-AMBIENT LIGHT SENSOR 1 INPUT CIRCUIT HIGH

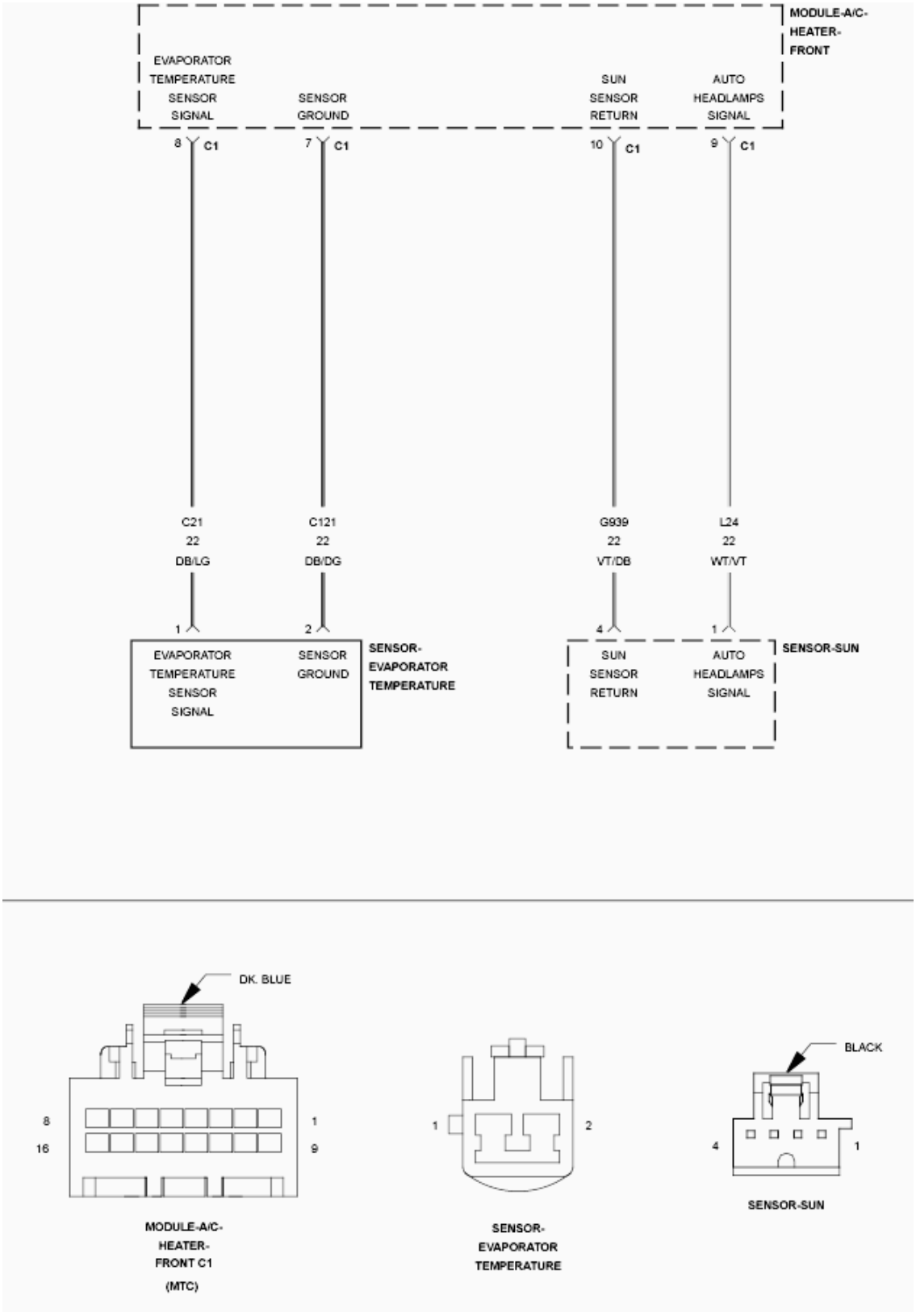


Fig. 39: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Twilight or Ambient Light Sensor input voltage is greater than 4.5 Volts for period of five seconds.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT TO VOLTAGE
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT OPEN
(C121) SENSOR GROUND CIRCUIT OPEN
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      NOTE: It can take up to 60 seconds or more for this DTC to mature.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 6
2. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**

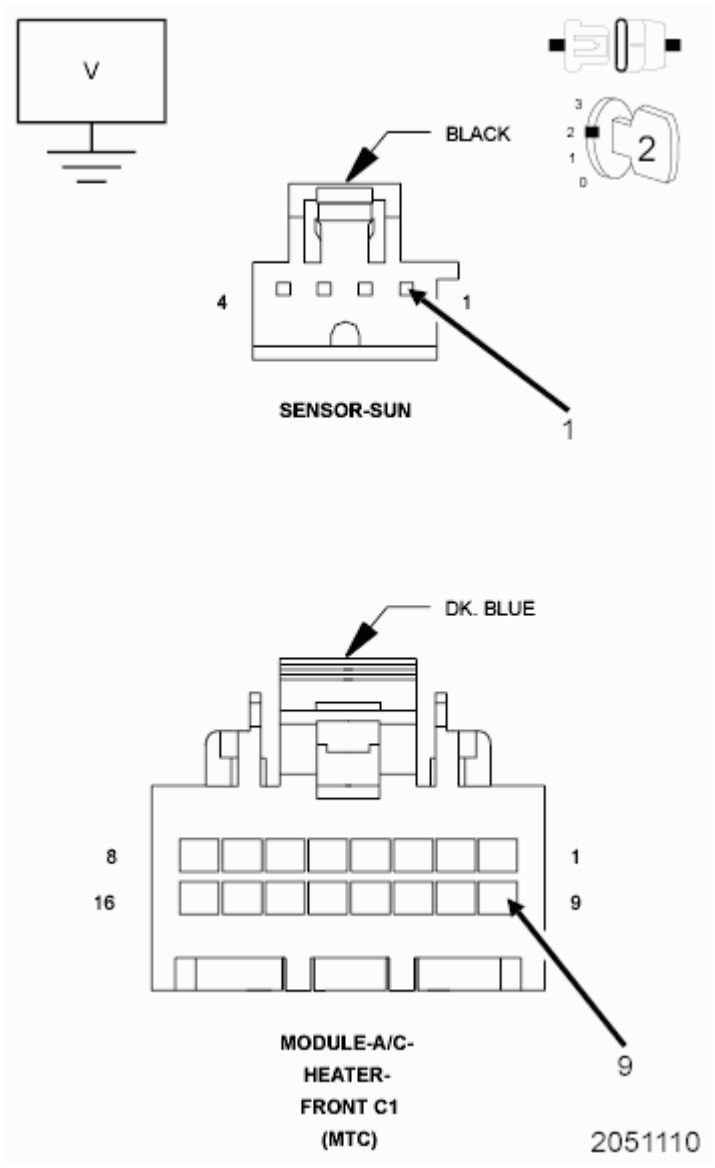


Fig. 40: Checking Auto Headlamps Signal Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Ignition on, engine not running.
4. Measure the voltage of the (L24) Auto Headlamps Signal circuit.

   Is there any voltage present?

   Yes

   - Repair the (L24) Auto Headlamps Signal circuit for a short to voltage.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR AN OPEN**

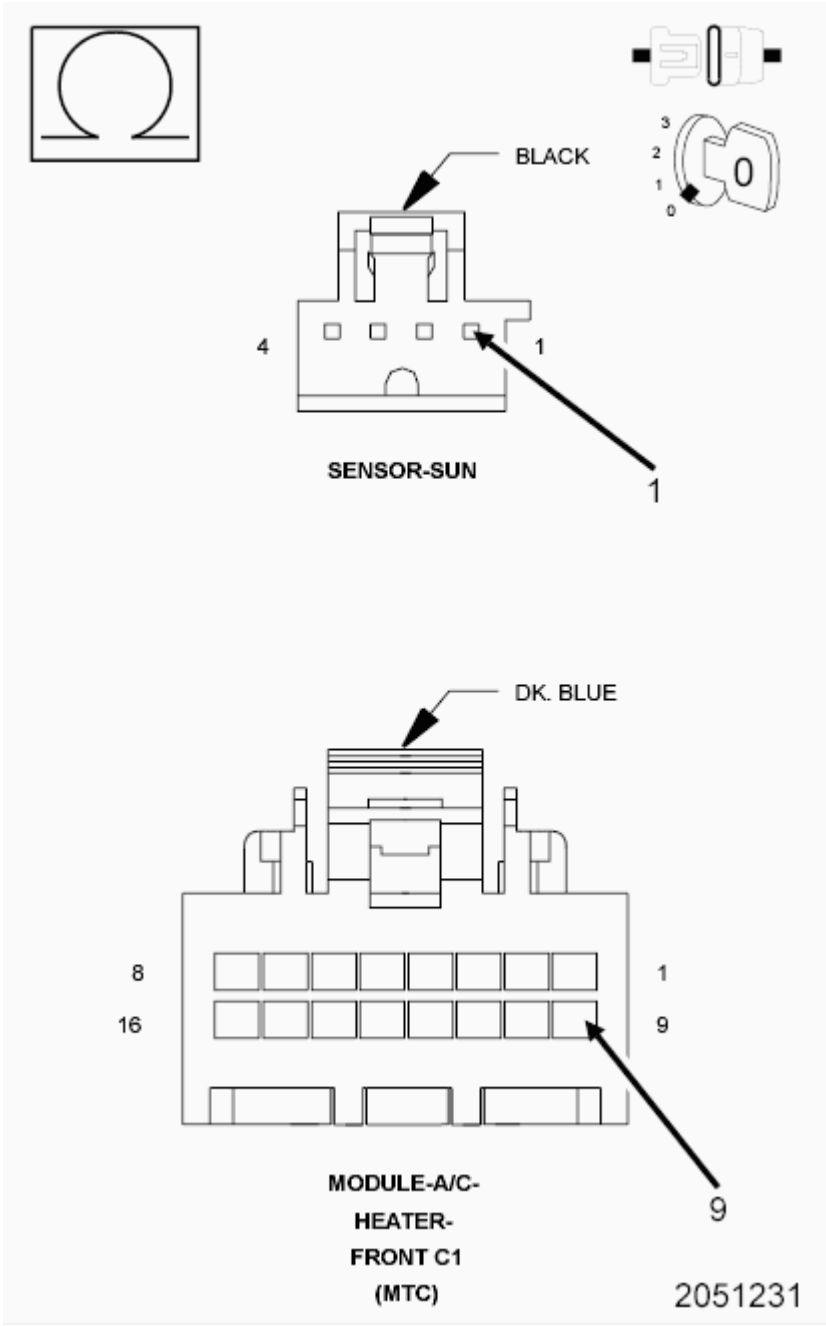


Fig. 41: Checking Auto Headlamps Signal Circuit For An Open

Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Sun Sensor harness connector.
3. Measure the resistance of the (L24) Auto Headlamps Signal circuit between the A/C Heater Control C1 harness connector and the Sun Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 4

   No

   - Repair the (L24) Auto Headlamps Signal circuit for an open.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

4. **CHECK THE (C121) SENSOR GROUND CIRCUIT FOR AN OPEN**

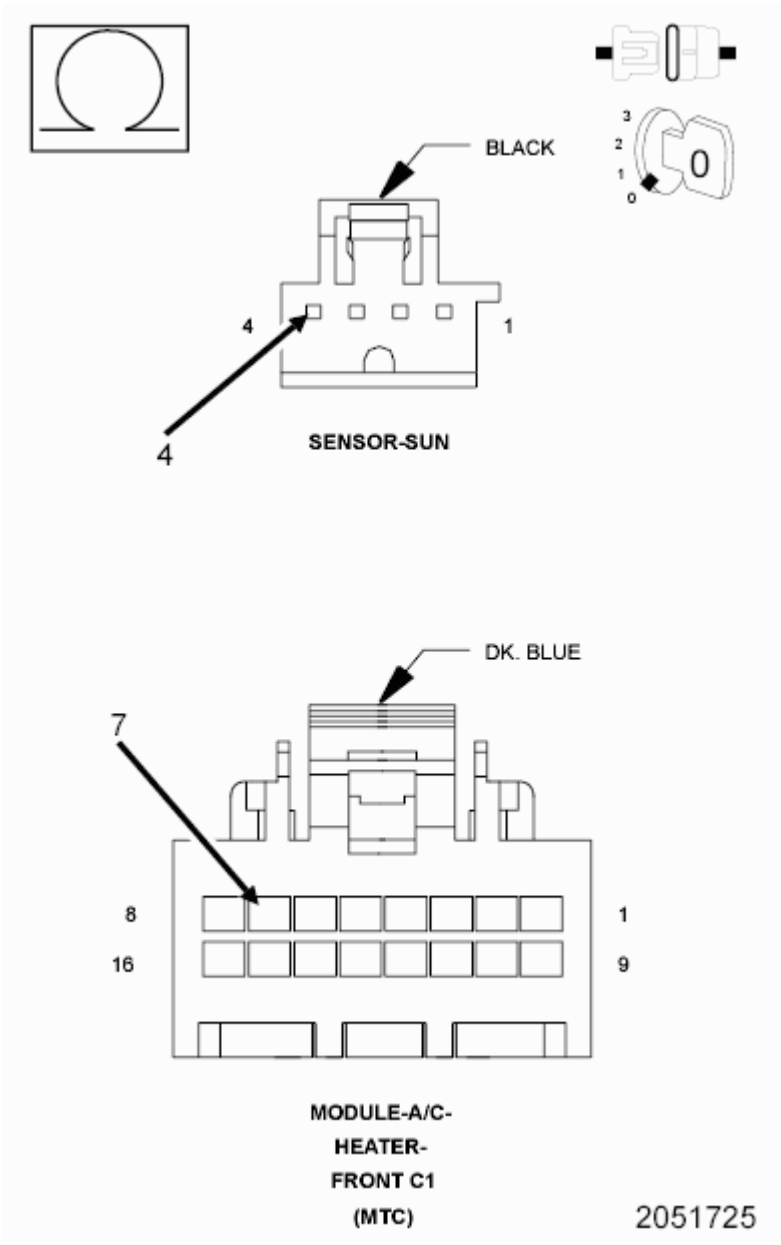


Fig. 42: Checking Sensor Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C121) Sensor Ground circuit between the A/C Heater Control C1 harness connector and the Sun Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 5

No

- Repair the (C121) Sensor Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

5. **CHECK THE SUN SENSOR AND A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   Did this DTC reset while performing the HVAC Verification Test?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B210A-SYSTEM VOLTAGE LOW

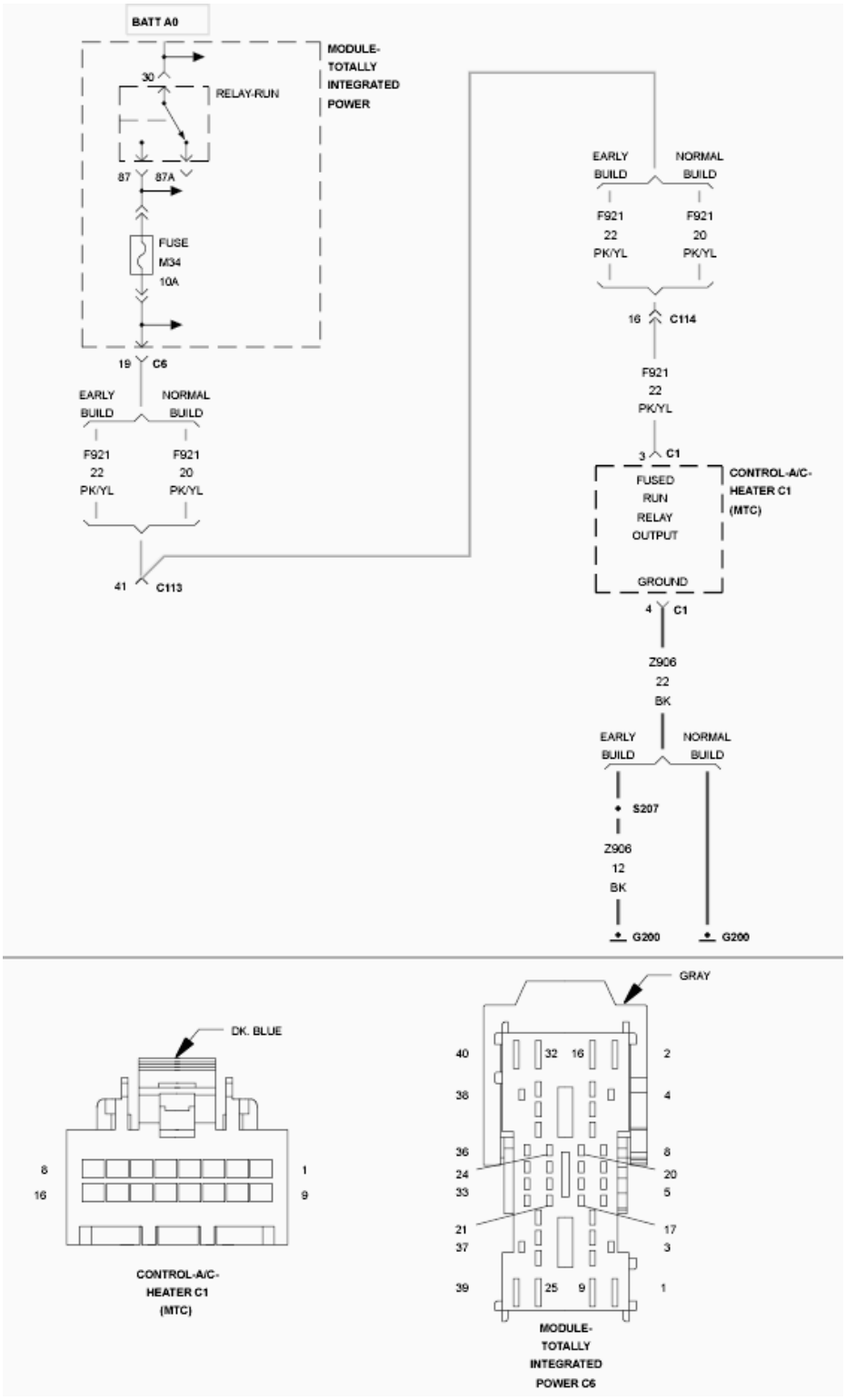


Fig. 43: Fused Run Relay Output Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the controller battery voltage is less than or equal to 10.0 Volts for period of 5.0 seconds.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
(F921) FUSED RUN RELAY OUTPUT CIRCUIT OPEN
(Z906) GROUND CIRCUIT OPEN
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR CHARGING SYSTEM DTCS**
   1. Using the scan tool, read PCM DTCs.

      Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK FOR TOTALLY INTEGRATED POWER MODULE DTCS**
   1. Using the scan tool, read TIPM DTCs.

      Are there any TIPM DTCS present?

Yes

- Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. **CHECK IF THE DTC IS ACTIVE**
   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 4

      No

      - Go to step 6
4. **CHECK THE (F921) FUSED RUN RELAY OUTPUT CIRCUIT FOR AN OPEN**

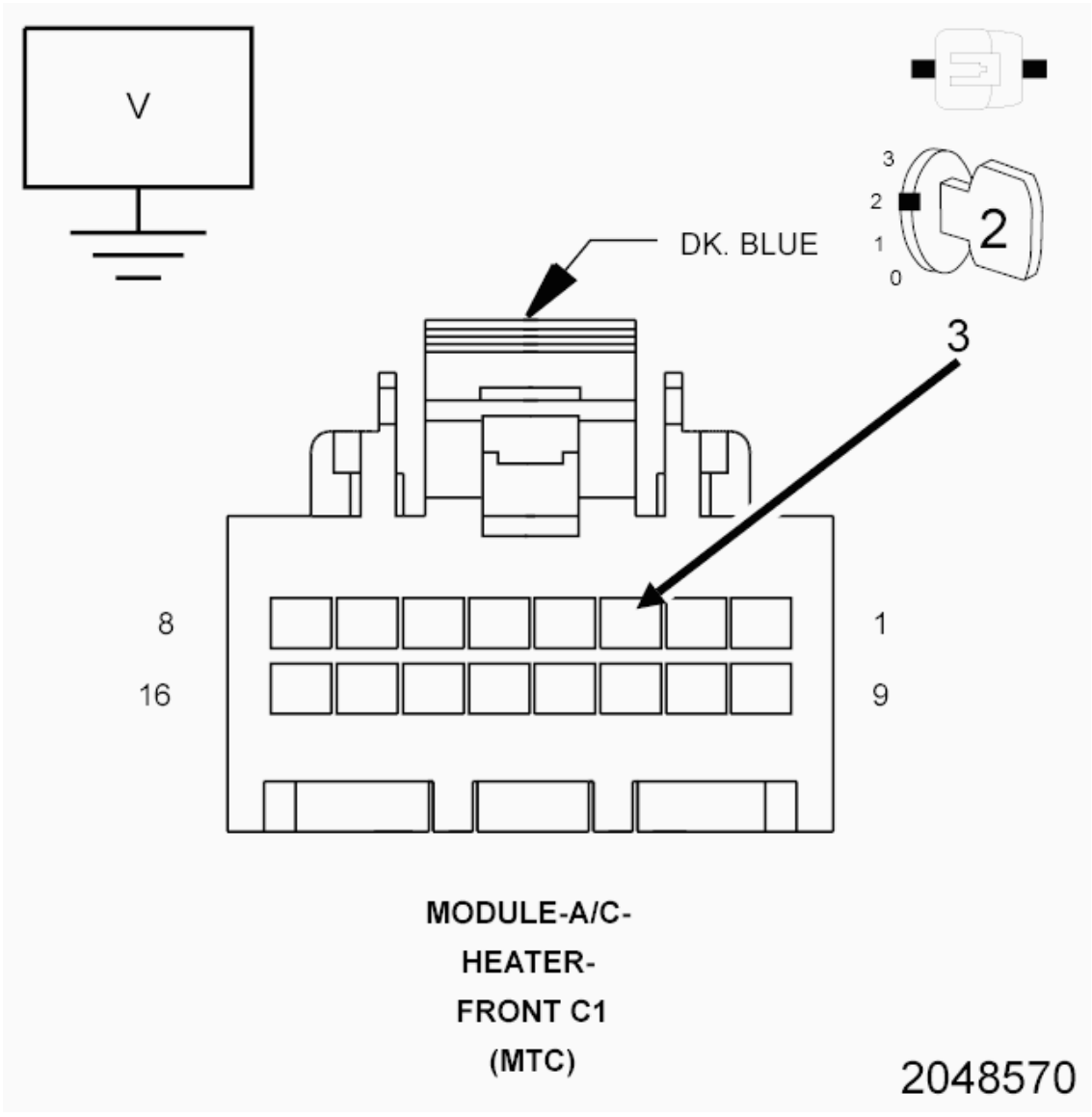


Fig. 44: Checking Fused Run Relay Output Circuit For An Open
Courtesy of CHRYSLER LLC

1. Ignition on, engine not running.
2. While back probing, measure the voltage of the (F921) Fused Run Relay Output circuit in the A/C Heater Control C1 harness connector.

   Is the voltage 10.0 Volts or below?

   Yes

   - Repair the (F921) Fused Run Relay Output circuit for an open or high resistance.

     NOTE: If the fuse is open, make sure to check for a short to ground on

the (F921) Fused Run Relay Output circuit.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (Z906) GROUND CIRCUIT FOR AN OPEN**

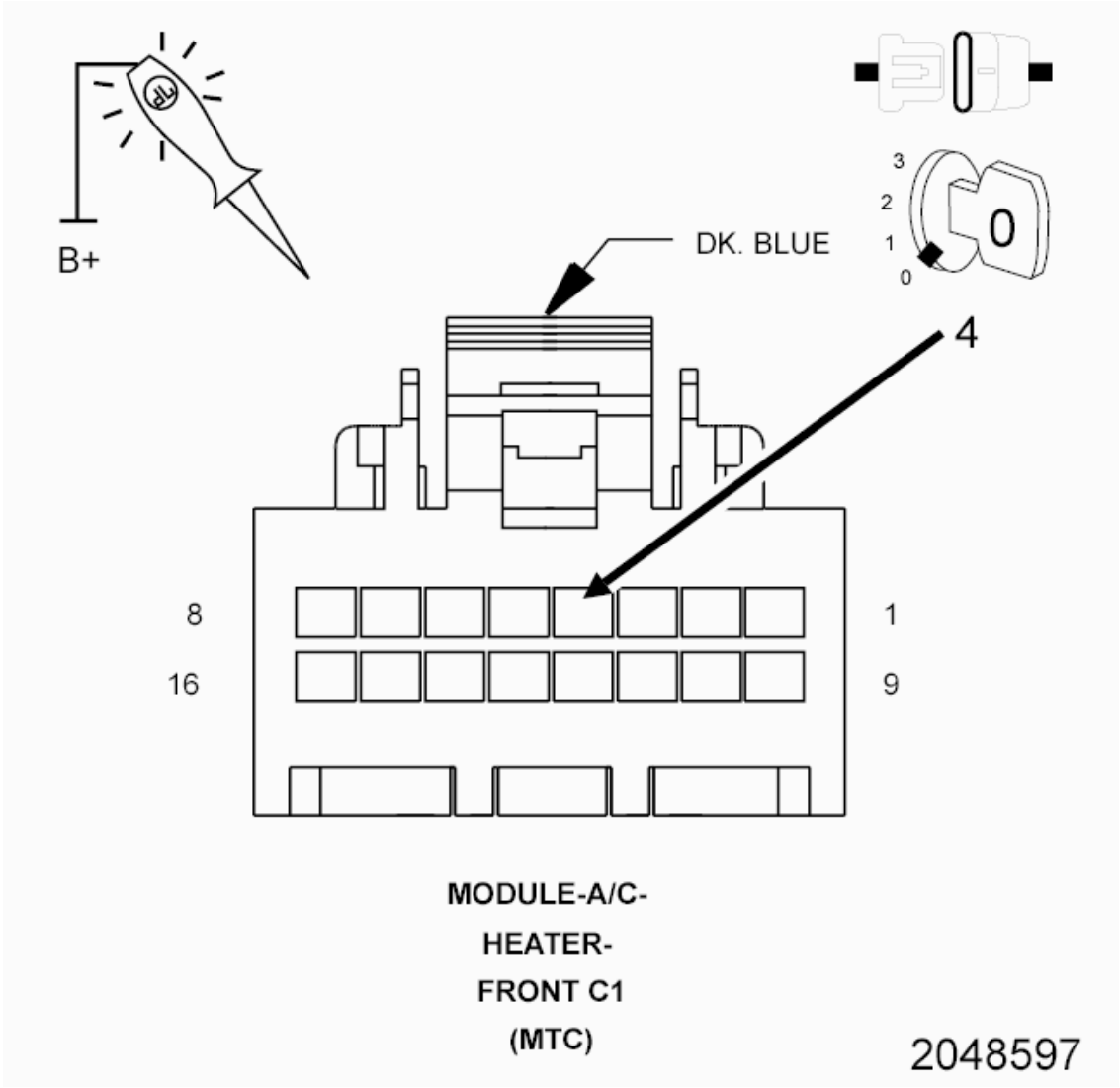


Fig. 45: Checking Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.

3. Using a 12-volt test light connected to 12-volts, check the (Z906) Ground circuit.

NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Repair the (Z906) Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B210B-SYSTEM VOLTAGE HIGH

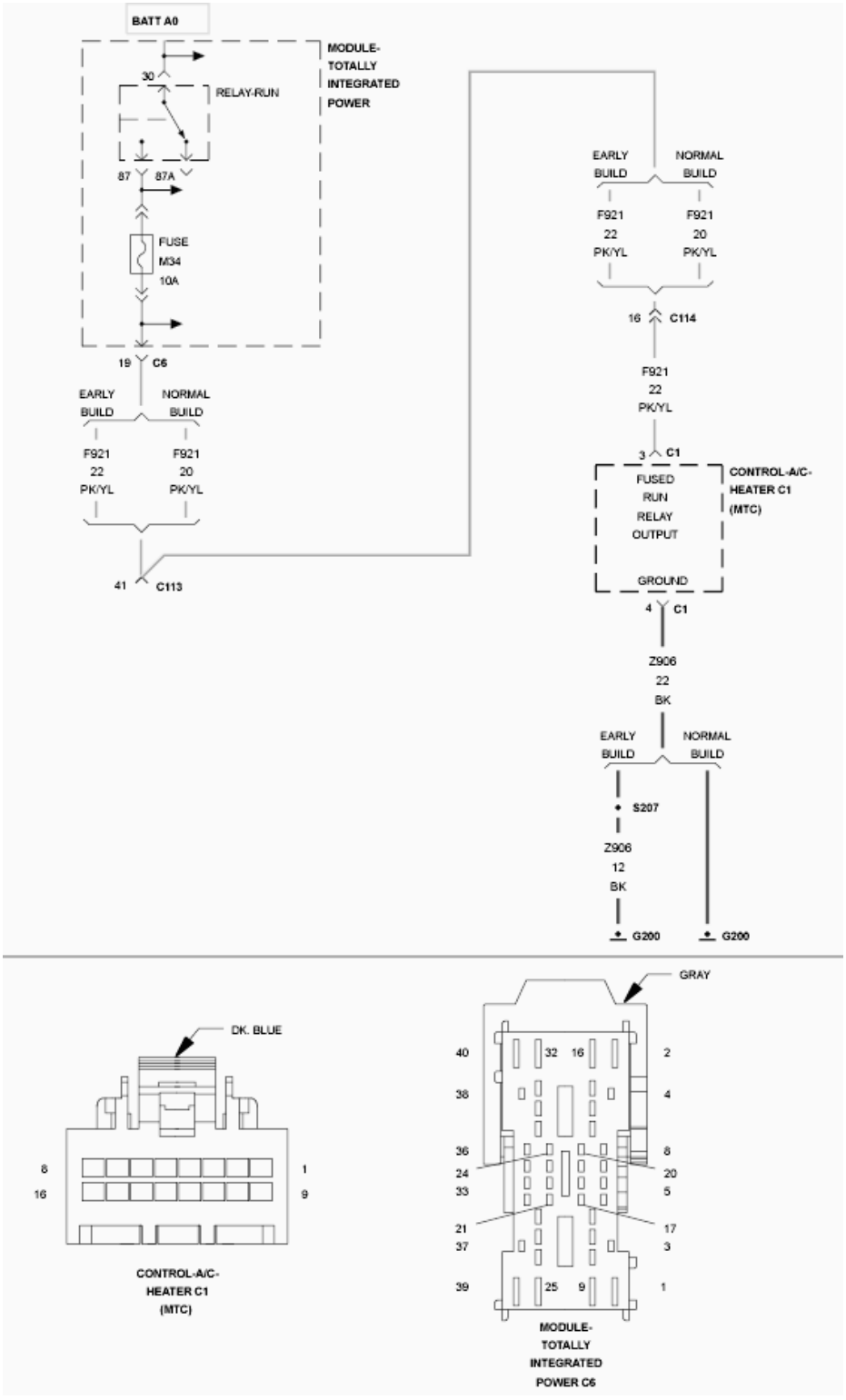


Fig. 46: Fused Run Relay Output Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the controller battery voltage is higher than 16.0 Volts for period of 1.0 second.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR CHARGING SYSTEM DTCS**
   1. Using the scan tool, read PCM DTCs.

      Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go To step 2
2. **CHECK FOR TOTALLY INTEGRATED POWER MODULE DTCS**
   1. Using the scan tool, read TIPM DTCs.

      Are there any TIPM DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. **CHECK IF THE DTC IS ACTIVE**
   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 4

      No

      - Go to step 5
4. **CHECK IF OTHER CONTROLLER ARE REPORTING AN OVER VOLTAGE CONDITION**
   1. Ignition on, engine not running.
   2. With the scan tool read DTCs.

      Are any other controllers reporting an over voltage condition?

      Yes

      - Go to DTC Based Diagnostics and perform the appropriate diagnostic procedure.

      No

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B2214-(HVAC) CLIMATE CONTROL INTERNAL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the A/C Heater Control has an internal fault. This Diagnostic Trouble Code (DTC) has a maturing time of five seconds and a de-maturing time of 10 seconds. If the DTCs status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK THE A/C HEATER CONTROL**

   Repair

   - Check for any controller software updates if applicable. If an update is available, reprogram the controller with the latest software. If no software updates are available, replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

U0010-CAN INTERIOR BUS

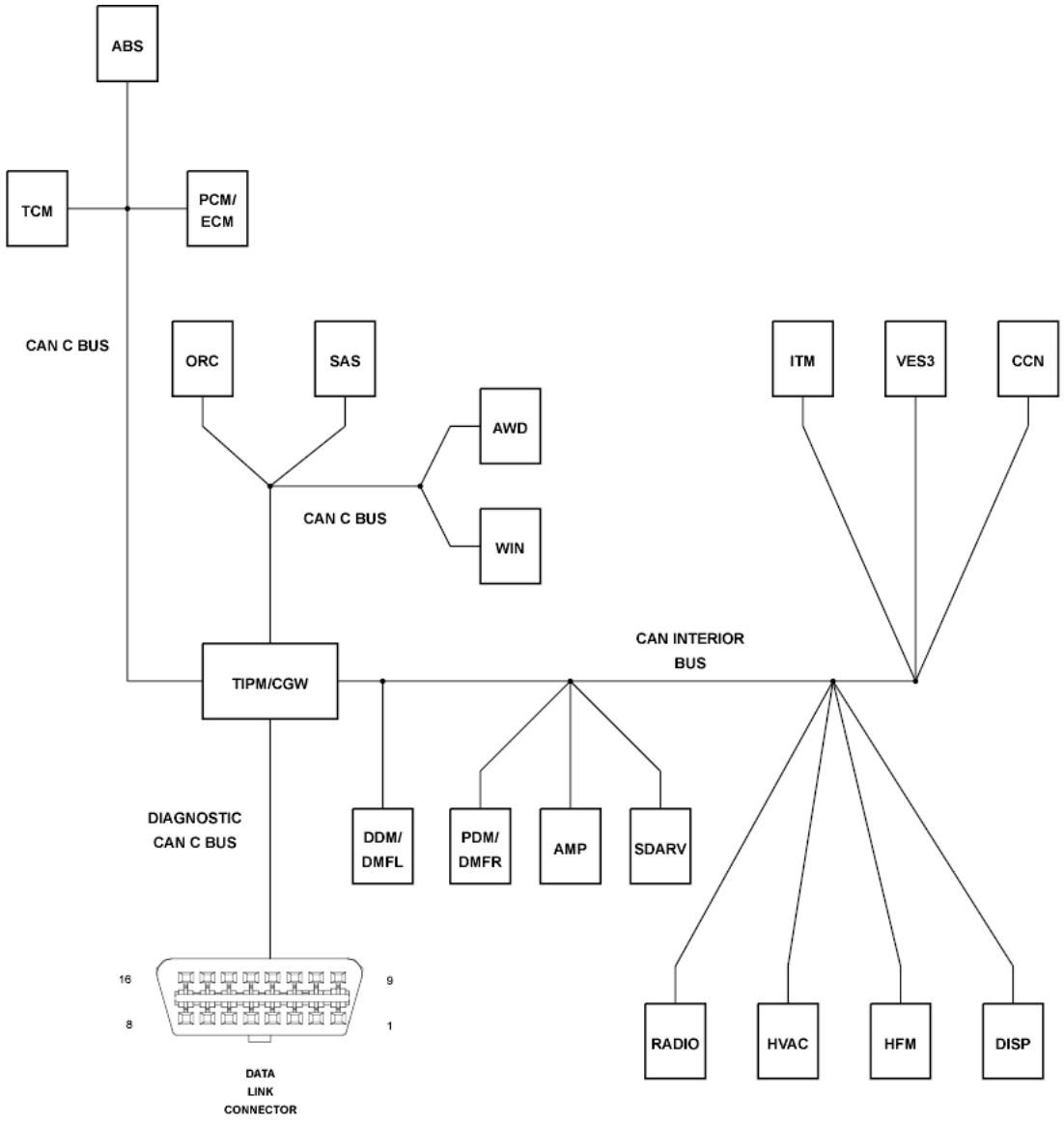


Fig. 47: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously when the ignition is on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  The A/C Heater Control detects a short to ground or a short to voltage on the CAN Bus circuits.

Possible Causes
BUS CIRCUITS SHORTED TO GROUND OR VOLTAGE
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
TOTALLY INTEGRATED POWER MODULE (TIPM)
TIPM POWER AND GROUND
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0010-CAN INTERIOR BUS** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0019-CAN B BUS

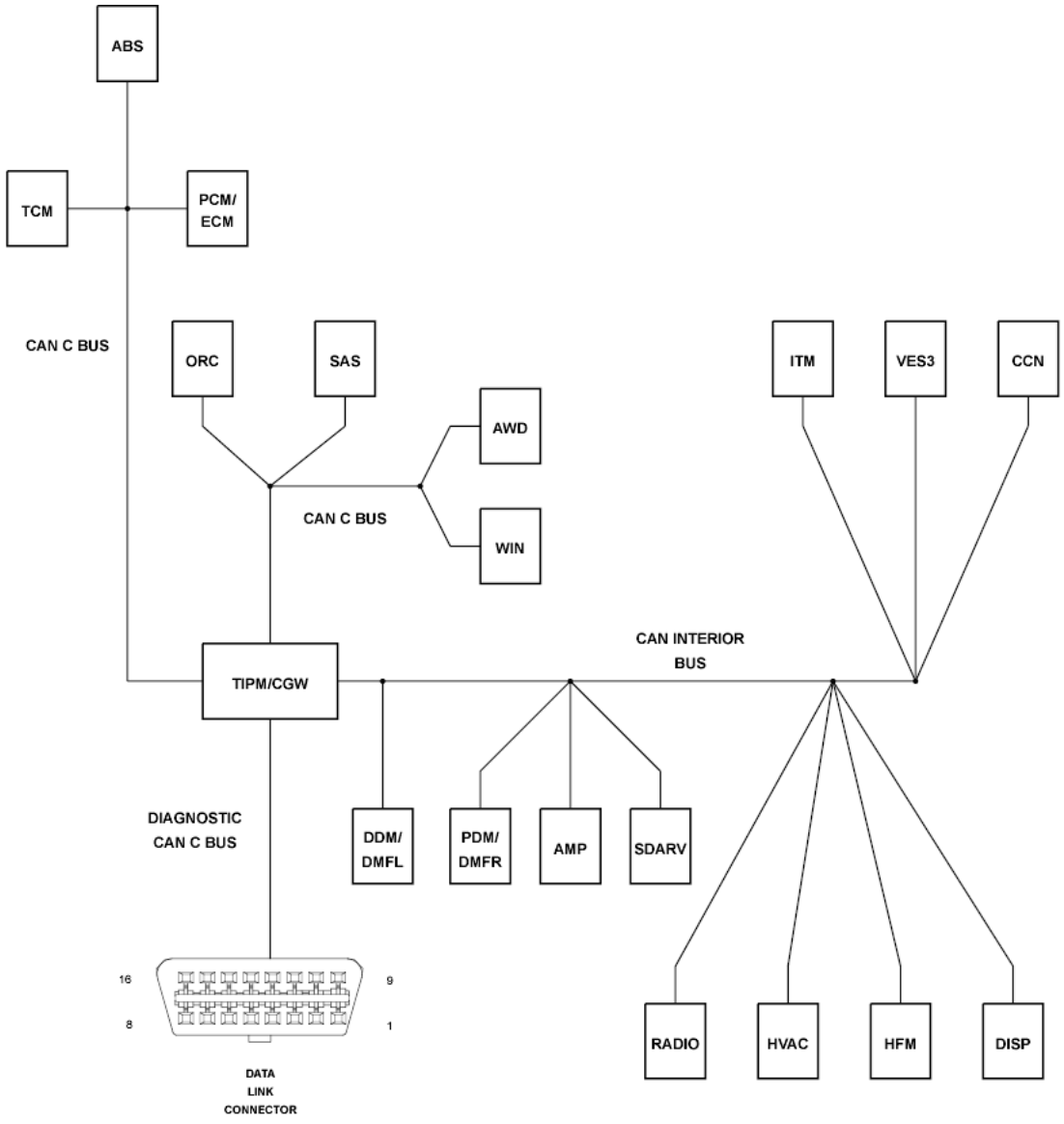


Fig. 48: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously when the ignition is on.

  12-volt battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  If the CAN B Bus (+) or CAN B Bus (-) circuit is open, shorted to voltage, or shorted to ground.

Possible Causes
(D55) CAN B BUS (+) CIRCUIT OPEN
(D54) CAN B BUS (-) CIRCUIT OPEN
(D55) CAN B BUS (+) CIRCUIT SHORTED TO VOLTAGE
(D54) CAN B BUS (-) CIRCUIT SHORTED TO VOLTAGE
(D55) CAN B BUS (+) CIRCUIT SHORTED TO GROUND
(D54) CAN B BUS (-) CIRCUIT SHORTED TO GROUND
(D55) CAN B BUS (+) CIRCUIT SHORTED TO THE (D54) CAN B BUS (-) CIRCUIT
ANY CAN B BUS MODULE

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0019-CAN B BUS** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0141-LOST COMMUNICATION WITH IPM (FCM/TIPM)

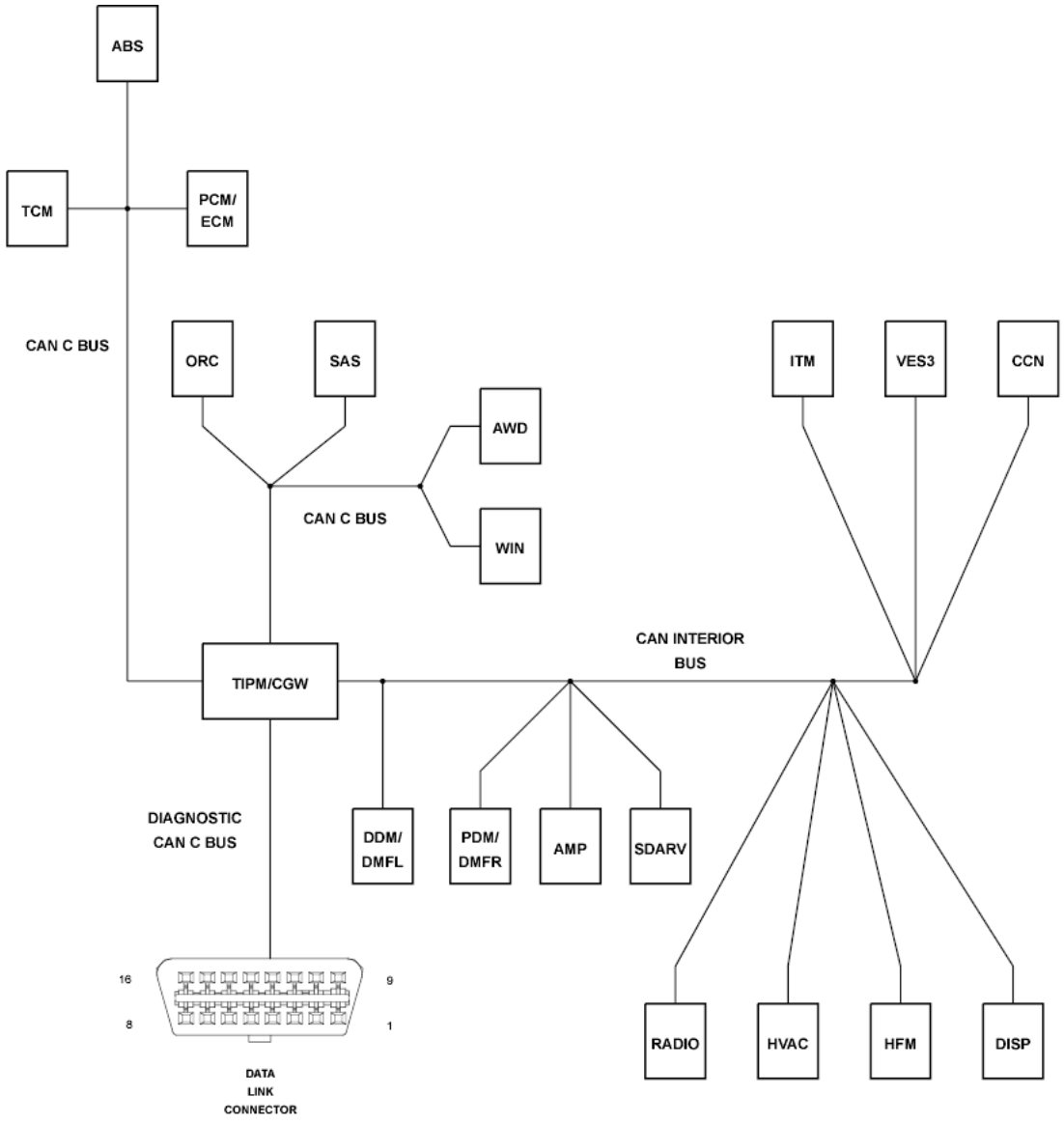


Fig. 49: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously when the ignition is on.

  12-volt battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Totally Integrated Power Module (TIPM) for three seconds.

Possible Causes
BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
FCM/TIPM NOT CONFIGURED CORRECTLY
TIPM POWER AND GROUND
TOTALLY INTEGRATED POWER MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0141-LOST COMMUNICATION WITH IPM (FCM/TIPM)**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0151-LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)

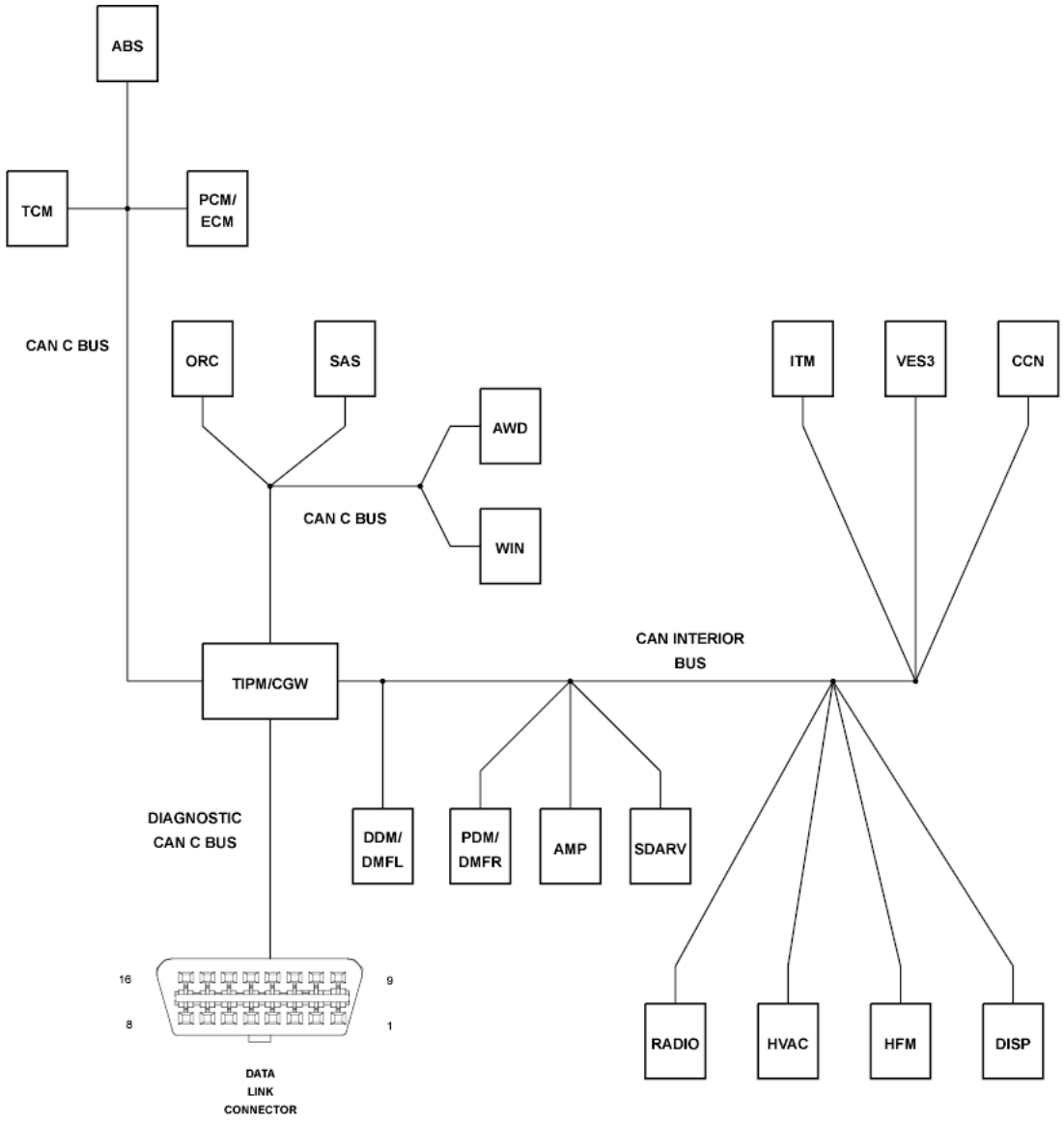


Fig. 50: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Occupant Restraint Controller (ORC) for approximately two to five seconds.

Possible Causes
(D51) OR (D65) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) OR (D64) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
ORC POWER AND GROUND
ORC
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0151-LOST COMMUNICATION WITH OCCUPANT RESTRAINT CONTROLLER (ORC)**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0155-LOST COMMUNICATION WITH CLUSTER/CCN

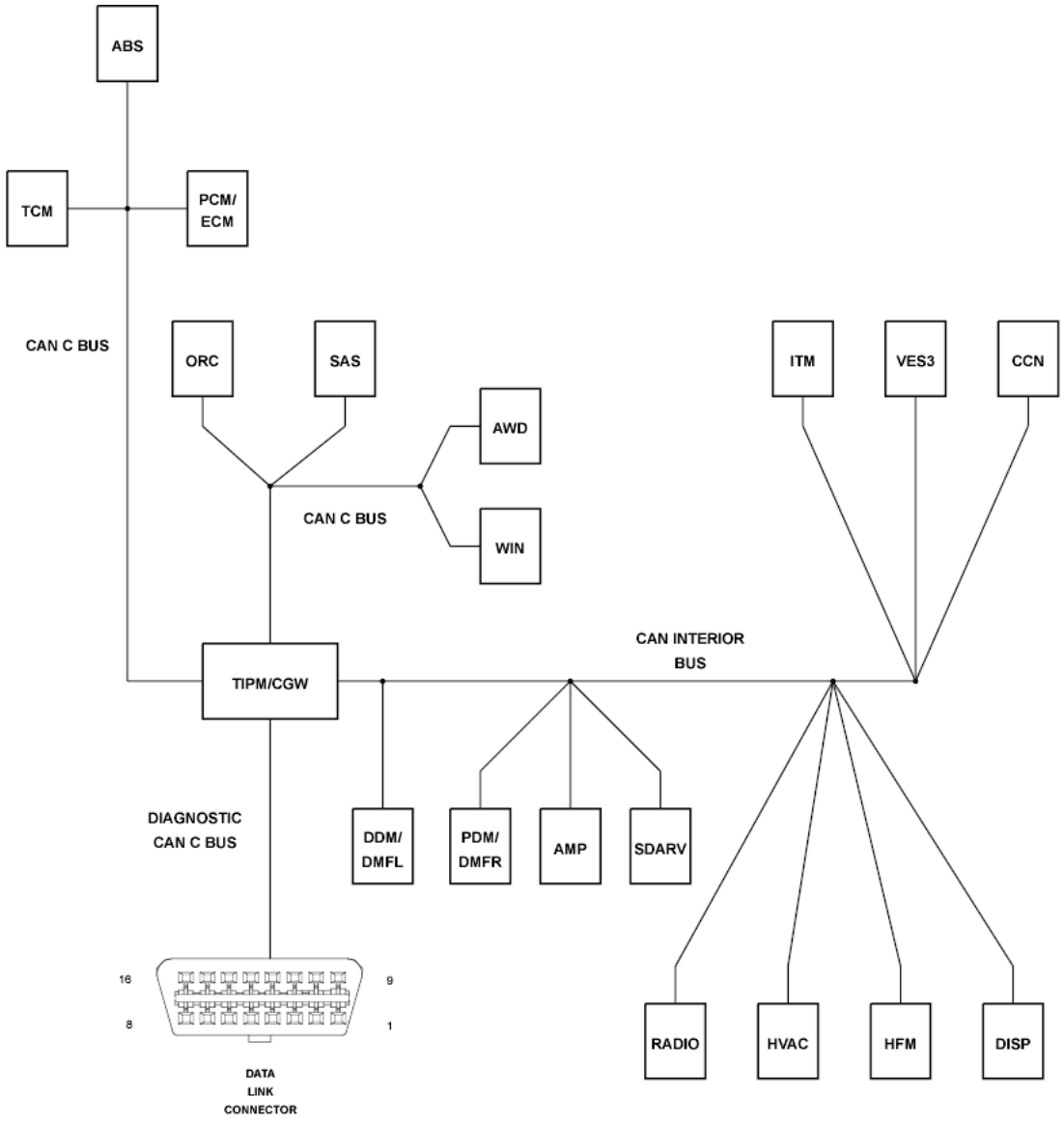


Fig. 51: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Cluster/CCN for approximately two to five seconds.

Possible Causes
(D265) CAN INTERIOR BUS(+) (125k) CIRCUIT SHORTED TO VOLTAGE
(D264) CAN INTERIOR BUS(-) (125k) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
CLUSTER/CCN POWER AND GROUND
CLUSTER/CCN
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0155-LOST COMMUNICATION WITH CLUSTER/CCN**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0167-LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE

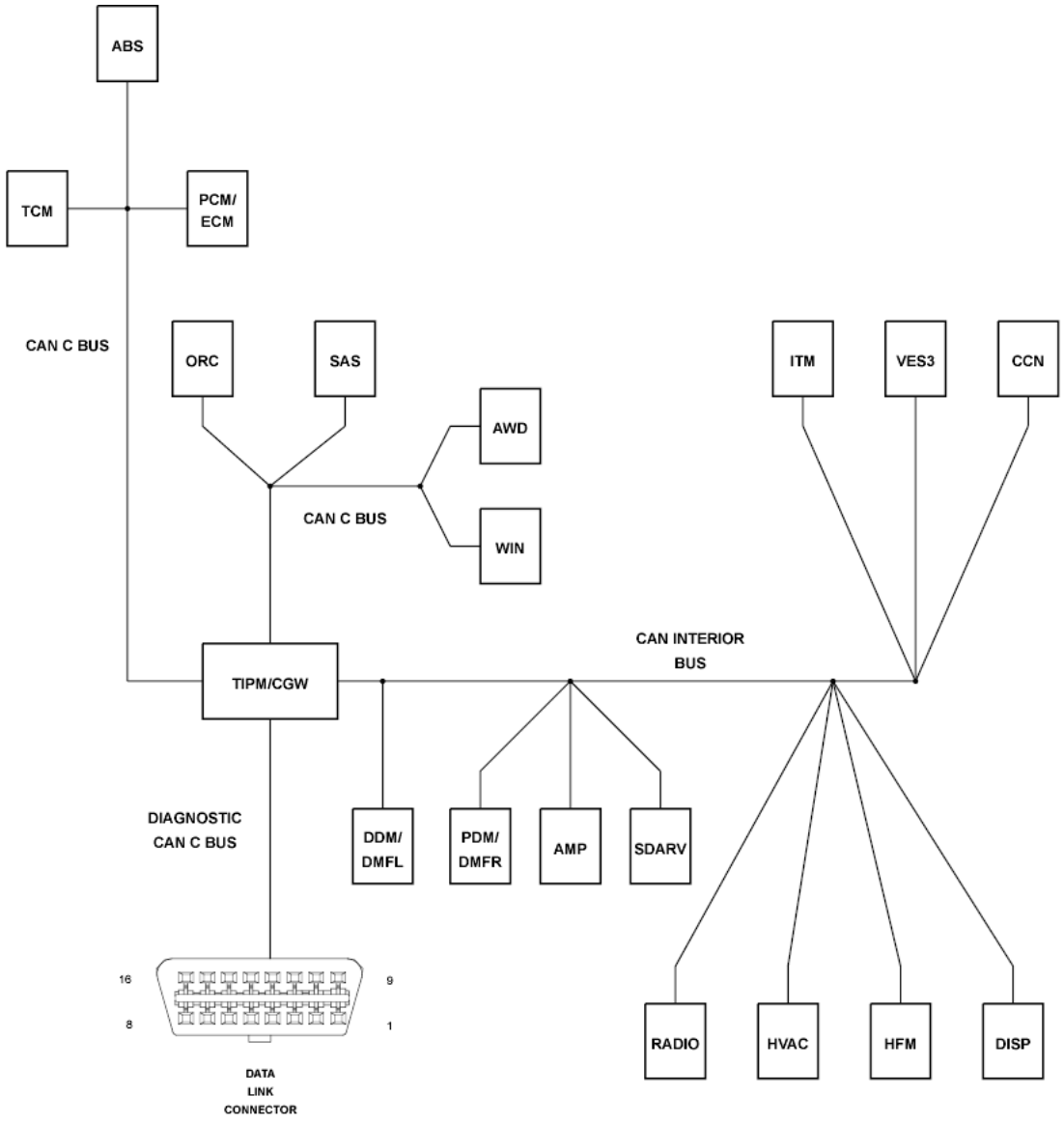


Fig. 52: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Intrusion Transceiver Control Module (ITM) for approximately two to five seconds.

Possible Causes
(D265) CAN INTERIOR BUS(+) (125k) CIRCUIT SHORTED TO VOLTAGE
(D264) CAN INTERIOR BUS(-) (125k) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
ITM POWER AND GROUND
INTRUSION TRANSCEIVER CONTROL MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0167-LOST COMMUNICATION WITH INTRUSION TRANSCEIVER CONTROL MODULE**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0168-LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIN)

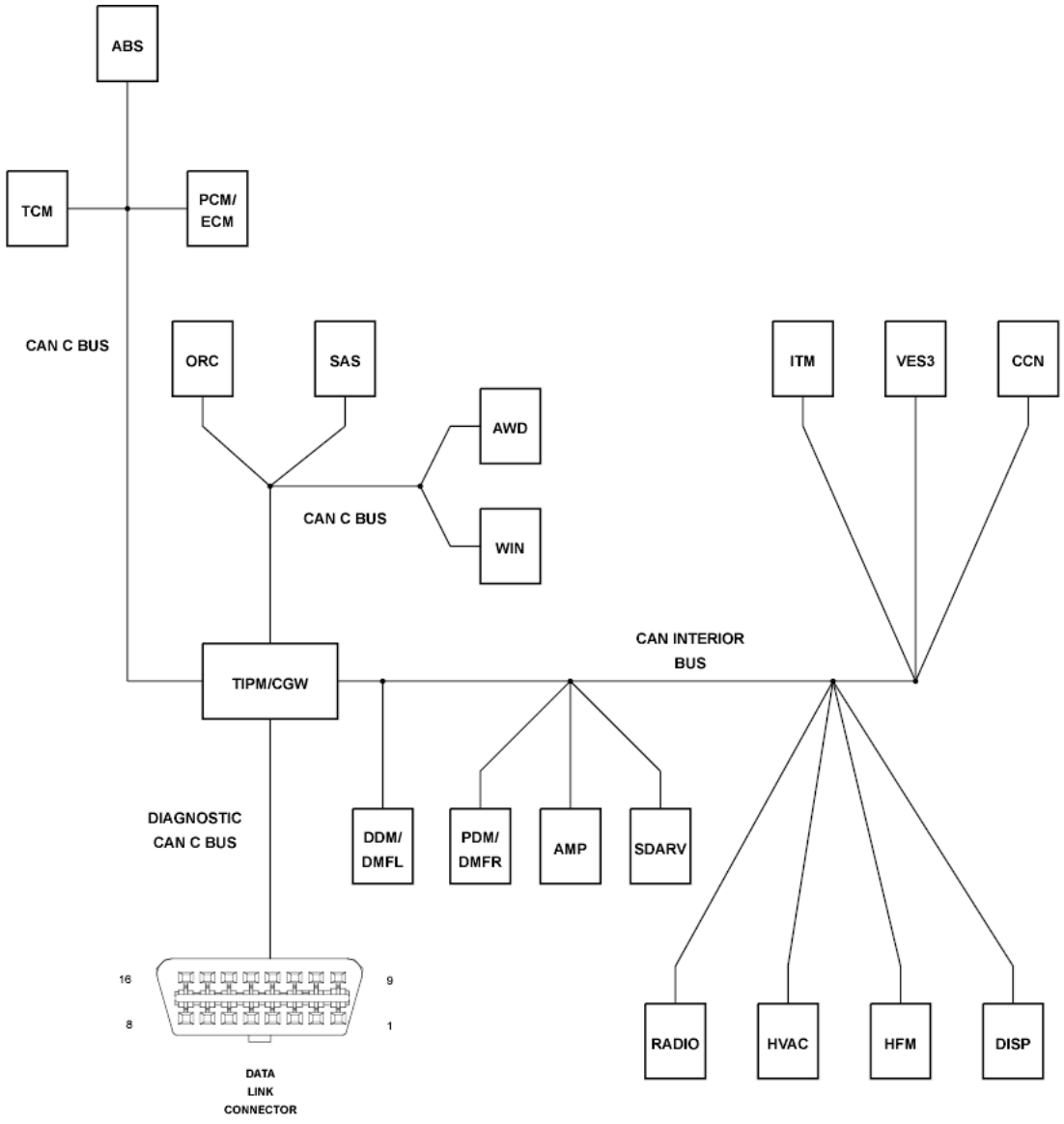


Fig. 53: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Vehicle Security Control Module (also known as the Wireless Ignition Node or WIN) for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
WIN POWER AND GROUND
WIRELESS IGNITION NODE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0168-LOST COMMUNICATION WITH VEHICLE SECURITY CONTROL MODULE (WIN)** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0184-LOST COMMUNICATION WITH RADIO

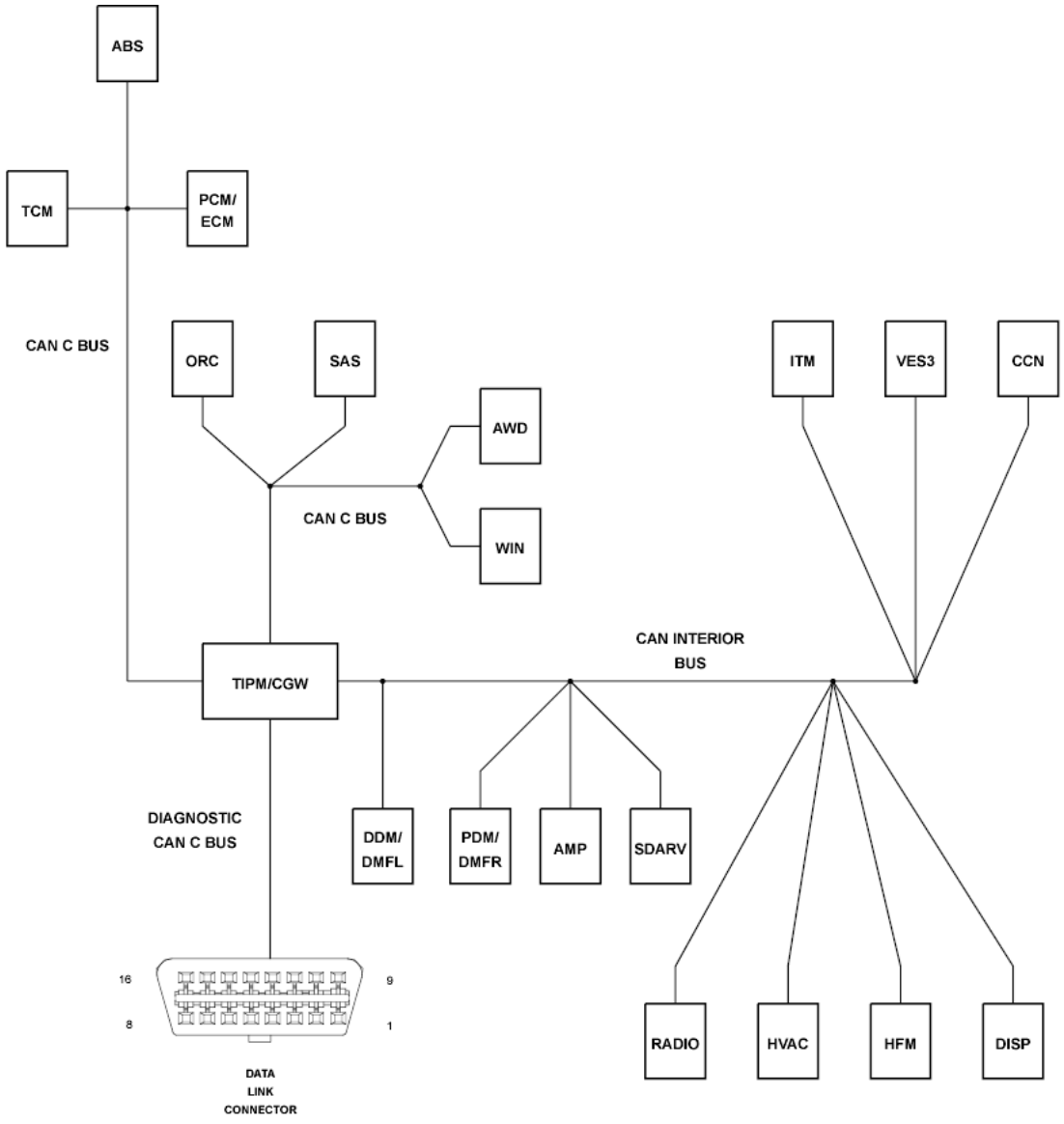


Fig. 54: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Radio for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
RADIO POWER AND GROUND
RADIO
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0184-LOST COMMUNICATION WITH RADIO** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0186-LOST COMMUNICATION WITH AUDIO AMPLIFIER

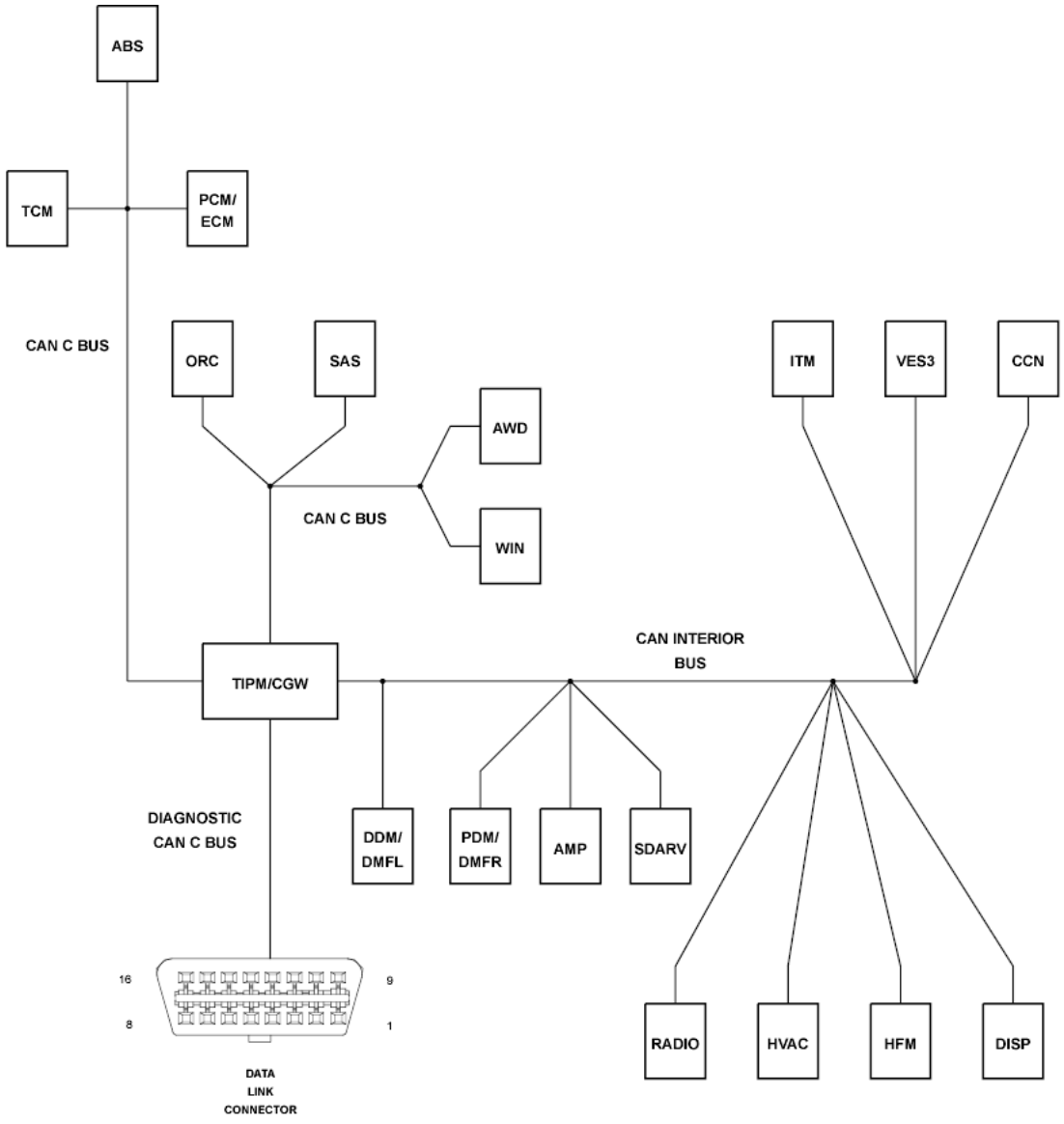


Fig. 55: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Audio Amplifier (AMP) for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
AMP POWER AND GROUND
AUDIO AMPLIFIER
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0186-LOST COMMUNICATION WITH AUDIO AMPLIFIER** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0197-LOST COMMUNICATION WITH HANDS FREE PHONE MODULE

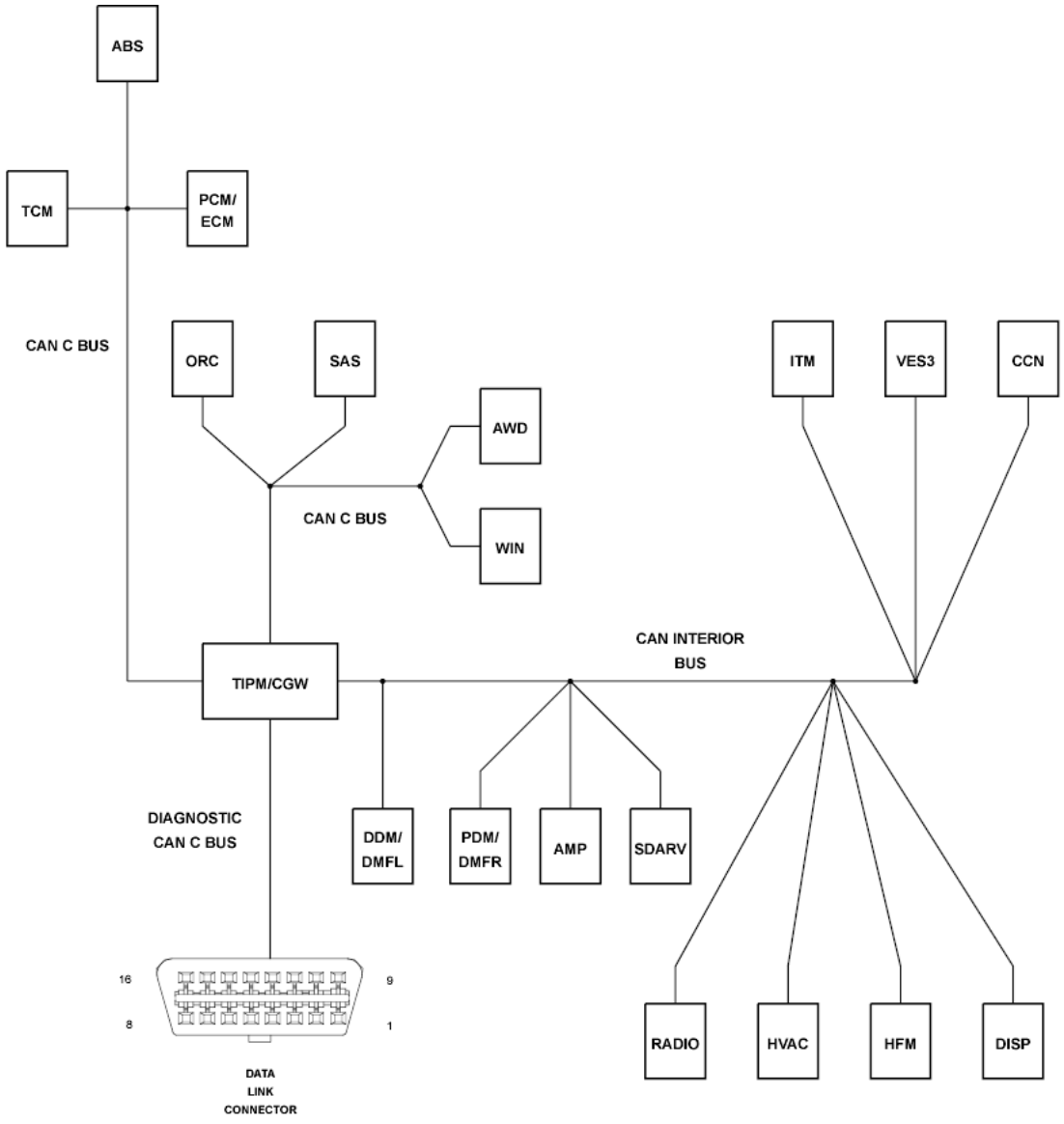


Fig. 56: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Hands Free Phone Module (HFM) for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
HFM POWER AND GROUND
HANDS FREE PHONE MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0197-LOST COMMUNICATION WITH HANDS FREE PHONE MODULE** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0203-LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT

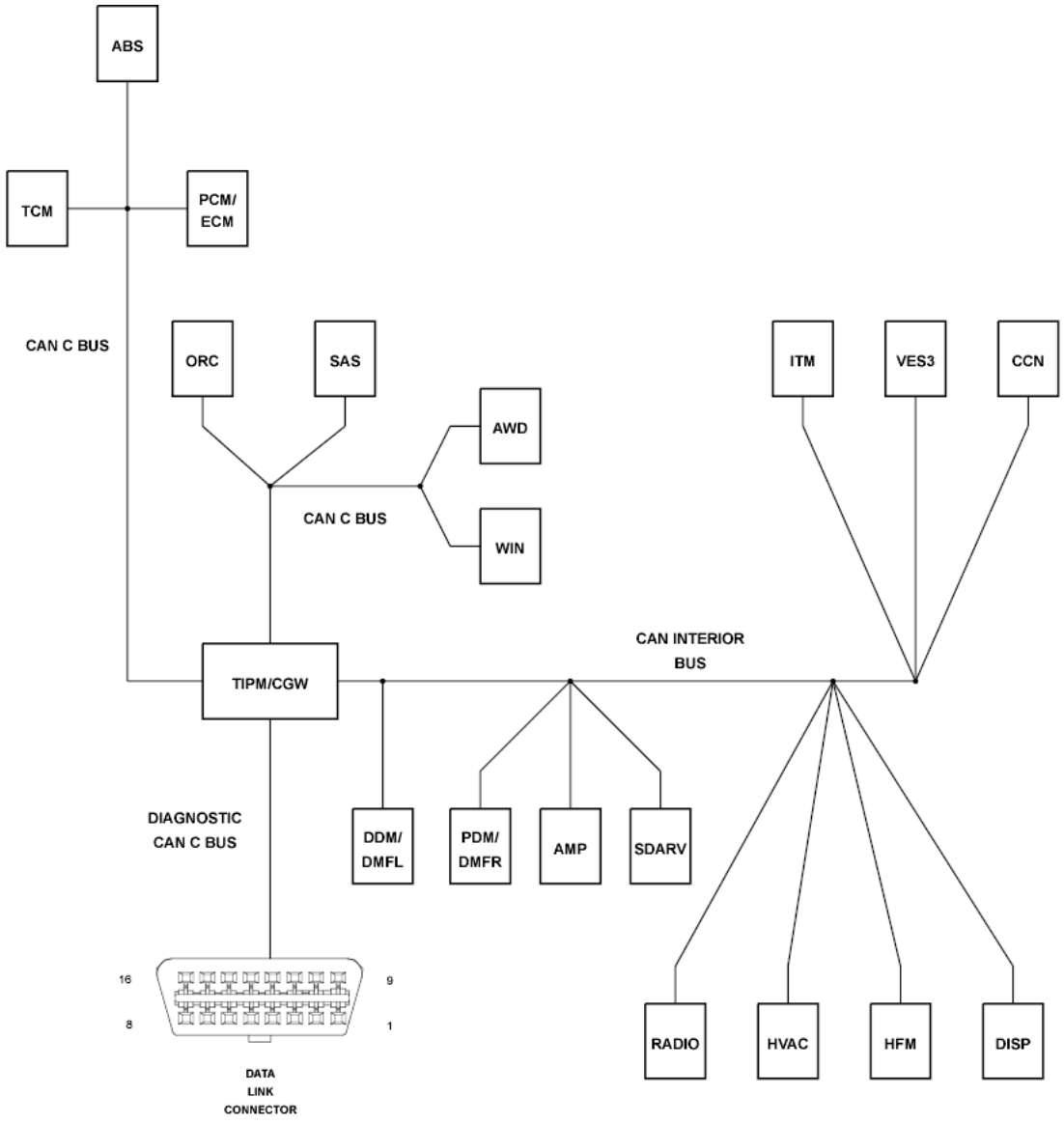


Fig. 57: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Driver Door Module (DDM) for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
DDM POWER AND GROUND
DRIVER DOOR MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0203-LOST COMMUNICATION WITH DOOR MODULE FRONT LEFT** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0249-LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW

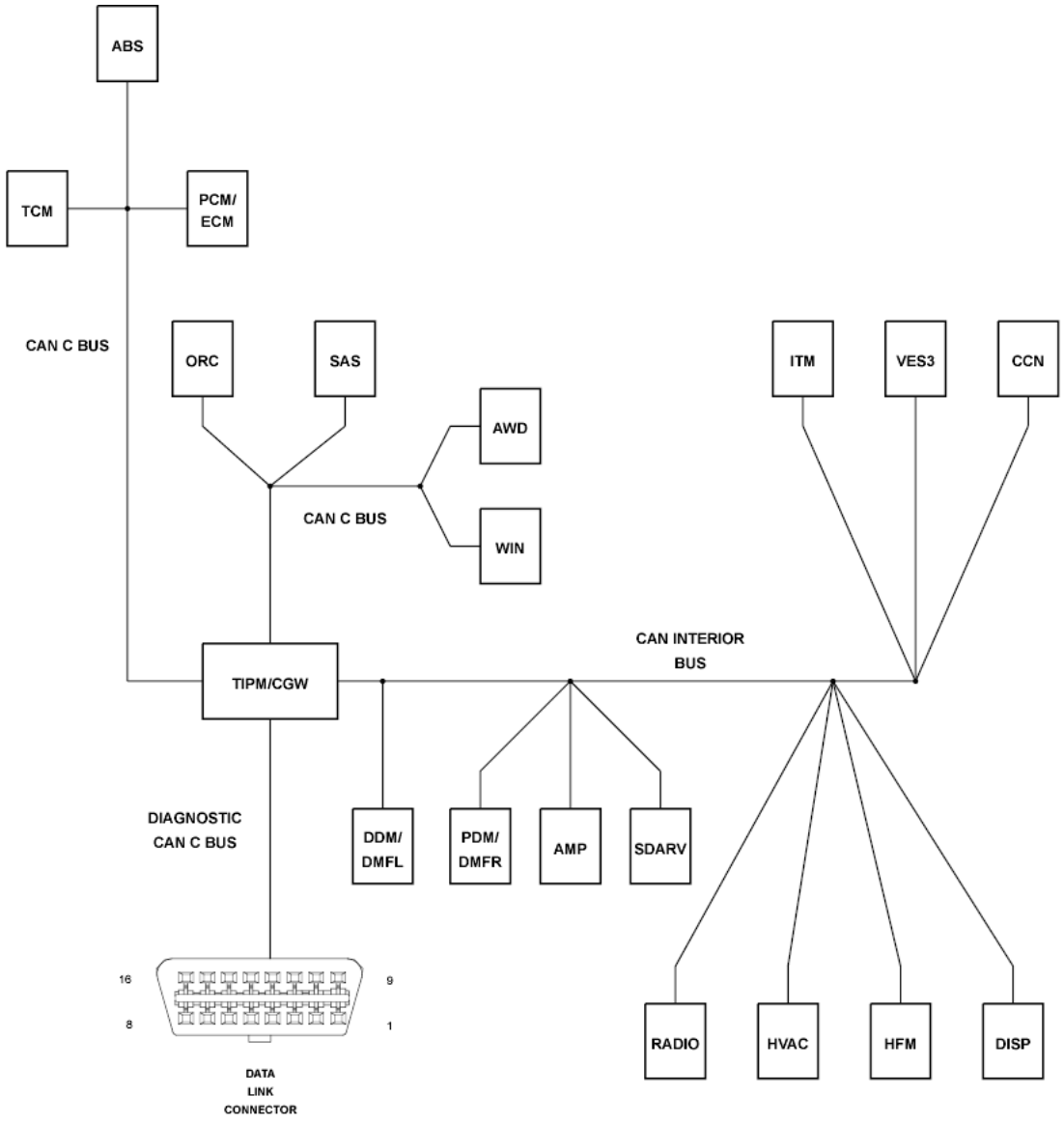


Fig. 58: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Vehicle Entertainment System Control Module (VES) for approximately two to five seconds.

Possible Causes
(D51) CAN C BUS(+) CIRCUIT SHORTED TO VOLTAGE
(D52) CAN C BUS(-) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
VES POWER AND GROUND
VEHICLE ENTERTAINMENT SYSTEM CONTROL MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY THE DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0249-LOST COMMUNICATION WITH VEHICLE ENTERTAINMENT CONTROL MODULE - LAST ROW** diagnostic procedure.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

B1000-92-A/C SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the

status changes when the switch button or knob is pushed or turned. An active Diagnostic trouble Code (DTC) indicates that the switch is stuck in an On position. A stored DTC indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the A/C On/Off Control Switch is stuck in an On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
   1. Inspect the A/C Heater Control for an object or debris holding the A/C On/Off Control Switch in an On position.

      NOTE: Using the scan tool you can read the On/Off status of the control switch.

      Is the A/C On/Off control switch being held in or stuck On?

      Yes

      - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 2
2. **A/C HEATER CONTROL**
   1. Turn the ignition on.

2. Using the scan tool, erase HVAC DTCs.
3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
4. Using the scan tool, read HVAC DTCs.

   Does the scan tool display this DTC as Active or is the status of the switch reading On?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B1009-92-RECIRCULATION SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the status changes when the switch button or knob is pushed or turned. An active DTC indicates that the switch is stuck in an On position. A stored Diagnostic trouble Code (DTC) indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Recirculation mode switch is stuck in a On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
    1. Inspect the A/C Heater Control for an object or debris holding the Recirculation mode switch in an On position.

        NOTE: Using the scan tool you can read the On/Off status of the control switch.

        Is the Recirculation mode switch being held in or stuck On?

        Yes

        - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

        No

        - Go to step 2
2. **A/C HEATER CONTROL**
    1. Turn the ignition on.
    2. Using the scan tool, erase HVAC DTCs.
    3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
    4. Using the scan tool, read HVAC DTCs.

        Does the scan tool display this DTC as Active or is the status of the switch reading On?

        Yes

        - Replace and program the A/C Heater Control in accordance with the Service Information.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

        No

        - Test complete.
        - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

B1015-92-EBL / REAR DEFROST SWITCH REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control contains various switches and knobs that are used to change the systems operation. Many of the switches are momentary switches which are normally open or in the Off position and the status changes when the switch button or knob is pushed or turned. An active DTC indicates that the switch is stuck in an On position. A stored Diagnostic Trouble Code (DTC) indicates that the switch was stuck in a On position for more than two minutes but has since returned to its normal state of Off.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Electric Back light (EBL) Electronic Rear Defrost switch is stuck in an On position for more than two minutes. This DTC has a de-maturing time of one second. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
OBJECT HOLDING SWITCH IN AN ON POSITION
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **INSPECT FOR OBJECT HOLDING SWITCH IN AN ON POSITION**
   1. Inspect the A/C Heater Control for an object or debris holding the (EBL) Electronic Rear Defrost switch in an On position.

      NOTE: Using the scan tool you can read the On/Off status of the control switch.

      Is the (EBL) Electronic Rear Defrost switch being held in or stuck in an On?

      Yes

      - Clean or repair the A/C Heater Control as necessary. If you are unable to clean the switch to

where the switch can work properly, replace and program the A/C Heater Control in accordance with the Service Information.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 2

2. **A/C HEATER CONTROL**
   1. Turn the ignition on.
   2. Using the scan tool, erase HVAC DTCs.
   3. Turn the ignition off for 10 seconds, and then turn the ignition on and wait a minimum of two minutes.
   4. Using the scan tool, read HVAC DTCs.

   Does the scan tool display this DTC as Active or is the status of the switch reading On?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B1030-11-EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO GROUND

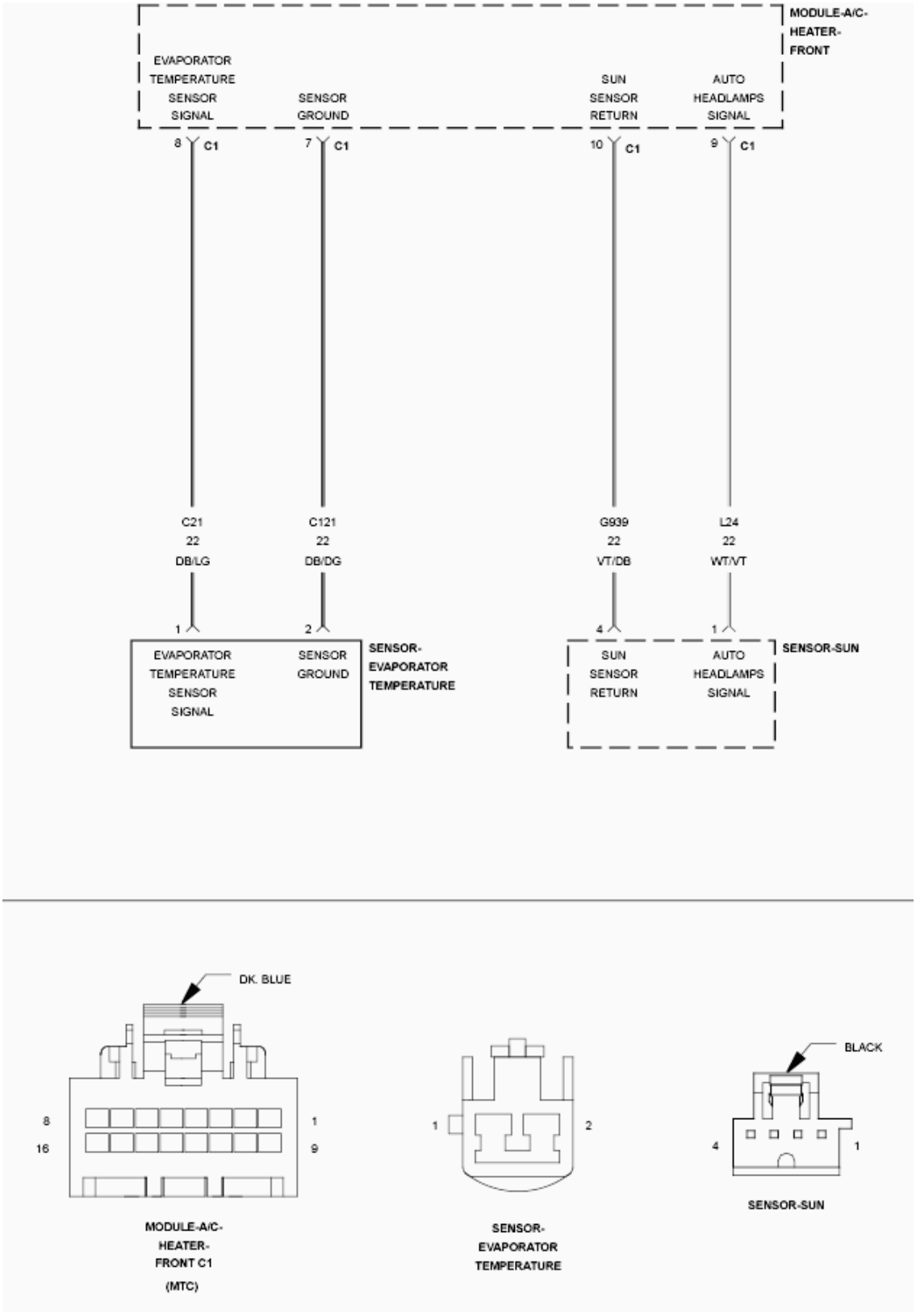


Fig. 59: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  The Evaporator Temperature Sensor voltage input to the A/C Heater Control is equal to or below 0.9 volts for a continuous period of 1.2 seconds. If the A/C Heater Control detects a valid voltage, the Diagnostic Trouble Code (DTC) will change from active to stored and will stay stored for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORT TO GROUND EVAPORATOR TEMPERATURE SENSOR A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 5
2. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO GROUND**

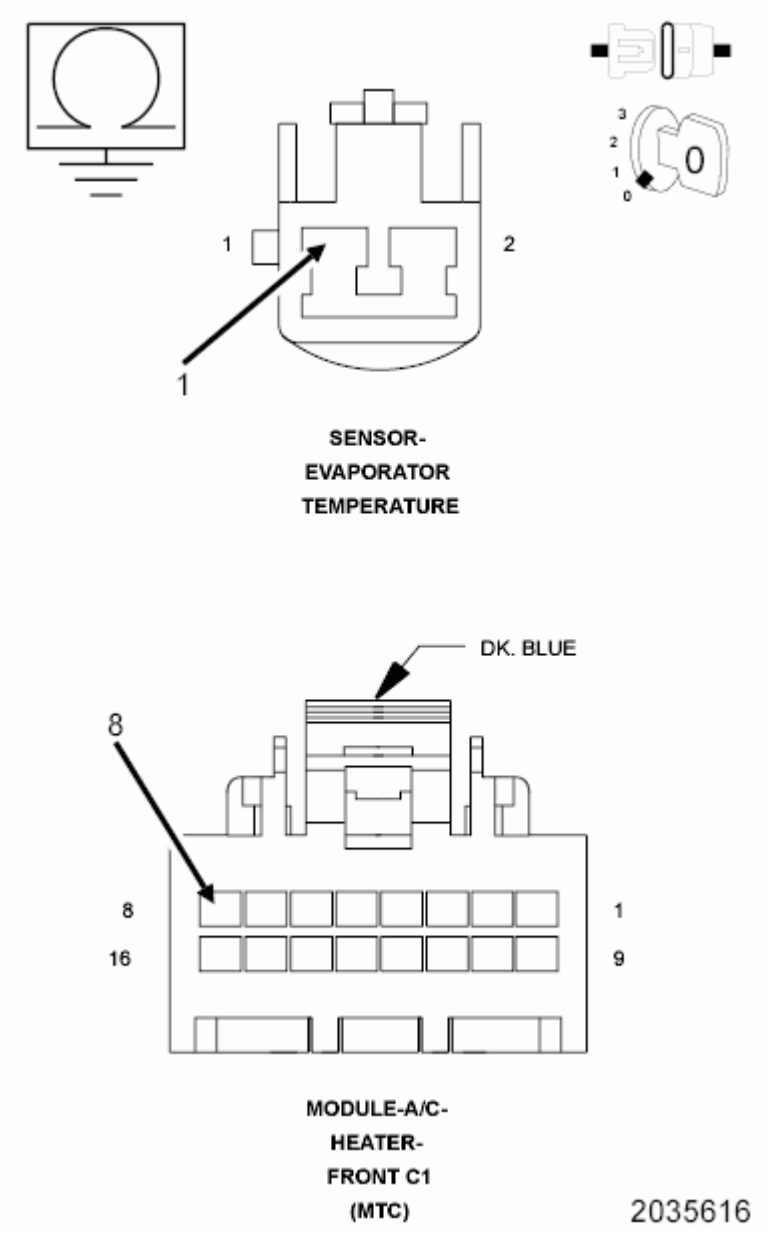


Fig. 60: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Evaporator Temperature Sensor harness connector.
4. Measure the resistance between ground and the (C21) Evaporator Temperature Sensor Signal circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO THE (C121) SENSOR GROUND CIRCUIT**

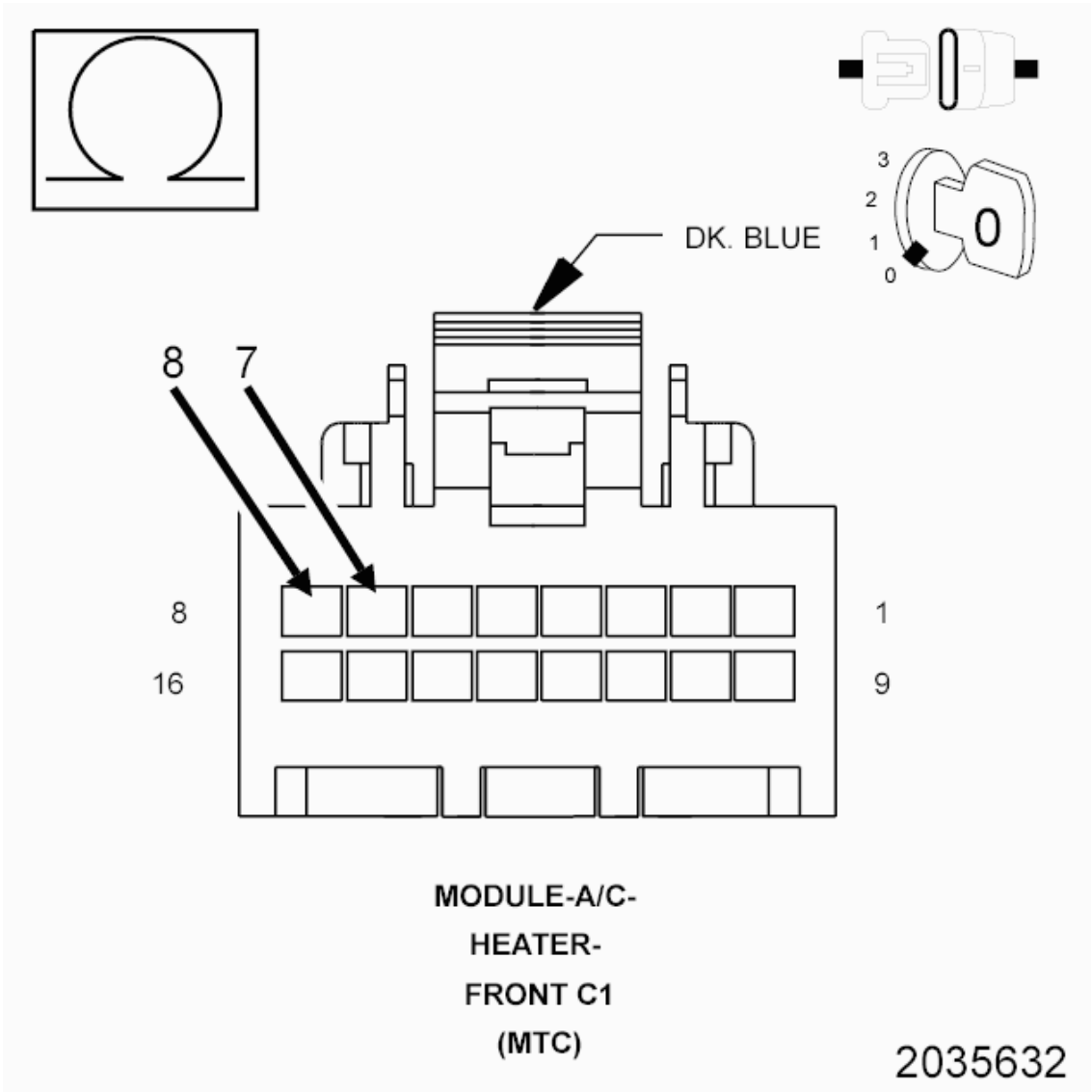


Fig. 61: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Sensor Ground Circuit
Courtesy of CHRYSLER LLC

1. Measure the resistance between the (C21) Evaporator Temperature Sensor Signal circuit and the

(C121) Sensor Ground circuit.

Is the resistance below 100k Ohms?

Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to (C121) Sensor Ground circuit.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
   1. Replace the Evaporator Temperature Sensor in Accordance with the Service Information.
   2. Cycle the ignition off for 30 seconds then back on.
   3. With the scan tool, read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1030-12-EVAPORATOR TEMPERATURE SENSOR - CIRCUIT SHORT TO BATTERY

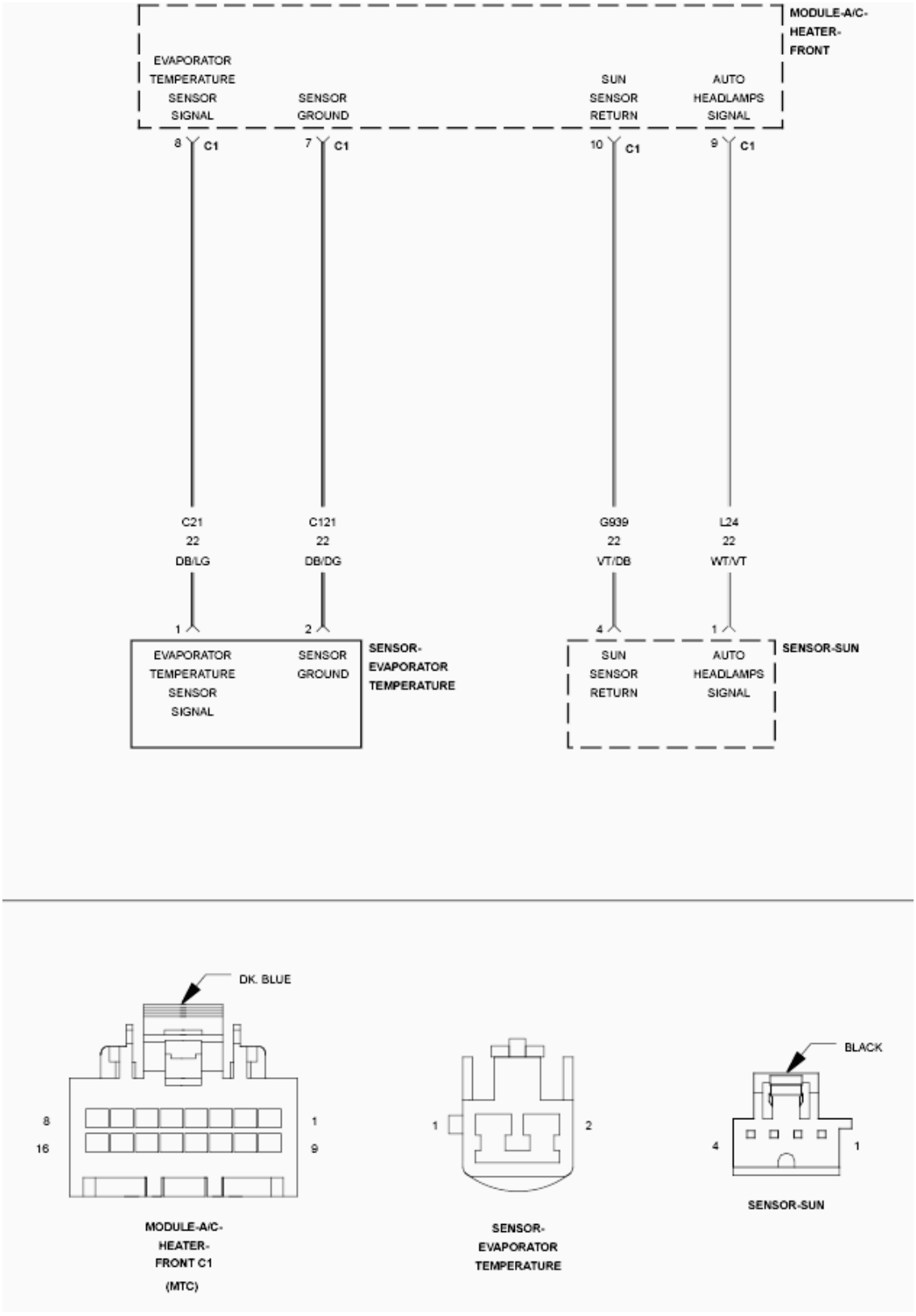


Fig. 62: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The Evaporator Temperature Sensor resistance changes in conjunction to temperature. The sensor thermistor forms the lower half of a voltage divider and the upper half of the voltage divider is provided by a pull up resistor to 5.0 volts.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  The Evaporator Temperature Sensor voltage input to the A/C Heater Control is equal to or above 4.8 volts for a continuous period of two seconds. If the A/C Heater Control detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT SHORTED TO VOLTAGE
(C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT OPEN
(C121) SENSOR GROUND CIRCUIT OPEN
EVAPORATOR TEMPERATURE SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT VOLTAGE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 7
2. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT VOLTAGE**

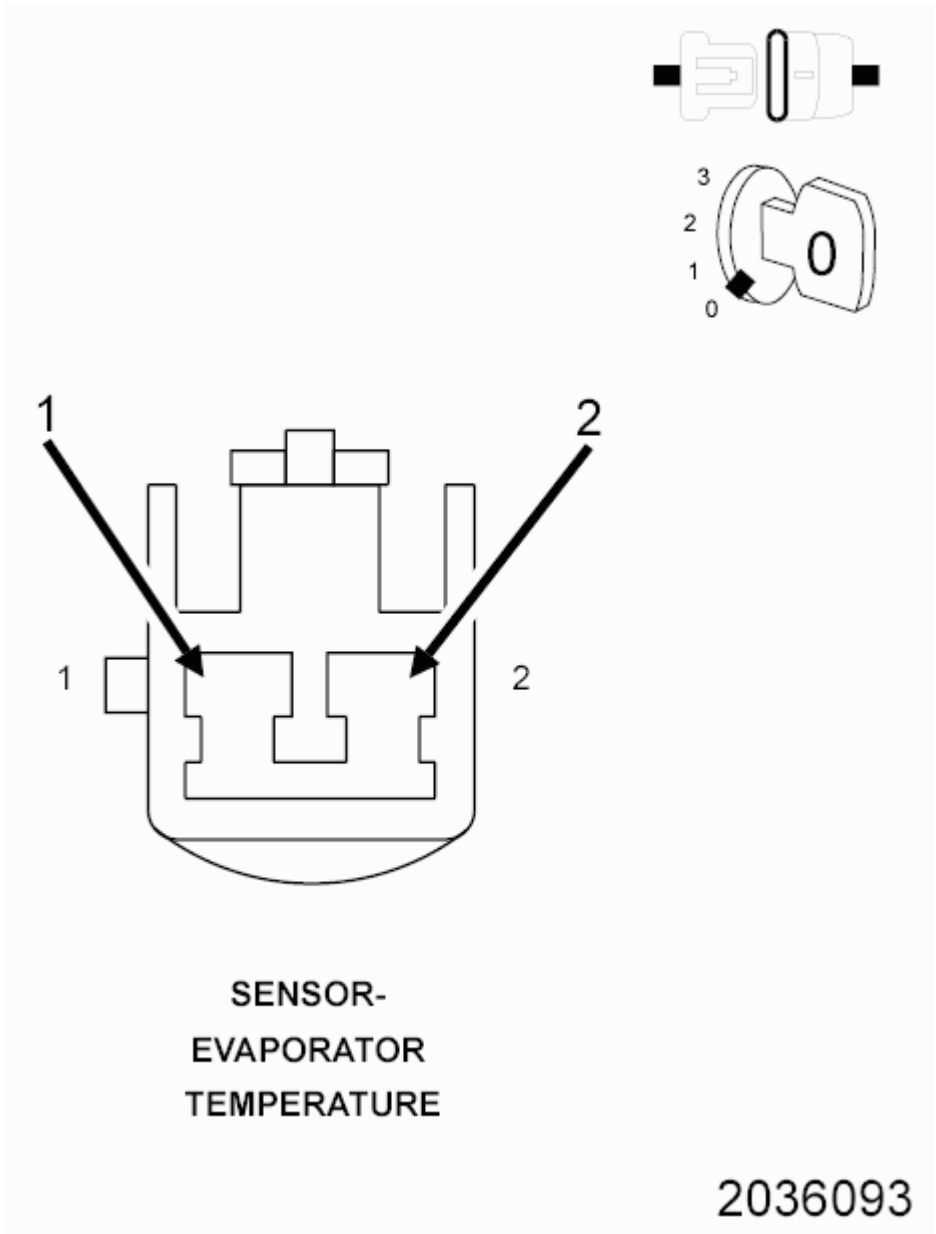


Fig. 63: Checking Evaporator Temperature Sensor Signal Circuit Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Evaporator Temperature Sensor harness connector.

NOTE: Due to the small terminal and pin size of the Evaporator Temperature Sensor and harness connector, make sure to not damage the terminals in this process.

3. Connect a jumper wire between the (C21) Evaporator Temperature Sensor Signal circuit and the (C121) Sensor Ground circuit in the Evaporator Temperature Sensor harness connector.

4. Ignition on, engine not running.
5. With the scan tool, read the Evaporator Temperature Sensor voltage.

   Is the voltage below 0.1 of a volt?

   Yes

   - Replace the Evaporator Temperature Sensor in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 3

3. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**

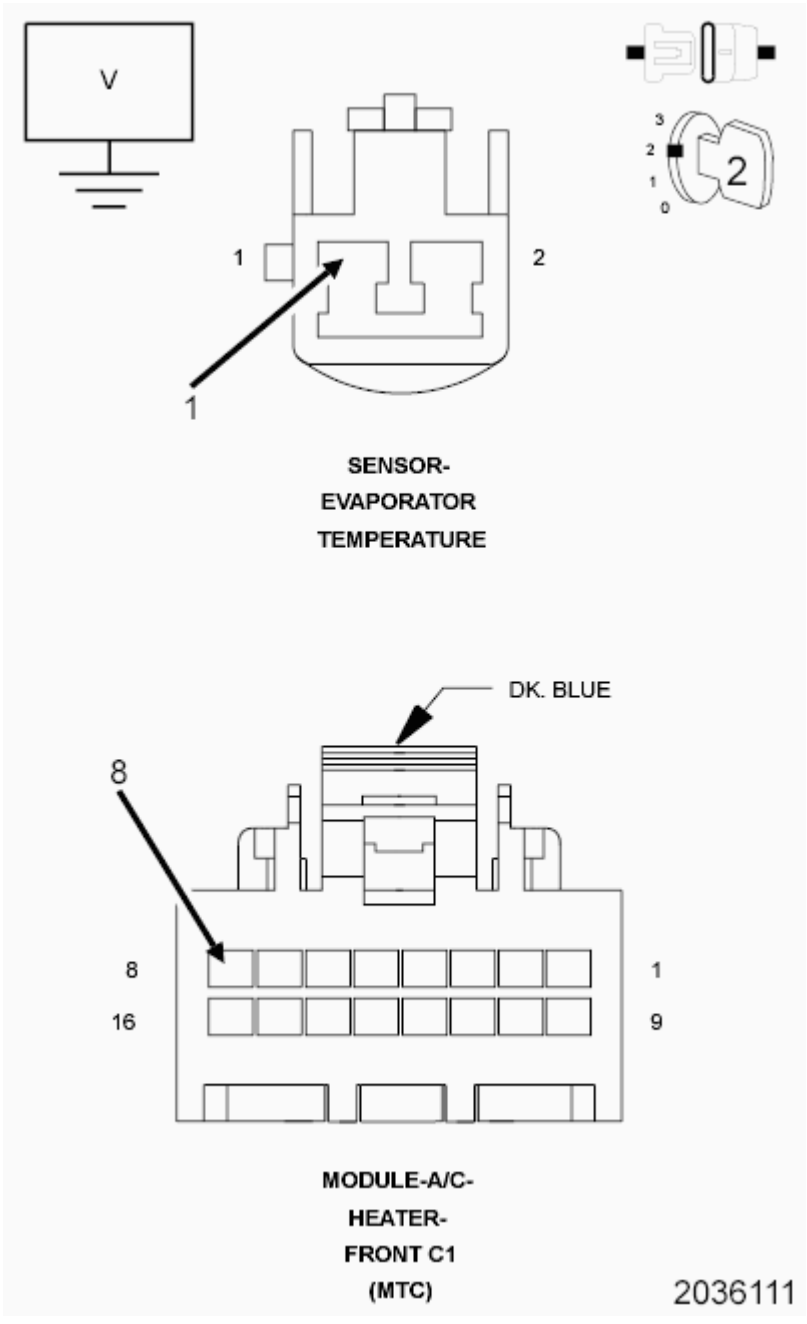


Fig. 64: Checking Evaporator Temperature Sensor Signal Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the jumper wire from the Evaporator Temperature Sensor harness connector.
3. Disconnect the A/C Heater Control C1 harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C21) Evaporator Temperature Sensor Signal circuit

Is there any voltage present?

Yes

- Repair the (C21) Evaporator Temperature Sensor Signal circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C21) EVAPORATOR TEMPERATURE SENSOR SIGNAL CIRCUIT FOR AN OPEN**

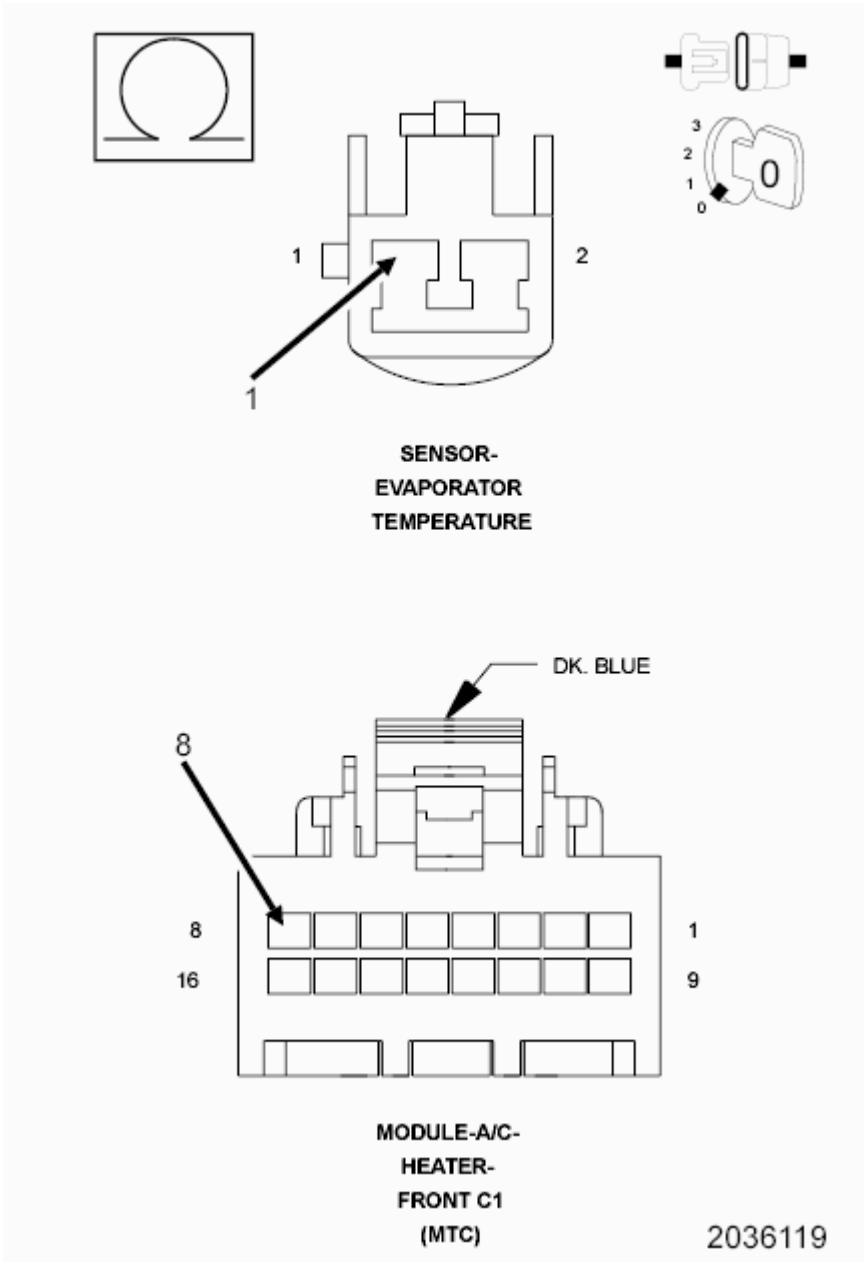


Fig. 65: Checking Evaporator Temperature Sensor Signal Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance of the (C21) Evaporator Temperature Sensor Signal circuit between the A/C Heater Control C1 harness connector and the Evaporator Temperature Sensor harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C21) Evaporator Temperature Sensor Signal circuit for an open or high

resistance.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (C121) SENSOR GROUND CIRCUIT FOR AN OPEN**

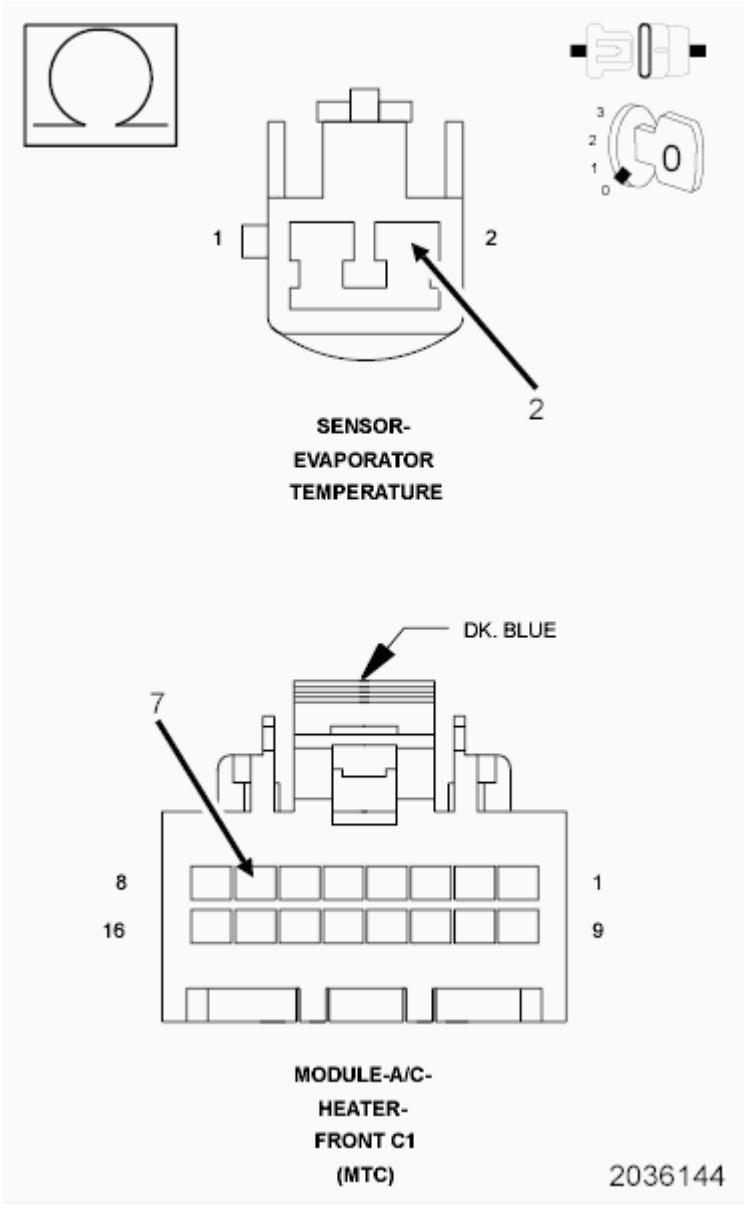


Fig. 66: Checking Sensor Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C121) Sensor Ground circuit between the A/C Heater Control C1

harness connector and the Evaporator Temperature Sensor harness connector.

Is the resistance above 1.0 Ohm?

Yes

- Repair the (C121) Sensor Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE EVAPORATOR TEMPERATURE SENSOR**
   1. Replace the Evaporator Temperature Sensor in Accordance with the Service Information.
   2. Cycle the ignition off for 30 seconds then back on.
   3. With the scan tool, read HVAC DTCs.

   Does this DTC reset?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1058-11-RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO GROUND

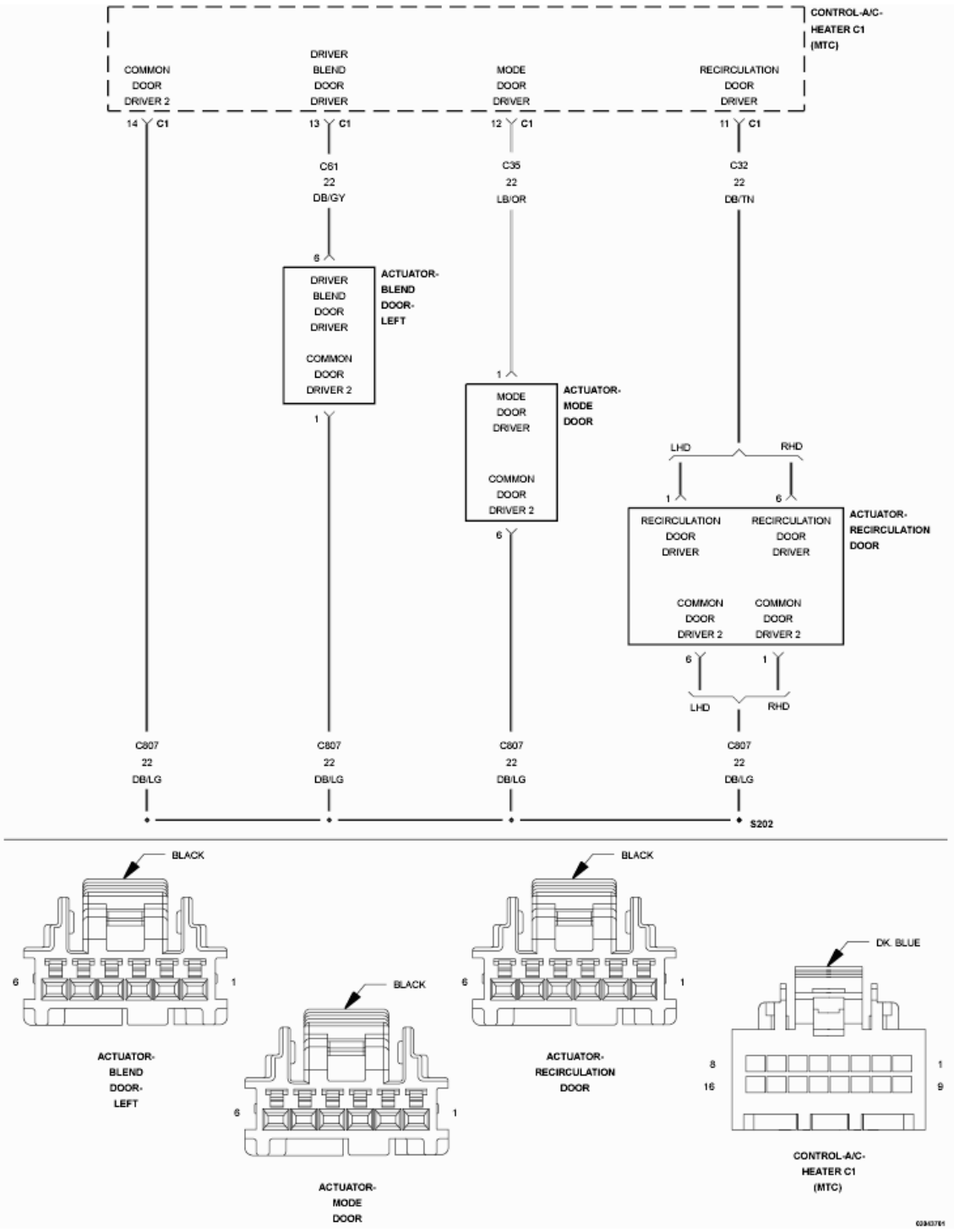


Fig. 67: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short to ground on the Recirculation Door Driver circuit. If the A/C Heater Control detects valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

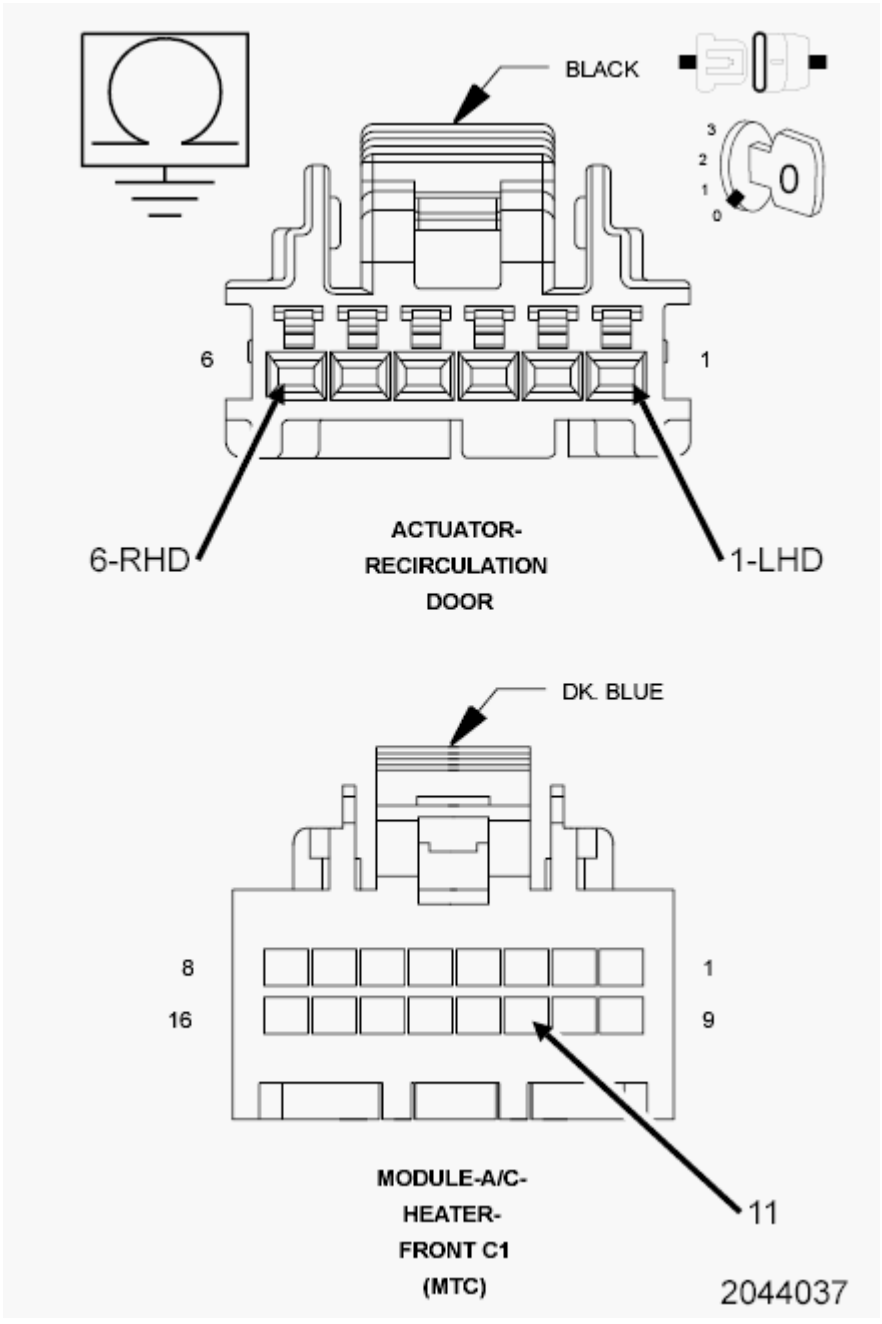


Fig. 68: Checking Recirculation Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Recirculation Door Actuator harness connector.
4. Measure the resistance between ground and the (C32) Recirculation Door Driver circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

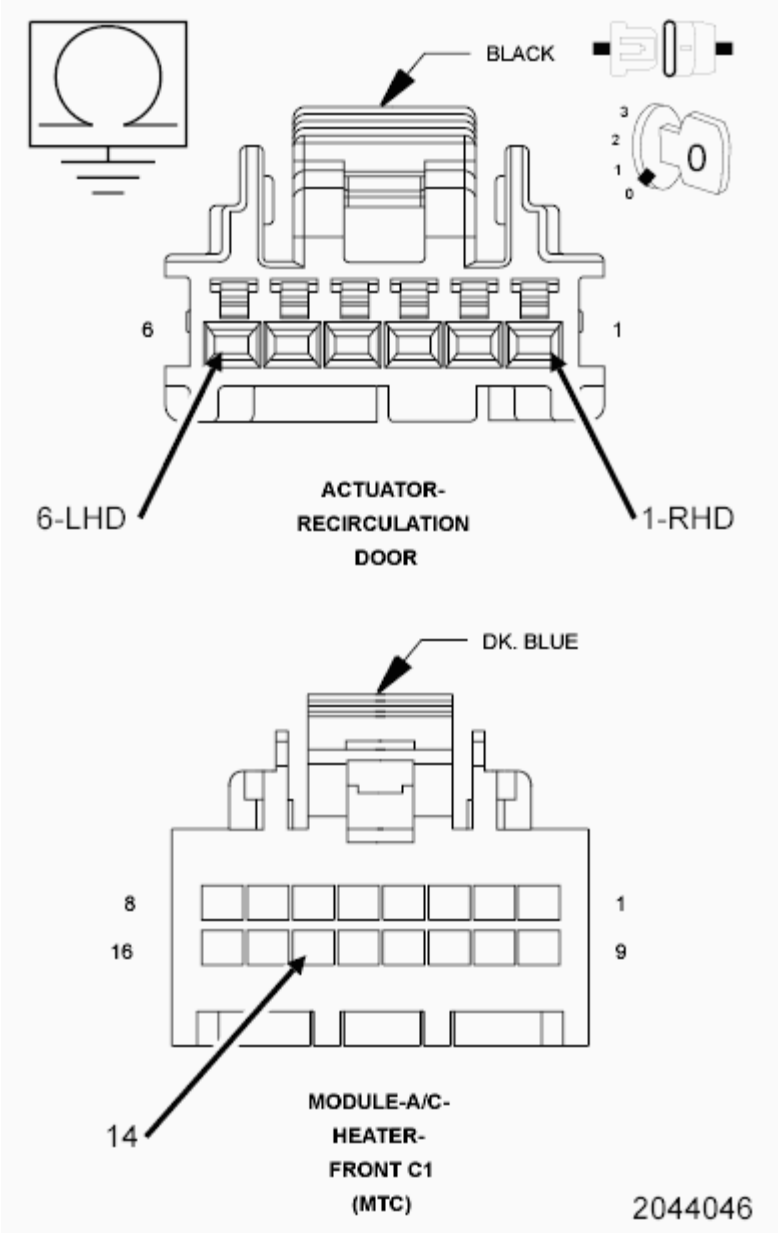


Fig. 69: Checking Common Door Driver 2 Circuit For A Short To Ground

Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1058-12-RECIRCULATION DOOR CONTROL - CIRCUIT SHORT TO BATTERY

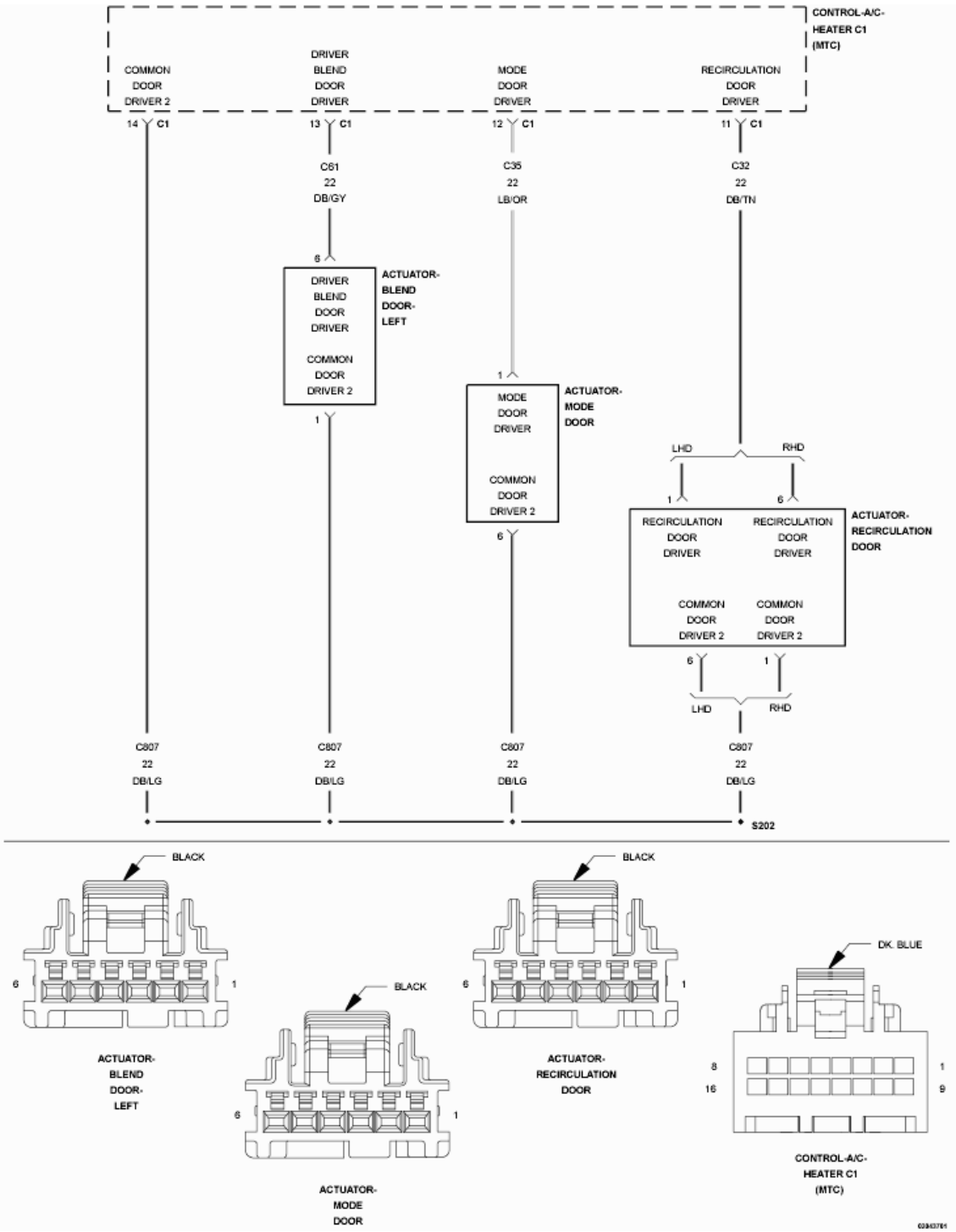


Fig. 70: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short voltage on the Recirculation Door control circuit. If the A/C Heater Control detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

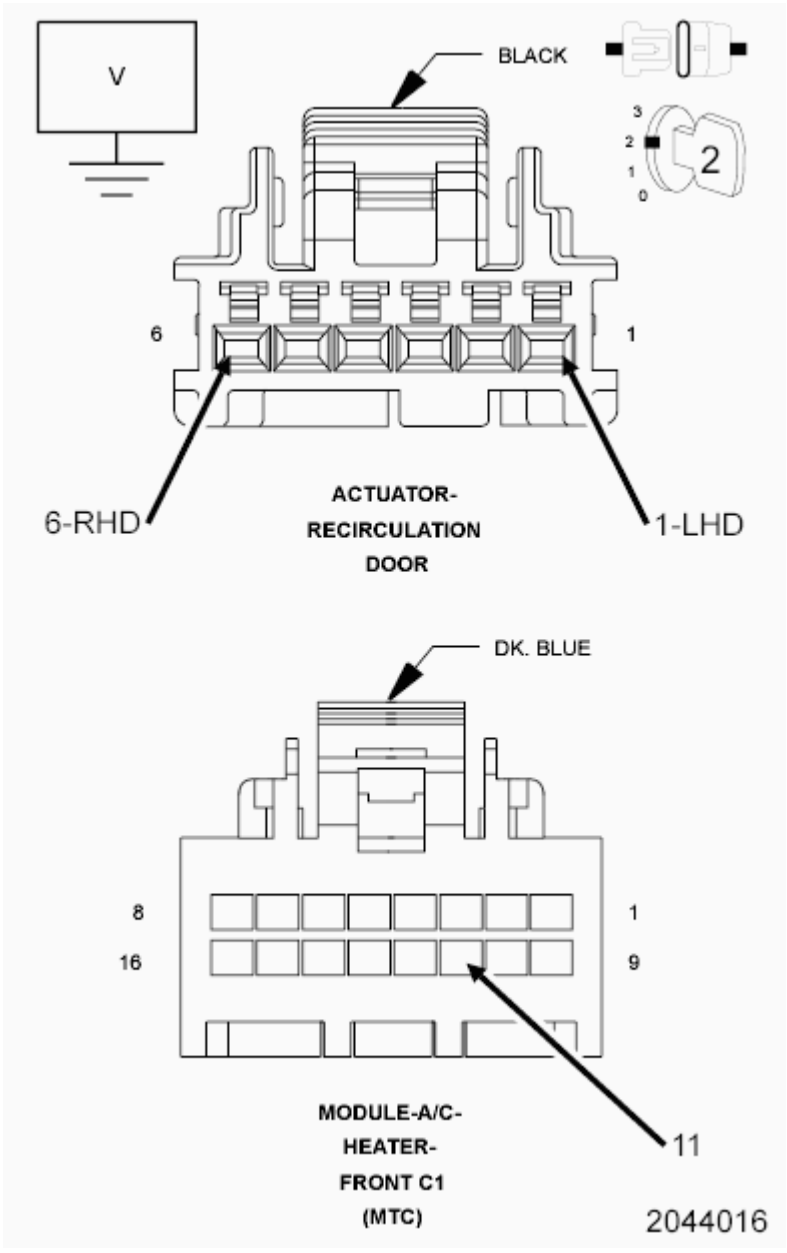


Fig. 71: Checking Recirculation Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Recirculation Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C32) Recirculation Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

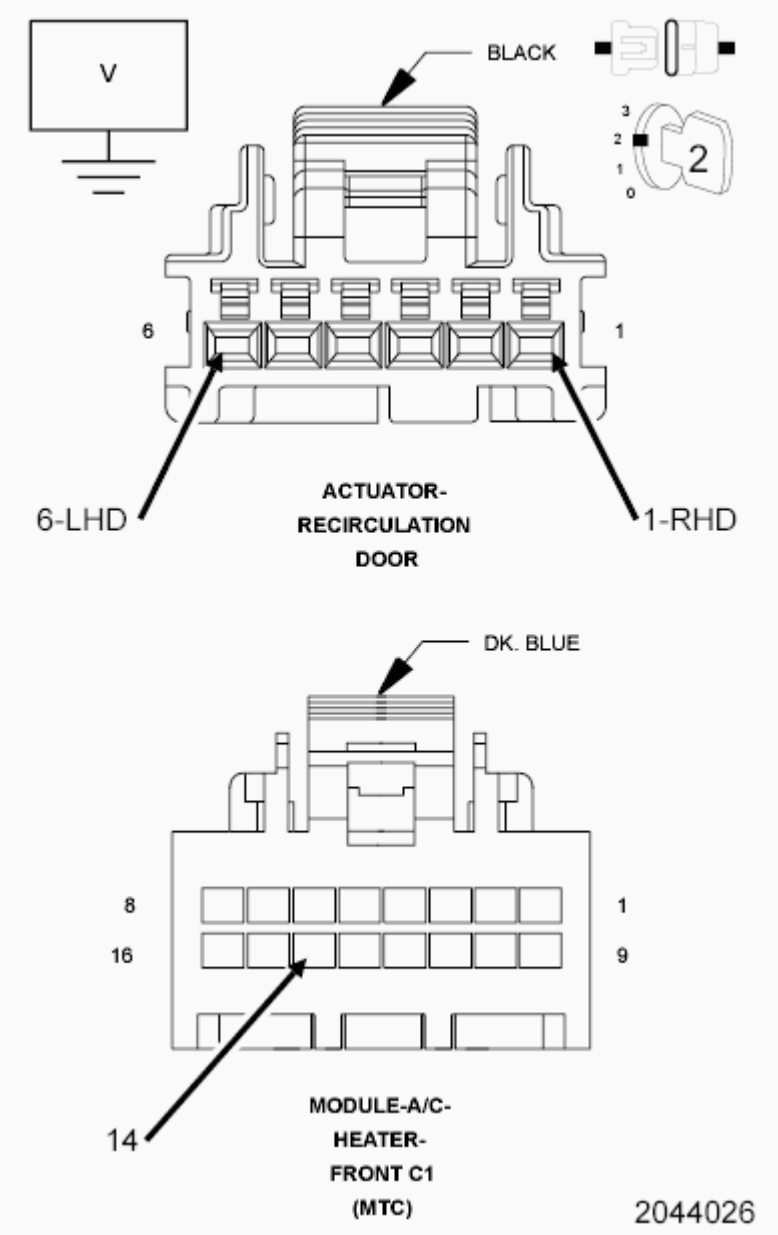


Fig. 72: Checking Common Door Driver 2 Circuit For A Short To Voltage

Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Turn the ignition off to the lock position.
   2. Replace the Recirculation Door Actuator in accordance with the Service Information.
   3. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B1058-13-RECIRCULATION DOOR CONTROL - CIRCUIT OPEN

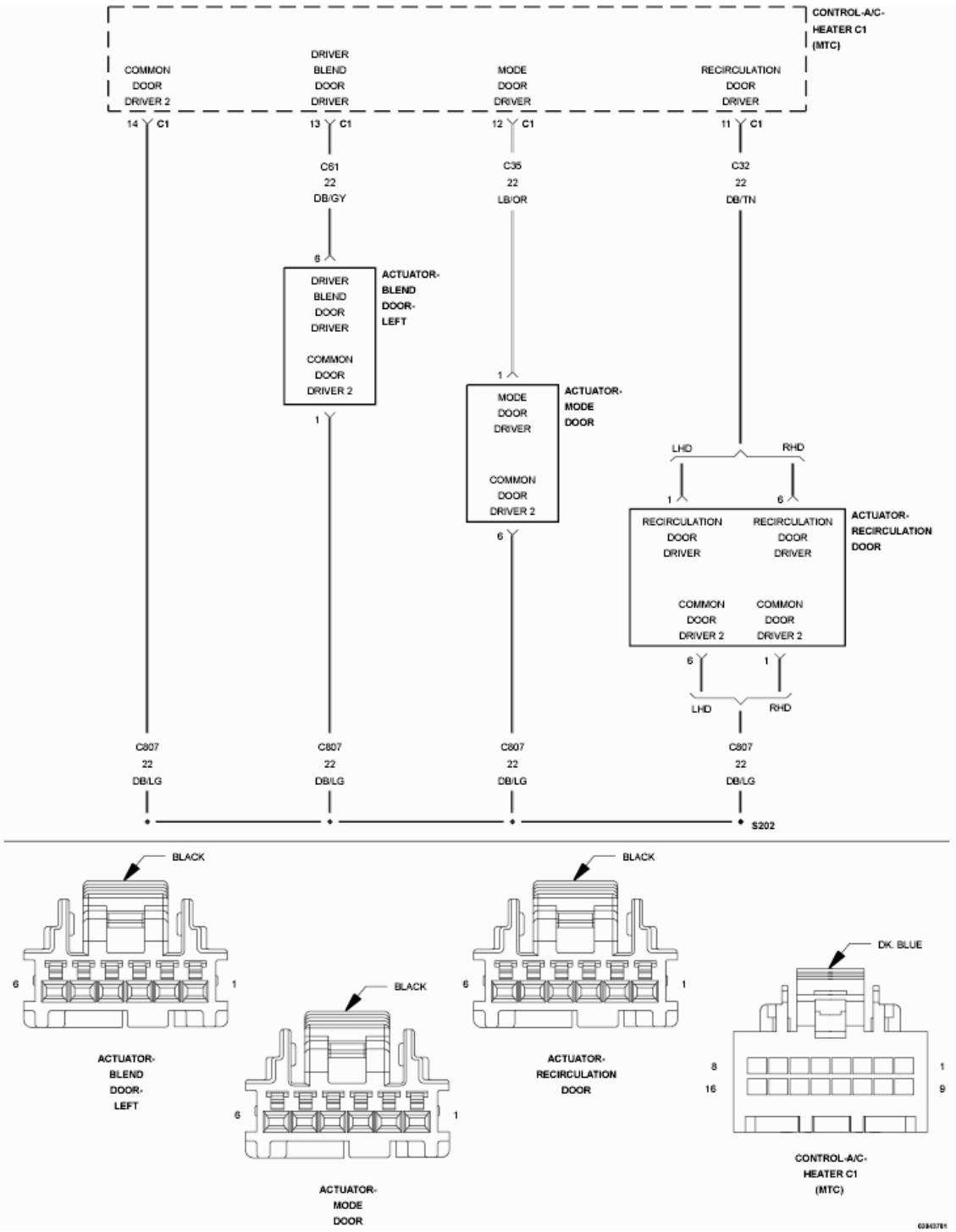


Fig. 73: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects an open in the Recirculation Door control circuit. If the A/C Heater Control detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE RECIRCULATION DOOR ACTUATOR**

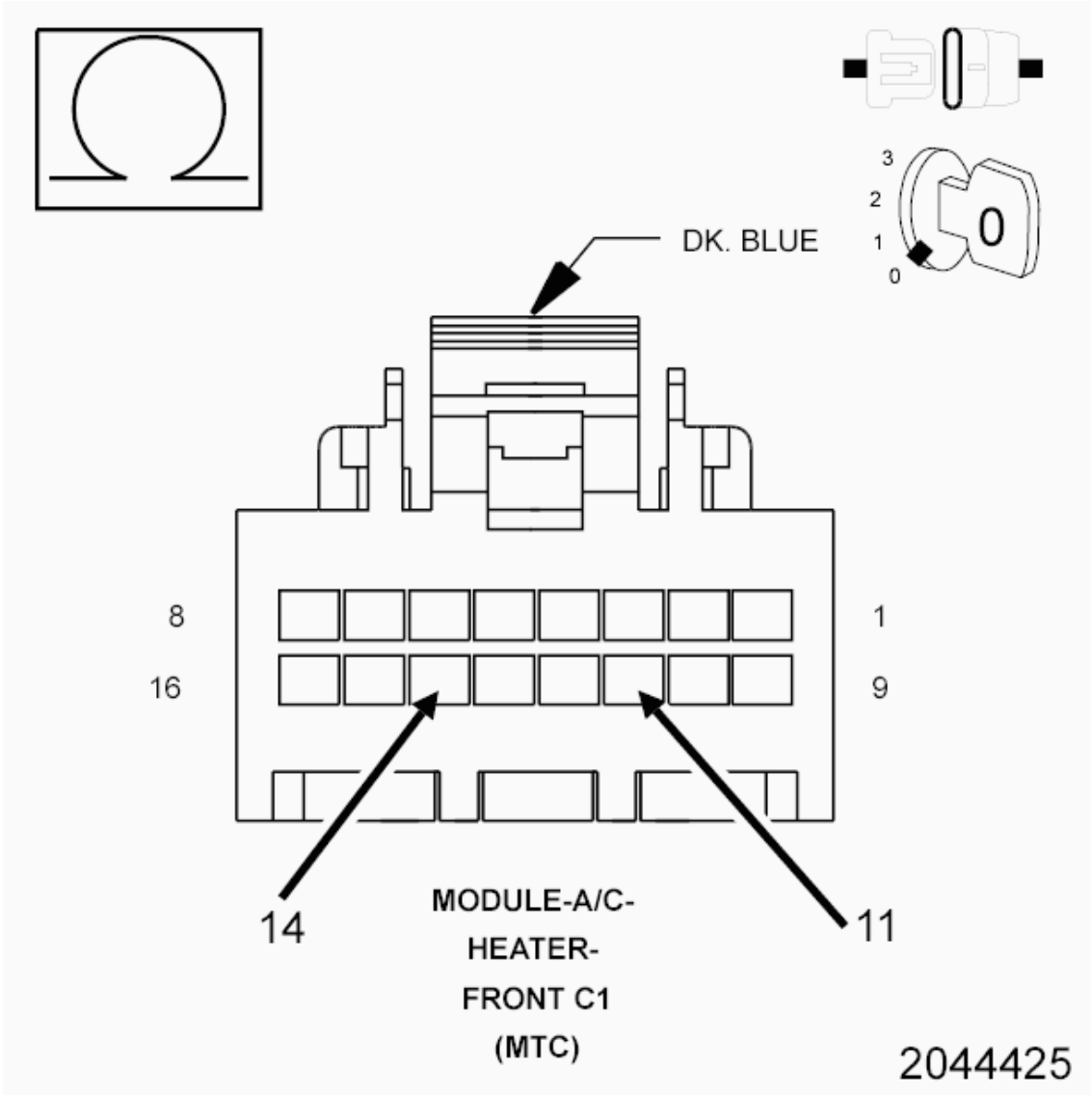


Fig. 74: Checking Recirculation Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C32) Recirculation Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR AN OPEN**

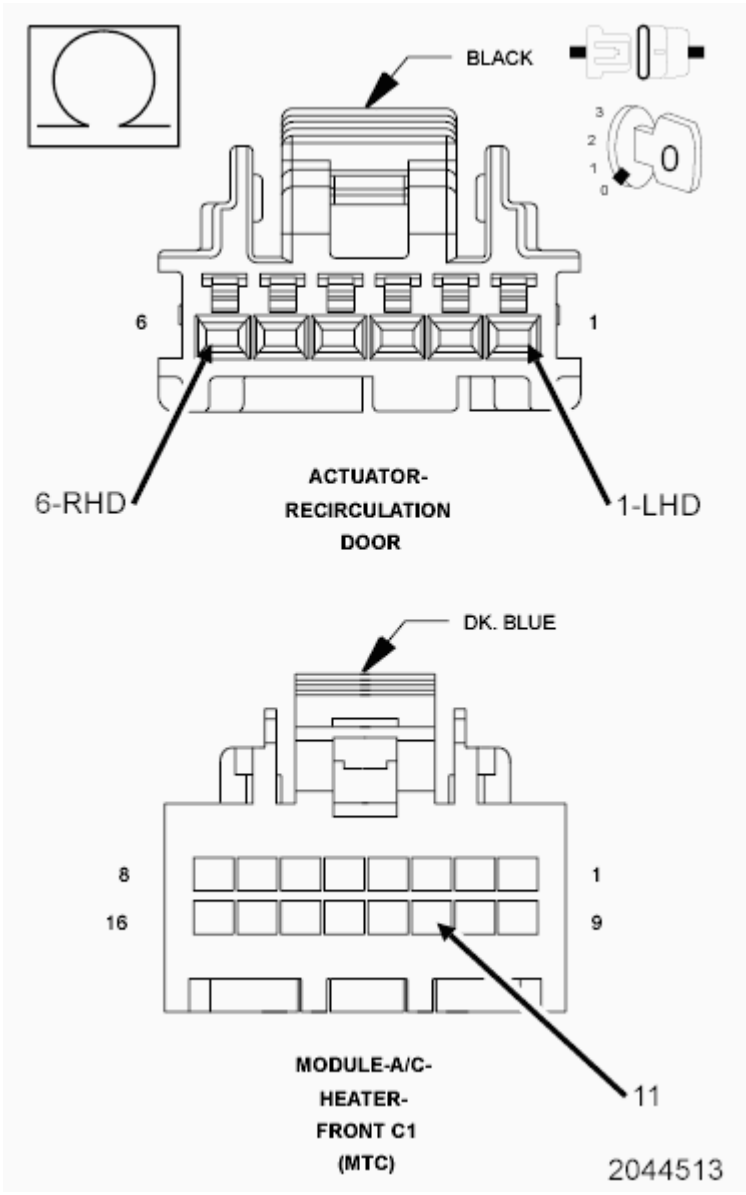


Fig. 75: Checking Recirculation Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Recirculation Door Actuator harness connector.
3. Measure the resistance of the (C32) Recirculation Door Driver circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C32) Recirculation Door Driver circuit for an open or high resistance.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

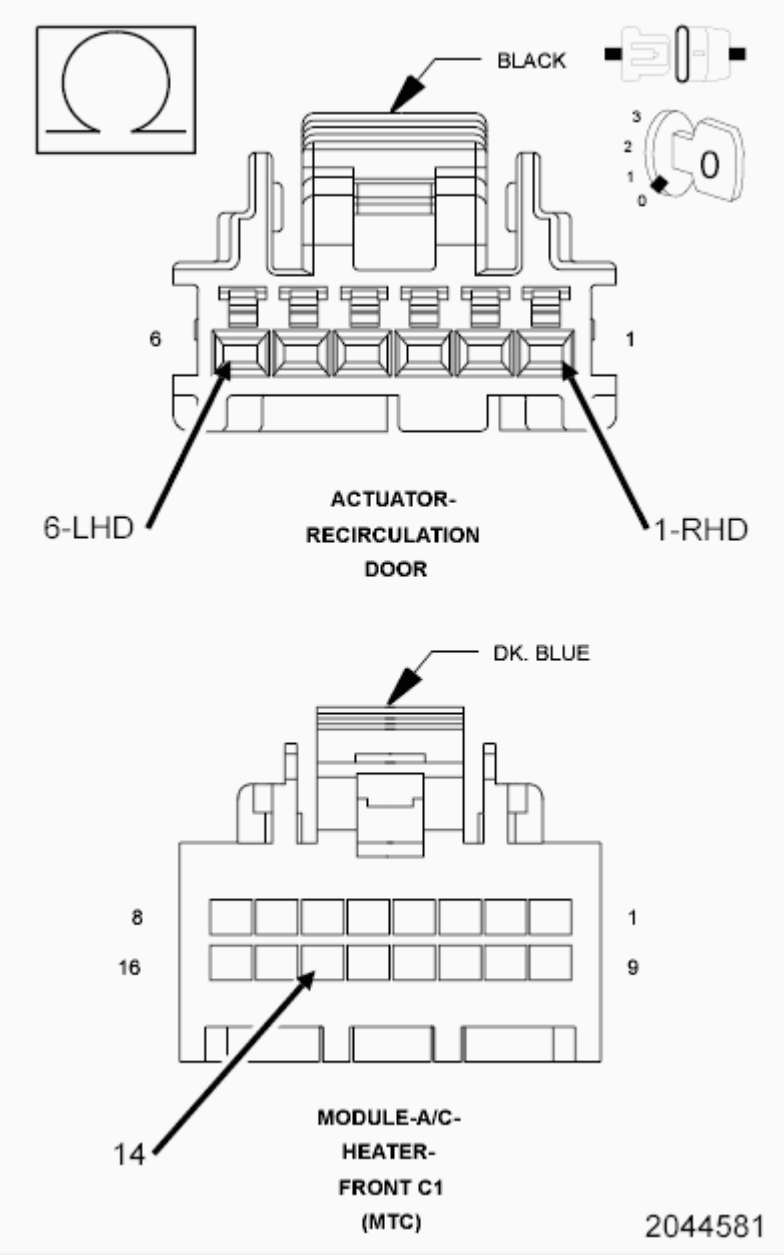


Fig. 76: Checking Common Door Driver 2 Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Recirculation Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Replace the Recirculation Door Actuator in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B1058-92-RECIRCULATION DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION

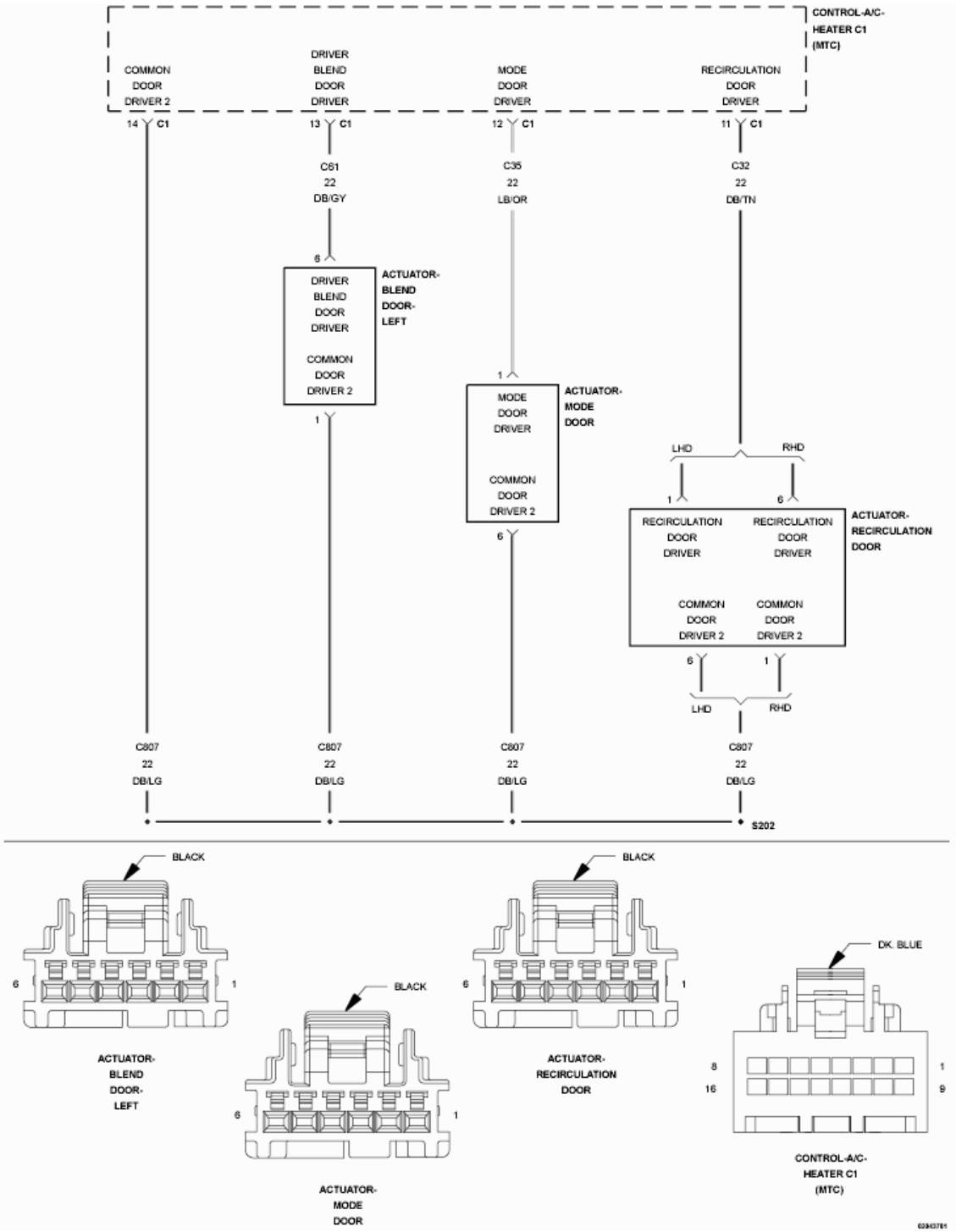


Fig. 77: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and no feedback pulses are detected in either clockwise or counterclockwise movement for the period of 15 seconds. If the A/C Heater Control detects valid feedback pulses for 15 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C32) RECIRCULATION DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

No

- Go to step 9

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. Using the scan tool, perform the HVAC Actuator Calibration Test.

      Did any other HVAC DTCs set while performing the Actuator Calibration Test?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 3

3. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

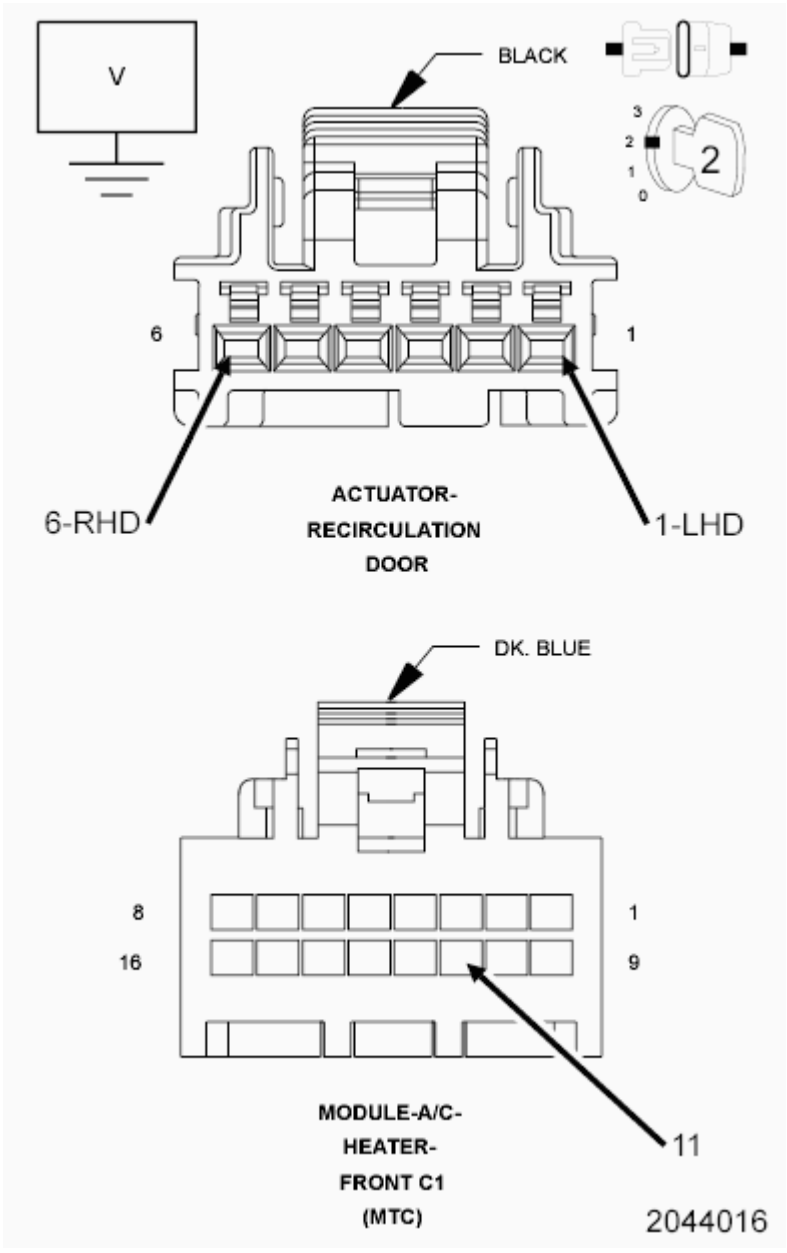


Fig. 78: Checking Recirculation Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Recirculation Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C32) Recirculation Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

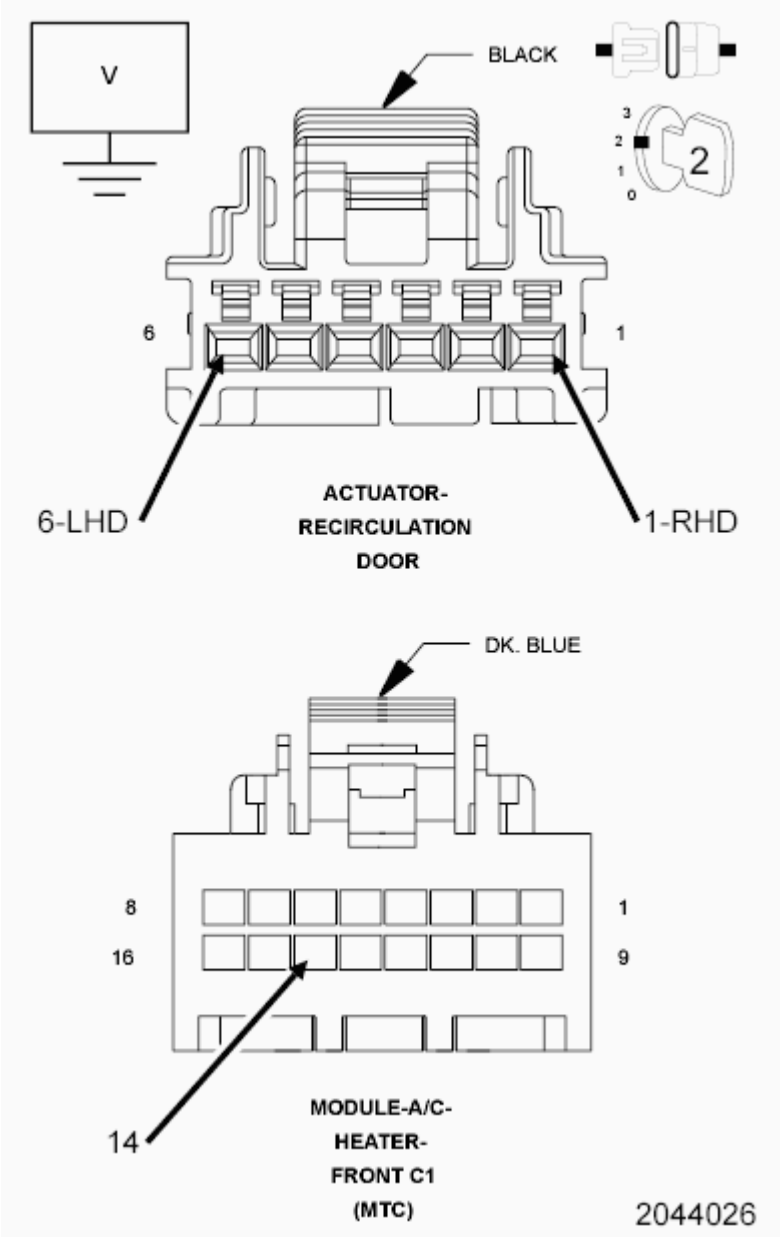


Fig. 79: Checking Common Door Driver 2 Circuit For A Short To Voltage

Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (C32) RECIRCULATION DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

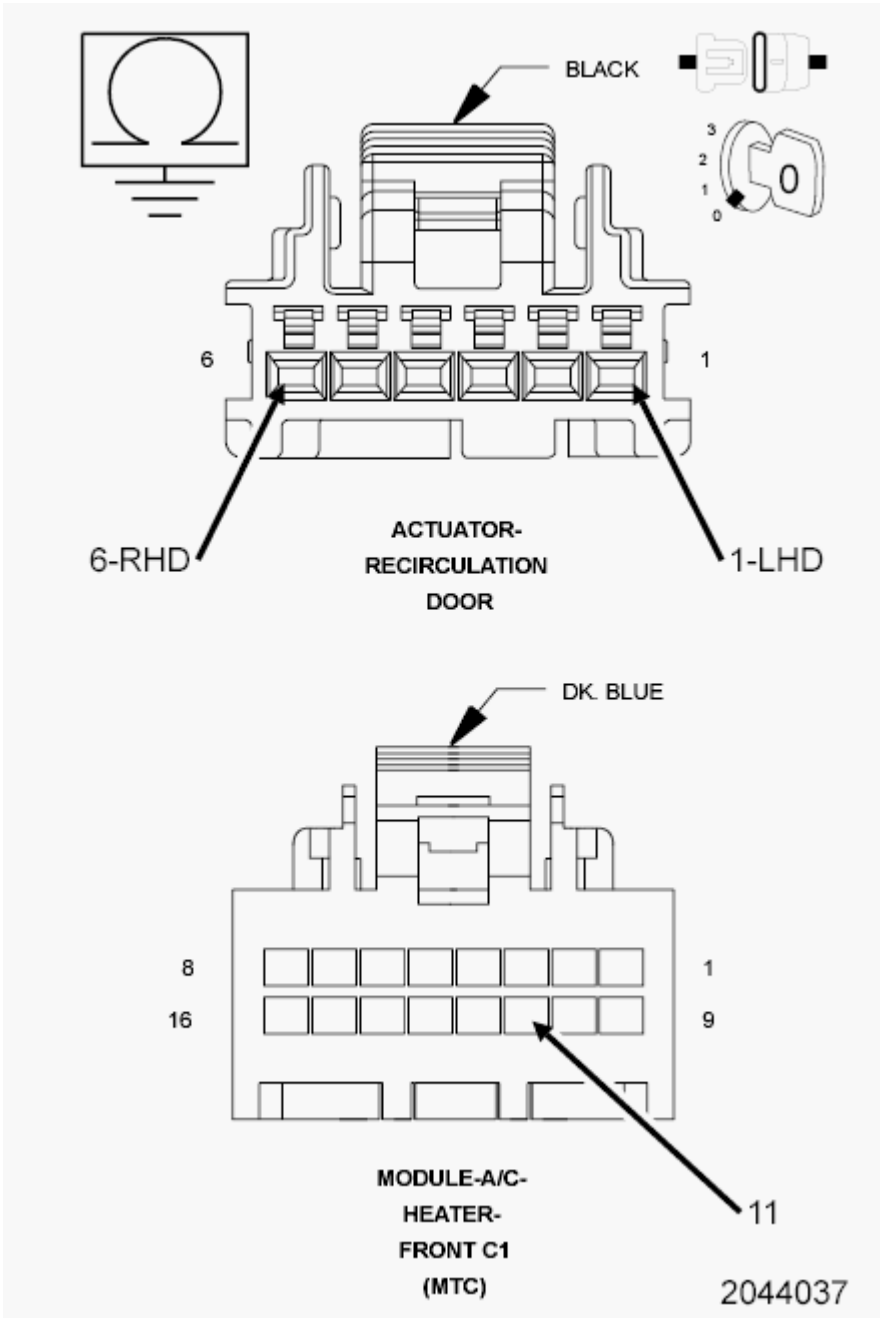


Fig. 80: Checking Recirculation Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C32) Recirculation Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C32) Recirculation Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

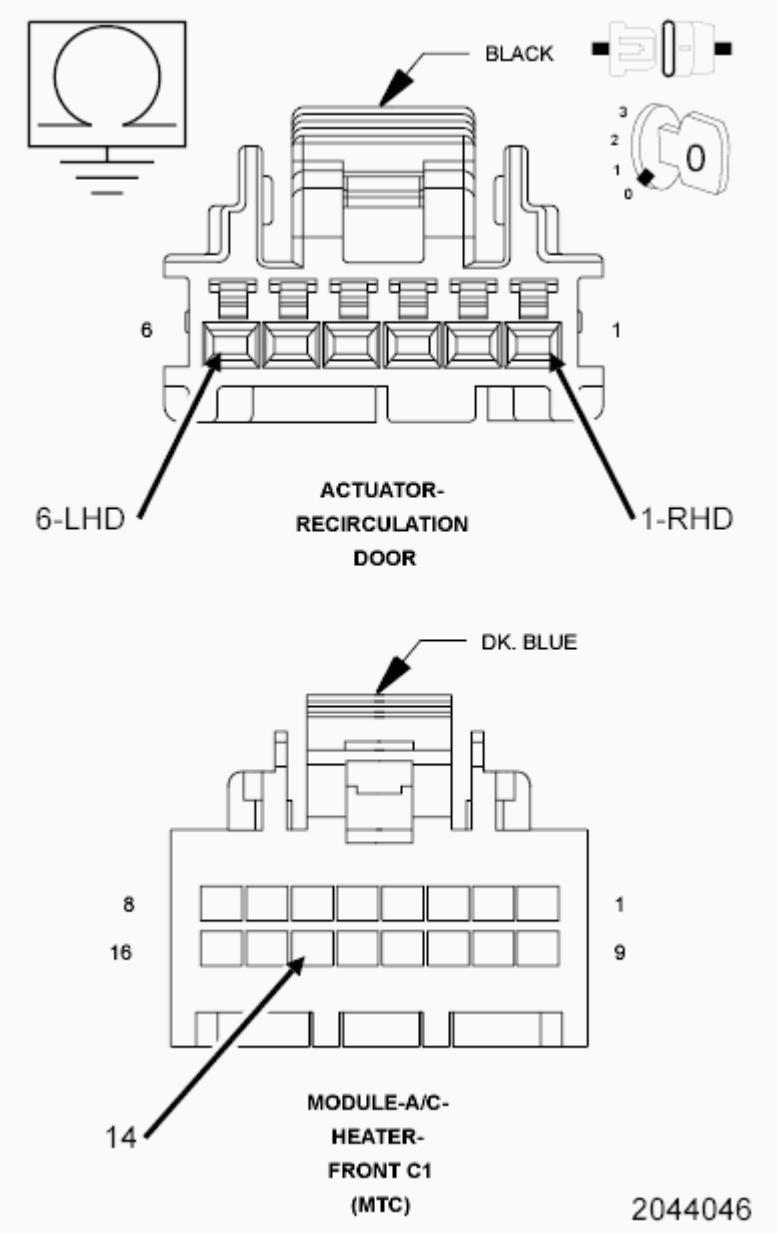


Fig. 81: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B105C-00-RECIRCULATION DOOR TRAVEL RANGE TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will

change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR BINDING
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. Using the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

    Yes

    - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

    No

    - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. Using the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration

Test?

Yes

- Go to step 4

No

- Go to step 6

4. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs.
   3. Using the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC reset during HVAC Actuator Calibration Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**

1. The conditions necessary to set the DTC are not present at this time.
2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B105D-00-RECIRCULATION DOOR TRAVEL RANGE TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
RECIRCULATION DOOR STOPS
RECIRCULATION DOOR
RECIRCULATION DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

       Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

       Yes

       - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

       No

       - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

       Is this DTC active?

       Yes

       - Go to step 4

       No

       - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 4

No

- Go to step 6

4. **CHECK THE RECIRCULATION DOOR**
   1. Remove the Recirculation Door Actuator and check the Recirculation Door stops, linkage (stripped or cracked) and door.

      Were there any problems found?

      Yes

      - Repair or replace the Recirculation Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5

5. **CHECK THE RECIRCULATION DOOR ACTUATOR**
   1. Replace the Recirculation Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.

3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B10B2-00-A/C COOL DOWN TEST PERFORMANCE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Controller has software to enable it to perform an A/C Cool Down Test by a command using a scan tool. This test checks for evaporator temperature drop over a predetermined time. If the test fails, this DTC will set. However, certain test conditions are required to perform this test. Failure to run this test within those parameters can result in failure of the test.

- **When Monitored:**

  With ever an A/C Cool Down Test is performed.

- **Set Condition:**

  This DTC is set whenever the A/C Cool Down Test is performed and the desired temperature drop is not achieved by the system. The DTC will go to stored after a successful A/C Cool Down Test.

Possible Causes
A/C SYSTEM WORKING IMPROPERLY

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CONDITIONS FOR A/C COOL DOWN TEST**

1. The following condition must be met before running the A/C Cool Down test.
   - No Powertrain Control Module (PCM) DTCs present.
   - No Communication DTCs present.
   - Condenser cooling fan working properly.
   - No active HVAC evaporator temperature sensor, sun sensor, recirculation, mode, or blend door actuator DTCs present.
   - The refrigerant system must be fully charged.
   - The blower motor must operate correctly in all speeds.
   - The evaporator temperature must be above 12.7° C (55° F).
   - The A/C compressor must be turned off.
   - Blower must be on high.

B11C2-11-FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO GROUND

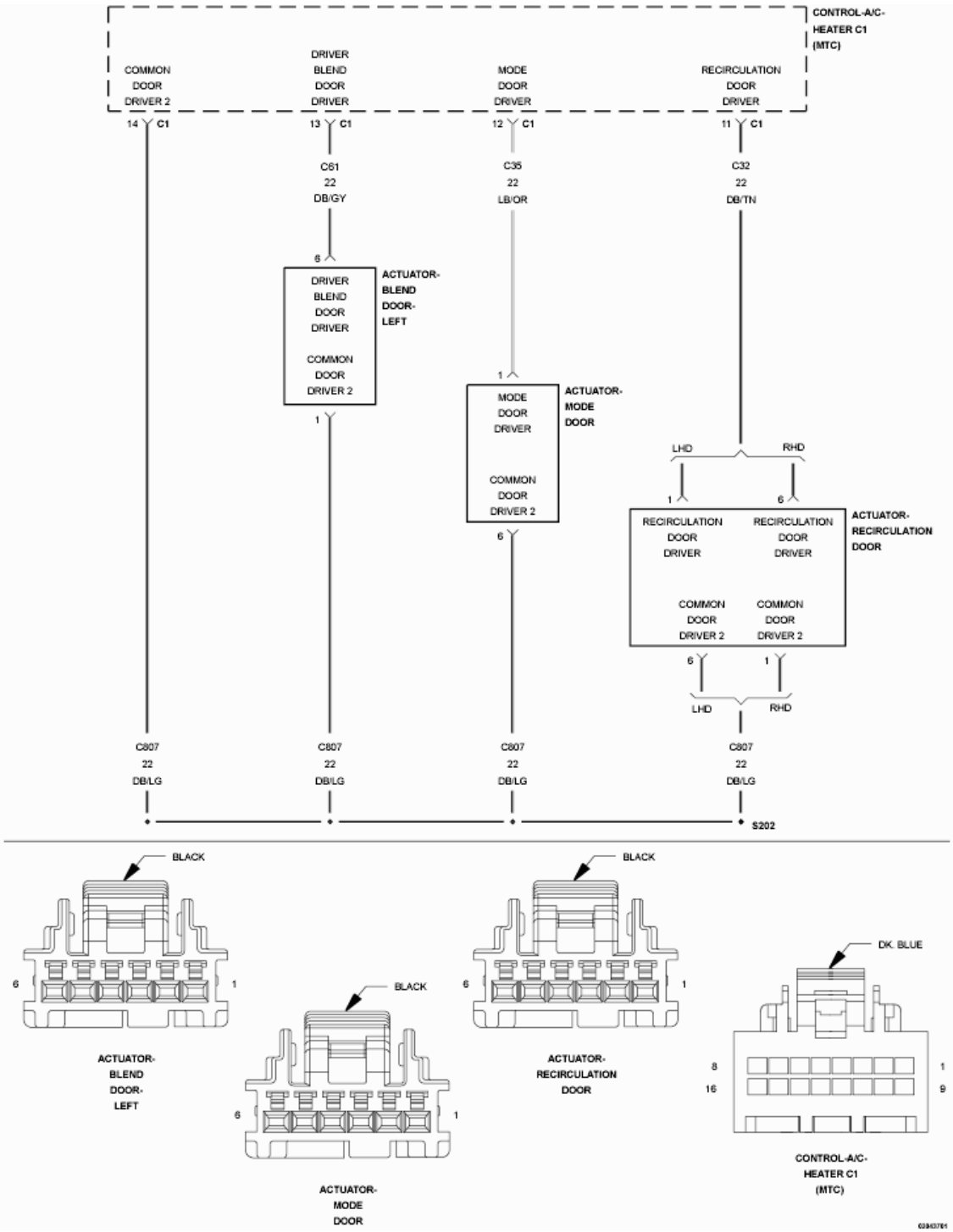


Fig. 82: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short to ground on the Mode Door control circuit. If the A/C Heater Control detects valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

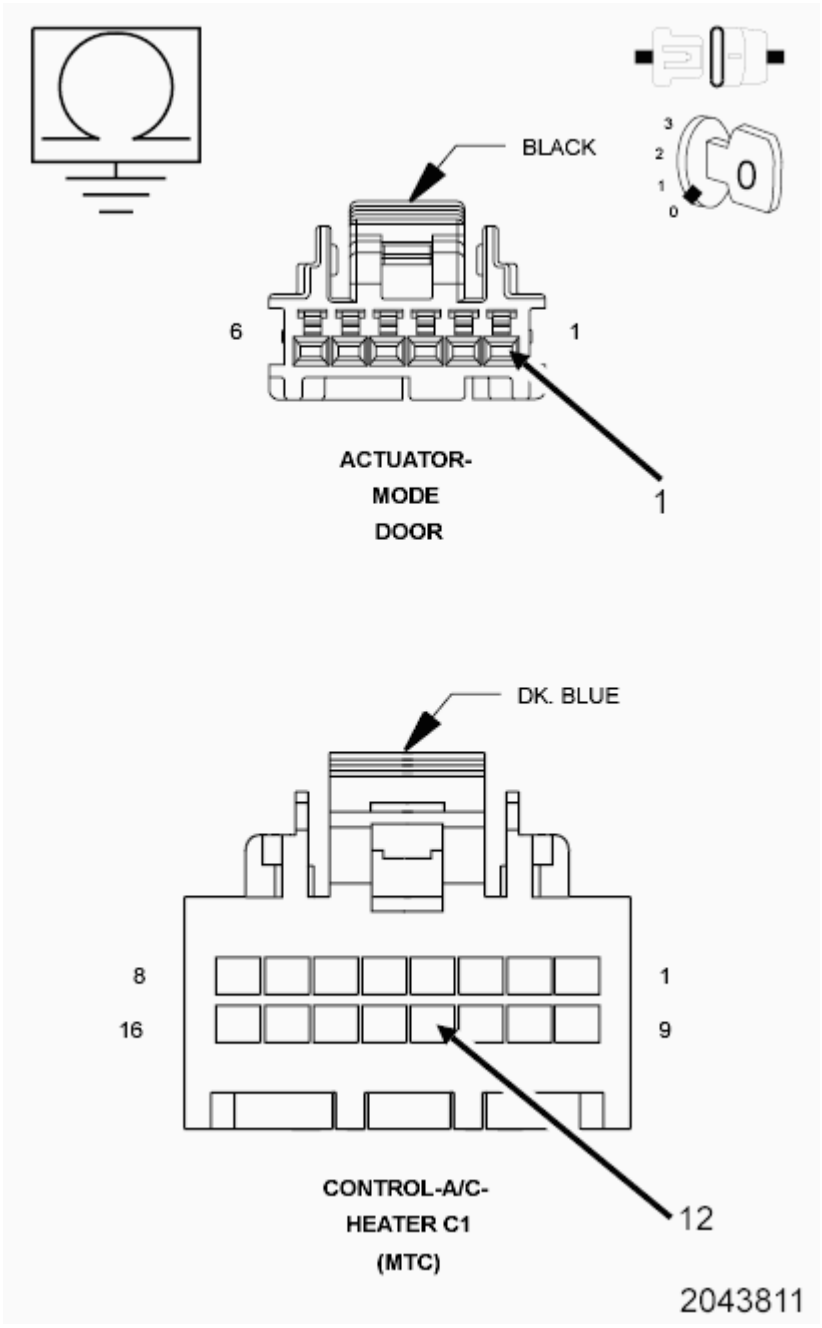


Fig. 83: Checking Mode Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Mode Door Actuator harness connector.
4. Measure the resistance between ground and the (C35) Mode Door Driver circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (C35) Mode Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

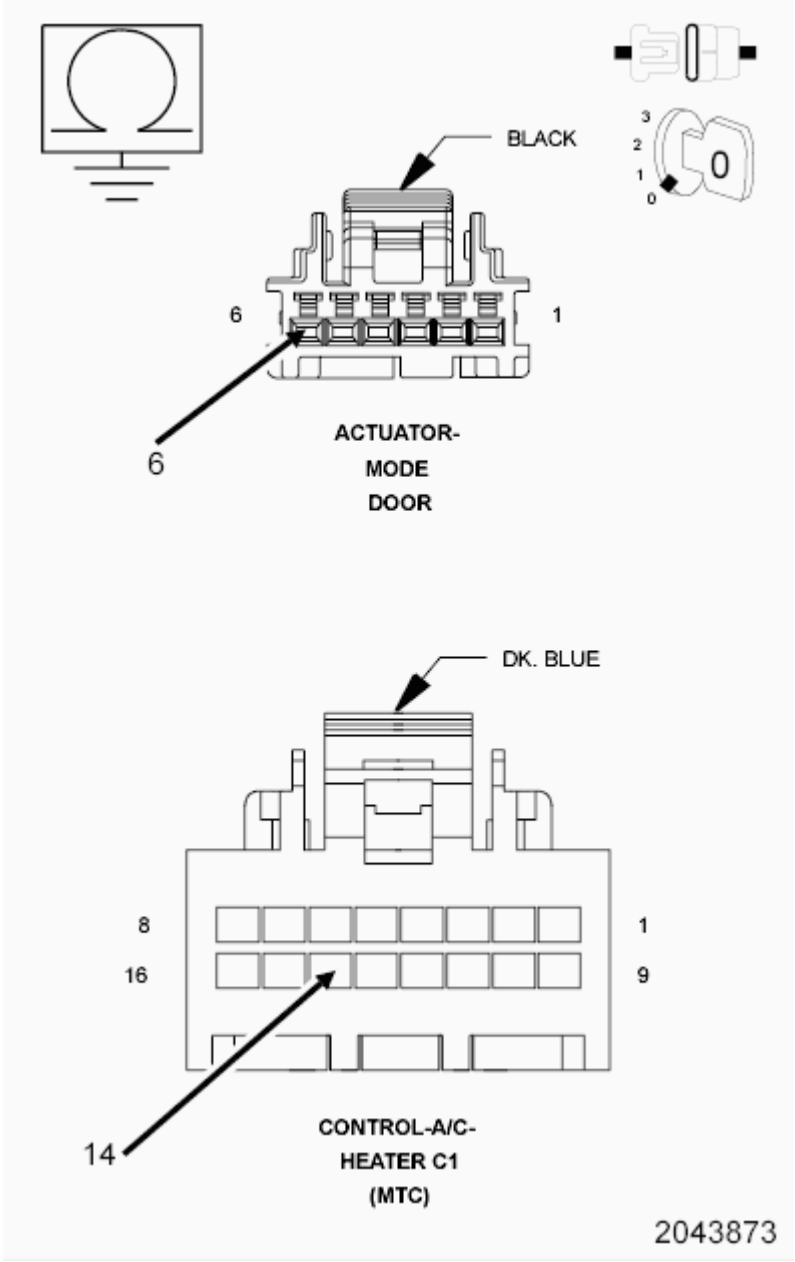


Fig. 84: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B11C2-12-FRONT MODE DOOR 1 CONTROL - CIRCUIT SHORT TO BATTERY

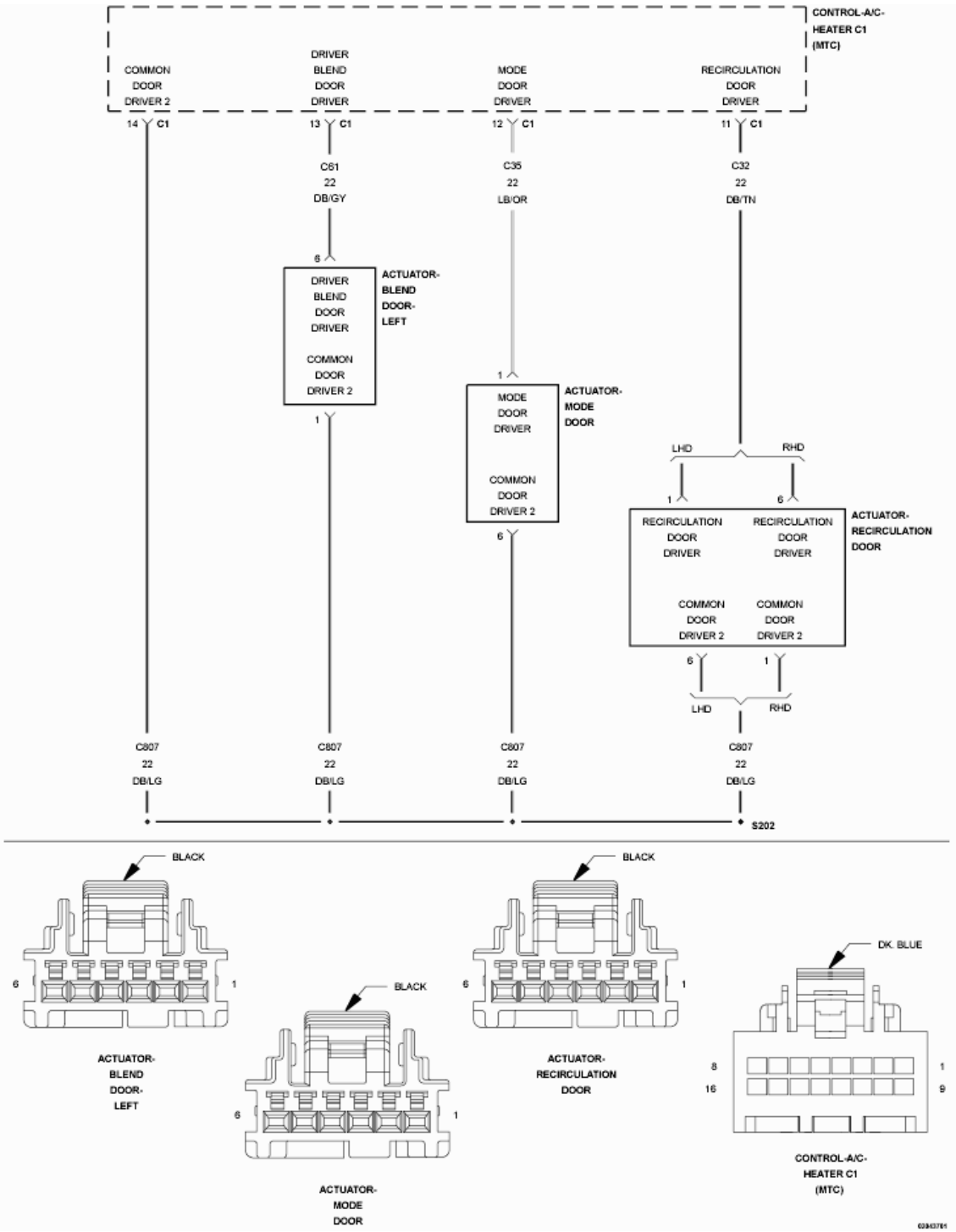


Fig. 85: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short voltage on the Mode Door control circuit. If the A/C Heater Control detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

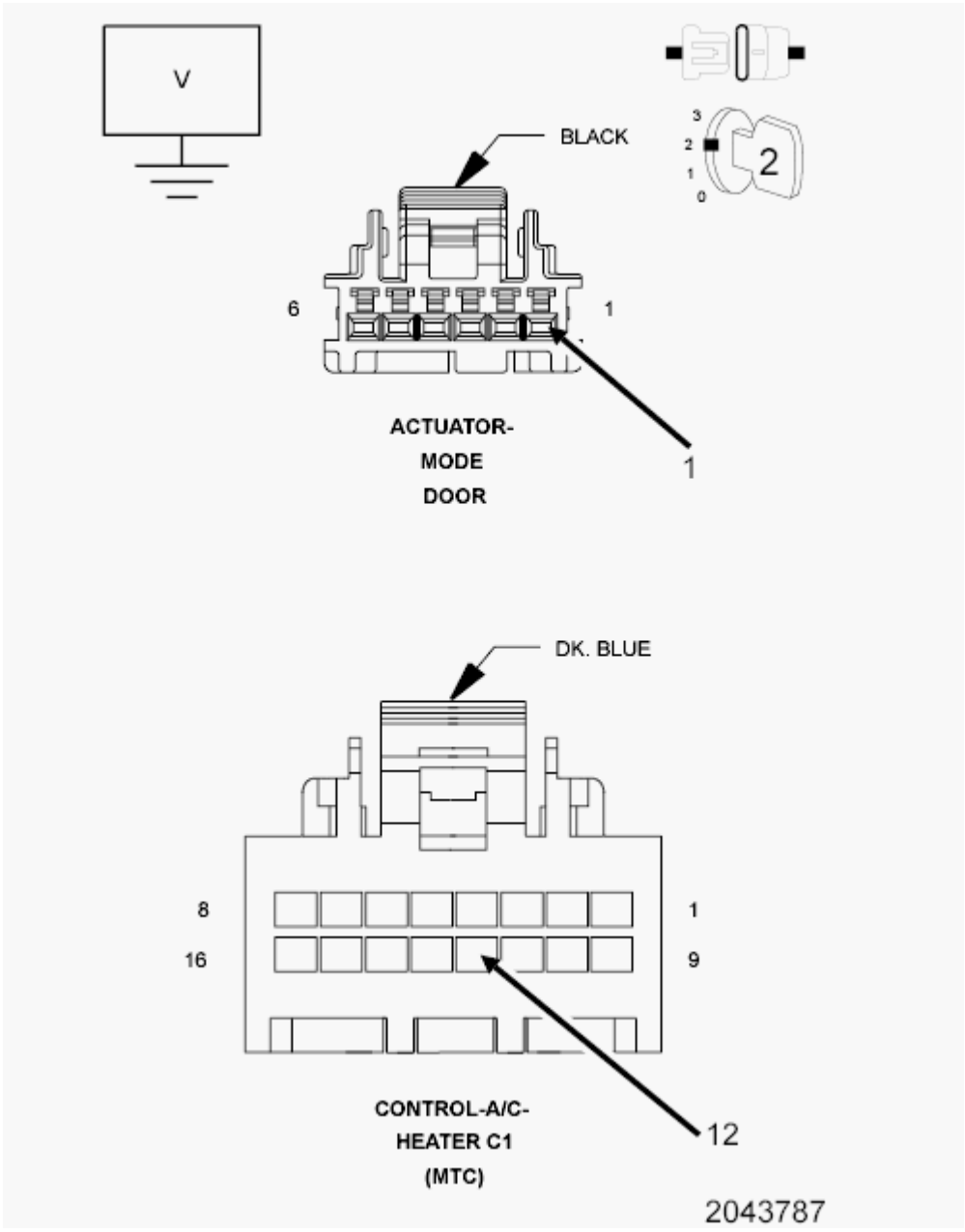


Fig. 86: Checking Mode Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Mode Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C35) Mode Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C35) Mode Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

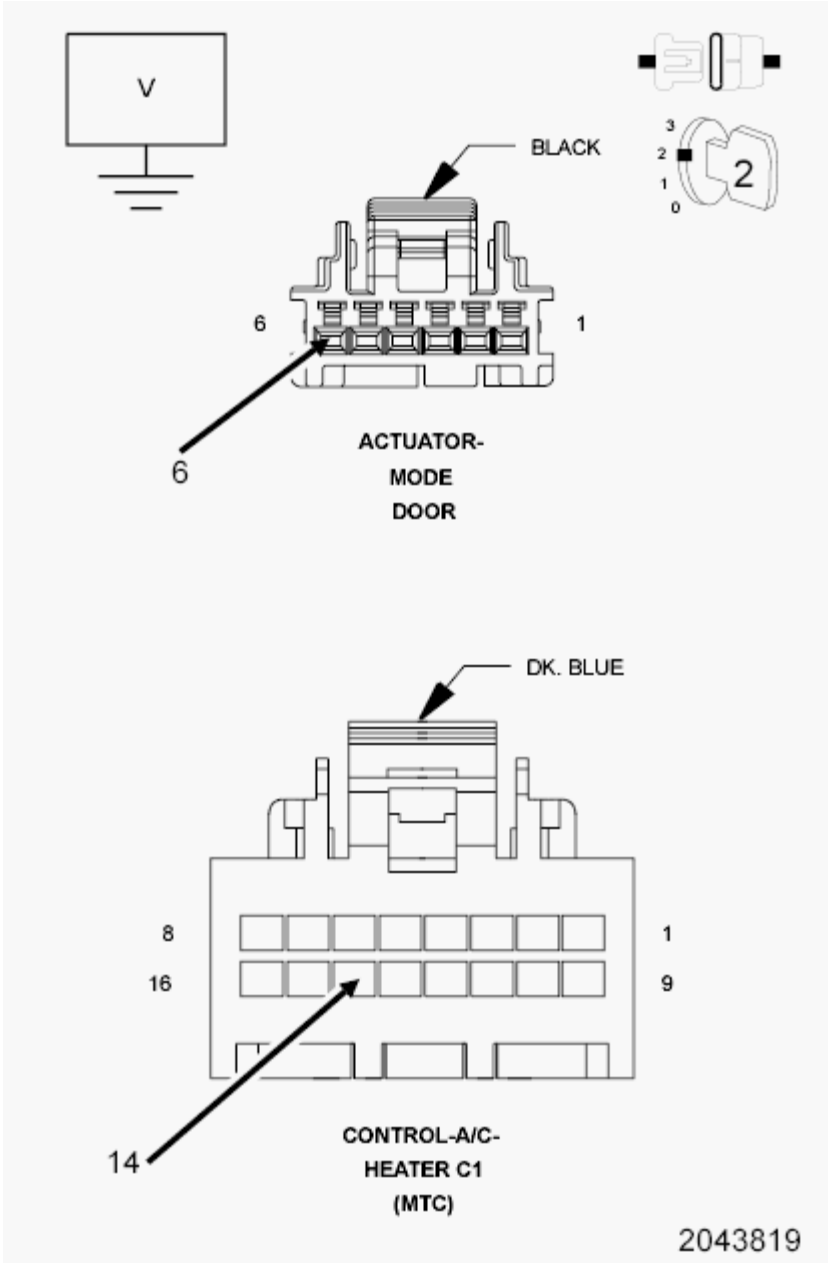


Fig. 87: Checking Common Door Driver 2 Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE MODE DOOR ACTUATOR**
   1. Turn the ignition off to the lock position.
   2. Replace the Mode Door Actuator in accordance with the Service Information.
   3. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B11C2-13-FRONT MODE DOOR 1 CONTROL - CIRCUIT OPEN

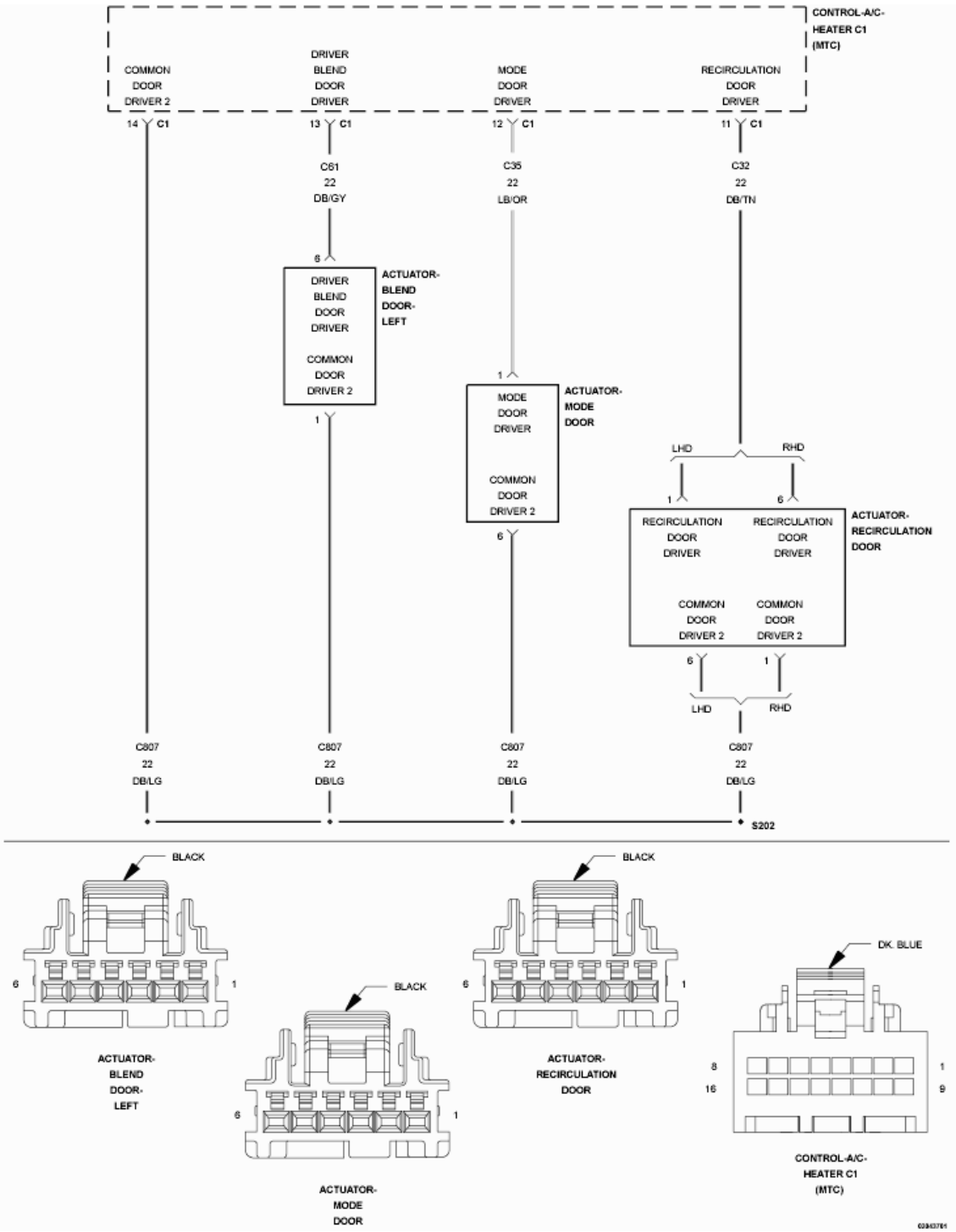


Fig. 88: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects an open in the Mode Door control circuit. If the A/C Heater Control detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. With the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE MODE DOOR ACTUATOR**

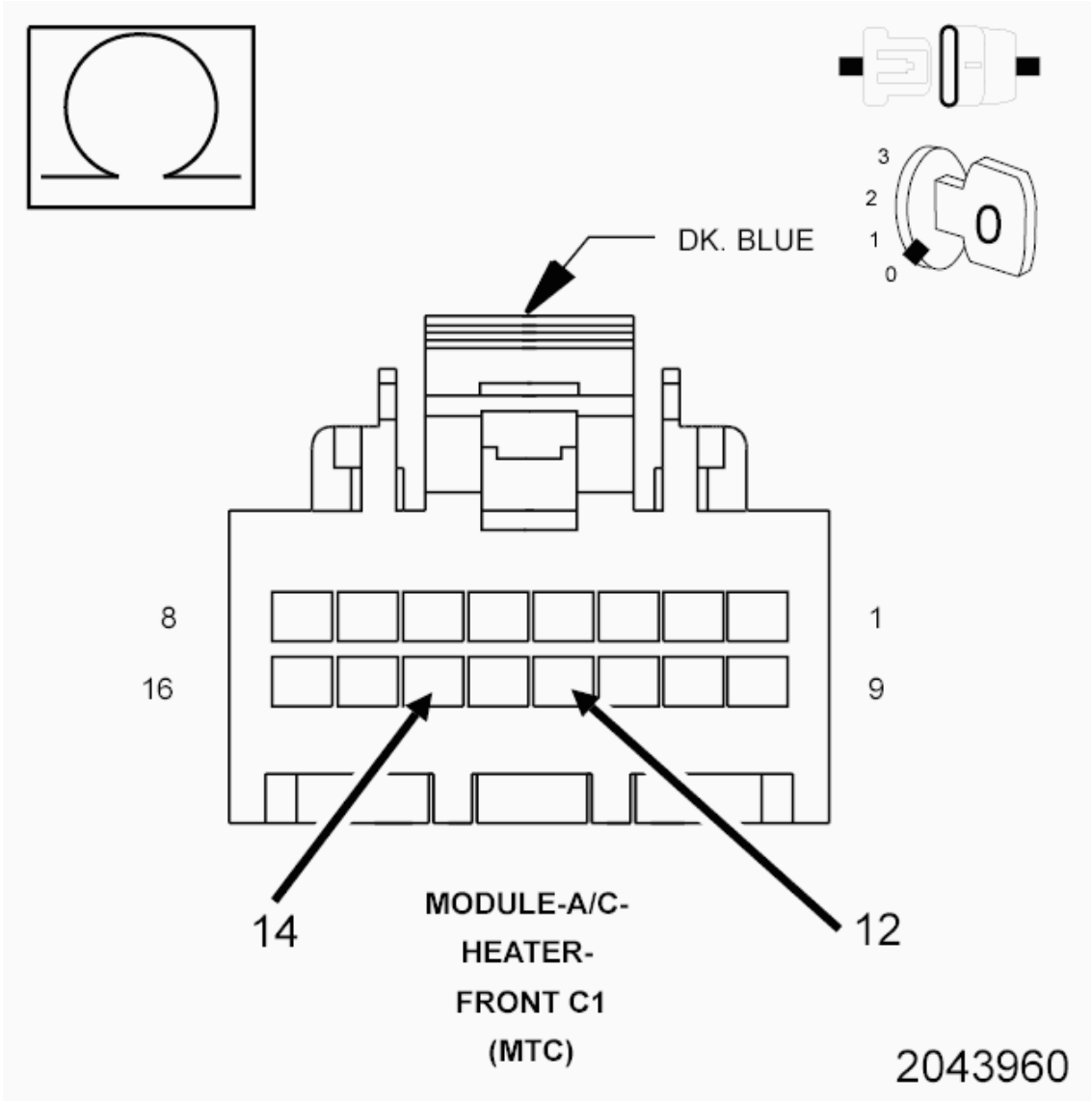


Fig. 89: Checking Mode Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C35) Mode Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR AN OPEN**

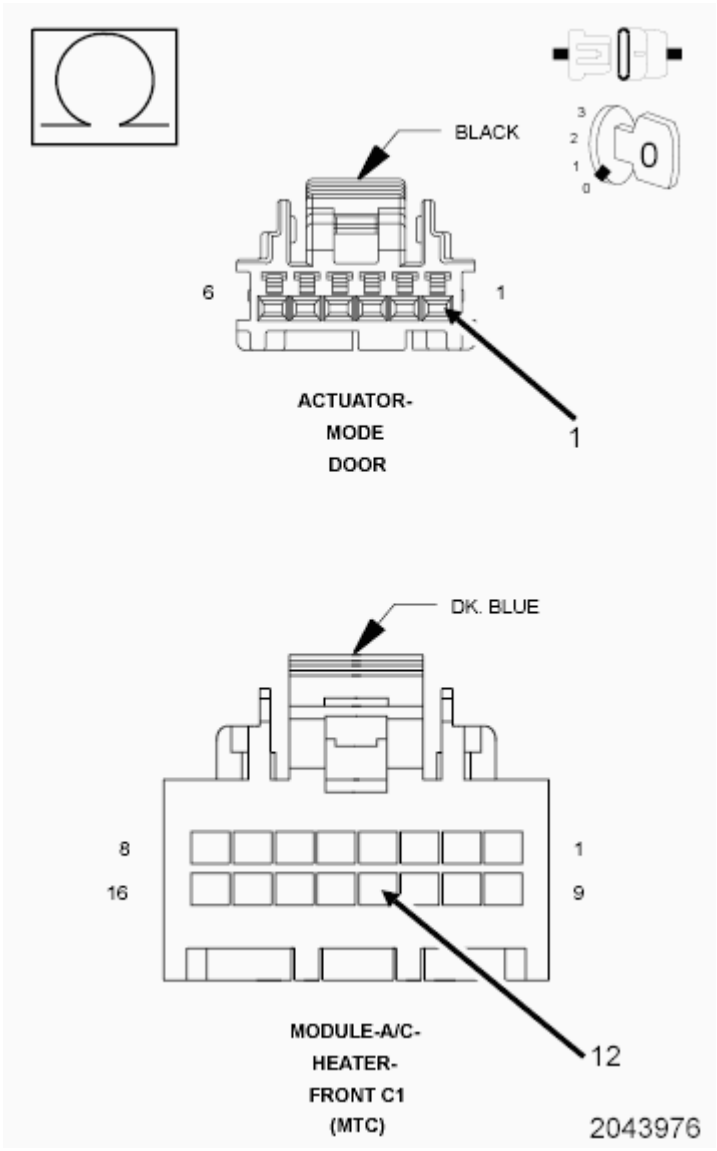


Fig. 90: Checking Mode Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Mode Door Actuator harness connector.
3. Measure the resistance of the (C35) Mode Door Driver circuit between the A/C Heater Control C1 harness connector and the Mode Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C35) Mode Door Driver circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

No

- Go to step 5

5. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

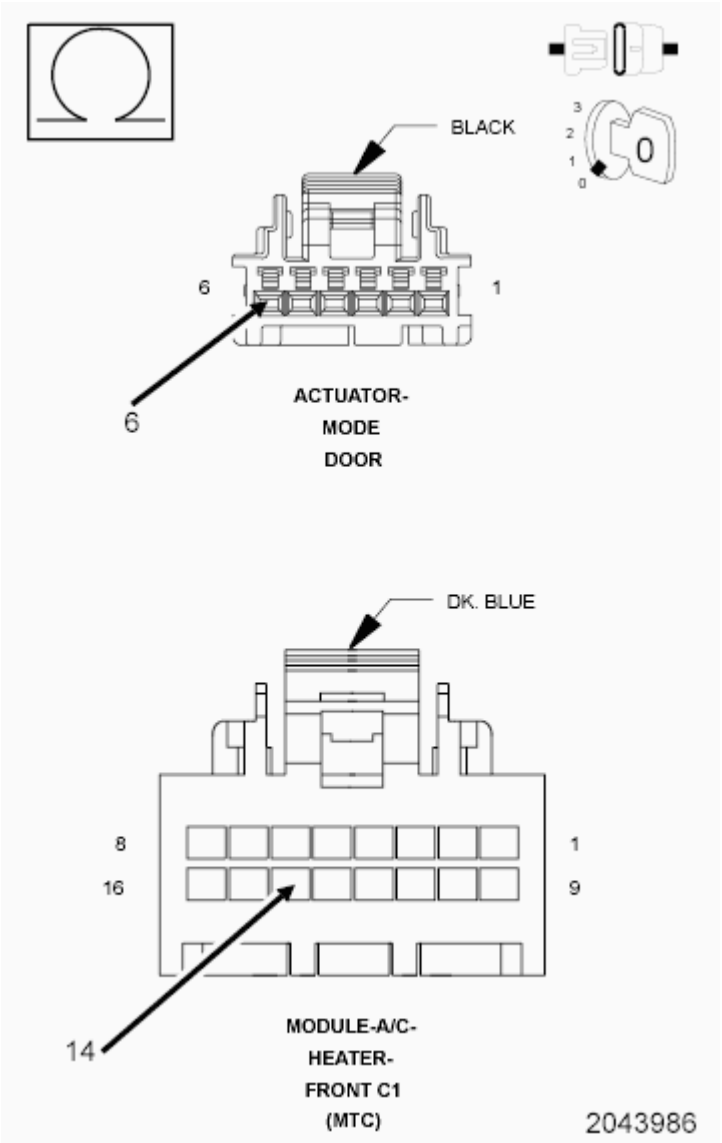


Fig. 91: Checking Common Door Driver 2 Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Mode Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

Yes

- Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Replace the Mode Door Actuator in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B11C2-92-FRONT MODE DOOR 1 CONTROL - PERFORMANCE OR INCORRECT OPERATION

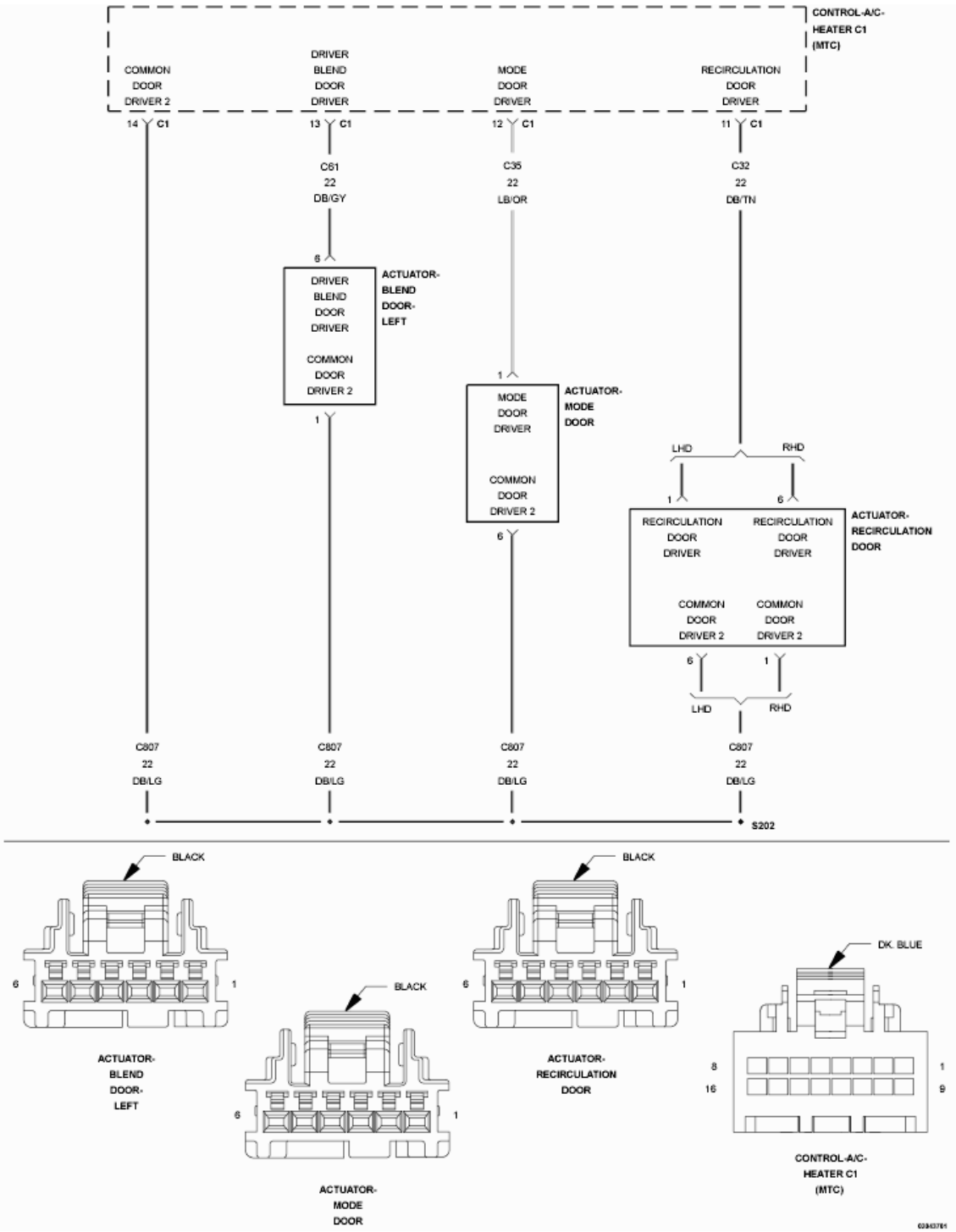


Fig. 92: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and no feedback pulses are detected in either clockwise or counterclockwise movement for the period of 15 seconds. If the A/C Heater Control detects valid feedback pulses for 15 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C35) MODE DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
MODE DOOR BINDING
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

No

- Go to step 9

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. Using the scan tool, perform the HVAC Actuator Calibration Test.

      Did any other HVAC DTCs set while performing the Actuator Calibration Test?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 3

3. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

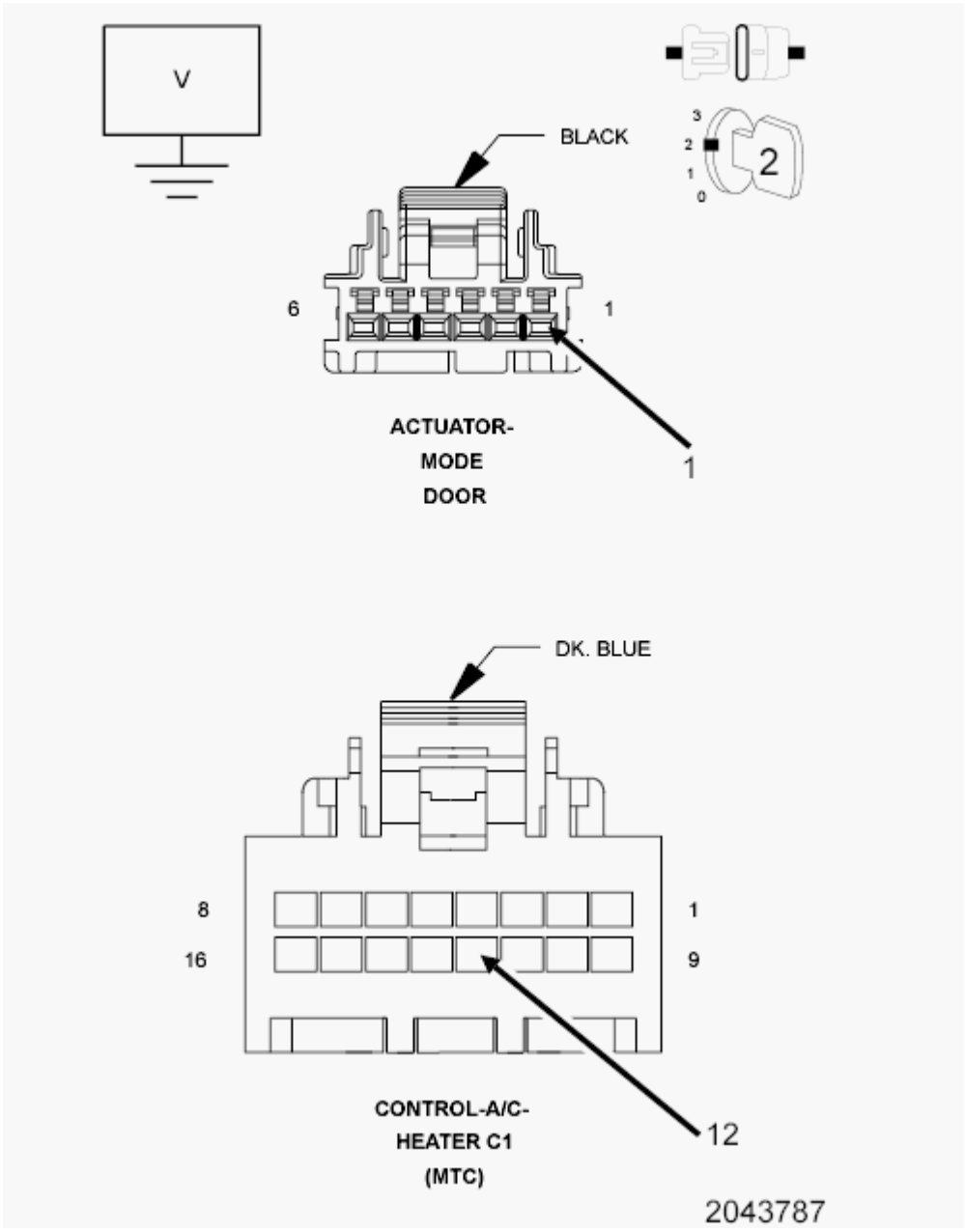


Fig. 93: Checking Mode Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Mode Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C35) Mode Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C35) Mode Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

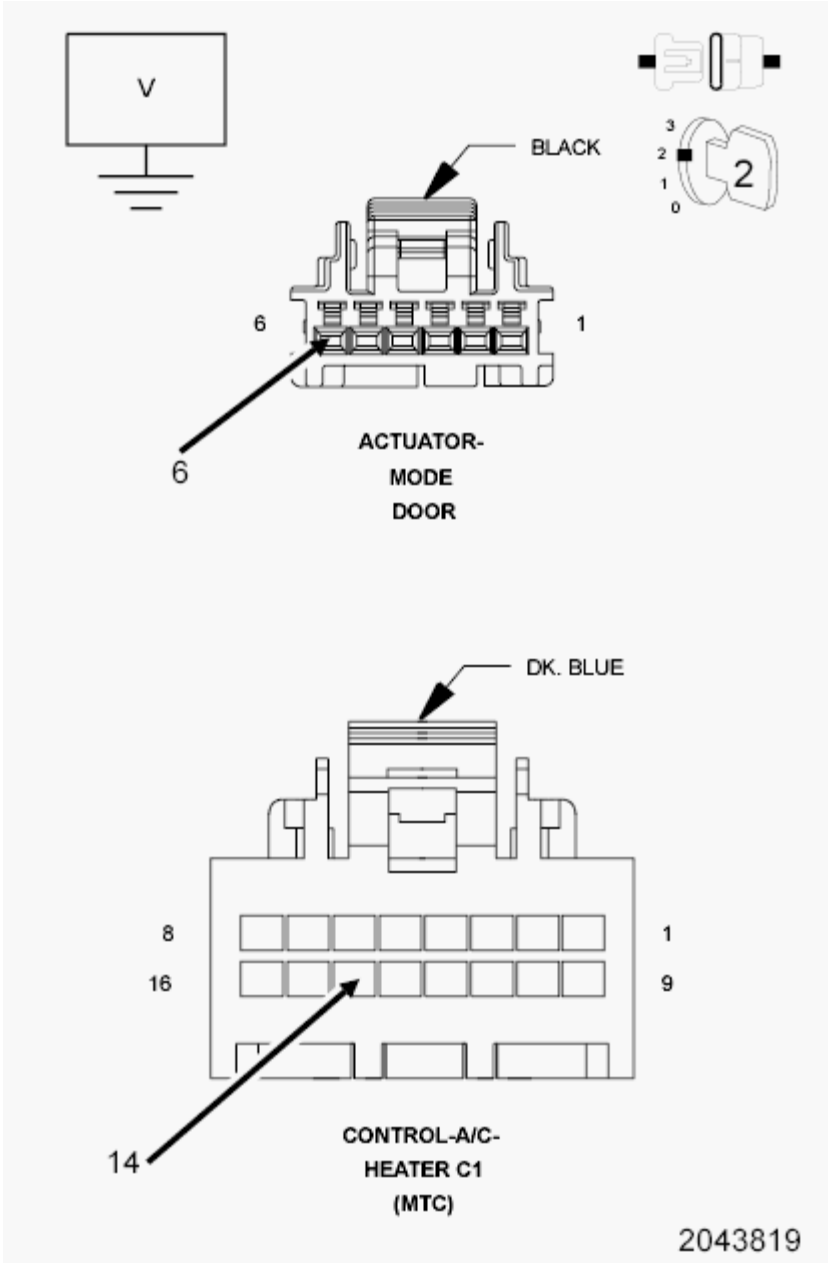


Fig. 94: Checking Common Door Driver 2 Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (C35) MODE DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

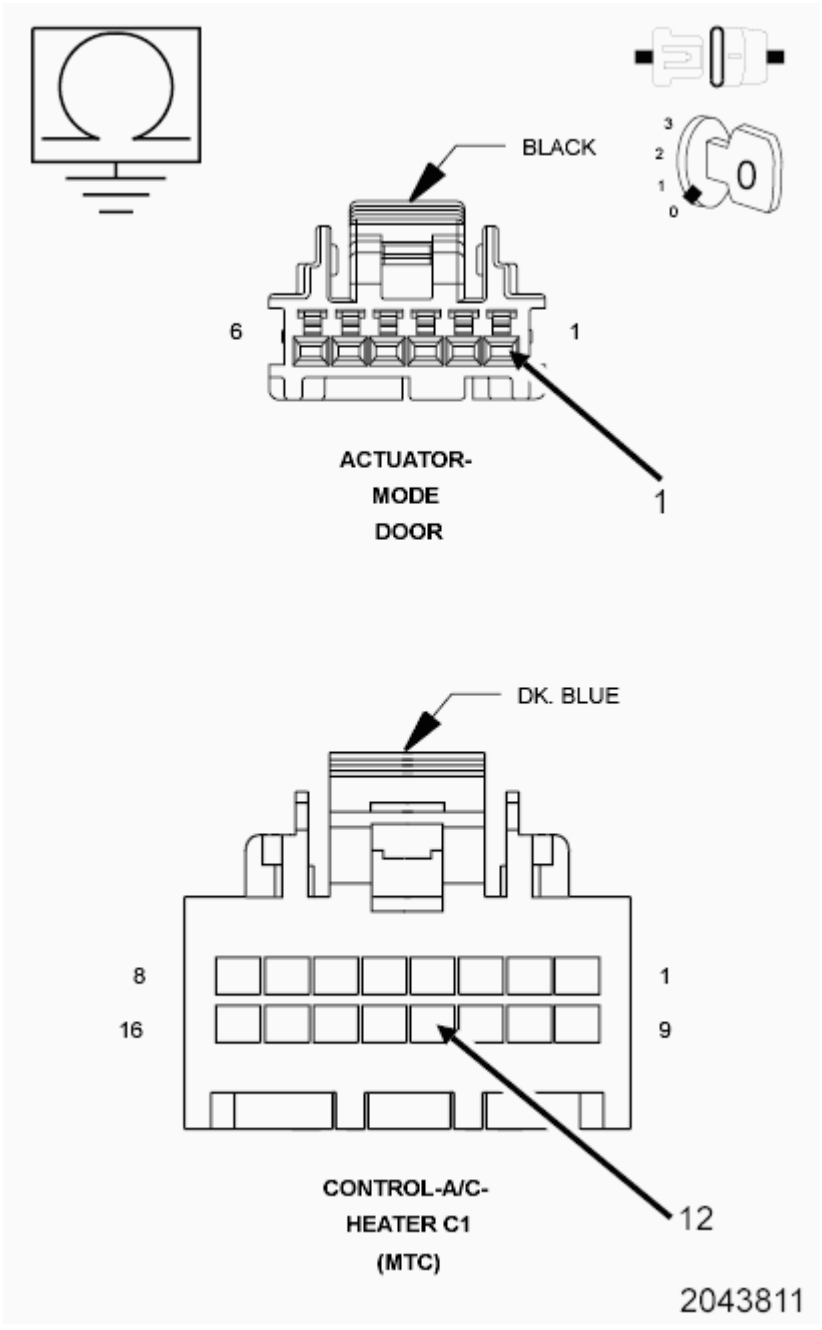


Fig. 95: Checking Mode Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C35) Mode Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C35) Mode Door Driver circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

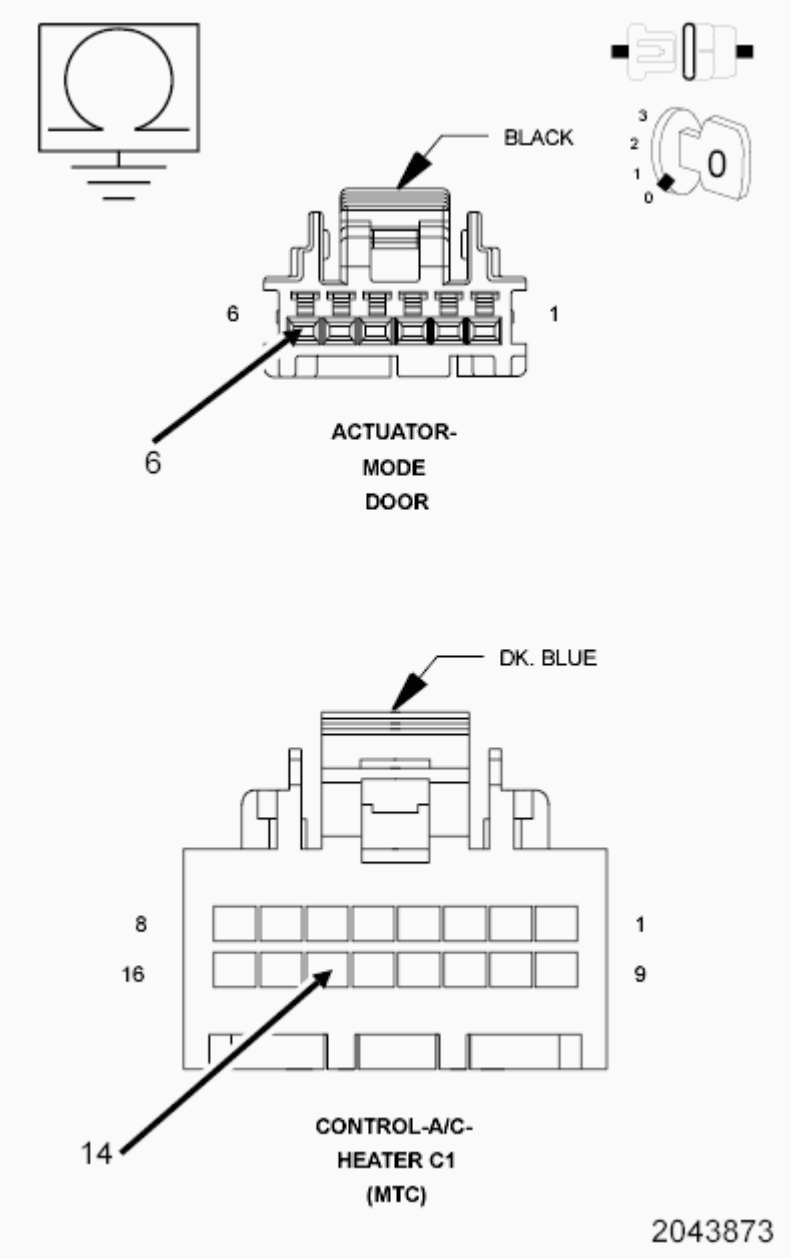


Fig. 96: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B11C3-00-FRONT MODE DOOR 1 TRAVEL RANGE TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
MODE DOOR BINDING
MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. Using the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

    Yes

    - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

    No

    - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. Using the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 4

No

- Go to step 6

4. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs.
   3. Using the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC reset during HVAC Actuator Calibration Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B11C4-00-FRONT MODE DOOR 1 TRAVEL RANGE TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
MODE DOOR STOPS
MODE DOOR

MODE DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

    Yes

    - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

    No

    - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC System Test?

    Yes

    - Go to step 4

    No

- Go to step 6

4. **CHECK THE MODE DOOR**
   1. Remove the Mode Door Actuator and check the Mode Door stops, linkage (stripped or cracked) and door.

      Were there any problems found?

      Yes

      - Repair or replace the Mode Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5
5. **CHECK THE MODE DOOR ACTUATOR**
   1. Replace the Mode Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B11CB-11-MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO GROUND

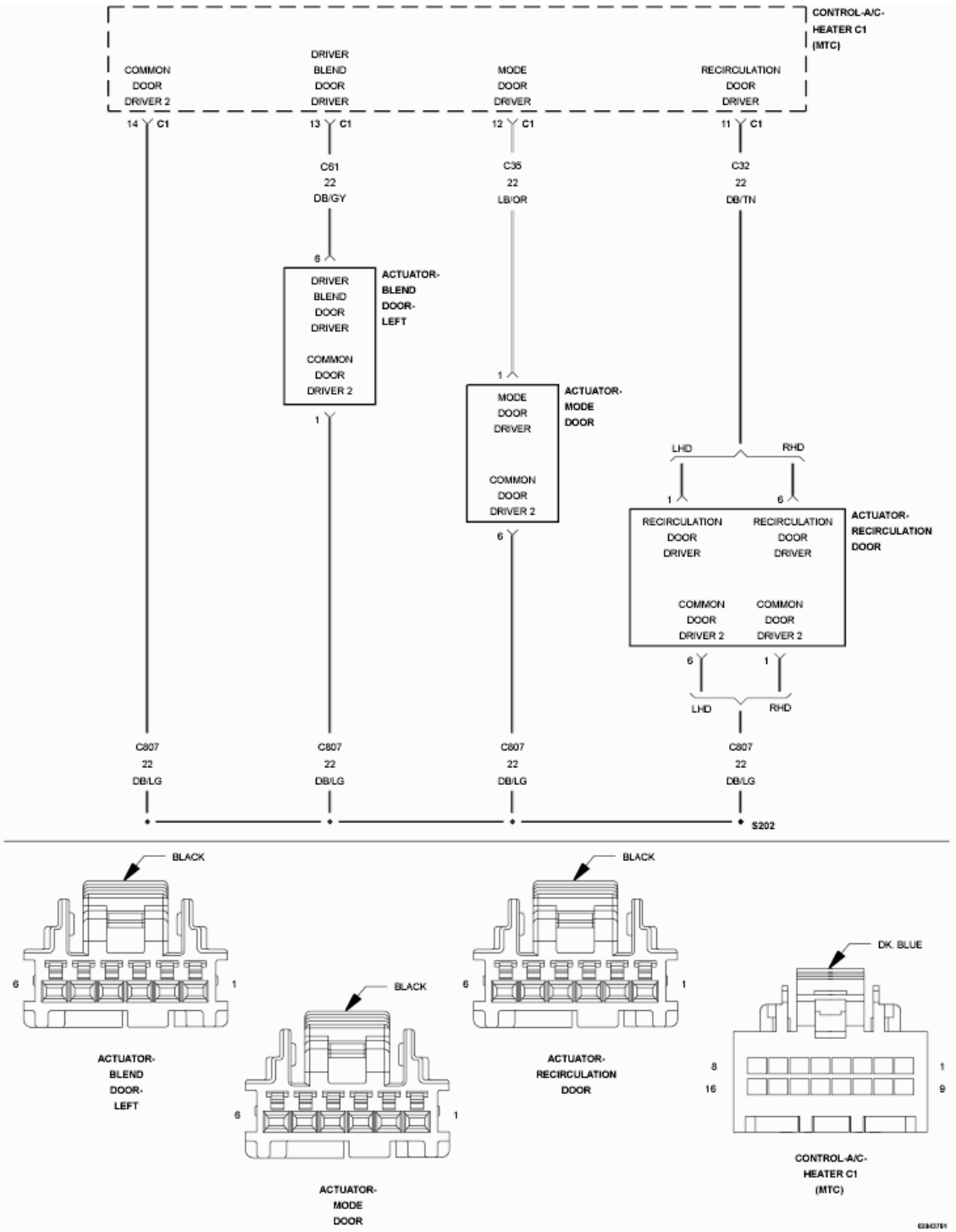


Fig. 97: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short to ground on the Blend Door control circuit. If the A/C Heater Control detects valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. Using the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

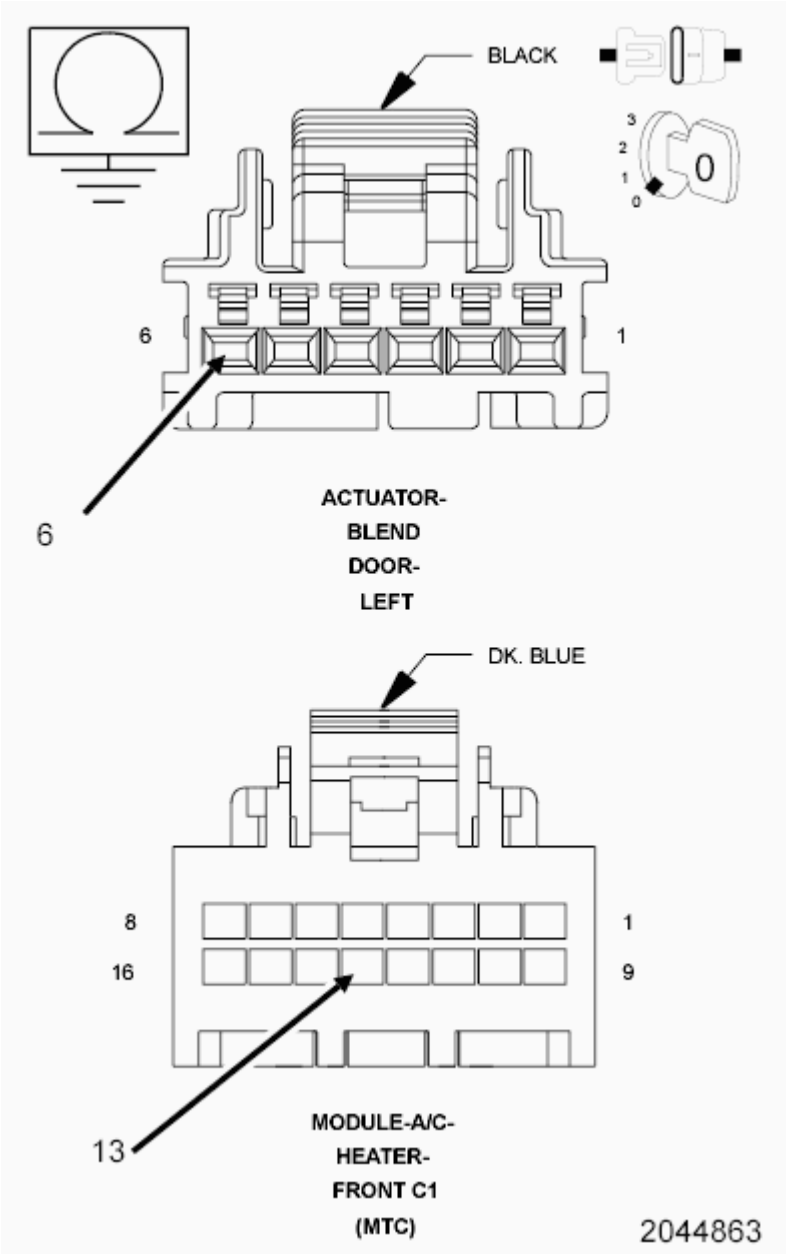


Fig. 98: Checking Blend Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Blend Door Actuator harness connector.
4. Measure the resistance between ground and the (C61) Blend Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C61) Blend Door Driver circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

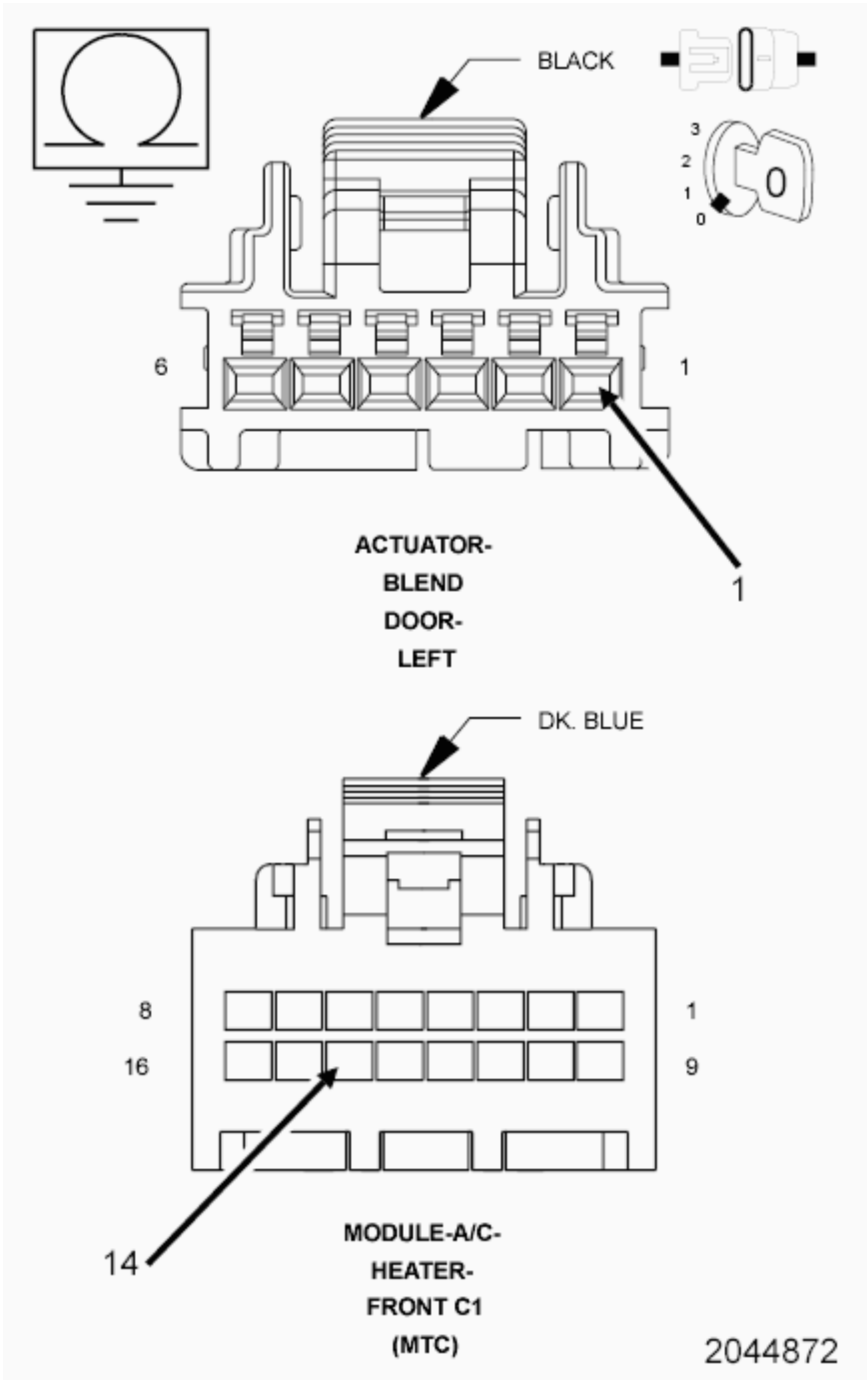


Fig. 99: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

- Repair the (C807) Common Door Driver 2 circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B11CB-12-MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT SHORT TO BATTERY

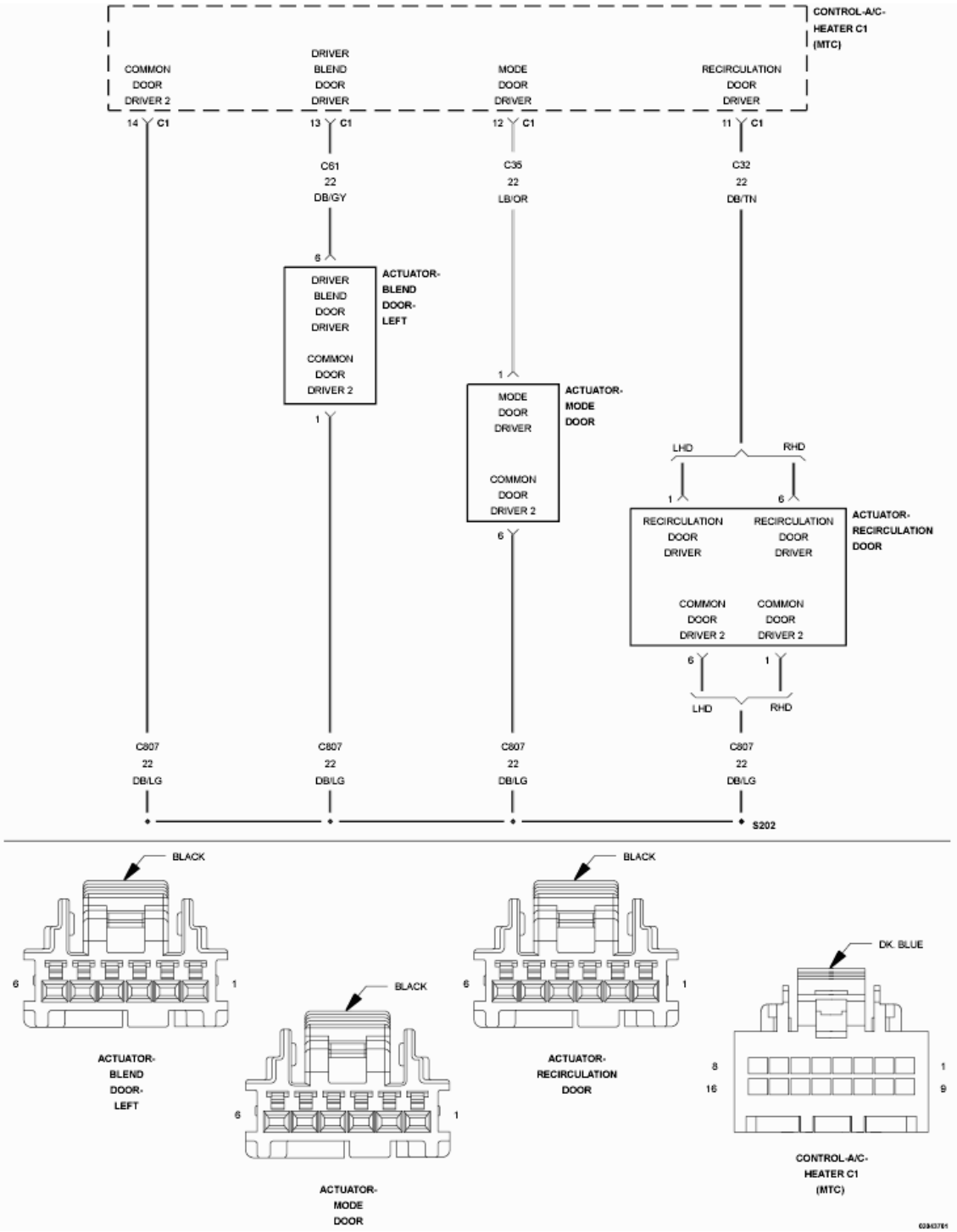


Fig. 100: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects a short voltage on the Blend Door control circuit. If the A/C Heater Control detects a valid voltage, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**

1. Using the scan tool, perform the HVAC Actuator Calibration Test.

   Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

   Yes

   - Go to step 3

   No

   - Go to step 6

3. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

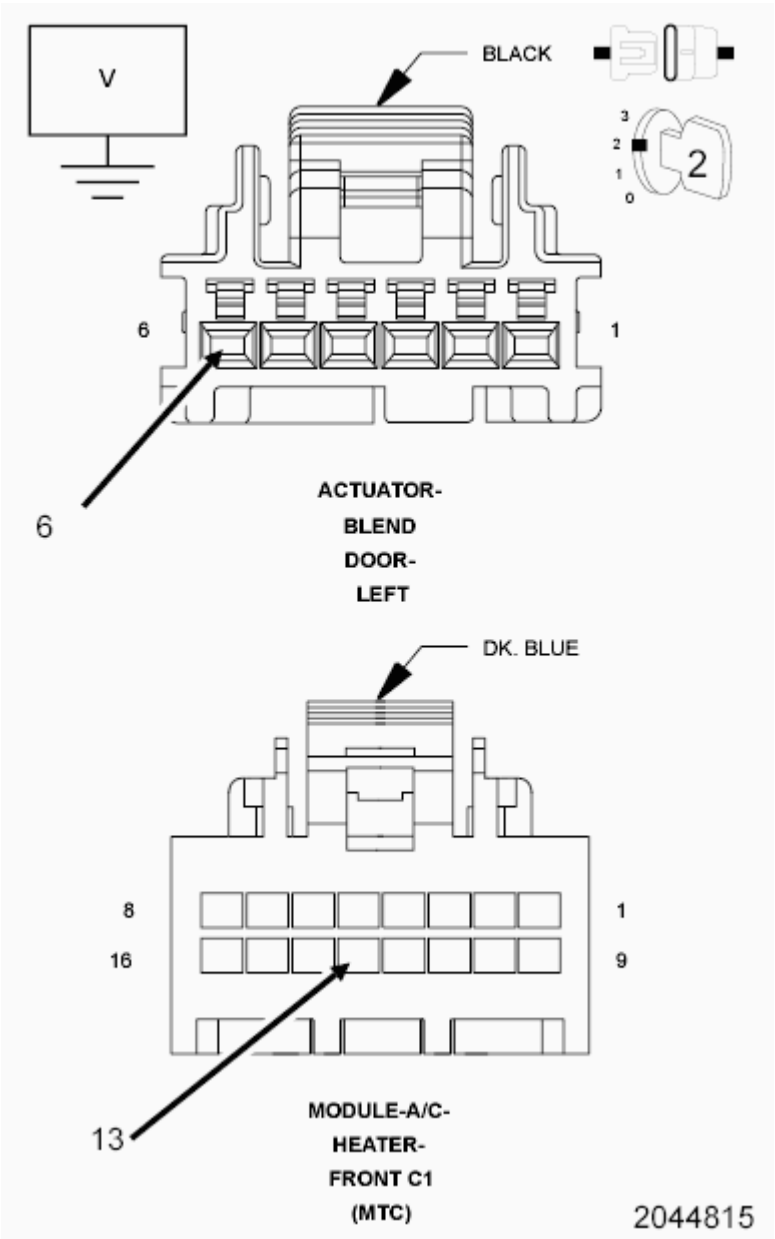


Fig. 101: Checking Blend Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Blend Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C61) Blend Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C61) Blend Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

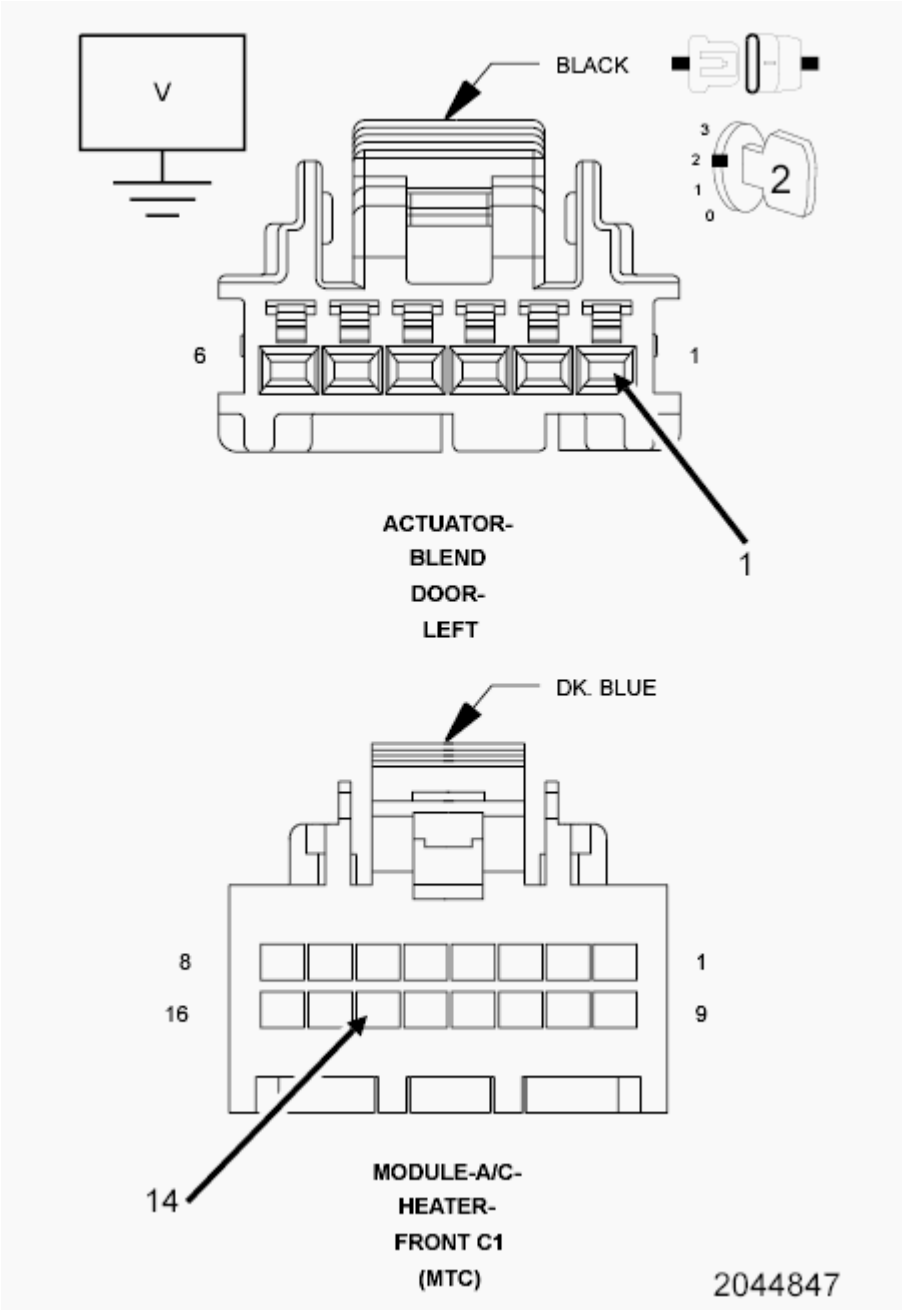


Fig. 102: Checking Common Door Driver 2 Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B11CB-13-MAIN/LEFT TEMPERATURE DOOR CONTROL - CIRCUIT OPEN

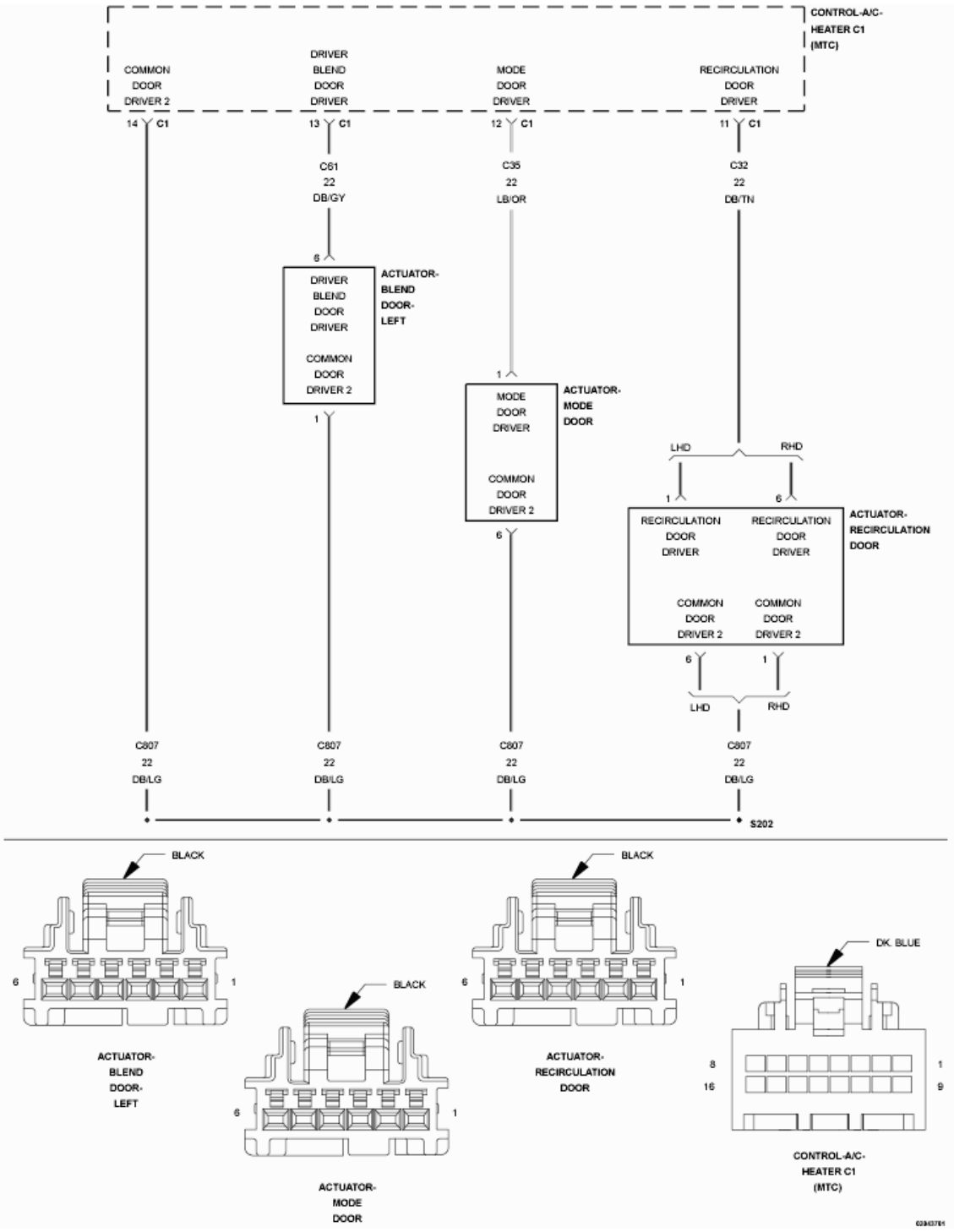


Fig. 103: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  The A/C Heater Control detects an open in the Blend Door control circuit. If the A/C Heater Control detects a valid current draw, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT OPEN
(C807) COMMON DOOR DRIVER 2 CIRCUIT OPEN
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 3

      No

      - Go to step 2
2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
   1. Using the scan tool, perform the HVAC Actuator Calibration Test.

Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration Test?

Yes

- Go to step 3

No

- Go to step 6

3. **CHECK THE BLEND DOOR ACTUATOR**

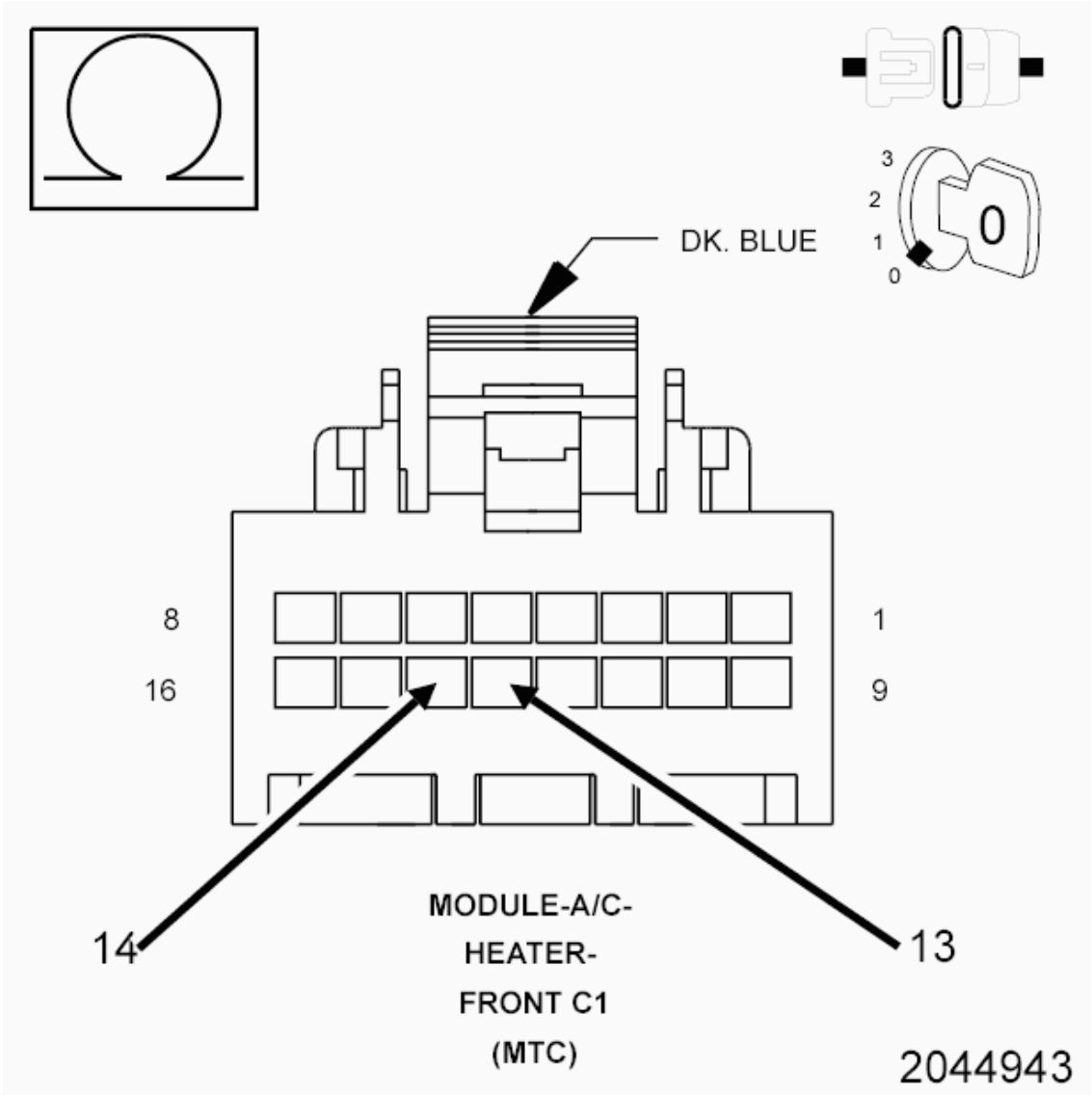


Fig. 104: Checking Blend Door Actuator
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Measure the resistance between the (C61) Blend Door Driver circuit and the (C807) Common Door Driver 2 circuit.

   Is the resistance 38.0 Ohms (± 5.0 Ohms)?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 4

4. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR AN OPEN**

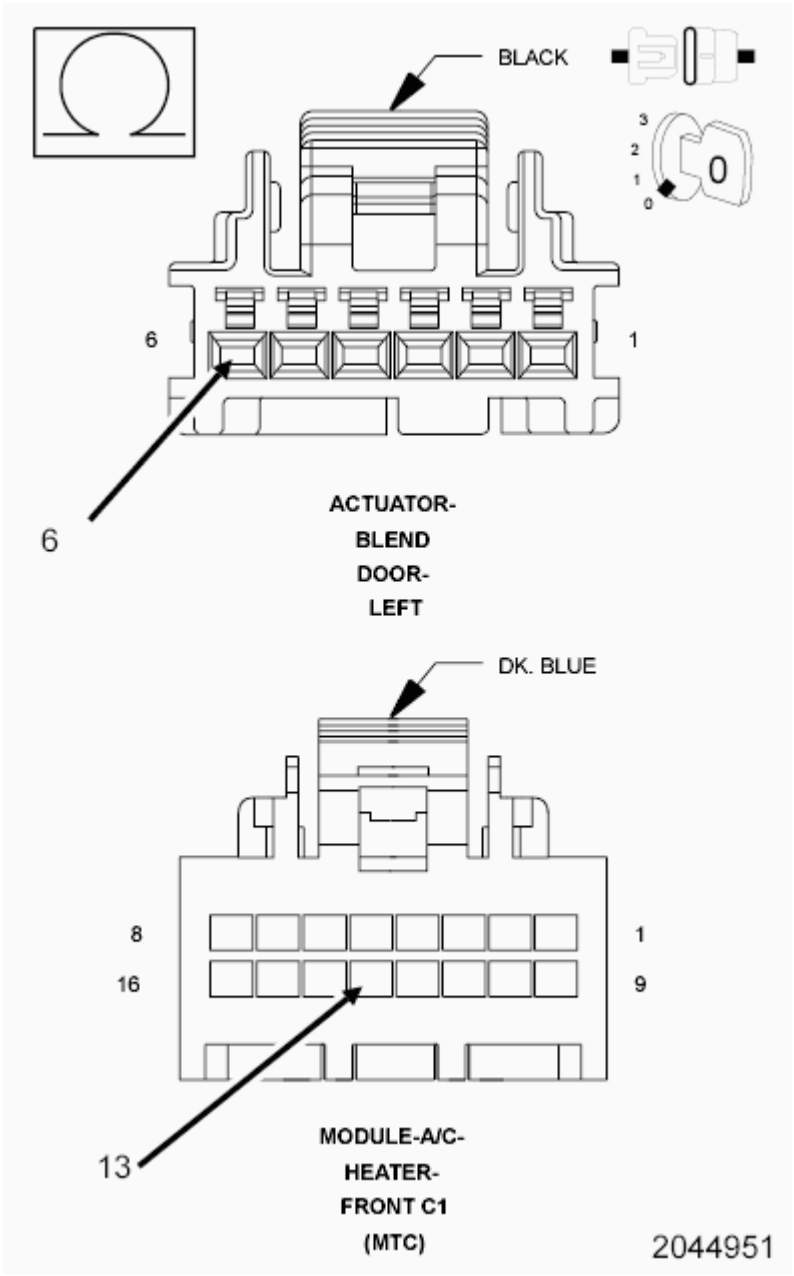


Fig. 105: Checking Blend Door Driver Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Blend Door Actuator harness connector.
3. Measure the resistance of the (C61) Blend Door Driver circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

- Repair the (C61) Blend Door Driver circuit for an open or high resistance.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR AN OPEN**

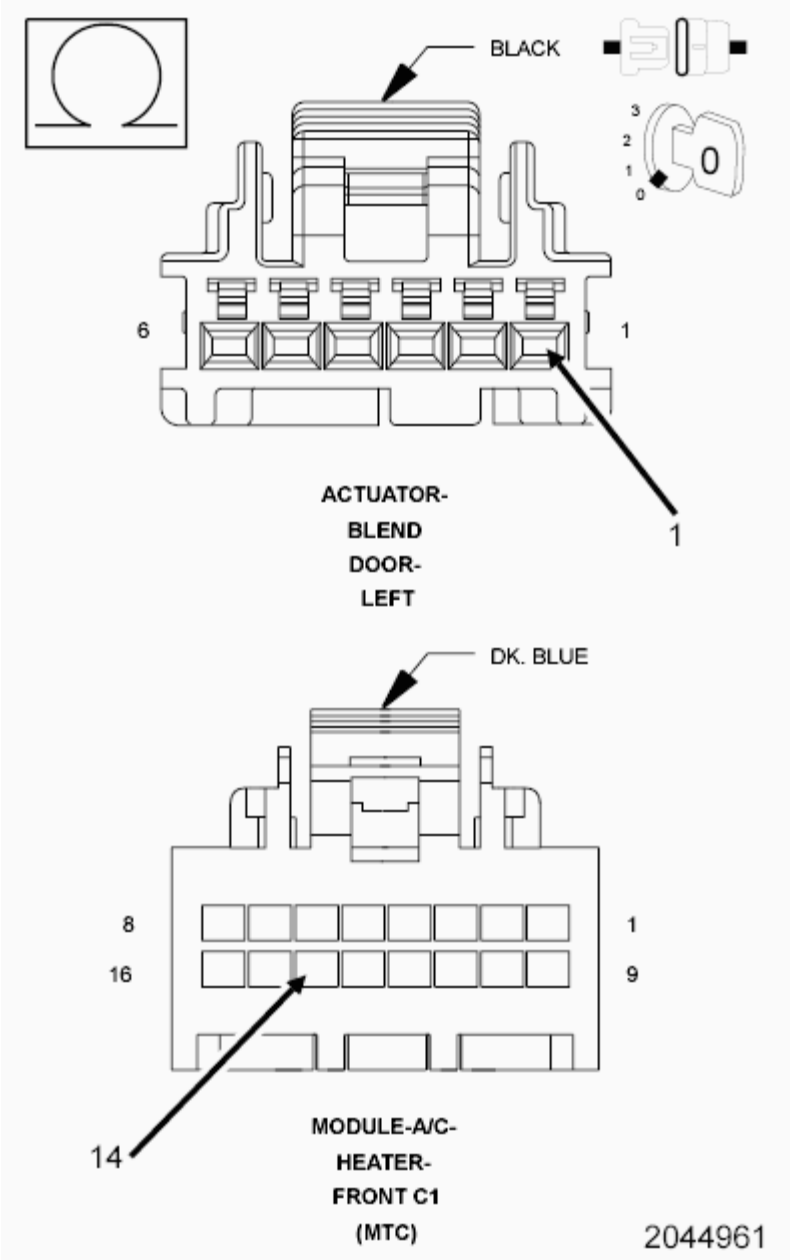


Fig. 106: Checking Common Door Driver 2 Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C807) Common Door Driver 2 circuit between the A/C Heater Control C1 harness connector and the Blend Door Actuator harness connector.

   Is the resistance above 1.0 Ohm?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for an open or high resistance.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Replace the Blend Door Actuator in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B11CB-92-MAIN/LEFT TEMPERATURE DOOR CONTROL - PERFORMANCE OR INCORRECT OPERATION

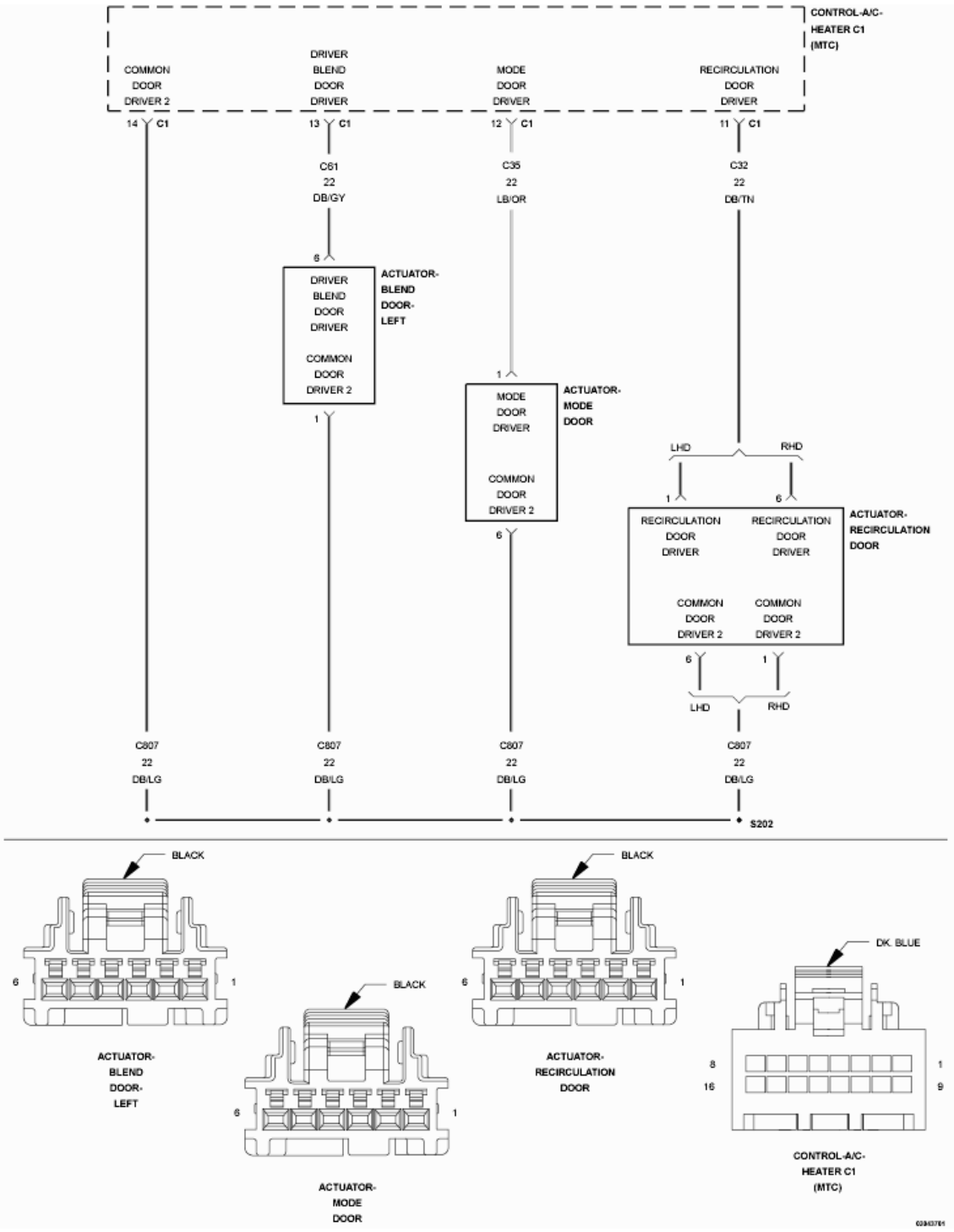


Fig. 107: Common/Mode Door Driver 2 Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic Trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  With the ignition on and an actuator movement is commanded by the A/C Heater Control or during an HVAC Actuator Calibration Test.

- **Set Condition:**

  If an actuator move is commanded by A/C Heater Control and no feedback pulses are detected in either clockwise or counterclockwise movement for the period of 15 seconds. If the A/C Heater Control detects valid feedback pulses for 15 seconds, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO VOLTAGE
(C61) BLEND DOOR DRIVER CIRCUIT SHORTED TO GROUND
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO VOLTAGE
(C807) COMMON DOOR DRIVER 2 CIRCUIT SHORTED TO GROUND
BLEND DOOR BINDING
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

No

- Go to step 9

2. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. Using the scan tool, perform the HVAC Actuator Calibration Test.

       Did any other HVAC DTCs set while performing the Actuator Calibration Test?

       Yes

       - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

       No

       - Go to step 3

3. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO VOLTAGE**

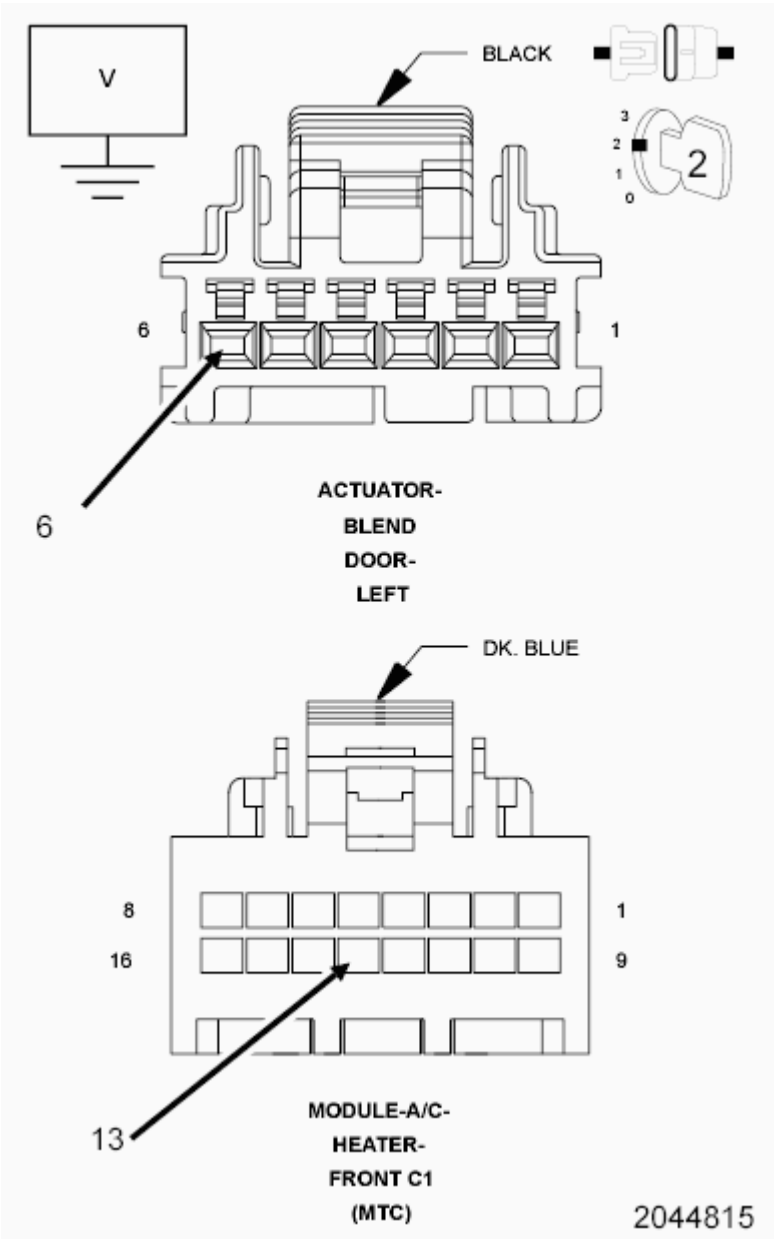


Fig. 108: Checking Blend Door Driver Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Blend Door Actuator harness connector.
4. Ignition on, engine not running.
5. Measure the voltage of the (C61) Blend Door Driver circuit.

   Is there any voltage present?

Yes

- Repair the (C61) Blend Door Driver circuit for a short to voltage.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 4

4. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO VOLTAGE**

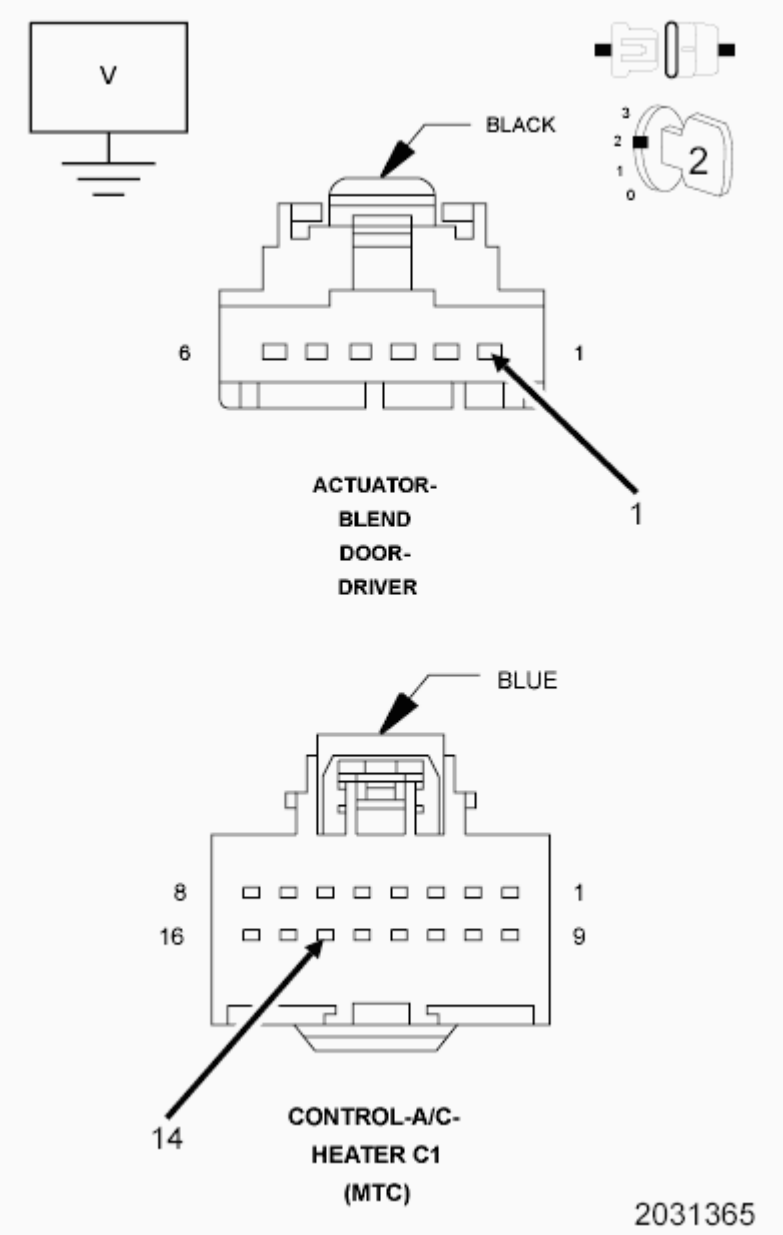


Fig. 109: Checking Common Door Driver 2 Circuit For A Short To Voltage

Courtesy of CHRYSLER LLC

1. Measure the voltage of the (C807) Common Door Driver 2 circuit.

   Is there any voltage present?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to voltage.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 5

5. **CHECK THE (C61) BLEND DOOR DRIVER CIRCUIT FOR A SHORT TO GROUND**

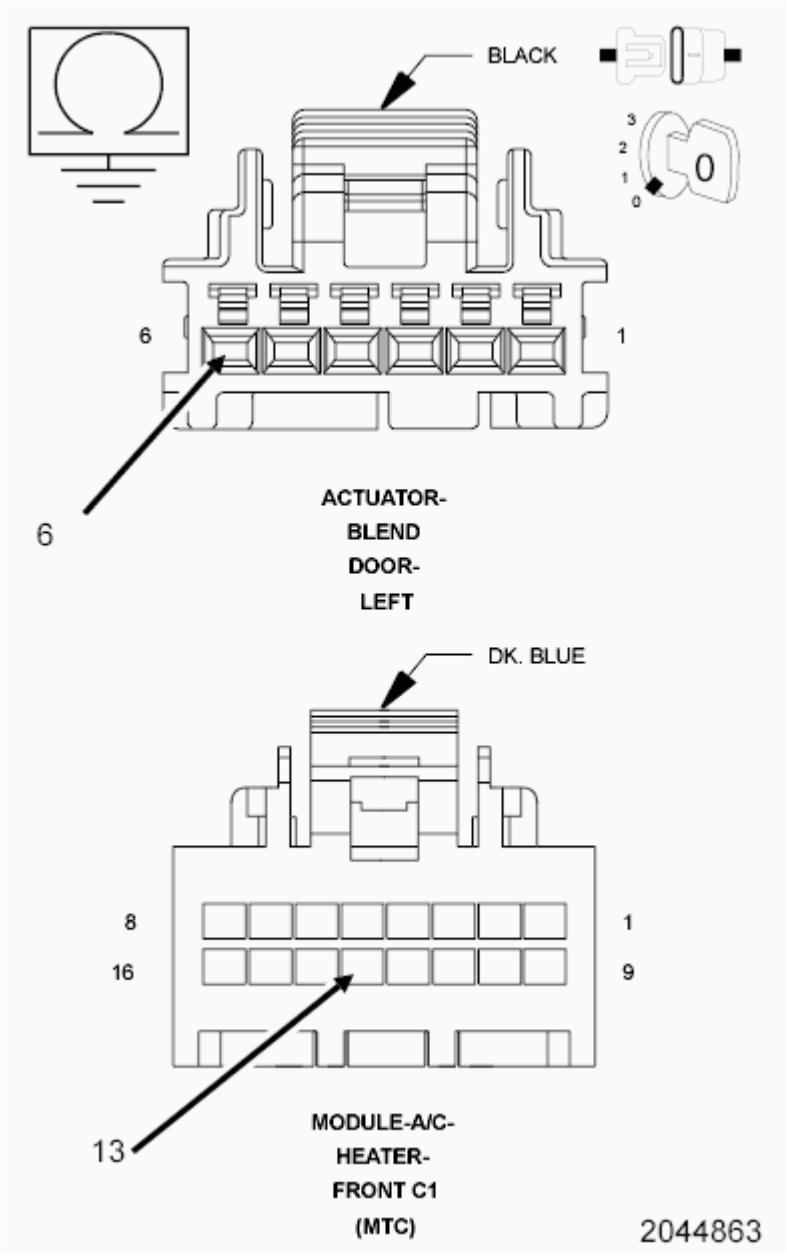


Fig. 110: Checking Blend Door Driver Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Measure the resistance between ground and the (C61) Blend Door Driver circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C61) Blend Door Driver circuit for a short to ground.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (C807) COMMON DOOR DRIVER 2 CIRCUIT FOR A SHORT TO GROUND**

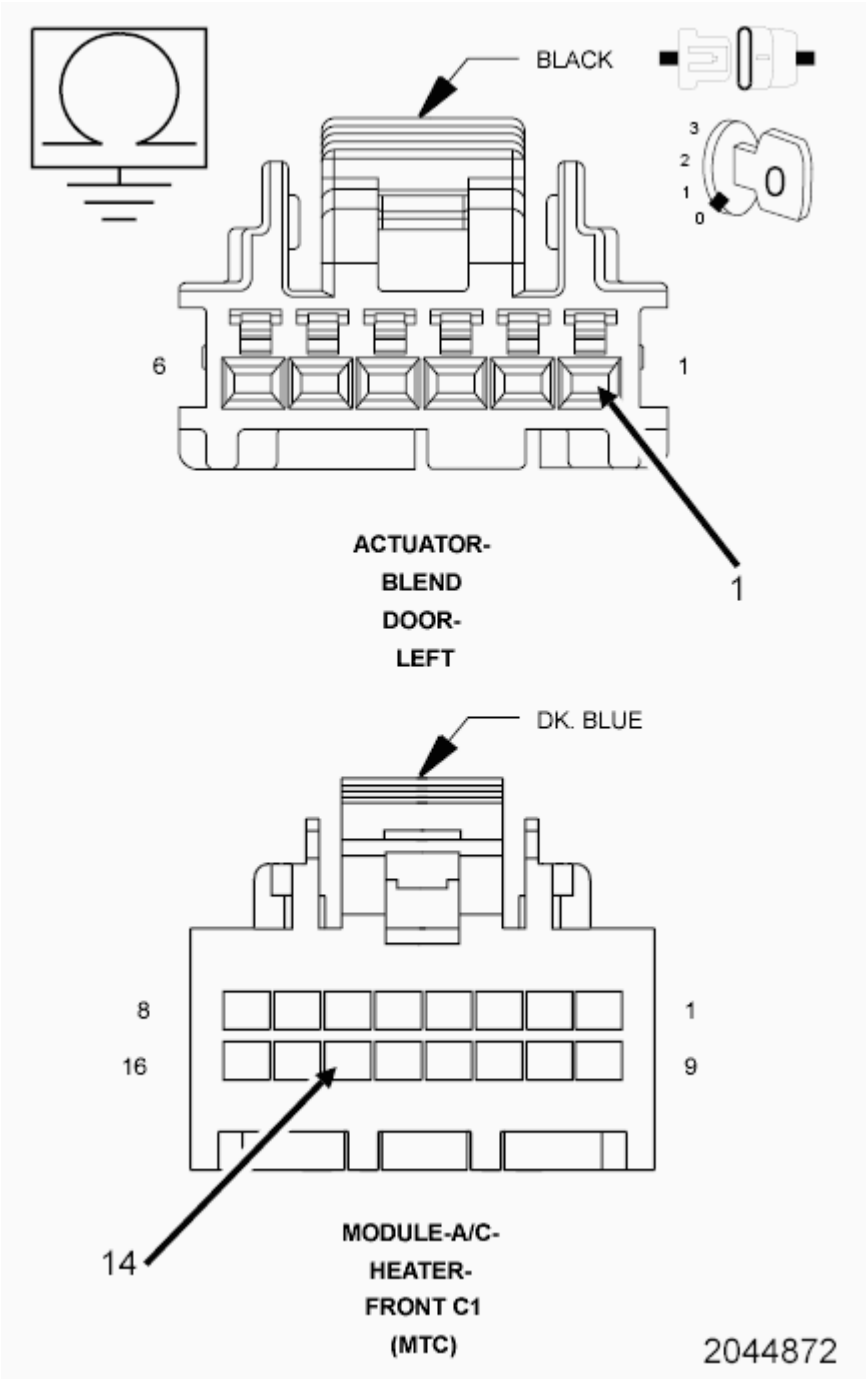


Fig. 111: Checking Common Door Driver 2 Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Measure the resistance between ground and the (C807) Common Door Driver 2 circuit.

   Is the resistance below 100k Ohms?

   Yes

   - Repair the (C807) Common Door Driver 2 circuit for a short to ground.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Go to step 7

7. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 8

8. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. Using the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

9. **CHECK THE WIRING AND CONNECTORS**
    1. The conditions necessary to set the DTC are not present at this time.
    2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
    3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
    4. Wiggle the wiring and connectors while checking for shorted and open circuits.

    Were there any problems found?

    Yes

    - Repair as necessary.
    - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

    No

    - Test complete.

B11CC-00-MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO SMALL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is less than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will

change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes
RELATED DTCS PRESENT
BLEND DOOR BINDING
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

    Yes

    - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

    No

    - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

    Is this DTC active?

    Yes

    - Go to step 4

    No

    - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

    Did this DTC change from Stored to Active while performing the HVAC Actuator Calibration

Test?

Yes

- Go to step 4

No

- Go to step 6

4. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door for binding and full travel.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5

5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs.
   3. With the scan tool, perform the HVAC Actuator Calibration Test.

      Did this DTC reset during HVAC Actuator Calibration Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC

was set.

3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B11CD-00-MAIN/LEFT TEMPERATURE DOOR TRAVEL TOO LARGE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

After the initial installation of the A/C Heater Control, the controller is calibrated to each individual blend/mode door actuator. These calibrations are stored as in the number of pulses it takes to move the door from one stop to another. The A/C Heater Control drives the Door Actuators by the use of Door Driver circuit and a Common Door Driver circuit and monitors all door actuator pulses to detect door movement in both directions. Most of the door actuators share a common door driver circuit but each door actuator has its own unique driver circuit. Due to shared circuitry, similar Diagnostic trouble Codes (DTCs) can set at the same time for multiple actuators depending upon the type of circuit malfunction, its location, and the direction the actuator is moving when the malfunction is present.

- **When Monitored:**

  When ever an Actuator Calibration Test is performed.

- **Set Condition:**

  The A/C Heater Control uses a pulse feedback to the controller to detect the total door movement range. If the amount of pulses required to move the door completely in both directions is greater than what the controller has stored in its memory, this DTC will set. If an Actuator Calibration Test is performed or during normal operation and the A/C Heater Control detects a valid range of the door movement span in both directions, the DTC will change from Active to Stored and will stay in the controllers memory for 100 ignition cycles.

Possible Causes

RELATED DTCS PRESENT
BLEND DOOR STOPS
BLEND DOOR
BLEND DOOR ACTUATOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR RELATED DTCS**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

       Are there any Door Control Circuit Short to Voltage, Short to Ground or Open DTCs present?

       Yes

       - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

       No

       - Go to step 2
2. **CHECK IF DTC IS ACTIVE**
    1. Ignition on, engine not running.
    2. With the scan tool, read HVAC DTCs.

       Is this DTC active?

       Yes

       - Go to step 4

       No

       - Go to step 3
3. **PERFORM HVAC ACTUATOR CALIBRATION TEST**
    1. With the scan tool, perform the HVAC Actuator Calibration Test.

       Did this DTC change from Stored to Active while performing the HVAC System Test?

       Yes

- Go to step 4

No

- Go to step 6

4. **CHECK THE BLEND DOOR**
   1. Remove the Blend Door Actuator and check the Blend Door stops, linkage (stripped or cracked) and door.

      Were there any problems found?

      Yes

      - Repair or replace the Blend Door as necessary in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Go to step 5

5. **CHECK THE BLEND DOOR ACTUATOR**
   1. Replace the Blend Door Actuator in accordance with the Service Information.
   2. With the scan tool, erase HVAC DTCs and perform the HVAC Actuator Calibration Test.

      Did this DTC reset?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.

4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B11D9-92-BLOWER SPEED KNOB REQUEST INPUT - PERFORMANCE OR INCORRECT OPERATION

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors the Blower Motor switch or dial for proper operation. If the monitored voltage on that circuit drops below or rises above a predetermined value, a DTC will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the internal blower circuit is less than 0.05 of a volt or greater than 4.95 volts for a period of 1200 msec.

Possible Causes
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **REPLACE THE A/C HEATER CONTROL**

   This DTC detects a problem with an internal circuit in the controller and is non serviceable.

   Repair

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B160F-11-TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO GROUND

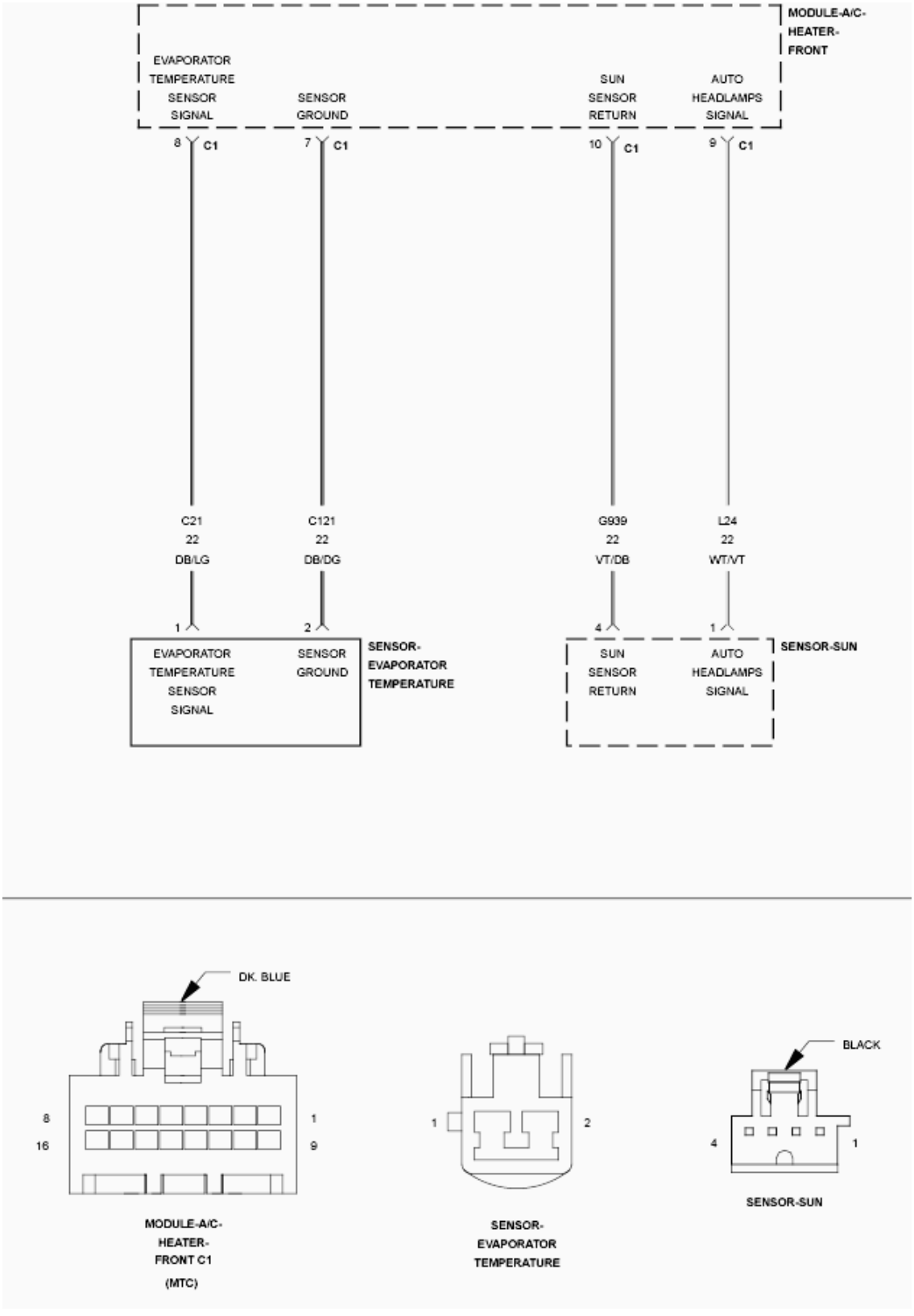


Fig. 112: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Twilight or Ambient Light Sensor input voltage is less than 1.05 volts for period of 1.2 seconds.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORTED TO GROUND
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 4
2. **CHECK (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

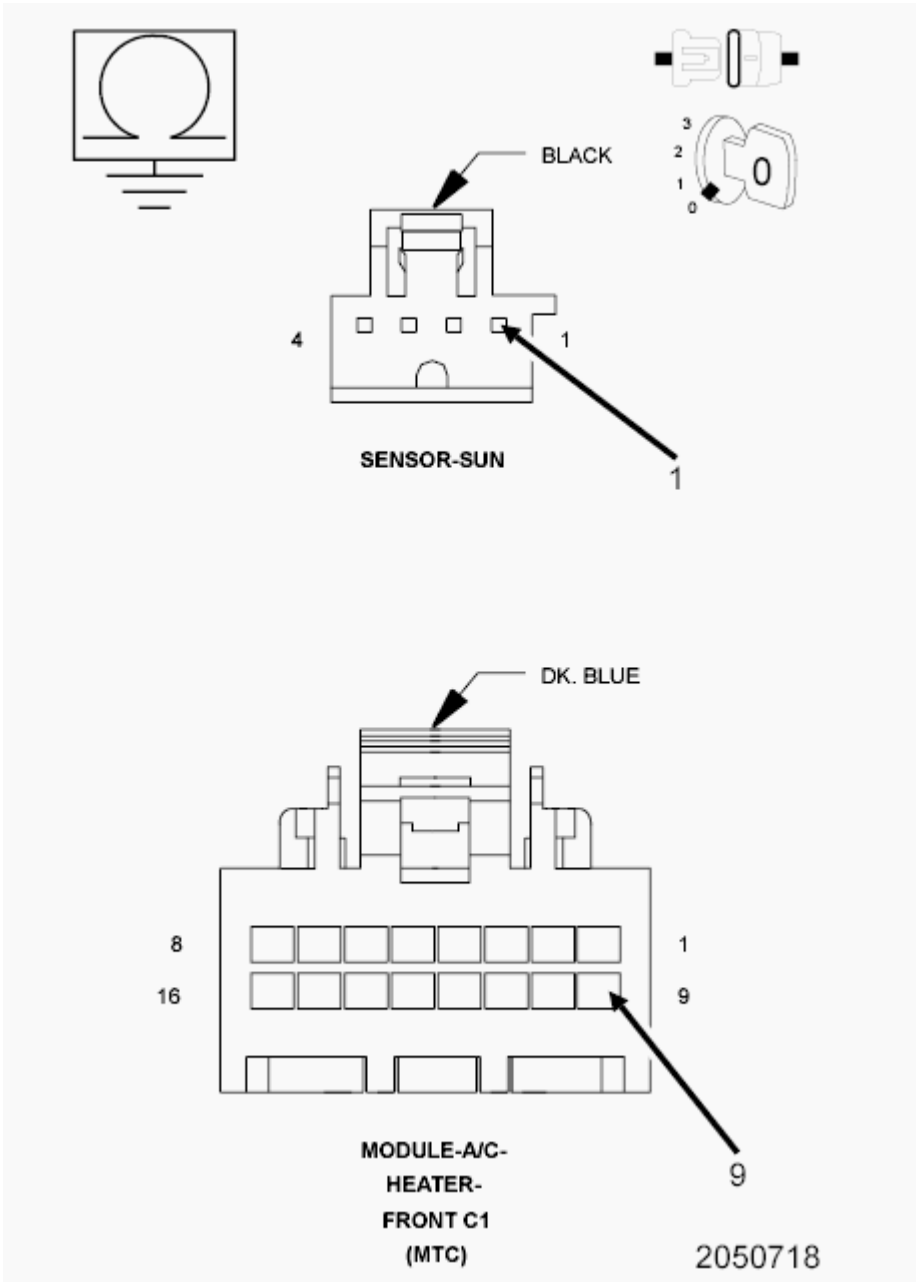


Fig. 113: Checking Auto Headlamps Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C2 harness connector.
3. Disconnect the Sun Sensor harness connector.
4. Measure the resistance between ground and he (L24) Auto Headlamps Signal circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (L24) Auto Headlamps Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      Did this DTC reset while performing the HVAC Verification Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

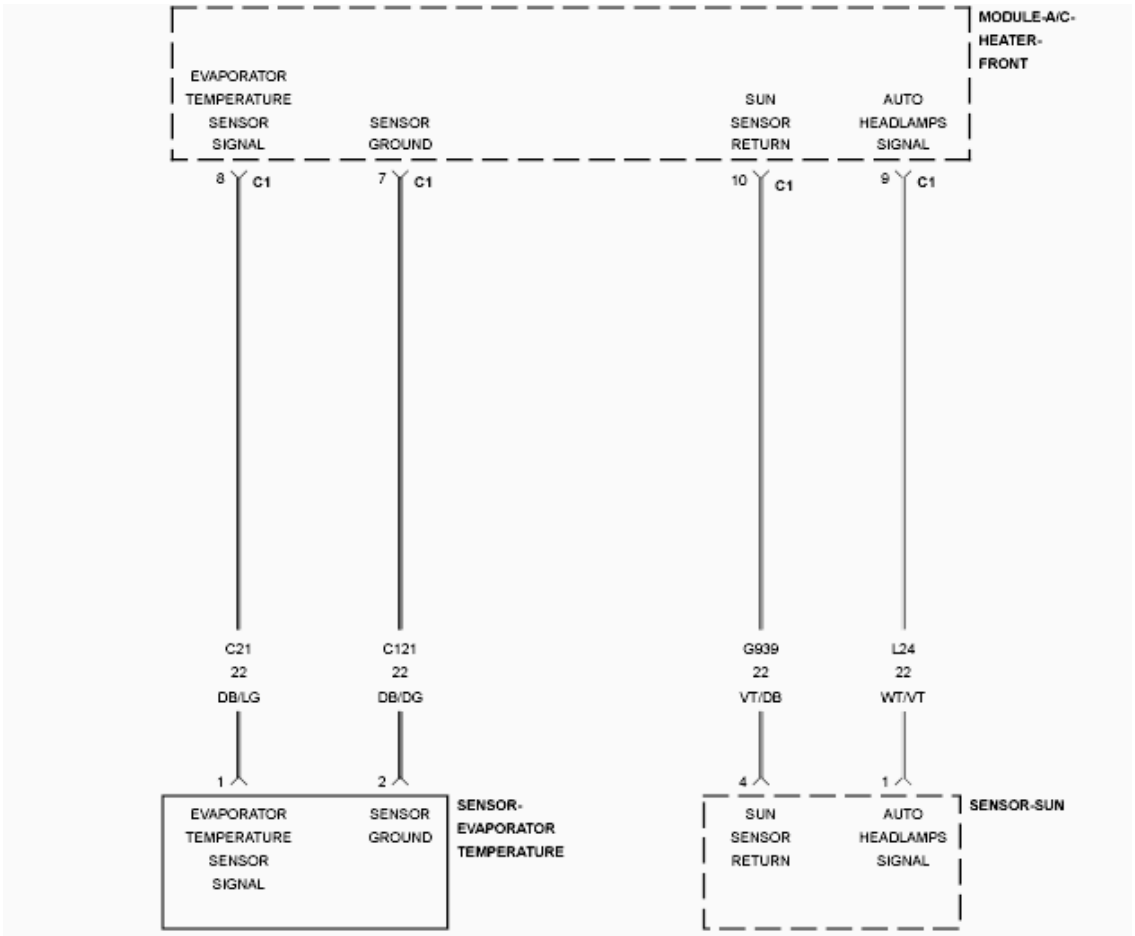
      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B160F-12-TWILIGHT/AMBIENT LIGHT SENSOR INPUT - CIRCUIT SHORT TO BATTERY



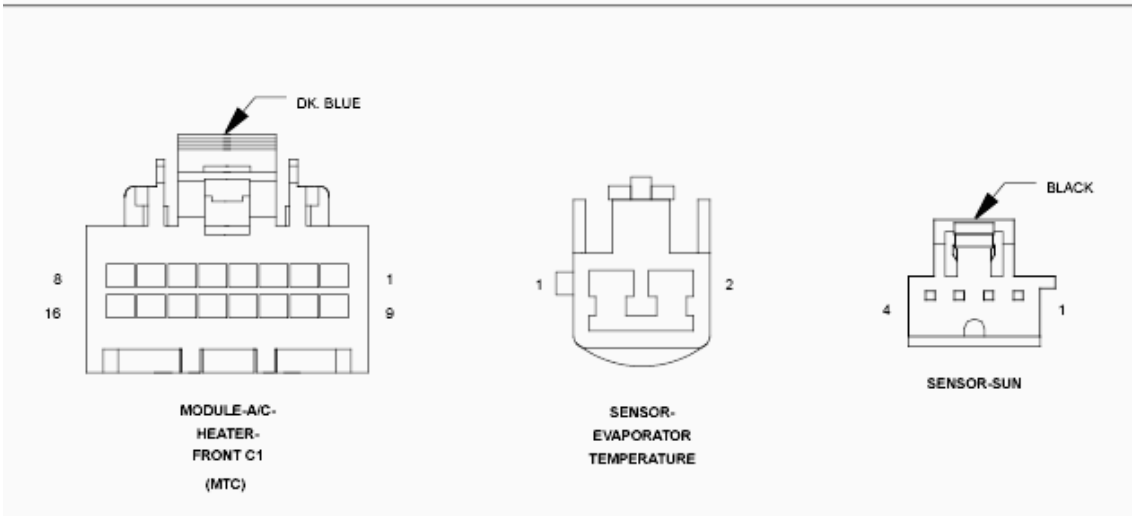


Fig. 114: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the Twilight or Ambient Light Sensor input voltage is greater than 4.83 volts for period of 1.2 seconds.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT TO VOLTAGE
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT OPEN
(C121) SENSOR GROUND CIRCUIT OPEN
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 6
2. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO VOLTAGE**

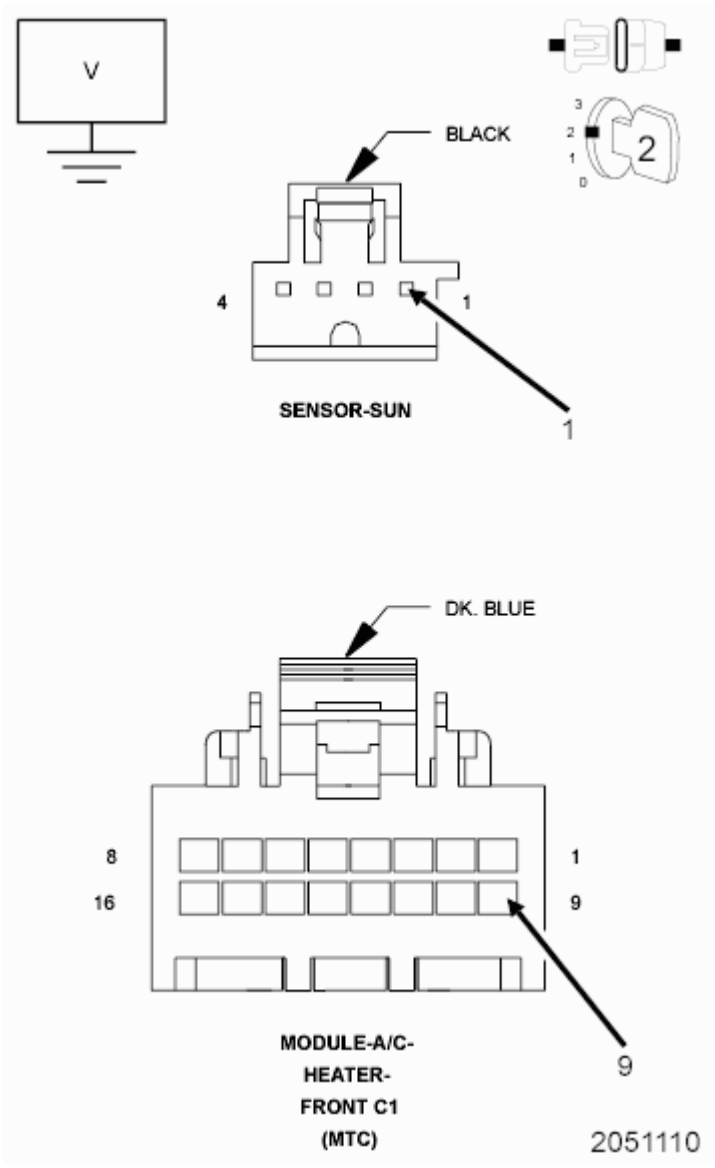


Fig. 115: Checking Auto Headlamps Signal Circuit For A Short To Voltage
Courtesy of CHRYSLER LLC

1. Turn the ignition off.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Ignition on, engine not running.
4. Measure the voltage of the (L24) Auto Headlamps Signal circuit.

   Is there any voltage present?

   Yes

   - Repair the (L24) Auto Headlamps Signal circuit for a short to voltage.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR AN OPEN**

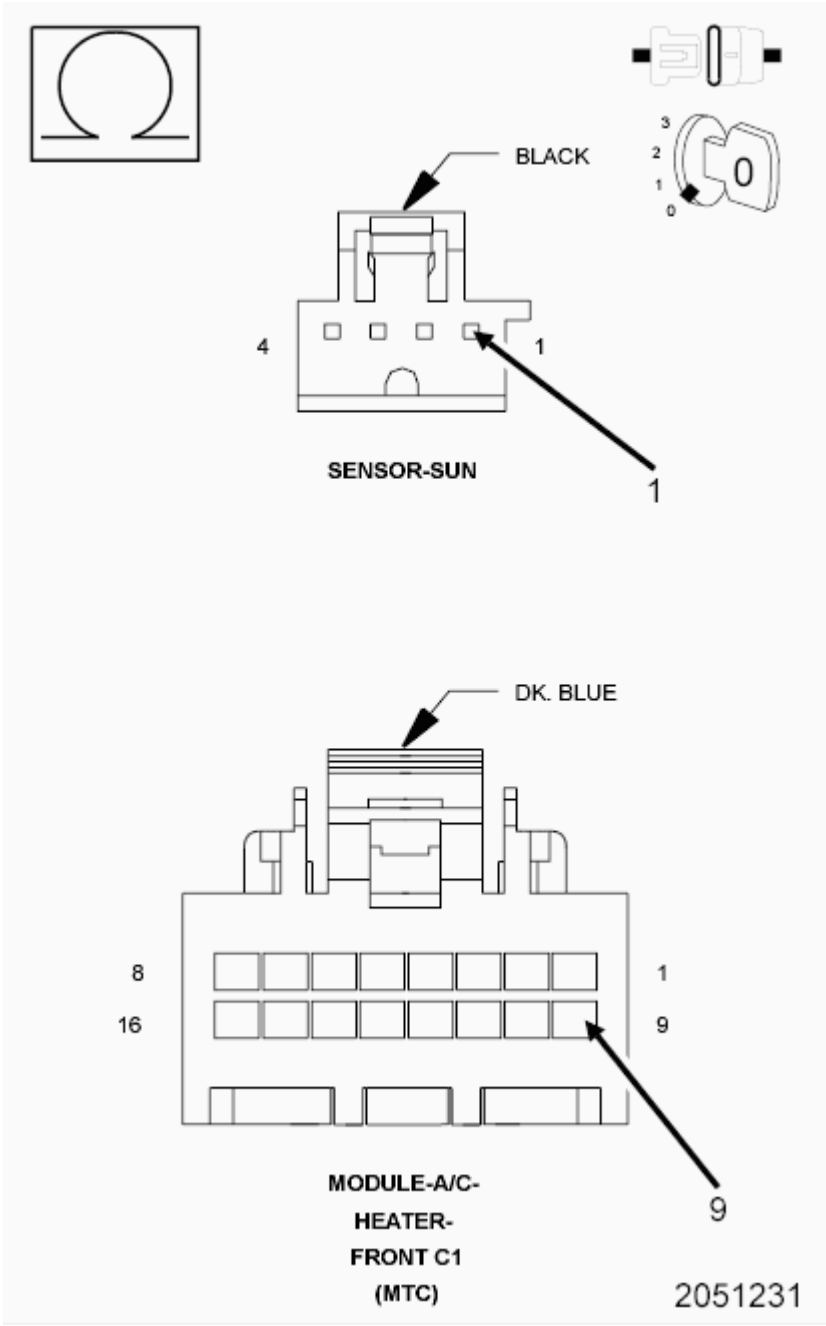


Fig. 116: Checking Auto Headlamps Signal Circuit For An Open

Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the Sun Sensor harness connector.
3. Measure the resistance of the (L24) Auto Headlamps Signal circuit between the A/C Heater Control C1 harness connector and the Sun Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 4

   No

   - Repair the (L24) Auto Headlamps Signal circuit for an open.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

4. **CHECK THE (C121) SENSOR GROUND CIRCUIT FOR AN OPEN**

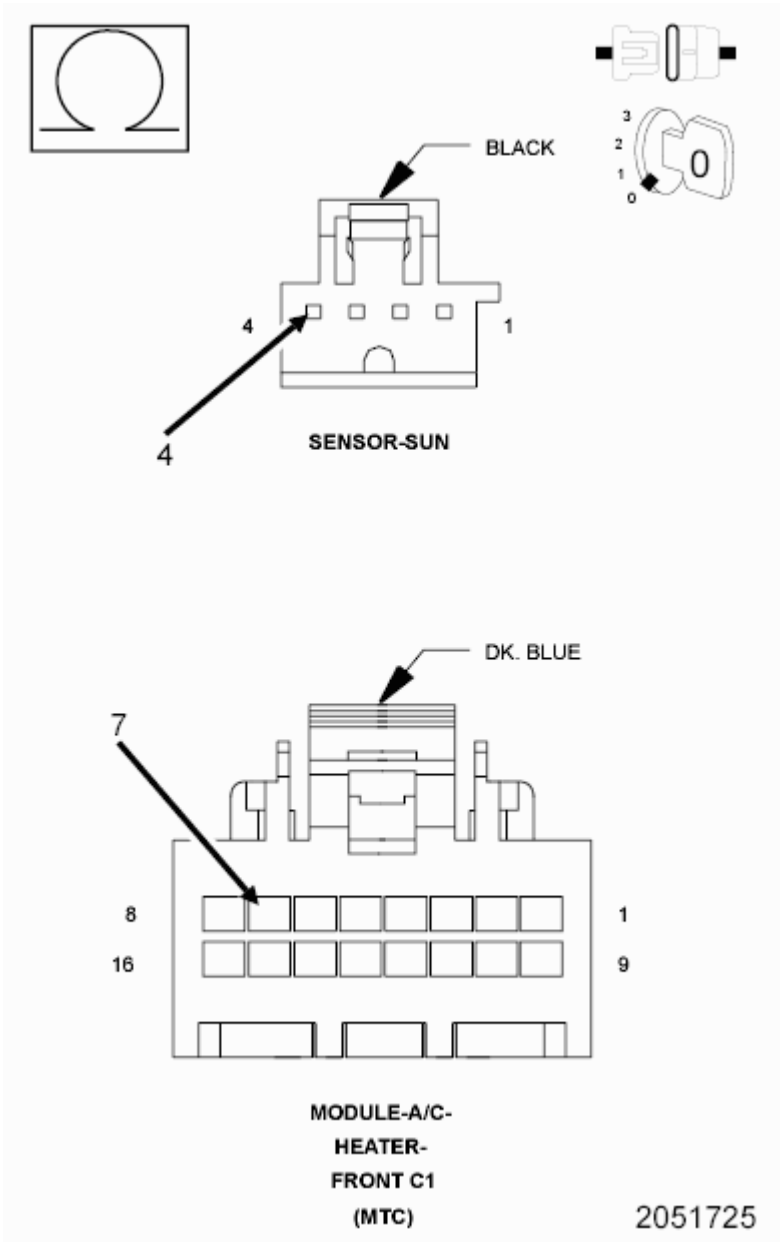


Fig. 117: Checking Sensor Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Measure the resistance of the (C121) Sensor Ground circuit between the A/C Heater Control C1 harness connector and the Sun Sensor harness connector.

   Is the resistance below 5.0 Ohms?

   Yes

   - Go to step 5

No

- Repair the (C121) Sensor Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

5. **CHECK THE SUN SENSOR AND A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   Did this DTC reset while performing the HVAC Verification Test?

   Yes

   - Replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.
6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B160F-92-TWILIGHT/AMBIENT LIGHT SENSOR INPUT - PERFORMANCE OR INCORRECT OPERATION

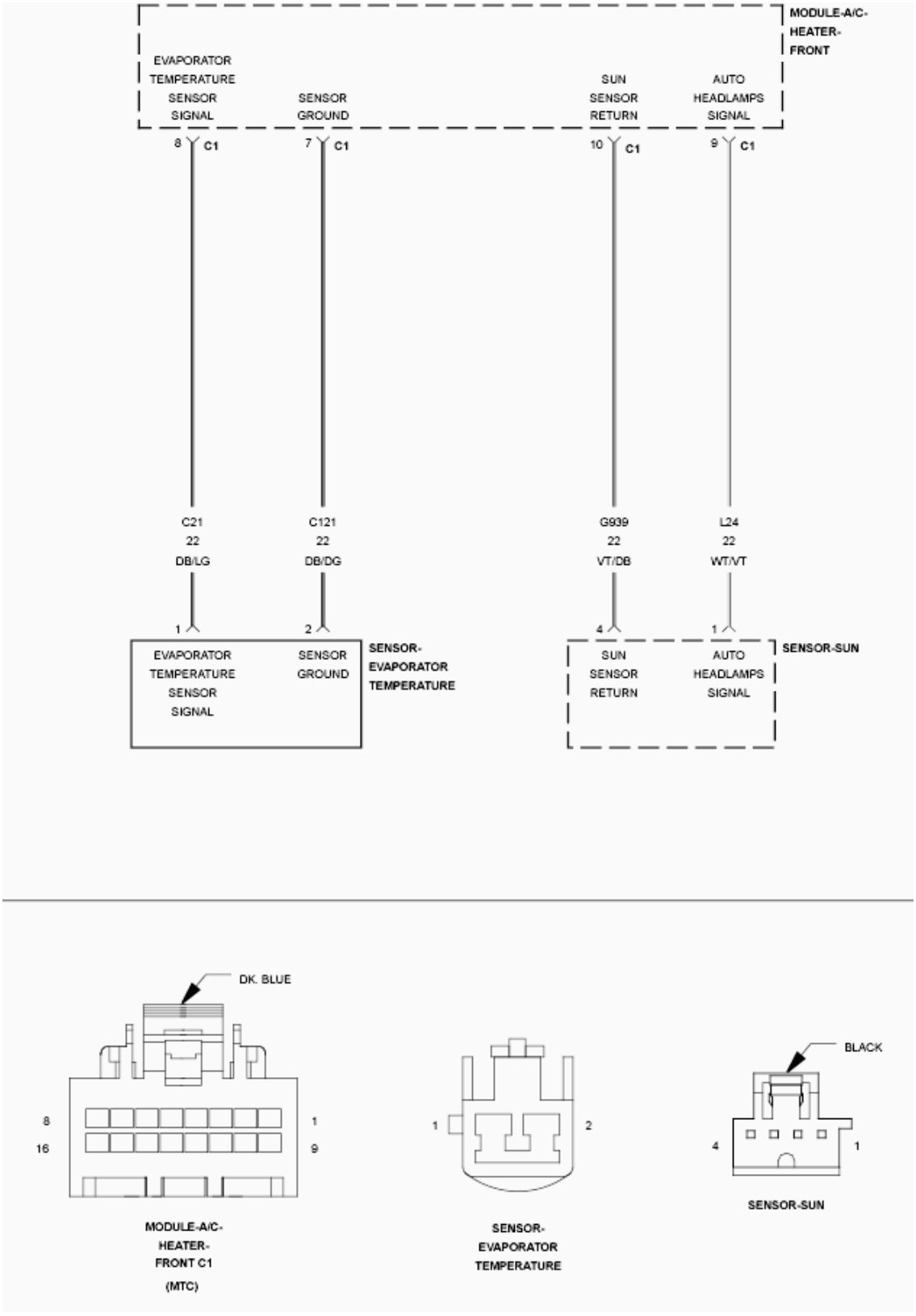


Fig. 118: Evaporator Temperature Sensor Signal Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC A/C Heater Control uses a variety of sensors to adjust HVAC operation to obtain optimal performance. These sensors are continuously monitored by the A/C Heater Control to assure that they are in range. If those sensors fall out of predetermined ranges a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  If the Auto Headlamps Signal input voltage is less than 4.3 volts and greater than 1.5 volts for period of 1.2 seconds. If the DTCs status changes from active to stored, the DTC will stay in memory for 100 ignition cycles.

Possible Causes
(L24) AUTO HEADLAMPS SIGNAL CIRCUIT SHORT TO GROUND
SUN SENSOR
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK IF THE DTC IS ACTIVE**
   1. Ignition on, engine not running.
   2. With the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 2

      No

      - Go to step 4
2. **CHECK (L24) AUTO HEADLAMPS SIGNAL CIRCUIT FOR A SHORT TO GROUND**

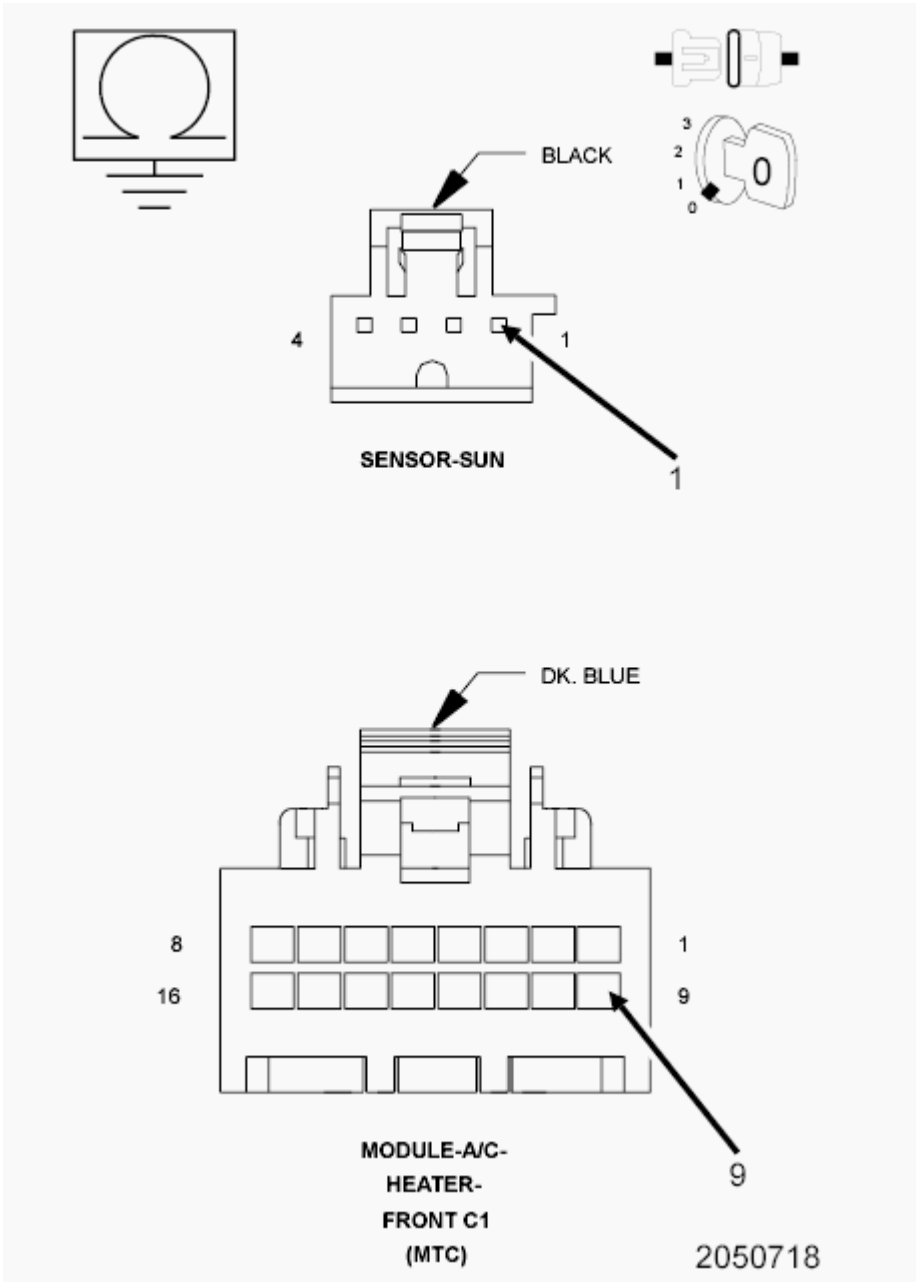


Fig. 119: Checking Auto Headlamps Signal Circuit For A Short To Ground
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Disconnect the Sun Sensor harness connector.
4. Measure the resistance between ground and he (L24) Auto Headlamps Signal circuit.

   Is the resistance below 100k Ohms?

Yes

- Repair the (L24) Auto Headlamps Signal circuit for a short to ground.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 3

3. **CHECK THE A/C HEATER CONTROL**
   1. Replace the Sun Sensor in accordance with the Service Information.
   2. Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      Did this DTC reset while performing the HVAC Verification Test?

      Yes

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.
4. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

      - Repair as necessary.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      No

      - Test complete.

B210A-84-SYSTEM VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE

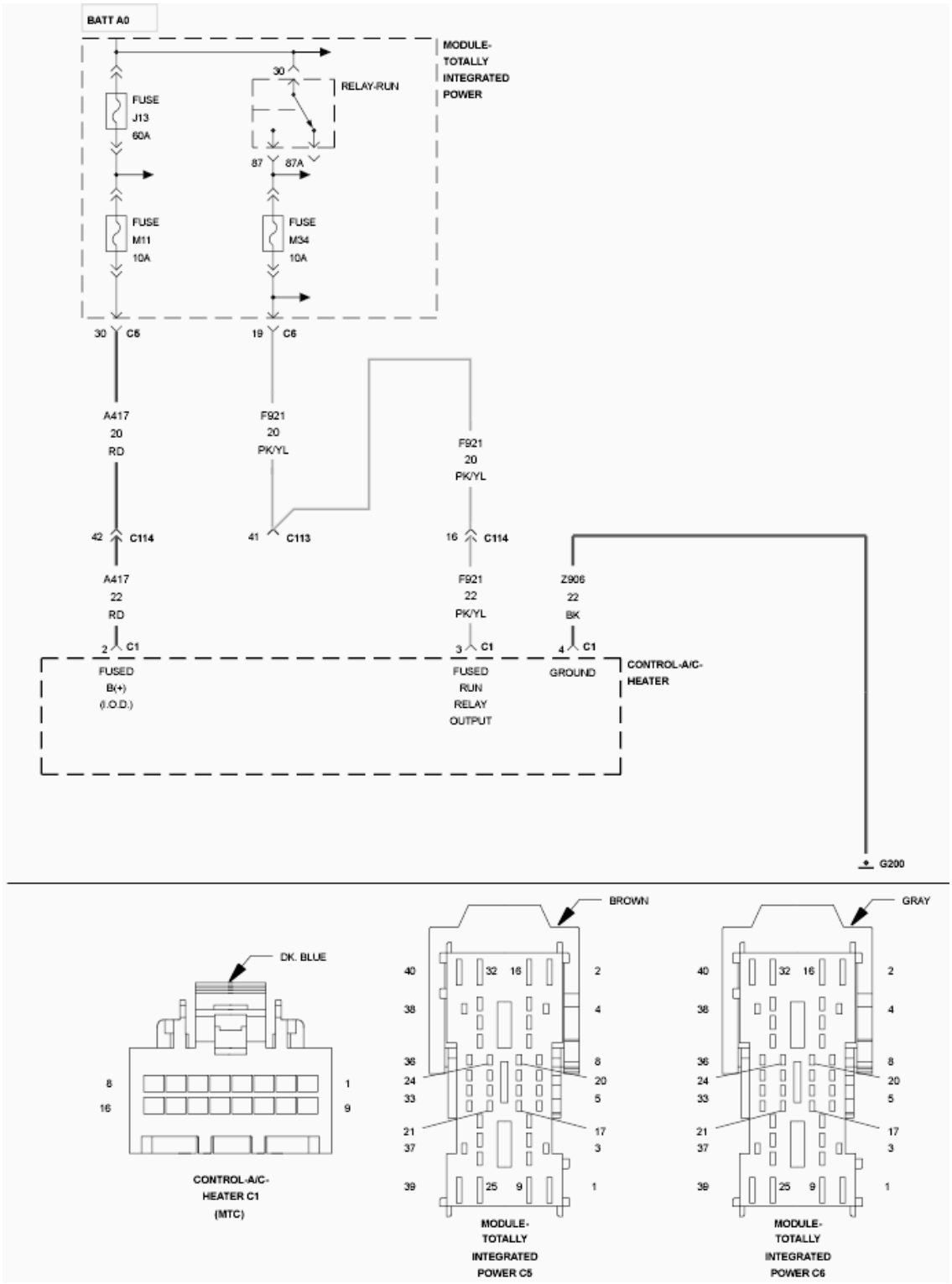


Fig. 120: Fused B+ Run Relay Output Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a DTC will set.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  If the controller system voltage or ignition voltage broadcast over the BUS is lower than monitored controller voltage the for period of 60 seconds.

Possible Causes
RELATED TIPM DTCS PRESENT
RELATED CHARGING SYSTEM DTCS PRESENT
RELATED HVAC DTCS PRESENT
OTHER CONTROLLERS REPORTING UNDER VOLTAGE CONDITION
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR TIPM DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read DTCs.

      Are there any Totally Integrated Power Module (TIPM) DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK FOR POWERTRAIN CONTROL MODULE DTCS**

1. With the scan tool, read DTCs.

   Are there any Powertrain Control Module (PCM) charging system DTCs present?

   Yes

   - Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

   No

   - Go to step 3

3. **CHECK FOR HVAC DTCS**
   1. With the scan tool, read HVAC DTCs.

      Is the DTC B210D-84-Battery Voltage Low - Signal Below Allowable Range present also?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the diagnostic procedure for **B210D-84-BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE**.

      No

      - Go to step 4

4. **CHECK IF THE DTC IS ACTIVE**
   1. With the scan tool, read HVAC DTCs.

      NOTE: It can take up to 60 seconds or more for this DTC to mature.

      Is this DTC active?

      Yes

      - Go to step 5

      No

      - Go to step 6

5. **CHECK IF OTHER CONTROLLERS ARE REPORTING AN OVER VOLTAGE CONDITION**
   1. With the scan tool, read DTCs.

      Are any other controllers reporting an over voltage condition?

Yes

- Go To DTC Based Diagnostics and perform the appropriate diagnostic procedure.

No

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B210B-85-SYSTEM VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE

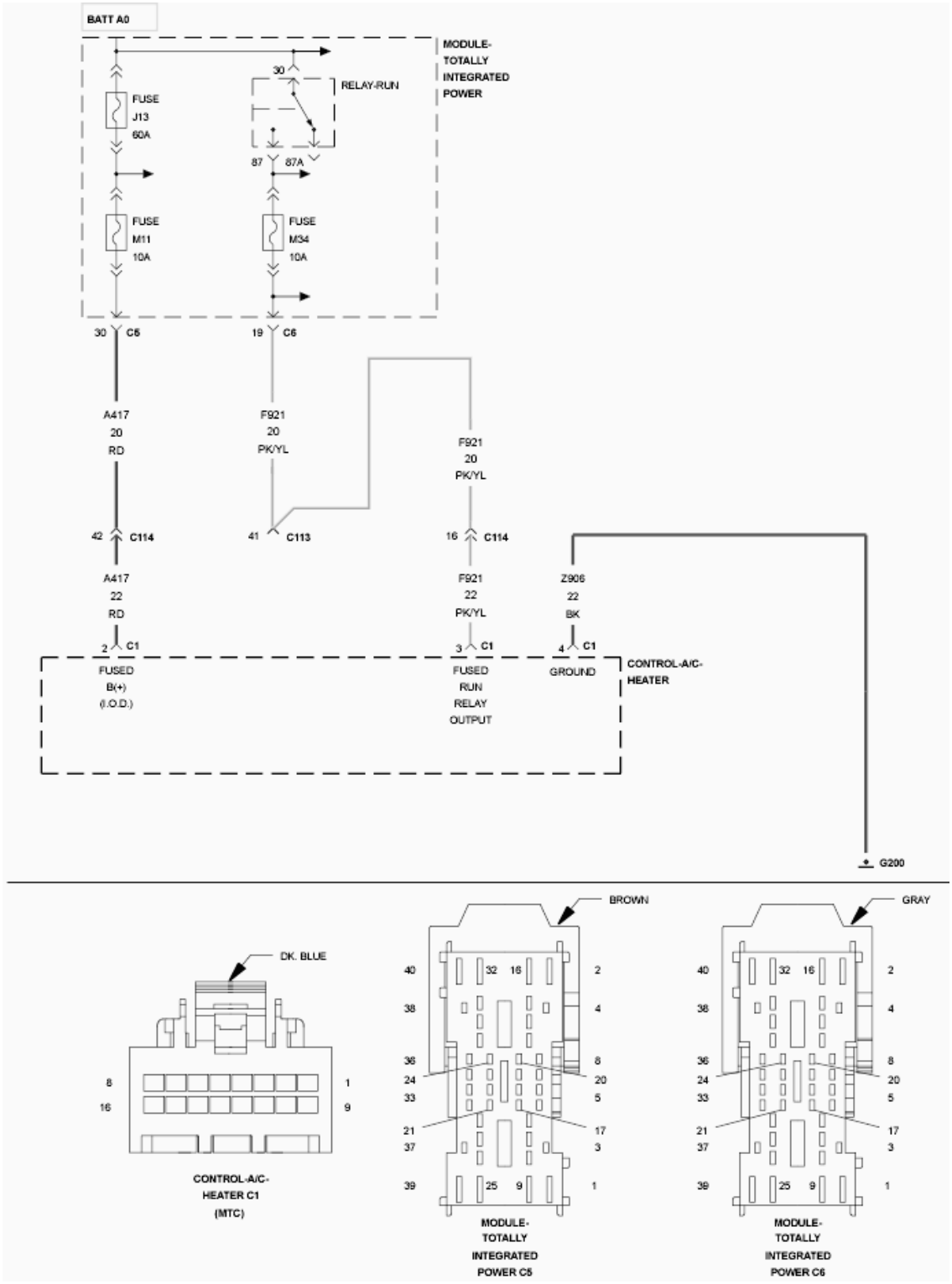


Fig. 121: Fused B+ Run Relay Output Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage as well as battery voltage derived from BUS communication to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a DTC will set.

- **When Monitored:**

  Continuously with the ignition on.

- **Set Condition:**

  If the controller system voltage or ignition voltage broadcast over the BUS is higher than monitored controller voltage the for period of 60 seconds.

Possible Causes
RELATED TIPM DTCS PRESENT
RELATED CHARGING SYSTEM DTCS PRESENT
RELATED HVAC DTCS PRESENT
OTHER CONTROLLERS REPORTING OVER VOLTAGE CONDITION
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR TIPM DTCS**
   1. Ignition on, engine not running.
   2. With the scan tool, read DTCs.

      Are there any Totally Integrated Power Module (TIPM) DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK FOR POWERTRAIN CONTROL MODULE DTCS**
   1. With the scan tool, read DTCs.

Are there any Powertrain Control Module (PCM) charging system DTCs present?

Yes

- Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. **CHECK FOR HVAC DTCS**
   1. With the scan tool, read HVAC DTCs.

      Is the DTC B210E-85-Battery Voltage High - Signal Above Allowable Range present also?

      Yes

      - See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the diagnostic procedure for **B210E-85-BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE**.

      No

      - Go to step 4
4. **CHECK IF THE DTC IS ACTIVE**
   1. With the scan tool, read HVAC DTCs.

      NOTE: It can take up to 60 seconds or more for this DTC to mature.

      Is this DTC active?

      Yes

      - Go to step 5

      No

      - Go to step 6
5. **CHECK IF OTHER CONTROLLERS ARE REPORTING AN OVER VOLTAGE CONDITION**
   1. With the scan tool, read DTCs.

      Are any other controllers reporting an over voltage condition?

      Yes

- Go to DTC Based Diagnostics and perform the appropriate diagnostic procedure.

No

- Replace and program the A/C Heater Control in accordance with the Service Information.
- Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

6. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. With the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B210D-84-BATTERY VOLTAGE LOW - SIGNAL BELOW ALLOWABLE RANGE

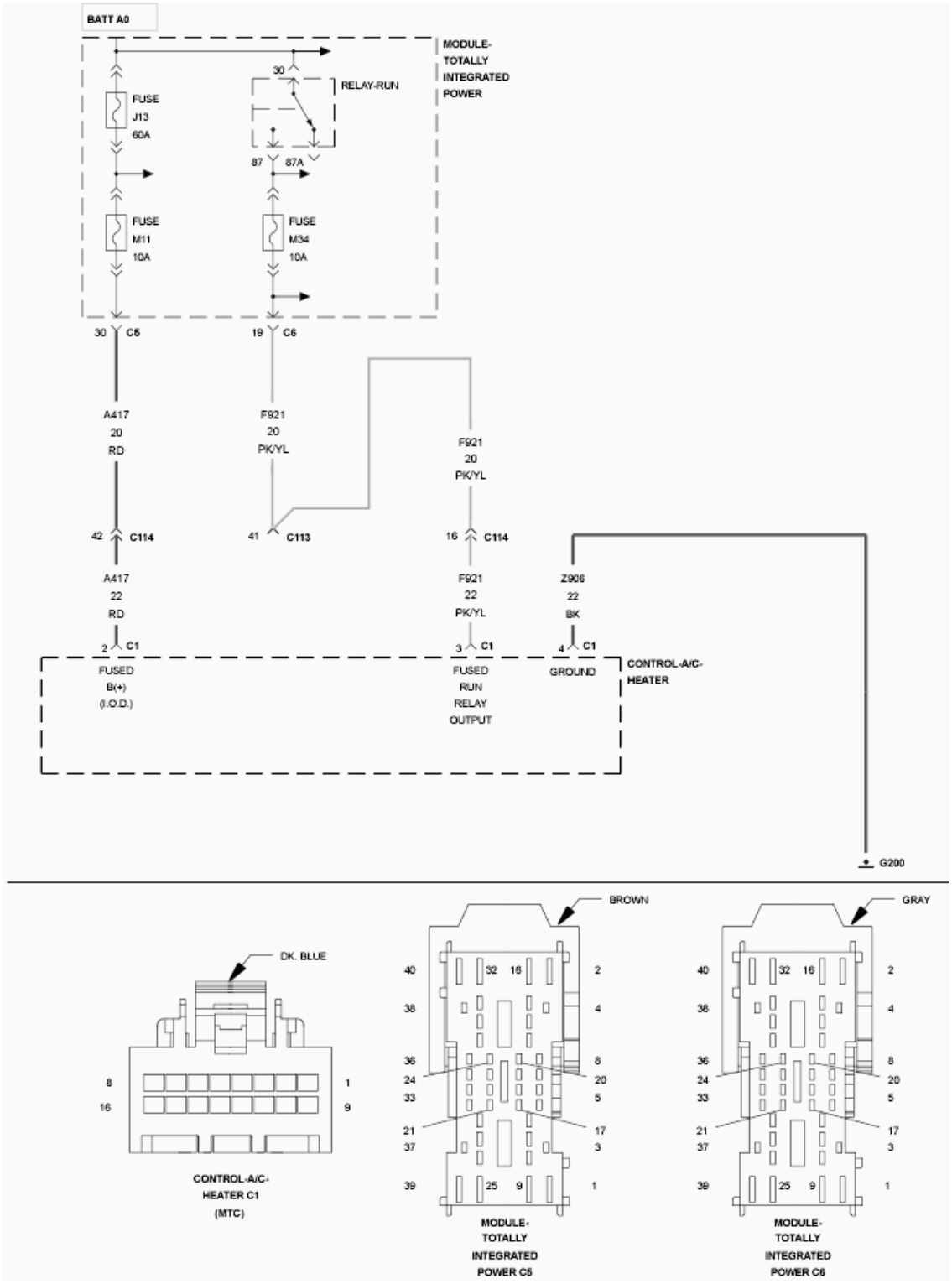


Fig. 122: Fused B+ Run Relay Output Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the controller battery voltage is less than or equal to 10.0 volts for period of 5.0 seconds.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
(F921) FUSED RUN RELAY OUTPUT CIRCUIT OPEN
(A417) FUSED B(+) CIRCUIT OPEN
(Z906) GROUND CIRCUIT OPEN
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR CHARGING SYSTEM DTCS**
   1. Using the scan tool, read PCM DTCs.

      Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK FOR TOTALLY INTEGRATED POWER MODULE DTCS**
   1. Using the scan tool, read TIPM DTCs.

      Are there any TIPM DTCS present?

Yes

- Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. **CHECK IF THE DTC IS ACTIVE**
   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 4

      No

      - Go to step 7
4. **CHECK THE (F921) FUSED RUN RELAY OUTPUT CIRCUIT FOR AN OPEN**

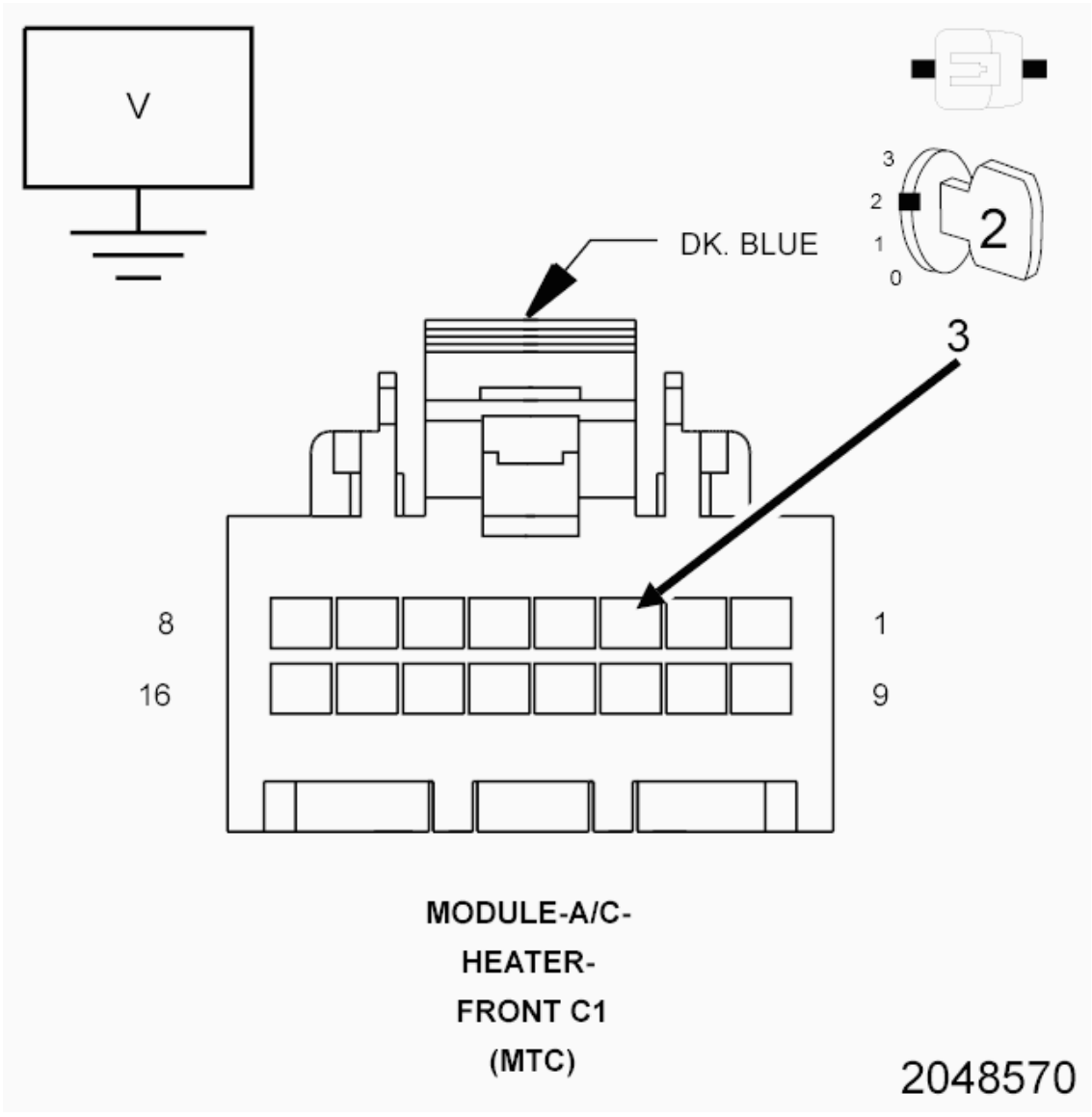


Fig. 123: Checking Fused Run Relay Output Circuit For An Open
Courtesy of CHRYSLER LLC

1. Ignition on, engine not running.
2. While back probing, measure the voltage of the (F921) Fused Run Relay Output circuit in the A/C Heater Control C1 harness connector.

   Is the voltage 10.0 volts or below?

   Yes

   - Repair the (F921) Fused Run Relay Output circuit for an open or high resistance.

     NOTE: If the fuse is open, make sure to check for a short to ground on

the (F921) Fused Run Relay Output circuit.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 5

5. **CHECK THE (A417) FUSED B(+) CIRCUIT FOR AN OPEN**

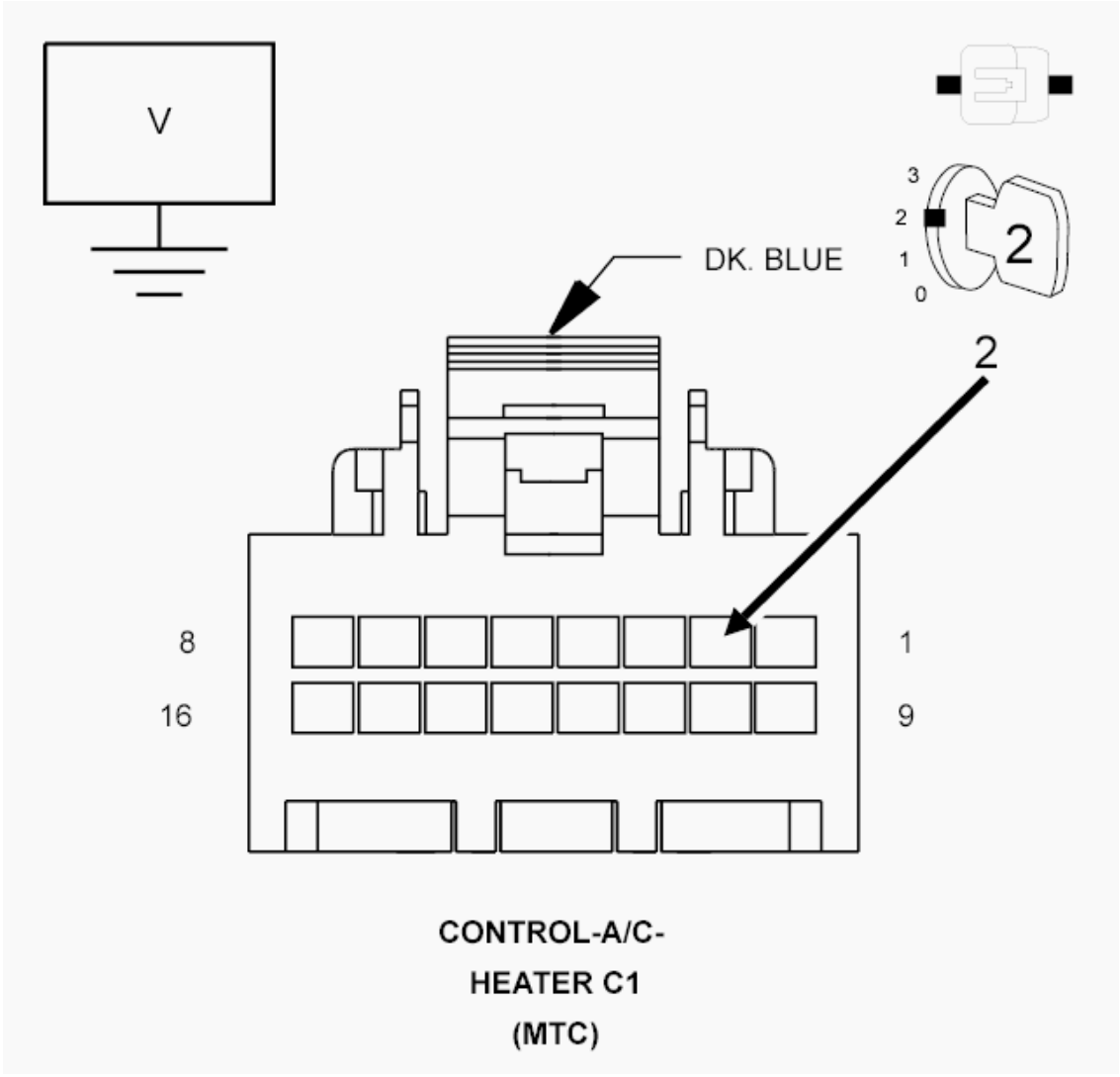


Fig. 124: Checking Fused B(+) Circuit For An Open
Courtesy of CHRYSLER LLC

1. Ignition on, engine not running.
2. While back probing, measure the voltage of the (A417) Fused B (+) circuit in the A/C Heater Control C1 harness connector.

Is the voltage 10.0 volts or below?

Yes

- Repair the (A417) Fused B (+) circuit for an open or high resistance.

  NOTE: Make sure to check if the IOD fuse is installed. If the fuse is open, make sure to check for a short to ground.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Go to step 6

6. **CHECK THE (Z906) GROUND CIRCUIT FOR AN OPEN**

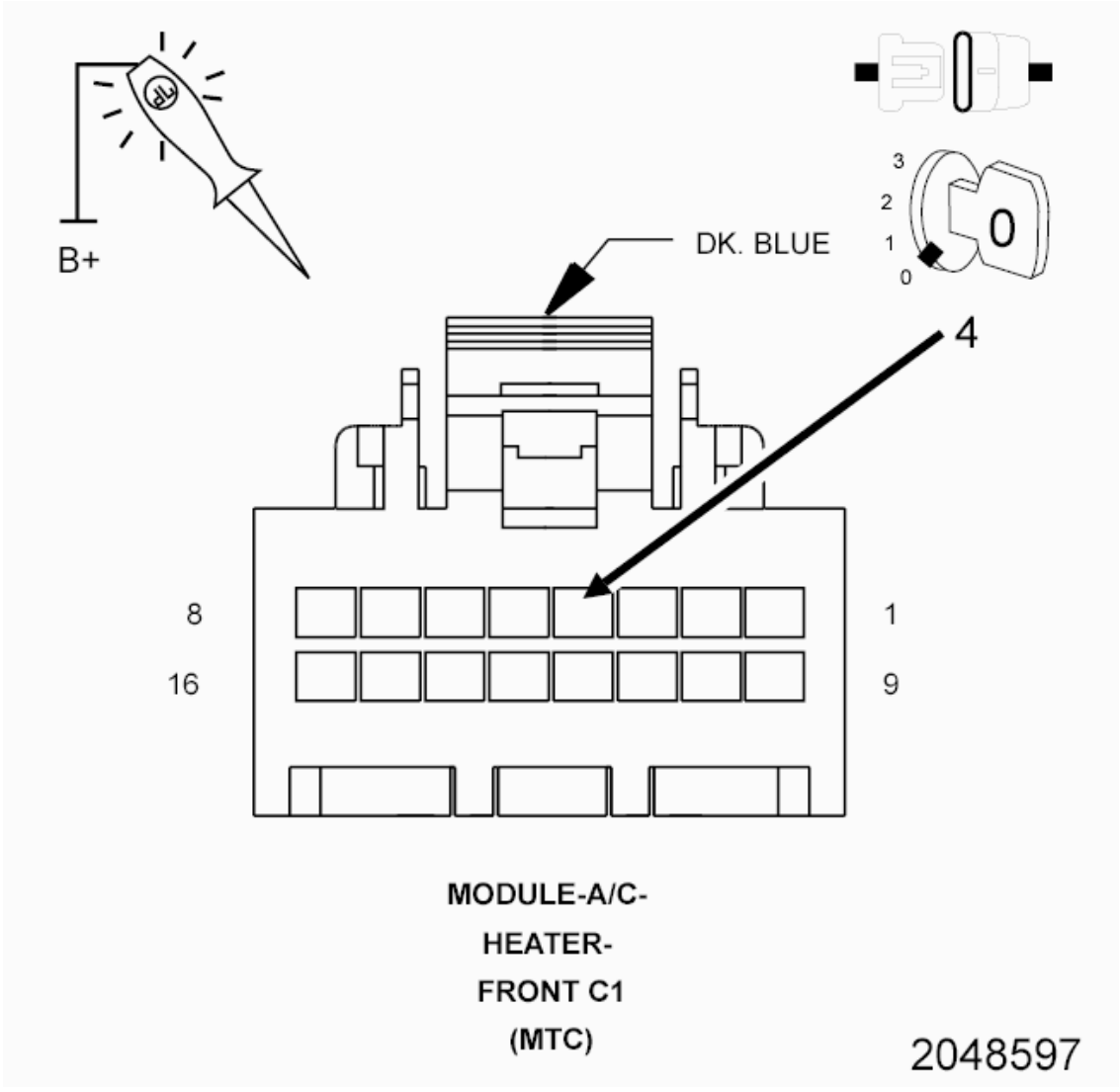


Fig. 125: Checking Ground Circuit For An Open
Courtesy of CHRYSLER LLC

1. Turn the ignition off to the lock position.
2. Disconnect the A/C Heater Control C1 harness connector.
3. Using a 12-volt test light connected to 12-volts, check the (Z906) Ground circuit.

NOTE: The test light must illuminate brightly. Compare the brightness to that of a direct connection to the battery.

Does the test light illuminate brightly?

Yes

- Replace and program the A/C Heater Control in accordance with the Service Information.

- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Repair the (Z906) Ground circuit for an open.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

7. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the **SYSTEM WIRING DIAGRAMS** as a guide, check all related splices and connectors for signs of water intrusion, corrosion, pushed out or bent terminals, and correct pin tension.
   4. Wiggle the wiring and connectors while checking for shorted and open circuits.

   Were there any problems found?

   Yes

   - Repair as necessary.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

   No

   - Test complete.

B210E-85-BATTERY VOLTAGE HIGH - SIGNAL ABOVE ALLOWABLE RANGE

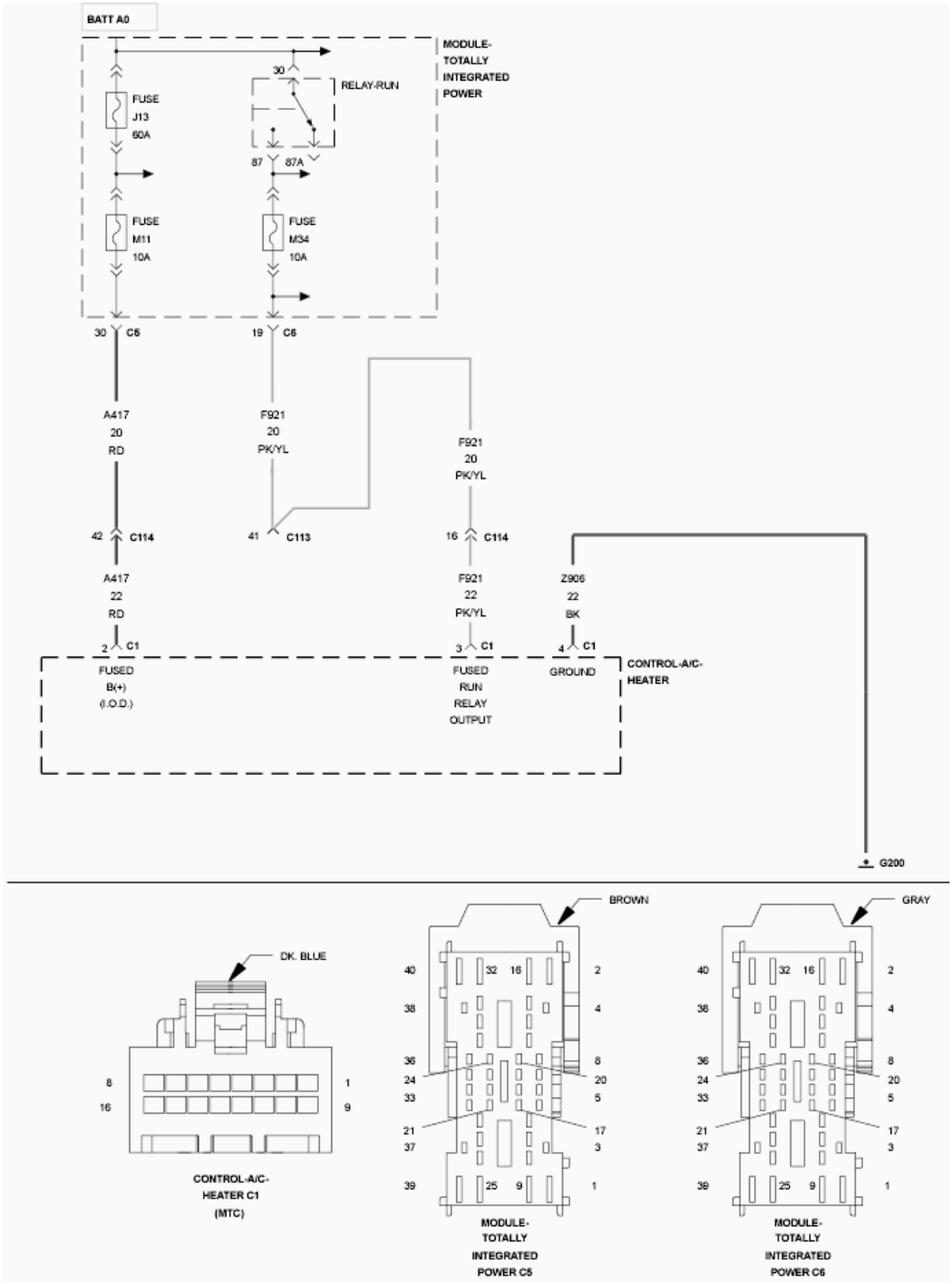


Fig. 126: Fused B+ Run Relay Output Ground Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Control constantly monitors battery and ignition voltage to ensure proper operation. If the voltage to the controller is out of range it could cause damage to the controller or its respective components. If the voltage of either circuit drops below or rises above a predetermined calibration a Diagnostic Trouble Code (DTC) will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the controller battery voltage is higher than 16.0 Volts for period of 1.0 second.

Possible Causes
RELATED CHARGING SYSTEM DTCS PRESENT
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK FOR CHARGING SYSTEM DTCS**
   1. Using the scan tool, read PCM DTCs.

      Are there any charging system DTCs present in the Powertrain Control Module (PCM)?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

      No

      - Go to step 2
2. **CHECK FOR TOTALLY INTEGRATED POWER MODULE DTCS**
   1. Using the scan tool, read TIPM DTCs.

      Are there any TIPM DTCs present?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Go to step 3

3. **CHECK IF THE DTC IS ACTIVE**
   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Go to step 4

      No

      - Go to step 5
4. **CHECK IF OTHER CONTROLLER ARE REPORTING AN OVER VOLTAGE CONDITION**
   1. Ignition on, engine not running.
   2. With the scan tool read DTCs.

      Are any other controllers reporting an over voltage condition?

      Yes

      - Go to DTC Based Diagnostics and perform the appropriate diagnostic procedure.

      No

      - Replace and program the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.
5. **CHECK THE WIRING AND CONNECTORS**
   1. The conditions necessary to set the DTC are not present at this time.
   2. Using the scan tool, check the Environmental Data to help identify the conditions in which the DTC was set.
   3. Using the schematics as a guide, inspect the wiring and connectors specific to this circuit.
   4. Check for an intermittent condition by inspecting the related wiring harness for chafed, pierced, pinched, partially broken wires.
   5. Check the connectors for broken, bent, pushed out, spread, corroded, or contaminated terminals.
   6. Wiggle the wiring and connectors while checking for shorted and open circuits.

      Were there any problems found?

      Yes

- Repair as necessary.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- Test complete.

B2214-00-(HVAC) CLIMATE CONTROL INTERNAL

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the A/C Heater Control has an internal fault. This Diagnostic Trouble Code (DTC) has a maturing time of five seconds and a de-maturing time of 10 seconds. If the DTCs status changes from active to stored it will stay in memory for 100 ignition cycles.

Possible Causes
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK THE A/C HEATER CONTROL**

   Repair

   - Check for any controller software updates if applicable. If an update is available, reprogram the controller with the latest software. If no software updates are available, replace and program the A/C Heater Control in accordance with the Service Information.
   - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

B222A-00-VEHICLE LINE MISMATCH

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The A/C Heater Controller checks for vehicle configuration using communication over the BUS. If the stored configuration does not match the configuration stored in the controller this DTC will set.

- **When Monitored:**

  With the ignition on.

- **Set Condition:**

  If the stored configuration does not match the configuration stored in the controller.

Possible Causes
VEHICLE CONFIGURATION NOT STORED IN THE TOTALLY INTEGRATED POWER MODULE (TIPM)
CONTROL MODULE INSTALLED IN INCORRECT VEHICLE
A/C HEATER CONTROL

Always perform the HVAC Pre-Diagnostic Troubleshooting procedure before proceeding. See DTC-Based Diagnostics/HVAC - Standard Procedure.

Diagnostic Test

1. **CHECK THE VEHICLE CONFIGURATION**

   NOTE: The DTC must be active and no BUS communication DTCs present before performing this test. If BUS communication DTCs are present, perform there respective test first. If the DTC is stored, erase the DTC and cycle the ignition. If the DTC resets and changes to active, then proceed.

   1. With the scan tool, check the vehicle configuration stored in the Totally Integrated Power Module (TIPM).
   2. With the scan tool, check the vehicle configuration stored in the A/C Heater Control (HVAC).

      Pick the answer that best describes your findings:

      TIPM has wrong or no vehicle configuration

      - With the scan tool, program the proper vehicle configuration in the TIPM.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

      HVAC has wrong vehicle configuration but TIPM has correct configuration.

      - Replace the A/C Heater Control in accordance with the Service Information.
      - Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC -**

Standard Procedure.

HVAC and TIPM have proper calibration and the DTC is active in the HVAC.

- Check if other modules such as the Powertrain Control Module (PCM) have the wrong configuration stored in the controller and reprogram or replace as necessary. If all other modules show the proper configuration, replace the A/C Heater Control in accordance with the Service Information.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

U0010-00-CAN INTERIOR BUS

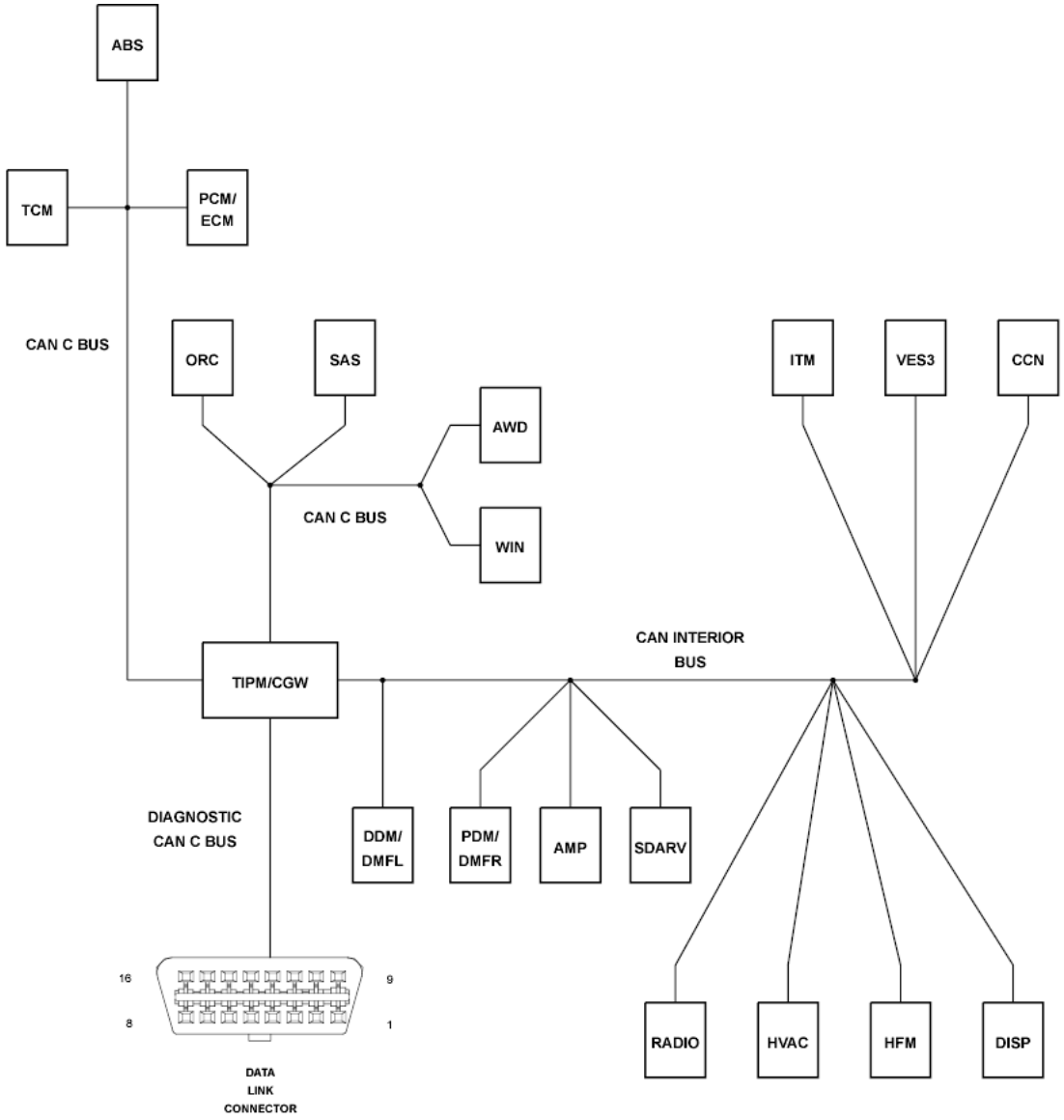


Fig. 127: CAN Interior Bus Circuit Schematic

Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously when the ignition is on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  The A/C Heater Control detects a short to ground or a short to voltage on the CAN Bus circuits.

Possible Causes
BUS CIRCUITS SHORTED TO GROUND OR VOLTAGE
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
TOTALLY INTEGRATED POWER MODULE (TIPM)
TIPM POWER AND GROUND
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the **U0010-CAN INTERIOR BUS** diagnostic procedure.

      No

- Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTCs diagnostic procedure.

U0141-00-LOST COMMUNICATION WITH IPM (FCM/TIPM)

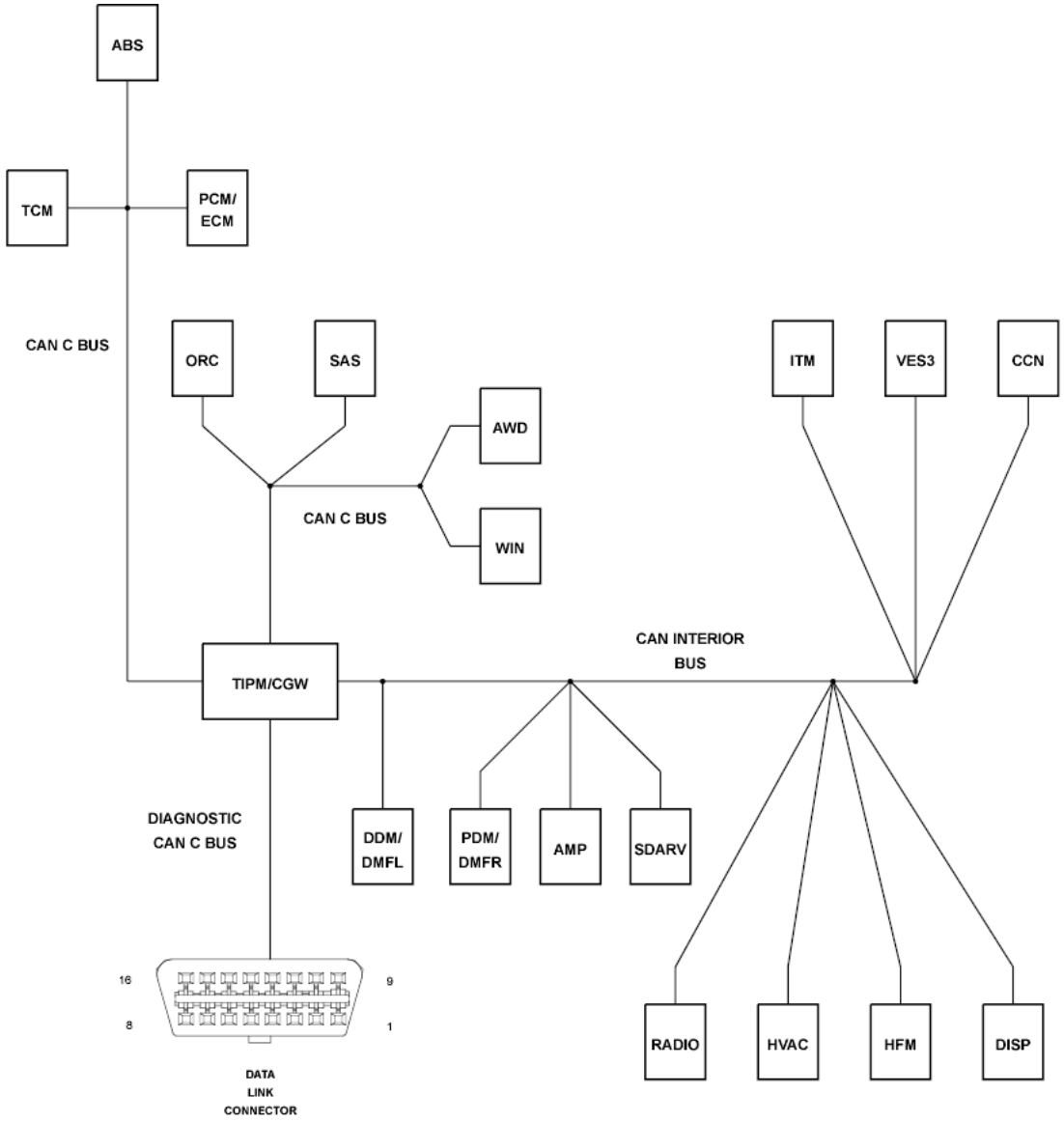


Fig. 128: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  Continuously when the ignition is on.

12-volt battery voltage between 10 and 16 Volts.

Ignition Off Draw (IOD) fuse installed.

Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Totally Integrated Power Module (TIPM) for three seconds.

Possible Causes
BUS CIRCUITS OPEN OR SHORTED
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
FCM/TIPM NOT CONFIGURED CORRECTLY
TIPM POWER AND GROUND
TOTALLY INTEGRATED POWER MODULE
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0141-LOST COMMUNICATION WITH IPM (FCM/TIPM)**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

U0155-00-LOST COMMUNICATION WITH CLUSTER/CCN

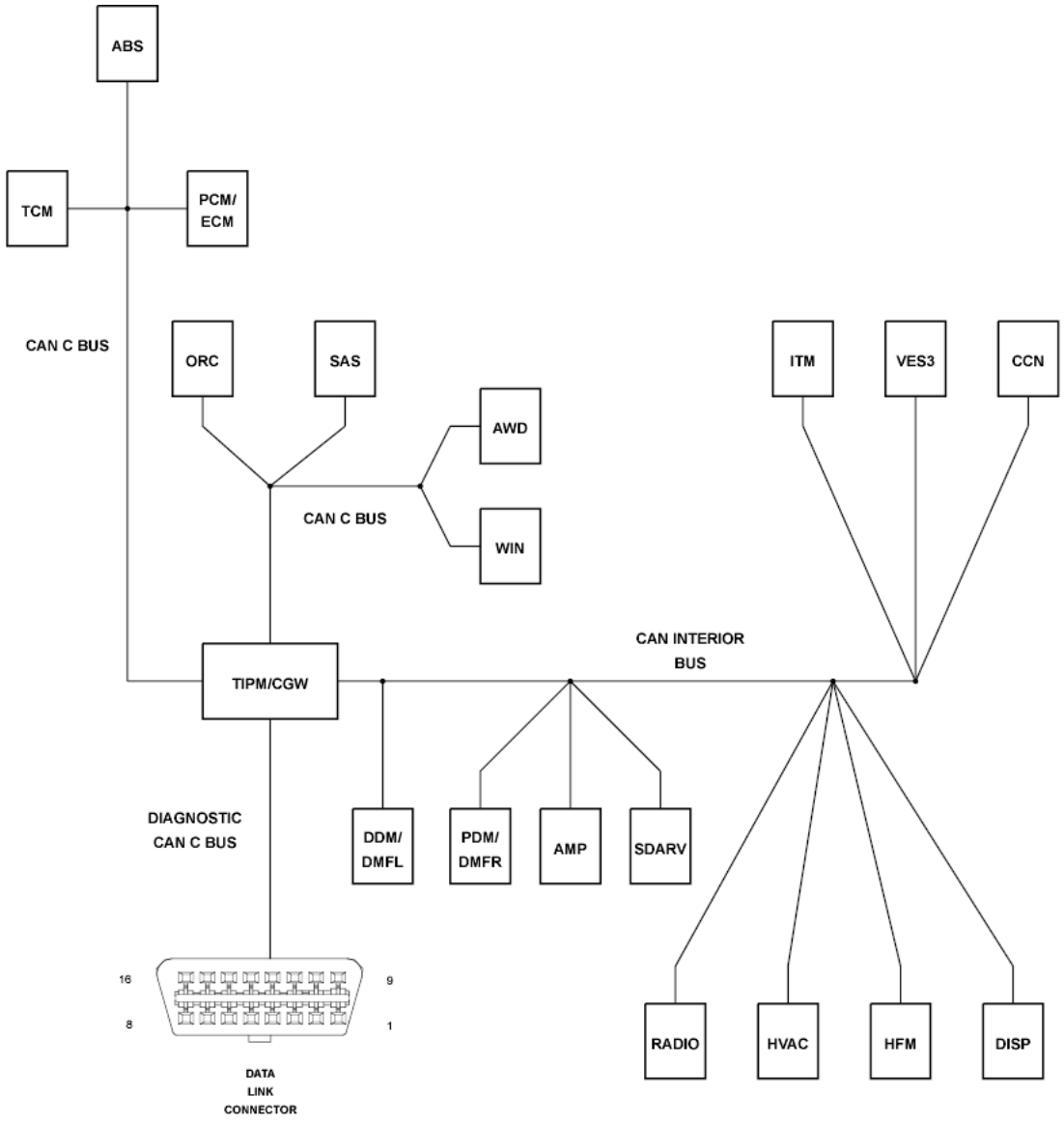


Fig. 129: CAN Interior Bus Circuit Schematic
Courtesy of CHRYSLER LLC

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

- **When Monitored:**

  With the ignition on.

  Battery voltage between 10 and 16 Volts.

  Ignition Off Draw (IOD) fuse installed.

  Totally Integrated Power Module (TIPM) is configured correctly.

- **Set Condition:**

  Bus messages not received from the Cluster/CCN for approximately two to five seconds.

Possible Causes
(D265) CAN INTERIOR BUS(+) (125k) CIRCUIT SHORTED TO VOLTAGE
(D264) CAN INTERIOR BUS(-) (125k) CIRCUIT SHORTED TO GROUND
DTCS RELATED TO BATTERY VOLTAGE, IGNITION, OR VIN MESSAGES
TIPM NOT CONFIGURED CORRECTLY
CLUSTER/CCN POWER AND GROUND
CLUSTER/CCN
A/C HEATER CONTROL

Diagnostic Test

1. **VERIFY DIAGNOSTIC TROUBLE CODE (DTC) IS ACTIVE**

   NOTE: Make sure the IOD fuse is installed and 12-volt battery voltage is between 10 and 16 Volts before proceeding.

   1. Using the scan tool, read active HVAC DTCs.

      Is this DTC active?

      Yes

      - Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the diagnostic procedure for **U0155-LOST COMMUNICATION WITH CLUSTER/CCN**.

      No

      - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the Stored Lost Communication DTC diagnostic procedure.

STANDARD PROCEDURE

HVAC SYSTEM TEST

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Theory of Operation

The HVAC System Test provides a starting point in the diagnostic process by identifying the appropriate diagnostic procedure or system test to perform when diagnosing a given symptom, condition, or Diagnostic

Trouble Code (DTC). It also provides a means for testing the entire HVAC system by utilizing the A/C Heater Control's On-Board System Tests. The HVAC System Tests can also assist in diagnosing stored DTCs.

Diagnostic Test

1. **HVAC SYSTEM TEST**

   NOTE: Diagnose and repair all active DTCs before diagnosing and repairing stored DTCs. If active DTCs are present, see 28 - DTC-Based Diagnostics and perform the appropriate diagnostic procedure.

   Make a selection based on the symptom, condition, or DTC that you want to diagnose.

   scan tool Indicates HVAC Not Active On Bus

   - Refer to **Non-DTC Diagnostics/Communication - Diagnosis and Testing** and perform the No Response from HVAC diagnostic procedure.

   Blower Motor Inoperative

   - Refer to **Heating and Air Conditioning/Distribution/MOTOR, Blower - Diagnosis and Testing** for Blower Motor diagnostic procedures.

   Actuator Calibration Test

   - Go to step 4

   A/C System Performance (Cool Down) Test

   - Go to step 2
2. **A/C COOL DOWN TEST**

   The following are prerequisites of the A/C Cool Down Test. Verify that the:

   - Refrigerant system has an adequate charge. Check and repair as necessary before proceeding in accordance with the Service Information. Refer to **Heating and Air Conditioning - Diagnosis and Testing** .
   - Blower motor operates correctly in all speeds. Diagnose and repair all blower related faults before proceeding.
   - Work area ambient temperature is above 16° C (60° F) before proceeding. Move the vehicle to a warmer work area if necessary.
   - Evaporator temperature is above 13° C (55° F) before proceeding.
   - A/C compressor is not running. If the compressor is running, turn the A/C off and allow the evaporator to warm up before proceeding.

NOTE: Running the AC Cool Down test will cause the A/C status indicator to flash. One or more status messages will display on the scan tool after running the Cool Down Test. These messages will clear after paging back out of this test function. Therefore, it is important to note all messages before doing so.

1. Start the engine.
2. Turn the Blower control to the high speed position.
3. With the scan tool in HVAC, select System Tests and then select Cool Down test. Allow the test to run to completion.

   Does the scan tool display a status message that indicates a fault has occurred?

   Yes

   - See 28 - DTC-Based Diagnostics/HVAC and perform the appropriate diagnostic procedure based on vehicle HVAC system.

   No

   - Go to step 3

3. **MODE SWITCH AND DOOR ACTUATOR CIRCUIT TEST**

NOTE: If at anytime a DTC becomes active during this test, proceed to the conclusion question. If multiple DTCs are active, diagnose those that relate to a short circuit first.

1. Start the engine and turn the Blower control to the low speed position.
2. Set the Blend control (single-zone) or Driver and Passenger Blend control (dual-zone) to the full cold position.
3. Monitor the scan tool for active HVAC DTCs while performing the following test steps.

- If equipped, press the A/C mode switch on, wait 30 seconds, and then press it off.
- On Dual-Zone systems, press the Recirculation mode switch on, wait 30 seconds, and then press it off.
- If equipped, press the EBL mode switch on, wait 30 seconds, and then press it off.
- Move the Blend control (single-zone) or Driver Blend control (dual-zone) from full cold to full hot, wait 30 seconds, and then move it back to full cold.
- If equipped, move the Passenger Blend control from full cold to full hot, wait 30 seconds, and then moved it back to full cold.
- Turn the Mode select control to the defrost position, wait 30 seconds, and then turn it to the panel position (dual-zone) or panel / recirculation position (single-zone). Wait 30 seconds before proceeding.

4. **ACTUATOR CALIBRATION TEST**

1. Ignition on, engine not running.
2. Using the scan tool, select Actuator Calibration Test. When the test is complete, read HVAC DTCs.

   Does the scan tool display any DTCs?

   Yes

   - See 28 - DTC-Based Diagnostics/HVAC and perform the appropriate diagnostic procedure based on vehicle HVAC system.

   No

   - Test Complete.

HVAC PRE-DIAGNOSTIC TROUBLESHOOTING PROCEDURE

For complete wiring diagrams, refer to **SYSTEM WIRING DIAGRAMS** .

Perform the following steps prior to any diagnostic procedure(s).

- Testing should only be performed with the battery fully charged to avoid false diagnosis.
- With the scan tool, read Powertrain Control Module (PCM) Diagnostic Trouble Codes (DTCs). If PCM DTCs are present. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure(s) before proceeding.
- Depending on the vehicle configuration, with the scan tool, read Totally Integrated Power Module (TIPM) DTCs. If TIPM DTCs are present. Refer to **DTC-Based Diagnostics/MODULE, Totally Integrated Power (TIPM) - Diagnosis and Testing** and perform the appropriate diagnostic procedure(s) before proceeding.
- With the scan tool, read HVAC DTCs. Record all Stored, Active, and Pending DTC information.
- With the scan tool, read the Environmental Data. Use this data to help identify the conditions in which the DTC was set.
- Refer to the When Monitored and Set Conditions for this DTC. DTCs can set at ignition on, at start up, or operating under specific conditions.
- Using the **SYSTEM WIRING DIAGRAMS** as a guide, inspect the wiring and connectors related to this circuit and clean/repair as necessary.
- Check for controller software updates if applicable. Some conditions can be corrected by upgrading the controller software.

  NOTE: If the controller is updated with new software, with the scan tool, perform a HVAC Actuator Calibration Test.

- Check for Service Information Tune-ups or Service Bulletins for any possible causes that may apply.

Did any of the above procedures repair the vehicle?

Yes

- Testing is complete.
- Perform the HVAC VERIFICATION TEST. See **DTC-Based Diagnostics/HVAC - Standard Procedure**.

No

- See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

HVAC VERIFICATION TEST

Perform the following procedures to verify that the repair(s) are valid.

1. Make sure that all accessories are turned off.
2. Make sure that the battery is fully charged.
3. Turn the ignition off to the lock position.
4. Disconnect all jumper wires and reconnect all previously disconnected components and connectors.
5. With the scan tool, record and erase all Diagnostic Trouble Codes (DTCs) from ALL modules.
6. Turn the ignition off, remove the scan tool from the DLC (Data Link Connector). Open the door and close the door. Wait a minimum 30 seconds, then turn the ignition on. Reconnect the scan tool.

NOTE: Disconnecting the scan tool and opening and closing the door will allow the controller to enter into sleep mode.

7. With the scan tool perform the HVAC Actuator Calibration Test.
8. Start and run the engine for two minutes while operating all functions of the system that caused the original concern.
9. With the scan tool, check for DTCs in all modules.

Is the original condition still present or are there any other HVAC DTCs present?

Yes

- See **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** and perform the appropriate diagnostic procedure.

No

- Repair is complete.

2009 HVAC

Heating & Air Conditioning - Service Information - Journey

DESCRIPTION

DESCRIPTION

A manual temperature control (MTC) single zone heating-A/C system, automatic temperature controlled (ATC) dual zone heating-A/C system, MTC tri-zone heating-A/C system and an ATC tri-zone heating-A/C system is available on this vehicle.

To maintain the performance level of the heating, ventilation and air conditioning (HVAC) system, the engine cooling system must be properly maintained. The use of a bug screen is not recommended. Any obstructions in front of the radiator or A/C condenser will reduce the performance of the A/C and engine cooling systems.

The engine cooling system includes the radiator, thermostat, radiator hoses and the engine coolant pump. Refer to **COOLING** for more information before opening or attempting any service to the engine cooling system.

FRONT HEATING AND A/C SYSTEM

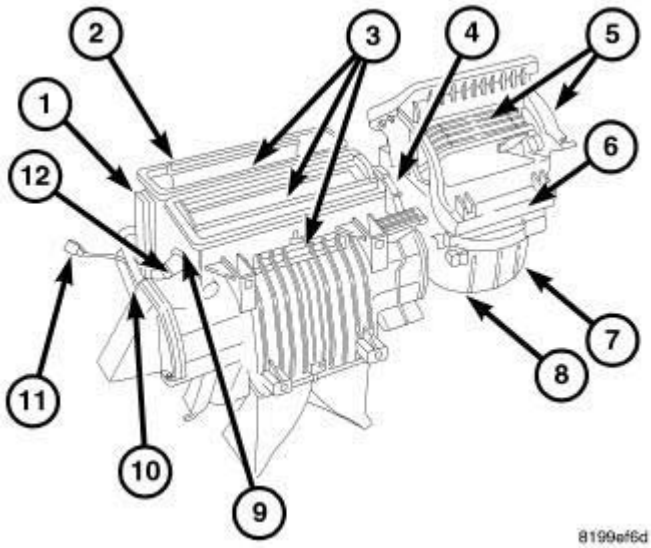


Fig. 1: HVAC Housing
Courtesy of CHRYSLER LLC

NOTE: Single zone HVAC shown. Dual zone similar.

All vehicles are equipped with a common front heater, ventilation and air conditioning (HVAC) housing (1). The heating-A/C system combines A/C, heating, and ventilating capabilities in a single HVAC housing mounted within the passenger compartment beneath the instrument panel. The HVAC housing includes:

- A/C evaporator (2)

- Mode-air doors (3)
- Mode door actuator (4)
- Recirculation-air door and actuator (5)
- Particulate air filter (when equipped) (6)
- Blower motor (7)
- Blower motor resistor or power module (depending on system application) (8)
- Blend door actuator(s) (9)
- Heater core (10)
- Evaporator temperature sensor (11)
- Blend-air door(s) (12)

NOTE: An electric positive temperature coefficient (PTC) heater is used on vehicles when equipped with the 2.0L diesel engine. The PTC heater unit compensates for the lower engine coolant temperatures produced by the diesel engine. The PTC heater unit is mounted in the HVAC air distribution housing, downstream of the heater core. See Heating and Air Conditioning/Cabin Heater/UNIT, Heater - Description.

Based upon the system mode selected, conditioned air can exit the front HVAC housing through one or a combination of the three main housing outlets: defrost, panel or floor. The defrost and panel outlets are located on the top of the HVAC air distribution housing and the floor outlets are located on each side of the distribution housing. Once the conditioned air exits the HVAC housing, it is further directed through molded plastic ducts to the various outlets within the vehicle interior. These outlets and their locations are as follows:

- **Defroster Outlet** - Two defroster outlets are located in the center of the instrument panel, near the base of the windshield.
- **Side Window Demister Outlets** - There are two side window demister outlets, one is located at each outboard end of the instrument panel, near the A-pillars.
- **Panel Outlets** - There are four panel outlets in the instrument panel, one located near each outboard end of the instrument panel facing the rear of the vehicle and two located near the top of the instrument panel center bezel.
- **Front Floor Outlets** - There are two front floor outlets, one located on each side the floor panel center tunnel behind the instrument panel.
- **Rear Seat Floor Outlets** - There are two rear seat floor outlets, one located on each side of the floor panel near the front of each rear seat foot well.

REAR HEATING AND A/C SYSTEM

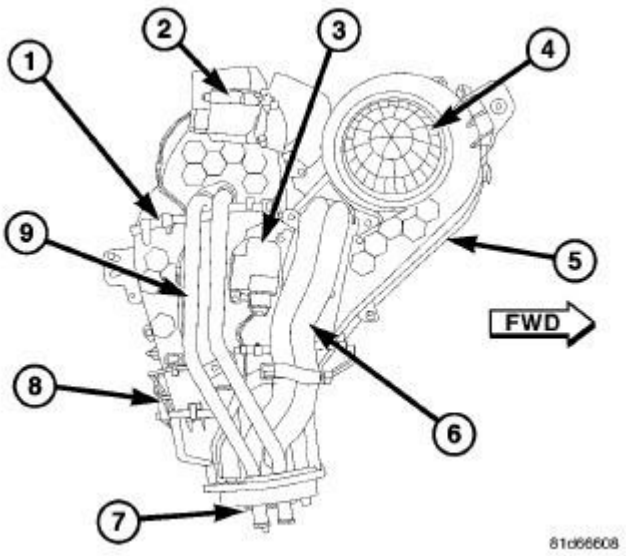


Fig. 2: Rear Heater AC Housing Description
Courtesy of CHRYSLER LLC

The tr-zone heating-A/C systems are equipped with a rear heater-A/C housing (1) that combines A/C and heating capabilities into a single unit mounted within the passenger compartment behind the right quarter interior trim panel. The rear heater-A/C housing includes:

- Mode door and actuator (2)
- Blend door and actuator (3)
- Blower motor (4)
- Blower motor resistor or power module (5) (depending on control system)
- A/C evaporator (6)
- A/C expansion valve (7)
- Wire harness (8)
- Heater core (9)

Based upon the rear temperature selected, conditioned air can exit the rear heater-A/C housing through one or a combination of the two rear housing outlets: ceiling or floor. The ceiling outlet is located at the top rear of the housing and the floor outlet is located at the top front of the rear housing. Once the conditioned air exits the rear heater-A/C housing, it is further directed through molded plastic ducts to the outlets at the rear of the passenger compartment. These outlets and their locations are as follows:

- **Ceiling Outlets** - There are four ceiling outlets in the headliner. One located at each outboard side of the intermediate seat position and one located in front of each rear seat position.
- **Floor Outlet** - There is one floor outlet in the right quarter interior trim panel located behind the right rear door area.

OPERATION

OPERATION

The standard front and available rear heating-A/C systems used in this vehicle are blend-air type systems. In a blend-air system, a blend-air door controls the amount of conditioned air that is allowed to flow through, or around the heater core. In the available front dual zone system, separate blend-air doors are used to provide completely independent side-to-side temperature control of the discharge air. The temperature control(s) determines the discharge air temperature(s) by operating the blend door actuator(s), which move the blend-air door(s). This design allows almost immediate control of output air temperature(s).

FRONT SYSTEM

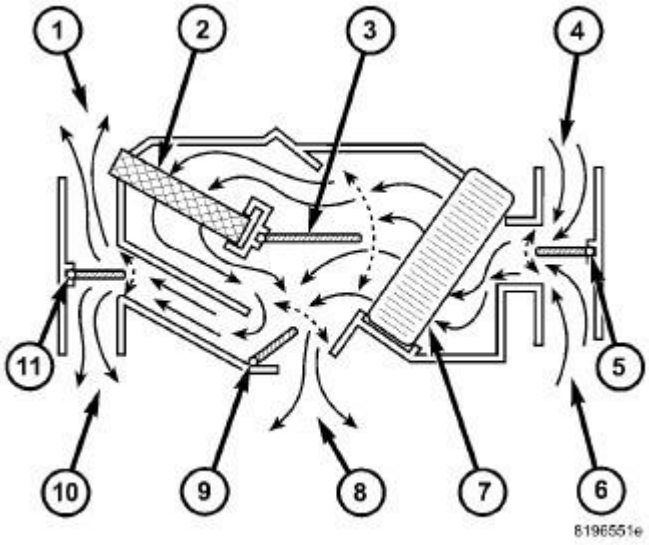


Fig. 3: Blend Air System Schematic
Courtesy of CHRYSLER LLC

NOTE: Typical blend-air type HVAC system shown.

The heating-A/C system pulls outside (ambient) air through the fresh air intake (4) located at the cowl panel at the base of the windshield and into the air inlet housing above the heating, ventilation and air conditioning (HVAC) housing and passes through the A/C evaporator (7). Air flow is then directed either through or around the heater core (2). This is done by adjusting the position of the blend-air door(s) (3) with the temperature control(s) located on the A/C-heater control in the instrument panel. Air flow is then directed out the floor outlet (8), instrument panel outlet (10) or the defroster outlet (1) in various combinations by adjusting the position of the mode-air doors (9 and 11) using the mode control located on the A/C-heater control. The temperature and mode control use electrical actuators to operated the air doors.

The velocity of the air flow out of the outlets can be adjusted with the blower speed control located on the A/C-heater control.

The fresh air intake can be shut off by pressing the Recirculation button on the A/C-heater control. This will operate the electrically actuated recirculation-air door (5), which closes off the fresh air intake. With the fresh

air intake closed, the conditioned air within the vehicle is pulled back into the HVAC housing through the recirculation air intake (6).

The A/C compressor can be engaged by pressing the A/C (snowflake) button on the A/C-heater control. It will automatically engage when the mode control is set in any Mix to Defrost position. This will remove heat and humidity from the air before it is directed through or around the heater core. The mode control on the A/C-heater control is used to direct the conditioned air to the selected system outlets.

The defroster outlets receive airflow from the HVAC housing through the molded plastic defroster duct, which is secured to the top of the instrument panel. The airflow from the defroster outlets is directed by fixed vanes in the defroster outlet grille and cannot be adjusted.

The side window demister outlets receive airflow from the HVAC housing through the defroster duct and molded plastic demister ducts, which are secured to the instrument panel support. The airflow from the side window demister outlets is directed by fixed vanes and cannot be adjusted. The demisters operate when the mode control is set in any Floor to Defrost position.

The instrument panel outlets receive airflow from the HVAC housing through a molded plastic center panel duct and two end panel ducts. The two end panel ducts direct airflow to the left and right instrument panel outlets, while the center panel duct directs airflow to the two center panel outlets. Each of these outlets can be individually adjusted to direct or shut off the flow of air leaving the outlets.

The front and rear floor outlets receive airflow from the HVAC housing through the front and rear floor ducts which are secured to each side of the HVAC housing. The rear seat ducts direct airflow beneath the carpet to the outlets located near the front of each rear seat foot well. None of the floor outlets can be adjusted.

NOTE: It is important to keep the air intake opening clear of debris. Leaf particles and other debris that is small enough to pass through the cowl opening screen can accumulate within the HVAC housing. The closed, warm, damp and dark environment created within the housing is ideal for the growth of certain molds, mildews and other fungi. Any accumulation of decaying plant matter provides an additional food source for fungal spores, which enter the housing with the fresh intake-air. Excess debris, as well as objectionable odors created by decaying plant matter and growing fungi can be discharged into the passenger compartment during heater-A/C operation if the air intake opening is not kept clear of debris.

The front A/C system is designed for use of non-CFC, R-134a refrigerant and uses an A/C expansion valve (TXV) to meter the flow of refrigerant to the A/C evaporator. To maintain minimum evaporator temperature and prevent evaporator freezing, an evaporator temperature sensor input is supplied to the A/C-heater control. In turn, the powertrain control module (PCM) cycles the A/C compressor clutch off and on as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing.

REAR SYSTEM

The rear heating-A/C system pulls interior air through the opening in the rear quarter interior trim panel and into the rear blower motor in the rear heater-A/C housing, then through the rear A/C evaporator. Air flow can be

directed either through or around the rear heater core by adjusting the blend-air door with either the front or the rear temperature control (depending on the front A/C-heater control setting). The air flow is then directed to the floor or ceiling outlets depending on the mode selected by the mode control. Air flow velocity can be adjusted with the blower speed control located on either the front A/C-heater control or the rear A/C-heater control (depending on the front A/C-heater control setting).

The headliner air outlets receive airflow from the rear heater-A/C housing through the molded plastic ceiling duct, which connects to the headliner duct and headliner air outlets. Airflow direction from the headliner air outlets can be adjusted to direct or shut off the flow of air leaving the outlets.

The rear floor outlet receives airflow from the rear heater-A/C housing through the molded plastic floor distribution duct, which connects to the rear floor outlet located in the rear quarter interior trim panel. The airflow from the rear floor outlet is directed by fixed vanes in the outlet and air flow direction cannot be adjusted. The rear floor outlet is integral to the rear quarter interior trim panel.

The rear A/C system is designed for use of non-CFC, R-134a refrigerant and uses an "H" valve-type thermal expansion valve (TXV) to meter the flow of refrigerant to the rear A/C evaporator.

DIAGNOSIS AND TESTING

A/C PERFORMANCE

The A/C system is designed to provide the passenger compartment with low temperature and low humidity air. The A/C evaporator, located in the HVAC housing is cooled to temperatures near the freezing point. As warm damp air passes over the fins of the A/C evaporator, the air transfers its heat to the refrigerant in the evaporator coils and the moisture in the air condenses on the evaporator fins. During periods of high heat and humidity, an A/C system will be more effective in the Recirculation mode (max-A/C). With the system in the Recirculation mode, only air from the passenger compartment passes through the A/C evaporator. As the passenger compartment air dehumidifies, the A/C system performance levels rise.

Humidity has an important bearing on the temperature of the air delivered to the interior of the vehicle. It is important to understand the effect that humidity has on the performance of the A/C system. When humidity is high, the A/C evaporator has to perform a double duty. It must lower the air temperature, and it must lower the temperature of the moisture in the air that condenses on the evaporator fins. Condensing the moisture in the air transfers heat energy into the evaporator fins and coils. This reduces the amount of heat the A/C evaporator can absorb from the air. High humidity greatly reduces the ability of the A/C evaporator to lower the temperature of the air.

However, evaporator capacity used to reduce the amount of moisture in the air is not wasted. Wringing some of the moisture out of the air entering the vehicle adds to the comfort of the passengers. Although, an owner may expect too much from their A/C system on humid days. A performance test is the best way to determine whether the system is performing up to design standards. This test also provides valuable clues as to the possible cause of trouble with the A/C system. The ambient air temperature in the location where the vehicle will be tested must be a minimum of 21° C (70° F) for this test. Also the evaporator temperature sensor probe must be a minimum of 16° C (60° F) for this test as well.

A/C PERFORMANCE TEST

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

CAUTION: The use of an A/C recycling/charging station for purposes of determining the actual charge level of an A/C system is not recommend. Service recycling/charging stations do not reflect the correct amount of refrigerant charge in the A/C system after a single "reclaim" cycle. Tests have shown that it can take two or more "reclaim" cycles to remove all of the refrigerant charge, depending on the equipment being used. Use only the following procedure for determining the proper charge level.

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

1. Check for diagnostic trouble codes using a scan tool. If no diagnostic trouble codes (DTCs) are found in the A/C-heater control or the powertrain control module (PCM) or engine control module (ECM) (depending on engine application) or the totally integrated power module (TIPM), go to 2. If any DTCs are found, repair as required, then proceed to 2.
2. Connect a tachometer and a manifold gauge set.

NOTE: The ambient air temperature of the vehicle and the location where the vehicle will be tested must be a minimum of 21° C (70° F) before performing this test. Also the evaporator temperature sensor must be a minimum of 18° C (65° F) for this test as well. Place the vehicle in the testing area until the temperature within the vehicle reaches a minimum of 18° C (65° F).

3. Operate the heating-A/C system under the following conditions.
   - Engine at normal operating temperature
   - Engine at normal idle speed
   - Door and windows closed
   - Transaxle in Park
   - A/C-heater controls set to Recirculation mode, full cool, panel mode, high blower and with A/C compressor engaged. If the A/C compressor does not engage, see the A/C System Diagnosis table
   - All panel outlet vanes open and positioned straight rearward
4. Insert a thermometer in the driver side center panel air outlet and operate the A/C system until the thermometer temperature stabilizes or a minimum of 5 minutes.

NOTE: This procedure requires the technician to know what the temperature and

relative humidity is at the time of the test. The temperature must be combined with the relative humidity to calculate the apparent ambient temperature, when the temperatures are above 21° C (70° F). Use the current ambient temperature and the relative humidity in your location. This information can be obtained from multiple sources, such as the internet or local news media.

5. With the A/C compressor clutch engaged, compare the air temperature at the center panel outlet and the compressor discharge pressure (high side) to the A/C Performance Temperature and Pressure chart.

A/C PERFORMANCE TEMPERATURE AND PRESSURE

Ambient Air Temperature (Apparent)	21° C (70° F)	27° C (80° F)	32° C (90° F)	38° C (100° F)	43° C (110° F)
Air Temperature at Center Panel Outlet	9° C (48° F)	9° C (48° F)	12° C (54° F)	15° C (59° F)	24° C (75° F)
Air Temperature at Driver Side 2nd Row Headliner Outlet	10° C (50° F)	13° C (55° F)	15° C (59° F)	17° C (63° F)	24° C (75° F)
Suction Pressure at Service Port (Low Side)	138 to 310 kPa (20 to 45 psi)	138 to 345 kPa (20 to 50 psi)	207 to 365 kPa (30 to 55 psi)	207 to 414 kPa (30 to 60 psi)	241 to 448 kPa (35 to 65 psi)
Discharge Pressure at Service Port (High Side)	1034 to 1724 kPa (150 to 250 psi)	1379 to 2068 kPa (175 to 300 psi)	1551 to 2241 kPa (175 to 325 psi)	1724 to 2413 kPa (250 to 350 psi)	2068 to 2758 kPa (300 to 475 psi)

6. If the air outlet temperature fails to meet the specifications in the A/C Performance Temperature and Pressure chart, or if the compressor discharge pressure is high, refer to the **A/C SYSTEM DIAGNOSIS** table.

A/C SYSTEM DIAGNOSIS

Condition	Possible Causes	Correction
Rapid A/C compressor clutch cycling with poor panel outlet temperatures (fixed displacement compressors only).	1. Low refrigerant system charge.	1. See **REFRIGERANT SYSTEM LEAKS**. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
Equal low and high side pressures	1. No refrigerant in the refrigerant system.	1. See **REFRIGERANT SYSTEM LEAKS**. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Inoperative A/C compressor or clutch (depending on compressor application).	2. See **COMPRESSOR, A/C**. Test the compressor and/or clutch and replace, if required.
	3. Improperly installed or inoperative evaporator temperature sensor.	3. See **SENSOR, Evaporator Temperature**. Correctly install or test the sensor and replace, if required.
	4. Improperly installed or inoperative A/C pressure transducer.	4. See **TRANSDUCER, A/C Pressure**. Test the transducer and replace, if required.
	5. Inoperative A/C-heater control, totally integrated power module (TIPM) or PCM/ECM (depending on engine application).	5. See the appropriate Electrical Diagnostic Procedures for testing of the A/C-heater control, TIPM or PCM/ECM. Test the module and replace, if required.
Normal refrigerant pressures, but A/C Performance Test air temperatures at center panel outlet are too high.	1. Excessive refrigerant oil in system.	1. See **REFRIGERANT OIL LEVEL**. Recover the refrigerant from the refrigerant system and inspect the refrigerant oil content. Restore the refrigerant oil to the proper level, if required.
	2. Blend door actuator(s) improperly installed or inoperative.	2. See **ACTUATOR, Blend Door, Front**. Inspect the actuator(s) for proper operation. Replace the actuator as required.
	3. Blend-air door(s) inoperative or sealing improperly.	3. See **HOUSING, HVAC**. Inspect the blend-air door(s) for proper operation and sealing. Repair if required.
The low side pressure is normal or slightly low, and the high side pressure is too low.	1. Low refrigerant system charge.	1. See **REFRIGERANT SYSTEM LEAKS**. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	2. Refrigerant flow through the A/C evaporator is restricted.	2. See **EVAPORATOR, A/C, Front**. Replace the restricted A/C evaporator, if required.

	3. Restricted refrigerant flow through the refrigerant lines.	3. See **Plumbing, Front**. Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line if required.
	4. Inoperative A/C compressor.	4. See **COMPRESSOR, A/C**. Replace the compressor, if required.
The low side pressure is normal or slightly high, and the high side pressure is too high.	1. Inoperative radiator cooling fan.	1. See **COOLING** . Test the radiator cooling fan and replace, if required.
	2. A/C condenser air flow restricted.	2. See **CONDENSER, A/C**. Check the A/C condenser for damaged fins, foreign objects obstructing air flow through the condenser fins and missing or improperly installed air seals. Clean, repair or replace components as required.
	3. Refrigerant flow through the A/C receiver/drier is restricted.	3. See **DRIER, A/C Receiver**. Replace the restricted A/C receiver/drier, if required.
	4. Restricted refrigerant flow through the refrigerant lines.	4. See **Plumbing, Front**. Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct the routing or replace the refrigerant line if required.
	5. Refrigerant system overcharged.	5. See **REFRIGERANT SYSTEM CHARGE**. Recover the refrigerant from the refrigerant system. Charge the refrigerant system to the proper level, if required.
	6. Air in the refrigerant system.	6. See **REFRIGERANT SYSTEM LEAKS**. Test the refrigerant system for leaks. Repair, evacuate and charge the refrigerant system, if required.
	7. Engine overheating.	7. See **COOLING** . Test the engine cooling system and repair, if required.
The low side pressure is too high, and the high side pressure is too low.	1. Accessory drive belt slipping.	1. See **COOLING** . Inspect the accessory drive belt condition and tension. Replace the accessory drive belt or tensioner, if required.
	2. Inoperative A/C expansion valve.	2. See **VALVE, A/C Expansion**. Replace the valve, if required.
	3. Inoperative A/C compressor.	3. See **COMPRESSOR, A/C**. Replace the compressor, if required.
The low side pressure is too low, and the high side pressure is too high.	1. Restricted refrigerant flow through the refrigerant lines.	1. See **LINE, A/C Liquid**, **LINE, A/C Suction** and **LINE, A/C Discharge**. Inspect the refrigerant lines for kinks, tight bends or improper routing. Correct

		the routing or replace the refrigerant line, if required.
	2. Restricted refrigerant flow through the A/C expansion valve.	2. See **VALVE, A/C Expansion**. Replace the valve, if required.
	3. Restricted refrigerant flow through the A/C condenser.	3. See **CONDENSER, A/C**. Replace the restricted condenser, if required.

HEATER PERFORMANCE

Before performing the following tests, see **COOLING** for the procedures to check the engine coolant level and flow, engine coolant reserve/recovery system operation, accessory drive belt condition and tension, radiator air flow and the fan drive operation.

WARNING: Do not remove radiator cap when engine is hot. Failure to follow this instruction may result in serious injury.

If vehicle has been run recently, wait 15 minutes before removing the radiator cap. Place a rag over the cap and turn it to the first safety stop. Allow pressure to escape through the overflow tube. When the system pressure stabilizes, remove the cap completely.

MAXIMUM HEATER OUTPUT

Engine coolant is delivered to and from the heater core through two heater hoses. With the engine idling at normal operating temperature, set the temperature control to the full hot position, the mode control to the floor position, and the blower motor control to the highest speed position. Using a test thermometer, check the temperature of the air being discharged at the front floor outlets. Compare the test thermometer reading to the Heater Temperature Reference chart.

HEATER TEMPERATURE REFERENCE

Ambient Temperature		Minimum Floor Outlet Temperature	
Celsius	**Fahrenheit**	**Celsius**	**Fahrenheit**
16°	60°	54°	130°
21°	70°	56°	132°
26°	80°	57°	134°
32°	90°	58°	136°

See **COOLING** if the heater outlet air temperature is below the minimum specification. Both of the heater hoses should be hot to the touch. The coolant return heater hose should be slightly cooler than the coolant supply heater hose. If the return hose is much cooler than the supply hose, locate and repair the engine coolant flow obstruction in the cooling system.

OBSTRUCTED COOLANT FLOW

Possible locations or causes of obstructed coolant flow are as follows:

- Low coolant level
- Inoperative water pump
- Inoperative thermostat
- Pinched or kinked heater hoses
- Improper heater hose routing
- Plugged heater hoses or supply and return ports at the cooling system connections
- Plugged heater core

If proper coolant flow through the cooling system is verified, and heater outlet air temperature is low, a mechanical problem may exist.

MECHANICAL PROBLEMS

Possible causes of insufficient heat due to mechanical problems are as follows:

- Obstructed cowl air intake
- Obstructed heater system outlets
- Inoperative engine thermostat
- Inoperative blower motor system
- Inoperative A/C-heater control
- Inoperative blend door actuator(s)
- Inoperative, obstructed or improperly installed blend-air door(s)

TEMPERATURE CONTROL

If the heater outlet air temperature cannot be adjusted with the temperature control on the A/C-heater control, the following could require service:

- Inoperative A/C-heater control
- Inoperative blend door actuator(s)
- Inoperative, obstructed or improperly installed blend-air door(s)
- Improper engine coolant temperature

SPECIFICATIONS

A/C SYSTEM

Item	Description	Notes
A/C Compressor	Denso 6SEU16 Variable Displacement - 2.0L/2.4L 5-Passenger models	ND-8 PAG oil

	Denso 10SR15 Fixed Displacement - 2.7L/3.5L 5-Passenger models Denso 10SR17 Fixed Displacement - All 7-Passenger models	
Freeze-up Control	Evaporator temperature sensor	Input to A/C-heater control, HVAC housing mounted, sets compressor to destroke 2° C (36° F) below evaporator target temperature (minimum 5° C (41° F)) and activates compressor when within 1° C (34° F) of evaporator target temperature
Low psi Control	A/C pressure transducer	Input to PCM/ECM, discharge line mounted, sets compressor to destroke below 200 kPa (29 psi), activates compressor above 234 -262 kPa (34 - 38 psi)
High psi Control	A/C pressure transducer	Input to PCM/ECM, discharge line mounted - compressor to destroke above 3130 kPa (454 psi) and below 200 kPa (29 psi)
R-134a Refrigerant Charge Capacity	Front A/C Only - 0.624 kg (22 oz.) Front and Rear A/C - 0.907 kg (32 oz.)	Also see A/C Underhood Specification Label located in the engine compartment
A/C Clutch Coil Draw (10SR15 and 10SR17 Compressors)	3.2 - 3.3 amps	@ 12V ± 0.5V @ 21° C (70° F)
A/C Clutch Coil Resistance (10SR15 and 10SR17 Compressors)	3.6 ± 0.2 ohms	When measured across coil lead connector
A/C Clutch Air Gap (10SR15 and 10SR17 Compressors)	0.35 - 0.60 mm (0.014 - 0.024 in.)	-

FASTENER TORQUE

Description	N.m	Ft. Lbs.	In. Lbs.

All Screws NOT Listed Below	1.2	-	10
A/C Compressor to Engine Bolts	25	18	-
A/C Pressure Transducer	5.6	-	50
Front Air Distribution Housing Screws	2.2	-	20
Front A/C Expansion Valve Bolts	11	-	97
Front HVAC Actuator Mounting Screws	2	-	17
Front HVAC Housing to Dash Panel Nuts	4.5	-	40
Front Floor Duct to HVAC Housing Screw	2	-	17
Front Mode Door Actuator Bracket Screws	2	-	17
Instrument Panel Center Duct Screws	2.2	-	20
Heat Shield to Dash Panel Nuts	1	-	10
Liquid Refrigerant Lines to A/C Receiver/Drier Nut	20	15	-
Lower to Upper Suction line Nut	20	15	-
Rear A/C expansion Valve to Tapping Plate Bolts	11	-	97
Rear Heater-A/C Housing to Quarter Panel Bolts	3	-	27
Rear Seat Floor Duct to Floor Support Screw	2.2	-	20
Refrigerant Lines to A/C Compressor Nuts	20	15	-
Refrigerant Lines to A/C Condenser Nuts	20	15	-
Refrigerant Lines to Front Expansion Valve Nut	20	15	-
Refrigerant Lines to Rear Expansion Valve Nut	11	-	97
Refrigerant Lines to Underbody Refrigerant	23	17	-

Line Nut			
Seat Belt Retractor to D-Pillar Bolts	52	38.5	-
Upper Seat Belt Bracket to D-Pillar Bolts	52	38.5	-
Underbody and Extension Refrigerant Line Nuts	23	17	-

SPECIAL TOOLS

SPECIAL TOOLS

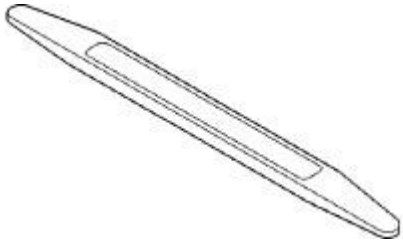


Fig. 4: Trim Stick C-4755
Courtesy of CHRYSLER LLC

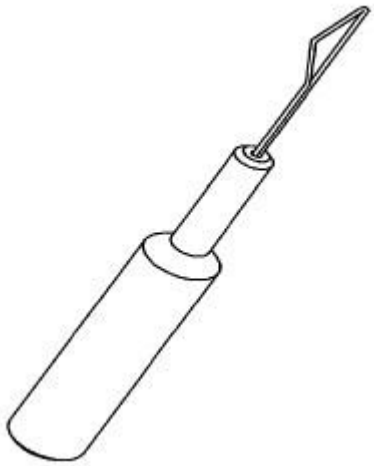


Fig. 5: Back Probe Tool 6801
Courtesy of CHRYSLER LLC

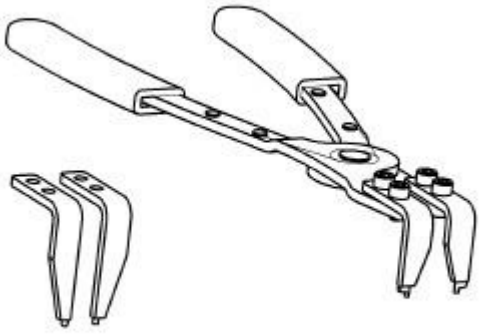


Fig. 6: Pliers, A/C Snap Ring 9764
Courtesy of CHRYSLER LLC

CONTROLS, FRONT

ACTUATOR, BLEND DOOR, FRONT

Description

DESCRIPTION

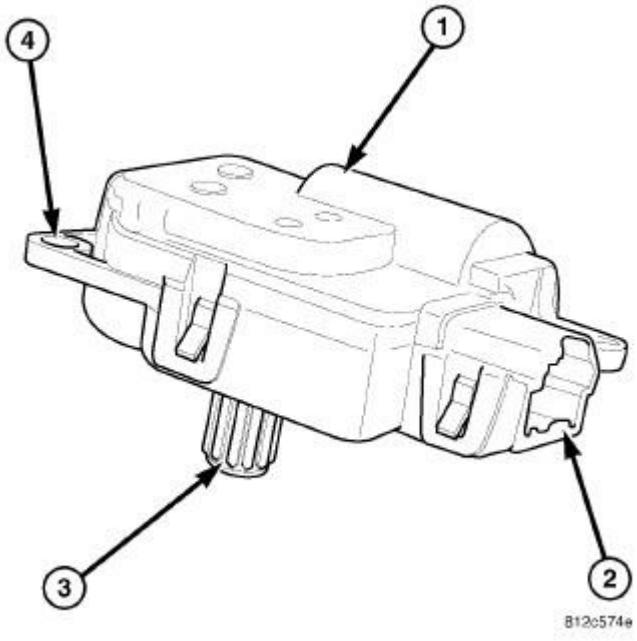


Fig. 7: Blend Door Actuators
Courtesy of CHRYSLER LLC

The blend door actuators (1) for the front heating-A/C system are reversible, 12-volt direct current (DC) servo motors. Models with the front single zone heating-A/C system have a single blend-air door, which is controlled by a single blend door actuator. Models with the front dual zone heating-A/C system have dual blend-air doors, which are controlled by two blend door actuators.

The blend door actuator for the single zone heating-A/Csystem is located on the driver side front HVAC air distribution housing. For the dual zone heating-A/C system, the same blend door actuator used for the single zone system becomes the driver side blend door actuator, which is mechanically connected to only the driver side blend-air door. A second separate blend door actuator is also located on the passenger side of the front air distribution housing which is mechanically connected to only the passenger side blend-air door.

The blend door actuators are contained within a black molded plastic housing with an integral wire connector receptacle (2). An output shaft with splines (3) connect the blend door actuators to the blend door linkage. Three integral mounting tabs (4) allow the actuators to be secured to the air distribution housing. The blend door actuators do not require mechanical indexing to the blend door linkage, as they are electronically calibrated by the A/C-heater control.

The A/C-heater control must be recalibrated each time an actuator motor is replaced. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The blend door actuators are interchangeable with the actuators for the recirculation and mode-air doors.

Operation

OPERATION

The blend door actuators are connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector. The blend door actuator(s) can move the blend-air door(s) in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the blend-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the blend-air door moves in the opposite direction. When the A/C-heater control makes the voltage to both connections high or both connections low, the blend-air door stops and will not move.

The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the blend door actuator(s) and the blend-air door(s). The A/C-heater control learns the blend-air door stop positions during the calibration procedure and will store a diagnostic trouble code(DTC) for any problems it detects in the blend door actuator circuits.

The blend door actuators are diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The blend door actuators cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The single zone heating-A/C system is equipped with a single blend door actuator. The dual zone system has two blend door actuators, one for the driver side blend-air door and one for the passenger side blend-air door.

NOTE: LHD model shown in illustrations. RHD model similar.

SINGLE ZONE/DUAL ZONE LEFT SIDE

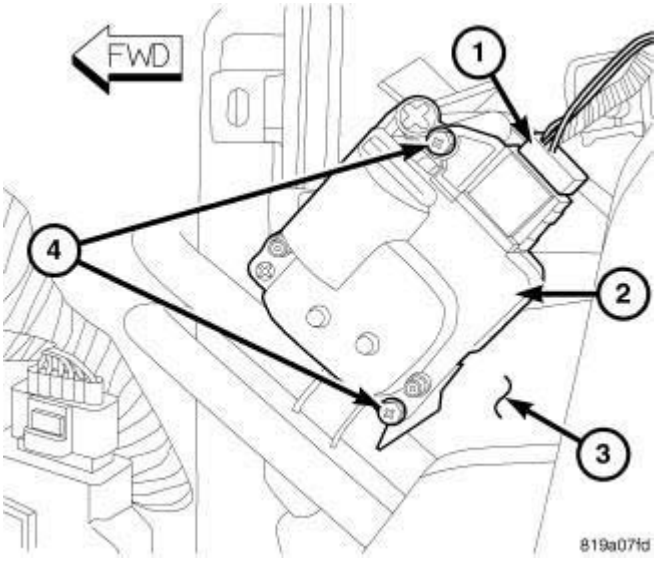


Fig. 8: Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. On RHD models, if equipped, remove the silencer from underneath the passenger side of the instrument panel.
3. On RHD models, remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
4. Disconnect the wire harness connector (1) from the blend door actuator (2) located on the left side of the HVAC air distribution housing (3).
5. Remove the two screws (4) that secure the blend door actuator to the air distribution housing and remove the actuator.

DUAL ZONE RIGHT SIDE

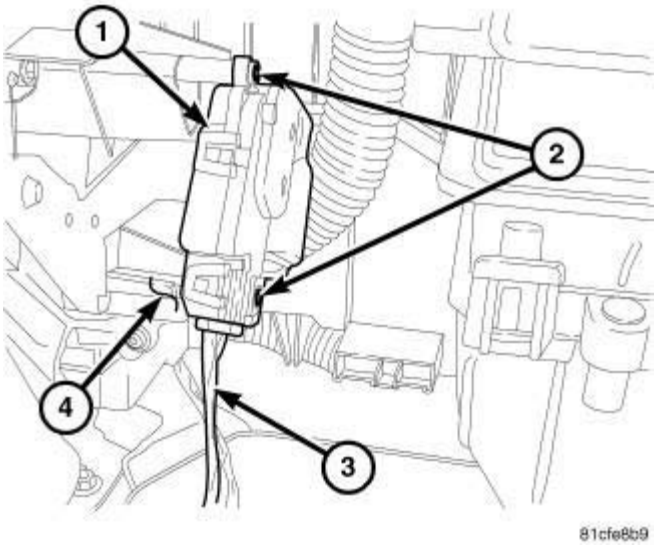


Fig. 9: Blend Door Actuator Dual Zone Passenger
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. On LHD models, if equipped, remove the silencer from underneath the passenger side of the instrument panel.
3. On LHD models, remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
4. Remove the front floor distribution duct from the right side of the air distribution housing. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Installation**.
5. Remove the screws (2) that secure the blend door actuator (1) to the right side of the air distribution housing (4) and remove the actuator from the housing.
6. Disconnect the wire harness connector (3) from the blend door actuator and remove the actuator from the vehicle.

Installation

INSTALLATION

NOTE: The single zone heating-A/C system is equipped with a single blend door actuator. The dual zone system has two blend door actuators, one for the driver side blend-air door and one for the passenger side blend-air door.

NOTE: LHD model shown in illustrations. RHD model similar.

SINGLE ZONE/DUAL ZONE LEFT SIDE

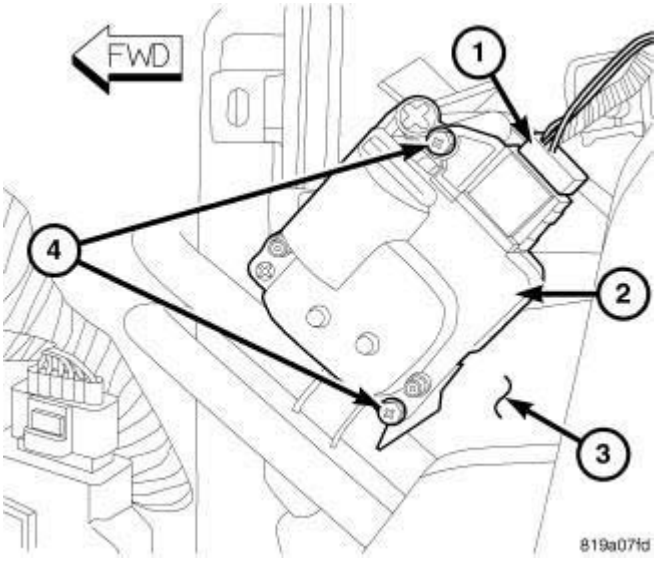


Fig. 10: Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the blend door actuator (2) onto the left side of the HVAC air distribution housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those in the blend air door linkage.
2. Install the two screws (4) that secure the blend door actuator to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
3. Connect the wire harness connector (1) to the blend door actuator.
4. On RHD models, install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
5. On RHD models, if equipped, install the silencer underneath the instrument panel.
6. Reconnect the negative battery cable.
7. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

DUAL ZONE RIGHT SIDE

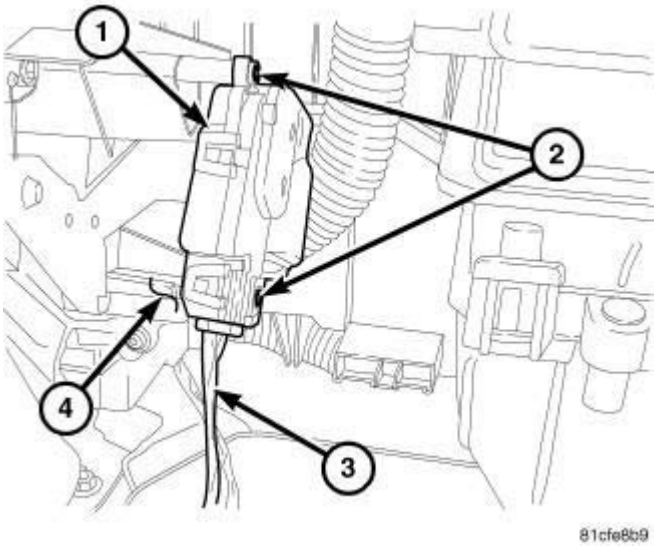


Fig. 11: Blend Door Actuator Dual Zone Passenger
Courtesy of CHRYSLER LLC

1. Position the blend door actuator (1) to the right side of the HVAC air distribution housing (4) and connect the wire harness connector (3) to the actuator.
2. Install the blend door actuator onto the air distribution housing. If necessary, rotate the actuator slightly to align the splines on the actuator with the blend door linkage.
3. Install the two screws (2) that secure the blend door actuator to the air distribution housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
4. Install the right front floor distribution duct onto the air distribution housing. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Installation**.
5. On LHD models, install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
6. On LHD models, if equipped, install the silencer underneath the instrument panel.
7. Reconnect the negative battery cable.
8. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

ACTUATOR, MODE DOOR, FRONT

Description

DESCRIPTION

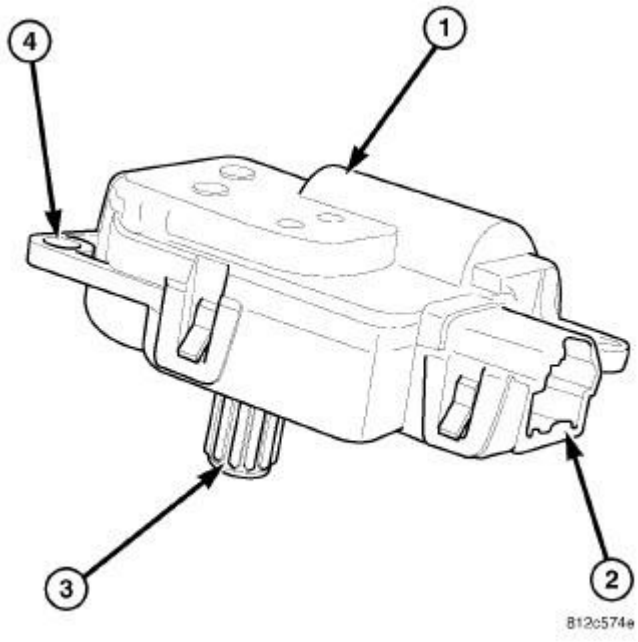


Fig. 12: Blend Door Actuators
Courtesy of CHRYSLER LLC

The mode door actuator (1) for the heating-A/C system is a reversible, 12-volt Direct Current (DC) servo motor, which is mechanically connected to the mode-air doors. The mode door actuator is located on the right side of the HVAC air distribution housing.

The mode door actuator is contained within a black molded plastic housing with an integral wire connector receptacle (2). An output shaft with splines (3) connect it to mode door linkage and integral mounting tabs (4) allow the actuator to be secured to the air distribution housing. The mode door actuator does not require mechanical indexing to the mode-air doors, as it is electronically calibrated by the A/C-heater control.

The A/C-heater control must be recalibrated each time an actuator motor is replaced. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The mode door actuator is interchangeable with the actuators for the recirculation and blend-air doors.

Operation

OPERATION

The mode door actuator is connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the instrument panel wire harness. The mode door actuator can move the mode-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the mode-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the mode-air door moves in the opposite direction. Once the A/C-heater control makes the voltage to both connections high or both connections low, the mode-air door stops and will not move.

The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the mode door actuator and the mode-air door. The A/C-heater control learns the mode-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the mode door actuator circuits. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The mode door actuator cannot be adjusted or repaired and it must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

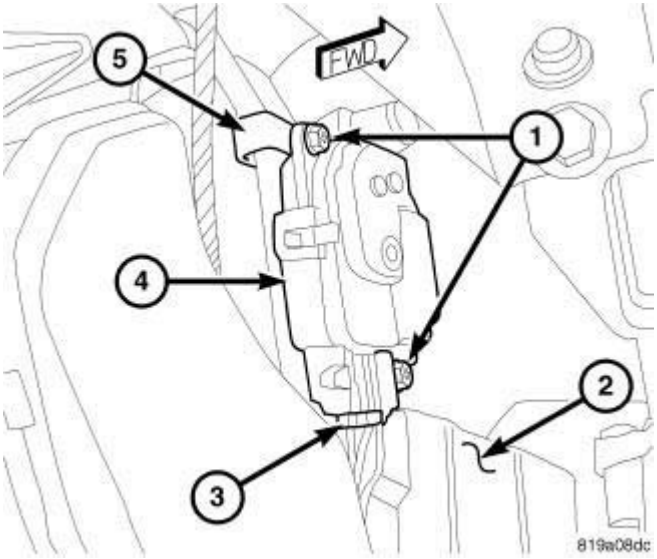


Fig. 13: Mode Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
3. Remove the screws (1) that secure the mode door actuator (4) to the bracket (5) located on the right side of the HVAC air distribution housing (2).
4. Disconnect the wire harness connector (3) from the mode door actuator and remove the actuator.

Installation

INSTALLATION

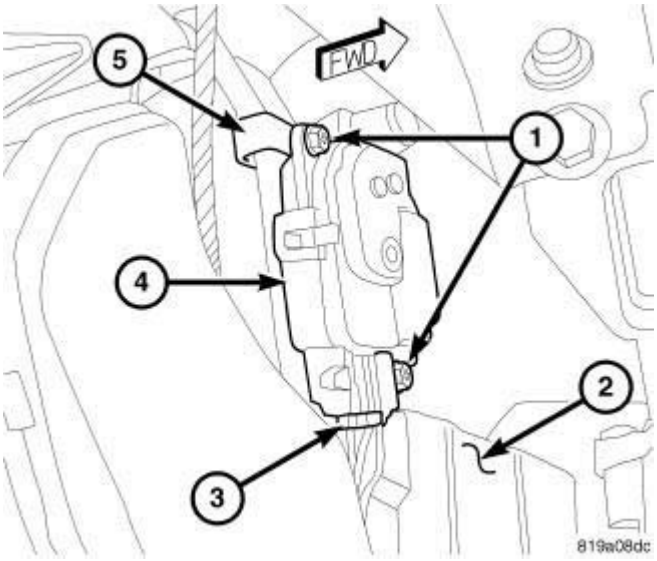


Fig. 14: Mode Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the mode door actuator (4) onto the bracket (5) located on the right side of the HVAC air distribution housing (2). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those in the mode air door linkage.
2. Install the screws (1) that secure the mode door actuator to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
3. Connect the wire harness connector (3) to the mode door actuator.
4. Install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
5. Reconnect the negative battery cable.
6. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

ACTUATOR, RECIRCULATION DOOR

Description

DESCRIPTION

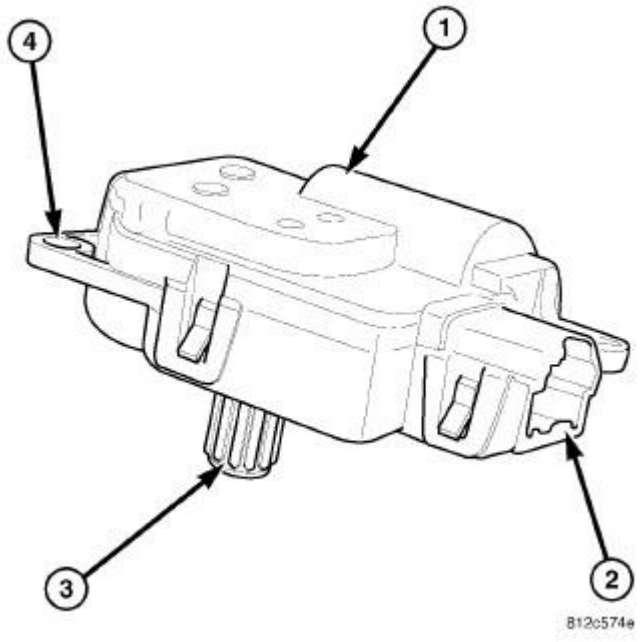


Fig. 15: Blend Door Actuators
Courtesy of CHRYSLER LLC

The recirculation door actuator (1) is a reversible, 12 volt direct current (DC) servo motor, which is connected directly to the pivot shaft lever of the recirculation-air door. The recirculation door actuator is located on the right side of the HVAC air inlet housing.

The recirculation door actuator is contained within a black molded plastic housing with an integral wire connector receptacle (2), an output shaft with splines (3) connect it to the recirculation door and three integral mounting tabs (4) allow the actuator to be secured to the air inlet housing. The recirculation door actuator does not require mechanical indexing to the recirculation-air door, as it is electronically calibrated by the A/C-heater control.

The A/C-heater control must be recalibrated each time an actuator motor is replaced. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The recirculation door actuator is interchangeable with the actuators for the blend and mode-air doors.

Operation

OPERATION

The recirculation door actuator is connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the instrument panel wire harness. The recirculation door actuator can move the recirculation-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the recirculation-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the recirculation-air door moves in the opposite direction. Once the A/C-heater control makes the voltage to both connections high or both

connections low, the recirculation-air door stops and will not move.

The A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the recirculation door actuator and the recirculation-air door. The A/C-heater control learns the recirculation-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the recirculation door actuator circuits. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The recirculation door actuator cannot be adjusted or repaired and it must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Illustration shown with instrument panel removed for clarity.

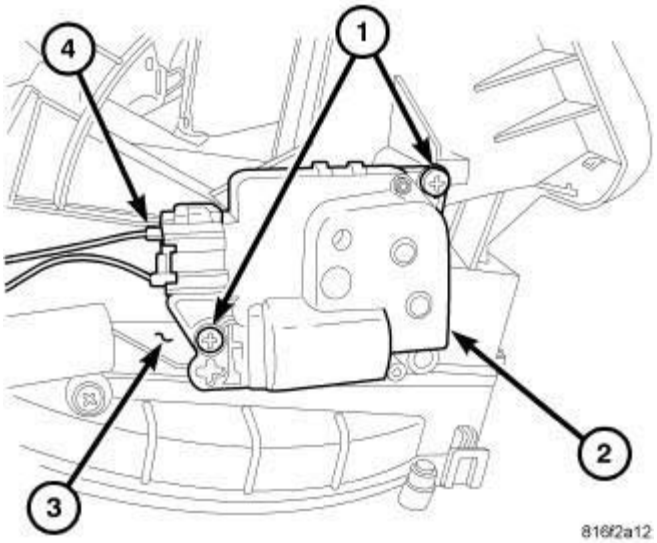


Fig. 16: Recirculation Door Actuator
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.

2. Remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
3. Reach through the glove box opening in the instrument panel and remove the screws (1) that secure the recirculation door actuator (2) to the right side of the HVAC air inlet housing (3).
4. Disconnect the wire harness connector (4) from the recirculation door actuator and remove the actuator.

Installation

INSTALLATION

NOTE: Illustrations shown with instrument panel removed for clarity.

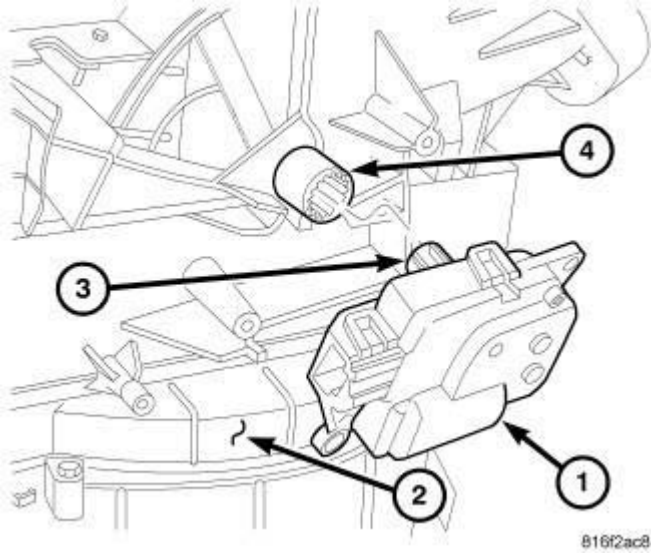


Fig. 17: Recirculation Door Actuator-Align
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Position the recirculation door actuator (1) to the right side of the HVAC air inlet housing (2).
2. Install the recirculation door actuator onto the air inlet housing. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft (3) with those on the recirculation door pivot shaft adapter (4).

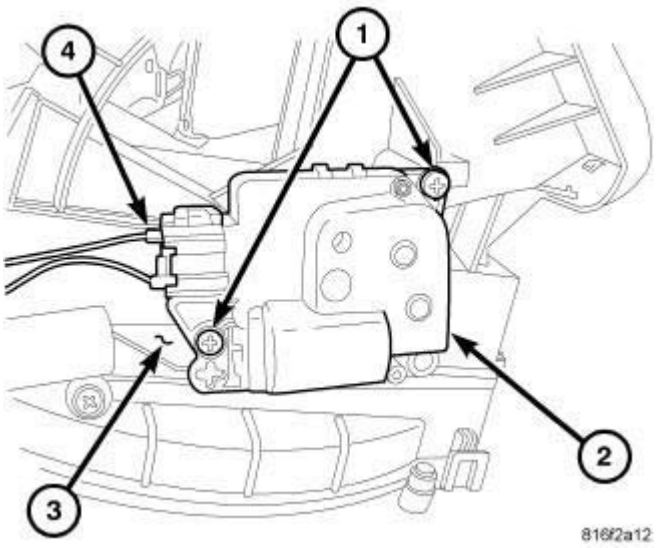


Fig. 18: Recirculation Door Actuator
Courtesy of CHRYSLER LLC

3. Install the screws (1) that secure the recirculation door actuator (2) to the air inlet housing (3). Tighten the screws to 2 N.m (17 in. lbs.).
4. Connect the instrument panel wire harness connector (4) to the recirculation door actuator.
5. Install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .
6. Reconnect the negative battery cable.
7. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

CONTROL, A/C AND HEATER, FRONT

Description

MANUAL TEMPERATURE CONTROL (MTC) SINGLE ZONE

The A/C-heater control for the front Manual Temperature Control (MTC) single zone system allows one temperature setting for the entire vehicle. All controls are identified by ISO graphic symbols.

The heating-A/C system uses a dedicated miroprocessor to drive the electrically operated door actuators. This control provides the vehicle operator with a number of setting options to help control the climate and comfort within the vehicle.

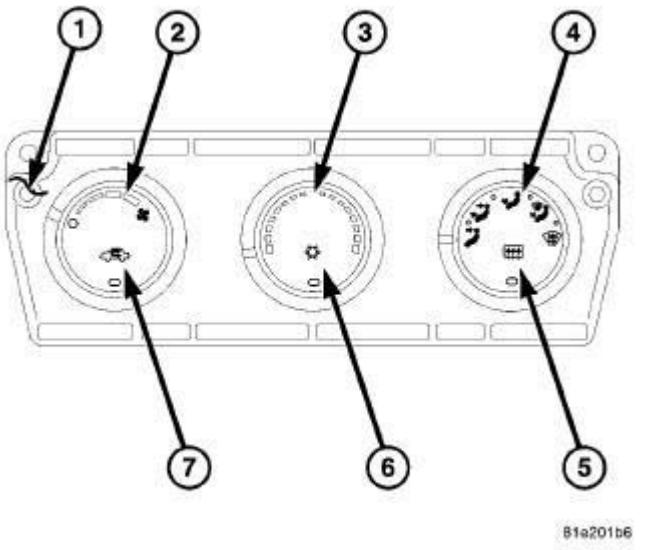


Fig. 19: Front Manual Temperature Control AC Heater Control
Courtesy of CHRYSLER LLC

The A/C-heater control (1) is located in the instrument panel and contains:

- a rotary control for blower motor speed selection, and to turn the blower motor off (2).
- a rotary control for temperature control of the discharged air (3).
- a rotary control for mode control of the discharged air (4).
- a push-button control with an indicator lamp to turn the rear window defogger system on and off (5).
- a push-button control with an indicator lamp to turn the A/C system on and off (6).
- a push-button control with an indicator lamp for recirculation control of the discharged air (7).

The A/C-heater control for the MTC heating and A/C system and is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

Prior to replacing an A/C-heater control, check for any Diagnostic Trouble Codes (DTCs) related to the heating-A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The A/C-heater control cannot be adjusted or repaired and must be replaced if inoperative or damaged.

AUTOMATIC TEMPERATURE CONTROL (ATC) DUAL ZONE

The A/C-heater control for the Automatic Temperature Control (ATC) dual zone front heating-A/C system allows both the driver and the front seat passenger the ability to individually regulate air temperature for their side of the vehicle. An infrared sensor located in the overhead console detects thermal radiation emitted by the front seat occupants and their surroundings. Based on the sensor input, the system automatically adjusts the air temperature, airflow volume, airflow distribution and amount of inside air recirculation to maintain front seat occupant comfort, even under changing outside weather conditions. All controls are identified by ISO graphic

symbols.

The ATC dual zone heating-A/C system uses a dedicated miroprocessor to automatically drive the electrically operated door actuators. The ATC A/C-heater control obtains vehicle speed, engine speed, engine coolant temperature, ambient temperature and refrigerant system pressure. The ATC A/C-heater control communicates with other electrical modules in the vehicle over the Controller Area Network (CAN) IHC bus.

This ATC system provides the vehicle operator with a number of setting options to help control the climate and comfort within the vehicle and offers several manual override features such as fan speed, airflow distribution, defrost mode and when the outside air contains smoke, odors or high humidity, the interior air can be manually recirculated.

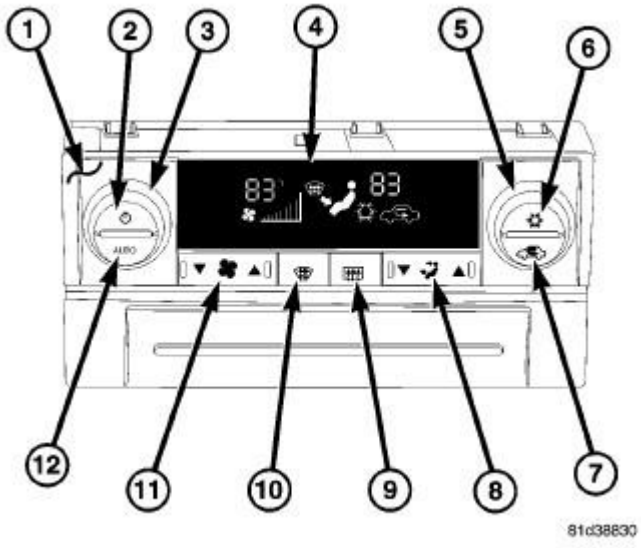


Fig. 20: Dual Zone Front ATC Control
Courtesy of CHRYSLER LLC

The ATC dual zone A/C-heater control (1) is located in the instrument panel and contains:

- a push button on/off control which allows the heating-A/C system to be completely turned off (2). The Vacuum-Flourescent (VF) digital display (4) is blank when the heater-A/C system is off.
- two rotary temperature controls to select both driver and front seat passenger comfort temperatures from 15° to 29° C (60° to 85° F) (3 and 5). Comfort temperatures for each zone are shown in the VF digital display. If the set temperatures are 15° C (60° F) and is adjusted lower, the A/C-heater control will attempt to achieve the lowest temperature possible, but the display will show LO. If the set temperatures are 29° C (85° F) and is adjusted up, the A/C-heater control will attempt to achieve the highest temperature possible, but the display will show HIGH. Temperatures can be displayed in either Metric or Fahrenheit.
- a push button A/C on/off control (6). An ISO Snowflake symbol appears in the VF digital display when the A/C system is in operation, whether under manual or Auto mode.
- a push button air recirculation control to set the heating-A/C system to Recirculation mode (7). An ISO Recirculation symbol appears in the VF digital display when Recirculation mode is selected and when the

system exceeds 80 percent circulated air under Auto mode (due to high A/C demand).

- a rocker switch mode control that can override the Auto mode (8). An ISO mode symbol appears in the VF digital display to indicate the current mode setting when selected manually or by Auto mode.
- a push button rear window defogger on/off control (9). An indicator lamp illuminates in the control when selected. The indicator lamp illuminates in the control even with the heating-A/C system turned off.
- a push button front window defogger control (10). An indicator lamp illuminates in the control when selected manually and an ISO symbol appears in the VF digital display when selected by auto mode.
- a rocker switch fan speed control that can override the auto mode (11). A bar graph is shown in the VF digital display to indicate the selected or determined front fan speed (depending on manual or auto mode).
- a push button automatic mode control to set the heating-A/C system to auto mode (12). AUTO appears in the VF digital display when the system is in auto mode.
- illumination lamps for backlighting of the control.
- computer logic that remembers the settings of the controls when the ignition is turned off and retains those settings after a restart. If the heating-A/C system is off when the ignition is turned off, the system will be off when the engine is restarted.
- computer logic that provides variable air recirculation under high temperature and humidity conditions. Because recirculation is generally accompanied by increased fan noise, the proportion of recirculated to outside air, gradually approaches full recirculation over a broad temperature range.

The front A/C-heater control utilizes integrated circuitry and information carried on the CAN IHS bus to monitor many sensors and switch inputs throughout the vehicle. In response to those inputs, the internal circuitry and programming of the A/C-heater control allows it to control the electronic functions and features of the ATC heating-A/C system.

The inputs received by the A/C-heater control of the ATC heating-A/C system are as follows:

- Refrigerant Pressure
- Evaporator Temperature
- Engine Coolant Temperature
- Ambient Air Temperature
- Infrared Temperature Sensor
- Vehicle Speed

The messages broadcasted by the A/C-heater control of the ATC heating-A/C system are as follows:

- A/C Request
- A/C Select
- Rear Window Defogger (EBL) Request

The A/C-heater control for the ATC heating and A/C system is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

Prior to replacing an A/C-heater control, check for any Diagnostic Trouble Codes (DTCs) related to the heating-

A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The A/C-heater control cannot be adjusted or repaired and must be replaced if inoperative or damaged. The illumination lamps for the A/C-heater control can be serviced separately.

MANUAL TEMPERATURE CONTROL (MTC) TRI ZONE

The A/C-heater controls for the Manual Temperature Control (MTC) tri-zone heating-A/C system allows the driver, front seat passenger and the intermediate seat passengers, the ability to individually regulate air temperature as well as fan speed for their portion of the vehicle. Primary controls for the rear heating-A/C system are located on the front A/C-heater control panel. All controls are identified by ISOgraphic symbols.

FRONT CONTROL PANEL

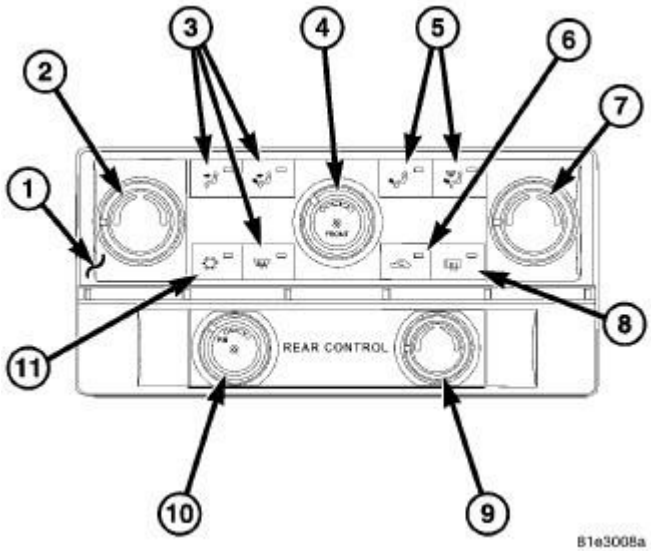


Fig. 21: Manual Temperature Control Tri Zone Front Control
Courtesy of CHRYSLER LLC

The front MTC dual zone A/C-heater control and integral computer (1) is located in the instrument panel and contains:

- three rotary temperature controls (2, 7 and 9) to select the separate temperatures for both of the front comfort zones and the rear comfort zone
- five push button mode controls (3 and 5) to select the position of the discharged air for the driver and front passenger comfort zones. An indicator lamp illuminates in each of the controls when selected.
- a rotary control knob for front fan speed selection and turning the heater-A/C system off (4).
- a push button air recirculation control (6). An indicator lamp illuminates in the control when selected.
- a push button rear window defogger on/off control (8). An indicator lamp illuminates in the control when selected. The rear window defogger system operates and the indicator lamp illuminates in the control even when the heating-A/C system is turned off.

- a rotary control knob for rear fan speed selection and turning the rear heater-A/C system off (10). This control has a position for locking out the rear heater-A/C controls, allowing only the driver and front seat passenger control of the rear heating-A/C system.
- a push button A/C on/off control (11). An indicator lamp illuminates in the control when the A/C system is in operation.
- computer logic that remembers the settings of the A/C-heater control when the ignition is turned off, and retains those settings after a restart. If the heating-A/C system is off when the ignition is turned off, the system will be off when the engine is restarted.

The front A/C-heater control utilizes integrated circuitry and information carried on the Controller Area Network (CAN) IHS bus to monitor many sensors and switch inputs throughout the vehicle. In response to those inputs, the internal circuitry and programming of the A/C-heater control allows it to control the electronic functions and features of the MTC heating-A/C system.

The front A/C-heater control is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

Prior to replacing an A/C-heater control, check for any Diagnostic Trouble Ccodes(DTCs) related to the heating-A/C system, and run the calibration procedure to verify that the concern is not an air-door calibration issue. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The front A/C-heater control cannot be adjusted or repaired and must be replaced if inoperative or damaged.

REAR CONTROL PANEL

The rear MTC A/C-heater control is located in the headliner and allows intermediate seat passengers to adjust rear air distribution, temperature and blower motor speed when the rear heating-A/C system primary on/off control in the front A/C-heater control in the instrument panel is set to the on position and the rear heater-A/C controls are NOT locked out by the driver or front seat passenger.

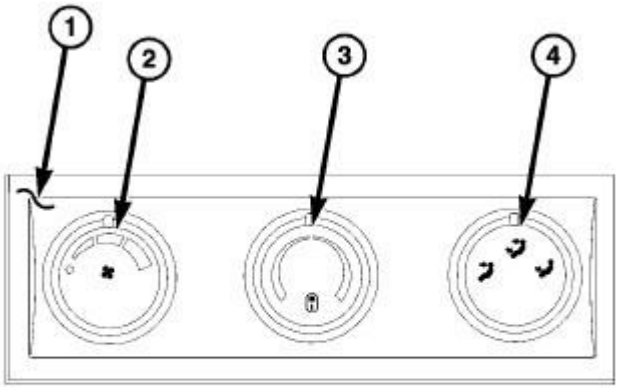


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Fig. 22: Manual Temperature Control Tri Zone Rear Control
Courtesy of CHRYSLER LLC

The rear A/C-heater control (1) contains:

- a rotary control knob for fan speed selection and turning the rear heating-A/C system on and off (2).
- a rotary control knob for temperature control of the rear discharged air (3). An indicator lamp illuminates in the control when the rear heater-A/C controls are locked out by the driver or front seat passenger.
- a rotary control knob for mode control of the rear discharged air (4).

The rear A/C-heater control is a slave potentiometer to the front A/C-heater control and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

AUTOMATIC TEMPERATURE CONTROL (ATC) TRI ZONE

The A/C-heater controls for the Automatic Temperature Control (ATC) tri-zone heating-A/C system allows the driver, font seat passenger and the intermediate seat passengers the ability to individually regulate the air temperature for their portion of the vehicle automatically. Primary controls for the rear are located on the front A/C-heater control panel. All controls are identified by ISO graphic symbols.

FRONT CONTROL PANEL

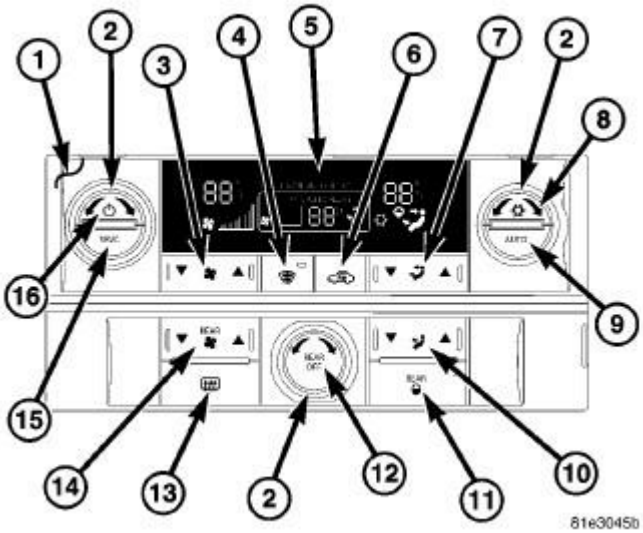


Fig. 23: ATC Tri Zone Front Control
Courtesy of CHRYSLER LLC

The front A/C-heater control (1) and integral computer is located in the instrument panel and contains:

- three rotary temperature controls (2) to select both of the front and the rear comfort temperatures from 15° to 29° C (60° to 85° F). Comfort temperatures for each zone are shown in the Vacuum-Flourescent (VF) digital display (5). If the set temperatures are 15° C (60° F) and is adjusted lower, the A/C-heater

control will attempt to achieve the lowest temperature possible, but the display will show LO. If the set temperatures are 29° C (85° F) and is adjusted up, the A/C-heater control will attempt to achieve the highest temperature possible, but the display will show HIGH. Temperatures can be displayed in either Metric or Fahrenheit, which is selected from the overhead console.

- a rocker switch front fan speed control (3) that can override the Auto mode. A bar graph is shown in the VF digital display to indicate the selected or determined front fan speed (depending on manual or Auto mode).
- a push button front window defogger control (4). An indicator lamp illuminates in the control when selected manually and an ISO symbol appears in the VF digital display when selected by Auto mode.
- a push button air recirculation control (6). An indicator lamp illuminates in the control when selected manually and an ISO Recirculation symbol appears in the VF digital display when the system exceeds 80 percent circulated air under Auto mode due to high A/C demand.
- a rocker switch front mode control (7) that can override the Auto mode. An ISO mode symbol appears in the VF digital display to indicate the current mode setting when selected manually or by Auto mode.
- a push button A/C on/off control (8). An ISO Snowflake symbol appears in the VF digital display when the A/C system is in operation, whether under manual or Auto mode.
- a push button automatic mode control (9) to set the heating-A/C system to Auto mode. FRONT AUTO appears in the VF digital display when the system is in Auto mode.
- a rocker switch rear mode control (10) that can override the rear A/C-heater control and the Auto mode. An ISO mode symbol appears in the center portion of the VF display to show the current mode setting when selected manually or by Auto mode.
- a push button control that locks out the rear heater-A/C controls (11), allowing only the driver and front seat passenger control of the rear heating-A/C system. An indicator lamp illuminates in the control when selected.
- a push button on/off control (12) that turns the rear heating-A/C system completely off. The center portion of the VF display is blank when the rear heating-A/C system is off.
- a push button rear window defogger on/off control (13). An indicator lamp illuminates in the control when selected. The indicator lamp illuminates in the control even with the heating-A/C system turned off.
- a rocker switch rear fan speed control (14) that can override the rear A/C-heater control and the Auto mode. A bar graph is shown in the center portion of the VF digital display to indicate the selected or determined rear fan speed (depending on manual or Auto mode).
- a push button synchronize control (15) that synchronizes the temperature of all three of the comfort zones to the drivers selected temperature. SYNC appears in the VF digital display when the system is synchronized, whether under manual or Auto mode.
- a push button on/off control (16) which allows the heating-A/C system to be completely turned off. The display is blank when the heater-A/C system is off.
- illumination lamps for backlighting of the control.
- computer logic that remembers the settings of the controls when the ignition is turned off and retains those settings after a restart. If the system is off when the ignition is turned off it will be off when the engine is restarted, etc.
- computer logic that provides variable air recirculation under high temperature and humidity conditions. Because recirculation is generally accompanied by increased fan noise, the proportion of recirculated to outside air gradually approaches full recirculation over a broad temperature range.

The front A/C-heater control utilizes integrated circuitry and information carried on the Controller Area Network (CAN) IHS bus to monitor many sensors and switch inputs throughout the vehicle. In response to those inputs, the internal circuitry and programming of the A/C-heater control allows it to control the electronic functions and features of the ATC heating-A/C system.

The inputs received by the A/C-heater control of the ATC heating-A/C system are as follows:

- Refrigerant Pressure
- Evaporator Temperature
- Engine Coolant Temperature
- Ambient Air Temperature
- Infrared Temperature Sensor
- Vehicle Speed

The messages broadcast by the A/C-heater control of the ATC heating-A/C system are as follows:

- A/C Request
- A/C Select
- Rear Window Defogger (EBL) Request
- Heated Front Seat Requests

The front A/C-heater control is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

Prior to replacing an A/C-heater control, check for any Diagnostic Trouble Codes (DTCs) related to the heating-A/C systems and run the calibration procedure to verify that the concern is not an system calibration issue. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The front A/C-heater control cannot be repaired and must be replaced if inoperative or damaged.

REAR CONTROL PANEL

The rear A/C-heater control is located in the rear overhead console and allows intermediate seat passengers to adjust rear air distribution, temperature and blower motor speed when the rear heating-A/C system primary on/off control in the front A/C-heater control in the instrument panel is set to the on position and the rear heater-A/C controls are NOT locked out by the driver and front seat passenger.

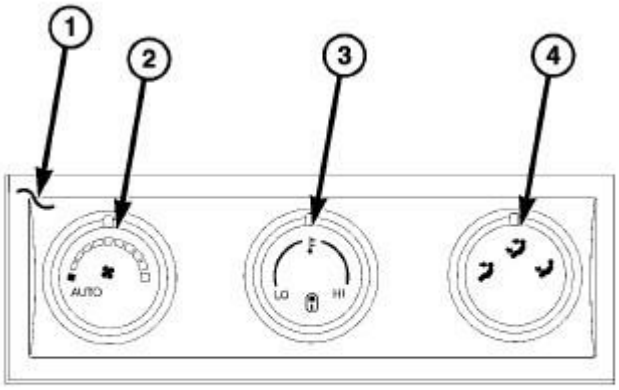


Fig. 24: ATC Tri Zone Rear Control
Courtesy of CHRYSLER LLC

The rear A/C-heater control (1) contains:

- a rotary control knob for fan speed selection and turning the rear heating-A/C system off or to Auto mode (2).
- a rotary control knob for temperature control of the rear discharged air (3). An indicator lamp illuminates in the control when the rear heater-A/C controls are locked out by the driver or front seat passenger.
- a rotary control knob for mode control of the rear discharged air (4).

The rear A/C-heater control is a slave potentiometer to the front A/C-heater control and cannot be repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Take the proper precautions to protect the front face of the instrument panel center bezel from cosmetic damage during this service procedure.

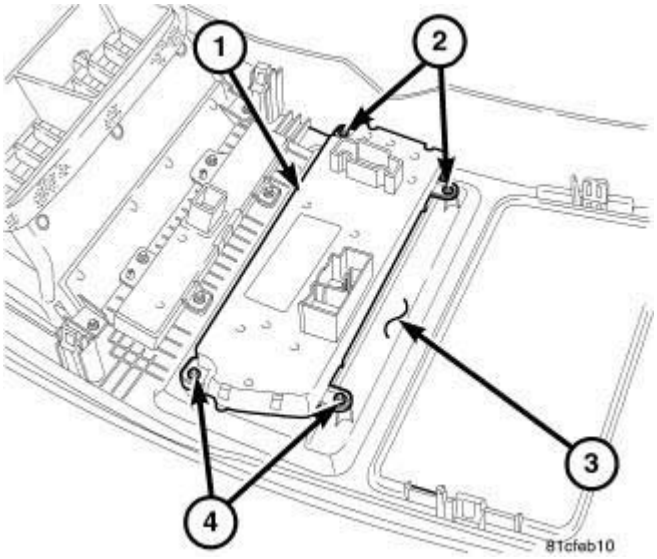


Fig. 25: AC Heater Control Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: MTC single zone A/C-heater control shown. Other A/C-heater controls similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the center bezel (3) and place it on a workbench. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the screws (2 and 4) that secure the A/C-heater control (1) to the back of the center bezel and remove the control.

Installation

INSTALLATION

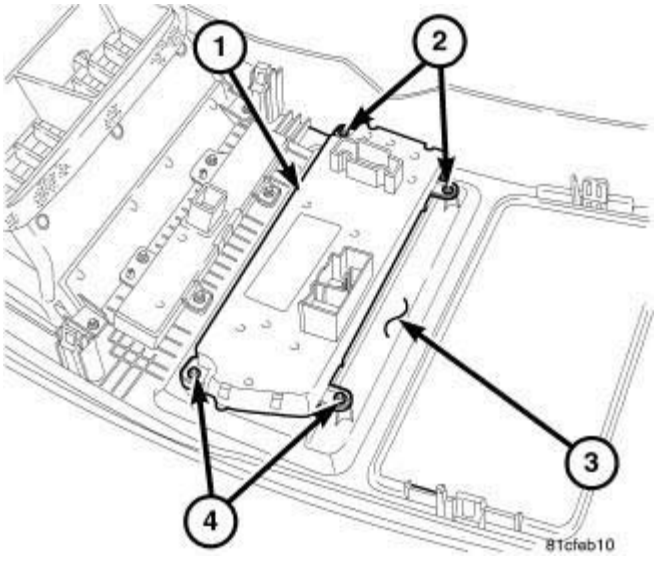


Fig. 26: AC Heater Control Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: MTC single zone A/C-heater control shown. Other A/C-heater controls similar.

1. Position the A/C-heater control (1) onto the back of the center bezel (3).
2. Install the screws (2 and 4) that secure the A/C-heater control to the center bezel. Tighten the screws to 2 N.m (17 in. lbs.).
3. Install the center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Reconnect the negative battery cable.

NOTE: The A/C-heater control will automatically perform the Actuator Calibration function when the ignition is initially turned on when installing a new control or when reinstalling the original control. However, the Actuator Calibration function must be manually initiated using a scan tool if the A/C-heater control has been previously installed in another vehicle.

5. If required, initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

MODULE, POWER, FRONT BLOWER MOTOR

Description

DESCRIPTION

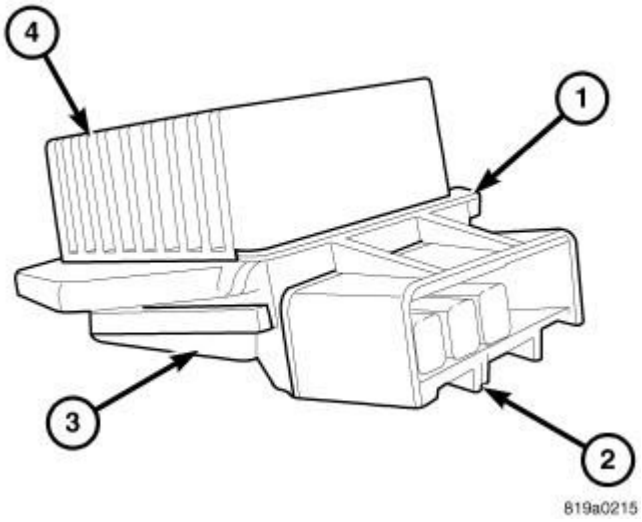


Fig. 27: Blower Mtr Pwr Module
Courtesy of CHRYSLER LLC

A blower motor power module is used on this model when equipped with the automatic temperature control

(ATC) heating-A/C system. Models equipped with the manual temperature control (MTC) heating-A/C system use a blower motor resistor, instead of the blower motor power module. See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Description**.

The blower motor power module is mounted to the bottom of the HVAC housing, on the passenger side of the vehicle. The blower motor power module consists of a molded plastic mounting plate (1) with an integral connector receptacle (2). Concealed behind the mounting plate is the power module electronic circuitry (3) and a finned aluminum heat sink (4). The blower motor power module is accessed for service from under the instrument panel.

Operation

OPERATION

The blower motor power module is connected to the vehicle electrical system through a dedicated lead and connector of the instrument panel wire harness. A second lead and connector of the instrument panel wire harness is connected to the blower motor. The blower motor power module allows the microprocessor-based automatic temperature control(ATC) A/C-heater control to calculate and provide infinitely variable blower motor speeds based upon either manual blower switch input or the ATC programming using a pulse width modulated (PWM) circuit strategy.

The PWM voltage is applied to a comparator circuit which compares the PWM signal voltage to the blower motor feedback voltage. The resulting output drives the power module circuitry, which provides a linear output voltage to change or maintain the desired blower speed.

The blower motor power module is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The blower motor power module cannot be adjusted or repaired must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: The heat sink for the blower motor power module may get very hot during normal operation. If the blower motor was turned on prior to servicing the blower motor power module, wait five minutes to allow the heat sink to cool before performing diagnosis or service. Failure to take this precaution may result in possible serious injury.

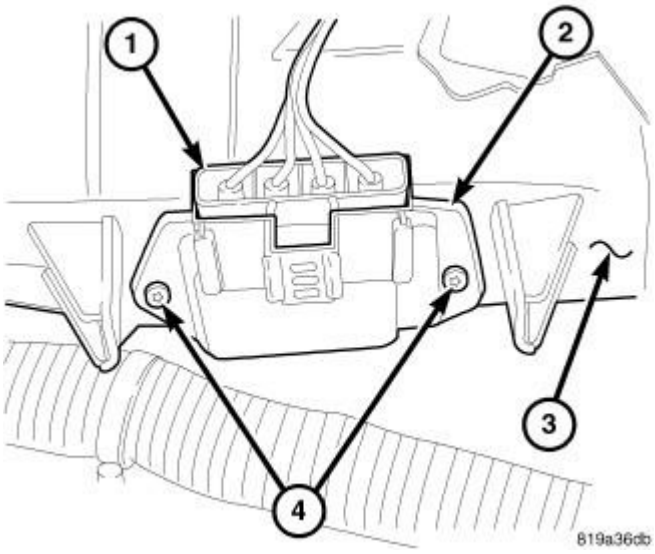


Fig. 28: Blower Motor Power Module
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector (1) from the blower motor power module (2) located at the bottom of the HVAC housing (3) on the passenger side of the vehicle.
3. Remove the two screws (4) that secure the blower motor power module to the HVAC housing and remove the power module.

Installation

INSTALLATION

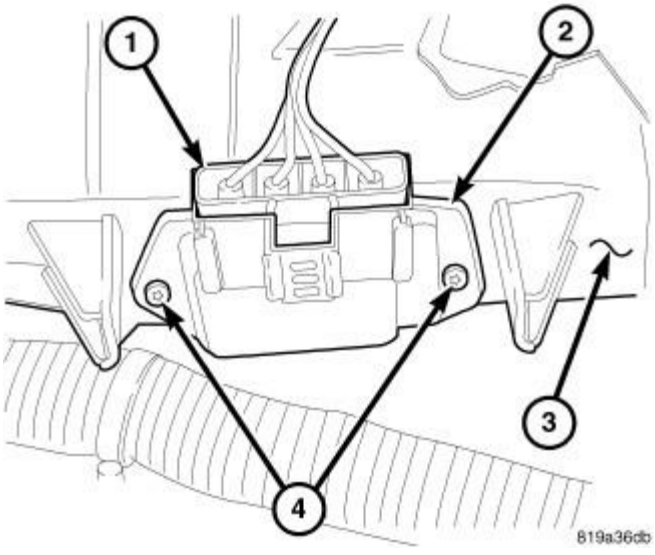


Fig. 29: Blower Motor Power Module
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Position the blower motor power module (2) into the bottom of the HVAC housing (3).
2. Install the two screws (4) that secure the blower motor power module to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the wire harness connector (1) to the blower motor power module.
4. Reconnect the negative battery cable.

RESISTOR, BLOWER MOTOR, FRONT

Description

DESCRIPTION

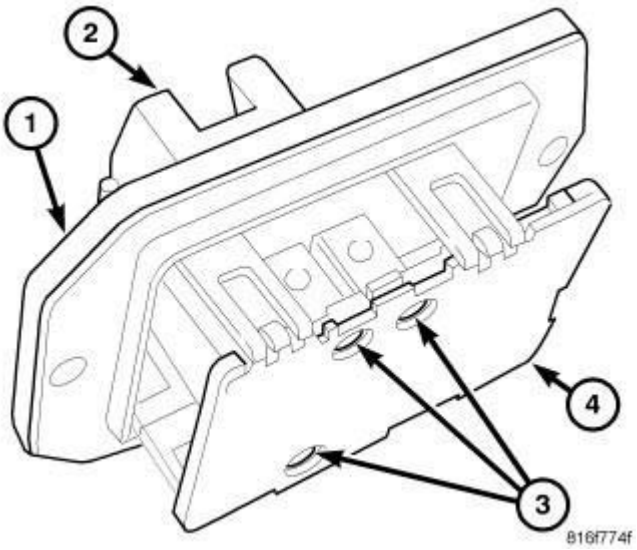


Fig. 30: Blower Motor Resistor - Description
Courtesy of CHRYSLER LLC

A blower motor resistor is used on vehicles equipped with the manual temperature control (MTC) heating-A/C system. Vehicles equipped with the automatic temperature control (ATC) heating-A/C system use a blower motor power module, instead of the blower motor resistor. See **Heating and Air Conditioning/Controls/MODULE, Power - Description**.

The blower motor resistor is mounted to the bottom of the HVAC housing, on the passenger side of the vehicle. The blower motor resistor consists of a molded plastic mounting plate (1) with an integral wire connector receptacle (2). Concealed behind the mounting plate are resistors (3) located between a two-piece stamped steel base (4). The blower motor resistor is accessed for service from under the instrument panel.

Operation

OPERATION

The blower motor resistor is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness. The blower motor resistor has three resistors, each of which will reduce the current flow through the blower motor to change the blower motor speed.

The blower motor control for the heating-A/C system directs the ground path for the blower motor through the correct resistor to obtain the selected speed. With the blower motor control in the lowest speed position, the ground path for the blower motor is applied through all of the resistors. Each higher speed selected with the blower motor control applies the blower motor ground path through fewer of the resistors, increasing the blower motor speed. When the blower motor control is in the highest speed position, the blower motor resistor is bypassed and the blower motor receives a direct path to ground.

The blower motor resistor cannot be adjusted or repaired and it must be replaced if inoperative or damaged.

Diagnosis and Testing

BLOWER MOTOR RESISTOR

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: See SYSTEM WIRING DIAGRAMS for circuit descriptions and diagrams. Wiring Information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the blower motor resistor. See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Removal**.
3. Using an ohmmeter, check for continuity between all of the blower motor resistor terminals. In each case there should be continuity. If OK, repair the wire harness circuits between the blower motor speed control and the blower motor resistor or blower motor as required. If not OK, replace the inoperative blower motor resistor.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering

column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: The blower motor resistor may get very hot during normal operation. If the blower motor was turned on prior to servicing the blower motor resistor, wait five minutes to allow the blower motor resistors to cool before performing diagnosis or service. Failure to take this precaution may result in possible injury.

CAUTION: Do not operate the blower motor with the blower motor resistor removed from the circuit. Failure to take this precaution can result in vehicle damage.

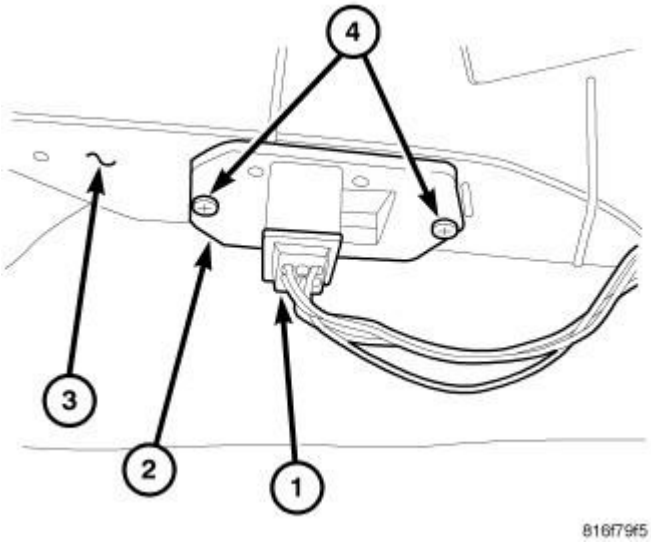


Fig. 31: Blower Motor Resistor
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector (1) from the blower motor resistor (2) located at the bottom of the HVAC housing (3) on the passenger side of the vehicle.
3. Remove the two screws (4) that secure the blower motor resistor to the HVAC housing and remove the resistor.

Installation

INSTALLATION

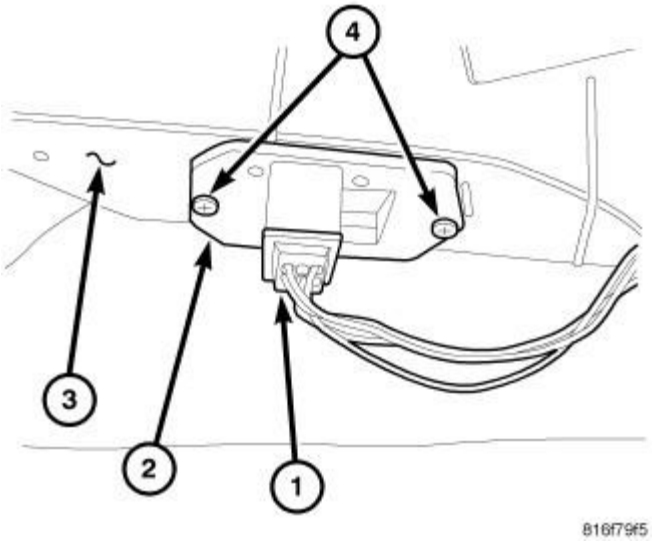


Fig. 32: Blower Motor Resistor
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Position the blower motor resistor (2) onto the bottom of the HVAC housing (3).
2. Install the two screws (4) that secure the blower motor resistor to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the wire harness connector (1) to the blower motor resistor.
4. Reconnect the negative battery cable.

SENSOR, AMBIENT TEMPERATURE

Description

DESCRIPTION

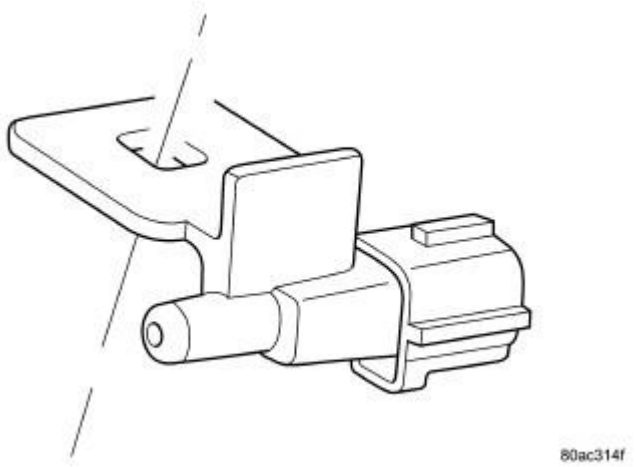


Fig. 33: Identifying Ambient Air Temperature Sensor
Courtesy of CHRYSLER LLC

The ambient air temperature sensor is a variable resistor that monitors the air temperature outside of the vehicle. The ATC system uses the sensor data to maintain optimum cabin temperature levels. The ambient air temperature sensor is mounted inside the front fascia.

Operation

OPERATION

The ambient air temperature sensor is a variable resistor that operates on a 5-volt reference signal sent by the Totally Integrated Power Module (TIPM). The ambient air temperature sensor is connected to the TIPM through a two-wire lead and connector of the vehicle wire harness. The ambient air temperature sensor changes its internal resistance in response to changes in the outside air temperature, which either increases or decreases the reference signal voltage read by the TIPM. The TIPM converts and broadcasts the sensor data over the Controller Area Network (CAN) IHS bus, where it is read by the ATC A/C-heater control, Powertrain Control Module (PCM) and other vehicle control modules.

The ambient air temperature sensor is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** .

The ambient air temperature sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

SENSOR, EVAPORATOR TEMPERATURE

Description

DESCRIPTION

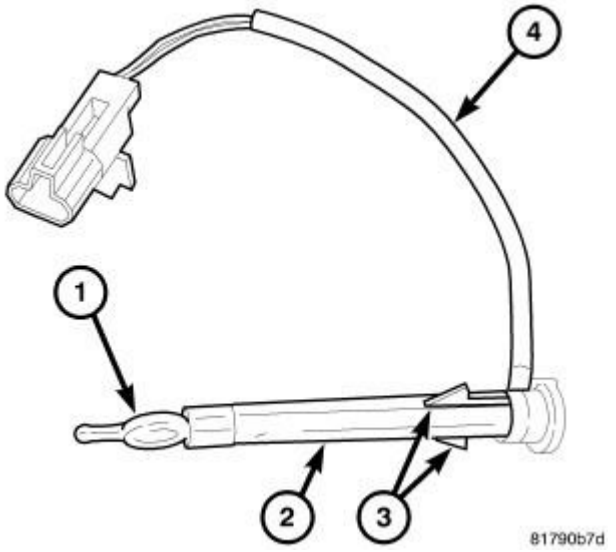


Fig. 34: Evaporator Temperature Sensor-Description
Courtesy of CHRYSLER LLC

The evaporator temperature sensor measures the temperature of the conditioned air downstream of the A/C evaporator. The evaporator temperature sensor is an electrical thermistor (1) mounted on the end of a molded plastic housing (2) that is inserted into the driver side of the HVAC housing near the coldest point of the A/C evaporator. The evaporator temperature sensor is retained in the HVAC housing by two integral retaining tabs (3) and is connected to the vehicle electrical system by use of a wire lead and connector (4) with two terminals.

Operation

OPERATION

The evaporator temperature sensor monitors the surface temperature of A/C evaporator and supplies an input signal to the A/C-heater control. The A/C-heater control uses the evaporator temperature sensor input signal to optimize A/C system performance and to protect the A/C system from evaporator freezing. The evaporator temperature sensor will change its internal resistance in response to the temperatures it monitors and is connected to the A/C-heater control through sensor ground circuit and a 5-volt reference signal circuit. As the temperature of the A/C evaporator decreases, the internal resistance of the evaporator temperature sensor decreases.

The A/C-heater control uses the monitored voltage reading as an indication of evaporator temperature. The A/C-heater control is programmed to respond to this input by requesting the powertrain control module (PCM) or the engine control module (ECM) (depending on engine application) to adjust the compressor swash plate angle as necessary to optimize A/C system performance and to protect the A/C system from evaporator freezing. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Operation**.

The evaporator temperature sensor is diagnosed using a scan tool.

The evaporator temperature sensor cannot be adjusted or repaired and it must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

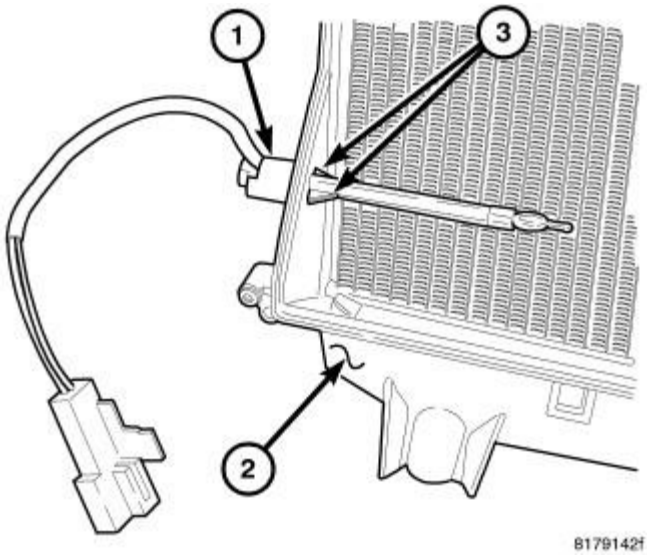


Fig. 35: Evaporator Temperature Sensor-Install
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with air distribution housing removed for clarity.

NOTE: It is not necessary to remove and disassemble the HVAC housing to service the evaporator temperature sensor. The evaporator temperature sensor can be removed for service from underneath the instrument panel.

1. Disconnect and isolate the negative battery cable.
2. Reach up under the driver side of the instrument panel and disconnect the electrical connector for the evaporator temperature sensor (1) from the instrument panel wire harness.
3. Using needle nose pliers, disengage the two retaining tabs (3) that secure the evaporator temperature sensor to the HVAC housing (2) by carefully pulling the sensor straight out of the side of the HVAC housing.
4. Route the electrical connector and wire lead of the evaporator temperature sensor out from under the heater core tubes and remove the sensor from the vehicle.

Installation

INSTALLATION

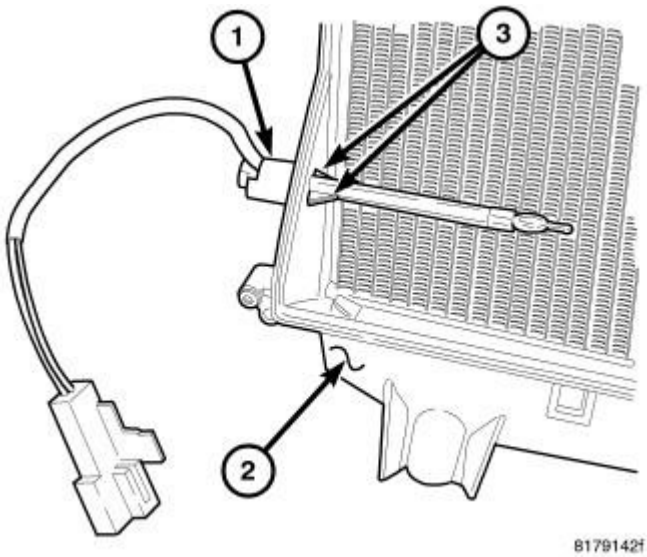


Fig. 36: Evaporator Temperature Sensor-Install
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with air distribution housing removed for clarity.

1. Route the electrical connector and wire lead of the evaporator temperature sensor (1) under the heater core tubes located on the driver side of the HVAC housing (2).
2. Install the evaporator temperature sensor into the driver side of the HVAC housing. Make sure the retaining tabs (3) are fully engaged to the housing.
3. Connect the electrical connector for the evaporator temperature sensor to the instrument panel wire harness.
4. Reconnect the negative battery cable.

SENSOR, INFRARED TEMPERATURE

Description

DESCRIPTION

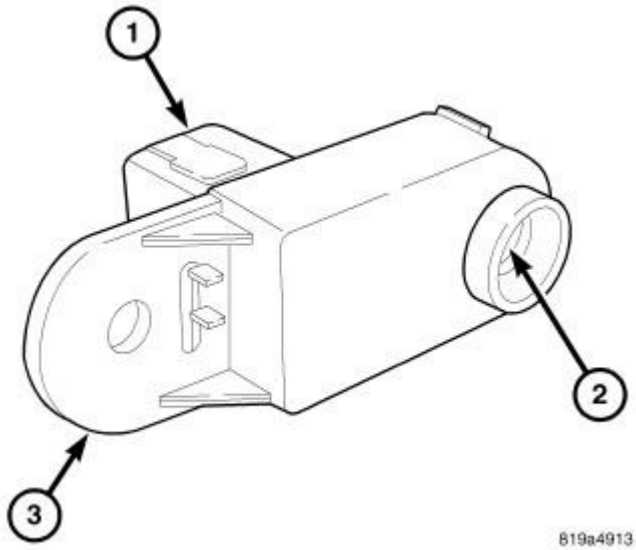


Fig. 37: Infrared Sensor
Courtesy of CHRYSLER LLC

The infrared temperature sensor is located in the overhead console and consists of an infrared transducer concealed behind a clear lens (2) in a molded plastic housing with an integral wire connector receptacle (1) and mounting tab (3).

The infrared sensor is used only on models equipped with the automatic temperature control (ATC) heating-A/C system.

Operation

OPERATION

The infrared sensor detects thermal radiation emitted by the driver and front passenger seat occupants and surroundings and converts its data into a linear Pulse Width Modulated (PWM) output signal which is read by the Automatic Temperature Control (ATC) A/C-heater control. The ATC A/C-heater control uses the infrared sensor data as one of the inputs necessary to automatically control the interior cabin temperature levels. By using thermal radiation (surface temperature) measurement, rather than an air temperature measurement, the ATC heating-A/C system is able to adjust itself to the comfort level as perceived by the occupants. This allows the ATC system to compensate for other ambient conditions affecting comfort levels, such as solar heat gain or evaporative heat loss.

The ATC system logic responds to the infrared sensor message by calculating and adjusting the air flow temperature and air flow rate needed to properly obtain and maintain the selected comfort level temperature of the occupants. The A/C-heater control continually monitors the infrared sensor circuits, and will store Diagnostic Touble Codes (DTCs) for any problem it detects.

The infrared sensor is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The infrared sensor cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

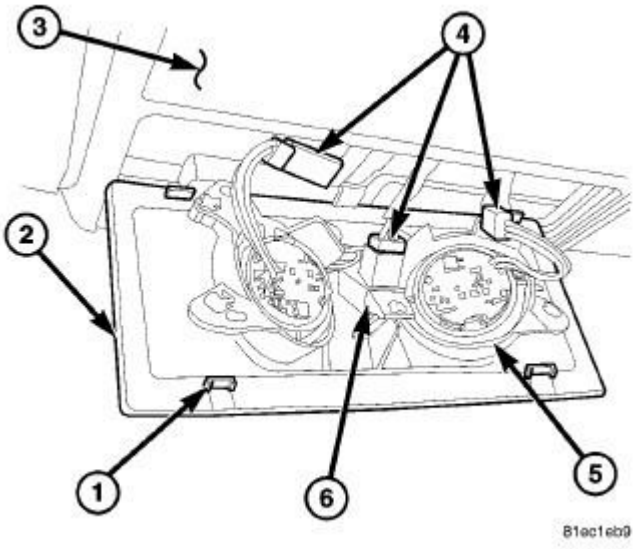


Fig. 38: Infrared Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Using Trim Stick C-4755 or equivalent, carefully disengage the four retaining tabs (1) that secure the infrared sensor and overhead map/courtesy lamp bezel (2) to the overhead console (3).
3. Disconnect the wire harness connectors (4) from the two overhead map/courtesy lamps (5) and the infrared sensor (6) and remove the sensor, lamp and bezel assembly from the vehicle

Installation

INSTALLATION

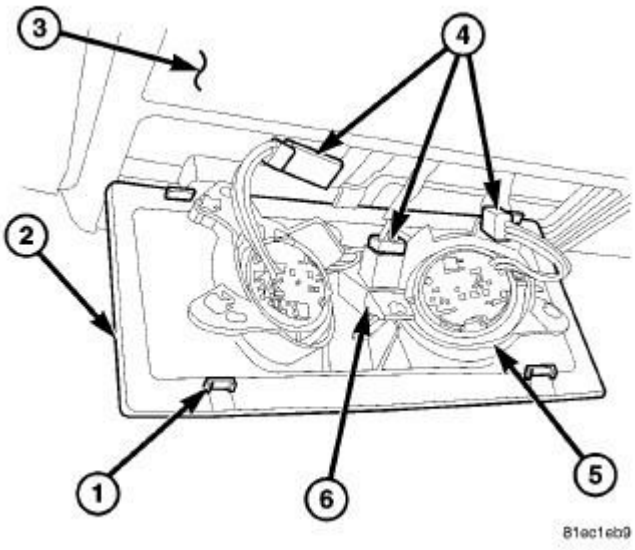


Fig. 39: Infrared Sensor
Courtesy of CHRYSLER LLC

1. Position the infrared sensor and overhead map/courtesy lamp bezel (2) to the overhead console (3).
2. Connect the wire harness connectors (4) to the two overhead map/courtesy lamps (5) and the infrared sensor (6).
3. Engage the four retaining tabs (1) that secure the infrared sensor and overhead map/courtesy lamp bezel to the overhead console. Make sure the retaining tabs are fully engaged.
4. Reconnect the negative battery cable.

SENSOR, SUN

Description

DESCRIPTION

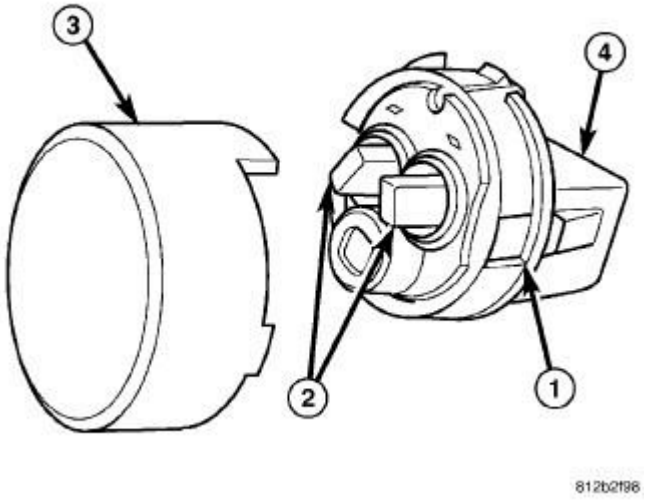


Fig. 40: Sensor-Sun
Courtesy of CHRYSLER LLC

NOTE: Typical sun sensor assembly shown.

The automatic temperature control (ATC) heating-A/C system uses a sun sensor assembly (1) to measure sun light intensity. The sun sensor assembly incorporates two sun sensors (2) within a molded plastic case which is mounted to the instrument panel and a clear lens (3) that protrudes through the defroster grille. The wire harness receptacle (4) connects the sun sensors to the vehicle electrical system through a wire lead and connector of the instrument panel wire harness.

Operation

OPERATION

The ATC dual-zone heating-A/C system uses two sun sensors to balance the system in response to side-to-side variations in sun light intensity. Passengers in sun and shadow require different functional settings because they experience very different temperatures. The sun sensor assembly provides data to the A/C heater control to help determine proper mode and blend-air door positions and blower motor speeds. The sun sensors are not thermistor type sensors, but rather photo diodes. For this reason the sun sensors responds to sun light intensity rather than temperature. The sun sensor assembly is also used to sense day and night conditions for automatic headlight control, if equipped.

The sun sensor is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The sun sensor assembly cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Diagnosis and Testing

SUN SENSOR

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in an accidental airbag deployment and possible serious or fatal injury.

The sun sensor assembly is located so that the sun rays will hit the sensors in the same way that it will hit the driver and the passenger. It is important that the area in front of the sun sensor assembly be unobstructed. Check for the following:

- Windshield wipers are properly adjusted.
- Defroster grille or sun sensor is properly installed. The sun sensor lens should protrude above the defroster grille.
- Any stickers on the windshield are not directly in front of the sun sensor.
- Any items laying on top of the instrument panel are not covering the sun sensor.

If the vehicle exhibits a lack of passenger comfort in sunny weather such as in the early afternoon, inspect the position of the sun sensor assembly. The sun sensor lens should protrude above the defroster grille to insure proper operation. If the sun sensor is not properly positioned, perform the following procedure:

1. Confirm that the defroster grille is properly installed. If not, repair as required.
2. Remove the defroster grille and verify that the sun sensor is properly installed to the instrument panel. See **Heating and Air Conditioning/Controls/SENSOR, Sun - Installation**.
3. Reinstall the defroster grille.

The A/C-heater control continually monitors the sun sensor circuits and will store diagnostic trouble codes (DTCs) for any problem it detects. The sun sensor can be tested in the vehicle with a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

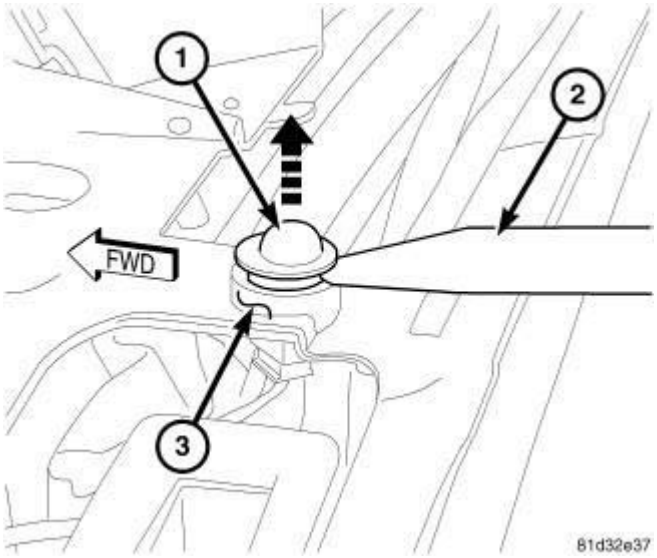


Fig. 41: Sun Sensor Remove
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Removal** .
3. Using Trim Stick C-4755 or equivalent (2), gently pry between both sides of the sun sensor assembly (1) and the instrument panel (3) to release the snap retainers that secure the sun sensor.

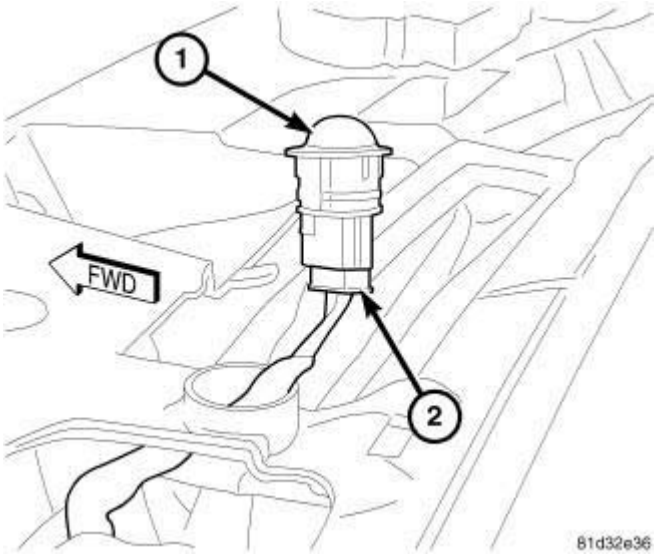


Fig. 42: Sun Sensor Wire Connector
Courtesy of CHRYSLER LLC

4. Disconnect the wire harness connector (2) from the sun sensor assembly (1) and remove the sensor.

Installation

INSTALLATION

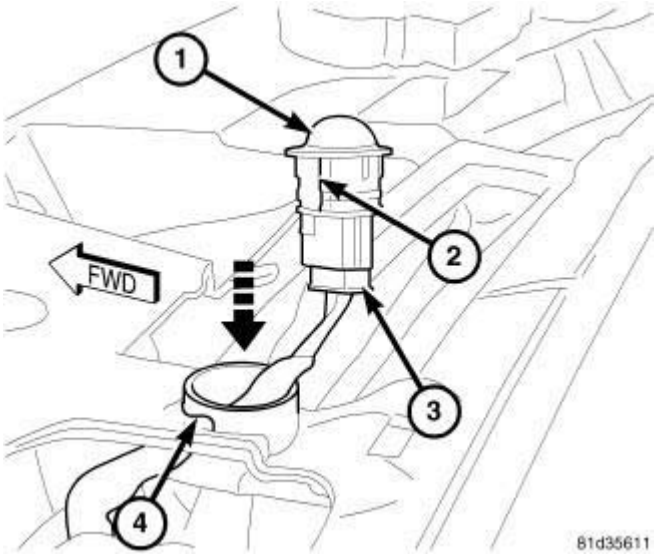


Fig. 43: Sun Sensor Install
Courtesy of CHRYSLER LLC

1. Position the sun sensor assembly (1) to the top of the instrument panel (4) and connect the wire harness connector (3).
2. Align the tab (2) on the sun sensor assembly with the opening in the instrument panel.
3. Gently push the sun sensor assembly into the instrument panel until the sensor snap retainers are securely engaged.
4. Install the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Installation** .
5. Reconnect the negative battery cable.

TRANSDUCER, A/C PRESSURE

Description

DESCRIPTION

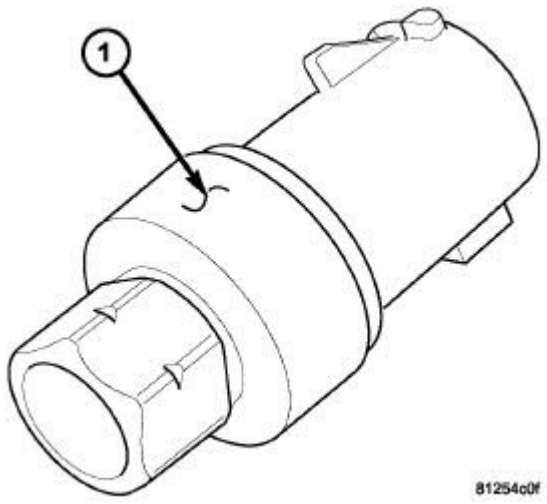


Fig. 44: A/C Pressure Transducer
Courtesy of CHRYSLER LLC

1 - A/C PRESSURE TRANSDUCER

The A/C pressure transducer (1) is a switch that is installed on a fitting located on the A/C liquid line at the right front corner of the engine compartment. An internally threaded fitting on the A/C pressure transducer connects it to the externally threaded Schrader-type fitting. A rubber O-ring seals the connection between the A/C pressure transducer and the A/C liquid line fitting. The A/C pressure transducer is connected to the vehicle electrical system by a molded plastic connector with three terminals.

Operation

OPERATION

The A/C pressure transducer monitors the pressures in the high side of the refrigerant system through its connection to a fitting on the A/C discharge line. The internal resistance of the A/C pressure transducer changes in response to the pressures it monitors.

The Totally Integrated Power Module (TIPM) provides a five volt reference signal and a sensor ground to the A/C pressure transducer. The TIPM then monitors the output voltage of the transducer on a sensor return circuit to determine refrigerant pressure and sends a message to the Powertrain Control Module (PCM) or the Engine Control Module (ECM) (depending on engine application) over the CAN C BUS.

With 2.7L/3.5L 5-Passenger and all 7-Passenger models, the PCM is programmed to respond to this and other sensor inputs by controlling the operation of the swash plate within the A/C compressor and the radiator cooling fan to help optimize A/C system performance and to protect the system components from damage. The PCM adjusts the swash plate to nearly a zero degree angle (low compressor displacement) when high side pressure rises above 3130 kPa (454 psi) and readjusts the swash plate to a greater angle (higher compressor displacement) when high side pressure drops below 1999 kPa (290 psi). The A/C pressure transducer also

reduces the swash plate angle if the high side pressure drops below 200 kPa (29 psi) and will increase the swash plate angle when the high side pressure rises above 234 - 262 kPa (34 - 38 psi). When the refrigerant pressure rises above 1655 kPa (240 psi), the PCM will actuate the cooling fan.

With 2.0L/2.4L 5-Passenger models, A/C compressor clutch engagement is controlled by the PCM or ECM, depending on engine application. When the A/C-heater control is set to any A/C position, it sends a request signal on the CAN-IHS bus to the TIPM, which then transfers the request on the CAN-C Bus to the PCM/ECM, which determines if operating conditions are correct for A/C clutch engagement. When all operating conditions have been met, the PCM/ECM sends a signal on a dedicated hard-wired circuit back to the TIPM to energize the internal A/C clutch high side driver. When energized, the A/C clutch high side driver provides battery current to the A/C clutch field coil.

A Schrader-type valve in the A/C discharge line fitting permits the A/C pressure transducer to be removed or installed without disturbing the refrigerant in the A/C system.

The A/C pressure transducer is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** .

The A/C pressure transducer cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and. See Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: It is not necessary to discharge the refrigerant system to replace the A/C pressure transducer.

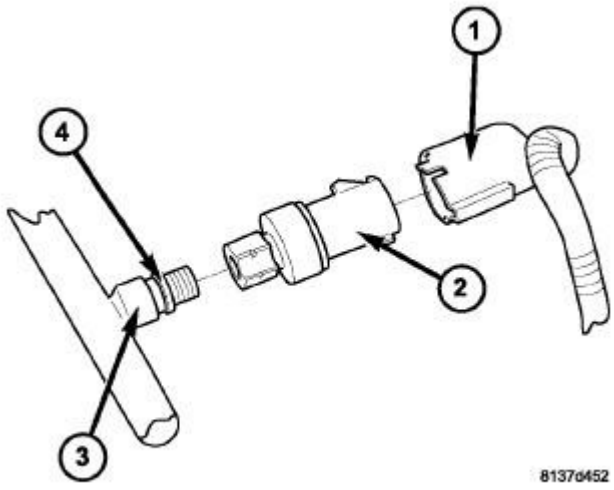


Fig. 45: Transducer-A/C pressure Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: Typical A/C pressure transducer shown.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector (1) from the A/C pressure transducer (2) located on the A/C liquid line (3) at the right front corner of the engine compartment.
3. Remove the A/C pressure transducer from the A/C liquid line and remove and discard the O-ring seal (4).

Installation

INSTALLATION

NOTE: Use only the specified O-ring as it is made of special material for R-134a. Use only refrigerant oil of the type required for the A/C compressor.

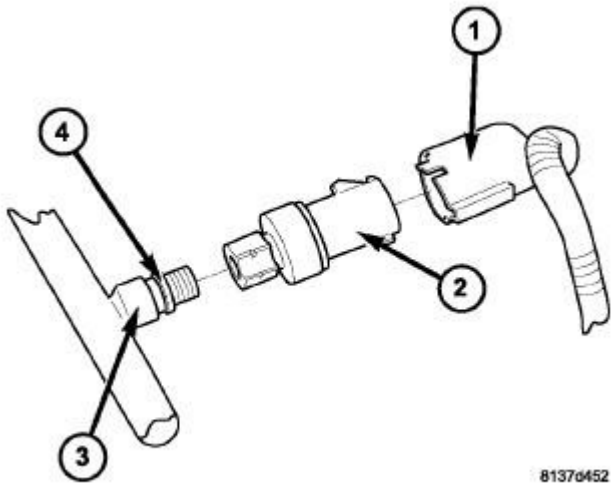


Fig. 46: Transducer-A/C pressure Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: Typical A/C pressure transducer shown.

1. Lubricate a new rubber O-ring seal (4) with clean refrigerant oil and install it onto the A/C liquid line (3).
2. Install the A/C pressure transducer (2) onto the A/C liquid line. Tighten the A/C pressure transducer to 5.6 N.m (50 in. lbs.).
3. Connect the wire harness connector (1) to the A/C pressure transducer.
4. Reconnect the negative battery cable.

CONTROLS, REAR

ACTUATOR, BLEND DOOR, REAR

Description

DESCRIPTION

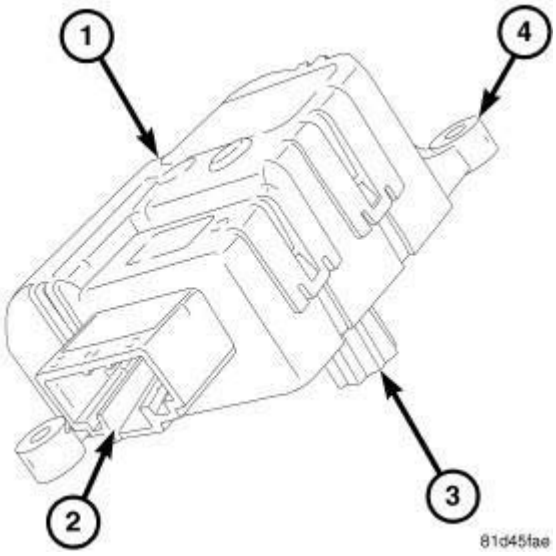


Fig. 47: Rear Actuator Description
Courtesy of CHRYSLER LLC

The blend door actuator (1) for the rear heating-A/C system is a reversible, 12 volt direct current (DC), servo motor. The rear blend door actuator is located on the outboard side of the rear heater-A/C housing.

The rear blend door actuator is contained within a black molded plastic housing with an integral wire connector receptacle (2), an output shaft with splines (3) connect it to the rear blend-air door and three integral mounting tabs (4) allow the actuator to be secured to the rear heater-A/C housing. The blend door actuator does not require mechanical indexing to the blend door linkage, as it is electronically calibrated by the A/C-heater control.

The A/C-heater control must be recalibrated each time an actuator motor is replaced. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The rear blend door actuator is interchangeable with the actuator for the rear mode-air door.

Operation

OPERATION

The rear blend door actuator is connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the rear heater-A/C wire harness. The rear blend door actuator can move the rear blend-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the rear blend-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the rear blend-air door moves in the opposite direction. When the front A/C-heater control makes the voltage to both connections high or both connections low, the rear blend-air door stops and will not move.

The front A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the rear blend door actuator and the rear blend-air door. The front A/C-heater control learns the rear blend-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for

any problems it detects in the rear blend door actuator circuits.

The rear blend door actuator is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The rear blend door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

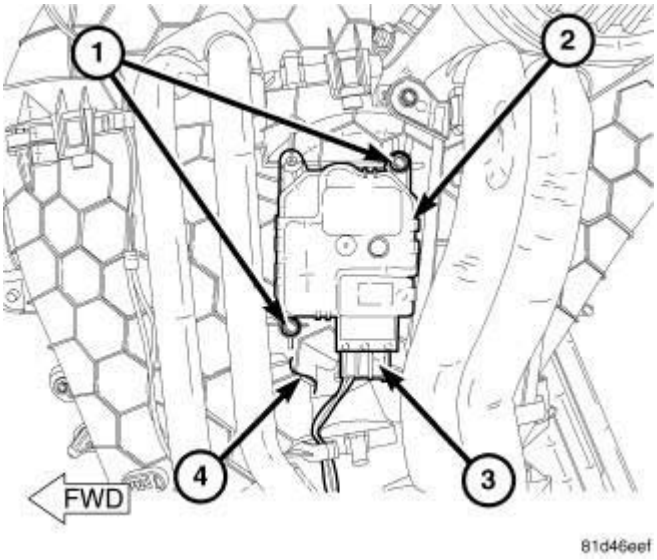


Fig. 48: Rear Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove rear heater-A/C housing (4) and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
3. Disconnect the wire harness connector (3) from the rear blend door actuator (2) located on the outboard side of the rear heater-A/C housing.
4. Remove the two screws (1) that secure the rear blend door actuator to the rear heater-A/C housing and remove the actuator.

Installation

INSTALLATION

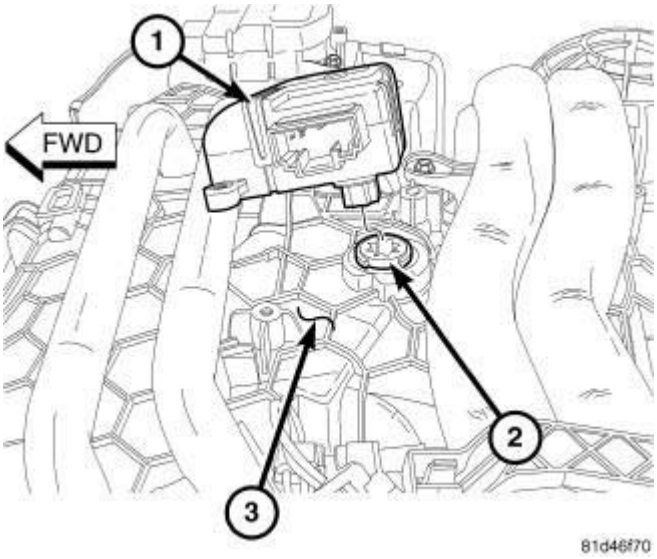


Fig. 49: Rear Blend Door Actuator Align
Courtesy of CHRYSLER LLC

1. Position the rear blend door actuator (1) onto the rear heater-A/C housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the rear blend-air door pivot shaft (2).

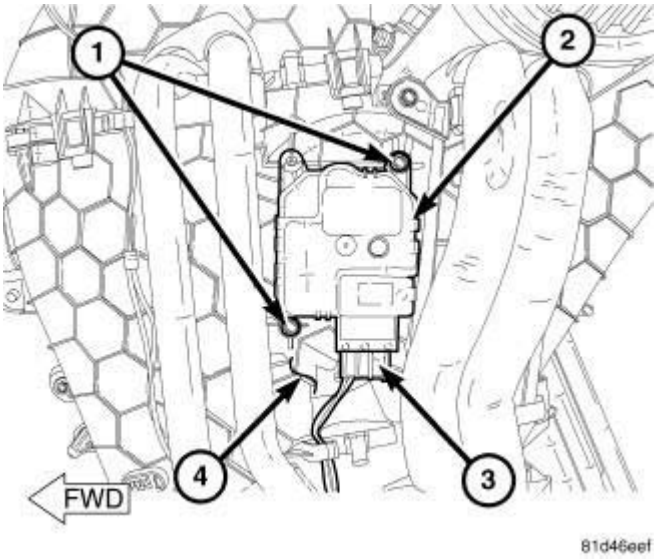


Fig. 50: Rear Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

2. Install the two screws (1) that secure the rear blend door actuator (2) to the rear heater-A/C housing (4). Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the wire harness connector (3) to the rear blend door actuator.
4. Install the rear heater-A/C housing. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Installation**.

5. Initiate the Actuator Calibrationfunction using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

ACTUATOR, MODE DOOR, REAR

Description

DESCRIPTION

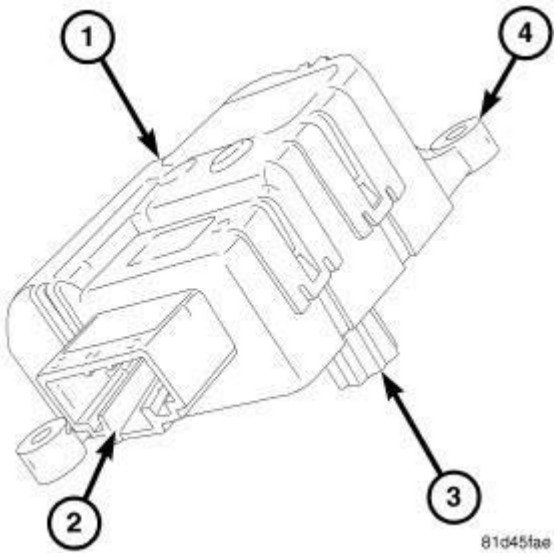


Fig. 51: Rear Actuator Description
Courtesy of CHRYSLER LLC

The mode door actuator (1) for the rear heater-A/C system is a reversible, 12 volt direct current (DC), servo motor. The rear mode door actuator is located on the outboard side of the rear heater-A/C housing.

The rear mode door actuator is contained within a black molded plastic housing with an integral wire connector receptacle (2), an output shaft with splines (3) connect it to the rear mode-air door and three integral mounting tabs (4) allow the actuator to be secured to the rear heater-A/C housing. The mode door actuator does not require mechanical indexing to the mode door linkage, as it is electronically calibrated by the A/C-heater control.

The A/C-heater control must be recalibrated each time an actuator motor is replaced. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The rear mode door actuator is interchangeable with the actuator for the rear blend-air door.

Operation

OPERATION

The rear mode door actuator is connected to the A/C-heater control through the vehicle electrical system by a dedicated two-wire lead and connector of the rear heater-A/C wire harness. The rear mode door actuator can

move the rear mode-air door in two directions. When the A/C-heater control pulls the voltage on one side of the motor connection high and the other connection low, the rear mode-air door will move in one direction. When the A/C-heater control reverses the polarity of the voltage to the motor, the rear mode-air door moves in the opposite direction. When the front A/C-heater control makes the voltage to both connections high or both connections low, the rear mode-air door stops and will not move.

The front A/C-heater control uses a pulse-count positioning system to monitor the operation and relative position of the rear mode door actuator and the rear mode-air door. The front A/C-heater control learns the rear mode-air door stop positions during the calibration procedure and will store a diagnostic trouble code (DTC) for any problems it detects in the rear mode door actuator circuits.

The rear mode door actuator is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The rear mode door actuator cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Removal

REMOVAL

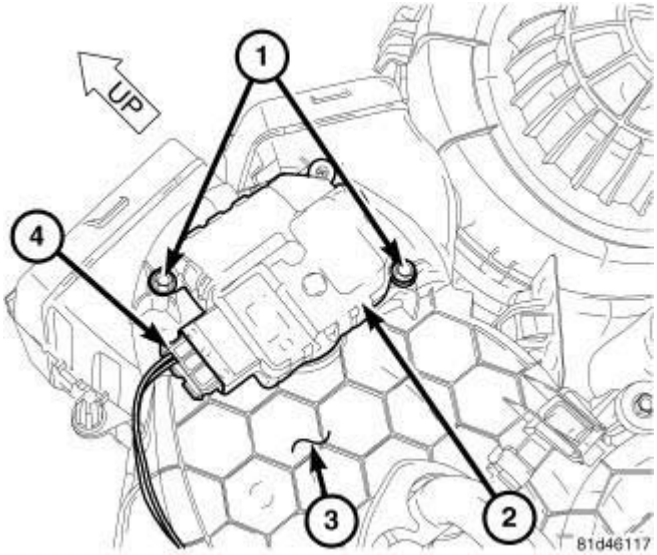


Fig. 52: Rear Housing Mode Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove rear heater-A/C housing (3) and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
3. Disconnect the wire harness connector (4) from the rear mode door actuator (2) located on the outboard side of the rear heater-A/C housing.
4. Remove the two screws (1) that secure the rear mode door actuator to rear heater-A/C housing and remove the actuator.

Installation

INSTALLATION

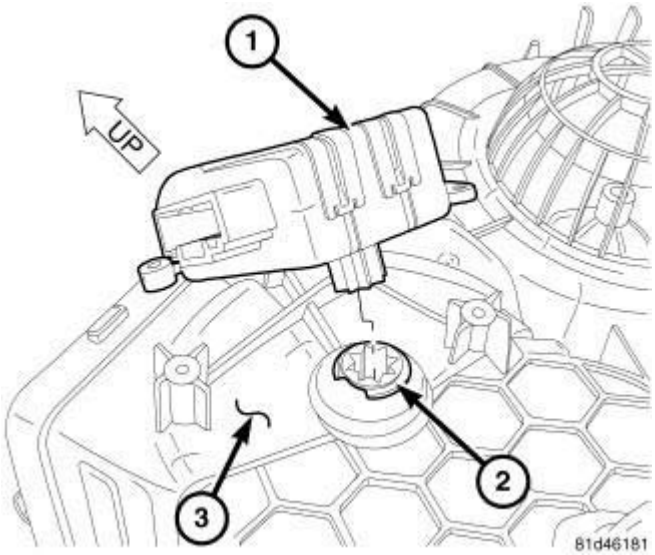


Fig. 53: Rear Mode Door Actuator Align
Courtesy of CHRYSLER LLC

1. Position the rear mode door actuator (1) onto the rear heater-A/C housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the rear mode-air door pivot shaft (2).

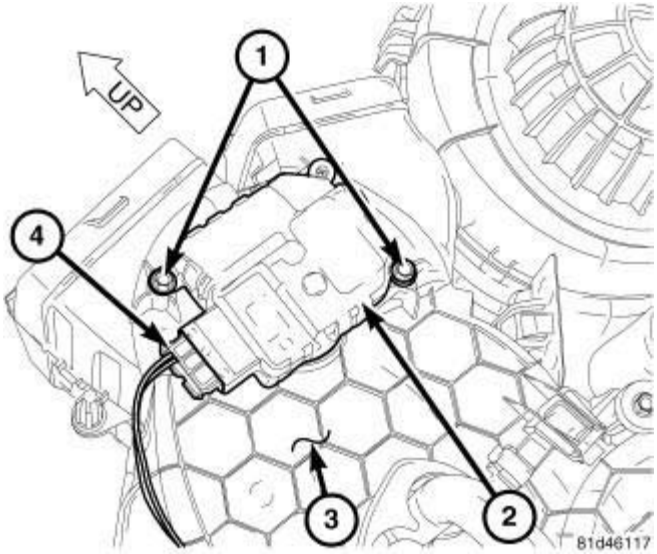


Fig. 54: Rear Housing Mode Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

2. Install the two screws (1) that secure the rear mode door actuator (2) to the rear heater-A/C housing (3). Tighten the screws to 1.2 N.m (10 in. lbs.).

3. Connect the wire harness connector (4) to the rear mode door actuator.
4. Install the rear heater-A/C housing. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Installation**.
5. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

CONTROL, A/C AND HEATER, REAR

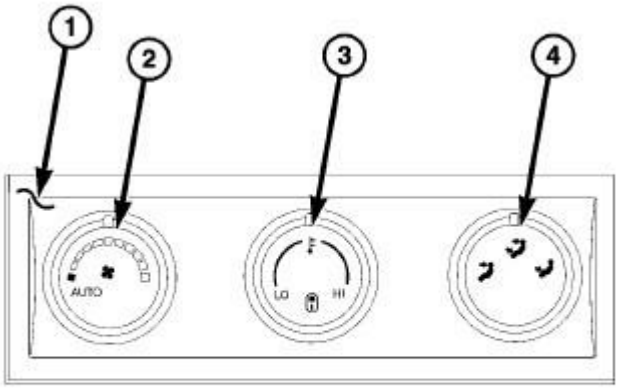
Description

DESCRIPTION

The A/C-heater controls allows the driver and front seat passenger and the intermediate seat passengers the ability to regulate air temperature as well as fan speed for the rear heating-A/C system and provides a floor outlet near the right rear door and upper air outlets at the ceiling. All controls are identified by ISO graphic symbols.

The primary controls for the rear heating-A/C system are located in the instrument panel. See **Heating and Air Conditioning/Controls/CONTROL, A/C and Heater - Description**.

The rear A/C-heater control is located in the headliner and allows intermediate seat passengers to adjust rear air distribution, temperature and blower motor speed when the rear heating-A/C system primary on/off control in the instrument panel is set to the on position and the rear heater-A/C controls are NOT locked out by the driver and front seat passenger.



81e3045a

Fig. 55: ATC Tri Zone Rear Control
Courtesy of CHRYSLER LLC

The rear automatic temperature control (ATC) A/C-heater control (1) contains:

- a rotary control knob for fan speed selection and turning the rear heating-A/C system off or to Auto mode (2).
- a rotary control knob for temperature control of the rear discharged air (3). An indicator lamp illuminates in the control when the rear heater-A/C controls are locked out by the driver or front seat passenger.
- a rotary control knob for mode control of the rear discharged air (4).

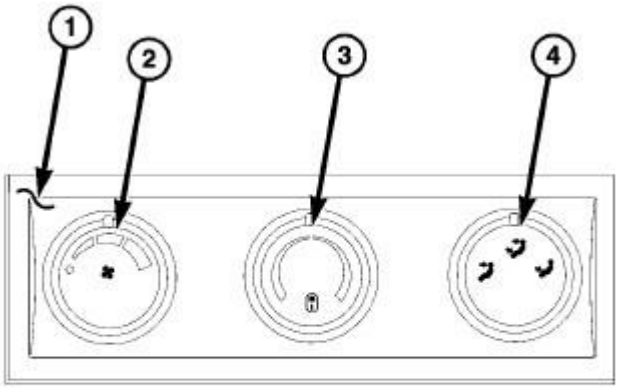


Fig. 56: Manual Temperature Control Tri Zone Rear Control
Courtesy of CHRYSLER LLC

The rear manual temperature control (MTC) A/C-heater control (1) contains:

- a rotary control knob for fan speed selection and turning the rear heating-A/C system on and off (2).
- a rotary control knob for temperature control of the rear discharged air (3). An indicator lamp illuminates in the control when the rear heater-A/C controls are locked out by the driver or front seat passenger.
- a rotary control knob for mode control of the rear discharged air (4).

The rear A/C-heater control is a slave potentiometer to the front A/C-heater control and is diagnosed using a scan tool (refer to **HEATING & AIR CONDITIONING (ATC) - ELECTRICAL DIAGNOSTICS** or **HEATING & AIR CONDITIONING (MTC) - ELECTRICAL DIAGNOSTICS**).

Prior to replacing an A/C-heater control, check for any diagnostic trouble codes (DTCs) related to the heating-A/C systems and run the calibration procedure to verify that the concern is not a system issue. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

The rear A/C-heater control cannot be repaired must be replaced if inoperative or damaged. The illumination lamps are available for service replacement.

Removal

REMOVAL

NOTE: Take the proper precautions to protect the face of the rear A/C-heater control bezel from cosmetic damage during this service procedure.

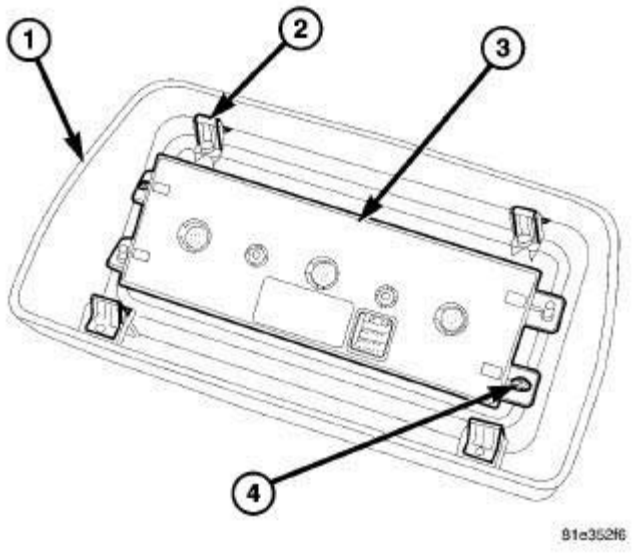


Fig. 57: Rear AC Heater Control Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the rear A/C-heater control (3) and bezel (1) as an assembly from the headliner by releasing the four metal retaining tabs (2) using Trim Stick C-4755 or equivalent.
3. Disconnect the wire harness connector from the back of the rear A/C-heater control and place the control and bezel assembly on a workbench.
4. Remove the two screws (4) that secure the rear A/C-heater control to the rear control bezel and remove the control from the bezel.

Installation

INSTALLATION

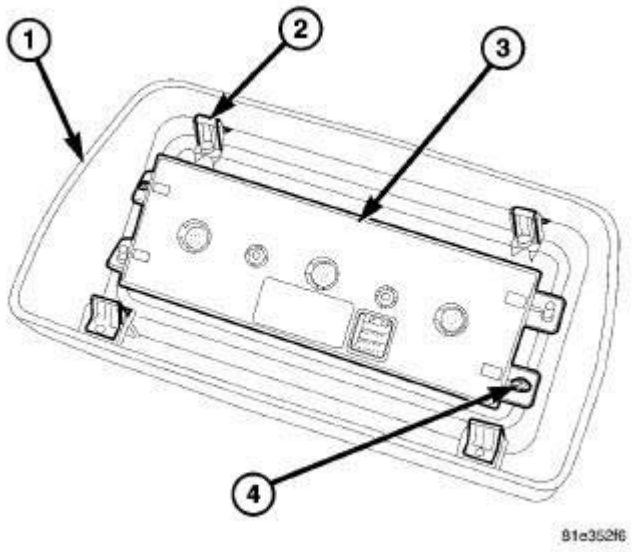


Fig. 58: Rear AC Heater Control Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the rear A/C-heater control (3) to the rear control bezel (1) and align the control to the two plastic guide posts on the back of the bezel.
2. Install the two screws (4) that secure the rear A/C-heater control to the rear control bezel. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the wire harness connector to the back of the rear A/C-heater control and install the bezel and control as an assembly to the headliner. Make sure the four metal retaining tabs (2) are fully engaged.
4. Reconnect the negative battery cable.
5. Initiate the Actuator Calibration function using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

MODULE, POWER, REAR BLOWER MOTOR

Description

DESCRIPTION

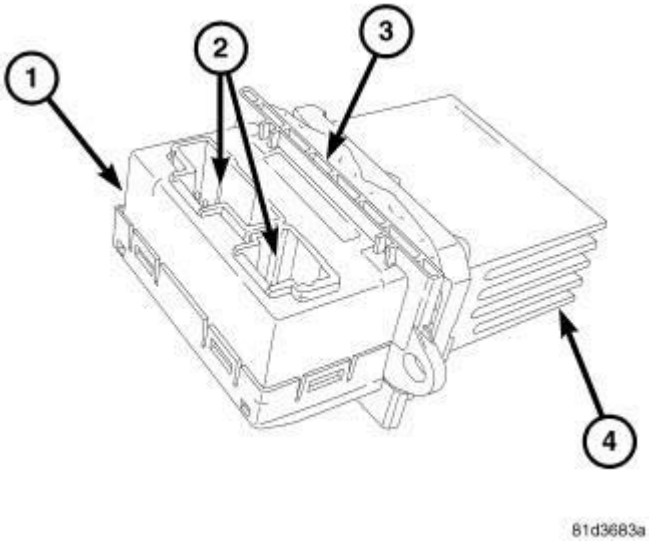


Fig. 59: Rear Blower Power Module Description
Courtesy of CHRYSLER LLC

A blower motor power module is used on this model when equipped with the automatic temperature control (ATC) rear heating-A/C system. Models equipped with the manual temperature control (MTC) rear heating-A/C system use a blower motor resistor, instead of the blower motor power module. See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Description**.

The rear blower motor power module (1) is mounted to the inboard side of the rear heating-A/C housing, located on the right side of the vehicle. The rear blower motor power module consists of a molded plastic housing with two integral wire connector receptacles (2) for the power module electronic circuitry, a mounting plate (3) with a gasket and a finned aluminum heat sink (4).

The rear blower motor power module can be accessed for service without removing the rear heater-A/C housing.

Operation

OPERATION

The rear blower motor power module is connected to the vehicle electrical system through a dedicated lead and connector of the rear body wire harness. A second lead and connector of the wire harness is connected to the rear blower motor. The rear blower motor power module allows the microprocessor-based automatic temperature contro (ATC) A/C-heater control to calculate and provide infinitely variable blower motor speeds based upon either manual blower switch input or the ATC programming using a pulse width modulated (PWM) circuit strategy.

The PWM voltage is applied to a comparator circuit which compares the PWM signal voltage to the rear blower motor feedback voltage. The resulting output drives the power module circuitry, which provides a linear output voltage to change or maintain the desired blower speed.

The rear blower motor power module is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC**

- Diagnosis and Testing .

The rear blower motor power module cannot be adjusted or repaired must be replaced if inoperative or damaged.

Removal

REMOVAL

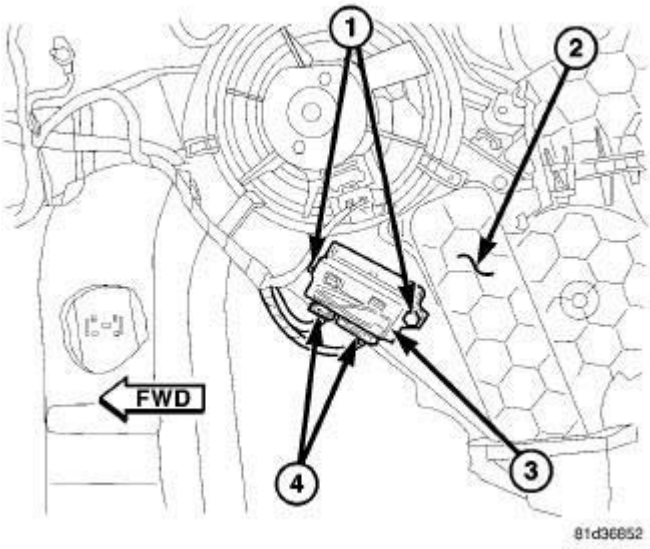


Fig. 60: Rear Blower Power Module Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
3. Disconnect the two wire harness connectors (4) from the rear blower motor power module (3).
4. Remove the two screws (1) that secure the rear blower motor power module to the rear heater-A/C housing (2) and remove the module.

Installation

INSTALLATION

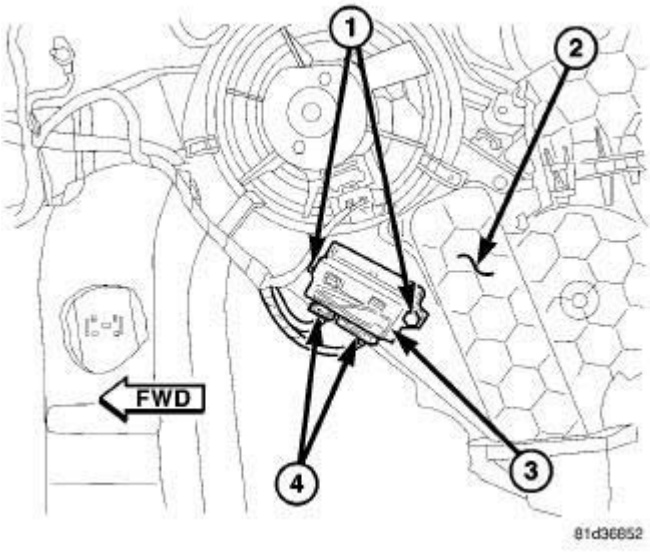


Fig. 61: Rear Blower Power Module Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the rear blower motor power module (3) onto the rear heater-A/C housing (2).
2. Install the two screws (1) that secure the rear blower motor power module to the rear heater-A/C housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the two wire harness connectors (4) to the rear blower motor power module.
4. Install the right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
5. Reconnect the negative battery cable.

RESISTOR, BLOWER MOTOR, REAR

Description

DESCRIPTION

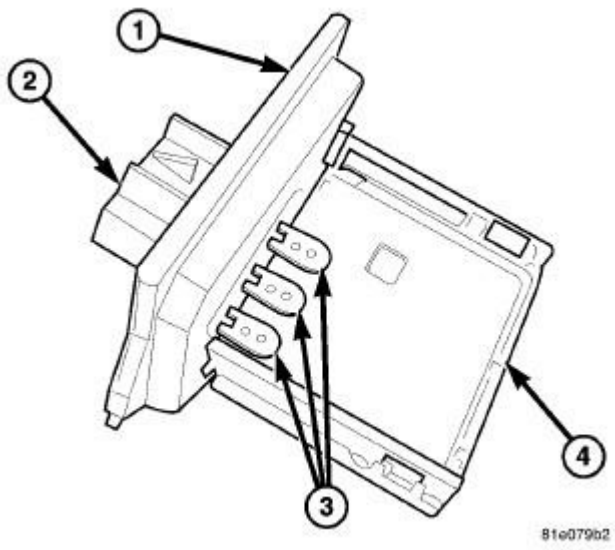


Fig. 62: Rear Blower Resistor
Courtesy of CHRYSLER LLC

A blower motor resistor is used on this model when equipped with the manual temperature control (MTC) rear heating-A/C system. Models equipped with the automatic temperature control (ATC) rear heating-A/C system use a blower motor power module, instead of the blower motor resistor. See **Heating and Air Conditioning/Controls/MODULE, Power - Description**.

The rear blower motor resistor is mounted to the inboard side of the rear heating-A/C housing, located on the right side of the vehicle. The rear blower motor resistor consists of a molded plastic mounting plate (1) with an integral wire connector receptacle (2). Concealed behind the mounting plate are resistors (3) located between a two-piece stamped steel heat sink (4).

The rear blower motor resistor can be accessed for service without removing the rear heater-A/C housing.

Operation

OPERATION

The blower motor resistor for the rear heating-A/C system is connected to the vehicle electrical system through a dedicated wire lead and connector of the rear heater-A/C wire harness. The rear blower motor resistor has an electrical circuit board with three resistors, each of which will reduce the current flow through the rear blower motor to change the blower motor speed.

The blower motor switch for the MTC rear heater-A/C system directs the ground path for the rear blower motor through the correct resistor to obtain the selected speed. With the rear blower motor control in the lowest speed position, the ground path for the rear blower motor is applied through all of the resistors. Each higher speed selected with the rear blower motor control applies the blower motor ground path through fewer of the resistors, increasing the rear blower motor speed. When the blower motor switch is in the highest speed position, the blower motor resistors are bypassed and the blower motor receives a direct path to ground through the rear blower motor switch.

The rear blower motor resistor cannot be adjusted or repaired and it must be replaced if inoperative or damaged.

Diagnosis and Testing

REAR BLOWER MOTOR RESISTOR

NOTE: See SYSTEM WIRING DIAGRAMS for circuit descriptions and diagrams. Wiring Information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the blower motor resistor. See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Removal**.
3. Using an ohmmeter, check for continuity between all of the blower motor resistor terminals. In each case there should be continuity. If OK, repair the wire harness circuits between the blower motor switch and the blower motor resistor or the blower motor as required. If not OK, replace the inoperative blower motor resistor.

Removal

REMOVAL

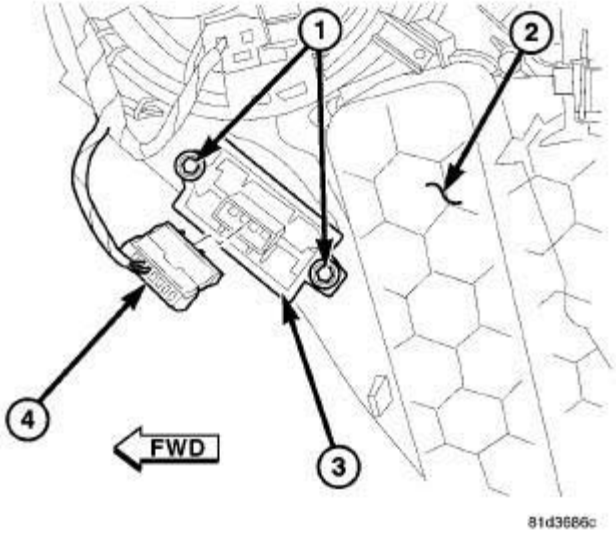


Fig. 63: Rear Blower Resistor Removal/Installation
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .

3. Disconnect the wire harness connector (4) from the rear blower motor resistor (3).
4. Remove the two screws (1) that secure the rear blower motor resistor to the rear heater-A/C housing (2) and remove the resistor.

Installation

INSTALLATION

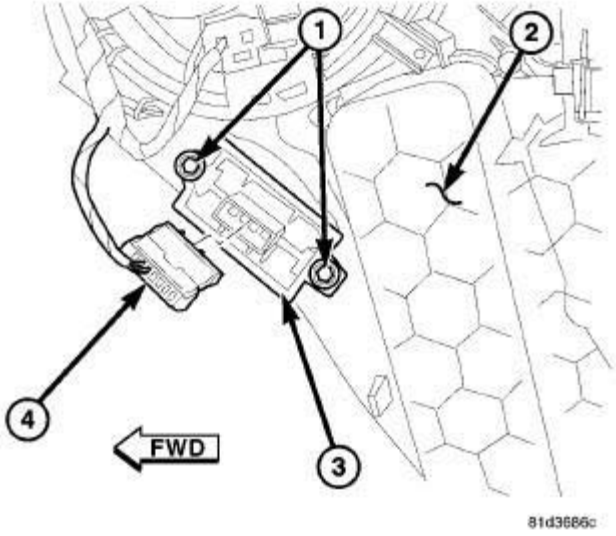


Fig. 64: Rear Blower Resistor Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the rear blower motor resistor (3) onto the rear heater-A/C housing (2).
2. Install the two screws (1) that secure the rear blower motor resistor to the rear heater-A/C housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the wire harness connector (4) to the rear blower motor resistor.
4. Install the right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
5. Reconnect the negative battery cable.

DISTRIBUTION, FRONT

DUCT, DEFROSTER

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect

and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown. RHD model similar.

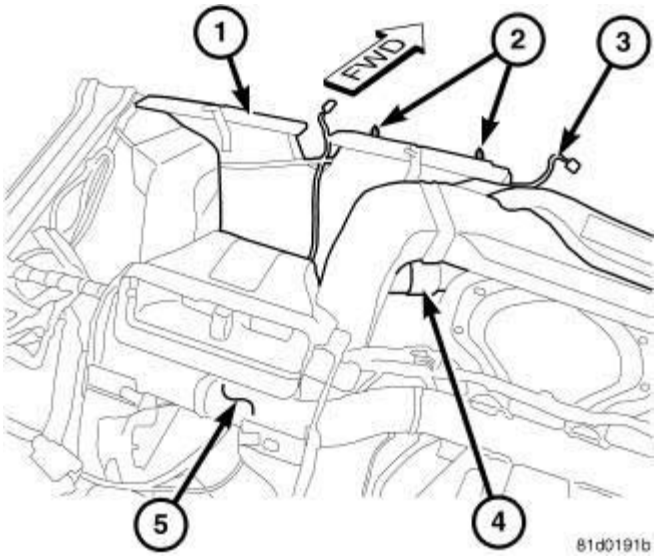


Fig. 65: Defroster Duct
Courtesy of CHRYSLER LLC

1. Remove the instrument panel and place it on a workbench. Refer to **Body/Instrument Panel/PANEL, Instrument - Removal** .
2. Remove the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal**.
3. Remove the cover from the instrument panel.
4. Remove the driver side outboard instrument panel and demister duct assembly. See **Heating and Air Conditioning/Distribution/DUCT, Instrument Panel - Removal**.
5. Disengage the two retaining clips (2) that secure the wire harness lead (3) to the top of the defroster duct (1).
6. Disconnect the defroster duct from the passenger side demister duct (4) and remove the defroster duct from the instrument panel support (5).

Installation

INSTALLATION

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown. RHD model similar.

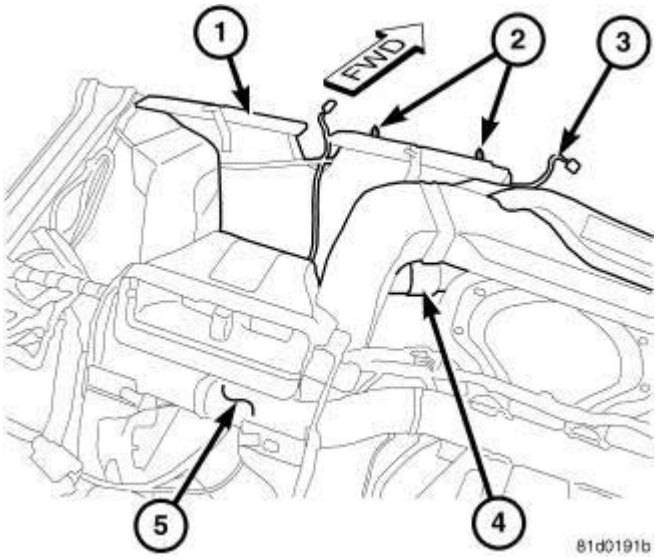


Fig. 66: Defroster Duct
Courtesy of CHRYSLER LLC

1. Position the defroster duct (1) to the top of the instrument panel support (5) and connect it to the passenger side demister duct (4).
2. Engage the two retaining clips (2) that secure the wire harness lead (3) to the top of the defroster duct.
3. Install the driver side instrument panel and demister duct assembly. See **Heating and Air Conditioning/Distribution/DUCT, Instrument Panel - Installation**.
4. Install the cover onto the instrument panel support.
5. Install the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Installation**.
6. Install the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Installation** .

DUCT, FLOOR DISTRIBUTION, FRONT

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag

system. Failure to take the proper precautions could result in an accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustrations. RHD model similar.

RIGHT FRONT FLOOR DUCT

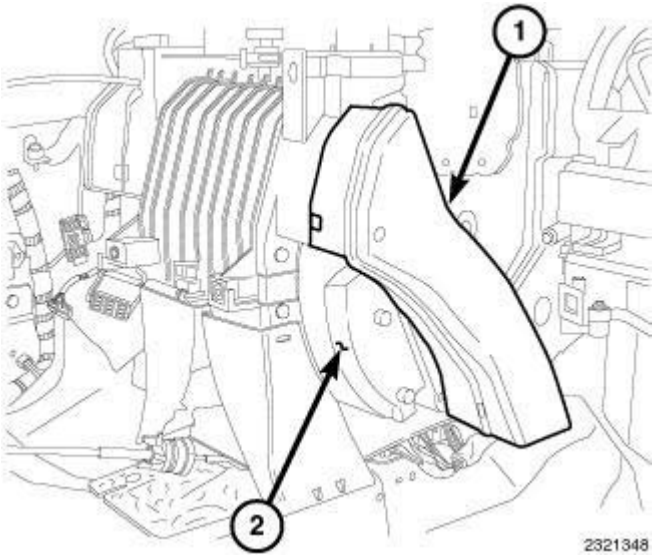


Fig. 67: Duct-Right Front Floor PM
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. On LHD models, remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
2. Disconnect the right floor duct (1) from the right side of the HVAC housing (2) and remove the duct.

LEFT FRONT FLOOR DUCT

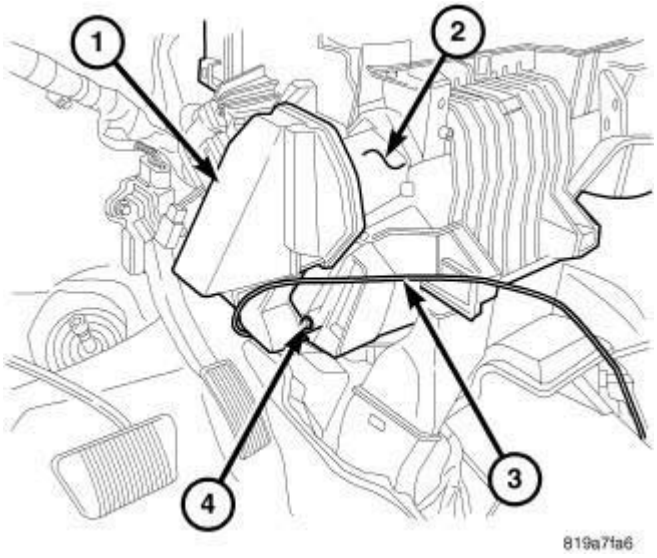


Fig. 68: Duct-Left Front Floor
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. On RHD models, remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
2. On LHD models, disconnect the shift interlock cable (3) from the left floor duct (1) and position the cable out of the way.
3. Remove the screw (4) that secures the left floor duct to the left side of the HVAC housing (2).
4. Disconnect the left floor duct from the HVAC housing and remove the duct.

REAR FLOOR DISTRIBUTION DUCTS

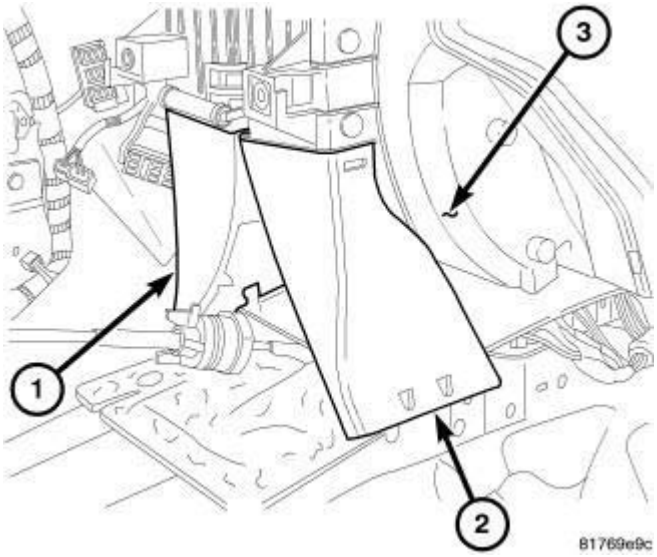


Fig. 69: Ducts-Rear Floor Distribution PM

Courtesy of CHRYSLER LLC

1. Remove the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Removal** .
2. Remove the rear seat floor ducts. Refer to **REAR SEAT FLOOR DUCTS**.
3. Disconnect the left rear floor distribution duct (1) and the right rear floor distribution duct (2) as required from the HVAC housing (3) and remove the duct(s).

REAR SEAT FLOOR DUCTS

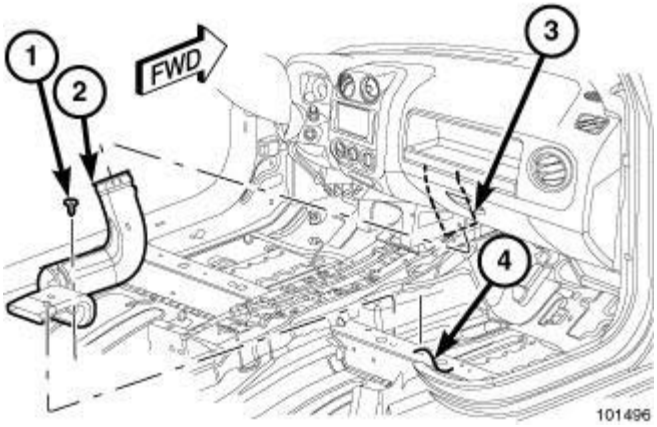


Fig. 70: Ducts-Rear Seat Floor PM
Courtesy of CHRYSLER LLC

NOTE: Right side rear floor duct shown. Left side duct similar.

1. Remove the center floor console. Refer to **Body/Interior/CONSOLE, Center - Removal** .
2. Remove the front seat from the side of the vehicle being serviced. Refer to **Body/Seats/SEAT - Removal** .
3. Pull the carpet back to gain access to the rear seat floor duct (2). Refer to **Body/Interior/CARPET - Removal** .
4. Remove the screw (1) and disengage the retainer that secures the rear seat floor duct to the floor support (4).
5. Disconnect the rear seat floor duct from the rear floor distribution duct (3) and remove the rear seat duct (s).

Installation

INSTALLATION

NOTE: LHD model shown in illustrations. RHD model similar.

RIGHT FRONT FLOOR DUCT

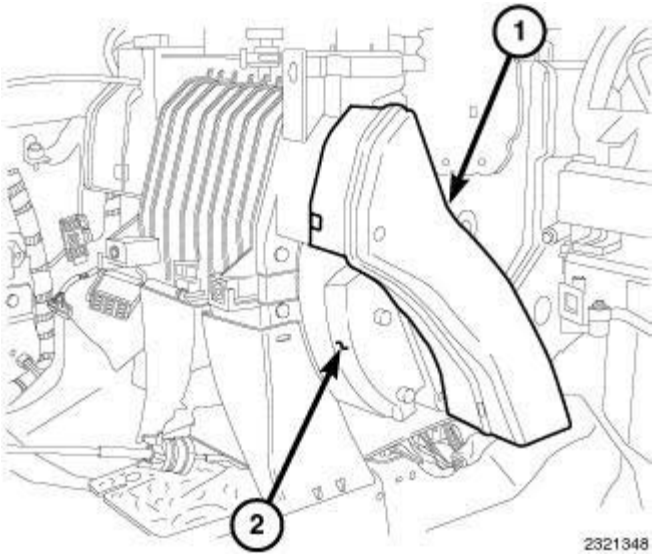


Fig. 71: Duct-Right Front Floor PM
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. Connect the right floor duct (1) to the right side of the HVAC housing (2). Make sure the duct is fully engaged to the housing.
2. On LHD models, install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .

LEFT FRONT FLOOR DUCT

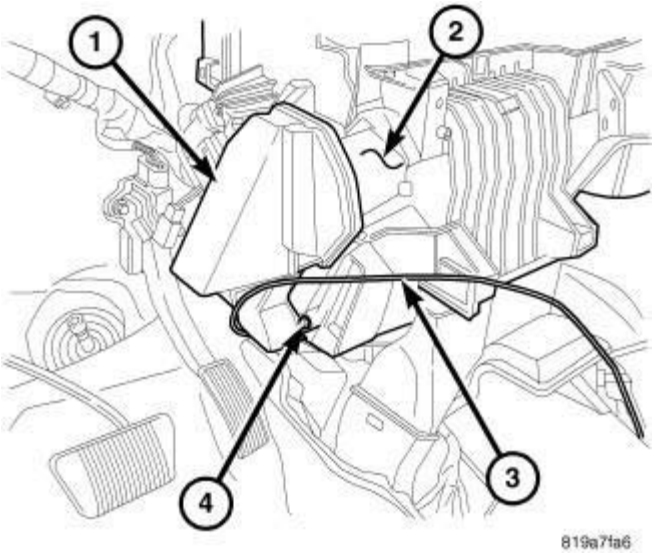


Fig. 72: Duct-Left Front Floor
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. Connect the left floor duct (1) to the left side of the HVAC housing (2). Make sure the duct is fully engaged to the housing.
2. Install the screw (4) that secures the left floor duct to the HVAC housing. Tighten the screw to 2 N.m (17 in. lbs.).
3. On LHD models, connect the shift interlock cable (3) to the left floor duct.
4. On RHD models, install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .

REAR FLOOR DISTRIBUTION DUCTS

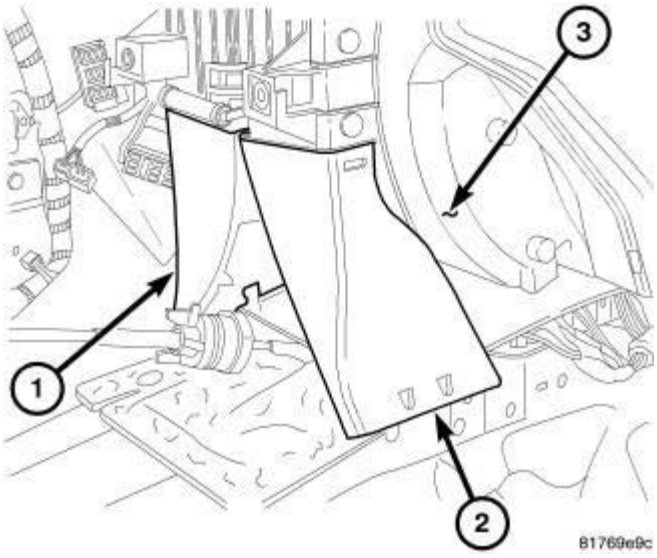


Fig. 73: Ducts-Rear Floor Distribution PM
Courtesy of CHRYSLER LLC

1. Connect the left rear floor distribution duct (1) and the right rear floor distribution duct (2) as required to the HVAC housing (3). Make sure the ducts are fully engaged to the housing.
2. Install the rear seat floor ducts. Refer to **REAR SEAT FLOOR DUCTS**.
3. Install the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Installation** .

REAR SEAT FLOOR DUCTS

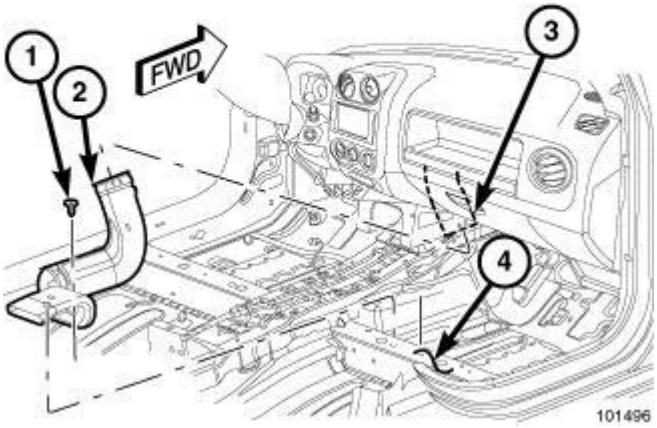


Fig. 74: Ducts-Rear Seat Floor PM
Courtesy of CHRYSLER LLC

NOTE: Right side rear floor duct shown. Left side duct similar.

1. Connect the rear seat floor duct (2) to the rear floor distribution duct (3). Make sure the ducts are fully engaged to each other.
2. Engage the retainer that secures the rear seat floor duct to the floor support (4) and install the retaining screw (1). Tighten the screw to 2.2 N.m (20 in. lbs.).
3. Reinstall the carpet. Refer to **Body/Interior/CARPET - Installation** .
4. Install the front seat to the side of the vehicle being serviced. Refer to **Body/Seats/SEAT - Installation** .
5. Install the center floor console. Refer to **Body/Interior/CONSOLE, Center - Installation** .

DUCT, INSTRUMENT PANEL

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The left and right instrument panel ducts are serviced with the left and right demister ducts as an assembly.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown in illustrations. RHD model similar.

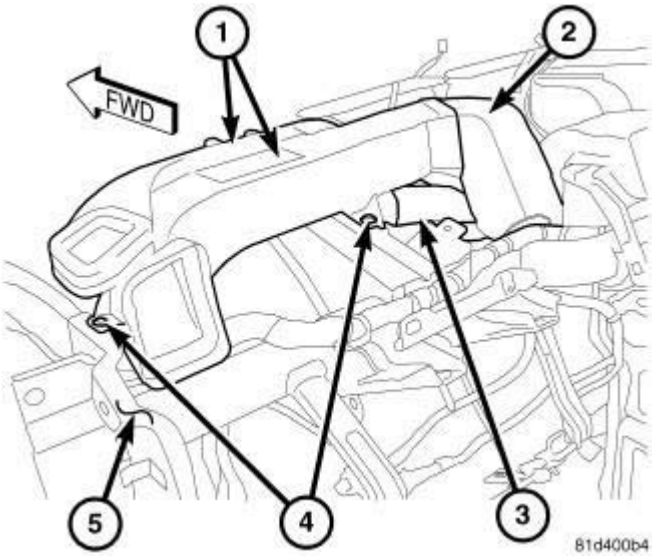


Fig. 75: Driver Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

1. Remove the instrument panel and place it on a workbench. Refer to **Body/Instrument Panel/PANEL, Instrument - Removal** .
2. Remove the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal**.
3. Remove the cover from the instrument panel.
4. Remove the two push-pin retainers (4) that secure the driver side instrument panel and demister duct assembly (1) to the top of the instrument panel support (5).
5. Disconnect the driver side instrument panel and demister duct assembly from the instrument panel center duct (2) and the defroster duct (3) and remove the driver side instrument panel and demister duct assembly.

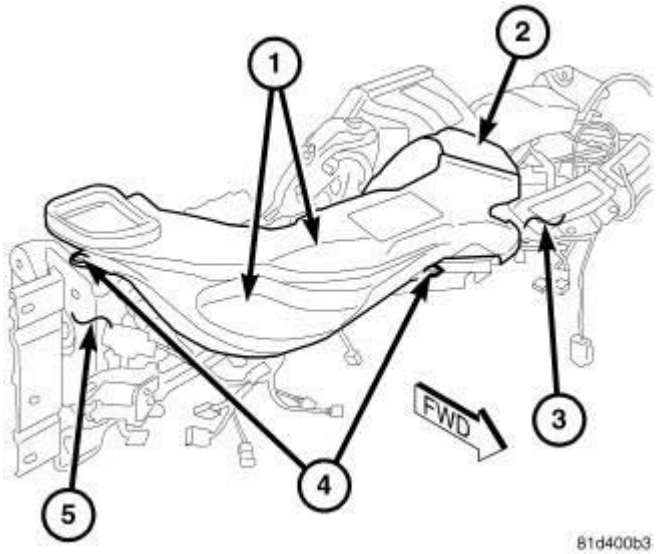


Fig. 76: Pass Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

6. Remove the two push-pin retainers (4) that secure the passenger side instrument panel and demister duct assembly (1) to the top of the instrument panel support (5).
7. Disconnect the passenger side instrument panel and demister duct assembly from the instrument panel center duct (2) and the defroster duct (3) and remove the passenger side instrument panel and demister duct assembly.

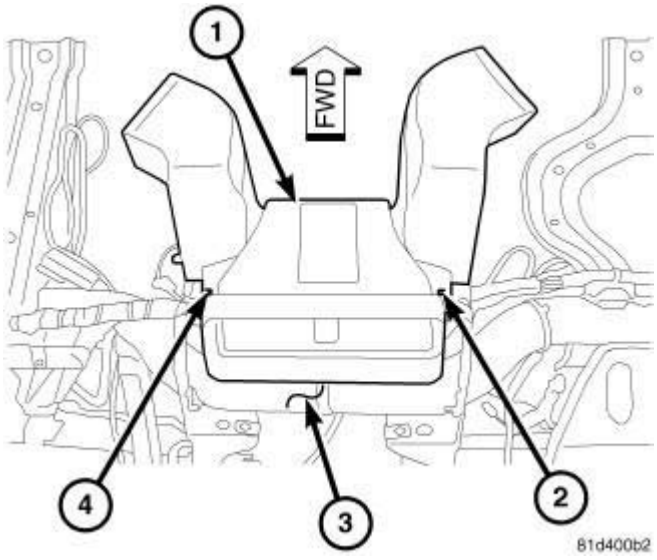


Fig. 77: Center Instrumental Panel Duct
Courtesy of CHRYSLER LLC

8. Remove the two screws (2 and 4) that secure the instrument panel center duct (1) to the instrument panel support (3) and remove the center duct.

Installation

INSTALLATION

NOTE: The left and right instrument panel ducts are serviced with the left and right demister ducts as an assembly.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown in illustrations. RHD model similar.

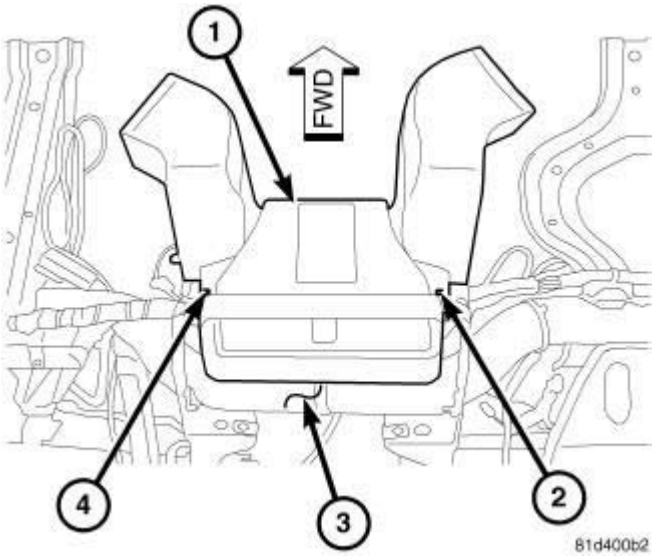


Fig. 78: Center Instrumental Panel Duct
Courtesy of CHRYSLER LLC

1. Position the instrument panel center duct (3) to the instrument panel support (4) and install the two retaining screws (2 and 4). Tighten the screws to 2.2 N.m (20 in. lbs.).

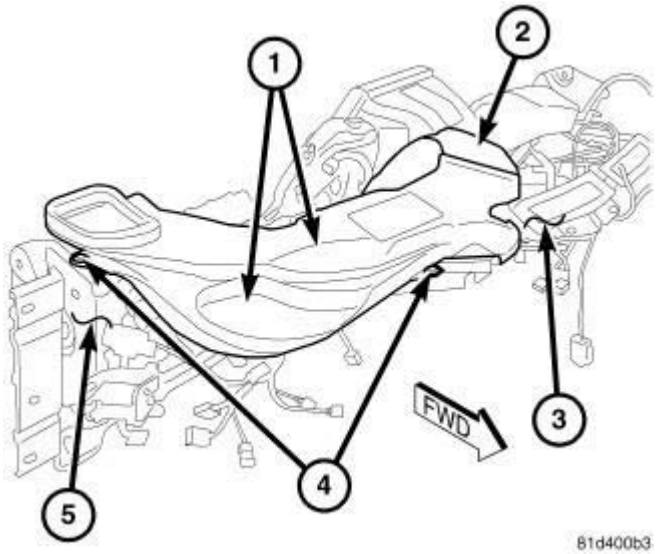


Fig. 79: Pass Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

2. Position the passenger side instrument panel and demister duct assembly (1) to the instrument panel support (5) and connect the instrument panel and demister duct assembly to the center duct (2) and to the defroster duct (3). Make sure the ducts are fully engaged.
3. Install the two push-pin retainers (4) that secure the passenger side instrument panel and demister duct assembly to the instrument panel support.

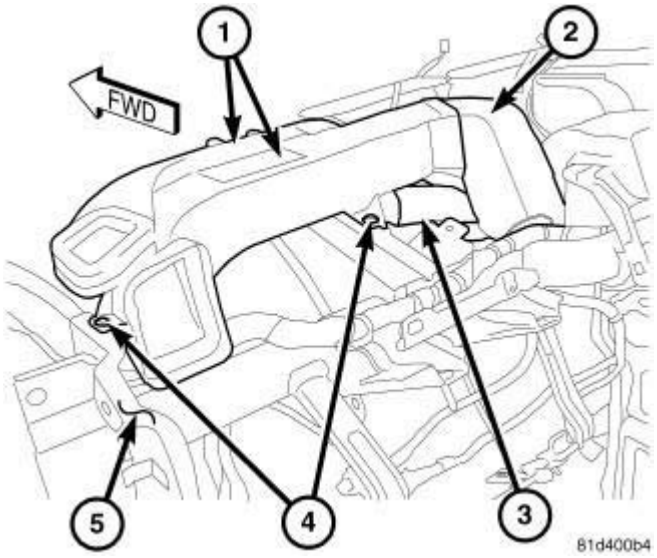


Fig. 80: Driver Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

4. Position the driver side instrument panel and demister duct assembly (1) to the instrument panel support (5) and connect the instrument panel and demister duct assembly to the center duct (2) and to the defroster duct (3). Make sure the ducts are fully engaged.

5. Install the two push-pin retainers (4) that secure the driver side instrument panel and demister duct assembly to the instrument panel support.
6. Install the cover onto the instrument panel.
7. Install the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Installation**.
8. Install the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Installation** .

DUCT, INSTRUMENT PANEL DEMISTER

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The left and right demister ducts are serviced with the left and right instrument panel ducts as an assembly.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown in illustrations. RHD model similar.

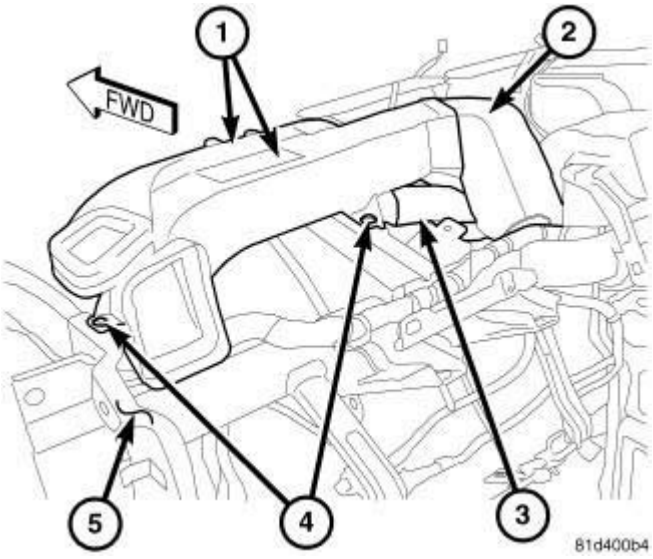


Fig. 81: Driver Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

1. Remove the instrument panel and place it on a workbench. Refer to **Body/Instrument Panel/PANEL, Instrument - Removal** .
2. Remove the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal**.
3. Remove the cover from the instrument panel.
4. Remove the two push-pin retainers (4) that secure the driver side instrument panel and demister duct assembly (1) to the top of the instrument panel support (5).
5. Disconnect the driver side instrument panel and demister duct assembly from the instrument panel center duct (2) and the defroster duct (3) and remove the driver side instrument panel and demister duct assembly.

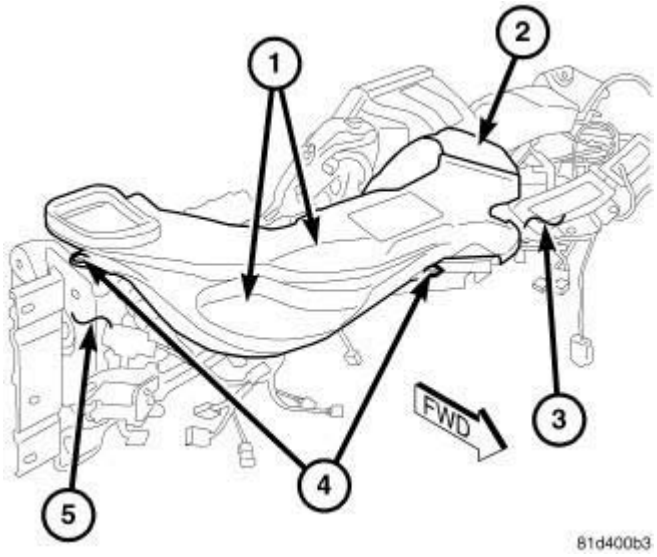


Fig. 82: Pass Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

6. Remove the two push-pin retainers (4) that secure the passenger side instrument panel and demister duct assembly (1) to the top of the instrument panel support (5).
7. Disconnect the passenger side instrument panel and demister duct assembly from the instrument panel center duct (2) and the defroster duct (3) and remove the passenger side instrument panel and demister duct assembly.

Installation

INSTALLATION

NOTE: The left and right demister ducts are serviced with the left and right instrument panel ducts as an assembly.

NOTE: Take the proper precautions to protect the front face of the instrument panel from cosmetic damage while performing this procedure.

NOTE: LHD model shown in illustrations. RHD model similar.

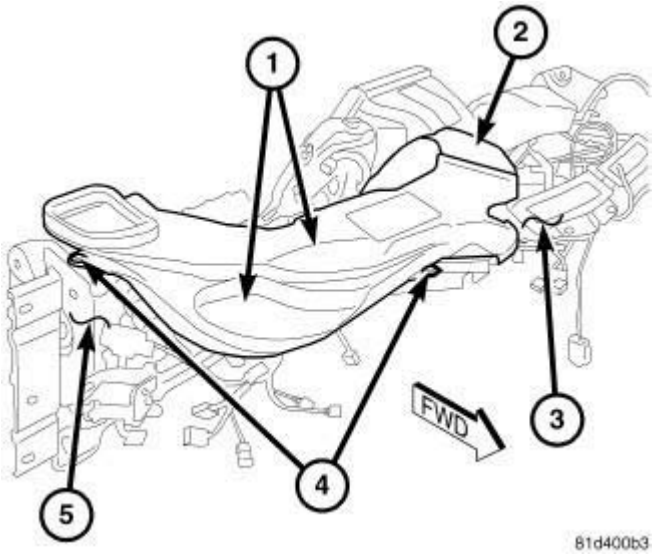


Fig. 83: Pass Instrumental Panel & Demister Duct
Courtesy of CHRYSLER LLC

1. Position the passenger side instrument panel and demister duct assembly (1) to the instrument panel support (5) and connect the instrument panel and demister duct assembly to the center duct (2) and to the defroster duct (3). Make sure the ducts are fully engaged.
2. Install the two push-pin retainers (4) that secure the passenger side instrument panel and demister duct assembly to the instrument panel support.

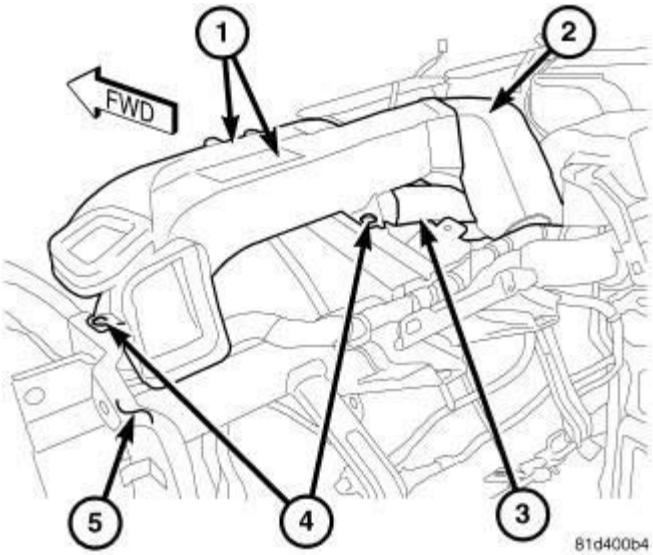


Fig. 84: Driver Instrumental Panel & Demister Duct

Courtesy of CHRYSLER LLC

3. Position the driver side instrument panel and demister duct assembly (1) to the instrument panel support (5) and connect the instrument panel and demister duct assembly to the center duct (2) and to the defroster duct (3). Make sure the ducts are fully engaged.
4. Install the two push-pin retainers (4) that secure the driver side instrument panel and demister duct assembly to the instrument panel support.
5. Install the cover onto the instrument panel.
6. Install the outboard instrument panel air outlets. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Installation**.
7. Install the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Installation** .

FILTER, PARTICULATE AIR

Description

DESCRIPTION

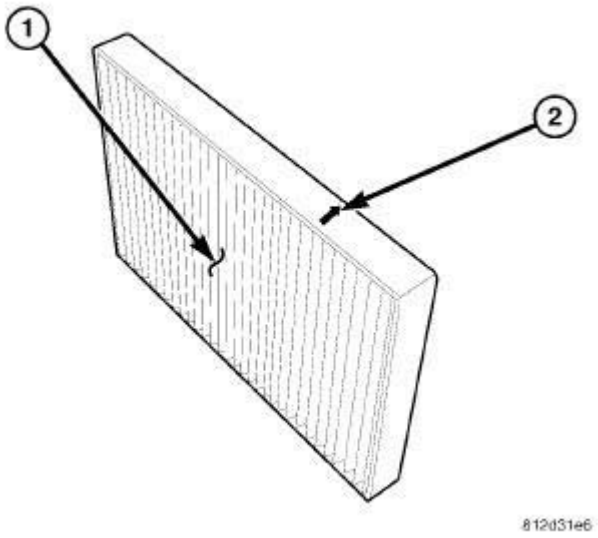


Fig. 85: Filter-Particulate Air Description
Courtesy of CHRYSLER LLC

Some models are equipped with a particulate air filter (1) that helps purify the outside air entering the HVAC housing. The filter is mounted in the passenger compartment, behind the glove box bin.

The filter should be replaced at least once a year or every 24,000 km (15,000 miles) and checked if heating-A/C system performance seems lower than expected. The particulate air filter is labeled with an arrow (2) to indicate the direction of air flow through the filter.

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: Always make sure the A/C-heater system is turned off and that the ignition switch is in the OFF position prior to servicing the particulate air filter. Never place fingers or other objects into the filter opening of the HVAC housing. Failure to follow this warning may result in serious injury.

NOTE: LHD model shown in illustrations. RHD model similar.

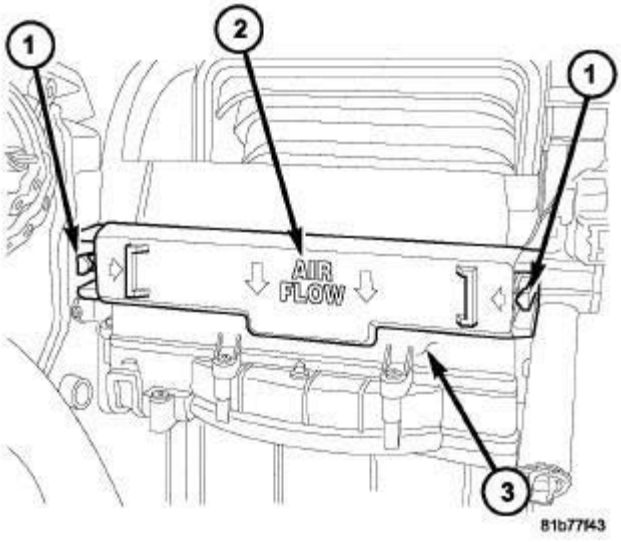


Fig. 86: Particulate Filter Cover Removal/Installation S1
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. Remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
2. Disengage the two retaining tabs (1) that secure the particulate air filter cover (2) to the passenger side of the HVAC housing (3) and remove the cover.

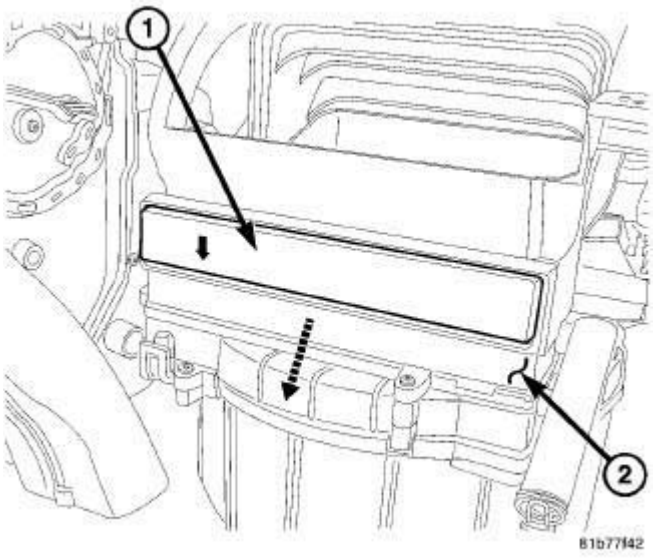


Fig. 87: Particulate Filter Removal S1
Courtesy of CHRYSLER LLC

3. Remove the particulate air filter (1) from the HVAC housing (2) by pulling the filter element straight out of the housing.

Installation

INSTALLATION

NOTE: The particulate air filter is labeled with an arrow to indicate air flow direction through the filter. Make sure to properly install the particulate air filter. Failure to properly install the filter will result in the need to replace the filter sooner than required by design.

NOTE: LHD model shown in illustrations. RHD model similar.

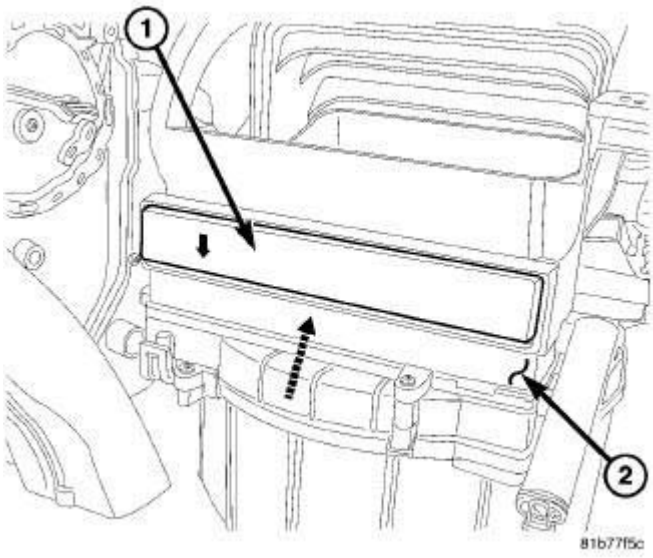


Fig. 88: Particulate Filter Install S1
Courtesy of CHRYSLER LLC

1. Install the particulate air filter (1) into the filter opening in the HVAC housing (2). Insert the particulate air filter directly into the housing with the arrow on the filter pointing to the floor.

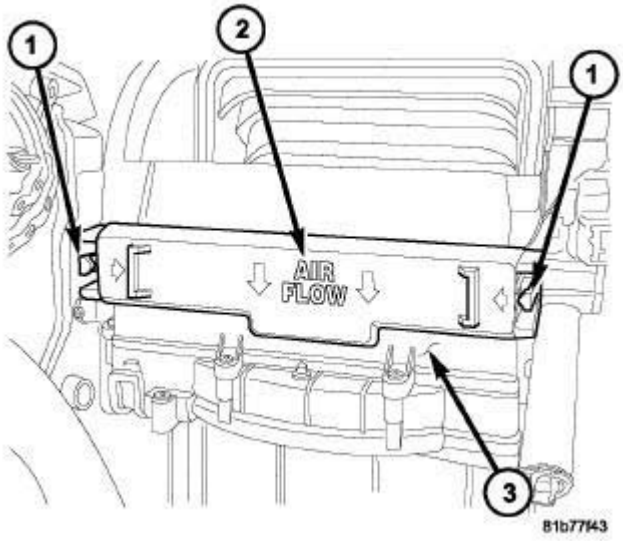


Fig. 89: Particulate Filter Cover Removal/Installation S1
Courtesy of CHRYSLER LLC

2. Position the particulate air filter cover (2) to the HVAC housing (3) and engage the two retaining tabs (1) that secure the cover to the housing. Make sure the retaining tabs are fully engaged.
3. Install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .

HOUSING, HVAC

Description

DESCRIPTION

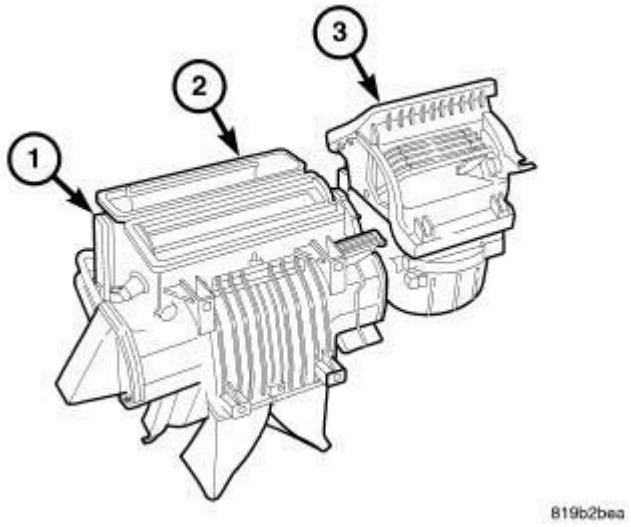


Fig. 90: HVAC housing assembly
Courtesy of CHRYSLER LLC

NOTE: LHD model shown RHD model similar.

All models are equipped with a common HVAC housing assembly that combines A/C and heating capabilities into a single unit mounted within the passenger compartment. The HVAC housing assembly consists of three separate housings:

- **HVAC housing** - The HVAC housing (1) is mounted to the dash panel behind the instrument panel and contains the A/C evaporator. The HVAC housing consists of an upper and a lower housing that are attached together and has mounting provisions for the air inlet housing, blower motor and the air distribution housing.
- **Air distribution housing** - The air distribution housing (2) is mounted to the rear of the HVAC housing and contains the heater core, blend-air and mode-air doors and door linkage.
- **Air inlet housing** - The air inlet housing (3) is mounted to the passenger side end of the HVAC housing and contains the recirculation-air door and actuator.

The heating-A/C system is a blend-air type system. The blend-air door controls the amount of conditioned air that is allowed to flow through, or around the heater core.

The A/C system is designed for the use of a non-CFC, R-134a refrigerant and uses an A/C evaporator to cool and dehumidify the incoming air prior to blending it with the heated air. A temperature control determines the discharge air temperature by operating the electric blend door actuator, which moves the blend-air door. This allows an almost immediate control of the output air temperature of the system. The electric mode door actuator

operates the mode-air door. The electric recirculation door actuator operates the recirculation-air door which closes off the fresh air intake into the HVAC housing and recirculates the air already inside the vehicle. The blower motor controls the velocity of air flowing through the HVAC housing assembly by spinning the blower wheel within the HVAC housing at the selected speed by use of the blower motor resistor or power module (depending on application), which is located on the bottom of the HVAC housing. The actuators, resistor or power module and the blower motor are connected to the vehicle electrical system by the instrument panel wire harness.

The air distribution housing must be removed from the HVAC housing and disassembled for service of the blend-air and mode-air doors. The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door. The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

Removal

HOUSING-AIR DISTRIBUTION

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The air distribution housing must be removed from the HVAC housing and disassembled for service of the blend-air and mode-air doors.

NOTE: LHD model shown in illustrations. RHD model similar.

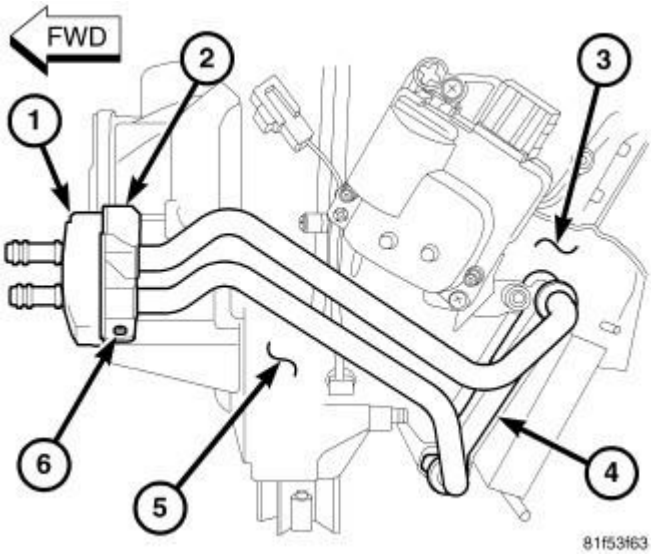


Fig. 91: Heater Core Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Remove the floor distribution ducts from the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Removal**.

NOTE: If the foam seal for the flange is deformed or damaged, it must be replaced.

3. Remove the foam seal (1) from the flange (2) located on the front of the HVAC housing (5).
4. Remove the screw (6) that secures the flange to the HVAC housing and remove the flange.
5. On RHD models, remove the air distribution housing (3) from the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**
6. Carefully pull the heater core (4) out of the air distribution housing.

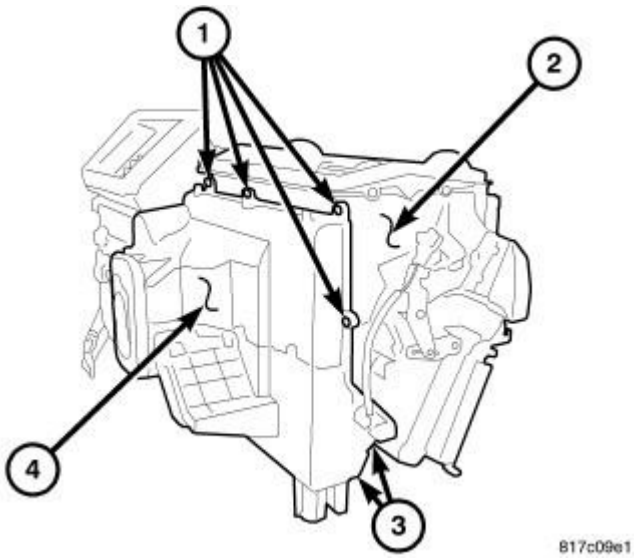


Fig. 92: Air Distribution Housing-Removal/Installation
Courtesy of CHRYSLER LLC

7. Remove the two metal retaining clips (3) that secure the bottom of air distribution housing (2) to the HVAC housing (4).
8. Remove the seven screws (1) that secure the air distribution housing to the rear of the HVAC housing.
9. Remove the air distribution housing from the rear of the HVAC housing.
10. If required, disassemble the air distribution housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Disassembly**.

HOUSING-AIR INLET

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

NOTE: LHD model shown. RHD model similar.

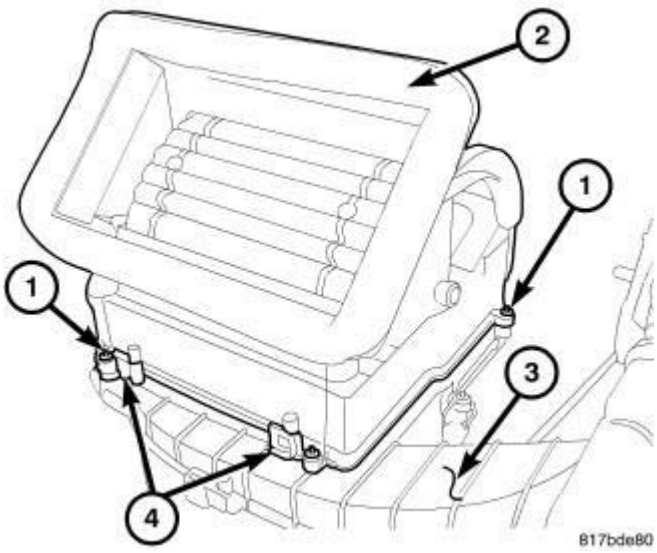


Fig. 93: Air Inlet Housing-Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. If equipped, remove the particulate air filter. See **Heating and Air Conditioning/Distribution/FILTER, Particulate Air - Removal**.
3. Remove the four screws (1) that secure the air inlet housing (2) to the top of the HVAC housing (3).
4. Disengage the two plastic retaining tabs (4) that secure the air inlet housing to the HVAC housing and remove the inlet housing from the HVAC housing.
5. If required, disassemble the air inlet housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Disassembly**.

SCREEN-AIR INLET

NOTE: LHD model shown. RHD model similar.

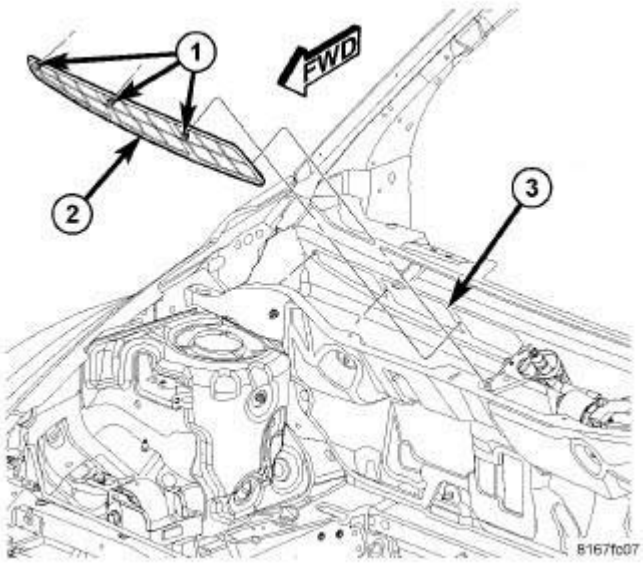


Fig. 94: Screen-HVAC Housing Air Inlet
Courtesy of CHRYSLER LLC

1. Remove the cowl grille screen. Refer to **Body/Exterior/COVER, Cowl Panel - Removal** .
2. Disengage the three push-in retainers (1) that secure the HVAC housing air inlet screen (2) to the cowl panel (3) and remove the screen.

HOUSING-HVAC

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the heater core, A/C evaporator, air intake housing and the mode-air and blend-air doors.

NOTE: LHD model shown in illustrations. RHD model similar.

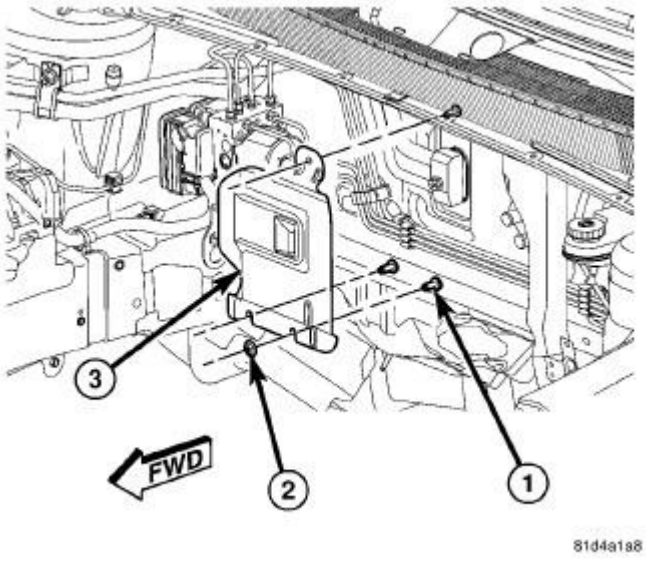


Fig. 95: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Partially drain the engine cooling system. Refer to **Cooling - Standard Procedure** .
4. If equipped with heat shield (3), remove the top nut (2) that secures the heat shield to the stud (1) located on the dash panel.

   NOTE: Two slots are provided at the bottom of the heat shield to aid in heat shield removal, if equipped. Complete removal of the two bottom heat shield retaining nuts is not required.

5. If equipped, reach behind the engine and remove the two bottom nuts the that secure the heat shield to the studs located on the dash panel and remove the heat shield. Rotate and tilt the heat shield as required.

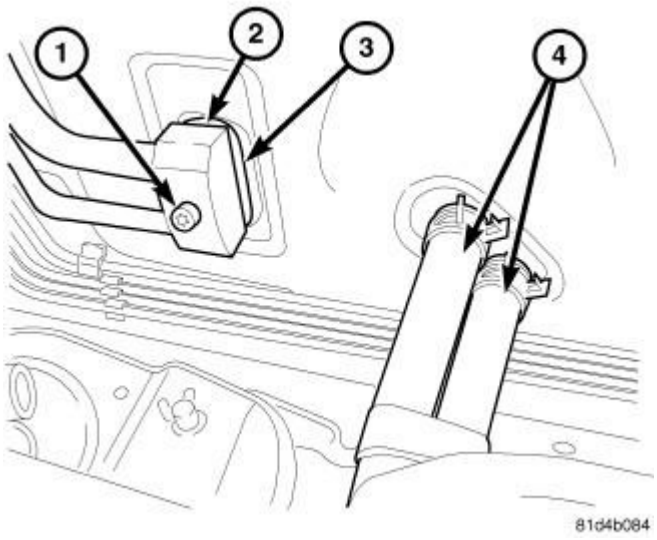


Fig. 96: Unified Liquid & Suction Line to Evaporator
Courtesy of CHRYSLER LLC

6. Remove the nut (1) that secures the A/C liquid and suction line assembly (2) to the A/C expansion valve (3).
7. Disconnect the A/C liquid and suction line assembly from the A/C evaporator and remove and discard the dual-plane seals.
8. Install plugs in, or tape over the opened refrigerant line fittings and the evaporator ports.
9. Disconnect the heater hoses (4) from the heater core tubes. Install plugs in, or tape over the opened heater core tubes to prevent coolant spillage during housing removal.

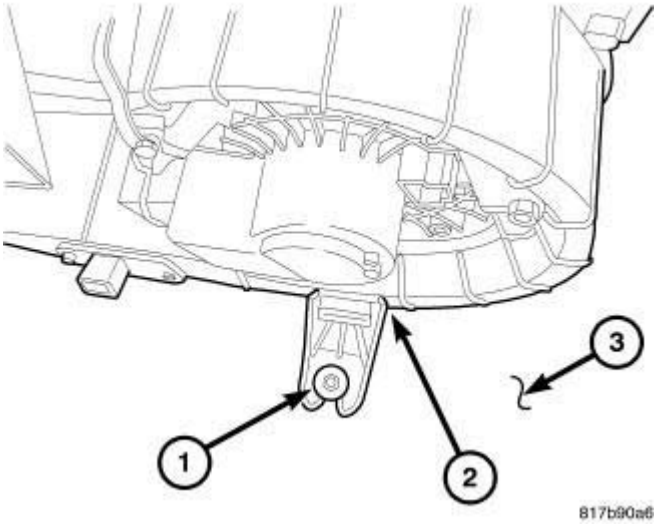


Fig. 97: HVAC Housing to Dash Panel Nut
Courtesy of CHRYSLER LLC

NOTE: Make sure to remove the five bolts that secure the HVAC housing to the

instrument panel support prior to removing the instrument panel from the vehicle.

10. Remove the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Removal** .
11. Remove the rear floor ducts. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Removal**.
12. Remove the condensation drain tube.
13. Remove the nut (1) that secures the passenger side of the HVAC housing (2) to the dash panel (3).

NOTE: Use care to ensure that the interior is covered in case of loss of residual fluids from the heater and evaporator cores.

14. Pull the HVAC housing rearward and remove the HVAC housing assembly from the passenger compartment.

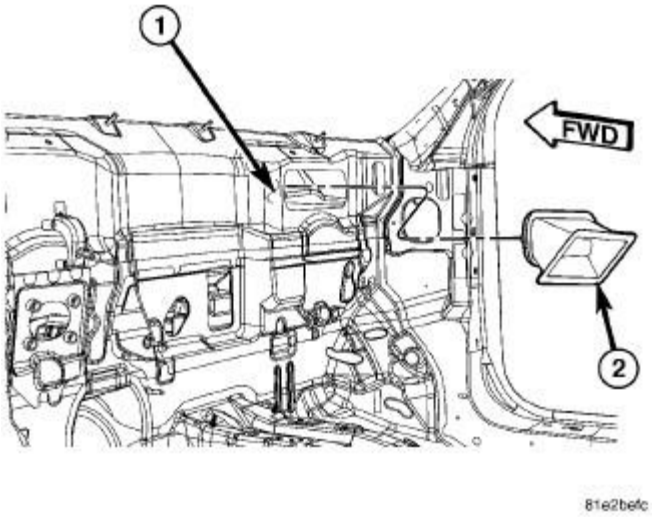


Fig. 98: Air Inlet Duct
Courtesy of CHRYSLER LLC

15. If required, remove the HVAC housing air inlet duct (2) from the passenger compartment side of the dash panel (1).

Disassembly

HOUSING-AIR DISTRIBUTION

NOTE: The air distribution housing must be removed from the HVAC housing and disassembled for service of the blend-air and mode-air doors.

NOTE: LHD model with A/C shown in illustrations. RHD and heater-only models similar.

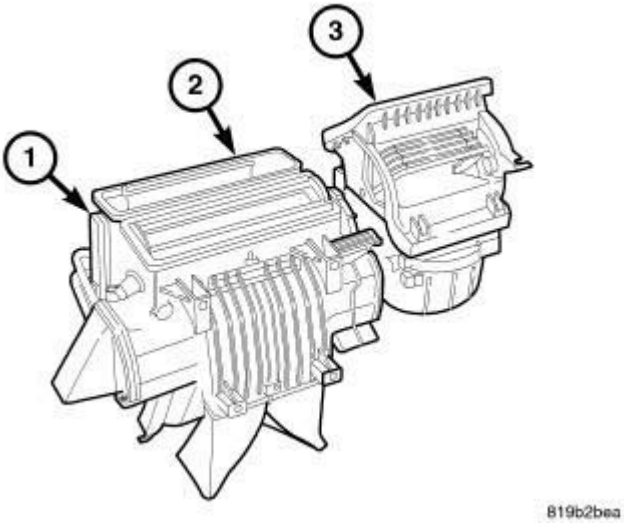


Fig. 99: HVAC housing assembly
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Remove the air distribution housing (2) from the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
3. If equipped with the 2.0L diesel engine, remove the electric positive temperature coefficient (PTC) heater unit from the air distribution housing. See **Heating and Air Conditioning/Cabin Heater/UNIT, Heater - Removal**.
4. Remove the heater core from the air distribution housing. See **Heating and Air Conditioning/Plumbing/CORE, Heater - Removal**.

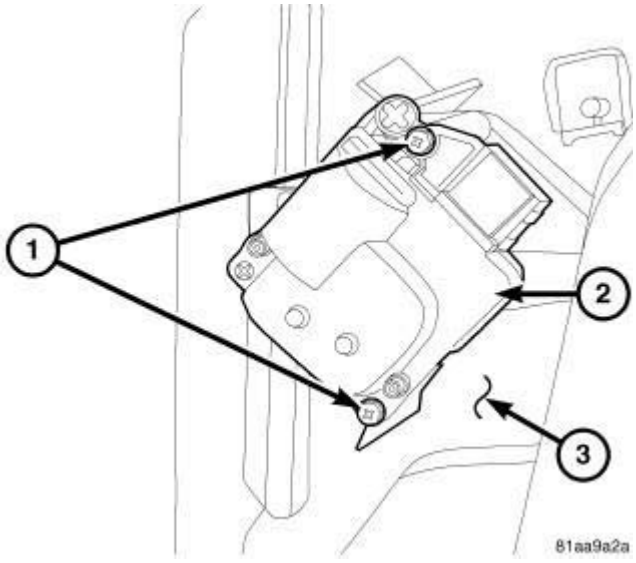


Fig. 100: Blend Door Actuator
Courtesy of CHRYSLER LLC

5. Remove the screws (1) that secure the blend door actuator (2) to the left side of the air distribution housing (3) and remove the actuator.
6. If equipped with dual zone system, remove the screws that secure the other blend door actuator to the right side of the air distribution housing and remove the actuator. See **Heating and Air Conditioning/Controls/ACTUATOR, Blend Door - Removal**.

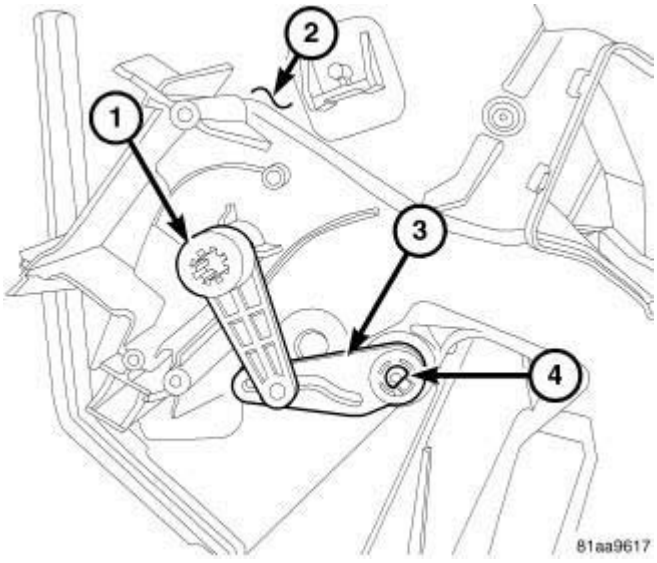


Fig. 101: Blend Door Levers
Courtesy of CHRYSLER LLC

7. Remove the blend door lever (1) from the left side of the air distribution housing (2).

NOTE: To remove the blend door pivot lever, disengage the retaining tab on the lever and pull the lever straight off the pivot shaft.

8. Remove the blend door pivot lever (3) from the end of the blend door pivot shaft (4).

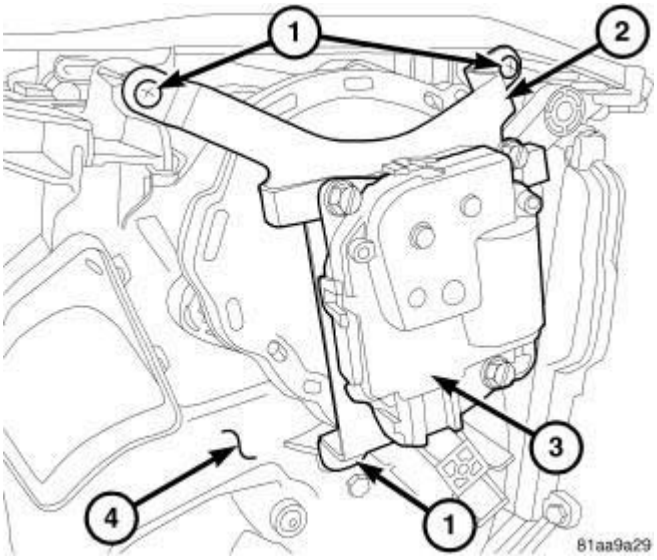


Fig. 102: Mode Door Actuator & Bracket
Courtesy of CHRYSLER LLC

NOTE: It is not necessary to remove the mode door actuator from the bracket when servicing the air distribution housing.

9. Remove the three screws (1) that secure the mode door actuator (2) and bracket (3) to the right side of the air distribution housing (4) and remove the actuator and bracket as an assembly.

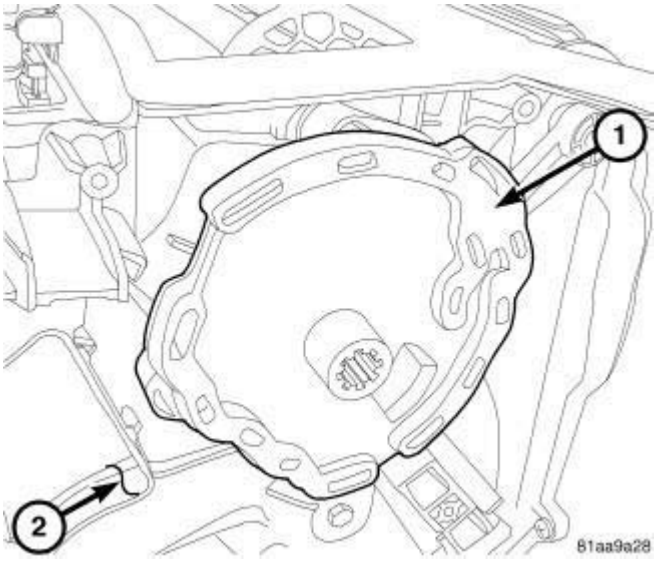


Fig. 103: Mode Door Cam
Courtesy of CHRYSLER LLC

10. Remove the mode door cam (1) from the right side of the air distribution housing (2).

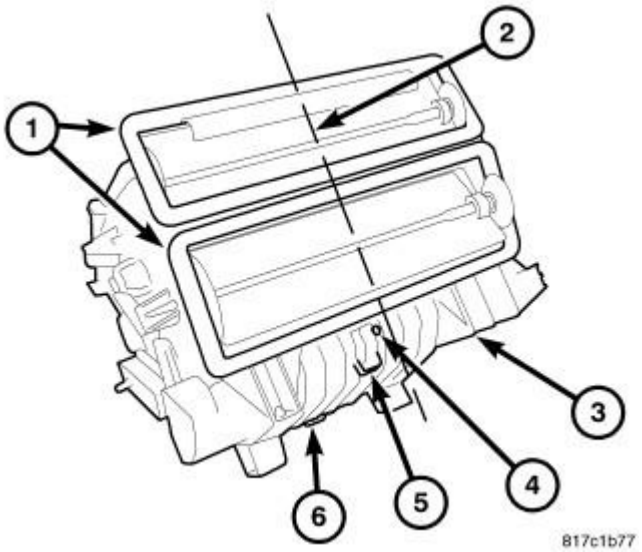


Fig. 104: Parting Line & Retainers
Courtesy of CHRYSLER LLC

NOTE: If any foam seal on the air distribution housing outlets is deformed or damaged, the seal must be replaced.

11. Carefully cut the two foam seals (1) along the parting line (2) of the two halves of the air distribution housing (3). If either seal is deformed or damaged, it must be replaced.
12. Remove the five screws (4) and one metal clip (5) that secure the two halves of the air distribution housing together.
13. Disengage the three plastic retaining tabs (6) that secure the two halves of the air distribution housing together and carefully separate the housing.

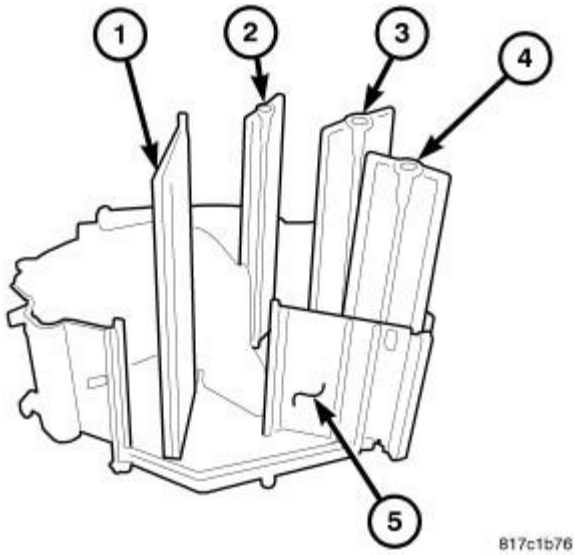


Fig. 105: Air Doors-Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: If a seal on an air door is deformed or damaged, the air door must be replaced.

NOTE: If equipped with dual zone heating/A/C system, there are two blend-air doors that mate together at the centerline of the housing.

14. Disengage the air doors (1, 2, 3 and 4) from the door levers and remove the air doors from the air distribution housing (5).

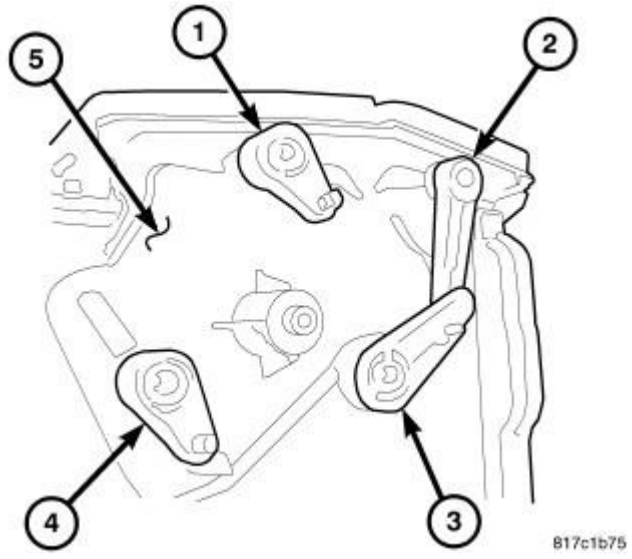


Fig. 106: Mode Door Levers-Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: To remove the door levers, disengage the retaining tabs on the inside of the air distribution housing and pull the levers straight out of the housing.

15. If required, remove the door levers (1, 2, 3 and 4) from the right side of the air distribution housing (5).

HOUSING-AIR INLET

NOTE: The air inlet housing must be removed from HVAC housing and disassembled for service of the recirculation-air door.

NOTE: LHD model shown in illustrations. RHD model similar.

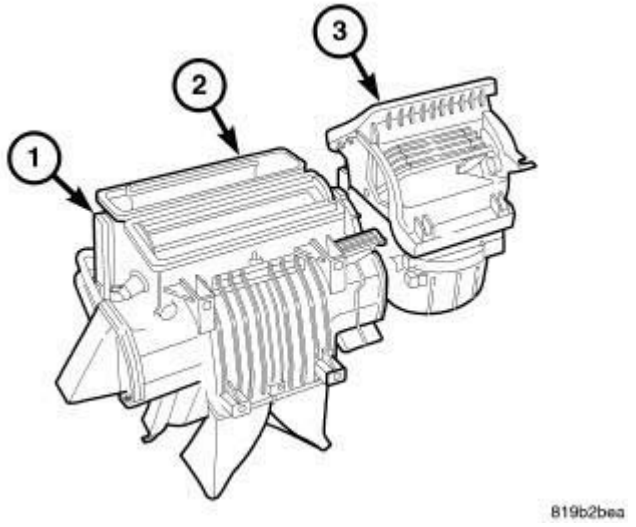


Fig. 107: HVAC housing assembly
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Remove the air inlet housing (3) from the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.

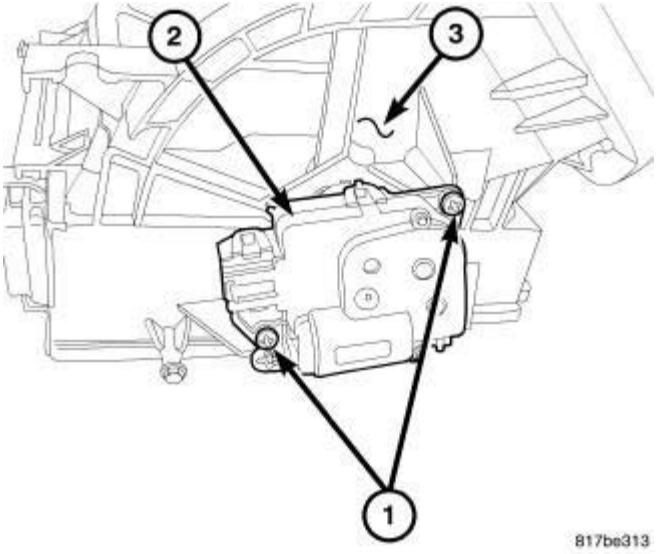


Fig. 108: Recirculation Door Actuator-Removal/Installation
Courtesy of CHRYSLER LLC

3. Remove the two screws (1) that secure the recirculation door actuator (2) to the right side of the air inlet housing (3) and remove the actuator.

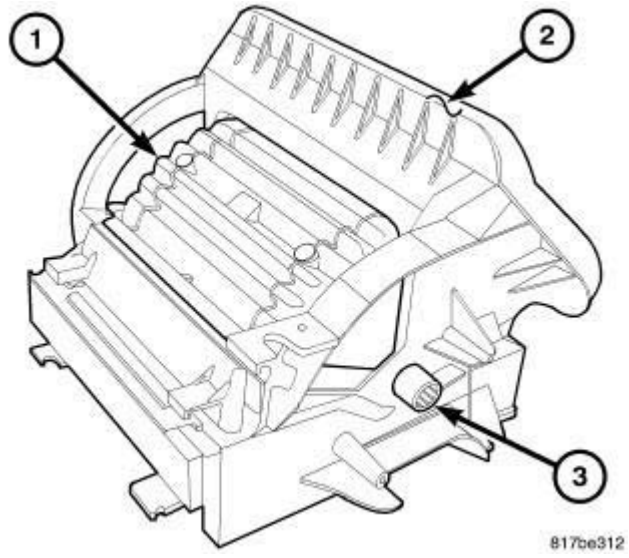


Fig. 109: Recirculation Air-Door & Pivot Shaft
Courtesy of CHRYSLER LLC

4. To remove the recirculation door pivot shaft adapter from the right end of the recirculation-air door, first carefully push down on the tab of the door lever pivot shaft adapter located inside of the air inlet housing, then pull the pivot shaft adapter straight out of the end of the recirculation-air door pivot shaft.

NOTE: If the foam seal on the air inlet housing is deformed or damaged, the seal must be replaced.

NOTE: If a rubber seal on the recirculation air-door is deformed or damaged, the air-door must be replaced.

5. Carefully pinch the two ends of the recirculation air-door together and remove the air-door from the air inlet housing. If the seal on the recirculation air-door is deformed or damaged, the air-door must be replaced.

HOUSING-HVAC

NOTE: The HVAC housing must be removed from the vehicle and disassembled for service of the A/C evaporator.

NOTE: LHD model shown in illustrations. RHD model similar.

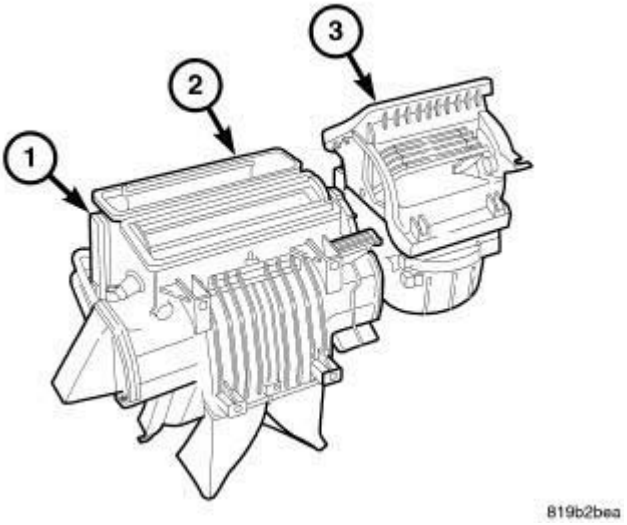


Fig. 110: HVAC housing assembly
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Remove the air distribution housing (2) from the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
3. Remove the air inlet housing (3) from the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.

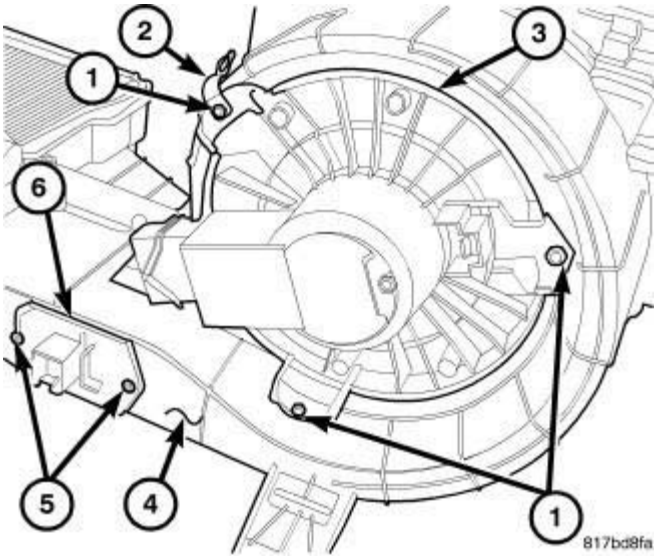


Fig. 111: Blower Motor & Resistor
Courtesy of CHRYSLER LLC

NOTE: Manual temperature system shown. Automatic system similar.

4. Remove the three screws (1) that secure the wire lead bracket (2) and the blower motor (3) to the bottom of the HVAC housing (4) and remove the blower motor and wire lead bracket.
5. Remove the two screws (5) that secure the blower motor resistor or power module (6) to the bottom of the HVAC housing and remove the resistor or power module.

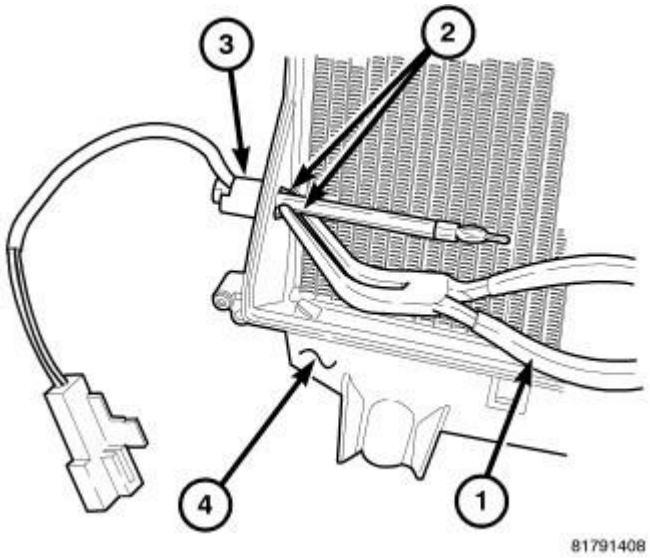


Fig. 112: Evaporator Temperature Sensor-Removal
Courtesy of CHRYSLER LLC

6. Using needle nose pliers (1), disengage the two retaining tabs (2) that secure the evaporator temperature sensor (3) to the driver side of the HVAC housing (4) and remove the sensor.

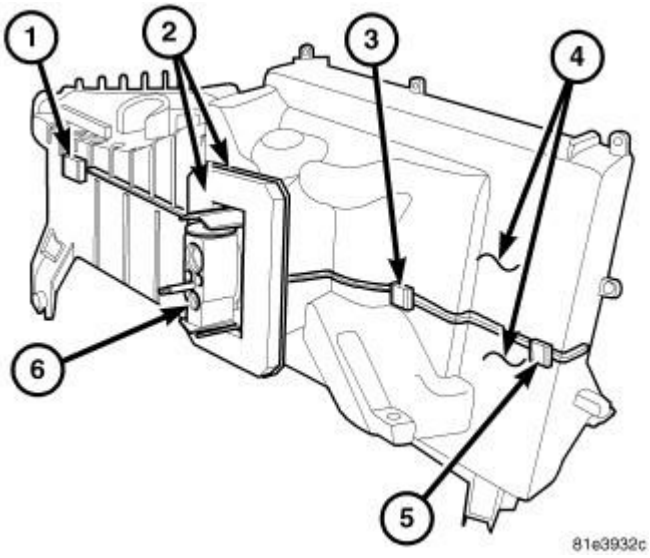


Fig. 113: HVAC Housing-Separate
Courtesy of CHRYSLER LLC

NOTE: If the foam seal or plastic flange is deformed or damaged, it must be

replaced.

7. Remove the two bolts that secure the A/C expansion valve (6 to the A/C evaporator and remove the valve. See **Heating and Air Conditioning/Plumbing/VALVE, A/C Expansion - Removal**.
8. Remove and discard the O-ring seals and install plugs in, or tape over the opened expansion valve and evaporator tube ports.
9. Remove the foam seal and plastic flange (2) from the front of the two halves of the HVAC housing (4). Carefully release the four retaining tabs located at the back of the flange and pull the flange off of the evaporator tubes. If the seal or flange is deformed or damaged, it must be replaced.
10. Remove the nine screws (3) and three metal clips (5) that secure the two halves of the HVAC housing together.
11. Disengage the nine plastic retaining tabs (1) that secure the two halves of the HVAC housing together and separate the housing.

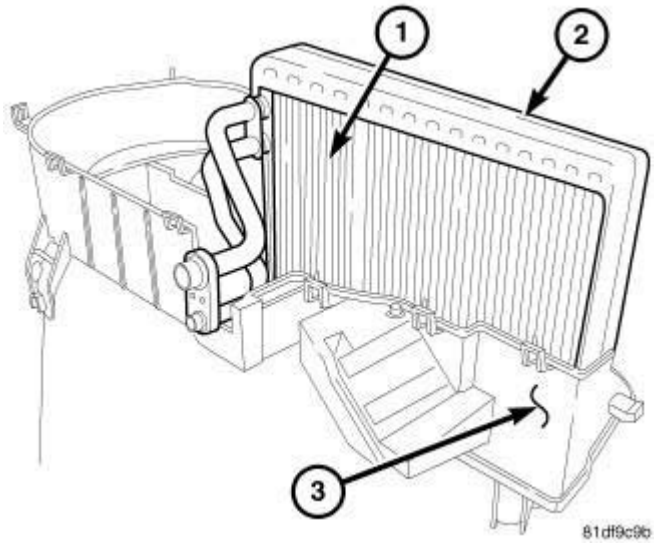


Fig. 114: Evaporator Removal/Installation
Courtesy of CHRYSLER LLC

12. Carefully lift the A/C evaporator (1) and the foam insulator (2) out of the lower half of the HVAC housing (3).

Assembly

HOUSING-AIR DISTRIBUTION

NOTE: LHD model with A/C shown in illustrations. RHD and heater-only models similar.

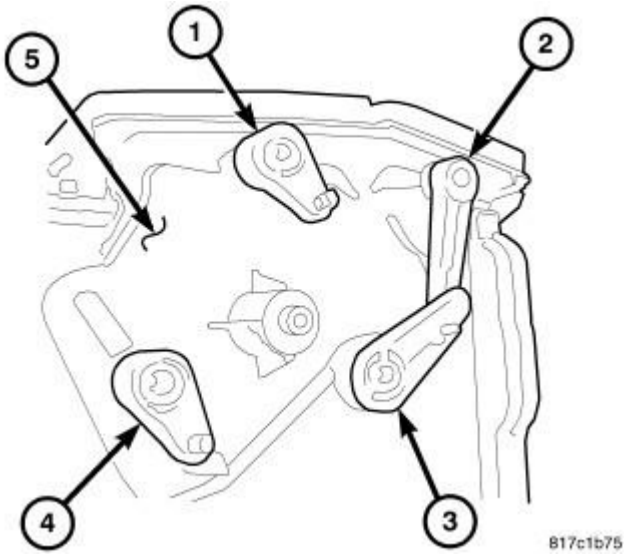


Fig. 115: Mode Door Levers-Removal/Installation
Courtesy of CHRYSLER LLC

1. If removed, install the four door levers (1, 2, 3 and 4) onto the right side of the air distribution housing (5) Make sure the lever retaining tabs are fully engaged to the housing.

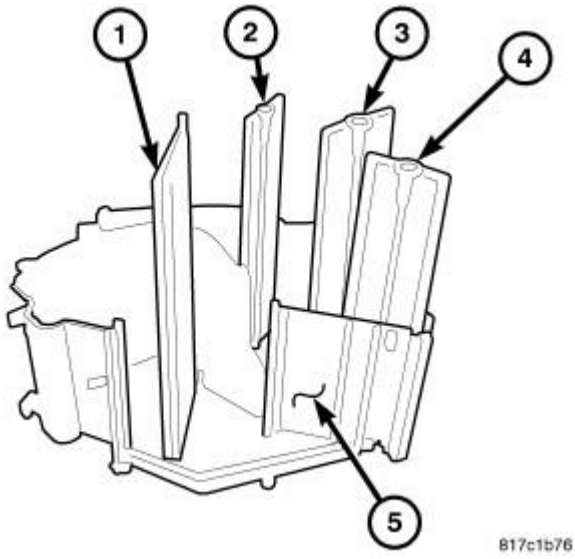


Fig. 116: Air Doors-Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: If a seal on an air door is deformed or damaged, the air door must be replaced.

NOTE: Properly position the air doors within the air distribution housing by first aligning the four door levers to the scribe lines located on the right outer side of the air distribution housing. Then, install the air doors onto the

door levers with the UP mark on each air door facing toward the top of the housing.

NOTE: If equipped with dual zone heating/A/C system, there are two blend-air doors that mate together at the centerline of the housing.

2. Align the four door levers to the scribe lines on the right outer side of the air distribution housing (5) and install the air door(s) (1, 2, 3 and 4) onto the door levers with the UP mark on each air door facing toward the top of the housing.

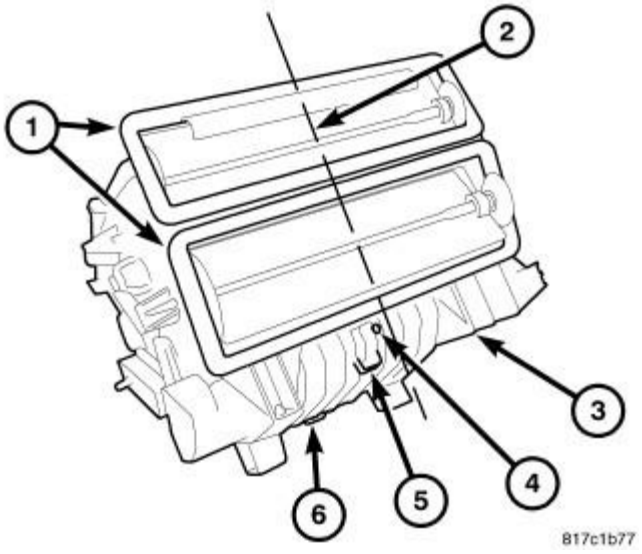


Fig. 117: Parting Line & Retainers
Courtesy of CHRYSLER LLC

3. Align the air door(s) with the pivot shaft hole(s) in the air distribution housing (3) and install the two halves of the housing together. Make sure the three plastic retaining tabs (6) are fully engaged.
4. Install the five screws (4) and one metal clip (5) that secure the two halves of the air distribution housing together. Tighten the screws to 2.2 N.m (20 in lbs.). Make sure the metal clip is fully engaged to the housing halves.

NOTE: If any foam seal on the air distribution housing outlets is deformed or damaged, the seal must be replaced.

5. Inspect the foam seals (1), especially at the parting line (2). If a foam seal is deformed or damaged, it must be replaced.

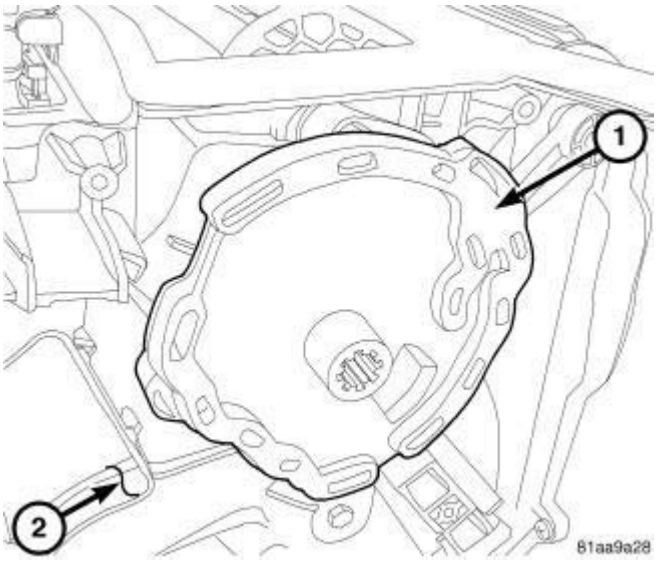


Fig. 118: Mode Door Cam
Courtesy of CHRYSLER LLC

NOTE: Align the pins on the mode door levers with the grooves in the back of the mode door cam prior to installation of the cam.

6. Align the mode door levers on the right side of the air distribution housing (2) to the mode door cam (1) and install the cam onto the housing. Make sure the levers are correctly engaged to the cam.

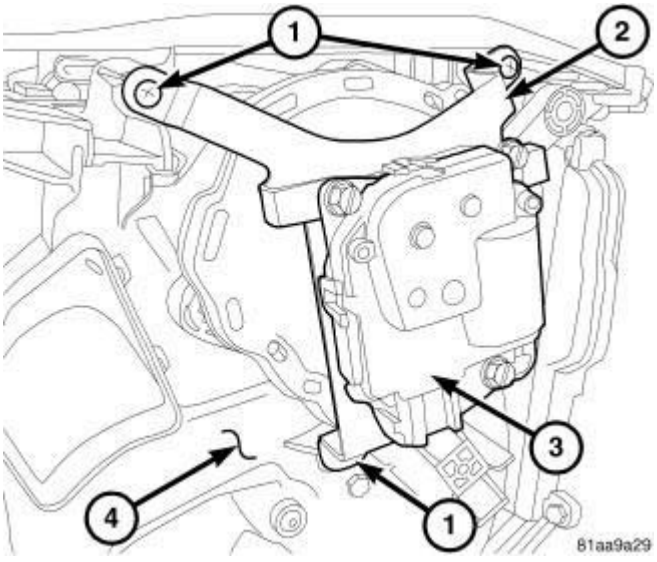


Fig. 119: Mode Door Actuator & Bracket
Courtesy of CHRYSLER LLC

7. Position the mode door actuator (2) and bracket (3) onto the right side of the HVAC air distribution housing (4). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those in the mode door cam.

8. Install the screws (1) that secure the mode door actuator bracket to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).

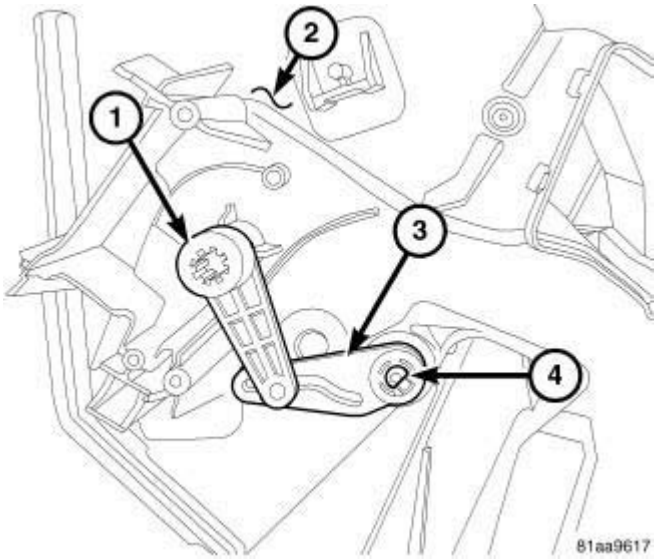


Fig. 120: Blend Door Levers
Courtesy of CHRYSLER LLC

9. Install the blend door pivot lever (3) onto the end of the blend door pivot shaft (4) located on the left side of the air distribution housing (2). Make sure the lever retaining tab is fully engaged to the pivot shaft.

NOTE: Align the pin on the blend door lever with the groove in the pivot lever prior to installation of the blend door lever.

10. Install the blend door lever (1) onto the air distribution housing. Make sure the levers are correctly aligned to each other.

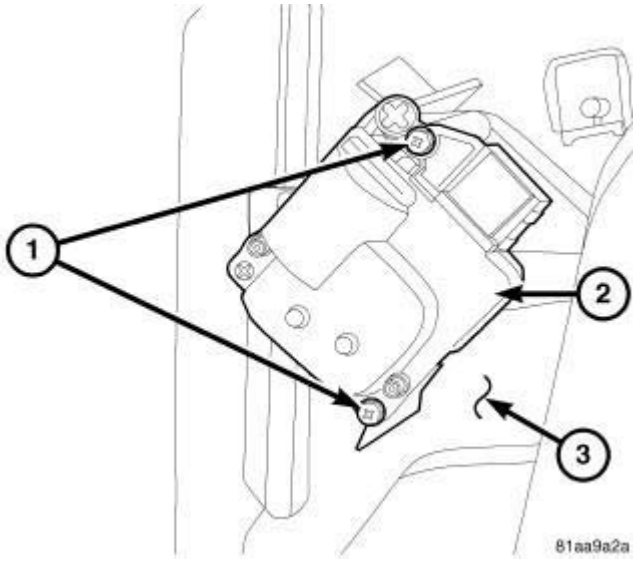


Fig. 121: Blend Door Actuator
Courtesy of CHRYSLER LLC

11. Position the blend door actuator (2) onto the left side of the air distribution housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those in the blend door lever.
12. Install the screws (1) that secure the blend door actuator to the air distribution housing. Tighten the screws to 2 N.m (17 in. lbs.).
13. If equipped with dual zone system, position the blend door actuator onto the right side of the air distribution housing and install the retaining screws. If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those in the blend door. Tighten the screws to 2 N.m (17 in. lbs.).

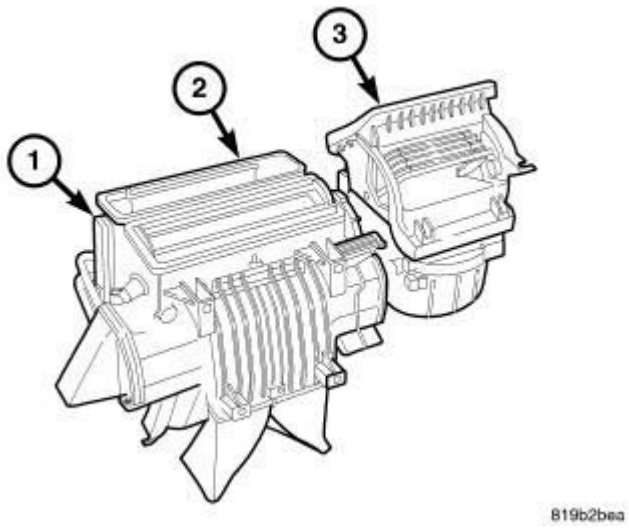


Fig. 122: HVAC housing assembly
Courtesy of CHRYSLER LLC

14. If equipped with the 2.0L diesel engine, install the electric positive temperature coefficient (PTC) heater unit into the air distribution housing (2). See **Heating and Air Conditioning/Cabin Heater/UNIT, Heater - Installation**.
15. Install the heater core into the air distribution housing. See **Heating and Air Conditioning/Plumbing/CORE, Heater - Installation**.
16. Install the air distribution housing onto the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
17. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

HOUSING-AIR INLET

NOTE: LHD model shown in illustrations. RHD model similar.

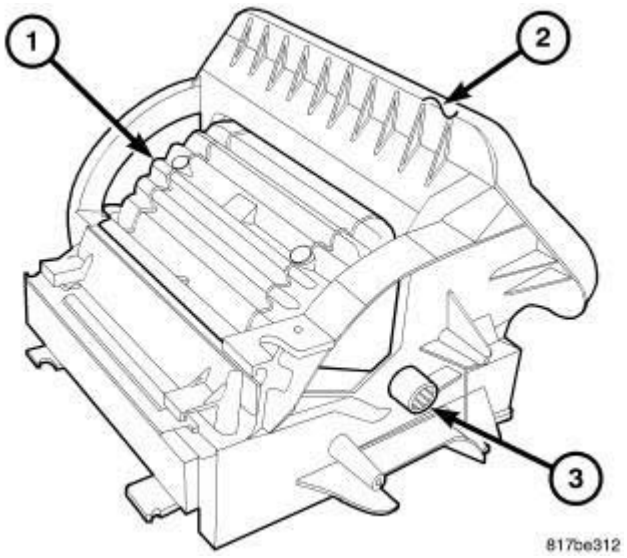


Fig. 123: Recirculation Air-Door & Pivot Shaft
Courtesy of CHRYSLER LLC

1. Carefully install the recirculation-air door (1) into the air inlet housing (2) by pinching the two ends of the air-door together and aligning the pivot shafts of the air-door to the pivot shaft holes in the air inlet housing.

NOTE: Install the recirculation door pivot shaft adapter by carefully pushing it straight into the end of the recirculation door pivot shaft.

2. Install the recirculation door pivot shaft adapter (3) into the right side pivot shaft of the recirculation air-door. Make sure the adapter is fully engaged to the pivot shaft.

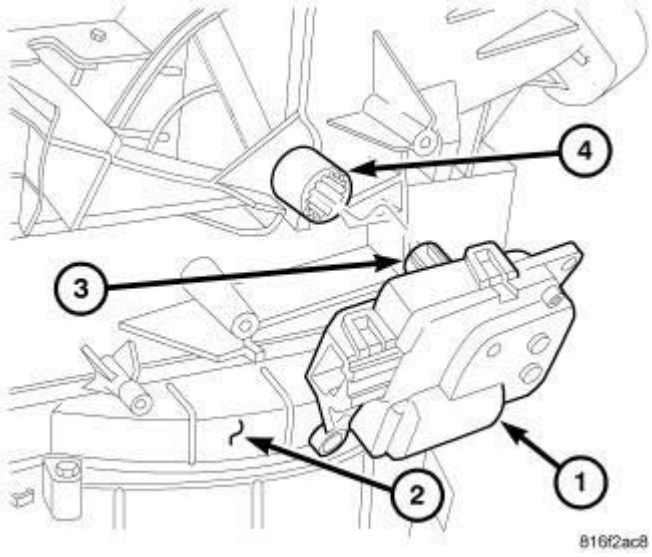


Fig. 124: Recirculation Door Actuator-Align
Courtesy of CHRYSLER LLC

3. Install the recirculation door actuator (1) onto the right side of the air inlet housing (2). If necessary, rotate the actuator slightly to align the splines of the actuator output shaft (3) with those on the recirculation door pivot shaft adapter (4).

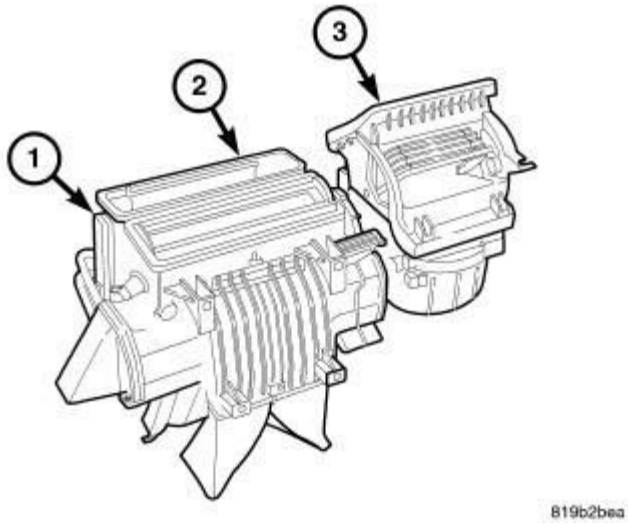


Fig. 125: HVAC housing assembly
Courtesy of CHRYSLER LLC

4. Install the air inlet housing (3) onto the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
5. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

HOUSING-HVAC

NOTE: LHD model shown in illustrations. RHD model similar.

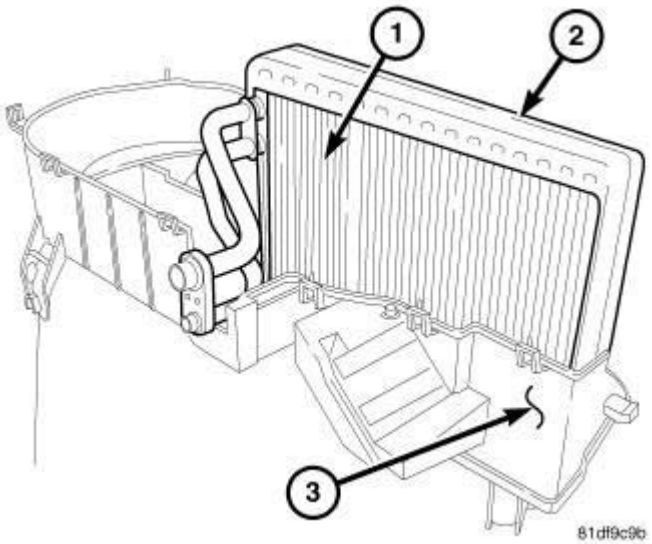


Fig. 126: Evaporator Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: Make sure that the foam insulator is properly positioned around the A/C evaporator and in the HVAC housing.

1. Carefully install the A/C evaporator (1) and foam insulator (2) into the lower half of the HVAC housing (3).

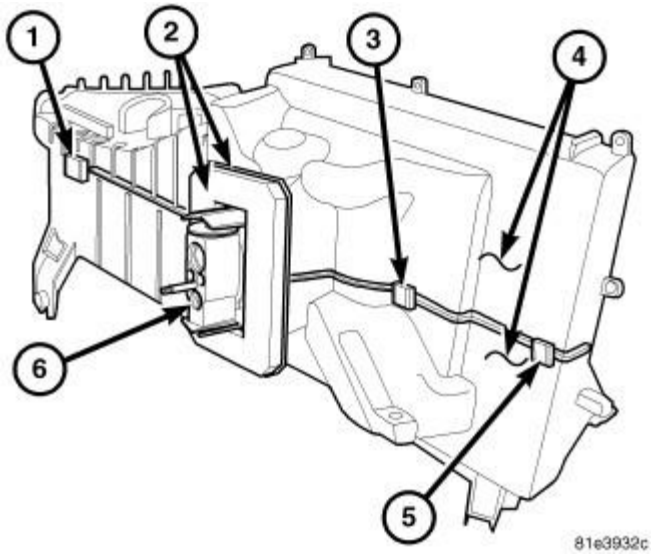


Fig. 127: HVAC Housing-Separate
Courtesy of CHRYSLER LLC

2. Install the two halves of the HVAC housing (4) together and engage the nine plastic retaining tabs (1). Make sure the retaining tabs are fully engaged.
3. Install the nine screws (3) and three metal clips (5) that secure the two halves of the HVAC housing

together. Tighten the screws to 1.2 N.m (10 in lbs.). Make sure the metal clips are fully engaged to the housing halves.

NOTE: If the foam seal or plastic flange is deformed or damaged, it must be replaced.

4. Install the plastic flange and foam seal (2) over the evaporator tubes and onto the front of the HVAC housing. Make sure the four flange retaining tabs are fully engaged to the housing.
5. Remove the tape or plugs from the expansion valve and evaporator ports.
6. Lubricate new O-ring seals with clean refrigerant oil and install them onto the evaporator tube fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
7. Install the A/C expansion valve (6) and the two retaining bolts. Tighten the bolts to 11 N.m (97 in. lbs.). See **Heating and Air Conditioning/Plumbing/VALVE, A/C Expansion - Installation**.

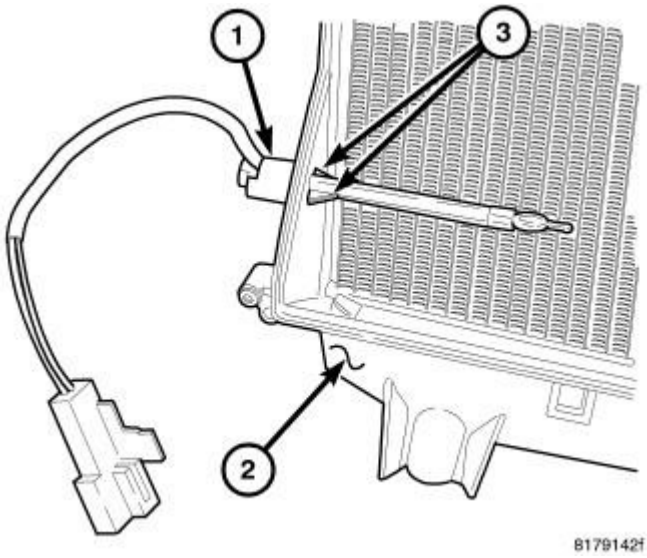


Fig. 128: Evaporator Temperature Sensor-Install
Courtesy of CHRYSLER LLC

8. Install the evaporator temperature sensor (1) into the driver side of the HVAC housing (2). Make sure the retaining tabs (3) are fully engaged to the housing.

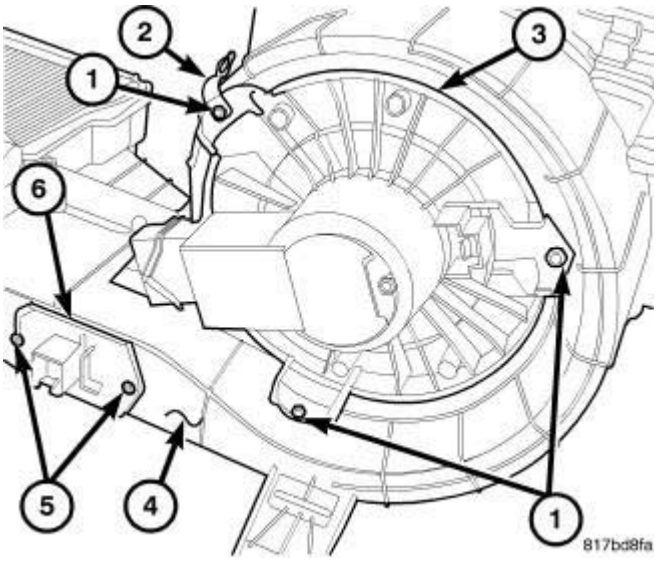


Fig. 129: Blower Motor & Resistor
Courtesy of CHRYSLER LLC

NOTE: Manual temperature system shown. Automatic system similar.

9. Position the blower motor (3) into the bottom of the HVAC housing (4).
10. Install the wire lead bracket (2) and the three screws (1) that secure the blower motor to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
11. Position the blower motor resistor or power module (6) into the HVAC housing.
12. Install the two screws (5) that secure the resistor or power module to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).

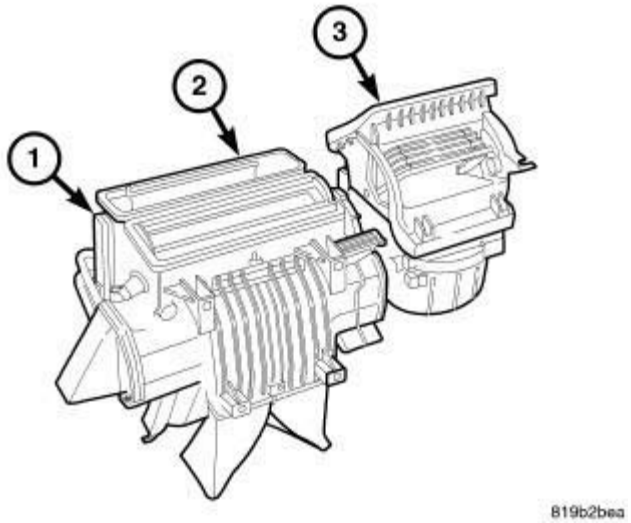


Fig. 130: HVAC housing assembly
Courtesy of CHRYSLER LLC

13. Install the air inlet housing (3) onto the HVAC housing (1). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
14. Install the air distribution housing (2) onto the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

NOTE: If the heater core is being replaced, flush the cooling system. Refer to Cooling - Standard Procedure .

15. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

Installation

HOUSING-AIR DISTRIBUTION

NOTE: LHD model shown in illustrations. RHD model similar.

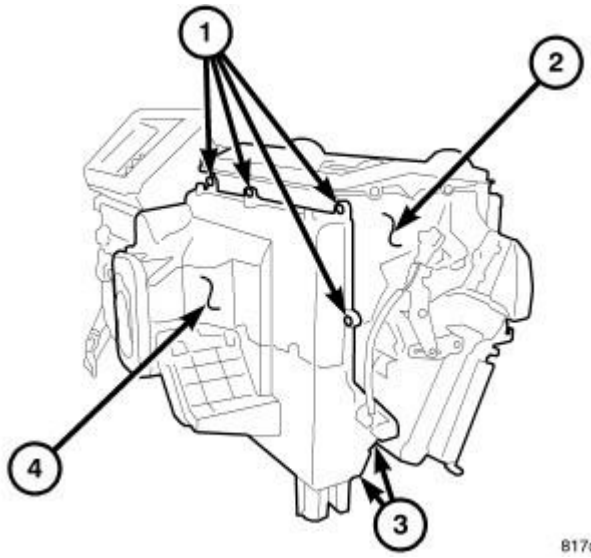


Fig. 131: Air Distribution Housing-Removal/Installation
Courtesy of CHRYSLER LLC

1. Position the air distribution housing (2) onto the rear of the HVAC housing (4).
2. Install the two metal retaining clips (3) that secure the bottom of the air distribution housing to the HVAC housing.
3. Install the seven screws (1) that secure the air distribution housing to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).

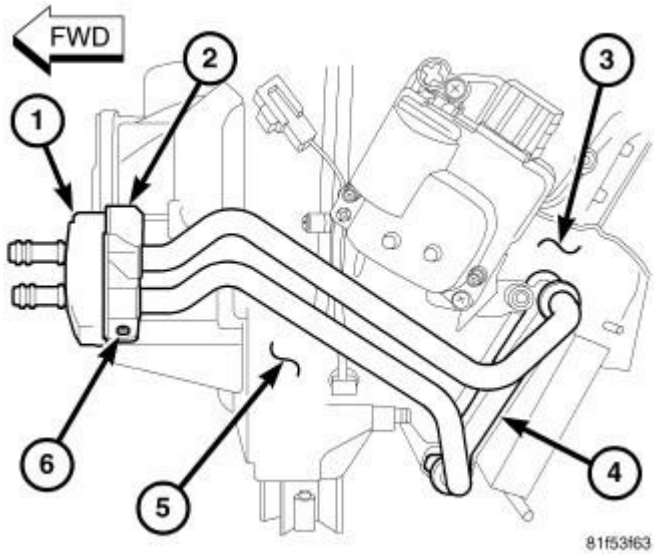


Fig. 132: Heater Core Removal/Installation
Courtesy of CHRYSLER LLC

4. Carefully install the heater core (4) into the side of the air distribution housing (3).
5. On RHD models, install the air distribution housing onto the HVAC housing (5). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
6. Install the flange (2) that secures the heater core tubes to the front of the HVAC housing.
7. Install the screw (6) that secures the flange to the HVAC housing. Tighten the screw to 1.2 N.m (10 in. lbs.).

NOTE: If the foam seal for the flange is deformed or damaged, it must be replaced.

8. Install the foam seal (1) onto the flange.
9. Install all of the floor distribution ducts onto the air distribution housing. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Installation**.

NOTE: If the heater core is being replaced, flush the cooling system. Refer to Cooling - Standard Procedure .

10. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

HOUSING-AIR INLET

NOTE: LHD model shown. RHD model similar.

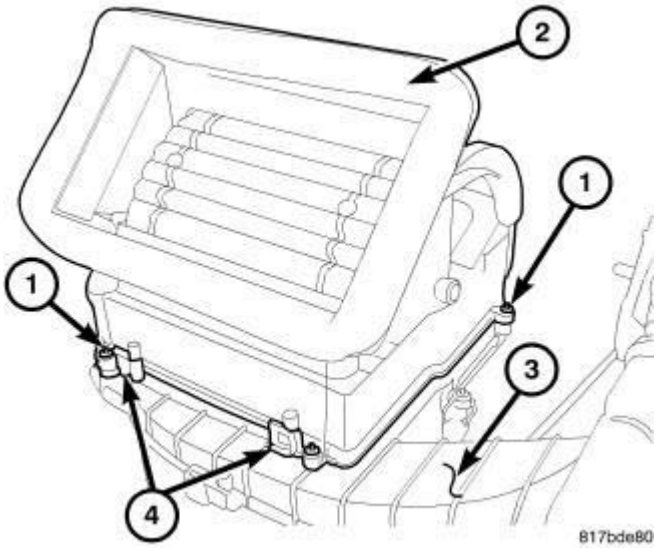


Fig. 133: Air Inlet Housing-Removal/Installation
Courtesy of CHRYSLER LLC

1. Install the air inlet housing (2) onto the top of the HVAC housing (3) and engage the two plastic retaining tabs (4). Make sure the retaining tabs are fully engaged.
2. Install the four screws (1) that secure the air inlet housing to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. If equipped, install the particulate air filter. See **Heating and Air Conditioning/Distribution/FILTER, Particulate Air - Installation**.
4. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

SCREEN-AIR INLET

NOTE: LHD model shown. RHD model similar.

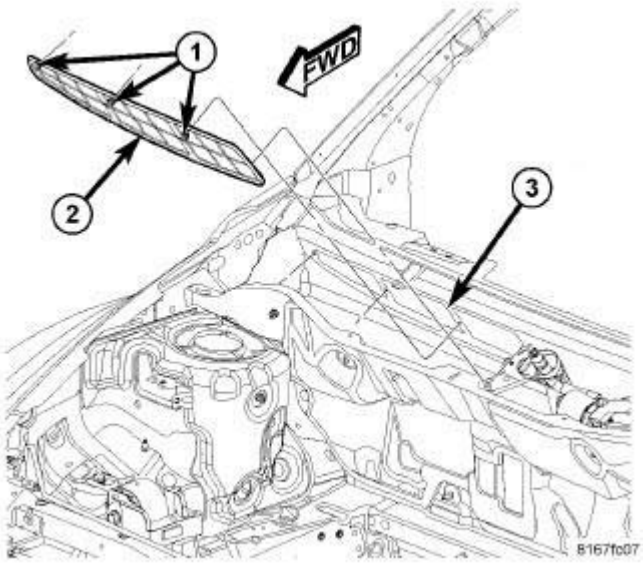


Fig. 134: Screen-HVAC Housing Air Inlet
Courtesy of CHRYSLER LLC

1. Position the HVAC housing air inlet screen (2) to the cowl panel (3) and fully engage the three push-in retainers (1) that secure the screen to the panel.
2. Install the cowl grille screen. Refer to **Body/Exterior/COVER, Cowl Panel - Installation** .

HOUSING-HVAC

NOTE: LHD model shown in illustrations. RHD model similar.

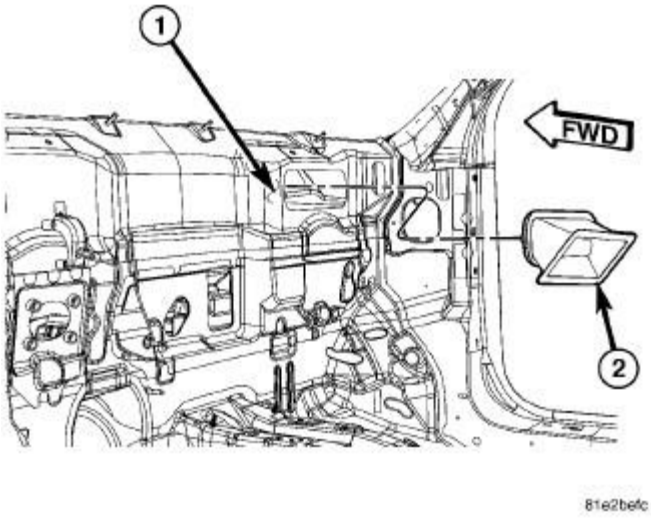


Fig. 135: Air Inlet Duct
Courtesy of CHRYSLER LLC

1. If removed, install the HVAC housing air inlet duct (2) onto the passenger compartment side of the dash panel (1). Make sure the foam seal is not missing or damaged and that the retaining tabs are fully engage to the dash panel.

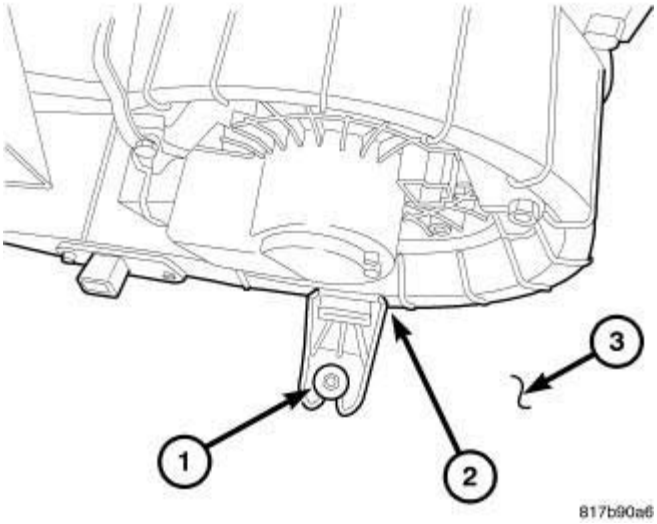


Fig. 136: HVAC Housing to Dash Panel Nut
Courtesy of CHRYSLER LLC

2. Position the HVAC housing assembly (2) to the dash panel (3). Be certain that the passenger side of the HVAC housing is correctly located over the dash panel mounting stud.
3. Install the nut (1) that secures the HVAC housing to the passenger compartment side of dash panel. Tighten the nut to 4.5 N.m (40 in. lbs.).
4. Install the condensation drain tube.
5. Install the rear floor ducts. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Installation**.
6. Install the instrument panel. Refer to **Body/Instrument Panel/PANEL, Instrument - Installation** .

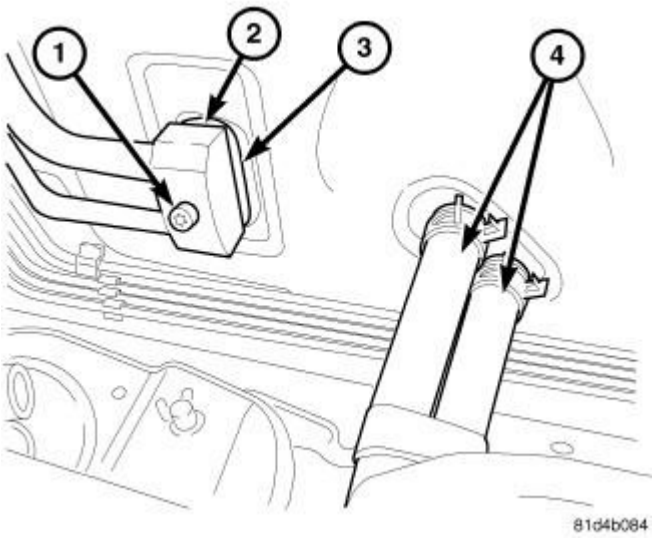


Fig. 137: Unified Liquid & Suction Line to Evaporator
Courtesy of CHRYSLER LLC

7. Remove the previously installed plugs or caps and connect the heater hoses (4) to the heater core tubes.
8. Remove the tape or plugs from the refrigerant line fittings and the expansion valve ports.
9. Lubricate the rubber O-ring seals with clean refrigerant oil and install them onto the liquid and suction line fittings. Use only the specified O-ring seals as they are made of special materials compatible to the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
10. Connect the A/C liquid and suction line assembly (2) to the A/C expansion valve (3).
11. Install the nut (1) that secures the A/C liquid and suction line assembly to the A/C expansion valve. Tighten the nut to 20 N.m (15 ft. lbs.).

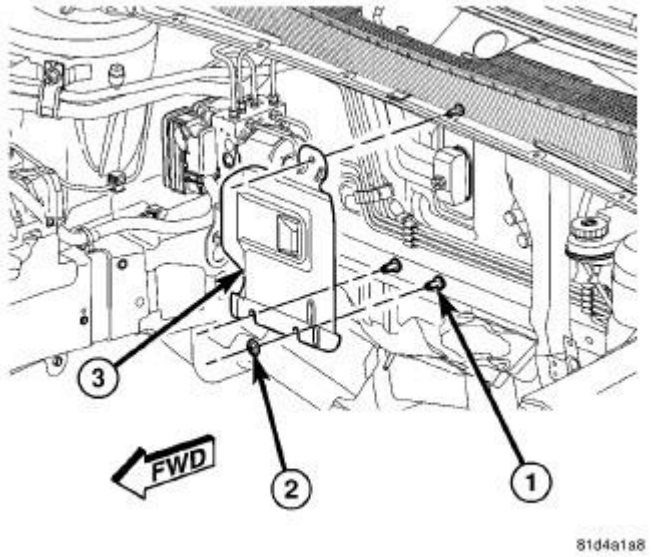


Fig. 138: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

12. If equipped, position the heat shield (3) onto the studs (1) located on the dash panel in the engine compartment and install the retaining nuts (2). Tighten the nuts to 1 N.m (10 in. lbs.).
13. Reconnect the negative battery cable.
14. If the heater core is being replaced, flush the cooling system. Refer to **Cooling - Standard Procedure** .
15. Refill the engine cooling system. Refer to **Cooling - Standard Procedure** .

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

16. Evacuate and charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
17. Initiate the Actuator Calibration function using a scan tool. See **Heating and Air Conditioning - Diagnosis and Testing**.

MOTOR, BLOWER, FRONT

Description

DESCRIPTION

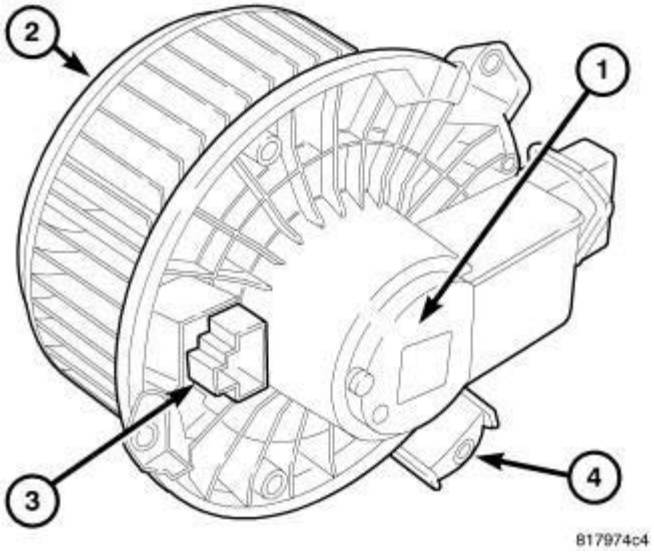


Fig. 139: Blower Motor-PM
Courtesy of CHRYSLER LLC

The blower motor (1) is used to control the velocity of air moving through the HVAC housing by spinning the blower wheel (2) within the HVAC air inlet housing at the selected speed.

The blower motor is a 12-volt, direct current (DC) motor mounted within a plastic housing with an integral wire harness connector (3) and three mounting tabs (4). The squirrel cage-type blower wheel is secured to the blower

motor shaft and is positioned within the air inlet housing on the passenger side of the HVAC housing.

Operation

OPERATION

The blower motor controls the velocity of air moving through the HVAC housing by spinning the blower wheel within the HVAC air inlet housing at the selected speed.

On the Manual Temperature Control (MTC) heating-A/C system, blower motor speed is controlled by regulating the path to ground through the blower control switch and the blower motor resistor. With the Automatic Temperature Control (ATC) heating-A/C system, blower motor speed is controlled by an electronic blower motor power module, that uses a Pulse Width Modulated (PWM) input from the A/C-heater control and a feedback signal from the blower motor to regulate the blower motor ground path. On both systems, the blower motor receives battery current through the Totally Integrated Power Module (TIPM) whenever the ignition switch is in the Run position, and the blower motor control is in any position except Off.

The blower motor can be accessed for service from underneath the instrument panel.

NOTE: The blower motor is supplied with a 12 volt feed from the TIPM whenever the ignition switch is in the Run position. Due to an open circuit condition within the blower motor control switch, the TIPM is unable to detect an open circuit for the blower motor.

The blower motor control system is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/HVAC - Diagnosis and Testing** .

The blower motor and blower motor wheel are factory balanced as an assembly and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Diagnosis and Testing

BLOWER MOTOR

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The blower motor is supplied with a 12V feed from the TIPM whenever the ignition switch is in RUN. Due to an open circuit condition within the blower motor control switch the TIPM is UNABLE to detect an OPEN circuit for the blower motor.

To determine if an open condition exists within the blower motor circuit wiring, it is necessary to disconnect the

negative battery cable and check for continuity within the blower motor circuits using an ohmmeter. See **SYSTEM WIRING DIAGRAMS** for circuit descriptions and diagrams.

OPERATION

Possible causes of an inoperative blower motor include:

- Open fuse
- Inoperative blower motor resistor
- Inoperative blower motor switch
- Inoperative blower motor
- Inoperative blower motor circuit wiring or wire harness connectors

NOISE

To determine if the blower motor is the source of the noise, simply switch the blower motor from Off to On. To verify that the blower motor is the source of the noise, unplug the blower motor wire harness connector and operate the heater-A/C system. If the noise goes away, possible causes include:

- Foreign material on fresh air inlet screen
- Foreign material in blower wheel
- Foreign material in HVAC housing
- Improper blower motor mounting
- Deformed or damaged blower wheel
- Worn blower motor bearings or brushes

VIBRATION

Possible causes of a blower motor vibration include:

- Improper blower motor mounting
- Foreign material in blower wheel
- Deformed or damaged blower wheel
- Worn blower motor bearings

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag

system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: The blower motor is located on the bottom of the passenger side of the HVAC housing. The blower motor can be removed from the vehicle without having to remove the HVAC housing.

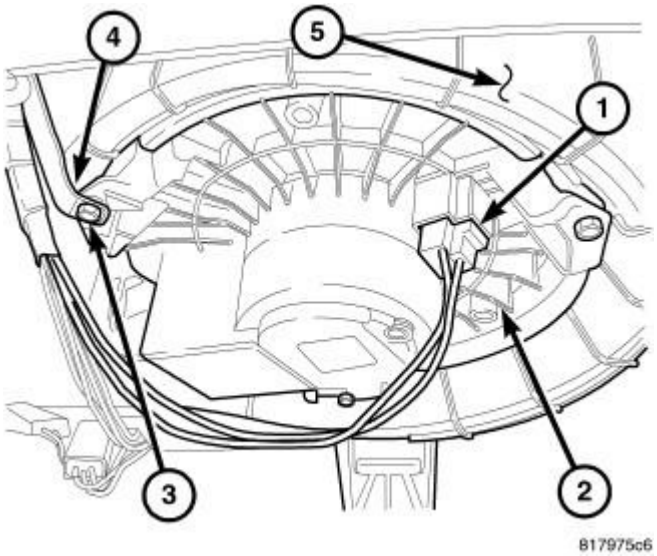


Fig. 140: Blower Motor-Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. If equipped, remove the silencer from below the passenger side of the instrument panel.
3. From underneath the instrument panel, disengage the connector lock and disconnect the instrument panel wire harness connector (1) from the blower motor (2).
4. Remove the three screws (3) that secure the blower motor and the wire lead bracket (4) (if equipped) to the bottom of the HVAC housing (5) and remove the blower motor.

Installation

INSTALLATION

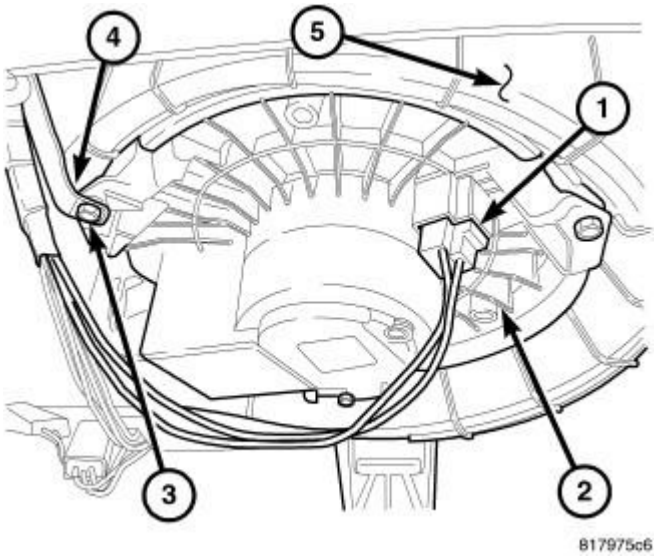


Fig. 141: Blower Motor-Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Position the blower motor (2) into the bottom of the HVAC housing (5).
2. Install the three screws (3) that secure the blower motor and the wire lead bracket (4) (if equipped) to the HVAC housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
3. Connect the instrument panel wire harness connector (1) to the blower motor and engage the connector lock.
4. If equipped, install the silencer below the passenger side of the instrument panel.
5. Reconnect the negative battery cable.

OUTLET, AIR, FRONT

Description

DESCRIPTION

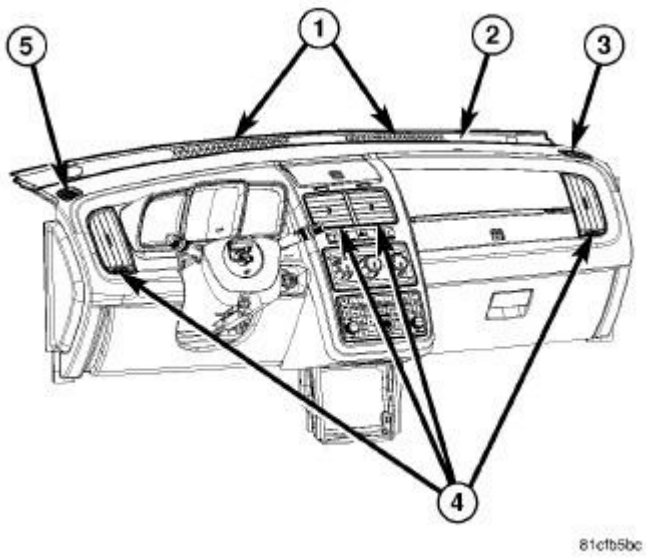


Fig. 142: Instrument Panel Outlets
Courtesy of CHRYSLER LLC

There are two defroster air outlets (1) in the defroster grille (2) located at the top of the instrument panel. The airflow from the defroster outlets are directed by fixed vanes in the grille and cannot be adjusted. The defroster air outlets are not serviceable from the defroster grille.

There are two side window demister air outlets (3 and 5). One located on each end of the instrument panel. The airflow from the side window demister air outlets is directed by fixed vanes and cannot be adjusted. The side window demister air outlets can be serviced separately from the instrument panel.

There are four instrument panel air outlets (4). One air outlet is located near each outboard end of the instrument panel facing the rear of the vehicle and two air outlets are located at the top of the instrument panel center bezel. Each of the instrument panel air outlets contain movable vanes that can direct or shut off the flow of the conditioned air leaving the outlets. The instrument panel air outlets can be serviced separately from the instrument panel.

Some models with A/C are equipped with a cooled beverage storage bin located in the instrument panel. Vehicles so equipped have an outlet, which, when opened with the A/C on, allows cooled air to flow into the bin.

Removal

BEVERAGE COOLER

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag

system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: LHD model shown in illustrations. RHD model similar.

OUTLET

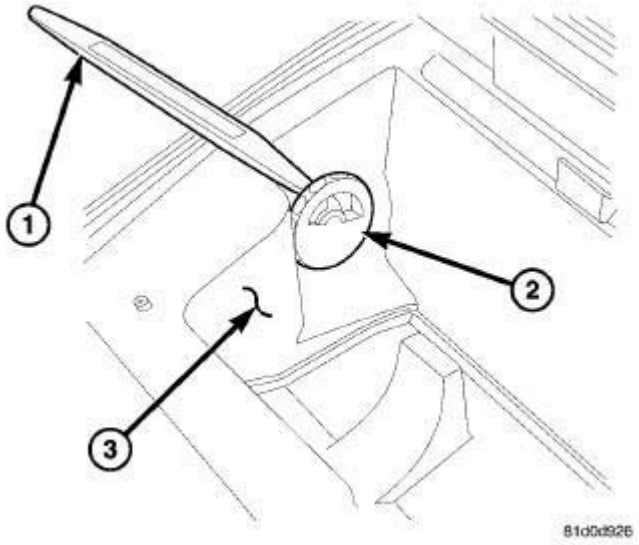


Fig. 143: Beverage Cooler Outlet
Courtesy of CHRYSLER LLC

1. Using Trim Stick C-4755 or equivalent (1), disengage the three retaining tabs that secure the beverage cooler outlet (2) to side of the glove box bin (3).

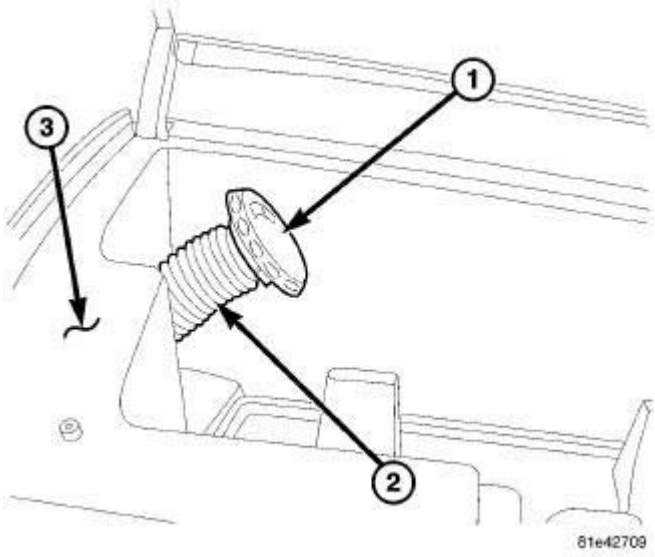


Fig. 144: Beverage Cooler Outlet & Hose
Courtesy of CHRYSLER LLC

NOTE: If the beverage cooler cold air supply hose becomes disconnected from the air beverage cooler outlet and falls back into the instrument panel during outlet removal, the beverage cooler bin may need to be removed from the instrument panel for outlet installation. Refer to Body/Instrument Panel/BIN, Instrument Panel - Removal .

2. Carefully pull the beverage cooler outlet (1) away from side of the beverage cooler bin (3) and disconnect the cold air supply hose (2) from the outlet. Make sure the end of the cold air supply hose remains in the bin and does not fall back into the instrument panel.

COLD AIR SUPPLY HOSE

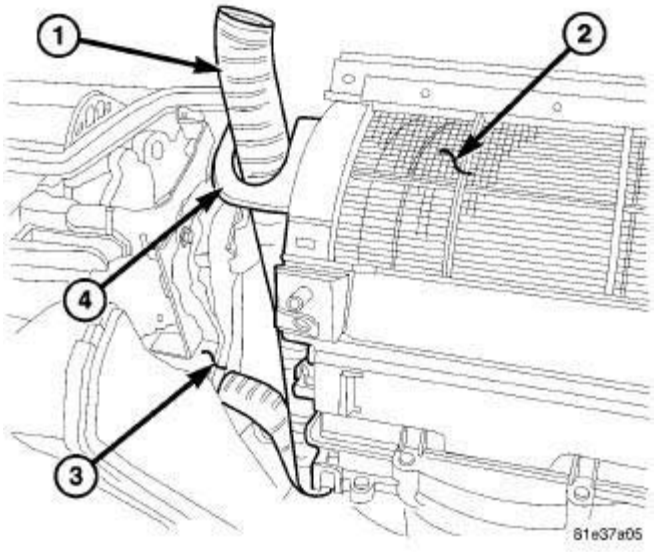


Fig. 145: Beverage Cooler Supply Hose
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. Disconnect and isolate the negative battery cable.
2. Remove the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Remove the outer passenger side instrument panel air outlet. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Removal**.
4. Remove the beverage cooler outlet. Refer to **OUTLET**.
5. Remove the beverage cooler bin. Refer to **Body/Instrument Panel/BIN, Instrument Panel - Removal** .
6. If equipped, remove the silencer trim panel out from underneath the passenger side of the instrument

panel. Refer to **Body/Instrument Panel/PANEL, Silencer - Removal** .

7. Remove the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Removal** .
8. Reach up underneath the instrument panel and disconnect the cold air supply hose (1) from the passenger side of the air distribution housing (3).
9. Working through the beverage cooler bin opening in the instrument panel, disengage the cold air supply hose from the bracket (4) located on the air inlet housing (2) and remove the hose. Note the routing of the hose and the instrument panel wiring for aid in reinstallation.

DEMISTER OUTLETS

WARNING: Disable the airbag system before attempting any steering wheel, steering column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Right side air outlet shown. Left side outlet similar.

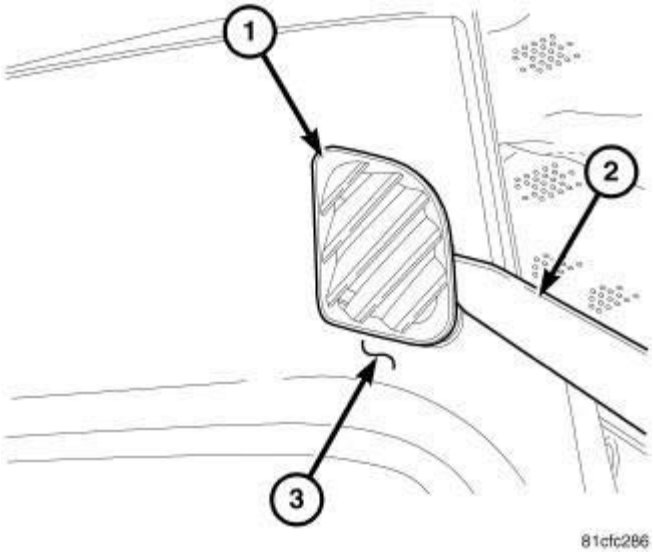


Fig. 146: Demister Outlet
Courtesy of CHRYSLER LLC

1. Using Trim Stick C-4755 or equivalent (2), carefully disengage the three retaining tabs that secure each demister air outlet (1) to the instrument panel cover (3) and remove the outlet.

AIR OUTLETS

WARNING: Disable the airbag system before attempting any steering wheel, steering

column, or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

OUTBOARD OUTLETS

NOTE: Right side air outlet shown. Left side outlet similar.

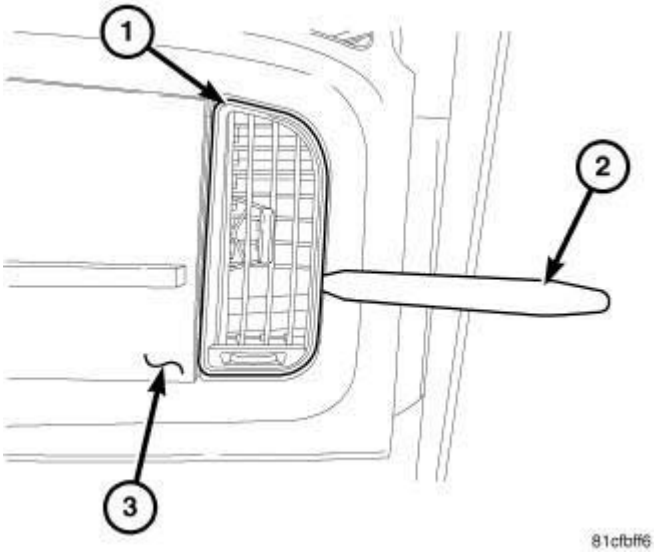


Fig. 147: Outboard Instrumental Panel Outlets
Courtesy of CHRYSLER LLC

1. Using trim stick C-4755 or equivalent (2), carefully disengage the four retaining tabs (two tabs on each side) that secure each air outlet (1) to the instrument panel cover (3) and remove the outlet.

CENTER OUTLETS

NOTE: Take the proper precautions to protect the front face of the center bezel from cosmetic damage while performing this procedure.

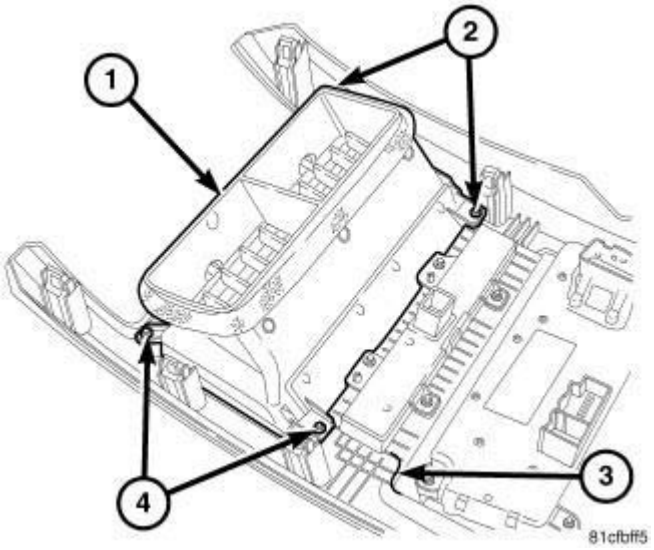


Fig. 148: Center Instrumental Panel Outlets
Courtesy of CHRYSLER LLC

1. Remove the center bezel (3) from the instrument panel and place it on a workbench. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
2. Remove the four screws (2 and 4) that secure the center instrument panel air outlets (1) to the center bezel and remove the outlets.

Installation

BEVERAGE COOLER

NOTE: LHD model shown in illustrations. RHD model similar.

OUTLET

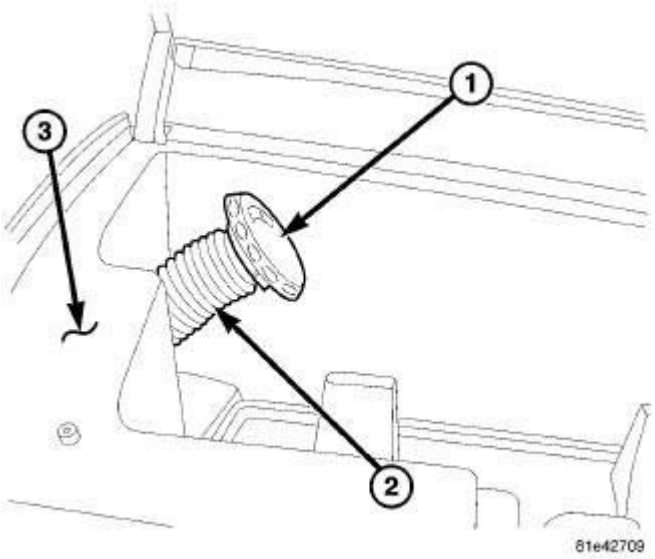


Fig. 149: Beverage Cooler Outlet & Hose
Courtesy of CHRYSLER LLC

NOTE: If the beverage cooler cold air supply hose falls back into the instrument panel during outlet installation, the beverage cooler bin may need to be removed from the instrument panel and the hose rerouted through the opening in the bin. Refer to Body/Instrument Panel/BIN, Instrument Panel - Removal .

1. Position the beverage cooler outlet (1) to the beverage cooler bin (3) and connect the cold air supply hose (2) to the outlet.

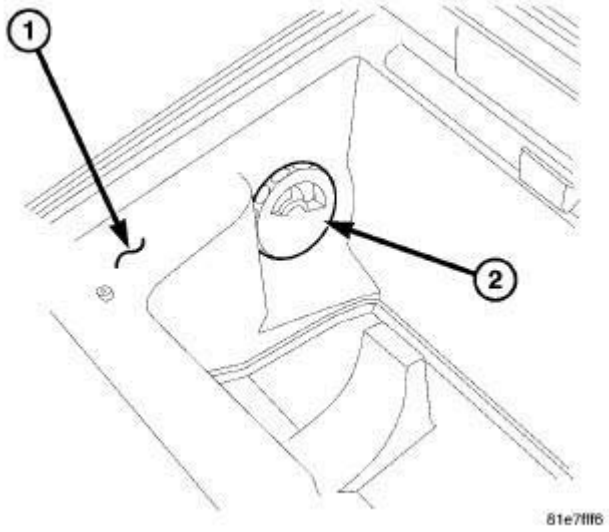


Fig. 150: Beverage Cooler Outlet Install
Courtesy of CHRYSLER LLC

2. Feed the cold air supply hose through the opening in the side of the beverage cooler bin (1) and align and install the beverage cooler outlet (2) onto the bin. Make sure the three retaining tabs on the outlet are fully engaged to the bin.

COLD AIR SUPPLY HOSE

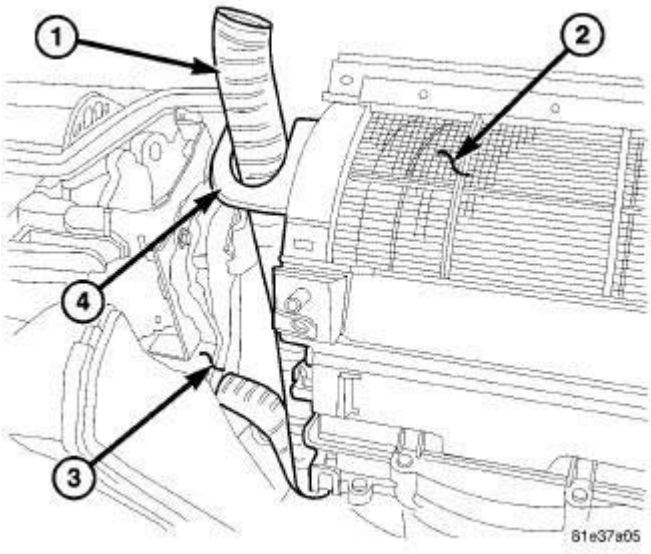


Fig. 151: Beverage Cooler Supply Hose
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with instrument panel removed for clarity.

1. Working through the beverage cooler bin opening in the instrument panel, feed the cold air supply hose (1) into the instrument panel. Note the routing of the hose and the instrument panel wiring.
2. Reach up underneath the instrument panel and connect the cold air supply hose to the passenger side of the air distribution housing (3).
3. Working through the beverage cooler bin opening in the instrument panel, engage the cold air supply hose to the bracket (4) located on the air inlet housing (2).
4. Position the beverage cooler bin to the instrument panel and route the cold air supply hose through the beverage cooler outlet opening.
5. Install the beverage cooler bin. Refer to **Body/Instrument Panel/BIN, Instrument Panel - Installation** .
6. Install the beverage cooler outlet. Refer to **OUTLET**.
7. Install the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
8. Install the outer passenger side instrument panel air outlet. See **Heating and Air Conditioning/Distribution/OUTLET, Air - Installation**.
9. Install the glove box bin. Refer to **Body/Instrument Panel/GLOVE BOX, Instrument Panel - Installation** .

10. If equipped, install the silencer trim panel underneath the passenger side of the instrument panel. Refer to **Body/Instrument Panel/PANEL, Silencer - Installation** .
11. Reconnect the negative battery cable.

DEMISTER OUTLETS

NOTE: Right side demister outlet shown. Left side outlet similar.

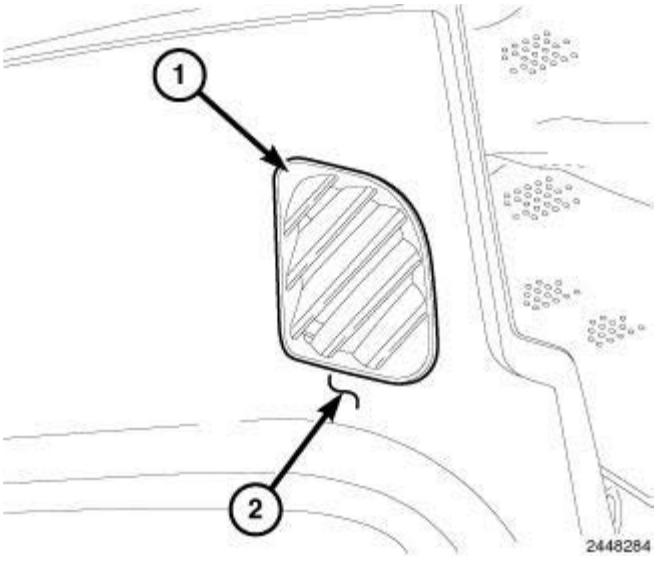


Fig. 152: Demister Outlet
Courtesy of CHRYSLER LLC

1. Position the demister air outlet (1) to the opening in the instrument panel cover (2) and engage the three retaining tabs. Make sure the retaining tabs are fully engaged.

AIR OUTLETS

OUTBOARD OUTLETS

NOTE: Right side air outlet shown. Left side outlet similar.

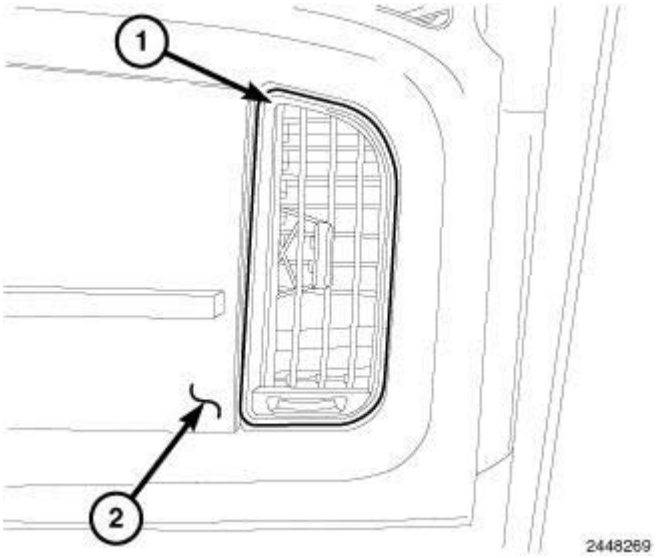


Fig. 153: Outboard Instrumental Panel Outlets
Courtesy of CHRYSLER LLC

1. Position the air outlet (1) to the opening in the instrument panel cover (2) and align the outlet to the instrument panel duct.

NOTE: Make sure that the air outlet(s) are properly aligned to the instrument panel duct(s).

2. Engage the four retaining tabs that secure each instrument panel outlet to the instrument panel cover. Make sure the retaining tabs are fully engaged.

CENTER OUTLETS

NOTE: Take the proper precautions to protect the front face of the center bezel from cosmetic damage while performing this procedure.

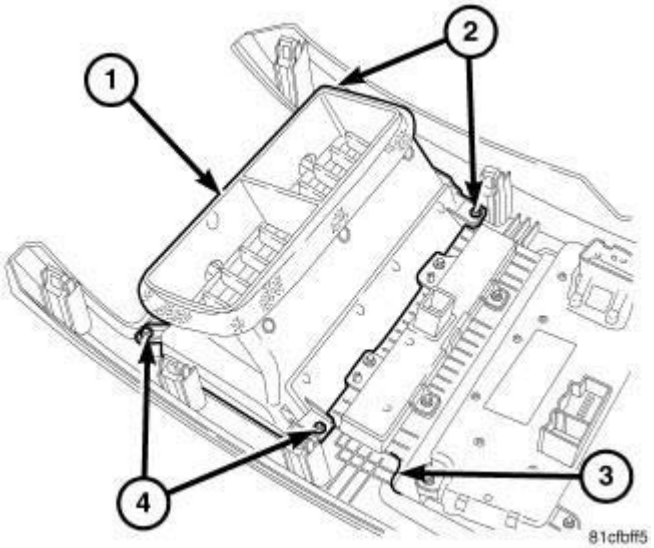


Fig. 154: Center Instrumental Panel Outlets
Courtesy of CHRYSLER LLC

1. Position the air outlets (1) to the back of the center bezel (3) and install the four retaining screws (2 and 4). Tighten the screws to 1.2 N.m (10 in. lbs.).

   NOTE: Make sure that the air outlets are properly aligned to the instrument panel center duct.

2. Install the center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .

DISTRIBUTION, REAR

DUCT, CEILING DISTRIBUTION

Removal

REMOVAL

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

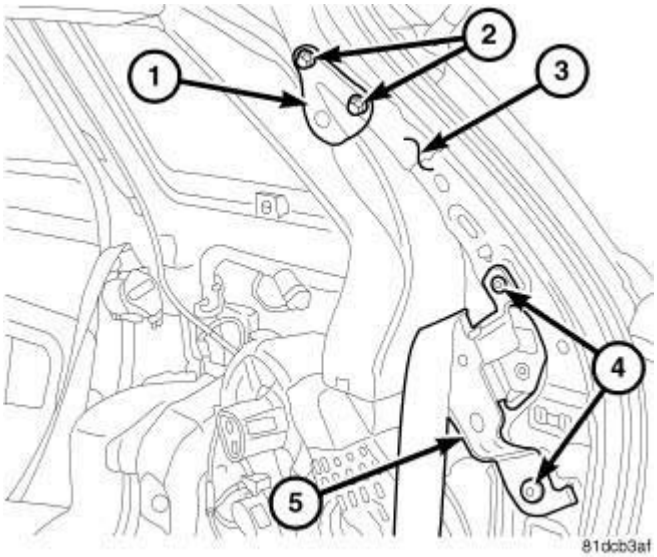


Fig. 155: D-Pillar Seat Belt Bracket
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right D-pillar trim panel. Refer to **Body/Interior/PANEL, D-Pillar Trim - Removal** .
3. Remove right quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
4. Remove the two bolts (2) that secure the upper seat belt bracket (1) to the right D-pillar (3) and remove the bracket.
5. Remove the two bolts (4) that secure the right seat belt retractor (5) to the right D-pillar and remove the retractor.

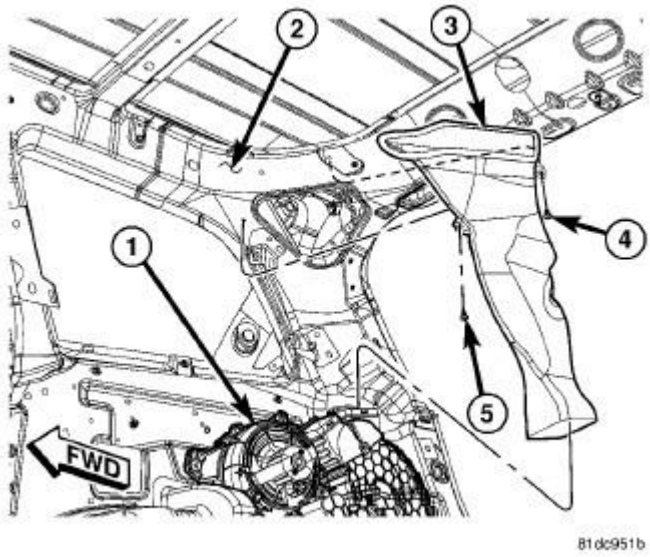


Fig. 156: Rear Ceiling Duct
Courtesy of CHRYSLER LLC

6. Remove the two retainers (4 and 5) that secure the rear ceiling distribution duct (3) to the right D-pillar (2).
7. Lift the rear ceiling distribution duct upward and disengage it from the rear heater-A/C housing (1).

CAUTION: Use care when removing the rear ceiling distribution duct from the heater-A/C housing to prevent damage to the molded plastic support brace located on the top of the housing outlet. Failure to follow this caution could result in part of, or all of the support brace falling into the rear housing, which may interfere with rear mode door operation.

8. Pull the bottom end of the rear ceiling distribution duct away from the rear heater-A/C housing and remove the duct.

Installation

INSTALLATION

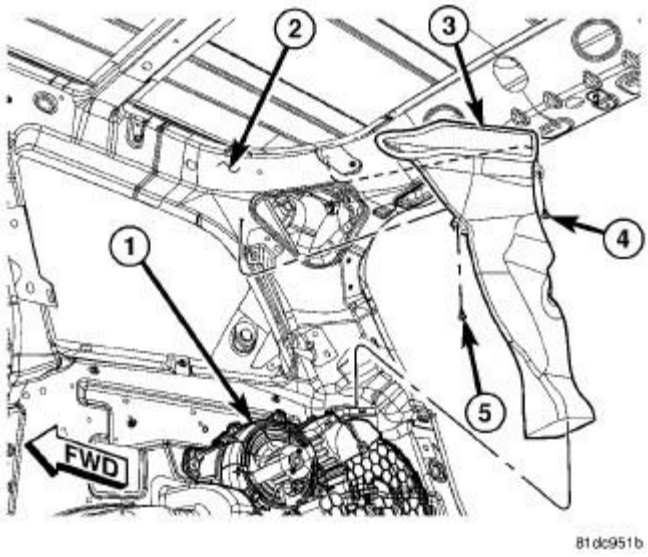


Fig. 157: Rear Ceiling Duct
Courtesy of CHRYSLER LLC

1. Position the rear ceiling distribution duct (3) to the right D-pillar (2).

CAUTION: Use care when installing the rear ceiling distribution duct onto the heater-A/C housing to prevent damage to the molded plastic support brace located on the top of the housing outlet. Failure to follow this caution could result in part of, or all of the support brace falling into the rear housing, which may interfere with rear mode door operation.

2. Install the rear ceiling distribution duct onto the top of the rear heater-A/C housing (1). Make sure the

duct is fully engaged to the housing.

3. Install the two retainers (4 and 5) that secure the rear ceiling distribution duct to the right D-pillar.

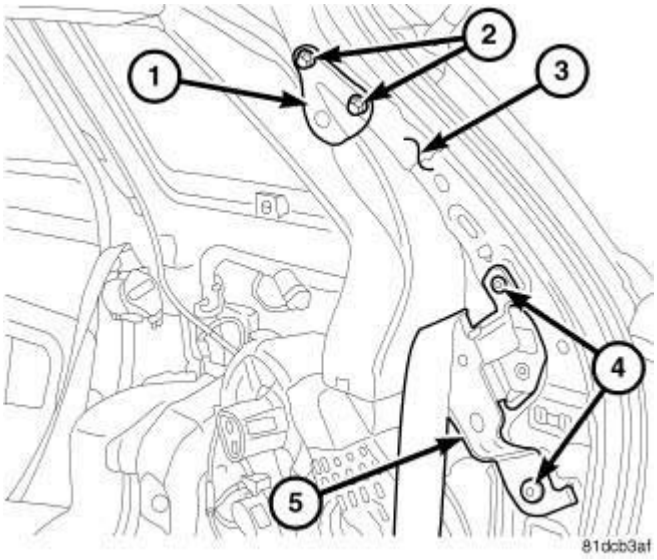


Fig. 158: D-Pillar Seat Belt Bracket
Courtesy of CHRYSLER LLC

4. Position the upper seat belt bracket (2) onto the D-pillar (3) and install the two retaining bolts (1). Tighten the bolts to 52 N.m (38.5 ft. lbs.).
5. Install the right seat belt retractor (5) and retaining bolts (4) onto the D-pillar. Tighten the bolts to 52 N.m (38.5 ft. lbs.).
6. Install the right quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
7. Install the right D-pillar trim panel. Refer to **INSTALLATION** .
8. Reconnect the negative battery cable.

DUCT, FLOOR DISTRIBUTION, REAR

Removal

REMOVAL

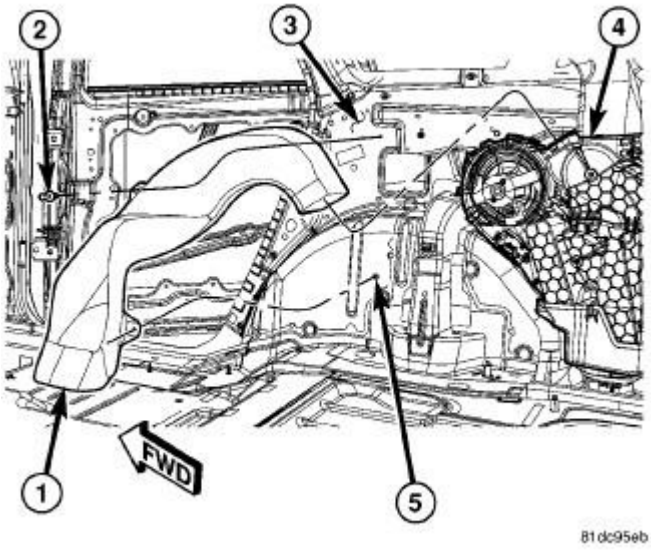


Fig. 159: Rear Floor Distribution Duct
Courtesy of CHRYSLER LLC

1. Remove right quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
2. Remove the push-pin retainer (2) that secures the rear floor distribution duct (1) to the right inner quarter panel (3).
3. Disengage the rear floor distribution duct from the stud (5) located on the right inner quarter panel.
4. Disengage the rear floor distribution duct from the rear heater-A/C housing (4) and remove the duct.

Installation

INSTALLATION

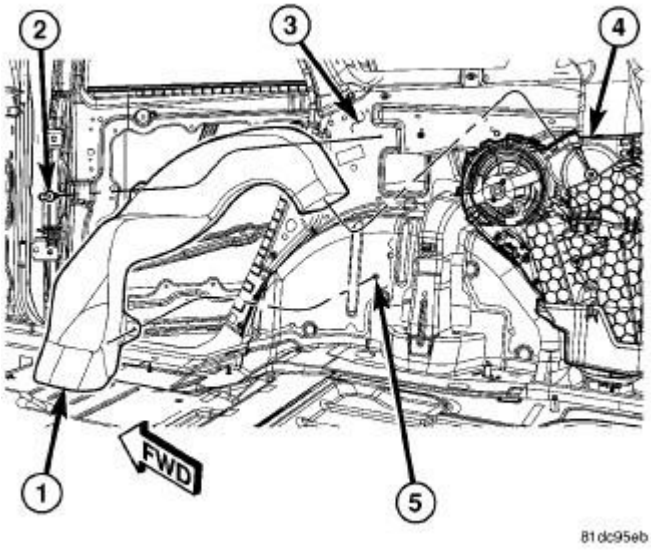


Fig. 160: Rear Floor Distribution Duct
Courtesy of CHRYSLER LLC

1. Install the rear floor distribution duct (1) onto rear heater-A/C housing (4). Make sure the duct is fully engaged to the housing.
2. Engage the rear floor distribution duct to the stud (5) located on the right inner quarter panel (3).
3. Install the push-pin retainer (2) that secures the rear floor distribution duct to the right inner quarter panel.
4. Install the right quarter panel trim. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .

HOUSING, A/C AND HEATER

Description

DESCRIPTION

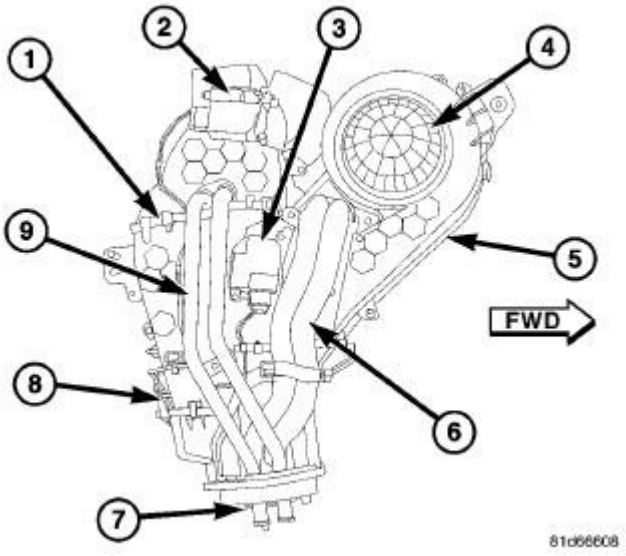


Fig. 161: Rear Heater AC Housing Description
Courtesy of CHRYSLER LLC

Models with the rear heating-A/C system use a rear heater-A/C housing (1) that combines A/C and heating capabilities into a single unit mounted within the rear passenger compartment. The rear heating-A/C system is a blend-air type system. A blend-air door controls the amount of conditioned air that is allowed to flow through, or around, the heater core (9). The rear A/C system is designed for the use of a non-CFC, R-134a refrigerant and uses an A/C expansion valve (7) and A/C evaporator (6) to cool and dehumidify the incoming air prior to blending it with the heated air. A temperature control determines the discharge air temperature by operating the blend door actuator (3), which moves the blend-air door. This allows an almost immediate control of the output air temperature of the rear system. The mode control operates the mode door actuator (2) that positions the mode-air door to direct the flow of the conditioned air out the upper or lower air outlets, depending on the position selected. Both electric door actuators are connected to the vehicle electrical system by the rear heater-A/C wire harness (8). The rear blower motor (4) controls the velocity of air flowing through the rear heater-A/C housing by spinning the blower wheel within the rear housing at the selected speed by use of the rear blower

motor resistor or power module (5) (depending on manual or automatic control).

The rear heater-A/C housing must be removed from the vehicle for service of the mode door actuator and blend door actuator and it must be disassembled for service of the A/C evaporator and the heater core.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

NOTE: The rear heater-A/C housing must be removed from the vehicle for service of the mode door actuator and blend door actuator and it must be disassembled for service of the A/C evaporator and the heater core.

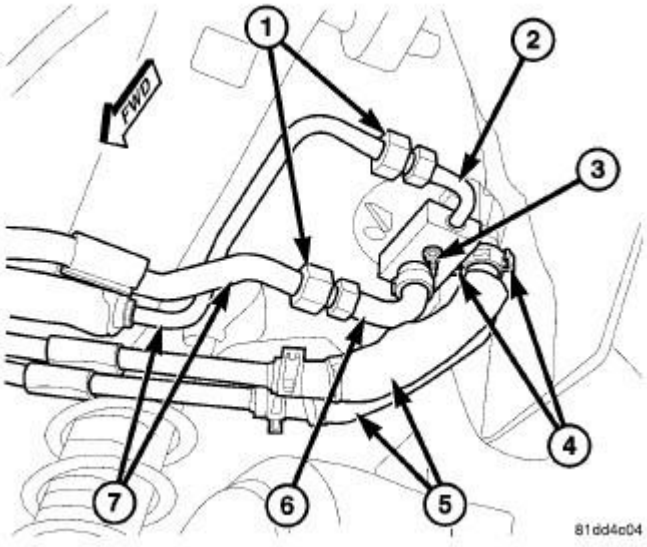


Fig. 162: Underbody Lines to Rear Housing
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Drain the engine cooling system. Refer to **Cooling - Standard Procedure** .
4. Raise and support the vehicle.

CAUTION: DO NOT apply excessive force on underbody heater lines or rear

heater tubes when disconnecting the connections. Excessive force may damage or deform the tubes and or lines, causing an engine coolant leak.

NOTE: Replacement of the rubber heater hose ends will be required if the rubber hoses are cut for removal.

5. Release the spring type hose clamps (4) and disconnect the underbody heater lines (5) from the rear heater core tubes located behind the right rear wheel housing.
6. Lower the underbody heater lines and drain any residual coolant from the lines into a suitable container.
7. Loosen the fitting nuts (1) that secure the underbody refrigerant lines (7) to the underbody refrigerant extension lines and sealing plate (2 and 6).
8. Disconnect the underbody refrigerant lines from underbody refrigerant extension lines and remove and discard the O-ring seals.
9. Remove the nut (3) that secures the underbody refrigerant extension lines and sealing plate to the rear A/C expansion valve.
10. Disconnect the extension lines and sealing plate from the rear A/C expansion valve and remove and discard the O-ring seals.
11. Install plugs in, or tape over the opened underbody refrigerant line fittings and rear expansion valve ports.

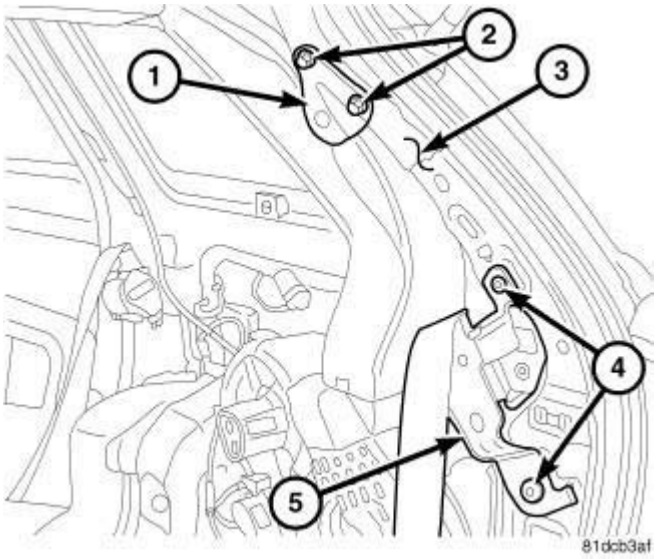


Fig. 163: D-Pillar Seat Belt Bracket
Courtesy of CHRYSLER LLC

12. Lower the vehicle.
13. Remove the right D-pillar trim panel. Refer to **Body/Interior/PANEL, D-Pillar Trim - Removal** .
14. Remove right quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
15. Remove the two bolts (2) that secure the upper seat belt bracket (1) to the right D-pillar (3) and remove the bracket.

16. Remove the two bolts (4) that secure the right seat belt retractor (5) to the right D-pillar and remove the retractor.

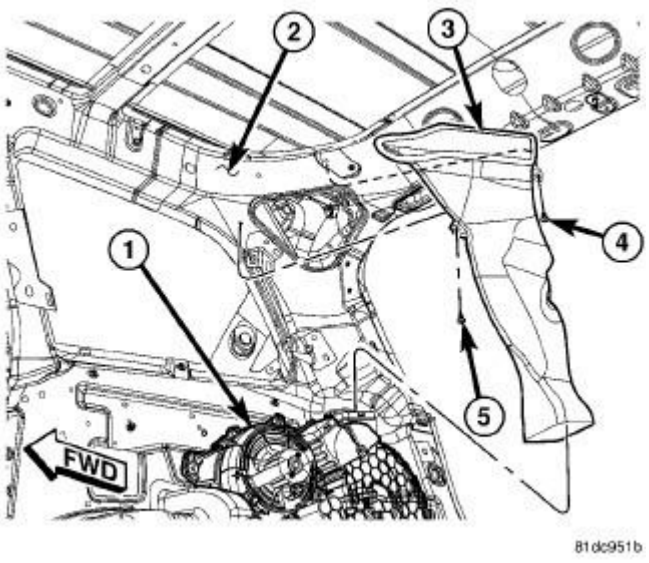


Fig. 164: Rear Ceiling Duct
Courtesy of CHRYSLER LLC

17. Remove the two retainers (4 and 5) that secure the rear ceiling distribution duct (3) to the right D-pillar (2).
18. Lift the rear ceiling distribution duct upward and disengage it from the rear heater-A/C housing (1).

CAUTION: Use care when removing the rear ceiling distribution duct from the heater-A/C housing to prevent damage to the molded plastic support brace located on the top of the housing outlet. Failure to follow this caution could result in part of, or all of the support brace falling into the rear housing, which may interfere with rear mode door operation.

19. Pull the bottom end of the rear ceiling distribution duct away from the rear heater-A/C housing and remove the duct.

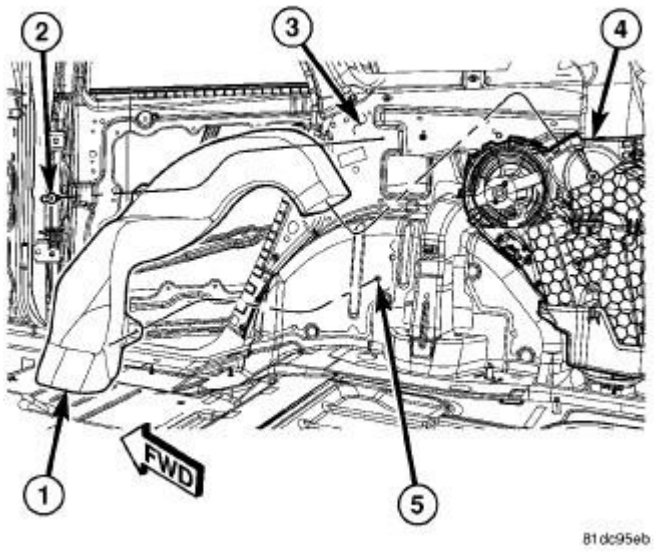


Fig. 165: Rear Floor Distribution Duct
Courtesy of CHRYSLER LLC

20. Remove the push-pin retainer (2) that secures the rear floor distribution duct (1) to the right inner quarter panel (3).
21. Disengage the rear floor distribution duct from the stud (5) located on the right inner quarter panel.
22. Disengage the rear floor distribution duct from the rear heater-A/C housing (4) and remove the duct.

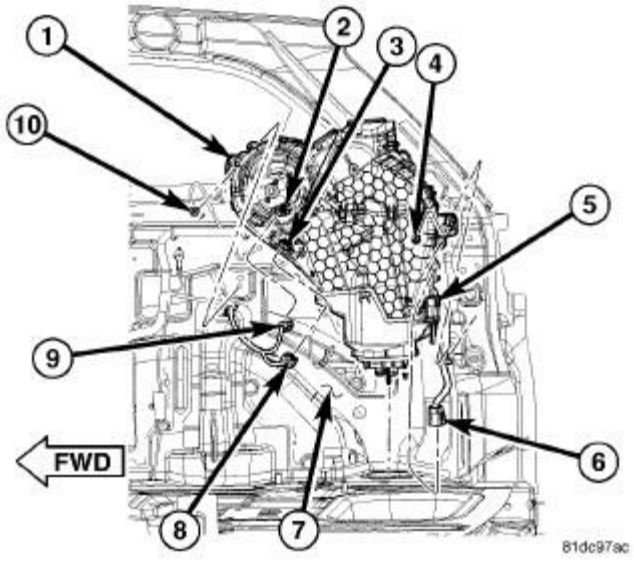


Fig. 166: Rear Heater AC Housing Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: MTC rear heater-A/C system shown. ATC system similar.

23. Disconnect the body wire harness connectors (8 and 9) from the rear blower motor (2) and the rear blower motor resistor or power module (3) (depending on control system).
24. Disconnect the body wire harness connector (6) from the rear heater-A/C wire harness connector (5).
25. Remove the two bolts (4 and 10) that secure the rear heater-A/C housing (1) to the right inner quarter panel (7) and remove the housing.

Disassembly

DISASSEMBLY

NOTE: The rear heater-A/C housing must be removed from the vehicle for service of the mode door actuator and blend door actuator and it must be disassembled for service of the A/C evaporator and the heater core. The blend-air door and mode-air door are only serviced with the respective housing.

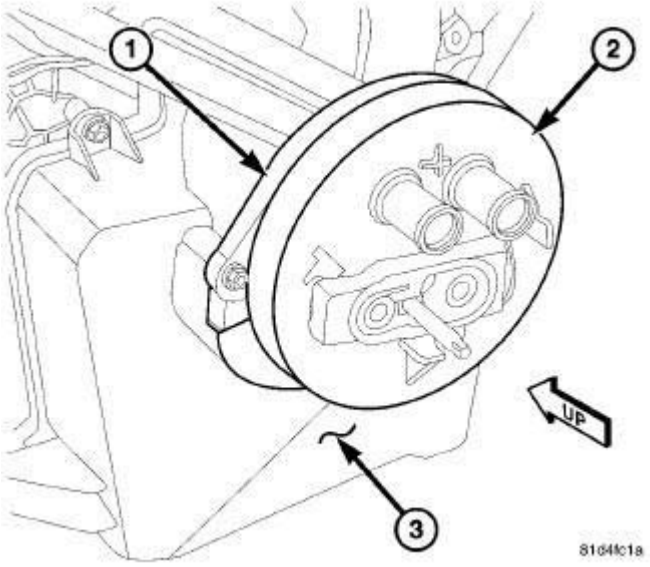


Fig. 167: Rear Housing Flange Seal 09
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the rear heater-A/C housing and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Removal**.
3. Remove the rear blower motor resistor or power module (depending on application). See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Removal** or. See **Heating and Air Conditioning/Controls/MODULE, Power - Removal**.
4. Remove the rear blower motor. See **Heating and Air Conditioning/Distribution/MOTOR, Blower - Removal**.
5. Remove the foam seal (2) from the flange (1) located at the bottom of the rear heater-A/C housing (3). If the foam seal is deformed or damaged, it must be replaced.

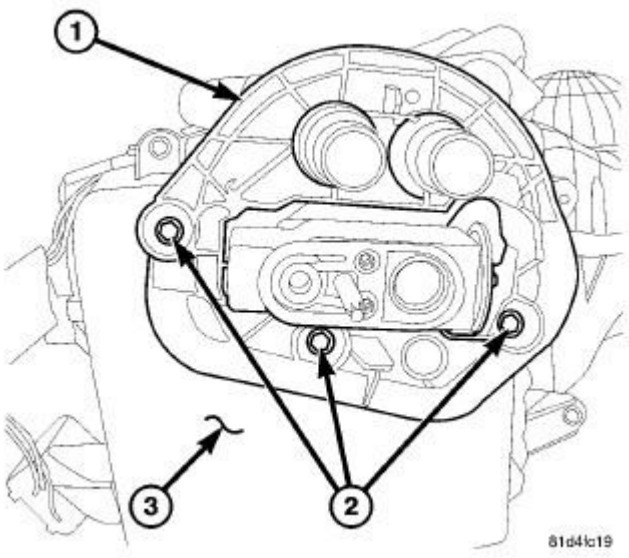


Fig. 168: Rear Housing Flange
Courtesy of CHRYSLER LLC

6. Remove the three screws (2) that secure the flange (1) to the bottom of the rear heater-A/C housing (3) and remove the flange.

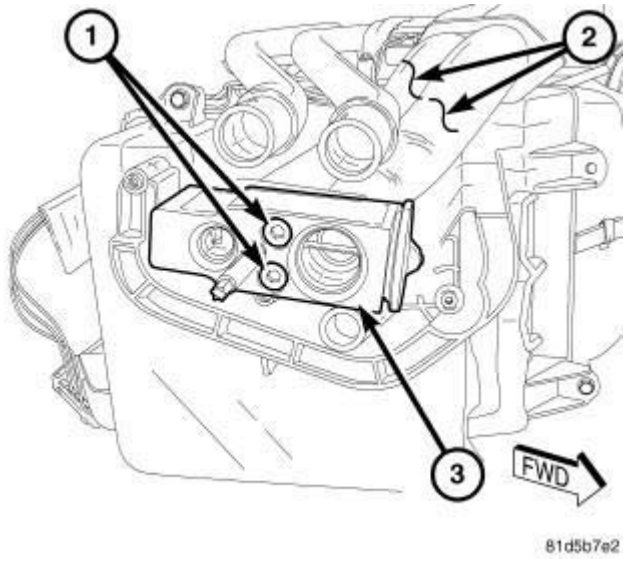


Fig. 169: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

7. Remove the two screws (1) that secure the rear expansion valve (3) to the tapping plate located on the end of the rear evaporator tubes (2) and remove the valve.
8. Remove and discard the O-ring seals and install plugs in, or tape over the opened evaporator tubes and expansion valve ports.

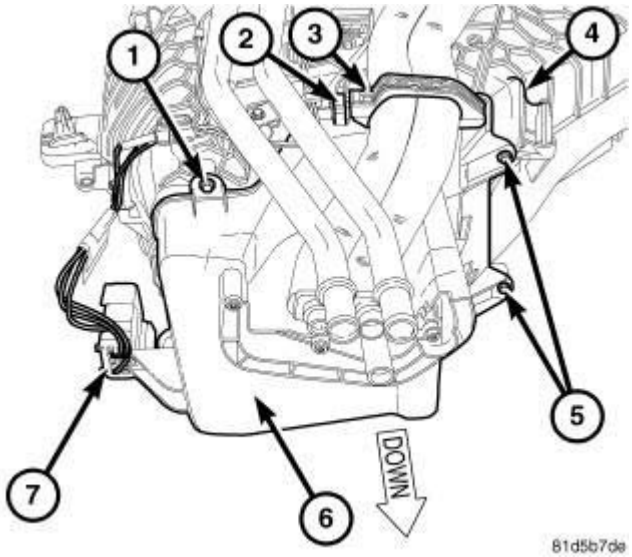


Fig. 170: Lower Rear Housing Removal/Installation
Courtesy of CHRYSLER LLC

9. Remove the wire harness connector (7) from the lower rear heater-A/C housing (6).
10. Open the evaporator tube retaining bracket (3) located on the outboard side of the lower housing.
11. Remove the metal retaining clip (2) that secures the lower housing to the rear heater-A/C housing (4).
12. Remove the five screws (1 and 5) that secure the lower housing the rear heater-A/C housing and carefully remove the lower housing. Rotate and tilt the lower housing as necessary for removal.

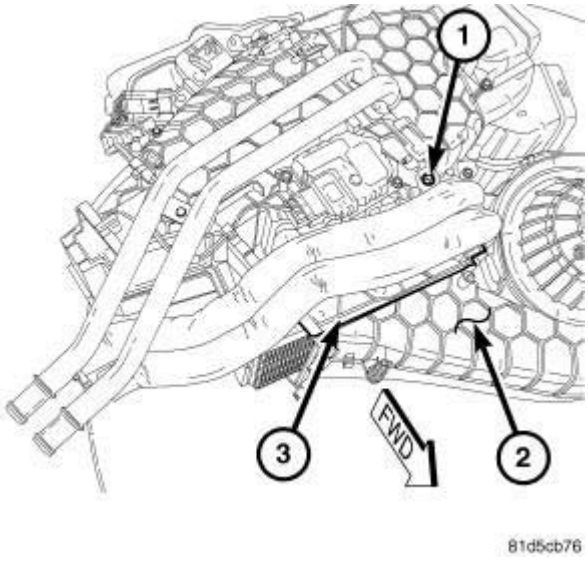


Fig. 171: Rear Evaporator Cover Removal/Installation
Courtesy of CHRYSLER LLC

13. Remove the screw (1) that secures the rear evaporator cover (3) to the outboard side of the rear heater-A/C housing (2) and remove the cover of the housing.

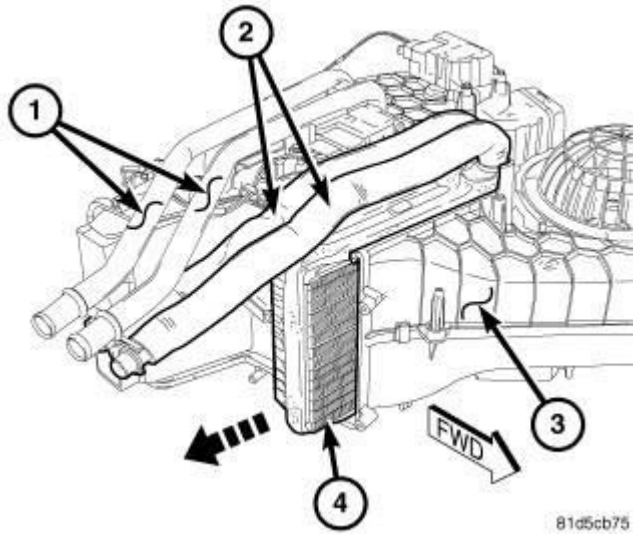


Fig. 172: Rear Evaporator Removal
Courtesy of CHRYSLER LLC

14. Carefully pull the rear A/C evaporator (4) out the bottom of the rear heater-A/C housing (3). Guide the evaporator tubes (2) past the heater core tubes (1). If the foam seals on the A/C evaporator are deformed or damaged, they must be replaced.

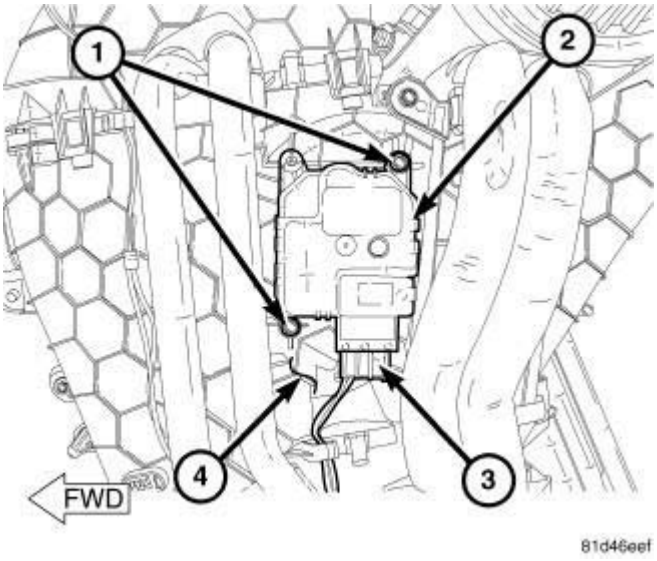


Fig. 173: Rear Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

15. Disconnect the wire harness connector (3) from the rear blend door actuator (2) located on the outboard side of the rear heater-A/C housing (4).
16. Remove the two screws (1) that secure the rear blend door actuator to the rear heater-A/C housing and remove the actuator.

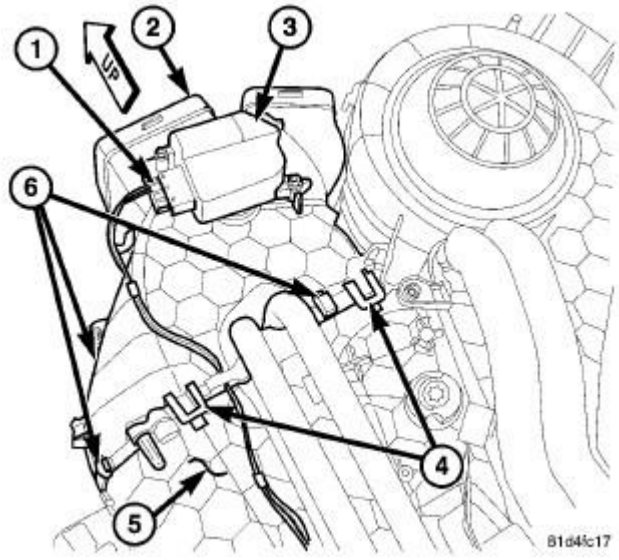


Fig. 174: Rear Distribution Housing Removal/Installation 09
Courtesy of CHRYSLER LLC

17. Disconnect the rear heater-A/C wire harness connector (1) from the rear mode door actuator (3) located on the outboard side of the rear heater-A/C distribution housing (2) and remove the wire harness from the rear heater-A/C housing (5).
18. Remove the three metal retaining clips (4) that secure the rear distribution housing to the rear heater-A/C housing.
19. Release the five plastic retaining tabs (4) that secure the rear distribution housing and rear heater-A/C housing together and separate the housings.
20. If required, remove the rear mode door actuator from the rear distribution housing. See **Heating and Air Conditioning/Controls/ACTUATOR, Mode Door - Removal**.

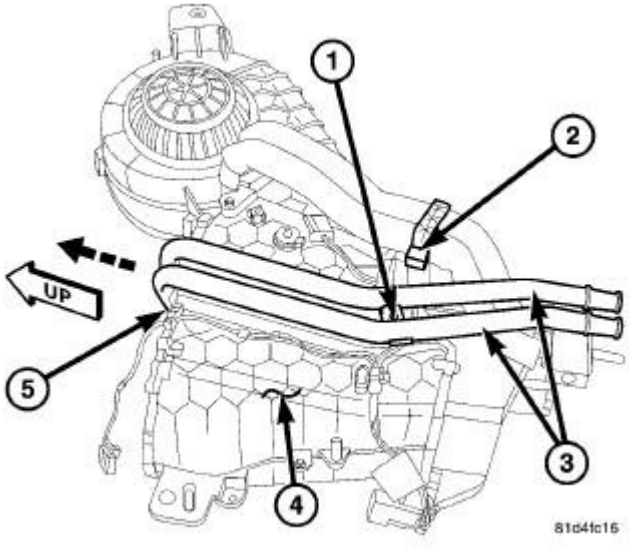


Fig. 175: Rear Heater Core Remove
Courtesy of CHRYSLER LLC

21. Remove the screw (1) that secures the rear heater core tubes (3) to the outboard side of the rear heater-A/C housing (4).
22. Pull the rear heater core (5) out of the top of the rear heater-A/C housing. If the foam seals on the heater core are deformed or damaged, they must be replaced.

Assembly

ASSEMBLY

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: If only the rear A/C evaporator is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals could result in a refrigerant system leak.

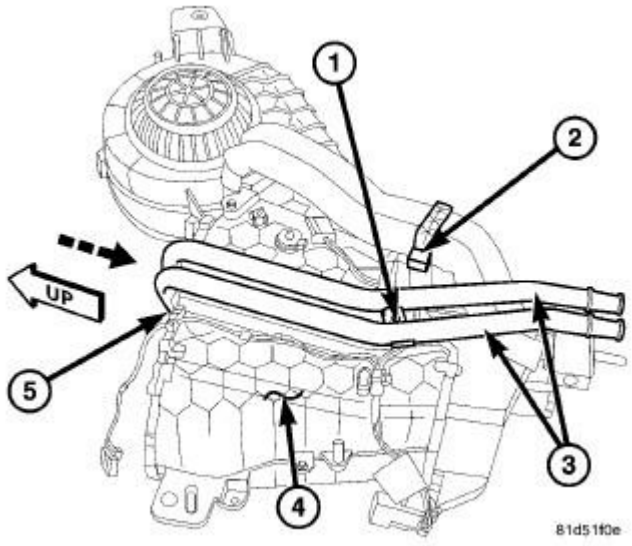


Fig. 176: Rear Heater Core Install
Courtesy of CHRYSLER LLC

1. Install the rear heater core (5) into the rear heater-A/C housing (4). Make sure that the foam seals are properly installed.
2. Install the screw (1) that secures the rear heater core tubes (3) to the outboard side of the rear heater-A/C housing. Tighten the screw to 1.2 N.m (10 in. lbs.).

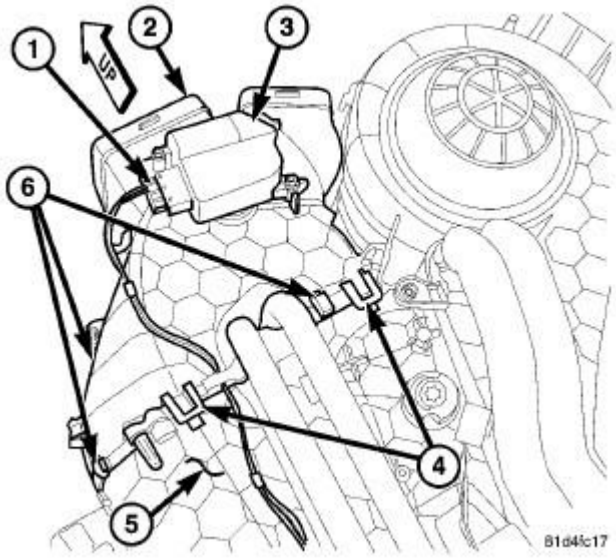


Fig. 177: Rear Distribution Housing Removal/Installation
Courtesy of CHRYSLER LLC

3. If removed, install the rear mode door actuator (3) to the rear heater-A/C distribution housing (2). See **Heating and Air Conditioning/Controls/ACTUATOR, Mode Door - Installation**.

4. Position the rear heater-A/C distribution housing to the rear heater-A/C housing (5) and engage the five plastic retaining tabs (4). Make sure the retaining tabs are fully engaged.
5. Install the three metal retaining clips (6) that secure the rear distribution housing to the rear heater-A/C housing.
6. Position the rear heater-A/C wire harness (1) to the rear heater-A/C distribution housing and connect it to the rear mode door actuator (3).

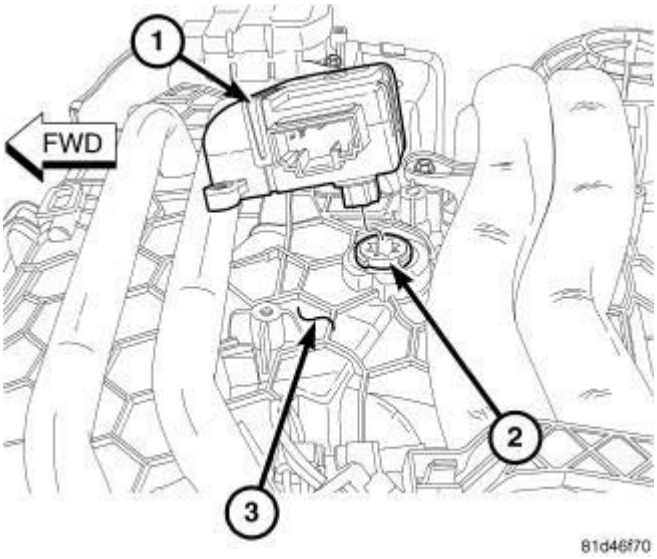


Fig. 178: Rear Blend Door Actuator Align
Courtesy of CHRYSLER LLC

7. Position the rear blend door actuator (1) onto the rear heater-A/C housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the rear blend-air door pivot shaft (2).

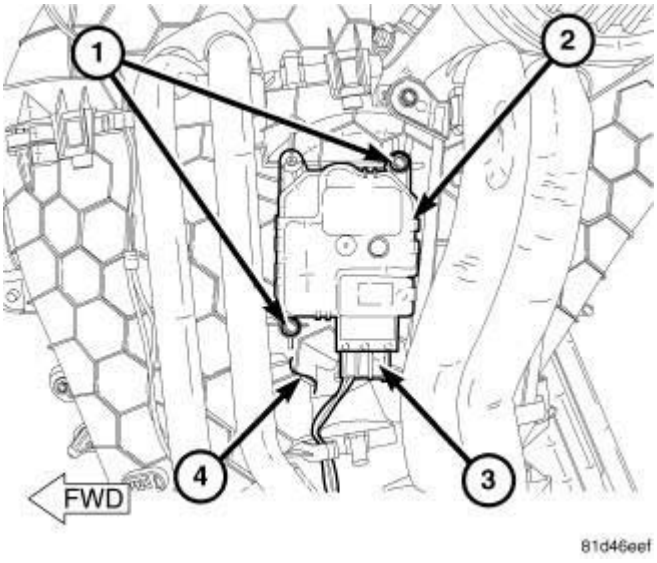


Fig. 179: Rear Blend Door Actuator Removal/Installation

Courtesy of CHRYSLER LLC

8. Install the two screws (1) that secure the rear blend door actuator (2) to the rear heater-A/C housing (4). Tighten the screws to 1.2 N.m (10 in. lbs.).
9. Connect the wire harness connector (3) to the rear blend door actuator.

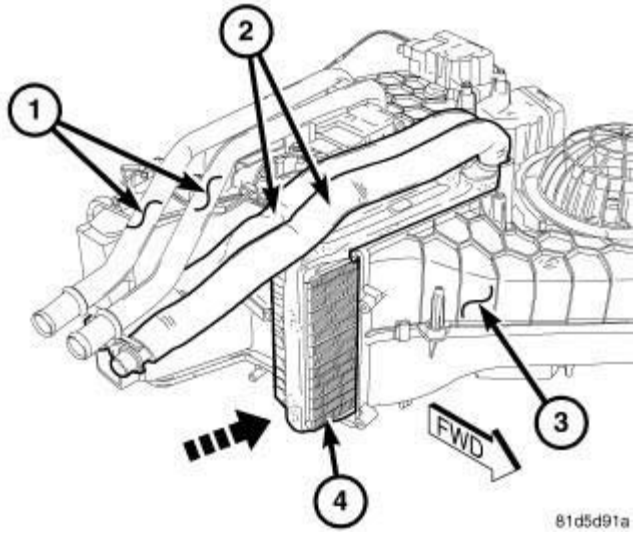


Fig. 180: Rear Evaporator Install
Courtesy of CHRYSLER LLC

10. Install the rear A/C evaporator (4) into the rear heater-A/C housing (3). Guide the evaporator tubes (2) past the rear heater core tubes (1). Make sure that the foam seals are properly installed on the evaporator.

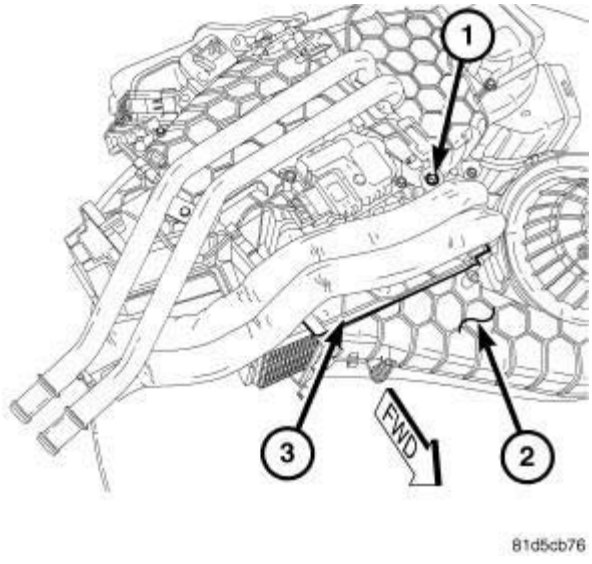


Fig. 181: Rear Evaporator Cover Removal/Installation
Courtesy of CHRYSLER LLC

11. Install the evaporator cover (3) onto the outboard side of the rear heater-A/C housing (2) and install the

retaining screw (1). Tighten the screw to 1.2 N.m (10 in. lbs.).

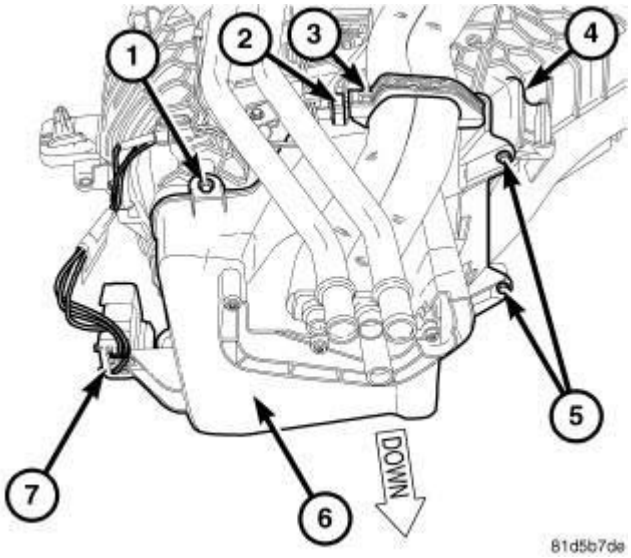


Fig. 182: Lower Rear Housing Removal/Installation
Courtesy of CHRYSLER LLC

12. Install the lower rear heater-A/C housing (6) onto the rear heater-A/C housing (4). Rotate and tilt the lower housing as necessary for installation.
13. Install the five screws (1 and 5) that secure the lower housing to the rear heater-A/C housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
14. Install the metal retaining clip (2) that secures the lower housing to the rear heater-A/C housing.
15. Close the evaporator tube retaining bracket (3). Make sure the bracket retainers are fully engaged.
16. Install the wire harness connector (7) onto the lower rear heater-A/C housing.

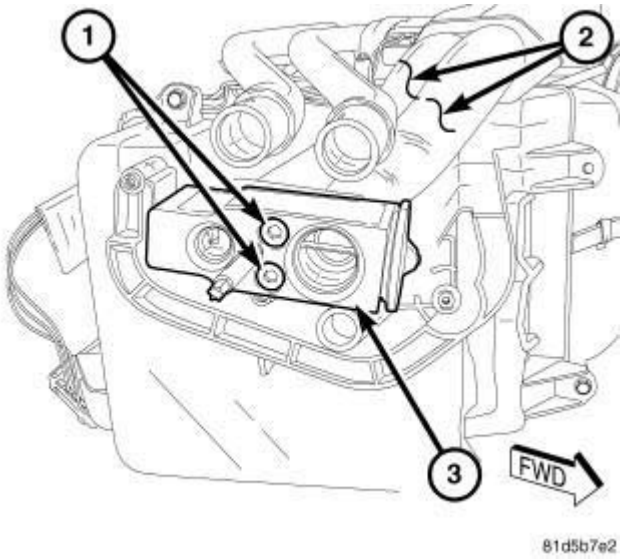


Fig. 183: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

17. Remove the tape or plugs from the rear evaporator tubes and expansion valve ports.
18. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the rear evaporator tube fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
19. Install the rear A/C expansion valve (3) onto the tapping plate located on the end of the rear evaporator tubes (2)
20. Install two bolts (1) that secure the rear A/C expansion valve to the taping plate. Tighten the bolts to 11 N.m (97 in. lbs.).

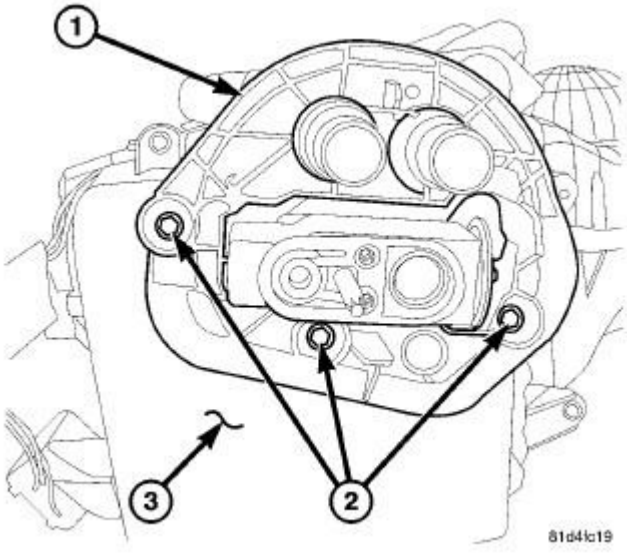


Fig. 184: Rear Housing Flange
Courtesy of CHRYSLER LLC

21. Position the flange (1) to the bottom of the rear heater-A/C housing (3) and install the three retaining screws (2). Tighten the screws to 1.2 N.m (10 in. lbs.).

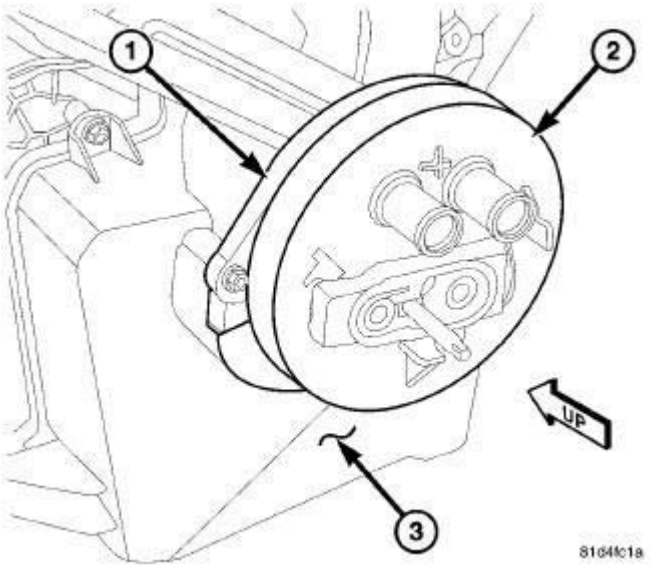


Fig. 185: Rear Housing Flange Seal
Courtesy of CHRYSLER LLC

22. Install the foam seal (2) onto the flange (1) at the bottom of the rear heater-A/C housing (3). Make sure that the foam seal is properly installed.
23. Install the rear blower motor. See **Heating and Air Conditioning/Distribution/MOTOR, Blower - Installation**.
24. Install the rear blower motor resistor or power module (depending on application). See **Heating and Air Conditioning/Controls/RESISTOR, Blower Motor - Installation** or. See **Heating and Air Conditioning/Controls/MODULE, Power - Installation**.
25. Install the rear heater-A/C housing. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Installation**.
26. Reconnect the negative battery cable.
27. If the rear heater core is being replaced, flush the cooling system. Refer to **Cooling - Standard Procedure** .
28. If the rear A/C evaporator is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

Installation

INSTALLATION

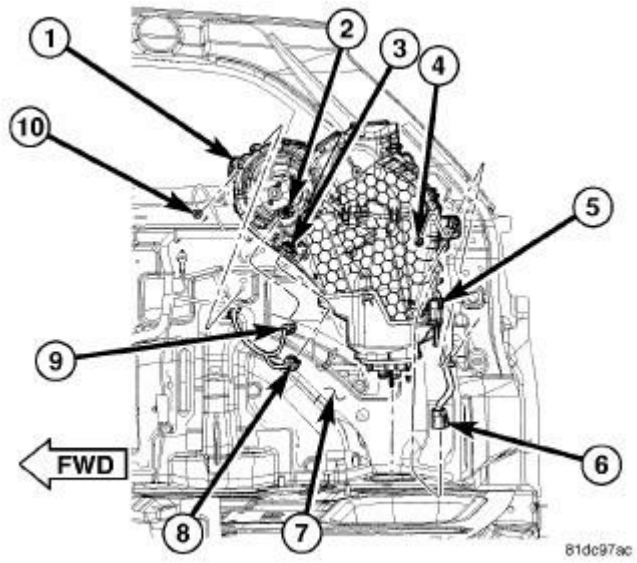


Fig. 186: Rear Heater AC Housing Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: MTC rear heater-A/C system shown. ATC system similar.

1. Position the rear heater-A/C housing (1) into the vehicle and align the guide pins on the housing to the holes in the right inner quarter panel (7).
2. Install the two bolts (4 and 10) that secure the rear heater-A/C housing to the right inner quarter panel. Tighten the bolts to 3 N.m (27 in. lbs.).
3. Connect the body wire harness connector (6) to the rear heater-A/C wire harness connector (5).
4. Connect the body wire harness connectors (8 and 9) to the rear blower motor (2) and the rear blower motor resistor or power module (3) (depending on control system).

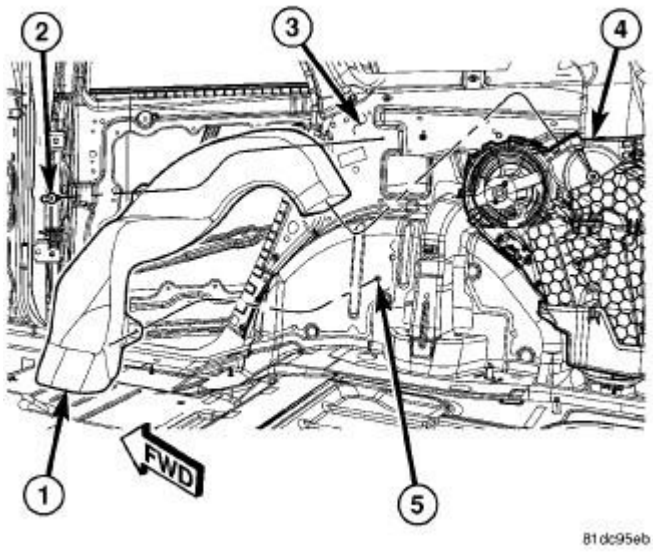


Fig. 187: Rear Floor Distribution Duct
Courtesy of CHRYSLER LLC

5. Install the rear floor distribution duct (1) onto rear heater-A/C housing (4). Make sure the duct is fully engaged to the housing.
6. Engage the rear floor distribution duct to the stud (5) located on the right inner quarter panel (3).
7. Install the push-pin retainer (2) that secures the rear floor distribution duct to the right inner quarter panel.

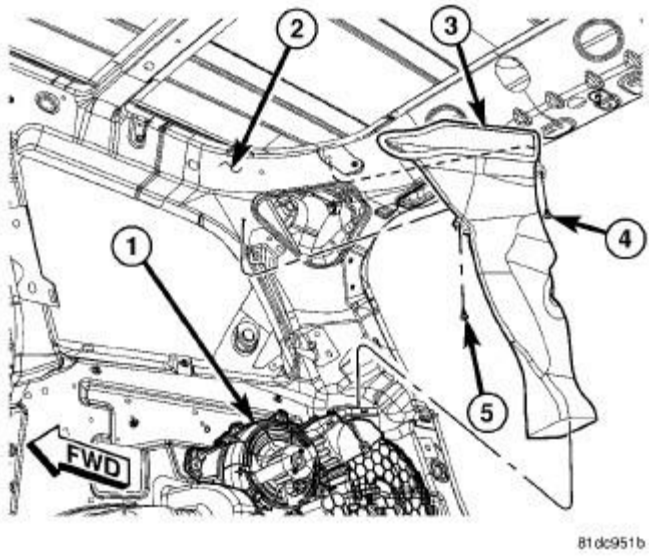


Fig. 188: Rear Ceiling Duct
Courtesy of CHRYSLER LLC

8. Position the rear ceiling distribution duct (3) to the right D-pillar (2).

CAUTION: Use care when installing the rear ceiling distribution duct onto the heater-A/C housing to prevent damage to the molded plastic support brace located on the top of the housing outlet. Failure to follow this caution could result in part of, or all of the support brace falling into the rear housing, which may interfere with rear mode door operation.

9. Install the rear ceiling distribution duct onto the top of the rear heater-A/C housing (1). Make sure the duct is fully engaged to the housing.
10. Install the two retainers (4 and 5) that secure the rear ceiling distribution duct to the right D-pillar.

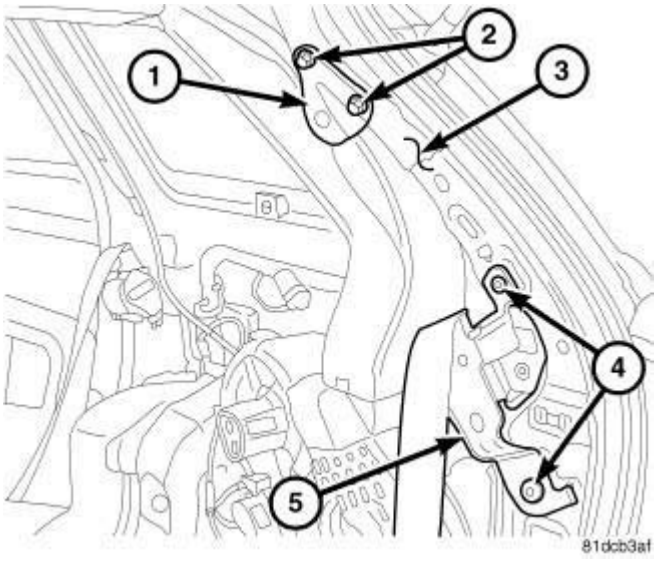


Fig. 189: D-Pillar Seat Belt Bracket
Courtesy of CHRYSLER LLC

11. Position the upper seat belt bracket (2) onto the D-pillar (3) and install the two retaining bolts (1). Tighten the bolts to 52 N.m (38.5 ft. lbs.).
12. Install the right seat belt retractor (5) and retaining bolts (4) onto the D-pillar. Tighten the bolts to 52 N.m (38.5 ft. lbs.).
13. Install the right quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
14. Install the right D-pillar trim panel. Refer to **Body/Interior/PANEL, D-Pillar Trim - Installation** .

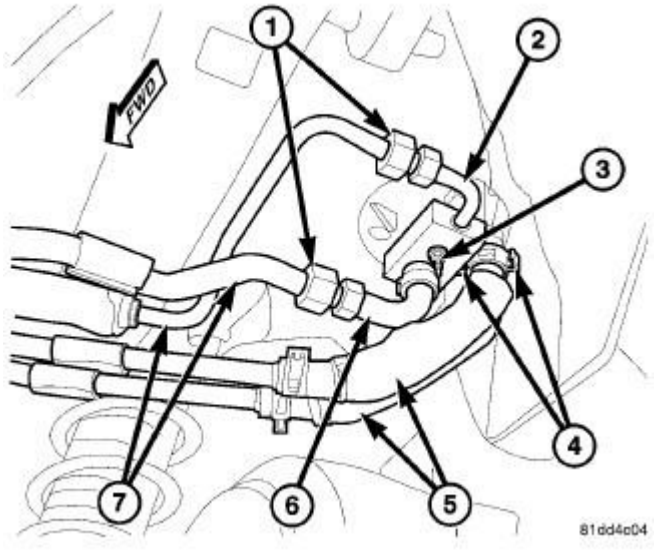


Fig. 190: Underbody Lines to Rear Housing
Courtesy of CHRYSLER LLC

15. Raise and support the vehicle.

CAUTION: DO NOT apply excessive force on underbody heater lines or rear heater tubes fittings when connecting the connections. Excessive force may damage or deform the tubes and or lines, causing an engine coolant leak.

NOTE: Replacement of the rubber heater hose ends will be required if the rubber hoses were cut for removal.

16. Remove the tape or plugs from all the opened refrigerant line fittings and the rear expansion valve ports.
17. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the underbody refrigerant extension line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
18. Connect the underbody refrigerant extension lines and sealing plate (2 and 6) to the rear A/C expansion valve.
19. Loosely install the nut (3) that secures the extension lines and sealing plate to the rear A/C expansion valve.
20. Connect the underbody refrigerant lines (7) to the underbody refrigerant extension lines and tighten the fitting nuts (1) to 23 N.m (17 ft. lbs.).
21. Tighten the nut that secures the extension lines and sealing plate to the rear A/C expansion valve to 11 N.m (97 in. lbs.).
22. Connect the underbody heater lines (5) to the rear heater core tubes located behind the right rear wheel housing and engage the spring type hose clamps (4).

23. Lower the vehicle.
24. Reconnect the negative battery cable.
25. If the heater core is being replaced, flush the cooling system. Refer to **Cooling - Standard Procedure** .
26. Fill the engine cooling system. Refer to **Cooling - Standard Procedure** .

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

27. Evacuate and charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
28. Calibrate the A/C-heater control. Refer to **DTC-Based Diagnostics/HVAC - Standard Procedure** .

MOTOR, BLOWER, REAR

Description

DESCRIPTION

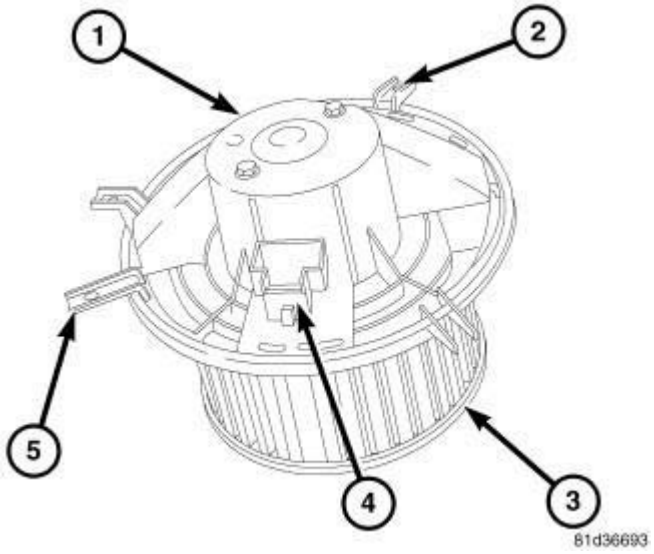


Fig. 191: Rear Blower
Courtesy of CHRYSLER LLC

The rear blower motor (1) is a 12-volt, direct current (DC) motor mounted within a plastic housing with an integral wire connector (4) and a squirrel cage-type blower wheel (3) that is secured to the blower motor shaft. Three integral mounting tabs (2) and a lock tab (5) secure the blower motor to the inboard side of the rear heater-A/C housing.

The rear blower motor can be accessed for service without removing the rear heater-A/C housing.

Operation

OPERATION

The rear blower motor is used to control the velocity of air moving through the rear heater-A/C housing by spinning the blower wheel within the heater-A/C housing at the selected speed.

The rear blower motor will only operate when the ignition switch is in ON and the rear blower motor switch located in the front accessory switch panel is ON. The rear blower motor receives a battery feed through the totally integrated power module (TIPM), whenever the ignition switch is in ON. See **Heating and Air Conditioning/Distribution/MOTOR, Blower - Diagnosis and Testing**.

The rear blower motor and blower wheel are factory balanced and cannot be adjusted or repaired and must be replaced as an assembly if inoperative or damaged.

Removal

REMOVAL

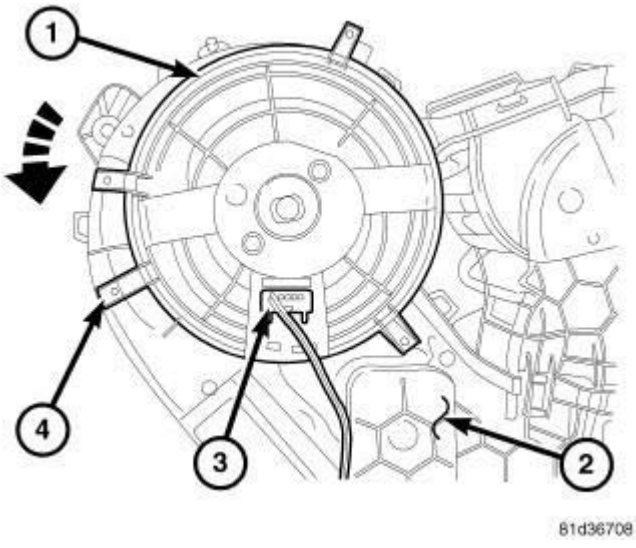


Fig. 192: Rear Blower Motor Remove
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Removal** .
3. Disconnect the wire harness connector (3) from the rear blower motor (1).
4. Disengage the locking tab (4) and remove the rear blower motor from the rear heater-A/C housing (2) by turning the blower motor counterclockwise.

Installation

INSTALLATION

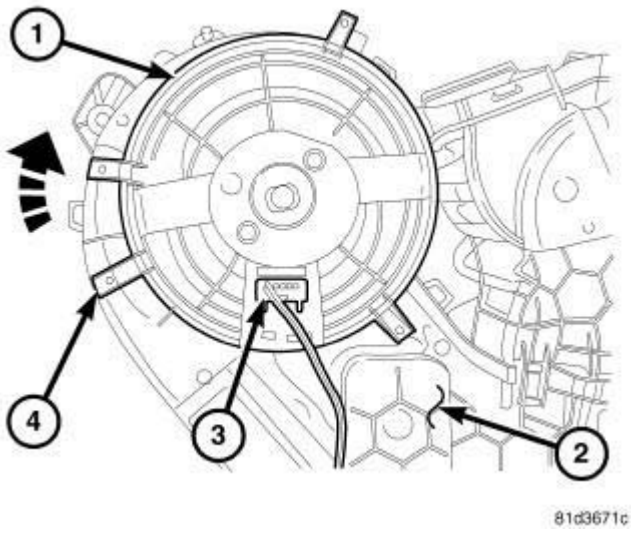


Fig. 193: Rear Blower Motor Install
Courtesy of CHRYSLER LLC

1. Position the rear blower motor (1) into the rear heater-A/C housing (2) and rotate the blower motor clockwise until the blower motor is fully engaged to the housing and the retaining tab (4) is in the locked position.
2. Connect the wire harness connector (3) to the rear blower motor.
3. Install the right rear quarter trim panel. Refer to **Body/Interior/PANEL, Quarter Trim - Installation** .
4. Reconnect the negative battery cable.

OUTLET, AIR, REAR

Removal

REMOVAL

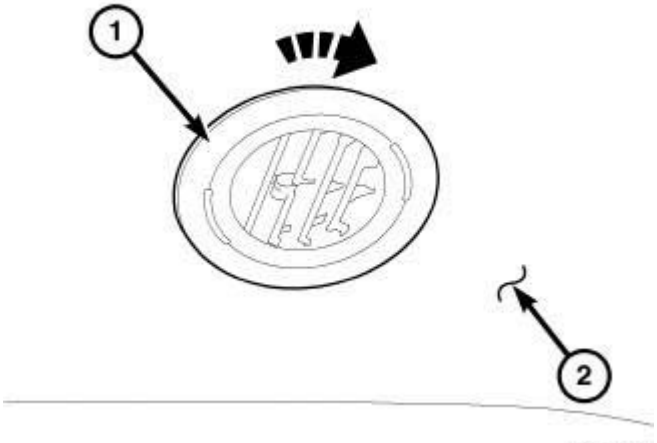


Fig. 194: Ceiling Air Outlet Removal RT
Courtesy of CHRYSLER LLC

1. Rotate the air outlet (1) being serviced clockwise until the retaining tabs on the back of the outlet disengage from the headliner (2).
2. Remove the air outlet from the headliner.

Installation

INSTALLATION

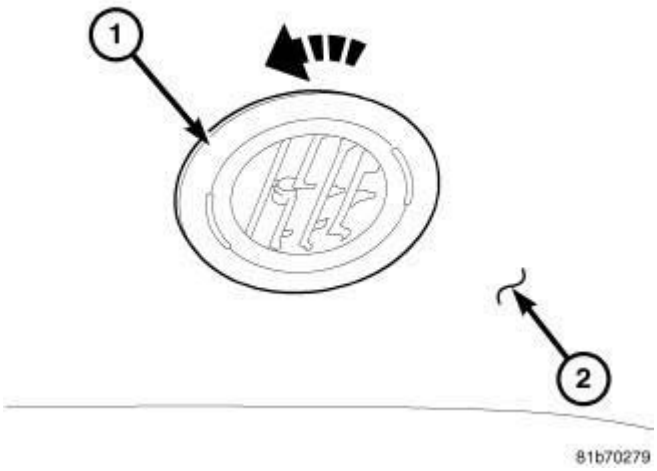


Fig. 195: Ceiling Air Outlet Install RT
Courtesy of CHRYSLER LLC

1. Position the air outlet (1) being serviced to the opening in the headliner (2).
2. Rotate the air outlet counterclockwise until the retaining tabs on the back of the outlet are fully engaged to the headliner.

PLUMBING, FRONT

DESCRIPTION

DESCRIPTION

The A/C refrigerant lines and hoses are used to carry the refrigerant between the various A/C system components. The refrigerant lines and hoses for the R-134a A/C system consist of a barrier-hose design with a nylon tube sandwiched between rubber layers. The nylon tube helps to contain the R-134a refrigerant, which has a small molecular structure. The ends of the refrigerant lines are made from lightweight aluminum and brazed fittings.

Any kinks or sharp bends in the refrigerant lines and hoses will reduce the capacity of the entire A/C system and

can reduce the flow of refrigerant within the system.

OPERATION

OPERATION

High pressures are produced in a refrigerant system when the A/C compressor is operating. Extreme care must be exercised to make sure that each of the refrigerant system connections is pressure-tight and leak free. It is a good practice to inspect all flexible hose refrigerant lines at least once a year to make sure they are in good condition and properly routed.

Depending on vehicle, model and market application, refrigerant lines are connected to each other or other A/C system components with block-type or quick-connect type fittings. To ensure the integrity of the refrigerant system, O-rings and/or gaskets may be used to seal the refrigerant system connections.

The refrigerant lines and hoses cannot be repaired and must be replaced if leaking or damaged.

WARNING

WARNING

WARNING: The A/C system contains refrigerant under high pressure. Repairs should only be performed by qualified service personnel. Serious or fatal injury may result from improper service procedures.

WARNING: Avoid breathing the refrigerant and refrigerant oil vapor or mist. Exposure may irritate the eyes, nose, and/or throat. Wear eye protection when servicing the A/C refrigerant system. Serious eye injury can result from direct contact with the refrigerant. If eye contact occurs, seek medical attention immediately.

WARNING: Do not expose the refrigerant to open flame. Poisonous gas is created when refrigerant is burned. An electronic leak detector is recommended. Serious or fatal injury may result from improper service procedures.

WARNING: If accidental A/C system discharge occurs, ventilate the work area before resuming service. Large amounts of refrigerant released in a closed work area will displace the oxygen and cause suffocation and serious or fatal injury.

WARNING: The evaporation rate of R-134a refrigerant at average temperature and altitude is extremely high. As a result, anything that comes in contact with the refrigerant will freeze. Always protect the skin or delicate objects from direct contact with the refrigerant.

WARNING: The R-134a service equipment or the vehicle refrigerant system should not be pressure tested or leak tested with compressed air. Some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures are potentially dangerous, and may result in fire or explosion causing property damage and serious or fatal injury.

WARNING: The engine cooling system is designed to develop internal pressures up to 145 kPa (21 psi). Do not remove or loosen the coolant pressure cap, cylinder block drain plugs, radiator drain, radiator hoses, heater hoses, or hose clamps while the engine cooling system is hot and under pressure. Allow the vehicle to cool for a minimum of 15 minutes before opening the cooling system for service. Failure to observe this warning can result in serious burns from the heated engine coolant.

CAUTION

CAUTION

CAUTION: Never add R-12 to a refrigerant system designed to use R-134a. Do not use R-12 equipment or parts on an R-134a A/C system. These refrigerants are not compatible and damage to the A/C system will result.

CAUTION: Never use R-12 refrigerant oil in an A/C system designed to use R-134a refrigerant oil. These refrigerant oils are not compatible and damage to the A/C system will result.

CAUTION: The use of A/C system sealers may result in damage to A/C refrigerant recovery/evacuation/recharging equipment and/or A/C system. Many federal, state/provincial and local regulations prohibit the recharge of A/C systems with known leaks. Chrysler LLC recommends the detection of A/C system leaks through the use of approved leak detectors and fluorescent leak detection dyes. Vehicles found with A/C system sealers should be treated as contaminated and replacement of the entire A/C refrigerant system is recommended. A/C systems found to be contaminated with A/C system sealers, A/C stop-leak products or seal conditioners voids the warranty for the A/C system.

CAUTION: Recover the refrigerant before opening any fitting or connection. Open the fittings with caution, even after the system has been discharged. Never open or loosen a connection before recovering the refrigerant.

CAUTION: The internal parts of the A/C system will remain stable as long as moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability. This may cause operational troubles or even serious damage if present in more than very

small quantities. Before disconnecting a component, clean the outside of the fittings thoroughly to prevent contamination from entering the refrigerant system. Keep service tools and the work area clean. Do not open the refrigerant system or uncap a replacement component until you are ready to service the system. Immediately after disconnecting a component from the refrigerant system, seal the open fittings with a cap or plug. This will prevent contamination from entering the A/C system.

CAUTION: Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do not open a container of refrigerant oil until you are ready to use it. Replace the cap on the oil container immediately after using. Store refrigerant oil only in a clean, airtight, and moisture-free container.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system. Failure to follow this caution will result in serious A/C compressor damage.

CAUTION: Do not overcharge the refrigerant system. Overcharging will cause excessive compressor head pressure and can cause compressor noise and A/C system failure.

DIAGNOSIS AND TESTING

REFRIGERANT SYSTEM LEAKS

WARNING: R-134a service equipment or vehicle A/C system should not be pressure tested or leak tested with compressed air. Mixture of air and R-134a can be combustible at elevated pressures. These mixtures are potentially dangerous and may result in fire or explosion causing property damage and possible serious or fatal injury.

Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved service equipment meeting SAE requirements to discharge an R-134a system. If accidental system discharge occurs, ventilate work area before resuming service.

NOTE: If the A/C system refrigerant charge is empty or low, a leak in the A/C system is likely. Visually inspect all A/C lines, fittings and components for an oily residue. Oil residue can be an indicator of an A/C system leak location.

NOTE: The only way to correctly determine if the A/C system is fully charged with refrigerant to perform the A/C PERFORMANCE TEST. See Heating and Air Conditioning - Diagnosis and Testing.

Connect a suitable manifold gauge set and determine if the static A/C system pressure is above or below 345

kPa (50 psi). See **Heating and Air Conditioning/Plumbing - Standard Procedure**. If less than 345 kPa (50 psi), proceed to **SYSTEM EMPTY**. If greater than 345 kPa (50 psi), go to **SYSTEM LOW**.

SYSTEM EMPTY

1. Evacuate the refrigerant system to the lowest degree of vacuum possible (approximately -88 kPa (-26 in. Hg) or greater vacuum). See **Heating and Air Conditioning/Plumbing - Standard Procedure**. Determine if the system holds a vacuum for 15 minutes. If vacuum is held, a leak is probably not present. If system will not maintain vacuum level, proceed to 2.
2. Prepare and dispense 0.284 kilograms (10 ounces) of R-134a refrigerant into the evacuated refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure** and proceed to 1 of the System Low procedure.

SYSTEM LOW

1. Position the vehicle in a wind-free work area. This will aid in detecting small leaks.
2. Operate the heating-A/C system with the engine at idle under the following conditions for at least 5 minutes.
   - Doors or windows open
   - Transaxle in Park or Neutral with the parking brake set (depending on application)
   - A/C-heater controls set to outside air, full cool, panel mode, high blower and with A/C compressor engaged

CAUTION: A leak detector only designed for R-12 refrigerant will not detect leaks in an R-134a refrigerant system.

3. Shut the vehicle Off and wait 2-7 minutes. Then use an electronic leak detector that is designed to detect R-134a refrigerant and search for leaks. Fittings, lines or components that appear to be oily usually indicate a refrigerant leak. To inspect the A/C evaporator for leaks, insert the leak detector probe into the drain tube opening or an air outlet. A dye for R-134a is available to aid in leak detection. Use only Chrysler LLC approved refrigerant dye.

STANDARD PROCEDURE

REFRIGERANT SYSTEM SERVICE EQUIPMENT

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

WARNING: Eye protection must be worn when servicing an air conditioning refrigerant system. Turn off (rotate clockwise) all valves on the equipment being used, before connecting to or disconnecting from the refrigerant

system. Failure to observe these warnings may result in serious or fatal injury.

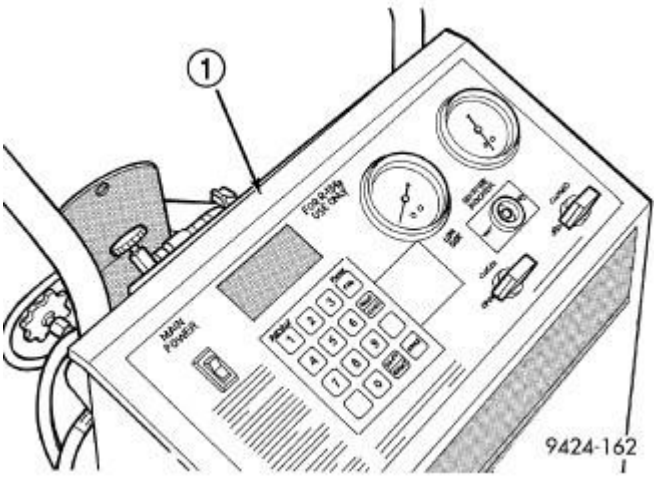


Fig. 196: Refrigerant Recovery/Recycling Station - Typical
Courtesy of CHRYSLER LLC

When servicing the A/C system, a R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 must be used (1). Per SAE standard J2788, refrigerant recovery stations must recover 95% of the refrigerant system within 30 minutes at 21.1 degrees C (70 degrees F) and be able to measure the amount of refrigerant removed from the system to an accuracy of 28 grams (1 oz.). When charging, the refrigerant recovery station must charge the system to an accuracy of 14 grams (0.5 oz.). Contact an automotive service equipment supplier for refrigerant recovery/recycling/charging equipment. Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

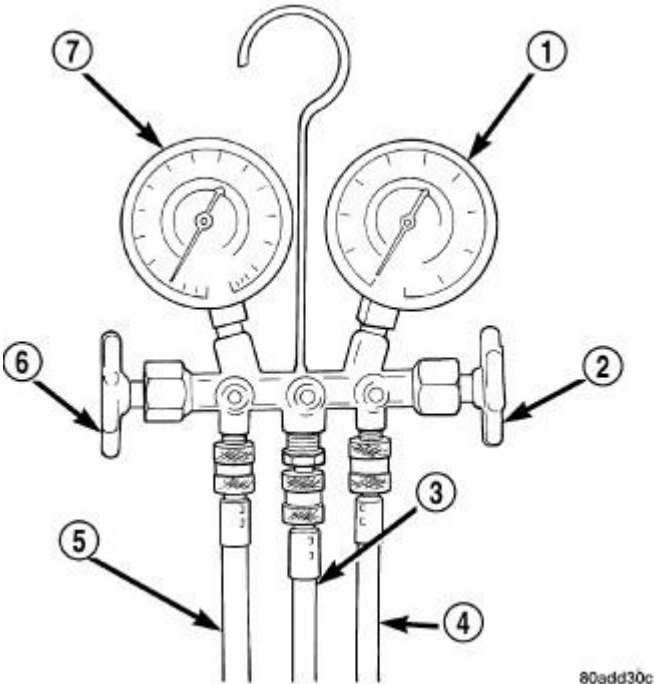


Fig. 197: Manifold Gauge Set - Typical
Courtesy of CHRYSLER LLC

A manifold gauge set (1) may be needed with some recovery/recycling/charging equipment. The manifold gauge set should have manual shut-off valves (2 and 6), or automatic back-flow valves located at the service port connector end of the manifold gauge set hoses (4 and 5). This will prevent refrigerant from being released into the atmosphere.

MANIFOLD GAUGE SET CONNECTIONS

CAUTION: Do not use an R-12 manifold gauge set on an R-134a system. The refrigerants are not compatible and A/C system damage will result.

- **LOW PRESSURE GAUGE HOSE** - The low pressure hose (Blue with Black stripe) attaches to the low side service port. This port is located on the A/C suction line near the dash panel.
- **HIGH PRESSURE GAUGE HOSE** - The high pressure hose (Red with Black stripe) attaches to the high side service port. This port is located on the A/C liquid line near the right front strut tower.
- **RECOVERY/RECYCLING/EVACUATION/CHARGING HOSE** - The center manifold hose (Yellow, or White, with Black stripe) is used to recover, evacuate, and charge the refrigerant system. When the low or high pressure valves on the manifold gauge set are opened, the refrigerant in the system will escape through this hose.

REFRIGERANT SYSTEM RECOVERY

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

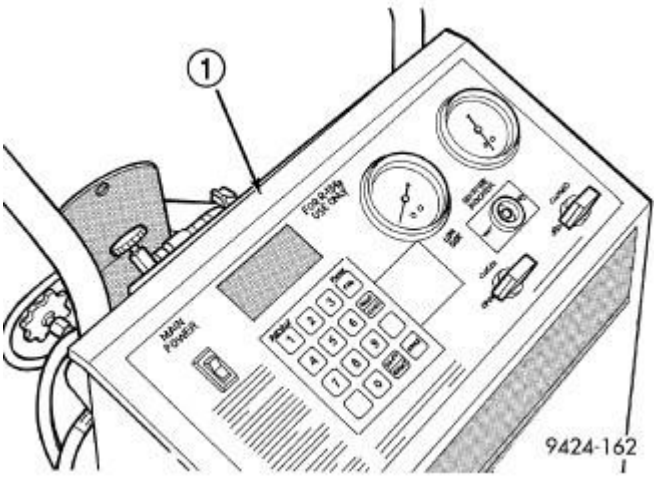


Fig. 198: Identifying R-134A Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER LLC

NOTE: If equipped with the rear heating-A/C system, use a heat gun to heat the underbody lines to help remove any trapped refrigerant from the rear A/C system.

When servicing the A/C system, a R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 must be used (1). Per SAE standard J2788, refrigerant recovery stations must recover 95% of the refrigerant system within 30 minutes at 21.1 degrees C (70 degrees F) and be able to measure the amount of refrigerant removed from the system to an accuracy of 28 grams (1 oz.). Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

REFRIGERANT SYSTEM EVACUATE

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system. Failure to follow this caution will result in serious A/C compressor damage.

NOTE: Special effort must be used to prevent moisture from entering the A/C system oil. Moisture in the oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

If an A/C compressor designed to use R-134a refrigerant is left open to the atmosphere for an extended period of time. It is recommended that the refrigerant oil be drained and replaced with new oil or a new A/C compressor be used. This will eliminate the possibility of contaminating the refrigerant system.

If the refrigerant system has been open to the atmosphere, it must be evacuated before the system can be filled. Moisture and air mixed with the refrigerant will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the A/C system and damage the A/C compressor. Moisture will boil at near room temperature when exposed to vacuum. To evacuate the refrigerant system:

NOTE: When connecting the service equipment coupling to the line fitting, verify that the valve of the coupling is fully closed. This will reduce the amount of effort required to make the connection.

1. Recover the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
2. With the engine OFF, connect a suitable charging station, refrigerant recovery machine or a manifold gauge set with vacuum pump and refrigerant recovery equipment. See **Heating and Air Conditioning/Plumbing - Standard Procedure**. Do not operate the engine with a vacuum on the A/C system.
3. Open the suction and discharge valves and start the vacuum pump. The vacuum pump should run a minimum of 45 minutes prior to charge to eliminate all moisture in system. When the suction gauge reads to the lowest degree of vacuum possible (approximately -88 kPa (- 26 in. Hg) or greater) for 30 minutes, close all valves and turn off vacuum pump. If the system fails to reach specified vacuum, the refrigerant system likely has a leak that must be corrected. If the refrigerant system maintains specified vacuum for at least 30 minutes, start the vacuum pump, open the suction and discharge valves. Then allow the system to evacuate an additional 10 minutes.

4. Close all valves. Turn off and disconnect the vacuum pump.
5. Charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

REFRIGERANT SYSTEM CHARGE

WARNING: Review safety precautions and warnings in this part before performing this procedure. See Heating and Air Conditioning/Plumbing - Warning and. See Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

NOTE: The Underhood HVAC Specification Label contains the refrigerant fill specification of the vehicle being serviced.

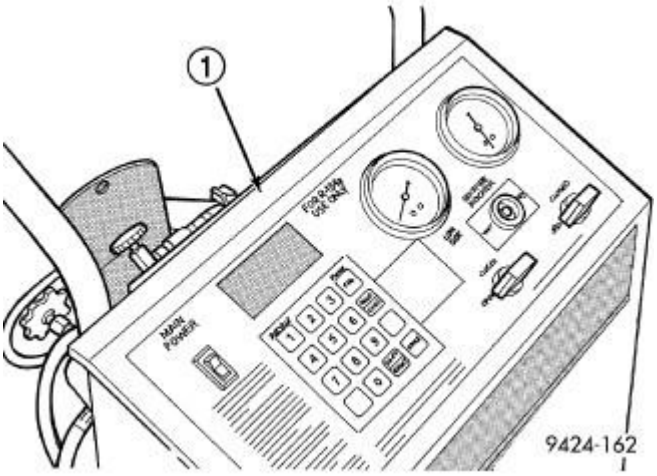


Fig. 199: Identifying R-134A Refrigerant Recovery/Recycling/Charging Station
Courtesy of CHRYSLER LLC

After all refrigerant system leaks have been repaired and the refrigerant system has been evacuated, a refrigerant charge can be injected into the system. See **Heating and Air Conditioning/Plumbing/REFRIGERANT - Specifications**.

When charging the A/C system, a R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 must be used (1). Per SAE standard J2788, refrigerant recovery stations must charge the system to an accuracy of 14 grams (0.5 oz.). Refer to the operating instructions supplied by the equipment manufacturer for proper care and use of this equipment.

CHARGING PROCEDURE

CAUTION: A small amount of refrigerant oil is removed from the A/C system each time the refrigerant system is recovered and evacuated. Before charging the A/C system, you MUST replenish any oil lost during the recovery process. See the equipment manufacturer instructions for more information.

1. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
2. Connect a manifold gauge set or R-134a refrigerant recovery/recycling/charging station that meets SAE standard J2788 to the refrigerant system.
3. Measure the proper amount of refrigerant and heat it to 52° C (125° F) with the charging station. See the operating instructions supplied by the equipment manufacturer for proper use of this equipment.
4. Open both the suction and discharge valves, then open the charge valve to allow the heated refrigerant to flow into the system.
5. When the transfer of refrigerant has stopped, close both the suction and discharge valves.
6. If all of the refrigerant charge did not transfer from the dispensing device, open all of the windows in the vehicle and set the heating-A/C system controls so that the A/C compressor is engaged and the blower motor is operating at its lowest speed setting. Run the engine at a steady high idle (about 1400 rpm). If the A/C compressor does not engage, test the compressor clutch control circuit and repair as required.
7. Open the low-side valve to allow the remaining refrigerant to transfer to the refrigerant system.

WARNING: Take care not to open the discharge (high pressure) valve at this time. Failure to follow this warning could result in possible serious or fatal injury.

8. Disconnect the charging station and manifold gauge set from the refrigerant system service ports.
9. Reinstall the caps onto the refrigerant system service ports.

COMPRESSOR, A/C

Description

FIXED DISPLACEMENT A/C COMPRESSOR

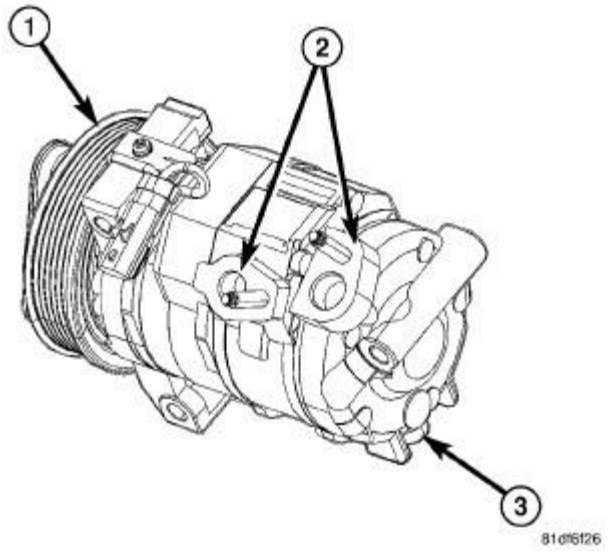


Fig. 200: Denso 10SR17 Compressor

Courtesy of CHRYSLER LLC

NOTE: Denso 10SR17 shown. Denso 10SR15 similar.

2.7L and 3.5L 5-Passenger models are equipped with the Denso 10SR15 A/C compressor. All 7-Passenger models are equipped with the Denso 10SR17 A/C compressor. Both A/C compressors are a fixed displacement, five double-acting piston, reciprocating swash plate-type compressor (1). Both compressors are clutch operated with suction and discharge ports (2) and have an integral high pressure relief valve (3) located near the rear of the compressor. The A/C compressor is secured to the engine with three bolts.

A label identifying the use of R-134a refrigerant and ND-8 PAG oil is located on each A/C compressor.

VARIABLE DISPLACEMENT A/C COMPRESSOR

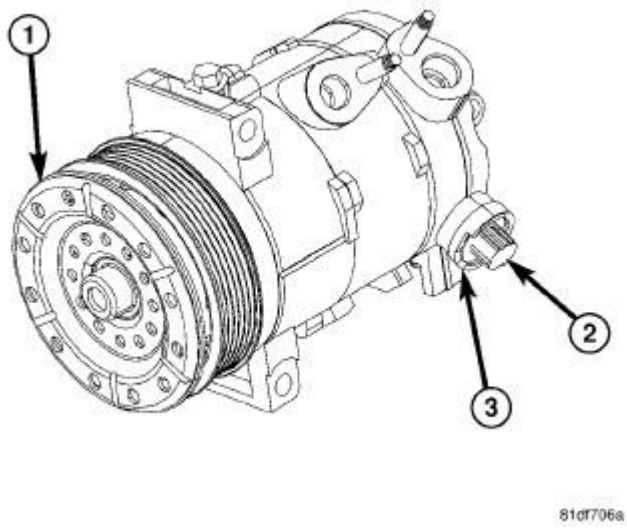


Fig. 201: Denso 6SEU16 Compressor
Courtesy of CHRYSLER LLC

2.0L and 2.4L 5-passenger models use a Denso 6SEU16 clutchless, variable displacement swashplate type A/C compressor (1). This A/C compressor has a total displacement of 160 cubic centimeters (9.7 cubic inches) and a control valve (2) and a high pressure relief valve (3) located on the back cover. The A/C compressor is secured to the engine with three bolts.

A label identifying the use of R-134a refrigerant and ND-8 PAG oil is located on the A/C compressor.

CLUTCH - FIXED DISPLACEMENT A/C COMPRESSOR

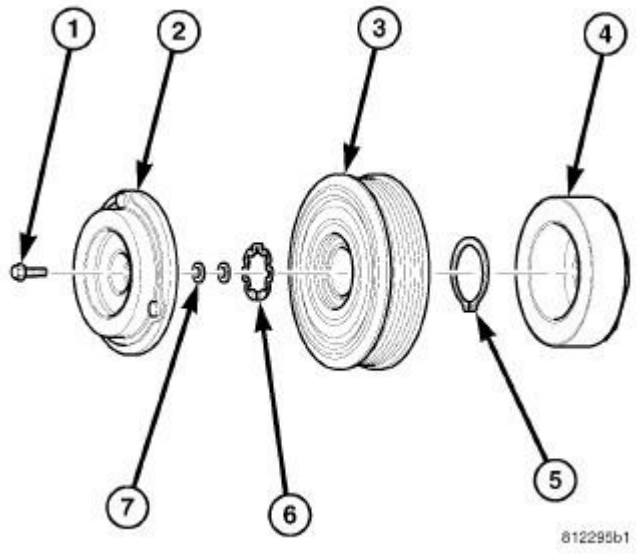


Fig. 202: A/C Compressor Clutch Components
Courtesy of CHRYSLER LLC

NOTE: Typical A/C clutch assembly shown.

The clutch assembly for the Denso 10SR15 and 10SR17 fixed displacement A/C compressors consists of a stationary electromagnetic A/C clutch field coil (4), pulley bearing and pulley assembly (3), clutch plate (2) and shims (7). These components provide the means to engage and disengage the A/C compressor from the engine accessory drive belt.

The A/C clutch field coil and the pulley bearing and pulley assembly are both retained on the nose of the A/C compressor with snap rings (5 and 6). The clutch plate is splined to the compressor shaft and secured with a bolt (1).

HUB AND PULLEY - VARIABLE DISPLACEMENT A/C COMPRESSOR

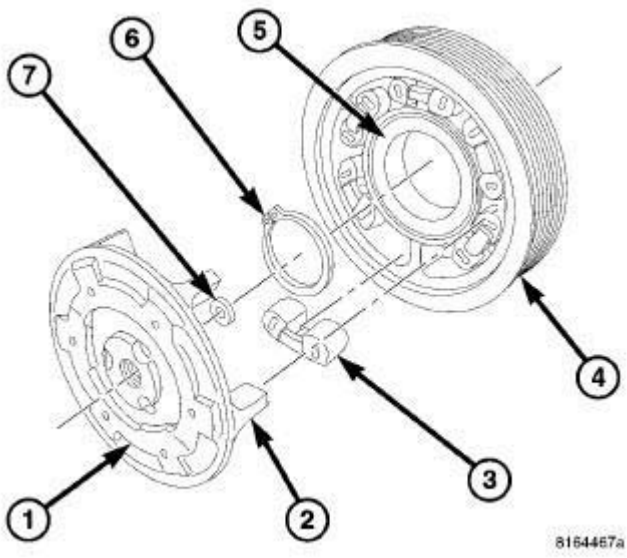


Fig. 203: A/C Compressor Hub & Pulley Assembly
Courtesy of CHRYSLER LLC

NOTE: Typical clutchless A/C compressor pulley and drive hub shown.

The non-servicable hub and pulley assembly for the Denso 6SEU16 variable displacement A/C compressor provides the means to drive the A/C compressor using the engine accessory drive belt. The hub and pulley assembly consists of an aluminum drive hub (1) with composite tabs (2) that are positioned between rubber dampeners (3), which are located inside of a composite pulley (4).

The A/C pulley has a bearing (5) which is retained to the nose of the A/C compressor with a snap ring (6). The drive hub and shim (7) are retained to the compressor shaft by use of left handed threads.

HIGH PRESSURE RELIEF VALVE

A high pressure relief valve is located on the compressor cylinder head at the rear of each A/C compressor. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Description**. This mechanical valve is designed to vent refrigerant from the A/C system to protect against damage to the A/C compressor and other A/C system components caused by condenser air flow restriction or an overcharge of refrigerant.

Operation

FIXED DISPLACEMENT A/C COMPRESSOR

The Denso 10SR15 and 10SR17 fixed displacement A/C compressors are driven by the engine through an electric clutch, drive pulley and belt arrangement. These A/C compressors are lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant.

The A/C compressors draw in low-pressure refrigerant vapor from the A/C evaporator through the suction port, then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is pumped to the

A/C condenser through the compressor discharge port.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level can prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

The Denso 10SR15 and 10SR17 fixed displacement A/C compressors cannot be repaired and must be replaced if inoperative or damaged. The compressor clutch, pulley and bearing assembly, and clutch field coil are available for service if inoperative or damaged. If an internal failure of the A/C compressor has occurred, the A/C receiver/drier must also be replaced. See **Heating and Air Conditioning/Plumbing/DRIER, A/C Receiver - Removal**.

VARIABLE DISPLACEMENT A/C COMPRESSOR

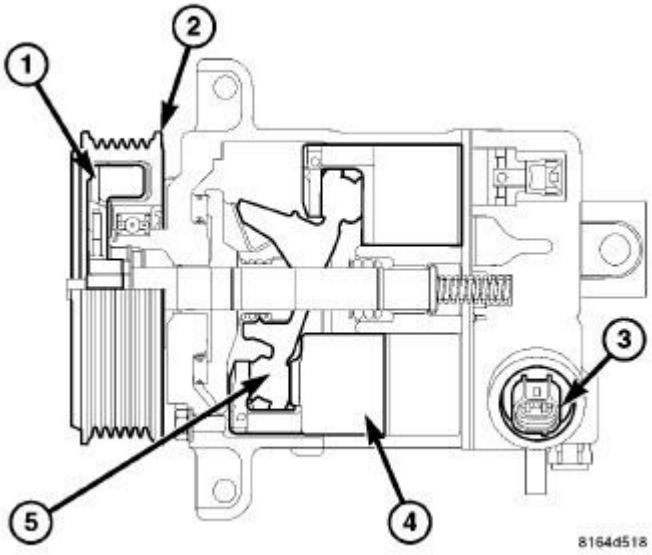


Fig. 204: 5SE12C Compressor-Operation
Courtesy of CHRYSLER LLC

NOTE: Typical variable displacement A/C compressor shown.

The Denso 6SEU16 A/C compressor is a variable displacement compressor (VDC) which is driven by the engine through a drive hub (1) and pulley (2). This A/C compressor does not require the use of an electromagnetic clutch, as the compressor uses an integral control solenoid (3) to reduce or increase the stroke of the five pistons (4) within the compressor by automatically adjusting the angle of the swashplate (5).

The A/C compressor draws in low-pressure refrigerant vapor from the A/C evaporator through its suction port. It then compresses the refrigerant into a high-pressure, high-temperature refrigerant vapor, which is then pumped to the A/C condenser through the compressor discharge port. The A/C compressor is lubricated by refrigerant oil that is circulated throughout the refrigerant system with the refrigerant. See **Heating and Air**

Conditioning/Plumbing/OIL, Refrigerant - Description.

The A/C compressor is controlled by the powertrain control module (PCM) or engine control module (ECM), depending on engine application. The PCM/ECM calculates compressor displacement required by A/C system load and demand by monitoring vehicle speed, A/C high side pressure, engine speed, evaporator temperature, accelerator pedal position, ambient temperature and A/C-heater request signals. The PCM/ECM then sends a pulse width modulated (PWM) signal to the A/C compressor control solenoid to increase or decrease refrigerant flow through an orifice located within the compressor housing. The amount of refrigerant allowed to pass through the orifice in the compressor determines the head pressure which controls the angle of the swashplate, which in turn, determines the amount of compressor displacement. When there is no demand for A/C, the swashplate is adjusted to nearly a zero degree angle, which removes compressor torque drag from the engine.

This A/C compressor will reduce the displacement of the compressor based on ambient air temperature. For example; as the outside temperature falls from 27° C (80° F) to 19° C (66° F), the amount of refrigerant flow required through the A/C orifice valve to keep the A/C evaporator cool becomes less, and the swashplate is adjusted to a lower angle, which reduces compressor displacement. However, due to the lower outside air temperature, panel air outlet temperature will not noticeably change.

The A/C compressor control system is diagnosed using a scan tool. See **Heating and Air Conditioning - Diagnosis and Testing**.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with a variable displacement A/C compressor. Failure to follow this caution will result in serious A/C compressor damage.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level can prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: The compressor drive hub and the pulley and bearing assembly can not be serviced separately from the A/C compressor. In the event of drive hub or pulley and bearing assembly damage or failure, the A/C compressor, drive hub and pulley and bearing must be replaced as an assembly.

The A/C compressor cannot be adjusted or repaired and must be replaced if inoperative or damaged. If an internal failure of the A/C compressor has occurred, the A/C receiver/drier must also be replaced. See **Heating and Air Conditioning/Plumbing/DRIER, A/C Receiver - Description**.

CLUTCH - FIXED DISPLACEMENT A/C COMPRESSOR

The clutch components for the Denso 10SR15 and 10SR17 fixed displacement A/C compressor provide the means to engage and disengage the compressor from the engine accessory drive belt. When the electromagnetic A/C clutch field coil is energized, it magnetically draws the clutch plate into contact with the clutch pulley and

drives the compressor shaft. When the coil is not energized, the pulley freewheels on the clutch hub bearing, which is part of the pulley assembly.

A/C compressor clutch engagement is controlled by the powertrain control module (PCM) or the engine control module (ECM), depending on engine application. When the A/C-heater control is set to any A/C position, it sends a request signal on the CAN-IHS bus to the totally integrated power module (TIPM), which then transfers the request on the CAN-C Bus to the PCM/ECM, which determines if operating conditions are correct for A/C clutch engagement. When all operating conditions have been met, the PCM/ECM sends a signal on a dedicated hard-wired circuit back to the totally integrated power module (TIPM) to energize the internal A/C clutch high side driver. When energized, the A/C clutch high side driver provides battery current to the A/C clutch field coil.

The A/C clutch control system is diagnosed using a scan tool. Refer to **DTC-Based Diagnostics/MODULE, Powertrain Control (PCM) - Diagnosis and Testing** .

The A/C compressor clutch components cannot be adjusted or repaired and must be replaced if inoperative or damaged.

HUB AND PULLEY - VARIABLE DISPLACEMENT A/C COMPRESSOR

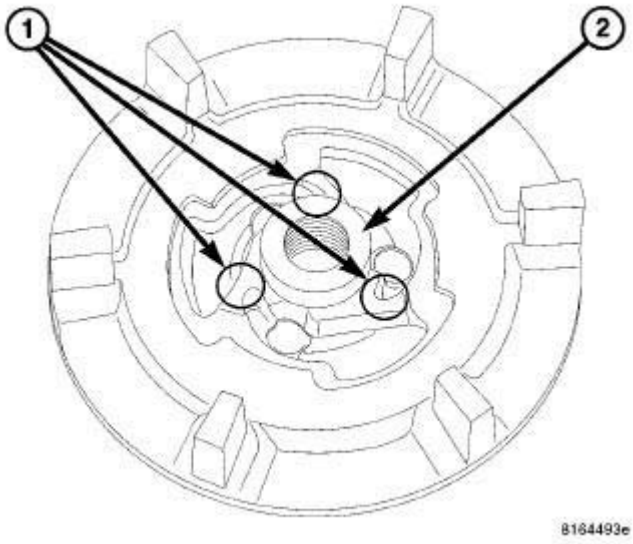


Fig. 205: A/C Compressor Hub
Courtesy of CHRYSLER LLC

NOTE: Typical clutchless compressor pulley drive hub shown.

The design of the Denso 6SEU16 variable displacement A/C compressor does not require the use of an electromagnetic clutch, as the compressor is controlled by an integral control valve that allows refrigerant to bypass within the compressor. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Description**.

The three bridges (1) located on compressor drive hub (2) are designed to break away in the event of compressor seizure. This action prevents damage to the serpentine accessory drive belt. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Inspection**.

NOTE: The compressor drive hub and the pulley and bearing assembly can not be serviced separately from the A/C compressor. In the event of drive hub or pulley and bearing assembly damage or failure, the A/C compressor, drive hub and pulley and bearing must be replaced as an assembly.

The compressor drive hub and the pulley and bearing assembly can not be serviced separately from the A/C compressor. The A/C compressor must be replaced if the drive hub or pulley and bearing assembly is worn or damaged.

HIGH PRESSURE RELIEF VALVE

The high pressure relief valve vents refrigerant from the A/C system when a discharge pressure of 3445 to 4135 kPa (500 to 600 psi) or above is reached. The high pressure relief valve closes with a minimum discharge pressure of 2756 kPa (400 psi) is reached.

The high pressure relief valve should not open when the A/C system is operating correctly. If the high pressure relief valve vents refrigerant, there is most likely a problem within the A/C refrigerant system. The high pressure relief valve vents only enough refrigerant to reduce the A/C system pressure, and then re-seats itself. If the high pressure relief valve vents refrigerant, see the A/C System Diagnosis chart. See **Heating and Air Conditioning - Diagnosis and Testing**.

The high pressure relief valve is factory-calibrated and cannot be adjusted or repaired, and must not be removed or otherwise disturbed. The valve is only serviced as a part of the A/C compressor.

Diagnosis and Testing

CLUTCH - FIXED DISPLACEMENT A/C COMPRESSOR

The compressor clutch coil electrical circuit for the Denso 10SR15 and 10SR17 fixed displacement A/C compressors is controlled by the powertrain control module (PCM) or the engine control module (ECM) (depending on engine application) through the totally integrated power module (TIPM) (refer to **SYSTEM WIRING DIAGRAMS** for complete HVAC wiring diagrams). Begin testing of a suspected compressor clutch coil problem by performing the preliminary checks.

PRELIMINARY CHECKS

1. Using a scan tool, check for diagnostic trouble codes (DTCs) in the A/C-heater control, TIPM and PCM/ECM. If no diagnostic trouble codes (DTCs) are found, go to 2. If any DTCs are found, repair as required.
2. If the A/C compressor clutch still will not engage, verify the refrigerant charge level. See **Heating and Air Conditioning - Diagnosis and Testing**. If the refrigerant charge level is OK, go to **COIL RESISTANCE TEST** and/or **COIL CURRENT DRAW TEST**. If the refrigerant charge level is not OK, adjust the refrigerant charge as required.

COIL RESISTANCE TEST

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the A/C clutch field coil connector.
3. Use an ohm meter and Back Probe Tool 6801 and measure the resistance of the clutch field coil at the field coil connector terminals.
4. Refer to the **A/C CLUTCH FIELD COIL SPECIFICATIONS** for the acceptable A/C clutch coil resistance. Specifications apply for a work area temperature of 21° C (70° F).
    a. If the A/C clutch coil reading is below specifications, the coil is shorted and must be replaced.
    b. If the A/C clutch coil reading is above specifications, the coil is open and must be replaced.

COIL CURRENT DRAW TEST

1. Verify the battery state of charge. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Diagnosis and Testing** .
2. Connect an ammeter (0 to 10 ampere scale selected) in series with the clutch coil feed terminal using Back Probe Tool 6801. Connect a voltmeter (0 to 20 volt scale selected) to measure voltage across the battery and the clutch coil.
3. With the heater-A/C control in the A/C mode and the blower at low speed, start the engine and allow it to run at a normal idle speed.
4. The compressor clutch should engage immediately, and the clutch coil supply voltage should be within two volts of the battery voltage. If the coil supply voltage is OK, go to 5. If the coil supply voltage is not within two volts of battery voltage, test the clutch coil feed circuit for excessive voltage drop and repair as necessary.
5. Refer to the **A/C CLUTCH FIELD COIL SPECIFICATIONS** for the acceptable A/C clutch field coil current draw. Specifications apply for a work area temperature of 21° C (70° F). If voltage is more than 12.5 volts, add electrical loads by turning on electrical accessories until voltage reads below 12.5 volts.
    a. If the compressor clutch coil current reading is zero, the coil is open and must be replaced.
    b. If the compressor clutch coil current reading is above specifications, the coil is shorted and must be replaced.

A/C CLUTCH FIELD COIL SPECIFICATIONS

Coil Resistance	Current Draw
3.6 ± 0.2 ohms	3.2 - 3.3 amps @ 11.5 - 12.5 volts

A/C SYSTEM NOISE TESTING

When investigating an A/C system related noise, you must first know the conditions under which the noise occurs. These conditions include: weather, vehicle speed, transmission in gear or neutral, engine speed, engine temperature, and any other special conditions. Noises that develop during A/C operation can often be misleading. For example: what sounds like a failed bearing, may be caused by loose bolts, nuts, mounting brackets or a loose A/C compressor.

NOTE: The A/C compressor must be replaced if any unusual noise is heard from the

compressor itself.

1. Select a quiet area for testing. Duplicate the complaint conditions as much as possible. Turn the A/C system On and Off several times to clearly identify any compressor noise. Listen to the A/C compressor while it is operating at maximum and minimum displacement. Probe the A/C compressor with an engine stethoscope or a long screwdriver with the handle held to your ear to better localize the source of the noise. To duplicate high-ambient temperature conditions (high head pressure), restrict the air flow through the A/C condenser. Install a manifold gauge set or a scan tool to be certain that the discharge pressure does not exceed 2600 kPa (377 psi).

   NOTE: Drive belts are speed sensitive. At different engine speeds and depending upon drive belt tension, drive belts can develop noises that are mistaken for an A/C compressor noise. Improper drive belt tension can cause a misleading noise when the compressor is operating at maximum displacement, which may not occur when the compressor is at minimum displacement.

2. Check the condition of the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Diagnosis and Testing** .

   NOTE: The A/C compressor must be replaced if the drive hub is broken or if the compressor shaft does not rotate smoothly.

3. Check the compressor hub and pulley and bearing assembly. Be certain that the hub and pulley are properly aligned and that the pulley bearing is mounted securely to the A/C compressor. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Inspection**.

   NOTE: The A/C compressor must be replaced if any debris or unusually discolored oil is found on the A/C compressor manifold.

4. Check the refrigerant system plumbing for incorrect routing, rubbing or interference, which can cause unusual noises. Also check the refrigerant lines and hoses for kinks or sharp bends that will restrict refrigerant flow, which can cause noises. See **Heating and Air Conditioning/Plumbing - Description**.
5. Loosen all of the compressor mounting hardware and retighten.

   CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

6. If the noise is from opening and closing of the high pressure relief valve, recover, evacuate and recharge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**. If the high pressure relief valve still does not seat properly, replace the A/C compressor. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal**.
7. If the noise is from liquid refrigerant slugging in the A/C suction line, replace the A/C receiver/drier. See

Heating and Air Conditioning/Plumbing/DRIER, A/C Receiver - Removal, check the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure** and the refrigerant system charge. See **Heating and Air Conditioning - Diagnosis and Testing**.

8. If a slugging condition still exists after replacing the A/C receiver/drier, then replace the A/C compressor. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal**.

Removal

CLUTCH - FIXED DISPLACEMENT A/C COMPRESSOR

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The compressor clutch assembly can be serviced with the refrigerant system fully-charged and with the A/C compressor installed on the engine.

NOTE: Typical A/C compressor and clutch assembly shown in illustrations.

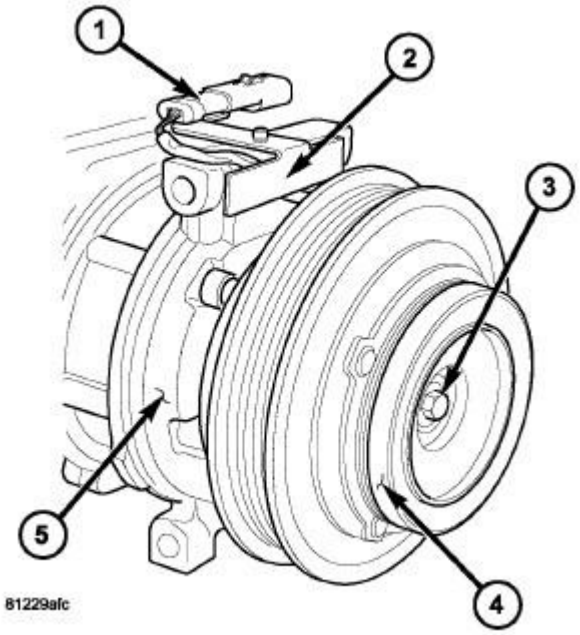


Fig. 206: A/C Compressor Shaft Bolt
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Raise and support the vehicle.

3. Remove the splash shield from the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. Disconnect the engine wire harness from the compressor clutch field coil connector (1) located on the top of the A/C compressor (5).

NOTE: Some models (depending on engine application) may require the A/C compressor to be removed from its installed location and repositioned to gain access to the compressor shaft bolt and/or pulley and field coil snap rings. However, the refrigerant system can still remain fully charged.

6. If necessary, remove the bolts that secure the A/C compressor to the engine and reposition the compressor to gain access to the shaft bolt and/or pulley and field coil snap rings. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal**.
7. Carefully remove the compressor clutch field coil connector and wire lead from the connector bracket (2).
8. Remove the compressor shaft bolt (3). A band-type oil filter wrench or a strap wrench may be used to hold the clutch plate (4) from rotating during bolt removal.

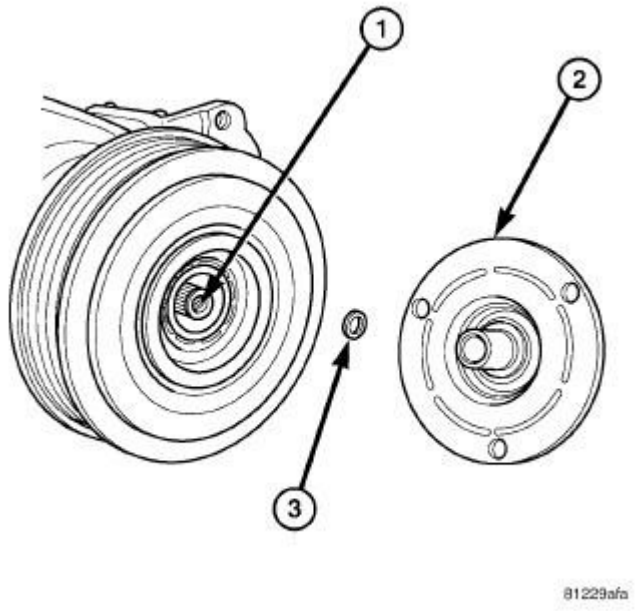


Fig. 207: Clutch Plate & Shim(s)
Courtesy of CHRYSLER LLC

CAUTION: Do not pry between the clutch plate and the pulley and bearing assembly to remove the clutch plate from the compressor shaft as this may damage the clutch plate.

NOTE: Use care not to lose any clutch shim(s) during removal of the clutch plate, as they may be reused during the clutch plate installation process.

9. Tap the clutch plate (2) lightly with a plastic mallet to release it from the splines on the compressor shaft (1) and remove the clutch plate and shim(s) (3).

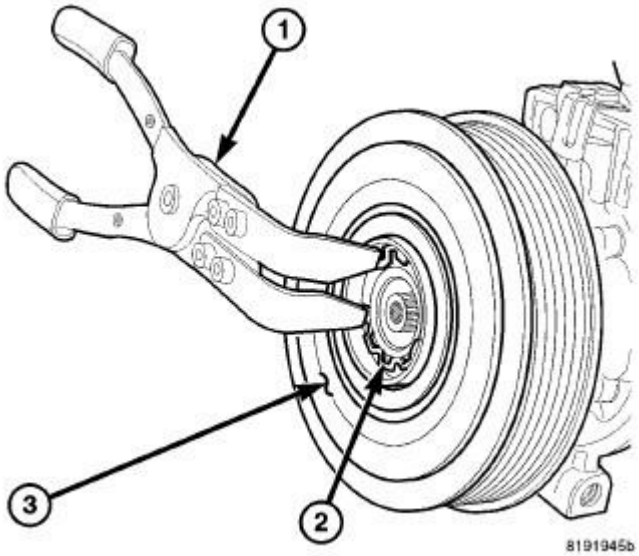


Fig. 208: Clutch Pulley & Snap Ring
Courtesy of CHRYSLER LLC

10. Using A/C Snap Ring Pliers 9764 or equivalent (1), remove the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor and remove the pulley and bearing assembly.

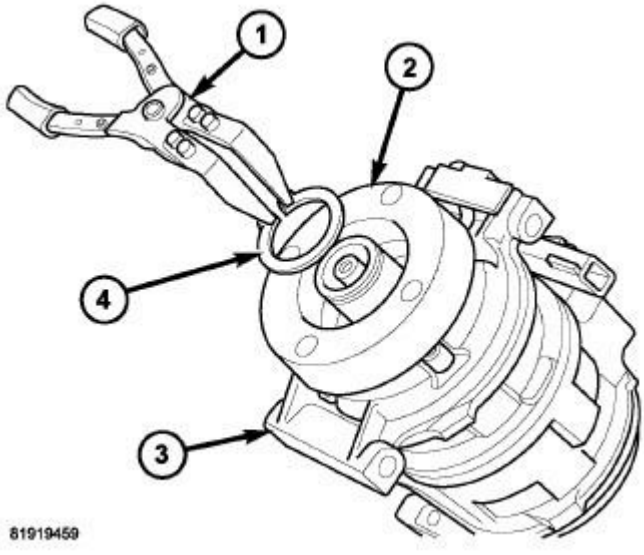


Fig. 209: Clutch Coil & Snap Ring

Courtesy of CHRYSLER LLC

11. Using A/C Snap Ring Pliers 9764 or equivalent (1), remove the snap ring (4) that secures the compressor clutch field coil (2) to the front of the A/C compressor (3) and remove the field coil.

A/C COMPRESSOR

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in possible serious or fatal injury.

NOTE: Variable displacement compressor shown in illustrations. Fixed displacement similar.

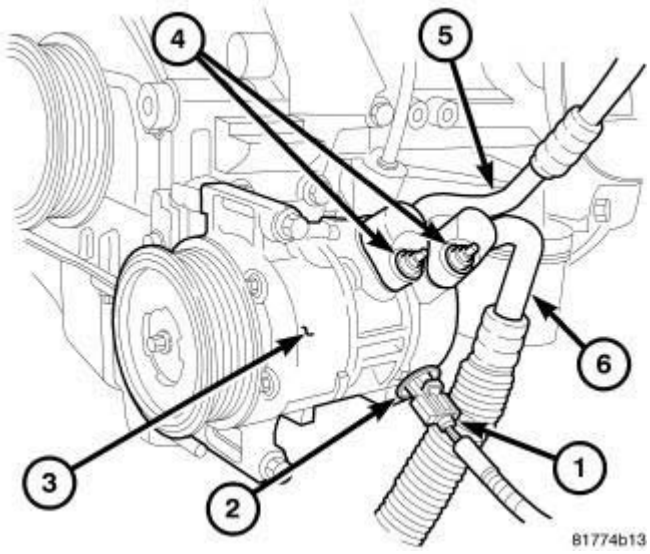


Fig. 210: A/C Compressor-Refrigerant Lines
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Raise and support the vehicle.
4. Remove the splash shield from the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
5. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
6. Disconnect the engine wire harness (1) from the clutch coil or compressor control valve (2), depending on application.
7. Remove the nuts (4) that secure the A/C discharge line (5) and the A/C suction line (6) to the A/C

compressor (3).

8. Disconnect the A/C discharge and suction lines from the A/C compressor and remove and discard the O-ring seals and gaskets.

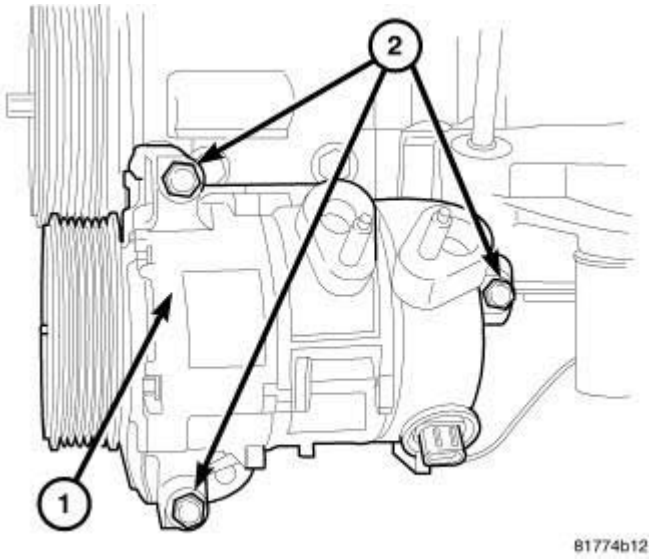


Fig. 211: A/C Compressor-Removal/Installation
Courtesy of CHRYSLER LLC

9. Support the A/C compressor (1) and remove the three bolts (2) that secure the compressor to the engine and remove the compressor.
10. Install plugs in, or tape over the opened refrigerant line fittings and compressor ports.

Inspection

CLUTCH INSPECTION - FIXED DISPLACEMENT A/C COMPRESSOR

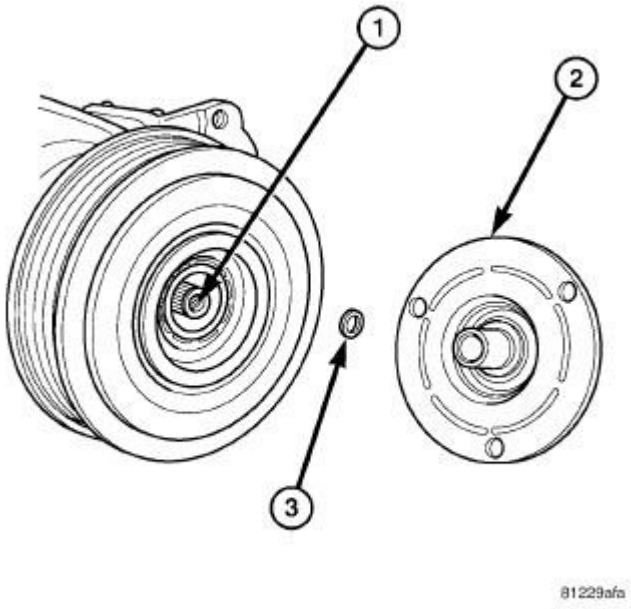


Fig. 212: Identifying Compressor Shaft, Clutch Plate & Shim
Courtesy of CHRYSLER LLC

Examine the friction surfaces of the pulley and the clutch plate (2) for wear. The pulley and clutch plate should be replaced if there is excessive wear or scoring.

If the friction surfaces are oily, inspect the shaft and nose area of the A/C compressor (1) for refrigerant oil. If refrigerant oil is found, the compressor shaft seal is leaking and the A/C compressor must be replaced.

Check the pulley bearing for roughness or excessive leakage of grease. Replace the pulley and clutch plate if required.

HUB AND PULLEY INSPECTION - VARIABLE DISPLACEMENT A/C COMPRESSOR

NOTE: The compressor drive hub and the pulley and bearing assembly can not be serviced separately from the A/C compressor. In the event of drive hub or pulley and bearing assembly damage or failure, the A/C compressor, drive hub and pulley and bearing must be replaced as an assembly.

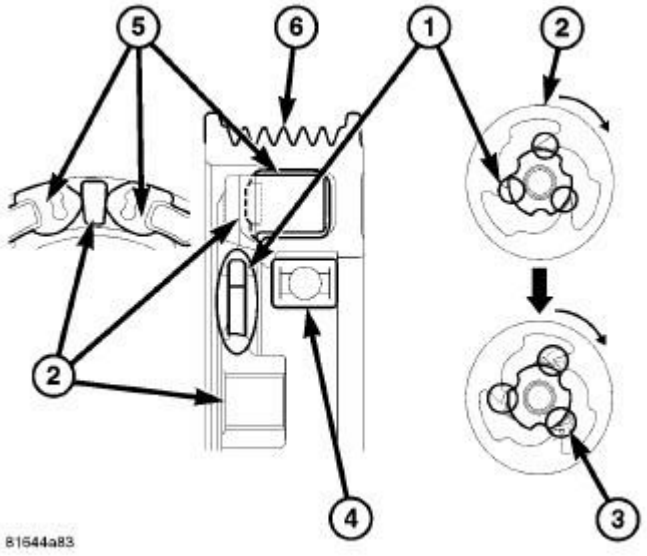


Fig. 213: Compressor Hub & Pulley Inspection
Courtesy of CHRYSLER LLC

NOTE: Typical clutchless compressor drive hub and pulley and bearing assembly shown.

The bridges (1) located on the non-servicable compressor hub (2) are designed to break away in the event of compressor seizure. Examine the bridges for separation or cracks (3). Damage to the bridges are an indication of excessive compressor torque, which is most likely caused by compressor failure.

Check the non-servicable pulley bearing (4) for roughness or excessive noise. Check the pulley dampeners (5) for excessive play which can be caused by deterioration or damage. Inspect the belt surfaces of the non-servicable pulley (4) for wear. If the pulley surfaces are oily, inspect the shaft and nose area of the A/C compressor for refrigerant oil. If refrigerant oil is found, the compressor shaft seal is leaking and the A/C compressor must be replaced.

Replace the A/C compressor if wear or damage is found to the drive hub or pulley and bearing assembly. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal**.

Installation

CLUTCH - FIXED DISPLACEMENT A/C COMPRESSOR

NOTE: Typical A/C compressor and clutch assembly shown in illustrations.

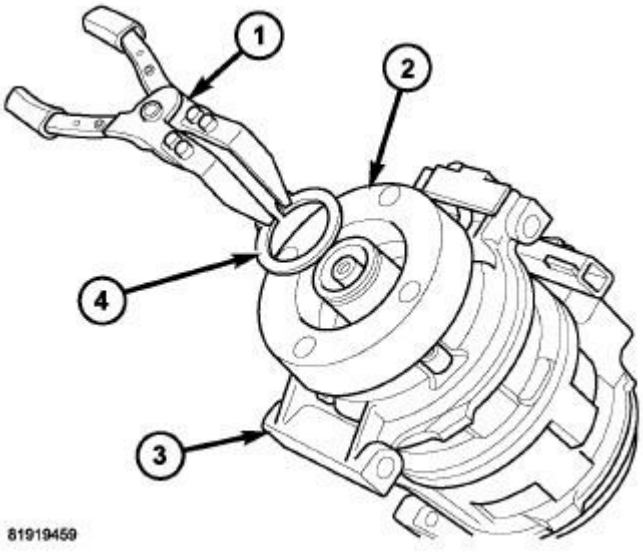


Fig. 214: Clutch Coil & Snap Ring
Courtesy of CHRYSLER LLC

1. Align the dowel pin on the back of the compressor clutch field coil (2) with the hole in the front of the A/C compressor (3) and position the field coil onto the compressor. Be certain that the compressor clutch field coil wire lead is properly routed so that it is not pinched between the A/C compressor and the field coil.

CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

NOTE: A new snap ring must be used to secure the compressor clutch field coil to the A/C compressor. The bevel side of the snap ring must face outward and both snap ring eyelets must be oriented to the right or to the left of the field coil dowel pin location on the A/C compressor.

2. Using A/C Snap Ring Pliers 9764 or equivalent (1), install the snap ring (4) that secures the compressor clutch field coil to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove and oriented correctly.

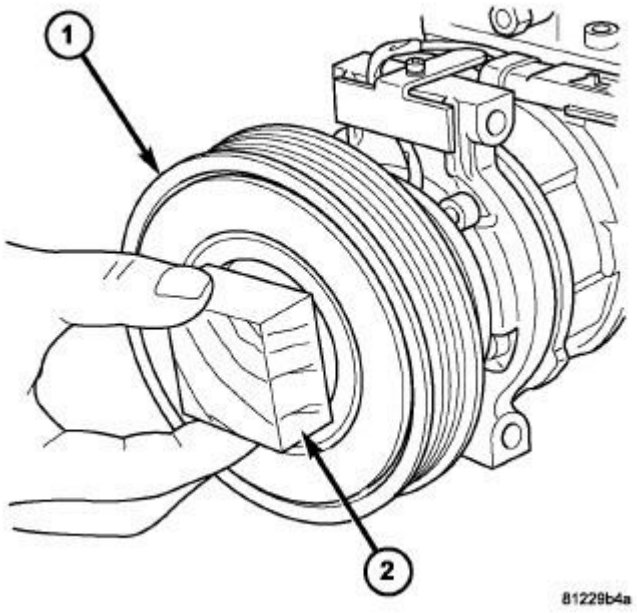


Fig. 215: Clutch Pulley - Installation
Courtesy of CHRYSLER LLC

CAUTION: Be certain to position the A/C clutch coil wire lead so that it is not damaged during A/C compressor pulley and bearing installation.

CAUTION: When installing the pulley and bearing assembly, DO NOT mar the friction surfaces of the pulley or premature failure of the A/C clutch will result.

3. Install the pulley and bearing assembly (1) onto the front of the A/C compressor. If necessary, tap the pulley gently with a block of wood (2) placed on the pulley friction surface.

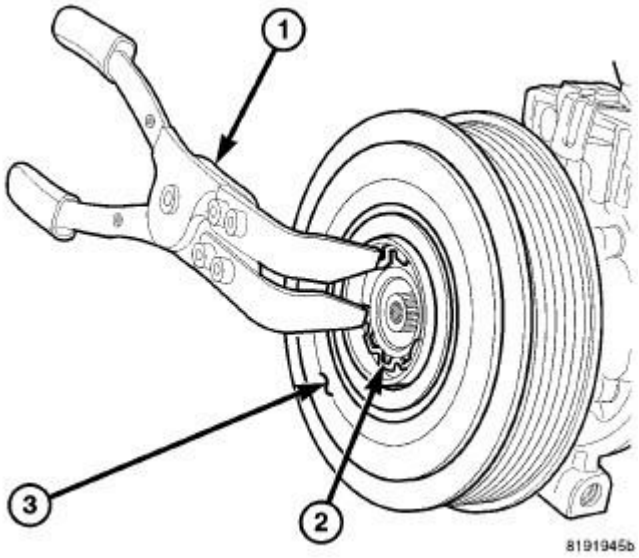


Fig. 216: Clutch Pulley & Snap Ring
Courtesy of CHRYSLER LLC

CAUTION: The snap ring must be fully and properly seated in the groove or it will vibrate out, resulting in a clutch failure and severe damage to the A/C compressor.

NOTE: A new snap ring must be used to secure the pulley and bearing assembly to the A/C compressor. The bevel side of the snap ring must face outward.

4. Using A/C Snap Ring Pliers 9764 or equivalent (1), install the snap ring (2) that secures the pulley and bearing assembly (3) to the front of the A/C compressor. Be certain that the snap ring is fully and properly seated in the groove.

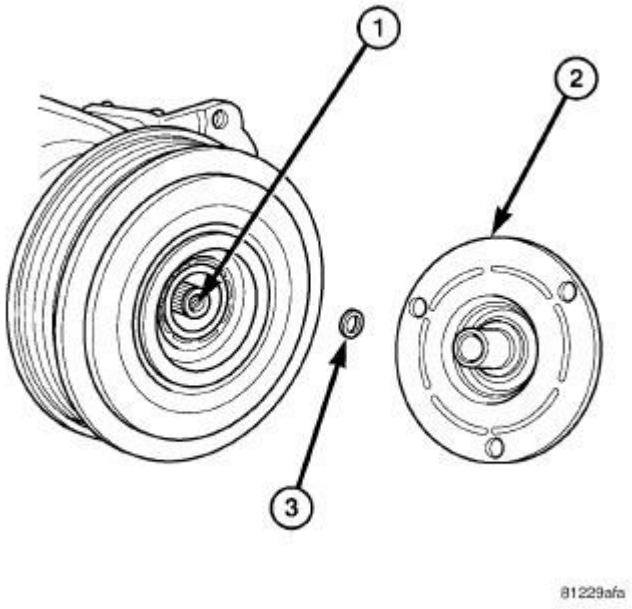


Fig. 217: Clutch Plate & Shim(s)
Courtesy of CHRYSLER LLC

5. If the original clutch plate (2) and pulley and bearing assembly are to be reused, reinstall the original shim (s) (3) onto the compressor shaft (1). If a new clutch plate and pulley and bearing assembly are being used, install a trial stack of shims 2.54 mm (0.010 in.) thick onto the compressor shaft.

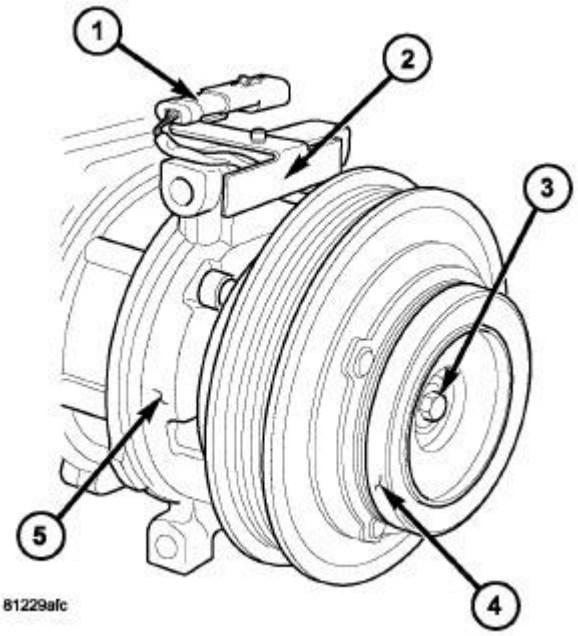


Fig. 218: A/C Compressor Shaft Bolt

Courtesy of CHRYSLER LLC

6. Install the clutch plate (4) onto the front of the A/C compressor (5).
7. Install the compressor shaft bolt (3). Tighten the bolt to 19 N.m (168 in. lbs.).

NOTE: The shims may compress after tightening the shaft bolt. Check the air gap in four or more places to verify the air gap is correct. Spin the pulley before performing a final check of the air gap.

NOTE: On models with the clutch plate recessed into the pulley, use a 90° wire gap gauge to measure the clutch air gap. On other models, use a blade type feeler gauge to measure the air gap.

8. With the clutch plate assembled tight against the shim(s), measure the air gap between the clutch plate and the pulley and bearing assembly. The air gap should be between 0.35 - 0.60 mm (0.014 - 0.024 in.). If the air gap is not between specifications, add or subtract shims as needed until the correct air gap is obtained.

CAUTION: Be certain that the compressor clutch coil wire lead is routed so that it is not pinched between the A/C compressor and the coil connector bracket.

9. Carefully route the compressor clutch field coil wire lead behind the connector bracket (2).
10. Install the compressor clutch field coil connector (1) onto the connector bracket.
11. Reinstall the A/C compressor onto the engine if removed for A/C clutch service. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation**.
12. Connect the engine wire harness to the compressor clutch field coil connector.
13. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
14. Install the splash shield onto the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
15. Lower the vehicle.
16. Reconnect the negative battery cable.

A/C COMPRESSOR

CAUTION: If the A/C compressor is being replaced, be certain to adjust the refrigerant system oil level. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. See Heating and Air

Conditioning/Plumbing/DRIER, A/C Receiver - Removal. Failure to replace the A/C receiver/drier can cause serious damage to the replacement A/C compressor.

NOTE: When replacing multiple A/C system components, see the REFRIGERANT OIL CAPACITIES to determine how much oil should be removed from the new A/C compressor. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets may result in a refrigerant system leak.

NOTE: Variable displacement compressor shown in illustrations. Fixed displacement similar.

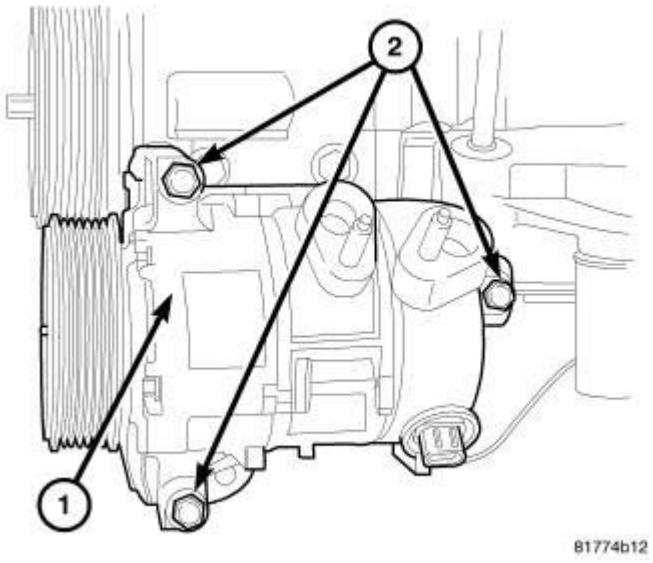


Fig. 219: A/C Compressor-Removal/Installation
Courtesy of CHRYSLER LLC

1. If the A/C compressor (1) is being replaced, refrigerant oil must first be drained from the new A/C compressor. When replacing multiple A/C system components, see the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Position the A/C compressor into the engine compartment.
3. Install the three bolts (2) that secure the A/C compressor to the engine. Tighten the bolts to 25 N.m (18 ft. lbs.).

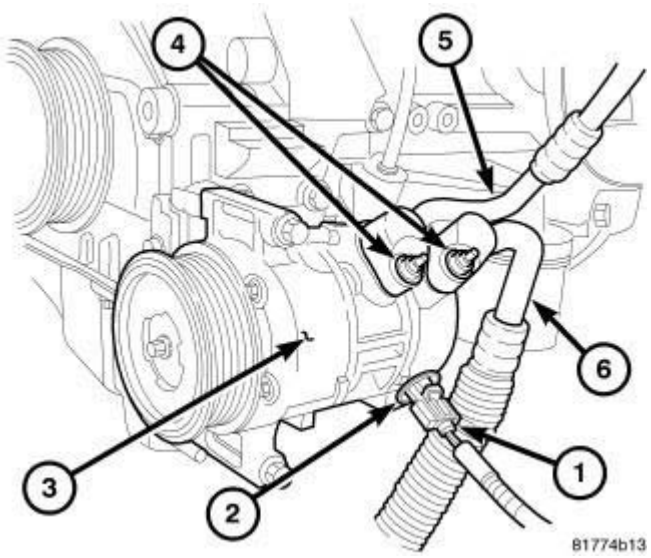


Fig. 220: A/C Compressor-Refrigerant Lines
Courtesy of CHRYSLER LLC

4. Remove the tape or plugs from the compressor ports and the refrigerant line fittings.
5. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
6. Connect the A/C discharge line (5) and the A/C suction line (6) to the A/C compressor (3).
7. Install the nuts (4) that secure the A/C suction and discharge lines to the A/C compressor. Tighten the nuts to 20 N.m (15 ft. lbs.).
8. Connect the engine wire harness (1) to the clutch coil or compressor control valve (2), depending on application.
9. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
10. Install the splash shield onto the right side frame rail. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
11. Lower the vehicle.
12. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

13. Evacuate and charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

CONDENSER, A/C

Description

DESCRIPTION

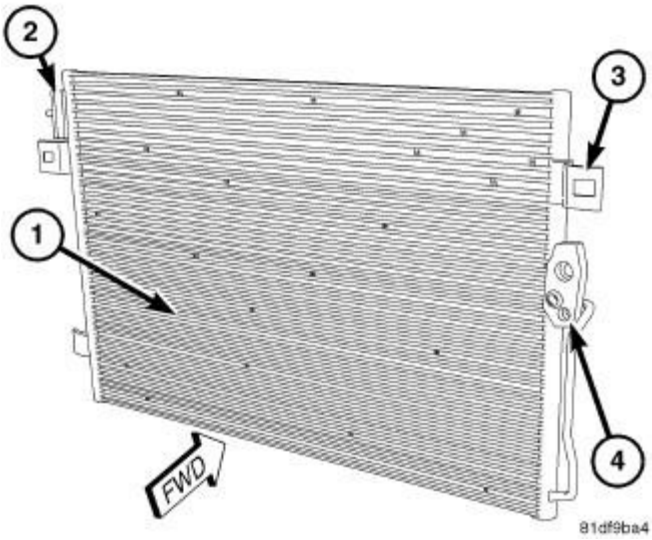


Fig. 221: Condenser Description
Courtesy of CHRYSLER LLC

NOTE: A/C condenser with automatic transmission cooler shown. A/C Condenser without cooler similar.

The A/C condenser (1) is located in the front of the engine compartment behind the grille. The A/C condenser is a heat exchanger that allows the high-pressure refrigerant gas being discharged by the A/C compressor to give up its heat to the air passing over the condenser fins, which causes the refrigerant to cool and change to a liquid state.

The A/C condenser is equipped with mounting tabs (3), a tapping block for the A/C discharge and liquid lines (4) and a tapping block for the integral automatic transmission cooler (2), when equipped with an automatic transaxle.

Operation

OPERATION

When air passes through the fins of the A/C condenser, the high-pressure refrigerant gas within the A/C condenser gives up its heat. The refrigerant then condenses as it leaves the A/C condenser and becomes a high-pressure liquid. The volume of air flowing over the condenser fins is critical to the proper cooling performance of the A/C system. Therefore, it is important that there are no objects placed in front of the radiator grille openings at the front of the vehicle or foreign material on the condenser fins that might obstruct proper air flow. Also, any factory-installed air seals or shrouds must be properly reinstalled following radiator or A/C condenser service.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and

metal gaskets could result in a refrigerant system leak.

The A/C condenser has no serviceable parts. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever a refrigerant line is disconnected from the A/C condenser.

The A/C condenser cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

CAUTION: Before removing the A/C condenser, note the location of each of the radiator/condenser air seals. These air seals are used to direct air through the A/C condenser and radiator. The air seals must be reinstalled in their proper locations in order for the A/C and engine cooling systems to perform as designed.

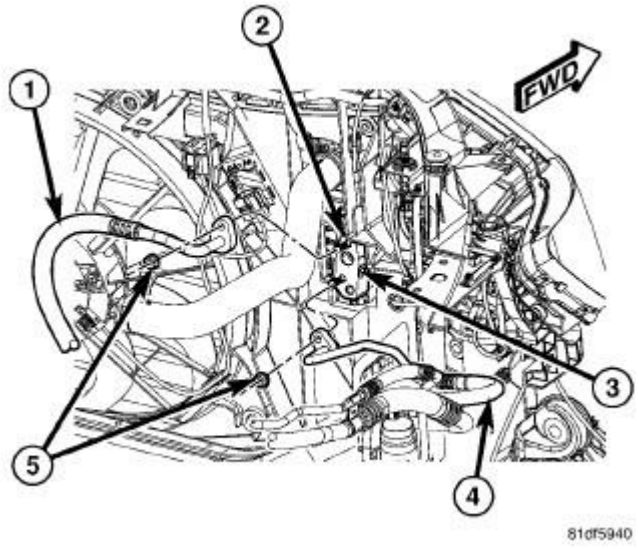


Fig. 222: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing -**

Standard Procedure.

3. Remove the nuts (5) that secure the A/C discharge line (1) and the A/C liquid line (4) to the tapping block (2) located on the right side of the A/C condenser.
4. Disconnect the A/C discharge and liquid lines from the tapping block and remove and discard the O-ring seals and gaskets.
5. Remove the bolt (3) that secures the tapping block to the right side of the radiator support.
6. Install plugs in, or tape over the opened refrigerant line fittings and condenser ports.

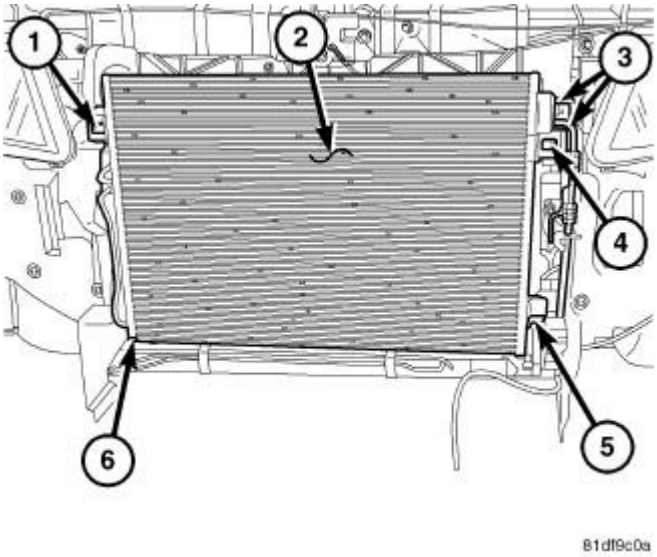


Fig. 223: Condenser Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: A/C condenser with automatic transmission cooler shown. A/C Condenser without cooler similar.

7. Remove the front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .
8. Remove the front bumper reinforcement. Refer to **Frame and Bumpers/Bumpers/REINFORCEMENT, Bumper - Removal** .
9. If equipped, disconnect the automatic transmission cooler lines (3) from the left side of the A/C condenser (2). Refer to **Cooling - Standard Procedure** .
10. If equipped with the 2.0L diesel engine, remove the charge air cooler. Refer to **Engine/Turbocharger System/COOLER and HOSES, Charge Air - Removal** .
11. Disengage the two plastic retaining tabs (1 and 4) that secure the top mounting brackets of the A/C condenser to the radiator.
12. Lift the A/C condenser slightly upward to disengage the two lower mounting brackets (5 and 6) from the condenser and remove the condenser from the engine compartment.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: If only the A/C condenser is being replaced, add 10 milliliters (0.3 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

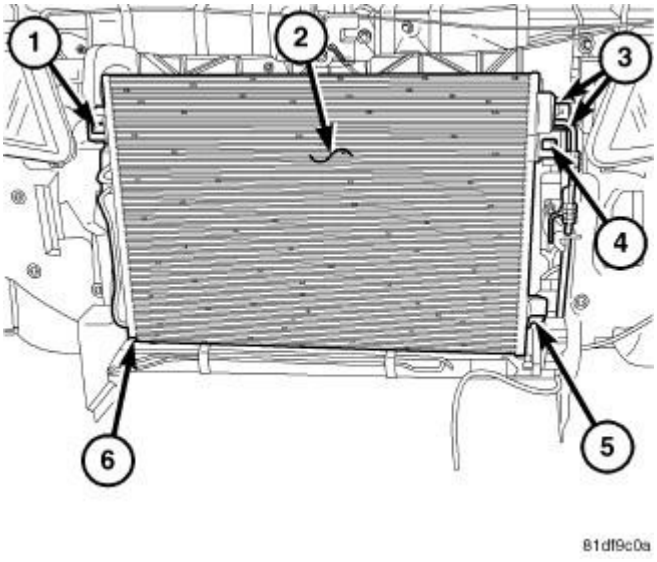


Fig. 224: Condenser Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: A/C condenser with automatic transmission cooler shown. A/C Condenser without cooler similar.

1. Position the A/C condenser (1) to the front of the engine compartment and engage the condenser to the two lower mounting brackets.
2. Engage the two plastic retaining tabs (1 and 4) that secure the top mounting brackets of the A/C condenser to the radiator. Make sure the retaining tabs are fully engaged.

3. If equipped, connect the automatic transmission cooler lines (2) to the left side of the A/C condenser. Refer to **Cooling - Standard Procedure** .
4. If equipped with the 2.0L diesel engine, install the charge air cooler. Refer to **Engine/Turbocharger System/COOLER and HOSES, Charge Air - Installation** .
5. Install the front bumper reinforcement. Refer to **Frame and Bumpers/Bumpers/REINFORCEMENT, Bumper - Installation** .
6. Install the front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation** .

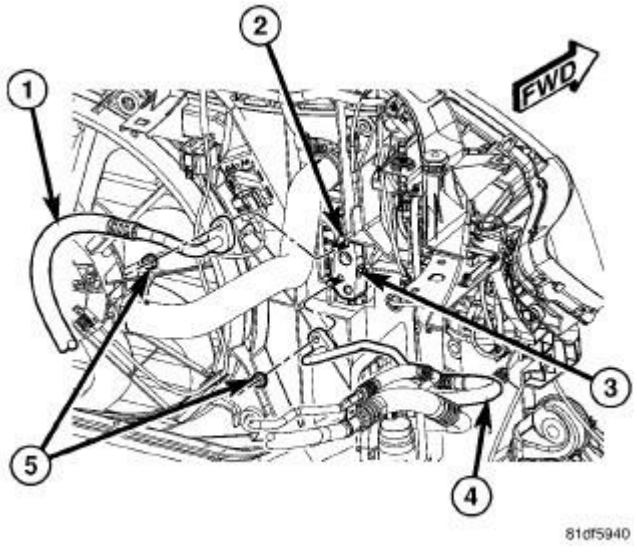


Fig. 225: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

7. Install the bolt (3) that secures the condenser tapping block (2) to the right side of the radiator support. Tighten the bolt securely.
8. Remove the tape or plug from the opened refrigerant line fittings and condenser ports.
9. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
10. Connect the A/C liquid line (4) and the A/C discharge line (1) to the tapping block and install the retaining nuts (5). Tighten the nuts to 20 N.m (15 ft. lbs.).
11. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

12. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**
13. If the A/C condenser is being replaced, add 10 milliliters (0.3 fluid ounce) of refrigerant oil to the

refrigerant system. When replacing multiple A/C system components, refer to the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

14. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

CORE, HEATER, FRONT

Description

DESCRIPTION

NOTE: LHD model shown. RHD model similar.

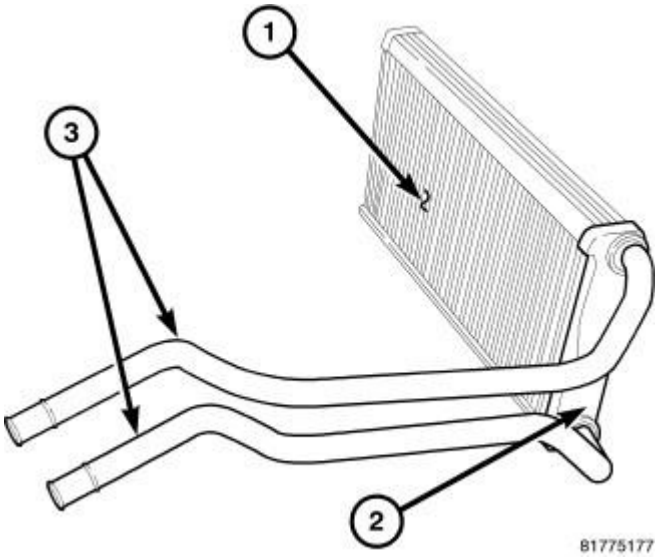


Fig. 226: Heater Core-Description
Courtesy of CHRYSLER LLC

The heater core (1) for the heating-A/C system is mounted within the HVAC air distribution housing, which is located behind the instrument panel. The heater core is a heat exchanger made of rows of tubes with fins and is positioned within the air distribution housing so that only the selected amount of air entering the housing passes through the heater core before it is distributed through the heating-A/C system ducts and outlets. One end of the heater core is fitted with a tank (2) that includes the fittings for the heater core tubes (3).

The heater core can only be serviced by removing the HVAC housing from the vehicle.

Operation

OPERATION

Engine coolant is circulated through the heater hoses to the heater core at all times. As the coolant flows through the heater core, heat is removed from the engine and is transferred to the heater core tubes and fins. Air

directed through the heater core picks up the heat from the heater core fins. The blend-air door allows control of the heater output air temperature by regulating the amount of air flowing through the heater core. The blower motor speed controls the volume of air flowing through the HVAC housing.

The heater core cannot be repaired and it must be replaced if inoperative, leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The HVAC housing assembly must be removed from vehicle for service of the heater core.

NOTE: LHD model with A/C shown. RHD and heater-only models similar.

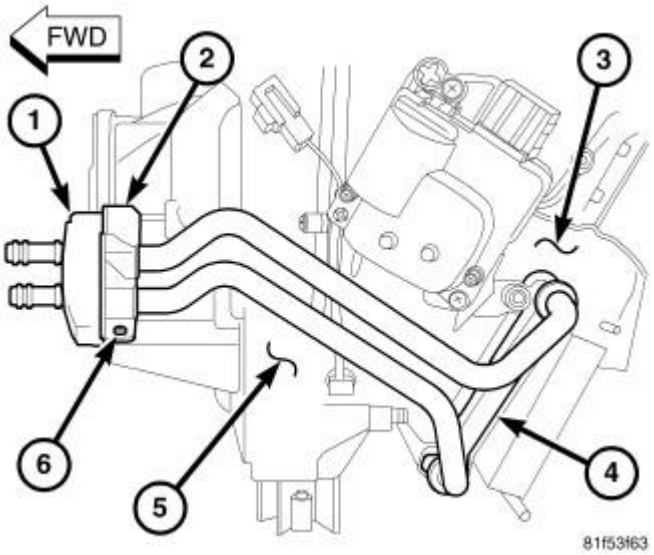


Fig. 227: Heater Core Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the HVAC housing assembly and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Remove the left side front floor duct. See **Heating and Air Conditioning/Distribution/DUCT, Floor Distribution - Removal**.

NOTE: If the foam seal for the flange is deformed or damaged, it must be

replaced.

3. Remove the foam seal (1) from the flange (2) located on the front of the HVAC housing (5).
4. Remove the screw (6) that secures the flange to the front of the HVAC housing and remove the flange.
5. On RHD models, remove the air distribution housing from the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**
6. Carefully pull the heater core (4) out of the driver side of the air distribution housing (3).

Installation

INSTALLATION

NOTE: LHD model with A/C shown. RHD and heater-only models similar.

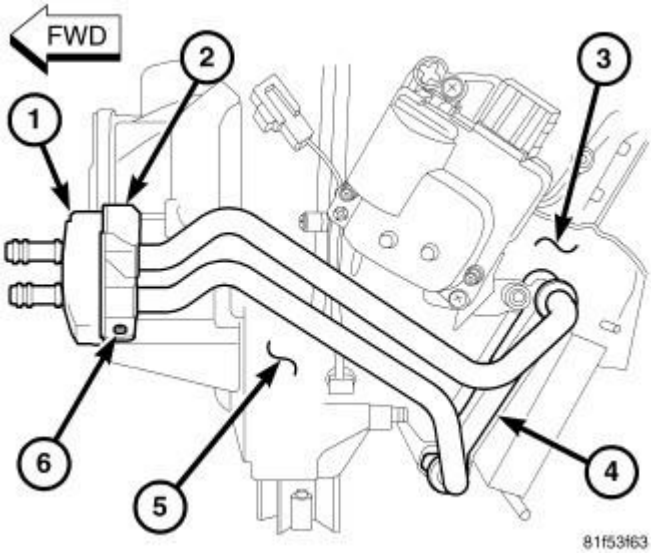


Fig. 228: Heater Core Removal/Installation
Courtesy of CHRYSLER LLC

1. Carefully install the heater core (4) into the side of the air distribution housing (3).
2. On RHD models, install the air distribution housing onto the HVAC housing (5). See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
3. Install the flange (2) that secures the heater core tubes to the front of the HVAC housing.
4. Install the screw (6) that secures the flange to the HVAC housing. Tighten the screw to 1.2 N.m (10 in. lbs.).

NOTE: If the foam seal for the flange is deformed or damaged, it must be replaced.

5. Install the foam seal (1) onto the flange.
6. Install the left side front floor duct. See **Heating and Air Conditioning/Distribution/DUCT, Floor**

Distribution - Installation.

NOTE: If the heater core is being replaced, flush the cooling system. Refer to Cooling - Standard Procedure .

7. Install the HVAC housing assembly. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.

CORE, SERVICE PORT VALVE

Description

DESCRIPTION

Refrigerant system service ports are used to recover, recycle, evacuate, charge and test the A/C refrigerant system. Unique sizes are used on the two service ports for the R-134a refrigerant system to ensure the system is not accidentally contaminated with R-12 refrigerant or by service equipment used for R-12 refrigerant.

The high side service port is located on the A/C liquid line near the right front strut tower. The low side service port is located on the A/C suction line near the dash panel.

Both the high side and low side A/C service port valve cores are serviceable.

NOTE: The protective cap aids in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective caps onto the service ports when refrigerant system service is complete.

Each of the service ports has a threaded plastic protective cap installed over it from the factory. The service port caps are serviceable items.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

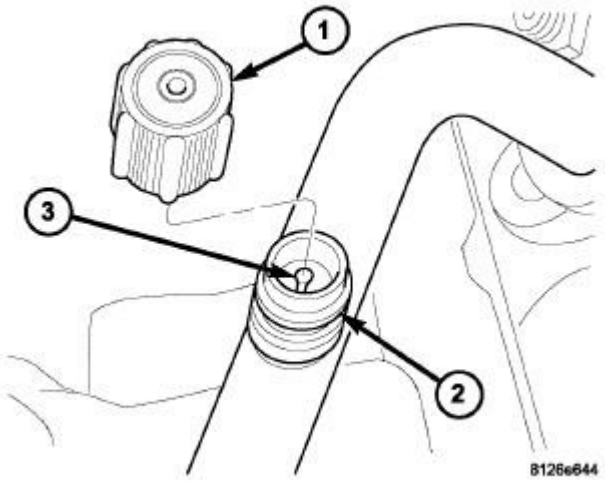


Fig. 229: Identifying A/C Service Port Components
Courtesy of CHRYSLER LLC

NOTE: Typical A/C service port shown.

1. Remove the protective cap (1) from the service port (2).
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Using a Schrader-type valve core tool, remove the valve core (3) from the service port.
4. Install a plug in, or tape over the opened service port(s).

Installation

INSTALLATION

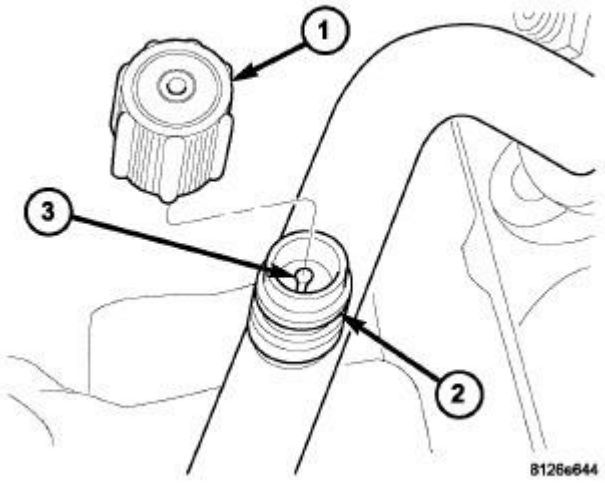


Fig. 230: Identifying A/C Service Port Components
Courtesy of CHRYSLER LLC

NOTE: Typical A/C service port shown.

1. Lubricate the valve core (3) with clean refrigerant oil prior to installation. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
2. Remove the tape or plug from the service port (2).

CAUTION: A valve core that is not fully seated in the A/C service port can result in damage to the valve during refrigerant system evacuation and charge. Such damage may result in a loss of system refrigerant while uncoupling the charge adapters.

3. Using a Schrader-type valve core tool, install and tighten the valve core into the service port(s).

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

4. Evacuate and charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

NOTE: The protective cap helps aid in service port sealing and helps protect the refrigerant system from contamination. Remember to always reinstall the protective cap onto the service port when refrigerant system service is complete.

5. Install the protective cap (1) onto the service port.

DRIER, A/C RECEIVER

Description

DESCRIPTION

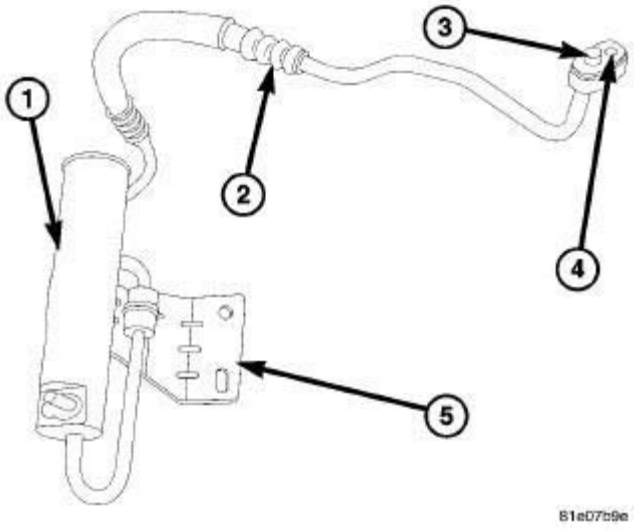


Fig. 231: Receiver/Drier Description
Courtesy of CHRYSLER LLC

The A/C receiver/drier (1) stores unused refrigerant, filters the refrigerant, helps remove moisture from the refrigerant and retains any refrigerant vapor that may leave the A/C condenser until it becomes a liquid.

The A/C receiver/drier is installed on the high-side of the A/C system, below the engine compartment behind the right side of the front fascia and is connected to the right side of the A/C condenser by an integral refrigerant line (2). An integral mounting bracket (5) secures the A/C receiver/drier to the right front frame rail and the connections are sealed by use of rubber O-ring seals (3) and metal gaskets (4).

Operation

OPERATION

The A/C receiver/drier performs a filtering action to prevent foreign material in the refrigerant from contaminating the A/C expansion valve. Refrigerant enters the A/C receiver/drier as a high-pressure, low temperature liquid. Desiccant inside the A/C receiver/drier absorbs any moisture which may have entered and become trapped within the refrigerant system. In addition, during periods of high demand operation of the A/C system, the A/C receiver/drier acts as a reservoir to store surplus refrigerant.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime

a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C receiver/drier has no serviceable parts except for the O-ring seals and gaskets. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever the A/C receiver/drier is disconnected.

The A/C receiver/drier cannot be repaired and must be replaced if leaking or damaged, or if an internal failure of the A/C compressor has occurred.

Removal

REMOVAL

WARNING: Review safety precautions and warnings in this part before performing this procedure. See Heating and Air Conditioning/Plumbing - Warning and. See Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions could result in possible serious or fatal injury.

NOTE: LHD model shown in illustrations. RHD model similar.

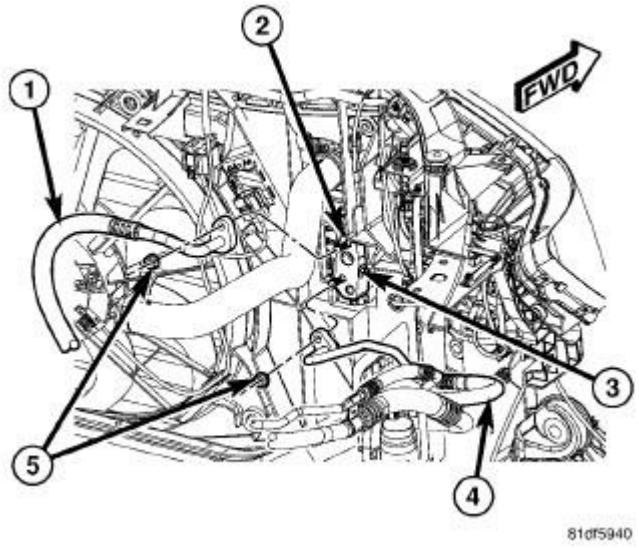


Fig. 232: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Remove the nut (5) that secures the A/C liquid line (4) to the tapping block (2) located on the right side of

the A/C condenser.

4. Disconnect the A/C liquid line from the tapping block and remove and discard the O-ring seal and gasket.
5. Install plugs in, or tape over the opened refrigerant line fitting and condenser port.

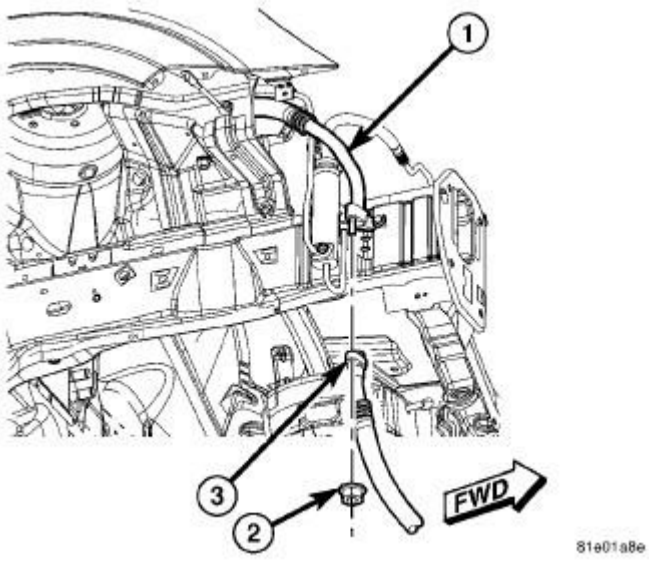


Fig. 233: Lower to Upper Suction Line
Courtesy of CHRYSLER LLC

6. Raise and support the vehicle.
7. Position the front portion of the right front wheelhouse splash shield out of the way to gain access to the A/C receiver/drier. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
8. Remove the nut (2) that secures the lower A/C suction line (3) to the upper A/C suction line (1).
9. Disconnect the lower A/C suction line to the upper A/C suction line and remove and discard the O-ring seal and gasket.

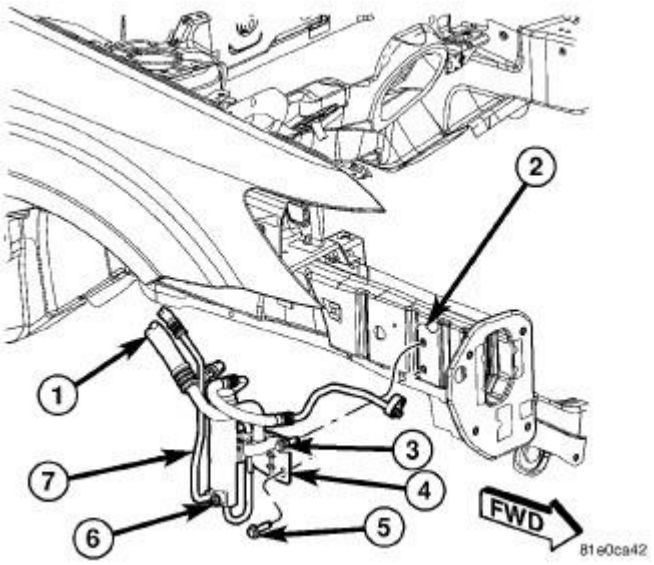


Fig. 234: Receiver/Drier Removal/Installation 09
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

10. Remove the bolt (3) that secures the rear section of the A/C suction line (1) to the right front frame rail (2) and position the suction line out of the way.
11. Remove the nut (6) that secures the rear section of the A/C liquid line (7) to the A/C receiver/drier (4).
12. Disconnect the rear section of the A/C liquid line from the A/C receiver/drier, remove and discard the O-ring seal and gasket and position the liquid line out of the way.
13. Remove the bolt (5) that secure the A/C receiver/drier to the right front frame rail and remove the receiver/drier.
14. Install plugs in, or tape over all of the opened refrigerant line fittings and the receiver/drier port.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

CAUTION: The A/C receiver/drier must be replaced if an internal failure of the A/C compressor has occurred. See Heating and Air Conditioning/Plumbing/DRIER, A/C Receiver - Removal. Failure to replace the A/C Receiver Drier can cause serious damage to the replacement A/C

compressor.

NOTE: If only the A/C receiver/drier is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: LHD model shown in illustrations. RHD model similar.

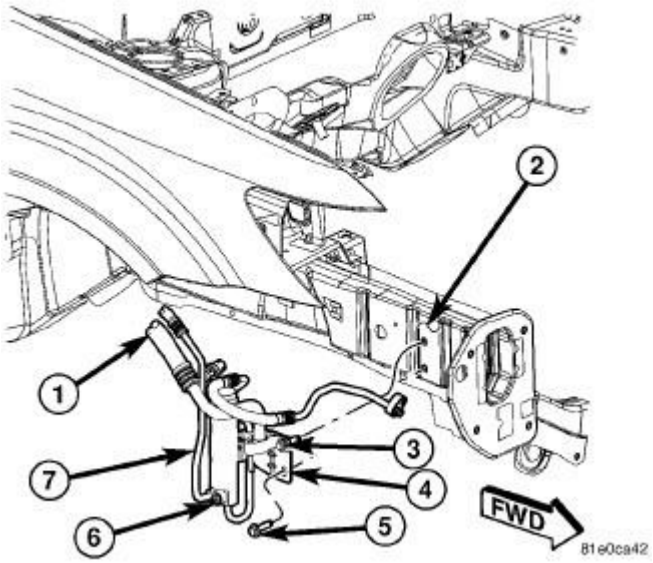


Fig. 235: Receiver/Drier Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

1. Position the A/C receiver/drier (4) to the right front frame rail (2) and loosely install the lower retaining bolt (5).
2. Install the bolt (3) that secures the upper portion of the A/C suction line (1) to the right front frame rail. Tighten both bolts securely.
3. Remove the tape or plugs from the opened refrigerant line fittings and the receiver/drier port.

4. Lubricate new O-ring seals with clean refrigerant oil and install them and new gaskets onto the refrigerant line fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
5. Connect the rear section of the A/C liquid line (7) to the A/C receiver/drier.
6. Install the nut (6) that secures the rear section of the A/C liquid line to the A/C receiver/drier. Tighten the nut to 20 N.m (15 ft. lbs.).

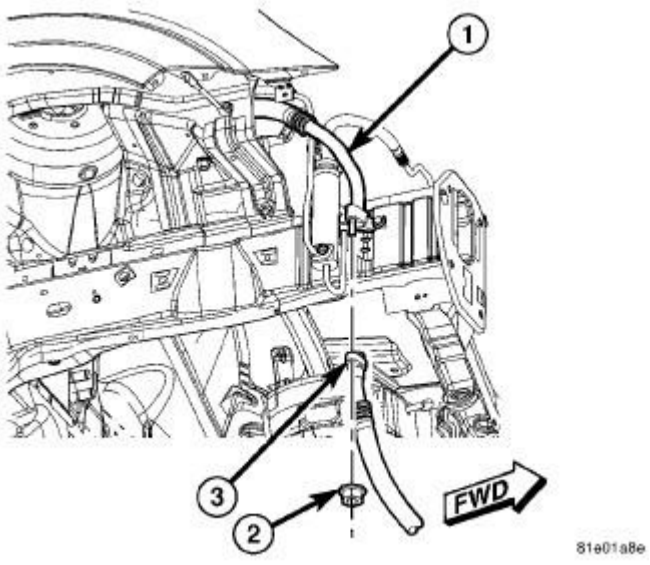


Fig. 236: Lower to Upper Suction Line
Courtesy of CHRYSLER LLC

7. Connect the lower portion of the A/C suction line (3) to the upper suction line (1)
8. Install the nut (2) that secures the lower portion of the A/C suction line to the upper suction line. Tighten the nut to 20 N.m (15 ft. lbs.).
9. Reposition the right front wheel house splash shield to the body. Refer to **Body/Exterior/SHIELD, Splash - Installation** .

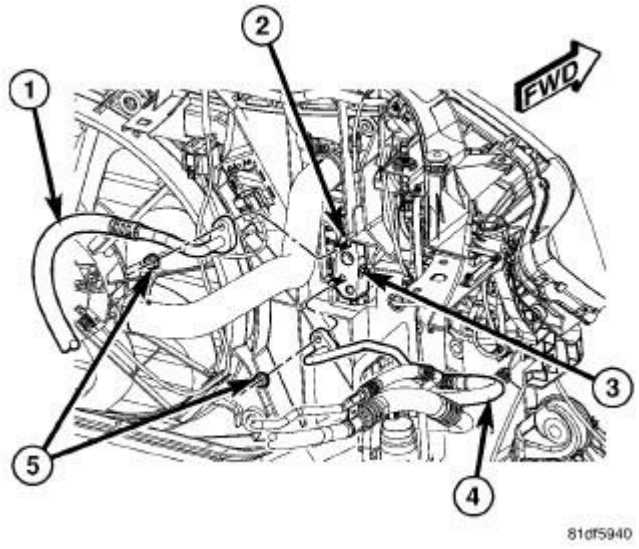


Fig. 237: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

10. Lower the vehicle.
11. Remove the tape or plug from the opened refrigerant line fitting and condenser ports.
12. Lubricate a new rubber O-ring seal with clean refrigerant oil and install it and a new gaskets onto the refrigerant line fitting. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
13. Connect the A/C liquid line (4) to the tapping block (2) and install the retaining nut (5). Tighten the nut to 20 N.m (15 ft. lbs.).
14. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

15. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**
16. If the A/C condenser is being replaced, add 10 milliliters (0.3 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
17. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

EVAPORATOR, A/C, FRONT

Description

DESCRIPTION

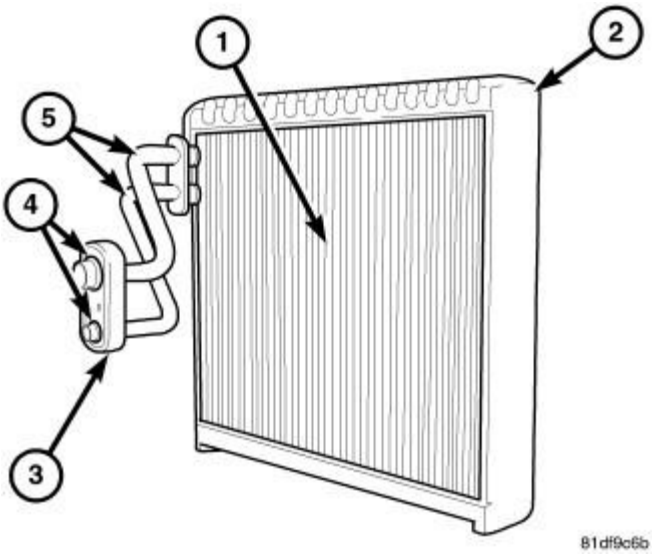


Fig. 238: Evaporator Description
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

The A/C evaporator (1) for the heating-A/C system is mounted in the HVAC housing, which is located behind the instrument panel. The A/C evaporator and its insulator (2) are positioned within the HVAC housing so that all air entering the housing must pass over the evaporator fins before it is distributed through the heating-A/C system ducts and outlets.

A tapping block (3) and O-ring seals (4) are used to connect and seal the A/C evaporator tubes (5) to the A/C expansion valve.

The A/C evaporator can only be serviced by removing and disassembling the HVAC housing assembly.

Operation

OPERATION

Refrigerant enters the A/C evaporator from the A/C expansion valve as a low-temperature, low-pressure mixture of liquid and gas. As air flows over the fins of the A/C evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low-pressure gas when it leaves the A/C evaporator.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C evaporator has no serviceable parts except for the O-ring seals. The O-ring seals used on the

connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the A/C expansion valve is removed from the A/C evaporator.

The A/C evaporator cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The HVAC housing assembly must be removed from vehicle and disassembled for service of the A/C evaporator.

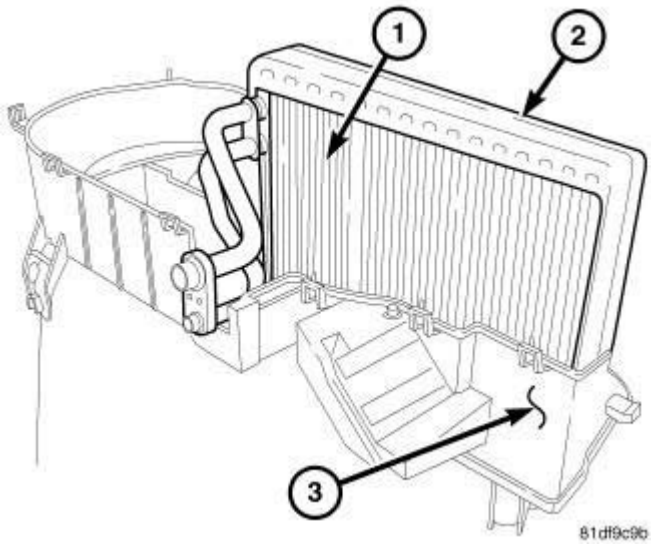


Fig. 239: Evaporator Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Remove the HVAC housing and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Removal**.
2. Disassemble the HVAC housing to gain access to the A/C evaporator. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Disassembly**.

NOTE: If the foam insulator around the A/C evaporator is deformed or damaged, the insulator must be replaced.

3. Carefully lift the A/C evaporator (1) and the foam insulator (2) out of the lower half of the HVAC housing (3).

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: If only the A/C evaporator is being replaced, add 10 milliliters (0.3 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: LHD model shown. RHD model similar.

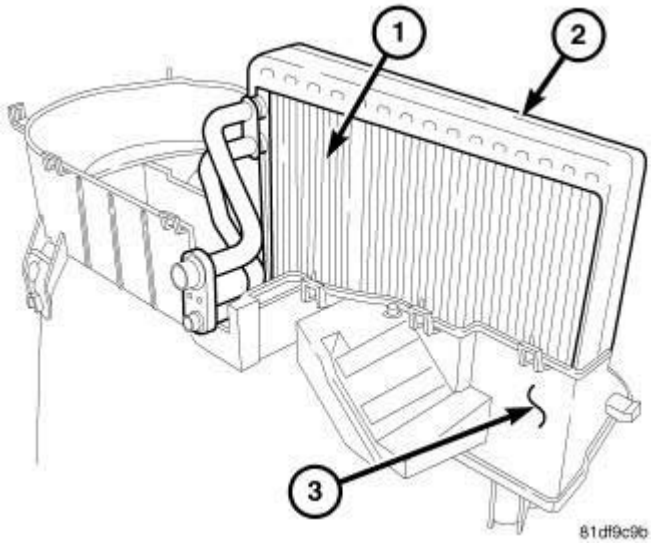


Fig. 240: Evaporator Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: Make sure that the foam insulator is properly positioned around the A/C evaporator and in the HVAC housing.

1. Carefully install the A/C evaporator (1) and foam insulator (2) into the lower half of the HVAC housing (3).
2. Assemble the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Assembly**.
3. Install the HVAC housing. See **Heating and Air Conditioning/Distribution/HOUSING, HVAC - Installation**.
4. If the A/C evaporator is being replaced, add 10 milliliters (0.3 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

LINE, A/C DISCHARGE

Description

DESCRIPTION

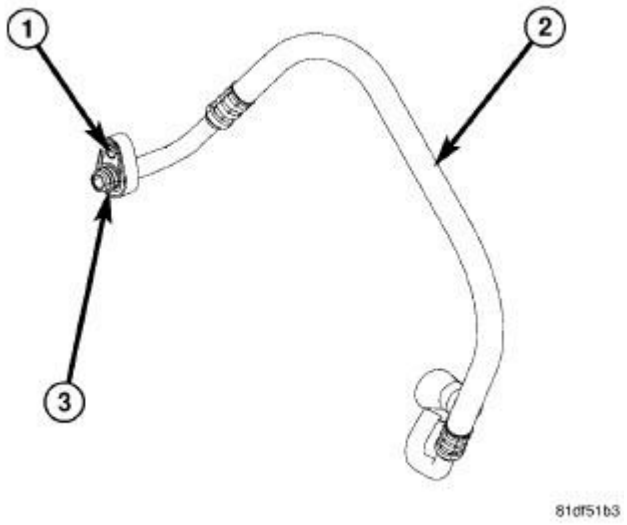


Fig. 241: Discharge Line Description
Courtesy of CHRYSLER LLC

NOTE: 2.7L shown. Other engines similar.

The A/C discharge line (2) is the refrigerant line that carries refrigerant from the A/C compressor to the A/C condenser.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C discharge line has no serviceable parts except for the metal gaskets (1) and rubber O-ring seals (3) used on the fittings. The O-ring seals are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever the A/C discharge line is disconnected.

The A/C discharge line cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

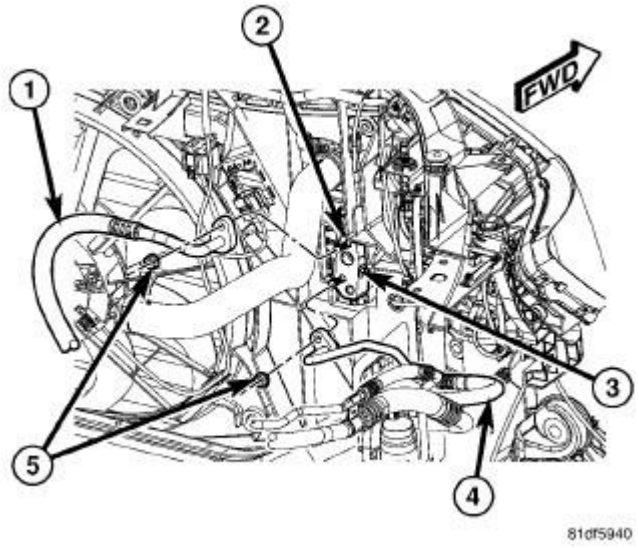


Fig. 242: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Remove the nut (5) that secures the A/C discharge line (1) to the condenser tapping block (2) located on the right side of the condenser.
4. Disconnect the A/C discharge line from the tapping block.

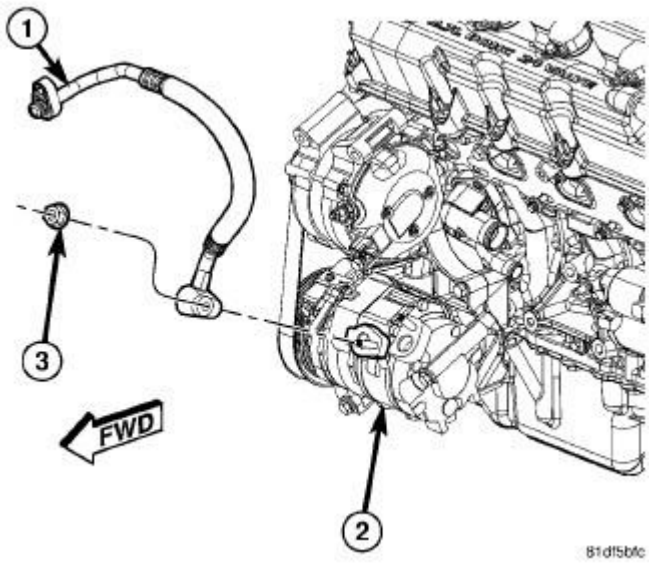


Fig. 243: Discharge Line to Compressor
Courtesy of CHRYSLER LLC

NOTE: 2.7L shown. Other engines similar.

5. Remove the nut (3) that secures the A/C discharge line (1) to the A/C compressor (2).
6. Disconnect the A/C discharge line from the A/C compressor and remove the discharge line from the engine compartment.
7. Remove and discard the O-ring seals and gaskets and install plugs in, or tape over the opened discharge line fittings and the compressor and condenser ports.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and

metal gaskets could result in a refrigerant system leak.

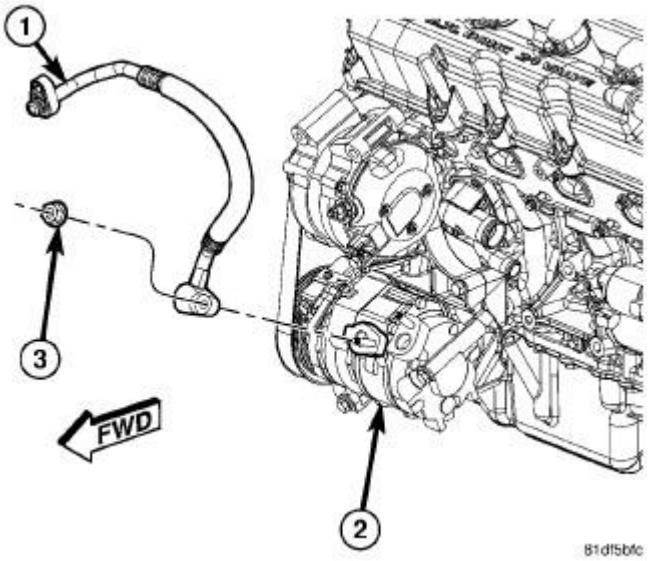


Fig. 244: Discharge Line to Compressor
Courtesy of CHRYSLER LLC

NOTE: 2.7L shown. Other engines similar.

1. Remove the tape or plugs from the opened discharge line fittings and the compressor and condenser ports.
2. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the discharge line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Position the A/C discharge line (1) into the engine compartment and connect it to the A/C compressor (2).
4. Install the nut (3) that secures the A/C discharge line to the A/C compressor. Tighten the nut to 20 N.m (15 ft. lbs.).

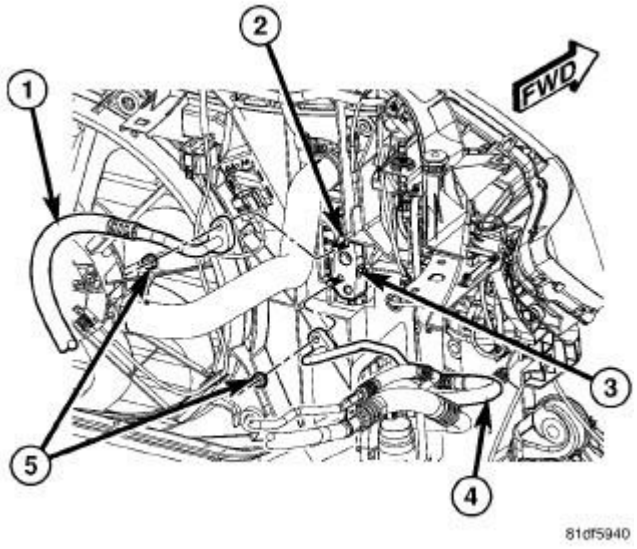


Fig. 245: Refrigerant Lines to Condenser Tapping Block
Courtesy of CHRYSLER LLC

5. Connect the A/C discharge line (1) to the condenser tapping block (2).
6. Install the nut (5) that secures the A/C discharge line to the tapping block. Tighten the nut to 20 N.m (15 ft. lbs.).
7. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

8. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
9. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
10. Charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

LINE, A/C LIQUID

Description

DESCRIPTION

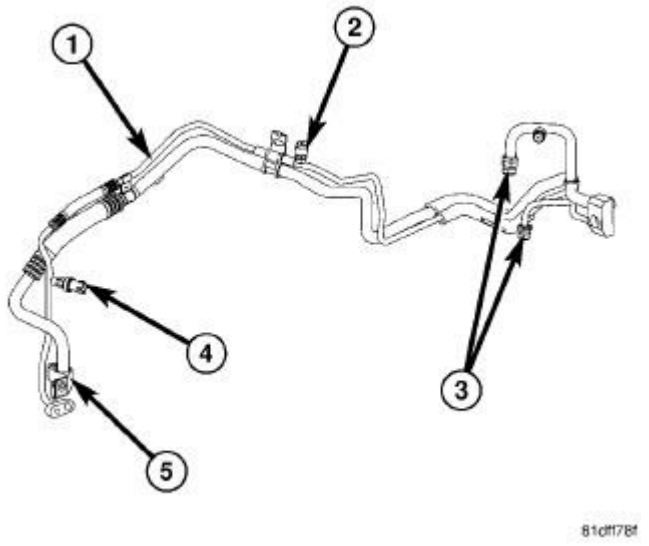


Fig. 246: Liquid/Suction Line Assembly with Rear A/C
Courtesy of CHRYSLER LLC

NOTE: A/C liquid and suction line assembly with rear A/C shown. Front A/C only line assembly similar.

The A/C liquid line is serviced in two sections. The front section of the A/C liquid line is the refrigerant line that carries liquid refrigerant from the A/C condenser to the A/C receiver/drier and is only serviced as an assembly with receiver/drier. See **Heating and Air Conditioning/Plumbing/DRIER, A/C Receiver - Description**.

The rear section of the A/C liquid line (1) carries liquid refrigerant from the A/C receiver/drier to the A/C expansion valve and includes the high side service port (2) and a fitting for the A/C pressure transducer (4). The rear section of the A/C liquid line is only serviced as an assembly with the A/C suction line (5). When equipped with rear A/C, the A/C liquid and suction line assembly includes connections for the underbody refrigerant lines (3).

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The A/C liquid and suction line assembly has no serviceable parts except for the metal gaskets, rubber O-ring seals and the service port valve cores. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever the A/C liquid/suction line assembly is disconnected.

The A/C liquid and suction line assembly cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Review safety precautions and warnings in this part before performing this procedure. See Heating and Air Conditioning/Plumbing - Warning and. See Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions could result in possible serious or fatal injury.

NOTE: The rear A/C liquid line is only serviced as an assembly with the upper A/C suction line.

NOTE: LHD model shown in illustrations. RHD model similar.

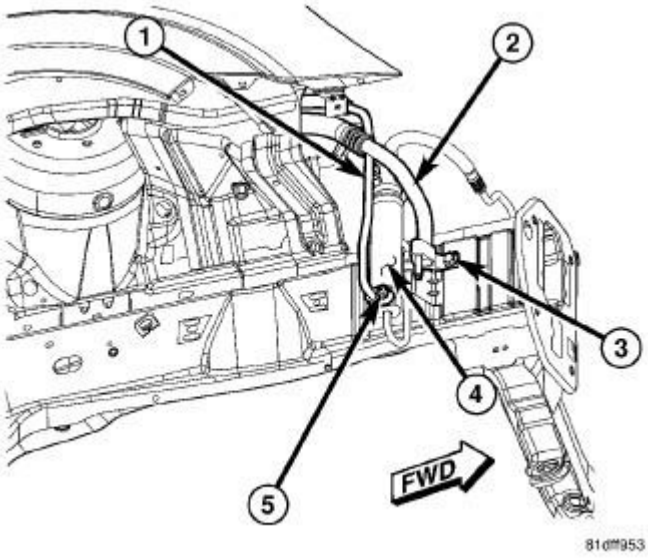


Fig. 247: Liquid Line to Receiver/Drier
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Raise and support the vehicle.
4. Position the front portion of the right front wheelhouse splash shield out of the way to gain access to the A/C receiver/drier. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
5. Remove the nut (5) that secures the rear section of the A/C liquid line (1) to the A/C receiver/drier (4).
6. Disconnect the rear section of the A/C liquid line from the A/C receiver/drier and remove and discard the O-ring seal and gasket.

7. Disconnect the lower portion of the A/C suction line from the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINE, A/C Suction - Removal**.
8. Remove the bolt (3) that secures the rear section of the A/C suction line (2) to the right front frame rail.

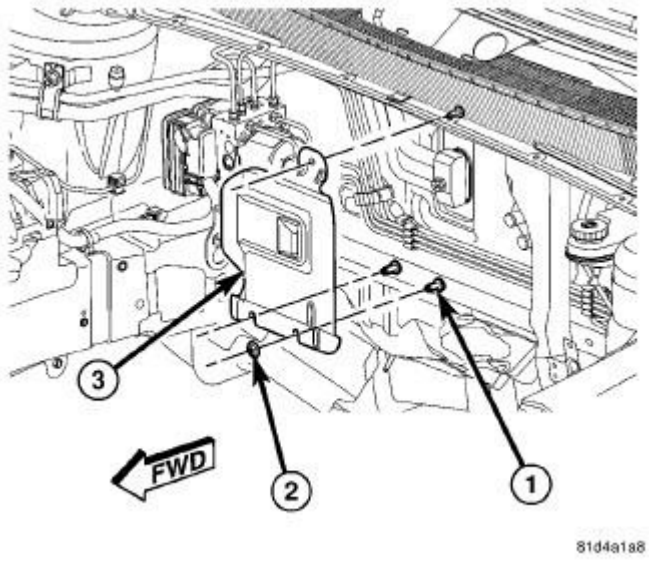


Fig. 248: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

9. Lower the vehicle.
10. If equipped with heat shield (3), remove the top nut (2) that secures the heat shield to the stud (1) located on the dash panel.

NOTE: Two slots are provided at the bottom of the heat shield to aid in heat shield removal, if equipped. Complete removal of the two bottom heat shield retaining nuts is not required.

11. If equipped, reach behind the engine and remove the two bottom nuts the that secure the heat shield to the studs located on the dash panel and remove the heat shield. Rotate and tilt the heat shield as required.

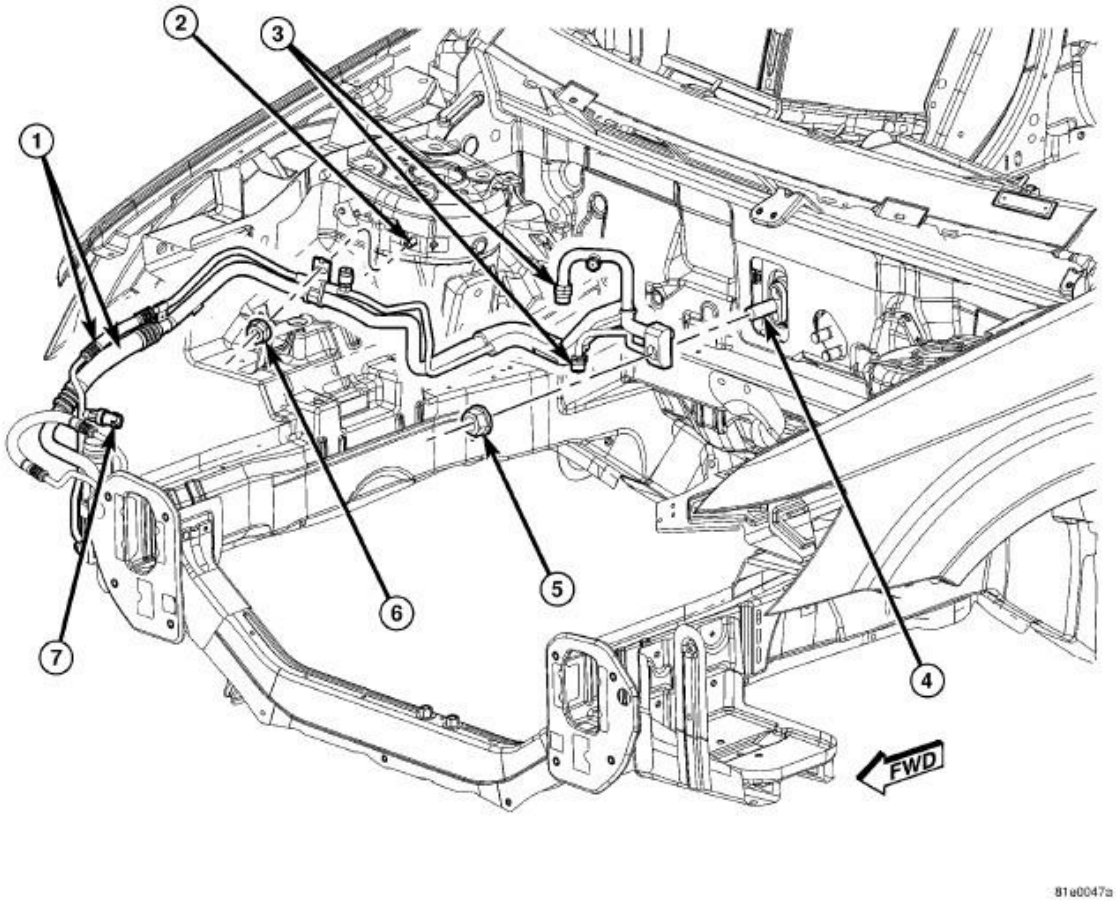


Fig. 249: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: It is only necessary to position the engine coolant reservoir and the power steering fluid reservoir out of the way. Draining of the coolant and power steering fluid is not required.

12. Remove the engine coolant reservoir from the right side of the engine compartment and position it out of the way. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .
13. Remove the power steering fluid reservoir from the right front strut tower and position it out of the way. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Removal** .
14. If equipped with ABS, remove the ABS control module and pump assembly and position the brake lines out of the way as necessary. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .
15. Disconnect the wire harness connector from the A/C pressure transducer (7) located on the A/C liquid line and remove the transducer if required. See **Heating and Air Conditioning/Controls/TRANSDUCER, A/C Pressure - Removal**.
16. If equipped with rear A/C, disconnect the rear A/C extension lines from the fittings (3) located on the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINES, A/C Underbody - Removal**.

17. Remove the nut (6) that secures the refrigerant line retaining bracket to the stud (2) located on the right front strut tower.
18. Remove the nut (5) that secures the A/C liquid and suction line assembly (1) to the A/C expansion valve (4).
19. Disconnect the A/C liquid and suction line assembly from the A/C expansion valve and remove and discard the O-ring seals.
20. Remove the A/C liquid and suction line assembly from the engine compartment.
21. Install plugs in, or tape over all of the opened refrigerant line fittings and the expansion valve and receiver/drier ports.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: LHD model shown in illustrations. RHD model similar.

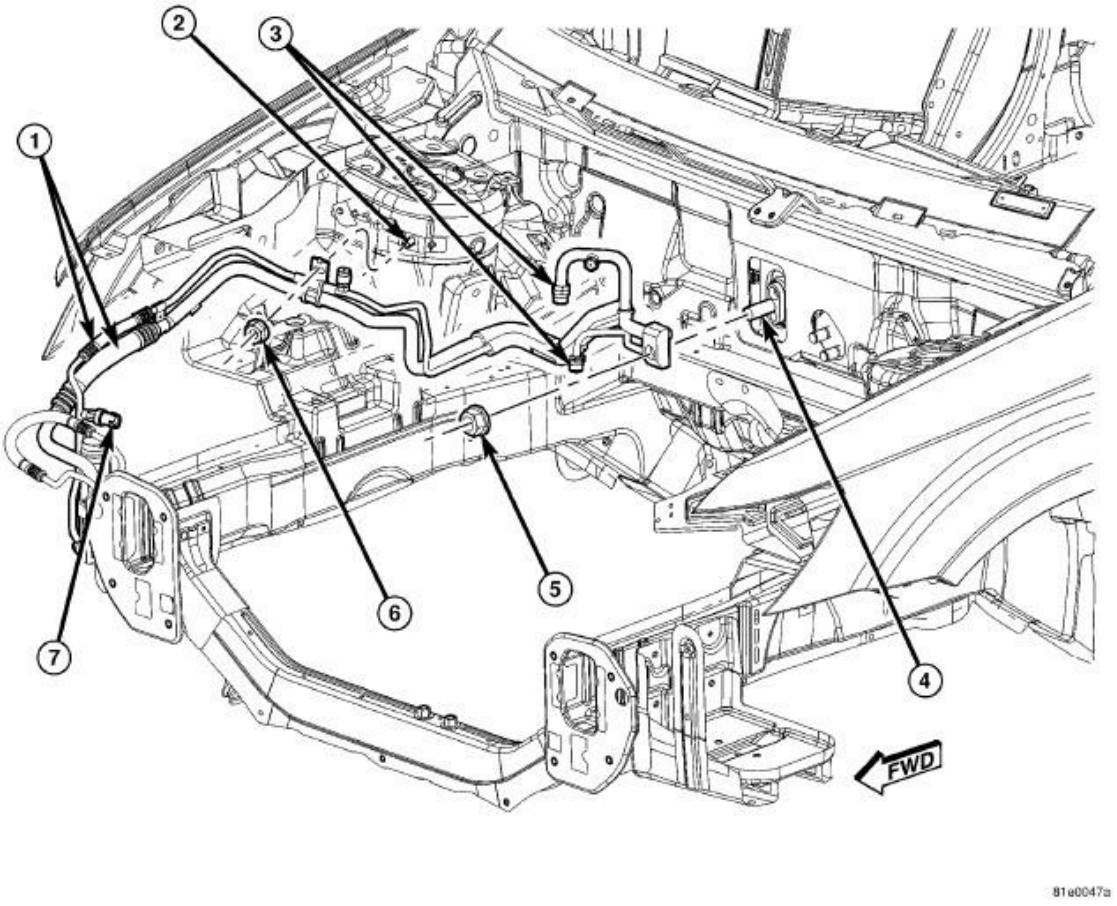


Fig. 250: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the tape or plugs from all of the opened refrigerant line fittings and the expansion valve and receiver/drier ports.
2. Lubricate new rubber O-rings with clean refrigerant oil and install them and new gaskets onto the liquid and suction line fittings. Use only the specified O-ring seals as they are made of special materials compatible to the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Position the A/C liquid and suction line assembly (1) into the engine compartment.
4. Connect the A/C liquid and suction line assembly to the A/C expansion valve (4).

CAUTION: Use care when installing the A/C lines to the A/C expansion valve. Carefully align the tube ends with the valve prior to tightening the A/C line retaining nut or damage to the sealing rings and tube ends may occur.

5. Install the nut (5) that secures the A/C liquid and suction line assembly to the A/C expansion valve. Tighten the nut to 20 N.m (15 ft. lbs.).
6. Install the nut (6) that secures the refrigerant line retaining bracket to the stud (2) located on the right

front strut tower. Tighten the nut securely.

7. If equipped with rear A/C, connect the rear A/C extension lines to the fittings (3) located on the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINES, A/C Underbody - Installation**.
8. If removed, lubricate a new rubber O-ring seal with clean refrigerant oil and install it onto the fitting for the A/C pressure transducer (7) located on the A/C liquid line and install the pressure transducer. Tighten the A/C pressure transducer to 5.6 N.m (50 in. lbs.).
9. Connect the wire harness connector to the A/C pressure transducer.
10. If equipped with ABS, install the ABS control module and pump assembly. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .
11. Install the power steering fluid reservoir. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Installation** .
12. Install the engine coolant reservoir. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Installation** .

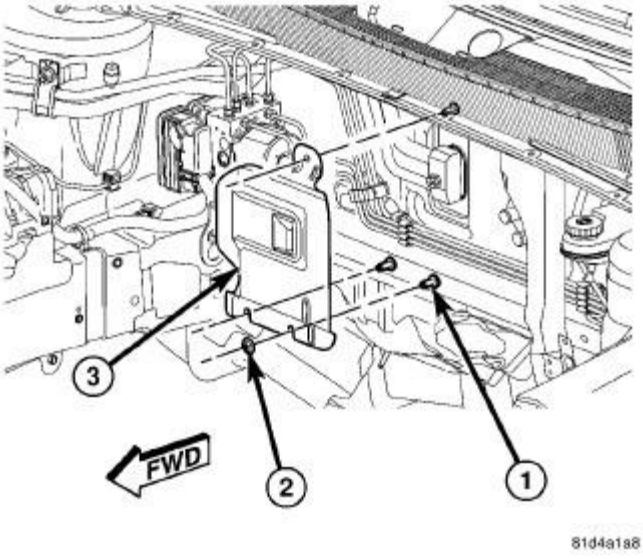


Fig. 251: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

13. If equipped, position the heat shield (3) onto the three studs (1) located on the dash panel in the engine compartment and install the three retaining nuts (2). Tighten the nuts to 1 N.m (10 in. lbs.).

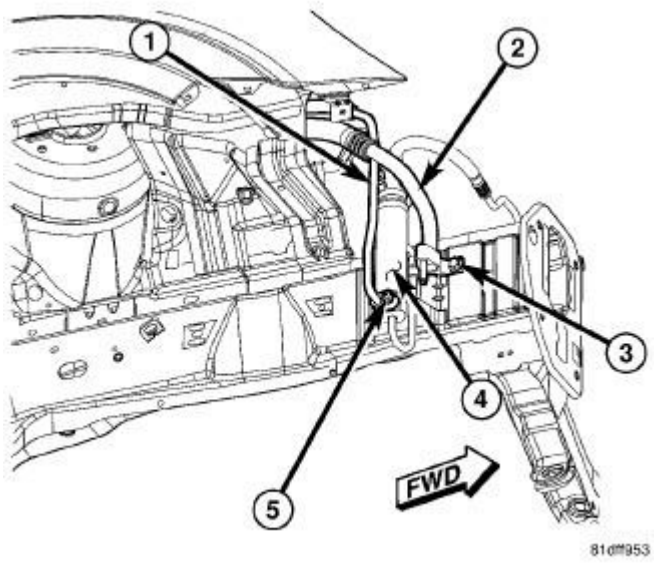


Fig. 252: Liquid Line to Receiver/Drier
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

14. Raise and support the vehicle.
15. Install the bolt (3) that secures the upper portion of the A/C suction line (2) to the right front frame rail. Tighten the bolt securely
16. Install the lower portion of the A/C suction line to the upper suction line. See **Heating and Air Conditioning/Plumbing/LINE, A/C Suction - Installation**.
17. Connect the rear section of the A/C liquid line (1) to the A/C receiver/drier (4).
18. Install the nut (5) that secures the rear section of the A/C liquid line (1) to the A/C receiver/drier (4). Tighten the nut to 20 N.m (15 ft. lbs.).
19. Reposition the right front wheel house splash shield to the body. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
20. Lower the vehicle.
21. Reconnect the negative battery cable.
22. If equipped with ABS, bleed the brake system. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

23. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
24. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant -**

Standard Procedure.

25. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

LINE, A/C SUCTION

Description

DESCRIPTION

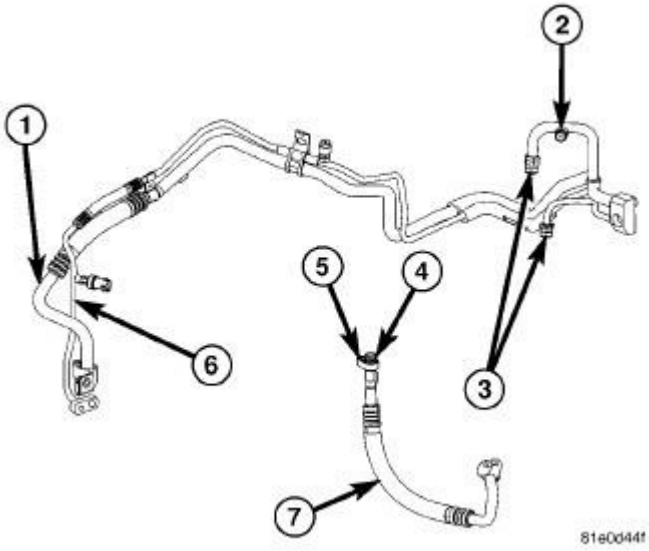


Fig. 253: Upper Suction/Liquid Line Assembly
Courtesy of CHRYSLER LLC

NOTE: A/C Suction line for 2.7L engine shown. Other engines similar.

The A/C suction line carries refrigerant from the A/C expansion valve to the A/C compressor and is serviced in two sections. The upper section of the A/C suction line (1) includes the low side service port (2) and is only serviced as an assembly with the rear A/C liquid line (6). When equipped with rear A/C, the A/C liquid and suction line assembly includes connections for the underbody refrigerant lines (3). The lower section of the A/C suction line (7) connects to the upper section of the suction line and the connections are sealed by use of metal gaskets (5) and rubber O-ring seals (4)

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

The lower A/C suction line and the A/C liquid and suction line assembly has no serviceable parts except for the metal gaskets, rubber O-ring seals and the service port valve cores. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals and gaskets must be replaced whenever the lower A/C suction line and/or the A/C liquid and suction line assembly is disconnected.

The lower A/C suction line and the A/C liquid and suction line assembly cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Review safety precautions and warnings in this part before performing this procedure. See Heating and Air Conditioning/Plumbing - Warning and. See Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions could result in possible serious or fatal injury.

NOTE: The A/C suction line is serviced in two sections.

NOTE: LHD model shown in illustrations. RHD model similar.

Upper A/C Suction Line

NOTE: The upper portion of the A/C suction line is only serviced as an assembly with the rear A/C liquid line.

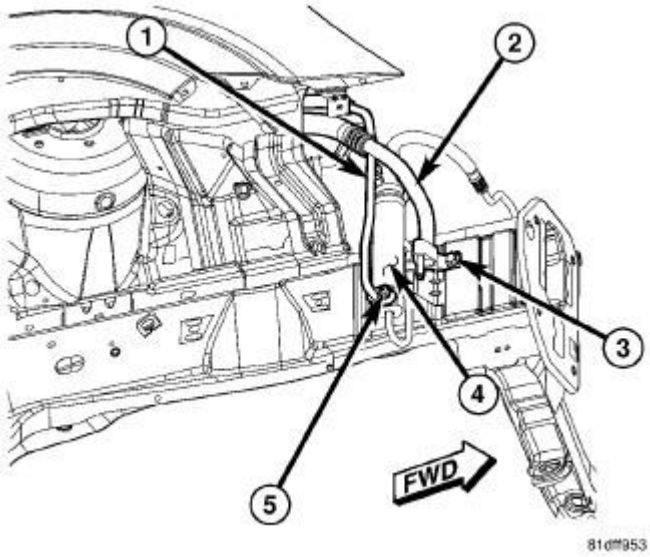


Fig. 254: Liquid Line to Receiver/Drier 09
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing -**

Standard Procedure.

3. Raise and support the vehicle.
4. Position the front portion of the right front wheelhouse splash shield out of the way to gain access to the A/C receiver/drier. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
5. Remove the nut (5) that secures the rear section of the A/C liquid line (1) to the A/C receiver/drier (4).
6. Disconnect the rear section of the A/C liquid line from the A/C receiver/drier and remove and discard the O-ring seal and gasket.
7. Disconnect the lower portion of the A/C suction line from the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINE, A/C Suction - Removal**.
8. Remove the bolt (3) that secures the rear section of the A/C suction line (2) to the right front frame rail.

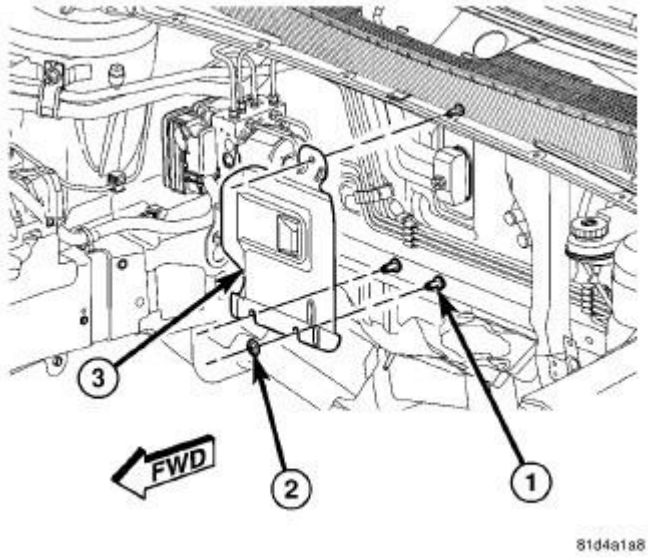


Fig. 255: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

9. Lower the vehicle.
10. If equipped with heat shield (3), remove the top nut (2) that secures the heat shield to the stud (1) located on the dash panel.

NOTE: Two slots are provided at the bottom of the heat shield to aid in heat shield removal, if equipped. Complete removal of the two bottom heat shield retaining nuts is not required.

11. If equipped, reach behind the engine and remove the two bottom nuts the that secure the heat shield to the studs located on the dash panel and remove the heat shield. Rotate and tilt the heat shield as required.

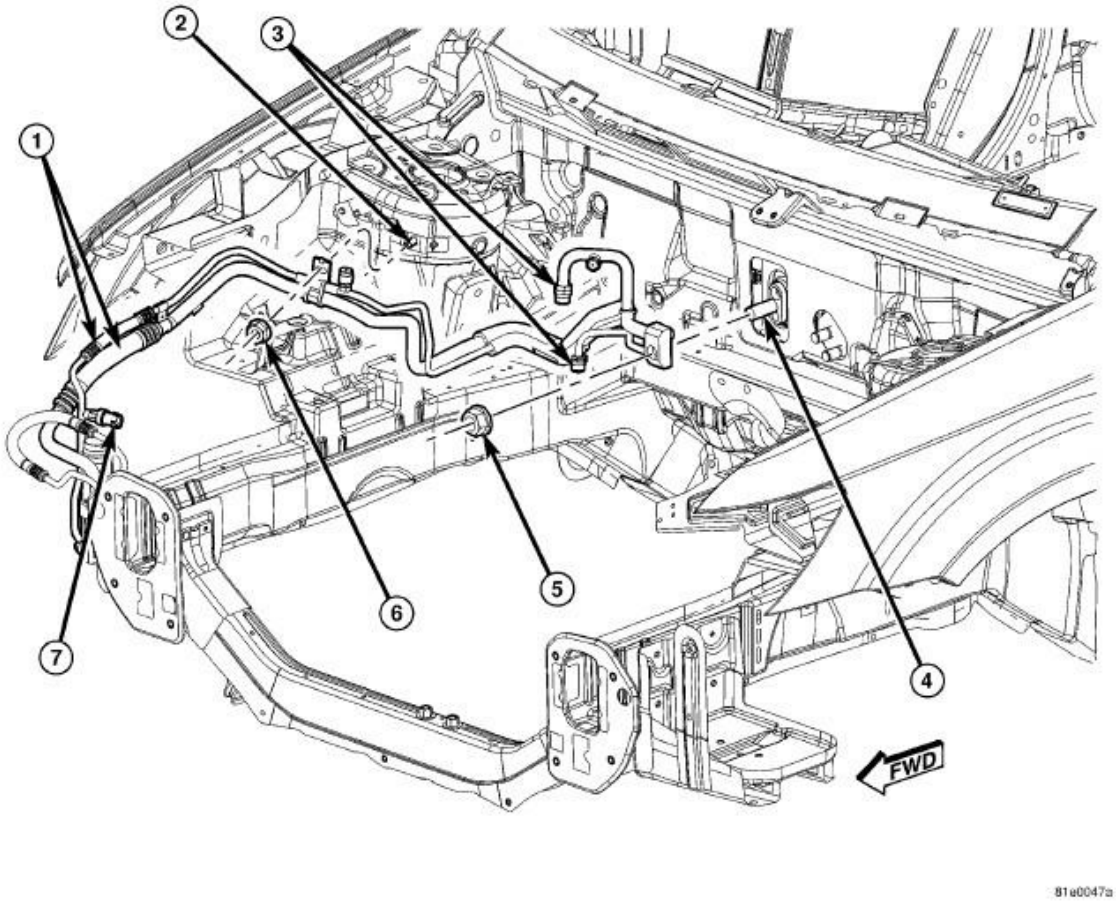


Fig. 256: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

NOTE: It is only necessary to position the engine coolant reservoir and the power steering fluid reservoir out of the way. Draining of the coolant and power steering fluid is not required.

12. Remove the engine coolant reservoir from the right side of the engine compartment and position it out of the way. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal** .
13. Remove the power steering fluid reservoir from the right front strut tower and position it out of the way. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Removal** .
14. If equipped with ABS, remove the ABS control module and pump assembly and position the brake lines out of the way as necessary. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .
15. Disconnect the wire harness connector from the A/C pressure transducer (7) located on the A/C liquid line and remove the transducer if required. See **Heating and Air Conditioning/Controls/TRANSDUCER, A/C Pressure - Removal**.
16. If equipped with rear A/C, disconnect the rear A/C extension lines from the fittings (3) located on the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINES, A/C Underbody - Removal**.

17. Remove the nut (6) that secures the refrigerant line retaining bracket to the stud (2) located on the right front strut tower.
18. Remove the nut (5) that secures the A/C liquid and suction line assembly (1) to the A/C expansion valve (4).
19. Disconnect the A/C liquid and suction line assembly from the A/C expansion valve and remove and discard the O-ring seals.
20. Remove the A/C liquid and suction line assembly from the engine compartment.
21. Install plugs in, or tape over all of the opened refrigerant line fittings and the expansion valve and receiver/drier ports.

Lower A/C Suction Line

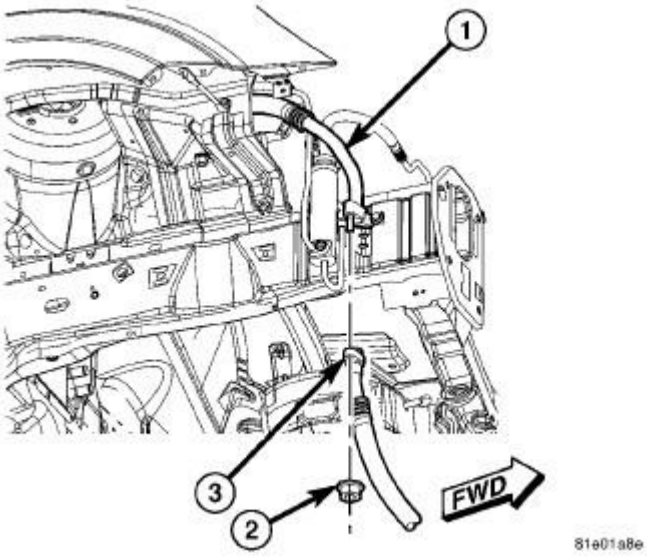


Fig. 257: Lower to Upper Suction Line
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Raise and support the vehicle.
4. Position the front portion of the right front wheelhouse splash shield out of the way to gain access to the A/C receiver/drier. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
5. Remove the nut (2) that secures the lower A/C suction line (3) to the upper A/C suction line (1).
6. Disconnect the lower A/C suction line to the upper A/C suction line and remove and discard the O-ring seal and gasket.

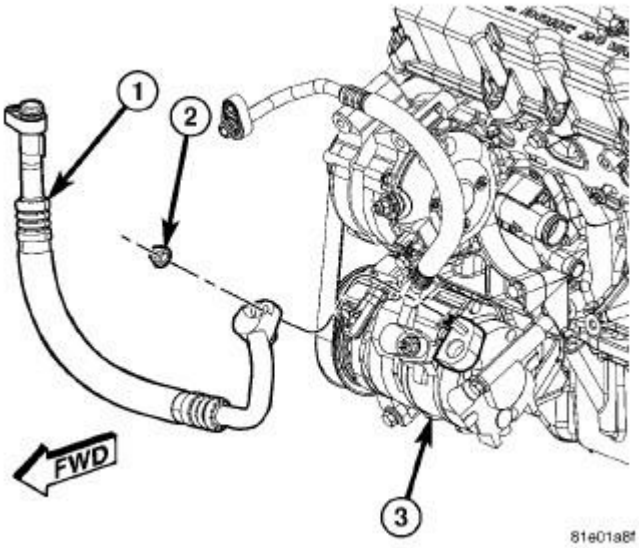


Fig. 258: Lower Suction Line to Compressor
Courtesy of CHRYSLER LLC

NOTE: 2.7L shown. Other engines similar.

7. Remove the nut (2) that secures the lower A/C suction line (1) to the A/C compressor (3).
8. Disconnect the lower A/C suction line from the A/C compressor and remove the lower line from the engine compartment.
9. Remove and discard the O-ring seals and gaskets and install plugs in, or tape over all the opened suction line fittings and the compressor port.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals and gaskets is required anytime a refrigerant line is disconnected. Failure to replace the rubber O-ring seals and metal gaskets could result in a refrigerant system leak.

NOTE: LHD model shown in illustrations. RHD model similar.

Upper A/C Suction Line

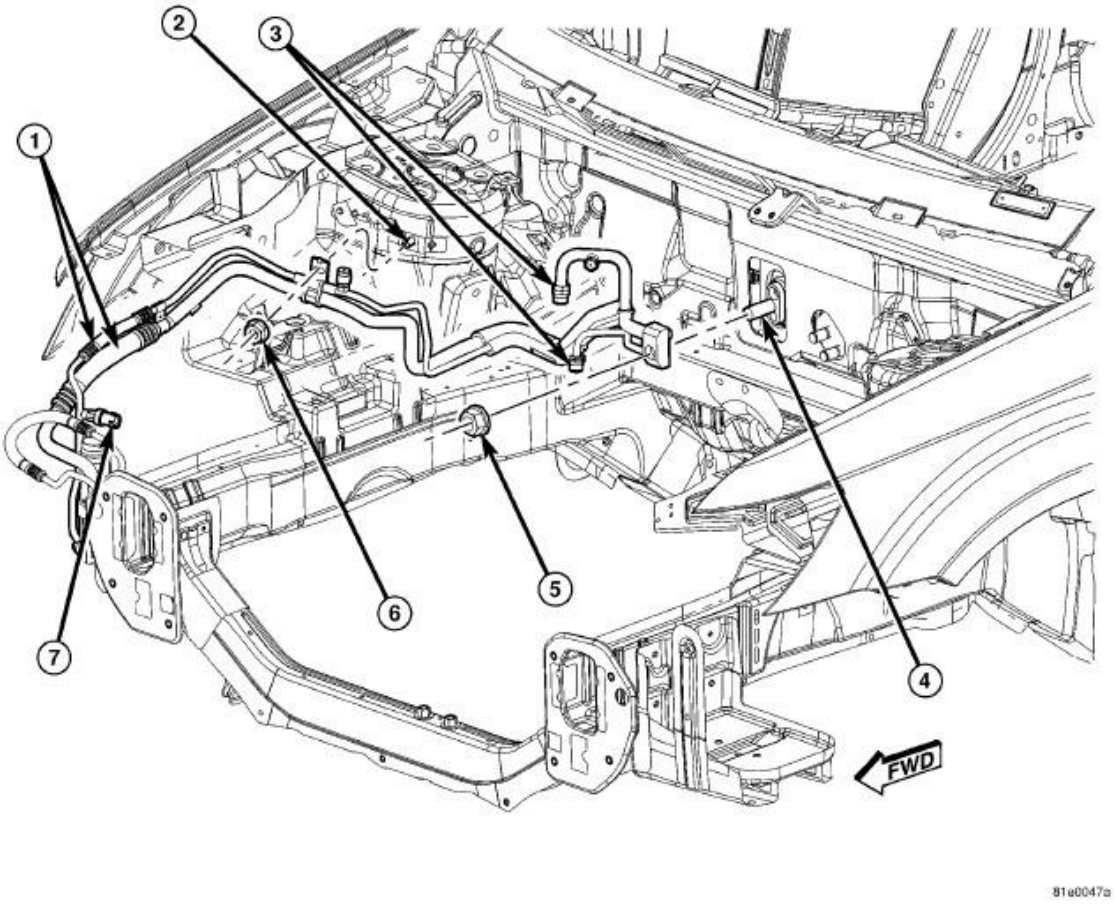


Fig. 259: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the tape or plugs from all of the opened refrigerant line fittings and the expansion valve and receiver/drier ports.
2. Lubricate new rubber O-rings with clean refrigerant oil and install them and new gaskets onto the liquid and suction line fittings. Use only the specified O-ring seals as they are made of special materials compatible to the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Position the A/C liquid and suction line assembly (1) into the engine compartment.
4. Connect the A/C liquid and suction line assembly to the A/C expansion valve (4).

CAUTION: Use care when installing the A/C lines to the A/C expansion valve. Carefully align the tube ends with the valve prior to tightening the A/C line retaining nut or damage to the sealing rings and tube ends may occur.

5. Install the nut (5) that secures the A/C liquid and suction line assembly to the A/C expansion valve. Tighten the nut to 20 N.m (15 ft. lbs.).
6. Install the nut (6) that secures the refrigerant line retaining bracket to the stud (2) located on the right front strut tower. Tighten the nut securely.
7. If equipped with rear A/C, connect the rear A/C extension lines to the fittings (3) located on the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINES, A/C Underbody - Installation**.
8. If removed, lubricate a new rubber O-ring seal with clean refrigerant oil and install it onto the fitting for the A/C pressure transducer (7) located on the A/C liquid line and install the pressure transducer. Tighten the A/C pressure transducer to 5.6 N.m (50 in. lbs.).
9. Connect the wire harness connector to the A/C pressure transducer.
10. If equipped with ABS, install the ABS control module and pump assembly. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .
11. Install the power steering fluid reservoir. Refer to **Steering/Pump/RESERVOIR, Power Steering Pump - Installation** .
12. Install the engine coolant reservoir. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Installation** .

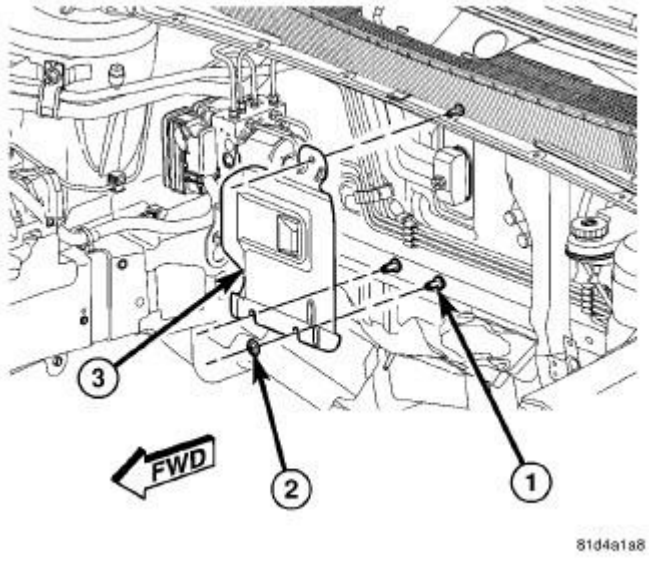


Fig. 260: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

13. If equipped, position the heat shield (3) onto the three studs (1) located on the dash panel in the engine compartment and install the three retaining nuts (2). Tighten the nuts to 1 N.m (10 in. lbs.).

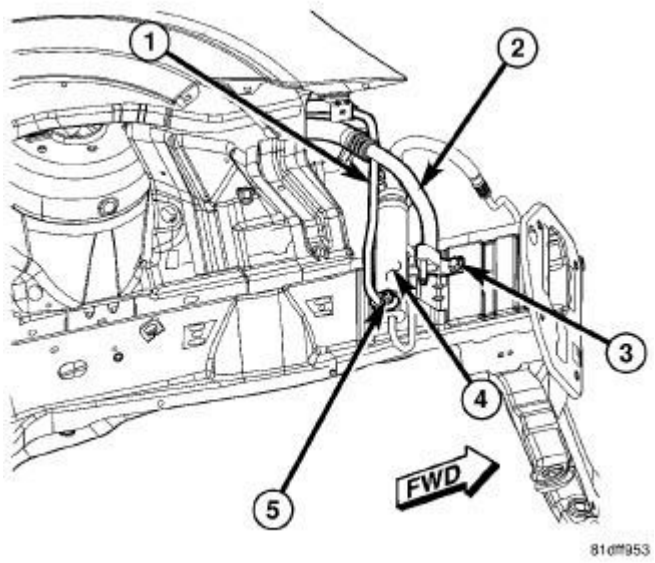


Fig. 261: Liquid Line to Receiver/Drier
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

14. Raise and support the vehicle.
15. Install the bolt (3) that secures the upper portion of the A/C suction line (2) to the right front frame rail. Tighten the bolt securely
16. Connect the lower portion of the A/C suction line to the A/C liquid and suction line assembly. See **Heating and Air Conditioning/Plumbing/LINE, A/C Suction - Installation**.
17. Connect the rear section of the A/C liquid line (1) to the A/C receiver/drier (4).
18. Install the nut (5) that secures the rear section of the A/C liquid line (1) to the A/C receiver/drier (4). Tighten the nut to 20 N.m (15 ft. lbs.).
19. Reposition the right front wheel house splash shield to the body. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
20. Lower the vehicle.
21. Reconnect the negative battery cable.
22. If equipped with ABS, bleed the brake system. Refer to **Brakes/Hydraulic/Mechanical/INTEGRATED CONTROL UNIT (ICU) - Installation** .

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

23. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
24. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant -**

Standard Procedure.

25. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

Lower A/C Suction Line

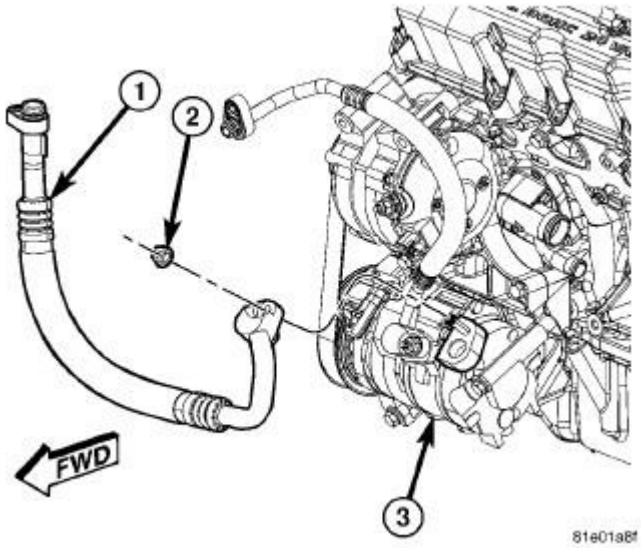


Fig. 262: Lower Suction Line to Compressor
Courtesy of CHRYSLER LLC

NOTE: 2.7L shown. Other engines similar.

1. Position the lower A/C suction line (1) into the engine compartment.
2. Remove the tape or plugs from the suction line fittings and the compressor port.
3. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the suction line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
4. Connect the lower A/C suction line to the A/C compressor (3).
5. Install the nut (2) that secures the lower A/C suction line to the A/C compressor. Tighten the nut to 20 N.m (15 ft. lbs.).

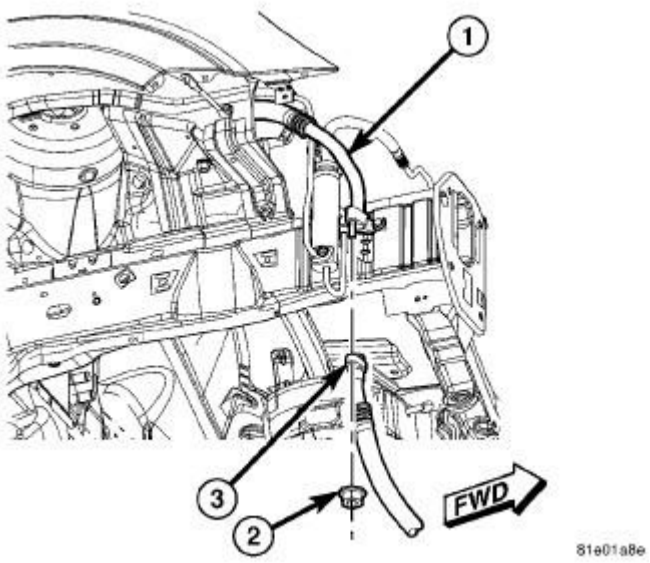


Fig. 263: Lower to Upper Suction Line
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with front fascia and headlamp removed for clarity.

6. Connect the lower portion of the A/C suction line (3) to the upper suction line (1)
7. Install the nut (2) that secures the lower portion of the A/C suction line to the upper suction line. Tighten the nut to 20 N.m (15 ft. lbs.).
8. Reposition the right front wheel house splash shield to the body. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
9. Lower the vehicle.
10. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

11. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
12. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
13. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

OIL, REFRIGERANT

Description

DESCRIPTION

The refrigerant oil used in R-134a refrigerant systems is a synthetic-based, polyalkylene glycol (PAG), wax-free lubricant. Mineral-based R-12 refrigerant oils are not compatible with PAG oils and should never be introduced to an R-134a refrigerant system.

There are different PAG oils available and each contain a different additive package. Always use only the type of refrigerant oil recommended for the A/C compressor in the vehicle.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level can prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

The A/C compressors used in this vehicle is designed to use ND-8 PAG refrigerant oil. Use only this type of refrigerant oil in the refrigerant system.

Operation

OPERATION

After performing any refrigerant recovery or recycling operation, always replenish the refrigerant system with the same amount of the recommended refrigerant oil as was removed. Too little refrigerant oil can cause A/C compressor damage, and too much can reduce A/C system performance.

PAG refrigerant oil is more hygroscopic than mineral oil, and will absorb any moisture it comes into contact with, even moisture in the air. The PAG oil container should always be kept tightly capped until it is ready to be used. After use, recap the oil container immediately to prevent moisture contamination.

Standard Procedure

REFRIGERANT OIL LEVEL

When an A/C system is assembled at the factory, all components except the A/C compressor are refrigerant oil free. After the refrigerant system has been charged and operated, the refrigerant oil in the A/C compressor is dispersed throughout the refrigerant system. The A/C receiver/drier, A/C evaporator, A/C condenser and the A/C compressor will each retain a significant amount of the needed refrigerant oil.

It is important to have the correct amount of refrigerant oil in the A/C system. This ensures proper lubrication of the A/C compressor. Too little oil will result in damage to the A/C compressor, while too much oil will reduce the cooling capacity of the A/C system and consequently result in higher discharge air temperatures.

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Drain the refrigerant oil from the A/C compressor using the procedures described below. Failure to properly drain the refrigerant oil from the A/C compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

CAUTION: ND-8 PAG refrigerant oil is used in the A/C system. Only refrigerant oil of the same type should be used to service this R-134a A/C system. Do not use any other refrigerant oil. The refrigerant oil container should be kept tightly capped until it is ready for use and then tightly capped after use to prevent contamination from moisture and dirt. Refrigerant oil will quickly absorb any moisture it comes in contact with, therefore, special effort must be used to keep all R-134a system components moisture-free. Moisture in the refrigerant oil is very difficult to remove and will cause a reliability problem with the A/C compressor.

NOTE: Most reclaim/recycling equipment will measure the amount of refrigerant oil being removed during the recovery process. This amount of refrigerant oil should always be added back into the refrigerant system. Refer to the reclaim/recycling equipment manufacturers instructions.

It will not be necessary to check the oil level within the A/C refrigerant system or to add oil, unless there has been an oil loss. A refrigerant oil loss may occur due to component replacement or a rupture or leak from a refrigerant line, connector fitting, component or component seal. If a leak does occurs, add 30 milliliters (1 fluid ounce) of the recommended refrigerant oil to the refrigerant system after the repair has been made. Refrigerant oil loss will be evident at the leak point by the presence of a wet, shiny surface around the leak.

Refrigerant oil must be added when an A/C receiver/drier, A/C evaporator or A/C condenser is replaced. Refer to the **REFRIGERANT OIL CAPACITIES**.

The refrigerant oil level in a new A/C compressor must first be adjusted prior to compressor installation. Refer to the following **COMPRESSOR OIL DRAIN PROCEDURE - DENSO 6SEU16 VARIABLE DISPLACEMENT**.

REFRIGERANT OIL CAPACITIES

Component	ml.	oz.
Total System Fill	100	3.4
A/C Receiver/drier	30	1.0
A/C Condenser	10	0.3
A/C Evaporator	10	0.3
A/C Compressor - Denso 6SEU16	50	1.7
	(Refer to **COMPRESSOR OIL DRAIN PROCEDURE - DENSO 6SEU16 VARIABLE DISPLACEMENT**)	
A/C Compressor - Denso 10SR15 and 10SR17	Drain and measure the oil from the old compressor (Refer to **COMPRESSOR OIL DRAIN PROCEDURE - DENSO 10SR15 AND 10SR17 FIXED DISPLACEMENT**).	

COMPRESSOR OIL DRAIN PROCEDURE - DENSO 6SEU16 VARIABLE DISPLACEMENT

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. The refrigerant oil in the Denso 6SEU16 A/C compressor can

only be drained using the procedure described below. Failure to properly drain the refrigerant oil from the A/C compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

If the Denso 6SEU16 A/C compressor is being replaced, some refrigerant oil must first be drained from the replacement A/C compressor. The 6SEU16 A/C compressor is filled with 100 milliliters (3.4 oz.) from the factory. Drain 50 milliliters (1.7 oz.) of refrigerant oil from the replacement 6SEU16 compressor. Use the following procedure to drain and measure refrigerant oil from the Denso 6SEU16 A/C compressor.

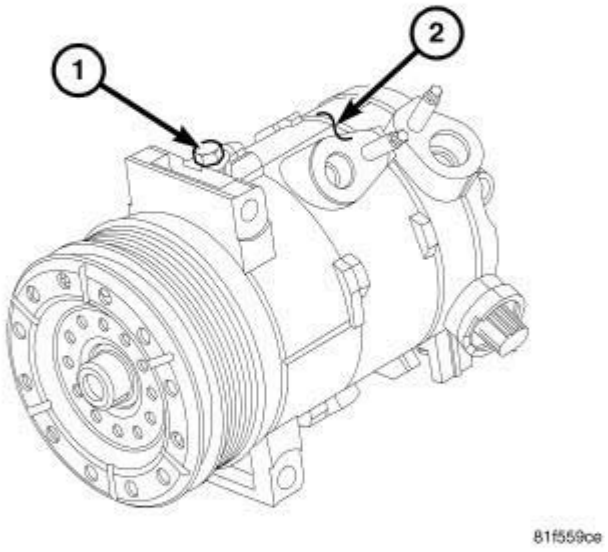


Fig. 264: 6SEU16 Compressor Drain Plug JC
Courtesy of CHRYSLER LLC

1. Place the replacement A/C compressor (2) on a workbench and remove the drain plug (1).

CAUTION: The 6SEU16 A/C compressor is filled with 100 milliliters (3.4 oz.) from the factory. Drain 50 milliliters (1.7 oz.) of refrigerant oil from the new 6SEU16 compressor when replacing only the compressor.

NOTE: When replacing multiple A/C system components, see the REFRIGERANT OIL CAPACITIES to determine how much oil should be removed from the replacement A/C compressor (example: new 6SEU16 compressor and receiver/drier requires 80 ml. (2.7 oz.) of oil to be added to the system. 100 ml. (3.4 oz.) of oil is in replacement compressor. 100 ml. (3.4 oz.) minus 80 ml. (2.7 oz.) equals 20 ml. (0.7 oz.) oil to be drained from replacement compressor).

2. Position the replacement A/C compressor so that the refrigerant oil can drain out of the drain port into a suitable clean measured container. Hold the replacement A/C compressor in this position until the required amount of refrigerant oil is drained from the compressor.

CAUTION: Failure to properly adjust the refrigerant oil level prior to installation of a replacement compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

3. Reinstall the drain plug. Tighten the drain plug securely.
4. Install the replacement A/C compressor onto the engine. See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation**.

COMPRESSOR OIL DRAIN PROCEDURE - DENSO 10SR15 AND 10SR17 FIXED DISPLACEMENT

CAUTION: Be certain to adjust the refrigerant system oil level when replacing an A/C compressor. Failure to properly drain and measure the refrigerant oil from the A/C compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

The Denso 10SR15 and 10SR17 A/C compressors are filled with refrigerant oil from the factory. Use the following procedure to drain and measure refrigerant oil from the Denso 10SR15 and 10SR17 A/C compressors.

1. Position the original A/C compressor so that the refrigerant oil can drain out of the suction and discharge ports into a suitable clean measured container. Hold the original A/C compressor in this position until all of the refrigerant oil is drained from the compressor.
2. Drain all of the refrigerant oil from the replacement A/C compressor into a clean measured container.
3. Refill the replacement A/C compressor with the same amount of refrigerant oil that was drained out of the original compressor. Use only clean refrigerant oil of the type recommended for the A/C compressor in the vehicle.

CAUTION: Failure to properly adjust the refrigerant oil level prior to installation of a replacement compressor can prevent the A/C system from operating as designed and cause serious compressor damage.

See **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation**.

REFRIGERANT

Description

DESCRIPTION

The refrigerant used in this air conditioning system is a HydroFluoroCarbon (HFC), type R-134a. Unlike R-12, which is a ChloroFluoroCarbon (CFC), R-134a refrigerant does not contain ozone-depleting chlorine. R-134a refrigerant is a non-toxic, non-flammable, clear, and colorless liquefied gas.

Even though R-134a does not contain chlorine, it must be reclaimed and recycled just like CFC-type refrigerants. This is because R-134a is a greenhouse gas and can contribute to global warming. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

Operation

OPERATION

R-134a refrigerant is not compatible with R-12 refrigerant in an A/C system. Even a small amount of R-12 refrigerant added to an R-134a refrigerant system will cause A/C compressor failure, refrigerant oil sludge or poor A/C system performance. In addition, the polyalkylene glycol (PAG) synthetic refrigerant oils used in an R-134a refrigerant system are not compatible with the mineral-based refrigerant oils used in an R-12 refrigerant system.

R-134a refrigerant system service ports, service tool couplers and refrigerant dispensing bottles have all been designed with unique fittings to ensure that an R-134a refrigerant system is not accidentally contaminated with the wrong refrigerant (R-12). There are also labels posted in the engine compartment of the vehicle and on the A/C compressor to identify that the A/C system is equipped with R-134a refrigerant.

Specifications

REFRIGERANT CHARGE CAPACITY

REFRIGERANT CHARGE CAPACITY

Application	Capacity
Front A/C Only	0.624 kg (22 oz.)
Front and Rear A/C	0.907 kg (32 oz.)

VALVE, A/C EXPANSION

Description

DESCRIPTION

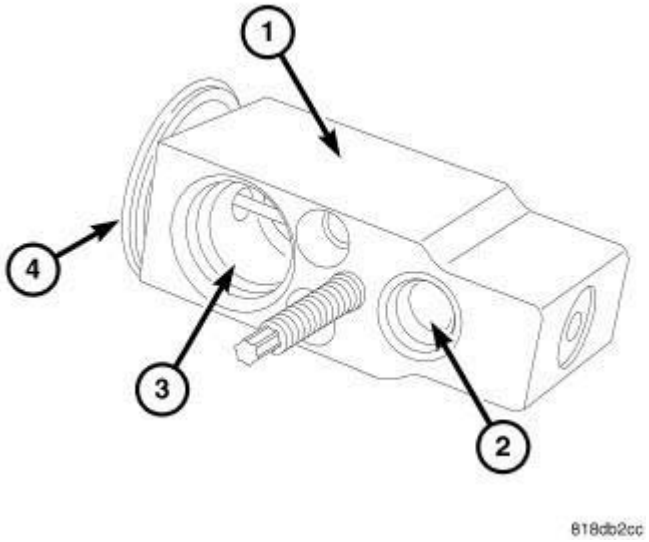


Fig. 265: A/C Expansion Valve Description KA
Courtesy of CHRYSLER LLC

The A/C expansion valve controls the amount of refrigerant entering the A/C evaporator. The A/C expansion valve is of a thermostatic expansion valve (TXV) design and consists of an aluminum H-valve type body (1) with an inlet port (2), outlet port (3) and an integral thermal sensor (4).

The A/C expansion valve is located in the engine compartment at the dash panel, between the A/C refrigerant lines and the A/C evaporator.

Operation

OPERATION

The A/C expansion valve controls the high-pressure, low temperature liquid refrigerant from the A/C liquid line and converts it into a low-pressure, low-temperature mixture of liquid and gas before it enters the A/C evaporator. A mechanical sensor in the A/C expansion valve monitors the temperature and pressure of the refrigerant leaving the A/C evaporator through the A/C suction line, and adjusts the orifice size at the liquid line port to let the proper amount of refrigerant into the evaporator to meet the vehicle A/C cooling requirements. Controlling the refrigerant flow through the A/C evaporator ensures that none of the refrigerant leaving the A/C evaporator is still in a liquid state, which could damage the A/C compressor.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve, or if the expansion valve is removed. Failure to replace the rubber O-ring seals may result in a refrigerant system leak.

The A/C expansion valve is factory calibrated and cannot be adjusted or repaired and must be replaced if inoperative or damaged.

Diagnosis and Testing

A/C EXPANSION VALVE

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: The A/C expansion valve should only be tested following testing of the A/C compressor.

NOTE: Liquid CO^2 is required to test the A/C expansion valve. This material is available from most welding supply facilities. Liquid CO^2 is also available from companies which service and sell fire extinguishers.

When testing the A/C expansion valve, the work area and the vehicle temperature must be 21° to 27° C (70° to 85° F). To test the expansion valve:

1. Connect a charging station or manifold gauge set to the refrigerant system service ports. Verify the refrigerant charge level.
2. Close all doors, windows and vents to the passenger compartment.
3. Set the A/C-heater controls so that the A/C compressor is operating, the temperature control is in the highest temperature position, the mode-air doors is directing air output to the floor and the blower motor operating is operating at the highest speed.
4. Start the engine and allow it to idle. After the engine has reached normal operating temperature, allow the passenger compartment to heat up. This will create the need for maximum refrigerant flow into the A/C evaporator.
5. If the refrigerant charge is sufficient, the discharge (high pressure) gauge should read 827 kPa to 1655 kPa (120 psi to 240 psi). The suction (low pressure) gauge should read 207 kPa to 345 kPa (30 psi to 50 psi). If OK, go to 6. If not OK, replace the inoperative A/C expansion valve.

WARNING: Protect the skin and eyes from exposure to liquid CO^2 or personal injury can result.

6. If the suction (low pressure) gauge reads within the specified range, freeze the A/C expansion valve for 30 seconds using liquid CO^2 or another suitable super-cold material.**Do not spray R-134a or R-12 refrigerant on the A/C expansion valve for this test.** The suction (low pressure) gauge reading should drop by 69 kPa (10 psi). If OK, go to 7. If not OK, replace the inoperative A/C expansion valve.
7. Allow the expansion valve control head to thaw. The suction (low pressure) gauge reading should stabilize at 207 kPa to 345 kPa (30 psi to 50 psi). If not OK, replace the inoperative A/C expansion valve.
8. When expansion valve testing is complete, test the overall A/C system performance. See **Heating and Air Conditioning - Diagnosis and Testing**.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

NOTE: LHD model shown in illustrations. RHD model similar.

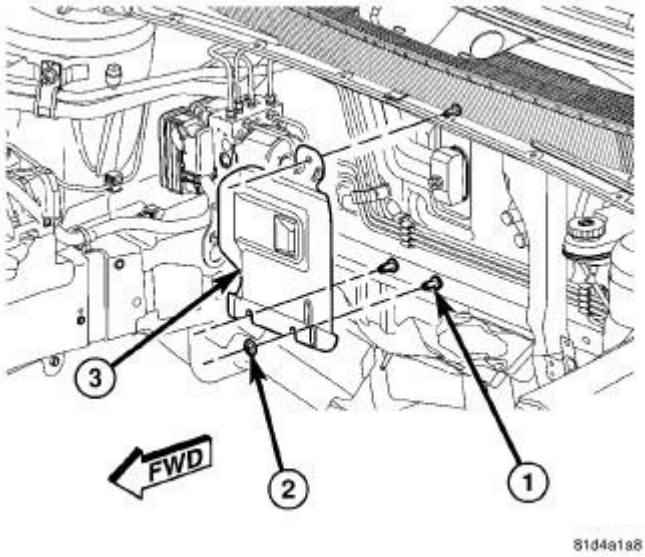


Fig. 266: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. If equipped with heat shield (3), remove the top nut (2) that secures the heat shield to the stud (1) located on the dash panel.

NOTE: Two slots are provided at the bottom of the heat shield to aid in heat shield removal, if equipped. Complete removal of the two bottom heat shield retaining nuts is not required.

4. If equipped, reach behind the engine and remove the two bottom nuts the that secure the heat shield to the studs located on the dash panel and remove the heat shield. Rotate and tilt the heat shield as required.

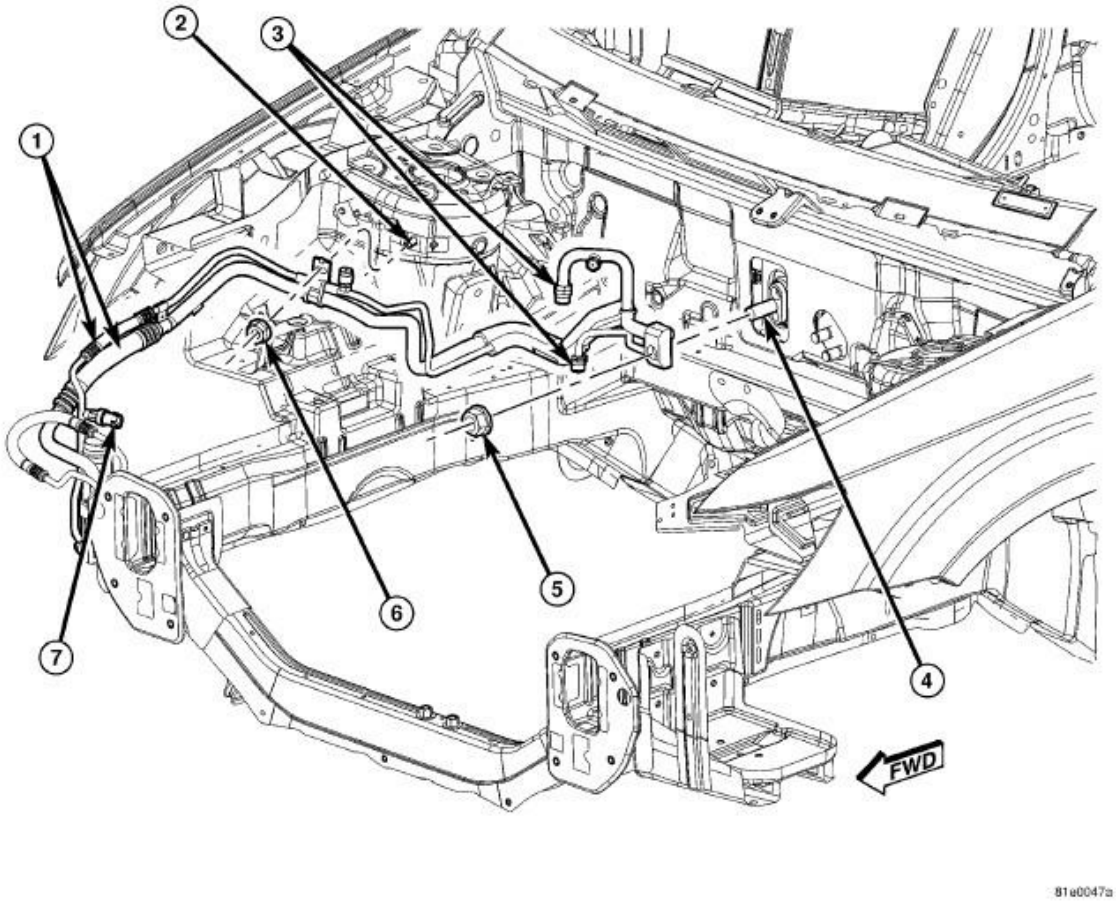


Fig. 267: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

5. Remove the nut (6) that secures the A/C liquid and suction line assembly (1) to the stud (2) located on the right front shock tower.
6. Remove the nut (5) that secures the A/C liquid and suction line assembly to the A/C expansion valve (4).
7. Disconnect the A/C liquid and suction line assembly from the A/C expansion valve, remove and discard the O-ring seals and position the refrigerant lines out of the way.

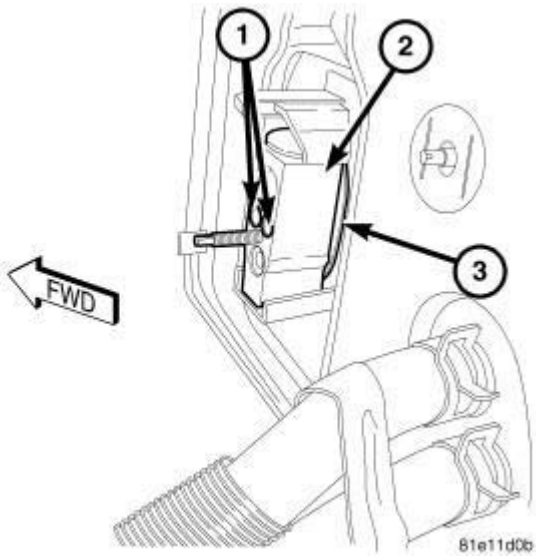


Fig. 268: Front Expansion Valve Removal/Installation
Courtesy of CHRYSLER LLC

8. Remove the two bolts (1) that secure the A/C expansion valve (2) to the evaporator tube tapping block (3).
9. Remove the A/C expansion valve from the tapping block and remove and discard the O-ring seals
10. Install plugs in, or tape over the opened refrigerant fittings and all expansion valve and evaporator tube ports.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve, or if the expansion valve is removed. Failure to replace the rubber O-ring seals may result in a refrigerant system leak.

NOTE: LHD model shown in illustrations. RHD model similar.

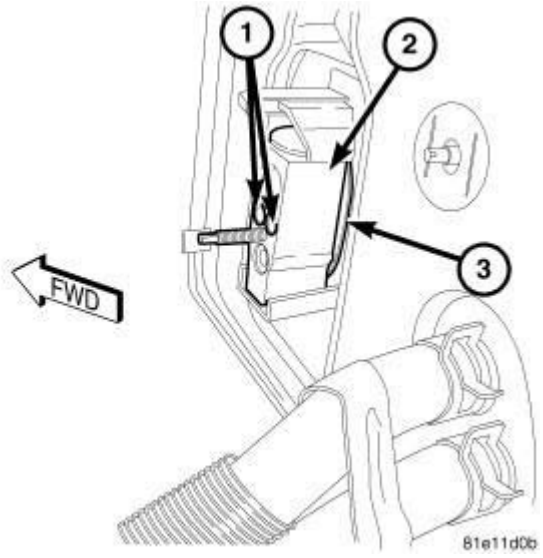


Fig. 269: Front Expansion Valve Removal/Installation
Courtesy of CHRYSLER LLC

1. Remove the tape or plugs from the opened refrigerant fittings and all expansion valve and evaporator ports.
2. Lubricate new O-ring seals with clean refrigerant oil and install them onto the refrigerant line and evaporator tube fittings. Use only the specified O-ring seals as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Install the A/C expansion valve (2) onto the evaporator tube tapping block (3)
4. Install the two bolts (1) that secure the A/C expansion valve to the evaporator tube tapping block. Tighten the bolts to 11 N.m (97 in. lbs.).

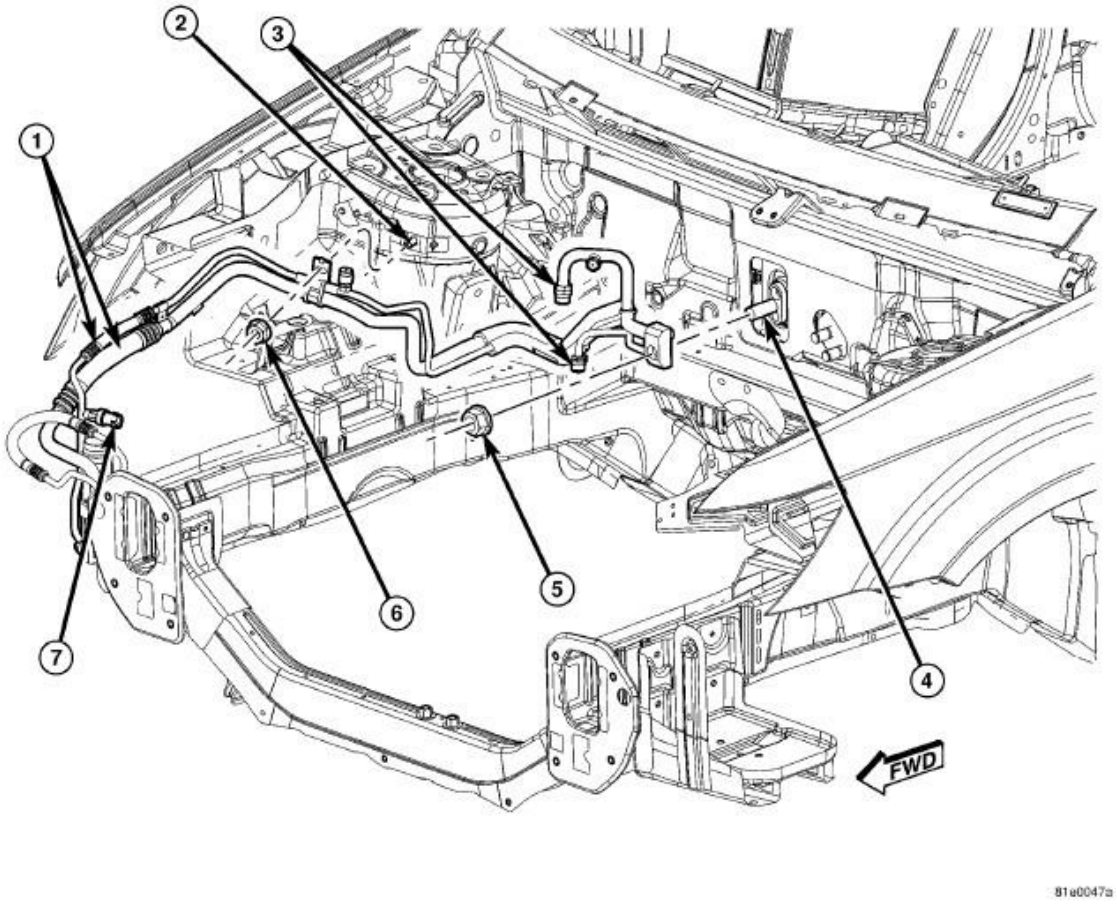


Fig. 270: Liquid & Suction Line Assembly Removal/Installation
Courtesy of CHRYSLER LLC

5. Connect the A/C liquid and suction line assembly (1) to the A/C expansion valve (4).

CAUTION: Use care when installing the A/C lines to the A/C expansion valve. Carefully align the tube ends with the valve prior to tightening the A/C line retaining nut or damage to the sealing rings and tube ends may occur.

6. Install the nut (5) that secures the A/C liquid and suction line assembly to the A/C expansion valve. Tighten the nut to 20 N.m (15 ft. lbs.).
7. Install the nut (6) that secures the refrigerant line retaining bracket to the stud (2) located on the right front strut tower. Tighten the nut securely.

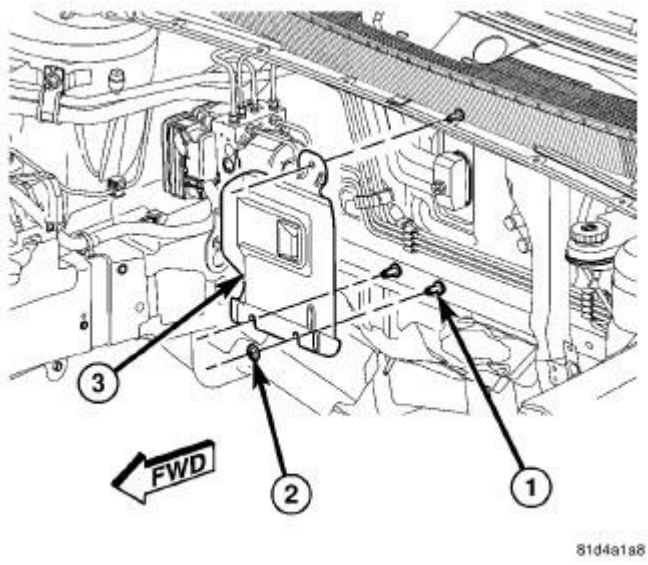


Fig. 271: Heat Shield - Unified Line
Courtesy of CHRYSLER LLC

8. If equipped, position the heat shield (3) onto the three studs (1) located on the dash panel in the engine compartment and install the three retaining nuts (2). Tighten the nuts to 1 N.m (10 in. lbs.).
9. Reconnect the negative battery cable.

CAUTION: Do NOT run the engine with a vacuum pump in operation or with a vacuum present within the A/C system when equipped with the Denso 6SEU16 variable displacement compressor. Failure to follow this caution will result in serious A/C compressor damage.

10. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
11. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
12. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

PLUMBING, REAR

CORE, HEATER, REAR

Description

DESCRIPTION

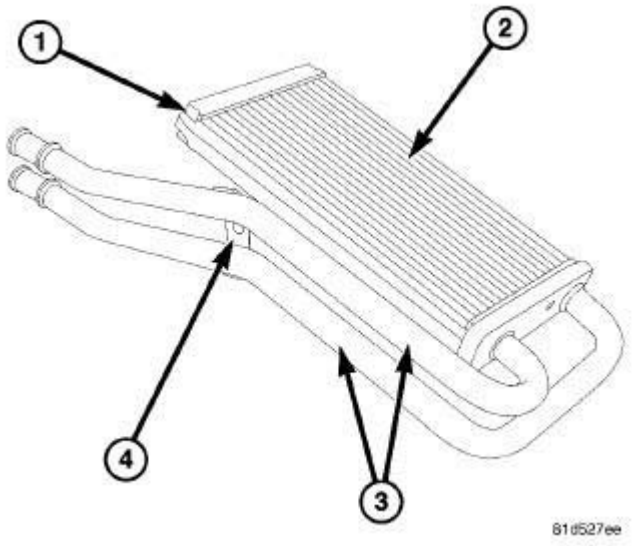


Fig. 272: Rear Heater Core Description
Courtesy of CHRYSLER LLC

The rear heater core (1) is located in the rear heater-A/C housing behind the right interior quarter trim panel. The rear heater core is a heat exchanger made of rows of tubes and fins (2). The heater core tubes (3) are permanently soldered to the heater core tank and are retained to the outboard side of the rear heater-A/C housing by use of an integral bracket (4) and screw.

The rear heater-A/C housing must be removed from the vehicle to service the rear heater core.

Operation

OPERATION

Engine coolant is circulated through heater hoses and tubes to the rear heater core at all times. As the coolant flows through the heater core, heat removed from the engine is transferred to the heater core fins and the air directed through the heater core picks up the heat from the fins. The rear blend-air door allows control of the rear heater output air temperature by controlling the amount of air flowing through or around the rear heater core. The rear blower motor speed controls the volume of air flowing through the rear heater-A/C housing.

The rear heater core cannot be repaired and must be replaced if inoperative, leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may

result in serious or fatal injury.

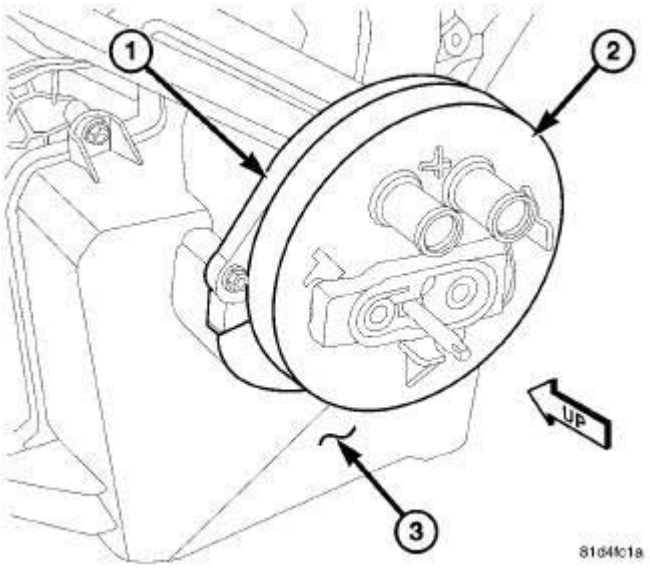


Fig. 273: Rear Housing Flange Seal
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the rear heater-A/C housing and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Removal**.
3. Remove the foam seal (2) from the flange (1) located at the bottom of the rear heater-A/C housing (3). If the foam seal is deformed or damaged, it must be replaced.

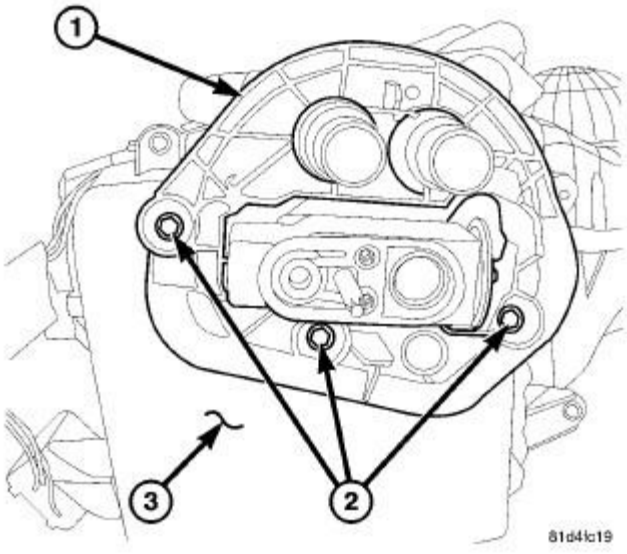


Fig. 274: Rear Housing Flange

Courtesy of CHRYSLER LLC

4. Remove the three screws (2) that secure the flange (1) to the bottom of the rear heater-A/C housing (3) and remove the flange.

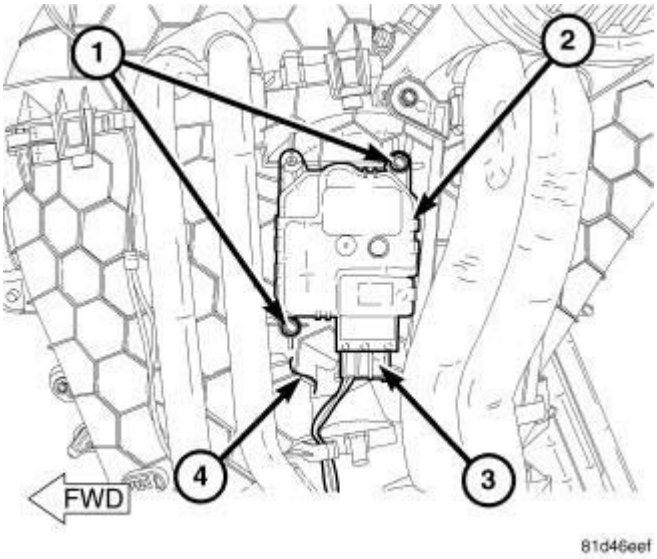


Fig. 275: Rear Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

5. Disconnect the wire harness connector (3) from the rear blend door actuator (2) located on the outboard side of the rear heater-A/C housing (4).
6. Remove the two screws (1) that secure the rear blend door actuator to the rear heater-A/C housing and remove the actuator.

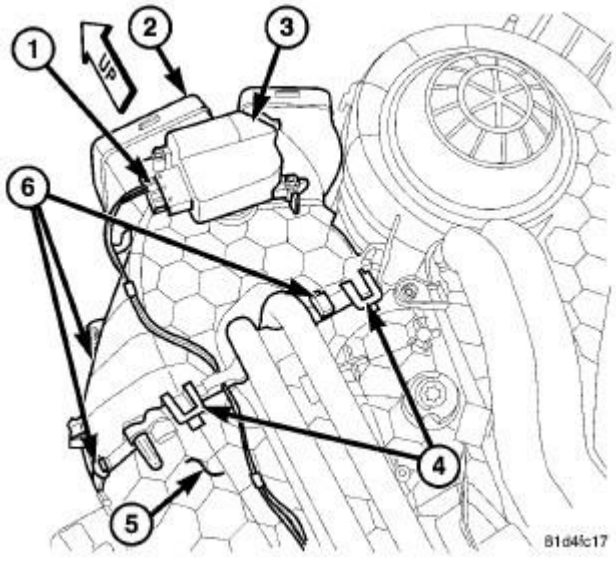


Fig. 276: Rear Distribution Housing Removal/Installation

Courtesy of CHRYSLER LLC

7. Disconnect the wire harness connector (1) from the rear mode door actuator (3) located on the outboard side of the rear heater-A/C distribution housing (2).
8. Remove the three metal retaining clips (4) that secure the rear distribution housing to the rear heater-A/C housing (5).
9. Release the five plastic retaining tabs (4) that secure the rear distribution housing and rear heater-A/C housing together and separate the housings.

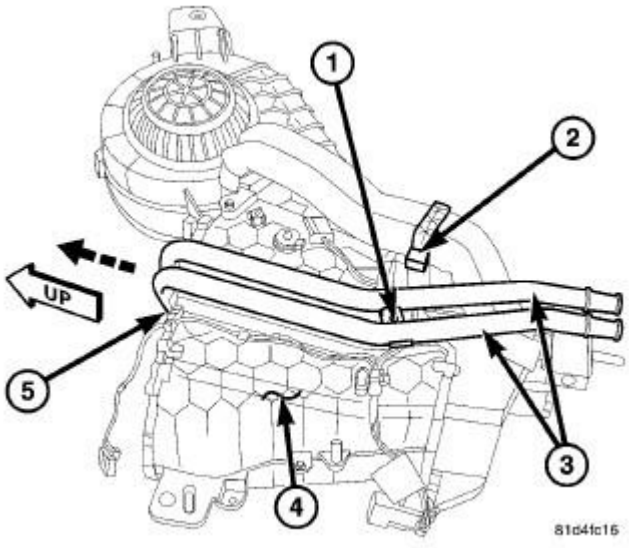


Fig. 277: Rear Heater Core Remove
Courtesy of CHRYSLER LLC

10. Remove the screw (1) that secures the rear heater core tubes (3) to the outboard side of the rear heater-A/C housing (4).

CAUTION: To prevent damage to the plastic evaporator tube bracket, carefully guide the heater core tubes past the bracket during removal of the heater core.

11. Carefully pull the rear heater core (5) out of the top of the rear heater-A/C housing. Guide the heater core tubes past the plastic evaporator tube bracket (2). If the foam seals on the heater core are deformed or damaged, they must be replaced.

Installation

INSTALLATION

CAUTION: To prevent damage to the plastic evaporator tube bracket, carefully guide the heater core tubes past the bracket during installation of the heater

core.

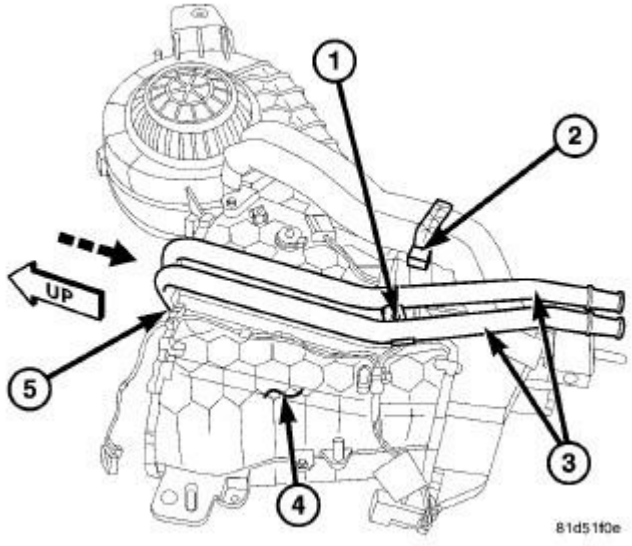


Fig. 278: Rear Heater Core Install
Courtesy of CHRYSLER LLC

1. Carefully install the rear heater core (5) into the rear heater-A/C housing (4). Guide the heater core tubes past the plastic evaporator tube bracket (2). Make sure that the foam seals are properly installed.
2. Install the screw (1) that secures the rear heater core tubes (3) to the outboard side of the rear heater-A/C housing. Tighten the screw to 1.2 N.m (10 in. lbs.).

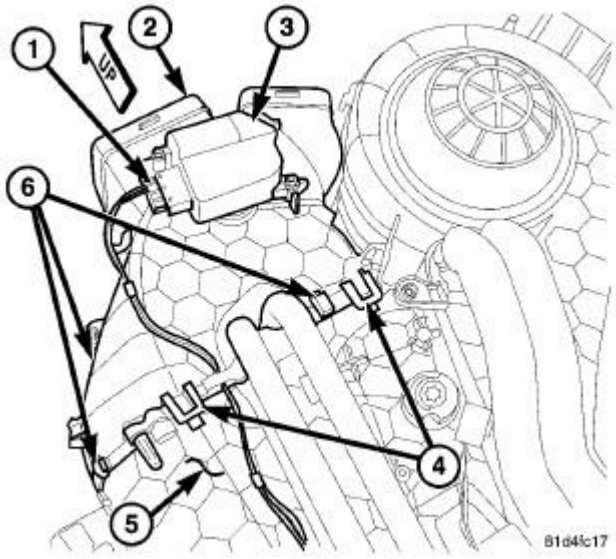


Fig. 279: Rear Distribution Housing Removal/Installation
Courtesy of CHRYSLER LLC

3. Position the rear heater-A/C distribution housing (2) to the rear heater-A/C housing (5) and engage the five plastic retaining tabs (4). Make sure the retaining tabs are fully engaged.
4. Install the three metal retaining clips (6) that secure the rear distribution housing to the rear heater-A/C housing.
5. Connect the wire harness connector (1) to the rear mode door actuator (3).

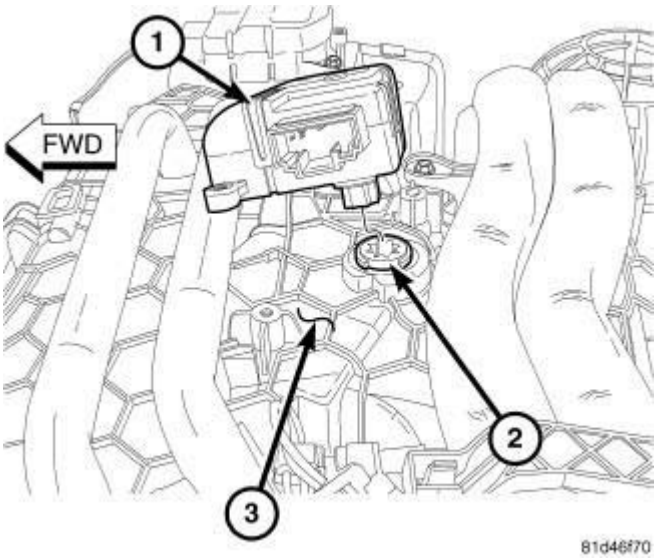


Fig. 280: Rear Blend Door Actuator Align
Courtesy of CHRYSLER LLC

6. Position the rear blend door actuator (1) onto the rear heater-A/C housing (3). If necessary, rotate the actuator slightly to align the splines on the actuator output shaft with those on the rear blend-air door pivot shaft (2).

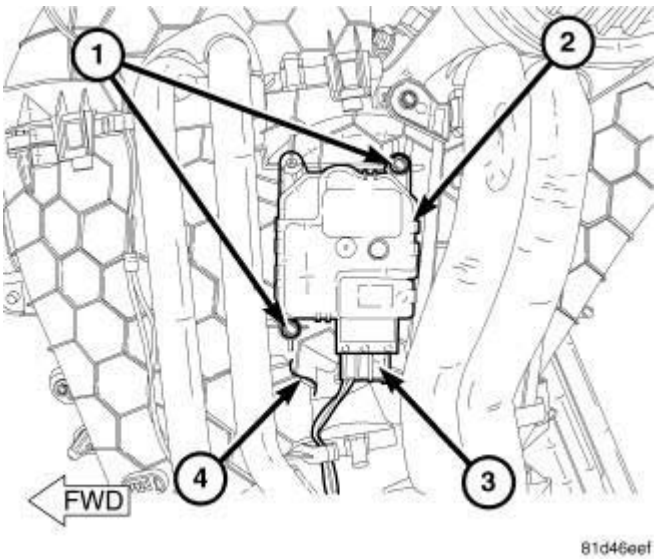


Fig. 281: Rear Blend Door Actuator Removal/Installation
Courtesy of CHRYSLER LLC

7. Install the two screws (1) that secure the rear blend door actuator (2) to the rear heater-A/C housing (4). Tighten the screws to 1.2 N.m (10 in. lbs.).
8. Connect the wire harness connector (3) to the rear blend door actuator.

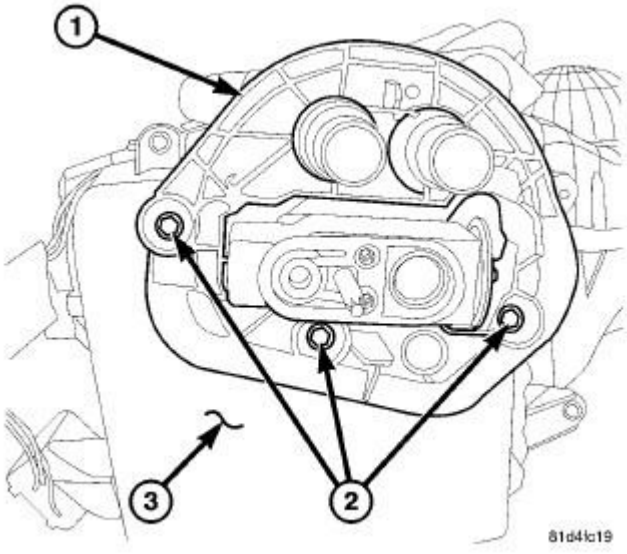


Fig. 282: Rear Housing Flange
Courtesy of CHRYSLER LLC

9. Position the flange (1) to the bottom of the rear heater-A/C housing (3) and install the three retaining screws (2). Tighten the screws to 1.2 N.m (10 in. lbs.).

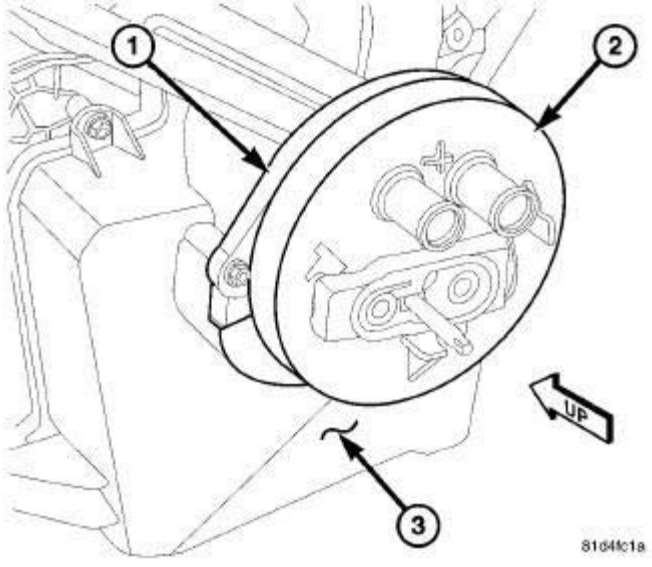


Fig. 283: Rear Housing Flange Seal
Courtesy of CHRYSLER LLC

10. Install the foam seal (2) onto the flange (1) at the bottom of the rear heater-A/C housing (3). Make sure that the foam seal is properly installed.
11. Install the rear heater-A/C housing. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Installation**.
12. Reconnect the negative battery cable.
13. If the rear heater core is being replaced, flush the cooling system. Refer to **Cooling - Standard Procedure** .
14. Refill the engine cooling system. Refer to **Cooling - Standard Procedure** .
15. Evacuate and charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

EVAPORATOR, A/C

Description

DESCRIPTION

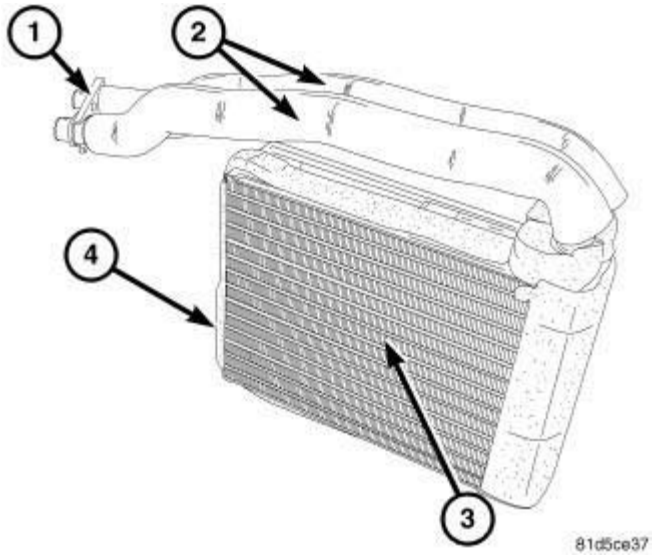


Fig. 284: Rear Evaporator Description
Courtesy of CHRYSLER LLC

The rear A/C evaporator (4) is located within the rear heater-A/C housing, behind the right interior quarter panel trim. The rear A/C evaporator is positioned in the rear heater-A/C housing so that all air entering the housing must pass over the evaporator fins (3) before it is distributed through the rear heating-A/C system ducts and outlets. However, air passing over the rear evaporator fins will only be conditioned when the A/C compressor is engaged and circulating refrigerant through the A/C evaporator.

The A/C expansion valve is connected and sealed to the A/C evaporator tubes (2) by use of rubber O-ring seals and a tapping plate (1).

The rear A/C evaporator can only be serviced by removing and disassembling the rear heater-A/C housing.

Operation

OPERATION

Refrigerant enters the rear A/C evaporator from the rear A/C expansion valve as a low-temperature, low-pressure mixture of liquid and gas. As air flows over the fins of the rear A/C evaporator, the humidity in the air condenses on the fins, and the heat from the air is absorbed by the refrigerant. Heat absorption causes the refrigerant to boil and vaporize. The refrigerant becomes a low-pressure gas when it leaves the rear A/C evaporator.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals could result in a refrigerant system leak.

The A/C evaporator has no serviceable parts except for the O-ring seals. The O-ring seals used on the connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the rear A/C expansion valve is removed from the rear A/C evaporator.

The rear A/C evaporator cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

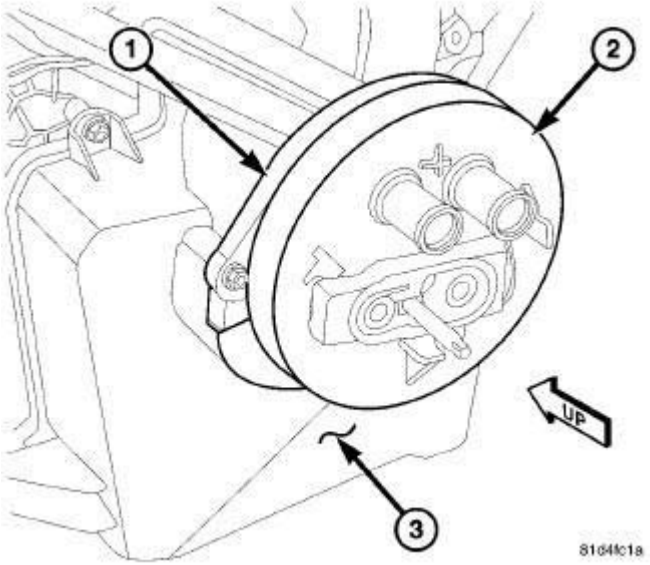


Fig. 285: Rear Housing Flange Seal
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the rear heater-A/C housing and place it on a workbench. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Removal**.
3. Remove the foam seal (2) from the flange (1) located at the bottom of the rear heater-A/C housing (3). If the foam seal is deformed or damaged, it must be replaced.

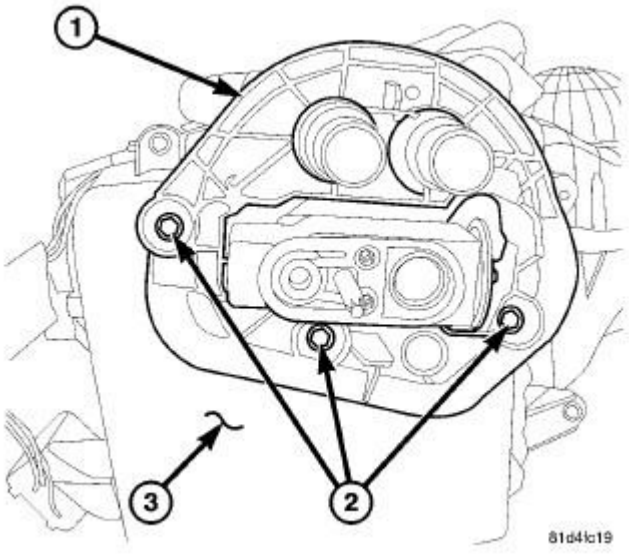


Fig. 286: Rear Housing Flange
Courtesy of CHRYSLER LLC

4. Remove the three screws (2) that secure the flange (1) to the bottom of the rear heater-A/C housing (3) and remove the flange.

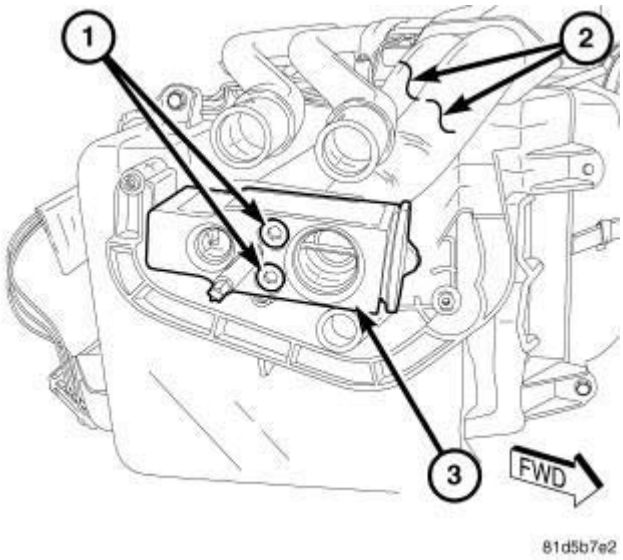


Fig. 287: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

5. Remove the two screws (1) that secure the rear expansion valve (3) to the tapping plate located on the end of the rear evaporator tubes (2) and remove the valve.
6. Remove and discard the O-ring seals and install plugs in, or tape over the opened evaporator tubes and expansion valve ports.

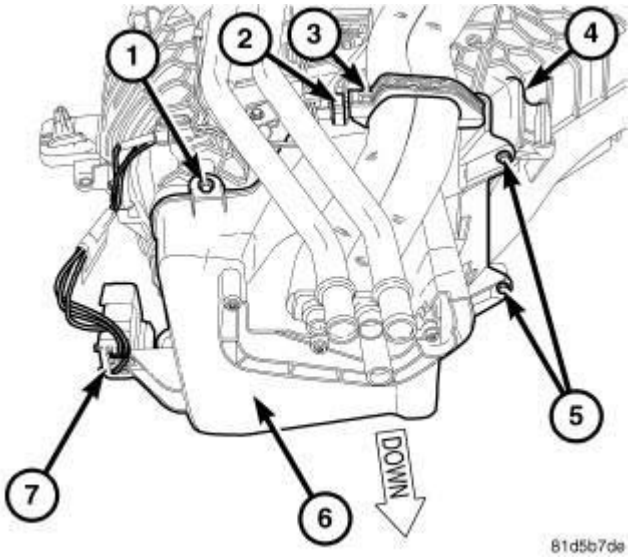


Fig. 288: Lower Rear Housing Removal/Installation
Courtesy of CHRYSLER LLC

7. Remove the wire harness connector (7) from the lower rear heater-A/C housing (6).
8. Open the evaporator tube retaining bracket (3) located on the outboard side of the lower housing.
9. Remove the metal retaining clip (2) that secures the lower housing to the rear heater-A/C housing (4).
10. Remove the five screws (1 and 5) that secure the lower housing the rear heater-A/C housing and carefully

remove the lower housing. Rotate and tilt the lower housing as necessary for removal.

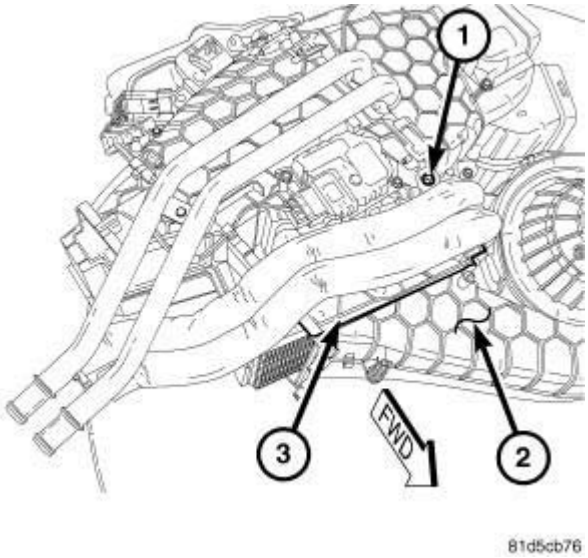


Fig. 289: Rear Evaporator Cover Removal/Installation
Courtesy of CHRYSLER LLC

11. Remove the screw (1) that secures the rear evaporator cover (3) to the outboard side of the rear heater-A/C housing (2) and remove the cover of the housing.

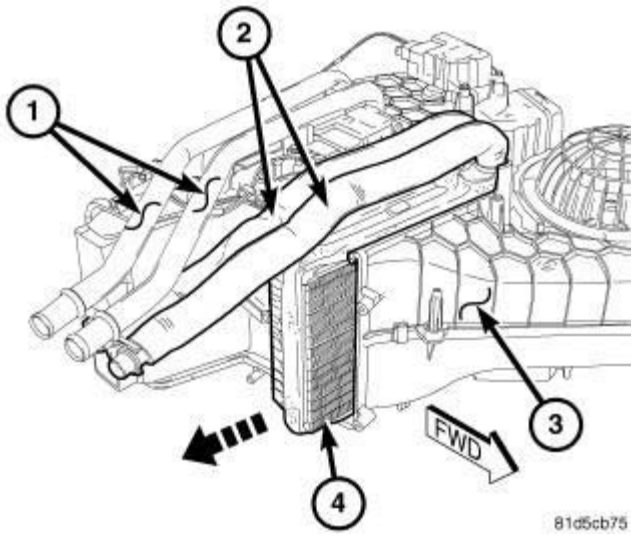


Fig. 290: Rear Evaporator Removal
Courtesy of CHRYSLER LLC

12. Carefully pull the rear A/C evaporator (4) out the bottom of the rear heater-A/C housing (3). Guide the evaporator tubes (2) past the heater core tubes (1). If the foam seals on the A/C evaporator are deformed or damaged, they must be replaced.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: If only the rear A/C evaporator is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line or expansion valve is disconnected. Failure to replace the rubber O-ring seals could result in a refrigerant system leak.

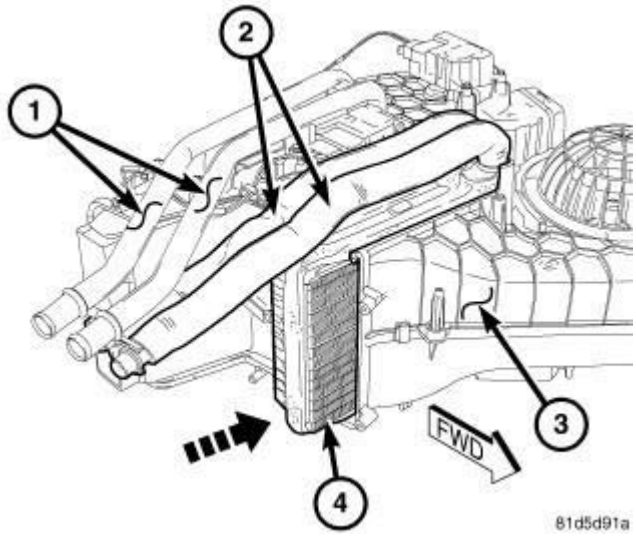


Fig. 291: Rear Evaporator Install
Courtesy of CHRYSLER LLC

1. Install the rear A/C evaporator (4) into the rear heater-A/C housing (3). Guide the evaporator tubes (2) past the rear heater core tubes (1). Make sure that the foam seals are properly installed on the evaporator.

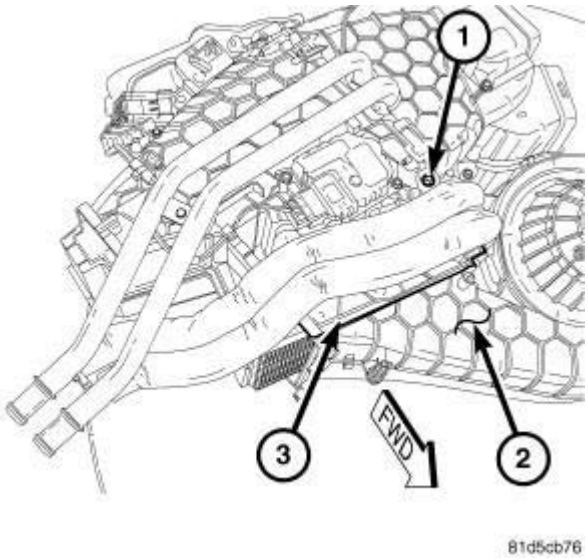


Fig. 292: Rear Evaporator Cover Removal/Installation
Courtesy of CHRYSLER LLC

2. Install the evaporator cover (3) onto the outboard side of the rear heater-A/C housing (2) and install the retaining screw (1). Tighten the screw to 1.2 N.m (10 in. lbs.).

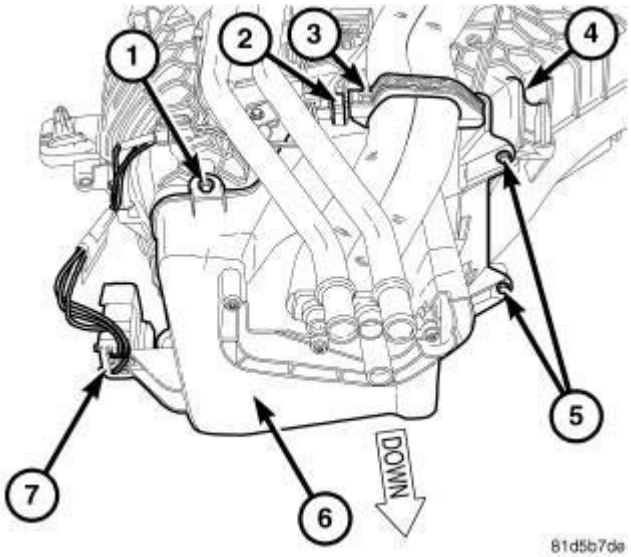


Fig. 293: Lower Rear Housing Removal/Installation
Courtesy of CHRYSLER LLC

3. Install the lower rear heater-A/C housing (6) onto the rear heater-A/C housing (4). Rotate and tilt the lower housing as necessary for installation.
4. Install the five screws (1 and 5) that secure the lower housing to the rear heater-A/C housing. Tighten the screws to 1.2 N.m (10 in. lbs.).
5. Install the metal retaining clip (2) that secures the lower housing to the rear heater-A/C housing.
6. Close the evaporator tube retaining bracket (3). Make sure the bracket retainers are fully engaged.

7. Install the wire harness connector (7) onto the lower rear heater-A/C housing.

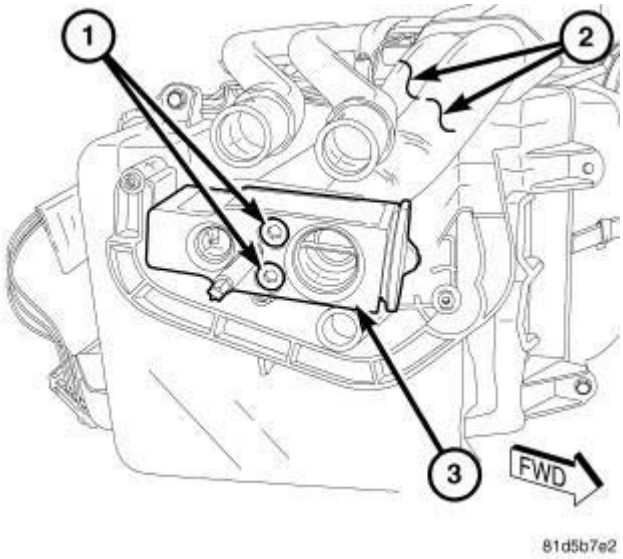


Fig. 294: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

8. Remove the tape or plugs from the rear evaporator tubes and expansion valve ports.
9. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the rear evaporator tube fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
10. Install the rear A/C expansion valve (3) onto the tapping plate located on the end of the rear evaporator tubes (2)
11. Install two bolts (1) that secure the rear A/C expansion valve to the taping plate. Tighten the bolts to 11 N.m (97 in. lbs.).

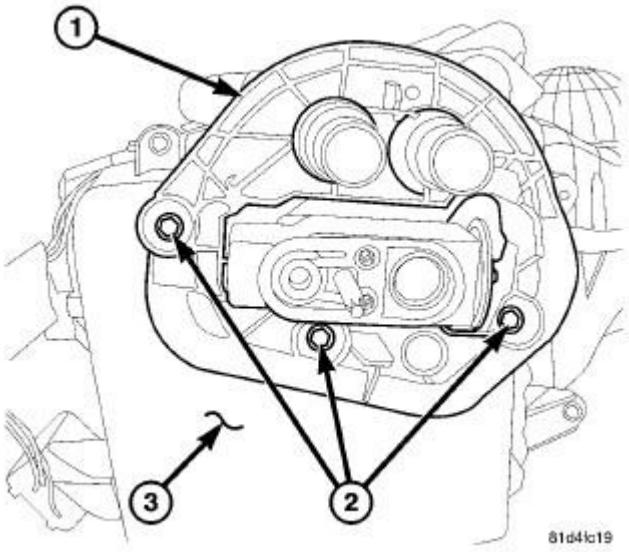


Fig. 295: Rear Housing Flange
Courtesy of CHRYSLER LLC

12. Position the flange (1) to the bottom of the rear heater-A/C housing (3) and install the three retaining screws (2). Tighten the screws to 1.2 N.m (10 in. lbs.).

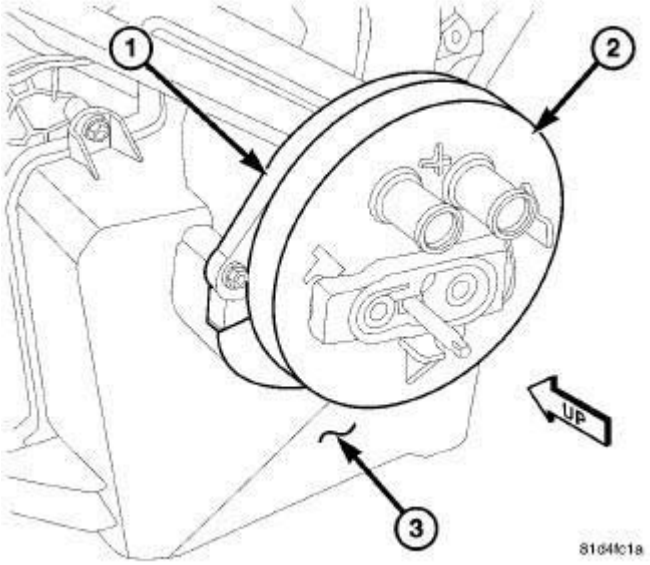


Fig. 296: Rear Housing Flange Seal
Courtesy of CHRYSLER LLC

13. Install the foam seal (2) onto the flange (1) at the bottom of the rear heater-A/C housing (3). Make sure that the foam seal is properly installed.
14. Install the rear heater-A/C housing. See **Heating and Air Conditioning/Distribution/HOUSING, A/C and Heater - Installation**.
15. Reconnect the negative battery cable.
16. If the rear A/C evaporator is being replaced, add 30 milliliters (1 fluid ounce) of refrigerant oil to the refrigerant system. When replacing multiple A/C system components, refer to the **REFRIGERANT OIL CAPACITIES** to determine how much oil should be added to the refrigerant system. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

LINES, A/C UNDERBODY

Description

DESCRIPTION

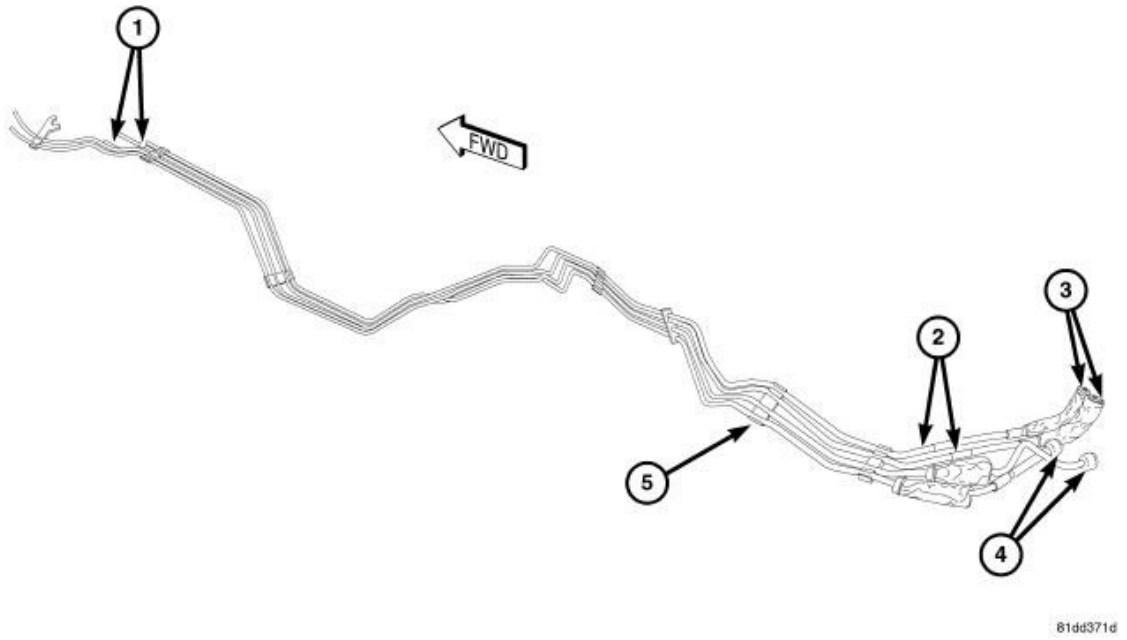


Fig. 297: Underbody Lines
Courtesy of CHRYSLER LLC

Models equipped with the rear heating-A/C system use metal lines attached to the vehicle underbody to carry refrigerant and engine coolant to and from the rear A/C evaporator and heater core. The underbody A/C lines (1) are connected to the front A/C suction and liquid lines and to the rear A/C expansion valve extension tubes using nut type fittings (4) and O-ring seals. The underbody heater lines (2) are connected to the front heater hoses and the rear heater core using spring type clamps (3). The underbody lines are retained to the vehicle by seven plastic mounting brackets (5).

NOTE: Replacement of the refrigerant line O-ring seals is required anytime an underbody refrigerant line is disconnected. Failure to replace the rubber O-ring seals may result in a refrigerant system leak.

The underbody lines have no serviceable parts except for the refrigerant line rubber O-ring seals and metal spring clamps. The O-ring seals used on the refrigerant line connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the underbody refrigerant lines are disconnected.

The underbody lines cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air

Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

NOTE: To prevent any contaminates from entering the rear heating-A/C system, make sure that the area around the underbody line connections is clean of any dirt or foreign residue prior to disconnecting the lines.

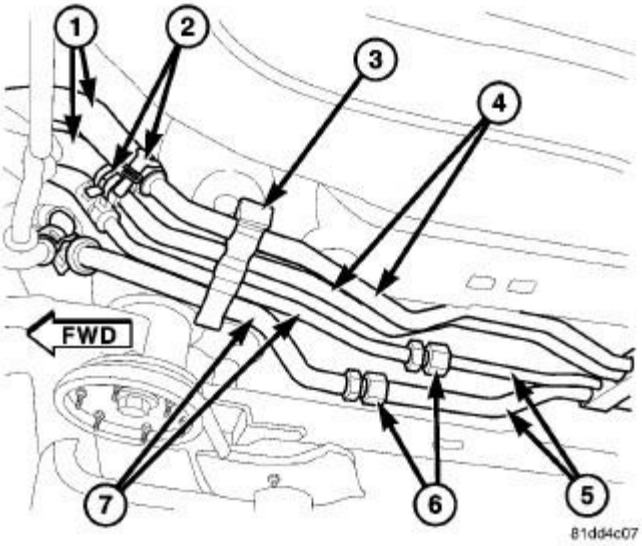


Fig. 298: Underbody Lines Front Connections
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Drain the engine cooling system. Refer to **Cooling - Standard Procedure** .
4. Raise and support the vehicle.
5. Remove the rear section of the exhaust system. Refer to **Exhaust System/PIPE, Exhaust - Removal** .
6. Remove the exhaust heat shields as necessary to gain access to the underbody lines. Refer to **Exhaust System/SHIELD, Heat - Description** .

NOTE: Replacement of the front heater hoses will be required if the hose ends are cut for removal.

7. Release the spring type hose clamps (2) and disconnect the front heater hoses (1) from the underbody heater lines (4).
8. Loosen the fitting nuts (6) that secure the underbody refrigerant lines (5) to the front A/C liquid and suction lines (7).

9. Disconnect the front A/C liquid and suction lines from the underbody refrigerant lines and remove and discard the O-ring seals.
10. Disengage the front A/C liquid and suction lines from the front underbody refrigerant line bracket (3).

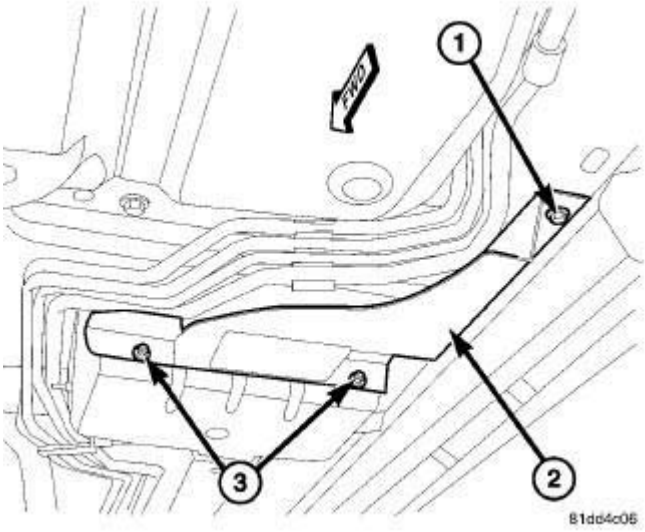


Fig. 299: Underbody Line Shield
Courtesy of CHRYSLER LLC

11. Remove the two nuts (3) and one screw (1) that secure the underbody line shield (2) to the vehicle underbody and remove the shield.

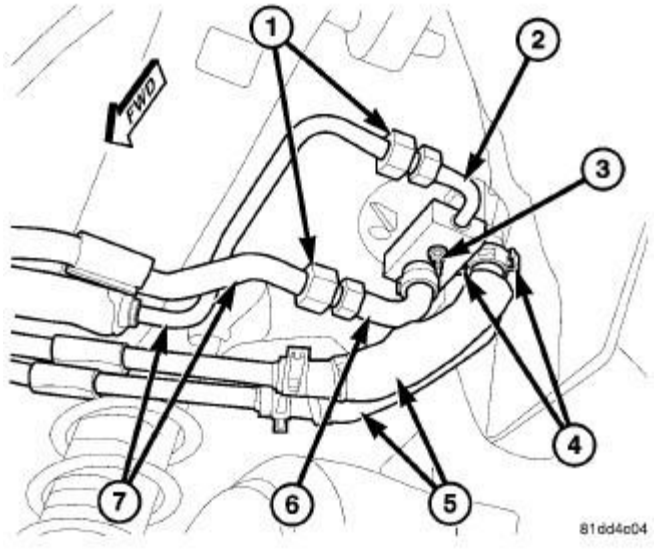


Fig. 300: Underbody Lines to Rear Housing
Courtesy of CHRYSLER LLC

CAUTION: DO NOT apply excessive force on underbody heater lines or rear heater tubes when disconnecting the connections. Excessive force may damage or deform the tubes and or lines, causing an engine coolant leak.

NOTE: Replacement of the rubber heater hose ends will be required if the rubber hoses are cut for removal.

12. Release the spring type hose clamps (4) and disconnect the underbody heater lines (5) from the rear heater core tubes located behind the right rear wheel housing.
13. Lower the underbody heater lines and drain any residual coolant from the lines into a suitable container.
14. Loosen the fitting nuts (1) that secure the underbody refrigerant lines (7) to the underbody refrigerant extension lines and sealing plate (2 and 6).
15. Disconnect the underbody refrigerant lines from underbody refrigerant extension lines and remove and discard the O-ring seals.
16. Remove the nut (3) that secures the underbody refrigerant extension lines and sealing plate to the rear A/C expansion valve.
17. Disconnect the extension lines and sealing plate from the rear A/C expansion valve and remove and discard the O-ring seals.

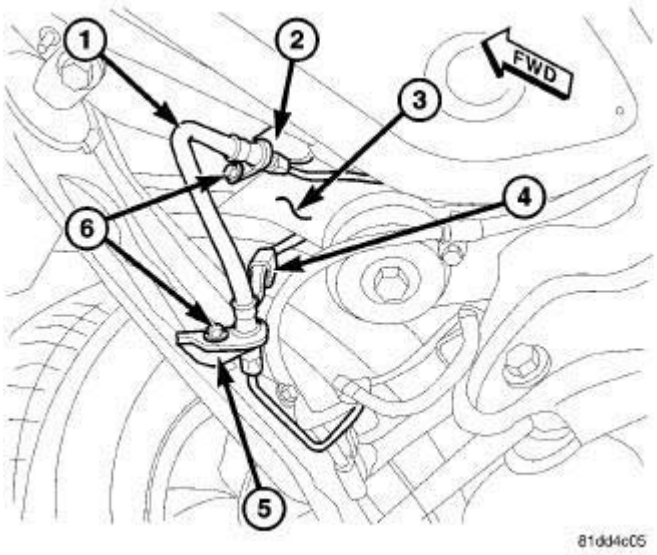


Fig. 301: Right Rear Brake Line Brackets & Wire Harness
Courtesy of CHRYSLER LLC

18. Disconnect the rear ABS wire harness lead and bracket (4) from the right side of the body (3) to gain clearance to partially lower the right side of the rear cradle.

NOTE: It is not necessary to disconnect the brake line to remove it from the brackets.

19. Remove the two bolts (6) that secure the right rear brake line (1) to the two brackets (2 and 5) and remove the brake line from the brackets to gain clearance to partially lower the right side of the rear cradle.

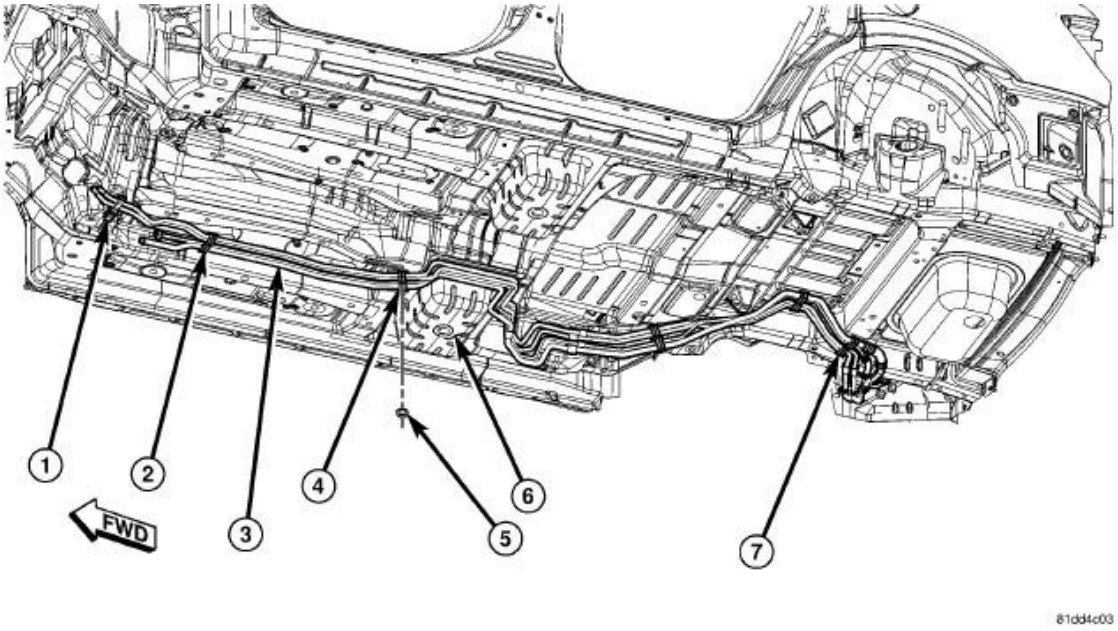


Fig. 302: Underbody Line Brackets
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with rear body cradle removed for clarity.

20. Remove the lower right rear shock retaining bolt. Refer to **Rear Suspension/SHOCK ABSORBER, Suspension - Removal** .

WARNING: Be sure to properly support the rear cradle before removing the right side retaining bolts. Failure to follow this warning may result in serious or fatal injury.

21. Support the right side of the rear cradle with a suitable jack stand and remove the bolts that secure the right side of the cradle to the body. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

CAUTION: Use care not to damage the ABS wire lead or the brake line when lowering the rear cradle for clearance.

22. Carefully lower the jack stand until the right side of the rear cradle (supported by the stand) is approximately 76-101 mm (3-4 in.) below the body. This will allow access to remove the underbody line assembly.
23. Remove the nut (5) that secures the underbody line bracket (4) to the stud located near the center of the underbody (6).

24. Disengage the remainder of the underbody line brackets (1, 2, and 7) from the studs located underneath the vehicle.
25. Rotate and tilt the underbody lines (3) as necessary and remove the lines from the vehicle.
26. Install plugs in, or tape over all the opened refrigerant line fittings and the rear expansion valve ports.

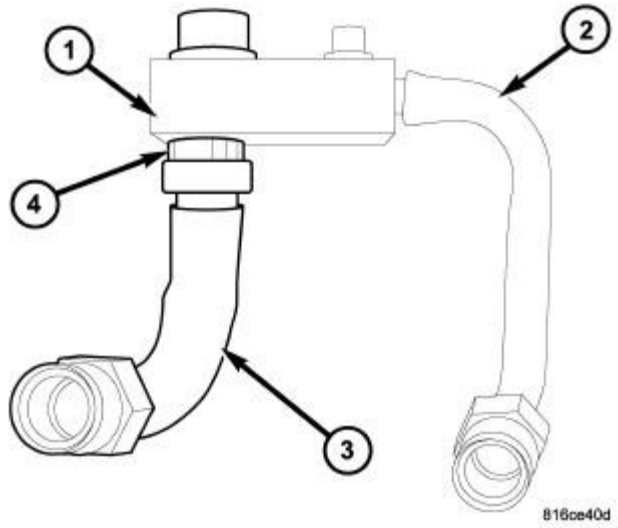


Fig. 303: Underbody Suction Extension Line
Courtesy of CHRYSLER LLC

27. If required, place the extension lines and sealing plate (1) on a workbench, remove the nylon retaining clip (4) that secures the suction extension line (3) to the sealing plate and remove the suction line from the sealing plate.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime an underbody refrigerant line is disconnected. Failure to replace the rubber O-ring

seals may result in a refrigerant system leak.

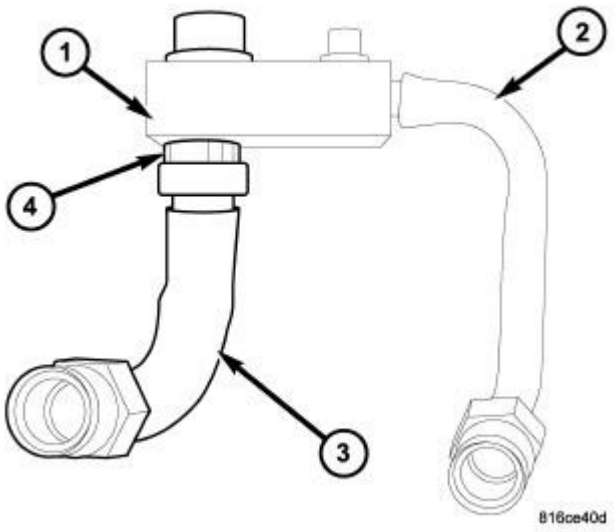


Fig. 304: Underbody Suction Extension Line
Courtesy of CHRYSLER LLC

1. If removed, install the suction extension line (3) into the sealing plate (1) and install the nylon retaining clip (4).

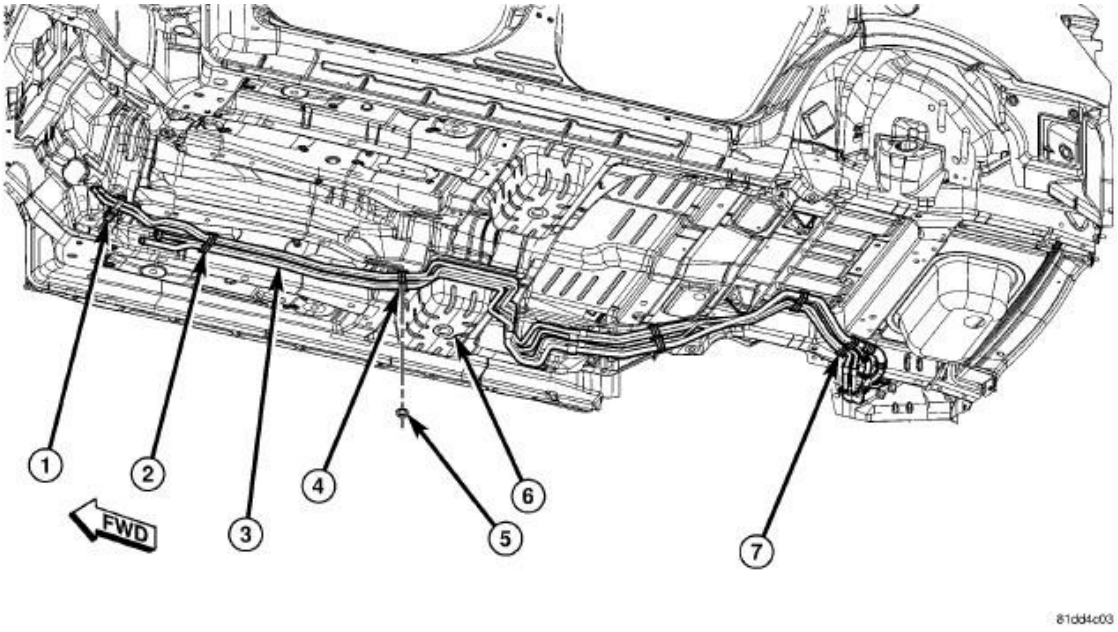


Fig. 305: Underbody Line Brackets
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with rear body cradle removed for clarity.

2. Position the underbody lines (3) and engage the underbody line brackets (1, 2, and 7) to the mounting studs located on the underbody (6). Rotate and tilt the underbody lines as necessary. Make sure the brackets are fully engaged to the studs.
3. Position the underbody line bracket (4) onto the mounting stud located near the center of the underbody and install the retaining nut (5). Tighten the nut securely.

CAUTION: Use care not to damage the ABS wire lead or the brake line when repositioning the rear cradle.

4. Carefully raise the jack stand until the right side of the rear cradle is positioned to the body.

WARNING: Be sure to properly support the rear cradle when installing the right side retaining bolts. Failure to follow this warning may result in serious or fatal injury.

5. Install the bolts that secure the right side of the cradle to the body and remove the jack stand. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
6. Install the lower right rear shock retaining bolt. Refer to **Rear Suspension/SHOCK ABSORBER, Suspension - Installation** .

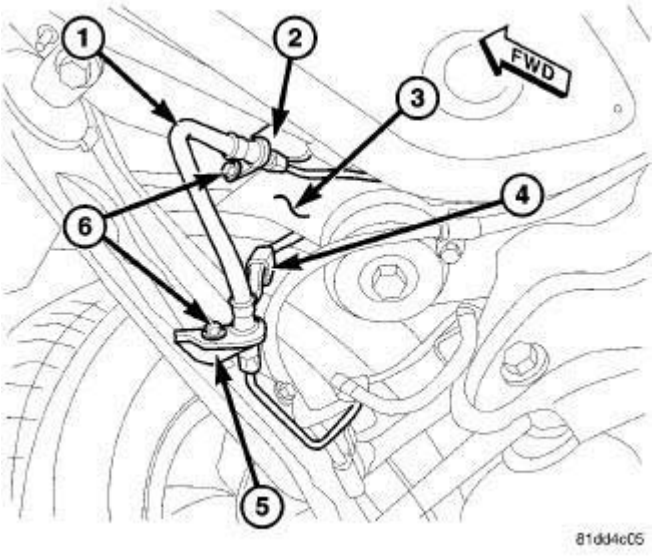


Fig. 306: Right Rear Brake Line Brackets & Wire Harness
Courtesy of CHRYSLER LLC

7. Connect the rear ABS wire harness lead and bracket (4) to the right side of the body (3).
8. Position the right rear brake line (1) onto the two brackets (2 and 5) and install the two retaining bolts (6). Tighten the bolts securely.

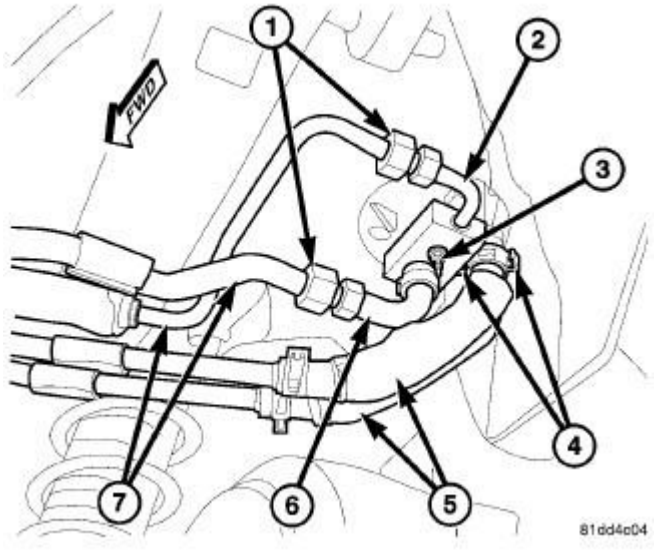


Fig. 307: Underbody Lines to Rear Housing
Courtesy of CHRYSLER LLC

CAUTION: DO NOT apply excessive force on underbody heater lines or rear heater tubes fittings when connecting the connections. Excessive force may damage or deform the tubes and or lines, causing an engine coolant leak.

NOTE: Replacement of the rubber heater hose ends will be required if the rubber hoses were cut for removal.

9. Remove the tape or plugs from all the opened refrigerant line fittings and the rear expansion valve ports.
10. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the underbody refrigerant extension line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
11. Connect the underbody refrigerant extension lines and sealing plate (2 and 6) to the rear A/C expansion valve.
12. Loosely install the nut (3) that secures the extension lines and sealing plate to the rear A/C expansion valve.
13. Connect the underbody refrigerant lines (7) to the underbody refrigerant extension lines and tighten the fitting nuts (1) to 23 N.m (17 ft. lbs.).
14. Tighten the nut that secures the extension lines and sealing plate to the rear A/C expansion valve to 11 N.m (97 in. lbs.).
15. Connect the underbody heater lines (5) to the rear heater core tubes located behind the right rear wheel housing and engage the spring type hose clamps (4).

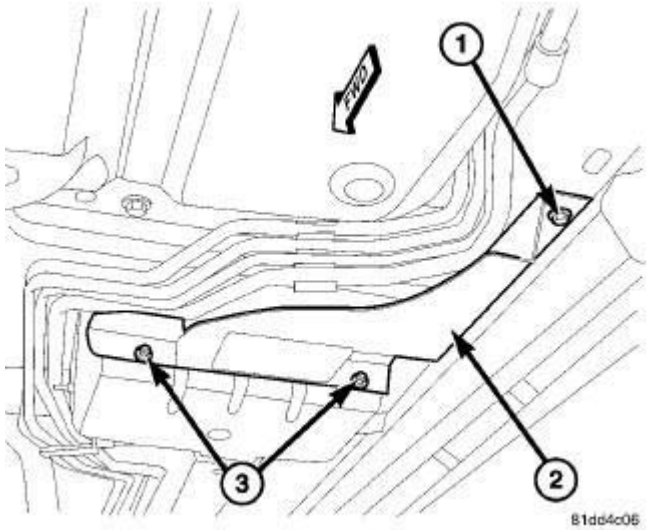


Fig. 308: Underbody Line Shield
Courtesy of CHRYSLER LLC

16. Position the underbody line shield (2) to the vehicle underbody and install the two nuts (3) and one screw (1). Tighten the fasteners securely.

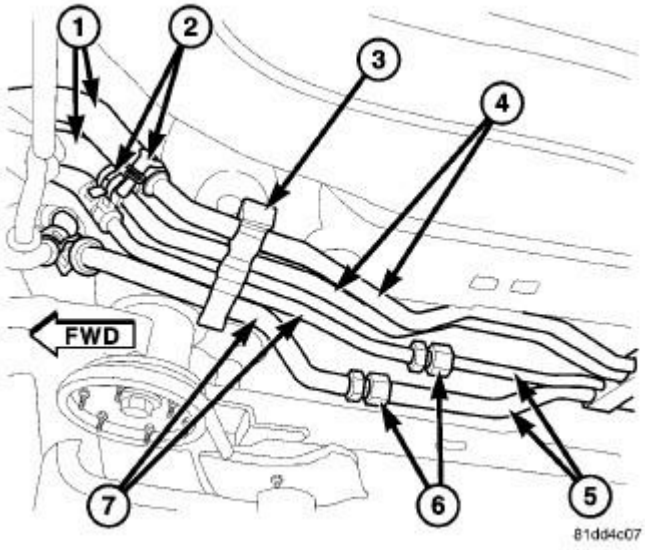


Fig. 309: Underbody Lines Front Connections
Courtesy of CHRYSLER LLC

17. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the underbody refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

18. Connect the front A/C liquid and suction lines (7) to the underbody refrigerant lines (5). Tighten the fitting nuts (6) to 23 N.m (17 ft. lbs.).
19. Position the front A/C liquid and suction lines into the front underbody refrigerant line bracket (3) and engage the bracket retainer.

NOTE: Replacement of the front heater hoses will be required if the hose ends were cut for removal.

20. Connect the front heater hoses (1) to the underbody heater lines (4) and engage the spring type hose clamps (2).
21. Install the exhaust heat shields as necessary.
22. Install the rear section of the exhaust system. Refer to **Exhaust System/PIPE, Exhaust - Installation** .
23. Lower the vehicle.
24. Reconnect the negative battery cable.
25. Fill the engine cooling system. Refer to **Cooling - Standard Procedure** .
26. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
27. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
28. Charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

LINES, A/C UNDERBODY, EXTENSION

Description

DESCRIPTION

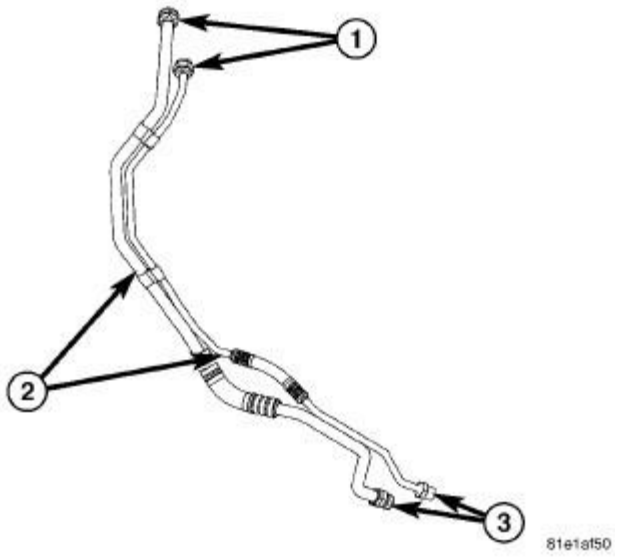


Fig. 310: Underbody A/C Extension Lines Description

Courtesy of CHRYSLER LLC

Models equipped with the rear heating-A/C system use metal lines attached to the vehicle underbody to carry refrigerant and engine coolant to and from the rear A/C evaporator and heater core. The underbody A/C lines are connected to the front A/C suction and liquid lines by use of underbody A/C extension lines (2). The underbody A/C extension lines are connected to the front and underbody refrigerant lines with nut type fittings (1 and 3) and O-ring seals.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime an underbody refrigerant line is disconnected. Failure to replace the rubber O-ring seals may result in a refrigerant system leak.

The underbody A/C extension lines have no serviceable parts except for the rubber O-ring seals. The O-ring seals used on the refrigerant line connections are made from a special type of rubber not affected by R-134a refrigerant. The O-ring seals must be replaced whenever the underbody refrigerant lines are disconnected.

The underbody A/C extension lines cannot be repaired and must be replaced if leaking or damaged.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

NOTE: To prevent any contaminates from entering the rear heating-A/C system, make sure that the area around the underbody line connections is clean of any dirt or foreign residue prior to disconnecting the lines.

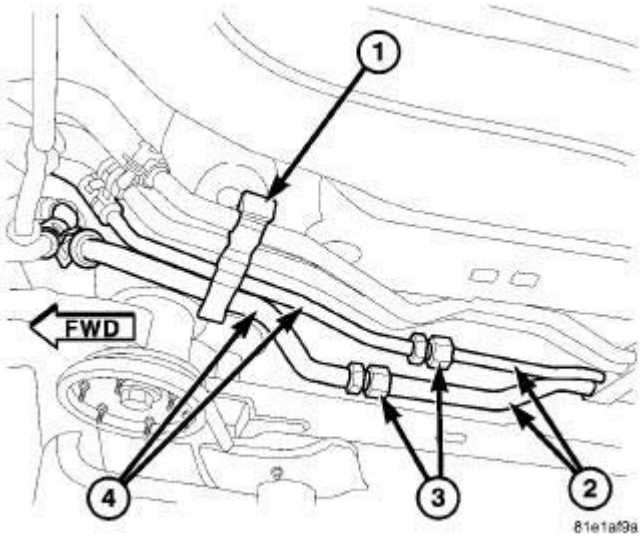


Fig. 311: Extension Lines-Underbody Connections
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
3. Raise and support the vehicle.
4. Disengage the underbody A/C extension lines (4) from the front underbody refrigerant line bracket (1).
5. Loosen the fitting nuts (3) that secure the underbody A/C extension lines to the underbody A/C liquid and suction lines (2).
6. Disconnect the underbody A/C extension lines from the underbody A/C liquid and suction lines and remove and discard the O-ring seals.
7. Install plugs in, or tape over the opened refrigerant line fittings.

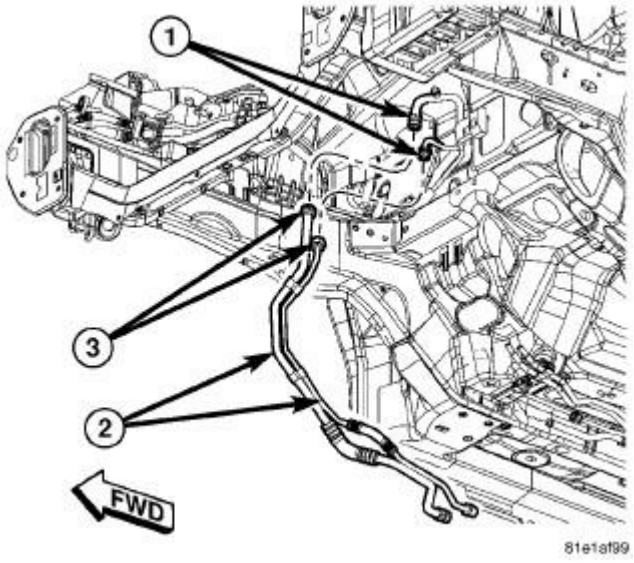


Fig. 312: Extension Lines-Upper Connections
Courtesy of CHRYSLER LLC

8. Lower the vehicle.
9. Loosen the fitting nuts (3) that secure the underbody A/C extension lines (2) to the front A/C liquid and suction lines (1).
10. Disconnect the underbody A/C extension lines from the front A/C liquid and suction lines and remove and discard the O-ring seals.
11. Rotate and tilt the underbody A/C extension lines as necessary and remove the lines from the vehicle.
12. Install plugs in, or tape over the opened refrigerant line fittings.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime an underbody refrigerant line is disconnected. Failure to replace the rubber O-ring

seals may result in a refrigerant system leak.

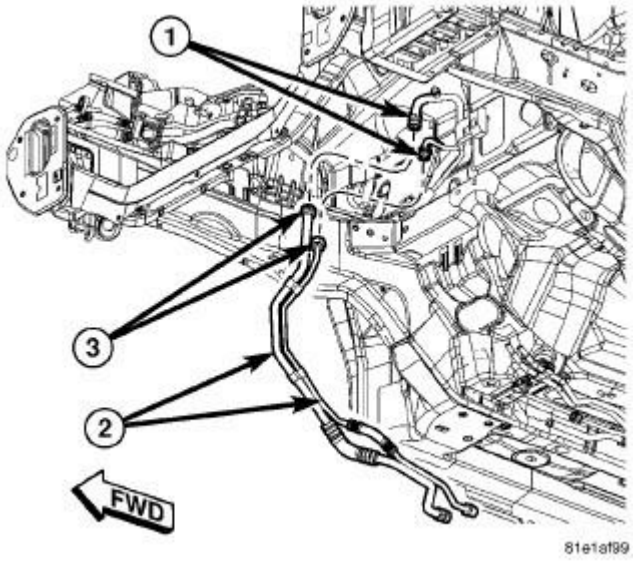


Fig. 313: Extension Lines-Upper Connections
Courtesy of CHRYSLER LLC

1. Remove the tape or plugs from the opened refrigerant extension line fittings.
2. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Position the underbody A/C extension lines (2) into the engine compartment. Rotate and tilt the underbody A/C extension lines as necessary.
4. Connect the underbody A/C extension lines to the front A/C liquid and suction lines (1). Tighten the fitting nuts (3) to 23 N.m (17 ft. lbs.).

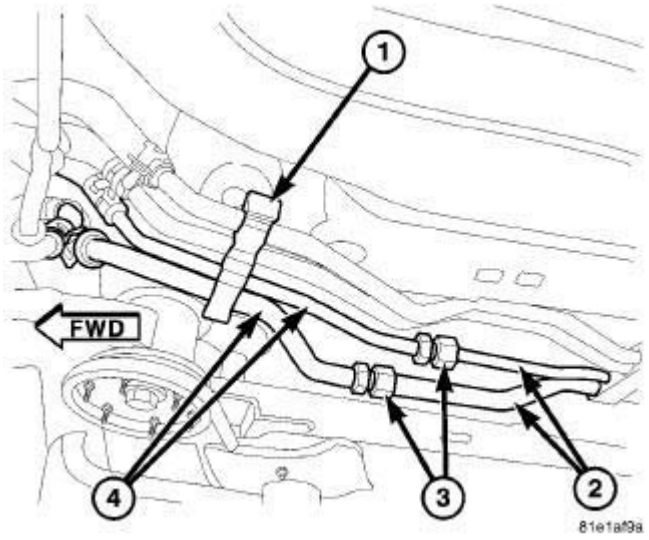


Fig. 314: Extension Lines-Underbody Connections
Courtesy of CHRYSLER LLC

5. Raise and support the vehicle.
6. Remove the tape or plugs from the opened underbody refrigerant line fittings.
7. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
8. Connect the underbody A/C extension lines (4) to the underbody A/C liquid and suction lines (2). Tighten the fitting nuts (3) to 23 N.m (17 ft. lbs.).
9. Position the underbody A/C extension lines into the front underbody refrigerant line bracket (1) and engage the bracket retainer.
10. Lower the vehicle.
11. Reconnect the negative battery cable.
12. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
13. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
14. Charge the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

VALVE, A/C EXPANSION

Description

DESCRIPTION

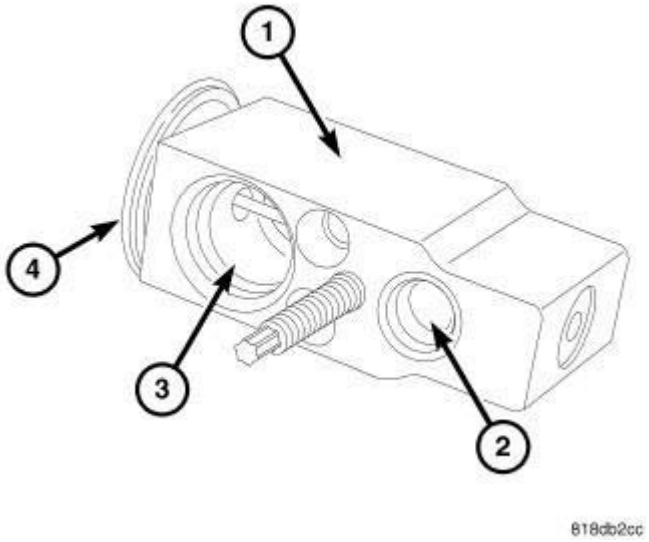


Fig. 315: A/C Expansion Valve Description KA
Courtesy of CHRYSLER LLC

The rear A/C expansion valve controls the amount of refrigerant entering the rear A/C evaporator. The rear A/C expansion valve is of a thermostatic expansion valve (TXV) design and consists of an aluminum H-valve type body (1) with an inlet port (2), outlet port (3) and an integral thermal sensor (4).

The rear A/C expansion valve is located on the bottom of the rear heater-A/C housing, which extends through the rear floor panel behind the right rear wheel housing.

Operation

OPERATION

The rear A/C expansion valve controls the flow of high-pressure, low temperature liquid refrigerant entering the expansion valve and converts it into a low-pressure, low-temperature mixture of liquid and gas before it enters the rear A/C evaporator. To meet the vehicles A/C cooling requirements, a mechanical sensor is used in the rear A/C expansion valve to monitor the temperature and pressure of the refrigerant leaving the rear A/C evaporator and then adjust the inlet port orifice size to allow only the proper amount of refrigerant to enter the evaporator. Controlling the refrigerant flow through the rear A/C evaporator ensures that none of the refrigerant leaving the evaporator is still in a liquid state, which could damage the A/C compressor.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve, or if the expansion valve is removed. Failure to replace the rubber O-ring seals may result in a refrigerant system leak.

The rear A/C expansion valve is factory calibrated and cannot be adjusted or repaired and must be replaced if inoperative or damaged. See **Heating and Air Conditioning/Plumbing/VALVE, A/C Expansion - Diagnosis and Testing**.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow these instructions may result in serious or fatal injury.

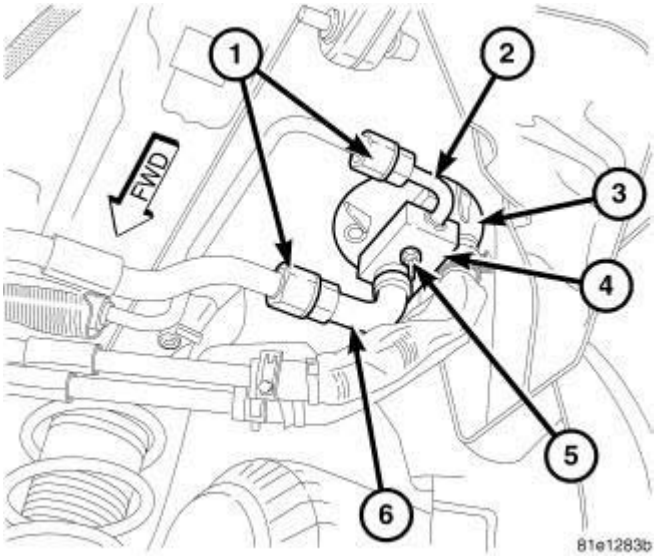


Fig. 316: Rear Underbody Refrigerant Extension Lines
Courtesy of CHRYSLER LLC

1. Recover the refrigerant from the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
2. Raise and support the vehicle.
3. Loosen the nuts (1) that secure the underbody refrigerant lines to the underbody refrigerant extension lines (2 and 6) located behind the right rear wheel housing.
4. Disconnect the underbody refrigerant lines from underbody refrigerant extension lines and remove and discard the O-ring seals.
5. Remove the nut (5) that secures the underbody refrigerant extension line sealing plate (4) to the rear A/C expansion valve (3).
6. Disconnect the underbody refrigerant extension lines and sealing plate from the rear A/C expansion valve and remove and discard the O-ring seals.

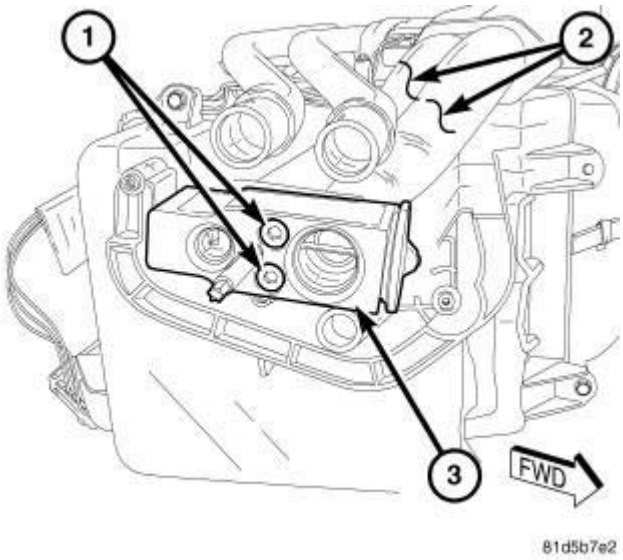


Fig. 317: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with rear heater-A/C housing removed from vehicle.

7. Remove the two bolts (1) that secure the rear A/C expansion valve (3) to the rear evaporator tubes (2), which extend through the rear floor panel behind the right rear wheel housing.
8. Remove the rear A/C expansion valve from the rear evaporator tubes and remove and discard the O-ring seals.
9. Install plugs in, or tape over all the opened underbody refrigerant line fittings and the rear evaporator and expansion valve ports.

Installation

INSTALLATION

CAUTION: Be certain to adjust the refrigerant oil level when servicing the A/C refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure. Failure to properly adjust the refrigerant oil level will prevent the A/C system from operating as designed and can cause serious A/C compressor damage.

NOTE: When replacing multiple A/C system components, refer to the REFRIGERANT OIL CAPACITIES to determine how much oil should be added to the refrigerant system. See Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure.

NOTE: Replacement of the refrigerant line O-ring seals is required anytime a refrigerant line is disconnected from the expansion valve, or if the expansion valve is removed. Failure to replace the rubber O-ring seals may result in a refrigerant

system leak.

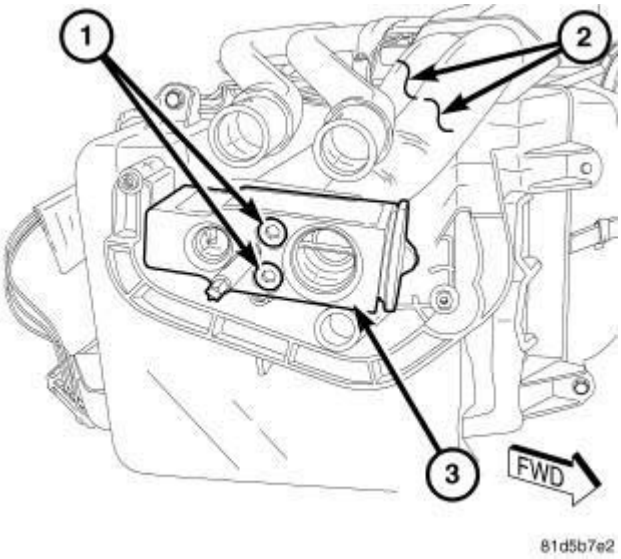


Fig. 318: Rear Expansion Valve Removal/Installation Bench
Courtesy of CHRYSLER LLC

NOTE: Illustration shown with rear heater-A/C housing removed from vehicle.

1. Remove the tape or plugs from the opened underbody refrigerant line fittings and the rear evaporator and expansion valve ports.
2. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the rear evaporator tube fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
3. Install the rear A/C expansion valve (3) onto the rear evaporator tubes (2) extending through the rear floor panel behind the right rear wheel housing.
4. Install two bolts (1) that secure the rear A/C expansion valve to the rear evaporator tubes. Tighten the bolts to 11 N.m (97 in. lbs.).

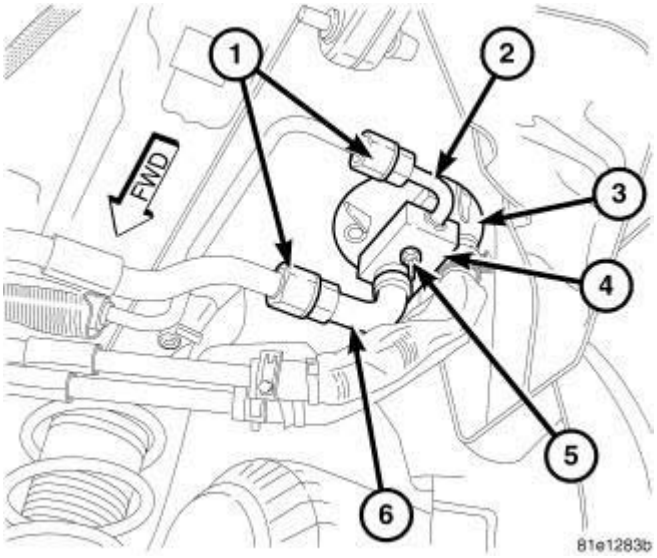


Fig. 319: Rear Underbody Refrigerant Extension Lines
Courtesy of CHRYSLER LLC

5. Lubricate new rubber O-ring seals with clean refrigerant oil and install them onto the underbody refrigerant extension line fittings. Use only the specified O-rings as they are made of a special material for the R-134a refrigerant system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.

CAUTION: Use care when installing the underbody refrigerant extension lines to the rear A/C expansion valve. Carefully align the tube ends with the valve prior to tightening the sealing plate retaining nut or damage to the sealing rings and tube ends may occur.

6. Connect the underbody refrigerant extension lines (2 and 6) and the sealing plate (4) to the rear A/C expansion valve (2).
7. Loosely install the nut (5) that secures the extension lines and sealing plate to the rear A/C expansion valve.
8. Connect the underbody refrigerant lines to the underbody refrigerant extension lines and tighten the fitting nuts (1) to 23 N.m (17 ft. lbs.).
9. Tighten the nut that secures the extension lines and sealing plate to the rear A/C expansion valve to 11 N.m (97 in. lbs.).
10. Lower the vehicle.
11. Evacuate the refrigerant system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.
12. Adjust the refrigerant oil level. See **Heating and Air Conditioning/Plumbing/OIL, Refrigerant - Standard Procedure**.
13. Charge the A/C system. See **Heating and Air Conditioning/Plumbing - Standard Procedure**.

CABIN HEATER

RELAY, HEATER UNIT

Description

DESCRIPTION

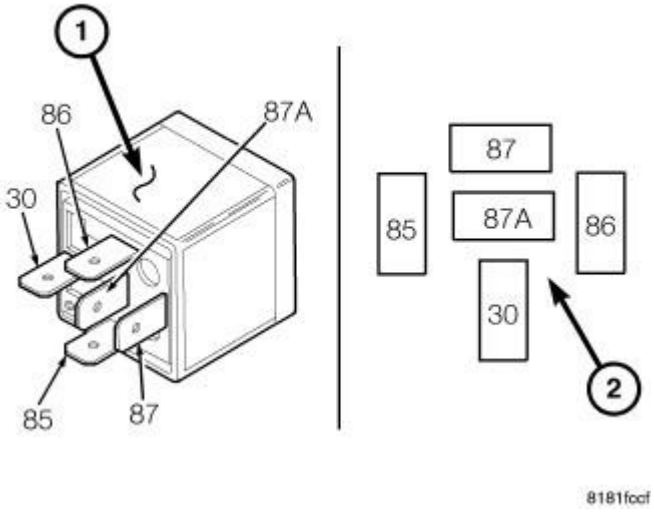


Fig. 320: Standard ISO-Type Relay
Courtesy of CHRYSLER LLC

Three relays (1) are used for the electric positive temperature coefficient (PTC) heater system when equipped with the 2.0L diesel engine. The relays are International Standards Organization (ISO)-type relays. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal functions and patterns (2). The PTC relays are electromechanical devices that switch fused battery current directly to the heating elements of the PTC heater unit. The PTC relays are energized by control circuits of the totally integrated power module (TIPM).

The three PTC relays are located in the diesel accessory fuse/relay block in the engine compartment.

Operation

OPERATION

The three ISO-standard relays (1) used for the electric positive temperature coefficient (PTC) heater system are electromechanical switches that use a low current ASD power input to control the high current fused battery power output to the PTC heater unit. On each relay, the movable, common feed relay contact is held against the fixed, normally closed relay contact by spring pressure. When the electromagnetic relay coil is energized, it draws the movable common feed relay contact away from the fixed, normally closed relay contact and, holds it against the fixed, normally open relay contact. This action allows high current to flow to one or more of the heating elements of the PTC heater.

When the relay coil is de-energized, spring pressure returns the movable relay contact back against the fixed, normally closed contact point. The resistor or diode is connected in parallel with the relay coil, and helps to

dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The terminals for the PTC relays are connected to the vehicle electrical system through receptacles in the diesel accessory fuse/relay block. Refer to **SYSTEM WIRING DIAGRAMS** for inputs and outputs of the PTC relays.

The PTC relays cannot be repaired and must be replaced if inoperative or damaged. See **SYSTEM WIRING DIAGRAMS** for diagnosis and testing of the ISO-standard relays and for complete TIPM and HVAC wiring diagrams.

Removal

REMOVAL

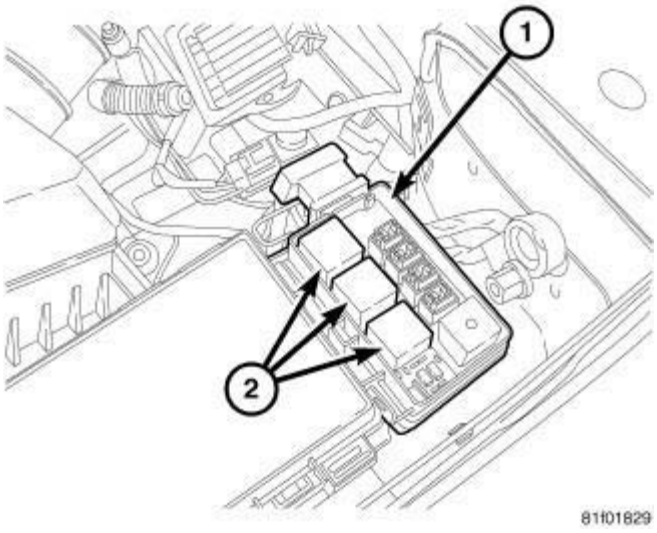


Fig. 321: Diesel Accessory Fuse/Relay Block
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Disconnect and isolate the negative battery cable.
2. Remove the cover from the diesel accessory fuse/relay block (1) located near the left front strut tower.
3. Remove the positive temperature coefficient (PTC) relays (2) as necessary from the fuse/relay block.

Installation

INSTALLATION

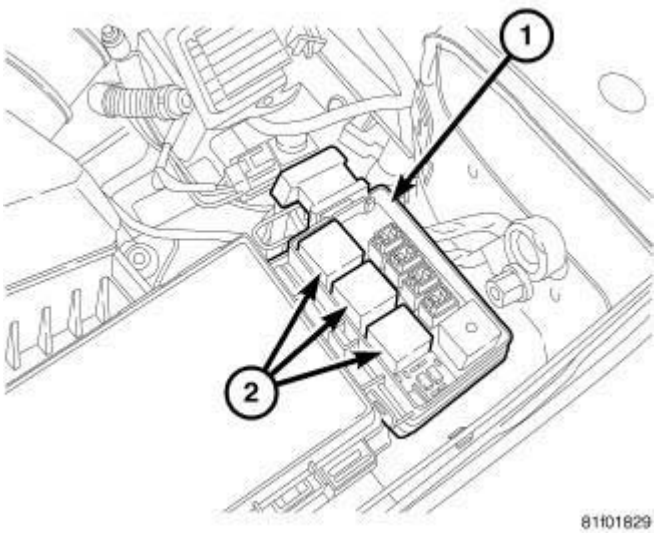


Fig. 322: Diesel Accessory Fuse/Relay Block
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Position the positive temperature coefficient (PTC) relays (2) as necessary into the proper receptacle of the diesel accessory fuse/relay block (1) located near the left front strut tower
2. Align the PTC relay terminals with the terminal cavities in the fuse/relay block and push down firmly on each relay until the terminals are fully seated.
3. Install the cover onto the diesel accessory fuse/relay block.
4. Reconnect the negative battery cable.

UNIT, HEATER

Description

DESCRIPTION

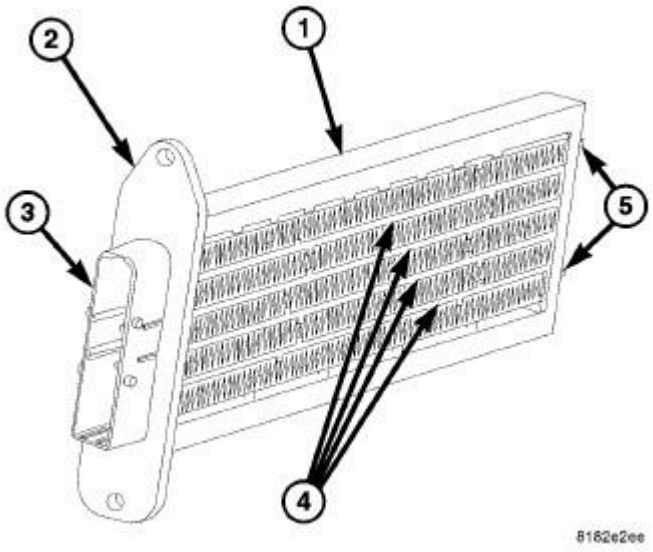


Fig. 323: Positive Temperature Coefficient Heater - Description
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

An electric positive temperature coefficient (PTC) heater unit (1) is used on vehicles when equipped with the 2.0L diesel engine. The PTC heater unit aids in passenger compartment heating by compensating for the lower engine coolant temperatures produced by the diesel engine. The PTC heater unit is mounted in the HVAC air distribution housing, downstream of the heater core and is controlled by the diesel engine control module (ECM) and the totally integrated power module (TIPM) through three relays.

The PTC heater consists of a molded plastic mounting plate (2) with an integral wire connector receptacle (3). Concealed behind the mounting plate are heating elements with fins (4) that transfer the heat produced by the PTC heater to the conditioned air flowing within the air distribution housing. Two retaining tabs (5) are molded onto the opposite end of the heater unit to support the heater unit inside the air distribution housing. The PTC heater unit is connected to the vehicle electrical system through the instrument panel wire harness.

The PTC heater unit is accessed for service from under the left side of the instrument panel.

Operation

OPERATION

The positive temperature coefficient (PTC) heater unit dissipates 1 kW of electrical power through three heating elements. The PTC heater unit is split into three "banks". Each bank (element) is driven separately based on alternator load. This allows for lower in-rush current and optimum battery charging. After a bank has been turned on, another bank can only be turned on 10 seconds after the previous. On average, the PTC banks are not switched more than 25 times for each vehicle start. Electrical power output is between 900-1050 W. The totally integrated power module (TIPM) operates three relays for the PTC heater unit. See **Heating and Air Conditioning/Cabin Heater/RELAY, Heater Unit - Description**.

The control system for the PTC heater unit is diagnosed using a scan tool. Prior to replacing a PTC heater unit, check for any diagnostic trouble codes (DTCs) related to the ECM, TIPM and heating-A/C system.

The PTC heater unit cannot be adjusted or repaired must be replaced if inoperative or damaged.

Diagnosis and Testing

POSITIVE TEMPERATURE COEFFICIENT (PTC) HEATER UNIT

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: See SYSTEM WIRING DIAGRAMS for circuit descriptions and diagrams. Wiring Information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

Prior to replacing the Positive Temperature Coefficient (PTC) heater unit, check for any Diagnostic Trouble Codes (DTCs) related to the Engine Control Module (ECM), Totally Integrated Power Module (TIPM) and the heating-A/C system and repair as necessary. See **DTC-Based Diagnostics/HVAC - Standard Procedure** .

1. Disconnect and isolate the negative battery cable.
2. Disconnect the wire harness connector from the PTC heater unit. See **Heating and Air Conditioning/Cabin Heater/UNIT, Heater - Removal**.
3. Using an ohmmeter, check for continuity between all of the PTC heater unit terminals. In each case there should be continuity. If OK, repair the wire harness circuits between the PTC heater unit, PTC relays and the TIPM. If NOT OK, replace the PTC heater unit.

Removal

REMOVAL

WARNING: Refer to the applicable warnings and cautions for this system before performing the following operation. See Heating and Air Conditioning/Plumbing - Warning and Heating and Air Conditioning/Plumbing - Caution. Failure to follow the warnings and cautions may result in possible serious or fatal injury.

WARNING: Disable the airbag system before attempting any steering wheel, steering column or instrument panel component diagnosis or service. Disconnect

and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

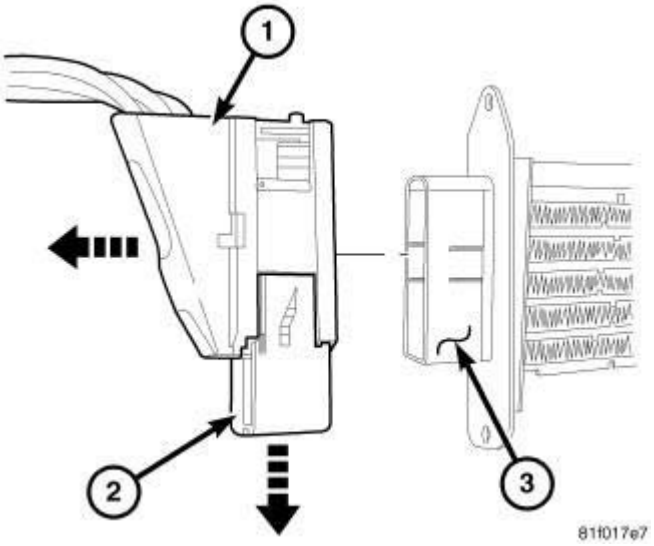


Fig. 324: Positive Temperature Coefficient Connector - Disconnect
Courtesy of CHRYSLER LLC

NOTE: PTC heater removed from distribution housing for clarity.

1. Disconnect and isolate the negative battery cable.

   NOTE: To disconnect the wire harness connector from the heater unit, pull downward on the connector lock while pulling the connector away from the heater unit.

2. Disengage the wire connector lock (2) that secures the wire harness connector (1) to the positive temperature coefficient (PTC) heater unit (3) located on the left side of the HVAC air distribution housing and disconnect the connector from the heater.

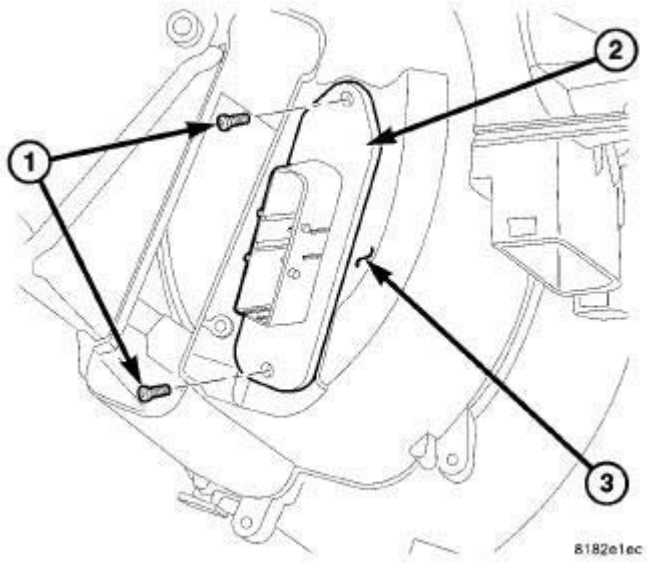


Fig. 325: PM/MK Positive Temperature Coefficient Heater Unit
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

3. Remove the two screws (1) that secure the PTC heater unit (2) to the left side of the HVAC air distribution housing (3).
4. Carefully remove the PTC heater unit from the air distribution housing by pulling it straight out of the housing.

Installation

INSTALLATION

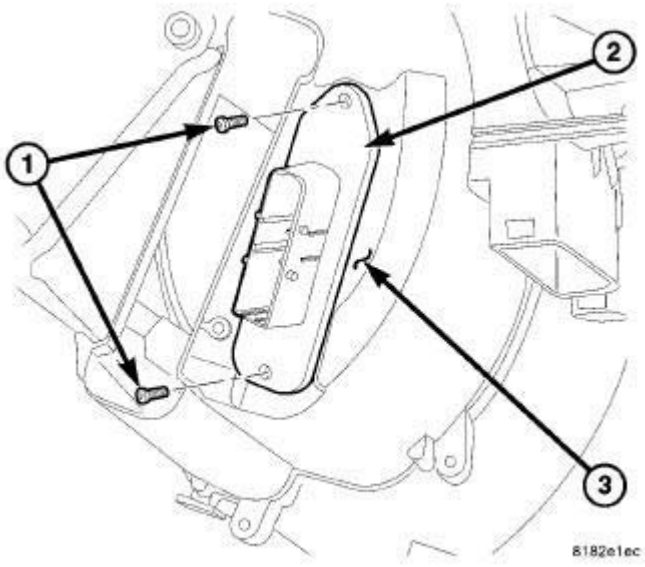


Fig. 326: PM/MK Positive Temperature Coefficient Heater Unit
Courtesy of CHRYSLER LLC

NOTE: LHD model shown. RHD model similar.

1. Carefully install the positive temperature coefficient (PTC) heater unit (2) into the left side of the HVAC air distribution housing (3). Make sure to position the two locator tabs on the end of the heater unit into the molded locator indentations on the right side of the air distribution housing.
2. Install the two screws (1) that secure the PTC heater unit to the air distribution housing. Tighten the screws to 1.2 N.m (10 in. lbs.).

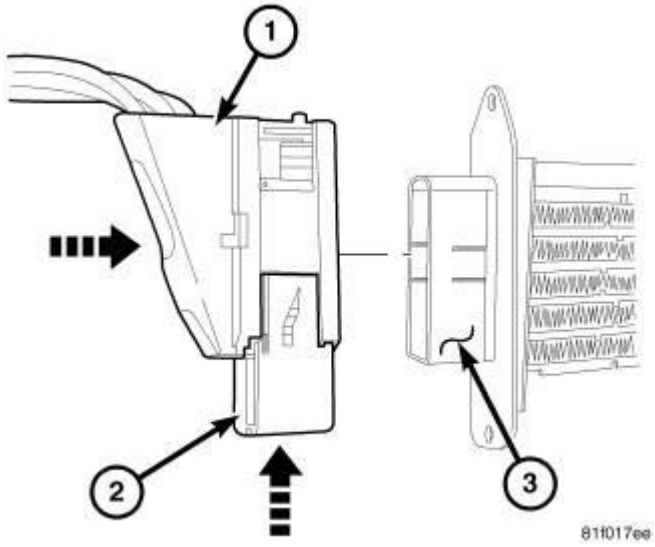


Fig. 327: Positive Temperature Coefficient Connector - Connect
Courtesy of CHRYSLER LLC

NOTE: PTC heater shown removed from distribution housing for clarity.

3. Connect the wire harness connector (1) to the PTC heater unit (3) while pushing upward on the connector lock (2). Make sure the wire harness connector and lock are fully engaged.
4. Reconnect the negative battery cable.

2009 ACCESSORIES AND EQUIPMENT

Instrument Cluster - Service Information - Journey

DESCRIPTION

DESCRIPTION

The instrument cluster contains the necessary hardware and software to serve as the vehicle electronic body control module and is commonly referred to as the Cab Compartment Node (CCN). The CCN utilizes integrated circuitry and information carried on the Controller Area Network (CAN) data bus and the Local Interface Network (LIN) data bus, along with several hardwired analog and multiplexed inputs to monitor sensors and switches throughout the vehicle. The CCN also contains various indicators, analog gauges, and a standard blue-green digital Vacuum Fluorescent Display (VFD) unit. The standard VFD is a fixed segment unit that displays odometer information, automatic transmission gear selector position (PRNDL), and several other indicators, some of which are model dependant.

There are several versions of the CCN offered for this vehicle. These versions accommodate all of the variations of optional equipment for the various markets in which the vehicle is offered. The CCN may also contain a separate reconfigurable blue-green digital VFD unit that has either a Compass Mini-Trip Computer (CMTC) option or an Electronic Vehicle Information Center (EVIC) option. Both of these options provide the outside ambient temperature, compass headings, average fuel economy, and elapsed time. The EVIC option also offers a user interface for customer programmable features, audio system setting displays, numerous textual warnings, reminder indicators, and certain diagnostic information.

A dedicated Light Emitting Diode (LED) soldered onto the circuit board illuminates each indicator in the CCN, except those within a VFD unit. Several dimmable LED units illuminate each gauge dial face for visibility when the exterior lighting is turned on. These LED units are not available for service replacement and, if damaged or ineffective, the entire CCN must be replaced.

The CCN is serviced only as a complete unit and cannot be adjusted or repaired. If a gauge, LED unit, VFD unit, electronic circuit board, circuit board hardware, cluster overlay, or cluster housing is damaged or ineffective, the entire CCN must be replaced. The cluster lens is available for separate service replacement.

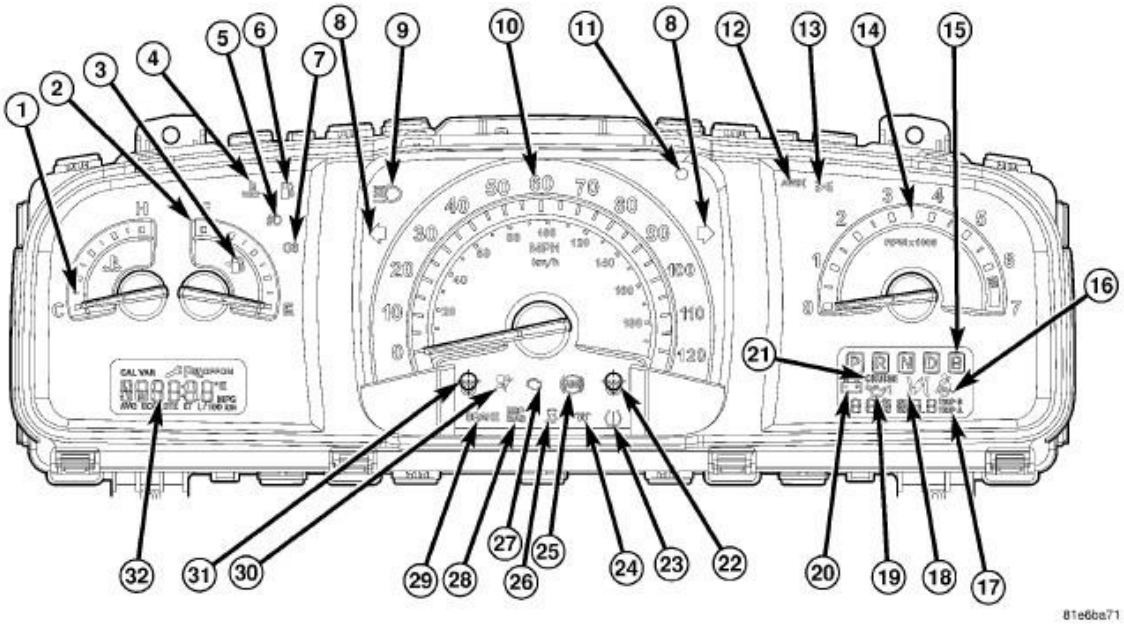


Fig. 1: Mechanical Instrument Cluster
Courtesy of CHRYSLER LLC

The mechanical instrument cluster is an electromechanical module that receives most of its information directly from the various control modules, with the data bus.

The cluster includes:

- A speedometer (10)
- A tachometer (14)
- A fuel gauge (2)
- A coolant Temperature gauge (1)

The warning and information indicators include the following:

- Coolant temperature warning (4)
- Front fog lamp indicator, front (5), and rear (7) (export only)
- Low fuel (6)
- Turn signal indicator (8)
- High beam (9)
- Vehicle theft security system alarm LED indicator (if equipped) (11)
- All-Wheel Drive (AWD) failure indicator (12)
- Front position lamps (13) (export only)
- Transaxle range indicator (15)
- Seat belt reminder (16)
- Odometer/Trip odometer (17)

- Electronic Throttle Control (ETC) warning lamp (18)
- Low oil pressure (19)
- Charging system (20)
- Cruise (if equipped) (21)
- Trip odometer reset button (cycle to change display; Trip A, Trip B, Outside Temperature for base vehicle) (22)
- Tire Pressure Monitoring (TPM) (23)
- Wait to Start Indicator (Export Diesel) (24)
- Anti-lock brake system (If equipped) (25)
- Electronic Stability Program (ESP) and Traction Control System (TSC) (26)
- Check engine (27)
- Electronic Stability Program (ESP) and / Brake Assist System (BAS) Malfunction Lamp (28)
- Brake/park brake warning (29) (Export will display an ICON)
- Airbag (30)
- Compass/Temp display and calibrate button (CMTC Only) (31)
- Vacuum Fluorescent Display (VFD) (32) (if equipped) - For CMTC option, use 31 Compass/Temp display and calibrate button to interface with display. For EVIC option, use front mounted steering wheel switches to interface with display.

Vehicle Warning Messages

When the appropriate conditions exist, messages such as "HOOD" (hood ajar), "DOOR" (door ajar), "GATE" (liftgate ajar), "LoCOOL" (low engine coolant), "LoWASH" (low washer fluid), "GASCAP" (fuel cap fault), "ESPOFF" (ESP in partial off mode), "NoBUS" (data bus communication fault), "NoFUSE" (IOD fuse out), "HotOIL" (2.4L engine oil temp too hot), or "CHANGE OIL" displays in the odometer.

Change Oil Message (Base and mid line clusters only)

Your vehicle is equipped with an engine oil change indicator system. The "CHANGE OIL" message flashes in the instrument cluster odometer for approximately 12 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message continues to display each time you turn the ignition switch to the ON position. To turn off the message temporarily, press and release the TRIP ODOMETER button on the instrument cluster. To reset the oil change indicator system, (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the ON position. (Do not start the engine).
2. Fully press the accelerator pedal slowly three times within 10 seconds.
3. Turn the ignition switch to the LOCK position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure

OPERATION

OPERATION

The instrument cluster contains the necessary hardware and software to serve as the vehicle's electronic body control module and is commonly referred to as the Cab Compartment Node (CCN). The following information deals primarily with the instrument cluster functions of this unit. Additional details of the electronic body control functions may be found within the service information for the system or component that the CCN controls. For example, additional details of the audible warning functions of the CCN are found within the **CHIME/BUZZER - SERVICE INFORMATION** .

The CCN is designed to allow the vehicle operator to monitor the conditions of many of the vehicle components and operating systems. The gauges and indicators in the CCN provide valuable information about the various standard and optional powertrains, fuel and emissions systems, cooling systems, lighting systems, safety systems and many other convenience items. The CCN is installed in the instrument panel so that the operator of the vehicle can view all of these monitors easily, yet still allow relative ease of access for service.

The microprocessor-based CCN hardware and software uses various inputs to control the gauges and indicators visible on the face of the cluster. Some of these inputs are hard wired, but most are in the form of electronic messages that are transmitted by other electronic modules over the Controller Area Network (CAN) data bus and the Local Interconnect Network (LIN) data bus. The CCN is the master of the LIN bus. These four modules talk to the CCN: The Heated Seat Module (HSM); the Remote Compass Module (RCM); the Steering Control Module (SCM); and the Accessory Switch Bank Module (ASBM). Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/COMMUNICATION - Operation** .

The CCN microprocessor smooths the input data using algorithms to provide gauge readings that are accurate, stable, and responsive to operating conditions. These algorithms are designed to provide gauge readings during normal operation that are consistent with customer expectations. However, when abnormal conditions exist such as high coolant temperature, the algorithm can drive the gauge pointer to an extreme position and the microprocessor can sound a chime through the on-board audible tone transducer to provide distinct visual and audible indications of a problem to the vehicle operator. The CCN may also produce audible warnings for other electronic modules in the vehicle based upon electronic tone request messages received over the CAN/LIN data bus. Each audible warning is intended to provide the vehicle operator with an audible alert to supplement a visual indication.

The CCN circuitry operates on battery current received through a fused B(+) fuse on a non-switched fused B(+) circuit, and on battery current received through a fused ignition switch output (run-start) fuse on a fused ignition switch output (run-start) circuit. This arrangement allows the/CCN to provide some features regardless of the ignition switch position, while other features will operate only with the ignition switch in the On or Start positions. The CCN circuitry is grounded through a ground circuit of the instrument panel wire harness.

The CCN also has a self-diagnostic actuator test capability that tests each of the CAN bus message-controlled functions of the cluster. This test illuminates the appropriate indicators, positions the gauge needles at several predetermined calibration points across the gauge faces, and illuminates all segments of the odometer/trip

odometer/gear selector indicator Vacuum-Fluorescent Display (VFD) unit and Electronic Vehicle Information Center (EVIC). The EVIC will display the hardware/software version, and the CAN and LIN Vehicle Maintenance Monitor (VMM) used in the CCN. See **Diagnosis and Testing** .

The CCN collects data and provides control signals for the following electrical equipment via the CAN data bus:

- Gauges
- Interior lighting controls
- Variable-intensity cluster lighting and illumination of instrument panel mounted equipment
- Vehicle Theft Alarm and Sentry Key Theft Deterrent System
- Power door lock system controls (automatic locking, and Remote Keyless Entry locking and unlocking)
- Headlamp switch actuation signal
- Steering wheel radio actuation signals
- Accessory power delay relay control
- Wiper control
- Turn signal flasher audible click
- Heated seat actuation signal (if equipped)
- UConnect® Hands-Free, Voice-Actuated Communication system actuation signal (if equipped)
- Display of the outputs for the HomeLink® universal home security system and compass (if equipped)
- Illuminated entry system
- Key-in-ignition warning chime
- Seat belt warning chime and lamp (Including BeltAlert®)
- Door ajar warning indicator
- Liftgate/trunk ajar warning indicator
- LIN master module

The CCN also provides the following enhancements to the above features:

- Time-out for interior lamps left on inadvertently
- Driver programmability of the power locks to unlock only the driver's door or all doors with the first actuation of the RKE unlock button
- Ability to program vehicle response to lock and unlock commands from the RKE transmitter
- The improved BeltAlert® seatbelt warning indication
- Filtering of input signals to the fuel gauge, temperature gauge, and speedometer to avoid sudden, unexpected pointer movements
- Headlamp control for turning the headlamps on if the windshield wipers are operated in daylight as required by law in some states

GAUGES

All gauges receive battery current through the CCN circuitry only when the ignition switch is in the On or Start positions. With the ignition switch in the Off position, battery current is not supplied to any gauges, and the CCN circuitry is programmed to move all of the gauge needles back to the low end of their respective scales. Therefore, the gauges do not accurately indicate any vehicle condition unless the ignition switch is in the On or Start positions.

All of the CCN gauges are stepper motors. The gauges are diagnosed using the CCN self-diagnostic actuator test. See **Diagnosis and Testing** . Proper testing of the CAN data bus and the electronic data bus message inputs to the CCN that control each gauge require the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information. Specific operation details for each gauge may be found elsewhere in this service information.

VACUUM-FLUORESCENT DISPLAYS

The Vacuum-Fluorescent Display (VFD) units are soldered to the CCN electronic circuit board. With the ignition switch in the Off or Accessory positions, the standard left and optional right VFD displays are activated when the driver door is opened and is deactivated when the driver door is closed. Otherwise, the display units are active when the ignition switch is in the On or Start positions, and inactive when the ignition switch is in the Off or Accessory positions.

The illumination intensity of the VFD units are controlled by the CCN circuitry based upon an input from the headlamp switch and a dimming level input received from the panel dimmer switch. The CCN synchronizes the illumination intensity of other VFD units with that of the unit in the CCN by sending electronic dimming level messages to other electronic modules in the vehicle over the CAN/LIN data bus.

The CCN VFD units have several display capabilities. The standard VFD unit displays odometer, trip odometer, engine hours, gear selector indication (PRNDL) for models with an automatic transmission, several warning or reminder indications, and various diagnostics information when certain fault conditions exist. An odometer/trip odometer switch on the CCN circuit board is used to control some of the display modes of the standard VFD. This switch is actuated manually by depressing the odometer/trip odometer switch button, which extends through the cluster lens below the speedometer at the bottom right hand side. Actuating this switch momentarily with the ignition switch in the On position will toggle the VFD between odometer, trip odometer modes, and outside ambient temperature (for base vehicle only). Depressing the switch button for about two seconds while the VFD is in the trip odometer mode will reset the trip odometer value to zero. The optional VFD unit on the left hand side displays the Compass Mini-Trip Computer (CMTC) or the Electronic Vehicle Information Center (EVIC). The left switch button, which extends through the cluster lens below the speedometer at the bottom left hand side, is used as a STEP button for the CMTC display and for customer programmable features. Refer to **Electrical - Message Systems/Message Center/CENTER, Electronic Vehicle Information - Operation** . The front mounted steering wheel switches are used to interface with the EVIC display.

NOTE: If the vehicles OnBoard Diagnostic (OBD) system determines that the fuel filler cap is loose, improperly installed, or damaged; a "GASCAP" message will be displayed in the Odometer/Trip Odometer. In this instance, tighten the fuel filler cap and press the odometer/trip odometer reset button once to turn the message OFF. The key must be in the Run/Start position during the reset, or you may just cycle the key. If left loose for three trips, or key cycles, a DTC will set and the MIL lamp will illuminate.

Holding the right switch depressed while turning the ignition switch from the Off position to the On position will initiate the CCN self-diagnostic actuator test. Refer to**Diagnosis and Testing** service information for additional details on this cluster function. The CCN microprocessor remembers which display mode is active when the ignition switch is turned to the Off position, and returns the VFD display to that mode when the ignition switch is turned On again.

The VFD unit is diagnosed using the CCN self-diagnostic actuator test. See **Diagnosis and Testing** . Proper testing of the CAN data bus and the electronic data bus message inputs to the CCN that control some of the VFD functions requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information. Specific operation details for the odometer, the trip odometer, the gear selector indicator, and the various warning and reminder indicator functions of the VFD unit may be found elsewhere in this service information. Refer to the vehicle owner's manual for further information on various readout messages.

ODOMETER/TRIP ODOMETER DISPLAY

The odometer and trip odometer give an indication to the vehicle operator of the distance the vehicle has traveled. The engine hours give an indication of the cumulative engine-ON time. This indicator is controlled by the instrument cluster circuitry based upon cluster programming and electronic messages received by the cluster from the Powertrain Control Module (PCM) or Engine Control Module (ECM) over the Controller Area Network (CAN) data bus.

The odometer/trip odometer will display some warning messages such as "DOOR" and "GATE" ajar. If equipped with the optional Electronic Vehicle Information Center (EVIC), the EVIC will display all messages except GASCAP.

The odometer, trip odometer, and engine hours information is displayed by the instrument cluster Vacuum Fluorescent Display (VFD). The VFD will display the odometer information whenever the driver side front door is opened with the ignition switch in the OFF or ACCESSORY positions, and will display the last previously selected odometer or trip odometer information when the ignition switch is turned to the ON or START positions. If your vehicle is equipped with an engine oil change indicator system, the "Change Oil" message will flash in the instrument cluster odometer for approximately 12 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The instrument cluster circuitry controls the VFD and provides the following features:

- **Odometer/Trip Odometer Display Toggling** - Actuating the trip odometer reset switch button momentarily with the VFD illuminated will toggle the display between the odometer and trip odometer information. Each time the VFD is illuminated with the ignition switch in the ON or START positions, the display will automatically return to the last mode previously selected (odometer or trip odometer).
- **Engine Hours Display Toggling** - When the trip odometer reset switch button is pressed and held for 10 seconds with the ignition switch in the ON position and the engine not running and the engine speed message from the PCM is zero, the trip odometer information will be momentarily displayed, then the engine hours information will be displayed. The VFD must be displaying the odometer information when the trip odometer reset switch button is pressed in order to toggle to the engine hours display. The engine hours will remain displayed for about 30 seconds, until the engine speed message is greater than zero, or until the ignition switch is turned to the OFF position, whichever occurs first.
- **Trip Odometer Reset** - When the trip odometer reset switch button is pressed and held for longer than about two seconds with the ignition switch in the ON or START position, the trip odometer will reset to

0.0 kilometers (miles). The VFD must be displaying the trip odometer information in order for the trip odometer information to reset.

- **GASCAP Message Display** - For vehicles manufactured with a United States country code, each time the cluster receives an electronic message from the PCM indicating a monitored leak in the evaporative emissions system the cluster replaces the displayed odometer/trip odometer value with the textual message, **GASCAP** . This message serves as a reminder to the vehicle operator to check that the gas cap is properly installed and tightened, but could also indicate another source of air leakage in the on-board evaporative and vapor recovery emissions systems. Unless the leak is corrected, this message will latch and remain displayed during the current and each subsequent ignition cycle until the trip odometer reset button is pressed and released momentarily, which will revert the display to the odometer/trip odometer information that was last displayed for the remainder of that ignition cycle. Once the source of a leak has been corrected, the GASCAP message display will stay illuminated until the evaporative emission system runs the next leak check and passes.
- **Change Oil Indicator** A change oil indicator is standard equipment on all instrument clusters built for the US market. The change oil indication appears within the fixed segment odometer Vacuum Fluorescent Display (VFD) unit on vehicles not equipped with an optional Electronic Vehicle Information Center (EVIC). On vehicles equipped with the optional EVIC, the change oil indication in the odometer VFD is electronically suppressed so as not to duplicate indications that are provided by the EVIC. The odometer VFD change oil indicator consists of cycling textual **CHANGE** then **OIL** messages, which appear in place of the odometer/trip odometer information. The EVIC change oil indicator consists of a textual **Oil Change Required** message that appears within the EVIC VFD
- **Communication Error** - If the cluster fails to receive an electronic **distance** message during normal operation, it will hold and display the last data received until the ignition switch is turned to the OFF position. If the cluster does not receive a **distance** message within one second after the ignition switch is turned to the ON position, it will display the last distance value stored in the cluster memory. If the cluster is unable to display distance information due to an error internal to the cluster, the VFD will display **Error** .
- **Actuator Test** - Each time the cluster is put through the actuator test, the odometer VFD will display all of its segments simultaneously, and then step through each character segment individually during the VFD portion of the test to confirm the functionality of the VFD and the cluster control circuitry.

The PCM continually monitors the vehicle speed pulse information received from the Vehicle Speed Sensor (VSS) or the Controller Anti-lock Brake (CAB) and engine speed pulse information received from the crankshaft position sensor, and then sends the proper messages to the CCN. For further diagnosis of the odometer/trip odometer or the instrument cluster circuitry that controls these functions. See **Diagnosis and Testing** .

For proper diagnosis of the VSS, the crankshaft position sensor, the CAB, the PCM, the CAN data bus, or the electronic communication related to odometer/trip odometer operation a diagnostic scan tool is required. Refer to the appropriate diagnostic service information.

COMPASS MINI-TRIP COMPUTER (CMTC) DISPLAY

The CMTC system conveniently allows the driver to select a variety of useful information by pressing the Compass/Temp Display and Calibrate button, which extends through the cluster lens below the speedometer at the bottom left hand side. The CMTC displays the following information:

- **Compass display**
- **Outside temperature display**
- **Trip computer functions**
- **Elapsed time**

For additional information. Refer to **Electrical - Message Systems/Message Center/CENTER, Electronic Vehicle Information - Operation** .

ELECTRONIC VEHICLE INFORMATION CENTER (EVIC) DISPLAY

The EVIC system conveniently allows the driver to select a variety of useful information by pressing the **MENU** button and **STEP/SELECT** button, which are located on the front of the steering wheel. The EVIC displays information related to the following:

- **Audio mode display**
- **Compass display**
- **Navigation system screens (if equipped)**
- **Outside temperature display**
- **Personal Settings (customer programmable features)**
- **System Status**
- **Trip computer functions**
- **UConnect™ hands-free communication system displays (if equipped)**
- **Vehicle information warning message displays**

For additional information. Refer to **Electrical - Message Systems/Message Center/CENTER, Electronic Vehicle Information - Operation** .

INDICATORS

Indicators are located in various positions within the CCN and are all connected to the CCN electronic circuit board. All indicators, except the inverter indicator (if equipped), are controlled by CAN data bus messages. The brake indicator is controlled by CAN data bus messages from the Controller Antilock Brake (CAB) as well as by hard-wired park brake switch inputs to the CCN. The seatbelt indicator is controlled by the CCN and is turned on and off depending upon the CAN message received. The Malfunction Indicator Lamp (MIL) is normally controlled by CAN data bus messages from the Powertrain Control Module (PCM); however, if the CCN loses CAN data bus communication, the CCN circuitry will automatically turn the MIL on and display NoBUS in the right VFD until CAN data bus communication is restored. The CCN uses CAN data bus messages from the Totally Integrated Power Module (TIPM), the ORC, the CAB, and the Sentry Key Remote Entry Module (SKREEM) to control all of the remaining indicators.

The various CCN indicators are controlled by different strategies. Some receive fused ignition switch output from the CCN circuitry and have a switched ground. Others are grounded through the CCN circuitry and have a switched battery feed. However, all indicators are completely controlled by the CCN microprocessor based upon various hard wired and electronic message inputs. The cruise indicator located within the VFD unit is

dimmable. All other indicators are illuminated at a fixed intensity, which is not affected by the selected illumination intensity of the CCN general illumination LED's. The illumination intensity of the dimmable indicators is synchronized with that of the CCN general illumination LED's.

In addition, certain indicators in this instrument cluster are automatically configured or self-configured. This feature allows the configurable indicators to be enabled by the CCN circuitry for compatibility with certain optional equipment. The CCN defaults for the ABS indicator and airbag indicator are enabled, and these configuration settings must be programmatically disabled in the CCN using a diagnostic scan tool for vehicles that do not have this equipment. The automatically configured or self-configured indicators remain latent in each CCN at all times and will be active only when the CCN receives the appropriate CAN message inputs for that optional system or equipment.

The hard-wired indicator inputs may be diagnosed using conventional diagnostic methods. However, the CCN circuitry and CAN/LIN bus message controlled indicators are diagnosed using the CCN self-diagnostic actuator test. Some indicators are requested to be turned on via the LIN bus. See **Diagnosis and Testing** . Proper testing of the CAN/LIN data bus and the electronic message inputs to the CCN that control an indicator requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information. Specific details of the operation for each indicator may be found elsewhere in this service information.

CLUSTER ILLUMINATION

The CCN has several illumination lamps that are illuminated whenever the exterior lighting is turned On. The illumination intensity of these lamps is adjusted when the left multifunction dimming control ring is rotated (down to dim, up to brighten) to one of five available minor detent positions. The CCN monitors a resistor-multiplexed input from the headlamp switch on a dimmer input circuit. In response to that input, the CCN electronic circuitry converts a fused 12-volt input it receives on a hard-wired panel lamps dimmer switch signal circuit into a 12-volt Pulse Width Modulated (PWM) output.

The CCN uses this PWM output to control the illumination intensity of the cluster, the instrument panel center stack illumination, and the VFD unit on the CCN circuit board. The CCN also transmits electronic dimming level messages over the LIN data bus to other electronic modules (such as the ASBM, HVAC control head, the radio, and the clock) in the vehicle to control and synchronize their illumination intensity.

In addition, the dimming control ring on the headlamp switch has a Parade Mode position to provide a parade or funeral mode. The CCN monitors the request for this mode from the headlamp switch, then transmits an electronic dimming level message to illuminate all VFD units in the vehicle at full (daytime) intensity for easier visibility when driving in daylight with the exterior lighting turned on.

The hard-wired headlamp switch and panel lamps dimmer inputs to and outputs from the CCN may be diagnosed using conventional diagnostic methods. However, proper testing of the PWM processing of the CCN and the electronic dimming level messages sent by the CCN over the CAN data bus requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

DIAGNOSIS AND TESTING

INSTRUMENT CLUSTER

As a quick diagnosis, the cluster will perform a functional check of the odometer display, transmission range display and warning indicators after the ignition is switched to RUN/START. If the cluster is not receiving any bus messages, the cluster will appear non-functional and "no bus" will appear in the odometer display.

A self-test of the cluster can also be initiated by pressing and holding the odometer reset button and switching the ignition from lock to unlock. The cluster will then step through several displays for functional verification. By pressing the trip odometer reset button while going through the self-test, you can temporarily freeze the test. Pressing the bottom again will continue sequence. The cluster will store bus communication faults with other modules. It will also store faults for the AIRBAG and ABS lamps. During the self-diagnostics, the AIRBAG and ABS lamps are tested.

If the cluster is not functioning properly, refer to **BODY** article.

If the cluster is not receiving bus messages, refer to **BODY** article.

In order to diagnose the instrument cluster functions, a scan tool and the proper Body Diagnostic article are required.

If the diagnostic procedure determines that a replacement of an instrument cluster component is required, refer to **Removal** and **Installation** .

REMOVAL

REMOVAL

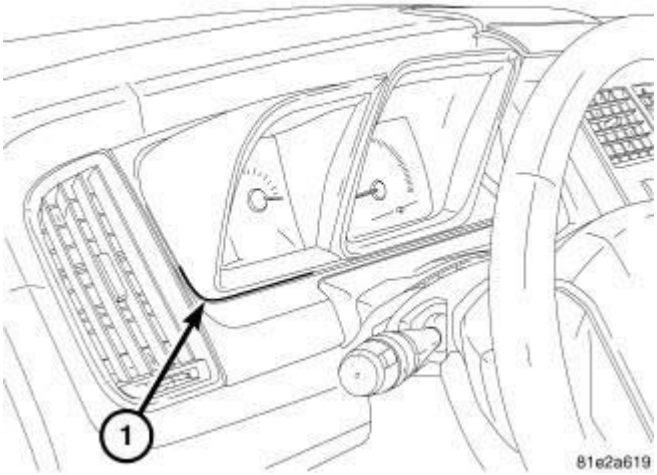


Fig. 2: Instrument Cluster
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.

NOTE: The left hand side of the instrument cluster trim bezel is under the AC vent

on the inboard side. When removing the instrument cluster trim bezel, it may be necessary to flex the AC vent slightly to relieve the bezel from under the AC vent.

2. Remove the instrument cluster trim bezel using a trim stick or equivalent and gently prying at point (1).

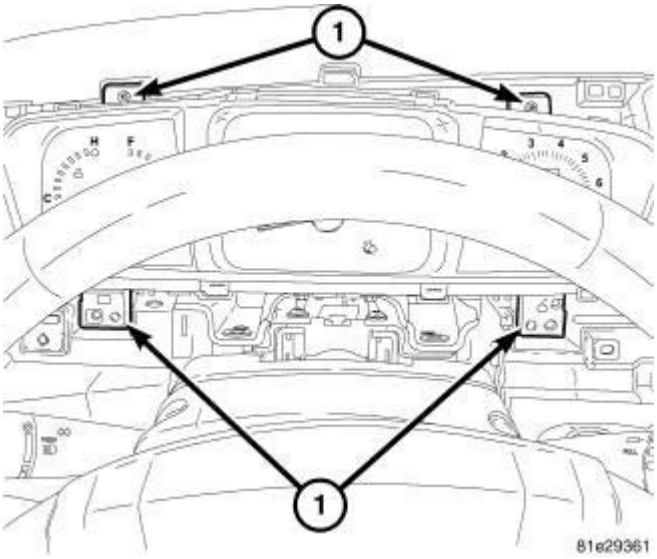


Fig. 3: Instrument Cluster
Courtesy of CHRYSLER LLC

3. Remove the four attaching screws (1) from the cluster.

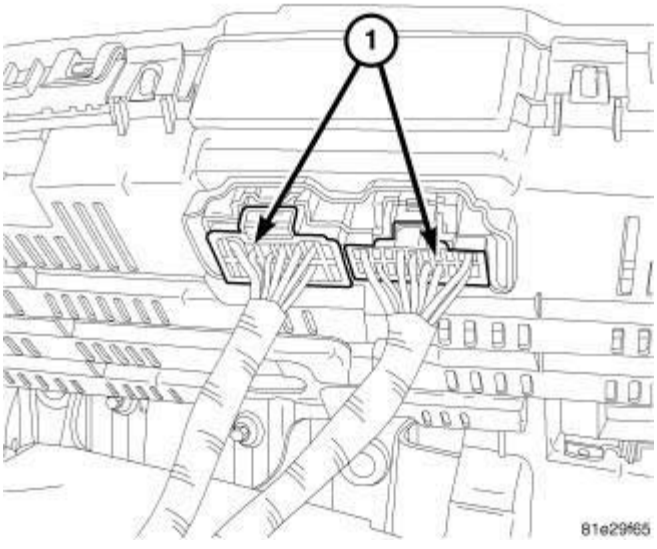


Fig. 4: Instrument Cluster & Electrical Connectors
Courtesy of CHRYSLER LLC

4. Pull the cluster forward and disconnect the two electrical connectors (1).

5. Remove the cluster from the instrument panel.

INSTALLATION

INSTALLATION

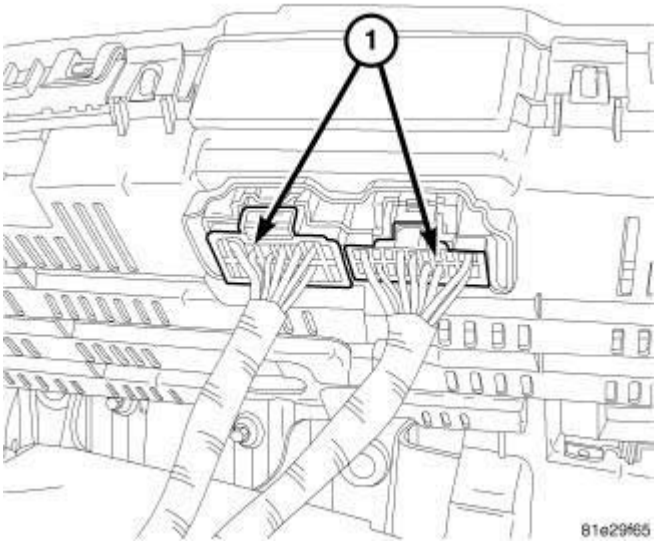


Fig. 5: Instrument Cluster & Electrical Connectors
Courtesy of CHRYSLER LLC

1. Carefully slide the cluster into its location and connect the two electrical connectors (1) to the cluster.

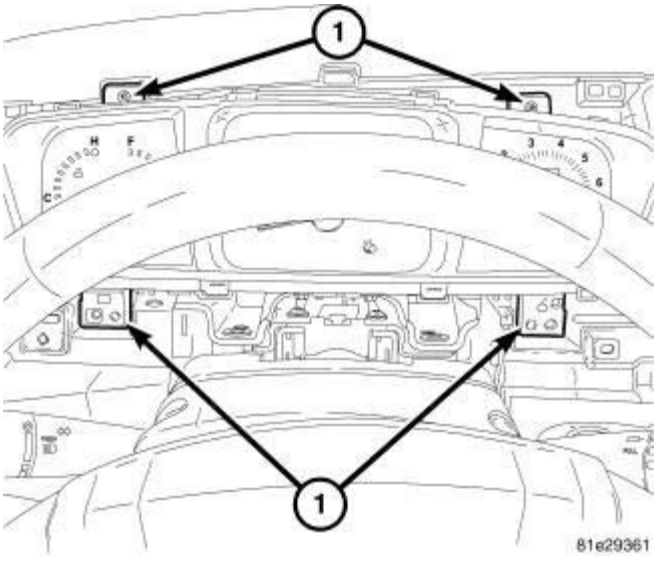


Fig. 6: Instrument Cluster
Courtesy of CHRYSLER LLC

2. Position the cluster in the instrument panel and Install the four cluster attaching screws (1).

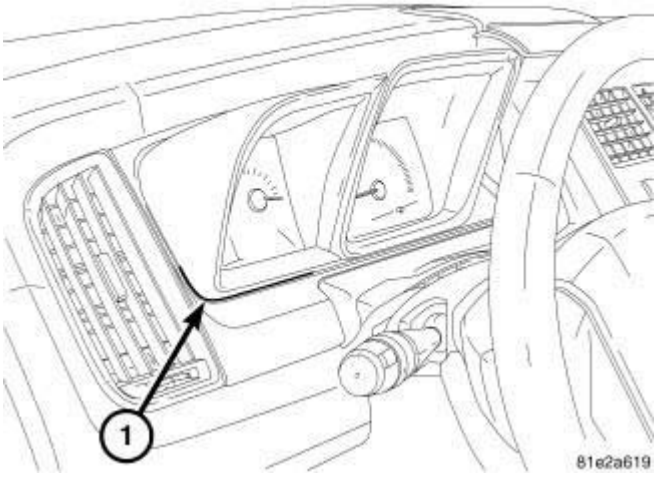


Fig. 7: Instrument Cluster
Courtesy of CHRYSLER LLC

NOTE: When installing the cluster trim bezel, be sure to place the left hand side of the bezel underneath the AC vent. It may be necessary to flex the trim on the AC vent slightly to allow the cluster trim bezel locking clips secure entry into the instrument panel.

3. Install the cluster trim bezel.
4. Connect the battery negative cable.

LENS, INSTRUMENT CLUSTER

REMOVAL

REMOVAL

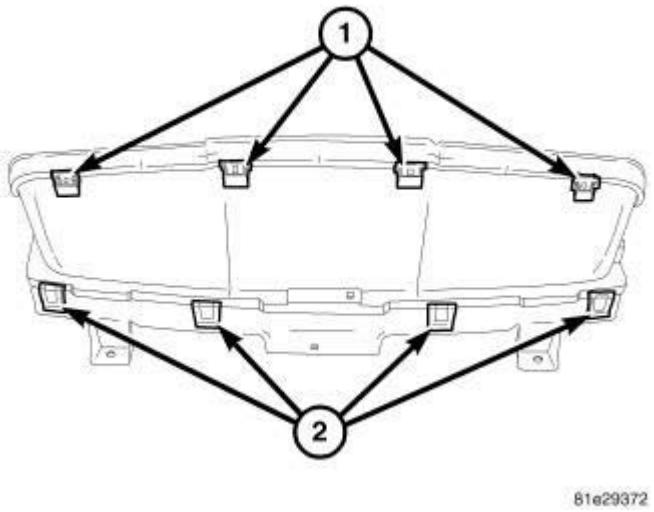


Fig. 8: Instrument Cluster Lens Locking Tabs
Courtesy of CHRYSLER LLC

1. Remove instrument cluster from vehicle. See **Removal** .
2. Separate the lens from the cluster by gently prying on the locking clips (1) around the perimeter of the lens.
3. Separate lens from instrument cluster and remove.

INSTALLATION

INSTALLATION

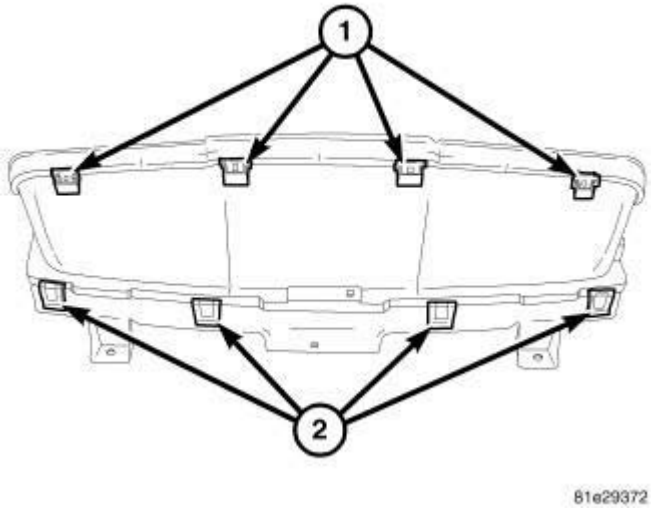


Fig. 9: Instrument Cluster Lens Locking Tabs
Courtesy of CHRYSLER LLC

1. Align lens locking tabs (1) with instrument cluster mask assembly and snap securely into place.
2. Install the instrument cluster into vehicle. See **Installation** .
3. Connect battery negative cable.

POD, SWITCH

DESCRIPTION

DESCRIPTION

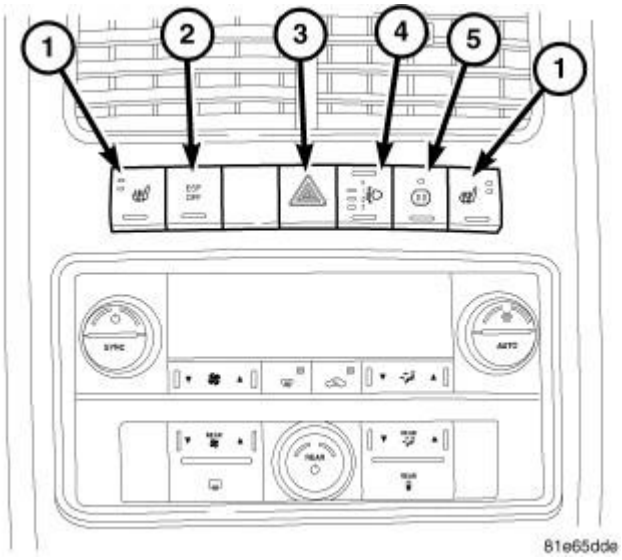


Fig. 10: Accessory Switch Bank Module
Courtesy of CHRYSLER LLC

The Accessory Switch Bank Module (ASBM) is located in the center stack area of the instrument panel just below the heater and air conditioner duct and above the radio. This switch is available in multiple configurations, which vary from a single momentary push button switch to as many as six momentary push button switches, depending upon the optional equipment in the vehicle. The pod may include the following switches:

- **Heated Seats (if equipped) (1)**
- **Electronic Stability Program Off (2)**
- **Hazard Warning (3)**
- **Headlamp Leveling (export only) (4)**
- **Electrical Inverter On/Off (domestic only) (5)**

The switch housing and the push buttons are constructed of molded plastic. Each push button has a smooth finish and is clearly identified with the appropriate text and International Control and Display Symbol icons. Several of the push buttons feature Light Emitting Diode (LED) units to give the vehicle operator an indication when the function of that switch is currently active.

Four screws secure the switch to the back of the instrument panel center bezel through integral mounting tabs that are molded into each corner of the switch housing. The back of the switch housing has an integral connector receptacle containing terminal pins that connect the switch to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

Panel lamps dimmer controlled illumination lamps integral to the circuit board within the switch provide back lighting for visibility at night, but these lamps are not serviceable. The individual switches in the ASBM cannot be repaired and are not serviced individually. If any component within the switch pod is ineffective or damaged, the entire switch pod must be replaced.

The Domestic version of the ASBM is as follows:

- **Heated Seat Switches** (if equipped) -. Refer to **Electrical - Heated/Cooled Systems/Heated Seats/SWITCH, Heated Seat - Description** .
- **ESP Off** -. Refer to **Brakes - Description** .
- **Hazard Switch** (all models) -. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Hazard Warning - Description** .
- **Electrical Inverter** (domestic models).

The Export version of the ASBM will vary from the domestic:

- **Heated Seat Switches** (if equipped) -. Refer to **Electrical - Heated/Cooled Systems/Heated Seats/SWITCH, Heated Seat - Description** .
- **Hazard Switch** (all models) -. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Hazard Warning - Description** .
- **Headlamp Leveling Switch** (if equipped) -. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Headlamp Leveling - Description** .

Each individual switch is not available for service replacement. If one or more switches are inoperative, the entire ASBM must be replaced. See **Removal** . To diagnose the ASBM switches, use a scan tool and the appropriate diagnostic service information.

OPERATION

OPERATION

For information covering details of operation for the individual switches or indicator contained within the instrument panel switch pod, refer to the specific service information covering the system to which that switch or indicator belongs.

- **Heated Seat Switches** (if equipped) -. Refer to **Electrical - Heated/Cooled Systems/Heated Seats/SWITCH, Heated Seat - Description** .
- **ESP On/Off** (domestic models) -. Refer to **Brakes - Description** .
- **Hazard Switch** (all models) -. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Hazard Warning - Description** .

- **Electrical Inverter** (domestic models)
- **Headlamp Leveling Switch** (if equipped) -. Refer to **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Headlamp Leveling - Description** .

REMOVAL

REMOVAL

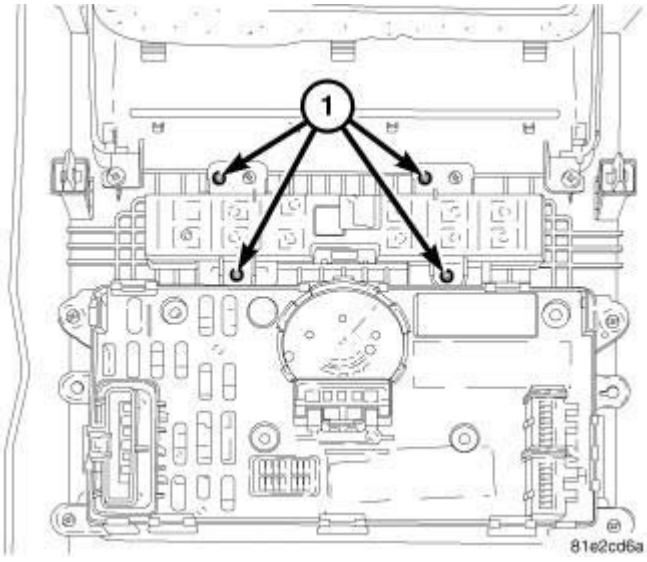


Fig. 11: Instrument Panel Center Bezel
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Removal** .
3. Disconnect the electrical connector from the switch by depressing the lock tab and pulling connector from the ASBM.
4. Remove the four screws (1) to the Accessory Switch Bank Module (ASBM).
5. Remove the ASBM from the instrument panel center bezel.

INSTALLATION

INSTALLATION

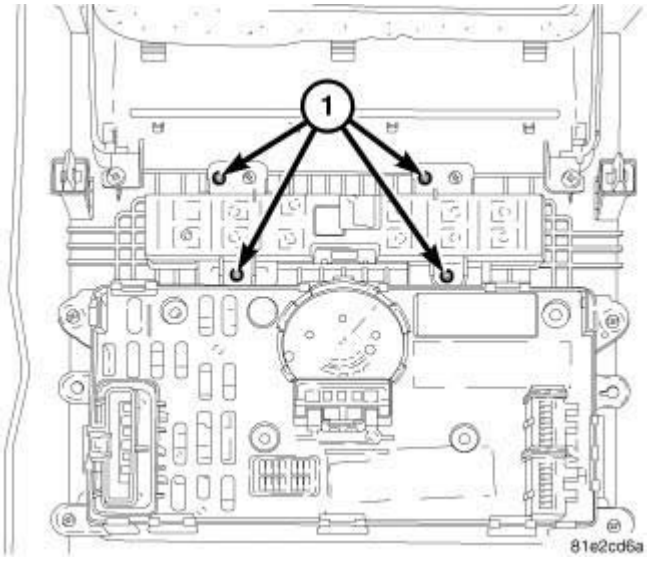


Fig. 12: Instrument Panel Center Bezel
Courtesy of CHRYSLER LLC

1. Position the accessory switch bank module (ASBM) in the center bezel and install the four screws (1).
2. Connect the electrical connector to the ASBM. Be sure the lock tab engages securely into the ASBM.
3. Install the instrument panel center bezel. Refer to **Body/Instrument Panel/BEZEL, Instrument Panel - Installation** .
4. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Lamps/Lighting - Exterior - Service Information - Journey

DESCRIPTION

DESCRIPTION

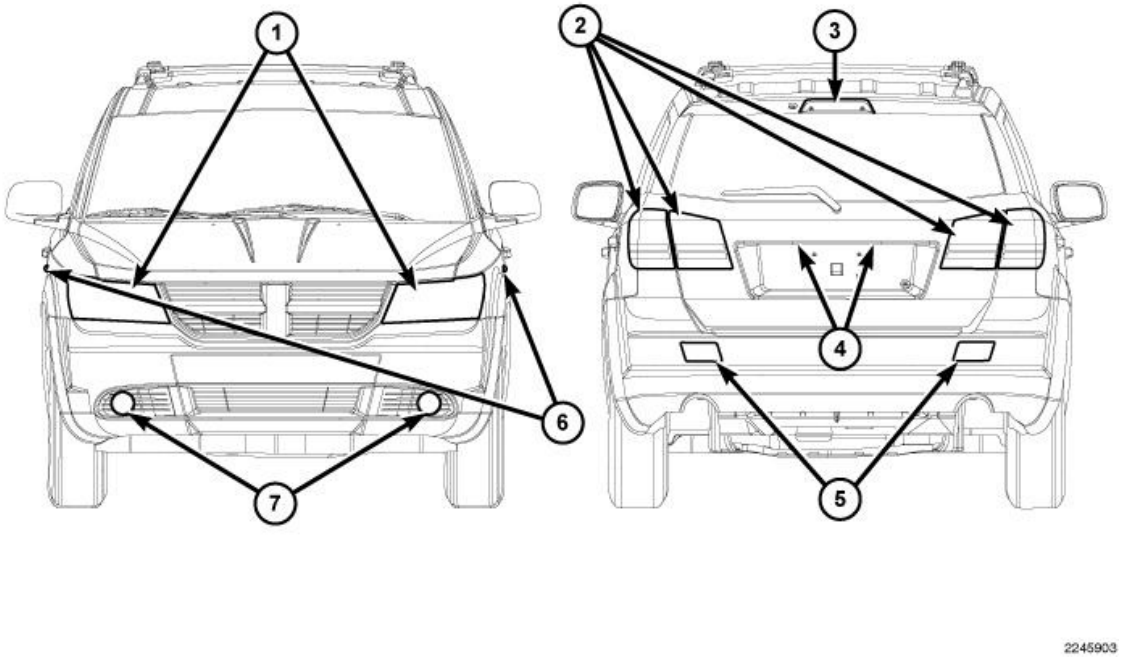


Fig. 1: Exterior Lighting System
Courtesy of CHRYSLER LLC

The exterior lighting system for this vehicle includes the following exterior lamp units:

- **Center High Mounted Stop Lamp (3)** - A standard equipment Center High Mounted Stop Lamp (CHMSL) is centered on the upper liftgate header above the liftgate glass opening at the rear of the vehicle.
- **Front Fog Lamps (7)** - Vehicles equipped with this option have a separate front fog lamp unit mounted near each outboard end of the front fascia, below each front lamp unit.
- **Front Lamp Units (1)** - A standard equipment front lamp unit with two, single-filament headlamp bulbs is located at each outboard side of the grille opening in the Front End Module (FEM).
- **Front Position Lamps** - A front position lamp is integral to each front lamp unit on vehicles manufactured for export markets where they are required.
- **License Plate Lamps (4)** - Two standard equipment rear license plate lamp units are integral to the liftgate handle assembly, just above the license plate tub formation on the outer liftgate panel.

- **Rear Fog Lamps (5)** - A rear fog lamp unit is mounted near each outboard end of the rear fascia, below each rear lamp unit on vehicles manufactured for export markets where they are required.
- **Rear Lamp Units (2)** - A standard equipment two-piece rear lamp unit is mounted on each side at the rear of the vehicle. One piece of the rear lamp is secured to the end of each quarter panel on either side of the liftgate opening and the second piece is secured to each side of the liftgate outer panel, adjacent to the first piece of the rear lamp when the liftgate is closed.
- **Repeater Lamps (6)** - A repeater lamp is mounted to each front fender just behind the front wheel opening on vehicles manufactured for export markets where they are required.

These exterior lighting lamp units and their controls are combined to provide the following exterior lighting features:

- **Automatic Headlamps** - Vehicles with the automatic headlamps option are equipped with a unique left (lighting) multi-function switch that includes an **AUTO** (Automatic) position and have an automatic headlamp sensor to sense ambient light levels. The automatic headlamp sensor is integral to the sun load sensor located on the top of the instrument panel. When the **AUTO** position of the headlamp switch is selected, the headlamps are turned ON and OFF automatically as ambient light levels dictate.
- **Backup Lamps** - The backup (or reverse) lamps include a clear bulb, reflector and clear lens that are integral to the liftgate portions of each rear lamp unit.
- **Brake Lamps** - The brake (or stop) lamps include a clear bulb, reflector and red lens that are integral to the quarter panel portions of each rear lamp unit, and the red lens and multiple Light-Emitting Diode (LED) units of the CHMSL.
- **Daytime Running Lamps** - Daytime Running Lamps (DRL) are standard equipment on vehicles manufactured for sale in Canada and optional on vehicles manufactured for the United States. Vehicles with the DRL feature enabled illuminate the high beam headlamp bulb in each front lamp unit at a reduced intensity to serve as the DRL.
- **Exterior Lamp Fail-Safe Operation** - The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) and the Totally Integrated Power Module (TIPM) provide a fail-safe feature which will automatically turn ON the low beam headlamps and all park lamps when the ignition switch is in the ON position and there is no detected communication from the Steering Control Module (SCM), or when the Local Interface Network (LIN) data bus or Controller Area Network (CAN) data bus are inoperative.
- **Exterior Lamp Load Shedding** - The TIPM provides a battery saver feature which will automatically turn OFF all exterior lamps (except the park/tail lamps in certain export markets) that remain ON with the ignition switch in the LOCK position after a timed interval of about eight minutes.
- **Front Fog Lamps** - The optional front fog lamps include the clear bulb, reflector and clear lens of each adjustable front fog lamp unit.
- **Hazard Warning Lamps** - The hazard warning lamps include the bulbs, reflectors and lenses of each lamp in the right and left, front and rear turn signal circuits.
- **Headlamps** - The headlamps include dual, single filament halogen bulbs, an adjustable reflector and a clear lens integral to each front lamp unit.
- **Headlamp Leveling** - Headlamp leveling is available only in certain markets where it is required equipment. A headlamp leveling actuator motor on each headlamp unit and a headlamp leveling switch integral to the switch pod in the instrument panel center stack allows the headlamp beam pattern to be

adjusted by the vehicle operator from the interior of the vehicle to compensate for passenger or cargo loads.

- **Headlamp Time Delay** - On vehicles equipped with the automatic headlamps option, when this feature is enabled the low or high beam headlamps remain illuminated for a programmable delay interval of 0 (disabled), 30, 60 or 90 seconds after the ignition switch has been turned to the OFF position. If the vehicle is equipped with the optional Electronic Vehicle Information Center (EVIC), this feature is customer programmable through the EVIC.
- **Headlamps With Wipers** - Vehicles with the automatic headlamps option have an automatic headlamps-with-wipers feature. When this feature is enabled and the **AUTO** position of the headlamp switch is selected, the headlamps are turned ON automatically whenever the windshield wipers are turned ON; and, if the headlamps were turned ON automatically when the wipers were turned ON, they will also turn OFF automatically when the wipers are turned OFF if the appropriate ambient light conditions exist. If the vehicle is equipped with the optional EVIC, this feature is customer programmable through the EVIC.
- **Optical Horn** - Also known as flash-to-pass, the beam selection function of the left (lighting) multi-function switch control stalk has a momentary intermediate position that allows the headlamp high beams to be flashed momentarily, without changing the headlamp beam selection.
- **Park/Tail Lamps** - The front park lamps include the amber bulbs, reflectors and clear lenses integral to each front lamp unit and, if the vehicle is so equipped, the clear position lamp bulb integral to each front lamp unit. The rear tail lamps include the clear bulbs, reflectors and red lenses integral to both the quarter panel and liftgate portions of each rear lamp unit as well as the bulbs and lenses of the license plate lamp units.
- **Rear Fog Lamps** - Rear fog lamps are available only in certain export markets where they are required equipment. The rear fog lamps include a clear bulb, a red lens and a reflector that are integral to each rear fog lamp unit.
- **Turn Signal Lamps** - The front turn signal lamps include an amber bulb, a reflector and a clear lens that are integral to each front lamp unit. In certain export markets where they are required, the clear bulbs and lenses of the repeater lamps on each front fender will also be included in the front turn signal circuits. The rear turn signal lamps include an amber bulb, a reflector and a clear lens that are integral to the quarter panel portion of each rear lamp unit.

Other components of the exterior lighting system for this vehicle include:

- **Backup Lamp Switch** - A plunger-type backup lamp switch is installed through the transmission housing of vehicles equipped with a manual transmission and is actuated by the shifter mechanism within the transmission when REVERSE gear is selected. On vehicles with an optional automatic transmission, a stand alone Transmission Range Sensor (TRS) performs the backup lamp switch function.
- **Brake Lamp Switch** - A plunger-type brake lamp switch is located on the brake pedal support bracket under the instrument panel and is actuated by the brake pedal arm when the brake pedal is depressed.
- **Clockspring** - The clockspring includes an integral turn signal cancel cam, which provides automatic turn signal cancellation as the steering wheel is rotated back to its centered position following a vehicle turning maneuver. The clockspring is located near the top of the steering column, directly beneath the steering wheel. Refer to **Restraints/CLOCKSPRING - Description** .
- **Hazard Switch** - A latching push button-actuated hazard switch is integral to the switch pod located just above the heater and air conditioner controls in the center stack area of the instrument panel.
- **Headlamp Leveling Switch** - A four mode push button-actuated headlamp leveling switch is integral to

the switch pod located just above the heater and air conditioner controls in the center stack area of the instrument panel of vehicles manufactured for certain export markets where the headlamp leveling feature is required.

- **Instrument Cluster** - The ElectroMechanical Instrument Cluster (EMIC) is also known as the Cab Compartment Node (CCN) in this vehicle. The EMIC/CCN is located in the instrument panel above the steering column opening, directly in front of the driver. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Instrument Panel Switch Pod** - The instrument panel switch pod contains the hazard switch and, on vehicles so equipped, the headlamp leveling switch. The switch pod is located just above the heater and air conditioner controls in the center stack area of the instrument panel. Refer to **Electrical - Instrument Cluster/Instrument Cluster/POD, Switch - Description** .
- **Left Multi-Function Switch** - The left (lighting) multi-function switch is located on the steering column, just below the steering wheel. A control stalk that extends from the left side of the switch is used to select the turn signal lamps (right or left) and to select the headlamp beam (low, high or optical horn). A control knob on the control stalk is used to select the park lamps, headlamps or fog lamps.
- **Park Brake Switch** - A park brake switch is located on the park brake mechanism. On vehicles with a manual transmission, a park brake hand lever mechanism is located on the side of the floor panel transmission tunnel between the two front seats. On vehicles with an automatic transmission, a park brake foot lever mechanism is located on the driver side cowl side inner panel below the instrument panel.
- **Steering Control Module** - The Steering Control Module (SCM) is located within the left multi-function switch housing on the top of the steering column, just below the steering wheel. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Steering Column - Description** .
- **Stop Lamp Inhibit Relay** - A stop lamp inhibit relay (also known as a brake lamp relay, brake lamp activation relay or trailer tow damping relay) is located in a connector on the left rear quarter inner panel just forward of the shock tower within the passenger compartment.
- **Totally Integrated Power Module** - The Totally Integrated Power Module (TIPM) is located in the engine compartment, near the battery. Refer to **Electrical - Wiring/Power Distribution/MODULE, Totally Integrated Power (TIPM) - Description** .
- **Trailer Tow Wiring** - Vehicles equipped with an optional Trailer Tow Prep package include a wire harness, four relays, a conventional 4-way light duty trailer tow connector and an installation instruction sheet shipped loose in the glove box from the factory for installation by the vehicle owner or the dealer.

Hard wired circuitry connects the exterior lighting system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the exterior lighting components through the use of a combination of soldered splices, splice block connectors and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

OPERATION

Following are paragraphs that briefly describe the operation of each of the major exterior lighting systems. The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the exterior lighting system or the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

AUTOMATIC HEADLAMPS

The optional automatic headlamp system includes the left (lighting) multi-function switch, the Steering Control Module (SCM), the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN), the Totally Integrated Power Module (TIPM), the heater and air conditioner control unit and the sun load sensor on the top of the instrument panel.

The sun load sensor provides an ambient light level input to the A/C - heater control whenever the ignition switch is in the ON position. The A/C - heater control responds to this input by sending the appropriate electronic **light level** messages to the TIPM over the Controller Area Network (CAN) data bus. When the **AUTO** (Automatic) position is selected with the left multi-function switch, the SCM responds to this input by sending the appropriate electronic **lighting switch status** messages to the EMIC over the Local Interface Network (LIN) data bus. The EMIC responds to this input by sending the appropriate electronic **lighting request** messages to the TIPM over the CAN data bus.

With the engine running, the TIPM responds to these messages by automatically controlling a pulse width modulated voltage output to the selected headlamp bulb filaments through the right and left low or high beam driver circuits to illuminate the headlamps. The TIPM also remembers which beams (low or high) were selected when the headlamps were last turned OFF, and energizes those beams and lamps again the next time it turns the headlamps ON.

BACKUP LAMPS

The backup (or reverse) lamps have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured to the body sheet metal within the passenger compartment. On vehicles with a manual transmission, the backup lamp switch provides an input to the TIPM through a backup lamp switch signal circuit, and the TIPM provides battery voltage to the backup lamps on the backup lamp control output circuit whenever the ignition switch is in the ON position and the REVERSE position is selected with the transmission shift linkage.

On vehicles with an automatic transmission, the Powertrain Control Module (PCM) continually monitors a hard wired multiplex input from the Transmission Range Sensor (TRS), then sends the appropriate electronic **transmission gear selector status** messages to other electronic modules over the Controller Area Network (CAN) data bus. Whenever the ignition switch is in the ON position and the TIPM receives an electronic message indicating the status of the transmission gear selector is REVERSE, it provides a battery voltage output

to the backup lamps on the backup lamp control output circuit.

BRAKE LAMPS

The brake (or stop) lamps and the Center High Mounted Stop Lamp (CHMSL) each have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal within the passenger compartment. The TIPM and the CHMSL receive battery voltage on the brake lamp switch output circuit when the brake lamp switch is closed by the brake pedal arm. The brake lamps are then controlled by the TIPM through High Side Drivers (HSD) on the left and right stop lamp control circuits. A stop lamp inhibit relay (also known as a brake lamp relay, brake lamp activation relay or trailer tow damping relay) is used by the Controller Antilock Brake (CAB) to mitigate undesirable brake lamp operation when the CAB activates various brake hydraulic circuits as part of its Traction Control System (TCS) and Trailer Sway Control (TSC) functions. The brake lamp function of the trailer tow wiring is also controlled by an output from the TIPM based upon a hard wired input from the brake lamp switch.

DAYTIME RUNNING LAMPS

Vehicles equipped with this option or manufactured for sale in Canada illuminate the high beam filament of both headlamps at a reduced intensity when the engine is running, the parking brake is released and the exterior lamps are turned OFF. The TIPM must be programmed appropriately for this feature to be enabled. Once enabled, anytime the TIPM receives electronic messages over the CAN data bus from the PCM indicating the engine is running and from the EMIC indicating the status of the left multi-function switch exterior lighting switch input is OFF and that the parking brake is released, the TIPM provides a pulse width modulated voltage output to the proper headlamp bulb filaments through the right and left high beam feed circuits to produce illumination at a reduced intensity.

FRONT FOG LAMPS

Vehicles equipped with optional front fog lamps include a front fog lamp switch integral to the left (lighting) multi-function switch on the steering column. The front fog lamps have a path to ground at all times through their connection to the headlamp and dash wire harness and a takeout with an eyelet terminal that is secured to the body sheet metal. The SCM monitors a hard wired multiplex input from the left multi-function switch to determine whether the fog lamps are selected, then sends the appropriate electronic **front fog lamp switch status** messages to the EMIC over the LIN data bus. The EMIC then relays the appropriate electronic **front fog lamp switch request** messages to the TIPM over the CAN data bus.

When the TIPM receives a **front fog lamp switch request** message, it controls front fog lamp operation by providing a battery voltage output to the fog lamps through the right and left front fog lamp control circuits. The TIPM also sends the appropriate electronic messages back to the EMIC to illuminate or extinguish the front fog lamp indicator. The TIPM will automatically de-energize the front fog lamps any time the headlamp high beams are selected, except on vehicles manufactured for certain export markets.

The TIPM also provides a battery saver (load shedding) feature for the front fog lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position, if there is a charging system failure, or if the electrical system voltage falls below about 11.75 volts for more than about 30 seconds.

Each front fog lamp includes an integral adjustment screw to be used for static aiming of the fog lamp beams.

HAZARD WARNING LAMPS

The hazard warning system includes the EMIC, the TIPM and the hazard switch in the switch pod located in the center stack area of the instrument panel, above the heater and air conditioner control unit. The hazard switch provides a hard wired input to the TIPM. When the TIPM receives an input from the hazard switch it controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the front and rear, right and left turn signal control circuits. On vehicles manufactured for certain export markets where they are required, the TIPM provides battery voltage to the repeater lamps through right and left repeater lamp control output circuits based upon the hazard switch input.

The TIPM also sends the appropriate electronic messages back to the EMIC over the CAN data bus to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the EMIC electronic circuit board that emulates the sound emitted by a conventional hazard warning flasher.

HEADLAMPS

The headlamp system includes the SCM, the EMIC, the TIPM, the headlamp switch on the instrument panel and the left (lighting) multi-function switch on the steering column. The headlamp bulbs have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The TIPM will store a Diagnostic Trouble Code (DTC) for any shorts or opens in the headlamp circuits.

The SCM monitors hard wired multiplex inputs to determine the status of the exterior lighting switches in the left multi-function switch and whether the headlamp high or low beams are selected. The SCM then sends the appropriate electronic **lighting switch status** and **headlamp beam select switch status** messages to the EMIC over the LIN data bus. The EMIC then sends the appropriate electronic **headlamp request** and **headlamp beam request** messages to the TIPM over the CAN data bus. The TIPM responds to these messages by providing a Pulse Width Modulated (PWM) voltage output to the headlamps through high side drivers on the right and left low and high beam feed circuits to illuminate the selected headlamp filaments. The TIPM also sends the appropriate electronic messages back to the EMIC to control the illumination of the high beam indicator.

When the optical horn feature is selected, the low beams will shut OFF about 200 milliseconds after the high beams are activated. The TIPM also remembers which beams (LOW or HIGH) were selected when the headlamps were last turned OFF, and energizes those beams again the next time the headlamps are turned ON. The TIPM provides a battery saver (load shedding) feature for the headlamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position. The SCM and the EMIC each provide a fail-safe feature for the headlamps, which will cause the TIPM to turn the low beam headlamps ON automatically if there is no input available from the SCM or the left multi-function switch. The TIPM also provides a fail-safe feature for the headlamps that will turn the headlamps ON automatically whenever a loss of CAN bus communication is detected with the ignition switch in the ON position.

Each headlamp includes integral reflector adjustment screws to be used for static aiming of the headlamps.

HEADLAMP DELAY

The headlamp delay feature includes the left (lighting) multi-function switch, the SCM, the EMIC and the

TIPM. On vehicles equipped with an optional Electronic Vehicle Information Center (EVIC), this feature has customer programmable delay intervals of 0 seconds (disabled), 30 seconds, 60 seconds and 90 seconds. If the exterior lighting switch is in the **AUTO** (Automatic) position when the ignition switch is moved from the ON position to any position except ON, then the headlamps will remain illuminated until after the selected delay interval has elapsed. The park lamps will not stay ON during the headlamp delay interval. The default delay interval is 90 seconds, but can be reprogrammed by the customer using the customer programmable features function of the EVIC, if the vehicle is so equipped.

HEADLAMP LEVELING

In certain export markets where required, a headlamp leveling system is provided on the vehicle. The headlamp leveling system includes unique front lamp units each equipped with a headlamp leveling actuator motor, and a rocker-actuated headlamp leveling switch integral to the switch pod in the instrument panel center stack. The headlamp leveling system allows the headlamp beams to be adjusted to one of four vertical positions to compensate for changes in inclination caused by the loading of the vehicle suspension. The leveling motors are mechanically connected through an integral pushrod to the adjustable headlamp reflector.

Each time the headlamp leveling switch is depressed the circuitry of the switch pod provides the appropriate electronic **select status up** or **select status down** messages to the EMIC over the LIN data bus. The EMIC then sends the appropriate electronic **select request up** or **select request down** messages to the TIPM over the CAN data bus. The TIPM responds to these messages by providing a voltage output to the headlamp leveling motors through a high side driver on the headlamp level sensor signal circuit to move the headlamp reflectors to the selected position based upon the voltage input received from the TIPM. The TIPM also sends the appropriate electronic messages back to the EMIC and the EMIC relays the messages back to the switch to control the illumination of the **1** , **2** , or **3** Light Emitting Diode (LED) selected position indicator in the headlamp leveling switch button.

The EMIC and TIPM logic will only allow the headlamp leveling system to operate while the ignition switch is in the ON position and the exterior lighting is turned ON.

PARK LAMPS

The park lamps system includes the left multi-function switch on the steering column, the SCM, the EMIC and the TIPM. The front park lamp, side marker lamp and, on vehicles manufactured for certain export markets, position lamp bulbs each have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The rear park/tail lamp, side marker lamp and license plate lamp bulbs each have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal.

The SCM monitors a hard wired multiplex input from the exterior lighting switch of the left multi-function switch, then sends the appropriate electronic **lighting switch status** messages to the EMIC over the LIN data bus. The EMIC then relays the appropriate electronic **lighting request** messages to the TIPM over the CAN data bus. The TIPM responds to these messages by providing a battery voltage output to the appropriate lamp bulbs through high side drivers on the front and rear, right and left lamp driver and control circuits.

The TIPM provides a battery saver (load shedding) feature for the park lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position. The SCM

and the EMIC each provide a fail-safe feature for the park lamps, which will cause the TIPM to turn the park lamps and low beam headlamps ON automatically if there is no input available from the SCM or the left multi-function switch. The TIPM also provides a fail-safe feature for the park lamps that will turn the park lamps and low beam headlamps ON automatically whenever a loss of CAN bus communication is detected with the ignition switch in the ON position.

REAR FOG LAMPS

Rear fog lamps are installed on vehicles manufactured for certain export markets where they are required. The rear fog lamp system includes the left (lighting) multi-function switch, the SCM, the EMIC and the TIPM. The rear fog lamp bulbs have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured to the body sheet metal.

The SCM monitors a hard wired multiplex input from the left multi-function switch to determine whether the rear fog lamps are selected, then sends the appropriate electronic **rear fog lamp switch status** messages to the EMIC over the LIN data bus. Then the EMIC relays the appropriate electronic **rear fog lamp request** messages to the TIPM over the CAN data bus. The TIPM responds to these messages by controlling a battery voltage output to the rear fog lamp bulbs through a high side driver on the rear fog lamp signal control circuit. The TIPM also sends the appropriate electronic messages back to the EMIC to control the rear fog lamp indicator.

The TIPM will automatically energize and de-energize the front fog lamps in concert with the rear fog lamps. The TIPM also provides a battery saver (load shedding) feature for the rear fog lamps, which will turn these lamps OFF if they are left ON for more than about eight minutes with the ignition switch in the LOCK position.

TRAILER TOW WIRING

Vehicles equipped with an optional trailer tow preparation package are shipped from the factory with a trailer tow wiring harness and 4-pin trailer connector that is packaged with an instruction card and placed in the glove box of the vehicle. The trailer tow harness includes four relays designed to isolate the trailer turn signal and stop lamp lighting from the rear vehicle lighting and prevent overloading of the turn signal and stop lamp lighting drivers in the TIPM. These vehicles also include a dedicated park lamp control output circuit protected by a 15 ampere fuse located in the TIPM.

If the trailer lighting is connected directly to the vehicle wiring without using the necessary relays, the vehicle electrical system will become overloaded and the rear lighting of the vehicle will cease to function. The TIPM will store a Diagnostic Trouble Code (DTC) for this condition.

TURN SIGNAL LAMPS

The turn signal lamps system includes the left (lighting) multi-function switch on the steering column, the SCM, the EMIC and the TIPM. The front turn signal lamp bulbs each have a path to ground at all times through their connection to the headlamp and dash wire harness. The headlamp and dash wire harness has takeouts with eyelet terminals that are secured to the body sheet metal. The rear turn signal lamp bulbs have a path to ground at all times through a takeout and eyelet terminal of the body wire harness that is secured by a ground screw to the body sheet metal.

The SCM monitors a hard wired multiplex input from the left multi-function switch to determine the status of the turn signal switch, then sends the appropriate electronic **turn signal switch status** messages to the EMIC

over the LIN data bus. Then the EMIC relays the appropriate electronic **turn signal request** messages to the TIPM over the CAN data bus. The TIPM responds to these messages by controlling a battery voltage output and the flash rate for either the right or left turn signal lamps through high side drivers on the appropriate front and rear, right or left turn signal control circuits. The TIPM also sends the appropriate electronic messages back to the EMIC to control the illumination and flash rate of the right or left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the EMIC electronic circuit board that emulates the sound emitted by a conventional turn signal flasher.

The EMIC also provides a **turn signal ON warning** that will generate repetitive chimes to indicate that a turn signal has been active continuously for 1.6 kilometers (1 mile) with the vehicle speed greater than 22 kilometers-per-hour (15 miles-per-hour). Vehicles built for markets other than the United States and Canada have a revised distance threshold of 4 kilometers (2.49 miles) for this feature. The chime will continue until the turn signal input becomes inactive or until the vehicle speed message indicates that the speed is less than 22 kilometers-per-hour (15 miles-per-hour), whichever occurs first.

WARNING

WARNINGS

WARNING: To avoid serious or fatal injury, eye protection should be used when servicing any glass components.

CAUTION: Do not contaminate the glass of halogen bulbs with fingerprints or allow contact with other possibly oily surfaces. Reduced bulb life will result.

CAUTION: Do not use bulbs with higher candle power than indicated in the Bulb Application table. See Electrical/Lamps/Lighting - Exterior - Specifications. In addition, do not use fuses, circuit breakers or relays having greater amperage value than indicated on the fuse panel or in the Owner's Manual. Damage to lamps, lenses, wiring and other related electrical components can result.

DIAGNOSIS AND TESTING

LAMPS/LIGHTING - EXTERIOR

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: When diagnosing the exterior lighting circuits, remember that high generator output can burn out bulbs rapidly and repeatedly; and, that dim or flickering bulbs can be caused by low generator output or poor battery condition. If one of these symptoms is a problem on the vehicle, be certain to diagnose the battery and charging system, then repair as necessary.

NOTE: A good ground is necessary for proper lighting operation. If a lighting problem is being diagnosed that involves multiple symptoms, systems, or components, the problem can often be traced to a loose, corroded, or open ground.

The lamps and the hard wired circuits between components related to the exterior lighting system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices that provide some features of the exterior lighting system. The most reliable, efficient, and accurate means to diagnose the exterior lighting system or the electronic controls and communication related to exterior lighting system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

BACKUP LAMPS

CONDITION	POSSIBLE CAUSES	CORRECTION
BACKUP LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace backup lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open backup lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open backup lamp feed circuit if required.
	4. Ineffective switch.	4. Test and replace backup lamp switch (manual transmission) or transmission range sensor (automatic transmission) if required.
	5. Ineffective TIPM inputs or outputs.	5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
BACKUP LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted backup lamp feed circuit if required.
	2. Ineffective switch.	2. Test and replace backup lamp switch (manual transmission) or transmission range sensor (automatic transmission) if required.
	3. Ineffective TIPM inputs or	3. Use a diagnostic scan tool to test the

	outputs.	TIPM inputs and outputs. Refer to the appropriate diagnostic information.

BRAKE LAMPS

NOTE: The Center High Mounted Stop Lamp (CHMSL) is illuminated by several Light-Emitting Diode (LED) units that are soldered to the electronic circuit board within the lamp housing. The CHMSL is hard wired to the output of the brake lamp switch, while the brake lamps are powered by high side drivers within the TIPM based upon an input from the brake lamp switch. If the brake lamps and all of the LED units within the CHMSL fail to operate, diagnose and repair the brake lamps before attempting to repair the CHMSL. If the brake lamps operate but none of the CHMSL LED units illuminate, test and repair the CHMSL ground or feed circuit if required. If some of the CHMSL LED units operate and others do not, the CHMSL assembly must be replaced with a new unit.

CONDITION	POSSIBLE CAUSES	CORRECTION
BRAKE LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace brake lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open brake lamp ground circuit if required.
	3. Ineffective fuse.	3. Test and replace the fuse in the TIPM if required.
	4. Ineffective feed circuit.	4. Test and repair open brake lamp switch output circuit or stop lamp output circuit if required.
	5. Ineffective switch.	5. Test and replace brake lamp switch if required.
	6. Ineffective TIPM inputs or outputs.	6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
BRAKE LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted brake lamp switch output circuit or stop lamp output circuit if required.
	2. Improperly adjusted switch.	2. Adjust the brake lamp switch if required.
	3. Ineffective switch.	3. Test and replace brake lamp switch if required.
	4. Ineffective TIPM inputs or outputs.	4. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

DAYTIME RUNNING LAMPS

NOTE: Before performing the following tests, determine whether the headlamp low and

high beams operate. If the headlamp low and high beams are also ineffective, diagnose and repair that problem before attempting to repair the Daytime Running Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
DAYTIME RUNNING LAMPS WILL NOT ILLUMINATE	1. Incorrect TIPM programming.	1. Use a diagnostic scan tool to check and configure TIPM if required.
	2. Automatic transmission in PARK position.	2. Place the transmission gear selector lever in any position except PARK.
	3. Parking brake applied.	3. Release the parking brake.
	4. Engine not running.	4. Start the engine.
	5. Ineffective TIPM inputs or outputs.	5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

FRONT FOG LAMPS

NOTE: The front fog lamp switch is integral to the left multi-function switch/Steering Control Module (SCM), which communicates with the ElectroMechanical Instrument Cluster (EMIC)/Cab Compartment Node (CCN) over the Local Interface Network (LIN) data bus. Before performing any of the following tests, determine whether the other functions of the left multi-function switch/SCM are operational. If the other left multi-function switch/SCM functions are ineffective, diagnose and repair that problem before attempting to repair the Front Fog Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
FRONT FOG LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace front fog lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open front fog lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open front fog lamp feed circuit if required.
	4. Ineffective EMIC (CCN) inputs or outputs.	4. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective TIPM inputs or outputs.	5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
FRONT FOG LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted front fog lamp feed circuit if required.
	2. Ineffective EMIC (CCN) inputs or outputs.	2. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective TIPM inputs or	3. Use a diagnostic scan tool to test the

	outputs.	TIPM inputs and outputs. Refer to the appropriate diagnostic information.

HAZARD WARNING LAMPS

NOTE: The hazard switch is integral to the upper instrument panel switch pod, which provides a hard wired output to the TIPM. Before performing any of the following tests, confirm whether the left and right turn signals operate satisfactorily. Then determine whether the other functions of the upper instrument panel switch pod are operational. If the turn signals are ineffective or operate improperly, or if the other instrument panel switch pod functions are ineffective, diagnose and repair those problems before attempting to repair the hazard warning lamps system.

CONDITION	POSSIBLE CAUSES	CORRECTION
HAZARD WARNING LAMPS DO NOT FLASH	1. Ineffective upper instrument panel switch pod. 2. Ineffective TIPM inputs or outputs.	1. Test and replace upper instrument panel switch pod if required. 2. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
HAZARD WARNING LAMPS DO NOT STOP FLASHING	1. Ineffective upper instrument panel switch pod. 2. Ineffective TIPM inputs or outputs.	1. Test and replace upper instrument panel switch pod if required. 2. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

HEADLAMPS

NOTE: As part of the exterior lighting fail-safe feature, upon ignition ON, all exterior park lamps and the headlamp low beams will illuminate regardless of the left multi-function switch control knob position if the SCM cannot detect an input from the left multi-function switch, or if there is a loss of communication between the left multi-function switch/SCM and the EMIC or between the EMIC and the TIPM. Diagnose and repair those problems before attempting to repair the Headlamps. In addition, the TIPM will store a Diagnostic Trouble Code (DTC) for an open or shorted headlamp circuit.

CONDITION	POSSIBLE CAUSES	CORRECTION
HEADLAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace headlamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open headlamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open headlamp low beam or high beam feed circuit if required.

	4. Ineffective EMIC (CCN) inputs or outputs. 5. Ineffective TIPM inputs or outputs.	4. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information. 5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit. 2. Ineffective EMIC (CCN) inputs or outputs. 3. Ineffective TIPM inputs or outputs.	1. Test and repair shorted headlamp low beam or high beam feed circuit if required. 2. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information. 3. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
HEADLAMPS ILLUMINATE WITH IGNITION ON AND HEADLAMP SWITCH OFF (FAIL-SAFE OPERATION)	1. Loss of LIN or CAN data bus communication.	1. Test and repair the LIN or CAN data bus if required. Refer to the appropriate diagnostic information.
HEADLAMPS WILL NOT SWITCH FROM HIGH TO LOW BEAMS, OR FROM LOW TO HIGH BEAMS	1. Ineffective EMIC (CCN) inputs or outputs. 2. Ineffective TIPM inputs or outputs.	1. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information. 2. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

HEADLAMP LEVELING

NOTE: The headlamp leveling switch is integral to the instrument panel switch pod, which communicates with the EMIC/CCN over the LIN data bus. Before performing any of the following tests, confirm whether the park lamps operate satisfactorily. Then determine whether the other functions of the instrument panel switch pod are operational. If the park lamps are ineffective or operate improperly, or if the other instrument panel switch pod functions are ineffective, diagnose and repair those problems before attempting to repair the Headlamp Leveling function.

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE LEVELING MOTOR IS INEFFECTIVE	1. Ineffective ground circuit. 2. Ineffective feed circuit. 3. Ineffective signal circuit. 4. Ineffective motor.	1. Test and repair open leveling motor ground circuit if required. 2. Test and repair open leveling motor feed circuit if required. 3. Test and repair open headlamp leveling motor signal circuit if required. 4. Test and replace headlamp leveling

		motor if required.
BOTH LEVELING MOTORS ARE INEFFECTIVE	1. Ineffective EMIC (CCN) inputs or outputs.	1. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	2. Ineffective motor ground circuit.	2. Test and repair open leveling motor ground circuit if required.
	3. Ineffective motor feed circuit.	3. Test and repair open leveling motor feed circuit if required.
	4. Ineffective signal circuit.	4. Test and repair open or shorted headlamp leveling motor signal circuit if required.
	5. Ineffective TIPM inputs or outputs.	5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective motors.	6. Test and replace leveling motors if required.

PARK LAMPS

NOTE: As part of the exterior lighting fail-safe feature, upon ignition ON, all exterior park lamps and the headlamp low beams will illuminate regardless of the left multi-function switch control knob position if the SCM cannot detect an input from the left multi-function switch, or if there is a loss of communication between the left multi-function switch/SCM and the EMIC or between the EMIC and the TIPM. Diagnose and repair those problems before attempting to repair the Park Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
PARK LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace park lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open park lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open park lamp feed circuit if required.
	4. Ineffective EMIC (CCN) inputs or outputs.	4. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective TIPM inputs or outputs.	5. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
PARK LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted park lamp feed circuit if required.
	2. Ineffective EMIC (CCN) inputs or outputs.	2. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.

	3. Ineffective TIPM inputs or outputs.	3. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

REAR FOG LAMPS

NOTE: The rear fog lamp switch is integral to the left multi-function switch/SCM, which communicates with the EMIC/CCN over the LIN data bus. Before performing any of the following tests, determine whether the other functions of the left multi-function switch/SCM are operational. If the other left multi-function switch/SCM functions are ineffective, diagnose and repair that problem before attempting to repair the Rear Fog Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
REAR FOG LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace rear fog lamp bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open rear fog lamp ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open fog lamp relay control rear circuit if required.
	4. Ineffective EMIC (CCN) inputs or outputs.	4. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	5. Incorrect TIPM configuration.	5. Use a diagnostic scan tool to check and correct the TIPM configuration settings if required. Refer to the appropriate diagnostic information.
	6. Ineffective TIPM inputs or outputs.	6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
REAR FOG LAMP DOES NOT EXTINGUISH	1. Ineffective feed circuit.	1. Test and repair shorted fog lamp relay control rear circuit if required.
	2. Ineffective EMIC (CCN) inputs or outputs.	2. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective TIPM inputs or outputs.	3. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.

TURN SIGNAL LAMPS

NOTE: The turn signal switch is integral to the left multi-function switch/SCM, which communicates with the EMIC/CCN over the LIN data bus. Before performing any of the following tests, determine whether the other functions of the left multi-function switch/SCM are operational. If the other left multi-function switch/SCM

functions are ineffective, diagnose and repair that problem before attempting to repair the Turn Signal Lamps.

CONDITION	POSSIBLE CAUSES	CORRECTION
ONE TURN SIGNAL LAMP DOES NOT ILLUMINATE	1. Ineffective or missing bulb.	1. Test and replace turn signal bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
	4. Ineffective TIPM inputs or outputs.	4. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNAL LAMPS (OR BOTH SIDES) DO NOT FLASH	1. Ineffective feed circuit.	1. Test and repair open right or left turn signal feed circuit if required.
	2. Ineffective EMIC (CCN) inputs or outputs.	2. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective TIPM inputs or outputs.	3. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
ALL RIGHT SIDE OR ALL LEFT SIDE TURN SIGNALS FLASH TOO RAPIDLY (MORE THAN 100 FLASHES PER MINUTE)	1. Ineffective or missing bulb.	1. Test and replace turn signal bulb if required.
	2. Ineffective ground circuit.	2. Test and repair open bulb ground circuit if required.
	3. Ineffective feed circuit.	3. Test and repair open right or left turn signal feed circuit if required.
TURN SIGNALS DO NOT AUTOMATICALLY CANCEL	1. Ineffective cancel cam.	1. Inspect and replace the turn signal cancel cam (clockspring) if required.
-	2. Ineffective cancel actuator.	2. Inspect and replace the turn signal cancel actuator (left multi-function switch) if required.

STANDARD PROCEDURE

FRONT LAMP AIMING

VEHICLE PREPARATION FOR LAMP ALIGNMENT

1. Check for and correct any burnt out bulbs.
2. If the vehicle is equipped with headlamp leveling, be certain that the headlamp leveling switch is in the **0** (zero) position.
3. Repair or replace any ineffective, worn or damaged body or suspension components that could hinder

proper lamp alignment.

4. Verify proper tire inflation pressures.
5. Remove any accumulations of mud, snow or ice from the vehicle underbody and clean the front lamp lenses.
6. Verify that there is no load in the vehicle (cargo or passengers), except for the driver.
7. The fuel tank should be FULL. Add 2.94 kilograms (6.5 pounds) of weight over the fuel tank for each estimated gallon of missing fuel.
8. Verify correct vehicle suspension height.

LAMP ALIGNMENT SCREEN PREPARATION

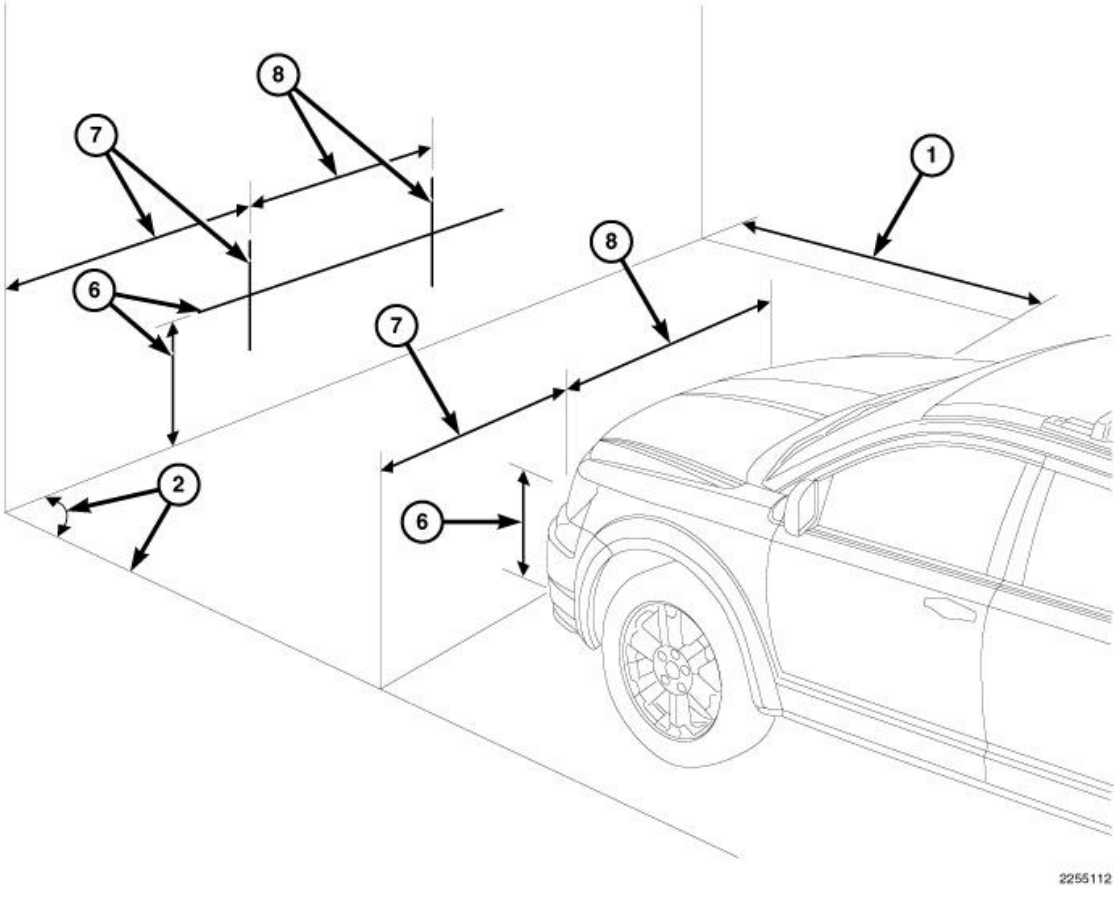


Fig. 2: Lamp Alignment Screen Preparation
Courtesy of CHRYSLER LLC

The procedure that follows will prepare a suitable front lamp alignment screen.

1. Tape a line on a level floor 7.62 meters (25 feet) away from and parallel to the flat wall that will be used as the lamp alignment screen. The level floor will be used as the horizontal zero reference.
2. An adjacent wall or floor member that is perpendicular to the alignment screen can be used as the vertical zero reference. If there is no adjacent wall or floor member that is perpendicular to the screen, tape a

second line on the floor perpendicular to both the alignment screen and the first line, and outboard of either side of where the vehicle will be positioned. This will be used as the vertical zero reference.

3. Position the vehicle so that the side of the vehicle is parallel to the vertical zero reference, and so that the front of the lamp lenses are in the vertical plane of the parallel line taped on the floor 7.62 meters (25 feet) away from the screen.
4. Rock the vehicle side-to-side three times to allow the suspension to stabilize.
5. Jounce the front suspension three times by pushing downward on the front bumper and releasing.
6. Measure the distance between the optical center of one of the lamps being aimed (head or fog) and the floor (horizontal zero reference). Transfer this measurement to the alignment screen with a piece of tape placed horizontally to the floor. This line will be used as the lamp horizontal reference.
7. Measure the distance between the vertical zero reference and the optical center of the nearest lamp being aimed (head or fog). Transfer this measurement to the alignment screen with a piece of tape placed vertically across the appropriate lamp (head or fog) horizontal reference. This is the centerline reference for the first lamp.
8. Measure the distance on center between the first and the second lamp being aimed. Transfer this measurement to the alignment screen with a second piece of tape placed vertically across the appropriate lamp (head or fog) horizontal reference. This is the centerline reference for the second lamp.

HEADLAMP ALIGNMENT

NOTE: Due to the linear nature of the headlamp cutoff, a properly aimed low beam headlamp will project the top edge of the high intensity pattern on the alignment screen just below the horizontal line to 50 millimeters (2 inches) below the horizontal line for domestic market vehicles, or to 130 millimeters (5.12 inches) below the horizontal line for export market vehicles. No horizontal (right/left) adjustment is required for this headlamp beam pattern in domestic market vehicles. Export market vehicles have a second horizontal (right/left) adjustment screw provided on the outboard side of the headlamp unit rear housing. The high beam pattern will be correct when the low beams are properly aimed.

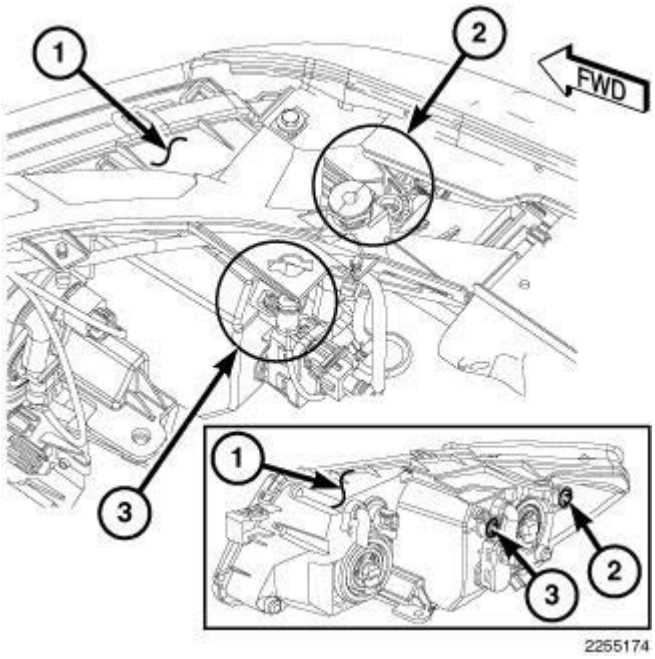


Fig. 3: Headlamp Alignment
Courtesy of CHRYSLER LLC

1. Turn the headlamps ON and select the LOW beams.
2. Rotate the vertical adjustment screw (3) on each front lamp unit (1) to adjust the beam height as required.
3. For export markets only, rotate the horizontal adjustment screw (2) on each lamp to adjust the beam right or left as required.

FOG LAMP ALIGNMENT

NOTE: A properly aimed front fog lamp will project a pattern on the alignment screen 100 millimeters (4 inches) below the fog lamp centerline and straight ahead of the lamp for domestic market vehicles. On export market vehicles, a properly aimed fog lamp will project a pattern on the alignment screen 200 millimeters (8 inches) below the fog lamp centerline and straight ahead of the lamp.

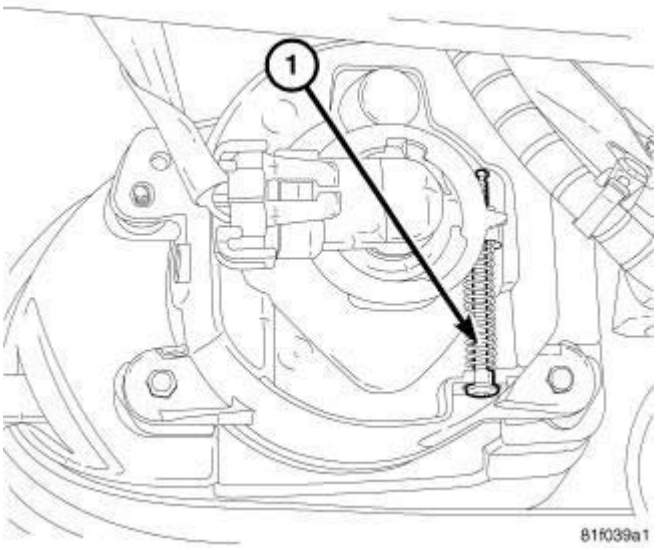


Fig. 4: Fog Lamp Alignment
Courtesy of CHRYSLER LLC

1. Turn the fog lamps ON.
2. Raise the lower portion of the inner wheel house shield to gain access to the rear of the fog lamp unit.
3. Rotate the vertical adjustment screw (1) on each lamp to adjust the beam height as required.

SPECIFICATIONS

SPECIFICATIONS

BULB APPLICATION TABLE

LAMP	BULB
BACKUP	3157 (P27W/7W)
BRAKE	3157 (P27W/7W)
CENTER HIGH MOUNTED STOP	LIGHT-EMITTING DIODES SERVICED IN ASSEMBLY
FRONT FOG	9145 (H10)
FRONT PARK	3757AK (PY27W/7W)
FRONT SIDE MARKER	168
FRONT TURN SIGNAL	3757AK (PY27W/7W)
HEADLAMP (LOW BEAM)	9006 - DOMESTIC H11 - EXPORT
HEADLAMP (HIGH BEAM)	9005
LICENSE	168
POSITION (EXPORT ONLY)	W5W
REAR FOG (EXPORT ONLY)	PS19W
REAR PARK (TAIL)	3157 (P27W/7W)
REAR TURN SIGNAL	3757AK (PY27W/7W)

REPEATER (EXPORT ONLY)	W5W

CAM, TURN SIGNAL CANCEL

DESCRIPTION

DESCRIPTION

The turn signal cancel cam is concealed within the clockspring case on the steering column. The turn signal cancel cam consists of integral eccentrics on the outer circumference of the molded plastic clockspring rotor. The clockspring mechanism provides turn signal cancellation as well as a constant electrical connection between the horn switch, driver airbag, speed control switches, Electronic Vehicle Information Center (EVIC) switches and remote radio switches on the steering wheel and the instrument panel wire harness on the steering column. The housing of the clockspring is secured to the steering column and remains stationary. The rotor of the clockspring, including the turn signal cancel cam lobes rotate with the steering wheel.

The turn signal cancel cam is serviced as a unit with the clockspring and cannot be repaired. If ineffective or damaged, the entire clockspring unit must be replaced. Refer to **Restraints/CLOCKSPRING - Removal** .

OPERATION

OPERATION

When the left multi-function switch control stalk is moved to a latched turn signal ON position, a turn signal cancel actuator is extended from the inside surface of the switch housing through a small rectangular opening on the left side of the clockspring case toward the turn signal cancel cam. As the steering wheel is rotated to complete the turn, one of the cam eccentrics will contact the actuator, automatically cancelling the turn signal event and releasing the latched left multi-function switch control stalk to the neutral or OFF position.

LAMP, CENTER HIGH MOUNTED STOP

REMOVAL

REMOVAL

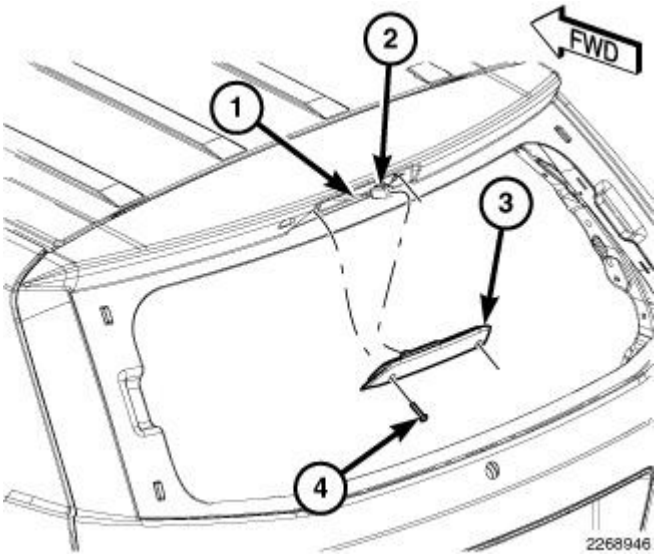


Fig. 5: Center High Mounted Stop Lamp
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the two screws (4) that secure the Center High Mounted Stop Lamp (CHMSL) (3) to the liftgate header panel (1).
3. Pull the CHMSL away from the liftgate far enough to access and disconnect the connector (2) of the liftgate wire harness (1) from the connector receptacle on the back of the lamp.
4. Remove the CHMSL from the liftgate.

INSTALLATION

INSTALLATION

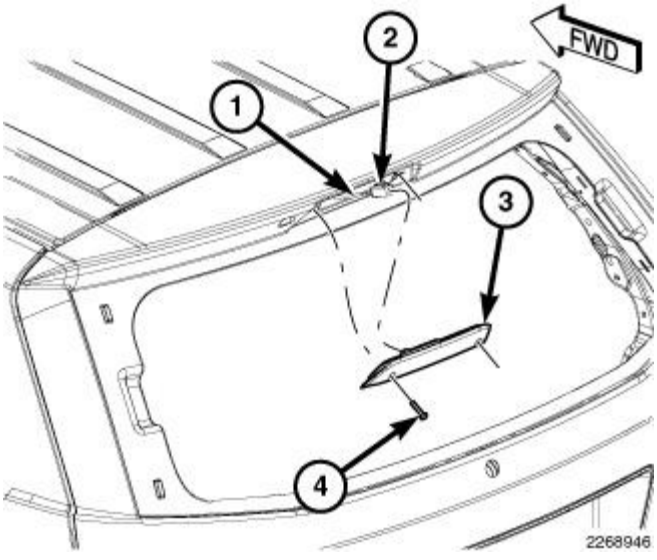


Fig. 6: Center High Mounted Stop Lamp

Courtesy of CHRYSLER LLC

1. Check to be certain that the two U-nuts in the Center High Mounted Stop Lamp (CHMSL) opening of the liftgate header panel are properly installed and in good condition.
2. Position the CHMSL (3) near the opening in the liftgate header panel.
3. Reconnect the connector (2) of the liftgate wire harness (1) to the connector receptacle on the back of the lamp.
4. Position the CHMSL into the liftgate header opening.
5. Install and tighten the two screws (4) that secure the CHMSL to the liftgate header panel. Tighten the screws to 1.5 N.m (15 in. lbs.).
6. Reconnect the battery negative cable.

LAMP, FOG, FRONT

REMOVAL

BULB

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

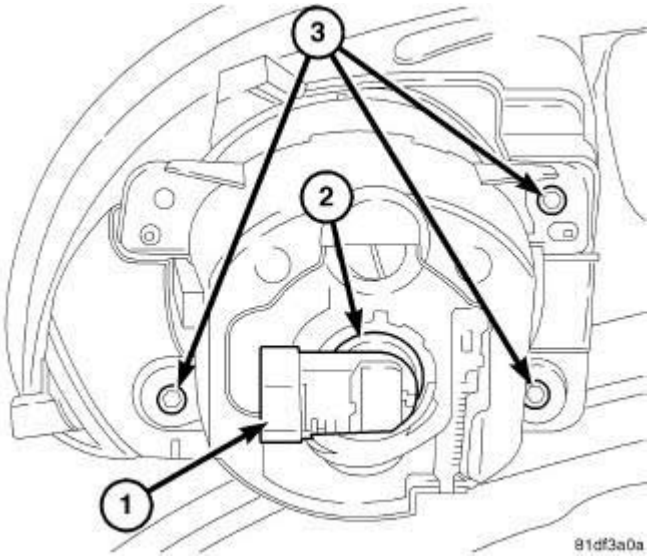


Fig. 7: Front Fog Lamp Bulb Connector Receptacle
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the lower inner front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
3. Disconnect the headlamp and dash wire harness connector from the front fog lamp bulb (2) connector receptacle (1).

4. Firmly grasp the bulb on the back of the front fog lamp housing and rotate it counterclockwise about 30 degrees to unlock it.
5. Pull the bulb straight out from the keyed opening in the housing.

LAMP

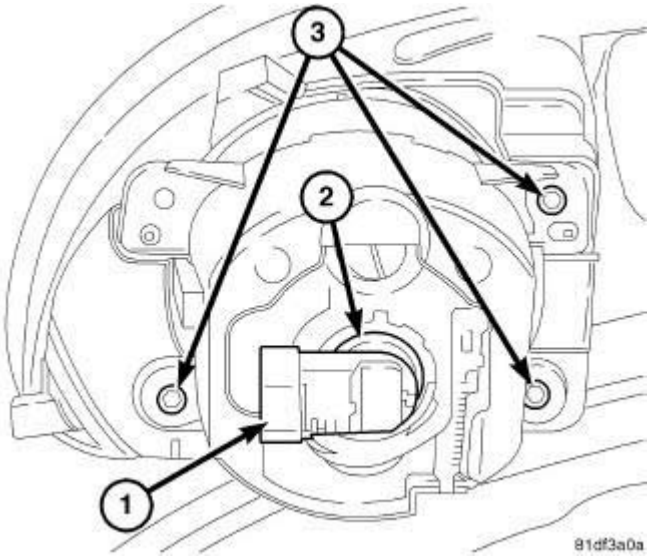


Fig. 8: Front Fog Lamp Bulb Connector Receptacle
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the lower inner front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
3. Disconnect the headlamp and dash wire harness connector from the front fog lamp bulb (2) connector receptacle (1).
4. Remove the three screws (3) that secure the front fog lamp mounting bracket to the fog lamp bezel on the back of the lower front fascia.
5. Remove the front fog lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

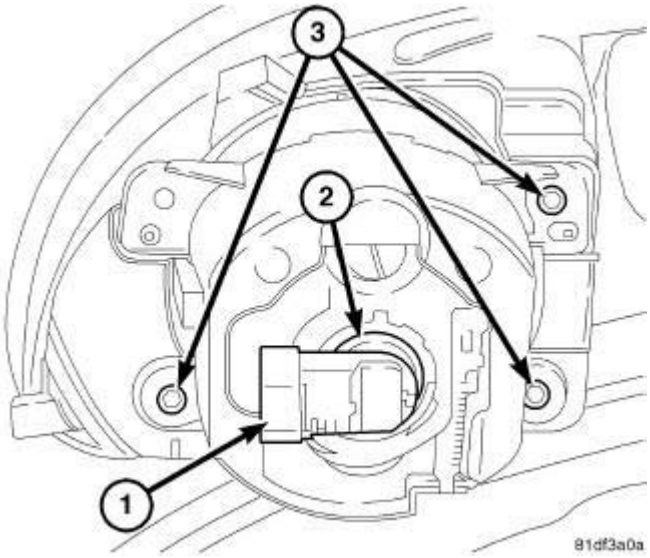


Fig. 9: Front Fog Lamp Bulb Connector Receptacle
Courtesy of CHRYSLER LLC

1. Align the front fog lamp bulb (2) with the keyed opening on the back of the front fog lamp housing.
2. Insert the bulb into the housing until it is firmly seated.
3. Rotate the bulb clockwise about 30 degrees to lock it into place. The bulb connector receptacle should be pointed outboard and horizontal in orientation.
4. Reconnect the headlamp and dash wire harness connector to the front fog lamp bulb connector receptacle (1).
5. Reinstall the lower inner front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
6. Reconnect the battery negative cable.

LAMP

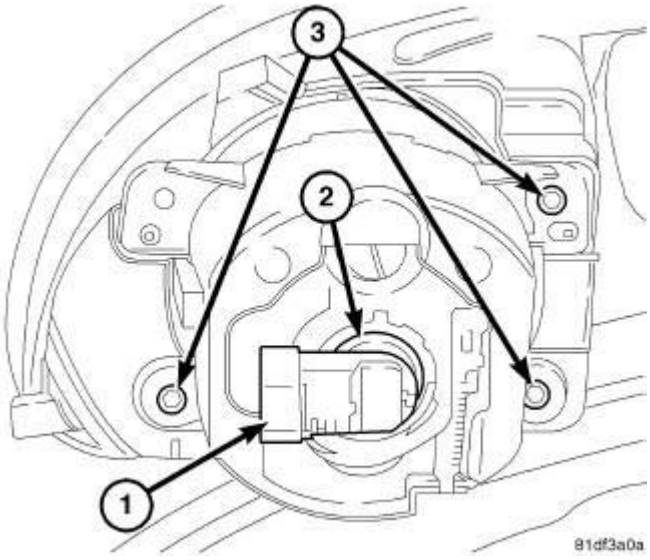


Fig. 10: Front Fog Lamp Bulb Connector Receptacle Screw
Courtesy of CHRYSLER LLC

1. Position the front fog lamp mounting bracket to the fog lamp bezel on the back of the lower front fascia.
2. Install and tighten the three screws (3) that secure the mounting bracket to the bezel. Tighten the screws securely.
3. Reconnect the headlamp and dash wire harness connector to the front fog lamp bulb (2) connector receptacle (1).
4. Reinstall the lower inner front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .
5. Reconnect the battery negative cable.
6. Confirm proper fog lamp alignment. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior - Standard Procedure**.

LAMP, FOG, REAR EXPORT

REMOVAL

BULB

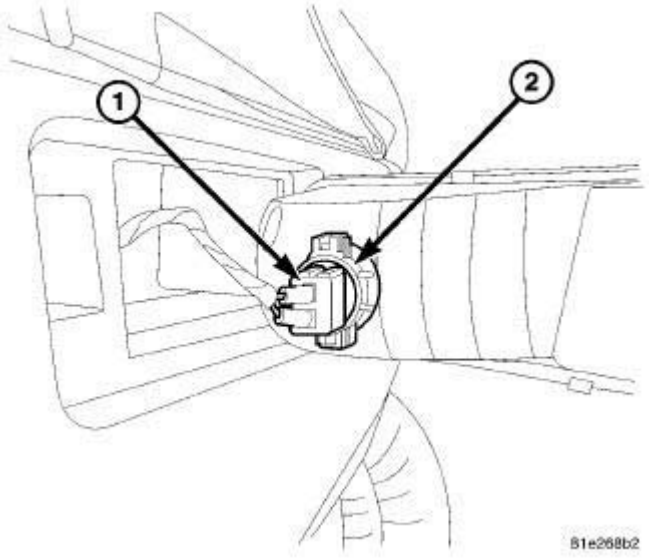


Fig. 11: Rear Fascia Wire Harness Connector
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear fog lamp from the rear fascia. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Fog - Removal**.
3. Disconnect the rear fascia wire harness connector (1) from the rear fog lamp bulb connector receptacle.
4. Firmly grasp the bulb (2) by the two latch features and squeeze them together to unlock the bulb from the

back of the rear fog lamp housing.

5. Pull the bulb straight out from the keyed opening in the housing.

LAMP

NOTE: The following procedure applies only to vehicles manufactured for certain export markets where rear fog lamps are optional or required equipment. Rear fog lamps are not available for vehicles manufactured for North American markets.

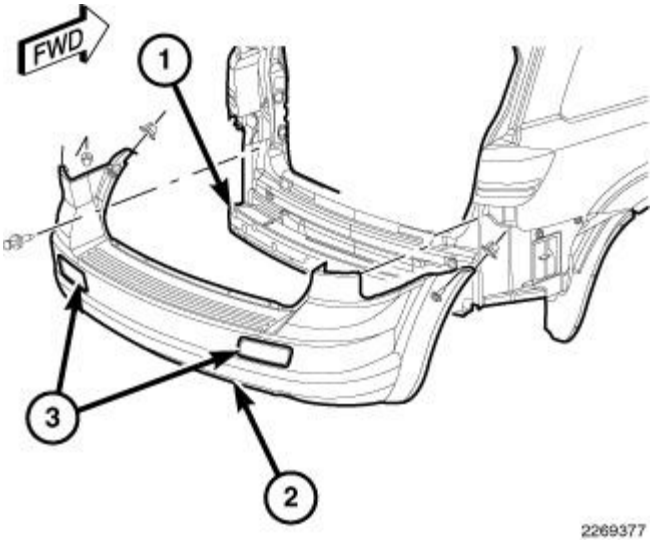


Fig. 12: Rear Bumper Reinforcement
Courtesy of CHRYSLER LLC

NOTE: The rear fog lamps can be removed without removing the rear fascia. The graphic shows the fascia removed only to clearly identify the involved components.

1. Disconnect and isolate the battery negative cable.
2. From behind the rear fascia (2), reach between the body sheet metal and above the rear bumper reinforcement (1) to access the back of the rear fog lamp (3).

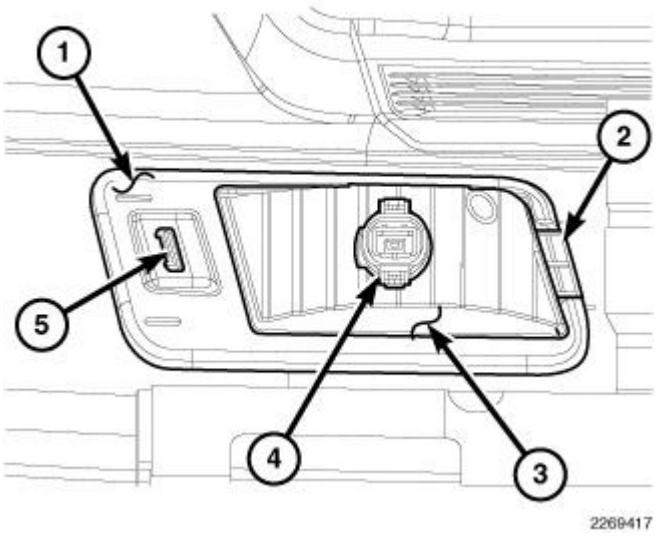


Fig. 13: Integral Latch Feature Of Rear Fog Lamp
Courtesy of CHRYSLER LLC

3. Locate the integral latch feature (5) of the rear fog lamp (3) protruding through the outboard side of the rear fog lamp seat (1) integral to the rear fascia.
4. Press the latch feature toward the center of the lamp and out through the face of the rear fog lamp seat of the rear fascia.
5. From the face of the rear fascia, pull the lamp outboard far enough to disengage the integral interlocking tab mounting feature (2) from behind the inboard side of the rear fog lamp seat of the fascia.
6. Pull the rear fog lamp out from the rear fascia far enough to access and disconnect the rear fascia wire harness connector from the rear fog lamp bulb connector receptacle (4) on the back of the lamp.
7. Remove the rear fog lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

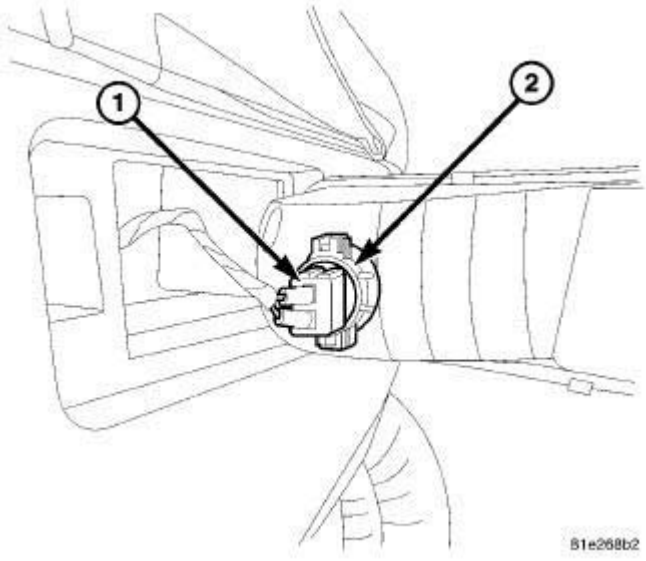


Fig. 14: Rear Fascia Wire Harness Connector
Courtesy of CHRYSLER LLC

1. Align the index tabs of the rear fog lamp bulb (2) with the slots in the collar of the bulb opening on the back of the rear fog lamp housing.
2. Insert the bulb into the housing until the index tabs are engaged in the slots of the collar.
3. Firmly and evenly push the bulb straight into the lamp housing until both bulb latch features snap into place and are fully engaged.
4. Reconnect the rear fascia wire harness connector (1) to the rear fog lamp bulb connector receptacle.
5. Reinstall the rear fog lamp into the rear fascia. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Fog - Installation**.
6. Reconnect the battery negative cable.

LAMP

NOTE: The following procedure applies only to vehicles manufactured for certain export markets where rear fog lamps are optional or required equipment. Rear fog lamps are not available for vehicles manufactured for North American markets.

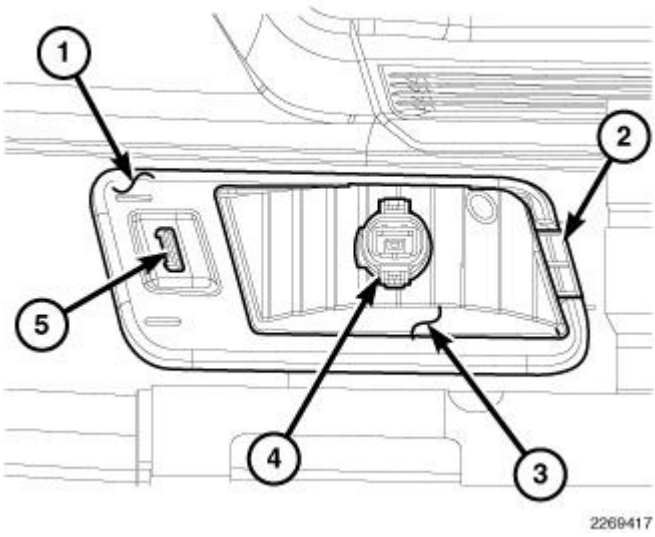


Fig. 15: Integral Latch Feature Of Rear Fog Lamp
Courtesy of CHRYSLER LLC

1. From the face of the rear fascia, position the rear fog lamp (3) close enough to the rear fog lamp seat (1) to access and reconnect the rear fascia wire harness connector to the rear fog lamp bulb connector receptacle (4).
2. Engage the integral interlocking tab mounting feature (2) behind the inboard side of the rear fog lamp seat of the fascia.
3. Align the integral latch feature (5) on the outboard side of the rear fog lamp housing with the clearance hole in the rear fog lamp seat of the fascia.
4. Using hand pressure, push the outboard side of the rear fog lamp firmly and evenly into the seat until the latch engages the back of the rear fascia and the lamp is fully seated.
5. Reconnect the battery negative cable.

LAMP, LICENSE PLATE

REMOVAL

BULB

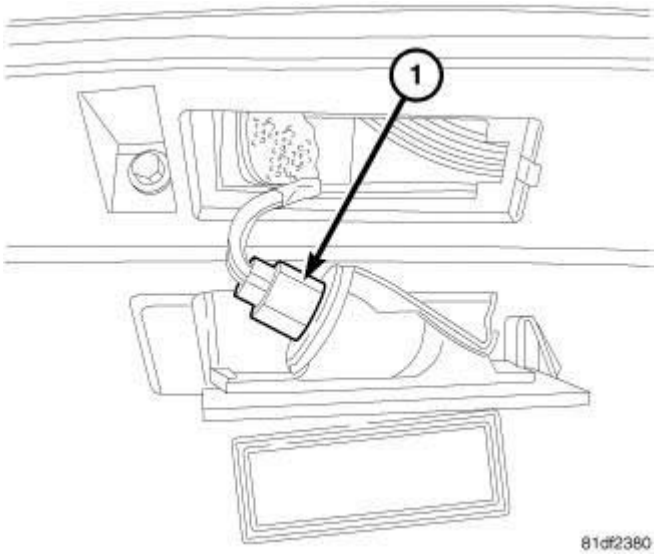


Fig. 16: License Plate Lamp Bulb Socket
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the license plate lamp from the underside of the liftgate handle and light bar assembly. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, License Plate - Removal**.
3. Pull the base of the bulb straight out of the license plate lamp bulb socket (1).

LAMP

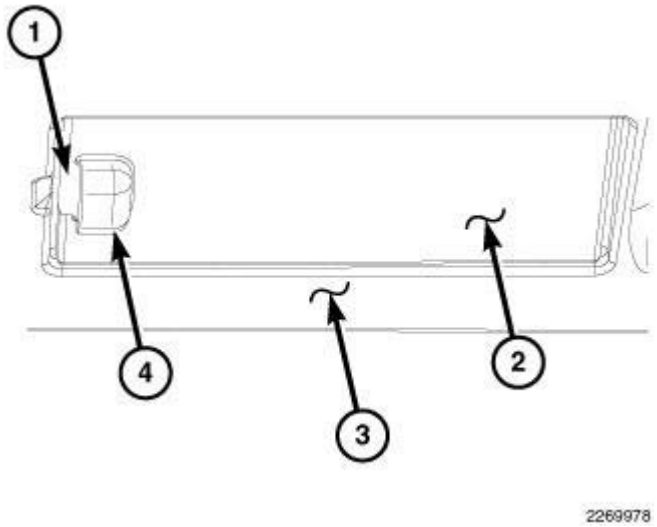


Fig. 17: License Plate Lamps
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Locate the two license plate lamps (2) on the underside of the liftgate handle and light bar assembly (3)

above the license plate tub on the liftgate outer panel.

3. Insert the end of a trim stick or a small screwdriver into the open end of the hood formation (4) on one end of the lamp lens to depress the latch tab (1) and pull that end of the lamp down from the handle and light bar assembly.
4. Pull the lamp towards the center of the vehicle far enough to disengage the lamp interlocking tab mounting feature from the outboard edge of the mounting hole.
5. Pull the lamp out of the mounting hole far enough to access the lamp wiring and bulb socket on the top of the lamp housing.
6. Firmly grasp the socket and rotate it counterclockwise about 30 degrees to unlock it.
7. Pull the socket and bulb straight out from the keyed opening in the lamp housing.
8. Remove the lamp from the vehicle.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

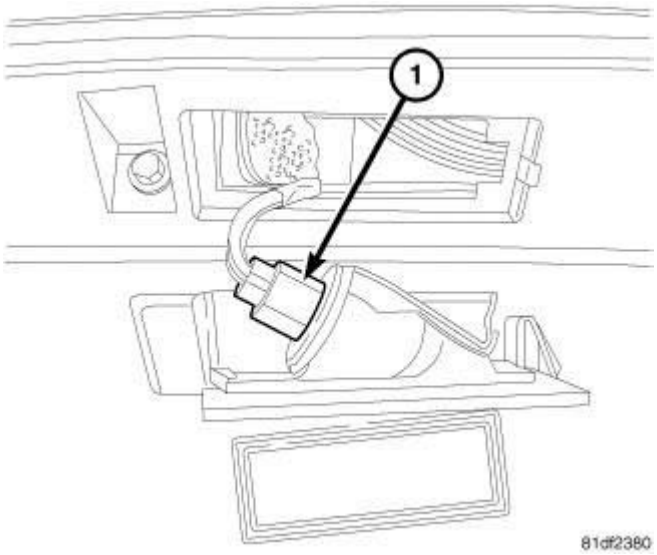


Fig. 18: License Plate Lamp Bulb Socket
Courtesy of CHRYSLER LLC

1. Align the base of the license plate lamp bulb with the socket (1).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the top of the license plate lamp housing.
4. Insert the bulb and socket into the housing until the socket is firmly seated.
5. Rotate the socket clockwise about 30 degrees to lock it into place.

6. Reinstall the lamp into the mounting hole on the underside of the liftgate handle and light bar assembly. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, License Plate - Installation**.

LAMP

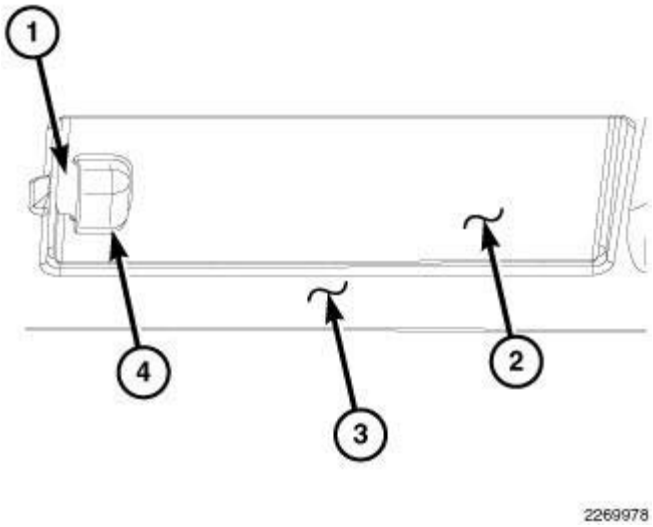


Fig. 19: License Plate Lamps
Courtesy of CHRYSLER LLC

1. Position the license plate lamp (2) to the underside of the liftgate handle and light bar assembly (3).
2. Align the socket and bulb with the keyed opening on the top of the lamp housing.
3. Insert the bulb and socket into the housing until the socket is firmly seated.
4. Rotate the socket clockwise about 30 degrees to lock it into place.
5. Engage the lamp interlocking tab mounting feature at the end of the lamp housing opposite from the hooded (4) latch (1) with the outboard edge of the mounting hole in the handle and light bar assembly.
6. Push the lamp toward the outboard side of the vehicle while pushing the inboard end of the lamp firmly and evenly into the mounting hole until the lamp latch feature snaps into place.
7. Reconnect the battery negative cable.

LAMP, SIDE REPEATER, EXPORT

REMOVAL

BULB

NOTE: Side repeater lamps are used only on vehicles manufactured for certain export markets where they are required.

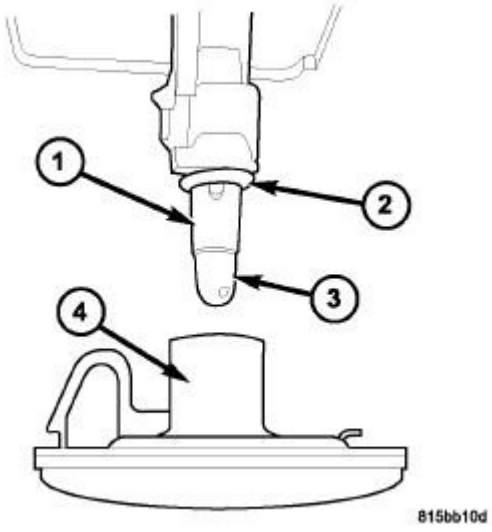


Fig. 20: Remove/Install Repeater Lamp Bulb
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the side repeater lamp from the fender mounting hole, but do not disconnect the wire harness connector. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Side Repeater - Removal**.
3. Firmly grasp the bulb socket (1) on the back of the lamp lens/housing (4) and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out from the keyed opening in the lamp housing.
5. Pull the base of the bulb (3) straight out of the socket.

LAMP

NOTE: Side repeater lamps are used only on vehicles manufactured for certain export markets where they are required.

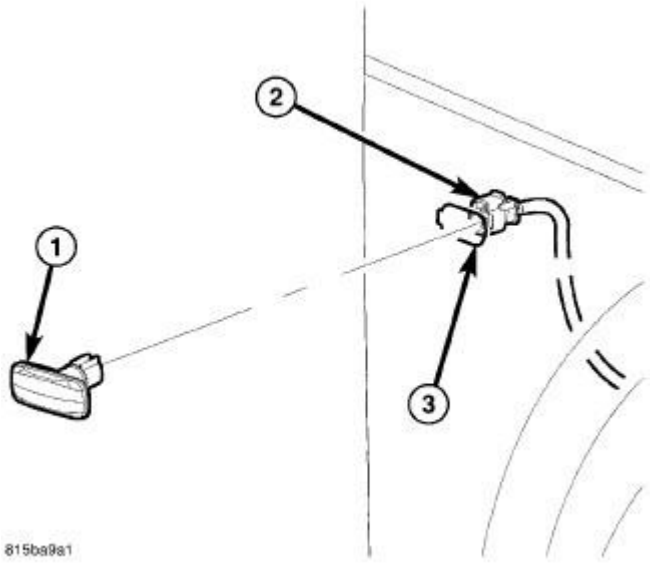


Fig. 21: Remove/Install Repeater Lamp
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.

NOTE: The same repeater lamp is used on both sides of the vehicle. Regardless of which side of the vehicle the lamp is mounted on, when properly oriented the fixed hook interlock tab feature integral to the back of the lamp housing is on the right-hand side of the lamp and the latch feature is on the left-hand side.

2. Using hand pressure, press the right edge of the repeater lamp lens/housing (1) toward the left against the spring pressure of the latch feature, then pull the right edge of the lamp outward far enough to disengage the fixed hook interlock tab feature from the right side of the fender mounting hole (3).
3. Pull the lamp out from the fender far enough to access and disconnect the wire harness connector (2) from the connector receptacle of the bulb socket on the back of the lamp lens/housing.
4. Remove the repeater lamp from the fender.

INSTALLATION

BULB

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

NOTE: Side repeater lamps are used only on vehicles manufactured for certain export markets where they are required.

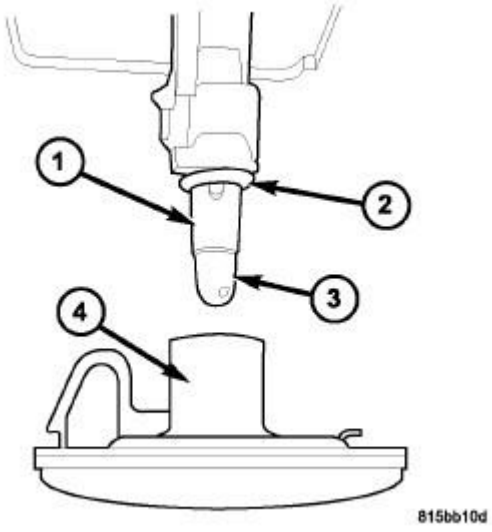


Fig. 22: Remove/Install Repeater Lamp Bulb
Courtesy of CHRYSLER LLC

1. Align the base of the bulb (3) with the socket (1).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Be certain that a rubber O-ring seal (2) is properly installed and in good condition around the base of the bulb socket.
4. Align the socket and bulb with the keyed opening on the back of the side repeater lamp lens/housing (4).
5. Insert the socket and bulb into the housing until the socket is firmly seated.
6. Rotate the socket clockwise about 30 degrees to lock it into place.
7. Reinstall the side repeater lamp into the fender mounting hole. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Side Repeater - Installation**.
8. Reconnect the battery negative cable.

LAMP

NOTE: Side repeater lamps are used only on vehicles manufactured for certain export markets where they are required.

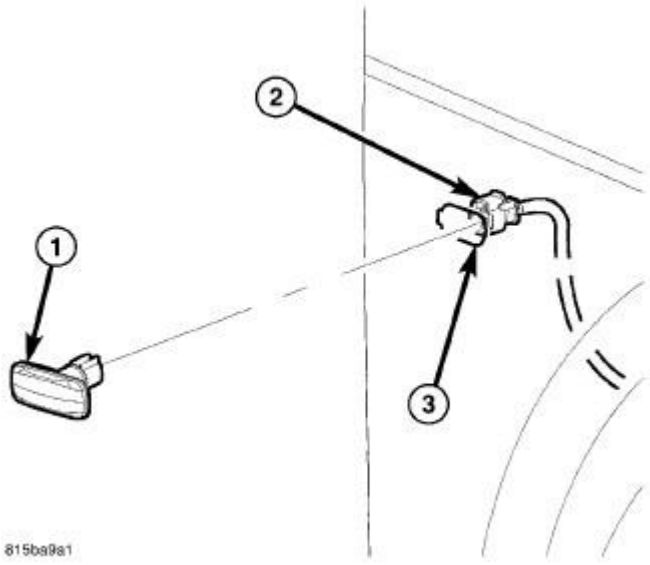


Fig. 23: Remove/Install Repeater Lamp
Courtesy of CHRYSLER LLC

1. Position the repeater lamp lens/housing (1) close enough to the fender mounting hole (3) to access and reconnect the wire harness connector (2) to the bulb socket on the back of the lamp lens/housing.

NOTE: The same repeater lamp is used on both sides of the vehicle. Regardless of which side of the vehicle the lamp is mounted on, when properly oriented the fixed hook interlock tab features integral to the back of the lamp housing is on the right-hand side of the lamp and the latch feature is on the left-hand side.

2. With the lamp lens/housing properly oriented, engage the fixed hook interlock tab feature on the back of the right side of the lamp with the right edge of the fender mounting hole.
3. Using hand pressure, press the left side of the lamp lens/housing into the mounting hole against the spring pressure of the latch feature until the latch snaps into place.
4. Reconnect the battery negative cable.

LAMP, TAIL STOP TURN

REMOVAL

BULB

Each rear lamp unit for this vehicle consists of two pieces. An outer rear lamp unit that is secured at the rear of each quarter panel includes bulbs for the park (or tail) lamps, the brake (or stop) lamps and the turn signal lamps. An inner rear lamp is secured on each outboard side of the liftgate outer panel adjacent to the outer lamp and also includes a bulb for the park (or tail) lamps as well as a bulb for the backup (or reverse) lamps.

OUTER LAMP

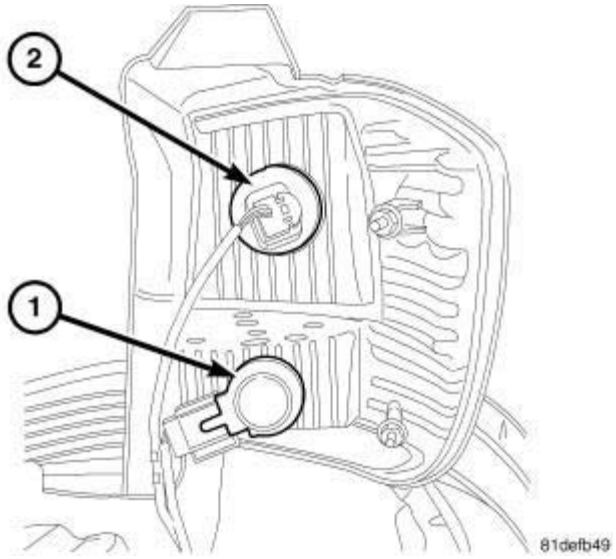


Fig. 24: Tail/Stop/Rear Side Marker And Turn Signal
Courtesy of CHRYSLER LLC

NOTE: The outer rear lamp unit contains two bulbs. They are the tail/stop/rear side marker (1) and the turn signal (2). The service procedures for each bulb are the same, only the bulb sizes and types may differ.

1. Disconnect and isolate battery negative cable.
2. Remove the outer rear lamp unit. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Tail Stop Turn - Removal**.
3. Firmly grasp the appropriate bulb socket (1 or 2) on the back of the lamp housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out of the lamp.
5. Pull the base of the bulb straight out of the socket.

INNER LAMP

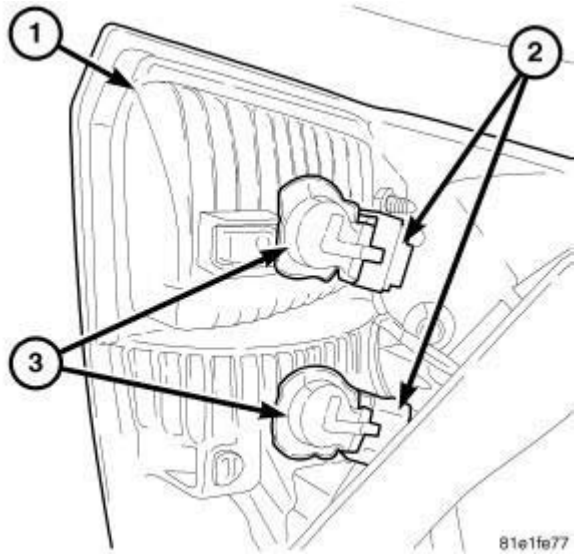


Fig. 25: Bulb Socket On Back Of Lamp Housing
Courtesy of CHRYSLER LLC

NOTE: The inner rear lamp unit contains two bulbs. The upper socket contains the tail lamp bulb, while the lower socket contains the backup lamp bulb. The service procedures for each bulb are the same, only the bulb sizes and types may differ.

1. Disconnect and isolate the battery negative cable.
2. Remove the inner rear lamp unit. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Tail Stop Turn - Removal**.
3. Firmly grasp the appropriate bulb socket (3) on the back of the lamp housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out of the lamp.
5. Pull the base of the bulb straight out of the socket.

LAMP

Each rear lamp unit for this vehicle consists of two pieces. An outer rear lamp unit that is secured at the rear of each quarter panel includes bulbs for the park (or tail) lamps, the brake (or stop) lamps and the turn signal lamps. An inner rear lamp is secured on each outboard side of the liftgate outer panel adjacent to the outer lamp and also includes a bulb for the park (or tail) lamps as well as a bulb for the backup (or reverse) lamps. These lamp units are serviced individually as follows.

OUTER

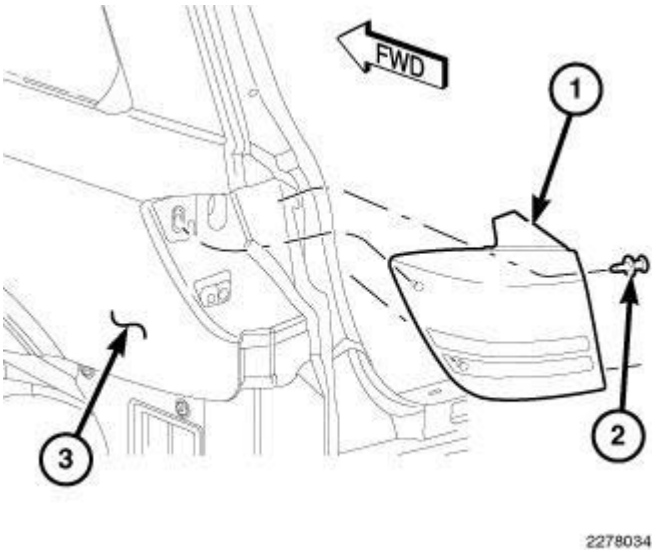


Fig. 26: Outer Rear Lamp Unit
Courtesy of CHRYSLER LLC

1. Disconnect and isolate battery negative cable.
2. Open the liftgate to access and remove the two push pin fasteners (2) that secure the inboard side of the outer rear lamp unit (1) to the side jamb of the liftgate opening.
3. Pull the outboard side of the outer rear lamp unit rearward far enough to disengage the two locating pins on the back of the lamp housing from the plastic grommets in the lamp opening of the body sheet metal (3).

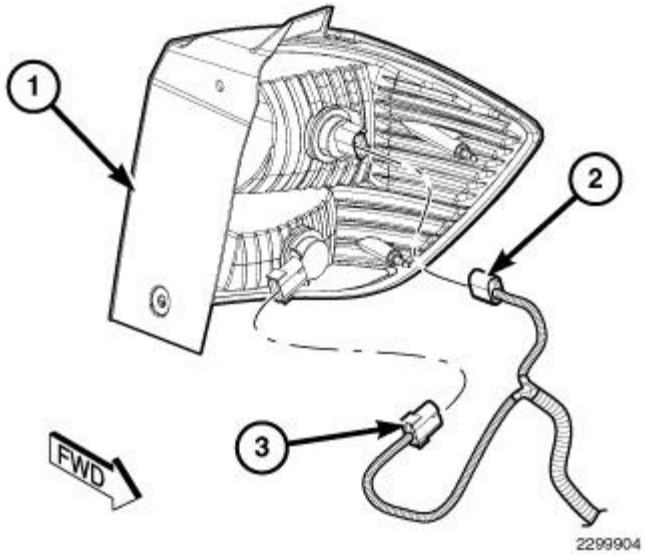


Fig. 27: Body Wire Harness Connectors
Courtesy of CHRYSLER LLC

4. Pull the lamp (1) away from the vehicle far enough to access and disconnect the two body wire harness connectors (2 and 3) from the bulb socket connector receptacles on the back of the lamp housing.

5. Remove the lamp from the vehicle.

INNER

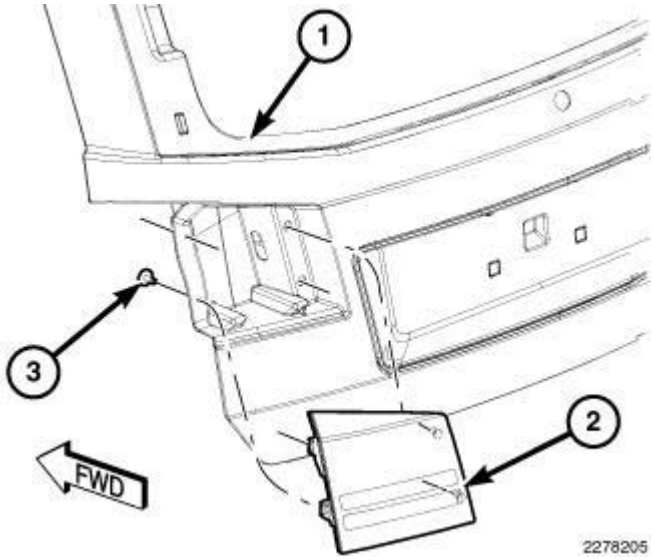


Fig. 28: Inner Rear Lamp Unit
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Open the liftgate (1) to access and remove the two screws (3) that secure the outboard side of the inner rear lamp unit (2) to the liftgate lamp opening.
3. Pull the inboard side of the inner rear lamp unit rearward far enough to disengage the two locating pins on the back of the lamp housing from the plastic grommets in the liftgate lamp opening.

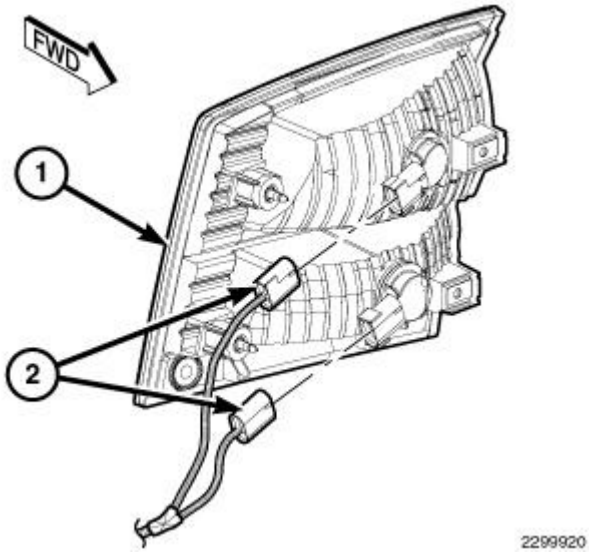


Fig. 29: Liftgate Wire Harness Connectors
Courtesy of CHRYSLER LLC

4. Pull the lamp (1) away from the vehicle far enough to access and disconnect the two liftgate wire harness connectors (2) from the bulb socket connector receptacles on the back of the lamp housing.
5. Remove the lamp from the vehicle.

INSTALLATION

BULB

Each rear lamp unit for this vehicle consists of two pieces. An outer rear lamp unit that is secured at the rear of each quarter panel includes bulbs for the park (or tail) lamps, the brake (or stop) lamps and the turn signal lamps. An inner rear lamp is secured on each outboard side of the liftgate outer panel adjacent to the outer lamp and also includes a bulb for the park (or tail) lamps as well as a bulb for the backup (or reverse) lamps.

OUTER LAMP

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

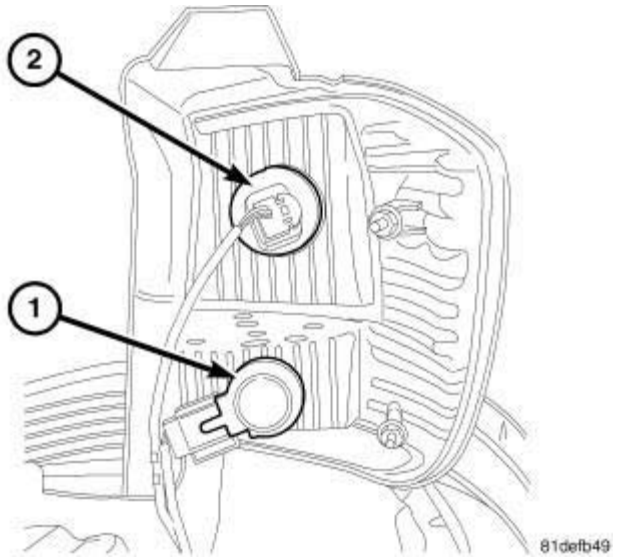


Fig. 30: Tail/Stop/Rear Side Marker And Turn Signal
Courtesy of CHRYSLER LLC

NOTE: The outer rear lamp unit contains two bulbs. They are the tail/stop/rear side marker (1) and the turn signal (2). The service procedures for each bulb are the same, only the bulb sizes and types may differ.

1. Align the base of the bulb with the appropriate bulb socket (1 or 2).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the back of the outer rear lamp unit housing.
4. Insert the socket and bulb into the housing until the socket is firmly seated.

5. Rotate the socket clockwise about 30 degrees to lock it into place.
6. Reinstall the outer rear lamp unit. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Tail Stop Turn - Installation**.
7. Reconnect the battery negative cable.

INNER LAMP

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

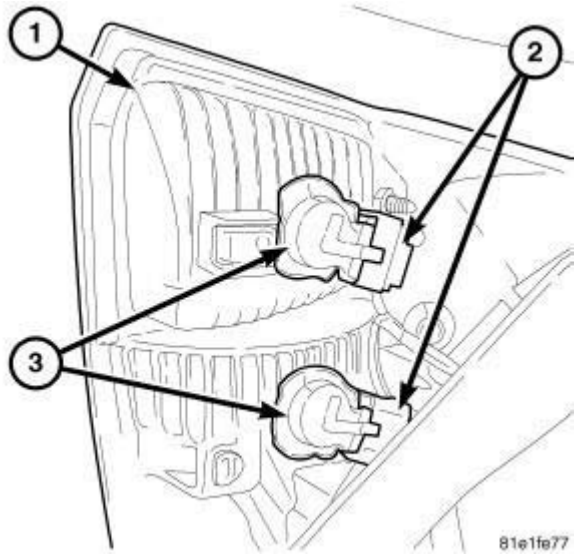


Fig. 31: Bulb Socket On Back Of Lamp Housing
Courtesy of CHRYSLER LLC

NOTE: The inner rear lamp unit contains two bulbs. The upper socket contains the tail lamp bulb, while the lower socket contains the backup lamp bulb. The service procedures for each bulb are the same, only the bulb sizes and types may differ.

1. Align the base of the bulb with the appropriate bulb socket (3).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the back of the inner rear lamp unit housing.
4. Insert the socket and bulb into the housing until the socket is firmly seated.
5. Rotate the socket clockwise about 30 degrees to lock it into place.
6. Reinstall the inner rear lamp unit. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/LAMP, Tail Stop Turn - Installation**.
7. Reconnect the battery negative cable.

LAMP

Each rear lamp unit for this vehicle consists of two pieces. An outer rear lamp unit that is secured at the rear of each quarter panel includes bulbs for the park (or tail) lamps, the brake (or stop) lamps and the turn signal lamps. An inner rear lamp is secured on each outboard side of the liftgate outer panel adjacent to the outer lamp and also includes a bulb for the park (or tail) lamps as well as a bulb for the backup (or reverse) lamps. These lamp units are serviced individually as follows.

OUTER

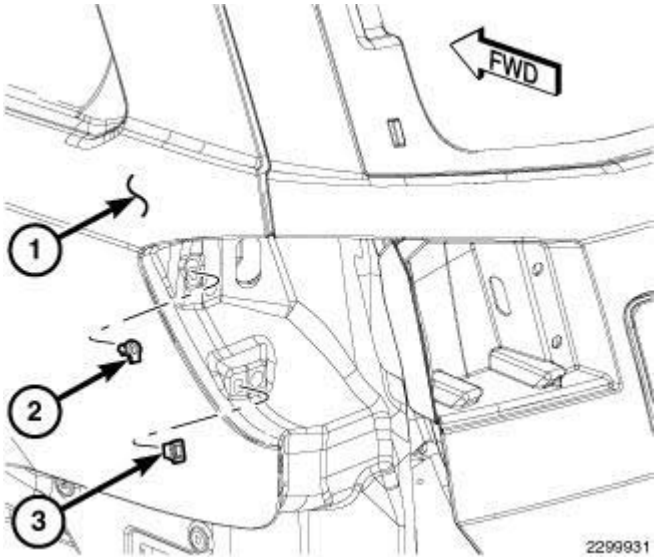


Fig. 32: Plastic Grommets
Courtesy of CHRYSLER LLC

1. Check to be certain that the two plastic grommets (2 and 3) are in good condition and properly installed in the outboard side of the lamp opening of the body sheet metal (1).

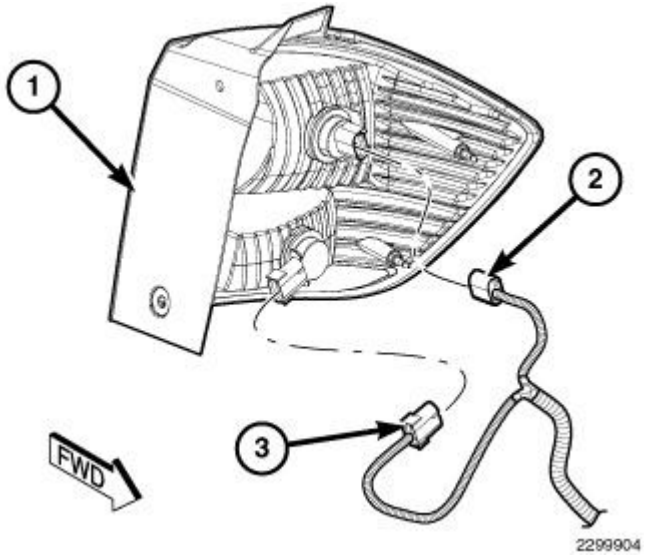


Fig. 33: Body Wire Harness Connectors
Courtesy of CHRYSLER LLC

2. Position the outer rear lamp unit (1) to the lamp opening of the body sheet metal.
3. Reconnect the two body wire harness connectors (2 and 3) to the bulb socket connector receptacles on the back of the lamp housing.

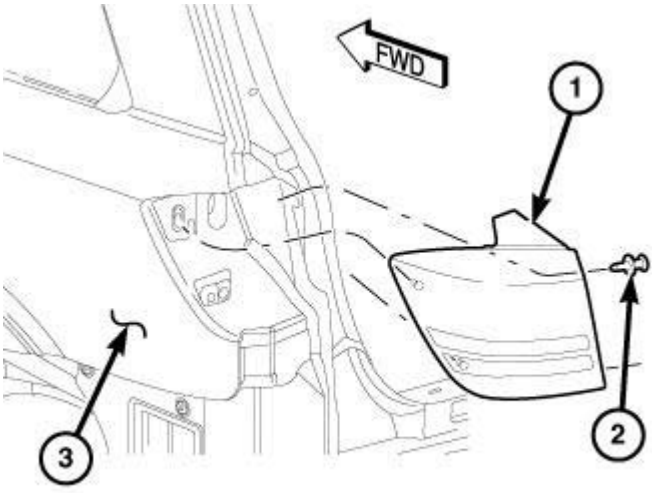


Fig. 34: Outer Rear Lamp Unit
Courtesy of CHRYSLER LLC

4. Align the two locating pins on the back of the lamp housing (1) with the plastic grommets in the lamp opening of the body sheet metal (3).
5. Using hand pressure, push firmly and evenly on the outboard top and bottom of the lamp until both alignment pins snap into the grommets.
6. Reinstall the two push pin fasteners (2) that secure the inboard side of the outer rear lamp unit to the side jamb of the liftgate opening.
7. Reconnect the battery negative cable.

INNER

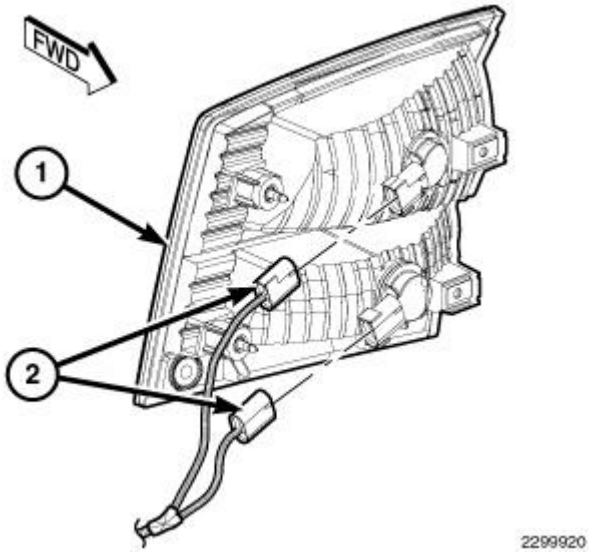


Fig. 35: Liftgate Wire Harness Connectors
Courtesy of CHRYSLER LLC

1. Check to be certain that the two plastic grommets are in good condition and properly installed on the inboard side of the liftgate lamp opening. If a grommet is removed, it must be replaced with a new unit.
2. Check to be certain that the two U-nuts are in good condition and properly installed on the outboard side of the inner rear lamp unit (1).
3. Position the lamp to the liftgate lamp opening.
4. Reconnect the two liftgate wire harness connectors (2) to the bulb socket connector receptacles on the back of the lamp housing.

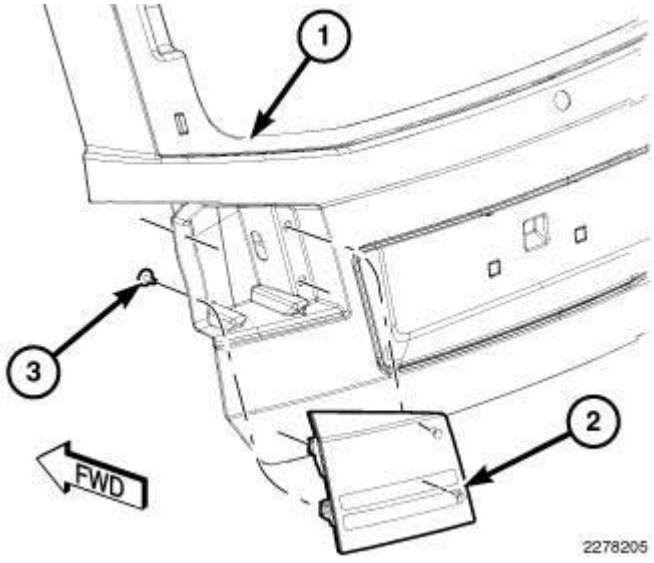


Fig. 36: Inner Rear Lamp Unit
Courtesy of CHRYSLER LLC

5. Align the two locating pins on the back of the lamp housing (2) with the plastic grommets in the liftgate

(1) lamp opening.

6. Using hand pressure, push firmly and evenly on the inboard top and bottom of the lamp until both alignment pins snap into the grommets.
7. Install and tighten the two screws (3) that secure the outboard side of the inner rear lamp unit to the liftgate lamp opening. Tighten the screws to 1.5 N.m (15 in. lbs.).
8. Reconnect the battery negative cable.

MOTOR, HEADLAMP LEVELING, EXPORT

DESCRIPTION

DESCRIPTION

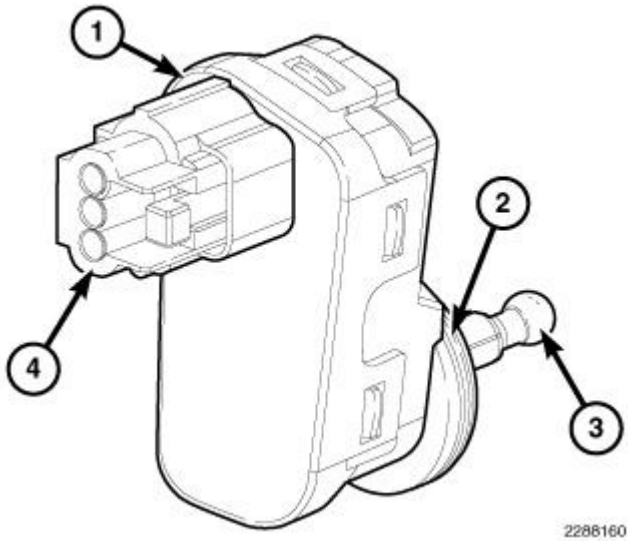


Fig. 37: Headlamp Leveling Motor
Courtesy of CHRYSLER LLC

The headlamp leveling motor (1) is located on the rear surface of each front lamp unit on vehicles equipped with the headlamp leveling system, which is available only in certain export markets where it is required equipment. The motor is encased within a molded plastic housing and is secured by an integral wedge-type mounting flange (2) to a keyed flange on the back of the front lamp unit housing. A rubber seal around the circumference of the mounting boss seals the motor to the lamp housing.

The outside of the motor housing features an integral molded connector (4) on its upper rearward surface and a plastic pushrod with a ball formation (3) on its free end extends from the motor mounting flange. Within the motor housing is a 12-volt Direct Current (DC) servo motor, an electronic controller board that includes the motor logic circuits, and an integral screw-drive transmission. The headlamp leveling motor is connected to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

The headlamp leveling motor cannot be repaired and, if ineffective or damaged, the entire motor unit must be replaced.

OPERATION

OPERATION

The controller board and logic circuitry of the headlamp leveling motor controls motor operation based upon a voltage signal input received from the Totally Integrated Power Module (TIPM). The TIPM uses electronic messages received over the Controller Area Network (CAN) data bus from the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) to determine the correct voltage signal to provide the leveling motor, while the EMIC uses electronic messages received over the Local Interface Network (LIN) data bus from the instrument panel switch pod to monitor the headlamp leveling switch selection.

The headlamp leveling motors have a path to ground at all times. The motors operate on battery voltage received through the headlamp low beam feed circuits so that the system will only operate when the headlamp low beams are turned ON. When the motor is energized it will extend or retract the motor pushrod through an integral screw-drive transmission. The ball on the end of the pushrod is snapped into a saddle bracket on the back of the reflector within the front lamp unit housing, which will cause the reflector to move as the pushrod is extended or retracted, changing the angle at which the light is projected from the headlamp bulb filaments.

The hard wired circuits for the headlamp leveling motors may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the active electronic elements within the headlamp leveling motors or the electronic controls and communication between other modules and devices that provide some features of the headlamp leveling system. The most reliable, efficient, and accurate means to diagnose the headlamp leveling motor or the electronic controls and communication related to headlamp leveling system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

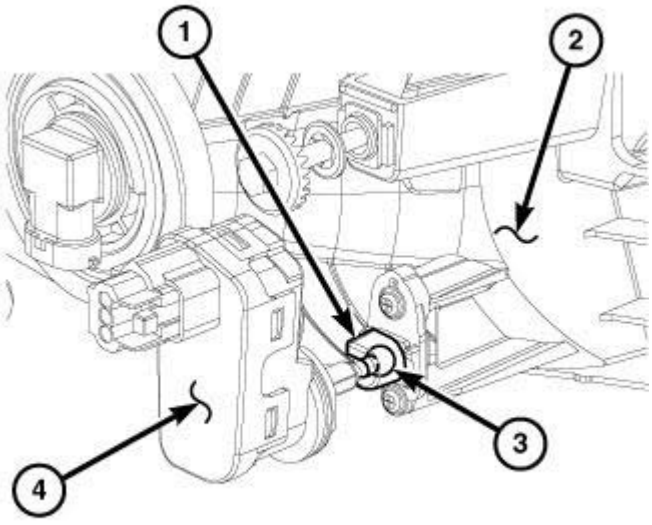


Fig. 38: Headlamp Leveling Motor On Back Of Lamp Housing
Courtesy of CHRYSLER LLC

NOTE: The graphic shows the right side front lamp unit as viewed from the back of the lamp with the housing removed. However, the housing cannot be removed from the lamp for service. This view was necessary in order to clearly illustrate the internal engagement of the headlamp leveling motor pushrod with the saddle bracket on the lamp reflector.

1. Disconnect and isolate the battery negative cable.
2. Remove front lamp unit from the vehicle. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/UNIT, Front Lamp - Removal**.
3. Rotate the headlamp leveling motor (4) on the back of the lamp housing counterclockwise about 30 degrees to unlock it from the housing.
4. Grasp the motor firmly with one hand and twist it toward the inboard side of the lamp far enough to disengage the ball on the end of the motor pushrod (3) from the saddle bracket (1) secured to the reflector (2) within the lamp housing.
5. Pull the motor and pushrod straight back and out of the front lamp unit housing.

INSTALLATION

INSTALLATION

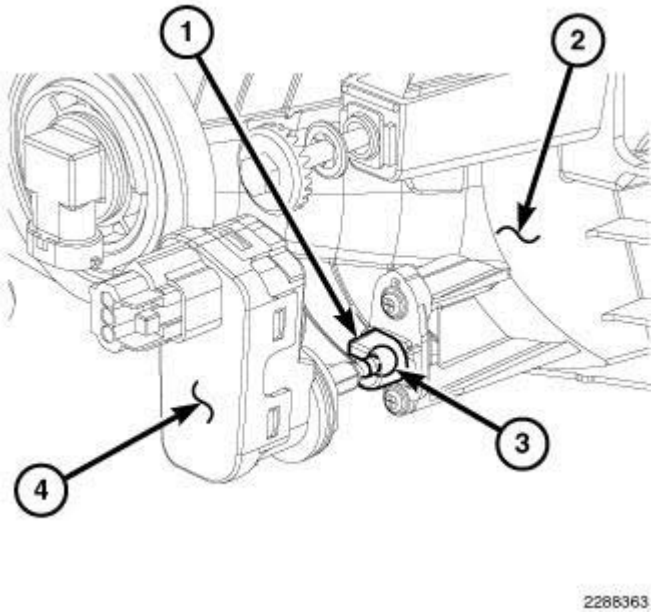


Fig. 39: Headlamp Leveling Motor On Back Of Lamp Housing
Courtesy of CHRYSLER LLC

NOTE: The graphic shows the right side front lamp unit as viewed from the back of the lamp with the housing removed. However, the housing cannot be removed from the lamp for service. This view was necessary in order to clearly illustrate the internal engagement of the headlamp leveling motor pushrod with the saddle bracket on the lamp reflector.

1. Align and insert the headlamp leveling motor (4) and pushrod into the front lamp unit housing.
2. Grasp the motor firmly with one hand and twist it toward the inboard side of the lamp far enough to align the ball on the end of the motor pushrod (3) with the saddle bracket (1) secured to the reflector (2) within the lamp housing.

NOTE: It may be helpful to also remove a headlamp bulb from the lamp reflector and insert a finger through the bulb opening to move the reflector far enough to align the saddle bracket with the motor pushrod ball.

3. With the motor pushrod ball and reflector saddle bracket aligned, twist the motor back toward the outboard side of the lamp far enough to engage the pushrod ball into the reflector saddle bracket.
4. Insert the mounting flange of the headlamp leveling motor into the mounting boss on the back of the front lamp unit housing until the motor is firmly seated.
5. Rotate the motor clockwise about 30 degrees to lock it into place.
6. Reinstall the front lamp unit into the vehicle. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/UNIT, Front Lamp - Installation**.
7. Reconnect the battery negative cable.

RELAY, TRAILER TOW

DESCRIPTION

DESCRIPTION

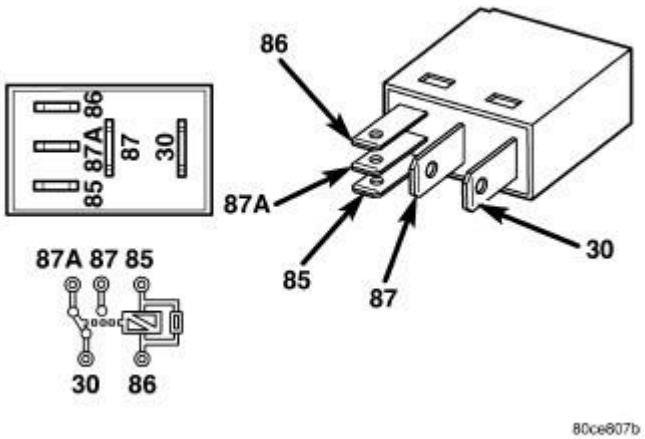


Fig. 40: Identifying Relay & Terminals
Courtesy of CHRYSLER LLC

Vehicles equipped with an optional trailer tow preparation package have four trailer tow relays, one each for the trailer tow stop/turn right and left and one each for the trailer stop lamp right and left. The trailer tow relays are conventional International Standards Organization (ISO) micro relays. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns, and terminal functions. Each relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through five integral male spade-type terminals that extend from the relay base plate.

The trailer tow relays are included with the trailer tow preparation wire harness that is shipped loose in the glove box for customer or dealer installation at the rear of the vehicle. A trailer tow stop/turn relay is located behind the rear fascia below each outer tail lamp, while a trailer stop lamp relay is located behind the rear fascia below each outboard end of the rear bumper reinforcement. Each relay and connector is wrapped within an isolator envelope for sound deadening and anti-rattle protection. Refer to **SYSTEM WIRING DIAGRAMS** for specific relay cavity assignment information.

Any of the trailer tow relays cannot be adjusted or repaired and, if ineffective or damaged, the affected unit must be replaced.

OPERATION

OPERATION

The trailer tow relays are electromechanical switches that use a low current input from the Totally Integrated Power Module (TIPM) to the tail lamps to control a high current output to the trailer brake and turn signal

lamps. Within each relay are an electromagnetic coil, a movable contact and two fixed contact points. A resistor is connected in parallel with the coil, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the field of the relay coil collapses.

The movable common supply contact point is held against the fixed normally closed contact point by spring pressure. When the relay coil is energized, an electromagnetic field is produced by the coil windings. This field draws the movable contact away from the normally closed contact, and holds it against the normally open contact. When the relay coil is de-energized, spring pressure returns the movable contact back against the normally closed contact.

The inputs and outputs of the trailer tow relays include:

- **Common Supply Terminal (30)** - The common feed terminal of both the left and right trailer tow stop/turn relays is connected to their respective left or right trailer tow stop/turn signal pins of the 4-way trailer tow connector at all times. The common feed terminals of both the left and right trailer tow stop relays is connected to the normally closed (87A) terminal of their respective left or right trailer tow stop/turn relay at all times.
- **Coil Ground Terminal (85)** - The coil ground terminal of both the left and right trailer tow stop/turn relays is connected to their respective left or right rear turn signal control circuits from the TIPM at all times. The coil ground terminals of both the left and right trailer tow stop relays are connected to the stop lamp control circuit from the TIPM at all times.
- **Coil Battery Terminal (86)** - The coil battery terminal of both the left and right trailer tow stop/turn relays is connected to a path to ground at all times. The coil battery terminal of both the left and right trailer tow stop relays is connected to their respective left or right rear turn signal control circuits from the TIPM at all times.
- **Normally Open Terminal (87)** - The normally open terminal of both the left and right trailer tow stop/turn relays is connected to the stop lamp control circuit from the TIPM whenever that relay is energized. The normally open terminal of both the left and right trailer tow stop relays is connected to a path to ground whenever that relay is energized.
- **Normally Closed Terminal (87A)** - The normally closed terminal of both the left and right trailer tow stop/turn relays is connected are connected to the common supply (30) terminal of their respective left or right trailer tow stop relay whenever the relay is de-energized. The normally closed terminal of both the left and right trailer tow stop relays is not connected to any circuit in this application.

The trailer tow relays and the hard wired circuits for the relays may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that provide some features of the trailer tow turn and stop lamp lighting system. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to trailer tow turn and stop lamp lighting operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

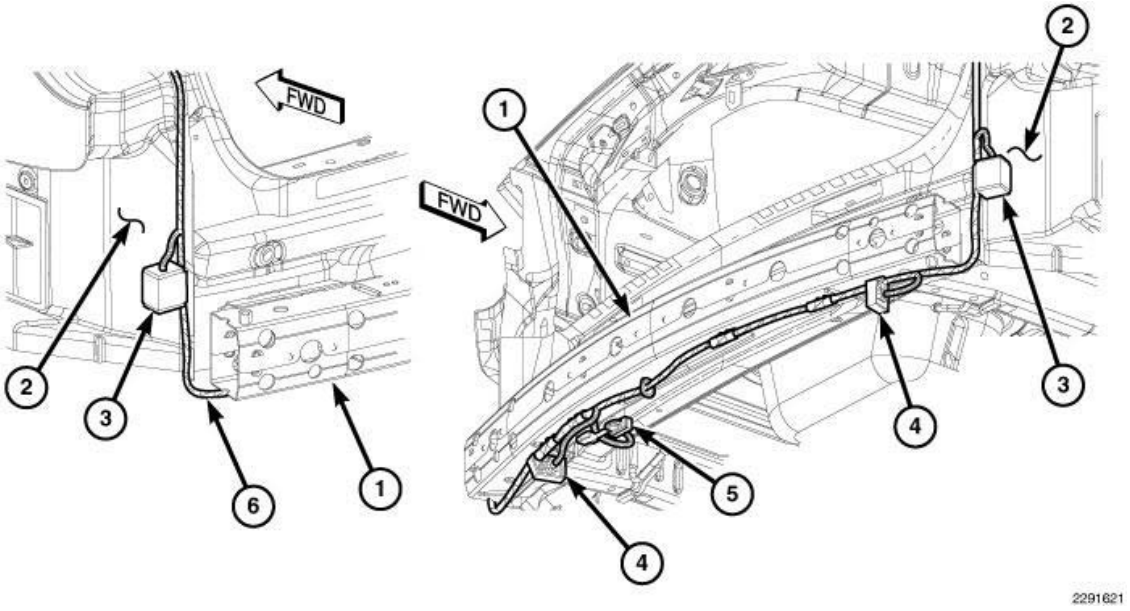


Fig. 41: Isolator Envelope
Courtesy of CHRYSLER LLC

TRAILER TOW STOP/TURN RELAYS

1. Disconnect and isolate the battery negative cable.
2. Remove the rear fascia from the vehicle. Refer to **Frame and Bumpers/Bumpers/FASCIA, Rear - Removal**
3. Disengage the left or right trailer tow stop/turn relay and connector from the isolator envelope (3) secured to the trailer tow wire harness (6) along the left or right body side aperture (2) just below the outer tail lamp.
4. Pull the relay straight out from the wire harness connector.

TRAILER TOW STOP LAMP RELAYS

1. Disconnect and isolate the battery negative cable.
2. Remove the rear fascia from the vehicle. Refer to **Frame and Bumpers/Bumpers/FASCIA, Rear - Removal**
3. Disengage the left or right trailer tow stop lamp relay and connector from the isolator envelope (4) secured to the trailer tow wire harness (6) on the underside of the rear bumper reinforcement (1) on the left or right side of the 4-way trailer tow connector (5).
4. Pull the relay straight out from the wire harness connector.

INSTALLATION

INSTALLATION

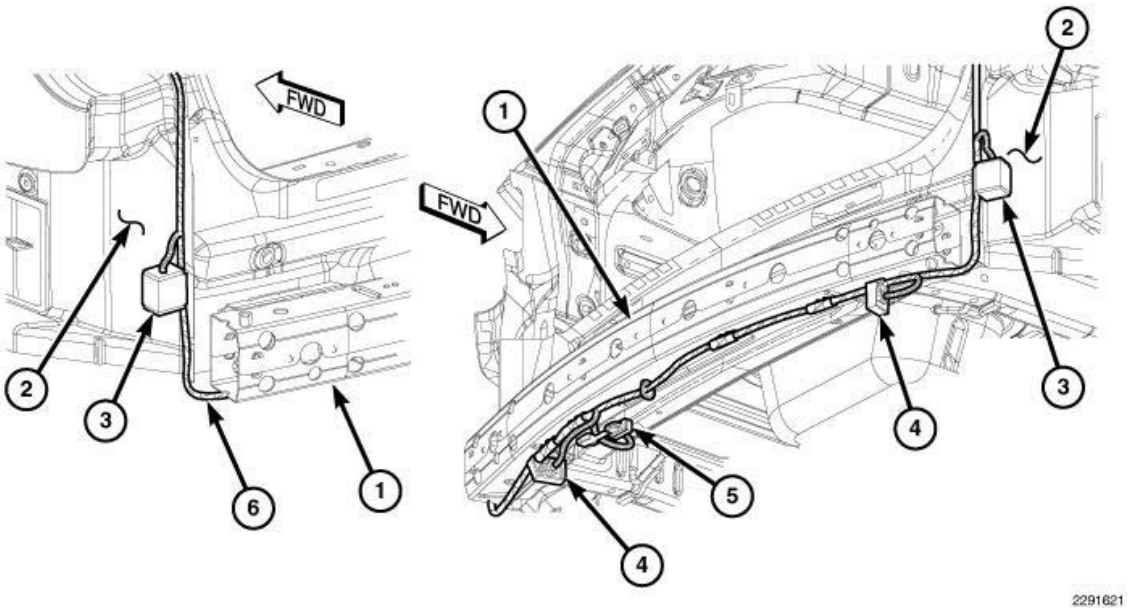


Fig. 42: Isolator Envelope
Courtesy of CHRYSLER LLC

TRAILER TOW STOP/TURN RELAYS

1. Align the terminals of the left or right trailer tow stop/turn relay with the terminal receptacles of the trailer tow wire harness connector.
2. Firmly and evenly push the relay into the connector until it is fully seated.
3. Insert the relay and connector into the isolator envelope (3) secured to the wire harness (6) along the left or right body side aperture (2) just below the outer tail lamp.
4. Reinstall the rear fascia onto the vehicle. Refer to **Frame and Bumpers/Bumpers/FASCIA, Rear - Installation** .
5. Reconnect the battery negative cable.

TRAILER TOW STOP LAMP RELAYS

1. Align the terminals of the left or right trailer tow stop lamp relay with the terminal receptacles of the trailer tow wire harness connector.
2. Firmly and evenly push the relay into the connector until it is fully seated.
3. Insert the relay and connector into the isolator envelope (4) secured to the trailer tow wire harness (6) on the underside of the rear bumper reinforcement (1) on the left or right side of the 4-way trailer tow connector (5).
4. Reinstall the rear fascia onto the vehicle. Refer to **Frame and Bumpers/Bumpers/FASCIA, Rear - Installation** .
5. Reconnect the battery negative cable.

SWITCH, BACKUP LAMP

DESCRIPTION

DESCRIPTION

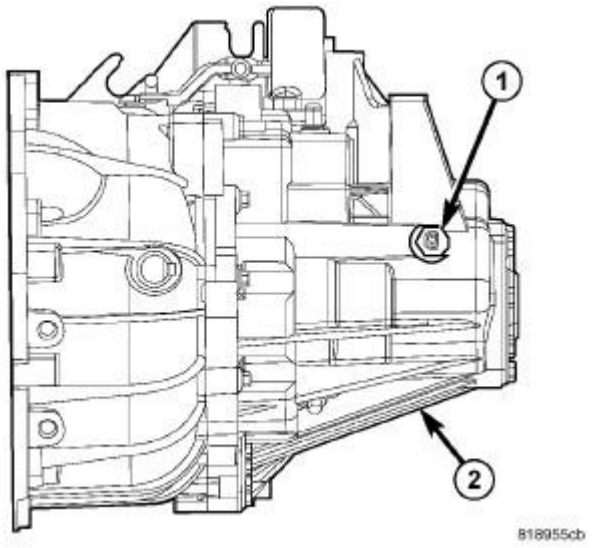


Fig. 43: Backup Lamp Switch
Courtesy of CHRYSLER LLC

Vehicles equipped with a manual transmission (2) have a normally open, spring-loaded plunger type backup lamp switch (1). Vehicles with an optional electronic automatic transmission have a Transmission Range Sensor (TRS) that is used to perform several functions, including that of the backup lamp switch. The TRS is described in further detail elsewhere in this service information. Refer to the service and diagnostic information for the automatic transmission type installed in the vehicle.

The backup lamp switch is located in a threaded hole on the left facing surface of the manual transmission housing. The switch has a threaded body and a hex formation near the plunger end of the switch. An integral connector receptacle at the end of the switch opposite the plunger connects the switch to the vehicle electrical system through a take out and connector of the engine wire harness. When installed, only the switch connector and the hex formation are visible on the outside of the transmission housing.

The backup lamp switch cannot be adjusted or repaired and, if ineffective or damaged, the entire switch unit must be replaced. Refer to the service and diagnostic information for the manual transmission type installed in the vehicle.

OPERATION

OPERATION

The backup lamp switch controls a path to ground for the Totally Integrated Power Module (TIPM) on the reverse switch signal circuit. The TIPM reads this input through an internal pull-up, then controls an output through a high side driver that regulates the flow of battery voltage to the backup lamp bulbs as appropriate on

the backup lamp feed circuit. The switch plunger is mechanically actuated by the gearshift mechanism within the transmission, which will depress the switch plunger and close the switch contacts whenever the REVERSE gear has been selected. The switch receives ground at all times through a take out and eyelet terminal of the wire harness that is secured to the body sheet metal.

The backup lamp switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that rely upon inputs from the backup lamp switch. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to backup lamp switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

BACKUP LAMP SWITCH

1. Disconnect and isolate the battery negative cable.
2. Locate and disconnect the engine wire harness connector from the backup lamp switch connector receptacle.
3. Check for continuity between the two terminal pins in the backup lamp switch connector receptacle.
   a. With the gear selector lever in the REVERSE position, there should be continuity.
   b. With the gear selector lever in any position other than REVERSE, there should be no continuity.
4. If the switch fails either of these two continuity tests, replace the ineffective backup lamp switch.

SWITCH, HAZARD WARNING

DESCRIPTION

DESCRIPTION

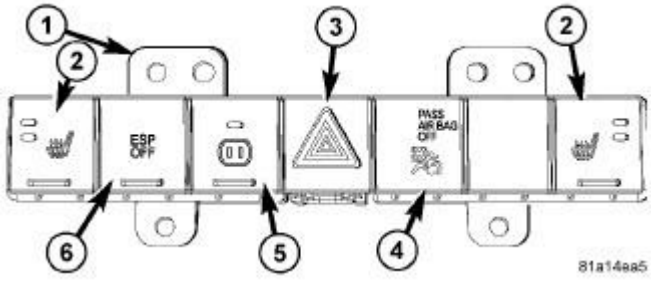


Fig. 44: Instrument Panel Switch Pod
Courtesy of CHRYSLER LLC

The hazard switch (3) is integral to the instrument panel switch pod (1), which is secured to the instrument panel center bezel just above the heater and air conditioner controls. A red, stencil-like International Control and Display Symbol icon for **Hazard Warning** identifies the hazard switch button. The remainder of the hazard

switch circuitry is concealed within the instrument panel switch pod.

The hazard switch button has panel lamps dimmer controlled illumination for night visibility. The switch button latches to a slightly lowered position when the hazard warning system is activated and the icon on the switch button will illuminate at an increased intensity while the turn signals and turn signal indicators are flashing. The switch button unlatches to a position flush with the other push buttons in the switch pod when the hazard warning is deactivated.

All of the circuitry and components of the hazard switch are contained within a molded black plastic instrument panel switch pod housing. A single connector receptacle is integral to the back of the switch pod housing. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The hazard switch cannot be adjusted or repaired and, if ineffective or damaged, the entire instrument panel switch pod unit must be replaced. Refer to **Electrical - Instrument Cluster/Instrument Cluster/POD, Switch - Removal** .

OPERATION

OPERATION

The status of the hazard switch is continually monitored by the circuitry within the instrument panel switch pod. The switch pod receives battery voltage at all times on a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness. The only other inputs to the switch pod consists of electronic communication with the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over the single wire Local Interface Network (LIN) data bus.

Whenever the hazard switch is in its unlatched and raised position, the hazard warning system is selected and the switch pod circuitry provides a hard wired output to the Totally Integrated Power Module (TIPM). When the TIPM receives a hazard switch input it then controls hazard warning system operation and flash rate by controlling battery voltage outputs through high side drivers on the right and left, front and rear turn signal feed circuits. The TIPM also sends the appropriate electronic messages back to the EMIC to control the illumination and flash rate of the right and left turn signal indicators, as well as to control the click rate of an electromechanical relay soldered onto the EMIC electronic circuit board that emulates the sound emitted by a conventional hazard warning flasher.

The hard wired circuits for the instrument panel switch pod may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the hazard warning switch or the electronic controls and communication between other modules and devices that provide some features of the hazard warning system. The most reliable, efficient, and accurate means to diagnose the hazard switch or the electronic controls and communication related to hazard warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, HEADLAMP LEVELING, EXPORT

DESCRIPTION

DESCRIPTION

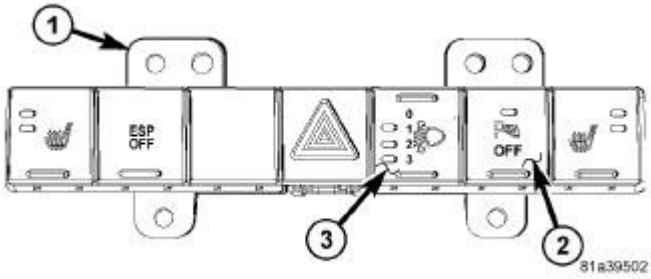


Fig. 45: Identifying Park Assist Switch
Courtesy of CHRYSLER LLC

The headlamp leveling switch (3) is used only on vehicles manufactured for certain export markets where the headlamp leveling system is required. The headlamp leveling switch is integral to the switch pod (1), which is secured to the instrument panel center bezel just above the heater and air conditioner controls. A stencil-like International Control and Display Symbol icon for **Headlamp Levelling Control** identifies the headlamp leveling switch button.

The switch push button is also marked with the numbers **0** , **1** , **2** , and **3** , which indicates each of the four headlamp leveling positions. Each higher number represents a lower aiming position of the headlamp beam relative to the road surface. The headlamp leveling switch button has panel lamps dimmer controlled illumination for night visibility. The switch button also features a jewel like Light Emitting Diode (LED) indicator adjacent to the numbers **1** , **2** , and **3** . The appropriate LED is illuminated when that headlamp position is currently selected. The momentary switch push button is operated by depressing, then releasing the top or bottom of the button in a rocker-like manner to enable the selection of a sequentially higher or lower position with each button press.

All of the circuitry and components of the headlamp leveling switch are contained within the molded black plastic instrument panel switch pod housing. A single connector receptacle is integral to the back of the switch pod housing. The switch pod is connected to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The headlamp leveling switch cannot be adjusted or repaired and, if ineffective or damaged, the entire instrument panel switch pod unit must be replaced. Refer to **Electrical - Instrument Cluster/Instrument Cluster/POD, Switch - Removal** .

OPERATION

OPERATION

The status of the headlamp leveling switch is continually monitored by the circuitry within the instrument panel switch pod. The switch pod receives battery voltage at all times on a fused battery feed circuit, and a path to ground at all times through the instrument panel wire harness. The only other inputs to and outputs from the switch pod consist of electronic communication with the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over the single wire Local Interface Network (LIN) data bus.

Whenever the headlamp leveling switch push button is depressed the switch pod circuitry sends an electronic **select status up** or **select status down** message input to the EMIC over the LIN data bus. The EMIC then sends the appropriate electronic **select request up** or **select request down** message to the TIPM over the Controller Area Network (CAN) data bus.

The TIPM responds to these messages by providing a voltage output to the headlamp leveling motors through high side drivers on the headlamp leveling motor right and left signal circuits to move the headlamp reflectors to the selected position based upon the voltage input received from the TIPM. The TIPM also sends the appropriate electronic messages back to the EMIC and the EMIC relays the messages back to the switch pod to control the illumination of the **1** , **2** or **3** Light Emitting Diode (LED) selected position indicator in the leveling switch button. The EMIC and TIPM logic will only allow the headlamp leveling system to operate while the ignition switch is in the ON position and the exterior lighting is turned ON.

The hard wired circuits for the instrument panel switch pod may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the headlamp leveling switch or the electronic controls and communication between other modules and devices that provide some features of the headlamp leveling system. The most reliable, efficient, and accurate means to diagnose the headlamp leveling switch or the electronic controls and communication related to headlamp leveling system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

SWITCH, MULTIFUNCTION, LEFT

DESCRIPTION

DESCRIPTION

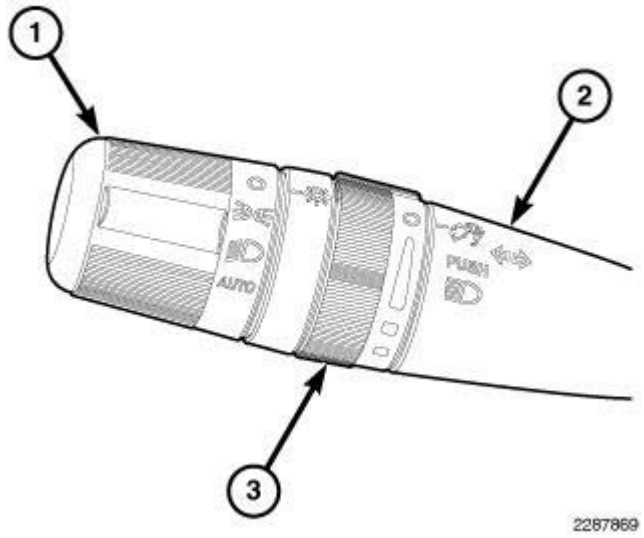


Fig. 46: Left Multifunction Switch
Courtesy of CHRYSLER LLC

The left (lighting) multi-function switch is located on the left side of the steering column, just below the

steering wheel. This switch is the primary control for the interior and exterior lighting systems. The only visible components of the switch are the control stalk (2), control knob (1) and control sleeve (3) that extend through the steering column shrouds on the left side of the column. The remainder of the switch including its mounting provisions, its electrical connection, and the turn signal cancel actuator are concealed beneath the shrouds.

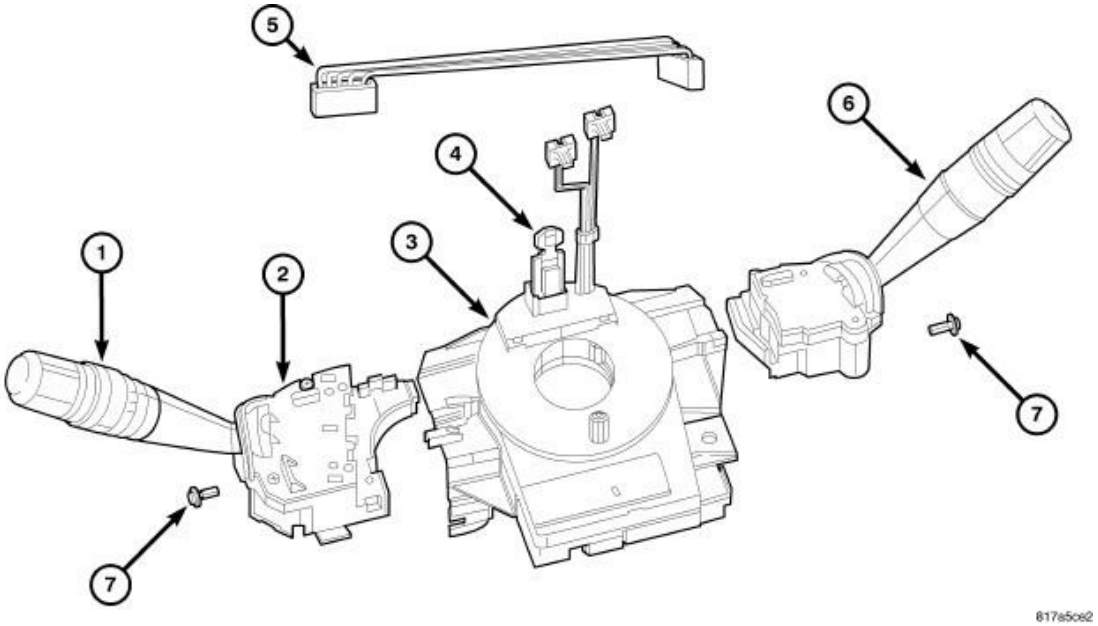


Fig. 47: Steering Control Module
Courtesy of CHRYSLER LLC

The switch housing (2) and controls (1) are constructed of molded black plastic. Each of the switch controls has white International Control and Display Symbol graphics applied to it, which clearly identify its many functions. A single screw (7) through a mounting tab integral to the back of the switch housing, and a slide tab integral to the bottom of the switch housing secure the switch to the mounting bracket integral to the clockspring (3).

The Steering Control Module (SCM) is internal to the switch housing. The switch outputs are internally connected directly to the SCM. A single connector receptacle containing seven terminal pins is integral to the inboard end of the switch housing and connects the right multi-function switch (6) through a jumper wire harness (5) directly to the SCM. An integral connector receptacle on the back of the switch housing connects the SCM to the vehicle electrical system through a dedicated take out and connector of the instrument panel wire harness.

The left multi-function switch provides the vehicle operator with a control interface for the following exterior lighting functions:

- **Automatic Headlamps** - For vehicles so equipped, the left multi-function switch control knob provides detent switching for the optional automatic headlamps.
- **Front Fog Lamps** - For vehicles so equipped, the left multi-function switch control knob provides detent switching for the optional front fog lamps.
- **Headlamps** - The left multi-function switch control knob provides detent switching for the headlamps.

- **Headlamp Beam Selection** - The left multi-function switch control stalk provides detent switching for selection of the headlamp high or low beams.
- **Headlamp Optical Horn** - The left multi-function switch control stalk includes momentary switching of the headlamp high beam circuits to provide an optical horn feature (sometimes referred to as flash-to-pass), which allows the vehicle operator to momentarily flash the headlamp high beams as an optical signalling device.
- **Park Lamps** - The left multi-function switch control knob provides detent switching for the park lamps.
- **Rear Fog Lamps** - For vehicles so equipped, the left multi-function switch control knob provides detent switching for the optional rear fog lamps. Rear fog lamps are optional only for vehicles manufactured for certain export markets, where they are required.
- **Turn Signal Control** - The left multi-function switch control stalk provides both momentary non-detent switching and detent switching with automatic cancellation for both the left and right turn signal lamps.

The left multi-function switch also provides the vehicle operator with a control interface for the following interior lighting functions:

- **Interior Lamps Defeat** - The left multi-function switch control ring provides detent switching to defeat the illumination of all interior courtesy lamps when a door or the liftgate is opened.
- **Interior Lamps On** - The left multi-function switch control ring provides detent switching to illuminate all interior courtesy lamps simultaneously.
- **Panel Lamps Dimming** - The left multi-function switch control ring provides simultaneous adjustable control of the illumination intensity of all instrument panel lighting at one of six available illumination intensity levels.
- **Parade Mode** - The left multi-function switch control ring provides detent switching for a parade mode that maximizes the illumination intensity of all instrument panel lighting for visibility when driving in daylight with the exterior lamps turned on.

The left multi-function switch cannot be adjusted or repaired. If any function of the switch is ineffective, or if the switch is damaged, the entire switch unit must be replaced. The clockspring (with the multi-function switch mounting bracket), the left multi-function switch (with the SCM), the right multi-function switch and the jumper wire harness are each available for separate service replacement.

OPERATION

OPERATION

The left (lighting) multi-function switch uses resistor multiplexing to control the many functions and features it provides using a minimal number of hard wired circuits. The switch receives clean grounds from the Steering Control Module (SCM), then provides resistor multiplexed return outputs to the SCM to indicate the selected switch positions. The SCM then sends electronic **switch status** messages over a Local Interface Network (LIN) data bus to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN), and the EMIC relays electronic **switch request** messages over the Controller Area Network (CAN) data bus to other electronic modules in the vehicle.

If the SCM detects no inputs from the left multi-function switch, it transmits an electronic **Signal Not Available**

(SNA) status message over the LIN data bus. The SNA status signals the EMIC to request other electronic modules to implement a fail-safe mode of operation for the exterior lighting system. The fail-safe mode automatically turns the exterior lighting ON when the ignition switch is in the ON position, and OFF when the ignition switch is in the OFF position.

The hard wired inputs and outputs of the left multi-function switch and SCM may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, the most reliable, efficient and accurate means to diagnose this component requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

EXTERIOR LIGHTING

Following are descriptions of how the left multi-function switch is operated to control the many exterior lighting functions and features it provides:

- **Automatic Headlamps** - The optional automatic headlamps feature is requested when the left multi-function switch control knob is rotated to the automatic (AUTO) detent position with the ignition switch in the ON position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Front Fog Lamps** - The optional front fog lamps are requested when the left multi-function switch control knob is pulled outward to the front fog lamps detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle. The switch control knob incorporates an internal cam mechanism that will only allow the front fog lamps to be selected while the headlamp ON position is also selected, and will automatically move the control knob to the front fog lamps OFF position when the control knob is rotated to deselect the headlamps.
- **Headlamps** - The headlamps are requested when the left multi-function switch control knob is rotated to the headlamps ON detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Headlamp Beam Selection** - The headlamp high beams are selected when the left multi-function switch control stalk is pushed forward to the high beam selection detent position. The low beams are selected when the control stalk is pulled rearward to the low beam selection detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **beam select switch status** message over the LIN data bus to the EMIC, which relays an electronic **beam select switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Headlamp Optical Horn** - The headlamp optical horn is selected each time the left multi-function switch control stalk is pulled fully rearward to a momentary position. The headlamp high beams will remain illuminated for as long as the control stalk is held in this momentary position and the low beams will be restored when the control stalk is released. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **beam select switch status** message over the LIN data bus to the EMIC, which relays an electronic **beam select switch request** message over the CAN data bus to other electronic modules in the vehicle.

- **Park Lamps** - The headlamps are requested when the left multi-function switch control knob is rotated to the park lamps ON detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Rear Fog Lamps** - The optional rear fog lamps are requested when the left multi-function switch control knob is pulled outward to the front fog lamps detent position and then rotated to the rear fog lamps detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle. The switch control knob incorporates an internal cam mechanism that will only allow the rear fog lamps to be selected while the front fog lamps ON position is also selected, and will automatically move the control knob to the rear fog lamp OFF position when the control knob is pushed in to deselect the front fog lamps.
- **Turn Signal Control** - The turn signals are requested when the left multi-function switch control stalk is moved downward (left signal) or upward (right signal). The control stalk has a detent position in each direction that provides turn signals with automatic cancellation, and an intermediate, momentary position in each direction that automatically provides three turn signal blinks as a LANE CHANGE feature when the control stalk is tapped or will energize the turn signals for as long as the control stalk is held in the momentary position. When the control stalk is moved to a detent turn signal switch position, a cancel actuator extends through an opening in the side of the clockspring case toward the center of the steering column. A turn signal cancel cam that is integral to the clockspring rotor rotates with the steering wheel and the cam lobes contact the cancel actuator when it is extended from the left multi-function switch. When the steering wheel is rotated during a turning maneuver, one of the turn signal cancel cam lobes will contact the turn signal cancel actuator. The cancel actuator latches against the cancel cam rotation in the direction opposite that which is signaled. If the left turn signal detent is selected, the lobes of the cancel cam will ratchet past the cancel actuator when the steering wheel is rotated to the left, but will unlatch the cancel actuator as the steering wheel rotates to the right and returns to center, which will cancel the turn signal event and release the control stalk from the detent so it returns to the neutral OFF position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **exterior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **exterior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.

INTERIOR LIGHTING

Following are descriptions of the how the left multi-function switch is operated to control the many interior lighting functions and features it provides:

- **Interior Lamps Defeat** - The interior lamps defeat feature is requested when the left multi-function switch control sleeve is rotated to the interior lamps DEFEAT detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **interior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **interior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Interior Lamps On** - The interior lamps ON feature is requested when the left multi-function switch control sleeve is rotated to the interior lamps ON detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **interior lighting switch status** message

over the LIN data bus to the EMIC, which relays an electronic **interior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.

- **Panel Lamps Dimming** - The panel lamps dimming function is active only when the left multi-function switch control knob is in any exterior lighting ON position. With the exterior lighting ON, the panel lamps dimming level is requested when the left multi-function switch control sleeve is rotated to any one of five minor detent positions. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **interior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **interior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.
- **Parade Mode** - The PARADE (or funeral) mode is active only when the left multi-function switch control knob is in any exterior lighting ON position. With the exterior lighting ON, the PARADE mode is requested when the left multi-function switch control sleeve is rotated to the PARADE mode detent position. The SCM reads the resistor multiplexed input from the left multi-function switch and sends an electronic **interior lighting switch status** message over the LIN data bus to the EMIC, which relays an electronic **interior lighting switch request** message over the CAN data bus to other electronic modules in the vehicle.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

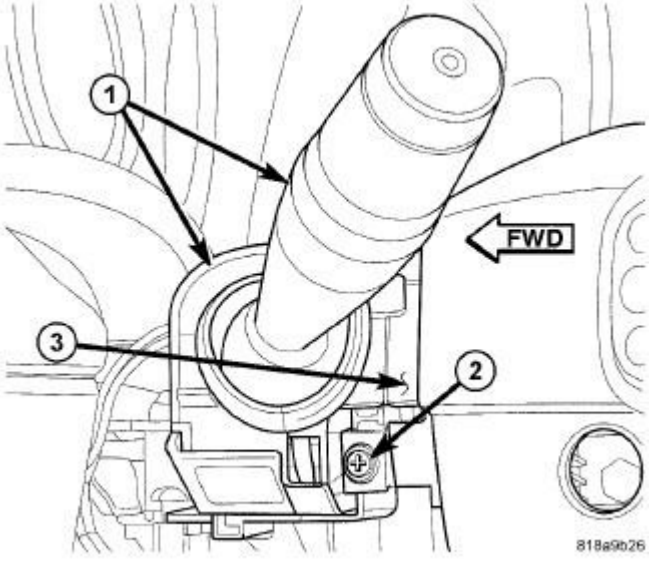


Fig. 48: Identifying Left Multi-Function Switch, Screw & Clockspring
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove both the upper and lower shrouds from the steering column. Refer to **Steering/Column/SHROUD, Steering Column - Removal** .
3. Disconnect the instrument panel wire harness connector from the connector receptacle on the back of the left multi-function switch.
4. Remove the screw (2) that secures the left multi-function switch (1) to the mounting bracket integral to the left side of the clockspring (3) on the steering column.

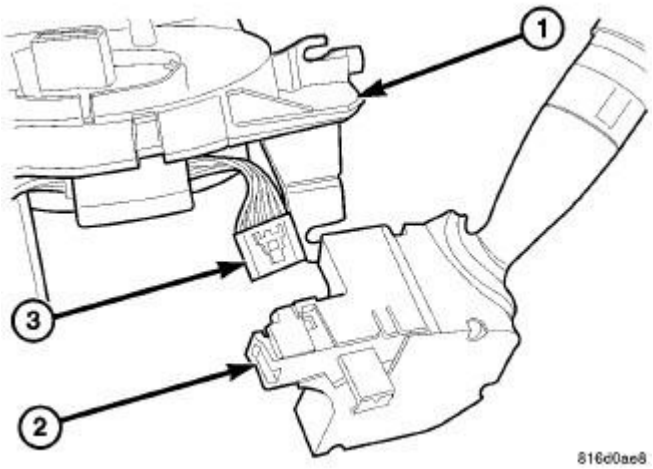


Fig. 49: Left Stalk Electrical Connector
Courtesy of CHRYSLER LLC

5. Slide the switch (2) away from the clockspring (1) far enough to disengage the slide tabs on the switch housing from the channel formations in the mounting bracket.
6. Disconnect the jumper wire harness connector (3) from the connector receptacle on the inboard end of the left multi-function switch.
7. Remove the switch from the clockspring.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper

precautions could result in accidental airbag deployment.

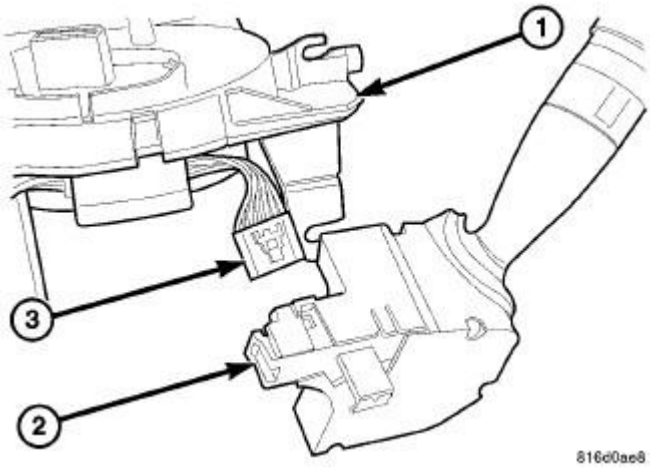


Fig. 50: Left Stalk Electrical Connector
Courtesy of CHRYSLER LLC

1. Position the left multi-function switch (2) close enough to the mounting bracket (1) integral to the left side of the clockspring to reconnect the jumper wire harness connector (3) to the connector receptacle on the inboard side of the switch housing.
2. Align the slide tabs on the switch housing with the channel formations integral to the clockspring mounting bracket, then slide the switch into the bracket until it is firmly seated.

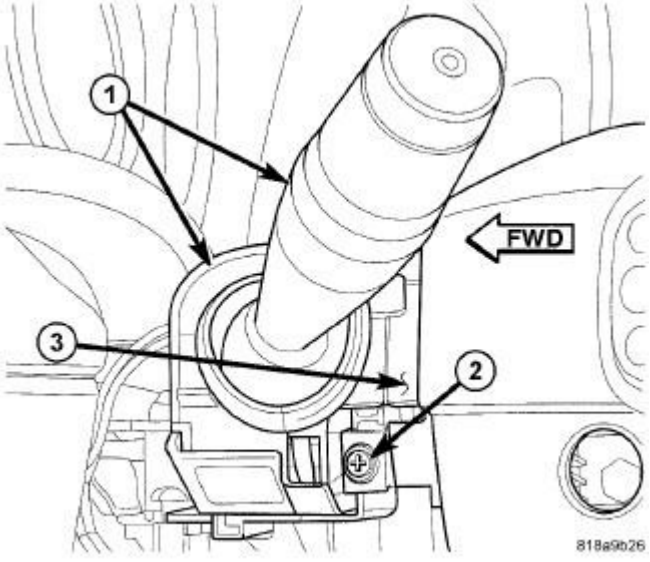


Fig. 51: Identifying Left Multi-Function Switch, Screw & Clockspring
Courtesy of CHRYSLER LLC

3. Install and tighten the screw (2) that secures the mounting tab on the front of the left multi-function switch (1) to the mounting bracket (3) on the clockspring. Tighten the screw to 1 N.m (10 in. lbs.).

4. Reconnect the instrument panel wiring harness connector to the back of the left multi-function switch.
5. Reinstall the upper and lower shrouds onto the steering column. Refer to **Steering/Column/SHROUD, Steering Column - Installation** .
6. Reconnect the battery negative cable.

SWITCH, PARKING BRAKE

DESCRIPTION

DESCRIPTION

There are two unique park brake switches used on this vehicle, depending upon whether the vehicle has a foot-operated or hand-operated park brake lever mechanism.

FOOT-OPERATED

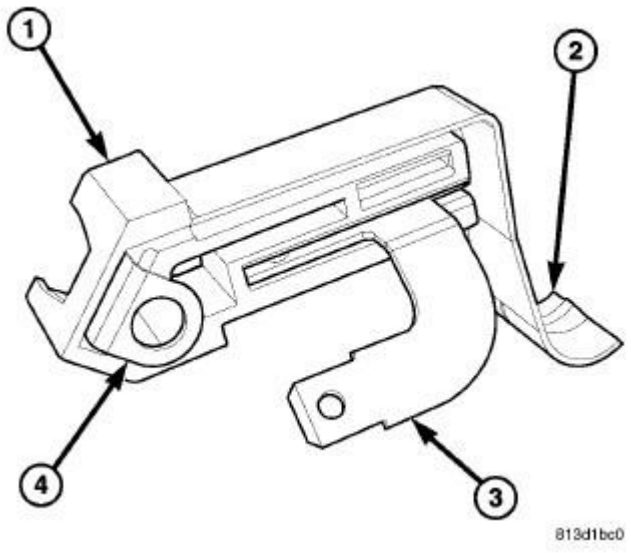


Fig. 52: Foot-Operated Park Brake Switch
Courtesy of CHRYSLER LLC

The foot-operated park brake switch (1) is located on the park brake lever mechanism on the cowl side inner panel below the instrument panel, outboard of the steering column. This switch includes a spade-type output terminal (3) that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. The output terminal is integral to the stationary contact within a molded plastic insulator.

A locating tab on the insulator engages a slot in the park brake lever mechanism for positive switch location. External to the insulator is a movable leaf contact with an integral grounding lug (4) on one end and an integral actuating lever and follower (2) on the opposite end. The switch is secured to and grounded by a single screw to the park brake lever mechanism.

The foot-operated park brake switch cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

HAND-OPERATED

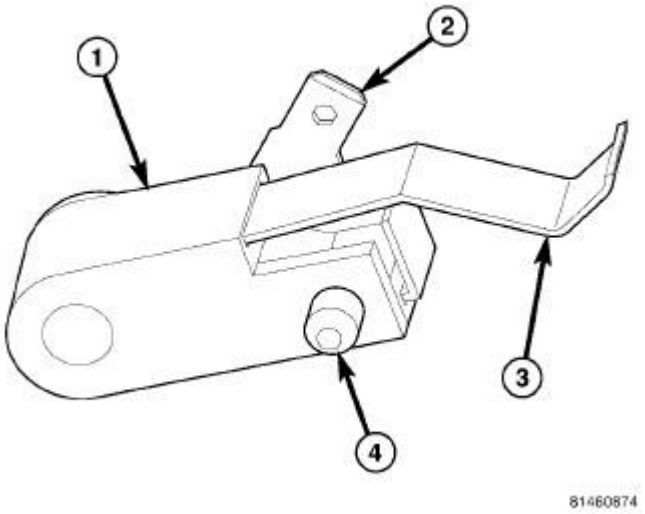


Fig. 53: Hand-Operated Park Brake Switch
Courtesy of CHRYSLER LLC

The hand-operated park brake switch (1) is located on the park brake lever mechanism on the floor panel transmission tunnel below the center floor console. This switch includes a spade-type output terminal (2) that connects the switch to the vehicle electrical system through a dedicated take out and connector of the body wire harness. The output terminal is integral to the stationary contact within a molded plastic insulator.

A locating tab (4) on the insulator engages a slot in the park brake lever mechanism for positive switch location. External to the insulator is a movable leaf contact (3) with an integral grounding lug on one end and an integral actuating lever and follower on the opposite end. The switch is secured to and grounded by a single screw to the park brake lever mechanism.

The hand-operated park brake switch cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

OPERATION

OPERATION

Both the foot-operated and hand-operated park brake switch are normally closed, mechanically actuated leaf contact switches that are operated by the foot or hand park brake lever mechanism. The switch is grounded through its mounting to the park brake lever mechanism and provides a ground input to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) on a park brake switch sense circuit whenever the park brake is applied, and opens this circuit whenever the park brake is released. The park brake switch sense input to the EMIC is used as a logic input by the EMIC for control of the brake indicator and

may also be used as a logic input for other electronic features in the vehicle.

The park brake switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication between other modules and devices that rely upon inputs from the park brake switch. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to park brake switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

PARK BRAKE SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: If the brake indicator stays ON with the ignition switch in the ON position and the park brake released, or comes ON while driving, the brake system must be diagnosed and repaired prior to performing the following tests. Refer to Brakes - Diagnosis and Testing . If no brake system problem is found, the following procedures will help to locate a shorted or open park brake switch sense circuit, or an ineffective park brake switch.

INDICATOR ILLUMINATES DURING BULB TEST, BUT DOES NOT WHEN PARK BRAKE APPLIED

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Apply the parking brake. Check for continuity between the park brake switch terminal and a good ground. There should be continuity. If OK, go to 2. If not OK, replace the ineffective park brake switch.
2. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavities of the body wire harness connector for the park brake switch and the instrument panel wire harness connector for the instrument cluster. There should be continuity. If not OK, repair the open park brake switch sense circuit between the park brake switch and the instrument cluster as required.

INDICATOR REMAINS ILLUMINATED - BRAKE SYSTEM CHECKS OKAY

1. Disconnect and isolate the battery negative cable. Disconnect the body wire harness connector for the park brake switch from the switch terminal. Check for continuity between the terminal of the park brake switch and a good ground. There should be no continuity with the park brake released, and continuity

with the park brake applied. If OK, go to 2. If not OK, replace the ineffective park brake switch.

2. Disconnect the instrument panel wire harness connector (Connector C2) for the instrument cluster from the cluster connector receptacle. Check for continuity between the park brake switch sense circuit cavity of the body wire harness connector for the park brake switch and a good ground. There should be no continuity. If not OK, repair the shorted park brake switch sense circuit between the park brake switch and the instrument cluster as required.

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

FOOT-OPERATED

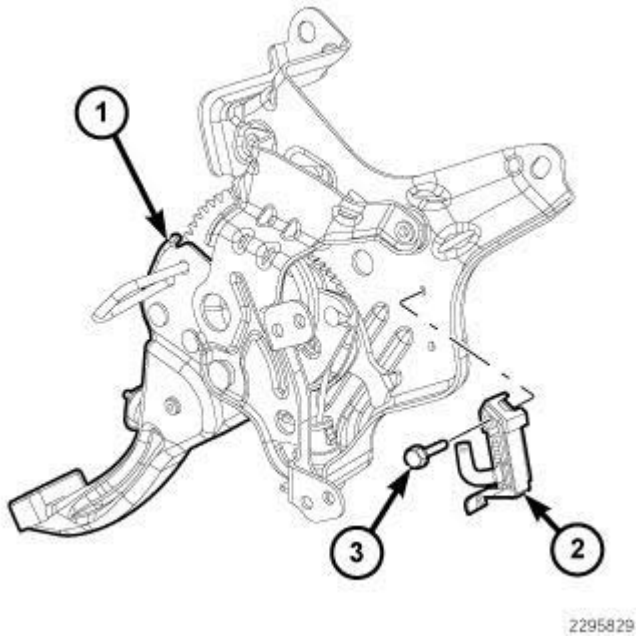


Fig. 54: Park Brake Lever Mechanism
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Apply the parking brake.
3. Reach under the left end of the instrument panel to access and disconnect the wire harness connector from

the terminal of the park brake switch (2) located on the park brake lever mechanism (1) on the left cowl side inner panel.

4. Remove the screw (3) that secures the park brake switch to the park brake lever mechanism.
5. Remove the switch from the park brake lever mechanism.

HAND-OPERATED

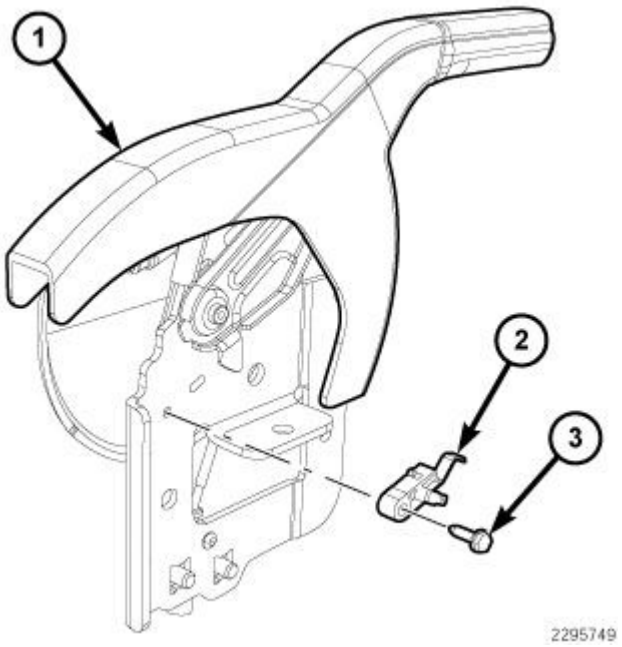


Fig. 55: Parking Brake Lever
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the console from the floor panel transmission tunnel. Refer to **Body/Interior/CONSOLE, Center - Removal**
3. Pull the parking brake lever (1) upward to apply the parking brake.
4. Disconnect the wire harness connector from the terminal of the park brake switch (2) located on the right side of the park brake lever mechanism.
5. Remove the screw (3) that secures the switch to the park brake lever bracket.
6. Remove the switch from the park brake lever bracket.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate

the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

FOOT-OPERATED

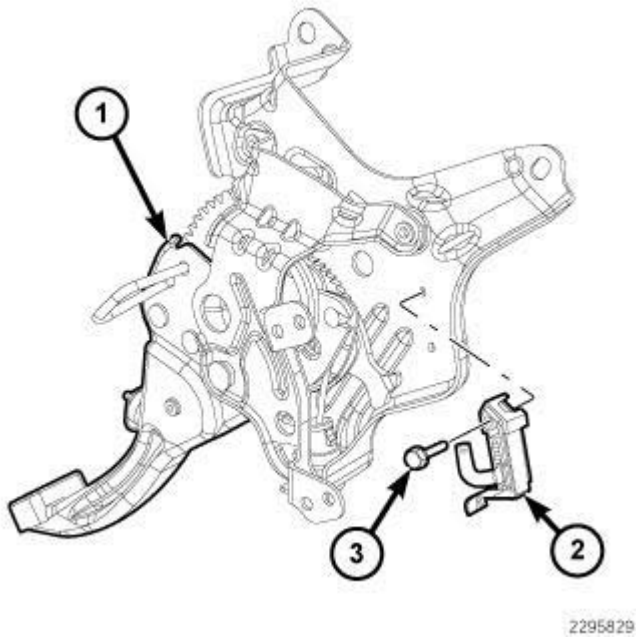


Fig. 56: Park Brake Lever Mechanism
Courtesy of CHRYSLER LLC

1. Reach under the left end of the instrument panel to position the park brake switch (2) onto the park brake lever mechanism (1) on the left cowl side inner panel. Be certain to engage the locating pin on the back of the switch insulator into the locating slot in the lever mechanism bracket.
2. Install and tighten the screw (3) that secures the park brake switch to the park brake lever mechanism. Tighten the screw to 2.5 N.m (24 in. lbs.).
3. Reconnect the wire harness connector to the terminal of the park brake switch.
4. Reconnect the battery negative cable.
5. Turn the ignition switch to the ON position and check for proper brake indicator operation with the parking brake applied, then release the parking brake and check that the brake indicator extinguishes.

HAND-OPERATED

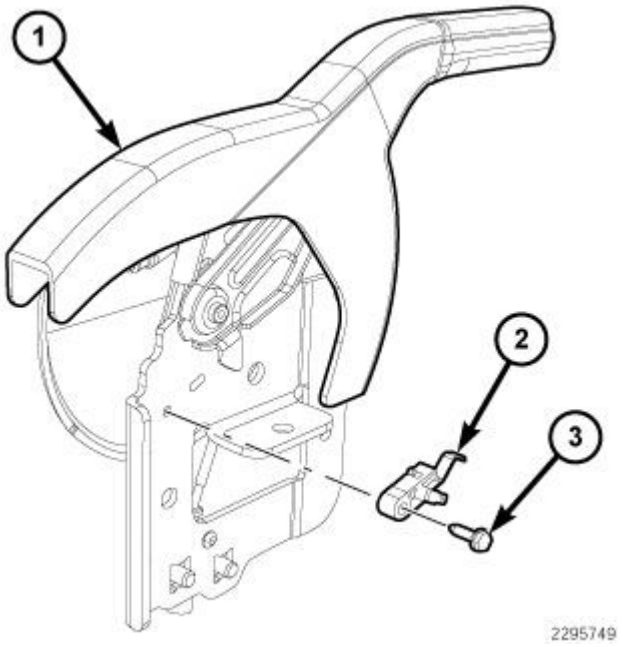


Fig. 57: Parking Brake Lever
Courtesy of CHRYSLER LLC

1. Position park brake switch (2) onto the right side of the park brake lever (1) bracket. Be certain to engage the locating pin on the back of the switch insulator into the locating slot in the lever bracket.
2. Install and tighten the screw (3) that secures the switch to the lever bracket. Tighten the screw to 2.5 N.m (24 in. lbs.).
3. Reconnect the wire harness connector to the terminal of the switch.
4. Reinstall the console onto the floor panel transmission tunnel. Refer to **Body/Interior/CONSOLE, Center - Installation**
5. Reconnect the battery negative cable.
6. Turn the ignition switch to the ON position and check for proper brake indicator operation with the parking brake applied, then release the parking brake and check that the brake indicator extinguishes.

SWITCH, STOP LAMP

DESCRIPTION

DESCRIPTION

Two unique brake lamp switches are used in this vehicle, depending upon whether the vehicle was built during early or late production. These switches are not interchangeable and both are illustrated and described in the paragraphs that follow.

EARLY PRODUCTION

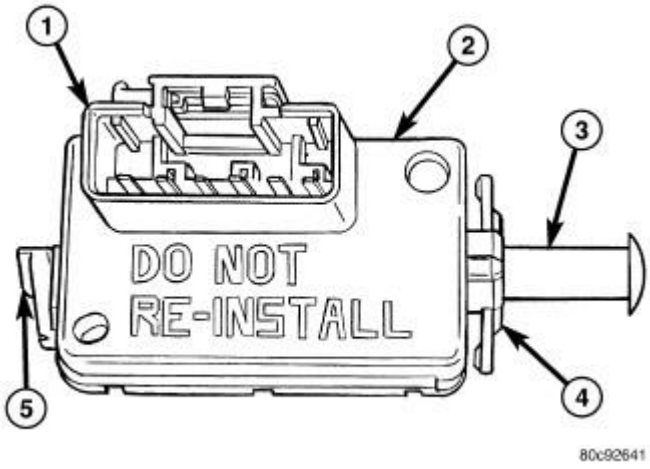


Fig. 58: Brake Lamp Switch
Courtesy of CHRYSLER LLC

This brake lamp switch (2) is a three circuit, spring-loaded plunger actuated switch that is secured to the brake pedal support bracket on the dash panel under the instrument panel on the driver side of the vehicle. The molded plastic switch housing has an integral connector receptacle (1) containing six terminal pins and featuring a Connector Position Assurance (CPA) lock. The switch is connected to the vehicle electrical system through a dedicated take out of the body wire harness.

The switch plunger (3) extends through a mounting collar (4) on one end of the switch housing. The plunger has a one time telescoping self-adjustment feature that is activated after the switch is installed by moving an adjustment release lever (5) on the opposite end of the switch housing clockwise, until it locks into a position that is horizontal and parallel to the connector receptacle.

This brake lamp switch cannot be readjusted or repaired. If the switch is damaged, ineffective, or removed from its mounting position for any reason, it must be replaced with a new unit.

LATE PRODUCTION

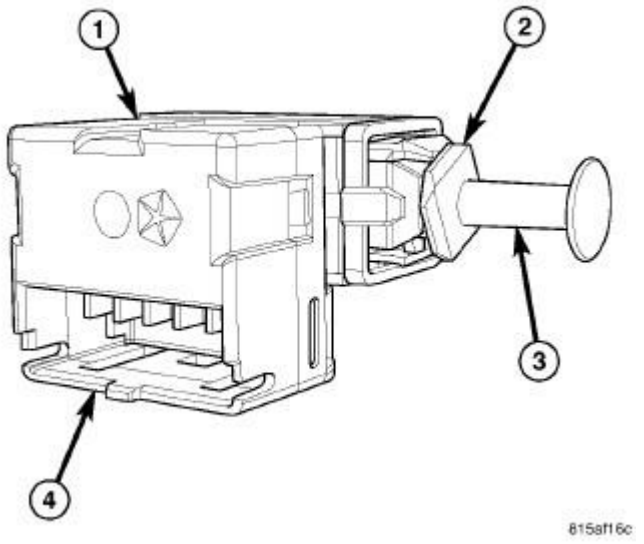


Fig. 59: Brake Lamp Switch
Courtesy of CHRYSLER LLC

This brake lamp switch (1) is a three circuit, spring-loaded plunger actuated switch that is secured to the brake pedal support bracket under the instrument panel on the driver side of the vehicle. The molded plastic switch housing has an integral connector receptacle (4) containing six terminal pins. The switch is connected to the vehicle electrical system through a dedicated take out of the body wire harness.

The switch plunger (3) extends through a mounting collar (2) on one end of the switch housing. The plunger has a telescoping self-adjustment feature that is activated after the switch is installed by pulling the brake pedal upward to its normal at-rest position. The telescoping plunger can be pulled outward from the switch housing to repeat the self-adjustment procedure if necessary.

This brake lamp switch cannot be repaired. If the switch is damaged or ineffective it must be replaced with a new unit.

OPERATION

OPERATION

Both the early and late production brake lamp switches control three independent circuits. These circuits are described as follows:

- **Brake Lamp Switch Circuit** - A normally open brake lamp switch circuit receives a battery voltage input, and supplies this battery voltage to the Center High Mounted Stop Lamp (CHMSL) and the Totally Integrated Power Module (TIPM) on a brake lamp switch output circuit only when the brake pedal is depressed (brake lamp switch plunger released).
- **Brake Lamp Switch Signal Circuit** - A normally closed brake lamp switch signal circuit receives a direct path to ground, and supplies this ground input to the Powertrain Control Module (PCM) on a brake signal 1 circuit only when the brake pedal is released (brake lamp switch plunger is depressed).

- **Speed Control Circuit** - A normally closed speed control circuit receives a battery voltage input from the Totally Integrated Power Module (TIPM) on an ignition run/start control output circuit, and supplies this battery voltage to the PCM on a brake signal 2 circuit only when the brake pedal is released (brake lamp switch plunger is depressed).

The PCM sends electronic **brake lamp switch status** messages to other electronic modules in the vehicle over the Controller Area Network (CAN) data bus for use as an additional logic input for controlling many other vehicle functions and features.

The brake lamp switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls and communication that provide some features related to brake lamp switch operation. The most reliable, efficient and accurate means to diagnose the electronic controls and communication related to brake lamp switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

DIAGNOSIS AND TESTING

BRAKE LAMP SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

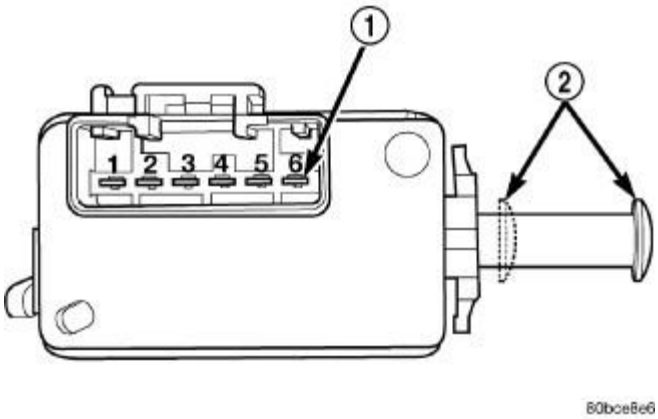


Fig. 60: Brake Lamp Switch - Early Production
Courtesy of CHRYSLER LLC

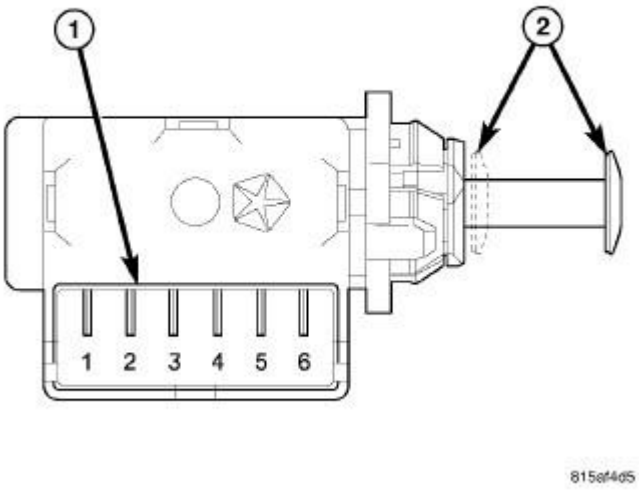


Fig. 61: Brake Lamp Switch - Late Production
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.

CAUTION: Do not remove the Eary Production-type brake lamp switch from the mounting bracket. The self-adjusting plunger of this switch is a one time only feature. If the switch is removed from the mounting bracket, it MUST be replaced with a new switch.

2. Disconnect the wire harness connector from the brake lamp switch.
3. Using an ohmmeter, perform the continuity tests at the terminal pins (1) in the brake lamp switch connector receptacle as shown in the Brake Lamp Switch Tests table below.

BRAKE LAMP SWITCH TESTS	
PLUNGER POSITION (2)	**CONTINUITY BETWEEN**
Released (Extended)	Pins 1 and 2
Compressed (Depressed)	Pins 3 and 4, 5 and 6

4. If the switch fails any of the continuity tests, replace the ineffective brake lamp switch as required.

REMOVAL

REMOVAL

Two unique brake lamp switches are used in this vehicle, depending upon whether the vehicle was built during early or late production. These switches are not interchangeable. Both switches are illustrated and described elsewhere in this service information to assist in positive identification. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Description**.

EARLY PRODUCTION

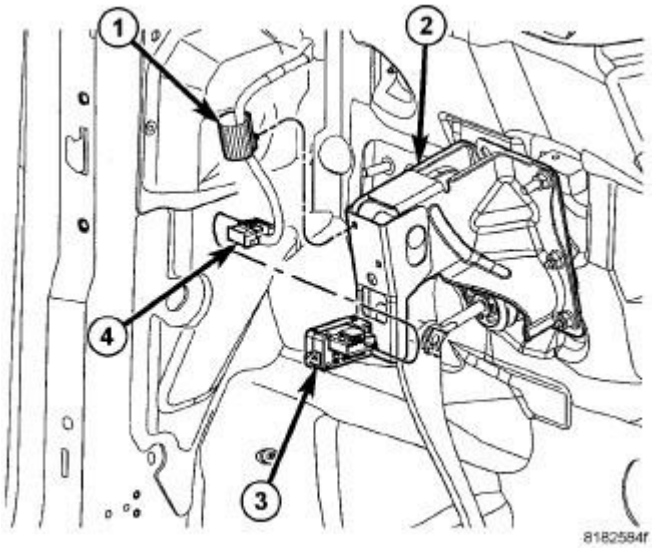


Fig. 62: Stop Lamp Switch Wiring Routing Clip, Brake Pedal Bracket, Stop Lamp Switch & Wiring Connector
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. If equipped, remove the silencer pad from below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Removal** .
3. Locate the brake lamp switch (3) on the brake pedal support bracket (2) under the instrument panel.
4. Disconnect the wire harness connector (4) from the switch.

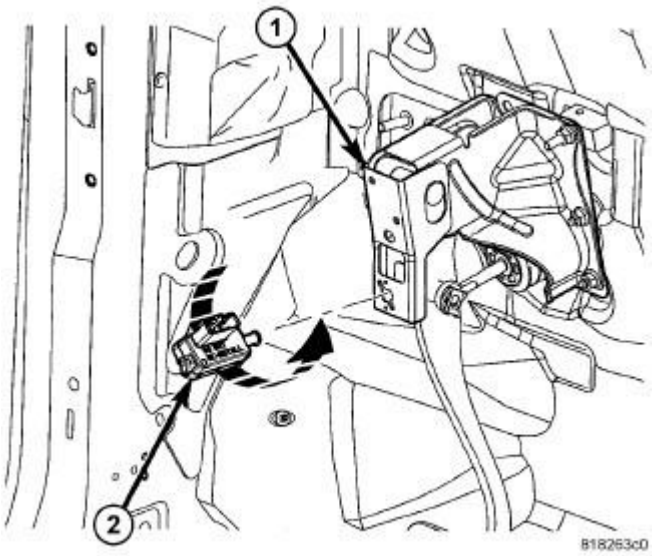


Fig. 63: STOP LAMP SWITCH REMOVAL
Courtesy of CHRYSLER LLC

1. Rotate the brake lamp switch housing (2) counterclockwise about 30 degrees to align the tabs on the switch locking collar with the keyed hole in the brake pedal support bracket (1).
2. Pull the switch straight rearward from the keyed hole to remove it from the bracket.
3. Discard the removed brake lamp switch. **The brake lamp switch self-adjusting plunger is a one time only feature. If the switch is removed from the bracket, it MUST be replaced with a new switch.**

LATE PRODUCTION

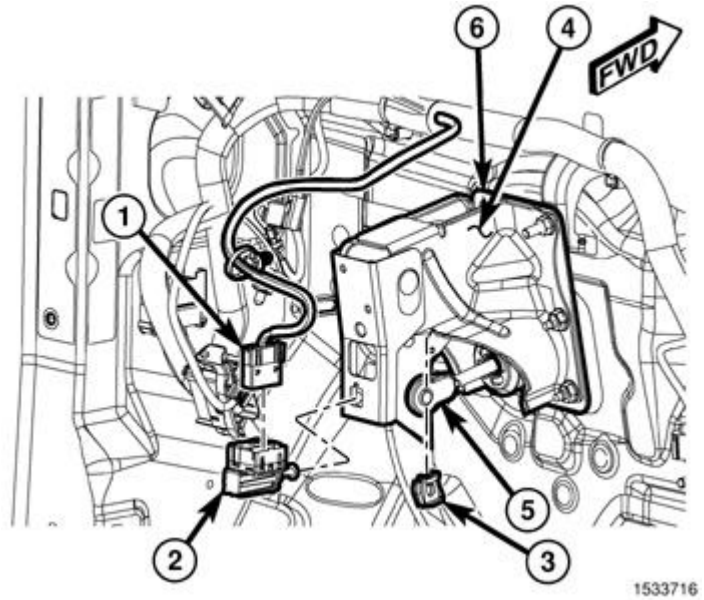


Fig. 64: Brake Lamp Switch On Brake Pedal Support Bracket
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. If equipped, remove the silencer pad from below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Removal** .
3. Locate the brake lamp switch (2) on the brake pedal support bracket (4) under the instrument panel.
4. Depress and hold the brake pedal in the depressed position.
5. Rotate the brake lamp switch housing (2) counterclockwise about 30 degrees to align the tabs on the switch locking collar with the keyed hole in the brake pedal support bracket.
6. Pull the switch straight rearward from the keyed hole to remove it from the bracket.
7. Release the brake pedal.
8. Disconnect the wire harness connector (1) from the switch.

INSTALLATION

INSTALLATION

Two unique brake lamp switches are used in this vehicle, depending upon whether the vehicle was built during early or late production. These switches are not interchangeable. Both switches are illustrated and described elsewhere in this service information to assist in positive identification. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Description**.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

EARLY PRODUCTION

CAUTION: The brake lamp switch self-adjusting switch plunger is a one time only feature. If the switch is removed from the mounting bracket, it MUST be replaced with a new switch.

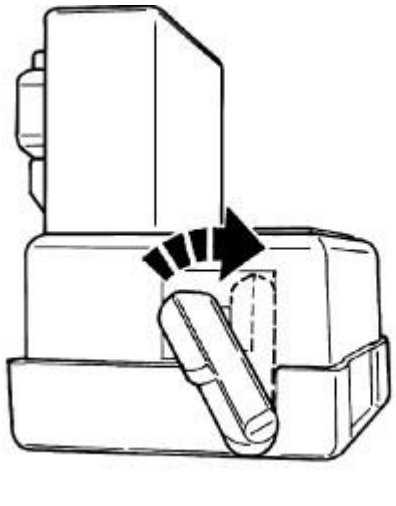


Fig. 65: Switch Adjustment Lever
Courtesy of CHRYSLER LLC

1. Obtain a new brake lamp switch. The adjustment lever on the new switch should be at about a 45 degree angle to the switch connector receptacle. If the adjustment lever is parallel with the connector receptacle, the switch adjustment has already been set and the switch must be scrapped.**DO NOT ATTEMPT TO RESET OR READJUST THE BRAKE LAMP SWITCH.**

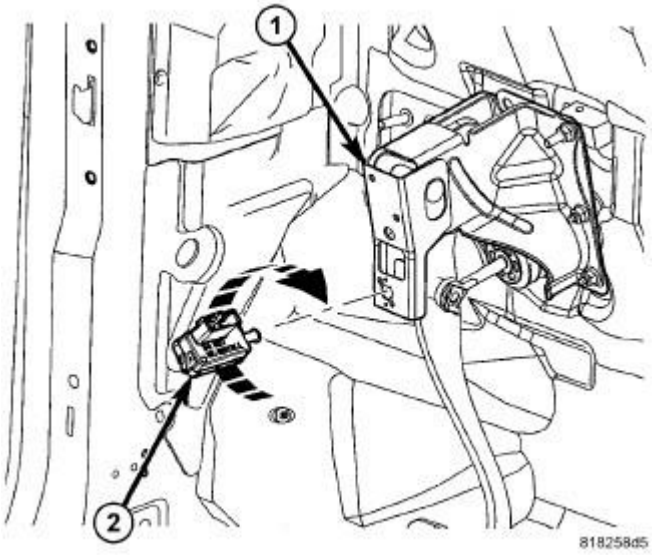


Fig. 66: Identifying Stop Lamp Switch & Pedal Clip
Courtesy of CHRYSLER LLC

2. Depress and hold the brake pedal in the depressed position.
3. Align the tabs on the brake lamp switch (2) locking collar with the keyed hole in the brake pedal support bracket (1) below the instrument panel.
4. Insert the tabs on the brake lamp switch locking collar through the keyed hole in the brake pedal support bracket until the switch housing is firmly seated against the bracket.

5. Rotate the switch housing clockwise about 30 degrees to engage the tabs on the locking collar with the bracket.

CAUTION: Release, but do not pull up on the brake pedal before the switch plunger adjustment has been completed.

6. Release the brake pedal, but do not pull it upward.
7. Rotate the plunger adjustment release lever (2) clockwise until it locks into place. The lever should be parallel to the brake lamp switch connector receptacle. This action will set the switch plunger length to a final adjustment position and cannot be undone. If not performed properly the first time, a new brake lamp switch **MUST** be installed.

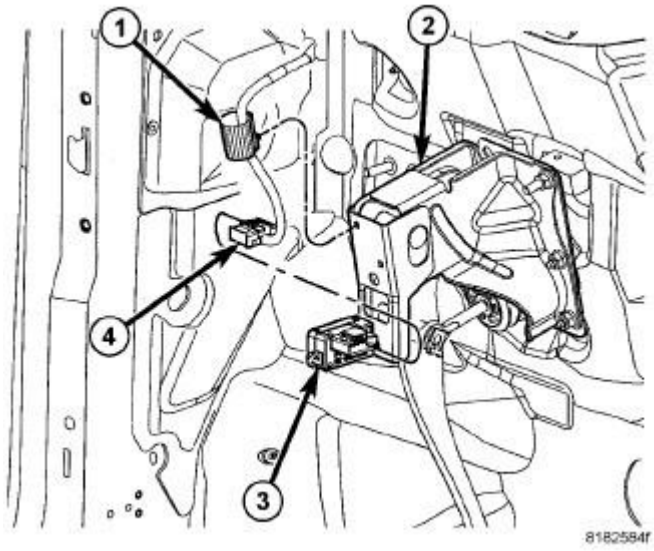


Fig. 67: Stop Lamp Switch Wiring Routing Clip, Brake Pedal Bracket, Stop Lamp Switch & Wiring Connector
Courtesy of CHRYSLER LLC

8. Reconnect the wire harness connector (4) to the brake lamp switch (3).
9. If equipped, reinstall the silencer pad below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Installation** .
10. Reconnect the battery negative cable.

LATE PRODUCTION

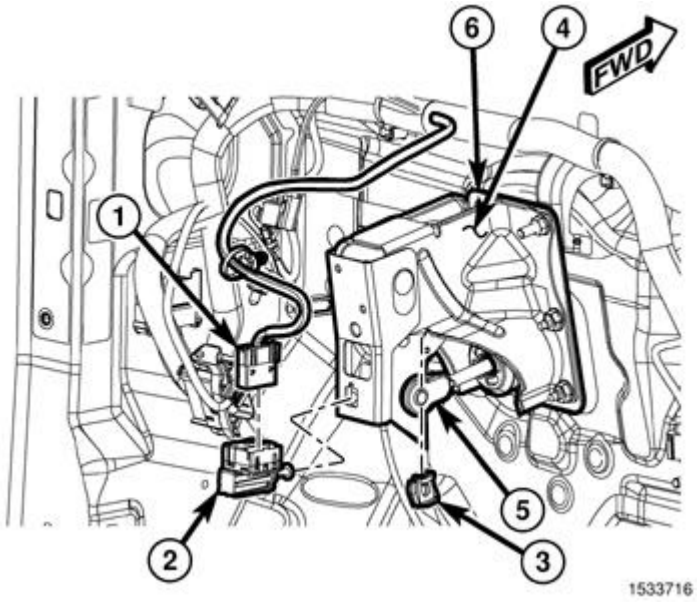


Fig. 68: Brake Lamp Switch On Brake Pedal Support Bracket
Courtesy of CHRYSLER LLC

1. Be certain that the brake lamp switch (2) plunger is pulled all the way out of the switch housing to its fully extended position.
2. Reconnect the wire harness connector (1) to the connector receptacle on the switch.
3. Depress and hold the brake pedal in the depressed position.
4. Align the tabs on the brake lamp switch locking collar with the keyed hole in the brake pedal support bracket (2).
5. Insert the tab on the brake lamp switch locking collar through the keyed hole in the support bracket until the switch housing is firmly seated against the bracket.
6. Rotate the switch housing clockwise about 30 degrees to engage the tabs on the locking collar with the support bracket.

CAUTION: Brake booster damage may occur if the brake pedal pull exceeds about 9 kilograms (20 pounds).

7. Release the brake pedal. Then pull the pedal lightly upward to its normal at-rest position. The pedal will set the plunger to the correct position as the pedal pushes the plunger into the switch housing. The switch plunger will make a light audible ratcheting noise as it self-adjusts.
8. If equipped, reinstall the silencer pad below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Installation** .
9. Reconnect the battery negative cable.

ADJUSTMENTS

ADJUSTMENT - LATE PRODUCTION TYPE ONLY

Two unique brake lamp switches are used in this vehicle, depending upon whether the vehicle was built during early or late production. These switches are not interchangeable and, only the late production type switch can be readjusted following initial installation using this adjustment procedure. If the early production type switch requires readjustment for any reason, it **must** be replaced with a new switch. Both switches are illustrated and described elsewhere in this service information to assist in positive identification. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior/SWITCH, Stop Lamp - Description**.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

1. Disconnect and isolate the battery negative cable.
2. If equipped, remove the silencer pad from below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Removal** .
3. Depress and hold the brake pedal in the depressed position.
4. Pull the brake lamp switch plunger all the way out of the switch housing to its fully extended position.

CAUTION: Brake booster damage may occur if the brake pedal pull exceeds about 9 kilograms (20 pounds).

5. Release the brake pedal. Then pull the pedal lightly upward to its normal at-rest position. The pedal will set the plunger to the correct position as the pedal pushes the plunger into the switch housing. The switch plunger will make a light audible ratcheting noise as it self-adjusts.
6. If equipped, reinstall the silencer pad below the steering column. Refer to **Body/Instrument Panel/PANEL, Silencer - Installation** .
7. Reconnect the battery negative cable.

UNIT, FRONT LAMP

STANDARD PROCEDURE

FRONT LAMP UNIT MOISTURE CLEARING

Some occasional moisture accumulation inside a vented front lamp unit is normal and appears as a fogging on the inside of the lamp lens, similar to the fog that sometimes appears on the inside of a windshield. This condition is caused by rapidly changing temperature and humidity levels between the air internal and external to the lamp, and will usually dissipate once the temperature and humidity conditions have been allowed to stabilize. Accelerated removal of such moisture may be accomplished by activating the headlamps on HIGH beam for about 15 minutes.

However, water droplets larger than 1 millimeter (0.039 inch) in size accumulated on the inside of the lamp lens, water droplets visible on most internal lamp surfaces or large quantities of water within the lamp indicates a problem with the lamp sealing that has allowed excessive amounts of water to enter the lamp. Once such excessive moisture has entered the lamp, it will always be present and will never disappear. A lamp with permanent internal moisture should be replaced.

REMOVAL

BULBS

HEADLAMP HIGH BEAM

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

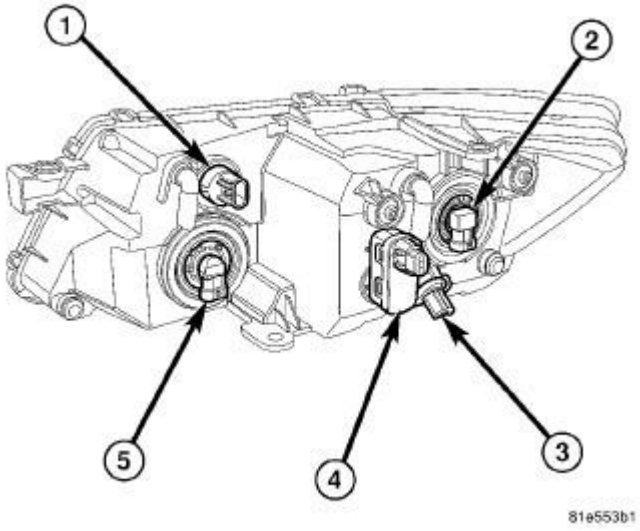


Fig. 69: Headlamp Bulb
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Disconnect the wire harness connector from the connector receptacle integral to the headlamp bulb (5) on the back of the front lamp unit housing.
3. Firmly grasp the bulb base and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the bulb and base straight out from the keyed opening in the reflector.

HEADLAMP LOW BEAM

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

1. Disconnect and isolate the battery negative cable.
2. Disconnect the wire harness connector from the connector receptacle integral to the headlamp bulb (2) on the back of the front lamp unit housing.
3. Firmly grasp the bulb base and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the bulb and base straight out from the keyed opening in the reflector.

POSITION LAMP

NOTE: The following procedure applies only to vehicles manufactured for certain export markets. Vehicles manufactured for domestic markets do not have a position lamp bulb, socket or wiring provided in the front lamp unit.

1. Disconnect and isolate the battery negative cable.
2. Disconnect the wire harness connector from the connector receptacle integral to the position lamp bulb socket (3) on the back of the front lamp unit housing.
3. Firmly grasp the position lamp bulb socket on the back of the housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out from the keyed opening in the housing.
5. Pull the base of the bulb straight out of the socket.

TURN SIGNAL/SIDE MARKER LAMP

1. Disconnect and isolate the battery negative cable.
2. Disconnect the wire harness connector from the connector receptacle integral to the turn signal/side marker lamp bulb socket (1) on the back of the front lamp unit housing.
3. Firmly grasp the turn signal/side marker lamp bulb socket on the back of the housing and rotate it counterclockwise about 30 degrees to unlock it.
4. Pull the socket and bulb straight out from the keyed opening in the housing.
5. Pull the base of the bulb straight out of the socket.

LAMP

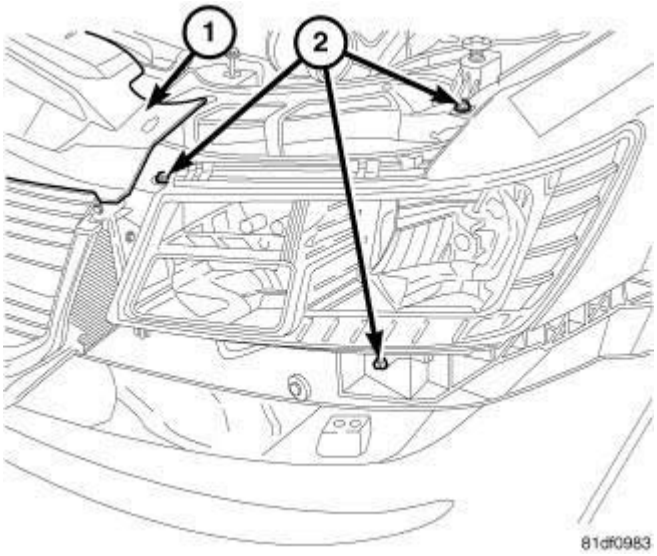


Fig. 70: Fascia & Grille
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Loosen the front fascia on the same side of the vehicle as the front lamp unit being removed. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .
3. Remove the four plastic push-pin fasteners that secure the upper grille to the Front End Module (FEM).
4. Flex the fascia and grille (1) outward far enough to access and remove the three screws (2) that secure the front lamp unit to the FEM.
5. Pull the front lamp unit away from the FEM far enough to access and disconnect the headlamp and dash wire harness connectors from the back of the lamp housing.
6. Remove the front lamp unit from the vehicle.

INSTALLATION

BULBS

HEADLAMP HIGH BEAM

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

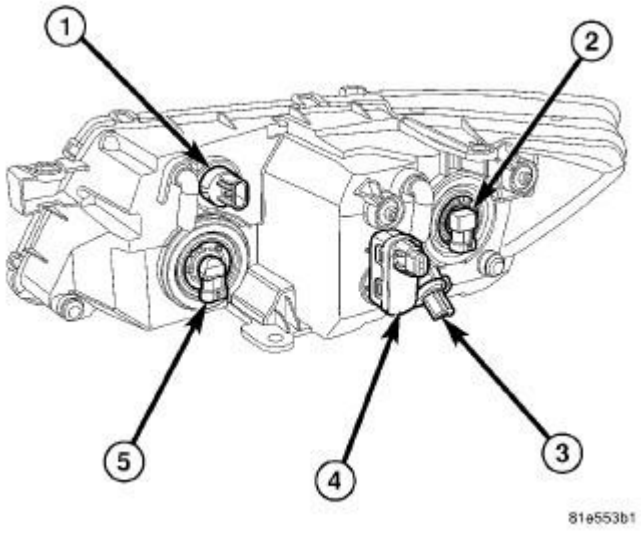


Fig. 71: Headlamp Bulb
Courtesy of CHRYSLER LLC

1. Align the headlamp bulb and base (5) with the keyed opening on the back of the front lamp unit reflector.
2. Insert the bulb into the reflector until the base is firmly seated.
3. Rotate the bulb base clockwise about 30 degrees to lock it into place.
4. Reconnect the wire harness connector to the connector receptacle integral to the headlamp bulb base.
5. Reconnect the battery negative cable.

HEADLAMP LOW BEAM

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

CAUTION: Do not contaminate the bulb glass by touching it with your fingers or by allowing it to contact other oily surfaces. Shortened bulb life will result.

1. Align the headlamp bulb and base (2) with the keyed opening on the back of the front lamp unit reflector.
2. Insert the bulb into the reflector until the base is firmly seated.
3. Rotate the bulb base clockwise about 30 degrees to lock it into place.
4. Reconnect the wire harness connector to the connector receptacle integral to the headlamp bulb base.
5. Reconnect the battery negative cable.

POSITION LAMP

CAUTION: Always use the correct bulb size and type for replacement. An incorrect

bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

NOTE: The following procedure applies only to vehicles manufactured for certain export markets. Vehicles manufactured for domestic markets do not have a position lamp bulb, socket or wiring provided in the front lamp unit.

1. Align the base of the bulb with the position lamp bulb socket (3).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the back of the front lamp unit housing.
4. Insert the socket and bulb straight into the housing until the socket is firmly seated.
5. Rotate the socket clockwise about 30 degrees to lock it into place.
6. Reconnect the wire harness connector to the connector receptacle integral to the position lamp bulb socket.
7. Reconnect the battery negative cable.

TURN SIGNAL/SIDE MARKER LAMP

CAUTION: Always use the correct bulb size and type for replacement. An incorrect bulb size or type may overheat and cause damage to the lamp, the socket or the lamp wiring.

1. Align the base of the bulb with the park/turn signal lamp bulb socket (1).
2. Push the bulb straight into the socket until the base is firmly seated.
3. Align the socket and bulb with the keyed opening on the back of the front lamp unit housing.
4. Insert the socket and bulb straight into the housing until the socket is firmly seated.
5. Rotate the socket clockwise about 30 degrees to lock it into place.
6. Reconnect the wire harness connector to the connector receptacle integral to the park/turn signal lamp bulb socket.
7. Reconnect the battery negative cable.

LAMP

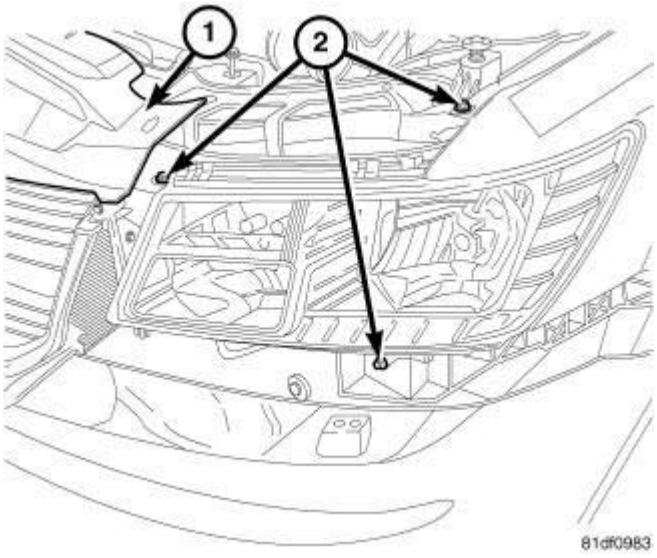


Fig. 72: Fascia & Grille
Courtesy of CHRYSLER LLC

NOTE: If the front lamp is being replaced with a new unit, the bulbs and sockets must be transferred from the unit being replaced.

1. Position the front lamp unit to the front of the vehicle.
2. Reconnect the headlamp and dash wire harness connectors to the back of the lamp housing.
3. Position the front lamp unit into the Front End Module (FEM).
4. Flex the fascia and grille (1) outward far enough to install and tighten the three screws (2) that secure the front lamp unit to the FEM. Tighten the screws securely.
5. Reinstall the four plastic push-pin fasteners that secure the upper grille to the FEM.
6. Reinstall the front fascia on the same side of the vehicle as the front lamp unit being installed. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation**
7. Reconnect the battery negative cable.
8. Confirm proper headlamp alignment. See **Electrical - Lamps and Lighting/Lamps/Lighting - Exterior - Standard Procedure**.

WIRING, TRAILER TOW

DESCRIPTION

DESCRIPTION

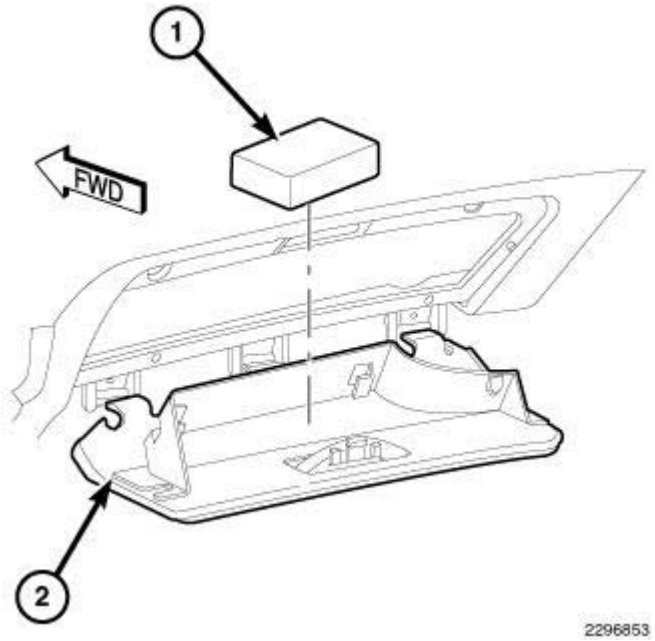


Fig. 73: Instruction Sheet Are Placed In Glove Box
Courtesy of CHRYSLER LLC

Vehicles equipped with an optional Trailer Tow Preparation package have a trailer tow wiring harness and an instruction sheet (1) that are placed in the glove box (2) of the vehicle when it is shipped from the factory. This package also includes four relays to isolate the trailer lighting from the vehicle lighting and a four-way trailer tow wiring connector that are all concealed behind the rear bumper fascia after installation is complete.

OPERATION

OPERATION

The trailer tow preparation wiring harness is connected to the body wire harness at the right and left outer rear lamp unit connections. After installation is complete, a trailer tow stop/turn relay is secured to the harness behind the rear bumper fascia just below each outer rear lamp unit, while a trailer tow stop lamp relay is located on the underside of each outboard end of the rear bumper reinforcement behind the rear fascia. The four-way trailer tow connector is located near the center of the rear fascia.

Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds. Also refer to the Instruction Sheet packaged with the harness for additional details.

2009 ACCESSORIES AND EQUIPMENT

Message Center - Service Information - Journey

SPECIAL TOOLS

SPECIAL TOOLS

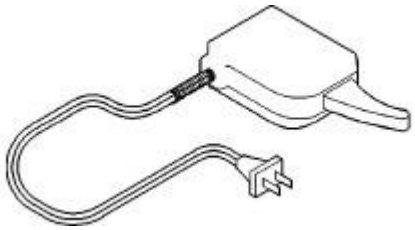


Fig. 1: De Gauser - 6029
Courtesy of CHRYSLER LLC

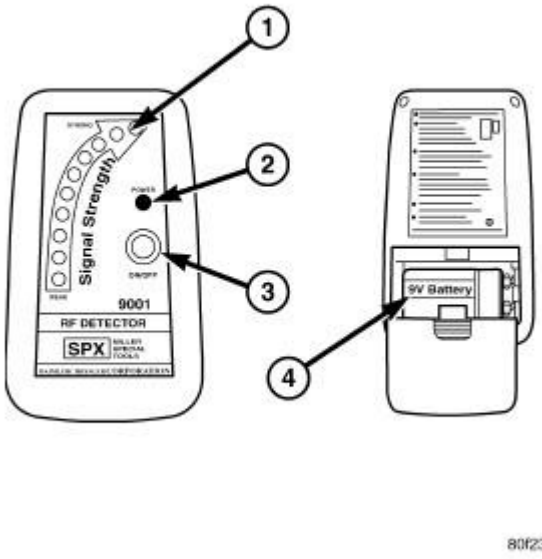


Fig. 2: RF Detector - 9001
Courtesy of CHRYSLER LLC

CENTER, ELECTRONIC VEHICLE INFORMATION

DESCRIPTION

DESCRIPTION

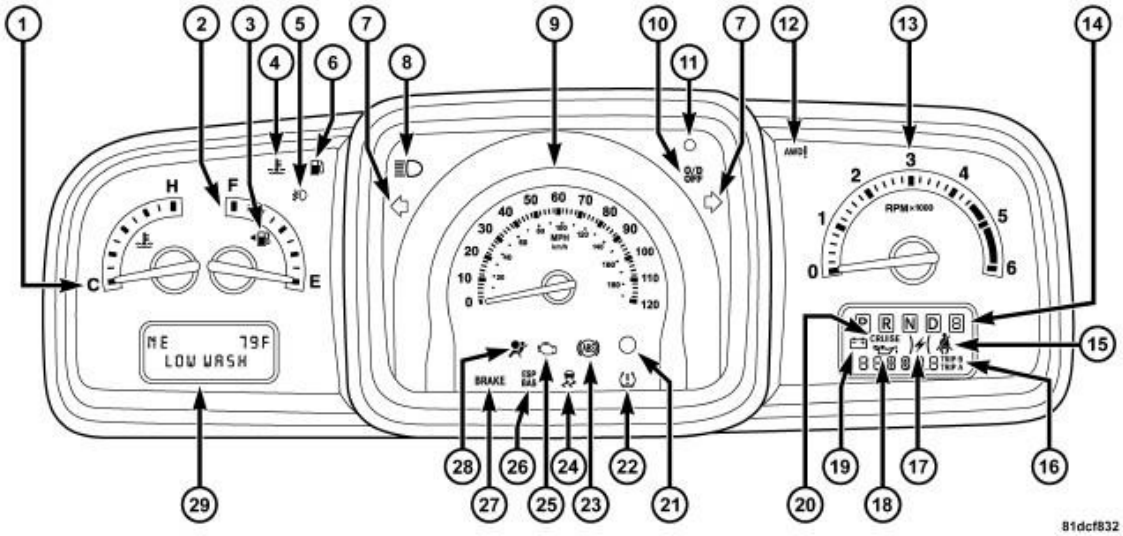


Fig. 3: Electronic Vehicle Information Center
Courtesy of CHRYSLER LLC

The Electronic Vehicle Information Center (EVIC) features a driver-interactive display (29). The display is located in the lower left part of the instrument cluster below the fuel (2) and engine temperature (1) gauges.

The display in the lower right part of the instrument cluster (15) below the tachometer (13) shows the vehicle odometer related functions. These functions include Trip Odometer (ODO), Trip A and Trip B readouts. The instrument cluster push-button (21) can be used to scroll through the different odometer functions. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** for additional information on the instrument cluster and related functions.

The Electronic Vehicle Information Center (EVIC) features a driver-interactive display. It is located in the instrument cluster below the fuel and temperature gauges. Vehicles equipped with steering wheel-mounted buttons (described in this information) are also equipped with the EVIC. The EVIC consists of the following:

- System Status
- Vehicle information warning message displays
- Tire Pressure Monitor System (TPM) - If Equipped
- Personal Settings (customer programmable features)
- Compass display
- Outside temperature display
- Trip computer functions

The EVIC system is comprised of several different components. Those components are:

- Instrument Cluster (sometimes referred to as Cab Compartment Node [CCN])
- ASBM EVIC Function Buttons
- Ambient Temperature Sensor

- Remote Compass Module (RCM)
- Controller Area Network (CAN) Data Bus
- Local Interface Network (LIN) Data Bus

The EVIC display is part of the Instrument Cluster assembly and is not serviced as a separate component. If the display is inoperative the complete Instrument Cluster assembly must be replaced. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Removal** .

OPERATION

OPERATION

The Electronic Vehicle Information Center (EVIC) uses both non-switched and ignition switched sources of battery current so that some of its features remain operational at any time, while others may only operate with the ignition switch in the "ON" position. When the ignition switch is turned to the "ON" position, the EVIC display will return to the last function being displayed before the ignition was turned to the "OFF" position.

The EVIC system is comprised of several different components that communicate over the Controller Area Network (CAN) and Local Interface Network (LIN) Data Buses. **If the system is inoperative a scan tool and the appropriate diagnostic information must be used to diagnose the system.**

The EVIC function buttons are used to operate the different functions of the EVIC system. Pressing and releasing the **MENU** button allows the driver to select the Compass/Temperature, Trip Computer, Personal Settings or System Status functions. The **STEP** button is used to toggle through options or features of the Trip Computer, Personal Settings or System Status functions. Pressing and releasing the **RESET** button allows the selection of setting or resetting of the function currently displayed at that time. Pressing and releasing the **C/T** (compass/temperature) button will cause the EVIC to return to the compass/temperature display mode from any other mode.

EVIC DISPLAY MODES

SYSTEM STATUS MODE

System display mode displays warnings and user interaction messages on the EVIC display. The driver can scroll to view multiple messages by using the **STEP** button.

When the appropriate conditions exist, the EVIC displays the following messages:

- Turn Signal On (with a continuous warning chime if the vehicle is driven more than 1 mile [1.6 km] with either turn signal on)
- Left Front Turn Signal Lamp Out (with a single chime)
- Left Rear Turn Signal Lamp Out (with a single chime)
- Right Front Turn Signal Lamp Out (with a single chime)
- Right Rear Turn Signal Lamp Out (with a single chime)
- RKE (Remote Keyless Entry) Battery Low (with a single chime)

- Channel # Transmit.
- Channel # Training.
- Channel # Trained.
- Clearing Channels.
- Channels Cleared.
- Did Not Train.
- Left Front Low Pressure (with a single chime).
- Left Rear Low Pressure (with a single chime).
- Right Front Low Pressure (with a single chime).
- Right Rear Low Pressure (with a single chime).
- Check TPM System (with a single chime).
- Low Fuel
- Cal
- Oil Change Required (with a single chime)
- Low Washer Fluid
- Coolant Low
- Key in Ignition
- Lights On

PERSONAL SETTINGS MODE (CUSTOMER PROGRAMMABLE FEATURES)

Allows the driver to set and recall features when the transmission is in Park by pressing and releasing the **MENU** button until Personal Settings is displayed in the EVIC. Pressing and releasing the **STEP** button will scroll through the following personal settings choices:

- **Language** When in this display you may select one of three languages for all display nomenclature, including the trip functions and the navigation system (if equipped). Press the **RESET** button while in this display to select English, Espanola, or French. Then, as you continue, the information will display in the selected language.

NOTE: The EVIC will not change the UConnect™ language selection.

- **Unlock Doors Automatically on Exit** When ON is selected, all doors will unlock when the vehicle is stopped and the transmission is in the P (Park) or N (Neutral) position and the driver's door is opened. To make your selection, press and release the **RESET** button until "ON" or "OFF" appears.
- **Remote Key Unlock** When DRIVER DOOR 1ST PRESS is selected, only the driver's door will unlock on the first press of the remote keyless entry unlock button. When Driver Door 1st Press is selected, you must press of the remote keyless entry unlock button twice to unlock the passenger's doors. When ALL DOORS 1ST PRESS is selected, all of the doors will unlock on the first press of the remote keyless entry unlock button. To make your selection, press and release the **RESET** button until "Driver Door 1st Press" or "All Doors 1st Press" appears.
- **Sound Horn with Remote Key Lock** When ON is selected, a short horn sound will occur when the

remote keyless entry "Lock" button is pressed. This feature may be selected with or without the flash lights on lock/unlock feature. To make your selection, press and release the **RESET** button until "ON" or "OFF" appears.

- **Flash Lights with Remote Key Lock** When ON is selected, the front and rear turn signals will flash when the doors are locked or unlocked with the remote keyless entry transmitter. This feature may be selected with or without the sound horn on lock feature selected. To make your selection, press and release the **RESET** button until "ON" or "OFF" appears.
- **Delay Turning Headlights Off** When this feature is selected, the driver can choose to have the headlights remain on for 0, 30, 60, or 90 seconds when exiting the vehicle. To make your selection, press and release the **RESET** button until "0," "30," "60," or "90" appears.
- **Headlights On with Wipers (Available with Auto Headlights Only)** When this feature is selected and the headlight switch is in the AUTO position, the headlights will activate approximately 10 seconds after the wipers are turned on. To make your selection, press and release the **RESET** button until "ON" or "OFF" appears.
- **Delay Power Off to Accessories Until Exit** When this feature is selected, the power window switches, radio, hands-free system (if equipped), DVD video system (if equipped), power sunroof (if equipped), and power outlets will remain active for up to 10 minutes after the ignition switch is turned off. Opening a vehicle door will cancel this feature. To make your selection, press and release the **RESET** button until "Off," "45 sec.," "5 min.," or "10 min." appears.
- **Confirmation of Voice Commands - If Equipped** When ON is selected, all voice commands from the UConnect™ system are confirmed. To make your selection, press and release the **RESET** button until "ON" or "OFF" appears.
- **Display Units of Measure in** The EVIC, odometer, and navigation system (if equipped) can be changed between English and Metric units of measure. To make your selection, press and release the **RESET** button until "US" or "METRIC" appears.

COMPASS/TEMPERATURE

Compass heading and outside temperature are displayed on the EVIC display screen. One of eight compass headings to indicate the direction the vehicle is facing (N, S, E, W, NE, NW, SE, SW) and one of 15 compass variance settings can be programmed. Outside temperature is displayed in °C (degrees Celsius) or °F (degrees Fahrenheit).

For additional information regarding the compass, refer to Personal Settings (Customer Programmable Features) in this information.

TRIP COMPUTER

Press and release the **MENU** button until one of the following Trip Functions displays in the EVIC:

- Average Fuel Economy
- Distance To Empty
- Elapsed Time
- Display Units of Measure in

Press the **STEP** button to cycle through all the Trip Computer functions.

The Trip Functions mode displays the following information:

- **Average Fuel Economy** Shows the average fuel economy since the last reset. When the fuel economy is reset, the display will read "RESET" or show dashes for two seconds. Then, the history information will be erased, and the averaging will continue from the last fuel average reading before the reset.
- **Distance To Empty (DTE)** Shows the estimated distance that can be traveled with the fuel remaining in the tank. This estimated distance is determined by a weighted average of the instantaneous and average fuel economy, according to the current fuel tank level. DTE cannot be reset through the **RESET** button. When the DTE value is less than 30 miles (48 km) estimated driving distance, the DTE display will change to a text display of "LOW FUEL." This display will continue until the vehicle runs out of fuel. Adding a significant amount of fuel to the vehicle will turn off the "LOW FUEL" text and a new DTE value will display.
- **Elapsed Time** Shows the total elapsed time of travel since the last reset when the ignition switch is in the ACC position. Elapsed time will increment when the ignition switch is in the ON or START position.
- **Display Units of Measure in:** To make your selection, press and release the **RESET** button until "US" or "METRIC" appears.

To Reset The Display Reset will only occur while a resettable function is being displayed. Press and release the **RESET** button once to clear the resettable function being displayed. To reset all resettable functions, press and release the **RESET** button a second time within 3 seconds of resetting the currently displayed function (>Reset ALL will display during this 3 second window).

DIAGNOSIS AND TESTING

ELECTRONIC VEHICLE INFORMATION CENTER

CAUTION: Do not place any external magnets, such as magnetic roof mount antennas, in the vicinity of the compass. Do not place any electronic devices (cell phones, laptop computers, PDAs, portable DVD players, etc), on or near the instrument panel as the Remote Compass Module (RCM) performance may be effected. Do not use magnetic tools when servicing the RCM.

The Electronic Vehicle Information Center (EVIC) data is obtained from several components on the Controller Area Network (CAN) and Local Interface Network (LIN) Data Bus circuits. The EVIC will not function properly if the bus messages from any of these components is not receive. If no EVIC data is displayed or the display indicates dashes "- -", check the CAN and LIN Data Bus circuit communications, the Instrument Cluster functions, the Remote Compass Module (RCM) and the Totally Integrated Power Module (TIPM). Should the RCM become disconnected, the instrument cluster display will go blank.

The use of a scan tool and the proper diagnostic procedures information are recommended for further testing of the Instrument Cluster, the RCM, the CAN Data Bus and the LIN Data Bus circuits. Refer to the appropriate wiring information for complete circuit schematic or connector pin-out information.

STANDARD PROCEDURE

MANUAL COMPASS CALIBRATION

CAUTION: Do not place any external magnets, such as magnetic roof mount antennas, in the vicinity of the compass. Do not place any electronic devices (cell phones, laptop computers, PDAs, portable DVD players, etc), on or near the instrument panel as the Remote Compass Module (RCM) performance may be effected. Do not use magnetic tools when servicing the RCM.

NOTE: Calibration is required anytime a new RCM is installed. Upon installation of the new RCM the "CAL" message will appear in the Electronic Vehicle Information Center (EVIC) display. The RCM will automatically calibrate if the vehicle is driven in two or more circles, slowly, and away from large metal objects. The RCM can also be calibrated by performing the following procedure.

NOTE: Confirmation that the proper variance zone is programmed, is recommended whenever manual compass calibration is performed. See Standard Procedure for the appropriate procedure.

The electronic compass unit features a self-calibrating design, which simplifies the calibration procedure. This feature automatically updates the compass calibration while the vehicle is being driven. This allows the compass unit to compensate for small changes in the residual magnetism that the vehicle may acquire during normal use. If the compass readings appear to be erratic or the Electronic Vehicle Information Center (EVIC) displays "CAL", perform the following manual calibration procedure. Also, any time EVIC service replacement components are installed, they must be calibrated using this procedure. Do not attempt to calibrate the compass near large metal objects such as other vehicles, large buildings, or bridges; or, near overhead or underground power lines.

Calibrate the compass manually as follows:

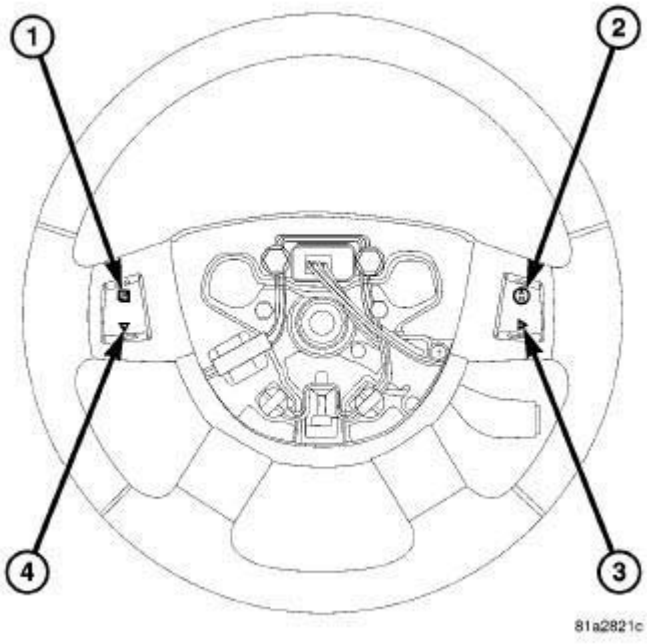


Fig. 4: EVIC Function Buttons
Courtesy of CHRYSLER LLC

NOTE: Do not attempt to calibrate the compass near large metal objects such as other vehicles, large buildings, or bridges; or, near overhead or underground power lines.

1. Start the engine but leave the vehicle in "PARK".
2. Press and release the **MENU** push button (1) until "Personal Settings" is displayed.
3. Once in the "Personal Settings" menu depress and release the **STEP** button (4) several times until "Calibrate Compass (Yes)" is displayed.
4. Momentarily depress and release the **RESET** push button (3) to initiate the calibration procedure. The "CAL" symbol will come on solid in the EVIC display.
5. Slowly drive the vehicle on a level surface, away from large metal objects and power lines, through one or two **complete** circles not exceeding 8 km/h (5 mph). The "CAL" symbol will disappear from the display to indicate successful compass calibration.

NOTE: A blank compass display indicates that vehicle degaussing (demagnetizing) may be necessary.

NOTE: If the "CAL" message remains in the display, either there is excessive magnetism near the compass, or the EVIC is inoperative. Attempt the calibration procedure at least one more time before performing EVIC diagnosis.

NOTE: If the wrong direction is still indicated in the compass display, the area selected for calibration may be too close to a strong magnetic field. Repeat the manual calibration procedure in another location.

COMPASS DEMAGNETIZING

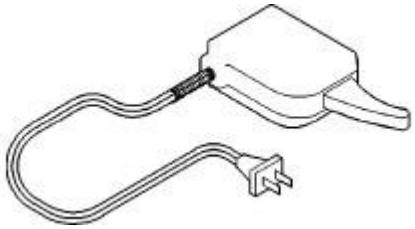


Fig. 5: Degaussing Tool #6029
Courtesy of CHRYSLER LLC

A degaussing tool (Special Tool 6029) is used to demagnetize, or degauss, the roof panel of the vehicle. Equivalent units must be rated as continuous duty for 110/115 volts and 60 Hz. They must also have a field strength of over 350 gauss at 7 millimeters (0.25 inch) beyond the tip of the probe.

To demagnetize the roof panel proceed as follows:

1. Be certain that the ignition switch is in the Off position, before you begin the demagnetizing procedure.

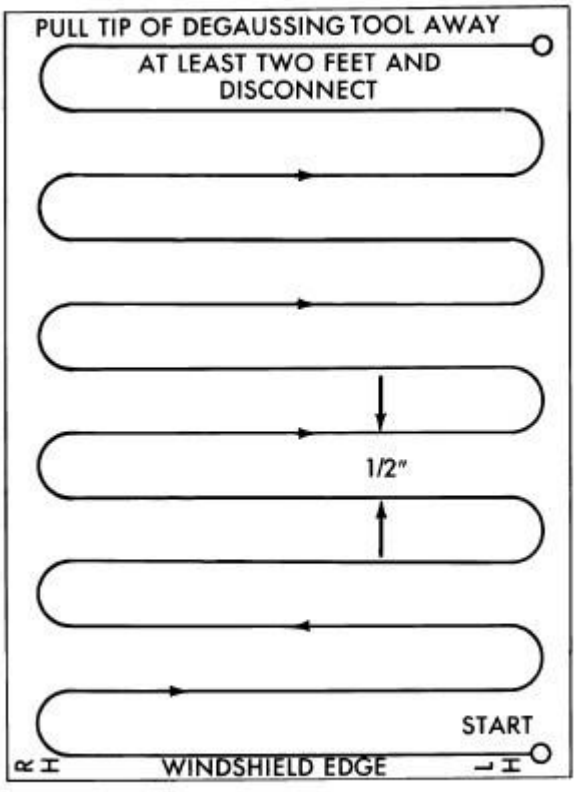


Fig. 6: View Of Roof Panel Grid
Courtesy of CHRYSLER LLC

2. Place a piece of paper approximately 22 by 28 centimeters (8.5 by 11 inches), oriented on the vehicle lengthwise from front to rear, on the center line of the roof at the windshield header. The purpose of the paper is to protect the roof panel from scratches, and to define the area to be demagnetized.
3. Connect the degaussing tool to an electrical outlet, while keeping the tool at least 61 centimeters (2 feet) away from the vehicle.
4. Slowly approach the center line of the roof panel at the windshield header, with the degaussing tool connected.
5. Contact the roof panel with the plastic coated tip of the degaussing tool. Be sure that the template is in place to avoid scratching the roof panel. Using a slow, back-and-forth sweeping motion, and allowing 13 millimeters (0.50 inch) between passes, move the tool at least 11 centimeters (4 inches) to each side of the roof center line, and 28 centimeters (11 inches) back from the windshield header.
6. With the degaussing tool still energized, slowly back it away from the roof panel. When the tip of the tool is at least 61 centimeters (2 feet) from the roof panel, disconnect the tool.
7. Calibrate the compass and adjust the compass variance. See **Standard Procedure**. .

COMPASS VARIANCE ADJUSTMENT

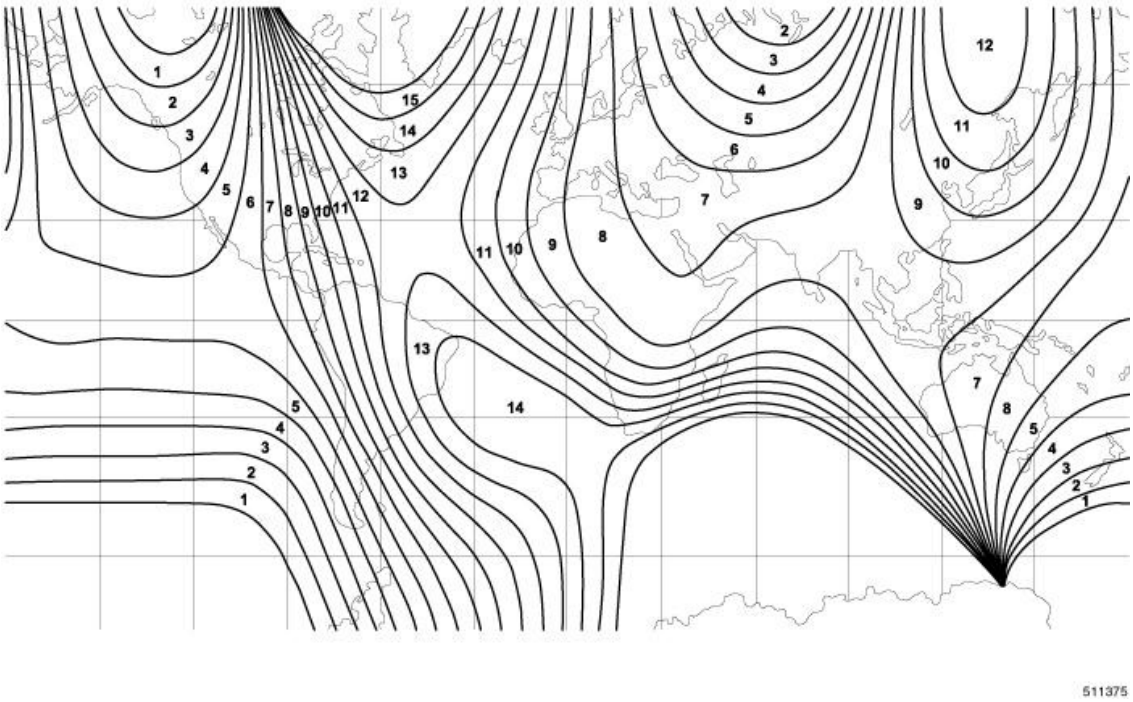


Fig. 7: Magnetic And Geographic North Map
Courtesy of CHRYSLER LLC

Compass variance, also known as magnetic declination, is the difference in angle between magnetic north and true geographic north. In some geographic locations, the difference between magnetic and geographic north is great enough to cause the compass to give false readings. If this problem occurs, the compass variance must be set.

NOTE: If the vehicle is taken on long trips into a new variance zone the compass function may be effected. Compass variance will need to be updated to the new zone number to function properly.

NOTE: The default for the compass variance from the factory is 8.

To set the compass variance:

1. Using the Variance Settings Map, find your geographic location and note the zone number.

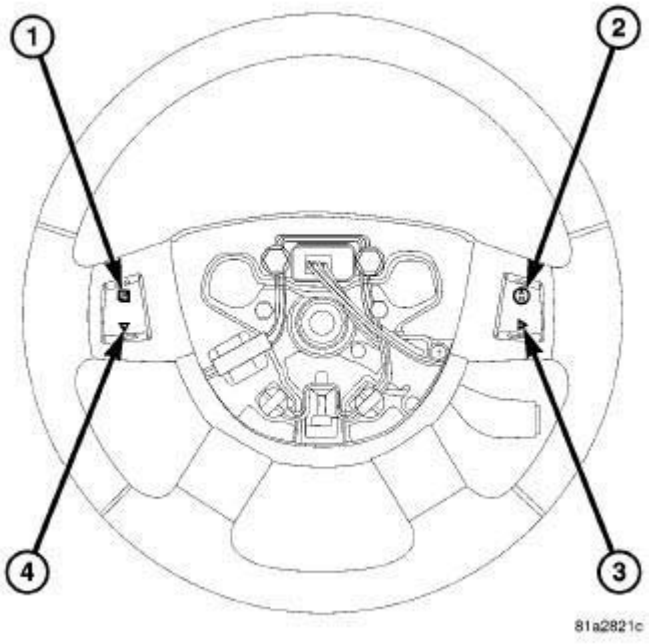


Fig. 8: EVIC Function Buttons
Courtesy of CHRYSLER LLC

2. Turn the ignition switch to the ON/RUN position. Press and release the **MENU** push button (1) until "Personal Settings" is displayed.
3. Press the **STEP** push button (4) until "Compass Variance" is displayed. The "Compass Variance" message and the current variance zone number will be displayed.
4. Press and release the **RESET** push button (3) to toggle through the zone numbers (1-15), until the zone number for your geographic location appears in the display.

NOTE: The default for the compass variance from the factory is 8. During programming, the Zone value will wrap around from Zone 15 to Zone 1.

5. Press and release the Compass Temperature **(C/T)** push button (2) to enter the displayed zone number into the compass unit memory.
6. Confirm that the correct directions are now indicated by the compass.

MODULE

DESCRIPTION

DESCRIPTION

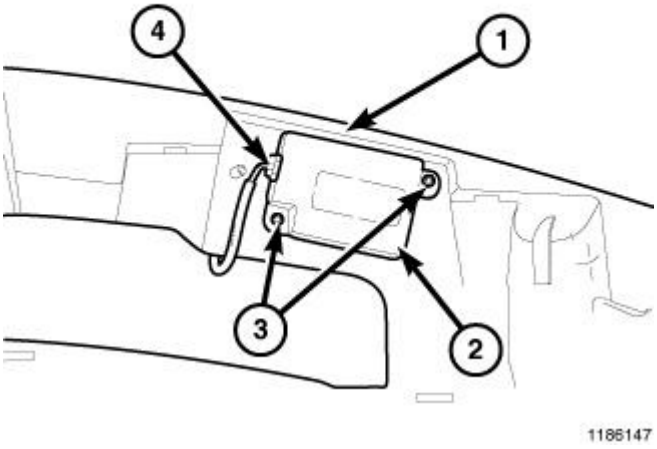


Fig. 9: Remote Compass Module
Courtesy of CHRYSLER LLC

The Remote Compass Module (RCM) (2) is a separate stand alone module mounted to the top of the instrument panel (1). The RCM can be accessed by removing the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Removal** .

If the compass position sensor (Remote Compass Module) is inoperative and requires replacement. See **Removal** for the appropriate procedure.

DIAGNOSIS AND TESTING

REMOTE COMPASS MODULE

The Remote Compass Module (RCM) data is transferred on the Controller Area Network (CAN) Data Bus circuit. The RCM and Electronic Vehicle Information Center (EVIC) will not function properly if the bus messages are not properly received. If no EVIC data is displayed, check the CAN Data Bus circuit communications, the RCM, the Instrument Cluster functions and the Totally Integrated Power Module (TIPM). **Any diagnosis of the RCM and EVIC display should begin with the use of a scan tool and the appropriate diagnostic service information.**

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

REMOVAL

REMOVAL

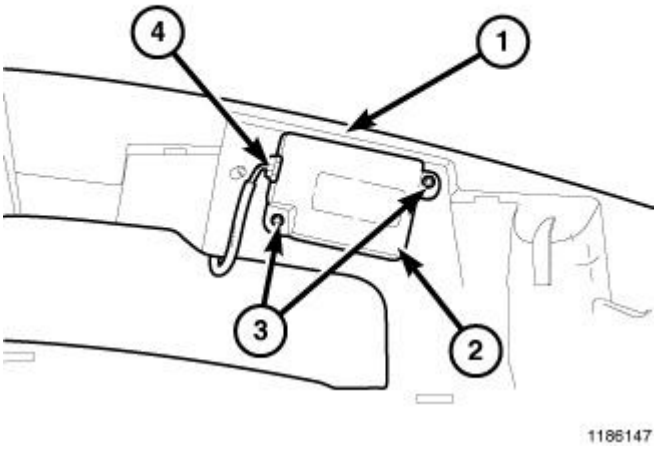


Fig. 10: Remote Compass Module
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Removal**
3. Remove the retaining screw (3) securing the Remote Compass Module (RCM) (2) to the instrument panel (1).
4. Disconnect the RCM electrical connector (4).
5. Remove the RCM from the vehicle.

INSTALLATION

INSTALLATION

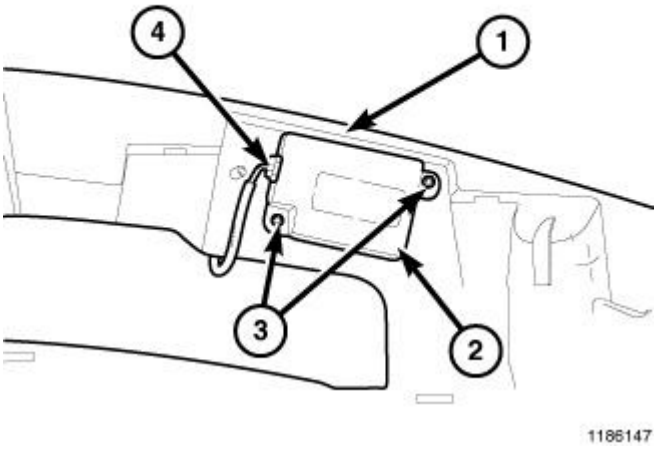


Fig. 11: Remote Compass Module

Courtesy of CHRYSLER LLC

1. Position the Remote Compass Module (RCM) (2) onto the top of the Instrument Panel (IP) (1).
2. Connect the electrical connector (4).
3. Install the RCM retaining screws (3).
4. Install the defroster grille. Refer to **Body/Instrument Panel/GRILLE, Defroster - Installation**
5. Connect the battery negative cable.
6. Perform the Compass Variance Adjustment. See **Standard Procedure** .
7. Perform the Manual Compass Calibration. See **Standard Procedure** .
8. Verify proper compass operation.

SENSOR, AMBIENT TEMPERATURE

DESCRIPTION

DESCRIPTION

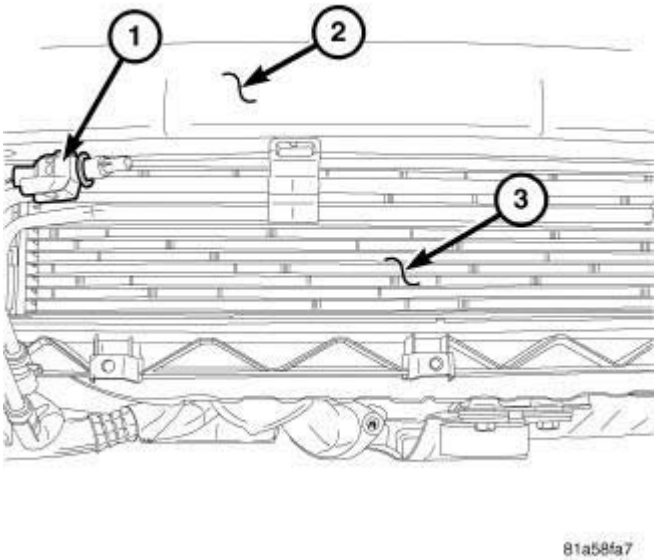


Fig. 12: Locating Ambient Temperature Sensor
Courtesy of CHRYSLER LLC

The ambient temperature sensor (1) is a variable resistor located under the bottom right side of the front bumper reinforcement (2). The sensor is attached to the power steering line bracket with a pushpin style retainer and can be accessed through the right opening in the front fascia assembly.

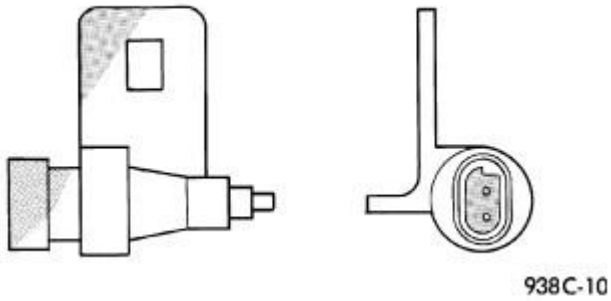


Fig. 13: Ambient Temperature Sensor
Courtesy of CHRYSLER LLC

The ambient temperature sensor cannot be adjusted or repaired and, if inoperative or damaged, must be replaced.

OPERATION

OPERATION

The ambient temperature sensor is a variable resistor that operates on a five-volt reference signal. The resistance in the sensor changes as temperature changes, changing the temperature sensor signal circuit voltage to the Totally Integrated Power Module (TIPM). Based upon the resistance in the sensor, the instrument cluster, sometimes referred to as the Cab Compartment Node (CCN), display senses a specific voltage on the Controller Area Network (CAN) data bus circuit, which corresponds to a specific temperature. The applicable instrument cluster display then displays the proper ambient temperature.

DIAGNOSIS AND TESTING

AMBIENT TEMPERATURE SENSOR

The temperature function is supported by the ambient temperature sensor, a wiring circuit, the Controller Area Network (CAN) data bus, the Local Area Network (LIN) data bus and the Totally Integrated Power Module (TIPM). When the sensor is exposed to temperatures above 60° C (130° F), or if the sensor circuit is shorted, 60° C (130° F) will appear in the display in place of the temperature. When the sensor is exposed to temperatures below - 40° C (- 40° F) or if the sensor circuit is open, - 40° C (- 40° F) will appear in the display.

The ambient temperature sensor circuit can be diagnosed using the following Temperature System Test, and Sensor Test. If the temperature sensor and circuit are confirmed to be OK, but the temperature display is inoperative or incorrect, further testing of the instrument cluster may be necessary. Refer to **Electrical/Instrument Cluster - Diagnosis and Testing** for the appropriate procedure.

SENSOR TEST

1. Turn the ignition switch to the Off position. Disconnect the ambient temperature sensor harness connector.
2. Measure the resistance of the ambient temperature sensor. At - 40° C (- 40° F), the sensor resistance is

336 kilohms. At 55° C (130° F), the sensor resistance is 2.488 kilohms. The sensor resistance should read between these two values. If OK, further testing of the instrument cluster may be necessary. Refer to **Electrical/Instrument Cluster - Diagnosis and Testing** for the appropriate procedure. If not OK, replace the inoperative ambient temperature sensor.

SENSOR CIRCUIT TEST

For complete circuit diagrams, refer to the appropriate wiring information. The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

NOTE: Temperature readings do not update immediately. Allow up to 60 seconds after the ignition switch is turned to the "ON" position for readings to meet test specifications.

1. Turn the ignition switch to the "OFF" position. Disconnect the wire harness connector from the ambient temperature sensor.
2. Turn the ignition switch to the "ON" position. The display should now read - 40° C (- 40° F). If OK, go to step 3. If not OK, repair the shorted sensor return circuit or ambient temperature sensor signal circuit to the ambient temperature sensor as required.
3. Turn the ignition switch to the "OFF" position. Taking care not to damage the wire terminals, connect a jumper wire between the two terminals in the body half of the ambient temperature sensor harness connector.
4. Turn the ignition switch to the "ON" position. The display should now read 60° C (130 F). If OK, go to step 5. If not OK, repair the open sensor return circuit or ambient temperature sensor signal circuit to the ambient temperature sensor as required.

NOTE: If the EVIC display does not show the ambient temperature in step 4, the vehicle may need to be driven several miles at a speed greater than 32 km/h (20 mph) for the temperature to update.

5. Turn the ignition switch to the "OFF" position. Remove the jumper wire. Turn the ignition switch to the "ON" position and wait until the display again reads - 40° C (- 40° F). Turn the ignition switch to the "OFF" position. Reconnect the ambient temperature sensor. Turn the ignition switch to the "ON" position. The display should now read the ambient temperature. If OK, the problem is intermittent. Perform further diagnosis while manipulating the related wire harnesses and components. If not OK, go to step 6.
6. Clear any Diagnostic Trouble Codes that may have been set while performing the test. Perform further diagnosis of the CAN data bus circuit, the LIN data bus circuit, the TIPM and the ambient temperature sensor (refer to **SENSOR TEST**).

REMOVAL

REMOVAL

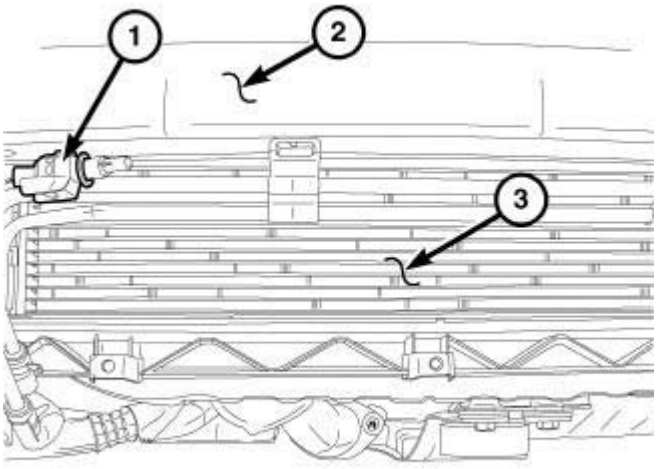


Fig. 14: Locating Ambient Temperature Sensor
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Working through the opening in the right side of the front fascia, disconnect the wire harness connector from the ambient temperature sensor (1).
3. Remove the fastener that secures the ambient temperature sensor to the power steering line bracket.
4. Remove the ambient temperature sensor from the vehicle.

INSTALLATION

INSTALLATION

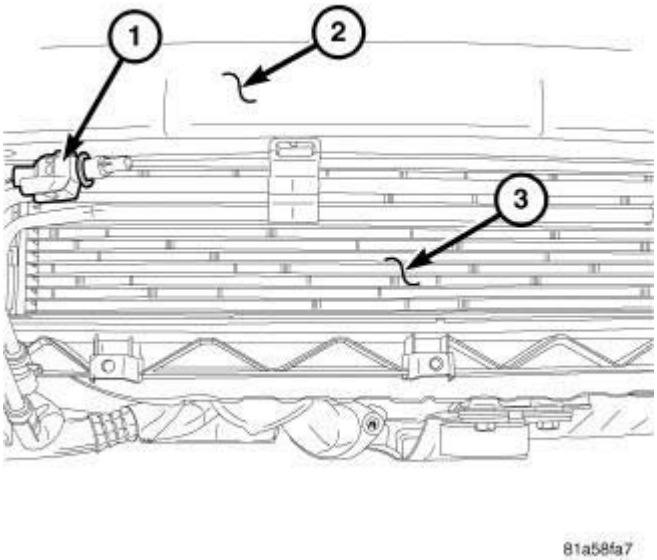


Fig. 15: Locating Ambient Temperature Sensor
Courtesy of CHRYSLER LLC

1. Working through the opening in the right side of the front fascia, position the ambient temperature sensor (1) in the vehicle.
2. Install the fastener that secures the ambient temperature sensor (1) to the power steering line bracket.
3. Connect the wire harness connector to the ambient temperature sensor.
4. Connect the battery negative cable.

SWITCH, EVIC CONTROL

REMOVAL

REMOVAL

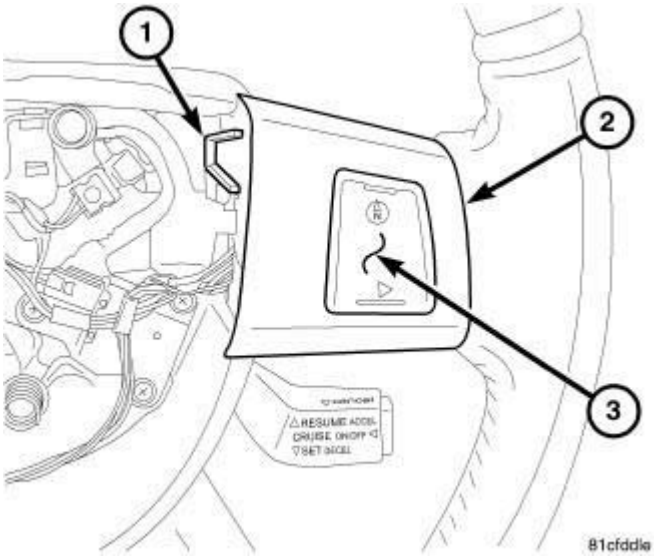


Fig. 16: Removing/Installing EVIC Switch And Bezel Assembly
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the driver airbag. Refer to **Restraints/AIR BAG, Driver - Removal** .
3. Using a trim stick (special tool # C-4755) or equivalent, gently pry the switch and bezel assembly (3) away from the steering wheel at the inner retaining tab (1) and the outer bezel edge (2).
4. With the switch and bezel assembly free from the steering wheel, lift the assembly up and disconnect the switch electrical connector.

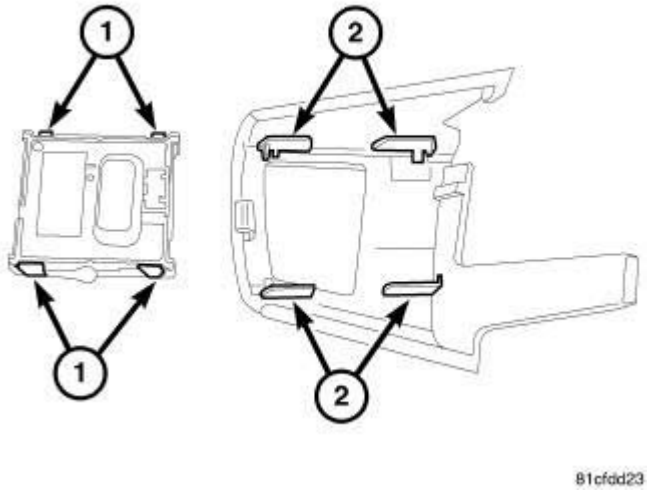


Fig. 17: EVIC Switch Separated From Bezel
Courtesy of CHRYSLER LLC

5. Using trim stick (special tool # C-4755) or equivalent, gently pry the switch bezel retainers (2) away from the switch tabs (1), while applying pressure to the back side of the switch. Remove the switch from the

bezel.

INSTALLATION

INSTALLATION

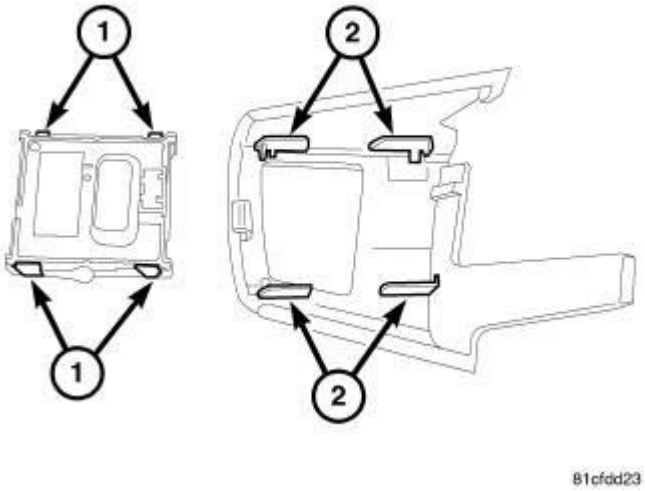


Fig. 18: EVIC Switch Separated From Bezel
Courtesy of CHRYSLER LLC

1. Position the steering wheel switch onto the switch bezel aligning the switch tabs (1) with the bezel retainers (2).
2. Press the switch into the bezel, until the switch is held in place by all four retainers.

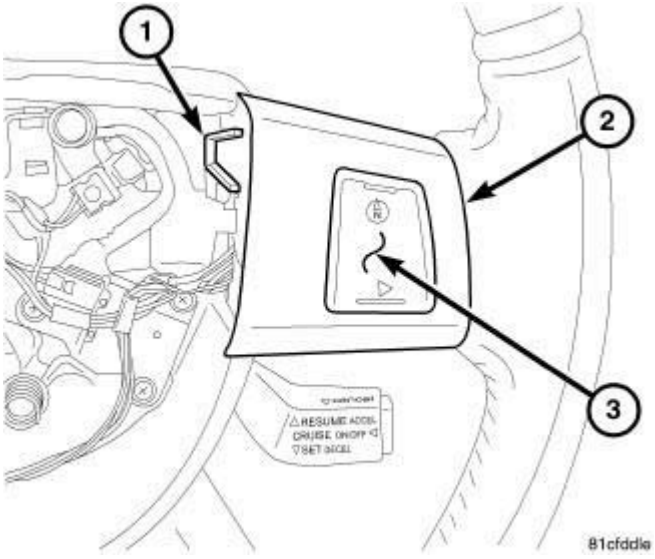


Fig. 19: Removing/Installing EVIC Switch And Bezel Assembly
Courtesy of CHRYSLER LLC

3. Position the switch and bezel assembly (3) over the steering wheel and connect the switch electrical connector.
4. Align the switch bezel tab (1) with the slot in the steering wheel and press the switch and bezel assembly (3) into the steering wheel until it is secured in place.
5. Install the driver airbag. Refer to **Restraints/AIR BAG, Driver - Installation** .
6. Do not reconnect the battery negative cable at this time. The Supplemental Restraint System (SRS) verification test procedure should be performed following service of any SRS component. Refer to **DTC-Based Diagnostics/CONTROLLER, Occupant Restraint (ORC) - Standard Procedure** .
7. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Overhead Console - Service Information - Journey

DESCRIPTION

DESCRIPTION

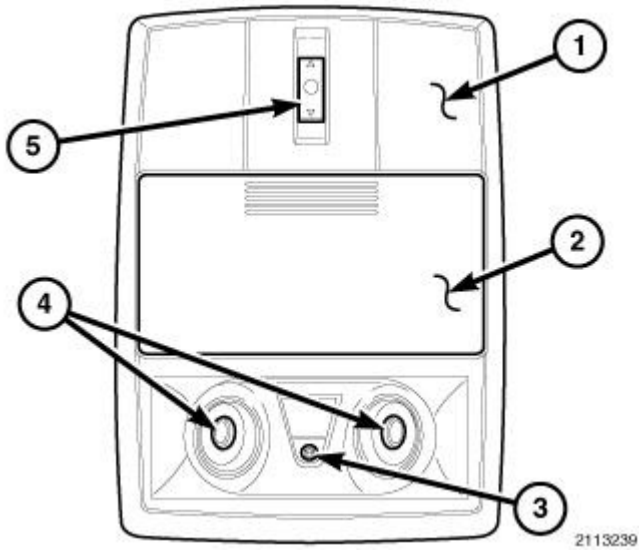


Fig. 1: Identifying Overhead Console Components
Courtesy of CHRYSLER LLC

There are two different style's of overhead console (1) available on this vehicle, High line and Mid or Low line. All overhead consoles are equipped with a sunglasses storage bin (2) and two reading and courtesy lamps (4). On High line models, the reading lamps are a Light Emitting Diode (LED) multi directional design, and on the Mid or Low line design the lamps are fixed with a replaceable incandescent bulb. The sunglasses storage bin also has a conversation mirror that is visible when the bin is locked in the partial open position. On vehicles equipped with a power sunroof, the sunroof switch (5) is located behind the sunglasses bin. On vehicles equipped with automatic climate control an infrared temperature sensor (3) is located between the reading and courtesy lamps. Both overhead console designs are mounted with six snap clips into a molded plastic retainer bracket located above the headliner to provide secure overhead console attachment.

REMOVAL

SUNGLASSES BIN

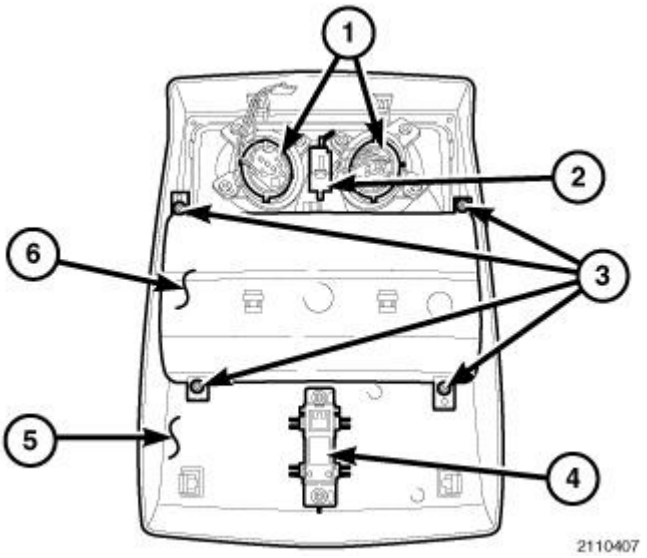


Fig. 2: Identifying Overhead Console Components
Courtesy of CHRYSLER LLC

1. Remove the overhead console (5). See **Removal** .
2. Remove the four fasteners (3) that secure the sunglasses bin (6) to the console.
3. Remove the bin from the console.

CONSOLE ASSEMBLY

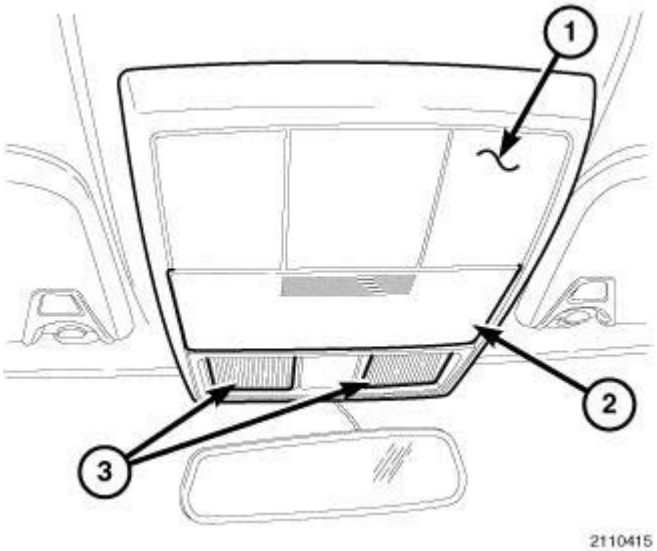


Fig. 3: Console Assembly
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Using your fingertips, grasp the sides of the overhead console (1) and pull straight down evenly to disengage the snap clips from the mounting bracket.

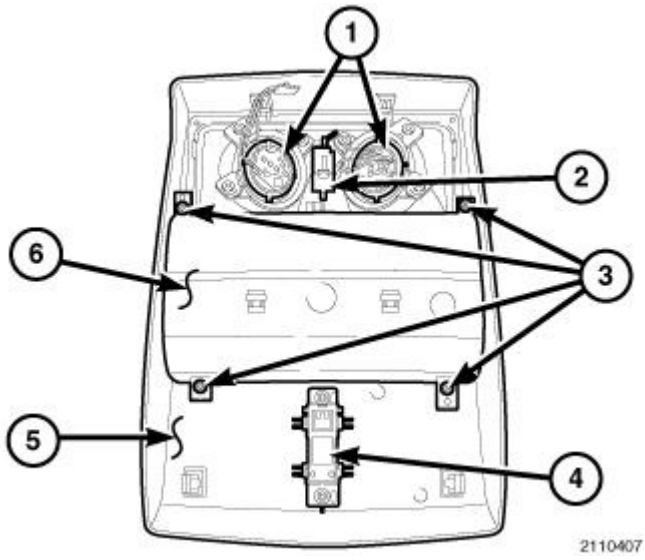


Fig. 4: Identifying Overhead Console Components
Courtesy of CHRYSLER LLC

3. Lower the overhead console (5) far enough to access the wire harness connectors.
4. If equipped, disconnect the courtesy lamps (1), infrared temperature sensor (2) and power sunroof switch (4) electrical connectors.
5. Remove the overhead console assembly from the vehicle.

INSTALLATION

SUNGLASSES BIN

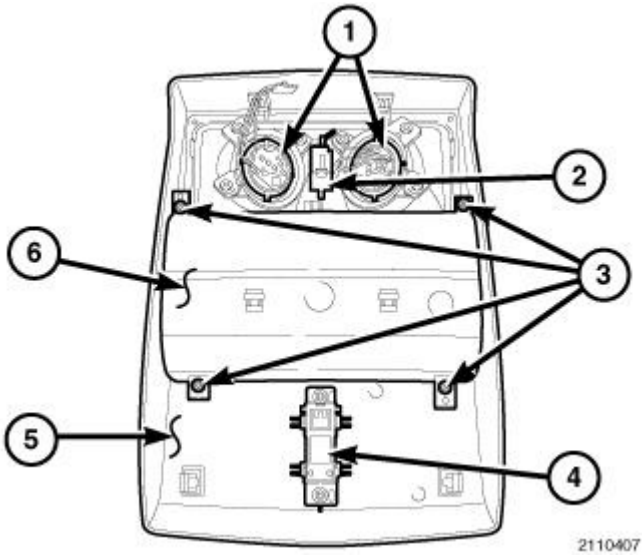


Fig. 5: Identifying Overhead Console Components
Courtesy of CHRYSLER LLC

1. Install the sunglasses bin (6) into the overhead console (5).
2. Install the four fasteners (3) that secure the bin to the console.
3. Install the overhead console. See **Installation** .

CONSOLE ASSEMBLY

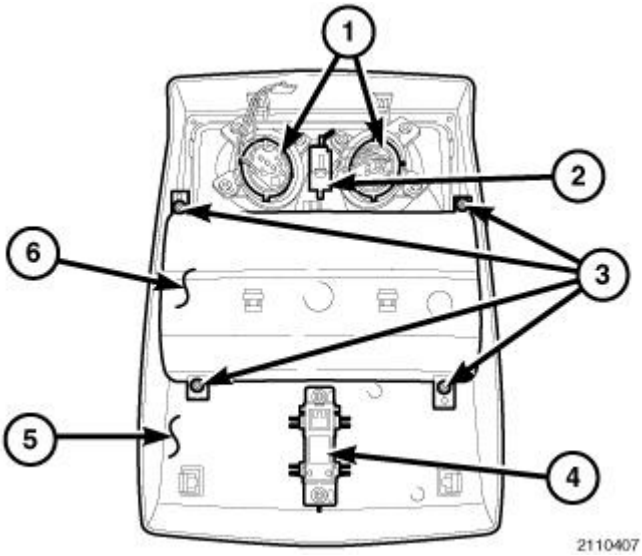


Fig. 6: Identifying Overhead Console Components
Courtesy of CHRYSLER LLC

1. Position the overhead console (5) in the vehicle near the headliner assembly.
2. If equipped, connect the courtesy lamps (1), infrared temperature sensor (2) and power sunroof switch (4) electrical connectors.
3. Position the overhead console so that the six retaining clips are lined up properly with the bracket.

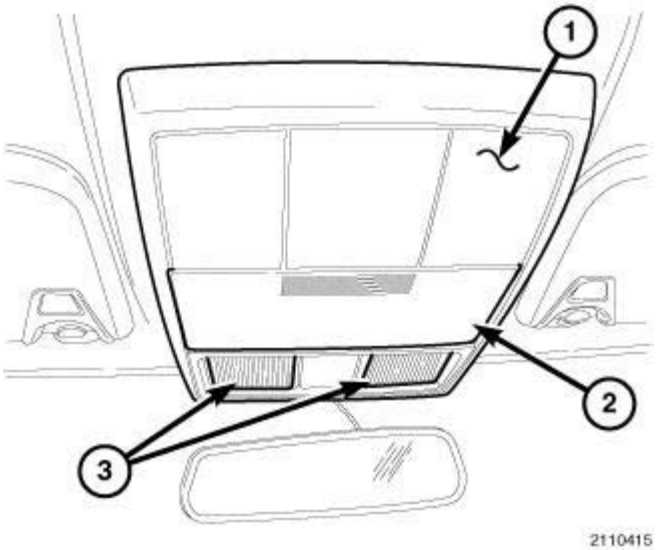


Fig. 7: Console Assembly
Courtesy of CHRYSLER LLC

4. Applying pressure to the overhead console (1), push straight up evenly to engage the snap clips into the mounting bracket.
5. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Power Distribution - Journey

OPERATION

OPERATION

The power distribution system for this vehicle is designed to provide safe, reliable, centralized and convenient access to distribution of the electrical current required to operate all of the many standard and optional factory-installed electrical and electronic powertrain, chassis, safety, comfort and convenience systems. At the same time, these systems were designed to provide centralized locations for conducting diagnosis of faulty circuits and for sourcing the additional current requirements of many aftermarket vehicle accessory and convenience items.

These power distribution systems also incorporate various types of circuit control and protection features, including:

- Automatic resetting circuit breakers
- Cartridge fuses
- Fusible links
- Mini and standard fuses
- Relays

The power distribution system for this vehicle may consist of the following components:

- Accessory power outlet
- Junction Block (JB)
- Power Distribution Center (PDC)
- Totally Integrated Power Module (TIPM)

SPECIAL TOOLS

SPECIAL TOOLS

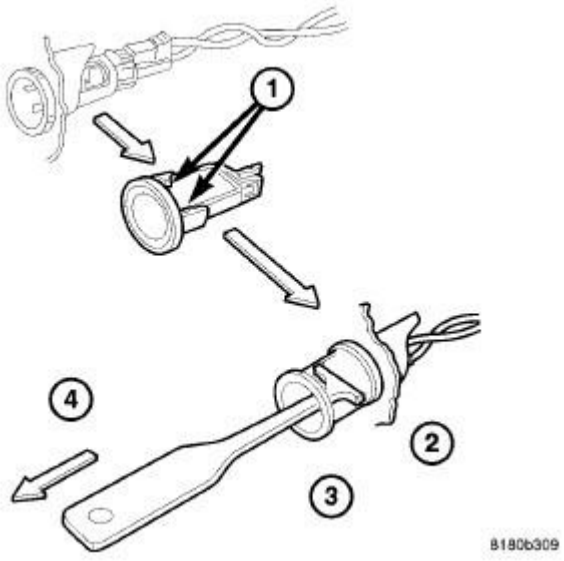


Fig. 1: 9857 Power Outlet Remover
Courtesy of CHRYSLER LLC

1. RETAINING TABS	3. POWER OUTLET
2. ELECTRICAL CONNECTOR	4. POWER OUTLET REMOVER

FUSE, IOD

DESCRIPTION

DESCRIPTION

All vehicles are equipped with an Ignition-Off Draw (IOD) fuse that is disconnected within the Totally Integrated Power Module (TIPM) when the vehicle is shipped from the factory. Dealer personnel are to reconnect the IOD fuse in the TIPM as part of the preparation procedures performed just prior to new vehicle delivery.

OPERATION

OPERATION

The term ignition-off draw identifies a normal condition where power is being drained from the battery with the ignition switch in the Off position. The IOD fuse feeds the memory and sleep mode functions for some of the electronic modules in the vehicle as well as various other accessories that require battery current when the ignition switch is in the OFF position, including the clock. The only reason the IOD fuse is disconnected is to reduce the normal IOD of the vehicle electrical system during new vehicle transportation and pre-delivery storage to reduce battery depletion, while still allowing vehicle operation so that the vehicle can be loaded, unloaded and moved as needed by both vehicle transportation company and dealer personnel.

Dealer personnel must reconnect the IOD fuse when the vehicle is being prepared for delivery in order to

restore full electrical system operation. Once the vehicle is prepared for delivery, the IOD function of this fuse becomes transparent and the fuse that has been assigned the IOD designation becomes only another Fused B(+) circuit fuse. The IOD fuse serves no useful purpose to the dealer technician in the service or diagnosis of any vehicle system or condition, other than the same purpose as that of any other standard circuit protection device.

The IOD fuse can be used by the vehicle owner as a convenient means of reducing battery depletion when a vehicle is to be stored for periods not to exceed about thirty days. However, it must be remembered that disconnecting the IOD fuse will not eliminate IOD, but only reduce this normal condition. If a vehicle will be stored for more than about thirty days, the battery negative cable should be disconnected to eliminate normal IOD; and, the battery should be tested and recharged at regular intervals during the vehicle storage period to prevent the battery from becoming discharged or damaged.

REMOVAL

REMOVAL

NOTE: When removing or installing the Ignition Off Draw (IOD) fuse, it is important that the ignition switch be in the OFF position. Failure to place the ignition switch in the OFF position can cause the radio display to become scrambled when the IOD fuse is installed. Removing and installing the IOD fuse again with the ignition switch in the OFF position will usually correct the scrambled radio display condition.

1. Turn the ignition switch to the OFF position.
2. Remove the cover from the Totally Integrated Power Module (TIPM).
3. Pull on IOD fuse (J13) holder until it reaches the first detent.

INSTALLATION

INSTALLATION

1. Push on IOD fuse until completely seated.
2. Install the cover to the Totally Integrated Power Module (TIPM).

JUNCTION BLOCK

DESCRIPTION

DESCRIPTION

An electrical Junction Block (JB) is located next to the Totally Integrated Power Module (TIPM). The JB combines the functions previously provided by a separate relay center. It also serves to simplify and centralize numerous electrical components, as well as to distribute electrical current to many of the accessory systems in the vehicle. It eliminates the need for numerous splice connections and serves in place of a bulkhead connector between many of the engine compartment, instrument panel, and body wire harnesses. The junction block is replaced as part of the engine harness.

MODULE, POWER INVERTER

DIAGNOSIS AND TESTING

INVERTER MODULE

For complete circuit diagrams, refer to the appropriate wiring information.

WARNING: Disable the airbag system before attempting any steering wheel, steering column, seat belt tensioner, side airbag or instrument panel component diagnosis or service. Disconnect and isolate the negative battery (ground) cable. Wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to follow these instructions may result in accidental airbag deployment and possible serious or fatal injury.

110 VOLT POWER OUTLET DIAGNOSIS

CONDITION	POSSIBLE CAUSES	CORRECTION
NO POWER AT THE 110 VOLT POWER OUTLET	1. Fuse inoperative.	1. Check Totally Integrated Power Module (TIPM) fuse number 37. Replace fuse, if required.
	2. Power outlet connector damaged.	2. Check for loose or corroded power outlet connector. Repair, if required.
	3. Inverter module connector damaged.	3. Check for loose or corroded inverter module connector. Repair, if required.
	4. Wiring damaged.	4. Check for shorted or open wires. Repair wiring, if required.
	5. Inverter module ground damaged.	5. Check for continuity between the inverter module and a known good ground. There should be continuity. Repair ground, if required.
	6. Power outlet inoperative.	6. Replace the power outlet.
	7. Inverter module inoperative.	7. Replace the inverter module.

REMOVAL

REMOVAL

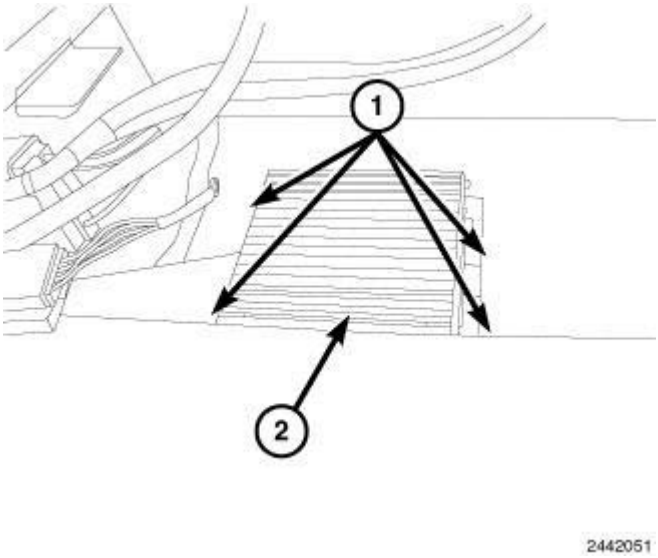


Fig. 2: Removing / Installing Power Inverter And Mounting Retainers
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Position the front drivers seat to the full rearward position.
3. Remove the power inverter (2) mounting retainers (1) located under the carpet.
4. Disconnect the electrical connectors.
5. Remove the power inverter module from the vehicle.

INSTALLATION

INSTALLATION

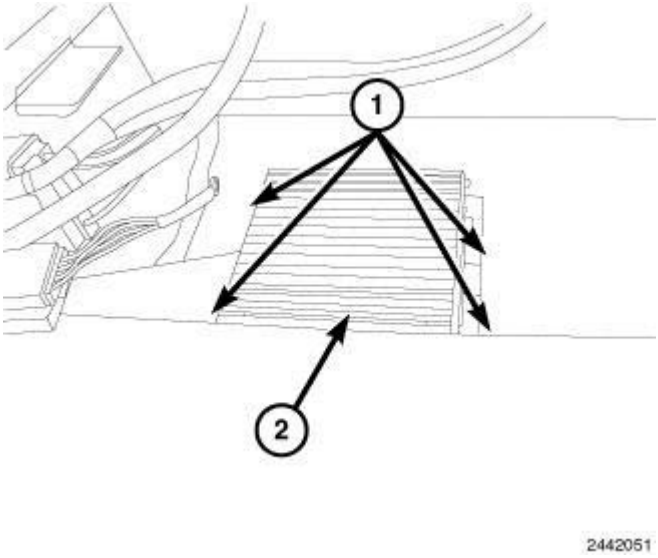


Fig. 3: Removing / Installing Power Inverter And Mounting Retainers
Courtesy of CHRYSLER LLC

1. Position the inverter into the vehicle and install mounting fasteners.
2. Connect the electrical connectors.
3. Connect the battery negative cable.
4. Position the front drivers seat back to the original position.

MODULE, TOTALLY INTEGRATED POWER (TIPM)

DESCRIPTION

DESCRIPTION

All of the electrical current distributed throughout this vehicle is directed through the standard equipment Totally Integrated Power Module (TIPM). The molded plastic TIPM housing is located on the right side of the engine compartment. The TIPM housing has a molded plastic cover. The TIPM cover is easily removed for service access and has a convenient fuse layout label affixed to the inside surface of the cover to ensure proper component identification.

The TIPM housing is secured to the TIPM mounting bracket by four clips integral to the TIPM housing. All of the TIPM outputs are through the integral engine compartment wire harness.

OPERATION

OPERATION

All of the current to the Totally Integrated Power Module (TIPM) comes directly from the positive battery cable to a stud located on the bottom of the TIPM. The cable is secured to the TIPM stud with a nut. Internal connection of all the TIPM circuits is accomplished by an intricate network of hard wiring and bus bars. Refer to appropriate wiring information for complete circuit diagrams.

The fuses, relays and TIPM housing assembly are available for service replacement.

STANDARD PROCEDURE

PROGRAMMING

1. Install a battery charger.
2. Verify that the charging rate provides approximately 13.5 volts.

NOTE: Do not allow the charger to time out during the reconfiguration process. Set the battery charger timer (if so equipped) to continuous charge.

3. Connect the CH9410 StarSCAN ethernet cable to the StarSCAN and the dealer's network drop.
4. Connect the CH9404 StarSCAN vehicle cable to the StarSCAN and the vehicle.
5. Place the Ignition in the "RUN" position, then Power "ON" the StarSCAN.

6. Select "ECU View".
7. Select "TIPMCGW" or "FCMCGW".
8. Select "MISC".
9. Select "Restore Vehicle Configuration".
10. Follow prompts on StarSCAN to complete the reconfigure procedure.
11. Once complete, Wait one minute and turn the ignition key to the "OFF" position.
12. Remove the StarSCAN unit, cable and charger from the vehicle.
13. Verify proper operation.

REMOVAL

REMOVAL

1. Open hood.
2. Disconnect and isolate the battery negative cable.
3. Release the Totally Integrated Power Module (TIPM) cover retaining clips and open the TIPM cover.
4. Remove the TIPM positive cable retaining nut and remove the cable from the stud.
5. Depress the four mounting clips to disengage and remove the TIPM housing from its mounting bracket.
6. Disconnect each of the seven TIPM wire harness connectors.
7. Remove the TIPM from the vehicle.

INSTALLATION

INSTALLATION

CAUTION: The original Cabin Compartment Node (CCN) and Powertrain Control Module (PCM) must be installed and functioning properly prior to powering up the new Totally Integrated Power Module (TIPM). The TIPM receives vehicle configuration data from the CCN and Vehicle Identification Number (VIN) information from the PCM. If configuration information becomes lost or corrupted, the data can be obtained from DealerCONNECT

1. Position the TIPM into the engine compartment.
2. Connect each of the seven TIPM wire harness connectors.
3. Position the TIPM onto the mounting bracket and push down until the mounting clips are fully seated.
4. Position the TIPM positive cable onto the mounting stud and install the retaining nut. Tighten the nut to 9 - 11 N.m (80 - 100 in. lbs.).
5. Open the TIPM cover and fully seat the airbag fuse holder (two fuses in one yellow carrier) and the Ignition Off Draw (IOD) fuse.
6. Connect the battery negative cable.
7. Close the hood.

8. Insert the ignition key and turn it to the RUN position and wait twelve seconds. The TIPM will collect the necessary vehicle configuration and VIN data from the CCN and PCM at this time. After twelve seconds turn the ignition key to the OFF position and then back to the ON position and verify proper vehicle systems operation.

OUTLET, POWER, 12 V

REMOVAL

REMOVAL

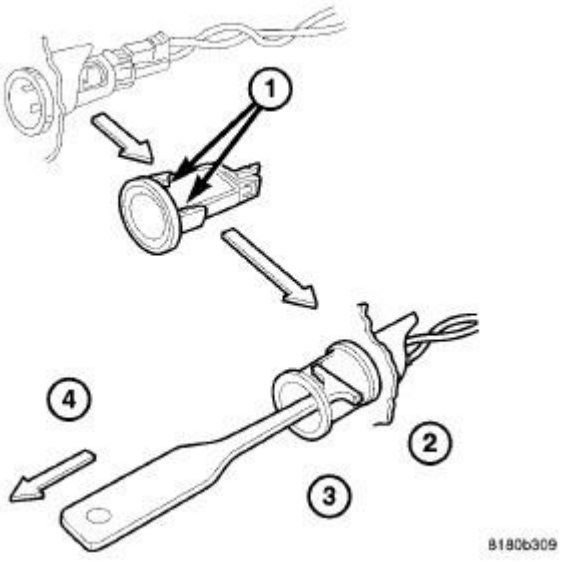


Fig. 4: Removing Cigar Lighter/Power Outlet
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Using Power Outlet Remover 9857 (4). Insert the tool with tips against bosses (1).
3. Pull out the base (3) through mounting ring by gently rocking power outlet remover.
4. Disconnect the base wires (2).

INSTALLATION

INSTALLATION

1. Connect wire harness connectors.
2. Install power outlet to instrument panel.
3. Connect battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Power Locks - Service Information - Journey

DESCRIPTION

DESCRIPTION

POWER DOOR LOCKS

The power lock system allows all doors to be locked or unlocked electrically by operating the switch on either front door trim panel. The power lock system operates on non-switched battery current supplied through a fuse in the junction block so that the system remains functional, regardless of the ignition switch position.

AUTOMATIC DOOR LOCKS

The system includes an automatic door locking feature actuated by the Cab Compartment Node (CCN). **The vehicle is built with the system enabled.** The system can be enabled/disabled by the customer. Refer to the owner's manual for information.

The CCN will automatically lock all doors when all of the conditions below are met:

- All doors are closed
- The vehicle speed exceeds 15 ± 1 M.P.H. (24km/h)
- The throttle position sensor tip-in is greater than 10 ± 2 degrees

When the system is disabled the door locks will work by use of the door lock switches only. When this system is enabled the automatic door locks will work automatically.

CHILD PROTECTION LOCK

The child protection locks are on the rear doors only. When enabled, they render the inside remote door release handles inoperative.

DOOR LOCK INHIBIT

The door lock inhibit feature is designed to prevent the locking of keys in a vehicle. The doors cannot be locked with either front door open unless the keys are removed from the ignition switch.

REMOTE KEYLESS ENTRY

The system allows locking and unlocking of vehicle door(s), deck lid release, and panic by remote control using a hand held radio frequency transmitter. The vehicle must be in PARK before the trunk lid can be unlatched with the transmitter.

The receiver may receive signals from up to four transmitters. Each transmitter has its own code, and the code is programmed and stored into receiver memory. If a transmitter is replaced or additional transmitters are added,

the codes for all units have to be reprogrammed into the receiver memory. If a receiver module is replaced, the transmitter codes must be stored in the new receiver memory.

HORN CHIRP TOGGLE

Once the transmitters have been programmed, the horn chirp can be enabled/disabled by sending the horn chirp toggle operation code to the CCN.

OPERATION

OPERATION

POWER DOOR LOCKS

All doors can be locked or unlocked electrically by operating the switch on either front door panel.

The rear doors can be locked or unlocked by actuation of the front door switch, or can be locked or unlocked mechanically and independently with their respective locking knobs.

The front doors can be locked or unlocked mechanically with the locking knob regardless of electrical locking and unlocking actuation with the front door knobs.

The left front door on all vehicles can be locked or unlocked mechanically from the outside with the key or electrically as described above. The left and right front doors can also be unlocked by actuation of the inside remote door handle.

AUTOMATIC DOOR LOCKS

The CCN controls the power locks when the door lock switch is activated. If the door lock switch is pressed for longer than eight consecutive seconds, the CCN will de-energize the door lock relay.

The automatic door lock system can be enabled/disabled either by the customer or with the scan tool. Refer to the scan tool or the vehicle owners manual for enabling/disabling procedures.

The CCN will automatically re-lock all doors if the above conditions are met and if any of the doors become ajar and then closes again.

The power latches are also equipped with a thermal protection system which prevents the latches from burning out.

CHILD PROTECTION LOCK

The lock when engaged, will disable the inside door handle from opening the door. The lock is part of the latch/lock assembly. The lock is engaged by moving a lever that is located on the rearward inside edge of the door.

DOOR LOCK INHIBIT

With the key in the ignition switch in the ON or OFF position and the driver's door open the CCN will ignore the command to lock the power door locks. Once the key is removed, or the driver's door is closed, the CCN will allow the power door locks to lock.

REMOTE KEYLESS ENTRY

The transmitter has four buttons for operation. They are LOCK, UNLOCK, DECK LID RELEASE, and PANIC.

- The **UNLOCK** button will unlock the driver's door and enable illuminated entry. Pushing and releasing the button once will unlock the driver's door. Pushing and releasing the button two times, within a five second interval, will unlock all doors.

  The unlock sequence can be toggled between driver door first and all door unlock functions.

- Upon pressing the **LOCK** button, the horn will sound a short CHIRP (if enabled) and flash the park lamps to notify that the all door lock signal was received and set. Illuminated entry is cancelled and the interior lamps are faded to off.
- **DECK LID RELEASE** - The Deck Lid release button changes from a default "press twice" actuation to a "press and hold" (for approximately one third of a second) default. Note that this is customer programmable to "no delay" if so desired.
- Pushing and holding the **PANIC** button will cause the panic alarm to sound for three minutes, until the panic button is pressed and held a second time, or the vehicle reaches a speed of 15 mph.

The receiver is capable of retaining a Vehicle Access Code (VAC) even when power is removed.

Each Remote Keyless Entry (RKE) module must have at least one and no more than four transmitters.

HORN CHIRP TOGGLE

This can be done using a scan tool or by the customer. The horn chirp will enter the opposite state of its current programmed state by receiving this operation code. The CCN is responsible for keeping track of the horn chirp status.

DIAGNOSIS AND TESTING

REMOTE KEYLESS ENTRY

When trouble shooting problems with the Remote Keyless Entry System, always verify that the power door lock/unlock switches are functional. If the doors do not lock/unlock with the power switches, the following components should be analyzed:

- Door Lock Switches
- Door lock/unlock motors
- Fuses
- Lock and unlock relays

- Radio/clock
- Remote keyless entry system

MOTOR, DOOR LOCK

DIAGNOSIS AND TESTING

DOOR LOCK MOTOR

Make certain battery is in normal condition before circuits are tested.

To determine which motor is faulty, check each individual door for electrical lock and unlock or disconnect the motor connectors one at a time, while operating the door lock switch. In the event that none of the motors work, the problem maybe caused by a shorted motor, a bad switch, or a bad relay. Disconnecting a defective motor will allow the others to work.

To test an individual door lock motor, disconnect the electrical connector from the motor. To lock the door, connect a 12 volt power source to the positive pin of the lock motor and a ground wire to the other pin. To unlock the door reverse the wire connections at the motor pin terminals. If these results are NOT obtained, replace the motor.

The door lock motor is integral to the door latch. If faulty, the entire door latch must be replaced.

SOLENOID, RELEASE, LIFTGATE

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the liftgate latch assembly. Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/LATCH - Removal** .
3. Remove the liftgate release solenoid.

INSTALLATION

INSTALLATION

1. Install the liftgate latch. Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/LATCH - Installation** .
2. Install the liftgate trim panel. Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Installation** .
3. Connect the battery negative cable.

SWITCH, DOOR LOCK CYLINDER

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Removal** .
3. Disconnect the wiring clip and pigtail wire connector.
4. Remove the Door Cylinder Lock Switch from door lock cylinder.

INSTALLATION

INSTALLATION

1. Install the Door Cylinder Lock Switch onto the door lock cylinder.
2. Connect the wiring clip and pigtail wire connector.
3. Install door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Installation** .
4. Connect the battery negative cable.

SWITCH, LOCK

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

VOLTAGE

The following wiring test sequence determines whether or not voltage is continuous through the body harness to switch.

1. Remove switch from door trim panel.
2. Carefully separate multiple terminal block on wiring harness from switch body.
3. Connect one lead of test light to a ground terminal:

- Touch other test light lead to battery feed B+ terminal.
- If test light comes on, the wiring circuit between the battery and switch is functional.
- If test light does not come on, check for a blown fuse. Refer to **SYSTEM WIRING DIAGRAMS** for circuit information.

DOOR LOCK SWITCH

NOTE: Vehicles equipped with the auto-express feature for power windows, the local interface network (LIN) controls the lock, mirror and window features.

Remove the non-express switch from its mounting location. Using an ohmmeter, refer to the **DOOR LOCK**

SWITCH CONTINUITY table to determine if the continuity is correct in the LOCK and UNLOCK switch positions. If these results are not obtained, replace the switch.

DOOR LOCK SWITCH CONTINUITY

-	SWITCH POSITION	CONTINUITY BETWEEN	RESISTANCE VALUE
MASTER DOOR LOCK	LOCK	3 AND 4	330 ohms ± 10%
MASTER DOOR LOCK	UNLOCK	3 AND 4	102 ohms ± 10%
PASSENGER DOOR LOCK	LOCK	4 AND 8	330 ohms ± 10%
PASSENGER DOOR LOCK	UNLOCK	4 AND 8	102 ohms ± 10%

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative remote cable.
2. Using a trim tool, or equivalent, carefully pry up on the window switch until it disengages from the door trim panel.
3. Disconnect switch wire connector.

INSTALLATION

INSTALLATION

1. Connect switch wire connector.
2. Install the switch by snapping into place.
3. Connect the battery negative remote cable.

TRANSMITTER, INTEGRATED KEY FOB

DIAGNOSIS AND TESTING

REMOTE KEYLESS ENTRY TRANSMITTER

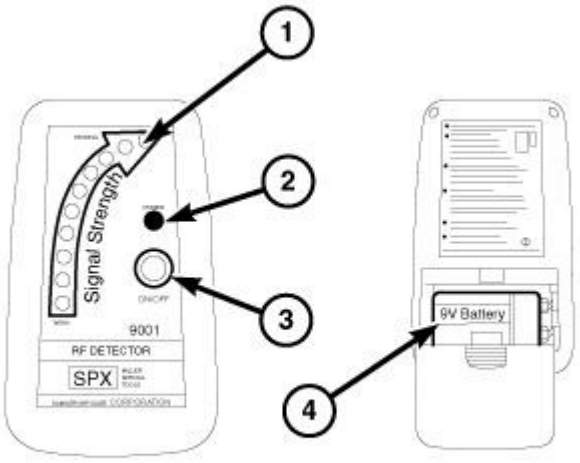


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Fig. 1: Radio Frequency Detector 9001
Courtesy of CHRYSLER LLC

Using special tool 9001, first test to ensure that the transmitter is functioning. Typical testing distance is 2.5 centimeters (1 inch) for Asian transmitters and 30.5 centimeters (12 inches) for all others. To test, position the transmitter as shown in illustration. Press any transmitter button, then test each button individually. The tool will beep if a radio signal strength that lights five or more LEDs is detected. Repeat this test three times. If transmitter fails any of the test refer to the proper Diagnostic Procedures information.

FOBIK TRAPPED IN WIN

The Fob with Integrated Key (FOBIK) cannot be rotated to the LOCK position, allowing it to be removed from the ignition switch also referred to as the Wireless Ignition Node/WIN. The automatic transmission or transaxle is shifted mechanically through a cable from the gearshift lever mechanism to the transmission or transaxle valve body. A gated park switch is physically located on and integral to the gearshift lever mechanism and is hard wired directly to the WIN. The gated park switch is a simple plunger-like actuated open or closed contact switch that could be considered redundant to the Transmission Range Sensor (TRS) except that it monitors the position selected with the gearshift lever, while the TRS monitors the position or gear of the transmission or transaxle that is actually engaged. A damaged or improperly adjusted gearshift cable could result in a different gear being engaged than that which is selected. The WIN uses the gated park switch input to control an internal key lock solenoid, which controls whether the FOBIK can be rotated to the LOCK position. When the gearshift lever is not in the PARK position, the gated park switch is a closed circuit, the key lock solenoid is energized and the FOBIK cannot be rotated to the LOCK position for removal.

CONDITION	POSSIBLE CAUSES	CORRECTION
	1. Damaged, binding or improperly adjusted gearshift cable.	1. Inspect and replace or adjust gearshift cable, if required.

CANNOT TURN FOBIK TO LOCK POSITION	2. Damaged or binding gearshift lever mechanism.	2. Inspect and replace or adjust gearshift lever mechanism.
	3. No gated park switch input to WIN.	3. Use a diagnostic scan tool with software release version 8.05 or greater to read and confirm no gated park switch input to the WIN. Refer to the appropriate CONDITION that follows.
	4. Key lock solenoid (WIN) unresponsive to gated park switch input.	4. Use a diagnostic scan tool with software release version 8.05 or greater to read and confirm gated park switch input to the WIN. Refer to the appropriate CONDITION that follows.
NO GATED PARK SWITCH INPUT	1. Open TRS park signal circuit.	1. Repair the open TRS park signal circuit between the gated park switch (gearshift lever mechanism) and the WIN, if required
	2. Damaged or ineffective gated park switch.	2. Replace the damaged or ineffective gated park switch (gearshift lever mechanism), if required.
KEY LOCK SOLENOID UNRESPONSIVE TO GATED PARK SWITCH INPUT	1. Damaged or ineffective key lock solenoid.	1. Replace the damaged or ineffective key lock solenoid (WIN), if required.

STANDARD PROCEDURE

FOBIK TRANSMITTER BATTERY REPLACEMENT

FOBIK WITH BATTERY COVER

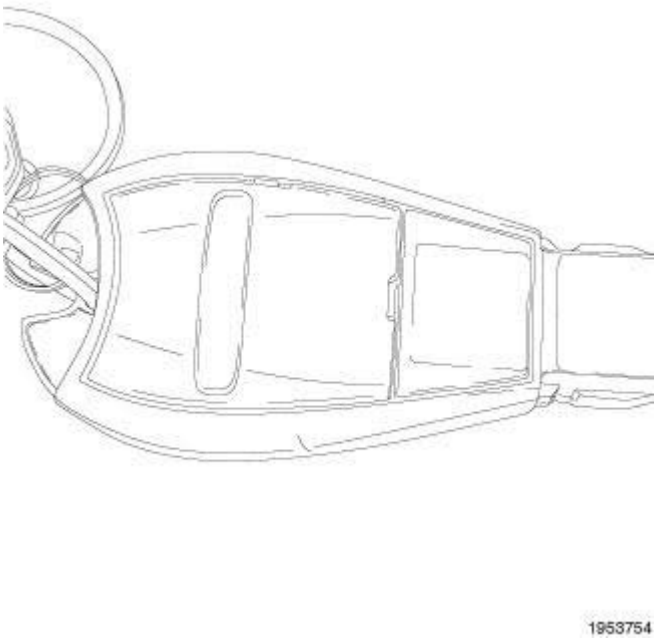

Fig. 2: FOBIK With Battery Cover
Courtesy of CHRYSLER LLC

NOTE: Do not disturb the metal terminal near the battery. Avoid touching the new battery. Skin oils may cause battery deterioration. If battery are touched, clean with rubbing alcohol.

To replace the FOBIK transmitter battery:

1. Using a small flat bladed tool, carefully remove the battery cover on the back of the FOBIK.

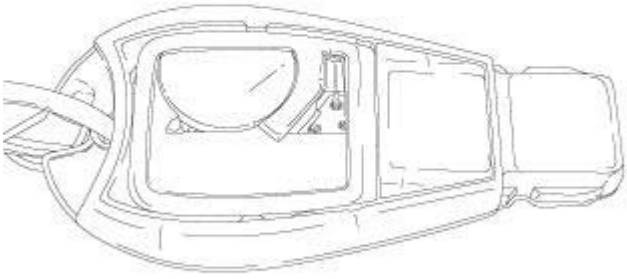

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Fig. 3: FOBIK With Battery Cover Removed
Courtesy of CHRYSLER LLC

2. Remove the battery one at a time by slightly lifting up and sliding out from the FOBIK.
3. Replace the battery with the same type of battery cell.
4. Install the battery with the positive terminal up.
5. Install battery cover and snap into place.
6. Test FOBIK operation.

FOBIK WITHOUT BATTERY COVER

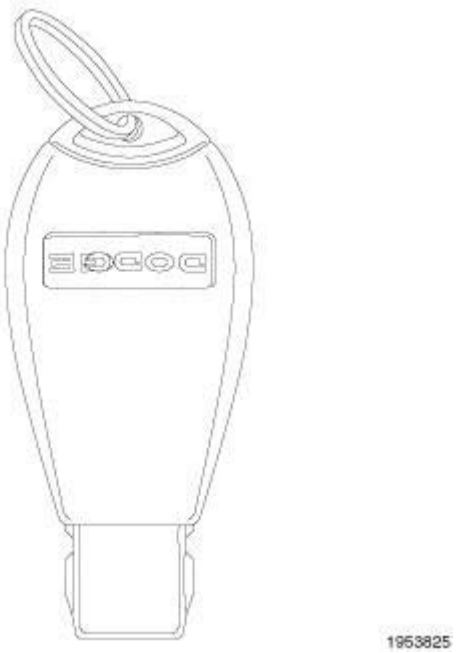

Fig. 4: FOBIK Without Battery Cover
Courtesy of CHRYSLER LLC

NOTE: Do not disturb the metal terminal near the battery. Avoid touching the new battery. Skin oils may cause battery deterioration. If battery are touched, clean with rubbing alcohol.

This design is a clam shell design whereby both halves are split apart.

1. Remove the valet/spare key from the FOBIK if present.
2. Using a trim stick C-4755 or equivalent, carefully separate the top half from the bottom half.

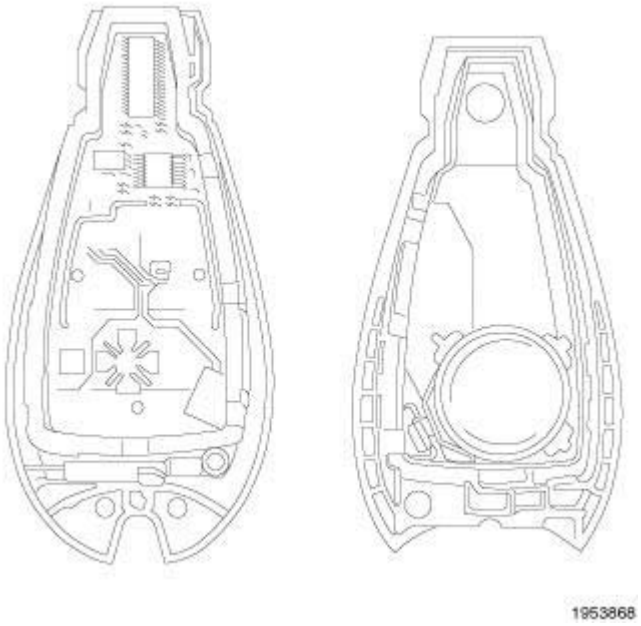

Fig. 5: FOBIK Without Battery Cover Separated
Courtesy of CHRYSLER LLC

3. Lift up on the battery to remove.
4. Replace battery with the same type of cell.
5. Install new battery negative side up.
6. Snap the top and bottom halves together.
7. Test FOBIK operation.

FOBIK PROGRAMING

Make sure instructions are followed in order. Refer to **MODULE PROGRAMMING** . .

SPECIFICATIONS

SPECIFICATIONS

BATTERY

The transmitter has two 3 volt batteries, which can be removed and replaced without special tools. Insert a dime in the side slot of the transmitter case and twist. The halves should separate and the batteries are stacked on top of each other. The batteries are available at local retail stores. Recommended batteries are Duracell DL 2016 or equivalent. Typical battery life is about two years.

CAUTION: Do not handle the batteries any more than necessary. Hands must be clean and dry.

RANGE

Normal Remote Keyless Entry (RKE) transmitter operation range for vehicles manufactured for domestic markets is up to 20 meters (66 feet) away from the vehicle. On vehicles manufactured for export markets, normal RKE transmitter range is up to 10 meters (33 feet) away from the vehicle. If a domestic market vehicle is equipped with the optional factory-installed Remote Start System, the normal transmitter range is increased to up to 91 meters (300 feet). Please note that the actual RKE transmitter range values may be better or worse than specified above, depending upon many possible variables in the environment at the specific time and location that any RKE transmission is attempted.

2009 ACCESSORIES AND EQUIPMENT

Power Mirrors - Service Information - Journey

DESCRIPTION

DESCRIPTION

AUTOMATIC DAY/NIGHT MIRROR

The automatic day/night mirror system is able to automatically change the reflectance of the inside rear view mirror in order to reduce the glare of headlamps approaching the vehicle from the rear. The automatic day/night rear view mirror receives battery current through a fuse in the junction block only when the ignition switch is in the ON position.

OUTSIDE REAR VIEW MIRROR

The power operated outside rear view mirrors allow the driver to adjust both outside mirrors electrically from the driver side front seat position by operating a switch on the door panel above the window switches. Vehicles equipped with the auto-express feature for power windows, the local interface network (LIN) controls the lock, mirror and window features.

OPERATION

OPERATION

AUTOMATIC DAY/NIGHT MIRROR

A switch located on the bottom of the automatic day/night mirror housing allows the vehicle operator to select whether the automatic dimming feature is operational. When the automatic day/night mirror is turned on, the mirror switch is lighted by an integral Light-Emitting Diode (LED). The mirror will automatically disable its self-dimming feature whenever the vehicle is being driven in reverse.

OUTSIDE REAR VIEW MIRROR

The power mirrors receive a non-switched battery feed through a fuse in the junction block so that the system will remain operational, regardless of the ignition switch position.

DIAGNOSIS AND TESTING

POWER MIRRORS

For complete circuit diagrams, refer to the appropriate wiring information.

1. Disconnect and isolate the battery negative cable.
2. Remove the power mirror switch. See **Removal** .

3. Disconnect wire connector from the switch.
4. Using two jumper wires, one connected to a 12 volt battery source, and the other connected to a good body ground. Refer to **MIRROR MOTOR TEST** for appropriate mirror response, using the mirror switch wiring harness connector.
5. If test results are not obtained as shown in the MIRROR MOTOR TEST table, check for open or shorted circuit, or replace mirror assembly as necessary.

If mirror motor tests OK, go to Mirror Switch Test.

MIRROR MOTOR TEST

MIRROR REACTION			
12 VOLT	**GROUND**	**LEFT**	**RIGHT**
6	7	-	UP
2	7	UP	-
7	6	-	DOWN
7	2	DOWN	-
1	7	-	RIGHT
8	7	RIGHT	-
7	1	-	LEFT
7	8	LEFT	-

MIRROR, AUTOMATIC DAY AND NIGHT

DESCRIPTION

DESCRIPTION

The automatic day/night mirror uses a thin layer of electrochromatic material between two pieces of conductive glass to make up the face of the mirror. When the mirror switch is in the On position, two photocell sensors are used by the mirror circuitry to monitor external light levels and adjust the reflectance of the mirror.

OPERATION

OPERATION

The ambient photocell sensor is located on the forward-facing (windshield side) of the rear view mirror housing, and detects the ambient light levels outside of the vehicle. The headlamp photocell sensor is located inside the rear view mirror housing behind the mirror glass and faces rearward, to detect the level of the light being received at the rear window side of the mirror. When the circuitry of the automatic day/night mirror detects that the difference between the two light levels is too great (the light level received at the rear of the mirror is much higher than that at the front of the mirror), it begins to darken the mirror.

The automatic day/night mirror circuitry also monitors the transmission using an input from the backup lamp circuit. The mirror circuitry is programmed to automatically disable its self-dimming feature whenever it senses

that the transmission backup lamp circuit is energized.

The automatic day/night mirror is a completely self-contained unit and cannot be repaired. If faulty or damaged, the entire mirror assembly must be replaced.

DIAGNOSIS AND TESTING

AUTOMATIC DAY/NIGHT INSIDE MIRROR

For complete circuit diagrams, refer to the appropriate wiring information.

1. Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Unplug the wire harness connector from the automatic day/night mirror. Connect the battery negative cable. Turn the ignition switch to the On position. Check for battery voltage at the fused ignition switch output (run/start) circuit cavity of the automatic day/night mirror wire harness connector. If OK, go to step 2. If not OK, repair the open circuit as required.
2. Turn the ignition switch to the Off position. Disconnect and isolate the battery negative cable. Check for continuity between the ground circuit cavity of the automatic day/night mirror wire harness connector and a good ground. There should be continuity. If OK, go to step 3. If not OK, repair the circuit to ground as required.
3. Connect the battery negative cable. Turn the ignition switch to the On position. Set the parking brake. Place the transmission gear selector lever in the Reverse position. Check for battery voltage at the backup lamp switch output circuit cavity of the automatic day/night mirror wire harness connector. If OK, go to step 4. If not OK, repair the open circuit as required.
4. Turn the ignition switch to the Off position. Disconnect the battery negative cable. Plug in the automatic day/night mirror wire harness connector. Connect the battery negative cable. Turn the ignition switch to the On position. Place the transmission gear selector lever in the Neutral position. Place the mirror switch in the On (the LED in the mirror switch is lighted) position. Cover the forward facing ambient photocell sensor to keep out any ambient light.

   NOTE: The ambient photocell sensor must be covered completely, so that no light reaches the sensor. Use a finger pressed tightly against the sensor, or cover the sensor completely with electrical tape.

5. Shine a light into the rearward facing headlamp photocell sensor. The mirror glass should darken. If OK, go to step 6. If not OK, replace the faulty automatic day/night mirror unit.
6. With the mirror glass darkened, place the transmission gear selector lever in the Reverse position. The mirror should return to its normal reflectance. If not OK, replace the faulty automatic day/night mirror unit.

MIRROR, OUTSIDE REARVIEW

REMOVAL

REMOVAL

For service procedures. Refer to **Body/Exterior/MIRROR, Outside Rearview - Removal** .

SWITCH, MIRROR

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Using a trim tool, or equivalent, carefully pry up on the window switch until it disengages from the door trim panel.
3. Disconnect switch wire connector.
4. Remove switch assembly.

INSTALLATION

INSTALLATION

1. Connect switch wire connector.
2. Install the switch to the door trim panel.
3. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Power Seats - Service Information - Journey

DESCRIPTION

DESCRIPTION

POWER SEAT SYSTEM

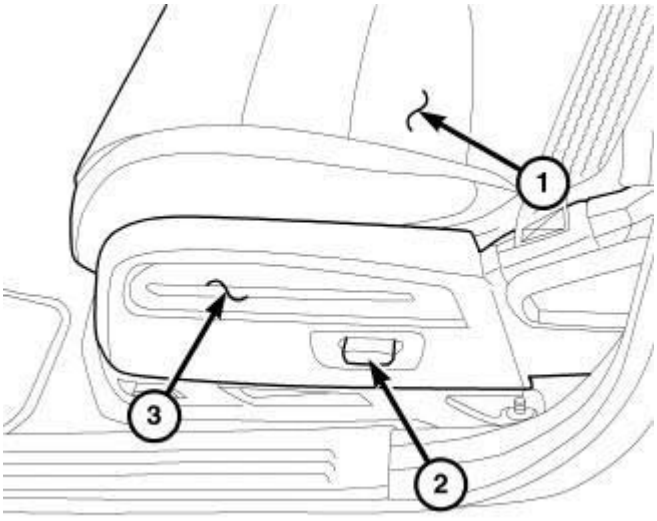

Fig. 1: Identifying Power Seat Switch, Seat Cushion & Seat Cushion Side Shield
Courtesy of CHRYSLER LLC

The driver six-way power seat is available on this vehicle. The power seat system allows the seat occupant to electrically adjust the seating position using the power seat switch assembly (2) located on the outboard seat cushion side shield (3).

The six-way power seat includes a six-way adjustable seat cushion track (1). The power seat can be adjusted up, down, front up, front down, forward, rearward. The power seat system is also available with the heated seat option. Refer to **Electrical - Heated/Cooled Systems/Heated Seats - Description** for additional information on the heated seats.

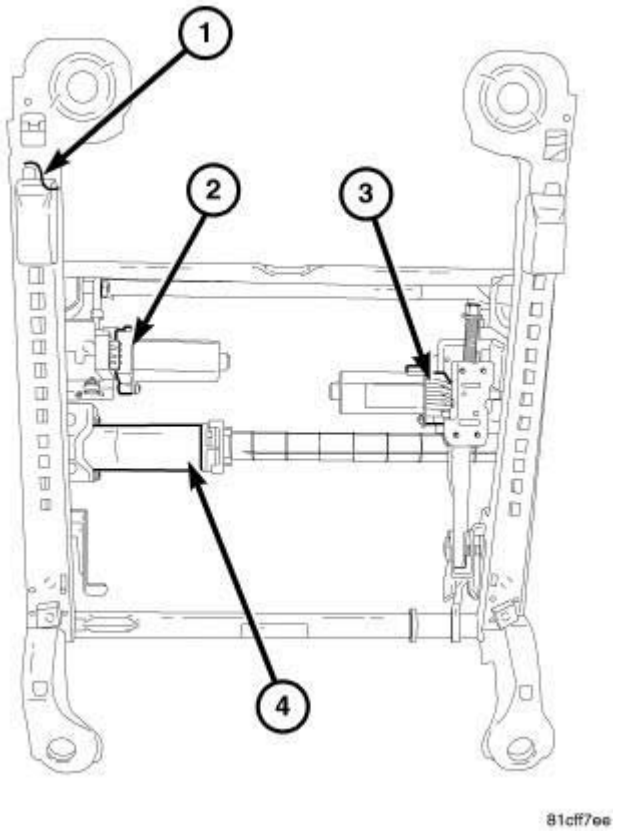

Fig. 2: Identifying Power Seat Adjuster
Courtesy of CHRYSLER LLC

The power seat adjuster (1) contains two reversible motors that are connected to worm-drive gearboxes that move the seat adjusters through screw-type drive units. These motors are the height adjust motor (3) and the front tilt motor (2). The third motor on the power seat adjuster is responsible for the fore and aft movement of the power seat. The fore/aft motor (4) is a reversible motor that is connected through two flex drive cables to a worm-drive gearbox that moves the seat adjuster through a screw-type drive unit. Each motor contains a self-resetting circuit breaker to protect it from overload. Consecutive or frequent resetting of the circuit breakers may damaged the motors.

The power seat adjuster assembly (1) includes the following major components:

The **Front Tilt Motor (2)** is located on the upper power seat adjuster assembly and controls the up and down movement of the seat front only. The front tilt motor is available as a service part and if found to be inoperative or damaged should be replaced. See **Removal** .

The **Height Adjust Motor (3)** is located on the rear of the lower power seat adjuster assembly and controls the up and down movement of the entire seat. The height adjust motor is available as a service part and if found to be inoperative or damaged should be replaced. See **Removal** .

The **Fore/Aft Motor (4)** is a reversible motor that is connected through two flex drive cables to a worm-drive gearbox that moves the seat adjuster through a screw-type drive unit. This motor is responsible for the fore and

aft movement of the power seat. The fore/aft motor is available as a service kit that includes the flex drive cables. If the motor is found to be inoperative or damaged it should be replaced. See **Removal**

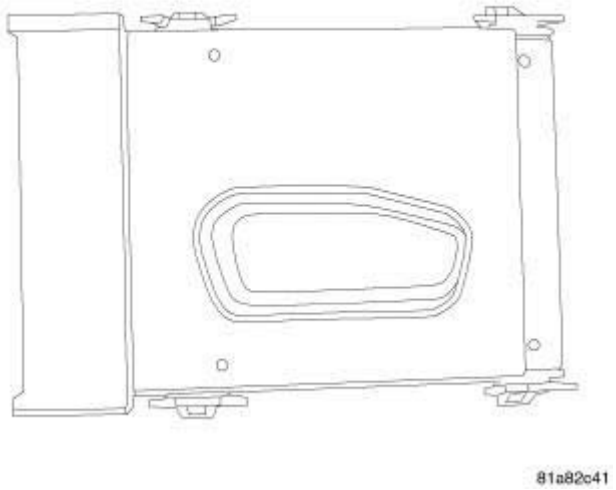

Fig. 3: Power Seat Switch
Courtesy of CHRYSLER LLC

Power Seat Switch - Vehicles may be equipped with a driver side six-way power seat switch. The power seat switches are paddle-type levers mounted on the outboard seat side shields. Movement of the seat cushions mimics the action of the switch paddles.

OPERATION

OPERATION

The power seat system receives battery current through a fuse in the Totally Integrated Power Module (TIPM) so that the power seats remain operational, regardless of the ignition switch position.

When a power seat switch is actuated, a battery feed and a ground path are applied through the power seat switch contacts to the appropriate motor or motors. The motor and drive unit operate to move the seat in the selected direction until the switch is released, or until the travel limit of the power seat track is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor is reversed through the switch contacts. This causes the motor to run in the opposite direction.

DIAGNOSIS AND TESTING

POWER SEAT SYSTEM

Operate the power seat switch and move the seat in all directions. The seat should move in each of the selected directions.

If the power seat adjuster fails to operate in more than one direction, proceed as follows:

1. Inspect the power seat adjuster motors to ensure the electrical connectors are fully seated to the motors. If OK, go to 2. If not OK, connect the electrical connector to the fully seated position.
2. Check the power seat fuse in the Totally Integrated Power Module (TIPM). If OK, go to 3. If not OK, replace the inoperative fuse.
3. Remove the power seat switch from the seat cushion side panel. Check for battery voltage at the fused B (+) circuit cavity of the power seat switch wire harness connector. If OK, go to 4. If not OK, repair the open circuit to the TIPM as required.
4. Check for continuity between the ground circuit cavity of the power seat switch wire harness connector and a good ground. There should be continuity. If OK, go to 5. If not OK, repair the open circuit to ground as required.
5. See **Diagnosis and Testing** . If the switch tests OK, check the wire harness between the power seat switch and the motor. If the circuits check OK, replace the faulty power seat motor, track or seat back frame assembly. If the circuits are not OK, repair the wire harness as required.

POWER SEAT DIAGNOSIS CHART

SYMPTOM	POSSIBLE CAUSE	CORRECTION
Power seat inoperative in all directions	Blown Fuse or inoperative circuit breaker	Check for damaged wiring and possible circuit short, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
-	Power seat switch	Perform appropriate power seat switch test. See **Diagnosis and Testing** . Replace switch as necessary
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Fore/aft seat movement completely inoperative	Power seat switch	Perform appropriate power seat switch test. See **Diagnosis and Testing** . Replace switch as necessary
-	Fore aft motor or flex drive cable.	Replace the fore aft motor assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Up/down seat movement completely inoperative	Power seat switch	Perform appropriate power seat switch test. See **Diagnosis and Testing** . Replace switch as necessary
-	Height adjust motor or drive assembly	Replace the height adjust motor and drive assembly.

-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Seat tilt movement completely inoperative	Power seat switch	Perform appropriate power seat switch test. See **Diagnosis and Testing** . Replace switch as necessary
-	Front tilt motor or drive assembly	Replace the front tilt motor and drive assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Seat motion chattering or vibrating during fore/aft movement	Foreign material under seat or in seat track	Remove foreign material. Clean and lubricate seat tracks as necessary
-	Poor seat track lubrication	Lubricate the lower portion of the effected seat tracks
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Loosen seat track to vehicle mounting bolts. Using the power seat switch, move the effected seat reward to the track stops. Tighten track bolts to proper torque and recheck seat operation. If seat motion is still abnormal, replace the fore aft motor assembly.
-	Fore aft motor or flex drive cable.	Replace the fore aft motor assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Seat motion chattering or vibrating during up/down movement	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots
-	Poor height adjust motor drive assembly lubrication	Lubricate the height adjust motor drive assembly
-	Loose components	Check and tighten loose components as necessary

-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	height adjust motor or drive assembly	Replace the height adjust motor and drive assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Seat motion chattering or vibrating during seat tilt movement	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots
-	Poor front tilt motor drive assembly lubrication	Lubricate the front tilt motor drive assembly
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	Front tilt motor or drive assembly	Replace the front tilt motor and drive assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Slow seat motion during fore/aft movement	Battery voltage low	Check vehicle charging system operation. Repair charging system and charge battery as necessary
-	Poor power seat system ground	Check for loose ground connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
-	Foreign material under seat or in seat track	Remove foreign material. Clean and lubricate seat tracks as necessary
-	Poor seat track lubrication	Lubricate the lower portion of the effected seat tracks
-	Loose components	Check and tighten loose components as necessary

-	Binding or sticking of components	Loosen seat track to vehicle mounting bolts. Using the power seat switch, move the effected seat reward to the track stops. Tighten track bolts to proper torque and recheck seat operation. If seat motion is still abnormal, replace the fore aft motor assembly.
-	Fore aft motor or flex drive cable.	Replace the fore aft motor assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Slow seat motion during up/down movement	Battery voltage low	Check vehicle charging system operation. Repair charging system and charge battery as necessary
-	Poor power seat system ground	Check for loose ground connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
-	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots
-	Poor height adjust motor drive assembly lubrication	Lubricate the height adjust motor drive assembly
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	Height adjust motor or drive assembly	Replace the height adjust motor and drive assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Slow seat motion during seat tilt movement	Battery voltage low	Check vehicle charging system operation. Repair charging system and charge battery as necessary

-	Poor power seat system ground	Check for loose ground connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
-	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots
-	Poor front tilt motor drive assembly lubrication	Lubricate the front tilt motor drive assembly
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	Front tilt motor or drive assembly	Replace the front tilt motor and drive assembly.
-	Wiring problems (system or vehicle)	Check for loose wire connections or damaged wiring, Refer to **SYSTEM WIRING DIAGRAMS** for complete circuit schematic or connector pin-out information. Repair as necessary
Squeaks, noises and rattles during fore/aft movement	Foreign material under seat or in seat track	Remove foreign material. Clean and lubricate seat tracks as necessary
-	Poor seat track lubrication	Lubricate the lower portion of the effected seat tracks
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Loosen seat track to vehicle mounting bolts. Using the power seat switch, move the effected seat reward to the track stops. Tighten track bolts to proper torque and recheck seat operation. If seat motion is still abnormal, replace the fore aft motor assembly.
-	Fore aft motor or flex drive cable.	Replace the fore aft motor assembly.
Squeaks, noises and rattles during up/down movement	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots

-	Poor height adjust motor drive assembly lubrication	Lubricate the height adjust motor drive assembly
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	height adjust motor or drive assembly	Replace the power seat track assembly.
Squeaks, noises and rattles during seat tilt movement	Foreign material under seat or in upper seat track pivots	Remove foreign material. Clean and lubricate upper seat track pivots as necessary
-	Poor upper seat track pivot lubrication	Lubricate the effected upper seat track pivots
-	Poor front tilt motor drive assembly lubrication	Lubricate the front tilt motor drive assembly
-	Loose components	Check and tighten loose components as necessary
-	Binding or sticking of components	Inspect and lubricate the effected upper seat track pivots. Recheck seat operation. If seat motion is still abnormal, replace the power seat track assembly.
-	Front tilt motor or drive assembly	Replace the power seat track assembly.

SPECIFICATIONS

TORQUE

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fore/Aft Motor to Mounting Bracket Screws	5	-	45
Front Tilt Motor and Gearbox Assembly to Mounting Bracket Screws	12	-	106
Front Tilt Motor Gearbox Spindle to Front Seat Track Tube Screw	17	-	150
Height Adjust Motor and Gearbox Assembly to Mounting Bracket Screws	12	-	106
Height Adjust Motor	17	-	150

Gearbox Spindle to Rear Seat Track Tube Screw			
Power Seat Track to Front Seat Cushion Bolts	28	21	-
Seat Riser to Power Seat Track Nuts/Bolts	48	35	-
Seat Riser to Vehicle Floor Nuts	88	65	-

MOTOR, SEAT, FORE AFT

REMOVAL

REMOVAL

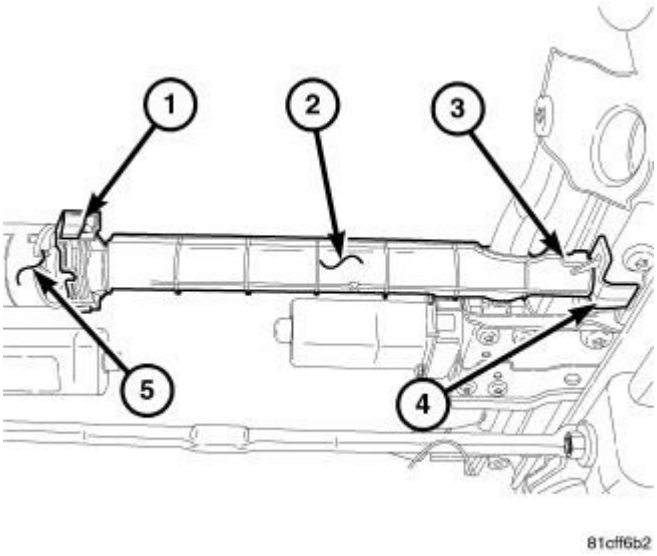

Fig. 4: Identifying Power Seat Fore/Aft Motor
Courtesy of CHRYSLER LLC

WARNING: Disable the airbag system before attempting any component diagnosis or service of the front seats, when equipped with front seat air bags. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

1. Disconnect and isolate the battery negative cable.
2. Remove the inoperative front seat assembly. Refer to **Body/Seats/SEAT - Removal** .
3. Remove the flex drive cable cover (2).

a. Using a small flat bladed tool, release the mounting strap (1) that secures the flex drive cable cover (2) to the fore/aft motor (5).
b. Pivot the cover away from the cable and pull it away from the seat frame (4) to disengage the cover slot from the mounting tab (3).

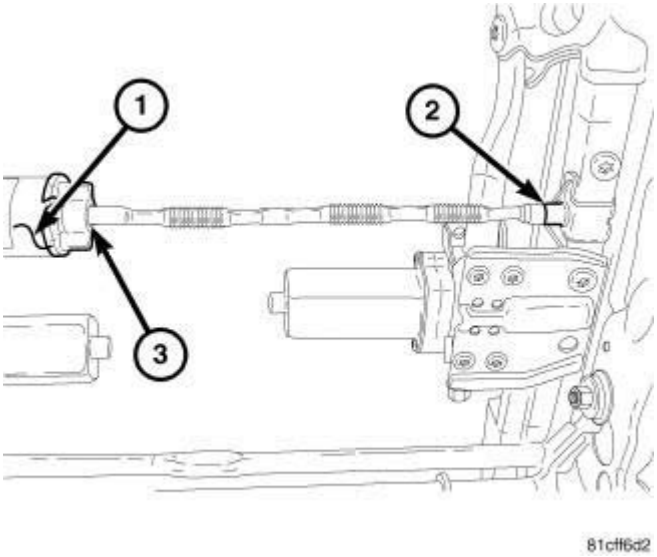

Fig. 5: Flex Drive Cable
Courtesy of CHRYSLER LLC

4. Remove the flex drive cable.
   a. Carefully bend the flex drive cable at the center and pull the motor end (3) away from the fore/aft motor (1) to disengage.
   b. Pull the cable out of the screw drive assembly (2) and remove from seat track.

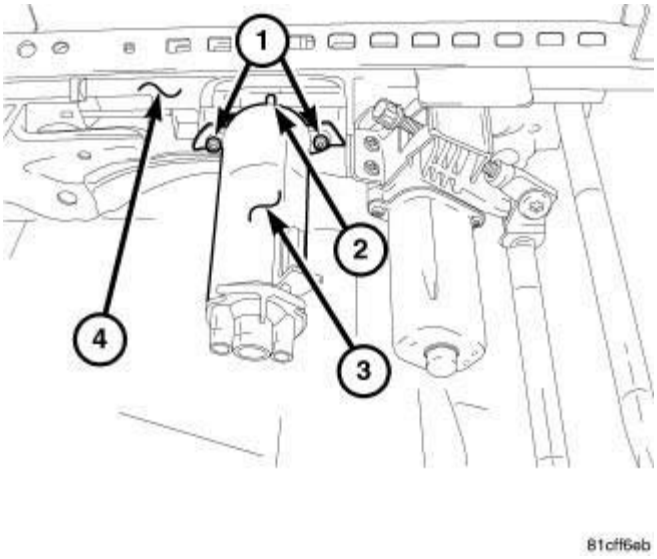

Fig. 6: Seat Frame Assembly
Courtesy of CHRYSLER LLC

5. Disconnect the fore aft motor electrical connector.
6. Remove the fore/aft motor to mounting bracket retaining screws (1).
7. Remove the fore/aft motor (3).
8. Remove the short flex drive cable (2) from the seat frame assembly (4).

INSTALLATION

INSTALLATION

WARNING: Disable the airbag system before attempting any component diagnosis or service of the front seats, when equipped with front seat air bags. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

CAUTION: Seat track side to side timing may be off if the fore aft motor was completely inoperative prior to removal. In the event the track timing is in question, proceed to 1 for track timing procedure. If track timing is not in question proceed to 2.

1. Using the square drive end of the old flex drive cable and a variable speed drill motor, drive the seat track screw drive assemblies reward until they reach the rear stops.
   a. Clamp one end of the old cable into the drill motor chuck.
   b. Put the other cable end into the seat track screw drive cable slot and slowly drive the seat track assembly reward until it reaches the rear stops. Take care not to bind the cable when the drive reaches the stop.
   c. Repeat this procedure for the other seat track.

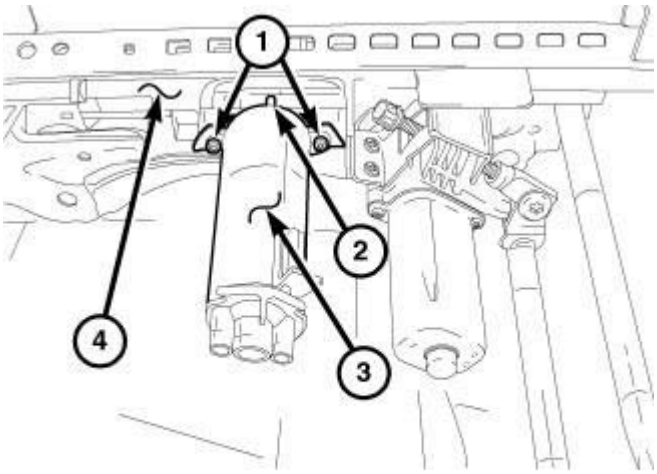

Fig. 7: Seat Frame Assembly
Courtesy of CHRYSLER LLC

2. Install the short flex drive cable (2) into the seat frame assembly (4). Ensure the square cable end is properly aligned and fully inserted into the square drive slot of the screw drive assembly.
3. Install the fore/aft motor (3) ensuring the square cable end is properly aligned and fully inserted into the square drive slot of the motor.
4. Install the motor retaining screws (1). Tighten the screws to 5 N.m (45 in. lbs.).

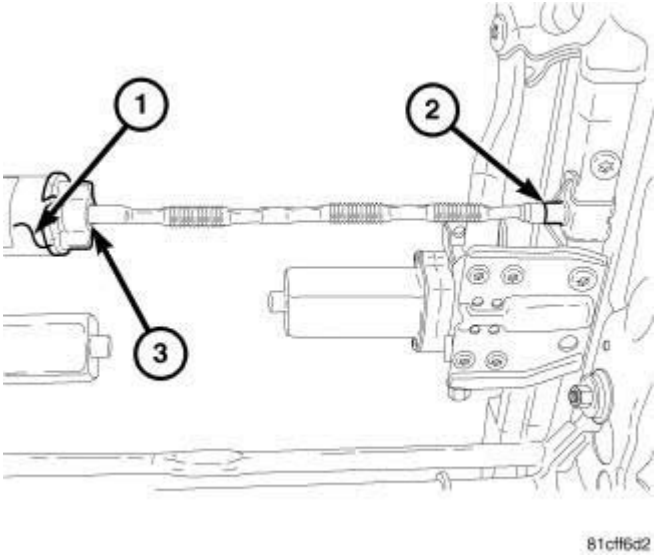

Fig. 8: Flex Drive Cable
Courtesy of CHRYSLER LLC

5. Install the flex drive cable.
   a. Install the flex drive cable into the seat frame assembly (2). Ensure the square cable end is properly aligned and fully inserted into the square drive slot of the screw drive assembly.

b. Install the flex drive cable into the fore/aft motor (1). Ensure the square cable end is properly aligned and fully inserted into the square drive slot of the motor assembly (3).

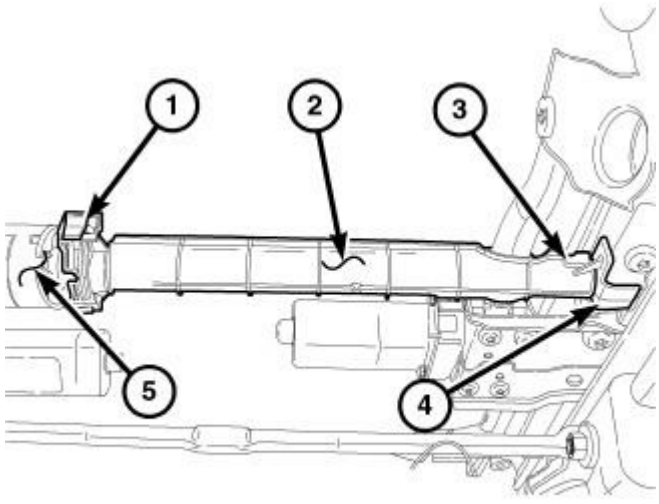

Fig. 9: Identifying Power Seat Fore/Aft Motor
Courtesy of CHRYSLER LLC

6. Position the flex drive cable cover (2) onto the seat track assembly (4). Ensure the cover slots are properly aligned and fully inserted onto the mounting tabs (3).
7. Pivot the cable cover towards the cable and onto the fore/aft motor (5).
8. Secure the cover to the motor with the retaining strap (1).
9. Connect the fore/aft motor electrical connector.
10. Install the power seat. Refer to **Body/Seats/SEAT - Installation** .
11. Verify proper power seat operation.

MOTOR, SEAT, HEIGHT ADJUST

REMOVAL

REMOVAL

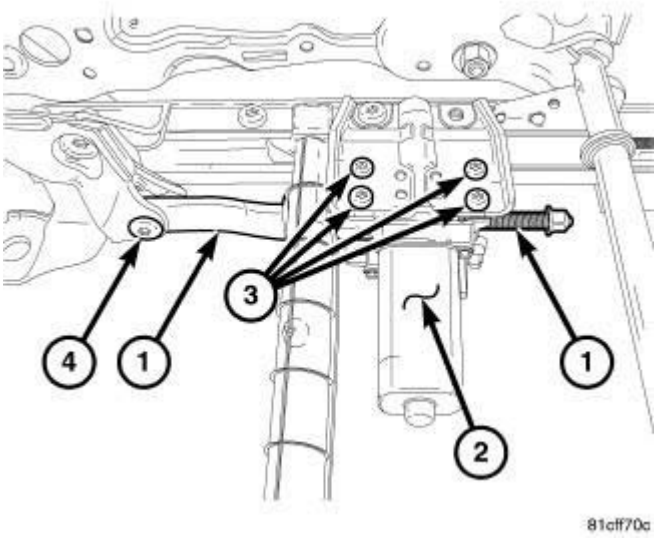

Fig. 10: Height Adjust Motor And Gearbox Assembly
Courtesy of CHRYSLER LLC

WARNING: Disable the airbag system before attempting any component diagnosis or service of the front seats, when equipped with front seat air bags. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

WARNING: Use caution when removing the height adjust motor and gearbox assembly (2) if the motor is inoperative, and the power seat is not in the full up position. The seat adjuster assembly is under load from the height adjust assist spring and may cause the motor to rotate under pressure when the fasteners are removed. The seat adjuster assembly also may spring upward when the motor is removed. If the height adjust motor is operative, move the power seat to the full up position prior to disconnecting the battery.

1. Disconnect and isolate the battery negative cable.
2. Remove the inoperative front seat assembly. Refer to **Body/Seats/SEAT - Removal** .
3. Disconnect the height adjust motor electrical connector.
4. Remove the height adjust motor gearbox spindle (1) retaining screw (4).
5. Remove the motor retaining screws (3).
6. Remove the height adjust motor and gearbox assembly (2) from the seat track.

INSTALLATION

INSTALLATION

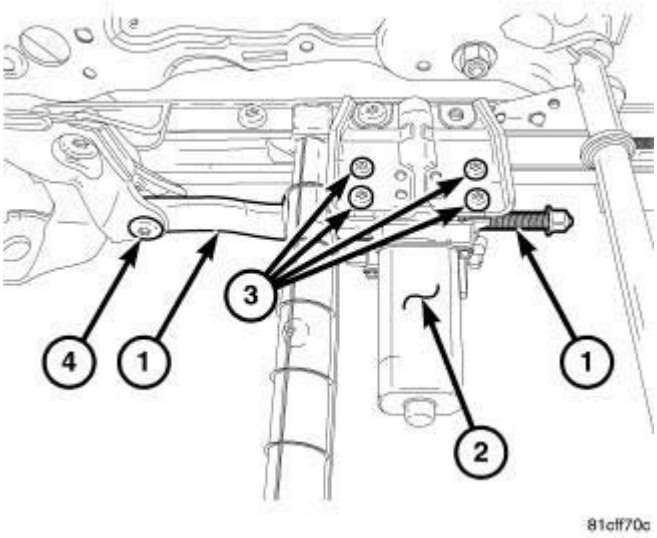

Fig. 11: Height Adjust Motor And Gearbox Assembly
Courtesy of CHRYSLER LLC

1. Screw the height adjust motor gearbox spindle (1) in or out as necessary until the motor retaining screws (3) and spindle screw (4) holes are aligned and all fasteners can be installed.
2. Position the height adjust motor and gearbox assembly (2) onto the seat track.
3. Install the motor retaining screws (3). Tighten the screws to 12 N.m (106 in. lbs.).
4. Install the height adjust motor gearbox spindle (1) retaining screw (4). Tighten the screw to 17 N.m (150 in. lbs.).
5. Connect the motor electrical connector.
6. Install the power seat. Refer to **Body/Seats/SEAT - Installation** .
7. Verify proper power seat operation.

MOTOR, SEAT, TILT

REMOVAL

REMOVAL

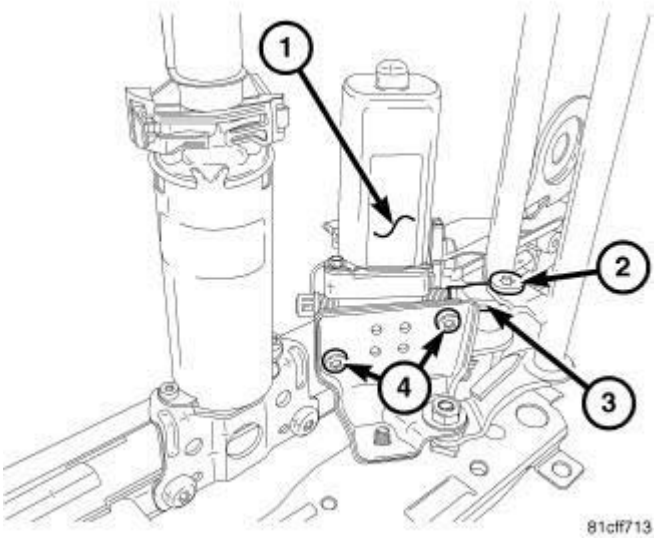

Fig. 12: Power Seat Tilt Motor And Drive Assembly
Courtesy of CHRYSLER LLC

WARNING: Disable the airbag system before attempting any component diagnosis or service of the front seats, when equipped with front seat air bags. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

1. Disconnect and isolate the battery negative cable.
2. Remove the inoperative front seat assembly. Refer to **Body/Seats/SEAT - Removal** .
3. Disconnect the front tilt motor electrical connector.
4. Remove the front tilt motor gearbox spindle (3) retaining screw (2).
5. Remove the motor retaining screws (4).
6. Remove the front tilt motor and gearbox assembly (1) from the seat track.

INSTALLATION

INSTALLATION

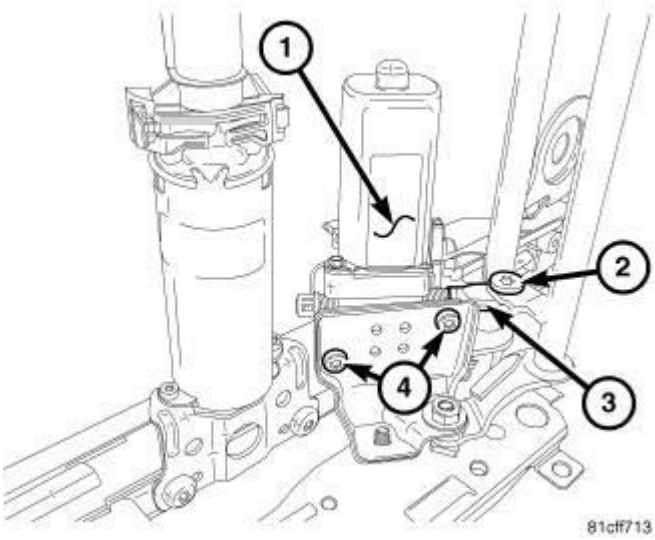

Fig. 13: Power Seat Tilt Motor And Drive Assembly
Courtesy of CHRYSLER LLC

1. Screw the front tilt motor gearbox spindle (3) in or out as necessary until the motor retaining screws (4) and spindle screw (2) holes are aligned and all fasteners can be installed.
2. Position the front tilt motor and gearbox assembly (1) onto the seat track.
3. Install the motor retaining screws (4). Tighten the screws to 12 N.m (106 in. lbs.).
4. Install the front tilt motor gearbox spindle (3) retaining screw (2). Tighten the screw to 17 N.m (150 in. lbs.).
5. Connect the motor electrical connector.
6. Install the power seat. Refer to **Body/Seats/SEAT - Installation** .
7. Verify proper power seat operation.

SWITCH, SEAT

DESCRIPTION

DESCRIPTION

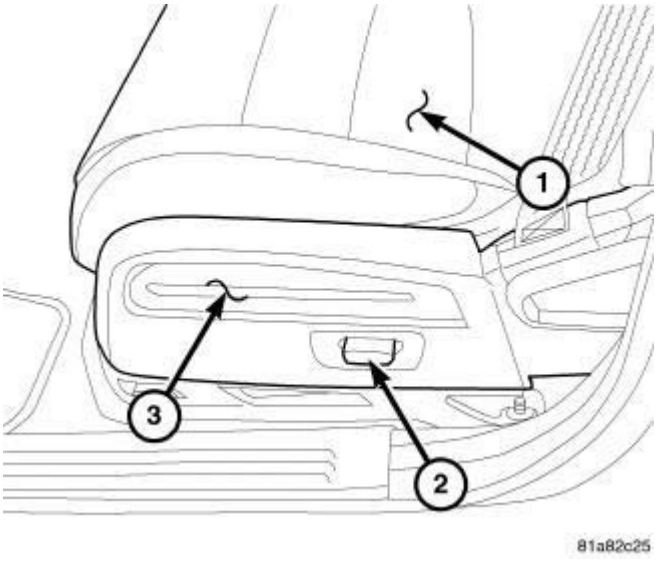

Fig. 14: Identifying Power Seat Switch, Seat Cushion & Seat Cushion Side Shield
Courtesy of CHRYSLER LLC

The driver power seat can be adjusted in six different ways using the power seat switch. The power seat switch (2) is located on the lower outboard side of the seat cushion (1) on the seat cushion side shield (3). The power seat system incorporates a seat switch with a seat cushion control paddle.

The individual components in the power seat switch assembly cannot be repaired. If the switch is damaged or inoperative, the entire power seat switch must be replaced.

OPERATION

OPERATION

When a power seat switch is actuated, a battery feed and a ground path are applied through the switch contacts to the power seat track adjuster motor. The selected adjuster motor operates to move the seat through its drive unit in the selected direction until the switch is released, or until the travel limit of the adjuster is reached. When the switch is moved in the opposite direction, the battery feed and ground path to the motor are reversed through the switch contacts. This causes the adjuster motor to run in the opposite direction.

No power seat switch should be held applied in any direction after the adjuster has reached its travel limit. The power seat adjuster motors each contain a self-resetting circuit breaker to protect them from overload. However, consecutive or frequent resetting of the circuit breaker may result in motor damage.

DIAGNOSIS AND TESTING

POWER SEAT SWITCH

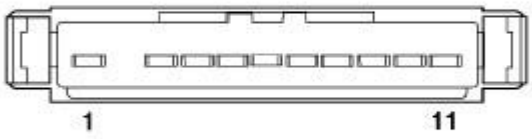

Fig. 15: Power Seat Switch Terminals
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the power seat switch from the power seat. See **Removal** .
3. Use an ohmmeter to test the continuity of the power seat switch. Refer to **POWER SEAT SWITCH CONTINUITY** table. If not OK, replace the faulty power seat switch. If switch tests OK. See **Diagnosis and Testing** .

POWER SEAT SWITCH CONTINUITY

SWITCH POSITION	CONTINUITY BETWEEN
OFF	7-4, 7-5, 7-8, 7-9, 7-10, 7-11
HORIZONTAL FORWARD	6-8, 7-4, 7-5, 7-9, 7-10, 7-11
HORIZONTAL REARWARD	6-4, 7-5, 7-8, 7-9, 7-10, 7-11
FRONT TILT DOWN	6-5, 7-4, 7-8, 7-9, 7-10, 7-11
FRONT TILT UP	6-9, 7-4, 7-5, 7-8, 7-10, 7-11
REAR TILT DOWN	6-10, 7-4, 7-5, 7-8, 7-9, 7-11
REAR TILT UP	6-11, 7-4, 7-5, 7-8, 7-9, 7-10

REMOVAL

REMOVAL

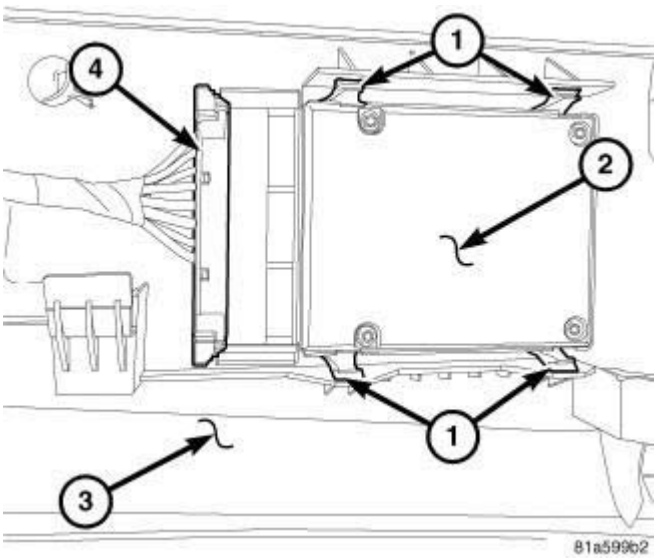

Fig. 16: Power Seat Switch
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the outboard seat cushion side shield (3).
3. Disconnect the power seat switch electrical harness connector (4).
4. Using a small flat bladed tool, gently release the four mounting tabs (1) that secure the power seat switch (2) and separate switch from side shield (3).

INSTALLATION

INSTALLATION

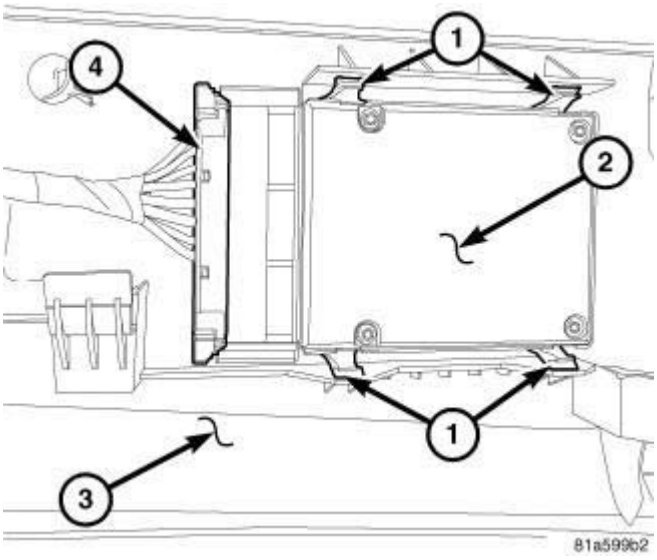

Fig. 17: Power Seat Switch
Courtesy of CHRYSLER LLC

1. Position the power seat switch (2) onto the seat cushion side shield (3). Gently apply pressure to the switch until the four mounting tabs (1) are fully seated into place.
2. Connect the power seat switch electrical connector (4).
3. Install the seat cushion outboard side shield.
4. Connect the battery negative cable.
5. Verify normal operation of the power seat assembly.

TRACK, SEAT

REMOVAL

REMOVAL

WARNING: Disable the airbag system before attempting any component diagnosis or service of the front seats, when equipped with front seat air bags. Disconnect and isolate the negative battery (ground) cable, then wait two minutes for the airbag system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the airbag system. Failure to take the proper precautions may result in accidental airbag deployment and possible serious or fatal injury.

NOTE: Driver seat shown in illustrations. Passenger seat similar.

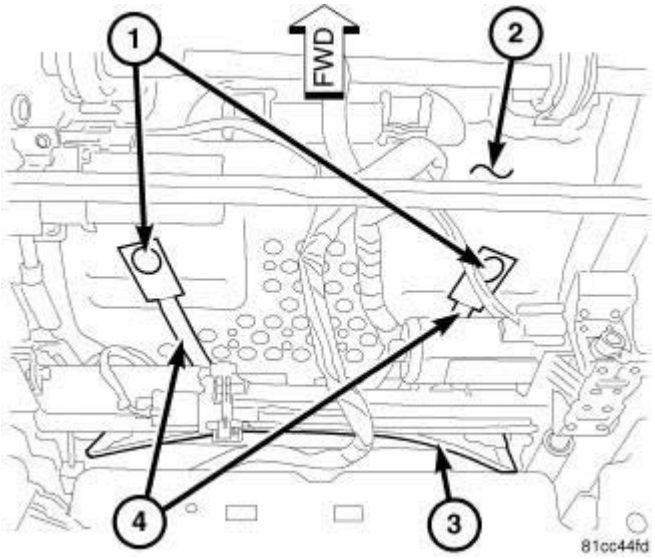

Fig. 18: Front Seat Bottom Closeout
Courtesy of CHRYSLER LLC

1. Position the seat so that the heads of the bolts which secure the rear of the seat riser to the track can be accessed.
2. Remove the seat from the vehicle and place it on a workbench. Refer to **Body/Seats/SEAT - Removal** .

3. Remove the inboard seat cushion side shield. Refer to **Body/Seats/SIDE SHIELDS, Seat Cushion - Removal** .
4. Remove the push-pin retainers (1) that secure the two elastic straps (4) of the seat bottom closeout (3) to the bottom of the seat cushion frame (2) and remove the closeout.

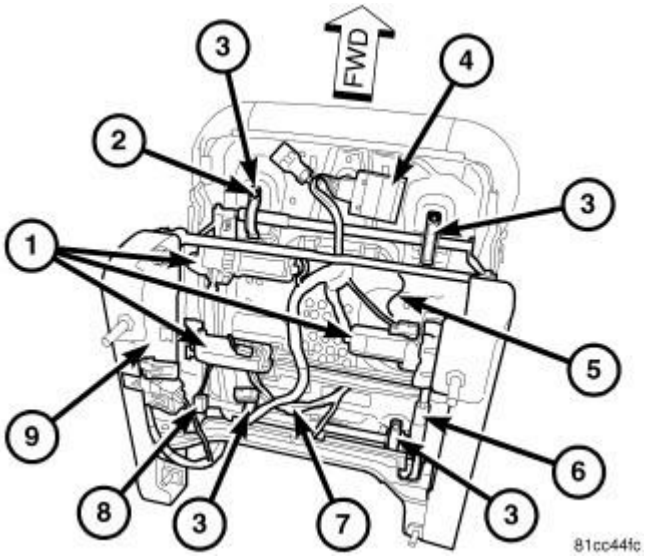

Fig. 19: Seat Cushion Frame
Courtesy of CHRYSLER LLC

NOTE: Heated seat shown in illustration. Non-heated seat similar.

5. If equipped, remove the heated seat module (4) from the bottom of the seat cushion frame (3).
6. Disconnect the wire harness connectors from the power seat motors (1) and the seat track position sensor (8) and remove the wire harness (7) from the bottom of the seat cushion frame and the seat riser (9).
7. If required, remove the seat track position sensor from the seat track.
8. Remove the bolt (2) that secures the four seat track mounting brackets (3) to the bottom of the seat cushion frame.
9. Disengage the seat track mounting brackets from the bottom of the seat cushion frame and remove the seat track assembly (6) from the frame.

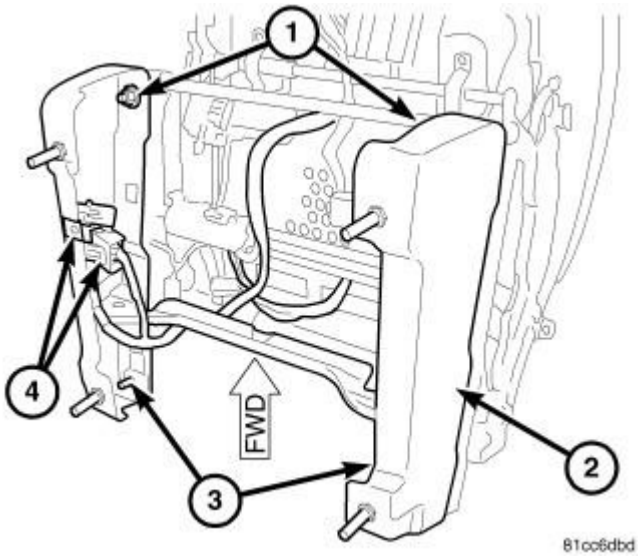

Fig. 20: Seat Riser
Courtesy of CHRYSLER LLC

10. If required, remove the wire harness retaining bracket (4) from the bottom of the seat riser (2).
11. Remove the two nuts (1) and the two bolts (3) that secure the seat riser to the seat track and remove the riser.

INSTALLATION

INSTALLATION

NOTE: Driver seat shown in illustrations. Passenger seat similar.

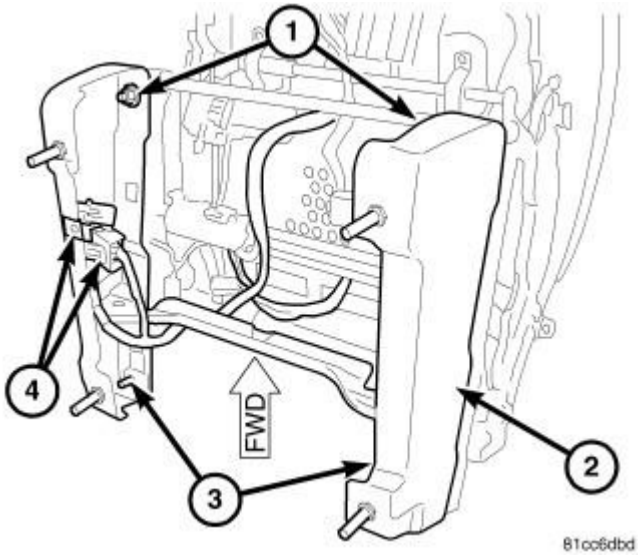

Fig. 21: Seat Riser
Courtesy of CHRYSLER LLC

1. Position the seat riser (2) to the seat track and install the retaining two nuts (1) and bolts (3). Tighten the nuts and bolts to 48 N.m (35 ft. lbs.).
2. Install the wire harness retaining bracket (4) onto the seat riser.

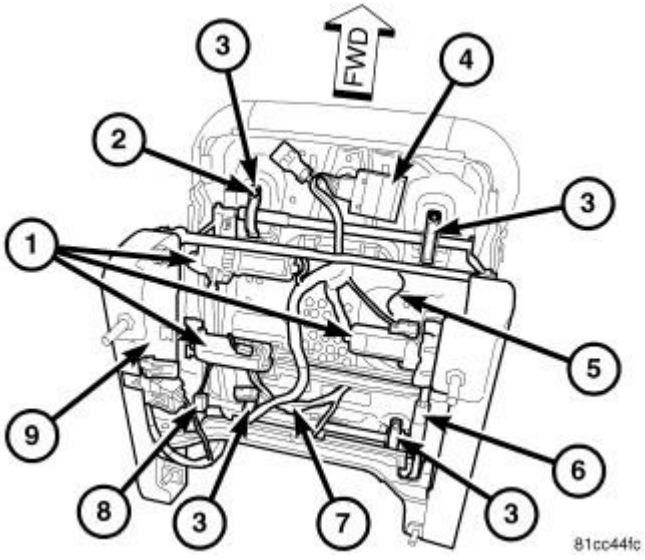

Fig. 22: Seat Track
Courtesy of CHRYSLER LLC

NOTE: Heated seat shown in illustration. Non-heated seat similar.

3. If removed, install the seat track position sensor (8).
4. Position the seat track assembly (6) to the bottom of the seat cushion frame (5). Make sure the seat track is properly located and that the plastic isolators are correctly installed.
5. Engage the four seat track mounting brackets (3) to the bottom of the seat cushion frame and install the retaining bolts (2). Tighten the bolts to 28 N.m (21 ft. lbs.).
6. Install the wire harness (7) to the bottom of the seat cushion frame and to the seat riser (9) and connect the wire harness connectors to the power seat motors (1) and the seat track position sensor.
7. If equipped, install the heated seat module (4) onto the bottom of the seat cushion frame.

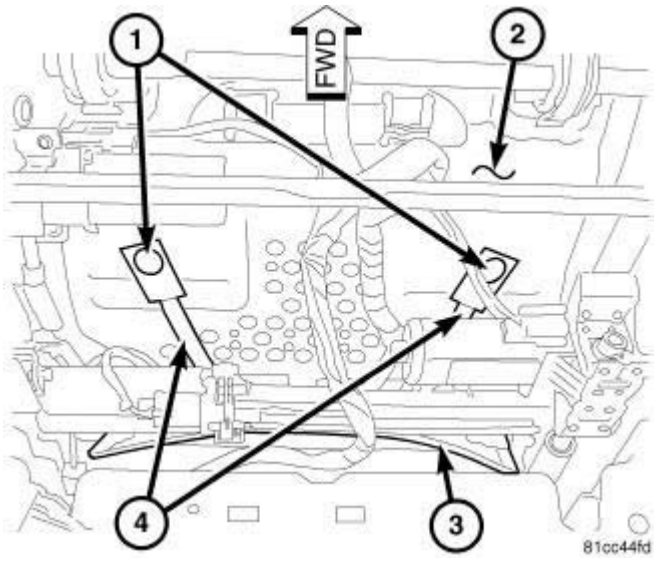

Fig. 23: Front Seat Bottom Closeout
Courtesy of CHRYSLER LLC

8. Position the seat bottom closeout (3) to the rear of the seat and install the push-pin retainers (1) that secure the two elastic straps (4) to the bottom of the seat cushion frame (2).
9. Install the inboard seat cushion side shield. Refer to **Body/Seats/SIDE SHIELDS, Seat Cushion - Installation** .
10. Install the seat into the vehicle. Refer to **Body/Seats/SEAT - Installation** .

2009 STEERING

Steering - [redacted]

DESCRIPTION

POWER STEERING SYSTEM

This vehicle comes with power steering as standard equipment. The power steering system consists of these major components:

- POWER STEERING GEAR
- POWER STEERING PUMP
- POWER STEERING PRESSURE HOSE
- POWER STEERING RETURN HOSE
- POWER STEERING SUPPLY HOSE
- POWER STEERING RESERVOIR

For information on the Power Steering Gear , refer to **Gear** . For information on the Power Steering Pump and all other components listed above, refer to **Pump** .

OPERATION

OPERATION

Turning of the steering wheel is converted into linear (side-to-side) travel through the meshing of the helical pinion teeth with the rack teeth within the steering gear. The lateral travel pushes and pulls the tie rods to change the direction of the vehicle's front wheels.

Power assist steering is provided by a belt driven rotary type pump. It directs fluid through power steering fluid hoses to the power steering gear where it is used to assist the driver's turning effort.

Manual steering control of the vehicle can be maintained if power steering assist is lost. However, under this condition, steering effort is significantly increased.

WARNING

WARNINGS AND CAUTIONS

WARNING: Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst.

WARNING: Fluid level should be checked with the engine off to prevent personal injury from moving parts.

CAUTION: When the system is open, cap all open ends of the hoses, power steering pump fittings or power steering gear ports to prevent entry of foreign material into the components.

CAUTION: When servicing power steering components, do not pinch off power steering hoses in an any way to stop fluid flow. Damage to hoses may result.

DIAGNOSIS AND TESTING

HYDRAULIC FLOW AND PRESSURE TEST

The following procedure is used to test the operation of the power steering system on this vehicle. This test will provide the gallons per minute (GPM) or flow rate of the power steering pump along with the maximum relief pressure. Perform this test anytime a power steering system problem is present. This test will determine if the power steering pump or power steering gear is not functioning properly. The following test is performed using the Power Steering Analyzer Kit 6815 (with appropriate hoses) and Adapters from Power Steering Analyzer Adapter Kit 6893A. See **Steering - Special Tools**.

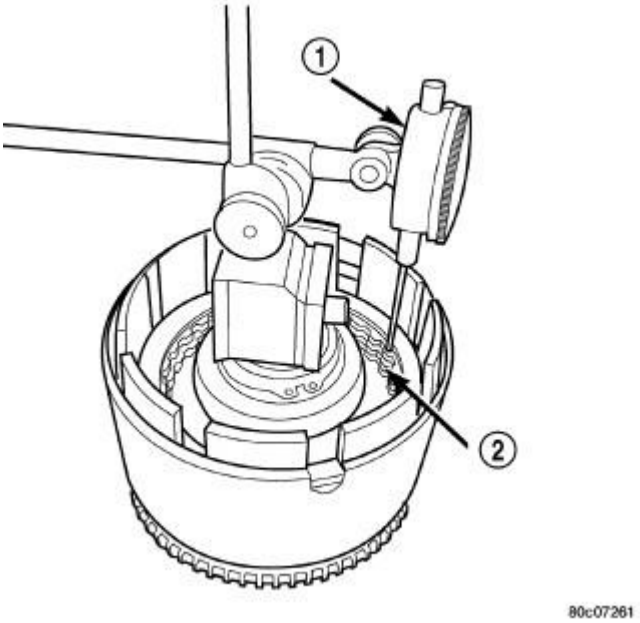

Fig. 1: Assembling Power Steering Analyzer
Courtesy of CHRYSLER LLC

1. Check power steering belt to ensure it is in good condition and adjusted properly.
2. Assemble Power Steering Analyzer as follows:

a. Gauge end (inlet) of Flow Meter And Gauge 6800 (3) - Hose 6905 (6), Hose 6713 (4), Adapter Tube 6844 (5)
b. Valve end (outlet) of Flow Meter And Gauge 6800 (3) - Hose 6959 (1), Adapter Fitting 6826 (2)

3. Un-thread pressure hose tube nut at power steering pump.
4. Connect Adapter Tube 6844 to pressure fitting on power steering pump. Tighten tube nut to specifications. See **Steering - Specifications**.
5. Connect power steering pressure hose to Adapter Fitting 6826. Tighten tube nut to specifications. See **Steering - Specifications**.
6. Open Analyzer test valve completely.
7. Start engine and allow to idle long enough to circulate power steering fluid through Analyzer flow meter and hoses.
8. Shut off engine and check fluid level; add fluid as necessary. Repeat 7 and 8 until air is bled from system.
9. Start engine and allow to idle.
10. The Analyzer gauge should read below 300 psi (2068 kPa). If above, inspect hoses for restrictions and repair as necessary. The initial pressure should be in range of 100-175 psi (689-1896 kPa). The flow meter should read above 1.5 GPM (5.7 LPM).

CAUTION: The following test procedure step involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.

NOTE: The power steering pump maximum relief pressure specification for all pumps is 1640 - 1740 psi (11,307 - 11,997 kPa).

11. Close flow meter valve fully three times and record highest pressure indicated each time. **All three readings must be within specifications and within 100 psi (690 kPa) of each other.**

CAUTION: During the next step, do not force the pump to operate against the stops for more than 5 seconds at a time as pump damage may result.

- If power steering pump pressures are within specifications, but not within 100 psi (690 kPa) of each other, replace power steering pump.
- If pressures are within 100 psi (690 kPa) of each other, but are outside of specifications, replace power steering pump.

If the power steering pump requires replacement, see **Steering/Pump - Removal**.

12. Completely open the valve on the Power Steering Analyzer flow meter. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest output pressure reading against one stop is not within 100 psi (690 kPa) of the highest reading at the other stop, the steering gear is leaking internally and must be replaced.

If the power steering gear requires replacement, see **Steering/Gear - Removal**.

STEERING SYSTEM DIAGNOSIS CHARTS

NOTE: There are three diagnosis charts following that cover NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES, PERFORMANCE ISSUES, and FLUID ISSUES.

NOISE, VIBRATION AND HARSHNESS (NVH) ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
OBJECTIONABLE HISS OR WHISTLE WHILE TURNING STEERING WHEEL WHEN STATIONARY OR MOVING SLOWLY*	1. Damaged or mispositioned steering column shaft/coupling dash boot seal.	1. Check to ensure boot is properly installed and seals against sheet metal. Reposition or replace steering column shaft/coupling dash boot seal as necessary.
-	2. Mis-routed power steering hose.	2. Check routing of power steering hoses. Ensure hoses do not come in unwanted contact with other components and objects.
-	3. Restriction in pressure or return hose.	3. Using an electronic listening tool, determine if noise is coming from either pressure or return hose. Replace hose that noise is present within.
-	4. Noisy valve in power steering gear.	4. For evaluation and correction, see **Steering/Gear - Diagnosis and Testing**.
RATTLE OR EXCESSIVE CLUNK**	1. Power steering gear loose on engine cradle/crossmember.	1. Check fastener torque and tighten to specifications. Replace as necessary. Check steering wheel center following repair.
-	2. Loose strut assembly mounting fasteners at tower or knuckle.	2. Check fastener torque and tighten to specifications.
-	3. Excessive play in outer tie rod.	3. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	4. Engine cradle/crossmember mounting fasteners loose at frame or bushings worn.	4. Check fastener torque and tighten to specifications. Inspect bushings and repair as necessary.
-	5. Wheel Mounting (Lug) nuts loose.	5. Inspect wheel mounting (Lug) nuts and studs and repair as necessary. Tighten nuts to specifications.
-	6. Power steering hose touching the body or frame of vehicle.	6. For evaluation and correction, see **Steering/Pump - Diagnosis and Testing**.
-	7. Stabilizer bar link joints	7. At park, jounce only one side of

	worn (occurs with steering input only when moving, not stationary).	vehicle front to exercise stabilizer bar. Replace stabilizer bar link.
-	8. Loose lower control arm mounting bolts at engine cradle, frame or crossmember (occurs with steering input only when moving, not stationary).	8. Check control arm mounting bolts and tighten to specified torque.
-	9. Loose intermediate shaft or column.	9. Rotate intermediate (steering) shaft in relationship to gear, checking for free-play. Check column fasteners and tighten to specifications as necessary.
-	10. Lower control arm pivot bushing worn (occurs with steering input only when moving, not stationary).	10. Inspect bushings for wear and replace lower control arm as necessary.
-	11. Internal power steering gear noise.	11. Drive vehicle on rough road, then steer rapidly back and forth when stopped. Replace power steering gear as necessary.
-	12. Loose inner tie rod.	12. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	13. Damaged engine cradle/crossmember.	13. Inspect the cradle/crossmember for cracks or other damage. Replace as necessary.
POPPING NOISE	1. Loose steering gear mounting fasteners.	1. Check fasteners for proper torque and retighten as necessary.
-	2. Loose outer tie rod mounting nut or jam nut.	2. Check fastener torque. Replace nuts as necessary and tighten to specifications.
-	3. Loose intermediate (steering) shaft coupling at gear input shaft.	3. Make sure coupling is fully seated on gear input shaft. Retighten or re-seat as necessary.
-	4. Worn tie rod (outer or inner).	4. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	5. Worn axle half-shaft.	5. For evaluation and correction, refer to **Differential and Driveline/Half Shaft - Diagnosis and Testing** .
CHIRP OR SQUEAL (POWER STEERING PUMP)	1. Loose power steering pump drive belt.	1. Inspect belt. Replace belt if worn or glazed. Tighten/adjust power steering pump drive belt if equipped with a manual tensioner.
-	2. Pulley alignment incorrect.	2. Realign accessory drives.

-	3. Malfunctioning belt auto-tensioner	3. Verify belt tension. Replace belt auto-tensioner.
-	4. Power steering pump noisy (worn bearing/bushing noise).	4. Using an electronic listening tool, determine if noise is coming from pump. Replace power steering pump as required.
-	5. Generator or water pump noisy.	5. Using an electronic listening tool, determine if noise is coming from Generator or water pump. Replace faulty component.
WHINE, GROWL, MOAN OR GROAN (POWER STEERING PUMP)***	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
-	2. Air in power steering fluid.	2. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See **Steering - Standard Procedure**.
-	3. Power steering hose touching body or frame of vehicle.	3. For evaluation and correction, see **Steering/Pump - Diagnosis and Testing**.
-	4. Wear of power steering pump internal components.	4. For evaluation and correction, see **Steering/Pump - Diagnosis and Testing**.
COLD START WHINE OR MOAN (POWER STEERING PUMP)***	1. Low power steering fluid level.	1. Fill power steering fluid reservoir to proper level and check for leaks (make sure all air is bled from the system fluid).
-	2. Extremely low ambient temperature (near 0 F° (-18 C°) or below)	2. Some noise is expected as pump attempts to pull cold, thick fluid. Noise should go away as vehicle warms up. Acceptable levels of excessive noise are one second at 0 F° (-18 C°) and 15 seconds at -20 F° (-29 C°). If noise is excessive, look for poor sealing on the return hose or a possible fluid leak.
SQUEAKING OR RUBBING SOUND	1. Steering column shroud or shaft rubbing.	1. While turning the steering wheel, listen down column to locate. Check interference between moving components. Move or realign shrouds or shaft as necessary. Replace components if this does not correct problem.
-	2. Clockspring inside steering	2. Remove clockspring and reinstall

	column noisy.	steering wheel for testing. If noise is gone, replace clockspring.
-	3. Boot/dash seal lubrication inadequate.	3. Remove boot seal and recheck for noise. Lubricate seal as necessary.
-	4. Steering gear outer tie rod noisy.	4. While a helper turns the steering wheel, use an electronic listening tool to determine if noise is coming from either outer tie rod. Replace outer tie rods as necessary.
-	5. Steering gear internally noisy.	5. Remove dash seal boot, then exercise the steering wheel. If noise is still present at gear, replace steering gear.
SCRUBBING OR KNOCKING SOUND.	1. Incorrect tire or wheel size.	1. Replace incorrect size tire or wheel with original equipment size.
-	2. Worn motor or transmission mount.	2. Drive vehicle, moving accelerator pedal rapidly up and down attempting to locate noise. Try in both forward and reverse. Replace mounts as necessary.
-	3. Tires contacting wheel well.	3. Make sure wheel house is properly positioned. If not, reposition as necessary. If steering wheel is properly centered, check steering gear travel left to right by rotating the steering wheel to each stop. Steering wheel should rotate the same amount in both directions from center. If not, replace steering gear.
-	4. Interference between moving steering components and other components.	4. Check for bent or misaligned components. Correct or replace as necessary.
-	5. Accessory drive pulley rubbing against another component.	5. Check pulleys for wear. Check for worn engine or transmission mount. Reposition components or replace mounts as necessary.

NOTE: * There is some noise in all power steering systems. One of the most common is a hissing sound evident when turning the steering wheel when at a standstill or when parking and the steering wheel is at the end of its travel. Hiss is a very high frequency noise similar to that experienced while slowly closing a water tap. The noise is present in every valve and results when high velocity fluid passes valve orifice edges. There is no relationship between this noise and the performance of the steering system.

NOTE: ** A light clunk may be felt or heard during steering wheel reversal while vehicle is stationary. This results from internal steering gear rack movement at the bushings and in no way affects the performance of the steering system. This

movement may be felt in the steering components during steering wheel reversal.

NOTE: * Power steering pump growl/moan/groan results from the development of high pressure fluid flow. Normally this noise level should not be high enough to be objectionable.**

PERFORMANCE ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
STEERING WHEEL OR COLUMN HAS FREE-PLAY/LASH/LOOSENESS (CLUNKING OR RATTLING)	1. Loose coupling pinch bolt at gear input shaft.	1. Check pinch bolt torque. Replace pinch bolt if equipped with thread locker patch and tighten to specifications.
-	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
-	3. Excessive free-play or noise from steering column bearings.	3. Replace steering column.
-	4. Excessive intermediate (steering) shaft coupling U-joint free-play.	4. Rotate steering wheel back-and-forth while watching coupling. Observe for free-play. Replace intermediate shaft as necessary.
-	5. Loose or worn outer tie rod.	5. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	6. Lack of lubrication in lower ball joint or ball joint is damaged.	6. For evaluation, refer to **Front Suspension/Front/BALL JOINT, Suspension - Diagnosis and Testing** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
-	7. Excessive lash inside steering gear.	7. Disconnect intermediate shaft and turn steering gear input shaft. Observe for any movement without a corresponding tire movement. Replace steering gear as necessary.
STEERING WHEEL HAS FORE AND AFT LOOSENESS.	1. Steering wheel retaining bolt loose.	1. Check steering wheel retaining bolt torque and tighten to specifications as necessary.
-	2. Loose steering column to instrument panel fasteners.	2. Check steering column to instrument panel fastener torque and tighten to specifications as necessary.

-	3. Steering column lower bearing spring retainer slipped on steering column shaft.	3. Pull steering wheel fore-and-aft while observing movement. Replace steering column as necessary.
STEERING WHEEL, DASH OR VEHICLE VIBRATES DURING STEERING MANEUVERS (ESPECIALLY AT LOW SPEED OR STANDSTILL).	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See **Steering - Standard Procedure**.
-	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
-	3. Excessive engine vibration.	3. Ensure that the engine is tuned properly.
-	4. Loose tie rod end jam nut.	4. Check torque and tighten the inner to outer tie rod jam nut to specifications.
-	5. Overcharged air conditioning (A/C) system.	5. Turn A/C off and verify issue goes away. Repair A/C as necessary.
-	6. Grounded, damaged or loose engine mount.	6. Visually inspect for damaged or misaligned mounts. Check fastener torque. Replace, realign or retighten as necessary.
-	7. Loose or worn outer tie rod.	7. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	8. Steering gear noisy.	8. During a parking event at 0 mph, verify there is vibration only with steering. Steer in both directions and verify that the noise follows the steering input. Check TSB's for any known tuning issue. Replace steering gear as necessary.
STEERING CATCHES, SURGES OR STICKS IN CERTAIN POSITIONS OR IS DIFFICULT TO TURN.	1. Low power steering fluid level.	1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system.
-	2. Tire(s) not properly inflated.	2. Check and inflate tires to the specified pressure.
-	3. Loose or slipping power steering/accessory drive belt.	3. Verify belt tension. Replace belt auto-tensioner and belt as necessary.
-	4. Lack of lubrication in lower ball joint or ball joint is damaged.	4. For evaluation, refer to **Front Suspension/Front/BALL JOINT, Suspension - Diagnosis and Testing** . Lubricate ball joint if equipped with a zerk fitting and check for function. If not equipped

		with a zerk fitting, test and replace ball joint as necessary.
-	5. Lack of lubrication in steering gear outer tie rod end (s).	5. For evaluation and correction, see **Steering/Gear/TIE ROD, Steering - Diagnosis and Testing**.
-	6. Faulty power steering pump.	6. Perform Power Steering Flow and Pressure Test. See **HYDRAULIC FLOW AND PRESSURE TEST**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.
-	7. Excessive friction in intermediate shaft/coupler joint.	7. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler joint.
-	8. Excessive friction in steering column.	8. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.
-	9. Worn or binding seat and bearing in front strut assembly.	9. Disconnect outer tie rod ends from knuckles, then turn tire and wheel assembly checking for smooth operation. Replace front strut assembly seat and bearing.
-	10. Faulty steering gear.	10. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
STEERING WHEEL DOES NOT RETURN TO CENTER POSITION.	1. Tire(s) not properly inflated.	1. Check and inflate tires to the specified pressure.
-	2. Improper front wheel alignment.	2. Check and adjust wheel alignment as necessary.
-	3. Lack of lubrication in lower ball joint or ball joint is damaged.	3. For evaluation, refer to **Front Suspension/Front/BALL JOINT, Suspension - Diagnosis and Testing** . Lubricate ball joint if equipped with a zerk fitting and

		check for function. If not equipped with a zerk fitting, test and replace ball joint as necessary.
-	4. Excessive friction in intermediate shaft/coupler joint.	4. Disconnect intermediate shaft/coupler at steering gear and check joint for smooth operation in all directions. Replace intermediate shaft/coupler.
-	5. Excessive friction in steering column.	5. Disconnect intermediate shaft/coupler at steering gear. Turn steering wheel two revolutions in either direction from on center and check for smooth operation. DO NOT turn past two revolutions. Damage to the clockspring may occur. Replace steering column as necessary.
-	6. Worn or binding seat and bearing in front strut assembly.	6. Disconnect steering gear outer tie rod ends at knuckles, then turn tire and wheel assembly in and out checking for smooth operation. Replace seat and bearing as necessary.
-	7. Excessive friction in power steering gear.	7. With vehicle on hoist, tires unsupported and engine off, steer gear throughout travel and check for smooth operation. Replace steering gear (only after all previous components have been checked).
EXCESSIVE STEERING WHEEL KICKBACK FROM ROAD INPUTS	1. Air in power steering fluid.	1. Inspect for excessive air bubbles in fluid (fluid will appear foamy and lighter in color). Inspect hoses for leaks and replace as necessary. Bleed air from fluid. See **Steering - Standard Procedure**.
-	2. Power steering gear loose on cradle/crossmember.	2. Inspect gear mounting bolts. Replace if necessary and tighten to specifications.
-	3. Steering column, coupling or intermediate shaft worn or loose.	3. Rotate steering wheel back-and-forth while inspecting intermediate shaft going into steering gear. Look for excessive free-play. Retighten if loose bolt is found. Replace steering column, coupling or intermediate shaft if necessary.
-	4. Power steering pump flow is	4. Perform Power Steering Flow and

	too low.	Pressure Test. See **HYDRAULIC FLOW AND PRESSURE TEST**. Look for low or erratic flow or pressure. Replace power steering pump as necessary.

FLUID ISSUES

CONDITION	POSSIBLE CAUSES	EVALUATION/CORRECTION
LOW FLUID LEVEL WITH VISIBLE LEAK.	1. Loose power steering hose fittings or connections.	1. Check torque on all tube nuts (at gear and pump). Inspect clamps at all rubber hose connections for correct position, damage and tension. Tighten tube nuts as required. Reposition or replace clamps at hose connections. Clean joints and reinspect for leaks.
-	2. Damaged or missing O-ring at power steering hose tube nuts.	2. Remove tube nut and inspect O-ring. If damaged or missing, replace O-ring. Clean joints and reinspect for leaks.
-	3. Power steering line or hose failure.	3. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace hoses as necessary.
-	4. Power steering component leaking (reservoir, pump, gear).	4. Clean fluid from around suspect areas. Run vehicle and inspect for leaks. Look inside reservoir to see if air is being ingested. Replace power steering component as necessary.
AERATED FLUID*	1. Low power steering fluid level.	1. Check fluid level and fill to proper level as necessary. Check for leaks. Make sure all air is bled from system.
-	2. Air leak at power steering supply hose, reservoir or pump.	2. Inspect components. Place a hand vacuum pump with Adapter 9688 on reservoir and verify that system can sustain vacuum. System should not lose more than 1 psi in 2 minutes (make sure vacuum pump is sealed well to the reservoir). Replace steering component as necessary.
RESERVOIR FLUID OVERFLOW OR FLUID THAT IS MILKY IN COLOR	1. Water contamination of power steering fluid.	1. Inspect fluid for milky appearance. Completely drain power steering fluid. Refill and bleed system. See **Steering - Standard Procedure**.

NOTE: * Extremely cold temperatures may cause power steering fluid aeration. The air should work its way out of the system as the fluid warms.

STANDARD PROCEDURE

POWER STEERING SYSTEM BLEEDING

WARNING: The fluid level should be checked with engine off to prevent injury from moving components.

CAUTION: Mopar® Power Steering Fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid is to be used in the power steering system. Both Fluids have the same material standard specifications (MS-9602). No other power steering or automatic transmission fluid is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

CAUTION: If the air is not purged from the power steering system correctly, pump failure could result.

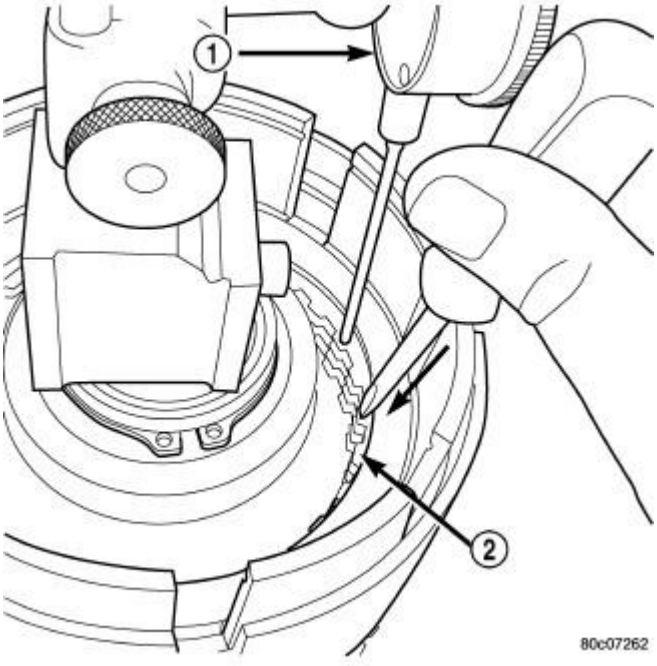

Fig. 2: Connecting Hand Vacuum Pump For Power Steering System Bleeding
Courtesy of CHRYSLER LLC

NOTE: Be sure the vacuum tool used in the following procedure is clean and free of any fluids.

1. Check the fluid level. As measured on the side of the reservoir, the level should indicate between MAX and MIN when the fluid is at normal ambient temperature. Adjust the fluid level as necessary. See

Steering/Pump/FLUID - Standard Procedure.

2. Tightly insert Power Steering Cap Adapter (4), Special Tool 9688, into the mouth of the reservoir (3).

CAUTION: Failure to use a vacuum pump reservoir (1) may allow power steering fluid to be sucked into the hand vacuum pump.

3. Attach Hand Vacuum Pump (2), Special Tool C-4207 or equivalent, with reservoir (1) attached, to the Power Steering Cap Adapter (4).

CAUTION: Do not run the engine while vacuum is applied to the power steering system. Damage to the power steering pump can occur.

NOTE: When performing the following step make sure the vacuum level is maintained during the entire time period.

4. Using Hand Vacuum Pump (2), apply 68-85 kPa (20-25 in. Hg) of vacuum to the system for a minimum of three minutes.
5. Slowly release the vacuum and remove the special tools.
6. Adjust the fluid level as necessary. Refer to Step 1.
7. Repeat Steps1 through 6 until the fluid no longer drops when vacuum is applied.
8. Start the engine and cycle the steering wheel lock-to-lock three times.

NOTE: Do not hold the steering wheel at the stops.

9. Stop the engine and check for leaks at all connections.
10. Check for any signs of air in the reservoir and check the fluid level. If air is present, repeat the procedure as necessary.

SPECIFICATIONS

TORQUE

POWER STEERING

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Gear Heat Shield Mounting Screws	8	6	71
Gear Mounting Bolts	120	89	-
Hose Tube Nut At Gear	31	23	275
Hose Tube Nut At Pump	31	23	275
Inner Tie Rod	78	58	-
Pump Mounting Bolts	23	17	200
Pressure Hose Routing Clamp Nuts At Front Engine	28	21	250

Brackets - 4.0L Engine			
Pressure Hose Routing Clamp Screws At Front Suspension Crossmember	8	-	71
Pressure Hose Routing Clamp Screw At Intake Manifold - 3.3L/3.8L Engine	28	21	250
Pressure Hose Routing Clamp Screw At Left Side Engine - 4.0L Engine	28	21	250
Pressure Hose Routing Clamp Screw at Right Side Engine - 3.3L/3.8L Engine	10	-	89
Pressure/Return Hose Routing Clamp Nut At Engine - 2.8L Diesel Engine	10	-	89
Pressure/Return Hose Routing Clamp Screw At Engine - 2.8L Diesel Engine	8	-	71
Pressure/Return Hose Routing Clamp Screw At Front Suspension Crossmember - 2.8L Diesel Engine	8	-	71
Reservoir Mounting Screw	12	9	105
Return Hose Routing Cradle Clamp Screw At ABS Support Bracket	8	-	71
Tie Rod Steering Arm Nut	75 + 245° Turn	55 + 245° Turn	-
Tie Rod Jam Nut	75	55	-

STEERING COLUMN

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Intermediate Shaft Coupling Pinch Bolt	42	31	-
Intermediate Shaft Extension Pinch Bolt	42	31	-
SCCM Mounting Screws	3	-	27
Steering Column Mounting Nuts	28	21	250
Steering Wheel Retaining Bolt	50	37	-

SPECIAL TOOLS

SPECIAL TOOLS

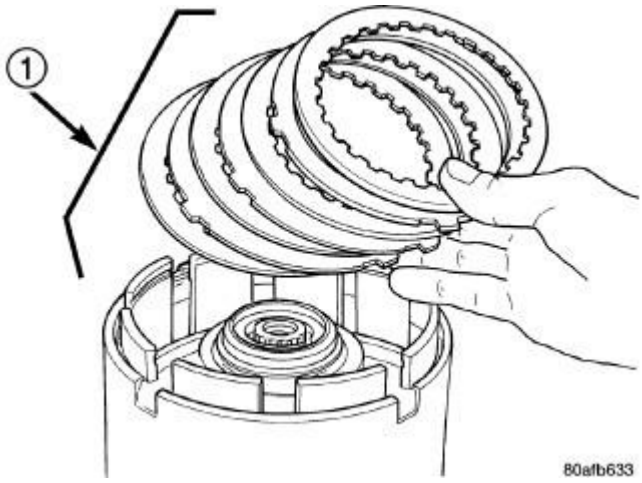

Fig. 3: Power Steering Analyzer 6815
Courtesy of CHRYSLER LLC

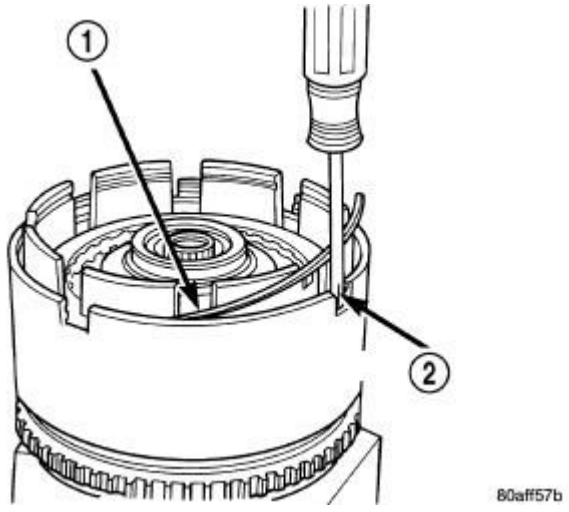

Fig. 4: Power Steering Analyzer Adapters 6893
Courtesy of CHRYSLER LLC

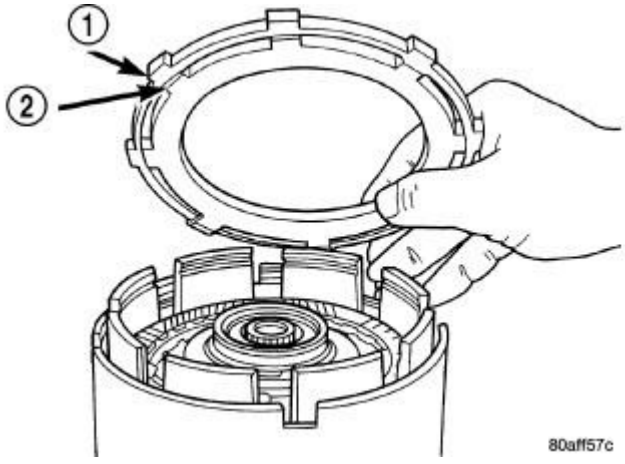

Fig. 5: Power Steering Analyzer Hose 6959

Courtesy of CHRYSLER LLC

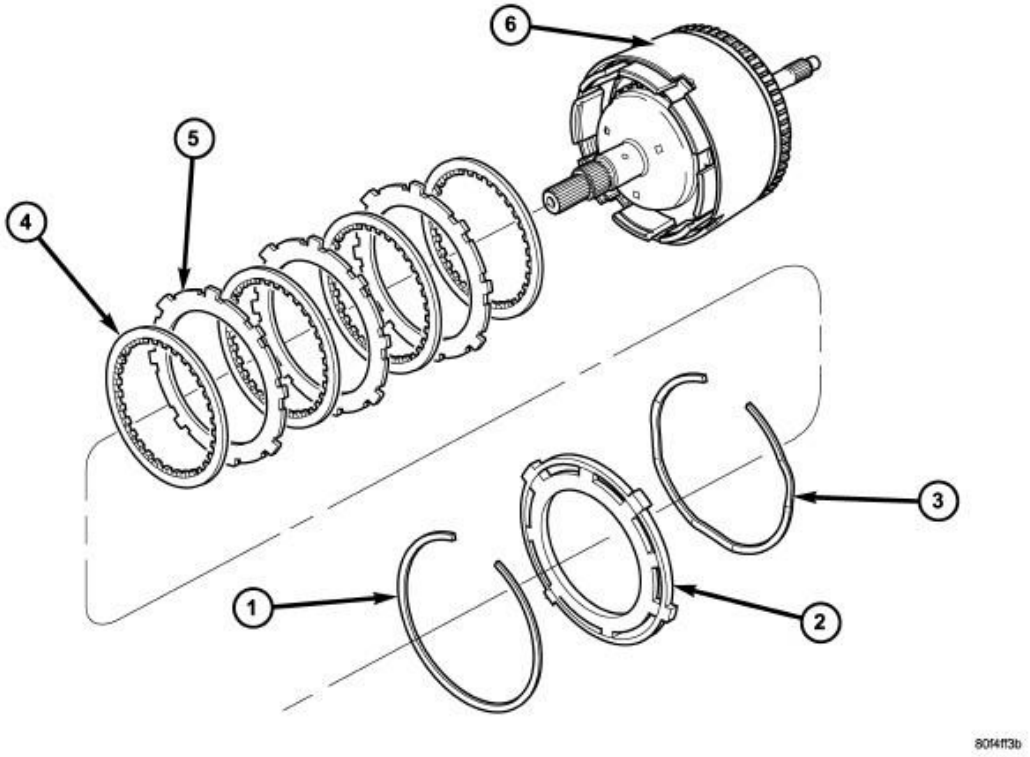

Fig. 6: Ball Joint Remover 9360
Courtesy of CHRYSLER LLC

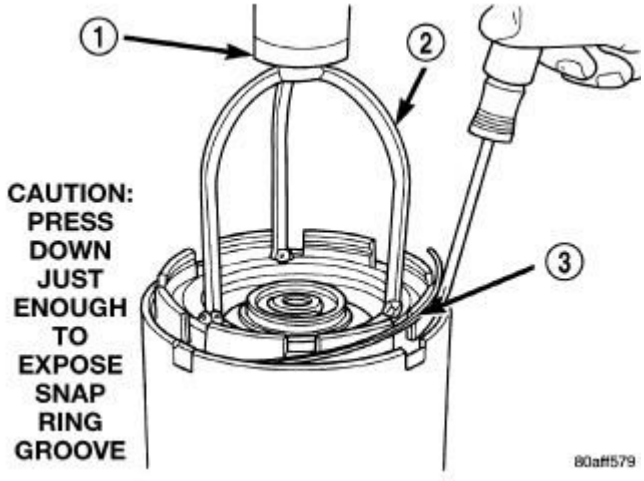

Fig. 7: Power Steering Cap Adapter 9688
Courtesy of CHRYSLER LLC

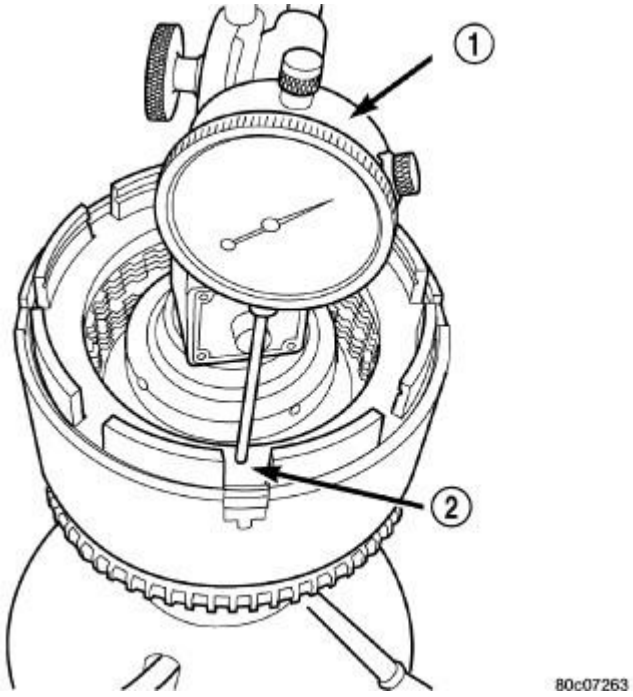

Fig. 8: Pulley Puller 9962
Courtesy of CHRYSLER LLC

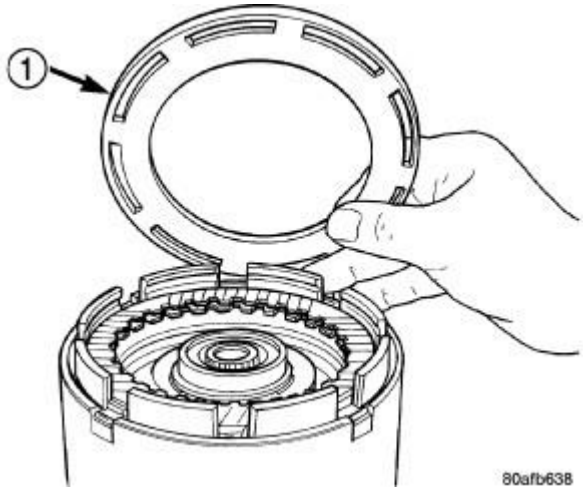

Fig. 9: Pulley Installer C-4063C
Courtesy of CHRYSLER LLC

COLUMN

DESCRIPTION

DESCRIPTION

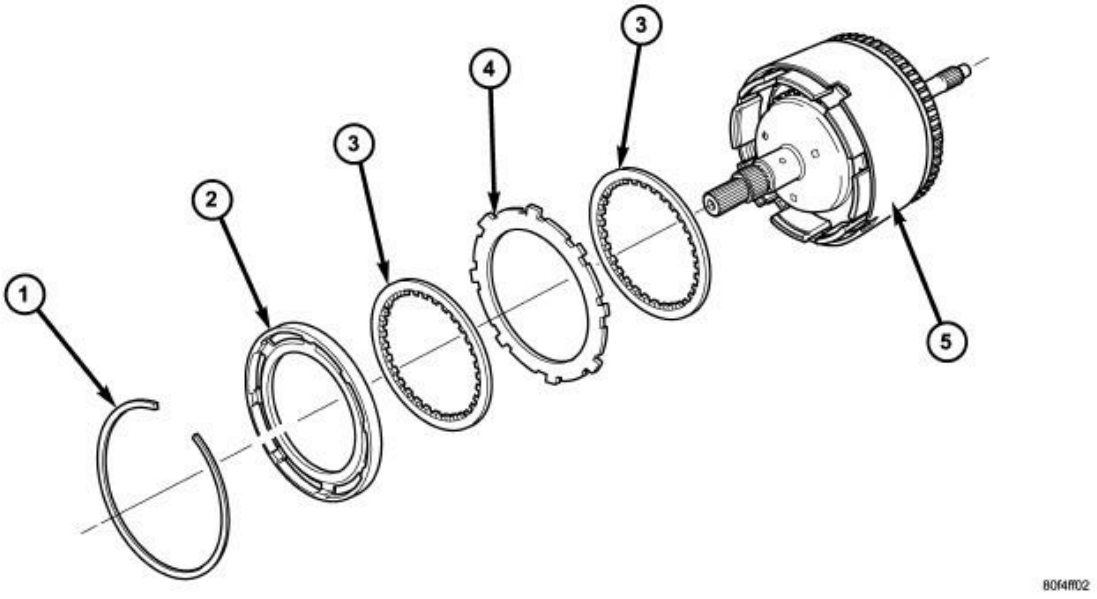

Fig. 10: Identifying Steering Column
Courtesy of CHRYSLER LLC

This vehicle is equipped with a tilt/telescoping type steering column (1). It is of the Corporate Low Pivot Column (CLPC) design family. When the lever is in the released position, the column can be tilted or telescoped manually.

The steering column is designed to be serviced only as a complete assembly if an internal component is found to be defective. The shaft, bearings and intermediate shaft are all serviced with the column.

The major components on the steering column assembly are:

- Clockspring (Integral part of Steering Column Control Module (SCCM))
- Driver Airbag
- Multi-Function Switches (left and right)
- Tilt Lever
- Shrouds
- Steering Wheel

These components can be serviced without removal of the steering column from the vehicle. Refer to the appropriate Service Information for servicing these components separately.

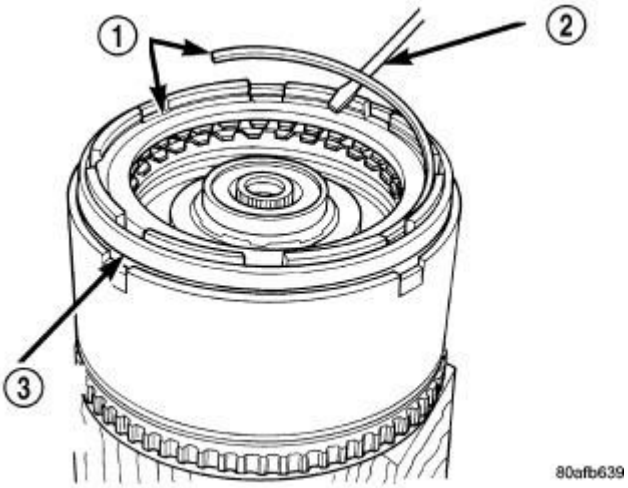

Fig. 11: Identifying Steering Column With Shaft Lock Module
Courtesy of CHRYSLER LLC

A theft deterrent devise, shaft lock module (2), is located on some steering columns (1). The electronically controlled shaft lock module locks the steering column shaft in place when the key is removed from the ignition key cylinder. For more information on the shaft lock module, refer to **MODULE, SHAFT LOCK** .

WARNING

WARNINGS AND CAUTIONS

WARNING: Safety goggles should be worn at all times when working on steering columns.

WARNING: Before beginning any service procedure that involves removing the air bag: Remove and isolate the negative (-) battery cable (ground) from the vehicle battery. This is the only sure way to disable the air bag system. Failure to do this could result in accidental air bag deployment and possible personal injury.

WARNING: The air bag system is a sensitive, complex electro-mechanical unit. Before attempting to diagnose, remove or install the air bag system components you must first disconnect and isolate the battery negative (ground) cable. Failure to do so could result in accidental deployment of the air bag and possible personal injury. The fasteners, screws, and bolts, originally used for the air bag components, have special coatings and are specifically designed for the air bag system. They must never be replaced with any substitutes. Anytime a new fastener is needed, replace with the correct fasteners provided in the service package or fasteners listed in the parts books. Before servicing a steering column equipped with an air bag, refer to Restraints - Warning .

WARNING: When handling an undeployed air bag during servicing of the steering column, the following precautions should be observed:

- **At no time should any source of electricity be permitted near the inflator on the back of the air bag.**
- **When carrying a live air bag, the trim cover should be pointed away from the body to minimize injury if the air bag should accidently deploy.**
- **If the air bag is placed on a bench or other surface, the plastic cover should be face-up to minimize movement, in case of accidental deployment.**

CAUTION: Disconnect negative (ground) cable from the battery before servicing any column component.

DIAGNOSIS AND TESTING

STEERING COLUMN

The two steering column bracket halves are riveted together above the steering column with raised locator pads under the rivets (when viewed from the top). These rivets and locator pads can help determine if column has been compromised. If the steering column has collapsed, the rivets will slide down the slotted upper half of the bracket with the steering column. A collapse may occur with the tube housing moving into the rear bracket assembly OR the tube may move inside the tube housing. Typically if a collapse happens, the rivets/locator pads should indicate damage. However, if **any** of the following steps indicate a collapse, the steering column will still need replacement.

NOTE: All illustrations within this procedure are typical; however the steering column functionality is the same in all vehicles.

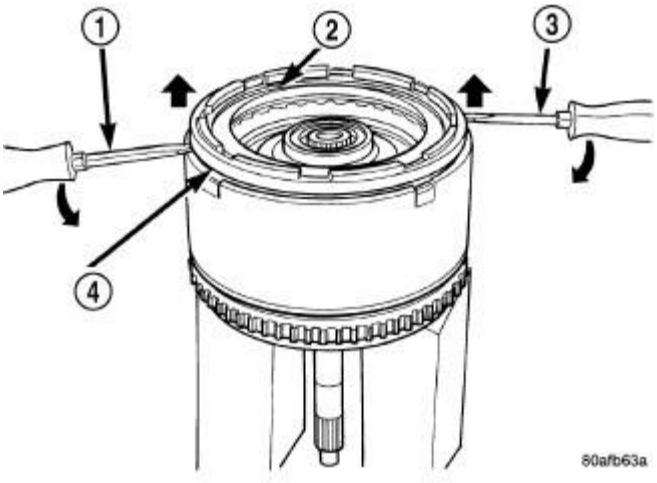

Fig. 12: Identifying Steering Column Opening Cover Reinforcement & Retaining Screws

Courtesy of CHRYSLER LLC

1. Grasp the steering wheel at the 9 and 3 o'clock positions, and again at the 12 and 6 o'clock positions and attempt to rock the steering wheel back and forth and up and down. If there is excessive movement or an audible clunking or grinding sound, replace the steering column. See **Steering/Column - Removal**.
2. Remove the steering column opening cover, and if equipped, remove the retaining screws (1) and the steering column opening cover reinforcement (2).

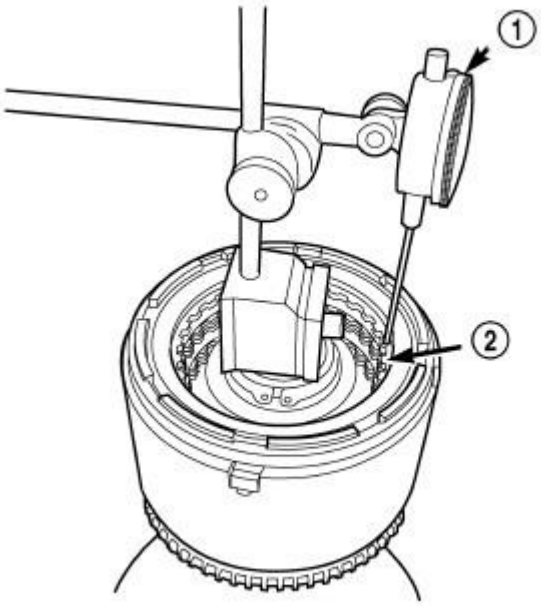

Fig. 13: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

3. Remove screws from the lower column shroud (2) and remove both the upper and lower shrouds.

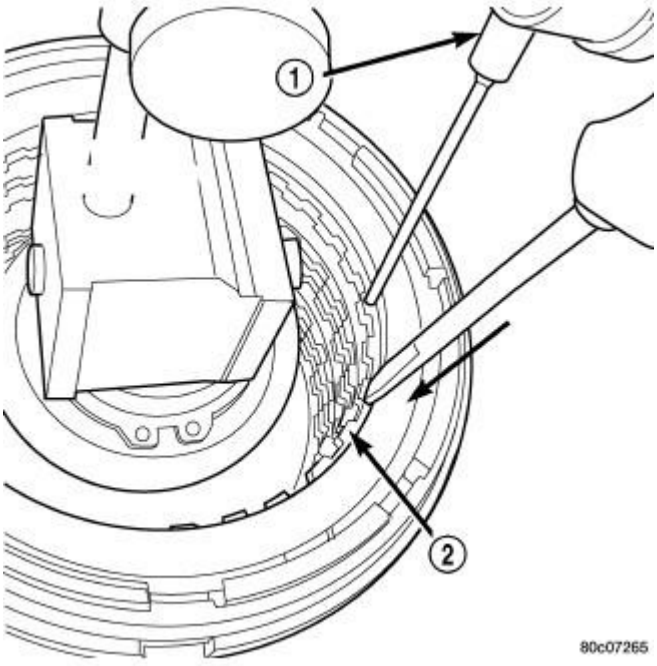

Fig. 14: Removing/Installing Rear Steering Column Mounting Bolts
Courtesy of CHRYSLER LLC

4. Remove the rear steering column mounting bolts (2).

NOTE: This illustration shows two vertical front steering column mounting bolts (3). Some steering column mounting brackets may have only one vertical mounting bolt in this position and another horizontal bolt. The horizontal bolt does not need to be loosened for this procedure.

5. Loosen the front steering column retaining bolts/nuts (3) several turns, but do not remove.

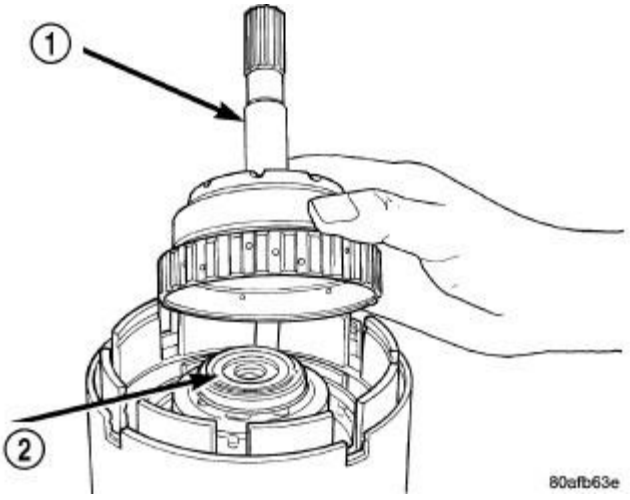

Fig. 15: Identifying Location Of Steering Column Rivets Relating To Steering Column Condition

Courtesy of CHRYSLER LLC

NOTE: A steering column which is in good condition (4) will have the rivets (2) centered on the raised locator pads (3). When a steering column is compromised (1), the rivets (2) should be moved off the locator pads (3).

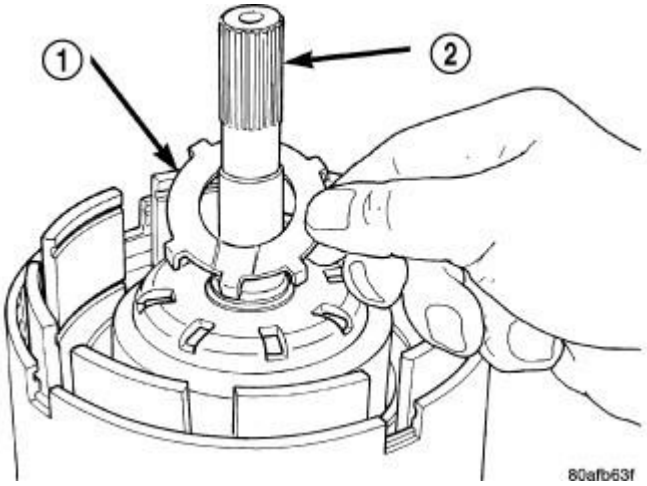

Fig. 16: Identifying Steering Column, Rivets, & Locator Pads
Courtesy of CHRYSLER LLC

6. Move the steering column assembly (1) down to view the rivets (2) in the top of the bracket (between instrument cluster and steering column). Verify that the rivets (2) have not moved off center of the locator pads (3). If the rivets (2) have moved, replace the steering column. See **Steering/Column - Removal**.

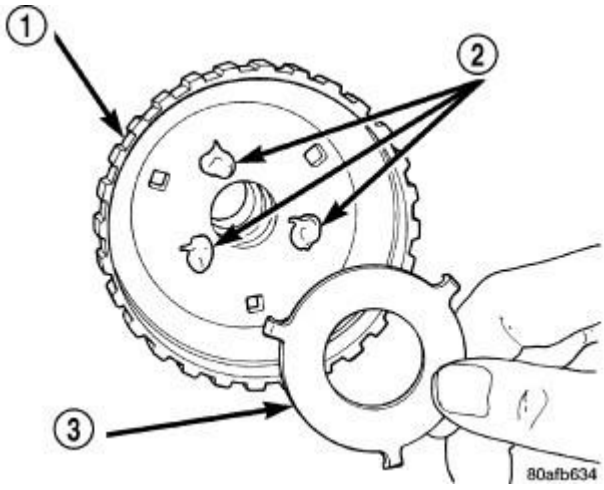

Fig. 17: Measuring Distance From Edge Of Steering Column Housing Tube To Edge Of Splined Shaft
Courtesy of CHRYSLER LLC

7. Remove the clockspring. Refer to **Restraints/CLOCKSPRING - Removal** .
8. Measure the distance from the edge of the steering column housing tube (1) to the edge of the splined

shaft (2). If the measurement (3) is less than 40 mm (1.574 in.), replace the steering column. See **Steering/Column - Removal**.

9. If the steering column passes all tests and measurements above, the steering column is not collapsed and should not need to be replaced.

REMOVAL

STEERING COLUMN

NOTE: Before proceeding, see Steering/Column - Warning.

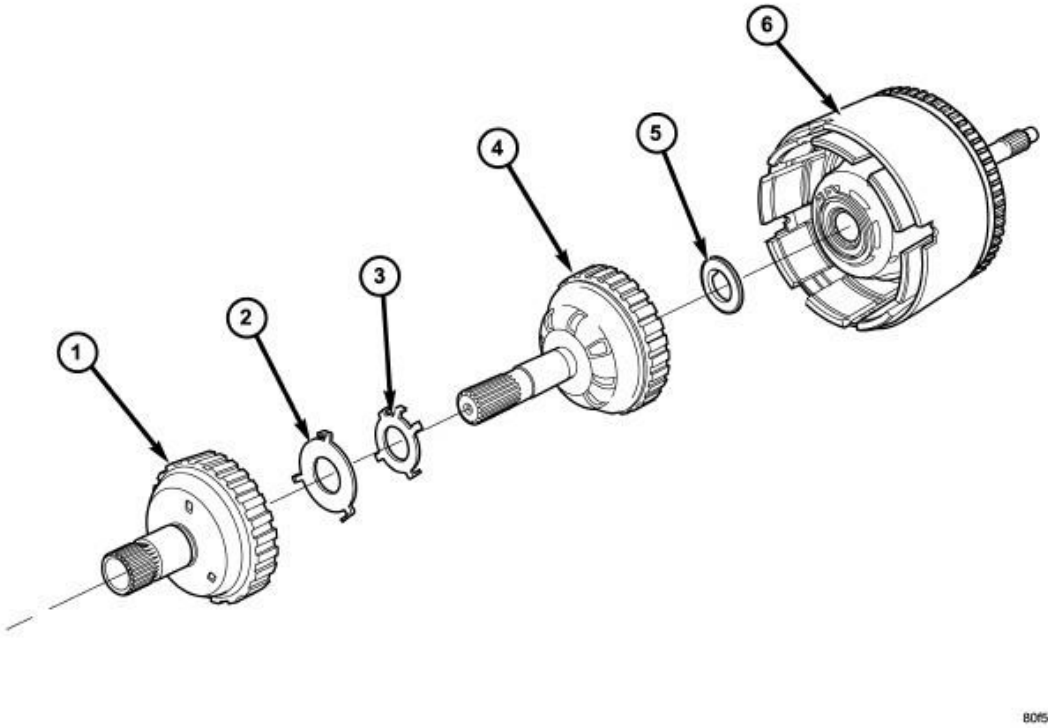

Fig. 18: Removing/Installing Steering Column Opening Cover
Courtesy of CHRYSLER LLC

1. Remove the instrument panel end cap and steering column opening cover (1). Refer to **REMOVAL** .

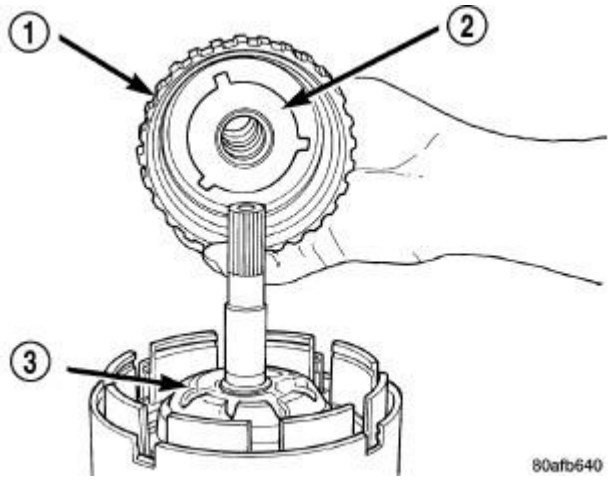

Fig. 19: Removing/Installing Steering Column Opening Reinforcement
Courtesy of CHRYSLER LLC

2. Remove the steering column cover reinforcement mounting screws (3, 4). Remove the steering column cover reinforcement (2).

NOTE: If equipped with a shaft lock module, the module cannot be removed from the steering column while the locking bolt is in the locked position without irreversibly damaging the column. Before attempting service, the ignition key must be inserted into the ignition lock cylinder. Once inserted, rotate the steering wheel from side to side. If the steering wheel can be rotated, the locking bolt is in the unlocked position. Leave the key in the ignition lock cylinder until shaft lock module removal has been completed.

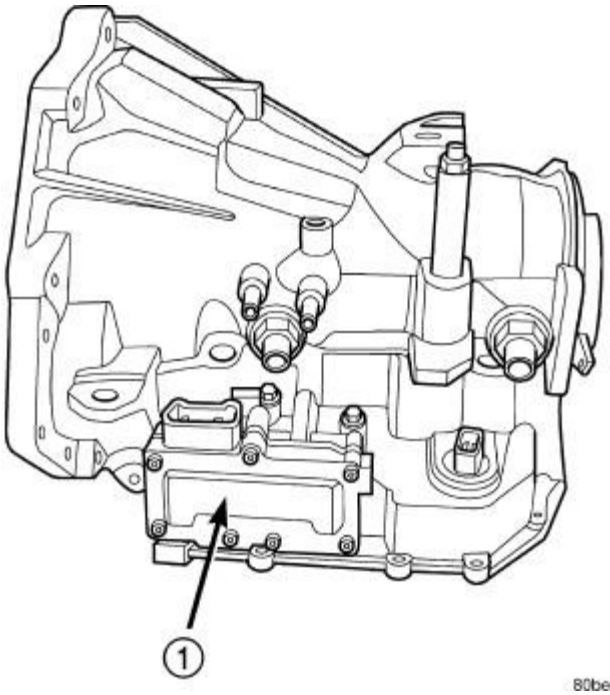

Fig. 20: Identifying Shaft Lock Module
Courtesy of CHRYSLER LLC

3. If equipped with a shaft lock module (2), perform the following steps.
   a. Insert the ignition key into the ignition lock cylinder. This will move the shaft lock module locking bolt to the unlocked position. Leave the key in the lock cylinder while the shaft lock module is being removed.
   b. Insert a suitable drift or pin punch (no more than 4 mm (5/32 in.) in diameter) into each release hole (1) on the module mounting bracket. Insert each drift or punch until it bottoms and leave in place. This will depress the two spring clips that secure the shaft lock module to the mounting bracket.
   c. Slide (and wiggle) the module toward the base of the column far enough to disengage the module from the mounting bracket.
   d. Remove the module from the steering column.
   e. Leave the wiring connector in place, but support the module to keep it away from the column and avoid wiring harness over-extension.

WARNING: When an undeployed airbag module is to be removed from the vehicle, first disconnect the battery ground cable and isolate it. Allow the system capacitor to discharge for a minimum of two minutes before starting any removal.

4. Disconnect the negative (-) cable from the battery and isolate the cable.
5. Position the front wheels of vehicle (and steering wheel) in the STRAIGHT-AHEAD position. This action will help keep the clock spring properly centered for reinstallation.

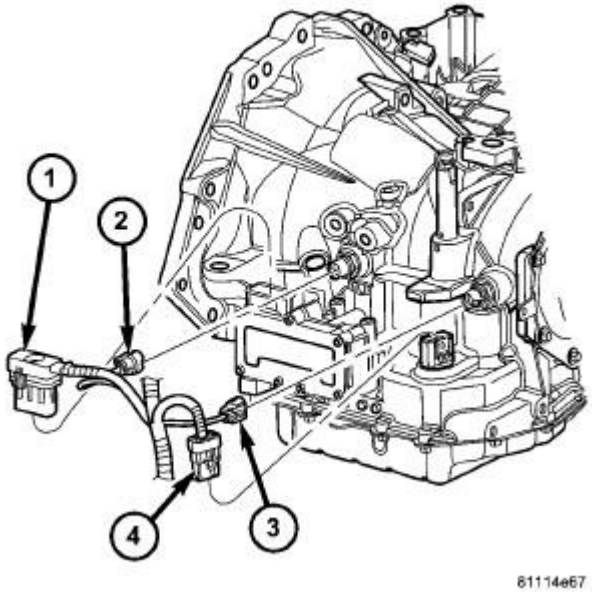

Fig. 21: Removing/Installing Driver Airbag

Courtesy of CHRYSLER LLC

6. Remove the driver airbag (1). Refer to **Restraints/AIR BAG, Driver - Removal** .

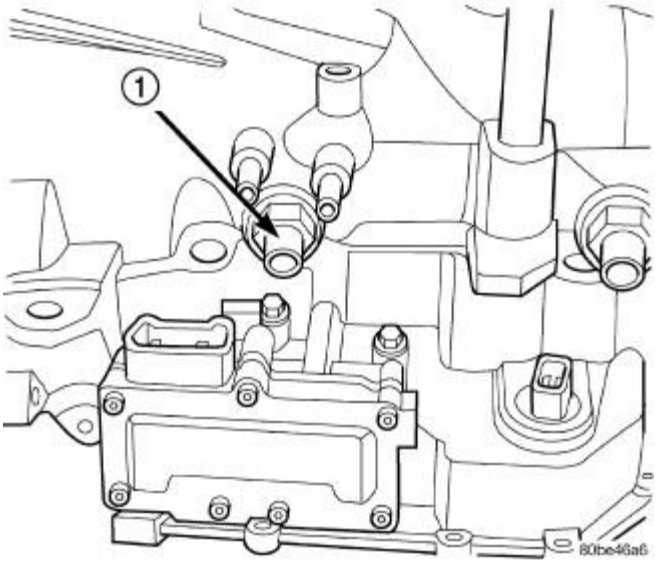

Fig. 22: Identifying Wiring Connector At Clockspring
Courtesy of CHRYSLER LLC

7. Disconnect the wiring connector (2) at the clockspring.

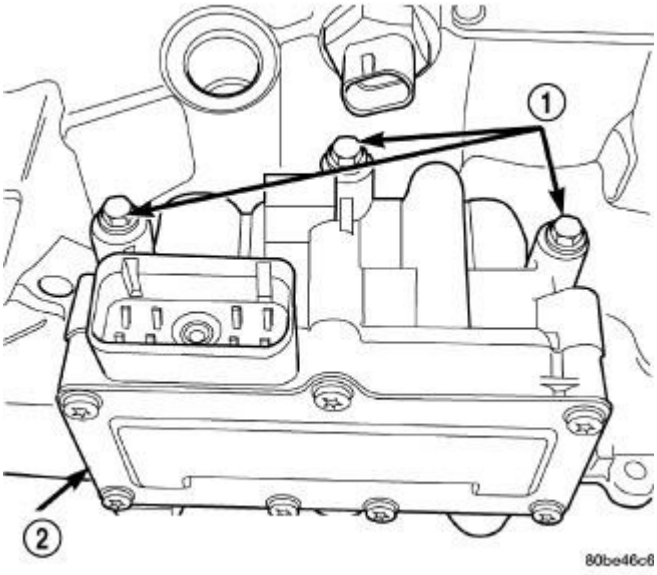

Fig. 23: Removing/Installing Steering Wheel Retaining Bolt
Courtesy of CHRYSLER LLC

8. While holding the steering wheel (4) firmly in place, remove the steering wheel retaining bolt (3) from

the steering column shaft.

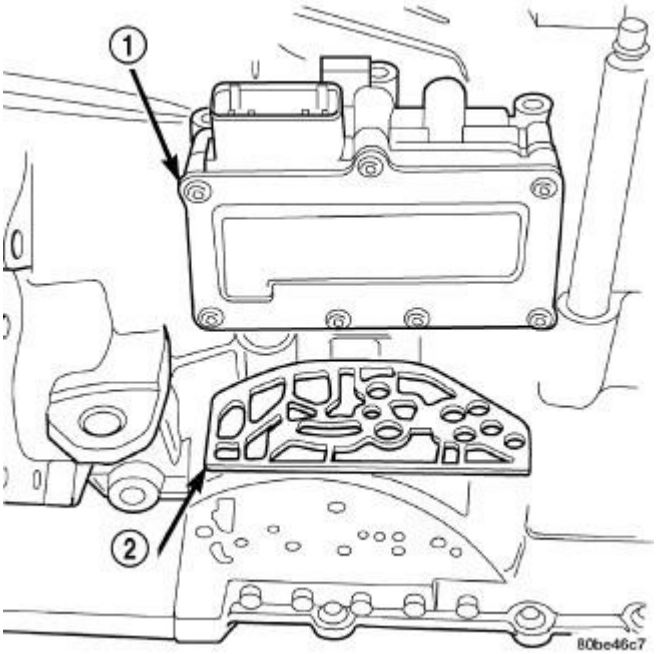

Fig. 24: Identifying Steering Wheel Puller
Courtesy of CHRYSLER LLC

CAUTION: Do not bump or hammer on the steering wheel or steering column shaft when removing the steering wheel.

9. Install an appropriate wheel puller with hooked legs (1) on the steering wheel over the steering shaft. See **Steering/Column/WHEEL, Steering - Removal**.

CAUTION: Do not attempt to rotate the clockspring rotor once the steering wheel is removed. The clockspring must remain centered in its travel to avoid overextending the clockspring inner parts, causing the clockspring to become inoperative. If removed and handled properly using the correct procedures, it should remain in the "centered" position. If there is any question as to whether the clockspring is in the "centered" position of travel, perform the clockspring centering procedure before installing the steering wheel. Refer to Restraints/CLOCKSPRING - Standard Procedure .

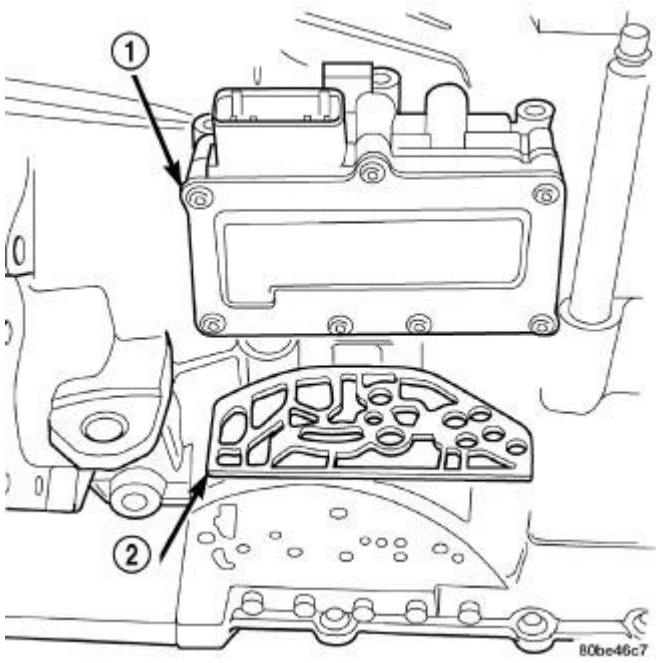

Fig. 25: Identifying Steering Wheel Puller
Courtesy of CHRYSLER LLC

10. While holding the steering wheel firmly in the STRAIGHT-AHEAD position, release the steering wheel from the steering column shaft splines using the wheel puller (1). Remove the steering wheel.

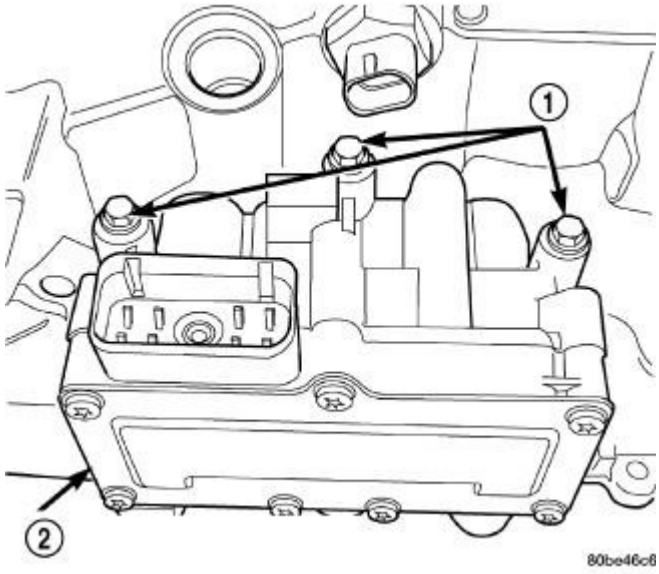

Fig. 26: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

11. Push the tilt lever (3) downward to the released position.

12. Remove the two screws (1) attaching the upper shroud to the lower shroud. After removing the screws, un-clip the upper and lower shrouds from one another by applying hand pressure along the seams where the shrouds connect on the sides.
13. Remove the upper shroud.
14. Remove the remaining screw (2) attaching the lower shroud (4) to the column.
15. Remove the lower shroud.
16. Push the tilt lever (3) upward, locking the column in place.
17. Disconnect the wiring harness connectors at the Steering Column Control Module (SCCM).

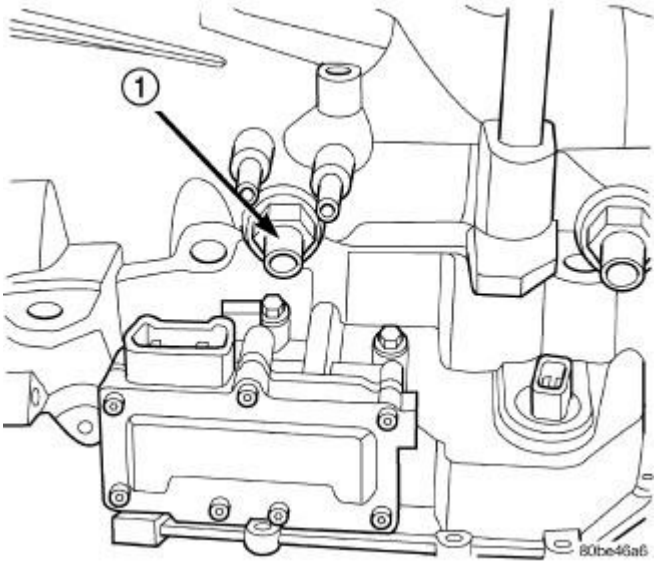

Fig. 27: Identifying Adjustable Pedals Switch
Courtesy of CHRYSLER LLC

18. If equipped, disconnect the wiring harness connector (1) at the adjustable pedals switch (3).

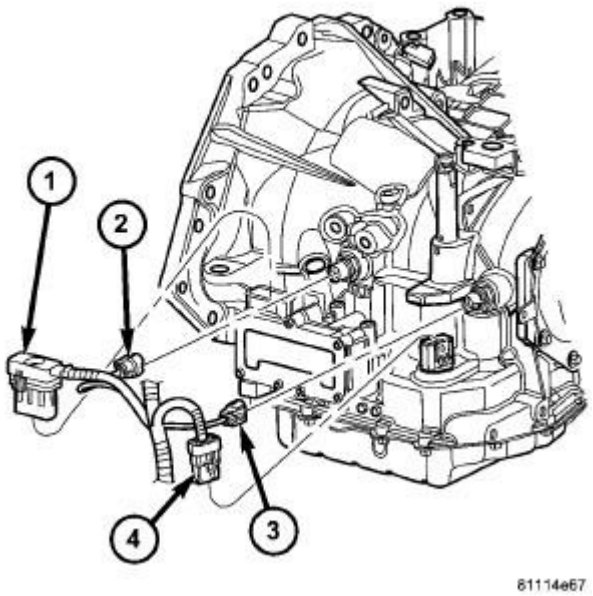

Fig. 28: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

19. Remove the intermediate shaft coupling bolt (1).
20. Separate the intermediate shaft (2) at the base of the column from the shaft extension (3).

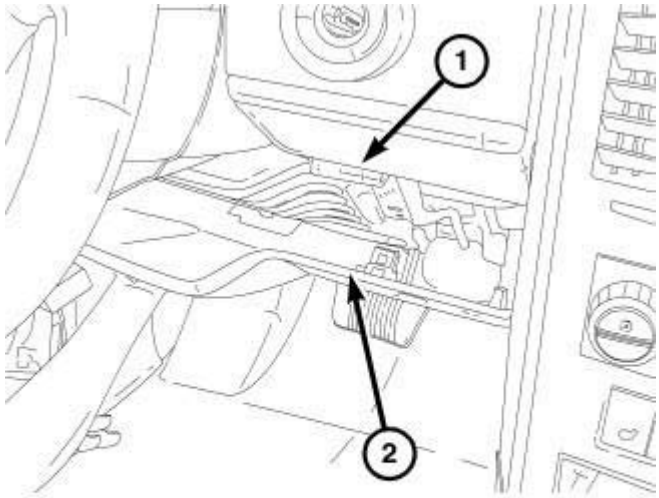

Fig. 29: Removing/Installing Wiring Harness Routing Clips
Courtesy of CHRYSLER LLC

21. Remove the wiring harness routing clips (1) from the bottom of the Steering Column.

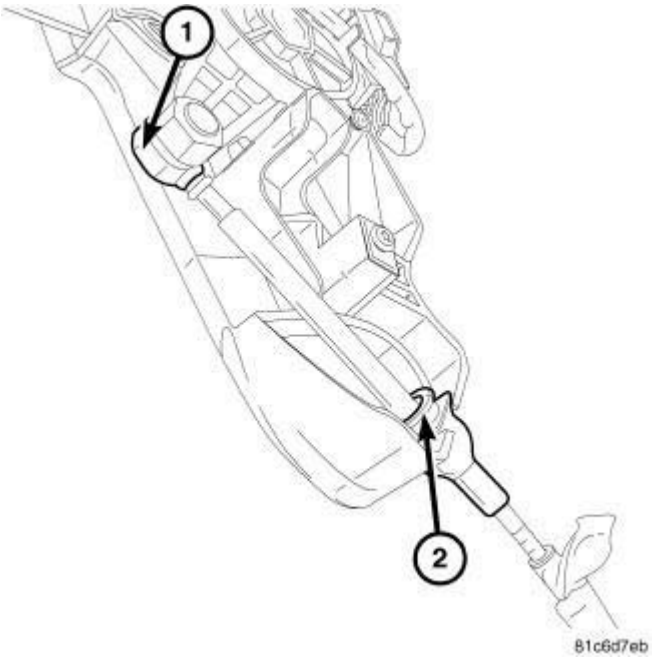

Fig. 30: Identifying Steering Column Mounting Nuts
Courtesy of CHRYSLER LLC

NOTE: If the same steering column is to be reinstalled, clamp the tilt lever to lock the column in place so that it can be easily reinstalled in the same orientation.

22. Remove the mounting nuts (1) attaching the steering column (2) to the instrument panel.
23. Remove the steering column from the vehicle.
24. To remove remaining components from the column, see **Steering/Column - Disassembly**.

RIGHT-HAND DRIVE

Right-Hand Drive steering column is typical of Left-Hand Drive. See **Column**.

DISASSEMBLY

DISASSEMBLY

STEERING COLUMN CONTROL MODULE

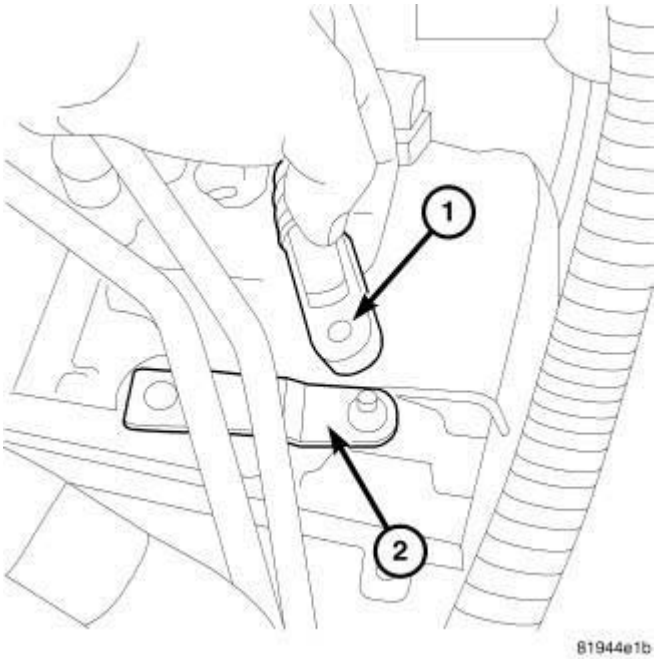

Fig. 31: Identifying SCCM Lower Mounting Screw
Courtesy of CHRYSLER LLC

1. Remove the lower mounting screw (2) attaching the Steering Column Control Module (SCCM) to the steering column.

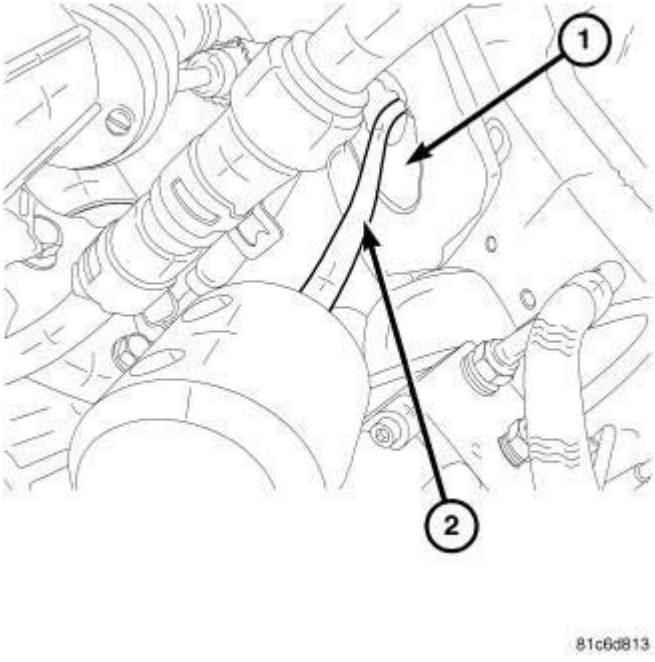

Fig. 32: Identifying SCCM Upper Mounting Screws
Courtesy of CHRYSLER LLC

2. Remove the two upper mounting screws (1) attaching the SCCM to the steering column.

3. Slide the SCCM off the steering column (2).

INSPECTION

INSPECTION

Inspect the column for damage any time the driver airbag has deployed.

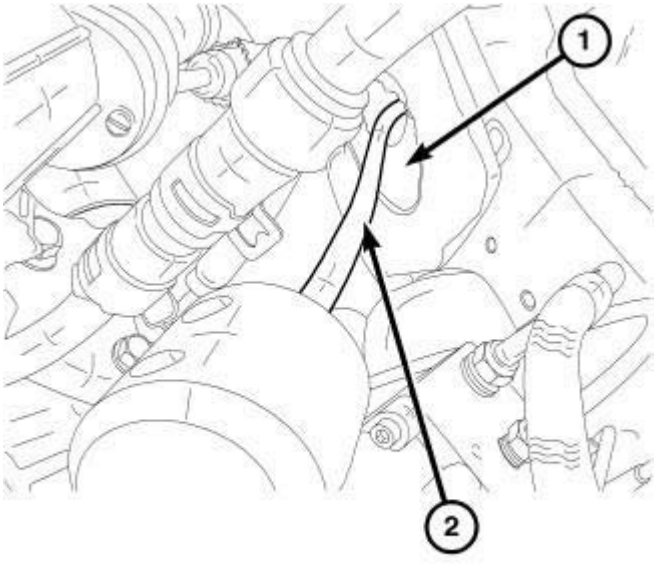

Fig. 33: Identifying Steering Column Rivets At Top Of Mounting Pads
Courtesy of CHRYSLER LLC

Lower the steering column from its mount and inspect the column collapse feature. If the rearmost rivets (1) have dislodged from top of their mounting pads (2), into the mounting bracket slots, the column must be replaced. **NO attempt should be made to return the rivets to the top of the pads.**

If any physical damage or stress cracks are present on the column, the column must be replaced.

ASSEMBLY

ASSEMBLY

STEERING COLUMN CONTROL MODULE

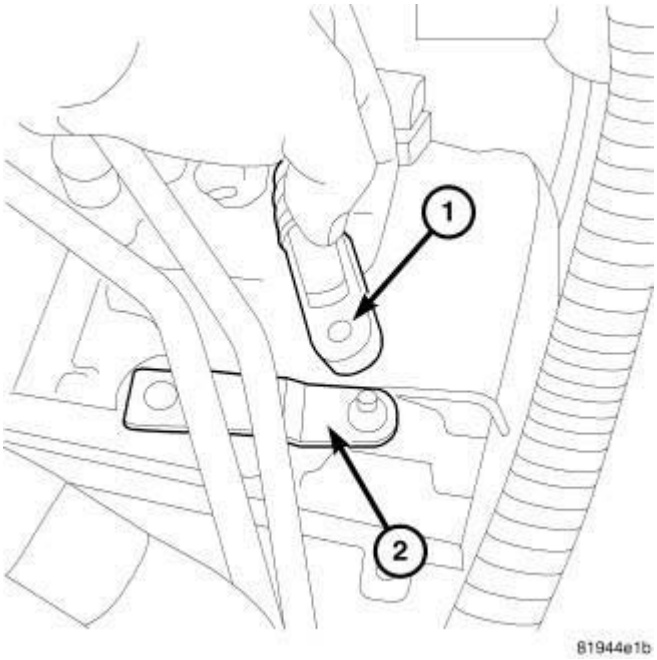

Fig. 34: Identifying SCCM Upper Mounting Screws
Courtesy of CHRYSLER LLC

1. Slide the Steering Column Control Module (SCCM) (with switch stalks) (2) onto the steering column (3).
2. Install the upper mounting screws (1) attaching the SCCM to the steering column. Tighten the screws securely.

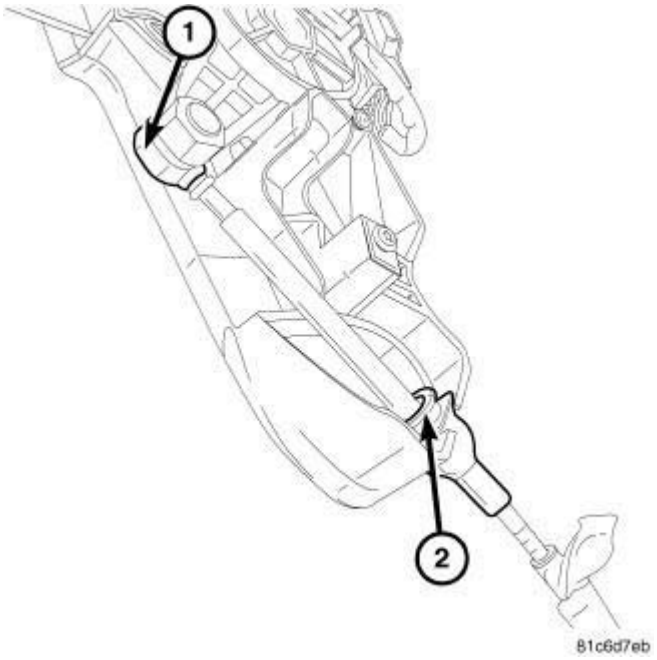

Fig. 35: Identifying SCCM Lower Mounting Screw
Courtesy of CHRYSLER LLC

3. Install the lower mounting screw (2) attaching the SCCM to the steering column. Tighten the screws securely.

INSTALLATION

STEERING COLUMN

1. If the steering column is being replaced, assemble components on the steering column as necessary before column installation. See **Steering/Column - Assembly**.

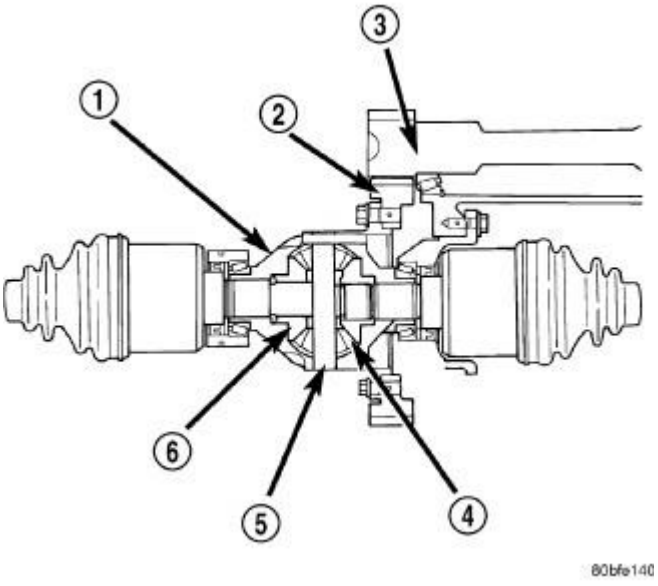

Fig. 36: Identifying Steering Column Mounting Nuts
Courtesy of CHRYSLER LLC

NOTE: When installing a tilt column, do not release the tilt lever from the locked position until after the column is installed on the instrument panel.

2. Install the steering column through the steering column opening.
3. Raise the steering column (2) onto the mounting studs and install the mounting nuts (1) on the studs. Starting with the left upper nut and proceeding in a clockwise tightening sequence, tighten all four mounting nuts to 28 N.m (21 ft. lbs.).

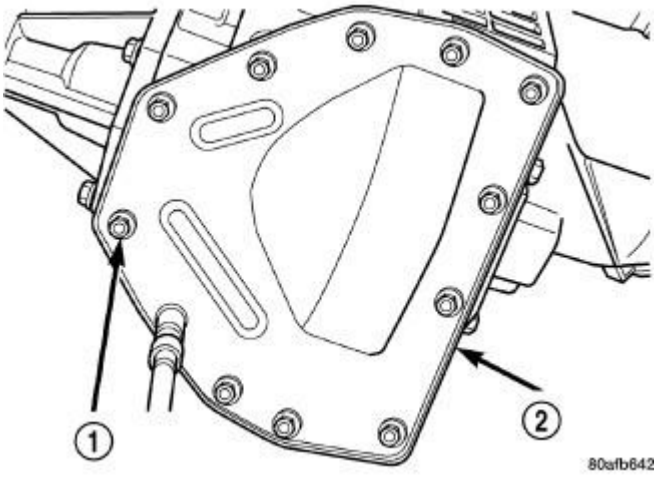

Fig. 37: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

4. Verify the front wheels of vehicle are in the STRAIGHT-AHEAD position.
5. Collapse the intermediate shaft (2). Center it over the shaft extension (3), lining up the ends, then slide the intermediate shaft onto the shaft extension.
6. Install the intermediate shaft coupling bolt (1). Tighten the bolt to 42 N.m (31 ft. lbs.).

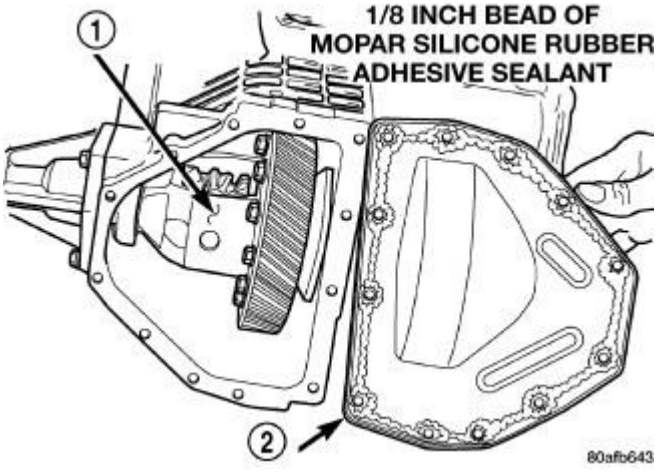

Fig. 38: Removing/Installing Wiring Harness Routing Clips
Courtesy of CHRYSLER LLC

7. Install the wiring harness routing clips (1) on the bottom of the steering column.
8. Connect the wiring harness connectors to the Steering Column Control Module (SCCM).
9. Connect any other the wiring harness connectors.

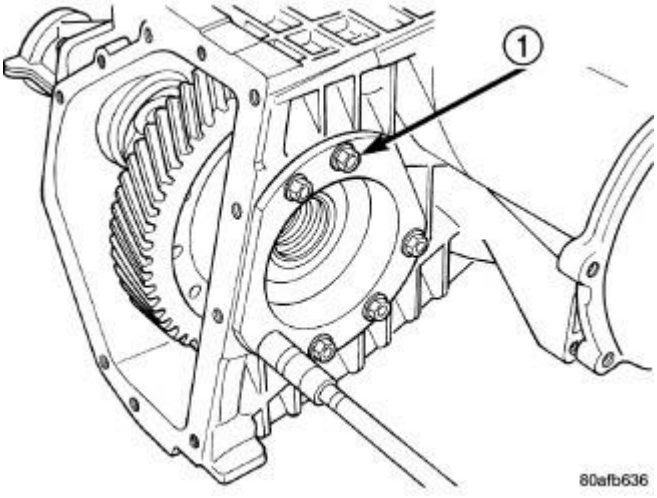

Fig. 39: Identifying Adjustable Pedals Switch
Courtesy of CHRYSLER LLC

10. If equipped, connect the wiring harness connector (1) to the adjustable pedals switch (3).

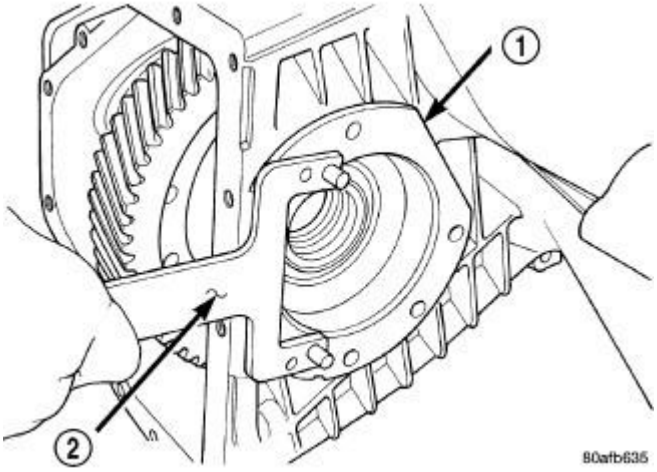

Fig. 40: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

11. Push the tilt lever (3) downward (released position).
12. Position the column tilt at the full-upward position.
13. Install the lower shroud (4) over the tilt lever and onto the column.
14. Install the screw (2) attaching the lower shroud (4) to the steering column.
15. Position the upper shroud on the column.
16. Clip the shrouds to one another.
17. Install the two screws (1) attaching the lower shroud to the upper shroud.
18. Push the tilt lever upward, locking the column in place.

CAUTION: When installing the steering wheel, the clockspring must be centered in its travel to avoid overextending the clockspring inner parts, causing the clockspring to become inoperative. If removed and handled properly using the correct procedures, it should be in the "centered" position at this time. If there is any question as to whether the clockspring is in the "centered" position of travel, perform the clockspring centering procedure before proceeding to avoid damaging clockspring. Refer to Restraints/CLOCKSPRING - Standard Procedure .

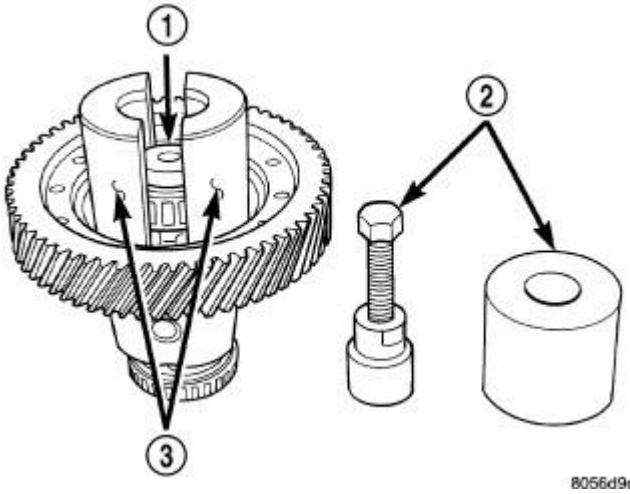

Fig. 41: Removing/Installing Steering Wheel Retaining Bolt
Courtesy of CHRYSLER LLC

19. Line up the steering wheel (4) with the steering shaft and install the steering wheel.
20. Install the steering wheel retaining bolt (3). Tighten the steering wheel retaining bolt to 50 N.m (37 ft. lbs.). See **Steering/Column/WHEEL, Steering - Installation**.

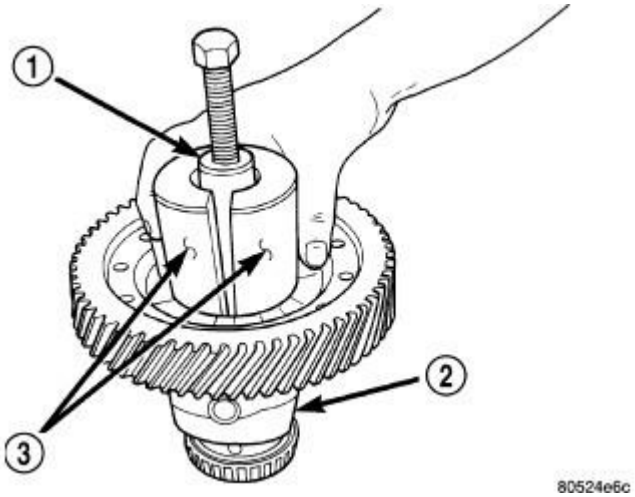

Fig. 42: Identifying Wiring Connector At Clockspring
Courtesy of CHRYSLER LLC

21. Connect the wiring connector (2) at the clockspring.

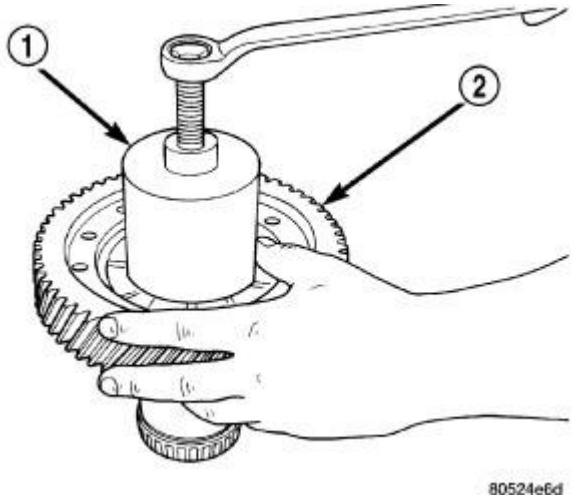

Fig. 43: Removing/Installing Driver Airbag
Courtesy of CHRYSLER LLC

22. Install the driver airbag (1). Refer to **Restraints/AIR BAG, Driver - Installation** .

WARNING: Do not connect the battery ground cable without following the proper procedure as indicated in the following step. Personal injury or death may result if the Airbag System Test is not performed first.

23. Reconnect the battery ground terminal following the Airbag System Test . Refer to **Restraints - Diagnosis and Testing** .

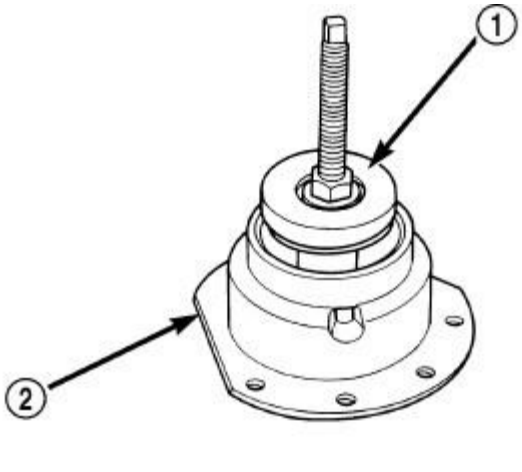

Fig. 44: Identifying Slide Tabs, Mounting Bracket & Shaft Lock Module
Courtesy of CHRYSLER LLC

24. If the steering column being installed requires the installation of a shaft lock module, perform the following:

a. If not present, insert the ignition key into the ignition lock cylinder. This will move the shaft lock module locking bolt to the unlocked position. Leave the key in the lock cylinder while the shaft lock module service is being completed.
b. Make sure the wiring harness connector is properly connected to the module.
c. Align the engagement and slide tabs (2) on the shaft lock module housing (1) with the slots and channels in the mounting bracket (3) on the steering column.
d. Carefully slide the module toward the top (steering wheel end) of the column until it is in mounted position and the spring clips on the module have engaged the bracket, locking it in place.

NOTE: If a NEW module has been installed, a NEW Wireless Ignition Node (WIN) must also be installed, then a diagnostic scan tool MUST be used to initialize the new module before the vehicle can be operated. Refer to Electrical/Vehicle Theft Security - Standard Procedure .

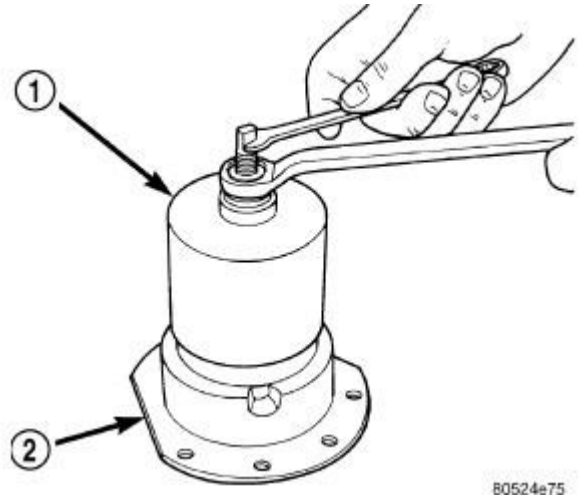

Fig. 45: Removing/Installing Steering Column Opening Reinforcement
Courtesy of CHRYSLER LLC

25. Install the steering column cover reinforcement (2) using the four mounting screws (3, 4).

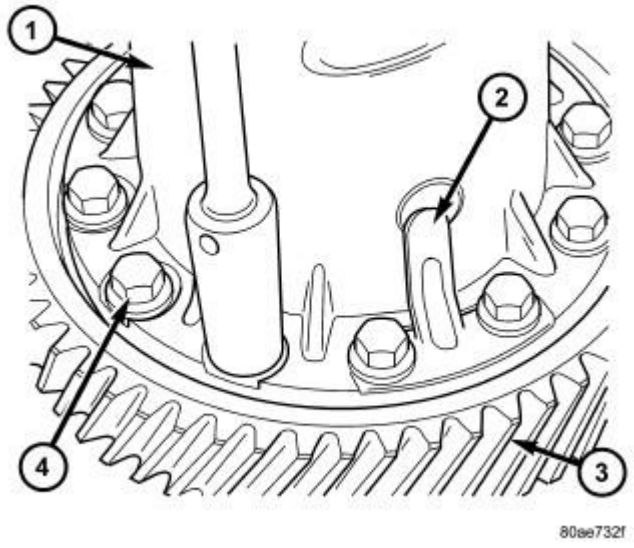

Fig. 46: Removing/Installing Steering Column Opening Cover
Courtesy of CHRYSLER LLC

26. Install the steering column opening cover and instrument panel end cap. Refer to **INSTALLATION** .
27. Test the operation of the all column mounted components. If applicable, reset the radio and the clock as necessary.
28. Road test the vehicle to ensure proper operation of the steering system.

RIGHT-HAND DRIVE

Right-Hand Drive steering column is typical of Left-Hand Drive. See **Column**.

SEAL, SHAFT COVER

Removal

REMOVAL

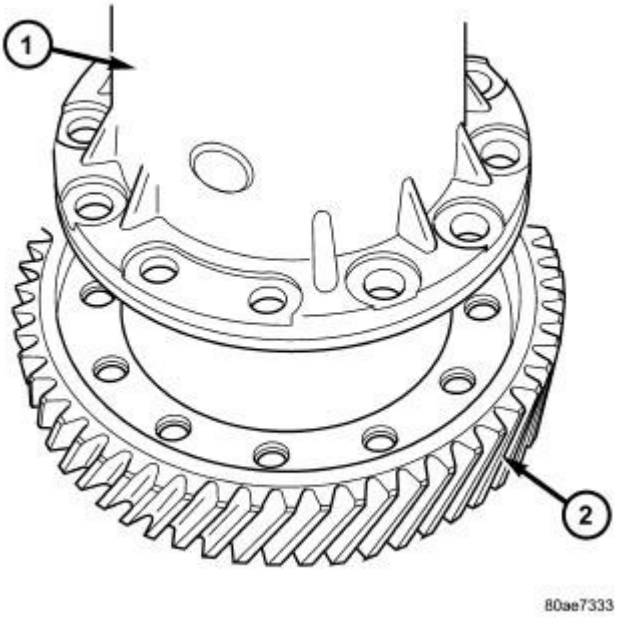

Fig. 47: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

1. Install a steering wheel holder locking the steering wheel in the STRAIGHT-AHEAD position.

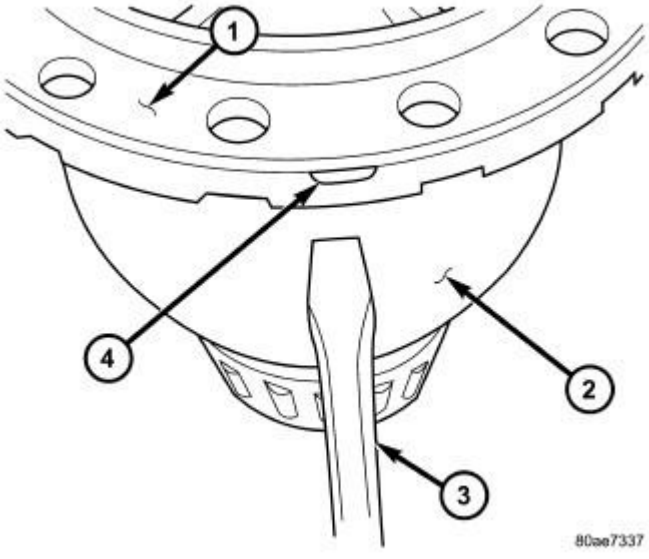

Fig. 48: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

2. Reposition the floor carpeting to access the steering column coupling at the base of the column.
3. Remove the intermediate shaft coupling bolt (1).

4. Separate the intermediate shaft (2) at the base of the column from the intermediate shaft extension (3).

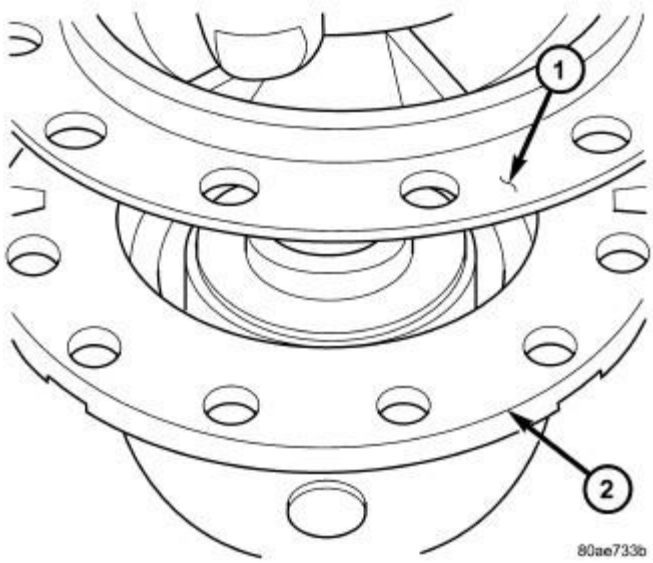

Fig. 49: Removing/Installing Shaft Seal & Cover
Courtesy of CHRYSLER LLC

5. Remove fasteners (1) securing shaft seal and cover (2) in place, then lift shaft seal and cover from intermediate shaft extension (4) and floor pan.

Installation

INSTALLATION

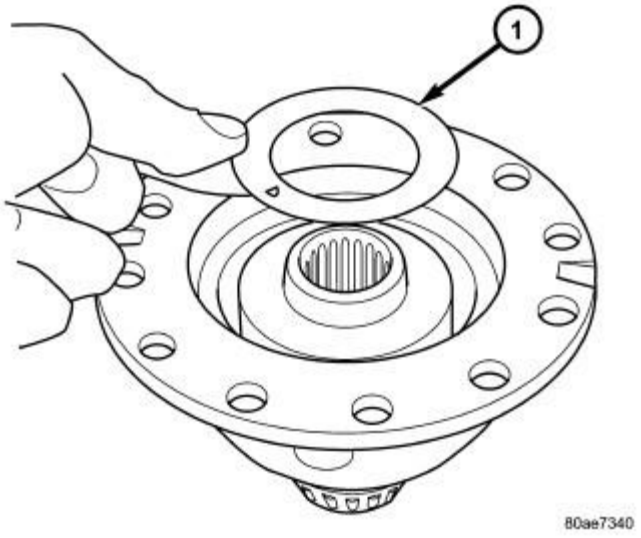

Fig. 50: Removing/Installing Shaft Seal & Cover

Courtesy of CHRYSLER LLC

1. Place shaft seal and cover (2) over mounting studs on floor pan and securely install fasteners. Make sure cover extends down over top of steering gear housing.

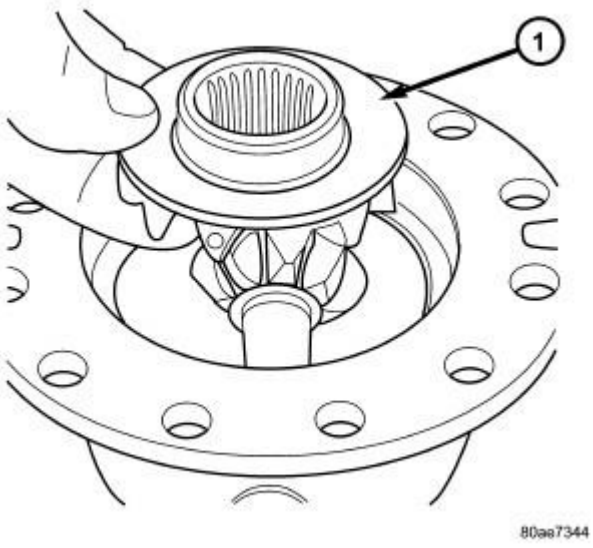

Fig. 51: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

2. Verify the front wheels of vehicle are in the STRAIGHT-AHEAD position.
3. Collapse the intermediate shaft (2). Center it over the steering gear pinion shaft (3), lining up the ends, then slide the intermediate shaft onto the shaft extension.
4. Install the intermediate shaft coupling bolt (1). Tighten the bolt to 42 N.m (31 ft. lbs.).
5. Reposition the floor carpet in place.

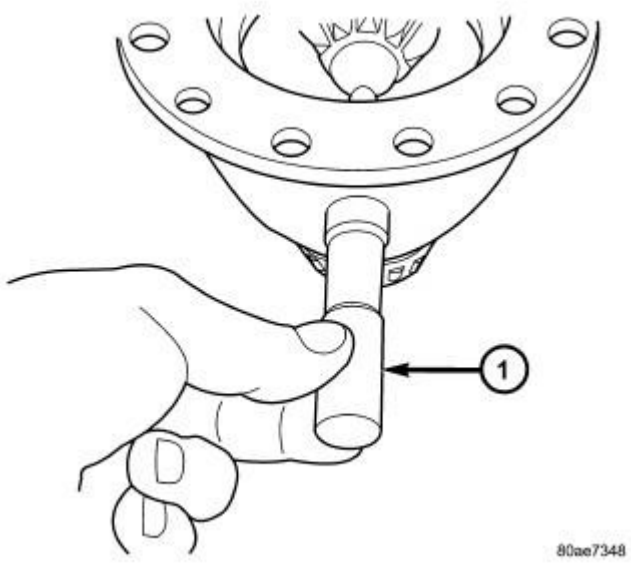

Fig. 52: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

6. Remove steering wheel holder.
7. Road test vehicle to ensure proper operation.

SHAFT, INTERMEDIATE

Removal

REMOVAL

1. Reposition the floor carpeting to access the steering column coupling at the base of the column.

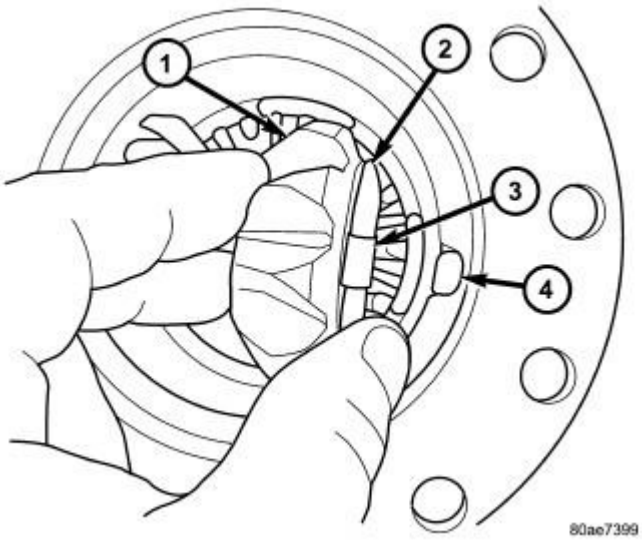

Fig. 53: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

2. Position the front wheels of vehicle (and steering wheel) in the STRAIGHT-AHEAD position.
3. Install steering wheel holder locking steering wheel in STRAIGHT-AHEAD position.

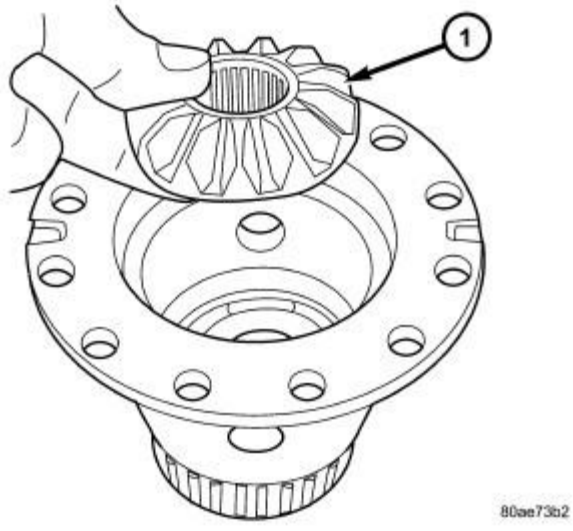

Fig. 54: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

4. Remove the intermediate shaft coupling bolt (1).
5. Separate the intermediate shaft (2) at the base of the column from the intermediate shaft extension (3).

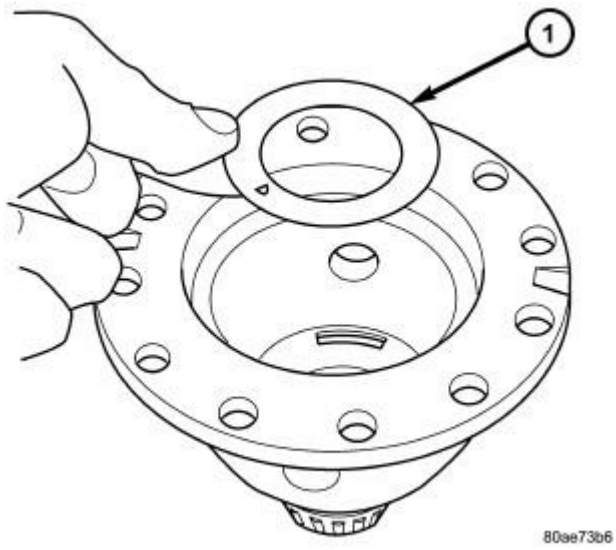

Fig. 55: Removing/Installing Shaft Seal & Cover
Courtesy of CHRYSLER LLC

6. Remove fasteners (1) securing shaft seal and cover (2) in place, then lift shaft seal and cover from intermediate shaft extension (4) and floor pan.
7. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

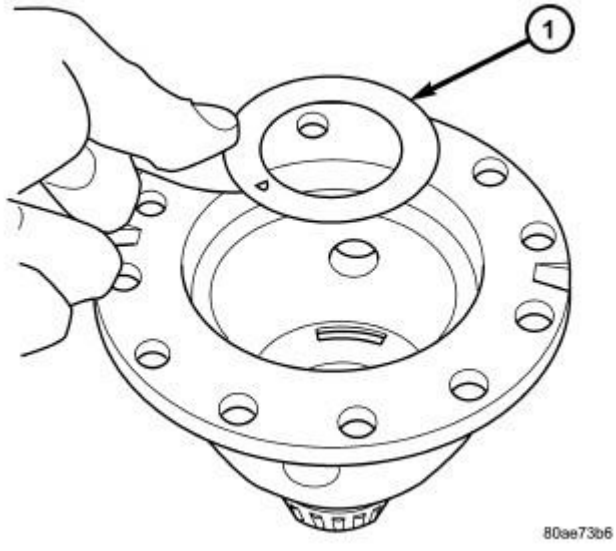

Fig. 56: Removing/Installing Intermediate Shaft Extension
Courtesy of CHRYSLER LLC

8. Remove pinch bolt (1) securing intermediate shaft extension (2) to steering gear shaft (3)
9. Slide intermediate shaft extension (2) off steering gear shaft (3).

Installation

INSTALLATION

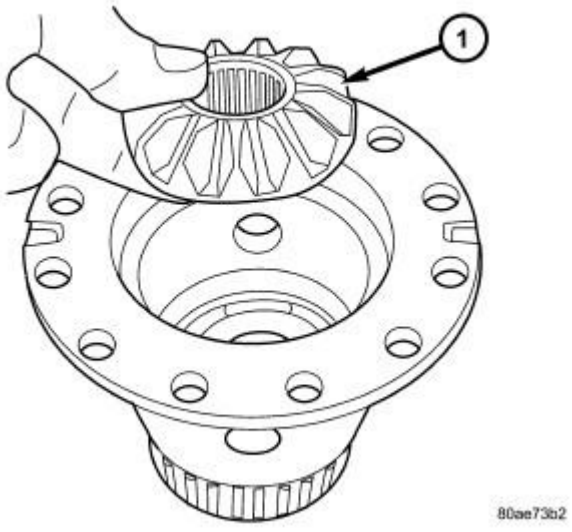

Fig. 57: Removing/Installing Intermediate Shaft Extension
Courtesy of CHRYSLER LLC

1. Match intermediate shaft extension (2) to steering gear shaft (3), then slide extension onto shaft.
2. Install pinch bolt (1) securing intermediate shaft extension (2) to steering gear shaft (3). Tighten pinch bolt to 42 N.m (31 ft. lbs.).
3. Lower vehicle.

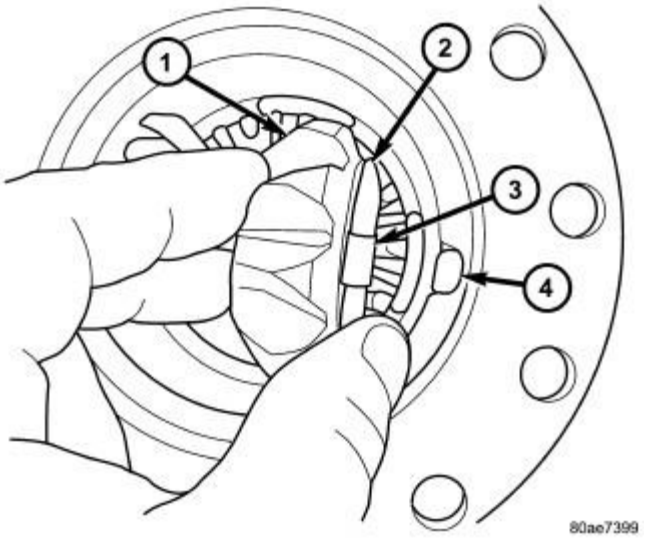

Fig. 58: Removing/Installing Shaft Seal & Cover

Courtesy of CHRYSLER LLC

4. Place shaft seal and cover (2) over mounting studs on floor pan and securely install fasteners. Make sure cover extends down over top of steering gear housing.

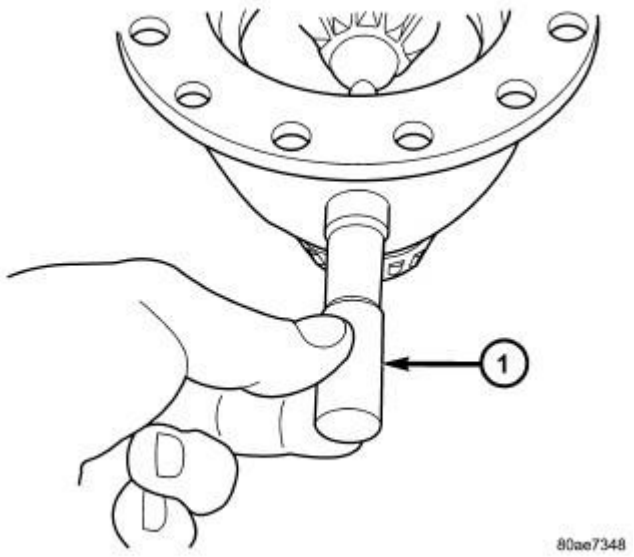

Fig. 59: Identifying Intermediate Shaft & Coupling Bolt
Courtesy of CHRYSLER LLC

5. Verify the front wheels of vehicle are in the STRAIGHT-AHEAD position.
6. Collapse the intermediate shaft (2). Center it over the shaft extension (3), lining up the ends, then slide the intermediate shaft onto the shaft extension.
7. Install the intermediate shaft coupling bolt (1). Tighten the bolt to 42 N.m (31 ft. lbs.).
8. Reposition the floor carpet in place.

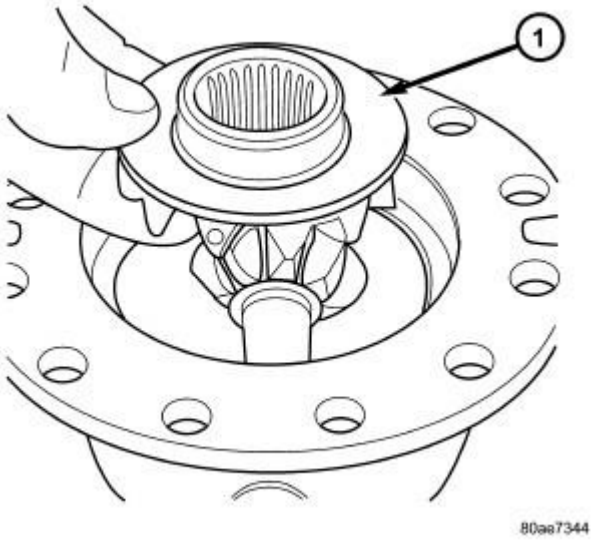

Fig. 60: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

9. Remove steering wheel holder.
10. Road test vehicle to ensure proper operation of steering.

SHROUD, STEERING COLUMN, LOWER

Removal

REMOVAL

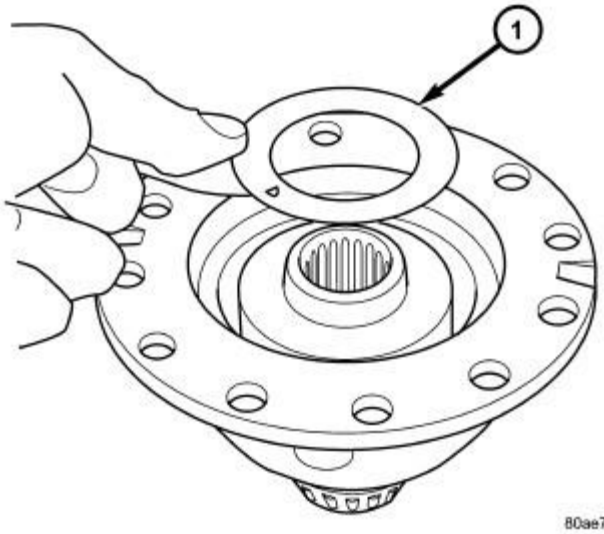

Fig. 61: Removing/Installing Upper & Lower Shrouds

Courtesy of CHRYSLER LLC

1. Push the tilt lever (3) downward to the released position.
2. Remove the two screws (1) attaching the upper shroud to the lower shroud. After removing the screws, un-clip the upper and lower shrouds from one another by applying hand pressure along the seams where the shrouds connect on the sides.
3. Remove the upper shroud.
4. Remove the remaining screw (2) attaching the lower shroud (4) to the column.
5. Remove the lower shroud.

Installation

INSTALLATION

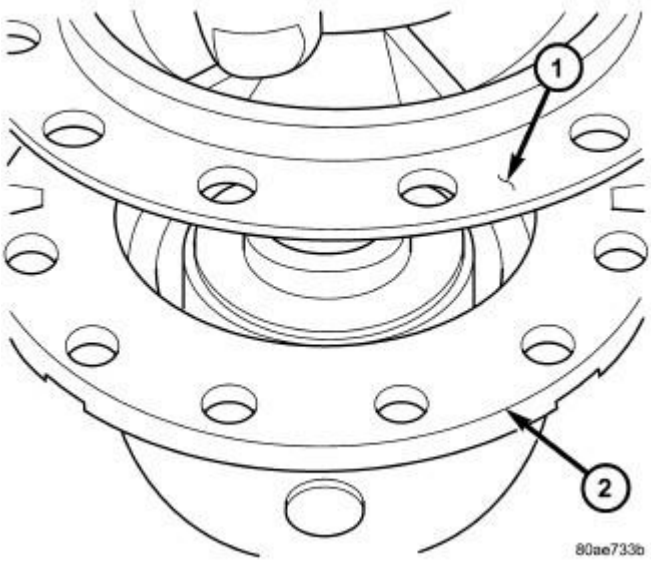

Fig. 62: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

1. Push the tilt lever (3) downward (released position).
2. Position the column tilt at the full-upward position.
3. Install the lower shroud (4) over the tilt lever and onto the column.
4. Install the screw (2) attaching the lower shroud (4) to the steering column.
5. Position the upper shroud on the column.
6. Clip the shrouds to one another.
7. Install the two screws (1) attaching the lower shroud to the upper shroud.
8. Push the tilt lever upward, locking the column in place.

SHROUD, STEERING COLUMN, UPPER

Removal

REMOVAL

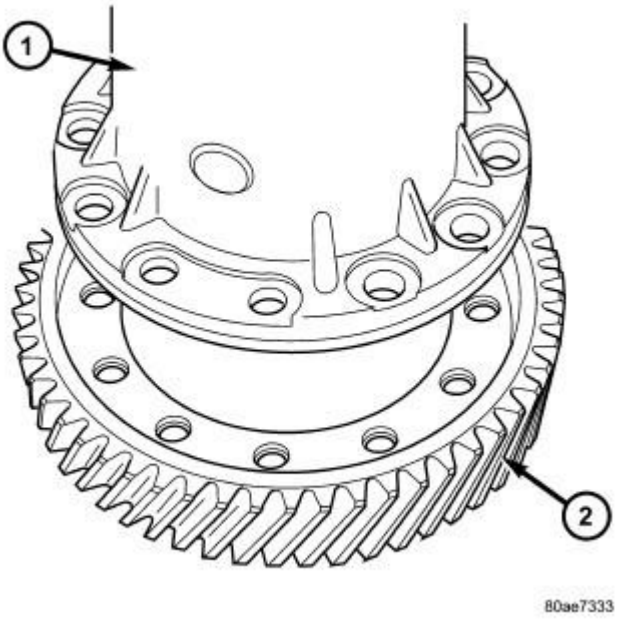

Fig. 63: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

1. Remove the two screws (1) attaching the upper shroud to the lower shroud.
2. Un-clip the upper and lower shrouds from one another by applying hand pressure along the seams where the shrouds connect on the sides.
3. Remove the upper shroud.

Installation

INSTALLATION

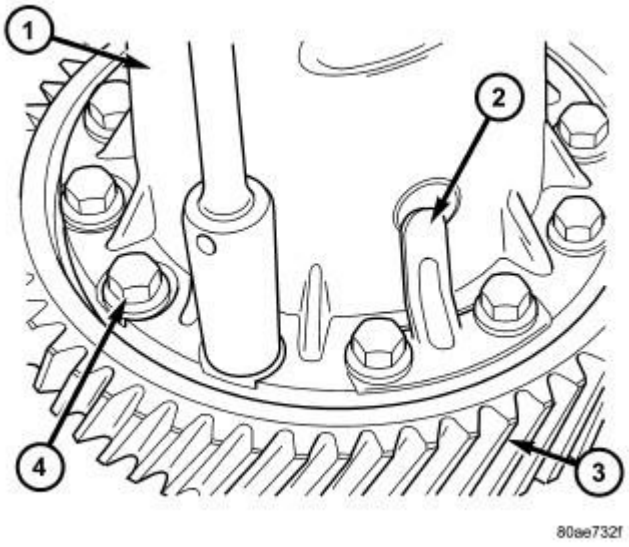

Fig. 64: Removing/Installing Upper & Lower Shrouds
Courtesy of CHRYSLER LLC

1. Position the upper shroud on the column.
2. Clip the upper and lower shrouds to one another.
3. Install the two screws (1) attaching the lower shroud to the upper shroud.

WHEEL, STEERING

Removal

REMOVAL

NOTE: Before proceeding, see Steering/Column - Warning.

1. Place front wheels of vehicle in STRAIGHT-AHEAD position.
2. Disconnect and isolate the battery negative (-) cable. Wait two minutes for the airbag system reserve capacitor to discharge before beginning any steering column, instrument panel, or airbag system/component service.

WARNING: When an undeployed airbag is to be removed from the vehicle, first disconnect and isolate the battery negative (ground) cable. Allow the airbag system reserve capacitor to discharge for two minutes before beginning any airbag system or component service. Personal injury may result if this procedure is not followed.

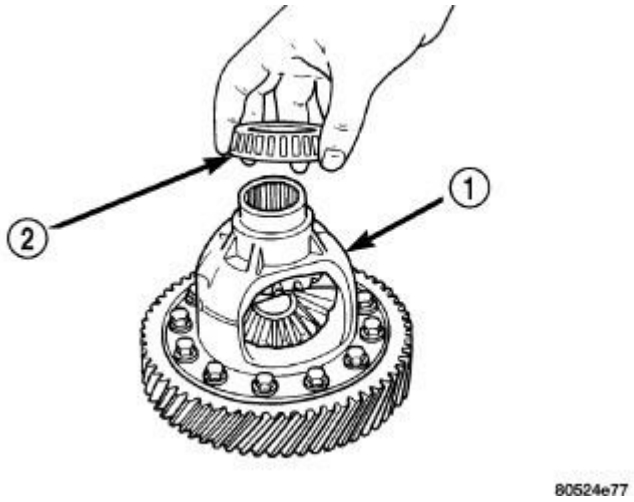

Fig. 65: Removing/Installing Driver Airbag
Courtesy of CHRYSLER LLC

3. Remove the driver airbag (1). Refer to **Restraints/AIR BAG, Driver - Removal** .

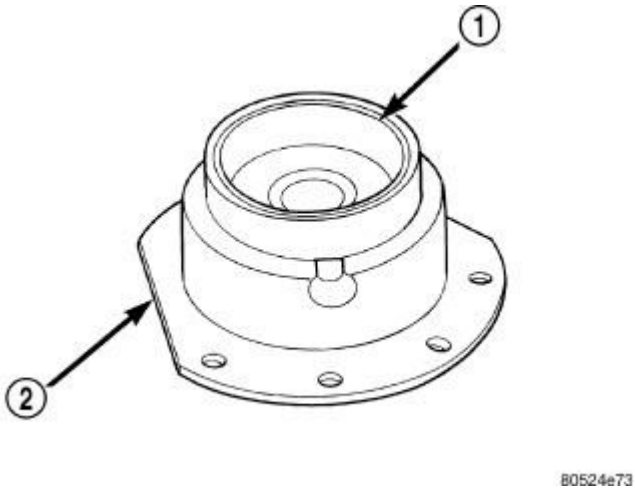

Fig. 66: Identifying Wiring Connector At Clockspring
Courtesy of CHRYSLER LLC

4. Disconnect the wiring connector (2) at the clockspring.

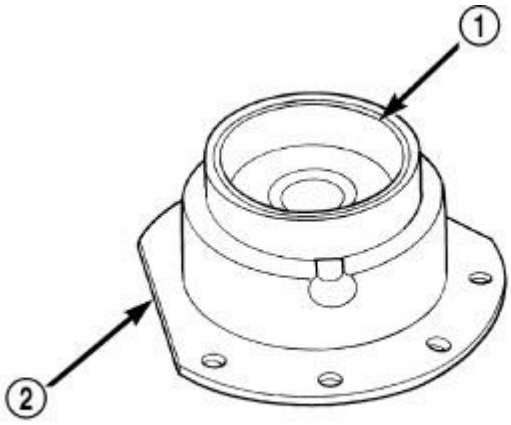

Fig. 67: Removing/Installing Steering Wheel Retaining Bolt
Courtesy of CHRYSLER LLC

5. Holding the steering wheel (4) firmly in place, remove the steering wheel retaining bolt (3) from the steering column shaft.

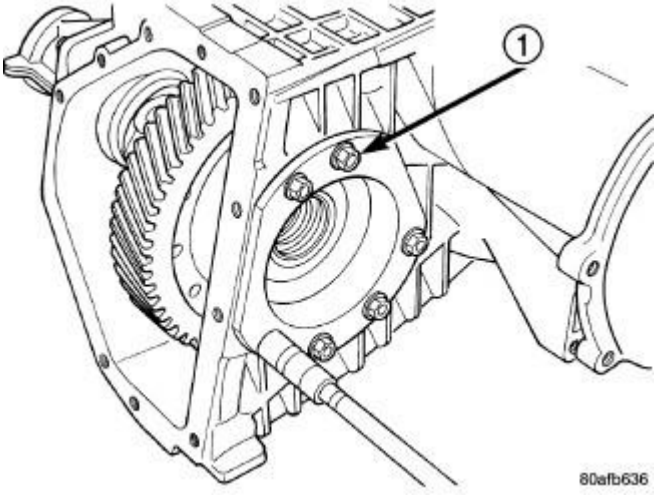

Fig. 68: Identifying Steering Wheel Puller
Courtesy of CHRYSLER LLC

CAUTION: Do not bump or hammer on the steering wheel or steering column shaft when removing the steering wheel.

6. Install an appropriate wheel puller with hooked legs (1) on the steering wheel over the steering shaft. See **Steering/Column/WHEEL, Steering - Removal**.

CAUTION: Do not attempt to rotate the clockspring rotor once the steering wheel is removed. The clockspring must remain centered in its travel to avoid overextending the clockspring inner parts, causing the

clockspring to become inoperative. If removed and handled properly using the correct procedures, it should remain in the "centered" position. If there is any question as to whether the clockspring is in the "centered" position of travel, perform the clockspring centering procedure before installing the steering wheel. Refer to Restraints/CLOCKSPRING - Standard Procedure .

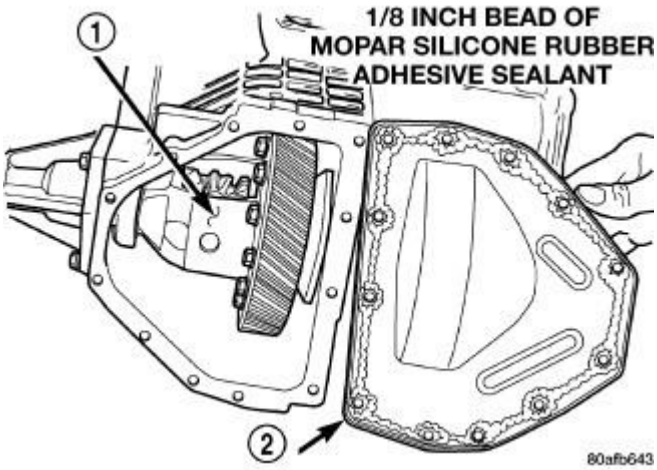

Fig. 69: Identifying Steering Wheel Puller
Courtesy of CHRYSLER LLC

7. Holding the steering wheel firmly in the STRAIGHT-AHEAD position, release the steering wheel from the steering column shaft splines using the wheel puller (1). Remove the steering wheel from the column.
8. Remove speed control switch from steering wheel. Refer to **Electrical/Speed Control/SWITCH, Speed Control - Removal** .
9. Remove remote audio switches from steering wheel. Refer to **Electrical/Audio and Video/SWITCH, Remote Radio - Removal** .

Installation

INSTALLATION

1. Install remote audio control switches on steering wheel. Refer to **Electrical/Audio and Video/SWITCH, Remote Radio - Installation** .
2. Install speed control switches on steering wheel. Refer to **Electrical/Speed Control/SWITCH, Speed Control - Installation** .

CAUTION: When installing the steering wheel, the clockspring must be centered in its travel to avoid overextending the clockspring inner parts, causing the clockspring to become inoperative. If removed and handled properly using the correct procedures, it should be in the "centered" position at this time. If there is any question as to whether the clockspring is in the "centered" position of travel, perform the

clockspring centering procedure before proceeding to avoid damaging clockspring. Refer to Restraints/CLOCKSPRING - Standard Procedure .

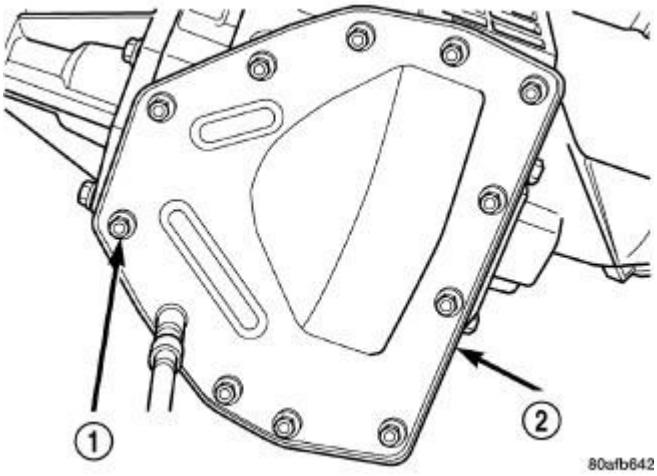

Fig. 70: Removing/Installing Steering Wheel Retaining Bolt
Courtesy of CHRYSLER LLC

3. Line up the steering wheel (4) with the steering shaft and install the steering wheel.
4. Install the steering wheel retaining bolt (3). Tighten the steering wheel retaining bolt to 50 N.m (37 ft. lbs.). See **Steering/Column/WHEEL, Steering - Installation**.

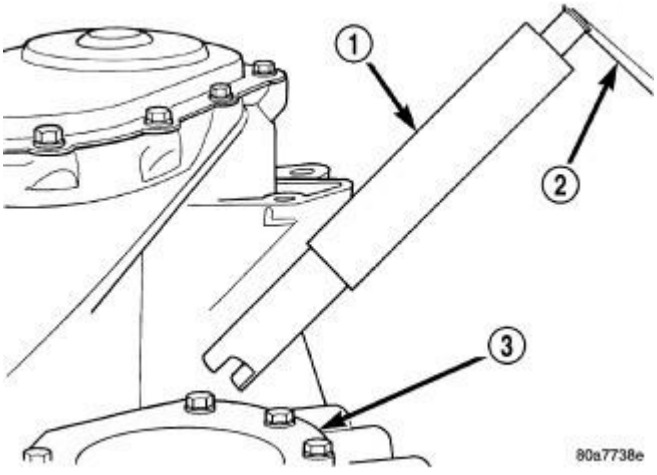

Fig. 71: Identifying Wiring Connector At Clockspring
Courtesy of CHRYSLER LLC

5. Connect the wiring connector (2) at the clockspring.

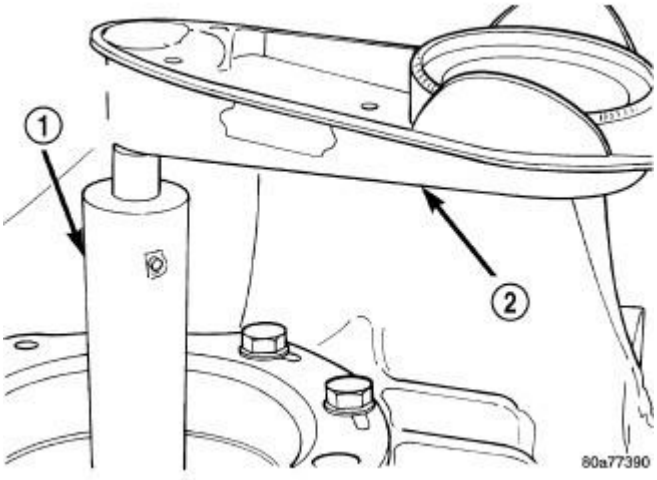

Fig. 72: Removing/Installing Driver Airbag
Courtesy of CHRYSLER LLC

6. Install the driver airbag (1). Refer to **Restraints/AIR BAG, Driver - Installation** .

WARNING: Do not connect the battery ground cable without following the proper procedure as indicated in the following step. Personal injury or death may result if the Airbag System Test is not performed first.

7. Reconnect the battery ground terminal following the Airbag System Test . Refer to **Restraints - Diagnosis and Testing** .
8. Road test the vehicle. Check operation of steering wheel mounted controls.

GEAR

WARNING

WARNINGS AND CAUTIONS

WARNING: Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst.

WARNING: Fluid level should be checked with the engine off to prevent personal injury from moving parts.

CAUTION: When the system is open, cap all open ends of the hoses, power steering pump fittings or power steering gear ports to prevent entry of foreign material into the components.

CAUTION: When servicing power steering components, do not pinch off power steering hoses in an any way to stop fluid flow. Damage to hoses may result.

DIAGNOSIS AND TESTING

POWER STEERING GEAR

NOTE: This information is designed to be used in conjunction with the diagnostic charts . See STEERING SYSTEM DIAGNOSIS CHARTS.

OBJECTIONABLE HISS OR WHISTLE POSSIBLY CAUSED BY A NOISY STEERING GEAR

1. Check and adjust power steering fluid level in the reservoir as necessary. See **Steering/Pump/FLUID - Standard Procedure**.
2. Start the vehicle and heat system by steering lock-to-lock 5 times with the engine running at 3000 RPM. Do not hold the gear against the stops for more than 15 seconds at a time.
3. Return the engine to idle speed.
4. Listen for the noise when turning the wheel slowly off center during a dry park maneuver.
5. Replace power steering gear if the hiss or whistle is present. See **Steering/Gear - Removal**.

REMOVAL

STEERING GEAR

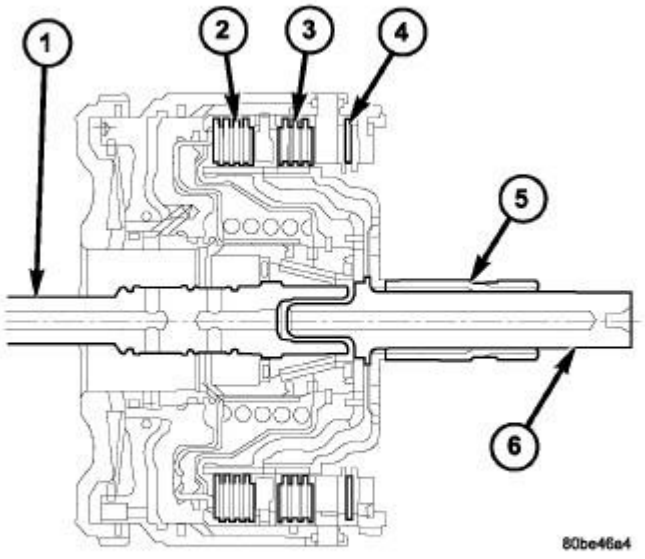

Fig. 73: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

1. Place front wheels of vehicle in STRAIGHT-AHEAD position.
2. Install steering wheel holder locking steering wheel in STRAIGHT-AHEAD position.
3. Remove negative (-) battery cable from battery and isolate cable.
4. Remove cap from power steering fluid reservoir.
5. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.
6. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

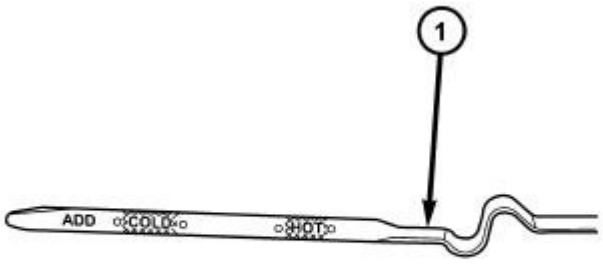

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Fig. 74: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

7. On each side of vehicle, remove wheel mounting nuts (3), then tire and wheel assembly (1).

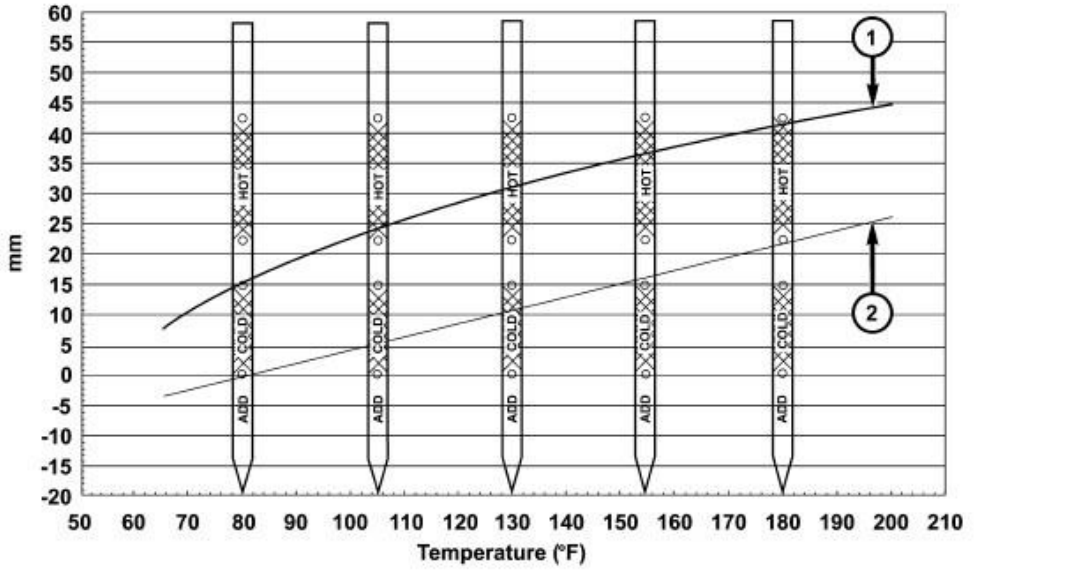

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Fig. 75: Identifying Stabilizer Bar Link, Stabilizer Bar, & Nut
Courtesy of CHRYSLER LLC

8. At each end of stabilizer bar, while holding stabilizer bar link (1) lower stud stationary (wrench placed on machined flats on stud), remove nut (2) securing link to stabilizer bar (3).

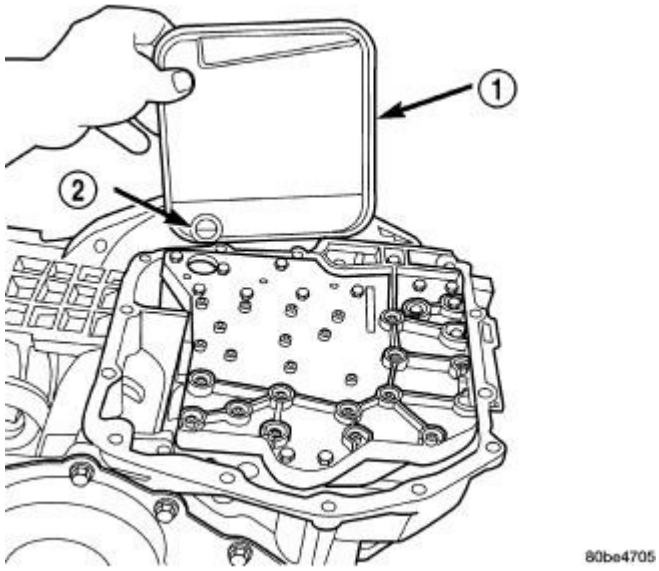

Fig. 76: Removing/Installing Outer Tie Rod Stud At Knuckle Steering Arm
Courtesy of CHRYSLER LLC

9. If outer tie rods (4) need to be transferred to new gear, loosen tie rod jam nut (3) on both sides of vehicle.
10. On both sides of vehicle, remove nut (1) attaching outer tie rod (5) to knuckle (2) by holding rod end stud stationary while loosening and removing nut with a wrench.

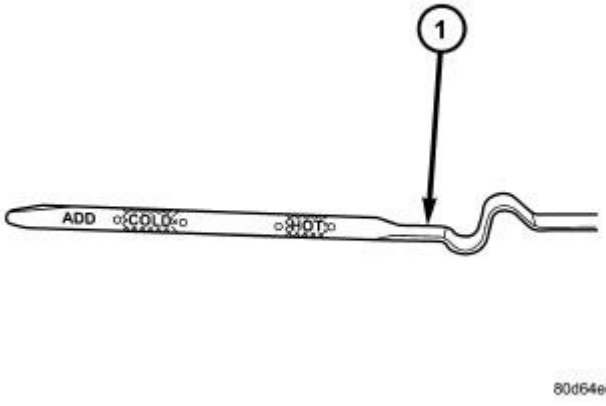

Fig. 77: Removing Outer Tie Rod Stud From Steering Knuckle Using Puller 9360
Courtesy of CHRYSLER LLC

11. Release each outer tie rod end (3) from knuckle (1) using Remover (1), Special Tool 9360.

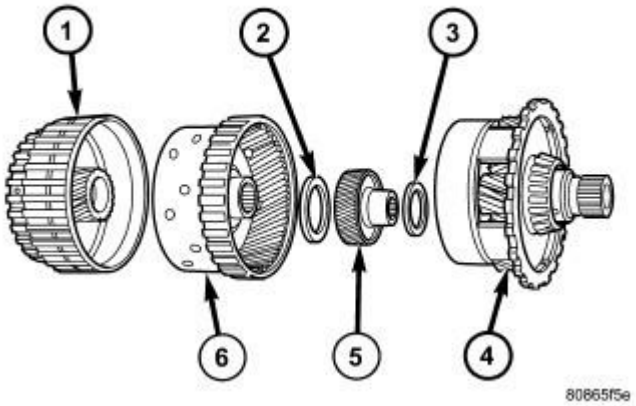

Fig. 78: Removing/Installing Front Engine Mount Thru-Bolt
Courtesy of CHRYSLER LLC

12. Remove front engine mount thru-bolt (4).

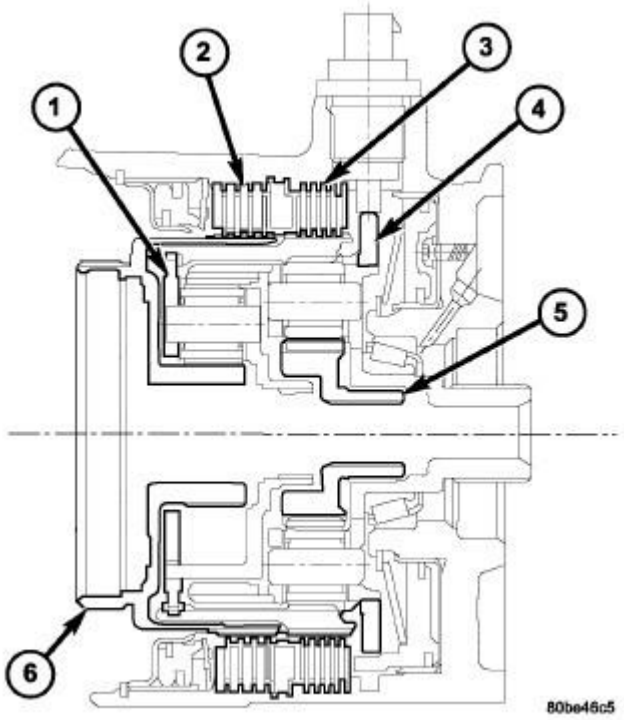

Fig. 79: Removing/Installing Fore-Aft Crossmember
Courtesy of CHRYSLER LLC

13. Remove fore-aft crossmember front mounting bolt (6).
14. Remove four fore-aft crossmember rear mounting bolts (3, 4).

15. Remove the fore-aft crossmember.

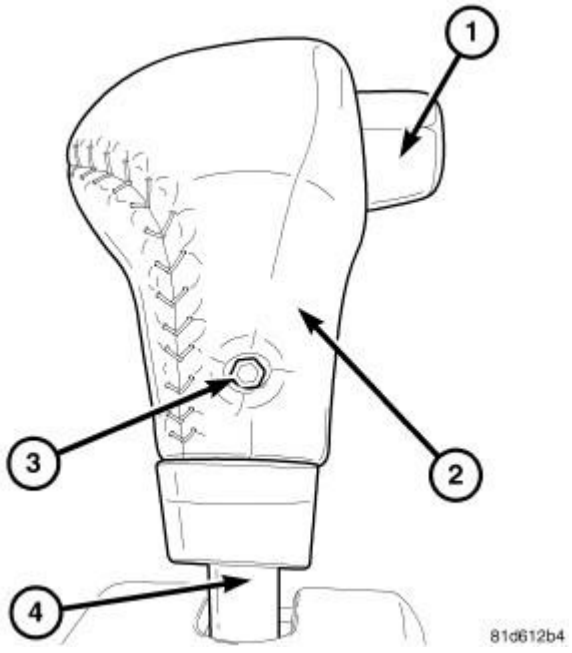

Fig. 80: Removing/Installing Heat Shield
Courtesy of CHRYSLER LLC

16. Remove screws and push-pins securing heat shield (1) over right side of steering gear (2). Remove heat shield.
17. Remove the rear engine mount.
    - For 3.3L / 3.8L engine, refer to **REMOVAL** .
    - For 4.0L engine, refer to **REMOVAL** .
    - For 2.8L Diesel engine, refer to **ENGINE MOUNTING** .

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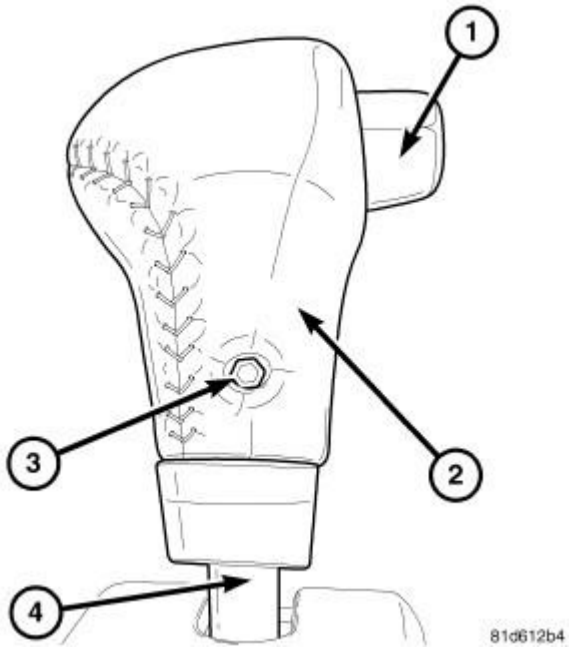

Fig. 81: Removing/Installing Screws At Power Steering Pressure Hose Routing Clamp(s) & Rear Of Crossmember
Courtesy of CHRYSLER LLC

18. Remove screws (3) securing power steering pressure hose routing clamp(s) (4.0L engine only uses one) to rear of crossmember.

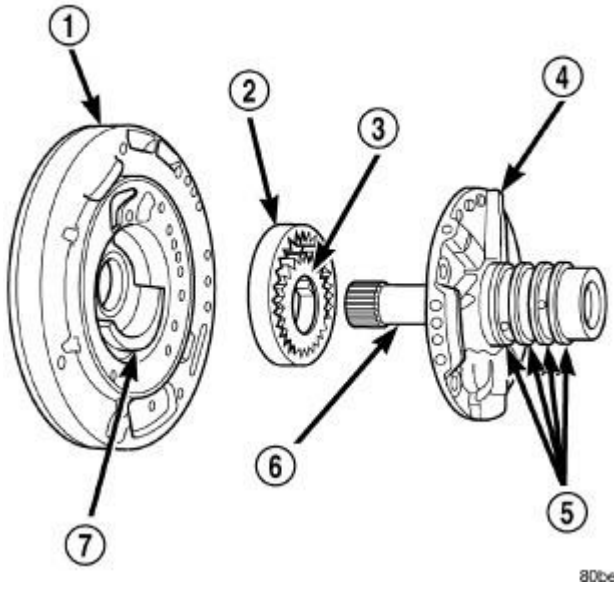

Fig. 82: Removing/Installing Stabilizer Bar At Crossmember
Courtesy of CHRYSLER LLC

19. Remove the screws (1) securing the stabilizer bushing retainers (2) to the crossmember.

20. Remove the two stabilizer bushing retainers (2).
21. Utilizing the slit cut into the cushions (bushings), remove the two cushions from the stabilizer bar.
22. Slowly rotate the stabilizer bar as necessary and remove it out through the driver side wheel opening.

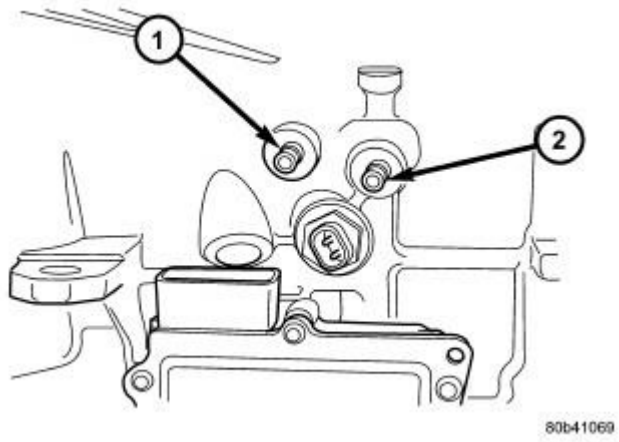

Fig. 83: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

23. Remove tube nut fastening return hose (5) to power steering gear (3). Remove return hose from gear port.
24. Remove tube nut fastening pressure hose (4) to power steering gear (3). Remove pressure hose from gear port.

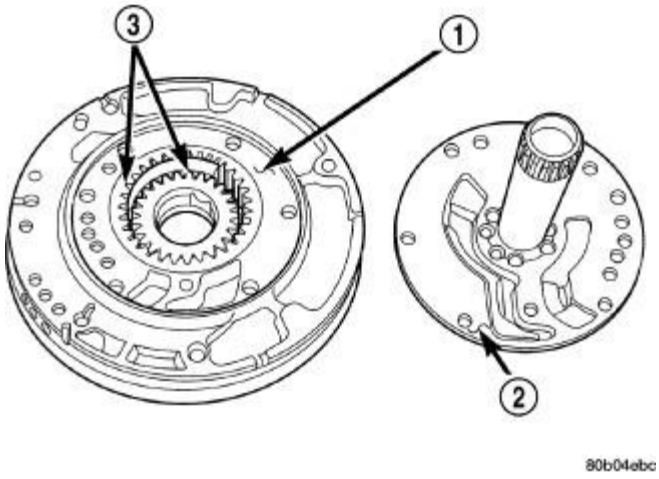

Fig. 84: Identifying Steering Gear & Bolts
Courtesy of CHRYSLER LLC

25. Remove bolts (1) securing steering gear (2) to crossmember.

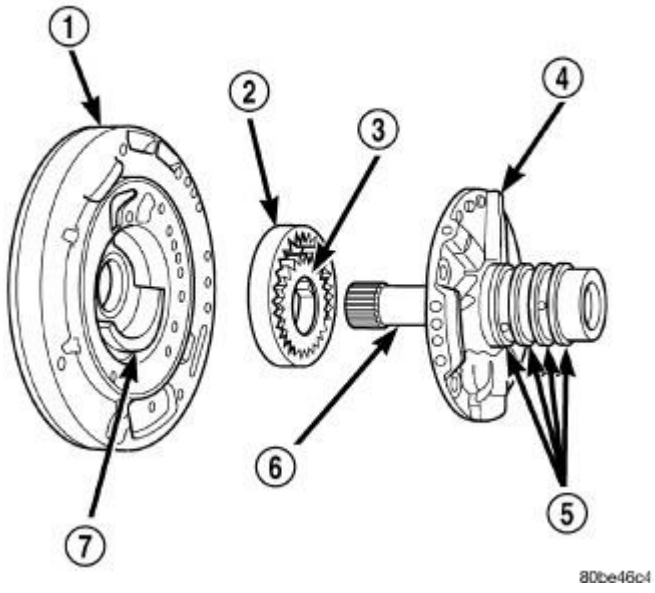

Fig. 85: Removing/Installing Intermediate Shaft Extension
Courtesy of CHRYSLER LLC

26. Slide dust shield upward exposing pinch bolt (1) securing intermediate shaft extension (2) to steering gear shaft (3).
27. Remove pinch bolt (1) securing intermediate shaft extension (2) to steering gear shaft (3)
28. Slide intermediate shaft extension (2) off steering gear shaft (3).

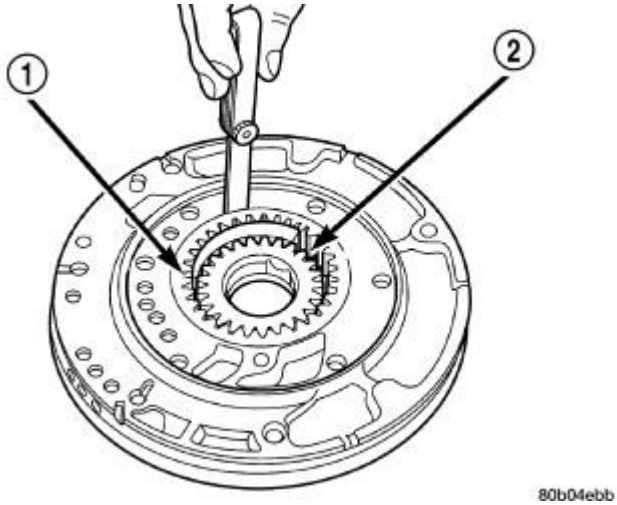

Fig. 86: Removing/Installing Steering Gear
Courtesy of CHRYSLER LLC

29. Rotate steering gear to position shown in **Fig. 86** , then slide steering gear out left wheel opening.
30. If necessary, remove outer tie rods from inner tie rod threads. Count how many rotations it takes to remove each outer tie rod for installation reference.

STEERING GEAR - RIGHT-HAND-DRIVE

Right-Hand-Drive steering gear is typical of Left-Hand-Drive. See **Gear**.

INSTALLATION

STEERING GEAR

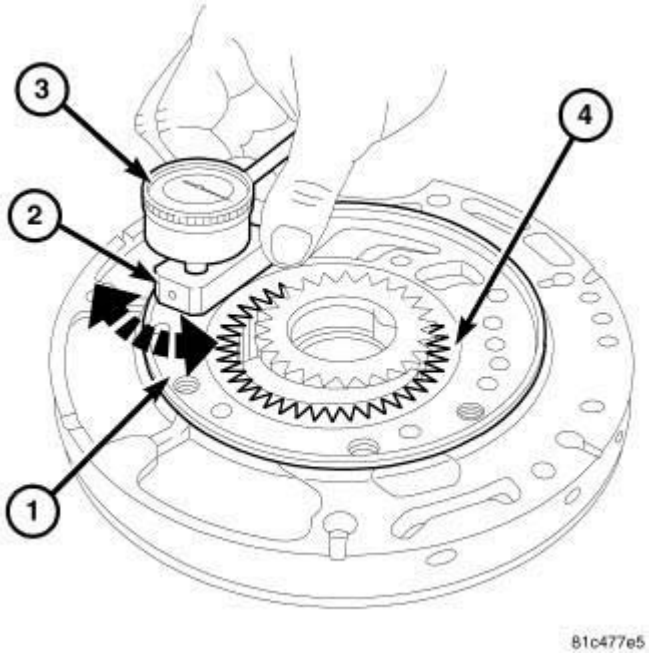

Fig. 87: Removing/Installing Steering Gear
Courtesy of CHRYSLER LLC

1. If necessary, install outer tie rods onto inner tie rod threads. As outer tie rods are installed, count out same number rotations as were counted on tie rod removal. This will get toe setting somewhat close to specification before vehicle is aligned at end of this procedure. Snug tie rod jam nuts on both ends of gear. Do not tighten at this time. Tighten tie rod jam nuts to specification while performing wheel alignment at end of this procedure.
2. Carefully install power steering gear (1) through left wheel opening using the reverse of how it was removed, then set it up into mounted position.

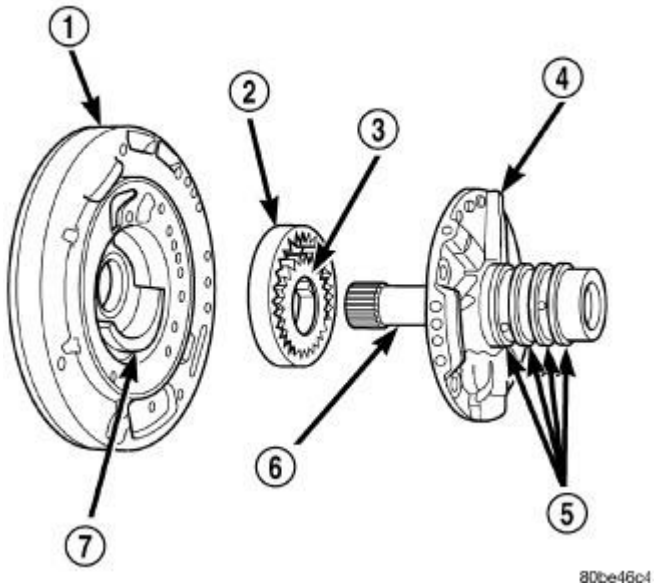

Fig. 88: Removing/Installing Intermediate Shaft Extension
Courtesy of CHRYSLER LLC

3. Find power steering gear's center of travel, then match intermediate shaft extension (2) with that on steering gear shaft (3). Slide extension onto steering gear shaft.
4. Install pinch bolt (1) securing intermediate shaft extension (2) to extension shaft (3). Tighten pinch bolt to 42 N.m (31 ft. lbs.).
5. Slide dust shield down over pinch bolt and steering gear shaft.

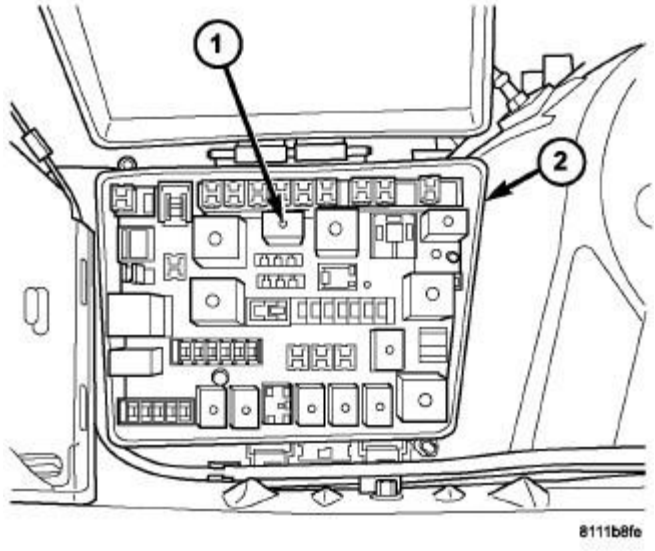

Fig. 89: Identifying Steering Gear & Bolts
Courtesy of CHRYSLER LLC

6. Center steering gear (2) mounting bosses over mounting holes in crossmember and install two steering gear mounting bolts (1). Tighten mounting bolts to 120 N.m (89 ft. lbs.).

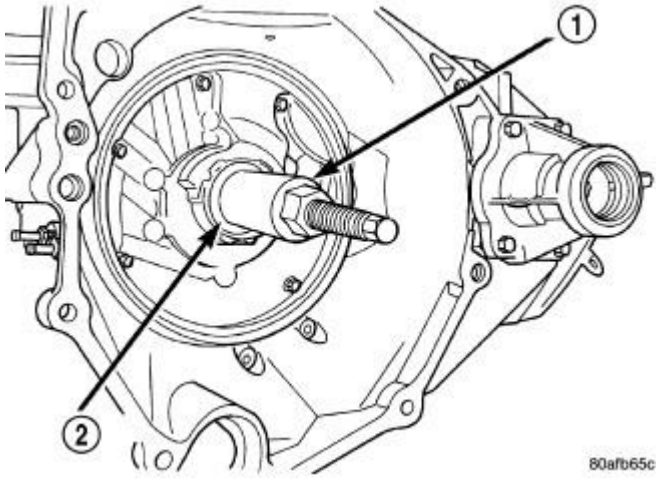

Fig. 90: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

7. Install return hose (5) into power steering gear (3) port. Thread return hose tube nut into gear and tighten to 31 N.m (23 ft. lbs.).
8. Install pressure hose (4) into power steering gear (3) port. Thread pressure hose tube nut into gear and tighten to 31 N.m (23 ft. lbs.).

NOTE: Before stabilizer bar installation, inspect the cushions and links for excessive wear, cracks, damage and distortion. Replace any pieces failing inspection.

NOTE: Before installing the stabilizer bar, make sure the bar is not upside-down. The stabilizer bar must be installed so that when in mounted position, the ends of the bar curve under the steering gear tie rods, up to the links.

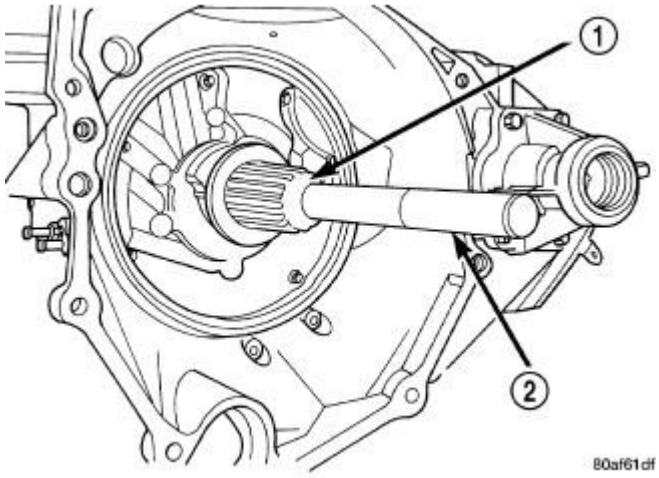

Fig. 91: Removing/Installing Stabilizer Bar At Crossmember
Courtesy of CHRYSLER LLC

9. Install the stabilizer bar through the driver side wheel opening. Rotate the bar as necessary until it is centered over the suspension crossmember and the ends curve upward below the steering gear tie rods.
10. Install the two cushions (bushings) on the stabilizer bar utilizing the slit cut into the cushion sides.
11. Install the two stabilizer bushing retainers (2) over the cushions.
12. Install the four screws (1) securing the stabilizer bushing retainers (2) to the crossmember. Tighten screws to 45 N.m (33 ft. lbs.).

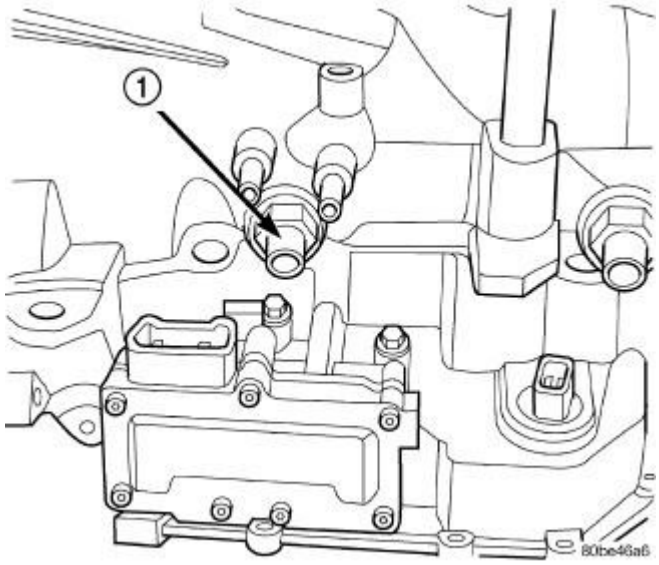

Fig. 92: Removing/Installing Screws At Power Steering Pressure Hose Routing Clamp(s) & Rear Of Crossmember
Courtesy of CHRYSLER LLC

13. Position the power steering pressure hose routing clamp(s) (4.0L engine only uses one) on the rear of the

crossmember. Install and tighten the screw(s) to 8 N.m (71 in. lbs.).

14. Install the rear engine mount.
    - For 3.3L / 3.8L engine, refer to **INSTALLATION** .
    - For 4.0L engine, refer to **INSTALLATION** .
    - For 2.8L Diesel engine, refer to **ENGINE MOUNTING** .

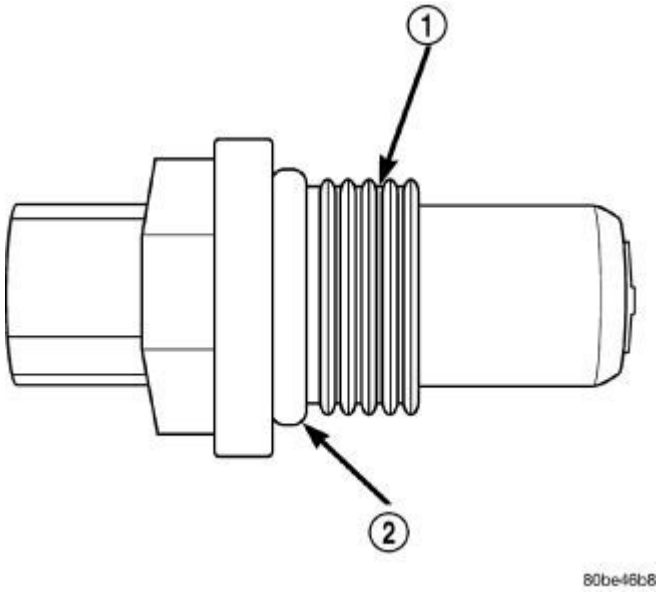

Fig. 93: Removing/Installing Heat Shield
Courtesy of CHRYSLER LLC

15. Position the heat shield (1) over the steering gear (2). Install the mounting screws and push-pins. Tighten the screws to 8 N.m (71 in. lbs.).

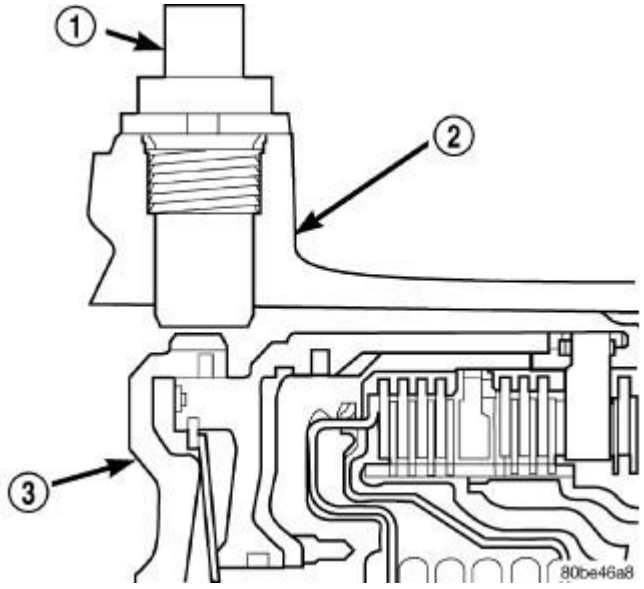

Fig. 94: Removing/Installing Fore-Aft Crossmember

Courtesy of CHRYSLER LLC

16. Position fore-aft crossmember in engine compartment and install mounting bolts (3, 4, 6). Tighten forward mounting bolt (6) to 113 N.m (83 ft. lbs.). Tighten rearward mounting bolts (3, 4) at suspension crossmember (2) to 55 N.m (41 ft. lbs.).

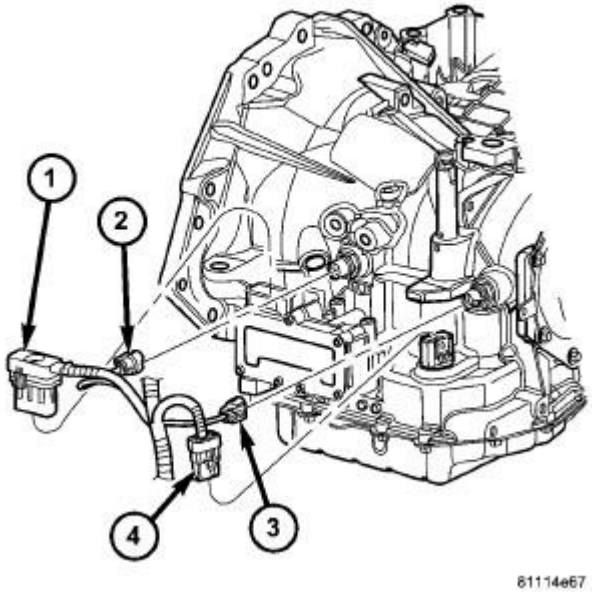

Fig. 95: Removing/Installing Front Engine Mount Thru-Bolt
Courtesy of CHRYSLER LLC

17. Install front engine mount thru-bolt (4). Tighten bolt to 57 N.m (42 ft. lbs.).

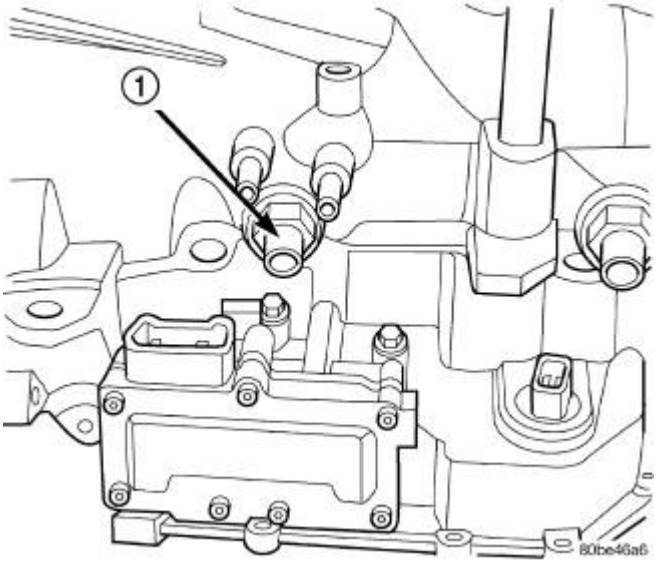

Fig. 96: Removing/Installing Outer Tie Rod Stud At Knuckle Steering Arm
Courtesy of CHRYSLER LLC

18. On each side of vehicle, attach outer tie rod (5) to knuckle (2). Start NEW nut (1) onto outer tie rod stud. While holding stud stationary, tighten nut using a wrench. Using a crowfoot wrench on a torque wrench, tighten nut to 75 N.m (55 ft. lbs.). Then, tighten nut an additional 245° turn after that torque is met.

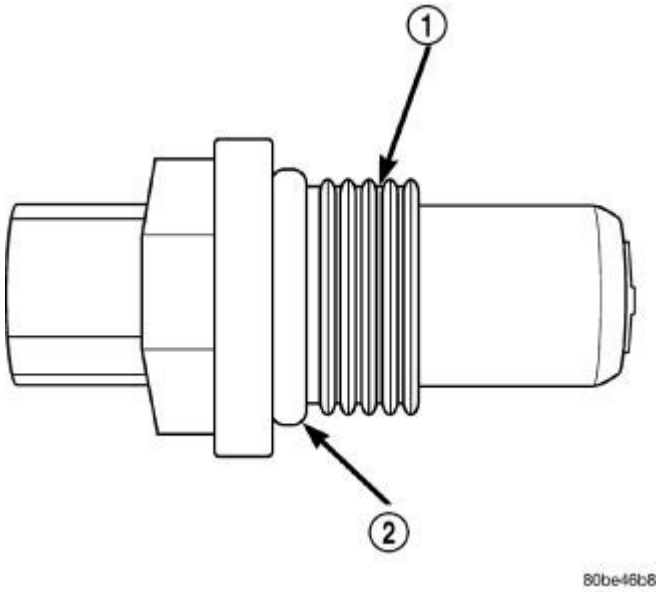

Fig. 97: Identifying Stabilizer Bar Link, Stabilizer Bar, & Nut
Courtesy of CHRYSLER LLC

19. Attach the stabilizer bar link (1) at each end of the stabilizer bar (3). At each link, install and tighten the nut (2) while holding the stabilizer bar link lower stud stationary. Tighten the nuts to 88 N.m (65 ft. lbs.).

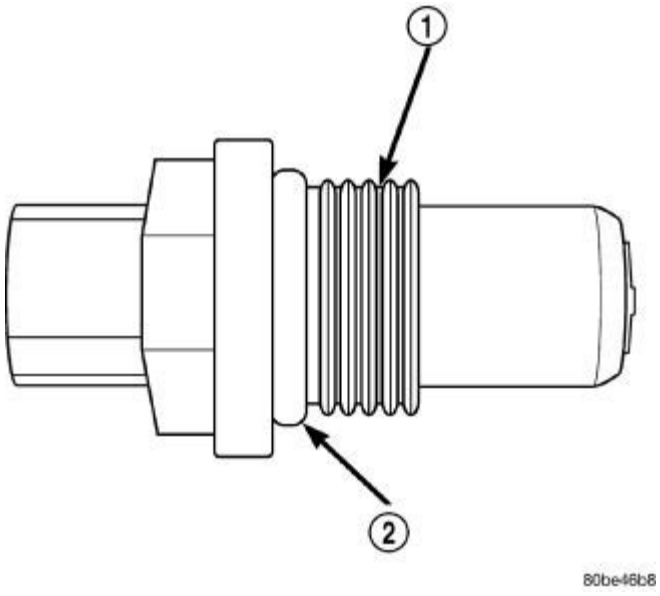

Fig. 98: Identifying Tire & Wheel Assembly

Courtesy of CHRYSLER LLC

20. On each side of vehicle, install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) in proper sequence to 135 N.m (100 ft. lbs.).
21. Lower vehicle.
22. Connect negative (-) battery cable on negative battery post.

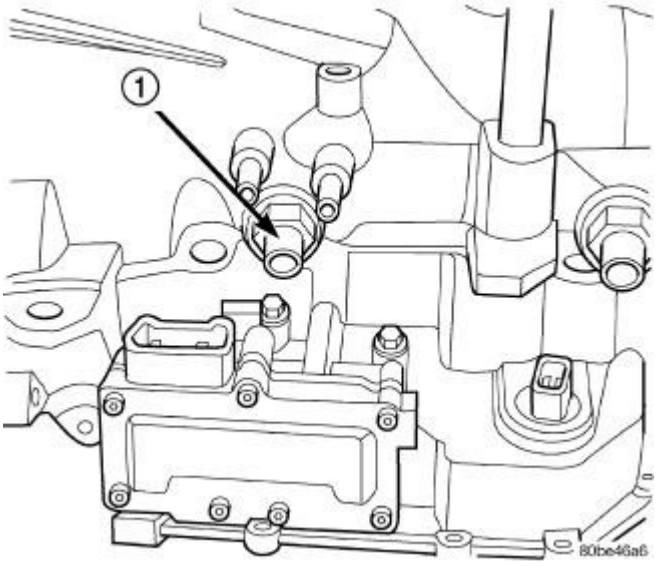

Fig. 99: Identifying Steering Wheel Holder
Courtesy of CHRYSLER LLC

23. Remove steering wheel holder.
24. Fill and bleed power steering system. See **Steering - Standard Procedure**.
25. Inspect for leaks.
26. Perform wheel alignment, setting toe to specifications. Refer to **Front Suspension/Wheel Alignment - Standard Procedure** .

STEERING GEAR - RIGHT-HAND-DRIVE

Right-Hand-Drive steering gear is typical of Left-Hand-Drive. See **Gear**.

TIE ROD, STEERING

Diagnosis and Testing

TIE ROD

Tie rod free-play can be measured using the following hand methods:

OUTER TIE ROD

1. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
2. Remove the front wheels. Refer to **Tires and Wheels - Removal** .
3. Install two standard wheel mounting nuts, flat side to rotor, diagonally opposite to each on the rotor.

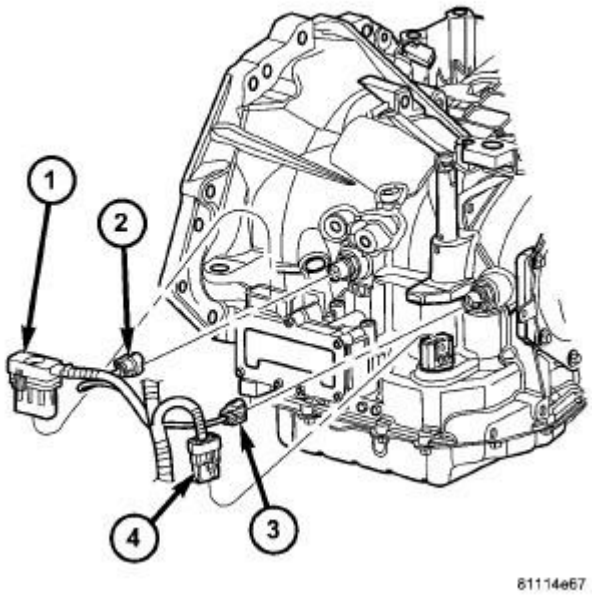

Fig. 100: Attaching Magnetic Dial Indicator To Inside Or Outside Of Brake Rotor
Courtesy of CHRYSLER LLC

4. Attach a magnetic dial indicator (2) to the inside or outside of the brake rotor, then align the dial indicator's contact pointer (1) with the direction of the stud axis and touch the outer tie rod.
5. Zero the dial indicator. (3)

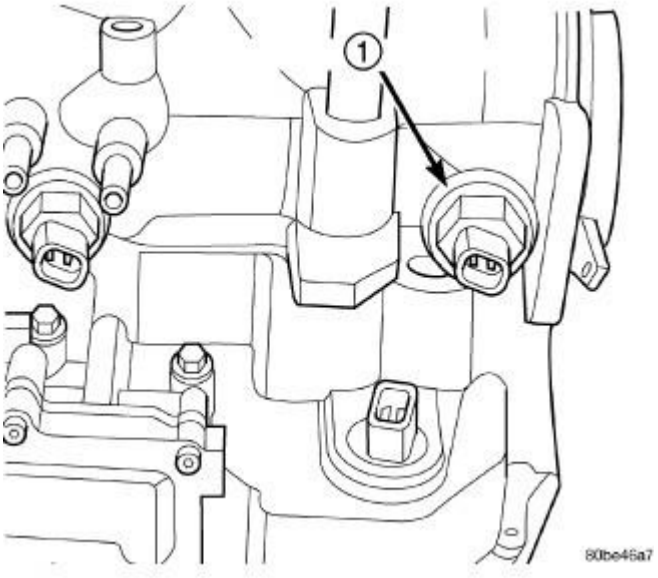

Fig. 101: Checking Outer Tie Rod Free-Play
Courtesy of CHRYSLER LLC

NOTE: When checking free-play, DO NOT rotate the tie rod. Just because a tie rod rotates easily does not mean that it is necessarily faulty. Using more than light hand pressure will result in a false reading.

6. Grasp the outer tie rod near the ball stud and attempt to move the tie rod straight up and down using light hand pressure. (Less than 10 lbs. of force.)
7. Measure and record any tie rod free-play movement.
8. Remove the magnetic dial indicator.
9. Remove the standard wheel mounting nuts from the two studs.

If the free-play in the tie rod exceeds 0.05 mm (.002 in.), replace the outer tie rod. See **OUTER TIE ROD**. If the free-play is less than 0.05 mm (.002 in.) at the outer tie rod check the inner tie rod for free-play. Refer to **INNER TIE ROD**.

INNER TIE ROD

NOTE: Always check and repair (if necessary) outer tie rod free-play before checking inner tie rod free-play. False results can otherwise be obtained.

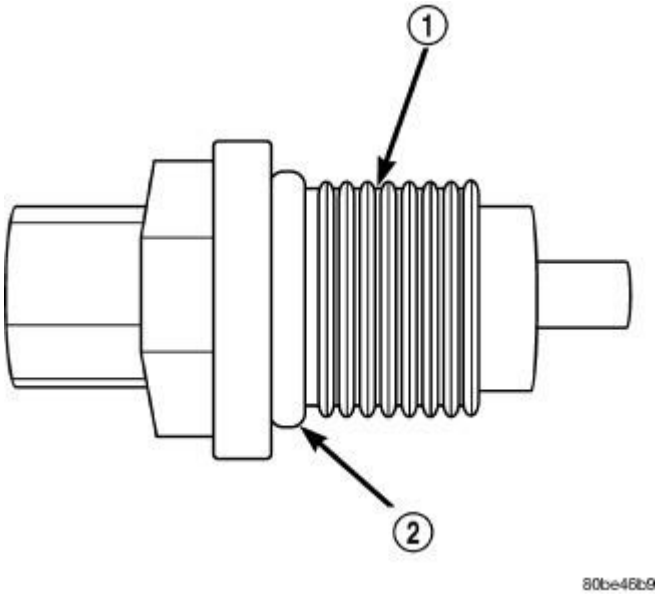

Fig. 102: Checking Inner Tie Rod Free-Play
Courtesy of CHRYSLER LLC

1. Grasp the inner tie rod near the steering gear bellows and attempt to move the tie rod straight up and down. If any free-play is felt, replace the inner tie rod. See **Steering/Gear/TIE ROD, Steering - Removal**.
2. If no free-play is felt, install the front wheels. Refer to **Tires and Wheels - Installation** .
3. Remove support and lower the vehicle.

Removal

INNER TIE ROD

1. Remove outer tie rod. See **OUTER TIE ROD**.
2. Remove tie rod jam nut from inner tie rod.

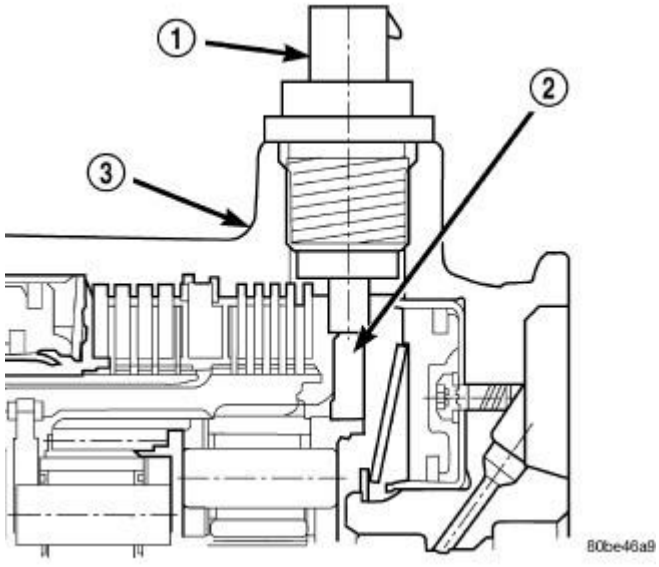

Fig. 103: Removing/Installing Heat Shield
Courtesy of CHRYSLER LLC

3. If servicing right inner tie rod, remove screws and push-pins securing heat shield (1) over right side of steering gear (2). Remove heat shield from over steering gear bellows.

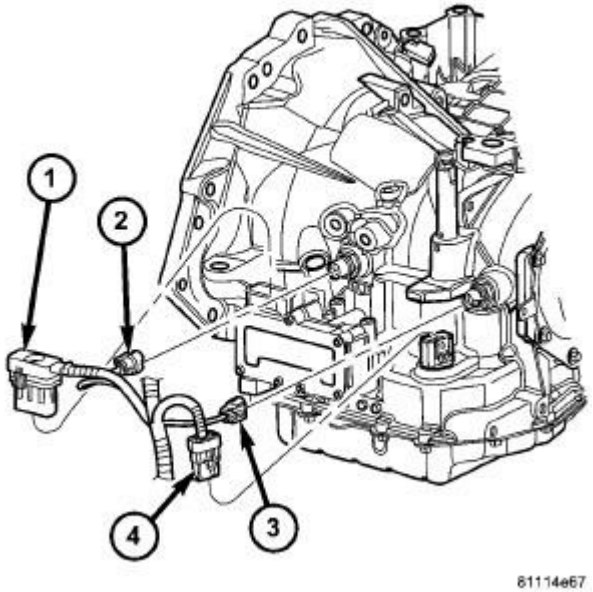

Fig. 104: Removing/Installing Bellows Clamps
Courtesy of CHRYSLER LLC

4. Remove clamp (3) securing bellows (1) to inner tie rod.
5. Remove clamp (2) securing bellows (1) to steering gear body.

6. Remove bellows.

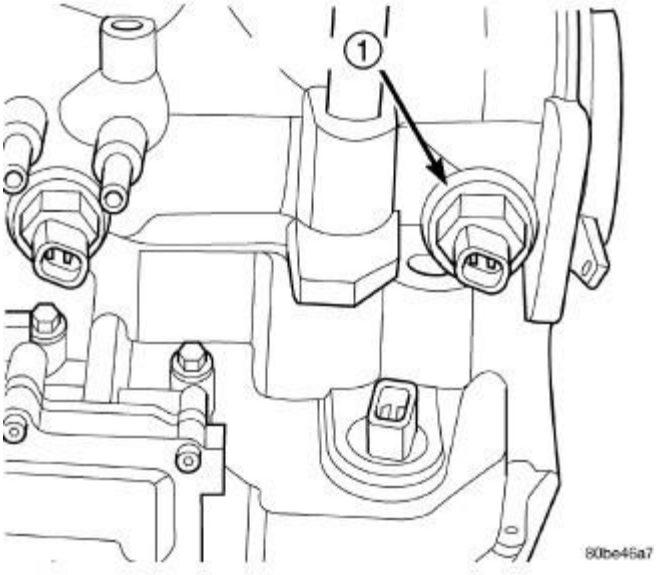

Fig. 105: Identifying Inner Tie Rod At Steering Gear
Courtesy of CHRYSLER LLC

7. Install appropriate inner tie rod removal tool on inner tie rod (1) hex.

CAUTION: If inner tie rod cannot be removed using specified tools, do not use a hammer or heat to loosen. Damage to steering gear will occur. Replace entire steering gear.

8. Un-thread and remove inner tie rod (1) from steering gear (2).

OUTER TIE ROD

1. Place front wheels of vehicle in STRAIGHT-AHEAD position.
2. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

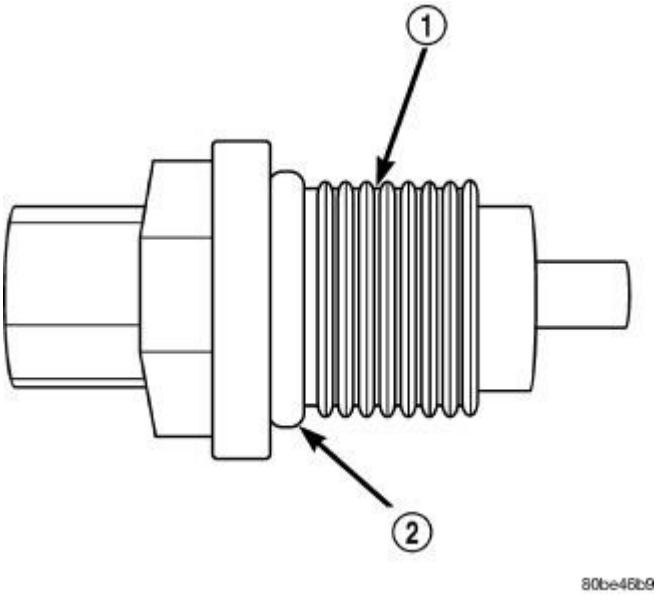

Fig. 106: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

3. Remove wheel mounting nuts (3), then tire and wheel assembly (1).

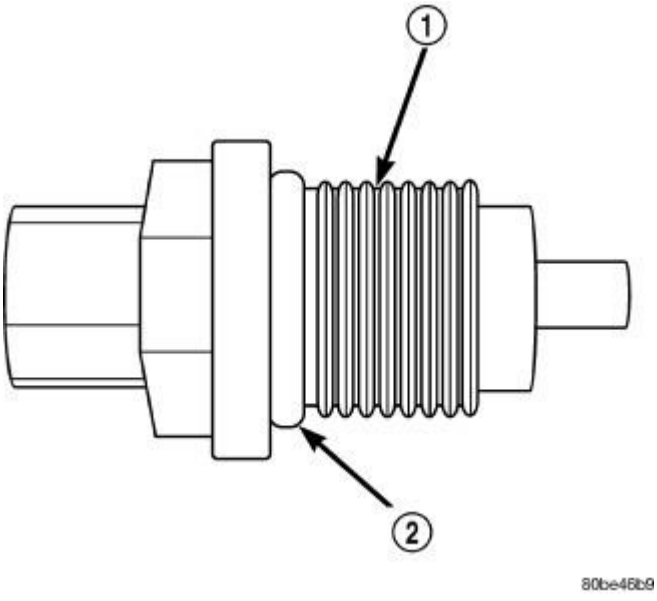

Fig. 107: Removing/Installing Outer Tie Rod Stud At Knuckle Steering Arm
Courtesy of CHRYSLER LLC

4. Loosen tie rod jam nut (3).
5. Remove nut (1) attaching outer tie rod (5) to knuckle (2) by holding rod end stud stationary while loosening and removing nut with a wrench.

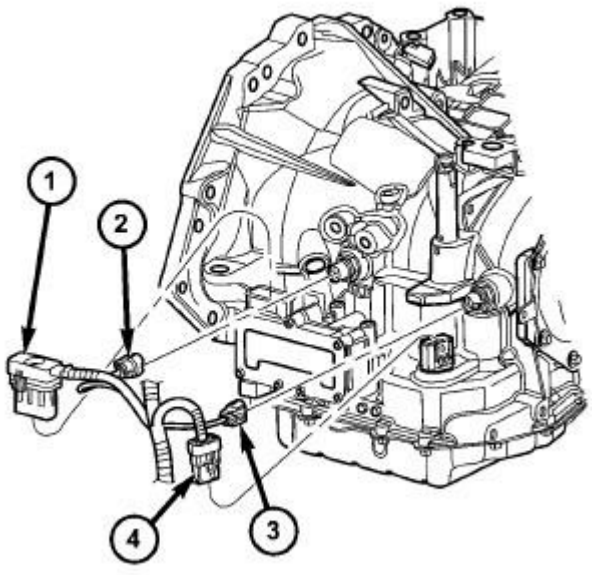

Fig. 108: Removing Outer Tie Rod Stud From Steering Knuckle Using Puller 9360
Courtesy of CHRYSLER LLC

6. Release outer tie rod end (3) from knuckle (1) using Remover (1), Special Tool 9360.
7. Remove outer tie rod from inner tie rod threads. Count how many rotations it takes to remove outer tie rod for installation reference.

Installation

INNER TIE ROD

1. Apply Mopar® Lock AND Seal Adhesive or equivalent medium thread locker adhesive to inboard end threads of inner tie rod.

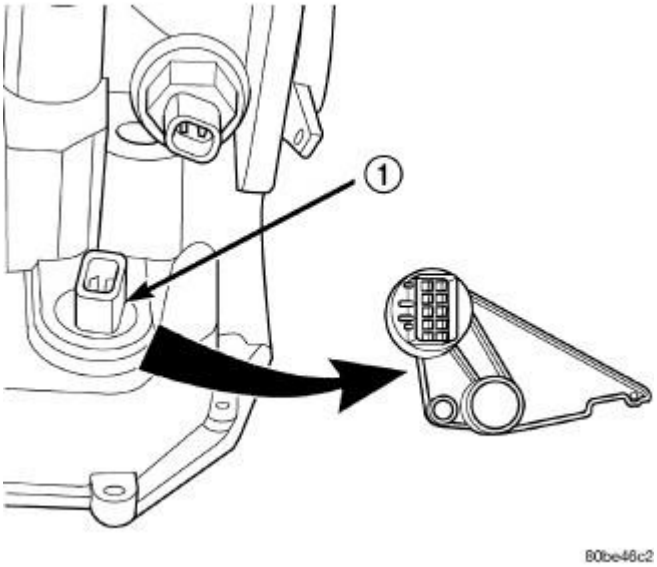

Fig. 109: Identifying Inner Tie Rod At Steering Gear
Courtesy of CHRYSLER LLC

2. Install inner tie rod (1) onto gear (2) using appropriate inner tie rod installer tool or crows foot wrench on hex. Tighten inner tie rod to 78 N.m, (58 ft. lbs.).
3. Loosely place new clamp over large end of bellows.
4. Slide new bellows with clamp over end of inner tie rod and onto gear body.

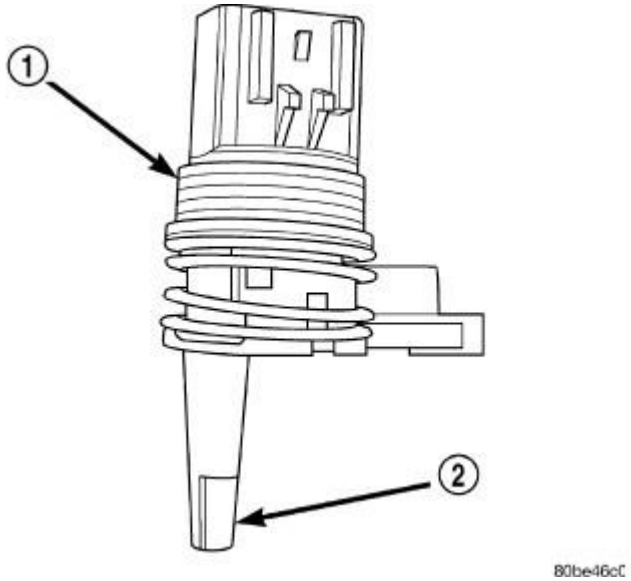

Fig. 110: Identifying Bellows & Groove In Inner Tie Rod Shaft
Courtesy of CHRYSLER LLC

5. Push small end of bellows (2) past groove (1) machined into inner tie rod.
6. Apply a small amount of Mopar® Lubriplate or equivalent uniformly to groove (1) in inner tie rod shaft.

This allows for toe adjustment without twisting bellows.

7. Pull small end of bellows outward until ridge inside bellows engages groove.

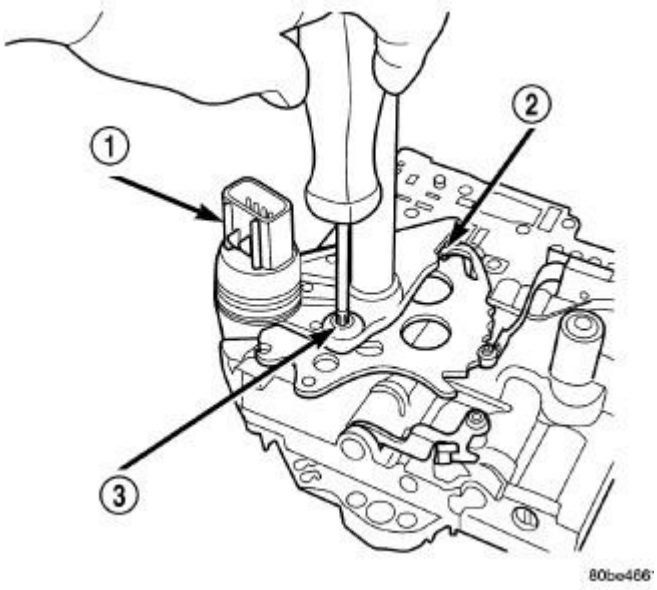

Fig. 111: Removing/Installing Bellows Clamps
Courtesy of CHRYSLER LLC

8. Install new clamp (3) over small end of bellows (1).

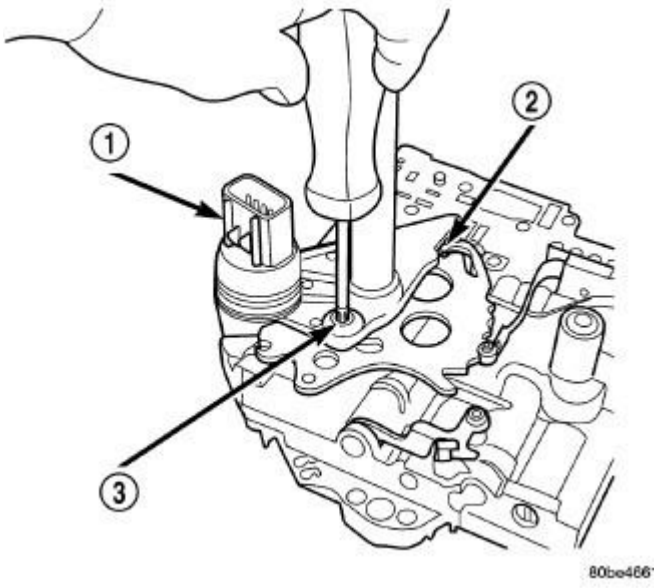

Fig. 112: Crimping Clamp Securing Bellows To Gear Body Using Crimping Pliers
Courtesy of CHRYSLER LLC

9. Using crimping pliers (1), crimp clamp securing bellows to gear body.

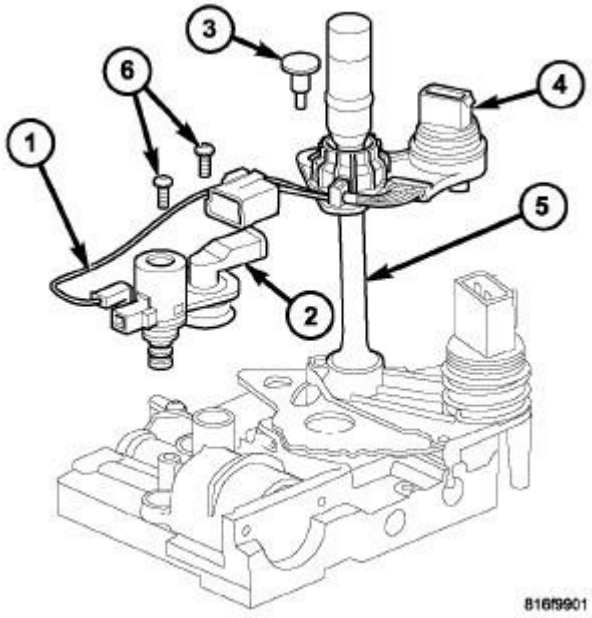

Fig. 113: Removing/Installing Heat Shield
Courtesy of CHRYSLER LLC

10. If servicing right inner tie rod, position heat shield (1) over steering gear (2). Install mounting screws and push-pins. Tighten screws to 8 N.m (71 in. lbs.).

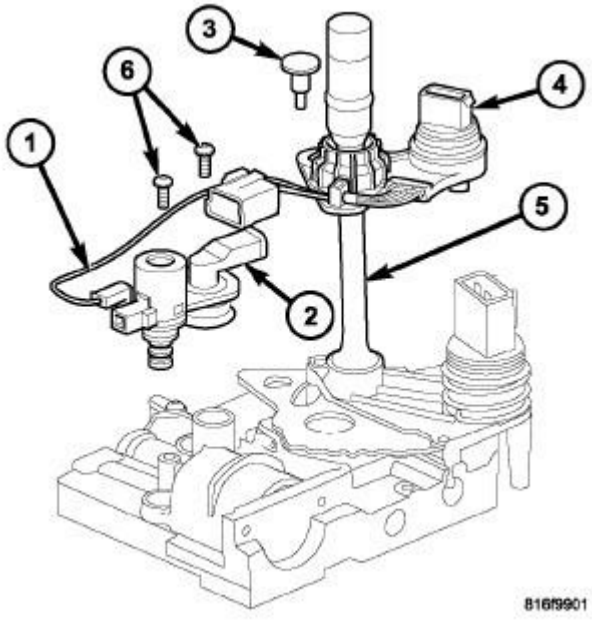

Fig. 114: Removing/Installing Outer Tie Rod Stud At Knuckle Steering Arm
Courtesy of CHRYSLER LLC

11. Thread tie rod jam nut (3) onto inner tie rod (4) far enough to install outer tie rod.
12. Install outer tie rod (5). See **OUTER TIE ROD**.

OUTER TIE ROD

1. Install outer tie rod onto inner tie rod threads. As outer tie rod is installed, count out same number rotations as were counted on tie rod removal. This will get toe setting somewhat close to specifications before vehicle is aligned at end of this procedure.

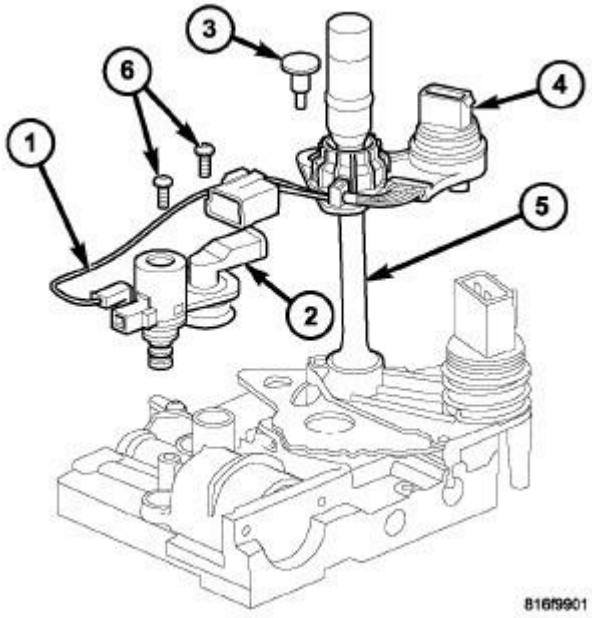

Fig. 115: Removing/Installing Outer Tie Rod Stud At Knuckle Steering Arm
Courtesy of CHRYSLER LLC

2. Attach outer tie rod (5) to knuckle (2). Start NEW nut (1) onto outer tie rod stud. While holding stud stationary, tighten nut using a wrench. Using a crowfoot wrench on a torque wrench, tighten nut to 75 N.m (55 ft. lbs.). Then, tighten nut an additional 245° turn after that torque is met.
3. Snug tie rod jam nut (3). Do not fully tighten at this time. Tighten tie rod jam nuts to specifications while performing wheel alignment at end of this procedure.

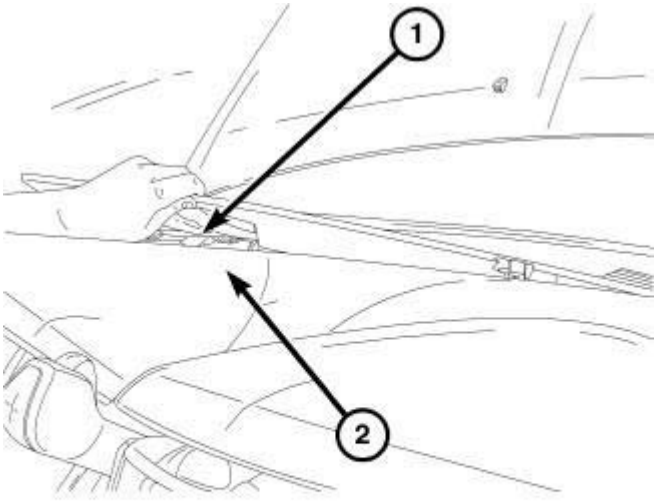

Fig. 116: Identifying Tire & Wheel Assembly
Courtesy of CHRYSLER LLC

4. Install tire and wheel assembly (1). Refer to **Tires and Wheels - Installation** . Install and tighten wheel mounting nuts (3) to 135 N.m (100 ft. lbs.).
5. Lower vehicle.
6. Perform wheel alignment, setting toe to specifications. Refer to **Front Suspension/Wheel Alignment - Standard Procedure** .

PUMP

DESCRIPTION

DESCRIPTION

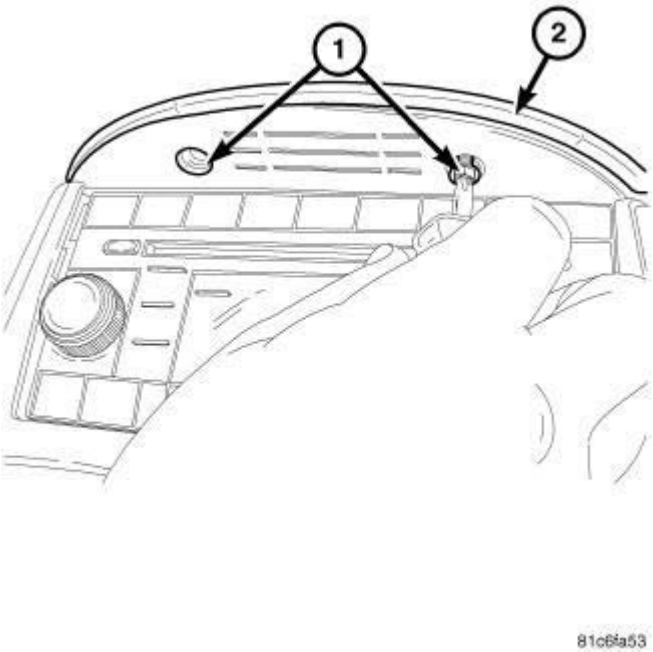

Fig. 117: Identifying Belt Driven Power Steering Pump
Courtesy of CHRYSLER LLC

Hydraulic pressure for operation of the power steering gear is provided by a droop-flow type power steering pump. The pump's output characteristic is called droop-flow because output decreases with speed. The pump provides assistance consistent with demand. It provides less assistance at highway speeds to enhance directional stability and control, while providing more assistance for steering ease in avoidance and parking maneuvers. The pump also responds to increases in system backpressure (such as when the vehicle negotiates a sharp turn) by raising the pump flow rate.

The belt driven power steering pump (2) is mounted to the front of the engine. The pulley can be serviced separately from the pump if damaged.

WARNING

WARNING

WARNING: Power steering fluid, engine parts and exhaust system may be extremely hot if engine has been running. Do not start engine with any loose or disconnected hoses. Do not allow hoses to touch hot exhaust manifold or catalyst.

WARNING: Fluid level should be checked with the engine off to prevent personal injury from moving parts.

CAUTION

CAUTION

CAUTION: When the system is open, cap all open ends of the hoses, power steering pump fittings or power steering gear ports to prevent entry of foreign material into the components.

CAUTION: When servicing power steering components, do not pinch off power steering hoses in an any way to stop fluid flow. Damage to hoses may result.

DIAGNOSIS AND TESTING

POWER STEERING PUMP AND HOSES

NOTE: This information is designed to be used in conjunction with the diagnostic charts . See STEERING SYSTEM DIAGNOSIS CHARTS.

CHECKING FOR WEAR OF POWER STEERING PUMP INTERNAL COMPONENTS

1. Place gear selector in PARK (or NEUTRAL) with wheels chalked.
2. With the engine idling, have a helper turn the steering wheel.
3. Using an electronic listening tool, determine if noise is coming from the pump.
4. Increase the engine speed and have a helper turn the steering wheel. Does the noise change with load?
5. Replace the power steering pump if excessive noise is present. See **Steering/Pump - Removal**.

CHECKING FOR POWER STEERING HOSES TOUCHING BODY OR FRAME OF VEHICLE

Check hoses and hose tubes as following:

- Inspect hoses and hose tubes for witness marks. If witness marks are present, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. See **Steering - Specifications**. **Do not bend tubing to adjust.** Replace the hose assembly if damaged.
- Check fastener torque of hose mounting brackets and tube nuts. See **Steering - Specifications**.
- Have a helper bump the steering gear off of the stops to induce pressure fluctuations which may move the hose. If hose contact is made, adjust hose(s) to the proper position by loosening, repositioning and tightening attachments to the specified torque. See **Steering - Specifications**. **Do not bend tubing to adjust.** Replace the hose assembly if damaged.

REMOVAL

2.8L DIESEL

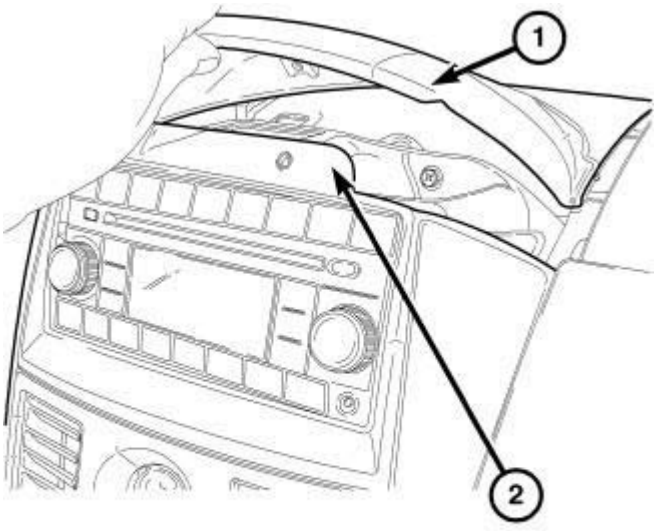

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Fig. 118: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.
4. Remove clamp, then supply hose (3) from pump (4).

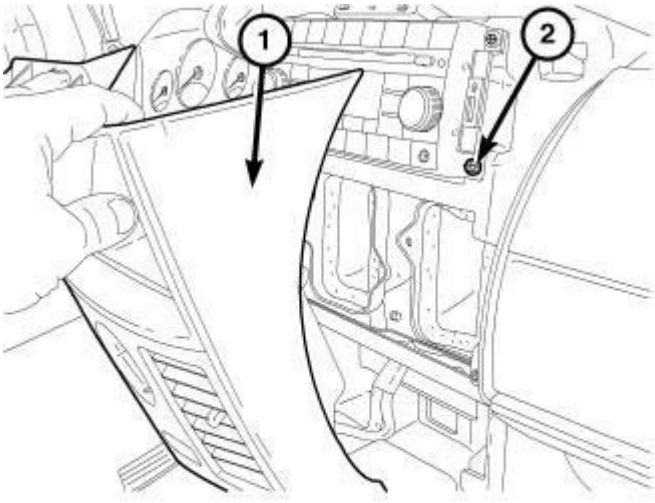

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Fig. 119: Removing/Installing Pressure Hose At Power Steering Pump

Courtesy of CHRYSLER LLC

5. Un-thread tube nut and remove pressure hose (1) from pump (2).
6. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

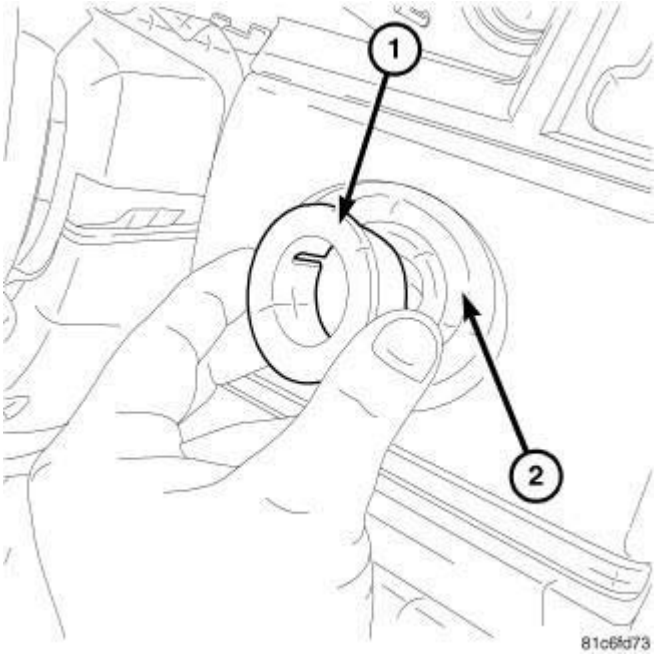

Fig. 120: Removing/Installing Engine Mount Bracket Fasteners
Courtesy of CHRYSLER LLC

7. Remove the engine mount bracket fasteners (1) and (4).
8. Using a floor jack, lift the right side of the engine only high enough to remove the pump mounting bolts in the next step.

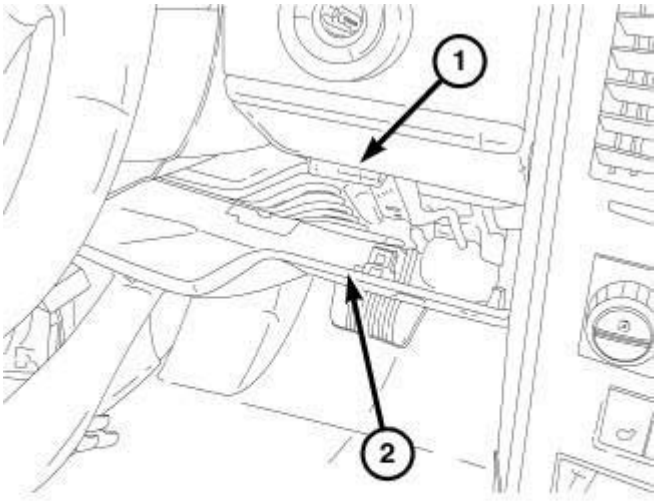

Fig. 121: Removing/Installing Power Steering Pump - 2.8L Diesel
Courtesy of CHRYSLER LLC

9. Remove three pump mounting bolts (1) through pump pulley.
10. Remove pump (2) from engine compartment.
11. If pulley needs removal, see **Steering/Pump/PULLEY, Power Steering Pump - Removal**.

3.3L / 3.8L

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

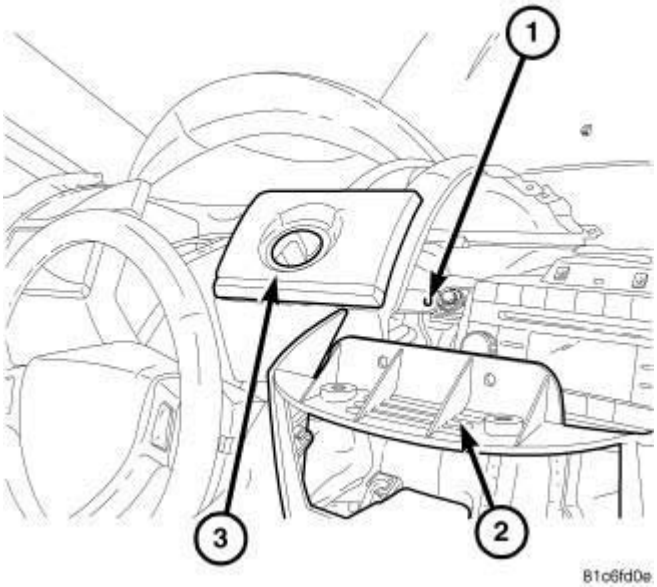

Fig. 122: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

4. Remove clamp, then supply hose (3) from pump (4).

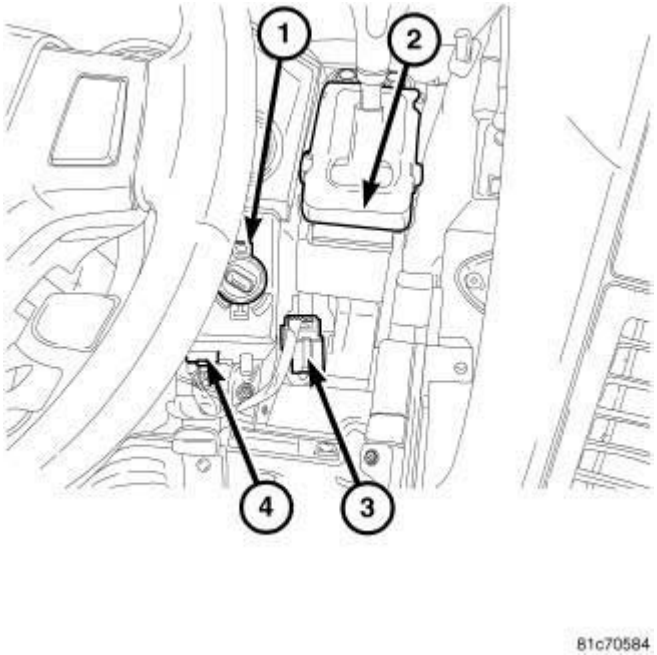

Fig. 123: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

5. Un-thread tube nut and remove pressure hose (1) from pump (2).
6. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

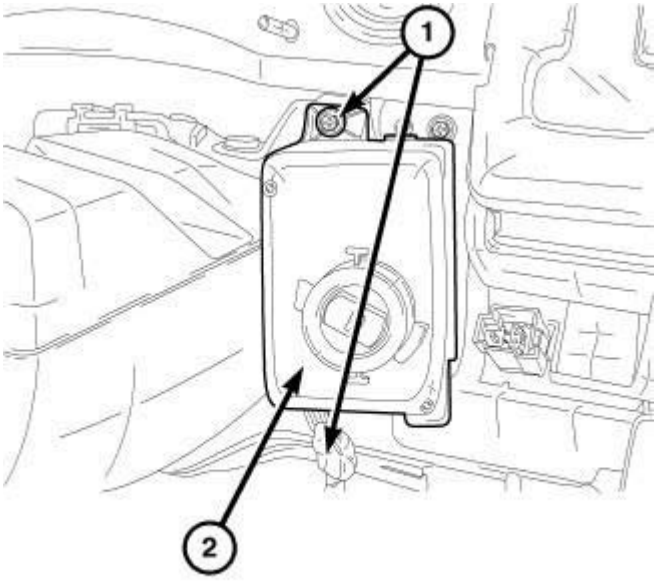

Fig. 124: Identifying Belt Driven Power Steering Pump
Courtesy of CHRYSLER LLC

7. Remove three pump mounting bolts (1) through pump pulley.
8. Remove pump (2) from engine compartment.
9. If pulley needs removal, see **Steering/Pump/PULLEY, Power Steering Pump - Removal**.

4.0L

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

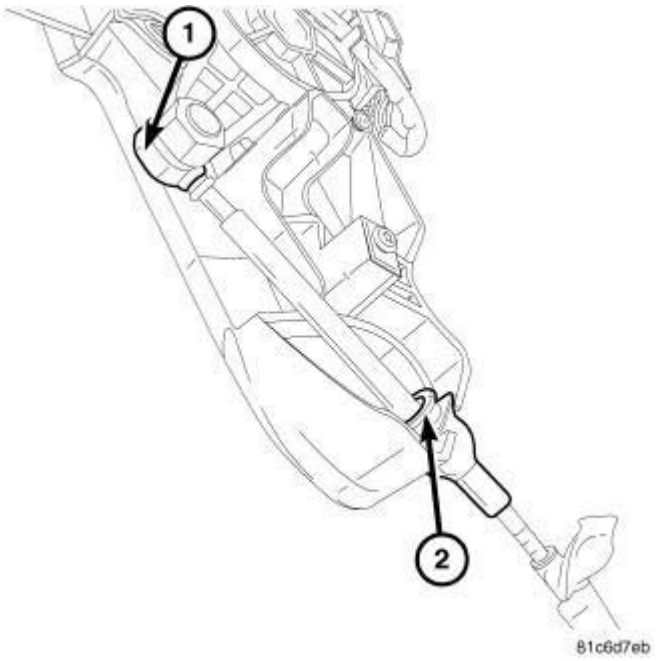

Fig. 125: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

4. Remove nuts (5) securing pressure hose routing clamps to engine (2).
5. Remove pressure hose routing clamps from studs (3).
6. Un-thread tube nut and remove pressure hose (1) from pump (2).

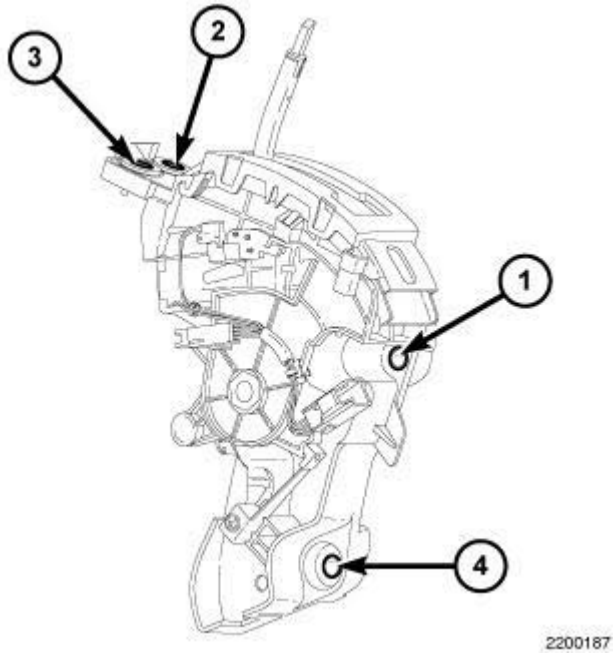

Fig. 126: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

7. Remove clamp, then supply hose (3) from pump (4).
8. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

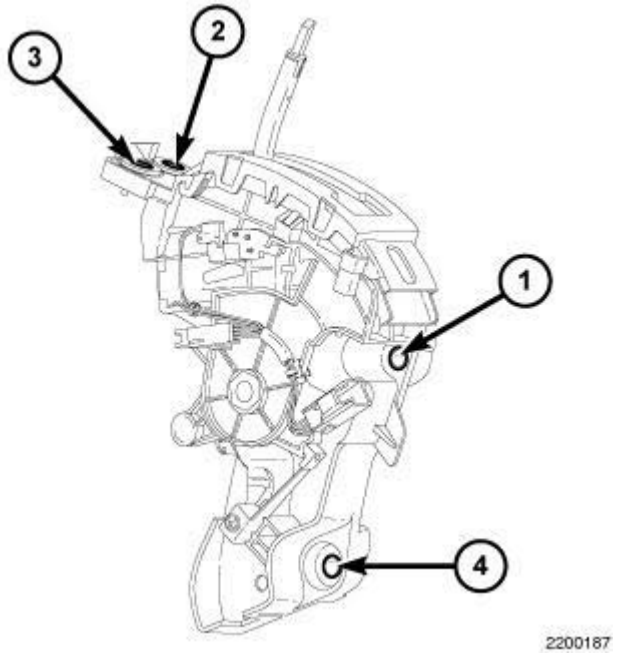

Fig. 127: Removing/Installing Power Steering Pump
Courtesy of CHRYSLER LLC

9. Remove three pump mounting bolts (3) through pump pulley (not shown in **Fig. 127**).
10. Remove pump (2) (with pulley) from engine compartment.
11. If pulley needs removal, see **Steering/Pump/PULLEY, Power Steering Pump - Removal**.

INSTALLATION

2.8L DIESEL

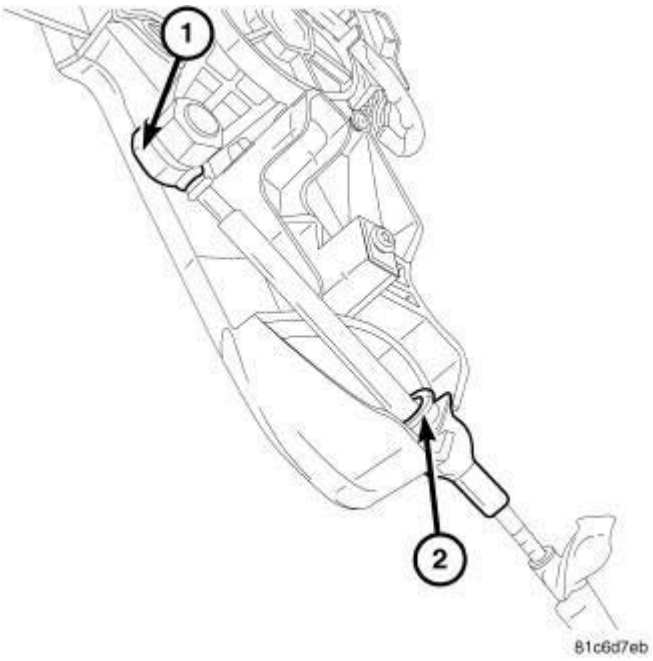

Fig. 128: Removing/Installing Power Steering Pump - 2.8L Diesel
Courtesy of CHRYSLER LLC

1. Position power steering pump (2) on engine.
2. Using a floor jack, lift the right side of the engine only high enough to install the pump mounting bolts in the next step.
3. Install three power steering pump mounting bolts (1) using openings in pulley. Tighten pump mounting bolts to 23 N.m (17 ft. lbs.).

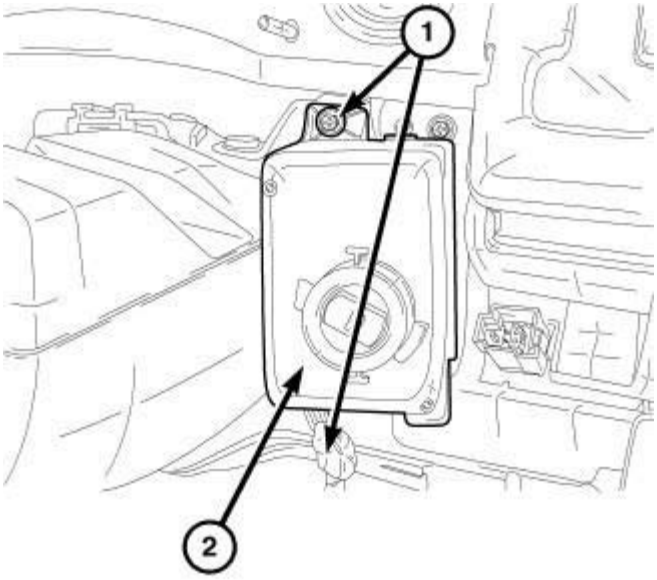

Fig. 129: Removing/Installing Engine Mount Bracket Fasteners

Courtesy of CHRYSLER LLC

4. Install the engine mount bracket fasteners (1) and (4) and tighten to 54 N.m (40 lbs.ft.).
5. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

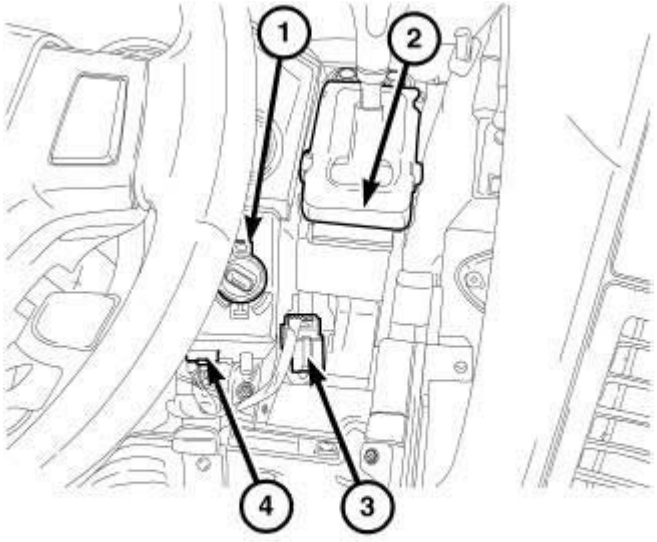

Fig. 130: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

6. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).

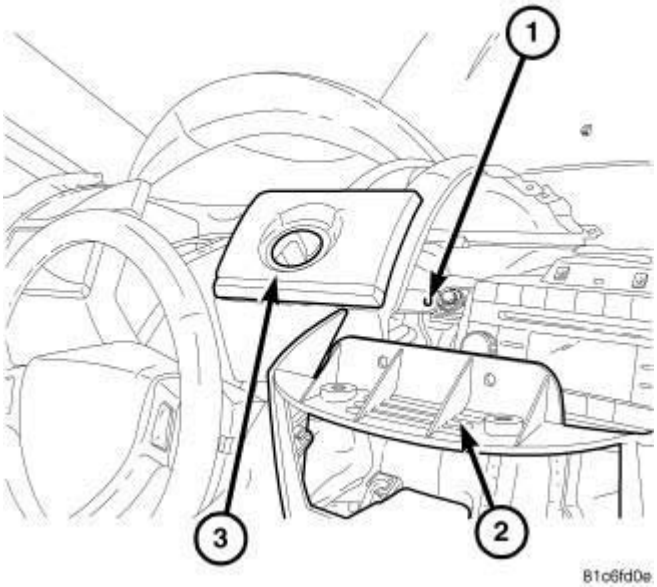

Fig. 131: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

7. Slide fluid supply hose (3) onto pump (4) fitting and install clamp securing it in place.
8. Connect negative (-) battery cable on negative battery post.
9. Fill and bleed power steering system. See **Steering - Standard Procedure**.
10. Inspect for leaks.

3.3L / 3.8L

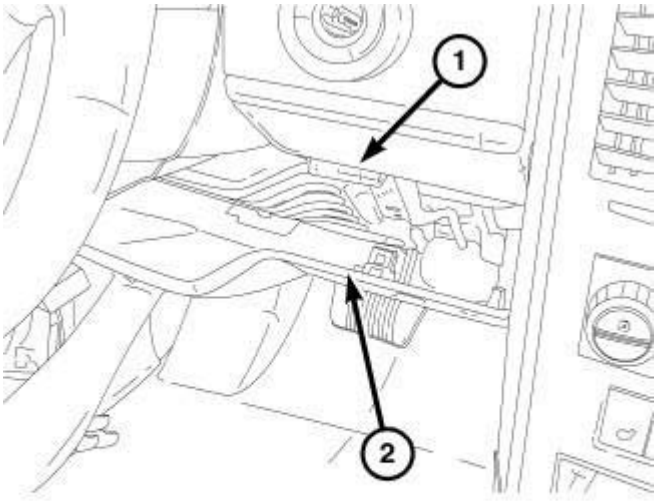

Fig. 132: Identifying Belt Driven Power Steering Pump
Courtesy of CHRYSLER LLC

1. Position power steering pump (2) on engine.
2. Install three power steering pump mounting bolts (1) using openings in pulley. Tighten pump mounting bolts to 23 N.m (17 ft. lbs.).
3. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

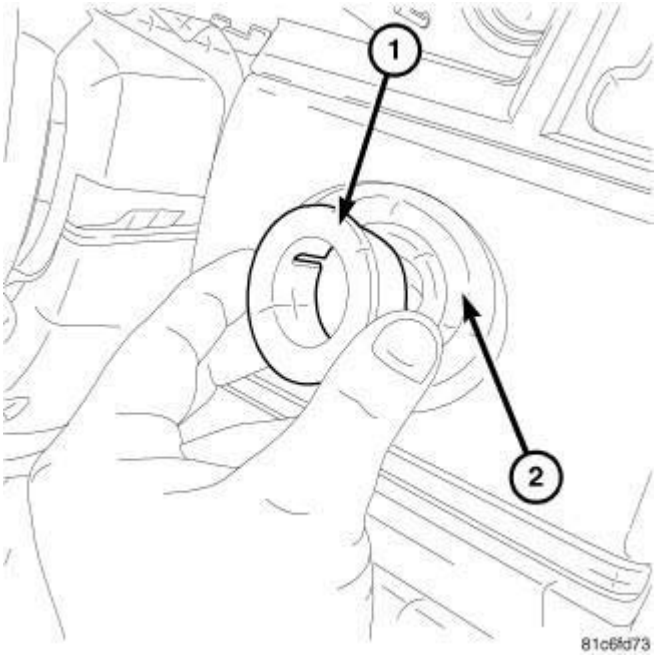

Fig. 133: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

4. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).

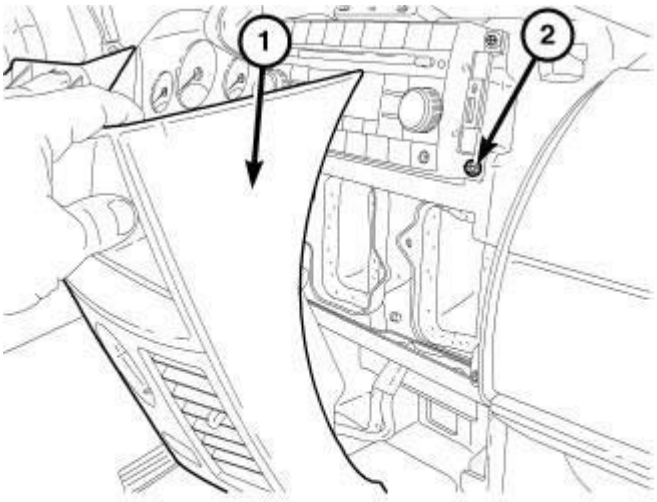

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Fig. 134: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

5. Slide fluid supply hose (3) onto pump (4) fitting and install clamp securing it in place.
6. Connect negative (-) battery cable on negative battery post.
7. Fill and bleed power steering system. See **Steering - Standard Procedure**.
8. Inspect for leaks.

4.0L

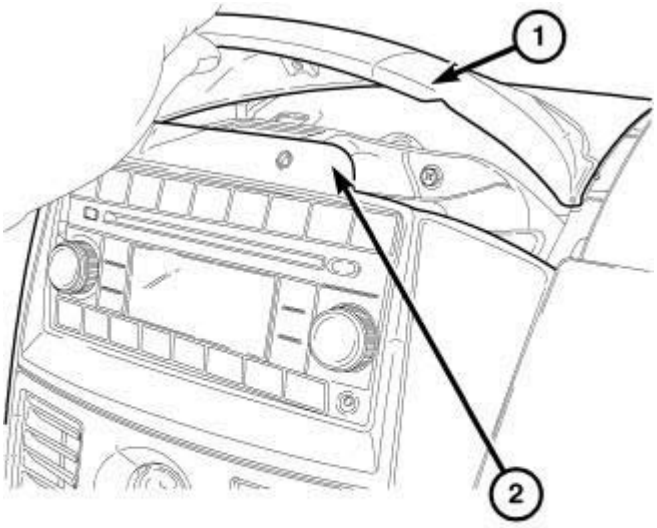

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Fig. 135: Removing/Installing Power Steering Pump
Courtesy of CHRYSLER LLC

1. Install power steering pump back in engine compartment using reverse order of its removal.
2. Install power steering pump onto its mounting bracket (1) cast into the engine cover.
3. Install three power steering pump mounting bolts (3) through pulley (not shown in **Fig. 135**). Tighten pump mounting bolts to 23 N.m (17 ft. lbs.).
4. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

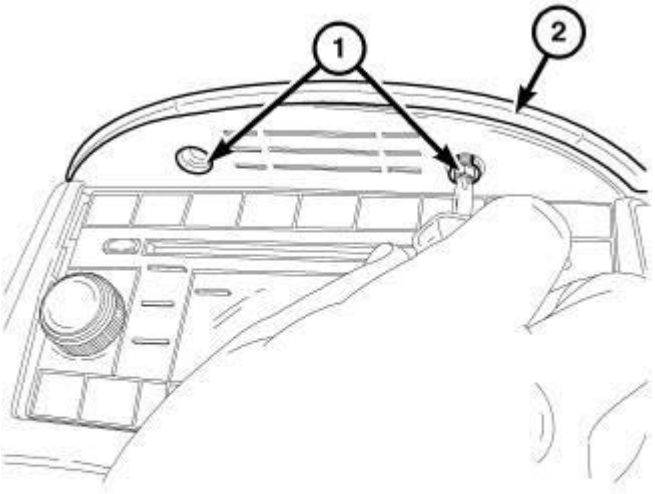
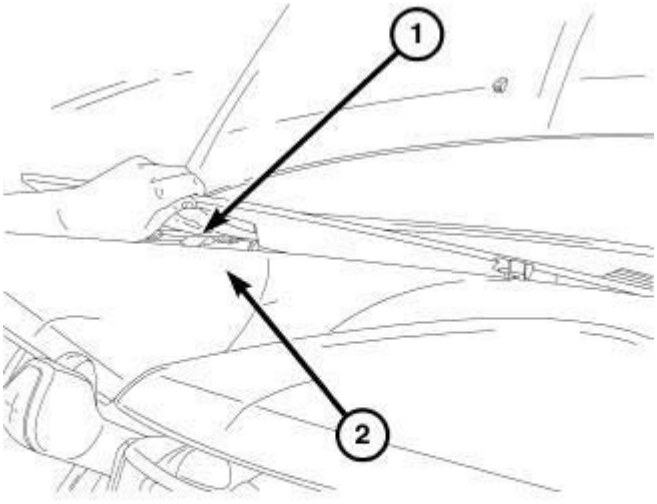


Fig. 136: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

5. Slide fluid supply hose (3) onto pump (4) fitting and install clamp securing it in place.

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.



81c6fa00

Fig. 137: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

6. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).
7. Install pressure hose routing clamps over studs (3) on engine mounted bracket and install nuts (5). Tighten nut to 28 N.m (21 ft. lbs.).
8. Connect negative (-) battery cable on negative battery post.
9. Fill and bleed power steering system. See **Steering - Standard Procedure**.
10. Inspect for leaks.

COOLER, POWER STEERING

Removal

REMOVAL

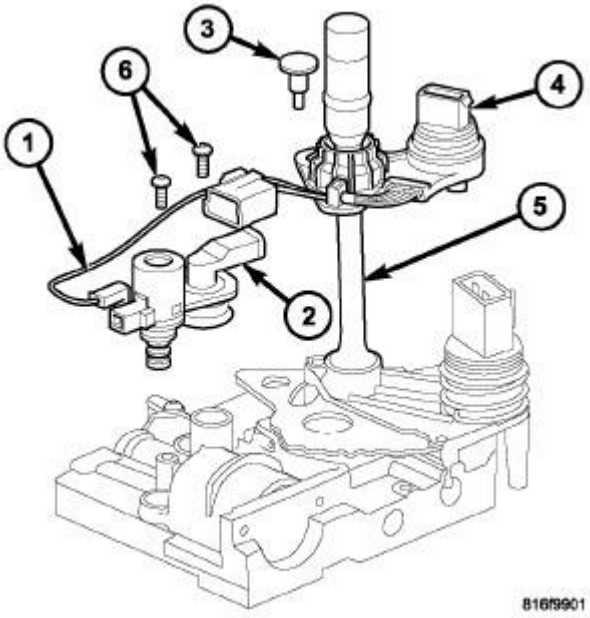


Fig. 138: Identifying Power Steering Cooler Hose & Return Hose
Courtesy of CHRYSLER LLC

NOTE: Before proceeding, see Steering - Warning.

1. Siphon as much fluid as possible from the power steering fluid reservoir.
2. Loosen the clamp and remove the return hose (1) from the power steering cooler fitting.
3. Loosen the clamp and remove the power steering cooler hose (2) from the power steering reservoir.

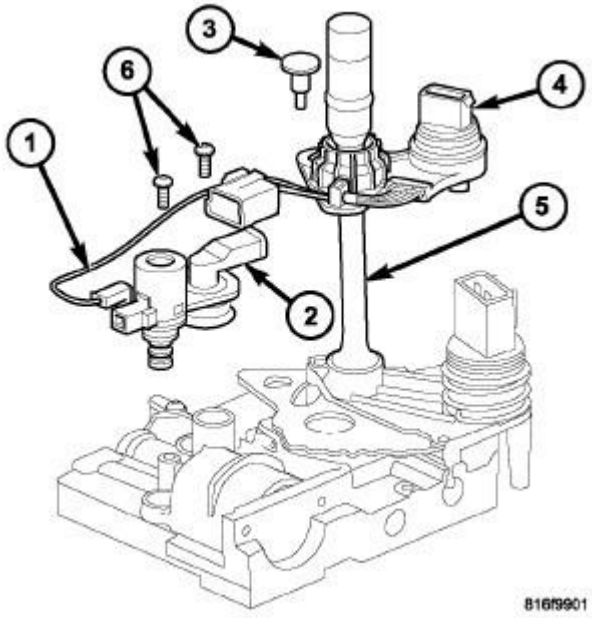


Fig. 139: Removing/Installing Power Steering Cooler Line
Courtesy of CHRYSLER LLC

4. Raise and support the vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
5. If equipped, remove the belly pan below the engine.
6. Remove the front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .
7. Disengage clips (2) that attach the power steering cooler line to radiator brace.
8. Remove the screw (3) that attaches the power steering cooler bracket and remove the power steering cooler line from the vehicle.

Installation

INSTALLATION

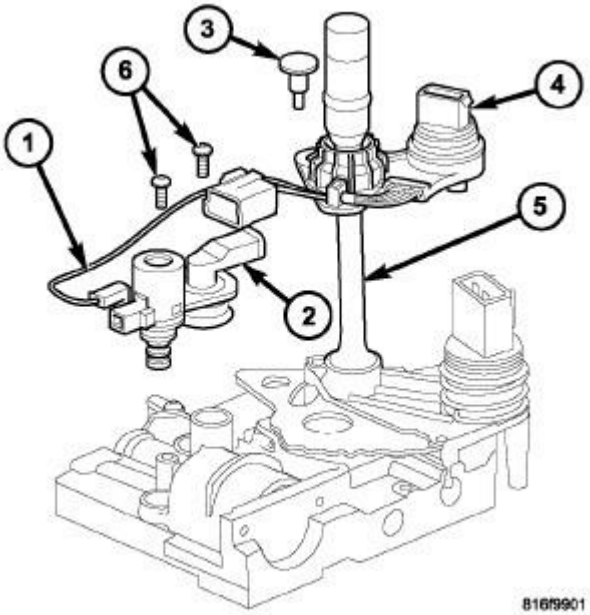


Fig. 140: Removing/Installing Power Steering Cooler Line
Courtesy of CHRYSLER LLC

1. Install the power steering cooler line (1) and snap in the clips (2) to the radiator brace.
2. Install screw (3) to attach power steering cooler line (1) to the body.

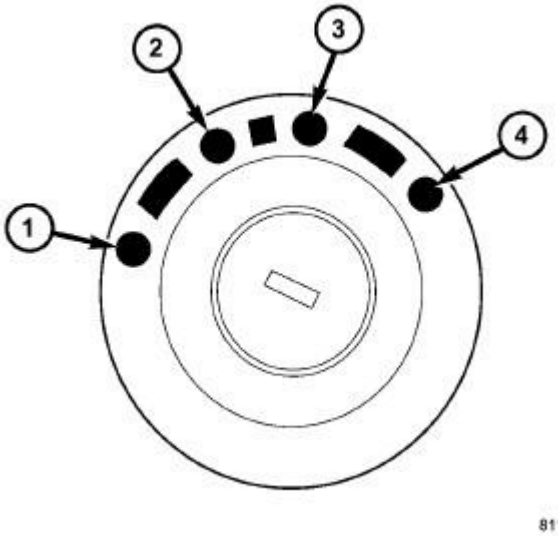


Fig. 141: Identifying Power Steering Cooler Hose & Return Hose
Courtesy of CHRYSLER LLC

3. Install the power steering cooler hose (2) and clamp to the power steering fluid reservoir fitting.

4. Install the supply hose (1) to the power steering cooler fitting. Slide hose clamp into position and attach it.
5. Install the front fascia. Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation** .
6. If equipped, install the belly pan below the engine.
7. Fill and bleed the power steering system. See **Steering - Standard Procedure**.
8. Check for leaks.

FLUID

Standard Procedure

POWER STEERING FLUID LEVEL CHECKING

WARNING: Fluid level should be checked with the engine OFF to prevent personal injury from moving parts and to assure an accurate fluid level reading.

CAUTION: Mopar® Power Steering Fluid + 4 or Mopar® ATF+4 Automatic Transmission Fluid is to be used in the power steering system. Both fluids have the same material standard specifications (MS-9602). No other power steering or automatic transmission fluid is to be used in the system. Damage may result to the power steering pump and system if another fluid is used. Do not overfill the system.

NOTE: Although not required at specific intervals, the fluid level may be checked periodically. Check the fluid level anytime there is a system noise or fluid leak suspected.

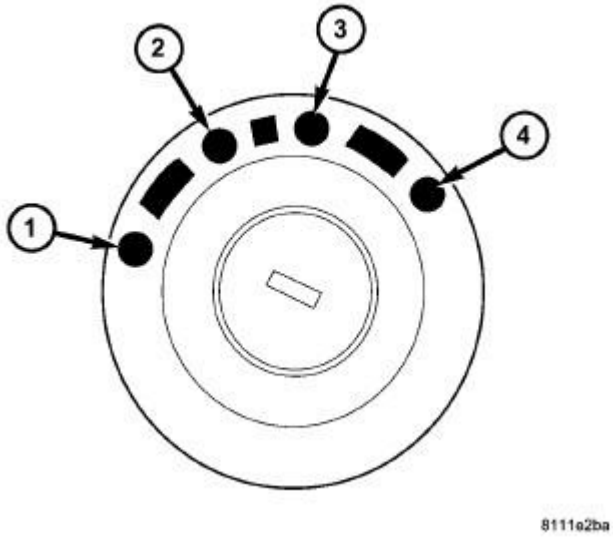


Fig. 142: Identifying Power Steering Reservoir
Courtesy of CHRYSLER LLC

The power steering fluid level can be viewed through the side of the power steering fluid reservoir. Compare the fluid level to the markings on the side of the reservoir. When the fluid is at normal ambient temperature, approximately 21°C to 27°C (70°F to 80°F), the fluid level should read between the MAX. and MIN. markings. When the fluid is hot, fluid level is allowed to read up to the MAX. line.

HOSE, POWER STEERING, PRESSURE AND RETURN, 2.8L DIESEL

Removal

REMOVAL

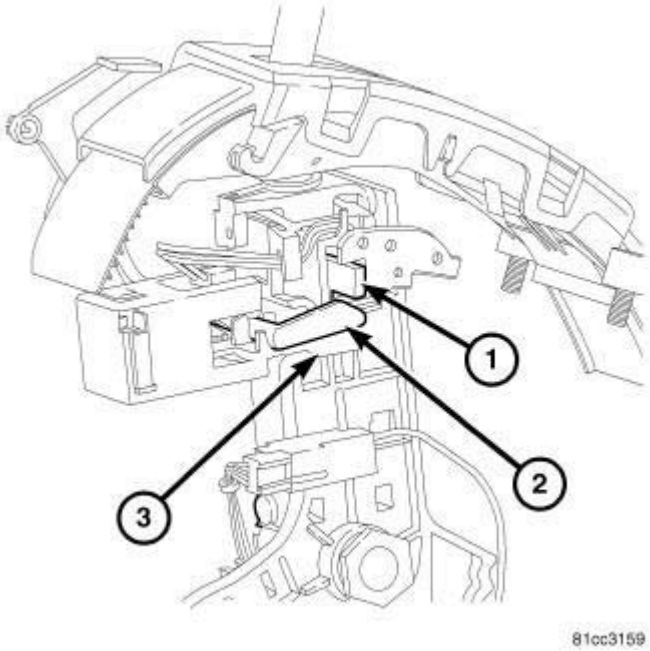


Fig. 143: Identifying Power Steering Cooler Hose & Return Hose
Courtesy of CHRYSLER LLC

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.
4. Loosen clamp attaching return hose (1) to the power steering cooler, and remove hose from the fitting.

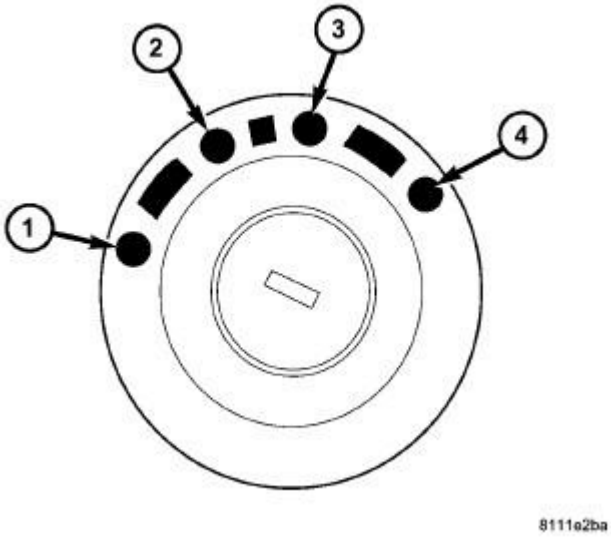


Fig. 144: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

5. Un-thread tube nut and remove pressure hose (1) from pump (2).

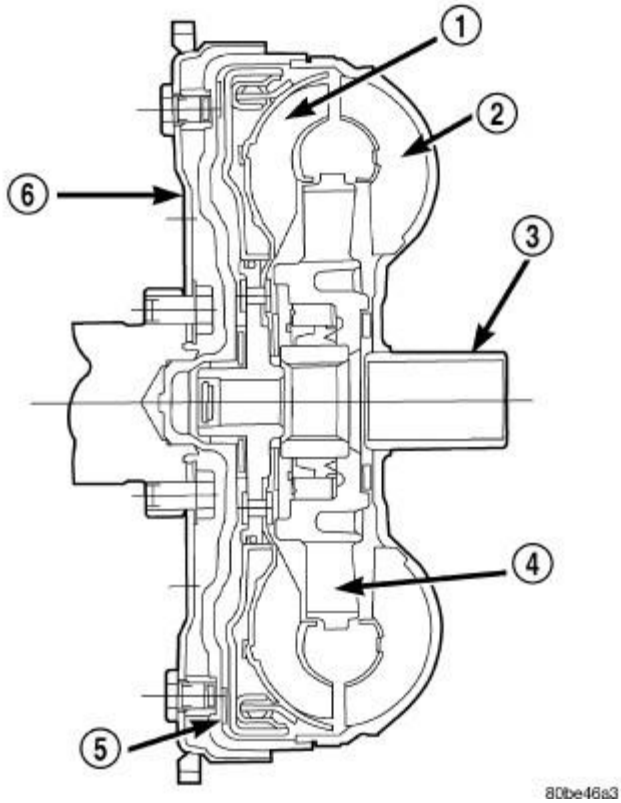


Fig. 145: Removing/Installing Screw & Nut At Hose Routing Clamp
Courtesy of CHRYSLER LLC

6. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
7. Remove nut (4), then hose tube routing clamp (3) from bracket (7) above A/C compressor.
8. Remove screw (5), securing hose routing clamp to engine flange (6).

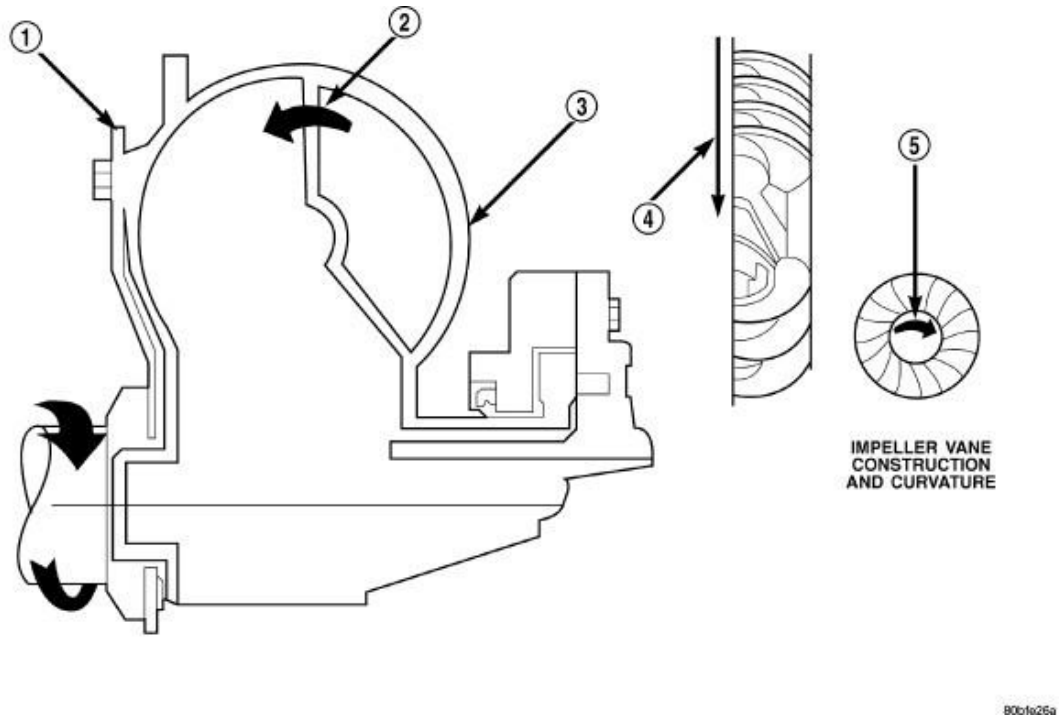


Fig. 146: Removing/Installing Pressure/Return Hose Assembly
Courtesy of CHRYSLER LLC

NOTE: Figure at right shows left-hand-drive configuration. Right-hand-drive is typical.

9. Remove the rear engine mount.
   - For 3.3L / 3.8L engine, refer to **REMOVAL** .
   - For 4.0L engine, refer to **REMOVAL** .
   - For 2.8L Diesel engine, refer to **ENGINE MOUNTING** .
10. Remove screw (4), securing hose routing clamp to front suspension crossmember (3).
11. Remove both tube nuts fastening hose assembly (2) to power steering gear (1). Remove hoses from gear ports.
12. Remove pressure/return hose assembly from vehicle.

Installation

INSTALLATION

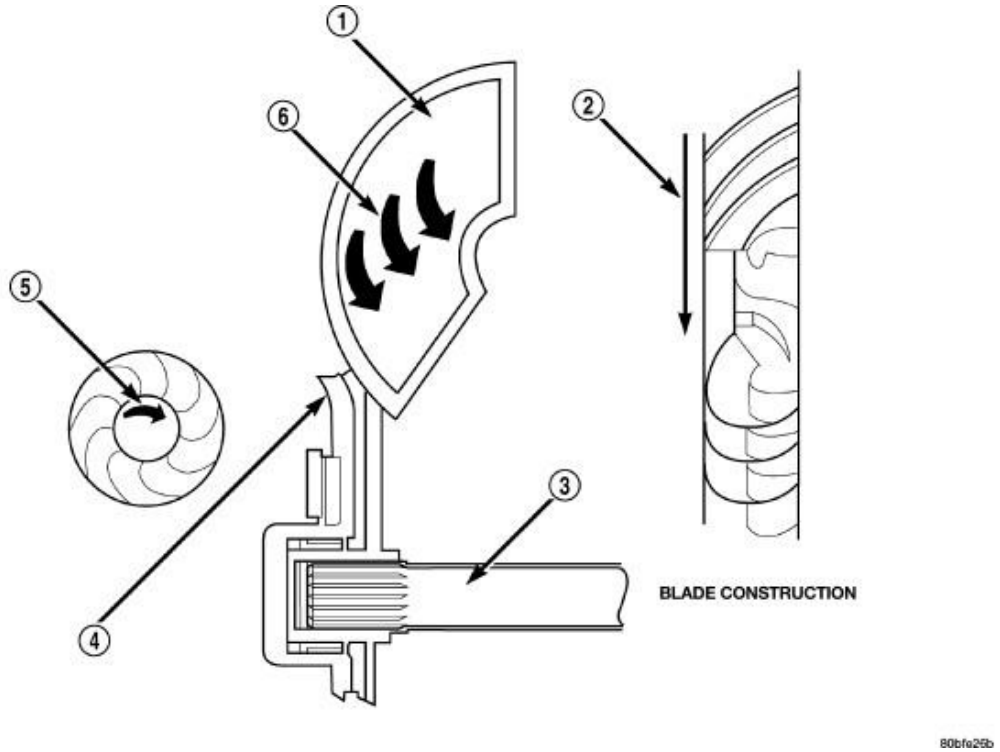


Fig. 147: Removing/Installing Pressure/Return Hose Assembly
Courtesy of CHRYSLER LLC

NOTE: Figure at right shows left-hand-drive configuration. Right-hand-drive is typical.

1. Insert the pressure/return hose assembly into the engine compartment from below.

   NOTE: Before installing power steering hoses at power steering gear, wipe clean connections with a lint-free cloth and replace O-rings. Lubricate O-rings using clean power steering fluid.

2. Install pressure/return hoses into power steering gear (1) ports (lower-pressure/upper-return). Thread tube nuts into gear, but do not tighten at this time.
3. Position hose routing clamp on front suspension crossmember (3). Install and tighten screw (4) to 8 N.m (71 in. lbs.).
4. Tighten hose tube nuts at steering gear (1) to 31 N.m (23 ft. lbs.).
5. Install the rear engine mount.
   - For 3.3L / 3.8L engine, refer to **INSTALLATION** .
   - For 4.0L engine, refer to **INSTALLATION** .
   - For 2.8L Diesel engine, refer to **ENGINE MOUNTING** .

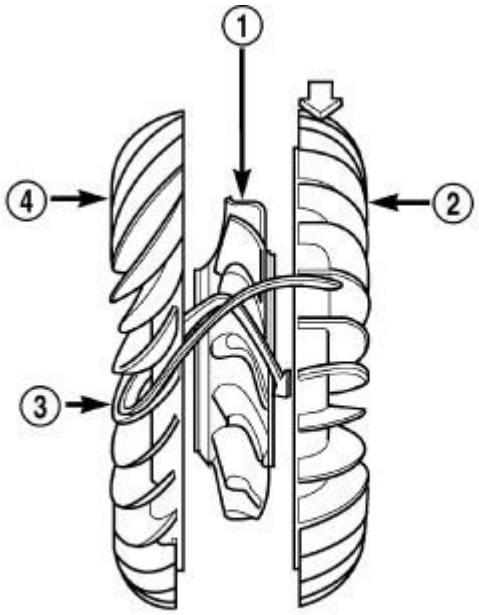


Fig. 148: Removing/Installing Screw & Nut At Hose Routing Clamp
Courtesy of CHRYSLER LLC

6. Guide hoses up the front of the engine toward the power steering pump (1).
7. Place hose routing clamp on engine flange (6). Install and tighten screw (5) to 8 N.m (71 in. lbs.).
8. Position hose tubes (2) at bracket (7) on front of engine above A/C compressor and install tube routing clamp (3) and nut (4). Tighten nut to 10 N.m (89 in. lbs.).

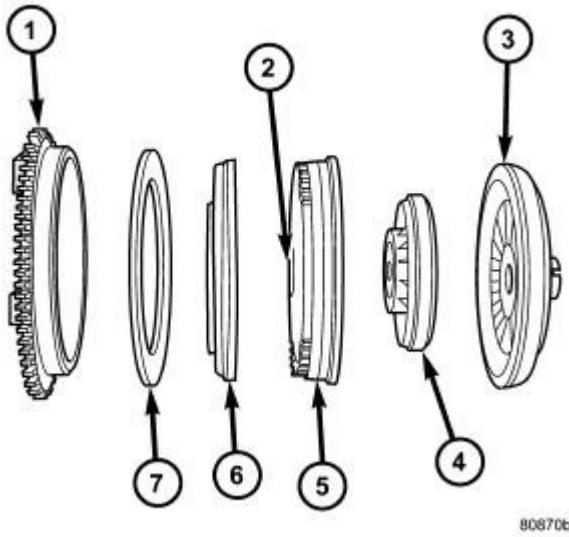


Fig. 149: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

9. Lower vehicle.

NOTE: Before installing power steering pressure hose at power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

10. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).

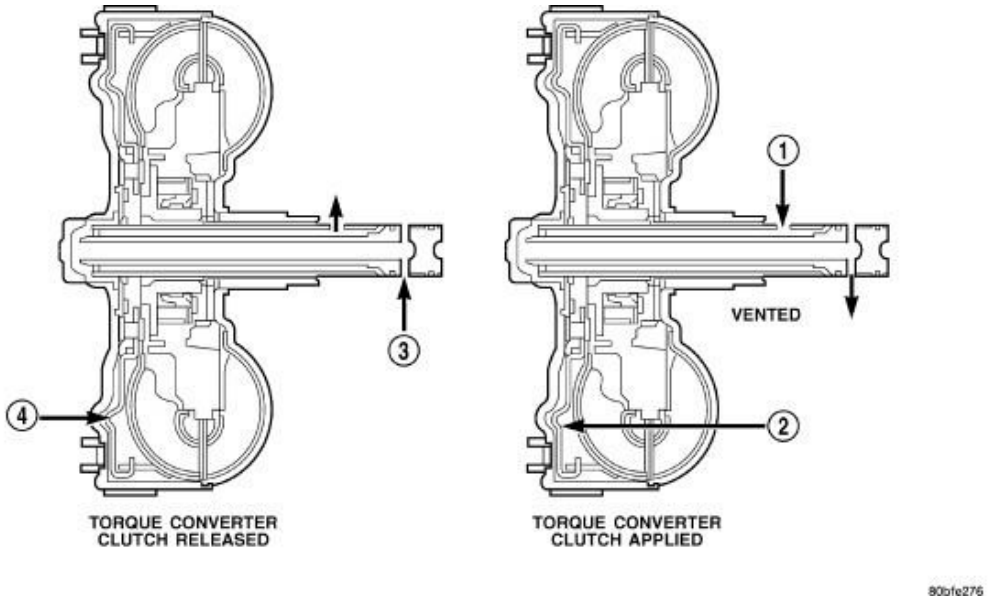


Fig. 150: Identifying Power Steering Cooler Hose & Return Hose
Courtesy of CHRYSLER LLC

11. Install return hose (1) onto power steering cooler fitting. Slide hose clamp into position on fitting and attach it.
12. Install negative (-) battery cable on negative battery post.
13. Fill and bleed power steering system. See **Steering - Standard Procedure**.
14. Inspect for leaks.

HOSE, POWER STEERING, PRESSURE, 3.3L AND 3.8L

Removal

REMOVAL

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

4. Remove air cleaner housing cover and hose to intake manifold.
   - For 3.3L / 3.8L engine, refer to **REMOVAL** .
   - For 4.0L engine, refer to **REMOVAL** .
   - For 2.8L Diesel engine, refer to **REMOVAL** .

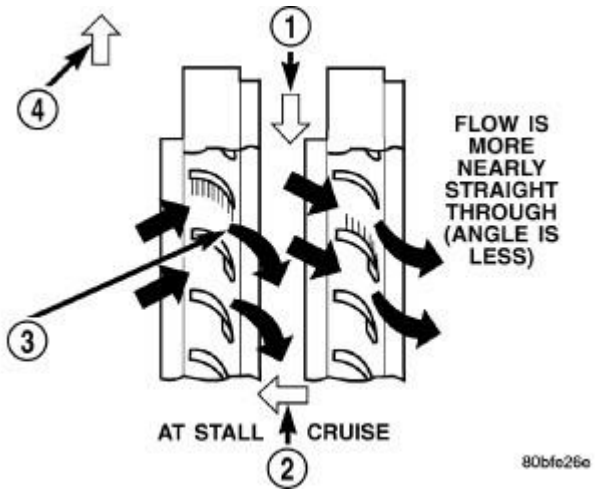


Fig. 151: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

5. Un-thread tube nut and remove pressure hose (1) from pump (2).

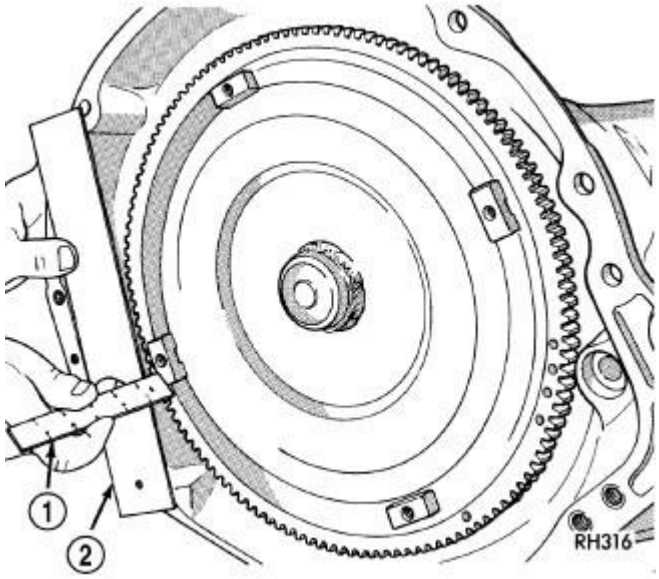


Fig. 152: Removing/Installing Alternator Bracket
Courtesy of CHRYSLER LLC

6. Remove alternator bracket bolt (1).
7. Remove alternator bracket nut (2) and bracket (3).

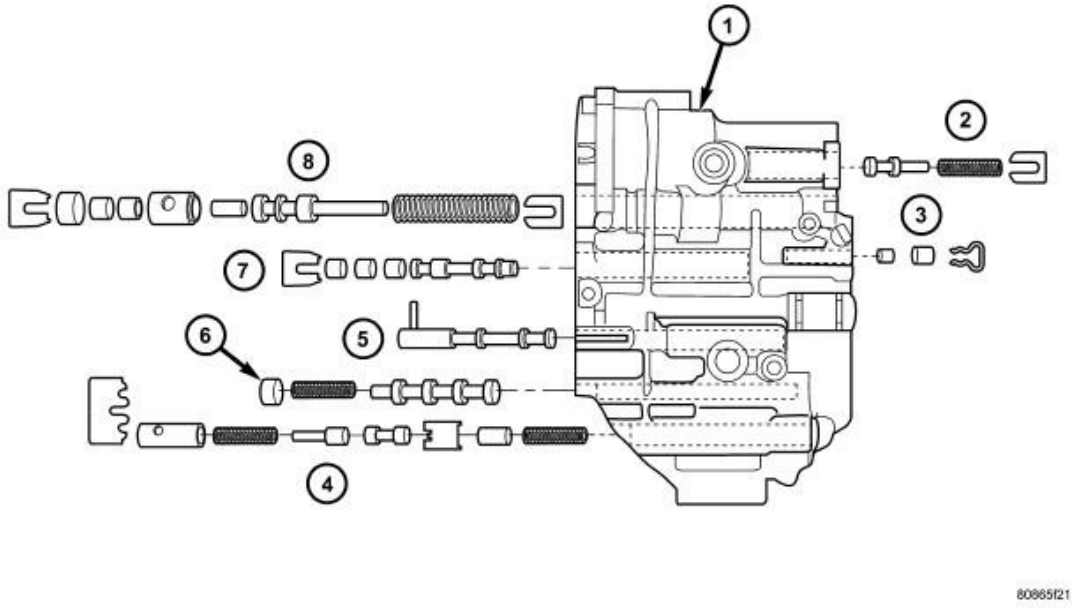


Fig. 153: Removing/Installing Pressure Hose Screws
Courtesy of CHRYSLER LLC

8. Remove stud head screw (2) securing pressure hose (3) routing clamp to intake manifold (4).
9. Remove screw (1) securing pressure hose (3) routing clamp to right side of engine (5).
10. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

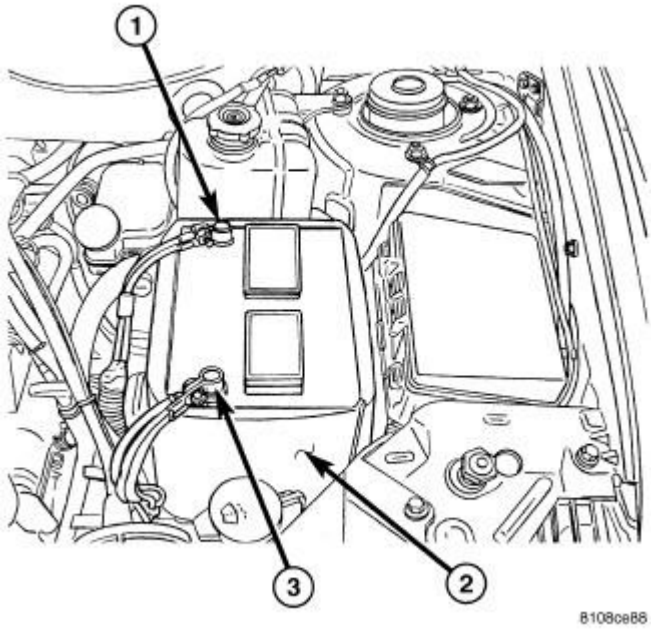


Fig. 154: Removing/Installing Screws At Power Steering Pressure Hose Routing Clamp(s) & Rear Of Crossmember

Courtesy of CHRYSLER LLC

11. Remove screw (2) securing pressure hose clamp to right side of front suspension crossmember.
12. Remove screws (3) securing pressure hose routing clamps to rear of front suspension crossmember.

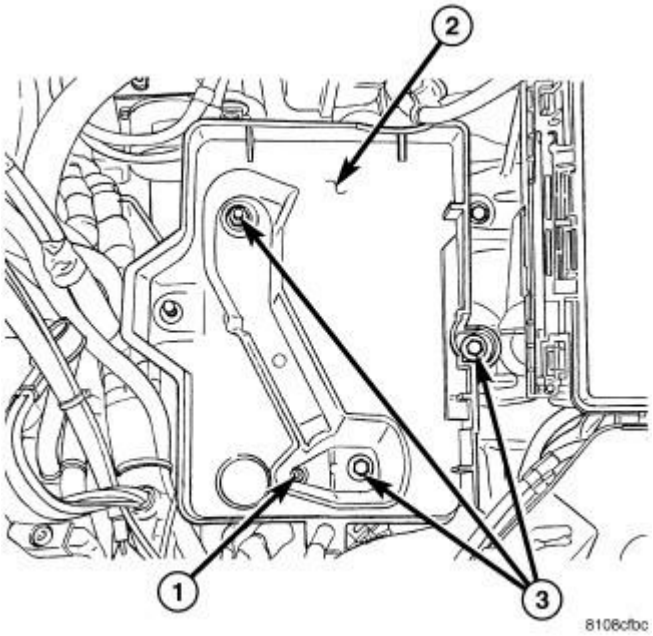


Fig. 155: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

13. Remove tube nut fastening pressure hose (4) to power steering gear (3). Remove pressure hose from gear port.
14. Lower vehicle enough to access pressure hose from engine compartment, but still clearing floor.
15. Remove pressure hose by pushing it down and out behind front suspension crossmember.

Installation

INSTALLATION

1. Place pressure hose into engine compartment using reverse order of removal. Push the pump end of hose up into engine compartment from underneath, over rear of front suspension crossmember.
2. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

NOTE: Before installing power steering pressure hose on power steering gear, wipe clean connections with a lint-free cloth and replace O-ring. Lubricate O-ring using clean power steering fluid.

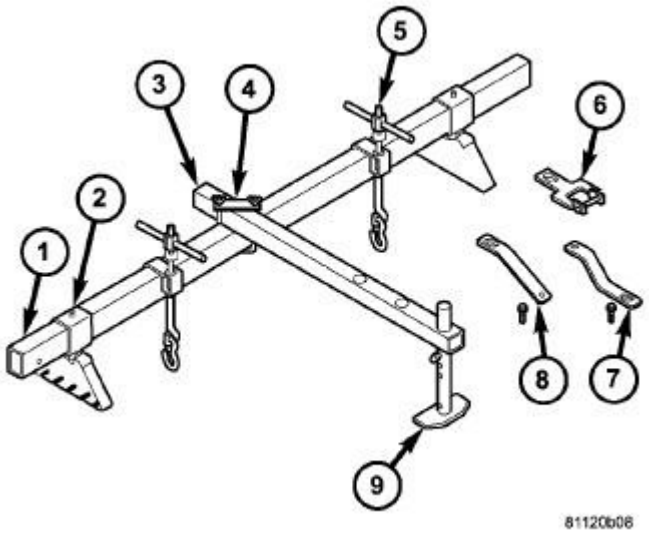


Fig. 156: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

3. Install pressure hose (4) into power steering gear (3) port. Thread pressure hose tube nut into gear, but do not tighten at this time.

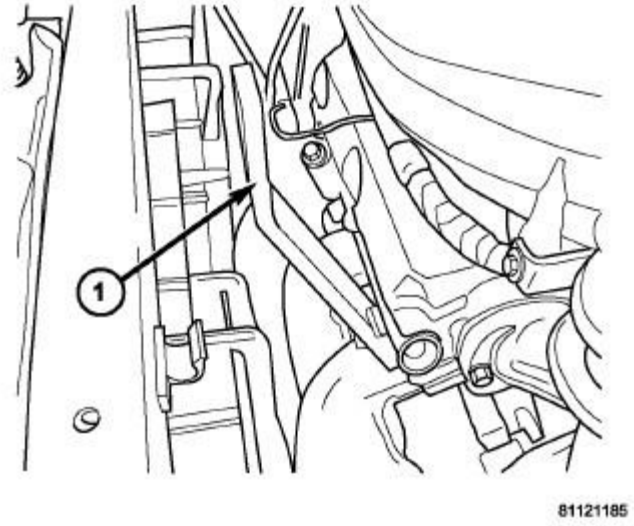


Fig. 157: Removing/Installing Screws At Power Steering Pressure Hose Routing Clamp(s) & Rear Of Crossmember
Courtesy of CHRYSLER LLC

4. Position pressure hose (1) routing clamps on rear of front suspension crossmember. Install and tighten screws (3) to 8 N.m (71 in. lbs.).

5. Position pressure hose (1) routing clamp at right side of front suspension crossmember. Install and tighten screw (2) to 8 N.m (71 in. lbs.).

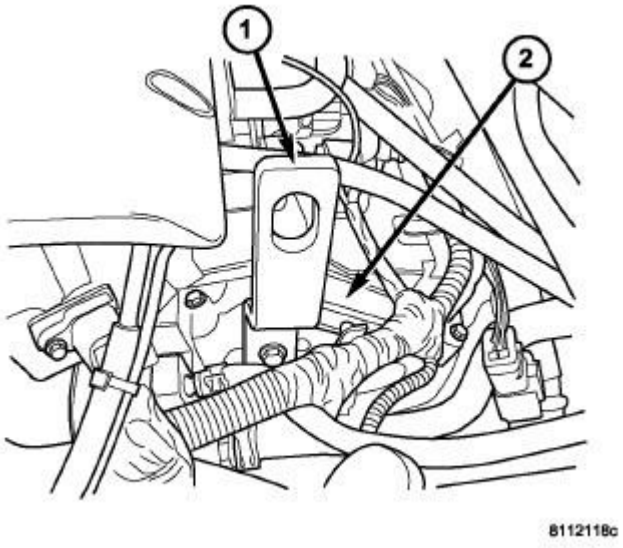


Fig. 158: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

6. Tighten pressure hose (4) tube nut at steering gear (3) to 31 N.m (23 ft. lbs.).
7. Lower vehicle.

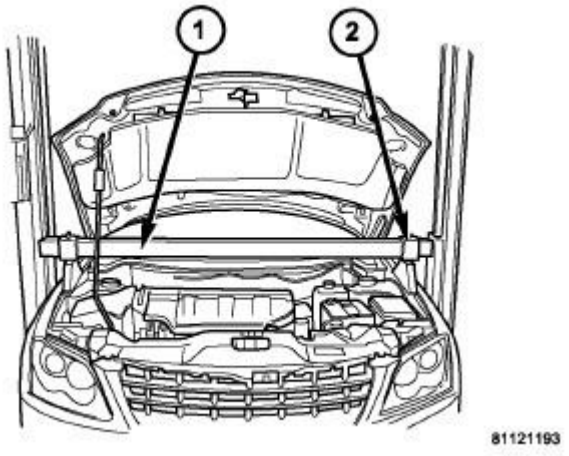


Fig. 159: Removing/Installing Pressure Hose Screws
Courtesy of CHRYSLER LLC

8. Route hose over engine and down to pump.
9. Position pressure hose (3) routing clamp at right side of engine (5) and install mounting screw. Tighten

screw to 10 N.m (89 in. lbs.).

10. Position pressure hose (3) routing clamp at intake manifold (4) and install stud head mounting screw. Tighten screw to 28 N.m (21 ft. lbs.).

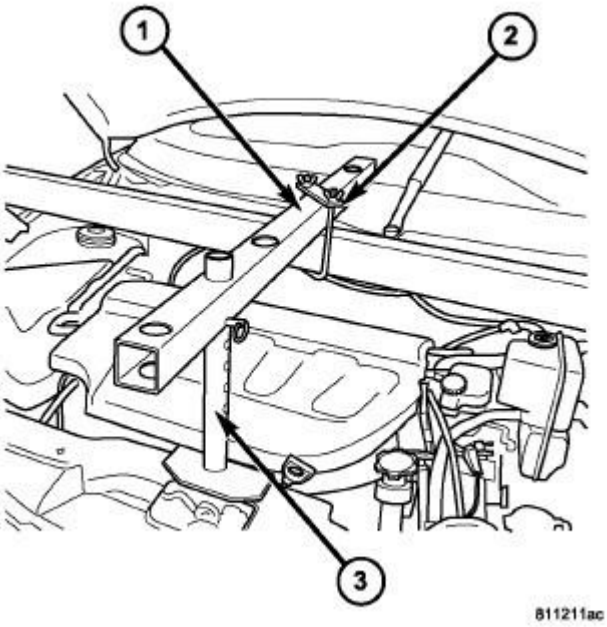


Fig. 160: Removing/Installing Alternator Bracket
Courtesy of CHRYSLER LLC

11. Install alternator bracket (3) to the alternator and stud.
12. Install alternator bracket nut (2) and tighten to 28 N.m (21 ft. lbs.).
13. Install alternator bracket bolt (1) and tighten to 28 N.m (21 ft. lbs.).

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

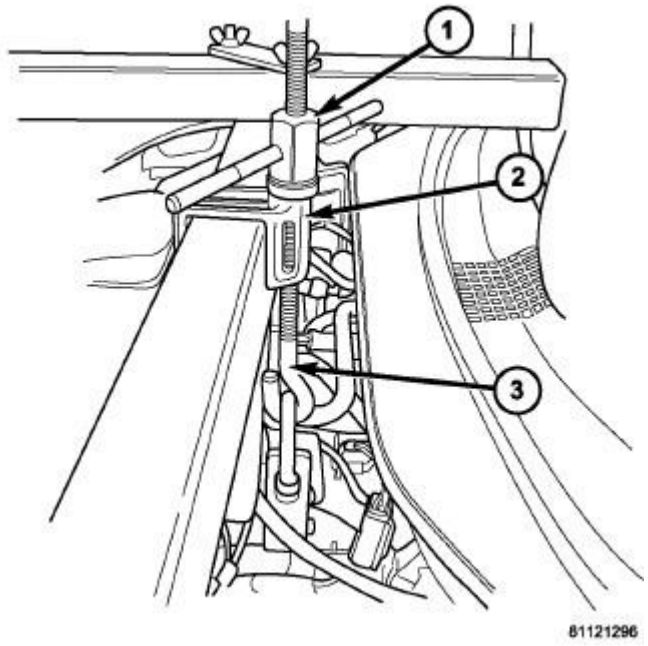


Fig. 161: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

14. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).
15. Install air cleaner housing cover and hose to intake manifold.
    - For 3.3L / 3.8L engine, refer to **INSTALLATION** .
    - For 4.0L engine, refer to **INSTALLATION** .
    - For 2.8L Diesel engine, refer to **INSTALLATION** .
16. Install negative (-) battery cable on negative battery post.
17. Fill and bleed power steering system. See **Steering - Standard Procedure**.
18. Inspect for leaks.

HOSE, POWER STEERING, PRESSURE, 4.0L

Removal

REMOVAL

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

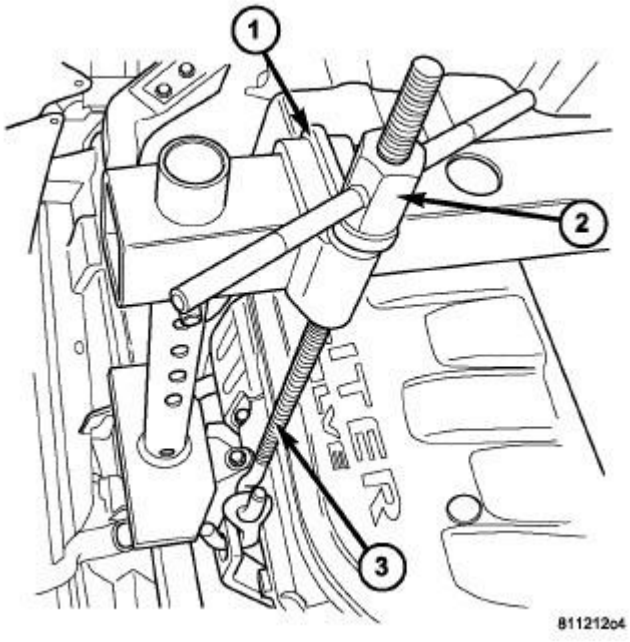


Fig. 162: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

4. Un-thread tube nut and remove pressure hose (1) from pump (2).
5. Remove nuts (5) securing pressure hose routing clamps to engine.
6. Remove pressure hose (1) routing clamps from studs (3).
7. Remove screw (4) securing pressure hose routing clamp to left side of engine.
8. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

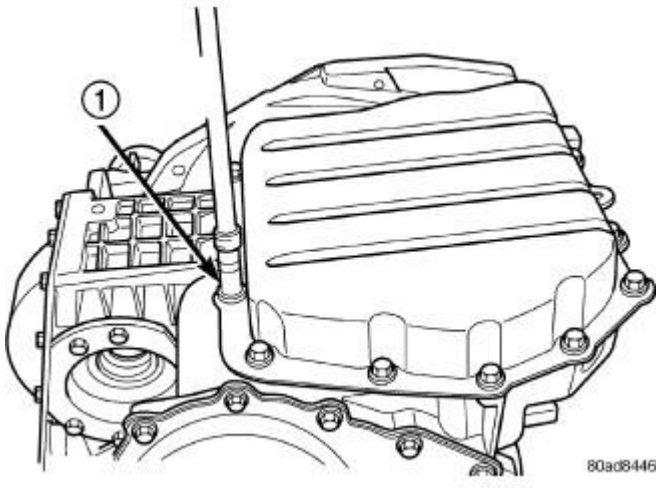


Fig. 163: Removing/Installing Power Steering Pressure Hose Screw At Routing Clamp & Rear Of Crossmember
Courtesy of CHRYSLER LLC

9. Remove screw (2) securing power steering pressure hose (1) routing clamp to rear of crossmember.

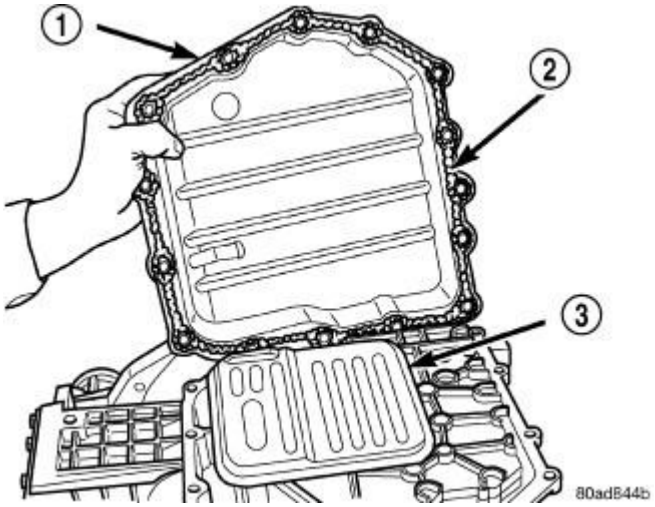


Fig. 164: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

10. Remove tube nut fastening pressure hose (4) to power steering gear (3). Remove pressure hose from gear port.
11. Lower vehicle enough to access pressure hose from engine compartment, but still clearing floor.
12. Remove pressure hose by pushing it down and out behind front suspension crossmember.

Installation

INSTALLATION

1. Place pressure hose into engine compartment using reverse order of removal. Push the pump end of hose up into engine compartment from underneath, over rear of front suspension crossmember.
2. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

NOTE: Before installing power steering pressure hose on power steering gear, wipe clean connections with a lint-free cloth and replace O-ring. Lubricate O-ring using clean power steering fluid.

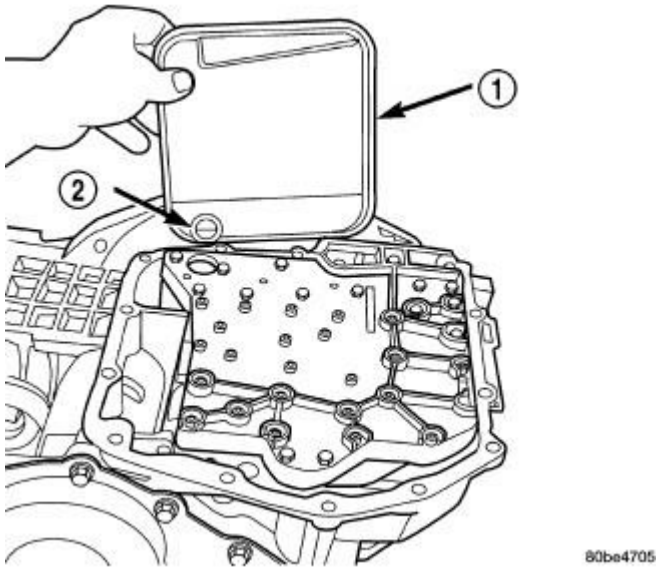


Fig. 165: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

3. Install pressure hose (4) into power steering gear (3) port. Thread pressure hose tube nut into gear, but do not tighten at this time.

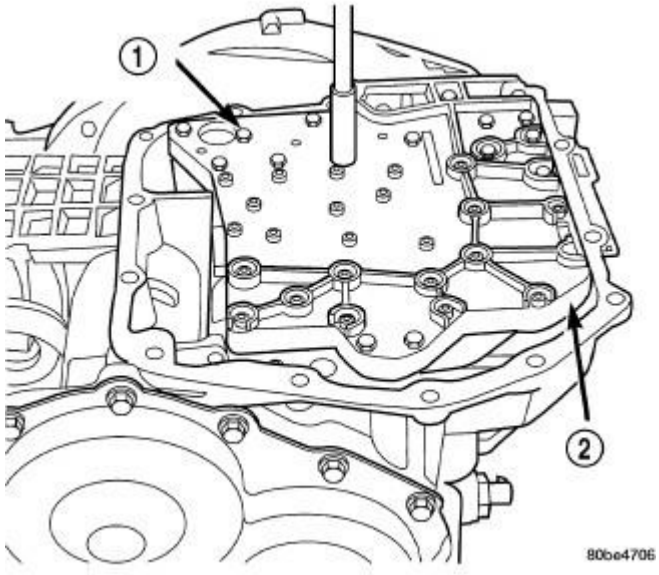


Fig. 166: Removing/Installing Power Steering Pressure Hose Screw At Routing Clamp & Rear Of Crossmember
Courtesy of CHRYSLER LLC

4. Position power steering pressure hose (1) routing clamp on rear of crossmember (3). Install and tighten screw (2) to 8 N.m (71 in. lbs.).

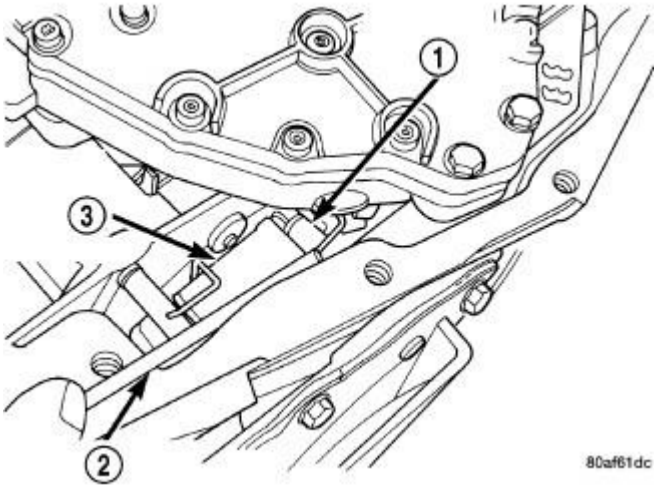


Fig. 167: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

5. Tighten pressure hose (4) tube nut at steering gear (4) to 31 N.m (23 ft. lbs.).
6. Lower vehicle.

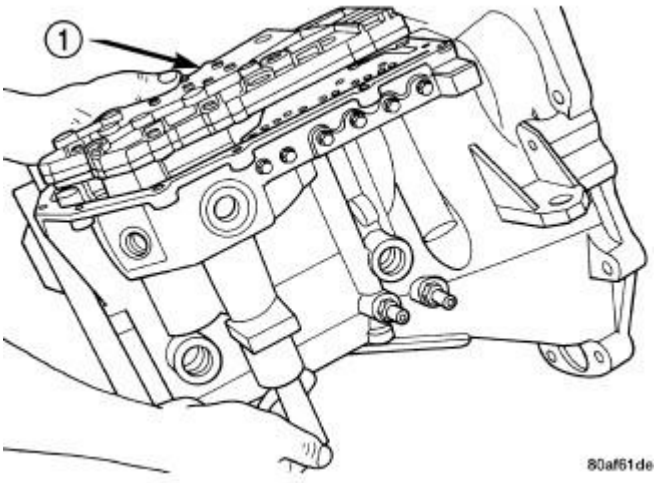


Fig. 168: Removing/Installing Pressure Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

7. Route hose around left side and front of engine.

NOTE: Before installing power steering pressure hose on power steering pump, replace O-ring on end of power steering pressure hose. Lubricate O-ring using clean power steering fluid.

8. Install pressure hose (1) into pump (2) fitting. Thread pressure hose tube nut into pump and tighten to 31 N.m (23 ft. lbs.).

9. Install pressure hose routing clamps over studs (3) on engine mounted bracket and install nuts (5). Tighten nut to 28 N.m (21 ft. lbs.).
10. Install screw (4) securing pressure hose routing clamp to left side of engine. Tighten screw to 28 N.m (21 ft. lbs.).
11. Install negative (-) battery cable on negative battery post.
12. Fill and bleed power steering system. See **Steering - Standard Procedure**.
13. Inspect for leaks.

HOSE, POWER STEERING, RETURN

Removal

GEAR TO COOLER

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.
4. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

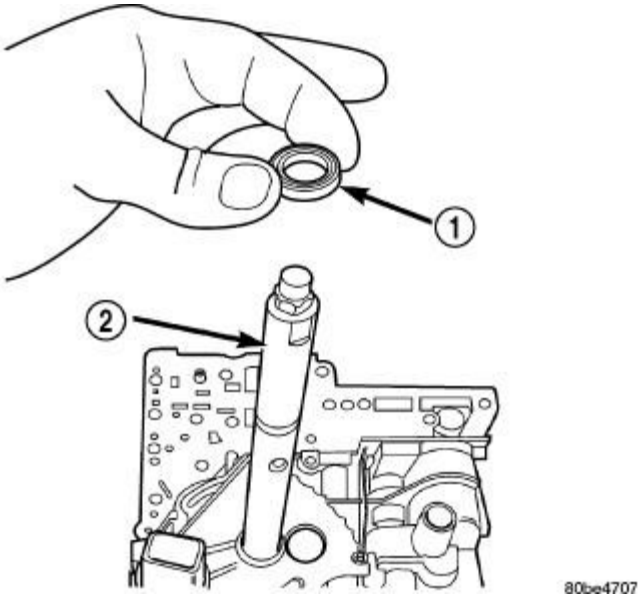


Fig. 169: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

5. Remove screw (1) securing return hose routing clamp to rear of ABS support bracket.
6. Remove tube nut fastening return hose (5) to power steering gear (3). Remove pressure hose from gear port.
7. Lower vehicle.

8. Remove battery. Refer to **Electrical/Battery System/BATTERY - Removal** .

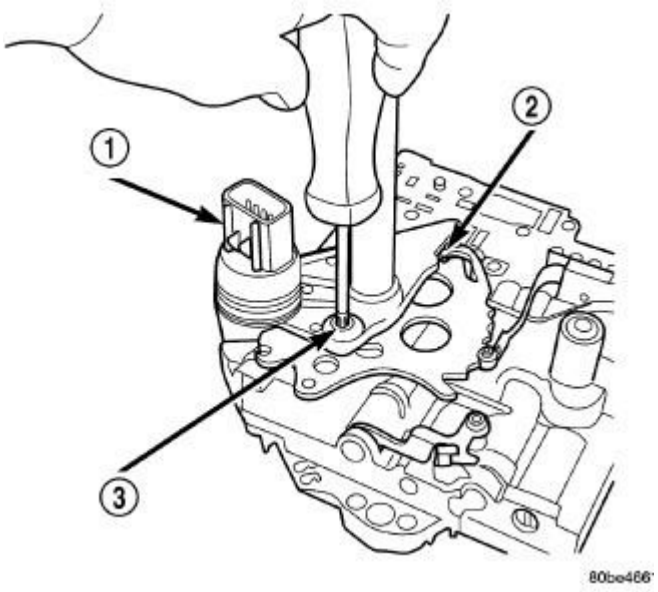


Fig. 170: Identifying Bolts, Nut, Battery Tray And Frame Rail
Courtesy of CHRYSLER LLC

9. Remove the two bolts (2) and one nut (1) securing the battery tray (3) to the left frame rail (4).

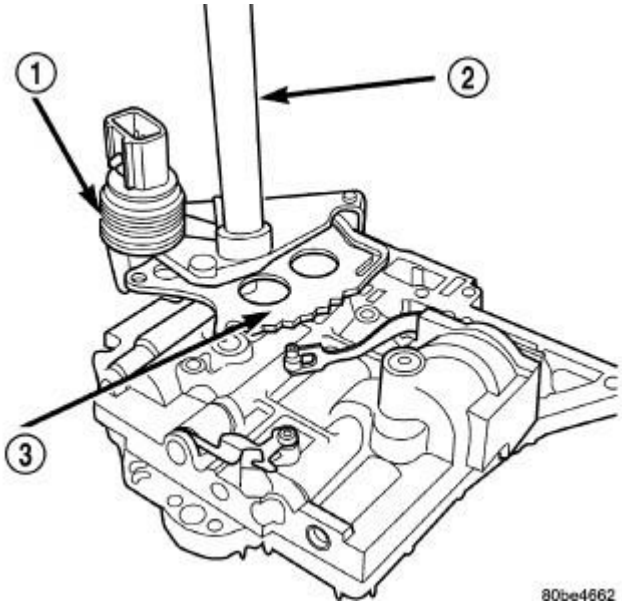


Fig. 171: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

10. Lift the battery tray off the mounting stud.
11. Remove clamp attaching return hose (5) from gear at return hose (2) to cooler. Separate hoses.

12. Remove return hose (5) from vehicle.

COOLER TO RESERVOIR

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

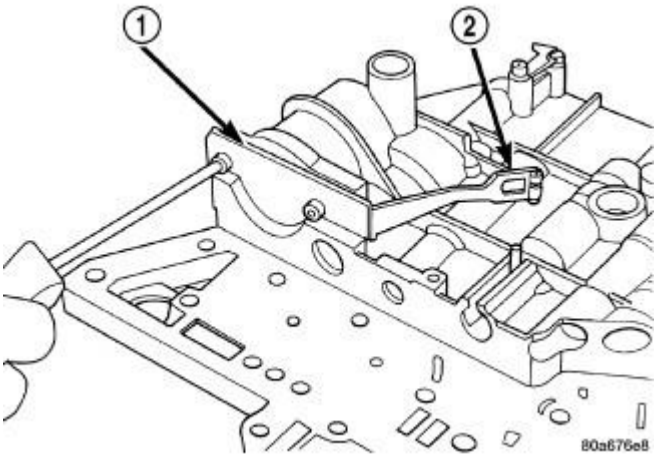


Fig. 172: Removing/Installing Front Fascia
Courtesy of CHRYSLER LLC

4. Remove the front bumper fascia (1). Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Removal** .

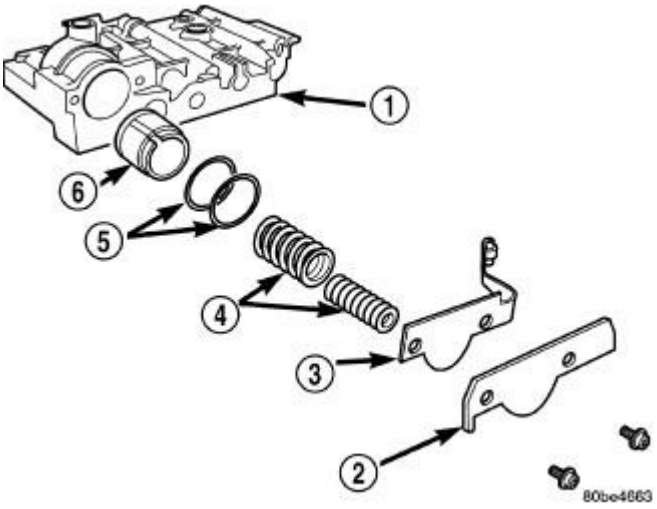


Fig. 173: Removing/Installing Lower Plastic Grille
Courtesy of CHRYSLER LLC

5. Disconnect the air temp sensor electrical connector (2).
6. Remove the air temp sensor mounting bolt (3).
7. Remove all the push pins securing the lower plastic grille (1) to the bumper and support frame.
8. Remove the lower plastic grille (1) from the bumper reinforcement.

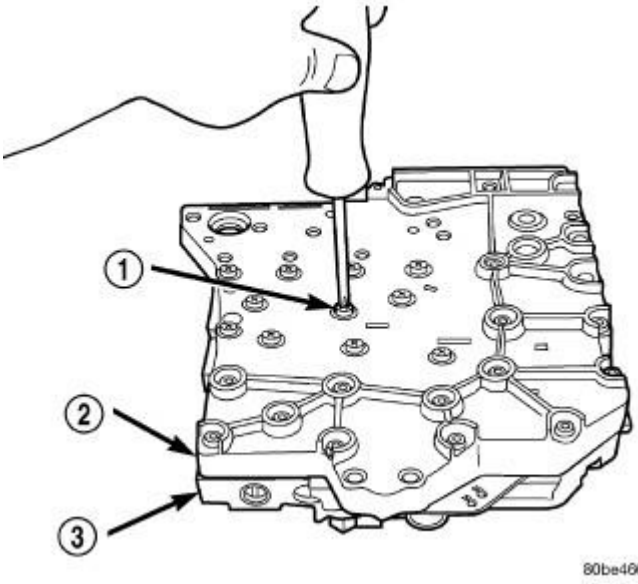


Fig. 174: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

9. Remove clamp attaching return hose (5) from gear at return hose (2) to cooler. Separate hoses.

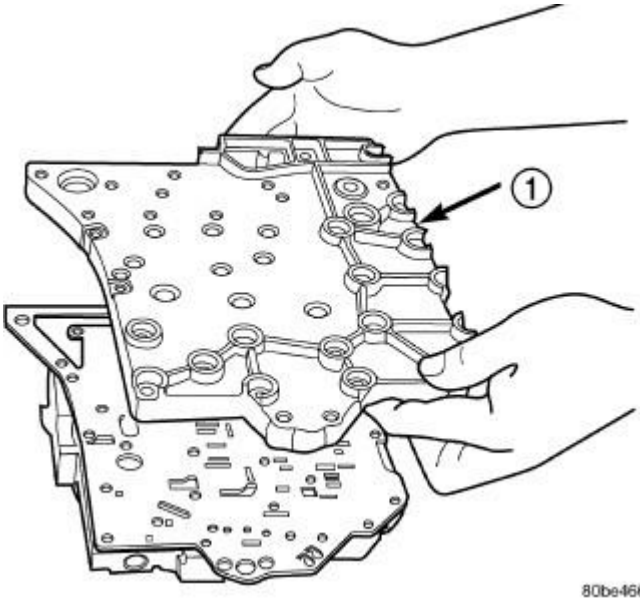


Fig. 175: Identifying Return Hose & Power Steering Fluid Reservoir

Courtesy of CHRYSLER LLC

10. Remove clamp attaching return hose (2) to power steering fluid reservoir (1). Remove hose from reservoir.

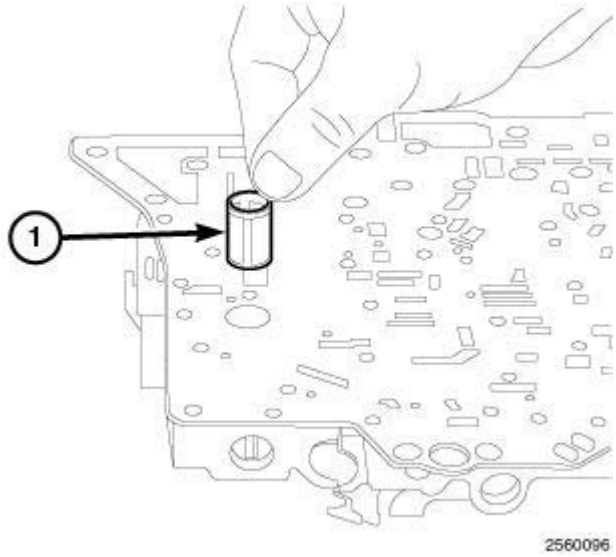


Fig. 176: Removing/Installing Tie Strap Clip At Right Side Of Cooling Module
Courtesy of CHRYSLER LLC

11. Remove tie strap clip (1 - overhead view) from right side of cooling module near reservoir end of hose.

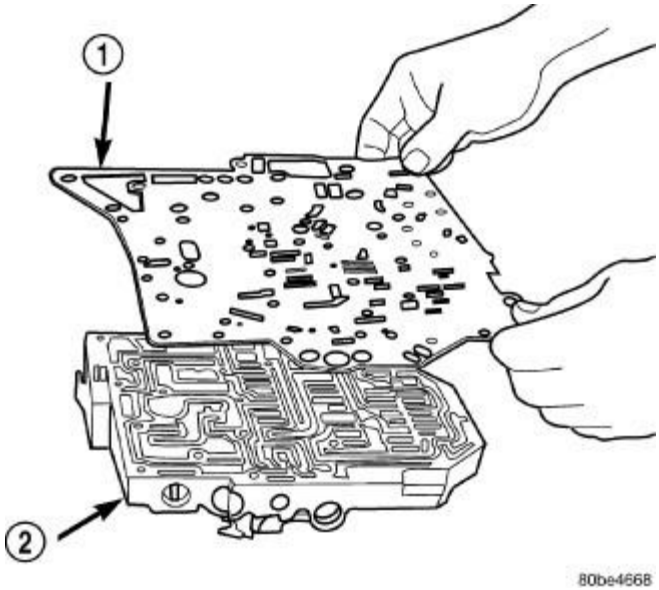


Fig. 177: Identifying Top & Bottom Clip Tabs Of Cooling Module
Courtesy of CHRYSLER LLC

NOTE: To release each return hose cooler tube mounting bracket in the following step, push inward on top and bottom clip tabs of cooling module, then pull

mounting bracket away from clip.

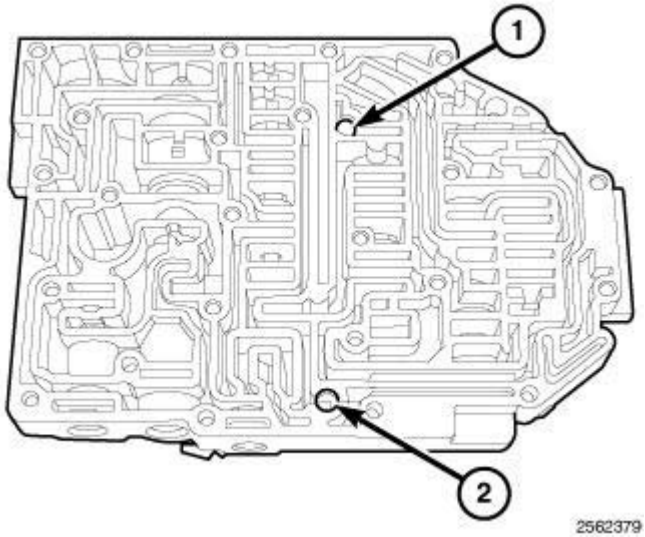


Fig. 178: Identifying Return Hose Cooler Tube & Cooler Tube Mounting Brackets
Courtesy of CHRYSLER LLC

12. Push inward on return hose cooler tube (1) mounting clip tabs and remove cooler tube mounting brackets (2) from clips on cooling module.
13. Remove return hose assembly.

Installation

GEAR TO COOLER

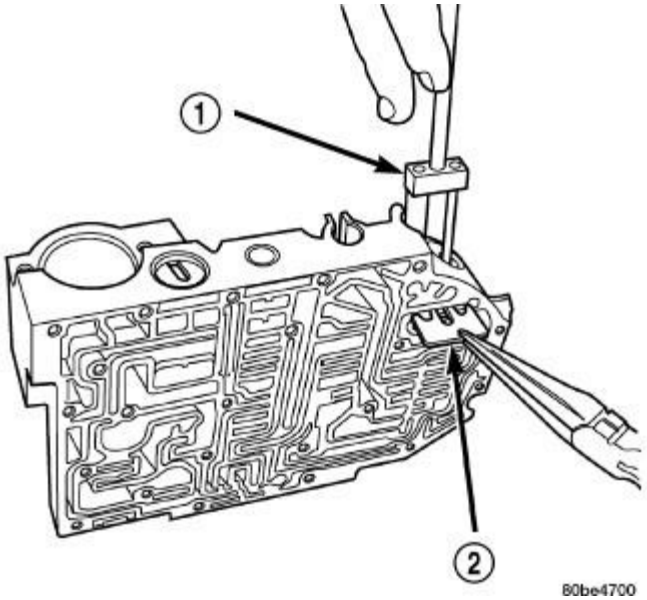


Fig. 179: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering

Gear
Courtesy of CHRYSLER LLC

1. Place return hose into engine compartment using reverse order of removal.
2. Install return hose routing clamp over battery tray mounting stud.
3. Install return hose (2) to cooler over return hose (5) from gear tube. Slide hose clamp into position on fluid reservoir and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

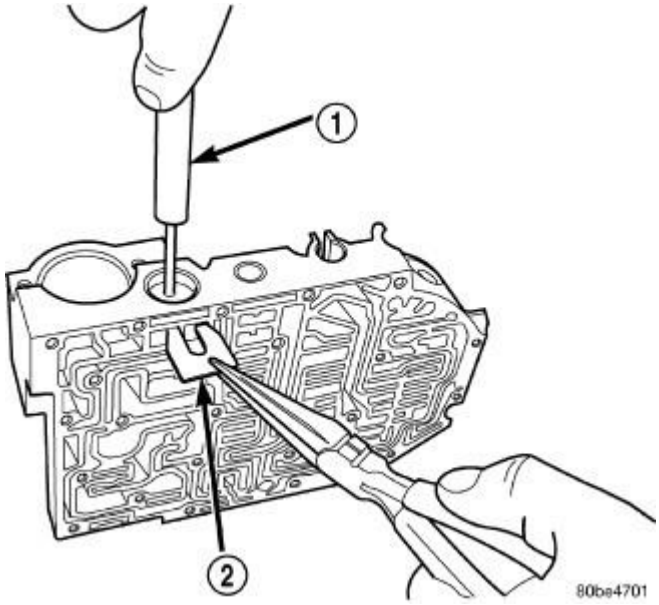


Fig. 180: Identifying Bolts, Nut, Battery Tray And Frame Rail
Courtesy of CHRYSLER LLC

4. Place the battery tray (3) into mounted position.
5. Install the one nut (1) and two bolts (2) securing the battery tray (3) to the frame rail (4).
6. Tighten the nut to 12 N.m (105 in. lbs.).
7. Tighten the bolts to 12 N.m (105 in. lbs.).
8. Install the battery. Refer to **Electrical/Battery System/BATTERY - Installation** .
9. Raise and support vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .

NOTE: **Before installing power steering return hose on power steering gear, wipe clean connection with a lint-free cloth and replace O-ring. Lubricate O-ring using clean power steering fluid.**

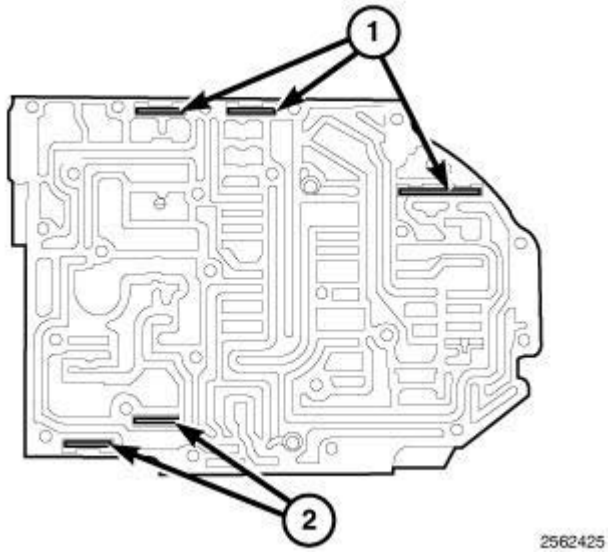


Fig. 181: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

10. Install return hose (5) into power steering gear (3) port. Thread pressure hose tube nut into gear, but do not tighten at this time.
11. Position return hose routing clamp and install screw (1) securing return hose routing clamp to rear of ABS support bracket. Tighten screw to 8 N.m (71 in. lbs.).
12. Tighten return hose (5) tube nut at steering gear (3) to 31 N.m (23 ft. lbs.).
13. Lower vehicle.
14. Install negative (-) battery cable on negative battery post.
15. Fill and bleed power steering system. See **Steering - Standard Procedure**.
16. Inspect for leaks.

COOLER TO RESERVOIR

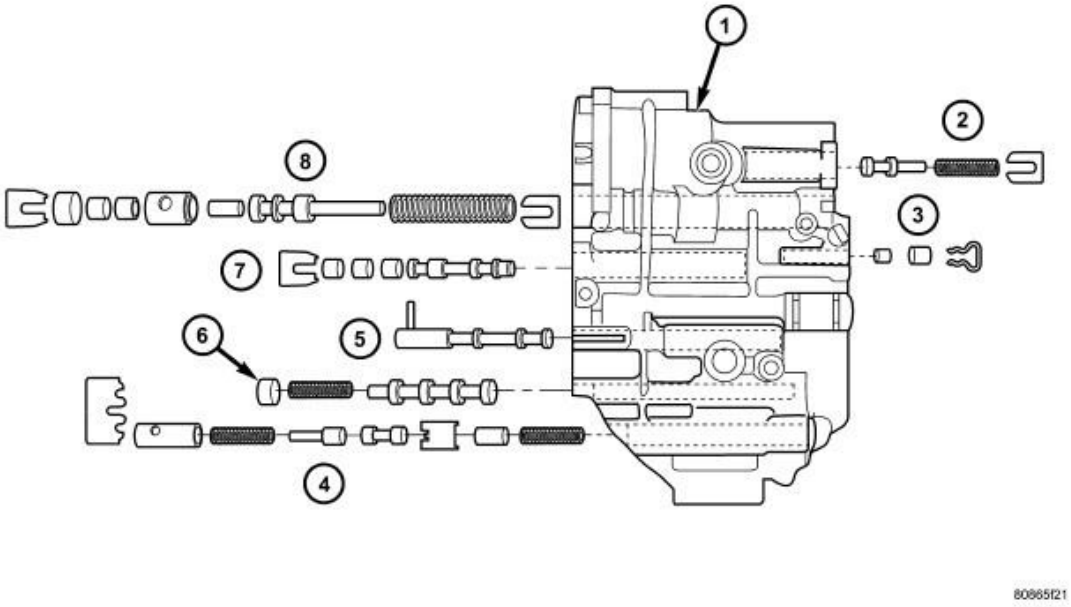


Fig. 182: Identifying Return Hose Cooler Tube & Cooler Tube Mounting Brackets
Courtesy of CHRYSLER LLC

1. Guide ends of return hose through openings around each side of cooling module.
2. Position return hose cooler tube mounting brackets (2) over clips on cooling module and press in on each until tabs on clip engage bracket, locking it in place.

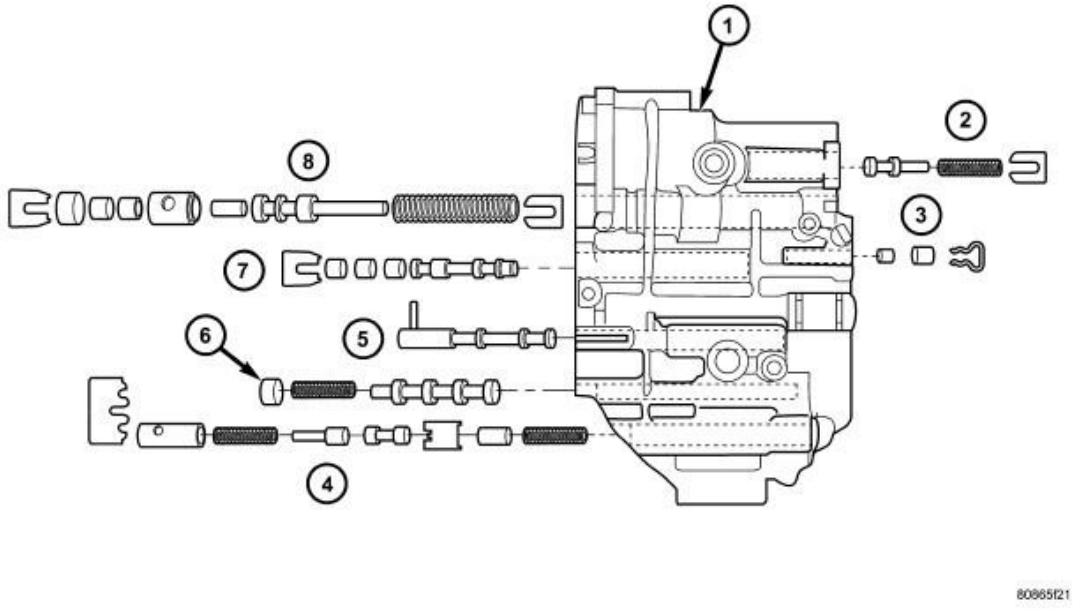


Fig. 183: Removing/Installing Tie Strap Clip At Right Side Of Cooling Module
Courtesy of CHRYSLER LLC

3. Guide reservoir end of return hose (2 - overhead view) up right side of cooling module and install tie strap clip (1 - overhead view) securing hose to cooling module.

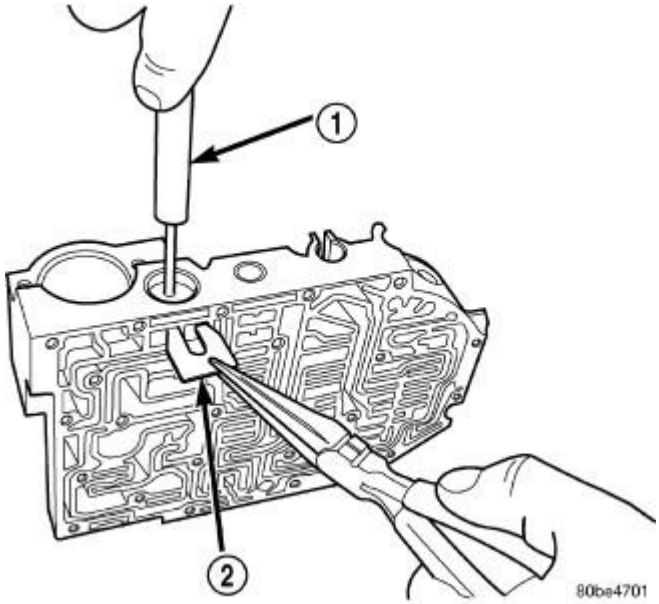


Fig. 184: Identifying Return Hose & Power Steering Fluid Reservoir
Courtesy of CHRYSLER LLC

4. Install return hose (2) onto reservoir (1). Slide hose clamp into position on fluid reservoir and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

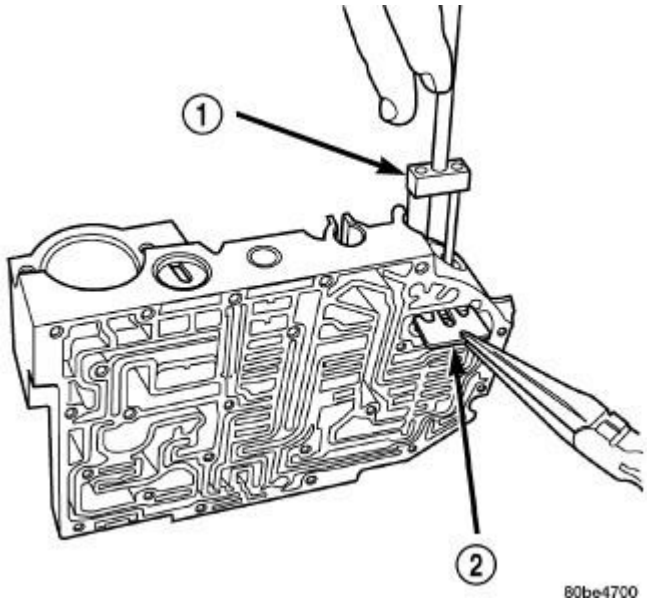


Fig. 185: Removing/Installing Tube Nuts Fastening Pressure Hose & Return Hose To Power Steering Gear
Courtesy of CHRYSLER LLC

5. Install return hose (2) to cooler over return hose (5) from gear tube. Slide hose clamp into position on fluid reservoir and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

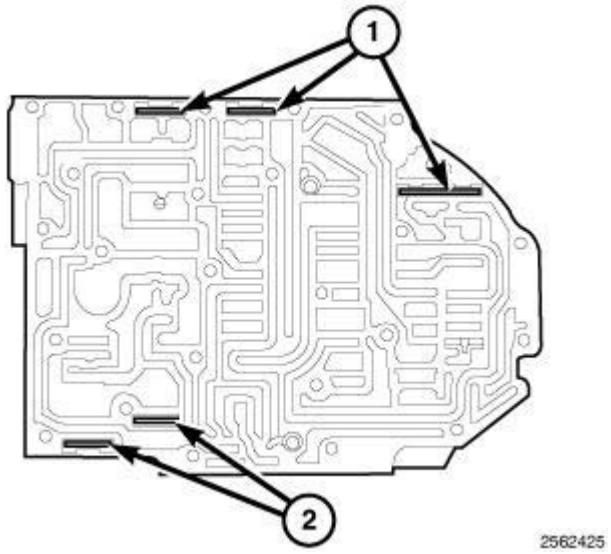


Fig. 186: Removing/Installing Lower Plastic Grille
Courtesy of CHRYSLER LLC

6. Install the lower plastic grille (1) to the vehicle.
7. Install the plastic push pins to the bumper and lower support.
8. Install the air temp sensor onto the lower support. Tighten the bolts to 5.5 N.m (49 in.lbs.).
9. Connect the electrical connector to the air temp sensor (2).

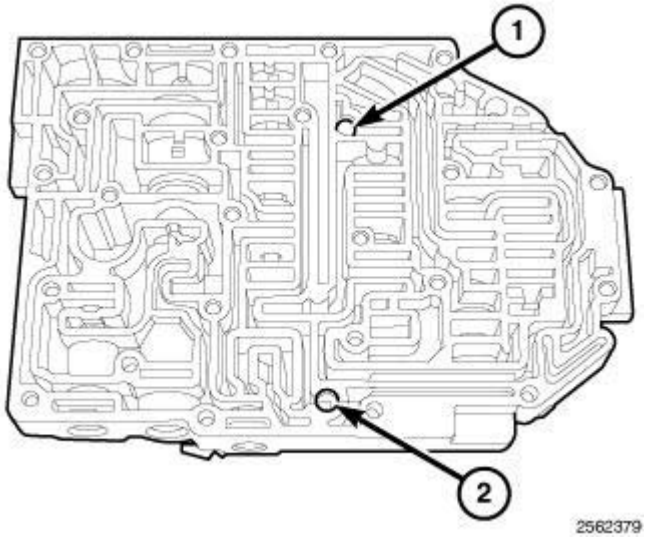


Fig. 187: Removing/Installing Front Fascia
Courtesy of CHRYSLER LLC

10. Install the front bumper fascia (1). Refer to **Frame and Bumpers/Bumpers/FASCIA, Front - Installation** .
11. Install negative (-) battery cable on negative battery post.
12. Fill and bleed power steering system. See **Steering - Standard Procedure**

13. Inspect for leaks.

HOSE, POWER STEERING, SUPPLY

Removal

REMOVAL

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.

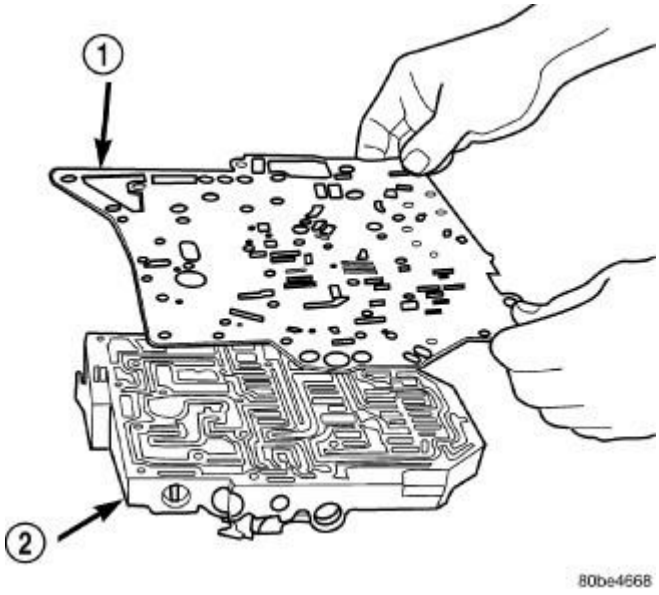


Fig. 188: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

4. Remove clamp attaching supply hose (3) to power steering pump (4). Remove hose from pump.
5. Remove clamp attaching supply hose (3) to power steering fluid reservoir (2). Remove hose from reservoir.

Installation

INSTALLATION

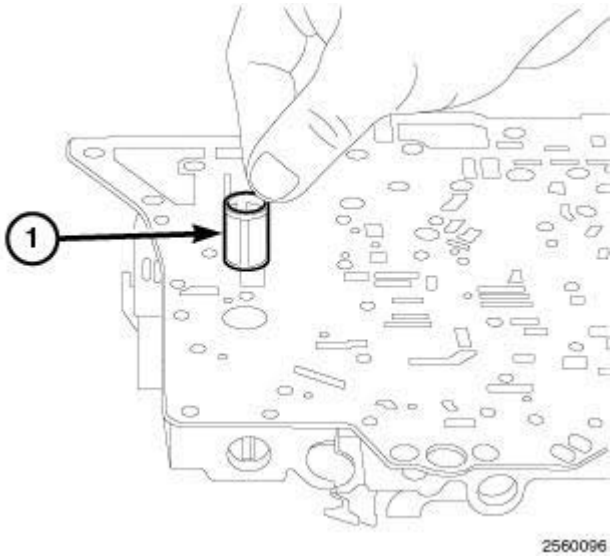


Fig. 189: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

1. Slide supply hose (3) onto reservoir (2). Do not install clamp at this time.
2. Slide supply hose (3) onto power steering pump (4). Position clamp over supply hose on pump fitting and attach it. **Be sure hose clamp is installed past bead on pump fitting.**
3. Position clamp over supply hose on reservoir fitting and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**
4. Install negative (-) battery cable on negative battery post.
5. Fill and bleed power steering system. See **Steering - Standard Procedure**.
6. Inspect for leaks.

PULLEY, POWER STEERING PUMP

Removal

REMOVAL

1. Remove power steering pump from engine. See **Steering/Pump - Removal**.

CAUTION: Do not hammer on power steering pump pulley or shaft to remove power steering pump pulley. Damage to pulley and power steering pump will occur.

CAUTION: It is very important to use Puller 9962, to remove pulley from power steering pump shaft. Use of other pullers can damage or break pulley and pump shaft.

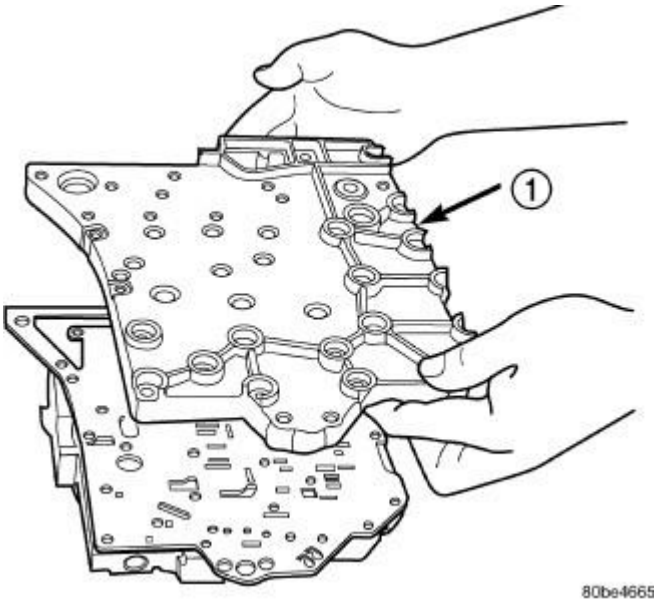


Fig. 190: Identifying Screw-Drive, Puller Body, & Buttons
Courtesy of CHRYSLER LLC

2. Coat Screw-Drive (1) with lubricant and thread into Puller Body (2).

NOTE: Two Buttons come with Puller kit (9962-3 and 9962-4). Be sure to use Button that best fits end of pump shaft to avoid damage to Button or pump shaft.

3. Insert Button 9962-4 (4), into end of Screw-Drive. Be sure not to misplace ball bearing that resides behind Button.

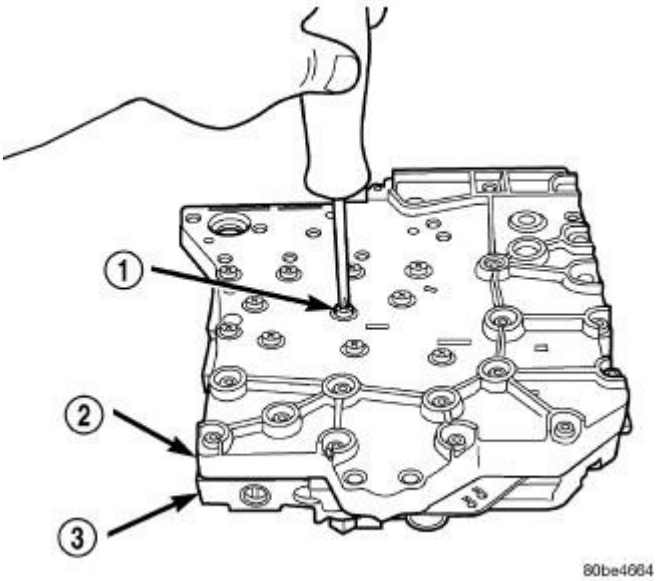


Fig. 191: Assembling Puller 9962 Over End Of Pump Shaft & Pulley Hub

Courtesy of CHRYSLER LLC

4. Assemble Puller 9962, over end of pump shaft and pulley hub.
   a. Place Button on end of Screw-Drive against pump shaft.
   b. Assemble Collets 9962-2 (3), surrounding Puller Body (1) and pulley hub flange, then slide the Collet Sleeve over the Collets.
   c. Hand tighten Screw-Drive (2) taking up any slack in Puller.
5. Hold Puller Body stationary while turning Screw-Drive until pulley is removed from power steering pump shaft.

NOTE: Inspect pulley. Replace if pulley is bent, cracked, or loose.

Installation

INSTALLATION

1. Place pulley hub over pump shaft.

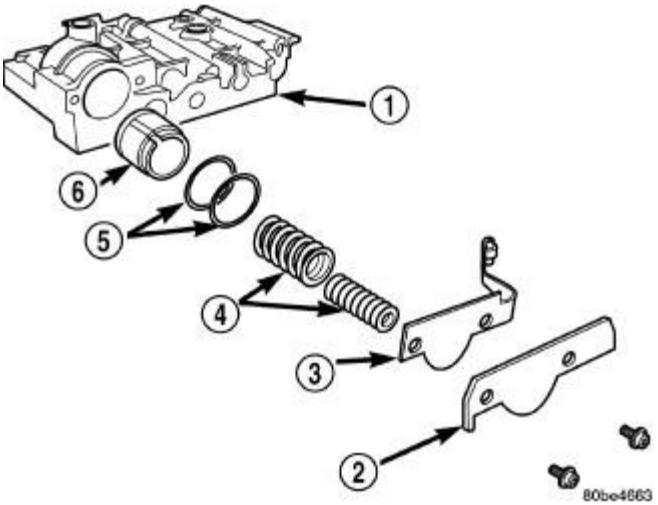


Fig. 192: Installing Pulley Using Installer C-4063C & Washers
Courtesy of CHRYSLER LLC

1 - INSTALLER C-4063C
2 - STACK OF WASHERS

2. Place a stack of washers approximately 13 mm (0.5 in.) thickness (2) over pulley hub.

NOTE: Installer, Special Tool C-4063C, is a combination of Installer, Special Tool C-4063C, and Forcing Screw, Special Tool C-4063-2. It is important to use Forcing Screw C-4063-2 when performing this procedure.

3. Thread Installer (1), Special Tool C-4063C, completely into internal threads of power steering pump shaft, then rotate Installer Nut down against washers on pump pulley.
4. Ensuring that special tool and pulley remain aligned with pump shaft, tighten Installer Nut, forcing pulley onto power steering pump shaft until washers come in contact with end of pump shaft. **When washers contact end of pump shaft, Installer Nut will no longer rotate.**
5. Remove special tool from power steering pump.
6. Install power steering pump on engine. See **Steering/Pump - Installation**.

RESERVOIR, POWER STEERING PUMP

Removal

REMOVAL

1. Remove negative (-) battery cable from battery and isolate cable.
2. Remove cap from power steering fluid reservoir.
3. Using a siphon pump, remove as much power steering fluid as possible from power steering fluid reservoir.
4. Remove engine appearance cover.

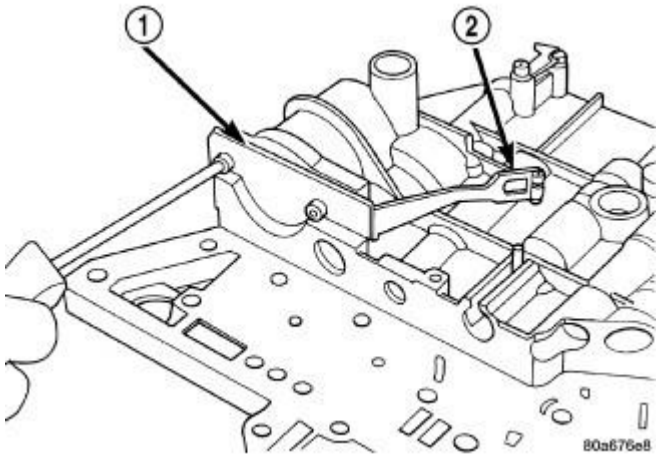


Fig. 193: Identifying Return Hose & Power Steering Fluid Reservoir
Courtesy of CHRYSLER LLC

5. Remove clamp attaching return hose (2) to power steering fluid reservoir (1). Remove hose from reservoir.

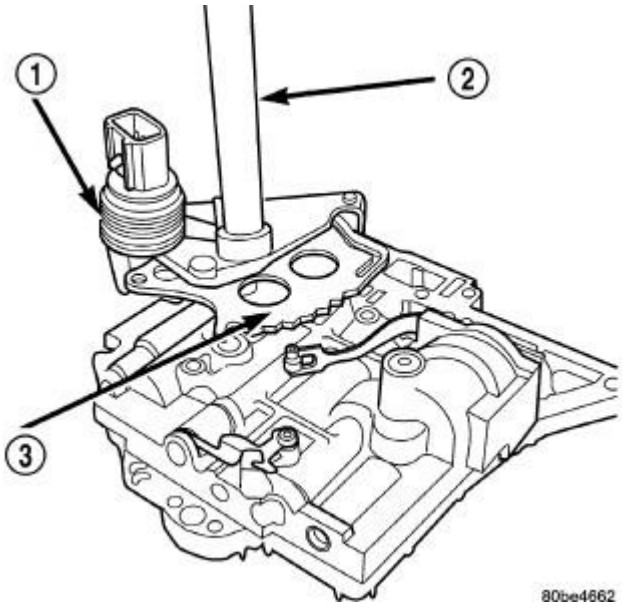


Fig. 194: Removing/Installing Supply Hose At Power Steering Pump
Courtesy of CHRYSLER LLC

6. Remove clamp attaching supply hose (3) to power steering fluid reservoir (2). Remove hose from reservoir.
7. Remove mounting nut (1) securing reservoir in place.
8. Slide reservoir upward and remove from mounting stud (5).

Installation

INSTALLATION

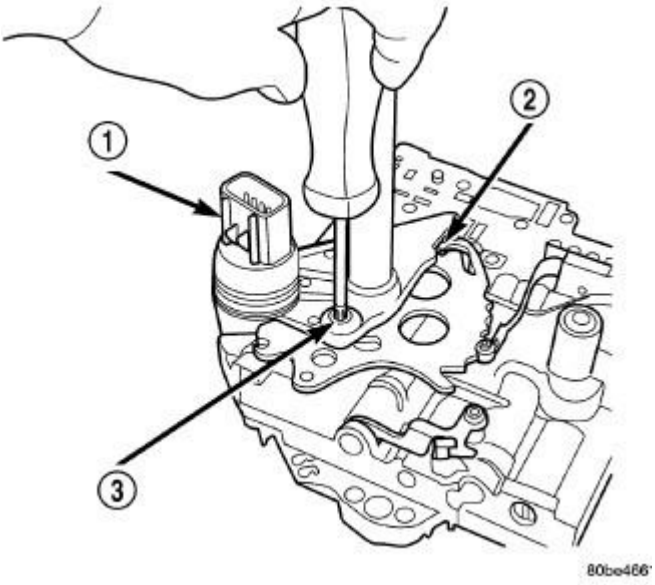


Fig. 195: Removing/Installing Supply Hose At Power Steering Pump

Courtesy of CHRYSLER LLC

1. Position reservoir (2) in place on mounting stud (5).
2. Install reservoir mounting nut (1). Tighten mounting nut to 12 N.m (9 ft. lbs.)
3. Install supply hose (3) onto reservoir (2). Slide hose clamp into position on fluid reservoir and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**

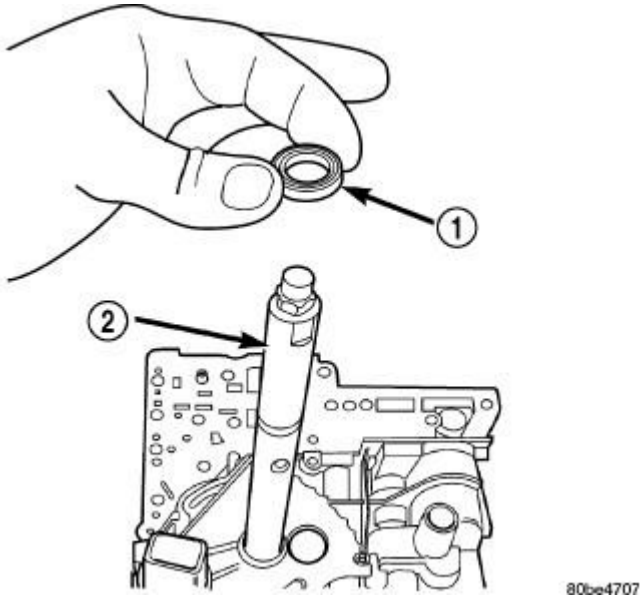


Fig. 196: Identifying Return Hose & Power Steering Fluid Reservoir
Courtesy of CHRYSLER LLC

4. Install return hose (2) onto reservoir (1). Slide hose clamp into position on fluid reservoir and attach it. **Be sure hose clamp is installed past bead on fluid reservoir fitting.**
5. Install negative (-) battery cable on negative battery post.
6. Fill and bleed power steering system. See **Steering - Standard Procedure**.
7. Inspect for leaks.

2009 ACCESSORIES AND EQUIPMENT

Power Top, Sunroof - Service Information - Journey

DESCRIPTION

DESCRIPTION

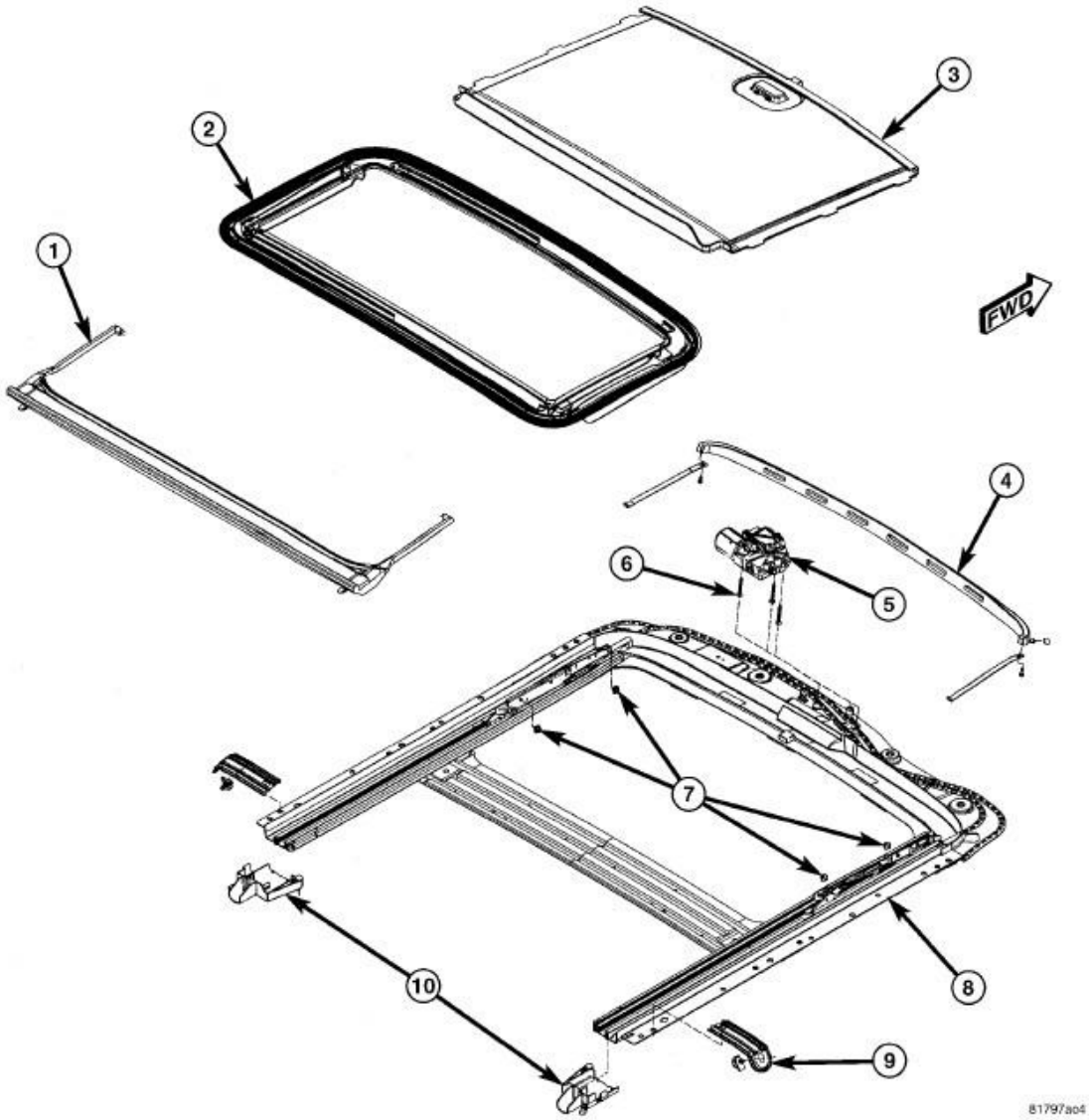


Fig. 1: Power Top/Sunroof Components
Courtesy of CHRYSLER LLC

1 - DRAIN TROUGH
2 - GLASS ASSEMBLY
3 - SUN SHADE
4 - WIND DEFLECTOR

5 - MOTOR
6 - MOTOR SCREWS (3) 3 N.m (26 in. lbs.)
7 - GLASS ASSEMBLY SCREWS (4) 3.5 N.m (31 in. lbs.)
8 - FRAME ASSEMBLY
9 - BRACKETS
10 - END CAPS

WARNING: Keep fingers and other body parts out of sunroof opening at all times.

The sunroof features a power sliding glass panel and a sunshade which can be manually positioned anywhere along its travel, rearward of glass panel front edge.

The sunroof is electrically operated from two switches located on the windshield header, between the map lamp. To operate the sunroof the ignition switch must be in either the Accessory or On/Run position. One switch (vent) is a push button type and opens the sunroof to the vent position only. The other switch (open/close) is a rocker type for opening and closing the sunroof. Pressing and releasing the open button once the sunroof will express open and the wind deflector will raise. If the button is pressed a second time the sunroof will stop in that position. Pressing and holding the close button will close the sunroof. If the close button is released the sunroof will stop in that position. Also, by pressing the close button the sunroof will close automatically.

SUNROOF OPERATION INSTRUCTIONS

SWITCH INPUTS			
-	OPEN	CLOSE	VENT
FULL VENT	1. Push and hold switch until glass stops in flush closed position glass will then express open 2. Press switch for less than 0.65 seconds for express to full open.	1. Push and hold switch until glass stops in flush closed position. 2. Press switch for less than 0.65 seconds for express to flush closed.	No action -
VENT RANGE	1. Push and hold switch until glass passes through flush closed position. Glass will then open 2. Press switch for less than 0.65 seconds for express to full open.	1. Push and hold switch until glass stops in flush closed position. 2. Press switch for less than 0.65 seconds for express to flush closed.	1. Push and hold switch until glass stops in full vent position. 2. Press switch for less than 0.65 seconds for express to full vent.
FLUSH	1. Press switch for less than 0.65 seconds for express to full open.	No action	1. Press and hold switch. Glass will travel through flush closed to full vent. Glass will stop when switch is released or when fully vented.

	2. Press switch for more than 0.65 seconds and glass will stop when switch is released	-	2. Press switch for less than 0.65 seconds for express to full vent.
FULL OPEN	No action -	1. Press and hold switch until glass stops in flush closed position or anywhere in between. 2. Press switch for less than 0.65 seconds for express to flush closed.	1. Press and hold switch. Glass will travel through flush closed to full vent. Glass will stop when switch is released. 2. Press switch for less than 0.65 seconds for express to full vent.

OPERATION

OPERATION

This vehicle has a vent, tilt and slide power sunroof system with express (one-touch) open/close feature. The sunroof system receives battery feed through the "sunroof" relay and a 25 amp mini fuse located in the Totally Integrated Power Module (TIPM). The sunroof system power is supplied when the ignition switch is in the RUN and ACCESSORY positions. The sunroof will operate normally with the key in any position while the Accessory Delay system is active.

The sunroof is electrically operated from two switches located in the overhead console in between the two reading lamps. The "VENT" switch is a push button type switch and opens the sunroof to the vent position only. The other switch "OPEN/CLOSED" is a rocker type switch for opening and closing the sunroof. Pressing and releasing the open button once, the sunroof will express open and the wind deflector will raise. If the button is pressed a second time the sunroof will stop in that position. Pressing and releasing the close button once will express close the sunroof. If the close button is pressed a second time during the express close operation the sunroof will stop in that position.

DIAGNOSIS AND TESTING

DIAGNOSTIC PROCEDURES

Before beginning sunroof diagnostics, verify that all other power accessories are in proper operating condition. Refer to **SUNROOF DIAGNOSIS CHART** table for possible causes. If not, a common electrical problem may exist. Refer to appropriate wiring diagrams information for circuit, splice and component descriptions. Check the condition of the circuit protection (20 amp circuit breaker in the Totally Integrated Power Module (TIPM)). Inspect all wiring connector pins for proper engagement and continuity. Check for battery voltage at the power sunroof drive motor. Refer to **SYSTEM WIRING DIAGRAMS** for circuit information. If battery voltage of more than 9 volts is detected at the drive motor, proceed with the following tests (the drive motor will not operate at less than 9 volts).

Before beginning diagnosis for wind noise or water leaks, verify that the problem was not caused by releasing the control switch before the sunroof was fully closed. The sunroof module has a water-management system. If

however, the sunroof glass is in a partial closed position, high pressure water may be forced beyond the water management system boundaries and onto the headlining.

SUNROOF DIAGNOSIS CHART

SYMPTOM	POSSIBLE CAUSE
Sunroof motor inoperative.	Faulty control switch. Faulty circuit ground between sunroof drive motor, control switch, and body harness. Faulty power circuit between sunroof drive motor, control switch, and body harness. Faulty drive motor. Faulty drive motor electrical connector.
Audible whine when switch is depressed, sunroof does not operate.	Faulty drive motor. Binding cable.
Audible clicking or ratcheting when switch is pressed, sunroof does not operate.	Broken or worn drive cable. Worn drive motor gear. Mechanisms not synchronized.
Sunroof vents and opens, but does not close.	Binding cable. Faulty circuit. Faulty control switch. Faulty drive motor. Broken trough guide
Sunroof vents, but does not open.	Binding cable or mechanism. Faulty circuit. Faulty switch. Faulty drive motor.
Sunroof does not vent.	Binding cable or mechanism. Faulty circuit. Faulty control switch. Faulty drive motor.
Sunroof water leak.	Drain tubes clogged or kinked or disconnected from the sunroof. Glass panel improperly adjusted. Faulty glass panel seal.
Gurgling sound from sunroof.	Low spot in drain hose routing, allowing water to stand.
Wind noise from sunroof.	Front of glass panel to high or rear to low. Wind deflector not deploying. Glass not centered in opening. Faulty glass panel seal.
Rattles from open sunroof while driving.	Loose or broken attaching hardware. Worn or broken mechanism.
Sunroof does not stop in the fully closed position.	Drive motor has lost position of glass, teach procedure required to reprogram drive motor. Refer to **Standard**

Procedure .

MOTOR, SUNROOF

STANDARD PROCEDURE

DRIVE MOTOR TEACH PROCEDURE

REPLACEMENT DRIVE MOTOR

1. Upon first powering up the sunroof, **continuously** press the close button on the power sunroof switch. The sunroof will begin moving in the tilt up direction.
2. The glass panel will move to the hard stop (just past the full tilt position) and then reverse to the soft stop (the full tilt position).
3. Once the sunroof has reversed **immediately** (within 5 seconds of stopping travel), release the switch and **continuously** press the close button again.
4. The sunroof glass will continue to move to the fully closed position. Once fully closed the close button can be released.

ORIGINAL DRIVE MOTOR

1. Cycle the sunroof to full close position and release close button on the power sunroof switch.
2. Once the sunroof is in the fully closed position, press and **continuously** hold the close button again.
3. After a ten second delay the sunroof will begin to move past the normal vent position to the hard stop position. It will then reverse to the normal full vent position (also called the soft stop).
4. Once the sunroof has reversed to the vent soft stop, **immediately** (within 5 seconds of stopping travel) release the close button and **continuously** press it again.
5. After a three second delay the sunroof glass will continue to move to the fully closed position. Once fully closed the close button can be released.

REMOVAL

REMOVAL

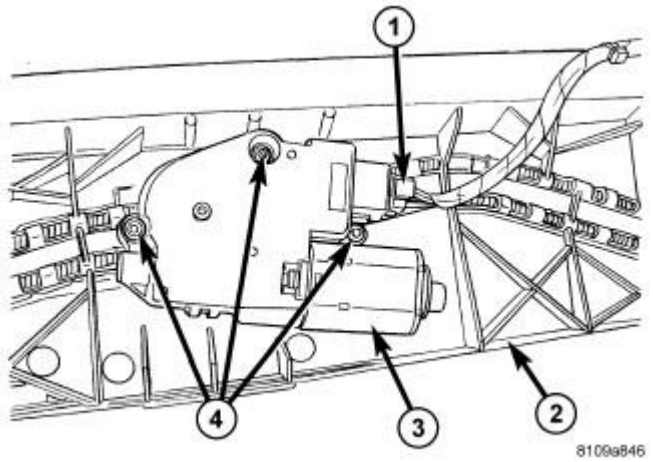


Fig. 2: Identifying Drive Motor Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR
2 - MODULE ASSEMBLY
3 - DRIVE MOTOR
4 - MOUNTING SCREWS

1. Remove headliner. Refer to **Body/Interior/HEADLINER - Removal** .
2. Disconnect the electrical connector (1).
3. Remove three motor assembly attaching screws (4) from bottom side of motor assembly (3) and remove motor assembly from the motor bracket.

INSTALLATION

INSTALLATION

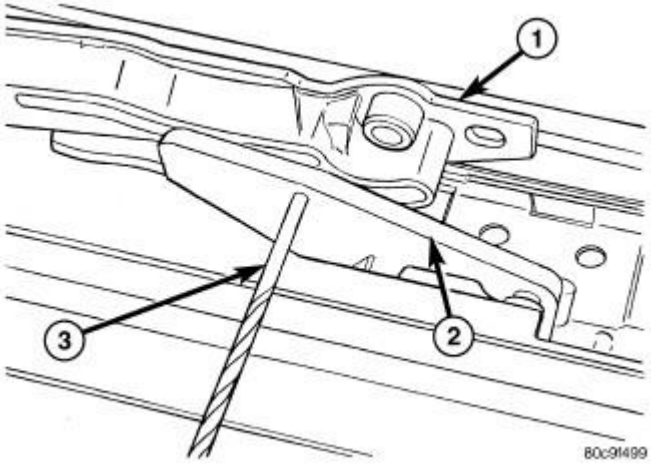


Fig. 3: Identifying Lifter Arm, Trolley, & Alignment Pin
Courtesy of CHRYSLER LLC

1 - LIFTER ARM
2 - TROLLEY
3 - ALIGNMENT PIN

1. If sunroof was open when drive motor was removed, carefully move glass panel into closed position and remove glass panel. Refer to **Body/Sunroof/GLASS, Sunroof - Removal** .
2. Set lifter arm timing by manually sliding the mechanisms (1) in the track until timing holes in the trollies are aligned with the timing holes in the lifter arm cams (2) and insert pins (3) into the mechanisms to hold mechanisms in closed position.

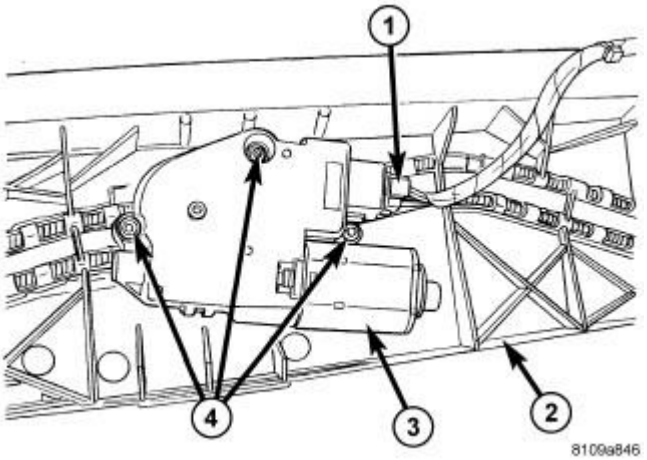


Fig. 4: Drive Motor Components
Courtesy of CHRYSLER LLC

1 - ELECTRICAL CONNECTOR
2 - MODULE ASSEMBLY
3 - DRIVE MOTOR
4 - MOUNTING SCREWS

3. Place motor (3) into position and install screws (4) attaching motor to bracket (2).
4. Tighten the screws (4) to 3 N.m (26 in. lbs.).
5. If sunroof glass panel was removed previously, remove the timing pins and install the sunroof glass panel. Refer to **Body/Sunroof/GLASS, Sunroof - Installation** .
6. Partially install the headliner and connect the sunroof wiring electrical connectors. Refer to **Body/Interior/HEADLINER - Installation** .
7. Temporarily install sunroof switch and perform the sunroof motor teach procedure. See **Standard Procedure** .
8. Test sunroof operation, adjust glass as necessary. Refer to **Body/Sunroof/GLASS, Sunroof -**

Adjustments .

9. Complete the headliner installation. Refer to **Body/Interior/HEADLINER - Installation** .

SWITCH, SUNROOF

DESCRIPTION

DESCRIPTION

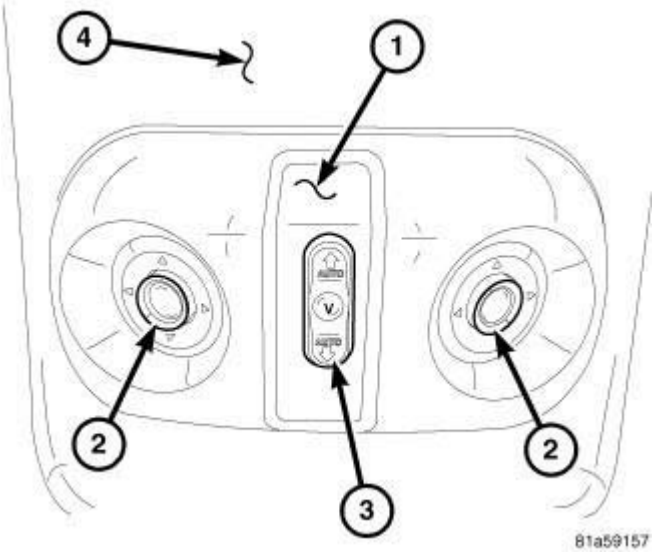


Fig. 5: Power Sunroof Switch
Courtesy of CHRYSLER LLC

The power sunroof switch (3) is a combination push-button and rocker switch module mounted in the overhead console assembly (1). The sunroof switch is a direct contact unit that is directly wired to the sunroof motor/module assembly. The sunroof switch performs the following functions:

- Power sunroof open (back of switch pushed)
- Power sunroof express open (back of switch pushed and released)
- Power sunroof closed (front of switch pushed)
- Power sunroof express closed (front of switch pushed and released)
- Power sunroof vent (switch center button pushed)

The power sunroof switch cannot be repaired. If the individual components are damaged or inoperative the switch assembly must be replaced. See **Removal** .

OPERATION

OPERATION

The sunroof is electrically operated from two switches located in the headliner on the courtesy/reading lamp

assembly. The power sunroof switch is hard wired to the sunroof motor/module assembly. The "VENT" switch is a push button type switch and opens the sunroof to the vent position only. The other switch "OPEN/CLOSED" is a rocker type switch for opening and closing the sunroof. Pressing and releasing the open button once, the sunroof will express open and the wind deflector will raise. If the button is pressed a second time the sunroof will stop in that position. Pressing and releasing the close button once will express close the sunroof. If the close button is pressed a second time during the express close operation the sunroof will stop in that position.

The switch is grounded at one terminal and receives a 5 volt signal from the sunroof motor/module on the remaining three terminals. The switch pulls down the 5 volt reference voltage from the module signaling it to perform the desired function.

For complete circuit diagrams, refer to SYSTEM WIRING DIAGRAMS . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

DIAGNOSIS AND TESTING

SUNROOF SWITCH

For complete circuit diagrams, refer to SYSTEM WIRING DIAGRAMS . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

1. Remove the overhead console. Refer to **Electrical - Message Systems/Overhead Console - Removal** .
2. Disconnect the power sunroof switch wire harness connector.
3. With the ignition key in the "RUN" position check for 5 volts on the "OPEN", "CLOSE" and "VENT" circuits of the sunroof switch harness connector. If OK, go to step 4. If not OK, inspect the wiring harness and connectors between the motor/module and switch for damage and repair as necessary.
4. With the ignition key in the "OFF" position check for continuity between the ground circuit of the sunroof switch harness connector and a known good ground. Continuity should be present. If OK, go to step 5. If not OK, inspect the wiring harness and connector and repair the ground circuit as necessary.

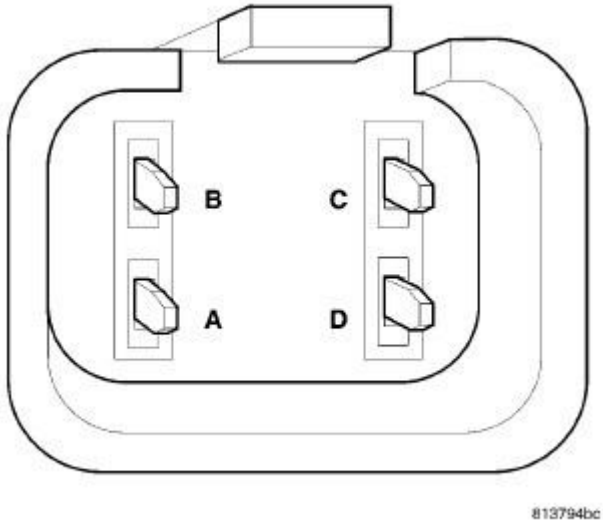


Fig. 6: Power Sunroof Switch Wire Harness Connector
Courtesy of CHRYSLER LLC

5. Using an ohmmeter, test the continuity of the power sunroof switch in each switch position. Refer to the **POWER SUNROOF SWITCH CONTINUITY TABLE**. If OK, inspect the wiring harness and connectors for damage and repair as necessary. If not OK, replace the overhead console assembly. Refer to **Electrical - Message Systems/Overhead Console - Removal** .

POWER SUNROOF SWITCH CONTINUITY TABLE

SWITCH POSITION	CONTINUITY BETWEEN PINS
OFF	NO CONTINUITY
SUNROOF OPEN	B AND D
SUNROOF CLOSED	B AND C
SUNROOF VENT	B AND A

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove overhead console. Refer to **Electrical - Message Systems/Overhead Console - Removal** .
3. Using a suitable flat bladed tool, release the mounting tabs from the sides of the sunroof control switch and pull the switch out of the overhead console assembly.

INSTALLATION

INSTALLATION

1. Insert the sunroof control switch into the overhead console assembly. Push the switch until it is securely

held in place by the mounting tabs.

2. Install the overhead console. Refer to **Electrical - Message Systems/Overhead Console - Installation** .
3. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Power Windows - Service Information - Journey

DESCRIPTION

DESCRIPTION

The power window system allows each of the door windows to be raised and lowered electrically by actuating a switch on the trim panel of each respective door. A master switch on the driver side front door trim panel allows the driver to raise or lower each of the passenger door windows, and to lock out the individual switches on the passenger doors from operation. The power window system receives battery feed only when the ignition switch is in the RUN or ACCESSORY position. The power window system will also operate when in power accessory delay

For service of mechanical components, such as the regulator, lift plate, window tracks, or glass, refer to **BODY** article.

OPERATION

OPERATION

Front and rear door window lift motors are of the permanent magnet type. A battery positive and negative connection to either of the two motor terminals will cause the motor to rotate in one direction. Reversing current through these same two connections will cause the motor to rotate in the opposite direction.

Each individual motor is grounded through the master switch.

EXPRESS DOWN WINDOW FEATURE

This feature allows you to remotely lower both front door windows at the same time. To use this feature, press and release the UNLOCK button on the RKE transmitter and then immediately press and hold the UNLOCK button until the windows lower to the desired level or until they lower completely.

STANDARD PROCEDURE

CLEAR/RELEARN

NOTE: Make sure battery is fully charged before proceeding.

NOTE: This needs to be completed every time the window glass is adjusted/removed, motor replaced, and or regulator replaced.

CLEAR/DENORMALIZE USING A SCAN TOOL

To clear/denormalize the door module memory, using a scan tool under the Miscellaneous menu look for Denormalization Window Command/ECU reset, and follow the directions.

RELEARN/NORMALIZE USING A SCAN TOOL

To relearn/normalize the door module memory, using a scan tool under the Miscellaneous menu look for Normalization Window command, and follow the directions.

CLEAR/DENORMALIZE, RELEARN/NORMALIZE WITHOUT A SCAN TOOL

Hold up/down the window switch for at least 30 seconds until the DTC is set for stuck switch. This will clear the memory of the calibration information (CLEAR/DENORMALIZE). Proceed to relearn/normalize.

1. Put a battery charger on vehicle.
2. If equipped with express-up/express-down, reset the express-up/down module for the door window glass. The window switch on the corresponding door must be used to control the window. Do not use the master switch for the passenger window.
3. To calibrate, start by moving the window to the middle position.
4. Drive the glass to the full-up position by pulling up on the window switch to its second detent and hold the switch until the glass is fully closed. Do not release the window switch. Continue to hold the window switch up for 2 seconds after the window glass is full closed.
5. Drive the glass to the full - down position by pushing down (depress) the window switch, (second detent if equipped with express-down) until the window glass is down for 2 seconds after the window glass is fully open. Do not release the window switch. Continue to hold the window switch down for 2 seconds after the window glass is fully open.
6. Check the operation of the express-up/ express-down feature.
7. If the express up/down doesn't work, repeat step # 3, waiting for 3 seconds.
8. Check that the window glass reverses when in the express-up mode by holding a pen in the path of the glass.
9. Once the proper operation of the express-up/express-down feature has been verified, clear all Diagnostic Trouble Codes (DTC's).

MOTOR, WINDOW REGULATOR

DIAGNOSIS AND TESTING

WINDOW MOTOR

1. Remove door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Removal** .
2. Connect positive (+) lead from a test battery to either of the two motor terminals.
3. Connect negative (-) lead from test battery to remaining motor terminal.
4. The motor should now rotate in one direction to either move window up or down.
    a. If window happens to already be in full UP position and motor is connected so as to move it in UP direction no movement will be observed.

b. Likewise, motor connected to move window in DOWN direction no movement will be observed if window is already in full DOWN position.
c. Reverse battery leads in steps 1 and 2 and window should now move. If window does not move, replace motor.

5. If window moved completely up or down, the test leads should be reversed one more time to complete a full window travel inspection.
6. If window does not move, check to make sure that it is free.
7. It is necessary that the window be free to slide up and down in the glass channels. If the window is not free to move up and down, the window lift motor will not be able to move the glass.
8. To determine if the glass is free, disconnect the regulator from the glass lift plate. Remove the two attaching screws, and slide the window up and down by hand.

REMOVAL

REMOVAL

1. Disconnect and isolate the battery negative cable.
2. Remove the door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Removal** .
3. Disconnect the electrical connector.
4. Remove the mounting fasteners and remove the motor.

INSTALLATION

INSTALLATION

1. Install the window motor and install the mounting fasteners.
2. Connect the electrical connector.
3. Install the door trim panel. Refer to **Body/Door - Front/PANEL, Door Trim - Installation** .
4. Connect the battery negative cable.

SWITCH, POWER WINDOW

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING

For switch testing, remove the switch. See **Removal** . Using an ohmmeter, refer to **MASTER WINDOW SWITCH TEST** table to determine if continuity is correct. If the results are not obtained, replace the switch.

The master window switch has an Auto-Down feature. Actuation of the master switch to the second down position will move the drivers side window completely down. The electronic switch will automatically disconnect the motor approximately 1 second after the window bottoms out. Failure of the electronic switch to detect stall current, will cause the switch to disconnect after approximately 13 seconds. The auto down function can be canceled by any movement of that switch.

MASTER WINDOW SWITCH TEST

SWITCH POSITION	CONTINUITY BETWEEN
OFF	5/13 AND 2
-	5/13 AND 3
-	5/13 AND 6
-	5/13 AND 7
LEFT FRONT UP-NON EXPRESS	1 AND 10
LEFT FRONT DOWN-NON EXPRESS	1 AND 9
RIGHT FRONT UP-NON EXPRESS	1 AND 12
RIGHT FRONT DOWN-NON EXPRESS	1 AND 14
LEFT REAR UP	1 AND 2
LEFT REAR DOWN	1 AND 3
RIGHT REAR UP	1 AND 6
RIGHT REAR DOWN	1 AND 7
LOCKOUT SWITCH (SWITCH NOT DEPRESSED)	1 AND 4

PASSENGER WINDOW SWITCH TEST

SWITCH POSITION	CONTINUITY BETWEEN	RESISTANCE VALUE
UP	4 AND 9	330 ohms ± 10%
DOWN	4 AND 9	3000 ohms ± 10%

REMOVAL

REMOVAL

SWITCH - FRONT DOOR	Refer to the **SWITCH - FRONT DOOR** removal procedure.
SWITCH - REAR DOOR	Refer to the **SWITCH - REAR DOOR** removal procedure.

SWITCH - FRONT DOOR

1. Disconnect and isolate the battery negative remote cable.
2. Using a trim tool, or equivalent, carefully pry up on the window switch until it disengages from the door trim panel.
3. Disconnect switch wire connector.
4. Remove switch assembly.

SWITCH - REAR DOOR

1. Disconnect and isolate the battery negative cable.
2. Using a trim tool, or equivalent, carefully pry up on the window switch until it disengages from the door

trim panel.
3. Disconnect the electrical connector.
4. Remove the switch from the handle.

INSTALLATION

INSTALLATION

SWITCH - FRONT DOOR	Refer to the **SWITCH - FRONT DOOR** installation procedure.
SWITCH - REAR DOOR	Refer to the **SWITCH - REAR DOOR** installation procedure.

SWITCH - FRONT DOOR

1. Install the switch by snapping into place.
2. Connect switch wire connector.
3. Install the switch to the door trim panel.
4. Connect the battery negative cable.

SWITCH - REAR DOOR

1. Connect the electrical connector.
2. Install the switch to the door trim panel.
3. Connect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Vehicle Theft Security - Service Information - Journey

DESCRIPTION

DESCRIPTION

The Vehicle Theft Security System (VTSS) is an available factory-installed option on this vehicle. The VTSS is comprised of two primary subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). The VTA is an active system that provides visual and audible responses as deterrents to and warnings of unauthorized vehicle tampering. The SKIS is a passive system that effectively immobilizes the vehicle against unauthorized operation. Following are paragraphs, which describe these subsystems of the VTSS.

Certain functions and features of the VTSS rely upon resources shared with or controlled by other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Other modules that may affect VTSS operation are:

- **Totally Integrated Power Module (TIPM)** - The TIPM is located in the engine compartment, near the battery. The TIPM provides the VTA system logic, driver and front passenger door ajar switch status, and power lock switch status. Refer to **Electrical - Wiring/Power Distribution/MODULE, Totally Integrated Power (TIPM) - Description** .
- **ElectroMechanical Instrument Cluster** - The ElectroMechanical Instrument Cluster (EMIC) is also known as the Cab Compartment Node (CCN) in this vehicle. The EMIC/CCN is located in the instrument panel above the steering column opening, directly in front of the driver. The EMIC provides the security indicator. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Powertrain Control Module** - The Powertrain Control Module (PCM) provides the SKIS engine control logic. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Powertrain Control - Description** .
- **Wireless Ignition Node** - The Wireless Ignition Node (WIN) provides ignition switch status. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/RECEIVER, Wireless Ignition Node - Description** .

Except for the Sentry Key transponders integral to the FOB with Integrated Key (FOBIK), which rely upon Low Frequency (LF) communication, hard-wired circuitry connects the VTA and SKIS components to the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the SKIS components through a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, procedures for proper wire and connector repair, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices, and grounds.

VEHICLE THEFT ALARM

The VTA is available in two different configurations for this vehicle: One configuration is designed for vehicles

manufactured for sale in North America; while, the other configuration is designed for vehicles manufactured for sale in markets outside of North America, also referred to as export markets within the context of this service information. All vehicles equipped with VTA are also equipped with the Remote Keyless Entry (RKE) system and the Sentry Key Immobilizer System (SKIS), regardless of their market destination.

The North American and export base version of the VTA system provide perimeter vehicle protection by monitoring the vehicle doors, the ignition switch, the liftgate, and the hood for vehicles built for certain markets where it is required equipment. If unauthorized vehicle use or tampering is detected these systems respond by pulsing the vehicle horn as an audible deterrent and flashing certain exterior lamps as a visual deterrent.

The VTA includes the following major components, which are described in further detail elsewhere in this service information:

- **Door Ajar Switches** - A door ajar switch is integral to the door latch mechanism of each front and rear door.
- **Hood Ajar Switch** - A hood ajar switch is located in a bracket on the right inner fender side shield of vehicles built for sale in certain export markets where it is required equipment.
- **Liftgate Ajar Switch** - A liftgate ajar switch is integral to the latch for the liftgate in the vehicle. Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/LATCH - Removal** .
- **Security Indicator** - A security indicator is integral to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN). Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is standard on all vehicles equipped with a Wireless Ignition Node (WIN). Vehicles equipped with the Vehicle Theft Alarm (VTA) are also equipped with SKIS. The SKIS provides passive vehicle protection by preventing the engine from operating unless a valid electronically encoded key is detected in the ignition lock cylinder.

The SKIS includes the following major components, which are described in further detail elsewhere in this service information:

- **Security Indicator** - A security indicator is integral to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN). Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Sentry Key Transponder** - The Sentry Key transponder is integral to the FOB with Integrated Key (FOBIK), which also includes an integral Remote Keyless Entry (RKE) transmitter and an integral mechanical valet key. See **Description**.
- **Wireless Ignition Node** - The Wireless Ignition Node (WIN) is located behind the instrument panel, and is partially concealed by the ignition switch bezel. The remainder of the WIN including its mounting provisions and electrical connections are concealed within the instrument panel. The WIN contains the integral ignition switch and performs all of the same SKIS functions performed by a Sentry Key Immobilizer Module (SKIM) used on prior vehicles. See **Description** .

OPERATION

OPERATION

The Vehicle Theft Security System (VTSS) is divided into two basic subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). Following are paragraphs that briefly describe the operation of each of these two subsystems.

VEHICLE THEFT ALARM

The Totally Integrated Power Module (TIPM) is used on this vehicle to control and integrate many of the functions and features included in the Vehicle Theft Alarm (VTA). In the VTA system, the TIPM receives inputs indicating the status of the door ajar switches, the ignition switch, the liftgate ajar switch, and the power lock switches. In vehicles built for certain export markets where it is required, the hood ajar switch provides a hard-wired input to the TIPM. The TIPM processes the information from all of these inputs and sends the appropriate electronic messages over the CAN data bus. The TIPM internally controls the output to the hazard warning lamps and sends a control output to energize or de-energize the horn relay as appropriate.

The hard-wired circuits between components related to the VTA system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information, and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls or communication between modules and devices that provide some features of the VTA system. The most reliable, efficient, and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. See the **Vehicle Theft Security System** menu item on the scan tool. Refer to the appropriate diagnostic service information.

Following are paragraphs that briefly describe the operation of each of the VTA features. See the owner's manual in the vehicle glove box for more information on the features, use, and operation of the VTA.

ENABLING

The TIPM must have the VTA function electronically enabled in order for the VTA to perform as designed. The logic in the TIPM keeps its VTA function dormant until it is enabled using a diagnostic scan tool. The VTA function of the TIPM is enabled on vehicles equipped with the VTA option at the factory, but a service replacement TIPM must be VTA-enabled by the dealer using a diagnostic scan tool. Refer to the appropriate diagnostic service information.

ARMING

Passive arming of the VTA occurs when the vehicle is exited with the FOB with Integrated Key (FOBIK) removed from the ignition switch, the headlamps are turned OFF, and the doors are locked while they are open using the power lock switch. Active arming occurs when the LOCK button on the Remote Keyless Entry (RKE) transmitter integral to the FOBIK is depressed to lock the vehicle. For active arming to occur, the doors, and the liftgate must be closed and the ignition switch must be in the OFF position when the FOBIK RKE transmitter LOCK button is depressed. The power lock switch will not function if the FOBIK is in the ignition switch or the headlamps are turned ON with the driver side front door open.

Pre-arming of the VTA is initiated when a door or the liftgate is open when the vehicle is locked using a power door lock switch or when the RKE transmitter LOCK button is depressed. Pre-arming will not occur if the FOBIK is in the ignition switch or the headlamps are turned ON with the driver side front door open. When the VTA is pre-armed, the arming sequence is delayed until all of the doors and the liftgate have been closed. The VTA will remain in pre-armed mode for up to 16 seconds after all doors and the liftgate have been closed.

Once the VTA begins the passive or active arming sequence, the security indicator in the instrument cluster will flash rapidly for about 16 seconds. This indicates that VTA arming is in progress. If the ignition switch is turned to the ON position, if a door or the liftgate is unlocked and opened by any means, or the RKE PANIC button (if equipped) is depressed during the 16 second arming process, the security indicator will stop flashing and the arming process will abort. Once the arming sequence is successfully completed, the security indicator will flash at a slower rate, indicating that the VTA is armed.

On vehicles equipped with the hood ajar switch, the VTA arming sequence will occur regardless of whether the hood is open or closed, but the underhood area will not be protected unless the hood is closed when the VTA arming sequence begins. Also, if the status of the hood ajar switch changes from open to closed during the 16 second arming process, the security indicator will stop flashing and the VTA arming sequence will abort. Once the arming process is successfully completed, the security indicator will flash at a slower rate, indicating that the VTA is armed.

DISARMING

For vehicles built for the North American market, passive disarming of the VTA occurs by inserting a valid Sentry Key Immobilizer System (SKIS) FOBIK into the ignition switch. Active disarming of the VTA for all markets occurs when the vehicle is unlocked by depressing the UNLOCK button of the FOBIK RKE transmitter. Once the alarm has been activated, either disarming method will also deactivate the alarm. Depressing the PANIC button (if equipped) on the FOBIK RKE transmitter will **not** disarm the VTA.

POWER-UP MODE

When the armed VTA senses that the battery has been disconnected and reconnected, it enters its power-up mode. In the power-up mode, the alarm system remains armed following a battery failure or disconnect. If the VTA was armed prior to a battery disconnect or failure, the technician, or vehicle operator will have to actively or passively disarm the alarm system after the battery is reconnected. The power-up mode will also apply if the battery goes dead while the system is armed, and battery jump-starting is attempted. The VTA will be armed until the technician or vehicle operator has actively or passively disarmed the alarm system. If the VTA is in the disarmed mode prior to a battery disconnect or failure, it will remain disarmed after the battery is reconnected or replaced, or if jump-starting is attempted.

ALARM

The VTA alarm output varies by the version of the VTA with which the vehicle is equipped. In all cases, the alarm provides both visual and audible outputs; however, the time intervals of these outputs vary by the requirements of the market for which the vehicle is manufactured. In all cases, the visual output will be a flashing ON and OFF of the exterior lamps. For vehicles equipped with the North American or the export base version of the VTA, the audible output will be a pulsing of the horn. See the owner's manual in the vehicle glove box for details of the alarm output requirements of the specific market for which the vehicle was manufactured. The inputs that will trigger the alarm include the door ajar switches, the liftgate ajar switch, and

in vehicles built for certain markets where required, the hood ajar switch.

TAMPER ALERT

The VTA tamper alert feature will pulse the horn three times upon VTA disarming if the alarm was triggered and has since timed out or if the battery has been disconnected and reconnected. This feature alerts the vehicle operator that the VTA alarm was activated while the vehicle was unattended.

SENTRY KEY IMMOBILIZER SYSTEM

The Sentry Key Immobilizer System (SKIS) is designed to provide passive protection against unauthorized vehicle use by disabling the engine whenever any method other than a valid Sentry Key FOB with Integrated Key (FOBIK) is used to start the vehicle. The SKIS is considered a passive protection system, because it is always active when the ignition system is energized and it does not require any customer intervention. The SKIS uses Low Frequency (LF) communication to obtain confirmation that the FOBIK in the ignition switch is valid for operating the vehicle. The microprocessor-based SKIS hardware and software also uses electronic messages to communicate with other electronic modules in the vehicle over the Controller Area Network (CAN) data bus. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/COMMUNICATION - Operation** .

Pre-programmed Sentry Key FOBIK transponders are provided with the vehicle from the factory. Each Wireless Ignition Node (WIN) will recognize a maximum of eight Sentry Key FOBIK transponders. If the customer would like additional FOBIKs, other than those provided with the vehicle, they may be purchased from any authorized dealer. These additional FOBIKs must be programmed to the WIN in the vehicle in order for the system to recognize them as valid. This can be done by the dealer using a diagnostic scan tool, or if Customer Learn programming is an available SKIS feature in the market where the vehicle was purchased, the customer can program the additional FOBIKs, as long as at least two valid Sentry Key FOBIKs are already available. See **Standard Procedure** .

The WIN performs a self-test of the SKIS each time the ignition switch is turned to the ON position, and will store fault information in the form of a Diagnostic Trouble Code (DTC) if a system malfunction is detected. The WIN will also send an electronic message to the instrument cluster if a fault is detected, and the instrument cluster illuminates the security indicator.

The hard-wired circuits between components related to the SKIS may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the SKIS or the electronic controls or communication between other modules and devices that provide some features of the SKIS. The most reliable, efficient, and accurate means to diagnose the SKIS or the electronic controls and communication related to SKIS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

DIAGNOSIS AND TESTING

VEHICLE THEFT SECURITY SYSTEM

The Vehicle Theft Security System (VTSS) is divided into two basic subsystems: Vehicle Theft Alarm (VTA) and Sentry Key Immobilizer System (SKIS). Following are the recommended procedures for diagnosis of each of these two subsystems.

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

VEHICLE THEFT ALARM

The hard-wired circuits between components related to the VTA system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the VTA system or the electronic controls or communication between other modules and devices that provide some features of the VTA system. The most reliable, efficient, and accurate means to diagnose the VTA system or the electronic controls and communication related to VTA system operation requires the use of a diagnostic scan tool. See the **Vehicle Theft Security System** menu item on the scan tool. Refer to the appropriate diagnostic service information.

SENTRY KEY IMMOBILIZER SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

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SKIS. The most reliable, efficient, and accurate means to diagnose the SKIS or the electronic controls and communication related to SKIS operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

STANDARD PROCEDURE

WIN INITIALIZATION - EXPORT WITH COLUMN LOCK MODULE

CAUTION: On vehicles equipped with the optional export premium Vehicle Theft System, when either the Wireless Ignition Node (WIN) or the shaft lock module (also known as Elektrische LenksAulenverriegelung/ELV or electric steering column lock) is replaced with a new unit, the existing WIN or ELV MUST also be replaced with a new unit. In other words, any time either the WIN or the ELV is replaced with a new unit, BOTH the WIN and the ELV MUST be replaced with new units, WITHOUT EXCEPTION. Following replacement of BOTH the WIN and the column lock module/ELV, the two modules MUST be initialized using diagnostic scan tool routines in the EXACT SEQUENCE that follows. Failure to follow this sequence may result in BOTH the new WIN and the new ELV being rendered unusable, requiring BOTH units to be replaced a second time.

1. After both the WIN and the ELV have been replaced with new units, connect the diagnostic scan tool to the Data Link Connector (DLC) and turn the ignition key to the ON/RUN position.
2. Navigate to the WIN in the ECU View of the diagnostic scan tool.
3. Run the WIN Replaced routine found under the Miscellaneous Functions menu item of the scan tool.
4. Turn the ignition key to the OFF position, wait 30 seconds, then cycle the key back to the ON/RUN position.
5. Scan tool to program the ignition key(s) to the WIN. See **Standard Procedure** .
6. Run the ELV Replaced routine, also found under the Miscellaneous Functions menu item of the r WIN in the ECU View of the diagnostic scan tool.
7. Turn the ignition key to the OFF position, wait 30 seconds, then cycle the key back to the ON/RUN position.
8. Verify that the ELV Locks the steering column when the key is removed from the ignition lock cylinder, and Unlocks the steering column when the key is inserted into the ignition lock cylinder.

SPECIAL TOOLS

VEHICLE THEFT SECURITY SYSTEMS

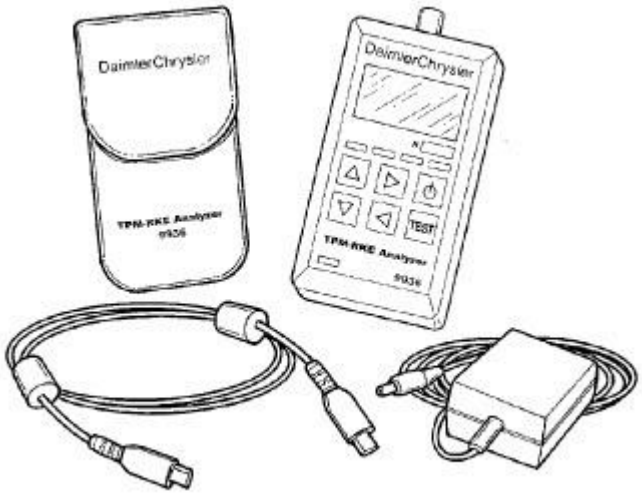


Fig. 1: TPM - RKE Analyzer No. 9936
Courtesy of CHRYSLER LLC

KEY, TRANSPONDER

DESCRIPTION

DESCRIPTION

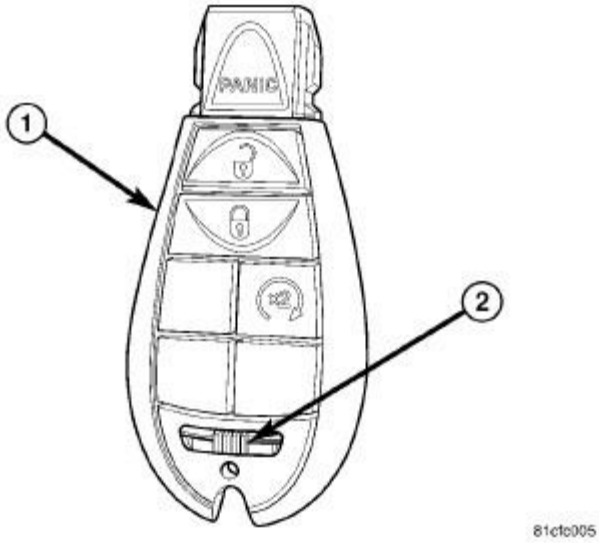


Fig. 2: Transponder Key
Courtesy of CHRYSLER LLC

The Sentry Key Immobilizer System (SKIS) has a transponder chip included on the circuit board beneath the

cover of each FOB with Integrated Key (FOBIK) (1) included with the vehicle. The FOBIK includes an integral mechanical valet key which is stored within the bottom of the FOBIK housing until it is released using the latch button (2). The valet key is cut to match the mechanical coding of the door and glove box lock cylinders. Each new replacement FOBIK must be programmed for operation of the Remote Keyless Entry (RKE) system and has a unique transponder identification code that is permanently programmed into it by the manufacturer. This identification code must be programmed into the Wireless Ignition Node (WIN) to be recognized by the SKIS as a valid key.

The FOBIK transponder cannot be adjusted or repaired. If ineffective or damaged, the entire FOBIK and RKE transmitter unit must be replaced.

OPERATION

OPERATION

When the ignition switch is turned to the ON position, the Wireless Ignition Node (WIN) communicates through its antenna with the Sentry Key transponder within the FOB with Integrated Key (FOBIK) using a Low Frequency (LF) signal. The Sentry Key transponder chip is within the range of the WIN transceiver antenna ring when it is inserted into the ignition switch.

The WIN determines whether a valid FOBIK is present in the ignition switch based upon the signal from the transponder. If a valid FOBIK is detected, that fact is communicated by the WIN to the Powertrain Control Module (PCM) over the Controller Area Network (CAN) data bus, and the PCM allows the engine to start. If the PCM receives an **invalid key** message, or receives no message from the WIN over the CAN data bus, the engine will be disabled. The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) will also respond to the **invalid key** message on the CAN data bus by flashing the security indicator ON and OFF.

Each Sentry Key FOBIK has a unique transponder identification code permanently programmed into it by the manufacturer. Likewise, the WIN has a unique Secret Key code programmed into it by the manufacturer. When a Sentry Key FOBIK is programmed into the memory of the WIN, the WIN stores the transponder identification code from the Sentry Key FOBIK and the Sentry Key FOBIK learns the Secret Key code from the WIN. Once the Sentry Key FOBIK learns the Secret Key code of the WIN, it is permanently stored in the memory of the transponder. Therefore, once a FOBIK has been programmed to a particular vehicle, it cannot be used on any other vehicle. Refer to **RECEIVER, WIRELESS IGNITION NODE** .

The Sentry Key Immobilizer System (SKIS) performs a self-test each time the ignition switch is turned to the ON position, and will store key-related fault information in the form of a Diagnostic Trouble Code (DTC) in WIN memory if a Sentry Key FOBIK transponder problem is detected. The Sentry Key FOBIK transponder chip can be diagnosed, and any stored DTC can be retrieved using a diagnostic scan tool. Refer to the appropriate diagnostic service information.

MODULE, SHAFT LOCK

DESCRIPTION

DESCRIPTION

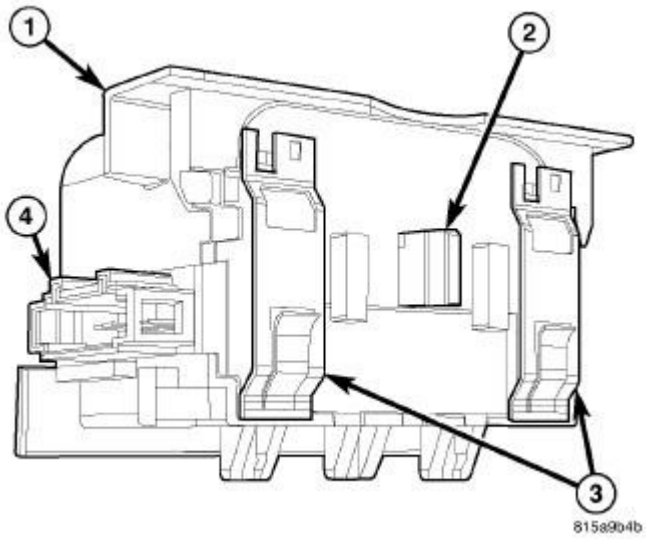


Fig. 3: Shaft Lock Module
Courtesy of CHRYSLER LLC

A shaft lock module (1) is part of the premium version of the Sentry Key Immobilizer System (SKIS) in the Vehicle Theft Security System (VTSS). The premium version of the SKIS is only available in vehicles built for certain markets, where the additional features offered by this system are required. The shaft lock module is located in a bracket integral to the lower end of the steering column housing casting below the instrument panel in the passenger compartment. This unit is designed to work in conjunction with the Wireless Ignition Node (WIN), sometimes reffered to as the Sentry Key REmote Entry Module (SKREEM) to control a locking bolt (2) that engages a machined slot in the steering shaft to prevent shaft rotation whenever there is not a valid key present in the ignition lock cylinder on the instrument panel.

Concealed within the module is the electronic circuitry of the module, and a bi-directional electric motor that actuates the locking bolt. The module is connected to the vehicle electrical system through the instrument panel wire harness.

The mounting provisions for the shaft lock module are designed to resist unauthorized tampering. The module cannot be removed from the steering column while the locking bolt is in the locked position, or while the steering column is installed in the vehicle. The shaft lock module unit cannot be adjusted or repaired and, if ineffective or damaged, the entire steering column must be replaced.

OPERATION

OPERATION

The electronic circuitry within the shaft lock module contains all of the logic circuits and components to monitor and control the operation of the shaft locking bolt. The module uses a serial data bus for bi-directional communication with the Wireless Ignition Node (WIN) , sometimes referred to as the Sentry Key REmote Entry Module (SKREEM). If the module detects a problem with the positioning or operation of the locking bolt, it sends an error message to the WIN. The WINthen stores a Diagnostic Trouble Code (DTC) and sends an

electronic error message to the Instrument Cluster, sometimes referred to as the Cab Compartment Node (CCN), over the Controller Area Network (CAN) data bus.

The shaft lock module continuously monitors inputs from the WIN and energizes the electric motor to move the locking bolt to the locked or unlocked position based upon that input. If the WIN indicates that the key present in the ignition lock cylinder is invalid, the locking bolt remains in the locked position. When the WIN indicates that a valid key is present in the ignition lock cylinder, the shaft lock module operates a motor to move the locking bolt to the unlocked position. However, to prevent inadvertent column locking due to a failure while the vehicle is being operated, the module cannot move the locking bolt from the unlocked position to the locked position as long as a key remains in the ignition lock cylinder.

The shaft lock module receives ground at all times through a hard wired remote ground point. The module receives battery voltage to operate and to move the locking bolt in the unlocked direction on a B(+) circuit, and receives battery voltage to operate the locking bolt in the locked direction only when the key is removed from the ignition switch. These connections allow the module to remain operational, regardless of the ignition switch position.

For added system security, the shaft lock module learns a unique Secret Key code from the WIN over the serial data bus upon initialization. This code is stored in the memory of the module and cannot be changed. Therefore, if the WIN requires service replacement, a new shaft lock module will also be required. Another security code, called a PIN, is used to gain access to the WIN Secured Access Mode. The Secured Access Mode is required during service to initialize a new shaft lock module. The shaft lock module is not available for separate service replacement. It is integral to the steering column so a complete column must be installed if the module is damaged or inoperative. Refer to **Steering/Column - Removal** .

REMOVAL

REMOVAL

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

NOTE: The shaft lock module cannot be removed from the steering column while the locking bolt is in the locked position without irreversibly damaging the column. Before attempting service, insert a valid FOB with Integrated Key (FOBIK) into the ignition switch, then rotate the steering wheel from side to side. If the steering wheel can be rotated, the locking bolt is in the unlocked position. Leave the FOBIK in the ignition switch until service has been completed. If the steering wheel cannot be rotated, test and repair the wiring circuits between the module and the ignition switch as required. If no problem is found in these circuits, the module has failed with the locking bolt in the locked position and

both the module and the steering column must be replaced with new units.

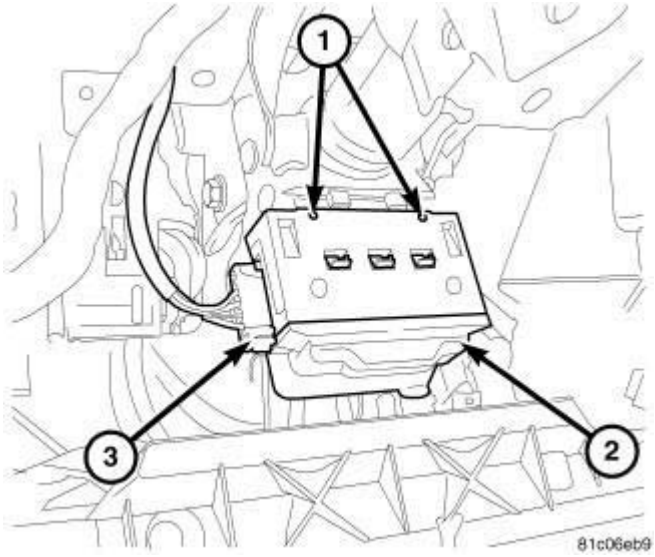


Fig. 4: Identifying Shaft Lock Module
Courtesy of CHRYSLER LLC

1. Insert a FOB with Integrated Key (FOBIK) into the ignition switch to move the shaft lock module locking bolt to the unlocked position. Leave the FOBIK in the ignition switch while the shaft lock module service is being completed.
2. Disconnect and isolate the battery negative cable.
3. Disconnect the instrument panel wire harness connector (3) from the shaft lock module (2) connector receptacle.
4. Remove the steering column from the vehicle. Refer to **Steering/Column - Removal** .
5. Depress the two spring clips that secure the shaft lock module to the mounting bracket on the steering column by inserting a suitable drift or punch into the release holes (1) on the upper surface of the bracket opposite the module.
6. While holding both of the spring clips depressed, slide the module toward the base of the column far enough to disengage the engagement tabs and slide tabs on the module from the slots and channels in the bracket.
7. Remove the module from the steering column bracket.

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system

capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

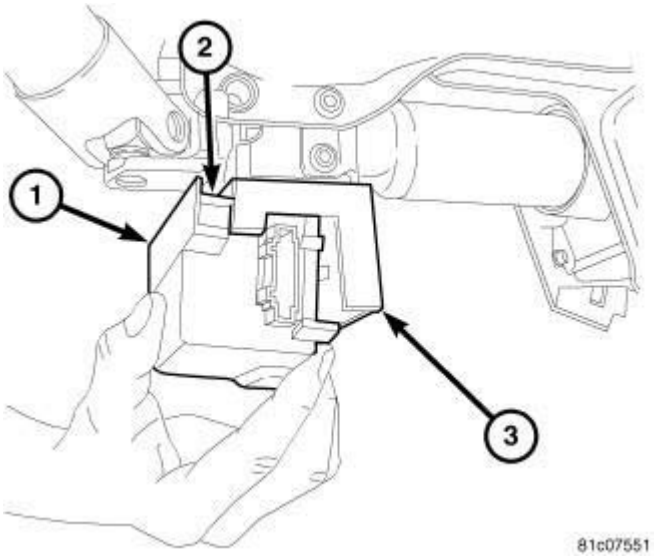


Fig. 5: Shaft Lock Module Components
Courtesy of CHRYSLER LLC

1. Be certain that a valid FOB with Integrated Key (FOBIK) is still present in the ignition switch. Leave the FOBIK in the ignition switch while the shaft lock module service is being completed.
2. Align the engagement and slide tabs integral to the housing of the shaft lock module (1) with the slots and channels in the mounting bracket (3) on the steering column.
3. Slide the module toward the top of the column far enough for the spring clips (2) on the module to engage the bracket.
4. Reinstall the steering column into the vehicle. Refer to **Steering/Column - Installation** .
5. Reconnect the instrument panel wire harness connector to the shaft lock module connector receptacle.
6. Reconnect the battery negative cable.

NOTE: If the shaft lock module has been replaced with a new unit, the Wireless Ignition Node (WIN) MUST also be replaced. Refer to Electrical - Electronic Control Modules/Electronic Control Modules/RECEIVER, Wireless Ignition Node - Removal . Also, a diagnostic scan tool MUST be used to initialize the new module before the vehicle can be operated. See Standard Procedure .

SWITCH, HOOD AJAR

DESCRIPTION

DESCRIPTION

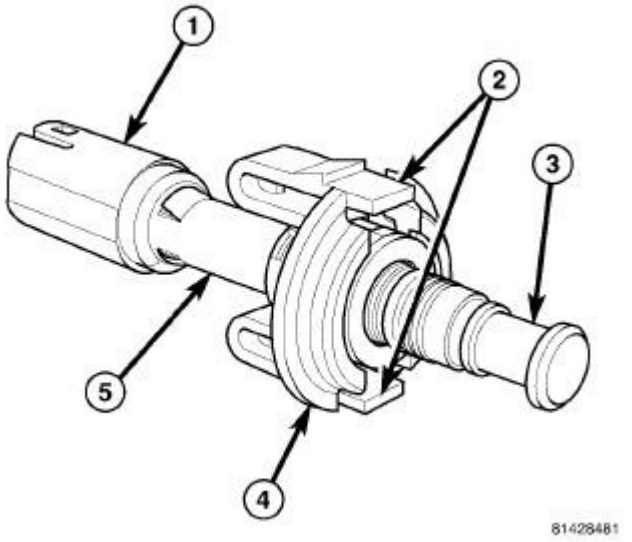


Fig. 6: Hood Ajar Switch
Courtesy of CHRYSLER LLC

The hood ajar switch is a normally closed, single pole, spring-loaded plunger actuated switch. This switch has two unique versions that are used in two different applications. One switch is used only on vehicles equipped with the Vehicle Theft Security System (VTSS) for sale in certain export markets where protection of the underhood area is required equipment. The second switch is used only on domestic vehicles equipped with an optional remote starter system.

The molded plastic switch body (5) has an integral molded connector receptacle (1) on the lower end containing two terminal pins. The switch is connected to the vehicle electrical system through a dedicated take out of the headlamp and dash wire harness. Two integral latches (2) lock the switch into a keyed mounting hole in the stamped steel switch mounting bracket. The mounting bracket is secured with screws to the right inner fender shield near the fender ledge in the engine compartment. The underside of the hood panel inner reinforcement actuates the switch plunger as the hood panel is closed.

The switch plunger (3) extends through a mounting collar (4) and a sleeve-like retainer ring on the upper end of the switch body. The retainer ring has a one time, self-adjustment feature that is activated after the switch is installed by closing the hood. The retainer ring is also color-coded to aid in identifying the switch application. A dark brown retainer ring identifies the underhood security switch application, while a white retainer ring identifies the remote starter system application.

An installed hood ajar switch cannot be readjusted or repaired. If the switch is damaged, ineffective, or requires readjustment, it must be replaced with a new unit.

OPERATION

OPERATION

The hood ajar switches are interchangeable physically, but not functionally. In each case, the hood ajar switch is

a normally closed switch that is held open as the spring-loaded switch plunger is depressed by the inner hood panel reinforcement when the hood panel is closed and latched. When the hood is opened, the spring-loaded switch plunger extends from the switch body and the switch contacts are closed.

In the underhood security application (export vehicles only - dark brown retainer ring), the switch is connected in series between ground and the hood ajar switch sense input of the Totally Integrated Power Module (TIPM). The TIPM uses an internal resistor pull up to monitor the state of the hood ajar switch contacts.

In the remote starter system application (domestic vehicles only - white retainer ring) the switch has a 1 kilohm diagnostic resistor connected in parallel to the switch contacts between the two switch terminals. The switch is connected in series between an output of the TIPM and the hood ajar switch sense input of the TIPM. The TIPM continually monitors this circuit and it will store a Diagnostic Trouble Code (DTC) for any fault that it detects.

The components of the switch self-adjustment feature include an integral stop on the shaft of the plunger and a ribbed, ratcheting sleeve-like retainer ring at the top of the switch body from which the plunger extends. With the switch mounting collar secured in its mounting bracket, the plunger is depressed by the hood inner reinforcement as the hood is closed. As the plunger is depressed, the plunger stop contacts the top of the retainer ring and it is driven downward, ratcheting through the switch mounting collar until the hood is fully closed and latched. The ribs on the retainer ring are engaged within the mounting collar to maintain this adjusted position.

The hood ajar switch as well as the hard-wired circuits between the switch and the TIPM may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between modules and other devices related to hood ajar switch operation that provide some features of the export vehicle theft or domestic remote starter systems. The most reliable, efficient, and accurate means to diagnose the electronic controls and communication related to hood ajar switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic service information.

REMOVAL

SWITCH

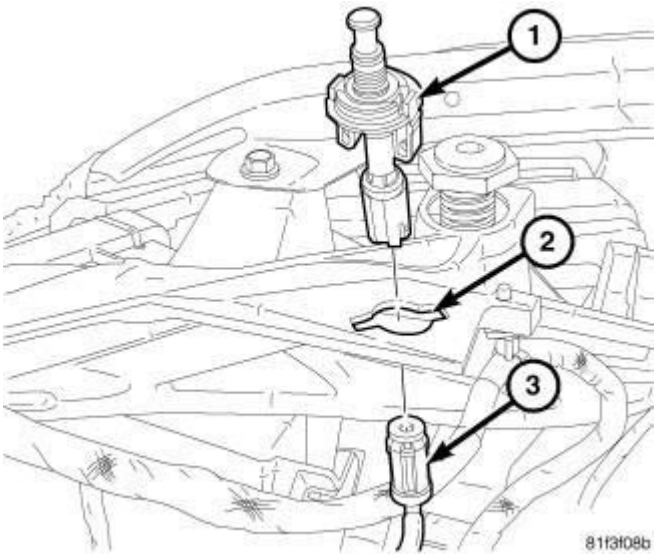


Fig. 7: Switch Connector Receptacle
Courtesy of CHRYSLER LLC

1. Unlatch and open the hood.
2. Disconnect and isolate the battery negative cable.
3. Disconnect the wire harness connector (3) from the switch connector receptacle.
4. From the top of the hood ajar switch mounting bracket (2), squeeze the two switch latch tabs together and pull the switch (1) upward through the hole in the mounting bracket.
5. Remove the hood ajar switch from the mounting bracket and discard.

INSTALLATION

SWITCH

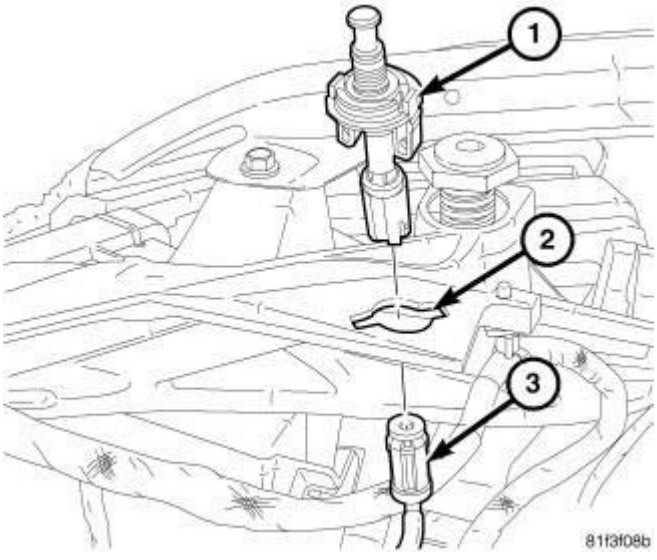


Fig. 8: Switch Connector Receptacle

Courtesy of CHRYSLER LLC

NOTE: Self-adjustment of the hood ajar switch is a one-time feature. If the switch is damaged, ineffective, removed or requires readjustment, it must be replaced with a new unit.

1. Position the hood ajar switch (1) above the hole in the mounting bracket (2).
2. Press the switch into the mounting hole until the integral switch latch tabs lock it into place.
3. Connect the harness connector (3) to the switch connector receptacle.
4. Reconnect the battery negative cable.
5. Close and latch the hood.

2009 ACCESSORIES AND EQUIPMENT

Wipers/Washers - Service Information - Journey

DESCRIPTION

FRONT

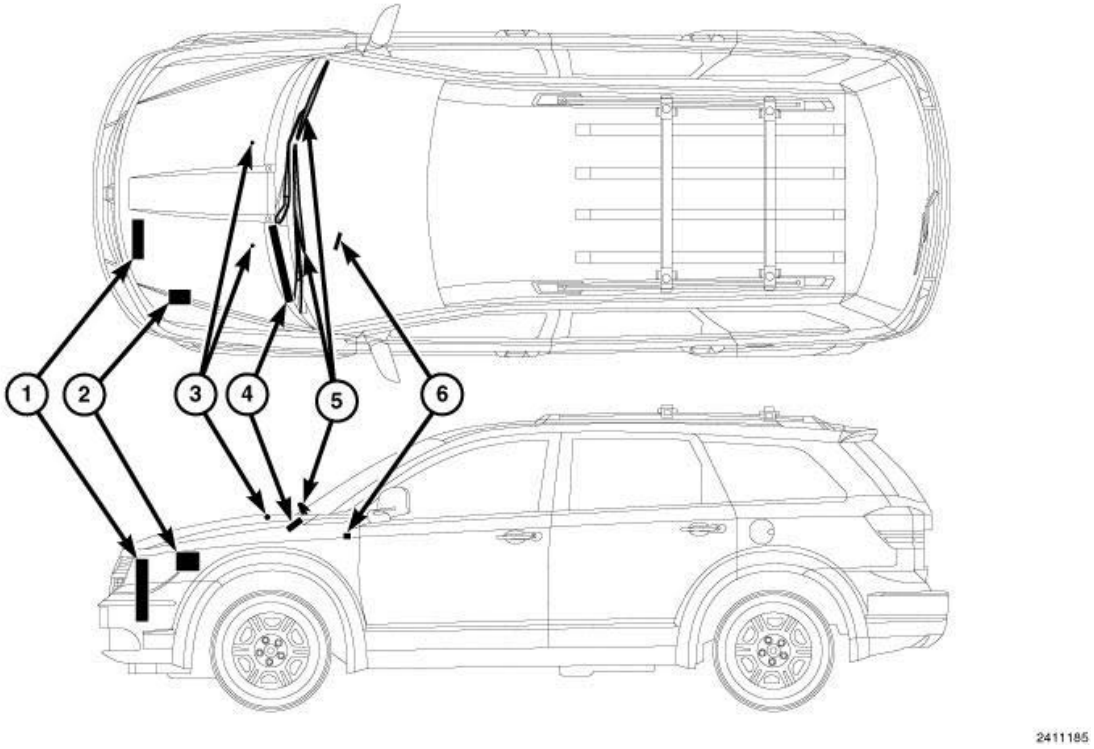


Fig. 1: Intermittent Front Wiper & Washer System
Courtesy of CHRYSLER LLC

An electrically operated intermittent front wiper and washer system is standard factory-installed safety equipment on this vehicle. The wiper and washer system includes the following major components, which are described in further detail elsewhere in this service information:

- **ElectroMechanical Instrument Cluster** - The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) is located on the instrument panel directly in front of the driver. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Front Washer Nozzle (3)** - Two fluidic front washer nozzles with integral check valves are secured by latch features to dedicated openings in the hood panel near the base of the windshield.
- **Front Washer Plumbing** - The plumbing for the washer system consists of rubber hoses, plastic tubes and molded rubber or plastic fittings. The plumbing is routed through the engine compartment from the washer reservoir. The front washer hose is routed along the left fender ledge to the hood hinge, then across the underside of the inner hood panel reinforcement to the washer nozzles.

- **Front Wiper Arms And Blades (5)** - The two front wiper arms are secured with nuts to the threaded ends of the two wiper pivot shafts, which extend through the cowl plenum cover/grille panel located near the base of the windshield. The two front wiper blades are each secured to their wiper arm with an integral latch, and are parked on the glass near the bottom of the windshield when the front wiper system is not in operation. The left and right wiper arms and wiper blades are unique and are not interchangeable.
- **Front Wiper Module (4)** - The wiper pivot shafts are the only visible components of the front wiper module. The remainder of the module is concealed within the cowl plenum beneath the cowl plenum cover/grille panel. The wiper module includes the wiper module bracket, three rubber-isolated wiper module mounts, the wiper motor, the wiper motor crank arm, the two wiper drive links and the two wiper pivots.
- **Right Multi-Function Switch (6)** - The right (wiper) multi-function switch and the left (lighting) multi-function switch are secured to brackets integral to the clockspring housing on the top of the steering column just below the steering wheel. The right multi-function switch is connected by a short jumper harness to the Steering Control Module (SCM), which is internal to the left multi-function switch housing. Only the switch control stalk extending from the right side of the steering column is visible, while the remainder of the switch is concealed beneath the steering column shrouds. The right multi-function switch is dedicated to providing all of the driver controls for both the front and rear wiper and washer systems.
- **Steering Control Module** - The Steering Control Module (SCM) is internal to the left multi-function switch housing, which is secured to a bracket integral to the left side of the clockspring housing on the top of the steering column just below the steering wheel. Only the left switch control stalk extending from the left side of the steering column is visible, while the remainder of the switch housing containing the SCM is concealed beneath the steering column shrouds. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Steering Column - Description** .
- **Totally Integrated Power Module (2)** - The Totally Integrated Power Module (TIPM) is located in the engine compartment, near the battery. Refer to **Electrical - Wiring/Power Distribution/MODULE, Totally Integrated Power (TIPM) - Description** .
- **Washer Pump/Motor** - The reversible electric washer pump/motor unit is located in a dedicated hole in a sump area on the lower, rearward facing surface of the washer reservoir, on the back of the cooling module just to the left of center. This single reversible washer pump/motor provides washer fluid to either the front or rear washer system plumbing, depending upon the direction of the pump motor rotation.
- **Washer Reservoir (1)** - The washer reservoir is located in the engine compartment on the back of the cooling module just to the left of center. The cap is accessed from the front of the engine compartment.

Hard wired circuitry connects the front wiper and washer system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the front wiper and washer system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

HEADLAMP

An electrically operated headlamp washer system is optional factory-installed equipment on this vehicle when it

is manufactured for certain export markets. The headlamp washer system includes the following major components, which are described in further detail elsewhere in this service information:

- **ElectroMechanical Instrument Cluster** - The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) is located on the instrument panel directly in front of the driver. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Headlamp Washer Nozzle** - A headlamp washer nozzle is secured to the front fascia beneath each front lamp unit.
- **Headlamp Washer Pump/Motor** - The electric headlamp washer pump/motor unit is located in a dedicated hole on the rearward facing side of the washer reservoir, on the left side of the cooling module in the engine compartment. This high pressure pump is located above and to the left of the reversible front and rear washer pump/motor unit on the reservoir.
- **Headlamp Washer Plumbing** - The plumbing for the headlamp washer system consists of large diameter rubber hoses and molded plastic fittings. The plumbing is routed to the washer nozzles on the front fascia from the washer reservoir. The connections at the headlamp washer pump and the two headlamp washer nozzles feature unique quick-connect fittings.
- **Headlamp Washer Relay** - The headlamp washer relay is an International Standards Organization (ISO) relay that is located near the Totally Integrated Power Module (TIPM) in the engine compartment near the battery.
- **Right Multi-Function Switch** - The right (wiper) multi-function switch and the left (lighting) multi-function switch are secured to brackets integral to the clockspring housing on the top of the steering column just below the steering wheel. The right multi-function switch is connected by a short jumper harness to the Steering Control Module (SCM), which is internal to the left multi-function switch housing. Only the switch control stalk extending from the right side of the steering column is visible, while the remainder of the switch is concealed beneath the steering column shrouds. The right multi-function switch is dedicated to providing all of the driver controls for both the front and rear wiper and washer systems.
- **Steering Control Module** - The Steering Control Module (SCM) is internal to the left multi-function switch housing, which is secured to a bracket integral to the left side of the clockspring housing on the top of the steering column just below the steering wheel. Only the left switch control stalk extending from the left side of the steering column is visible, while the remainder of the switch housing containing the SCM is concealed beneath the steering column shrouds. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Steering Column - Description** .
- **Totally Integrated Power Module** - The Totally Integrated Power Module (TIPM) is located in the engine compartment, near the battery. Refer to **Electrical - Wiring/Power Distribution/MODULE, Totally Integrated Power (TIPM) - Description** .
- **Washer Reservoir** - A unique washer reservoir is used on vehicles with the optional headlamp washer system, which has dedicated provisions for the headlamp washer pump and plumbing. This reservoir is mounted in the same location and using the same mounting hardware as is used for vehicles without the headlamp washers. The reservoir is located on the left side of the cooling module in the engine compartment.

Hard wired circuitry connects the headlamp washer system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical

system and to the headlamp washer system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

REAR

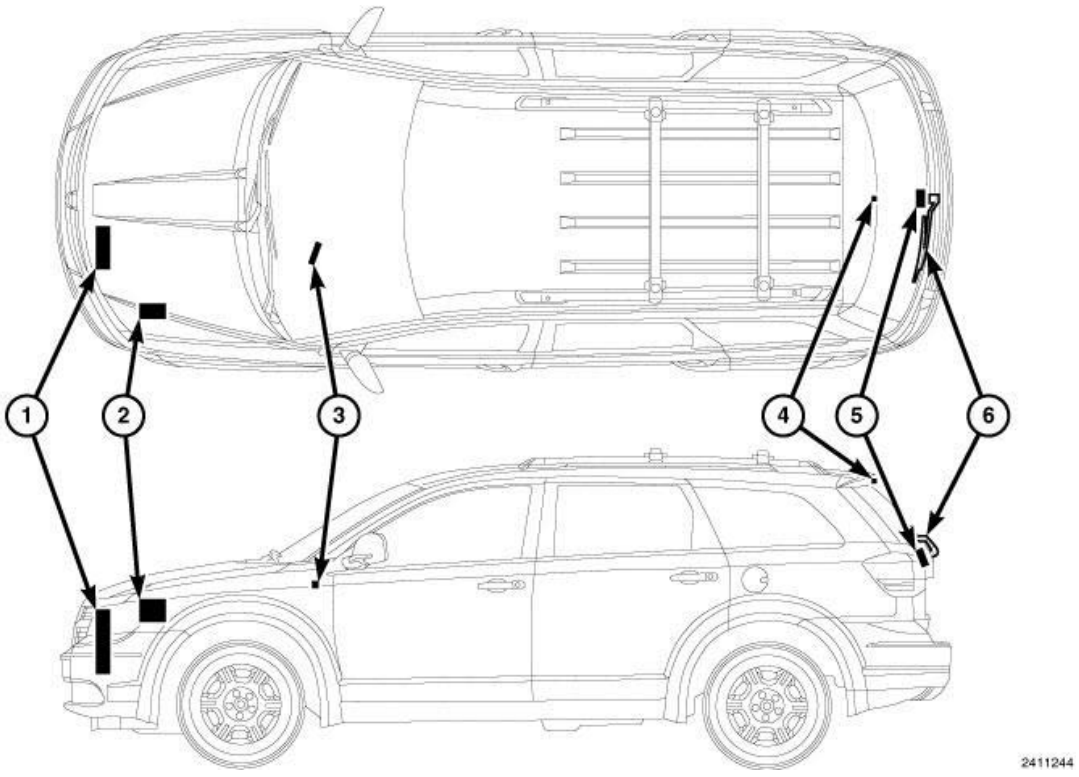


Fig. 2: Intermittent Rear Wiper & Washer System
Courtesy of CHRYSLER LLC

An electrically operated fixed interval intermittent rear wiper and washer system is standard factory-installed equipment on this vehicle. The rear wiper and washer system includes the following major components, which are described in further detail elsewhere in this service information:

- **ElectroMechanical Instrument Cluster** - The ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) is located on the instrument panel directly in front of the driver. Refer to **Electrical - Instrument Cluster/Instrument Cluster - Description** .
- **Rear Washer Nozzle (4)** - The fluidic rear washer nozzle with an integral check valve is secured by integral latch features to a mounting hole on the lower surface of the rear spoiler formation on the liftgate outer panel above the liftgate glass.
- **Rear Washer Plumbing** - The plumbing for the rear washer system consists of rubber hoses and molded plastic fittings. The plumbing is routed along the left side of the engine compartment from the washer reservoir on the cooling module through the dash into the passenger compartment. It is then routed within the body wiring harness along the left side of the floor to the left rear inner wheel housing, then up the

wheel housing to the D-pillar. It exits the wire harness near the top of the D-pillar and connects to the liftgate washer hose, which is routed along the liftgate opening upper reinforcement to the center of the vehicle then through the upper liftgate opening to the rear washer nozzle on the upper liftgate.

- **Rear Wiper Arm And Blade (6)** - The single rear wiper arm is secured by a nut directly to the rear wiper motor output shaft, which extends through a rubber grommet inserted into a hole in the liftgate outer panel at the base of the liftgate glass. The rear wiper blade is secured to the rear wiper arm with an integral latch feature, and is parked near the base of the glass when the rear wiper system is not in operation.
- **Rear Wiper Motor (5)** - The rear wiper motor includes the motor bracket and three rubber-isolated wiper motor mounts. The wiper motor output shaft is the only visible component of the rear wiper motor. The remainder of the motor is concealed by the inner liftgate trim on the inside of the liftgate beneath the liftgate glass opening.
- **Right Multi-Function Switch (3)** - The right (wiper) multi-function switch and the left (lighting) multi-function switch are secured to brackets integral to the clockspring housing, on the top of the steering column just below the steering wheel. The right multi-function switch is connected to the Steering Control Module (SCM) by a short jumper harness. The SCM is internal to the left multi-function switch housing. Only the switch control stalk extending from the right side of the steering column is visible, while the remainder of the switch is concealed beneath the steering column shrouds. The right multi-function switch is dedicated to providing all of the driver controls for both the front and rear wiper and washer systems.
- **Steering Control Module** - The Steering Control Module (SCM) is internal to the left multi-function switch housing, which is secured to a bracket integral to the left side of the clockspring housing on the top of the steering column just below the steering wheel. Only the left switch control stalk extending from the left side of the steering column is visible, while the remainder of the switch housing containing the SCM is concealed beneath the steering column shrouds. Refer to **Electrical - Electronic Control Modules/Electronic Control Modules/MODULE, Steering Column - Description** .
- **Totally Integrated Power Module (2)** - The Totally Integrated Power Module (TIPM) is located in the engine compartment, near the battery. Refer to **Electrical - Wiring/Power Distribution/MODULE, Totally Integrated Power (TIPM) - Description** .
- **Washer Reservoir (1)** - The rear washer system shares a single reservoir and reversible pump with the front washer system, but has its own dedicated plumbing. The washer reservoir is located in the engine compartment attached to the FEM (Front End Module). The filler neck and cap are accessed from the right front corner of the engine compartment.

Hard wired circuitry connects the rear wiper and washer system components to the electrical system of the vehicle. These hard wired circuits are integral to several wire harnesses, which are routed throughout the vehicle and retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system and to the rear wiper and washer system components through the use of a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, further details on wire harness routing and retention, as well as pin-out and location views for the various wire harness connectors, splices and grounds.

OPERATION

FRONT

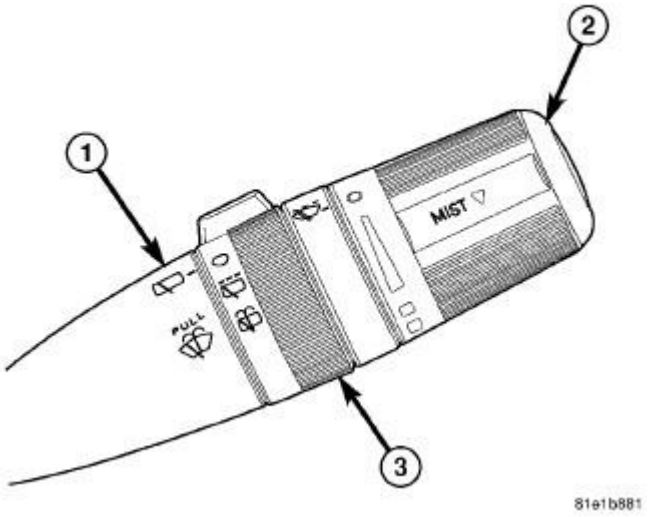


Fig. 3: Right (Wiper) Multi-Function Switch
Courtesy of CHRYSLER LLC

The front wiper and washer system is designed to provide the vehicle operator with a convenient, safe, and reliable means of maintaining visibility through the windshield glass. The various components of this system are designed to convert electrical energy produced by the vehicle electrical system into the mechanical action of the wiper blades to wipe the outside surface of the glass, as well as into the hydraulic action of the washer system to apply washer fluid stored in an on-board reservoir to the area of the glass to be wiped. When combined, these components provide the means to effectively maintain clear visibility for the vehicle operator by removing excess accumulations of rain, snow, bugs, mud, or other minor debris from the outer surface of the windshield glass that might be encountered while driving the vehicle under numerous types of inclement operating conditions.

The vehicle operator initiates all front and rear wiper and washer system functions with the control stalk of the right (wiper) multi-function switch (1) that extends from the right side of the steering column, just below the steering wheel. Rotating the control knob (2) on the end of the control stalk, selects the OFF, DELAY, LOW, or HIGH front wiper system operating modes. In the DELAY mode, the control knob also allows the vehicle operator to select from one of five intermittent wipe delay intervals.

Pulling the control stalk rearward actuates the momentary front washer system switch, which selects the WASH and WIPE-AFTER-WASH modes, depending upon when and how long the switch is held closed. Pushing the control stalk downward actuates a momentary switch and selects the MIST mode, which cycles the wiper blades for as long as the switch is held closed then completes the current cycle and parks the blades at the base of the windshield after the switch is released.

The right multi-function switch provides hard wired analog and resistor multiplexed inputs to the Steering Control Module (SCM) internal to the left (lighting) multi-function switch housing for all of the wiper and washer system functions. The SCM then sends electronic **wiper** and **washer switch** status messages to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN), over a Local Interface Network (LIN) data bus. The EMIC responds to the SCM inputs by sending electronic **wiper** and

washer system request messages to the Totally Integrated Power Module (TIPM) over the Controller Area Network (CAN) data bus requesting the appropriate wiper and washer system operating modes.

Front wiper and washer system operation is completely controlled by the SCM, EMIC and TIPM logic circuits, and that logic will only allow these systems to operate when the ignition switch is in the ACCESSORY or ON positions. The TIPM uses intelligent, high current, self-protected high side switches to control wiper system operation by energizing or de-energizing the wiper motor low and high speed brushes. The TIPM uses an H-bridge circuit to control the operation of the reversible washer pump/motor unit. The right multi-function switch circuitry receives battery current and a clean ground output from the SCM, then provides analog and multiplexed inputs to the SCM to indicate the selected front wiper and front washer system mode.

The hard wired circuits and components of the front wiper and washer system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the front wiper and washer system. The most reliable, efficient, and accurate means to diagnose the front wiper and washer system or the electronic controls and communication related to front wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

OPERATING MODES

Following are paragraphs that briefly describe the operation of each of the front wiper and washer system operating modes.

CONTINUOUS WIPE MODE

When the LOW position of the control knob on the control stalk of the right (wiper) multi-function switch is selected, the SCM sends an electronic **wiper switch low** status message to the EMIC over the LIN data bus. The EMIC then relays an electronic **wiper switch low** request message to the TIPM over the CAN data bus. The TIPM then directs battery current to the low speed brush of the wiper motor, causing the wipers to cycle at low speed.

When the HIGH position of the control knob is selected, the SCM sends an electronic **wiper switch high** status message to the EMIC. The EMIC then relays an electronic **wiper switch high** request message to the TIPM. The TIPM then directs battery current to the high speed brush of the wiper motor, causing the wipers to cycle at high speed.

When the OFF position of the multi-function switch control knob is selected, the SCM sends an electronic **wiper switch off** status message to the EMIC, the EMIC relays an electronic **wiper switch off** request message to the TIPM, then one of two events will occur. The event that occurs depends upon the position of the wiper blades on the windshield at the moment that the control knob OFF position is selected.

If the wiper blades are in the down position on the windshield when the OFF position is selected, the park switch that is integral to the wiper motor is closed to ground, which provides a hard wired park switch sense input to the TIPM. The TIPM then de-energizes the wiper motor and the wiper motor ceases to operate. If the wiper blades are not in the down position on the windshield at the moment the OFF position is selected, the park switch is an open circuit and the TIPM continues running the wiper motor at low speed until the wiper blades are in the down position on the windshield and the park switch input to the TIPM is again closed to

ground.

INTERMITTENT WIPE MODE

When the control knob on the control stalk of the right (wiper) multi-function switch is moved to one of the five DELAY interval positions, the SCM sends an electronic **wiper switch delay interval** status message to the EMIC. The EMIC then relays an electronic **wiper switch delay interval** request message to the TIPM. The TIPM's electronic intermittent wipe logic circuit responds by calculating the correct length of time between wiper sweeps based upon the selected delay interval input.

The TIPM monitors the changing state of the wiper motor park switch through a hard wired park switch sense input. This input allows the TIPM to determine the proper intervals at which to energize and de-energize the wiper motor intermittently for one low speed cycle at a time.

The TIPM logic is also programmed to provide vehicle speed sensitivity to the selected intermittent wipe delay intervals. In order to provide this feature, the TIPM monitors electronic **vehicle speed** messages from the Controller Antilock Brake (CAB) and doubles the selected delay interval whenever the vehicle speed is about 16 kilometers-per-hour (10 miles-per-hour) or less.

MIST WIPE MODE

When the control stalk of the right (wiper) multi-function switch is moved downward to the momentary MIST position, the SCM sends an electronic **wiper mist mode** status message to the EMIC, the EMIC relays an electronic **wiper mist mode** request message to the TIPM, then the TIPM energizes the low speed brush of the wiper motor for as long as the switch is held closed, then de-energizes the motor when the state of the switch changes to open, parking the wiper blades near the base of the windshield. The TIPM can operate the front wiper motor in this mode for only one low speed cycle at a time, or for an indefinite number of sequential low speed cycles, depending upon how long the switch is held closed.

WASH MODE

When the control stalk of the right (wiper) multi-function switch is pulled rearward to the front momentary WASH position for more than about one-half second with the wiper system operating, the SCM sends an electronic **washer switch** status message to the EMIC, the EMIC relays an electronic **washer switch** request message to the TIPM, then the TIPM directs battery current and ground to the washer pump/motor. This will cause the washer pump/motor to be energized in the front wash direction for as long as the switch is held closed (up to approximately 10 seconds) and to be de-energized when the control stalk is released.

When the control stalk is pulled rearward to the front momentary WASH position while the front wiper system is operating in one of the DELAY interval positions, the washer pump/motor operation is the same. However, the TIPM also overrides the selected delay interval and operates the front wiper motor in a continuous low speed mode for as long as the control stalk is held in the front momentary WASH position, then reverts to the selected delay interval several wipe cycles after the control stalk is released. If the WASH switch is held closed for more than approximately 10 seconds, the TIPM will suspend washer pump/motor operation until the control stalk is released for about 2 seconds and then cycled back to the WASH position.

WIPE-AFTER-WASH MODE

When the control stalk of the right (wiper) multi-function switch is pulled rearward to the front momentary WASH position for more than about one-half second while the wiper system is not operating, the SCM sends an electronic **washer switch** status message to the EMIC, the EMIC relays an electronic **washer switch** request message to the TIPM, and the TIPM directs battery current and ground to the washer pump/motor and energizes the wiper motor in a continuous low speed mode for as long as the switch is held closed (up to approximately 10 seconds). When the control stalk is released, the TIPM de-energizes the washer pump/motor immediately, but allows the wiper motor to operate for two or three additional wipe cycles before it de-energizes the wiper motor and parks the wiper blades near the base of the windshield.

If the control stalk is held rearward for more than about 10 seconds, the TIPM will suspend washer pump/motor operation until the stalk is released for about 2 seconds and then cycled back to the WASH position; however, the wipers will continue to operate for as long as the switch is held closed. The TIPM monitors the changing state of the wiper motor park switch through a hard wired wiper park switch sense circuit input. This input allows the TIPM to count the number of wipe cycles that occur after the control stalk is released, and to determine the proper interval at which to de-energize the wiper motor to complete the WIPE-AFTER-WASH mode cycle.

HEADLAMP

The headlamp washer system is designed to provide the vehicle operator with a convenient, safe, and reliable means of maintaining headlamp lighting performance. The various components of this system are designed to convert electrical energy produced by the vehicle electrical system into the hydraulic action of the washer system to apply washer fluid stored in an on-board reservoir to the lenses of the two front lamp units, removing excess accumulations of snow, ice, bugs, mud, or other minor debris from the front lamps that might be encountered while driving the vehicle under numerous types of inclement operating conditions.

The vehicle operator initiates the headlamp washer system function using the control knob on the end of the right multi-function switch control stalk that extends from the right side of the steering column, just below the steering wheel. While the headlamps are turned ON and the engine is running, pushing the knob on the end of the control stalk towards the steering column beyond the actuation point for more than about 100 milliseconds (0.10 second) activates the headlamp washer pump/motor in combination with the front washer pump/motor. When the headlamp washer pump/motor unit is energized, hydraulic pressure builds within the headlamp washer system plumbing against the pressure of the control valve in each headlamp washer nozzle. Sufficient pressure causes the headlamp washer nozzles to dispense high pressure washer fluid onto the lenses of both front lamp units for about 1600 milliseconds (1.6 seconds).

Headlamp washer system operation is completely controlled by the Totally Integrated Power Module (TIPM) logic circuits based upon electronic **wash command** message inputs received from the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over the Controller Area Network (CAN) data bus. The EMIC monitors electronic **wash switch status** and **lighting switch status** message inputs received over the Local Interface Network (LIN) data bus from the Steering Control Module (SCM) (also known as the steering column module) based upon the right and left multi-function switch positions. The TIPM will only allow this system to operate when the engine is running and the headlamp low beams are turned ON. The TIPM uses a low side driver to energize or de-energize the headlamp washer system relay which, in turn, controls the operation of the headlamp washer pump/motor unit.

The hard wired circuits and components of the headlamp washer system may be diagnosed using conventional

diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the headlamp washer system. The most reliable, efficient, and accurate means to diagnose the headlamp washer system or the electronic controls and communication related to headlamp washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REAR

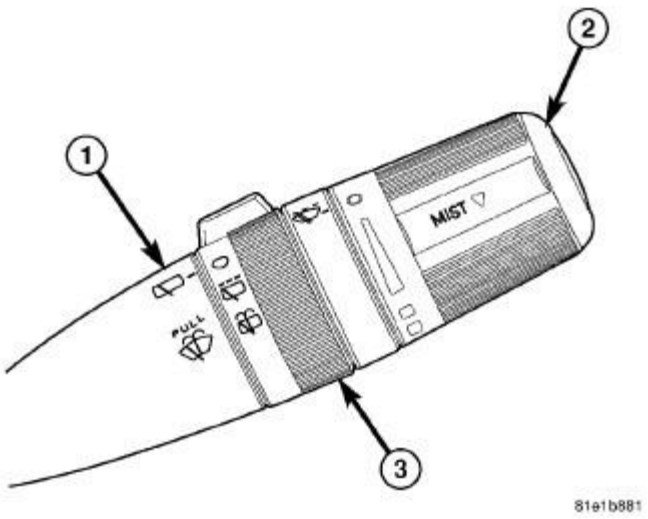


Fig. 4: Right (Wiper) Multi-Function Switch
Courtesy of CHRYSLER LLC

The rear wiper and washer system is designed to provide the vehicle operator with a convenient, safe, and reliable means of maintaining visibility through the liftgate glass. The various components of this system are designed to convert electrical energy produced by the vehicle electrical system into the mechanical action of the wiper blade to wipe the outside surface of the glass, as well as into the hydraulic action of the washer system to apply washer fluid stored in an on-board reservoir to the area of the glass to be wiped. When combined, these components provide the means to effectively maintain clear visibility for the vehicle operator by removing excess accumulations of rain, snow, bugs, mud, or other minor debris from the outer surface of the liftgate glass that might be encountered while driving the vehicle under numerous types of inclement operating conditions.

The vehicle operator initiates all front and rear wiper and washer system functions with the control stalk (1) of the right (wiper) multi-function switch that extends from the right side of the steering column, just below the steering wheel. Rotating the control sleeve (3) on the control stalk to the OFF or INTERMITTENT detent positions or the momentary WASH position selects the rear wiper and washer system operating modes.

The right multi-function switch provides hard wired analog and resistor multiplexed inputs to the Steering Control Module (SCM) integral to the left (lighting) multi-function switch for all of the wiper and washer system functions. The SCM then sends electronic **rear wiper/washer switch** status messages to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over a Local

Interface Network (LIN) data bus. The EMIC then sends electronic **rear wiper/washer switch** request messages to the Totally Integrated Power Module (TIPM) over the Controller Area Network (CAN) data bus requesting the appropriate rear wiper and washer system operating modes.

Rear wiper and washer system operation is completely controlled by the SCM, EMIC and TIPM logic circuits, and that logic will only allow these systems to operate when the ignition switch is in the ACCESSORY or ON positions. The TIPM uses intelligent, high current, self-protected high side switches to control wiper system operation by energizing or de-energizing the rear wiper motor. The TIPM uses an H-bridge circuit to control the operation of the reversible washer pump/motor unit. The right multi-function switch circuitry receives a clean ground output from the SCM on a multi-function switch return circuit, then provides analog and resistor multiplexed inputs to the SCM to indicate the selected rear wiper and rear washer system mode.

The hard wired circuits and components of the rear wiper and washer system may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the rear wiper and washer system. The most reliable, efficient, and accurate means to diagnose the rear wiper and washer system or the electronic controls and communication related to rear wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

OPERATING MODES

Following are paragraphs that briefly describe the operation of each of the rear wiper and washer system operating modes.

INTERMITTENT WIPE MODE

When the INTERMITTENT WIPE position of the control sleeve on the control stalk of the right multi-function switch is selected, the SCM sends an electronic **rear wiper switch** status message to the EMIC over the LIN data bus, then the EMIC relays an electronic **rear wiper switch** request message to the TIPM over the CAN data bus, and the TIPM directs battery current to the rear wiper motor at fixed delay intervals to enable the rear wiper motor intermittent wipe mode.

WASH MODE

When the control sleeve of the right multi-function switch is rotated counterclockwise past the INTERMITTENT detent position to the momentary rear WASH position, the SCM sends an electronic **rear washer switch** status message to the EMIC over the LIN data bus, then the EMIC relays an electronic **rear washer switch** request message to the TIPM over the CAN data bus, and the TIPM directs battery current to the rear wiper motor and directs battery current and ground to the washer pump/motor unit. These outputs will cause the washer pump motor and the rear wiper motor to operate continuously for as long as the switch is held closed up to approximately 10 seconds. The washer pump is de-energized as soon as the control sleeve is released, but the rear wiper motor continues to operate for two to three continuous cycles before reverting to the fixed delay interval operation. The TIPM uses a hard wired output from a park switch internal to the rear wiper motor as an additional logic input to monitor the position of the rear wiper blade on the glass and to control the number of continuous wiper sweeps following washer operation.

DIAGNOSIS AND TESTING

FRONT

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

If the front wiper motor operates, but the wipers do not move on the windshield, replace the ineffective front wiper module. If the washer pump/motor operates, but no washer fluid is dispensed on the glass; or, if the wipers operate, but chatter, lift, or do not clear the glass, clean and inspect the front wiper and washer system components as required. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning** and. See **Electrical - Wipers/Washers/Wipers/Washers - Inspection**.

The hard wired front wiper and washer system circuits and components may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the front wiper and washer system. The most reliable, efficient, and accurate means to diagnose the front wiper and washer system or the electronic controls and communication related to front wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NOTE: The front wiper and washer switches are integral to the right multi-function switch. The right multi-function switch is hard wired to the left multi-function switch/Steering Control Module (SCM), which communicates with the ElectroMechanical Instrument Cluster (EMIC)/Cab Compartment Node (CCN) over the Local Interface Network (LIN) data bus. Before performing any of the following tests, determine whether the other functions of the right and left multi-function switch/SCM are operational. If only the right multi-function switch functions are inoperative, test and repair the right multi-function switch or the jumper harness between the right and left multi-function switches before attempting to repair the Front Wiper and Washer System. If both the right and left multi-function switch/SCM functions are ineffective, diagnose and repair that problem before attempting to repair the Front Wiper and Washer System.

CONDITION	POSSIBLE CAUSES	CORRECTION
WIPER MOTOR DOES NOT OPERATE IN ANY SWITCH	1. Ineffective motor ground circuit.	1. Test and repair open wiper motor ground circuit if required.

POSITION	2. Ineffective motor feed circuits.	2. Test and repair low speed and high speed feed circuits between TIPM and front wiper motor if required.
	3. Ineffective right multi-function switch.	3. Test and replace ineffective right multi-function switch if required.
	4. Ineffective SCM inputs or outputs.	4. Use a diagnostic scan tool to test the SCM inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective EMIC (CCN) inputs or outputs.	5. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective TIPM inputs or outputs.	6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	7. Ineffective wiper motor.	7. Test and replace open or shorted wiper motor as required.
WIPERS DO NOT PARK CORRECTLY	1. Ineffective wiper motor park switch input circuit.	1. Test and repair wiper park switch input circuit between TIPM and front wiper motor if required.
	2. Ineffective TIPM inputs or outputs.	2. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective wiper motor park switch.	3. Test and replace ineffective wiper motor if required.
WIPER MOTOR OPERATES SLOWLY IN ALL SWITCH POSITIONS	1. Ineffective wiper motor.	1. Check amperage draw with linkage disconnected from wiper motor crank arm. Correct draw should be about 6 amperes. If incorrect, refer to the appropriate Possible Cause that follows:
	2. Amperage draw too low.	2. Test and repair shorted low and high speed feed circuits if required.
	3. Amperage draw too high.	3. With linkage disconnected from wiper motor crank arm check linkage and pivots for binding. If binding is detected, repair or replace front wiper module if required. If no linkage binding detected, replace the front wiper motor if required.
WIPERS RUN AT HIGH SPEED WITH SWITCH LOW SPEED SELECTED OR AT LOW SPEED WITH SWITCH HIGH SPEED SELECTED	1. Ineffective motor feed circuit wiring.	1. Test and repair low speed and high speed feed circuits between TIPM and front wiper motor if required.
	1. Ineffective washer pump ground circuit.	1. Test and repair open washer pump ground circuit if required.
	2. Ineffective washer pump	2. Test and repair washer pump feed circuits between TIPM and washer pump

	feed circuits.	if required.
	3. Ineffective right multi-function switch.	3. Test and replace ineffective right multi-function switch if required.
	4. Ineffective SCM inputs or outputs.	4. Use a diagnostic scan tool to test the SCM inputs and outputs. Refer to the appropriate diagnostic information.
WASHER PUMP DOES NOT OPERATE	5. Ineffective EMIC (CCN) inputs or outputs.	5. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective TIPM inputs or outputs.	6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	7. Ineffective washer pump.	7. Test and replace open or shorted washer pump if required.

HEADLAMP

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

Before attempting to diagnose the headlamp washer system, confirm whether the front washer system operates satisfactorily. If the front washer system is ineffective or operates improperly, diagnose and repair that problem before attempting to repair the headlamp washer system. If the front washer system operates satisfactorily and the headlamp washer pump/motor unit operates, but no washer fluid is dispensed on the front lamp unit lenses, inspect the headlamp washer plumbing for pinched or leaking hoses and fittings. If the headlamp washer pump/motor unit does not operate, check the headlamp washer system fuse.

The hard wired headlamp washer system circuits and components may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the headlamp washer system. The most reliable, efficient, and accurate means to diagnose the headlamp washer system or the electronic controls and communication related to headlamp washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REAR

WARNING: To avoid personal injury or death, on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, occupant classification system, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment, possible personal injury, or death.

If the rear wiper motor operates, but the wiper motor output shaft does not move, replace the ineffective rear wiper motor. If the washer pump/motor operates, but no washer fluid is dispensed on the glass; or, if the wiper operates, but chatters, lifts, or does not clear the glass, clean and inspect the rear wiper and washer system components as required. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning** and. See **Electrical - Wipers/Washers/Wipers/Washers - Inspection**.

The hard wired rear wiper and washer system circuits and components may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . The wiring information includes wiring diagrams, proper wire and connector repair procedures, details of wire harness routing and retention, connector pin-out information and location views for the various wire harness connectors, splices and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the rear wiper and washer system. The most reliable, efficient, and accurate means to diagnose the rear wiper and washer system or the electronic controls and communication related to rear wiper and washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

NOTE: The rear wiper and washer switches are integral to the right multi-function switch. The right multi-function switch is hard wired to the left multi-function switch/Steering Control Module (SCM), which communicates with the ElectroMechanical Instrument Cluster (EMIC)/Cab Compartment Node (CCN) over the Local Interface Network (LIN) data bus. Before performing any of the following tests, determine whether the other functions of the right and left multi-function switch/SCM are operational. If only the right multi-function switch functions are inoperative, test and repair the right multi-function switch or the jumper harness between the right and left multi-function switches before attempting to repair the Rear Wiper and Washer System. If both the right and left multi-function switch/SCM functions are ineffective, diagnose and repair that problem before attempting to repair the Rear Wiper and Washer System.

CONDITION	POSSIBLE CAUSES	CORRECTION
WIPER MOTOR DOES NOT OPERATE IN ANY SWITCH POSITION	1. Ineffective motor ground circuit. 2. Ineffective motor feed circuits.	1. Test and repair open wiper motor ground circuit if required. 2. Test and repair motor feed circuit between TIPM and rear wiper motor if required.

	3. Ineffective right multi-function switch.	3. Test and replace ineffective right multi-function switch if required.
	4. Ineffective SCM inputs or outputs.	4. Use a diagnostic scan tool to test the SCM inputs and outputs. Refer to the appropriate diagnostic information.
	5. Ineffective EMIC (CCN) inputs or outputs.	5. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information.
	6. Ineffective TIPM inputs or outputs.	6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	7. Ineffective wiper motor.	7. Test and replace open or shorted wiper motor if required.
WIPER DOES NOT PARK CORRECTLY	1. Ineffective wiper motor park switch input circuit.	1. Test and repair wiper park switch input circuit between TIPM and front wiper motor if required.
	2. Ineffective TIPM inputs or outputs.	2. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information.
	3. Ineffective wiper motor park switch.	3. Test and replace ineffective wiper motor if required.
WIPER MOTOR OPERATES SLOWLY	1. Ineffective wiper motor.	1. Check amperage draw with wiper arm disconnected from rear wiper motor output shaft. Correct draw should be about 6 amperes. If incorrect, refer to the appropriate Possible Cause that follows:
	2. Amperage draw too low.	2. Test and repair shorted rear wiper motor signal and fused ignition switch output (run - accessory) circuits if required.
	3. Amperage draw too high.	3. With wiper arm disconnected from wiper motor output shaft check for binding between output shaft and rubber grommet in liftgate. If binding is detected, lubricate or replace grommet if required. If no binding is detected, replace the wiper motor if required.
	1. Ineffective washer pump ground circuit.	1. Test and repair open washer pump ground circuit if required.
	2. Ineffective washer pump feed circuits.	2. Test and repair washer pump feed circuits between TIPM and washer pump if required.
	3. Ineffective right multi-function switch.	3. Test and replace ineffective right multi-function switch if required.
WASHER PUMP DOES NOT	4. Ineffective SCM inputs or	4. Use a diagnostic scan tool to test the SCM inputs and outputs. Refer to the

OPERATE	outputs. 5. Ineffective EMIC (CCN) inputs or outputs. 6. Ineffective TIPM inputs or outputs. 7. Ineffective washer pump.	appropriate diagnostic information. 5. Use a diagnostic scan tool to test the EMIC (CCN) inputs and outputs. Refer to the appropriate diagnostic information. 6. Use a diagnostic scan tool to test the TIPM inputs and outputs. Refer to the appropriate diagnostic information. 7. Test and replace open or shorted washer pump if required.

CLEANING

FRONT

WIPER SYSTEM

CAUTION: Protect the rubber squeegees of the wiper blades from any petroleum-based cleaners, solvents, or contaminants. These products can rapidly deteriorate the rubber squeegees.

The squeegees of wiper blades exposed to the elements for a long time tend to lose their wiping effectiveness. Periodic cleaning of the squeegees is suggested to remove any deposits of salt or road film. The wiper blades, arms, and windshield glass should only be cleaned using a sponge or soft cloth and windshield washer fluid, a mild detergent, or a non-abrasive cleaner. If the wiper blades continue to leave streaks, smears, hazing, or beading on the glass after thorough cleaning of the squeegees and the glass, the entire wiper blade assembly must be replaced.

WASHER SYSTEM

CAUTION: Never introduce petroleum-based cleaners, solvents, or contaminants into the washer system. These products can rapidly deteriorate the rubber seals and hoses of the washer system, as well as the rubber squeegees of the wiper blades.

CAUTION: Never use compressed air to flush the washer system plumbing. Compressed air pressures are too great for the washer system plumbing components and will result in further system damage. Never use sharp instruments to clear a plugged washer nozzle or damage to the nozzle orifice and improper nozzle spray patterns will result.

If the washer system is contaminated with foreign material, drain the washer reservoir by removing the washer pump/motor unit from the reservoir. Clean foreign material from the inside of the washer pump inlet filter screen and the washer reservoir using clean washer fluid, a mild detergent, or a non-abrasive cleaner. Flush foreign material from the washer system plumbing by first disconnecting the washer hose from the washer nozzle, then running the washer pump/motor to run clean washer fluid or water through the system. A plugged

or restricted washer nozzle should be carefully back-flushed using compressed air. If the washer nozzle obstruction cannot be cleared, replace the washer nozzle.

REAR

WIPER SYSTEM

CAUTION: Protect the rubber squeegee of the wiper blade from any petroleum-based cleaners, solvents, or contaminants. These products can rapidly deteriorate the rubber squeegee.

The squeegee of a wiper blade exposed to the elements for a long time tends to lose its wiping effectiveness. Periodic cleaning of the squeegee is suggested to remove any deposits of salt or road film. The wiper blade, arm, and liftgate glass should only be cleaned using a sponge or soft cloth and windshield washer fluid, a mild detergent, or a non-abrasive cleaner. If the wiper blade continues to leave streaks, smears, hazing, or beading on the glass after thorough cleaning of the squeegees and the glass, the entire wiper blade assembly must be replaced.

WASHER SYSTEM

CAUTION: Never introduce petroleum-based cleaners, solvents, or contaminants into the washer system. These products can rapidly deteriorate the rubber seals and hoses of the washer system, as well as the rubber squeegee of the wiper blade.

CAUTION: Never use compressed air to flush the washer system plumbing. Compressed air pressures are too great for the washer system plumbing components and will result in further system damage. Never use sharp instruments to clear a plugged washer nozzle or damage to the nozzle orifice and improper nozzle spray patterns will result.

If the washer system is contaminated with foreign material, drain the washer reservoir by removing the washer pump/motor from the reservoir. Clean foreign material from the inside of the washer pump/motor inlet filter screen and the washer reservoir using clean washer fluid, a mild detergent, or a non-abrasive cleaner. Flush foreign material from the washer system plumbing by first disconnecting the washer hose from the rear washer nozzle, then running the washer pump/motor to run clean washer fluid or water through the system. A plugged or restricted rear washer nozzle should be carefully back-flushed using compressed air. If the washer nozzle obstruction cannot be cleared, replace the rear washer nozzle.

INSPECTION

FRONT

WIPER SYSTEM

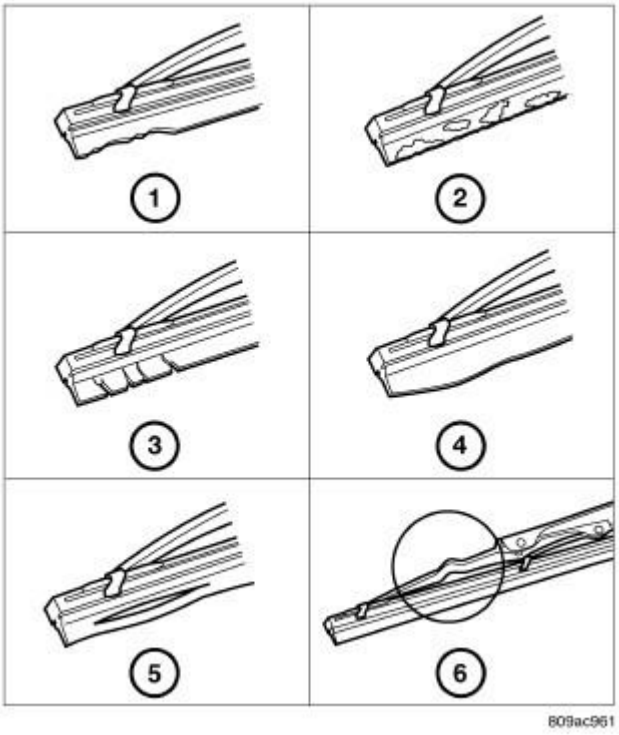


Fig. 5: Inspecting Wiper Blades
Courtesy of CHRYSLER LLC

The wiper blades and wiper arms should be inspected periodically, not just when wiper performance problems are experienced. This inspection should include the following points:

1. Carefully inspect the wiper blades for any indications of worn or uneven edges (1), foreign material deposits (2), hardening or cracking (3), deformation or fatigue (4), or splitting (5). Inspect the wiper blade support components and the wiper arms for damage (6) or corrosion. If the wiper arms and blades are contaminated with any foreign material, clean them and the glass as required. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning**. If a wiper blade or arm is damaged, or if corrosion is evident, replace the affected wiper arm or blade with a new unit. Do not attempt to repair a wiper arm or blade that is damaged or corroded.
2. Carefully lift the wiper blade off of the glass. Note the action of the wiper arm hinge. The wiper arm should pivot freely at the hinge, but with no lateral looseness evident. If there is any binding evident in the wiper arm hinge, or if there is evident lateral play in the wiper arm hinge, replace the wiper arm.

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

3. Once proper hinge action of the wiper arm is confirmed, check the hinge for proper spring tension. Remove the wiper blade from the wiper arm. Either place a small postal scale between the blade end of the wiper arm and the glass, or carefully lift the blade end of the arm away from the glass using a small fish scale. On vehicles with unequal wiper arm lengths, be certain that measurements on both arms are

taken at a point an equal distance from their wiper arm hinge pins. Compare the scale readings between the right and left wiper arms. Replace a wiper arm if it has comparatively lower spring tension, as evidenced by a lower scale reading.

4. After cleaning and inspecting the wiper components and the glass, if the wiper blade still fails to clear the glass without smearing, streaking, chattering, hazing, or beading, replace the wiper blade.

WASHER SYSTEM

The washer system components should be inspected periodically, not just when washer performance problems are experienced. This inspection should include the following points:

1. Check for ice or other foreign material in the washer reservoir. If contaminated, clean and flush the washer system. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning**.
2. Inspect the washer plumbing for pinched, leaking, deteriorated, or incorrectly routed hoses and damaged or disconnected hose fittings. Replace damaged or deteriorated hoses and hose fittings. Leaking washer hoses can sometimes be repaired by cutting the hose at the leak and splicing it back together using an inline connector fitting. Similarly, sections of deteriorated hose can be cut out and replaced by splicing in new sections of hose using inline connector fittings. Whenever routing a washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts. Also, sharp bends that might pinch the washer hose must be avoided.

REAR

WIPER SYSTEM

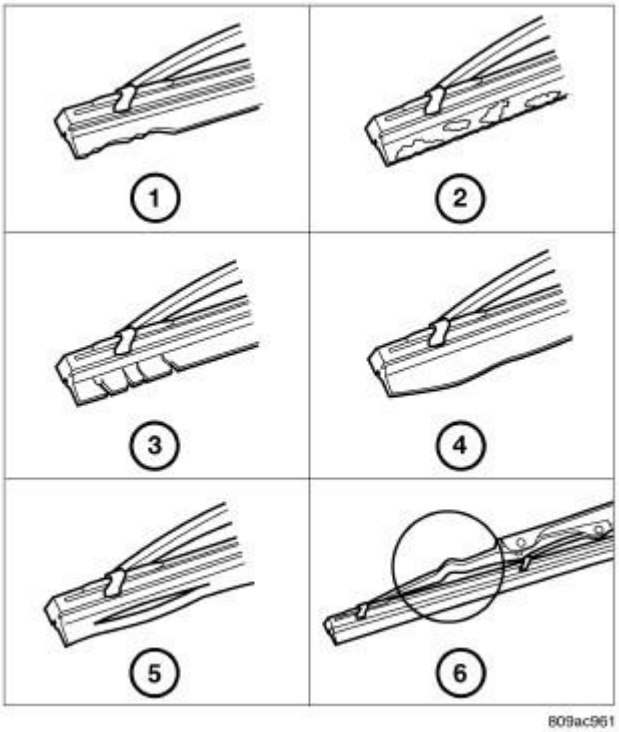


Fig. 6: Inspecting Wiper Blades
Courtesy of CHRYSLER LLC

The rear wiper blade and wiper arm should be inspected periodically, not just when wiper performance problems are experienced. This inspection should include the following points:

1. Carefully inspect the wiper blade for any indications of worn or uneven edges (1), foreign material deposits (2), hardening or cracking (3), deformation or fatigue (4), or splitting (5). Inspect the wiper blade support components and the wiper arm for damage (6). If the wiper arm and blade are contaminated with any foreign material, clean them and the glass as required. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning**. If the wiper blade or arm is damaged, replace it with a new unit. Do not attempt to repair a wiper arm or blade that is damaged or corroded.
2. Carefully lift the wiper blade off of the glass. Note the action of the wiper arm hinge. The wiper arm should pivot freely at the hinge, but with no lateral looseness evident. If there is any binding evident in the wiper arm hinge, or there is evident lateral play in the wiper arm hinge, replace the wiper arm.

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

3. Once proper hinge action of the wiper arm is confirmed, check the hinge for proper spring tension. The spring tension of the wiper arm should be sufficient to cause the rubber squeegee to conform to the curvature of the glass. Replace a wiper arm if it has insufficient spring tension to maintain contact between the squeegee and the glass.
4. After cleaning and inspecting the wiper components and the glass, if the wiper blade still fails to clear the glass without smearing, streaking, chattering, hazing, or beading, replace the wiper blade.

WASHER SYSTEM

The washer system components should be inspected periodically, not just when washer performance problems are experienced. This inspection should include the following points:

1. Check for ice or other foreign material in the washer reservoir. If contaminated, clean and flush the washer system. See **Electrical - Wipers/Washers/Wipers/Washers - Cleaning**.
2. Inspect the washer plumbing for pinched, leaking, deteriorated, or incorrectly routed hoses and damaged or disconnected hose fittings. Replace damaged or deteriorated hoses and hose fittings. Leaking washer hoses can sometimes be repaired by cutting the hose at the leak and splicing it back together using an inline connector fitting. Similarly, sections of deteriorated hose can be cut out and replaced by splicing in new sections of hose using inline connector fittings. Whenever routing a washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts. Also, sharp bends that might pinch the washer hose must be avoided.

SPECIFICATIONS

SPECIFICATIONS

TORQUE SPECIFICATIONS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Right Multi-Function Switch Mounting Screw	1	-	10
Front Wiper Arm Mounting Nuts	24	18	-
Rear Wiper Arm Mounting Nut	9	-	80
Front Wiper Module Mounting Screws	10	-	90
Front Wiper Motor Mounting Screws	9	-	80
Rear Wiper Motor Bracket Mounting Screws	5	-	44

ARM, WIPER

DESCRIPTION

FRONT

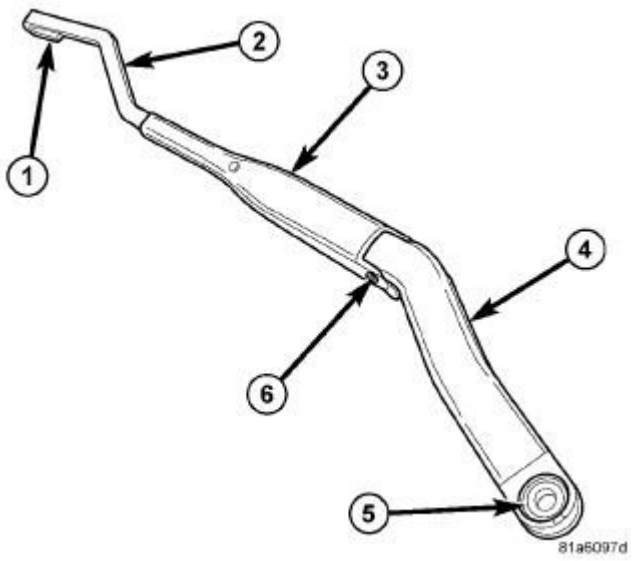


Fig. 7: Front Wiper Arm
Courtesy of CHRYSLER LLC

The front wiper arms are the rigid members located between the wiper pivots that protrude from the cowl plenum cover/grille panel near the base of the windshield and the wiper blades on the windshield glass. These wiper arms feature an over-center hinge that allows easy access to the windshield glass for cleaning.

The wiper arm has a die cast metal pivot end (4) with a large tapered mounting hole (5) at one end. A molded

black plastic cap fits over the wiper arm retaining nut to conceal the nut and this mounting hole following wiper arm installation.

The wide end of a tapered, stamped steel channel (3) hinges on and is secured with a hinge pin (6) to the blade end of the wiper arm pivot end. One end of a long, rigid, stamped steel strap (2) with a small hole near its pivot end is riveted and crimped within the narrow end of the stamped steel channel. The tip of the wiper blade end of this strap is bent back under itself to form a small hook (1). Concealed within the stamped steel channel, one end of a long tension spring is engaged with a wire hook on the underside of the die cast pivot end, while the other end of the spring is hooked through the small hole in the steel strap. The entire wiper arm has a satin black finish applied to all of its visible surfaces.

The right and left wiper arms are unique and are not interchangeable. A wiper arm cannot be adjusted or repaired. If damaged or ineffective, the entire wiper arm unit must be replaced.

REAR

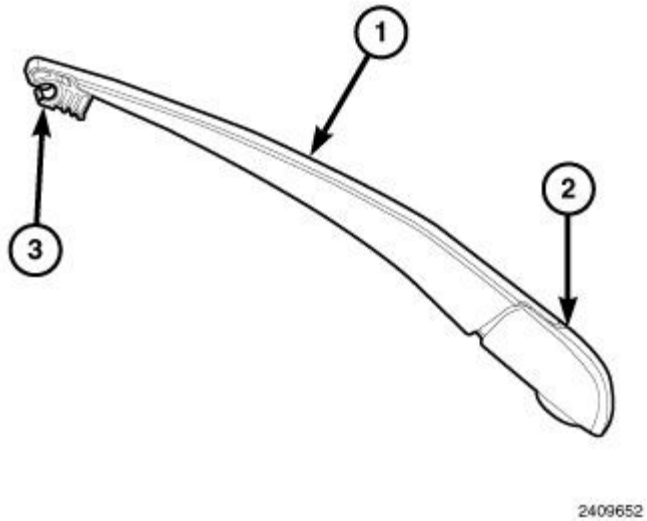


Fig. 8: Rear Wiper Arm
Courtesy of CHRYSLER LLC

The rear wiper arm is the rigid member located between the rear wiper motor output shaft that protrudes through the liftgate outer panel below the center of the liftgate glass opening and the wiper blade on the outside of the glass. The wiper arm is constructed of molded black plastic. A hinged pivot end is also molded plastic.

A molded black plastic nut cover (2) with two pivot pins on one end and a snap feature on the other fits over the wiper arm retaining nut to conceal the nut and mounting hole following wiper arm installation. The wiper arm hinge and tension spring are concealed on the underside of the wide end of the arm (1), while an integral latch feature (3) concealed on the underside of the narrow end of the wiper arm accepts the pivot pin of the matching molded plastic wiper blade unit.

The rear wiper arm cannot be adjusted or repaired. If damaged or ineffective, the entire wiper arm unit must be replaced.

OPERATION

FRONT

The front wiper arms are designed to mechanically transmit the motion from the wiper pivots to the wiper blades. The wiper arm must be properly indexed to the wiper pivot in order to maintain the proper wiper blade travel on the glass. The tapered mounting hole in the wiper arm pivot end interlocks with the serrations on the tapered outer circumference of the wiper pivot shaft, allowing positive engagement and finite adjustment of this connection.

The mounting nuts lock the wiper arms to the threaded studs of the wiper pivot shafts. The spring-loaded wiper arm hinge controls the down-force applied through the tip of the wiper arm to the wiper blade on the glass. The hook formation on the tip of the wiper arm provides a cradle for securing and latching the wiper blade pivot block to the wiper arm.

REAR

The rear wiper arm is designed to mechanically transmit the motion from the rear wiper motor output shaft to the rear wiper blade. The wiper arm must be properly indexed to the motor output shaft in order to maintain the proper wiper blade travel on the glass. The tapered hole in the wiper arm pivot end interlocks with the serrations on the outer circumference of the tapered motor output shaft, allowing positive engagement and finite adjustment of this connection.

A hex nut secures the wiper arm pivot end to the threads on the rear wiper motor output shaft and the plastic cover snaps over this connection for a neat appearance. The spring-loaded wiper arm hinge controls the down-force applied through the tip of the wiper arm to the wiper blade on the glass. The latch formation on the tip of the wiper arm provides a cradle for securing and latching the wiper blade pivot pin to the wiper arm.

REMOVAL

FRONT

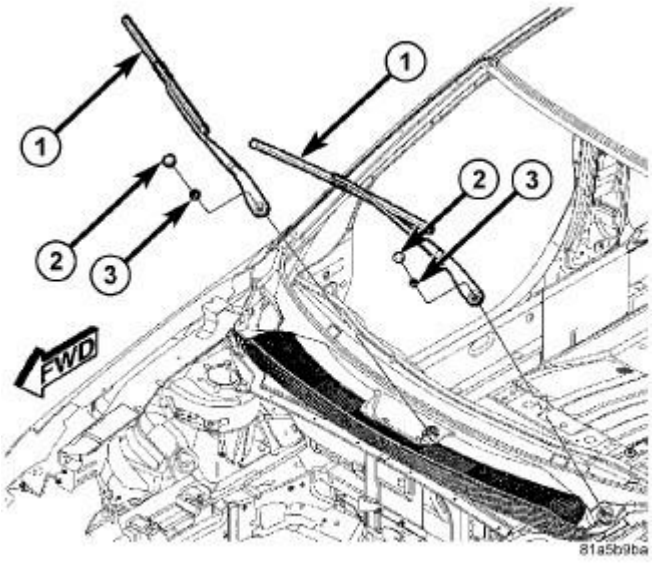


Fig. 9: Removing/Installing Wiper Arm
Courtesy of CHRYSLER LLC

1. Lift the front wiper arm (1) to its over-center position to hold the wiper blade off of the glass and relieve the spring tension on the wiper arm to pivot shaft connection.
2. Carefully pry the plastic nut cap (2) off of the pivot end of the wiper arm.
3. Remove the nut (3) that secures the wiper arm to the wiper pivot shaft.

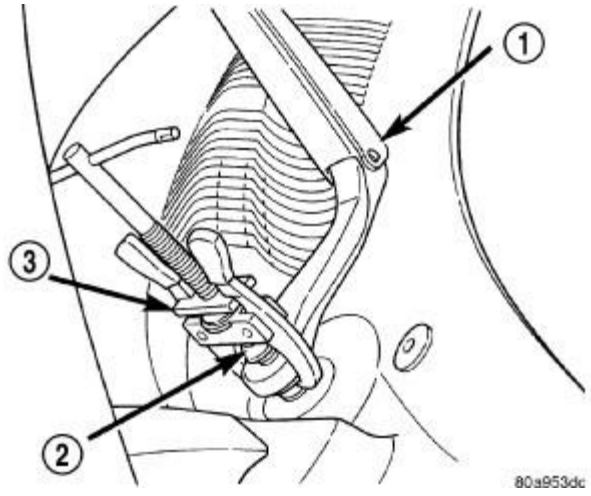


Fig. 10: Disengaging Wiper Arm From Pivot Shaft
Courtesy of CHRYSLER LLC

4. If necessary, use a suitable battery terminal puller (3) to disengage the wiper arm (1) from the pivot shaft (2).
5. Remove the front wiper arm pivot end from the pivot shaft.

REAR

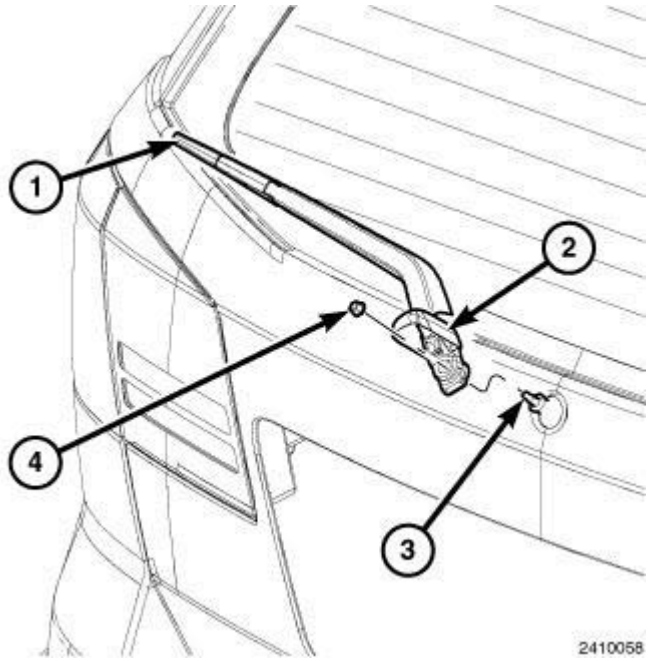


Fig. 11: Rear Wiper Motor Output Shaft
Courtesy of CHRYSLER LLC

1. Unsnap and swing the molded plastic nut cover (2) off of the pivot end of the wiper arm (1).
2. Remove the nut (4) that secures the wiper arm to the rear wiper motor output shaft (3).

CAUTION: The use of a battery terminal puller when removing the rear wiper arm is NOT recommended as this may damage the rear wiper arm.

3. Use a slight rocking action to disengage the rear wiper arm pivot end from the output shaft and remove the wiper arm.

INSTALLATION

FRONT

NOTE: Be certain that the wiper motor is in the park position before attempting to install the front wiper arms. Turn the ignition switch to the ON position and move the right (wiper) multi-function switch control knob to its OFF position. If the wiper pivots move, wait until they stop moving, then turn the ignition switch back to the OFF position. The front wiper motor is now in its park position.

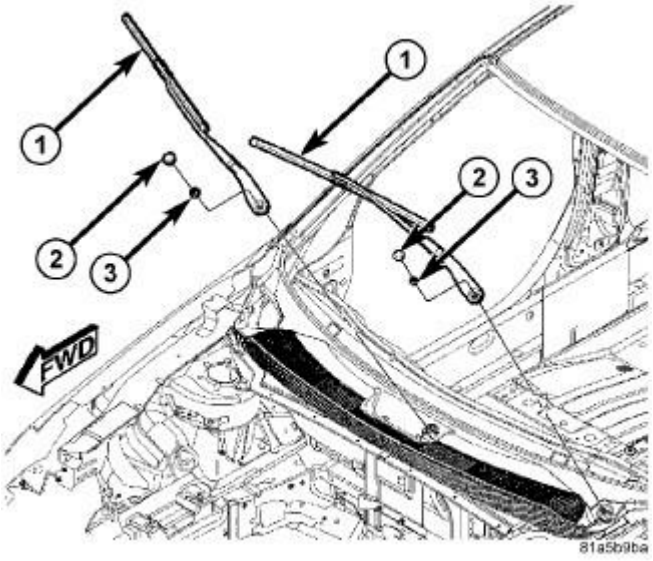


Fig. 12: Removing/Installing Wiper Arm
Courtesy of CHRYSLER LLC

1. The front wiper arms (1) must be indexed to the pivot shafts with the front wiper motor in the park position to be properly installed. Position the wiper arm pivot ends onto the wiper pivot shafts so that the tip of the wiper blade is aligned with the wiper alignment lines located within the lower margin (blackout area) of the windshield glass.
2. Once the wiper blade is aligned, lift the wiper arm away from the windshield slightly to relieve the spring tension on the pivot end and push the pivot end of the wiper arm down firmly and evenly over the pivot shaft.
3. Install and tighten the nut (3) that secures the wiper arm to the pivot shaft. Tighten the nut to 24 N.m (18 ft. lbs.).
4. Wet the windshield glass, then operate the front wipers. Turn the front wipers OFF, then check for the correct wiper arm position and readjust as required.
5. Reinstall the plastic nut cap (2) onto the wiper arm pivot nut.

INSTALLATION

NOTE: Be certain that the rear wiper motor is in the park position before attempting to install the rear wiper arm. Turn the ignition switch to the ON position and move the rear wiper switch to its OFF position. If the wiper motor output shaft moves, wait until it stops moving, then turn the ignition switch back to the OFF position. The wiper motor is now in its park position.

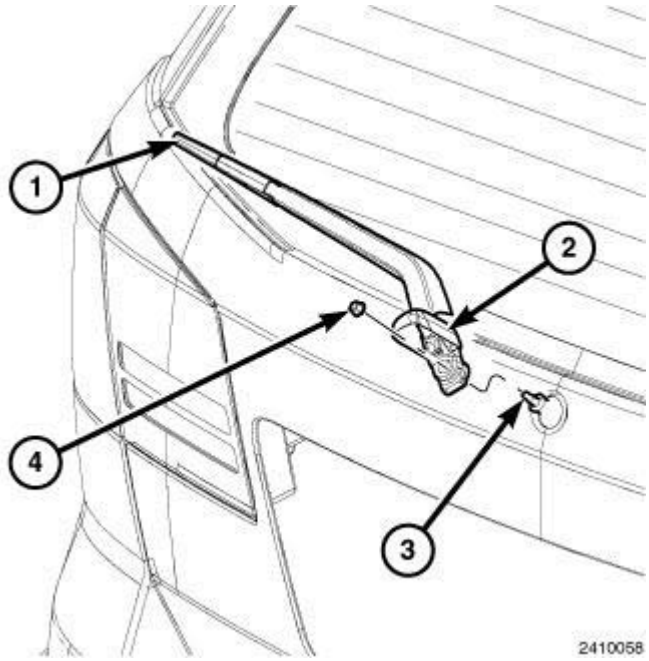


Fig. 13: Rear Wiper Motor Output Shaft
Courtesy of CHRYSLER LLC

1. The rear wiper arm (1) must be indexed to the rear wiper motor output shaft with the motor in the park position to be properly installed. Position the wiper arm pivot end onto the output shaft (3) so that the tip of the wiper blade is aligned with the second rear window defogger grid line from the bottom of the liftgate glass.
2. With the rear wiper arm properly indexed, push the tapered mounting hole on the pivot end of the wiper arm down over the output shaft.
3. Install and tighten the nut (4) that secures the rear wiper arm to the output shaft. Tighten the nut to 9 N.m (80 in. lbs.).
4. Fold and snap the molded plastic nut cover (2) over the nut on the pivot end of the rear wiper arm.
5. Wet the lift glass and operate the rear wiper. Turn the rear wiper switch to the OFF position, then check for correct wiper arm position and readjust as required.

BLADE, WIPER

DESCRIPTION

FRONT

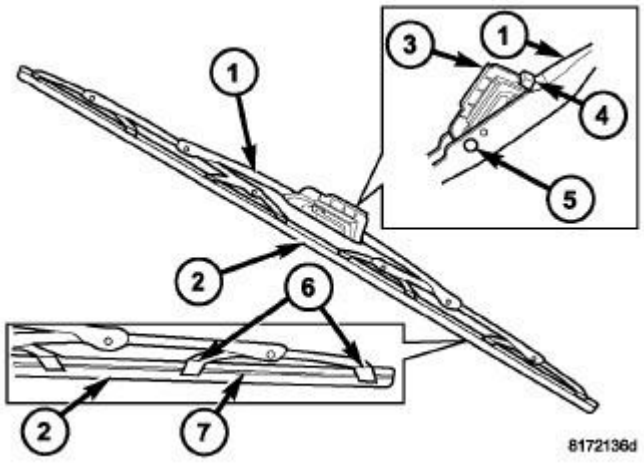


Fig. 14: Identifying Wiper Blade Components
Courtesy of CHRYSLER LLC

Each wiper blade is secured by an integral latching pivot block (3) to the hook formation on the tip of each wiper arm, and rests on the glass near the base of the windshield when the wipers are not in operation. The wiper blade consists of the following components:

- **Superstructure (1)** - The superstructure includes several stamped steel bridges and links with claw formations (6) that grip the wiper blade element. Also included in this unit is the latching, molded plastic pivot block that secures the superstructure to the wiper arm. All of the metal components of the wiper blade have a satin black finish applied.
- **Element (2)** - The wiper element or squeegee is the resilient rubber member of the wiper blade that contacts the glass.
- **Flexor (7)** - The flexor is a rigid metal component running along the length of each side of the wiper element where it is gripped by the claws of the superstructure.

The passenger side wiper blades are 47.50 centimeters (18.70 inches) long. The driver side wiper blades are 60 centimeters (23.62 inches) long. They have non-replaceable rubber elements (squeegees). The wiper blades cannot be adjusted or repaired. If ineffective, worn, or damaged the entire wiper blade unit must be replaced.

REAR

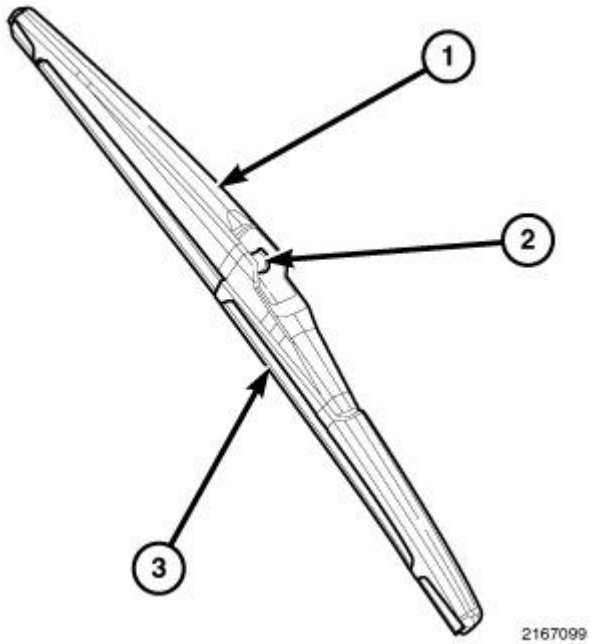


Fig. 15: Rear Wiper Blade Is Secured By An Integral Pivot Pin
Courtesy of CHRYSLER LLC

The rear wiper blade is secured by an integral pivot pin (2) to a receptacle at the tip of the rear wiper arm, and rests near the base of the liftgate glass when the wiper is not in operation. The rear wiper blade consists of the following components:

- **Superstructure (1)** - The superstructure includes a molded black plastic bridge and plastic links with claw formations that grip the wiper blade element. Also included in this unit is the pivot pin that secures the superstructure to the wiper arm.
- **Element (3)** - The wiper element or squeegee is the resilient rubber member of the wiper blade that contacts the glass.
- **Flexor** - The flexor is a rigid metal component running along the length of each side of the wiper element where it is gripped by the claws of the superstructure.

The rear wiper blade is 30.50 centimeters (12.00 inches) long with a non-replaceable element (squeegee). The wiper blade superstructure cannot be adjusted or repaired. If ineffective, worn, or damaged the entire wiper blade unit must be replaced.

OPERATION

FRONT

The wiper blades are moved back and forth across the glass by the wiper arms when the wipers are being operated. The wiper blade superstructure is the flexible frame that grips the wiper blade element and evenly distributes the force of the spring-loaded wiper arm along the length of the element. The combination of the wiper arm force and the flexibility of the superstructure makes the element conform to and maintain proper contact with the glass, even as the blade is moved over the varied curvature that may be encountered across the

glass surface.

The wiper element flexor provides the claws of the blade superstructure with a rigid, yet flexible component on the element which can be gripped. The rubber element is designed to be stiff enough to maintain an even cleaning edge as it is drawn across the glass, yet resilient enough to conform to the glass surface and flip from one cleaning edge to the other each time the wiper blade changes directions.

REAR

The rear wiper blade is moved back and forth across the liftgate glass by the wiper arm when the rear wiper system is in operation. The wiper blade superstructure is the flexible frame that grips the wiper blade element and evenly distributes the force of the spring-loaded wiper arm along the length of the element. The combination of the wiper arm force and the flexibility of the superstructure makes the element conform to and maintain proper contact with the glass, even as the blade is moved over the varied curvature found across the glass surface.

The wiper element flexor provides the claws of the blade superstructure with a rigid, yet flexible component on the element which can be gripped. The rubber element is designed to be stiff enough to maintain an even cleaning edge as it is drawn across the glass, but resilient enough to conform to the glass surface and flip from one cleaning edge to the other each time the wiper blade changes directions.

REMOVAL

FRONT

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

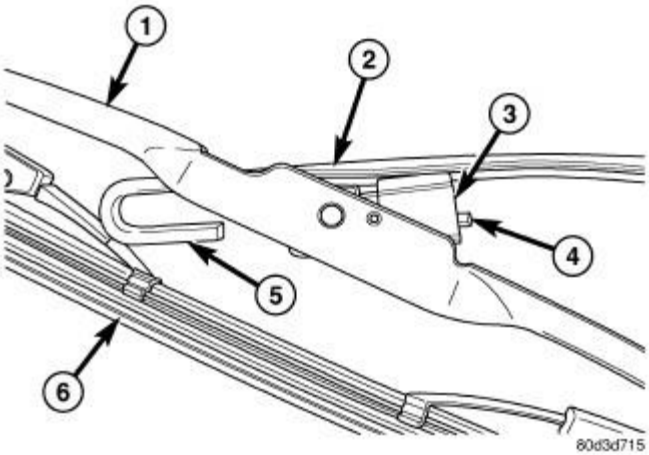


Fig. 16: Removing/Installing Wiper Blade
Courtesy of CHRYSLER LLC

NOTE: The notched end of the wiper element flexor should always be oriented towards

the end of the wiper blade that is nearest to the wiper pivot.

1. Lift the wiper arm (2) to raise the wiper blade and element (6) off of the glass, until the wiper arm hinge is in its over-center position.
2. To remove the blade from the arm, depress the latch release tab (4) on the pivot block (3) under the tip of the arm and slide the blade away from the tip towards the pivot end of the arm far enough to disengage the pivot block from the hook formation (5) on the end of the arm.
3. Extract the hook formation on the tip of the wiper arm through the opening in the wiper blade superstructure (1) just ahead of the pivot block.
4. Gently lower the tip of the wiper arm onto the glass.

REAR

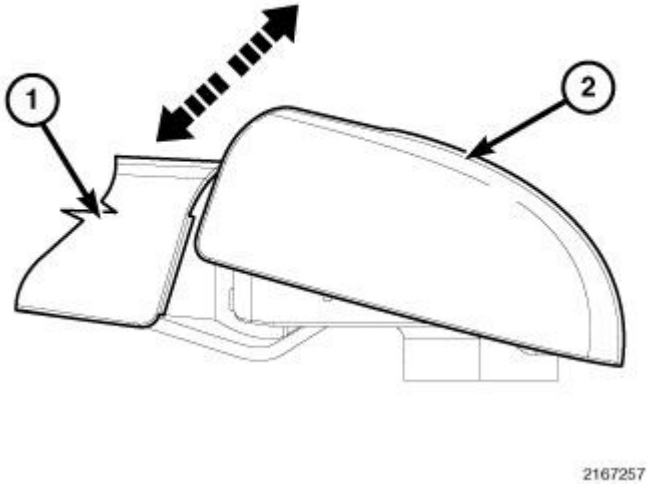


Fig. 17: Rear Wiper Arm Pivot Cap
Courtesy of CHRYSLER LLC

1. Lift the rear wiper arm pivot cap (2) upward to allow the rear wiper blade to be raised off of the glass.

NOTE: The rear wiper arm cannot be raised to its over-center hinge position unless the pivot cover is raised first.

2. Lift the rear wiper arm to its over-center hinge position to raise the wiper blade and element off of the liftgate glass.

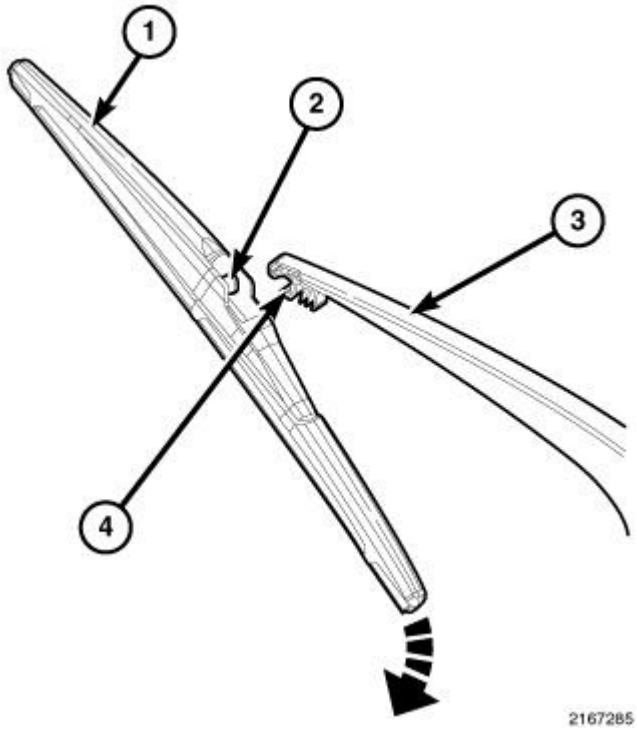


Fig. 18: Removing/Installing Wiper Blade From Wiper Arm
Courtesy of CHRYSLER LLC

3. To remove the wiper blade (1) from the wiper arm (3), grasp the end of the blade nearest to the motor output shaft, then over-rotate it out from under the arm and past its stop far enough to unsnap the blade pivot pin (2) from the receptacle (4) on the end of the arm.
4. Gently lower the tip of the wiper arm onto the glass.

INSTALLATION

FRONT

CAUTION: Do not allow the wiper arm to spring back against the glass without the wiper blade in place or the glass may be damaged.

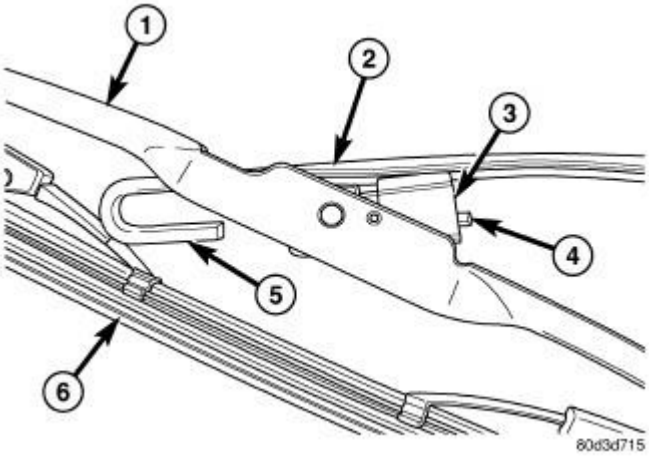


Fig. 19: Removing/Installing Wiper Blade
Courtesy of CHRYSLER LLC

NOTE: The notched end of the wiper element flexor should always be oriented towards the end of the wiper blade that is nearest to the wiper pivot.

1. Lift the wiper arm (2) off of the windshield glass, until the wiper arm hinge is in its over-center position.
2. Position the wiper blade near the hook formation (5) on the tip of the arm with the notched end of the wiper element flexor oriented towards the end of the wiper arm that is nearest to the wiper pivot.
3. Insert the hook formation on the tip of the arm through the opening in the blade superstructure (1) ahead of the pivot block (3) far enough to engage the pivot block into the hook.
4. Slide the pivot block up into the hook formation on the tip of the wiper arm until the latch release tab (4) snaps into its locked position. Latch engagement will be accompanied by an audible click.
5. Gently lower the wiper blade and element (6) onto the glass.

REAR

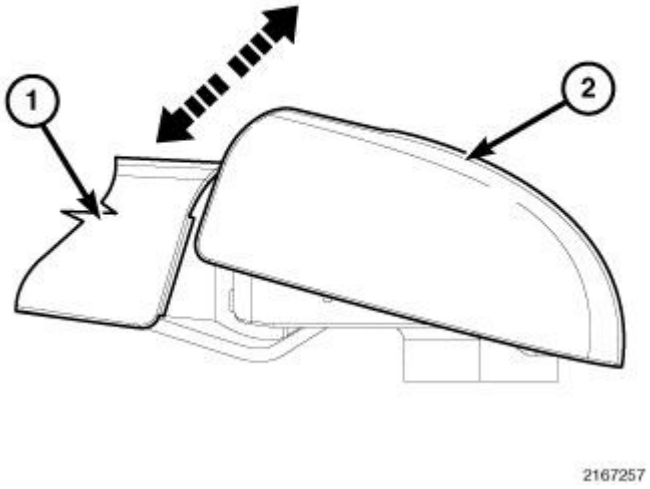


Fig. 20: Rear Wiper Arm Pivot Cap
Courtesy of CHRYSLER LLC

1. Lift the rear wiper arm pivot cap (2) upward to allow the rear wiper arm to be raised off of the glass.

NOTE: The rear wiper arm cannot be raised to its over-center hinge position unless the pivot cover is raised first.

2. Lift the rear wiper arm to its over-center hinge position and off of the liftgate glass.

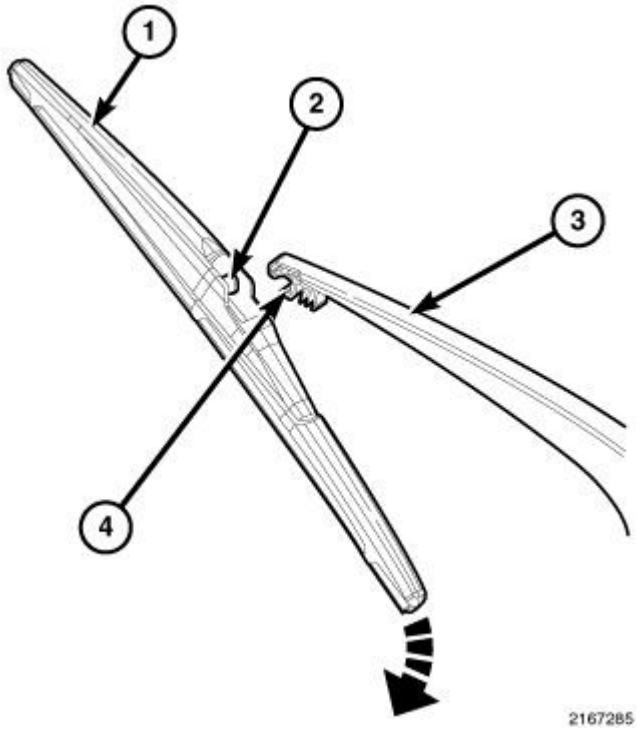


Fig. 21: Removing/Installing Wiper Blade From Wiper Arm
Courtesy of CHRYSLER LLC

3. Position the rear wiper blade (1) with the pivot pin (2) aligned with the opening of the receptacle (4) on the tip of the wiper arm (3).
4. Using hand pressure, press the wiper blade pivot pin firmly and evenly into the wiper arm receptacle until it snaps into place.
5. Lower the wiper blade onto the glass and snap the pivot cover back into place.

CHECK VALVE, WASHER

DESCRIPTION

DESCRIPTION

Diaphragm-type washer system check valves are standard equipment in this vehicle. The check valves for both the front and rear washer systems are integral to their respective washer nozzles. The check valve for the headlamp washer system, which is optional equipment only on vehicles manufactured for certain export markets, is integral to the headlamp washer hose tee fitting. The headlamp washer tee fitting is located behind the front fascia near the left headlamp washer nozzle.

Each diaphragm-type check valve consists of a molded plastic valve body where a small diaphragm is held against the lip of an integral sump well by a small plastic piston and a coiled spring.

The front and rear check valves cannot be adjusted or repaired and, if ineffective or damaged, the washer nozzle unit must replaced. The headlamp washer system tee fitting with the integral check valve also cannot be adjusted or repaired, and is serviced only as a unit with the headlamp washer hose assembly.

OPERATION

OPERATION

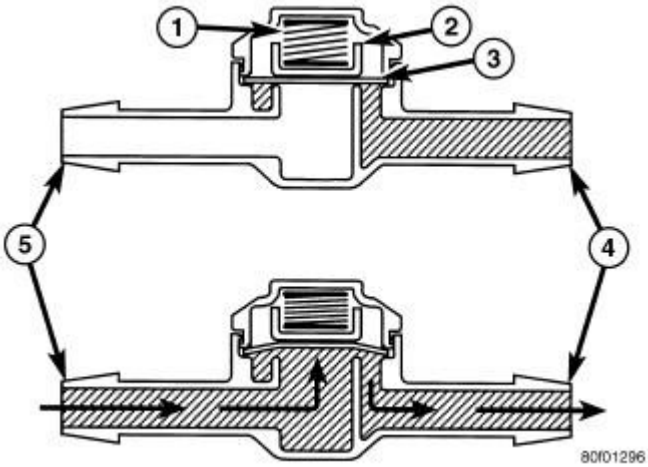


Fig. 22: Cutaway View Of Washer System Check Valve
Courtesy of CHRYSLER LLC

Diaphragm-type washer system check valves provide more than one function. First, they prevent washer fluid from draining out of the washer supply hoses back to the washer reservoir. This drain-back would result in a lengthy delay from when the washer system is activated until washer fluid was dispensed through the washer nozzles because the washer pump would have to refill the washer plumbing from the reservoir to the nozzle. Such a drain-back condition could also result in water, dirt, or other outside contaminants being drawn into the washer system through the washer nozzle orifice. This water could subsequently freeze and plug the nozzle, while other contaminants could interfere with proper nozzle operation and cause improper nozzle spray patterns. In addition, the check valve prevents washer fluid from siphoning out through the washer nozzle after the washer system is turned OFF.

When the washer pump pressurizes and pumps washer fluid from the reservoir through the washer plumbing (5), the fluid pressure unseats a diaphragm (3) from over a sump well within the valve by overriding the pressure applied to it by a piston (2) and coiled spring (1). With the diaphragm unseated, washer fluid is allowed to flow toward the washer nozzle (4). When the washer pump stops operating, the spring pressure on the piston seats the diaphragm over the sump well in the valve and fluid flow in either direction within the washer plumbing is prevented.

HOSES AND TUBES, WASHER

DESCRIPTION

FRONT

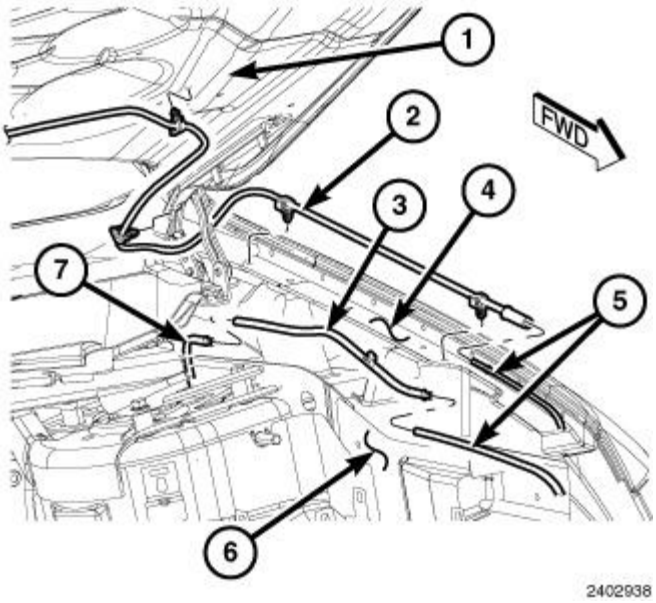


Fig. 23: Front Washer Plumbing Components
Courtesy of CHRYSLER LLC

The front washer plumbing consists of a small diameter rubber hose (2) that is routed along the left front fender ledge (4) from the washer reservoir hose (5) located at the left front corner of the engine compartment. The reservoir hose is attached to the front outlet nipple of the washer pump/motor unit near the bottom of the reservoir. The hose is then secured by plastic push-in type retainers to the left fender ledge within the engine compartment to the left side of the cowl plenum.

From the cowl plenum, the front hose is routed up toward the inner hood panel reinforcement (1). The hose is secured to the left hood hinge and the left side of the inner hood panel reinforcement by plastic push-in type retainers, then is routed through the rear hood silencer brackets across the underside of the inner hood panel. Plastic inline fittings, a molded rubber tee and a molded rubber elbow provide the take outs for the two front washer nozzles.

Washer hose is available for service as roll stock, which may be cut to length. The molded plastic or rubber washer hose fittings cannot be repaired. If these fittings are ineffective or damaged, they must be replaced.

HEADLAMP

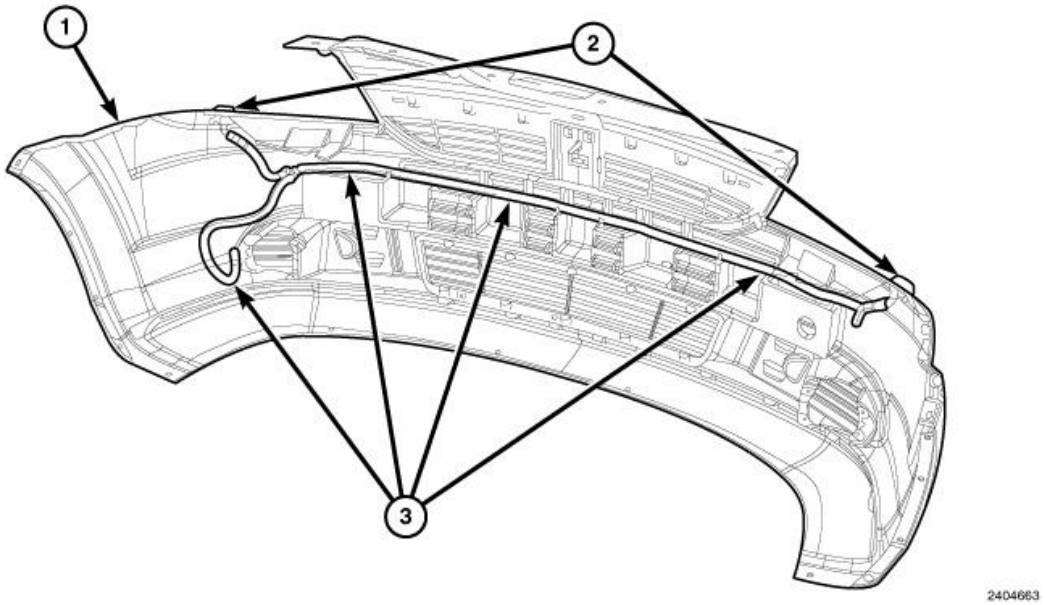


Fig. 24: Headlamp Washer System Plumbing Components
Courtesy of CHRYSLER LLC

The headlamp washer system plumbing consists of a large diameter high pressure rubber hose (3) that is routed from the outlet nipple of the headlamp washer pump/motor unit on the washer reservoir to the barbed nipple of a tee fitting with an integral check valve located near the left headlamp washer nozzle on the back side of the front fascia (1). The other two barbed nipples of the tee fitting are connected to one short and one long length of hose that each terminate at a headlamp washer nozzle (2) behind the fascia and below the two front lamp units. The hose is secured and routed from left to right behind the fascia and above the fascia reinforcement by several routing clips. The hose connections at the nozzles and the washer pump are secured using molded plastic quick-connect fittings.

The headlamp washer hose is serviced only as a complete unit. The molded plastic washer hose fittings and

check valve cannot be repaired. If these fittings or the check valve are ineffective or damaged, the entire headlamp washer hose unit must be replaced.

REAR

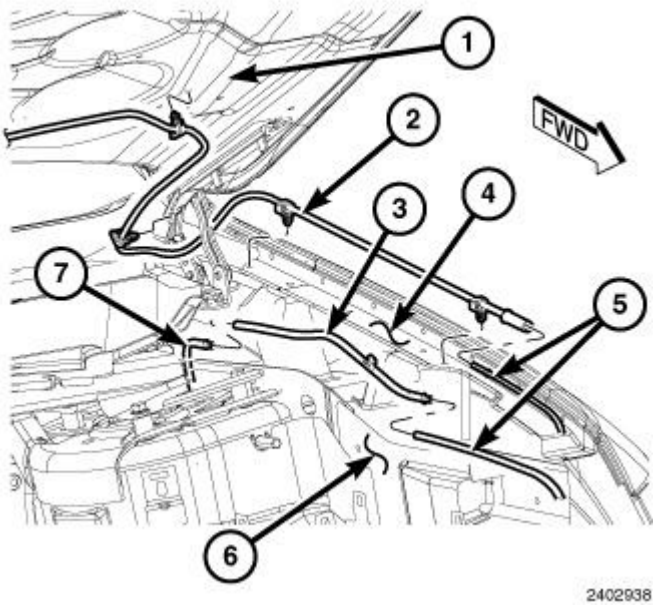


Fig. 25: Front Washer Plumbing Components
Courtesy of CHRYSLER LLC

The rear washer plumbing consists of a small diameter rubber hose (3) that is routed along the left front fender shield (6) from the washer reservoir hose (5) located at the left front corner of the engine compartment. The reservoir hose is attached to the rear outlet nipple of the washer pump/motor unit near the bottom of the reservoir. The hose is then secured by a plastic clip retainer to the front end sheet metal within the engine compartment and routed to just behind the left strut tower, where it connects to the unibody hose (7).

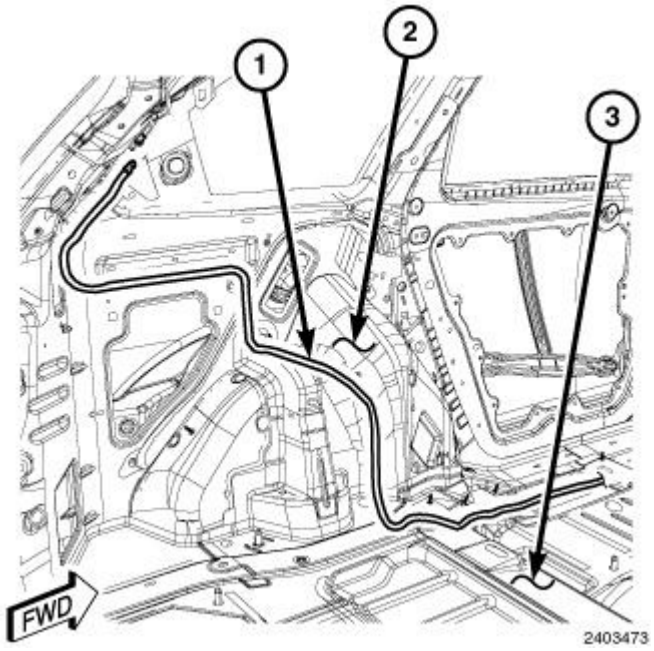


Fig. 26: Unibody Hose
Courtesy of CHRYSLER LLC

The unibody hose (1) passes from the engine compartment through a hole with a rubber grommet in the dash panel into the passenger compartment where it enters the body wire harness. The hose and wire harness bundle is routed along the floor panel (3) near the left sill back to the base of the left rear inner wheel house (2). The hose and wiring bundle is then routed over the wheel house and along the quarter inner panel near the belt line, then up the D-pillar.

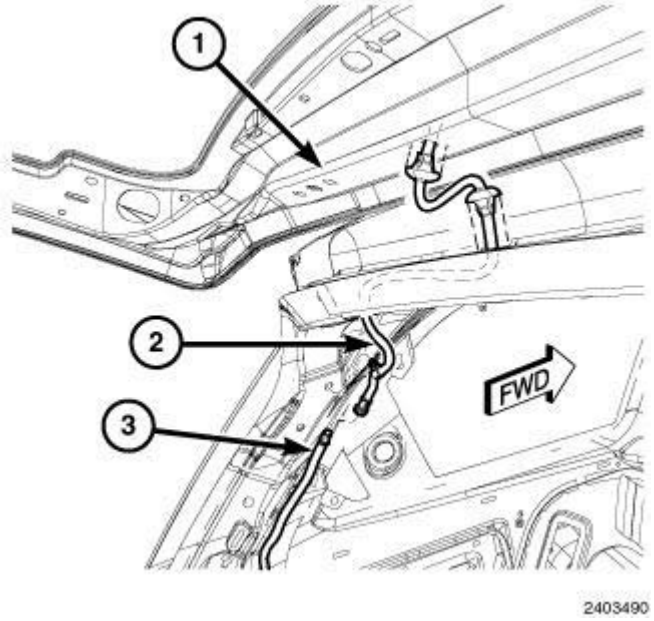


Fig. 27: Liftgate Washer Hose

Courtesy of CHRYSLER LLC

The unibody hose (3) exits the body wire harness near the top of the D-pillar, where it is connected to the liftgate washer hose (2) by a quick connect fitting. The liftgate washer hose is routed up the D-pillar to the upper liftgate opening header panel, then to the center of the upper liftgate opening. The liftgate hose is routed through a hole with a rubber grommet in the upper liftgate opening header panel and passes through another hole with a rubber grommet in the upper liftgate panel (1) to the rear washer nozzle on the upper liftgate.

Washer hose is available for service as roll stock, which may be cut to length. The unibody washer hose is integral to the body wire harness. The molded plastic washer hose fittings and routing clips cannot be repaired. If these fittings or clips are ineffective or damaged, they must be replaced.

OPERATION

FRONT

Washer fluid in the washer reservoir is pressurized and fed by the washer pump/motor unit through the front washer system plumbing and fittings to the two front washer nozzles. Whenever routing the washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts; and, sharp bends that might pinch the hose must be avoided.

HEADLAMP

Washer fluid in the washer reservoir is pressurized and fed by the headlamp washer pump/motor unit through the headlamp washer system plumbing and fittings to the two headlamp washer nozzles. Whenever routing the washer hose, it must be routed away from hot, sharp, or moving parts; and, sharp bends that might pinch the hose must be avoided.

REAR

Washer fluid in the washer reservoir is pressurized and fed by the washer pump/motor unit through the rear washer system plumbing and fittings to the rear washer nozzle. Whenever routing the washer hose or a wire harness containing a washer hose, it must be routed away from hot, sharp, or moving parts; and, sharp bends that might pinch the hose must be avoided.

LINKAGE, WIPER ARM

DESCRIPTION

DESCRIPTION

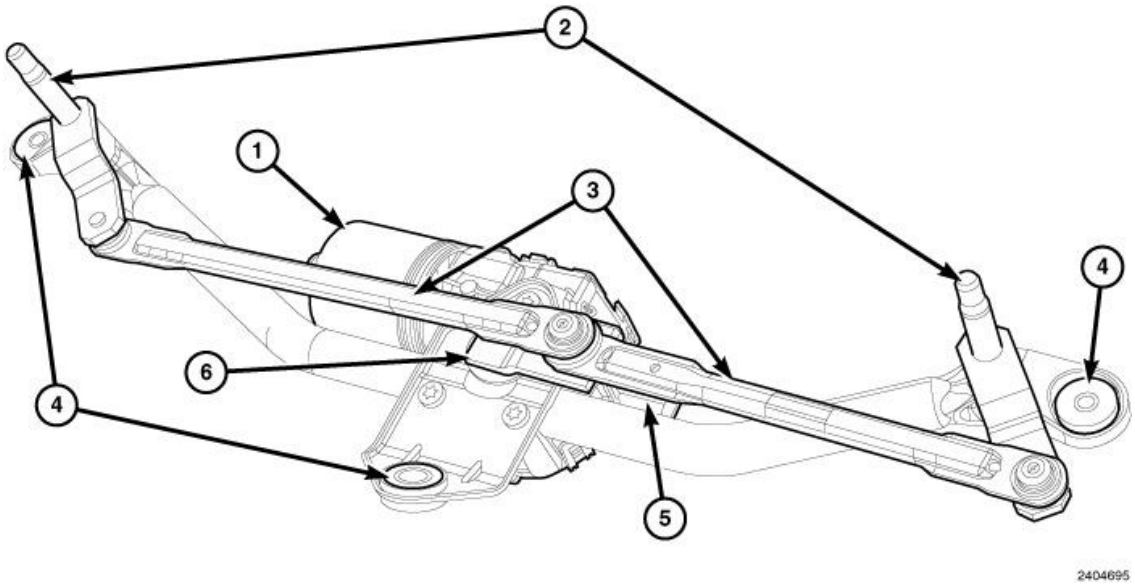


Fig. 28: Front Wiper Linkage Module
Courtesy of CHRYSLER LLC

The front wiper linkage module is secured by three screws through three rubber grommet-type insulators to two brackets and weld nuts on the cowl plenum panel and one bracket and weld nut on the driver side strut tower. The module is concealed beneath the molded plastic cowl plenum cover/grille panel between the base of the windshield and the rear edge of the hood panel. The ends of the pivot shafts that protrude through dedicated openings in the cowl plenum cover/grille panel to drive the wiper arms and blades and are the only visible components of the front wiper linkage module. The front wiper linkage module consists of the following major components:

- **Bracket** - The front wiper module bracket consists of a long tubular steel main member that has a die cast pivot bracket formation near each end where the two wiper pivots are secured. A stamped steel mounting bracket for the wiper motor is secured near the center of the main member. Each of the two wiper pivot brackets secures the module to the cowl plenum with a screw through a rubber insulator (4), and a third rubber insulator on the motor bracket secures the module with a screw in the bracket on the driver side strut tower.
- **Crank Arm** - The front wiper motor crank arm (6) is a stamped steel unit with a hole on the driven end that is secured to the wiper motor output shaft with a nut, and has a long ball stud secured to the drive end to accept the wiper linkage.
- **Linkage** - Two stamped steel drive links (3) connect the wiper motor crank arm to the wiper pivot lever arms. The right side drive link has a plastic socket-type bushing on each end. The left side drive link has a plastic socket-type bushing on one end, and a plastic sleeve-type bushing on the other end. The socket-type bushing on one end of each drive link is snap-fit over the ball stud on the lever arm of its respective pivot. The left side drive link sleeve-type bushing end is then fit over the motor crank arm ball stud, and the other socket-type bushing of the right side drive link is snap-fit over the exposed end of the wiper motor crank arm ball stud.
- **Motor** - The front wiper motor (1) features a transmission housing from which the wiper motor output shaft exits, and has three mounting bosses with internal threads to which the motor is mounted to the

center wiper linkage module bracket with screws. is secured with three screws near the center of the main tubular member of the wiper module bracket. A nut secures the wiper motor crank arm to the motor output shaft. The two-speed permanent magnet wiper motor features an integral transmission, an internal park switch, and an internal automatic resetting circuit breaker. A short pigtail wire and connector (5) connect the wiper motor to the vehicle electrical system through a dedicated take out and connector of the headlamp and dash wire harness.

- **Pivots -** The two front wiper pivots (2) are secured within the die cast pivot brackets on the outboard ends of the wiper linkage module main member. The lever arms that extend from the center of the pivot shafts each have a ball stud on their end. The upper end of each pivot shaft where the wiper arms will be fastened each has a finely splined and tapered driver with a threaded stud extending from the top. The lower ends of the pivot shafts are installed through permanently lubricated bushings in the pivot brackets.

The front wiper linkage module cannot be adjusted or repaired. The wiper motor is available for separate service replacement. If any other component of the linkage module is ineffective or damaged, the entire wiper linkage module unit must be replaced.

OPERATION

OPERATION

The front wiper linkage module operation is controlled by the battery current inputs received by the wiper motor from the Totally Integrated Power Module (TIPM). The wiper motor speed is controlled by current flow to either the low speed or the high speed set of brushes.

The park switch is a single pole, single throw, momentary switch within the wiper motor that is mechanically actuated by the wiper motor transmission components. The park switch alternately opens and closes the wiper park switch sense circuit to ground, depending upon the position of the wipers on the glass. This feature allows the motor to complete its current wipe cycle after the wiper system has been turned OFF, and to park the wiper blades in the lowest portion of the wipe pattern. The automatic resetting circuit breaker protects the motor from overloads.

The wiper motor crank arm, the two wiper linkage members, and the two driven wiper pivots mechanically convert the rotary output of the wiper motor to the back and forth wiping motion of the wiper arms and blades on the glass.

The hard wired inputs and outputs of the wiper motor may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the wiper system. The most reliable, efficient, and accurate means to diagnose the wiper system or the electronic controls and communication related to wiper motor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

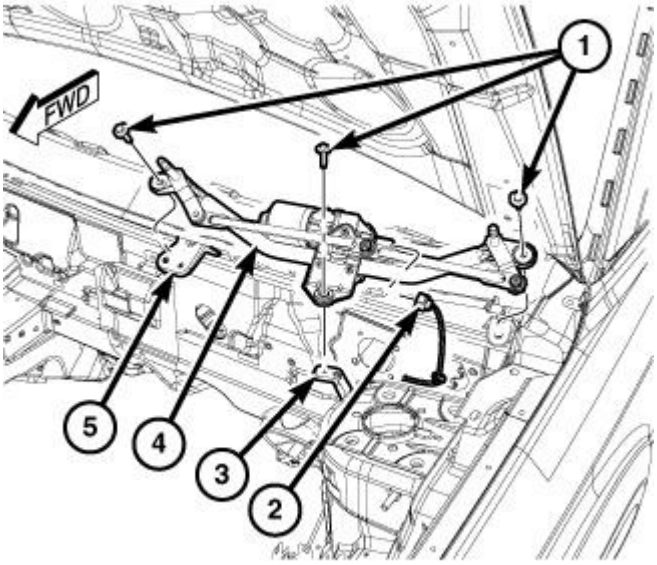


Fig. 29: Front Wiper Linkage Module Wiper Motor
Courtesy of CHRYSLER LLC

NOTE: **The front wiper linkage module includes the wiper motor. The wiper motor is also available for separate service replacement and can be removed from the wiper linkage module without removing the module from the vehicle. See Electrical - Wipers/Washers/Wipers/Washers/MOTOR, Wiper - Removal.**

1. Remove both front wiper arms from the wiper pivots. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**.
2. Disconnect and isolate the battery negative cable.
3. Remove the outer and inner cowl plenum cover/grille panels from the vehicle. Refer to **Body/Exterior/COVER, Cowl Panel - Removal** .
4. Disconnect the headlamp and dash wire harness connector (2) from the wiper motor pigtail wire connector.
5. Remove the three screws (1) that secure the front wiper linkage module (4) to the driver side strut tower bracket (3) and the two cowl brackets (5).
6. Remove the front wiper linkage module from the vehicle as a unit.

INSTALLATION

INSTALLATION

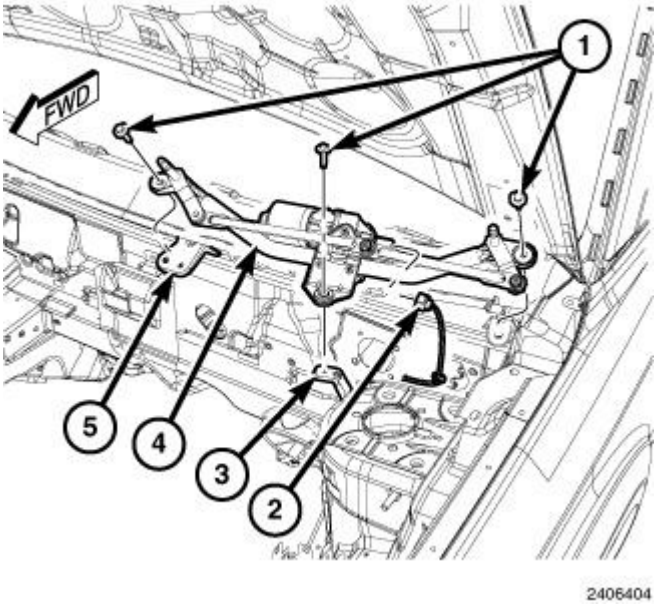


Fig. 30: Front Wiper Linkage Module Wiper Motor
Courtesy of CHRYSLER LLC

NOTE: The front wiper linkage module includes the wiper motor. The wiper motor is also available for separate service replacement and can be removed from the wiper linkage module without removing the module from the vehicle. See Electrical - Wipers/Washers/Wipers/Washers/MOTOR, Wiper - Removal.

1. Position the front wiper linkage module (4) into the vehicle as a unit.
2. Reconnect the headlamp and dash wire harness connector (2) to the wiper motor pigtail wire connector. Be certain to route the wire harness take out under the wiper linkage module.
3. Install but do not tighten the three screws (1) that secure the front wiper linkage module to the driver side strut tower bracket (3) and the two cowl brackets (5).
4. Starting on the driver side and working toward the passenger side, tighten each of the three screws. Tighten the screws to 10 N.m (90 in. lbs.).
5. Reinstall the inner and outer cowl plenum cover/grille panels. Refer to **Body/Exterior/COVER, Cowl Panel - Installation** .
6. Reconnect the battery negative cable.
7. Reinstall both front wiper arms onto the wiper pivots. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**.

MOTOR, WIPER

DESCRIPTION

REAR

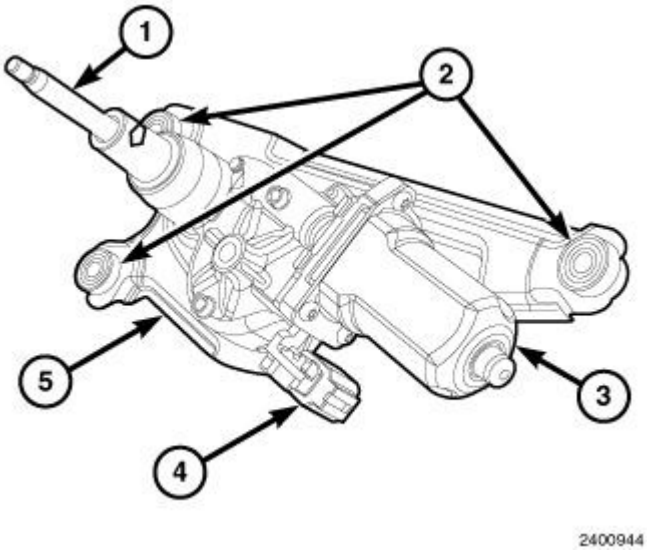


Fig. 31: Rear Wiper Motor
Courtesy of CHRYSLER LLC

The rear wiper motor is concealed within the liftgate, below the liftgate glass and behind the liftgate inner trim panel. The end of the motor output shaft (1) that extends through the liftgate outer panel to drive the rear wiper arm and blade is the only visible component of the rear wiper motor. A rubber bezel and grommet is engaged within the output shaft hole of the liftgate outer panel and seals the output shaft where it passes through the panel. An integral connector receptacle (4) connects the rear wiper motor to the vehicle electrical system through a dedicated take out and connector of the liftgate wire harness. The rear wiper motor consists of the following major components:

- **Bracket (5)** - The rear wiper motor bracket consists of a stamped metal mounting plate for the wiper motor that is secured with screws to the wiper motor transmission housing, and through three rubber isolators (2) to the liftgate inner panel.
- **Motor (3)** - The single-speed permanent magnet rear wiper motor is secured with screws to the rear wiper motor transmission, which is secured to the motor bracket with screws. The wiper motor includes the integral transmission, the motor output shaft, an automatic resetting circuit breaker, and the rear wiper motor park switch that parks the rear wiper blade near the base of the liftgate glass.

The rear wiper motor cannot be adjusted or repaired. If any component of the motor is ineffective or damaged, the entire rear wiper motor unit must be replaced. The output shaft bezel and grommet unit is available for individual service replacement.

OPERATION

REAR

The rear wiper motor operation is controlled by the Totally Integrated Power Module (TIPM), which uses intelligent, high current, self-protected high side switches to control rear wiper system operation for energizing or de-energizing the rear wiper motor. The TIPM uses internal programming and electronic messages received over the Controller Area Network (CAN) data bus from the ElectroMechanical Instrument Cluster (EMIC) (also

known as the Cab Compartment Node/CCN) to provide the appropriate rear wiper and washer system operating modes. The EMIC uses electronic messages received from the Steering Control Module (SCM) over a Local Interconnect Network (LIN) data bus to determine when to send electronic rear wiper system requests to the TIPM.

The rear wiper motor park switch is a single pole, single throw, momentary switch within the wiper motor that is mechanically actuated by the wiper motor transmission components. The park switch alternately closes and opens a path to ground for the rear wiper motor electronic control logic circuitry of the TIPM, depending upon the position of the rear wiper blade on the liftgate glass. This input allows the electronic logic circuits of the TIPM to control all of the electronic features of rear wiper motor operation and to keep the motor energized long enough to complete its current wipe cycle and park the wiper blade after the wiper system or the ignition switch has been turned OFF.

The rear wiper motor is grounded at all times through a take out in the body wire harness that is secured to a remote ground location. The automatic resetting circuit breaker protects the motor from overloads. The rear wiper motor transmission converts the rotary output of the wiper motor to the back and forth wiping motion of the rear wiper arm and blade on the liftgate glass.

The hard wired inputs and outputs of the rear wiper motor may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or communication between other modules and devices that provide some features of the rear wiper and washer system. The most reliable, efficient, and accurate means to diagnose the rear wiper system or the electronic controls and communication related to rear wiper motor operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

FRONT

CAUTION: Do not apply pressure to, or pry on, the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm, apply pressure to, or pry on, only the metal portions of the drive link around the bushing. If the bushing is damaged, the entire front wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire front wiper motor and crank arm unit MUST be replaced.

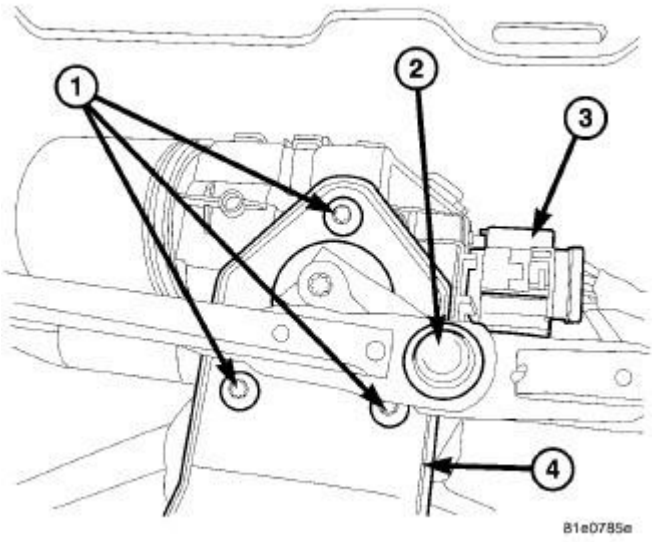


Fig. 32: Wiper Pivots
Courtesy of CHRYSLER LLC

1. Unlatch and open the hood.
2. Remove both front wiper arms from the wiper pivots. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**.
3. Disconnect and isolate the battery negative cable.
4. Remove the outer and inner cowl plenum cover/grille panels from the vehicle. Refer to **Body/Exterior/COVER, Cowl Panel - Removal** .
5. Disconnect the headlamp and dash wire harness connector from the wiper motor pigtail wire connector (3).
6. Disengage the socket bushing (2) of the right wiper drive link from the ball stud on the wiper motor crank arm using two large screwdrivers, one on each side of the ball stud. Pry between the crank arm and the metal portion of the drive link until the socket unsnaps from the ball.
7. Disengage the sleeve bushing of the left wiper drive link from the ball stud on the wiper motor crank arm using two large screwdrivers, one on each side of the ball stud. Pry between the crank arm and the metal portion of the drive link until the sleeve unsnaps from the ball.
8. Remove the three screws (1) that secure the wiper motor to the center bracket (4) of the wiper linkage module.
9. Remove the wiper motor from under the wiper linkage module bracket and out of the cowl plenum.

REAR

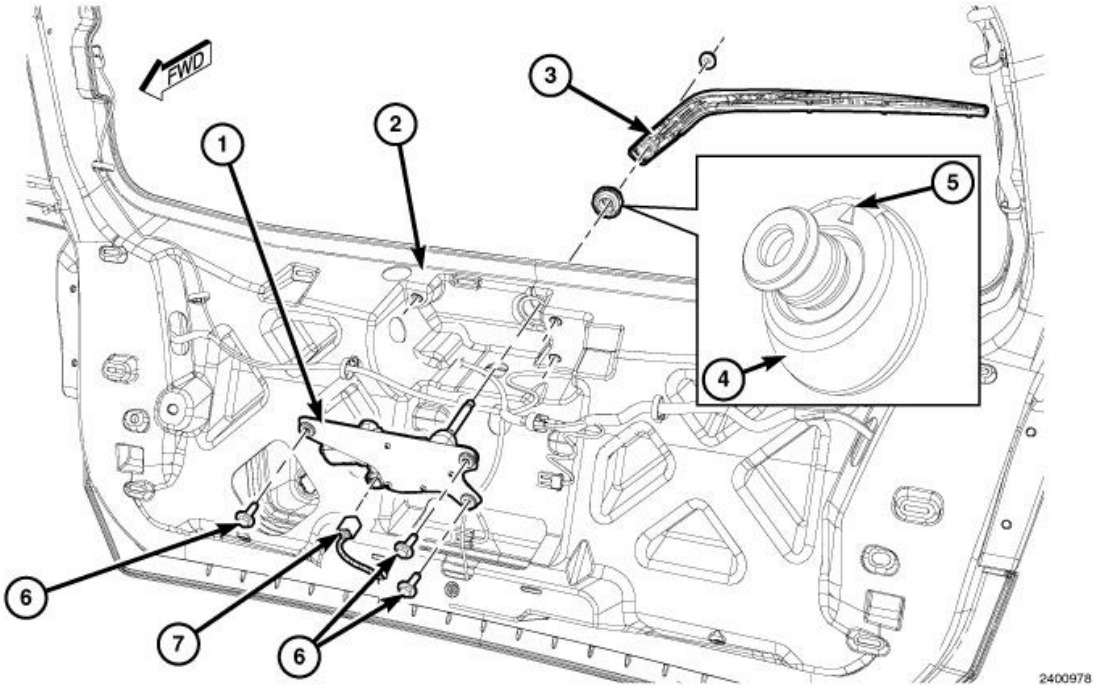


Fig. 33: Rear Wiper Motor Output Shaft
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the rear wiper arm (3) from the rear wiper motor output shaft. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Removal**.

NOTE: The output shaft bezel and grommet (4) does not have to be removed to remove the rear wiper motor from the liftgate.

3. Remove the trim panel from the liftgate inner panel (2). Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Removal** .
4. Disconnect the wire harness connector (7) from the rear wiper motor (1).
5. Remove the three screws (6) that secure the motor mounting bracket to the liftgate inner panel.
6. Remove the motor from the liftgate.
7. Remove the bezel and rubber grommet on the outer liftgate panel from the output shaft clearance hole. **Be certain to take proper precautions to protect the outer liftgate panel and its paint finish from damage during this procedure.**

INSTALLATION

FRONT

CAUTION: Do not apply pressure to, or pry on, the plastic drive link bushings. When removing a drive link from, or installing a drive link onto the ball stud on the wiper motor crank arm, apply pressure to, or pry on, only the metal

portions of the drive link around the bushing. If the bushing is damaged, the entire front wiper linkage module MUST be replaced.

CAUTION: Do not remove the crank arm nut from the wiper motor output shaft. The crank arm is indexed to the output shaft with the motor in the park position during the manufacturing process, but there are no provisions made for correctly indexing this connection in the field. If the crank arm to output shaft indexing is incorrect, the entire front wiper motor and crank arm unit MUST be replaced.

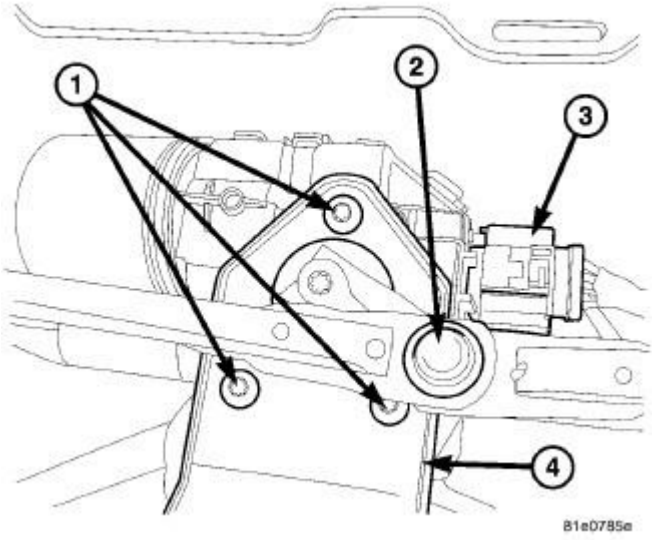


Fig. 34: Wiper Pivots
Courtesy of CHRYSLER LLC

1. Position the front wiper motor to the center bracket (4) of the wiper linkage module from the underside of the bracket.
2. Install and tighten the three screws (1) that secure the motor to the bracket. Tighten the screws to 9 N.m (80 in. lbs.).
3. Reconnect the headlamp and dash wire harness connector to the wiper motor pigtail wire connector (3). Be certain to route the wire harness take out under the wiper linkage module.
4. Reconnect the battery negative cable.
5. Turn the ignition switch (also known as the Wireless Ignition Node/WIN) to the ON position.

WARNING: To avoid serious or fatal injury and vehicle damage, be certain there are no objects including hands or fingers in the rotational path of the wiper motor crank arm. The following step will activate the front wiper motor to ensure it is in the Park position, and may cause the motor crank arm to complete up to one complete revolution.

6. Turn the front wiper system ON, then back to OFF using the right (wiper) multi-function switch control knob.
7. Wait until the wiper motor stops moving, then turn the ignition switch back to the OFF position.
8. Position the sleeve bushing of the left wiper drive link onto the ball stud on the end of the motor crank arm. Place a short 19 millimeter or 3/4 inch socket over the bushing as an installation tool. Then use large channel-lock pliers to apply enough pressure to the underside of the crank arm and the top of the socket to snap the bushing onto the ball stud. **Do not apply pressure directly to the plastic bushing.**

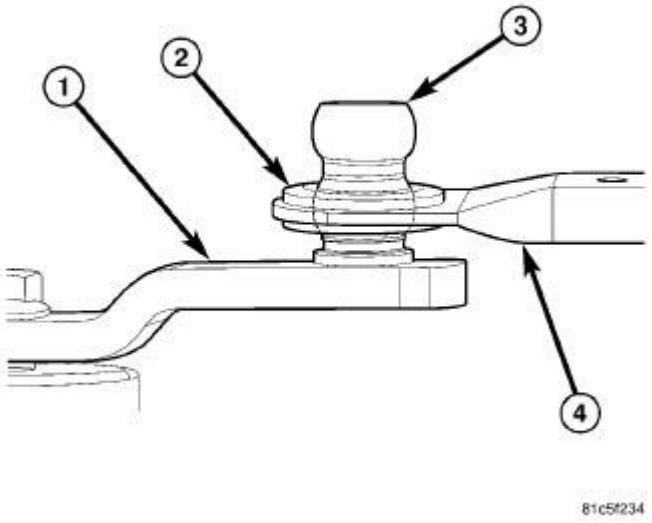


Fig. 35: Motor Crank Arm Ball Stud
Courtesy of CHRYSLER LLC

CAUTION: Carefully inspect the installed sleeve bushing (2) to be certain it is centered over the lower ball of the ball stud (3), and not trapped between the lower ball and the crank arm (1). There should be a visible clearance between the lower surface of the sleeve bushing and the crank arm. Refer to the accompanying illustration. The sleeve bushing must be able to swivel freely on the lower ball during wiper operation. If the bushing is trapped between the lower ball and the crank arm, the bushing and the drive link (4) may be damaged.

9. Position the socket bushing of the right wiper drive link over the ball stud on the crank arm. Place a short 19 millimeter or 3/4 inch socket over the bushing as an installation tool. Then use large channel-lock pliers to apply enough pressure to the underside of the crank arm and the top of the socket to snap the bushing onto the ball stud. **Do not apply pressure directly to the plastic bushing.**
10. Reinstall the inner and outer cowl plenum cover/grille panels. Refer to **Body/Exterior/COVER, Cowl Panel - Installation** .
11. Reinstall both front wiper arms onto the wiper pivots. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**.

REAR

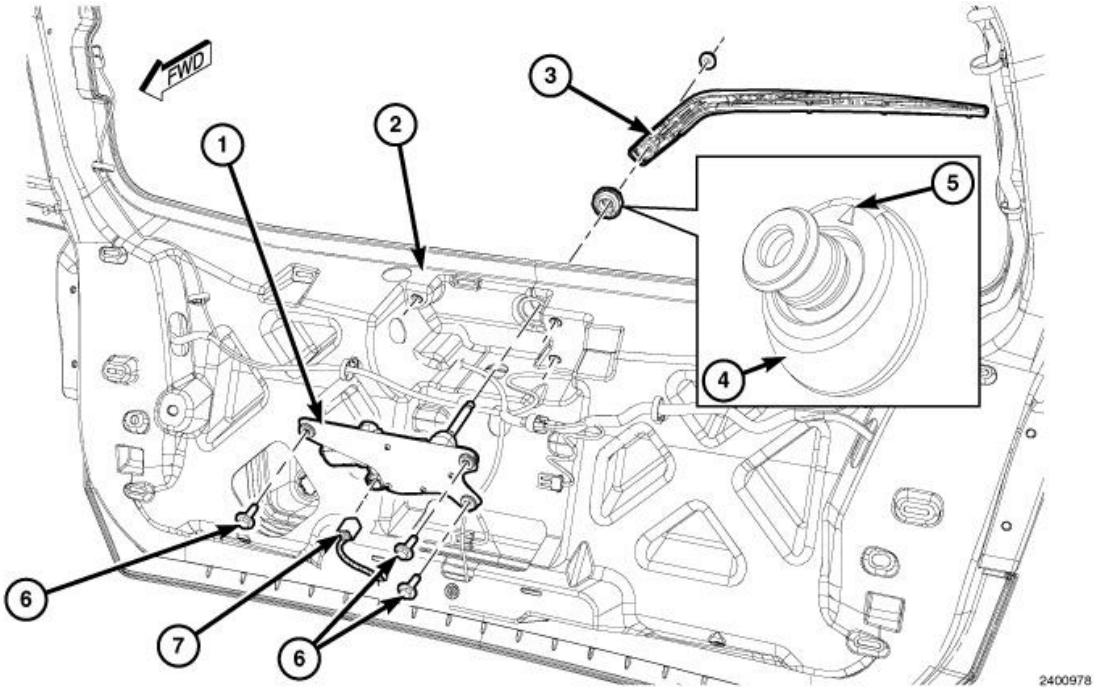


Fig. 36: Rear Wiper Motor Output Shaft
Courtesy of CHRYSLER LLC

1. If the output shaft bezel and grommet (4) were removed from the outside of the liftgate, install the rubber bezel and grommet into the clearance hole of the liftgate outer panel. Be certain the arrow (5) molded onto the grommet is oriented upward.
2. Position the rear wiper motor and bracket unit (1) onto the liftgate inner panel (2) as a unit.
3. Install and tighten the three screws (6) that secure the mounting bracket to the liftgate. Tighten the screws to 5 N.m (44 in. lbs.).
4. Reconnect the wire harness connector (7) to the motor connector receptacle.
5. Reinstall the trim panel onto the liftgate inner panel. Refer to **Body/Decklid/Hatch/Liftgate/Tailgate/PANEL, Trim - Installation** .
6. Reinstall the rear wiper arm (3) onto the output shaft. See **Electrical - Wipers/Washers/Wipers/Washers/ARM, Wiper - Installation**.
7. Reconnect the battery negative cable.

NOZZLE, WASHER

DESCRIPTION

FRONT

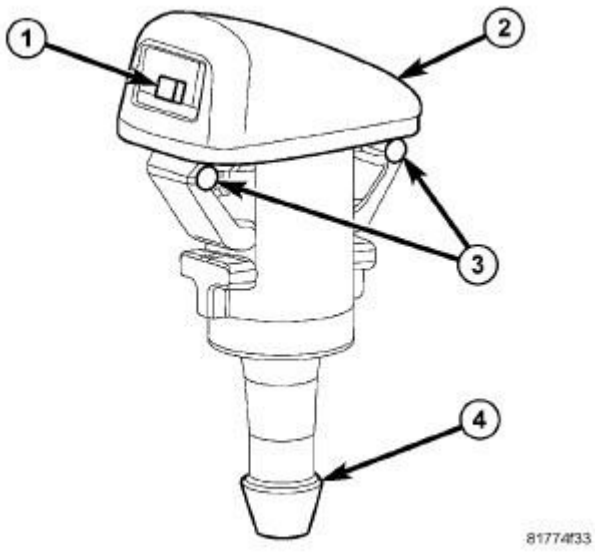


Fig. 37: Front Washer Nozzle
Courtesy of CHRYSLER LLC

The fluidic front washer nozzles (2) are constructed of molded plastic and include an integral check valve. Each nozzle has two integral latches (3) that secure them in dedicated holes in the hood panel near the base of the windshield. The domed upper surface of the washer nozzle is visible on the outside of the hood panel, and the two nozzle orifices (1) are oriented towards the windshield glass.

An integral diaphragm type check valve is contained within the body of each nozzle. The washer plumbing fittings (4) for the washer nozzles extend below the hood panel and are accessible from the engine compartment.

The front washer nozzles cannot be adjusted or repaired and, if ineffective or damaged, they must be replaced.

HEADLAMP

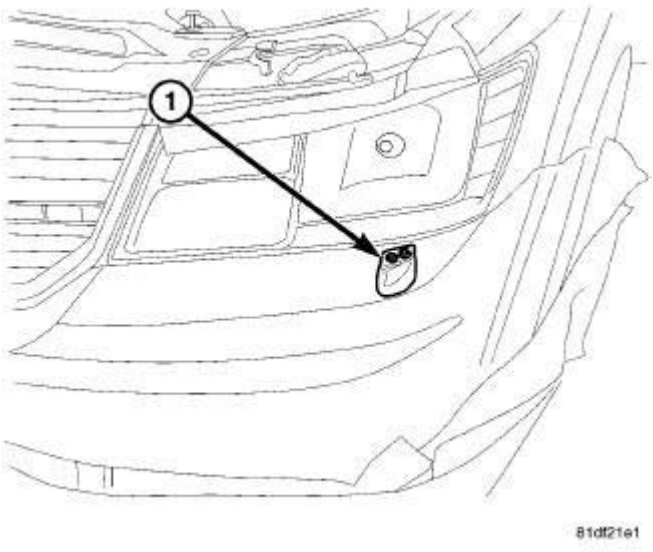


Fig. 38: Headlamp Washer Nozzles
Courtesy of CHRYSLER LLC

Vehicles equipped with the optional headlamp washer system have two fixed headlamp washer nozzles (1), one secured to the front fascia beneath each front lamp unit.

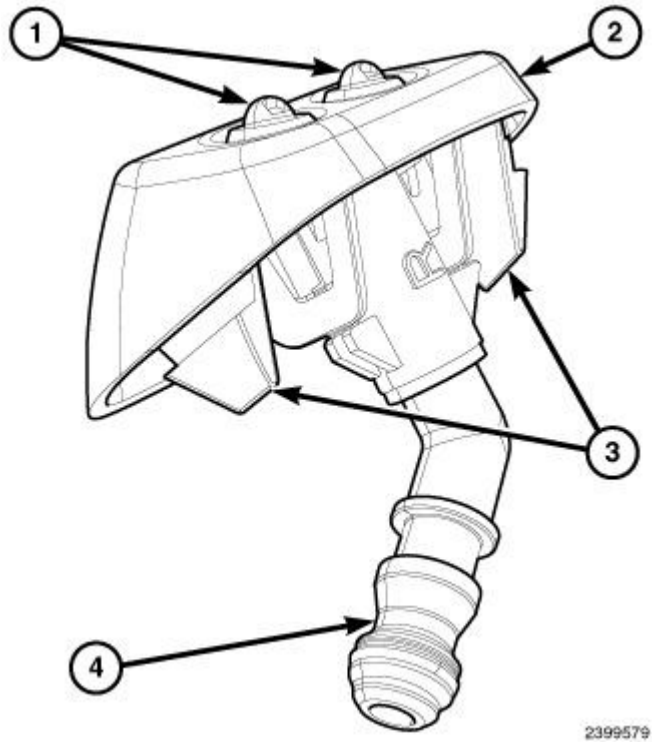


Fig. 39: Integral Mounting Bezel Is Secured By Two Integral Latch
Courtesy of CHRYSLER LLC

Each nozzle includes two orifices (1) to ensure complete headlamp lens coverage by the fluid streams emitted from the nozzle. The fixed body of the molded plastic nozzle is located below the front fascia. An integral mounting bezel (2) is secured by two integral latch features (3) within the mounting hole in the front fascia. A large diameter high pressure washer fluid supply hose from the dedicated headlamp washer pump/motor unit is routed to the nozzle, where it is secured by a quick connect fitting to the nipple fitting (4) at the base of the nozzle.

The headlamp washer nozzle cannot be adjusted or repaired and, if ineffective or damaged, the entire nozzle and mounting bezel must be replaced with a new unit.

REAR

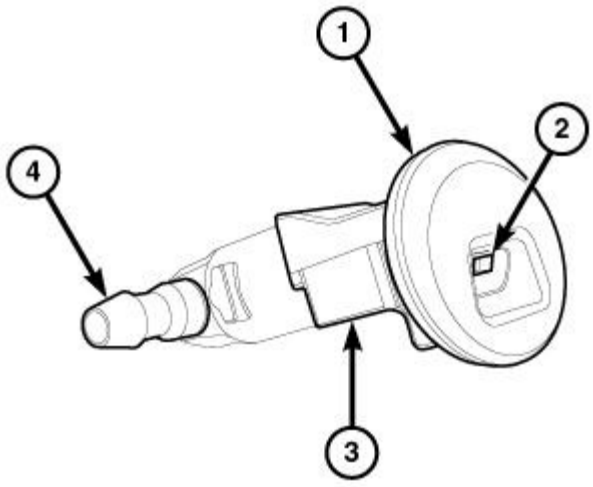


Fig. 40: Center High-Mounted Stop Lamp
Courtesy of CHRYSLER LLC

The fluidic rear washer nozzle is constructed of molded plastic and includes an integral check valve. The rear washer nozzle is secured by two integral latch features (3) within a mounting hole to the left of the Center High-Mounted Stop Lamp (CHMSL) in the lower surface of the brow above the liftgate glass opening in the outer liftgate panel.

The outer surface of the washer nozzle is visible on the lower exterior surface of the liftgate, and a rubber gasket (1) seals the nozzle to the spoiler mounting hole. The nozzle orifice (2) is oriented downward towards the liftgate glass. The washer plumbing fitting (4) is concealed between the liftgate inner and outer panels.

The rear washer nozzle cannot be adjusted or repaired and, if ineffective or damaged, it must be replaced.

OPERATION

FRONT

The two front washer nozzles are designed to dispense washer fluid into the wiper pattern area on the outside of the windshield glass. Pressurized washer fluid is fed to each nozzle from the washer reservoir by the washer

pump/motor unit through a single hose, which is attached to a barbed nipple on each washer nozzle below the inner hood panel. A fluidic matrix within the washer nozzle causes the pressurized washer fluid to be emitted from the nozzle orifice as an oscillating stream to more effectively cover a larger area of the glass to be cleaned.

The integral check valve in each nozzle prevents washer fluid from draining out of the washer supply hoses back to the washer reservoir. This drain-back would result in a lengthy delay after the washer switch is actuated until washer fluid was dispensed through the nozzles, because the washer pump would have to refill the washer plumbing from the reservoir to the nozzles. Such a drain-back condition could also result in water, dirt, or other outside contaminants being siphoned into the washer system through the washer nozzle orifice. This water could subsequently freeze and plug the nozzle, while other contaminants could interfere with proper nozzle operation and cause improper nozzle spray patterns. In addition, the check valve prevents washer fluid from siphoning through the washer nozzles after the washer system is turned OFF.

When the washer pump pressurizes and pumps washer fluid from the reservoir through the washer plumbing, the fluid pressure unseats a diaphragm from over a sump well within the nozzle by overriding the spring pressure applied to it by a piston. With the diaphragm unseated, washer fluid is allowed to flow toward the nozzle orifice. When the washer pump stops operating, the spring pressure on the piston seats the diaphragm over the sump well in the nozzle and fluid flow in either direction within the washer plumbing is prevented.

HEADLAMP

When the headlamp washer pump/motor unit is activated, pressure builds within the high pressure hoses to each headlamp washer nozzle. Driven by this pressure, a control valve integral to each nozzle allows a precisely metered quantity of washer fluid to be sprayed in several high pressure streams against the lenses of both front lamp units. When the pressure drops, the control valve closes and the nozzle spray ceases.

The headlamp washer system only operates when the engine is running and the headlamps are turned ON. When those conditions have been met, the headlamp washer system operates whenever the front (windshield) washer system is activated.

REAR

The rear washer nozzle is designed to dispense washer fluid into the wiper pattern area on the outside of the liftgate glass. Pressurized washer fluid is fed to the nozzle from the washer reservoir by the washer pump/motor through a single hose, which is attached to a barbed nipple on the back of the nozzle. A fluidic matrix within the nozzle causes the pressurized washer fluid to be emitted from the nozzle orifice as an oscillating stream to more effectively cover a larger area of the glass to be cleaned.

The integral check valve in the nozzle prevents washer fluid from draining out of the washer supply hose back to the washer reservoir. This drain-back would result in a lengthy delay after the washer switch is actuated until washer fluid was dispensed through the nozzle because the washer pump would have to refill the washer plumbing from the reservoir to the nozzle. Such a drain-back condition could also result in water, dirt, or other outside contaminants being siphoned into the washer system through the washer nozzle orifice. This water could subsequently freeze and plug the nozzle, while other contaminants could interfere with proper nozzle operation and cause improper nozzle spray patterns. In addition, the check valve prevents washer fluid from siphoning through the washer nozzle after the washer system is turned OFF.

When the washer pump pressurizes and pumps washer fluid from the reservoir through the washer plumbing

the fluid pressure unseats a diaphragm from over a sump well within the nozzle by overriding the spring pressure applied to it by a piston. With the diaphragm unseated, washer fluid is allowed to flow toward the nozzle orifice. When the washer pump stops operating, the spring pressure on the piston seats the diaphragm over the sump well in the nozzle and fluid flow in either direction within the washer plumbing is prevented.

REMOVAL

FRONT

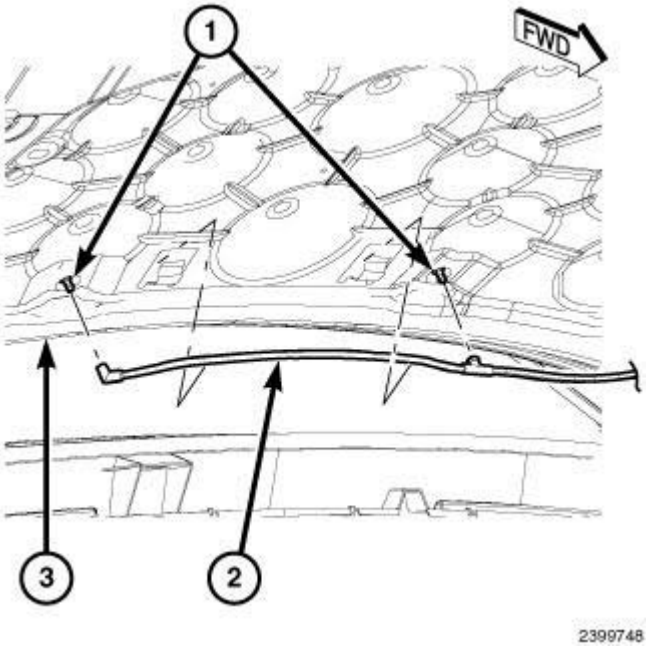


Fig. 41: Washer Nozzle Hose
Courtesy of CHRYSLER LLC

1. From the underside of the hood (3), remove the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood reinforcement as necessary to access the washer nozzle hose (2) connections.
2. From the underside of the hood, disconnect the washer nozzle hose from the barbed nipple (1) of the washer nozzle.

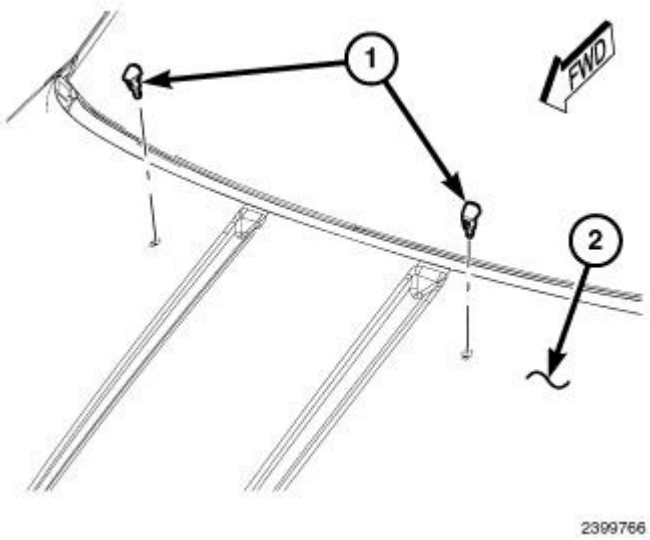


Fig. 42: Washer Nozzle
Courtesy of CHRYSLER LLC

3. From the underside of the hood, release the integral latch features of the washer nozzle (1) and push the nozzle out through the mounting hole toward the top side of the hood.
4. Remove the washer nozzle from the top of the hood panel.

HEADLAMP

CAUTION: Take proper precautions to ensure there is no cosmetic damage done to the paint finish of the headlamp washer nozzle bezel or the front fascia during the following procedure.

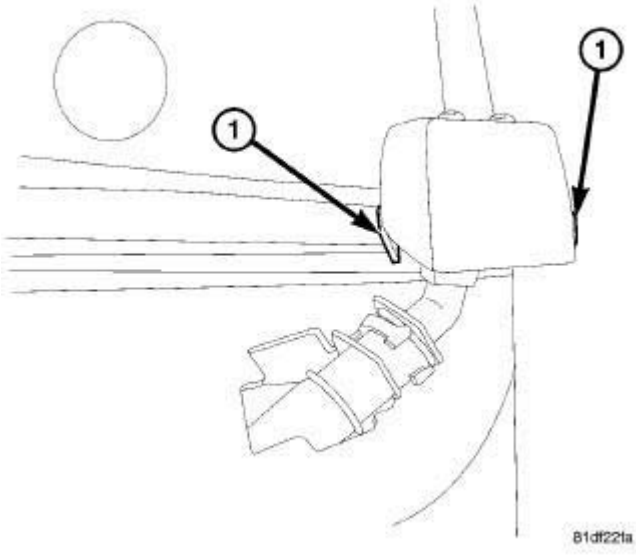


Fig. 43: Integral Latches Of Washer Nozzle Bezel

Courtesy of CHRYSLER LLC

1. Raise and support the vehicle.
2. Remove the push pin retainers that secure the lower front edge of the front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal** .
3. Reach up behind the front fascia to access and securely clamp the headlamp washer supply hose to prevent the contents of the washer reservoir from draining during the following procedure.
4. From behind the front fascia, depress the two integral latches (1) of the washer nozzle bezel and push the nozzle out through the face of the fascia.

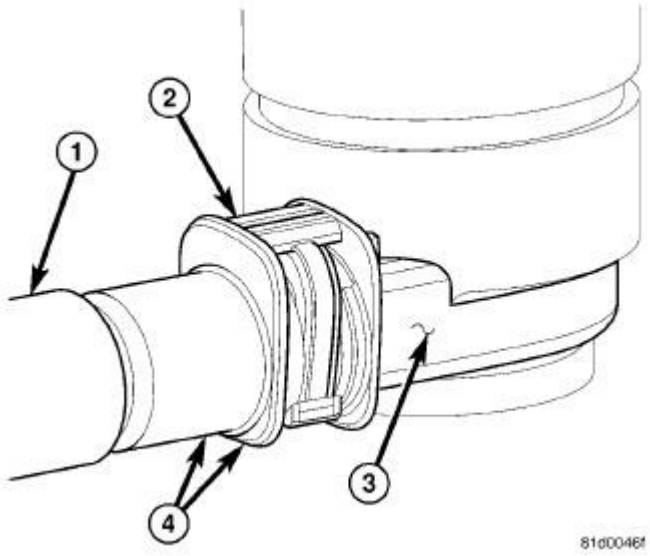


Fig. 44: Removing/Installing Hose At Headlamp Washer Nozzle Nipple
Courtesy of CHRYSLER LLC

5. From the face of the front fascia, pull the nozzle out from the mounting hole far enough to access the headlamp washer nozzle supply hose (1) quick connect fitting (4).
6. Pull the molded plastic lock (2) away from the quick connect fitting far enough to disengage the hose from the washer nozzle nipple (3).
7. Remove the nozzle from the front fascia.

REAR

NOTE: The rear washer nozzle latch feature is a one time component, and will be damaged if the nozzle is removed from its mounting hole for service. If removed from its mounting hole for any reason, the rear washer nozzle must be replaced with a new unit.

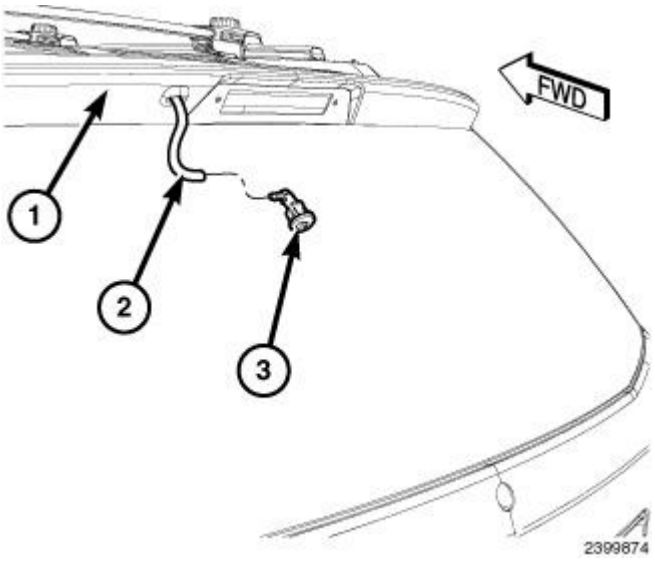


Fig. 45: Rear Washer Nozzle
Courtesy of CHRYSLER LLC

1. Using a trim stick or another suitable wide flat-bladed tool, gently pry the rear washer nozzle (3) to release the latch features that secure it in the mounting hole of the liftgate outer panel (1).
2. Pull the rear washer nozzle out from the liftgate outer panel far enough to access the washer supply hose (2).
3. Disconnect the hose from the barbed nipple on the back of the nozzle.
4. Cut 4 to 6 millimeters (0.15 to 0.23 inch) from the end of the hose to ensure a good fit to the barbed nipple of the replacement rear washer nozzle.
5. Discard the removed nozzle.

INSTALLATION

FRONT

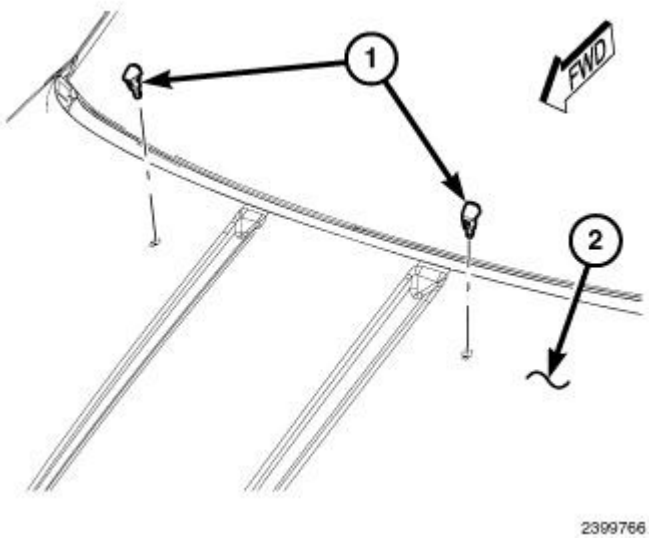


Fig. 46: Washer Nozzle
Courtesy of CHRYSLER LLC

1. From the top of the hood, position the washer nozzle (1) to the mounting hole on the outside of the hood panel (2).
2. Align the anti-rotation tabs of the nozzle with the anti-rotation notches in the mounting hole.
3. Using hand pressure, push firmly and evenly on the top of the washer nozzle until the integral latch features lock into place on the underside of the hood.

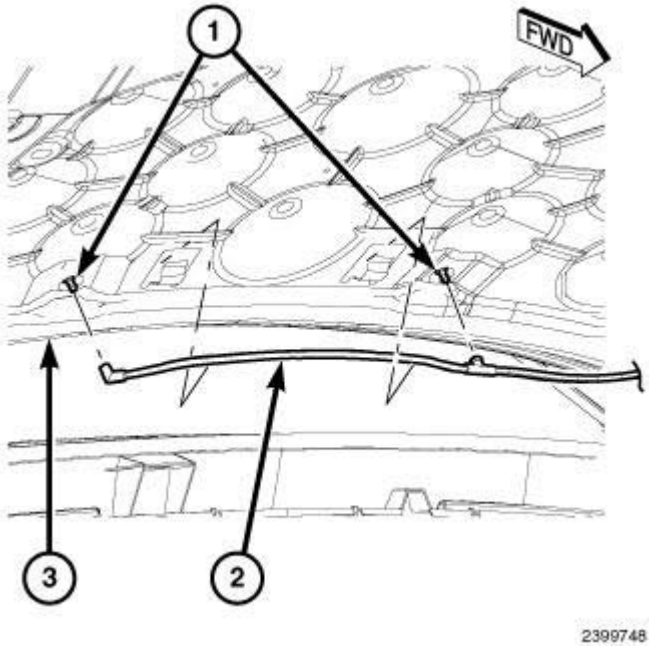


Fig. 47: Washer Nozzle Hose
Courtesy of CHRYSLER LLC

4. From the underside of the hood (3), reconnect the washer hose (2) fitting to the barbed nipple (1) of the

washer nozzle.

5. Reinstall the washer nozzle hose into its routing clips as necessary on the underside of the hood.
6. Reinstall the push-in retainers that secure the rear edge of the hood silencer pad to the inner hood reinforcement.

HEADLAMP

CAUTION: Take proper precautions to ensure there is no cosmetic damage done to the paint finish of the headlamp washer nozzle bezel or the front fascia during the following procedure.

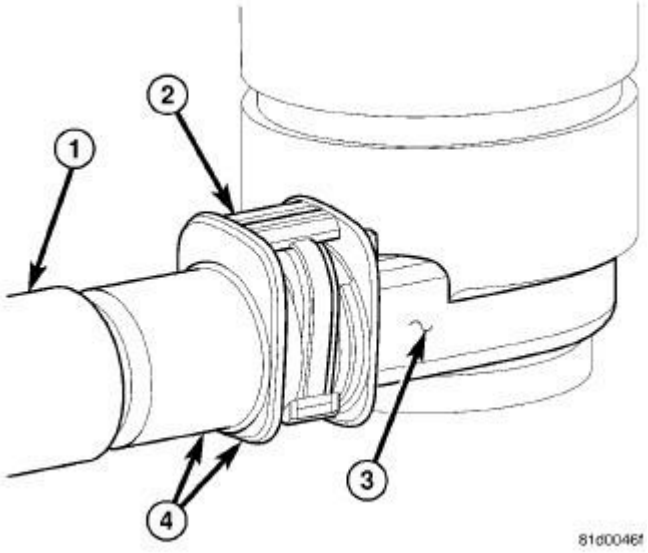


Fig. 48: Removing/Installing Hose At Headlamp Washer Nozzle Nipple
Courtesy of CHRYSLER LLC

1. Pull the washer nozzle supply hose (1) quick connect fitting (4) out through the mounting hole of the front fascia far enough to seat the molded plastic lock (2) onto the fitting.
2. Push the quick connect fitting onto the headlamp washer nozzle nipple (3) until it snaps into place with an audible click.

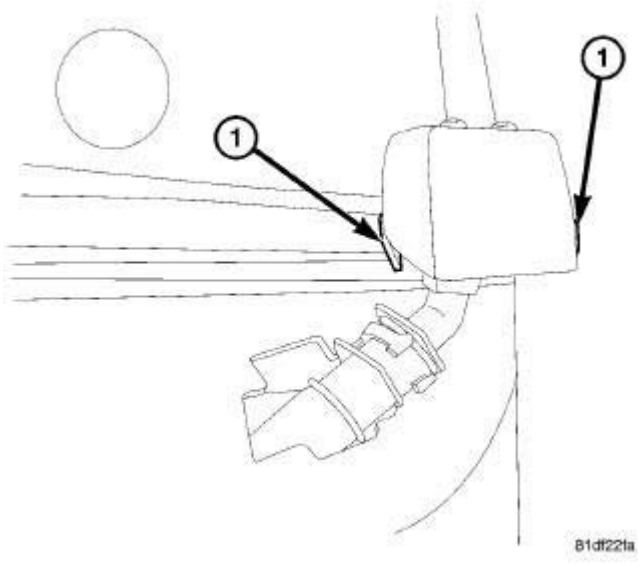


Fig. 49: Integral Latches Of Washer Nozzle Bezel
Courtesy of CHRYSLER LLC

3. Position the headlamp washer nozzle into the mounting hole in the front fascia.
4. Align the washer nozzle bezel with the mounting hole in the front fascia.
5. Using hand pressure, push the bezel down into the fascia mounting hole until both bezel latch features are fully engaged on the back side of the fascia.
6. Reach up behind the front fascia to access and remove the clamp from the washer supply hose.
7. Reinstall the push pin retainers that secure the lower front edge of the front wheel house splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation** .

REAR

NOTE: The rear washer nozzle latch feature is a one time component, and will be damaged if the nozzle is removed from its mounting hole for service. If removed from its mounting hole for any reason, the rear washer nozzle must be replaced with a new unit.

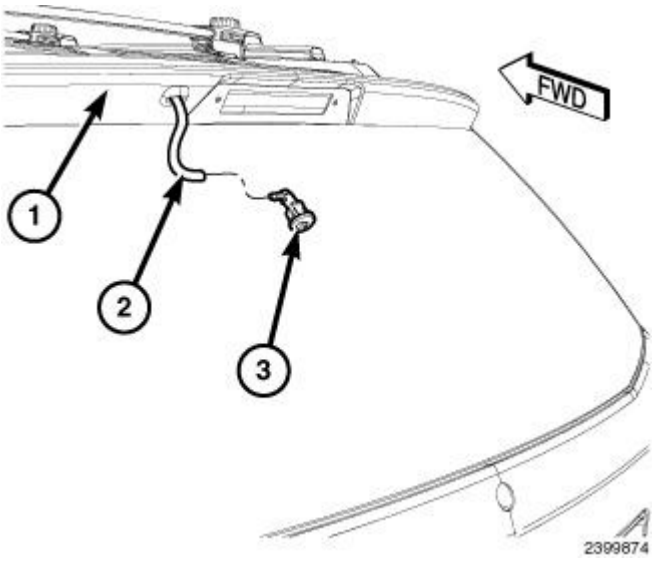


Fig. 50: Rear Washer Nozzle
Courtesy of CHRYSLER LLC

1. Position the new rear washer nozzle (3) to the mounting hole in the liftgate outer panel (1). Be certain that the rubber gasket is in position on the back of the nozzle.
2. Reconnect the washer supply hose (2) to the barbed nipple on the back of the nozzle.
3. Push the hose and nozzle nipple into the mounting hole in the liftgate outer panel and align the anti-rotation tab to the mounting hole.
4. Using hand pressure, push firmly and evenly on the nozzle until both integral latch features are fully engaged on the back side of the outer panel.

PUMP, WINDSHIELD WASHER

DESCRIPTION

FRONT AND REAR

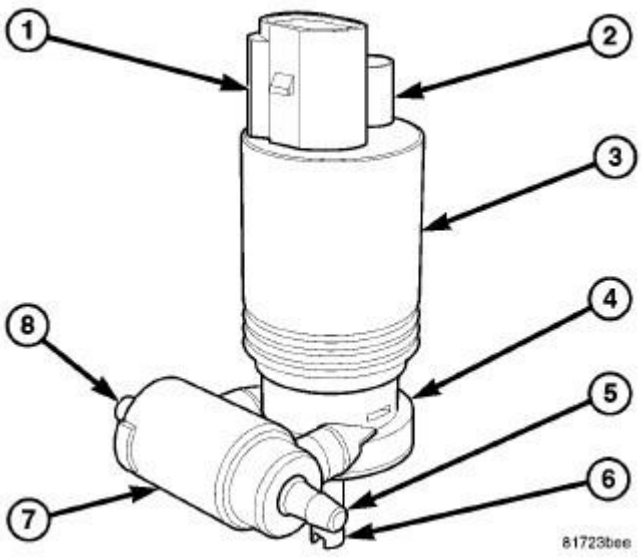


Fig. 51: Washer Pump/Motor
Courtesy of CHRYSLER LLC

The washer pump/motor unit is located on the top of a sump area on the rearward facing side of the washer reservoir, which is located on the upper left corner of the cooling module in the engine compartment. A small permanently lubricated and sealed reversible electric motor (3) is coupled to the rotor-type washer pump (4). The use of an integral valve body (7) allows the washer pump/motor unit to provide washer fluid to either the front or the rear washer systems, depending upon the direction of the motor/pump impeller rotation.

An inlet nipple (6) on the pump housing passes through a rubber grommet seal/filter screen installed in a dedicated mounting hole of the washer reservoir sump. The filter screen prevents most debris from entering the pump housing. When the pump is installed in the reservoir the front barbed outlet nipple (5) on the pump valve body housing connects the unit to the front washer hose, and the rear barbed outlet nipple (8) connects the unit to the rear washer hose. The letters **F** and **R** molded into the valve body housing adjacent to each nipple provide further clarification of the nipple assignments.

The washer pump/motor unit is retained on the reservoir by the interference fit between the pump inlet nipple and the grommet seal, which is a light press fit. The top of the washer pump is also secured to the washer reservoir by the use of a snap fit between the motor housing and a receptacle molded into the reservoir that allows for mounting of the washer pump without the use of fasteners. An integral connector receptacle (1) on the top of the motor housing connects the unit to the vehicle electrical system through a dedicated take out and connector of the Front End Module (FEM) wire harness.

Service replacement washer pumps may also include a snap post (2) at the top of the pump motor housing, but this feature is not used in this application. The washer pump/motor unit cannot be repaired. If ineffective or damaged, the entire washer pump/motor unit must be replaced.

HEADLAMP

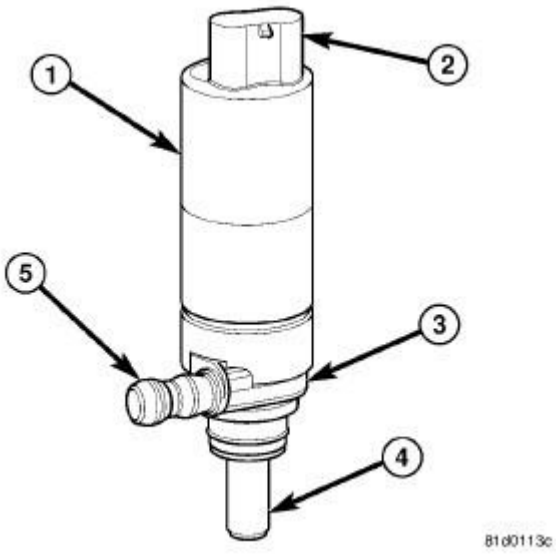


Fig. 52: Headlamp Washer Pump/Motor Unit
Courtesy of CHRYSLER LLC

The headlamp washer pump/motor unit (1) of vehicles so equipped is located on the top of a sump area just above and outboard of the reversible front and rear washer pump on the rearward facing side of the washer reservoir, on the upper left corner of the cooling module in the engine compartment. A small permanently lubricated and sealed electric motor is coupled to the rotor-type washer pump.

An inlet nipple (4) on the bottom of the pump housing (3) passes through a rubber grommet seal/filter screen installed in a dedicated mounting hole of the washer reservoir. When the pump is installed in the reservoir the quick connect outlet nipple (5) on the pump housing points toward the left side of the vehicle and connects the unit to the headlamp washer hose.

The headlamp washer pump/motor unit is retained on the reservoir by the interference fit between the pump inlet nipple and the grommet seal, which is a light press fit. The top of the washer pump is also secured to the washer reservoir by a light snap fit into a receptacle molded into the reservoir that allows for mounting of the washer pump without the use of fasteners. An integral connector receptacle (2) on the top of the motor housing connects the unit to the vehicle electrical system through a dedicated take out and connector of the Front End Module (FEM) wire harness.

The headlamp washer pump/motor unit cannot be repaired. If ineffective or damaged, the entire headlamp washer pump/motor unit must be replaced.

OPERATION

FRONT AND REAR

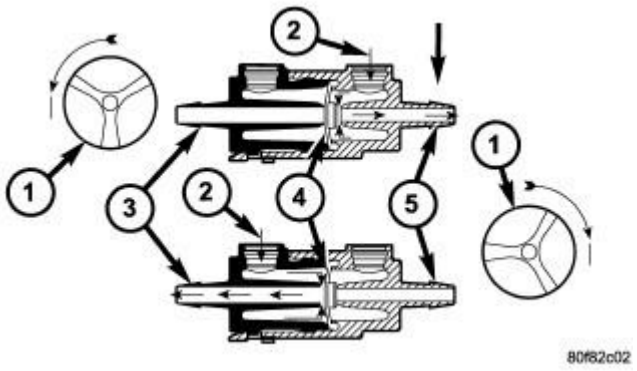


Fig. 53: Washer Pump/Motor Operation
Courtesy of CHRYSLER LLC

The washer pump/motor unit features a reversible electric motor. The direction of the motor is controlled by hard wired outputs from the Totally Integrated Power Module (TIPM). When battery current and ground are applied to the two pump motor terminals, the motor rotates in one direction. When the polarity of these connections is reversed, the motor rotates in the opposite direction. When the pump motor is energized, the rotor-type pump pressurizes the washer fluid and forces it through one of the two pump outlet nipples, and into the front or rear washer plumbing.

The TIPM controls the hard wired outputs to the pump motor based upon electronic **washer request** messages received over the Controller Area Network (CAN) data bus from the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN). The EMIC receives electronic **washer switch** status messages over a Local Interface Network (LIN) bus connection from the Steering Control Module (SCM) within the left (lighting) multi-function switch housing. The SCM monitors hard wired analog and multiplex inputs from the washer switch circuitry contained within the right (wiper) multi-function switch to determine the proper electronic messages to send.

Washer fluid is drawn through the pump inlet nipple from the washer reservoir to the inlet port of the washer pump housing. An integral valve body is located in a housing on the outlet port side (2) of the pump housing. A diaphragm (4) in this valve body controls which washer system plumbing receives the washer fluid being pressurized by the pump.

When the pump impeller (1) rotates in the counterclockwise direction (viewed from the bottom), the biased diaphragm is sealing off the rear washer system outlet and nipple so the pressurized washer fluid is pushed out through the pump front outlet port and the front washer outlet nipple (5). When the pump impeller rotates in the clockwise direction (viewed from the bottom), pressurized washer fluid is pushed out through the pump rear outlet port and moves the diaphragm to open the rear washer outlet nipple and seal off the front washer outlet nipple, then the pressurized washer fluid is pushed out through the rear washer outlet nipple (3).

The washer pump/motor unit and the hard wired motor control circuits from the TIPM may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the washer pump/motor unit or the electronic controls or communication between other modules and devices that provide some features of the front and rear wiper and washer system. The most reliable, efficient, and accurate means to diagnose the washer pump/motor unit or the electronic controls and communication related to washer pump/motor unit operation

requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

HEADLAMP

Headlamp washer pump/motor unit operation is completely controlled by the Totally Integrated Power Module (TIPM) logic circuits based upon electronic **wash request** and **lighting request** message inputs received from the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over the Controller Area Network (CAN) data bus. The EMIC monitors electronic **washer switch** and **lighting switch** status messages received over the Local Interface Network (LIN) data bus from the Steering Control Module (SCM). The SCM monitors analog and resistor multiplexed inputs from the front washer switch circuitry contained within the right (wiper) multi-function switch and the exterior lighting switch circuitry of the left (lighting) multi-function switch to determine the proper washer switch and lighting switch status messages to send.

The headlamp washer relay control coil operates on battery voltage received from the run relay, so it is only functional while the engine is running. In addition, the TIPM will only allow the headlamp washers to operate when the headlamps are turned ON. The TIPM uses a low side driver to energize or de-energize the headlamp washer relay which, in turn, controls the operation of the headlamp washer pump/motor unit.

The hard wired circuits and components of the headlamp washer pump/motor unit may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the headlamp washer pump/motor or the electronic controls or communication between other modules and devices that provide some features of the headlamp washer system. The most reliable, efficient, and accurate means to diagnose the headlamp washer pump/motor unit or the electronic controls and communication related to headlamp washer pump/motor unit operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

FRONT AND REAR

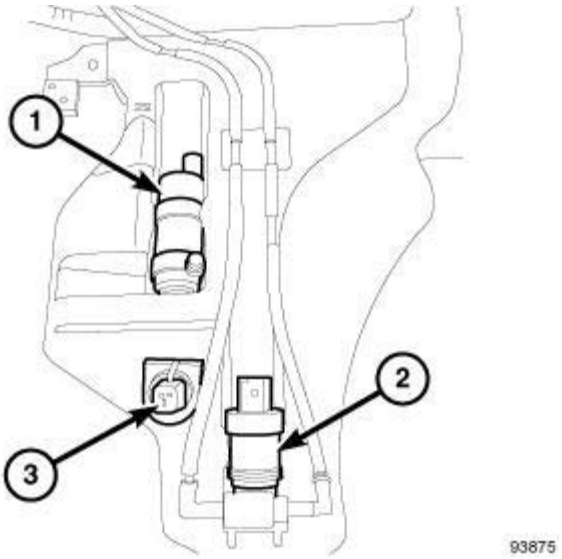


Fig. 54: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Siphon the washer fluid from the washer reservoir into a clean container for reuse.
3. Remove the washer reservoir from the cooling module. See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Removal**.
4. Pull lightly outward on the top of the washer pump/motor housing (2), away from the washer reservoir to disengage the top of the motor from the receptacle in the reservoir.
5. Using hand pressure, firmly grasp and pull the washer pump upward far enough to disengage the pump inlet nipple from the rubber grommet seal/filter screen in the reservoir. Care must be taken not to damage the reservoir.
6. Remove the washer pump/motor unit from the washer reservoir.
7. Remove the rubber grommet seal/filter screen from the washer pump mounting hole in the reservoir and discard.

HEADLAMP

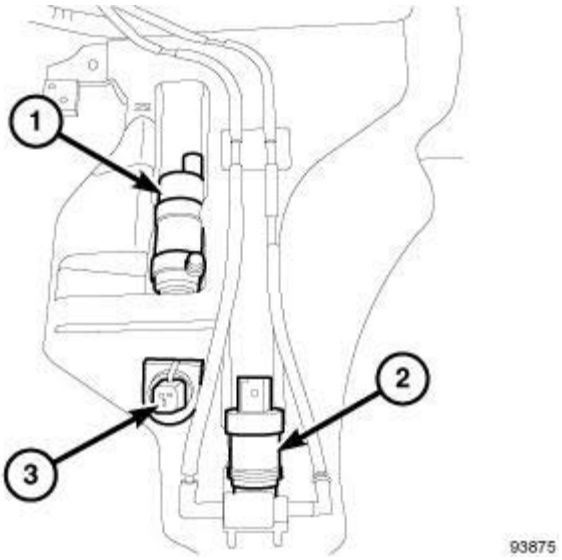


Fig. 55: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Siphon the washer fluid from the washer reservoir into a clean container for reuse.
3. Remove the washer reservoir from the cooling module. See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Removal**.
4. Pull lightly outward on the top of the washer pump/motor housing (1), away from the washer reservoir to disengage the top of the motor from the receptacle in the reservoir.
5. Using hand pressure, firmly grasp and pull the washer pump upward far enough to disengage the pump inlet nipple from the rubber grommet seal/filter screen in the reservoir. Care must be taken not to damage

the reservoir.

6. Remove the rubber grommet seal/filter screen from the pump mounting hole in the washer reservoir and discard.

INSTALLATION

FRONT AND REAR

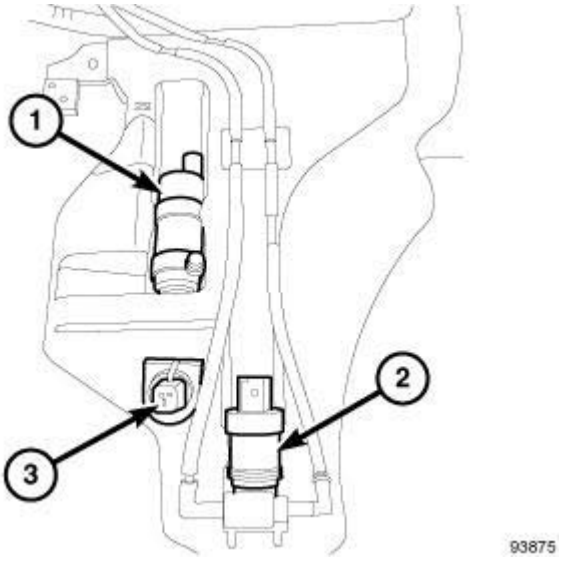


Fig. 56: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Install a new rubber grommet seal/filter screen into the washer pump mounting hole in the washer reservoir. Always use a new rubber grommet seal/filter screen on the reservoir.
2. Position the inlet nipple on the base of the pump housing of the washer pump/motor unit (2) to the rubber grommet seal/filter screen in the reservoir.
3. Using hand pressure, press firmly and evenly downward on the top of washer pump/motor unit until the inlet nipple is fully seated in the rubber grommet seal/filter screen in the pump mounting hole of the reservoir.
4. Align the top of the washer pump/motor unit housing with the receptacle in the washer reservoir.
5. Using hand pressure, press firmly and evenly on the top of washer pump/motor unit until the motor housing snaps into the receptacle.
6. Reinstall the washer reservoir onto the cooling module. See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Installation**.
7. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.
8. Reconnect the battery negative cable.

HEADLAMP

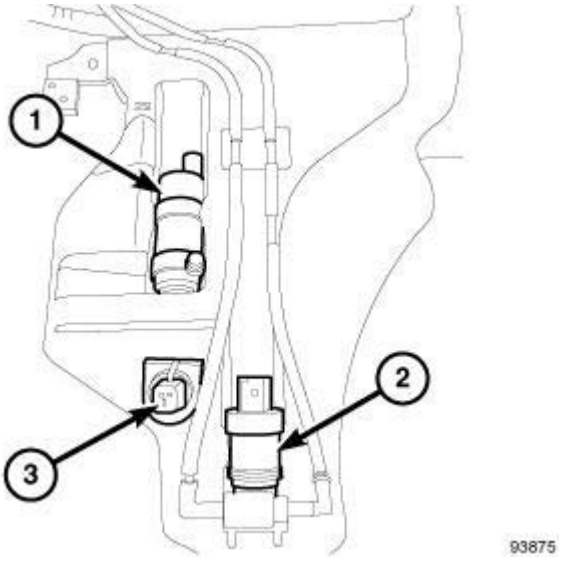


Fig. 57: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Install a new rubber grommet seal/filter screen into the headlamp washer pump/motor unit mounting hole in the washer reservoir. Always use a new rubber grommet seal on the reservoir.
2. Position the inlet nipple of the headlamp washer pump/motor unit (1) to the rubber grommet seal/filter screen in the reservoir.
3. Using hand pressure, press firmly and evenly downward on the washer pump/motor unit until the inlet nipple is fully seated in the rubber grommet seal/filter screen in the pump mounting hole of the reservoir.
4. Align the top of the washer pump/motor unit housing with the receptacle in the washer reservoir.
5. Using hand pressure, press firmly and evenly on the top of washer pump/motor unit until the motor housing snaps into the receptacle.
6. Reinstall the washer reservoir onto the cooling module. See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Installation**.
7. Refill the washer reservoir with the washer fluid drained during removal.
8. Reconnect the battery negative cable.

RELAY, HEADLAMP WASHER

DESCRIPTION

DESCRIPTION

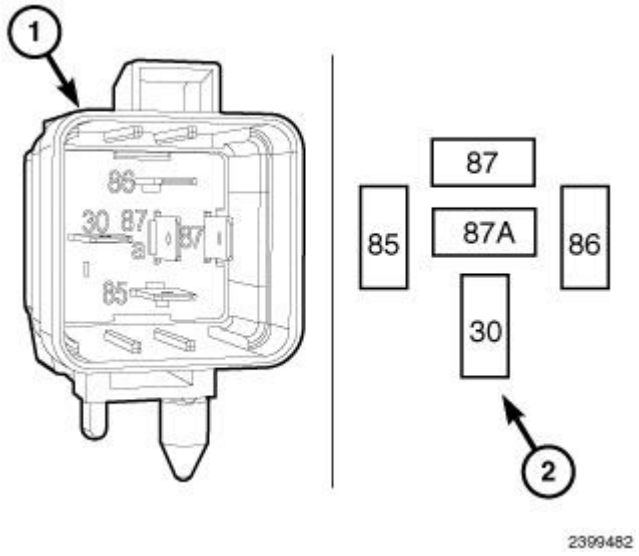


Fig. 58: Headlamp Washer Relay
Courtesy of CHRYSLER LLC

The headlamp washer relay (1) is a conventional International Standards Organization (ISO) skirted relay. Relays conforming to the ISO specifications have common physical dimensions, current capacities, terminal patterns (2), and terminal functions. This relay is contained within a small, rectangular, molded plastic housing and is connected to all of the required inputs and outputs through five integral male spade-type terminals that extend from the relay base plate.

The headlamp washer relay is located in a dedicated connector on a take out of the Front End Module (FEM) wire harness, and is secured to the radiator closure panel to the left of the washer reservoir in front of the Totally Integrated Power Module (TIPM) in the engine compartment, near the battery. The headlamp washer relay cannot be adjusted or repaired and, if ineffective or damaged, the unit must be replaced.

OPERATION

OPERATION

The headlamp washer relay is an electromechanical switch that uses a low current input from the Totally Integrated Power Module (TIPM) to control a high current output to the headlamp washer pump/motor unit. The movable common feed contact point is held against the fixed normally closed contact point by spring pressure. When the relay coil is energized, an electromagnetic field is produced by the coil windings. This electromagnetic field draws the movable relay contact point away from the fixed normally closed contact point, and holds it against the fixed normally open contact point. When the relay coil is de-energized, spring pressure returns the movable contact point back against the fixed normally closed contact point. A resistor is connected in parallel with the relay coil in the relay, and helps to dissipate voltage spikes and electromagnetic interference that can be generated as the electromagnetic field of the relay coil collapses.

The headlamp washer relay terminals are connected to the vehicle electrical system through a dedicated take out and connector of the Front End Module (FEM) wire harness. The inputs and outputs of the headlamp washer relay include:

- **Common Feed Terminal** - The common feed terminal (30) is connected to battery current on a fused B (+) circuit from a fuse in the Totally Integrated Power Module (TIPM) at all times.
- **Coil Ground Terminal** - The coil ground terminal (85) is connected to battery current on a fused run relay output circuit from a fuse in the TIPM at all times. This circuit is energized by the run relay only while the engine is running.
- **Coil Battery Terminal** - The coil battery terminal (86) is connected to a low side driver output from the TIPM on a headlamp washer relay control circuit. The TIPM controls headlamp washer system operation through this relay connection.
- **Normally Open Terminal** - The normally open terminal (87) is connected through a headlamp washer relay output circuit to the headlamp washer pump/motor unit at all times. When the relay is energized, the normally open terminal of the relay is connected to battery current from the fuse in the TIPM.
- **Normally Closed Terminal** - The normally closed terminal (87A) is not connected to any circuit in this application, but will have battery current present whenever the headlamp washer relay coil is not energized.

The headlamp washer relay as well as the hard wired inputs and outputs of the relay may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the electronic controls or the communication between modules and other devices that provide some features of the headlamp washer system. The most reliable, efficient, and accurate means to diagnose the headlamp washer relay or the electronic controls and communication related to headlamp washer system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

RESERVOIR, WINDSHIELD WASHER

DESCRIPTION

DESCRIPTION

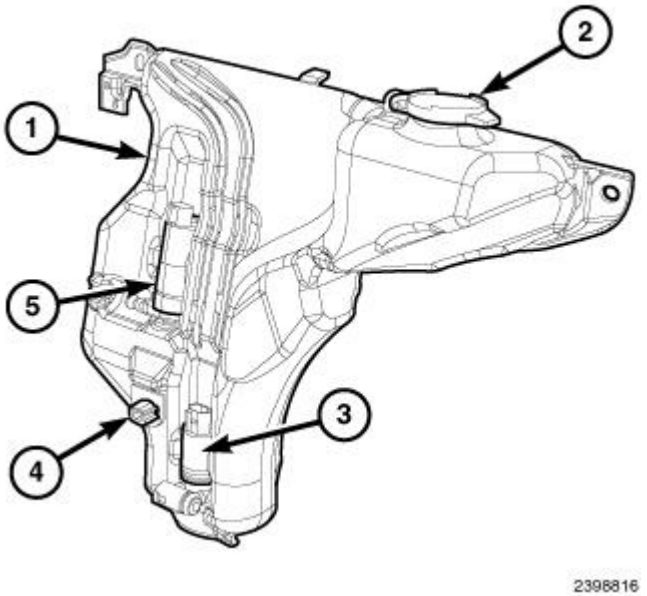


Fig. 59: Molded Plastic Washer Fluid Reservoir
Courtesy of CHRYSLER LLC

The molded plastic washer fluid reservoir (1) is mounted on the upper left corner of the cooling module on the back of the Front End Module (FEM) carrier (also known as the radiator closure). The filler neck for the reservoir extends upward just past the upper radiator closure member and through the upper radiator seal. This reservoir is constructed of opaque black plastic, which does not allow the fluid level to be inspected without removing the reservoir filler cap (2).

The bright yellow plastic filler cap with a rubber seal and an International Control and Display Symbol icon for **Windshield Washer** molded into it snaps over the open end of the washer reservoir filler neck. The cap hinges on and is secured to an integral molded hook formation on the top of the reservoir just to the left of the filler neck when it is removed for inspecting or adjusting the fluid level in the reservoir.

The washer reservoir is secured to the cooling module through integral mounting brackets at the top on the inboard and outboard sides by two screws. In addition, integral mounting tab provisions on the bottom of the washer reservoir engage through slots or slotted loops integral to the cooling module to secure the lower end of the reservoir.

There is a dedicated mounting hole in the top of the sump area on the rearward facing side of the reservoir with a receptacle provided for the mounting of the reversible washer/pump motor unit (3) without the use of fasteners. A separate dedicated mounting hole is provided in the rearward facing side of the reservoir for the washer fluid level switch (4). An integral molded routing trough for the washer hose and washer pump/motor unit wiring routes the hose and wiring bundle from the washer pump to the outboard side of the reservoir.

A unique reservoir is used for vehicles manufactured for export markets with the optional headlamp washer system. This reservoir has a dedicated sump area and mounting receptacle for the high pressure headlamp washer pump (5) near the outboard side of the reservoir, directly above the washer fluid level switch location. The location and mounting provisions for this reservoir are the same as for those vehicles without the headlamp

washer system.

A washer reservoir cannot be repaired and, if ineffective or damaged, the unit must be replaced. The reversible washer pump/motor unit, the washer fluid level switch, the headlamp washer pump/motor unit, their rubber grommet seals, as well as the reservoir filler cap are each available for individual service replacement.

OPERATION

OPERATION

The washer fluid reservoir provides a secure, on-vehicle storage location for a large reserve of washer fluid for operation of the front, rear and, if equipped, headlamp washer systems. The washer reservoir filler cap provides a clearly marked and readily accessible point at which to add washer fluid to the reservoir.

The washer/pump motor unit is located in a sump area near the bottom of the reservoir to be certain that washer fluid will be available to the pump as the fluid level in the reservoir becomes depleted. The washer fluid level switch is mounted far enough above the washer pump inlet nipple in the sump area of the reservoir so that there will be adequate warning to the vehicle operator that the washer fluid level is low, well before the washer system will no longer operate.

REMOVAL

REMOVAL

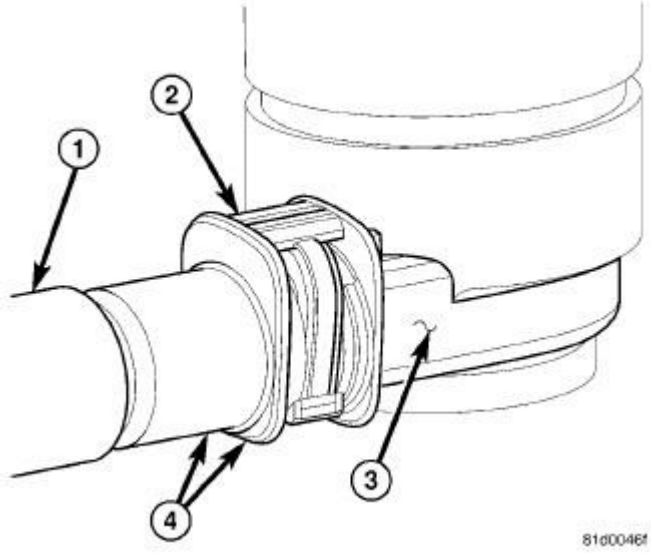


Fig. 60: Removing/Installing Hose At Headlamp Washer Nozzle Nipple
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Siphon the washer fluid from the washer reservoir into a clean container for reuse.
3. If equipped with certain optional engines, it may be necessary to remove the air filter housing for access

to the washer reservoir mounting provisions and connections. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Removal** .

4. If the vehicle is so equipped, disconnect the Front End Module (FEM) wire harness connector (2) and headlamp washer supply hose (1) from the headlamp washer pump/motor unit (3). To disconnect the quick connect fitting (4), pull the molded plastic lock (2) away from the headlamp washer supply hose quick connect fitting far enough to disengage the hose from the washer pump nipple.

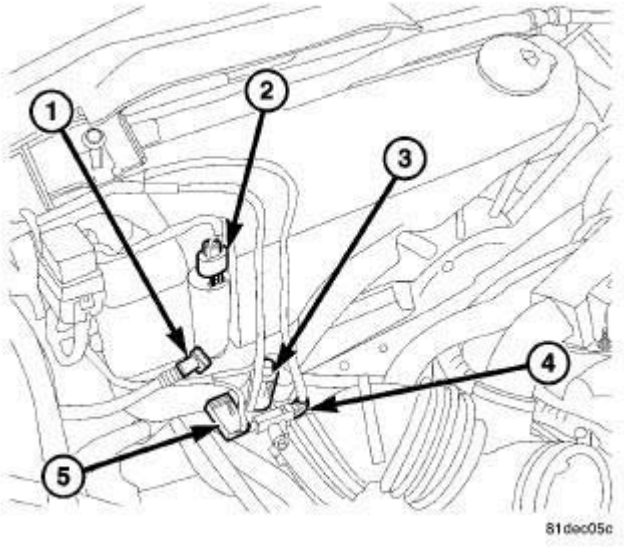


Fig. 61: Front End Module Wire Harness Connector
Courtesy of CHRYSLER LLC

5. Disconnect the FEM wire harness connector (5) from the washer fluid level switch connector receptacle on the back of the reservoir.
6. Disconnect the FEM wire harness connector (3) and the front and rear washer supply hoses (4) from the reversible washer pump/motor unit.
7. Disengage each of the FEM wire harness takeouts and washer supply hoses from the integral routing provisions of the washer reservoir.

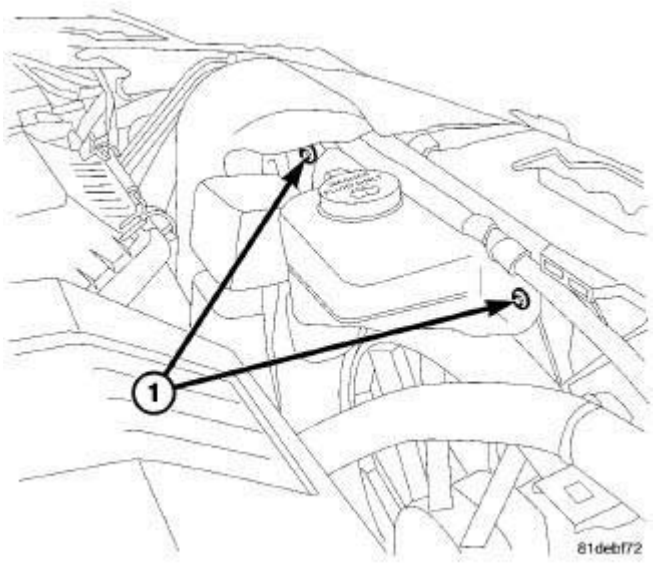


Fig. 62: Washer Reservoir Screws
Courtesy of CHRYSLER LLC

8. Remove the two screws (1) that secure the washer reservoir inboard and outboard mounting brackets to the back of the cooling module.
9. Lift the washer reservoir straight up to disengage the mounting tabs from the cooling module.
10. Remove the washer reservoir from the left side of the cooling module.

INSTALLATION

INSTALLATION

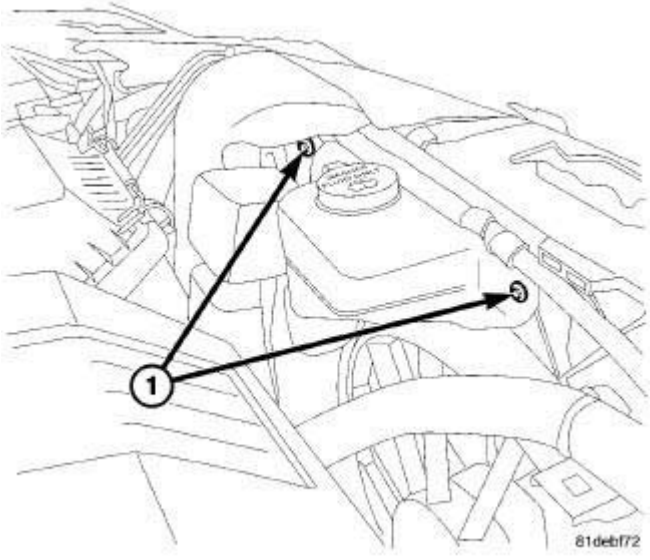


Fig. 63: Washer Reservoir Screws

Courtesy of CHRYSLER LLC

1. Position the washer reservoir to the left side of the cooling module.
2. Engage the mounting provisions at the bottom of the washer reservoir with the cooling module.
3. Install and tighten the two screws (1) that secure the washer reservoir inboard and outboard mounting brackets to the back of the cooling module. Tighten the screws securely.
4. Engage each of the Front End Module (FEM) wire harness takeouts and washer supply hoses into the integral routing provisions of the washer reservoir.

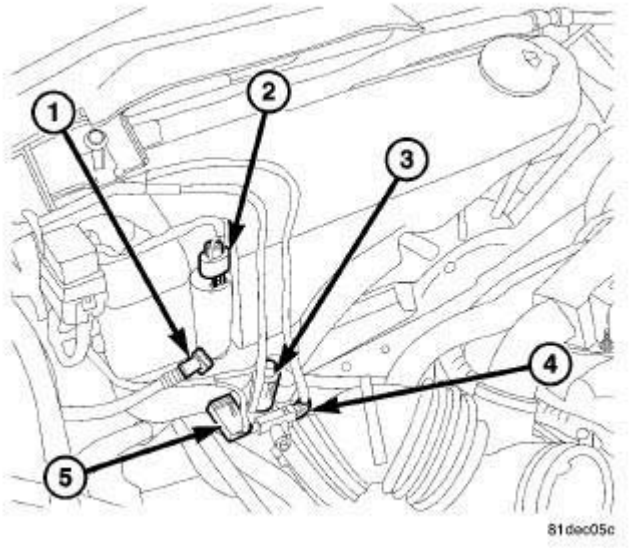


Fig. 64: Front End Module Wire Harness Connector
Courtesy of CHRYSLER LLC

5. Reconnect the FEM wire harness connector (3) and the front and rear washer supply hoses (4) to the reversible washer pump/motor unit.
6. Reconnect the FEM wire harness connector (5) to the washer fluid level switch connector receptacle on the back of the reservoir.

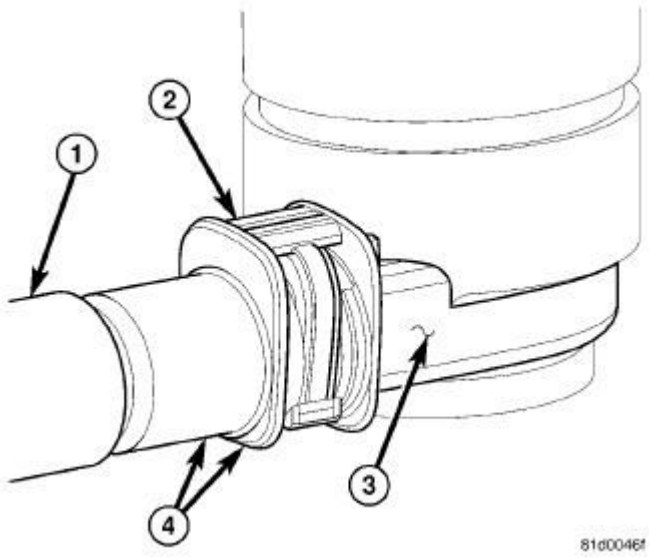


Fig. 65: Removing/Installing Hose At Headlamp Washer Nozzle Nipple
Courtesy of CHRYSLER LLC

7. If the vehicle is so equipped, reconnect the FEM wire harness connector and headlamp washer supply hose (1) to the headlamp washer pump/motor unit. To reconnect the quick connect fitting (4), first seat the molded plastic lock (2) onto the washer supply hose quick connect fitting. Next, push the quick connect fitting onto the headlamp washer pump/motor unit outlet nipple (3) until it snaps into place with an audible click.
8. If removed, reinstall the air filter housing. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .
9. Refill the washer reservoir with the washer fluid drained from the reservoir during the removal procedure.
10. Reconnect the battery negative cable.

SWITCH, MULTIFUNCTION, RIGHT

DESCRIPTION

DESCRIPTION

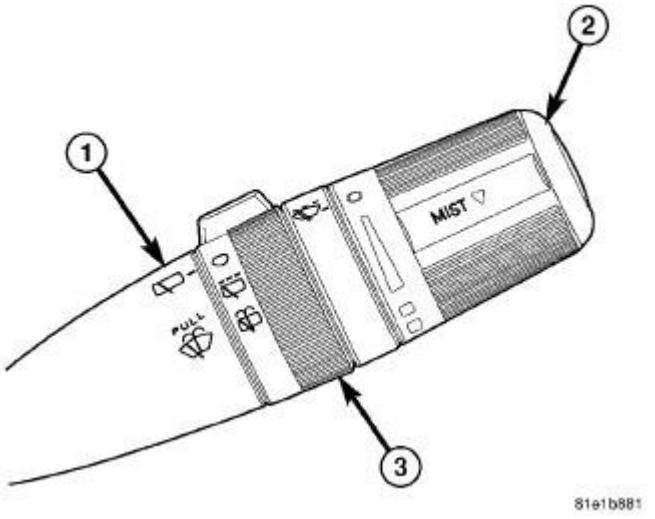


Fig. 66: Right (Wiper) Multi-Function Switch
Courtesy of CHRYSLER LLC

The right (wiper) multi-function switch is located on the right side of the steering column, just below the steering wheel. This switch is the primary control for the front and rear wiper and washer systems. The only visible components of the switch are the control stalk (1), control knob (2) and control sleeve (3) that extend through the steering column shrouds on the right side of the column. The remainder of the switch including its mounting provisions and electrical connection are concealed beneath the shrouds.

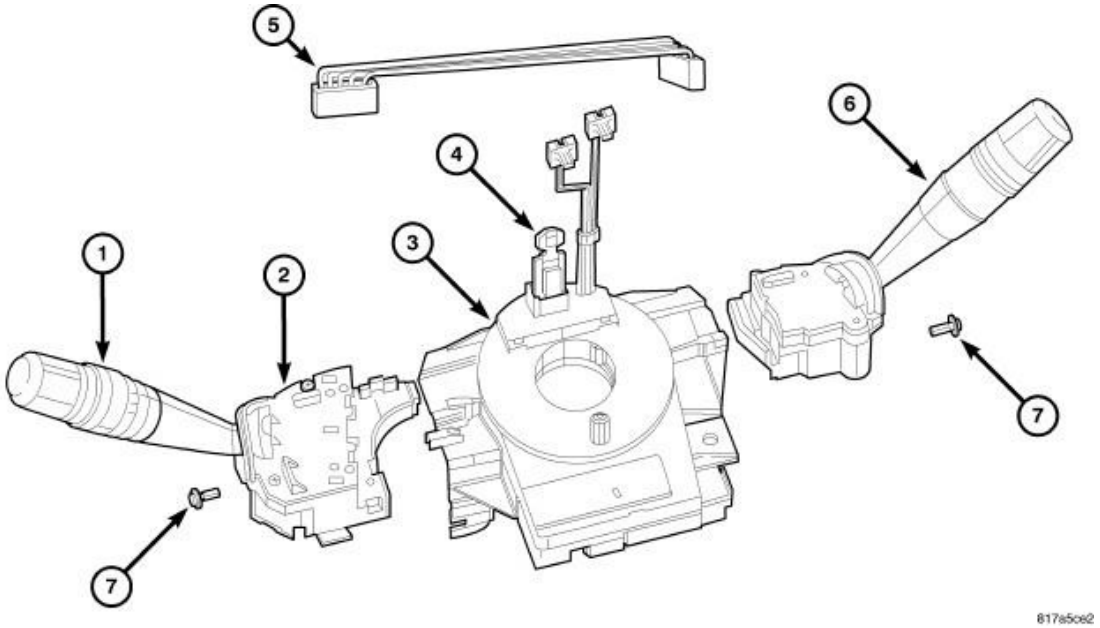


Fig. 67: Identifying Steering Control Module Components
Courtesy of CHRYSLER LLC

The switch housing and controls (6) are constructed of molded black plastic. Each of the switch controls has

white International Control and Display Symbol graphics applied to it, which clearly identify its many functions. A single screw (7) through a mounting tab integral to the back of the switch housing, and a slide tab integral to the bottom of the switch housing secure the switch to the mounting bracket integral to the clockspring (3). A single connector receptacle containing seven terminal pins is integral to the inboard end of the switch housing and is connected by a jumper wire harness (5) directly to the Steering Control Module (SCM), which is internal to the housing (2) of the left multi-function switch (1).

The right (wiper) multi-function switch provides the vehicle operator with a control interface for the following wiper and washer system functions:

- **Continuous Front Wipers** - The right multi-function switch control knob provides detent switching for two continuous front wipe modes, low speed or high speed.
- **Intermittent Front Wipers** - The right multi-function switch control knob provides detent switching for the intermittent front wipe mode with five minor detent delay interval positions.
- **Front Wiper Mist Mode** - The right multi-function switch control stalk includes momentary switching of the front wiper motor low speed circuit to provide a mist mode features (sometimes referred to as pulse wipe), which allows the vehicle operator to momentarily operate the front wipers for one or more complete cycles.
- **Front Washer Mode** - The right multi-function switch control stalk provides momentary switching for control of the front washer system operation.
- **Intermittent Rear Wipe Mode** - The right multi-function switch control sleeve provides detent switching for a single fixed interval intermittent rear wiper mode.
- **Rear Washer Mode** - The right multi-function switch control sleeve provides one momentary switch positions for control of rear washer system operation.

The right multi-function switch cannot be adjusted or repaired. If any function of the switch is ineffective, or if the switch is damaged, the entire switch unit must be replaced. The clockspring (with the multi-function switch mounting bracket), the left multi-function switch (with the SCM), the right multi-function switch and the jumper wire harness are each available for separate service replacement.

OPERATION

OPERATION

The right (wiper) multi-function switch uses a combination of resistor multiplexing and conventional analog switching to control the many functions and features it provides. The switch receives a clean ground from the Steering Control Module (SCM), then provides resistor multiplexed and conventional analog return outputs to the SCM to indicate the selected switch positions. The SCM then sends electronic **switch status** messages over a Local Interface Network (LIN) data bus to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN), and the EMIC relays electronic **wiper** and **washer switch** request messages over the Controller Area Network (CAN) data bus to other electronic modules in the vehicle.

If the SCM detects no inputs from the right multi-function switch, it transmits an electronic **Signal Not Available (SNA)** status message over the LIN data bus. The SNA status signals the EMIC to request other electronic modules to implement a fail-safe mode of operation for the front and rear wiper systems. The fail-safe mode will maintain the last selected front and rear wiper system operation for the remainder of the current

ignition cycle, after which both wiper systems will default to OFF.

The right multi-function switch as well as the hard-wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, the most reliable, efficient and accurate means to diagnose this component requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

Following are descriptions of how the right multi-function switch is operated to control the many front and rear wiper and washer system functions and features it provides:

- **Front Wiper Control** - The control knob on the end of the right multi-function switch control stalk is rotated to one of the two continuous wiper detents, to one of five intermittent wiper detents, or to the OFF position to select the front wiper mode. The SCM reads the input from the right multi-function switch and sends electronic **wiper switch** status messages over the LIN data bus to the EMIC, which relays an electronic **wiper switch** request message over the CAN data bus to other electronic modules in the vehicle.
- **Front Wiper Mist Mode** - The front wiper mist mode is requested when the right multi-function switch control stalk is depressed downward towards the floor to a momentary MIST position. The front wiper motor will continue to operate, one complete cycle at a time, for as long as the control stalk is held in this position. The SCM reads the resistor multiplexed input from the right multi-function switch and sends an electronic **wiper switch** status message over the LIN data bus to the EMIC, which relays an electronic **wiper switch** request message over the CAN data bus to other electronic modules in the vehicle.
- **Front Washer Control** - The right multi-function switch control stalk is pulled rearward towards the steering wheel to a momentary WASH position to activate the washer pump/motor in the front washer mode. The washer pump/motor will continue to operate for as long as the control stalk is held in this position. The SCM reads the resistor multiplexed input from the right multi-function switch and sends an electronic **washer switch** status message over the LIN data bus to the EMIC, which relays an electronic **washer switch** request message over the CAN data bus to other electronic modules in the vehicle.
- **Rear Wiper Control** - The rear wiper mode is selected when the right multi-function switch control sleeve is rotated to the fixed interval intermittent rear wipe detent position, or the OFF detent position. The SCM reads the input from the right multi-function switch and sends an electronic **wiper switch** status message over the LIN data bus to the EMIC, which relays an electronic **wiper switch** request message over the CAN data bus to other electronic modules in the vehicle.
- **Rear Washer Control** - The right multi-function switch control sleeve is rotated to one of two momentary WASH positions, either fully forward or fully rearward, to activate the washer pump/motor in the rear washer mode. The washer pump/motor will continue to operate in the rear washer mode until the control sleeve is released. The SCM reads the input from the right multi-function switch and sends an electronic **washer switch** status message over the LIN data bus to the EMIC, which relays an electronic **washer switch** request message over the CAN data bus to other electronic modules in the vehicle.

DIAGNOSIS AND TESTING

RIGHT MULTI-FUNCTION SWITCH

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering

wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

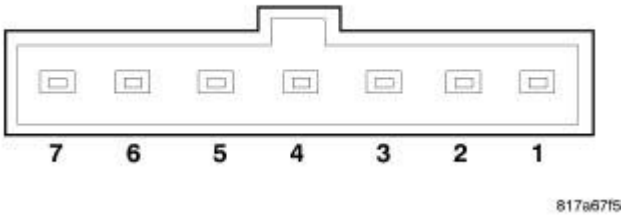


Fig. 68: Right Multi-Function Switch Connector
Courtesy of CHRYSLER LLC

The right multi-function switch as well as the hard wired inputs and outputs of the switch may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** .

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the Steering Control Module (SCM) or the electronic controls or communication between other modules and devices that provide some features of the front and rear wiper and washer systems. The most reliable, efficient and accurate means to diagnose the SCM or the electronic controls and communication related to SCM operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

1. Remove the right multi-function switch from the integral mounting bracket on the right side of the clockspring. See **Electrical - Wipers/Washers/Wipers/Washers/SWITCH, Multifunction - Removal**.
2. Using an ohmmeter, test the resistance between the terminals of the switch as shown in the three Function Tests tables below. For all functions except those of the control stalk the values should be either less than 100 ohms (switch CLOSED) or greater than 1 megohm (switch OPEN).

CONTROL STALK FUNCTION TESTS			
FUNCTION	PINS		RESISTANCE
	1	7	
Front Wash	X	X	10000 Ohms
Front Mist	X	X	5490 Ohms

CONTROL KNOB FUNCTION TESTS			
FUNCTION	BETWEEN PIN 7 (GROUND) AND PINS		
	4	5	6
Off	CLOSED	CLOSED	OPEN

Front Delay 1	CLOSED	CLOSED	CLOSED
Front Delay 2	CLOSED	OPEN	CLOSED
Front Delay 3	OPEN	OPEN	CLOSED
Front Delay 4	OPEN	CLOSED	CLOSED
Front Delay 5	OPEN	CLOSED	OPEN
Front Wiper Low	OPEN	OPEN	OPEN
Front Wiper High	CLOSED	OPEN	OPEN

CONTROL SLEEVE FUNCTION TESTS		
FUNCTION	**BETWEEN PIN 7 (GROUND) AND PINS**	
	2	**3**
Off	CLOSED	OPEN
Rear Wipe	CLOSED	CLOSED
Rear Wash	OPEN	CLOSED

3. If the switch fails any of the tests, replace the ineffective right multi-function switch as required. If the switch tests okay, but the switch input to the Steering Control Module (SCM) remains incorrect, be certain to check for a short or open in the jumper harness between the right multi-function switch and the SCM.

REMOVAL

REMOVAL

WARNING: To avoid personal or fatal injury, on vehicles equipped with airbags, disable the supplemental restraint system before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the supplemental restraint system. Failure to take the proper precautions could result in accidental airbag deployment.

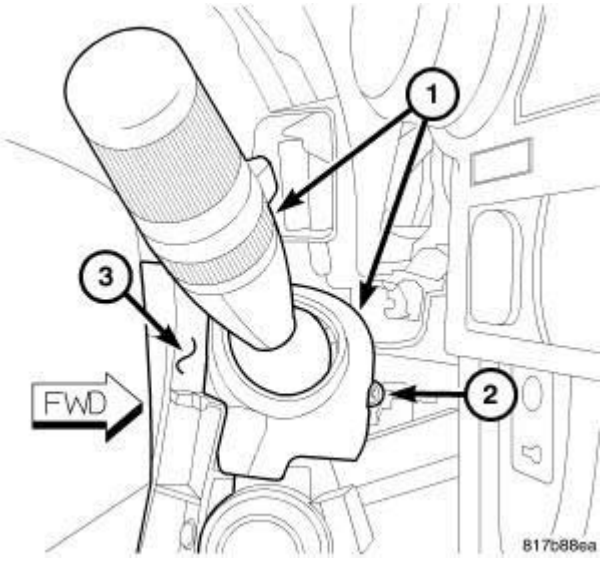


Fig. 69: Removing/Installing Right Multi-Function Switch
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove both the upper and lower shrouds from the steering column. Refer to **Steering/Column/SHROUD, Steering Column - Removal** .
3. Remove the screw (2) that secures the right multi-function switch (1) to the mounting bracket integral to the right side of the clockspring (3) on the steering column.
4. Slide the switch away from the clockspring far enough to disengage the slide tabs on the switch housing from the channel formations in the mounting bracket.

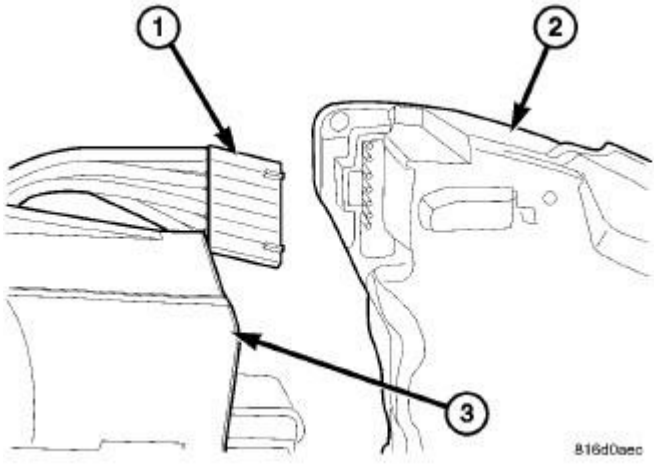


Fig. 70: Right Multi-Function Switch Harness Connector
Courtesy of CHRYSLER LLC

5. Disconnect the jumper wire harness connector (1) from the connector receptacle on the inboard end of the right multi-function switch (2).

6. Remove the switch from the clockspring (3).

INSTALLATION

INSTALLATION

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

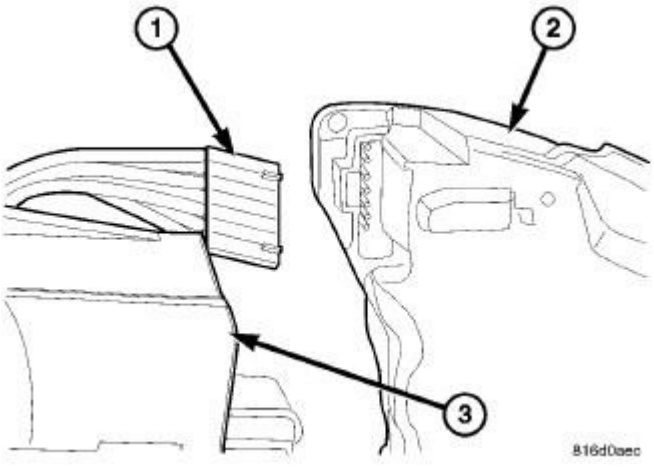


Fig. 71: Right Multi-Function Switch Harness Connector
Courtesy of CHRYSLER LLC

1. Position the right multi-function switch (2) close enough to the mounting bracket (3) integral to the right side of the clockspring to reconnect the jumper wire harness connector (1) to the connector receptacle on the inboard side of the switch housing.
2. Align the slide tabs on the switch housing with the channel formations integral to the clockspring mounting bracket, then slide the switch into the bracket until it is firmly seated.

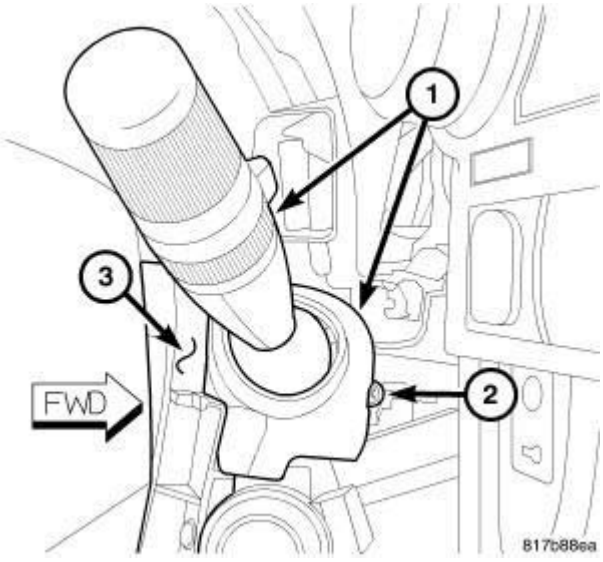


Fig. 72: Removing/Installing Right Multi-Function Switch
Courtesy of CHRYSLER LLC

3. Install and tighten the screw (2) that secures the mounting tab on the back of the right multi-function switch (1) to the mounting bracket on the clockspring (3). Tighten the screw to 1 N.m (10 in. lbs.).
4. Reinstall the upper and lower shrouds onto the steering column. Refer to **Steering/Column/SHROUD, Steering Column - Installation** .
5. Reconnect the battery negative cable.

SWITCH, WASHER FLUID LEVEL

DESCRIPTION

DESCRIPTION

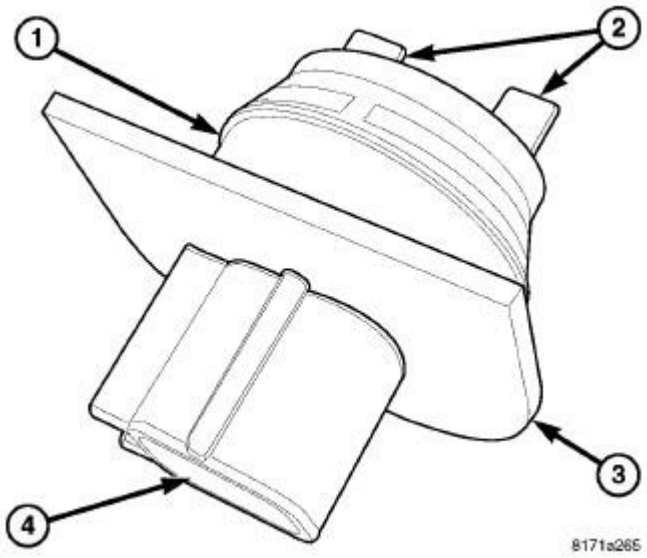


Fig. 73: Washer Fluid Level Switch
Courtesy of CHRYSLER LLC

The washer fluid level switch (3) is a two-pin conductivity sensor with no moving parts mounted on the rearward facing side of the washer reservoir on the upper left corner of the cooling module on the Front End Module (FEM). Only the molded plastic switch mounting flange and the integral connector receptacle (4) are visible when the switch is installed in the reservoir.

A short nipple formation (1) extends from the inner surface of the switch mounting flange, and a barb on the nipple is pressed through a rubber grommet seal installed in the mounting hole of the reservoir. Two over-molded pins or electrodes (2) extend from the back of the nipple formation. The switch is connected to the vehicle electrical system through a dedicated take out and connector of the FEM wire harness.

The washer fluid level switch cannot be adjusted or repaired. If ineffective or damaged, the switch must be replaced.

OPERATION

OPERATION

The washer fluid level switch uses fluid conductivity to monitor the level of the washer fluid in the washer reservoir. Electricity is conducted between the two switch pins or electrodes only when they are immersed in the washer fluid, which closes the switch circuit. When the fluid level in the washer reservoir falls below the pins, electrical current cannot be conducted and the switch becomes an open circuit, which signals a low fluid condition.

In order to prevent an electrical charge from accumulating in the electrical leads of the switch, the switch receives current that is pulsed from the Totally Integrated Power Module (TIPM) located in the engine compartment near the battery. The TIPM monitors the switch return signal and is programmed to respond to three consecutive open switch readings by sending an electronic **washer fluid indicator lamp-ON request**

message to the ElectroMechanical Instrument Cluster (EMIC) (also known as the Cab Compartment Node/CCN) over the Controller Area Network (CAN) data bus. The EMIC responds to this message by illuminating the washer fluid indicator and by sounding an audible chime tone warning.

The washer fluid level switch is connected to the vehicle electrical system through a dedicated take out and connector of the Front End Module (FEM) wire harness. The switch is connected in series between a sensor return circuit and the washer fluid switch sense input to the TIPM.

The washer fluid level switch and the hard wired circuits between the switch and the TIPM may be diagnosed using conventional diagnostic tools and procedures. Refer to **SYSTEM WIRING DIAGRAMS** . However, conventional diagnostic methods will not prove conclusive in the diagnosis of the washer fluid level indicator or the electronic controls or communication between other modules and devices that provide some features of the washer system. The most reliable, efficient, and accurate means to diagnose the washer fluid level indicator or the electronic controls and communication related to washer fluid level switch operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

REMOVAL

REMOVAL

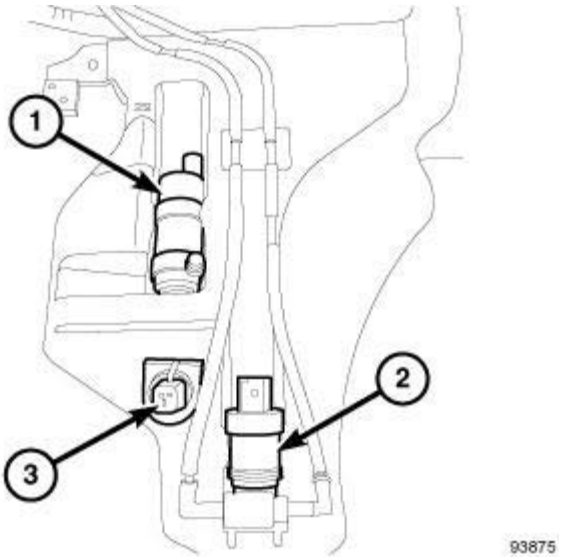


Fig. 74: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Disconnect and isolate the battery negative cable.
2. Remove the washer reservoir from the back of the cooling module on the Front End Module (FEM). See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Removal**.
3. Disconnect the FEM wire harness connector from the washer fluid level switch connector receptacle (3) on the back of the reservoir.
4. Using a trim stick or another suitable wide flat-bladed tool, gently pry the barbed nipple of the washer fluid level switch out of the rubber grommet seal in the washer reservoir. Care must be taken not to damage the reservoir.

5. Remove the switch from the washer reservoir.
6. Remove the rubber grommet seal from the switch mounting hole in the washer reservoir and discard.

INSTALLATION

INSTALLATION

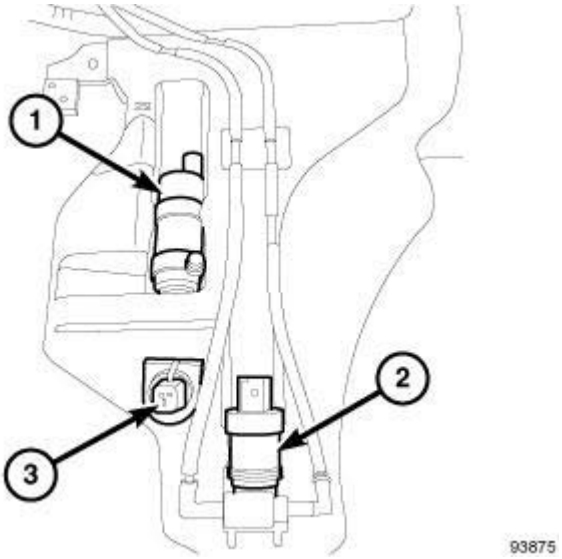


Fig. 75: Washer Pump/Motor Housing
Courtesy of CHRYSLER LLC

1. Install a new rubber grommet seal into the washer fluid level switch mounting hole of the washer reservoir. Always use a new rubber grommet seal on the reservoir.
2. Insert the nipple formation of the switch through the rubber grommet seal in the reservoir.
3. Using hand pressure, press firmly and evenly on the switch mounting flange until the barbed nipple is fully seated in the rubber grommet seal in the reservoir. The flat edge of the switch mounting flange should be oriented upward.
4. Reconnect the Front End Module (FEM) wire harness connector (3) to the switch connector receptacle.
5. Reinstall the washer reservoir onto the back of the cooling module on the FEM. See **Electrical - Wipers/Washers/Wipers/Washers/RESERVOIR, Windshield Washer - Installation**.
6. Reconnect the battery negative cable.

2009 ACCESSORIES AND EQUIPMENT

Chime/Buzzer - Service Information - Journey

DESCRIPTION

DESCRIPTION

The chime warning system uses an electromechanical transducer and an electromechanical relay that are soldered onto the circuit board of the instrument cluster also known as the Cab Compartment Node (CCN) to provide audible indications of various vehicle conditions that may require the attention of the vehicle operator or occupants. The CCN also includes the necessary hardware and software to serve as the vehicle's electronic body control module.

The electromechanical transducer generates chime tones, while the electromechanical relay generates click tones to emulate the sounds associated with conventional turn signal and hazard warning flasher operation. The microprocessor-based CCN utilizes electronic **chime request** messages received from other modules in the vehicle over the Controller Area Network (CAN) data bus along with hard-wired inputs to monitor many sensors and switches throughout the vehicle. In response to those inputs, the circuitry and programming of the CCN allow it to control the audible outputs that are produced through its on-board transducer and relay.

The CCN is capable of producing the following audible outputs:

- **Slow Rate Repetitive Click** - Repeated **click** tones that are issued at a slow rate of about 90 clicks per minute.
- **Fast Rate Repetitive Click** - Repeated **click** tones that are issued at a fast rate of more than about 180 clicks per minute.
- **Single Chime Tone** - A single **chime** tone.
- **Continuous Repetitive Chime Tone** - Repeated **chime** tones that are issued continuously.

Hard-wired circuitry connects the CCN and the various chime warning system switch and sensor inputs to their modules and to each other through the electrical system of the vehicle. These hard-wired circuits are integral to several wire harnesses that are routed throughout the vehicle and they are retained by many different methods. These circuits may be connected to each other, to the vehicle electrical system, and to the CCN through a combination of soldered splices, splice block connectors, and many different types of wire harness terminal connectors and insulators. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, further details on wire harness routing and retention, and pin-out and location views for the various wire harness connectors, splices, and grounds.

The chime warning system circuits and components cannot be adjusted or repaired. If the CCN circuitry, the on-board transducer, or the relay is damaged or ineffective, the instrument cluster assembly must be replaced.

OPERATION

OPERATION

DOOR AJAR CHIME

The Cab Compartment Node (CCN) will sound an audible chime when the key is in the ignition and the driver's door is open. This is to prevent partial closing of vehicle doors.

An audible chime will sound when the vehicle begins to move and the transmission range indicator display will indicate DOOR.

ENHANCED SEAT BELT REMINDER

If all the following are met after sixty seconds with the engine ON, then the enhanced seat belt reminder feature will be activated.

- Driver seat belt is unbuckled for ten seconds or more.
- Vehicle speed is greater than five mph (8 km/h).
- The gear positioning is not in REVERSE (except in MTX vehicles where the reverse position cannot be detected).

The seat belt indicator will periodically blink, accompanied with a continuous chime for approximately ninety-six seconds or until the driver seat belt is buckled. When the enhanced seat belt feature is not initiated or if the feature is disabled, the seat belt indicator will be turned ON continuously until the driver seat belt is buckled.

In the same ignition cycle, if the seat belt is again unbuckled for more than ten seconds with the vehicle speed greater than five mph (8 km/h), the enhanced seat belt reminder feature will again be initiated.

The enhanced seat belt reminder feature is customer programmable and can be enabled/disabled with the use of a Scan Tool, or by the customer completing a sequence of steps.

CUSTOMER PROGRAMMING OF ENHANCED SEAT BELT REMINDER FEATURE

1. With the ignition not in RUN or START, buckle the driver seat belt.
2. Turn the ignition switch to the RUN or START position and wait for the seat belt reminder check to be completed.
3. Unbuckle and then re-buckle the driver seat belt causing the indicator to go ON and OFF three or more times ending with the seat belt buckled.
4. Return the ignition switch back to a non-RUN or no-START position (the feature will toggle from the current status) and a confirmation chime will sound indicating to the customer the proper sequence to enable/disable the feature was performed.

EXTERIOR LAMPS LEFT ON

An audible chime tone that indicates the exterior lamps were left on.

FASTEN SEAT BELTS

At power up, the instrument cluster will conduct a seat belt lamp bulb check. If the driver side seat belt buckle

is unbuckled during the bulb check, an accompanying chime will sound within the duration of the bulb check.

KEY LEFT IN IGNITION

An audible chime tone that indicates the key was left in ignition.

SINGLE WARNING CHIME

After a bulb check at power-up, if any of the following indicators are still activated, the CCN will sound a single chime tone. ABS, Air Bag, Check Engine, Charging System, Engine Temperature, Low Fuel (after 10 seconds for accurate fuel information), and BRAKE (if speed is greater than 2 mph).

DIAGNOSIS AND TESTING

CHIME WARNING SYSTEM

WARNING: To avoid serious or fatal injury on vehicles equipped with airbags, disable the Supplemental Restraint System (SRS) before attempting any steering wheel, steering column, airbag, seat belt tensioner, impact sensor, or instrument panel component diagnosis or service. Disconnect and isolate the battery negative (ground) cable, then wait two minutes for the system capacitor to discharge before performing further diagnosis or service. This is the only sure way to disable the SRS. Failure to take the proper precautions could result in accidental airbag deployment.

The hard-wired circuits between components related to the chime warning system may be diagnosed using conventional diagnostic tools and procedures. Refer to the appropriate wiring information. The wiring information includes wiring diagrams, procedures for proper wire and connector repair, details of wire harness routing and retention, connector pin-out information, and location views for the various wire harness connectors, splices, and grounds.

However, conventional diagnostic methods will not prove conclusive in the diagnosis of the chime warning system or the electronic controls or communication between modules and other devices that provide some features of the chime warning system. The most reliable, efficient, and accurate means to diagnose the chime warning system or the electronic controls and communication related to chime warning system operation requires the use of a diagnostic scan tool. Refer to the appropriate diagnostic information.

2009 ACCESSORIES AND EQUIPMENT

Wiring Harness - Service Information - Journey

GROMMET

REMOVAL

GROMMET - A PILLAR

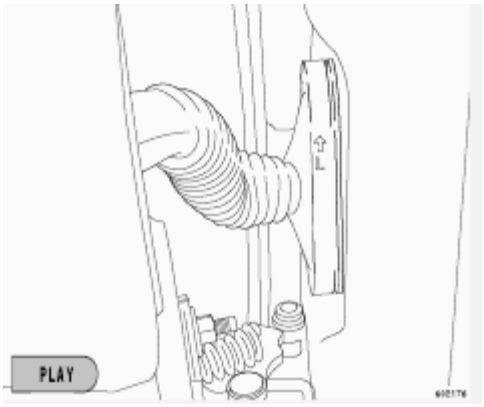


Fig. 1: A Pillar Grommet
Courtesy of CHRYSLER LLC

1. Peel the A Pillar grommet (1) off of the connector/retainer and move it up the wire harness.
2. Grasp the wire harness (2) by the convolute section of the grommet and gently pull the wire harness down towards the floor to expose the connector lock tabs.

CAUTION: Do not force the locking tab past the connector body, as damage to the connector may occur.

3. While still pulling down on the harness, use a small slotted screw driver (3) to **gently** push one of the top lock tabs until the lock feature is flush with the connector/retainer body.
4. Repeat the step 3 for the remaining top lock tab.
5. The connector should now be able to rock out of the sheet metal hole without causing any damage to the connector or sheet metal.

TRAILER TOW

STANDARD PROCEDURE

TRAILER TOW HARNESS INSTALLATION

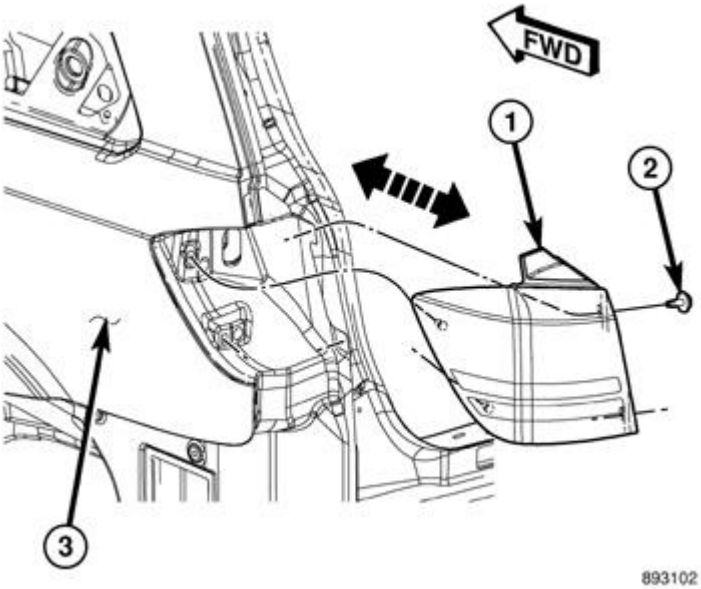


Fig. 2: Push Pin Fasteners & Rear Tail Lamp Assemblies
Courtesy of CHRYSLER LLC

1. Remove the push pin fasteners (2) and separate the rear tail lamp assemblies (1).

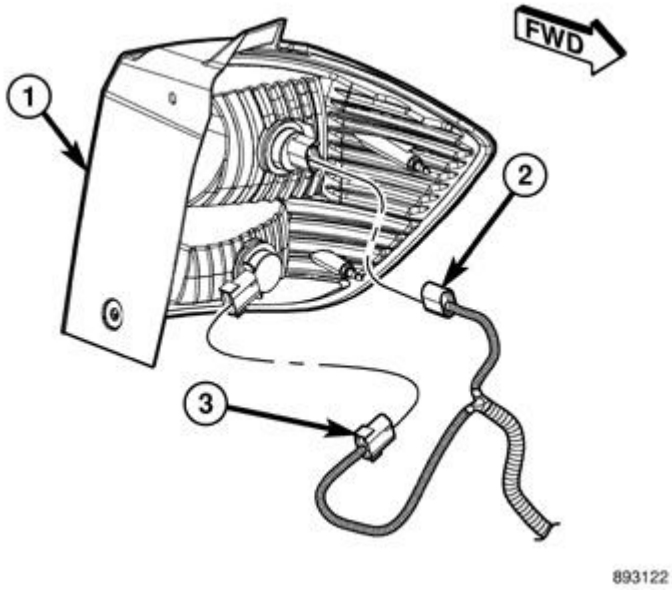


Fig. 3: Tail Lamp Electrical Connectors & Tail Lamp Assemblies
Courtesy of CHRYSLER LLC

2. Disconnect the tail lamp electrical connectors (2 and 3).

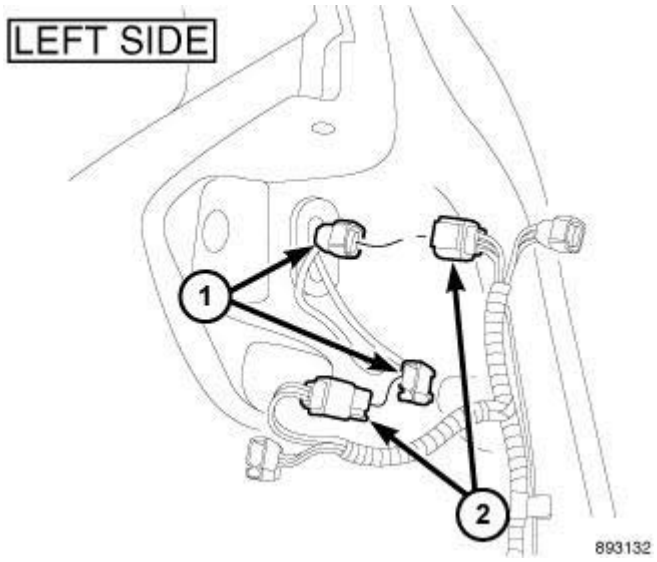


Fig. 4: Tail Lamp Electrical Connectors
Courtesy of CHRYSLER LLC

3. Connect the harness (2) to the left side tail lamp electrical connectors (1).

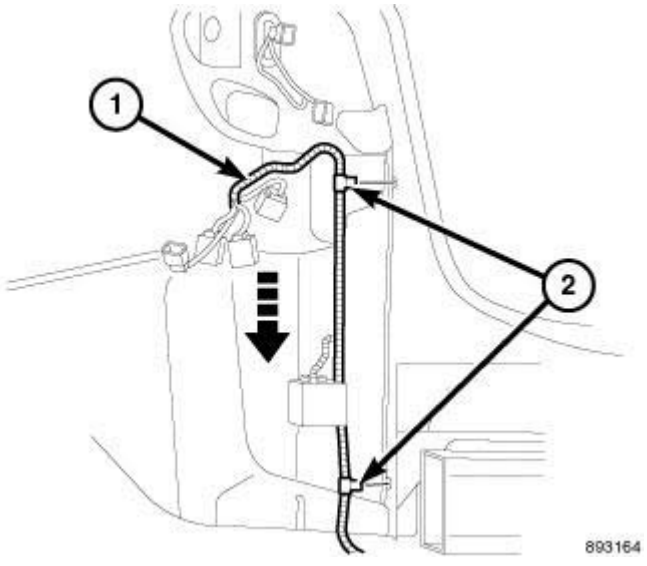


Fig. 5: Harness & Support Clips
Courtesy of CHRYSLER LLC

4. Position the harness (1) through the tail lamp opening and down the side of the fender.
5. Secure the support clips (2) to the body seem.

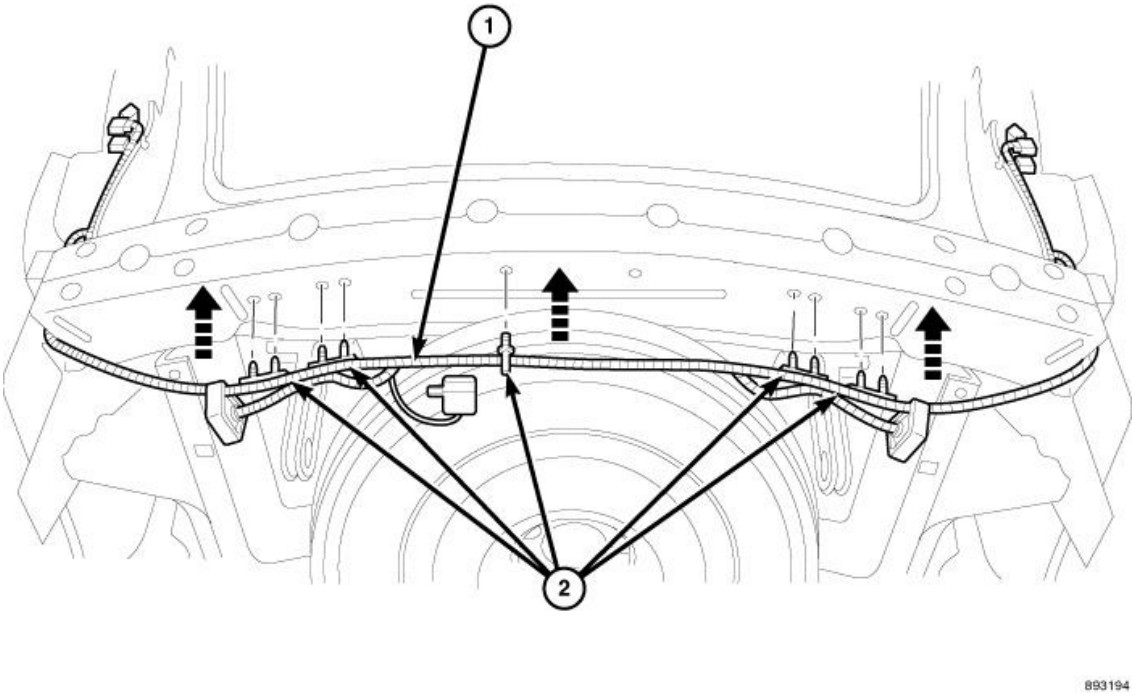


Fig. 6: Harness & Push Pin Fasteners
Courtesy of CHRYSLER LLC

6. Position the harness (1) over the exhaust and fasten the push pin fasteners (2) to the under side of the rear bumper in the existing holes.

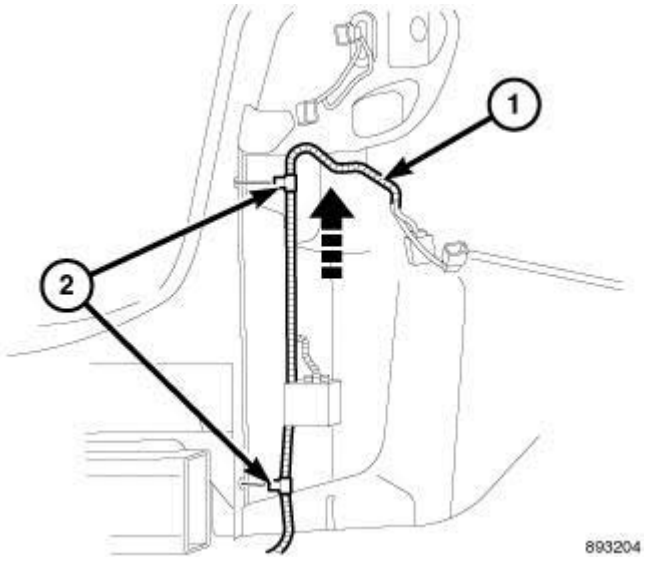


Fig. 7: Harness & Right Tail Lamp
Courtesy of CHRYSLER LLC

7. Position the harness (1) up the right side of the vehicle to the right tail lamp opening and secure the clips

(2) to the body seem.

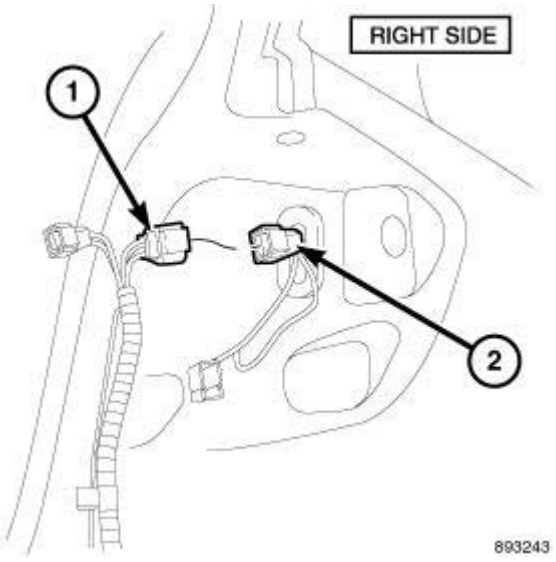


Fig. 8: Right Side Tail Lamp Electrical Connectors
Courtesy of CHRYSLER LLC

8. Connect the harness (1) to the right side tail lamp electrical connectors (2).

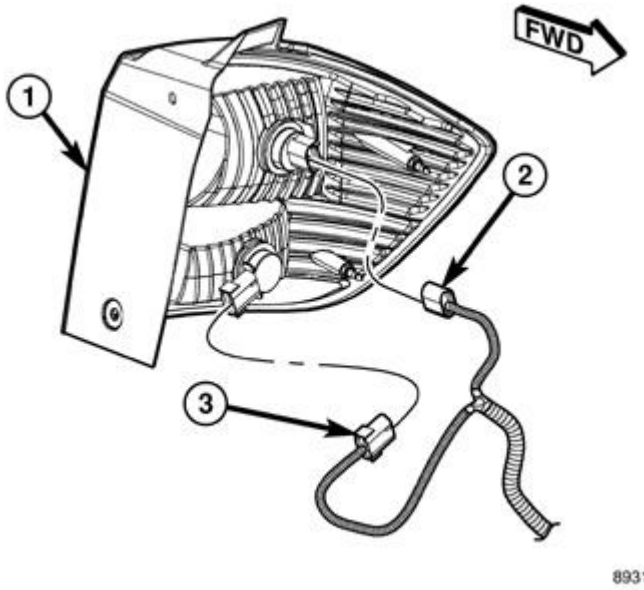


Fig. 9: Tail Lamp Electrical Connectors & Tail Lamp Assemblies
Courtesy of CHRYSLER LLC

9. Connect the tail lamp electrical connectors (2 and 3) to the tail lamp assemblies (1).

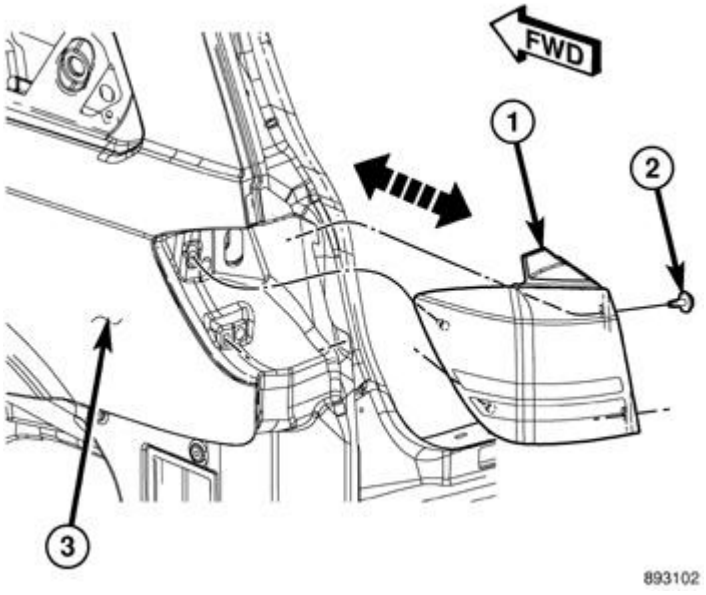
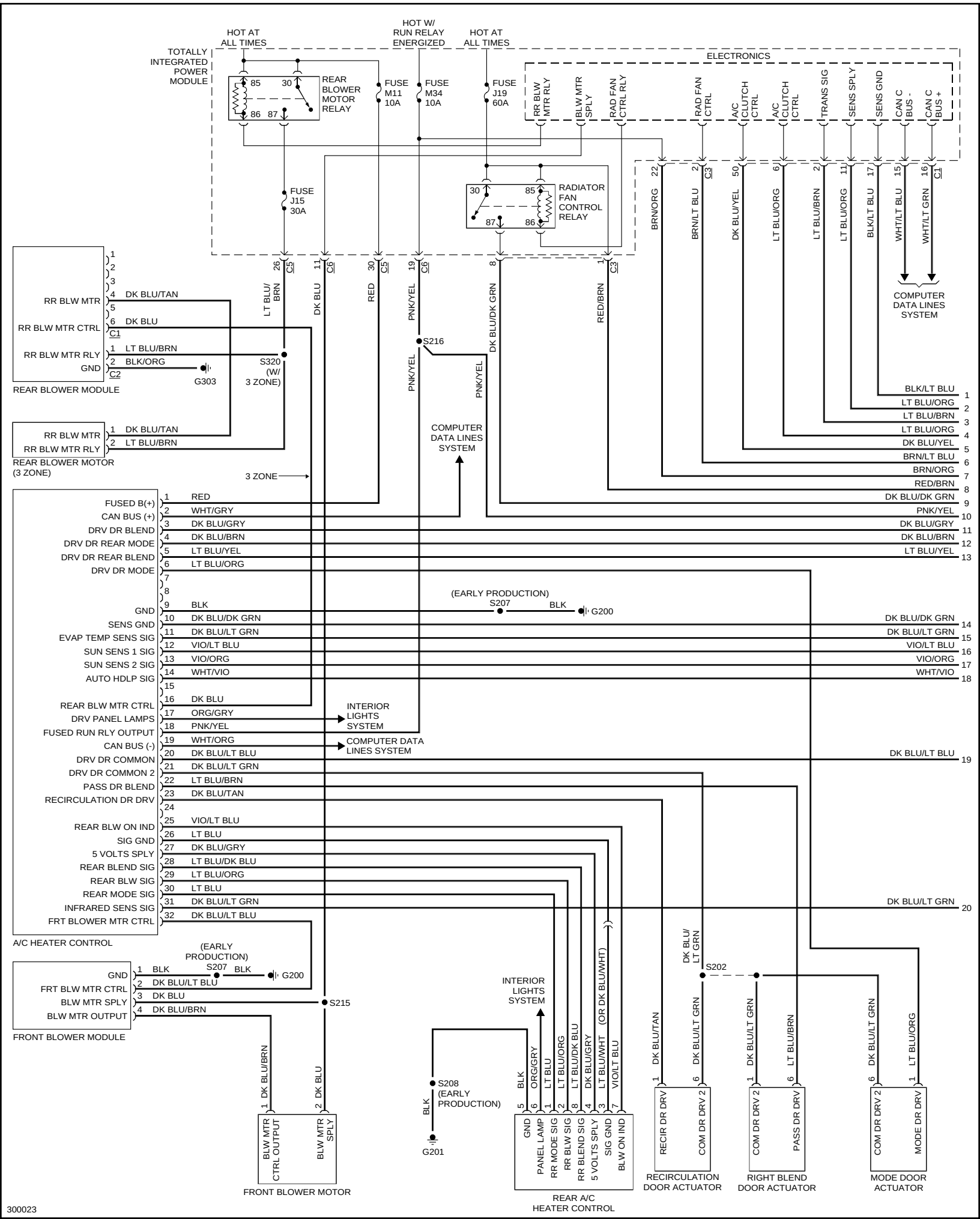
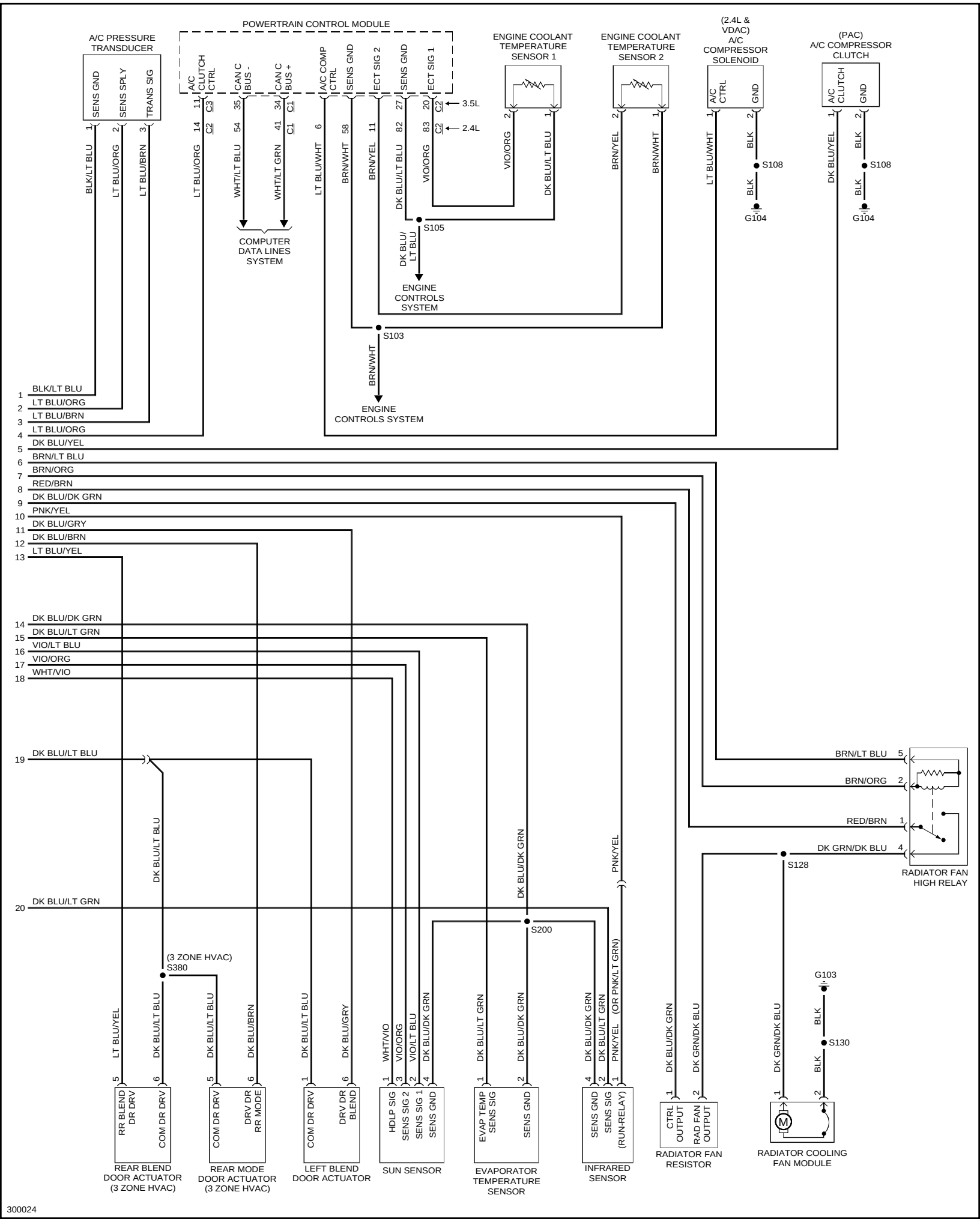
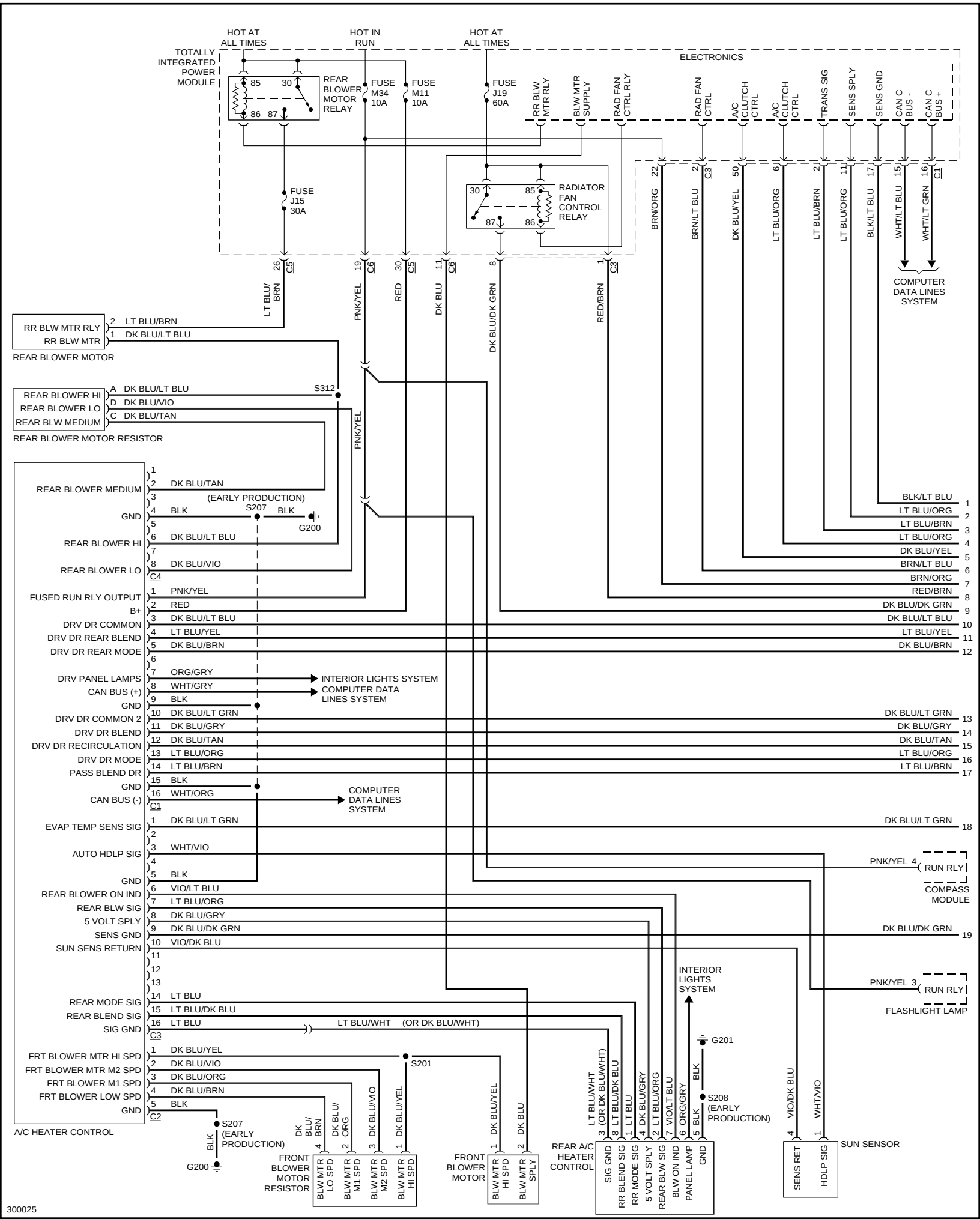


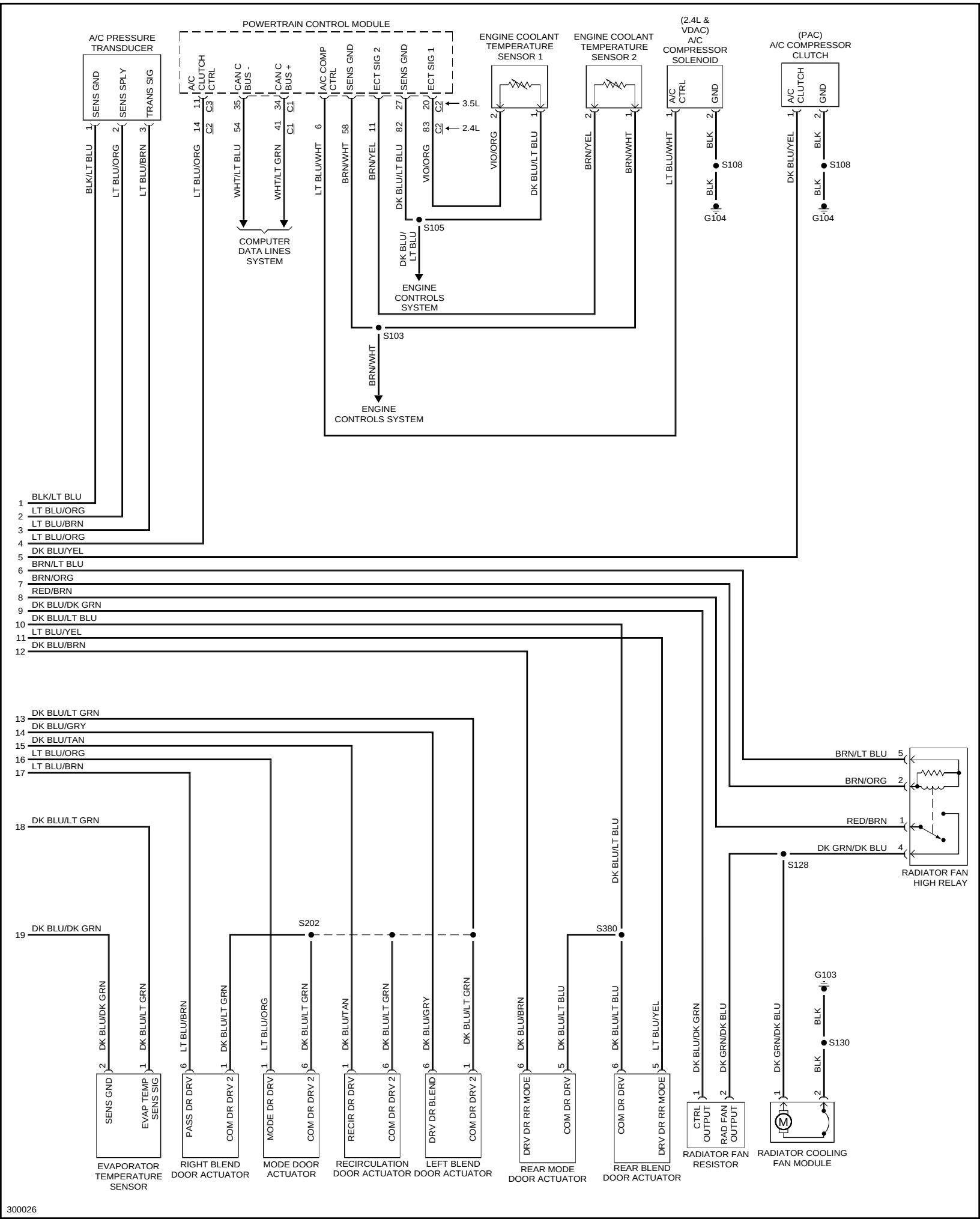
Fig. 10: Push Pin Fasteners & Rear Tail Lamp Assemblies
Courtesy of CHRYSLER LLC

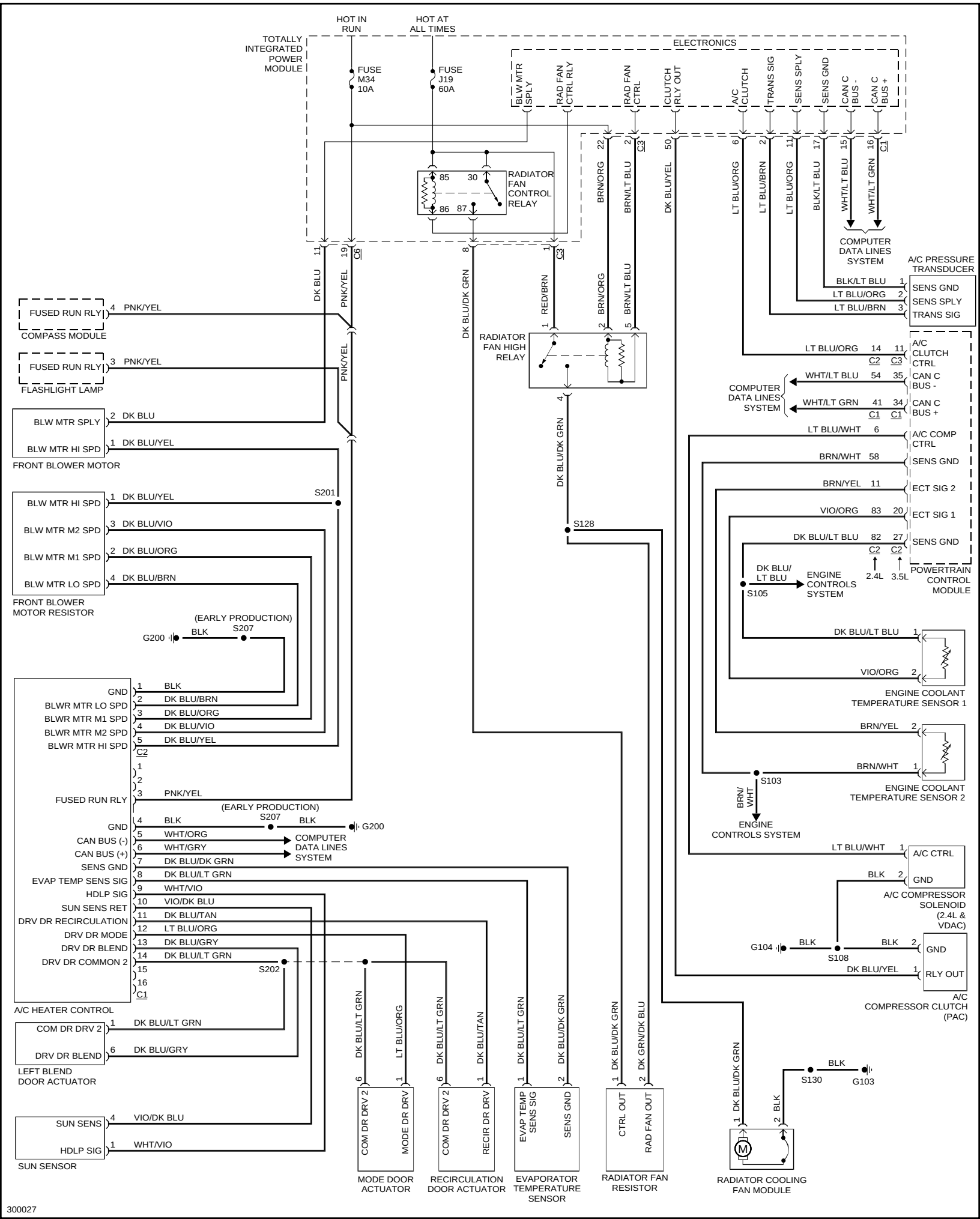
10. Install tail lamps assemblies (1) and install the push pin fasteners (2) fully.

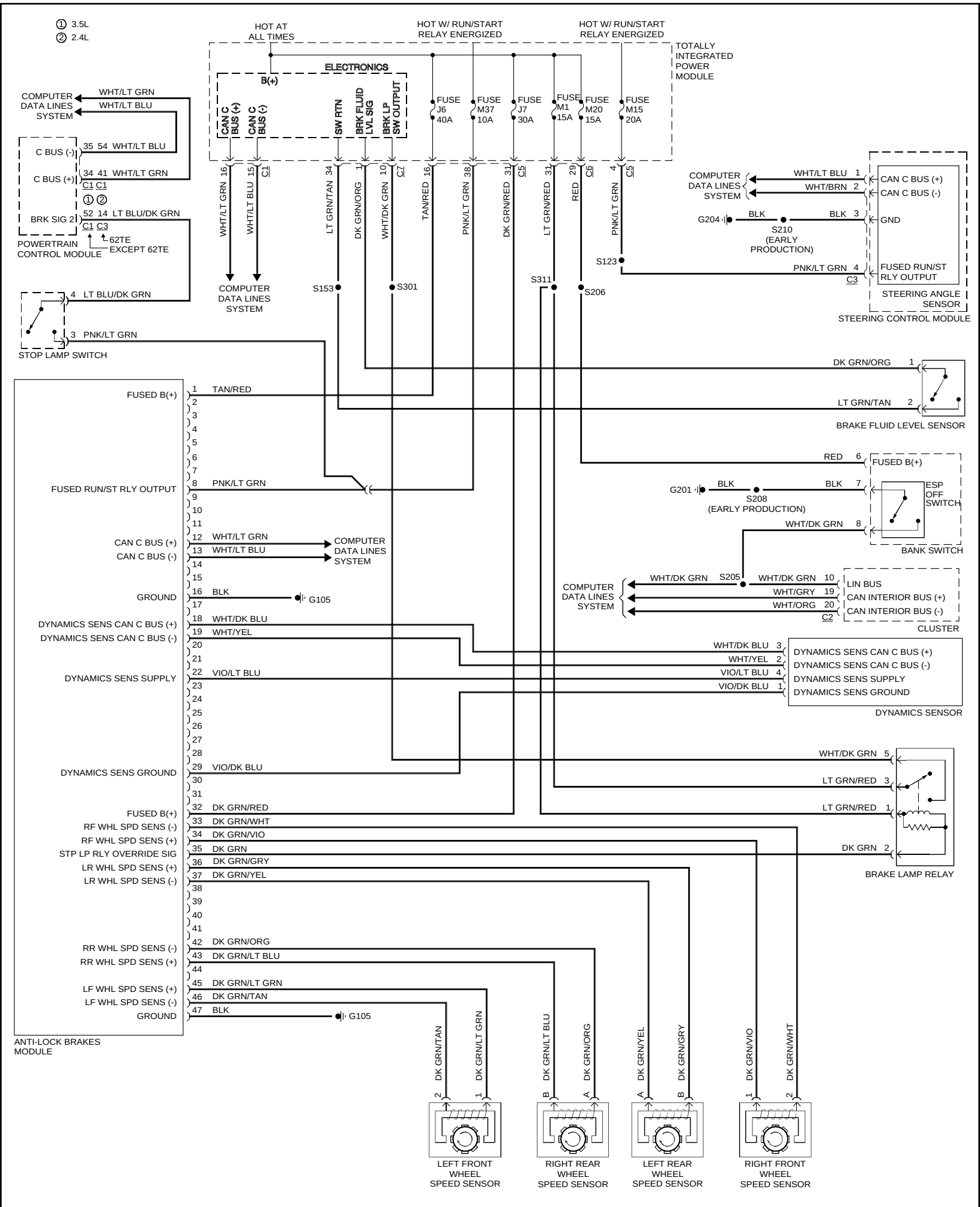

HOT AT ALL TIMES
HOT W/ RUN RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
REAR BLOWER MOTOR RELAY
FUSE M11 10A
FUSE M34 10A
FUSE J19 60A
FUSE J15 30A
RADIATOR FAN CONTROL RELAY
RR BLW MTR RLY
BLW MTR SPLY
RAD FAN CTRL RLY
RAD FAN CTRL
A/C CLUTCH CTRL
A/C CLUTCH CTRL
TRANS SIG
SENS SPLY
SENS GND
CAN C BUS -
CAN C BUS +
COMPUTER DATA LINES SYSTEM
REAR BLOWER MODULE
RR BLW MTR
RR BLW MTR CTRL
RR BLW MTR RLY
GND
S320 (W/ 3 ZONE)
G303
REAR BLOWER MOTOR (3 ZONE)
3 ZONE
S216
COMPUTER DATA LINES SYSTEM
A/C HEATER CONTROL
FUSED B(+)
CAN BUS (+)
DRV DR BLEND
DRV DR REAR MODE
DRV DR REAR BLEND
DRV DR MODE
SENS GND
EVAP TEMP SENS SIG
SUN SENS 1 SIG
SUN SENS 2 SIG
AUTO HDLP SIG
REAR BLW MTR CTRL
DRV PANEL LAMPS
FUSED RUN RLY OUTPUT
CAN BUS (-)
DRV DR COMMON
DRV DR COMMON 2
PASS DR BLEND
RECIRCULATION DR DRV
REAR BLW ON IND
SIG GND
5 VOLTS SPLY
REAR BLEND SIG
REAR BLW SIG
REAR MODE SIG
INFRARED SENS SIG
FRT BLOWER MTR CTRL
(EARLY PRODUCTION)
S207
G200
INTERIOR LIGHTS SYSTEM
COMPUTER DATA LINES SYSTEM
FRONT BLOWER MODULE
FRT BLW MTR CTRL
BLW MTR SPLY
BLW MTR OUTPUT
S215
S202
S208 (EARLY PRODUCTION)
G201
FRONT BLOWER MOTOR
BLW MTR CTRL OUTPUT
BLW MTR SPLY
REAR A/C HEATER CONTROL
PANEL LAMP
RR MODE SIG
RR BLW SIG
RR BLEND SIG
5 VOLTS SPLY
SIG GND
BLW ON IND
RECIRCULATION DOOR ACTUATOR
RECIR DR DRV
COM DR DRV 2
RIGHT BLEND DOOR ACTUATOR
PASS DR DRV
MODE DOOR ACTUATOR
MODE DR DRV
300023


POWERTRAIN CONTROL MODULE
A/C PRESSURE TRANSDUCER
SENS GND
SENS SPLY
TRANS SIG
A/C CLUTCH CTRL
CAN C BUS -
CAN C BUS +
A/C COMP CTRL
SENS GND
ECT SIG 2
SENS GND
ECT SIG 1
3.5L
2.4L
ENGINE COOLANT TEMPERATURE SENSOR 1
ENGINE COOLANT TEMPERATURE SENSOR 2
(2.4L & VDAC) A/C COMPRESSOR SOLENOID
A/C CTRL
GND
(PAC) A/C COMPRESSOR CLUTCH
A/C CLUTCH
GND
S108
G104
S105
S103
COMPUTER DATA LINES SYSTEM
ENGINE CONTROLS SYSTEM
ENGINE CONTROLS SYSTEM
BLK/LT BLU
LT BLU/ORG
LT BLU/BRN
LT BLU/ORG
DK BLU/YEL
BRN/LT BLU
BRN/ORG
RED/BRN
DK BLU/DK GRN
PNK/YEL
DK BLU/GRY
DK BLU/BRN
LT BLU/YEL
DK BLU/LT GRN
VIO/LT BLU
VIO/ORG
WHT/VIO
DK BLU/LT BLU
DK BLU/LT GRN
S200
S380
(3 ZONE HVAC)
RADIATOR FAN HIGH RELAY
S128
RADIATOR FAN RESISTOR
RADIATOR COOLING FAN MODULE
G103
S130
REAR BLEND DOOR ACTUATOR (3 ZONE HVAC)
REAR MODE DOOR ACTUATOR (3 ZONE HVAC)
LEFT BLEND DOOR ACTUATOR
SUN SENSOR
EVAPORATOR TEMPERATURE SENSOR
INFRARED SENSOR
300024

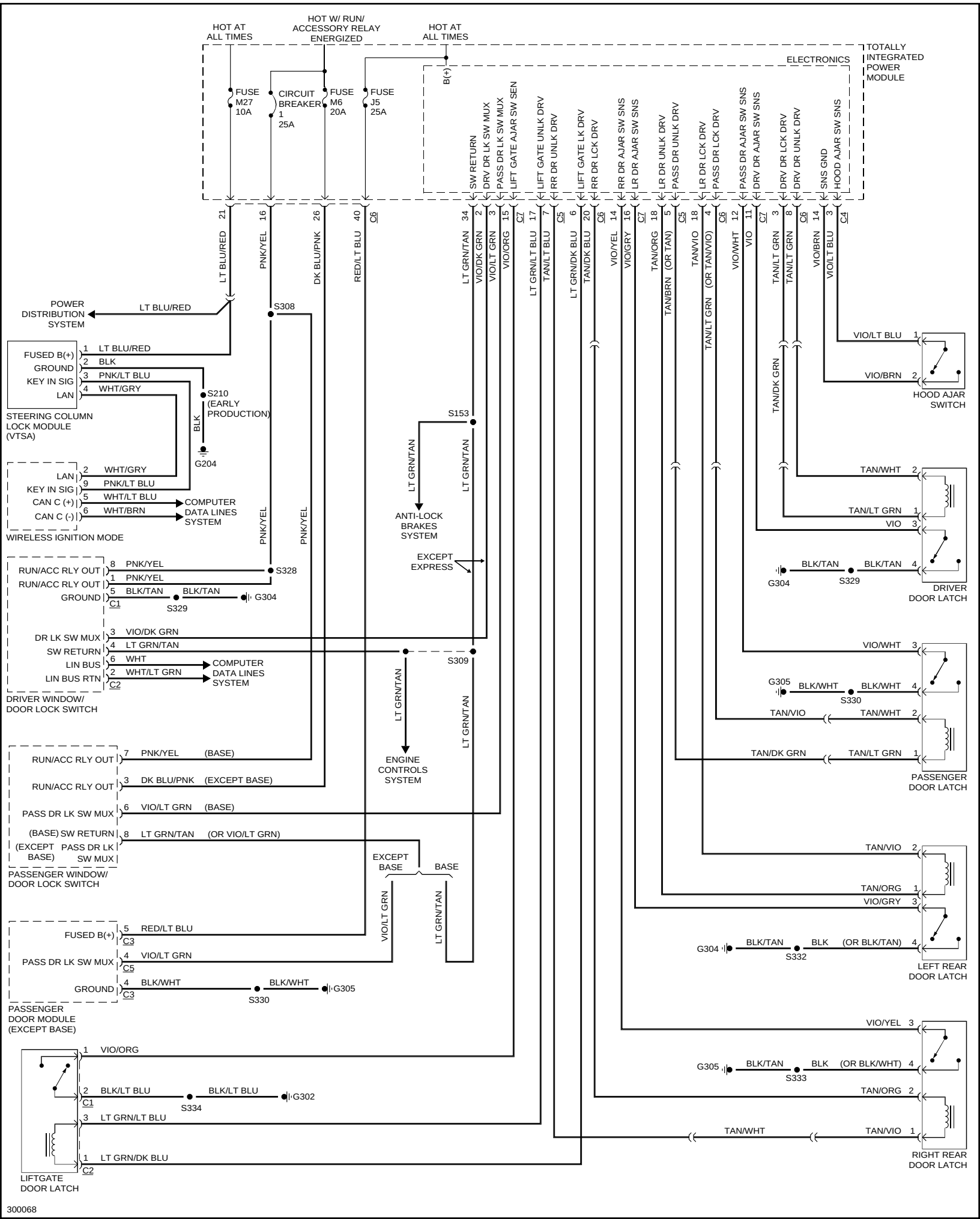

HOT AT ALL TIMES
HOT IN RUN
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
REAR BLOWER MOTOR RELAY
FUSE M34 10A
FUSE M11 10A
FUSE J19 60A
FUSE J15 30A
RADIATOR FAN CONTROL RELAY
RR BLW MTR RLY
BLW MTR SUPPLY
RAD FAN CTRL RLY
RAD FAN CTRL
A/C CLUTCH CTRL
A/C CLUTCH CTRL
TRANS SIG
SENS SPLY
SENS GND
CAN C BUS -
CAN C BUS +
COMPUTER DATA LINES SYSTEM
RR BLW MTR RLY
RR BLW MTR
REAR BLOWER MOTOR
REAR BLOWER HI
REAR BLOWER LO
REAR BLW MEDIUM
REAR BLOWER MOTOR RESISTOR
S312
PNK/YEL
REAR BLOWER MEDIUM
(EARLY PRODUCTION)
S207
G200
REAR BLOWER HI
REAR BLOWER LO
FUSED RUN RLY OUTPUT
B+
DRV DR COMMON
DRV DR REAR BLEND
DRV DR REAR MODE
DRV PANEL LAMPS
INTERIOR LIGHTS SYSTEM
CAN BUS (+)
COMPUTER DATA LINES SYSTEM
GND
DRV DR COMMON 2
DRV DR BLEND
DRV DR RECIRCULATION
DRV DR MODE
PASS BLEND DR
GND
CAN BUS (-)
COMPUTER DATA LINES SYSTEM
EVAP TEMP SENS SIG
AUTO HDLP SIG
GND
REAR BLOWER ON IND
REAR BLW SIG
5 VOLT SPLY
SENS GND
SUN SENS RETURN
PNK/YEL 4
RUN RLY
COMPASS MODULE
PNK/YEL 3
RUN RLY
FLASHLIGHT LAMP
REAR MODE SIG
REAR BLEND SIG
SIG GND
LT BLU/WHT (OR DK BLU/WHT)
INTERIOR LIGHTS SYSTEM
G201
S208 (EARLY PRODUCTION)
FRT BLOWER MTR HI SPD
FRT BLOWER MTR M2 SPD
FRT BLOWER M1 SPD
FRT BLOWER LOW SPD
GND
A/C HEATER CONTROL
S207 (EARLY PRODUCTION)
G200
S201
FRONT BLOWER MOTOR RESISTOR
FRONT BLOWER MOTOR
REAR A/C HEATER CONTROL
SUN SENSOR
SENS RET
HDLP SIG
300025

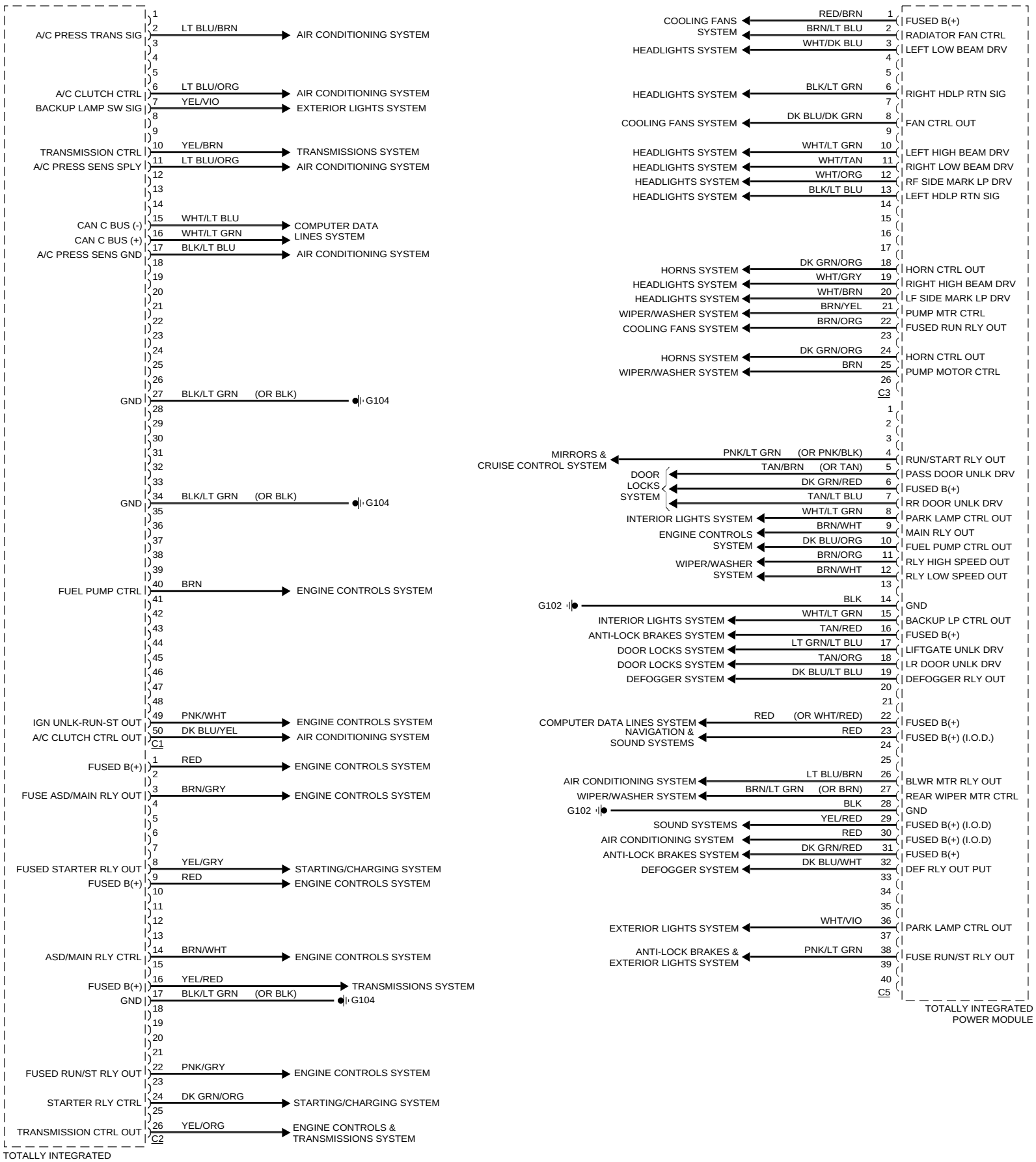

POWERTRAIN CONTROL MODULE
A/C PRESSURE TRANSDUCER
SENS GND
SENS SPLY
TRANS SIG
A/C CLUTCH CTRL
CAN C BUS -
CAN C BUS +
A/C COMP CTRL
SENS GND
ECT SIG 2
SENS GND
ECT SIG 1
3.5L
2.4L
ENGINE COOLANT TEMPERATURE SENSOR 1
ENGINE COOLANT TEMPERATURE SENSOR 2
(2.4L & VDAC) A/C COMPRESSOR SOLENOID
A/C CTRL
GND
(PAC) A/C COMPRESSOR CLUTCH
A/C CLUTCH
GND
BLK/LT BLU
LT BLU/ORG
LT BLU/BRN
LT BLU/ORG
WHT/LT BLU
WHT/LT GRN
LT BLU/WHT
BRN/WHT
BRN/YEL
DK BLU/LT BLU
VIO/ORG
VIO/ORG
DK BLU/LT BLU
BRN/YEL
BRN/WHT
LT BLU/WHT
DK BLU/YEL
BLK
S108
BLK
G104
BLK
S108
BLK
G104
S105
DK BLU/ LT BLU
ENGINE CONTROLS SYSTEM
COMPUTER DATA LINES SYSTEM
S103
BRN/WHT
ENGINE CONTROLS SYSTEM
1 BLK/LT BLU
2 LT BLU/ORG
3 LT BLU/BRN
4 LT BLU/ORG
5 DK BLU/YEL
6 BRN/LT BLU
7 BRN/ORG
8 RED/BRN
9 DK BLU/DK GRN
10 DK BLU/LT BLU
11 LT BLU/YEL
12 DK BLU/BRN
13 DK BLU/LT GRN
14 DK BLU/GRY
15 DK BLU/TAN
16 LT BLU/ORG
17 LT BLU/BRN
18 DK BLU/LT GRN
19 DK BLU/DK GRN
BRN/LT BLU 5
BRN/ORG 2
RED/BRN 1
DK GRN/DK BLU 4
RADIATOR FAN HIGH RELAY
S128
S202
S380
DK BLU/LT BLU
G103
BLK
S130
BLK
DK BLU/DK GRN
DK GRN/DK BLU
DK GRN/DK BLU
SENS GND
EVAP TEMP SENS SIG
EVAPORATOR TEMPERATURE SENSOR
PASS DR DRV
COM DR DRV 2
RIGHT BLEND DOOR ACTUATOR
MODE DR DRV
COM DR DRV 2
MODE DOOR ACTUATOR
RECIR DR DRV
COM DR DRV 2
RECIRCULATION DOOR ACTUATOR
DRV DR BLEND
COM DR DRV 2
LEFT BLEND DOOR ACTUATOR
DRV DR RR MODE
COM DR DRV
REAR MODE DOOR ACTUATOR
COM DR DRV
DRV DR RR MODE
REAR BLEND DOOR ACTUATOR
CTRL OUTPUT
RAD FAN OUTPUT
RADIATOR FAN RESISTOR
RADIATOR COOLING FAN MODULE
300026

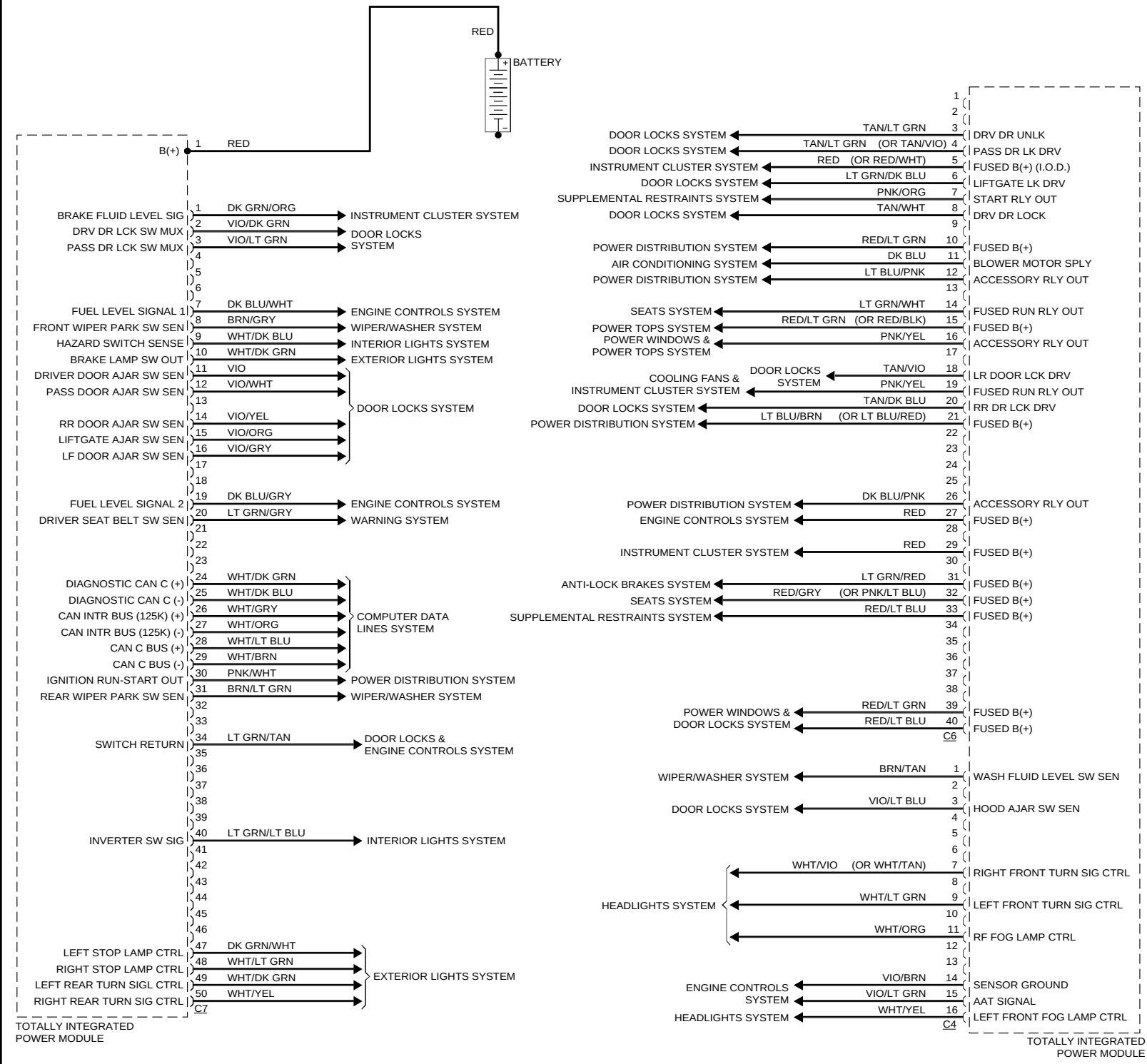

HOT IN RUN
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
FUSE M34 10A
FUSE J19 60A
ELECTRONICS
BLW MTR SPLY
RAD FAN CTRL RLY
RAD FAN CTRL
CLUTCH RLY OUT
A/C CLUTCH
TRANS SIG
SENS SPLY
SENS GND
CAN C BUS -
CAN C BUS +
RADIATOR FAN CONTROL RELAY
85
30
86
87
COMPUTER DATA LINES SYSTEM
A/C PRESSURE TRANSDUCER
SENS GND
SENS SPLY
TRANS SIG
RADIATOR FAN HIGH RELAY
A/C CLUTCH CTRL
CAN C BUS -
CAN C BUS +
A/C COMP CTRL
SENS GND
ECT SIG 2
ECT SIG 1
SENS GND
DK BLU/ LT BLU
ENGINE CONTROLS SYSTEM
S105
2.4L
3.5L
POWERTRAIN CONTROL MODULE
ENGINE COOLANT TEMPERATURE SENSOR 1
ENGINE COOLANT TEMPERATURE SENSOR 2
S103
BRN/ WHT
ENGINE CONTROLS SYSTEM
A/C CTRL
GND
A/C COMPRESSOR SOLENOID (2.4L & VDAC)
G104
S108
RLY OUT
A/C COMPRESSOR CLUTCH (PAC)
FUSED RUN RLY
COMPASS MODULE
FLASHLIGHT LAMP
BLW MTR SPLY
BLW MTR HI SPD
FRONT BLOWER MOTOR
BLW MTR M2 SPD
BLW MTR M1 SPD
BLW MTR LO SPD
FRONT BLOWER MOTOR RESISTOR
S201
S128
(EARLY PRODUCTION)
G200
S207
GND
BLWR MTR LO SPD
BLWR MTR M1 SPD
BLWR MTR M2 SPD
BLWR MTR HI SPD
C2
FUSED RUN RLY
(EARLY PRODUCTION)
CAN BUS (-)
CAN BUS (+)
SENS GND
EVAP TEMP SENS SIG
HDLP SIG
SUN SENS RET
DRV DR RECIRCULATION
DRV DR MODE
DRV DR BLEND
DRV DR COMMON 2
S202
C1
A/C HEATER CONTROL
COM DR DRV 2
DRV DR BLEND
LEFT BLEND DOOR ACTUATOR
SUN SENS
HDLP SIG
SUN SENSOR
MODE DOOR ACTUATOR
RECIRCULATION DOOR ACTUATOR
EVAPORATOR TEMPERATURE SENSOR
RADIATOR FAN RESISTOR
S130
G103
RADIATOR COOLING FAN MODULE
300027

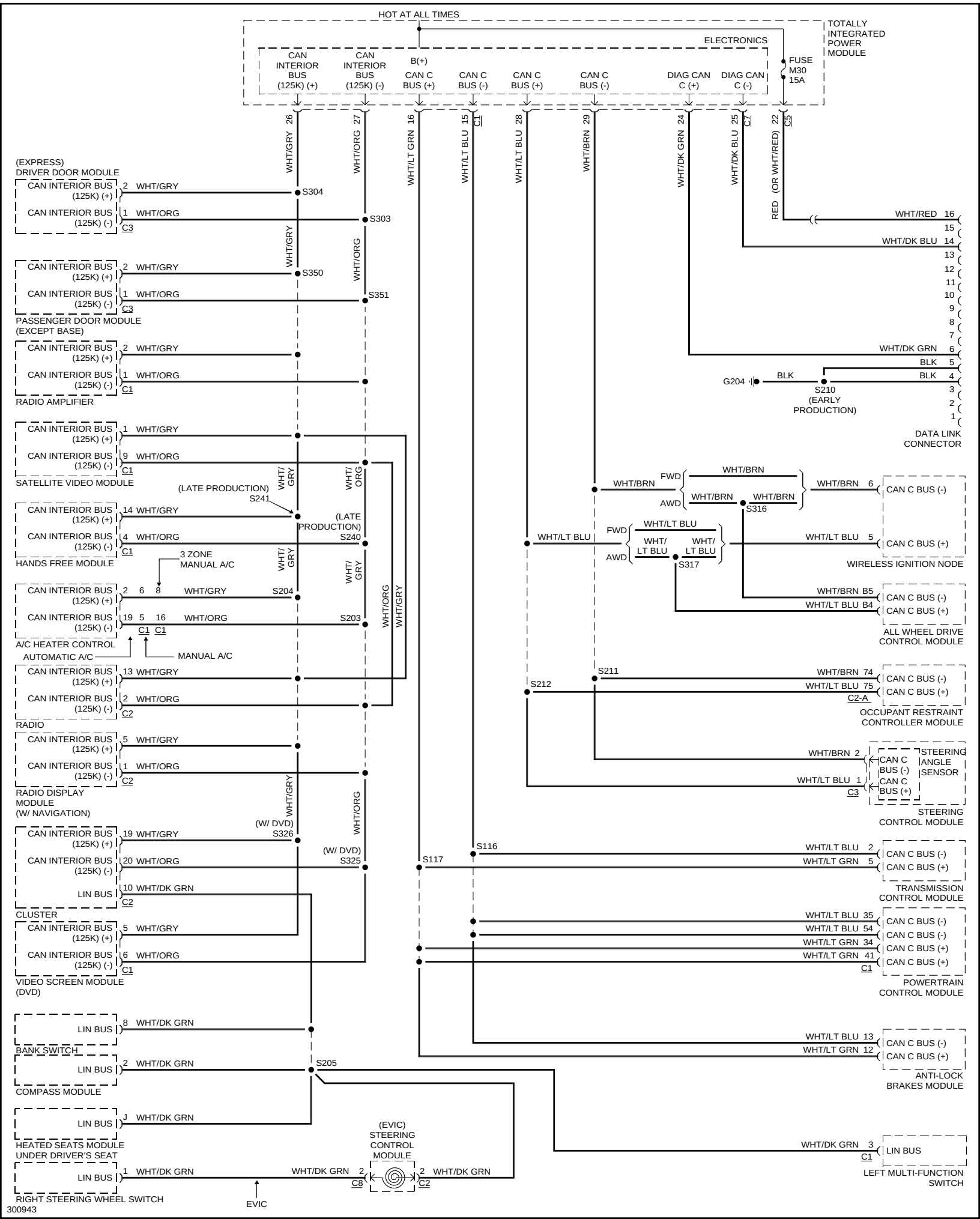

① 3.5L
② 2.4L
HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
HOT W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
CAN C BUS (+)
CAN C BUS (-)
SW RTN
BRK FLUID LVL SIG
BRK LP SW OUTPUT
FUSE J6 40A
FUSE M37 10A
FUSE J7 30A
FUSE M1 15A
FUSE M20 15A
FUSE M15 20A
COMPUTER DATA LINES SYSTEM
WHT/LT GRN
WHT/LT BLU
C BUS (-)
35 54 WHT/LT BLU
C BUS (+)
34 41 WHT/LT GRN
C1 C1
BRK SIG 2
52 14 LT BLU/DK GRN
C1 C3
POWERTRAIN CONTROL MODULE
62TE
EXCEPT 62TE
4 LT BLU/DK GRN
3 PNK/LT GRN
STOP LAMP SWITCH
WHT/LT GRN 16 C1
WHT/LT BLU 15 C1
LT GRN/TAN 34
DK GRN/ORG 1
WHT/DK GRN 10 C7
TAN/RED 16
PNK/LT GRN 38
DK GRN/RED 31 C5
LT GRN/RED 31
RED 29 C6
PNK/LT GRN 4 C5
COMPUTER DATA LINES SYSTEM
S153
S301
S311
S206
S123
COMPUTER DATA LINES SYSTEM
WHT/LT BLU 1
WHT/BRN 2
CAN C BUS (+)
CAN C BUS (-)
G204
BLK
S210 (EARLY PRODUCTION)
BLK 3
GND
PNK/LT GRN 4 C3
FUSED RUN/ST RLY OUTPUT
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
DK GRN/ORG 1
LT GRN/TAN 2
BRAKE FLUID LEVEL SENSOR
RED 6
FUSED B(+)
G201
BLK
S208 (EARLY PRODUCTION)
BLK 7
ESP OFF SWITCH
WHT/DK GRN 8
BANK SWITCH
S205
WHT/DK GRN 10
WHT/GRY 19
WHT/ORG 20 C2
LIN BUS
CAN INTERIOR BUS (+)
CAN INTERIOR BUS (-)
CLUSTER
WHT/DK BLU 3
WHT/YEL 2
VIO/LT BLU 4
VIO/DK BLU 1
DYNAMICS SENS CAN C BUS (+)
DYNAMICS SENS CAN C BUS (-)
DYNAMICS SENS SUPPLY
DYNAMICS SENS GROUND
DYNAMICS SENSOR
WHT/DK GRN 5
LT GRN/RED 3
LT GRN/RED 1
DK GRN 2
BRAKE LAMP RELAY
FUSED B(+) 1 TAN/RED
2
3
4
5
6
7
FUSED RUN/ST RLY OUTPUT 8 PNK/LT GRN
9
10
11
CAN C BUS (+) 12 WHT/LT GRN
CAN C BUS (-) 13 WHT/LT BLU
14
15
GROUND 16 BLK
G105
17
DYNAMICS SENS CAN C BUS (+) 18 WHT/DK BLU
DYNAMICS SENS CAN C BUS (-) 19 WHT/YEL
20
21
DYNAMICS SENS SUPPLY 22 VIO/LT BLU
23
24
25
26
27
28
DYNAMICS SENS GROUND 29 VIO/DK BLU
30
31
FUSED B(+) 32 DK GRN/RED
RF WHL SPD SENS (-) 33 DK GRN/WHT
RF WHL SPD SENS (+) 34 DK GRN/VIO
STP LP RLY OVERRIDE SIG 35 DK GRN
LR WHL SPD SENS (+) 36 DK GRN/GRY
LR WHL SPD SENS (-) 37 DK GRN/YEL
38
39
40
41
RR WHL SPD SENS (-) 42 DK GRN/ORG
RR WHL SPD SENS (+) 43 DK GRN/LT BLU
44
LF WHL SPD SENS (+) 45 DK GRN/LT GRN
LF WHL SPD SENS (-) 46 DK GRN/TAN
GROUND 47 BLK
G105
ANTI-LOCK BRAKES MODULE
DK GRN/TAN 2
DK GRN/LT GRN 1
DK GRN/LT BLU B
DK GRN/ORG A
DK GRN/YEL A
DK GRN/GRY B
DK GRN/VIO 1
DK GRN/WHT 2
LEFT FRONT WHEEL SPEED SENSOR
RIGHT REAR WHEEL SPEED SENSOR
LEFT REAR WHEEL SPEED SENSOR
RIGHT FRONT WHEEL SPEED SENSOR

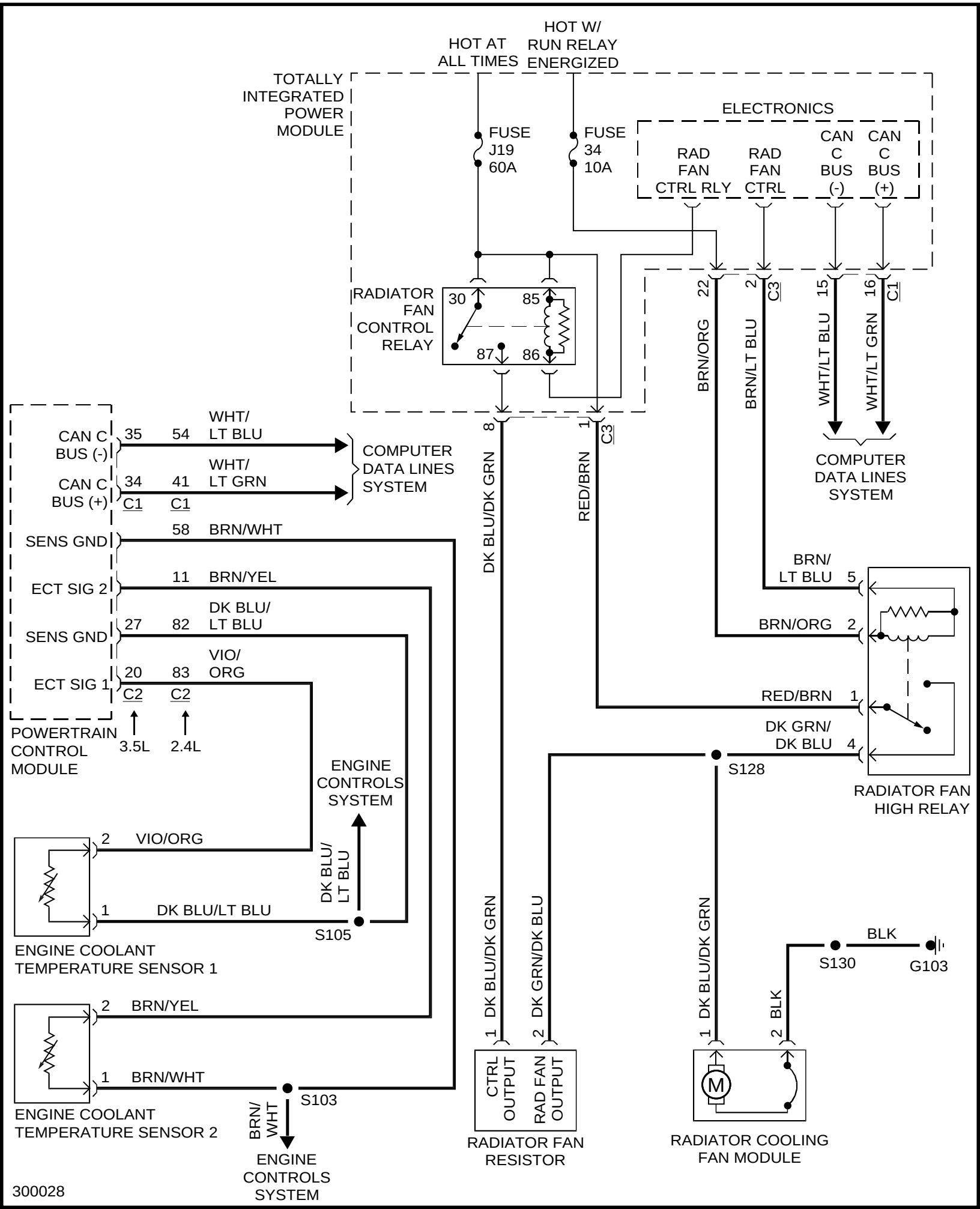
300038

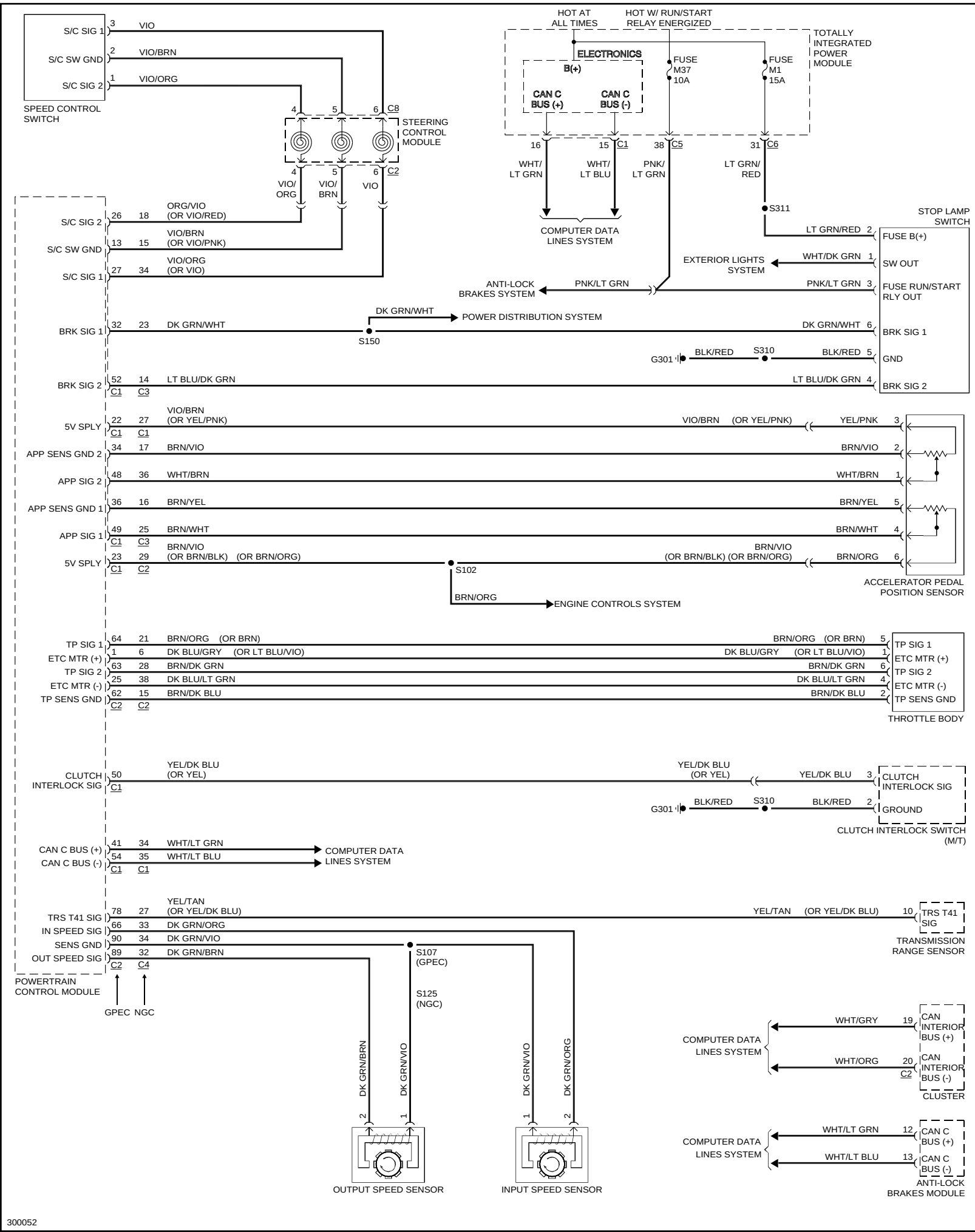

HOT AT ALL TIMES
HOT W/ RUN/ ACCESSORY RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
FUSE M27 10A
CIRCUIT BREAKER 1 25A
FUSE M6 20A
FUSE J5 25A
SW RETURN
DRV DR LK SW MUX
PASS DR LK SW MUX
LIFT GATE AJAR SW SEN
LIFT GATE UNLK DRV
RR DR UNLK DRV
LIFT GATE LK DRV
RR DR LCK DRV
RR DR AJAR SW SNS
LR DR AJAR SW SNS
LR DR UNLK DRV
PASS DR UNLK DRV
LR DR LCK DRV
PASS DR LCK DRV
PASS DR AJAR SW SNS
DRV DR AJAR SW SNS
DRV DR LCK DRV
DRV DR UNLK DRV
SNS GND
HOOD AJAR SW SNS
LT BLU/RED
PNK/YEL
DK BLU/PNK
RED/LT BLU
LT GRN/TAN
VIO/DK GRN
VIO/LT GRN
VIO/ORG
LT GRN/LT BLU
TAN/LT BLU
LT GRN/DK BLU
TAN/DK BLU
VIO/YEL
VIO/GRY
TAN/ORG
TAN/BRN (OR TAN)
TAN/VIO
TAN/LT GRN (OR TAN/VIO)
VIO/WHT
VIO
TAN/LT GRN
TAN/LT GRN
VIO/BRN
VIO/LT BLU
POWER DISTRIBUTION SYSTEM
LT BLU/RED
S308
FUSED B(+)
GROUND
KEY IN SIG
LAN
STEERING COLUMN LOCK MODULE (VTSA)
S210 (EARLY PRODUCTION)
BLK
G204
S153
ANTI-LOCK BRAKES SYSTEM
EXCEPT EXPRESS
WIRELESS IGNITION MODE
CAN C (+)
CAN C (-)
COMPUTER DATA LINES SYSTEM
RUN/ACC RLY OUT
S328
S329
G304
BLK/TAN
DRIVER WINDOW/ DOOR LOCK SWITCH
DR LK SW MUX
LIN BUS
LIN BUS RTN
S309
ENGINE CONTROLS SYSTEM
PASSENGER WINDOW/ DOOR LOCK SWITCH
(BASE)
(EXCEPT BASE)
PASS DR LK SW MUX
EXCEPT BASE
BASE
PASSENGER DOOR MODULE (EXCEPT BASE)
S330
G305
BLK/WHT
LIFTGATE DOOR LATCH
S334
G302
BLK/LT BLU
DRIVER DOOR LATCH
HOOD AJAR SWITCH
PASSENGER DOOR LATCH
LEFT REAR DOOR LATCH
RIGHT REAR DOOR LATCH
S332
S333
TAN/WHT
TAN/VIO
TAN/ORG
TAN/DK GRN
VIO/GRY
VIO/YEL
BLK/TAN
BLK
(OR BLK/TAN)
(OR BLK/WHT)
300068


A/C PRESS TRANS SIG
LT BLU/BRN
AIR CONDITIONING SYSTEM
A/C CLUTCH CTRL
LT BLU/ORG
AIR CONDITIONING SYSTEM
BACKUP LAMP SW SIG
YEL/VIO
EXTERIOR LIGHTS SYSTEM
TRANSMISSION CTRL
YEL/BRN
TRANSMISSIONS SYSTEM
A/C PRESS SENS SPLY
LT BLU/ORG
AIR CONDITIONING SYSTEM
CAN C BUS (-)
WHT/LT BLU
CAN C BUS (+)
WHT/LT GRN
COMPUTER DATA LINES SYSTEM
A/C PRESS SENS GND
BLK/LT BLU
AIR CONDITIONING SYSTEM
GND
BLK/LT GRN (OR BLK)
G104
GND
BLK/LT GRN (OR BLK)
G104
FUEL PUMP CTRL
BRN
ENGINE CONTROLS SYSTEM
IGN UNLK-RUN-ST OUT
PNK/WHT
ENGINE CONTROLS SYSTEM
A/C CLUTCH CTRL OUT
DK BLU/YEL
AIR CONDITIONING SYSTEM
C1
FUSED B(+)
RED
ENGINE CONTROLS SYSTEM
FUSE ASD/MAIN RLY OUT
BRN/GRY
ENGINE CONTROLS SYSTEM
FUSED STARTER RLY OUT
YEL/GRY
STARTING/CHARGING SYSTEM
FUSED B(+)
RED
ENGINE CONTROLS SYSTEM
ASD/MAIN RLY CTRL
BRN/WHT
ENGINE CONTROLS SYSTEM
FUSED B(+)
YEL/RED
TRANSMISSIONS SYSTEM
GND
BLK/LT GRN (OR BLK)
G104
FUSED RUN/ST RLY OUT
PNK/GRY
ENGINE CONTROLS SYSTEM
STARTER RLY CTRL
DK GRN/ORG
STARTING/CHARGING SYSTEM
TRANSMISSION CTRL OUT
YEL/ORG
ENGINE CONTROLS & TRANSMISSIONS SYSTEM
C2
TOTALLY INTEGRATED POWER MODULE
COOLING FANS SYSTEM
RED/BRN
FUSED B(+)
BRN/LT BLU
RADIATOR FAN CTRL
HEADLIGHTS SYSTEM
WHT/DK BLU
LEFT LOW BEAM DRV
HEADLIGHTS SYSTEM
BLK/LT GRN
RIGHT HDLP RTN SIG
COOLING FANS SYSTEM
DK BLU/DK GRN
FAN CTRL OUT
HEADLIGHTS SYSTEM
WHT/LT GRN
LEFT HIGH BEAM DRV
HEADLIGHTS SYSTEM
WHT/TAN
RIGHT LOW BEAM DRV
HEADLIGHTS SYSTEM
WHT/ORG
RF SIDE MARK LP DRV
HEADLIGHTS SYSTEM
BLK/LT BLU
LEFT HDLP RTN SIG
HORNS SYSTEM
DK GRN/ORG
HORN CTRL OUT
HEADLIGHTS SYSTEM
WHT/GRY
RIGHT HIGH BEAM DRV
HEADLIGHTS SYSTEM
WHT/BRN
LF SIDE MARK LP DRV
WIPER/WASHER SYSTEM
BRN/YEL
PUMP MTR CTRL
COOLING FANS SYSTEM
BRN/ORG
FUSED RUN RLY OUT
HORNS SYSTEM
DK GRN/ORG
HORN CTRL OUT
WIPER/WASHER SYSTEM
BRN
PUMP MOTOR CTRL
C3
MIRRORS & CRUISE CONTROL SYSTEM
PNK/LT GRN (OR PNK/BLK)
RUN/START RLY OUT
DOOR LOCKS SYSTEM
TAN/BRN (OR TAN)
PASS DOOR UNLK DRV
DK GRN/RED
FUSED B(+)
TAN/LT BLU
RR DOOR UNLK DRV
INTERIOR LIGHTS SYSTEM
WHT/LT GRN
PARK LAMP CTRL OUT
ENGINE CONTROLS SYSTEM
BRN/WHT
MAIN RLY OUT
DK BLU/ORG
FUEL PUMP CTRL OUT
WIPER/WASHER SYSTEM
BRN/ORG
RLY HIGH SPEED OUT
BRN/WHT
RLY LOW SPEED OUT
G102
BLK
GND
INTERIOR LIGHTS SYSTEM
WHT/LT GRN
BACKUP LP CTRL OUT
ANTI-LOCK BRAKES SYSTEM
TAN/RED
FUSED B(+)
DOOR LOCKS SYSTEM
LT GRN/LT BLU
LIFTGATE UNLK DRV
DOOR LOCKS SYSTEM
TAN/ORG
LR DOOR UNLK DRV
DEFOGGER SYSTEM
DK BLU/LT BLU
DEFOGGER RLY OUT
COMPUTER DATA LINES SYSTEM
RED (OR WHT/RED)
FUSED B(+)
NAVIGATION & SOUND SYSTEMS
RED
FUSED B(+) (I.O.D.)
AIR CONDITIONING SYSTEM
LT BLU/BRN
BLWR MTR RLY OUT
WIPER/WASHER SYSTEM
BRN/LT GRN (OR BRN)
REAR WIPER MTR CTRL
G102
BLK
GND
SOUND SYSTEMS
YEL/RED
FUSED B(+) (I.O.D)
AIR CONDITIONING SYSTEM
RED
FUSED B(+) (I.O.D)
ANTI-LOCK BRAKES SYSTEM
DK GRN/RED
FUSED B(+)
DEFOGGER SYSTEM
DK BLU/WHT
DEF RLY OUT PUT
EXTERIOR LIGHTS SYSTEM
WHT/VIO
PARK LAMP CTRL OUT
ANTI-LOCK BRAKES & EXTERIOR LIGHTS SYSTEM
PNK/LT GRN
FUSE RUN/ST RLY OUT
C5
TOTALLY INTEGRATED POWER MODULE

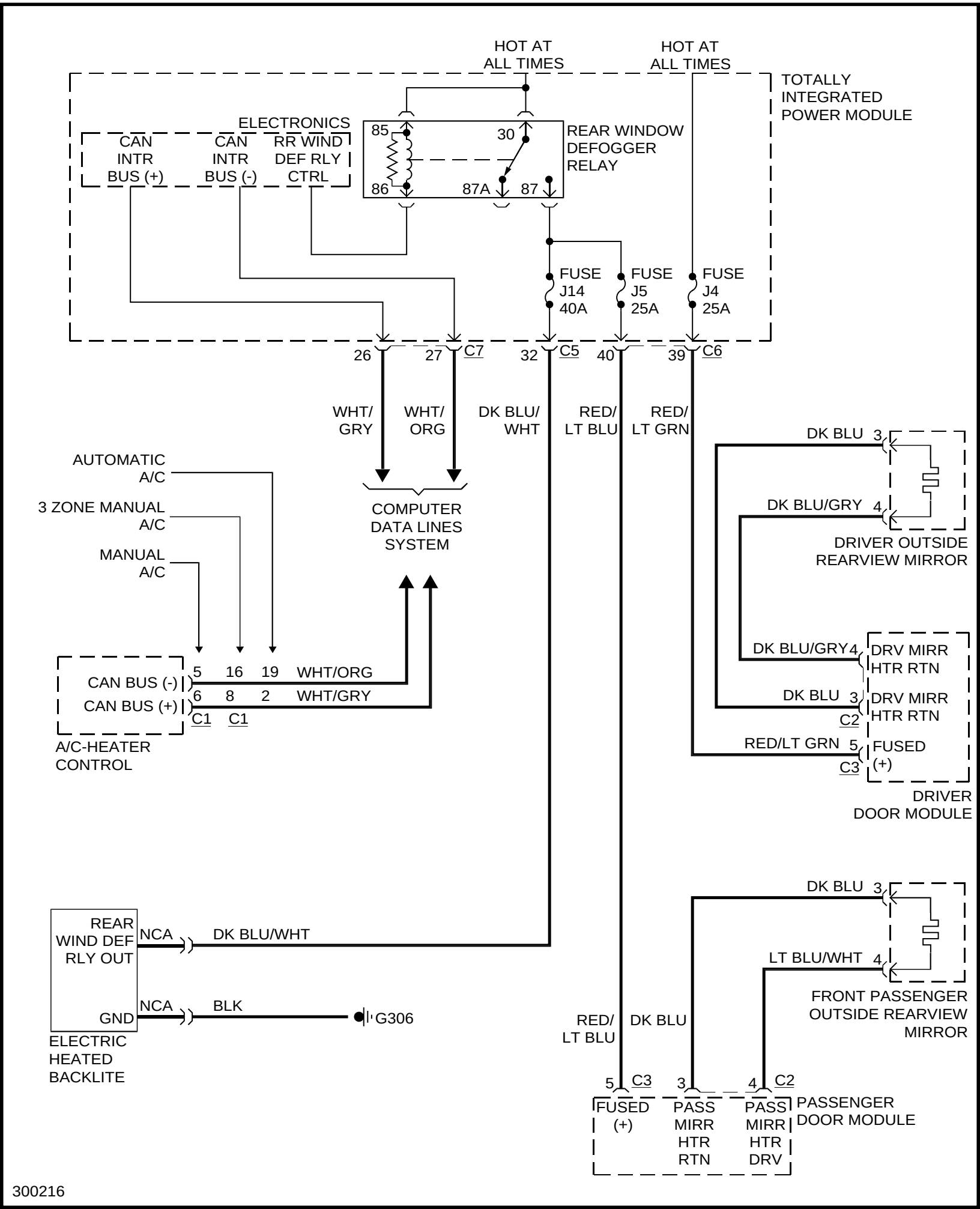

RED
BATTERY
+
-
B(+)
1
RED
BRAKE FLUID LEVEL SIG
DRV DR LCK SW MUX
PASS DR LCK SW MUX
1 DK GRN/ORG
2 VIO/DK GRN
3 VIO/LT GRN
INSTRUMENT CLUSTER SYSTEM
DOOR LOCKS SYSTEM
FUEL LEVEL SIGNAL 1
FRONT WIPER PARK SW SEN
HAZARD SWITCH SENSE
BRAKE LAMP SW OUT
7 DK BLU/WHT
8 BRN/GRY
9 WHT/DK BLU
10 WHT/DK GRN
ENGINE CONTROLS SYSTEM
WIPER/WASHER SYSTEM
INTERIOR LIGHTS SYSTEM
EXTERIOR LIGHTS SYSTEM
DRIVER DOOR AJAR SW SEN
PASS DOOR AJAR SW SEN
RR DOOR AJAR SW SEN
LIFTGATE AJAR SW SEN
LF DOOR AJAR SW SEN
11 VIO
12 VIO/WHT
14 VIO/YEL
15 VIO/ORG
16 VIO/GRY
DOOR LOCKS SYSTEM
FUEL LEVEL SIGNAL 2
DRIVER SEAT BELT SW SEN
19 DK BLU/GRY
20 LT GRN/GRY
ENGINE CONTROLS SYSTEM
WARNING SYSTEM
DIAGNOSTIC CAN C (+)
DIAGNOSTIC CAN C (-)
CAN INTR BUS (125K) (+)
CAN INTR BUS (125K) (-)
CAN C BUS (+)
CAN C BUS (-)
24 WHT/DK GRN
25 WHT/DK BLU
26 WHT/GRY
27 WHT/ORG
28 WHT/LT BLU
29 WHT/BRN
COMPUTER DATA LINES SYSTEM
IGNITION RUN-START OUT
REAR WIPER PARK SW SEN
30 PNK/WHT
31 BRN/LT GRN
POWER DISTRIBUTION SYSTEM
WIPER/WASHER SYSTEM
SWITCH RETURN
34 LT GRN/TAN
DOOR LOCKS & ENGINE CONTROLS SYSTEM
INVERTER SW SIG
40 LT GRN/LT BLU
INTERIOR LIGHTS SYSTEM
LEFT STOP LAMP CTRL
RIGHT STOP LAMP CTRL
LEFT REAR TURN SIGL CTRL
RIGHT REAR TURN SIG CTRL
47 DK GRN/WHT
48 WHT/LT GRN
49 WHT/DK GRN
50 WHT/YEL
C7
EXTERIOR LIGHTS SYSTEM
TOTALLY INTEGRATED POWER MODULE
DOOR LOCKS SYSTEM
TAN/LT GRN 3
DRV DR UNLK
DOOR LOCKS SYSTEM
TAN/LT GRN (OR TAN/VIO) 4
PASS DR LK DRV
INSTRUMENT CLUSTER SYSTEM
RED (OR RED/WHT) 5
FUSED B(+) (I.O.D.)
DOOR LOCKS SYSTEM
LT GRN/DK BLU 6
LIFTGATE LK DRV
SUPPLEMENTAL RESTRAINTS SYSTEM
PNK/ORG 7
START RLY OUT
DOOR LOCKS SYSTEM
TAN/WHT 8
DRV DR LOCK
POWER DISTRIBUTION SYSTEM
RED/LT GRN 10
FUSED B(+)
AIR CONDITIONING SYSTEM
DK BLU 11
BLOWER MOTOR SPLY
POWER DISTRIBUTION SYSTEM
LT BLU/PNK 12
ACCESSORY RLY OUT
SEATS SYSTEM
LT GRN/WHT 14
FUSED RUN RLY OUT
POWER TOPS SYSTEM
RED/LT GRN (OR RED/BLK) 15
FUSED B(+)
POWER WINDOWS & POWER TOPS SYSTEM
PNK/YEL 16
ACCESSORY RLY OUT
COOLING FANS & INSTRUMENT CLUSTER SYSTEM
DOOR LOCKS SYSTEM
TAN/VIO 18
LR DOOR LCK DRV
PNK/YEL 19
FUSED RUN RLY OUT
DOOR LOCKS SYSTEM
TAN/DK BLU 20
RR DR LCK DRV
POWER DISTRIBUTION SYSTEM
LT BLU/BRN (OR LT BLU/RED) 21
FUSED B(+)
POWER DISTRIBUTION SYSTEM
DK BLU/PNK 26
ACCESSORY RLY OUT
ENGINE CONTROLS SYSTEM
RED 27
FUSED B(+)
INSTRUMENT CLUSTER SYSTEM
RED 29
FUSED B(+)
ANTI-LOCK BRAKES SYSTEM
LT GRN/RED 31
FUSED B(+)
SEATS SYSTEM
RED/GRY (OR PNK/LT BLU) 32
FUSED B(+)
SUPPLEMENTAL RESTRAINTS SYSTEM
RED/LT BLU 33
FUSED B(+)
POWER WINDOWS & DOOR LOCKS SYSTEM
RED/LT GRN 39
FUSED B(+)
RED/LT BLU 40
FUSED B(+)
C6
WIPER/WASHER SYSTEM
BRN/TAN 1
WASH FLUID LEVEL SW SEN
DOOR LOCKS SYSTEM
VIO/LT BLU 3
HOOD AJAR SW SEN
HEADLIGHTS SYSTEM
WHT/VIO (OR WHT/TAN) 7
RIGHT FRONT TURN SIG CTRL
WHT/LT GRN 9
LEFT FRONT TURN SIG CTRL
WHT/ORG 11
RF FOG LAMP CTRL
ENGINE CONTROLS SYSTEM
VIO/BRN 14
SENSOR GROUND
VIO/LT GRN 15
AAT SIGNAL
HEADLIGHTS SYSTEM
WHT/YEL 16
LEFT FRONT FOG LAMP CTRL
C4
TOTALLY INTEGRATED POWER MODULE

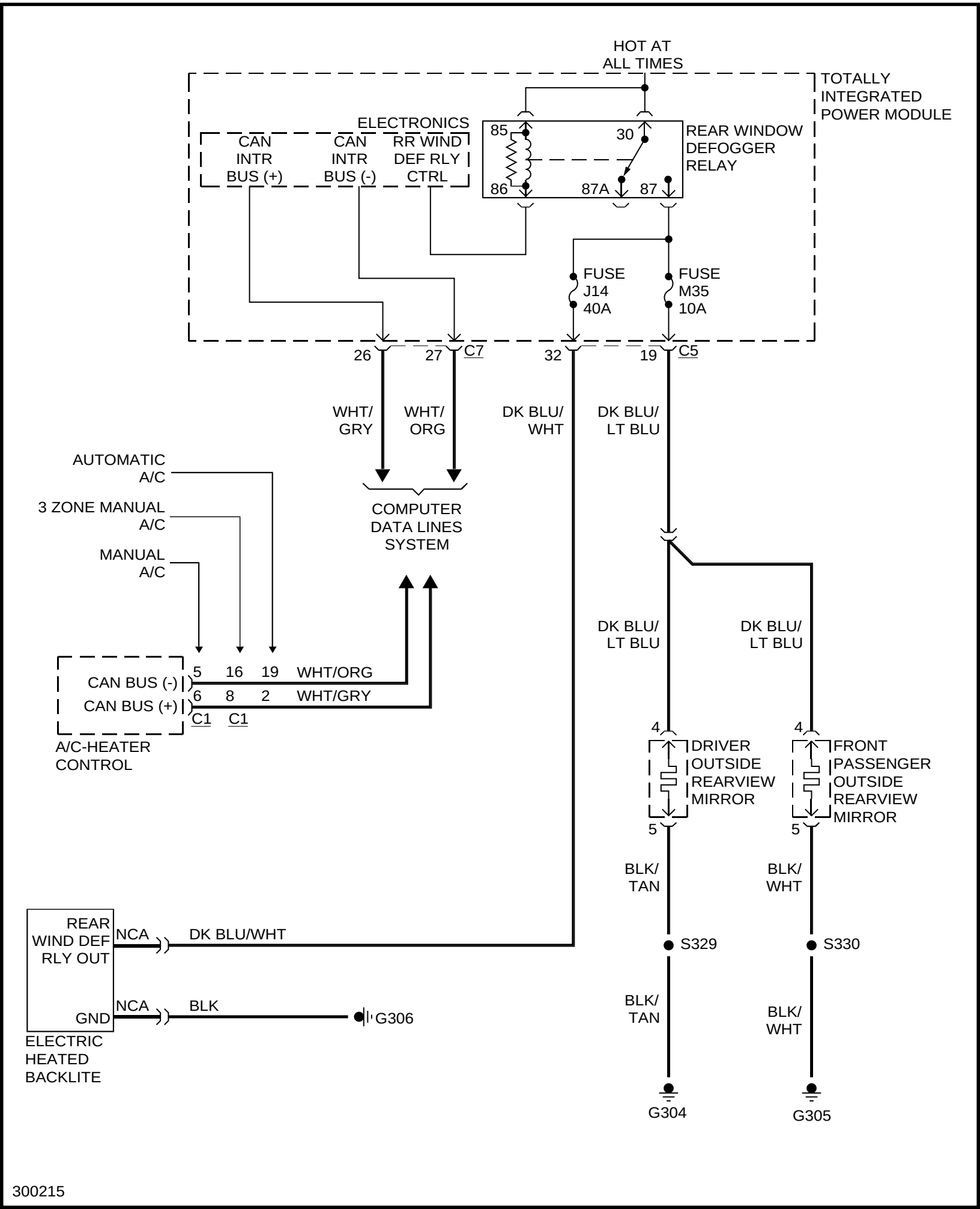

HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
CAN INTERIOR BUS (125K) (+)
CAN INTERIOR BUS (125K) (-)
B(+)
CAN C BUS (+)
CAN C BUS (-)
CAN C BUS (+)
CAN C BUS (-)
DIAG CAN C (+)
DIAG CAN C (-)
FUSE M30 15A
WHT/GRY
WHT/ORG
WHT/LT GRN
WHT/LT BLU
WHT/BRN
WHT/DK GRN
WHT/DK BLU
RED (OR WHT/RED)
(EXPRESS) DRIVER DOOR MODULE
PASSENGER DOOR MODULE (EXCEPT BASE)
RADIO AMPLIFIER
SATELLITE VIDEO MODULE
HANDS FREE MODULE
A/C HEATER CONTROL
AUTOMATIC A/C
MANUAL A/C
3 ZONE MANUAL A/C
RADIO
RADIO DISPLAY MODULE (W/ NAVIGATION)
CLUSTER
VIDEO SCREEN MODULE (DVD)
BANK SWITCH
COMPASS MODULE
HEATED SEATS MODULE UNDER DRIVER'S SEAT
RIGHT STEERING WHEEL SWITCH
EVIC
(EVIC) STEERING CONTROL MODULE
(LATE PRODUCTION)
(W/ DVD)
S241
S304
S303
S350
S351
S204
S203
S240
S326
S325
S116
S117
S205
S212
S211
S316
S317
G204
S210 (EARLY PRODUCTION)
DATA LINK CONNECTOR
FWD
AWD
WHT/RED 16
WHT/DK BLU 14
WHT/DK GRN 6
BLK 5
BLK 4
CAN C BUS (-)
CAN C BUS (+)
WIRELESS IGNITION NODE
ALL WHEEL DRIVE CONTROL MODULE
OCCUPANT RESTRAINT CONTROLLER MODULE
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
TRANSMISSION CONTROL MODULE
POWERTRAIN CONTROL MODULE
ANTI-LOCK BRAKES MODULE
LEFT MULTI-FUNCTION SWITCH
LIN BUS
300943


HOT AT ALL TIMES
HOT W/ RUN RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE J19 60A
FUSE 34 10A
RAD FAN CTRL RLY
RAD FAN CTRL
CAN C BUS (-)
CAN C BUS (+)
RADIATOR FAN CONTROL RELAY
30
85
87
86
22
2
C3
15
16
C1
BRN/ORG
BRN/LT BLU
WHT/LT BLU
WHT/LT GRN
COMPUTER DATA LINES SYSTEM
8
1
C3
DK BLU/DK GRN
RED/BRN
CAN C BUS (-)
35
54
WHT/ LT BLU
CAN C BUS (+)
34
41
WHT/ LT GRN
C1
C1
SENS GND
58
BRN/WHT
ECT SIG 2
11
BRN/YEL
SENS GND
27
82
DK BLU/ LT BLU
ECT SIG 1
20
83
VIO/ ORG
C2
C2
POWERTRAIN CONTROL MODULE
3.5L
2.4L
BRN/ LT BLU
5
BRN/ORG
2
RED/BRN
1
DK GRN/ DK BLU
4
S128
RADIATOR FAN HIGH RELAY
ENGINE CONTROLS SYSTEM
2
VIO/ORG
1
DK BLU/LT BLU
DK BLU/ LT BLU
S105
ENGINE COOLANT TEMPERATURE SENSOR 1
2
BRN/YEL
1
BRN/WHT
S103
ENGINE COOLANT TEMPERATURE SENSOR 2
BRN/ WHT
ENGINE CONTROLS SYSTEM
1
DK BLU/DK GRN
2
DK GRN/DK BLU
CTRL OUTPUT
RAD FAN OUTPUT
RADIATOR FAN RESISTOR
1
DK BLU/DK GRN
2
BLK
S130
BLK
G103
M
RADIATOR COOLING FAN MODULE
300028

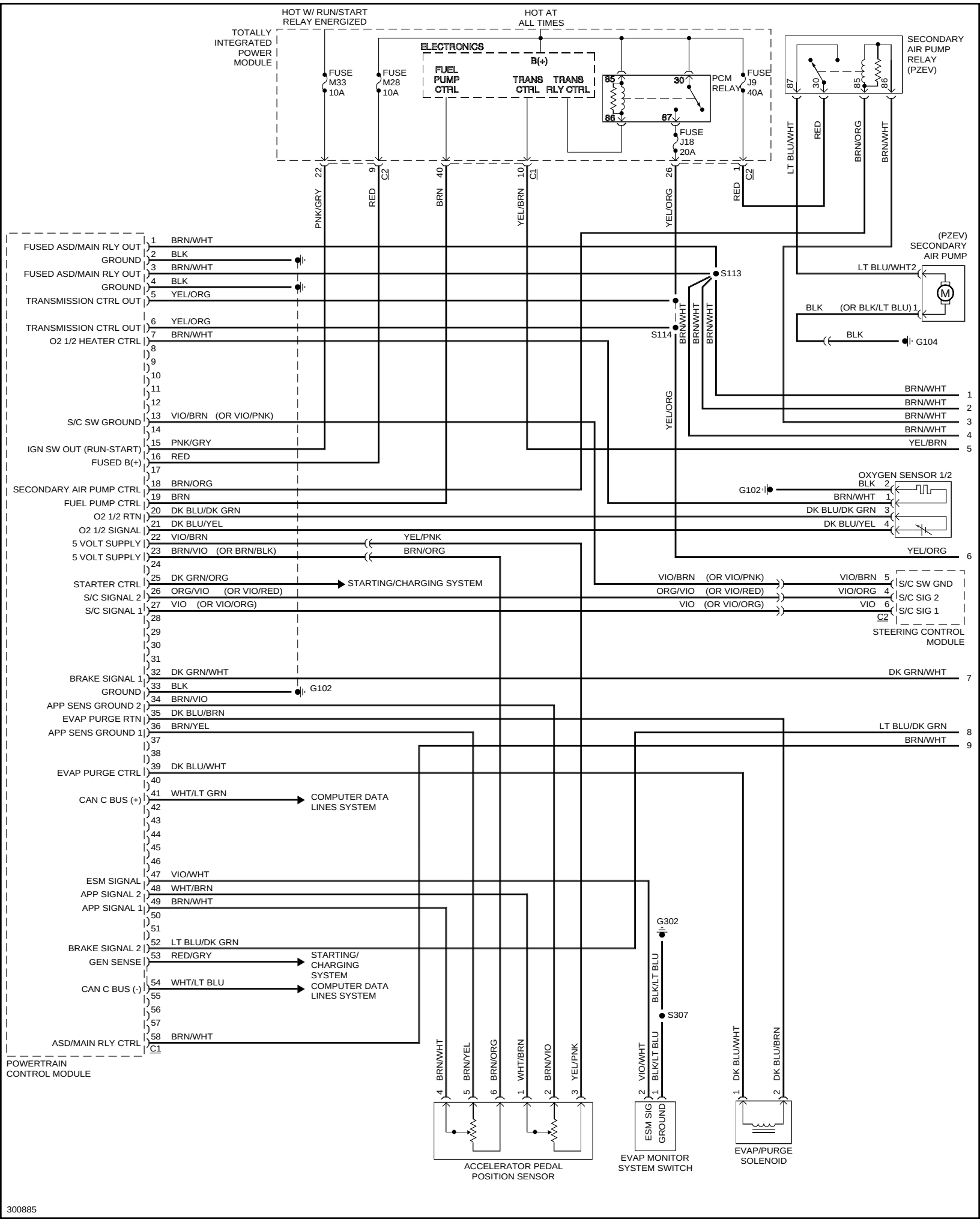

SPEED CONTROL SWITCH
S/C SIG 1
S/C SW GND
S/C SIG 2
VIO
VIO/BRN
VIO/ORG
STEERING CONTROL MODULE
C8
C2
VIO/ORG
VIO/BRN
VIO
HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
CAN C BUS (+)
CAN C BUS (-)
FUSE M37 10A
FUSE M1 15A
C1
C5
C6
WHT/LT GRN
WHT/LT BLU
PNK/LT GRN
LT GRN/RED
COMPUTER DATA LINES SYSTEM
S311
STOP LAMP SWITCH
LT GRN/RED
FUSE B(+)
EXTERIOR LIGHTS SYSTEM
WHT/DK GRN
SW OUT
ANTI-LOCK BRAKES SYSTEM
PNK/LT GRN
FUSE RUN/START RLY OUT
ORG/VIO (OR VIO/RED)
VIO/BRN (OR VIO/PNK)
VIO/ORG (OR VIO)
DK GRN/WHT
POWER DISTRIBUTION SYSTEM
BRK SIG 1
S150
DK GRN/WHT
BRK SIG 1
G301
BLK/RED
S310
GND
BRK SIG 2
LT BLU/DK GRN
5V SPLY
APP SENS GND 2
APP SIG 2
APP SENS GND 1
APP SIG 1
VIO/BRN (OR YEL/PNK)
BRN/VIO
WHT/BRN
BRN/YEL
BRN/WHT
BRN/VIO (OR BRN/BLK) (OR BRN/ORG)
S102
BRN/ORG
ENGINE CONTROLS SYSTEM
ACCELERATOR PEDAL POSITION SENSOR
TP SIG 1
ETC MTR (+)
TP SIG 2
ETC MTR (-)
TP SENS GND
BRN/ORG (OR BRN)
DK BLU/GRY (OR LT BLU/VIO)
BRN/DK GRN
DK BLU/LT GRN
BRN/DK BLU
THROTTLE BODY
CLUTCH INTERLOCK SIG
YEL/DK BLU (OR YEL)
GROUND
CLUTCH INTERLOCK SWITCH (M/T)
CAN C BUS (+)
CAN C BUS (-)
WHT/LT GRN
WHT/LT BLU
COMPUTER DATA LINES SYSTEM
TRS T41 SIG
IN SPEED SIG
SENS GND
OUT SPEED SIG
YEL/TAN (OR YEL/DK BLU)
DK GRN/ORG
DK GRN/VIO
DK GRN/BRN
TRANSMISSION RANGE SENSOR
POWERTRAIN CONTROL MODULE
GPEC
NGC
S107 (GPEC)
S125 (NGC)
DK GRN/BRN
DK GRN/VIO
DK GRN/VIO
DK GRN/ORG
OUTPUT SPEED SENSOR
INPUT SPEED SENSOR
WHT/GRY
WHT/ORG
CAN INTERIOR BUS (+)
CAN INTERIOR BUS (-)
CLUSTER
WHT/LT GRN
WHT/LT BLU
CAN C BUS (+)
CAN C BUS (-)
ANTI-LOCK BRAKES MODULE

300052

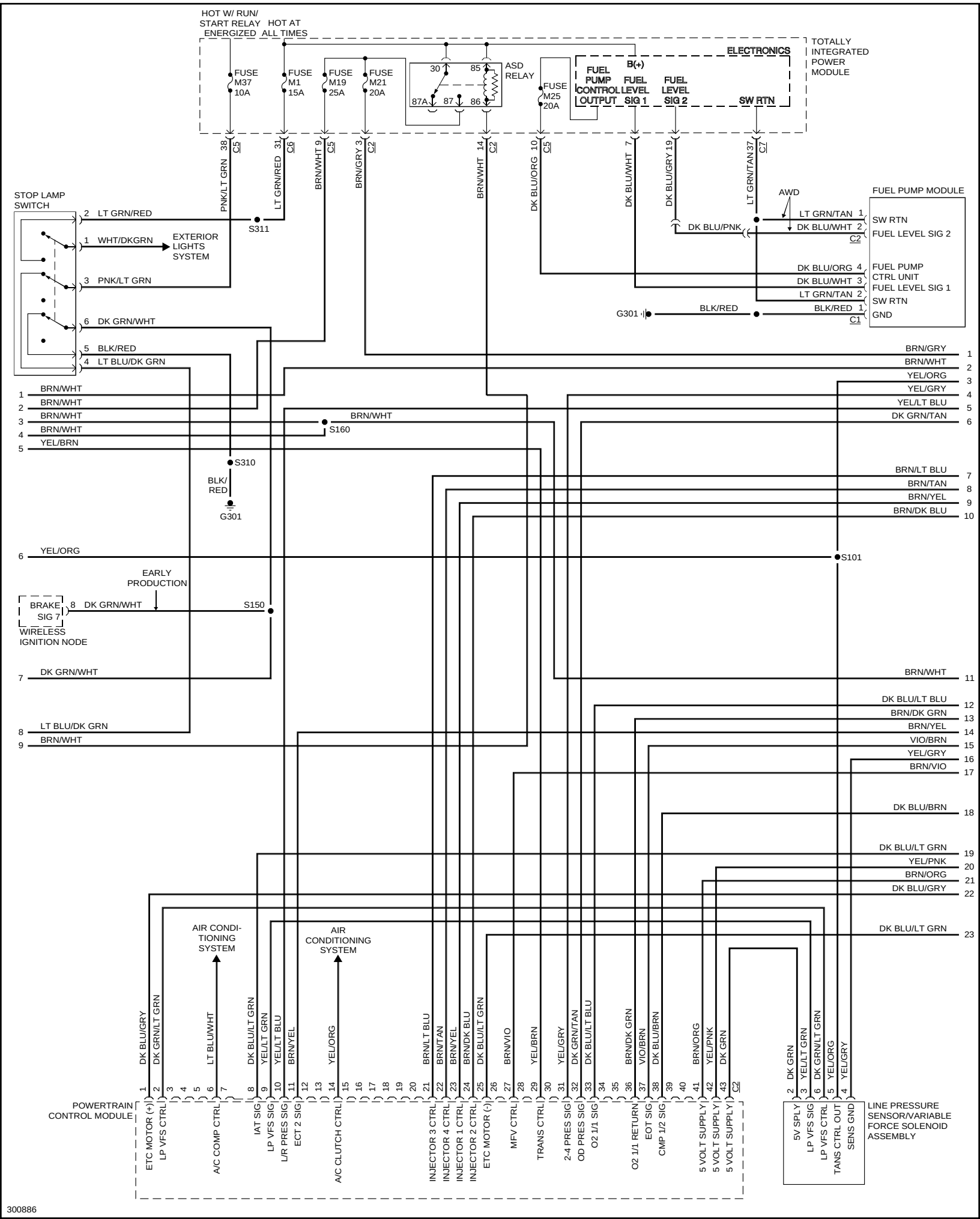

HOT AT ALL TIMES
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
CAN INTR BUS (+)
CAN INTR BUS (-)
RR WIND DEF RLY CTRL
85
30
86
87A
87
REAR WINDOW DEFOGGER RELAY
FUSE J14 40A
FUSE J5 25A
FUSE J4 25A
26
27
C7
32
C5
40
39
C6
WHT/ GRY
WHT/ ORG
DK BLU/ WHT
RED/ LT BLU
RED/ LT GRN
AUTOMATIC A/C
3 ZONE MANUAL A/C
MANUAL A/C
COMPUTER DATA LINES SYSTEM
DK BLU 3
DK BLU/GRY 4
DRIVER OUTSIDE REARVIEW MIRROR
CAN BUS (-)
CAN BUS (+)
5 16 19 WHT/ORG
6 8 2 WHT/GRY
C1 C1
A/C-HEATER CONTROL
DK BLU/GRY 4
DRV MIRR HTR RTN
DK BLU 3
DRV MIRR HTR RTN
C2
RED/LT GRN 5
FUSED (+)
C3
DRIVER DOOR MODULE
REAR WIND DEF RLY OUT
NCA
DK BLU/WHT
GND
NCA
BLK
G306
ELECTRIC HEATED BACKLITE
DK BLU 3
LT BLU/WHT 4
FRONT PASSENGER OUTSIDE REARVIEW MIRROR
RED/ LT BLU
DK BLU
5 C3
3
4 C2
FUSED (+)
PASS MIRR HTR RTN
PASS MIRR HTR DRV
PASSENGER DOOR MODULE
300216


HOT AT
ALL TIMES
TOTALLY
INTEGRATED
POWER MODULE
ELECTRONICS
CAN
INTR
BUS (+)
CAN
INTR
BUS (-)
RR WIND
DEF RLY
CTRL
85
30
86
87A
87
REAR WINDOW
DEFOGGER
RELAY
FUSE
J14
40A
FUSE
M35
10A
26
27
C7
32
19
C5
WHT/
GRY
WHT/
ORG
DK BLU/
WHT
DK BLU/
LT BLU
AUTOMATIC
A/C
3 ZONE MANUAL
A/C
MANUAL
A/C
COMPUTER
DATA LINES
SYSTEM
CAN BUS (-)
CAN BUS (+)
5
16
19
WHT/ORG
6
8
2
WHT/GRY
C1
C1
A/C-HEATER
CONTROL
DK BLU/
LT BLU
DK BLU/
LT BLU
4
4
DRIVER
OUTSIDE
REARVIEW
MIRROR
FRONT
PASSENGER
OUTSIDE
REARVIEW
MIRROR
5
5
BLK/
TAN
BLK/
WHT
S329
S330
REAR
WIND DEF
RLY OUT
NCA
DK BLU/WHT
GND
NCA
BLK
G306
BLK/
TAN
BLK/
WHT
ELECTRIC
HEATED
BACKLITE
G304
G305

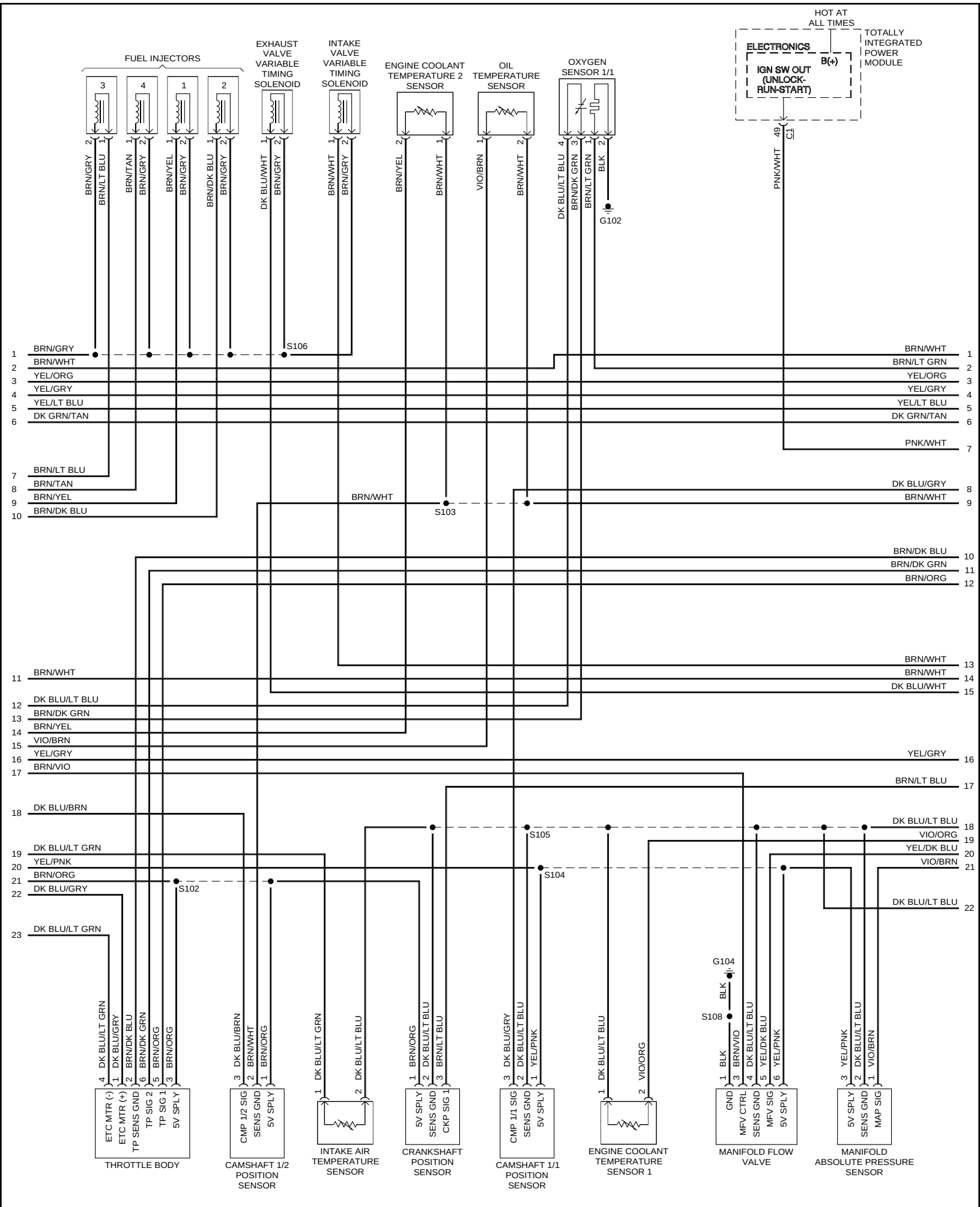
300215


HOT W/ RUN/START RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
FUEL PUMP CTRL
TRANS CTRL
TRANS RLY CTRL
FUSE M33 10A
FUSE M28 10A
FUSE J18 20A
FUSE J9 40A
PCM RELAY
SECONDARY AIR PUMP RELAY (PZEV)
(PZEV) SECONDARY AIR PUMP
POWERTRAIN CONTROL MODULE
FUSED ASD/MAIN RLY OUT
GROUND
TRANSMISSION CTRL OUT
O2 1/2 HEATER CTRL
S/C SW GROUND
IGN SW OUT (RUN-START)
FUSED B(+)
SECONDARY AIR PUMP CTRL
FUEL PUMP CTRL
O2 1/2 RTN
O2 1/2 SIGNAL
5 VOLT SUPPLY
STARTER CTRL
S/C SIGNAL 2
S/C SIGNAL 1
BRAKE SIGNAL 1
APP SENS GROUND 2
EVAP PURGE RTN
APP SENS GROUND 1
EVAP PURGE CTRL
CAN C BUS (+)
ESM SIGNAL
APP SIGNAL 2
APP SIGNAL 1
BRAKE SIGNAL 2
GEN SENSE
CAN C BUS (-)
ASD/MAIN RLY CTRL
STARTING/CHARGING SYSTEM
COMPUTER DATA LINES SYSTEM
STARTING/ CHARGING SYSTEM COMPUTER DATA LINES SYSTEM
S113
S114
G102
G104
G302
S307
OXYGEN SENSOR 1/2
STEERING CONTROL MODULE
S/C SW GND
S/C SIG 2
S/C SIG 1
ACCELERATOR PEDAL POSITION SENSOR
EVAP MONITOR SYSTEM SWITCH
EVAP/PURGE SOLENOID
ESM SIG
GROUND

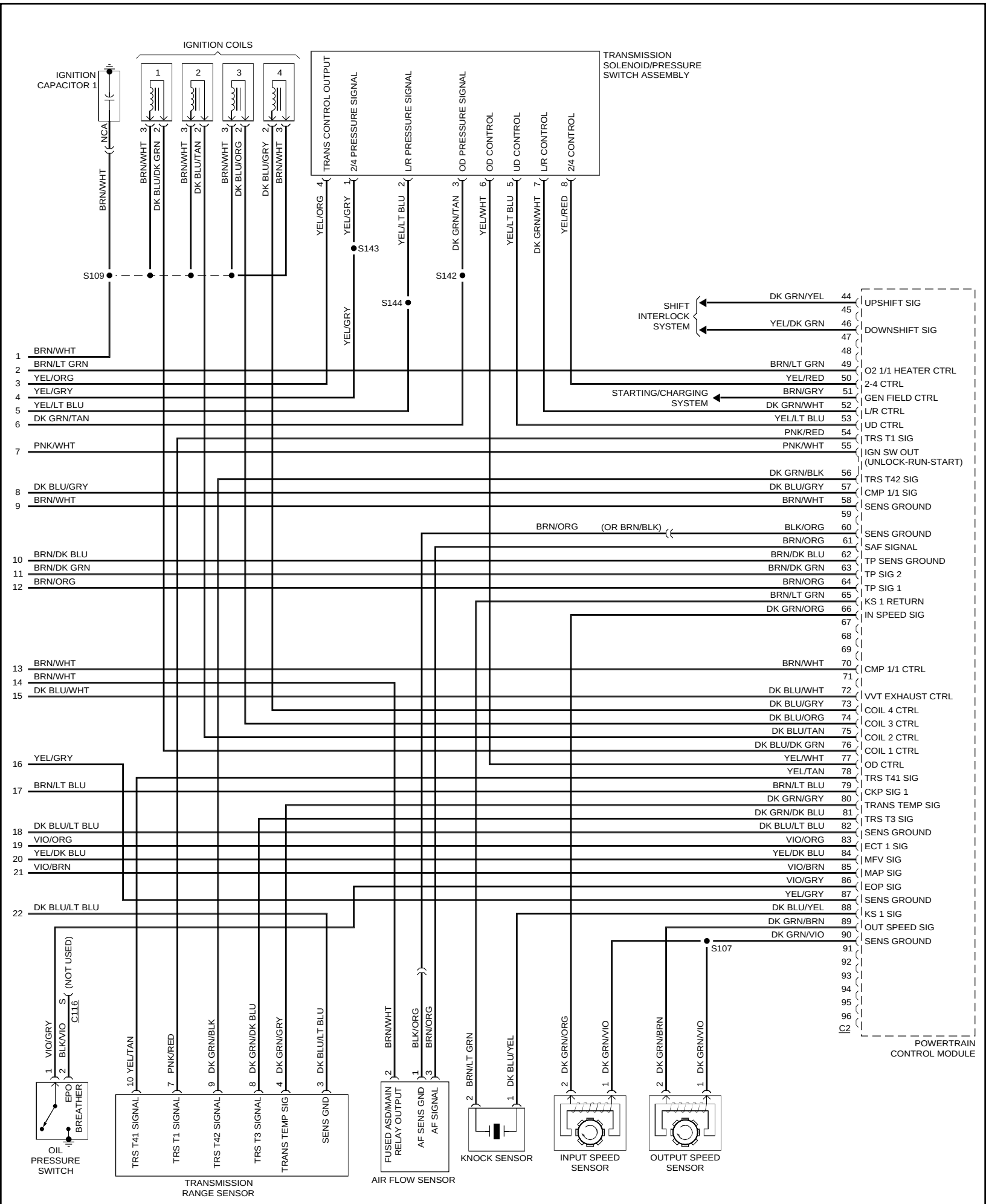
300885


HOT W/ RUN/ START RELAY ENERGIZED
HOT AT ALL TIMES
FUSE M37 10A
FUSE M1 15A
FUSE M19 25A
FUSE M21 20A
ASD RELAY
FUSE M25 20A
ELECTRONICS
TOTALLY INTEGRATED POWER MODULE
FUEL PUMP CONTROL OUTPUT
B(+)
FUEL LEVEL SIG 1
FUEL LEVEL SIG 2
SW RTN
STOP LAMP SWITCH
EXTERIOR LIGHTS SYSTEM
FUEL PUMP MODULE
AWD
SW RTN
FUEL LEVEL SIG 2
FUEL PUMP CTRL UNIT
FUEL LEVEL SIG 1
GND
S311
S160
S310
S101
S150
G301
EARLY PRODUCTION
BRAKE SIG 7
WIRELESS IGNITION NODE
AIR CONDI-TIONING SYSTEM
AIR CONDITIONING SYSTEM
POWERTRAIN CONTROL MODULE
LINE PRESSURE SENSOR/VARIABLE FORCE SOLENOID ASSEMBLY
ETC MOTOR (+)
LP VFS CTRL
A/C COMP CTRL
IAT SIG
LP VFS SIG
L/R PRES SIG
ECT 2 SIG
A/C CLUTCH CTRL
INJECTOR 3 CTRL
INJECTOR 4 CTRL
INJECTOR 1 CTRL
INJECTOR 2 CTRL
ETC MOTOR (-)
MFV CTRL
TRANS CTRL
2-4 PRES SIG
OD PRES SIG
O2 1/1 SIG
O2 1/1 RETURN
EOT SIG
CMP 1/2 SIG
5 VOLT SUPPLY
5 VOLT SUPPLY
5 VOLT SUPPLY
5V SPLY
LP VFS SIG
LP VFS CTRL
TANS CTRL OUT
SENS GND

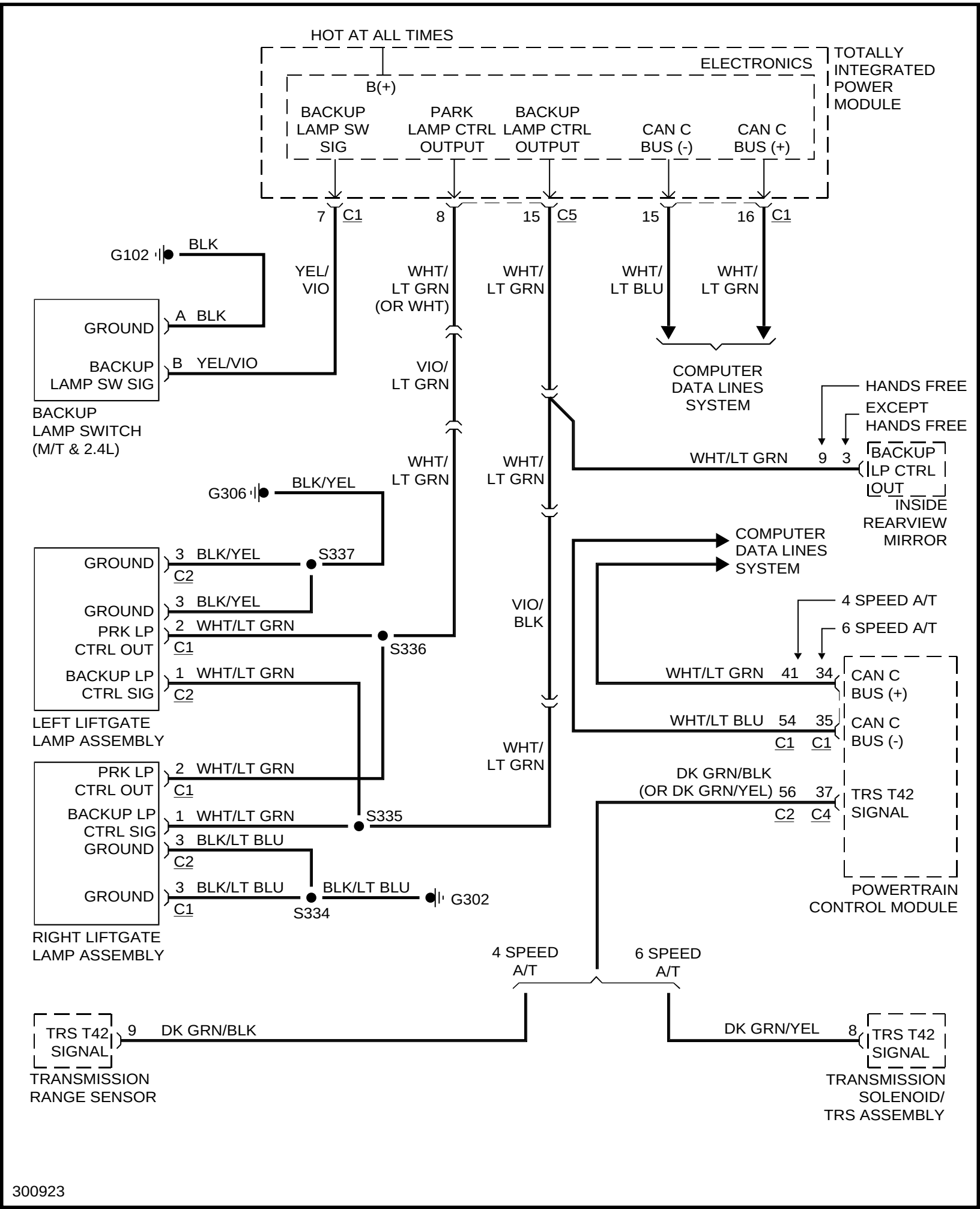
300886

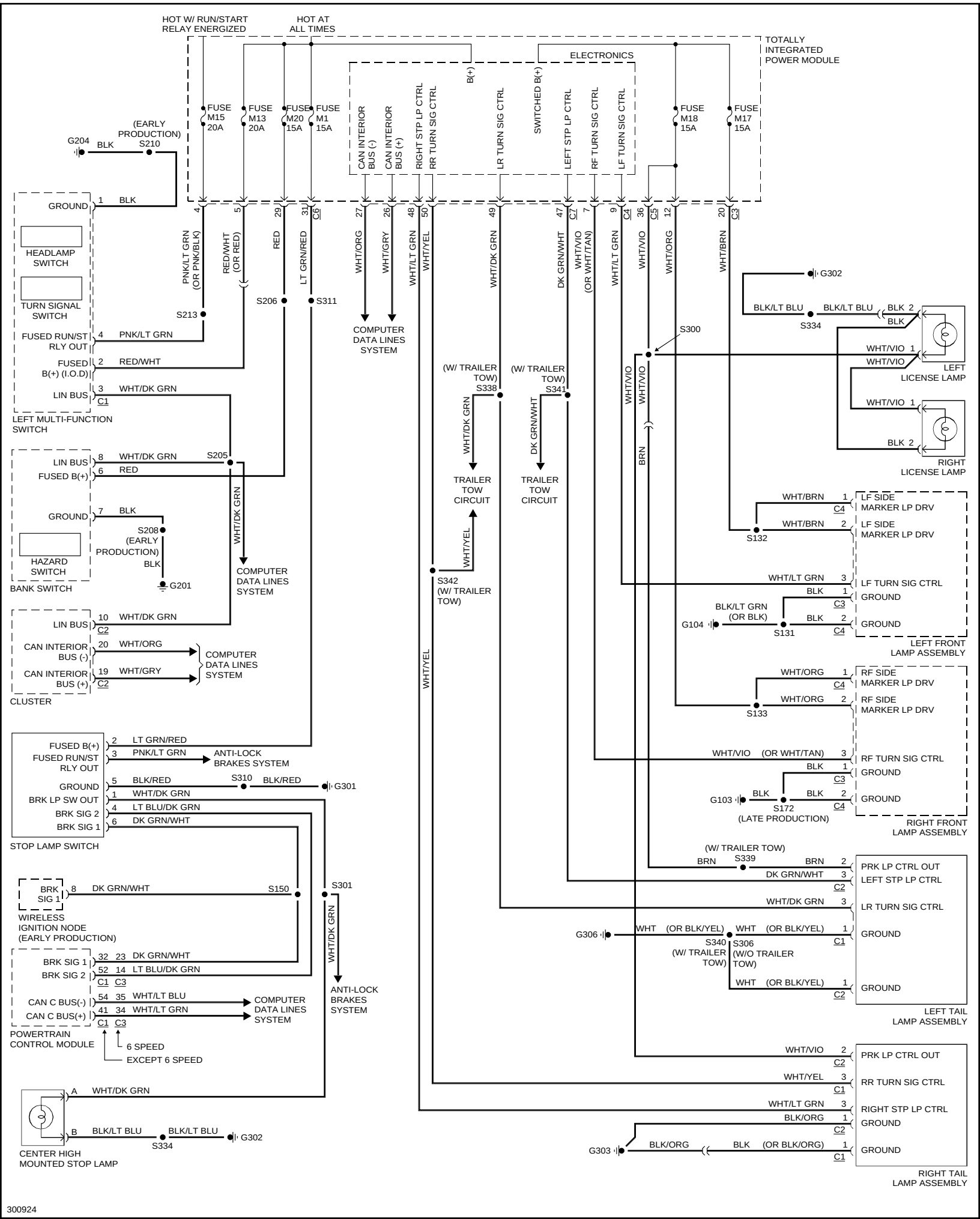

HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
IGN SW OUT (UNLOCK-RUN-START)
B(+)
49
C1
FUEL INJECTORS
3
4
1
2
EXHAUST VALVE VARIABLE TIMING SOLENOID
INTAKE VALVE VARIABLE TIMING SOLENOID
ENGINE COOLANT TEMPERATURE 2 SENSOR
OIL TEMPERATURE SENSOR
OXYGEN SENSOR 1/1
BRN/GRY
BRN/LT BLU
BRN/TAN
BRN/GRY
BRN/YEL
BRN/GRY
BRN/DK BLU
BRN/GRY
DK BLU/WHT
BRN/GRY
BRN/WHT
BRN/GRY
BRN/YEL
BRN/WHT
VIO/BRN
BRN/WHT
DK BLU/LT BLU
BRN/DK GRN
BRN/LT GRN
BLK
G102
PNK/WHT
S106
S103
S102
S105
S104
G104
S108
BRN/GRY
BRN/WHT
BRN/LT BLU
BRN/TAN
BRN/YEL
BRN/DK BLU
BRN/WHT
DK BLU/GRY
BRN/WHT
BRN/DK BLU
BRN/DK GRN
BRN/ORG
BRN/WHT
BRN/WHT
DK BLU/WHT
DK BLU/LT BLU
BRN/DK GRN
BRN/YEL
VIO/BRN
YEL/GRY
BRN/VIO
YEL/GRY
BRN/LT BLU
DK BLU/BRN
DK BLU/LT BLU
VIO/ORG
DK BLU/LT GRN
YEL/PNK
YEL/DK BLU
VIO/BRN
BRN/ORG
DK BLU/GRY
DK BLU/LT BLU
DK BLU/LT GRN
BLK
4 DK BLU/LT GRN
1 DK BLU/GRY
2 BRN/DK BLU
6 BRN/DK GRN
5 BRN/ORG
3 BRN/ORG
ETC MTR (-)
ETC MTR (+)
TP SENS GND
TP SIG 2
TP SIG 1
5V SPLY
THROTTLE BODY
3 DK BLU/BRN
2 BRN/WHT
1 BRN/ORG
CMP 1/2 SIG
SENS GND
5V SPLY
CAMSHAFT 1/2 POSITION SENSOR
1 DK BLU/LT GRN
2 DK BLU/LT BLU
INTAKE AIR TEMPERATURE SENSOR
1 BRN/ORG
2 DK BLU/LT BLU
3 BRN/LT BLU
5V SPLY
SENS GND
CKP SIG 1
CRANKSHAFT POSITION SENSOR
3 DK BLU/GRY
2 DK BLU/LT BLU
1 YEL/PNK
CMP 1/1 SIG
SENS GND
5V SPLY
CAMSHAFT 1/1 POSITION SENSOR
1 DK BLU/LT BLU
2 VIO/ORG
ENGINE COOLANT TEMPERATURE SENSOR 1
1 BLK
3 BRN/VIO
4 DK BLU/LT BLU
5 YEL/DK BLU
6 YEL/PNK
GND
MFV CTRL
SENS GND
MFV SIG
5V SPLY
MANIFOLD FLOW VALVE
3 YEL/PNK
2 DK BLU/LT BLU
1 VIO/BRN
5V SPLY
SENS GND
MAP SIG
MANIFOLD ABSOLUTE PRESSURE SENSOR

300887

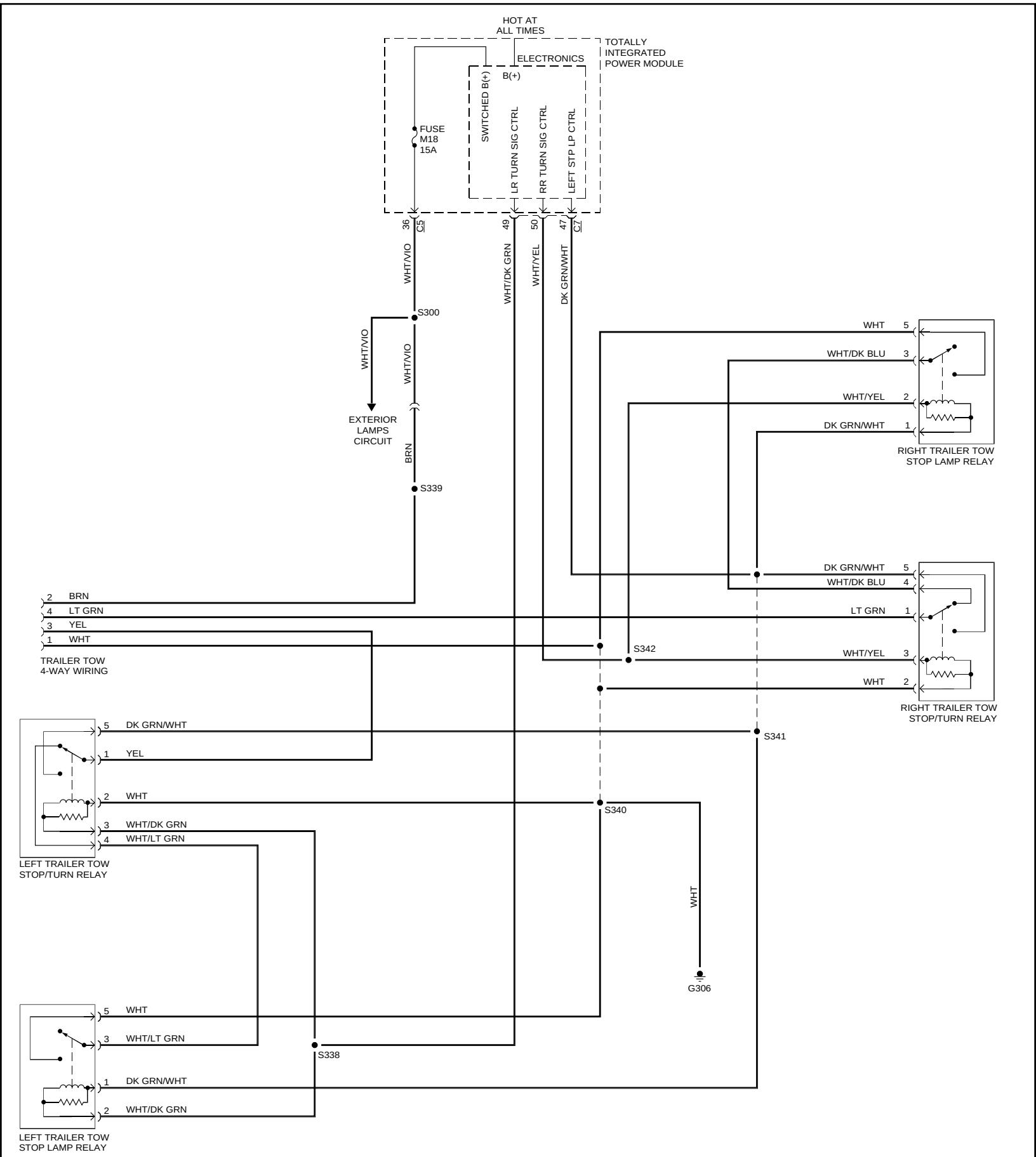

IGNITION COILS
IGNITION CAPACITOR 1
NCA
BRN/WHT
BRN/WHT
DK BLU/DK GRN
DK BLU/TAN
DK BLU/ORG
DK BLU/GRY
BRN/WHT
S109
TRANSMISSION SOLENOID/PRESSURE SWITCH ASSEMBLY
TRANS CONTROL OUTPUT
2/4 PRESSURE SIGNAL
L/R PRESSURE SIGNAL
OD PRESSURE SIGNAL
OD CONTROL
UD CONTROL
L/R CONTROL
2/4 CONTROL
YEL/ORG
YEL/GRY
YEL/LT BLU
DK GRN/TAN
YEL/WHT
YEL/LT BLU
DK GRN/WHT
YEL/RED
S143
S144
S142
SHIFT INTERLOCK SYSTEM
STARTING/CHARGING SYSTEM
DK GRN/YEL
YEL/DK GRN
BRN/LT GRN
YEL/RED
BRN/GRY
DK GRN/WHT
YEL/LT BLU
PNK/RED
PNK/WHT
DK GRN/BLK
DK BLU/GRY
BRN/WHT
BRN/ORG
(OR BRN/BLK)
BLK/ORG
BRN/ORG
BRN/DK BLU
BRN/DK GRN
BRN/ORG
BRN/LT GRN
DK GRN/ORG
BRN/WHT
BRN/WHT
DK BLU/WHT
DK BLU/WHT
DK BLU/GRY
DK BLU/ORG
DK BLU/TAN
DK BLU/DK GRN
YEL/WHT
YEL/TAN
BRN/LT BLU
DK GRN/GRY
DK GRN/DK BLU
DK BLU/LT BLU
VIO/ORG
YEL/DK BLU
VIO/BRN
VIO/GRY
YEL/GRY
DK BLU/YEL
DK GRN/BRN
DK GRN/VIO
S107
1 UPSHIFT SIG
2 DOWNSHIFT SIG
3 O2 1/1 HEATER CTRL
4 2-4 CTRL
5 GEN FIELD CTRL
6 L/R CTRL
7 UD CTRL
8 TRS T1 SIG
9 IGN SW OUT (UNLOCK-RUN-START)
10 TRS T42 SIG
11 CMP 1/1 SIG
12 SENS GROUND
13 SENS GROUND
14 SAF SIGNAL
15 TP SENS GROUND
16 TP SIG 2
17 TP SIG 1
18 KS 1 RETURN
19 IN SPEED SIG
20 CMP 1/1 CTRL
21 VVT EXHAUST CTRL
22 COIL 4 CTRL
23 COIL 3 CTRL
24 COIL 2 CTRL
25 COIL 1 CTRL
26 OD CTRL
27 TRS T41 SIG
28 CKP SIG 1
29 TRANS TEMP SIG
30 TRS T3 SIG
31 SENS GROUND
32 ECT 1 SIG
33 MFV SIG
34 MAP SIG
35 EOP SIG
36 SENS GROUND
37 KS 1 SIG
38 OUT SPEED SIG
39 SENS GROUND
C2
POWERTRAIN CONTROL MODULE
VIO/GRY
BLK/VIO
S
(NOT USED)
C116
EPO BREATHER
OIL PRESSURE SWITCH
TRS T41 SIGNAL
TRS T1 SIGNAL
TRS T42 SIGNAL
TRS T3 SIGNAL
TRANS TEMP SIG
SENS GND
TRANSMISSION RANGE SENSOR
FUSED ASD/MAIN RELAY OUTPUT
AF SENS GND
AF SIGNAL
AIR FLOW SENSOR
KNOCK SENSOR
INPUT SPEED SENSOR
OUTPUT SPEED SENSOR

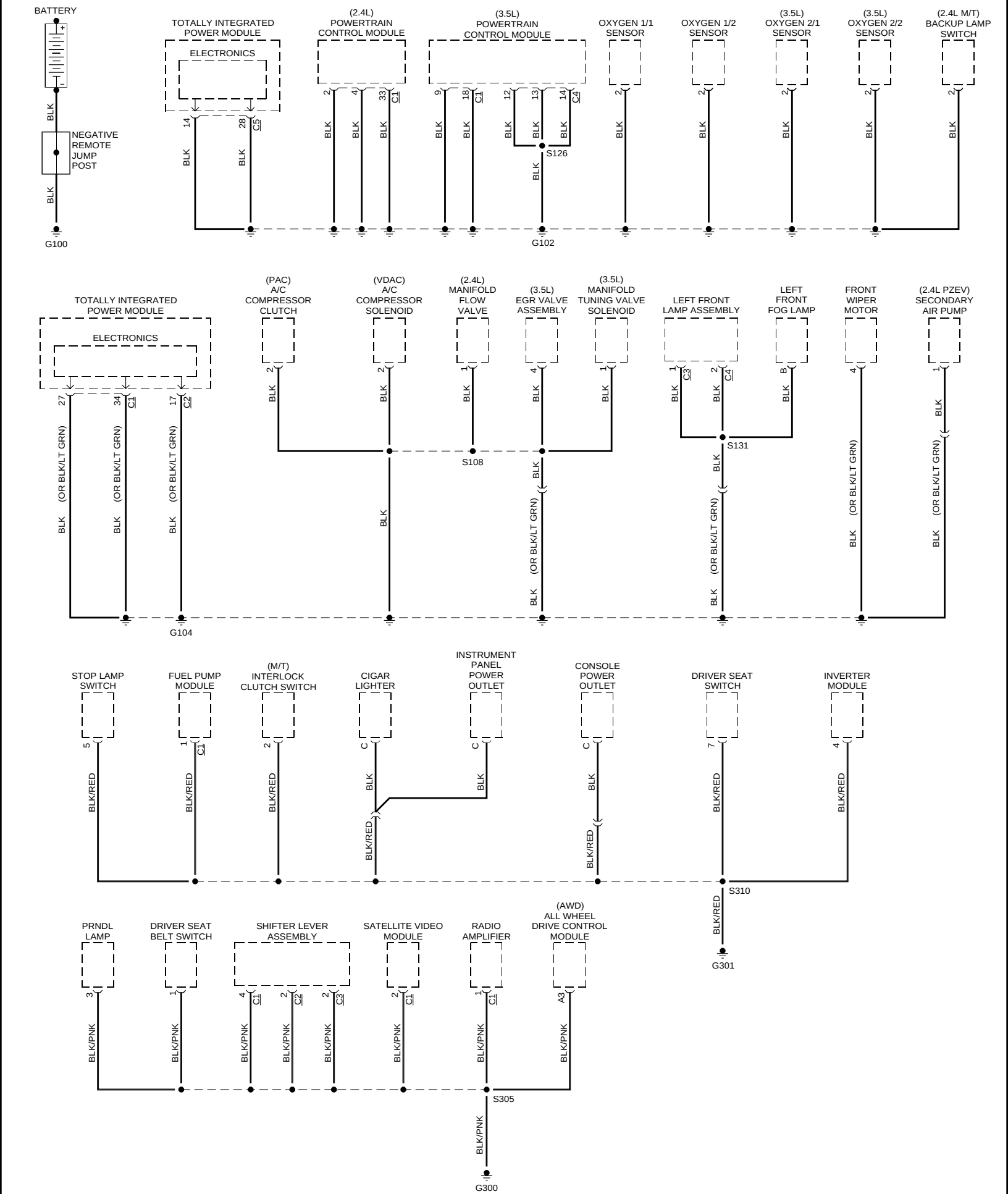
300888


HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
BACKUP LAMP SW SIG
PARK LAMP CTRL OUTPUT
BACKUP LAMP CTRL OUTPUT
CAN C BUS (-)
CAN C BUS (+)
7 C1
8
15 C5
15
16 C1
G102
BLK
YEL/VIO
WHT/LT GRN (OR WHT)
WHT/LT GRN
WHT/LT BLU
WHT/LT GRN
GROUND
A BLK
BACKUP LAMP SW SIG
B YEL/VIO
BACKUP LAMP SWITCH (M/T & 2.4L)
VIO/LT GRN
COMPUTER DATA LINES SYSTEM
HANDS FREE
EXCEPT HANDS FREE
WHT/LT GRN
9 3
BACKUP LP CTRL OUT
INSIDE REARVIEW MIRROR
WHT/LT GRN
WHT/LT GRN
G306
BLK/YEL
GROUND
3 BLK/YEL
S337
C2
COMPUTER DATA LINES SYSTEM
GROUND
3 BLK/YEL
PRK LP CTRL OUT
2 WHT/LT GRN
C1
S336
VIO/BLK
4 SPEED A/T
6 SPEED A/T
BACKUP LP CTRL SIG
1 WHT/LT GRN
C2
WHT/LT GRN
41
34
CAN C BUS (+)
WHT/LT BLU
54
35
CAN C BUS (-)
C1
C1
LEFT LIFTGATE LAMP ASSEMBLY
WHT/LT GRN
PRK LP CTRL OUT
2 WHT/LT GRN
C1
DK GRN/BLK (OR DK GRN/YEL)
56
37
TRS T42 SIGNAL
C2
C4
BACKUP LP CTRL SIG
1 WHT/LT GRN
S335
GROUND
3 BLK/LT BLU
C2
GROUND
3 BLK/LT BLU
C1
S334
BLK/LT BLU
G302
POWERTRAIN CONTROL MODULE
RIGHT LIFTGATE LAMP ASSEMBLY
4 SPEED A/T
6 SPEED A/T
TRS T42 SIGNAL
9
DK GRN/BLK
DK GRN/YEL
8
TRS T42 SIGNAL
TRANSMISSION RANGE SENSOR
TRANSMISSION SOLENOID/ TRS ASSEMBLY
300923

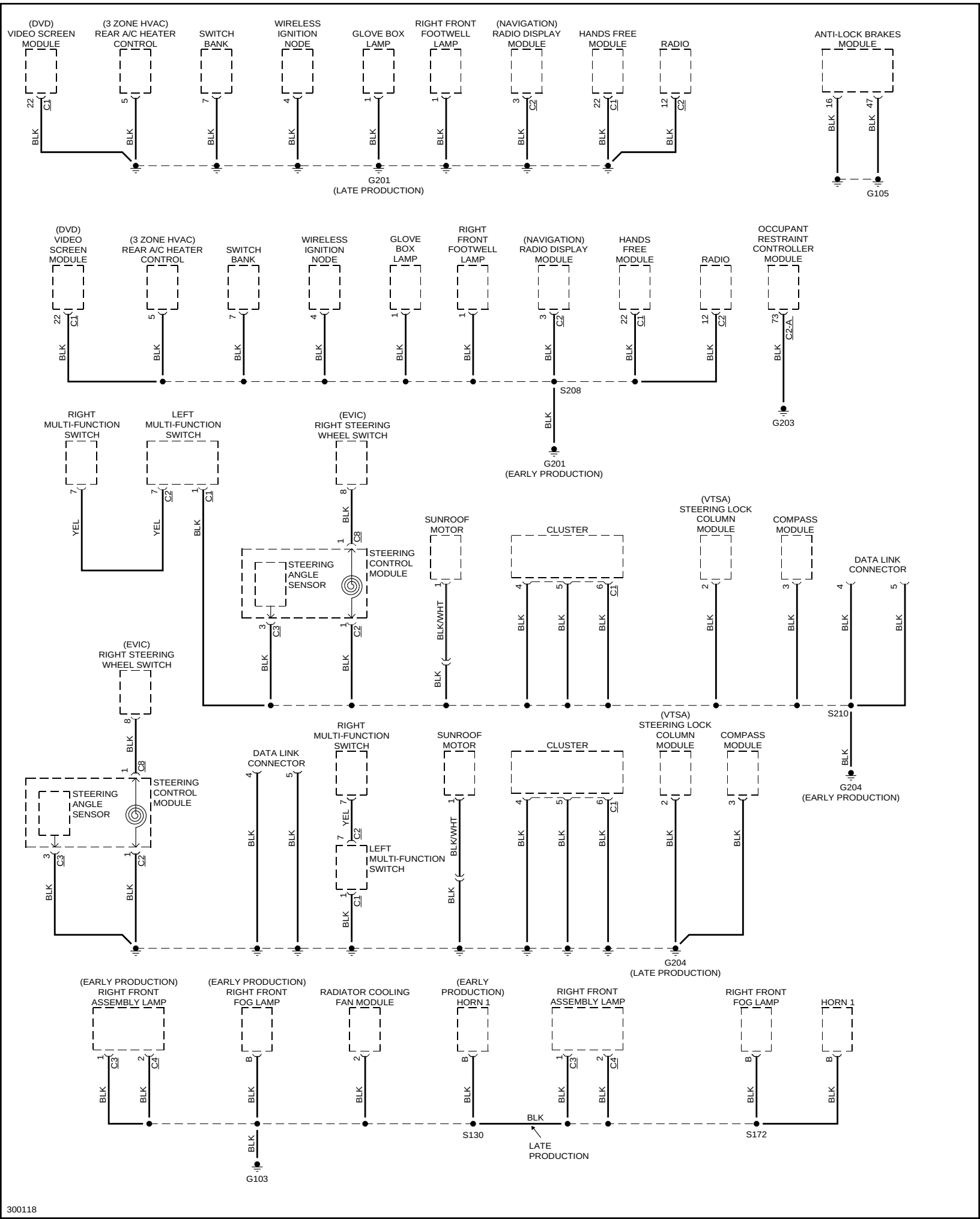

HOT W/ RUN/START RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M15 20A
FUSE M13 20A
FUSE M20 15A
FUSE M1 15A
FUSE M18 15A
FUSE M17 15A
B(+)
SWITCHED B(+)
CAN INTERIOR BUS (-)
CAN INTERIOR BUS (+)
RIGHT STP LP CTRL
RR TURN SIG CTRL
LR TURN SIG CTRL
LEFT STP LP CTRL
RF TURN SIG CTRL
LF TURN SIG CTRL
(EARLY PRODUCTION)
G204
BLK
S210
LEFT MULTI-FUNCTION SWITCH
GROUND
HEADLAMP SWITCH
TURN SIGNAL SWITCH
FUSED RUN/ST RLY OUT
FUSED B(+) (I.O.D)
LIN BUS
PNK/LT GRN (OR PNK/BLK)
RED/WHT (OR RED)
RED
LT GRN/RED
WHT/ORG
WHT/GRY
WHT/LT GRN
WHT/YEL
WHT/DK GRN
DK GRN/WHT
WHT/VIO (OR WHT/TAN)
WHT/VIO
WHT/ORG
WHT/BRN
S213
S206
S311
S205
S300
COMPUTER DATA LINES SYSTEM
BANK SWITCH
HAZARD SWITCH
S208 (EARLY PRODUCTION)
G201
CLUSTER
CAN INTERIOR BUS (-)
CAN INTERIOR BUS (+)
(W/ TRAILER TOW)
S338
S341
TRAILER TOW CIRCUIT
S342 (W/ TRAILER TOW)
G302
S334
BLK/LT BLU
LEFT LICENSE LAMP
RIGHT LICENSE LAMP
S132
LF SIDE MARKER LP DRV
LF TURN SIG CTRL
GROUND
BLK/LT GRN (OR BLK)
G104
S131
LEFT FRONT LAMP ASSEMBLY
S133
RF SIDE MARKER LP DRV
RF TURN SIG CTRL
G103
S172 (LATE PRODUCTION)
RIGHT FRONT LAMP ASSEMBLY
S339
PRK LP CTRL OUT
LEFT STP LP CTRL
LR TURN SIG CTRL
G306
S340 (W/ TRAILER TOW)
S306 (W/O TRAILER TOW)
LEFT TAIL LAMP ASSEMBLY
RR TURN SIG CTRL
RIGHT STP LP CTRL
G303
RIGHT TAIL LAMP ASSEMBLY
STOP LAMP SWITCH
FUSED B(+)
FUSED RUN/ST RLY OUT
GROUND
BRK LP SW OUT
BRK SIG 2
BRK SIG 1
ANTI-LOCK BRAKES SYSTEM
S310
G301
WIRELESS IGNITION NODE (EARLY PRODUCTION)
S150
S301
POWERTRAIN CONTROL MODULE
CAN C BUS(-)
CAN C BUS(+)
6 SPEED
EXCEPT 6 SPEED
CENTER HIGH MOUNTED STOP LAMP

300924

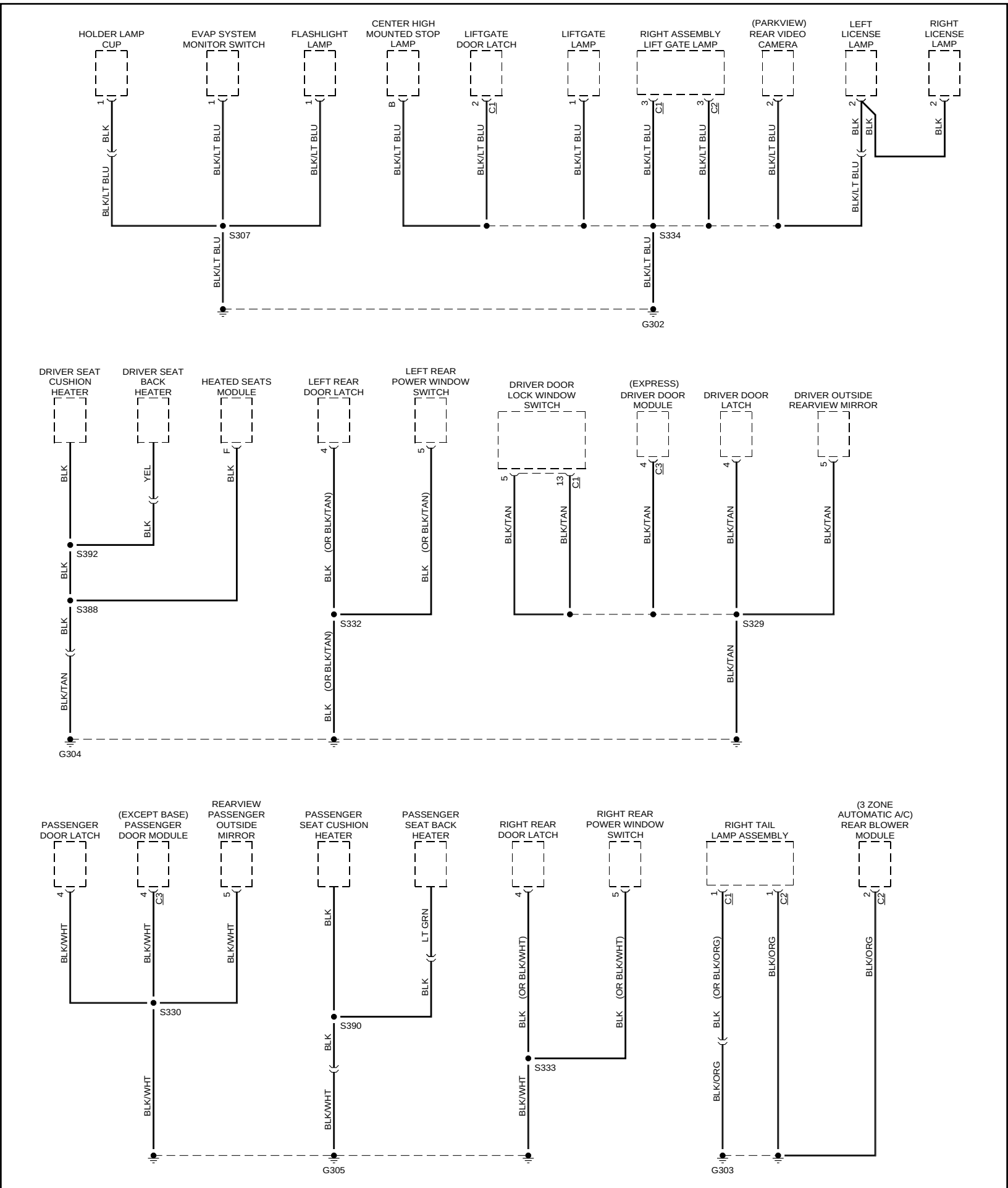

HOT AT
ALL TIMES
TOTALLY
INTEGRATED
POWER MODULE
ELECTRONICS
B(+)
SWITCHED B(+)
LR TURN SIG CTRL
RR TURN SIG CTRL
LEFT STP LP CTRL
FUSE
M18
15A
36
C5
49
50
47
C7
WHT/VIO
WHT/DK GRN
WHT/YEL
DK GRN/WHT
S300
WHT/VIO
WHT/VIO
EXTERIOR
LAMPS
CIRCUIT
BRN
S339
WHT
5
WHT/DK BLU
3
WHT/YEL
2
DK GRN/WHT
1
RIGHT TRAILER TOW
STOP LAMP RELAY
DK GRN/WHT
5
WHT/DK BLU
4
LT GRN
1
WHT/YEL
3
WHT
2
RIGHT TRAILER TOW
STOP/TURN RELAY
2
BRN
4
LT GRN
3
YEL
1
WHT
TRAILER TOW
4-WAY WIRING
S342
S341
5
DK GRN/WHT
1
YEL
2
WHT
3
WHT/DK GRN
4
WHT/LT GRN
LEFT TRAILER TOW
STOP/TURN RELAY
S340
WHT
G306
5
WHT
3
WHT/LT GRN
S338
1
DK GRN/WHT
2
WHT/DK GRN
LEFT TRAILER TOW
STOP LAMP RELAY


BATTERY
NEGATIVE REMOTE JUMP POST
BLK
G100
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
14
28
C5
(2.4L) POWERTRAIN CONTROL MODULE
2
4
33
C1
(3.5L) POWERTRAIN CONTROL MODULE
9
18
C1
12
13
14
C4
S126
G102
OXYGEN 1/1 SENSOR
OXYGEN 1/2 SENSOR
(3.5L) OXYGEN 2/1 SENSOR
(3.5L) OXYGEN 2/2 SENSOR
(2.4L M/T) BACKUP LAMP SWITCH
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
27
34
C1
17
C2
(OR BLK/LT GRN)
G104
(PAC) A/C COMPRESSOR CLUTCH
(VDAC) A/C COMPRESSOR SOLENOID
(2.4L) MANIFOLD FLOW VALVE
(3.5L) EGR VALVE ASSEMBLY
(3.5L) MANIFOLD TUNING VALVE SOLENOID
S108
LEFT FRONT LAMP ASSEMBLY
C3
C4
S131
LEFT FRONT FOG LAMP
FRONT WIPER MOTOR
(2.4L PZEV) SECONDARY AIR PUMP
STOP LAMP SWITCH
FUEL PUMP MODULE
(M/T) INTERLOCK CLUTCH SWITCH
CIGAR LIGHTER
INSTRUMENT PANEL POWER OUTLET
CONSOLE POWER OUTLET
DRIVER SEAT SWITCH
INVERTER MODULE
5
1
C1
2
C
7
4
BLK/RED
S310
G301
PRNDL LAMP
DRIVER SEAT BELT SWITCH
SHIFTER LEVER ASSEMBLY
SATELLITE VIDEO MODULE
RADIO AMPLIFIER
(AWD) ALL WHEEL DRIVE CONTROL MODULE
3
1
4
C1
2
C2
2
C3
2
C1
1
C1
A3
BLK/PNK
S305
G300

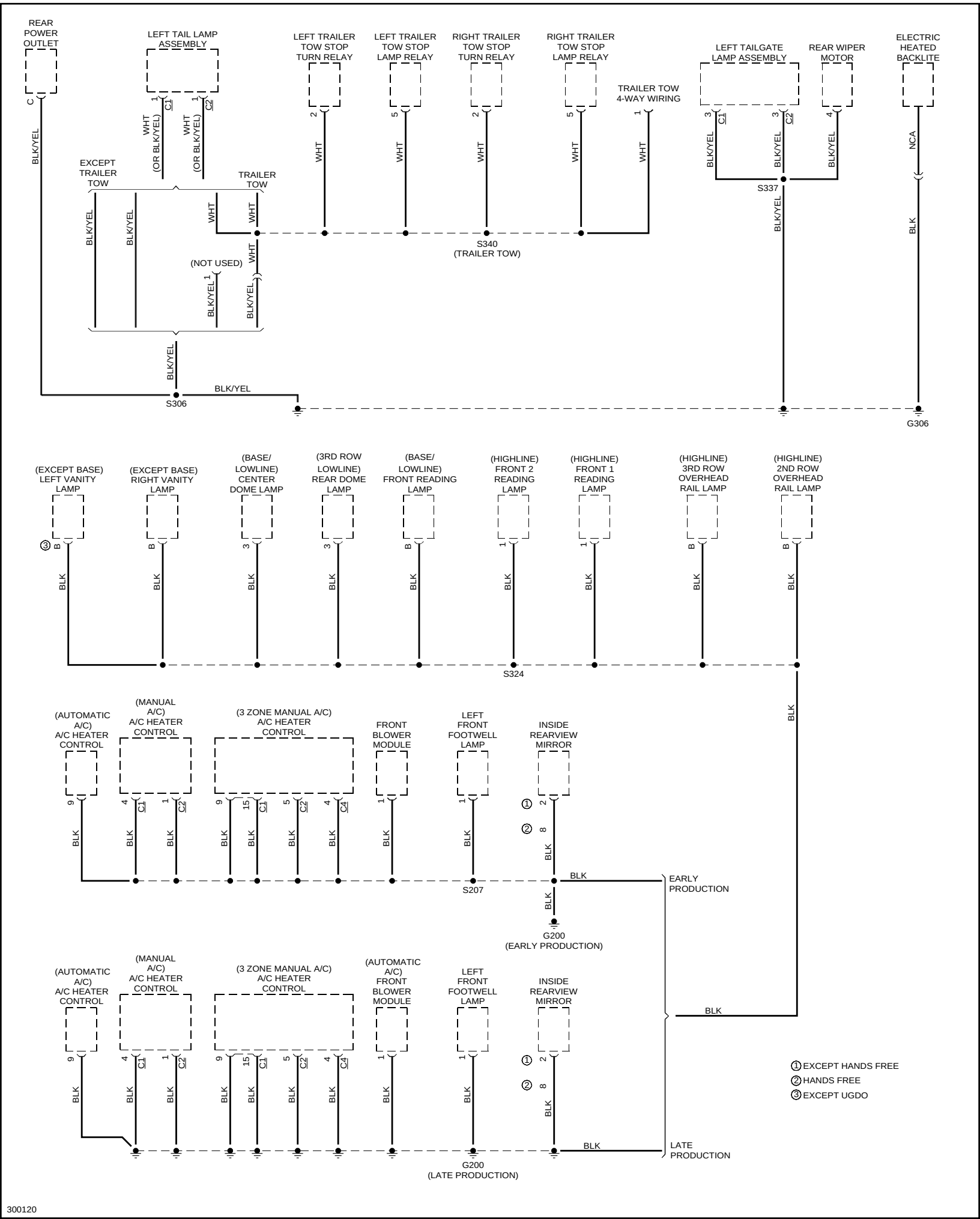
300117


(DVD) VIDEO SCREEN MODULE
(3 ZONE HVAC) REAR A/C HEATER CONTROL
SWITCH BANK
WIRELESS IGNITION NODE
GLOVE BOX LAMP
RIGHT FRONT FOOTWELL LAMP
(NAVIGATION) RADIO DISPLAY MODULE
HANDS FREE MODULE
RADIO
ANTI-LOCK BRAKES MODULE
G201 (LATE PRODUCTION)
G105
OCCUPANT RESTRAINT CONTROLLER MODULE
S208
G203
G201 (EARLY PRODUCTION)
RIGHT MULTI-FUNCTION SWITCH
LEFT MULTI-FUNCTION SWITCH
(EVIC) RIGHT STEERING WHEEL SWITCH
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
SUNROOF MOTOR
CLUSTER
(VTSA) STEERING LOCK COLUMN MODULE
COMPASS MODULE
DATA LINK CONNECTOR
S210
G204 (EARLY PRODUCTION)
G204 (LATE PRODUCTION)
(EARLY PRODUCTION) RIGHT FRONT ASSEMBLY LAMP
(EARLY PRODUCTION) RIGHT FRONT FOG LAMP
RADIATOR COOLING FAN MODULE
(EARLY PRODUCTION) HORN 1
S130
LATE PRODUCTION
S172
G103

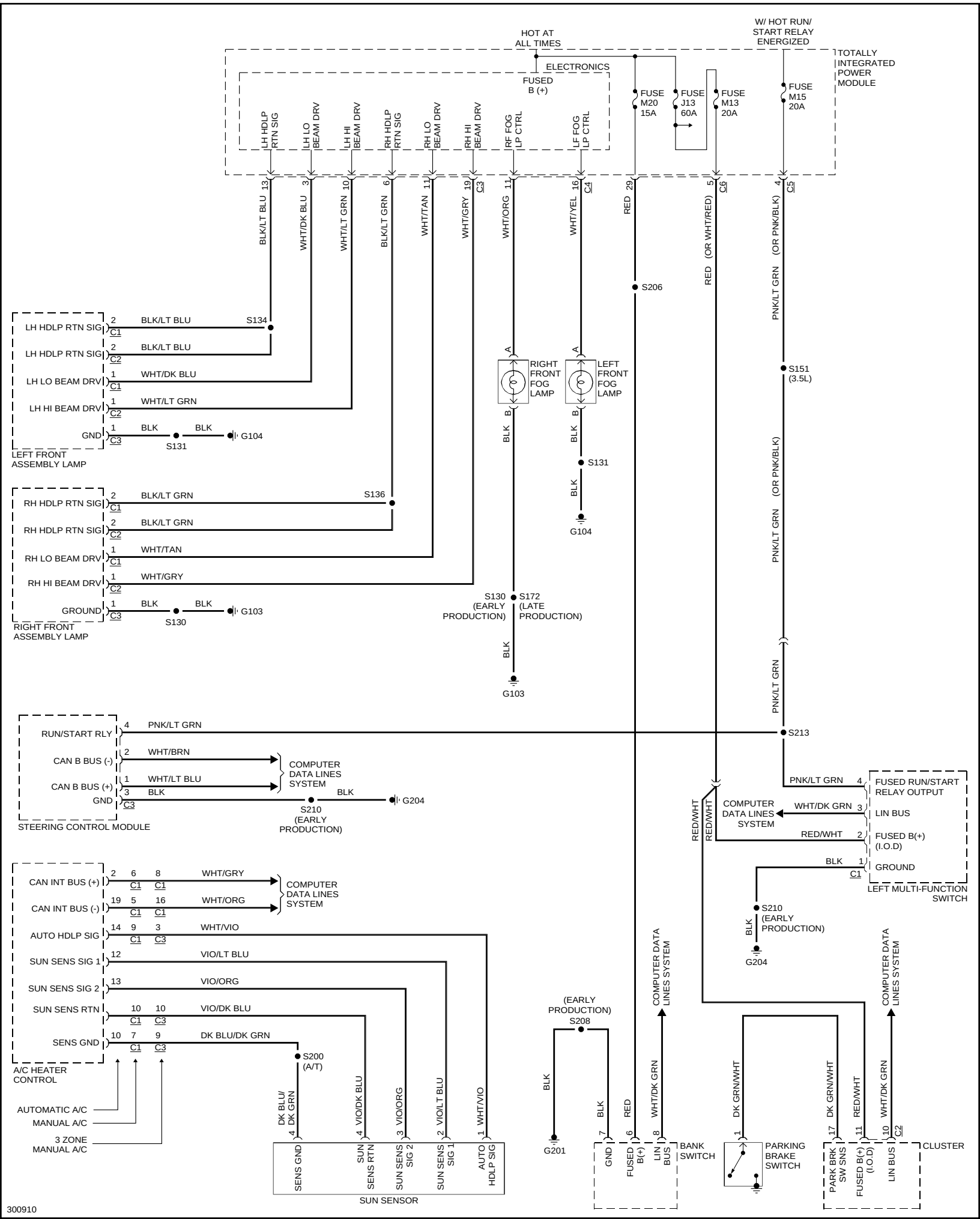
300118


HOLDER LAMP CUP
EVAP SYSTEM MONITOR SWITCH
FLASHLIGHT LAMP
CENTER HIGH MOUNTED STOP LAMP
LIFTGATE DOOR LATCH
LIFTGATE LAMP
RIGHT ASSEMBLY LIFT GATE LAMP
(PARKVIEW) REAR VIDEO CAMERA
LEFT LICENSE LAMP
RIGHT LICENSE LAMP
S307
S334
G302
DRIVER SEAT CUSHION HEATER
DRIVER SEAT BACK HEATER
HEATED SEATS MODULE
LEFT REAR DOOR LATCH
LEFT REAR POWER WINDOW SWITCH
DRIVER DOOR LOCK WINDOW SWITCH
(EXPRESS) DRIVER DOOR MODULE
DRIVER DOOR LATCH
DRIVER OUTSIDE REARVIEW MIRROR
S392
S388
S332
S329
G304
PASSENGER DOOR LATCH
(EXCEPT BASE) PASSENGER DOOR MODULE
REARVIEW PASSENGER OUTSIDE MIRROR
PASSENGER SEAT CUSHION HEATER
PASSENGER SEAT BACK HEATER
RIGHT REAR DOOR LATCH
RIGHT REAR POWER WINDOW SWITCH
RIGHT TAIL LAMP ASSEMBLY
(3 ZONE AUTOMATIC A/C) REAR BLOWER MODULE
S330
S390
S333
G305
G303

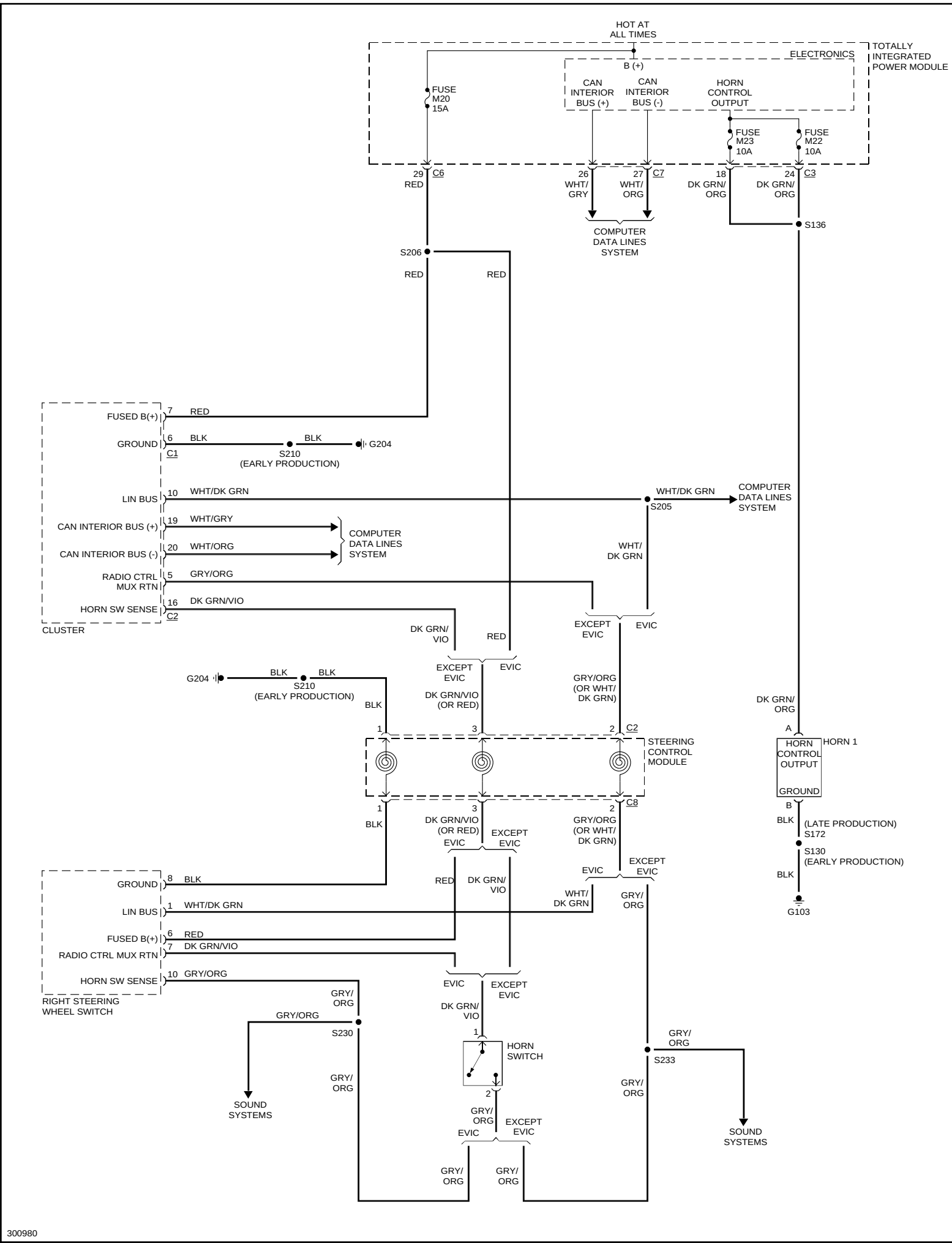
300119


REAR POWER OUTLET
LEFT TAIL LAMP ASSEMBLY
LEFT TRAILER TOW STOP TURN RELAY
LEFT TRAILER TOW STOP LAMP RELAY
RIGHT TRAILER TOW STOP TURN RELAY
RIGHT TRAILER TOW STOP LAMP RELAY
TRAILER TOW 4-WAY WIRING
LEFT TAILGATE LAMP ASSEMBLY
REAR WIPER MOTOR
ELECTRIC HEATED BACKLITE
EXCEPT TRAILER TOW
TRAILER TOW
(NOT USED)
S340 (TRAILER TOW)
S337
S306
G306
(EXCEPT BASE) LEFT VANITY LAMP
(EXCEPT BASE) RIGHT VANITY LAMP
(BASE/ LOWLINE) CENTER DOME LAMP
(3RD ROW LOWLINE) REAR DOME LAMP
(BASE/ LOWLINE) FRONT READING LAMP
(HIGHLINE) FRONT 2 READING LAMP
(HIGHLINE) FRONT 1 READING LAMP
(HIGHLINE) 3RD ROW OVERHEAD RAIL LAMP
(HIGHLINE) 2ND ROW OVERHEAD RAIL LAMP
S324
(AUTOMATIC A/C) A/C HEATER CONTROL
(MANUAL A/C) A/C HEATER CONTROL
(3 ZONE MANUAL A/C) A/C HEATER CONTROL
FRONT BLOWER MODULE
LEFT FRONT FOOTWELL LAMP
INSIDE REARVIEW MIRROR
S207
G200 (EARLY PRODUCTION)
EARLY PRODUCTION
(AUTOMATIC A/C) FRONT BLOWER MODULE
G200 (LATE PRODUCTION)
LATE PRODUCTION
① EXCEPT HANDS FREE
② HANDS FREE
③ EXCEPT UGDO

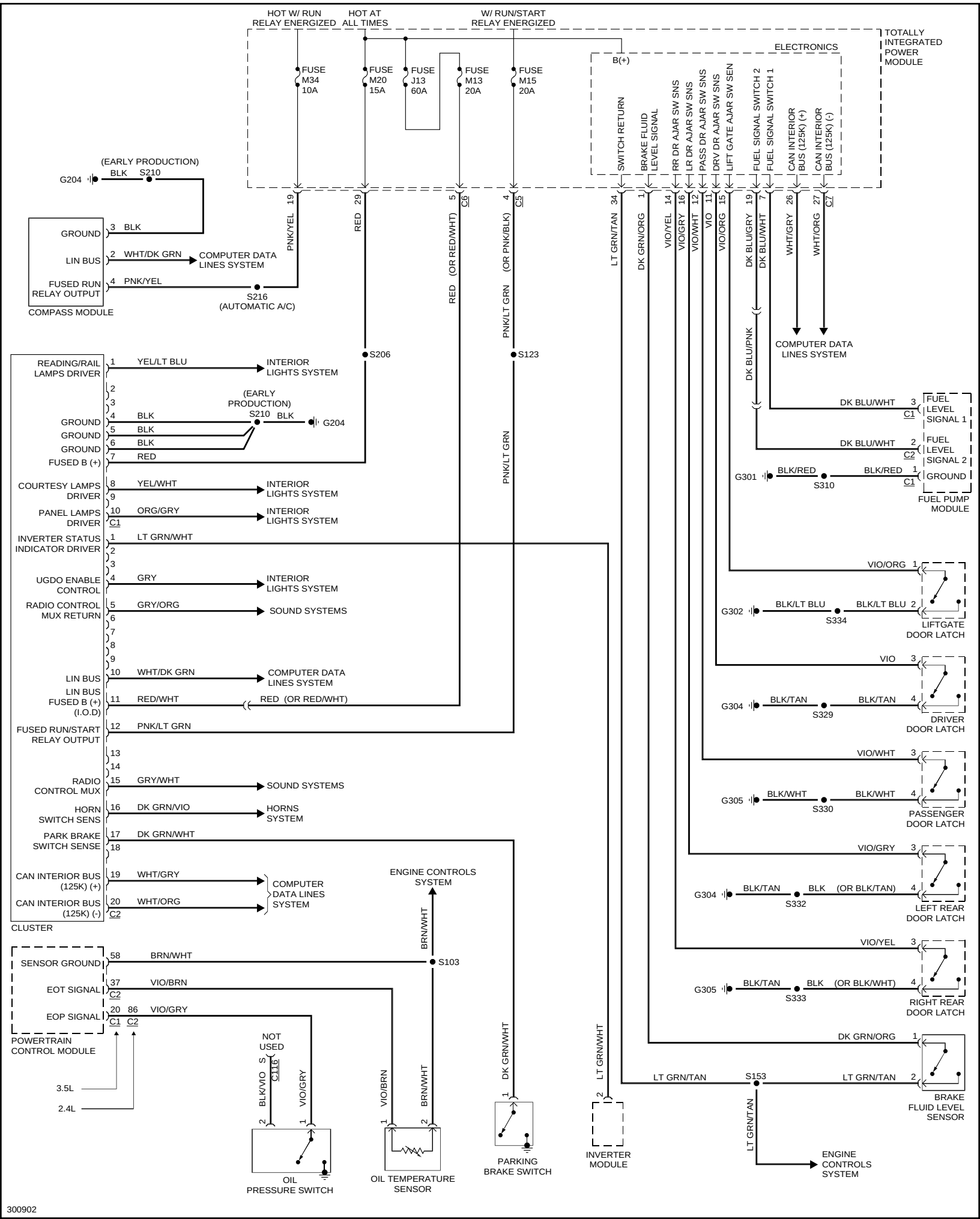
300120

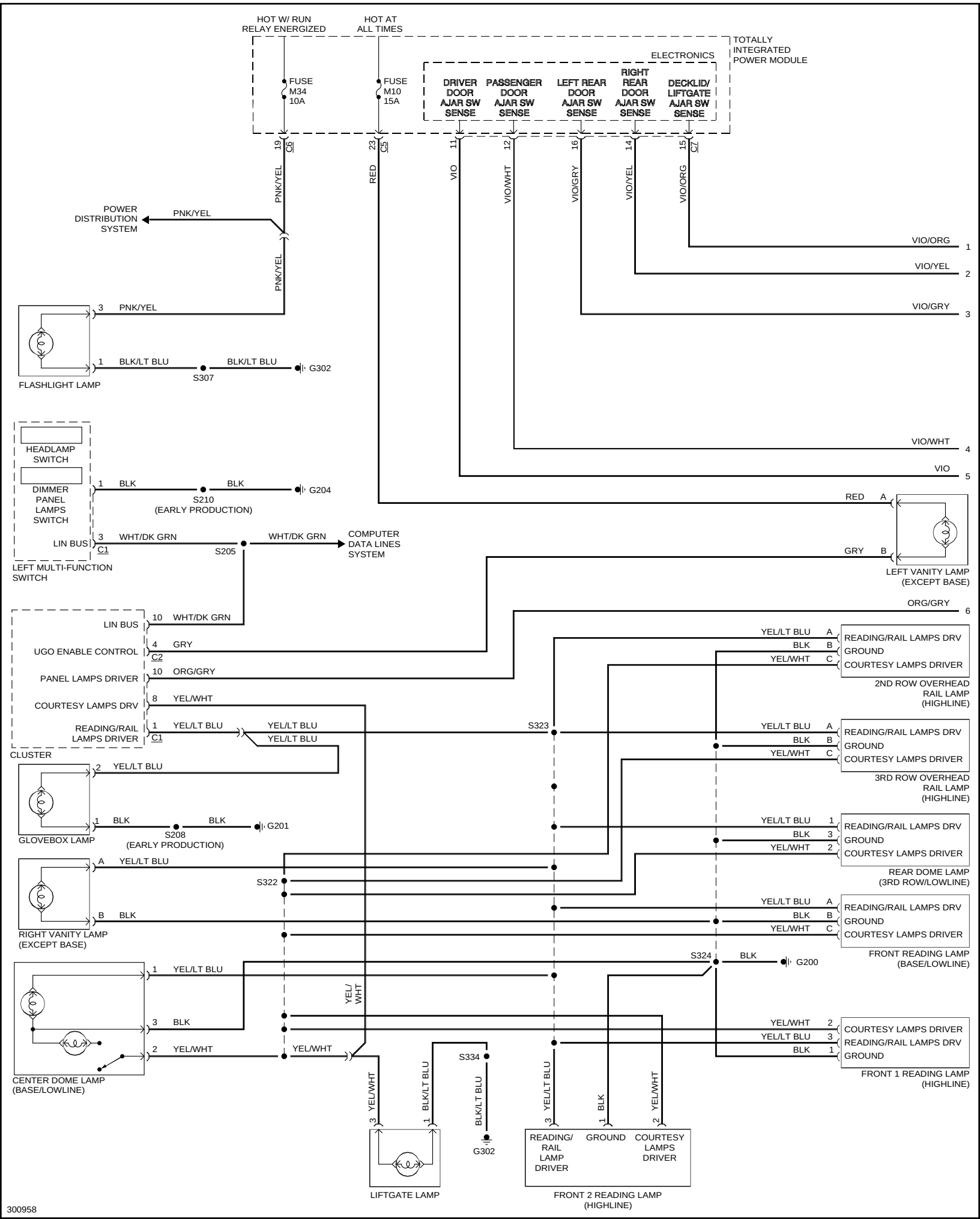

HOT AT ALL TIMES
W/ HOT RUN/ START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS FUSED B (+)
FUSE M20 15A
FUSE J13 60A
FUSE M13 20A
FUSE M15 20A
LH HDLP RTN SIG
LH LO BEAM DRV
LH HI BEAM DRV
RH HDLP RTN SIG
RH LO BEAM DRV
RH HI BEAM DRV
RF FOG LP CTRL
LF FOG LP CTRL
BLK/LT BLU
WHT/DK BLU
WHT/LT GRN
BLK/LT GRN
WHT/TAN
WHT/GRY
WHT/ORG
WHT/YEL
RED
RED (OR WHT/RED)
PNK/LT GRN (OR PNK/BLK)
S206
S151 (3.5L)
RIGHT FRONT FOG LAMP
LEFT FRONT FOG LAMP
S131
G104
S130 (EARLY PRODUCTION)
S172 (LATE PRODUCTION)
G103
LEFT FRONT ASSEMBLY LAMP
RIGHT FRONT ASSEMBLY LAMP
S134
S136
LH HDLP RTN SIG
RH HDLP RTN SIG
LH LO BEAM DRV
LH HI BEAM DRV
RH LO BEAM DRV
RH HI BEAM DRV
GND
GROUND
BLK
G104
G103
S213
RUN/START RLY
CAN B BUS (-)
CAN B BUS (+)
WHT/BRN
WHT/LT BLU
COMPUTER DATA LINES SYSTEM
STEERING CONTROL MODULE
S210 (EARLY PRODUCTION)
G204
FUSED RUN/START RELAY OUTPUT
LIN BUS
FUSED B(+) (I.O.D)
GROUND
LEFT MULTI-FUNCTION SWITCH
CAN INT BUS (+)
CAN INT BUS (-)
WHT/GRY
WHT/ORG
AUTO HDLP SIG
WHT/VIO
SUN SENS SIG 1
VIO/LT BLU
SUN SENS SIG 2
VIO/ORG
SUN SENS RTN
VIO/DK BLU
SENS GND
DK BLU/DK GRN
A/C HEATER CONTROL
AUTOMATIC A/C
MANUAL A/C
3 ZONE MANUAL A/C
S200 (A/T)
SUN SENSOR
SENS GND
SUN SENS RTN
SUN SENS SIG 2
SUN SENS SIG 1
AUTO HDLP SIG
(EARLY PRODUCTION) S208
G201
COMPUTER DATA LINES SYSTEM
BANK SWITCH
PARKING BRAKE SWITCH
CLUSTER
PARK BRK SW SNS
LIN BUS
DK GRN/WHT
RED/WHT
WHT/DK GRN

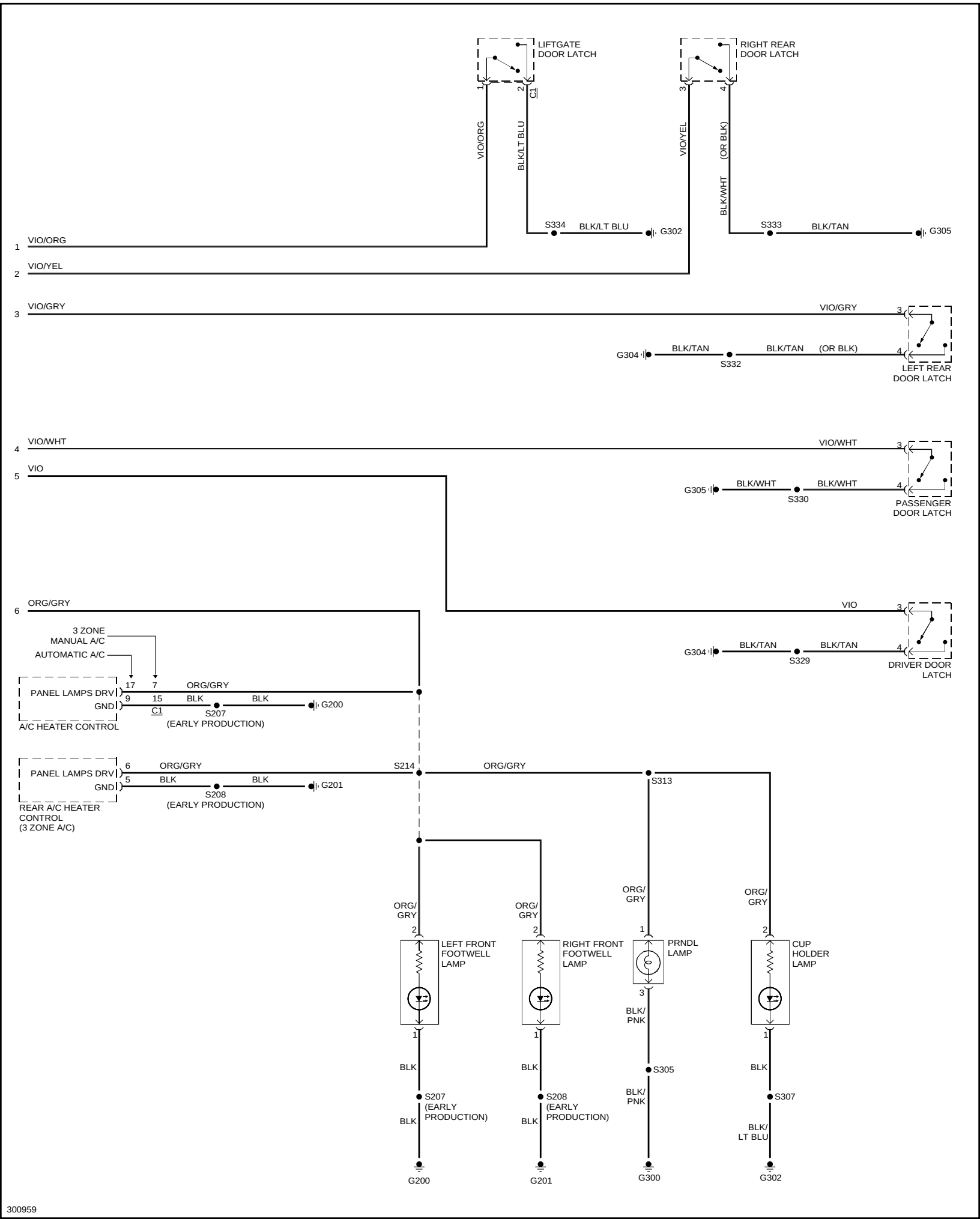
300910


HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B (+)
CAN INTERIOR BUS (+)
CAN INTERIOR BUS (-)
HORN CONTROL OUTPUT
FUSE M20 15A
FUSE M23 10A
FUSE M22 10A
29 RED C6
26 WHT/GRY
27 WHT/ORG C7
18 DK GRN/ORG
24 DK GRN/ORG C3
COMPUTER DATA LINES SYSTEM
S136
S206
RED
RED
FUSED B(+) 7 RED
GROUND 6 BLK C1
BLK
S210 (EARLY PRODUCTION)
BLK
G204
LIN BUS 10 WHT/DK GRN
WHT/DK GRN
S205
COMPUTER DATA LINES SYSTEM
CAN INTERIOR BUS (+) 19 WHT/GRY
CAN INTERIOR BUS (-) 20 WHT/ORG
COMPUTER DATA LINES SYSTEM
WHT/DK GRN
RADIO CTRL MUX RTN 5 GRY/ORG
HORN SW SENSE 16 DK GRN/VIO C2
CLUSTER
DK GRN/VIO
RED
EXCEPT EVIC
EVIC
EXCEPT EVIC
EVIC
G204
BLK
S210 (EARLY PRODUCTION)
BLK
DK GRN/VIO (OR RED)
GRY/ORG (OR WHT/DK GRN)
DK GRN/ORG
A
1
3
2 C2
STEERING CONTROL MODULE
HORN CONTROL OUTPUT
HORN 1
GROUND
B
1
3
2 C8
BLK
DK GRN/VIO (OR RED)
GRY/ORG (OR WHT/DK GRN)
BLK
(LATE PRODUCTION)
S172
S130
(EARLY PRODUCTION)
BLK
G103
EVIC
EXCEPT EVIC
EVIC
EXCEPT EVIC
GROUND 8 BLK
LIN BUS 1 WHT/DK GRN
FUSED B(+) 6 RED
RADIO CTRL MUX RTN 7 DK GRN/VIO
HORN SW SENSE 10 GRY/ORG
RIGHT STEERING WHEEL SWITCH
RED
DK GRN/VIO
WHT/DK GRN
GRY/ORG
EVIC
EXCEPT EVIC
GRY/ORG
GRY/ORG
S230
DK GRN/VIO
1
HORN SWITCH
2
GRY/ORG
S233
GRY/ORG
GRY/ORG
SOUND SYSTEMS
GRY/ORG
EVIC
EXCEPT EVIC
SOUND SYSTEMS
GRY/ORG
GRY/ORG

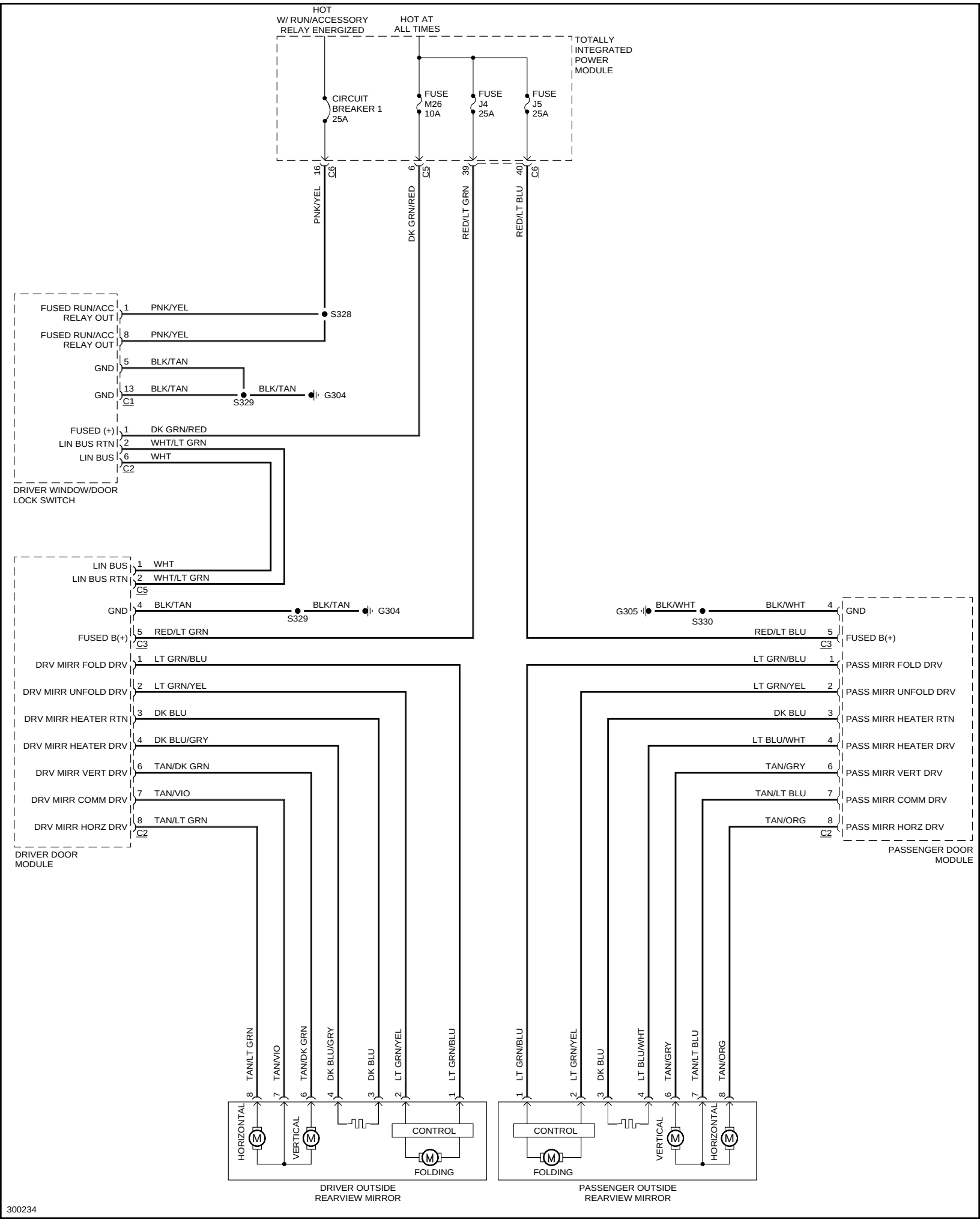
300980


HOT W/ RUN RELAY ENERGIZED
HOT AT ALL TIMES
W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
FUSE M34 10A
FUSE M20 15A
FUSE J13 60A
FUSE M13 20A
FUSE M15 20A
SWITCH RETURN
BRAKE FLUID LEVEL SIGNAL
RR DR AJAR SW SNS
LR DR AJAR SW SNS
PASS DR AJAR SW SNS
DRV DR AJAR SW SNS
LIFT GATE AJAR SW SEN
FUEL SIGNAL SWITCH 2
FUEL SIGNAL SWITCH 1
CAN INTERIOR BUS (125K) (+)
CAN INTERIOR BUS (125K) (-)
(EARLY PRODUCTION)
G204
BLK
S210
COMPASS MODULE
GROUND
LIN BUS
FUSED RUN RELAY OUTPUT
WHT/DK GRN
COMPUTER DATA LINES SYSTEM
PNK/YEL
S216
(AUTOMATIC A/C)
RED
(OR RED/WHT)
(OR PNK/BLK)
PNK/LT GRN
S206
S123
LT GRN/TAN
DK GRN/ORG
VIO/YEL
VIO/GRY
VIO/WHT
VIO
VIO/ORG
DK BLU/GRY
DK BLU/WHT
WHT/GRY
WHT/ORG
DK BLU/PNK
COMPUTER DATA LINES SYSTEM
DK BLU/WHT
FUEL LEVEL SIGNAL 1
FUEL LEVEL SIGNAL 2
G301
BLK/RED
S310
GROUND
FUEL PUMP MODULE
READING/RAIL LAMPS DRIVER
YEL/LT BLU
INTERIOR LIGHTS SYSTEM
COURTESY LAMPS DRIVER
YEL/WHT
PANEL LAMPS DRIVER
ORG/GRY
INVERTER STATUS INDICATOR DRIVER
LT GRN/WHT
UGDO ENABLE CONTROL
GRY
RADIO CONTROL MUX RETURN
GRY/ORG
SOUND SYSTEMS
LIN BUS
LIN BUS FUSED B (+) (I.O.D)
RED/WHT
FUSED B (+)
FUSED RUN/START RELAY OUTPUT
RADIO CONTROL MUX
GRY/WHT
HORN SWITCH SENS
DK GRN/VIO
HORNS SYSTEM
PARK BRAKE SWITCH SENSE
DK GRN/WHT
CAN INTERIOR BUS (125K) (+)
WHT/GRY
CAN INTERIOR BUS (125K) (-)
WHT/ORG
COMPUTER DATA LINES SYSTEM
CLUSTER
ENGINE CONTROLS SYSTEM
BRN/WHT
S103
SENSOR GROUND
EOT SIGNAL
VIO/BRN
EOP SIGNAL
VIO/GRY
POWERTRAIN CONTROL MODULE
3.5L
2.4L
NOT USED
BLK/VIO
C116
OIL PRESSURE SWITCH
OIL TEMPERATURE SENSOR
PARKING BRAKE SWITCH
INVERTER MODULE
VIO/ORG
G302
BLK/LT BLU
S334
LIFTGATE DOOR LATCH
VIO
G304
BLK/TAN
S329
DRIVER DOOR LATCH
VIO/WHT
G305
BLK/WHT
S330
PASSENGER DOOR LATCH
VIO/GRY
G304
BLK/TAN
BLK (OR BLK/TAN)
S332
LEFT REAR DOOR LATCH
VIO/YEL
G305
BLK/TAN
BLK (OR BLK/WHT)
S333
RIGHT REAR DOOR LATCH
DK GRN/ORG
LT GRN/TAN
S153
BRAKE FLUID LEVEL SENSOR
ENGINE CONTROLS SYSTEM
300902

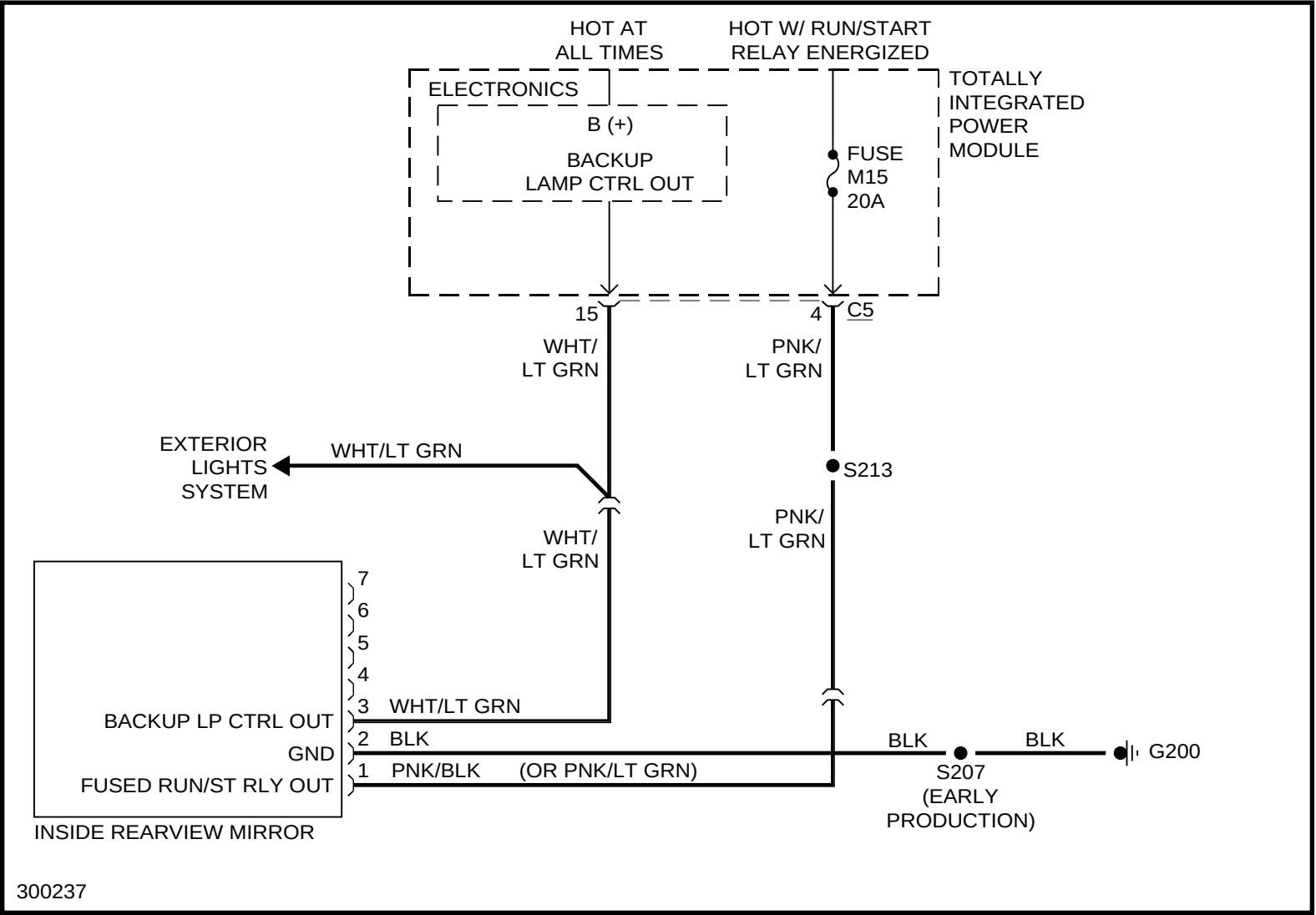

HOT W/ RUN RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M34 10A
FUSE M10 15A
DRIVER DOOR AJAR SW SENSE
PASSENGER DOOR AJAR SW SENSE
LEFT REAR DOOR AJAR SW SENSE
RIGHT REAR DOOR AJAR SW SENSE
DECKLID/ LIFTGATE AJAR SW SENSE
19 C6
23 C5
11
12
16
14
15 C7
PNK/YEL
RED
VIO
VIO/WHT
VIO/GRY
VIO/YEL
VIO/ORG
POWER DISTRIBUTION SYSTEM
PNK/YEL
PNK/YEL
VIO/ORG 1
VIO/YEL 2
VIO/GRY 3
3 PNK/YEL
1 BLK/LT BLU
BLK/LT BLU
S307
G302
FLASHLIGHT LAMP
HEADLAMP SWITCH
DIMMER PANEL LAMPS SWITCH
LIN BUS
C1
1 BLK
BLK
S210
(EARLY PRODUCTION)
G204
3 WHT/DK GRN
WHT/DK GRN
S205
COMPUTER DATA LINES SYSTEM
LEFT MULTI-FUNCTION SWITCH
VIO/WHT 4
VIO 5
RED A
GRY B
LEFT VANITY LAMP (EXCEPT BASE)
ORG/GRY 6
LIN BUS
UGO ENABLE CONTROL
PANEL LAMPS DRIVER
COURTESY LAMPS DRV
READING/RAIL LAMPS DRIVER
C2
C1
10 WHT/DK GRN
4 GRY
10 ORG/GRY
8 YEL/WHT
1 YEL/LT BLU
YEL/LT BLU
YEL/LT BLU
CLUSTER
S323
YEL/LT BLU A
BLK B
YEL/WHT C
READING/RAIL LAMPS DRV
GROUND
COURTESY LAMPS DRIVER
2ND ROW OVERHEAD RAIL LAMP (HIGHLINE)
3RD ROW OVERHEAD RAIL LAMP (HIGHLINE)
2 YEL/LT BLU
1 BLK
BLK
S208
(EARLY PRODUCTION)
G201
GLOVEBOX LAMP
YEL/LT BLU 1
BLK 3
YEL/WHT 2
REAR DOME LAMP (3RD ROW/LOWLINE)
A YEL/LT BLU
S322
B BLK
RIGHT VANITY LAMP (EXCEPT BASE)
FRONT READING LAMP (BASE/LOWLINE)
S324
BLK
G200
1 YEL/LT BLU
3 BLK
2 YEL/WHT
YEL/WHT
YEL/WHT
CENTER DOME LAMP (BASE/LOWLINE)
YEL/WHT 2
YEL/LT BLU 3
BLK 1
FRONT 1 READING LAMP (HIGHLINE)
S334
3 YEL/WHT
1 BLK/LT BLU
BLK/LT BLU
G302
LIFTGATE LAMP
3 YEL/LT BLU
1 BLK
2 YEL/WHT
READING/ RAIL LAMP DRIVER
GROUND
COURTESY LAMPS DRIVER
FRONT 2 READING LAMP (HIGHLINE)
300958

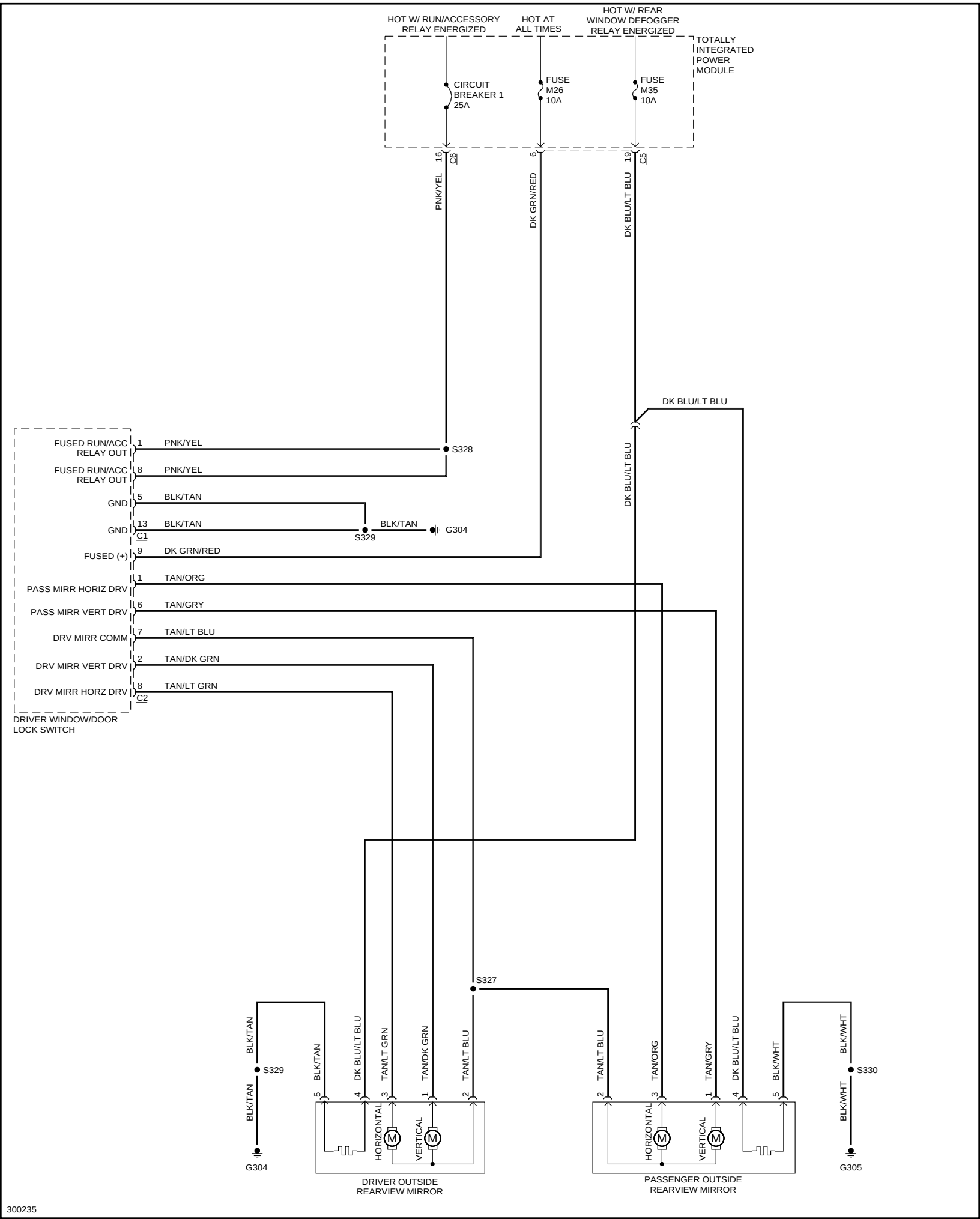

LIFTGATE DOOR LATCH
RIGHT REAR DOOR LATCH
VIO/ORG
BLK/LT BLU
VIO/YEL
BLK/WHT (OR BLK)
S334 BLK/LT BLU G302
S333 BLK/TAN G305
1 VIO/ORG
2 VIO/YEL
3 VIO/GRY
VIO/GRY
G304 BLK/TAN S332 BLK/TAN (OR BLK)
LEFT REAR DOOR LATCH
4 VIO/WHT
VIO/WHT
5 VIO
G305 BLK/WHT S330 BLK/WHT
PASSENGER DOOR LATCH
6 ORG/GRY
VIO
G304 BLK/TAN S329 BLK/TAN
DRIVER DOOR LATCH
3 ZONE MANUAL A/C
AUTOMATIC A/C
PANEL LAMPS DRV
GND
ORG/GRY
BLK
S207 (EARLY PRODUCTION)
G200
A/C HEATER CONTROL
S208 (EARLY PRODUCTION)
G201
REAR A/C HEATER CONTROL (3 ZONE A/C)
S214
S313
ORG/ GRY
LEFT FRONT FOOTWELL LAMP
RIGHT FRONT FOOTWELL LAMP
PRNDL LAMP
CUP HOLDER LAMP
BLK/ PNK
S305
S307
BLK/ LT BLU
G300
G302

300959

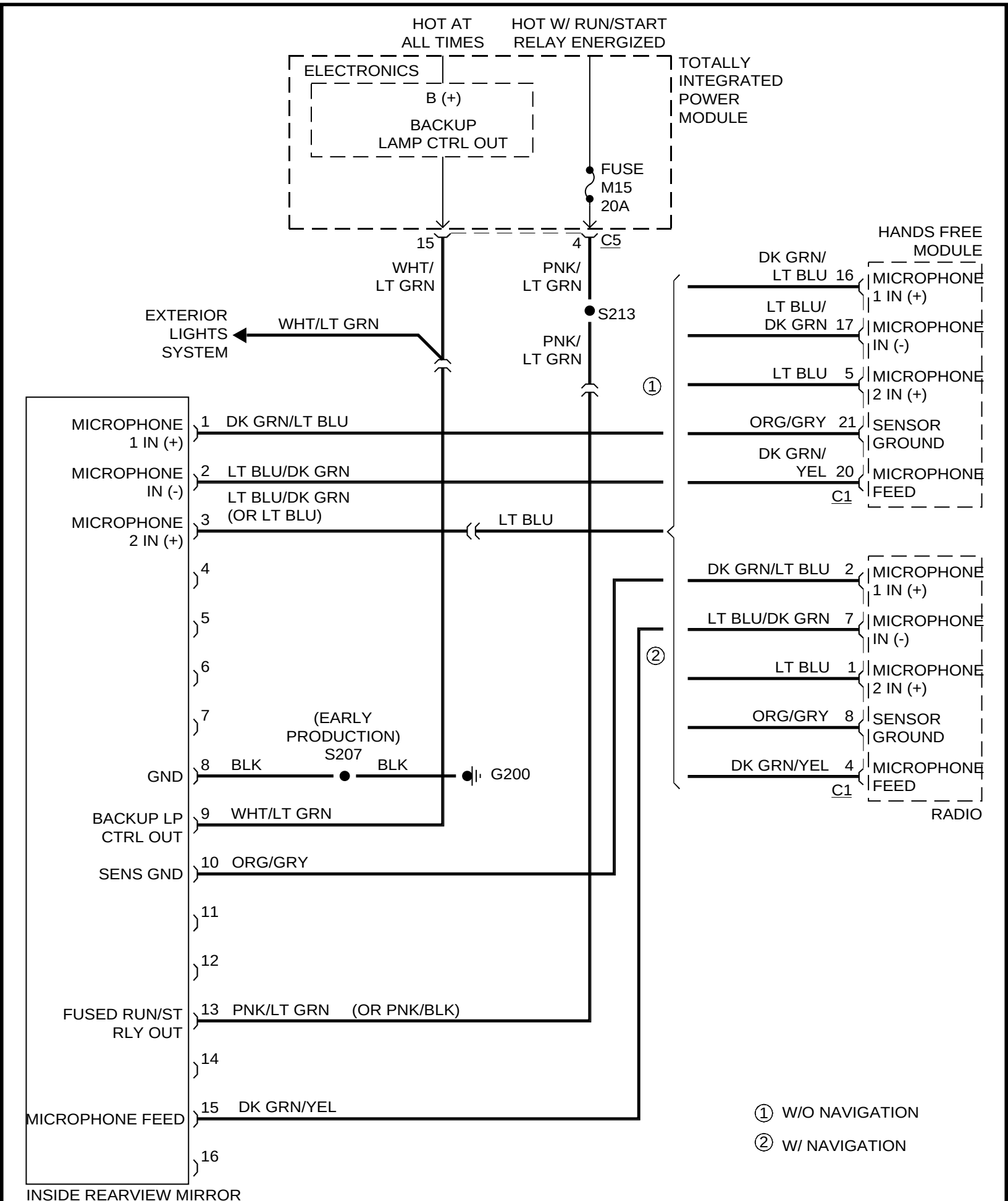

HOT
W/ RUN/ACCESSORY
RELAY ENERGIZED
HOT AT
ALL TIMES
TOTALLY
INTEGRATED
POWER
MODULE
CIRCUIT
BREAKER 1
25A
FUSE
M26
10A
FUSE
J4
25A
FUSE
J5
25A
16
C6
6
C5
39
40
C6
PNK/YEL
DK GRN/RED
RED/LT GRN
RED/LT BLU
FUSED RUN/ACC
RELAY OUT
1
PNK/YEL
S328
FUSED RUN/ACC
RELAY OUT
8
PNK/YEL
GND
5
BLK/TAN
GND
13
C1
BLK/TAN
S329
BLK/TAN
G304
FUSED (+)
1
DK GRN/RED
LIN BUS RTN
2
WHT/LT GRN
LIN BUS
6
C2
WHT
DRIVER WINDOW/DOOR
LOCK SWITCH
LIN BUS
1
WHT
LIN BUS RTN
2
C5
WHT/LT GRN
GND
4
BLK/TAN
S329
BLK/TAN
G304
FUSED B(+)
5
C3
RED/LT GRN
DRV MIRR FOLD DRV
1
LT GRN/BLU
DRV MIRR UNFOLD DRV
2
LT GRN/YEL
DRV MIRR HEATER RTN
3
DK BLU
DRV MIRR HEATER DRV
4
DK BLU/GRY
DRV MIRR VERT DRV
6
TAN/DK GRN
DRV MIRR COMM DRV
7
TAN/VIO
DRV MIRR HORZ DRV
8
C2
TAN/LT GRN
DRIVER DOOR
MODULE
G305
BLK/WHT
S330
BLK/WHT
4
GND
RED/LT BLU
5
C3
FUSED B(+)
LT GRN/BLU
1
PASS MIRR FOLD DRV
LT GRN/YEL
2
PASS MIRR UNFOLD DRV
DK BLU
3
PASS MIRR HEATER RTN
LT BLU/WHT
4
PASS MIRR HEATER DRV
TAN/GRY
6
PASS MIRR VERT DRV
TAN/LT BLU
7
PASS MIRR COMM DRV
TAN/ORG
8
C2
PASS MIRR HORZ DRV
PASSENGER DOOR
MODULE
TAN/LT GRN
TAN/VIO
TAN/DK GRN
DK BLU/GRY
DK BLU
LT GRN/YEL
LT GRN/BLU
HORIZONTAL
VERTICAL
CONTROL
FOLDING
M
DRIVER OUTSIDE
REARVIEW MIRROR
LT GRN/BLU
LT GRN/YEL
DK BLU
LT BLU/WHT
TAN/GRY
TAN/LT BLU
TAN/ORG
CONTROL
FOLDING
VERTICAL
HORIZONTAL
PASSENGER OUTSIDE
REARVIEW MIRROR

300234

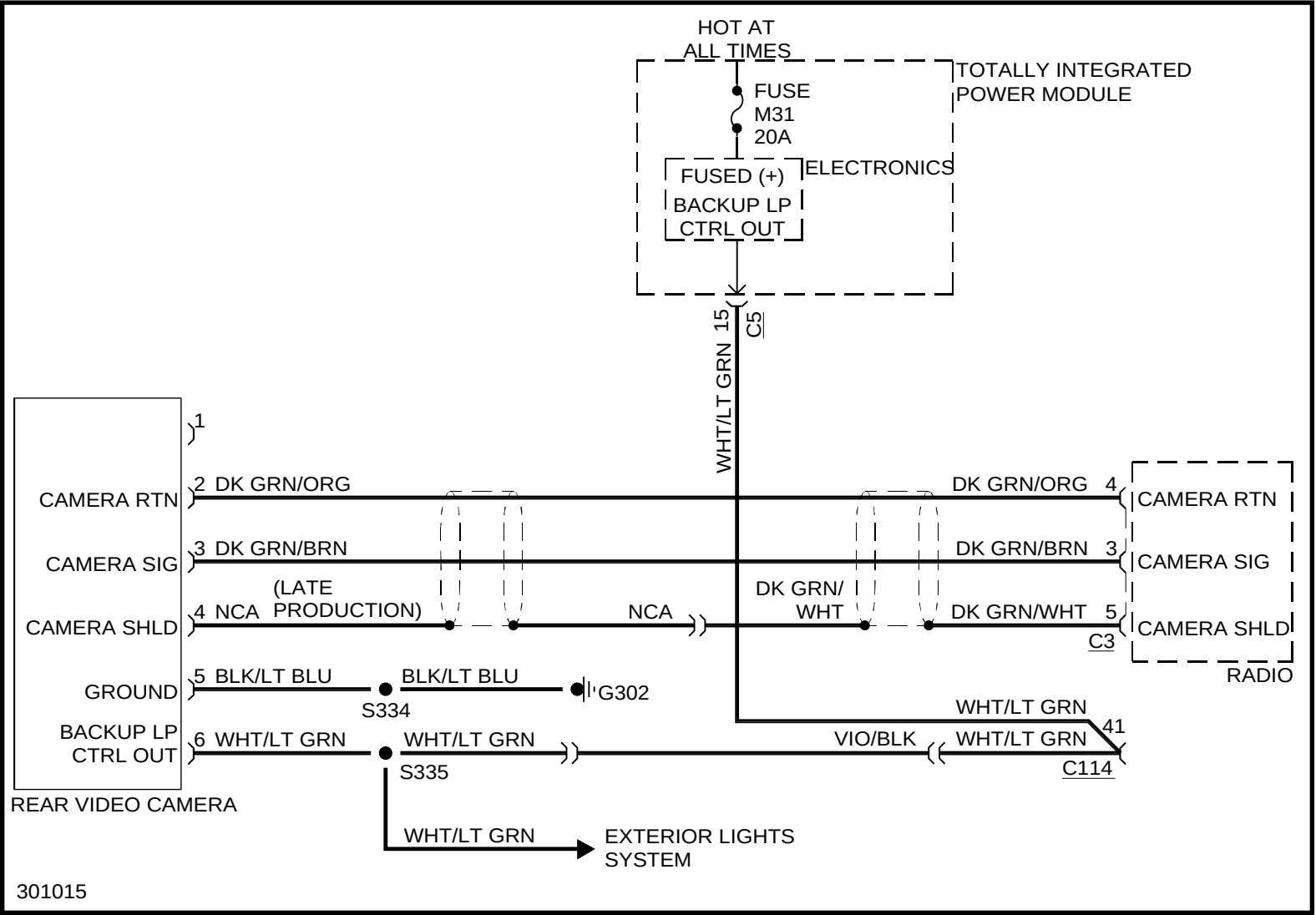

HOT AT
ALL TIMES
HOT W/ RUN/START
RELAY ENERGIZED
ELECTRONICS
B (+)
BACKUP
LAMP CTRL OUT
FUSE
M15
20A
TOTALLY
INTEGRATED
POWER
MODULE
15
4
C5
WHT/
LT GRN
PNK/
LT GRN
EXTERIOR
LIGHTS
SYSTEM
WHT/LT GRN
S213
WHT/
LT GRN
PNK/
LT GRN
7
6
5
4
3 WHT/LT GRN
BACKUP LP CTRL OUT
2 BLK
GND
1 PNK/BLK (OR PNK/LT GRN)
FUSED RUN/ST RLY OUT
BLK
BLK
G200
S207
(EARLY
PRODUCTION)
INSIDE REARVIEW MIRROR
300237

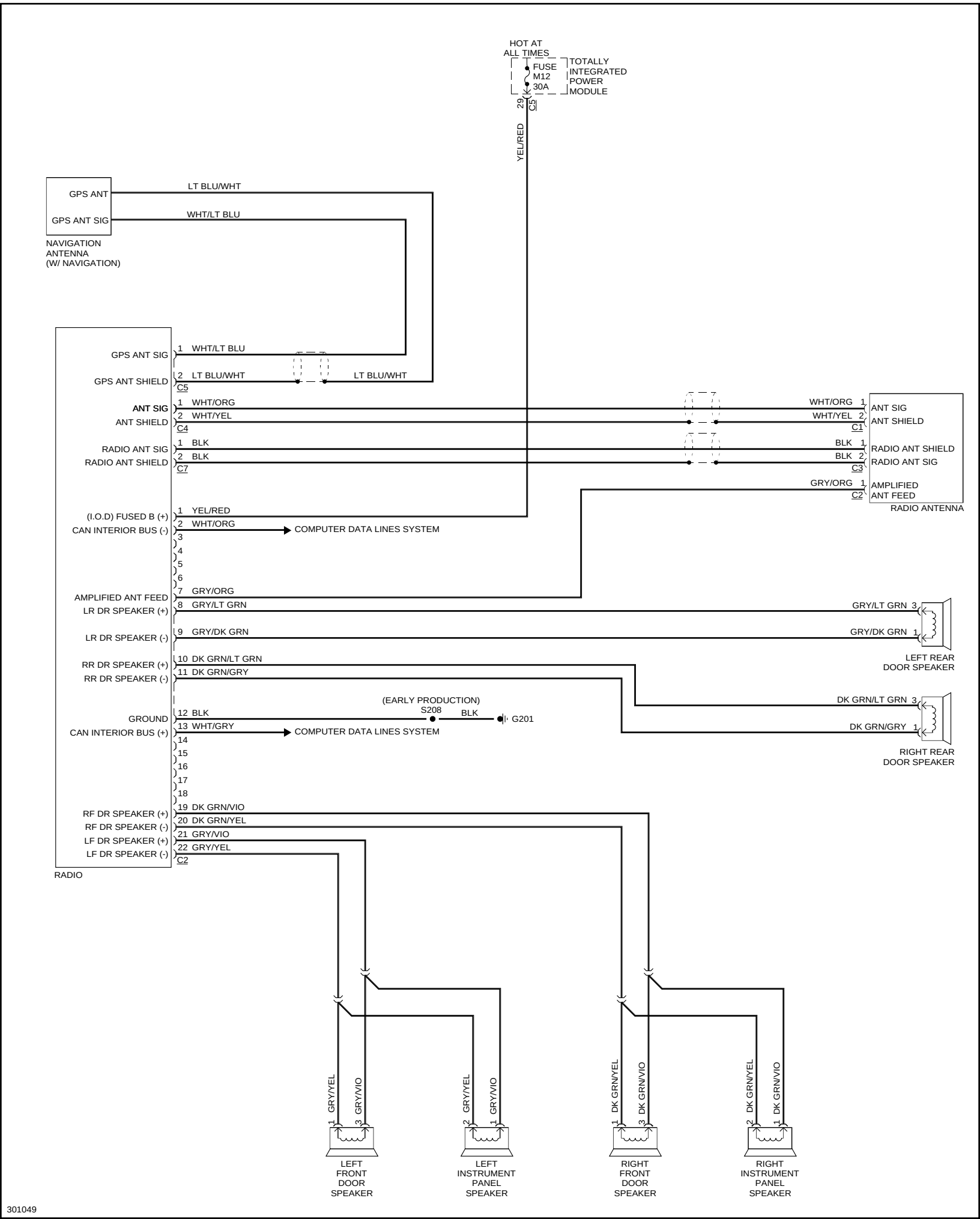

HOT W/ RUN/ACCESSORY RELAY ENERGIZED
HOT AT ALL TIMES
HOT W/ REAR WINDOW DEFOGGER RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
CIRCUIT BREAKER 1 25A
FUSE M26 10A
FUSE M35 10A
16
C6
6
19
C5
PNK/YEL
DK GRN/RED
DK BLU/LT BLU
DK BLU/LT BLU
DK BLU/LT BLU
FUSED RUN/ACC RELAY OUT
1
PNK/YEL
S328
FUSED RUN/ACC RELAY OUT
8
PNK/YEL
GND
5
BLK/TAN
GND
13
C1
BLK/TAN
S329
BLK/TAN
G304
FUSED (+)
9
DK GRN/RED
PASS MIRR HORIZ DRV
1
TAN/ORG
PASS MIRR VERT DRV
6
TAN/GRY
DRV MIRR COMM
7
TAN/LT BLU
DRV MIRR VERT DRV
2
TAN/DK GRN
DRV MIRR HORZ DRV
8
C2
TAN/LT GRN
DRIVER WINDOW/DOOR LOCK SWITCH
S327
BLK/TAN
S329
BLK/TAN
BLK/TAN
G304
5
BLK/TAN
4
DK BLU/LT BLU
3
TAN/LT GRN
1
TAN/DK GRN
2
TAN/LT BLU
HORIZONTAL
VERTICAL
M
M
DRIVER OUTSIDE REARVIEW MIRROR
2
TAN/LT BLU
3
TAN/ORG
1
TAN/GRY
4
DK BLU/LT BLU
5
BLK/WHT
HORIZONTAL
VERTICAL
M
M
PASSENGER OUTSIDE REARVIEW MIRROR
BLK/WHT
S330
BLK/WHT
G305

300235

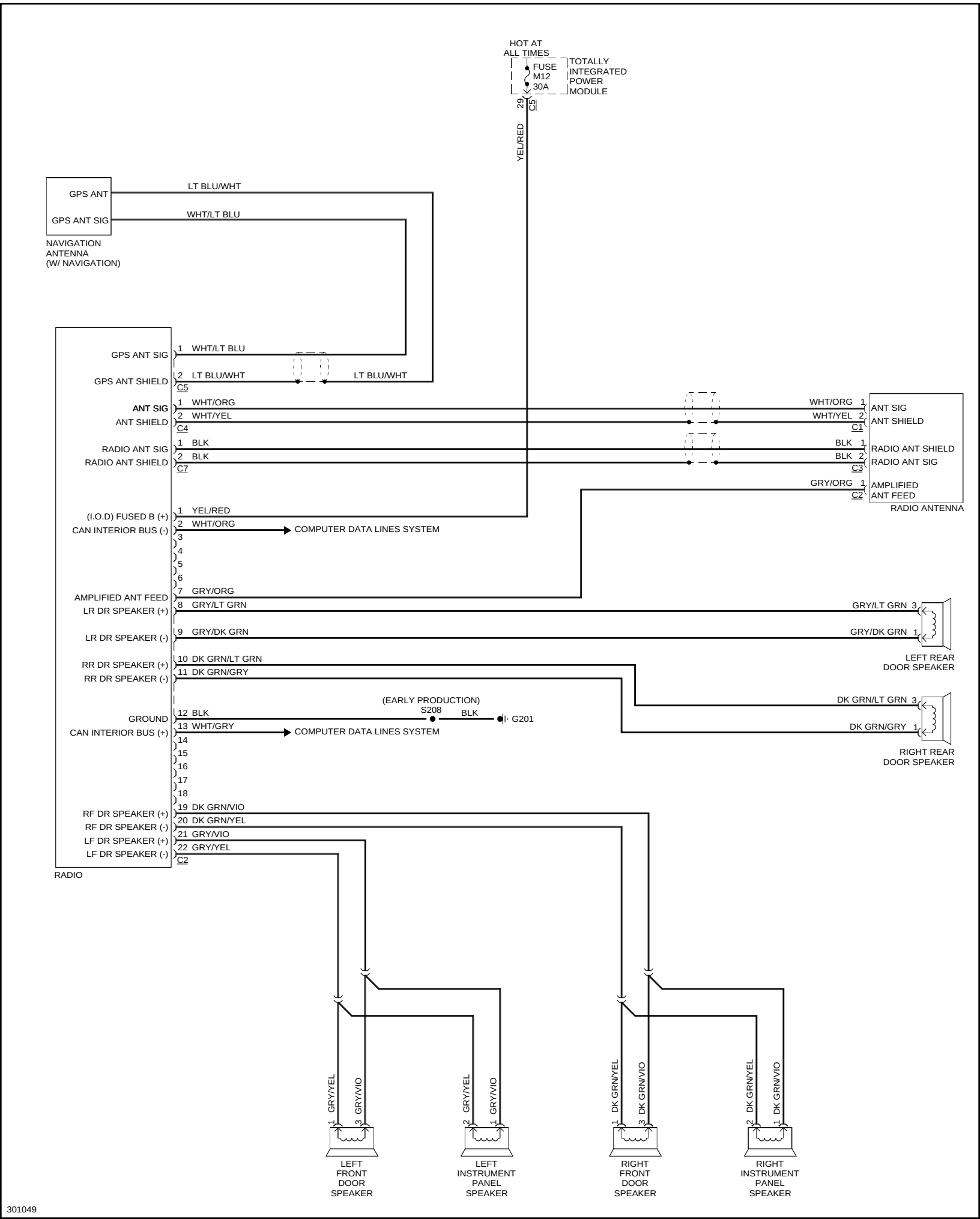

HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
ELECTRONICS
B (+)
BACKUP LAMP CTRL OUT
TOTALLY INTEGRATED POWER MODULE
FUSE M15 20A
15
4
C5
WHT/ LT GRN
PNK/ LT GRN
S213
EXTERIOR LIGHTS SYSTEM
WHT/LT GRN
PNK/ LT GRN
①
HANDS FREE MODULE
DK GRN/ LT BLU 16
MICROPHONE 1 IN (+)
LT BLU/ DK GRN 17
MICROPHONE IN (-)
LT BLU 5
MICROPHONE 2 IN (+)
ORG/GRY 21
SENSOR GROUND
DK GRN/ YEL 20
MICROPHONE FEED
C1
MICROPHONE 1 IN (+)
1 DK GRN/LT BLU
MICROPHONE IN (-)
2 LT BLU/DK GRN
LT BLU/DK GRN (OR LT BLU)
MICROPHONE 2 IN (+)
3
LT BLU
4
5
6
7
(EARLY PRODUCTION) S207
GND
8 BLK
BLK
G200
BACKUP LP CTRL OUT
9 WHT/LT GRN
SENS GND
10 ORG/GRY
11
12
FUSED RUN/ST RLY OUT
13 PNK/LT GRN (OR PNK/BLK)
14
MICROPHONE FEED
15 DK GRN/YEL
16
INSIDE REARVIEW MIRROR
②
DK GRN/LT BLU 2
MICROPHONE 1 IN (+)
LT BLU/DK GRN 7
MICROPHONE IN (-)
LT BLU 1
MICROPHONE 2 IN (+)
ORG/GRY 8
SENSOR GROUND
DK GRN/YEL 4
MICROPHONE FEED
C1
RADIO
① W/O NAVIGATION
② W/ NAVIGATION

300236

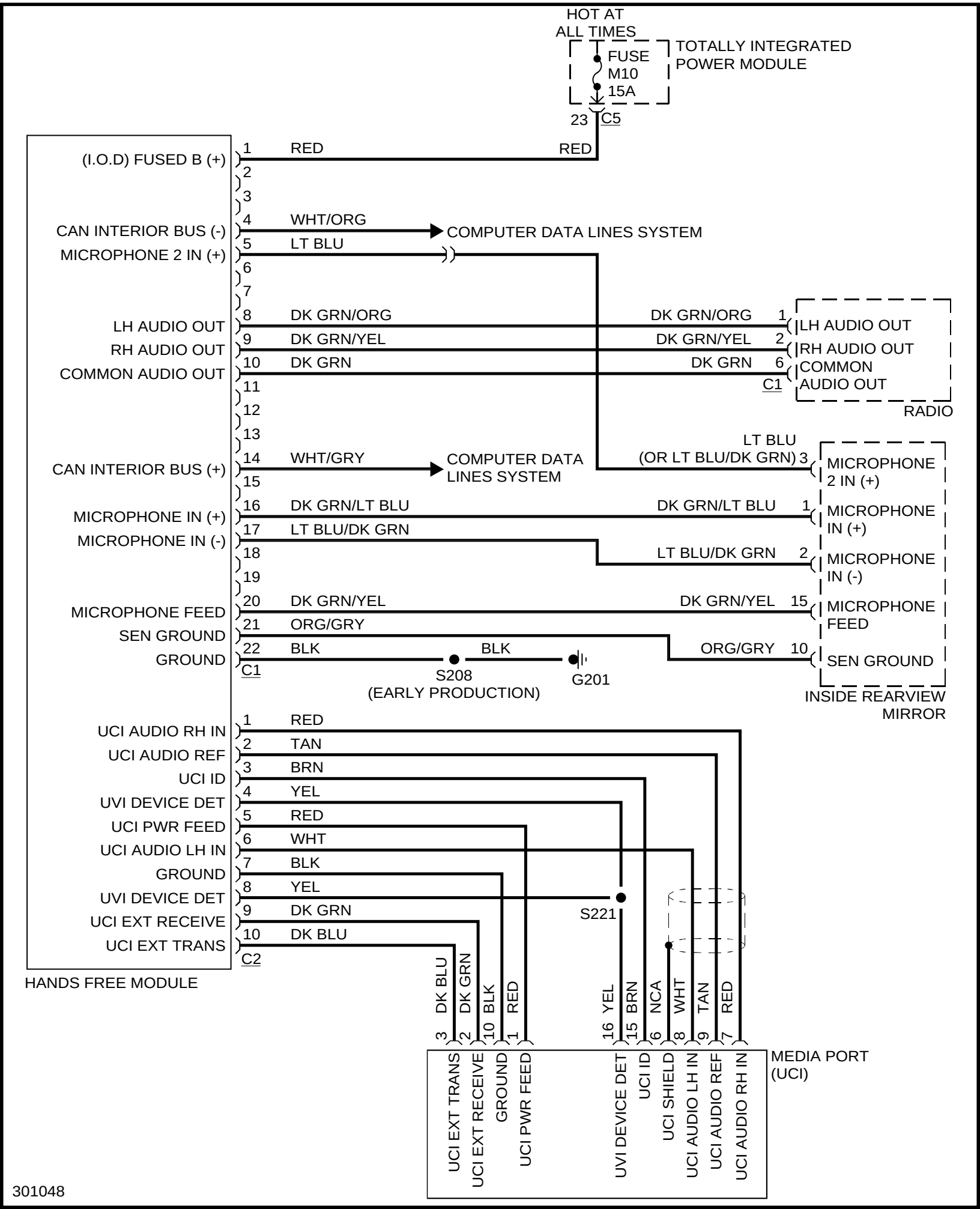

HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
FUSE M31 20A
FUSED (+) ELECTRONICS BACKUP LP CTRL OUT
15
C5
WHT/LT GRN
1
2 DK GRN/ORG
CAMERA RTN
3 DK GRN/BRN
CAMERA SIG
4 NCA
CAMERA SHLD
(LATE PRODUCTION)
NCA
DK GRN/ WHT
DK GRN/ORG 4
DK GRN/BRN 3
DK GRN/WHT 5
C3
CAMERA RTN
CAMERA SIG
CAMERA SHLD
RADIO
5 BLK/LT BLU
GROUND
BLK/LT BLU
G302
S334
WHT/LT GRN
41
BACKUP LP CTRL OUT
6 WHT/LT GRN
WHT/LT GRN
VIO/BLK
WHT/LT GRN
C114
S335
REAR VIDEO CAMERA
WHT/LT GRN
EXTERIOR LIGHTS SYSTEM
301015


HOT AT ALL TIMES
FUSE M12 30A
TOTALLY INTEGRATED POWER MODULE
29 C5
YEL/RED
GPS ANT
GPS ANT SIG
LT BLU/WHT
WHT/LT BLU
NAVIGATION ANTENNA (W/ NAVIGATION)
GPS ANT SIG
GPS ANT SHIELD
1 WHT/LT BLU
2 LT BLU/WHT
C5
LT BLU/WHT
ANT SIG
ANT SHIELD
1 WHT/ORG
2 WHT/YEL
C4
WHT/ORG 1
WHT/YEL 2
C1
ANT SIG
ANT SHIELD
RADIO ANT SIG
RADIO ANT SHIELD
1 BLK
2 BLK
C7
BLK 1
BLK 2
C3
RADIO ANT SHIELD
RADIO ANT SIG
GRY/ORG 1
C2
AMPLIFIED ANT FEED
RADIO ANTENNA
(I.O.D) FUSED B (+)
CAN INTERIOR BUS (-)
1 YEL/RED
2 WHT/ORG
COMPUTER DATA LINES SYSTEM
3
4
5
6
7 GRY/ORG
AMPLIFIED ANT FEED
LR DR SPEAKER (+)
8 GRY/LT GRN
GRY/LT GRN 3
LR DR SPEAKER (-)
9 GRY/DK GRN
GRY/DK GRN 1
LEFT REAR DOOR SPEAKER
RR DR SPEAKER (+)
RR DR SPEAKER (-)
10 DK GRN/LT GRN
11 DK GRN/GRY
DK GRN/LT GRN 3
DK GRN/GRY 1
RIGHT REAR DOOR SPEAKER
(EARLY PRODUCTION)
S208
GROUND
CAN INTERIOR BUS (+)
12 BLK
13 WHT/GRY
BLK
G201
COMPUTER DATA LINES SYSTEM
14
15
16
17
18
RF DR SPEAKER (+)
RF DR SPEAKER (-)
LF DR SPEAKER (+)
LF DR SPEAKER (-)
19 DK GRN/VIO
20 DK GRN/YEL
21 GRY/VIO
22 GRY/YEL
C2
RADIO
GRY/YEL
GRY/VIO
LEFT FRONT DOOR SPEAKER
LEFT INSTRUMENT PANEL SPEAKER
DK GRN/YEL
DK GRN/VIO
RIGHT FRONT DOOR SPEAKER
RIGHT INSTRUMENT PANEL SPEAKER

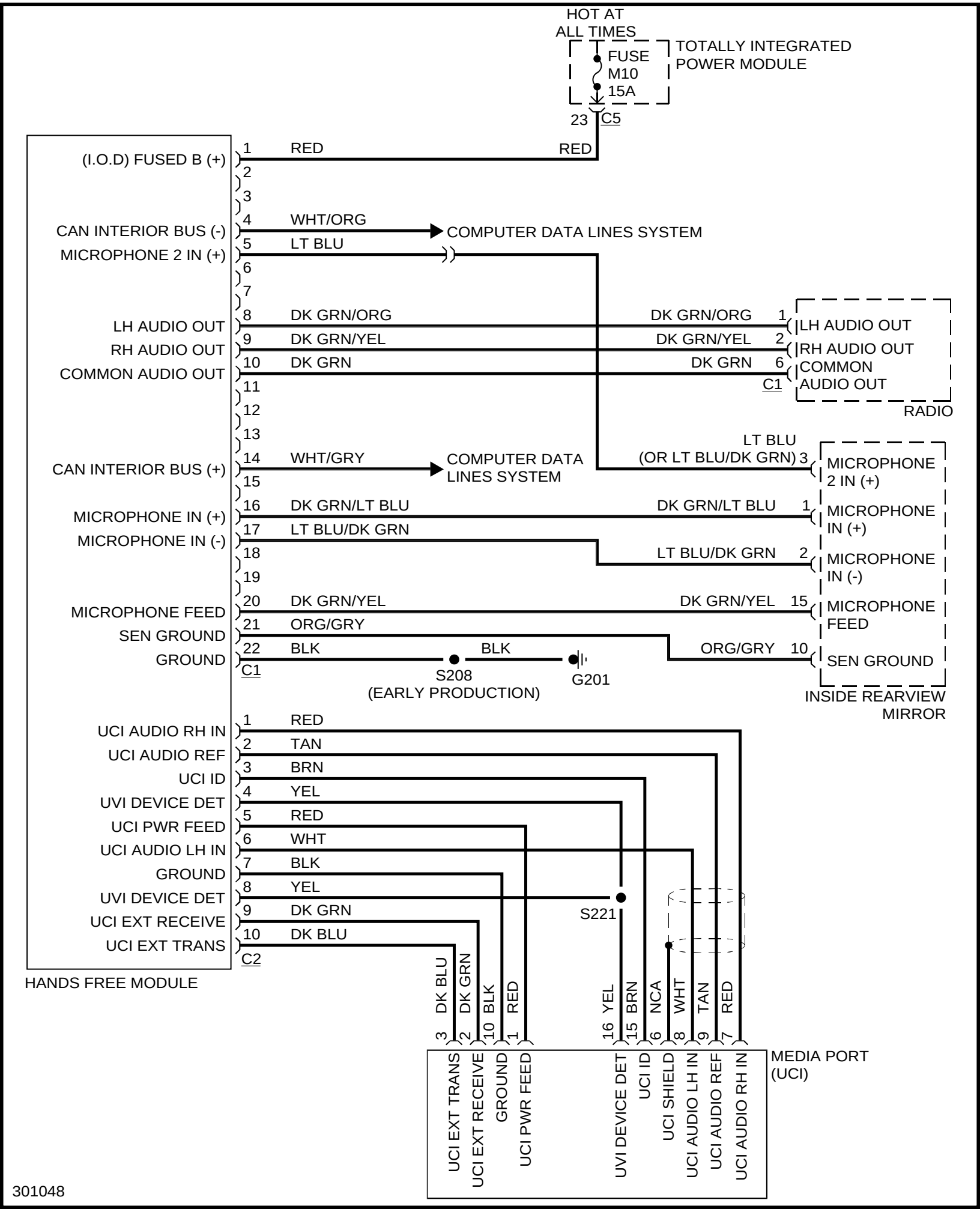
301049


HOT AT ALL TIMES
FUSE M12 30A
TOTALLY INTEGRATED POWER MODULE
29 C5
YEL/RED
GPS ANT
GPS ANT SIG
LT BLU/WHT
WHT/LT BLU
NAVIGATION ANTENNA (W/ NAVIGATION)
GPS ANT SIG
GPS ANT SHIELD
1 WHT/LT BLU
2 LT BLU/WHT
C5
LT BLU/WHT
ANT SIG
ANT SHIELD
1 WHT/ORG
2 WHT/YEL
C4
WHT/ORG 1
WHT/YEL 2
C1
ANT SIG
ANT SHIELD
RADIO ANT SIG
RADIO ANT SHIELD
1 BLK
2 BLK
C7
BLK 1
BLK 2
C3
RADIO ANT SHIELD
RADIO ANT SIG
GRY/ORG 1
C2
AMPLIFIED ANT FEED
RADIO ANTENNA
(I.O.D) FUSED B (+)
CAN INTERIOR BUS (-)
1 YEL/RED
2 WHT/ORG
COMPUTER DATA LINES SYSTEM
3
4
5
6
7 GRY/ORG
AMPLIFIED ANT FEED
LR DR SPEAKER (+)
8 GRY/LT GRN
GRY/LT GRN 3
LR DR SPEAKER (-)
9 GRY/DK GRN
GRY/DK GRN 1
LEFT REAR DOOR SPEAKER
RR DR SPEAKER (+)
RR DR SPEAKER (-)
10 DK GRN/LT GRN
11 DK GRN/GRY
DK GRN/LT GRN 3
DK GRN/GRY 1
RIGHT REAR DOOR SPEAKER
(EARLY PRODUCTION)
S208
GROUND
CAN INTERIOR BUS (+)
12 BLK
13 WHT/GRY
BLK
G201
COMPUTER DATA LINES SYSTEM
14
15
16
17
18
RF DR SPEAKER (+)
RF DR SPEAKER (-)
LF DR SPEAKER (+)
LF DR SPEAKER (-)
19 DK GRN/VIO
20 DK GRN/YEL
21 GRY/VIO
22 GRY/YEL
C2
RADIO
GRY/YEL
GRY/VIO
LEFT FRONT DOOR SPEAKER
LEFT INSTRUMENT PANEL SPEAKER
DK GRN/YEL
DK GRN/VIO
RIGHT FRONT DOOR SPEAKER
RIGHT INSTRUMENT PANEL SPEAKER

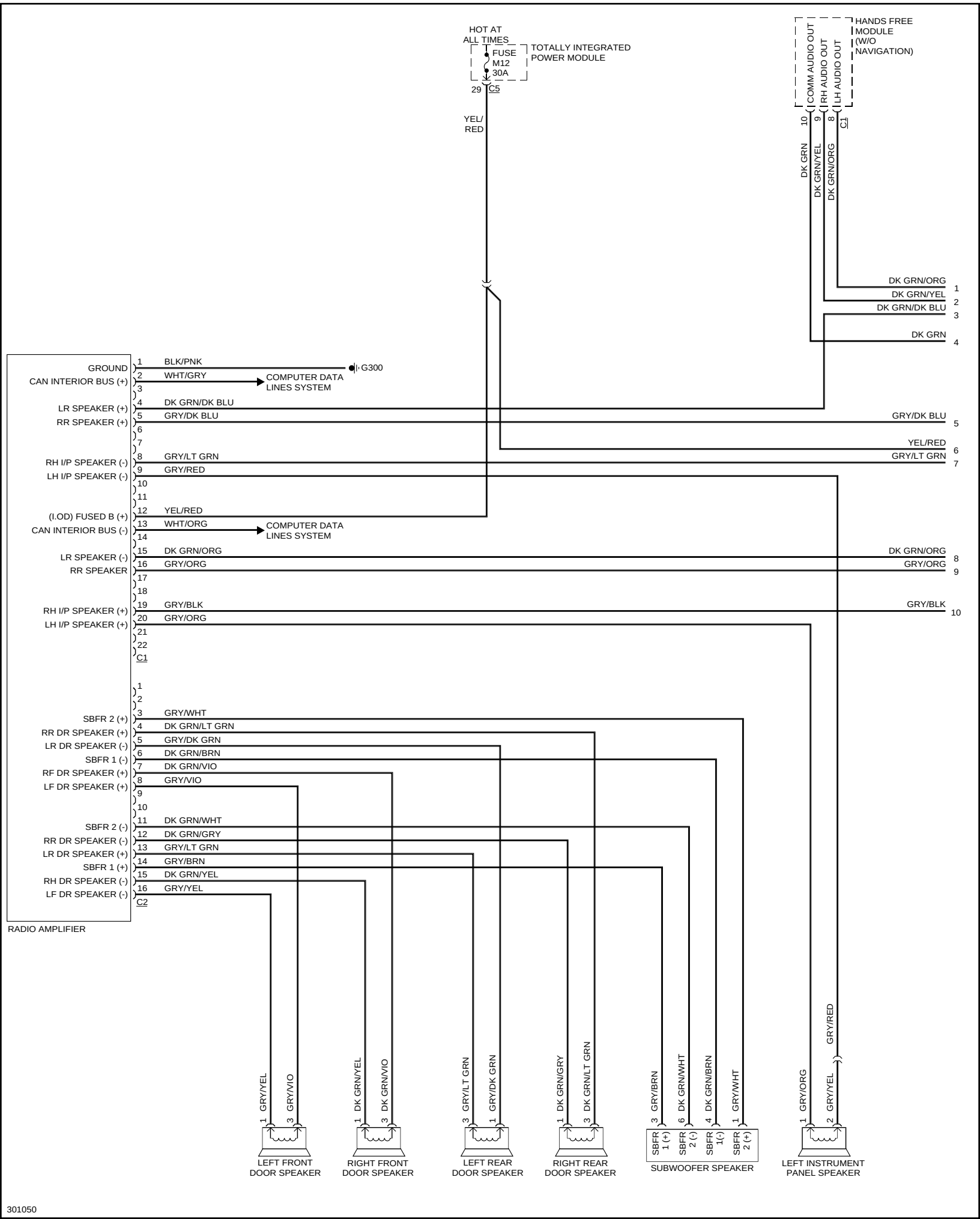
301049


HOT AT ALL TIMES
FUSE M10 15A
TOTALLY INTEGRATED POWER MODULE
23 C5
(I.O.D) FUSED B (+) 1 RED
RED
CAN INTERIOR BUS (-) 4 WHT/ORG
COMPUTER DATA LINES SYSTEM
MICROPHONE 2 IN (+) 5 LT BLU
LH AUDIO OUT 8 DK GRN/ORG
DK GRN/ORG 1 LH AUDIO OUT
RH AUDIO OUT 9 DK GRN/YEL
DK GRN/YEL 2 RH AUDIO OUT
COMMON AUDIO OUT 10 DK GRN
DK GRN 6 COMMON AUDIO OUT
C1
RADIO
CAN INTERIOR BUS (+) 14 WHT/GRY
COMPUTER DATA LINES SYSTEM
LT BLU (OR LT BLU/DK GRN) 3
MICROPHONE 2 IN (+)
MICROPHONE IN (+) 16 DK GRN/LT BLU
DK GRN/LT BLU 1 MICROPHONE IN (+)
MICROPHONE IN (-) 17 LT BLU/DK GRN
LT BLU/DK GRN 2 MICROPHONE IN (-)
MICROPHONE FEED 20 DK GRN/YEL
DK GRN/YEL 15 MICROPHONE FEED
SEN GROUND 21 ORG/GRY
GROUND 22 BLK
BLK
ORG/GRY 10 SEN GROUND
C1
S208
(EARLY PRODUCTION)
G201
INSIDE REARVIEW MIRROR
UCI AUDIO RH IN 1 RED
UCI AUDIO REF 2 TAN
UCI ID 3 BRN
UVI DEVICE DET 4 YEL
UCI PWR FEED 5 RED
UCI AUDIO LH IN 6 WHT
GROUND 7 BLK
UVI DEVICE DET 8 YEL
S221
UCI EXT RECEIVE 9 DK GRN
UCI EXT TRANS 10 DK BLU
C2
HANDS FREE MODULE
3 DK BLU
2 DK GRN
10 BLK
1 RED
16 YEL
15 BRN
6 NCA
8 WHT
9 TAN
7 RED
UCI EXT TRANS
UCI EXT RECEIVE
GROUND
UCI PWR FEED
UVI DEVICE DET
UCI ID
UCI SHIELD
UCI AUDIO LH IN
UCI AUDIO REF
UCI AUDIO RH IN
MEDIA PORT (UCI)

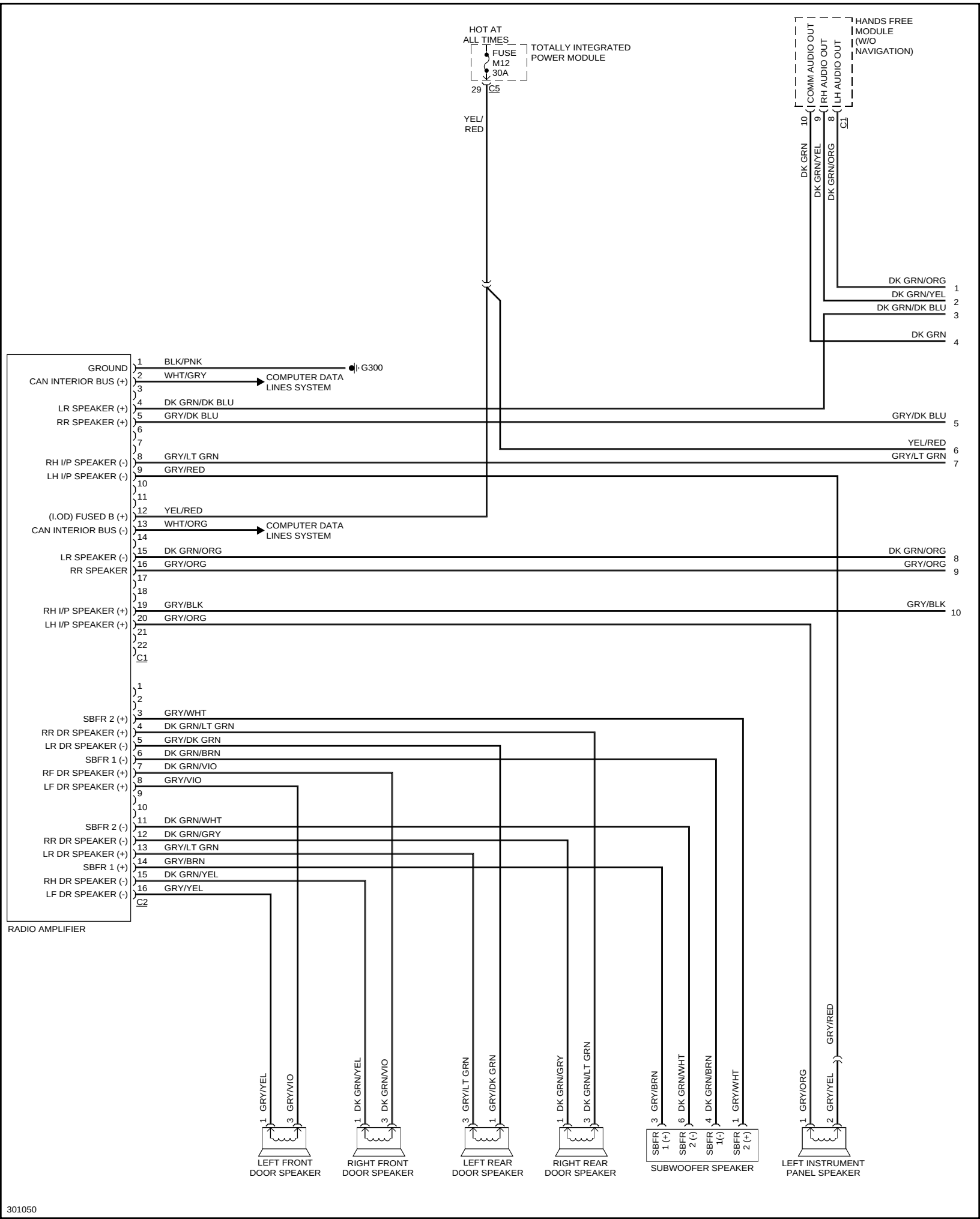
301048


HOT AT ALL TIMES
FUSE M10 15A
TOTALLY INTEGRATED POWER MODULE
23 C5
(I.O.D) FUSED B (+) 1 RED
RED
CAN INTERIOR BUS (-) 4 WHT/ORG
COMPUTER DATA LINES SYSTEM
MICROPHONE 2 IN (+) 5 LT BLU
LH AUDIO OUT 8 DK GRN/ORG
DK GRN/ORG 1 LH AUDIO OUT
RH AUDIO OUT 9 DK GRN/YEL
DK GRN/YEL 2 RH AUDIO OUT
COMMON AUDIO OUT 10 DK GRN
DK GRN 6 COMMON AUDIO OUT
C1
RADIO
CAN INTERIOR BUS (+) 14 WHT/GRY
COMPUTER DATA LINES SYSTEM
LT BLU (OR LT BLU/DK GRN) 3
MICROPHONE 2 IN (+)
MICROPHONE IN (+) 16 DK GRN/LT BLU
DK GRN/LT BLU 1 MICROPHONE IN (+)
MICROPHONE IN (-) 17 LT BLU/DK GRN
LT BLU/DK GRN 2 MICROPHONE IN (-)
MICROPHONE FEED 20 DK GRN/YEL
DK GRN/YEL 15 MICROPHONE FEED
SEN GROUND 21 ORG/GRY
GROUND 22 BLK
BLK
ORG/GRY 10 SEN GROUND
C1
S208
(EARLY PRODUCTION)
G201
INSIDE REARVIEW MIRROR
UCI AUDIO RH IN 1 RED
UCI AUDIO REF 2 TAN
UCI ID 3 BRN
UVI DEVICE DET 4 YEL
UCI PWR FEED 5 RED
UCI AUDIO LH IN 6 WHT
GROUND 7 BLK
UVI DEVICE DET 8 YEL
S221
UCI EXT RECEIVE 9 DK GRN
UCI EXT TRANS 10 DK BLU
C2
HANDS FREE MODULE
3 DK BLU
2 DK GRN
10 BLK
1 RED
16 YEL
15 BRN
6 NCA
8 WHT
9 TAN
7 RED
UCI EXT TRANS
UCI EXT RECEIVE
GROUND
UCI PWR FEED
UVI DEVICE DET
UCI ID
UCI SHIELD
UCI AUDIO LH IN
UCI AUDIO REF
UCI AUDIO RH IN
MEDIA PORT (UCI)

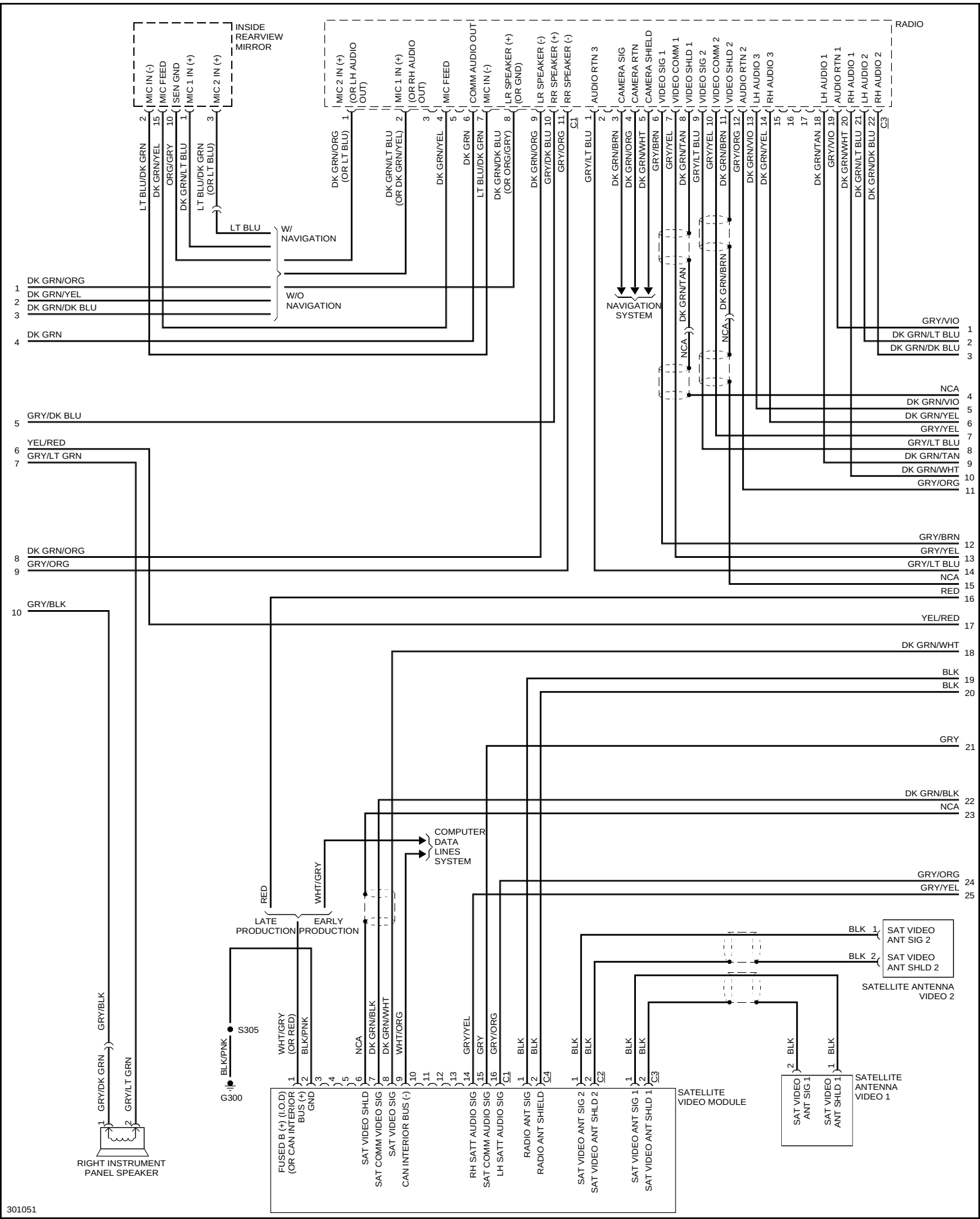
301048


HOT AT ALL TIMES
FUSE M12 30A
TOTALLY INTEGRATED POWER MODULE
29 C5
YEL/RED
HANDS FREE MODULE (W/O NAVIGATION)
COMM AUDIO OUT
RH AUDIO OUT
LH AUDIO OUT
10 9 8 C1
DK GRN
DK GRN/YEL
DK GRN/ORG
DK GRN/ORG 1
DK GRN/YEL 2
DK GRN/DK BLU 3
DK GRN 4
GROUND 1 BLK/PNK G300
CAN INTERIOR BUS (+) 2 WHT/GRY COMPUTER DATA LINES SYSTEM
3
LR SPEAKER (+) 4 DK GRN/DK BLU
RR SPEAKER (+) 5 GRY/DK BLU GRY/DK BLU 5
6
7
YEL/RED 6
RH I/P SPEAKER (-) 8 GRY/LT GRN GRY/LT GRN 7
LH I/P SPEAKER (-) 9 GRY/RED
10
11
(I.OD) FUSED B (+) 12 YEL/RED
CAN INTERIOR BUS (-) 13 WHT/ORG COMPUTER DATA LINES SYSTEM
14
LR SPEAKER (-) 15 DK GRN/ORG DK GRN/ORG 8
RR SPEAKER 16 GRY/ORG GRY/ORG 9
17
18
RH I/P SPEAKER (+) 19 GRY/BLK GRY/BLK 10
LH I/P SPEAKER (+) 20 GRY/ORG
21
22
C1
1
2
SBFR 2 (+) 3 GRY/WHT
RR DR SPEAKER (+) 4 DK GRN/LT GRN
LR DR SPEAKER (-) 5 GRY/DK GRN
SBFR 1 (-) 6 DK GRN/BRN
RF DR SPEAKER (+) 7 DK GRN/VIO
LF DR SPEAKER (+) 8 GRY/VIO
9
10
SBFR 2 (-) 11 DK GRN/WHT
RR DR SPEAKER (-) 12 DK GRN/GRY
LR DR SPEAKER (+) 13 GRY/LT GRN
SBFR 1 (+) 14 GRY/BRN
RH DR SPEAKER (-) 15 DK GRN/YEL
LF DR SPEAKER (-) 16 GRY/YEL
C2
RADIO AMPLIFIER
GRY/RED
1 GRY/YEL 3 GRY/VIO
LEFT FRONT DOOR SPEAKER
1 DK GRN/YEL 3 DK GRN/VIO
RIGHT FRONT DOOR SPEAKER
3 GRY/LT GRN 1 GRY/DK GRN
LEFT REAR DOOR SPEAKER
1 DK GRN/GRY 3 DK GRN/LT GRN
RIGHT REAR DOOR SPEAKER
3 GRY/BRN 6 DK GRN/WHT 4 DK GRN/BRN 1 GRY/WHT
SBFR 1 (+) SBFR 2 (-) SBFR 1(-) SBFR 2 (+)
SUBWOOFER SPEAKER
1 GRY/ORG 2 GRY/YEL
LEFT INSTRUMENT PANEL SPEAKER

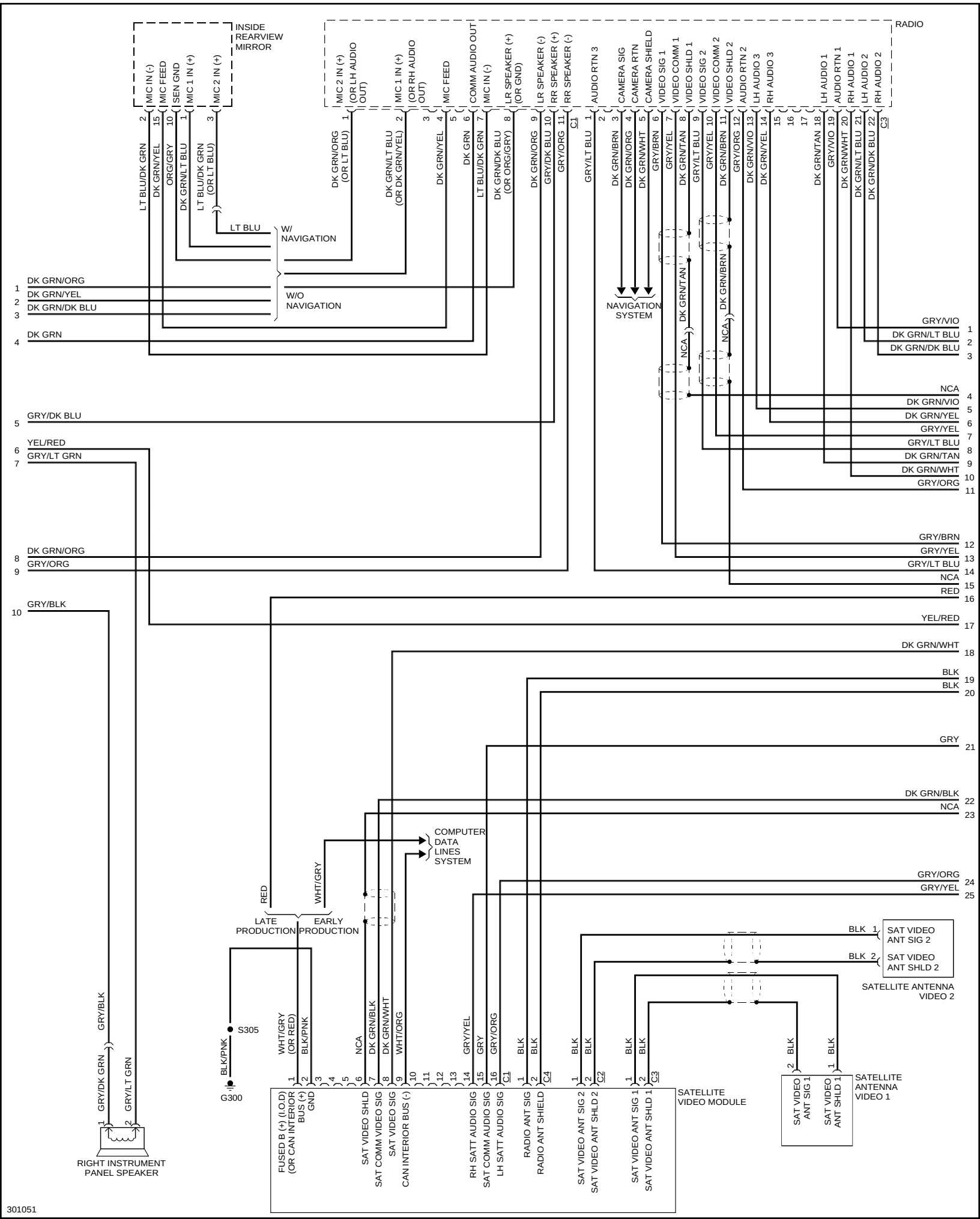
301050


HOT AT ALL TIMES
FUSE M12 30A
TOTALLY INTEGRATED POWER MODULE
29 C5
YEL/RED
HANDS FREE MODULE (W/O NAVIGATION)
COMM AUDIO OUT
RH AUDIO OUT
LH AUDIO OUT
10 9 8 C1
DK GRN
DK GRN/YEL
DK GRN/ORG
DK GRN/ORG 1
DK GRN/YEL 2
DK GRN/DK BLU 3
DK GRN 4
GROUND 1 BLK/PNK G300
CAN INTERIOR BUS (+) 2 WHT/GRY COMPUTER DATA LINES SYSTEM
3
LR SPEAKER (+) 4 DK GRN/DK BLU
RR SPEAKER (+) 5 GRY/DK BLU GRY/DK BLU 5
6
7
YEL/RED 6
RH I/P SPEAKER (-) 8 GRY/LT GRN GRY/LT GRN 7
LH I/P SPEAKER (-) 9 GRY/RED
10
11
(I.OD) FUSED B (+) 12 YEL/RED
CAN INTERIOR BUS (-) 13 WHT/ORG COMPUTER DATA LINES SYSTEM
14
LR SPEAKER (-) 15 DK GRN/ORG DK GRN/ORG 8
RR SPEAKER 16 GRY/ORG GRY/ORG 9
17
18
RH I/P SPEAKER (+) 19 GRY/BLK GRY/BLK 10
LH I/P SPEAKER (+) 20 GRY/ORG
21
22
C1
1
2
SBFR 2 (+) 3 GRY/WHT
RR DR SPEAKER (+) 4 DK GRN/LT GRN
LR DR SPEAKER (-) 5 GRY/DK GRN
SBFR 1 (-) 6 DK GRN/BRN
RF DR SPEAKER (+) 7 DK GRN/VIO
LF DR SPEAKER (+) 8 GRY/VIO
9
10
SBFR 2 (-) 11 DK GRN/WHT
RR DR SPEAKER (-) 12 DK GRN/GRY
LR DR SPEAKER (+) 13 GRY/LT GRN
SBFR 1 (+) 14 GRY/BRN
RH DR SPEAKER (-) 15 DK GRN/YEL
LF DR SPEAKER (-) 16 GRY/YEL
C2
RADIO AMPLIFIER
GRY/RED
1 GRY/YEL 3 GRY/VIO
LEFT FRONT DOOR SPEAKER
1 DK GRN/YEL 3 DK GRN/VIO
RIGHT FRONT DOOR SPEAKER
3 GRY/LT GRN 1 GRY/DK GRN
LEFT REAR DOOR SPEAKER
1 DK GRN/GRY 3 DK GRN/LT GRN
RIGHT REAR DOOR SPEAKER
3 GRY/BRN 6 DK GRN/WHT 4 DK GRN/BRN 1 GRY/WHT
SBFR 1 (+) SBFR 2 (-) SBFR 1(-) SBFR 2 (+)
SUBWOOFER SPEAKER
1 GRY/ORG 2 GRY/YEL
LEFT INSTRUMENT PANEL SPEAKER

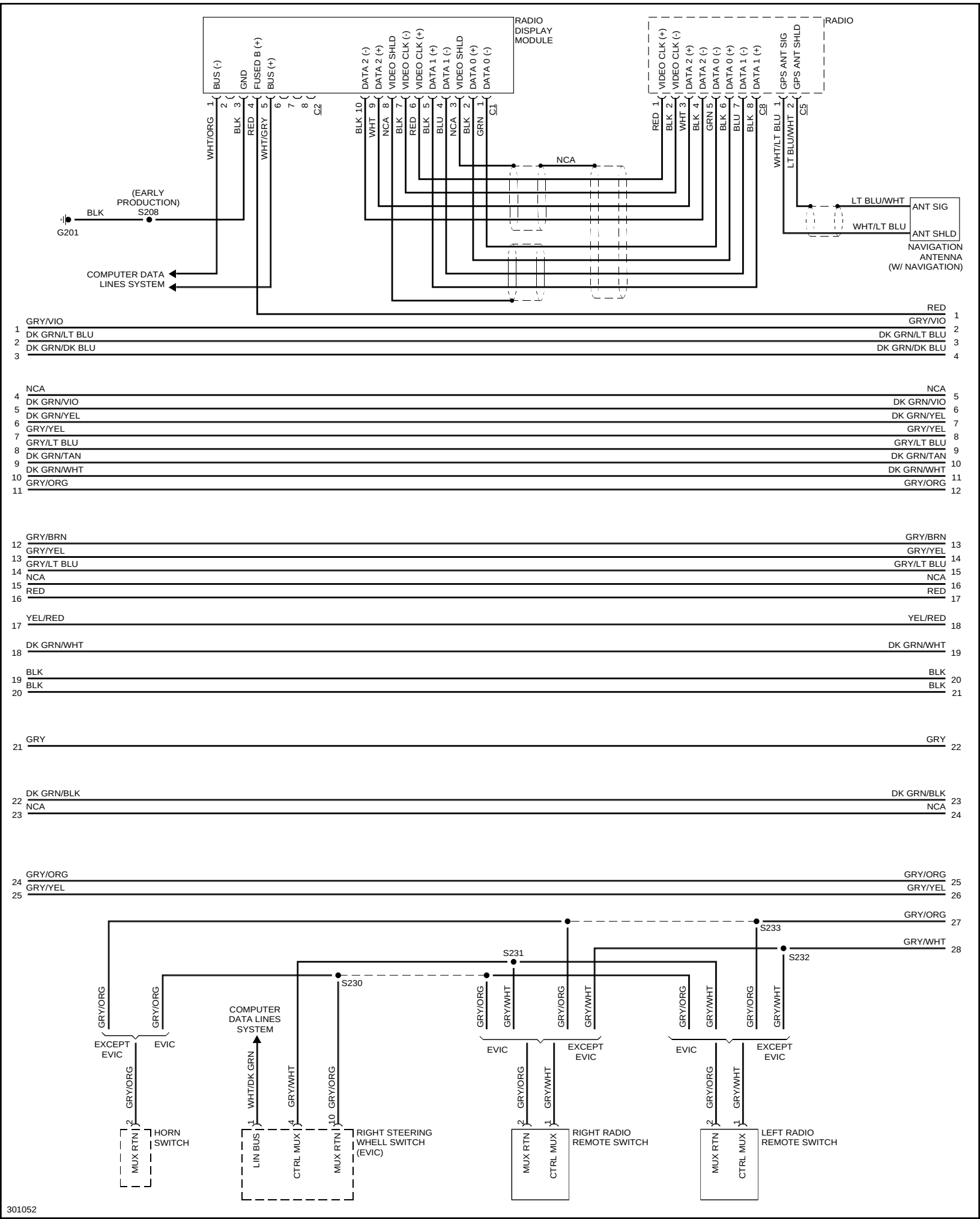
301050

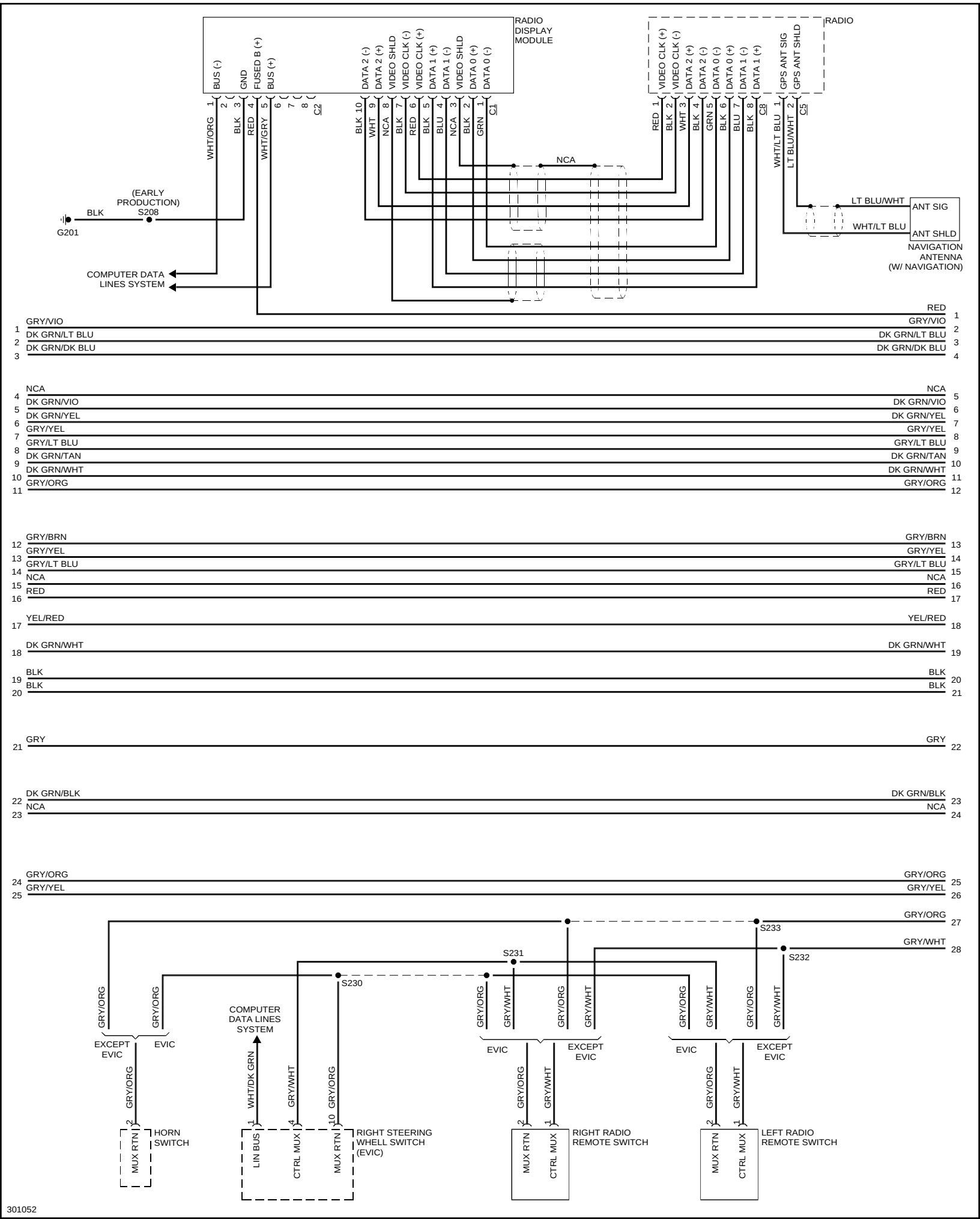

INSIDE REARVIEW MIRROR
MIC IN (-)
MIC FEED
SEN GND
MIC 1 IN (+)
MIC 2 IN (+)
LT BLU/DK GRN
DK GRN/YEL
ORG/GRY
DK GRN/LT BLU
LT BLU/DK GRN (OR LT BLU)
LT BLU
W/ NAVIGATION
W/O NAVIGATION
DK GRN/ORG
DK GRN/YEL
DK GRN/DK BLU
DK GRN
RADIO
MIC 2 IN (+) (OR LH AUDIO OUT)
MIC 1 IN (+) (OR RH AUDIO OUT)
MIC FEED
COMM AUDIO OUT
MIC IN (-)
LR SPEAKER (+) (OR GND)
LR SPEAKER (-)
RR SPEAKER (+)
RR SPEAKER (-)
AUDIO RTN 3
CAMERA SIG
CAMERA RTN
CAMERA SHIELD
VIDEO SIG 1
VIDEO COMM 1
VIDEO SHLD 1
VIDEO SIG 2
VIDEO COMM 2
VIDEO SHLD 2
AUDIO RTN 2
LH AUDIO 3
RH AUDIO 3
LH AUDIO 1
AUDIO RTN 1
RH AUDIO 1
LH AUDIO 2
RH AUDIO 2
NAVIGATION SYSTEM
NCA
GRY/VIO
DK GRN/LT BLU
DK GRN/DK BLU
GRY/DK BLU
YEL/RED
GRY/LT GRN
GRY/BLK
GRY/BRN
GRY/YEL
GRY/LT BLU
DK GRN/VIO
DK GRN/TAN
DK GRN/WHT
GRY/ORG
RED
DK GRN/BLK
BLK
GRY
COMPUTER DATA LINES SYSTEM
WHT/GRY
LATE PRODUCTION
EARLY PRODUCTION
S305
G300
BLK/PNK
WHT/GRY (OR RED)
FUSED B (+) (I.O.D) (OR CAN INTERIOR BUS (+)
GND
SAT VIDEO SHLD
SAT COMM VIDEO SIG
SAT VIDEO SIG
CAN INTERIOR BUS (-)
RH SATT AUDIO SIG
SAT COMM AUDIO SIG
LH SATT AUDIO SIG
RADIO ANT SIG
RADIO ANT SHIELD
SAT VIDEO ANT SIG 2
SAT VIDEO ANT SHLD 2
SAT VIDEO ANT SIG 1
SAT VIDEO ANT SHLD 1
SATELLITE VIDEO MODULE
SAT VIDEO ANT SIG 1
SAT VIDEO ANT SHLD 1
SATELLITE ANTENNA VIDEO 1
SAT VIDEO ANT SIG 2
SAT VIDEO ANT SHLD 2
SATELLITE ANTENNA VIDEO 2
RIGHT INSTRUMENT PANEL SPEAKER

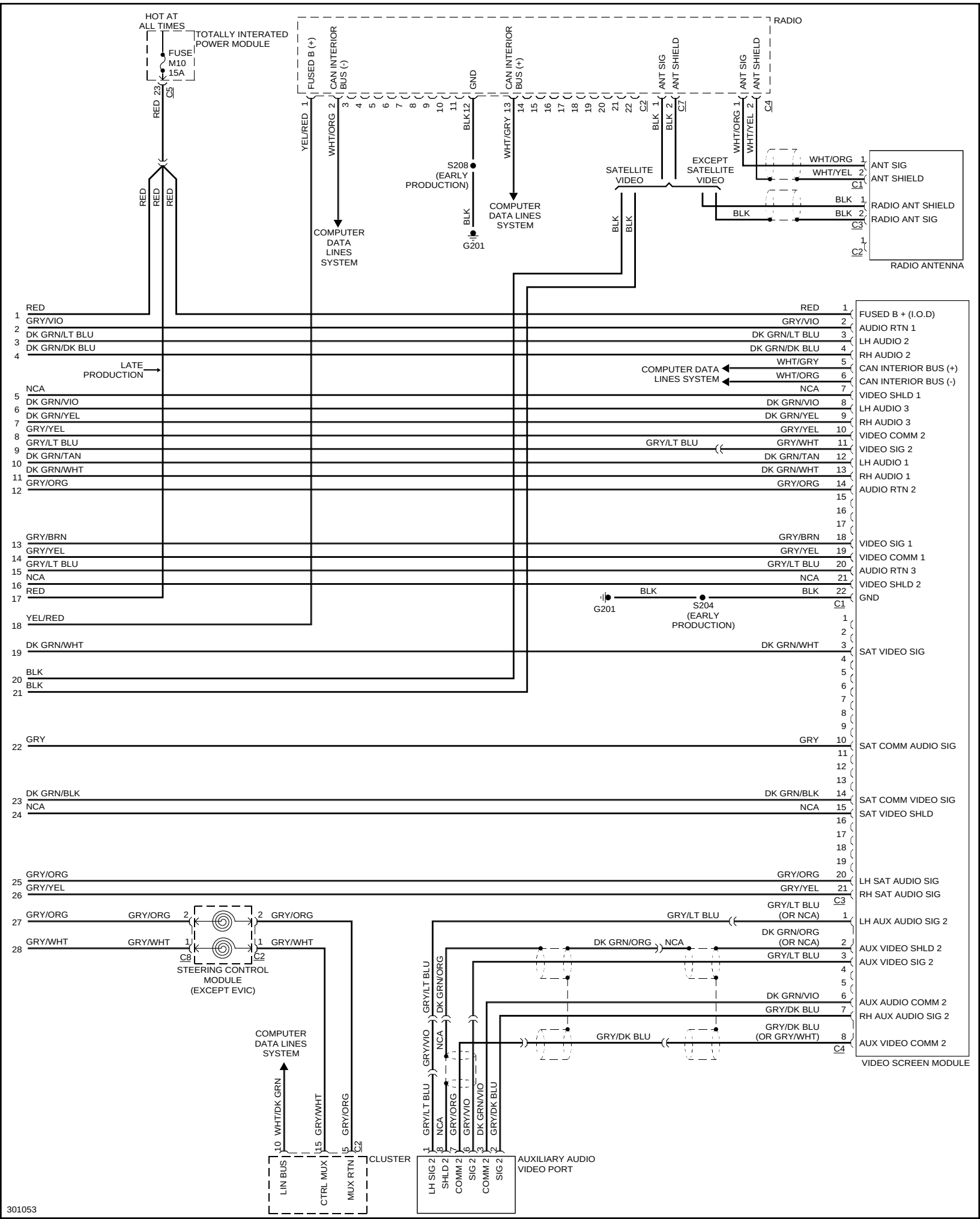
301051

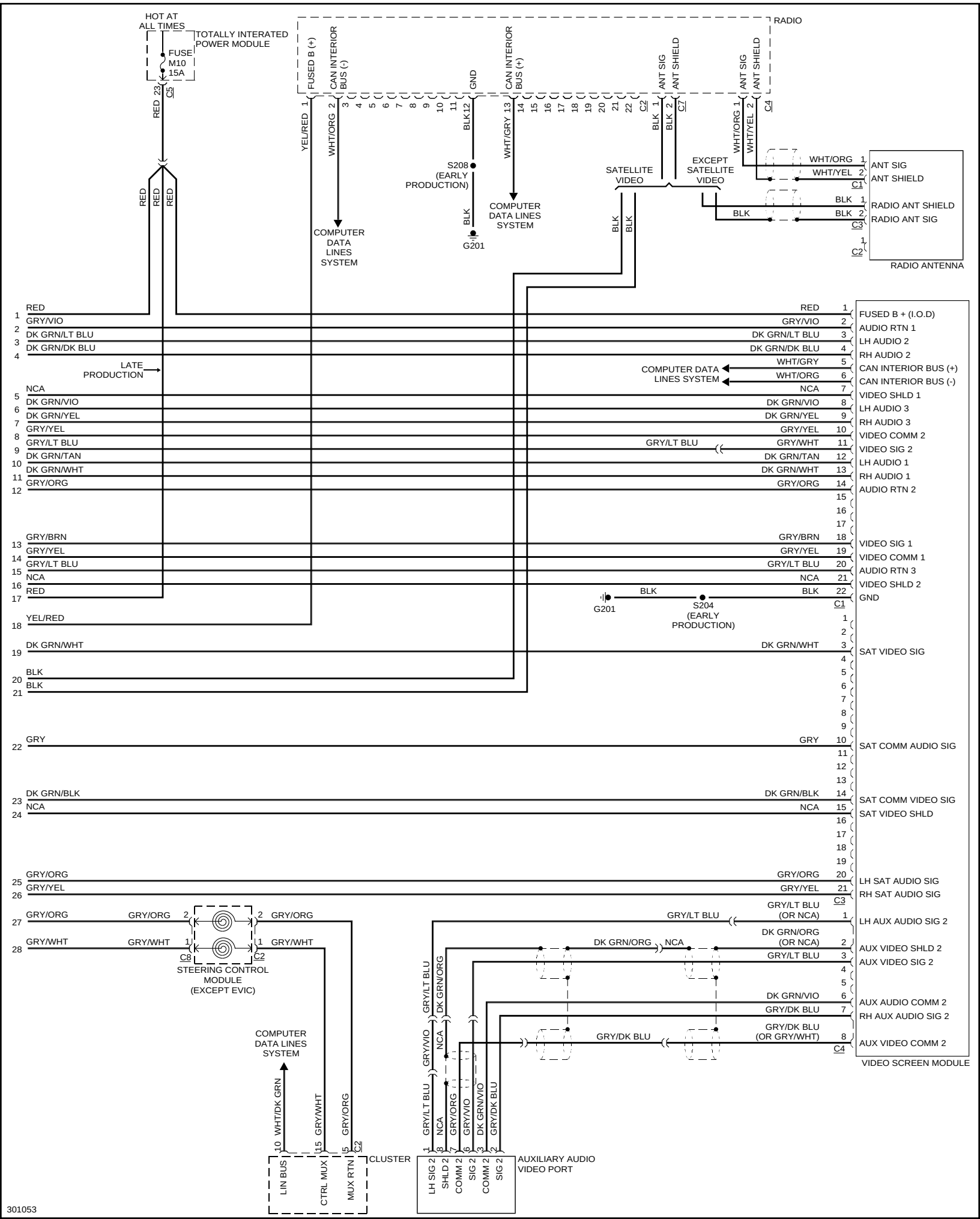

INSIDE REARVIEW MIRROR
MIC IN (-)
MIC FEED
SEN GND
MIC 1 IN (+)
MIC 2 IN (+)
LT BLU/DK GRN
DK GRN/YEL
ORG/GRY
DK GRN/LT BLU
LT BLU/DK GRN (OR LT BLU)
LT BLU
W/ NAVIGATION
W/O NAVIGATION
DK GRN/ORG
DK GRN/YEL
DK GRN/DK BLU
DK GRN
RADIO
MIC 2 IN (+) (OR LH AUDIO OUT)
MIC 1 IN (+) (OR RH AUDIO OUT)
MIC FEED
COMM AUDIO OUT
MIC IN (-)
LR SPEAKER (+) (OR GND)
LR SPEAKER (-)
RR SPEAKER (+)
RR SPEAKER (-)
AUDIO RTN 3
CAMERA SIG
CAMERA RTN
CAMERA SHIELD
VIDEO SIG 1
VIDEO COMM 1
VIDEO SHLD 1
VIDEO SIG 2
VIDEO COMM 2
VIDEO SHLD 2
AUDIO RTN 2
LH AUDIO 3
RH AUDIO 3
LH AUDIO 1
AUDIO RTN 1
RH AUDIO 1
LH AUDIO 2
RH AUDIO 2
NAVIGATION SYSTEM
NCA
GRY/VIO
DK GRN/LT BLU
DK GRN/DK BLU
GRY/DK BLU
YEL/RED
GRY/LT GRN
GRY/BLK
GRY/BRN
GRY/YEL
GRY/LT BLU
DK GRN/VIO
DK GRN/TAN
DK GRN/WHT
GRY/ORG
RED
DK GRN/BLK
BLK
GRY
COMPUTER DATA LINES SYSTEM
WHT/GRY
LATE PRODUCTION
EARLY PRODUCTION
S305
G300
BLK/PNK
WHT/GRY (OR RED)
FUSED B (+) (I.O.D) (OR CAN INTERIOR BUS (+)
GND
SAT VIDEO SHLD
SAT COMM VIDEO SIG
SAT VIDEO SIG
CAN INTERIOR BUS (-)
RH SATT AUDIO SIG
SAT COMM AUDIO SIG
LH SATT AUDIO SIG
RADIO ANT SIG
RADIO ANT SHIELD
SAT VIDEO ANT SIG 2
SAT VIDEO ANT SHLD 2
SAT VIDEO ANT SIG 1
SAT VIDEO ANT SHLD 1
SATELLITE VIDEO MODULE
SAT VIDEO ANT SIG 1
SAT VIDEO ANT SHLD 1
SATELLITE ANTENNA VIDEO 1
SAT VIDEO ANT SIG 2
SAT VIDEO ANT SHLD 2
SATELLITE ANTENNA VIDEO 2
RIGHT INSTRUMENT PANEL SPEAKER

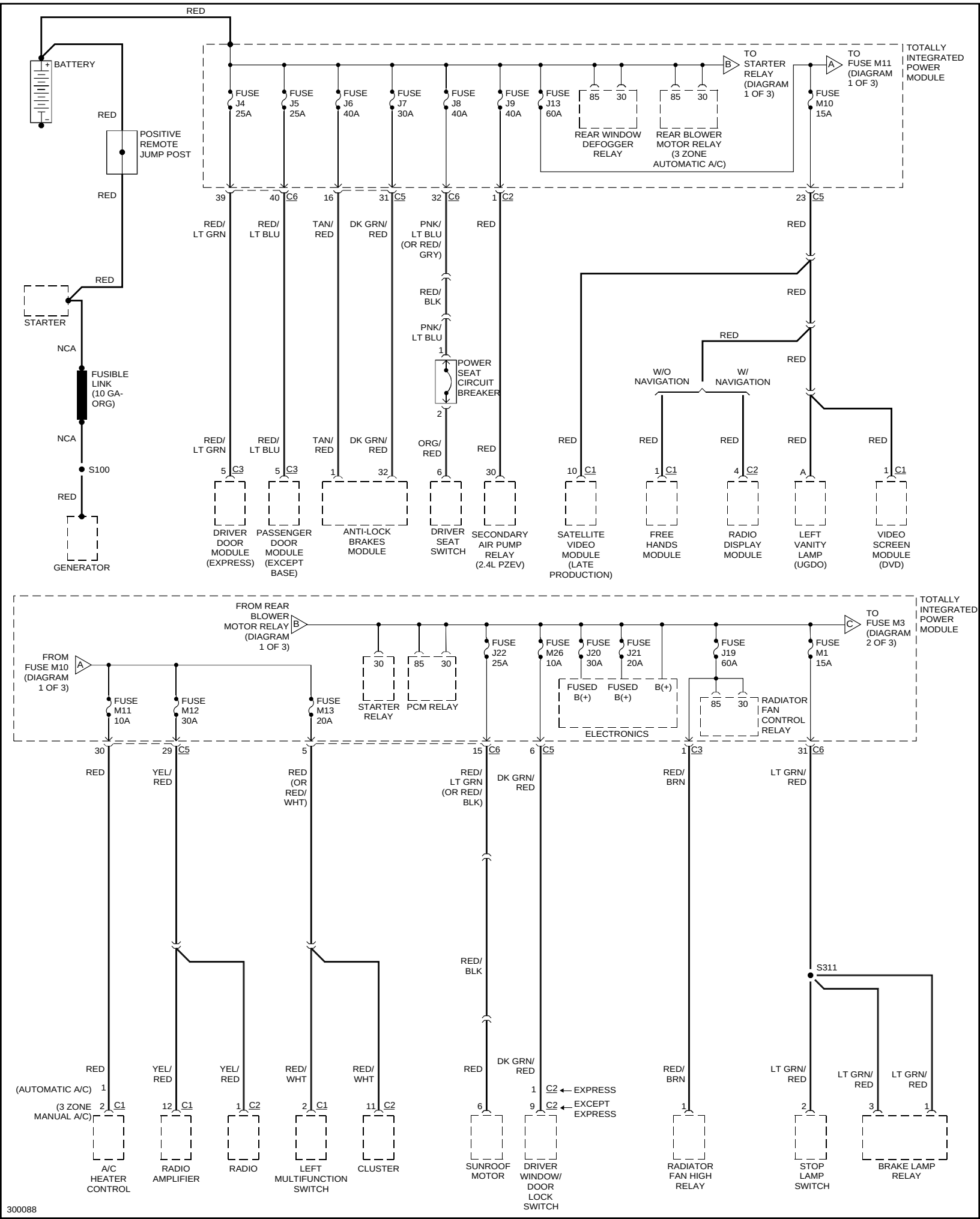
301051

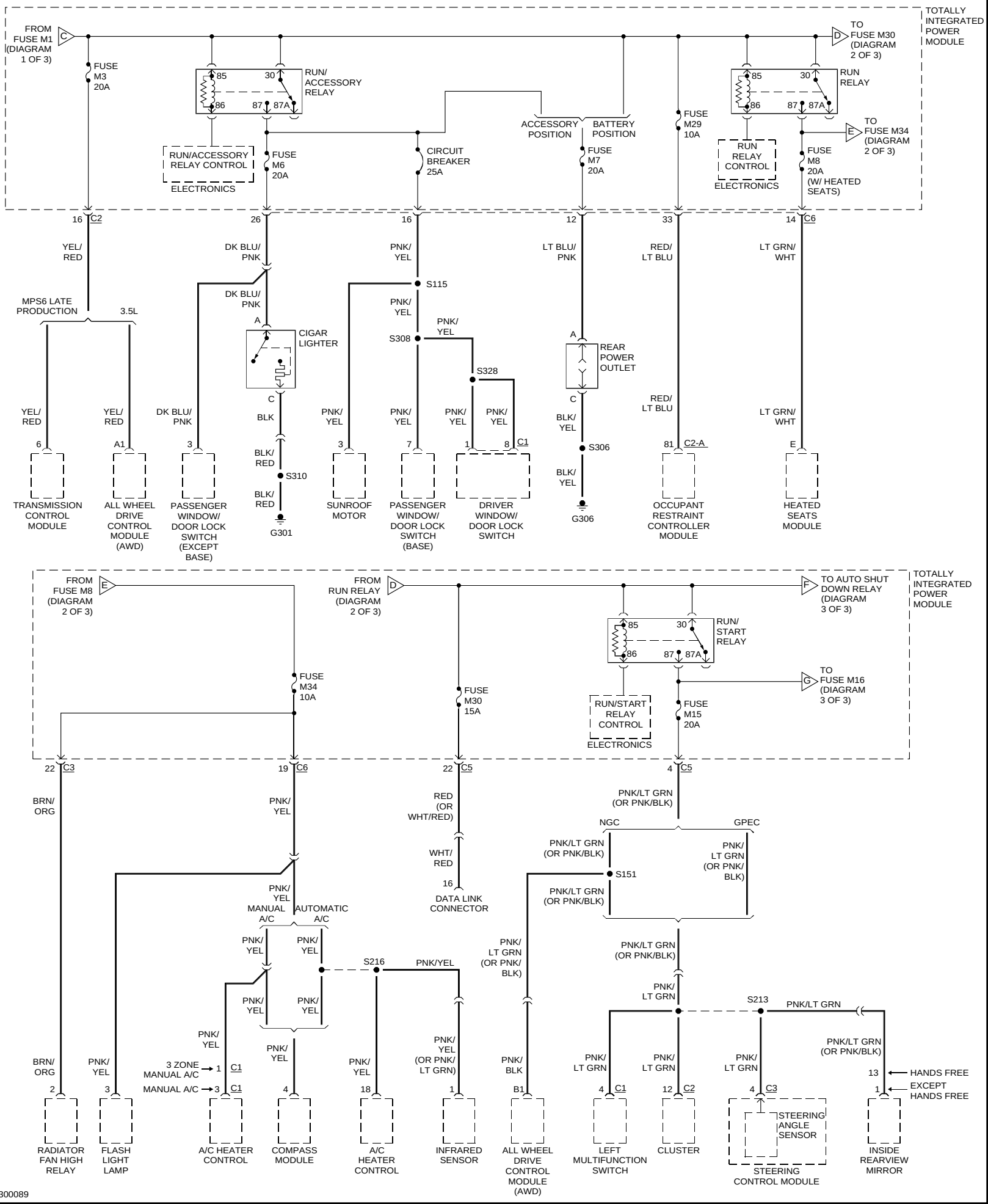

RADIO DISPLAY MODULE
BUS (-)
GND
FUSED B (+)
BUS (+)
DATA 2 (-)
DATA 2 (+)
VIDEO SHLD
VIDEO CLK (-)
VIDEO CLK (+)
DATA 1 (+)
DATA 1 (-)
VIDEO SHLD
DATA 0 (+)
DATA 0 (-)
C2
C1
RADIO
VIDEO CLK (+)
VIDEO CLK (-)
DATA 2 (+)
DATA 2 (-)
DATA 0 (-)
DATA 0 (+)
DATA 1 (-)
DATA 1 (+)
GPS ANT SIG
GPS ANT SHLD
C8
C5
WHT/ORG
BLK
RED
WHT/GRY
BLK 10
WHT 9
NCA 8
BLK 7
RED 6
BLK 5
BLU 4
NCA 3
BLK 2
GRN 1
RED 1
BLK 2
WHT 3
BLK 4
GRN 5
BLK 6
BLU 7
BLK 8
WHT/LT BLU 1
LT BLU/WHT 2
NCA
(EARLY PRODUCTION)
S208
BLK
G201
COMPUTER DATA LINES SYSTEM
LT BLU/WHT
WHT/LT BLU
ANT SIG
ANT SHLD
NAVIGATION ANTENNA (W/ NAVIGATION)
RED
1 GRY/VIO GRY/VIO 2
2 DK GRN/LT BLU DK GRN/LT BLU 3
3 DK GRN/DK BLU DK GRN/DK BLU 4
4 NCA NCA 5
5 DK GRN/VIO DK GRN/VIO 6
6 DK GRN/YEL DK GRN/YEL 7
7 GRY/YEL GRY/YEL 8
8 GRY/LT BLU GRY/LT BLU 9
9 DK GRN/TAN DK GRN/TAN 10
10 DK GRN/WHT DK GRN/WHT 11
11 GRY/ORG GRY/ORG 12
12 GRY/BRN GRY/BRN 13
13 GRY/YEL GRY/YEL 14
14 GRY/LT BLU GRY/LT BLU 15
15 NCA NCA 16
16 RED RED 17
17 YEL/RED YEL/RED 18
18 DK GRN/WHT DK GRN/WHT 19
19 BLK BLK 20
20 BLK BLK 21
21 GRY GRY 22
22 DK GRN/BLK DK GRN/BLK 23
23 NCA NCA 24
24 GRY/ORG GRY/ORG 25
25 GRY/YEL GRY/YEL 26
GRY/ORG
27
S233
GRY/WHT
28
S232
S231
S230
GRY/ORG
GRY/ORG
EXCEPT EVIC
EVIC
COMPUTER DATA LINES SYSTEM
WHT/DK GRN
GRY/WHT
GRY/ORG
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
EVIC
EXCEPT EVIC
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
EVIC
EXCEPT EVIC
GRY/ORG
GRY/ORG
GRY/WHT
GRY/WHT
2
1
4
10
2
1
2
1
2
1
MUX RTN
HORN SWITCH
LIN BUS
CTRL MUX
MUX RTN
RIGHT STEERING WHELL SWITCH (EVIC)
MUX RTN
CTRL MUX
RIGHT RADIO REMOTE SWITCH
MUX RTN
CTRL MUX
LEFT RADIO REMOTE SWITCH
301052

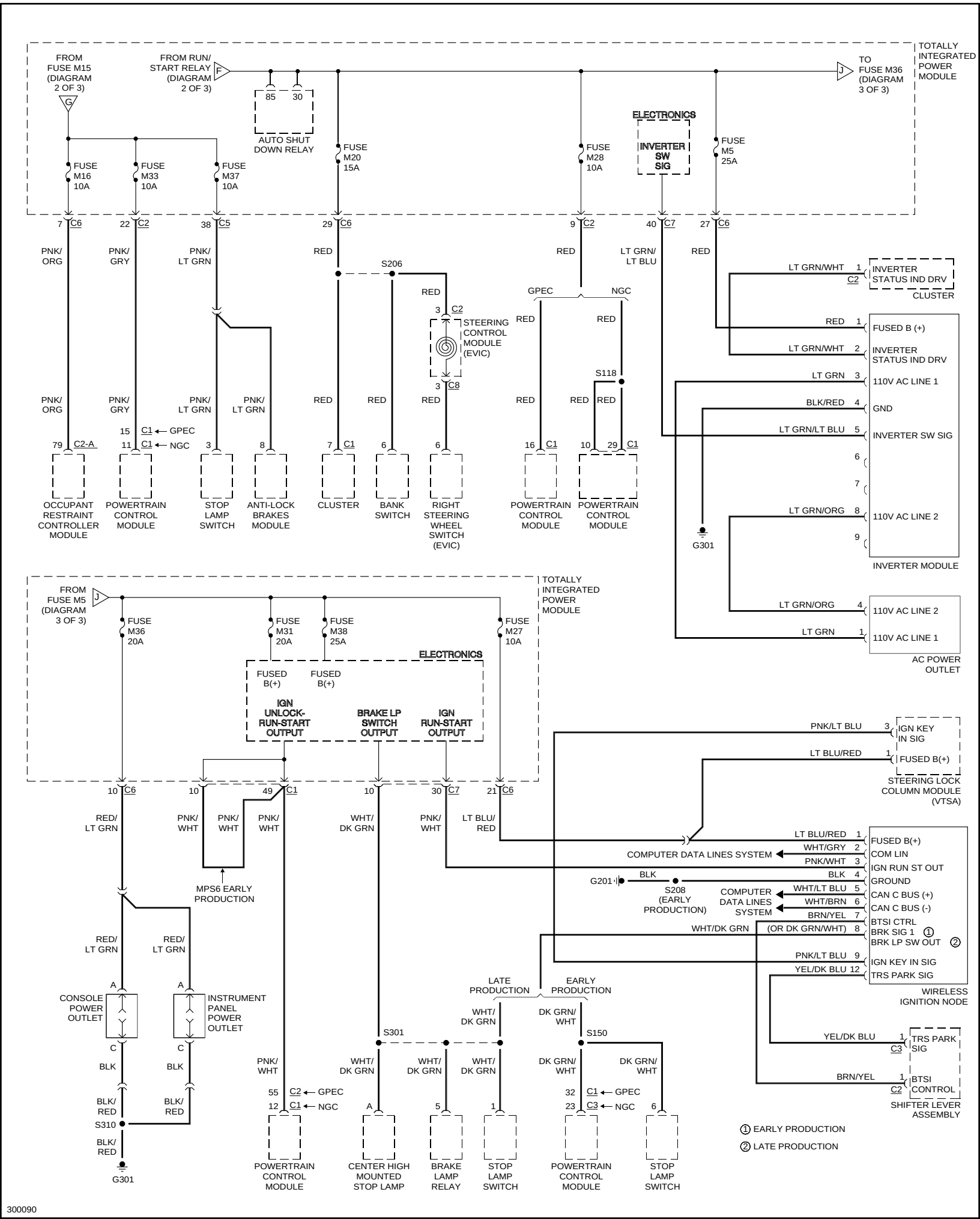

RADIO DISPLAY MODULE
BUS (-)
GND
FUSED B (+)
BUS (+)
DATA 2 (-)
DATA 2 (+)
VIDEO SHLD
VIDEO CLK (-)
VIDEO CLK (+)
DATA 1 (+)
DATA 1 (-)
VIDEO SHLD
DATA 0 (+)
DATA 0 (-)
C2
C1
RADIO
VIDEO CLK (+)
VIDEO CLK (-)
DATA 2 (+)
DATA 2 (-)
DATA 0 (-)
DATA 0 (+)
DATA 1 (-)
DATA 1 (+)
GPS ANT SIG
GPS ANT SHLD
C8
C5
WHT/ORG
BLK
RED
WHT/GRY
BLK 10
WHT 9
NCA 8
BLK 7
RED 6
BLK 5
BLU 4
NCA 3
BLK 2
GRN 1
RED 1
BLK 2
WHT 3
BLK 4
GRN 5
BLK 6
BLU 7
BLK 8
WHT/LT BLU 1
LT BLU/WHT 2
NCA
(EARLY PRODUCTION)
S208
BLK
G201
COMPUTER DATA LINES SYSTEM
LT BLU/WHT
WHT/LT BLU
ANT SIG
ANT SHLD
NAVIGATION ANTENNA (W/ NAVIGATION)
RED
1 GRY/VIO GRY/VIO 2
2 DK GRN/LT BLU DK GRN/LT BLU 3
3 DK GRN/DK BLU DK GRN/DK BLU 4
4 NCA NCA 5
5 DK GRN/VIO DK GRN/VIO 6
6 DK GRN/YEL DK GRN/YEL 7
7 GRY/YEL GRY/YEL 8
8 GRY/LT BLU GRY/LT BLU 9
9 DK GRN/TAN DK GRN/TAN 10
10 DK GRN/WHT DK GRN/WHT 11
11 GRY/ORG GRY/ORG 12
12 GRY/BRN GRY/BRN 13
13 GRY/YEL GRY/YEL 14
14 GRY/LT BLU GRY/LT BLU 15
15 NCA NCA 16
16 RED RED 17
17 YEL/RED YEL/RED 18
18 DK GRN/WHT DK GRN/WHT 19
19 BLK BLK 20
20 BLK BLK 21
21 GRY GRY 22
22 DK GRN/BLK DK GRN/BLK 23
23 NCA NCA 24
24 GRY/ORG GRY/ORG 25
25 GRY/YEL GRY/YEL 26
GRY/ORG
27
S233
GRY/WHT
28
S232
S231
S230
GRY/ORG
GRY/ORG
EXCEPT EVIC
EVIC
COMPUTER DATA LINES SYSTEM
WHT/DK GRN
GRY/WHT
GRY/ORG
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
EVIC
EXCEPT EVIC
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
EVIC
EXCEPT EVIC
GRY/ORG
GRY/ORG
GRY/WHT
GRY/WHT
2
1
4
10
2
1
2
1
2
1
MUX RTN
HORN SWITCH
LIN BUS
CTRL MUX
MUX RTN
RIGHT STEERING WHELL SWITCH (EVIC)
MUX RTN
CTRL MUX
RIGHT RADIO REMOTE SWITCH
MUX RTN
CTRL MUX
LEFT RADIO REMOTE SWITCH
301052


HOT AT ALL TIMES
TOTALLY INTERATED POWER MODULE
FUSE M10 15A
RADIO
FUSED B (+)
CAN INTERIOR BUS (-)
GND
CAN INTERIOR BUS (+)
ANT SIG
ANT SHIELD
ANT SIG
ANT SHIELD
RED
YEL/RED
WHT/ORG
BLK
WHT/GRY
BLK
BLK
WHT/ORG
WHT/YEL
S208 (EARLY PRODUCTION)
G201
COMPUTER DATA LINES SYSTEM
COMPUTER DATA LINES SYSTEM
SATELLITE VIDEO
EXCEPT SATELLITE VIDEO
WHT/ORG
WHT/YEL
ANT SIG
ANT SHIELD
BLK
BLK
RADIO ANT SHIELD
RADIO ANT SIG
RADIO ANTENNA
LATE PRODUCTION
COMPUTER DATA LINES SYSTEM
RED
GRY/VIO
DK GRN/LT BLU
DK GRN/DK BLU
WHT/GRY
WHT/ORG
NCA
DK GRN/VIO
DK GRN/YEL
GRY/YEL
GRY/LT BLU
DK GRN/TAN
DK GRN/WHT
GRY/ORG
GRY/WHT
GRY/LT BLU
FUSED B + (I.O.D)
AUDIO RTN 1
LH AUDIO 2
RH AUDIO 2
CAN INTERIOR BUS (+)
CAN INTERIOR BUS (-)
VIDEO SHLD 1
LH AUDIO 3
RH AUDIO 3
VIDEO COMM 2
VIDEO SIG 2
LH AUDIO 1
RH AUDIO 1
AUDIO RTN 2
GRY/BRN
GRY/YEL
GRY/LT BLU
NCA
RED
YEL/RED
BLK
BLK
G201
S204 (EARLY PRODUCTION)
GRY/BRN
GRY/YEL
GRY/LT BLU
NCA
BLK
VIDEO SIG 1
VIDEO COMM 1
AUDIO RTN 3
VIDEO SHLD 2
GND
DK GRN/WHT
SAT VIDEO SIG
GRY
SAT COMM AUDIO SIG
DK GRN/BLK
NCA
SAT COMM VIDEO SIG
SAT VIDEO SHLD
GRY/ORG
GRY/YEL
LH SAT AUDIO SIG
RH SAT AUDIO SIG
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
STEERING CONTROL MODULE (EXCEPT EVIC)
GRY/LT BLU (OR NCA)
DK GRN/ORG (OR NCA)
GRY/LT BLU
DK GRN/VIO
GRY/DK BLU
GRY/DK BLU (OR GRY/WHT)
LH AUX AUDIO SIG 2
AUX VIDEO SHLD 2
AUX VIDEO SIG 2
AUX AUDIO COMM 2
RH AUX AUDIO SIG 2
AUX VIDEO COMM 2
VIDEO SCREEN MODULE
COMPUTER DATA LINES SYSTEM
WHT/DK GRN
GRY/WHT
GRY/ORG
CLUSTER
LIN BUS
CTRL MUX
MUX RTN
GRY/LT BLU
NCA
GRY/ORG
GRY/VIO
DK GRN/VIO
GRY/DK BLU
AUXILIARY AUDIO VIDEO PORT
LH SIG 2
SHLD 2
COMM 2
SIG 2
COMM 2
SIG 2
301053

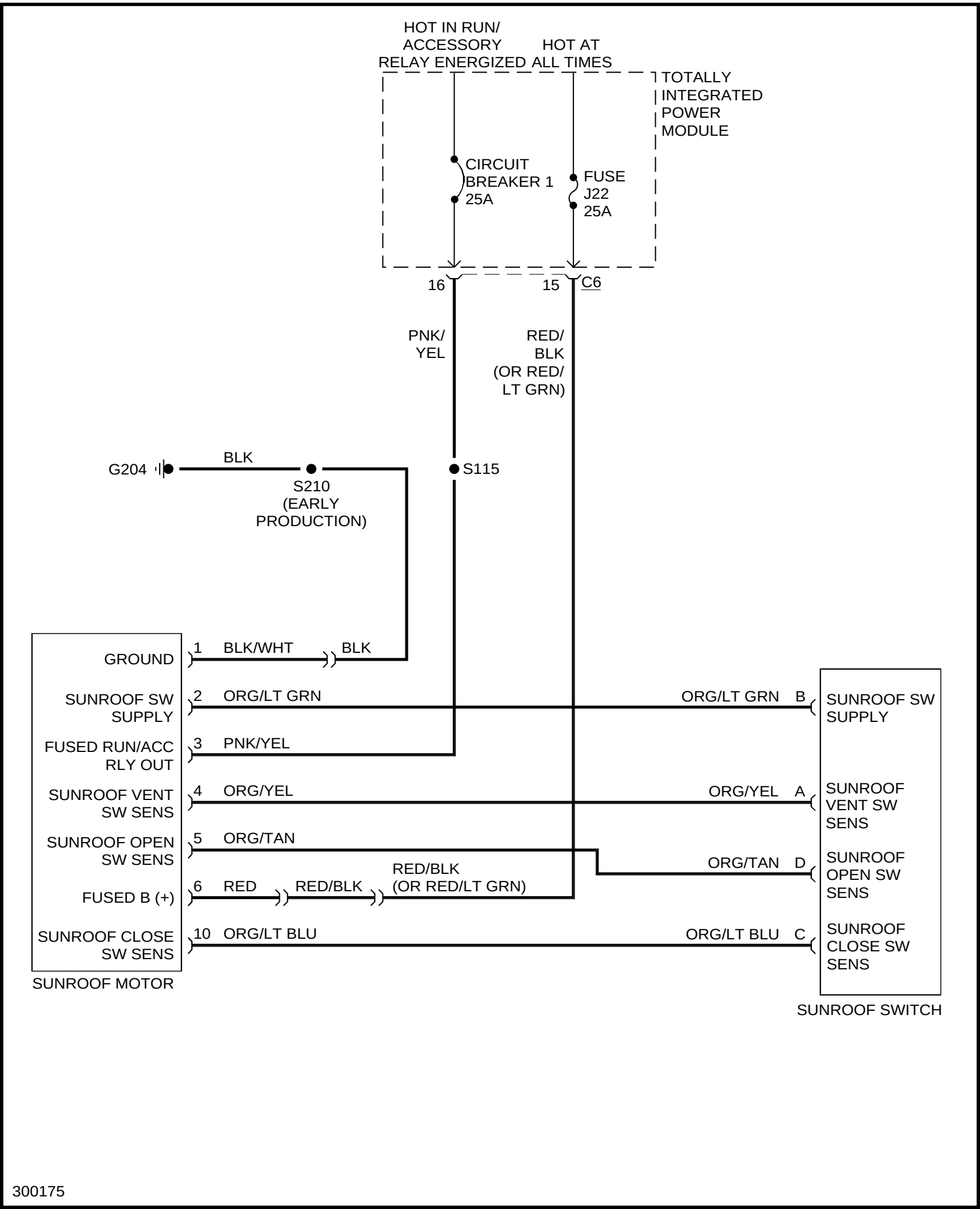

HOT AT ALL TIMES
TOTALLY INTERATED POWER MODULE
FUSE M10 15A
RADIO
FUSED B (+)
CAN INTERIOR BUS (-)
GND
CAN INTERIOR BUS (+)
ANT SIG
ANT SHIELD
ANT SIG
ANT SHIELD
RED
YEL/RED
WHT/ORG
BLK
WHT/GRY
BLK
BLK
WHT/ORG
WHT/YEL
S208 (EARLY PRODUCTION)
G201
COMPUTER DATA LINES SYSTEM
COMPUTER DATA LINES SYSTEM
SATELLITE VIDEO
EXCEPT SATELLITE VIDEO
WHT/ORG
WHT/YEL
ANT SIG
ANT SHIELD
BLK
BLK
RADIO ANT SHIELD
RADIO ANT SIG
RADIO ANTENNA
LATE PRODUCTION
COMPUTER DATA LINES SYSTEM
RED
GRY/VIO
DK GRN/LT BLU
DK GRN/DK BLU
WHT/GRY
WHT/ORG
NCA
DK GRN/VIO
DK GRN/YEL
GRY/YEL
GRY/LT BLU
DK GRN/TAN
DK GRN/WHT
GRY/ORG
GRY/WHT
GRY/LT BLU
FUSED B + (I.O.D)
AUDIO RTN 1
LH AUDIO 2
RH AUDIO 2
CAN INTERIOR BUS (+)
CAN INTERIOR BUS (-)
VIDEO SHLD 1
LH AUDIO 3
RH AUDIO 3
VIDEO COMM 2
VIDEO SIG 2
LH AUDIO 1
RH AUDIO 1
AUDIO RTN 2
GRY/BRN
GRY/YEL
GRY/LT BLU
NCA
RED
YEL/RED
BLK
BLK
G201
S204 (EARLY PRODUCTION)
GRY/BRN
GRY/YEL
GRY/LT BLU
NCA
BLK
VIDEO SIG 1
VIDEO COMM 1
AUDIO RTN 3
VIDEO SHLD 2
GND
DK GRN/WHT
SAT VIDEO SIG
GRY
SAT COMM AUDIO SIG
DK GRN/BLK
NCA
SAT COMM VIDEO SIG
SAT VIDEO SHLD
GRY/ORG
GRY/YEL
LH SAT AUDIO SIG
RH SAT AUDIO SIG
GRY/ORG
GRY/WHT
GRY/ORG
GRY/WHT
STEERING CONTROL MODULE (EXCEPT EVIC)
GRY/LT BLU (OR NCA)
DK GRN/ORG (OR NCA)
GRY/LT BLU
DK GRN/VIO
GRY/DK BLU
GRY/DK BLU (OR GRY/WHT)
LH AUX AUDIO SIG 2
AUX VIDEO SHLD 2
AUX VIDEO SIG 2
AUX AUDIO COMM 2
RH AUX AUDIO SIG 2
AUX VIDEO COMM 2
VIDEO SCREEN MODULE
COMPUTER DATA LINES SYSTEM
WHT/DK GRN
GRY/WHT
GRY/ORG
CLUSTER
LIN BUS
CTRL MUX
MUX RTN
GRY/LT BLU
NCA
GRY/ORG
GRY/VIO
DK GRN/VIO
GRY/DK BLU
AUXILIARY AUDIO VIDEO PORT
LH SIG 2
SHLD 2
COMM 2
SIG 2
COMM 2
SIG 2
301053


RED
BATTERY
RED
POSITIVE REMOTE JUMP POST
RED
RED
STARTER
NCA
FUSIBLE LINK (10 GA-ORG)
NCA
S100
RED
GENERATOR
TOTALLY INTEGRATED POWER MODULE
FUSE J4 25A
FUSE J5 25A
FUSE J6 40A
FUSE J7 30A
FUSE J8 40A
FUSE J9 40A
FUSE J13 60A
REAR WINDOW DEFOGGER RELAY
REAR BLOWER MOTOR RELAY (3 ZONE AUTOMATIC A/C)
TO STARTER RELAY (DIAGRAM 1 OF 3)
TO FUSE M11 (DIAGRAM 1 OF 3)
FUSE M10 15A
39
40 C6
16
31 C5
32 C6
1 C2
23 C5
RED/ LT GRN
RED/ LT BLU
TAN/ RED
DK GRN/ RED
PNK/ LT BLU (OR RED/ GRY)
RED
RED
RED/ BLK
PNK/ LT BLU
1
POWER SEAT CIRCUIT BREAKER
2
RED
W/O NAVIGATION
W/ NAVIGATION
RED/ LT GRN
RED/ LT BLU
TAN/ RED
DK GRN/ RED
ORG/ RED
RED
RED
RED
RED
RED
RED
5 C3
5 C3
1
32
6
30
10 C1
1 C1
4 C2
A
1 C1
DRIVER DOOR MODULE (EXPRESS)
PASSENGER DOOR MODULE (EXCEPT BASE)
ANTI-LOCK BRAKES MODULE
DRIVER SEAT SWITCH
SECONDARY AIR PUMP RELAY (2.4L PZEV)
SATELLITE VIDEO MODULE (LATE PRODUCTION)
FREE HANDS MODULE
RADIO DISPLAY MODULE
LEFT VANITY LAMP (UGDO)
VIDEO SCREEN MODULE (DVD)
FROM REAR BLOWER MOTOR RELAY (DIAGRAM 1 OF 3)
TOTALLY INTEGRATED POWER MODULE
TO FUSE M3 (DIAGRAM 2 OF 3)
FROM FUSE M10 (DIAGRAM 1 OF 3)
FUSE M11 10A
FUSE M12 30A
FUSE M13 20A
STARTER RELAY
PCM RELAY
FUSE J22 25A
FUSE M26 10A
FUSE J20 30A
FUSE J21 20A
FUSE J19 60A
FUSE M1 15A
FUSED B(+)
FUSED B(+)
B(+)
ELECTRONICS
RADIATOR FAN CONTROL RELAY
30
29 C5
5
15 C6
6 C5
1 C3
31 C6
RED
YEL/ RED
RED (OR RED/ WHT)
RED/ LT GRN (OR RED/ BLK)
DK GRN/ RED
RED/ BRN
LT GRN/ RED
RED/ BLK
S311
RED
(AUTOMATIC A/C) 1
(3 ZONE MANUAL A/C) 2 C1
YEL/ RED
12 C1
YEL/ RED
1 C2
RED/ WHT
2 C1
RED/ WHT
11 C2
RED
6
DK GRN/ RED
1 C2 ← EXPRESS
9 C2 ← EXCEPT EXPRESS
RED/ BRN
1
LT GRN/ RED
2
LT GRN/ RED
3
LT GRN/ RED
1
A/C HEATER CONTROL
RADIO AMPLIFIER
RADIO
LEFT MULTIFUNCTION SWITCH
CLUSTER
SUNROOF MOTOR
DRIVER WINDOW/ DOOR LOCK SWITCH
RADIATOR FAN HIGH RELAY
STOP LAMP SWITCH
BRAKE LAMP RELAY
300088

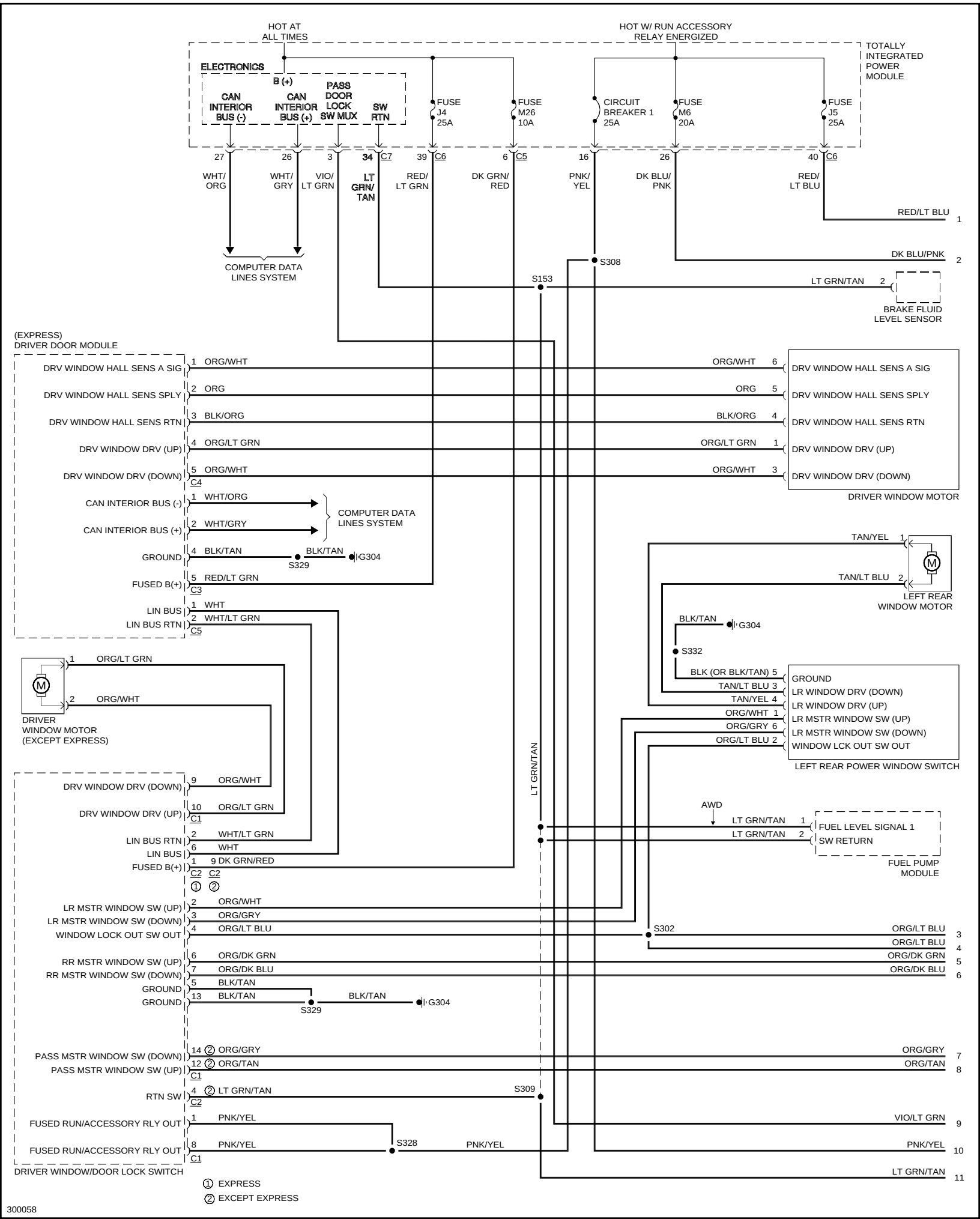

TOTALLY INTEGRATED POWER MODULE
FROM FUSE M1 (DIAGRAM 1 OF 3)
C
FUSE M3 20A
RUN/ ACCESSORY RELAY
85
30
86
87
87A
RUN/ACCESSORY RELAY CONTROL
ELECTRONICS
FUSE M6 20A
CIRCUIT BREAKER 25A
ACCESSORY POSITION
BATTERY POSITION
FUSE M7 20A
FUSE M29 10A
RUN RELAY
RUN RELAY CONTROL
ELECTRONICS
FUSE M8 20A (W/ HEATED SEATS)
D
TO FUSE M30 (DIAGRAM 2 OF 3)
E
TO FUSE M34 (DIAGRAM 2 OF 3)
16 C2
26
16
12
33
14 C6
YEL/ RED
DK BLU/ PNK
PNK/ YEL
LT BLU/ PNK
RED/ LT BLU
LT GRN/ WHT
MPS6 LATE PRODUCTION
3.5L
S115
S308
S328
CIGAR LIGHTER
REAR POWER OUTLET
BLK
BLK/ YEL
BLK/ RED
S310
S306
G301
G306
6
A1
3
7
1
8 C1
81 C2-A
E
TRANSMISSION CONTROL MODULE
ALL WHEEL DRIVE CONTROL MODULE (AWD)
PASSENGER WINDOW/ DOOR LOCK SWITCH (EXCEPT BASE)
SUNROOF MOTOR
PASSENGER WINDOW/ DOOR LOCK SWITCH (BASE)
DRIVER WINDOW/ DOOR LOCK SWITCH
OCCUPANT RESTRAINT CONTROLLER MODULE
HEATED SEATS MODULE
TOTALLY INTEGRATED POWER MODULE
FROM FUSE M8 (DIAGRAM 2 OF 3)
FROM RUN RELAY (DIAGRAM 2 OF 3)
F
TO AUTO SHUT DOWN RELAY (DIAGRAM 3 OF 3)
RUN/ START RELAY
FUSE M34 10A
FUSE M30 15A
RUN/START RELAY CONTROL
ELECTRONICS
FUSE M15 20A
G
TO FUSE M16 (DIAGRAM 3 OF 3)
22 C3
19 C6
22 C5
4 C5
BRN/ ORG
PNK/ YEL
RED (OR WHT/RED)
PNK/LT GRN (OR PNK/BLK)
NGC
GPEC
WHT/ RED
16
DATA LINK CONNECTOR
S151
PNK/ LT GRN (OR PNK/ BLK)
MANUAL A/C
AUTOMATIC A/C
S216
PNK/YEL
S213
PNK/LT GRN
3 ZONE MANUAL A/C
MANUAL A/C
C1
C2
C3
2
3
18
1
B1
12
13
HANDS FREE
EXCEPT HANDS FREE
RADIATOR FAN HIGH RELAY
FLASH LIGHT LAMP
A/C HEATER CONTROL
COMPASS MODULE
A/C HEATER CONTROL
INFRARED SENSOR
ALL WHEEL DRIVE CONTROL MODULE (AWD)
LEFT MULTIFUNCTION SWITCH
CLUSTER
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
INSIDE REARVIEW MIRROR
300089

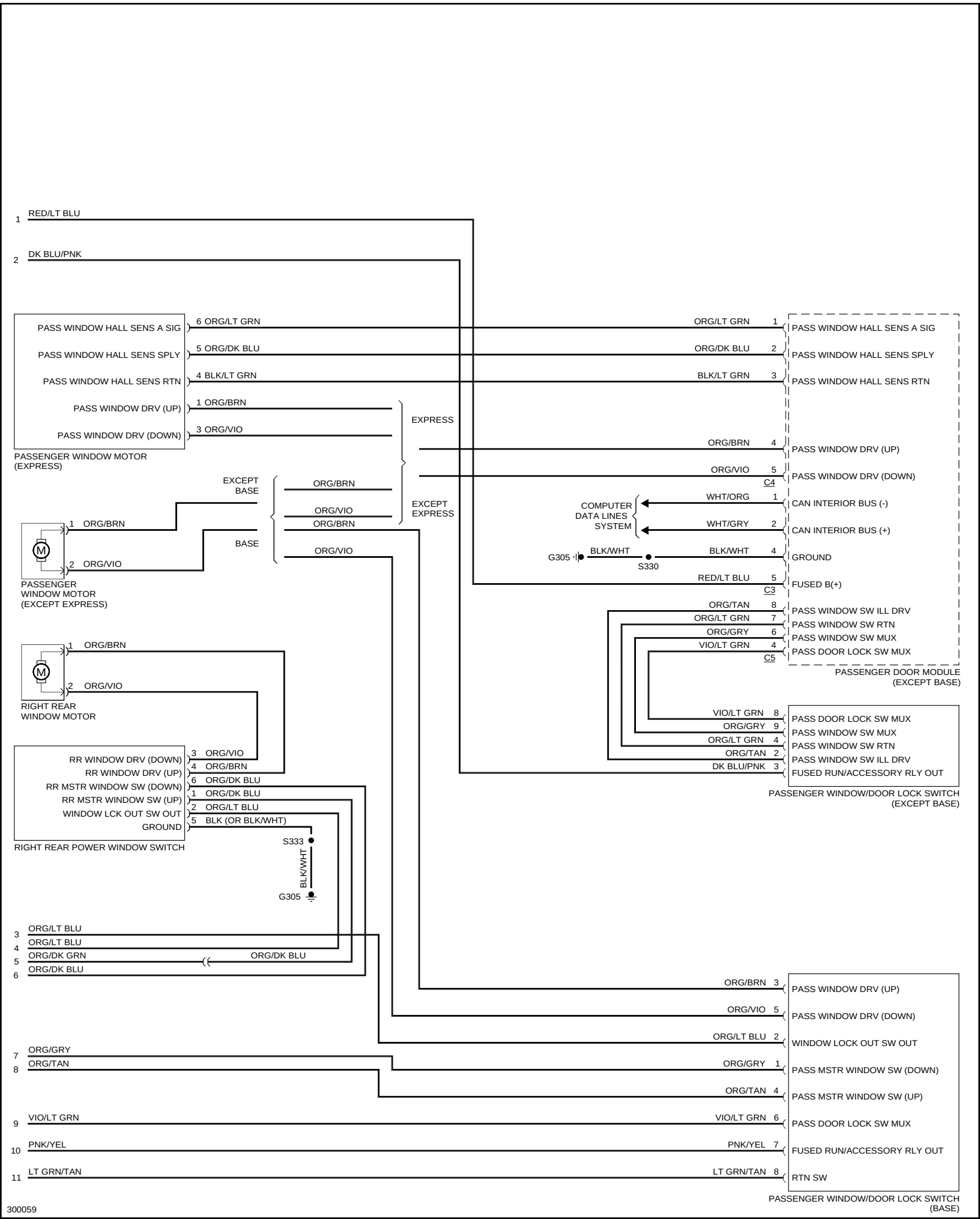

FROM FUSE M15 (DIAGRAM 2 OF 3)
G
FROM RUN/ START RELAY (DIAGRAM 2 OF 3)
F
85
30
AUTO SHUT DOWN RELAY
TO FUSE M36 (DIAGRAM 3 OF 3)
J
TOTALLY INTEGRATED POWER MODULE
FUSE M16 10A
FUSE M33 10A
FUSE M37 10A
FUSE M20 15A
FUSE M28 10A
ELECTRONICS
INVERTER SW SIG
FUSE M5 25A
7 C6
22 C2
38 C5
29 C6
9 C2
40 C7
27 C6
PNK/ ORG
PNK/ GRY
PNK/ LT GRN
RED
LT GRN/ LT BLU
S206
RED
3 C2
STEERING CONTROL MODULE (EVIC)
3 C8
GPEC
NGC
S118
15 C1 GPEC
11 C1 NGC
79 C2-A
3
8
7 C1
6
6
16 C1
10
29 C1
OCCUPANT RESTRAINT CONTROLLER MODULE
POWERTRAIN CONTROL MODULE
STOP LAMP SWITCH
ANTI-LOCK BRAKES MODULE
CLUSTER
BANK SWITCH
RIGHT STEERING WHEEL SWITCH (EVIC)
POWERTRAIN CONTROL MODULE
POWERTRAIN CONTROL MODULE
LT GRN/WHT 1
C2
INVERTER STATUS IND DRV
CLUSTER
RED 1
FUSED B (+)
LT GRN/WHT 2
INVERTER STATUS IND DRV
LT GRN 3
110V AC LINE 1
BLK/RED 4
GND
LT GRN/LT BLU 5
INVERTER SW SIG
6
7
LT GRN/ORG 8
110V AC LINE 2
9
INVERTER MODULE
G301
LT GRN/ORG 4
110V AC LINE 2
LT GRN 1
110V AC LINE 1
AC POWER OUTLET
FROM FUSE M5 (DIAGRAM 3 OF 3)
J
TOTALLY INTEGRATED POWER MODULE
FUSE M36 20A
FUSE M31 20A
FUSE M38 25A
FUSE M27 10A
ELECTRONICS
FUSED B(+)
FUSED B(+)
IGN UNLOCK-RUN-START OUTPUT
BRAKE LP SWITCH OUTPUT
IGN RUN-START OUTPUT
10 C6
10
49 C1
10
30 C7
21 C6
RED/ LT GRN
PNK/ WHT
PNK/ WHT
PNK/ WHT
WHT/ DK GRN
PNK/ WHT
LT BLU/ RED
MPS6 EARLY PRODUCTION
PNK/LT BLU 3
IGN KEY IN SIG
LT BLU/RED 1
FUSED B(+)
STEERING LOCK COLUMN MODULE (VTSA)
LT BLU/RED 1
FUSED B(+)
WHT/GRY 2
COM LIN
COMPUTER DATA LINES SYSTEM
PNK/WHT 3
IGN RUN ST OUT
BLK 4
GROUND
G201
BLK
S208 (EARLY PRODUCTION)
WHT/LT BLU 5
CAN C BUS (+)
COMPUTER DATA LINES SYSTEM
WHT/BRN 6
CAN C BUS (-)
BRN/YEL 7
BTSI CTRL
WHT/DK GRN
(OR DK GRN/WHT) 8
BRK SIG 1 ①
BRK LP SW OUT ②
PNK/LT BLU 9
IGN KEY IN SIG
YEL/DK BLU 12
TRS PARK SIG
WIRELESS IGNITION NODE
RED/ LT GRN
RED/ LT GRN
A
A
CONSOLE POWER OUTLET
INSTRUMENT PANEL POWER OUTLET
C
C
BLK
BLK
BLK/ RED
BLK/ RED
S310
BLK/ RED
G301
LATE PRODUCTION
EARLY PRODUCTION
WHT/ DK GRN
DK GRN/ WHT
S301
S150
YEL/DK BLU 1
C3
TRS PARK SIG
BRN/YEL 1
C2
BTSI CONTROL
SHIFTER LEVER ASSEMBLY
PNK/ WHT
WHT/ DK GRN
WHT/ DK GRN
WHT/ DK GRN
DK GRN/ WHT
DK GRN/ WHT
55 C2 GPEC
12 C1 NGC
A
5
1
32 C1 GPEC
23 C3 NGC
6
① EARLY PRODUCTION
② LATE PRODUCTION
POWERTRAIN CONTROL MODULE
CENTER HIGH MOUNTED STOP LAMP
BRAKE LAMP RELAY
STOP LAMP SWITCH
POWERTRAIN CONTROL MODULE
STOP LAMP SWITCH

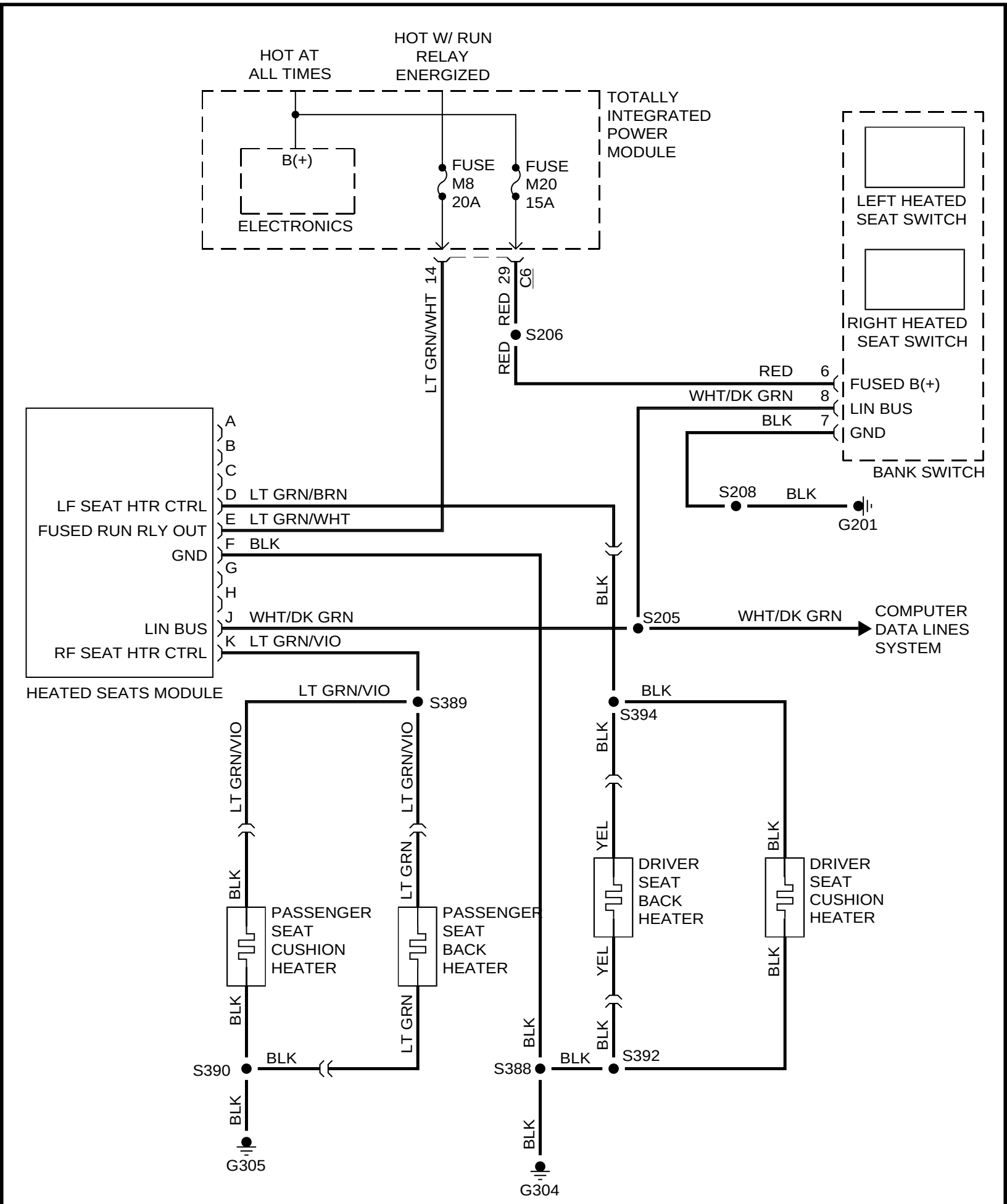
300090


HOT IN RUN/
ACCESSORY
RELAY ENERGIZED
HOT AT
ALL TIMES
TOTALLY
INTEGRATED
POWER
MODULE
CIRCUIT
BREAKER 1
25A
FUSE
J22
25A
16
15
C6
PNK/
YEL
RED/
BLK
(OR RED/
LT GRN)
G204
BLK
S115
S210
(EARLY
PRODUCTION)
GROUND
1
BLK/WHT
BLK
SUNROOF SW
SUPPLY
2
ORG/LT GRN
ORG/LT GRN
B
SUNROOF SW
SUPPLY
FUSED RUN/ACC
RLY OUT
3
PNK/YEL
SUNROOF VENT
SW SENS
4
ORG/YEL
ORG/YEL
A
SUNROOF
VENT SW
SENS
SUNROOF OPEN
SW SENS
5
ORG/TAN
ORG/TAN
D
SUNROOF
OPEN SW
SENS
FUSED B (+)
6
RED
RED/BLK
RED/BLK
(OR RED/LT GRN)
SUNROOF CLOSE
SW SENS
10
ORG/LT BLU
ORG/LT BLU
C
SUNROOF
CLOSE SW
SENS
SUNROOF MOTOR
SUNROOF SWITCH

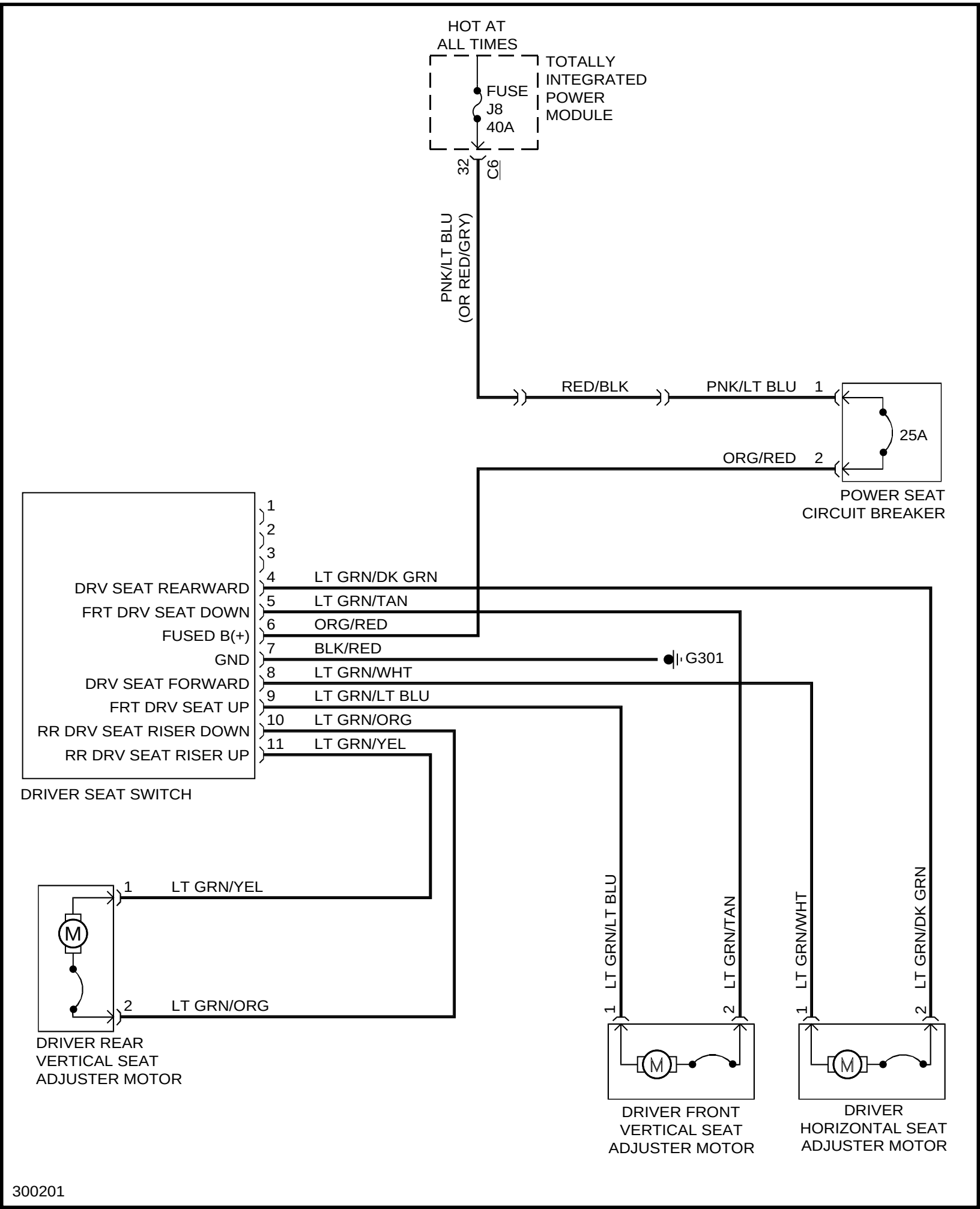
300175


HOT AT ALL TIMES
HOT W/ RUN ACCESSORY RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B (+)
CAN INTERIOR BUS (-)
CAN INTERIOR BUS (+)
PASS DOOR LOCK SW MUX
SW RTN
FUSE J4 25A
FUSE M26 10A
CIRCUIT BREAKER 1 25A
FUSE M6 20A
FUSE J5 25A
27 WHT/ORG
26 WHT/GRY
3 VIO/LT GRN
34 C7 LT GRN/TAN
39 C6 RED/LT GRN
6 C5 DK GRN/RED
16 PNK/YEL
26 DK BLU/PNK
40 C6 RED/LT BLU
COMPUTER DATA LINES SYSTEM
RED/LT BLU 1
DK BLU/PNK 2
S308
S153
LT GRN/TAN 2
BRAKE FLUID LEVEL SENSOR
(EXPRESS) DRIVER DOOR MODULE
DRV WINDOW HALL SENS A SIG 1 ORG/WHT
DRV WINDOW HALL SENS SPLY 2 ORG
DRV WINDOW HALL SENS RTN 3 BLK/ORG
DRV WINDOW DRV (UP) 4 ORG/LT GRN
DRV WINDOW DRV (DOWN) 5 ORG/WHT
C4
ORG/WHT 6 DRV WINDOW HALL SENS A SIG
ORG 5 DRV WINDOW HALL SENS SPLY
BLK/ORG 4 DRV WINDOW HALL SENS RTN
ORG/LT GRN 1 DRV WINDOW DRV (UP)
ORG/WHT 3 DRV WINDOW DRV (DOWN)
DRIVER WINDOW MOTOR
CAN INTERIOR BUS (-) 1 WHT/ORG
CAN INTERIOR BUS (+) 2 WHT/GRY
COMPUTER DATA LINES SYSTEM
GROUND 4 BLK/TAN
BLK/TAN S329 G304
FUSED B(+) 5 RED/LT GRN
C3
LIN BUS 1 WHT
LIN BUS RTN 2 WHT/LT GRN
C5
TAN/YEL 1
TAN/LT BLU 2
LEFT REAR WINDOW MOTOR
BLK/TAN G304
S332
BLK (OR BLK/TAN) 5 GROUND
TAN/LT BLU 3 LR WINDOW DRV (DOWN)
TAN/YEL 4 LR WINDOW DRV (UP)
ORG/WHT 1 LR MSTR WINDOW SW (UP)
ORG/GRY 6 LR MSTR WINDOW SW (DOWN)
ORG/LT BLU 2 WINDOW LCK OUT SW OUT
LEFT REAR POWER WINDOW SWITCH
DRIVER WINDOW MOTOR (EXCEPT EXPRESS)
1 ORG/LT GRN
2 ORG/WHT
LT GRN/TAN
AWD
LT GRN/TAN 1 FUEL LEVEL SIGNAL 1
LT GRN/TAN 2 SW RETURN
FUEL PUMP MODULE
DRV WINDOW DRV (DOWN) 9 ORG/WHT
DRV WINDOW DRV (UP) 10 ORG/LT GRN
C1
LIN BUS RTN 2 WHT/LT GRN
LIN BUS 6 WHT
FUSED B(+) 1 9 DK GRN/RED
C2 C2
① ②
LR MSTR WINDOW SW (UP) 2 ORG/WHT
LR MSTR WINDOW SW (DOWN) 3 ORG/GRY
WINDOW LOCK OUT SW OUT 4 ORG/LT BLU
RR MSTR WINDOW SW (UP) 6 ORG/DK GRN
RR MSTR WINDOW SW (DOWN) 7 ORG/DK BLU
GROUND 5 BLK/TAN
GROUND 13 BLK/TAN
BLK/TAN S329 G304
S302
ORG/LT BLU 3
ORG/LT BLU 4
ORG/DK GRN 5
ORG/DK BLU 6
PASS MSTR WINDOW SW (DOWN) 14 ② ORG/GRY
PASS MSTR WINDOW SW (UP) 12 ② ORG/TAN
C1
RTN SW 4 ② LT GRN/TAN
C2
S309
FUSED RUN/ACCESSORY RLY OUT 1 PNK/YEL
FUSED RUN/ACCESSORY RLY OUT 8 PNK/YEL
C1
S328
PNK/YEL
DRIVER WINDOW/DOOR LOCK SWITCH
ORG/GRY 7
ORG/TAN 8
VIO/LT GRN 9
PNK/YEL 10
LT GRN/TAN 11
① EXPRESS
② EXCEPT EXPRESS
300058

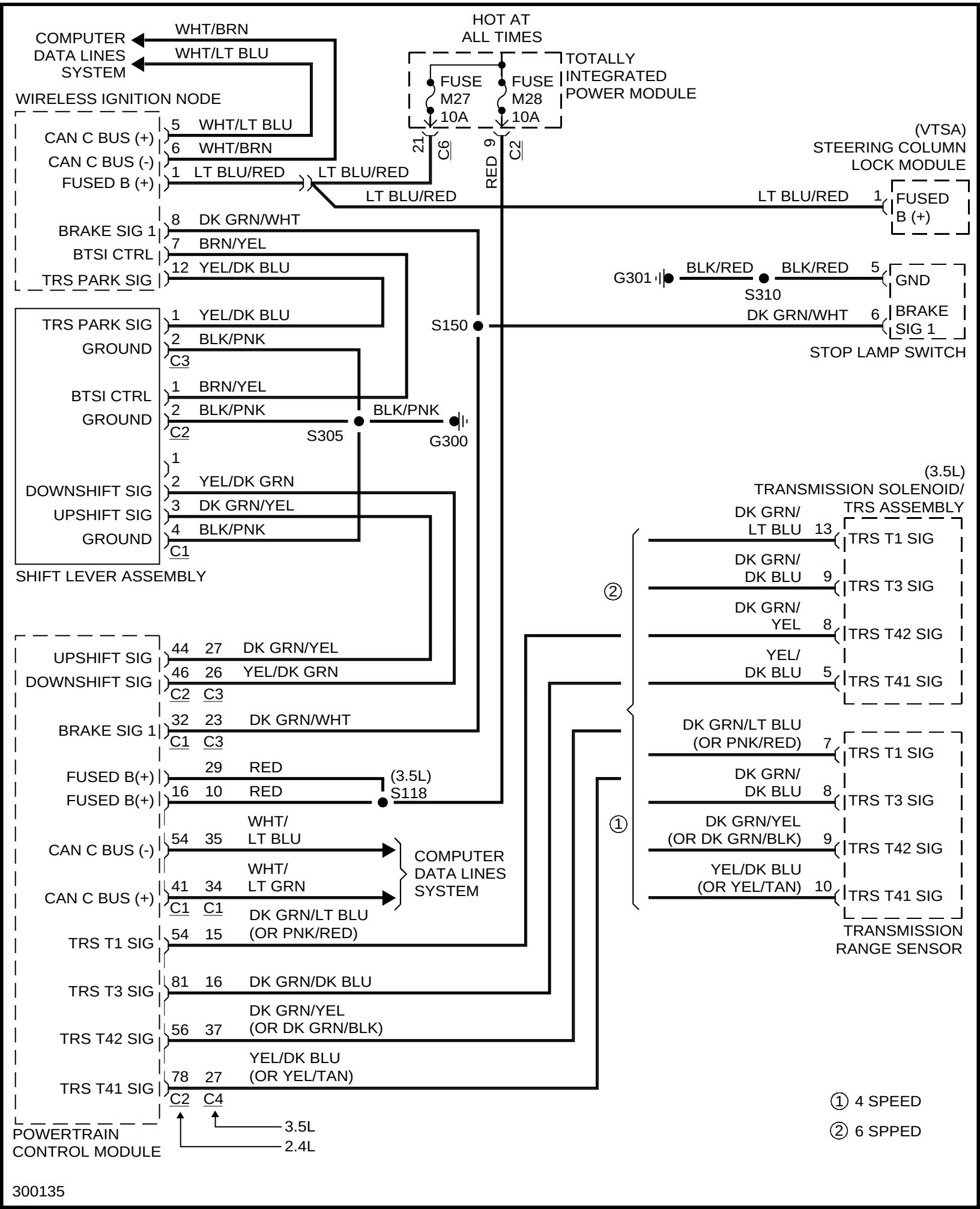

1 RED/LT BLU
2 DK BLU/PNK
PASS WINDOW HALL SENS A SIG
PASS WINDOW HALL SENS SPLY
PASS WINDOW HALL SENS RTN
PASS WINDOW DRV (UP)
PASS WINDOW DRV (DOWN)
6 ORG/LT GRN
5 ORG/DK BLU
4 BLK/LT GRN
1 ORG/BRN
3 ORG/VIO
PASSENGER WINDOW MOTOR (EXPRESS)
EXPRESS
EXCEPT BASE
ORG/BRN
ORG/VIO
EXCEPT EXPRESS
BASE
ORG/BRN
ORG/VIO
1 ORG/BRN
2 ORG/VIO
PASSENGER WINDOW MOTOR (EXCEPT EXPRESS)
1 ORG/BRN
2 ORG/VIO
RIGHT REAR WINDOW MOTOR
RR WINDOW DRV (DOWN)
RR WINDOW DRV (UP)
RR MSTR WINDOW SW (DOWN)
RR MSTR WINDOW SW (UP)
WINDOW LCK OUT SW OUT
GROUND
3 ORG/VIO
4 ORG/BRN
6 ORG/DK BLU
1 ORG/DK BLU
2 ORG/LT BLU
5 BLK (OR BLK/WHT)
RIGHT REAR POWER WINDOW SWITCH
S333
BLK/WHT
G305
3 ORG/LT BLU
4 ORG/LT BLU
5 ORG/DK GRN
6 ORG/DK BLU
ORG/DK BLU
7 ORG/GRY
8 ORG/TAN
9 VIO/LT GRN
10 PNK/YEL
11 LT GRN/TAN
ORG/LT GRN 1
ORG/DK BLU 2
BLK/LT GRN 3
ORG/BRN 4
ORG/VIO 5
C4
WHT/ORG 1
WHT/GRY 2
COMPUTER DATA LINES SYSTEM
G305
BLK/WHT
BLK/WHT 4
S330
RED/LT BLU 5
C3
ORG/TAN 8
ORG/LT GRN 7
ORG/GRY 6
VIO/LT GRN 4
C5
PASS WINDOW HALL SENS A SIG
PASS WINDOW HALL SENS SPLY
PASS WINDOW HALL SENS RTN
PASS WINDOW DRV (UP)
PASS WINDOW DRV (DOWN)
CAN INTERIOR BUS (-)
CAN INTERIOR BUS (+)
GROUND
FUSED B(+)
PASS WINDOW SW ILL DRV
PASS WINDOW SW RTN
PASS WINDOW SW MUX
PASS DOOR LOCK SW MUX
PASSENGER DOOR MODULE (EXCEPT BASE)
VIO/LT GRN 8
ORG/GRY 9
ORG/LT GRN 4
ORG/TAN 2
DK BLU/PNK 3
PASS DOOR LOCK SW MUX
PASS WINDOW SW MUX
PASS WINDOW SW RTN
PASS WINDOW SW ILL DRV
FUSED RUN/ACCESSORY RLY OUT
PASSENGER WINDOW/DOOR LOCK SWITCH (EXCEPT BASE)
ORG/BRN 3
ORG/VIO 5
ORG/LT BLU 2
ORG/GRY 1
ORG/TAN 4
VIO/LT GRN 6
PNK/YEL 7
LT GRN/TAN 8
PASS WINDOW DRV (UP)
PASS WINDOW DRV (DOWN)
WINDOW LOCK OUT SW OUT
PASS MSTR WINDOW SW (DOWN)
PASS MSTR WINDOW SW (UP)
PASS DOOR LOCK SW MUX
FUSED RUN/ACCESSORY RLY OUT
RTN SW
PASSENGER WINDOW/DOOR LOCK SWITCH (BASE)
300059

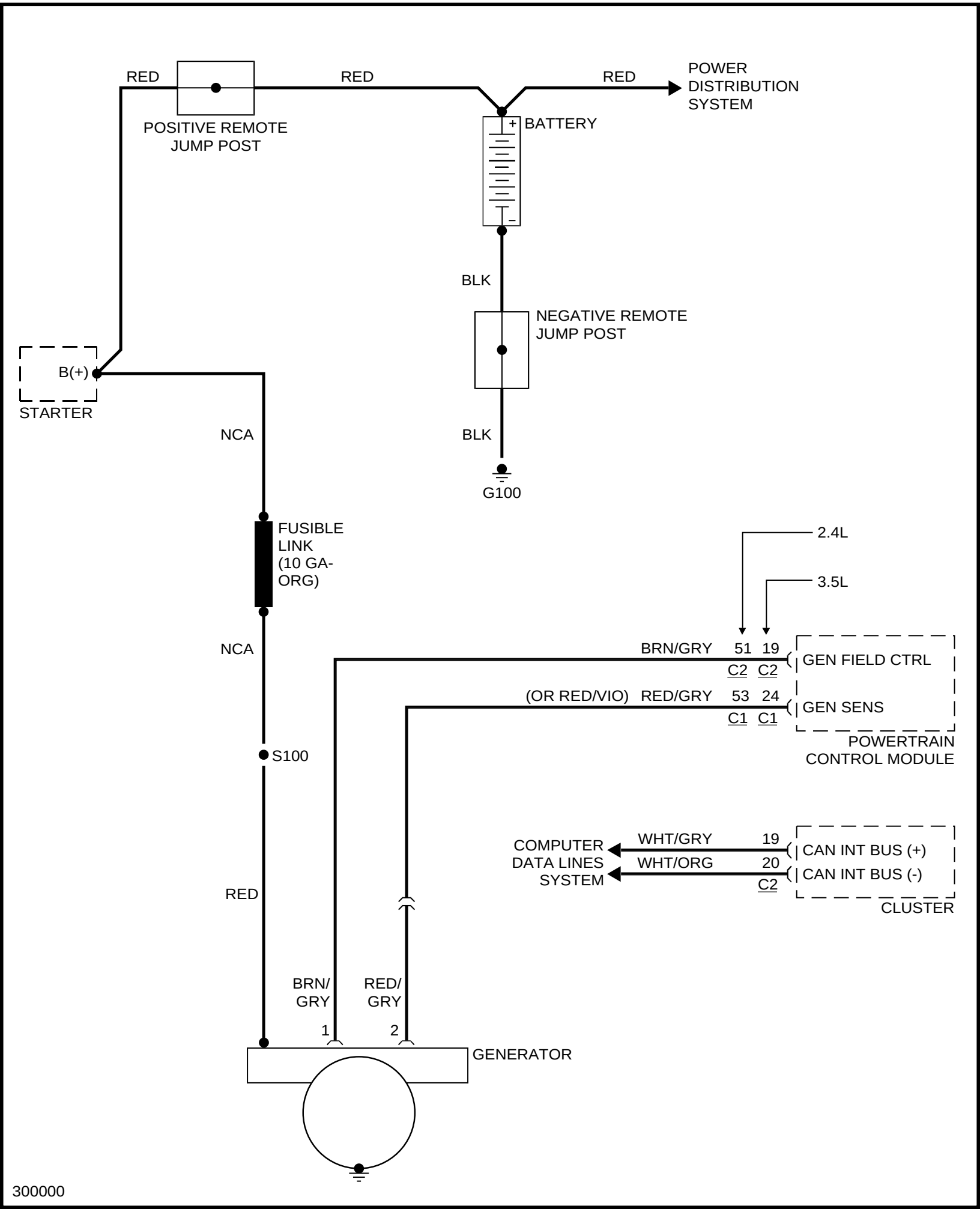

HOT AT ALL TIMES
HOT W/ RUN RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
B(+)
ELECTRONICS
FUSE M8 20A
FUSE M20 15A
LEFT HEATED SEAT SWITCH
RIGHT HEATED SEAT SWITCH
FUSED B(+)
LIN BUS
GND
BANK SWITCH
LT GRN/WHT 14
RED 29
C6
S206
RED
RED 6
WHT/DK GRN 8
BLK 7
S208
BLK
G201
A
B
C
D LT GRN/BRN
E LT GRN/WHT
F BLK
G
H
J WHT/DK GRN
K LT GRN/VIO
LF SEAT HTR CTRL
FUSED RUN RLY OUT
GND
LIN BUS
RF SEAT HTR CTRL
HEATED SEATS MODULE
BLK
S205
WHT/DK GRN
COMPUTER DATA LINES SYSTEM
LT GRN/VIO
S389
BLK
S394
LT GRN/VIO
LT GRN/VIO
BLK
PASSENGER SEAT CUSHION HEATER
LT GRN
PASSENGER SEAT BACK HEATER
YEL
DRIVER SEAT BACK HEATER
BLK
DRIVER SEAT CUSHION HEATER
BLK
LT GRN
YEL
BLK
BLK
S390
BLK
S388
BLK
S392
BLK
G305
BLK
G304

300202

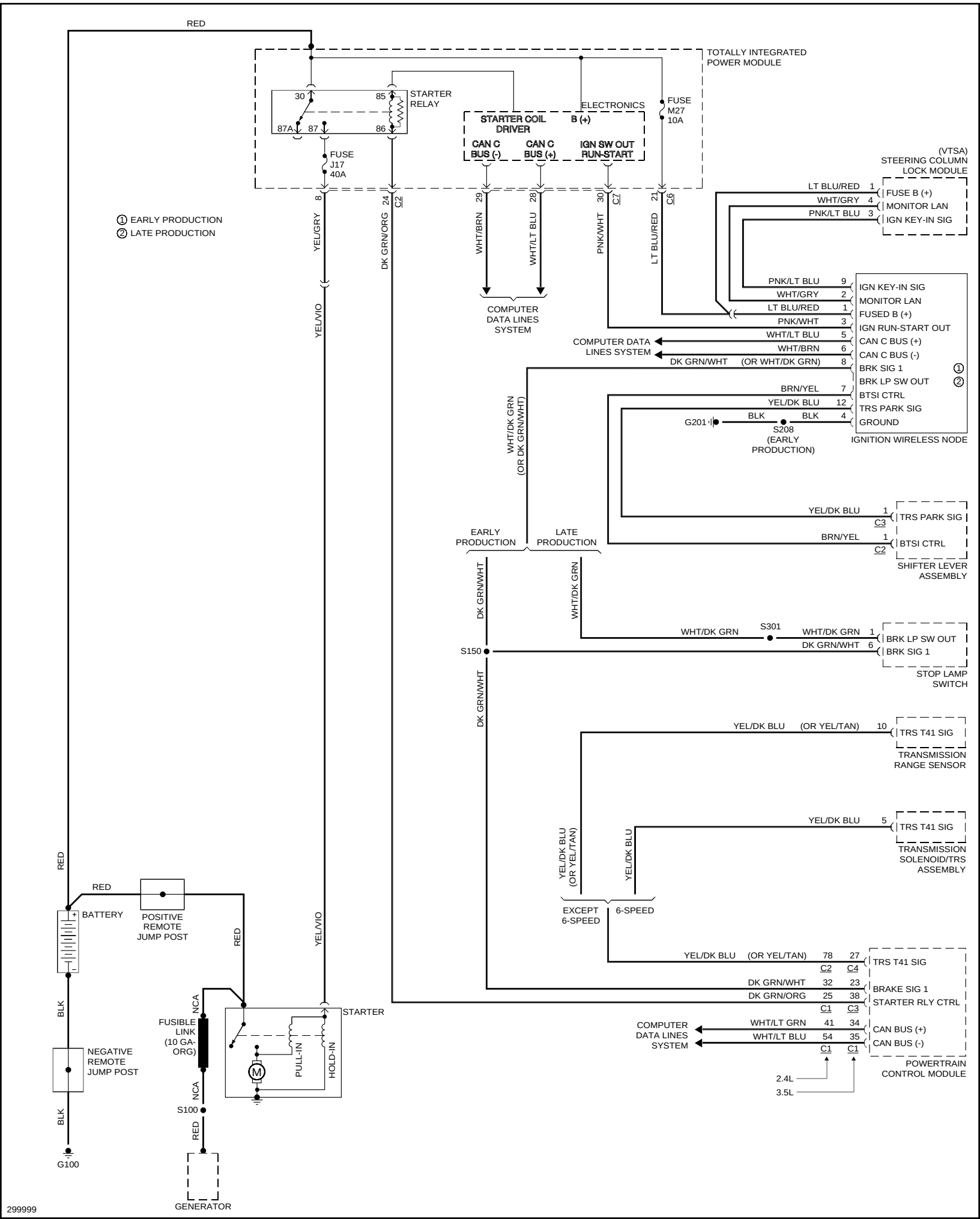

HOT AT
ALL TIMES
TOTALLY
INTEGRATED
POWER
MODULE
FUSE
J8
40A
32
C6
PNK/LT BLU
(OR RED/GRY)
RED/BLK
PNK/LT BLU
1
25A
ORG/RED
2
POWER SEAT
CIRCUIT BREAKER
1
2
3
4
LT GRN/DK GRN
DRV SEAT REARWARD
5
LT GRN/TAN
FRT DRV SEAT DOWN
6
ORG/RED
FUSED B(+)
7
BLK/RED
GND
G301
8
LT GRN/WHT
DRV SEAT FORWARD
9
LT GRN/LT BLU
FRT DRV SEAT UP
10
LT GRN/ORG
RR DRV SEAT RISER DOWN
11
LT GRN/YEL
RR DRV SEAT RISER UP
DRIVER SEAT SWITCH
1
LT GRN/YEL
M
2
LT GRN/ORG
DRIVER REAR
VERTICAL SEAT
ADJUSTER MOTOR
1
LT GRN/LT BLU
2
LT GRN/TAN
M
DRIVER FRONT
VERTICAL SEAT
ADJUSTER MOTOR
1
LT GRN/WHT
2
LT GRN/DK GRN
M
DRIVER
HORIZONTAL SEAT
ADJUSTER MOTOR

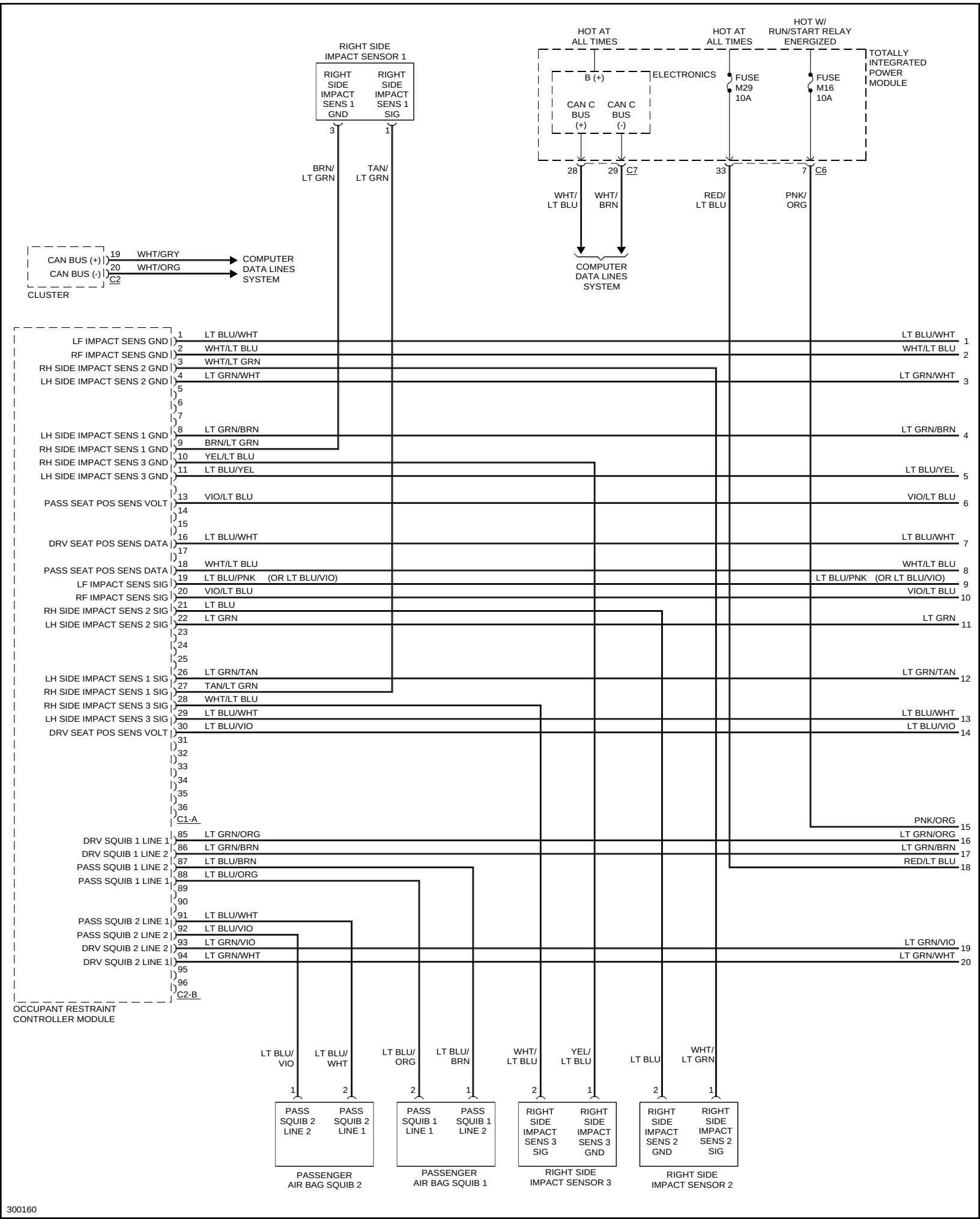
300201


COMPUTER DATA LINES SYSTEM
WHT/BRN
WHT/LT BLU
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
FUSE M27 10A
FUSE M28 10A
WIRELESS IGNITION NODE
CAN C BUS (+)
CAN C BUS (-)
FUSED B (+)
5 WHT/LT BLU
6 WHT/BRN
1 LT BLU/RED
LT BLU/RED
LT BLU/RED
21
C6
RED 9
C2
(VTSA) STEERING COLUMN LOCK MODULE
LT BLU/RED 1
FUSED B (+)
BRAKE SIG 1
BTSI CTRL
TRS PARK SIG
8 DK GRN/WHT
7 BRN/YEL
12 YEL/DK BLU
G301
BLK/RED
BLK/RED 5
GND
S310
S150
DK GRN/WHT 6
BRAKE SIG 1
STOP LAMP SWITCH
TRS PARK SIG
GROUND
1 YEL/DK BLU
2 BLK/PNK
C3
BTSI CTRL
GROUND
1 BRN/YEL
2 BLK/PNK
C2
S305
BLK/PNK
G300
(3.5L) TRANSMISSION SOLENOID/ TRS ASSEMBLY
DOWNSHIFT SIG
UPSHIFT SIG
GROUND
1
2 YEL/DK GRN
3 DK GRN/YEL
4 BLK/PNK
C1
SHIFT LEVER ASSEMBLY
DK GRN/ LT BLU 13
TRS T1 SIG
DK GRN/ DK BLU 9
TRS T3 SIG
DK GRN/ YEL 8
TRS T42 SIG
YEL/ DK BLU 5
TRS T41 SIG
②
UPSHIFT SIG
DOWNSHIFT SIG
44 27 DK GRN/YEL
46 26 YEL/DK GRN
C2 C3
BRAKE SIG 1
32 23 DK GRN/WHT
C1 C3
FUSED B(+)
FUSED B(+)
29 RED
16 10 RED
(3.5L) S118
DK GRN/LT BLU (OR PNK/RED) 7
TRS T1 SIG
DK GRN/ DK BLU 8
TRS T3 SIG
DK GRN/YEL (OR DK GRN/BLK) 9
TRS T42 SIG
YEL/DK BLU (OR YEL/TAN) 10
TRS T41 SIG
①
CAN C BUS (-)
CAN C BUS (+)
54 35 WHT/ LT BLU
41 34 WHT/ LT GRN
C1 C1
COMPUTER DATA LINES SYSTEM
TRANSMISSION RANGE SENSOR
TRS T1 SIG
TRS T3 SIG
TRS T42 SIG
TRS T41 SIG
54 15 DK GRN/LT BLU (OR PNK/RED)
81 16 DK GRN/DK BLU
56 37 DK GRN/YEL (OR DK GRN/BLK)
78 27 YEL/DK BLU (OR YEL/TAN)
C2 C4
3.5L
2.4L
POWERTRAIN CONTROL MODULE
① 4 SPEED
② 6 SPPED
300135

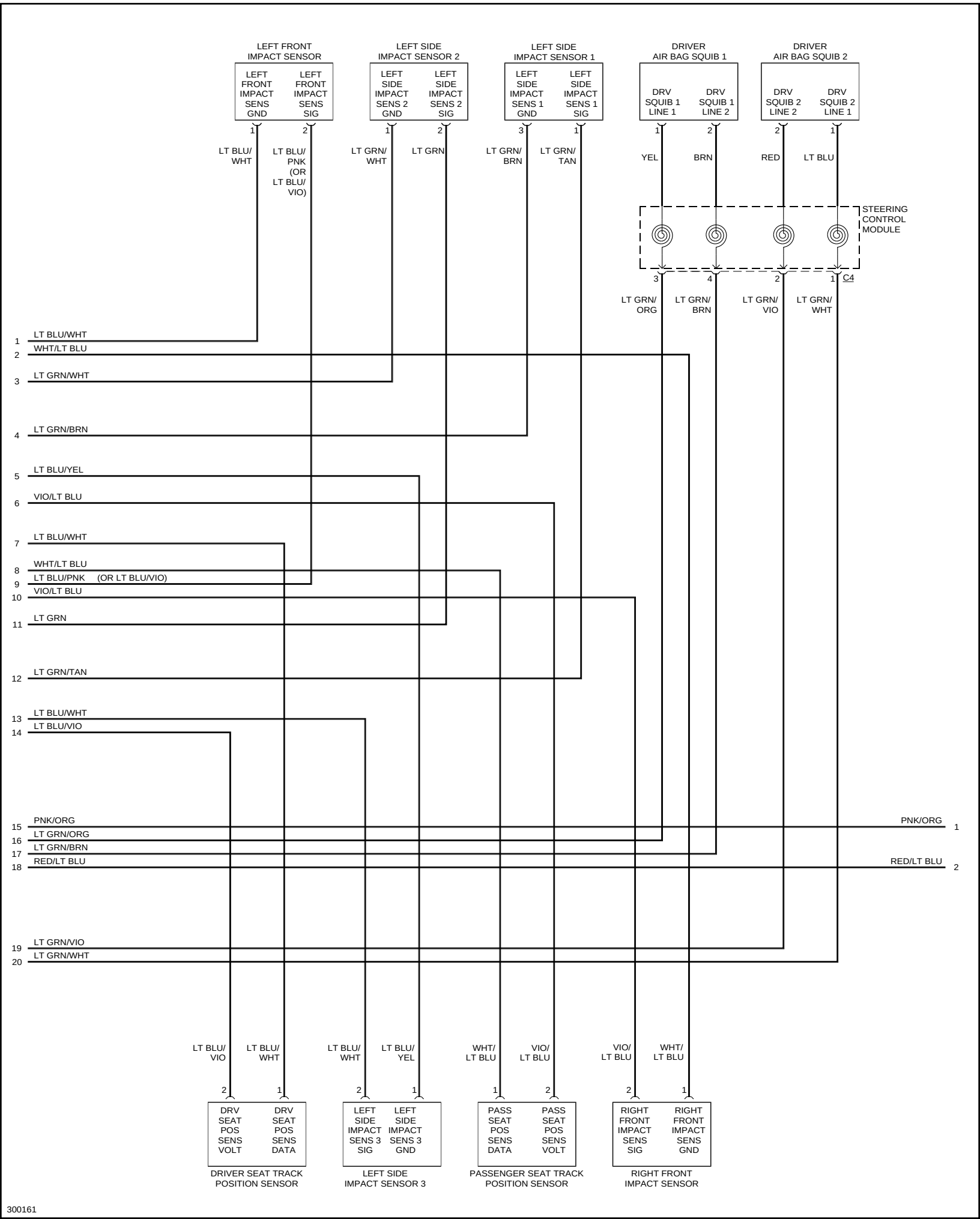

RED
RED
RED
POWER DISTRIBUTION SYSTEM
POSITIVE REMOTE JUMP POST
BATTERY
+
-
BLK
NEGATIVE REMOTE JUMP POST
B(+)
STARTER
NCA
BLK
G100
FUSIBLE LINK (10 GA-ORG)
2.4L
3.5L
NCA
BRN/GRY
51
19
C2
C2
GEN FIELD CTRL
(OR RED/VIO)
RED/GRY
53
24
C1
C1
GEN SENS
POWERTRAIN CONTROL MODULE
S100
COMPUTER DATA LINES SYSTEM
WHT/GRY
19
WHT/ORG
20
C2
CAN INT BUS (+)
CAN INT BUS (-)
CLUSTER
RED
BRN/ GRY
RED/ GRY
1
2
GENERATOR

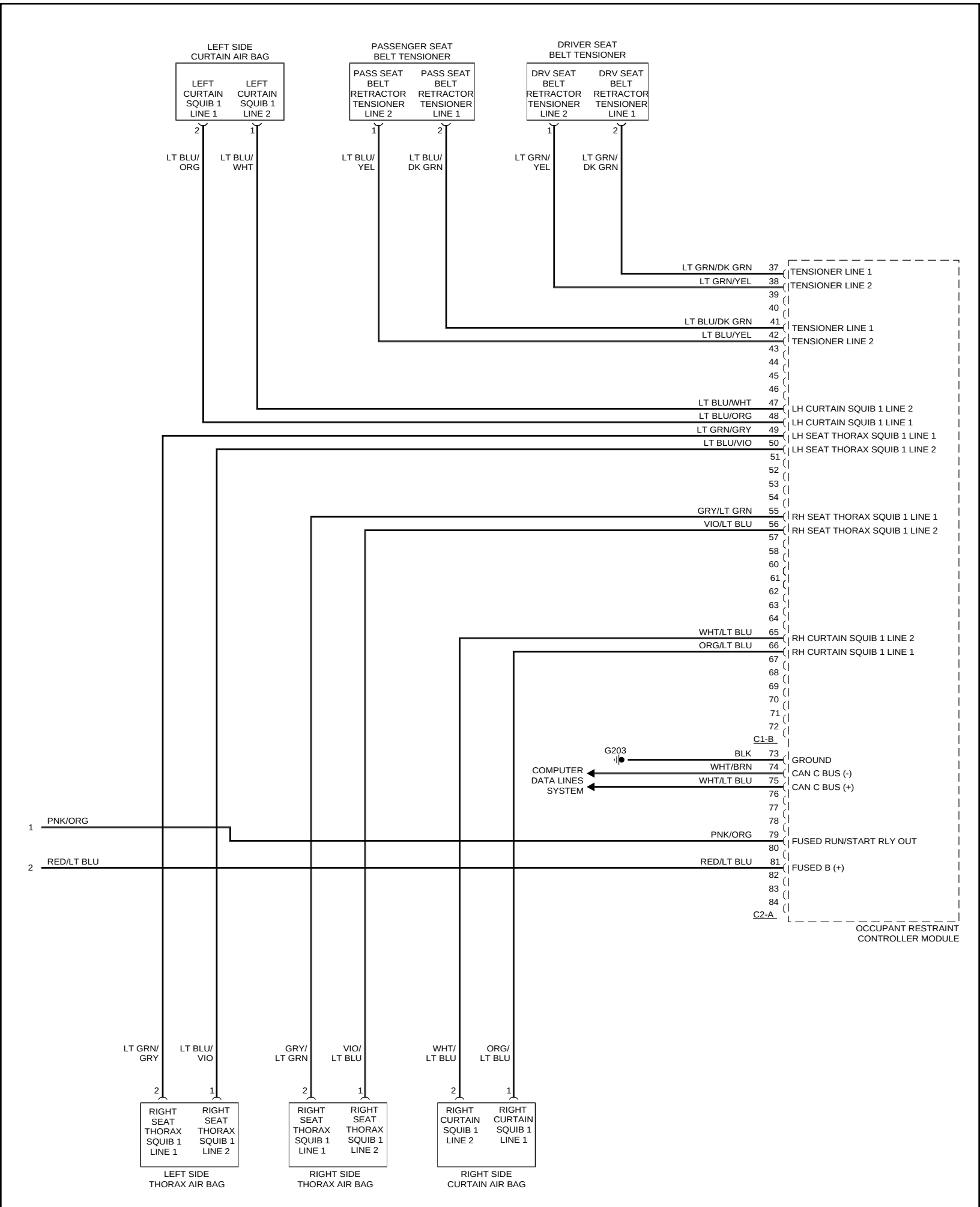
300000


RED
TOTALLY INTEGRATED POWER MODULE
30
85
87A
87
86
STARTER RELAY
FUSE J17 40A
STARTER COIL DRIVER
ELECTRONICS
B (+)
CAN C BUS (-)
CAN C BUS (+)
IGN SW OUT RUN-START
FUSE M27 10A
(VTSA) STEERING COLUMN LOCK MODULE
LT BLU/RED 1
FUSE B (+)
WHT/GRY 4
MONITOR LAN
PNK/LT BLU 3
IGN KEY-IN SIG
① EARLY PRODUCTION
② LATE PRODUCTION
YEL/GRY
DK GRN/ORG
WHT/BRN
WHT/LT BLU
PNK/WHT
LT BLU/RED
C2
C6
C7
COMPUTER DATA LINES SYSTEM
PNK/LT BLU 9
IGN KEY-IN SIG
WHT/GRY 2
MONITOR LAN
LT BLU/RED 1
FUSED B (+)
PNK/WHT 3
IGN RUN-START OUT
WHT/LT BLU 5
CAN C BUS (+)
WHT/BRN 6
CAN C BUS (-)
DK GRN/WHT (OR WHT/DK GRN) 8
BRK SIG 1
BRK LP SW OUT
BRN/YEL 7
BTSI CTRL
YEL/DK BLU 12
TRS PARK SIG
BLK 4
GROUND
G201
S208 (EARLY PRODUCTION)
IGNITION WIRELESS NODE
WHT/DK GRN (OR DK GRN/WHT)
YEL/DK BLU 1
TRS PARK SIG
C3
BRN/YEL 1
BTSI CTRL
C2
SHIFTER LEVER ASSEMBLY
EARLY PRODUCTION
LATE PRODUCTION
DK GRN/WHT
WHT/DK GRN
S301
WHT/DK GRN 1
BRK LP SW OUT
DK GRN/WHT 6
BRK SIG 1
S150
STOP LAMP SWITCH
YEL/DK BLU (OR YEL/TAN) 10
TRS T41 SIG
TRANSMISSION RANGE SENSOR
YEL/DK BLU 5
TRS T41 SIG
TRANSMISSION SOLENOID/TRS ASSEMBLY
YEL/DK BLU (OR YEL/TAN)
YEL/DK BLU
EXCEPT 6-SPEED
6-SPEED
YEL/DK BLU (OR YEL/TAN) 78 27
TRS T41 SIG
C2 C4
DK GRN/WHT 32 23
BRAKE SIG 1
DK GRN/ORG 25 38
STARTER RLY CTRL
C1 C3
WHT/LT GRN 41 34
CAN BUS (+)
WHT/LT BLU 54 35
CAN BUS (-)
C1 C1
COMPUTER DATA LINES SYSTEM
POWERTRAIN CONTROL MODULE
2.4L
3.5L
RED
BATTERY
POSITIVE REMOTE JUMP POST
BLK
NEGATIVE REMOTE JUMP POST
G100
NCA
FUSIBLE LINK (10 GA-ORG)
S100
STARTER
PULL-IN
HOLD-IN
GENERATOR
299999

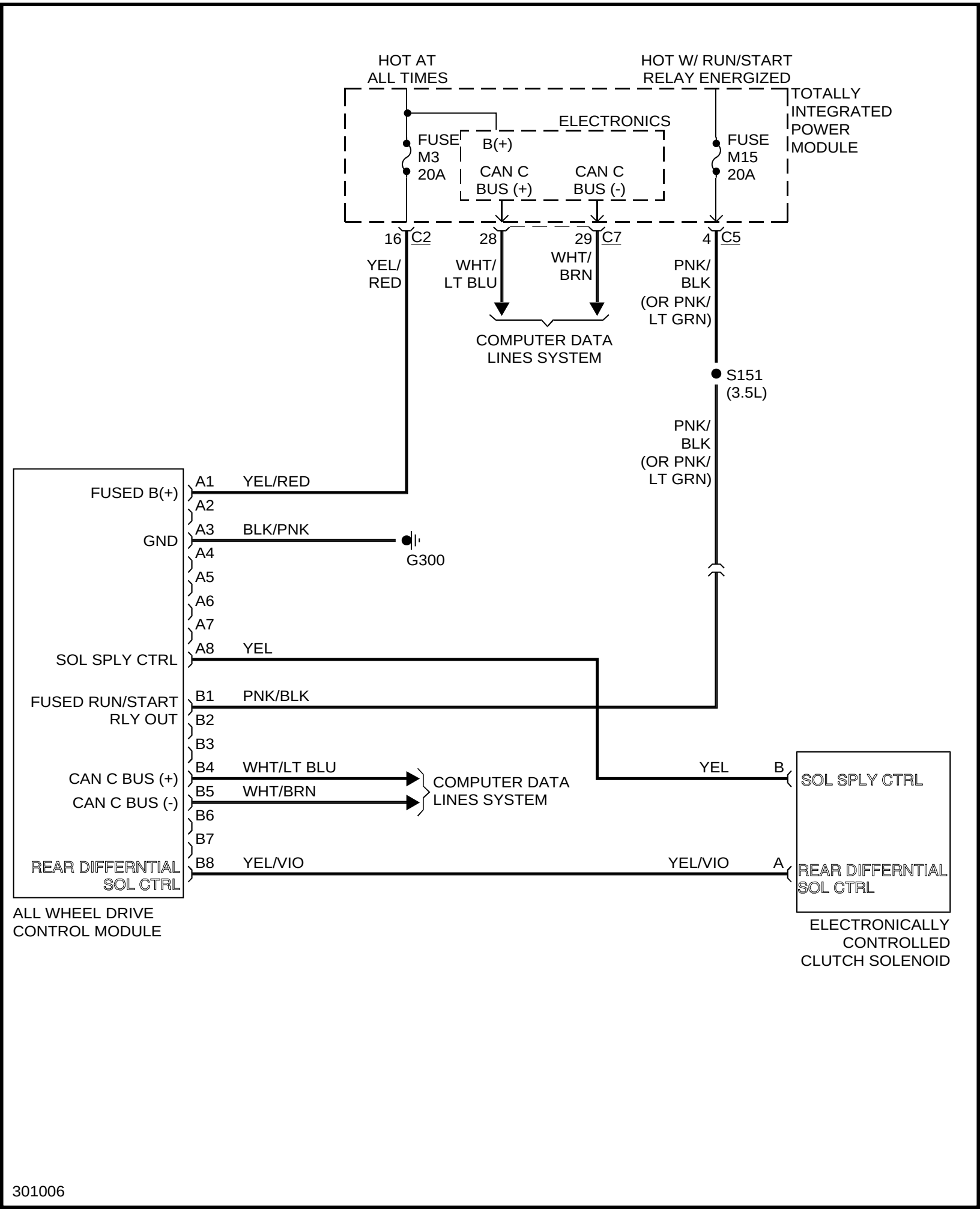

RIGHT SIDE IMPACT SENSOR 1
RIGHT SIDE IMPACT SENS 1 GND
RIGHT SIDE IMPACT SENS 1 SIG
3
1
BRN/ LT GRN
TAN/ LT GRN
HOT AT ALL TIMES
HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
B (+)
ELECTRONICS
CAN C BUS (+)
CAN C BUS (-)
FUSE M29 10A
FUSE M16 10A
28
29
C7
33
7
C6
WHT/ LT BLU
WHT/ BRN
RED/ LT BLU
PNK/ ORG
COMPUTER DATA LINES SYSTEM
CAN BUS (+)
CAN BUS (-)
19
20
C2
WHT/GRY
WHT/ORG
COMPUTER DATA LINES SYSTEM
CLUSTER
LF IMPACT SENS GND
RF IMPACT SENS GND
RH SIDE IMPACT SENS 2 GND
LH SIDE IMPACT SENS 2 GND
LH SIDE IMPACT SENS 1 GND
RH SIDE IMPACT SENS 1 GND
RH SIDE IMPACT SENS 3 GND
LH SIDE IMPACT SENS 3 GND
PASS SEAT POS SENS VOLT
DRV SEAT POS SENS DATA
PASS SEAT POS SENS DATA
LF IMPACT SENS SIG
RF IMPACT SENS SIG
RH SIDE IMPACT SENS 2 SIG
LH SIDE IMPACT SENS 2 SIG
LH SIDE IMPACT SENS 1 SIG
RH SIDE IMPACT SENS 1 SIG
RH SIDE IMPACT SENS 3 SIG
LH SIDE IMPACT SENS 3 SIG
DRV SEAT POS SENS VOLT
1 LT BLU/WHT
2 WHT/LT BLU
3 WHT/LT GRN
4 LT GRN/WHT
8 LT GRN/BRN
9 BRN/LT GRN
10 YEL/LT BLU
11 LT BLU/YEL
13 VIO/LT BLU
16 LT BLU/WHT
18 WHT/LT BLU
19 LT BLU/PNK (OR LT BLU/VIO)
20 VIO/LT BLU
21 LT BLU
22 LT GRN
26 LT GRN/TAN
27 TAN/LT GRN
28 WHT/LT BLU
29 LT BLU/WHT
30 LT BLU/VIO
C1-A
85 LT GRN/ORG
86 LT GRN/BRN
87 LT BLU/BRN
88 LT BLU/ORG
91 LT BLU/WHT
92 LT BLU/VIO
93 LT GRN/VIO
94 LT GRN/WHT
C2-B
OCCUPANT RESTRAINT CONTROLLER MODULE
LT BLU/WHT 1
WHT/LT BLU 2
LT GRN/WHT 3
LT GRN/BRN 4
LT BLU/YEL 5
VIO/LT BLU 6
LT BLU/WHT 7
WHT/LT BLU 8
LT BLU/PNK (OR LT BLU/VIO) 9
VIO/LT BLU 10
LT GRN 11
LT GRN/TAN 12
LT BLU/WHT 13
LT BLU/VIO 14
PNK/ORG 15
LT GRN/ORG 16
LT GRN/BRN 17
RED/LT BLU 18
LT GRN/VIO 19
LT GRN/WHT 20
LT BLU/ VIO
LT BLU/ WHT
LT BLU/ ORG
LT BLU/ BRN
WHT/ LT BLU
YEL/ LT BLU
LT BLU
WHT/ LT GRN
PASS SQUIB 2 LINE 2
PASS SQUIB 2 LINE 1
PASS SQUIB 1 LINE 1
PASS SQUIB 1 LINE 2
RIGHT SIDE IMPACT SENS 3 SIG
RIGHT SIDE IMPACT SENS 3 GND
RIGHT SIDE IMPACT SENS 2 GND
RIGHT SIDE IMPACT SENS 2 SIG
PASSENGER AIR BAG SQUIB 2
PASSENGER AIR BAG SQUIB 1
RIGHT SIDE IMPACT SENSOR 3
RIGHT SIDE IMPACT SENSOR 2

300160

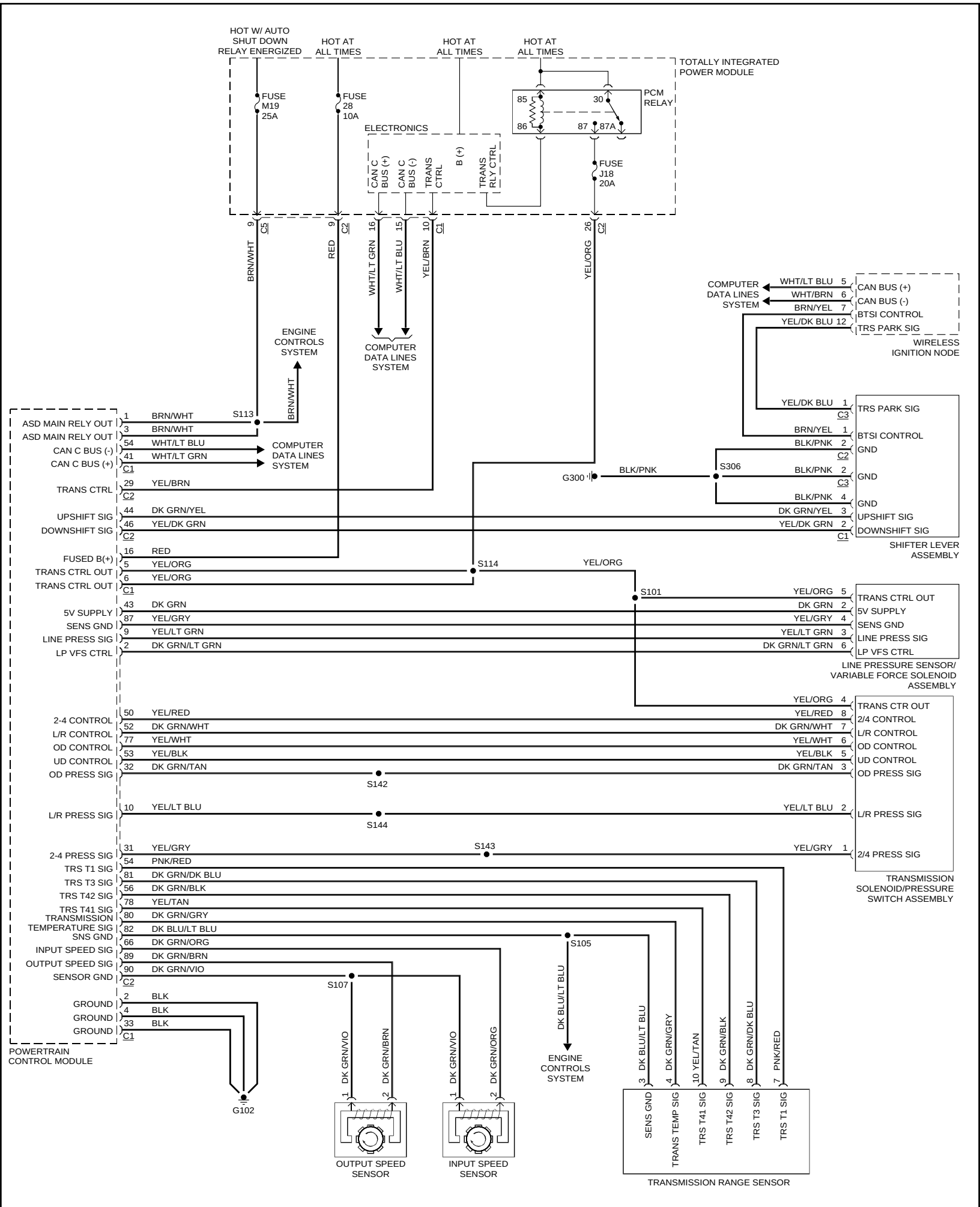

LEFT FRONT IMPACT SENSOR
LEFT FRONT IMPACT SENS GND
LEFT FRONT IMPACT SENS SIG
LEFT SIDE IMPACT SENSOR 2
LEFT SIDE IMPACT SENS 2 GND
LEFT SIDE IMPACT SENS 2 SIG
LEFT SIDE IMPACT SENSOR 1
LEFT SIDE IMPACT SENS 1 GND
LEFT SIDE IMPACT SENS 1 SIG
DRIVER AIR BAG SQUIB 1
DRV SQUIB 1 LINE 1
DRV SQUIB 1 LINE 2
DRIVER AIR BAG SQUIB 2
DRV SQUIB 2 LINE 2
DRV SQUIB 2 LINE 1
LT BLU/ WHT
LT BLU/ PNK (OR LT BLU/ VIO)
LT GRN/ WHT
LT GRN
LT GRN/ BRN
LT GRN/ TAN
YEL
BRN
RED
LT BLU
STEERING CONTROL MODULE
C4
LT GRN/ ORG
LT GRN/ BRN
LT GRN/ VIO
LT GRN/ WHT
1 LT BLU/WHT
2 WHT/LT BLU
3 LT GRN/WHT
4 LT GRN/BRN
5 LT BLU/YEL
6 VIO/LT BLU
7 LT BLU/WHT
8 WHT/LT BLU
9 LT BLU/PNK (OR LT BLU/VIO)
10 VIO/LT BLU
11 LT GRN
12 LT GRN/TAN
13 LT BLU/WHT
14 LT BLU/VIO
15 PNK/ORG
16 LT GRN/ORG
17 LT GRN/BRN
18 RED/LT BLU
19 LT GRN/VIO
20 LT GRN/WHT
PNK/ORG
RED/LT BLU
LT BLU/ VIO
LT BLU/ WHT
LT BLU/ WHT
LT BLU/ YEL
WHT/ LT BLU
VIO/ LT BLU
VIO/ LT BLU
WHT/ LT BLU
DRV SEAT POS SENS VOLT
DRV SEAT POS SENS DATA
LEFT SIDE IMPACT SENS 3 SIG
LEFT SIDE IMPACT SENS 3 GND
PASS SEAT POS SENS DATA
PASS SEAT POS SENS VOLT
RIGHT FRONT IMPACT SENS SIG
RIGHT FRONT IMPACT SENS GND
DRIVER SEAT TRACK POSITION SENSOR
LEFT SIDE IMPACT SENSOR 3
PASSENGER SEAT TRACK POSITION SENSOR
RIGHT FRONT IMPACT SENSOR
300161


LEFT SIDE CURTAIN AIR BAG
LEFT CURTAIN SQUIB 1 LINE 1
LEFT CURTAIN SQUIB 1 LINE 2
PASSENGER SEAT BELT TENSIONER
PASS SEAT BELT RETRACTOR TENSIONER LINE 2
PASS SEAT BELT RETRACTOR TENSIONER LINE 1
DRIVER SEAT BELT TENSIONER
DRV SEAT BELT RETRACTOR TENSIONER LINE 2
DRV SEAT BELT RETRACTOR TENSIONER LINE 1
LT BLU/ ORG
LT BLU/ WHT
LT BLU/ YEL
LT BLU/ DK GRN
LT GRN/ YEL
LT GRN/ DK GRN
LT GRN/DK GRN 37 TENSIONER LINE 1
LT GRN/YEL 38 TENSIONER LINE 2
LT BLU/DK GRN 41 TENSIONER LINE 1
LT BLU/YEL 42 TENSIONER LINE 2
LT BLU/WHT 47 LH CURTAIN SQUIB 1 LINE 2
LT BLU/ORG 48 LH CURTAIN SQUIB 1 LINE 1
LT GRN/GRY 49 LH SEAT THORAX SQUIB 1 LINE 1
LT BLU/VIO 50 LH SEAT THORAX SQUIB 1 LINE 2
GRY/LT GRN 55 RH SEAT THORAX SQUIB 1 LINE 1
VIO/LT BLU 56 RH SEAT THORAX SQUIB 1 LINE 2
WHT/LT BLU 65 RH CURTAIN SQUIB 1 LINE 2
ORG/LT BLU 66 RH CURTAIN SQUIB 1 LINE 1
C1-B
G203
BLK 73 GROUND
COMPUTER DATA LINES SYSTEM
WHT/BRN 74 CAN C BUS (-)
WHT/LT BLU 75 CAN C BUS (+)
1 PNK/ORG
PNK/ORG 79 FUSED RUN/START RLY OUT
2 RED/LT BLU
RED/LT BLU 81 FUSED B (+)
C2-A
OCCUPANT RESTRAINT CONTROLLER MODULE
LT GRN/ GRY
LT BLU/ VIO
GRY/ LT GRN
VIO/ LT BLU
WHT/ LT BLU
ORG/ LT BLU
RIGHT SEAT THORAX SQUIB 1 LINE 1
RIGHT SEAT THORAX SQUIB 1 LINE 2
RIGHT CURTAIN SQUIB 1 LINE 2
RIGHT CURTAIN SQUIB 1 LINE 1
LEFT SIDE THORAX AIR BAG
RIGHT SIDE THORAX AIR BAG
RIGHT SIDE CURTAIN AIR BAG

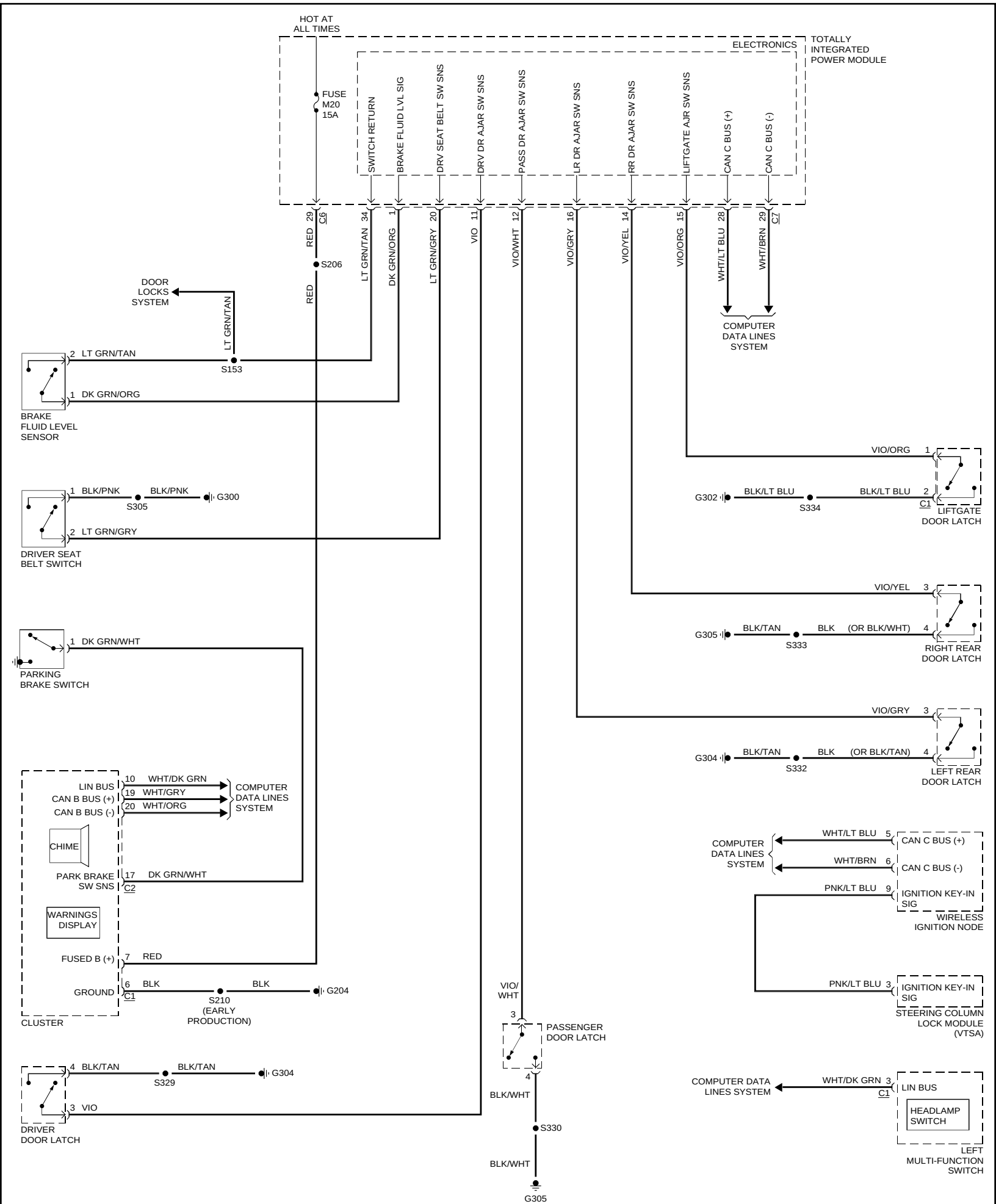
300162


HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M3 20A
B(+)
CAN C BUS (+)
CAN C BUS (-)
FUSE M15 20A
16 C2
28
29 C7
4 C5
YEL/ RED
WHT/ LT BLU
WHT/ BRN
PNK/ BLK (OR PNK/ LT GRN)
COMPUTER DATA LINES SYSTEM
S151 (3.5L)
PNK/ BLK (OR PNK/ LT GRN)
FUSED B(+)
A1 YEL/RED
A2
GND
A3 BLK/PNK
G300
A4
A5
A6
A7
SOL SPLY CTRL
A8 YEL
FUSED RUN/START RLY OUT
B1 PNK/BLK
B2
B3
CAN C BUS (+)
B4 WHT/LT BLU
CAN C BUS (-)
B5 WHT/BRN
COMPUTER DATA LINES SYSTEM
B6
B7
REAR DIFFERNTIAL SOL CTRL
B8 YEL/VIO
YEL B
SOL SPLY CTRL
YEL/VIO A
REAR DIFFERNTIAL SOL CTRL
ALL WHEEL DRIVE CONTROL MODULE
ELECTRONICALLY CONTROLLED CLUTCH SOLENOID

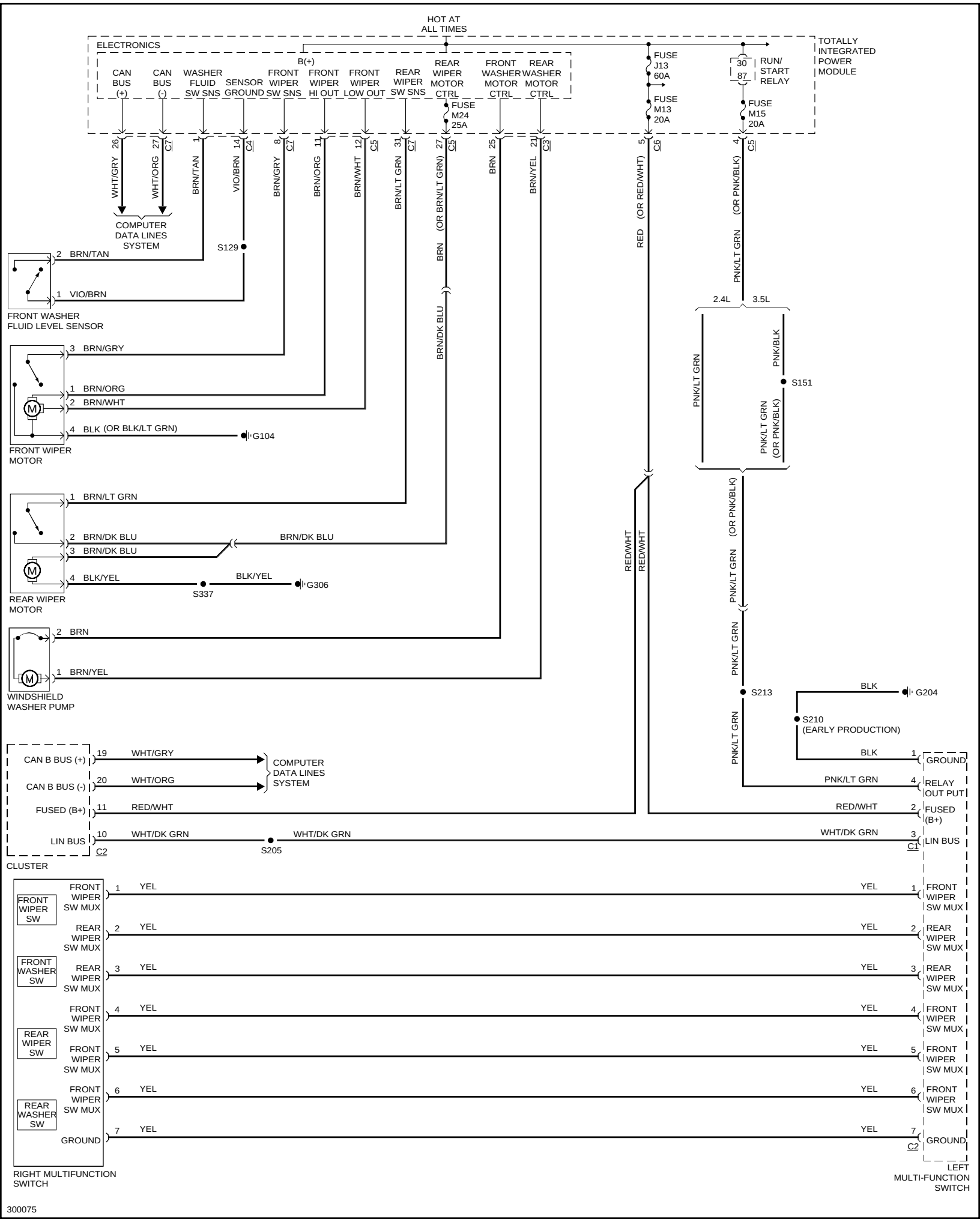
301006


HOT W/ AUTO SHUT DOWN RELAY ENERGIZED
HOT AT ALL TIMES
HOT AT ALL TIMES
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
FUSE M19 25A
FUSE 28 10A
ELECTRONICS
CAN C BUS (+)
CAN C BUS (-)
TRANS CTRL
B (+)
TRANS RLY CTRL
85
30
86
87
87A
PCM RELAY
FUSE J18 20A
9 C5 BRN/WHT
9 C2 RED
16 WHT/LT GRN
15 WHT/LT BLU
10 C1 YEL/BRN
26 C2 YEL/ORG
ENGINE CONTROLS SYSTEM
BRN/WHT
COMPUTER DATA LINES SYSTEM
COMPUTER DATA LINES SYSTEM
WHT/LT BLU 5 CAN BUS (+)
WHT/BRN 6 CAN BUS (-)
BRN/YEL 7 BTSI CONTROL
YEL/DK BLU 12 TRS PARK SIG
WIRELESS IGNITION NODE
YEL/DK BLU 1 C3 TRS PARK SIG
BRN/YEL 1 BTSI CONTROL
BLK/PNK 2 GND C2
BLK/PNK 2 GND C3
BLK/PNK 4 GND
DK GRN/YEL 3 UPSHIFT SIG
YEL/DK GRN 2 DOWNSHIFT SIG C1
SHIFTER LEVER ASSEMBLY
S113
S306
G300
BLK/PNK
1 BRN/WHT
3 BRN/WHT
54 WHT/LT BLU
41 WHT/LT GRN
C1
29 YEL/BRN
C2
44 DK GRN/YEL
46 YEL/DK GRN
C2
16 RED
5 YEL/ORG
6 YEL/ORG
C1
S114
YEL/ORG
S101
YEL/ORG 5
DK GRN 2
YEL/GRY 4
YEL/LT GRN 3
DK GRN/LT GRN 6
TRANS CTRL OUT
5V SUPPLY
SENS GND
LINE PRESS SIG
LP VFS CTRL
LINE PRESSURE SENSOR/ VARIABLE FORCE SOLENOID ASSEMBLY
YEL/ORG 4
YEL/RED 8
DK GRN/WHT 7
YEL/WHT 6
YEL/BLK 5
DK GRN/TAN 3
TRANS CTR OUT
2/4 CONTROL
L/R CONTROL
OD CONTROL
UD CONTROL
OD PRESS SIG
50 YEL/RED
52 DK GRN/WHT
77 YEL/WHT
53 YEL/BLK
32 DK GRN/TAN
S142
10 YEL/LT BLU
S144
YEL/LT BLU 2
L/R PRESS SIG
31 YEL/GRY
54 PNK/RED
81 DK GRN/DK BLU
56 DK GRN/BLK
78 YEL/TAN
80 DK GRN/GRY
82 DK BLU/LT BLU
66 DK GRN/ORG
89 DK GRN/BRN
90 DK GRN/VIO
C2
S143
YEL/GRY 1
2/4 PRESS SIG
TRANSMISSION SOLENOID/PRESSURE SWITCH ASSEMBLY
2-4 PRESS SIG
TRS T1 SIG
TRS T3 SIG
TRS T42 SIG
TRS T41 SIG
TRANSMISSION TEMPERATURE SIG
SNS GND
INPUT SPEED SIG
OUTPUT SPEED SIG
SENSOR GND
S105
S107
DK BLU/LT BLU
ENGINE CONTROLS SYSTEM
2 BLK GROUND
4 BLK GROUND
33 BLK GROUND
C1
POWERTRAIN CONTROL MODULE
G102
1 DK GRN/VIO
2 DK GRN/BRN
1 DK GRN/VIO
2 DK GRN/ORG
OUTPUT SPEED SENSOR
INPUT SPEED SENSOR
3 DK BLU/LT BLU
4 DK GRN/GRY
10 YEL/TAN
9 DK GRN/BLK
8 DK GRN/DK BLU
7 PNK/RED
SENS GND
TRANS TEMP SIG
TRS T41 SIG
TRS T42 SIG
TRS T3 SIG
TRS T1 SIG
TRANSMISSION RANGE SENSOR

301003


HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M20 15A
SWITCH RETURN
BRAKE FLUID LVL SIG
DRV SEAT BELT SW SNS
DRV DR AJAR SW SNS
PASS DR AJAR SW SNS
LR DR AJAR SW SNS
RR DR AJAR SW SNS
LIFTGATE AJR SW SNS
CAN C BUS (+)
CAN C BUS (-)
29 C6
34
1
20
11
12
16
14
15
28
29 C7
RED
LT GRN/TAN
DK GRN/ORG
LT GRN/GRY
VIO
VIO/WHT
VIO/GRY
VIO/YEL
VIO/ORG
WHT/LT BLU
WHT/BRN
S206
DOOR LOCKS SYSTEM
LT GRN/TAN
S153
2 LT GRN/TAN
1 DK GRN/ORG
BRAKE FLUID LEVEL SENSOR
COMPUTER DATA LINES SYSTEM
VIO/ORG 1
G302
BLK/LT BLU
S334
BLK/LT BLU 2
C1
LIFTGATE DOOR LATCH
1 BLK/PNK
BLK/PNK
S305
G300
2 LT GRN/GRY
DRIVER SEAT BELT SWITCH
VIO/YEL 3
G305
BLK/TAN
BLK (OR BLK/WHT) 4
S333
RIGHT REAR DOOR LATCH
1 DK GRN/WHT
PARKING BRAKE SWITCH
VIO/GRY 3
G304
BLK/TAN
BLK (OR BLK/TAN) 4
S332
LEFT REAR DOOR LATCH
LIN BUS
CAN B BUS (+)
CAN B BUS (-)
10 WHT/DK GRN
19 WHT/GRY
20 WHT/ORG
COMPUTER DATA LINES SYSTEM
CHIME
PARK BRAKE SW SNS
17 DK GRN/WHT
C2
WARNINGS DISPLAY
FUSED B (+)
7 RED
GROUND
6 BLK
C1
BLK
G204
S210 (EARLY PRODUCTION)
CLUSTER
WHT/LT BLU 5
CAN C BUS (+)
WHT/BRN 6
CAN C BUS (-)
COMPUTER DATA LINES SYSTEM
PNK/LT BLU 9
IGNITION KEY-IN SIG
WIRELESS IGNITION NODE
PNK/LT BLU 3
IGNITION KEY-IN SIG
STEERING COLUMN LOCK MODULE (VTSA)
VIO/WHT
3
PASSENGER DOOR LATCH
4
BLK/WHT
S330
BLK/WHT
G305
4 BLK/TAN
BLK/TAN
S329
G304
3 VIO
DRIVER DOOR LATCH
COMPUTER DATA LINES SYSTEM
WHT/DK GRN 3
C1
LIN BUS
HEADLAMP SWITCH
LEFT MULTI-FUNCTION SWITCH

300957


HOT AT ALL TIMES
ELECTRONICS
B(+)
CAN BUS (+)
CAN BUS (-)
WASHER FLUID SW SNS
SENSOR GROUND
FRONT WIPER SW SNS
FRONT WIPER HI OUT
FRONT WIPER LOW OUT
REAR WIPER SW SNS
REAR WIPER MOTOR CTRL
FRONT WASHER MOTOR CTRL
REAR WASHER MOTOR CTRL
FUSE M24 25A
FUSE J13 60A
FUSE M13 20A
30
87
RUN/ START RELAY
FUSE M15 20A
TOTALLY INTEGRATED POWER MODULE
WHT/GRY
WHT/ORG
BRN/TAN
VIO/BRN
BRN/GRY
BRN/ORG
BRN/WHT
BRN/LT GRN
BRN (OR BRN/LT GRN)
BRN
BRN/YEL
RED (OR RED/WHT)
PNK/LT GRN (OR PNK/BLK)
COMPUTER DATA LINES SYSTEM
S129
2 BRN/TAN
1 VIO/BRN
FRONT WASHER FLUID LEVEL SENSOR
3 BRN/GRY
1 BRN/ORG
2 BRN/WHT
4 BLK (OR BLK/LT GRN)
G104
FRONT WIPER MOTOR
BRN/DK BLU
2.4L
3.5L
PNK/LT GRN
PNK/BLK
S151
PNK/LT GRN (OR PNK/BLK)
1 BRN/LT GRN
2 BRN/DK BLU
3 BRN/DK BLU
BRN/DK BLU
4 BLK/YEL
BLK/YEL
S337
G306
REAR WIPER MOTOR
RED/WHT
RED/WHT
PNK/LT GRN (OR PNK/BLK)
PNK/LT GRN
2 BRN
1 BRN/YEL
WINDSHIELD WASHER PUMP
S213
BLK
G204
S210 (EARLY PRODUCTION)
PNK/LT GRN
CAN B BUS (+)
CAN B BUS (-)
FUSED (B+)
LIN BUS
19 WHT/GRY
20 WHT/ORG
11 RED/WHT
10 WHT/DK GRN
C2
S205
WHT/DK GRN
C1
BLK 1 GROUND
PNK/LT GRN 4 RELAY OUT PUT
RED/WHT 2 FUSED (B+)
WHT/DK GRN 3 LIN BUS
CLUSTER
FRONT WIPER SW
REAR WIPER SW
FRONT WASHER SW
REAR WASHER SW
FRONT WIPER SW MUX
REAR WIPER SW MUX
GROUND
1 YEL
2 YEL
3 YEL
4 YEL
5 YEL
6 YEL
7 YEL
RIGHT MULTIFUNCTION SWITCH
LEFT MULTI-FUNCTION SWITCH
300075

2009 Dodge JC - DODGE JOURNEY

Submodel: | **Engine Type:** L4 | **Liters:** 2.4L
Fuel Delivery: | **Fuel:**

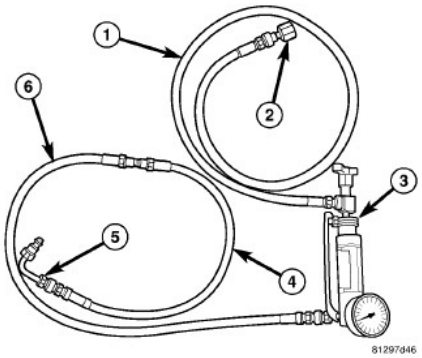
HYDRAULIC FLOW AND PRESSURE TEST

Special Tools: Click to display a list of tools used in this procedure

WARNING: **To prevent personal injury, safety goggles should be worn at all times while performing any test procedures on the power steering system.**

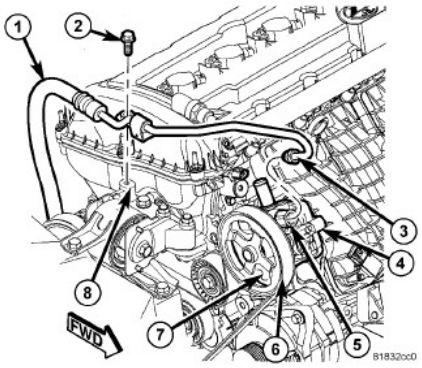
The following procedure is to be used to test the operation of the power steering system on this vehicle. This test will provide the flow rate (Gallons Per Minute (GPM)) of the power steering pump along with the maximum relief pressure. Perform this test any time a power steering system problem is present. This test will help determine if the power steering pump or power steering gear is not functioning properly. The test is performed using tools in the Power Steering Analyzer Kit 6815 with appropriate hoses and adapters. (Refer to 19 - Steering - Special Tools)

1. Check the power steering belt to ensure it is in good condition and adjusted properly.
2. Assemble the following hoses and adapters on the Flow Meter And Gauge 6800 (3):
   a. Gauge end (inlet) - Hose 6905 (6) (in 6893A kit), Hose 6713 (4) (in 6815 kit), Adapter Tube 6844 (5) (in 6893A kit)
   b. Valve end (outlet) - Hose 6959 (1), Adapter Fitting 6826 (2)

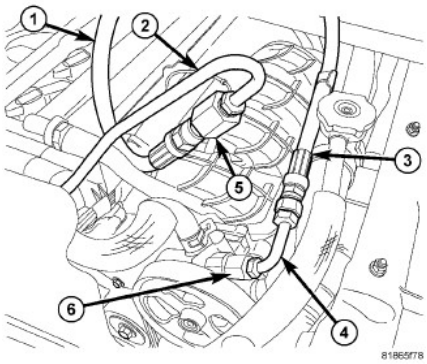


NOTE: In the following steps, figures showing the four-cylinder gas engine have been used. Pump location differs depending on engine application, but a standard pressure hose tube nut fitting is used by all.

3. Unthread the tube nut (3) and disconnect the power steering pressure hose (1) at the power steering pump pressure fitting (5).



4. Connect the vehicle's power steering pressure hose (2) to Adapter Fitting 6826 (5) (on Hose 6959 (1) leading to Analyzer outlet). Tighten the tube nut. (Refer to 19 - Steering - Specifications)
5. Connect Adapter Fitting 6844 (4) (on Hose 6713 (3) leading to Analyzer inlet), to the open power steering pump pressure fitting (6). Tighten the tube nut. (Refer to 19 - Steering - Specifications)
6. Route the hoses away from the exhaust system as well as possible.



TEST PROCEDURE

1. Completely open the valve on the Power Steering Analyzer flow meter.
2. Start the engine and let idle long enough to circulate power steering fluid through the analyzer and hoses, until the air is out of the fluid. Shut off the engine.
3. Check the power steering fluid level and add fluid as necessary. Start the engine again and let idle.
4. The analyzer gauge should read below 862 kPa (125 psi). If above, inspect the hoses for restrictions and repair as necessary. The pressure once the engine is warm should be in the range of 345-552 kPa (50-80 psi). The flow meter should read above 1.5 GPM.

CAUTION: **The following test procedure step involves testing maximum pump pressure output and flow control valve operation. Do not leave valve closed for more than five seconds as the pump could be damaged.**

NOTE: Power steering pump maximum relief pressure is 10,500 to 11,900 kPa (1525 to 1725 psi).

5. Close the flow meter valve fully three times and record highest pressure indicated each time. **All three readings must be within specifications and within 690 kPa (100 psi) of each other.**

- If the power steering pump pressures are within specifications, but not within 690 kPa (100 psi) of each other, replace the power steering pump.
- If the pressures are within 690 kPa (100 psi) of each other, but are outside of specifications, replace the power steering pump.

If the power steering pump requires replacement, (Refer to 19 - Steering/Pump - Removal) .

CAUTION: **During the next step, do not force the pump to operate against the stops for more than 5 seconds at a time as pump damage may result.**

6. Completely open the valve on the Power Steering Analyzer flow meter. Turn the steering wheel to the extreme left until the stop in the steering gear is met, then turn the steering wheel to the right until the right stop is met. Record the highest indicated pressure at each position. Compare the recorded readings to the specifications. If the highest output pressure reading against one stop is not within 690 kPa (100 psi) of the highest reading at the other stop, the steering gear is leaking internally and must be replaced.

If the power steering gear requires replacement, (Refer to 19 - Steering/Gear - Removal) .

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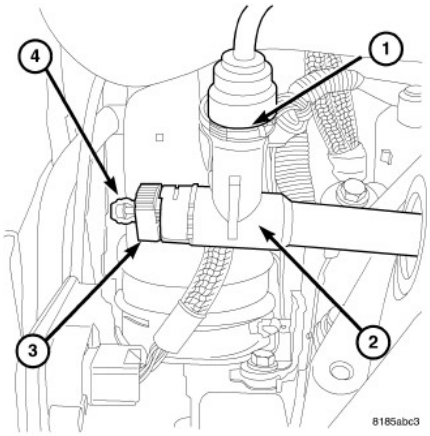
2009 Dodge JC - DODGE JOURNEY

Submodel: | **Engine Type:** L4 | **Liters:** 2.4L
Fuel Delivery: | **Fuel:**

STANDARD PROCEDURE - MANUAL BLEEDING CLUTCH HYDRAULIC CIRCUIT



NOTE: An assistant is required to perform this procedure

1. Verify fluid level in clutch/brake cylinder. Top off with DOT 3 brake fluid as necessary. Leave cap off.
2. Raise vehicle on hoist.

NOTE: The container must be positioned at a lower level than the bleeder valve on the clutch slave cylinder

3. Remove the dust cap from the bleed port on the clutch slave cylinder and install suitable size and length of clear hose (4) to monitor and divert fluid into a suitable container.
4. Lower vehicle, but only enough to gain access to and fill the brake master cylinder.
5. Have the assistant press down and hold the clutch pedal until it reaches the floor.

NOTE: Do not allow clutch/brake fluid reservoir to run dry while fluid exits bleed port. If the reservoir runs dry during this procedure, it must be refilled. and this step must be repeated.

NOTE: Ensure the assistant does not release the clutch pedal from the floor while the bleed port on the clutch slave cylinder is open. Otherwise, air will enter the clutch hydraulic circuit.

6. Open the bleed port on the clutch slave cylinder enough to allow hydraulic fluid to drain. Any air in the system will escape at this time.
7. Close the bleed port on the clutch slave cylinder, and have the assistant release the clutch pedal to the full up position.
8. Repeat steps 5 through 7 at least 15 times or until air bubbles are no longer present in the clutch hydraulic fluid.
9. Slowly actuate the clutch pedal 10 times between the full up and pedal stop position.
10. **Apply parking brake**. Start engine and verify clutch operation and pedal feel. If the clutch pedal feels fine and the transaxle can be easily shifted from neutral to any gear, the clutch is operating correctly. If pedal still feels spongy or clutch does not fully disengage, excessive air is still trapped within the system, most likely at the master cylinder.
11. Disconnect the hose from the bleed port on the clutch master cylinder and install the dust cap.
12. Top off brake master cylinder fluid level with DOT 3 brake fluid as necessary.

POWER BLEEDING CLUTCH HYDRAULIC CIRCUIT

1. Remove reservoir cap and connect bleeder cap to clutch/brake fluid reservoir.**NOTE:**Use Bleeder Cap/Modified reservoir cap adapter Snap-on #901-059 or equivalent.
2. Connect service filling machine to bleeder cap.**NOTE:**Use Service Filling Machine/Brake power bleeder or equivalent.
3. Service filling machine should be pressurized between 2.0 and 2.5 bar (29 - 36 PSI).

4. Remove dust cap from bleeder valve and connect the transparent bleeder hose to bleeder valve.

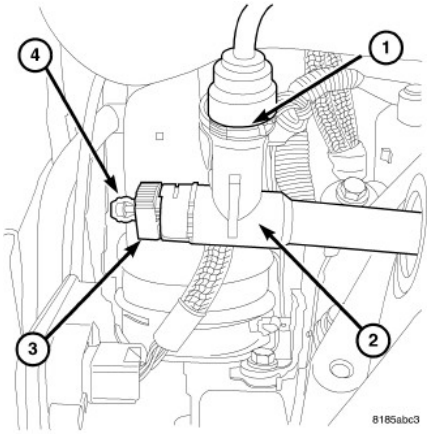
NOTE: Use Bleeder Container to capture hydraulic fluid and the Transparent Bleeder Hose to route fluid to container.

NOTE: The Container must be at a lower level than the bleeder valve on the clutch slave cylinder.

5. Place the other end of hose in the bleeder container to capture the used fluid. The end of the hose MUST be submerged in the DOT 3 brake fluid.

6. Turn on the service filling machine.

NOTE: While bleeding the system, do not allow the clutch fluid reservoir to completely empty out. If this happens, refill the clutch fluid reservoir, and repeat the procedure.



7. Open the bleeder valve (3) on the clutch slave cylinder enough to allow fluid to flow from the clutch hydraulic system.

8. Allow fluid to flow out of bleed port until no more air bubbles can be seen in the transparent bleeder hose.

9. Once fluid is free of air bubbles; make 15 quick actuations between clutch pedal stop positions.

10. Close the bleeder valve at the clutch slave cylinder and disconnect the service filling machine.

11. Check clutch pedal to see if vehicle is properly bled.

12. If vehicle is not properly bled, repeat procedure.

13. Remove bleeder cap from the clutch fluid reservoir and replace reservoir cap.

14. Disconnect transparent bleeder hose from bleeder valve and replace dust cap.

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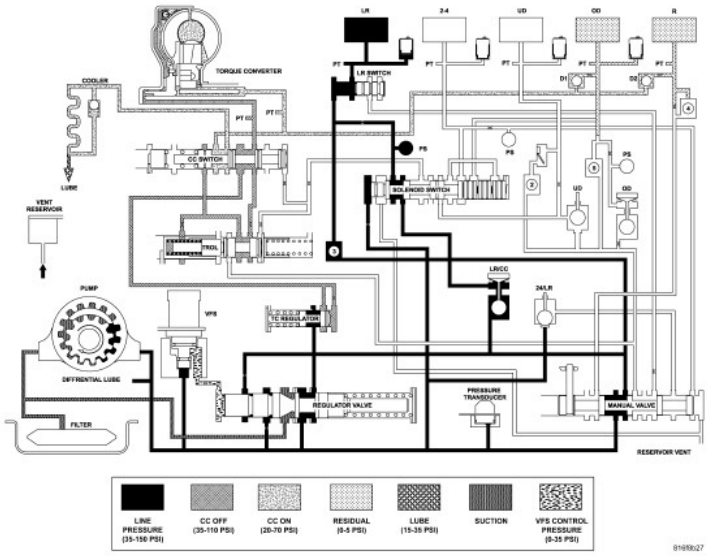
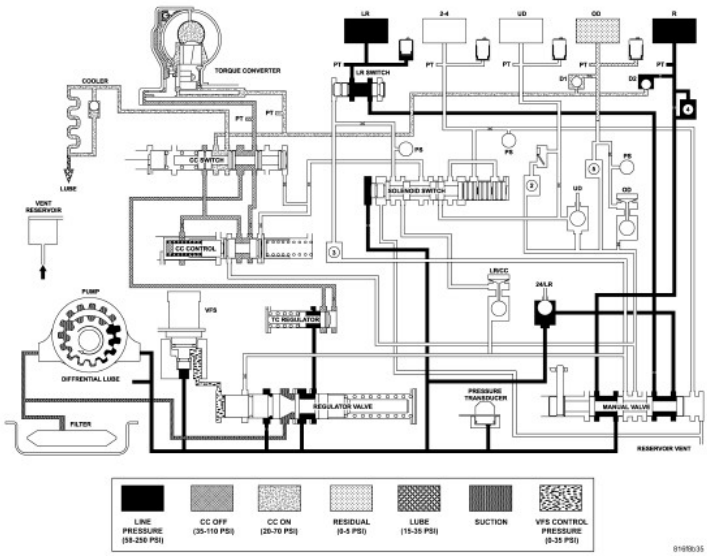
2009 Dodge JC - DODGE JOURNEY

Submodel: | **Engine Type:** L4 | **Liters:** 2.4L
Fuel Delivery: | **Fuel:**

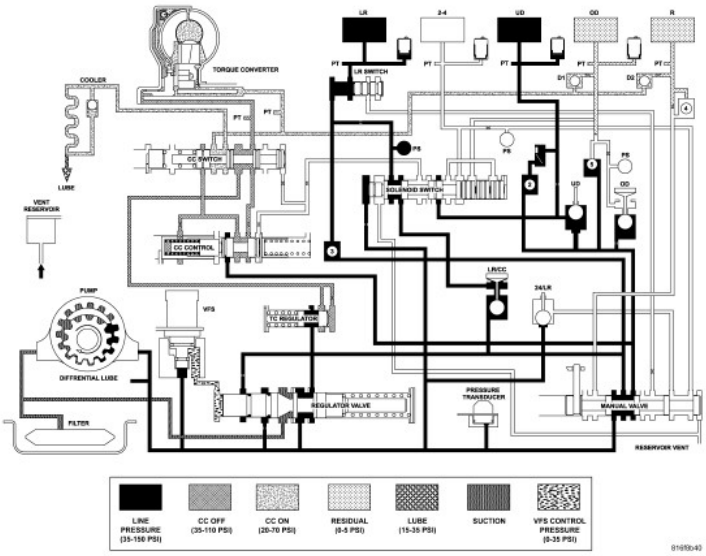
40TE - WITH VARIABLE LINE PRESSURE



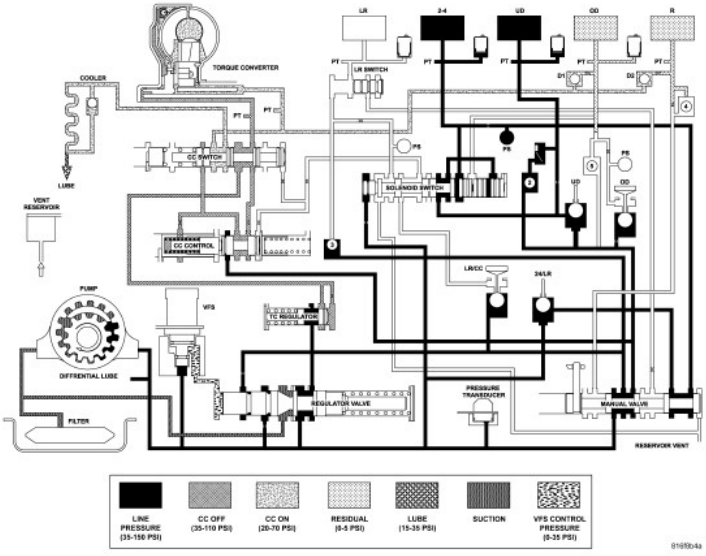
Park and Neutral



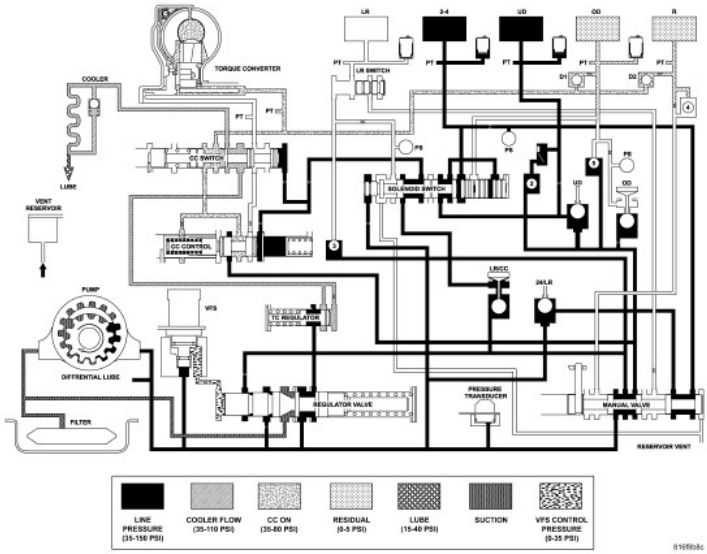
Reverse



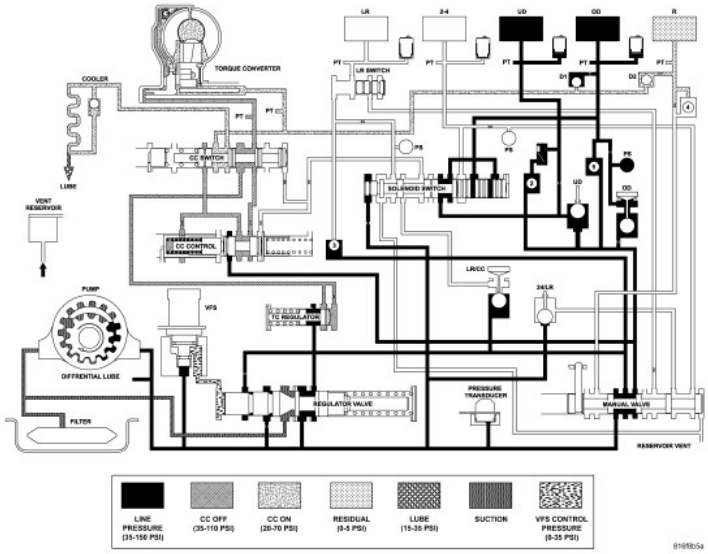
Drive - First Gear



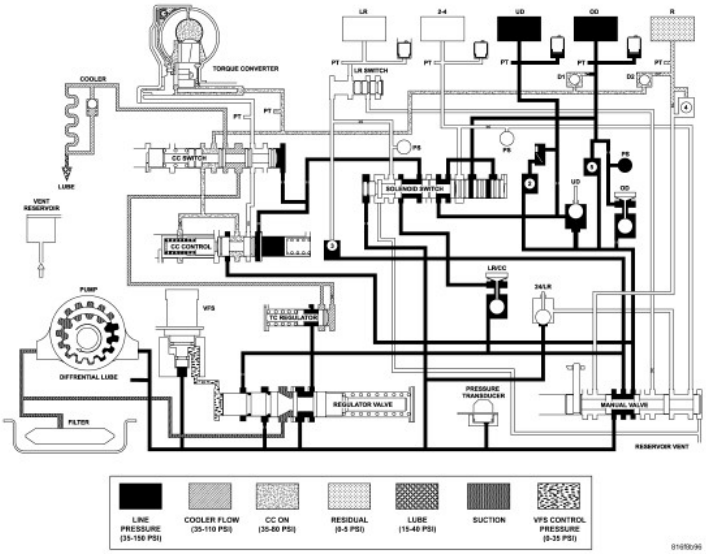
Drive - Second Gear



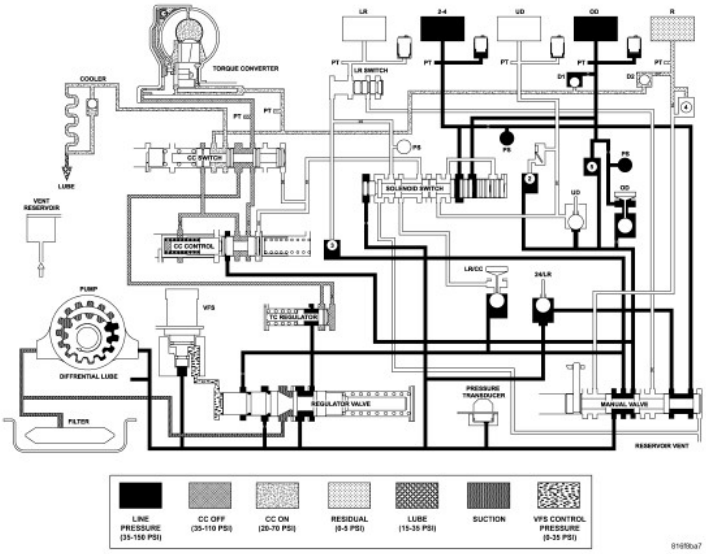
Drive - Second Gear EMCC



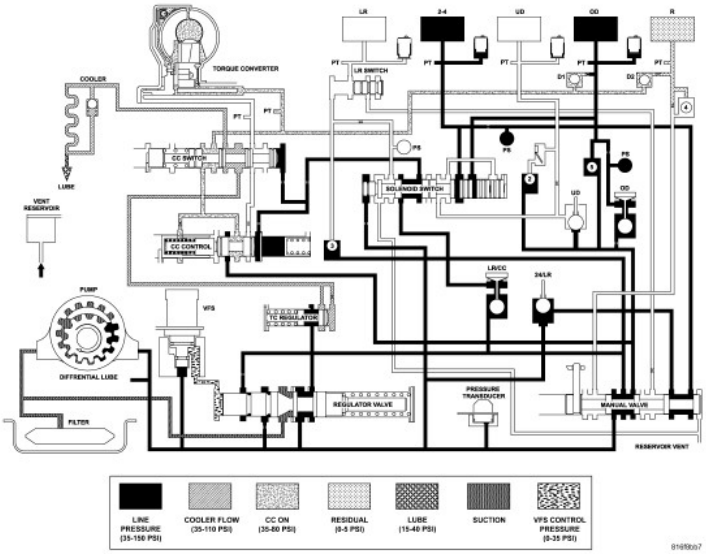
Drive - Direct Gear



Drive - Direct Gear EMCC



Drive - Fourth Gear (Overdrive)



Drive - Fourth Gear (Overdrive) EMCC

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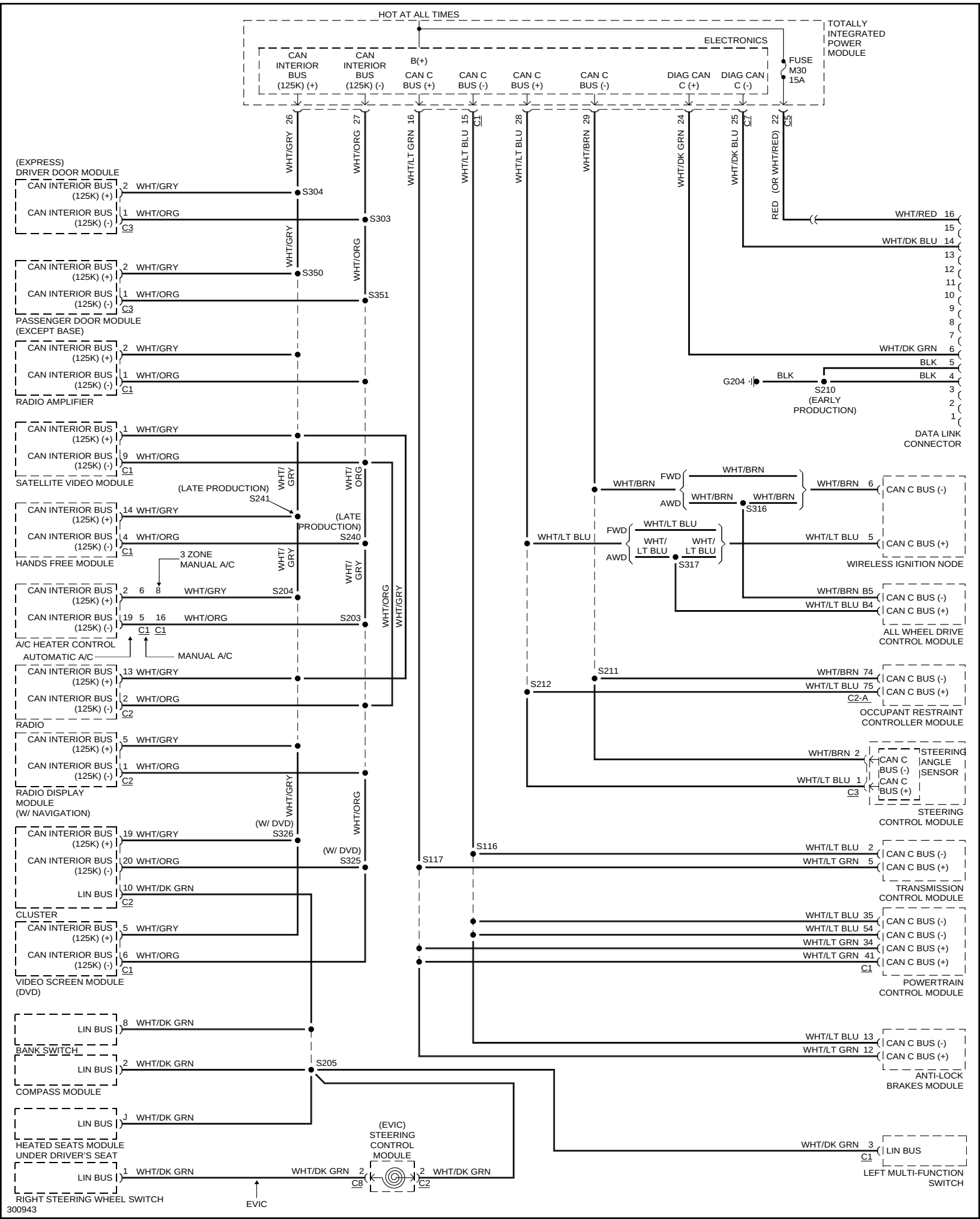
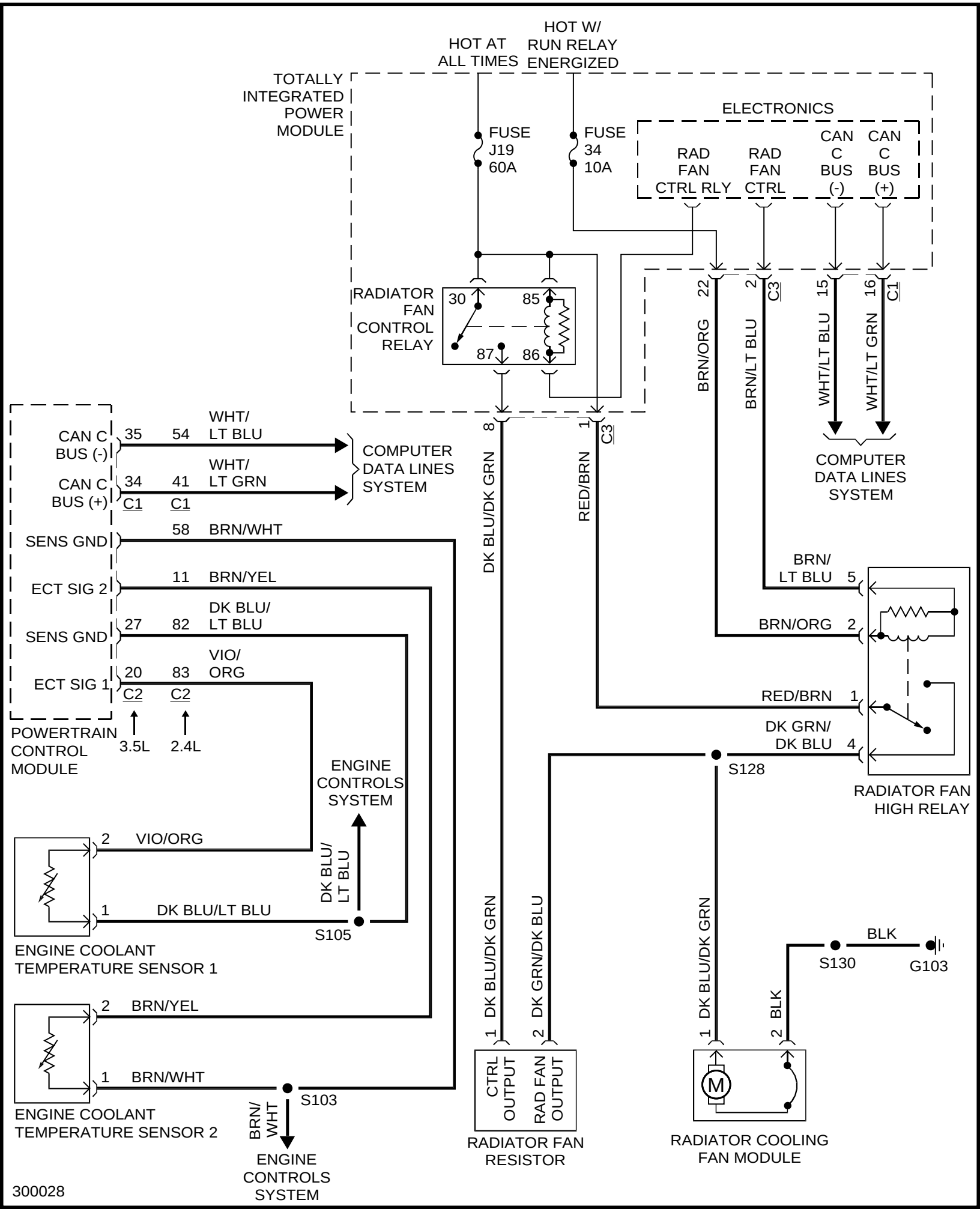
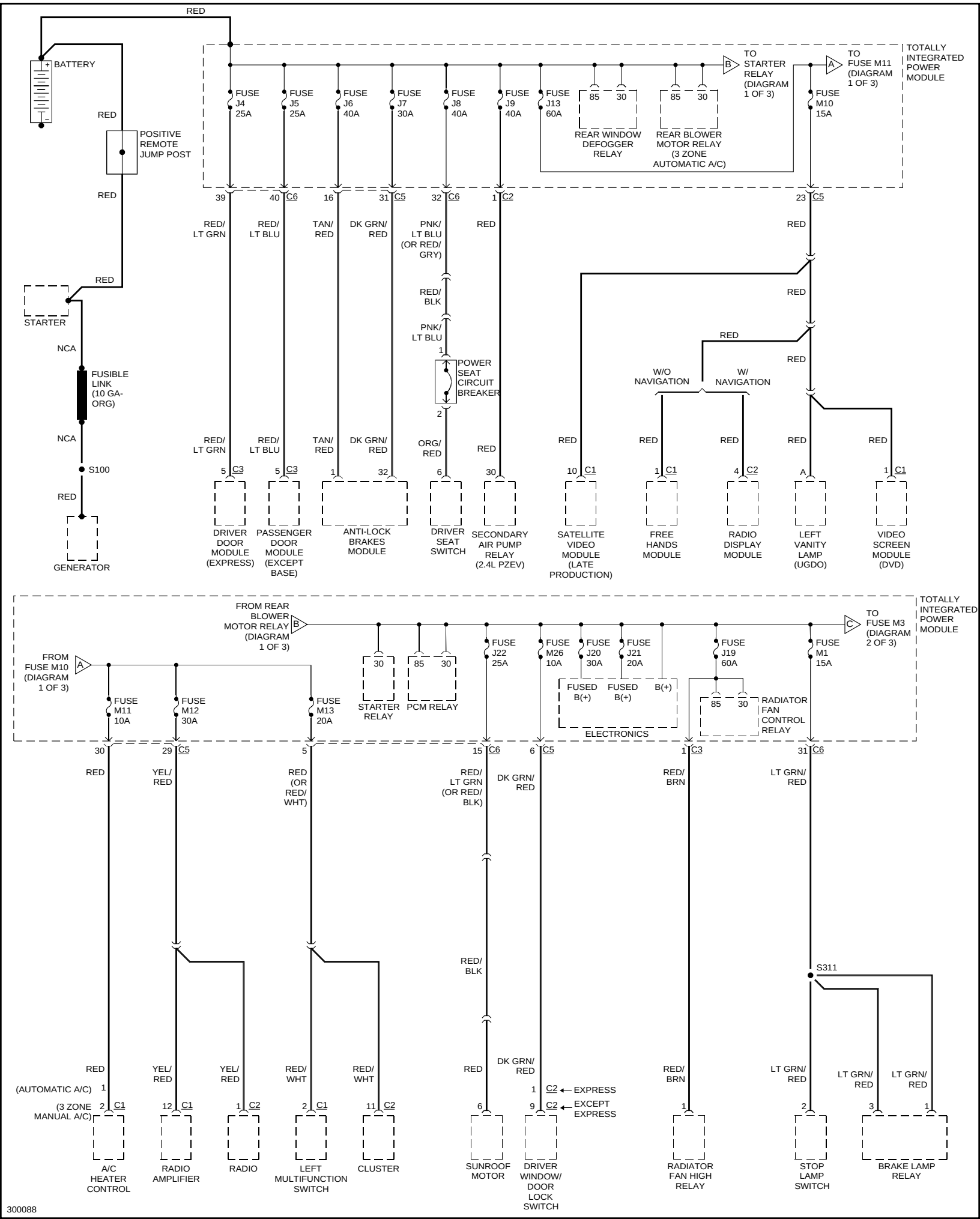
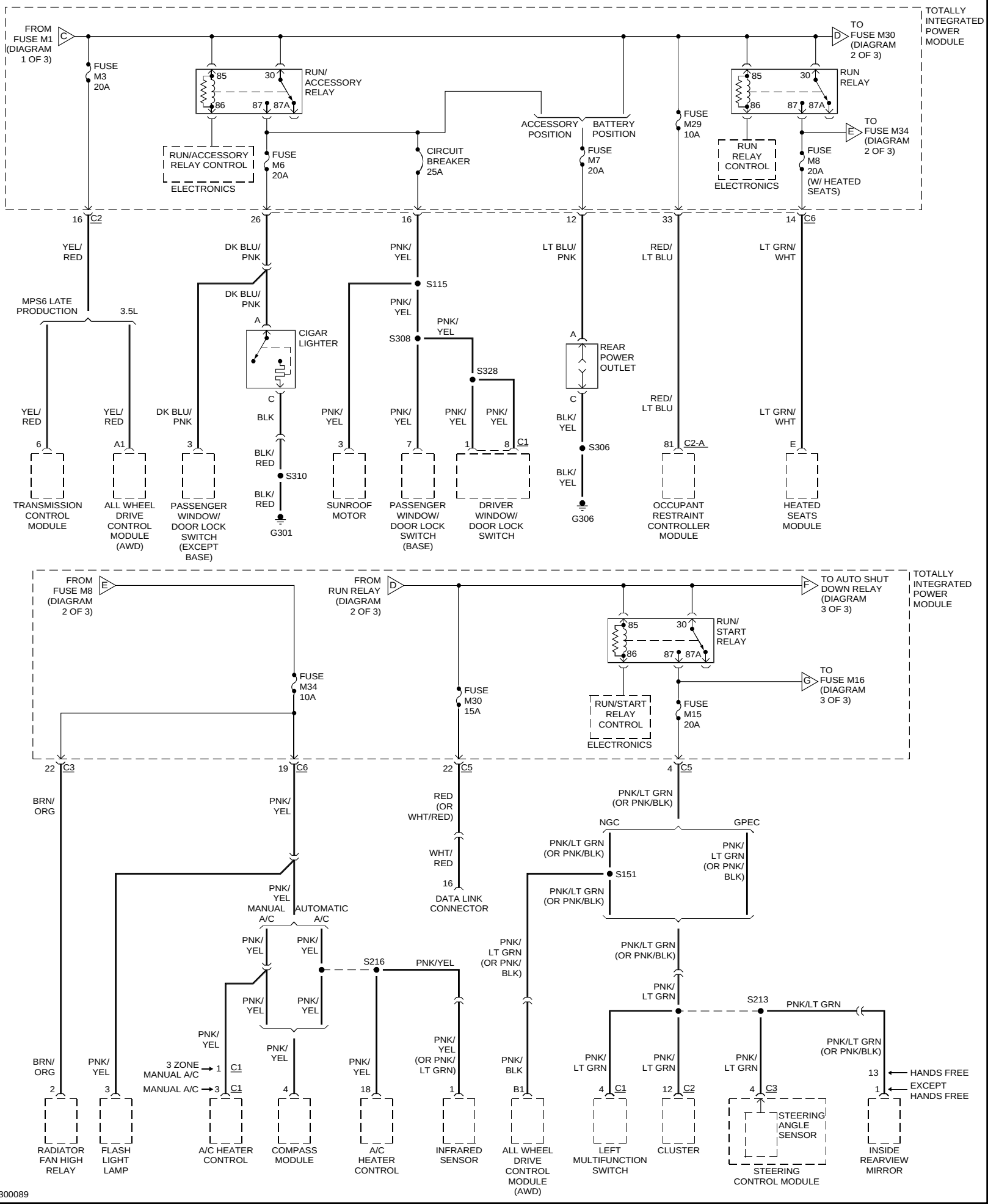
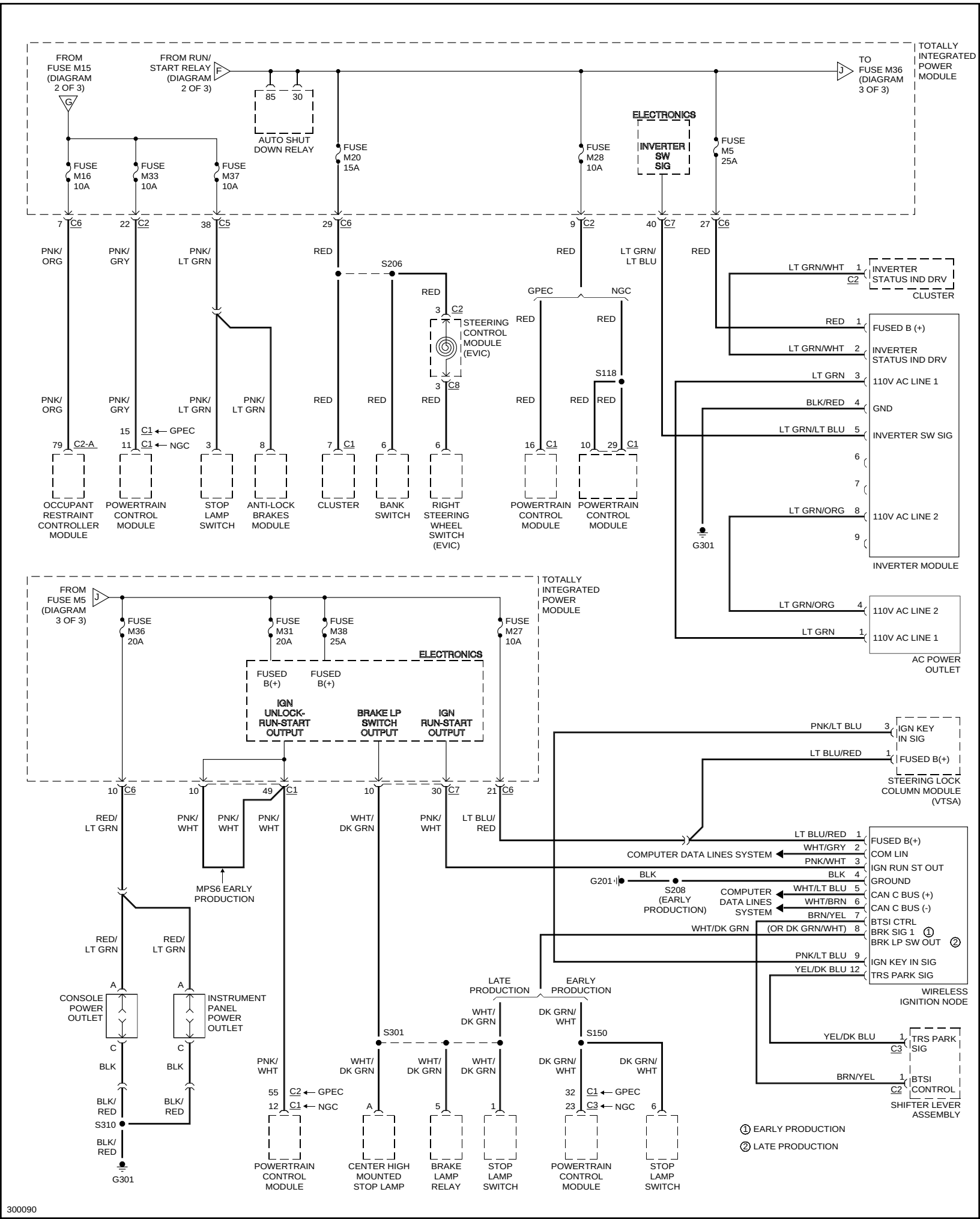

HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
CAN INTERIOR BUS (125K) (+)
CAN INTERIOR BUS (125K) (-)
B(+)
CAN C BUS (+)
CAN C BUS (-)
CAN C BUS (+)
CAN C BUS (-)
DIAG CAN C (+)
DIAG CAN C (-)
FUSE M30 15A
WHT/GRY
WHT/ORG
WHT/LT GRN
WHT/LT BLU
WHT/BRN
WHT/DK GRN
WHT/DK BLU
RED (OR WHT/RED)
(EXPRESS) DRIVER DOOR MODULE
PASSENGER DOOR MODULE (EXCEPT BASE)
RADIO AMPLIFIER
SATELLITE VIDEO MODULE
HANDS FREE MODULE
A/C HEATER CONTROL
AUTOMATIC A/C
MANUAL A/C
3 ZONE MANUAL A/C
RADIO
RADIO DISPLAY MODULE (W/ NAVIGATION)
CLUSTER
VIDEO SCREEN MODULE (DVD)
BANK SWITCH
COMPASS MODULE
HEATED SEATS MODULE UNDER DRIVER'S SEAT
RIGHT STEERING WHEEL SWITCH
EVIC
(EVIC) STEERING CONTROL MODULE
(LATE PRODUCTION)
(W/ DVD)
S241
S304
S303
S350
S351
S204
S203
S240
S326
S325
S116
S117
S205
S212
S211
S316
S317
G204
S210 (EARLY PRODUCTION)
DATA LINK CONNECTOR
FWD
AWD
WHT/RED 16
WHT/DK BLU 14
WHT/DK GRN 6
BLK 5
BLK 4
CAN C BUS (-)
CAN C BUS (+)
WIRELESS IGNITION NODE
ALL WHEEL DRIVE CONTROL MODULE
OCCUPANT RESTRAINT CONTROLLER MODULE
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
TRANSMISSION CONTROL MODULE
POWERTRAIN CONTROL MODULE
ANTI-LOCK BRAKES MODULE
LEFT MULTI-FUNCTION SWITCH
LIN BUS
300943

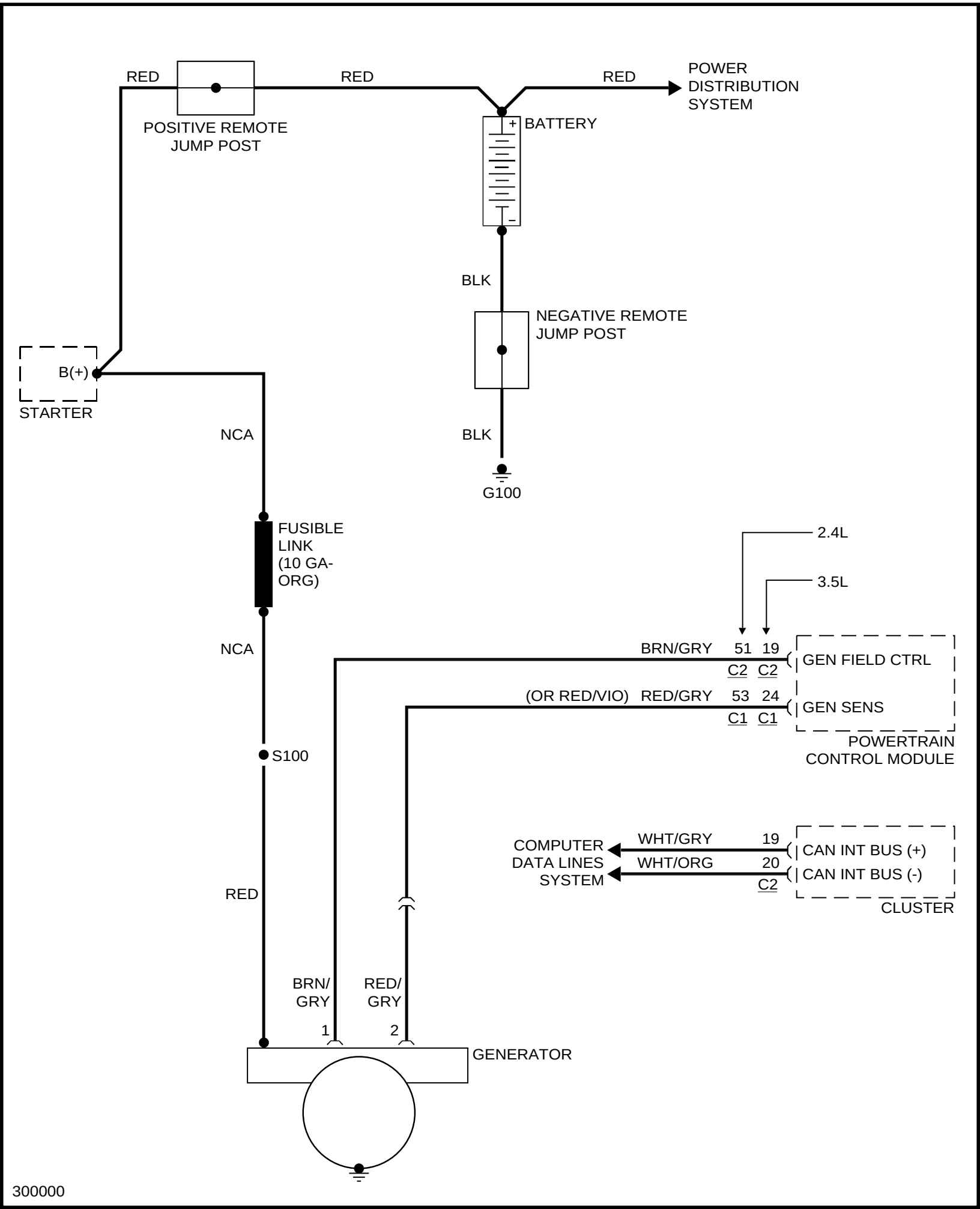

HOT AT ALL TIMES
HOT W/ RUN RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE J19 60A
FUSE 34 10A
RAD FAN CTRL RLY
RAD FAN CTRL
CAN C BUS (-)
CAN C BUS (+)
RADIATOR FAN CONTROL RELAY
30
85
87
86
22
2
C3
15
16
C1
BRN/ORG
BRN/LT BLU
WHT/LT BLU
WHT/LT GRN
COMPUTER DATA LINES SYSTEM
8
1
C3
DK BLU/DK GRN
RED/BRN
CAN C BUS (-)
35
54
WHT/ LT BLU
CAN C BUS (+)
34
41
WHT/ LT GRN
C1
C1
SENS GND
58
BRN/WHT
ECT SIG 2
11
BRN/YEL
SENS GND
27
82
DK BLU/ LT BLU
ECT SIG 1
20
83
VIO/ ORG
C2
C2
POWERTRAIN CONTROL MODULE
3.5L
2.4L
BRN/ LT BLU
5
BRN/ORG
2
RED/BRN
1
DK GRN/ DK BLU
4
S128
RADIATOR FAN HIGH RELAY
ENGINE CONTROLS SYSTEM
2
VIO/ORG
1
DK BLU/LT BLU
DK BLU/ LT BLU
S105
ENGINE COOLANT TEMPERATURE SENSOR 1
2
BRN/YEL
1
BRN/WHT
S103
ENGINE COOLANT TEMPERATURE SENSOR 2
BRN/ WHT
ENGINE CONTROLS SYSTEM
1
DK BLU/DK GRN
2
DK GRN/DK BLU
CTRL OUTPUT
RAD FAN OUTPUT
RADIATOR FAN RESISTOR
1
DK BLU/DK GRN
2
BLK
S130
BLK
G103
M
RADIATOR COOLING FAN MODULE
300028


RED
BATTERY
RED
POSITIVE REMOTE JUMP POST
RED
RED
STARTER
NCA
FUSIBLE LINK (10 GA-ORG)
NCA
S100
RED
GENERATOR
TOTALLY INTEGRATED POWER MODULE
FUSE J4 25A
FUSE J5 25A
FUSE J6 40A
FUSE J7 30A
FUSE J8 40A
FUSE J9 40A
FUSE J13 60A
REAR WINDOW DEFOGGER RELAY
REAR BLOWER MOTOR RELAY (3 ZONE AUTOMATIC A/C)
TO STARTER RELAY (DIAGRAM 1 OF 3)
TO FUSE M11 (DIAGRAM 1 OF 3)
FUSE M10 15A
39
40 C6
16
31 C5
32 C6
1 C2
23 C5
RED/ LT GRN
RED/ LT BLU
TAN/ RED
DK GRN/ RED
PNK/ LT BLU (OR RED/ GRY)
RED
RED
RED/ BLK
PNK/ LT BLU
1
POWER SEAT CIRCUIT BREAKER
2
RED
W/O NAVIGATION
W/ NAVIGATION
RED/ LT GRN
RED/ LT BLU
TAN/ RED
DK GRN/ RED
ORG/ RED
RED
RED
RED
RED
RED
RED
5 C3
5 C3
1
32
6
30
10 C1
1 C1
4 C2
A
1 C1
DRIVER DOOR MODULE (EXPRESS)
PASSENGER DOOR MODULE (EXCEPT BASE)
ANTI-LOCK BRAKES MODULE
DRIVER SEAT SWITCH
SECONDARY AIR PUMP RELAY (2.4L PZEV)
SATELLITE VIDEO MODULE (LATE PRODUCTION)
FREE HANDS MODULE
RADIO DISPLAY MODULE
LEFT VANITY LAMP (UGDO)
VIDEO SCREEN MODULE (DVD)
FROM REAR BLOWER MOTOR RELAY (DIAGRAM 1 OF 3)
TOTALLY INTEGRATED POWER MODULE
TO FUSE M3 (DIAGRAM 2 OF 3)
FROM FUSE M10 (DIAGRAM 1 OF 3)
FUSE M11 10A
FUSE M12 30A
FUSE M13 20A
STARTER RELAY
PCM RELAY
FUSE J22 25A
FUSE M26 10A
FUSE J20 30A
FUSE J21 20A
FUSE J19 60A
FUSE M1 15A
FUSED B(+)
FUSED B(+)
B(+)
ELECTRONICS
RADIATOR FAN CONTROL RELAY
30
29 C5
5
15 C6
6 C5
1 C3
31 C6
RED
YEL/ RED
RED (OR RED/ WHT)
RED/ LT GRN (OR RED/ BLK)
DK GRN/ RED
RED/ BRN
LT GRN/ RED
RED/ BLK
S311
RED
(AUTOMATIC A/C) 1
(3 ZONE MANUAL A/C) 2 C1
YEL/ RED
12 C1
YEL/ RED
1 C2
RED/ WHT
2 C1
RED/ WHT
11 C2
RED
6
DK GRN/ RED
1 C2 ← EXPRESS
9 C2 ← EXCEPT EXPRESS
RED/ BRN
1
LT GRN/ RED
2
LT GRN/ RED
3
LT GRN/ RED
1
A/C HEATER CONTROL
RADIO AMPLIFIER
RADIO
LEFT MULTIFUNCTION SWITCH
CLUSTER
SUNROOF MOTOR
DRIVER WINDOW/ DOOR LOCK SWITCH
RADIATOR FAN HIGH RELAY
STOP LAMP SWITCH
BRAKE LAMP RELAY
300088

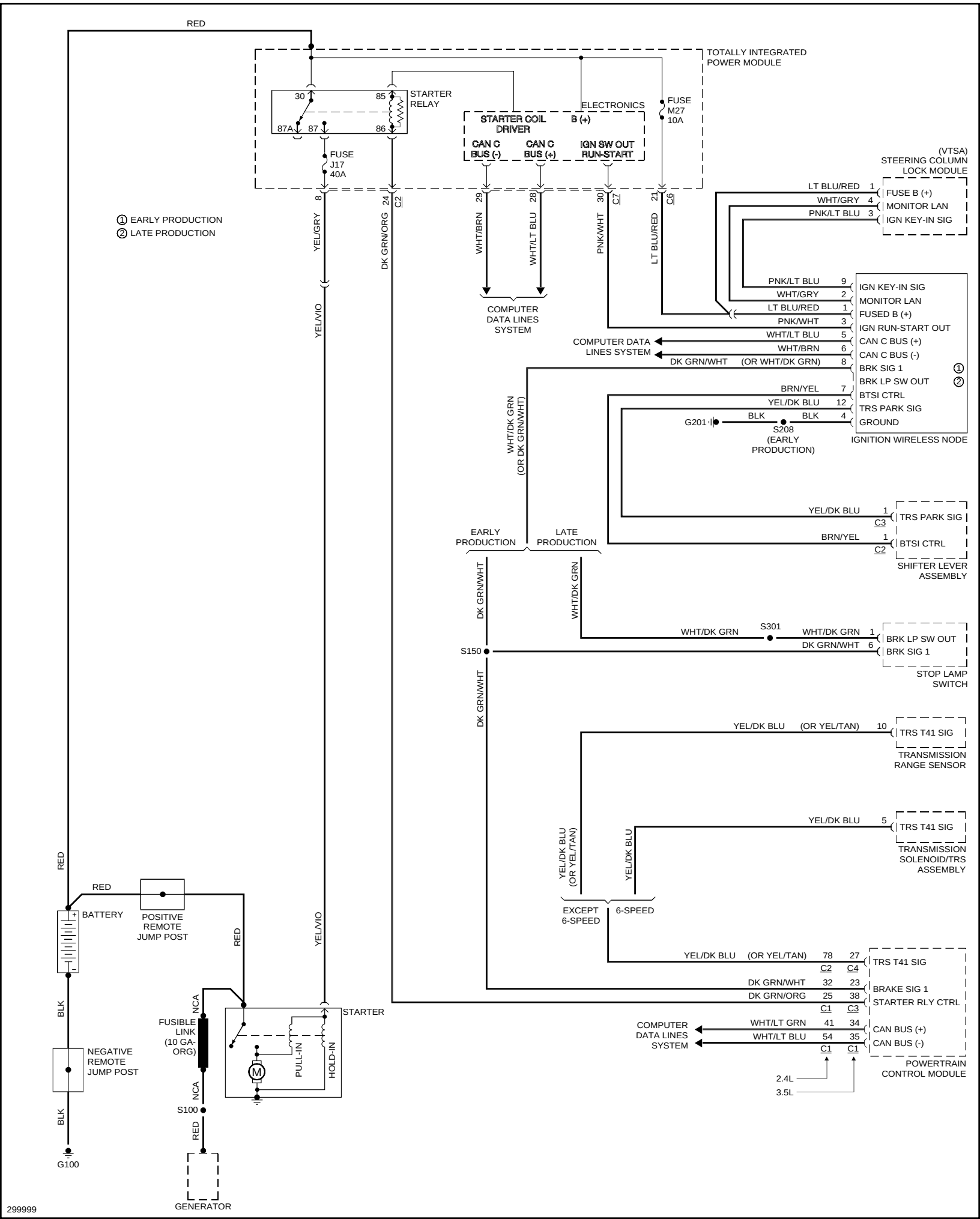

TOTALLY INTEGRATED POWER MODULE
FROM FUSE M1 (DIAGRAM 1 OF 3)
C
FUSE M3 20A
RUN/ ACCESSORY RELAY
85
30
86
87
87A
RUN/ACCESSORY RELAY CONTROL
ELECTRONICS
FUSE M6 20A
CIRCUIT BREAKER 25A
ACCESSORY POSITION
BATTERY POSITION
FUSE M7 20A
FUSE M29 10A
RUN RELAY
RUN RELAY CONTROL
ELECTRONICS
FUSE M8 20A (W/ HEATED SEATS)
D
TO FUSE M30 (DIAGRAM 2 OF 3)
E
TO FUSE M34 (DIAGRAM 2 OF 3)
16 C2
26
16
12
33
14 C6
YEL/ RED
DK BLU/ PNK
PNK/ YEL
LT BLU/ PNK
RED/ LT BLU
LT GRN/ WHT
MPS6 LATE PRODUCTION
3.5L
S115
S308
S328
CIGAR LIGHTER
REAR POWER OUTLET
BLK
BLK/ YEL
BLK/ RED
S310
S306
G301
G306
6
A1
3
7
1
8 C1
81 C2-A
E
TRANSMISSION CONTROL MODULE
ALL WHEEL DRIVE CONTROL MODULE (AWD)
PASSENGER WINDOW/ DOOR LOCK SWITCH (EXCEPT BASE)
SUNROOF MOTOR
PASSENGER WINDOW/ DOOR LOCK SWITCH (BASE)
DRIVER WINDOW/ DOOR LOCK SWITCH
OCCUPANT RESTRAINT CONTROLLER MODULE
HEATED SEATS MODULE
TOTALLY INTEGRATED POWER MODULE
FROM FUSE M8 (DIAGRAM 2 OF 3)
FROM RUN RELAY (DIAGRAM 2 OF 3)
F
TO AUTO SHUT DOWN RELAY (DIAGRAM 3 OF 3)
RUN/ START RELAY
FUSE M34 10A
FUSE M30 15A
RUN/START RELAY CONTROL
ELECTRONICS
FUSE M15 20A
G
TO FUSE M16 (DIAGRAM 3 OF 3)
22 C3
19 C6
22 C5
4 C5
BRN/ ORG
PNK/ YEL
RED (OR WHT/RED)
PNK/LT GRN (OR PNK/BLK)
NGC
GPEC
WHT/ RED
16
DATA LINK CONNECTOR
S151
PNK/ LT GRN (OR PNK/ BLK)
MANUAL A/C
AUTOMATIC A/C
S216
PNK/YEL
S213
PNK/LT GRN
3 ZONE MANUAL A/C
MANUAL A/C
C1
C2
C3
2
3
18
1
B1
12
13
HANDS FREE
EXCEPT HANDS FREE
RADIATOR FAN HIGH RELAY
FLASH LIGHT LAMP
A/C HEATER CONTROL
COMPASS MODULE
A/C HEATER CONTROL
INFRARED SENSOR
ALL WHEEL DRIVE CONTROL MODULE (AWD)
LEFT MULTIFUNCTION SWITCH
CLUSTER
STEERING ANGLE SENSOR
STEERING CONTROL MODULE
INSIDE REARVIEW MIRROR
300089

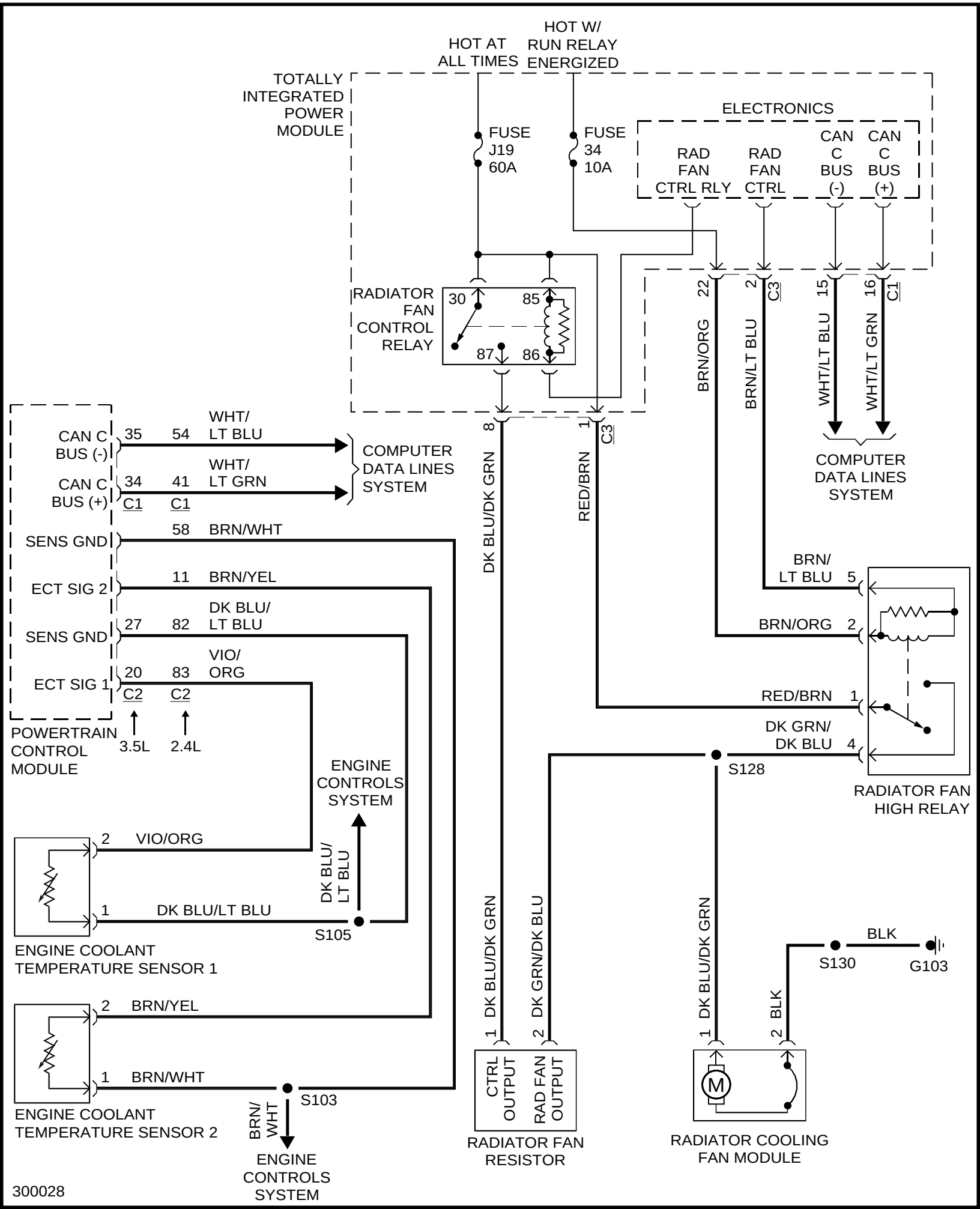

FROM FUSE M15 (DIAGRAM 2 OF 3)
G
FROM RUN/ START RELAY (DIAGRAM 2 OF 3)
F
85
30
AUTO SHUT DOWN RELAY
TO FUSE M36 (DIAGRAM 3 OF 3)
J
TOTALLY INTEGRATED POWER MODULE
FUSE M16 10A
FUSE M33 10A
FUSE M37 10A
FUSE M20 15A
FUSE M28 10A
ELECTRONICS
INVERTER SW SIG
FUSE M5 25A
7 C6
22 C2
38 C5
29 C6
9 C2
40 C7
27 C6
PNK/ ORG
PNK/ GRY
PNK/ LT GRN
RED
LT GRN/ LT BLU
S206
RED
3 C2
STEERING CONTROL MODULE (EVIC)
3 C8
GPEC
NGC
S118
15 C1 GPEC
11 C1 NGC
79 C2-A
3
8
7 C1
6
6
16 C1
10
29 C1
OCCUPANT RESTRAINT CONTROLLER MODULE
POWERTRAIN CONTROL MODULE
STOP LAMP SWITCH
ANTI-LOCK BRAKES MODULE
CLUSTER
BANK SWITCH
RIGHT STEERING WHEEL SWITCH (EVIC)
POWERTRAIN CONTROL MODULE
POWERTRAIN CONTROL MODULE
LT GRN/WHT 1
C2
INVERTER STATUS IND DRV
CLUSTER
RED 1
FUSED B (+)
LT GRN/WHT 2
INVERTER STATUS IND DRV
LT GRN 3
110V AC LINE 1
BLK/RED 4
GND
LT GRN/LT BLU 5
INVERTER SW SIG
6
7
LT GRN/ORG 8
110V AC LINE 2
9
INVERTER MODULE
G301
LT GRN/ORG 4
110V AC LINE 2
LT GRN 1
110V AC LINE 1
AC POWER OUTLET
FROM FUSE M5 (DIAGRAM 3 OF 3)
J
TOTALLY INTEGRATED POWER MODULE
FUSE M36 20A
FUSE M31 20A
FUSE M38 25A
FUSE M27 10A
ELECTRONICS
FUSED B(+)
FUSED B(+)
IGN UNLOCK-RUN-START OUTPUT
BRAKE LP SWITCH OUTPUT
IGN RUN-START OUTPUT
10 C6
10
49 C1
10
30 C7
21 C6
RED/ LT GRN
PNK/ WHT
PNK/ WHT
PNK/ WHT
WHT/ DK GRN
PNK/ WHT
LT BLU/ RED
MPS6 EARLY PRODUCTION
PNK/LT BLU 3
IGN KEY IN SIG
LT BLU/RED 1
FUSED B(+)
STEERING LOCK COLUMN MODULE (VTSA)
LT BLU/RED 1
FUSED B(+)
WHT/GRY 2
COM LIN
COMPUTER DATA LINES SYSTEM
PNK/WHT 3
IGN RUN ST OUT
BLK 4
GROUND
G201
BLK
S208 (EARLY PRODUCTION)
WHT/LT BLU 5
CAN C BUS (+)
COMPUTER DATA LINES SYSTEM
WHT/BRN 6
CAN C BUS (-)
BRN/YEL 7
BTSI CTRL
WHT/DK GRN
(OR DK GRN/WHT) 8
BRK SIG 1 ①
BRK LP SW OUT ②
PNK/LT BLU 9
IGN KEY IN SIG
YEL/DK BLU 12
TRS PARK SIG
WIRELESS IGNITION NODE
RED/ LT GRN
RED/ LT GRN
A
A
CONSOLE POWER OUTLET
INSTRUMENT PANEL POWER OUTLET
C
C
BLK
BLK
BLK/ RED
BLK/ RED
S310
BLK/ RED
G301
LATE PRODUCTION
EARLY PRODUCTION
WHT/ DK GRN
DK GRN/ WHT
S301
S150
YEL/DK BLU 1
C3
TRS PARK SIG
BRN/YEL 1
C2
BTSI CONTROL
SHIFTER LEVER ASSEMBLY
PNK/ WHT
WHT/ DK GRN
WHT/ DK GRN
WHT/ DK GRN
DK GRN/ WHT
DK GRN/ WHT
55 C2 GPEC
12 C1 NGC
A
5
1
32 C1 GPEC
23 C3 NGC
6
① EARLY PRODUCTION
② LATE PRODUCTION
POWERTRAIN CONTROL MODULE
CENTER HIGH MOUNTED STOP LAMP
BRAKE LAMP RELAY
STOP LAMP SWITCH
POWERTRAIN CONTROL MODULE
STOP LAMP SWITCH

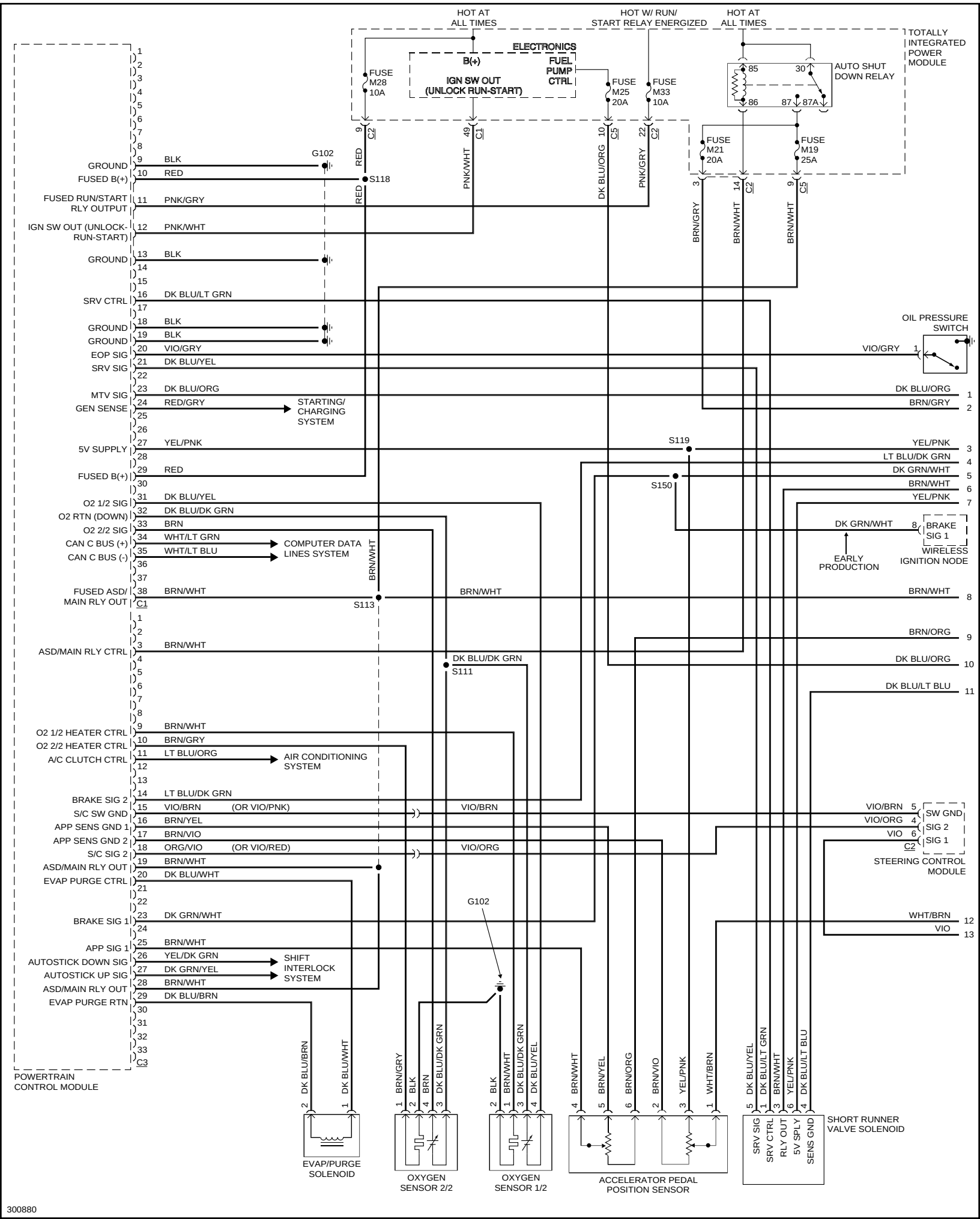
300090


RED
RED
RED
POWER DISTRIBUTION SYSTEM
POSITIVE REMOTE JUMP POST
BATTERY
+
-
BLK
NEGATIVE REMOTE JUMP POST
B(+)
STARTER
NCA
BLK
G100
FUSIBLE LINK (10 GA-ORG)
2.4L
3.5L
NCA
BRN/GRY
51
19
C2
C2
GEN FIELD CTRL
(OR RED/VIO)
RED/GRY
53
24
C1
C1
GEN SENS
POWERTRAIN CONTROL MODULE
S100
COMPUTER DATA LINES SYSTEM
WHT/GRY
19
WHT/ORG
20
C2
CAN INT BUS (+)
CAN INT BUS (-)
CLUSTER
RED
BRN/ GRY
RED/ GRY
1
2
GENERATOR

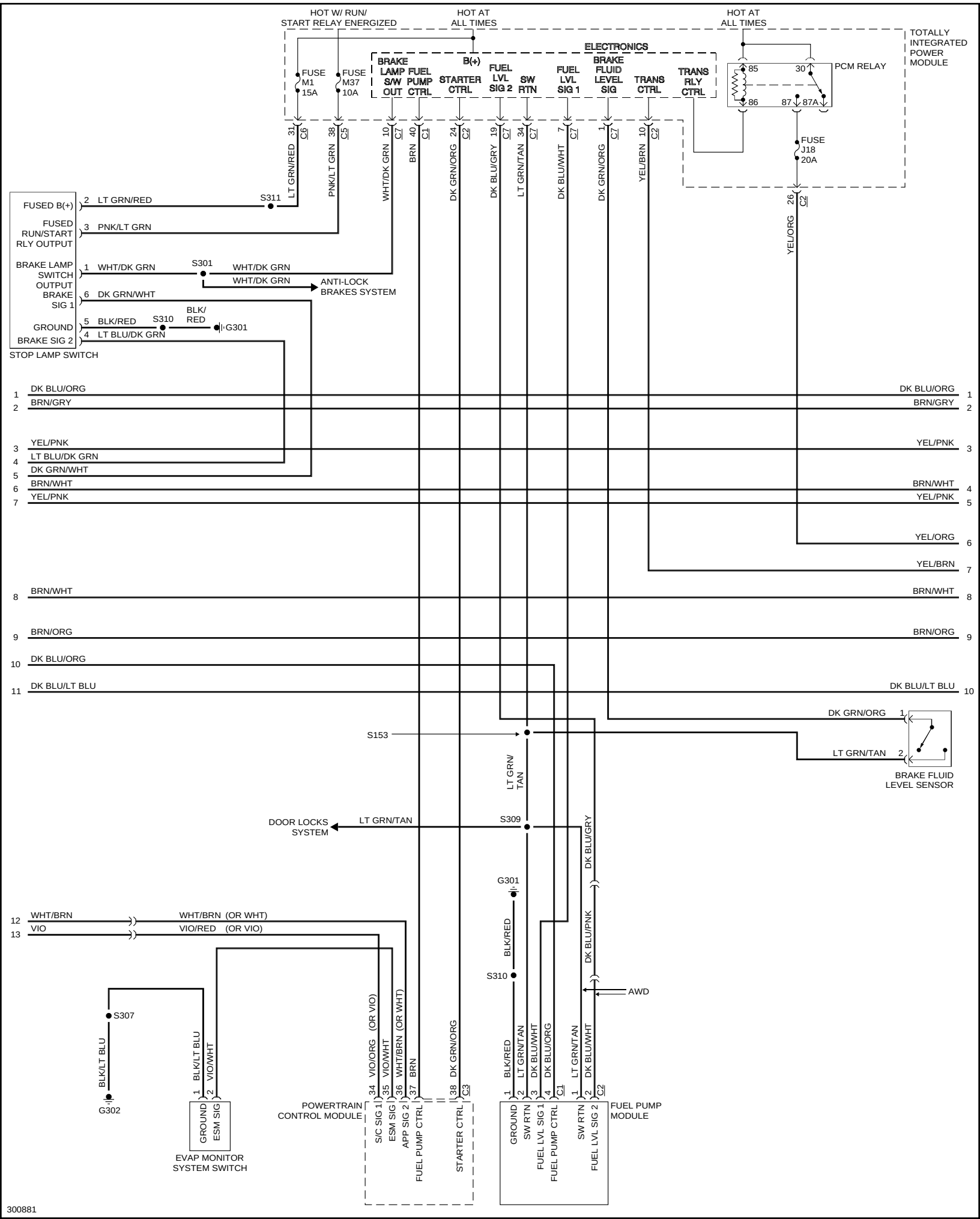
300000


RED
TOTALLY INTEGRATED POWER MODULE
30
85
87A
87
86
STARTER RELAY
FUSE J17 40A
STARTER COIL DRIVER
ELECTRONICS
B (+)
CAN C BUS (-)
CAN C BUS (+)
IGN SW OUT RUN-START
FUSE M27 10A
(VTSA) STEERING COLUMN LOCK MODULE
LT BLU/RED 1
FUSE B (+)
WHT/GRY 4
MONITOR LAN
PNK/LT BLU 3
IGN KEY-IN SIG
① EARLY PRODUCTION
② LATE PRODUCTION
YEL/GRY
DK GRN/ORG
WHT/BRN
WHT/LT BLU
PNK/WHT
LT BLU/RED
C2
C6
C7
COMPUTER DATA LINES SYSTEM
PNK/LT BLU 9
IGN KEY-IN SIG
WHT/GRY 2
MONITOR LAN
LT BLU/RED 1
FUSED B (+)
PNK/WHT 3
IGN RUN-START OUT
WHT/LT BLU 5
CAN C BUS (+)
WHT/BRN 6
CAN C BUS (-)
DK GRN/WHT (OR WHT/DK GRN) 8
BRK SIG 1
BRK LP SW OUT
BRN/YEL 7
BTSI CTRL
YEL/DK BLU 12
TRS PARK SIG
BLK 4
GROUND
G201
S208 (EARLY PRODUCTION)
IGNITION WIRELESS NODE
WHT/DK GRN (OR DK GRN/WHT)
YEL/DK BLU 1
TRS PARK SIG
C3
BRN/YEL 1
BTSI CTRL
C2
SHIFTER LEVER ASSEMBLY
EARLY PRODUCTION
LATE PRODUCTION
DK GRN/WHT
WHT/DK GRN
S301
WHT/DK GRN 1
BRK LP SW OUT
DK GRN/WHT 6
BRK SIG 1
S150
STOP LAMP SWITCH
YEL/DK BLU (OR YEL/TAN) 10
TRS T41 SIG
TRANSMISSION RANGE SENSOR
YEL/DK BLU 5
TRS T41 SIG
TRANSMISSION SOLENOID/TRS ASSEMBLY
YEL/DK BLU (OR YEL/TAN)
YEL/DK BLU
EXCEPT 6-SPEED
6-SPEED
YEL/DK BLU (OR YEL/TAN) 78 27
TRS T41 SIG
C2 C4
DK GRN/WHT 32 23
BRAKE SIG 1
DK GRN/ORG 25 38
STARTER RLY CTRL
C1 C3
WHT/LT GRN 41 34
CAN BUS (+)
WHT/LT BLU 54 35
CAN BUS (-)
C1 C1
COMPUTER DATA LINES SYSTEM
POWERTRAIN CONTROL MODULE
2.4L
3.5L
RED
BATTERY
POSITIVE REMOTE JUMP POST
BLK
NEGATIVE REMOTE JUMP POST
G100
NCA
FUSIBLE LINK (10 GA-ORG)
S100
STARTER
PULL-IN
HOLD-IN
GENERATOR
299999

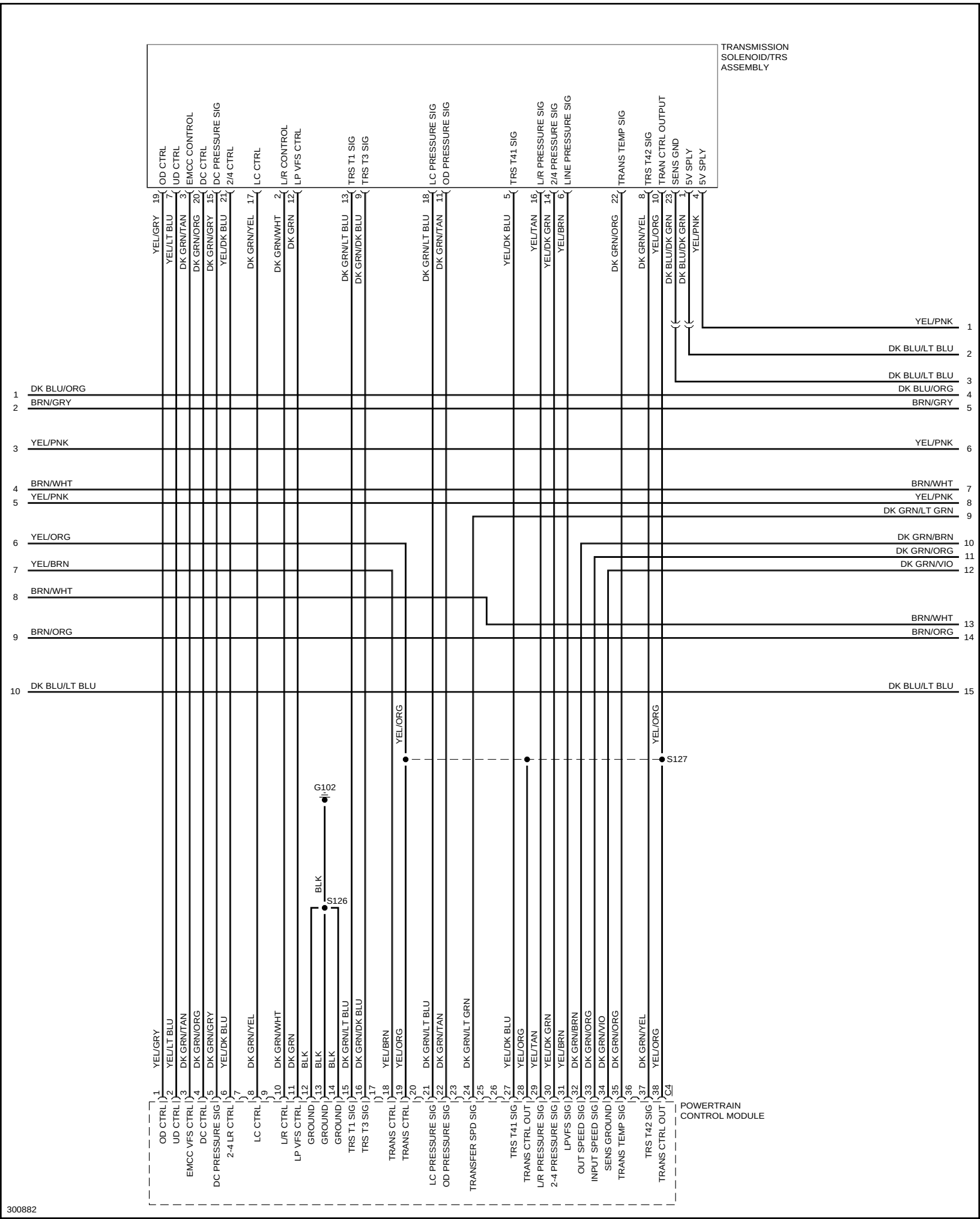

HOT AT ALL TIMES
HOT W/ RUN RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE J19 60A
FUSE 34 10A
RAD FAN CTRL RLY
RAD FAN CTRL
CAN C BUS (-)
CAN C BUS (+)
RADIATOR FAN CONTROL RELAY
30
85
87
86
22
2
C3
15
16
C1
BRN/ORG
BRN/LT BLU
WHT/LT BLU
WHT/LT GRN
COMPUTER DATA LINES SYSTEM
8
1
C3
DK BLU/DK GRN
RED/BRN
CAN C BUS (-)
35
54
WHT/ LT BLU
CAN C BUS (+)
34
41
WHT/ LT GRN
C1
C1
SENS GND
58
BRN/WHT
ECT SIG 2
11
BRN/YEL
SENS GND
27
82
DK BLU/ LT BLU
ECT SIG 1
20
83
VIO/ ORG
C2
C2
POWERTRAIN CONTROL MODULE
3.5L
2.4L
BRN/ LT BLU
5
BRN/ORG
2
RED/BRN
1
DK GRN/ DK BLU
4
S128
RADIATOR FAN HIGH RELAY
ENGINE CONTROLS SYSTEM
2
VIO/ORG
1
DK BLU/LT BLU
DK BLU/ LT BLU
S105
ENGINE COOLANT TEMPERATURE SENSOR 1
2
BRN/YEL
1
BRN/WHT
S103
ENGINE COOLANT TEMPERATURE SENSOR 2
BRN/ WHT
ENGINE CONTROLS SYSTEM
1
DK BLU/DK GRN
2
DK GRN/DK BLU
CTRL OUTPUT
RAD FAN OUTPUT
RADIATOR FAN RESISTOR
1
DK BLU/DK GRN
2
BLK
S130
BLK
G103
M
RADIATOR COOLING FAN MODULE
300028


HOT AT ALL TIMES
HOT W/ RUN/ START RELAY ENERGIZED
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
B(+)
IGN SW OUT (UNLOCK RUN-START)
FUEL PUMP CTRL
FUSE M28 10A
FUSE M25 20A
FUSE M33 10A
FUSE M21 20A
FUSE M19 25A
AUTO SHUT DOWN RELAY
85
30
86
87
87A
G102
S118
S119
S150
S113
S111
GROUND
FUSED B(+)
FUSED RUN/START RLY OUTPUT
IGN SW OUT (UNLOCK-RUN-START)
SRV CTRL
EOP SIG
SRV SIG
MTV SIG
GEN SENSE
5V SUPPLY
O2 1/2 SIG
O2 RTN (DOWN)
O2 2/2 SIG
CAN C BUS (+)
CAN C BUS (-)
FUSED ASD/ MAIN RLY OUT
ASD/MAIN RLY CTRL
O2 1/2 HEATER CTRL
O2 2/2 HEATER CTRL
A/C CLUTCH CTRL
BRAKE SIG 2
S/C SW GND
APP SENS GND 1
APP SENS GND 2
S/C SIG 2
ASD/MAIN RLY OUT
EVAP PURGE CTRL
BRAKE SIG 1
APP SIG 1
AUTOSTICK DOWN SIG
AUTOSTICK UP SIG
ASD/MAIN RLY OUT
EVAP PURGE RTN
STARTING/ CHARGING SYSTEM
COMPUTER DATA LINES SYSTEM
AIR CONDITIONING SYSTEM
SHIFT INTERLOCK SYSTEM
POWERTRAIN CONTROL MODULE
OIL PRESSURE SWITCH
BRAKE SIG 1
EARLY PRODUCTION
WIRELESS IGNITION NODE
STEERING CONTROL MODULE
SW GND
SIG 2
SIG 1
EVAP/PURGE SOLENOID
OXYGEN SENSOR 2/2
OXYGEN SENSOR 1/2
ACCELERATOR PEDAL POSITION SENSOR
SHORT RUNNER VALVE SOLENOID
SRV SIG
SRV CTRL
RLY OUT
5V SPLY
SENS GND

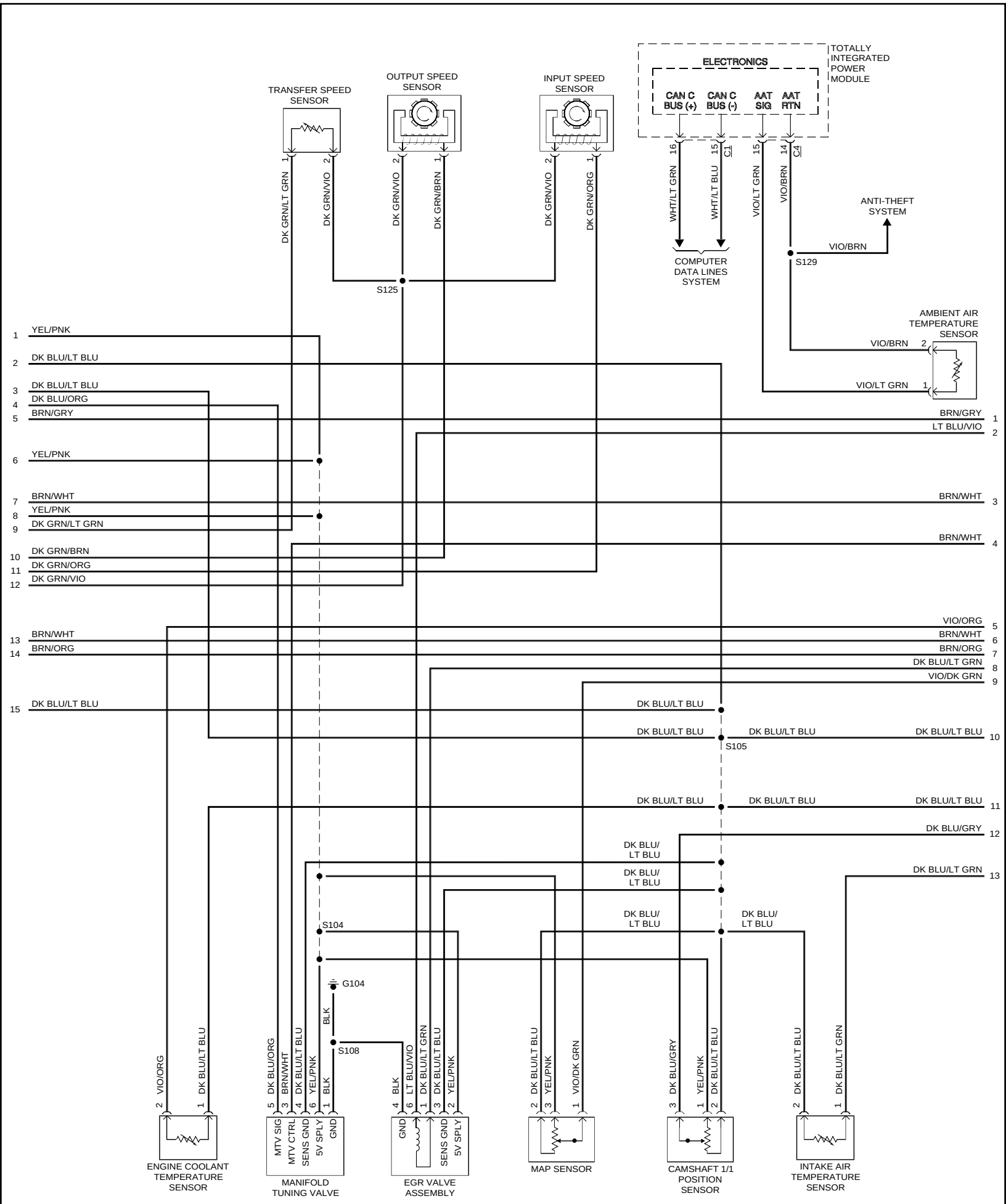
300880


HOT W/ RUN/ START RELAY ENERGIZED
HOT AT ALL TIMES
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M1 15A
FUSE M37 10A
BRAKE LAMP S/W OUT
FUEL PUMP CTRL
B(+) STARTER CTRL
FUEL LVL SIG 2
SW RTN
FUEL LVL SIG 1
BRAKE FLUID LEVEL SIG
TRANS CTRL
TRANS RLY CTRL
PCM RELAY
85
30
86
87
87A
FUSE J18 20A
FUSED B(+)
FUSED RUN/START RLY OUTPUT
BRAKE LAMP SWITCH OUTPUT
BRAKE SIG 1
GROUND
BRAKE SIG 2
STOP LAMP SWITCH
S311
S301
S310
G301
ANTI-LOCK BRAKES SYSTEM
BRAKE FLUID LEVEL SENSOR
S153
S309
DOOR LOCKS SYSTEM
S307
G302
AWD
EVAP MONITOR SYSTEM SWITCH
POWERTRAIN CONTROL MODULE
FUEL PUMP MODULE
S/C SIG 1
ESM SIG
APP SIG 2
FUEL PUMP CTRL
STARTER CTRL
GROUND
SW RTN
FUEL LVL SIG 1
FUEL PUMP CTRL
SW RTN
FUEL LVL SIG 2

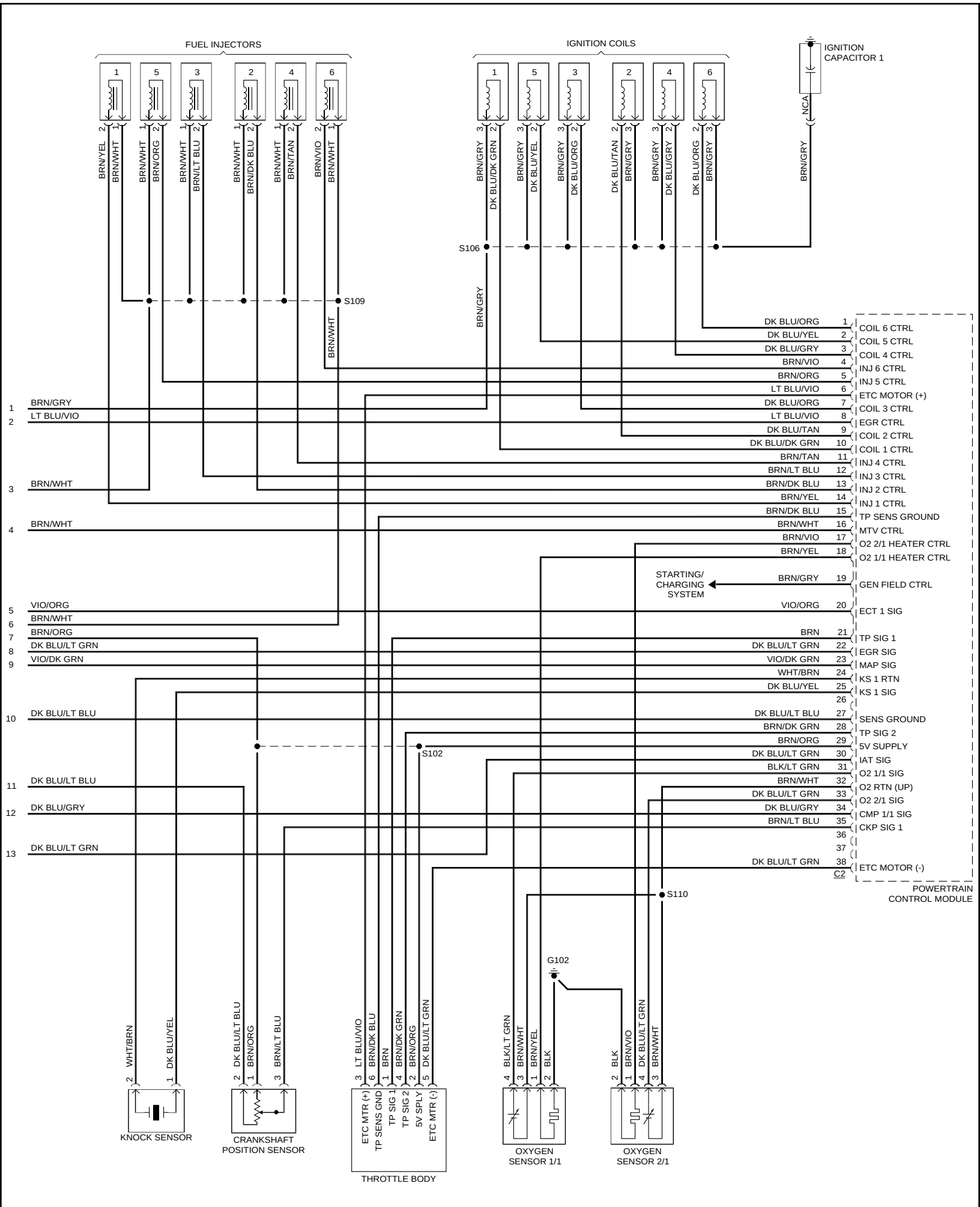
300881


TRANSMISSION SOLENOID/TRS ASSEMBLY
OD CTRL
UD CTRL
EMCC CONTROL
DC CTRL
DC PRESSURE SIG
2/4 CTRL
LC CTRL
L/R CONTROL
LP VFS CTRL
TRS T1 SIG
TRS T3 SIG
LC PRESSURE SIG
OD PRESSURE SIG
TRS T41 SIG
L/R PRESSURE SIG
2/4 PRESSURE SIG
LINE PRESSURE SIG
TRANS TEMP SIG
TRS T42 SIG
TRAN CTRL OUTPUT
SENS GND
5V SPLY
5V SPLY
YEL/GRY 19
YEL/LT BLU 7
DK GRN/TAN 3
DK GRN/ORG 20
DK GRN/GRY 15
YEL/DK BLU 21
DK GRN/YEL 17
DK GRN/WHT 2
DK GRN 12
DK GRN/LT BLU 13
DK GRN/DK BLU 9
DK GRN/LT BLU 18
DK GRN/TAN 11
YEL/DK BLU 5
YEL/TAN 16
YEL/DK GRN 14
YEL/BRN 6
DK GRN/ORG 22
DK GRN/YEL 8
YEL/ORG 10
DK BLU/DK GRN 23
DK BLU/DK GRN 1
YEL/PNK 4
YEL/PNK 1
DK BLU/LT BLU 2
DK BLU/LT BLU 3
DK BLU/ORG 4
BRN/GRY 5
YEL/PNK 6
BRN/WHT 7
YEL/PNK 8
DK GRN/LT GRN 9
DK GRN/BRN 10
DK GRN/ORG 11
DK GRN/VIO 12
BRN/WHT 13
BRN/ORG 14
DK BLU/LT BLU 15
1 DK BLU/ORG
2 BRN/GRY
3 YEL/PNK
4 BRN/WHT
5 YEL/PNK
6 YEL/ORG
7 YEL/BRN
8 BRN/WHT
9 BRN/ORG
10 DK BLU/LT BLU
YEL/ORG
S127
G102
BLK
S126
BLK
POWERTRAIN CONTROL MODULE
1 YEL/GRY OD CTRL
2 YEL/LT BLU UD CTRL
3 DK GRN/TAN EMCC VFS CTRL
4 DK GRN/ORG DC CTRL
5 DK GRN/GRY DC PRESSURE SIG
6 YEL/DK BLU 2-4 LR CTRL
7
8 DK GRN/YEL LC CTRL
9
10 DK GRN/WHT L/R CTRL
11 DK GRN LP VFS CTRL
12 BLK GROUND
13 BLK GROUND
14 BLK GROUND
15 DK GRN/LT BLU TRS T1 SIG
16 DK GRN/DK BLU TRS T3 SIG
17
18 YEL/BRN TRANS CTRL
19 YEL/ORG TRANS CTRL
20
21 DK GRN/LT BLU LC PRESSURE SIG
22 DK GRN/TAN OD PRESSURE SIG
23
24 DK GRN/LT GRN TRANSFER SPD SIG
25
26
27 YEL/DK BLU TRS T41 SIG
28 YEL/ORG TRANS CTRL OUT
29 YEL/TAN L/R PRESSURE SIG
30 YEL/DK GRN 2-4 PRESSURE SIG
31 YEL/BRN LPVFS SIG
32 DK GRN/BRN OUT SPEED SIG
33 DK GRN/ORG INPUT SPEED SIG
34 DK GRN/VIO SENS GROUND
35 DK GRN/ORG TRANS TEMP SIG
36
37 DK GRN/YEL TRS T42 SIG
38 YEL/ORG TRANS CTRL OUT
C4

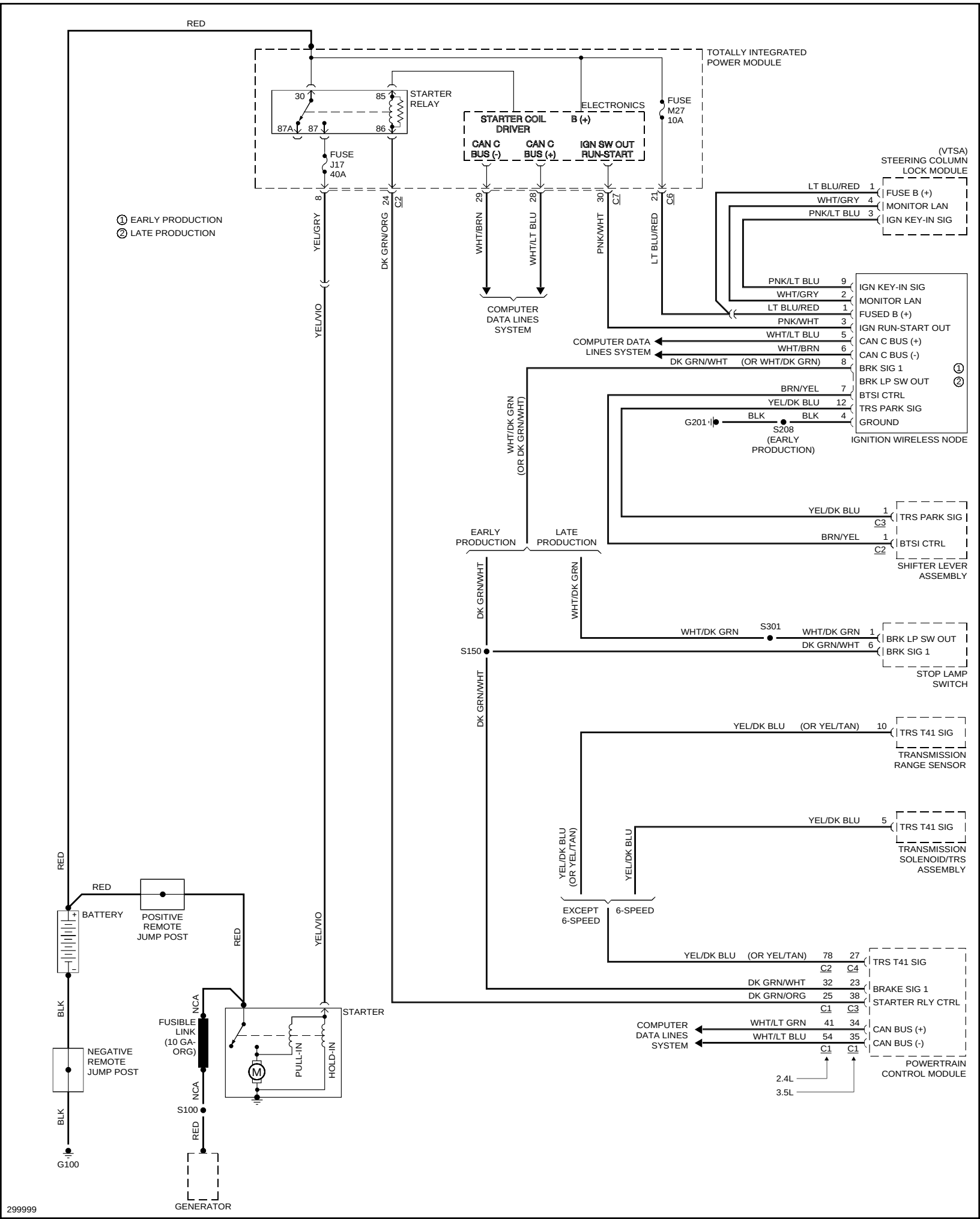
300882

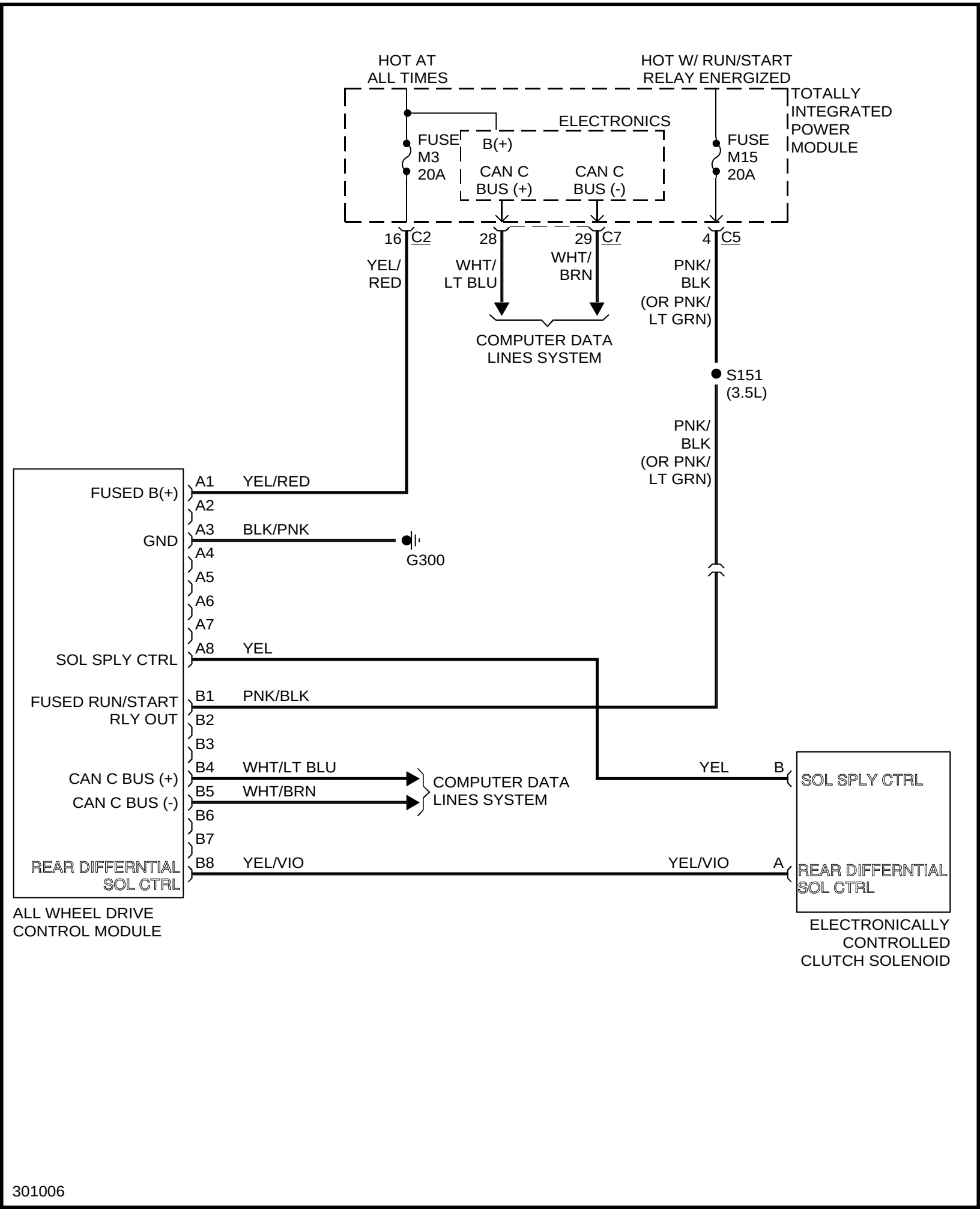

TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
CAN C BUS (+)
CAN C BUS (-)
AAT SIG
AAT RTN
TRANSFER SPEED SENSOR
OUTPUT SPEED SENSOR
INPUT SPEED SENSOR
DK GRN/LT GRN
DK GRN/VIO
DK GRN/BRN
DK GRN/ORG
WHT/LT GRN
WHT/LT BLU
VIO/LT GRN
VIO/BRN
C1
C4
S125
S129
COMPUTER DATA LINES SYSTEM
ANTI-THEFT SYSTEM
AMBIENT AIR TEMPERATURE SENSOR
YEL/PNK
DK BLU/LT BLU
DK BLU/ORG
BRN/GRY
LT BLU/VIO
BRN/WHT
DK GRN/LT GRN
DK GRN/BRN
DK GRN/ORG
DK GRN/VIO
VIO/ORG
BRN/ORG
DK BLU/LT GRN
VIO/DK GRN
DK BLU/GRY
DK BLU/ LT BLU
S105
S104
G104
S108
BLK
ENGINE COOLANT TEMPERATURE SENSOR
MANIFOLD TUNING VALVE
MTV SIG
MTV CTRL
SENS GND
5V SPLY
GND
EGR VALVE ASSEMBLY
MAP SENSOR
CAMSHAFT 1/1 POSITION SENSOR
INTAKE AIR TEMPERATURE SENSOR

300883

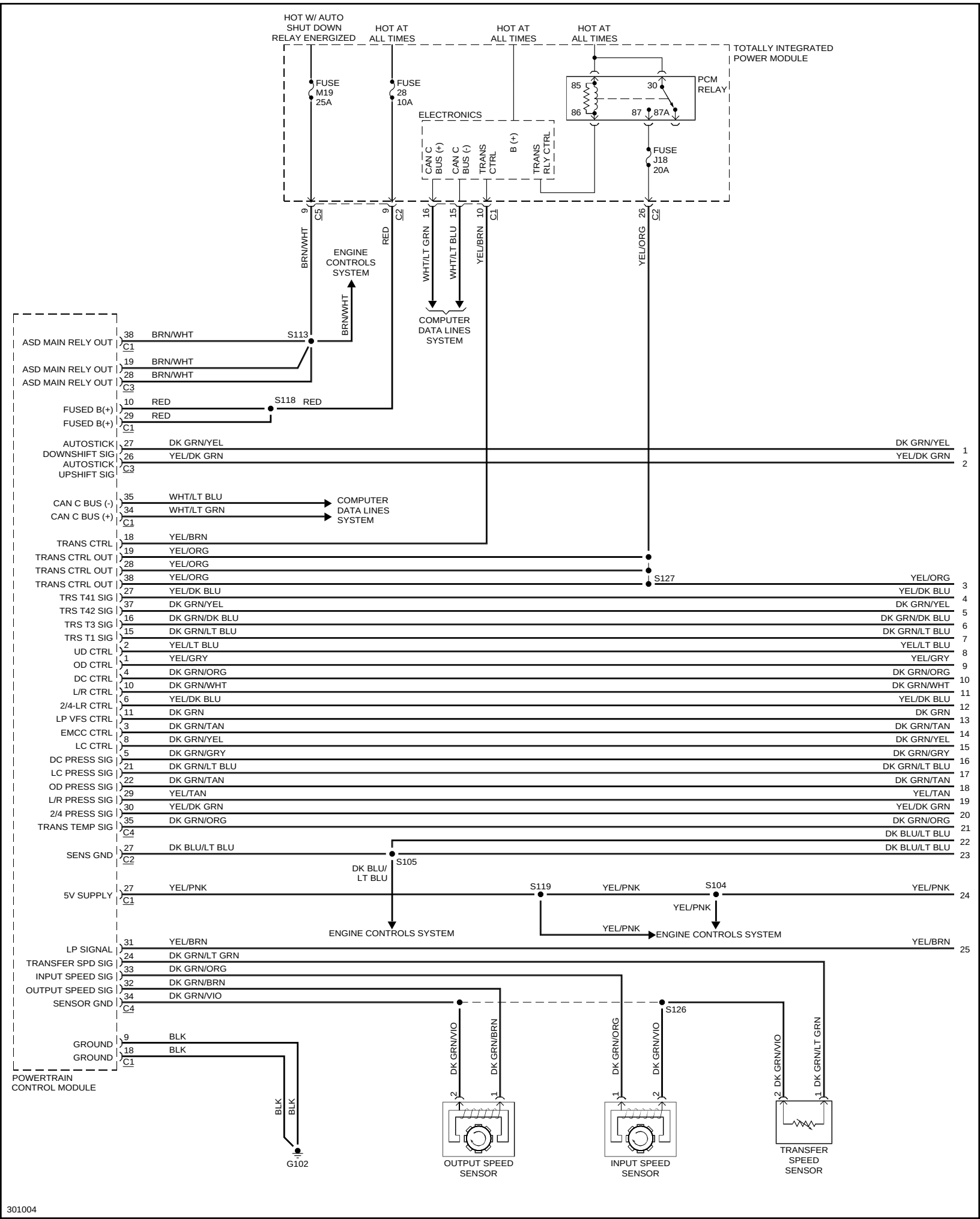

FUEL INJECTORS
IGNITION COILS
IGNITION CAPACITOR 1
NCA
BRN/GRY
S106
S109
S102
S110
G102
BRN/WHT
BRN/GRY
DK BLU/ORG 1 COIL 6 CTRL
DK BLU/YEL 2 COIL 5 CTRL
DK BLU/GRY 3 COIL 4 CTRL
BRN/VIO 4 INJ 6 CTRL
BRN/ORG 5 INJ 5 CTRL
LT BLU/VIO 6 ETC MOTOR (+)
DK BLU/ORG 7 COIL 3 CTRL
LT BLU/VIO 8 EGR CTRL
DK BLU/TAN 9 COIL 2 CTRL
DK BLU/DK GRN 10 COIL 1 CTRL
BRN/TAN 11 INJ 4 CTRL
BRN/LT BLU 12 INJ 3 CTRL
BRN/DK BLU 13 INJ 2 CTRL
BRN/YEL 14 INJ 1 CTRL
BRN/DK BLU 15 TP SENS GROUND
BRN/WHT 16 MTV CTRL
BRN/VIO 17 O2 2/1 HEATER CTRL
BRN/YEL 18 O2 1/1 HEATER CTRL
STARTING/ CHARGING SYSTEM
BRN/GRY 19 GEN FIELD CTRL
VIO/ORG 20 ECT 1 SIG
BRN 21 TP SIG 1
DK BLU/LT GRN 22 EGR SIG
VIO/DK GRN 23 MAP SIG
WHT/BRN 24 KS 1 RTN
DK BLU/YEL 25 KS 1 SIG
26
DK BLU/LT BLU 27 SENS GROUND
BRN/DK GRN 28 TP SIG 2
BRN/ORG 29 5V SUPPLY
DK BLU/LT GRN 30 IAT SIG
BLK/LT GRN 31 O2 1/1 SIG
BRN/WHT 32 O2 RTN (UP)
DK BLU/LT GRN 33 O2 2/1 SIG
DK BLU/GRY 34 CMP 1/1 SIG
BRN/LT BLU 35 CKP SIG 1
36
37
DK BLU/LT GRN 38 ETC MOTOR (-)
C2
POWERTRAIN CONTROL MODULE
1 BRN/GRY
2 LT BLU/VIO
3 BRN/WHT
4 BRN/WHT
5 VIO/ORG
6 BRN/WHT
7 BRN/ORG
8 DK BLU/LT GRN
9 VIO/DK GRN
10 DK BLU/LT BLU
11 DK BLU/LT BLU
12 DK BLU/GRY
13 DK BLU/LT GRN
KNOCK SENSOR
WHT/BRN
DK BLU/YEL
CRANKSHAFT POSITION SENSOR
DK BLU/LT BLU
BRN/ORG
BRN/LT BLU
THROTTLE BODY
LT BLU/VIO
BRN/DK BLU
BRN
BRN/DK GRN
BRN/ORG
DK BLU/LT GRN
ETC MTR (+)
TP SENS GND
TP SIG 1
TP SIG 2
5V SPLY
ETC MTR (-)
OXYGEN SENSOR 1/1
BLK/LT GRN
BRN/WHT
BRN/YEL
BLK
OXYGEN SENSOR 2/1
BLK
BRN/VIO
DK BLU/LT GRN
BRN/WHT

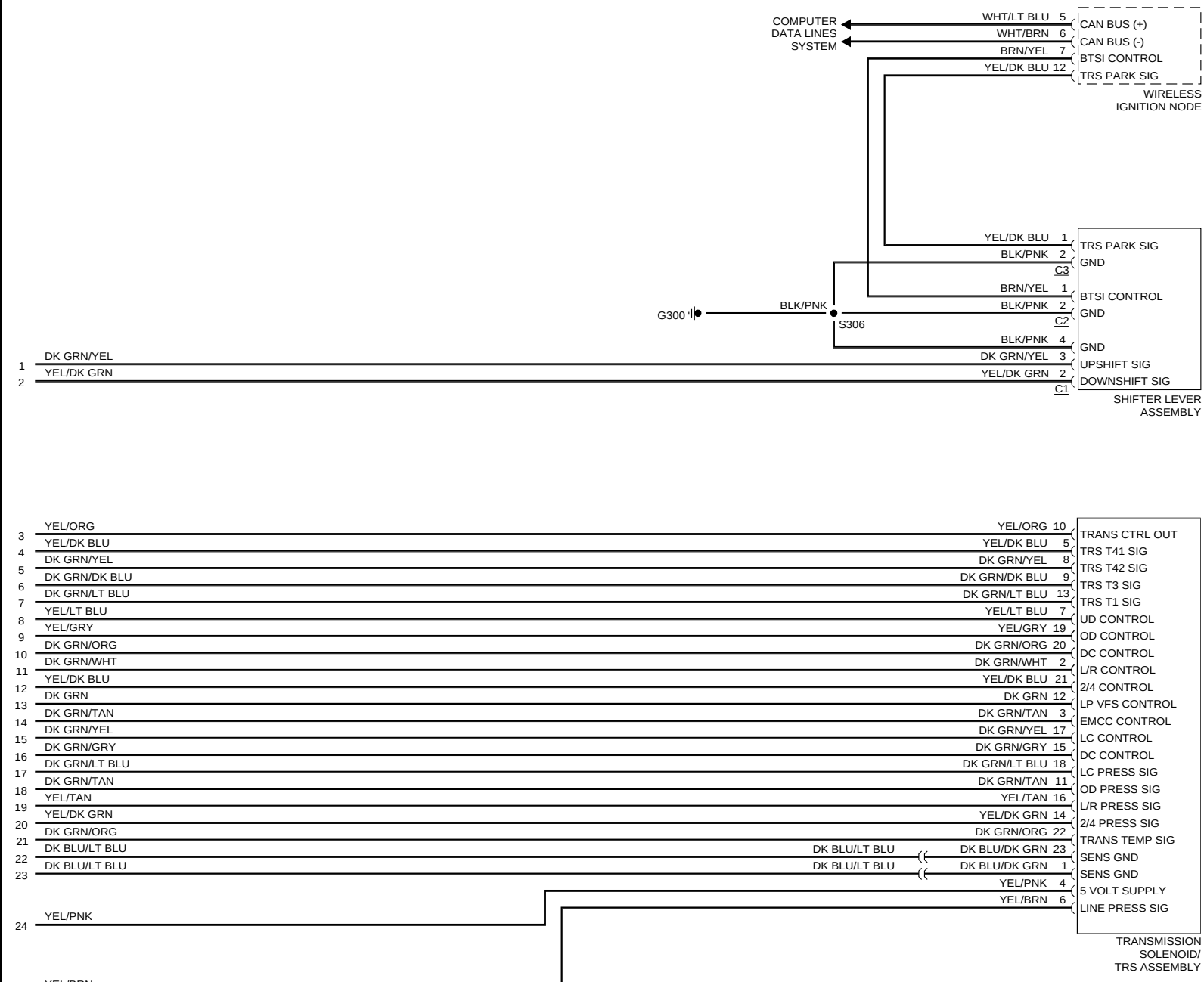
300884


RED
TOTALLY INTEGRATED POWER MODULE
30
85
87A
87
86
STARTER RELAY
FUSE J17 40A
STARTER COIL DRIVER
ELECTRONICS
B (+)
CAN C BUS (-)
CAN C BUS (+)
IGN SW OUT RUN-START
FUSE M27 10A
(VTSA) STEERING COLUMN LOCK MODULE
LT BLU/RED 1
FUSE B (+)
WHT/GRY 4
MONITOR LAN
PNK/LT BLU 3
IGN KEY-IN SIG
① EARLY PRODUCTION
② LATE PRODUCTION
YEL/GRY
DK GRN/ORG
WHT/BRN
WHT/LT BLU
PNK/WHT
LT BLU/RED
C2
C6
C7
COMPUTER DATA LINES SYSTEM
PNK/LT BLU 9
IGN KEY-IN SIG
WHT/GRY 2
MONITOR LAN
LT BLU/RED 1
FUSED B (+)
PNK/WHT 3
IGN RUN-START OUT
WHT/LT BLU 5
CAN C BUS (+)
WHT/BRN 6
CAN C BUS (-)
DK GRN/WHT (OR WHT/DK GRN) 8
BRK SIG 1
BRK LP SW OUT
BRN/YEL 7
BTSI CTRL
YEL/DK BLU 12
TRS PARK SIG
BLK 4
GROUND
G201
S208 (EARLY PRODUCTION)
IGNITION WIRELESS NODE
WHT/DK GRN (OR DK GRN/WHT)
YEL/DK BLU 1
TRS PARK SIG
C3
BRN/YEL 1
BTSI CTRL
C2
SHIFTER LEVER ASSEMBLY
EARLY PRODUCTION
LATE PRODUCTION
DK GRN/WHT
WHT/DK GRN
S301
WHT/DK GRN 1
BRK LP SW OUT
DK GRN/WHT 6
BRK SIG 1
S150
STOP LAMP SWITCH
YEL/DK BLU (OR YEL/TAN) 10
TRS T41 SIG
TRANSMISSION RANGE SENSOR
YEL/DK BLU 5
TRS T41 SIG
TRANSMISSION SOLENOID/TRS ASSEMBLY
YEL/DK BLU (OR YEL/TAN)
YEL/DK BLU
EXCEPT 6-SPEED
6-SPEED
YEL/DK BLU (OR YEL/TAN) 78 27
TRS T41 SIG
C2 C4
DK GRN/WHT 32 23
BRAKE SIG 1
DK GRN/ORG 25 38
STARTER RLY CTRL
C1 C3
WHT/LT GRN 41 34
CAN BUS (+)
WHT/LT BLU 54 35
CAN BUS (-)
C1 C1
COMPUTER DATA LINES SYSTEM
POWERTRAIN CONTROL MODULE
2.4L
3.5L
RED
BATTERY
POSITIVE REMOTE JUMP POST
BLK
NEGATIVE REMOTE JUMP POST
G100
NCA
FUSIBLE LINK (10 GA-ORG)
S100
STARTER
PULL-IN
HOLD-IN
GENERATOR
299999


HOT AT ALL TIMES
HOT W/ RUN/START RELAY ENERGIZED
TOTALLY INTEGRATED POWER MODULE
ELECTRONICS
FUSE M3 20A
B(+)
CAN C BUS (+)
CAN C BUS (-)
FUSE M15 20A
16 C2
28
29 C7
4 C5
YEL/ RED
WHT/ LT BLU
WHT/ BRN
PNK/ BLK (OR PNK/ LT GRN)
COMPUTER DATA LINES SYSTEM
S151 (3.5L)
PNK/ BLK (OR PNK/ LT GRN)
FUSED B(+)
A1 YEL/RED
A2
GND
A3 BLK/PNK
G300
A4
A5
A6
A7
SOL SPLY CTRL
A8 YEL
FUSED RUN/START RLY OUT
B1 PNK/BLK
B2
B3
CAN C BUS (+)
B4 WHT/LT BLU
CAN C BUS (-)
B5 WHT/BRN
COMPUTER DATA LINES SYSTEM
B6
B7
REAR DIFFERNTIAL SOL CTRL
B8 YEL/VIO
YEL B
SOL SPLY CTRL
YEL/VIO A
REAR DIFFERNTIAL SOL CTRL
ALL WHEEL DRIVE CONTROL MODULE
ELECTRONICALLY CONTROLLED CLUTCH SOLENOID

301006

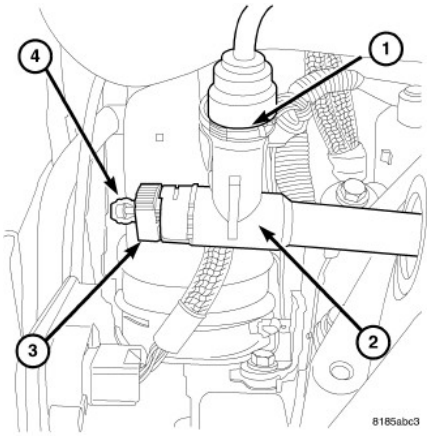

HOT W/ AUTO SHUT DOWN RELAY ENERGIZED
HOT AT ALL TIMES
HOT AT ALL TIMES
HOT AT ALL TIMES
TOTALLY INTEGRATED POWER MODULE
FUSE M19 25A
FUSE 28 10A
ELECTRONICS
CAN C BUS (+)
CAN C BUS (-)
TRANS CTRL
B (+)
TRANS RLY CTRL
85
30
86
87
87A
PCM RELAY
FUSE J18 20A
9 C9
9 C2
16
15
10 C1
26 C2
BRN/WHT
RED
WHT/LT GRN
WHT/LT BLU
YEL/BRN
YEL/ORG
ENGINE CONTROLS SYSTEM
BRN/WHT
COMPUTER DATA LINES SYSTEM
ASD MAIN RELY OUT
38 BRN/WHT
S113
C1
19 BRN/WHT
ASD MAIN RELY OUT
28 BRN/WHT
ASD MAIN RELY OUT
C3
FUSED B(+)
10 RED
S118 RED
FUSED B(+)
29 RED
C1
AUTOSTICK DOWNSHIFT SIG
27 DK GRN/YEL
DK GRN/YEL 1
AUTOSTICK UPSHIFT SIG
26 YEL/DK GRN
YEL/DK GRN 2
C3
CAN C BUS (-)
35 WHT/LT BLU
CAN C BUS (+)
34 WHT/LT GRN
C1
COMPUTER DATA LINES SYSTEM
TRANS CTRL
18 YEL/BRN
TRANS CTRL OUT
19 YEL/ORG
TRANS CTRL OUT
28 YEL/ORG
TRANS CTRL OUT
38 YEL/ORG
S127
YEL/ORG 3
TRS T41 SIG
27 YEL/DK BLU
YEL/DK BLU 4
TRS T42 SIG
37 DK GRN/YEL
DK GRN/YEL 5
TRS T3 SIG
16 DK GRN/DK BLU
DK GRN/DK BLU 6
TRS T1 SIG
15 DK GRN/LT BLU
DK GRN/LT BLU 7
UD CTRL
2 YEL/LT BLU
YEL/LT BLU 8
OD CTRL
1 YEL/GRY
YEL/GRY 9
DC CTRL
4 DK GRN/ORG
DK GRN/ORG 10
L/R CTRL
10 DK GRN/WHT
DK GRN/WHT 11
2/4-LR CTRL
6 YEL/DK BLU
YEL/DK BLU 12
LP VFS CTRL
11 DK GRN
DK GRN 13
EMCC CTRL
3 DK GRN/TAN
DK GRN/TAN 14
LC CTRL
8 DK GRN/YEL
DK GRN/YEL 15
DC PRESS SIG
5 DK GRN/GRY
DK GRN/GRY 16
LC PRESS SIG
21 DK GRN/LT BLU
DK GRN/LT BLU 17
OD PRESS SIG
22 DK GRN/TAN
DK GRN/TAN 18
L/R PRESS SIG
29 YEL/TAN
YEL/TAN 19
2/4 PRESS SIG
30 YEL/DK GRN
YEL/DK GRN 20
TRANS TEMP SIG
35 DK GRN/ORG
DK GRN/ORG 21
C4
DK BLU/LT BLU 22
SENS GND
27 DK BLU/LT BLU
DK BLU/LT BLU 23
C2
S105
DK BLU/ LT BLU
5V SUPPLY
27 YEL/PNK
C1
S119
YEL/PNK
S104
YEL/PNK 24
YEL/PNK
YEL/PNK
ENGINE CONTROLS SYSTEM
ENGINE CONTROLS SYSTEM
LP SIGNAL
31 YEL/BRN
YEL/BRN 25
TRANSFER SPD SIG
24 DK GRN/LT GRN
INPUT SPEED SIG
33 DK GRN/ORG
OUTPUT SPEED SIG
32 DK GRN/BRN
SENSOR GND
34 DK GRN/VIO
C4
S126
GROUND
9 BLK
GROUND
18 BLK
C1
POWERTRAIN CONTROL MODULE
DK GRN/VIO
DK GRN/BRN
DK GRN/ORG
DK GRN/VIO
DK GRN/VIO
DK GRN/LT GRN
2
1
1
2
2
1
BLK
BLK
G102
OUTPUT SPEED SENSOR
INPUT SPEED SENSOR
TRANSFER SPEED SENSOR


COMPUTER DATA LINES SYSTEM
WHT/LT BLU 5
WHT/BRN 6
BRN/YEL 7
YEL/DK BLU 12
CAN BUS (+)
CAN BUS (-)
BTSI CONTROL
TRS PARK SIG
WIRELESS IGNITION NODE
YEL/DK BLU 1
BLK/PNK 2
C3
BRN/YEL 1
BLK/PNK 2
C2
BLK/PNK 4
TRS PARK SIG
GND
BTSI CONTROL
GND
GND
G300
BLK/PNK
S306
DK GRN/YEL
YEL/DK GRN
DK GRN/YEL 3
YEL/DK GRN 2
C1
UPSHIFT SIG
DOWNSHIFT SIG
SHIFTER LEVER ASSEMBLY
YEL/ORG
YEL/DK BLU
DK GRN/YEL
DK GRN/DK BLU
DK GRN/LT BLU
YEL/LT BLU
YEL/GRY
DK GRN/ORG
DK GRN/WHT
YEL/DK BLU
DK GRN
DK GRN/TAN
DK GRN/YEL
DK GRN/GRY
DK GRN/LT BLU
DK GRN/TAN
YEL/TAN
YEL/DK GRN
DK GRN/ORG
DK BLU/LT BLU
DK BLU/LT BLU
YEL/PNK
YEL/BRN
YEL/ORG 10
YEL/DK BLU 5
DK GRN/YEL 8
DK GRN/DK BLU 9
DK GRN/LT BLU 13
YEL/LT BLU 7
YEL/GRY 19
DK GRN/ORG 20
DK GRN/WHT 2
YEL/DK BLU 21
DK GRN 12
DK GRN/TAN 3
DK GRN/YEL 17
DK GRN/GRY 15
DK GRN/LT BLU 18
DK GRN/TAN 11
YEL/TAN 16
YEL/DK GRN 14
DK GRN/ORG 22
DK BLU/DK GRN 23
DK BLU/DK GRN 1
YEL/PNK 4
YEL/BRN 6
TRANS CTRL OUT
TRS T41 SIG
TRS T42 SIG
TRS T3 SIG
TRS T1 SIG
UD CONTROL
OD CONTROL
DC CONTROL
L/R CONTROL
2/4 CONTROL
LP VFS CONTROL
EMCC CONTROL
LC CONTROL
DC CONTROL
LC PRESS SIG
OD PRESS SIG
L/R PRESS SIG
2/4 PRESS SIG
TRANS TEMP SIG
SENS GND
SENS GND
5 VOLT SUPPLY
LINE PRESS SIG
TRANSMISSION SOLENOID/ TRS ASSEMBLY

2009 Dodge JC - DODGE JOURNEY

Submodel: | **Engine Type:** V6 | **Liters:** 3.5L
Fuel Delivery: MPI | **Fuel:**

STANDARD PROCEDURE - MANUAL BLEEDING CLUTCH HYDRAULIC CIRCUIT



NOTE: An assistant is required to perform this procedure

1. Verify fluid level in clutch/brake cylinder. Top off with DOT 3 brake fluid as necessary. Leave cap off.
2. Raise vehicle on hoist.

NOTE: The container must be positioned at a lower level than the bleeder valve on the clutch slave cylinder

3. Remove the dust cap from the bleed port on the clutch slave cylinder and install suitable size and length of clear hose (4) to monitor and divert fluid into a suitable container.
4. Lower vehicle, but only enough to gain access to and fill the brake master cylinder.
5. Have the assistant press down and hold the clutch pedal until it reaches the floor.

NOTE: Do not allow clutch/brake fluid reservoir to run dry while fluid exits bleed port. If the reservoir runs dry during this procedure, it must be refilled. and this step must be repeated.

NOTE: Ensure the assistant does not release the clutch pedal from the floor while the bleed port on the clutch slave cylinder is open. Otherwise, air will enter the clutch hydraulic circuit.

6. Open the bleed port on the clutch slave cylinder enough to allow hydraulic fluid to drain. Any air in the system will escape at this time.
7. Close the bleed port on the clutch slave cylinder, and have the assistant release the clutch pedal to the full up position.
8. Repeat steps 5 through 7 at least 15 times or until air bubbles are no longer present in the clutch hydraulic fluid.
9. Slowly actuate the clutch pedal 10 times between the full up and pedal stop position.
10. **Apply parking brake**. Start engine and verify clutch operation and pedal feel. If the clutch pedal feels fine and the transaxle can be easily shifted from neutral to any gear, the clutch is operating correctly. If pedal still feels spongy or clutch does not fully disengage, excessive air is still trapped within the system, most likely at the master cylinder.
11. Disconnect the hose from the bleed port on the clutch master cylinder and install the dust cap.
12. Top off brake master cylinder fluid level with DOT 3 brake fluid as necessary.

POWER BLEEDING CLUTCH HYDRAULIC CIRCUIT

1. Remove reservoir cap and connect bleeder cap to clutch/brake fluid reservoir.**NOTE:**Use Bleeder Cap/Modified reservoir cap adapter Snap-on #901-059 or equivalent.
2. Connect service filling machine to bleeder cap.**NOTE:**Use Service Filling Machine/Brake power bleeder or equivalent.
3. Service filling machine should be pressurized between 2.0 and 2.5 bar (29 - 36 PSI).

4. Remove dust cap from bleeder valve and connect the transparent bleeder hose to bleeder valve.

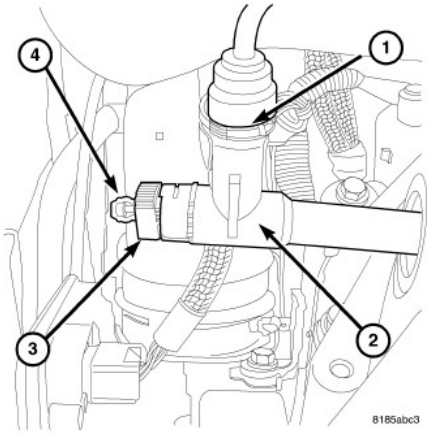
NOTE: Use Bleeder Container to capture hydraulic fluid and the Transparent Bleeder Hose to route fluid to container.

NOTE: The Container must be at a lower level than the bleeder valve on the clutch slave cylinder.

5. Place the other end of hose in the bleeder container to capture the used fluid. The end of the hose MUST be submerged in the DOT 3 brake fluid.

6. Turn on the service filling machine.

NOTE: While bleeding the system, do not allow the clutch fluid reservoir to completely empty out. If this happens, refill the clutch fluid reservoir, and repeat the procedure.



7. Open the bleeder valve (3) on the clutch slave cylinder enough to allow fluid to flow from the clutch hydraulic system.

8. Allow fluid to flow out of bleed port until no more air bubbles can be seen in the transparent bleeder hose.

9. Once fluid is free of air bubbles; make 15 quick actuations between clutch pedal stop positions.

10. Close the bleeder valve at the clutch slave cylinder and disconnect the service filling machine.

11. Check clutch pedal to see if vehicle is properly bled.

12. If vehicle is not properly bled, repeat procedure.

13. Remove bleeder cap from the clutch fluid reservoir and replace reservoir cap.

14. Disconnect transparent bleeder hose from bleeder valve and replace dust cap.

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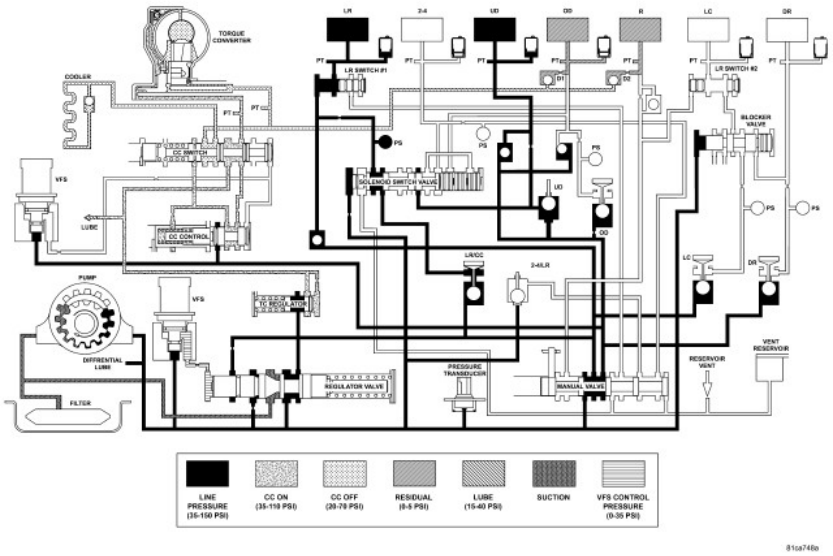
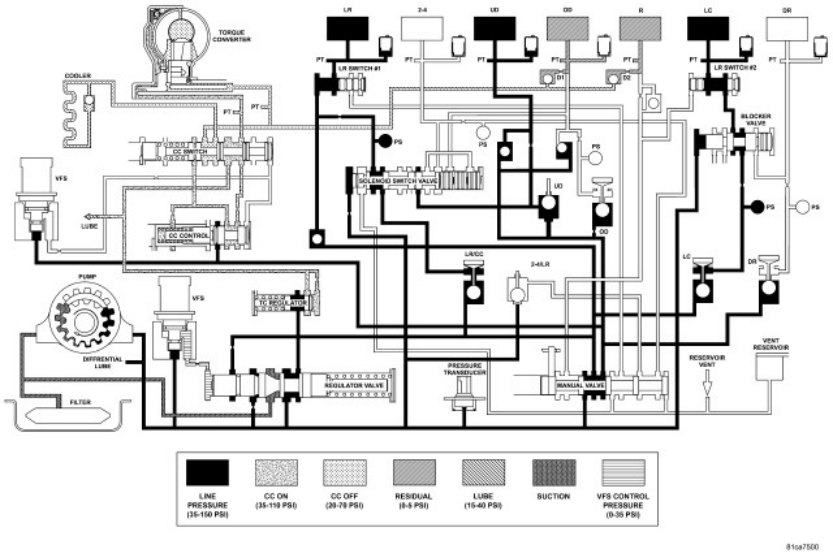
2009 Dodge JC - DODGE JOURNEY

Submodel: | **Engine Type:** V6 | **Liters:** 3.5L
Fuel Delivery: MPI | **Fuel:**

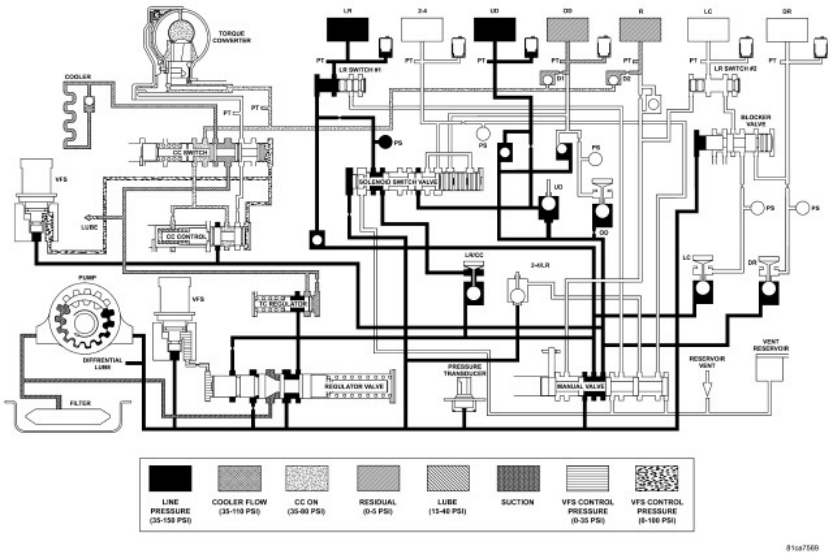
SCHEMATICS AND DIAGRAMS



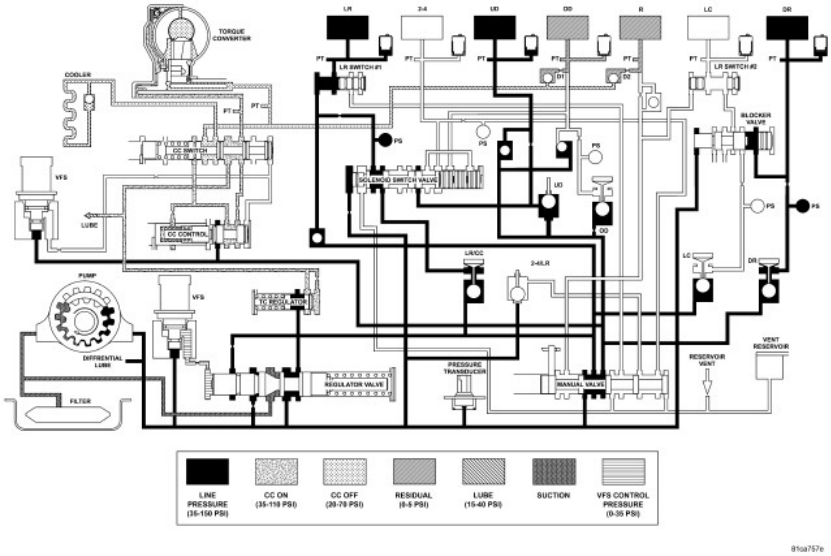
DRIVE FIRST



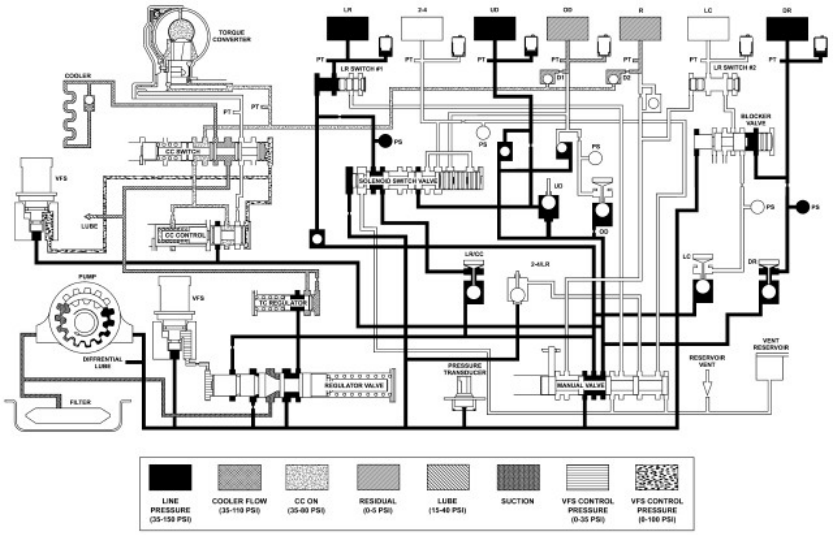
DRIVE FIRST COAST



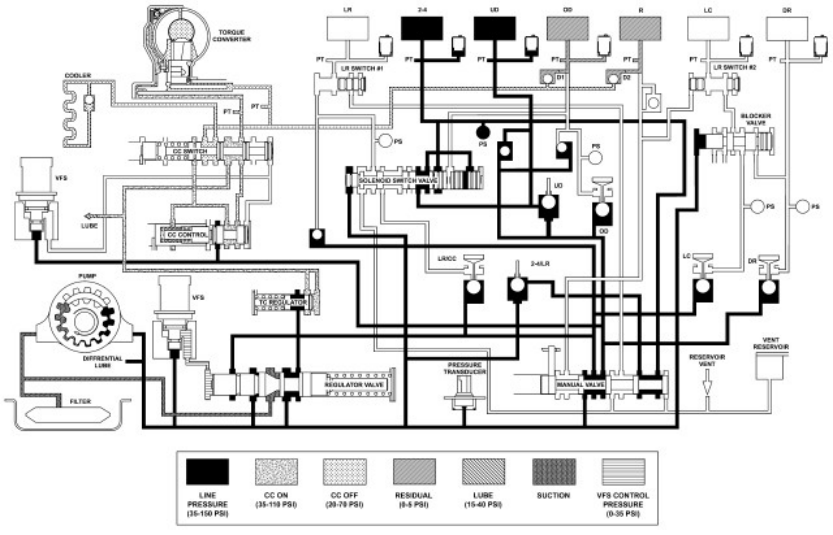
DRIVE FIRST EMCC



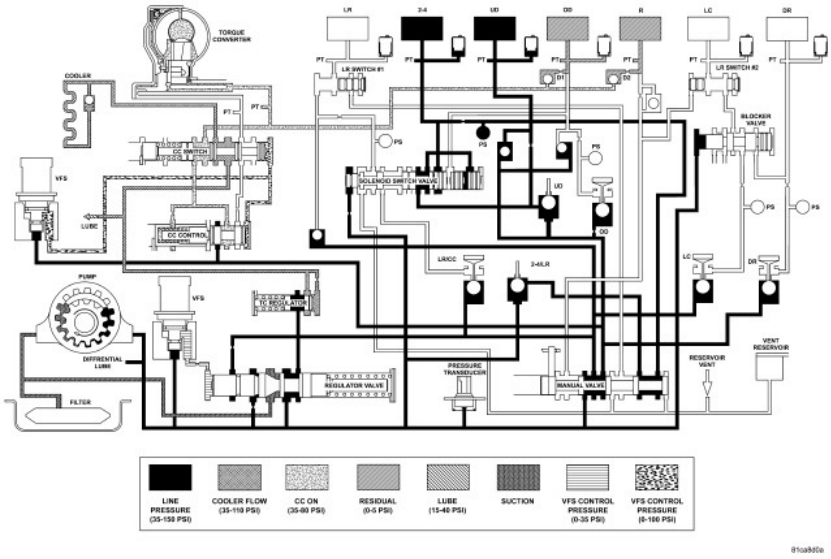
DRIVE SECOND



DRIVE SECOND EMCC



DRIVE THIRD



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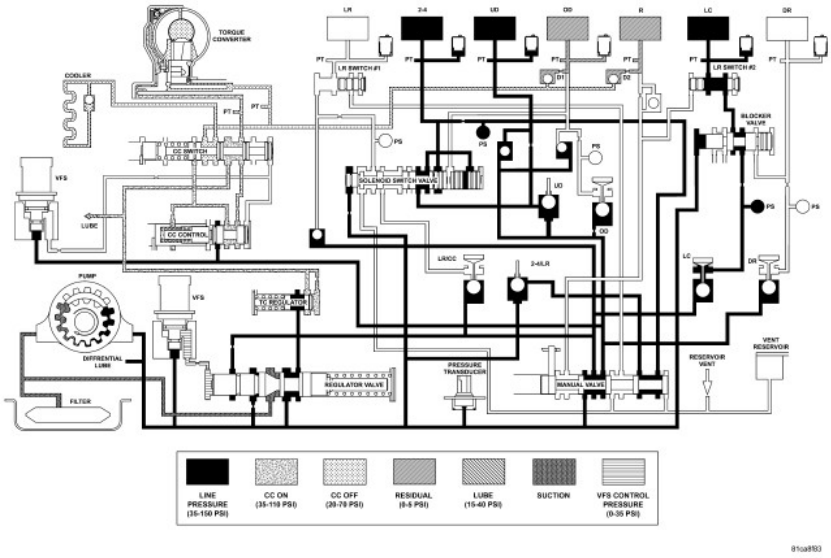

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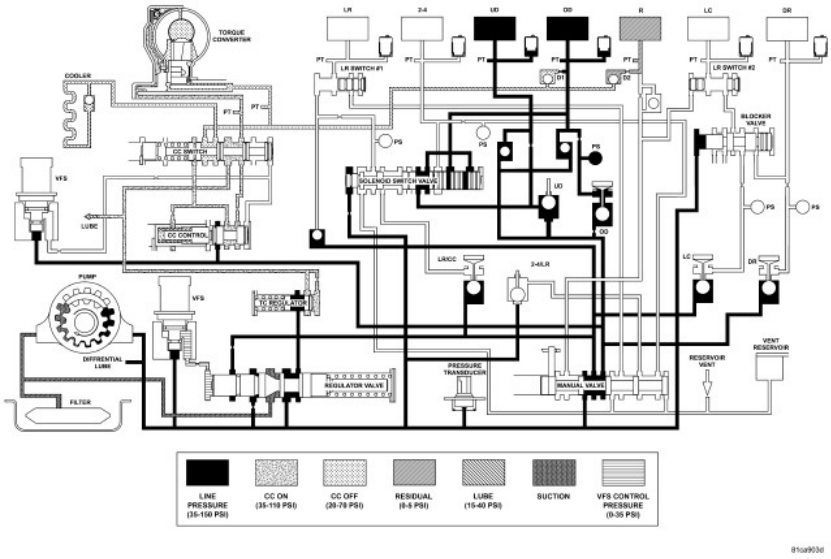

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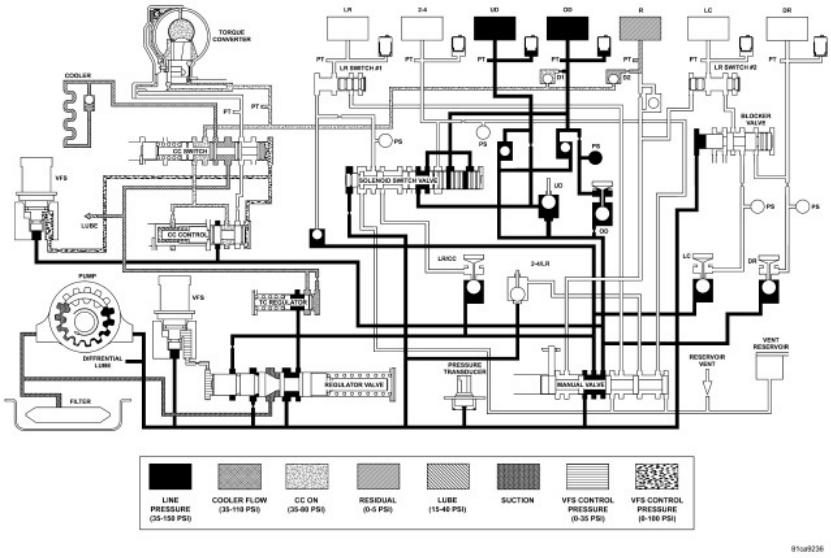

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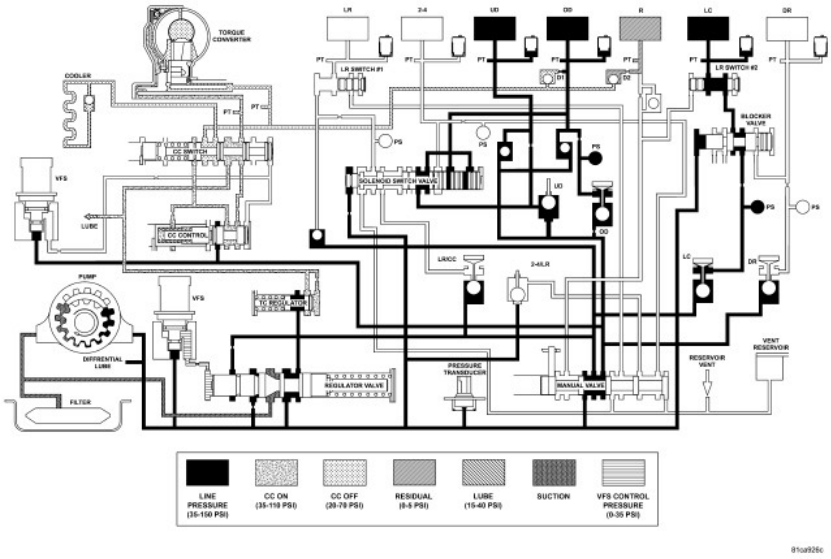
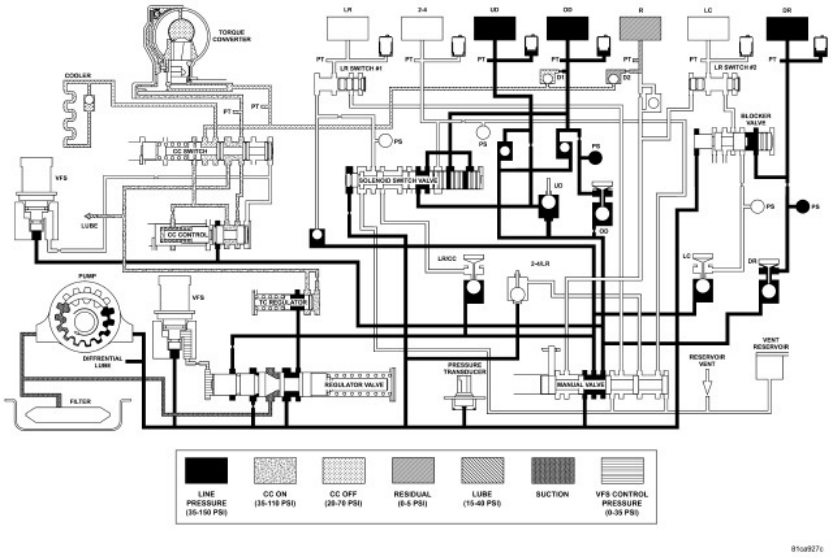
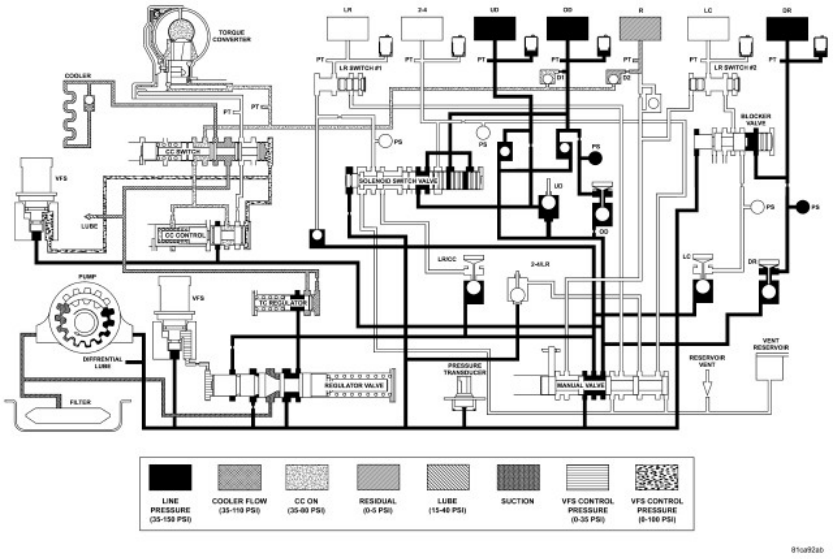


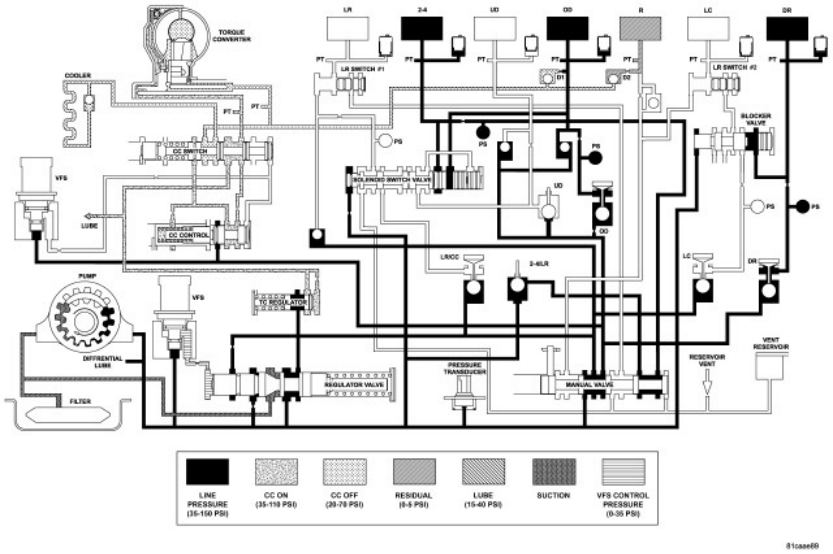
FOURTH COAST



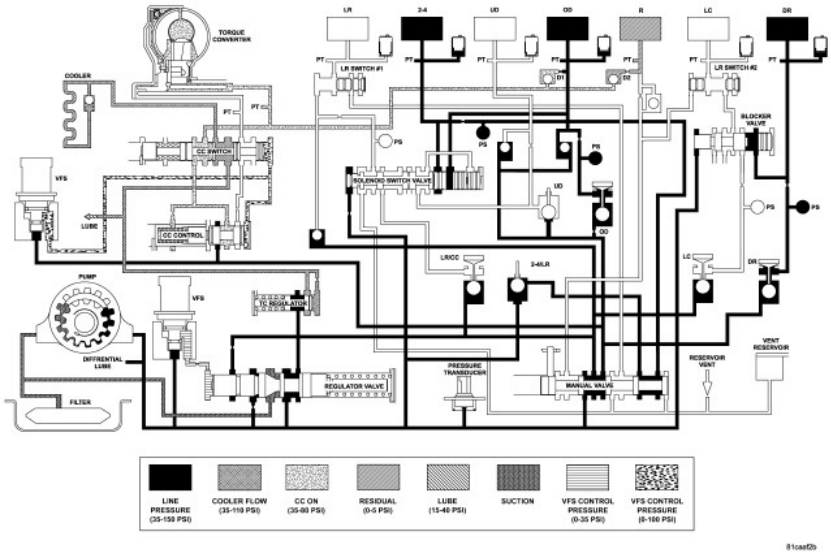
DRIVE FIFTH



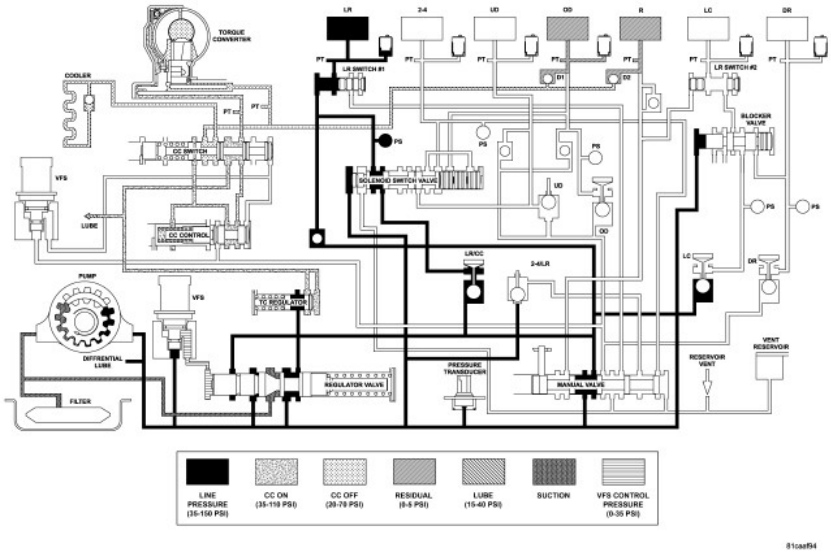
DRIVE FIFTH EMCC



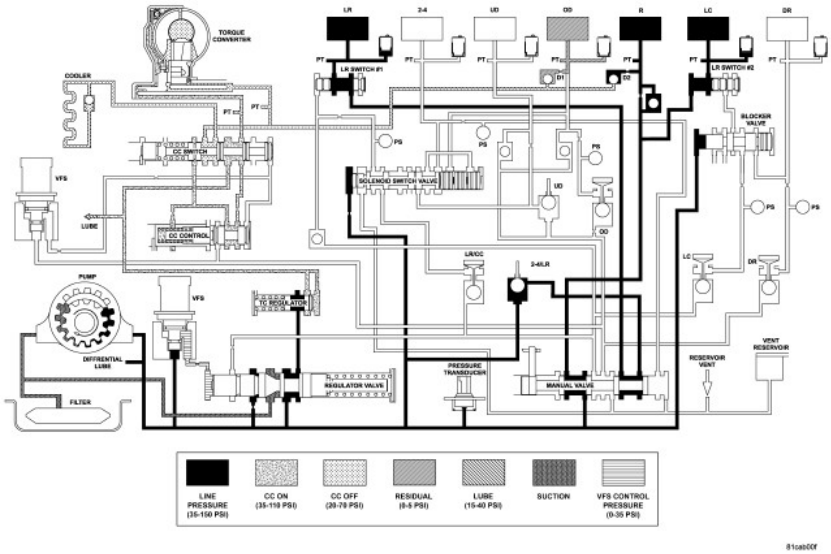
DRIVE SIXTH



DRIVE SIXTH EMCC



PARK NEUTRAL



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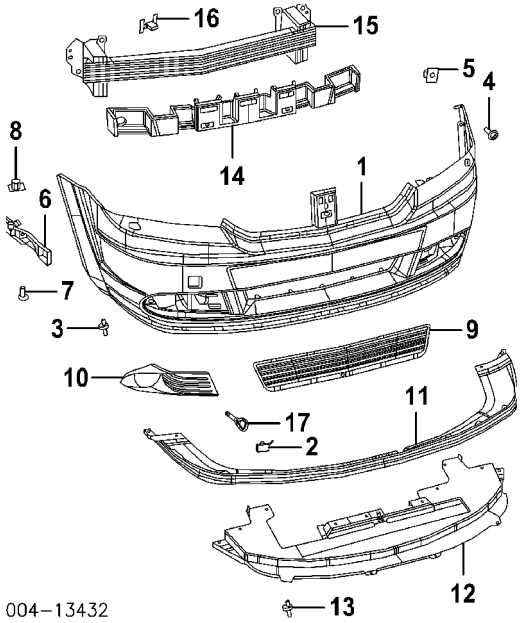
EBSCO Publishing Green Initiatives

FRONT BUMPER

Procedures 1 and 28



Refinish Bumper Cover	3.4
Refinish Tow Hook Cover	.3
R&I Bumper Cover	1.5
O/H Bumper Cover (Includes R&I)	#3.0

#Includes R&I/R&R Grille

Add to R&R or O/H Bumper Cover

w/Fog Lamps	.3
w/Headlamp Washer	.4

NOTE: All Parts in this section are included in overhaul unless noted otherwise.

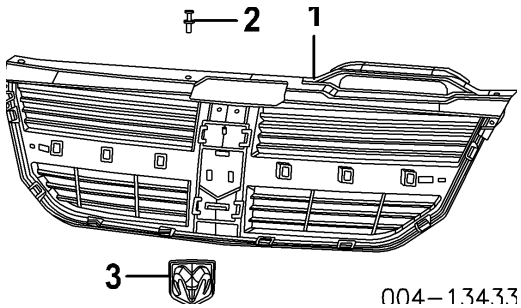
1	Cover, Bumper (P)				
	w/Headlamp Washer		#3.0	68034179AC	$637.00
	w/o Headlamp Washer		#3.0	68034169AC	$430.00
	#Includes R&I/R&R Grille				
2	Cover, Tow Hook (P)		.1	68034176AA	$14.80
	(P) Paint to Match				
3	Clip, Cover (a)			6508746AA	$4.80
	(a) As Required				
4	Screw, Cover (2/Side)	R		6505628AA	$2.95
		L		6505628AA	$2.95
5	Grommet, Cover (2/Side)	R		6035401	$2.70
		L		6035401	$2.70

2010 Dodge Journey R/T Utility

6	Bracket, Cover	R			5178410AB	$2.80
		L			5178411AC	$4.55
7	Screw, Bracket (2/Side)	R			6104610AA	$4.25
		L			6104610AA	$4.25
8	Grommet, Screw (2/Side)	R			6035401	$2.70
		L			6035401	$2.70
9	Grille, Center Cover			.2	5178282AA	$10.70
10	Grille, Outer Cover					
	w/Fog Lamps	R		.2	5178284AA	$14.35
		L		.2	5178285AA	$14.35
	w/o Fog Lamps	R		.2	5178286AA	$14.50
		L		.2	5178287AA	$14.50
11	Dam, Air		#.2		5178283AB	$797.00
	#w/Bumper Cover Removed					
12	Shield, Splash			.3	5116301AC	$50.10
13	Clip, Mounting (6)				6504521	$4.20
14	Absorber, Energy		IOH		5116263AB	$34.00
15	Reinf, Bumper		#.4		5116280AB	$143.00
	#w/Bumper Cover Removed, Not Included in O/H					
16	Clip, Absorber	R			5303389AA	$5.45
		L			5303389AA	$5.45
17	Hook, Tow-See Wheel Section					

2010 Dodge Journey R/T Utility

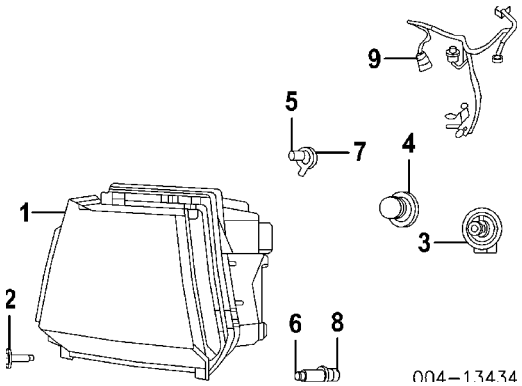
GRILLE



	R&I Grille	#.3		
	#w/Bumper Cover Removed			
1	Grille	#.3	1BG84SZ0AE	$159.00
	#w/Bumper Cover Removed			
2	Clip, Grille (4)		6504521	$4.20
	Moulding, Grille		N.A.	
3	Emblem, Grille (Adhesive)	.2	5155674AA	$38.70

FRONT LAMPS

COMBINATION LAMP



Aim Lamps			.4	
R&I Combination Lamp	R	#.3		
	L	#.3		

#w/Bumper Cover Removed

NOTE: R&R Does Not include aim lamps.

1 Lamp, Combination	R	#.3	5116288AA	$190.00
	L	#.3	5116289AA	$190.00

#w/Bumper Cover Removed

2 Bolt, Mtg (3/Side)	R		6105098AA	$3.65
	L		6105098AA	$3.65
3 Bulb, Headlamp				
Low Beam	R	#.2	L0009006	$13.70
	L	#.2	L0009006	$13.70
High Beam	R	#.2	L0009005	$14.35
	L	#.2	L0009005	$14.35
4 Bulb, Turn Signal	R	#.2	L0003757AK	$3.85
	L	#.2	L0003757AK	$3.85
5 Bulb, Park Lamp	R	#.2	L002825W5W	$2.20
	L	#.2	L002825W5W	$2.20
6 Bulb, Side Marker	R	#.2	L0000168	$1.10
	L	#.2	L0000168	$1.10

#R&R One Side Complete, Included in R&I/R&R Combination Lamp

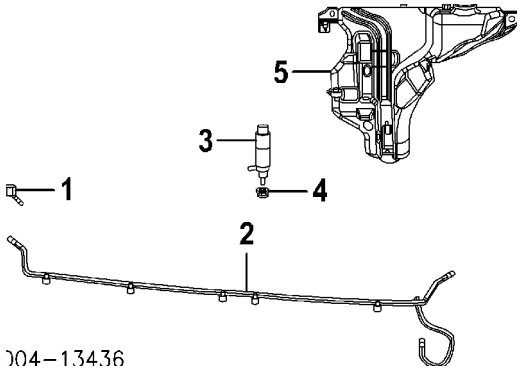
7 Socket, Park Lamp	R		68038216AA	$13.30
	L		68038216AA	$13.30
8 Socket, Side Marker	R		68038235AA	$9.35
	L		68038235AA	$9.35

9 Harness, Front Lamp¶

SE Model	5084578AF	$475.00
SXT, R/T Model	5084577AF	$490.00

¶Order by Application

HEADLAMP WASHER



Refinish Washer Nozzle	R		.3
	L		.3
R&I Washer Nozzle	R	#.2	
	L	#.2	

#w/Bumper Cover Removed

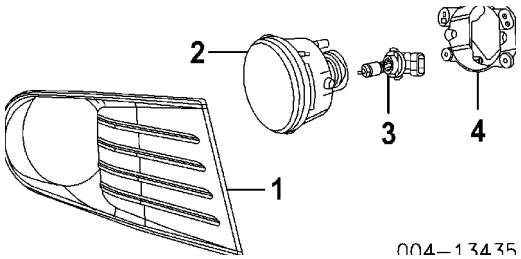
1 Nozzle, Washer

Bright Silver, (Code S2)	R	#.2	1GD08WS2AA	$55.50
	L	#.2	1GD09WS2AA	$55.50
Brilliant Black, (Code XR)	R	#.2	1GD08AXRAA	$55.50
	L	#.2	1GD09AXRAA	$55.50
Deep Water Blue, (Code BS)	R	#.2	1GD08GBSAA	$55.50
	L	#.2	1GD09GBSAA	$55.50
Inferno Red, (Code RH)	R	#.2	1GD08ARHAA	$55.50
	L	#.2	1GD09ARHAA	$55.50
Melbourne Green, (Code PL)	R	#.2	1GD08GPLAA	$55.50
	L	#.2	1GD09GPLAA	$427.00
Sandstone, (Code KG)	R	#.2	1GD08FKGAA	$55.50
	L	#.2	1GD09FKGAA	$55.50
Silver Steel, (Code A4)	R	#.2	1GD08DA4AA	$55.50
	L	#.2	1GD09DA4AA	$55.50
Stone White, (Code W1)	R	#.2	N.A.	
	L	#.2	N.A.	
Surf Blue, (Code QD)	R	#.2	1GD08FQDAA	$54.10
	L	#.2	1GD09FQDAA	$54.10

#w/Bumper Cover Removed

2	Hose, Washer			5178444AA	$53.95
3	Pump, H/Lamp Washer		#.3	5012060AA	$40.45
	#Included in R&R Washer Reservoir				
4	Grommet, Pump			5012060AA	$40.45
5	Reservoir, Washer-See Windshield Section				

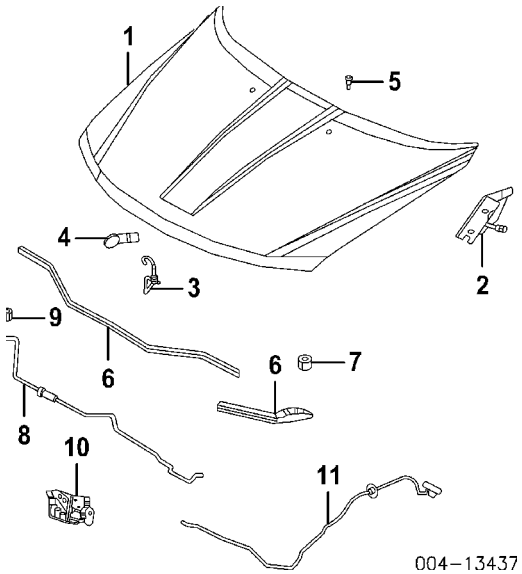
FOG LAMP



	R&I Fog Lamp	R	#.2		
		L	#.2		
	#w/Splash Shield Removed, Included in R&R or O/H Bumper Cover				
1	Grille, Outer Cover-See Front Bumper Section				
2	Lamp, Fog	R	#.2	4805856AA	$69.95
		L	#.2	4805856AA	$69.95
	#w/Splash Shield Removed, Included in R&R or O/H Bumper Cover				
3	Bulb, Fog Lamp	R	#.2	L0009145	$15.50
		L	#.2	L0009145	$15.50
	#w/Splash Shield Removed, Included in R&I/R&R Fog Lamp				
4	Brkt, Fog Lamp	R		5029228AA	$79.45
		L		5029228AA	$79.45

HOOD

Procedures 4 and 28



Refinish Hood Outside			2.8		
Add for Underside			1.4		
Refinish Hood Hinge	R		.5		
	L		.5		
R&I Hood			.5		
R&I Washer Nozzle	R	#.2			
	L	#.2			
#Included in R&R Hood					
1 Hood (Alum)			1.2	5076777AC	$502.00
Insulator, Hood				5076896AB	$56.80
Clip, Insulator (6)				4878883AA	$5.45
2 Hinge, Hood	R	#.3		5178240AB	$20.95
	L	#.3		5178241AB	$20.95
#w/Hood & Cowl Grille Removed					
3 Striker, Hood		#.2		5155607AA	$9.10
4 Plate, Striker		#.2		5026571AA	$3.30
#R&R Complete					
5 Nozzle, Washer-See Windshield Section					
6 Seal, Front Hood	R		.2	5076809AB	$11.10
	L		.1	4891938AA	$10.10
7 Bumper, Hood					
Type 1	R		.1	5054227AA	$3.65
	L		.1	5054227AA	$3.65
Type 2	R		.2	4103165	$7.50

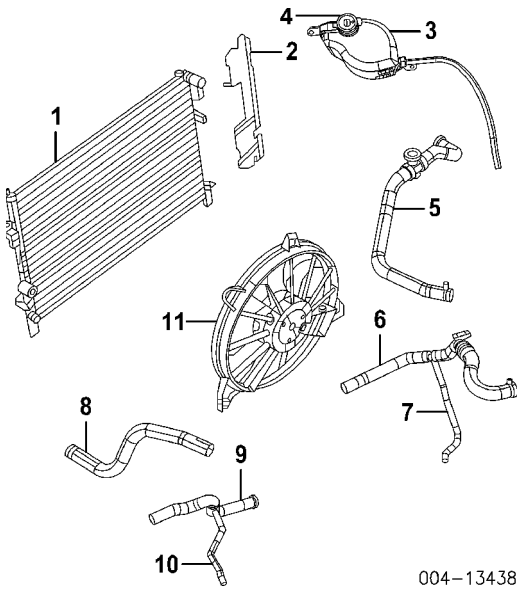
2010 Dodge Journey R/T Utility

		L	.2	4103165	$7.50
8	Rod, Hood Prop		.2	5076853AB	$7.25
9	Bushing, Hood Rod			4880116AA	$4.20
	Clip, Hood Rod			6506223AA	$6.00
	Isolator, Prop Rod			5008284AB	$5.45
10	Latch, Hood		.3	4389642AC	$32.20
11	Cable, Hood Release		1.5	5155803AB	$8.35

COOLING

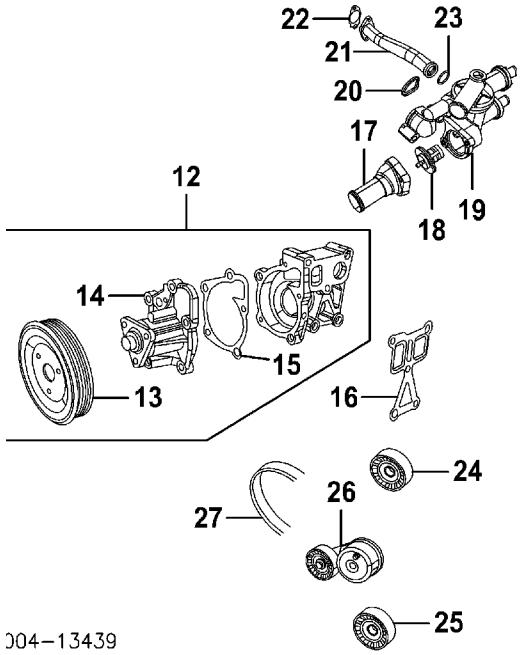
Procedures 5 and 28

2.4L ENG



	R&I Radiator Assy			2.2		
1	Radiator			2.2	68038238AA	$259.00
2	Deflector, Air¶		R	.1	5058507AC	$9.00
			L	.1	5058457AC	$10.60
	¶Order by Application					
3	Tank, Coolant Recovery			.6	5058455AD	$22.00
4	Cap, Tank				55056382AA	$7.60
	Hose, Radiator Inlet					
5	No. 1		#.6		5058394AB	$61.85
6	No. 2		#.6		5058446AB	$119.00
	#R&R Complete					
7	Hose, Cooler Inlet-See Engine Oil Cooler Section					
	Hose, Radiator Outlet					
8	No. 1		#1.0		5058398AC	$18.80
9	No. 2		#1.0		5058566AB	$67.10
	#R&R Complete					
10	Hose, Cooler Outlet-See Engine Oil Cooler Section					
11	Fan, Cooling			.8	68038247AA	$166.00

2010 Dodge Journey R/T Utility



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12	Pump Assy, Water		5047138AB	$65.60
13	Pulley, Water Pump (a)	1.1	68046027AA	$23.80
14	Pump, Water (a)	3.0	68046026AA	$60.95
15	Gskt, Water Pump (a)		68046028AA	$4.35
	(a) Included w/Water Pump Assy			
16	Gskt, Pump		4884696AA	$0.85
17	Cover, Thermostat	#.8	4884571AB	$5.20
18	Thermostat			
	170 Degrees	#.8	55111016AC	$38.95
	203 Degrees	#.8	55111017AB	$25.85
	#R&R Complete			
19	Housing, Thermostat	#3.2	68003582AB	$55.00
20	Seal, Housing		4884572AA	$5.60
21	Tube, Inlet	#3.2	4884697AB	$10.45
	#R&R Complete, Includes R&R Thermostat			
22	Gasket, Tube		4884703AB	
23	O-Ring, Tube		4884873AA	$4.70
	Pulley, Idler			
24	Upper	#.7	4891797AA	$16.30
25	Lower	#.7	4891596AB	$17.60
26	Tensioner, Belt	#.8	4891595AB	$46.45
	#Includes R&R Drive Belt			
27	Belt, Drive	.6	4891721AB	$18.00

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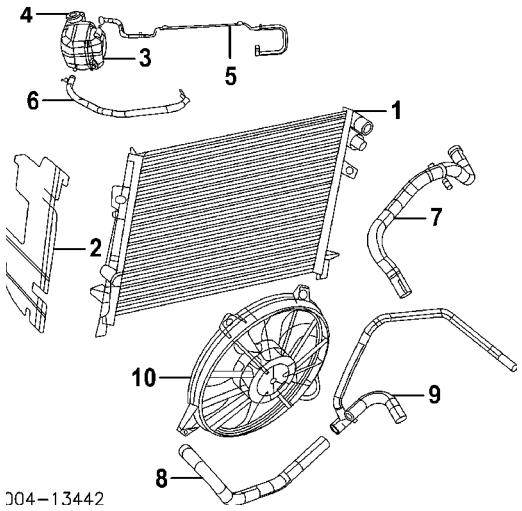
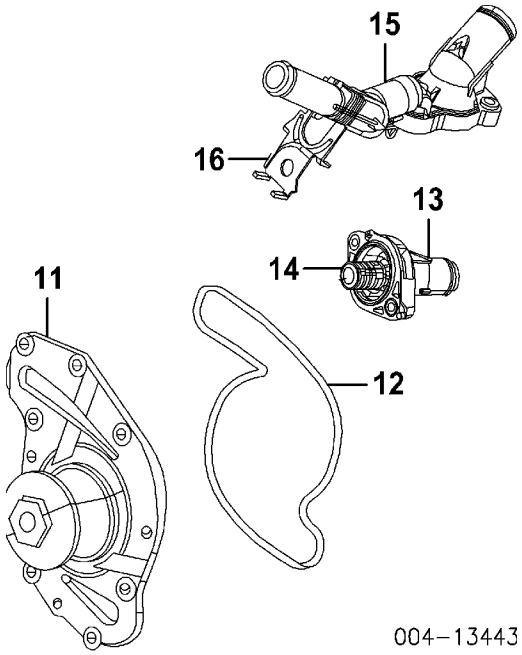
3.5L ENG



	R&I Radiator Assy			2.2		
1	Radiator			2.2	68038238AA	$259.00
2	Deflector, Air¶		R	.1	5058507AC	$9.00
			L	.1	5058457AC	$10.60
	¶Order by Application					
3	Tank, Coolant Recovery			.6	5058456AB	$32.00
4	Cap, Tank				4596198	$20.50
5	Hose, Tank Inlet			.3	5058407AC	$36.30
6	Hose, Tank Outlet			.3	5058412AB	$16.80
7	Hose, Radiator Inlet			.6	5058393AC	$23.95
	Hose, Radiator Outlet					
8	No. 1	#1.0			5058397AC	$23.00
9	No. 2	#1.0			5291896AC	$40.70
	#R&R Complete					
10	Fan, Cooling			.8	68038241AA	$158.00

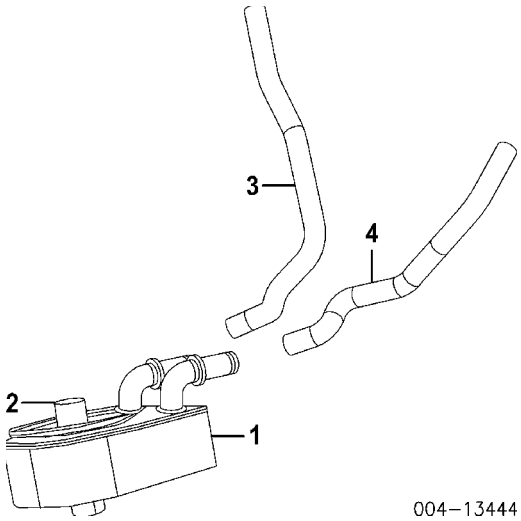
2010 Dodge Journey R/T Utility



11	Pump, Water	4.2	4792968AD	$83.60
12	Gskt, Water Pump		4792982AA	$10.95
13	Cover, Thermostat		4892307AA	$53.10
14	Thermostat	.8	4666140AA	$10.75
15	Housing, Thermostat	3.2	4892189AD	$24.80
16	Bracket, Housing		4892210AD	$3.95

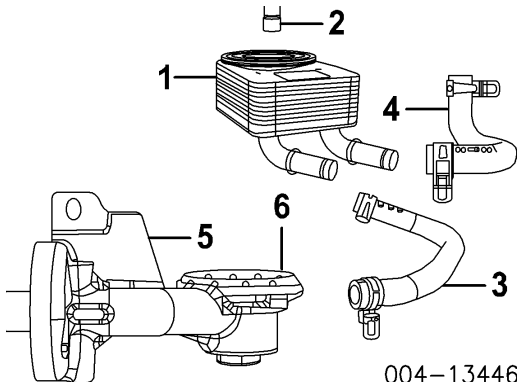
ENGINE OIL COOLER

2.4L ENG



1	Cooler, Eng Oil		.9	4884757AE	$86.45
2	Connector, Oil Cooler			4884758AB	$39.95
3	Hose, Cooler Inlet	#.7		5291898AA	$16.00
4	Hose, Cooler Outlet	#.7		5291899AA	$16.00
	#R&R Complete				

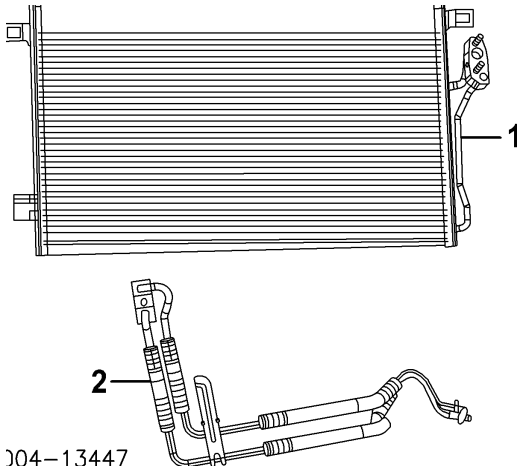
3.5L ENG



1	Cooler, Eng Oil		1.0	4892420AA	$92.10
2	Connector, Oil Cooler			4892338AB	$6.30
3	Hose, Cooler Inlet	#.8		5058545AB	$19.45
4	Hose, Cooler Outlet	#.8		5058544AB	$12.35
	#R&R Complete				
5	Adapter, Oil Filter	#1.2		4892405AB	$110.00
	#Includes R&R Oil Cooler				
6	Gskt, Adapter			4892378AA	$11.45

2010 Dodge Journey R/T Utility

TRANS OIL COOLER



1	Condenser/Trans Cooler-See A/C /Heater/Ventilation Section			
2	Hose Set, Cooler			
	2.4L Eng	1.2	5058402AC	$63.80
	3.5L Eng	1.2	5058400AB	$66.45

2010 Dodge Journey R/T Utility

A/C REFRIGERANT CAPACITIES

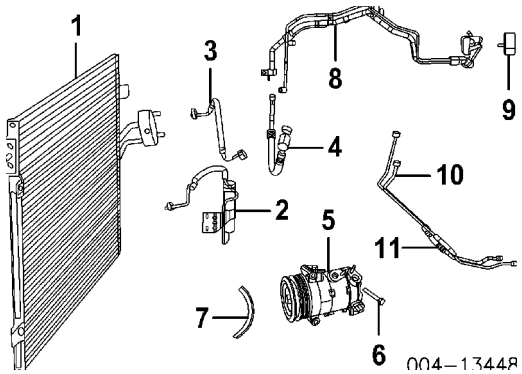
A/C R-134a Refrigerant Capacity

16.9-18.7 Ozs (1.06-1.18 Lbs), 479-530 g

A/C HEATER/VENTILATION

Procedure 6

FRONT

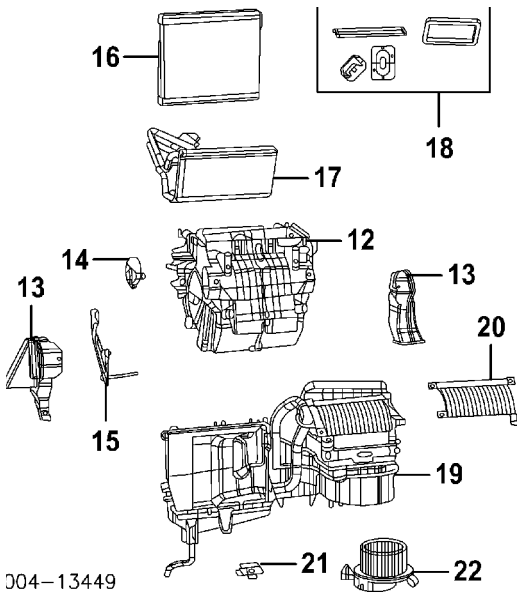


R&I A/C Condenser Assy		#1.4		
#w/Bumper Cover Removed				
Evacuate & Recharge System		1.4		
Recover Refrigerant		.3		

NOTE: R&R Does Not include recover, evacuate and recharge system.

1	Condenser/Trans Cooler	#1.4	68038244AA	$317.00
	#w/Bumper Cover Removed			
2	Receiver/Drier	1.3	68040262AA	$205.00
3	Hose, Discharge			
	2.4L Eng	.8	5058539AB	$25.20
	3.5L Eng			
	w/Rear A/C	.8	5058541AB	$21.80
	w/o Rear A/C	.8	5058582AB	$22.10
4	Hose, Suction			
	w/Rear A/C			
	2.4L Eng	.9	5058535AB	$32.10
	3.5L Eng	.9	5058501AB	$32.10
	w/o Rear A/C			
	2.4L Eng	.9	5058650AB	$76.30
	3.5L Eng	.9	5058537AB	$31.10
5	Compressor			
	w/Rear A/C			
	2.4L Eng	1.7	55111433AD	$540.00
	3.5L Eng	1.7	55111425AB	$539.00
	w/o Rear A/C			
	2.4L Eng	1.7	55111410AD	$665.00
	3.5L Eng	1.7	55111090AB	$514.00

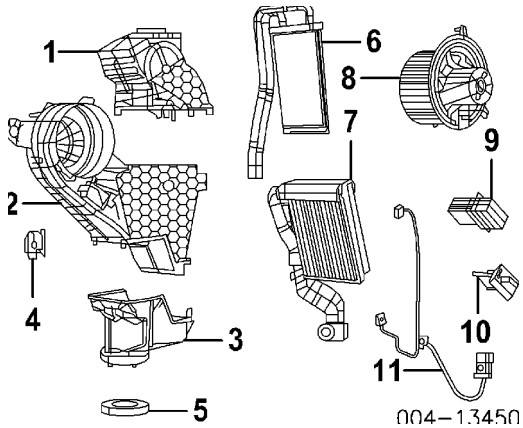
6	Bolt, Compressor Mtg (3)			6104035AA	$6.70
7	Belt, Drive				
	2.4L Eng-See Cooling Section				
	3.5L Eng		.6	4891875AA	$23.95
8	Hose/Tube, Evaporator				
	w/Rear A/C		1.3	68040255AA	$90.60
	w/o Rear A/C		1.3	68040261AA	$90.60
9	Valve, Expansion			68004206AB	$53.60
	Tube, Rear A/C				
10	Discharge	#2.0		5058791AA	$114.00
11	Suction	#2.0		5058500AC	$45.50
	#R&R Complete				



12	Case, A/C /Heater				
	w/Rear A/C	#1.7		68038537AA	$154.00
	w/o Rear A/C	#1.7		68038531AA	$128.00
	#w/Instrument Panel Removed, Includes R&R Blower Case				
13	Duct, Case		R	68038529AA	$23.20
			L	68018108AA	$13.20
14	Motor, Actuator (3)			68018109AA	$29.35
15	Sensor, Temp			5191343AA	$21.95
16	Evaporator				
	w/Rear A/C	#2.2		68038528AA	$192.00
	w/o Rear A/C	#2.2		68038539AA	$210.00
17	Core, Heater				
	w/Rear A/C	#2.1		68038527AA	$147.00

	w/o Rear A/C	#2.1	68038538AA	$131.00
18	Seal Kit, Case		68038530AA	$74.60
19	Case, Blower	#1.7	68038526AA	$234.00
	#w/Instrument Panel Removed			
20	Screen, Vent		68027841AA	$5.85
21	Resistor, Blower	.8	5191344AA	$24.80
22	Motor, Blower	1.0	5191345AA	$106.00

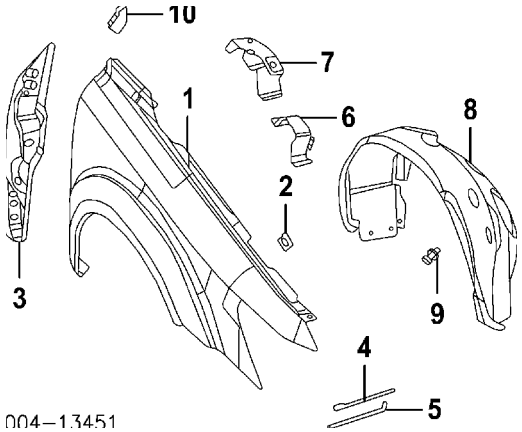
REAR



	R&I Rear A/C Assembly	#3.4		
	#w/Quarter Lower Trim Panel Removed			
	Case, A/C /Heater			
1	Upper	#3.8	68038195AA	$130.00
2	Center	#3.8	68038193AA	$164.00
3	Lower	#3.8	68038194AA	$103.00
	#R&R Complete, w/Quarter Lower Trim Panel Removed			
4	Motor, Actuator (2)		68038198AA	$35.45
5	Seal, Lower		68038196AA	$15.95
6	Core, Heater	#3.7	68038188AA	$184.00
7	Evaporator, Rear	#4.0	68038191AA	$309.00
	#w/Quarter Lower Trim Panel Removed			
8	Motor, Blower	#.6	68038189AA	$106.00
9	Module, Power	#.4	4885482AC	$75.60
10	Resistor, Blower	#.4	68038192AA	$44.50
	#w/Quarter Lower Trim Panel Removed			
11	Harness, Wiring		68038197AA	$67.45

FRONT FENDER

Procedures 7 and 28



Refinish Fender Outside	R		2.1
	L		2.1
Add to Edge Fender	R		.5
	L		.5
R&I Fender	R	#3.0	
	L	#3.0	

#Includes R&I Bumper Cover, R&I/R&R Combination Lamp & Fender Liner

1	Fender, Front	R	#3.4	5076730AB	$89.30
		L	#3.4	5076731AB	$89.30

#Includes R&I Bumper Cover, R&I/R&R Combination Lamp & Fender Liner

2	Brkt, Fender	R		5178218AA	$1.70
		L		5178218AA	$1.70
3	Silencer, Fender	R	.1	5178088AA	$11.50
		L	.1	5178089AA	$11.50
	Bracket, Front Fender				
4	No. 1	R	.1	5155817AA	$3.40
		L	.1	5155817AA	$3.40
5	No. 2	R	.1	5155817AA	$3.40
		L	.1	5155817AA	$3.40
6	Bracket, Front Upr Fender	R	1.0	5076736AA	$50.65
		L	1.0	5076737AA	$50.65
7	Bracket, Rear Upr Fender	R	1.0	5178158AA	$64.00
		L	1.0	5178159AA	$64.00
8	Liner, Fender	R	.4	5116278AB	$46.60
		L	.4	5116279AB	$46.60
9	Clip, Liner (a)	R		6504521	$4.20
		L		6504521	$4.20

(a) As Required

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10 Moulding, Fender (Adhesive)	R	.2	5178150AD	$6.95
	L	.2	5178151AD	$6.95

2010 Dodge Journey R/T Utility

UNDERHOOD DIMENSIONS

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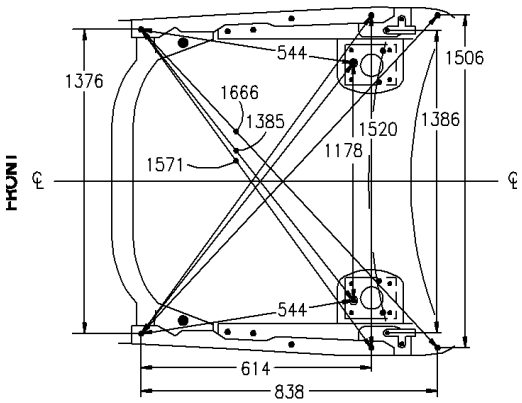
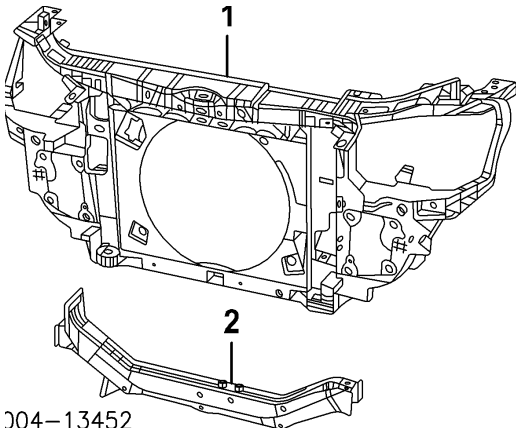


2010 Dodge Journey R/T Utility

FRONT INNER STRUCTURE

Procedures 8 and 28

FRONT

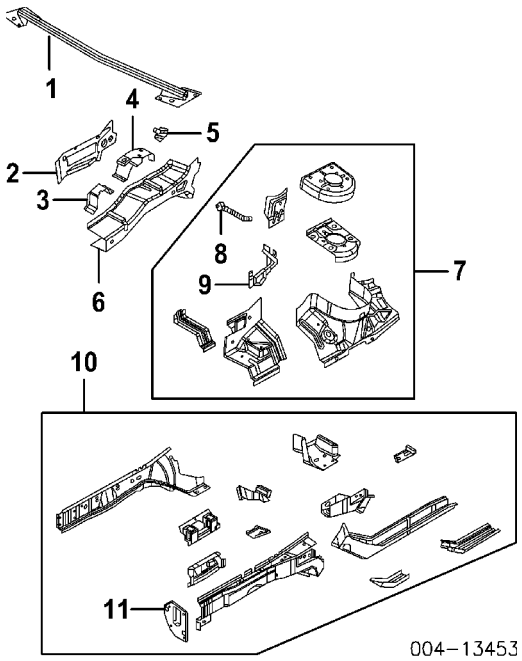


Add to R&R Radiator Support Complete

	To R&I/R&R Base Model Mechanical Components	#1.3		
	#Includes R&I/R&R A/C Condenser & Front Impact Sensors, Power Steering Cooler			
	To Aim Lamps	.4		
	Evacuate & Recharge System	1.4		
	Recover Refrigerant	.3		
1	Support, Radiator (Com)	#6.6	5116300AC	$212.00
	#Includes R&I/R&R Radiator & Cooling Fan Assy, Combination Lamps, Air Deflectors, Air Cleaner Assy, Hood Latch, Washer Reservoir, Horns, Disconnect & Connect Hood Release Cable, Wiring &/or Harness as Necessary			
2	Bar, Lower Tie	4.0	5067896AB	$165.00

SIDE

2010 Dodge Journey R/T Utility

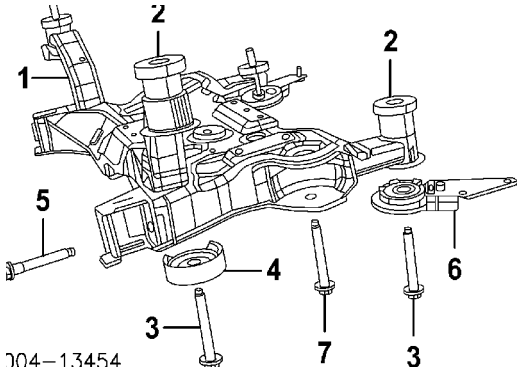


1	Brace, Cross		#.5	5178217AC	$43.95
	#w/Cowl Grille Removed				
2	Reinf, Apron Upper Inr	R	1.0	5155248AA	$12.30
		L	1.0	5155249AA	$12.30
3	Bracket, Front Upr Fender-See Front Fender Section				
4	Bracket, Rear Upr Fender-See Front Fender Section				
5	Brkt, Rear Mtg	R		5155818AB	$3.25
		L		5155819AB	$3.25
6	Reinf, Apron Upper Otr	R	3.5	5067774AB	$124.00
		L	3.5	5067775AB	$124.00
7	Apron Assy	R	5.0	5067914AD	$309.00
		L	5.0	5067915AD	$309.00
8	Brkt, Coolant Tank¶	R		5067901AA	$14.20
9		L	.5	5178239AA	$14.60
	¶Included w/Apron Assy				
10	Rail Assy, Front	R	9.5	5067882AD	$379.00
		L	9.5	5067883AC	$387.00
11	Reinf, Bumper (a)	R	1.5	5067868AA	$26.35
		L	1.5	5067869AA	$26.35

(a) Included w/Front Rail Assy

SUB-FRAME

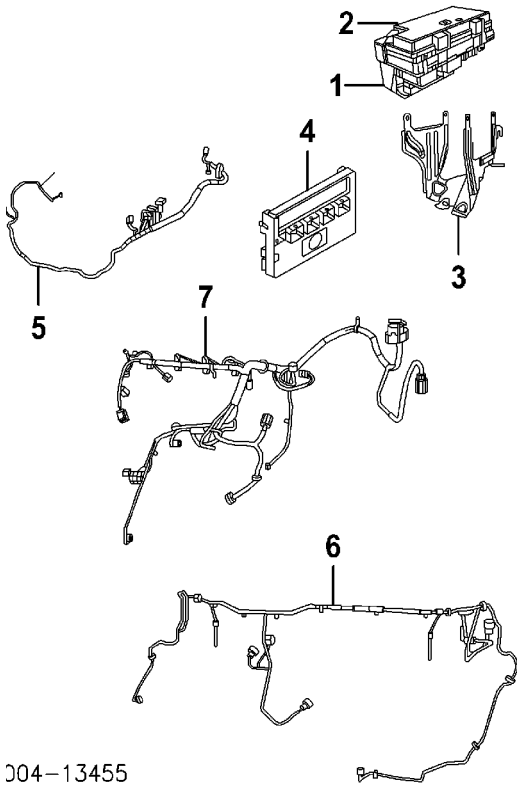
2010 Dodge Journey R/T Utility



1	Sub-Frame		6.0 5085819AE	$344.00
2	Bushing, Sub-Frame (2/Side)	R	4766075AB	$27.60
		L	4766075AB	$27.60
3	Bolt, Bushing (2/Side)	R	6105245AA	$7.30
		L	6105245AA	$7.30
4	Seat, Lower	R	5085795AB	$14.85
		L	5085795AB	$14.85
5	Bolt, Mounting	R	6508844AA	$5.10
		L	6508844AA	$5.10
6	Bracket, Sub-Frame	R	5151014AA	$9.50
		L	5151015AA	$9.50
7	Bolt, Bracket	R	6508758AA	$6.50
		L	6508758AA	$6.50

ELECTRICAL COMPONENTS

2010 Dodge Journey R/T Utility



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1	Box, Fuse/Relay	56049720AQ	$550.00
2	Cover, Fuse/Relay Box	.1 68036345AA	$9.80
3	Bracket, Mounting	5082092AB	$41.20
4	Module, Eng Control-See Electrical Section		
5	Harness, Front Lamp-See Front Lamps Section		
6	Harness, Eng Compartment¶		
	w/Rear A/C	68028695AC	$190.00
	w/o Rear A/C	68024568AD	$175.00
	¶Order by Application		
7	Harness, Engine		
	2.4L Eng		
	w/Rear A/C	4801697AC	$417.00
	w/o Rear A/C	68018226AC	$455.00
	3.5L Eng	4801699AB	$227.00

AIR BAG SYSTEM

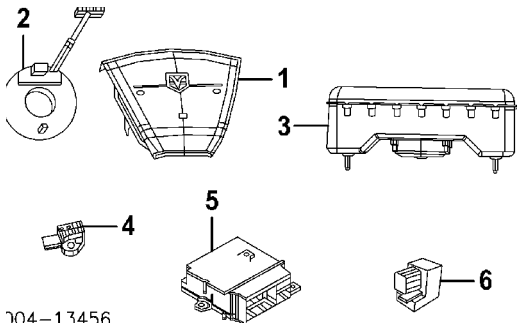
Procedure 30

NOTE 1: R&R Does Not include disable and enable or diagnose Air Bag System.

NOTE 2: Refer to Procedural Explanation 30 for Supplemental Restraint/Air Bag System Component Inspection and Replacement Information.

NOTE 3: For Air Bag System Service procedures, refer to Manufacturer's Service Repair Manual or Mitchell's Air Bag Service and Repair Manual.

FRONT



Disable & Enable Air Bag System			.3		
Diagnose Air Bag System		#.5			
#Includes Disconnect & Connect Scan Tool & Retrieve/Clear Trouble Codes					
1 Module, Driver Air Bag					
Beige			.3	1MP01DK7AA	$257.00
Gray			.3	1MP01XDVAA	$257.00
2 Clockspring			.7	68003216AC	$255.00
3 Module, Pass Air Bag		#.5		52029371AB	$297.00
#w/Instrument Panel Removed					
4 Sensor, Front Impact	R		.5	4896011AB	$25.95
	L		.5	4896011AB	$25.95
5 Module, Occupant Restraint¶					
w/Side Curtain Air Bags		#.6		4896814AF	$138.00
w/o Side Curtain Air Bags		#.6		4896822AF	$83.80
¶Order by Application					
#w/Center Console Removed					
6 Sensor, Seat Position					
Passenger Side		#.3		5084008AA	$8.95
Driver Side		#.3		5084008AA	$8.95

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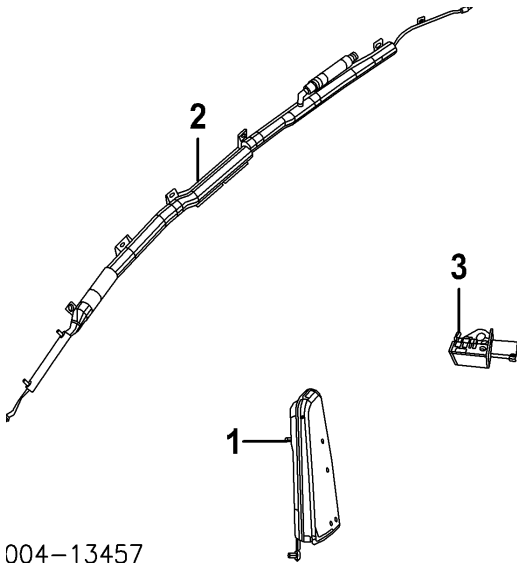
#w/Seat Assy Removed

Pretensioner, Seat Belt-See Seat Belts Section

SIDE



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Disable & Enable Air Bag System .3

Diagnose Air Bag System #.5

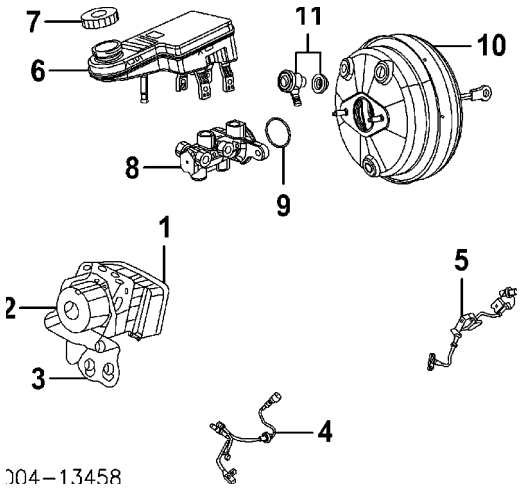
#Includes Disconnect & Connect Scan Tool & Retrieve/Clear Trouble Codes

1	Module, Seat Air Bag				
	Passenger Side		#.6	4645992AC	$217.00
	Driver Side		#.6	4645997AC	$217.00
	#w/Front Seat Assy Removed				
2	Module, Side Curtain Air Bag	R	#.7	52029350AC	$364.00
		L	#.7	52029351AC	$364.00
	#w/Headliner Removed				
3	Sensor, Side Impact	R	#.3	4896011AB	$25.95
		L	#.3	4896011AB	$25.95

#w/Front Door Trim Panel Removed

2010 Dodge Journey R/T Utility

ABS/BRAKES

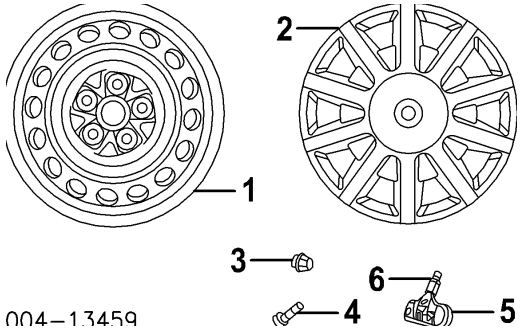


	Bleed Brake System			.6		
	NOTE: R&R Does Not include bleed system.					
1	Module, ABS Control		#3.6		68038226AA	$217.00
2	Control Unit, Hydraulic		#3.6		68038227AA	$300.00
	#R&R Complete					
3	Bracket, Mounting		#.3		68038228AA	$21.20
	#w/Control Unit Removed					
4	Sensor, Front ABS	R		.8	5085822AB	$26.35
		L		.8	5085823AB	$24.50
5	Sensor, Rear ABS	R		.7	4743869AE	$13.85
		L		.7	4743874AE	$13.35
6	Reservoir, Brake Fluid		#.5		68038557AA	$33.20
	#Included in R&R Brake Master Cylinder					
7	Cap, Reservoir				4683656	$13.70
8	Cylinder, Brake Master			1.5	68038556AB	$119.00
9	O-Ring, Cylinder				5191826AA	$7.35
10	Booster, Brake		#2.9		68038555AC	$147.00
	#Includes R&R Brake Master Cylinder					
11	Valve, Check			.4	4723391	$20.35

WHEEL

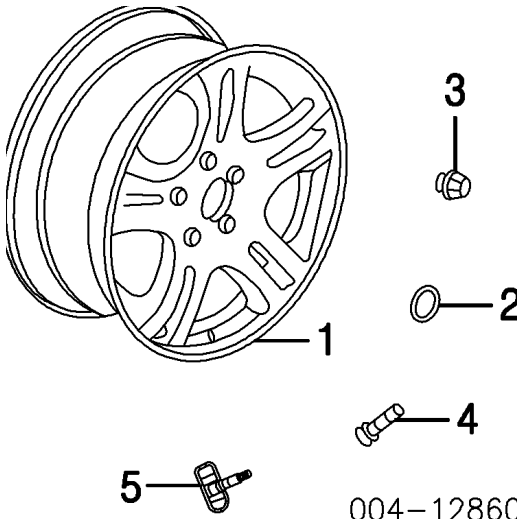
Procedure 10

STEEL WHEEL



	Refinish Wheel	.5		
	Add to R&I Spare Wheel & Tire Assy	.2		
1	Wheel, Steel (16x6-1/2")	.3	4721566AC	$104.00
2	Cover		1BG69PAKAB	$29.20
3	Nut, Lug		6502738	$7.00
4	Stem, Valve		2073355	$3.45
5	Sensor, Tire Pressure		68001698AA	$24.85
6	Nut, Mounting		68001743AB	$39.85

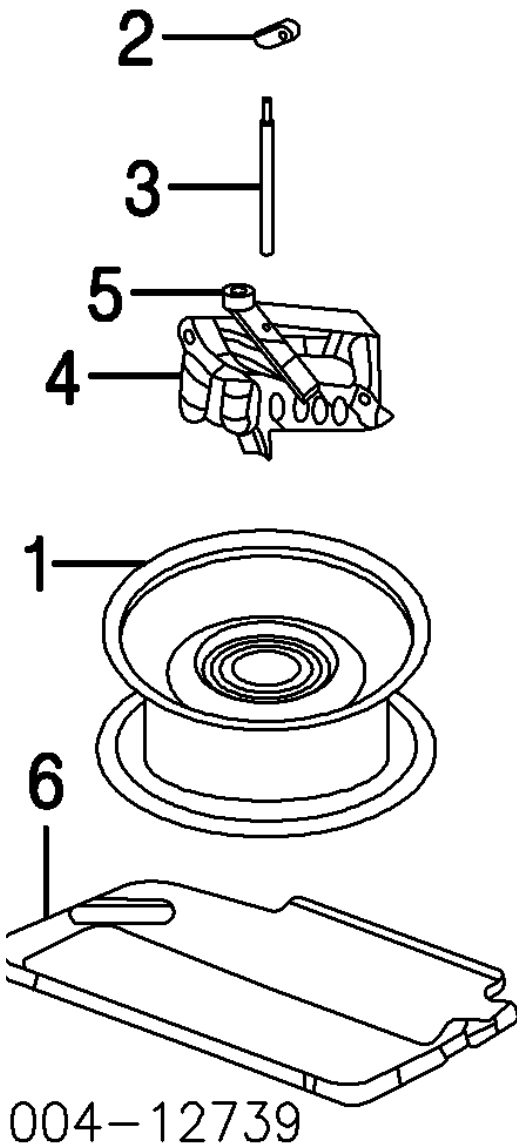
ALLOY WHEEL



	Add to R&I Spare Wheel & Tire Assy	.2		
1	Wheel, Alloy (19x7")			
	Chrome	.3	1CY86SZ0AA	$420.00
	Cast	.3	1CY85PAKAA	$385.00
2	Cap, Center		52110398AA	$21.85

3	Nut, Lug	6504672	$7.45
4	Stem, Valve	2073355	$3.45
5	Sensor, Tire Pressure	68001698AA	$24.85
	Nut, Mounting	68001743AB	$39.85

SPARE WHEEL & HARDWARE



1	Wheel, Spare	4721567AA	$143.00
2	Hold-Down, Spare	5178091AC	$86.60
3	Bolt, Mounting	N.A.	
4	Jack	4880456AA	$93.00
5	Wrench, Lug	52124170AA	$30.70
6	Shield, Spare Wheel	5178501AC	$93.95

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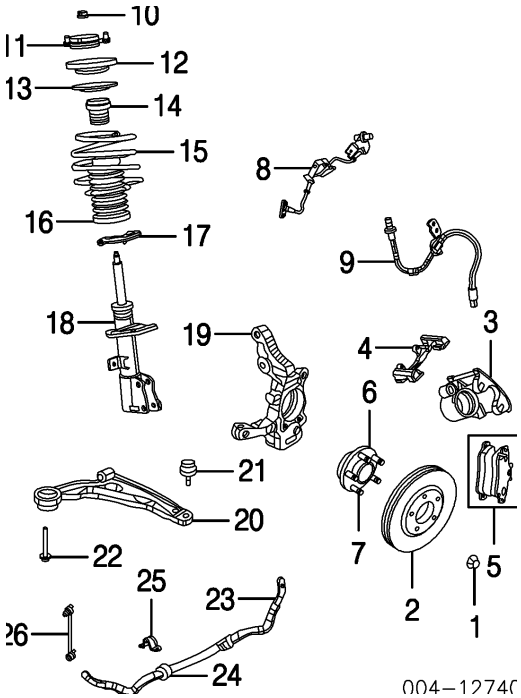
Hook, Tow	5116161AC	$28.90

FRONT SUSPENSION

Procedure 11



R&I Suspension (One Side)	R	1.6
	L	1.6
O/H Suspension (Includes R&I)		
O/H One Side (Includes R&I)	R	3.7
	L	3.7
O/H Both Sides (Includes R&I)		7.0
Adjust Four Wheel Alignment		1.8
Adjust Front Alignment		1.2
Bleed Brake System		.6

NOTE 1: R&I/R&R or O/H Does Not include alignment or bleed brake system.

NOTE 2: All Parts in this section are included in overhaul unless noted otherwise.

1	Nut, Axle-See Front Drive Axle Section				
2	Rotor, Brake	R	#.6	4721995AA	$62.75
		L	#.6	4721995AA	$62.75
	#R&R Both Sides 1.0				

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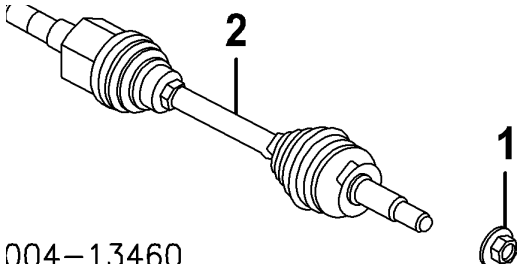
3	Caliper, Brake	R	#.5	68003707AA	$63.45
		L	#.5	68003697AA	$63.45
4	Bracket, Caliper	R	#.5	68038077AA	$42.80
		L	#.5	68038077AA	$42.80
	#R&R One Side Complete, R&R Both Sides .8				
5	Pad Set, Brake		#1.0	68029263AA	$95.45
	#Deduct .5 for Each Caliper Removed				
6	Hub/Bearing	R	#1.1	4721010AA	$242.00
		L	#1.1	4721010AA	$242.00
	#Includes R&R Rotor, R&R Both Sides 2.0				
7	Stud, Lug (5/Side)	R		6508707AA	$2.95
		L		6508707AA	$2.95
8	Sensor, Front ABS-See ABS/Brakes Section				
9	Hose, Front Brake	R	#.3	4862210AB	$28.00
		L	#.3	4862211AB	$28.00
	#w/Caliper Removed Deduct .2				
10	Nut, Retainer	R		6508273AA	$8.45
		L		6508273AA	$8.45
11	Mount, Upper Strut	R	#1.4	5171178AB	$18.50
		L	#1.4	5171178AB	$18.50
12	Bearing, Strut	R	#1.4	5171093AC	$15.70
		L	#1.4	5171093AC	$15.70
13	Isolator, Upper Spring	R	#1.4	5151024AA	$17.85
		L	#1.4	5151024AA	$17.85
14	Jounce, Bumper	R	#1.4	5151184AB	$14.50
		L	#1.4	5151184AB	$14.50
15	Spring, Coil¶	R	#1.4	5151130AB	$87.30
		L	#1.4	5151130AB	$87.30
	¶Order by Application				
16	Shield, Dust	R	#1.4	5171132AC	$2.70
		L	#1.4	5171132AC	$2.70
17	Isolator, Lower Spring	R	#1.4	5085405AB	$6.65
		L	#1.4	5085405AB	$6.65
18	Absorber, Shock¶	R	#1.4	68039640AA	$77.10
		L	#1.4	68039641AA	$77.10
	¶Order by Application				
	#R&R One Side Complete, w/Knuckle Removed Deduct .6, R&R Both Sides 2.6				
19	Knuckle, Steering	R	#1.8	5171102AB	$117.00

		L	#1.8	5171101AB	$117.00
	#Includes R&R Hub & Rotor, R&R Both Sides 3.0				
20	Arm, Control	R	#1.3	4766424AA	$200.00
		L	#1.3	4766423AA	$200.00
	#w/Knuckle Removed Deduct .6, R&R Both Sides 2.4				
21	Joint, Ball	R	#1.1	5085914AC	$37.60
		L	#1.1	5085914AC	$37.60
	#w/Knuckle Removed Deduct .7				
22	Bolt, Control Arm	R		6508758AA	$6.50
		L		6508758AA	$6.50
23	Bar, Stabilizer¶		#2.8	5151138AB	$202.00
	#Includes R&R Links, Clamps & Bushings, Not Included in O/H				
24	Bushing, Stabilizer¶	R	#	5151238AB	$10.60
		L	#	5151238AB	$10.60
	¶Order by Application				
25	Clamp, Bushing	R	#	5151025AA	$3.95
		L	#	5151025AA	$3.95
26	Link, Stabilizer	R	#.4	4766962AA	$36.85
		L	#.4	4766962AA	$36.85
	#Not Included in O/H				

FRONT DRIVE AXLE



R&I Axle Shaft Assy		R	#.3	
		L	#.3	
#w/Necessary Suspension Components Removed				
1	Nut, Axle	R		N.A.
		L		N.A.
2	Axle, Drive	R	#.3	N.A.
		L	#.3	N.A.
#w/Necessary Suspension Components Removed				

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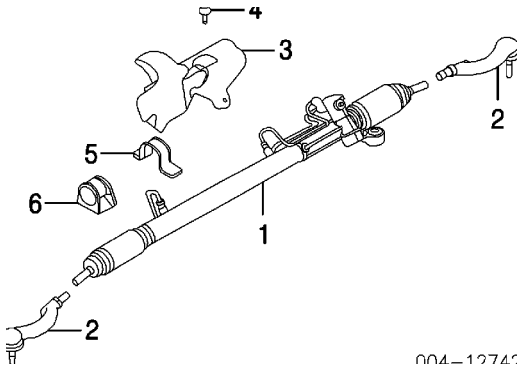
FRONT STEERING LINKAGE/GEAR



R&I Gear Assy			4.0		
NOTE: R&I/R&R Does Not include check or adjust alignment.					
1 Gear, Steering					
Std Steering			4.4	5151347AC	$842.00
Firm Feel, Performance Strg			4.4	5151348AC	$842.00
2 End, Tie Rod		R	.3	5183761AB	$41.60
		L	.3	5183761AB	$41.60
3 Shield, Heat				5085543AB	$34.95
4 Screw, Shield (2)				6105085AA	$2.80
5 Clamp, Steering Gear		R		N.A.	
6 Bushing, Strg Gear Clamp		R		N.A.	

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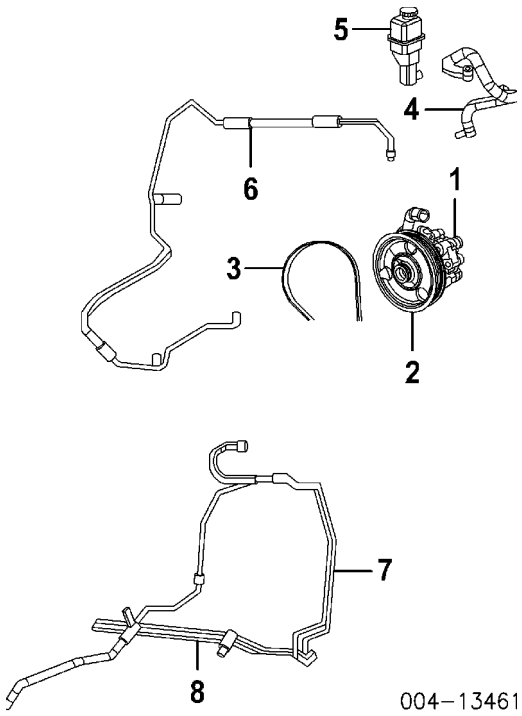
STEERING PUMP



1	Pump, Power Steering			
	2.4L Eng	.9	5151016AD	$179.00
	3.5L Eng	2.5	5151835AB	$133.00
2	Pulley, Pump			
	2.4L Eng-Serviced w/Power Steering Pump			
	3.5L Eng		4593830AA	$16.20
3	Belt, Drive			
	2.4L Eng-See Cooling Section			
	3.5L Eng-See A/C /Heater/Ventilation Section			
4	Hose, Pump Supply			
	2.4L Eng	.4	4766283AA	$14.85
	3.5L Eng	.4	4766282AB	$23.20
5	Reservoir, Fluid	.8	4766963AA	$30.20
6	Hose, Pressure			
	2.4L Eng	1.7	5272817AE	$70.85
	3.5L Eng	1.7	N.A.	
7	Hose, Return	1.1	5085546AB	$29.35
8	Cooler, Pwr Steering	#.6	4766279AC	$136.00

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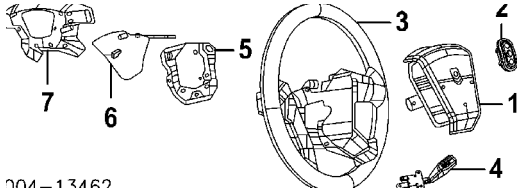
#w/Bumper Cover Removed

STEERING WHEEL/COLUMN

NOTE: All Parts in this section are included in overhaul unless noted otherwise.

WHEEL & TRIM



1	Module, Driver Air Bag-See Air Bag System Section				
2	Switch, Audio Control	R	.3	4685728AB	$16.30
		L	.3	4685729AB	$18.80
3	Wheel, Steering				
	w/Audio Controls				
	Beige		.6	1FS562R4AB	$387.00
	Gray		.6	1FS56XDVAB	$322.00
	w/o Audio Controls		.6	1EB83DK5AA	$285.00
4	Switch, Cruise Control		.4	4671929AA	$9.95
5	Switch, Horn			5189428AB	$83.95
6	Harness, Wiring			68000462AB	$67.45
7	Cover, Strg Wheel				
	w/Audio Controls				
	Beige			1ES10DK5AB	$61.60
	Gray			1EB85XDVAB	$72.35
	w/o Audio Controls			1EB84DK5AB	$72.35

COLUMN TILT

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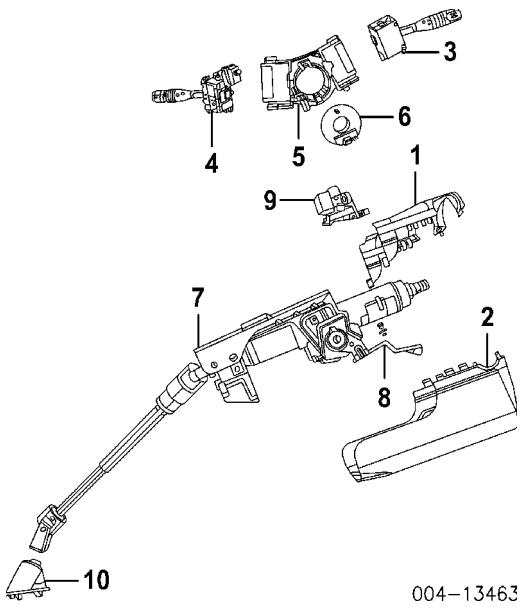
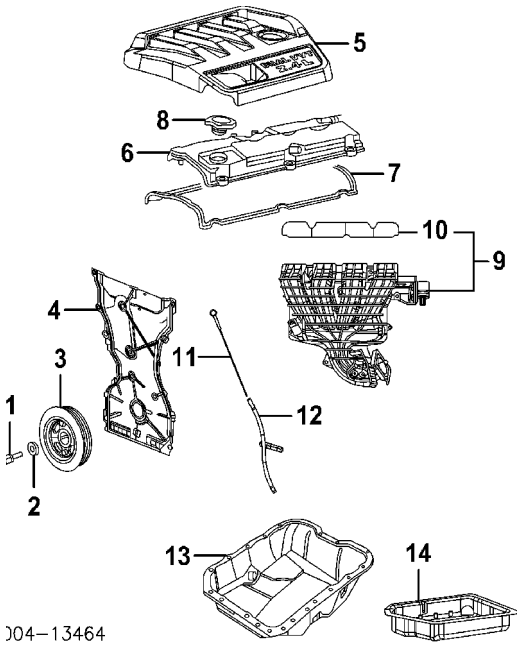


	R&I Steering Column		1.6	
	O/H Steering Column (Includes R&I)		3.2	
1	Cover, Upper Column			
	Beige	#.5	N.A.	
	Gray	#.5	1JL081DVAB	$23.50
2	Cover, Lower Column			
	Beige	#.5	1GA13DK7AC	$63.70
	Gray	#.5	1GA13XDVAC	$65.85
	#R&R Complete			
3	Switch, Wiper		1.0 68003215AB	$24.10
4	Switch, H/Lamp/Signal¶		1.0 68015101AC	$61.20
	¶Order by Application			
5	Body, Switch		1.2 N.A.	
6	Clockspring-See Air Bag System Section			
7	Column, Steering		2.7 N.A.	
8	Lever, Tilt		.8 5057246AE	$28.10
9	Mounting, Switch		5057238AC	$8.70
	Lock, Steering		1.6 N.A.	
	Switch, Ignition		.9 N.A.	
10	Seal, Column		5291892AC	$61.20

ENGINE/TRANSMISSION

Procedure 12

2.4L ENG



R&I Engine/Trans Assy 10.3

1	Bolt, Crankshaft		6509029AA	$1.80
2	Washer, Crank Bolt		4884877AB	$1.45
3	Pulley, Crankshaft	1.1	2312425000	$41.20
4	Cover, Timing	#2.7	4884466AB	$48.60
	Seal, Crankshaft	#1.4	2142125000	$10.30
	#Includes R&R Crankshaft Pulley			
	Pump, Oil		5189868AD	$219.00
5	Cover, Engine	.4	4891689AB	$37.20
6	Cover, Valve	.9	4884760AE	$66.70
7	Gskt, Valve Cover		4884762AA	$7.35
8	Cap, Oil Filler		53013775AA	$7.95
9	Manifold Assy, Intake	2.6	4884495AF	$194.00
10	Gasket, Manifold¶		4884550AB	$3.80
	¶Included w/Intake Manifold Assy			
11	Dipstick, Eng Oil		4884688AD	$3.80
12	Tube, Dipstick	.6	4884733AC	$8.30
13	Pan, Eng Oil	1.6	4884665AE	$47.85
14	Pan, Trans Oil	.9	4431997	$41.10

3.5L ENG

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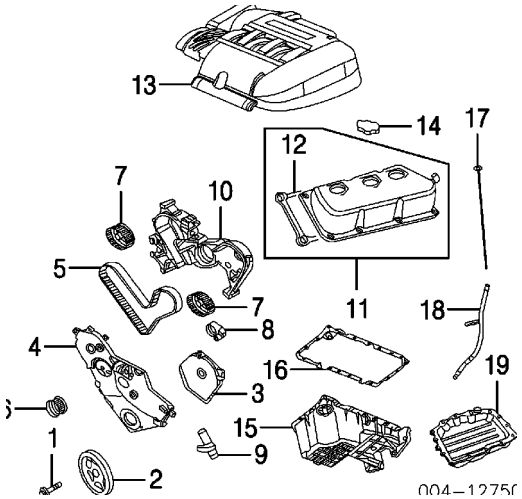

	R&I Engine/Trans Assy			12.7	
1	Bolt, Crankshaft			6101984	$3.00
2	Pulley, Crankshaft			1.0 4892135AA	$67.85
	Cover, Frt Timing				
3	Upper		#2.4	4892270AA	$10.85
4	Lower		#2.4	4892138AB	$16.85
	#R&R Complete, Includes R&R Crankshaft Pulley				
5	Belt, Timing		#3.7	4792353	$163.00
	#Includes R&R Crankshaft Pulley, Upper & Lower Timing Covers				
6	Sprocket, Crankshaft		#.2	4536479	$24.95
7	Gear, Upper Timing	R	#.2	4792025AB	$13.50
		L	#.2	4792580AC	$31.80
8	Roller, Tensioner		#.1	4663515AC	$52.85
9	Tensioner, Timing Belt		#.2	4892109AA	$137.00
	#w/Timing Belt Removed				
10	Cover, Rear Timing			4892136AC	$197.00
	Pump, Oil			4663844AF	$64.80
	Gskt, Oil Pump			4648938AC	$9.10
11	Cover Assy, Valve	R	#2.5	4892206AB	$96.20
		L	#1.1	4892203AA	$63.30
	#R&R Both Sides 3.2				
12	Gasket, Valve Cover¶	R		4892146AA	$14.35
		L		4892146AA	$14.35
	¶Included w/Valve Cover Assy				
13	Cover, Eng			.3 4891936AE	$108.00
14	Cap, Oil Filler			4892289AA	$6.50

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15	Pan, Eng Oil	1.6	4892447AA	$106.00
16	Gasket, Eng Oil Pan		4792869AA	$12.45
	Plate, Baffle		4663938AD	$7.35
17	Dipstick, Eng Oil		4892121AA	$4.30
18	Tube, Dipstick	.5	4892119AA	$5.50
19	Pan, Trans Oil	.9	5078556AA	$7.00

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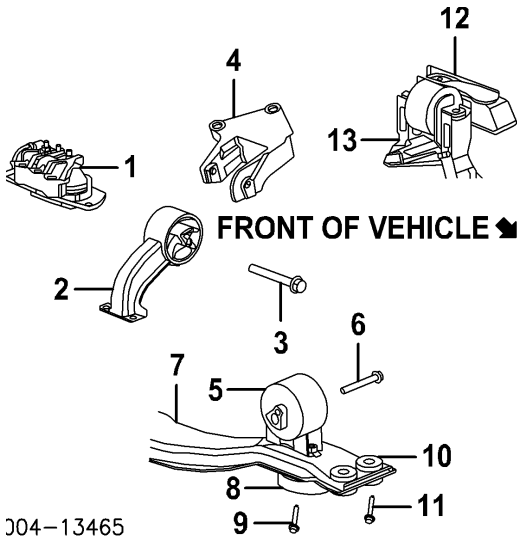
ENGINE/TRANSMISSION MOUNTS



1	Mount, Front Eng					
	2.4L Eng			1.2	5171070AD	$111.00
	3.5L Eng			1.2	5171073AC	$110.00
2	Mount, Right Eng					
	2.4L Eng	R	#1.6		5171086AC	$66.45
	3.5L Eng	R	#1.6		5171089AC	$66.45
3	Bolt, Right Eng Mtg	R			6506022AA	$3.35
4	Brkt, Right Eng					
	2.4L Eng	R	#1.6		5085074AE	$41.10
	3.5L Eng	R	#1.6		5085517AE	$32.50
	#R&R Complete					
5	Mount, Left Eng					
	2.4L Eng	L		1.0	5171078AC	$48.00
	3.5L Eng	L		1.0	5171081AC	$48.35
6	Bolt, Left Engine Mount	L			6506022AA	$3.35
	Brkt, Left Eng					
	2.4L Eng	L			5273373AD	$29.50
	3.5L Eng	L			5085514AB	$34.10
7	Crossmember, Eng Mtg			.8	5272647AF	$110.00
8	Damper, Vibration					
	2.4L Eng				4766422AA	$46.30
	3.5L Eng				5085896AA	$47.85
9	Bolt, Eng Mount				6508759AA	$0.85
10	Bushing, Crossmember-Serviced w/Eng Mtg Crossmember					
11	Bolt, Crossmember (a)¶				6508950AA	$5.45
	¶Order by Application					

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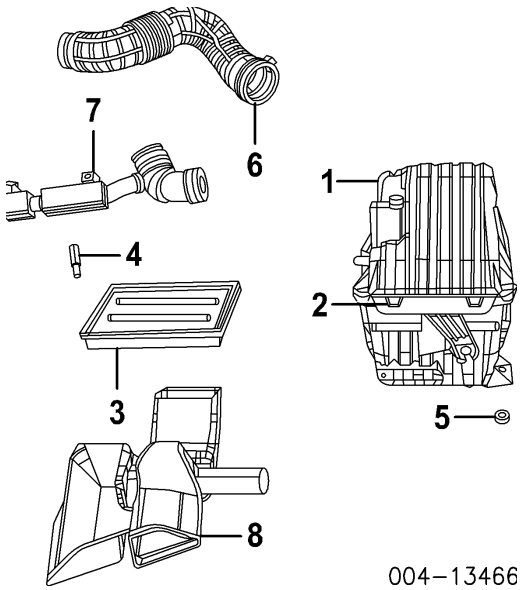
	(a) As Required				
12	Mount, Trans				
	2.4L Eng		.9	4766474AC	$84.10
	3.5L Eng		.9	4766475AC	$85.10
13	Brkt, Trans Mount				
	2.4L Eng	#.4		5085825AB	$25.35
	3.5L Eng	#.4		5085826AB	$21.80
	#w/Mount Removed				

2010 Dodge Journey R/T Utility

AIR CLEANER



004−13466

	R&I Air Cleaner Assy	.6		
1	Housing, Air Cleaner	.6	4891913AC	$103.00
2	Clamp, Housing (2)		68038513AA	$1.50
3	Element, Air Cleaner	.3	4891916AA	$27.80
4	Sensor, Air Temp	.3	56028364AA	$9.80
5	Grommet, Mtg (2)		4268295	$3.50
	Hose, Air Cleaner			
6	2.4L Eng	.3	4891892AB	$94.10
7	3.5L Eng	.3	4891911AB	$29.60
8	Duct, Air Cleaner			
	2.4L Eng	.3	4891893AB	$34.50
	3.5L Eng	.3	4891896AB	$30.00

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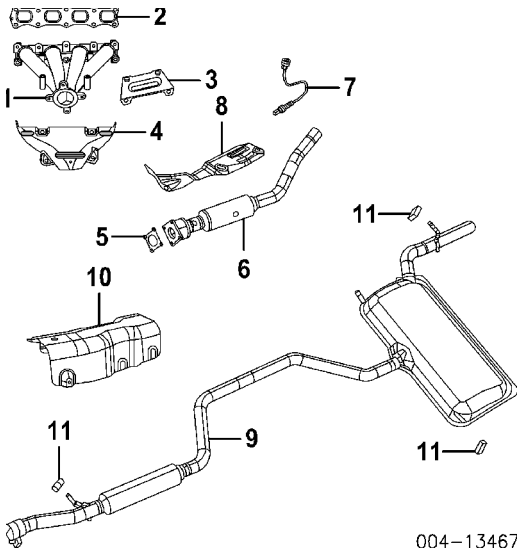
EXHAUST

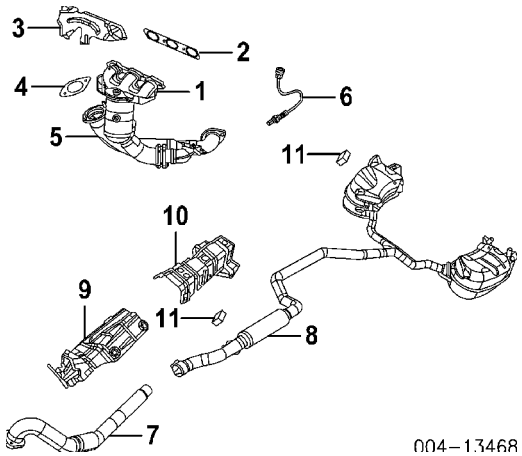
2.4L ENG



R&I Exhaust System Complete	#1.8			
R&R Exhaust System Complete	#2.2			
#Does Not Include R&R Exhaust Manifold & Heat Shields				
1 Manifold, Exhaust		1.9	4693321AD	$93.00
2 Gskt, Manifold			1555A185	$2.85
3 Brkt, Manifold			4693350AC	$2.20
4 Shield, Manifold				
Upper	#.5		4693348AB	$6.30
#Included in R&R Exhaust Manifold				
Lower		.2	4693349AB	$12.45
5 Gskt, Flange			4616671AB	$8.70
6 Converter, Catalytic				
w/Calif Emissions		1.0	5105145AC	$679.00
w/o Calif Emissions		1.0	68039232AA	$684.00
7 Sensor, Oxygen-See Emission System Section				
8 Shield, Converter Heat			5178234AB	$35.30
9 Muffler		1.2	4880202AC	$480.00
10 Shield, Muffler Heat	#.4		5178074AB	$46.10
#w/Exhaust System Removed				

11	Hanger, Exhaust (4)			5105110AB	$2.20

3.5L ENG



R&I Exhaust System Complete #2.7

R&R Exhaust System Complete #3.0

#Does Not Include R&R Exhaust Manifold & Heat Shields

1	Manifold, Exhaust					
	w/Calif Emissions	R		2.6	5171140AB	$710.00
		L		1.7	5171143AC	$505.00
	w/o Calif Emissions	R		2.6	68042142AA	$512.00
		L		1.7	68042141AA	$387.00
2	Gasket, Manifold	R			4663958	$7.60
		L			4663958	$7.60
3	Shield, Manifold Heat	R	#.7		4892164AB	$6.80
		L	#.4		4892165AC	$8.95

#Included in R&R Exhaust Manifold

4	Gskt, Pipe			4880235AC	$7.80
5	Pipe, Crossover		2.0	4880400AF	$65.20
6	Sensor, Oxygen-See Emission System Section				
7	Pipe, Front		.8	5085434AD	$138.00
8	Muffler		1.2	4743708AC	$849.00
	Shield, Exhaust Heat				
9	Front	#.4		5178234AB	$35.30
10	Rear	#.4		5178328AB	$46.00

#w/Exhaust System Removed

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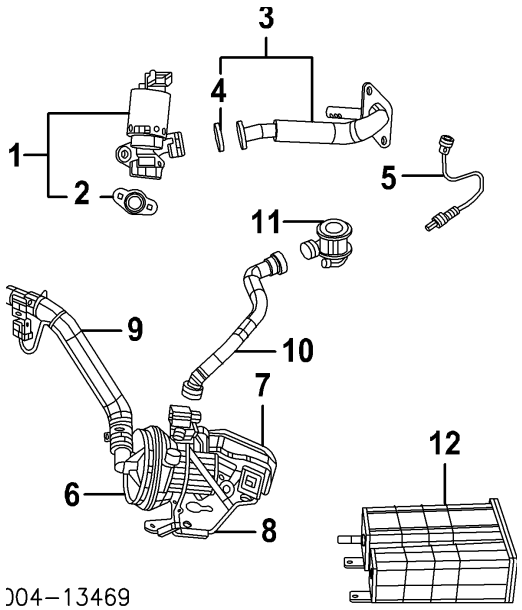
11	Hanger, Exhaust (4)	5105110AB	$2.20

EMISSION SYSTEM



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1	Valve Assy, EGR			
	3.5L Eng	.9	4593688AD	$82.00
2	Gskt, EGR Valve¶		4891068AB	$7.85
	¶Included w/EGR Valve Assy			
3	Tube Assy, EGR			
	3.5L Eng	.6	4593576AC	$24.45
4	Gasket, Tube (a)		5277928	$2.70
	(a) Included w/EGR Tube Assy			
5	Sensor, Oxygen			
	2.4L Eng	.5	56029084AA	$41.60
	3.5L Eng			
	Front R	.5	56029049AA	$48.85
	Front L	.5	56029049AA	$48.85
	Rear R	.7	56029049AA	$48.85
	Rear L	.7	56029049AA	$48.85
6	Pump, Air			
	2.4L Eng	.8	4891832AA	$224.00
7	Shield, Heat		4891952AA	$22.80
8	Brkt, Pump		4891831AB	$26.85
9	Hose, Air			
	2.4L Eng	.4	4891927AA	$12.60
10	Tube, Air			
	2.4L Eng		4891608AB	$12.95
11	Valve, Check			

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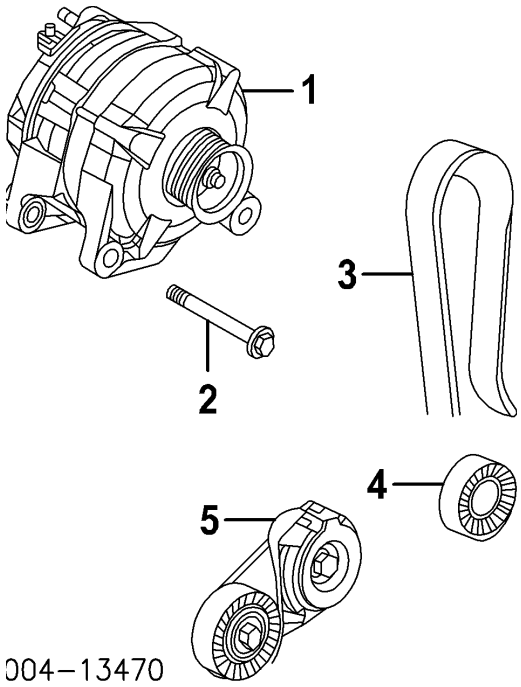
	2.4L Eng		68042314AA	$70.10
12	Canister, Vapor			
	2.4L Eng			
	w/Calif Emissions	.9	4766519AC	$163.00
	w/o Calif Emissions	.9	4766520AC	$84.10
	3.5L Eng	.9	4766520AC	$84.10

ELECTRICAL

ALTERNATOR



1 Alternator			
2.4L Eng	1.7	4801490AA	$337.00
3.5L Eng			
140 Amp	.8	5033759AC	$293.00
160 Amp	.8	4801483AA	$266.00
2 Bolt, Mounting			
2.4L Eng			
Type 1		6104227AA	$2.75
Type 2		6508278AA	$0.45
3.5L Eng			
Type 1		6102172AA	$1.85
Type 2		6102122AA	$2.80
3 Belt, Drive			
2.4L Eng-See Cooling Section			
3.5L Eng-See A/C /Heater/Ventilation Section			
4 Pulley, Idler			
2.4L Eng-See Cooling Section			
3.5L Eng	.7	4891720AA	$26.80
5 Tensioner, Belt			

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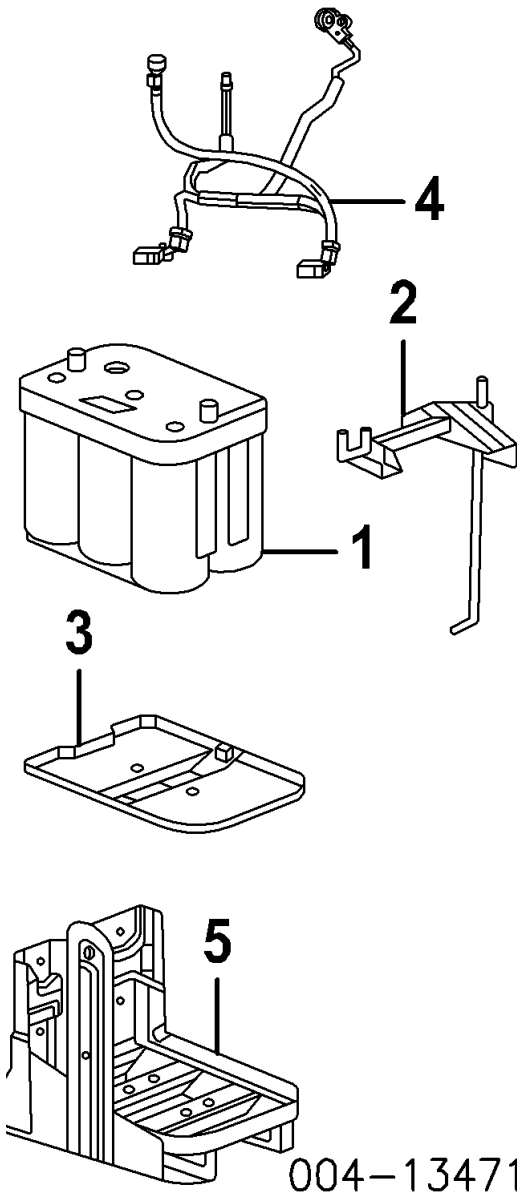
2.4L Eng-See Cooling Section

3.5L Eng .8 4593805AB $114.00

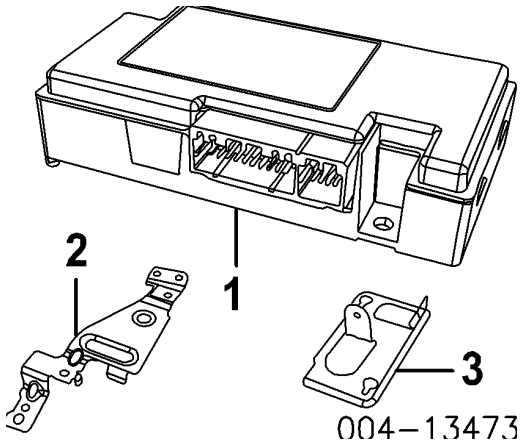
BATTERY



1	Battery	.7	N.A.	
2	Hold-Down, Battery		5116495AA	$12.65
3	Tray, Battery		5116485AA	$8.45
4	Cable Set, Battery	1.4	5084111AD	$70.95
5	Support, Battery	#1.1	5178247AA	

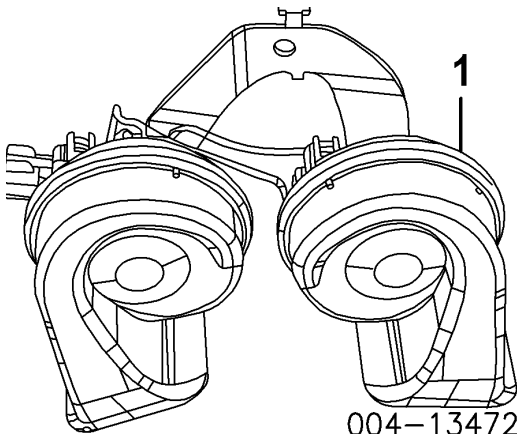
#Includes R&R Battery

COMMUNICATIONS SYSTEM



1	Module, Communication¶	.6	5064481AD	$499.00
	¶Order by Application			
	Bracket, Module			
2	No. 1		68046547AA	$55.20
3	No. 2		5031941AA	$4.60

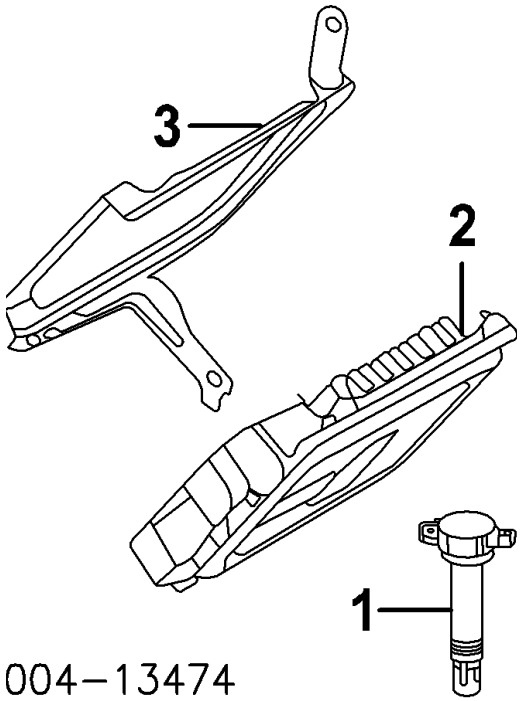
HORN



1	Horn, Dual	.3	56050166AC	$43.30

IGNITION

2010 Dodge Journey R/T Utility



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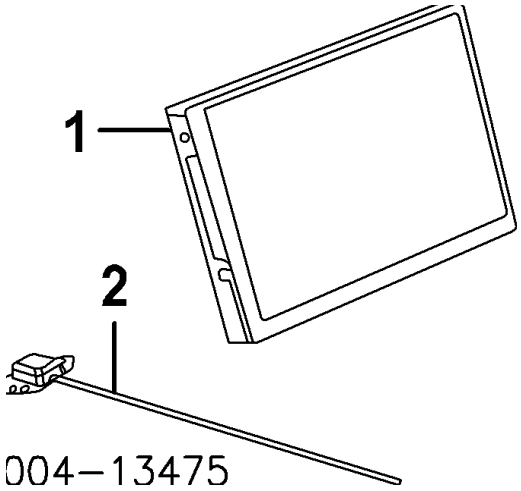
R&R Ignition Coils Complete

	2.4L Eng		.8		
	3.5L Eng		1.2		
1	Coil, Ignition				
	2.4L Eng, (4)		.4	4606824AB	$24.30
	3.5L Eng, (3/Side)	R	.4	4606869AB	$39.85
		L	.4	4606869AB	$39.85
2	Module, Eng Control				
	2.4L Eng		.7	5150472AA	$369.00
	3.5L Eng		.7	5150244AC	$369.00
3	Bracket, Module				
	2.4L Eng			5187497AC	$19.35
	3.5L Eng			5187495AD	$13.30

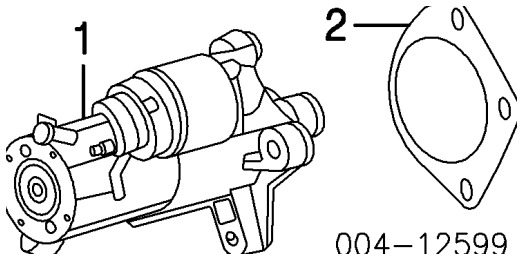
NAVIGATION SYSTEM

2010 Dodge Journey R/T Utility



1	Display, Navigation	.8	5064339AD	$825.00
2	Antenna, GPS	1.3	5064187AA	$60.10

STARTER

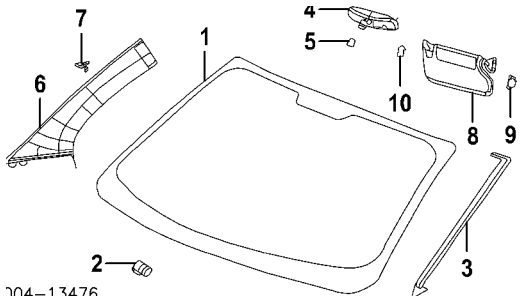


1	Starter			
	2.4L Eng	1.8	5034555AA	$81.70
	3.5L Eng	2.6	4608800AE	$104.00
2	Shield, Starter			
	3.5L Eng		4861592AA	$2.10

2010 Dodge Journey R/T Utility

WINDSHIELD

Procedure 13



R&I Windshield #2.9

#Includes R&R Cowl Grille & Clean Up Old Adhesive as Necessary

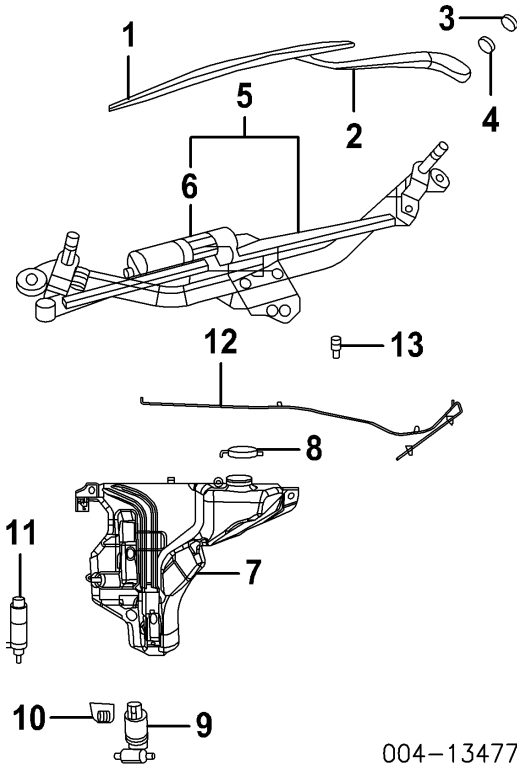
1	Glass, Windshield				
	Dodge		#2.6	68041380AA	$429.00
	NAGS				
	Green		#2.6	DW01759GTN	$337.70
	Green/Blue Shade		#2.6	DW01759GBN	$360.50

#Includes R&R Cowl Grille & Clean Up Old Adhesive as Necessary

	Adhesive, Glass			N.A.	
2	Spacer, Windshield	R		55276549AA	$6.45
		L		55276549AA	$6.45
3	Moulding, Windshield	R		5116264AB	$26.60
		L		5116265AB	$26.60
4	Mirror, Rear View				
	w/Microphone		.2	55157457AB	$310.00
	w/o Microphone				
	Standard		.2	4805332AD	$33.60
	Electrochromic		.2	4805572AD	$169.00
5	Brkt, Mirror Mtg			55076401	$13.95
6	Garnish, Windshield	R	.2	1BG08DW1AB	$33.95
		L	.2	1BG09DW1AB	$33.95
7	Clip, Garnish (a)	R		68045441AA	$5.00
		L		68045441AA	$5.00
	(a) As Required				
8	Visor, Sun				
	Right				
	Illuminated	R	.2	1MS51DW1AA	$56.20
	Non-Illuminated	R	.2	1MT57DW1AA	$56.20
	Left				
	Illuminated				

	w/GDO	L		.2	1MS50DW1AA	$166.00
	w/o GDO	L		.2	1MT58DW1AA	$56.20
	Non-Illuminated	L		.2	1MT56DW1AA	$56.20
	Support, Visor	R			1MT61DW1AA	$1.95
		L			1MT61DW1AA	$1.95
9	Retainer, Visor	R			68046178AA	$5.70
		L			68046178AA	$5.70
10	Clip, Visor	R			68046287AA	$5.60
		L			68046287AA	$5.60

WIPER SYSTEM



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1	Blade, Wiper	R		.1	68046382AA	$30.45
		L		.1	68030273AA	$31.20
2	Arm, Wiper	R	#.2		68030274AA	$32.95
		L	#.2		68030275AA	$31.60
	#Includes R&R Wiper Blade or Insert					
3	Cap, Nut	R			4630783	$2.80
		L			4630783	$2.80
4	Nut, Wiper Arm	R			6504954AA	$4.80
		L			6504954AA	$4.80
5	Link Assy, Wiper		#1.3		5116303AE	$150.00
6	Motor, Wiper¶		#1.3		68030272AA	$110.00

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¶Included w/Wiper Link Assy

#R&R Complete, Includes R&R Cowl Grille

7	Reservoir, Washer				
	w/Headlamp Washer		#1.2	68041382AB	$45.85
	w/o Headlamp Washer		#1.0	68041379AA	$45.00

#Includes R&I/R&R Air Cleaner Assy

8	Cap, Reservoir			55077261AA	$12.10
9	Pump, Windshield Washer		#.3	5179153AC	$56.80

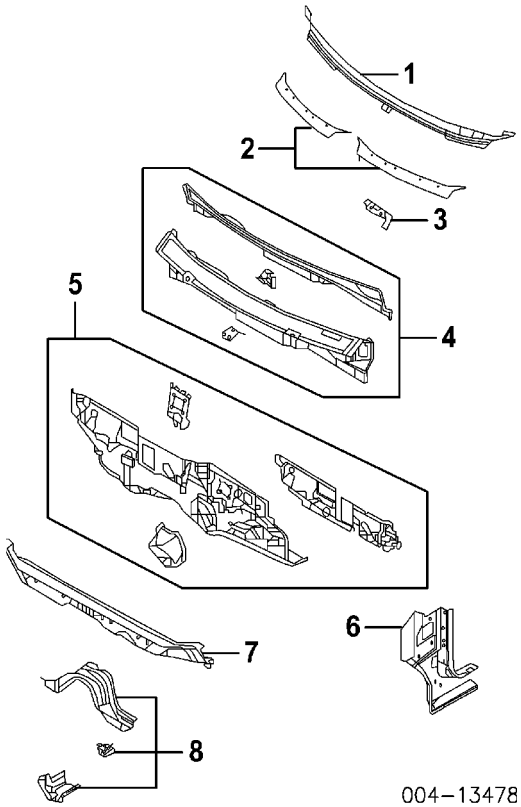
#Included in R&R Washer Reservoir

10	Sensor, Fluid Level			5152029AA	$2.70
11	Pump, H/Lamp Washer-See Front Lamps Section				
12	Hose, Washer (a)			N.A.	
	(a) Cut to Fit				
13	Nozzle, Washer	R	#.2	5116079AA	$13.95
		L	#.2	5116079AA	$13.95

#Included in R&R Hood

COWL & DASH

Procedures 14 and 28



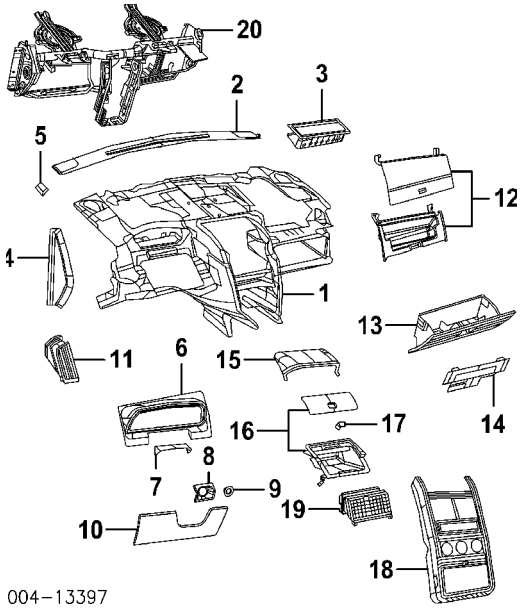
R&I Cowl Grille Assy #.6

#Includes R&I/R&R Wiper Arms

1	Grille, Cowl		#.6	5178502AD	$18.70
2	Screen, Cowl		#.6	5116266AE	$62.60
	#R&R Complete, Includes R&I/R&R Wiper Arms				
3	Baffle, Air Inlet	R		5155718AB	$6.35
		L		5155719AB	$6.35
4	Panel, Upper Cowl		5.0	5067917AC	$225.00
5	Panel, Dash		6.5	5067841AC	$315.00
6	Panel, Side Cowl-See Rocker/Pillars/Floor Section				
	Crossmember, Dash				
7	Upper		3.5	5067932AB	$85.10
8	Lower		2.0	5178054AA	$57.00

INSTRUMENT PANEL

Procedure 14



R&I Instrument Panel 5.7

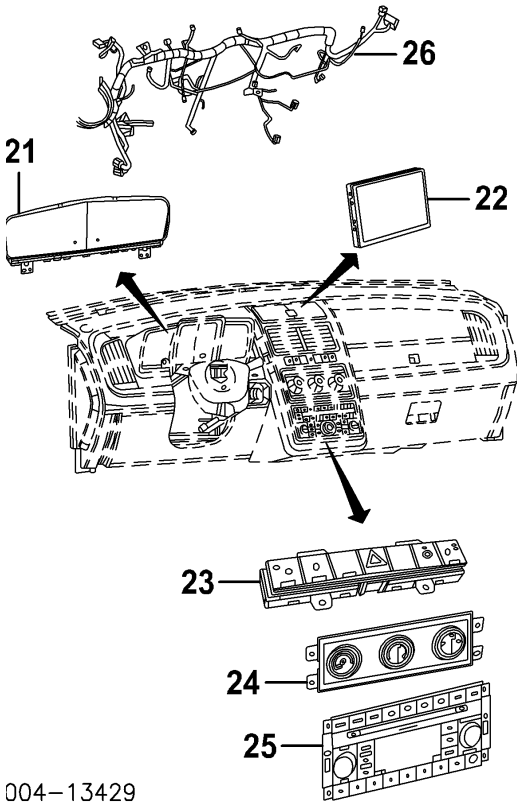
NOTE: All Parts in this section are included in R&R Instrument Panel unless noted otherwise.

1 Panel, Instrument				
Beige		8.2	1MQ64DK7AA	$1,195.00
Gray		8.2	1MQ64XDVAA	$1,195.00
2 Grille, Defroster				
w/ATC				
Beige		.3	1EK84DK7AD	$320.00
Gray		.3	1EK84XDVAD	$320.00
w/o ATC				
Beige		.3	1CB64DK7AD	$320.00
Gray		.3	1CB64XDVAD	$320.00
3 Module, Pass Air Bag-See Air Bag System Section				
4 Cover, Side Panel				
Beige	R	.1	1AZ22DK7AB	$9.35
	L	.1	1AZ23DK7AB	$9.35
Gray	R	.1	1AZ22XDVAB	$9.35
	L	.1	1AZ23XDVAB	$9.35
5 Vent, Side Defroster				
Beige	R	.3	1LR991K7AA	$55.20
	L	.3	1LR981K7AA	$6.20
Gray	R	.3	1LR991DVAA	$55.20

	L	.3	1LR981DVAA	$11.80
6 Bezel, Inst Cluster				
SE Model		.4	1GE11XDVAD	
SXT, R/T Model¶				
Beige		.4	1HQ121KAAC	
Gray		.4	1HQ121D1AC	
¶Order by Application				
7 Cover, Upper Column				
Beige		.3	1LS04DK7AA	$204.00
Gray		.3	1LS041D1AA	$204.00
8 Bezel, Ignition				
Beige			1KV12DK7AA	$56.30
Gray			1KV12XDVAA	$56.30
9 Ring, Trim			1KV11DX9AA	$105.00
10 Cover, Lower Column				
Beige		.4	1HS28DK7AB	$30.50
Gray		.4	1HS28XDVAB	$30.50
11 Vent, Outer Air				
Beige	R	.3	1HQ16DK7AE	$15.45
	L	.3	1GQ11DK7AE	$24.10
Gray	R	.3	1HQ16XDVAE	$15.45
	L	.3	1GQ11XDVAE	$14.50
12 Box, Upper Glove				
Beige		.4	1HP181K7AD	$257.00
Gray		.4	1HP181DVAD	$257.00
Lock, Upper Glove Box				
Beige		.2	1LS981K7AA	$23.35
Gray		.2	1LS981DVAA	$23.20
13 Box, Lower Glove				
Beige		.4	1GX111K7AC	$71.35
Gray		.4	1GX11DVAA	
14 Panel, Lower Inst				
Beige		.4	1GD12DK7AB	$11.10
Gray		.4	1GD12XDVAB	$11.10
15 Bezel, Upper				
Beige		.3	1GD10DK7AC	$61.20
Gray		.3	1GD10XDVAC	$61.20
16 Bin, Storage¶				
Beige		.2	1HN941K7AE	$48.00
Gray		.2	1HN941DVAE	$48.00
¶Order by Application				
17 Lock, Lid			68043528AA	$7.70
18 Bezel, Center				
w/ATC				
Beige		.5	1MU10DK7AA	$402.00
Gray¶		.5	1MU961DVAA	$232.00

	w/o ATC				
	Beige		.5	1MU05DK7AA	$307.00
	Gray		.5	1MU05XDVAA	$307.00
	¶Order by Application				
19	Vent, Center Air		.3	68043527AA	
20	Reinf, Inst Panel	#1.1		5023938AC	$294.00

#w/Instrument Panel Removed, Not Included in R&R Instrument Panel



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21	Cluster, Instrument¶		.9	56044830AG	$319.00
	¶Order by Application				
22	Display, Navigation-See Electrical Section				
23	Panel, Switch¶		.8	4602562AG	$42.85
24	Control, A/C /Heater¶				
	w/ATC				
	w/Rear A/C		.6	55111898AB	$164.00
	w/o Rear A/C		.6	55111893AB	$164.00
	w/o ATC				
	w/Rear A/C		.6	55111892AD	$153.00
	w/o Rear A/C		.6	55111891AB	$85.00

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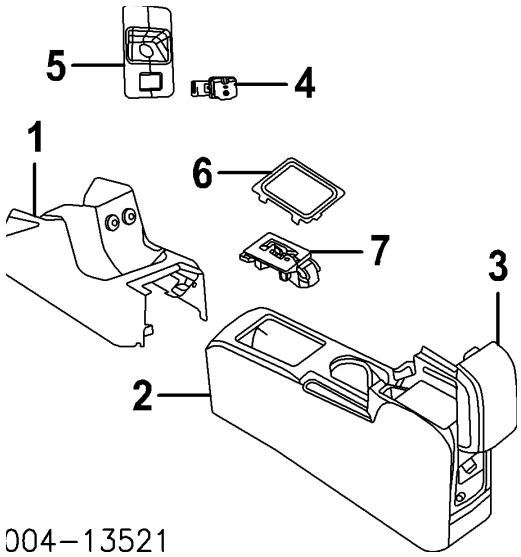
25	Radio¶				
	w/Navigation System		.7	5091099AB	$3,255.00
	w/o Navigation System				
	w/Rear View Camera		.7	5064245AE	$1,020.00
	w/o Rear View Camera		.7	5064411AD	$487.00
26	Harness, Instrument Panel¶	#		5084588AE	$332.00

¶Order by Application

#Not Included in R&R Instrument Panel

CENTER CONSOLE

Procedure 14



R&I Center Console Assy Complete .6

NOTE: All Parts in this section are included in R&R Center Console Assy unless noted otherwise.

	Console, Center¶			
1	Front			
	Beige	.5	1LM421K7AA	$60.45
	Gray	.5	1LM421DVAA	$60.45
2	Rear			
	Beige	.8	N.A.	
	Gray	.8	N.A.	
	Bezel, Console¶		68042606AA	$6.35
3	Armrest, Console¶			
	Beige	.2	1LN381KAAA	
	Gray	.2	1LN381DVAA	
	¶Order by Application			
	Hinge, Armrest		68043083AA	$13.10
	Mat, Console		68042604AA	$6.30
	Holder, Cup	.3	68042605AA	$7.85
	Bezel, Cup Holder		68042942AA	$7.25
	Liner, Cup Holder		68042603AA	$8.95
	Bin, Storage		68042520AA	$7.20
	Socket, Power		N.A.	
	Jack, Auxiliary		5107083AB	$37.80
4	Outlet, Power		4793554AC	$9.50
5	Bezel, Power Socket¶		68042913AA	$7.85

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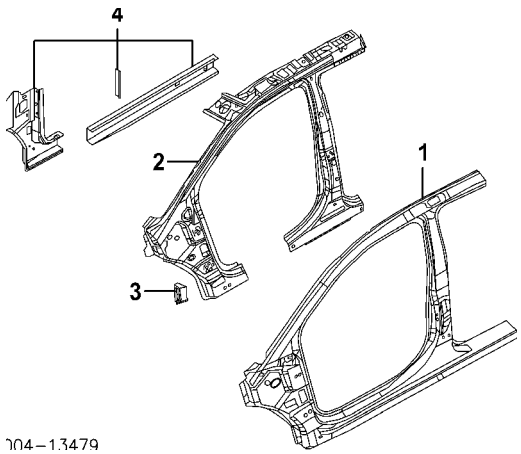
	¶Order by Application				
	Inverter, Power	#.5		5026409AB	$117.00
	#Not Included in R&R Console				
6	Bezel, Shifter		.4	1BJ20SZ0AB	$21.20
7	Indicator, Shift¶			1CD59DX9AB	$42.60
	¶Order by Application				

ROCKER/PILLARS/FLOOR

Procedures 14, 15 and 28

SHEET METAL



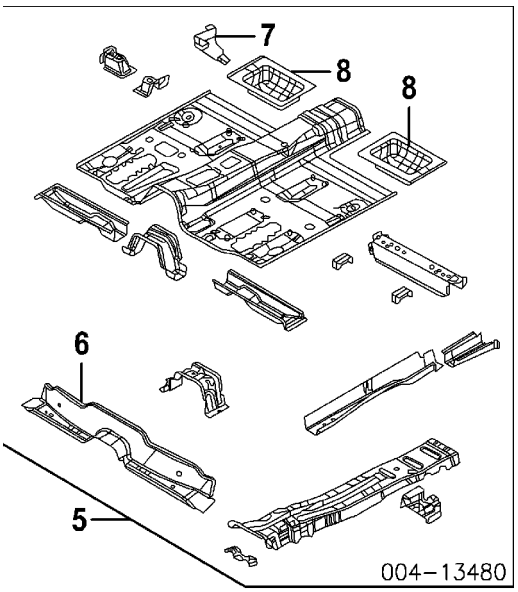
Refinish Door Opening Panel	R	3.6
	L	3.6
Refinish Hinge Pillar Section	R	1.2
	L	1.2
Refinish Roof Rail	R	1.6
	L	1.6
Refinish Rocker Panel & Center Pillar Section	R	2.4
	L	2.4
Refinish Rocker Panel Section	R	2.0
	L	2.0
Refinish Center Pillar Section	R	1.0
	L	1.0
Section Hinge Pillar	R	7.8
	L	7.8
Section Rocker Panel & Center Pillar	R	12.0
	L	12.0
Section Rocker Panel	R	11.0
	L	11.0
Section Center Pillar	R	7.5
	L	7.5
Add to R&I/R&R Side Curtain Air Bag	R	#.7

		L	#.7		

#w/Headliner Removed

NOTE: Manufacturer advises foam fillers have been utilized within panels in this section. Refer to vehicle body/service repair manuals for recommended replacement and safety precautions.

1	Panel, Outer Door Opening	R	18.5	68035428AA	$352.00
		L	18.5	68035429AA	$352.00
	Striker, Latch-See Front Door Section				
2	Panel, Inner Door Frame	R	9.5	68035434AA	$1,500.00
		L	9.5	68035435AA	$1,500.00
3	Extension, Inner Panel	R	1.0	5178520AA	$14.95
		L	1.0	5178521AA	$14.95
4	Panel, Inner Front Pillar	R	4.5	5155250AC	$255.00
		L	4.5	5155251AC	$255.00
	Panel, Side Cowl-Serviced w/Inner Front Pillar Panel				

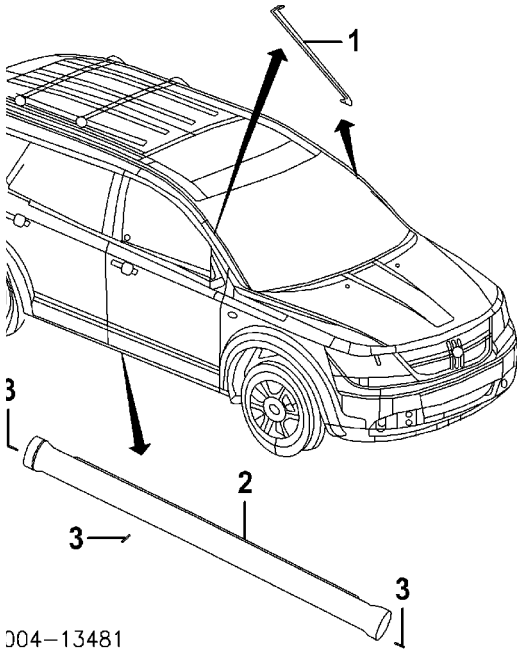


5	Pan Assy, Front Floor			5067837AC	$507.00
6	Crossmember, Front¶			5155224AA	$53.35
7	Panel, Closeout¶	R		5116282AB	$13.80
		L		5116283AB	$13.80
8	Pan, Rear Floor¶	R		5067962AA	$85.00
		L		5067962AA	$85.00

¶Included w/Front Floor Pan Assy

EXTERIOR TRIM

2010 Dodge Journey R/T Utility

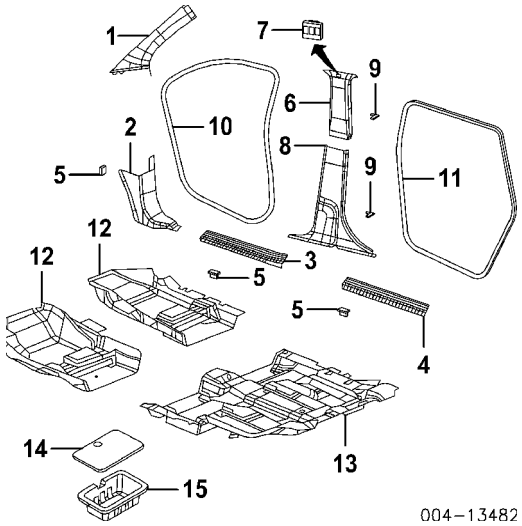


Refinish Rocker Moulding	R	1.4		
	L	1.4		
R&I Rocker Moulding	R	.8		
	L	.8		

1	Moulding, Windshield-See Windshield Section				
2	Moulding, Rocker (P)	R	.8	5178148AC	$97.45
		L	.8	5178149AC	$58.45
	(P) Paint to Match				
3	Rivet, Moulding (a)	R		6500911	$5.45
		L		6500911	$5.45
	(a) As Required				

INTERIOR TRIM

2010 Dodge Journey R/T Utility



1 Garnish, Windshield-See Windshield Section				
2 Panel, Cowl Trim				
Beige	R	.3	1BE52DK7AC	$49.20
	L	.3	1BE53DK7AC	$49.20
Gray	R	.3	1EE52XDVAB	
	L	.3	1BE53XDVAC	$49.20
3 Plate, Front Scuff				
Beige	R	.2	1BE44DK7AB	$6.85
	L	.2	1BE45DK7AC	$10.60
Gray	R	.2	1BE44XDVAB	$6.85
	L	.2	1BE45XDVAC	$12.95
4 Plate, Rear Scuff				
Beige	R	.2	1BE48DK7AB	$5.80
	L	.2	1BE49DK7AB	$5.80
Gray	R	.2	1BE48XDVAB	$5.80
	L	.2	1BE49XDVAB	$5.80
5 Clip, Trim (a)	R		6505670AA	$2.95
	L		6505670AA	$2.95
(a) As Required				
6 Trim, Upper Center	R	.3	1BG10DW1AD	$43.30
	L	.3	1BG11DW1AD	$43.30
7 Cap, Center Pillar	R		1MK90DW1AA	$1.30
	L		1MK90DW1AA	$1.30
8 Trim, Lower Center				
Beige	R	#.3	1BE36DK7AB	$12.10
	L	#.3	1BE37DK7AB	$12.10
Gray	R	#.3	1BE36XDVAB	$12.10
	L	#.3	1BE37XDVAB	$12.10

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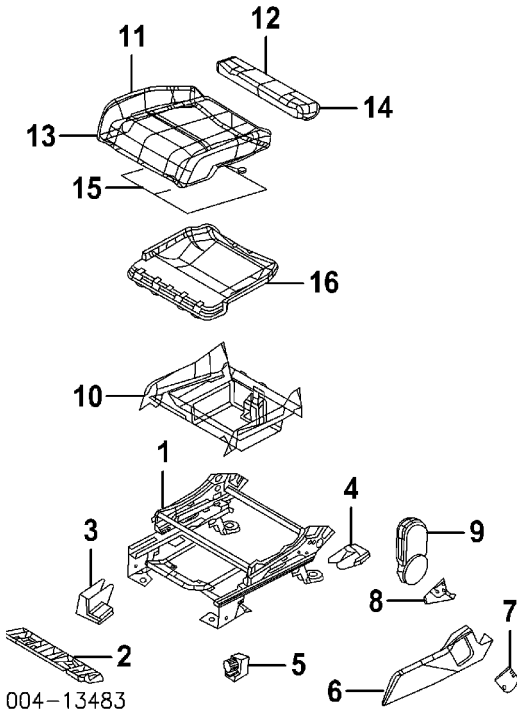
	#w/Scuff Plates Removed				
9	Clip, Panel (a)	R		68045441AA	$5.00
		L		68045441AA	$5.00
	(a) As Required				
10	W/Strip, Frt Door Opng (On Body)	R	.5	5076862AD	$42.20
		L	.5	5076863AD	$42.20
11	W/Strip, Rear Door Opng (On Body)	R	.5	5076860AD	$37.30
		L	.5	5076861AD	$37.30
12	Carpet, Front¶	R		1DP54XDVAB	$204.00
		L		1DP55XDVAB	$209.00
	¶Order by Application				
13	Carpet, Rear				
	Beige			1DP62DK7AB	$274.00
	Gray			1DP62XDVAB	$274.00
14	Lid, Storage Bin				
	Beige	R		1BZ93DK7AB	$158.00
		L		1BZ93DK7AB	$158.00
	Gray	R		1BZ93XDVAB	$158.00
		L		1BZ93XDVAB	$158.00
15	Bin, Storage	R		1BZ94XXXAB	$18.30
		L		1BZ94XXXAB	$18.30

FRONT SEAT

PASSENGER SIDE

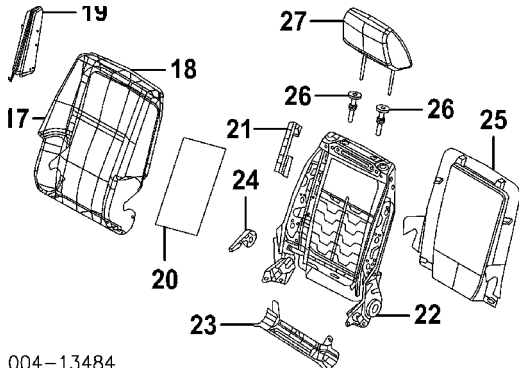


R&I Seat Assy			.3		
1 Track, Seat					
Std Seat		#.7		4610177AA	$329.00
Fold Flat Seat		#.7		68037303AA	$329.00
#w/Seat Assy Removed					
2 Bracket, Seat					
Fold Flat Seat				68047995AA	
Cover, Seat Track					
3 Front	R			68047028AA	
	L			68047029AA	
4 Rear	R			68047026AA	
	L			68047026AA	
5 Sensor, Seat Position-See Air Bag System Section					
6 Panel, Side Trim					
Beige	R		.1	1KF631K7AA	$34.85
	L		.1	1KF681K7AA	$29.20
Gray	R		.1	1KF631DVAA	$33.30
	L		.1	1KF681DVAA	$29.20
7 Cover, Trim Panel					
Std Seat				1DQ361DAAA	$2.25

	Fold Flat Seat			1CZ06XDVAB	$9.05
8	Cover, Inner				
	Beige	R		1DQ821K7AA	
		L		1DQ831K7AA	
	Gray	R		1DQ82XDVAA	$3.70
		L		1DQ83XDVAA	$7.45
9	Cover, Recliner				
	Fold Flat Seat				
	Beige	R		N.A.	
		L		1DQ531KAAA	$7.30
	Gray	R		N.A.	
		L		1DQ53XDVAA	$23.80
10	Box, Storage				
	Fold Flat Seat				
	Beige		#.2	1LB491K7AA	$204.00
	Gray¶		#.2	1LB491DVAA	$204.00
	¶Order by Application				
	#w/Seat Assy Removed, Included in R&R Seat Track				
	Cover, Seat Cushion				
11	Front				
	SE Model				
	Std Trim		#.8	1KF471DVAA	$219.00
	Premium Trim		#.8	1LB361DVAA	$281.00
	SXT Model				
	Beige		#.8	1LQ881K7AA	$265.00
	Gray		#.8	1LQ881DVAA	$265.00
	R/T Model				
	Beige		#.8	1LR201K7AA	$411.00
	Gray		#.8	1LR201DVAA	$411.00
12	Rear				
	SXT Model		#.8	1LQ891DVAA	$96.55
	R/T Model				
	Beige		#.8	1LR221K7AA	$85.10
	Gray		#.8	1LR221DVAA	$85.10
	Pad, Seat Cushion				
13	Front		#.8	68037291AA	$148.00
14	Rear				
	SXT, R/T Model		#.8	4610076AA	$65.45
15	Heater, Seat Cushion		#.8	4610192AA	$60.30
16	Frame, Seat Cushion				
	SE, SXT Model		#.8	4610165AA	$57.25
	R/T Model		#.8	68043312AA	

2010 Dodge Journey R/T Utility

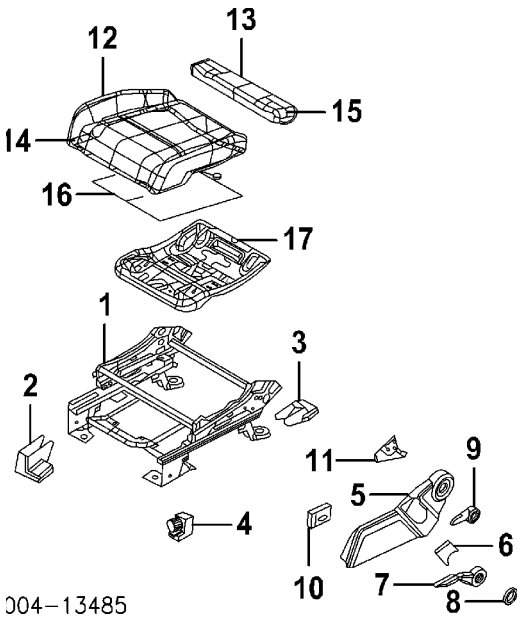
#R&R Complete, w/Seat Assy Removed



17	Cover, Seat Back			
	SE Model			
	Std Trim	#1.1	1LQ841DVAA	$358.00
	Premium Trim	#1.1	1LT281DVAA	$456.00
	SXT Model¶	#1.1	1LQ961DVAA	$399.00
	R/T Model			
	Beige	#1.1	1LR501K7AA	$483.00
	Gray	#1.1	1LR501DVAA	$481.00
	¶Order by Application			
18	Pad, Seat Back	#1.1	68043315AA	$200.00
19	Module, Seat Air Bag-See Air Bag System Section			
20	Heater, Seat Back	#1.1	4610194AA	$73.45
21	Bracket, Mtg		68037301AA	$8.60
22	Frame, Seat Back			
	Std Seat	#1.1	4610145AA	$256.00
	Fold Flat Seat	#1.1	4610149AA	$294.00
	#R&R Complete, w/Seat Assy Removed			
23	Panel, Closeout			
	Std Seat		68037171AA	
	Fold Flat Seat		68041156AA	$23.35
24	Handle, Recliner			
	Beige		1DQ601KAAA	$6.20
	Gray¶		1DQ601DAAA	$15.45
	¶Order by Application			
25	Panel, Seat Back			
	Fold Flat Seat	#.2	68021481AA	$15.20
	#Included in R&R Seat Back			
26	Guide, Headrest			
	Locking¶		1DS911DVAA	$3.70

	Non-Locking		1DS941DVAA	$6.35
	¶Order by Application			
27	Headrest			
	SE Model			
	Std Trim	#.2	1LQ861DVAA	$56.70
	Premium Trim	#.2	1LQ751DVAA	$56.70
	SXT Model			
	Beige	#.2	1LQ751K7AA	$89.95
	Gray	#.2	1LQ751DVAA	$56.70
	R/T Model			
	Beige	#.2	1LR231K7AA	$70.00
	Gray	#.2	1LR231DVAA	$70.00
	#Included in R&R Seat Back			

DRIVER SIDE



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R&I Seat Assy .3

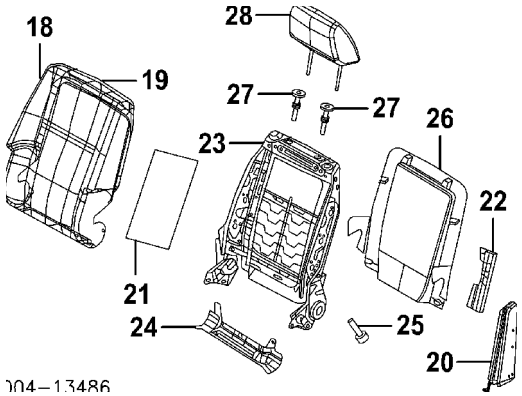
1	Track, Seat				
	Man Seat		#.5	68037292AA	$469.00
	Pwr Seat		#.5	68041157AA	$924.00
	#w/Seat Assy Removed				
	Cover, Seat Track				
2	Front	R		68047028AA	
		L		68047029AA	
3	Rear	R		68047026AA	
		L		68047026AA	
4	Sensor, Seat Position-See Air Bag System Section				

2010 Dodge Journey R/T Utility

5	Panel, Side Trim				
	Man Seat	R	.1	1KF121DVAA	$10.35
		L	.1	1MW601DVAA	$37.60
	Pwr Seat				
	Beige	R	.1	1KF121K7AA	$10.35
		L	.1	1MW641K7AA	$45.85
	Gray	R	.1	1KF121DVAA	$10.35
		L	.1	1MW641DVAA	$45.85
6	Cover, Trim Panel				
	Man Seat			1DQ431DAAA	$7.35
	Pwr Seat			1CZ06XDVAB	$9.05
7	Handle, Seat Height Adj				
	Man Seat			1DQ631DAAA	$11.80
8	Cap, Handle				
	Man Seat			1DQ651DAAA	$3.30
9	Handle, Recliner				
	Beige			1DQ591KAAA	$7.70
	Gray			1DQ591DAAA	$7.70
10	Switch, Pwr Seat			56049429AE	$28.45
11	Cover, Inner				
	Beige	R		1DQ821K7AA	
		L		1DQ831K7AA	
	Gray	R		1DQ82XDVAA	$3.70
		L		1DQ83XDVAA	$7.45
	Cover, Seat Cushion				
12	Front				
	SE Model				
	Std Trim		#.8	1KF471DVAA	$219.00
	Premium Trim		#.8	1LB361DVAA	$281.00
	SXT Model				
	Beige		#.8	1LQ871K7AA	
	Gray		#.8	1LB361DVAA	$281.00
	R/T Model				
	Beige		#.8	1LR211K7AA	$383.00
	Gray		#.8	1LR211DVAA	$383.00
13	Rear				
	SXT Model		#.8	1LQ891DVAA	$96.55
	R/T Model				
	Beige		#.8	1LR221K7AA	$85.10
	Gray		#.8	1LR221DVAA	$85.10
	Pad, Seat Cushion				
14	Front		#.8	68037291AA	$148.00
15	Rear				
	SXT, R/T Model		#.8	4610076AA	$65.45
16	Heater, Seat Cushion		#.8	4610192AA	$60.30
17	Frame, Seat Cushion		#.8	4610165AA	$57.25

2010 Dodge Journey R/T Utility

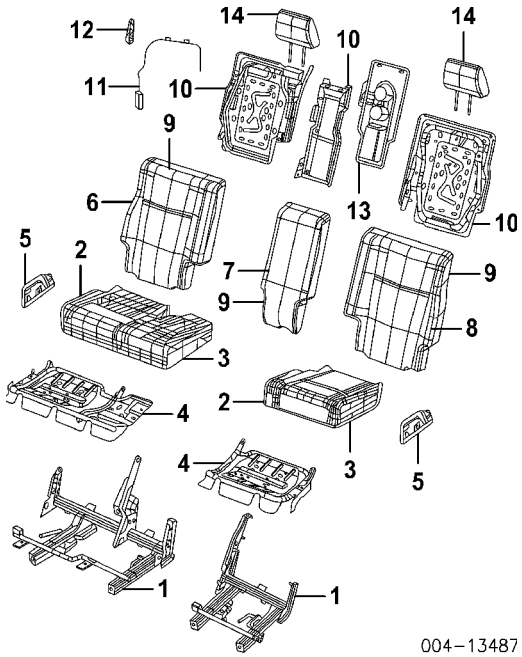
#R&R Complete, w/Seat Assy Removed



18	Cover, Seat Back			
	SE Model			
	Std Trim	#1.1	1LQ851DVAA	$372.00
	Premium Trim	#1.1	1LT291DVAA	$475.00
	SXT Model¶	#1.1	1LQ911DVAA	$413.00
	R/T Model			
	Beige	#1.1	1LR491K7AA	$488.00
	Gray	#1.1	1LR491DVAA	$488.00
	¶Order by Application			
19	Pad, Seat Back	#1.1	68043315AA	$200.00
20	Module, Seat Air Bag-See Air Bag System Section			
21	Heater, Seat Back	#1.1	4610194AA	$73.45
22	Bracket, Mtg		68037172AA	$4.35
23	Frame, Seat Back	#1.1	4610149AA	$294.00
	#R&R Complete, w/Seat Assy Removed			
24	Panel, Closeout¶		68041156AA	$23.35
25	Handle, Lumbar¶		1LB341DVAA	$6.20
	¶Order by Application			
26	Panel, Seat Back			
	Pwr Seat			
	Beige	#.2	1LB331K7AA	$146.00
	Gray	#.2	1LB331DVAA	$146.00
	#Included in R&R Seat Back			
27	Guide, Headrest			
	Locking¶			
	Beige		1DS911K7AA	$2.80
	Gray		1DS911DVAA	$3.70
	Non-Locking			

	Beige		1DS94DK2AA	$23.50
	Gray		1DS941DVAA	$6.35
	¶Order by Application			
28	Headrest			
	SE Model			
	Std Trim	#.2	1LQ861DVAA	$56.70
	Premium Trim	#.2	1LQ751DVAA	$56.70
	SXT Model			
	Beige	#.2	1LQ751K7AA	$89.95
	Gray	#.2	1LQ751DVAA	$56.70
	R/T Model			
	Beige	#.2	1LR231K7AA	$70.00
	Gray	#.2	1LR231DVAA	$70.00
	#Included in R&R Seat Back			

CENTER SEAT



R&I Center Seat	R		.3		
	L		.3		
1 Adjuster, Seat	R	#.4		68042360AA	$212.00
	L	#.4		68042359AA	$225.00
#w/Seat Assy Removed					
2 Cover, Seat Cushion					
SE Model					
Std Trim	R	#.9		1LM961DVAA	$353.00
	L	#.8		1LM971DVAA	$273.00
Premium Trim	R	#.9		1LN081DVAA	$419.00
	L	#.8		1LN101DVAA	$212.00
SXT Model¶					
Beige	R	#.9		1LN081K7AA	$419.00
	L	#.8		1LN101K7AA	
Gray	R	#.9		1LN081DVAA	$419.00
	L	#.8		1LN101DVAA	$212.00
R/T Model					
Beige	R	#.9		1LN111K7AA	$477.00
	L	#.8		1LN181K7AA	$393.00
Gray	R	#.9		1LN111DVAA	$477.00
	L	#.8		1LN181DVAA	$393.00
¶Order by Application					
3 Pad, Seat Cushion	R	#.9		68042327AA	$151.00
	L	#.8		68042357AA	$156.00
4 Frame, Seat Cushion	R	#.9		68044746AA	$211.00

		L	#.8	68044745AA	$171.00
	#R&R One Side Complete, w/Seat Assy Removed				
5	Trim, Side Seat				
	Beige	R		1LH101K7AA	$22.80
		L		1LG741K7AA	$27.95
	Gray	R		1LH101DVAA	$22.80
		L		1LG741DVAA	$22.80
	Cover, Seat Back				
6	Right				
	SE Model¶				
	Std Trim	R	#1.1	1LM921DVAA	$269.00
	Premium Trim	R	#1.1	1MS061DVAA	$454.00
	SXT Model				
	Beige	R	#1.1	1MS061K7AA	$454.00
	Gray	R	#1.1	1MS061DVAA	$454.00
	R/T Model				
	Beige	R	#1.1	1LN161K7AA	$413.00
	Gray	R	#1.1	1LN161DVAA	$413.00
7	Middle				
	SE Model				
	Std Trim		#.9	68042312AA	$74.50
	Premium Trim		#.9	1LH321DVAA	$217.00
	SXT Model				
	Beige		#.9	1LH321K7AA	$273.00
	Gray		#.9	1LH321DVAA	$217.00
	R/T Model				
	Beige		#.9	1LL951K7AA	$180.00
	Gray		#.9	1LL951DVAA	$180.00
8	Left				
	SE Model¶				
	Std Trim	L	#1.1	1LN291DVAA	$198.00
	Premium Trim	L	#1.1	1MS091DVAA	$454.00
	SXT Model				
	Beige	L	#1.1	1MS091K7AA	$454.00
	Gray	L	#1.1	1MS091DVAA	$454.00
	R/T Model				
	Beige	L	#1.1	1LN211K7AA	$413.00
	Gray	L	#1.1	1LN211DVAA	$413.00
	¶Order by Application				
9	Pad, Seat Back				
	Right	R	#1.1	68045078AA	$151.00
	Middle		#.9	68042312AA	$74.50
	Left	L	#1.1	68042237AA	$153.00
10	Frame, Seat Back				

Right	R	#1.1	68042300AA	$174.00
Middle¶		#.9	68042369AA	$145.00
Left	L	#1.1	68042300AA	$174.00

¶Order by Application

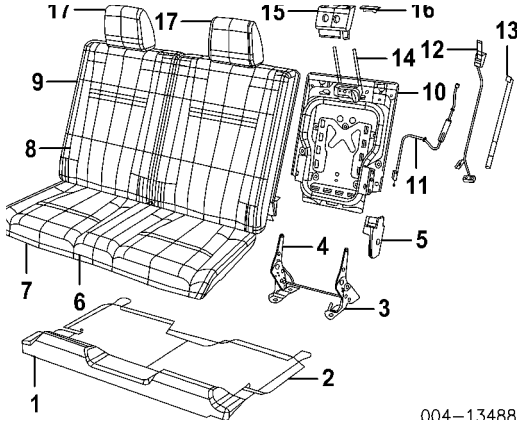
#R&R One Seat Complete, w/Seat Assy Removed

11 Cable, Release				
Type 1	R		68042373AA	$34.60
	L		68042373AA	$34.60
Type 2	R		68042368AA	$43.10
	L		68042355AA	$44.00
Type 3	R		68042315AA	$68.20
	L		68042238AA	$61.85
12 Handle, Release				
Beige	R		1LG701K7AA	$5.95
	L		1LG701K7AA	$5.95
Gray	R		1LG701DVAA	$5.95
	L		1LG701DVAA	$5.95
13 Panel, Seat Back				
Middle				
Beige		#.2	1MG911K7AA	$86.00
Gray		#.2	1MG911DVAA	$86.00
14 Headrest				
SE Model				
Std Trim	R	#.2	1LL501DVAA	$117.00
	L	#.2	1LL501DVAA	$117.00
Premium Trim	R	#.2	1LH261DVAA	$48.35
	L	#.2	1LH261DVAA	$48.35
SXT Model				
Beige	R	#.2	1LH261K7AA	$48.35
	L	#.2	1LH261K7AA	$48.35
Gray	R	#.2	1LH261DVAA	$48.35
	L	#.2	1LH261DVAA	$48.35
R/T Model				
Beige	R	#.2	1LM001K7AA	
	L	#.2	1LM001K7AA	
Gray	R	#.2	1LM001DVAA	$55.00
	L	#.2	1LM001DVAA	$55.00

#Included in R&R Seat Back

2010 Dodge Journey R/T Utility

REAR SEAT



R&I Rear Seat			.4		
1 Support, Seat			#.2	68039196AA	$47.10
2 Frame, Seat			#.4	68039194AA	$70.50
3 Bracket, Seat					
Outer		R	#.3	68039190AA	$33.45
		L	#.3	68039191AA	$33.45
Inner		R	#.3	68039192AA	$29.35
		L	#.3	68039193AA	$29.35
#w/Seat Assy Removed					
4 Recliner, Seat		R		68039184AA	$255.00
		L		N.A.	
5 Shield, Recliner					
Outer					
Beige		R		68055883AA	$9.50
		L		68055881AA	$9.50
Gray		R		68055883AA	$9.50
		L		68055881AA	$9.50
Inner					
Beige		R		68055882AA	$9.50
		L		68055880AA	$9.50
Gray		R		68055882AA	$9.50
		L		68055880AA	$9.50
6 Cover, Seat Cushion					
SE Model					
Std Trim			#1.0	1KQ83BD5AA	$417.00
Premium Trim			#1.0	1KQ91BD1AA	$214.00
SXT Model					
Beige			#1.0	N.A.	
Gray			#1.0	1KQ91BD1AA	$214.00
R/T Model					
Beige			#1.0	1KQ971K7AA	$401.00
Gray			#1.0	1KQ971DVAA	$401.00

7	Pad, Seat Cushion		#1.0	68039195AA	$204.00
	#R&R Complete, w/Seat Assy Removed, Included in R&R Seat Cushion				
8	Cover, Seat Back				
	SE Model				
	Std Trim	R	#1.4	1KQ86BD5AA	$227.00
		L	#1.4	1PR411DVAA	$116.00
	Premium Trim	R	#1.4	1PR401DVAA	$143.00
		L	#1.4	1PR391DVAA	$143.00
	SXT Model				
	Beige	R	#1.4	N.A.	
		L	#1.4	N.A.	
	Gray	R	#1.4	1PR401DVAA	$143.00
		L	#1.4	1PR391DVAA	$143.00
	R/T Model				
	Beige	R	#1.4	1KQ981K7AA	
		L	#1.4	1PR371K7AA	$241.00
	Gray	R	#1.4	1KQ98BD1AA	$454.00
		L	#1.4	1PR371DVAA	$241.00
9	Pad, Seat Back	R	#1.4	68039198AA	$125.00
		L	#1.4	68039203AA	$125.00
10	Frame, Seat Back	R	#1.4	68039186AA	$208.00
		L	#1.4	68039189AA	$208.00
	#R&R Complete, w/Seat Assy Removed, Included in R&R Seat Back				
11	Cable, Release	R		68039115AA	$39.80
		L		68039115AA	$39.80
12	Cable, Recliner	R		68039180AA	$27.95
		L		68039180AA	$27.95
13	Strap, Seat				
	Beige	R		1KQ771K7AA	$48.35
		L		1KQ771K7AA	$48.35
	Gray	R		1KQ771DVAA	$48.35
		L		1KQ771DVAA	$48.35
14	Support, Headrest	R		68039114AA	$125.00
		L		68039114AA	$125.00
15	Cover, Support	R		68039116AA	$16.30
		L		68039116AA	$16.30
16	Bezel, Cover				
	Beige	R		1KQ761K7AA	$23.45
		L		1KQ761K7AA	$23.45
	Gray	R		1KQ761DVAA	$23.45
		L		1KQ761DVAA	$23.45
17	Headrest				

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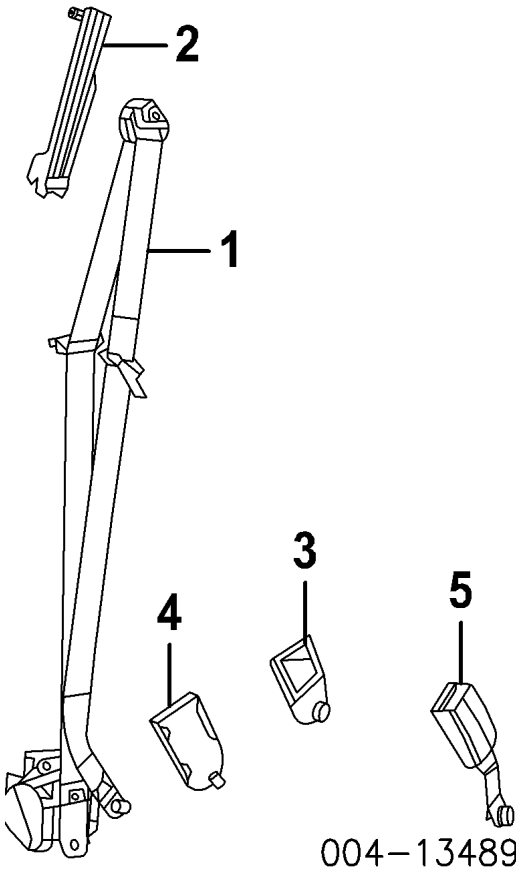
SE Model				
Std Trim	R	#.2	1KQ901DVAA	$81.10
	L	#.2	1KQ901DVAA	$81.10
Premium Trim	R	#.2	1KQ961DVAA	$51.70
	L	#.2	1KQ961DVAA	$51.70
SXT Model				
Beige	R	#.2	N.A.	
	L	#.2	N.A.	
Gray	R	#.2	1KQ961DVAA	$51.70
	L	#.2	1KQ961DVAA	$51.70
R/T Model				
Beige	R	#.2	1KR041K7AA	$81.10
	L	#.2	1KR041K7AA	$81.10
Gray	R	#.2	1KR041DVAA	$51.70
	L	#.2	1KR041DVAA	$51.70

#Included in R&R Seat Back

SEAT BELTS

FRONT



1	Belt, Seat				
	w/Code CGK				
	Beige	R	#.4	1AN08DK7AC	$215.00
		L	#.4	1AN09DK7AC	$212.00
	Gray	R	#.4	1AN08XDVAE	$215.00
		L	#.4	1AN09XDVAE	$212.00
	w/o Code CGK				
	Beige	R	#.4	1AN02DK7AC	$204.00
		L	#.4	1AN03DK7AC	$210.00
	Gray	R	#.4	1AN02XDVAC	$204.00
		L	#.4	1AN03XDVAC	$210.00
	#w/Upper & Lower Center Pillar Trim Panels Removed				
	Pretensioner, Seat Belt-Serviced w/Seat Belt				
2	Adjuster, Seat Belt	R	#.3	4664338AC	$34.85

	L	#.3	4664338AC	$34.85

#w/Upper Center Trim Panel Removed

Cover, Anchor

3 Outer

Beige	R		1DQ36DK7AA	$2.35
	L		1DQ43DK7AA	$4.00
Gray	R		1DQ36XDVAA	$2.35
	L		1DQ43XDVAA	$4.00

4 Inner

Pwr Seat

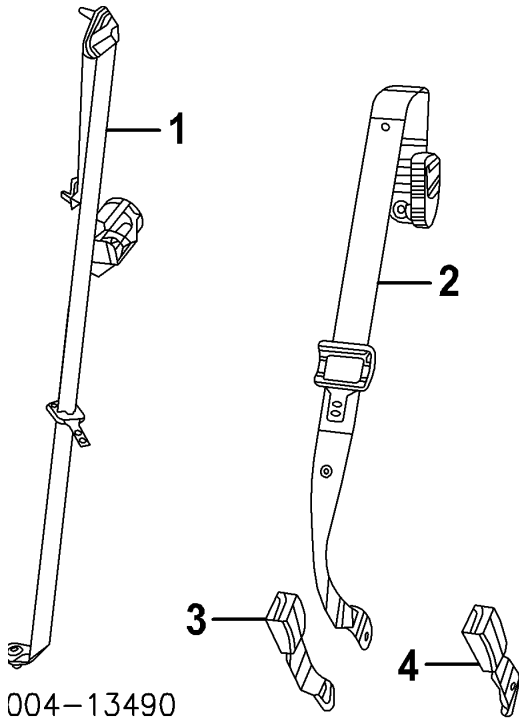
Beige	R		1CZ06DK7AA	$9.05
	L		1CZ06DK7AA	$9.05
Gray	R		1CZ06XDVAA	$9.05
	L		1CZ06XDVAA	$9.05

5 Buckle, Seat Belt

Beige	R	#.3	YS361K7AC	$40.30
	L	#.3	1AN171K7AB	$41.30
Gray	R	#.3	YS361DVAC	$40.30
	L	#.3	1AN171DVAB	$41.30

#w/Seat Assy Removed

CENTER



Belt, Seat

1 Outer

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	w/Code CGK				
	Beige	R	#.4	1AN10DK7AC	$123.00
		L	#.4	1AN11DK7AC	$123.00
	Gray	R	#.4	1AN10XDVAC	$123.00
		L	#.4	1AN11XDVAC	$123.00
	w/o Code CGK				
	Beige	R	#.4	1AN04DK7AC	$116.00
		L	#.4	1AN05DK7AC	$116.00
	Gray	R	#.4	1AN04XDVAC	$116.00
		L	#.4	1AN05XDVAC	$116.00
	#w/Necessary Trim Removed				
2	Center				
	Beige		#.9	1AN15DK7AB	$153.00
	Gray		#.9	1AN15XDVAB	$153.00
	#Included in R&R Seat Assy				
	Buckle, Seat Belt				
3	Outer				
	Beige	R	.3	1AN181K7AA	$43.95
		L	.3	1AN191K7AA	$45.80
	Gray	R	.3	1AN181DVAA	$43.95
		L	.3	1AN191DVAA	$45.80
4	Center				
	Beige		.3	1AN361K7AA	$45.80
	Gray		.3	N.A.	

REAR

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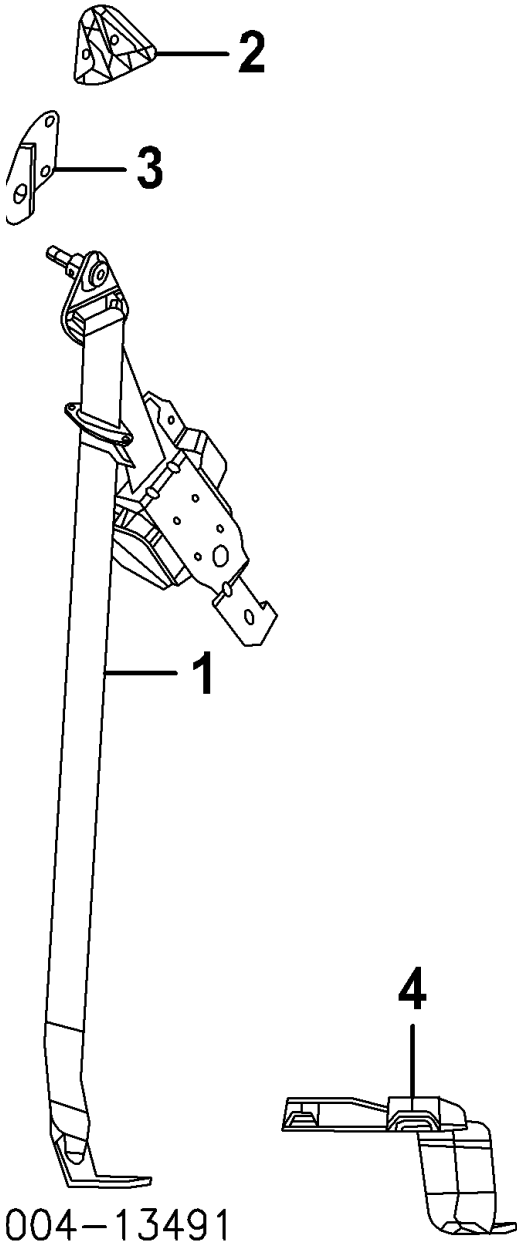

1	Belt, Seat				
	Beige	R	#.4	N.A.	
		L	#.4	1AN131K7AC	$144.00
	Gray	R	#.4	N.A.	
		L	#.4	1AN131DVAC	$144.00
	#w/Necessary Trim Removed				
2	Cover, Anchor	R		WF64DW1AA	$9.60

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		L	WF64DW1AA	$9.60
3	Brkt, Seat Belt	R	4610128AB	$2.50
		L	4610129AB	$2.50
4	Buckle Set, Seat Belt			
	Beige	#.2	1AN211K7AB	$48.00
	Gray	#.2	1AN211DVAB	$48.00

#w/Rear Seat Assy Removed

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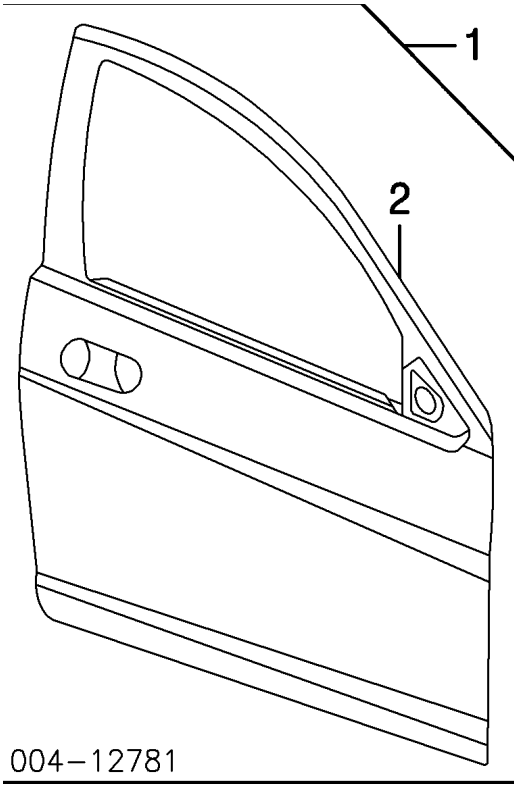
FRONT DOOR

Procedures 16 and 28

SHEET METAL



Refinish Door Outside	R	2.4			
	L	2.4			
Add for Jambs & Interior	R	1.0			
	L	1.0			
Add for Jambs	R	.5			
	L	.5			
R&I Door Assy	R	1.0			
	L	1.0			
Add to R&I/R&R Side Impact Sensor	R	.3			
	L	.3			
1 Shell Assy, Door	R	#6.0	68040230AB	$314.00	
	L	#6.0	68040231AB	$304.00	
#Includes R&I/R&R Rear View Mirror Assy					
2 Panel, Door Repair¶	R	#7.0	5076744AB	$114.00	
	L	#7.0	5076745AB	$114.00	

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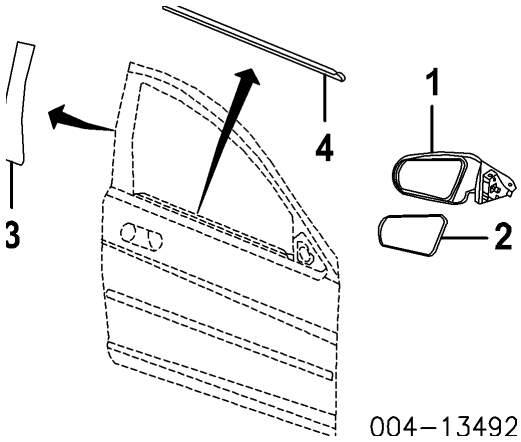
¶Included w/Door Shell Assy

#Includes R&I/R&R Rear View Mirror Assy & Door Glass

EXTERIOR TRIM



Refinish Rear View Mirror	R	.7		
	L	.7		
R&I Rear View Mirror	R	#.7		
	L	#.7		
R&I Outer Belt Moulding	R	#.6		
	L	#.6		
#Includes R&I Trim Panel				
1 Mirror, Rear View				
SE Model	R	#.3	5076884AC	$103.00
	L	#.3	5076885AC	$103.00
SXT, R/T Model				
w/Memory¶				
Bright Silver, (Code S2)	R	#.3	1CE281S2AC	$118.00
	L	#.3	1CE291S2AC	$118.00
Brilliant Black, (Code XR)	R	#.3	1CE281XRAC	$118.00
	L	#.3	1CE291XRAC	$118.00
Deep Water Blue, (Code BS)	R	#.3	1CE281BSAC	$126.00
	L	#.3	1CE291BSAC	$118.00
Inferno Red, (Code RH)	R	#.3	1CE281RHAC	$118.00
	L	#.3	1CE291RHAC	$118.00
Melbourne Green, (Code PL)	R	#.3	1CE281PLAC	$118.00
	L	#.3	1CE291PLAC	$118.00
Sandstone, (Code KG)	R	#.3	1CE281KGAC	$118.00

		L	#.3	1CE291KGAC	$118.00
	Silver Steel, (Code A4)	R	#.3	1CE281A4AC	$118.00
		L	#.3	1CE291A4AC	$126.00
	Stone White, (Code W1)	R	#.3	1CE281W1AC	$118.00
		L	#.3	1CE291W1AC	$118.00
	w/o Memory				
	Bright Silver, (Code S2)	R	#.3	1CE341S2AC	$116.00
		L	#.3	1CE351S2AC	$158.00
	Brilliant Black, (Code XR)	R	#.3	1CE341XRAC	$116.00
		L	#.3	1CE351XRAC	$158.00
	Deep Water Blue, (Code BS)	R	#.3	1CE341BSAC	$116.00
		L	#.3	1CE351BSAC	$158.00
	Inferno Red, (Code RH)	R	#.3	1CE341RHAC	$116.00
		L	#.3	1CE351RHAC	$158.00
	Melbourne Green, (Code PL)	R	#.3	1CE341PLAC	$116.00
		L	#.3	1CE351PLAC	$158.00
	Sandstone, (Code KG)	R	#.3	1CE341KGAC	$116.00
		L	#.3	1CE351KGAC	$158.00
	Silver Steel, (Code A4)	R	#.3	1CE341A4AC	$116.00
		L	#.3	1CE351A4AC	$158.00
	Stone White, (Code W1)	R	#.3	1CE341W1AC	$116.00
		L	#.3	1CE351W1AC	$158.00
	Surf Blue, (Code QD)	R	#.3	N.A.	
		L	#.3	N.A.	
	#w/Trim Panel Removed				
2	Glass, Mirror¶	R		68045690AA	$27.80
		L		68045691AA	$27.80
	¶Order by Application				
3	Tape, Black-Out				
	Front	R	#.2	5178424AA	$2.00
		L	#.2	5178425AA	$2.00
	Rear	R	#.2	5116268AA	$10.35
		L	#.2	5116269AA	$10.35
	#Time is for Installation only				
4	Moulding, Outer Belt	R	#.2	5076856AB	$26.60
		L	#.2	5076857AB	$26.60
	#w/Trim Panel Removed				

INTERIOR TRIM

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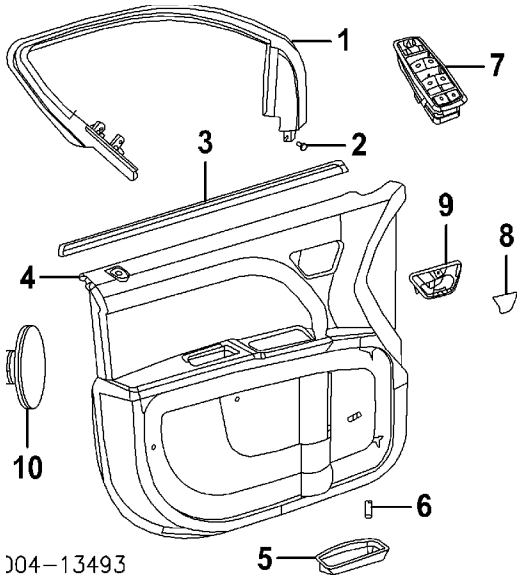

R&I Trim Panel	R		.4	
	L		.4	

NOTE: All Parts in this section are included in R&R Trim Panel unless noted otherwise.

1 Trim, Upper Door					
Std Sound System	R	#.3		1EF04XXXAA	$18.00
	L	#.3		1EF03XXXAA	$18.00
Infinity Sound System	R	#.3		1JB04XXXAA	$24.30
	L	#.3		1JB03XXXAA	$24.30
#w/Trim Panel Removed, Not Included in R&R Trim Panel					
2 Clip, Trim (a)	R			6509103AA	$0.35
	L			6509103AA	$0.35
(a) As Required					
3 Moulding, Inner Belt	R	#.1		5076874AB	$9.60
	L	#.1		5076875AB	$9.60
#w/Trim Panel Removed					
4 Panel, Door Trim					
SE Model	R		.5	1BE74XDVAB	$409.00
	L		.5	1BE75XDVAB	$409.00
SXT Model					
Beige	R		.5	1BG861K7AC	$422.00
	L		.5	1BG871K7AC	$422.00
Gray	R		.5	1BG861DVAC	$422.00
	L		.5	1BG871DVAC	$422.00
R/T Model					
Beige	R		.5	1BG901K7AC	$422.00

	L		.5	1BG911K7AC	$422.00
Gray	R		.5	1BG901DVAC	$422.00
	L		.5	1BG911DVAC	$422.00
5 Handle, Pull					
Beige	R			1MQ191K7AA	$54.70
	L			1MQ191K7AA	$54.70
Gray	R			1MQ191DVAA	$54.70
	L			1MQ191DVAA	$54.70
6 Cover, Screw					
Beige	R			1MV231K7AA	$5.85
	L			1MV231K7AA	$5.85
Gray¶	R			1MV23XDVAA	$11.60
	L			1MV23XDVAA	$11.60
7 Switch, Power Window					
Right					
w/One Touch	R		.2	4602540AD	$20.35
w/o One Touch	R		.2	4602544AD	$18.70
	L		.2	4602632AD	$31.35
¶Order by Application					
8 Cap, Bezel					
Beige	R			1GC82DK7AA	$1.85
	L			1GC83DK7AA	$105.00
Gray	R			1GC82XDVAA	$1.80
	L			1GC83XDVAA	$1.85
9 Bezel, Handle					
Beige	R			1GC78DK7AA	$5.85
	L			1GC79DK7AA	$5.85
Gray	R			1GC78XDVAA	$5.85
	L			1GC79XDVAA	$5.85
10 Speaker, Door					
Std Sound System	R	#.3		5091019AB	$7.50
	L	#.3		5091019AB	$7.50
Infinity Sound System	R	#.3		5081669AA	$95.35
	L	#.3		5081669AA	$95.35

#w/Trim Panel Removed, Included in R&R Door Carrier, Not Included in R&R Trim Panel

Shield, Moisture	R	#	N.A.
	L	#	N.A.

#w/Trim Panel Removed, Not Included in R&R Trim Panel

HARDWARE

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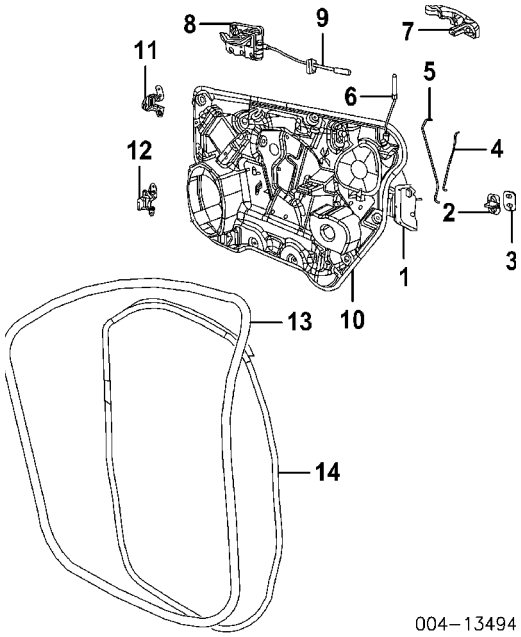
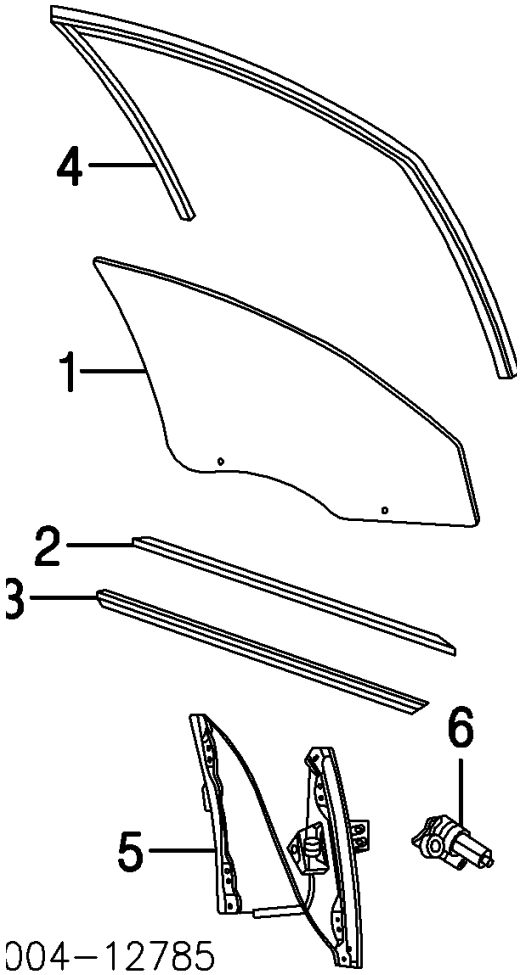


Refinish Outside Door Handle	R		.5		
	L		.5		
Refinish Upper Hinge	R		.5		
	L		.5		
Refinish Lower Hinge	R		.5		
	L		.5		
R&I Outside Door Handle	R	#.7			
	L	#.7			
#Includes R&I Trim Panel					
R&I Door Carrier	R	#.6			
	L	#.6			
#w/Trim Panel & Door Glass Removed					
1 Latch, Door					
w/Theft Deterrent	R	#.4		4589440AA	$122.00
	L	#.4		4589441AD	$125.00
w/o Theft Deterrent	R	#.4		4589426AA	$67.40
	L	#.4		4589421AA	$77.85
#w/Door Carrier Removed, Included in R&R Door Carrier					
2 Striker, Latch	R		.2	4589050AA	$12.00
	L		.2	4589050AA	$12.00
3 Shim, Striker (a)	R			55362034AA	$1.95
	L			55362034AA	$1.95

(a) As Required					
4	Rod, Lock Cylinder	L		68043795AA	$4.60
5	Rod, Outside Handle				
	w/Theft Deterrent	R		68043802AA	$5.20
		L		68043803AA	$5.20
	w/o Theft Deterrent	R		68043798AA	$5.20
		L		68043799AA	$5.20
6	Rod, Lock	R		68043790AA	$7.60
		L		68043791AA	$7.60
7	Handle, Outside Door				
	w/Theft Deterrent				
	Chrome	R	#.3	4589186AD	$57.65
		L	#.3	4589295AD	$85.90
	Bright Silver, (Code S2)	R	#.3	XU82WS2AD	$57.35
		L	#.3	1EE55WS2AC	$64.80
	Brilliant Black, (Code XR)	R	#.3	XU82AXRAD	$59.45
		L	#.3	1EE55AXRAC	$71.35
	Inferno Red, (Code RH)	R	#.3	XU82ARHAD	$61.30
		L	#.3	N.A.	
	Deep Water Blue, (Code BS)	R	#.3	XU82GBSAD	$59.85
		L	#.3	1EE55GBSAD	$43.35
	Melbourne Green, (Code PL)	R	#.3	XU82GPLAD	$62.60
		L	#.3	1EE55GPLAD	
	Sandstone, (Code KG)	R	#.3	XU82FKGAD	$59.70
		L	#.3	1EE55FKGAC	$64.80
	Silver Steel, (Code A4)	R	#.3	XU82DA4AD	$57.95
		L	#.3	1EE55DA4AC	$64.80
	Stone White, (Code W1)	R	#.3	XU82SW1AD	$57.35
		L	#.3	1EE55SW1AC	$64.80
	Surf Blue, (Code QD)	R	#.3	N.A.	
		L	#.3	N.A.	
	w/o Theft Deterrent				
	Chrome	R	#.3	4589186AD	$57.65
		L	#.3	4589185AD	$68.55
	Bright Silver, (Code S2)	R	#.3	XU82WS2AD	$57.35
		L	#.3	XU57WS2AD	$54.50
	Brilliant Black, (Code XR)	R	#.3	XU82AXRAD	$59.45
		L	#.3	XU57AXRAD	$55.35
	Inferno Red, (Code RH)	R	#.3	XU82ARHAD	$61.30
		L	#.3	XU57ARHAD	$58.35
	Deep Water Blue, (Code BS)	R	#.3	XU82GBSAD	$59.85
		L	#.3	XU57GBSAD	$59.85

	Melbourne Green, (Code PL)	R	#.3	XU82GPLAD	$62.60
		L	#.3	XU57GPLAD	$62.60
	Sandstone, (Code KG)	R	#.3	XU82FKGAD	$59.70
		L	#.3	XU57FKGAD	$55.85
	Silver Steel, (Code A4)	R	#.3	XU82DA4AD	$57.95
		L	#.3	XU57DA4AD	$55.10
	Stone White, (Code W1)	R	#.3	XU82SW1AD	$57.35
		L	#.3	XU57SW1AD	$54.50
	Surf Blue, (Code QD)	R	#.3	N.A.	
		L	#.3	N.A.	
	#w/Trim Panel Removed				
	Cyl, Door Lock	L	#.2	N.A.	
	#Included in R&R Left Outside Door Handle				
8	Handle, Inside Door	R	#.2	68043746AA	$39.85
		L	#.2	68043747AA	$39.85
	#w/Trim Panel Removed				
9	Cable, Inside Handle	R		68043748AA	$13.80
		L		68043748AA	$13.80
10	Carrier, Door	R	#2.3	68043728AA	$212.00
		L	#2.3	68043729AA	$212.00
	#w/Trim Panel & Door Glass Removed				
	Harness, Door Wiring¶	R		4795994AE	$53.30
		L		4795993AE	$69.50
	¶Order by Application				
11	Hinge, Upper Door	R	#.2	5074256AB	$28.90
		L	#.2	5074257AB	$28.90
12	Hinge, Lower Door	R	#.2	55360918AF	$53.70
		L	#.2	55360919AF	$53.70
	#w/Door Assy Removed				
13	W/Strip, Frt Door Opng-See Rocker/Pillars/Floor Section				
14	Weatherstrip, Door (On Door)	R	.5	5076866AC	$68.45
		L	.5	5076867AC	$68.45

2010 Dodge Journey R/T Utility



1 Glass, Front Door					
Dodge	R		1.0	5076886AA	$172.00
	L		1.0	5076887AA	$172.00
NAGS	R		1.0	DD11553GTN	$226.80
	L		1.0	DD11554GTN	$226.80
2 Moulding, Outer Belt-See Exterior Trim Section					
3 Moulding, Inner Belt-See Interior Trim Section					
4 W/Strip, Glass Run	R		.2	5076870AB	$24.80
	L		.2	5076871AB	$24.80
5 Regulator, Window	R	#.6		68043734AA	$39.85
	L	#.6		68043735AA	$85.00

#w/Door Carrier Removed, Includes R&R Regulator Motor, Included in R&R Door Carrier

2010 Dodge Journey R/T Utility

6	Motor, Regulator				
	w/One Touch	R	#.2	4589152AA	$17.00
		L	#.2	4589153AA	$17.00
	w/o One Touch	R	#.2	4589154AA	$18.85
		L	#.2	4589151AA	$23.35

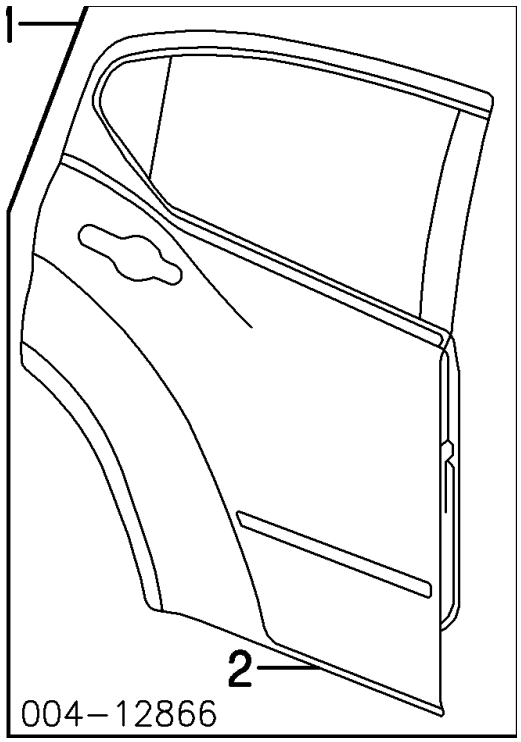
#w/Door Carrier Removed, Included in R&R Door Carrier

2010 Dodge Journey R/T Utility

REAR DOOR

Procedures 16 and 28

SHEET METAL



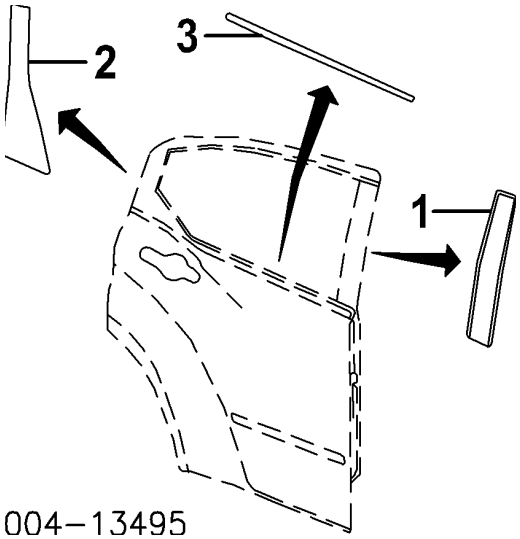
Refinish Door Outside		R		2.4		
		L		2.4		
Add for Jambs & Interior		R		1.0		
		L		1.0		
Add for Jambs		R		.5		
		L		.5		
R&I Door Assy		R		1.0		
		L		1.0		
1	Shell Assy, Door	R		5.2	68040232AA	$420.00
		L		5.2	68040233AA	$420.00
2	Panel, Door Repair¶	R	#6.5		5076782AB	$122.00
		L	#6.5		5076783AB	$122.00

¶Included w/Door Shell Assy

#Includes R&I/R&R Door Glass

EXTERIOR TRIM

2010 Dodge Journey R/T Utility

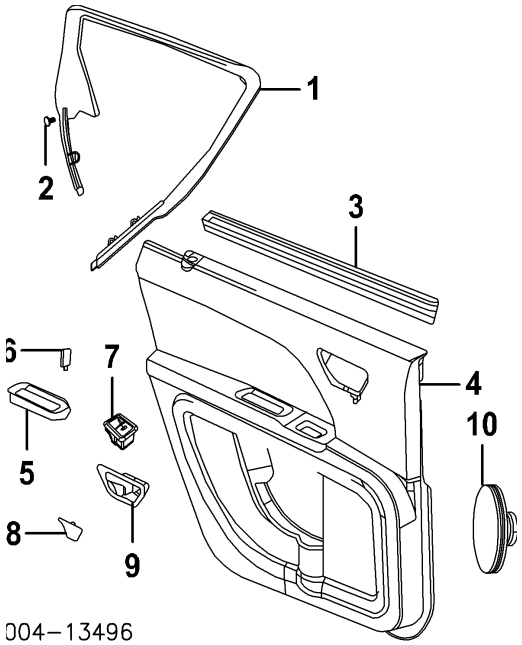


004–13495

	R&I Outer Belt Moulding	R	#.6		
		L	#.6		
	#Includes R&I Trim Panel				
1	Tape, Front Black-Out	R	#.2	5116326AA	$10.35
		L	#.2	5116327AA	$10.35
2	Tape, Rear Black-Out	R	#.2	5116270AA	$13.70
		L	#.2	5116271AA	$13.70
	#Time is for Installation only				
3	Moulding, Outer Belt	R	#.2	5076858AB	$28.00
		L	#.2	5076859AB	$28.00
	#w/Trim Panel Removed				

INTERIOR TRIM

2010 Dodge Journey R/T Utility



004–13496

R&I Trim Panel

R	.4	
L	.4	

NOTE: All Parts in this section are included in R&R Trim Panel unless noted otherwise.

1	Trim, Upper Door	R	#.3	1EF02XXXAA	$16.70
		L	#.3	1EF01XXXAA	$16.70
	#w/Trim Panel Removed, Not Included in R&R Trim Panel				
2	Clip, Trim (a)	R		6509103AA	$0.35
		L		6509103AA	$0.35
	(a) As Required				
3	Moulding, Inner Belt	R	#.1	5076876AB	$8.95
		L	#.1	5076877AB	$8.95
	#w/Trim Panel Removed				
4	Panel, Door Trim				
	SE Model	R	.5	1BE78XDVAB	$409.00
		L	.5	1BE79XDVAB	$409.00
	SXT Model				
	Beige	R	.5	1BH041K7AC	$422.00
		L	.5	1BH051K7AC	$422.00
	Gray	R	.5	1BH041DVAC	$422.00
		L	.5	1BH051DVAC	$422.00
	R/T Model				
	Beige	R	.5	1BH061K7AC	$422.00
		L	.5	1BH071K7AC	$422.00

Gray	R		.5	1BH061DVAC	$422.00
	L		.5	1BH071DVAC	$422.00
5 Handle, Pull					
Beige	R			1MQ191K7AA	$54.70
	L			1MQ191K7AA	$54.70
Gray	R			1MQ191DVAA	$54.70
	L			1MQ191DVAA	$54.70
6 Cover, Screw					
Beige	R			1MV231K7AA	$5.85
	L			1MV231K7AA	$5.85
Gray¶	R			1MV23XDVAA	$11.60
	L			1MV23XDVAA	$11.60
¶Order by Application					
7 Switch, Power Window	R		.2	4602531AC	$9.80
	L		.2	4602531AC	$9.80
8 Cap, Bezel					
Beige	R			1GC82DK7AA	$1.85
	L			1GC83DK7AA	$105.00
Gray	R			1GC82XDVAA	$1.80
	L			1GC83XDVAA	$1.85
9 Bezel, Handle					
Beige	R			1GC78DK7AA	$5.85
	L			1GC79DK7AA	$5.85
Gray	R			1GC78XDVAA	$5.85
	L			1GC79XDVAA	$5.85
10 Speaker, Door					
Std Sound System	R	#.3		5091019AB	$7.50
	L	#.3		5091019AB	$7.50
Infinity Sound System	R	#.3		5081669AA	$95.35
	L	#.3		5081669AA	$95.35

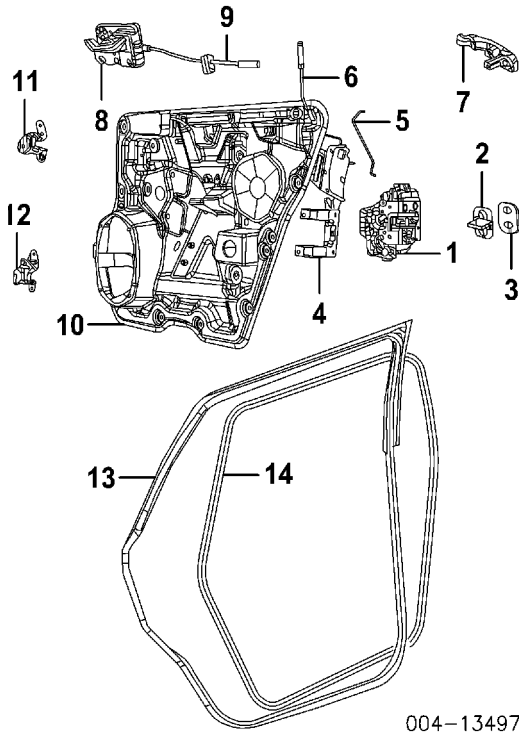
#w/Trim Panel Removed, Included in R&R Door Carrier, Not Included in R&R Trim Panel

Shield, Moisture	R	#	N.A.
	L	#	N.A.

#w/Trim Panel Removed, Not Included in R&R Trim Panel

HARDWARE

2010 Dodge Journey R/T Utility



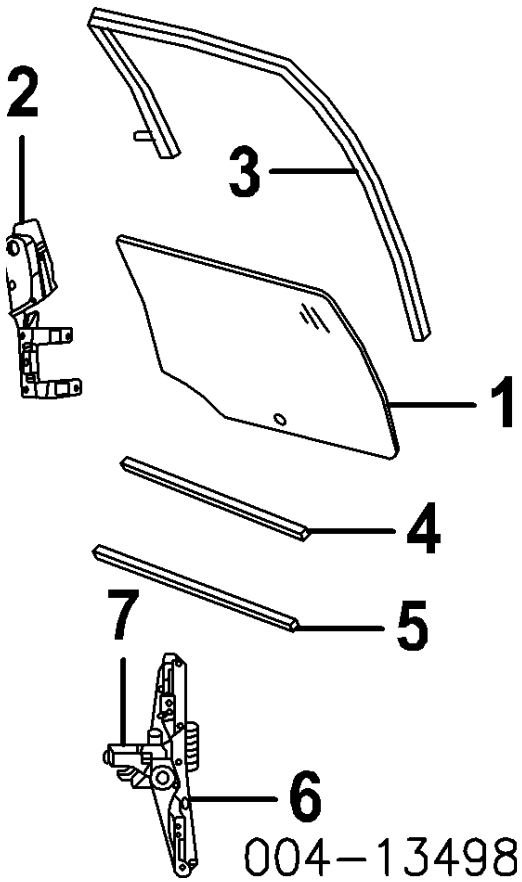
Refinish Outside Door Handle	R		.5		
	L		.5		
Refinish Upper Hinge	R		.5		
	L		.5		
Refinish Lower Hinge	R		.5		
	L		.5		
R&I Outside Door Handle	R	#.7			
	L	#.7			
#Includes R&I Trim Panel					
R&I Door Carrier	R	#.6			
	L	#.6			
#w/Trim Panel & Door Glass Removed					
1 Latch, Door					
w/Theft Deterrent	R	#.4		4589438AD	$119.00
	L	#.4		4589439AE	$119.00
w/o Theft Deterrent	R	#.4		4589424AD	$80.15
	L	#.4		4589425AD	$80.15
#w/Door Carrier Removed, Included in R&R Door Carrier					
2 Striker, Latch	R		.2	4589050AA	$12.00

2010 Dodge Journey R/T Utility

		L		.2 4589050AA	$12.00
3	Shim, Striker (a)	R		55362034AA	$1.95
		L		55362034AA	$1.95
	(a) As Required				
4	Channel, Rear Glass-See Glass & Parts Section				
5	Rod, Outside Handle				
	w/Theft Deterrent	R		68043880AA	$5.95
		L		68043881AA	$5.95
	w/o Theft Deterrent	R		68043878AA	$5.50
		L		68043879AA	$5.50
6	Rod, Lock	R		68043792AA	$7.85
		L		68043793AA	$7.85
7	Handle, Outside Door				
	Chrome	R	#.3	4589186AD	$57.65
		L	#.3	4589187AD	$64.70
	Bright Silver, (Code S2)	R	#.3	XU82WS2AD	$57.35
		L	#.3	XU83WS2AD	$57.35
	Brilliant Black, (Code XR)	R	#.3	XU82AXRAD	$59.45
		L	#.3	XU83AXRAD	$57.95
	Inferno Red, (Code RH)	R	#.3	XU82ARHAD	$61.30
		L	#.3	XU83ARHAD	$61.30
	Deep Water Blue, (Code BS)	R	#.3	XU82GBSAD	$59.85
		L	#.3	XU83GBSAD	$59.85
	Melbourne Green, (Code PL)	R	#.3	XU82GPLAD	$62.60
		L	#.3	XU83GPLAD	$62.60
	Sandstone, (Code KG)	R	#.3	XU82FKGAD	$59.70
		L	#.3	XU83FKGAD	$62.45
	Silver Steel, (Code A4)	R	#.3	XU82DA4AD	$57.95
		L	#.3	XU83DA4AD	$57.95
	Stone White, (Code W1)	R	#.3	XU82SW1AD	$57.35
		L	#.3	XU83SW1AD	$57.35
	Surf Blue, (Code QD)	R	#.3	N.A.	
		L	#.3	N.A.	
8	Handle, Inside Door	R	#.2	68043746AA	$39.85
		L	#.2	68043747AA	$39.85
	#w/Trim Panel Removed				
9	Cable, Inside Handle	R		68043749AA	$13.80
		L		68043749AA	$13.80
10	Carrier, Door	R	#2.3	68043732AA	$210.00
		L	#2.3	68043733AA	$210.00
	#w/Trim Panel & Door Glass Removed				

	Harness, Door Wiring				
	w/Theft Deterrent	R		5084014AE	$58.85
		L		5084014AE	$58.85
	w/o Theft Deterrent	R		5084013AE	$46.80
		L		5084013AE	$46.80
11	Hinge, Upper Door	R	#.2	5067940AB	$17.15
		L	#.2	5067941AB	$17.15
12	Hinge, Lower Door	R	#.2	5067938AC	$29.90
		L	#.2	5067939AC	$29.90
	#w/Door Assy Removed				
13	W/Strip, Rear Door Opng-See Rocker/Pillars/Floor Section				
14	Weatherstrip, Door (On Door)	R	.5	5076868AB	$74.00
		L	.5	5076869AB	$74.00

GLASS & PARTS



1	Glass, Rear Door				
	Dodge				

2010 Dodge Journey R/T Utility

	Tint	R		1.0 5178046AA	$146.00
		L		1.0 5178047AA	$146.00
	Privacy	R		1.0 5076890AA	$164.00
		L		1.0 5076891AA	$164.00
	NAGS				
	Tint	R		1.0 DD11555GTN	$231.40
		L		1.0 DD11556GTN	$231.40
	Privacy	R		1.0 DD11555YPN	$219.60
		L		1.0 DD11556YPN	$219.60
2	Channel, Rear Glass	R		.2 68043892AA	$7.50
		L		.2 68043893AA	$3.20
3	Run, Glass	R		.2 5076872AA	$25.60
		L		.2 5076873AA	$25.60
4	Moulding, Outer Belt-See Exterior Trim Section				
5	Moulding, Inner Belt-See Interior Trim Section				
6	Regulator, Window	R	#.6	68043738AA	$38.20
		L	#.6	68043739AA	$38.20

#w/Door Carrier Removed, Includes R&R Regulator Motor, Included in R&R Door Carrier

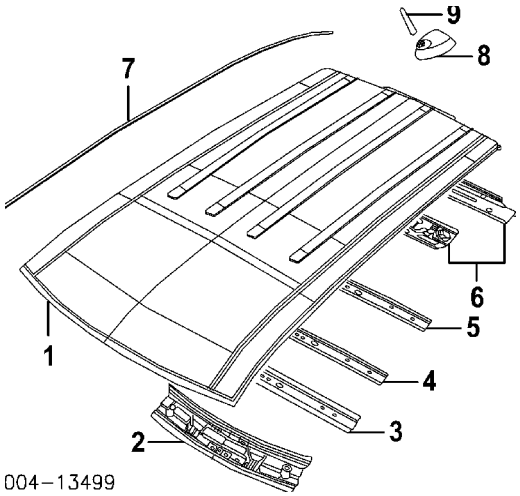
7	Motor, Regulator				
	w/One Touch	R	#.2	4589152AA	$17.00
		L	#.2	4589153AA	$17.00
	w/o One Touch	R	#.2	4589154AA	$18.85
		L	#.2	4589151AA	$23.35

#w/Door Carrier Removed, Included in R&R Door Carrier

ROOF

Procedures 17 and 28

SHEET METAL/EXTERIOR TRIM



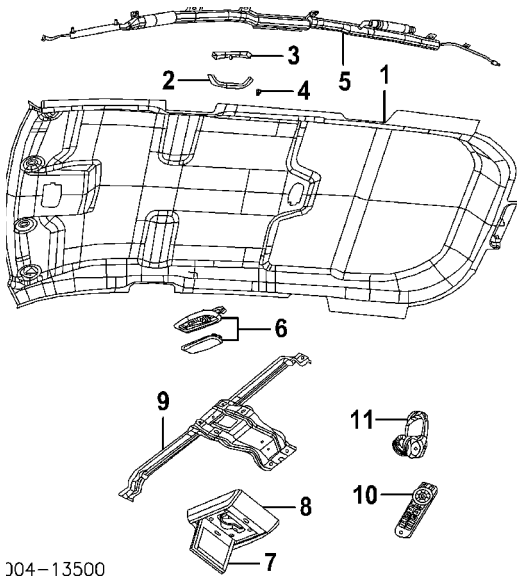
Refinish Roof Outside		4.0
Add to Edge (If Necessary)		.5
Add to R&R Roof		
w/Antenna		.3
w/Entertainment System		.5
w/Luggage Rack		.8
w/Overhead Console		.5
Add to R&I/R&R Side Curtain Air Bags		1.4
R&I Antenna	#1.2	

#Includes Drop Rear Section of Headliner to Gain Access

1	Panel, Roof				
	w/Sunroof		#19.8	68035443AA	$827.00
	w/o Sunroof		#18.0	5076933AB	$365.00
	#Does Not Include R&I/R&R Quarter Glass				
2	Panel, Front Header		3.0	5076970AB	$60.00
	Bow, Roof				
3	No. 1		1.5	5067959AA	$21.95
4	No. 2		1.5	5076975AA	$7.85
5	No. 3		1.5	5076975AA	$7.85
6	Panel, Rear Header		3.5	5076971AB	$60.35
7	Moulding, Roof	R	.5	5116272AB	$22.35

		L	.5	5116272AB	$22.35
8	Base, Antenna	#1.2		5064252AC	$27.90
	#Includes Drop Rear Section of Headliner to Gain Access				
9	Mast, Antenna		.1	5064710AA	$5.50

INTERIOR TRIM



004–13500

	R&I Headliner				
	w/Sunroof		3.0		
	w/o Sunroof		2.8		
	Add to R&I/R&R Headliner				
	w/Entertainment System		.5		
	w/Overhead Console		.5		
1	Headliner¶				
	w/Sunroof		3.0	1MS201W1AA	$1,160.00
	w/o Sunroof		2.8	1MS10DW1AA	$850.00
	¶Order by Application				
	Panel, Rear Header		.3	1DE55DW1AB	$32.50
2	Handle, Assist				
	Front	R	.2	QY62DW1AE	$26.60
		L	.2	QY62DW1AE	$26.60
	Rear	R	.2	QY66DW1AD	$21.45
		L	.2	QY67DW1AD	$21.45
	Retainer, Handle				
3	Front	R		68046079AA	$20.95
		L		68046079AA	$20.95
4	Rear	R		68046080AA	$22.35
		L		68046080AA	$22.35

Hook, Coat¶	R		.1	1MU01DW1AA	$23.35
	L		.1	1MU01DW1AA	$23.35

¶Order by Application

5 Module, Side Curtain Air Bag-See Air Bag System Section

6 Lamp, Dome (a) .2 N.A.

(a) As Required

7 Console, Entertainment System

Factory Installed	#.5		1CM00DW1AF	$641.00
Dealer Installed	#.5		68022580AB	$990.00

8 Bezel, Console

w/Rear A/C¶	#.5		1NU59DW1AA	$41.80
w/o Rear A/C	#.5		1FN43DW1AC	$41.80

¶Order by Application

#R&R Complete

9 Bracket, Mounting

w/Sunroof			5064399AC	$76.95
w/o Sunroof			5064407AD	$42.80

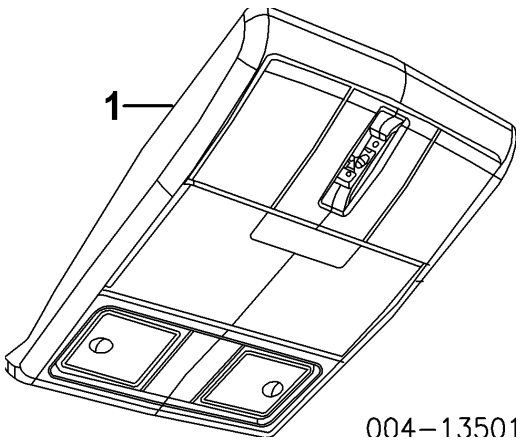
10 Control, Remote

Factory Installed			5107094AB	$85.45
Dealer Installed			68024459AA	$34.85

11 Headphones

Factory Installed			5107082AC	$83.50
Dealer Installed			5064037AA	$62.55

OVERHEAD CONSOLE

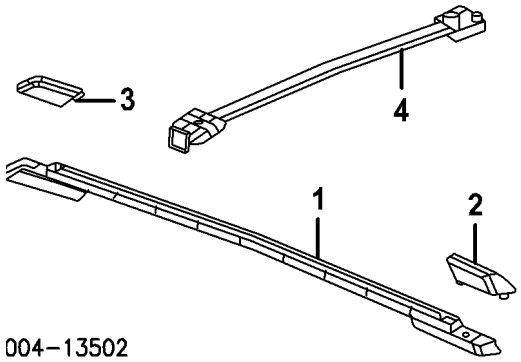


R&I Overhead Console			.5		
1 Console, Overhead¶					
w/Sunroof			.5	1MU021W1AA	$180.00
w/o Sunroof			.5	1MU03DW1AA	$119.00

¶Order by Application

2010 Dodge Journey R/T Utility

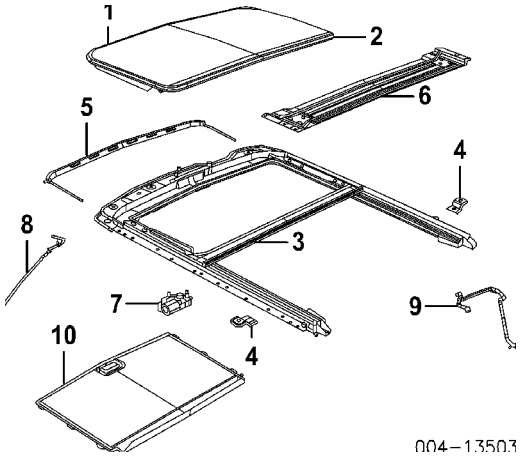
ROOF LUGGAGE RACK



R&I Side Rail	R	.4		
	L	.4		
1 Rail, Side¶	R	.4	5067890AB	$66.80
	L	.4	5067891AB	$66.80
¶Order by Application				
2 Cap, Front Rail	R	.1	5178368AB	$7.30
	L	.1	5178369AA	$7.30
3 Cap, Rear Rail	R	.1	5178370AB	$6.85
	L	.1	5178371AB	$6.85
4 Rail, Cross				
Front			5178270AA	$103.00
Rear			5178271AA	$103.00

2010 Dodge Journey R/T Utility

SUNROOF



R&I Sunroof Glass		.7	
O/H Sunroof Assy (Includes R&I)		2.4	

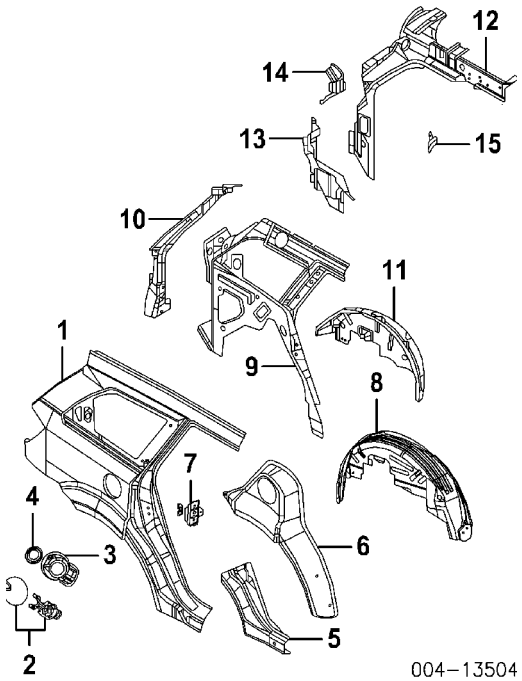
NOTE: All Parts in this section are included in O/H unless noted otherwise.

1	Glass, Sunroof		.7	5183171AA	$315.00
2	Seal, Sunroof		#.2	5183172AB	$88.85
	#w/Sunroof Glass Removed				
3	Frame, Sunroof		IOH	5183170AC	$319.00
4	Bracket, Frame	R		68034512AA	$28.10
		L		68034512AA	$28.10
5	Deflector, Air		.3	68019335AA	$78.30
6	Channel, Drain		#.4	5183176AA	$62.85
	#w/Sunroof Glass Removed				
7	Motor, Sunroof		#.4	5183174AA	$210.00
	#w/Headliner Removed				
8	Hose, Front Drain	R		5178176AD	$8.60
		L		5178177AD	$8.45
9	Hose, Rear Drain	R		5178342AC	$10.80
		L		5178341AC	$10.80
10	Shade, Sun		#.2	1DP18DW1AA	$68.60
	#w/Drain Channel Removed				

QUARTER PANEL

Procedures 20 and 28

SHEET METAL



Refinish Quarter Panel Outside	R		2.4
	L		2.4
Add for Pillar	R		.5
	L		.5
Add to Edge Panel	R		.5
	L		.5
Add for Inside	R		.8
	L		.8
Refinish Fuel Door	L	#.5	
#Included in Refinish Left Quarter Panel			
Add for Inside			.2
Refinish Lamp Mounting Panel	R		.8
	L		.8
R&R Both Quarter Panels			28.9
R&R Roof & Both Quarter Panels			
w/Sunroof			48.3
w/o Sunroof			46.5

2010 Dodge Journey R/T Utility

Add to R&R Roof & Both Quarter Panels					
w/Antenna			.3		
w/Entertainment System			.5		
w/Luggage Rack			.8		
w/Overhead Console			.5		
Add to R&R Quarter Panel					
To R&I Quarter Glass	R		.3		
	L		.3		
Add to R&I/R&R Side Curtain Air Bag	R	#.7			
	L	#.7			

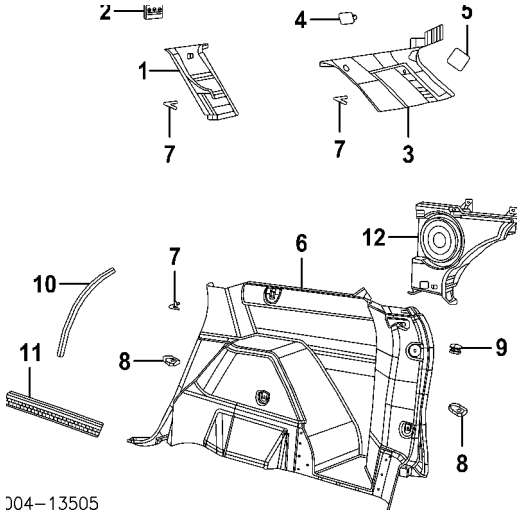
#w/Headliner Removed

NOTE: Manufacturer advises foam fillers have been utilized within panels in this section. Refer to vehicle body/service repair manuals for recommended replacement and safety precautions.

1	Panel, Outer Quarter	R		15.0	68035430AA	$352.00
		L		15.5	68035431AA	$352.00
2	Door, Fuel	L		.5	5076926AB	$17.95
3	Housing, Fuel Filler	L	#.7		5178277AC	$14.60
	#w/Fender Liner Removed					
4	Seal, Fuel Filler	L			52090496AA	$6.85
5	Reinf, Front Panel	R		1.5	5067928AA	$48.95
		L		1.5	5067929AA	$48.95
6	Panel, Outer Wheelhouse	R	#3.0		5067950AB	$265.00
		L	#3.0		5067951AB	$265.00
	#w/Outer Quarter Panel Removed Deduct 1.0					
7	Retainer, Striker	R		.5	5178422AA	$3.05
		L		.5	5178422AA	$3.05
	Striker, Latch-See Rear Door Section					
8	Liner, Fender	R		.4	5116276AC	$39.60
		L		.4	5116277AC	$39.60
	Clip, Liner (a)	R			6503598	$5.70
		L			6503598	$5.70
	(a) As Required					
9	Panel, Inner Quarter	R		4.5	68035436AA	$1,500.00
		L		4.5	68035437AA	$1,500.00
10	Trough, Drain	R	#2.5		5076962AC	$81.50
		L	#2.5		5076963AC	$81.50
	#w/Outer Quarter Panel Removed					

11	Panel, Inner Wheelhouse	R	2.5	5067906AC	$190.00
		L	2.5	5067907AC	$190.00
12	Reinf, Inner Quarter Panel	R	2.0	5178058AA	$101.00
		L	2.0	5178059AA	$101.00
13	Extension, Quarter Panel	R	1.0	5076934AB	$180.00
		L	1.0	5076935AB	$180.00
14	Panel, Lamp Mtg	R	#1.5	5076944AB	$160.00
		L	#1.5	5076945AB	$160.00
	#w/Outer Quarter Panel Removed				
15	Bracket, Wheelhouse	R	.5	5115859AA	$5.45
		L	.5	5115859AA	$5.45

INTERIOR TRIM



1	Panel, Front Upper Trim	R	.3	1BG12DW1AC	$13.30
		L	.3	1BG13DW1AC	$13.30
2	Cap, Trim Panel	R		1MK90DW1AA	$1.30
		L		1MK90DW1AA	$1.30
3	Panel, Rear Upper Trim¶	R	.3	1FB18DW1AB	$53.50
		L	.3	1FB19DW1AB	$53.50
	Cover, Screw				
4	Front	R		1MK93DW1AA	$1.00
		L		1MK93DW1AA	$1.00
5	Rear	R		1MK95DW1AA	$1.00
		L		1MK95DW1AA	$1.00
6	Panel, Lower Trim¶				
	Right				
	w/Rear A/C				
	Beige	R	.6	1CA86DK7AC	$69.00
	Gray	R	.6	1CA86XDVAC	$69.00
	w/o Rear A/C				

	Beige	R		.6	1CU68DK7AB	$116.00
	Gray	R		.6	1CU68XDVAB	$116.00
	Left					
	Std Sound System					
	Beige	L		.6	1CU67DK7AB	$116.00
	Gray	L		.6	1CU67XDVAB	$116.00
	Infinity Sound System					
	Beige	L		.6	1JW29DK7AB	$166.00
	Gray	L		.6	1JW29XDVAB	$166.00
	¶Order by Application					
7	Clip, Trim (a)	R			68045441AA	$5.00
		L			68045441AA	$5.00
	(a) As Required					
8	Anchor, Tie-Down (2/Side)	R			55196901AB	$18.30
		L			55196901AB	$18.30
9	Cap, Anchor (2/Side)	R			68045457AA	$2.00
		L			68045457AA	$2.00
10	W/Strip, Inner (On Body)	R		.2	5076878AC	$10.60
		L		.2	5076878AB	$10.60
11	Plate, Rear Scuff-See Rocker/Pillars/Floor Section					
12	Sub-Woofer	L	#.3		5064298AC	$202.00
	#w/Left Lower Trim Panel Removed					
	Cover, Tonneau-See Rear Body Section					

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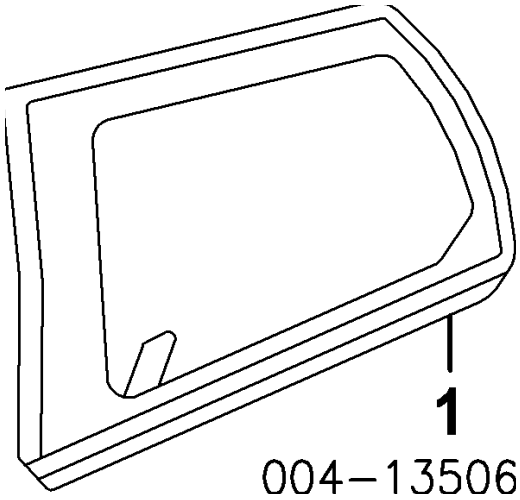
QUARTER GLASS



R&I Quarter Glass	R	#2.1		
	L	#2.1		

#Includes Clean Up Old Adhesive as Necessary

1 Glass, Quarter

Dodge				
Tint	R	#1.8	5178050AC	$242.00
	L	#1.8	5178051AC	$242.00
Privacy	R	#1.8	5155278AC	$284.00
	L	#1.8	5155279AC	$284.00
NAGS				
Tint	R	#1.8	DQ11557GTY	$224.30
	L	#1.8	DQ11558GTY	$224.30
Privacy	R	#1.8	DQ11557YPY	$370.75
	L	#1.8	DQ11558YPY	$370.75

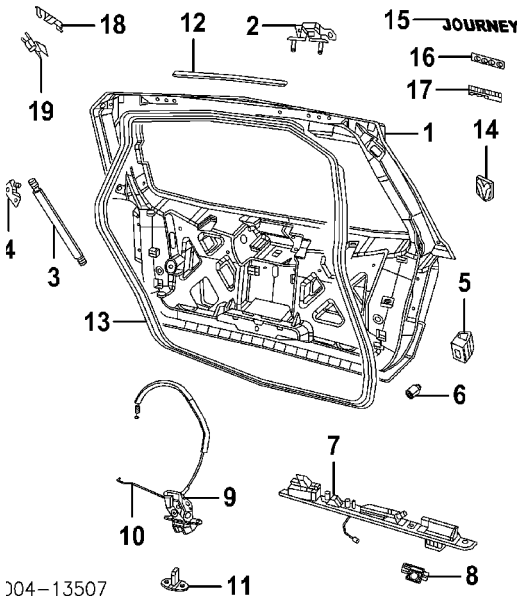
#Includes Clean Up Old Adhesive as Necessary

Adhesive, Glass			N.A.	

LIFTGATE

Procedures 25 and 28

SHEET METAL/EXTERIOR TRIM



Refinish Liftgate Outside		2.6		
Add for Underside		1.3		
Refinish Hinge	R	.5		
	L	.5		
R&I Liftgate		.8		
R&I Liftgate Handle		#.8		
R&I Lock Cylinder		#.6		

#Includes R&I Liftgate Lower Trim Panel

Add to R&R Liftgate				
To Transfer Liftgate Glass		#.8		

#Includes Clean Up Old Adhesive as Necessary

1	Shell, Liftgate (Com)				
	w/Keyless Entry		#5.5	1CZ91TZZAD	$824.00
	w/o Keyless Entry		#5.5	1DA24ZZZAD	$1,150.00

#Includes Wiper Components

2	Hinge, Liftgate	R	#.5	5074292AB	$13.55
		L	#.5	5074292AB	$13.55

#w/Liftgate Removed, Includes Caulk & Seal

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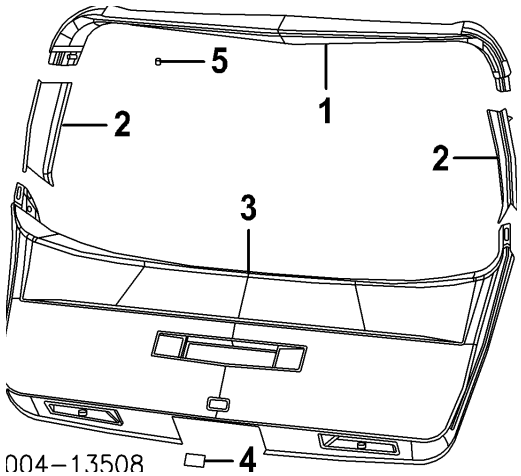
3	Strut, Liftgate	R		.2	5178293AC	$23.00
		L		.2	5178293AC	$23.00
4	Bracket, Liftgate	R	#.2		5178418AA	$4.30
		L	#.2		5178418AA	$4.30
	#w/Strut Removed Deduct .1					
	Bumper, Liftgate					
5	Upper	R		.1	5109694AA	$4.70
		L		.1	5109694AA	$4.70
6	Lower	R		.1	4673791AA	$0.90
		L		.1	4673791AA	$0.90
7	Handle, Liftgate					
	w/Rear View Camera		#.6		5178321AD	$834.00
	w/o Rear View Camera		#.4		5178320AD	$80.35
	#w/Liftgate Lower Trim Panel Removed					
	Harness, Liftgate¶				5267856AE	$106.00
	¶Order by Application					
	Harness, Rear Lamp-Serviced w/Liftgate Harness					
8	Camera, Rear View					
	Factory Installed		#.2		5026338AB	$225.00
	Dealer Installed		#.2		5191906AA	$344.00
	#w/Liftgate Handle Removed, Included in R&R Liftgate Handle					
9	Latch, Liftgate					
	w/Keyless Entry		#.3		4589243AB	$109.00
	w/o Keyless Entry		#.3		4589065AB	$52.55
10	Rod, Lock Cyl				5178213AB	$1.45
	Cylinder, Lock		#.2		N.A.	
	#w/Lower Trim Panel Removed					
11	Striker, Latch			.2	4589234AA	$11.60
12	Seal, Liftgate (On Liftgate)			.2	5076880AA	$13.30
13	Weatherstrip, Liftgate (On Body)			.4	5076822AD	$58.45
14	Emblem (Adhesive)			.2	5155656AA	$27.35
	Nameplate (Adhesive)					
15	"JOURNEY"			.2	5178268AA	$9.80
16	"AWD"			.2	4806213AA	$27.60
17	"FLEX FUEL E85 ETHANOL"			.2	4389988AA	$35.85
18	"SXT"			.2	4806210AB	$27.20

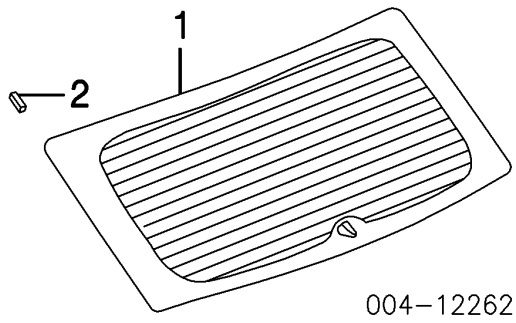
19	"R/T"		.2	4806327AC	$35.00

INTERIOR TRIM



1	Panel, Upper Trim		.2	1BZ30DW1AA	$38.00
2	Panel, Side Trim	R	.2	1GC70DW1AA	$16.30
		L	.2	1GC71DW1AA	$16.30
3	Panel, Lower Trim				
	Beige	#.4		1BE54DK7AB	
	Gray	#.4		1BE54XDVAB	
	#w/Side Trim Removed				
4	Cover, Hole			N.A.	
5	Clip, Trim Panel (a)			N.A.	
	(a) As Required				

GLASS & PARTS



1	Glass, Liftgate			
	Dodge			
	Tint	#2.5	5178053AA	$437.00
	Privacy	#2.5	5076881AA	$462.00
	NAGS			
	Tint	#2.5	DB11559GTN	$382.10
	Privacy	#2.5	DB11559YPN	$495.75

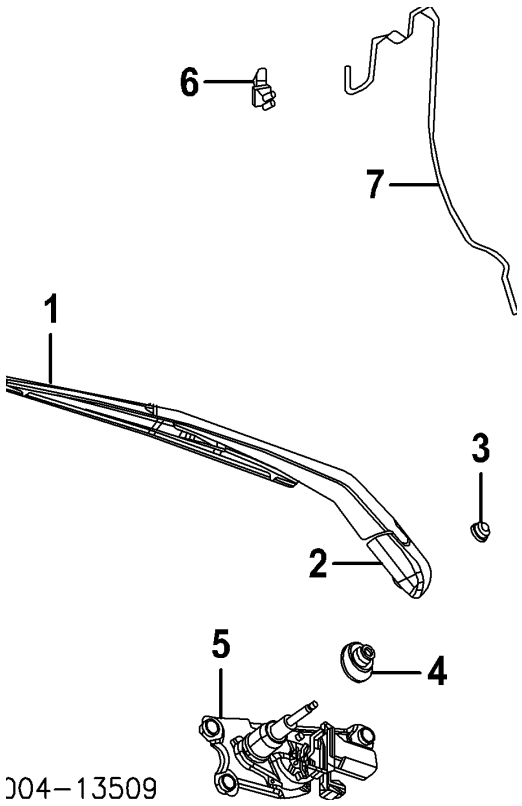
#Includes R&I/R&R Wiper Arm, Includes Clean Up Old Adhesive as Necessary

Adhesive, Glass — N.A.

2 Spacer, Glass — R — N.A.

L — N.A.

WIPER SYSTEM

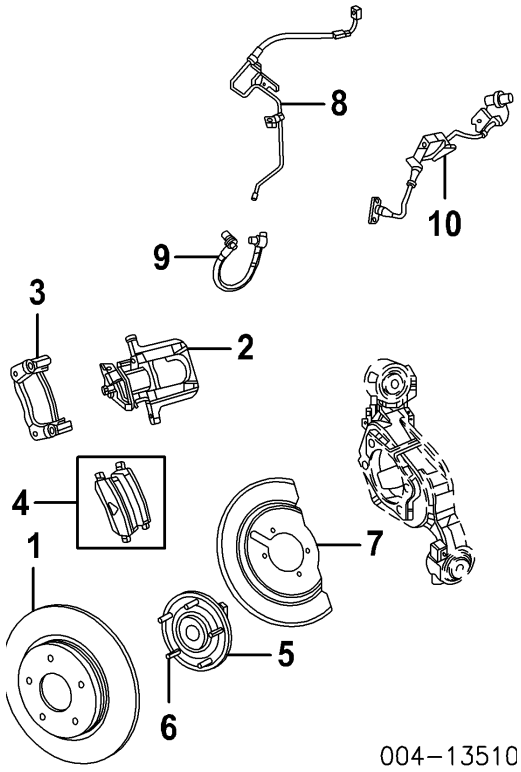


R&I Washer Nozzle — .2

1	Blade, Wiper		.1	68040372AA	$9.70
2	Arm, Wiper	#.2		68040371AA	$20.80
	#Includes Wiper Blade or Insert, Included in R&R Wiper Motor				
3	Nut, Wiper Arm			6505316AA	$1.85
4	Grommet, Wiper Motor			5178334AB	$1.70
5	Motor, Wiper	#.5		5178201AC	$57.45
	#w/Liftgate Lower Trim Panel Removed				
6	Nozzle, Washer	#.2		5116020AA	$11.60
	#Included in R&R Liftgate				
7	Hose, Washer¶			N.A.	
	¶Cut to Fit				

REAR SUSPENSION

Procedure 23



R&I Suspension/Crossmember Assy

FWD		2.8
AWD		3.5
R&I Suspension (One Side)	R	2.3
	L	2.3
O/H Suspension		
One Side	R	4.2
	L	4.2
Both Sides		8.0
Adjust Four Wheel Alignment		1.6
Bleed Brake System		.6

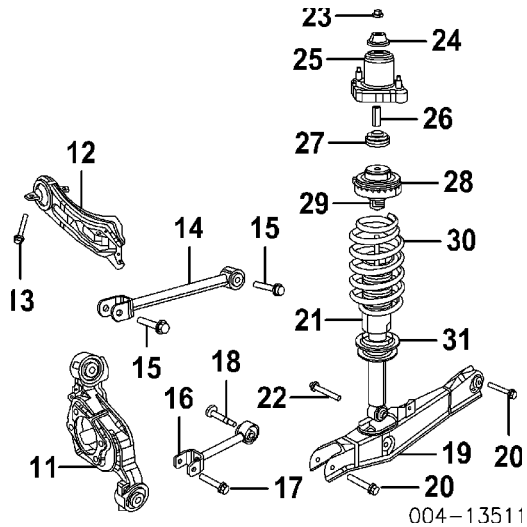
NOTE 1: R&I/R&R or O/H Does Not include alignment or bleed brake system.

NOTE 2: All Parts in this section are included in overhaul unless noted otherwise.

1	Rotor, Brake	R	#.6	4721996AA	$62.25
		L	#.6	4721996AA	$62.25

#R&R Both 1.0

2	Caliper, Brake	R	#.5	68029890AA	$62.30
		L	#.5	68029889AA	$62.30
3	Brkt, Caliper	R	#.5	68029886AA	$29.70
		L	#.5	68029886AA	$29.70
	#R&R One Side Complete, R&R Both Sides .8				
4	Pad Set, Brake		#1.0	68029887AA	$76.30
	#Deduct .5 for Each Caliper Removed				
5	Hub/Bearing, Rear	R	#1.0	5171125AB	$135.00
		L	#1.0	5171125AB	$135.00
	#Includes R&R Rotor				
6	Stud, Lug (5/Side)	R		N.A.	
		L		N.A.	
7	Shield, Splash	R	#.2	4721682AA	$6.85
		L	#.2	4721683AA	$6.85
	#w/Hub Removed				
	Hose, Brake				
8	No. 1	R	#.5	4862212AD	$37.10
		L	#.5	4862213AD	$37.10
	#Not Included in O/H				
9	No. 2	R	#.3	4766559AA	$13.30
		L	#.3	4766559AA	$13.30
	#w/Caliper Removed Deduct .2				
10	Sensor, Rear ABS-See ABS/Brakes Section				



11	Knuckle, Rear	R	#1.4	4766562AA	$245.00
		L	#1.4	4766563AA	$245.00

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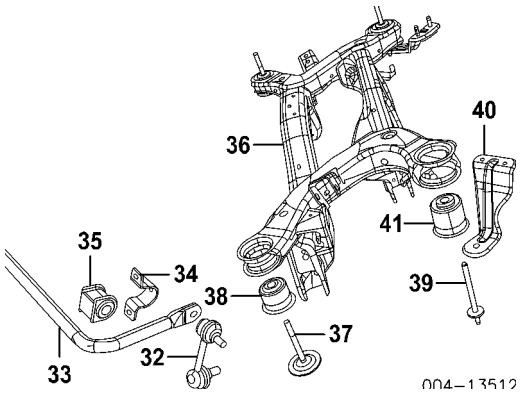
#Includes R&R Hub, Rotor & Splash Shield

12	Arm, Trailing	R	#1.5	5085416AD	$52.35
		L	#1.5	5085415AD	$52.35
	#w/Knuckle Removed Deduct .9				
13	Bolt, Trailing Arm (2/Side)	R		6104462AA	$4.75
		L		6104462AA	$4.75
14	Link, Lateral	R	#.6	5085419AB	$24.85
		L	#.6	5085419AB	$24.85
	#w/Knuckle Removed Deduct .3				
15	Bolt, Link (2/Side)	R		6104242AA	$5.60
		L		6104242AA	$5.60
16	Link, Toe	R	#.8	5085417AB	$23.30
		L	#.8	5085417AB	$23.30
	#w/Knuckle Removed Deduct .4				
17	Bolt, Outer Link	R		6104242AA	$5.60
		L		6104242AA	$5.60
18	Bolt, Inner Link	R		6508486AA	$8.95
		L		6508486AA	$8.95
19	Arm, Lower Control				
	FWD	R	#1.0	5085418AC	$57.85
		L	#1.0	5085418AC	$57.85
	AWD	R	#1.0	5151208AB	$131.00
		L	#1.0	5151208AB	$131.00
	#w/Knuckle Removed Deduct .6				
20	Bolt, Control Arm (2/Side)	R		6104242AA	$5.60
		L		6104242AA	$5.60
21	Absorber, Shock¶	R	#1.6	4766867AB	$60.50
		L	#1.6	4766867AB	$60.50
	¶Order by Application				
22	Bolt, Shock Mtg	R		6104243AA	$9.20
		L		6104243AA	$9.20
23	Nut, Shock Mtg	R	#1.6	6503335	$4.80
		L	#1.6	6503335	$4.80
24	Bushing, Upper Mtg	R	#1.6	5151286AA	$2.20
		L	#1.6	5151286AA	$2.20
25	Brkt, Shock Mtg	R	#1.6	5085495AC	$27.50
		L	#1.6	5085495AC	$27.50
26	Spacer, Shock Absorber	R	#1.6	5085519AA	$4.50
		L	#1.6	5085519AA	$4.50
27	Bushing, Lower Mtg	R	#1.6	5151285AA	$2.60

		L	#1.6	5151285AA	$2.60
28	Isolator, Upper¶	R	#1.6	5151000AB	$3.45
		L	#1.6	5151000AB	$3.45
29	Bumper, Shock¶	R	#1.6	5151185AB	$13.20
		L	#1.6	5151185AB	$13.20
30	Spring, Coil¶	R	#1.6	5151241AB	$61.20
		L	#1.6	5151241AB	$61.20
	Boot, Dust¶	R	#1.6	5151026AA	$5.30
		L	#1.6	5151026AA	$5.30
31	Isolator, Lower¶	R	#1.6	5151282AA	$2.60
		L	#1.6	5151282AA	$2.60

¶Order by Application

#R&R One Side Complete, w/Lower Control Arm Removed Deduct .8



32	Link, Stabilizer	R	#.4	5174245AD	$26.35
		L	#.4	5174245AD	$26.35

#Not Included in O/H

33	Bar, Stabilizer				
	FWD		#1.0	5151207AB	$99.00

#Includes R&R Stabilizer Links, Brackets & Bushings, Not Included in O/H

	AWD		#3.8	5151207AB	$99.00

#Includes R&I Differential, Includes R&R Stabilizer Links, Brackets & Bushings, Not Included in O/H

34	Clamp, Stabilizer	R	#	5105566AA	$2.30
		L	#	5105566AA	$2.30
35	Bushing, Stabilizer	R	#	5151206AB	$6.30
		L	#	5151206AB	$6.30

#Not Included in O/H

36	Crossmember, Susp				
	FWD		#4.6	5151022AA	$412.00
	AWD		#5.5	5151022AA	$412.00

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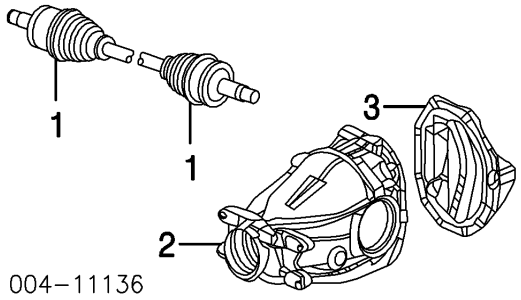
	#Not Included in O/H			
37	Bolt, Front Mtg	R	6509048AA	$10.50
		L	6509048AA	$10.50
38	Bushing, Front Mtg	R	5085562AC	$26.75
		L	5085562AC	$26.75
39	Bolt, Rear Mtg	R	6509044AA	$8.85
		L	6509044AA	$8.85
40	Brkt, Mounting	R	5151020AA	$6.20
		L	5151021AA	$6.20
41	Bushing, Rear Mtg	R	5171207AA	$16.95
		L	5171207AA	$16.95

2010 Dodge Journey R/T Utility

REAR DRIVE AXLE



	R&I Differential Assy		#3.2	
	#Includes R&I Axle Shaft Assemblies			
	R&I Axle Shaft Assy	R	#.6	
		L	#.6	
	#w/Necessary Suspension Components Removed			
	Nut, Axle	R		N.A.
		L		N.A.
1	Axle, Rear	R	#.6	N.A.
		L	#.6	N.A.
	#w/Necessary Suspension Components Removed			
2	Housing, Differential		#3.6	N.A.
	#Includes R&I Axle Shaft Assemblies			
3	Cover, Housing		#.7	N.A.
	#w/Differential Assy Removed			

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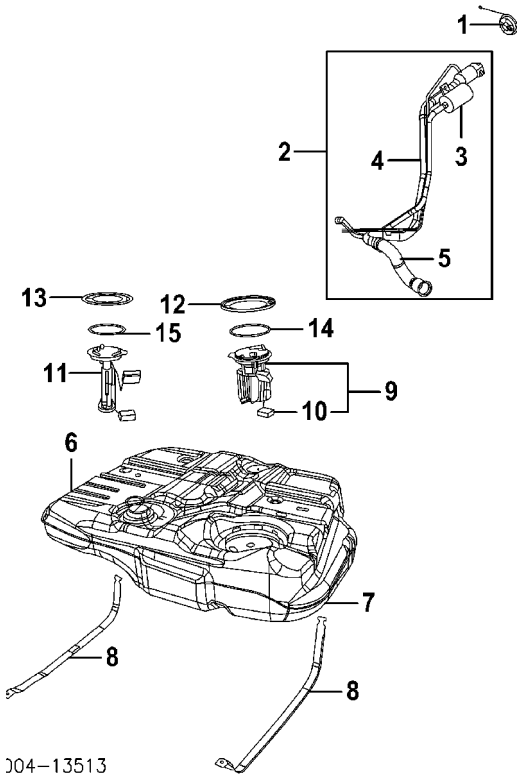
FUEL TANK



R&I Fuel Tank

FWD	2.4
AWD	3.0

NOTE: R&I/R&R Does Not include drain and refill.

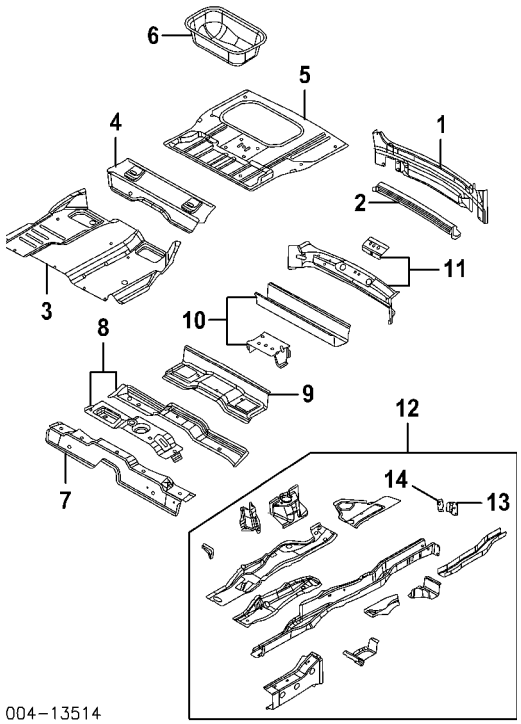
1	Cap, Fuel Filler			
	Locking		68030940AA	$66.70
	Non-Locking		5278632AG	$16.60
2	Tube Assy, Fuel Filler		4766507AC	$76.80
3	Filter, Fuel¶		68039537AA	$93.70
4	Tube, Fuel Filler¶		68039535AA	$76.80
5	Hose, Fuel Filler¶		68039532AA	$46.10
	¶Included w/Fuel Filler Tube Assy			
6	Tank, Fuel (a)			
	FWD		68036146AC	$572.00
	AWD		68036146AC	$572.00
	(a) Order by Application			
7	Shield, Tank Heat		4766132AA	$51.35
8	Strap, Tank	R	4766508AD	$27.70

		L	4766509AD	$25.70
9	Pump Assy, Fuel			
	FWD (a)		68039210AA	$260.00
	AWD		68038901AA	$272.00
	(a) Order by Application			
10	Sender, Fuel (b)			
	FWD-Serviced w/Fuel Pump Assy			
	AWD		68042941AA	$94.10
	(b) Included w/Fuel Pump Assy			
11	Pump, Auxiliary			
	AWD		68038902AA	$111.00
	Ring, Lock			
12	Fuel Pump		55366299AA	$9.35
13	Aux Pump			
	AWD		5105332AB	$7.70
	Seal, O-Ring			
14	Fuel Pump		55366298AA	$21.30
15	Aux Pump			
	AWD		5105331AA	$9.60

REAR BODY

Procedures 26 and 28

SHEET METAL



Refinish Rear Body Panel		
Upper		1.5
Lower		1.2
Refinish Rear Floor Pan		1.6
Add for Underside		.7
Refinish Sidemember Assy	R	1.4
	L	1.4

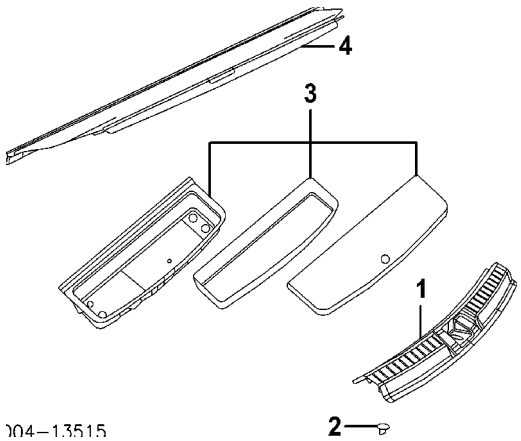
NOTE: Manufacturer advises foam fillers have been utilized within panels in this section. Refer to vehicle body/service repair manuals for recommended replacement and safety precautions.

	Panel, Rear Body				
1	Upper		7.5	5067994AA	$43.00
2	Lower	#4.0		5067995AC	$31.10
	#w/Upper Rear Body Panel Removed				
	Striker, Latch-See Liftgate Section				
3	Pan, Center Floor			5178062AA	$63.70
4	Crossmember, Rear Seat			5067953AA	$17.50

5	Pan, Rear Floor		#13.5	5155123AA	$90.80
	#w/Rear Body Panel Removed				
6	Box, Storage		#2.5	5178093AA	$54.20
	#Included in R&R Rear Floor Pan				
7	Crossmember, No. 1			5155218AB	$70.85
8	Reinf, Seat			5155191AA	$57.60
9	Crossmember, No. 2			5067952AB	$65.30
10	Crossmember, No. 3			5155145AA	$71.70
11	Crossmember, No. 4		4.5	5067996AA	$66.60
12	Sidemember Assy	R	#12.5	5155178AD	$405.00
		L	#12.5	5155179AD	$405.00
	#w/Rear Floor Pan Removed Deduct 4.0				
	Bracket, Bumper Mtg¶				
13	Outer	R	1.5	5178528AA	$16.00
		L	1.5	5178529AA	$16.00
14	Inner	R	1.0	5178532AA	$16.00
		L	1.0	5178533AA	$16.00

¶Included w/Sidemember Assy

INTERIOR TRIM



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1	Plate, Scuff			
	Beige	.2	1BE73DK7AB	$67.95
	Gray	.2	1BE73XDVAB	$67.95
2	Clip, Plate (4)		6505670AA	$2.95
3	Bin, Storage			
	Beige	.4	1BE811K7AB	$200.00
	Gray	.4	1BE811DVAB	$200.00
4	Cover, Tonneau¶			
	Beige		1DD79DK7AC	$282.00

2010 Dodge Journey R/T Utility

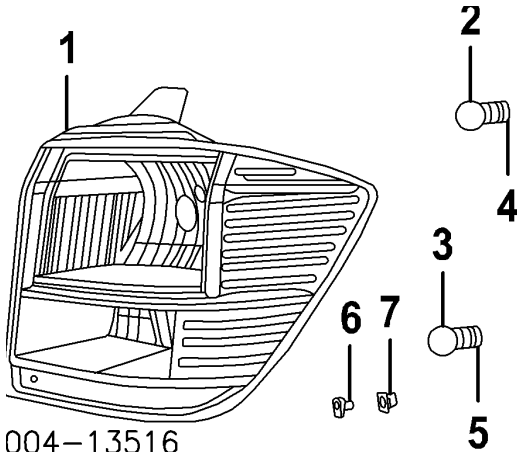
Gray	1DD79XDVAC	$282.00

¶Order by Application

REAR LAMPS

COMBINATION LAMP

ON BODY

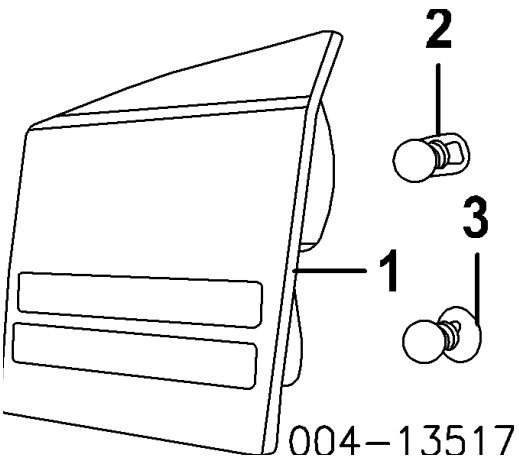


R&I Combination Lamp		R		.3		
		L		.3		
1	Lamp, Combination	R		.3	5116290AD	$69.45
		L		.3	5116291AD	$69.45
2	Bulb, Stop/Tail Lamp	R	#.2		L003157K	$2.50
		L	#.2		L003157K	$2.50
3	Bulb, Signal Lamp	R	#.2		L003157K	$2.50
		L	#.2		L003157K	$2.50
	#Included in R&R Combination Lamp					
4	Socket, Stop/Tail Lamp	R			68036506AA	$4.45
		L			68036506AA	$4.45
5	Socket, Signal Lamp	R			68036507AA	$3.85
		L			68036507AA	$3.85
	Grommet, Mtg					
6	No. 1	R			5113359AA	$5.70
		L			5113359AA	$5.70
7	No. 2	R			5113360AA	$6.30
		L			5113360AA	$6.30
	Harness, Rear Lamp	R			N.A.	
		L			N.A.	

COMBINATION LAMP

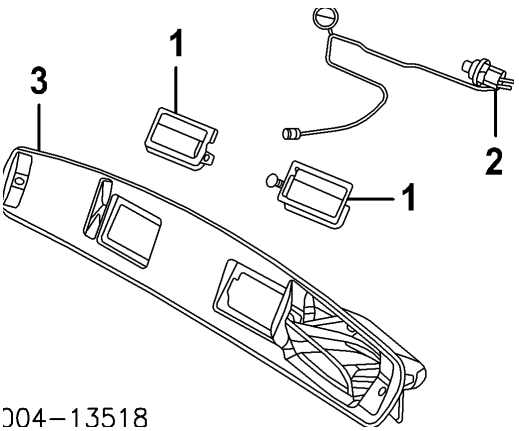
ON LIFTGATE

2010 Dodge Journey R/T Utility



R&I Combination Lamp		R	#.3		
		L	#.3		
#Included in R&R Liftgate					
1	Lamp, Combination	R	#.3	4806368AB	$64.85
		L	#.3	4806369AB	$64.85
#Included in R&R Liftgate					
2	Bulb, Tail Lamp	R	#.2	L0003757AK	$3.85
		L	#.2	L0003757AK	$3.85
3	Bulb, Back-Up Lamp	R	#.2	L003157K	$2.50
		L	#.2	L003157K	$2.50
#Included in R&R Combination Lamp					
Harness, Rear Lamp-See Liftgate Section					

LICENSE LAMP

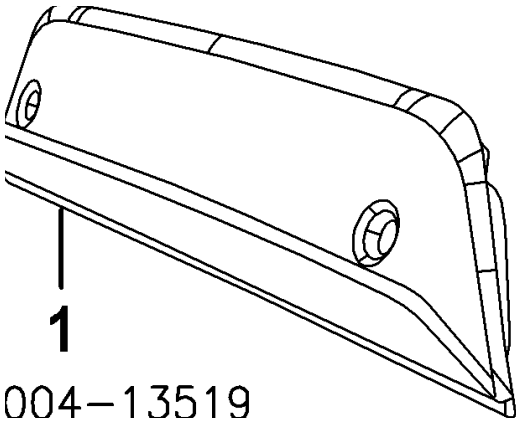


1	Lamp, License	R	#.1	68041378AA	$27.00
		L	#.1	68041378AA	$27.00
Bulb, License Lamp		R	#.1	N.A.	

2010 Dodge Journey R/T Utility

			L	#.1	N.A.
	#R&R One Side Complete, Included in R&R Liftgate Handle				
2	Harness, License Lamp				68040760AA $30.00
3	Handle, Liftgate-See Liftgate Section				

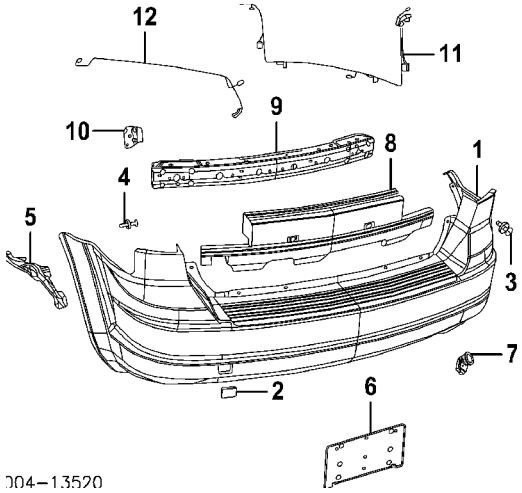
HIGH MOUNT STOP LAMP



	R&I High Mount Stop Lamp			#.2	
	#Included in R&R Liftgate				
1	Lamp, High Mount Stop			#.2	5116302AC $44.00
	#Included in R&R Liftgate				

REAR BUMPER

Procedures 27 and 28



Refinish Rear Bumper Cover			3.2		
Refinish Tow Hook Cover			.3		
R&I Rear Bumper Cover			1.2		
O/H Rear Bumper Cover (Includes R&I)			1.8		
Add to R&R or O/H Rear Bumper Cover					
w/Park Distance Sensors			.4		

NOTE: All Parts in this section are included in overhaul unless noted otherwise.

1	Cover, Rear Bumper (P)					
	SE, SXT Model			1.5	68034219AC	$249.00
	R/T Model			1.5	68034223AC	$295.00
2	Cover, Tow Hook (P)			.1	1EQ50TZZAA	$13.35
	(P) Paint to Match					
	Clip, Cover (a)					
3	Type 1				6501925	$4.20
4	Type 2				4389947AA	$6.00
	(a) As Required					
5	Brkt, Side Cover	R	#.2		5178412AD	$6.45
		L	#.2		5178413AC	$6.45
	#w/Rear Bumper Cover Removed, Not Included in O/H					
6	Brkt, License Plate			.2	5288487	$58.50
7	Sensor, Park Distance (4)					
	Dealer Installed		#.2		82208246AE	$257.00

2010 Dodge Journey R/T Utility

	#w/Rear Bumper Cover Removed			
8	Absorber, Energy	IOH	5116285AD	$54.95
9	Bar, Impact	#.3	5116281AB	$94.20
	#w/Rear Bumper Cover Removed, Not Included in O/H			
10	Bracket, Bumper Mtg-See Rear Body Section			
	Hook, Tow-See Wheel Section			
11	Harness, Rear Wiring	#	5178314AB	$18.70
12	Harness, Trailer	#	5084971AD	$93.60
	#Not Included in O/H			

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INTRODUCTION

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INTRODUCTION

This manual has been prepared with the assistance of service and engineering specialists to acquaint you with the operation and maintenance of your new vehicle. It is supplemented by a Warranty Information Booklet and various customer-oriented documents. You are urged to read these publications carefully. Following the instructions and recommendations in this manual will help assure safe and enjoyable operation of your vehicle.

NOTE: After you read the manual, it should be stored in the vehicle for convenient reference and remain with the vehicle when sold so that the new owner will be aware of all safety warnings.

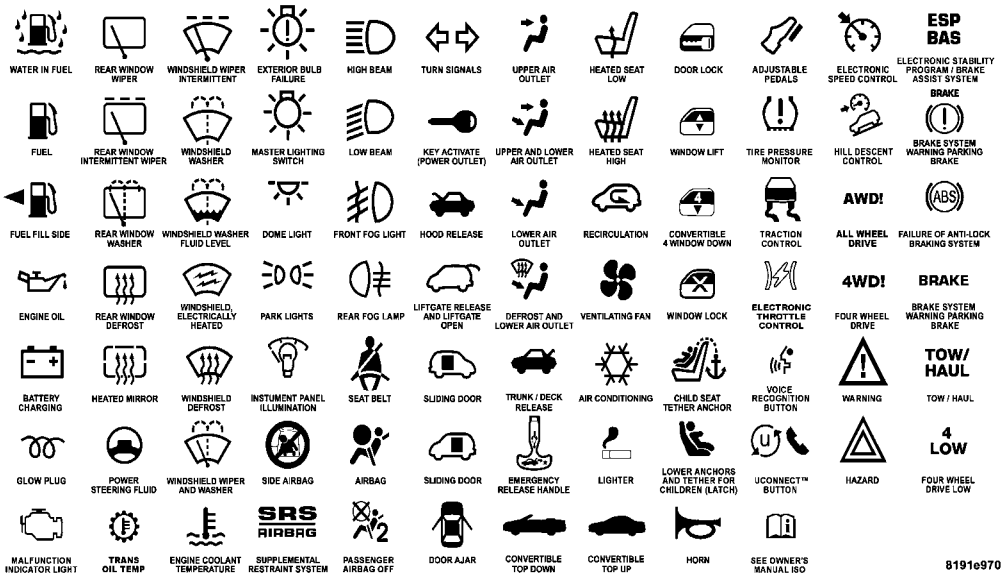
When it comes to service, remember that your authorized dealer knows your vehicle best, has the factory-trained technicians and genuine Mopar® parts, and is interested in your satisfaction.

HOW TO USE THIS MANUAL

Consult the Table of Contents to determine which section contains the information you desire.

The detailed Index at the back of this manual contains a complete listing of all subjects.

Consult the following table for a description of the symbols that may be used on your vehicle or throughout this Owner's Manual.

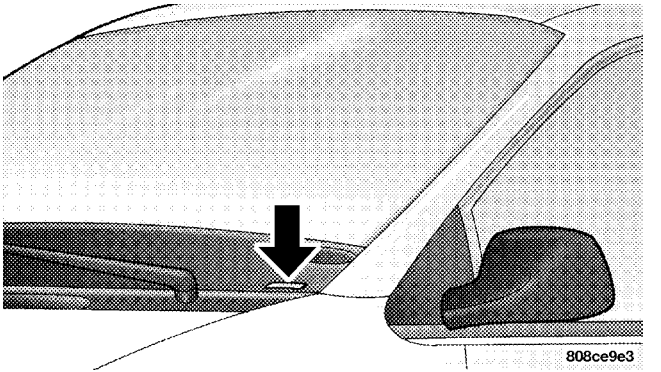

WATER IN FUEL
REAR WINDOW WIPER
WINDSHIELD WIPER INTERMITTENT
EXTERIOR BULB FAILURE
HIGH BEAM
TURN SIGNALS
UPPER AIR OUTLET
HEATED SEAT LOW
DOOR LOCK
ADJUSTABLE PEDALS
ELECTRONIC SPEED CONTROL
ESP BAS
ELECTRONIC STABILITY PROGRAM / BRAKE ASSIST SYSTEM
FUEL
REAR WINDOW INTERMITTENT WIPER
WINDSHIELD WASHER
MASTER LIGHTING SWITCH
LOW BEAM
KEY ACTIVATE (POWER OUTLET)
UPPER AND LOWER AIR OUTLET
HEATED SEAT HIGH
WINDOW LIFT
TIRE PRESSURE MONITOR
HILL DESCENT CONTROL
BRAKE
BRAKE SYSTEM WARNING PARKING BRAKE
FUEL FILL SIDE
REAR WINDOW WASHER
WINDSHIELD WASHER FLUID LEVEL
DOME LIGHT
FRONT FOG LIGHT
HOOD RELEASE
LOWER AIR OUTLET
RECIRCULATION
CONVERTIBLE 4 WINDOW DOWN
TRACTION CONTROL
AWD!
ALL WHEEL DRIVE
ABS
FAILURE OF ANTI-LOCK BRAKING SYSTEM
ENGINE OIL
REAR WINDOW DEFROST
WINDSHIELD, ELECTRICALLY HEATED
PARK LIGHTS
REAR FOG LAMP
LIFTGATE RELEASE AND LIFTGATE OPEN
DEFROST AND LOWER AIR OUTLET
VENTILATING FAN
WINDOW LOCK
ELECTRONIC THROTTLE CONTROL
4WD!
FOUR WHEEL DRIVE
BRAKE
BRAKE SYSTEM WARNING PARKING BRAKE
BATTERY CHARGING
HEATED MIRROR
WINDSHIELD DEFROST
INSTUMENT PANEL ILLUMINATION
SEAT BELT
SLIDING DOOR
TRUNK / DECK RELEASE
AIR CONDITIONING
CHILD SEAT TETHER ANCHOR
VOICE RECOGNITION BUTTON
WARNING
TOW/ HAUL
TOW / HAUL
GLOW PLUG
POWER STEERING FLUID
WINDSHIELD WIPER AND WASHER
SIDE AIRBAG
AIRBAG
SLIDING DOOR
EMERGENCY RELEASE HANDLE
LIGHTER
LOWER ANCHORS AND TETHER FOR CHILDREN (LATCH)
UCONNECT™ BUTTON
HAZARD
4 LOW
FOUR WHEEL DRIVE LOW
MALFUNCTION INDICATOR LIGHT
TRANS OIL TEMP
ENGINE COOLANT TEMPERATURE
SRS AIRBAG
SUPPLEMENTAL RESTRAINT SYSTEM
PASSENGER AIRBAG OFF
DOOR AJAR
CONVERTIBLE TOP DOWN
CONVERTIBLE TOP UP
HORN
SEE OWNER'S MANUAL ISO
8191e970

WARNINGS AND CAUTIONS

This Owners Manual contains **WARNINGS** against operating procedures that could result in an accident or bodily injury. It also contains **CAUTIONS** against procedures that could result in damage to your vehicle. If you do not read this entire Owners Manual, you may miss important information. Observe all Warnings and Cautions.

VEHICLE IDENTIFICATION NUMBER

The Vehicle Identification Number (VIN) is on the left front corner of the instrument panel and is visible from outside of the vehicle through the windshield. This number also appears on the Automobile Information Disclosure Label affixed to a window on your vehicle, the vehicle registration, and the title.



VIN Location

NOTE: It is illegal to remove the VIN.

VEHICLE MODIFICATIONS/ALTERATIONS

WARNING!
Any modifications or alterations to this vehicle could seriously affect its roadworthiness and safety and may lead to an accident resulting in serious injury or death.

THINGS TO KNOW BEFORE STARTING YOUR VEHICLE

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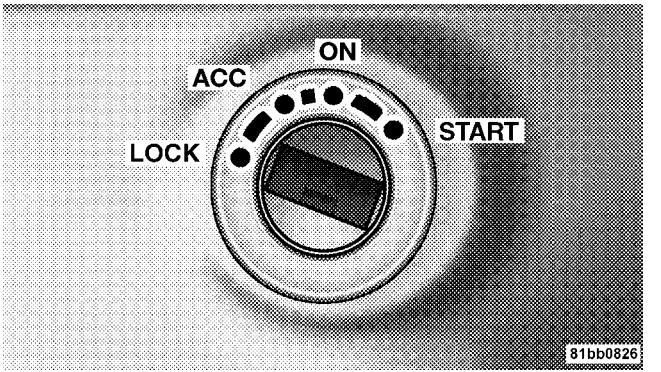
A WORD ABOUT YOUR KEYS

Your vehicle uses a keyless ignition system. This system consists of a Fob with Integrated Key and a Wireless Ignition Node (WIN) with integral ignition switch. You can insert the double-sided integrated key into the ignition switch with either side up.

Wireless Ignition Node (WIN)

The Wireless Ignition Node (WIN) operates similarly to an ignition switch. It has four operating positions, three of which are detented and one spring-loaded. The detented positions are LOCK, ACC, and ON. The START position is a spring-loaded momentary contact position. When released from the START position, the switch automatically returns to the detented ON position.



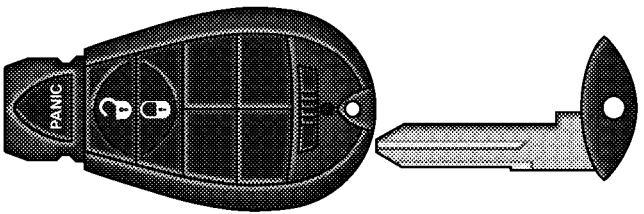
Wireless Ignition Node (WIN)

Fob With Integrated Key

The Fob with Integrated Key operates the ignition switch. It also contains the Remote Keyless Entry (RKE) transmitter and a valet key, which stores in the rear of the Fob.

The valet key allows for entry into the vehicle should the battery in the vehicle or the Fob go dead. You can keep the valet key with you when valet parking.

To remove the valet key from the Fob, slide the mechanical latch at the top of the Fob sideways with your thumb and then pull the key out of the Fob with your other hand.



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Valet Key Removal

NOTE:

- You can insert the double-sided valet key into the lock cylinder with either side up.
- Only the drivers door is equipped with a lock cylinder.

Tip Start Feature

Do not press the accelerator. Use the Fob with Integrated Key to briefly turn the ignition switch to the START position and release it as soon as the starter engages. The starter motor will continue to run, and it will disengage automatically when the engine is running.

Ignition Key Removal

Place the shift lever in PARK. Turn the key to the LOCK position and then remove the key.

NOTE:

- For vehicles not equipped with the Electronic Vehicle Information Center (EVIC), the power window switches, radio, power sunroof (if equipped), and ignition-powered power outlets will remain active for approximately 45 seconds after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature.
- For vehicles equipped with the EVIC, the power window switches, radio, power sunroof (if equipped), and ignition-powered power outlets will remain active for up to 10 minutes after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature. The time for this feature is programmable. Refer to "Key-Off Power Delay," under "Personal Settings (Customer Programmable Features)" under "Electronic Vehicle Information Center (EVIC)" in Section 4.

WARNING!

Never leave children alone in a vehicle. Leaving unattended children in a vehicle is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Don't leave the key in the ignition. A child could operate power windows, other controls, or move the vehicle.

CAUTION!

An unlocked car is an invitation to thieves. Always remove the key from the ignition and lock all doors when leaving the vehicle unattended.

Key-In-Ignition Reminder

If you open the driver's door and the key is in the ignition, a chime will sound to remind you to remove the key.

NOTE: The Key-In-Ignition reminder only sounds when the ignition key is placed in the LOCK or ACC position.

SENTRY KEY® IMMOBILIZER SYSTEM

The Sentry Key® Immobilizer system prevents unauthorized vehicle operation by disabling the engine. The system does not need to be armed or activated. Operation is automatic, regardless of whether the vehicle is locked or unlocked.

The system uses the factory-mated Remote Keyless Entry (RKE) transmitter with integrated key and Wireless Ignition Node (WIN) to prevent unauthorized vehicle operation. Therefore, only RKE transmitters that are programmed to the vehicle can be used to start and operate the vehicle. The system will not allow the engine to crank if an invalid RKE transmitter is used to operate the ignition switch.

After turning the ignition switch to the ON position, the Vehicle Security Light will turn on for three seconds for a bulb check. If the light remains on after the bulb check, it

indicates that there is a problem with the electronics. This condition will result in the engine being shut off after two seconds.

If the Vehicle Security Light turns on during normal vehicle operation (vehicle running for longer than 10 seconds), it indicates that there is a fault in the electronics. Should this occur, have the vehicle serviced as soon as possible.

NOTE:

- The Sentry Key® Immobilizer system is not compatible with aftermarket remote starting systems. Use of these systems may result in vehicle starting problems and loss of security protection.
- Exxon/Mobil Speedpass™, additional RKE transmitters, or any other transponder-equipped components on the same key chain **will not** cause a fault unless the additional part is **physically held against the transmitter** being used to start the vehicle. Cell phones, pagers, or other RF electronics will not cause interference with this system.

All of the RKE transmitters provided with your new vehicle have been programmed to the vehicle electronics.

Replacement Keys

NOTE: Only RKE transmitters that are programmed to the vehicle electronics can be used to start and operate the vehicle. Once a transmitter is programmed to a vehicle, it cannot be programmed to any other vehicle.

CAUTION!
Always remove the keys from the vehicle and lock all doors when leaving the vehicle unattended.

At the time of purchase, the original owner is provided with a four-digit Personal Identification Number (PIN). Keep the PIN in a secure location. This number is required for authorized dealer replacement of RKE transmitters. Duplication of RKE transmitters may be performed at an authorized dealer or by using the Customer Key Programming procedure. This procedure consists of programming a blank transmitter to the vehicle electronics. A blank transmitter is one that has never been programmed.

NOTE: When having the Sentry Key® Immobilizer system serviced, bring all vehicle RKE transmitters with you to the authorized dealer.

Customer Key Programming

If you have two valid RKE transmitters with integrated keys, you can program new transmitters to the system by performing the following steps:

1. Insert the first valid integrated key into the ignition switch and turn the ignition switch to the ON position for at least three seconds, but no longer than 15 seconds. Turn the ignition switch to the LOCK position and remove the first key.

2. Insert the second valid integrated key and turn the ignition switch to the ON position within 15 seconds. After 10 seconds, a chime will sound and the Vehicle Security Light will begin to flash. Turn the ignition switch to the LOCK position and remove the second key.

3. Insert a blank integrated key into the ignition switch and turn the ignition switch to the ON position within 60 seconds. After 10 seconds, a single chime will sound and the Vehicle Security Light will stop flashing, turn on again for three seconds, and then turn off.

The new integrated key is programmed. **The RKE transmitter will also be programmed during this procedure.**

Repeat this procedure to program up to eight keys. If you do not have a programmed RKE transmitter with integrated key, contact your authorized dealer for details.

NOTE: If a programmed key is lost, see your authorized dealer to have all remaining keys erased from the system's memory. This will prevent the lost key from starting your vehicle. The remaining keys must then be reprogrammed. All vehicle keys must be taken to an authorized dealer at the time of service to be reprogrammed.

General Information

The Sentry Key® system complies with FCC rules Part 15 and with RSS-210 of Industry Canada. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference that may be received, including interference that may cause undesired operation.

SECURITY ALARM SYSTEM — IF EQUIPPED

The Vehicle Security Alarm (VSA) system monitors the vehicle doors and liftgate for unauthorized entry and the ignition switch for unauthorized operation. If something triggers the alarm, the system will prevent the vehicle from starting, sound the horn intermittently, flash the headlights and taillights, and flash the Vehicle Security Light in the instrument cluster.

Rearming of the System

If something triggers the alarm, and no action is taken to disarm it, the system will turn off the horn after three minutes, turn off all of the visual signals after 15 minutes, and then the system will rearm itself.

To Arm the System

1. Remove the key from the ignition switch and exit the vehicle.

2. Lock the doors and liftgate by pressing the power door LOCK switch or the LOCK button on the Remote Keyless Entry (RKE) transmitter.

NOTE: The system will not arm if you lock the doors with the manual door LOCK plungers or the door LOCK cylinder on the driver's door.

3. Close all doors. The Vehicle Security Light in the instrument cluster will flash rapidly for about 16 seconds to signal that the system is arming. During this period, opening any door or the liftgate will cancel the arming process. If the system arms successfully, the Vehicle Security Light will flash at a slower rate to indicate the alarm is set.

NOTE: For added security, whenever the Security Alarm is armed, the HomeLink®/Garage Door Opener (if equipped) is disabled as well.

To Disarm the System

Either press the UNLOCK button on the RKE transmitter or insert a valid ignition key into the ignition lock cylinder and turn the key to the ON position.

NOTE:

- Unlocking the doors with the manual door LOCK plungers or the door LOCK cylinder on the driver's door will not disarm the system.
- When the system is armed, the interior power door LOCK switches will not unlock the doors.

The Security Alarm System is designed to protect your vehicle; however, you can create conditions where the system will give you a false alarm. If the previously described arming sequence has occurred, the system will

arm regardless of whether you are inside or outside the vehicle. If you remain inside the vehicle and open a door, the alarm will sound. If this occurs, disarm the system.

Tamper Alert
If something has triggered the alarm in your absence, the horn will sound three times when you unlock the doors. Check the vehicle for tampering.

ILLUMINATED ENTRY SYSTEM

The interior lights will turn on when you press the unlock button on the Remote Keyless Entry (RKE) transmitter or open a door or the liftgate.

This feature also turns on the approach lighting (if so equipped). Refer to "Illumin Approach," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.

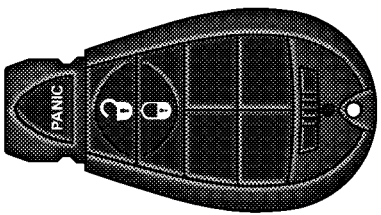
The interior lights will fade to off after about 30 seconds or they will immediately fade to off once the ignition switch is turned ON.

NOTE:
- The illuminated entry system will not operate the interior lights if the Dimmer Control is in the extreme downward (Defeat) position.

REMOTE KEYLESS ENTRY (RKE)

This system allows you to lock or unlock the doors and liftgate or activate the Panic Alarm from distances up to about 35 ft (11 m) using a hand-held radio transmitter. The transmitter need not be pointed at the vehicle to activate the system.

NOTE: Inserting the Fob with Integrated Key into the ignition switch disables all buttons on that transmitter; however, the buttons on the remaining transmitters will continue to work. Driving at speeds 5 mph (8 km/h) and above disables all transmitter buttons for all fobs.



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Remote Keyless Entry (RKE) Transmitter

To Unlock the Doors and Liftgate

Press and release the UNLOCK button on the transmitter once to unlock the driver's door, or twice within five seconds to unlock all doors and liftgate. The turn signal lights will flash to acknowledge the unlock signal. The illuminated entry system will also turn on.

Remote Key Unlock, Driver Door/All Doors First

This feature lets you program the system to unlock either the driver's door or all doors on the first press of the UNLOCK button on the transmitter. To change the current setting, proceed as follows:

- For vehicles equipped with the Electronic Vehicle Information Center (EVIC), refer to "RKE Unlock," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.
- For vehicles not equipped with the EVIC, perform the following steps:

1. Press and hold the LOCK button on a programmed transmitter for at least four seconds, but no longer than 10 seconds. Then, press and hold the UNLOCK button while still holding the LOCK button.
2. Release both buttons at the same time.

3. Test the feature while outside of the vehicle by pressing the LOCK/UNLOCK buttons on the transmitter with the ignition switch in the LOCK position and the key removed.

4. Repeat these steps if you want to return this feature to its previous setting.

NOTE: Pressing the LOCK button on the transmitter while you are inside the vehicle will activate the Security Alarm. Opening a door with the Security Alarm activated will cause the alarm to sound. Press the UNLOCK button to deactivate the Security Alarm.

Flash Lights with Remote Key Lock

This feature will cause the turn signal lights to flash when the doors are locked or unlocked with the transmitter. This feature can be turned on or turned off. To change the current setting, proceed as follows:

- For vehicles equipped with the EVIC, refer to "Flash Light With Lock," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.
- For vehicles not equipped with the EVIC, perform the following steps:

1. Press and hold the UNLOCK button on a programmed transmitter for at least four seconds, but no longer than 10 seconds. Then, press and hold the LOCK button while still holding the UNLOCK button.

2. Release both buttons at the same time.

3. Test the feature while outside of the vehicle by pressing the LOCK/UNLOCK buttons on the transmitter with the ignition switch in the LOCK position and the key removed.

4. Repeat these steps if you want to return this feature to its previous setting.

NOTE: Pressing the LOCK button on the transmitter while you are in the vehicle will activate the Security Alarm. Opening a door with the Security Alarm activated will cause the alarm to sound. Press the UNLOCK button to deactivate the Security Alarm.

Illuminated Approach — If Equipped
This feature activates the headlights for up to 90 seconds when the doors are unlocked with the transmitter. The time for this feature is programmable on vehicles equipped with the EVIC. Refer to "Illumin Approach," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.

To Lock the Doors and Liftgate

Press and release the LOCK button on the transmitter to lock all doors and liftgate. The turn signal lights will flash and the horn will chirp to acknowledge the signal.

Sound Horn with Remote Key Lock
This feature will cause the horn to chirp when the doors are locked with the transmitter. This feature can be turned on or turned off. To change the current setting, proceed as follows:

- For vehicles equipped with the EVIC, refer to "Sound Horn with Lock," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.
- For vehicles not equipped with the EVIC, perform the following steps:

1. Press the LOCK button on a programmed transmitter for at least four seconds, but no longer than 10 seconds. Then, press the PANIC button while still holding the LOCK button.
2. Release both buttons at the same time.

3. Test the feature while outside of the vehicle by pressing the LOCK button on the transmitter with the ignition switch in the LOCK position and the key removed.

4. Repeat these steps if you want to return this feature to its previous setting.

NOTE: Pressing the LOCK button on the transmitter while you are in the vehicle will activate the Security Alarm. Opening a door with the Security Alarm activated will cause the alarm to sound. Press the UNLOCK button to deactivate the Security Alarm.

Using the Panic Alarm

To turn the Panic Alarm feature ON or OFF, press and hold the PANIC button on the transmitter for at least one second and release. When the Panic Alarm is on, the headlights and park lights will flash, the horn will pulse on and off, and the interior lights will turn on.

The Panic Alarm will stay on for three minutes unless you turn it off by either pressing the PANIC button a second time or drive the vehicle at a speed of 15 mph (24 km/h) or greater.

NOTE:

- The interior lights will turn off if you turn the ignition switch to the ACC or ON position while the Panic Alarm is activated. However, the exterior lights and horn will remain on.
- You may need to be less than 35 ft (11 m) from the vehicle when using the transmitter to turn off the Panic Alarm due to the radio frequency noises emitted by the system.

Express Down Window Feature

This feature allows you to remotely lower both front door windows at the same time. To use this feature, press and release the unlock button on the transmitter and then immediately press and hold the unlock button until the windows lower to the level desired or until they lower completely.

Programming Additional Transmitters

Refer to Sentry Key®, "Customer Key Programming." (See page 17 for more information.)

If you do not have a programmed transmitter, contact your authorized dealer for details.

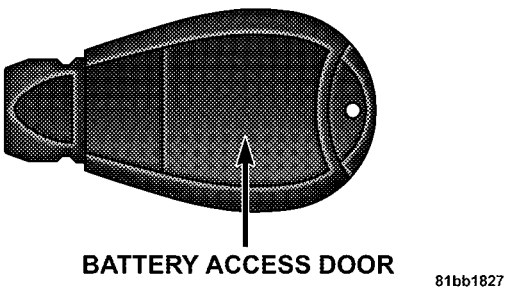
Transmitter Battery Service

The recommended replacement battery is one CR2032 battery.

NOTE:

- Perchlorate Material — special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate
- Do not touch the battery terminals that are on the back housing or the printed circuit board.

1. Battery access is through a door located on the rear of the fob. Insert a small, flat blade screwdriver into the slot and gently pry open the access door.



Battery Replacement

2. Remove and replace the batteries. Avoid touching the new batteries with your fingers. Skin oils may cause battery deterioration. If you touch a battery, clean it with rubbing alcohol.

3. Reposition the access door panel over the battery opening and snap into place.

General Information

This device complies with Part 15 of the FCC rules and RSS 210 of Industry Canada. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

NOTE: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

If your RKE transmitter fails to operate from a normal distance, check for these two conditions.

1. A weak battery in the transmitter. The expected life of the battery is a minimum of three years.

2. Closeness to a radio transmitter such as a radio station tower, airport transmitter, and some mobile or CB radios.

REMOTE STARTING SYSTEM — IF EQUIPPED

This system uses the Remote Keyless Entry (RKE) transmitter to start the engine conveniently from outside the vehicle while still maintaining security. The system has a targeted range of 328 ft (100 m).

NOTE: The vehicle must be equipped with an automatic transaxle to be equipped with Remote Start.

How To Use Remote Start

All of the following conditions must be met before the engine will remote start:

- Shift lever in PARK
- Doors closed
- Hood closed
- Liftgate closed
- HAZARD switch off
- BRAKE switch inactive (brake pedal not pressed)
- Ignition key removed from ignition switch
- Battery at an acceptable charge level, and
- RKE PANIC button not pressed.

To Enter Remote Start Mode

Press and release the REMOTE START button on the RKE transmitter twice within five seconds. The parking lights will flash and the horn will honk twice (if programmed). Then, the engine will start and the vehicle will remain in the Remote Start mode for a 15-minute cycle.

NOTE:

- The park lamps will turn on and remain on during Remote Start mode.

- For security, power window and power sunroof operation (if so equipped) are disabled when the vehicle is in the Remote Start mode.
- The engine can be started two consecutive times (two 15-minute cycles) with the RKE transmitter. However, the ignition switch must be cycled to the ON position before you can repeat the start sequence for a third cycle.

To Exit Remote Start Mode without Driving the Vehicle
Allow the engine to run for the entire 15-minute cycle.

To Exit Remote Start Mode and Drive the Vehicle
Before the end of the 15-minute cycle, press and release the UNLOCK button on the RKE transmitter to unlock the doors and disarm the Vehicle Security Alarm (if equipped). Then, insert the key into the ignition switch and turn the switch to the ON position.

NOTE: The ignition switch must be in the ON position in order to drive the vehicle.

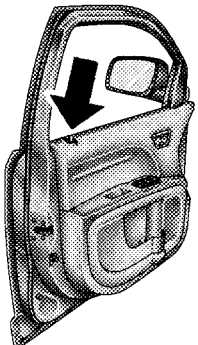
To Turn Off the Engine While in Remote Start Mode
Press and release the REMOTE START button one time.

NOTE: To avoid inadvertent shut downs, the system will disable the one time press of the REMOTE START button for two seconds after receiving a valid Remote Start request.

DOOR LOCKS

Manual Door Locks

To lock each door, push the door lock plunger on each door trim panel downward. To unlock each door, pull the door lock plunger on each door trim panel upward.



Door Lock Plunger

If the door lock plunger is down when you shut the door, the door will lock. Therefore, make sure the key is not inside the vehicle before closing the door.

NOTE: The manual door locks will not lock or unlock the liftgate.

WARNING!

- **For personal security and safety in the event of an accident, lock the vehicle doors before you drive as well as when you park and leave the vehicle.**
- **When leaving the vehicle, always remove the key from the ignition and lock your vehicle. Unsupervised use of vehicle equipment may cause severe personal injuries and death.**
- **Never leave children alone in a vehicle. Leaving unattended children in a vehicle is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Do not leave the key in the ignition. A child could operate power windows, other controls, or move the vehicle.**

Power Door Locks

A power door lock switch is on each front door trim panel. Use this switch to lock or unlock the doors and liftgate.

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Power Door Lock Switch

To prevent you from locking your key in the vehicle, the power door lock switch will not operate when the key is in the ignition and either front door is open. A chime will sound as a reminder to remove the key.

Automatic Door Locks

The doors will lock automatically if all of the following conditions are met:

1. The Automatic Door Locks feature is enabled
2. The transaxle is in gear
3. All doors are closed
4. The throttle is pressed
5. The vehicle speed is above 15 mph (24 km/h), and
6. The doors were not previously locked using the power door lock switch or Remote Keyless Entry (RKE) transmitter

Automatic Door Locks — If Equipped
The auto door lock feature can be enabled or disabled by your authorized dealer. See your authorized dealer for programming.

Automatic Unlock Doors on Exit
The doors will unlock automatically if:

1. The Automatic Unlock Doors On Exit feature is enabled

2. The transaxle was in gear and the vehicle speed returned to 0 mph (0 km/h)

3. The transaxle is in NEUTRAL or PARK

4. The driver's door is opened

5. The doors were not previously unlocked, and

6. The vehicle speed is 0 mph (0 km/h).

Automatic Unlock Doors on Exit Programming
The Automatic Unlock Doors On Exit feature can be enabled or disabled as follows:

- For vehicles equipped with the EVIC, refer to "Personal Settings (Customer Programmable Features)" under "Electronic Vehicle Information Center (EVIC)" in Section 4.
- For vehicles not equipped with the EVIC, perform the following steps:

1. Enter the vehicle and close all doors.

2. Place the key in the ignition switch.

3. Within 15 seconds, cycle the ignition switch between LOCK and ON and then back to LOCK four times ending up in the LOCK position. **However, do not start the engine.**

4. Within 30 seconds, depress the power door unlock switch to unlock the doors.

5. A single chime will indicate the completion of the programming.

NOTE: If you do not hear the chime, it means that the system did not enter the programming mode and you will need to repeat the procedure.

6. Repeat these steps if you want to return this feature to its previous setting.

NOTE: Use the Automatic Unlock Doors On Exit feature in accordance with local laws.

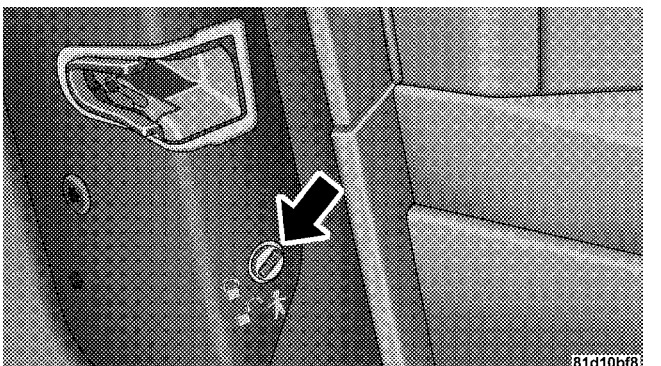
Child Protection Door Lock System (Rear Doors)

To provide a safer environment for small children riding in the rear seats, the rear doors are equipped with a Child Protection Door Lock system.

To Engage the Child Protection Door Lock System

1. Open the rear door.

2. Insert the tip of the valet key (or alike) into the child lock control and rotate it to the LOCK position.



Child Lock Control

3. Repeat Steps 1 and 2 for the opposite rear door.

NOTE: When the Child Protection Door Lock system is engaged, the door can be opened only by using the outside door handle even though the inside door lock is in the unlocked position.

WARNING!

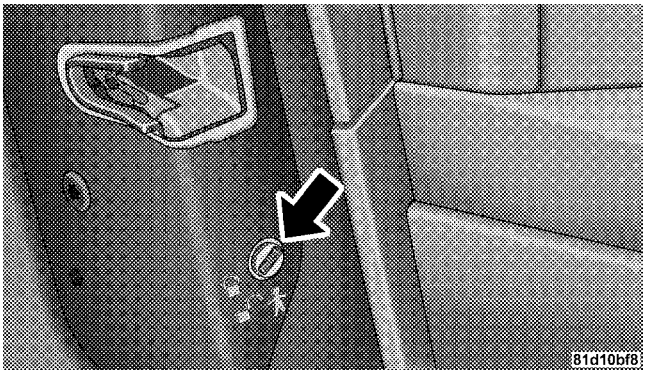
Avoid trapping anyone in a vehicle in a collision. Remember that the rear doors can only be opened from the outside when the child protection locks are engaged. Failure to follow this warning may result in serious injury or death.

NOTE:

- After engaging the Child Protection Door Lock system, always test the door from the inside to make certain it is in the desired position.
- For emergency exit with the system engaged, move the lock plunger up to the UNLOCK position, roll down the window, and open the door with the outside door handle.

To Disengage the Child Protection Door Lock System

1. Open the rear door.
2. Insert the tip of the valet key (or alike) into the child lock control and rotate it to the UNLOCK position.



Child Lock Control

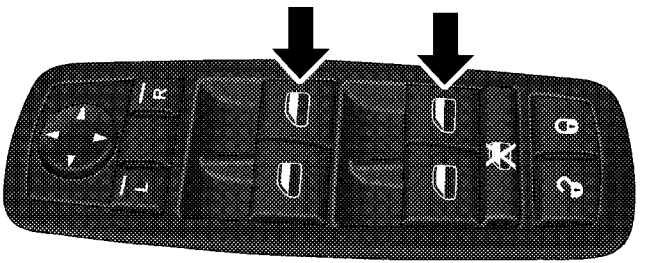
3. Repeat Steps 1 and 2 for the opposite rear door.

NOTE: After disengaging the Child Protection Door Lock system, always test the door from the inside to make certain it is in the desired position.

WINDOWS

Power windows

The window controls on the driver's door trim panel control all of the door windows.



Power Window Switches

There are single window controls on each passenger door trim panel, which operate the passenger door windows. The window controls will operate when the ignition switch is in the ON or ACC position.

NOTE:

- For vehicles not equipped with the Electronic Vehicle Information Center (EVIC), the power window switches will remain active for 45 seconds after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature.
- For vehicles equipped with the EVIC, the power window switches will remain active for up to 10 minutes after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature. The time for this feature is programmable. Refer to "Key-Off Power Delay," under "Personal Settings (Customer Programmable Features)" under "Electronic Vehicle Information Center (EVIC)" in Section 4.

WARNING!

Never leave children in a vehicle with the key in the ignition switch. Occupants, particularly unattended children, can become entrapped by the windows while operating the power window switches. Such entrapment may result in serious injury or death.

Auto-Down Feature

The driver's power window switch has an Auto-down feature. Press the window switch past the first detent, release, and the window will go down automatically.

To open the window part way, press the window switch to the first detent and release it when you want the window to stop.

To stop the window from going all the way down during the Auto-down operation, pull up on the switch briefly.

Auto-Up Feature with Anti-Pinch Protection — If Equipped

On some models, the driver's power window switch has an Auto-up feature. Pull the window switch up to the second detent, release, and the window will go up automatically.

To stop the window from going all the way up during the Auto-up operation, push down on the switch briefly.

To close the window part way, pull the window switch up to the first detent and release it when you want the window to stop.

NOTE:

- If the window runs into any obstacle during Auto-closure, it will reverse direction and then stop. Remove the obstacle and use the window switch again to close the window.
- Any impact due to rough road conditions may trigger the auto-reverse function unexpectedly during auto-closure. If this happens, pull the switch lightly to the first detent and hold to close window manually.

WARNING!

There is no anti-pinch protection when the window is almost closed. To avoid personal injury, be sure to clear your arms, hands, fingers, and objects from the window path before closing the window. Such entrapment may result in serious injury.

Window Lockout Switch

The window lockout switch on the driver's door trim panel allows you to disable the window control on the other doors. To disable the window controls, press and release the window lockout button (setting it in the down position). To enable the window controls, press and release the window lockout button again (setting it in the up position).

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Window Lockout Switch

Reset

It may be necessary at some point in time to reactivate the Auto-up/Auto-down feature. To do so, perform the following steps:

1. Pull the window switch up to close window completely and continue to hold the switch up for an additional two seconds after the window is closed.

2. Push the window switch down firmly to the second detent to open the window completely and continue to hold the switch down for an additional two seconds after the window is fully open.

Wind Buffeting

Wind buffeting can be described as the perception of pressure on the ears or a helicopter type sound in the ears. Your vehicle may exhibit wind buffeting with the windows down, or the sunroof (if equipped) in certain open or partially open positions. This is a normal occurrence and can be minimized. If the buffeting occurs with

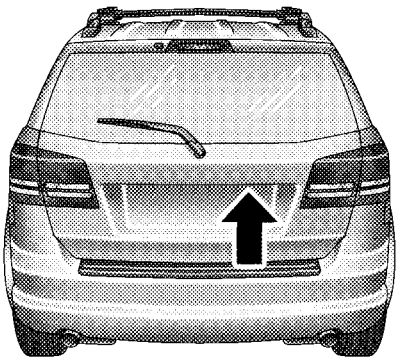
the rear windows open, then open the front and rear windows together to minimize the buffeting. If the buffeting occurs with the sunroof open, adjust the sunroof opening to minimize the buffeting or open any window.

LIFTGATE

The liftgate can be unlocked or locked with the Remote Keyless Entry (RKE) transmitter or by activating the power door lock switch located on either front door trim panel.

NOTE: The liftgate cannot be unlocked or locked with the manual door lock plungers on the door trim panels or the door lock cylinder on the driver's door.

To open the unlocked liftgate, squeeze the handle and pull the liftgate toward you. Gas props will raise and support the liftgate in the open position.



Liftgate Release

NOTE: Because the gas pressure drops with temperature, it may be necessary to assist the props when opening the liftgate in cold weather.

WARNING!

- **Driving with the liftgate open can allow poisonous exhaust gases into your vehicle. These fumes could injure you and your passengers. Keep the liftgate closed when you are operating the vehicle.**
- **If you are required to drive with the liftgate open, make sure that all windows are closed, and the blower switch on the climate control is set at high speed. DO NOT use the recirculation mode.**

OCCUPANT RESTRAINTS

Some of the most important safety features in your vehicle are the restraint systems. The following safety features are standard on your vehicle:

- Front airbags for both the driver and front passenger
- Supplemental side curtain airbags for the driver and passengers seated next to a window
- Supplemental front seat mounted side airbags
- An energy-absorbing steering column and steering wheel
- Knee Bolsters/Blockers for front seat occupants
- Three-point lap and shoulder belts for all seating positions
- Pretensioning and load-limiting retractors for the front seat belts to enhance occupant protection by managing occupant energy during an impact event.
- All seat belt systems (except the driver's and second row center position) include Automatic Locking Retractors (ALRs).

If you will be carrying children too small for adult-size belts, your seat belts or the Lower Anchors and Tether for Children (LATCH) feature can also be used to hold infant and child restraint systems.

Please pay close attention to the information in this section. It tells you how to use your restraint system properly to keep you and your passengers as safe as possible.

WARNING!

In a collision, you and your passengers can suffer much greater injuries if you are not properly buckled up. You can strike the interior of your vehicle or other passengers or you can be thrown out of the vehicle. Always be sure you and others in your vehicle are buckled up properly.

Buckle up even though you are an excellent driver, even on short trips. Someone on the road may be a poor driver and cause a collision that includes you. This can happen far away from home or on your own street.

Research has shown that seat belts save lives, and they can reduce the seriousness of injuries in a collision. Some of the worst injuries happen when people are thrown from the vehicle. Seat belts reduce the possibility of ejection and the risk of injury caused by striking the inside of the vehicle. **Everyone** in a motor vehicle should be belted at all times.

Lap/Shoulder Belts

All seating positions in your vehicle are equipped with lap/shoulder belts.

The belt webbing retractor is designed to lock during very sudden stops or impacts. This feature allows the shoulder part of the belt to move freely with you under normal conditions. However, in a collision, the belt will lock and reduce your risk of striking the inside of the vehicle or being thrown out.

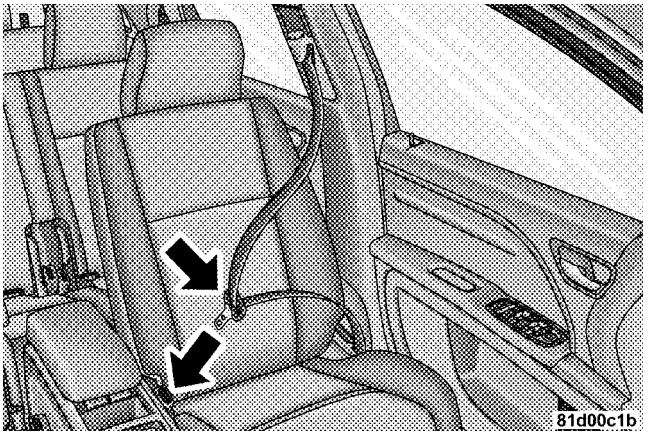
WARNING!

- **It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed.**
- **Do not allow people to ride in any area of your vehicle that is not equipped with seats and seat belts.**
- **Be sure everyone in your vehicle is in a seat and using a seat belt properly.**
- **Wearing a seat belt incorrectly is dangerous. Seat belts are designed to go around the large bones of your body. These are the strongest parts of your body and can take the forces of a collision best.**
- **Wearing your belt in the wrong place could make your injuries in a collision much worse. You might suffer internal injuries, or you could even slide out of part of the belt. Follow these instructions to wear your seat belt safely and to keep your passengers safe, too.**
- **Two people should never be belted into a single seat belt. People belted together can crash into one another in an accident, hurting one another badly. Never use a lap/shoulder belt or a lap belt for more than one person, no matter what their size.**

Lap/Shoulder Belt Operating Instructions

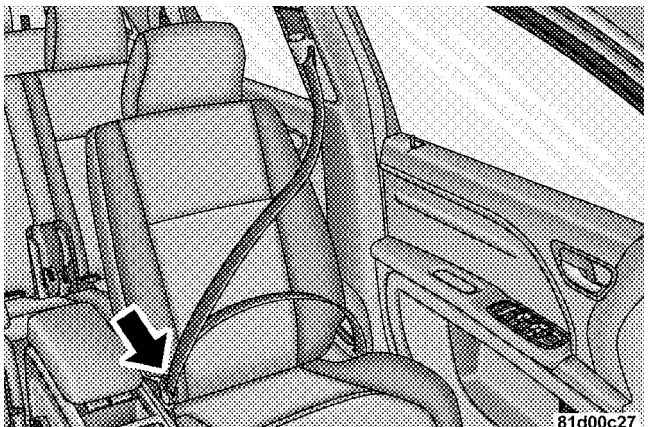
1. Enter the vehicle and close the door. Sit back and adjust the front seat.

2. The seat belt latch plate is along side the pillar near the back of your seat. Grasp the latch plate and pull out the belt. Slide the latch plate up the webbing as far as necessary to make the belt go around your lap.



Pulling Out Lap/Shoulder Belt

3. When the belt is long enough to fit, insert the latch plate into the buckle until you hear a “click.”

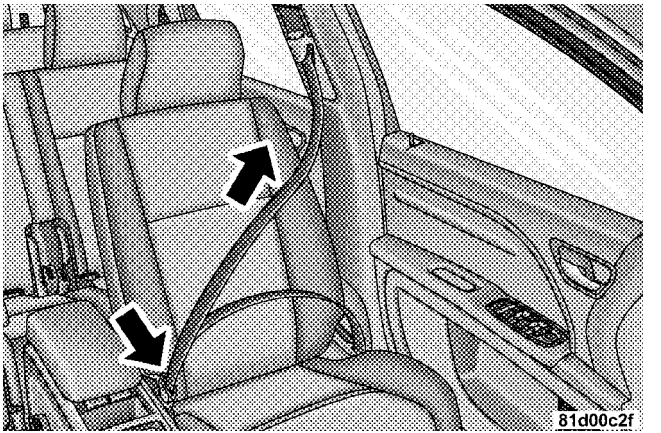


Connecting Latch Plate To Buckle

WARNING!

- **A belt that is buckled into the wrong buckle will not protect you properly. The lap portion could ride too high on your body, possibly causing internal injuries. Always buckle your belt into the buckle nearest you.**
- **A belt that is too loose will not protect you as well. In a sudden stop, you could move too far forward, increasing the possibility of injury. Wear your seat belt snugly.**
- **A belt that is worn under your arm is very dangerous. Your body could strike the inside surfaces of the vehicle in a collision, increasing head and neck injury. A belt worn under the arm can cause internal injuries. Ribs aren’t as strong as shoulder bones. Wear the belt over your shoulder so that your strongest bones will take the force in a collision.**
- **A shoulder belt placed behind you will not protect you from injury during a collision. You are more likely to hit your head in a collision if you do not wear your shoulder belt. The lap and shoulder belt are meant to be used together.**

4. Position the lap belt across your thighs, below your abdomen. To remove slack in the lap belt portion, pull up a bit on the shoulder belt. To loosen the lap belt if it is too tight, tilt the latch plate and pull on the lap belt. A snug belt reduces the risk of sliding under the belt in a collision.



Removing Slack From Belt

WARNING!

• A lap belt worn too high can increase the risk of internal injury in a collision. The belt forces won't be at the strong hip and pelvic bones, but across your abdomen. Always wear the lap belt as low as possible and keep it snug.

• A twisted belt can't do its job as well. In a collision, it could even cut into you. Be sure the belt is straight. If you can't straighten a belt in your vehicle, take it to your authorized dealer and have it fixed.

5. Position the shoulder belt on your chest so that it is comfortable and not resting on your neck. The retractor will withdraw any slack in the belt.

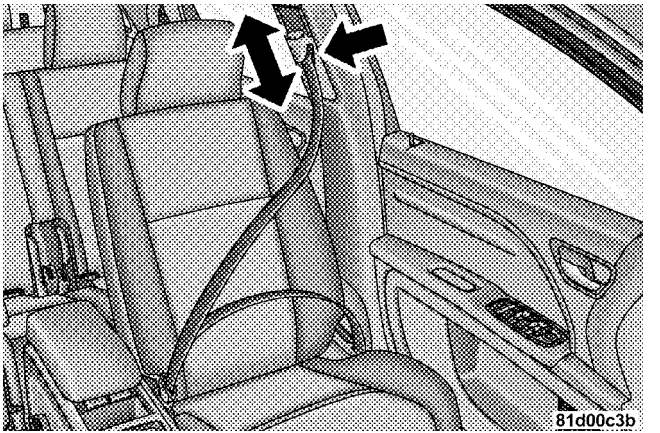
6. To release the belt, push the red button on the buckle. The belt will automatically retract to its stowed position. If necessary, slide the latch plate down the webbing to allow the belt to retract fully.

WARNING!

A frayed or torn belt could rip apart in a collision and leave you with no protection. Inspect the belt system periodically, checking for cuts, frays, or loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system. Seat belt assemblies must be replaced after a collision if they have been damaged (bent retractor, torn webbing, etc.).

Adjustable Upper Shoulder Belt Anchorage

In the driver's seat and front passenger's seat, the shoulder belt can be adjusted upward or downward to position the belt away from your neck. Push and fully depress the button above the webbing to release the anchorage, then move it up or down to the position that fits you best.



Adjusting Upper Shoulder Belt

As a guide, if you are shorter than average you will prefer a lower position and if you are taller than average

you will prefer a higher position. When you release the anchorage try to move it up and down to make sure that it is locked in position.

In the rear seat, move toward the center of the seat to position the belt away from your neck.

Lap/Shoulder Belt Untwisting Procedure

Use the following procedure to untwist a twisted lap/shoulder belt.

1. Position the latch plate as close as possible to the anchor point.

2. At about 6 to 12 in (15 to 30 cm) above the latch plate, grasp and twist the belt webbing 180 degrees to create a fold that begins immediately above the latch plate.

3. Slide the latch plate upward over the folded webbing. The folded webbing must enter the slot at the top of the latch plate.

4. Continue to slide the latch plate up until it clears the folded webbing.

Seat Belt Pretensioners

The driver and front passenger's seat belts are equipped with pretensioning devices that are designed to remove any slack from the seat belt systems in the event of a collision. These devices improve the performance of the seat belt by assuring that the belt is tight around the occupant early in a collision. Pretensioners work for all size occupants, including those in child restraints.

NOTE: These devices are not a substitute for proper seat belt placement by the occupant. The seat belt must still be worn snugly and positioned properly.

The pretensioners are triggered by the Occupant Restraint Controller (ORC). Like the front airbags, the pretensioners are single use items. After a collision that is severe enough to deploy the airbags and pretensioners, both must be replaced.

Enhanced Seat Belt Reminder System (BeltAlert®)

If the driver's seat belt has not been buckled within 60 seconds of starting the vehicle and if the vehicle speed is greater than 5 mph (8 km/h), the Enhanced Warning System (BeltAlert®) will alert the driver to buckle the seat belt. The driver should also instruct all other occupants to buckle their seat belts. Once the warning is triggered, the BeltAlert® will continue to chime and flash the Seat Belt Reminder Light for 96 seconds or until the driver's seat belt is buckled. The BeltAlert® will be reactivated if the driver's seat belt is unbuckled for more than 10 seconds and the vehicle speed is greater than 5 mph (8 km/h).

BeltAlert® Programming

The BeltAlert® can be enabled or disabled by your authorized dealer or by performing the following steps:

NOTE: The manufacturer of this vehicle does not recommend deactivating the BeltAlert®.

1. With all doors closed, and the ignition switch in any position except ON or START, buckle the driver's seat belt.

2. Turn the ignition switch to the ON position, (engine does not need to be running). Wait for the Seat Belt Reminder Light to turn off and then proceed to the next step.

NOTE: You must perform the following steps within 60 seconds of turning the ignition switch to the ON position.

3. Unbuckle the driver's seat belt, allow the seat belt to retract, and then re-buckle the driver's seat belt at least three times, ending with the seat belt buckled.

NOTE: Watch for the Seat Belt Reminder Light to turn on while the seat belt retracts and turn off while re-buckling the seat belt. It may be necessary to completely retract the seat belt each time.

4. Turn the ignition switch to the LOCK position. A single chime will sound to signify that you have successfully completed the programming.

The BeltAlert® can be reactivated by repeating this procedure.

NOTE: When the BeltAlert® is deactivated, the Seat Belt Reminder Light will continue to illuminate as long as the driver's seat belt is unbuckled/retracted.

Automatic Locking Mode

In this mode, the shoulder belt is automatically prelocked. However, the belt will still retract to remove slack in the shoulder belt. Use The Automatic Locking mode any time a child safety seat is installed in a seating position that has a seat belt with this feature. Children 12 years old and younger should be properly restrained in the rear seat whenever possible.

How to Engage the Automatic Locking Mode

1. Buckle the combination lap and shoulder belt.

2. Grasp the shoulder portion and pull downward until the entire belt is extracted.

3. Allow the belt to retract. As the belt retracts, you will here a clicking sound. This indicates the safety belt is now in the Automatic Locking mode.

How to Disengage the Automatic Locking Mode

Unbuckle the combination lap and shoulder belt and allow it to retract completely to disengage the Automatic Locking mode and activate the vehicle sensitive (emergency) locking mode.

Seat Belts and Pregnant Women

We recommend that pregnant women use the seat belts throughout their pregnancy. Keeping the mother safe is the best way to keep the baby safe.

Pregnant women should wear the lap part of the belt across the thighs and as snug across the hips as possible. Keep the belt low so that it does not come across the abdomen. That way the strong bones of the hips will take the force if there is a collision.

Seat Belt Extender

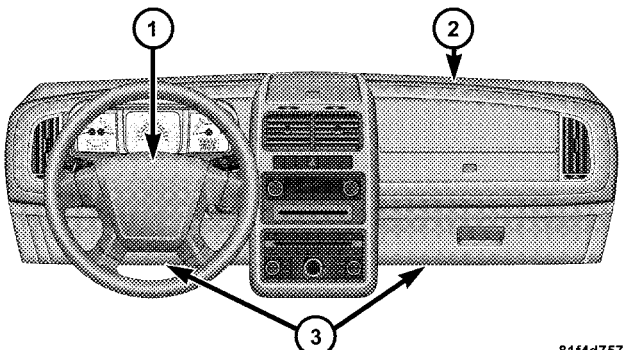
If a seat belt is too short even when fully extended and when the adjustable upper shoulder belt anchorage (if so equipped) is in its lowest position, your authorized dealer can provide you with a seat belt extender. This extender should be used only if the existing belt is not long enough. When it is not required, remove the extender and store it.

WARNING!

Using a seat belt extender when not needed can increase the risk of injury in a collision. Only use when the seat belt is not long enough when it is worn low and snug and in the recommended seating positions. Remove and store the extender when not needed.

Driver and Front Passenger Supplemental Restraint System (SRS) - Airbag

This vehicle has front airbags for both the driver and front passenger as a supplement to the seat belt restraint systems. The driver's airbag is mounted in the center of the steering wheel. The passenger's front airbag is mounted in the top of the instrument panel. The words SRS AIRBAG are embossed on the airbag covers.



1 — Driver's Airbag
2 — Front Passenger's Airbag
3 — Knee Bolsters

NOTE: The front airbags are certified to the Federal regulations that allow less forceful deployment.

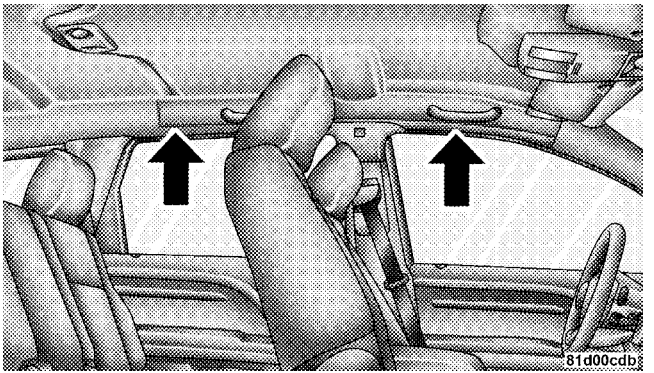
The front airbags have a multistage inflator design. This may allow the airbag to have different rates of inflation that are based on collision severity.

WARNING!

- **Do not put anything on or around the front airbag covers or attempt to open them. You may damage the airbags and you could be injured because the airbags are no longer functional. These protective covers for the airbag cushions are designed to open only when the airbags are inflating.**
- **Do not drill, cut or tamper with the knee bolster in any way.**
- **Do not mount any accessories to the knee bolster such as alarm lights, stereos, citizens band radios etc.**

This vehicle also has supplemental side curtain airbags to protect the driver and passengers sitting next to a window and supplemental front seat mounted side airbags.

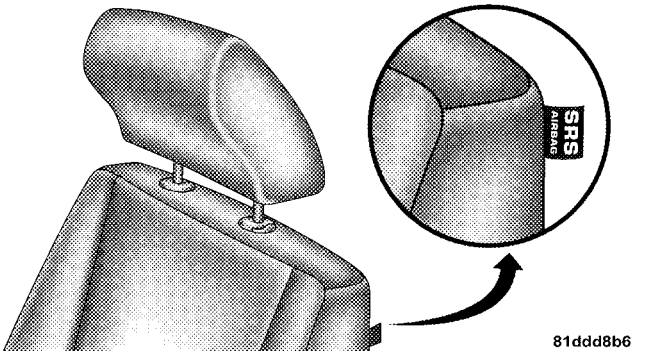
The supplemental side curtain airbags are located above the side windows. Their covers are also labeled SRS AIRBAG.



Supplemental Side Curtain Airbags

NOTE: Airbag covers may not be obvious in the interior trim, but they will open to allow airbag deployment.

The supplemental front seat mounted side airbags are marked with an SRS label sewn into the outboard side of the seat.



Seat Mounted Side Airbag Label

WARNING!

- **Do not stack luggage or other cargo up high enough to block the location of the side curtain airbag. The area where the side curtain airbag is located should remain free from any obstructions. Do not have any accessory items installed which will alter the roof, including adding a sunroof to your vehicle. Do not add roof racks that require permanent attachments (bolts or screws) for installation on the vehicle roof. Do not drill into the roof of the vehicle for any reason.**
- **Do not use accessory seat covers or place objects between you and the supplemental front seat mounted side airbags; the performance could be adversely affected and/or objects could be pushed into you, causing serious injury.**
- **Do not attach cupholders or any other objects on or around the door. The inflating supplemental front seat mounted side airbags could drive the object into occupants, causing serious injury.**

NOTE: Do not use a clothing bar mounted to the coat hooks in this vehicle. A clothing bar will impede the proper performance of the curtain airbags.

Along with the seat belts, front airbags work with the instrument panel knee bolsters to provide improved protection for the driver and front passenger. Side curtain and seat airbags also work with seat belts to improve occupant protection.

While the seat belts are designed to protect you in many types of collisions, the front airbags will deploy in moderate to severe frontal collisions. The supplemental side curtain airbag and supplemental front seat mounted side airbag on the crash side of the vehicle will also trigger in moderate to severe side collisions. However, even in collisions where the airbags deploy, you need the seat belts to keep you in the correct position for the airbags to protect you properly.

Here are some simple steps you can take to minimize the risk of harm from a deploying airbag.

1. Children 12 years old and younger should ride buckled up in the rear seat.

WARNING!

Infants in rear-facing child restraints should NEVER ride in the front seat of a vehicle with a passenger front airbag. An airbag deployment could cause severe injury or death to infants in that position.

2. Children who are not big enough to wear the vehicle seat belt properly should be secured in the rear seat in child restraints or belt-positioning booster seats. (Refer to information on Child Restraint in this section)

3. Older children who do not use child restraints or belt-positioning booster seats should ride properly buckled up in the rear seat. Never allow children to slide the shoulder belt behind them or under their arm.

4. If a child from 1 to 12 years old must ride in the front passenger's seat because the vehicle is crowded, move the seat as far back as possible and use the proper child restraint. (Refer to information on Child Restraint in this section.)

5. You should read the instructions provided with your child restraint to make sure that you are using it properly.

6. All occupants should use their seat belts properly.

7. The driver's seat and front passenger's seat should be moved back as far as practical to allow the airbags time to inflate.

8. Do not lean against the door, as the supplemental side curtain airbags and supplemental front seat mounted side airbags will inflate forcefully into the space between you and the door.

9. If the airbag system in this vehicle needs to be modified to accommodate a disabled person, contact the Customer Center. Phone numbers are provided in the "If You Need Customer Assistance" section.

WARNING!

- **Relying on the airbags alone could lead to more severe injuries in a collision. The airbags work with your seat belt to restrain you properly. In some collisions, the airbags won't deploy at all. Always wear your seat belts even though you have airbags.**
- **Being too close to the steering wheel or instrument panel during airbag deployment could cause serious injury. Airbags need room to inflate. Sit back, comfortably extending your arms to reach the steering wheel or instrument panel.**
- **Supplemental side curtain airbags and supplemental front seat mounted side airbags also need room to inflate. Do not lean against the door or window. Sit upright in the center of the seat.**

Airbag System Components

The airbag system consists of the following:

- Occupant Restraint Controller (ORC)
- Side Remote Pressure and Acceleration Sensors
- Airbag Warning Light
- Driver Airbag
- Front Passenger Airbag
- Supplemental Side Curtain Airbags
- Supplemental Front Seat Mounted Side Airbags
- Steering Wheel and Column
- Instrument Panel
- Interconnecting Wiring
- Seat Belt Reminder Light
- Knee Impact Bolsters
- Front Acceleration Sensors
- Front Seat Belt Retractor Pretensioners
- Front Seat Track Position Sensors

How the Airbag System Works

- The **Occupant Restraint Controller (ORC)** determines if a frontal collision is severe enough to require the airbags to inflate. If airbags are required, the ORC determines the necessary rate of airbag inflation for that event.
- The ORC determines if a side impact is severe enough to deploy the supplemental side curtain airbag and supplemental front seat mounted side airbag.
- The ORC detects rollover.

- The ORC and other systems monitor the readiness of the electronic components whenever the ignition switch is in the START or ON position. These include all of the items listed above except the knee impact bolsters, the instrument panel, and the steering wheel and column. Furthermore, the airbag system is not active if the key is in the LOCK position, the ACC position, or not in the ignition.

- The ORC commands Airbag Warning Light operation. The Airbag Warning Light in the instrument panel turns on for four to six seconds as a self-check when the ignition is first turned on. After the self-check, the light will turn off. If the ORC detects a malfunction in any part of the system, the light will turn on until the malfunction is corrected. A single chime will sound if the light comes on again after initial start-up.

WARNING!

Ignoring the Airbag Warning Light in your instrument panel could mean you won't have the airbags to protect you in a collision. If the light does not come on, stays on after you start the vehicle, or if it comes on as you drive, have the airbag system checked right away.

- The **Driver and Front Passenger Airbag/Inflator Units** are located in the center of the steering wheel and the passenger's side of the instrument panel. When the ORC detects a collision requiring the airbags, it signals the inflator units. A large quantity of nontoxic gas is generated to inflate the front airbags. Different airbag inflation rates may be possible based on collision severity. The steering wheel hub trim cover and the upper passenger's side of the instrument

panel separate and fold out of the way as the bags inflate to their full size. The bags fully inflate in about 50 to 70 ms. This is about half of the time that it takes to blink your eyes. The bags then quickly deflate while helping to restrain the driver and front passenger. The driver's front airbag gas is vented through vent holes in the sides of the airbag. The passenger's front airbag gas is vented through vent holes in the sides of the airbag. In this way, the airbags do not interfere with your control of the vehicle.

- The **Knee Impact Bolsters** help protect the knees of the driver and the front passenger and position everyone for the best interaction with the front airbag.
- The **Supplemental Side Impact SRS Side Curtain Airbags** are designed to activate only in certain side collisions. When the ORC detects a collision requiring the side curtain airbag to inflate, it signals the inflators on the crash side of the vehicle. A quantity of nontoxic gas is generated to inflate the side curtain airbag. The inflating side curtain airbag pushes the outside edge of the headliner out of the way and covers the window. The airbag inflates in about 30 ms (about one-quarter of the time that it takes to blink your eyes) with enough force to injure you if you are not belted and seated properly, or if items are positioned in the area where the side curtain airbag inflates. This especially applies to children. The side curtain airbag is only about 3-1/2 in (9 cm) thick when it is inflated.
- The **Supplemental Front Seat Mounted Side Airbags** are designed to activate only in certain side collisions. When the ORC (with side impact option) detects a collision requiring the front seat mounted side airbag to inflate, it signals the inflators on the crash side of the vehicle. A quantity of nontoxic gas is generated to inflate the front seat mounted side airbag. The inflating front seat mounted side airbag pushes through the seam in the seat's trim cover and opens into the space

between the occupant and the door. The airbag inflates at a very high speed and with enough force to injure you if you are not belted and seated properly, or if items are positioned in the area where the front seat mounted side airbag inflates. This especially applies to children.

The following requirements must be strictly adhered to:

- Do not make any modifications to the front seat components, assembly, or to the seat cover in any way.
- Do not use prior or future model year seat covers not designated for the specific model being repaired. Always use the correct seat cover specified for the vehicle.
- Do not replace the seat cover with an aftermarket seat cover.
- Do not add a secondary seat cover other than those approved by the manufacturer of this vehicle/Mopar®.
- At no time should any supplemental restraint system (SRS) component or SRS-related component or fastener be modified or replaced with any part except those, which are approved by the manufacturer of this vehicle/Mopar®.

WARNING!

Unapproved modifications or service procedures to the front seat assembly, its related components, or seat cover may inadvertently change the airbag deployment in case of a frontal crash. This could result in death or serious injury to the driver or front seat passenger if the vehicle is involved in an accident. A modified vehicle may not comply with required Federal Motor Vehicle Safety Standards (FMVSS).

If a Deployment Occurs

The airbag system is designed to deploy when the ORC detects a moderate to severe collision to help restrain the driver and front passenger and then to immediately deflate.

NOTE: A frontal collision that is not severe enough to need airbag protection will not activate the system. This does not mean something is wrong with the airbag system.

If you do have a collision that deploys the airbags, any or all of the following may occur:

- The nylon airbag material may sometimes cause abrasions and/or skin reddening to the driver and front passenger as the airbags deploy and unfold. The abrasions are similar to friction rope burns or those you might get sliding along a carpet or gymnasium floor. They are not caused by contact with chemicals. They are not permanent and normally heal quickly. However, if you haven't healed significantly within a few days or if you have any blistering, see your doctor immediately.

- As the airbags deflate, you may see some smoke-like particles. The particles are a normal by-product of the process that generates the nontoxic gas used for airbag inflation. These airborne particles may irritate the skin, eyes, nose, or throat. If you have skin or eye irritation, rinse the area with cool water. For nose or throat irritation, move to fresh air. If the irritation continues, see your doctor. If these particles settle on your clothing, follow the garment manufacturer's instructions for cleaning.
- It is not advisable to drive your vehicle after the airbags have been deployed. If you are involved in another collision, the airbags will not be in place to protect you.

WARNING!

Deployed airbags and seat belt pretensioners cannot protect you in another collision. Have the airbags, seat belt pretensioner, and seat belt retractor assembly replaced by an authorized dealer as soon as possible.

Enhanced Accident Response System

In the event of an impact that causes airbag deployment, with the vehicle communication network intact, and the power intact, the Enhanced Accident Response System performs the following functions:

- Cuts off fuel to the engine.
- Flashes hazard lights.

- Turns on the interior lights, which remain on as long as the battery has power or until the ignition key is removed.
- Unlocks the doors automatically.

NOTE: The interior lights can only be deactivated if the key is removed from the ignition switch or the vehicle is driven.

Maintaining Your Airbag System

WARNING!

- **Modifications to any part of the airbag system could cause it to fail when you need it. You could be injured because the airbags are not there to protect you. Do not modify the components or wiring, including adding any kind of badges or stickers to the steering wheel hub trim cover or the upper passenger's side of the instrument panel. Do not modify the front bumper, vehicle body structure, or frame.**
- **You need proper knee impact protection in a collision. Do not mount or locate any aftermarket equipment on or behind the knee impact bolster.**
- **It is dangerous to try to repair any part of the airbag system yourself. Be sure to tell anyone who works on your vehicle that it has airbags.**

NOTE: Perchlorate Material — special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.

Airbag Warning Light

You will want to have the airbags ready to inflate for your protection in an impact. While the airbag system is designed to be maintenance free, if any of the following occurs, have an authorized dealer service the system promptly:

- The Airbag Warning Light does not come on or flickers during the four to six seconds when the ignition switch is first turned ON.
- The light remains on or flickers after the four to six second interval.
- The light flickers or comes on and remains on while driving.

Event Data Recorder (EDR)

In the event of an accident, your vehicle is designed to record up to five seconds of specific vehicle data parameters (see the following list) in an event data recorder prior to the moment of airbag deployment, or near deployment, and up to a quarter second of high-speed deceleration data during and/or after airbag deployment. EDR data are ONLY recorded if an airbag deploys, or nearly deploys, and are otherwise unavailable.

NOTE:

1. A near-deployment event occurs when the airbag sensor detects severe vehicle deceleration usually indicative of a crash, but not severe enough to warrant airbag deployment.

2. Under certain circumstances, EDR data may not be recorded (e.g., loss of battery power).

In conjunction with other data gathered during a complete accident investigation, the electronic data may be used by the manufacturer of this vehicle and others to learn more about the possible causes of crashes and associated injuries in order to assess and improve vehicle performance. In addition to crash investigations initiated by the manufacturer of this vehicle, such investigations may be requested by customers, insurance carriers, government officials, and professional crash researchers, such as those associated with universities, and with hospital and insurance organizations.

In the event that an investigation is undertaken by the manufacturer of this vehicle (regardless of initiative), the company or its designated representative will first obtain permission of the appropriate custodial entity for the vehicle (usually the vehicle owner or lessee) before accessing the electronic data stored, unless ordered to download data by a court with legal jurisdiction (i.e., pursuant to a warrant). A copy of the data will be provided to the custodial entity upon request. General data that does not identify particular vehicles or crashes may be released for incorporation in aggregate crash databases, such as those maintained by the U.S. government and various states. Data of a potentially sensitive nature, such as would identify a particular driver, vehicle, or crash, will be treated confidentially. Confidential data will not be disclosed by the manufacturer of this vehicle to any third party except when:

1. Used for research purposes, such as to match data with a particular crash record in an aggregate database, provided confidentiality of personal data is thereafter preserved

2. Used in defense of litigation involving a product of the manufacturer of this vehicle

3. Requested by police under a legal warrant

4. Otherwise required by law

Data Parameters that May Be Recorded:

- Diagnostic trouble code(s) and warning light status for electronically-controlled safety systems, including the airbag system
- Airbag disable light status (if equipped)
- ″Time″ of airbag deployment (in terms of ignition cycles and vehicle mileage)
- Airbag deployment level (if applicable)
- Impact acceleration and angle
- Seat belt status
- Brake status (service and parking brakes)
- Accelerator status (including vehicle speed)
- Engine control status (including engine speed)
- Transaxle gear selection
- Cruise control status
- Traction/stability control status
- Tire Pressure Monitoring System status (if equipped)

Child Restraint

Everyone in your vehicle needs to be buckled up all the time, including babies and children. Every state in the United States and all Canadian provinces require that small children ride in proper restraint systems. This is the law, and you can be prosecuted for ignoring it.

Children 12 years and younger should ride properly buckled up in a rear seat, if available. According to crash statistics, children are safer when properly restrained in the rear seats rather than in the front.

WARNING!

In a collision, an unrestrained child, even a tiny baby, can become a missile inside the vehicle. The force required to hold even an infant on your lap could become so great that you could not hold the child, no matter how strong you are. The child and others could be badly injured. Any child riding in your vehicle should be in a proper restraint for the child's size.

There are different sizes and types of restraints for children from newborn size to the child almost large enough for an adult safety belt. Always check the child seat Owner's Manual to ensure you have the correct seat for your child. Use the restraint that is correct for your child.

Infants and Child Restraints

- Safety experts recommend that children ride rearward-facing in the vehicle until they are at least one year old **and** weigh at least 20 lbs (9 kg). Two types of child restraints can be used rearward-facing, infant carriers and convertible child seats.
- The infant carrier is only used rearward-facing in the vehicle. It is recommended for children who weigh up to about 20 lbs (9 kg). Convertible child seats can be used either rearward-facing or forward-facing in the vehicle. Convertible child seats often have a higher weight limit in the rearward-facing direction than infant carriers do, so they can be used rearward-facing by children who weigh more than 20 lbs (9 kg) but are less than one year old. Both types of child restraints are held in the vehicle by the lap/shoulder belt or the LATCH child restraint anchor system. Refer to

"LATCH — Child Seat Anchor System (Lower Anchors and Tether for CHildren)" in this section.

- Rearward-facing child seats must **NEVER** be used in the front seat of a vehicle with the front passenger airbag unless the airbag is turned off. An airbag deployment could cause severe injury or death to infants in this position.

Older Children and Child Restraints

Children who weigh more than 20 lbs (9 kg) and who are older than one year can ride forward-facing in the vehicle. Forward-facing child seats and convertible child seats used in the forward-facing direction are for children who weigh 20 to 40 lbs (9 to 18 kg) and who are older than one year. These child seats are also held in the vehicle by the lap/shoulder belt or the LATCH child restraint anchorage system. Refer to "LATCH — Child Seat Anchorage System (Lower Anchors and Tether for CHildren)" in this section.

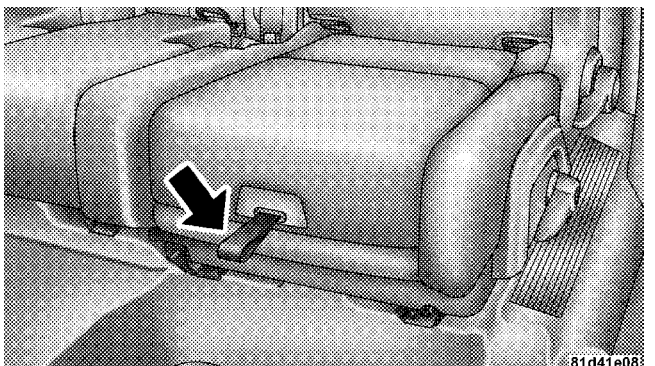
The belt-positioning booster seat is for children weighing more than 40 lbs (18 kg), but who are still too small to fit the vehicle's seat belts properly. If the child cannot sit with knees bent over the vehicle's seat cushion while the child's back is against the seatback, they should use a belt-positioning booster seat. The child and belt-positioning booster seat are held in the vehicle by the lap/shoulder belt.

Integrated Child Booster Seat — If Equipped

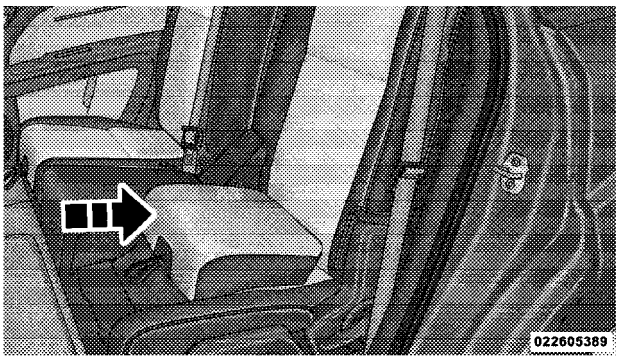
The Integrated Child Booster Seat is located in each outboard second-row passenger seat. The Booster Seat is designed for children weighing between 48 and 85 lbs (22 and 39 kg) and between 47 in (119 cm) and 57 in (145 cm) tall.

To position a child into the Integrated Child Booster Seat follow these steps:

1. Pull the release loop forward to release the latch and seat cushion.



2. Lift the seat cushion up and push back to lock it in the booster seat position.



New Integrated 1

3. Place the child upright in the seat with their back firmly against the seatback.

4. Grasp the latch plate and pull out the seat belt.

5. Slide the latch plate up the webbing as far as necessary to allow the seat belt to go around the child's lap.

NOTE: The lap portion of the seat belt should be low on the hips and as snug as possible.

6. Once the seat belt is long enough to fit properly, insert the latch plate into the buckle until you hear a "click."

7. To remove the slack from the lap belt, pull upward on the shoulder portion of the seat belt.

8. To release the seat belt, push the red button on the buckle.

WARNING!

Be certain that the seat cushion is locked securely into position before using the seat. Otherwise, the seat will not provide the proper stability for child seats and/or passengers. An improperly latched seat cushion could cause serious injury.

Children too Large for Booster Seats

Children who are large enough to wear the shoulder belt comfortably and whose legs are long enough to bend over the front of the seat when their back is against the seatback should use the lap/shoulder belt in a rear seat.

- Make sure that the child is upright in the seat.

- The lap portion should be low on the hips and as snug as possible.
- Check belt fit periodically. A child's squirming or slouching can move the belt out of position.
- If the shoulder belt contacts the face or neck, move the child closer to the center of the vehicle. Never allow a child to put the shoulder belt under an arm or behind their back.

NOTE: For additional information, refer to www.seatcheck.org or call 1–866–SEATCHECK.

WARNING!

- **Improper installation can lead to failure of an infant or child restraint. It could come loose in a collision. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.**
- **A rearward-facing child restraint should only be used in a rear seat. A rearward-facing child restraint in the front seat may be struck by a deploying passenger airbag, which may cause severe or fatal injury to the infant.**

Here are some tips on getting the most out of your child restraint:

- Before buying any restraint system, make sure that it has a label certifying that it meets all applicable Safety Standards. We also recommend that you make sure that you can install the child restraint in the vehicle where you will use it before you buy it.
- The restraint must be appropriate for your child's weight and height. Check the label on the restraint for weight and height limits.
- Carefully follow the instructions that come with the restraint. If you install the restraint improperly, it may not work when you need it.
- Buckle the child into the seat according to the child restraint manufacturer's directions.
- When your child restraint is not in use, secure it in the vehicle with the seat belt or remove it from the vehicle. Do not leave it loose in the vehicle. In a sudden stop or collision, it could strike the occupants or seatbacks and cause serious personal injury.

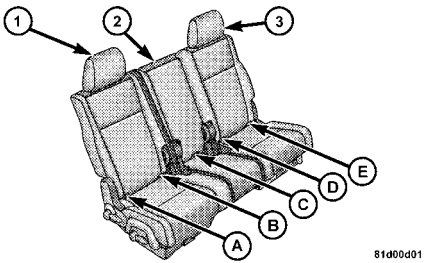
LATCH — Child Seat Anchor System (Lower Anchors and Tether for CHildren)

Your vehicle's second row passenger seats are equipped with the child restraint anchor system called LATCH. The LATCH system provides for the installation of the child restraint without using the vehicle's seat belts, instead securing the child restraint using lower anchors and upper tether straps from the child restraint to the vehicle structure.

LATCH-compatible child restraint systems are now available. However, because the lower anchors are to be introduced over a period of years, child restraint systems having attachments for those anchors will continue to have features for installation using the vehicle's seat belts. Child restraints having tether straps and hooks for

connection to the top tether anchors have been available for some time. For some older child restraints, many child restraint manufacturers offer add-on tether strap kits or retrofit kits. You are urged to take advantage of all the available attachments provided with your child restraint in any vehicle.

All three second-row passenger seating positions have lower anchors that are capable of accommodating LATCH-compatible child seats. You should **NEVER** install LATCH-compatible child seats so that two seats share a common lower anchorage. If installing child seats in adjacent seating positions, or if your child restraints are not LATCH-compatible, install the restraints using the vehicle's seat belts.



Latch Anchorages

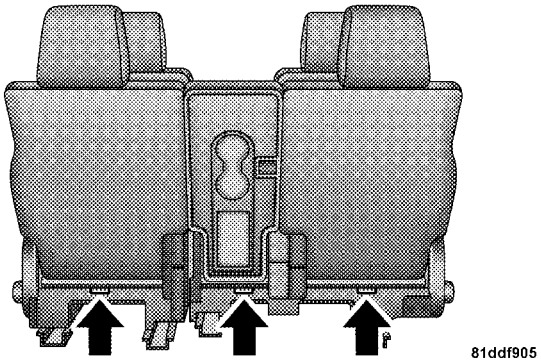
1 — Outer 60% Seating Position. Use Lower Anchor Loops A and B. If placing a second child seat in the vehicle, use the Outer 40% Seating Position and Lower Anchor Loops D and E. DO NOT USE Middle 60% Seating Position and Lower Anchorage Loops B and C.
2 — Middle 60% Seating Position. Use Lower Anchor Loops B and C. If placing a second child seat in the vehicle, use the Outer 40% Seating Position and Lower Anchor Loops D and E. DO NOT USE Outer 60% Seating Position and Lower Anchor Loops A and B.
3 — Outer 40% Seating Position. Use Lower Anchor Loops D and E. If placing a second child seat in the vehicle, use Outer 60% Seating Position and Lower Anchor Loops A and B or Middle 60% Seating Position and Lower Anchor Loops B and C.

Installing the LATCH-Compatible Child Restraint System

We urge you to follow the manufacturer's directions carefully when installing your child restraint. Not all child restraint systems will be installed as described here. Again, carefully follow the installation instructions that are provided with the child restraint system.

The lower anchors are round bars located at the rear of the seat cushion where it meets the seatback and are just visible when you lean into the rear seat to install the child restraint. You will easily feel them if you run your finger along the intersection of the seatback and seat cushion surfaces.

In addition, there are tether strap anchors located behind each rear seatback, near to the floor.



Tether Strap Anchors

Many, but not all restraint systems will be equipped with separate straps on each side, with each having a hook or connector for attachment to the lower anchor and a means of adjusting the tension in the strap. Forward-facing toddler restraints and some rear-facing infant restraints will also be equipped with a tether strap, a

hook for attachment to the tether strap anchor and a means of adjusting the tension of the strap.

You will first loosen the adjusters on the lower straps and on the tether strap so that you can more easily attach the hooks or connectors to the vehicle anchors. Next, attach the lower hooks or connectors over the top of the seatcover material. Then attach the tether strap to the anchor directly behind the seat where you are placing the child restraint, being careful to route the tether strap to provide the most direct path between the anchor and the child restraint, preferably between the head restraint posts underneath the head restraint. Finally, tighten all three straps as you push the child restraint rearward and downward into the seat, removing slack in the straps according to the child restraint manufacturer's instructions.

NOTE:

- Ensure that the tether strap does not slip into the opening between the seatbacks as you remove slack in the strap.
- When using the LATCH attaching system to install a child restraint, please ensure that all seat belts not being used for occupant restraints are stowed and out of reach of children. It is recommended that before installing the child restraint, buckle the seat belt so the seat belt is tucked behind the child restraint. This should stow the seat belt out of the reach of an inquisitive child. Remind all children in the vehicle that the seat belts are not toys and that they should not play with them. In addition, never leave unattended children in the vehicle.

WARNING!

Improper installation of a child restraint to the LATCH anchorages can lead to failure of an infant or child restraint. The child could be badly injured or killed. Follow the manufacturer's directions exactly when installing an infant or child restraint.

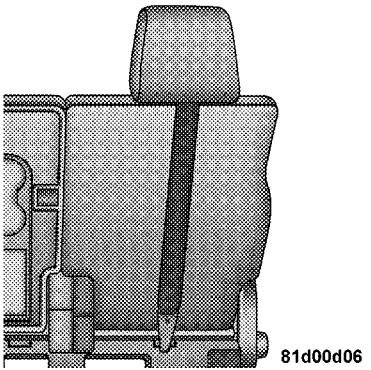
Installing Child Restraints Using the Vehicle Seat Belt

The seat belts in the passenger seating positions are equipped with either an Automatic Locking Retractor (ALR) or a cinching latch plate or both. Both types of seat belts are designed to keep the lap portion of the seat belt tight around the child restraint so that it is not necessary to use a locking clip. The ALR will make a ratcheting noise if you extract the entire belt from the retractor and then allow the belt to retract into the retractor. For additional information on ALR, refer to "Automatic Locking Mode" in this section.

To install a child restraint, first, pull enough of the seat belt webbing from the retractor to route it through the belt path of the child restraint and slide the latch plate into the buckle. Next, extract all the seat belt webbing out of the retractor and then allow the belt to retract into the retractor. Finally, pull on any excess webbing to tighten the lap portion around the child restraint. Any seat belt system will loosen with time, so check the belt occasionally, and pull it tight if necessary.

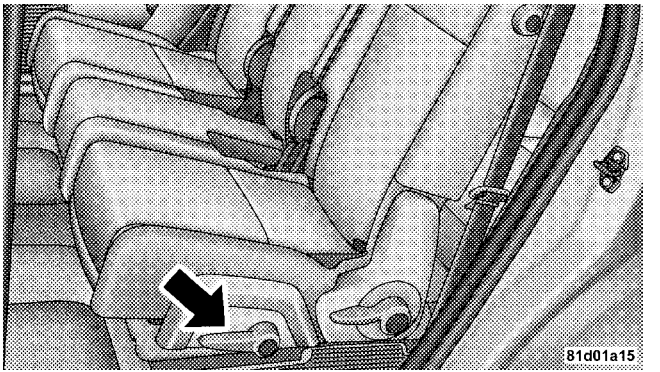
To attach a child restraint tether strap:

- Route the tether strap to provide the most direct path for the strap between the anchor and the child seat, preferably between the head restraint posts underneath the head restraint.



Tether Strap Mounting

• If necessary, move the seat forward to provide better access to the tether anchor.



Seat Track Release Lever

• Attach the tether strap hook of the child restraint to the tether anchor and remove slack in the tether strap according to the child restraint manufacturer's instructions.

NOTE: Ensure that the tether strap does not slip into the opening between the seatbacks as you remove slack in the strap.

WARNING!

An incorrectly anchored tether strap could lead to increased head motion and possible injury to the child. Use only the anchor positions directly behind the child seat to secure a child restraint top tether strap.

Transporting Pets

Airbags deploying in the front seat could harm your pet. An unrestrained pet will be thrown about and possibly injured, or injure a passenger during panic braking or in a collision.

Pets should be restrained in the rear seat in pet harnesses or pet carriers that are secured by seat belts.

ENGINE BREAK-IN RECOMMENDATIONS

A long break-in period is not required for the engine in your vehicle.

Drive moderately during the first 300 mi (500 km). After the initial 60 mi (100 km), speeds up to 50 or 55 mph (80 or 90 km/h) are desirable.

While cruising, brief full-throttle acceleration, within the limits of local traffic laws, contributes to a good break-in. Wide-open throttle acceleration in low gear can be detrimental and should be avoided.

The engine oil installed in the engine at the factory is a high-quality energy-conserving type lubricant. Oil changes should be consistent with anticipated climate conditions under which vehicle operations will occur. For the recommended viscosity and quality grades, refer to

"Maintenance Procedures" in Section 7. NON-DETERGENT OR STRAIGHT MINERAL OILS MUST NEVER BE USED.

A new engine may consume some oil during its first few thousand miles (kilometers) of operation. This should be considered as a normal part of the break-in and not interpreted as an indication of difficulty.

SAFETY TIPS

Transporting Passengers

NEVER TRANSPORT PASSENGERS IN THE CARGO AREA.

WARNING!

- **It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed.**
- **Do not allow people to ride in any area of your vehicle that is not equipped with seats and seat belts.**
- **Be sure everyone in your vehicle is in a seat and using a seat belt properly.**
- **On seven passenger models, do not drive the vehicle with the second row passenger seat in the easy entry/exit position (seat cushion flipped upward and seat moved forward), as this position is only intended for entering and exiting the third row seats. Failure to follow this warning may result in personal injury.**
- **On seven passenger models, do not allow a passenger to sit in a third row seat with the second row seat-back(s) folded flat. In a collision, the passenger could slide underneath the seat belt and be seriously or even fatally injured.**

Lock Your Vehicle

Always remove the key from the ignition and lock all doors when leaving the vehicle unattended, even in your own driveway or garage. Try to park your vehicle in a well-lit area and never invite theft by leaving articles of value exposed.

Exhaust Gas

WARNING!

- **Exhaust gases can injure or kill. They contain carbon monoxide (CO), which is colorless and odorless. Breathing it can make you unconscious and can eventually poison you. To avoid breathing CO follow these safety tips:**

Do not run the engine in a closed garage or in confined areas any longer than needed to move your vehicle in or out of the area.

If it is necessary to sit in a parked vehicle with the engine running, adjust your heating or cooling controls to force outside air into the vehicle. Set the blower at high speed.

If you are required to drive with the liftgate open, make sure that all windows are closed, and the blower switch on the climate control is set at high speed. DO NOT use the recirculation mode.

The best protection against carbon monoxide entry into the vehicle body is a properly maintained engine exhaust system.

Whenever a change is noticed in the sound of the exhaust system, when exhaust fumes can be detected inside the vehicle, or when the underside or rear of the vehicle is damaged, have a competent mechanic inspect the complete exhaust system and adjacent body areas for broken, damaged, deteriorated, or mispositioned parts. Open seams or loose connections could permit exhaust fumes to seep into the passenger compartment. In addition, inspect the exhaust system each time the vehicle is raised for lubrication or oil change. Replace as required.

Safety Checks You Should Make Inside The Vehicle

Seat Belts

Inspect the seat belt system periodically, checking for cuts, frays, and loose parts. Damaged parts must be replaced immediately. Do not disassemble or modify the system.

Front seat belt assemblies must be replaced after a collision. Rear seat belt assemblies must be replaced after a collision if they have been damaged (i.e., bent retractor, torn webbing, etc.). If there is any question regarding belt or retractor condition, replace the seat belt.

Airbag Warning Light

The light should turn on and remain on for four to six seconds as a bulb check when the ignition switch is first turned ON. If the light is not lit during starting, or if the light stays on, flickers, or turns on while driving, have the system checked by an authorized dealer.

Defroster

Check operation by selecting the defrost mode and place the blower control on high speed. You should be able to feel the air directed against the windshield. See your authorized dealer for service if your defroster is inoperable.

Periodic Safety Checks You Should Make Outside The Vehicle

Tires
Examine tires for excessive tread wear and uneven wear patterns. Check for stones, nails, glass, or other objects lodged in the tread. Inspect the tread and sidewall for cuts and cracks. Check the wheel nuts for tightness. Check the tires (including spare) for proper pressure.

Lights
Have someone observe the operation of exterior lights while you work the controls. Check Turn Signal and High Beam Indicator Lights on the instrument panel.

Door Latches
Check for positive closing, latching, and locking.

Fluid Leaks
Check area under vehicle after overnight parking for fuel, engine coolant, oil, or other fluid leaks. Also, if gasoline fumes are detected or if fuel, power steering fluid, or brake fluid leaks are suspected, the cause should be located and corrected immediately.

UNDERSTANDING THE FEATURES OF YOUR VEHICLE

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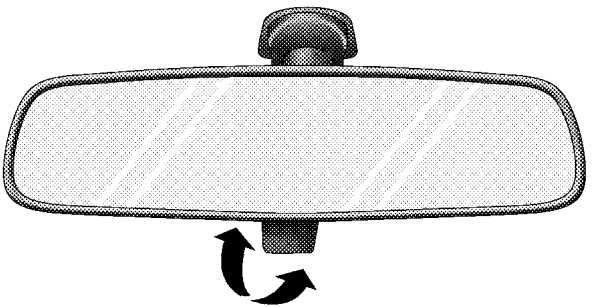
MIRRORS

Inside Day/Night Mirror

Adjust the mirror to center on the view through the rear window. A two-point pivot system allows for horizontal and vertical mirror adjustment.

Annoying headlight glare can be reduced by moving the small control under the mirror to the night position (toward the rear of the vehicle). The mirror should be adjusted while set in the day position (toward the windshield).



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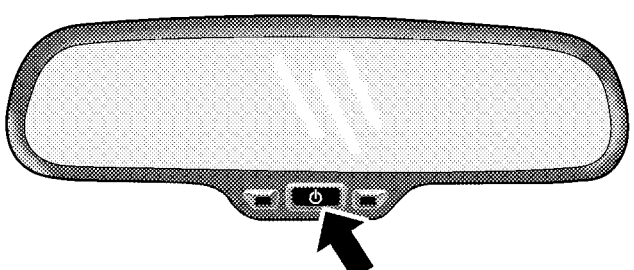
Manual Rearview Mirror

Automatic Dimming Inside Mirror — If Equipped

This mirror automatically adjusts for annoying headlight glare from vehicles behind you. You can turn the feature on or off by pressing the button at the base of the mirror. A light will illuminate next to the switch when the automatic dimming feature is activated.



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Automatic Dimming Mirror

CAUTION!

To avoid damage to the mirror during cleaning, never spray any cleaning solution directly onto the mirror. Apply the solution onto a clean cloth and wipe the mirror clean.

Outside Mirrors

To receive maximum benefit, adjust the outside mirror(s) to center on the adjacent lane of traffic and a slight overlap of the view obtained from the inside mirror.

NOTE: The passenger-side convex outside mirror will give a much wider view to the rear, and especially of the lane next to your vehicle.

WARNING!

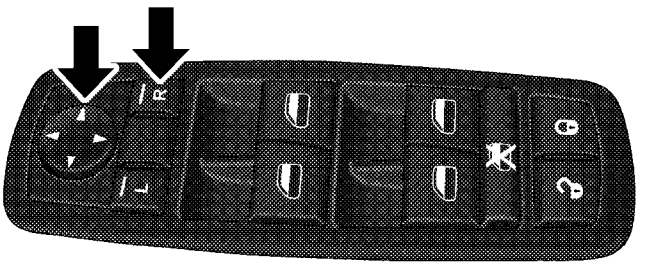
Vehicles and other objects seen in the passenger-side convex mirror will look smaller and farther away than they really are. Relying too much on your passenger-side convex mirror could cause you to collide with another vehicle or other object. Use your inside mirror when judging the size or distance of a vehicle seen in the passenger-side convex mirror. Failure to follow this warning may result in serious injury or death.

Outside Mirrors Folding Feature — If Equipped

Some models have exterior mirrors that are hinged. The hinge allows the mirror to pivot forward and rearward to resist damage. The hinge has three detent positions: forward, rearward, and normal.

Power Remote Control Mirrors

The power MIRROR switch is located on driver's door trim panel.



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Power MIRROR Switches

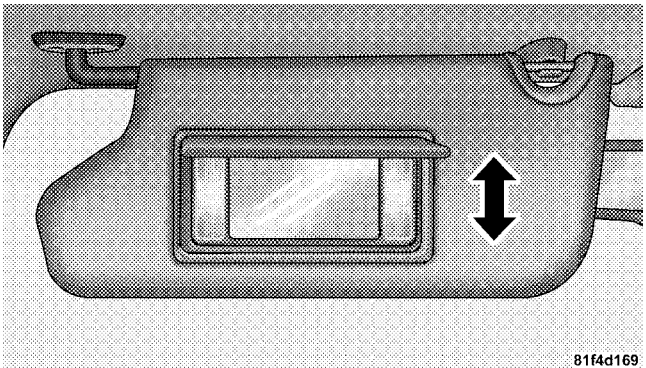
Models without Express Window Feature

Press the mirror SELECT button marked L or R and then press one of the four arrow buttons to move the mirror in the direction the arrow is pointing.

Models with Express Window Feature
Press and release the mirror SELECT button marked L or R and then press one of the four arrow buttons to move the mirror in the direction the arrow is pointing. The selection times out after 30 seconds of inactivity in order to guard against accidentally changing a mirror position following an adjustment.

Heated Remote Control Mirrors — If Equipped
These mirrors are heated to melt frost or ice. This feature is activated whenever you turn on the Electric Rear Window Defroster.

Illuminated Vanity Mirrors — If Equipped
An illuminated vanity mirror is on each sun visor. To use the mirror, rotate the sun visor downward and swing the mirror cover upward. The light will turn on automatically. Closing the mirror cover will turn off the light.



Illuminated Vanity Mirror

Sun Visor "Slide-On Rod" Feature — If Equipped
This feature allows for additional flexibility in positioning the visor to block out the sun.

1. Fold down the sun visor.
2. Unclip the visor from the center clip.

3. Pull the sun visor toward the inside rearview mirror to extend it.

PARKVIEW® REAR BACKUP CAMERA — IF EQUIPPED

The Parkview® Rear Backup Camera captures live video of the area behind the vehicle. The live video displays on the radio's display screen when backing up your vehicle.

NOTE: Refer to "Setting Display Properties," under "System Settings" in the Navigation User's Manual for navigation screen brightness adjustment instructions.

To operate the Rear Backup Camera:

1. Start the engine.
2. Move the shift lever into REVERSE.
3. Wait one to two seconds and the video will display on the radio's display screen.

NOTE: The video will only display while the shift lever is in REVERSE.

WARNING!

Drivers must be careful when backing up a vehicle, even when using the Rear Backup Camera. Always check carefully for pedestrians, animals, other vehicles, obstructions, and blind spots before backing up a vehicle. You are responsible for the safety of your surroundings and must continue to pay attention while backing up a vehicle. Failure to do so can result in serious injury or death.

CAUTION!

- **To avoid vehicle damage, only use the Rear Backup Camera as a parking aid, as the camera is unable to capture every obstacle or object in your drive path.**
- **To avoid vehicle damage, drive slowly when backing up a vehicle so that you can stop in time when an obstacle comes into view. It is recommended that the driver look frequently over their shoulder when backing up a vehicle.**

NOTE: If snow, ice, mud, or anything else builds up on the camera lens, clean the lens, rinse with water, and dry with a soft cloth. Do not cover the lens.

HANDS-FREE COMMUNICATION (UConnect®) — IF EQUIPPED

NOTE: The sales code RER, REN and REU radios contain an integrated Hands-Free Communication (UConnect®) system. Refer to your "Navigation User's Manual" for UConnect® system operating instructions for these radios.

UConnect® is a voice-activated, hands-free, in-vehicle communications system. UConnect® allows you to dial a phone number with your cellular phone using simple voice commands (e.g., "Call" ... "Mike" ..."Work" or "Dial" ... "248-555-1212"). Your cellular phone's audio is transmitted through your vehicle's audio system; the system will automatically mute your radio when using the UConnect® system.

NOTE: The UConnect® system requires a cellular phone equipped with the Bluetooth® "Hands-Free Profile," Version 0.96 or higher. See the UConnect® website for supported phones.

NOTE: For UConnect® customer support, visit the following websites:

- www.chrysler.com/uconnect
- www.dodge.com/uconnect
- www.jeep.com/uconnect
- or call 1–877–855–8400

UConnect® allows you to transfer calls between the system and your cellular phone as you enter or exit your vehicle and enables you to mute the system's microphone for private conversation.

The UConnect® phonebook enables you to store up to 32 names, with four numbers per name. Each language has a separate 32-name phonebook accessible only in that language. This system is driven through your Bluetooth® "Hands-Free profile" cellular phone. UConnect® features Bluetooth® technology - the global standard that enables different electronic devices to connect to each other without wires or a docking station, so UConnect® works no matter where you stow your cellular phone (be it your purse, pocket, or briefcase), as long as your phone is turned on and has been paired to the vehicle's UConnect® system. The UConnect® system allows up to seven cellular phones to be linked to the system. Only one linked (or paired) cellular phone can be used with the system at a time. The system is available in English, Spanish, or French languages.

Phone Button

The rearview mirror contains the microphone for the system (depending on the type of mirror and radio equipped), and either the radio or the mirror has the two control buttons (PHONE Button and VOICE RECOGNITION button) that will enable you to access the system.

Voice Recognition Button

Actual button location may vary with radio. The individual buttons are described in the "Operation" section.

The UConnect® system can be used with any Hands-Free Profile certified Bluetooth® cellular phone. See the UConnect® website for supported phones. If your cellular phone supports a different profile (e.g., Headset Profile) you may not be able to use any UConnect® features. Refer to your cellular service provider or the phone manufacturer for details.

The UConnect® system is fully integrated with the vehicle's audio system. The volume of the UConnect® system can be adjusted either from the radio volume control knob or from the steering wheel radio control (right switch), if so equipped.

The radio display will be used for visual prompts from the UConnect® system such as "CELL" or caller ID on certain radios.

Operation

Voice commands can be used to operate the UConnect® system and to navigate through the UConnect® menu structure. Voice commands are required after most UConnect® system prompts. You will be prompted for a specific command and then guided through the available options.

- Prior to giving a voice command, one must wait for the beep, which follows the "Ready" prompt or another prompt.

- For certain operations, compound commands can be used. For example, instead of saying "Setup" and then "Phone Pairing," the following compound command can be said: "Setup Phone Pairing."
- For each feature explanation in this section, only the combined form of the voice command is given. You can also break the commands into parts and say each part of the command when you are asked for it. For example, you can use the combined form voice command "Phonebook New Entry," or you can break the combined form command into two voice commands: "Phonebook" and "New Entry." Please remember, the UConnect® system works best when you talk in a normal conversational tone, as if speaking to someone sitting a few feet/meters away from you.

Voice Command Tree
Refer to "Voice Tree" in this section.

Help Command
If you need assistance at any prompt, or if you want to know your options at any prompt, say "Help" following the beep. The UConnect® system will play all the options at any prompt if you ask for help.

To activate the UConnect® system from idle, simply press the PHONE button and follow the audible prompts for directions. All UConnect® system sessions begin with a press of the PHONE button on the radio control head.

Cancel Command
At any prompt, after the beep, you can say "Cancel" and you will be returned to the main menu. However, in a few instances the system will take you back to the previous menu.

Pair (Link) UConnect® System to a Cellular Phone
To begin using your UConnect® system, you must pair your compatible Bluetooth® enabled cellular phone.

To complete the pairing process, you will need to reference your cellular phone Owner's Manual. The UConnect® website may also provide detailed instructions for pairing.

The following are general phone to UConnect® system pairing instructions:

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Setup Phone Pairing."
- When prompted, after the beep, say "Pair a Phone" and follow the audible prompts.
- You will be asked to say a four-digit Personal Identification Number (PIN), which you will later need to enter into your cellular phone. You can enter any four-digit PIN. You will not need to remember this PIN after the initial pairing process.
- For identification purposes, you will be prompted to give the UConnect® system a name for your cellular phone. Each cellular phone that is paired should be given a unique phone name.
- You will then be asked to give your cellular phone a priority level between 1 and 7, with 1 being the highest priority. You can pair up to seven cellular phones to your UConnect® system. However, at any given time, only one cellular phone can be in use, connected to your UConnect® system. The priority allows the UConnect® system to know which cellular phone to use if multiple cellular phones are in the vehicle at the same time. For example, if priority 3 and priority 5 phones are present in the vehicle, the UConnect® system will use the priority 3 cellular phone when you make a call. You can select to use a lower priority cellular phone at any time (refer to "Advanced Phone Connectivity" in this section).

Dial by Saying a Number

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Dial."
- The system will prompt you to say the number you want to call.
- For example, you can say "234-567-8901." The phone number that you enter must be of valid length and combination. Based on the country in which the vehicle was purchased, the UConnect® system limits the user from dialing an invalid combination of numbers. For example, in the U.S., 234-567-890 is nine digits long, which is not a valid U.S. phone number - the closest valid phone number has 10 digits.
- The UConnect® system will confirm the phone number and then dial. The number will appear in the display of certain radios.

Call by Saying a Name

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Call."
- The system will prompt you to say the name of the person you want to call.
- After the "Ready" prompt and the following beep, say the name of the person you want to call. For example, you can say "John Doe," where John Doe is a previously stored name entry in the UConnect® phonebook. To learn how to store a name in the phonebook, refer to "Add Names to Your UConnect® Phonebook," in this section.
- The UConnect® system will confirm the name and then dial the corresponding phone number, which may appear in the display of certain radios.

Add Names to Your UConnect® Phonebook

NOTE: Adding names to the phonebook is recommended when the vehicle is not in motion.

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Phonebook New Entry."
- When prompted, say the name of the new entry. Use of long names helps the voice recognition and it is recommended. For example, say "Robert Smith" or "Robert" instead of "Bob."
- When prompted, enter the number designation (e.g., "Home," "Work," "Mobile," or "Pager"). This will allow you to store multiple numbers for each phonebook entry, if desired.
- When prompted, recite the phone number for the phonebook entry that you are adding.

After you are finished adding an entry into the phonebook, you will be given the opportunity to add more phone numbers to the current entry or to return to the main menu.

The UConnect® system will allow you to enter up to 32 names in the phonebook with each name having up to four associated phone numbers and designations. Each language has a separate 32-name phonebook accessible only in that language.

Phonebook Download

UConnect® allows the user to download entries from their phone via Bluetooth®. To use this feature, press the PHONE button and say "Phonebook Download." The system prompts, "Ready to accept "V" card entry via Bluetooth®…" The system is now ready to accept phonebook entries from your phone using the Bluetooth®

Object Exchange Profile (OBEX). Please see your phone Owner's Manual for specific instructions on how to send these entries from your phone.

NOTE:

- The phone handset must support Bluetooth® OBEX transfers of phonebook entries to use this feature.
- Some phones cannot send phonebook entries if they are already connected to any system via Bluetooth®, and you may see a message on the phone display that the Bluetooth® link is busy. In this case, the user must first disconnect or drop the Bluetooth® connection to the UConnect® system, and then send the address book entry via Bluetooth®. Please see your phone Owner's Manual for specific instructions on how to drop the Bluetooth® connection.
- If the phonebook entry is longer than 24 characters, it will only use the first 24 characters.

Edit Entries in the UConnect® Phonebook

NOTE: Editing names in the phonebook is recommended when the vehicle is not in motion.

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Phonebook Edit."
- You will then be asked for the name of the phonebook entry that you wish to edit.
- Next, choose the number designation (home, work, mobile, or pager) that you wish to edit.
- When prompted, recite the new phone number for the phonebook entry that you are editing.

After you are finished editing an entry in the phonebook, you will be given the opportunity to edit another entry in the phonebook, call the number you just edited, or return to the main menu.

"Phonebook Edit" can be used to add another phone number to a name entry that already exists in the phonebook. For example, the entry John Doe may have a mobile and a home number, but you can add "John Doe's" work number later using the "Phonebook Edit" feature.

Delete Entries in the UConnect® Phonebook

NOTE: Editing phonebook entries is recommended when the vehicle is not in motion.

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Phonebook Delete."
- After you enter the Phonebook Delete menu, you will then be asked for the name of the entry that you wish to delete. You can either say the name of a phonebook entry that you wish to delete or you can say "List Names" to hear a list of the entries in the phonebook from which you choose. To select one of the entries from the list, press the "Voice Recognition" button while the UConnect® system is playing the desired entry and say "Delete."
- After you enter the name, the UConnect® system will ask you which designation you wish to delete: home, work, mobile, pager, or all. Say the designation you wish to delete.
- Note that only the phonebook entry in the current language is deleted.

Delete All Entries in the UConnect® Phonebook

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Phonebook Erase All."
- The UConnect® system will ask you to verify that you wish to delete all the entries from the phonebook.

- After confirmation, the phonebook entries will be deleted.
- Note that only the phonebook in the current language is deleted.

List All Names in the UConnect® Phonebook

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Phonebook List Names."
- The UConnect® system will play the names of all the phonebook entries.
- To call one of the names in the list, press the "Voice Recognition" button during the playing of the desired name, and say "Call."

NOTE: The user can also exercise "Edit" or "Delete" operations at this point.

- The UConnect® system will then prompt you as to the number designation you wish to call.
- The selected number will be dialed.

Phone Call Features

The following features can be accessed through the UConnect® system if the feature(s) are available on your cellular service plan. For example, if your cellular service plan provides three-way calling, this feature can be accessed through the UConnect® system. Check with your cellular service provider for the features that you have.

Answer or Reject an Incoming Call - No Call Currently in Progress

When you receive a call on your cellular phone, the UConnect® system will interrupt the vehicle audio system, if on, and will ask if you would like to answer the call. Press the PHONE button to accept the call. To reject

the call, press and hold the PHONE button until you hear a single beep, indicating that the incoming call was rejected.

Answer or Reject an Incoming Call - Call Currently in Progress

If a call is currently in progress and you have another incoming call, you will hear the same network tones for call waiting that you normally hear when using your cell phone. Press the PHONE button to place the current call on hold and answer the incoming call.

NOTE: The UConnect® system compatible phones in the market today do not support rejecting an incoming call when another call is in progress. Therefore, the user can only answer an incoming call or ignore it.

Making a Second Call While Current Call in Progress

To make a second call while you are currently on a call, press the "Voice Recognition" button and say "Dial" or "Call" followed by the phone number or phonebook entry you wish to call. The first call will be on hold while the second call is in progress. To go back to the first call, refer to "Toggling Between Calls" in this section. To combine two calls, refer to "Conference Call" in this section.

Place/Retrieve a Call From Hold

To put a call on hold, press the PHONE button until you hear a single beep. This indicates that the call is on hold. To bring the call back from hold, press and hold the PHONE button until you hear a single beep.

Toggling Between Calls

If two calls are in progress (one active and one on hold), press the PHONE button until you hear a single beep, indicating that the active and hold status of the two calls have switched. Only one call can be placed on hold at one time.

Conference Call
When two calls are in progress (one active and one on hold), press and hold the PHONE button until you hear a double beep indicating that the two calls have been joined into one conference call.

Three-Way Calling
To initiate three-way calling, press the "Voice Recognition" button while a call is in progress, and make a second phone call, as described under "Making a Second Call While Current Call in Progress." After the second call has established, press and hold the PHONE button until you hear a double beep, indicating that the two calls have been joined into one conference call.

Call Termination
To end a call in progress, momentarily press the PHONE button. Only the active call(s) will be terminated and if there is a call on hold, it will become the new active call. If the active call is terminated by the far end, a call on hold may not become active automatically. This is cell phone-dependent. To bring the call back from hold, press and hold the PHONE button until you hear a single beep.

Redial

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Redial."
- The UConnect® system will call the last number that was dialed from your cellular phone.

NOTE: This may not be the last number dialed from the UConnect® system.

Call Continuation
Call continuation is the progression of a phone call on the UConnect® system after the vehicle ignition key has been switched to OFF. Call continuation functionality available on the vehicle can be any one of three types:

- After the ignition key is switched to OFF, a call can continue on the UConnect® system either until the call ends, or until the vehicle battery condition dictates cessation of the call on the UConnect® system and transfer of the call to the mobile phone.
- After the ignition key is switched to OFF, a call can continue on the UConnect® system for a certain duration, after which the call is automatically transferred from the UConnect® system to the mobile phone.
- An active call is automatically transferred to the mobile phone after the ignition key is switched to OFF.

UConnect® System Features

Language Selection
To change the language that the UConnect® system is using:

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say the name of the language you wish to switch to English, Espanol, or Francais.
- Continue to follow the system prompts to complete language selection.

After selecting one of the languages, all prompts and voice commands will be in that language.

NOTE: After every UConnect® language change operation, only the language-specific 32-name phonebook is usable. The paired phone name is not language-specific and usable across all languages.

Emergency Assistance
If you are in an emergency and the mobile phone is reachable:

- Pick up the phone and manually dial the emergency number for your area.

If the phone is not reachable and the UConnect® system is operational, you may reach the emergency number as follows:

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Emergency" and the UConnect® system will instruct the paired cellular phone to call the emergency number. This feature is supported in the U.S., Canada, and Mexico.

NOTE: The emergency number dialed is based on the country where the vehicle is purchased (911 for the U.S. and Canada and 060 for Mexico). The number dialed may not be applicable with the available cellular service and area.

The UConnect® system does slightly lower your chances of successfully making a phone call as to that for the cell phone directly.

Your phone must be turned on and paired to the UConnect® system to allow use of this vehicle feature in emergency situations, when the cell phone has network coverage and stays paired to the UConnect® system.

Towing Assistance
If you need towing assistance:

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Towing Assistance."

NOTE: The Towing Assistance number dialed is based on the country where the vehicle is purchased (1-800-528-2069 for the U.S., 1-877-213-4525 for Canada, 55-14-3454 for Mexico City and 1-800-712-3040 for outside Mexico City in Mexico).

Please refer to the 24-Hour "Towing Assistance" coverage details in the Warranty Information Booklet and on the 24–Hour Towing Assistance Card.

Paging
To learn how to page, refer to "Working with Automated Systems." Paging works properly except for pagers of certain companies, which time out a little too soon to work properly with the UConnect® system.

Voice Mail Calling
To learn how to access your voice mail, refer to "Working with Automated Systems."

Working with Automated Systems
This method is used in instances where one generally has to press numbers on the cellular phone keypad while navigating through an automated telephone system.

You can use your UConnect® system to access a voice mail system or an automated service, such as a paging service or automated customer service line. Some services require immediate response selection. In some instances, that may be too quick for use of the UConnect® system.

When calling a number with your UConnect® system that normally requires you to enter in a touch-tone sequence on your cellular phone keypad, you can press the "Voice Recognition" button and say the sequence you wish to enter, followed by the word "Send." For example, if required to enter your PIN followed with a pound, (3 7 4 6 #), you can press the "Voice Recognition" button and say, "3 7 4 6 # Send." Saying a number, or sequence of numbers, followed by "Send," is also to be used for navigating through an automated customer service center menu structure, and to leave a number on a pager.

You can also send stored UConnect® phonebook entries as tones for fast and easy access to voice mail and pager entries. To use this feature, dial the number you wish to call and then press the "Voice Recognition" button and say, "Send." The system will prompt you to enter the name or number and say the name of the phonebook entry you wish to send. The UConnect® system will then

send the corresponding phone number associated with the phonebook entry, as tones over the phone.

NOTE:

- You may not hear all of the tones due to cellular phone network configurations; this is normal.
- Some paging and voice mail systems have system time out settings that are too short and may not allow the use of this feature.

Barge In - Overriding Prompts

The "Voice Recognition" button can be used when you wish to skip part of a prompt and issue your voice recognition command immediately. For example, if a prompt is asking "Would you like to pair a phone, clear a...," you could press the "Voice Recognition" button and say, "Pair a Phone" to select that option without having to listen to the rest of the voice prompt.

Turning Confirmation Prompts On/Off

Turning confirmation prompts off will stop the system from confirming your choices (e.g., the UConnect® system will not repeat a phone number before you dial it).

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Setup Confirmations." The UConnect® system will play the current confirmation prompt status and you will be given the choice to change it.

Phone and Network Status Indicators

If available on the radio and/or on a premium display such as the instrument panel cluster, and supported by your cell phone, the UConnect® system will provide notification to inform you of your phone and network status when you are attempting to make a phone call using UConnect®. The status is given for roaming, network signal strength, phone battery strength, etc.

Dialing Using the Cellular Phone Keypad

You can dial a phone number with your cellular phone keypad and still use the UConnect® system (while dialing via the cell phone keypad, the user must exercise caution and take precautionary safety measures). By dialing a number with your paired Bluetooth® cellular phone, the audio will be played through your vehicle's audio system. The UConnect® system will work the same as if you dial the number using voice recognition.

NOTE: Certain brands of mobile phones do not send the dial ring to the UConnect® system to play it on the vehicle audio system, so you will not hear it. Under this situation, after successfully dialing a number the user may feel that the call did not go through even though the call is in progress. Once your call is answered, you will hear the audio.

Mute/Un-Mute (Mute Off)

When you mute the UConnect® system, you will still be able to hear the conversation coming from the other party, but the other party will not be able to hear you. In order to mute the UConnect® system:

- Press the "Voice Recognition" button.
- Following the beep, say "Mute."

In order to un-mute the UConnect® system:

- Press the "Voice Recognition" button.
- Following the beep, say "Mute off."

Advanced Phone Connectivity

Transfer Call to and from Cellular Phone

The UConnect® system allows ongoing calls to be transferred from your cellular phone to the UConnect® system without terminating the call. To transfer an ongoing call from your UConnect® paired cellular phone to the UConnect® system or vice versa, press the "Voice Recognition" button and say "Transfer Call."

Connect or Disconnect Link Between the UConnect® System and Cellular Phone

Your cellular phone can be paired with many different electronic devices, but can only be actively "connected" with one electronic device at a time.

If you would like to connect or disconnect the Bluetooth® connection between a UConnect® paired cellular phone and the UConnect® system, follow the instructions described in your cellular phone User's Manual.

List Paired Cellular Phone Names

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Setup Phone Pairing."
- When prompted, say "List Phones."
- The UConnect® system will play the phone names of all paired cellular phones in order from the highest to the lowest priority. To "select" or "delete" a paired phone being announced, press the "Voice Recognition" button and say "Select" or "Delete." Also, see the next two sections for an alternate way to "select" or "delete" a paired phone.

Select Another Cellular Phone

This feature allows you to select and start using another phone paired with the UConnect® system.

- Press the PHONE button to begin.

- After the "Ready" prompt and the following beep, say "Setup Select Phone" and follow the prompts.
- You can also press the "Voice Recognition" button at any time while the list is being played, and then choose the phone that you wish to select.
- The selected phone will be used for the next phone call. If the selected phone is not available, the UConnect® system will return to using the highest priority phone present in or near (approximately within 30 ft [9 m]) the vehicle.

Delete UConnect® Paired Cellular Phones

- Press the PHONE button to begin.
- After the "Ready" prompt and the following beep, say "Setup Phone Pairing."
- At the next prompt, say "Delete" and follow the prompts.
- You can also press the "Voice Recognition" button at any time while the list is being played, and then choose the phone you wish to delete.

Things You Should Know About Your UConnect® System

UConnect® Tutorial

To hear a brief tutorial of the system features, press the PHONE button and say "UConnect® Tutorial."

Voice Training

For users experiencing difficulty with the system recognizing their voice commands or numbers, the UConnect® system Voice Training feature may be used. To enter this training mode, follow one of the two following procedures:

From outside the UConnect® mode (e.g., from radio mode):

- Press and hold the "Voice Recognition" button for five seconds until the session begins, or,
- Press the "Voice Recognition" button and say the "Setup, Voice Training" command.

Repeat the words and phrases when prompted by the UConnect® system. For best results, the Voice Training session should be completed when the vehicle is parked with the engine running, all windows closed, and the blower fan switched OFF.

This procedure may be repeated with a new user. The system will adapt to the last trained voice only.

To restore the Voice Recognition system to factory default settings, enter the Voice Training session via the above procedure and follow the prompts.

Voice Recognition (VR)

- For best performance, adjust the rearview mirror to provide at least ½ in (1 cm) gap between the overhead console (if equipped) and the mirror.
- Always wait for the beep before speaking.
- Speak normally, without pausing, just as you would speak to a person sitting a few feet/meters away from you.
- Make sure that no one other than you is speaking during a voice recognition period.
- Performance is maximized under:
  - low-to-medium blower setting,
  - low-to-medium vehicle speed,
  - low road noise,
  - smooth road surface,

- fully closed windows,
- dry weather condition.

- Even though the system is designed for users speaking in North American English, French, and Spanish accents, the system may not always work for some.
- When navigating through an automated system such as voice mail, or when sending a page, at the end of speaking the digit string, make sure to say "Send."
- Storing names in the phonebook when the vehicle is not in motion is recommended.
- It is not recommended to store similar sounding names in the UConnect® phonebook.
- The UConnect® phonebook nametag recognition rate is optimized for the person who stored the name in the phonebook.
- You can say "O" (letter "O") for "0" (zero). "800" must be spoken "eight-zero-zero."
- Even though international dialing for most number combinations is supported, some shortcut dialing number combinations may not be supported.
- In a convertible vehicle, system performance may be compromised with the convertible top down.

Far End Audio Performance

- Audio quality is maximized under:
  - low-to-medium blower setting,
  - low-to-medium vehicle speed,
  - low road noise,
  - smooth road surface,
  - fully closed windows,

- dry weather conditions, and
- operation from the driver's seat.

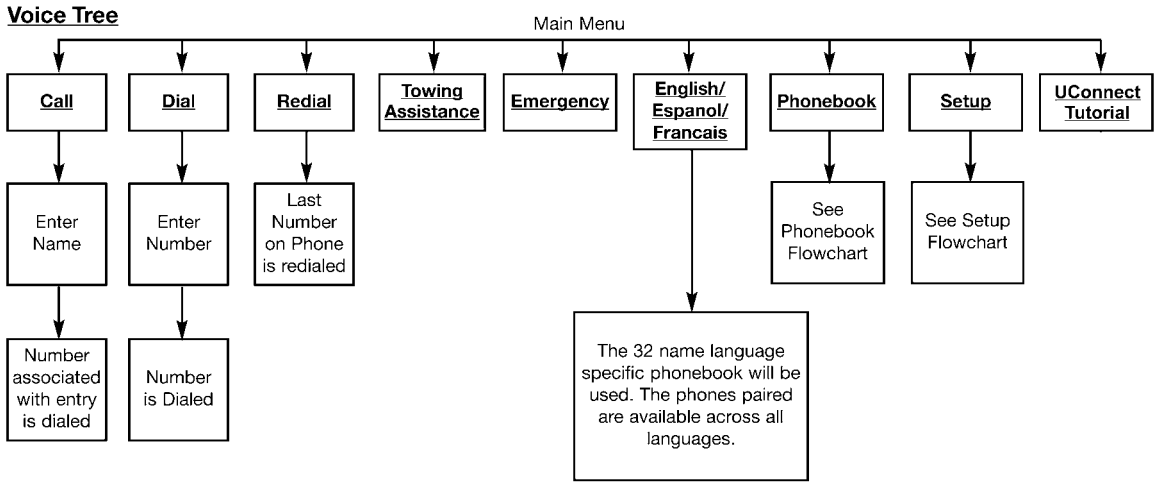
- Performance, such as audio clarity, echo, and loudness to a large degree rely on the phone and network, and not the UConnect® system.
- Echo at the far end can sometimes be reduced by lowering the in-vehicle audio volume.
- In a convertible vehicle, system performance may be compromised with the convertible top down.

Bluetooth® Communication Link

Cellular phones have been found to lose connection to the UConnect® system. When this happens, the connection can generally be re-established by switching the phone off/on. Your cell phone is recommended to remain in Bluetooth® ON mode.

Power-Up

After switching the ignition key from OFF to either ON or ACC position, or after a language change, you must wait at least five seconds prior to using the system.



Note: **Available Voice commands are shown in bold face and are underlined.**

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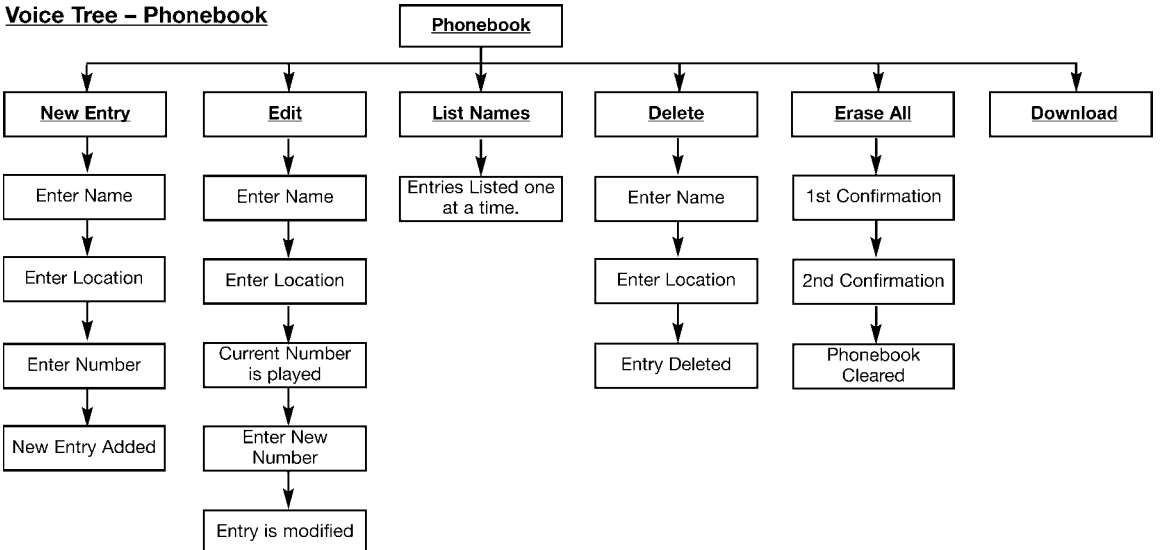

Note: Available Voice commands are shown in bold face and are underlined.

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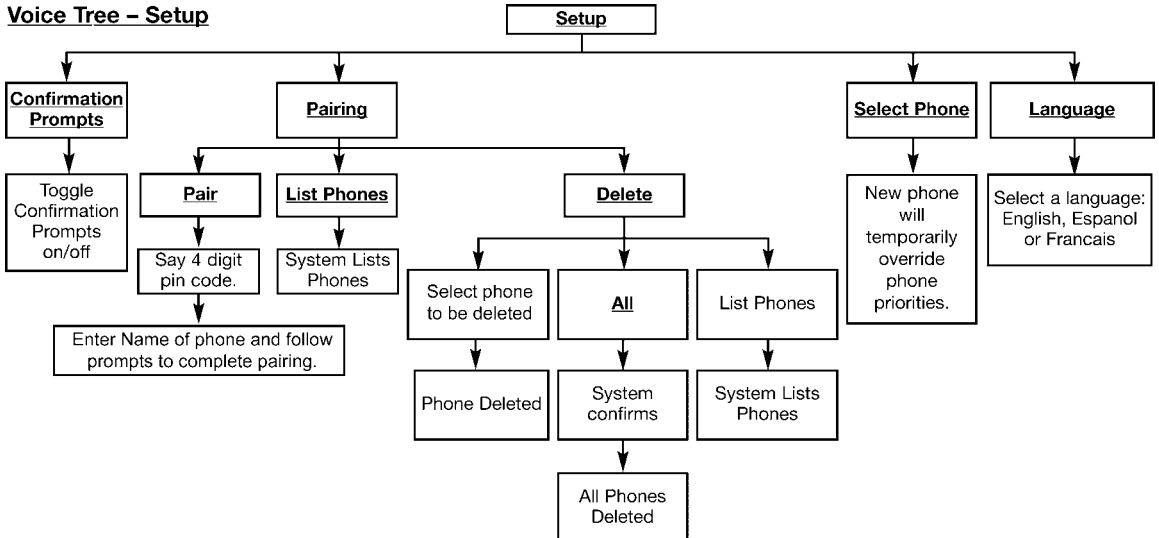
Voice Tree – Setup



Note: Available Voice commands are shown in bold face and are underlined. 819402e4

Voice Commands	
Primary	Alternate(s)
zero	
one	
two	
three	
four	
five	
six	
seven	
eight	
nine	
star (*)	
plus (+)	
pound (#)	
add location	
all	

Voice Commands	
Primary	Alternate(s)
call	
cancel	
confirmation prompts	
continue	
delete	
dial	
download	
edit	
emergency	
English	
erase all	
Espanol	
Francais	
help	
home	

Voice Commands	
Primary	Alternate(s)
language	
list names	
list phones	
mobile	
mute	
mute off	
new entry	
no	
pager	
pair a phone	
phone pairing	pairing
phonebook	phone book
previous	
record again	
redial	

Voice Commands	
Primary	Alternate(s)
return to main menu	return or main menu
select phone	select
send	
set up	phone settings or phone set up
towing assistance	
transfer call	
UConnect® Tutorial	
try again	
voice training	
work	
yes	

General Information

This device complies with Part 15 of the FCC rules and RSS 210 of Industry Canada. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

VOICE RECOGNITION SYSTEM — IF EQUIPPED

Voice Recognition System (VR) Operation

This Voice Recognition System allows you to control your AM, FM radio, satellite radio, disc player, and a memo recorder.

NOTE: In a stressful situation, take care to speak into the Voice Interface System as calmly and normally as possible. The ability of the Voice Interface System to recognize user voice commands may be negatively affected by rapid speaking or a raised voice level.

WARNING!

Any voice commanded system should be used only in safe driving conditions and all attention should be kept on the roadway ahead. Failure to do so may result in an accident causing serious injury or death.

When you press the VR hard-key, you will hear a beep. The beep is your signal to give a command.

NOTE: If you do not say a command within a few seconds, the system will present you with a list of options.

If you ever wish to interrupt the system while it lists options, press the VR hard-key, listen for the beep, and say your command.

Pressing the VR hard-key while the system is speaking is known as "barging in." The system will be interrupted and you can add or change commands. This will become helpful once you start to learn the options.

NOTE: At any time, you can say the words CANCEL, HELP, or MAIN MENU.

These commands are universal and can be used from any menu. All other commands can be used depending upon the active application.

For example, if you are in the disc menu and you are listening to FM radio, you can speak commands from the disc menu or from the FM radio menu.

When using this system, you should speak clearly and at a normal speaking volume.

The system will best recognize your speech if the windows are closed, and the heater/air-conditioning fan is set to low.

At any point, if the system does not recognize one of your commands, you will be prompted to repeat it.

To hear the first available Menu, press the VR hard-key and say HELP or MAIN MENU.

Commands

The Voice Recognition System understands two types of commands. Global commands are available at all times. Local commands are available if the supported radio mode is active.

Changing the Volume

1. Start a dialogue by pressing the VR hard-key.
2. Say a command (e.g., HELP).
3. Use the ON/OFF VOLUME rotary knob to adjust the volume to a comfortable level while the voice recognition system is speaking. Please note the volume setting for VR is different then the audio system.

Main Menu
Start a dialogue by pressing the VR hard-key. You may say MAIN MENU to switch to the main menu.

In this mode, you can say the following commands:

- RADIO (to switch to the radio mode)
- DISC (to switch to the disc mode)
- MEMO (to switch to the memo recorder)

Radio AM (or Radio Long Wave or Radio Medium Wave - if equipped)
To switch to the AM band say AM or RADIO AM. In this mode, you may say the following commands:

- FREQUENCY (to change the frequency)
- NEXT STATION (to select the next station)
- PREVIOUS STATION (to select the previous station)
- RADIO MENU (to switch to the radio menu)
- MAIN MENU (to switch to the main menu)

Radio FM
To switch to the FM band say FM or RADIO FM. In this mode, you may say the following commands:

- FREQUENCY (to change the frequency)
- NEXT STATION (to select the next station)
- PREVIOUS STATION (to select the previous station)
- RADIO MENU (to switch to the radio menu)
- MAIN MENU (to switch to the main menu)

Satellite Radio
To switch to satellite radio mode say SAT or SATELLITE RADIO. In this mode, you may say the following commands:

- CHANNEL NUMBER (to change the channel by its spoken number)

- NEXT CHANNEL (to select the next channel)
- PREVIOUS CHANNEL (to select the previous channel)
- LIST CHANNEL (to hear a list of available channels)
- SELECT NAME (to say the name of a channel)
- RADIO MENU (to switch to the radio menu)
- MAIN MENU (to switch to the main menu)

Disc

To switch to the disc mode say DISC. In this mode, you may say the following commands:

- TRACK (#) (to change the track)
- NEXT TRACK (to play the next track)
- PREVIOUS TRACK (to play the previous track)
- MAIN MENU (to switch to the main menu)

Memo

To switch to the voice recorder mode say MEMO. In this mode, you may say the following commands:

- NEW MEMO (to record a new memo) — During the recording you may press the VR hard-key to stop recording. You continue by saying one of the following commands:
  - SAVE (to save the memo)
  - CONTINUE (to continue recording)
  - DELETE (to delete the recording)
- PLAY MEMOS (to play previously recorded memos) — During the playback you may press the VR hard-key to stop playing memos. You continue by saying one of the following commands:
  - REPEAT (to repeat a memo)
  - NEXT (to play the next memo)

- PREVIOUS (to play the previous memo)
- DELETE (to delete a memo)

- DELETE ALL (to delete all memos)

NOTE: Keep in mind that you have to press the VR hard-key first and wait for the beep, before speaking the "barge in" commands.

Voice Training

For users experiencing difficulty with the system recognizing their voice commands or numbers, the UConnect® system Voice Training feature may be used.

1. Press the VR hard-key, speak "System Setup" and once you are in that menu then speak "Voice Training." This will train your own voice to the system and will improve recognition.

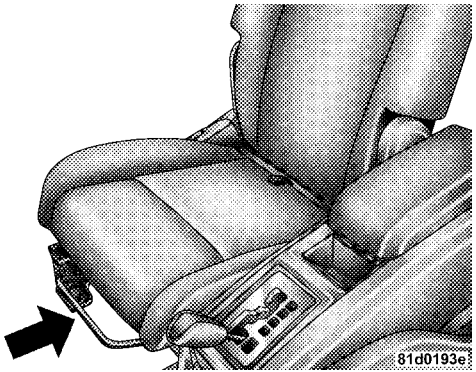
2. Repeat the words and phrases when prompted by the UConnect® System. For best results, the Voice Training session should be completed when the vehicle is parked, engine running, all windows closed, and the blower fan switched OFF. This procedure may be repeated with a new user. The system will adapt to the last trained voice only.

SEATS

Manual Front Seat Adjustments

Forward and Rearward Adjustment

The manual seat adjustment bar is at the front of the seat, near the floor. Pull the bar upward to move the seat forward or rearward. Release the bar once the seat is in the position desired. Then, using body pressure, move forward and rearward on the seat to be sure that the seat adjusters have latched.



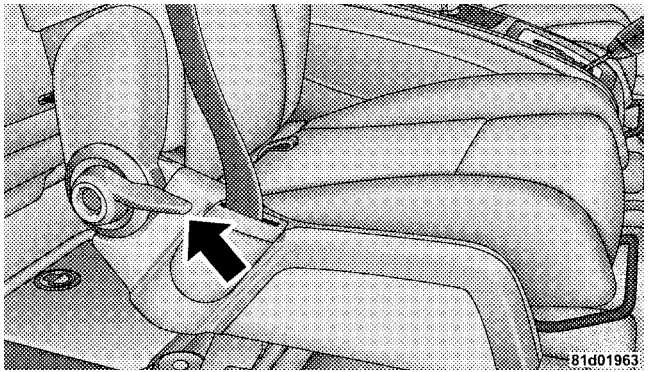
Manual Seat Adjustment

WARNING!

Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. The seat belt might not be adjusted properly and you could be injured. Adjust any seat only while the vehicle is parked.

Recliner Adjustment

The control lever is on the outboard side of the seat. To recline the seat, lean forward slightly and lift the lever. Then lean back to the position desired and release the lever. To return the seatback to its normal upright position, lean forward and lift the lever. Release the lever once the seatback is in the upright position.



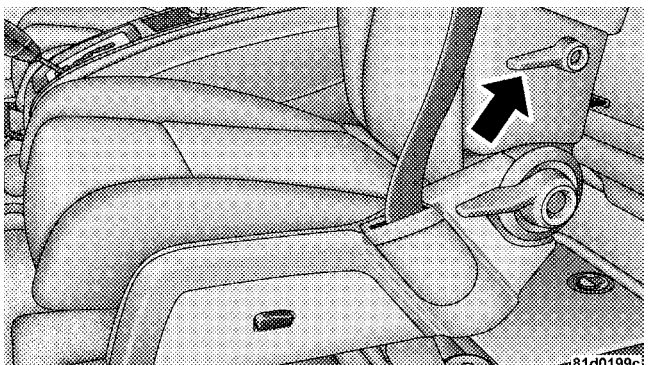
Seatback Release

WARNING!

- **Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. The seat belt might not be adjusted properly and you could be injured. Adjust the seat only while the vehicle is parked.**
- **Do not ride with the seatback reclined so that the shoulder belt is no longer resting against your chest. In a collision you could slide under the seat belt and be seriously or even fatally injured. Use the recliner only when the vehicle is parked.**

Lumbar Support — If Equipped

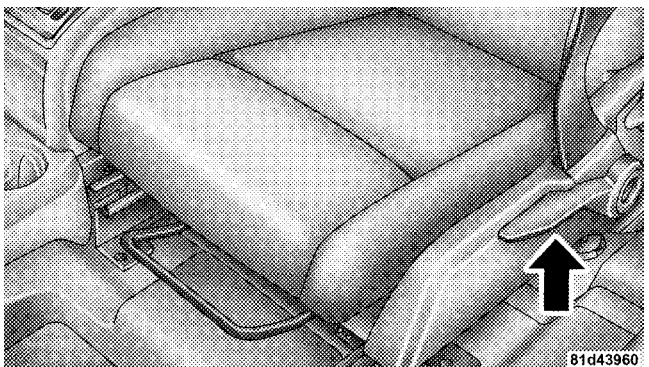
The control lever is on the outboard side of the seatback. Turn the control lever downward to increase the lumbar support or upward to decrease the lumbar support as desired.



Lumbar Control

Driver's Seat Height Adjustment — If Equipped

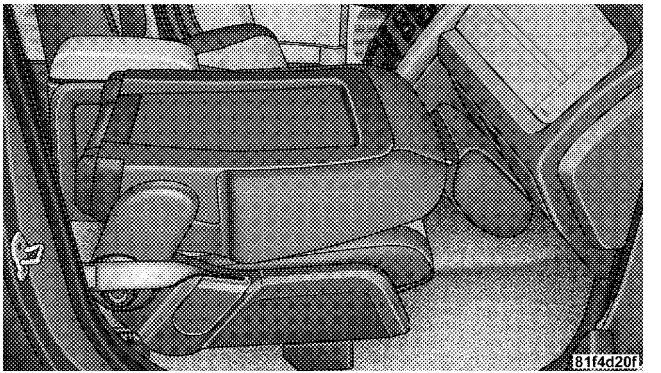
The control lever is located on the outboard side of the seat. Raise the lever to raise the seat. Lower the lever to lower the seat. The total seat travel is 2.15 in (55 mm).



Seat Height Adjustment Lever

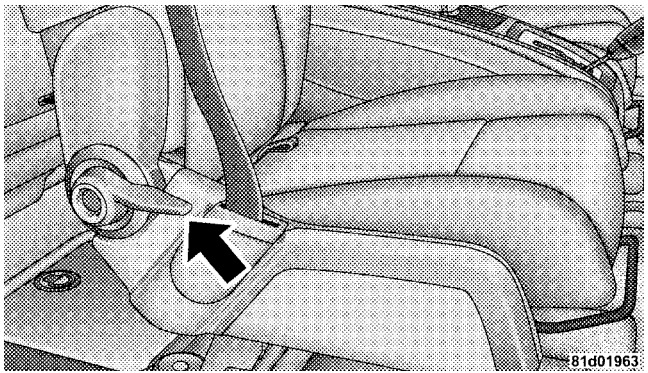
Fold Flat Front Passenger Seat — If Equipped

This feature allows for extended cargo space. When the seat is folded flat, it is an extension of the load floor surface (allowing long cargo to fit from the rear hatch up to the instrument panel). The fold-flat seatback also has a hardback surface that you can use as a work surface when the seat is folded flat and the vehicle is not in motion.



Fold Flat Seat

Pull upward on the lever to fold or unfold the seat.



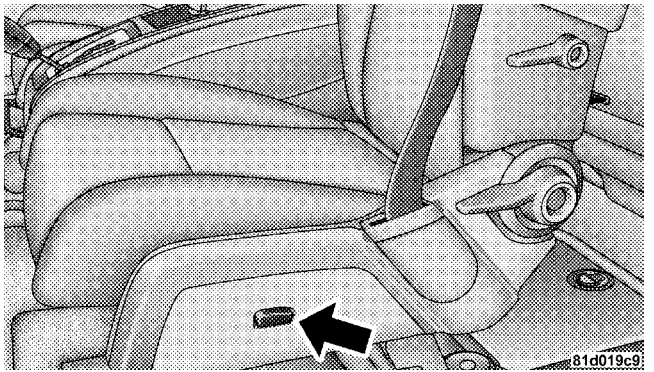
Seatback Release

WARNING!

Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. Adjust any seat only while the vehicle is parked.

Power Seat — If Equipped

The power seat switch is on the outboard side of the seat near the floor. Use this switch to move the seat up, down, forward, rearward, or to tilt the seat.



Power Seat Switch

CAUTION!

Do not place any article under any seat as it may cause damage to the seat controls.

WARNING!

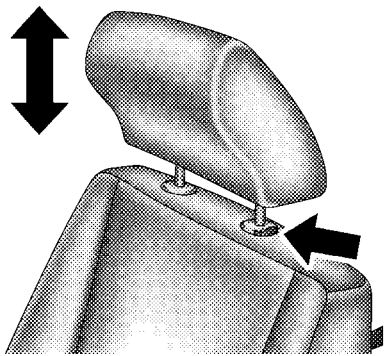
Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. The seat belt might not be adjusted properly and you could be injured. Adjust any seat only while the vehicle is parked.

Head Restraints

Head restraints can reduce the risk of whiplash injury in the event of impact from the rear.

Front Seats

Adjust the head restraints so that the upper edge is as high as practical. The left sleeve that the head restraint post slides through contains a lock release button. You can raise the head restraint without pressing this button. However, you must press this button to lower the head restraint.



Adjustable Head Restraint

To remove the head restraint, you must press the lock release button on the left sleeve and the right sleeve simultaneously. To reinstall the head restraint, insert the posts into the sleeves and push the head restraint downward until it locks in place. Then, if desired, press the button on the left sleeve and lower the head restraint.

WARNING!

- **Do not sit in a seat or allow a passenger to sit in a seat without having the head restraint installed and adjusted properly. Failure to follow this warning may result in personal injury to you or your passenger in the event of an accident.**
- **Do not leave a head restraint that is removed from a seat loose in the vehicle. A loose head restraint thrown forward in a collision or hard stop could endanger the occupants of the vehicle.**

Second Row Passenger Seats

These head restraints are non-adjustable and non-removable.

Third Row Passenger Seats — Seven Passenger Models

These head restraints are non-adjustable and non-removable. However, you can fold them forward when they are not in use by passengers. Refer to "50/50 Split Third-Row Passenger Seats with Fold-Flat Feature" for operating instructions.

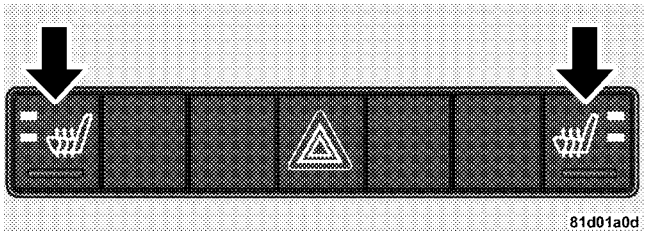
WARNING!

Do not allow a passenger to sit in a third row seat without having the head restraint unfolded and locked in place. Failure to follow this warning may result in personal injury to the passenger in the event of an accident.

Heated Seats — If Equipped

Heated seats provide comfort and warmth on cold days and can help soothe sore muscles and backs. The heaters provide the same heat level for both cushion and back. The driver's seat and front passenger's seat are heated.

The controls for each heater are located in the switch bank in the center of the instrument panel. After turning ON the ignition, you can choose from High, Low, or Off heat settings. Amber indicator lights in each switch indicate the level of heat in use. Two indicator lights will illuminate for high, one for low, and none for off.



Heated Seat Switch

Press the switch once to select high-level heating. Press the switch a second time to select low-level heating. Press the switch a third time to shut OFF the heating elements.

If high level heating is selected, the system automatically switches to low level heating and turns one indicator light off after 30 minutes of continuous operation. It will turn the heater and the remaining indicator light off after an additional 30 minutes of continuous operation. If low level heating is selected, the system automatically turns the heater and the indicator light off after 30 minutes of continuous operation.

NOTE: Once a heat setting is selected, heat will be felt within two to five minutes.

WARNING!

Persons who are unable to feel pain to the skin because of advanced age, chronic illness, diabetes, spinal cord injury, medication, alcohol use, exhaustion or other physical condition must exercise care when using the seat heater. It may cause burns even at low temperatures, especially if used for long periods. Do not place anything on the seat that insulates against heat, such as a blanket or cushion. This may cause the seat heater to overheat.

60/40 Split Second-Row Passenger Seats

To provide additional storage area, each second-row passenger seat can be folded flat. This allows for extended cargo space and still maintains some seating room if needed.

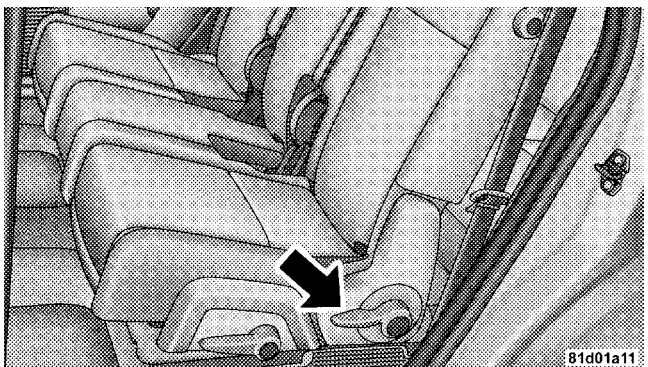
NOTE: Prior to folding the second-row passenger seat, make sure the front seatback is not in a reclined position. This will allow the seat to fold easily.

WARNING!

- **It is extremely dangerous to ride in a cargo area, inside or outside of a vehicle. In a collision, people riding in these areas are more likely to be seriously injured or killed.**
- **Do not allow people to ride in any area of your vehicle that is not equipped with seats and seat belts.**
- **Be sure everyone in your vehicle is in a seat and using a seat belt properly.**
- **On seven passenger models, do not allow a passenger to sit in a third row seat with the second row seatback(s) folded flat. In a collision, the passenger could slide underneath the seat belt and be seriously or even fatally injured.**

To Fold the Seat

1. Locate the control lever on the lower outboard side of the seat.



Seatback Release

2. Place one hand on the seatback and apply a gentle pressure.

3. Lift the control lever with the other hand, allow the seatback to move forward slightly, and then release the lever.

WARNING!

To prevent personal injury or damage to objects, keep your head, arms, and objects out of the folding path of the seatback.

4. Gently guide the seatback into the folded position.

To Unfold the Seat

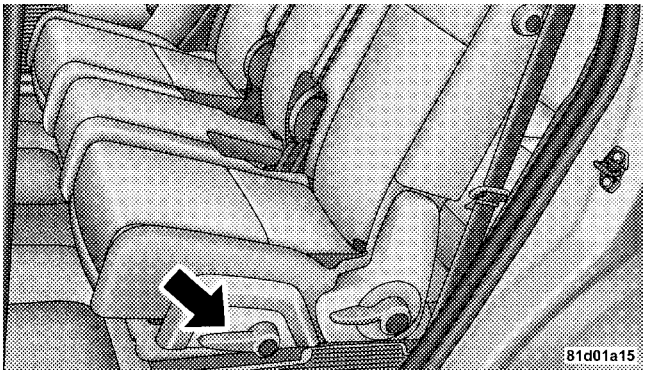
Raise the seatback and lock it in place.

WARNING!

Be certain that the seatback is locked securely into position. Otherwise, the seat will not provide the proper stability for child seats and/or passengers. An improperly latched seat could cause serious injury.

Forward and Rearward Adjustment

The control lever is on the outboard side of the seat. Lift the lever to move the seat forward or rearward. Release the lever once the seat is in the position desired. Then, using body pressure, move forward and rearward on the seat to be sure that the seat adjusters have latched.



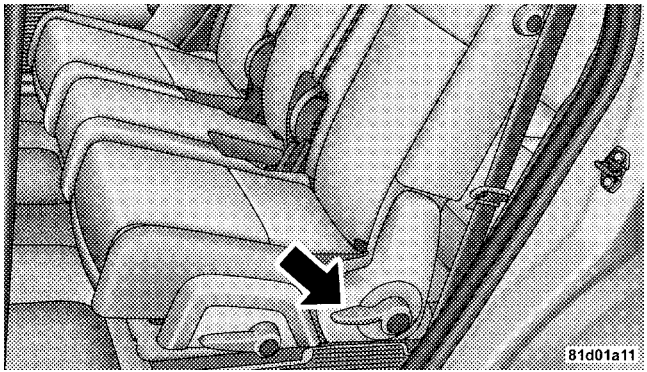
Manual Seat Adjustment

WARNING!

Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. The seat belt might not be adjusted properly and you could be injured. Adjust any seat only while the vehicle is parked.

Recliner Adjustment

The control lever is on the outboard side of the seat. To recline the seat, lean back, lift the lever, position the seatback as desired, and then release the lever. To return the seatback to its normal upright position, lean back, lift the lever, lean forward, and then release the lever once the seatback is in the upright position.



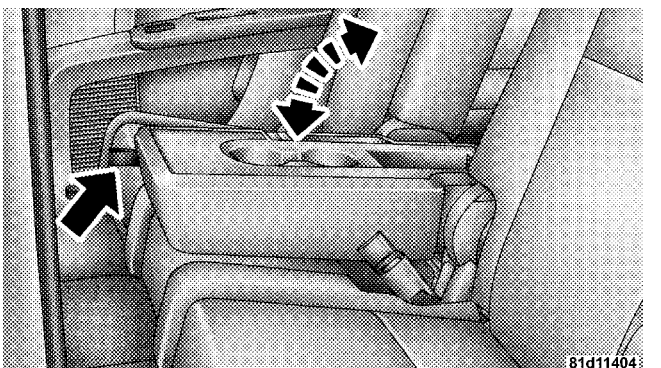
Seatback Release

WARNING!

- **Adjusting a seat while the vehicle is moving is dangerous. The sudden movement of the seat could cause you to lose control. The seat belt might not be adjusted properly and you could be injured. Adjust the seat only while the vehicle is parked.**
- **Do not ride with the seatback reclined so that the shoulder belt is no longer resting against your chest. In a collision you could slide under the seat belt and be seriously or even fatally injured. Use the recliner only when the vehicle is parked.**

20% Seatback/Armrest — Second Row Passenger Seat

The latch release-loop is located at the top of the 20% seatback/armrest. Pull the release-loop upward to release the latch and then downward to lower the 20% seatback/armrest.



Latch Release-Loop

Raise the 20% seatback/armrest and lock it in place when not in use or when additional seating area is required.

WARNING!

Keep the latch clean and free of objects and be certain that the seatback is locked securely into position. Otherwise, the seat will not provide the proper stability for child seats and/or passengers. An improperly latched seat could cause serious injury.

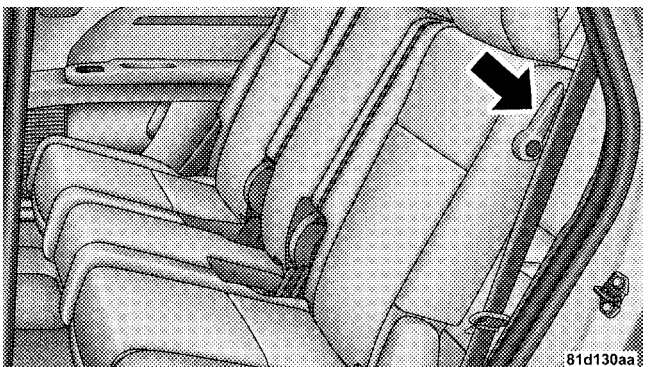
Stadium Tip 'n Slide™ (Easy Entry/Exit Seat) — Seven Passenger Models

This feature allows passengers to easily enter or exit the third-row passenger seats from either side of the vehicle.

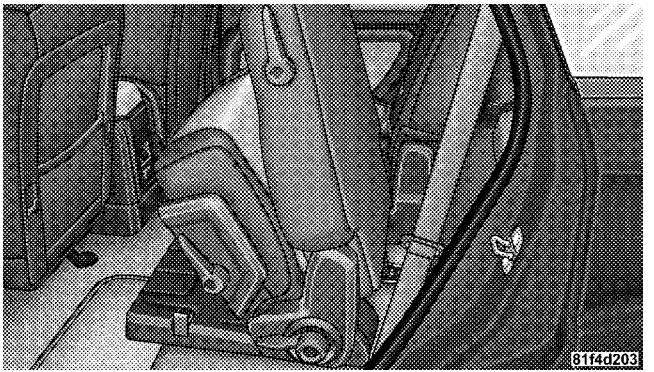
To Move the Second-Row Passenger Seat Forward

NOTE: Raise the 20% seatback/armrest before moving the 60% seat to allow for full seat travel.

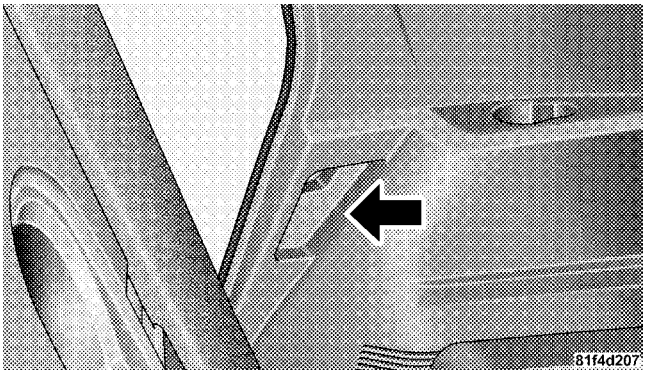
Move the control lever on the upper outboard side of the seatback forward, and in one fluid motion, the seat cushion flips upward and the seat moves forward on its tracks.



Tip 'n Slide™ Control Lever



Tip n Slide Seat™



Grab Handle

NOTE: A hand-grip is molded into the front of each quarter trim panel near the door opening to assist entry and exit from the third-row passenger seats.

WARNING!

Do not drive the vehicle with the seat in this position, as it is only intended for entering and exiting the third row seats. Failure to follow this warning may result in personal injury.

To Unfold and Move the Second-Row Passenger Seat Rearward

1. Move the seatback rearward until it locks in place and then continue sliding the seat rearward on its tracks until it locks in place.

2. Push the seat cushion downward to lock it in place.

3. Adjust the seat track position as desired. Then, using body pressure, move forward and rearward on the seat to be sure that the seat adjusters have latched.

WARNING!

Be certain that the seatback and seat are locked securely into position. Otherwise, the seat will not provide the proper stability for child seats and/or passengers. An improperly latched seat could cause serious injury.

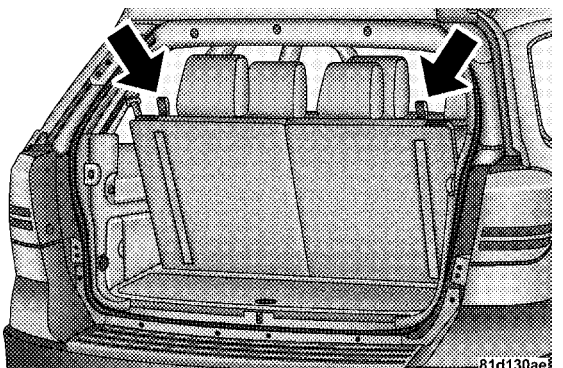
50/50 Split Third-Row Passenger Seats with Fold-Flat Feature — Seven Passenger Models

To provide additional storage area, each third-row passenger seat can be folded flat. This allows for extended cargo space and still maintains some rear seating room if needed.

NOTE: Prior to folding the third-row passenger seat, make sure the second-row passenger seat is not in a reclined position. This will allow the seat to fold easily.

To Fold the Seat

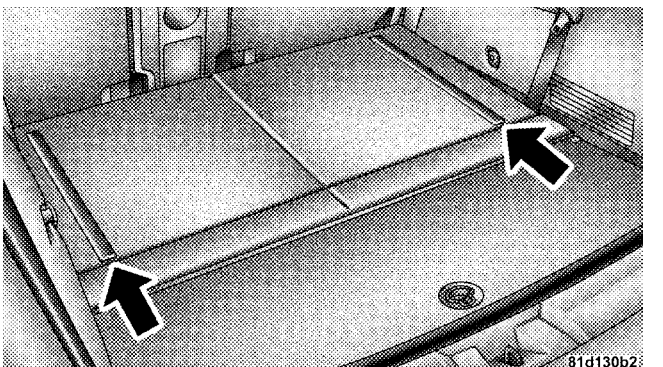
Pull the latch release-loop located at the top of the seatback upward, push the seat forward slightly, and release the release-loop. Then, continue to push the seat forward. The head restraints will fold automatically as the seat moves forward.



Seatback Release

To Unfold the Seat

Grasp the assist strap loop on the seatback and pull it toward you to raise the seatback. Continue to raise the seatback until it locks in place. Then, raise the head restraint to lock it in place.



Assist Strap

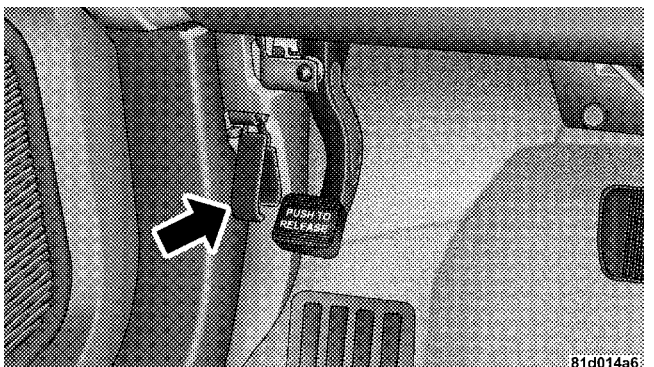
The seatback can also be locked in a reclined position. To do so, pull the latch release-loop located at the top of the seatback upward, allow the seatback to recline, and release the release-loop.

WARNING!

- **Be certain that the seatback is locked securely into position. Otherwise, the seat will not provide the proper stability for passengers. An improperly latched seat could cause serious injury.**
- **Do not allow a passenger to sit in a third row seat without having the head restraint unfolded and locked in place. Failure to follow this warning may result in personal injury to the passenger in the event of an accident.**
- **Do not allow a passenger to sit in a third row seat with the second row seatback(s) folded flat. In a collision, the passenger could slide underneath the seat belt and be seriously or even fatally injured.**

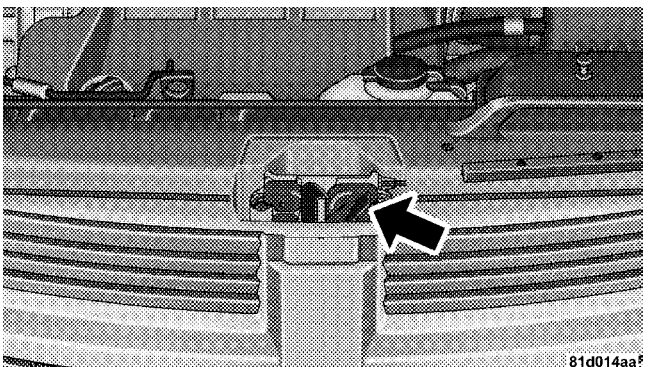
TO OPEN AND CLOSE THE HOOD

Two latches must be released to open the hood. First, pull the hood release lever located under the left side of the instrument panel.



Hood Release

Outside of the vehicle, locate the safety latch lever near the center of the grille between the grille and hood opening. Push the safety latch lever to the right and then raise the hood.



Underhood Safety Latch

Use the hood prop rod to secure the hood in the open position. Place the upper end of the prop rod in the hole on the underside of the hood.

Hood Prop Rod

To prevent possible damage:

- Before closing hood, make sure the hood prop rod is fully seated into its storage retaining clips.
- Do not slam the hood to close it. Use a firm downward push at the center front edge of the hood to ensure that both latches engage. Never drive your vehicle unless the hood is fully closed, with both latches engaged.

WARNING!

If the hood is not fully latched, it could fly up when the vehicle is moving and block your forward vision. Be sure all hood latches are fully latched before driving. Failure to follow this warning may lead to an accident resulting in serious injury or death.

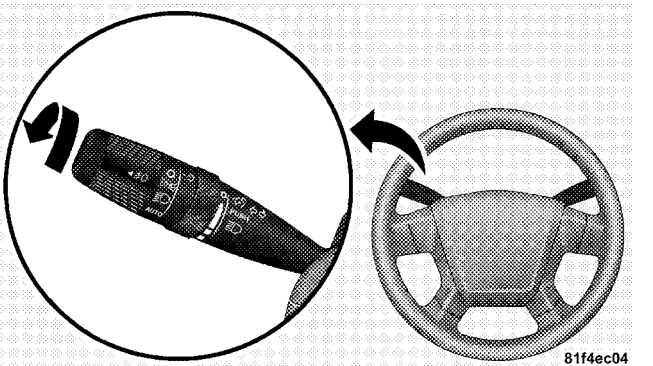
LIGHTS

Exterior and Interior Lighting Control

The multifunction lever on the left side of the steering column controls the operation of the headlights, parking lights, turn signal lights, instrument panel lights, instrument panel light dimming, interior lights, and fog lights (if equipped).

Headlights and Parking Lights

Turn the end of the multifunction lever to the first detent for parking light operation. Turn the end of the lever to the second detent for headlight operation.



Headlight Switch

Automatic Headlights — If Equipped

This system automatically turns the headlights on or off according to ambient light levels. To turn the system ON, turn the end of the multifunction lever to the AUTO position (third detent). When the system is on, the headlight time delay feature is also on. This means the headlights will stay on for up to 90 seconds after you turn the ignition switch to the LOCK position. To turn the Automatic System OFF, turn the end of the multifunction lever out of the AUTO position.

NOTE: The engine must be running before the headlights will turn on in the automatic mode.

Headlights with Wipers (Available with Auto Headlights Only)

When this feature is active, the headlights will turn on approximately 10 seconds after the wipers are turned ON if the multifunction lever is placed in the AUTO position. In addition, the headlights will turn off when the wipers are turned OFF if they were turned ON by this feature.

The Headlights with Wipers feature can be turned on or off through the Electronic Vehicle Information Center (EVIC) (if equipped). Refer to "Headlights With Wipers," under "Personal Settings (Customer Programmable Features)" under "Electronic Vehicle Information Center" in Section 4.

Headlight Time Delay — If Equipped

This feature is particularly useful when exiting your vehicle in an unlit area. It provides the safety of headlight illumination for up to 90 seconds after turning the ignition switch to the LOCK position.

To activate the delay, turn the ignition switch to the LOCK position while the headlights are still on. Then, turn OFF the headlights within 45 seconds. The delay interval begins when you turn OFF the headlights. Only the headlights will illuminate during this time.

If you turn the headlights, or parking lights, or ignition switch ON again, the system will cancel the delay.

If you turn the headlights OFF before the ignition, they will turn off in the normal manner.

The headlight delay time is programmable on vehicles equipped with the EVIC. Refer to "Headlight Off Delay," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center (EVIC)" in Section 4.

Daytime Running Lights (DRL) — If Equipped

The high beam headlights will turn on as Daytime Running Lights (DRL) and operate at DRL (lower) intensity, whenever the ignition is ON, the engine is running, the HEADLIGHT switch is off, the parking brake is off, the turn signal is off, and the shift lever is in any position except PARK.

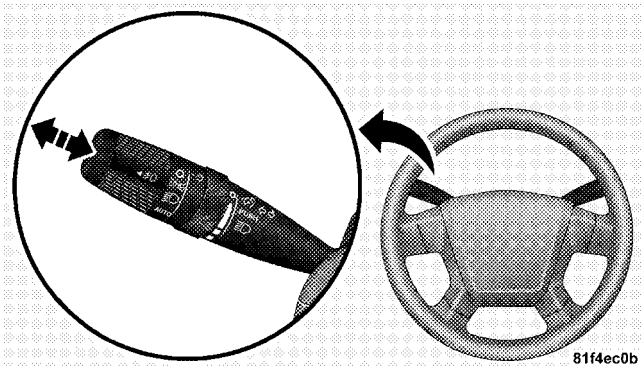
NOTE: The Daytime Running Lights will turn off automatically when the turn signal is in operation and turn on again when the turn signal is not operating.

Lights-On Reminder

If the headlights or parking lights are on after the ignition is turned to the LOCK position, a chime will sound to alert the driver when the driver's door is opened.

Fog Lights — If Equipped

To activate the front fog lights, turn ON the parking lights or the low beam headlights and pull out on the end of the multifunction lever.

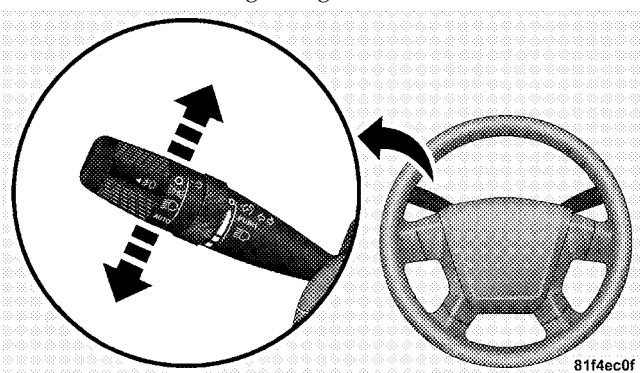


Front Fog Light

NOTE: The front fog lights will only operate with the headlights on low beam. Selecting high beam headlights will turn off the front fog lights.

Turn Signals

Move the multifunction lever upward or downward and the corresponding turn signal indicator on the instrument panel will flash to show proper operation of the front and rear turn signal lights.



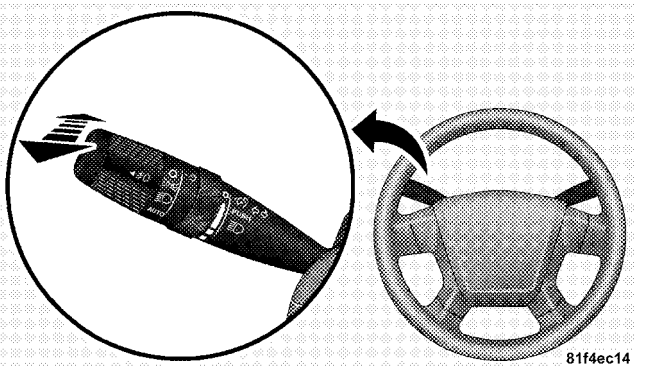
Turn Signal Control

You can signal a lane change by moving the lever upward or downward partially without moving beyond the detent.

NOTE: If either turn signal indicator has a very fast flash rate, check for an inoperative outside light bulb. If an indicator fails to light when the lever is moved, see your authorized dealer for service.

Highbeam/Lowbeam Select Switch

Push the multifunction lever away from you to switch the headlights to HIGH beam. Pull the Lever toward you, to switch the headlights back to LOW beam.



Highbeam Control

Flash to Pass

You can signal another vehicle with your headlights by lightly pulling the multifunction lever toward you. This will cause the headlights to turn on at high beam and remain on until the lever is released.

NOTE: If the multifunction lever is held in the Flash to Pass position for more than 15 seconds, the high beams will shut off. If this occurs, wait 30 seconds before activating the Flash to Pass function again.

Interior Lights

Courtesy/Reading Lights

Models with Overhead Console

These lights are mounted in the overhead console between the sun visors. They are also located in the headliner above the second row passenger seats. Press and release the lens to turn ON or turn OFF the light manually. These lights also turn on when you press the UNLOCK button on the Remote Keyless Entry (RKE) transmitter, open a door or the liftgate, or turn the Dimmer Control completely upward to the second detent. For models equipped with LED lighting, you can swivel the lens socket to direct the light as desired.

Models without Overhead Console

There are two courtesy/reading lights mounted in the headliner between the sun visors. Press and release the button next to the lens to turn ON or turn OFF the light manually. A courtesy light is also mounted in the headliner above the second row passenger seats. Press and release the lens to turn ON or turn OFF the light manually. These lights also turn on when you press the UNLOCK button on the RKE transmitter, open a door or the liftgate, or turn the Dimmer Control completely upward to the second detent.

Cargo Light

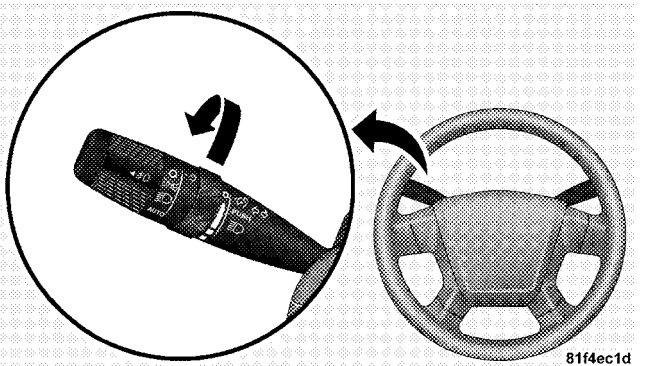
This light is mounted in the liftgate trim panel. It turns on when you press the UNLOCK button on the RKE transmitter, open a door or the liftgate, or turn the Dimmer Control completely upward to the second detent.

Battery Saver Feature

To protect the battery, the interior lights will turn off automatically within 10 minutes of turning the ignition switch to the LOCK position. This will occur if the interior lights were switched ON manually or are on because a door is open.

Dimmer Control

The Dimmer Control is part of the multifunction lever. It controls the operation of the interior lights and the brightness of the instrument panel lights.



Dimmer Control

Instrument Panel Dimming

With the parking lights or headlights on, rotate the Dimmer Control upward or downward to change the brightness of the instrument panel lights.

Parade Mode (Daytime Brightness Feature)
Rotate the Dimmer Control to the first detent to brighten the odometer and radio display when the parking lights or headlights are on during daylight conditions.

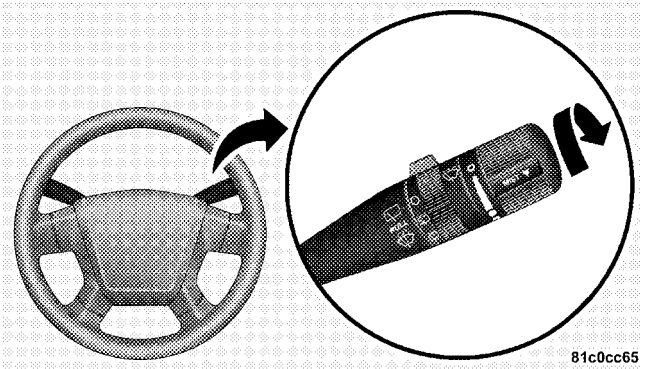
Interior Light ON
Rotate the Dimmer Control completely upward to the second detent to turn ON the interior lights.

NOTE: The Battery Saver feature will not activate until the ignition switch is in the LOCK position. Refer to "Battery Saver Feature" for additional information.

Interior Light Defeat OFF
Rotate the Dimmer Control completely downward to the (O) OFF position. The interior lights will remain off when the doors are open.

WINDSHIELD WIPERS AND WASHERS

The Windshield Wiper/Washer control lever is located on the right side of the steering column.



Windshield Wiper/Washer Lever

Rotate the end of the lever to the first detent past the intermittent settings for low speed wiper operation, or to the second detent past the intermittent settings for high speed wiper operation.

NOTE: The wipers will automatically return to the park position if you turn OFF the ignition switch while they are operating. The wipers will resume operation when you turn the ignition switch to the ON position again.

CAUTION!

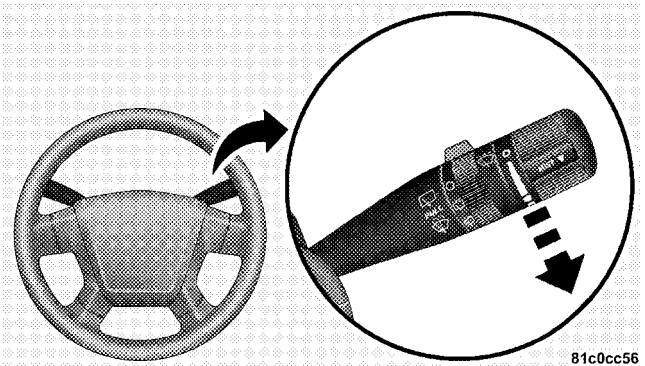
- **Turn the windshield wipers OFF when driving through an automatic car wash. Damage to the windshield wipers may result if the wiper control is left in any position other than OFF.**
- **In cold weather, always turn OFF the WIPER switch and allow the wipers to return to the park position before turning OFF the engine. If the WIPER switch is left ON and the wipers freeze to the windshield, damage to the wiper motor may occur when the vehicle is restarted.**
- **Always remove any buildup of snow that prevents the windshield wiper blades from returning to the park position. If the windshield wiper control is turned OFF and the blades cannot return to the park position, damage to the wiper motor may occur.**

Intermittent Wiper System

Use the intermittent wiper system when weather conditions make a single wiping cycle with a variable pause between cycles desirable. Rotate the end of the Windshield Wiper/Washer control lever to the first detent, and then turn the end of the lever to select the desired delay interval. There are five delay settings, which allow you to regulate the wipe interval from a minimum of two cycles every second to a maximum of approximately 36 seconds between cycles or from a minimum of one cycle every second to a maximum of approximately 18 seconds between cycles at vehicle speeds greater than 10 mph (16 km/h).

Mist Feature

Push downward on the Windshield Wiper/Washer control lever to activate a single wipe cycle to clear the windshield of road mist or spray from a passing vehicle. The wipers will continue to operate until you release the lever.



Mist Control

Headlights with Wipers (Available with Auto Headlights Only)

When this feature is active, the headlights will turn on approximately 10 seconds after the wipers are turned ON if the multifunction lever (on the left side of the steering column) is placed in the (A) AUTO position. In addition, the headlights will turn off when the wipers are turned OFF if they were turned ON by this feature.

The Headlights with Wipers feature can be turned on or off through the Electronic Vehicle Information Center (EVIC) (if equipped). Refer to "Headlights With Wipers," under "Personal Settings (Customer Programmable Features)," under "Electronic Vehicle Information Center" in Section 4.

Windshield Washers

To use the washer, pull the Windshield Wiper/Washer control lever toward you and hold it for as long as washer spray is desired.

If you activate the washer while the wiper control is in the delay range, the wipers will operate in low speed for two wipe cycles after releasing the lever and then resume the intermittent interval previously selected.

If you activate the washer while the wiper control is in the OFF position, the wipers will operate for two wipe cycles and then turn OFF.

WARNING!

Sudden loss of visibility through the windshield could lead to an accident. You might not see other vehicles or other obstacles. To avoid sudden icing of the windshield during freezing weather, warm the windshield with the defroster before and during windshield washer use.

Adding Washer Fluid

NOTE: Refer to the "Engine Compartment" diagram in Section 7 for the location of the washer fluid reservoir.

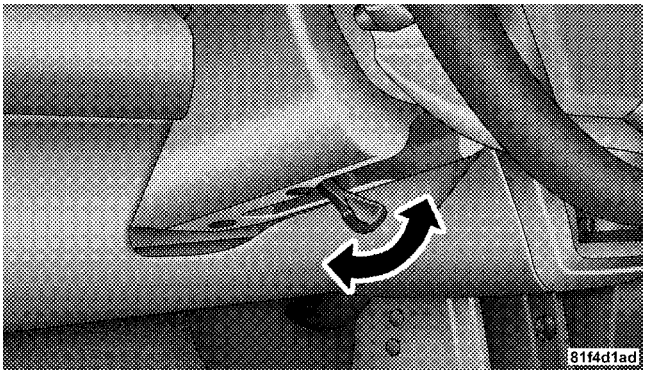
The fluid reservoir for the windshield washers is located in the engine compartment. Be sure to check the fluid level in the reservoir at regular intervals. Fill the reservoir with windshield washer solvent (not radiator antifreeze) and operate the system for a few seconds to flush out the residual water.

WARNING!

Commercially available windshield washer solvents are flammable. They could ignite and burn you. Care must be exercised when filling or working around the washer solution.

TILT/TELESCOPING STEERING COLUMN — IF EQUIPPED

This feature allows you to tilt the steering column upward or downward. It also allows you to lengthen or shorten the steering column. The tilt/telescoping control handle is located below the steering wheel at the end of the steering column.



Tilt/Telescoping Steering Wheel Lock

To unlock the steering column, push the control handle downward. To tilt the steering column, move the steering wheel upward or downward as desired. To lengthen or shorten the steering column, pull the steering wheel outward or push it inward as desired. To lock the steering column in position, pull the control handle upward until fully engaged.

WARNING!

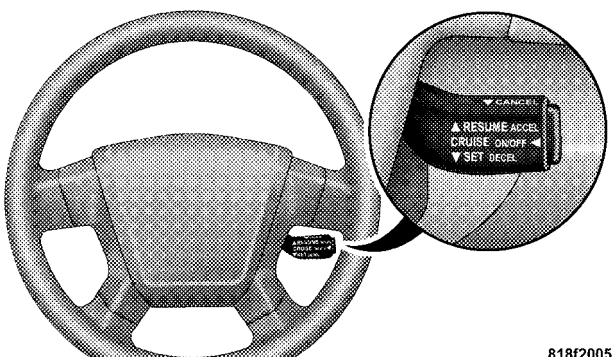
Do not adjust the steering wheel while driving. The tilt/telescoping adjustment must be locked while driving. Adjusting the steering wheel while driving or driving without the tile/telescoping adjustment locked could cause the driver to lose control of the vehicle. Failure to follow this warning may result in serious injury or death.

ELECTRONIC SPEED CONTROL — IF EQUIPPED

When engaged, this device takes over the accelerator operation at speeds greater than 25 mph (40 km/h).

Electronic Speed Control Operation

The speed control lever is located on the right side of the steering wheel.



Speed Control Lever

To Activate

Push and release the ON/OFF button located on the end of the speed control lever. The Cruise Indicator Light in the instrument cluster will illuminate. To turn the system OFF, push and release the ON/OFF button a second time. The Cruise Indicator Light will turn off. Be sure to turn the system OFF when not in use.

NOTE:

- The Electronic Speed Control System will automatically turn off when the engine is turned OFF.
- The Electronic Speed Control System is designed to shut down if you operate multiple speed control switch-functions simultaneously (i.e., Set and Cancel). If this occurs, push and release the ON/OFF button to reactivate the system and then reestablish the desired Set speed.

WARNING!

Leaving the Electronic Speed Control system on when not in use is dangerous. You could accidentally set the system or cause it to go faster than you want. You could lose control and have an accident. Always leave the system OFF when you are not using it.

To Set At A Desired Speed

When the vehicle reaches the speed desired, press downward on the lever to SET DECEL and release. Release the accelerator pedal and the vehicle will operate at the selected speed.

NOTE:

- The vehicle must be traveling at least 25 mph (40 km/h) for the speed control to set.
- The vehicle should be traveling at a steady speed and on level ground before pressing the lever to SET DECEL.

To Deactivate

A soft tap on the brake pedal, or pulling the speed control lever toward you to CANCEL, or normal brake pressure while slowing the vehicle will deactivate the speed control without erasing the set speed from memory. Pressing the ON/OFF button or turning OFF the ignition erases the set speed from memory.

To Resume Speed

If you deactivate the speed control without erasing the set speed from memory and your vehicle speed is above 20 mph (32 km/h) you can resume the previous set speed. To do so, push the lever upward to RESUME ACCEL and release, and then remove your foot from the accelerator pedal.

To Vary the Speed Setting

When the speed control is set, you can increase speed by pushing up and holding the lever in RESUME ACCEL. Release the lever when the desired speed is reached, and the new set speed will be established.

Tapping RESUME ACCEL once will result in a 1 mph (1.6 km/h) speed increase. Each time the lever is tapped, speed increases so that tapping the lever three times will increase speed by 3 mph (5 km/h), etc.

To decrease speed while the speed control is set, push downward and hold the lever in SET DECEL. Release the lever when the desired speed is reached, and the new set speed will be established.

Tapping SET DECEL once will result in a 1 mph (1.6 km/h) speed decrease. Each time the lever is tapped, speed decreases.

To Accelerate For Passing

Depress the accelerator pedal as you would normally. When the pedal is released, the vehicle will return to the set speed.

Using Speed Control on Hills

NOTE: The speed control system maintains speed up and down hills. A slight speed change on moderate hills is normal.

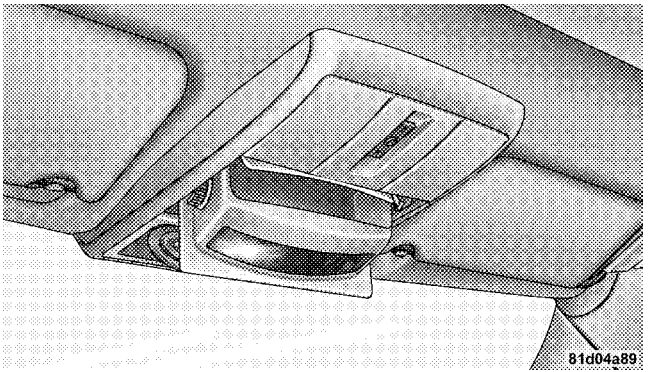
On steep hills, a greater speed loss or gain may occur so it may be preferable to drive without speed control.

WARNING!

Speed Control can be dangerous where the system can't maintain a constant speed. Your vehicle could go too fast for the conditions, and you could lose control. An accident could be the result. Don't use Speed Control in heavy traffic or on roads that are winding, icy, snow-covered, or slippery.

OVERHEAD CONSOLE

The overhead console contains courtesy/reading lights, storage for sunglasses, an interior observation mirror, and an optional power sunroof switch.



Overhead Console

Courtesy/Reading Lights

Refer to "Courtesy/Reading Lights" under "Lights" in Section 3.

Sunglasses Storage

To access the storage compartment, press on the raised bars on the compartment door in the center of the console and release and the door will swing downward.

Interior Observation Mirror

The convex interior observation mirror provides the driver and front seat passenger a wide field of view to conveniently view passengers sitting in the rear passenger seats. To use the interior observation mirror, first, press on the raised bars on the compartment door and release. The door will swing downward. Then, raise the door until it is almost closed and release. The door will latch in position to use the interior observation mirror.

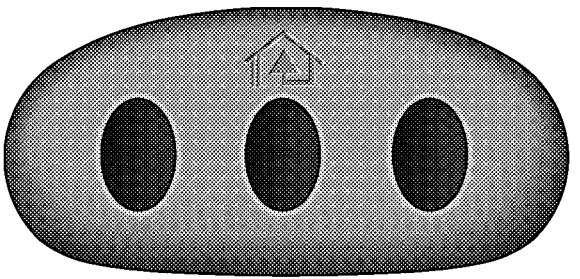
Power Sunroof Switch — If Equipped

Refer to "Power Sunroof" in Section 3.

GARAGE DOOR OPENER — IF EQUIPPED

HomeLink® replaces up to three remote controls (hand-held transmitters) that operate devices such as garage door openers, motorized gates, lighting, or home security systems. The HomeLink® unit operates off your vehicle's battery.

The HomeLink® buttons that are located in the sun visor designate the three different HomeLink® channels.



HomeLink® Buttons

NOTE: HomeLink® is disabled when the Vehicle Security Alarm is active.

WARNING!

Your motorized door or gate will open and close while you are training the Universal Transceiver. Do not train the transceiver if people or pets are in the path of the door or gate. Only use this transceiver with a garage door opener that has a "stop and reverse" feature as required by Federal safety standards. This includes most garage door opener models manufactured after 1982. Do not use a garage door opener without these safety features. Call toll-free 1–800–355–3515 or, on the Internet at www.HomeLink.com for safety information or assistance.

WARNING!

Vehicle exhaust contains carbon monoxide, a dangerous gas. Do not run your vehicle in the garage while training the transceiver. Exhaust gas can cause serious injury or death.

Programming HomeLink®

Before You Begin

If you have not trained any of the HomeLink® buttons, erase all channels before you begin training.

To do this, press and hold the two outside buttons for 20 seconds until the red indicator flashes.

It is recommended that a new battery be placed in the hand-held transmitter of the device being programmed to HomeLink® for more efficient training and accurate transmission of the radio-frequency signal.

Your vehicle should be parked outside of the garage when programming.

1. Turn the ignition switch to the ON/RUN position.

2. Hold the battery side of the hand-held transmitter away from the HomeLink® button you wish to program.

Place the hand-held transmitter 1–3 in (3-8 cm) away from the HomeLink® button you wish to program while keeping the indicator light in view.

3. Simultaneously press and hold both the chosen HomeLink® button and the hand-held transmitter button until the HomeLink® indicator changes from a slow to a rapidly blinking light, then release both the HomeLink® and hand-held transmitter buttons.

Watch for the HomeLink® indicator to change flash rates. When it changes, it is programmed. It may take up to 30 seconds, or longer in rare cases. The garage door may open and close while you train.

NOTE:

- Some gate operators and garage door openers may require you to replace Step 3 with procedures noted in the "Gate Operator/Canadian Programming" section.
- After training a HomeLink® channel, if the garage door does not operate with HomeLink® and the garage door opener was manufactured after 1995, the garage door opener may have a rolling code. If so, proceed to the heading "Programming A Rolling Code System."

4. Press and hold the just-trained HomeLink® button and observe the indicator light.

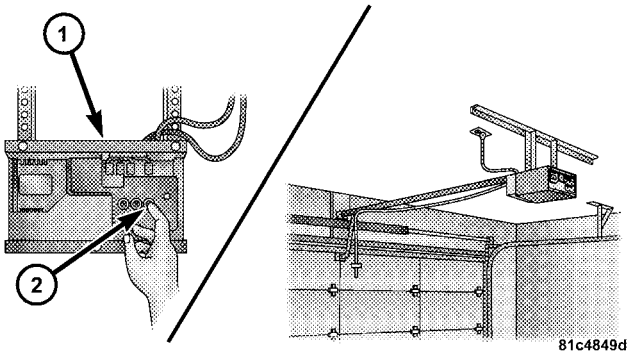
If the indicator light stays on constantly, programming is complete and the garage door (or device) should activate when the HomeLink® button is pressed.

If the indicator light blinks rapidly for two seconds, and then turns to a constant light, continue with programming for a Rolling Code.

5. PROGRAMMING A ROLLING CODE SYSTEM

At the garage door opener motor (in the garage), locate the "Learn" or "Training" button.

This can usually be found where the hanging antenna wire is attached to the garage door opener motor (it is NOT the button normally used to open and close the door).



1 — Garage Door Opener 2 — Training Button

6. Firmly press and release the "Learn" or "Training" button. The name and color of the button may vary by manufacturer.

NOTE: There are 30 seconds in which to initiate the next step after the "Learn" button has been pressed.

7. Return to the vehicle and press the programmed HomeLink® button twice (holding the button for two seconds each time). If the device is plugged in and activates, programming is complete.

If the device does not activate, press the button a third time (for two seconds) to complete the training.

If you have any problems, or require assistance, please call toll-free 1–800–355–3515 or, on the Internet at www.HomeLink.com for information or assistance.

To program the remaining two HomeLink® buttons, repeat each step for each remaining button. DO NOT erase the channels.

Gate Operator/Canadian Programming

Canadian radio-frequency laws require transmitter signals to "time-out" (or quit) after several seconds of transmission – which may not be long enough for HomeLink® to pick up the signal during programming.

Similar to this Canadian law, some U.S. gate operators are designed to "time-out" in the same manner.

It may be helpful to unplug the device during the cycling process to prevent possible overheating of the garage door or gate motor.

If you are having difficulties programming a garage door opener or a gate operator, replace "Programming HomeLink®" Step 3 with the following:

3. Continue to press and hold the HomeLink® button while you press and release - every two seconds ("cycle") your hand-held transmitter until HomeLink® has successfully accepted the frequency signal. The indicator light will flash slowly and then rapidly when fully trained.

If you unplugged the device for training, plug it back in at this time.

Then proceed with Step 4 under "Programming HomeLink®" earlier in this section.

Using HomeLink®

To operate, simply press and release the programmed HomeLink® button. Activation will now occur for the trained device (i.e., garage door opener, gate operator, Security system, entry door lock, home/office lighting, etc. The hand-held transmitter of the device may also be used at any time.

Reprogramming A Single HomeLink® Button

To re-program a channel that has been previously trained, follow these steps:

1. Turn the ignition switch to the ON/RUN position.

2. Press and hold the desired HomeLink® button until the indicator light begins to flash after 20 seconds. **Do not release the button.**

3. **Without releasing the button,** proceed with Programming Homelink® Step 2 and follow all remaining steps.

Security

It is advised to erase all channels before you sell or turn in your vehicle.

To do this, press and hold the two outside buttons for 20 seconds until the red indicator flashes. Note that all channels will be erased. Individual channels cannot be erased.

The HomeLink® Universal Transceiver is disabled when the Vehicle Security Alarm is active.

Troubleshooting Tips

If you are having trouble programming HomeLink®, here are some of the most common solutions:

- Replace the battery in the original transmitter.
- Press the "Learn" button on the Garage Door Opener to complete the training for a Rolling Code.
- Did you unplug the device for training, and remember to plug it back in?

If you have any problems, or require assistance, please call toll-free 1–800–355–3515 or, on the Internet at www.HomeLink.com for information or assistance.

General Information

This device complies with FCC rules Part 15 and Industry Canada RSS-210. Operation is subject to the following two conditions:

1. This device may not cause harmful interference

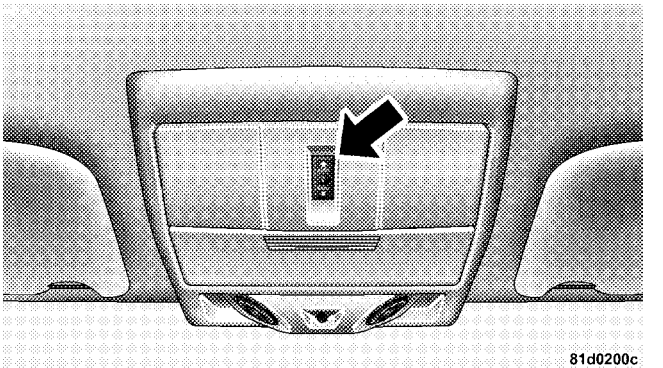
2. This device must accept any interference that may be received including interference that may cause undesired operation

NOTE: The transmitter has been tested and it complies with FCC and IC rules. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the device.

The term IC before the certification/registration number only signifies that Industry Canada technical specifications were met.

POWER SUNROOF — IF EQUIPPED

The power sunroof switch is located between the sun visors on the overhead console.



Power sunroof Switch

WARNING!

- **Never leave children in a vehicle, with the key in the ignition switch. Occupants, particularly unattended children, can become entrapped by the power sunroof while operating the power sunroof switch. Such entrapment may result in serious injury or death.**
- **In an accident, there is a greater risk of being thrown from a vehicle with an open sunroof. You could also be seriously injured or killed. Always fasten your seat belt properly and make sure all passengers are also properly secured.**
- **Do not allow small children to operate the sunroof. Never allow fingers or other body parts, or any object to project through the sunroof opening. Injury may result.**

Opening Sunroof - Manually

Press and hold the switch in the rearward position. Release the switch when the sunroof is in the position desired and it will stop moving. If you continue to hold the switch in the rearward position, the sunroof will open fully and then stop automatically. Release the switch once the sunroof stops moving.

Opening Sunroof - Express

Press the switch rearward and release, and the sunroof will open automatically from any position. The sunroof will open fully and then stop automatically. This is called Express Open. During Express Open operation, any movement of the sunroof switch will stop the sunroof.

Closing Sunroof - Manually

Press and hold the switch in the forward position. Release the switch when the sunroof is in the position desired and it will stop moving. If you continue to hold

the switch in the forward position, the sunroof will close fully and then stop automatically. Release the switch once the sunroof stops moving.

Closing Sunroof - Express

Press the switch forward and release, and the sunroof will close automatically from any position. The sunroof will close fully and stop automatically. This is called Express Close. During Express Close operation, any movement of the sunroof switch will stop the sunroof.

Pinch Protect Feature

This feature will detect an obstruction in the opening of the sunroof during Express Close operation. If an obstruction in the path of the sunroof is detected, the sunroof will automatically retract. Remove the obstruction if this occurs. Next, press the switch forward and release to Express Close.

Pinch Protect Override

If a known obstruction (ice, debris, etc.) prevents closing, press the switch forward and hold for two seconds after the reversal occurs. This allows the sunroof to move towards the closed position.

NOTE: Pinch protection is disabled while the switch is pressed.

Venting Sunroof - Express

Press and release the ″V″ button in the center of the switch, and the sunroof will open to the vent position. This is called Express Vent, which operates regardless of sunroof position. During Express Vent operation, any movement of the sunroof switch will stop the sunroof.

Sunshade Operation

The sunshade can be opened manually. However, the sunshade will open automatically as the sunroof opens.

NOTE: The sunshade cannot be closed if the sunroof is open.

Wind Buffeting

Wind buffeting can be described as the perception of pressure on the ears or a helicopter type sound in the ears. Your vehicle may exhibit wind buffeting with the windows down, or the sunroof in certain open or partially open positions. This is a normal occurrence and can be minimized. If the buffeting occurs with the rear windows open, then open the front and rear windows together to minimize the buffeting. If the buffeting occurs with the sunroof open, then adjust the sunroof opening to minimize the buffeting or open any window.

Sunroof Maintenance

Use only a non-abrasive cleaner and a soft cloth to clean the glass panel.

Ignition Off Operation

For vehicles not equipped with the Electronic Vehicle Information Center (EVIC), the power sunroof switch will remain active for 45 seconds after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature.

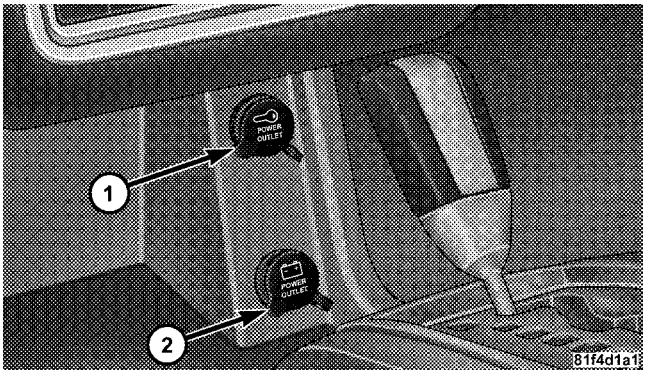
For vehicles equipped with the EVIC, the power sunroof switch will remain active for up to 10 minutes after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature. The time is programmable. Refer to “Key-Off Power Delay,” under “Personal Settings (Customer Programmable Features),” under “Electronic Vehicle Information Center (EVIC)” in Section 4.

Sunroof Fully Closed

Press the switch forward and release to ensure that the sunroof is fully closed.

ELECTRICAL POWER OUTLETS

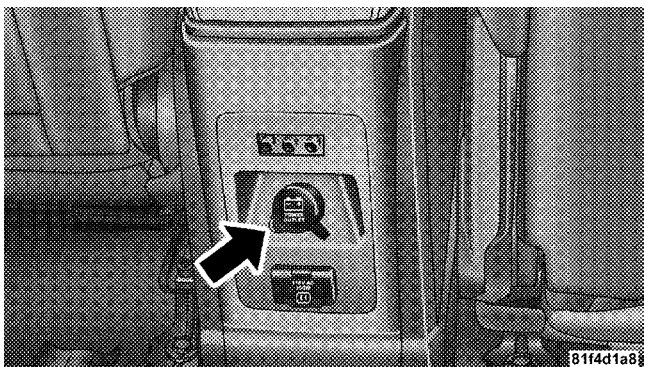
There are two fused 12-Volt power outlets located in the center console below the radio. The outlet on the top has power available when the ignition switch in the ON or ACC position. The outlet on the bottom has power available when the ignition switch is in the LOCK, ON, or ACC position.



Front Power Outlets

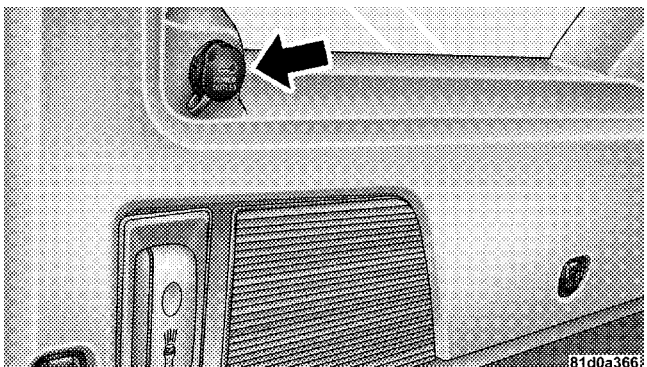
1 — Switched Power
2 — Battery Power

A third fused 12-Volt power outlet is located on the back of the center console. This outlet has power available when the ignition switch is in the LOCK, ON or ACC position.



Rear Power Outlet

A fourth fused 12-Volt power outlet is located on the left quarter trim panel in the cargo area. This outlet has power available when the ignition switch is in the ON or ACC position.



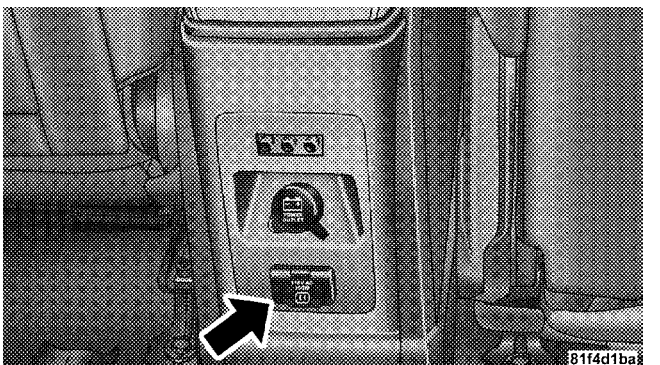
Electrical Outlet Use With Engine Off

CAUTION!

- **Many accessories that can be plugged in draw power from the vehicle's battery, even when not in use (i.e., cellular phones, etc.). Eventually, if plugged in long enough, the vehicle's battery will discharge sufficiently to degrade battery life and/or prevent engine starting.**
- **Accessories that draw higher power (i.e., coolers, vacuum cleaners, lights, etc.) will degrade the battery even more quickly. Only use these intermittently and with greater caution.**
- **After the use of high power draw accessories, or long periods of the vehicle not being started (with accessories still plugged in), the vehicle must be driven a sufficient length of time to allow the alternator to recharge the vehicle's battery.**
- **Power outlets are designed for accessory plugs only. Do not hang any type of accessory or accessory bracket from the plug.**

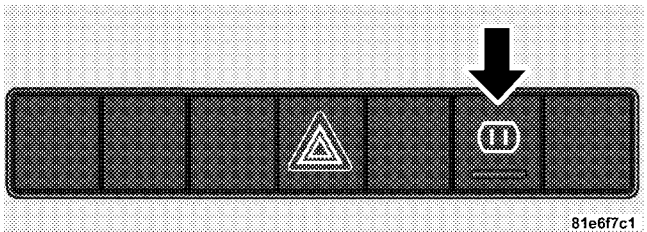
POWER INVERTER — If EQUIPPED

Your vehicle may be equipped with a 115 Volt AC (150 Watt maximum) power outlet located on the back of the center console. This outlet can power small appliances and electronic devices.



Power Inverter

The control switch for the outlet is located in the switch bank above the climate control.



Power Inverter Switch

Press and release the switch once to turn ON the power outlet. A status indicator in the switch will illuminate in approximately one second to indicate that power is available at the outlet. Press and release the switch again to turn OFF the power outlet. The status indicator will also turn off.

NOTE: Due to built-in overload protection, the power outlet will shut down if the 115 Volt AC (150 Watt maximum) power rating is exceeded.

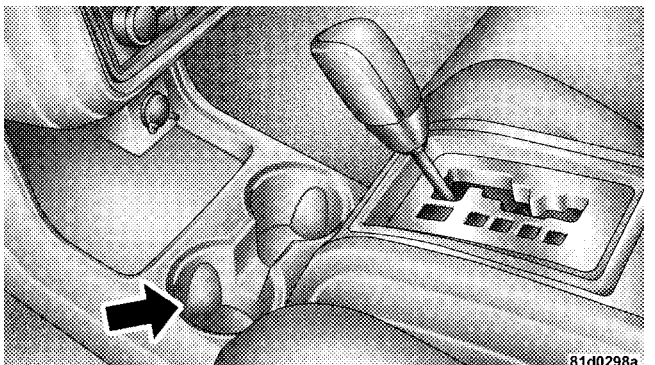
WARNING!

To Avoid Serious Injury or Death:

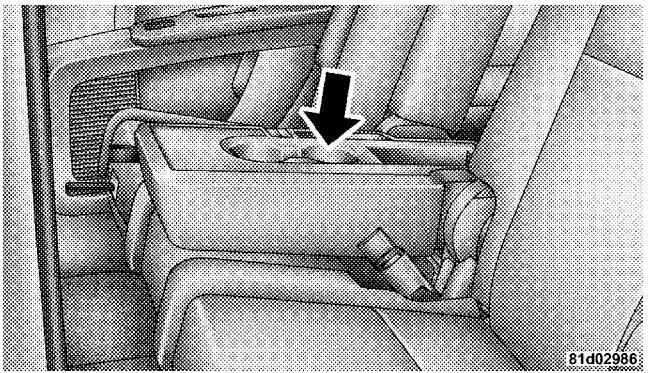
- **Do not use a three-prong adaptor.**
- **Do not insert any objects into the receptacles.**
- **Do not touch with wet hands.**
- **Close the lid when not in use.**
- **If this outlet is mishandled, it may cause an electric shock and failure.**

CUP AND BOTTLE HOLDERS

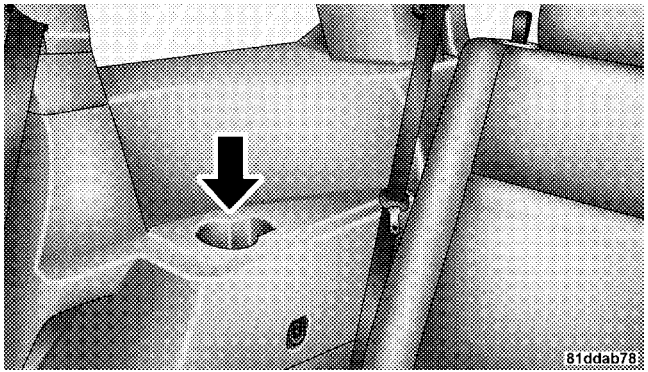
CUPHOLDERS



Center Console Cupholders

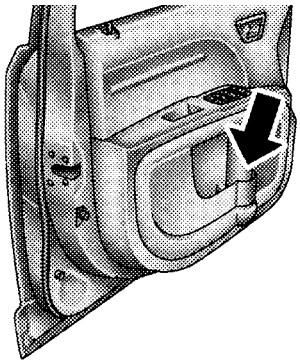


Armrest Cupholders



Quarter Trim Panel Cupholders
(Seven Passenger Models)

BOTTLE HOLDERS



Door Bottle Holder

WARNING!

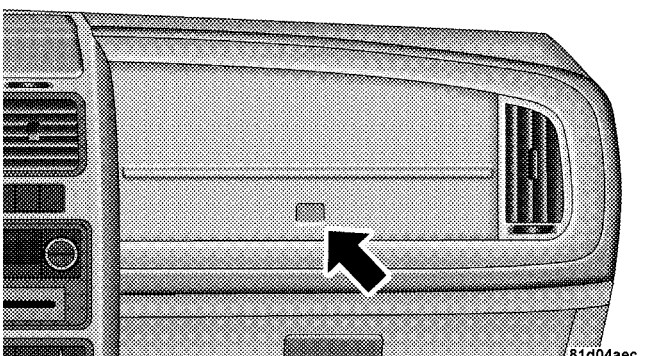
If containers of hot liquid are placed in the bottle holder, they can spill when the door is closed, burning the occupants. Be careful when closing the doors to avoid injury.

STORAGE

Beverage Cooler/Storage Compartment — If Equipped

NOTE: The Beverage Cooler can keep chilled beverages cool depending on ambient temperature and climate control setting. The cooler is intended for non-perishable beverages only.

The Beverage Cooler/Storage Compartment is located on the passenger's side of the instrument panel above the glove compartment. The beverage retainer inside the cooler is designed to hold up to two 12 oz (0.35 l) cans when placed horizontally in the retainer. The beverage retainer is removable to allow for storage of other items in the compartment when not in use as a cooler.

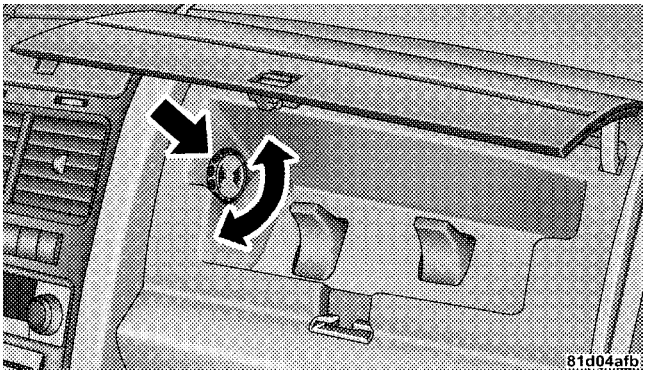


Beverage Cooler/Storage Compartment

Press and release the button on the door to open it. The large door swings upward to allow easy access to the compartment's contents.

Beverage Cooler Operation

The blower speed setting on the climate control sets the rate at which air flows into the compartment. The airflow control valve inside the compartment determines how much air flows into the compartment. Turning the valve rearward increases the airflow, turning it forward decreases the airflow, and turning it all the way forward turns off the airflow.



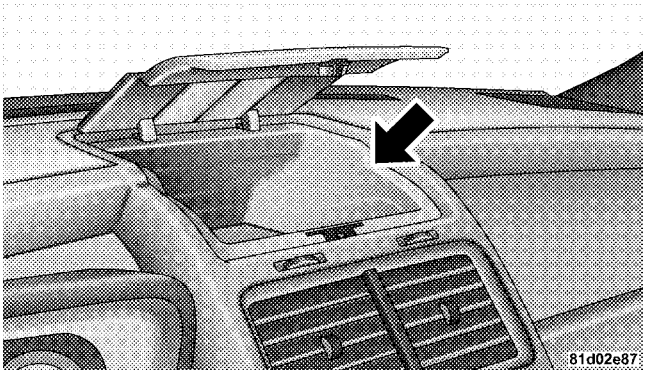
Airflow Control Valve

The compartment cools when the airflow control valve is open, the engine is running, and the Air Conditioning (A/C) is on or the Automatic Temperature Control (ATC) system (if equipped) is set for automatic operation. This allows you to cool the compartment when the climate control is in a cooling or heating mode.

NOTE: Whether operating a Manual Heating and A/C system or operating an ATC system in a manual mode, the A/C indicator must be ON to cool the compartment.

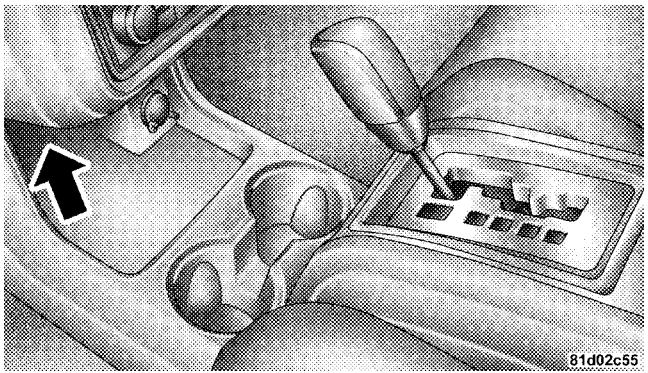
Instrument Panel Storage Compartment — If Equipped

Press and release the button on the door to open it. The door swings upward to allow easy access to the compartment.

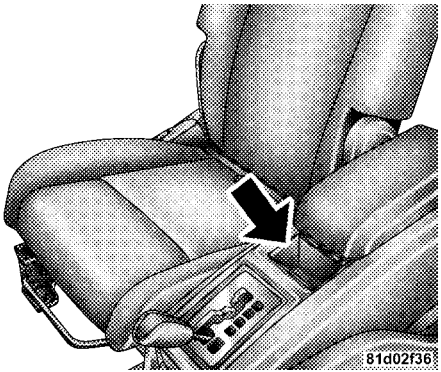


Instrument Panel Storage Compartment

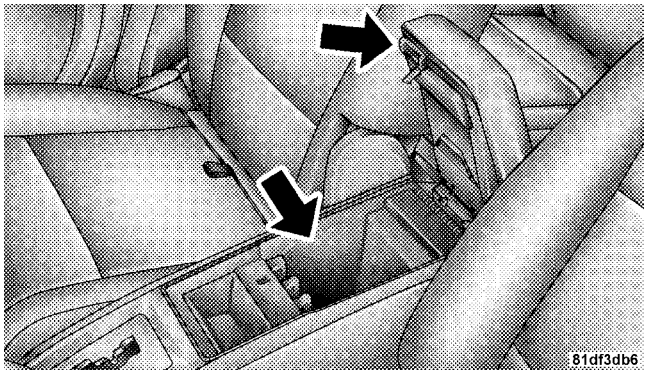
Center Console Storage



Center Stack Cubby Bin



Center Console Cubby Bin

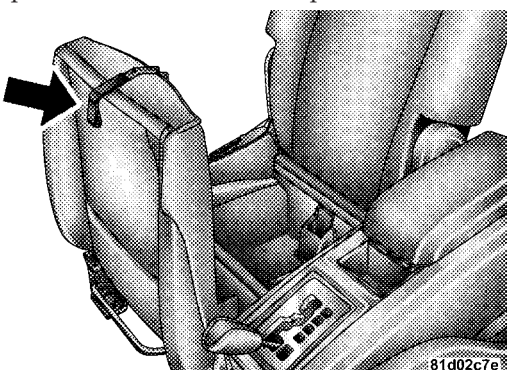


Center Console Storage Bin

NOTE: The sliding armrest (if so equipped) must be in the rearward position in order to access the release button on the front of the bin door.

Flip 'n Stow™ Front Passenger Seat Storage — If Equipped

The seat latch release-loop is located in the center of the seat cushion between the seat cushion and the seatback. Pull the loop upward to release the latch and then forward to open the seat to the detent position.



Front Passenger Seat Storage Compartment

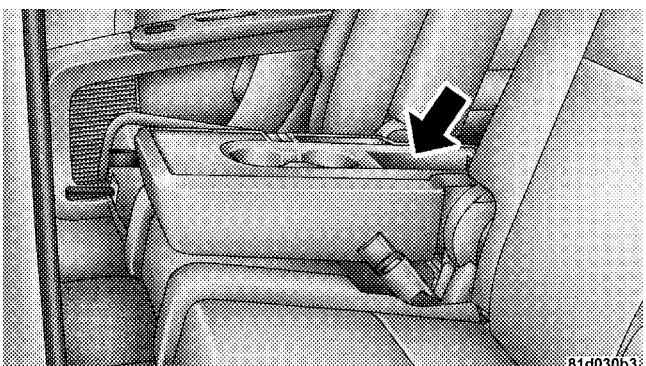
NOTE: Make sure that objects inside the bin do not interfere with the latch before closing the seat. Push the seat cushion downward after closing it to make sure it latches to the base.

WARNING!

Be certain that the seat cushion is locked securely into position before using the seat. Otherwise, the seat will not provide the proper stability for passengers. An improperly latched seat cushion could cause serious injury.

Second-Row Passenger Seat Temporary Storage Bin

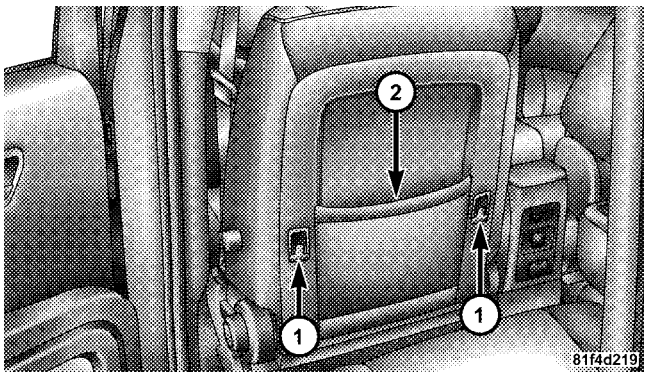
This is a temporary storage bin designed for use when the 20% seatback/armrest is down. Be sure to remove all items from this bin before raising the 20% seatback/armrest.



Armrest Cubby Bin

Second-Row Map Pocket and Grocery Retainers — If Equipped

A map storage pocket and grocery retainers are located on the back of the drivers seatback.

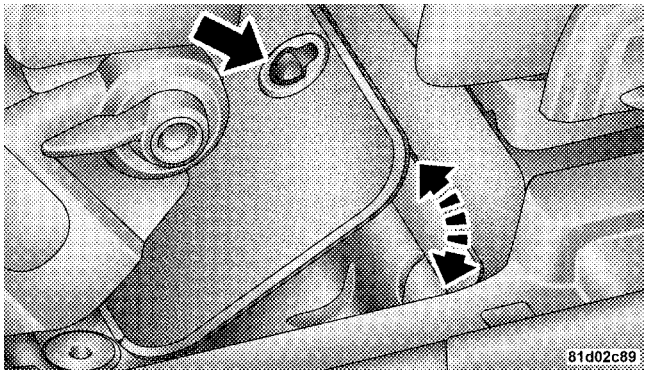


1 - Grocery Retainers
2 - Map Storage

In-Floor Storage Bin with Removable Liner

NOTE: Position the front seat to at least a mid-track position to provide easier access to the storage bin.

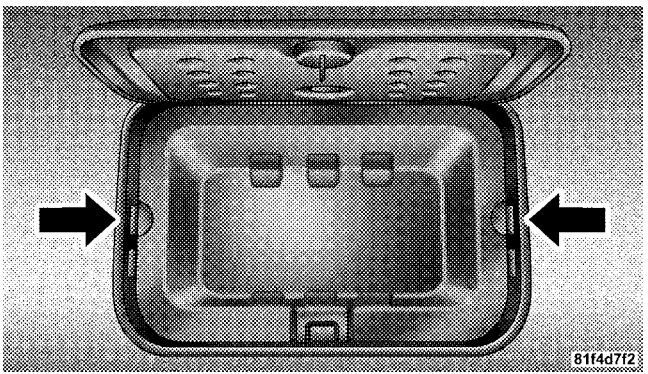
An in-floor storage bin is located behind each front seat. Each 1.6 gal (5.9 l) bin can hold up to 12, 12 oz (0.35 l) cans, plus ice, or other items. The removable bin liner allows for easy filling, emptying, and cleaning.



In-Floor Storage Bin

To access the bin, position the floor mat aside (if equipped). Pull the door latch release-loop upward to release the latch and then forward to open the bin door.

The liner can be removed for easy cleaning by lifting on the notches as shown.

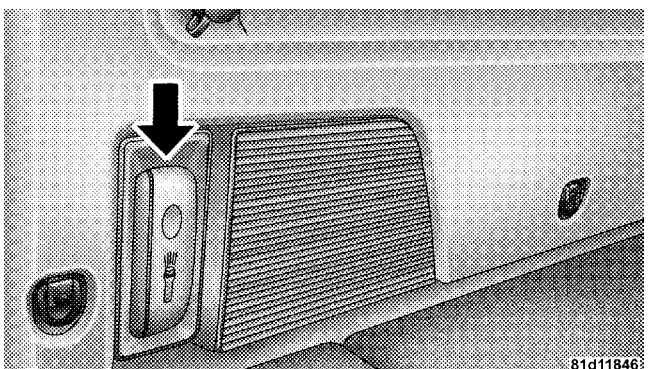


Removable Liner

CARGO AREA FEATURES

Rechargeable Flashlight — If Equipped

The rechargeable LED flashlight stores in its charging station in the left rear quarter trim panel. To remove it, press on the indent on the side of the flashlight and release.



Rechargeable Flashlight

NOTE: Be sure to return the flashlight to its charging station when not in use to ensure it is ready for operation the next time you need it.

Cargo Management System

Five Passenger System Features

- A raised load floor that sits on top of a large built-in storage bin.
- A tri-fold door built into the load floor that allows easy access to items in the built-in storage bin.
- 60/40 split second-row passenger seats with fold flat feature, which allows for extended cargo space. Refer to “Seats” in this section.
- An optional front passenger seat with fold flat feature, which extends cargo space even further. Refer to “Seats” in this section.
- Cargo tie-downs.

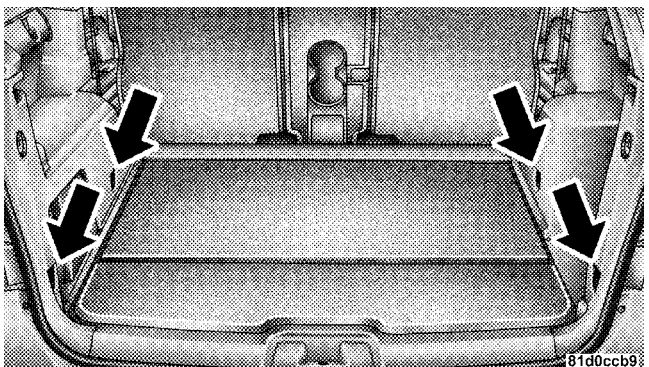
- A retractable cargo area cover (if equipped).

Seven Passenger System Features

- A large built-in storage bin with a hinged hardcover located in the floor behind the third-row passenger seats.
- 60/40 split second-row passenger seats with fold flat feature, which allows for extended cargo space. Refer to “Seats” in this section.
- 50/50 split third-row passenger seats with fold flat feature, which allows for extended cargo space. Refer to “Seats” in this section.
- An optional front passenger seat with fold flat feature, which extends cargo space even further. Refer to “Seats” in this section.
- Cargo tie-downs.

Cargo Tie-Downs

Cargo tie-downs are located on both rear trim panels. These tie-downs should be used to secure loads safely when the vehicle is moving.



Cargo Tie-Downs

WARNING!

- **Cargo tie-downs are not safe anchors for a child seat tether strap. In a sudden stop or collision, a tie-down could pull loose and allow the child seat to come loose. A child could be badly injured. Use only the anchors provided for child seat tethers.**
- **The weight and position of cargo and passengers can change the vehicle center of gravity and vehicle handling. To avoid loss of control resulting in personal injury, follow these guidelines for loading your vehicle:**

- Do not carry loads that exceed the load limits described on the label attached to the left door or left door center pillar.
- Always place cargo evenly on the cargo floor. Put heavier objects as low and as far forward as possible.
- Place as much cargo as possible in front of the rear axle. Too much weight or improperly placed weight over or behind the rear axle can cause the vehicle to sway.
- Do not pile luggage or cargo higher than the top of the seatback. This could impair visibility or become a dangerous projectile in a sudden stop or collision.

WARNING!

To help protect against personal injury, passengers should not be seated in the rear cargo area. The rear cargo space is intended for load carrying purposes only, not for passengers, who should sit in seats and use seat belts.

Retractable Cargo Area Cover (If Equipped) — Five Passenger Models

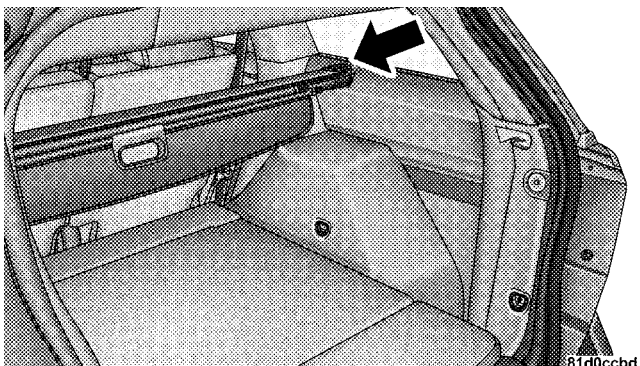
NOTE: The purpose of this cover is for privacy, not to secure loads. It will not prevent cargo from shifting or protect passengers from loose cargo.

The removable retractable cargo area cover mounts in the cargo area behind the top of the rear seats.

The cover, when extended, covers the cargo area to keep items out of sight. Notches in the trim panels near the liftgate opening secure the extended cover in place.

The cover rolls away neatly inside its housing when not in use. You can also remove the cover from the vehicle to make more room in the cargo area.

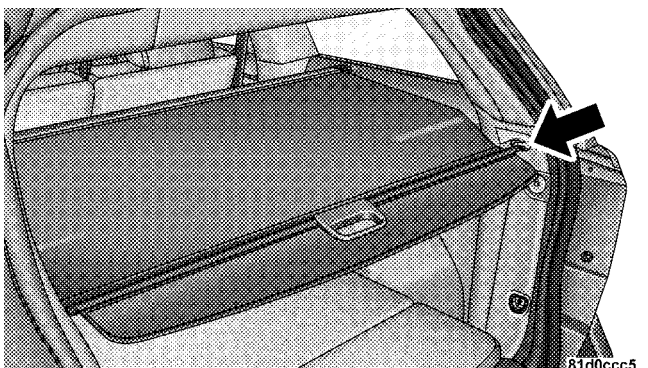
To install the cover, position it in the vehicle so that the flat side of the housing faces upward. Then, insert either the left or the right spring-loaded post (located on the ends of the cover housing) into the left attachment point or the right attachment point (shown).



Installing Retractable Cargo Area Cover

Then, insert the spring-loaded post on the opposite end of the cover housing into the attachment point on the opposite side of the vehicle.

Next, grab the cover handle and pull the cover toward you. As the cover nears the liftgate opening, guide the rear attachment posts (on both ends of the cover) into the notches in the trim panels. Then, lower the cover to position the posts into the bottom of the notches and release the handle.



Positioning Retractable Cargo Area Cover

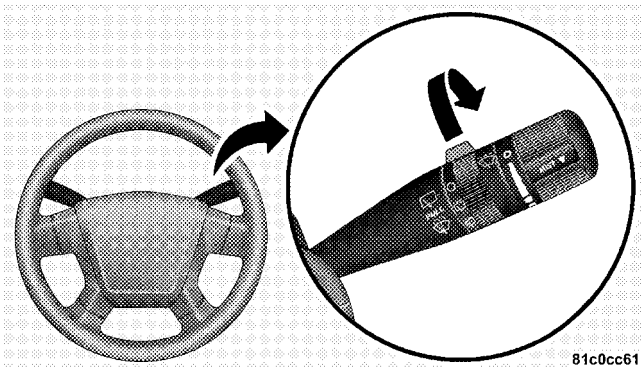
WARNING!

A cargo cover that is unsecured in the vehicle could cause injury in an accident. It could become airborne during a sudden stop and strike someone inside the vehicle. Do not store the cargo cover on the cargo floor or in the passenger compartment. Remove the cover from the vehicle when taken from its mounting. Do not store it in the vehicle.

REAR WINDOW FEATURES

Rear Window Wiper/Washer — If Equipped

The Rear Window Wiper/Washer Control is located on the right side of the steering column.



Rear Window Wiper/Washer Control

The rotary ring switch on the lever controls rear wiper and washer operation. Rotate the switch upward to the first detent to activate the rear wiper. Rotate the switch upward to the second detent to activate the rear washer. The washer will continue to operate until you release the switch. Once released, the wiper will cycle three times, return to the park position, and then resume normal operation.

NOTE: The rear wiper will automatically return to the park position if you turn OFF the ignition switch while it is operating. The rear wiper will resume operation when you turn the ignition switch to the ON position again.

CAUTION!

- **Turn the rear wiper OFF when driving through an automatic car wash. Damage to the rear wiper may result if the rear wiper switch is left in the ON position.**
- **In cold weather, always turn OFF the rear wiper switch and allow the rear wiper to return to the park position before turning OFF the engine. If the rear wiper switch is left ON and the rear wiper freezes to the window, damage to the rear wiper motor may occur when the vehicle is restarted.**
- **Always remove any buildup of snow that prevents the rear wiper blade from returning to the park position. If the rear wiper control is turned OFF and the blade cannot return to the park position, damage to the rear wiper motor may occur.**

Adding Washer Fluid

NOTE: Refer to the "Engine Compartment" diagram in Section 7 for the location of the washer fluid reservoir.

The windshield washer and rear window washer share the same fluid reservoir. The reservoir is located in the front of the engine compartment. Be sure to check the fluid level at regular intervals. Fill the reservoir with windshield washer solvent (not radiator antifreeze) and operate the system for a few seconds to flush out the residual water.

Rear Window Defroster — If Equipped

The Electric Rear Window Defroster control is located on the climate control. Press this button to turn on the rear window defroster and the heated outside rearview mirrors (if equipped). An indicator in the button will illuminate when the rear window defroster is on. The defroster automatically turns off after approximately 10 minutes. For five more minutes of operation, press the button again.

CAUTION!

- **Use care when washing the inside of the rear window. Do not use abrasive window cleaners on the interior surface of the window. Use a soft cloth and a mild washing solution, wiping parallel to the heating elements. Labels can be peeled off after soaking with warm water.**
- **Do not use scrapers, sharp instruments, or abrasive window cleaners on the interior surface of the window.**
- **Keep all objects a safe distance from the window.**

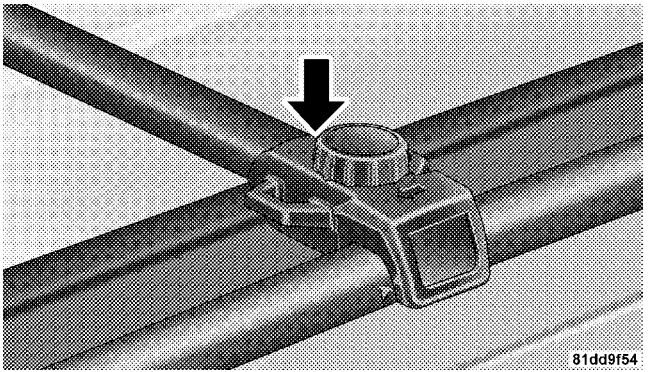
Failure to follow these cautions can cause damage to the heating elements.

ROOF LUGGAGE RACK — IF EQUIPPED

The roof rack cross rails and side rails are designed to carry cargo weight. The load must not exceed 150 lbs (68 kg), and it should be distributed uniformly over the cross rails. In addition, the roof rack does not increase the total load carrying capacity of the vehicle. Be sure the total load of cargo inside the vehicle plus that on the roof rack does not exceed the maximum vehicle load capacity.

To Move the Cross Rails

1. Loosen the knobs on top of each cross rail approximately six turns to disengage the clamp tooth from the side rail.



Roof Luggage Rack

2. Relocate the cross rails, aligning the cross rail stanchions (end pieces) with one of the vertical marks on the outboard surface of the side rail for proper positioning. There are four frontward marks for the front cross rail and four rearward marks for the rear cross rail. Make sure the cross rails remain equally spaced or parallel at any position for proper function.

3. Tighten the knobs on each cross rail to lock it in position. As you tighten the knob, make sure the clamp tooth engages completely into the side rail slot.

4. Attempt to move the cross rail to ensure that it is locked in position.

NOTE:

- To help control wind noise when installing the cross rails, make sure the arrows marked on the underside of the cross rails face the front of the vehicle.
- To help reduce the amount of wind noise when the cross rails are not in use, fasten the front cross rail in the fourth position from the front and the rear cross rail in the eighth position.

The tie down holes on the cross rail ends should always be used to tie down the load. Check the straps frequently to be sure that the load remains securely attached.

CAUTION!

- **Cross rails should remain equally spaced or parallel at any luggage rack position for proper function. Noncompliance could result in damage to the roof rack, cargo, and vehicle.**
- **To avoid damage to the roof rack and vehicle, do not exceed the maximum roof rack load capacity of 150 lbs (68 kg). Always distribute loads as evenly as possible and secure the load appropriately.**
- **Long loads, which extend over the windshield, such as wood panels or surfboards, or loads with large frontal area should be secured to both the front and rear of the vehicle.**
- **Place a blanket or other protection between the surface of the roof and the load.**
- **Travel at reduced speeds and turn corners carefully when carrying large or heavy loads on the roof rack. Wind forces, due to natural causes or nearby truck traffic, can add sudden upward lift to loads. This is especially true on large flat loads and may result in damage to the cargo or your vehicle.**

WARNING!

Cargo must be securely tied before driving your vehicle. Improperly secured loads can fly off the vehicle, particularly at high speeds, resulting in personal injury or property damage. Follow the Roof Rack Cautions when carrying cargo on your roof rack.

UNDERSTANDING YOUR INSTRUMENT PANEL

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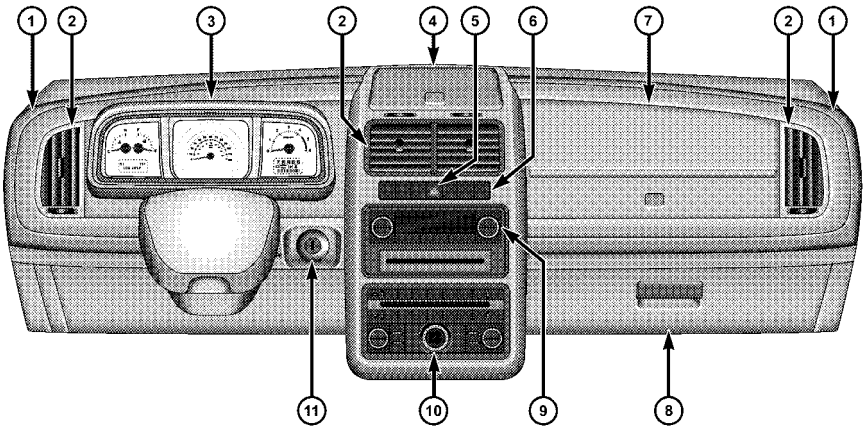
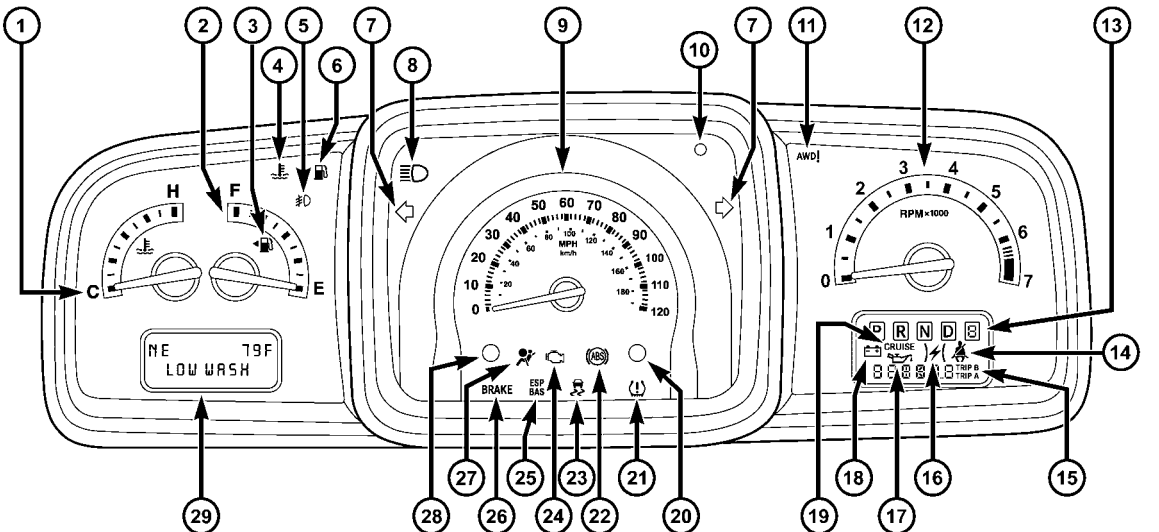
INSTRUMENT PANEL FEATURES



1 — Side Window Demist Outlet
2 — Air Outlet
3 — Instrument Cluster
4 — Storage Compartment or Remote Display Panel*
5 — HAZARD Switch
6 — Switch Bank
7 — Beverage Cooler/Storage Compartment*
8 — Glove Box
9 — Climate Control
10 — Radio
11 — Ignition Switch
* If Equipped

INSTRUMENT CLUSTER



INSTRUMENT CLUSTER DESCRIPTIONS

1. Coolant Temperature Gauge

The temperature gauge indicates engine coolant temperature. Any reading within the normal range indicates that the cooling system is operating satisfactorily. The gauge pointer will likely indicate a high temperature when driving in hot weather, up mountain grades, in heavy traffic, or when towing a trailer. If the pointer rises to the "H" mark, safely pull over and stop the vehicle. If the Air Conditioning A/C system is on, turn it off. Also, shift the transaxle into NEUTRAL and idle the vehicle. If the needle remains on the "H" mark, turn the engine OFF immediately and call for service. (See page 394 for more information.)

NOTE: The gauge pointer will remain near its last reading when the engine is turned off. It will return to a true reading when the engine is restarted.

CAUTION!

Do not leave your vehicle unattended with the engine running, as you would not be able to react to the temperature indicator light if the engine overheats.

2. Fuel Gauge

The fuel gauge shows the level of fuel in the tank when ignition switch is in the ON position.

3. Fuel Cap Indicator

This symbol indicates the side of the vehicle where the fuel filler cap is located.

4. Coolant Temperature Warning Light

This light warns of an overheated engine condition. If the light turns on while driving, safely pull over and stop the vehicle. If the A/C system is on, turn it off. Also, shift the transaxle into NEUTRAL and idle the vehicle. If the temperature reading does not return to normal, turn the engine off immediately and call for service. (See page 394 for more information.)

NOTE: As the coolant temperature gauge approaches "H," this indicator will illuminate and a single chime will sound. Further overheating will cause the temperature gauge to pass "H." In this case, the indicator light will flash continuously and a continuous chime will sound, until the engine is allowed to cool.

CAUTION!

Driving with a hot cooling system could damage your vehicle. If the temperature gauge reads "H," safely pull over and stop the vehicle. Idle the vehicle with the A/C turned off until the pointer drops back into the normal range. If the pointer remains on the "H," and you hear continuous chimes, turn the engine OFF immediately, and call for service.

WARNING!

A hot engine cooling system is dangerous. You or others could be badly burned by steam or boiling coolant. You may want to call a service center if your vehicle overheats. If you decide to look under the hood yourself, refer to Section 7 and follow the warnings under the Cooling System Pressure Cap paragraph.

5. Front Fog Light Indicator Light — If Equipped

This light shows when the fog lights are ON. (See page 148 for more information.)

6. Low Fuel Warning Light

This indicator lights when the fuel level drops to approximately one-eighth tank. (See page 372 for more information.)

7. Turn Signal Indicator Light

The left or right arrow will flash in unison with the corresponding front and rear turn signal lights when the turn signal switch is operated. (See page 149 for more information.)

NOTE: A chime will sound if the vehicle is driven more than 1 mi (1.6 km) with either turn signal on.

NOTE: Check for an inoperative outside light bulb if either indicator flashes at a rapid rate.

8. High Beam Indicator Light

This light shows that the headlights are on high beam. Pull the multifunction lever on the left side of the steering column toward you to switch to low beam. (See page 150 for more information.)

9. Speedometer

Shows the vehicle speed.

10. Vehicle Security Alarm (VSA) Indicator Light — If Equipped

This light will flash rapidly for approximately 16 seconds when the vehicle Security system is arming and then flash slowly when the system is armed. The light will also turn on for about three seconds when the ignition switch is first turned ON. (See page 18 for more information.)

11. All-Wheel Drive (AWD) Failure Indicator Light — If Equipped

AWD!

This light monitors the All-Wheel-Drive (AWD) system. The light will turn on for a bulb check when the ignition switch is turned to the ON position and may stay on for as long as three seconds.

When lit solid: There is an AWD system fault. AWD performance will be at a reduced level. Service the AWD system soon.

When blinking: The AWD system is temporarily disabled due to overload condition.

12. Tachometer

This gauge measures engine revolutions per minute (RPM x 1000). Before the pointer reaches the red area, ease up on the accelerator to prevent engine damage.

13. Transaxle Range Indicator

This display indicator shows automatic transaxle gear selection. (See page 311 for more information.)

14. Seat Belt Reminder Light

This light will turn on for several seconds after the ignition switch is turned ON as a reminder to "buckle up." This light will remain on as long as the driver's seat belt remains unbuckled. (See page 48 for more information.)

15. Odometer/Trip Odometer

The odometer shows the total distance the vehicle has been driven. The trip odometer shows individual trip mileage. Refer to "Trip Odometer button" for additional information.

NOTE: U.S. Federal regulations require upon transfer of vehicle ownership, the seller certify the mileage the vehicle has been driven. Therefore, if the odometer reading is changed because of repair or replacement, be sure to keep a record of the reading before and after the service so that the correct mileage can be determined.

Vehicle Warning Messages

When the appropriate conditions exist, messages such as "hood" (hood ajar), "door" (door ajar), "gATE" (liftgate ajar), "LoCOOL" (low engine coolant), "LoWASH" (low washer fluid), "gASCAP" (fuel cap fault), "ESPOFF" (ESP in partial off mode), "NoFUSE" (IOD fuse out), "HotOIL" (2.4L engine oil temp too hot), or "CHANgE OIL" will display in the odometer.

NOTE: If the instrument cluster is equipped with the optional Electronic Vehicle Information Center (EVIC), then most warnings will display in the EVIC. (See page 221 for more information.)

Hot Oil — 2.4L Engine

Refer to "Engine Oil Overheating — 2.4L Engine Only" under "If Your Engine Overheats" in Section 6.

Fuel Cap Fault Message

If the vehicle diagnostic system determines that the fuel filler cap is loose, improperly installed, or damaged, the word "gASCAP" will display in the odometer. If this occurs, tighten the fuel filler cap until a "clicking" sound is heard. Then press the TRIP ODOMETER button to turn

off the message. If the problem persists, the message will appear the next time the vehicle is started.

A loose, improperly installed, or damaged fuel filler cap may also turn on the MIL. (See page 421 for more information.)

Change Oil Message (Base And Mid Line Clusters Only)

Your vehicle is equipped with an engine oil change indicator system. The "CHANgE OIL" message will flash in the instrument cluster odometer for approximately 12 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message will continue to display each time you turn the ignition switch to the ON position. To turn off the message temporarily, press and release the TRIP ODOMETER button on the instrument cluster. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the ON position. (Do not start the engine).
2. Fully depress the accelerator pedal slowly three times within 10 seconds.
3. Turn the ignition switch to the LOCK position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.

16. Electronic Throttle Control (ETC) Warning Light — If Equipped

This light will turn on briefly as a bulb check when the ignition switch is turned ON. This light will also turn on while the engine is running if there is a problem with the Electronic Throttle Control (ETC) system.

If the light turns on while the engine is running, safely bring the vehicle to a complete stop as soon as possible, place the shift lever in PARK, and cycle the ignition key. The light should turn off. If the light remains lit with the engine running, your vehicle will usually be drivable. However, see your authorized dealer for service as soon as possible.

If the light is flashing when the engine is running, immediate service is required. In this case, you may experience reduced performance, an elevated/rough idle or engine stall, and your vehicle may require towing. Also, have the system checked by an authorized dealer if the light does not turn on during starting.

17. Oil Pressure Warning Light

This light shows low engine oil pressure. The light will turn on and remain on when the ignition switch is turned from the LOCK or ACC position to the ON position. The light will turn off after the engine is started.

If the light does not turn on during starting, have the system checked by an authorized dealer.

If the light turns on and remains on while driving, safely bring the vehicle to a stop and shut off the engine. DO NOT OPERATE THE VEHICLE UNTIL THE CAUSE IS CORRECTED. This light does not show the quantity of oil in the engine. The engine oil level must be checked using the proper procedure. (See page 424 for more information.)

18. Charging System Warning Light

This light shows the status of the electrical charging system. The light should turn on when the ignition switch is first turned ON and remain on briefly as a bulb check. If the light stays on or turns on while driving, turn off some of the vehicle's electrical devices, such as the fog lights or rear defroster. If the light remains on, it means that the charging system is experiencing a problem. See your local authorized dealer to obtain service immediately.

19. Cruise Indicator Light — If Equipped

CRUISE

This indicator lights when the electronic speed control system is turned on. (See page 159 for more information.)

20. Trip Odometer Button

Changing the Display

Press and release this button once to change the display from odometer to "Trip A." Press and release it again to change the display from "Trip A" to "Trip B."

Resetting the Trip Odometer

Display the trip mileage that you want to reset, "Trip A" or "Trip B." Then push and hold the button (approximately two seconds) until the display resets to 0. The odometer must be in Trip Mode to reset the trip odometer.

21. Tire Pressure Monitoring Telltale Light — If Equipped

Each tire, including the spare (if provided), should be checked monthly when cold and inflated to the inflation pressure recommended by the vehicle manufacturer on the vehicle placard or tire inflation pressure label. (If your vehicle has tires of a different size than the size indicated on the vehicle placard or tire inflation pressure label, you should determine the proper tire inflation pressure for those tires.)

As an added safety feature, your vehicle has been equipped with a tire pressure monitoring system (TPMS) that illuminates a low tire pressure telltale when one or more of your tires is significantly under-inflated. Accordingly, when the low tire pressure telltale light illuminates, you should stop and check your tires as soon as possible, and inflate them to the proper pressure. Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.

Please note that the TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure, even if under-inflation has not reached the level to trigger illumination of the TPMS low tire pressure telltale.

Your vehicle has also been equipped with a TPMS malfunction indicator to indicate when the system is not operating properly. The TPMS malfunction indicator is combined with the low tire pressure telltale. When the system detects a malfunction, the telltale will flash for approximately one minute and then remain continuously illuminated. This sequence will continue upon subsequent vehicle start-ups as long as the malfunction exists.

When the malfunction indicator is illuminated, the system may not be able to detect or signal low tire pressure as intended. TPMS malfunctions may occur for a variety of reasons, including the installation of replacement or alternate tires or wheels on the vehicle that prevent the TPMS from functioning properly. Always check the TPMS malfunction telltale light after replacing one or more tires or wheels on your vehicle to ensure that the replacement or alternate tires and wheels allow the TPMS to continue to function properly. (See page 355 for more information.)

CAUTION!

The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures and warning have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result. (Refer to "Tire Inflation Pressures" under "Tires — General Information" and to "Tire Pressure Monitor System (TPMS)" in Section 5 for more information).

22. Anti-Lock Brake System (ABS) Warning Light

This light monitors the Anti-Lock Brake System (ABS). The light will turn on when the ignition switch is turned to the ON position and may stay on for as long as four seconds.

If the ABS light remains on or turns on while driving, it indicates that the Anti-Lock portion of the brake system is not functioning and that service is required. However, the conventional brake system will continue to operate normally if the Brake System Warning Light is not on.

If the ABS light is on, the brake system should be serviced as soon as possible to restore the benefit of Anti-Lock brakes. Furthermore, the ABS light should be checked frequently to assure that it is operating properly. If the light does not turn on, have the system checked by an authorized dealer. (See page 328 for more information.)

23. Electronic Stability Program (ESP)/Traction Control System (TCS) Indicator Light

If this indicator light flashes during acceleration, ease up on the accelerator and apply as little throttle as possible. Adapt your speed and driving to the prevailing road conditions. (See page 328 for more information.)

24. Malfunction Indicator Light (MIL)

This light is part of an Onboard Diagnostic system called OBD II. The OBD system monitors emissions, engine, and automatic transaxle control systems. The MIL will turn on when the key is in the ON position before engine start. If the MIL does not turn on when turning the key from LOCK or ACC to ON, have the condition checked promptly.

Certain conditions such as a loose or missing gas cap, poor fuel quality, etc., may illuminate the MIL after engine start. The vehicle should be serviced if the MIL

stays on through several of your typical driving cycles. In most situations, the vehicle will drive normally and will not require towing.

If the MIL flashes when the engine is running, serious conditions may exist that could lead to immediate loss of power or severe catalytic converter damage. (See page 421 for more information.)

CAUTION!

Prolonged driving with the MIL on could cause further damage to the emissions control system. It could also affect fuel economy and driveability. The vehicle must be serviced before any emissions tests can be performed.

If the MIL is flashing while the engine is running, severe catalytic converter damage and power loss will soon occur. Immediate service is required.

25. Electronic Stability Program (ESP)/Brake Assist System (BAS) Malfunction Indicator Light – If Equipped

The yellow ESP/BAS Malfunction Indicator Light will turn on when the ignition switch is turned to the ON position. The light should go out with the engine running. The system will turn the light on continuously while the engine is running if it detects a malfunction in either the ESP or the BAS or both. If this light remains on after the several ignition cycles, and the vehicle has been driven several miles (kilometers) at speeds greater than 30 mph (48 km/h), see your authorized dealer as soon as possible to have the problem diagnosed and corrected. (See page 328 for more information.)

26. Brake System Warning Light

BRAKE

This light monitors various brake functions, including brake fluid level and parking brake application. If the light turns on, it may indicate that the parking brake is applied, that the brake fluid level is low, or that there is a problem with the ABS.

The dual brake system provides a reserve braking capacity to a portion of the hydraulic system in the event of a failure. Failure of either half of the dual brake system is indicated by the Brake System Warning Light, which will turn on when the brake fluid level in the master cylinder drops below a specified level.

The light will remain on until the cause is corrected.

NOTE: The light may flash momentarily during sharp cornering maneuvers due to a change in fluid level. If so, the vehicle should have service performed and the brake fluid level checked.

Immediate repair is necessary if brake failure is indicated.

WARNING!

Driving a vehicle with the Brake System Warning Light on is dangerous. A significant decrease in braking performance or vehicle stability during braking may occur. It will take you longer to stop the vehicle or will make your vehicle harder to control. You could have an accident. Have the vehicle checked immediately.

Vehicles equipped with ABS are also equipped with Electronic Brake Force Distribution (EBD). Both the Brake Warning Light and the ABS Light will turn on in the event of an EBD failure. Immediate repair of the ABS is required in the event of an EBD failure.

The operation of the Brake Warning Light can be checked by turning the ignition switch from the LOCK position to the ON position. The light should turn on for approximately two seconds and then turn off. The light will remain on if the parking brake is applied or if a brake fault is detected. If the parking brake is not applied and the light remains on, or if the light does not turn on, have the light inspected by an authorized dealer.

NOTE: The light will turn on when the ignition switch is in the ON position and the parking brake is applied. This light shows only that the parking brake is applied. It does not show the degree of brake application. (See page 326 for more information.)

27. Airbag Warning Light

This light will turn on for four to six seconds as a bulb check when the ignition switch is first turned ON. If the light is either not on during starting, or stays on, or turns on while driving, then have the system inspected at your authorized dealer as soon as possible. (See page 63 for more information.)

28. Compass/Temperature Display Button (Mid Line Clusters Only)

Operates the Compass/Temperature display in the Vacuum Fluorescent Display.

29. Vacuum Fluorescent Display (Mid Line And Premium Clusters Only)

On vehicles equipped with a Premium Cluster, this display shows the Electronic Vehicle Information Center (EVIC) messages when the appropriate conditions exist. (See page 221 for more information.)

On vehicles equipped with a Mid Line Cluster, this display shows the compass heading (N, S, E, W, NE, NW, SE, and SW) and the outside temperature. The COMPASS/TEMPERATURE DISPLAY button operates

this display. Press and release the button once to turn on the display. Press and release it again to turn off the display.

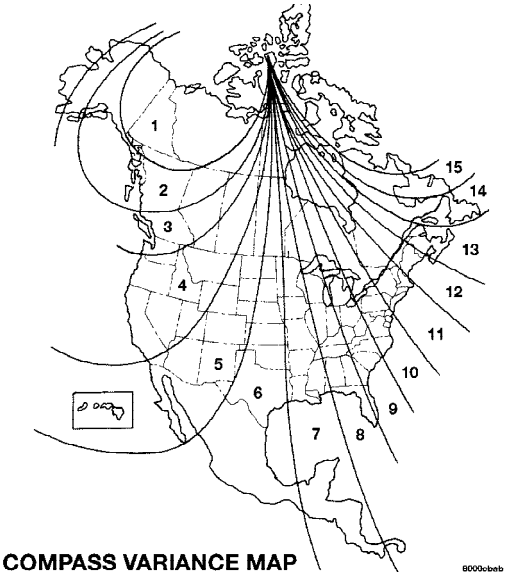
Setting Compass Variance (Mid Line Cluster Only)

Compass Variance is the difference between magnetic North and geographic North. To allow the compass module to compensate for that difference and ensure accuracy, you can set the variance in the compass module to the zone where the vehicle is located according to the Compass Variance Map. To set the variance, perform the following procedure.

NOTE:

- Magnetic materials should be kept away from the top of the instrument panel, as this is where the compass sensor is located.
- The shift lever must be in PARK to enter the variance setting mode.

  To set the variance, first, turn the ignition switch to the ON position. Next, press and hold the COMPASS/ TEMPERATURE DISPLAY button until the current variance zone number displays (approximately 10 seconds). Then, press and release the button to increment the variance value by one, until the proper variance zone is selected according to the map. Finally, turn the ignition switch to the LOCK position to exit this mode.



COMPASS VARIANCE MAP

NOTE: The default variance setting is Zone 8. When setting the variance, the numbering will wrap around from Zone 15 to Zone 1.

Calibrating the Compass (Mid Line Cluster Only)

If the compass appears erratic, inaccurate, or abnormal, you may wish to calibrate it. However, prior to calibrating the compass, make sure the proper Compass Variance value is selected.

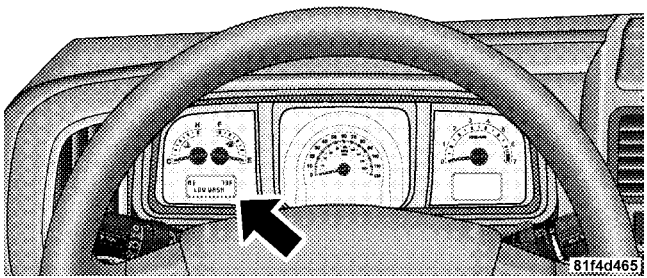
NOTE: The shift lever must be in PARK to enter the Calibration mode.

To calibrate the compass, first, start the engine. Next, press and hold the COMPASS/TEMPERATURE DISPLAY button until the current variance zone number displays (approximately 10 seconds). Then, press and hold the button again until the direction displays with the "CAL" indicator on continuously (approximately 10

seconds). Finally, drive the vehicle in one or more complete circles, at speeds under 5 mph (8 km/h), in an area free from power lines and large metallic objects, until the "CAL" indicator turns off. The compass will now function normally.

ELECTRONIC VEHICLE INFORMATION CENTER (EVIC) — IF EQUIPPED

The Electronic Vehicle Information Center (EVIC) features a driver-interactive display. It is located in the instrument cluster below the fuel and temperature gauges. Vehicles equipped with steering wheel-mounted buttons (described in this section) are also equipped with the EVIC. The EVIC consists of the following:

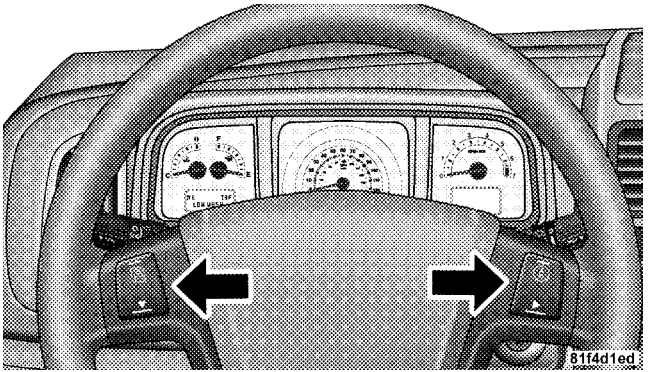


EVIC

- Compass display,
- Outside temperature display,
- Trip computer functions,

- System status, including vehicle information warning message displays, and Tire Pressure Monitor System (TPMS) displays (if equipped), and,
- Personal Settings (customer programmable features).

The system allows the driver to select information by pressing the following buttons mounted on the steering wheel.



EVIC Steering Wheel Switches

MENU Button

Press and release this button and the mode displayed will change between Compass/ Outside Temperature, Trip Functions, System Status, and Personal Settings.

RESET Button

Press this button to reset Trip Functions and change Personal Settings.

SCROLL Button

Press this button to scroll through Trip Functions (Average Fuel Economy, Distance To Empty [DTE], Elapsed Time, Units In), System Status Messages, and Personal Settings (Customer Programmable Features).

COMPASS/ TEMPERATURE Button

Press this button to display the Compass/Outside Temperature.

Electronic Vehicle Information Center (EVIC) Displays

When the appropriate conditions exist, the EVIC displays the following messages:

- Turn Signal On (with a continuous warning chime if the vehicle is driven more than 1 mi [1.6 km] with either turn signal on)
- Left Front Turn Signal Light Out (with a single chime)
- Left Rear Turn Signal Light Out (with a single chime)
- Right Front Turn Signal Light Out (with a single chime)
- Right Rear Turn Signal Light Out (with a single chime)
- RKE Battery Low (with a single chime)
- Personal Settings Not Available – Vehicle Not in PARK

- Channel # Transmit. Refer to “Garage Door Opener” in Section 2.
- Channel # Training. Refer to “Garage Door Opener” in Section 2.
- Channel # Trained. Refer to “Garage Door Opener” in Section 2.
- Clearing Channels. Refer to “Garage Door Opener” in Section 2.
- Channels Cleared. Refer to “Garage Door Opener” in Section 2.
- Did Not Train. Refer to “Garage Door Opener” in Section 2.
- Left Front Low Pressure (with a single chime). Refer to information on “Tire Pressure” and “Tire Pressure Monitor” in Section 5.
- Left Rear Low Pressure (with a single chime). Refer to information on “Tire Pressure” and “Tire Pressure Monitor” in Section 5.
- Right Front Low Pressure (with a single chime). Refer to information on “Tire Pressure” and “Tire Pressure Monitor” in Section 5.
- Right Rear Low Pressure (with a single chime). Refer to information on “Tire Pressure” and “Tire Pressure Monitor” in Section 5.
- Check TPM System (with a single chime). Refer to information on “Tire Pressure Monitor” in Section 5.
- Low Fuel
- Cal
- Oil Change Required (with a single chime)
- Low Washer Fluid

- Coolant Low
- Key in Ignition
- Lights On

Oil Change Required

Your vehicle is equipped with an engine oil change indicator system. The "Oil Change Required" message will display in the EVIC for approximately 5 seconds after a single chime has sounded to indicate the next scheduled oil change interval. The engine oil change indicator system is duty cycle based, which means the engine oil change interval may fluctuate dependent upon your personal driving style.

Unless reset, this message will continue to display each time you turn the ignition switch to the ON position. To turn off the message temporarily, press and release the MENU button. To reset the oil change indicator system (after performing the scheduled maintenance) perform the following procedure:

1. Turn the ignition switch to the ON position (Do not start the engine).
2. Fully depress the accelerator pedal slowly three times within 10 seconds.
3. Turn the ignition switch to the LOCK position.

NOTE: If the indicator message illuminates when you start the vehicle, the oil change indicator system did not reset. If necessary, repeat this procedure.

Trip Functions

Press and release the MENU button until one of the following Trip Functions displays in the EVIC:

- Average Fuel Economy
- Distance To Empty
- Elapsed Time
- Units In

Press the SCROLL button to cycle through all the Trip Computer functions.

The Trip Functions mode displays the following information.

- *Average Fuel Economy*

Shows the average fuel economy since the last reset. When the fuel economy is reset, the display will read "RESET" or show dashes for two seconds. Then, the history information will be erased, and the averaging will continue from the last fuel average reading before the reset.

- *Distance To Empty (DTE)*

Shows the estimated distance that can be traveled with the fuel remaining in the tank. This estimated distance is determined by a weighted average of the instantaneous and average fuel economy, according to the current fuel tank level. DTE cannot be reset through the RESET button.

NOTE: Significant changes in driving style or vehicle loading will greatly affect the actual drivable distance of the vehicle, regardless of the DTE displayed value.

- When the DTE value is less than 30 mi (48 km) estimated driving distance, the DTE display will change to a text display of "LOW FUEL." This display will continue until the vehicle runs out of fuel. Adding

a significant amount of fuel to the vehicle will turn off the ″LOW FUEL″ text and a new DTE value will display.

- *Elapsed Time*

Shows the total elapsed time of travel since the last reset when the ignition switch is in the ACC position. Elapsed time will increment when the ignition switch is in the ON or START position.

- *Units In*

The EVIC, odometer, and navigation system (if equipped) can be changed between English and Metric units of measure. To make your selection, press and release the RESET button until “U.S.” or “METRIC” appears.

To Reset The Display

Reset will only occur while a resettable function is being displayed. Press and release the RESET button once to clear the resettable function being displayed. To reset all resettable functions, press and release the RESET button a second time within three seconds of resetting the currently-displayed function. (>Reset ALL will display during this three-second window).

Compass Display

COMPASS/ TEMPERATURE Button

Press and release this button to display one of eight compass readings and the outside temperature. The compass readings indicate the direction the vehicle is facing.

Automatic Compass Calibration

This compass is self-calibrating, which eliminates the need to calibrate the compass manually. When the vehicle is new, the compass may appear erratic and the EVIC will display "CAL" until the compass is calibrated. You may calibrate the compass by slowly completing one or more 360-degree turns (in an area free from large metal or metallic objects) until the "CAL" message displayed in the EVIC turns off. The compass will now function normally.

Manual Compass Calibration

If the compass appears erratic or is inaccurate, you can calibrate the compass manually by performing the following steps.

1. Turn the ignition switch ON.

2. Press and release the MENU button until Personal Settings displays in the EVIC.

3. Press the SCROLL button until "CALIBRATE COMPASS" displays in the EVIC.

4. Press and release the RESET button to start the calibration. The message "CAL" will display in the EVIC.

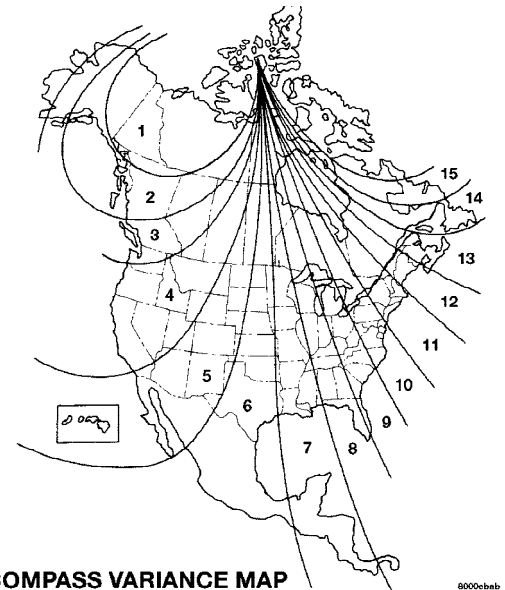
5. Slowly complete one or more 360-degree turns (in an area free from large metal or metallic objects) until the "CAL" message turns off. The compass will now function normally.

Compass Variance

Compass Variance is the difference between magnetic North and geographic North. To allow the compass module to compensate for that difference and ensure accuracy, you can set the variance in the compass module to the zone where the vehicle is located according to the Compass Variance Map. To set the variance, perform the following steps.

NOTE:

- The default variance setting is Zone 8. When setting the variance, the numbering will wrap around from Zone 15 to Zone 1.
- Magnetic materials should be kept away from the top of the instrument panel, as this is where the compass sensor is located.



COMPASS VARIANCE MAP

1. Turn the ignition switch ON.

2. Press and release the MENU button until Personal Settings displays in the EVIC.

3. Press the SCROLL button until "COMPASS VARIANCE" message and the last variance zone number displays in the EVIC.

4. Press and release RESET button until the proper variance zone is selected according to the map.

5. Press and release the COMPASS/TEMPERATURE button to exit.

Personal Settings (Customer Programmable Features)

Personal Settings allows the driver to set and recall features when the transaxle is in PARK.

Press and release the MENU button until Personal Settings displays in the EVIC.

Use the SCROLL button to display one of the following choices.

"LANGUAGE"

When in this display you may select one of three languages for all display nomenclature, including the trip functions and the navigation system (if equipped). Press the RESET button while in this display to select English, French, or Spanish. Then, as you continue, the information will display in the selected language.

NOTE: The EVIC will not change the UConnect® language selection. Refer to "Language Selection" under "Hands-Free Communication (UConnect®)" in Section 3.

"AUTO UNLK ON EXIT"

When ON is selected, all doors and the liftgate will unlock when the vehicle is stopped and the transaxle is in the PARK or NEUTRAL position and the driver's door is opened. To make your selection, press and release the RESET button until "ON" or "OFF" appears.

"RKE UNLOCK"
When **Driver Door 1st Press** is selected, only the driver's door will unlock on the first press of the Remote Keyless Entry (RKE) UNLOCK button. When Driver Door 1st Press is selected, you must press the RKE UNLOCK button twice to unlock the passenger doors and liftgate. When **All Doors 1st Press** is selected, all doors and the liftgate will unlock on the first press of the RKE UNLOCK button. To make your selection, press and release the RESET button until "Driver Door 1st Press" or "All Doors 1st Press" appears.

"SOUND HORN WITH LOCK"
When ON is selected, a short horn sound will occur when the RKE LOCK button is pressed. This feature may be selected with or without the flash lights with lock feature. To make your selection, press and release the RESET button until "ON" or "OFF" appears.

"FLASH LAMP WITH LOCK"
When ON is selected, the front and rear turn signals will flash when the doors are locked or unlocked with the RKE transmitter. This feature may be selected with or without the sound horn on lock feature selected. To make your selection, press and release the RESET button until "ON" or "OFF" appears.

"HEADLAMP OFF DELAY"
When this feature is selected, the driver can choose to have the headlights remain on for 0, 30, 60, or 90 seconds after turning the ignition to the LOCK position. To make your selection, press and release the RESET button until "0," "30," "60," or "90" appears.

"HEADLAMPS WITH WIPERS" (Available with Auto Headlights Only)
When ON is selected, and the multifunction lever is placed in the AUTO position, the headlights will turn on approximately 10 seconds after the wipers are turned

ON. The headlights will also turn off when the wipers are turned OFF if they were turned ON by this feature. To make your selection, press and release the RESET button until “ON” or “OFF” appears.

“KEY-OFF POWER DELAY”
When this feature is selected, the power window switches, radio, hands-free system (if equipped), DVD video system (if equipped), power sunroof (if equipped), and ignition powered outlets will remain active for up to 10 minutes after the ignition switch is turned OFF. Opening a vehicle door will cancel this feature. To make your selection, press and release the RESET button until “Off,” “45 sec.,” “5 min.,” or “10 min.” appears.

“ILLUMIN APPROACH”
When this feature is selected, the headlights will activate and remain on for up to 90 seconds when the doors are unlocked with the RKE transmitter. To make your selection, press and hold the RESET button until “Off,” “30 sec,” “60 sec,” or “90 sec” appears.

“DISPLAY UNITS IN”
The EVIC, odometer, and navigation system (if equipped) can be changed between English and Metric units of measure. To make your selection, press and release the RESET button until “U.S.” or “METRIC” appears.

“NAV TURN BY TURN” — If Equipped
When ON is selected, the Turn-by-Turn directions will appear in the display as the vehicle approaches a designated turn within a programmed route. To make your selection, press and release the RESET button until “ON” or “OFF” appears.

COMPASS VARIANCE
Refer to “Compass Variance” under “Compass Display.”

CALIBRATE COMPASS

Refer to “Manual Compass Calibration” under “Compass Display.”

RADIO GENERAL INFORMATION

Radio Broadcast Signals

The radio will provide excellent reception under most operating conditions. Like any system, however, car radios have performance limitations, due to mobile operation and natural phenomena, which might lead you to believe your sound system is malfunctioning. To help you understand and save you concern about these “apparent” malfunctions, you must understand a point or two about the transmission and reception of radio signals.

Two Types of Signals

There are two basic types of radio signals: AM (Amplitude Modulation), in which the transmitted sound causes the amplitude, or height, of the radio waves to vary; and FM (Frequency Modulation), in which the frequency of the wave is varied to carry the sound.

Electrical Disturbance

Radio waves may pick up electrical disturbances during transmission. They mainly affect the wave amplitude, and thus remain a part of the AM reception. They interfere very little with the frequency variations that carry the FM signal.

AM Reception

AM sound is based on wave amplitude, so AM reception can be disrupted by such things as lightning, power lines and neon signs.

FM Reception

Because FM transmission is based on frequency variations, interference that consists of amplitude variations can be filtered out, leaving the reception relatively clear, which is the major feature of FM radio.

NOTE:

- For vehicles not equipped with the Electronic Vehicle Information Center (EVIC), the radio and steering wheel radio controls (if equipped) will remain active for 45 seconds after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature.
- For vehicles equipped with the EVIC, the radio and steering wheel radio controls (if equipped) will remain active for up to 10 minutes after the ignition switch is turned to the LOCK position. Opening either front door will cancel this feature. The time is programmable. For details, refer to "Key-Off Power Delay," under "Personal Settings (Customer Programmable Features)" under "Electronic Vehicle Information Center (EVIC)" in Section 4.

SALES CODE REN — MULTIMEDIA SYSTEM — IF EQUIPPED

NOTE: The sales code is located on the lower right side of the unit's faceplate.

The REN Multimedia system contains a radio, CD/DVD player, USB port, a 30-gigabyte hard drive (HDD), and a "JukeBox" (virtual CD changer). Sirius Satellite Radio is optional. The 6.5 in (16.5 cm) touch screen allows for easy menu selection.

A 30-gigabyte HDD allows uploads of music and photos from CDs or through the USB port. The Gracenote database finds the artist, track, and title for the music.

An auxiliary input jack permits passengers to listen to a portable MP3 player through the vehicle's speakers. For vehicles equipped with the Video Entertainment System (VES)™, separate audio outputs allow passengers to listen to the vehicle speakers while different audio tracks play through the system's wireless headphones. This means rear-seat passengers can watch a DVD on the optional rear seat entertainment system, while the driver and front-seat passenger listen to the radio.

Other special features include direct tune, music type selections, easy store presets, backup camera display for vehicles equipped with a backup camera, and on some models, a dual display screen operation. Refer to your radio-specific user's manual for detailed operating instructions.

Operating Instructions — Satellite Radio (If Equipped)

Refer to your radio-specific user's manual for detailed operating instructions.

Operating Instructions — Voice Recognition System (VR) (If Equipped)

For the radio, refer to "Voice Recognition System (VR)" in Section 3.

For Hands Free Phone Communication (UConnect®) "Voice Recognition System (VR)," refer to "Hands-Free Communication (UConnect®)" in Section 3.

Operating Instructions — Hands-Free Communication (UConnect®) (If Equipped)

Refer to "Hands-Free Communication (UConnect®)" in Section 3.

Clock Setting Procedure

Setting the Clock

1. Turn on the multimedia system.

2. Touch the screen where the time is displayed. The clock setting menu will appear on the screen.

3. To move the hour forward, touch the screen where the word “Hour” with the arrow pointing upward is displayed. To move the hour backward, touch the screen where the word “Hour” with the arrow pointing downward is displayed.

4. To move the minute forward, touch the screen where the word “Min” with the arrow pointing upward is displayed. To move the minute backward, touch the screen where the word “Min” with the arrow pointing downward is displayed.

5. To save the new time setting, touch the screen where the word “Save” is displayed.

Changing Daylight Savings Time

When selected, this feature will display the time of day in daylight savings time. Proceed as follows to change the current setting:

1. Turn on the multimedia system.

2. Touch the screen where the time is displayed. The clock setting menu will appear on the screen.

3. When this feature is on, a check mark will appear in the box next to the words “Daylight Savings.” Touch the screen where the words “Daylight Savings” are displayed to change the current setting.

Show Time if Radio is Off

When selected, this feature will display the time of day on the touch screen when the multimedia system is turned off. Proceed as follows to change the current setting:

1. Turn on the multimedia system.

2. Touch the screen where the time is displayed. The clock setting menu will appear on the screen.

3. When this feature is on, a check mark will appear in the box next to the words “Show Time if Radio is Off.” Touch the screen where the words “Show Time if Radio is Off” are displayed to change the current setting.

Changing the Time Zone

1. Turn on the multimedia system.

2. Touch the screen where the time is displayed. The clock setting menu will appear on the screen.

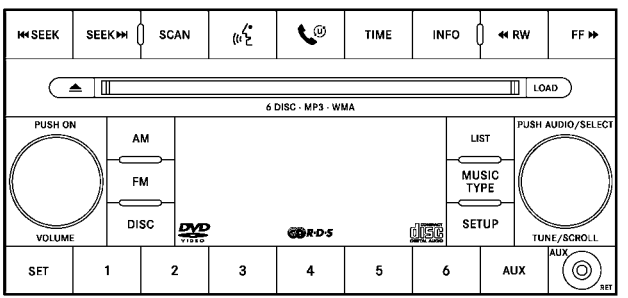
3. Touch the screen where the words “Set Time Zone” are displayed. The time zone selection menu will appear on the screen.

4. Select a time zone by touching the screen where your selection appears. If you do not see a time zone that you want to select, touch the screen where the word “Page” is displayed to view additional time zones in the menu.

5. Touch the screen where the word “Save” is displayed.

SALES CODE REQ — AM/FM STEREO RADIO AND 6–DISC CD/DVD CHANGER (MP3/WMA AUX JACK)

NOTE: The radio sales code is located on the lower right side of your radio faceplate.



RET Radio

Operating Instructions - Radio Mode

NOTE: The ignition switch must be in the ON or ACC position to operate the radio.

Power Switch/Volume Control (Rotary)
Push the ON/VOLUME control knob to turn on the radio. Press the ON/VOLUME control knob a second time to turn off the radio.

Electronic Volume Control
The electronic volume control turns continuously (360 degrees) in either direction without stopping. Turning the ON/VOLUME control knob to the right increases the volume and to the left decreases it.

When the audio system is turned ON, the sound will be set at the same volume level as last played.

SEEK Buttons
Press and release the SEEK buttons to search for the next listenable station in AM/FM mode. Press the right switch to seek up and the left switch to seek down. The radio will remain tuned to the new station until you make another selection. Holding either button will bypass stations without stopping until you release it.

SCAN Button
Pressing the SCAN button causes the tuner to search for the next listenable station, in AM, FM or Satellite (if equipped) frequencies, pausing for five seconds at each listenable station before continuing to the next. To stop the search, press the SCAN button a second time.

Voice Recognition Button (UConnect® Hands-Free Phone) — If Equipped
Press this button to operate the Hands-Free Phone (UConnect®) feature (if equipped). Refer to "Hands-Free Communication (UConnect®)" in Section 3.

If your vehicle is not equipped with or this feature is not available on your vehicle, a "Not Equipped With UConnect" message will display on the radio screen.

Phone Button (UConnect® Hands-Free Phone) — If Equipped
Press this button to operate the Hands-Free Phone (UConnect®) feature (if equipped). Refer to "Hands-Free Communication (UConnect®)" in Section 3.

If your vehicle is not equipped with or this feature is not available on your vehicle, a "Not Equipped With UConnect" message will display on the radio screen.

TIME Button
Press the TIME button and the time of day will display. In AM or FM mode, pressing the TIME button will switch between the time and frequency displays.

Clock Setting Procedure

1. Press and hold the TIME button until the hours blink.

2. Adjust the hours by turning the right side TUNE/SCROLL control knob.

3. After adjusting the hours, press the right side TUNE/SCROLL control knob to set the minutes. The minutes will begin to blink.

4. Adjust the minutes using the right side TUNE/SCROLL control knob. Press the TUNE/SCROLL control knob to save the time change.

5. To exit, press any button/knob or wait five seconds.

The clock can also be set by pressing the SETUP button and selecting the "SET HOME CLOCK" entry. Once in this display follow the above procedure, starting at step 2.

INFO Button

Press the INFO button for an RDS station (one with call letters displayed). The radio will return a Radio Text message broadcast from an FM station (FM mode only).

RW/FF

Pressing the RW (Rewind) or FF (Fast Forward) buttons causes the tuner to search for the next frequency in the direction of the arrows. This feature operates in AM, FM or Satellite (if equipped) frequencies.

TUNE Control

Turn the rotary TUNE/SCROLL control knob clockwise to increase or counterclockwise to decrease the frequency.

Setting the Tone, Balance, and Fade
Push the rotary TUNE/SCROLL control knob and BASS will display. Turn the TUNE/SCROLL control knob to the right or left to increase or decrease the bass tones.

Push the rotary TUNE/SCROLL control knob a second time and MID will display. Turn the TUNE/SCROLL control knob to the right or left to increase or decrease the mid-range tones.

Push the rotary TUNE/SCROLL control knob a third time and TREBLE will display. Turn the TUNE/SCROLL control knob to the right or left to increase or decrease the treble tones.

Push the rotary TUNE/SCROLL control knob a fourth time and BALANCE will display. Turn the TUNE/SCROLL control knob to the right or left to adjust the sound level from the right or left side speakers.

Push the rotary TUNE/SCROLL control knob a fifth time and FADE will display. Turn the TUNE/SCROLL control knob to the left or right to adjust the sound level between the front and rear speakers.

Push the rotary TUNE/SCROLL control knob again to exit setting tone, balance, and fade.

MUSIC TYPE Button
Pressing this button once will turn on the Music Type mode for five seconds. Pressing the MUSIC TYPE button or turning the TUNE/SCROLL control knob within five seconds will allow the program format type to be selected. Many radio stations do not currently broadcast Music Type information.

Toggle the MUSIC TYPE button to select the following format types:

Program Type	16-Digit Character Display
No program type or undefined	None
Adult Hits	Adlt Hit
Classical	Classicl
Classic Rock	Cls Rock
College	College
Country	Country
Foreign Language	Language
Information	Inform
Jazz	Jazz
News	News
Nostalgia	Nostalga
Oldies	Oldies
Personality	Persnlty
Public	Public
Rhythm and Blues	R & B
Religious Music	Rel Musc
Religious Talk	Rel Talk
Rock	Rock
Soft	Soft
Soft Rock	Soft Rck
Soft Rhythm and Blues	Soft R & B
Sports	Sports
Talk	Talk
Top 40	Top 40
Weather	Weather

By pressing the SEEK button when the Music Type icon is displayed, the radio will be tuned to the next frequency station with the same selected Music Type name. The Music Type function only operates when in the FM mode.

If a preset button is activated while in the Music Type (Program Type) mode, the Music Type mode will be exited and the radio will tune to the preset station.

SETUP Button
Pressing the SETUP button allows you to select between the following items:

NOTE: Turn the TUNE/SCROLL control knob to scroll through the entries. Push the AUDIO/SELECT button to select an entry and make changes.

- **DVD Enter -** When the disc is in DVD Menu mode, selecting DVD Enter will allow you to play the current highlighted selection. Use the remote control to scroll up and down the menu (if equipped).

- **DISC Play/Pause -** You can toggle between playing the DVD and pausing the DVD by pushing the SELECT button (if equipped).

- **DVD Play Options -** Selecting the DVD Play Options will display the following:
  - Subtitle – Repeatedly pressing SELECT will switch subtitles to different subtitle languages that are available on the disc (if equipped).
  - Audio Stream – Repeatedly pressing SELECT will switch to different audio languages (if supported on the disc) (if equipped).

- Angle – Repeatedly pressing SELECT will change the viewing angle if supported by the DVD disc (if equipped).

NOTE: The available selections for each of the above entries varies depending upon the disc.

NOTE: These selections can only be made while playing a DVD.

- **VES™ Power -** Allows you to turn VES™ ON and OFF (if equipped).
- **VES™ Lock -** Locks out rear VES™ remote controls (if equipped).
- **VES™ CH1/CH2 -** Allows the user to change the mode of either the IR1 or IR2, wireless headphones by pressing the AUDIO/SELECT button (if equipped).
- **Set Home Clock -** Pressing the SELECT button allows you to set the clock. Turn the TUNE/SCROLL control knob to adjust the hours and then press and turn the TUNE/SCROLL control knob to adjust the minutes. Press the TUNE/SCROLL control knob again to save changes.
- **Player Defaults -** Selecting this item will allow the user to scroll through the following items, and set defaults according to customer preference.

Menu Language — If Equipped

Selecting this item will allow the user to choose the default startup DVD menu language (effective only if language supported by disc). If you want to select a language not listed, then scroll down and select ″other.″ Enter the four-digit country code using the TUNE/SCROLL control knob to scroll up and down to select the number and then push to select.

Audio Language — If Equipped

Selecting this item allows you to choose a default audio language (effective only if the language is supported by the disc). You can select a language not listed by scrolling down and selecting "other." Enter the country code using the TUNE/SCROLL control knob to scroll up and down to select the number and then push to select.

Subtitle Language — If Equipped

Selecting this item allows you to choose a default subtitle language (effective only if the language is supported by the disc). You can select a language not listed by scrolling down and selecting "other." Enter the country code using the TUNE/SCROLL control knob to scroll up and down to select the number and then push to select.

Subtitles — If Equipped

Selecting this item allows you to choose between subtitle Off or On.

Audio DRC — If Equipped

Selecting this item allows you to limit maximum audio dynamic range. The default is set to "High," and under this setting, dialogues will play at 11 db higher than if the setting is "Normal."

Aspect Ratio — If Equipped

Selecting this item allows you to choose between wide screen, pan scan, and letter box.

AutoPlay — If Equipped

When this is set to On and a DVD video is inserted, it will bypass the DVD menu screen and automatically play the movie. In some rare cases, the DVD player may not auto-play the main title. In such cases, use the MENU button on the remote control to select desired title to play.

NOTE: The user will have to set these defaults before loading a disc. If changes are made to these settings after

a disc is loaded, changes will not be effective. Also, the defaults are effective only if the disc supports the customer-preferred settings.

AM and FM Buttons
Press the buttons to select AM or FM Modes.

SET Button — To Set the Pushbutton Memory
When you are receiving a station that you wish to commit to pushbutton memory, press the SET button. The symbol SET 1 will now show in the display window. Select the button (1-6) you wish to lock onto this station and press and release that button. If a button is not selected within five seconds after pressing the SET button, the station will continue to play but will not be stored into pushbutton memory.

You may add a second station to each pushbutton by repeating the above procedure with this exception: Press the SET button twice and SET 2 will show in the display window. Each button can be set for SET 1 and SET 2 in both AM and FM. This allows a total of 12 AM, 12 FM, and 12 Satellite (if equipped) stations to be stored into pushbutton memory. The stations stored in SET 2 memory can be selected by pressing the pushbutton twice.

Every time a preset button is used, a corresponding button number will display.

Buttons 1 - 6
These buttons tune the radio to the stations that you commit to pushbutton memory {12 AM, 12 FM, and 12 Satellite (if equipped) stations}.

DISC Button
Pressing the DISC button will allow you to switch from AM/FM modes to Disc modes.

Operation Instructions - (DISC MODE for CD and MP3/WMA Audio Play, DVD-VIDEO)

The radio DVD player and many DVD discs are coded by geographic region. These region codes must match in order for the disc to play. If the region code for the DVD disc does not match the region code for the radio DVD player, it will not play the disc. Customers may take their vehicle to an authorized dealer to change the region code of the player a maximum of five times.

CAUTION!

The radio may shut down during extremely hot conditions. When this occurs, the radio will indicate "Disc Hot" and shut off until a safe temperature is reached. This shutdown is necessary to protect the optics of the DVD player and other radio internal components.

NOTE: The ignition switch must be in the ON or ACC position to operate the radio.

LOAD Button — Loading Compact Disc(s)

Press the LOAD button and the pushbutton with the corresponding number (1-6) where the CD is being loaded. The radio will display PLEASE WAIT and prompt when to INSERT DISC. After the radio displays ″INSERT DISC,″ insert the CD into the player.

Radio display will show ″LOADING DISC″ when the disc is loading and "READING DISC" when the radio is reading the disc.

CAUTION!

This CD player will accept 4–3/4 in (12 cm) discs only. The use of other sized discs may damage the CD player mechanism.

Eject Button — Ejecting Compact Disc(s)

Press the EJECT button and the pushbutton with the corresponding number (1-6) where the CD was loaded and the disc will unload and move to the entrance for easy removal. Radio display will show ″EJECTING DISC″ when the disc is being ejected and prompt the user to remove the disc.

Press and hold the EJECT button for five seconds and all CDs will be ejected from the radio.

The disc can be ejected with the radio and ignition OFF.

SEEK Button (CD MODE)

Press the right SEEK button for the next selection on the CD. Press the left SEEK button to return to the beginning of the current selection, or return to the beginning of the previous selection if the CD is within the first second of the current selection. Pressing and holding the SEEK button will allow you to scroll through the tracks faster in CD, MP3/MWA modes.

SCAN Button (CD MODE)

Press the SCAN button to scan through each track on the CD currently playing.

TIME Button (CD MODE)

Press this button to change the display from a large CD playing time display to a small CD playing time display.

RW/FF (CD MODE)

Press and hold FF (Fast Forward) and the CD player will begin to fast forward until FF is released, or RW or another CD button is pressed. The RW (Rewind) button works in a similar manner.

AM or FM Button (CD MODE)

Switches the radio to the Radio mode.

Notes On Playing MP3/WMA Files

The radio can play MP3/WMA files; however, acceptable MP3/WMA file recording media and formats are limited. When writing MP3/WMA files, pay attention to the following restrictions.

Supported Media (Disc Types)

The MP3/WMA file recording media supported by the radio are CDDA, CD-R, CD-RW, MP3,WMA, DVD Video, DVD-R, DVD-RW, DVD+R, DVD+RW, and CDDA+MP3.

Supported Medium Formats (File Systems)

The medium formats supported by the radio are ISO 9660 Level 1 and Level 2 and includes the Joliet extension. When reading discs recorded using formats other than ISO 9660 Level 1 and Level 2, the radio may fail to read files properly and may be unable to play the file normally. UDF and Apple HFS formats are not supported.

The radio uses the following limits for file systems:

- Maximum number of directory levels: 8
- Maximum number of files: 255
- Maximum number of folders: 100
- Maximum number of characters in file/folder names:
  - Level 1: 12 (including a separator ″.″ and a three-character extension)
  - Level 2: 31 (including a separator ″.″ and a three-character extension)

Multisession disc formats are supported by the radio. Multisession discs may contain combinations of normal CD audio tracks and computer files (including MP3/WMA files). Discs created with an option such as ″keep disc open after writing″ are most likely multisession discs. The use of multisession for CD audio or MP3/WMA playback may result in longer disc loading times.

If a disc contains multi-formats, such as CD audio and MP3/WMA tracks, the radio will only play the MP3/WMA tracks on that disc.

Supported MP3/WMA File Formats

The radio will recognize only files with the MP3/WMA extension as MP3/WMA files. Non-MP3/WMA files named with the MP3/WMA extension may cause playback problems. The radio is designed to recognize the file as an invalid MP3/WMA and will not play the file.

When using the MP3/WMA encoder to compress audio data to an MP3/WMA file, the bit rate and sampling frequencies in the following table are supported. In addition, variable bit rates (VBR) are also supported. The majority of MP3/WMA files use a 44.1 kHz sampling rate and a 192, 160, 128, 96 or VBR bit rates.

MPEG Specification	Sampling Frequency (kHz)	Bit Rate (kbps)
MPEG-1 Audio Layer 3	48, 44.1, 32	320, 256, 224, 192, 160, 128, 112, 96, 80, 64, 56, 48
MPEG-2 Audio Layer 3	24, 22.05, 16	160, 128, 144, 112, 96, 80, 64, 56, 48

WMA Specification	Sampling Frequency (kHz)	Bit Rate (kbps)
WMA	44.1 and 48	48, 64, 96, 128, 160, 192 VBR

ID3 Tag information for artist, song title, and album title are supported for ID3 version 1 tags. ID3 version 2 is not supported by the radios.

Playlist files are not supported. MP3 Pro files are not supported.

Playback of MP3/WMA Files
When a medium containing MP3/WMA data is loaded, the radio checks all files on the medium. If the medium contains a lot of folders or files, the radio will take more time to start playing the MP3/WMA files.

Loading times for playback of MP3/WMA files may be affected by the following:

- Media - CD-RW media may take longer to load than CD-R media
- Medium formats - Multisession discs may take longer to load than non-multisession discs
- Number of files and folders - Loading times will increase with more files and folders

To increase the speed of disc loading, it is recommended to use CD-R media and single-session discs. To create a single-session disc, enable the "Disc at Once" option before writing to the disc.

LIST Button (DISC Mode for MP3/WMA Play)
Pressing the LIST button will bring up a list of all folders on the disc. Scrolling up or down the list is done by turning the TUNE/SCROLL control knob. Selecting a folder by pressing the TUNE/SCROLL control knob will begin playing the files contained in that folder (or the next folder in sequence if the selection does not contain playable files).

The folder list will time out after five seconds.

INFO Button (DISC Mode for MP3/WMA Play)
Pressing the INFO button repeatedly will scroll through the following TAG information: Song Title, Artist, File Name, and Folder Name (if available).

Press the INFO button once more to return to ″elapsed time″ priority mode.

Press and hold the INFO button for three seconds or more and radio will display song titles for each file.

Press and hold the INFO button again for three seconds to return to ″elapsed time″ display.

Operation Instructions - Auxiliary Mode
The auxiliary (AUX) jack is an audio input jack, which allows the user to plug in a portable device such as an MP3/WMA player, cassette player, or microphone and utilize the vehicle's audio system to amplify the source and play through the vehicle speakers.

Pressing the AUX button will change the mode to auxiliary device if the AUX jack is connected.

NOTE: The AUX device must be turned on and the device's volume set to the proper level. If the AUX audio is not loud enough, turn the device's volume up. If the AUX audio sounds distorted, turn the device's volume down.

SEEK Button (Auxiliary Mode)
No function.

SCAN Button (Auxiliary Mode)
No function.

EJECT Button (Auxiliary Mode)
No function.

TIME Button (Auxiliary Mode)
Press the TIME button to change the display from elapsed playing time to time of day. The time of day will display for five seconds.

RW/FF (Auxiliary Mode)
No function.

SET Button (Auxiliary Mode)
No function.

Operating Instructions — Voice Recognition System (VR) (If Equipped)
For the radio, refer to "Voice Recognition System (VR)" in Section 3.

For UConnect® "Voice Recognition System (VR)," refer to "Hands-Free Communication (UConnect®)" in Section 3.

Operating Instructions - Hands-Free Phone (UConnect®) (If Equipped)
Refer to "Hands-Free Communication (UConnect®)" in Section 3.

Operating Instructions - Satellite Radio Mode (If Equipped)
Refer to "Satellite Radio" in this section.

Operating Instructions - Video Entertainment System (VES)™ (If Equipped)
Refer to separate "Video Entertainment System (VES)™ Guide."

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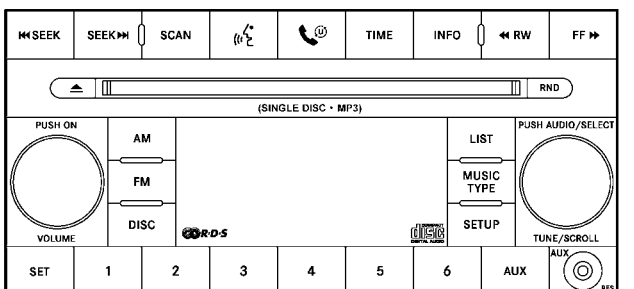
SALES CODE RES — AM/FM STEREO RADIO WITH CD PLAYER (MP3 AUX JACK)

NOTE: The radio sales code is located on the lower right side of your radio faceplate.



RES Radio (Non-Satellite Model Shown - With Satellite Similar)

Operating Instructions - Radio Mode

NOTE: The ignition switch must be in the ON or ACC position to operate the radio.

Power Switch/Volume Control (Rotary)
Push the On/Volume control knob to turn on the radio. Push the On/Volume control knob a second time to turn off the radio.

Electronic Volume Control
The electronic volume control turns continuously (360 degrees) in either direction without stopping. Turning the On/Volume control knob to the right increases the volume and to the left decreases it.

When the audio system is turned on, the sound will be set at the same volume level as last played.

SEEK Buttons
Press and release the SEEK buttons to search for the next listenable station in AM/FM mode. Press the right switch

to seek up and the left switch to seek down. The radio will remain tuned to the new station until you make another selection. Holding either button will bypass stations without stopping until you release it.

SCAN Button
Pressing the SCAN button causes the tuner to search for the next listenable station in AM or FM frequencies, pausing for five seconds at each listenable station before continuing to the next. To stop the search, press the SCAN button a second time.

Voice Recognition System (Radio) — If Equipped
Refer to "Voice Recognition System (VR)" in Section 3.

Voice Recognition Button (UConnect® Hands-Free Phone) — If Equipped
Press this button to operate the Hands-Free Phone (UConnect®) feature (if equipped). Refer to "Hands-Free Communication (UConnect®)" in Section 3.

If your vehicle is not equipped with or this feature is not available on your vehicle, a "Not Equipped With UConnect" message will display on the radio screen.

Phone Button (UConnect® Hands-Free Phone) — If Equipped
Press this button to operate the Hands-Free Phone (UConnect®) feature (if equipped). Refer to "Hands-Free Communication (UConnect®)" in Section 3.

If your vehicle is not equipped with or this feature is not available on your vehicle, a "Not Equipped With UConnect" message will display on the radio screen.

TIME Button
Press the TIME button and the time of day will display. In AM or FM mode, pressing the TIME button will switch between the time and frequency displays.

Clock Setting Procedure

1. Press and hold the TIME button, until the hours blink.

2. Adjust the hours by turning the right side Tune/Scroll control knob.

3. After adjusting the hours, press the right side Tune/Scroll control knob to set the minutes. The minutes will begin to blink.

4. Adjust the minutes using the right side Tune/Scroll control knob. Press the Tune/Scroll control knob to save time change.

5. To exit, press any button/knob or wait five seconds.

The clock can also be set by pressing the SETUP button. For vehicles equipped with satellite radio, press the SETUP button, use the Tune/Scroll control to select SET CLOCK, and then follow the above procedure, starting at Step 2. For vehicles not equipped with satellite radio, press the SETUP button and then follow the above procedure, starting at Step 2.

INFO Button

Press the INFO button for an RDS station (one with call letters displayed). The radio will return a Radio Text message broadcast from an FM station (FM mode only).

RW/FF

Pressing the RW (Rewind) or FF (Fast Forward) buttons causes the tuner to search for the next frequency in the direction of the arrows. This feature operates in either AM or FM frequencies.

TUNE Control

Turn the rotary Tune/Scroll control knob clockwise to increase or counterclockwise to decrease the frequency.

Setting the Tone, Balance, and Fade

Push the rotary Tune/Scroll control knob and BASS will display. Turn the Tune/Scroll control knob to the right or left to increase or decrease the bass tones.

Push the rotary Tune/Scroll control knob a second time and MID will display. Turn the Tune/Scroll control knob to the right or left to increase or decrease the mid-range tones.

Push the rotary Tune/Scroll control knob a third time and TREBLE will display. Turn the Tune/Scroll control knob to the right or left to increase or decrease the treble tones.

Push the rotary Tune/Scroll control knob a fourth time and BALANCE will display. Turn the Tune/Scroll control knob to the right or left to adjust the sound level from the right or left side speakers.

Push the rotary Tune/Scroll control knob a fifth time and FADE will display. Turn the Tune/Scroll control knob to the left or right to adjust the sound level between the front and rear speakers.

Push the rotary Tune/Scroll control knob again to exit setting tone, balance, and fade.

MUSIC TYPE Button

Pressing this button once will turn on the Music Type mode for five seconds. Pressing the MUSIC TYPE button or turning the Tune/Scroll control knob within five seconds will allow the program format type to be selected. Many radio stations do not currently broadcast Music Type information.

Toggle the MUSIC TYPE button to select the following format types:

Program Type	16-Digit Character Display
No program type or undefined	None
Adult Hits	Adlt Hit
Classical	Classicl
Classic Rock	Cls Rock
College	College
Country	Country

Program Type	16-Digit Character Display
Foreign Language	Language
Information	Inform
Jazz	Jazz
News	News
Nostalgia	Nostalga
Oldies	Oldies
Personality	Persnlty
Public	Public
Rhythm and Blues	R & B
Religious Music	Rel Musc
Religious Talk	Rel Talk
Rock	Rock
Soft	Soft
Soft Rock	Soft Rck
Soft Rhythm and Blues	Soft R & B
Sports	Sports
Talk	Talk
Top 40	Top 40
Weather	Weather

By pressing the SEEK button when the Music Type icon is displayed, the radio will be tuned to the next frequency station with the same selected Music Type name. The Music Type function only operates when in the FM mode.

If a preset button is activated while in the Music Type (Program Type) mode, the Music Type mode will be exited and the radio will tune to the preset station.

SETUP Button

Pressing the SETUP button allows you to select between the following items:

- **Set Clock** — Pressing the SELECT button will allow you to set the clock. Turn the Tune/Scroll control knob to adjust the hours and then press and turn the Tune/Scroll control knob to adjust the minutes. Press the Tune/Scroll control knob again to save changes.

AM and FM Buttons
Press the buttons to select AM or FM modes.

SET Button — To Set the Pushbutton Memory
When you are receiving a station that you wish to commit to pushbutton memory, press the SET button. The symbol SET 1 will now show in the display window. Select the button (1 to 6) you wish to lock onto this station and press and release that button. If a button is not selected within five seconds after pressing the SET button, the station will continue to play but will not be stored into pushbutton memory.

You may add a second station to each pushbutton by repeating the above procedure with this exception: Press the SET button twice and SET 2 will show in the display window. Each button can be set for SET 1 and SET 2 in both AM and FM. This allows a total of 12 AM and 12 FM stations to be stored into pushbutton memory. The stations stored in SET 2 memory can be selected by pressing the pushbutton twice.

Every time a preset button is used, a corresponding button number will display.

Buttons 1 - 6
These buttons tune the radio to the stations that you commit to pushbutton memory (12 AM and 12 FM stations).

DISC Button
Pressing the DISC button will allow you to switch from AM/FM modes to Disc modes.

Operation Instructions - CD MODE for CD and MP3 Audio Play

NOTE: The ignition switch must be in the ON or ACC position to operate the radio.

NOTE: This radio is capable of playing compact discs (CD), recordable compact discs (CD-R), rewritable compact discs (CD-RW), compact discs with MP3 tracks and multisession compact discs with CD and MP3 tracks.

Inserting Compact Disc(s)
Gently insert one CD into the CD player with the CD label facing up. The CD will automatically be pulled into the CD player and the CD icon will illuminate on the radio display. If a CD does not go into the slot more than 1.0 in (2.5 cm), a disc may already be loaded and must be ejected before a new disc can be loaded.

If you insert a disc with the ignition ON and the radio ON, the unit will switch from radio to CD mode and begin to play when you insert the disc. The display will show the disc number, the track number, and index time in minutes and seconds. Play will begin at the start of track 1.

CAUTION!

- **This CD player will accept 4–3/4 in (12 cm) discs only. The use of other sized discs may damage the CD player mechanism.**
- **Do not use adhesive labels. These labels can peel away and jam the player mechanism.**
- **RES is a single CD player. Do not attempt to insert a second CD if one is already loaded.**
- **Dual-media disc types (one side is a DVD, the other side is a CD) should not be used, and they can cause damage to the player.**

EJECT Button - Ejecting a CD

Press the EJECT button to eject the CD.

If you have ejected a disc and have not removed it within 10 seconds, it will be reloaded. If the CD is not removed, the radio will reinsert the CD but will not play it.

A disc can be ejected with the radio and ignition OFF.

NOTE: Ejecting with ignition OFF is not allowed on convertible or soft-top models (if equipped).

SEEK Button

Press the right SEEK button for the next selection on the CD. Press the left SEEK button to return to the beginning of the current selection, or return to the beginning of the previous selection if the CD is within the first second of the current selection. Pressing and holding the SEEK button will allow faster scrolling through the tracks in CD, MP3 modes.

SCAN Button

Press the SCAN button to scan through each track on the CD currently playing.

TIME Button

Press this button to change the display from a large CD playing time display to a small CD playing time display.

RW/FF

Press the RW button to stop the CD at the beginning of the current CD track/title.

Press and hold FF (Fast Forward) and the CD player will begin to fast forward until FF is released or RW or another CD button is pressed. The RW (Reverse) button works in a similar manner.

AM or FM Button
Switches the AM or FM radio to the opposite radio mode.

RND Button (Random Play Button)
Press this button while the CD is playing to activate Random Play. This feature plays the selections on the compact disc in random order to provide an interesting change of pace.

Press the right SEEK button to move to the next randomly selected track.

Press the RND button a second time to stop Random Play.

Notes On Playing MP3 Files

The radio can play MP3 files; however, acceptable MP3 file recording media and formats are limited. When writing MP3 files, pay attention to the following restrictions.

Supported Media (Disc Types)
The MP3 file recording media supported by the radio are CDDA, CD-R, CD-RW, MP3, and CDDA+MP3.

Supported Medium Formats (File Systems)
The medium formats supported by the radio are ISO 9660 Level 1 and Level 2 and includes the Joliet extension. When reading discs recorded using formats other than ISO 9660 Level 1 and Level 2, the radio may fail to read files properly and may be unable to play the file normally. UDF and Apple HFS formats are not supported.

The radio uses the following limits for file systems:

- Maximum number of folder levels: 8
- Maximum number of files: 255
- Maximum number of folders. (The radio display of file names and folder names is limited. For large numbers of files and/or folders, the radio may be unable to display the file name and folder name and will assign

a number instead. With a maximum number of files, exceeding 20 folders will result in this display. With 200 files, exceeding 50 folders will result in this display.)

- Maximum number of characters in file/folder names:
  - Level 1: 12 (including a separator ".″ and a three-character extension)
  - Level 2: 31 (including a separator ".″ and a three-character extension)

Multisession disc formats are supported by the radio. Multisession discs may contain combinations of normal CD audio tracks and computer files (including MP3 files). Discs created with an option such as "keep disc open after writing" are most likely multisession discs. The use of multisession for CD audio or MP3 playback may result in longer disc loading times.

Supported MP3 File Formats

The radio will recognize only files with the *.MP3 extension as MP3 files. Non-MP3 files named with the *.MP3 extension may cause playback problems. The radio is designed to recognize the file as an invalid MP3 and will not play the file.

When using the MP3 encoder to compress audio data to an MP3 file, the bit rate and sampling frequencies in the following table are supported. In addition, variable bit rates (VBR) are also supported. The majority of MP3 files use a 44.1 kHz sampling rate and a 192, 160, 128, 96 or VBR bit rates.

MPEG Specification	Sampling Frequency (kHz)	Bit Rate (kbps)
MPEG-1 Audio Layer 3	48, 44.1, 32	320, 256, 224, 192, 160, 128, 112, 96, 80, 64, 56, 48, 40, 32
MPEG-2 Audio Layer 3	24, 22.05, 16	160, 128, 144, 112, 96, 80, 64, 56, 48, 40, 32, 24, 16, 8

ID3 Tag information for artist, song title, and album title are supported for version 1 ID3 tags. ID3 version 2 is not supported by the radios.

Playlist files are not supported. MP3 Pro files are not supported.

Playback of MP3 Files

When a medium containing MP3 data is loaded, the radio checks all files on the medium. If the medium contains a lot of folders or files, the radio will take more time to start playing the MP3 files.

Loading times for playback of MP3 files may be affected by the following:

- Media - CD-RW media may take longer to load than CD-R media
- Medium formats - Multisession discs may take longer to load than non-multisession discs
- Number of files and folders - Loading times will increase with more files and folders

To increase the speed of disc loading, it is recommended to use CD-R media and single-session discs. To create a single-session disc, enable the “Disc at Once” option before writing to the disc.

LIST Button (CD Mode for MP3 Play)

Pressing the LIST button will bring up a list of all folders on the disc. Scrolling up or down the list is done by turning the Tune/Scroll control knob. Selecting a folder by pressing the Tune/Scroll control knob will begin playing the files contained in that folder (or the next folder in sequence if the selection does not contain playable files).

The folder list will time out after five seconds.

INFO Button (CD Mode for MP3 Play)

Pressing the INFO button repeatedly will scroll through the following TAG information: Song Title, Artist, File Name, and Folder Name (if available).

Press the INFO button once more to return to "elapsed time" priority mode.

Press and hold the INFO button for three seconds or more and the radio will display song titles for each file.

Press and hold the INFO button again for three seconds to return to "elapsed time" display.

Operation Instructions - Auxiliary Mode

The auxiliary (AUX) jack is an audio input jack, which allows the user to plug in a portable device such as an MP3 player, or cassette player, and utilize the vehicle's audio system to amplify the source and play through the vehicle speakers.

Pressing the AUX button will change the mode to auxiliary device if the AUX jack is connected.

NOTE: The AUX device must be turned on and the device's volume set to proper level. If the AUX audio is not loud enough, turn the device's volume up. If the AUX audio sounds distorted, turn the device's volume down.

TIME Button (Auxiliary Mode)
Press this button to change the display to time of day. The time of day will display for five seconds (when ignition is OFF).

Operating Instructions - Hands-Free Phone (UConnect®) (If Equipped)
Refer to "Hands-Free Communication (UConnect®)" in Section 3.

Operating Instructions - Satellite Radio Mode (If Equipped)
Refer to "Satellite Radio" in this section.

Operating Instructions - Video Entertainment System (VES)™ (If Equipped)
Refer to separate "Video Entertainment System (VES)™ Guide."

SALES CODE REU — MULTIMEDIA SYSTEM — IF EQUIPPED

NOTE: The sales code is located on the lower right side of the unit's faceplate.

The REU Multimedia system contains a radio, Sirius Satellite Radio player, navigation system, six disc CD/DVD player, USB port, 30-gigabyte hard drive (HDD), and the UConnect® Hands-Free Bluetooth® cellular system.

A 7 in (17.8 cm) remote screen allows easy menu selection, while the Advanced Voice Dialog System recognizes more than 1,000 words for audio, navigation, entertainment, and hands-free mobile phone use.

The satellite navigation capability combines a Global-Positioning System (GPS)-based navigation system with

a remote color screen to provide maps, turn identification, selection menus, and instructions for selecting a variety of destinations and routes.

A shared HDD for the navigation system, the database, and other radio features allows uploads of music and photos from CDs or through the USB port. The Gracenote database finds the artist, track, and title for the music.

An auxiliary input jack permits passengers to listen to a portable MP3 player through the vehicle's speakers. For vehicles equipped with the Video Entertainment System (VES)™, separate audio outputs allow passengers to listen to the vehicle speakers while different audio tracks play through the system's wireless headphones. This means rear-seat passengers can watch a DVD on the optional rear-seat entertainment system while the driver and front-seat passenger listen to the radio.

Other special features include music type selections, traffic messaging (optional), easy store presets, parental lockout for VES™ (if equipped), and a backup camera display for vehicles equipped with a backup camera. Refer to your "Navigation User's Manual" for detailed operating instructions.

Operating Instructions — Satellite Radio

Refer to your "Navigation User's Manual" for detailed operating instructions.

Operating Instructions — Hands-Free Communication (UConnect®) (If Equipped)

Refer to your "Navigation User's Manual" for detailed operating instructions.

Clock Setting Procedure

The GPS receiver in this system is synchronized to the time data being transmitted by the GPS satellites. The satellites' clock is Greenwich Mean Time (GMT). This is the worldwide standard for time. This makes the system's clock very accurate once the appropriate time zone and daylight savings information is set.

Changing the Time Zone

NOTE: You can skip Steps 2 and 3 by pressing and holding the "TIME" button on the radio for three seconds.

1. Turn on the multimedia system.
2. Press and release the "SETUP" button on the radio.
3. If "Time Setup" is highlighted on the menu, press and release the joystick in the center of the radio. Otherwise, turn the knob surrounding the joystick to select "Time Setup," and then press and release the joystick.
4. Turn the knob surrounding the joystick to scroll to "Time Zone," and then press and release the joystick.
5. If the desired time zone setting has a check mark next to it, proceed to the next step. Otherwise, turn the knob surrounding the joystick to select the desired time zone setting, and then press and release the joystick. A check mark will display next to the selection.
6. Press and release the "SETUP" button to exit the screen.

Changing Daylight Savings Time

When On is selected, this feature will display the time of day in daylight savings time. Proceed as follows to change the current setting:

NOTE: You can skip Steps 2 and 3 by pressing and holding the "TIME" button on the radio for three seconds.

1. Turn on the multimedia system.
2. Press and release the "SETUP" button on the radio.

3. If “Time Setup” is highlighted on the menu, press and release the joystick in the center of the radio. Otherwise, turn the knob surrounding the joystick to select “Time Setup,” and then press and release the joystick.

4. Turn the knob surrounding the joystick to scroll to “Daylight Savings,” and then press and release the joystick.

5. If the desired setting has a check mark next to it, proceed to the next step. Otherwise, turn the knob surrounding the joystick to select “Off” or “On,” and then press and release the joystick. A check mark will display next to the selection.

6. Press and release the “SETUP” button to exit the screen.

Setting the User Clock

If you wish to set the clock to a time different from the system clock, you can manually adjust the time by performing the following:

NOTE: You can skip Steps 2 and 3 by pressing and holding the “TIME” button on the radio for three seconds.

1. Turn on the multimedia system.

2. Press and release the “SETUP” button on the radio.

3. If “Time Setup” is highlighted on the menu, press and release the joystick in the center of the radio. Otherwise, turn the knob surrounding the joystick to select “Time Setup,” and then press and release the joystick.

4. If “User Time” has a check mark next to it, proceed to the next step. Otherwise, turn the knob surrounding the joystick to scroll to “User Time,” and then press and release the joystick.

5. Turn the knob surrounding the joystick to select “Set Hours,” and then press and release the joystick.

6. Turn the knob surrounding the joystick to set the hour highlighted on the clock on the screen. Press and release the joystick when done.

7. Turn the knob surrounding the joystick to select “Set Minutes,” and then press and release the joystick.

8. Turn the knob surrounding the joystick to set the minutes highlighted on the clock on the screen. Press and release the joystick when done.

9. Press and release the “SETUP” button to exit the screen.

Show Time if Radio is Off

When selected, this feature will display the time of day on the screen when the system is turned off. Proceed as follows to change the current setting:

NOTE: You can skip Steps 2 and 3 by pressing and holding the “TIME” button on the radio for three seconds.

1. Turn on the multimedia system.

2. Press and release the “SETUP” button on the radio.

3. If “Time Setup” is highlighted on the menu, press and release the joystick in the center of the radio. Otherwise, turn the knob surrounding the joystick to select “Time Setup,” and then press and release the joystick.

4. Turn the knob surrounding the joystick to scroll to "Clock if Radio off," and then press and release the joystick to change the current setting. A check mark will display next to "Clock if Radio off" when the feature is selected.

5. Press and release the "SETUP" button to exit the screen.

SATELLITE RADIO — IF EQUIPPED (REN/REQ/RER/RES/REU RADIOS ONLY)

Satellite radio uses direct satellite-to-receiver broadcasting technology to provide clear digital sound, coast to coast. The subscription service provider is Sirius Satellite Radio. This service offers over 130 channels of music, sports, news, entertainment, and programming for children, directly from its satellites and broadcasting studios.

NOTE: Sirius service is not available in Hawaii and has limited coverage in Alaska.

System Activation

Sirius Satellite Radio service is pre-activated, and you may begin listening immediately to the one year of audio service that is included with the factory-installed satellite radio system in your vehicle. Sirius will supply a welcome kit that contains general information, including how to setup your on-line listening account at no additional charge. For further information, call the toll-free number 888-539-7474, or visit the Sirius web site at www.sirius.com, or at www.siriuscanada.ca for Canadian residents.

Electronic Serial Number/Sirius Identification Number (ESN/SID)

Please have the following information available when calling:

1. The Electronic Serial Number/Sirius Identification Number (ESN/SID).

2. Your Vehicle Identification Number.

To access the ESN/SID, refer to the following steps:

ESN/SID Access With REQ/RES Radios
With the ignition switch in the ON/RUN or ACC position and the radio on, press the SETUP button and scroll using the Tune/Scroll control knob until Sirius ID is selected. Press the Tune/Scroll control knob and the Sirius ID number will display. The Sirius ID number display will time out in two minutes. Press any button on the radio to exit this screen.

ESN/SID Access With REN/RER Radios
While in SAT mode, press the MENU button on the radio faceplate.

Next, touch the SUBSCRIPTION tab on the touch screen. All the ESNs that apply to your vehicle will display.

ESN/SID Access With REU Radio
While in SAT mode, press the MENU button on the radio faceplate.

Next, turn the knob surrounding the joystick in the center of the radio to scroll to Subscription, and then press and release the joystick. All of the ESNs that apply to your vehicle will display.

Selecting Satellite Mode

Press the SAT button until "SAT" appears in the display. A CD may remain in the radio while in the Satellite radio mode.

Satellite Antenna

To ensure optimum reception, do not place items on the roof around the rooftop antenna location or strap items to the trunk lid around the trunk lid antenna (if equipped). Metal objects placed within the line of sight of the antenna will cause decreased performance. Larger luggage items such as bikes should be placed as far rearward

as possible, within the loading design of the rack. Do not place items directly on or above the antenna.

Reception Quality

Satellite reception may be interrupted due to one of the following reasons:

- The vehicle is parked in an underground parking structure or under a physical obstacle.
- Dense tree coverage may interrupt reception in the form of short audio mutes.
- Driving under wide bridges or along tall buildings can cause intermittent reception.
- Placing objects over or too close to the antenna can cause signal blockage.

Operating Instructions - Satellite Mode

NOTE: The ignition switch must be in the ON or ACC position to operate the radio.

SEEK Buttons

Press and release the SEEK buttons to search for the next channel in Satellite mode. Press the right switch to seek up and the left switch to seek down. The radio will remain tuned to the new channel until you make another selection. Holding either button will bypass channels without stopping until you release it.

SCAN Button

Pressing the SCAN button causes the tuner to search for the next channel, pausing for eight seconds before continuing to the next. To stop the search, press the SCAN button a second time.

INFO Button — Except REU Radio
Pressing the INFO button will cycle the display information between Artist, Song Title, and Composer (if available). Also, pressing and holding the INFO button for an additional three seconds will make the radio display the Song Title all of the time (press and hold again to return to normal display).

INFO Button — REU Radio
Pressing the INFO button will display information about Artist, Song Title, and Composer (if available). Pressing the INFO button again will close the INFO screen.

RW/FF
Pressing the RW (Rewind) or FF (Fast Forward) buttons causes the tuner to search for the next channel in the direction of the arrows.

TUNE Control (Rotary)
Turn the rotary Tune/Scroll control knob clockwise to increase or counterclockwise to decrease the channel.

MUSIC TYPE Button — Except REU Radio
Pressing this button once will turn on the Music Type mode for five seconds. Pressing the MUSIC TYPE button or turning the Tune/Scroll control knob within five seconds will allow the program format type to be selected.

Toggle the MUSIC TYPE button again to select the music type.

By pressing the SEEK button when the Music Type function is active, the radio will be tuned to the next channel with the same selected Music Type name.

If a preset button is activated while in the Music Type (Program Type) mode, the Music Type mode will be exited and the radio will tune to the preset channel.

MUSIC TYPE Button — REU Radio
Pressing this button provides a MUSIC TYPES list from which you can make a selection. Once a selection is

made, you can seek up, or down, or scan the channels and the radio will tune to the next station matching the selected format. There is no time-out for this screen. Pressing the MUSIC TYPE button again will close the MUSIC TYPE screen. Once closed, seek up, seek down, and scan will no longer be based on your selection.

SETUP Button
Pressing the SETUP button allows you to select the following items:

- Display Sirius ID number — Press the AUDIO/ SELECT button to display the Sirius ID number. This number is used to activate, deactivate, or change the Sirius subscription.

SET Button – To Set the Pushbutton Memory
When you are receiving a channel that you wish to commit to pushbutton memory, press the SET button. The symbol SET 1 will now show in the display window. Select the button (1-6) you wish to lock onto this channel and press and release that button. If a button is not selected within five seconds after pressing the SET button, the channel will continue to play but will not be stored into pushbutton memory.

You may add a second channel to each pushbutton by repeating the above procedure with this exception: Press the SET button twice and SET 2 will show in the display window. Each button can be set for SET 1 and SET 2. This allows a total of 12 Satellite channels to be stored into pushbutton memory. The channels stored in SET 2 memory can be selected by pressing the pushbutton twice.

Every time a preset button is used, a corresponding button number will display.

Buttons 1 - 6
These buttons tune the radio to the channels that you commit to pushbutton memory (12 Satellite stations).

Operating Instructions - Hands-Free Phone (If Equipped)

Refer to "Hands-Free Communication (UConnect®)" in Section 3.

Operating Instructions - Video Entertainment System (VES)™ (If Equipped)

Refer to separate "Video Entertainment System (VES)™ Guide."

SIRIUS BACKSEAT TV™ — IF EQUIPPED

Satellite video uses direct satellite receiver broadcasting technology to provide streaming video. The subscription service provider is SIRIUS Satellite Radio. SIRIUS Backseat TV™ offers three video channels for family entertainment, directly from its satellites and broadcasting studios.

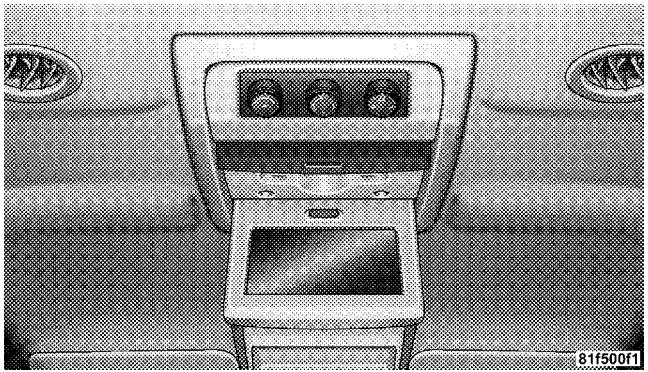
NOTE: SIRIUS service is not available in Hawaii and has limited coverage in Alaska.

Refer to your Video Entertainment System (VES)™, RER Navigation or REN Multimedia User Manual for detailed operating instructions.

VIDEO ENTERTAINMENT SYSTEM (VES)™ — IF EQUIPPED

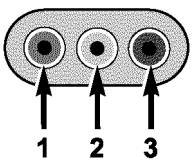
The optional Video Entertainment System (VES)™ includes the following components for rear seat entertainment:

- A diagonal 8 in (20 cm) Liquid Crystal Display (LCD) screen integrated into the center overhead console. The screen features brightness control for optimum daytime and nighttime viewing.
- The LCD Screen swings down from the console to allow the rear seat passenger(s) to view the display.



VES™ with Rear HVAC Controls

- The touch screen radio and DVD player controls allow front seat operation for easy setup in the case of younger rear seat passengers.
- A battery-powered infrared remote control that snaps into a molded compartment in the center console.
- Two wireless infrared headsets allow rear seat passengers to listen to the same or individual audio sources.



Audio/Video RCA Jacks (AUX Jacks) on the rear of the center console enable the monitor to display video directly from a video camera, connect video games for display on the screen, or play music directly from an MP3 player.

1. Video in (yellow)
2. Left audio in (white)
3. Right audio in (red)

NOTE: Refer to your "Video Entertainment System (VES)™ User Manual" for detailed operating instructions.

UNIVERSAL CONSUMER INTERFACE (UCI) — IF EQUIPPED

NOTE: This section is for sales code RES/REL and REQ/RET radios only with UConnect®. For sales code REN/REZ touch screen radio and REU/REX/RE1 radio, refer to the separate User's Manual.

This feature allows you to plug an iPod® mobile digital device into the vehicle's sound system through a connector (UCI connector) using an optional connection cable (available through MOPAR®). See your authorized dealer for details.

Using this feature,

- the iPod® audio can be played on the vehicle's sound system, providing metadata (Track Title, Artist, Album, etc.) information display on radio.
- the iPod® can be controlled using the radio buttons to Play, Browse and List the iPod® contents.
- the iPod® battery charges when plugged into the UCI connector.

Connecting The iPod® Device

Use the optional connection cable to connect an iPod® to the vehicle's UCI connector (which is located in the glove box or center console on some vehicles. This location may vary with vehicle). Once the iPod® is connected and synchronized to the vehicle system (this may take a few seconds to connect), the vehicle brand logo appears on the iPod® display, and it starts charging and is ready for use by pressing radio switches as described below.

Controlling The iPod® Using Radio Buttons

To get into the UCI (iPod®) mode and access a connected iPod®, press the AUX button on the radio faceplate. Once in the UCI (iPod®) mode, the iPod® audio track (if available from iPod®) will start playing over the vehicle audio system.

Play Mode

When switched to UCI mode the iPod® will be in Play mode. In Play mode, you may use the following buttons on the radio faceplate to control the iPod® and display data:

Tune/Scroll Knob

Use the Tune/Scroll knob to go to the next or previous track.

The Tune/Scroll knob functions similar to the scroll wheel on the iPod® mobile digital device.

Turning it clockwise (forward) by one click while playing a track skips to the next track.

Turning it counterclockwise (backward) by one click during the first two seconds of the track will jump to the previous track in the list and turning this button at any other time in the track will jump to the beginning of the current track.

RW (Rewind) Button

Press and hold the RW button to move backward in the current track. Holding the RW button long enough will take you back to the beginning of the current track.

Pressing and releasing the RW button will go back five seconds of the current track.

FF (Fast Forward) Button

Press and hold the FF button to move forward in the current track.

Pressing and releasing the FF button will go forward five seconds of the current track.

SEEK Buttons

Use the SEEK buttons to move to the previous or the next track.

If the left (down) button is pressed during the first two seconds of the current track, it will go back to the

previous track in the list; if you press this button at any other time in the current track it will go back to the beginning of the track.

If the right (up) button is pressed during Play mode, it will go to the next track in the list.

INFO Button
Press the INFO button while a track is playing to see the information (Track Title, Artist, Album, etc.) for that track. Each press of the INFO button will take you to the next screen of data for that track. Once you have seen all of the screens, the last press of the INFO button will take you back to the Play mode screen on the radio.

REPEAT Button
Press the REPEAT button to repeat the current playing track.

SCAN Button
Pressing the SCAN button will play the first five seconds of each track in the current list and then forward to the next song. To stop the SCAN mode and start playing the desired track, press the SCAN button again.

During the SCAN mode, you can also press the SEEK button to the left or right to go to the previous or next tracks.

RND (Random) Button (RES/REL Radios Only)
Pressing the RND button will switch between the shuffle on and shuffle off modes of the iPod®. If the RND icon is showing on the radio display then the Shuffle mode is on.

List or Browse Mode

During Play mode, pressing any of the following buttons will take you to List mode. List mode enables you to scroll through the list of menus and tracks on the iPod® device.

Tune/Scroll Knob

In the List mode, the Tune/Scroll knob functions in a similar manner as the scroll wheel on the iPod®.

Turning the Tune/Scroll knob clockwise (forward) and counterclockwise (backward) scrolls through lists, displaying the track detail on the radio display. Once you have the track to be played highlighted on the radio display, press the Tune/Scroll knob to select and start playing the track. By turning the Tune/Scroll knob fast, you can jump through the list faster. During fast scroll, you may notice a slight delay in updating the information on the radio display.

During all List modes, the iPod® will display all lists in "wrap-around" mode. So if the track you wish to select is at the bottom of the list, you just turn the Tune/Scroll knob backward (counterclockwise) to get to the track faster.

Radio Preset Buttons

In the List mode, the radio preset buttons are used as shortcuts to the following lists on the iPod® device.

- 1 – Playlists
- 2 – Artists
- 3 – Albums
- 4 – Genres
- 5 - Audiobooks
- 6 – Podcasts

After pressing a preset button, you will see the list you are in on the top line and the first item in that list on the second line.

To exit the List mode without selecting a track, press the same preset button again to go back to Play mode.

LIST Button

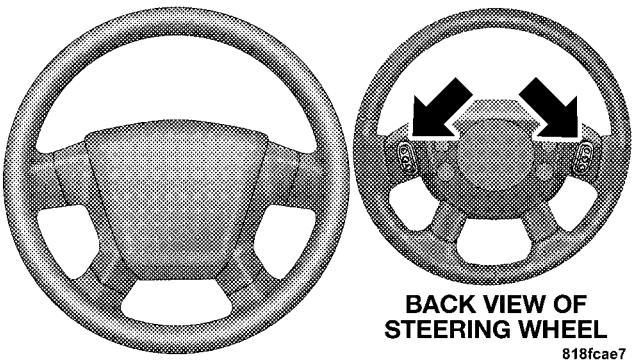
Pressing the LIST button will take to the top level menu of the iPod®. This takes you to the same top level menu as on your iPod®. Turn the Tune/Scroll knob to list the top menu item you wish to select and then press the Tune/Scroll knob. This will take you to the next sub menu list item of the iPod® and you can follow the same steps to go to the desired track in that list. Not all iPod® sub menu levels are available on this system.

MUSIC TYPE Button

The MUSIC TYPE button is another shortcut button to the genre listing on your iPod®.

REMOTE SOUND SYSTEM CONTROLS — IF EQUIPPED

The remote sound system controls are located on the rear surface of the steering wheel. The left- and right-hand controls are rocker-type switches with a pushbutton in the center of each switch. Reach behind the steering wheel to access the switches.



Remote Sound Controls

Right-Hand Switch Functions

- Press the top of the switch to increase the volume.
- Press the bottom of the switch to decrease the volume.
- Press the button in the center of the switch to change modes (i.e., AM, FM, etc.).

Left-Hand Switch Functions for Radio Operation

- Press the top of the switch to SEEK the next listenable station up from the current setting.
- Press the bottom of the switch to SEEK the next listenable station down from the current setting.
- Press the button in the center of the switch to tune to the next preset that you have programmed.

Left-Hand Switch Functions for Media (i.e., CD) Operation

- Press the top of the switch once to listen to the next track.
- Press the bottom of the switch once either to listen to the beginning of the current track or to listen to the beginning of the previous track if it is within one second after the current track begins to play.

- Press the switch up or down twice to listen to the second track, three times to listen to the third track, and so forth.
- Press the button located in the center of the switch to change to the next preset that you have programmed.

CD/DVD MAINTENANCE

To keep the CD/DVD discs in good condition, take the following precautions:

1. Handle the disc by its edge; avoid touching the surface.

2. If a disc is stained, clean the surface with a soft cloth, wiping from center to edge.

3. Do not apply paper, paper CD labels, or tape to the disc; avoid scratching a disc.

4. Do not use solvents such as benzine, thinner, cleaners, or antistatic sprays.

5. Store a disc in its case after playing.

6. Do not expose a disc to direct sunlight.

7. Do not store a disc where temperatures may become too high.

8. Do not play discs that are small in size or have irregular shapes.

RADIO OPERATION AND CELLULAR PHONES

Under certain conditions, the cellular phone being on in your vehicle can cause erratic or noisy performance from your radio. This condition may be lessened or eliminated by relocating the cellular phone antenna. This condition is not harmful to the radio. If your radio performance does not satisfactorily “clear” by the repositioning of the antenna, it is recommended that the radio volume be turned down or off during cellular phone operation.

CLIMATE CONTROLS

The air conditioning and heating system is designed to make you comfortable in all types of weather. For information about basic climate control functions, refer to "General Climate Control Functions — All Systems." For more detailed information about the climate controls in your vehicle, refer to "Single-Zone Manual Air Conditioning and Heating System," "Two- and Three-Zone Manual Air Conditioning and Heating Systems," or "Two- and Three-Zone Automatic Temperature Control (ATC) Systems."

General Climate Control Functions — All Systems

Blower Control

Use this control to regulate the amount of air forced through the ventilation system in any mode.

Temperature Control

Use this control to regulate the temperature of the air inside the cabin.

Air Conditioning (A/C) Control

Use this control to engage and disengage the A/C.

NOTE:

- The A/C compressor will not engage until the engine has been running for about 10 seconds.
- If A/C performance seems lower than expected, check the front of the A/C condenser (located in front of the radiator) for an accumulation of dirt or insects. Clean with a gentle water spray from behind the radiator and through the condenser. Fabric front fascia protectors may reduce airflow to the condenser, reducing air conditioning performance.

Mode Control (Air Direction)

Use these controls to choose from several patterns of air distribution.

- *Panel*

Air is directed through the outlets in the instrument panel. For vehicles equipped with a three-zone system, air is also directed through the outlets in the headliner, unless the climate control for the rear passengers is ON and in Floor mode.

NOTE: These outlets are adjustable to direct airflow. For maximum airflow to the rear, aim the center instrument panel outlets so that they are directed toward the rear seat passengers.

- *Bi-Level*

Air is directed through the panel and floor outlets. For vehicles equipped with a three-zone system, air is also directed through the outlets in the headliner, unless the climate control for the rear passengers is ON and in Floor mode.

NOTE: For all settings except full cold or full hot, there is a difference in temperature between the upper and lower outlets. The warmer air flows to the floor outlets. This feature gives improved comfort during sunny but cool conditions.

- *Floor*

Air is directed through the floor outlets with a small amount flowing through the defrost and side window demist outlets. For vehicles equipped with a three-zone system, air is directed through the floor outlet in the right quarter trim panel, unless the climate control for the rear passengers is ON and in Panel mode.

- *Mix*

Air is directed through the floor, defrost, and side window demist outlets. For vehicles equipped with a three-zone system, air is directed through the floor outlet in the right quarter trim panel, unless the climate control for the rear passengers is ON and in Panel mode.

NOTE: This setting works best in cold or snowy conditions that require extra heat to the windshield. This setting is good for maintaining comfort while reducing moisture on the windshield.

- *Defrost*

Air is directed through the windshield and side window demist outlets. For vehicles equipped with a three-zone system, air is directed through the floor outlet in the right quarter trim panel, unless the climate control for the rear passengers is ON and in Panel mode.

NOTE: Use this mode with maximum blower and temperature settings for best windshield and side window defrosting.

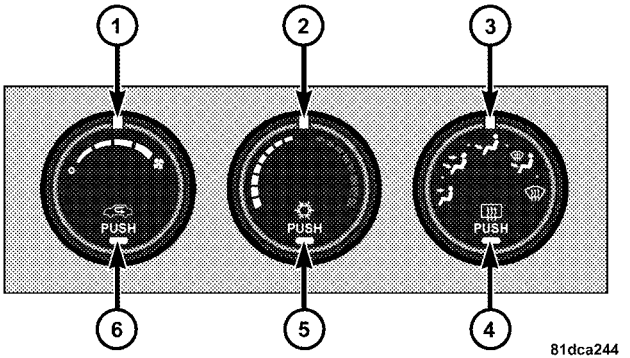
- *Recirculation Control*

Use this button to block the flow of outside air from coming into the passenger compartment.

NOTE:

- Only use the Recirculation mode as a temporary means to block out any outside odors, smoke, or dust, and to cool the interior rapidly upon initial start up in very hot or humid weather.
- Continuous use of the Recirculation mode may make the inside air stuffy and window fogging may occur. Extended use of this mode is not recommended.
- The use of the Recirculation mode in cold or damp weather will cause windows to fog on the inside, because of moisture build-up inside the vehicle. Select the outside air position for maximum defogging.

Single-Zone Manual Air Conditioning and Heating System



Single-Zone Manual Climate Control

1. Blower Control
The blower speed increases as you move the control to the right from the "O" (Off) position. There are four blower speeds.

2. Temperature Control
Turn left for cooler or right for warmer temperature settings.

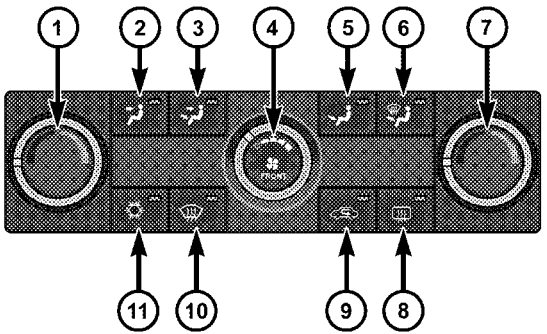
3. Mode Control
Turn to select either a primary mode as identified by the symbols on the control, or a blend of two of these modes. The closer the setting is to a particular symbol, the more air distribution you receive from that mode. See Note [1] and [2]

4. Electric Rear Window Defroster Control
Refer to "Rear Window Features" in Section 3 for more information.

5. A/C Control
Press and release to change the current setting. The indicator illuminates when ON. See Note [3]

6. Recirculation Mode Control
Press and release to change the current setting. The indicator illuminates when ON.
Note [1] - The A/C compressor operates in Mix and Defrost, or a blend of these modes, even if the A/C control is not pressed. This dehumidifies the air to help dry the windshield. To improve fuel economy, use these modes only when necessary.
Note [2] - The A/C will engage automatically to prevent fogging when the Recirculation button is pressed and the Mode control is set to Panel or Panel/Floor. The A/C can be deselected manually without disturbing the Mode control selection.
Note [3] - For maximum cooling, use A/C and recirculation at the same time. If economy mode is desired, turn OFF the A/C and turn the Temperature control to the desired temperature setting.

Two- and Three-Zone Manual Air Conditioning and Heating Systems — If Equipped



Two-Zone Manual Climate Control

1. Left Front Temperature Control
Provides left front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

2. Panel Mode Button
Press and release to select. The indicator illuminates when selected.

3. Bi-Level Mode Button
Press and release to select. The indicator illuminates when selected.

4. Front Blower Control
The blower speed increases as you move the control to the right from the "O" (Off) position. There are four blower speeds.

5. Floor Mode Button
Press and release to select. The indicator illuminates when selected.

6. Mix Mode Button
Press and release to select. The indicator illuminates when selected.

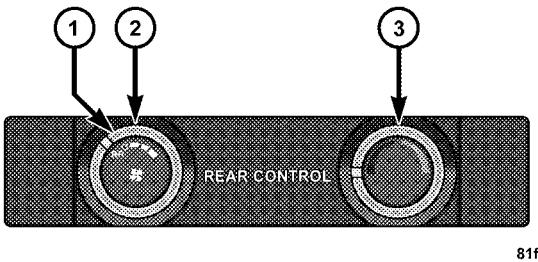
7. Right Front Temperature Control
Provides right front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

8. Electric Rear Window Defroster Button
Refer to "Rear Window Features" in Section 3 for more information.

9. Recirculation Mode Button
Press and release to change the current setting. The indicator illuminates when ON.

10. Defrost Mode Button
Press and release to select. The indicator illuminates when selected.

11. A/C Button
Press and release to change the current setting. The indicator illuminates when ON.

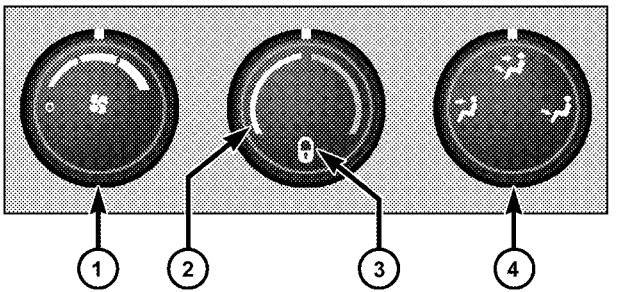


Rear-Zone Manual Climate Control

1. RR Control
Turns the climate control in the overhead console above the second row passenger seats ON and OFF. Press and release to change the current setting.

2. Rear Blower Control
The blower speed increases as you move the control to the right from the "O" (Off) position. There are three blower speeds.

3. Rear Temperature Control
Provides independent temperature control for the rear cabin. Turn left for cooler or right for warmer temperature settings in the rear cabin.



Rear-Zone Manual Climate Control

The Rear-Zone Manual Climate Control for the rear passengers is located in the overhead console above the second row passenger seats.

1. Rear Blower Control

The blower speed increases as you move the control to the right from the "O" (Off) position. There are three blower speeds.

2. Rear Temperature Control

Provides rear seat occupants with independent temperature control. Turn left for cooler or right for warmer temperature settings in the rear cabin.

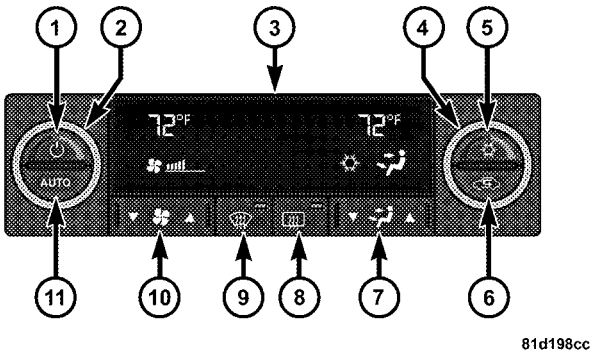
3. Lockout

This indicator illuminates when the climate control is turned OFF by the RR control on the Rear-Zone Manual Climate Control in the instrument panel.

4. Rear Mode Control

Turn to select Panel, Bi-Level, or Floor for the mode of rear cabin air distribution.

Two- and Three-Zone Automatic Temperature Control (ATC) Systems — If Equipped



Two-Zone ATC

1. ATC ON/OFF Button
Press and release to change the current setting.

2. Left Front Temperature Control
Provides left front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

3. Display Screen
Shows the current blower speed, mode, and temperature settings, and it will display an indicator when Recirculation mode is ON and when the A/C is ON.

4. Right Front Temperature Control
Provides right front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

5. A/C Button
Press and release to change the current setting.

6. Recirculation Mode Button
Press and release to change the current setting. See Note [1]

7. Mode Button
Press the DOWN or UP arrow to change the mode of air distribution to Floor, Panel, Bi-Level, or Mix.

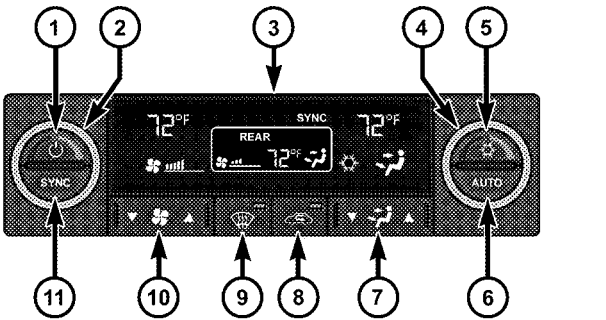
8. Electric Rear Window Defroster Button
Refer to "Rear Window Features" in Section 3 for more information.

9. Defrost Mode Button
Press and release to select. The indicator illuminates when ON.

10. Front Blower Button
Press the DOWN arrow to decrease or the UP arrow to increase blower speed.

11. AUTO Button
Controls airflow temperature, distribution, volume, and the amount of air recirculation automatically. Press and release to select. Refer to "Automatic Operation — Two- and Three-Zone ATC" for more information.

Note [1] - To prevent window fogging, Recirculation Mode will not operate when either Defrost or Mix mode is selected. Doing so will cause the indicator to blink and then turn OFF.



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1. ATC ON/OFF Button
Press and release to change the current setting.

2. Left Front Temperature Control
Provides left front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

3. Display Screen
Shows the current blower speed, mode, and temperature settings, and it will display an indicator when the A/C is ON.

4. Right Front Temperature Control
Provides right front seat occupant with independent temperature control. Turn left for cooler or right for warmer temperature settings.

5. A/C Button
Press and release to change the current setting.

6. AUTO Button
Controls airflow temperature, distribution, volume, and the amount of air recirculation automatically. Press and release to select. Refer to "Automatic Operation — Two- and Three-Zone ATC" for more information.

7. Mode Button
Press the DOWN or UP arrow to change the mode of air distribution to Floor, Panel, Bi-Level, or Mix.

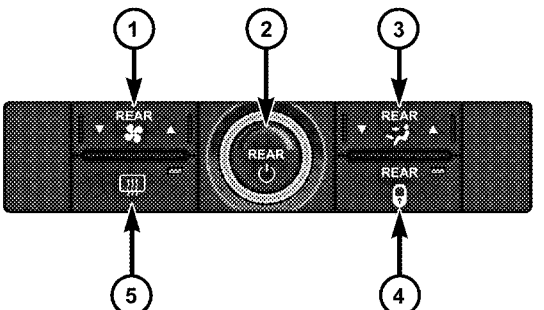
8. Recirculation Mode Button
Press and release to change the current setting. The indicator illuminates when ON. See Note [1]

9. Defrost Mode Button
Press and release to select. The indicator illuminates when ON.

10. Front Blower Control
Press the DOWN arrow to decrease or the UP arrow to increase front blower speed.

11. SYNC Button
Press and release to control the temperature setting for all three zones from the Left Front Temperature Control.

Note [1] - To prevent window fogging, Recirculation Mode will not operate when either Defrost or Mix mode is selected. Doing so will cause the indicator to blink and then turn OFF.



Three-Zone ATC Lower Control Panel

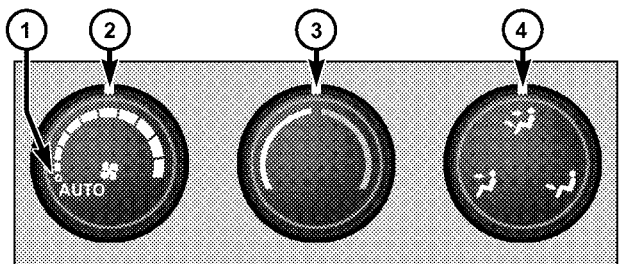
1. Rear Blower Control
Press the DOWN arrow to decrease or the UP arrow to increase rear blower speed.

2. Rear Temperature Control
Provides independent temperature control for the rear cabin. Turn left for cooler or right for warmer temperature settings in the rear cabin.

3. Rear Mode Button
Press the DOWN or UP arrow to change the mode of rear cabin air distribution to Floor, Panel, or Bi-Level.

4. REAR Button
Turns the climate control in the overhead console above the second row passenger seats ON and OFF. Press and release the button to change the current setting. The indicator illuminates when ON.

5. Electric Rear Window Defroster Button
Refer to "Rear Window Features" in Section 3 for more information.



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Rear-Zone ATC

The Rear-Zone ATC for the rear passengers is in the overhead console above the second row passenger seats.

1. AUTO
Controls airflow temperature, distribution, and volume automatically. Turn to this position to select. Refer to "Automatic Operation — Rear-Zone ATC" for more information.

2. Rear Blower Control
The blower speed increases as you move the control to the right from the "O" (Off) position. There are 10 blower speeds.

3. Rear Temperature Control
Provides rear seat occupants with independent temperature control. Turn left for cooler or right for warmer temperature settings in the rear cabin. When the rear climate control is turned OFF by the rear button on the Three – Zone ATC, a red indicator will appear at the bottom of the Rear Temperature Control Knob.

4. Rear Mode Control
Turn to select Panel, Bi-Level, or Floor for the mode of rear cabin air distribution.

Automatic Operation — Two- and Three-Zone ATC
The Two- and Three-Zone ATC systems automatically maintain the climate in the cabin of the vehicle. To accomplish this, the system gathers information from the climate controls, from a dual sun-sensor located in the top of the instrument panel, from an infrared sensor located between the sun visors, and from various sensors located throughout the vehicle.

- The climate controls provide the system with operator input.
- The dual sun-sensor monitors sun load coming through the windshield.
- The infrared sensor independently measures the surface temperature of the driver and passengers.
- Other sensors take into account vehicle-speed, A/C pressure, outside temperature, and engine cooling temperature.

Using all of these inputs, the system automatically adjusts airflow temperature, airflow distribution, airflow volume, and the amount of outside air recirculation. This maintains a comfortable temperature even under changing conditions.

To select automatic operation, perform the following steps:

1. Press and release the AUTO button and the ATC displays the word "AUTO," along with current settings for temperature, mode, and blower speed. It also displays the snowflake icon if the A/C is running.

2. Turn the Left Front Temperature Control, the Right Front, and if so equipped, the Rear Temperature Control to dial in the temperature that you want the system to

maintain for each zone. On Three-Zone ATC systems, if so desired, push and release the SYNC button. Then turn the Left Front Temperature Control to dial in the temperature that you want the system to maintain for all three zones.

Once the comfort level is selected, the system will maintain that level automatically using the heating system. Should the desired comfort level require A/C, the system will automatically make the adjustment. You will experience the greatest efficiency by simply allowing the system to function automatically. 72°F (22°C) is the recommended setting for maximum comfort for the average person; however, this may vary.

NOTE:

- The temperature setting can be adjusted at anytime without affecting automatic operation.
- Pressing the A/C button, or adjusting the blower speed, or changing the mode of air distribution while in AUTO mode will cancel automatic operation.

Automatic Operation — Rear-Zone ATC

1. Press the REAR button on the Three-Zone ATC in the instrument panel to turn ON the Rear-Zone ATC in the overhead console.

2. Turn the Rear Blower control on the Rear-Zone ATC in the overhead console to the AUTO position.

3. Turn the Rear Temperature control on the Rear-Zone ATC in the overhead console to dial in the temperature that you want the system to maintain in the rear cabin.

NOTE:

- The temperature setting can be adjusted at anytime without affecting automatic operation.

Operating Tips

NOTE: Refer to the chart at the end of this section for suggested control settings for various weather conditions.

Summer Operation

The engine cooling system in air-conditioned vehicles must be protected with a high-quality antifreeze coolant to provide proper corrosion protection and to protect against engine overheating. Refer to "Cooling System" under "Maintenance Procedures" and to "Fluids, Lubricants, and Genuine Parts" in Section 7 for information pertaining to the cooling system and coolant selection.

Winter Operation

Use of the air Recirculation mode during Winter months is not recommended because it may cause window fogging.

Vacation Storage

Anytime you store your vehicle, or keep it out of service (i.e., vacation) for two weeks or more, run the air conditioning system at idle for about five minutes in the fresh air and high blower settings. This will ensure adequate system lubrication to minimize the possibility of compressor damage when the system is started again.

Window Fogging

Interior fogging on the windshield can be quickly removed by turning the mode selector to Defrost. The Defrost/Floor mode can be used to maintain a clear windshield and provide sufficient heating. If side window fogging becomes a problem, increase blower speed. Vehicle windows tend to fog on the inside in mild but rainy or humid weather.

NOTE: Recirculate without A/C should not be used for long periods as fogging may occur.

Side Window Demisters

A side window demister outlet is located at each end of the instrument panel. These non-adjustable outlets direct air toward the side windows when the system is in the Floor, Mix, or Defrost mode. The air is directed at the area of the windows through which you view the outside mirrors.

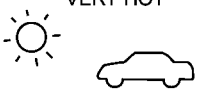
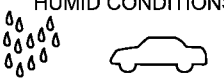
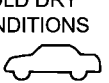
Outside Air Intake

Make sure the air intake, located directly in front of the windshield, is free of obstructions such as leaves. Leaves collected in the air intake may reduce airflow, and if they enter the plenum, they could plug the water drains. In Winter months, make sure the air intake is clear of ice, slush, and snow.

A/C Air Filter — If Equipped

The A/C Air Filter will reduce, but not eliminate, diesel and agricultural smells. The filter acts on air coming from outside the vehicle and recirculated air within the passenger compartment. Refer to "Maintenance Procedures" in Section 7 for A/C Air Filter service information or see your authorized dealer for service. Refer to the Maintenance Schedule in Section 8 for filter service intervals.

Control Setting Suggestions for Various Weather Conditions

WEATHER	CONTROL SETTINGS
HOT WEATHER AND VEHICLE INTERIOR IS VERY HOT 	Open the windows, start the vehicle, press the button to turn recirculate off. Set the Fan control to the high position. Press the button. Set the Mode control at or between and . Set the temperature control to full cool. After the hot air is pushed from the vehicle press the button to turn recirculate on and roll up the windows. Once you are comfortable, press the button to turn recirculate off and adjust the temperature control for comfort.
WARM WEATHER	Press the button to turn recirculate off. If it's sunny, set the Mode control at or near and turn the air conditioning on. If it's cloudy or dark, set the Mode control at or near .
COOL OR COLD HUMID CONDITIONS 	Press the button to turn recirculate off. If it's sunny, set the Mode control at or between and then turn the air conditioning on. If it's cloudy or dark, set the Mode control at or near and turn the air conditioning on. If the windows begin to fog, set Mode control at or between and .
COLD DRY CONDITIONS 	Set the Mode control at ot near . If it is sunny, you may want more upper air. In this case, set the Mode control at or between and . In very cold weather, if you need extra heat at the windshield, set the Mode control at or near the .

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STARTING AND OPERATING

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STARTING PROCEDURES

Before starting your vehicle, adjust your seat, adjust the inside and outside mirrors, fasten your seat belt, and if present, instruct all other occupants to buckle their seat belts.

WARNING!

- **Never leave children alone in a vehicle. Leaving unattended children in a vehicle is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Don't leave the key in the ignition. A child could operate power windows, other controls, or move the vehicle.**
- **Do not leave animals or children inside parked vehicles in hot weather; interior heat buildup may cause serious injury or death.**
- **Be sure to turn OFF the engine and remove the key from the ignition switch if you want to rest or sleep in your car. Accidents can be caused by inadvertently moving the shift lever. Accidents can also be caused by pressing the accelerator pedal. This may cause excessive heat in the exhaust system, resulting in overheating and vehicle fire, which may cause serious or fatal injuries.**

Automatic Transaxle

The shift lever must be in the NEUTRAL or PARK position before you can start the engine. Apply the brakes before shifting into any driving gear.

CAUTION!

Damage to the transaxle may occur if the following precautions are not observed:

- **Shift into PARK only after the vehicle has come to a complete stop.**
- **Shift into or out of REVERSE only after the vehicle has come to a complete stop and the engine is at idle speed.**
- **Do not shift from REVERSE, PARK, or NEUTRAL into any forward gear when the engine is above idle speed.**
- **Before shifting into any gear, make sure your foot is firmly on the brake pedal.**

Normal Starting (Tip Start)

NOTE: Normal Starting of either a cold or a warm engine is obtained without pumping or depressing the accelerator pedal.

Do not press the accelerator. Use the Fob with Integrated Key to briefly turn the ignition switch to the START position and release it as soon as the starter engages. The starter motor will continue to run, and it will disengage automatically when the engine is running. If the engine fails to start, the starter will disengage automatically in 10 seconds. If this occurs, turn the ignition switch to the LOCK position, wait 10 to 15 seconds, then repeat the normal starting procedure.

Extremely Cold Weather (Below −20°F or −29°C)

To ensure reliable starting at these temperatures, use of an externally powered electric engine block heater (available from your authorized dealer) is recommended.

If Engine Fails To Start

WARNING!

- **Never pour fuel or other flammable liquids into the throttle body air inlet opening in an attempt to start the vehicle. This could result in a flash fire causing serious personal injury.**
- **Do not attempt to push or tow your vehicle to get it started. Vehicles equipped with an automatic transaxle cannot be started this way. Unburned fuel could enter the catalytic converter and once the engine has started, ignite and damage the converter and vehicle. If the vehicle has a discharged battery, booster cables may be used to obtain a start from a booster battery or the battery in another vehicle. This type of start can be dangerous if done improperly. Refer to Section 6 for proper jump-starting procedures and follow them carefully.**

If the engine fails to start after you have followed the "Normal Starting" or "Extreme Cold Weather" procedures, it may be flooded. To clear any excess fuel, push the accelerator pedal all the way to the floor and hold it. Then, turn the ignition switch to the START position and release it as soon as the starter engages. The starter motor will disengage automatically in 10 seconds. Once this occurs, release the accelerator pedal, turn the ignition switch to the LOCK position, wait 10 to 15 seconds, then repeat the normal starting procedure.

CAUTION!

To prevent damage to the starter, wait 10 to 15 seconds before trying again.

After Starting

The idle speed is controlled automatically and it will decrease as the engine warms up.

ENGINE BLOCK HEATER — IF EQUIPPED

The engine block heater warms engine coolant and permits quicker starts in cold weather. Connect the cord to a standard 110-115 Volt AC electrical outlet with a grounded, three-wire extension cord.

The engine block heater cord is bundled under the hood between the headlight assembly and the Totally Integrated Power Module (Fuse Box) on the driver's side of the vehicle.

WARNING!

Remember to disconnect the cord before driving. Damage to the 110-115 Volt electrical cord could cause electrocution.

AUTOMATIC TRANSAXLE

CAUTION!

Damage to the transaxle may occur if the following precautions are not observed:

- **Shift into PARK only after the vehicle has come to a complete stop.**
- **Shift into or out of REVERSE only after the vehicle has come to a complete stop and the engine is at idle speed.**
- **Do not shift from REVERSE, PARK, or NEUTRAL into any forward gear when the engine is above idle speed.**
- **Before shifting into any gear, make sure your foot is firmly on the brake pedal.**

NOTE: You MUST press and hold the brake pedal down while shifting out of PARK.

WARNING!

- **It is dangerous to move the shift lever out of PARK or NEUTRAL if the engine speed is higher than idle speed. If your foot is not firmly on the brake pedal, the vehicle could accelerate quickly forward or in reverse. You could lose control of the vehicle and hit someone or something. Only shift into gear when the engine is idling normally and when your right foot is firmly on the brake pedal.**
- **Unintended movement of a vehicle could injure those in and near the vehicle. As with all vehicles, you should never exit a vehicle while the engine is running. Before exiting a vehicle, you should always shift the vehicle into PARK, remove the key from the ignition, and apply the parking brake. Once the key is removed from the ignition, the shift lever is locked in the PARK position, securing the vehicle against unwanted movement. Furthermore, you should never leave unattended children inside a vehicle.**

Brake/Transaxle Interlock System

This vehicle is equipped with a Brake Transaxle Shift Interlock System (BTSI) that holds the shift lever in the PARK position when the ignition switch is in the LOCK position. To move the shift lever out of the PARK position, the ignition switch must be turned to the ON position, and the brake pedal must be depressed.

BTSI Override

There is an override for the BTSI that allows you to move the shift lever out of the PARK position if an electrical system malfunction occurs (i.e., dead battery). To activate the override system, perform the following steps:

1. Firmly apply the parking brake.

2. Insert the ignition key into the ignition switch and rotate it to the ON position.

3. Remove the cubby bin liner located in the center console behind the shift lever.

4. Insert a screwdriver or similar small tool into the hole at the front of the cubby bin and push the manual override release lever forward.

5. While holding the release lever forward, move the shift lever from PARK to NEUTRAL.

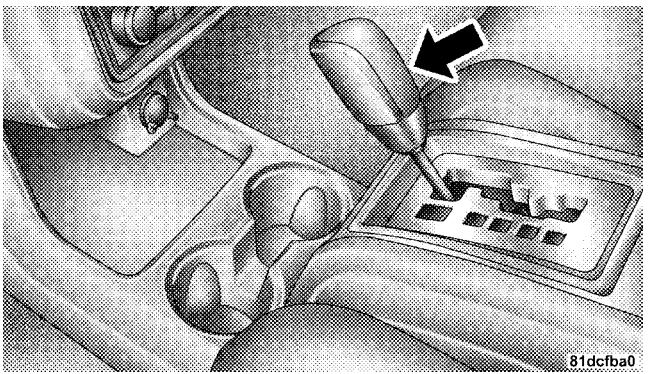
6. Release the manual override.

Automatic Transaxle Ignition Interlock System

This system prevents the key from being removed unless the shift lever is in PARK. It also prevents shifting out of PARK unless the key is in the ON position and the brake pedal is applied.

4-Speed or 6-Speed (AutoStick®) Automatic Transaxle

The electronically controlled transaxle provides a precise shift schedule. The transaxle electronics are self-calibrating; therefore, the first few shifts on a new vehicle may be somewhat abrupt. This is a normal condition, and precision shifts will develop within a few hundred miles (kilometers).



Shift Lever

Gear Ranges

PARK

PARK supplements the parking brake by locking the transaxle. The engine can be started in this range. Never attempt to use PARK while vehicle is in motion. Apply parking brake when leaving vehicle in this range.

When parking on a flat surface, place the shift lever in the PARK position first, and then apply the parking brake.

When parking on a hill, it is important to set the parking brake before placing the shift lever in PARK, otherwise the load on the transaxle locking mechanism may make it difficult to move the shift lever out of PARK. As an added precaution, turn the front wheels toward the curb on a downhill grade and away from the curb on an uphill grade.

WARNING!

Never use PARK position on an Automatic Transaxle as a substitute for the parking brake. Always apply parking brake fully when parked to guard against vehicle movement and possible injury or damage.

CAUTION!

DO NOT race the engine when shifting from PARK or NEUTRAL positions into another gear range as this can damage the drivetrain.

REVERSE

Use REVERSE for moving the vehicle rearward. Shift into REVERSE only after the vehicle has come to a complete stop.

NEUTRAL
The engine may be started in this range.

WARNING!

Do not coast in NEUTRAL and never turn off the ignition to coast down a hill. These are unsafe practices that limit your response to changing traffic or road conditions. You might lose control of the vehicle and have an accident.

DRIVE — 6-Speed Transaxle
This range should be used for most city and highway driving. It provides the smoothest upshifts, downshifts, and best fuel economy. However, use the AutoStick® mode and select the "5" range when frequent transaxle shifting occurs while using the DRIVE range, such as when operating the vehicle under heavy loading conditions, (i.e., in hilly terrain, traveling into strong head winds or while towing heavy trailers). Under these conditions, using the "5" range will improve performance and extend transaxle life by reducing excessive shifting and heat build-up.

"D" (Overdrive) — 4-Speed Transaxle
This range should be used for most city and highway driving. It provides the smoothest upshifts, downshifts, and best fuel economy. However, select the "3" range when frequent transaxle shifting occurs while using the "D" (Overdrive) range, such as when operating the vehicle under heavy loading conditions, (i.e., in hilly terrain, traveling into strong head winds or while towing heavy trailers). Under these conditions, using the "3" range will improve performance and extend transaxle life by reducing excessive shifting and heat build-up.

"3" (Drive) — 4-Speed Transaxle
This range eliminates shifts into "D" (Overdrive). The transaxle will operate normally in 1st, 2nd, and 3rd while in this range. The "3" (Drive) range should also be used when descending steep grades to prevent brake system distress.

NOTE: Using the "3" (Drive) range while operating the vehicle under heavy operating conditions will improve performance and extend transaxle life by reducing excessive shifting and heat build up.

"L" (Low) — 4-Speed Transaxle
This range should be used for engine braking when descending very steep grades. In this range, upshifts will occur only to prevent engine overspeed while downshifts occur earlier than other gear range selections.

CAUTION!

If the transaxle operating temperature exceeds acceptable limits, the vehicle computer will override "D" (Overdrive) and "5" range (for 6-speed AutoStick® transaxle) and "3" range (for 4-speed auto transaxle) by changing shift points. This is done to prevent transaxle damage due to overheating.

Reset Mode - Electronic Transaxle
The transaxle is monitored electronically for abnormal conditions. If a condition is detected that could cause damage, the transaxle automatically shifts into 2nd gear (3rd gear for 6-speed). The transaxle remains in 2nd gear (3rd gear for 6-speed) despite the forward gear selected.

PARK, REVERSE, and NEUTRAL will continue to operate. This Reset feature allows the vehicle to be driven to an authorized dealer for service without damaging the transaxle.

In the event of a momentary problem, the transaxle can be reset to regain all forward gears by performing the following steps:

1. Stop the vehicle.
2. Shift into PARK.
3. Turn the ignition switch to the LOCK position.
4. Restart the engine.
5. Shift into the desired gear range and resume driving.

NOTE: Even if the transaxle can be reset, it is recommended that you visit an authorized dealer at your earliest possible convenience. Your authorized dealer has diagnostic equipment to determine if the problem could recur.

If the transaxle cannot be reset, authorized dealer service is required.

AUTOSTICK® — IF EQUIPPED

AutoStick® is a driver-interactive transaxle that offers six manual ratio changes to provide you with more control of the vehicle. AutoStick® allows you to maximize engine braking, eliminate undesirable upshifts and downshifts, and improve overall vehicle performance. This system can also provide you with more control during passing, city driving, cold slippery conditions, mountain driving, trailer towing, and many other situations.

AutoStick® Operation

By placing the shift lever one shift-level below the DRIVE position, it can be moved from side to side. This allows the driver to select a higher or lower range of gears. Moving the shift lever to the Left (-) triggers a downshift and to the Right (+) an upshift. The gear position will display in the instrument cluster on the transaxle range indicator.

NOTE: In Autostick® mode, the transaxle will only shift up or down when the driver moves the shift lever to the Right (+) or Left (-).

AutoStick® is deactivated when the shift lever is moved out of the AutoStick (+/-) position.

AutoStick® General Information

- You can start out in 1st or 2nd gear. The system will ignore attempts to upshift at too low of a vehicle speed.
- If a ratio other than 1st is selected, and the vehicle is brought to a stop, the transaxle control logic will automatically select the 1st gear ratio.
- Starting out in 2nd gear is helpful in snow or icy conditions.
- Avoid using speed control when Autostick® is engaged.
- The transaxle will automatically shift up when maximum engine speed is reached while Autostick® is engaged.
- Transaxle shifting will be more noticeable when Autostick® is engaged.

- If a low range is selected and the engine accelerates to the rev limit, the transaxle will automatically select the next higher ratio.
- If a downshift would cause the engine to over-speed, that shift will not occur until it is safe for the engine. Mostly the transaxle will stay in the manually selected ratio, however:
  - If the system detects powertrain overheating, the transaxle will revert to the automatic shift mode and remain in that mode until the powertrain cools off.
  - If the system detects a problem, it will disable the AutoStick® mode and the transaxle will return to the automatic mode until the problem is corrected.

ALL WHEEL DRIVE (AWD) — IF EQUIPPED

This feature provides on-demand All-Wheel Drive (AWD). The system is automatic with no driver inputs or additional driving skills required. Under normal driving conditions, the front wheels provide most of the traction. If the front wheels begin to lose traction, power is shifted automatically to the rear wheels. The greater the front wheel traction loss, the greater the power transfer to the rear wheels.

Additionally, on dry pavement under heavy throttle input (where one may have no wheel spin), torque will be sent to the rear in a pre-emptive effort to improve vehicle launch and performance characteristics.

CAUTION!

All wheels must have the same size and type tires. Unequal tire sizes must not be used. Unequal tire size may cause failure of the power transfer unit.

DRIVING ON SLIPPERY SURFACES

ACCELERATION

Rapid acceleration on snow covered, wet, or other slippery surfaces may cause the front wheels to pull erratically to the right or left. This phenomenon occurs when there is a difference in the surface traction under the front (driving) wheels.

WARNING!

Rapid acceleration on slippery surfaces is dangerous. Unequal traction can cause sudden pulling of the front wheels. You could lose control of the vehicle and possibly have an accident. Accelerate slowly and carefully whenever there is likely to be poor traction (ice, snow, wet, mud, loose sand, etc.).

TRACTION

When driving on wet or slushy roads, it is possible for a wedge of water to build up between the tire and road surface. This is hydroplaning and may cause partial or complete loss of vehicle control and stopping ability. To reduce this possibility, the following precautions should be observed:

1. Slow down during rainstorms or when roads are slushy.

2. Slow down if the road has standing water or puddles.

3. Replace the tires when tread wear indicators first become visible.

4. Keep the tires properly inflated.

5. Maintain enough distance between your vehicle and the vehicle in front of you to avoid a collision in a sudden stop.

DRIVING THROUGH WATER

Driving through water more than a few inches/centimeters deep will require extra caution to ensure safety and prevent damage to your vehicle.

Flowing/Rising Water

WARNING!

Do not drive on, or cross, a road or a path where water is flowing and/or rising (as in storm run-off). Flowing water can wear away the road or path's surface and cause your vehicle to sink into deeper water. Furthermore, flowing and/or rising water can carry your vehicle away swiftly. Failure to follow this warning may result in injuries that are serious or fatal to you, your passengers, and others around you.

Shallow Standing Water

Although your vehicle is capable of driving through shallow standing water, consider the following Caution and Warning before doing so.

CAUTION!

- **Always check the depth of the standing water before driving through it. Never drive through standing water that is deeper than the bottom of the tire rims mounted on the vehicle.**
- **Determine the condition of the road or the path that is under water, and if there are any obstacles in the way, before driving through the standing water.**
- **Do not exceed 5 mph (8 km/h) when driving through standing water. This will minimize wave effects.**

CAUTION!

- **Driving through standing water may cause damage to your vehicle's drivetrain components. Always inspect your vehicle's fluids (i.e., engine oil, transmission, axle, etc.) for signs of contamination (i.e., fluid that is milky or foamy in appearance) after driving through standing water. Do not continue to operate the vehicle if any fluid appears contaminated, as this may result in further damage. Such damage is not covered by the New Vehicle Limited Warranty.**
- **Getting water inside your vehicle's engine can cause it to lock up and stall out, and cause serious internal damage to the engine. Such damage is not covered by the New Vehicle Limited Warranty.**

WARNING!

- **Driving through standing water limits your vehicle's traction capabilities. Do not exceed 5 mph (8 km/h) when driving through standing water.**
- **Driving through standing water limits your vehicle's braking capabilities, which increases stopping distances. Therefore, after driving through standing water, drive slowly and lightly press on the brake pedal several times to dry the brakes.**
- **Getting water inside your vehicle's engine can cause it to lock up and stall out, and leave you stranded.**
- **Failure to follow these warnings may result in injuries that are serious or fatal to you, your passengers, and others around you.**

PARKING BRAKE

The parking brake should always be applied when the driver is not in the vehicle.

WARNING!

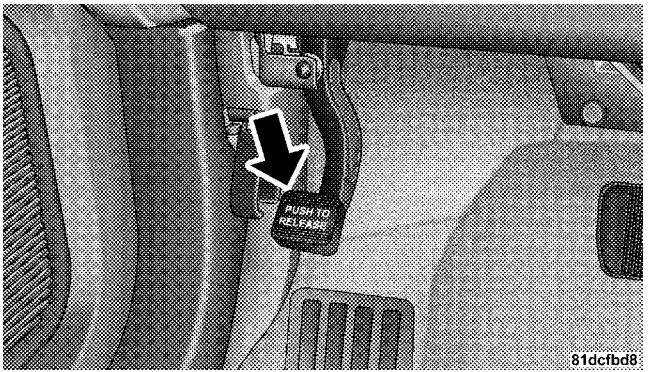
Never use PARK position on an automatic transaxle as a substitute for the parking brake. Always apply parking brake fully when parked to guard against vehicle movement and possible injury or damage.

When parking on a flat surface, place the shift lever in the PARK position first, and then apply the parking brake.

When parking on a hill, it is important to apply the parking brake before placing the shift lever in PARK, otherwise the load on the transaxle locking mechanism may make it difficult to move the shift lever out of PARK.

As an added precaution, turn the front wheels toward the curb on a downhill grade and away from the curb on an uphill grade.

The foot operated parking brake is positioned below the lower left corner of the instrument panel. To apply the parking brake, push the parking brake pedal down and then remove your foot from the pedal. To release the parking brake, push down on the parking brake pedal and then release.



Parking Brake

The brake light in the instrument cluster will turn on when the parking brake is applied and the ignition switch is in the ON position.

NOTE: This light only shows that the parking brake is applied. It does not show the degree of brake application.

BRAKE

The Brake System Warning Light in the instrument cluster will turn on when the parking brake is applied and the ignition switch is on.

NOTE: This light only shows that the parking brake is applied. It does not show the degree of brake application.

CAUTION!

If the Brake System Warning Light remains on with the parking brake released, a brake system malfunction is indicated. Have the brake system serviced by an authorized dealer immediately.

WARNING!

- **Never leave children alone in a vehicle. Leaving unattended children in a vehicle is dangerous for a number of reasons. A child or others could be seriously or fatally injured. Don't leave the keys in the ignition. A child could operate power windows, other controls, or move the vehicle.**
- **Be sure the parking brake is fully disengaged before driving: failure to do so can lead to brake failure, and an accident.**

BRAKE SYSTEM

BRAKE

Your vehicle is equipped with dual hydraulic brake systems. If either of the two hydraulic systems loses normal capability, the remaining system will still function. However, there will be some loss of overall braking effectiveness. This will be evident by increased pedal travel during application and greater pedal force required to slow or stop the vehicle. In addition, if the malfunction is caused by a leak in the hydraulic system, the Brake System Warning Light will turn on as the brake fluid level drops in the master cylinder.

In the event power assist is lost for any reason (i.e., repeated brake applications with the engine OFF) the brakes will still function. However, the effort required to brake the vehicle will be much greater than that required with the power system operating.

WARNING!

- **Riding the brakes can lead to brake failure and possibly an accident. Driving with your foot resting or riding on the brake pedal can result in abnormally high brake temperatures, excessive lining wear, and possible brake damage. You wouldn't have your full braking capacity in an emergency.**
- **Driving a vehicle with the Brake System Warning Light on is dangerous. A significant decrease in braking performance or vehicle stability during braking may occur. It will take you longer to stop the vehicle or will make your vehicle harder to control. You could have an accident. Have the vehicle checked immediately.**

Anti-Lock Brake System (ABS)

This system aids the driver in maintaining vehicle control under adverse braking conditions. The system controls hydraulic brake pressure to prevent wheel lock-up to help avoid skidding on slippery surfaces during braking. Refer to "Anti-Lock Brake System (ABS)" under "Electronic Brake Control System" in this section for more information.

WARNING!

The ABS cannot prevent the natural laws of physics from acting on the vehicle, nor can it increase the traction afforded by prevailing road conditions. ABS cannot prevent accidents, including those resulting from excessive speed in turns, driving on very slippery surfaces, or hydroplaning. Only a safe, attentive, and skillful driver can prevent accidents. The capabilities of an ABS-equipped vehicle must never be exploited in a reckless or dangerous manner, which could jeopardize the user's safety or the safety of others.

ELECTRONIC BRAKE CONTROL SYSTEM

Your vehicle is equipped with an advanced electronic brake control system commonly referred to as ESP. This system includes Anti-Lock Brake System (ABS), Brake Assist System (BAS), Traction Control System (TCS), Electronic Roll Mitigation (ERM), and Electronic Stability Program (ESP). These systems work together to enhance both vehicle stability and control in various driving conditions.

Anti-Lock Brake System (ABS)

The Anti-Lock Brake System (ABS) provides increased vehicle stability and brake performance under most braking conditions. The system automatically "pumps" the brakes during severe braking conditions to prevent wheel lock-up.

When the vehicle is driven over 7 mph (11 km/h), you may also hear a slight clicking sound as well as some related motor noises. These noises are the system performing its self check cycle to ensure that the ABS is working properly. This self check occurs each time the vehicle is started and accelerated past 7 mph (11 km/h).

ABS is activated during braking under certain road or stopping conditions. ABS-inducing conditions can include ice, snow, gravel, bumps, railroad tracks, loose debris, or panic stops.

You also may experience the following when the brake system goes into Anti-lock:

- The ABS motor running (it may continue to run for a short time after the stop),
- The clicking sound of solenoid valves,
- Brake pedal pulsations, and
- A slight drop or fall away of the brake pedal at the end of the stop.

These are all normal characteristics of ABS.

WARNING!

- **The ABS contains sophisticated electronic equipment that may be susceptible to interference caused by improperly installed or high output radio transmitting equipment. This interference can cause possible loss of anti-lock braking capability. Installation of such equipment should be performed by qualified professionals.**
- **Pumping of the Anti-Lock Brakes will diminish their effectiveness and may lead to an accident. Pumping makes the stopping distance longer. Just press firmly on your brake pedal when you need to slow down or stop.**
- **The ABS cannot prevent the natural laws of physics from acting on the vehicle, nor can it increase braking or steering efficiency beyond that afforded by the condition of the vehicle brakes and tires or the traction afforded.**
- **The ABS cannot prevent accidents, including those resulting from excessive speed in turns, following another vehicle too closely, or hydroplaning. Only a safe, attentive, and skillful driver can prevent accidents.**
- **The capabilities of an ABS equipped vehicle must never be exploited in a reckless or dangerous manner, which could jeopardize the user's safety or the safety of others.**

All vehicle wheels and tires must be the same size and type and tires must be properly inflated to produce accurate signals for the computer.

Anti-Lock Brake Light

The Anti-Lock Brake Light monitors the ABS. The light will turn on when the ignition switch is turned to the ON position and may stay on for as long as four seconds.

If the ABS Light remains on or comes on while driving, it indicates that the Anti-Lock portion of the brake system is not functioning and that service is required. However, the conventional brake system will continue to operate normally if the Brake System Warning Light is not on.

If the ABS Light is on, the brake system should be serviced as soon as possible to restore the benefits of Anti-Lock brakes. If the ABS Light does not come on when the ignition switch is turned to the ON position, have the light repaired as soon as possible.

If both the Brake System Warning Light and the ABS Light remain on, the ABS and Electronic Brake Force Distribution (EBD) systems are not functioning. Immediate repair to the ABS system is required.

Brake Assist System (BAS)

The BAS is designed to optimize the vehicle's braking capability during emergency braking maneuvers. The system detects an emergency braking situation by sensing the rate and amount of brake application and then applies optimum pressure to the brakes. This can help reduce braking distances. The BAS complements the ABS. Applying the brakes very quickly results in the best BAS assistance. To receive the benefit of the system, you must apply continuous braking pressure during the stopping sequence, (do not "pump" the brakes). Do not reduce brake pedal pressure unless braking is no longer desired. Once the brake pedal is released, the BAS is deactivated.

WARNING!

BAS cannot prevent the natural laws of physics from acting on the vehicle, nor can it increase the traction afforded by prevailing road conditions. BAS cannot prevent accidents, including those resulting from excessive speed in turns, driving on very slippery surfaces, or hydroplaning. Only a safe, attentive, and skillful driver can prevent accidents. The capabilities of a BAS-equipped vehicle must never be exploited in a reckless or dangerous manner, which could jeopardize the user's safety or the safety of others.

Traction Control System (TCS)

This system monitors the amount of wheel spin of each of the driven wheels. If wheel spin is detected, brake pressure is applied to the slipping wheel(s) and engine power is reduced to provide enhanced acceleration and stability. A feature of the TCS functions similar to a limited slip differential and controls the wheel spin across a driven axle. If one wheel on a driven axle is spinning faster than the other, the system will apply the brake of the spinning wheel. This will allow more engine torque to be applied to the wheel that is not spinning. This feature remains active even if TCS and ESP are in the "Partial Off" mode. Refer to "ESP (Electronic Stability Program)" in this section for more information.

Electronic Roll Mitigation (ERM)

This system anticipates the potential for wheel lift by monitoring the driver's steering wheel input and the speed of the vehicle. When ERM determines that the rate of change of the steering wheel angle and vehicle's speed are sufficient to potentially cause wheel lift, it then applies the appropriate brake and may also reduce engine power to lessen the chance that wheel lift will occur. ERM will only intervene during very severe or evasive driving maneuvers. ERM can only reduce the chance of wheel lift occurring during severe or evasive driving maneuvers. It cannot prevent wheel lift due to other factors, such as road conditions, leaving the roadway, or striking objects or other vehicles.

WARNING!

Many factors, such as vehicle loading, road conditions, and driving conditions, influence the chance that wheel lift or rollover may occur. ERM cannot prevent all wheel lift or rollovers, especially those that involve leaving the roadway or striking objects or other vehicles. Only a safe, attentive, and skillful driver can prevent accidents. The capabilities of an ERM-equipped vehicle must never be exploited in a reckless or dangerous manner, which could jeopardize the user's safety or the safety of others.

Electronic Stability Program (ESP)

This system enhances directional control and stability of the vehicle under various driving conditions. ESP corrects for over-steering and under-steering the vehicle by applying the brake of the appropriate wheel. Engine power may also be reduced to help the vehicle maintain the desired path.

The ESP uses sensors in the vehicle to determine the path that the driver intends to steer the vehicle and compares it to the actual path of the vehicle. When the actual path does not match the intended path, the ESP applies the brake of the appropriate wheel to assist in counteracting the condition of over-steer or under-steer.

- Over-steer - when the vehicle is turning more than appropriate for the steering wheel position.
- Under-steer - when the vehicle is turning less than appropriate for the steering wheel position.

ESP/TCS Indicator Light

The ESP/TCS Indicator Light located in the instrument cluster, starts to flash as soon as the tires lose traction and the ESP system becomes

active. The ESP/TCS Indicator Light also flashes when TCS is active. If the ESP/TCS Indicator Light begins to flash during acceleration, ease up on the accelerator and apply as little throttle as possible. Be sure to adapt your speed and driving to the prevailing road conditions.

WARNING!

ESP cannot prevent the natural laws of physics from acting on the vehicle, nor can it increase the traction afforded by prevailing road conditions. ESP cannot prevent accidents, including those resulting from excessive speed in turns, driving on very slippery surfaces, or hydroplaning. Only a safe, attentive, and skillful driver can prevent accidents. The capabilities of an ESP-equipped vehicle must never be exploited in a reckless or dangerous manner, which could jeopardize the user's safety or the safety of others.

ESP Operating Modes

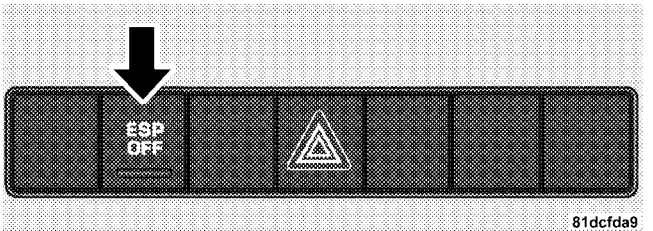
The ESP system has two available operating modes.

Full On

This is the normal operating mode for ESP. Whenever the vehicle is started the system will be in this mode. This mode should be used for most driving situations. ESP should only be turned to "Partial Off" for specific reasons as noted. Refer to "Partial Off" for additional information.

Partial Off

The ESP OFF button is located in the switch bank above the climate Control. To enter the "Partial Off" mode, momentarily depress the ESP OFF button and the ESP/TCS Indicator Light will illuminate. To turn the ESP on again, momentarily depress the ESP OFF button and the ESP/TCS Indicator Light will turn off. This will restore the normal "ESP On" mode of operation.



ESP OFF Button

NOTE: To improve the vehicle's traction when driving with snow chains, or when starting off in deep snow, sand, or gravel, it may be desirable to switch to the "Partial Off" mode by momentarily depressing the ESP OFF button. Once the situation requiring "Partial Off" mode is overcome, turn ESP back on by momentarily depressing the ESP OFF button. This may be done while the vehicle is in motion.

ESP/BAS Warning Light and ESP/TCS Indicator Light

ESP
BAS

The malfunction indicator for the ESP is combined with the BAS indicator. The ESP/BAS Malfunction Indicator Light and the ESP/TCS Indicator Light in the instrument cluster both turn on when the ignition switch is turned to the ON position. They should both turn off with the engine running. If the ESP/BAS Malfunction Indicator Light turns on continuously with the engine running, a malfunction has been detected in either the ESP or the BAS system, or both. If this light remains on after several ignition cycles, and the vehicle has been driven several miles (kilometers) at speeds greater than 30 mph (48 km/h), see your authorized dealer as soon as possible to have the problem diagnosed and corrected.

NOTE:

- ″The ESP/TCS Indicator Light and the ESP/BAS Malfunction Indicator Light will turn on momentarily each time the ignition switch is turned ON.
- Each time the ignition is turned ON, the ESP System will be ON even if it was turned off previously.
- The ESP Control System will make buzzing or clicking sounds when it is active. This is normal; the sounds will stop when ESP becomes inactive following the maneuver that caused the ESP activation.

Trailer Sway Control (TSC)

TSC uses sensors in the vehicle to recognize an excessively swaying trailer. TSC activates automatically once the excessively swaying trailer is recognized. When TSC is functioning, the ESP/TCS Indicator Light will flash, the engine power will be reduced, and you will feel the brake being applied to individual wheels in an attempt to stop the trailer from swaying.

NOTE: The TSC is disabled when the ESP system is in the "Partial Off" mode.

WARNING!

- **TSC cannot stop all trailers from swaying. Always use caution when towing a trailer and follow the tongue weight recommendations. Refer to ″Vehicle Loading" and "Trailer Towing" in this section for more information before towing a trailer with your vehicle.**
- **If TSC activates while towing a trailer, stop the vehicle at the nearest safe location and adjust the trailer load to eliminate the trailer sway.**
- **Failure to follow these warnings can result in an accident or serious personal injury.**

POWER STEERING

The standard power steering system will give you good vehicle response and increased ease of maneuverability in tight spaces. The system will provide mechanical steering capability if power assist is lost.

If for some reason the power assist is interrupted, it will still be possible to steer your vehicle. Under these conditions, you will observe a substantial increase in steering effort, especially at very low vehicle speeds and during parking maneuvers.

NOTE: Increased noise levels at the end of the steering wheel travel are considered normal and do not indicate that there is a problem with the power steering system.

Upon initial start-up in cold weather, the power steering pump may make noise for a short amount of time. This is due to the cold, thick fluid in the steering system. This noise should be considered normal, and it does not in any way damage the steering system.

WARNING!

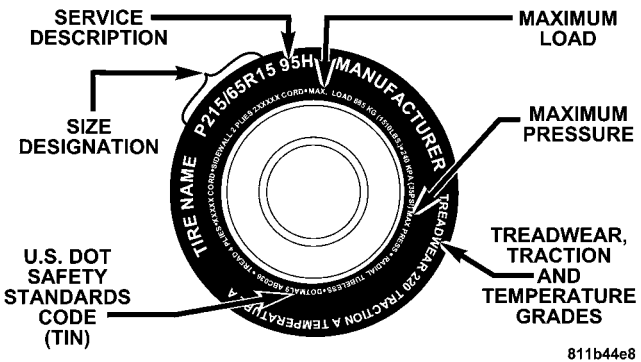
Continued operation with reduced power steering assist could pose a safety risk to yourself and others. Service should be obtained as soon as possible.

CAUTION!

Prolonged operation of the steering system at the end of the steering wheel travel will increase the steering fluid temperature and it should be avoided when possible. Damage to the power steering pump may occur.

TIRE SAFETY INFORMATION

TIRE MARKINGS



NOTE:

- P (Passenger) - Metric tire sizing is based on U.S. design standards. P-Metric tires have the letter "P" molded into the sidewall preceding the size designation. Example: P215/65R15 95H.
- European-Metric tire sizing is based on European design standards. Tires designed to this standard have the tire size molded into the sidewall beginning with the section width. The letter ″P″ is absent from this tire size designation. Example: 215/65R15 96H.
- LT (Light Truck) - Metric tire sizing is based on U.S. design standards. The size designation for LT-Metric tires is the same as for P-Metric tires except for the letters "LT" that are molded into the sidewall preceding the size designation. Example: LT235/85R16.
- Temporary spare tires are high-pressure compact spares designed for temporary emergency use only. Tires designed to this standard have the letter "T" molded into the sidewall preceding the size designation. Example: T145/80D18 103M.
- High flotation tire sizing is based on U.S. design standards, and it begins with the tire diameter molded into the sidewall. Example: 31x10.5 R15 LT.

5

Tire Sizing Chart

TIRE SIZING TERMS
Size Designation:
P = Passenger Car tire size based on U.S. design standards **″....blank....″** = Passenger Car tire based on European design standards **LT** = Light Truck tire based on U.S. design standards **T** = Temporary spare tire **31** = Overall diameter in inches (in)
215 = Section width in millimeters (mm)
65 = Aspect ratio in percent (%) — Ratio of section height to section width of tire **10.5** = Section width in inches (in)
R = Construction code — ″R″ means radial construction —″D″ means diagonal or bias construction
15 = Rim diameter in inches (in)

TIRE SIZING TERMS
Service Description:
95 = Load Index — A numerical code associated with the maximum load a tire can carry
H = Speed Symbol — A symbol indicating the range of speeds at which a tire can carry a load corresponding to its load index under certain operating conditions — The maximum speed corresponding to the speed symbol should only be achieved under specified operating conditions (i.e., tire pressure, vehicle loading, road conditions, and posted speed limits)
Load Identification:
"....blank...." = Absence of any text on the sidewall of the tire indicates a Standard Load (SL) Tire
Extra Load (XL) = Extra load (or reinforced) tire
Light Load = Light load tire
C, D, E = Load range associated with the maximum load a tire can carry at a specified pressure
Maximum Load — Maximum load indicates the maximum load this tire is designed to carry
Maximum Pressure — Maximum pressure indicates the maximum permissible cold tire inflation pressure for this tire

TIRE IDENTIFICATION NUMBER (TIN)

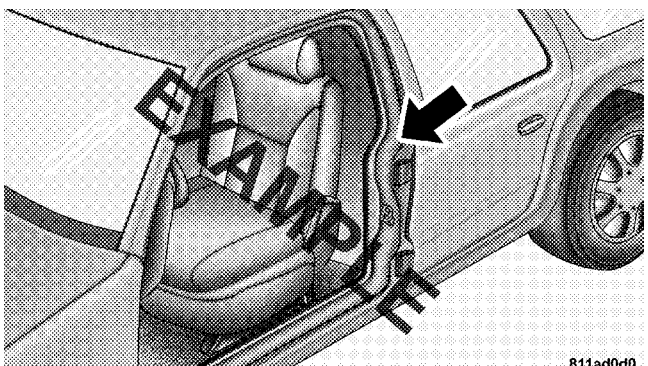
The TIN may be found on one or both sides of the tire, however, the date code may only be on one side. Tires with white sidewalls will have the full TIN, including the date code, located on the white sidewall side of the tire. Look for the TIN on the outboard side of black sidewall tires as mounted on the vehicle. If the TIN is not found on the outboard side, then you will find it on the inboard side of the tire.

TIRE IDENTIFICATION NUMBER
EXAMPLE: DOT MA L9 ABCD 0301
DOT = Department of Transportation — This symbol certifies that the tire is in compliance with the U.S. Department of Transportation tire safety standards, and is approved for highway use
MA = Code representing the tire manufacturing location (two digits)
L9 = Code representing the tire size (two digits)
ABCD = Code used by the tire manufacturer (one to four digits)
03 = Number representing the week in which the tire was manufactured (two digits) —03 means the 3rd week.
01 = Number representing the year in which the tire was manufactured (two digits) —01 means the year 2001 — Prior to July 2000, tire manufacturers were only required to have one number to represent the year in which the tire was manufactured. Example: 031 could represent the 3rd week of 1981 or 1991

TIRE LOADING AND TIRE PRESSURE

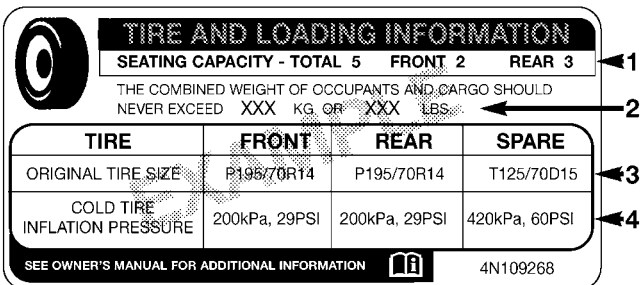
Tire Placard Location

NOTE: The proper cold tire inflation pressure is listed on either the face of the driver's door or the driver's side B-Pillar.



Tire Placard Location

Tire and Loading Information Placard



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Tire And Loading Information Placard

This placard tells you important information about the:

1) number of people that can be carried in the vehicle

2) total weight your vehicle can carry

3) tire size designed for your vehicle

4) cold tire inflation pressures for the front, rear, and spare tires.

Loading

The vehicle maximum load on the tire must not exceed the load carrying capacity of the tire on your vehicle. You will not exceed the tire's load carrying capacity if you adhere to the loading conditions, tire size, and cold tire inflation pressures specified on the Tire and Loading Information placard and in the "Vehicle Loading" section of this manual.

NOTE: Under a maximum loaded vehicle condition, gross axle weight ratings (GAWRs) for the front and rear axles must not be exceeded. For further information on GAWRs, vehicle loading, and trailer towing, refer to "Vehicle Loading" in this section.

To determine the maximum loading conditions of your vehicle, locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs." on the Tire and Loading Information placard. The combined weight of occupants, cargo/luggage and trailer tongue weight (if applicable) should never exceed the weight referenced here.

Steps for Determining Correct Load Limit

1. Locate the statement "The combined weight of occupants and cargo should never exceed XXX kg or XXX lbs" on your vehicle's placard.

2. Determine the combined weight of the driver and passengers that will be riding in your vehicle.

3. Subtract the combined weight of the driver and passengers from XXX kg or XXX lbs.

4. The resulting figure equals the available amount of cargo and luggage load capacity. For example, if "XXX" amount equals 1,400 lbs (635 kg) and there will be five 150 lb (68 kg) passengers in your vehicle, the amount of

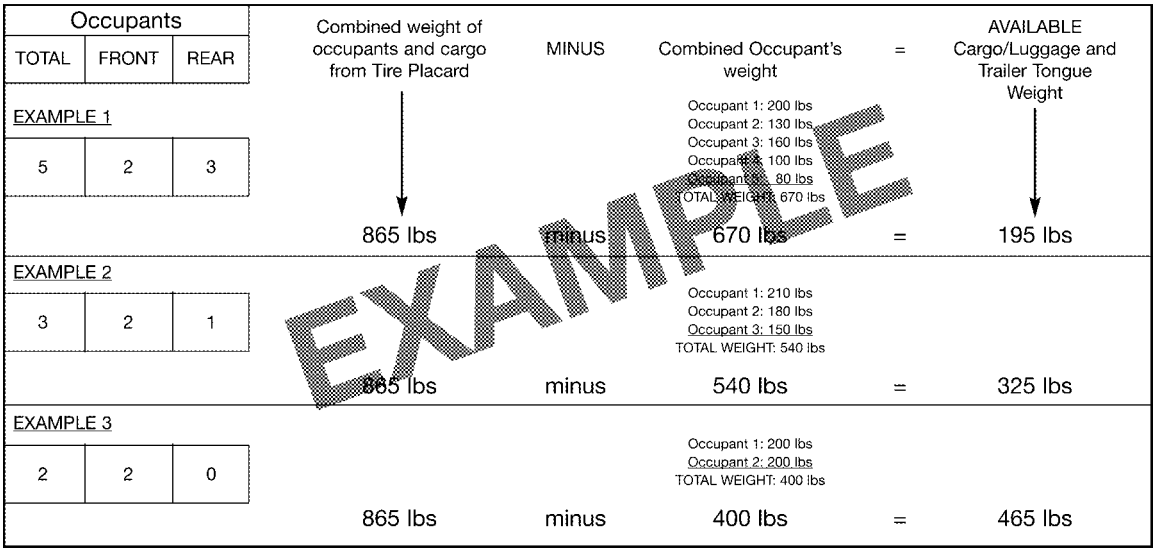
available cargo and luggage load capacity is 650 lbs (295 kg) (since 5 x 150 = 750, and 1400 – 750 = 650 lbs [295 kg]).

5. Determine the combined weight of luggage and cargo being loaded on the vehicle. That weight may not safely exceed the available cargo and luggage load capacity calculated in Step 4.

6. If your vehicle will be towing a trailer, load from your trailer will be transferred to your vehicle. Consult this manual to determine how this reduces the available cargo and luggage load capacity of your vehicle.

NOTE: The following table shows examples on how to calculate total load, cargo/luggage, and towing capacities of your vehicle with varying seating configurations and number and size of occupants. This table is for illustration purposes only and may not be accurate for the seating and load carry capacity of your vehicle.

NOTE: For the following example, the combined weight of occupants and cargo should never exceed 865 lbs (392 kg).


Occupants
TOTAL
FRONT
REAR
Combined weight of occupants and cargo from Tire Placard
MINUS
Combined Occupant's weight
=
AVAILABLE Cargo/Luggage and Trailer Tongue Weight
EXAMPLE 1
5
2
3
Occupant 1: 200 lbs
Occupant 2: 130 lbs
Occupant 3: 160 lbs
Occupant 4: 100 lbs
Occupant 5: 80 lbs
TOTAL WEIGHT: 670 lbs
865 lbs
minus
670 lbs
=
195 lbs
EXAMPLE 2
3
2
1
Occupant 1: 210 lbs
Occupant 2: 180 lbs
Occupant 3: 150 lbs
TOTAL WEIGHT: 540 lbs
865 lbs
minus
540 lbs
=
325 lbs
EXAMPLE 3
2
2
0
Occupant 1: 200 lbs
Occupant 2: 200 lbs
TOTAL WEIGHT: 400 lbs
865 lbs
minus
400 lbs
=
465 lbs
EXAMPLE

811a4d11

WARNING!

Overloading of your tires is dangerous. Overloading can cause tire failure, affect vehicle handling, and increase your stopping distance. Use tires of the recommended load capacity for your vehicle. Never overload them.

TIRES — GENERAL INFORMATION

Tire Pressure

Proper tire inflation pressure is essential to the safe and satisfactory operation of your vehicle. Three primary areas are affected by improper tire pressure:

1. Safety—

WARNING!

•Improperly inflated tires are dangerous and can cause accidents.

•Under-inflation increases tire flexing and can result in tire failure.

WARNING!

•Over-inflation reduces a tire's ability to cushion shock. Objects on the road and chuckholes can cause damage that result in tire failure.

•Over-inflated or under-inflated tires can affect vehicle handling and can fail suddenly, resulting in loss of vehicle control.

WARNING!

•Unequal tire pressures can cause steering problems. You could lose control of your vehicle.

•Unequal tire pressures from one side of the vehicle to the other can cause the vehicle to drift to the right or left.

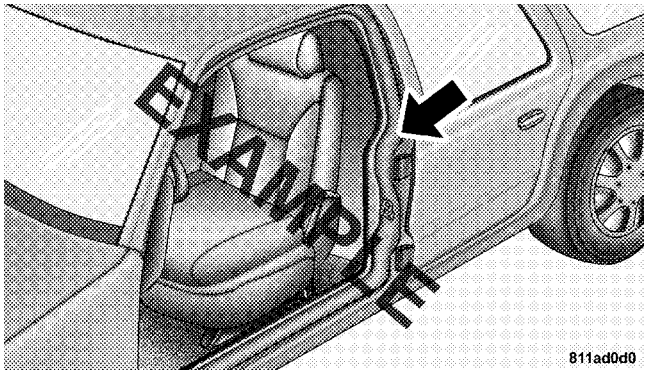
•Always drive with each tire inflated to the recommended cold tire inflation pressure.

2. Economy—
Improper inflation pressures can cause uneven wear patterns to develop across the tire tread. These abnormal wear patterns will reduce tread life resulting in a need for earlier tire replacement. Under-inflation also increases tire rolling resistance and results in higher fuel consumption.

3. Ride Comfort and Vehicle Stability—
Proper tire inflation contributes to a comfortable ride. Over-inflation produces a jarring and uncomfortable ride.

Tire Inflation Pressures
The proper cold tire inflation pressure is listed either on the face of the driver's door or on the driver's side "B" pillar.

Some vehicles may have Supplemental Tire Pressure Information for vehicle loads that are less than the maximum loaded vehicle condition. These pressure conditions will be found in the "Supplemental Tire Pressure Information" section of this manual.



Tire Placard Location

The pressure should be checked and adjusted as well as inspecting for signs of tire wear or visible damage at least once a month. Use a good quality pocket-type gauge to check tire pressure. DO NOT make a visual judgement when determining proper inflation. Radial tires may look properly inflated even when they are under-inflated.

CAUTION!

After inspecting or adjusting the tire pressure, always reinstall the valve stem cap (if equipped). This will prevent moisture and dirt from entering the valve stem, which could damage the valve stem.

Inflation pressures specified on the placard are always "cold tire inflation pressure." Cold tire inflation pressure is defined as the tire pressure after the vehicle has not been driven for at least three hours, or driven less than 1 mi (1.6 km) after a three hour period. The cold tire inflation pressure must not exceed the maximum inflation pressure molded into the tire sidewall.

Check tire pressures more often if subject to a wide range of outdoor temperatures, as tire pressures vary with temperature changes.

Tire pressures change by approximately 1 psi (7 kPa) per 12°F (7°C) of air temperature change. Keep this in mind when checking tire pressure inside a garage, especially in the Winter.

Example: If garage temperature = 68°F (20°C) and the outside temperature = 32°F (0°C) then the cold tire inflation pressure should be increased by 3 psi (21 kPa), which equals 1 psi (7 kPa) for every 12°F (7°C) for this outside temperature condition.

Tire pressure may increase from 2 to 6 psi (13 to 40 kPa) during operation. DO NOT reduce this normal pressure build up or your tire pressure will be too low.

Tire Pressures for High Speed Operation

The manufacturer advocates driving at safe speeds within posted speed limits. Where speed limits or conditions are such that the vehicle can be driven at high speeds, maintaining correct tire inflation pressure is very important. Increased tire pressure and reduced vehicle loading may be required for high-speed vehicle operation. Refer to original equipment or an authorized tire dealer for recommended safe operating speeds, loading and cold tire inflation pressures.

WARNING!

High speed driving with your vehicle under maximum load is dangerous. The added strain on your tires could cause them to fail. You could have a serious accident. Don't drive a vehicle loaded to the maximum capacity at continuous speeds above 75 mph (120 km/h).

Radial Ply Tires

WARNING!

Combining radial ply tires with other types of tires on your vehicle will cause your vehicle to handle poorly. The instability could cause an accident. Always use radial ply tires in sets of four (or six, in case of trucks with dual rear wheels). Never combine them with other types of tires.

Cuts and punctures in radial tires are repairable only in the tread area because of sidewall flexing. Consult your authorized tire dealer for radial tire repairs.

Compact Spare Tire — If Equipped

The compact spare is for temporary emergency use with radial tires. It is engineered to be used on your style vehicle only. Since this tire has limited tread life, the original tire should be repaired (or replaced) and reinstalled at the first opportunity.

WARNING!

- **Temporary use spare tires are for emergency use only. With these tires, DO NOT drive more than 50 mph (80 km/h).**
- **Temporary-use spare tires have limited tread life. When the tread is worn to the tread wear indicators, the temporary use spare tire needs to be replaced.**
- **Be sure to follow the warnings, which apply to your spare. Failure to do so could result in spare tire failure and loss of vehicle control.**

DO NOT install a wheel cover or attempt to mount a conventional tire on the compact spare wheel, since the wheel is designed specifically for the compact spare.

DO NOT install more than one compact spare tire/wheel on the vehicle at any given time.

CAUTION!

Because of the reduced ground clearance, DO NOT take your vehicle through an automatic car wash with the compact spare installed. Damage to the vehicle may result.

Limited-Use Spare — If Equipped

The limited-use spare tire is for temporary emergency use on your vehicle. This tire is identified by a limited-use spare tire warning label located on the limited-use spare tire and wheel assembly. This tire may look like the original equipped tire on the front or rear axle of your vehicle, but it is not. Installation of this limited-use spare tire affects vehicle handling. Since it is not the same tire, replace (or repair) the original tire and reinstall on the vehicle at the first opportunity.

WARNING!

The limited-use spare tires are for emergency use only. Installation of this limited-use spare tire affects vehicle handling. With this tire, DO NOT drive more than 50 mph (80 km/h). Keep inflated to the cold tire inflation pressure listed on either your tire placard or limited-use spare tire and wheel assembly. Replace (or repair) the original tire at the first opportunity and reinstall it on your vehicle. Failure to do so could result in loss of vehicle control.

Tire Spinning

When stuck in mud, sand, snow, or ice conditions, DO NOT spin your vehicle's wheels faster than 30 mph (48 km/h) or for longer than 30 seconds continuously without stopping when you are stuck.

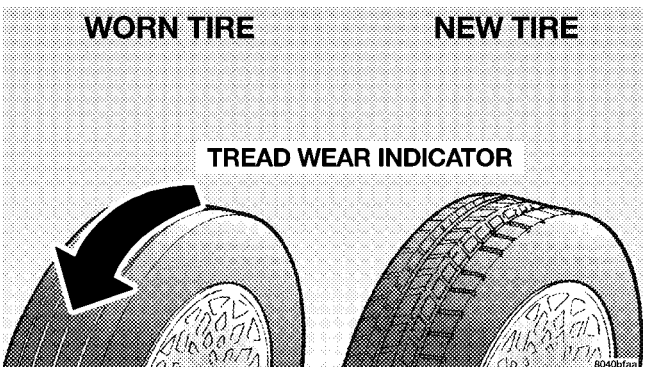
For additional information, refer to "Freeing A Stuck Vehicle" in Section 6.

WARNING!

Fast spinning tires can be dangerous. Forces generated by excessive wheel speeds may cause tire damage or failure. A tire could explode and injure someone. DO NOT spin your vehicle's wheels faster than 30 mph (48 km/h) or for more than 30 seconds continuously when you are stuck, and don't let anyone near a spinning wheel, no matter what the speed.

Tread Wear Indicators

Tread wear indicators are in the original equipment tires to help you in determining when your tires should be replaced.



These indicators are molded into the bottom of the tread grooves. They will appear as bands when the tread depth becomes 1/16 in (2 mm). When the tread is worn to the tread wear indicators, the tire should be replaced.

Many states have laws requiring tire replacement at this point.

Life of Tire

The service life of a tire is dependent upon varying factors including, but not limited to:

- Driving style
- Tire pressure
- Distance driven

WARNING!

Tires and the spare tire should be replaced after six years, regardless of the remaining tread. Failure to follow this warning can result in sudden tire failure. You could lose control and have an accident resulting in serious injury or death.

Keep dismounted tires in a cool, dry place with as little exposure to light as possible. Protect tires from contact with oil, grease, and gasoline.

Replacement Tires

The tires on your new vehicle provide a balance of many characteristics. They should be inspected regularly for wear and correct cold tire inflation pressure. The manufacturer strongly recommends that you use tires equivalent to the originals in size, quality and performance when replacement is needed. (Refer to the paragraph on

"Tread Wear Indicators"). Refer to the "Tire and Loading Information" placard for the size designation of your tire. The service description and load identification will be found on the original equipment tire. Failure to use equivalent replacement tires may adversely affect the safety, handling, and ride of your vehicle. We recommend that you contact your original equipment or an authorized tire dealer with any questions you may have on tire specifications or capability.

WARNING!

DO NOT use a tire, wheel size or rating other than that specified for your vehicle. Some combinations of unapproved tires and wheels may change suspension dimensions and performance characteristics, resulting in changes to steering, handling, and braking of your vehicle. This can cause unpredictable handling and stress to steering and suspension components. You could lose control and have an accident resulting in serious injury or death. Use only the tire and wheel sizes with load ratings approved for your vehicle.

WARNING!

- **NEVER use a tire with a smaller load index or capacity, other than what was originally equipped on your vehicle. Using a tire with a smaller load index could result in tire overloading and failure. You could lose control and have an accident.**
- **Failure to equip your vehicle with tires having adequate speed capability can result in sudden tire failure and loss of vehicle control.**

CAUTION!

Replacing original tires with tires of a different size may result in false speedometer and odometer readings.

Alignment And Balance

Poor suspension alignment may result in:

- Fast tire wear.
- Uneven tire wear, such as feathering and one-sided wear.
- Vehicle pull to right or left.

Tires may also cause the vehicle to pull to the left or right. Alignment will not correct this condition. See your authorized dealer for proper diagnosis.

Improper alignment will not cause vehicle vibration. Vibration may be a result of tire and wheel out-of-balance. Proper balancing will reduce vibration and avoid tire cupping and spotty wear.

TIRE CHAINS

Due to limited clearance, tire chains are not recommended.

CAUTION!
Damage to the vehicle may result if tire chains are used.

SNOW TIRES

Some areas of the country require the use of snow tires during the winter. Standard tires are of the all season type and satisfy this requirement as indicated by the M+S designation on the tire sidewall.

If you need snow tires, select tires equivalent in size and type to the original equipment tires. Use snow tires only in sets of four. Failure to do so may adversely affect the safety and handling of your vehicle.

Snow tires generally have lower speed ratings than what was originally equipped with your vehicle and should not be operated at sustained speeds over 75 mph (120 km/h).

TIRE PRESSURE MONITOR SYSTEM (TPMS) — IF EQUIPPED

- The Tire Pressure Monitor System (TPMS) will warn the driver of a low tire pressure based on the vehicle recommended cold placard pressure.
- The tire pressure will vary with temperature by about 1 psi (6.9 kPa) for every 12°F (6.5°C). This means that when the outside temperature decreases, the tire pressure will decrease. Tire pressure should always be set based on cold inflation tire pressure. This is defined as the tire pressure after the vehicle has not been driven for at least three hours, or driven less than 1 mi (1 km) after a three hour period. The cold tire inflation pressure must not exceed the maximum inflation pressure molded into the tire sidewall. Refer to the "Tires – General Information" in this section for information on

how to properly inflate the vehicle's tires. The tire pressure will also increase as the vehicle is driven. This is normal and there should be no adjustment for this increased pressure.

- The TPMS will warn the driver of a low tire pressure if the tire pressure falls below the low-pressure warning limit for any reason, including low temperature effects and natural pressure loss through the tire.
- The TPMS will continue to warn the driver of low tire pressure as long as the condition exists, and will not turn off until the tire pressure is at or above the recommended cold placard pressure. Once the low tire pressure warning (Tire Pressure Monitoring Telltale light) illuminates, you must increase the tire pressure to the recommended cold placard pressure in order for the Tire Pressure Monitoring Telltale light to turn off. The system will automatically update and the Tire Pressure Monitoring Telltale light will turn off once the system receivesthe updated tire pressures. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

  – For example, your vehicle may have a recommended cold (parked for more than three hours) placard pressure of 33 psi (227 kPa). If the ambient temperature is 68°F (20°C) and the measured tire pressure is 28 psi (193 kPa), a temperature drop to 20°F (-7°C) will decrease the tire pressure to approximately 24 psi (165 kPa). This tire pressure is low enough to turn ON the Tire Pressure Monitoring Telltale light. Driving the vehicle may cause the tire pressure to rise to approximately 28 psi (193 kPa), but the Tire Pressure Monitoring Telltale light will still be on. In this situation, the Tire Pressure Monitoring Telltale light will turn off only after the tires are inflated to the vehicle's recommended cold placard pressure value.

CAUTION!

- **The TPMS has been optimized for the original equipment tires and wheels. TPMS pressures and warning have been established for the tire size equipped on your vehicle. Undesirable system operation or sensor damage may result when using replacement equipment that is not of the same size, type, and/or style. Aftermarket wheels can cause sensor damage. Do not use aftermarket tire sealants or balance beads if your vehicle is equipped with a TPMS, as damage to the sensors may result.**
- **After inspecting or adjusting the tire pressure, always reinstall the valve stem cap. This will prevent moisture and dirt from entering the valve stem, which could damage the Tire Pressure Monitoring Sensor.**

NOTE:

- The TPMS is not intended to replace normal tire care and maintenance, or to provide warning of a tire failure or condition.
- The TPMS should not be used as a tire pressure gauge while adjusting your tire pressure.
- Driving on a significantly under-inflated tire causes the tire to overheat and can lead to tire failure. Under-inflation also reduces fuel efficiency and tire tread life, and may affect the vehicle's handling and stopping ability.
- The TPMS is not a substitute for proper tire maintenance, and it is the driver's responsibility to maintain correct tire pressure using an accurate tire pressure gauge, even if under-inflation has not reached the level to trigger illumination of the Tire Pressure Monitoring Telltale light.

- Seasonal temperature changes will affect tire pressure, and the TPMS will monitor the actual tire pressure in the tire.

Base System — If Equipped

The Tire Pressure Monitor System (TPMS) uses wireless technology with wheel rim mounted electronic sensors to monitor tire pressure levels. Sensors, mounted to each wheel as part of the valve stem, transmit tire pressure readings to the receiver module.

NOTE: It is particularly important for you to check the tire pressure in all of the tires on your vehicle monthly and to maintain the proper pressure.

The TPMS consists of the following components:

- Receiver Module
- Four Tire Pressure Monitoring Sensors
- Tire Pressure Monitoring Telltale light

Tire Pressure Monitoring Low Pressure Warnings

The Tire Pressure Monitoring Telltale light will illuminate in the instrument cluster and a chime will sound when tire pressure is low in one or more of the four active road tires. Should this occur, you should stop as soon as possible, check the inflation pressure of each tire on your vehicle, and inflate each tire to the vehicle's recommended cold placard pressure value. Once the system receives the updated tire pressures, the system will automatically update and the Tire Pressure Monitoring Telltale light will turn off. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Check TPMS Warning

When a system fault is detected, the Tire Pressure Monitoring Telltale light will flash on and off for 75 seconds and then remain on solid. The system fault will also sound a chime. If the ignition key is cycled, this sequence

will repeat, providing the system fault still exists. The Tire Pressure Monitoring Telltale light will turn off when the fault condition no longer exists. A system fault can occur due to any of the following:

1. Jamming due to electronic devices or driving next to facilities emitting the same Radio Frequencies as the TPMS sensors.

2. Installing some form of aftermarket window tinting that affects radio wave signals.

3. Lots of snow or ice around the wheels or wheel housings.

4. Using tire chains on the vehicle.

5. Using wheels/tires not equipped with TPMS sensors.

NOTE:

1. The compact spare tire does not have a tire pressure monitoring sensor. Therefore, the TPMS will not monitor the pressure in the compact spare tire.

2. If you install the compact spare tire in place of a road tire that has a pressure below the low-pressure warning limit, a chime will sound and the TPMS Telltale light will turn on upon the next ignition key cycle.

3. After driving the vehicle for up to 10 minutes above 15 mph (25 km/h), the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid.

4. For each subsequent ignition key cycle, a chime will sound and the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid.

5. Once you repair or replace the original road tire and reinstall it on the vehicle in place of the compact spare, the TPMS will update automatically and the TPMS Telltale light will turn off, as long as no tire pressure is below the low-pressure warning limit in any of the four active road tires. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Premium System — If Equipped

The Tire Pressure Monitor System (TPMS) uses wireless technology with wheel rim mounted electronic sensors to monitor tire pressure levels. Sensors, mounted to each wheel as part of the valve stem, transmit tire pressure readings to the receiver module.

NOTE: It is particularly important for you to check the tire pressure in all of the tires on your vehicle monthly and to maintain the proper pressure.

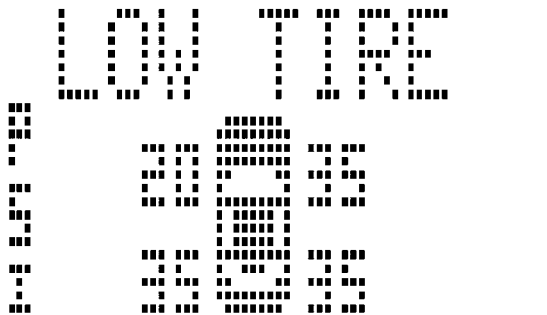
The TPMS consists of the following components:

- Receiver module
- Four Tire Pressure Monitoring Sensors
- Three Trigger modules (mounted in three of the four wheel-wells)
- Various Tire Pressure Monitoring System messages, which display in the Electronic Vehicle Information Center (EVIC)
- Tire Pressure Monitoring Telltale light

Tire Pressure Monitoring Low Pressure Warnings

The Tire Pressure Monitoring Telltale light will illuminate in the instrument cluster and a chime will sound when tire pressure is low in one or more of the four active road tires. In addition, the

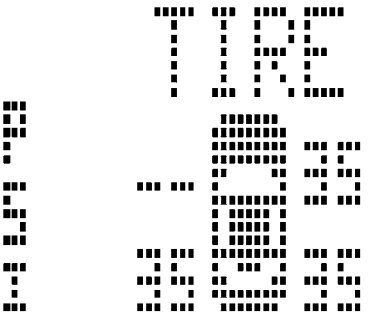
Electronic Vehicle Information Center (EVIC) will display a graphic showing the pressure values of each tire with the low tire pressure values flashing.



Should this occur, you should stop as soon as possible and inflate the tires with low pressure (those flashing in the EVIC graphic) to the vehicle's recommended cold placard pressure value. Once the system receives the updated tire pressures, the system will automatically update, the graphic display in the EVIC will stop flashing, and the Tire Pressure Monitoring Telltale light will turn off. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

Check TPMS Warning

When a system fault is detected, the Tire Pressure Monitoring Telltale light will flash on and off for 75 seconds and then remain on solid. The system fault will also sound a chime. In addition, the EVIC will display a ″CHECK TPM SYSTEM″ message for three seconds and then display dashes (- -) in place of the pressure value to indicate which sensor is not being received.



If the ignition key is cycled, this sequence will repeat, providing the system fault still exists. If the system fault no longer exists, the Tire Pressure Monitoring Telltale light will no longer flash, and the "CHECK TPM SYSTEM" message will no longer display, and a pressure value will display in place of the dashes. A system fault can occur due to any of the following:

1. Jamming due to electronic devices or driving next to facilities emitting the same radio frequencies as the TPMS sensors.

2. Installing some form of aftermarket window tinting that affects radio wave signals.

3. Lots of snow or ice around the wheels or wheel housings.

4. Using tire chains on the vehicle.

5. Using wheels/tires not equipped with TPMS sensors.

NOTE:
1. The compact spare tire does not have a tire pressure monitoring sensor. Therefore, the TPMS will not monitor the pressure in the compact spare tire.

2. If you install the compact spare tire in place of a road tire that has a pressure below the low-pressure warning limit, upon the next ignition key cycle, the TPMS Telltale

light will remain on and a chime will sound. In addition, the graphic in the EVIC will still display a flashing pressure value.

3. After driving the vehicle for up to 10 minutes above 15 mph (25 km/h), the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid. In addition, the EVIC will display a "CHECK TPM SYSTEM" message for three seconds and then display dashes (- -) in place of the pressure value.

4. For each subsequent ignition key cycle, a chime will sound, the TPMS Telltale light will flash on and off for 75 seconds and then remain on solid, and the EVIC will display a "CHECK TPM SYSTEM" message for three seconds and then display dashes (- -) in place of the pressure value.

5. Once you repair or replace the original road tire and reinstall it on the vehicle in place of the compact spare, the TPMS will update automatically. In addition, the TPMS Telltale light will turn off and the graphic in the EVIC will display a new pressure value instead of dashes (- -), as long as no tire pressure is below the low-pressure warning limit in any of the four active road tires. The vehicle may need to be driven for up to 10 minutes above 15 mph (25 km/h) in order for the TPMS to receive this information.

General Information

This device complies with Part 15 of the FCC rules and RSS 210 of Industry Canada. Operation is subject to the following conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

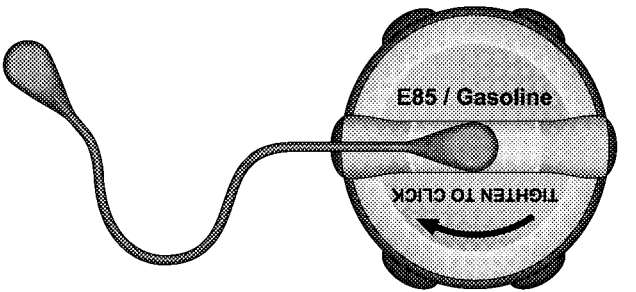
The tire pressure sensors are covered under one of the following licenses:

United States KR5S120123
Canada 2671-S120123

FLEXIBLE FUEL— 2.7L ENGINES ONLY (EXCEPT CALIFORNIA EMISSION STATES)

E-85 GENERAL INFORMATION

The information in this section is for Flexible Fuel vehicles only. This section only covers those subjects that are unique to these vehicles. Please refer to the other sections of this manual for information on features that are common between Flexible Fuel and gasoline only powered vehicles.



E-85 Fuel Cap

CAUTION!
Only vehicles with the special E-85 fuel filler cap can operate on E-85.

Along with the special E-85 fuel filler cap, your vehicle may display a badge, which also indicates it can operate on E-85.

81ae46a9

E-85 Badge

ETHANOL FUEL (E-85)

E-85 is a mixture of approximately 85% fuel ethanol and 15% unleaded gasoline.

WARNING!

Ethanol vapors are extremely flammable and could cause serious personal injury. Never have any smoking materials lit in or near the vehicle when removing the fuel filler tube cap (gas cap) or filling the tank. Do not use E-85 as a cleaning agent and never use it near an open flame.

FUEL REQUIREMENTS

If your vehicle is E-85 compatible, it will operate on unleaded gasoline with an octane rating of 87, or E-85 fuel, or any mixture of these two fuels.

For best results, a refueling pattern that avoids alternating between E-85 and unleaded gasoline is recommended.

When you do switch fuel types it is recommended that:

- you do not add less than 5 gal (19 L) when refueling
- you drive the vehicle immediately after refueling for at least 5 miles (8 km)

Observing these precautions will avoid possible hard starting and/or significant deterioration in driveability during warm up.

NOTE: Use seasonally adjusted E-85 fuel (ASTM D5798). With non-seasonally adjusted E-85 fuel you may experience hard starting and rough idle following start up even if the above recommendations are followed, especially when the ambient temperature is below 32°F (0°C).

Engine Block Heater (if equipped)
Block heater usage is beneficial for E-85 startability when the ambient temperature is less than 32°F (0°C).

SELECTION OF ENGINE OIL FOR FLEXIBLE FUEL VEHICLES (E-85) AND GASOLINE VEHICLES

FFV vehicles operated on E–85 require specially formulated engine oils. These special requirements are included in Mopar® engine oils, and in equivalent oils meeting Chrysler Specification MS-6395. The manufacturer only recommends engine oils that are API Certified and meet the requirements of Material Standard MS-6395. MS-6395 contains additional requirements, developed during extensive fleet testing, to provide additional protection to the manufacturer's engines. Use Mopar® or an equivalent oil meeting the specification MS-6395.

NOTE: Your engine oil filler cap also describes the correct engine oil to use.

STARTING

The characteristics of E-85 fuel make it unsuitable for use when ambient temperatures fall below 0°F (-18°C). In the range of 0°F (-18°C) to 32°F (0°C), you may experience an increase in the time it takes for your engine to start, and a deterioration in driveability (sags and/or hesitations) until the engine is fully warmed up.

CRUISING RANGE

Because E-85 fuel contains less energy per gallon than gasoline, you will experience an increase in fuel consumption. You can expect your fuel economy and driving range to decrease by about 30% compared to gasoline operation.

REPLACEMENT PARTS

Many components in your Flexible Fuel Vehicle (FFV) are designed to be compatible with ethanol. Always be sure that your vehicle is serviced with correct ethanol compatible parts.

CAUTION!

Replacing fuel system components with non-ethanol compatible components can damage your vehicle.

MAINTENANCE

CAUTION!

Do not use ethanol mixture greater than 85% in your vehicle. It will cause difficulty in cold starting and may affect driveability.

FUEL REQUIREMENTS

2.4L and 2.7L Engines

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2.4L and 2.7L Engines are designed to meet all emissions regulations and provide excellent fuel economy and performance when using high-quality unleaded "regular" gasoline having an octane rating of 87. The use of premium gasoline is not recommended. Under normal conditions, the use of premium gasoline will not provide a benefit over high-quality unleaded regular gasolines, and in some circumstances may result in poorer performance.

3.5L Engine

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800dfab7

The 3.5L Engine is designed to meet all emissions regulations and provide satisfactory fuel economy and performance when using high-quality unleaded gasoline having an octane range of 87 to 89. The manufacturer recommends the use of 89 octane for optimum performance. The use of premium gasoline is not recommended. Under normal conditions, the use of premium gasoline will not provide a benefit over high-quality regular and mid-grade gasolines, and in some circumstances may result in poorer performance.

Light spark knock at low engine speeds is not harmful to your engine. However, continued heavy spark knock at high speeds can cause damage and immediate service is required. Poor quality gasoline can cause problems such

as hard starting, stalling, and hesitations. If you experience these symptoms, try another brand of gasoline before considering service for the vehicle.

Over 40 auto manufacturers worldwide have issued and endorsed consistent gasoline specifications (the World Wide Fuel Charter, WWFC) which define fuel properties necessary to deliver enhanced emissions, performance, and durability for your vehicle. The manufacturer recommends the use of gasolines that meet the WWFC specifications, if they are available.

Reformulated Gasoline

Many areas of the country require the use of cleaner burning gasoline referred to as reformulated gasoline. Reformulated gasolines contain oxygenates and are specifically blended to reduce vehicle emissions and improve air quality.

The manufacturer supports the use of reformulated gasolines. Properly blended reformulated gasolines will provide excellent performance and durability of engine and fuel system components.

Gasoline/Oxygenate Blends

Some fuel suppliers blend unleaded gasoline with oxygenates such as 10% ethanol, MTBE, and ETBE. Oxygenates are required in some areas of the country during the Winter months to reduce carbon monoxide emissions. Fuels blended with these oxygenates may be used in your vehicle.

CAUTION!

For vehicles equipped with a 2.4L or 3.5L engine, DO NOT use gasoline containing Methanol or E85 Ethanol. Use of these blends may result in starting and driveability problems and may damage critical fuel system components.

NOTE: The **2.7L engine** is now rated for E85 Ethanol use **(EXCEPT CALIFORNIA EMISSION STATES).** Only vehicles with the E-85 fuel filler door label can operate on E-85. For more information, refer to "Flexible Fuel" in this section.

Problems that result from using methanol/gasoline or E85 ethanol blends are not the responsibility of the manufacturer. While MTBE is an oxygenate made from Methanol, it does not have the negative effects of methanol.

MMT In Gasoline

MMT is a manganese-containing metallic additive that is blended into some gasoline to increase octane. Gasoline blended with MMT provides no performance advantage beyond gasoline of the same octane number without MMT. Gasoline blended with MMT reduces spark plug life and reduces emission system performance in some vehicles. The manufacturer recommends that gasoline without MMT be used in your vehicle. The MMT content of gasoline may not be indicated on the gasoline pump, therefore, you should ask your gasoline retailer whether the gasoline contains MMT. It is even more important to look for gasoline without MMT in Canada, because MMT can be used at levels higher than those allowed in the United States. MMT is prohibited in Federal and California reformulated gasoline.

Materials Added to Fuel

All gasoline sold in the United States is required to contain effective detergent additives. Use of additional detergents or other additives is not needed under normal conditions and they would result in additional cost. Therefore, you should not have to add anything to the fuel.

Fuel System Cautions

CAUTION!

Follow these guidelines to maintain your vehicle's performance:

- The use of leaded gas is prohibited by Federal law. Using leaded gasoline can impair engine performance and damage the emissions control system.
- An out-of-tune engine or certain fuel or ignition malfunctions can cause the catalytic converter to overheat. If you notice a pungent burning odor or some light smoke, your engine may be out of tune or malfunctioning and may require immediate service. Contact your authorized dealer for service assistance.
- The use of fuel additives, which are now being sold as octane enhancers, is not recommended. Most of these products contain high concentrations of methanol. Fuel system damage or vehicle performance problems resulting from the use of such fuels or additives is not the responsibility of the manufacturer.

NOTE: Intentional tampering with the emissions control system can result in civil penalties being assessed against you.

Carbon Monoxide Warnings

WARNING!

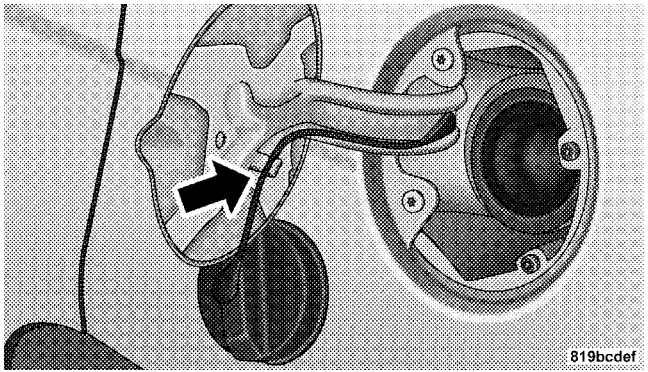
Carbon monoxide (CO) in exhaust gases is deadly. Follow the precautions below to prevent carbon monoxide poisoning:

- Do not inhale exhaust gases. They contain carbon monoxide, a colorless and odorless gas, which can kill. Never run the engine in a closed area, such as a garage, and never sit in a parked vehicle with the engine running for an extended period. If the vehicle is stopped in an open area with the engine running for more than a short period, adjust the ventilation system to force fresh, outside air into the vehicle.
- Guard against carbon monoxide with proper maintenance. Have the exhaust system inspected every time the vehicle is raised. Have any abnormal conditions repaired promptly. Until repaired, drive with all side windows fully open.
- Keep the liftgate closed when driving your vehicle to prevent carbon monoxide and other poisonous exhaust gases from entering the vehicle.

ADDING FUEL

Fuel Filler Cap (Gas Cap)

The gas cap is located behind the fuel filler door on the left side of the vehicle. If the gas cap is lost or damaged, be sure the replacement cap has been designed for use with this vehicle.



Fuel Filler Cap (Gas Cap)

NOTE: When removing the fuel filler cap, lay the cap tether in the hook, located on the fuel filler door reinforcement.

CAUTION!

- **Damage to the fuel system or emissions control system could result from using an improper fuel tank filler tube cap (gas cap).**
- **A poorly fitting gas cap could let impurities into the fuel system.**
- **A poorly fitting gas cap may cause the Malfunction Indicator Light (MIL) to turn on.**
- **To avoid fuel spillage and overfilling, do not "top off" the fuel tank after filling. When the fuel nozzle "clicks" or shuts off, the fuel tank is full.**

WARNING!

- **Never have any smoking materials lit in or near the vehicle when the gas cap is removed or the tank filled.**
- **Never add fuel to the vehicle when the engine is running.**
- **A fire may result if gasoline is pumped into a portable container that is inside of a vehicle. You could be burned. Always place gas containers on the ground while filling.**
- **Failure to follow this warning may result in serious injury or death.**

NOTE:

- Tighten the gas cap until you hear a "clicking" sound. This is an indication that the gas cap is tightened properly. The MIL in the instrument cluster may turn on if the gas cap is not secured properly. Make sure that the gas cap is tightened each time the vehicle is refueled.
- When the fuel nozzle "clicks" or shuts off, the fuel tank is full.

Loose Fuel Filler Cap Message

If the vehicle diagnostic system determines that the fuel filler cap in loose, improperly installed, or damaged, the word "gASCAP" will display in the odometer. If this occurs, tighten the fuel filler cap until a "clicking" sound is heard and press the TRIP ODOMETER button to turn off the message. If the problem persists, the message will appear the next time the vehicle is started.

A loose, improperly installed, or damaged fuel filler cap may also turn on the MIL. Refer to "Onboard Diagnostic System — OBD II" in Section 7.

VEHICLE LOADING

The load carrying capacity of your vehicle is shown on the "Vehicle Certification Label." This information should be used for passenger and luggage loading as indicated.

Do not exceed the specified Gross Vehicle Weight Rating (GVWR) or the Gross Axle Weight Rating (GAWR).

Vehicle Certification Label

Your vehicle has a Vehicle Certification Label affixed to the rear of the driver's door.

The label contains the following information:

- Name of manufacturer
- Month and year of manufacture
- Gross Vehicle Weight Rating (GVWR)
- Gross Axle Weight Rating (GAWR) front
- Gross Axle Weight Rating (GAWR) rear
- Vehicle Identification Number (VIN)
- Type of Vehicle
- Month Day and Hour of Manufacture (MDH)

The bar code allows a computer scanner to read the VIN.

Gross Vehicle Weight Rating (GVWR)

The GVWR is the total allowable weight of your vehicle. This includes driver, passengers, and cargo. The total load must be limited so that you do not exceed the GVWR.

Gross Axle Weight Rating (GAWR)

The GAWR is the maximum capacity of the front and rear axles. Distribute the load over the front and rear axles evenly. Make sure that you do not exceed either front or rear GAWR.

WARNING!

Because the front wheels steer the vehicle, it is important that you do not exceed the maximum front or rear GAWR. A dangerous driving condition can result if either rating is exceeded. You could lose control of the vehicle and have an accident.

Overloading

The load carrying components (axle, springs, tires, wheels, etc.) of your vehicle will provide satisfactory service as long as you do not exceed the GVWR and the front and rear GAWR.

The best way to figure out the total weight of your vehicle is to weigh it when it is fully loaded and ready for operation. Weigh it on a commercial scale to ensure that it is not over the GVWR.

Figure out the weight on the front and rear of the vehicle separately. It is important that you distribute the load evenly over the front and rear axles.

Overloading can cause potential safety hazards and shorten useful service life. Heavier axles or suspension components do not necessarily increase the vehicle's GVWR.

Loading

To load your vehicle properly, first figure out its empty weight, axle-by-axle and side-by-side. Store heavier items down low and be sure you distribute their weight as evenly as possible. Stow all loose items securely before driving. If weighing the loaded vehicle shows that you have exceeded either GAWR, but the total load is within the specified GVWR, you must redistribute the weight. Improper weight distribution can have an adverse effect on the way your vehicle steers and handles and the way the brakes operate.

A loaded vehicle is shown in the illustration. Note that neither the GVWR nor the GAWR capacities have been exceeded.

EXAMPLE ONLY	Front Axle	Rear Axle
Empty Weight	2054 lbs (932 kg)	1805 lbs (819 kg)
Load (including driver, passengers, and cargo)	271 lbs (123 kg)	579 lbs (263 kg)
Total	2325 lbs (1055 kg)	2384 lbs (1081 kg)
GAWR	2546 lbs (1155 kg)	2708 lbs (1228 kg)

NOTE: Refer to the "Vehicle Certification Label" affixed to the rear of the driver's door for your vehicle's GVWR and GAWRs. This table is only an example.

TRAILER TOWING

In this section, you will find safety tips and information on limits to the type of towing you can reasonably do with your vehicle. Before towing a trailer, carefully review this information to tow your load as efficiently and safely as possible.

To maintain warranty coverage, follow the requirements and recommendations in this manual concerning vehicles used for trailer towing.

Common Towing Definitions

The following trailer towing related definitions will assist you in understanding the following information:

Gross Vehicle Weight Rating (GVWR)

The Gross Vehicle Weight Rating (GVWR) is the total allowable weight of your vehicle. This includes driver, passengers, cargo, and tongue weight. The total load must be limited so that you do not exceed the GVWR.

Gross Trailer Weight (GTW)
The Gross Trailer Weight (GTW) is the weight of the trailer plus the weight of all cargo, consumables, and equipment (permanent or temporary) loaded in or on the trailer in its "loaded and ready for operation" condition. The recommended way to measure GTW is to put your fully loaded trailer on a vehicle scale. The entire weight of the trailer must be supported by the scale.

Gross Combination Weight Rating (GCWR)
The Gross Combination Weight Rating (GCWR) is the total permissible weight of your vehicle and trailer when weighed in combination. (Note that GCWR ratings include a 150 lbs (68 kg) allowance for the presence of a driver.)

Gross Axle Weight Rating (GAWR)
The Gross Axle Weight Rating (GAWR) is the maximum capacity of the front and rear axles. Distribute the load over the front and rear axles evenly. Make sure that you do not exceed either front or rear GAWR.

WARNING!

It is important that you do not exceed the maximum front or rear GAWR. A dangerous driving condition can result if either rating is exceeded. You could lose control of the vehicle and have an accident.

Tongue Weight (TW)
Tongue weight (TW) is the downward force exerted on the hitch ball by the trailer. In most cases, it should not be less than 10% or more than 15% of the trailer load. You must consider this as part of the load on your vehicle.

Frontal Area
Frontal area is the maximum height and maximum width of the front of a trailer.

Trailer Sway Control — Electronic
Refer to "TSC (Trailer Sway Control)" under "Electronic Brake Control System" in this section for information on this system.

Trailer Sway Control — Mechanical
The trailer sway control is a telescoping link that can be installed between the hitch receiver and the trailer tongue that typically provides adjustable friction associated with the telescoping motion to dampen any unwanted trailer swaying motions while traveling.

Weight-Carrying Hitch
A weight-carrying hitch supports the trailer tongue weight, just as if it were luggage located at a hitch ball or some other connecting point of the vehicle. These kinds of hitches are the most popular on the market today and they are commonly used to tow small- and medium-sized trailers.

Weight-Distributing Hitch
A weight-distributing system works by applying leverage through spring (load) bars. They are typically used for heavier loads to distribute trailer tongue weight to the tow vehicle's front axle and the trailer axle(s). When used in accordance with the manufacturers directions, it provides for a more level ride, offering more consistent steering and brake control thereby enhancing towing safety. The addition of a friction / hydraulic sway control also dampens sway caused by traffic and crosswinds and contributes positively to tow vehicle and trailer stability. Trailer sway control and a weight distributing (load equalizing) hitch are recommended for heavier Tongue Weights (TW) and may be required depending on vehicle and trailer configuration / loading to comply with Gross Axle Weight Rating (GAWR) requirements.

WARNING!

- **An improperly adjusted weight distributing hitch system may reduce handling, stability, braking performance, and could result in an accident.**
- **Weight distributing systems may not be compatible with surge brake couplers. Consult with your hitch and trailer manufacturer or a reputable recreational vehicle dealer for additional information.**

EXAMPLE ONLY

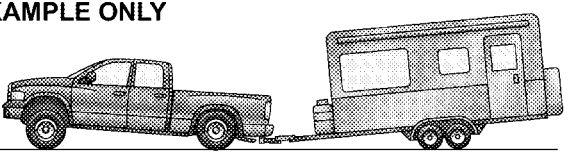


FIG. 1 WITHOUT WEIGHT DISTRIBUTION (INCORRECT)

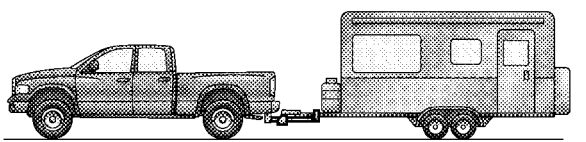


FIG 2. WITH WEIGHT DISTRIBUTION (CORRECT) 8181f965

Weight Distributing Hitch System

EXAMPLE ONLY

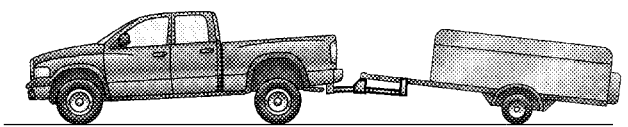


FIG. 3 IMPROPER ADJUSTMENT (INCORRECT)

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Improper Adjustment of Weight Distributing System

Trailer Hitch Classification

Your vehicle may be factory equipped for safe towing of trailers weighing over 2,000 lbs (907 kg) with the optional Trailer Tow Prep Package. See your authorized dealer for package content.

The following chart provides the industry standard for the maximum trailer weight a given trailer hitch class can tow and should be used to assist you in selecting the correct trailer hitch for your intended towing condition.

Trailer Hitch Classification Definitions	
Class	**Max. Trailer Hitch Industry Standards**
Class I - Light Duty	2,000 lbs (907 kg)
Class II - Medium Duty	3,500 lbs (1587 kg)
Class III - Heavy Duty	5,000 lbs (2268 kg)
Class IV - Extra Heavy Duty	10,000 lbs (4540 kg)
Refer to the "Trailer Towing Weights (Maximum Trailer Weight Ratings)" chart for the Maximum Gross Trailer Weight (GTW) towable for your given drivetrain.	

All trailer hitches should be professionally installed on your vehicle.

5

Trailer Towing Weights (Maximum Trailer Weight Ratings)

The following chart provides the maximum trailer weight ratings towable for your given drivetrain.

Engine/ Transaxle	GCWR (Gross Combined Wt. Rating)	Frontal Area	Max. GTW (Gross Trailer Wt.)	Max. Tongue Wt.
2.4L Automatic	6,000 lbs (2,722 kg)	22 sq ft (2.0 sq m)	1,000 lbs (454 kg) which includes up to 5 persons & Luggage	100 lbs (45 kg)
2.7L/3.5L (without Trailer Tow Prep Package (AHT)	7,300 lbs (3,311 kg)	32 sq ft (3.0 sq m)	2,000 lbs (907 kg) which includes 1 to 2 persons & Luggage	200 lbs (91 kg)
	7,300 lbs (3,311 kg)	32 sq ft (3.0 sq m)	1,500 lbs (680 kg) which includes 3 to 4 persons & Luggage	150 lbs (68 kg)
	7,300 lbs (3,311 kg)	32 sq ft (3.0 sq m)	1,000 lbs (454 kg) which includes 5 to 7 persons & Luggage	100 lbs (45 kg) *Except for AWD models.
2.7L (with Trailer Tow Prep Package (AHT)	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	3,000 lbs (1,361 kg) which includes up to 5 persons & Luggage	300 lbs (136 kg)
	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	1,000 lbs (454 kg) which includes 6 to 7 persons & Luggage	100 lbs (91 kg)

Engine/ Transaxle	GCWR (Gross Combined Wt. Rating)	Frontal Area	Max. GTW (Gross Trailer Wt.)	Max. Tongue Wt.
3.5L (with Trailer Tow Prep Package (AHT)	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	3,500 lbs (1,588 kg) which includes 1 to 2 persons & Luggage	350 lbs (159 kg)
	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	3,000 lbs (1,361 kg) which includes 3 to 4 persons & Luggage	300 lbs (136 kg)
	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	2,500 lbs (1,134 kg) which includes 5 to 6 persons & Luggage	250 lbs (113 kg) *Except for AWD models.
	8,300 lbs (3,765 kg)	40 sq ft (3.7 sq m)	2,500 lbs (1,134 kg) which includes 7 persons & Luggage	100 lbs (113 kg) *Except for AWD models.

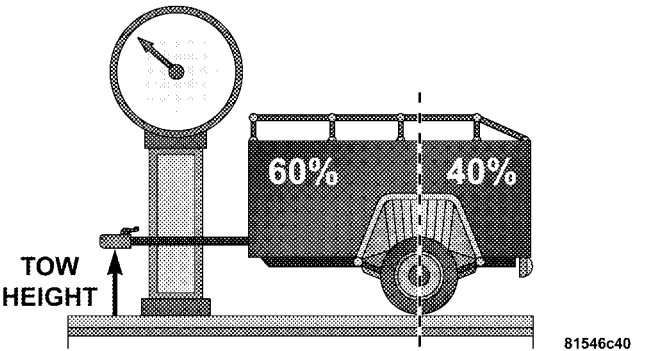
NOTE: The trailer tongue weight must be considered as part of the combined weight of occupants and cargo, and should never exceed the weight referenced on the Tire and Loading Information placard. Refer to the Tire–Safety Information Section in this manual.

NOTE: * For All Wheel Drive (AWD) models carrying 5 to 7 persons and luggage will exceed the rear Gross Axle Weight Rating (GAWR) and therefore should not be attempted.

Trailer and Tongue Weight

Always load a trailer with 60% to 65% of the weight in the front of the trailer. This places 10% to 15% of the Gross Trailer Weight (GTW) on the tow hitch of your vehicle. Loads balanced over the wheels or heavier in the rear can cause the trailer to sway **severely** side to side which will cause loss of control of the vehicle and trailer. Failure to load trailers heavier in front is the cause of many trailer accidents.

Never exceed the maximum tongue weight stamped on your bumper or trailer hitch.



Consider the following items when computing the weight on the rear axle of the vehicle:

- The tongue weight of the trailer.
- The weight of any other type of cargo or equipment put in or on your vehicle.
- The weight of the driver and all passengers.

NOTE: Remember that everything put into or on the trailer adds to the load on your vehicle. Also, additional factory-installed options or authorized dealer-installed options must be considered as part of the total load on your vehicle. Refer to the "Tire and Loading Information" placard for the maximum combined weight of occupants and cargo for your vehicle.

Towing Requirements

To promote proper break-in of your new vehicle drivetrain components the following guidelines are recommended:

CAUTION!

- **Avoid towing a trailer for the first 500 mi (805 km) of vehicle operation. Doing so may damage your vehicle.**
- **During the first 500 mi (805 km) of trailer towing, limit your speed to 50 mph (80 km/h).**

Perform the maintenance listed in Section 8. When towing a trailer, never exceed the GAWR, or GCWR, ratings.

WARNING!

Improper towing can lead to an injury accident. Follow these guidelines to make your trailer towing as safe as possible:

Make certain that the load is secured in the trailer and that it will not shift during travel. When trailering cargo that is not fully secured, dynamic load shifts can occur that may be difficult for the driver to control. You could lose control of your vehicle and have an accident.

- When hauling cargo or towing a trailer, do not overload your vehicle or trailer. Overloading can cause a loss of control, poor performance, or damage to brakes, axle, engine, transaxle, steering, suspension, chassis structure, or tires.
- Safety chains must always be used between your vehicle and trailer. Always connect the chains to the frame or hook retainers of the vehicle hitch. Cross the chains under the trailer tongue and allow enough slack for turning corners.
- Vehicles with trailers should not be parked on a grade. When parking, apply the parking brake on the tow vehicle. Put the tow vehicle automatic transaxle in PARK. Always, block or "chock" the trailer wheels.
- GCWR must not be exceeded.
- **Total weight must be distributed between the tow vehicle and the trailer such that the following four ratings are not exceeded:**

  1. GVWR
  2. GTW
  3. GAWR

4. Tongue weight rating for the trailer hitch utilized. (This requirement may limit the ability to always achieve the 10% to 15% range of tongue weight as a percentage of total trailer weight.)

Towing Requirements — Tires

– Do not attempt to tow a trailer while using a compact spare tire.

– Proper tire inflation pressures are essential to the safe and satisfactory operation of your vehicle. Refer to "Tires–General Information" in this section for information on tire pressures and for proper tire inflation procedures.

– Also, check the trailer tires for proper tire inflation pressures before trailer usage.

– Check for signs of tire wear or visible tire damage before towing a trailer. Refer to "Tires–General Information" in this section for information on tread wear indicators and for the proper inspection procedure.

– When replacing tires, refer to "Tires–General Information" in this section for information on replacement tires and for the proper tire replacement procedures. Replacing tires with a higher load carrying capacity will not increase the vehicle's GVWR and GAWR limits.

Towing Requirements — Trailer Brakes

– Do **not** interconnect the hydraulic brake system or vacuum system of your vehicle with that of the trailer. This could cause inadequate braking and possible personal injury.

– An electronically actuated trailer brake controller is required when towing a trailer with electronically

actuated brakes. When towing a trailer equipped with a hydraulic surge actuated brake system, an electronic brake controller is not required.

– Trailer brakes are recommended for trailers over 1,000 lbs (454 kg) and required for trailers in excess of 2,000 lbs (907 kg).

CAUTION!

If the trailer weighs more than 1,000 lbs (454 kg) loaded, it should have its own brakes, and they should be of adequate capacity. Failure to do this could lead to accelerated brake lining wear, higher brake pedal effort, and longer stopping distances.

WARNING!

Do not connect trailer brakes to your vehicle's hydraulic brake lines. It can overload your brake system and cause it to fail. You might not have brakes when you need them and could have an accident.

Towing any trailer will increase your stopping distance. When towing, you should allow for additional space between your vehicle and the vehicle in front of you. Failure to do so could result in an accident.

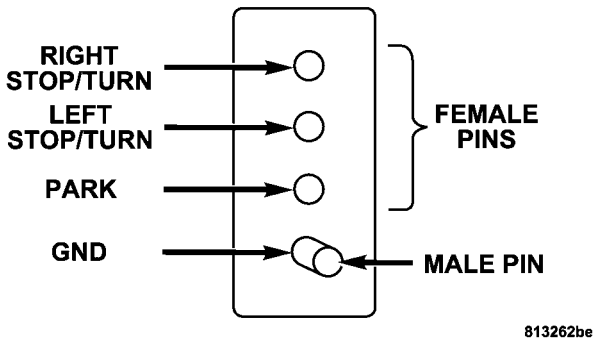
Towing Requirements — Trailer Lights and Wiring

Whenever you pull a trailer, regardless of the trailer size, stoplights and turn signals on the trailer are required for motoring safety.

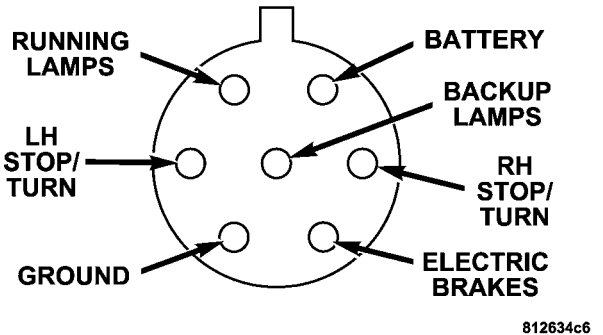
The Trailer Tow Package may include a 4- and 7-pin wiring harness. Use a factory approved trailer harness and connector.

NOTE: Do not cut or splice wiring into the vehicles wiring harness.

The electrical connections are all complete to the vehicle but you must mate the harness to a trailer connector. Refer to the following illustrations.



4-Pin Connector



7-Pin Connector

Towing Tips

Before setting out on a trip, practice turning, stopping, and backing up the trailer in an area located away from heavy traffic.

Towing Tips — Automatic Transaxle

The DRIVE range can be selected when towing. However, if frequent shifting occurs while in this range, select the "3" range for 4-speed automatic or the "5" range for 6-speed automatic.

NOTE: Using the "3" or "5" range while operating the vehicle under heavy operating conditions will improve performance and extend transaxle life by reducing excessive shifting and heat build up. This action will also provide better engine braking.

If you REGULARLY tow a trailer for more than 45 minutes of continuous operation, then change the automatic transaxle fluid and filter according to the interval specified for "police, taxi, fleet, or frequent trailer towing" in the Maintenance Schedule.

NOTE: Check the 4-speed automatic transaxle fluid level before towing. The 6-speed transaxle is sealed and the fluid level cannot be checked. See your authorized dealer for assistance.

Towing Tips — Electronic Speed Control (If Equipped)

- Don't use in hilly terrain or with heavy loads.
- When using the speed control, if you experience speed drops greater than 10 mph (16 km/h), disengage until you can get back to cruising speed.
- Use speed control in flat terrain and with light loads to maximize fuel efficiency.

Towing Tips — Autostick® (If Equipped)

- By using the Autostick® modes and selecting a specific gear range, frequent shifting can be avoided. The highest gear range should be selected that allows for adequate performance. For example, choose "4" if the desired speed can be maintained. Choose "3" or "2" if needed to maintain the desired speed.
- Extended driving at high RPM should be avoided to prevent excess heat generation. A reduction in vehicle speed may be required to avoid extended driving at high RPM. Return to a higher gear range or vehicle speed when road conditions and RPM level allows.

Towing Tips — Cooling System
To reduce potential for engine and transaxle overheating, take the following actions:

– *City Driving*
When stopped for short periods, put transaxle in NEUTRAL and increase engine idle speed.

– *Highway Driving*
Reduce speed.

– *Air Conditioning*
Turn off temporarily.

– Refer to "Cooling System" under "Maintenance Procedures" in Section 7.

RECREATIONAL TOWING (BEHIND MOTORHOME, ETC.)

TOWING THIS VEHICLE BEHIND ANOTHER VEHICLE (Flat Towing With All Four Wheels On The Ground)

Recreational towing for this vehicle is not recommended.

NOTE: If the vehicle requires towing, make sure all four wheels are off the ground.

WHAT TO DO IN EMERGENCIES

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- ■ If Your Engine Overheats 394
  - □ Engine Oil Overheating — 2.4L Gas And 2.0L Diesel Engines Only (If Equipped) 395
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HAZARD WARNING FLASHER

The HAZARD switch is located in the instrument panel switch bank above the climate controls.

Push and release the switch to turn on the hazard warning flashers. When the hazard warning is activated, all directional turn signals will flash on and off to warn oncoming traffic of an emergency. Push and release the switch a second time to turn off the flashers.

This is an emergency warning system and it should not be used when the vehicle is in motion. Use it when your vehicle is disabled and it is creating a safety hazard for other motorists.

When you must leave the vehicle to seek assistance, the hazard warning flashers will continue to operate even though the ignition switch is in the LOCK position.

NOTE: With extended use, the hazard warning flashers may wear down your battery.

IF YOUR ENGINE OVERHEATS

In any of the following situations, you can reduce the potential for overheating by taking the appropriate action.

- On the highways — Slow down.
- In city traffic — While stopped, put the transaxle in NEUTRAL, but do not increase engine idle speed.

NOTE: There are steps that you can take to slow down an impending overheat condition. If your Air Conditioning A/C system is on, turn it off. The A/C system adds heat to the engine cooling system and turning off the A/C system removes this heat. You can also turn the Temperature control to maximum heat, the Mode control to floor, and the Blower control to High. This allows the heater core to act as a supplement to the radiator and aids in removing heat from the engine cooling system.

CAUTION!

Driving with a hot cooling system could damage your vehicle. If the temperature gauge reads "H," safely pull over and stop the vehicle. Idle the vehicle with the A/C turned off until the pointer drops back into the normal range. If the pointer remains on the "H," and you hear continuous chimes, turn the engine OFF immediately, and call for service.

WARNING!

A hot engine cooling system is dangerous. You or others could be badly burned by steam or boiling coolant. You may want to call a service center if your vehicle overheats. If you decide to look under the hood yourself, refer to Section 7 and follow the warnings under the Cooling System Pressure Cap paragraph.

Engine Oil Overheating — 2.4L Gas and 2.0L Diesel Engines Only (If Equipped)

On hot days the engine oil temperature may become too hot during sustained high-speed driving or if towing a trailer up long grades. If this happens, a HOTOIL message will flash in the odometer and the vehicle speed will be reduced to 48 mph (77 km/h) maximum until the engine oil temperature is reduced.

NOTE: Although the maximum vehicle speed is reduced to 48 mph (77 km/h), you may of course reduce vehicle speed further as needed.

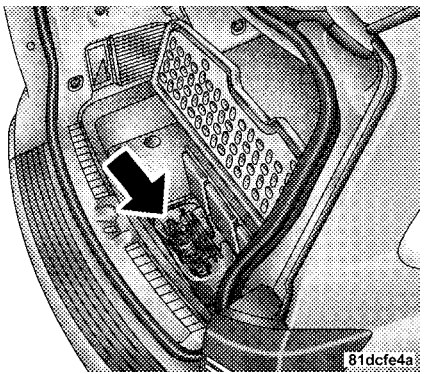
JACKING AND TIRE CHANGING

WARNING!

- **Do not attempt to change a tire on the side of the vehicle close to moving traffic. Pull far enough off the road to avoid the danger of being hit when operating the jack or changing the wheel.**
- **Getting under a jacked-up vehicle is dangerous. The vehicle could slip off the jack and fall on you. You could be crushed. Never get any part of your body under a vehicle that is on a jack. Never start or run the engine while the vehicle is on a jack. If you need to get under a raised vehicle, take it to a service center where it can be raised on a lift.**
- **The jack is designed to use as a tool for changing tires only. The jack should not be used to lift the vehicle for service purposes. The vehicle should be jacked on a firm level surface only. Avoid ice or slippery areas.**
- **A loose tire or jack thrown forward in a collision or hard stop could endanger the occupants of the vehicle. Always stow the jack parts and the spare tire in the places provided.**

Jack Location

The jack and jack-handle are stowed underneath a cover in the rear storage bin in the cargo area.



Jack Storage Location

Spare Tire Location

The spare tire is stowed underneath the rear of the vehicle and is held in place by means of a cable winch mechanism.

Preparations For Jacking

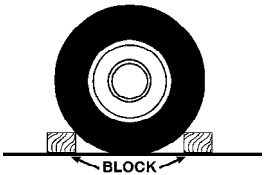
1. Park the vehicle on a firm level surface as far from the edge of the roadway as possible. Avoid icy or slippery areas.

2. **Set the parking brake** and place the shift lever in PARK.

3. Turn OFF the ignition.

4. Turn ON the hazard warning flashers.

5. Passengers should not remain in the vehicle when the vehicle is being jacked.

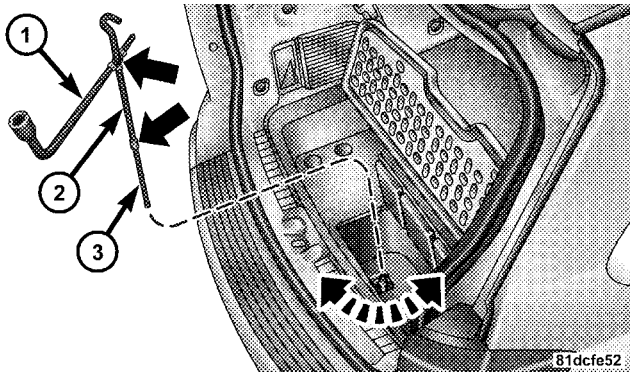


6. Block both the front and rear of the wheel diagonally opposite the jacking position. For example, if changing the right front tire, block the left rear wheel.

Spare Tire Removal

NOTE: On Seven-Passenger Models, fold the third-row passenger seats flat. This will provide more space when accessing the jacking tools and when operating the winch mechanism.

1. Remove the jack-handle components 1, 2, and 3 from storage and assemble them.



Lowering/Raising Spare Tire

NOTE: Assemble components 2 and 3 by seating the small ball at the end of component 2 in the small hole at the end of component 3. This will lock these components together. Assemble components 1 and 2 so that the wheel nut socket at the end of component 1 faces upward when seated on component 2. This will make it easier to rotate the assembly when operating the winch mechanism.

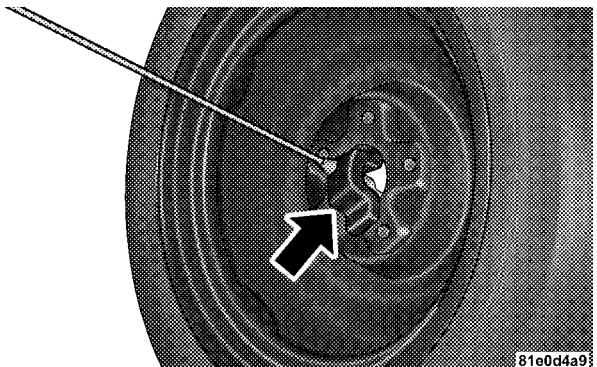
2. Fit the assembled jack-handle over the winch drive nut located in the jack storage area. Rotate the jack-handle assembly counterclockwise until the spare tire is on the ground with enough cable slack to allow you to pull the spare tire out from underneath the vehicle.

CAUTION!

The winch mechanism is designed for use with the jack-handle only. Use of an air wrench or other power tools is not recommended and it can damage the winch.

3. Pull the spare tire out from underneath the vehicle and raise it upright so the tire's tread is on the ground.

4. Tilt the retainer at the end of the winch cable and remove it from the center of the wheel.

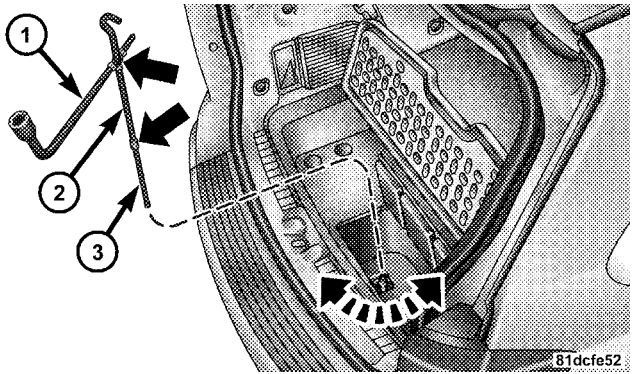


Spare Tire Retainer

Spare Tire Stowage

NOTE: On Seven-Passenger Models, fold the third-row passenger seats flat. This will provide more space when accessing the jacking tools and when operating the winch mechanism.

1. Remove the jack-handle components 1, 2, and 3 from storage and assemble them.



Lowering/Raising Spare Tire

NOTE: Assemble components 2 and 3 by seating the small ball at the end of component 2 in the small hole at the end of component 3. This will lock these components together. Assemble components 1 and 2 so that the wheel nut socket at the end of component 1 faces upward when seated on component 2. This will make it easier to rotate the assembly when operating the winch mechanism.

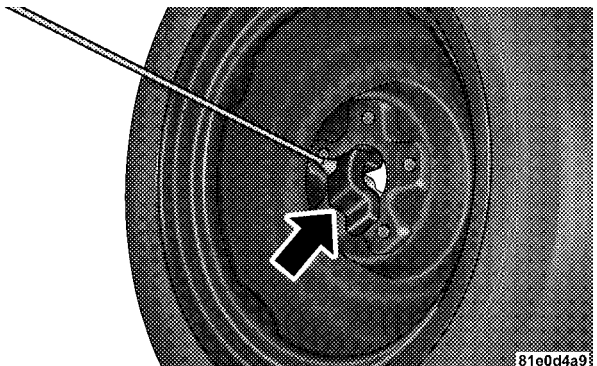
2. Fit the assembled jack-handle over the winch drive nut located in the jack storage area. Rotate the jack-handle assembly counterclockwise until there is enough cable slack to allow you to pull the cable and retainer out from underneath the vehicle.

CAUTION!

The winch mechanism is designed for use with the jack-handle only. Use of an air wrench or other power tools is not recommended and it can damage the winch.

3. Place the spare tire near to the winch cable. Hold the spare upright so that the tire's tread is on the ground and the valve stem is at the top of the wheel and facing away from the rear of the vehicle.

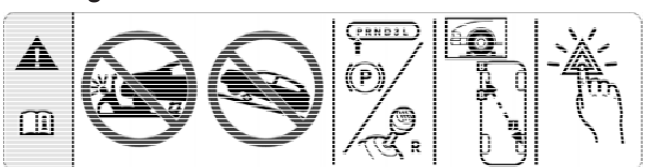
4. Tilt the retainer at the end of the winch cable and drop it through the center of the wheel. Then place the spare tire with the cable and retainer underneath the vehicle.



Spare Tire Retainer

5. Fit the assembled jack-handle over the winch drive nut. Rotate the jack-handle assembly clockwise to raise the spare tire into the storage area. Continue to rotate the jack-handle assembly until you hear the winch mechanism click three times. It cannot be over tightened. Push against the tire several times to be sure it is held securely in place.

Jacking Instructions



Jack Warning Label

WARNING!

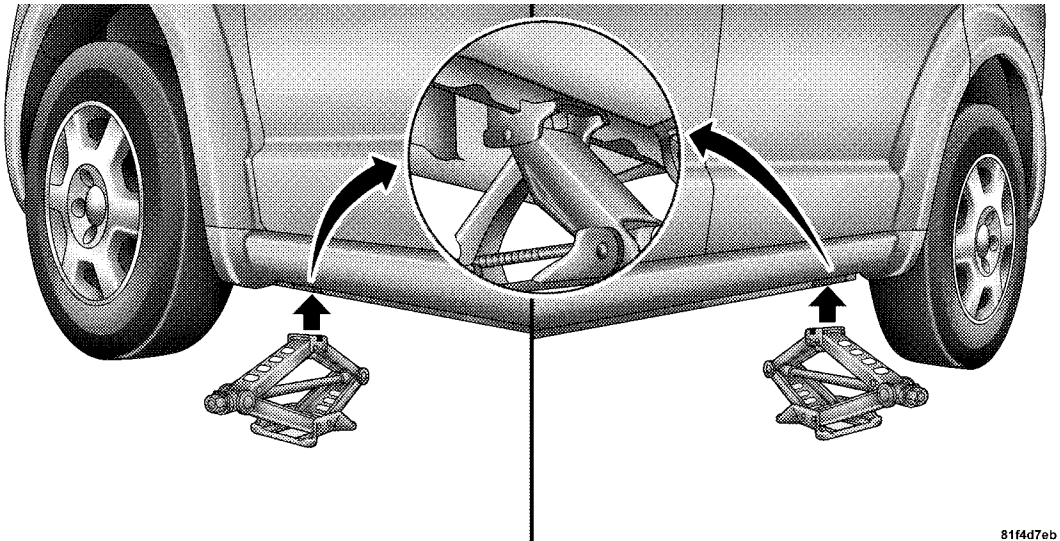
Carefully follow these tire changing warnings to help prevent personal injury or damage to your vehicle:

- **Always park on a firm, level surface as far from the edge of the roadway as possible before raising the vehicle.**
- **Block the wheel diagonally opposite the wheel to be raised.**
- **Set the parking brake firmly and set an automatic transaxle in PARK; a manual transaxle in REVERSE.**
- **Never start or run the engine with the vehicle on a jack.**
- **Do not let anyone sit in the vehicle when it is on a jack.**
- **Do not get under the vehicle when it is on a jack.**
- **Only use the jack in the positions indicated and for lifting this vehicle during a tire change.**
- **If working on or near a roadway, be extremely careful of motor traffic.**
- **To assure that spare tires, flat or inflated are securely stowed, spares must be stowed with the valve stem facing the ground.**
- **Turn on the Hazard warning flasher.**

1. Remove the spare tire, jack, and jack-handle from stowage.

2. Loosen, but do not remove, the wheel nuts on the wheel with the flat tire. Turn the wheel nuts counter-clockwise one turn while the wheel is still on the ground.

3. Place the jack underneath the lift area that is closest to the flat tire. Turn the jack screw clockwise to firmly engage the jack saddle with the lift area of the sill flange.



Jack Engagement Locations

4. Raise the vehicle by turning the jack screw clockwise with the jack handle. Raise the vehicle until the tire just clears the road surface and enough clearance is obtained to install the spare tire. Minimum tire lift provides maximum stability.

WARNING!

Raising the vehicle higher than necessary can make the vehicle less stable. It could slip off the jack and hurt someone near it. Raise the vehicle only enough to remove the tire.

5. Remove the wheel nuts. For vehicles so equipped, remove the wheel cover from the wheel by hand. Do not pry the wheel cover off. Then pull the wheel off the hub.

WARNING!

To avoid possible personal injury, handle the wheel covers with care to avoid contact with any sharp edges.

NOTE: For vehicles so equipped, the wheel cover is held on the wheel by the wheel nuts. When reinstalling the original wheel, properly align the wheel cover to the valve stem, place the wheel cover onto the wheel, and then install the wheel nuts.

6. Install the spare tire.

NOTE:

- For vehicles so equipped, do not attempt to install a center cap or wheel cover on the compact spare.

- Refer to “Compact Spare Tire” and to “Limited-Use Spare” under “Tires — General Information” in Section 5 for additional warnings, cautions, and information about the spare tire, its use, and operation.

7. Install the wheel nuts with the cone shaped end of the nut toward the wheel. Lightly tighten the wheel nuts.

WARNING!

To avoid the risk of forcing the vehicle off the jack, do not tighten the wheel nuts fully until the vehicle has been lowered. Failure to follow this warning may result in personal injury or death.

8. Lower the vehicle by turning the jack screw counterclockwise with the jack handle.

9. Finish tightening the wheel nuts. Push down on the wrench while tightening for increased leverage. Alternate wheel nuts until each nut has been tightened twice. Correct wheel nut tightness is 95 ft lbs (130 N·m). If in doubt about the correct tightness, have them checked with a torque wrench by your authorized dealer or at a service station.

10. Lower the jack to its fully closed position.

WARNING!

A loose tire or jack, thrown forward in a collision or hard stop could endanger the occupants of the vehicle. Always stow the jack parts and the spare tire in the places provided. Have the deflated (flat) tire repaired or replaced immediately.

11. Place the deflated (flat) tire in the cargo area. **Do not stow the deflated tire in the spare tire stowage location.** Have the deflated (flat) tire repaired or replaced as soon as possible.

12. To stow the winch cable and retainer, fit the assembled jack-handle over the winch drive nut. Rotate the jack-handle assembly clockwise until you hear the winch mechanism click three times. It cannot be over tightened.

13. Stow the jack-handle and jack.

14. Check the tire pressure as soon as possible. Adjust the tire pressure as required.

Wheel Nuts

Tighten all wheel nuts occasionally to eliminate the possibility of wheel studs being sheared or the bolt holes in the wheels becoming elongated. This is especially important during the first few hundred miles (kilometers) of operation and after changing a tire. This allows the wheel nuts to seat properly. All wheel nuts should first be firmly seated against the wheel. The wheel nuts should then be tightened to recommended torque. Tighten the wheel nuts to the final torque in increments. Progress around the bolt circle, tightening the nut opposite of the one you previously tightened until the final torque is achieved. Recommended torque is 95 ft lbs (130 N·m).

JUMP-STARTING PROCEDURES

WARNING!

- **Take care to avoid the radiator cooling fan whenever the hood is raised. It can start anytime the ignition switch is ON. You can be hurt by the fan.**
- **Do not attempt to push or tow your vehicle to get it started. Vehicles equipped with an automatic transaxle cannot be started this way. Unburned fuel could enter the catalytic converter and once the engine has started, ignite and damage the converter and vehicle. If the vehicle has a discharged battery, booster cables may be used to obtain a start from another vehicle. This type of start can be dangerous if done improperly, so follow this procedure carefully.**
- **Do not use a booster battery or any other booster source with an output that exceeds 12 Volts.**

WARNING!

- **Battery fluid is a corrosive acid solution; do not allow battery fluid to contact eyes, skin, or clothing. Don't lean over battery when attaching clamps or allow the clamps to touch each other. If acid splashes in eyes or on skin, flush contaminated area immediately with large quantities of water.**
- **A battery generates hydrogen gas, which is flammable and explosive. Keep flame or spark away from the vent holes.**

The battery is stored in a compartment that is located behind the left front fender and is accessible through the wheel well. Remote jump-start terminals are located in the engine compartment.

1. Wear eye protection and remove any metal jewelry such as watchbands or bracelets that might make an inadvertent electrical contact.

2. When boosting from a battery in another vehicle, park that vehicle within booster cable reach, but without allowing the vehicles to touch. Set parking brake, place automatic transaxle in PARK, and turn ignition to LOCK for both vehicles.

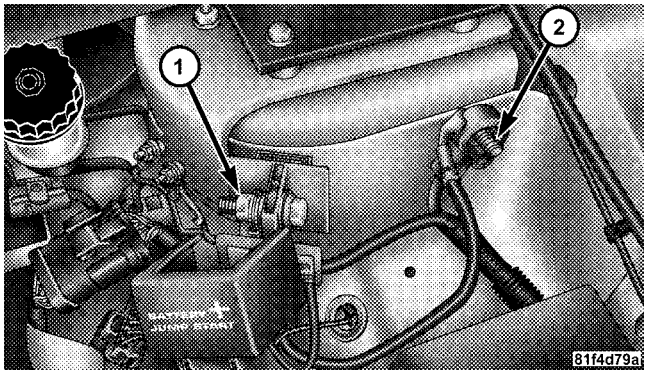
WARNING!

Do not permit vehicles to touch each other as this could establish a ground connection and personal injury could result.

3. Turn off the heater, radio, and all unnecessary electrical loads.

4. Remove the protective cover over the remote jump-start positive battery post **(+)** in the engine compartment. Connect one end of the jumper cable to the positive battery post. Connect the other end of the same cable to the positive terminal of the booster battery. Refer to the following illustration for jump-starting connections.

5. Connect the other cable, first to the negative terminal of the booster battery and **then to the engine ground (-) of the vehicle with the discharged battery.** Make sure you have a good contact on the engine ground. Refer to the following illustration for jump-starting connections.



1 — Positive Terminal
2 — Negative Terminal

6. If the vehicle is equipped with Sentry Key Immobilizer, turn the ignition switch to the ON position for three seconds before moving the ignition switch to the START position.

7. Start the engine in the vehicle that has the booster battery, let the engine idle a few minutes, and then start the engine in the vehicle with the discharged battery.

8. When removing the jumper cables, reverse the sequence exactly. Be careful of the moving belts and fan.

9. Reinstall the protective cover over the remote jump-start positive battery post.

WARNING!

During cold weather when temperatures are below freezing point, electrolyte in a discharged battery may freeze. Do not attempt jump-starting because the battery could rupture or explode. The battery temperature must be brought up above freezing point before attempting jump-start.

NOTE: Refer to "Maintenance Procedures" in Section 7 for information on accessing the battery for service or replacement.

WARNING!

Any procedure other than above could result in:

1. Personal injury caused by electrolyte squirting out the battery vent;

2. Personal injury or property damage due to battery explosion;

3. Damage to charging system of booster vehicle or of immobilized vehicle.

FREEING A STUCK VEHICLE

If your vehicle becomes stuck in mud, sand, or snow, it can often be moved by a rocking motion. Turn your steering wheel right and left to clear the area around the front wheels. Then shift back and forth between REVERSE and 1st gear. Usually the least accelerator pedal pressure to maintain the rocking motion without spinning the wheels is most effective.

NOTE:

If your vehicle is equipped with Traction Control, turn the system OFF before attempting to "rock" the vehicle. Refer to "Partial Off Mode" under "Electronic Stability Program (ESP)" in Section 5.

WARNING!

Fast spinning tires can be dangerous. Forces generated by excessive wheel speeds may cause axle and tire damage or failure. A tire could explode and injure someone. Do not spin your vehicle's wheels faster than 30 mph (48 km/h) or for longer than 30 seconds continuously without stopping when you are stuck, and don't let anyone near a spinning wheel, no matter what the speed.

CAUTION!

Racing the engine or spinning the wheels too fast may lead to transaxle overheating and failure. It can also damage the tires. Do not spin the wheels above 30 mph (48 km/h). Do not spin the wheels continuously for more than 30 seconds.

TOWING A DISABLED VEHICLE

Without The Ignition Key

Front Wheel Drive (FWD)
Special care must be taken when the vehicle is towed with the ignition in the LOCK position. Flat bed towing is the preferred towing method. However, if a flat bed towing vehicle is not available, a wheel lift towing vehicle may be used. Furthermore, rear towing is not recommended with the front wheels on the ground, as transaxle damage can result. If rear towing is the only alternative, a front end dolly must be used. Proper towing equipment is necessary to prevent damage to the vehicle.

All Wheel Drive (AWD)
Your vehicle must be transported on a flat bed truck.

Towing This Vehicle Behind Another Vehicle (Flat Towing With The Key In The Ignition And All Four Wheels On The Ground)

CAUTION!

- **If the vehicle being towed requires steering, the ignition switch must be in the ON position, not in the LOCK or ACC position.**
- **Do not attempt to tow this vehicle from the front with sling type towing equipment. Damage to the front fascia will result.**
- **Do not push or tow this vehicle with another vehicle as damage to the bumper fascia and transaxle may result.**

If you must use the accessories (wipers, defrosters, etc.) while being towed, the key must be in the ON position, not the ACC position. Make certain the transaxle remains in NEUTRAL.

Front Wheel Drive (FWD)
Your vehicle may be towed under the following conditions: The shift lever must be in NEUTRAL, the distance to be traveled must not exceed 15 mi (25 km), and the towing speed must not exceed 25 mph (40 km/h). Exceeding these towing limits may cause a transaxle failure. If the transaxle is not operative, or if the vehicle is to be towed more than 15 mi (25 km), the vehicle must be transported either with a flat bed truck or with the front wheels off the ground.

All Wheel Drive (AWD)
Your vehicle may be towed under the following conditions: The shift lever must be in NEUTRAL, the distance to be traveled must not exceed 15 mi (25 km), the towing speed must not exceed 25 mph (40 km/h), and both front and rear wheels must be on the ground. Exceeding these towing limits may cause a transaxle failure. If the transaxle is not operative, or if the vehicle is to be towed more than 15 mi (25 km), the vehicle must be transported on a flat bed truck.

Towing This Vehicle Behind Another Vehicle With A Tow Dolly

Front Wheel Drive (FWD)
Rear towing is not recommended with the front wheels on the ground, as transaxle damage can result. If rear towing is the only alternative, **a front end dolly must be used.** Proper towing equipment is necessary to prevent damage to the vehicle.

All Wheel Drive (AWD)

CAUTION!

The manufacturer does not recommend towing an All-Wheel Drive (AWD) on a tow dolly. Vehicle damage may occur.

MAINTAINING YOUR VEHICLE

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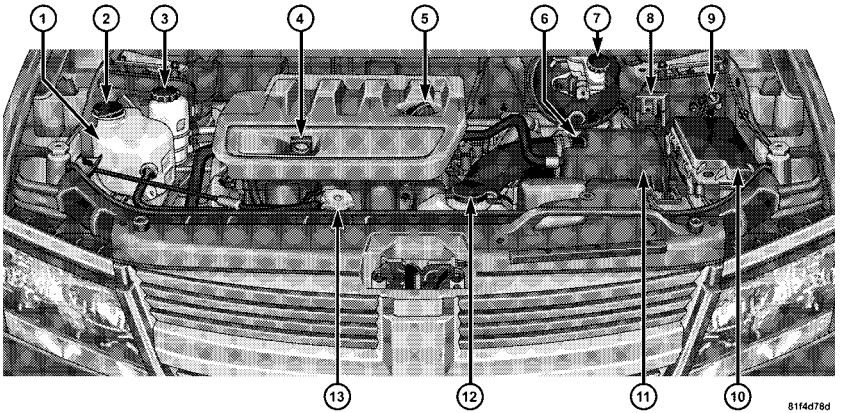
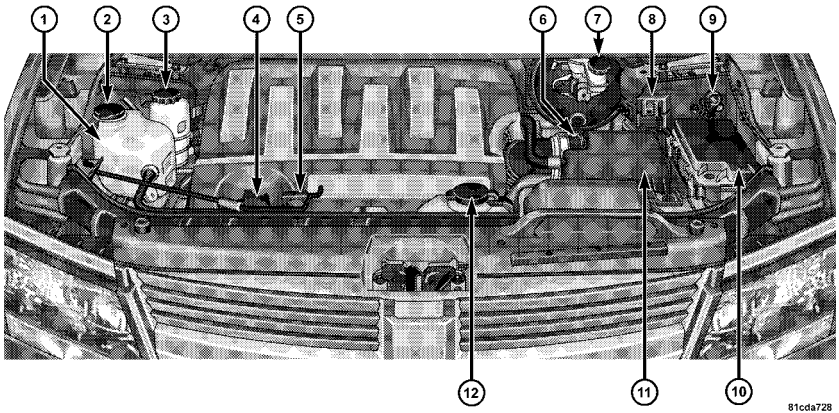
7

2.4L ENGINE COMPARTMENT



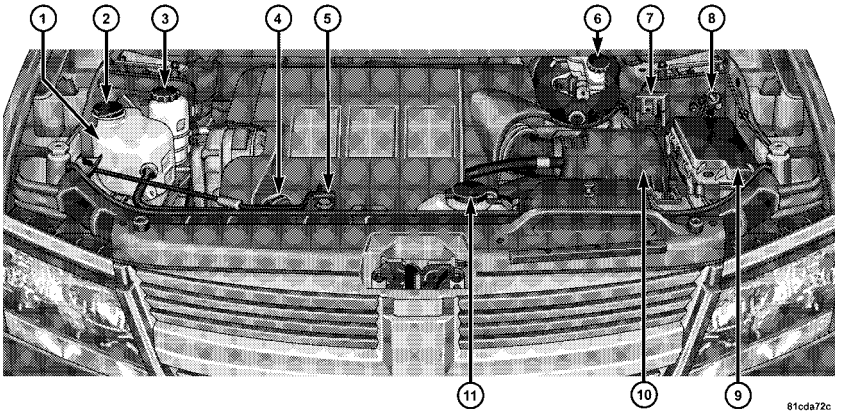
1 — Coolant Bottle
2 — Engine Coolant Reservoir
3 — Power Steering Fluid
4 — Engine Oil Dipstick
5 — Engine Oil Fill
6 — Automatic Transaxle Dipstick
7 — Power Steering Fluid Reservoir
8 — Remote Jump-Start Positive Battery Post
9 — Remote Jump-Start Negative Post
10 — Fuses (Totally Integrated Power Module [TIPM])
11 — Air Cleaner Filter
12 — Washer Fluid Bottle
13 — Engine Coolant Cap

2.7L ENGINE COMPARTMENT



1 — Coolant Bottle
2 — Coolant Pressure Cap
3 — Power Steering Fluid
4 — Engine Oil Fill
5 — Engine Oil Dipstick
6 — Automatic Transaxle Dispstick
7 — Brake Fluid Reservoir
8 — Remote Jump-Start Positive Battery Post
9 — Remote Jump-Start Negative Post
10 — Fuses (Totally Integrated Power Module [TIPM])
11 — Air Cleaner Filter
12 — Washer Fluid Bottle

3.5L ENGINE COMPARTMENT



1 — Coolant Bottle
2 — Coolant Pressure Cap
3 — Power Steering Fluid
4 — Engine Oil Fill
5 — Engine Oil Dipstick
6 — Brake Fluid Reservoir
7 — Remote Jump-Start Positive Battery Post
8 — Remote Jump-Start Negative Post
9 — Fuses (Totally Integrated Power Module [TIPM])
10 — Air Cleaner Filter
11 — Washer Fluid Bottle

ONBOARD DIAGNOSTIC SYSTEM — OBD II

Your vehicle is equipped with a sophisticated Onboard Diagnostic system called OBD II. This system monitors the performance of the emissions, engine, and automatic transaxle control systems. When these systems are operating properly, your vehicle will provide excellent performance and fuel economy, as well as engine emissions well within current government regulations.

If any of these systems require service, the OBD II system will turn on the Malfunction Indicator Light (MIL). It will also store diagnostic codes and other information to assist your service technician in making repairs. Although your vehicle will usually be drivable and not need towing, see your authorized dealer for service as soon as possible.

CAUTION!

- **Prolonged driving with the MIL on could cause further damage to the emissions control system. It could also affect fuel economy and driveability. The vehicle must be serviced before any emissions tests can be performed.**
- **If the MIL is flashing while the engine is running, severe catalytic converter damage and power loss will soon occur. Immediate service is required.**

Loose Fuel Filler Cap Message

If the vehicle diagnostic system determines that the fuel filler cap in loose, improperly installed, or damaged, the word “gASCAP” will display in the odometer. If this occurs, tighten the fuel filler cap until a “clicking” sound is heard and press the TRIP ODOMETER button to turn

off the message. If the problem persists, the message will appear the next time the vehicle is started.

A loose, improperly installed, or damaged fuel filler cap may also turn on the MIL.

EMISSIONS INSPECTION AND MAINTENANCE PROGRAMS

In some localities, it may be a legal requirement to pass an inspection of this vehicle's emissions control system. Failure to pass could prevent vehicle registration.

For states that require an Inspection and Maintenance (I/M), this check verifies the Malfunction Indicator Light (MIL) is functioning and is not on when the engine is running, and that the OBD II system is ready for testing.

Normally, the OBD II system will be ready. The OBD II system may **not** be ready if the vehicle was recently serviced, recently had a dead battery, or a battery replacement. If the OBD II system should be determined not ready for the I/M test, the vehicle may fail the test.

This vehicle has a simple ignition key-actuated test, which you can use prior to going to the test station. To check if this vehicle's OBD II system is ready, you must do the following:

1. Insert the ignition key into the ignition switch.

2. Turn the ignition to the ON position, but do not crank or start the engine.

3. If you crank or start the engine, you will have to start this test over.

4. As soon as you turn the ignition key to the ON position, you will see the MIL symbol come on as part of a normal bulb check.

5. Approximately 15 seconds later, one of two things will happen:

a. The MIL will flash for about 10 seconds and then return to being fully illuminated until you turn OFF the ignition key or start the engine. This means that the vehicle's OBD II system is **not ready** and you should **not** proceed to the I/M station.

b. The MIL will not flash at all and will remain fully illuminated until you turn OFF the ignition key or start the engine. This means that the vehicle's OBD II system is **ready,** and you can proceed to the I/M station.

If the OBD II system is **not ready,** you should see an authorized dealer or repair facility. If this vehicle was recently serviced or had a battery failure or replacement, you may need to do nothing more than drive the vehicle as you normally would in order for the OBD II system to update. A recheck with the above test routine may then indicate that the system is now ready.

Regardless of whether the vehicle's OBD II system is ready or not ready, if the MIL is illuminated during normal vehicle operation, you should have the vehicle serviced before going to the I/M station. The I/M station can fail the vehicle because the MIL is on with the engine running.

REPLACEMENT PARTS

Use of genuine Mopar® parts for normal/scheduled maintenance and repairs is highly recommended to ensure the designed performance. Damage or failures caused by the use of non-Mopar® parts for maintenance and repairs will not be covered by the manufacturer's warranty.

AUTHORIZED DEALER SERVICE

Your authorized dealer has the qualified service personnel, special tools, and equipment to perform all service operations in an expert manner. Service manuals are available which include detailed service information for your vehicle. Refer to these service manuals before attempting any procedure yourself.

NOTE: Intentional tampering with emissions control systems can result in civil penalties being assessed against you.

WARNING!

You can be badly injured working on or around a motor vehicle. Only do service work for which you have the knowledge and the proper equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.

MAINTENANCE PROCEDURES

The pages that follow contain the **required** maintenance services determined by the engineers who designed your vehicle.

Besides the maintenance items for which there are fixed maintenance intervals, there are other items that should operate satisfactorily without periodic maintenance. However, if a malfunction of these items does occur, it could adversely affect the engine or vehicle performance. These items should be inspected if a malfunction is observed or suspected.

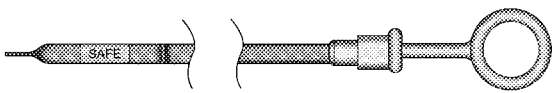
Engine Oil

Checking Oil Level

To assure proper engine lubrication, the engine oil must be maintained at the correct level. Check the oil level at regular intervals, such as every fuel stop.

The best time to check the engine oil level is about five minutes after a fully warmed engine is shut off. Do not check oil level before starting the engine after it has sat overnight. Checking engine oil level when the engine is cold will give you an incorrect reading.

Checking the oil while the vehicle is on level ground and only when the engine is hot, will improve the accuracy of the oil level readings. Maintain the oil level between the range markings on the dipstick. Either the range markings consist of a crosshatch zone marked SAFE or a crosshatch zone marked with MIN at the low end of the range and MAX at the high end of the range. Adding 1.0 qt (1.0 l) of oil when the reading is at the low end of the range marking will raise the oil level to the high end of the range marking.



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Engine Oil Dipstick

CAUTION!

Do not overfill the engine. Overfilling the engine will cause oil aeration, which can lead to loss of oil pressure and an increase in oil temperature. This could damage your engine.

Change Engine Oil

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance. Refer to the Maintenance Schedule in Section 8 for information on this system.

NOTE: Under no circumstances should oil change intervals exceed 6,000 mi (10 000 km) or six months, whichever occurs first.

Engine Oil Selection

For best performance and maximum protection under all types of operating conditions, the manufacturer only recommends engine oils that are API Certified and meet the requirements of Chrysler Material Standard MS-6395.

American Petroleum Institute (API) Engine Oil Identification Symbol

This symbol means that the oil has been certified by the American Petroleum Institute (API). The manufacturer only recommends API Certified engine oils.

Engine Oil Viscosity (SAE Grade) — 2.4L and 2.7L Engines
SAE 5W-20 engine oil is recommended for all operating temperatures. This engine oil improves low temperature starting and vehicle fuel economy.

The engine oil filler cap also shows the recommended engine oil viscosity for your engine. For information on engine oil filler cap location, refer to the "Engine Compartment" illustration in this section.

Lubricants that do not have both, the engine oil certification mark and the correct SAE viscosity grade number should not be used.

Engine Oil Viscosity (SAE Grade) — 3.5L Engine
SAE 10W-30 engine oil is preferred for use in 3.5L Engines for all operating temperatures.

The engine oil filler cap also shows the recommended engine oil viscosity for your engine. For information on engine oil filler cap location, refer to the "Engine Compartment" illustration in this section.

Lubricants that do not have both, the engine oil certification mark and the correct SAE viscosity grade number should not be used.

Synthetic Engine Oils
You may use synthetic engine oils provided the recommended oil quality requirements are met, and the recommended maintenance intervals for oil and filter changes are followed.

Materials Added to Engine Oil
The manufacturer strongly recommends against the addition of any additives (other than leak detection dyes) to the engine oil. Engine oil is an engineered product and its performance may be impaired by supplemental additives.

Disposing of Used Engine Oil and Oil Filters

Care should be taken in disposing of used engine oil and oil filters from your vehicle. Used oil and oil filters, indiscriminately discarded, can present a problem to the environment. Contact your authorized dealer, service station, or governmental agency for advice on how and where used oil and oil filters can be safely discarded in your area.

Engine Oil Filter

The engine oil filter should be replaced at every engine oil change.

Engine Oil Filter Selection

This manufacturer's engines have a full-flow type disposable oil filter. Use a filter of this type for replacement. The quality of replacement filters varies considerably. Only high quality filters should be used to assure most efficient service. Mopar® Engine Oil Filters are high quality oil filters and are recommended.

Drive Belts — Check Condition and Tension

Belt tension is controlled by means of an automatic tensioner. Therefore, no belt tension adjustments are required. However, belt and belt tensioner condition should be inspected periodically and replaced if required. Improper belt tension can cause belt slippage and failure. Low generator belt tension can cause battery failure.

Inspect belts for evidence of cuts, cracks, glazing, or frayed cords and replace if there is indication of damage that could result in belt failure. Also, check belt routing to make sure there is no interference between the belts and other engine components. Refer to the Maintenance Schedule in Section 8 for specified service intervals. See your authorized dealer for service.

Spark Plugs

Spark plugs must fire properly to assure engine performance and emissions control. New plugs should be installed at the specified mileage. The entire set should be replaced if there is any malfunction due to a faulty spark plug. Refer to "Fluids, Lubricants, and Genuine Parts" in this section for the proper type of spark plug for use in your vehicle.

Engine Air Cleaner Filter

Refer to the Maintenance Schedule in Section 8 for engine air cleaner filter service intervals.

NOTE: Be sure to follow the "dusty or off-road conditions" maintenance interval if applicable.

WARNING!

The air induction system (air cleaner, hoses, etc.,) can provide a measure of protection in the case of engine backfire. Do not remove the air induction system (air cleaner, hoses, etc.,) unless such removal is necessary for repair or maintenance. Make sure that no one is near the engine compartment before starting the vehicle with the air induction system (air cleaner, hoses, etc.,) removed. Failure to do so can result in serious personal injury.

Catalytic Converter

The catalytic converter requires the use of unleaded fuel only. Leaded gasoline will destroy the effectiveness of the catalyst as an emissions control device.

Under normal operating conditions, the catalytic converter will not require maintenance. However, it is important to keep the engine properly tuned to assure proper catalyst operation and prevent possible catalyst damage.

CAUTION!

Damage to the catalytic converter can result if your vehicle is not kept in proper operating condition. In the event of engine malfunction, particularly involving engine misfire or other apparent loss of performance, have your vehicle serviced promptly. Continued operation of your vehicle with a severe malfunction could cause the converter to overheat, resulting in possible damage to the converter and the vehicle.

NOTE: Intentional tampering with emissions control systems can result in civil penalties being assessed against you.

WARNING!

A hot exhaust system can start a fire if you park over materials that can burn. Such materials might be grass or leaves coming into contact with your exhaust system. Do not park or operate your vehicle in areas where your exhaust system can contact anything that can burn.

In unusual situations involving grossly malfunctioning engine operation, a scorching odor may indicate severe and abnormal catalyst overheating. If this occurs, safely bring the vehicle to a complete stop, shut the engine OFF, and allow the vehicle to cool. Thereafter, obtain service, including a tune-up to manufacturer's specifications immediately.

To minimize the possibility of catalyst damage:

- Do not shut OFF the engine or interrupt the ignition when the transaxle is in gear and the vehicle is in motion.
- Do not try to start the engine by pushing or towing the vehicle.
- Do not idle the engine with any ignition coil connectors disconnected for prolonged periods.

Maintenance-Free Battery

You will never have to add water, nor is periodic maintenance required.

NOTE: The battery is stored in a compartment that is located behind the left front fender and is accessible through the wheel well. The wheel and tire assemble do not need to be removed to access the compartment. Remote battery terminals are located in the engine compartment for jump-starting.

To access the battery, turn the steering wheel fully to the right and remove the access panel from the inner fender shield.

WARNING!

- **Battery fluid is a corrosive acid solution and can burn or even blind you. Don't allow battery fluid to contact your eyes, skin, or clothing. Don't lean over a battery when attaching clamps. If acid splashes in eyes or on skin, flush the area immediately with large amounts of water.**
- **Battery gas is flammable and explosive. Keep flame or sparks away from the battery. Don't use a booster battery or any other booster source with an output greater than 12 Volts. Don't allow cable clamps to touch each other.**
- **Battery posts, terminals, and related accessories contain lead and lead compounds. Wash hands after handling.**

CAUTION!

- **It is essential when replacing the cables on the battery that the positive cable is attached to the positive post and the negative cable is attached to the negative post. Battery posts are marked positive (+) and negative (-) and identified on the battery case. Cable clamps should be tight on the terminal posts and free of corrosion.**
- **If a "fast charger" is used while the battery is in the vehicle, disconnect both vehicle battery cables before connecting the charger to the battery. Do not use a "fast charger" to provide starting voltage as battery damage can result.**

Air Conditioner Maintenance

For best possible performance, your air conditioner should be checked and serviced by an authorized dealer at the start of each warm season. This service should include cleaning of the condenser fins and a performance test. Drive belt tension should also be checked at this time.

WARNING!

- **Use only refrigerants and compressor lubricants approved by the manufacturer for your air conditioning system. Some unapproved refrigerants are flammable and can explode, injuring you. Other unapproved refrigerants or lubricants can cause the system to fail, requiring costly repairs. Refer to Section 3 of the Warranty Information book for further warranty information.**
- **The air conditioning system contains refrigerant under high pressure. To avoid risk of personal injury or damage to the system, adding refrigerant or any repair requiring lines to be disconnected should be done by an experienced technician.**

Refrigerant Recovery and Recycling

R-134a Air Conditioning Refrigerant is a hydrofluorocarbon (HFC) that is endorsed by the Environmental Protection Agency and is an ozone-saving product. However, the manufacturer recommends that air conditioning service be performed by authorized dealers or other service facilities using recovery and recycling equipment.

NOTE: Use only manufacturer approved A/C system sealers, stop leak products, seal conditioners, compressor oil, and refrigerants.

A/C Air Filter — If Equipped

Refer to the Maintenance Schedule in Section 8 for A/C air filter service intervals.

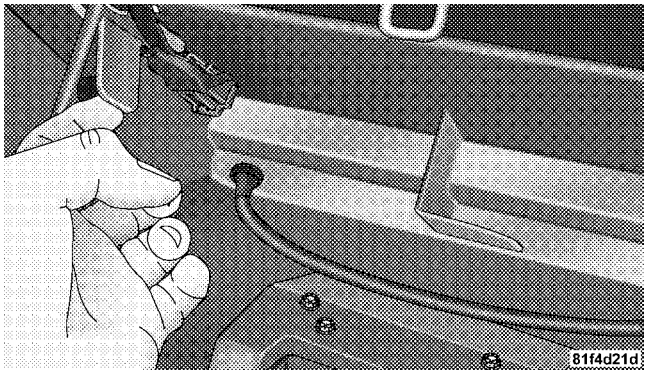
WARNING!

Do not remove the A/C air filter while the blower is operating or personal injury may result.

The A/C air filter is located in the fresh air inlet behind the glove box. Perform the following steps to replace the filter:

1. Open the glove box and remove all contents.

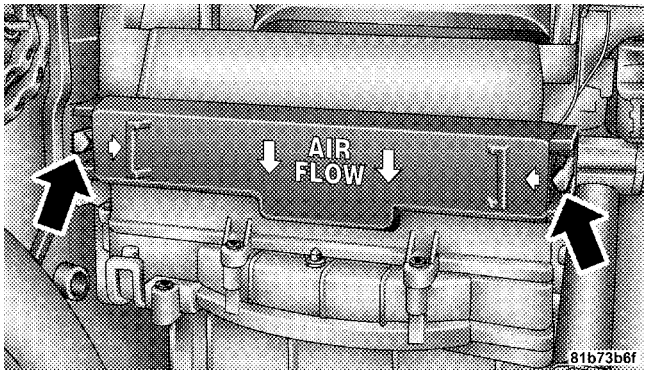
2. Push the retaining tab on each side of the glove box inward while gently pulling the glove box door outward until both tabs clear the door opening in the instrument panel.



Glove Box Removal

3. Pivot the glove box downward.

4. Disengage the two retaining tabs that secure the filter cover to the HVAC housing and remove the cover.



A/C Air Filter Replacement

5. Remove the A/C air filter by pulling it straight out of the housing.

6. Install the A/C air filter with the arrow on the filter pointing toward the floor. When installing the filter cover, make sure the retaining tabs fully engage the cover.

CAUTION!

The A/C air filter is labeled with an arrow to indicate airflow direction through the filter. Failure to install the filter properly will result in the need to replace it more often.

7. Reinstall the glove box door. Make sure that the hinges are seated fully as you raise the door. Otherwise, the door latch will not align properly.

Power Steering — Fluid Check

Checking the power steering fluid level at a defined service interval is not required. The fluid should only be checked if a leak is suspected, abnormal noises are apparent, and/or the system is not functioning as anticipated. Coordinate inspection efforts through an authorized dealer. No chemical flushes should be used in any power steering system; only the approved lubricant may be used.

WARNING!

Fluid level should be checked on a level surface and with the engine OFF to prevent injury from moving parts and to ensure accurate fluid level reading. Do not overfill. Use only manufacturer's recommended power steering fluid.

If necessary, add fluid to restore to the proper indicated level. With a clean cloth, wipe any spilled fluid from all surfaces. Refer to "Fluids, Lubricants, and Genuine Parts" in this section for the correct fluid type.

Front Suspension Ball Joints

There are two front suspension lower ball joints that are permanently lubricated. Inspect these ball joints when other maintenance is performed. A damaged seal and the corresponding potentially damaged ball joint must be replaced.

Steering Linkage

The tie rod end ball joints should be inspected for external leakage and damage when other maintenance is performed.

Body Lubrication

Locks and all body pivot points, including seat tracks, door hinges, liftgate hinges, and hood hinges, should be lubricated periodically to assure quiet, easy operation and to protect against rust and wear. Prior to the application of any lubricant, the parts concerned should be wiped clean to remove dust and grit; after lubricating, excess oil and grease should be removed. Particular attention should also be given to hood latching components to ensure proper function. When performing other underhood services, the hood latch, release mechanism, and safety catch should be cleaned and lubricated.

The external lock cylinders should be lubricated twice a year, preferably in the Fall and Spring. Apply a small amount of a high quality lubricant such as Mopar® Lock Cylinder Lubricant or equivalent directly into the lock cylinder.

Wiper Blades

Clean the rubber edges of the wiper blades and the windshield and rear window periodically with a sponge or soft cloth and a mild nonabrasive cleaner. This will remove accumulations of salt, waxes, or road film, and help reduce streaking and smearing.

Operation of the wipers on dry glass for long periods may cause deterioration of the wiper blades. Always use washer fluid when using the wipers to remove salt or dirt from a dry windshield or rear window.

Avoid using the wiper blades to remove frost or ice from the windshield or rear window. Make sure that they are not frozen to the glass before turning them on to avoid damaging the blade. Keep the blade rubber out of contact with petroleum products such as engine oil, gasoline, etc.

NOTE: Always refer to the wiper blade packaging for specific installation instructions. Many wiper blade replacements fit multiple vehicles.

Windshield Washers/Rear Window Washer

NOTE: Refer to the appropriate "Engine Compartment" diagram in Section 7 for the location of the washer fluid reservoir.

The windshield washer and the rear window washer share the same fluid reservoir. The fluid reservoir is located in the engine compartment. Be sure to check the fluid level in the reservoir at regular intervals. Fill the reservoir with windshield washer solvent (not radiator antifreeze) and operate the system for a few seconds to flush out the residual water.

When refilling the washer fluid reservoir, apply some washer fluid to a cloth or towel and wipe the wiper blades clean. This will help blade performance.

To prevent freeze-up of your windshield washer system in cold weather, select a solution or mixture that meets or exceeds the temperature range of your climate. This rating information can be found on most washer fluid containers.

The fluid reservoir will hold nearly 1 gal (4 l) of washer fluid when the message "LoWASH" appears in the instrument cluster.

WARNING!

Commercially available windshield washer solvents are flammable. They could ignite and burn you. Care must be exercised when filling or working around the washer solution.

Exhaust System

The best protection against carbon monoxide entry into the vehicle body is a properly maintained engine exhaust system.

Whenever a change is noticed in the sound of the exhaust system, when exhaust fumes can be detected inside the vehicle, or when the underside or rear of the vehicle is damaged, have a competent technician inspect the complete exhaust system and adjacent body areas for broken, damaged, deteriorated, or mispositioned parts. Open seams or loose connections could permit exhaust fumes to seep into the passenger compartment. In addition, inspect the exhaust system each time the vehicle is raised for lubrication or oil change. Replace as required.

WARNING!

Exhaust gases can injure or kill. They contain carbon monoxide (CO), which is colorless and odorless. Breathing it can make you unconscious and can eventually poison you. To avoid breathing CO, refer to "Exhaust Gas" under "Safety Tips" in Section 2.

Cooling System

WARNING!

- **When working near the radiator cooling fan, disconnect the fan motor lead or turn the ignition switch to the LOCK position. The fan is temperature controlled and can start at any time the ignition switch is in the ON position.**
- **You or others can be badly burned by hot coolant or steam from your radiator. If you see or hear steam coming from under the hood, don't open the hood until the radiator has had time to cool. Never try to open a cooling system pressure cap when the radiator is hot.**

Coolant Checks

Check engine coolant (antifreeze) protection every 12 months (before the onset of freezing weather, where applicable). If coolant is dirty or rusty in appearance, the system should be drained, flushed, and refilled with fresh coolant. Check the front of the A/C condenser for any accumulation of bugs, leaves, etc. If dirty, clean by gently spraying water from a garden hose vertically down the face of the condenser.

Check the coolant recovery bottle tubing for brittle rubber, cracking, tears, cuts, and tightness of the connection at the bottle and radiator. Inspect the entire system for leaks.

Cooling System — Drain, Flush, and Refill
The system should be drained, flushed, and refilled at the intervals shown in the Maintenance Schedule in Section 8.

If the solution is dirty or contains a considerable amount of sediment, clean and flush with a reliable cooling system cleaner. Follow with a thorough rinsing to remove all deposits and chemicals. Properly dispose of old antifreeze solution.

Selection of Coolant
Use only the manufacturer's recommended coolant. Refer to "Fluids, Lubricants, and Genuine Parts" in this section for the correct coolant type.

CAUTION!

- **Mixing of coolants other than specified HOAT engine coolants, may result in engine damage and may decrease corrosion protection. If a non-HOAT coolant is introduced into the cooling system in an emergency, it should be replaced with the specified coolant as soon as possible.**
- **Do not use plain water alone or alcohol-based engine coolant (antifreeze) products. Do not use additional rust inhibitors or antirust products, as they may not be compatible with the radiator engine coolant and may plug the radiator.**
- **This vehicle has not been designed for use with propylene glycol-based coolants. Use of propylene glycol-based coolants is not recommended.**

Adding Coolant

Your vehicle has been built with an improved engine coolant that allows extended maintenance intervals. This coolant can be used up to five years or 100,000 mi (160 000 km) before replacement. To prevent reducing this extended maintenance period, it is important that you use the same coolant throughout the life of your vehicle. Please review these recommendations for using Hybrid Organic Additive Technology (HOAT) coolant.

When adding coolant:

- The manufacturer recommends using Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula HOAT (Hybrid Organic Additive Technology).
- Mix a minimum solution of 50% HOAT engine coolant and distilled water. Use higher concentrations (not to exceed 70%) if temperatures below −34°F (−37°C) are anticipated.
- Use only high purity water such as distilled or deionized water when mixing the water/engine coolant solution. The use of lower quality water will reduce the amount of corrosion protection in the engine cooling system.

Please note that it is the owner's responsibility to maintain the proper level of protection against freezing according to the temperatures occurring in the area where the vehicle is operated.

NOTE: Mixing coolant types will decrease the life of the engine coolant and will require more frequent coolant changes.

Cooling System Pressure Cap

The cap must be fully tightened to prevent loss of coolant, and to ensure that coolant will return to the radiator from the coolant recovery bottle.

The cap should be inspected and cleaned if there is any accumulation of foreign material on the sealing surfaces.

WARNING!

- **The warning words "DO NOT OPEN HOT" on the cooling system pressure cap are a safety precaution. Never add coolant when the engine is overheated. Do not loosen or remove the cap to cool an overheated engine. Heat causes pressure to build up in the cooling system. To prevent scalding or injury, do not remove the pressure cap while the system is hot or under pressure.**
- **Do not use a pressure cap other than the one specified for your vehicle. Personal injury or engine damage may result.**

Disposal of Used Coolant

Used ethylene glycol-based engine coolant is a regulated substance requiring proper disposal. Check with your local authorities to determine the disposal rules for your community. To prevent ingestion by animals or children, do not store ethylene glycol-based engine coolant in open containers or allow it to remain in puddles on the ground. If ingested by a child, contact a physician immediately. Clean up any ground spills immediately.

Coolant Level

Four Cylinder Engines — the coolant bottle provides a quick visual method for determining that the coolant level is adequate. With the engine idling and warm to normal operating temperature, the level of the coolant in the bottle should be between the "ADD" and "FULL" lines, shown on the bottle.

Six Cylinder Engines — the level of the coolant in the pressurized coolant bottle should be between the "COLD" and "FULL" range on the bottle when the engine is cold.

The radiator normally remains completely full, so there is no need to remove the radiator cap unless checking for coolant freeze point or replacing coolant. Advise your service attendant of this. As long as the engine operating temperature is satisfactory, the coolant bottle need only be checked once a month. When additional coolant is needed to maintain the proper level, it should be added to the coolant bottle. Do not overfill.

Points to Remember

NOTE: When the vehicle is stopped after a few miles (kilometers) of operation, you may observe vapor coming from the front of the engine compartment. This is normally a result of moisture from rain, snow, or high humidity accumulating on the radiator and being vaporized when the thermostat opens, allowing hot coolant to enter the radiator.

If an examination of your engine compartment shows no evidence of radiator or hose leaks, the vehicle may be safely driven. The vapor will soon dissipate.

- Do not overfill the coolant recovery bottle.
- Check coolant freeze point in the radiator and in the coolant recovery bottle. If antifreeze needs to be added, contents of coolant recovery bottle must also be protected against freezing.
- If frequent coolant additions are required, or if the level in the coolant recovery bottle does not drop when the engine cools, the cooling system should be pressure tested for leaks.

- Maintain coolant concentration at 50% HOAT engine coolant (minimum) and distilled water for proper corrosion protection of your engine, which contains aluminum components.
- Make sure that the radiator and coolant recovery bottle overflow hoses are not kinked or obstructed.
- Keep the front of the radiator clean. If your vehicle is equipped with air conditioning, keep the front of the condenser clean, also.
- Do not change the thermostat for Summer or Winter operation. If replacement is ever necessary, install ONLY the correct type thermostat. Other designs may result in unsatisfactory coolant performance, poor gas mileage, and increased emissions.

Hoses and Vacuum/Vapor Harnesses

Inspect surfaces of hoses and nylon tubing for evidence of heat and mechanical damage. Hard or soft spots, brittle rubber, cracking, tears, cuts, abrasions, and excessive swelling indicate deterioration of the rubber

Pay particular attention to the hoses nearest to high heat sources such as the exhaust manifold. Inspect hose routing to be sure hoses do not touch any heat source or moving component that may cause heat damage or mechanical wear.

Ensure nylon tubing in these areas has not melted or collapsed

Inspect all hose connections such as clamps and couplings to make sure they are secure and no leaks are present.

Components should be replaced immediately if there is any evidence of wear or damage that could cause failure.

Fuel System

The Electronic Fuel Injection high-pressure fuel system's hoses and fittings have unique material characteristics that provide adequate sealing and resist attack by deteriorated gasoline.

You are urged to use only the manufacturer's specified hoses and fittings, or their equivalent in material and specification, in any fuel system servicing. It is mandatory to replace any damaged hoses or fittings that have been removed during service. Care should be taken with installing fittings to ensure they are properly installed and fully connected. See your authorized dealer for service.

Brake System

In order to assure brake system performance, all brake system components should be inspected periodically. Suggested service intervals can be found in the "Maintenance Schedule" in Section 8.

WARNING!

Riding the brakes can lead to brake failure and possibly an accident. Driving with your foot resting or riding on the brake pedal can result in abnormally high brake temperatures, excessive lining wear, and possible brake damage. You wouldn't have your full braking capacity in an emergency.

Brake and Power Steering Hoses

When servicing the vehicle for scheduled maintenance, inspect the surface of the hoses and nylon tubing for evidence of heat and mechanical damage. Hard and brittle rubber, cracking, tears, cuts, abrasions, and excessive swelling suggest deterioration of the rubber. Particular attention should be made to examining those hose surfaces nearest to high heat sources, such as the exhaust manifold.

Ensure nylon tubing in these areas has not melted or collapsed.

Inspect all hose clamps and couplings to make sure they are secure and no leaks are present.

NOTE:

- Often, fluids such as oil, power steering fluid, and brake fluid are used during assembly plant operations to ease the assembly of hoses to couplings. Therefore, oil wetness at the hose-coupling area is not necessarily an indication of leakage. Actual dripping of hot fluid when systems are under pressure (during vehicle operation) should be noted before a hose is replaced based on leakage.
- Inspect the brake hoses whenever the brake system is serviced and at every engine oil change. Inspect hydraulic brake hoses for surface cracking, scuffing, or worn spots. If there is any evidence of cracking, scuffing, or worn spots, the hose should be replaced immediately. Eventual deterioration of the hose can take place, resulting in a possibility of a burst failure.

WARNING!

Worn brake hoses can burst and cause brake failure. You could have an accident. If you see any signs of cracking, scuffing, or worn spots, have the brake hoses replaced immediately.

Master Cylinder - Brake Fluid Level Check

Check the fluid level in the master cylinder immediately if the Brake System Warning Light indicates system failure.

Check the fluid level in the master cylinder when performing underhood services.

Clean the top of the master cylinder area before removing the cap. If necessary, add fluid to bring the fluid level up to the requirements described on the brake fluid reservoir.

Overfilling of fluid is not recommended because it may cause leaking in the system.

Fluid level can be expected to fall as the brake pads wear. Brake fluid level should be checked when pads are replaced. However, low fluid level may be caused by a leak and a checkup may be needed.

Use only manufacturer's recommended brake fluid. Refer to "Fluids, Lubricants, and Genuine Parts" in this section for the correct fluid type.

WARNING!

- **Overfilling the brake fluid reservoir can result in spilling brake fluid on hot engine parts and the brake fluid catching fire.**
- **Use of a brake fluid that may have a lower initial boiling point, or is unidentified as to specification, may result in sudden brake failure during hard prolonged braking. You could have an accident.**

Use only brake fluid that has been in a tightly closed container to avoid contamination from foreign matter or moisture.

CAUTION!

Do not allow petroleum-based fluid to contaminate the brake fluid. Seal damage may result.

Automatic Transaxle

The automatic transaxle and differential assembly are contained within a single housing.

The fluid level in the automatic transaxle should be checked whenever the vehicle is serviced. Operation with an improper fluid level will greatly reduce the life of the transaxle and the fluid.

Fluid Level Check — Vehicles with 3.5L Engine

The automatic transaxle has no dipstick and is dealer serviced only.

Fluid Level Check — Vehicles with 2.4L and 2.7L Engines

Use the following procedure to check the automatic transaxle fluid level properly:

1. Park the vehicle on level ground.
2. Run the engine at curb idle speed for a minimum of 60 seconds.
3. Apply the parking brake fully.
4. Place the shift lever momentarily in each gear position ending with the lever in PARK.
5. Wipe the area around the dipstick clean to eliminate the possibility of dirt entering the transaxle.

6. Remove the dipstick and determine if the fluid is hot or cold. Hot fluid is approximately 180°F (82°C), which is the normal operating temperature after the vehicle is driven at least 15 mi (24 km). Hot fluid cannot be held comfortably between the fingertips. Cold fluid is at a temperature below 80°F (27°C).

7. Wipe the dipstick clean and reinsert until seated. Then, remove dipstick and note the reading.

a. If the fluid is hot, the reading should be in the crosshatched area marked "HOT" (between the upper two holes in the dipstick).

b. If the fluid is cold, the fluid level should be between the lower two holes in the area marked "COLD."

If the fluid level is low, add sufficient fluid through the filler (dipstick) tube to bring it to the proper level. Do not overfill.

CAUTION!

- **Using a transmission fluid other than the manufacturer's recommended fluid may cause deterioration in transmission shift quality and/or torque converter shudder. Using a transmission fluid other than that recommended by the manufacturer will result in more frequent fluid and filter changes. Refer to "Fluids, Lubricants, and Genuine Parts" for the correct fluid type.**
- **Dirt and water in the transaxle can cause serious damage. To prevent dirt and water from entering the transaxle after checking or replenishing fluid, make certain that the dipstick cap is re-seated properly.**

Fluid and Filter Changes
Change the automatic transaxle fluid and filter at the intervals shown in the "Maintenance Schedule" in this manual.

In addition, change the fluid and filter if the transaxle is disassembled for any reason.

Selection of Lubricant
It is important that the proper lubricant is used in the transaxle to assure optimum transaxle performance. Use only manufacturer's recommended transmission fluid. Refer to "Fluids, Lubricants, and Genuine Parts" in this section for the correct fluid type. It is important that the transmission fluid be maintained at the prescribed level using the recommended fluid. No chemical flushes should be used in any transaxle; only the approved lubricant may be used.

Special Additives
Automatic Transmission Fluid (ATF) is an engineered product and its performance may be impaired by supplemental additives. Therefore, do not add any fluid additives to the transaxle. The only exception to this policy is the use of special dyes to aid in detecting fluid leaks. In addition, avoid using transmission sealers as they may adversely affect seals.

Front and Rear Wheel Bearings

Front and rear wheel bearings are permanently sealed. No regular maintenance is required for these components.

Appearance Care and Protection from Corrosion

Protection of Body and Paint from Corrosion

Vehicle body care requirements vary according to geographic locations and usage. Chemicals that make roads passable in snow and ice and those that are sprayed on trees and road surfaces during other seasons are highly corrosive to the metal in your vehicle. Outside parking, which exposes your vehicle to airborne contaminants, road surfaces on which the vehicle is operated, extreme hot or cold weather and other extreme conditions will have an adverse effect on paint, metal trim, and underbody protection.

The following maintenance recommendations will enable you to obtain maximum benefit from the corrosion resistance built into your vehicle.

What Causes Corrosion?

Corrosion is the result of deterioration or removal of paint and protective coatings from your vehicle.

The most common causes are:

- Road salt, dirt, and moisture accumulation.
- Stone and gravel impact.
- Insects, tree sap, and tar.
- Salt in the air near seacoast localities.
- Atmospheric fallout/industrial pollutants.

Washing

- Wash your vehicle regularly. Always wash your vehicle in the shade using Mopar® Car Wash or a mild car wash soap, and rinse the panels completely with clear water.
- If insects, tar, or other similar deposits have accumulated on your vehicle, use Mopar® Super Kleen Bug and Tar Remover to remove.

- Use Mopar® Cleaner Wax to remove road film, stains and to protect your paint finish. Take care never to scratch the paint.
- Avoid using abrasive compounds and power buffing that may diminish the gloss or thin out the paint finish.

CAUTION!

Do not use abrasive or strong cleaning materials such as steel wool or scouring powder that will scratch metal and painted surfaces.

Special Care

- If you drive on salted or dusty roads or if you drive near the ocean, hose off the undercarriage at least once a month.
- It is important that the drain holes in the lower edges of the doors, rocker panels, and cargo area be kept clear and open.
- If you detect any stone chips or scratches in the paint, touch them up immediately. The cost of such repairs is considered the responsibility of the owner.
- If your vehicle is damaged due to an accident or similar cause, which destroys the paint and protective coating, have your vehicle repaired as soon as possible. The cost of such repairs is considered the responsibility of the owner.
- If you carry special cargo such as chemicals, fertilizers, de-icer salt, etc., be sure that such materials are well packaged and sealed.
- If a lot of driving is done on gravel roads, consider mud or stone shields behind each wheel.

- Use Mopar® touch up paint on scratches as soon as possible. Your authorized dealer has touch up paint to match the color of your vehicle.

Wheel and Wheel Trim Care

All wheels and wheel trim, especially aluminum and chrome plated wheels should be cleaned regularly with a mild soap and water to prevent corrosion. To remove heavy soil and/or excessive brake dust, use Mopar® Wheel Cleaner (05066247AB) or equivalent or select a nonabrasive, non-acidic cleaner. Do not use scouring pads, steel wool, a bristle brush, or metal polishes. Only Mopar® or equivalent is recommended. Do not use oven cleaner. Avoid automatic car washes that use acidic solutions or harsh brushes that may damage the wheels' protective finish.

Interior Care

Instrument Panel Cover

The instrument panel cover has a low glare surface, which minimizes reflections in the windshield. Do not use protectants or other products, which may cause undesirable reflections. Use soap and warm water to restore the low glare surface.

Cleaning Interior Trim

Interior Trim should be cleaned starting with a damp cloth, a damp cloth with Mopar® Total Clean, then Mopar® Spot & Stain Remover if absolutely necessary. Do not use harsh cleaners or Armorall®. Use Mopar® Total Clean to clean vinyl upholstery

Cleaning Leather Upholstery

Mopar® Total Clean is specifically recommended for leather upholstery.

Your leather upholstery can be best preserved by regular cleaning with a damp soft cloth. Small particles of dirt can act as an abrasive and damage the leather upholstery and should be removed promptly with a damp cloth. Stubborn soils can be removed easily with a soft cloth and Mopar® Total Clean. Care should be taken to avoid soaking your leather upholstery with any liquid. Please do not use polishes, oils, cleaning fluids, solvents, detergents, or ammonia-based cleaners to clean your leather upholstery. Application of a leather conditioner is not required to maintain the original condition.

WARNING!

Do not use volatile solvents for cleaning purposes. Many are potentially flammable, and if used in closed areas they may cause respiratory harm.

YES Essentials® Fabric Cleaning Procedure – If Equipped

YES Essentials® seats may be cleaned in the following manner:

- Remove as much of the stain as possible by blotting with a clean, dry towel.
- Blot any remaining stain with a clean, damp towel.
- For tough stains, apply Mopar® Total Clean or a mild soap solution to a clean, damp cloth and remove stain. Use a fresh, damp towel to remove soap residue.
- For grease stains, apply Mopar® Multi-Purpose Cleaner to a clean, damp cloth and remove stain. Use a fresh, damp towel to remove soap residue.
- Do not use any solvents or protectants on Yes Essentials® products.

Cleaning Headlights

Your vehicle has plastic headlights that are lighter and less susceptible to stone breakage than glass headlights.

Plastic is not as scratch resistant as glass and therefore different lens cleaning procedures must be followed.

To minimize the possibility of scratching the lenses and reducing light output, avoid wiping with a dry cloth. To remove road dirt, wash with a mild soap solution followed by rinsing.

Do not use abrasive cleaning components, solvents, steel wool or other aggressive material to clean the lenses.

Glass Surfaces

All glass surfaces should be cleaned on a regular basis with Mopar® Glass Cleaner or any commercial household-type glass cleaner. Never use an abrasive type cleaner. Use caution when cleaning the inside rear window equipped with an electric defroster. Do not use scrapers or other sharp instruments that may scratch the elements.

When cleaning the rear view mirror, spray cleaner on the towel or rag that you are using. Do not spray cleaner directly on the mirror.

Cleaning Plastic Instrument Cluster Lenses

The lenses in front of the instruments in this vehicle are molded in clear plastic. When cleaning the lenses, care must be taken to avoid scratching the plastic.

1. Clean with a wet soft rag. A mild soap solution may be used, but do not use high alcohol content or abrasive cleaners. If soap is used, wipe clean with a clean damp rag.
2. Dry with a soft tissue.

Seat Belt Maintenance

Do not bleach, dye, or clean the belts with chemical solvents or abrasive cleaners. This will weaken the fabric. Sun damage can also weaken the fabric.

If the belts need cleaning, use a mild soap solution or lukewarm water. Do not remove the belts from the car to wash them.

Replace the belts if they appear frayed or worn or if the buckles do not work properly.

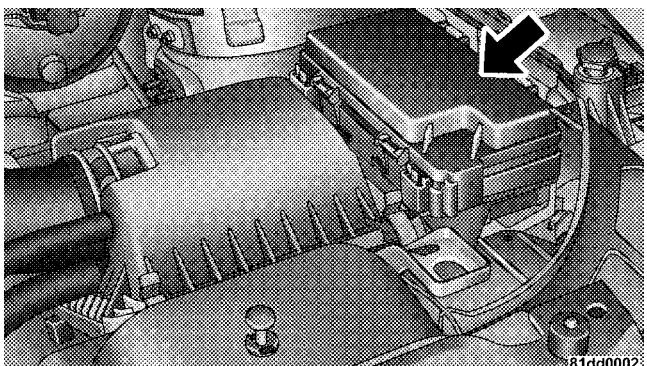
Dry with a soft tissue.

Cleaning The Cupholders

Clean with a damp cloth or towel using a mild detergent.

FUSES (TOTALLY INTEGRATED POWER MODULE)

The Totally Integrated Power Module (TIPM) is located in the engine compartment near the air cleaner assembly. This center contains fuses and relays.



Totally Integrated Power Module (TIPM)

CAUTION!

- **When installing the power module cover, it is important to ensure the cover is properly positioned and fully latched. Failure to do so may allow water to get into the TIPM, and possibly result in an electrical system failure.**
- **When replacing a blown fuse, it is important to use only a fuse having the correct amperage rating. The use of a fuse with a rating other than indicated may result in a dangerous electrical system overload. If a properly rated fuse continues to blow, it indicates a problem in the circuit that must be corrected.**

Cavity	Cartridge Fuse	Mini-Fuse	Description
J1	40 Amp Green	—	Power Folding Seat
J2	30 Amp Pink	—	Transfer Case Module - if equipped
J3	30 Amp Pink	—	Rear Door Module
J4	25 Amp White	—	Driver Door Node
J5	25 Amp White	—	Passenger Door Node
J6	40 Amp Green	—	Anti-Lock Brake System (ABS) Pump/ Electronic Stability Program (ESP)

Cavity	Cartridge Fuse	Mini-Fuse	Description
J7	30 Amp Pink	—	Anti-Lock Brake System (ABS) Valve/ Electronic Stability Program (ESP)
J8	40 Amp Green	—	Power Memory Seat - if equipped
J9	40 Amp Green	—	Flex Fuel/PZEV Motor - if equipped
J10	30 Amp Pink	—	(If Equipped) Headlamp Washer Relay-(BUX), Manual Tuning Valve
J11	30 Amp Pink	—	(If Equipped) Sway Bar/Thatchum Security (BUX)/Power Sliding Door

Cavity	Cartridge Fuse	Mini-Fuse	Description
J13	60 Amp Yellow	—	Ignition Off Draw (IOD) Main
J14	40 Amp Green	—	Electric Back Light (EBL)
J15	30 Amp Pink	—	Rear Blower - if equipped
J17	40 Amp Green	—	Starter Solenoid
J18	20 Amp Yellow	—	NGC (Powertrain Control Module)/ Transmission Range
J19	60 Amp Yellow	—	Radiator Fan Motor
J20	30 Amp Pink	—	Front Windshield Wiper Hi/Low
J21	20 Amp Blue	—	Front/Rear Washer

Cavity	Cartridge Fuse	Mini-Fuse	Description
J22	25 Amp White	—	Sunroof Module - if equipped
M1	—	15 Amp Blue	Center High Mounted Stop Light (CHMSL)
M2	—	20 Amp Yellow	(If Equipped) Trailer Lights
M3	—	20 Amp Yellow	Front/Rear Axle
M4	—	10 Amp Red	(If Equipped) Trailer Tow
M5	—	25 Amp Natural	Power Inverter - if equipped
M6	—	20 Amp Yellow	Power Outlet #1/ Accessory (ACC) Rain Sensor
M7	—	20 Amp Yellow	Power Outlet #2 (Battery or Accessory (ACC) Selectable)
M8	—	20 Amp Yellow	Front Heated Seats - if equipped
M9	—	20 Amp Yellow	(If Equipped) Rear Heated Seats

Cavity	Cartridge Fuse	Mini-Fuse	Description
M10	—	15 Amp Blue	Vanity Lamps/ Hands-Free Module (HFM) - if equipped, Remote Display - if equipped, Satellite Digital Audio Receiver (SDARS) - if equipped, Universal Garage Door Opener (UGDO) - if equipped, Vanity Light, Video Entertainment System (VES)™ - if equipped
M11	—	10 Amp Red	Automatic Temperature Control (ATC) - if equipped, Underhood Light
M12	—	30 Amp Green	Radio, Amplifier (AMP)
M13	—	20 Amp Yellow	Cabin Compartment Node (CCN), Multi-function Switch/Siren Module
M14	—	20 Amp Yellow	(If Equipped) Trailer Tow (BUX)
M15	—	20 Amp Yellow	Auto Dim Rearview Mirror - if equipped, Infrared Sensor (IR) - if equipped, Multi-function Switch, Tire Pressure Monitor System (TPMS) - if equipped, Transfer Case Module - if equipped,

Cavity	Cartridge Fuse	Mini-Fuse	Description
M16	—	10 Amp Red	Occupant Restraint Controller (ORC)/ Occupant Classification Module (OCM)
M17	—	15 Amp Blue	Left Park/Side Marker/Running/Tail Lights, License Lights
M18	—	15 Amp Blue	Right Park/Side Marker/Running/Tail Lights
M19	—	25 Amp Natural	Auto Shut Down (ASD) #1 and #2
M20	—	15 Amp Blue	Electronic Vehicle Information Center (EVIC) - if equipped, Interior Lighting, Steering Wheel Switches - if equipped, Switch Bank
M21	—	20 Amp Yellow	Auto Shut Down (ASD) #3
M22	—	10 Amp Red	Right Horn
M23	—	10 Amp Red	Left Horn
M24	—	25 Amp Natural	Rear Wiper

Cavity	Cartridge Fuse	Mini-Fuse	Description
M25	—	20 Amp Yellow	Fuel Pump/Diesel Lift Pump
M26	—	10 Amp Red	Power MIRRORS Switch/Drivers Window Switch
M27	—	10 Amp Red	Steering Column Lock, Wireless Ignition Node (WIN)
M28	—	10 Amp Red	NGC (Powertrain Control Module)/ Transmission Feed (Batt)
M29	—	10 Amp Red	Occupant Classification Module (OCM)
M30	—	15 Amp Blue	Rear Wiper Module Module/Power Folding Mirror

Cavity	Cartridge Fuse	Mini-Fuse	Description
M31	—	20 Amp Yellow	Back-Up Lights
M32	—	10 Amp Red	Occupant Restraint Controller (ORC)
M33	—	10 Amp Red	NGC (Powertrain Control Module) Battery Feed
M34	—	10 Amp Red	Power Assist Module, HVAC Module, Headlamp Washers, Compass Module - if equipped, Flashlight - if equipped
M35	—	10 Amp Red	Heated Mirrors - if equipped
M36	—	20 Amp Yellow	Power Outlet #3 (Batt)

Cavity	Cartridge Fuse	Mini-Fuse	Description
M37	—	10 Amp Red	Anti-Lock Brake System (ABS), Electronic Stability Program (ESP), STOP LIGHT Switch
M38	—	25 Amp Natural	Lock/Unlock Motors
K1	—	—	Ignition Run/ Accessory Relay
K2	—	—	Ignition Run Relay
K3	—	—	Starter Solenoid Relay
K4	—	—	Ignition Run/Start Relay
K5	—	—	(NGC) Powertrain Control Module Relay
K6	—	—	Electric Back Light (EBL) Relay
K7	—	—	—
K8	—	—	—
K9	—	—	Rear Blower Relay
K10	—	—	ASD Relay (Feed for M19 and M21)
K11	—	—	Radiator Fan Relay Low Speed

VEHICLE STORAGE

If you will not be using your vehicle for more than 21 days you may want to take steps to preserve your battery. You may:

- Remove the IOD (Ignition Off-Draw) mini-fuses from the Totally Integrated Power Module located in the engine compartment.
- Or, disconnect the batter negative cable.

REPLACEMENT BULBS

All the inside bulbs are brass or glass wedge base. Aluminum base bulbs are not approved and should not be used for replacement.

LIGHT BULBS — Interior	Bulb Number
Courtesy/Reading Lights (Incandescent)	578
Courtesy/Reading Lights (Optional LED)	LED (Serviced at Authorized Dealer)
Glove Box Light	194
Cargo Light	579
Optional Door Map Pocket/Cupholder Lighting	LED (Serviced at Authorized Dealer)

NOTE: For lighted switches, see your authorized dealer for replacement instructions.

LIGHTS BULBS — Outside	Bulb No.
Low Beam Headlight	9006
High Beam Headlight	9005
Front Park/Turn Signal	3757AK
Side Marker Light	168
Front Fog Light	9145//H10
Center High Mounted Stop Light (CHMSL)	LED (Serviced at Authorized Dealer)
Rear Tail/Stop	3157K
Rear Turn Signal	3757A
Rear Tail	3157K
Backup Light	3157K
License Light	168

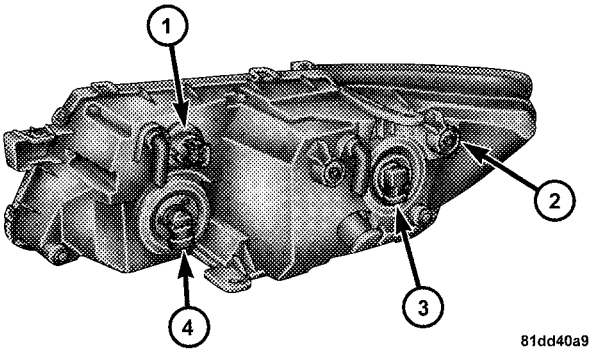
BULB REPLACEMENT

Low Beam Headlight, High Beam Headlight, Front Turn Signal/Park Light, Side Marker Light

1. Open the hood.

NOTE: It may be necessary to remove the air cleaner filter housing and position the Totally Integrated Power Module (TIPM) aside to replace certain the lights in the left headlight housing.

2. Rotate the applicable bulb and connector assembly ¼ turn counterclockwise and remove the assembly from the headlight housing.



1 — Front Turn Signal/Park Light Bulb
2 — Side Marker Light Bulb
3 — Low Beam Headlight Bulb
4 — High Beam Headlight Bulb

3. Disconnect the bulb from the harness connector and then connect the replacement bulb.

CAUTION!

Do not touch the new bulb with your fingers. Oil contamination will severely shorten bulb life. If the bulb comes in contact with any oily surface, clean the bulb with rubbing alcohol.

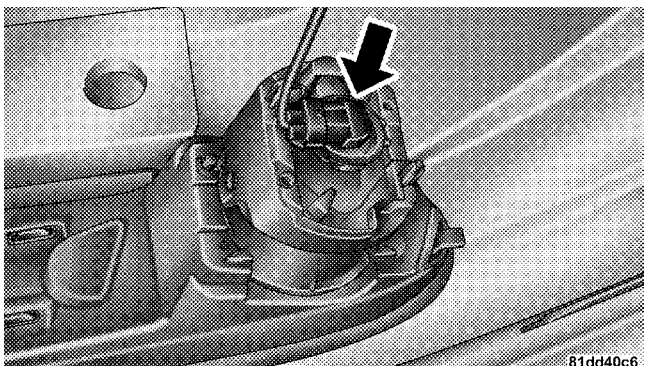
4. Install the bulb and connector assembly into the headlight housing and rotate it ¼ turn clockwise to lock it in place.

Front Fog Light

NOTE: Turn the steering wheel to the right if replacing the left front fog light or to the left if replacing the right front fog light to allow for easier access to the front of the wheel well.

1. Remove the fasteners retaining the front lower wheel well access panel and remove the access panel.

2. Rotate the bulb's electrical connector ¼ turn counterclockwise and remove it from the fog light housing.



3. Remove the bulb from the connector socket and install the replacement bulb.

CAUTION!

Do not touch the new bulb with your fingers. Oil contamination will severely shorten bulb life. If the bulb comes in contact with an oily surface, clean the bulb with rubbing alcohol.

4. Install the bulb and connector assembly into the fog light housing and rotate the connector ¼ turn clockwise to lock it in place.

5. Reinstall the front lower wheel well access panel and fasteners.

Tail/Stop Light, Rear Turn Signal Light, Tail Light, Backup Light

The taillights are a two-piece design. The tail/stop lights and rear turn signal lights are located in the rear corner body panels. The tail and backup lights are located in the liftgate.

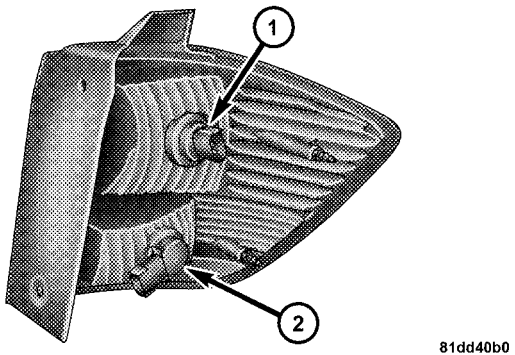
Changing the Tail/Stop Light or Rear Turn Signal Light

1. Open the liftgate.

2. Remove the two fasteners from the inboard side of the taillight housing.

3. Carefully insert a trim stick (plastic flat-blade tool) between the body panel and the outboard side of the taillight housing with one hand and grasp the flange on the inboard side of the taillight housing with the other hand. Use the trim stick and hand pressure together to disengage the taillight housing from the vehicle.

4. Rotate the applicable bulb's electrical connector ¼ turn counterclockwise and remove it from the taillight housing.



1 — Tail/Stop Light Bulb
2 — Rear Turn Signal Light Bulb

5. Remove the bulb from the connector socket and install the replacement bulb.

6. Install the bulb and connector assembly into the taillight housing and rotate the connector ¼ turn clockwise to lock it in place.

7. Reinstall the taillight housing and fasteners.

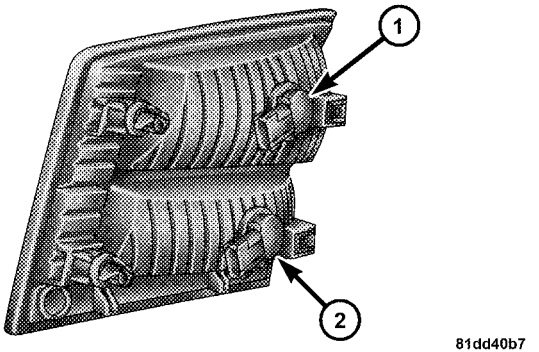
Changing the Tail Light or Backup Light

1. Open the liftgate.

2. Remove the two fasteners retaining the taillight housing to the liftgate from the inboard face of the liftgate.

3. Carefully insert a trim stick (plastic flat-blade tool) between the taillight housing and the liftgate. Use the trim stick and hand pressure together to disengage the taillight housing from the liftgate.

4. Rotate the applicable bulb's electrical connector ¼ turn counterclockwise and remove it from the housing.



1 — Tail Light Bulb
2 — Backup Light Bulb

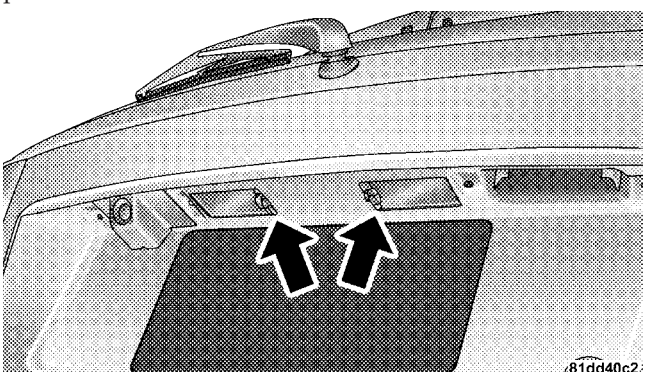
5. Remove the bulb from the connector socket and install the replacement bulb.

6. Install the bulb and connector assembly into the housing and rotate the connector ¼ turn clockwise to lock it in place.

7. Reinstall the taillight housing and fasteners.

License Plate Light

1. Push the small locking tab sticking out of the end of the lens toward the side of the vehicle and hold it in that position.



License Light

2. Insert a small flat-blade tool between the end of the lens with the locking tab and the surrounding housing and then pivot the tool to separate the lens from the housing.

3. Hold the lens with one hand and rotate the bulb's electrical connector ¼ turn counterclockwise with the other hand and then separate the bulb and connector assembly from the lens.

4. Remove the bulb from the connector socket and install the replacement bulb.

5. Install the bulb and connector assembly into the lens and rotate the connector ¼ turn clockwise to lock it in place.

6. Insert the end of the lens without the locking tab into the housing on the liftgate and then push the opposite end of the lens into the housing, making sure it locks in the housing.

FLUIDS AND CAPACITIES

Component	U.S.	Metric
Fuel (approximate)		
Front Wheel Drive (FWD) Models with 2.4 Liter PZEV Engine	18.5 gal	70 l
FWD Models without 2.4 Liter PZEV Engine	20.5 gal	77.6 l
All-Wheel Drive Models	21.1 gal	79.8 l
Engine Oil with Filter		
2.4 Liter Engine (SAE 5W-20, API Certified)	4.5 qts	4.26 l
2.7 Liter Engine (SAE 5W-20, API Certified)	5.5 qts	5.2 l
3.5 Liter Engine (SAE 10W-30, API Certified)	5.5 qts	5.2 l
Cooling System *		
2.4 Liter Engine and Single- or Dual-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	7.9 qts	7.5 l
2.4 Liter Engine and Three-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	9.8 qts	9.3 l

Component	U.S.	Metric
2.7 Liter Engine and Single- or Dual-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	9.8 qts	9.3 l
2.7 Liter Engine and Three-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	12 qts	11.4 l
3.5 Liter Engine and Single- or Dual-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	9.8 qts	9.3 l
3.5 Liter Engine and Three-Zone Climate Control System (Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula) or equivalent	12 qts	11.4 l
* Includes heater and coolant recovery bottle filled to MAX level.		

FLUIDS, LUBRICANTS, AND GENUINE PARTS

Engine

Component	Fluids, Lubricants, and Genuine Parts
Engine Coolant	Mopar® Antifreeze/Coolant 5 Year/100,000 Mile Formula HOAT (Hybrid Organic Additive Technology) or equivalent
Engine Oil (2.4L)	Use API Certified SAE 5W-20 Engine Oil meeting the requirements of Chrysler Material Standard MS-6395. Refer to the engine oil fill cap for correct SAE grade.
Engine Oil (2.7L)	Use API Certified SAE 5W-20 Engine Oil meeting the requirements of Chrysler Material Standard MS-6395. Refer to the engine oil fill cap for correct SAE grade.
Engine Oil (3.5L)	Use API Certified SAE 10W-30 Engine Oil meeting the requirements of Chrysler Material Standard MS-6395. Refer to the engine oil fill cap for correct SAE grade.
Oil Filter (2.4L)	Mopar® 04884900AB or equivalent
Oil Filter (2.7L)	Mopar® 04884899AB or equivalent
Oil Filter (3.5L)	Mopar® 04884899AB or equivalent
Spark Plugs (2.4L)	ZFR5F-11 (Gap.044 in [1.12 mm])

Component	Fluids, Lubricants, and Genuine Parts
Spark Plugs (2.7L)	TE10MCC5 (Gap.050 in [1.27 mm])
Spark Plugs (3.5L)	ZFR5LP-13G (Gap.050 in [1.27 mm])
Fuel Selection (2.4L)	87 Octane
Fuel Selection (2.7L)	87 Octane
Fuel Selection (2.7L - EXCEPT CALIFORNIA EMISSION STATES)	E-85 Ethanol
Fuel Selection (3.5L)	87 to 89 Octane

Chassis

Component	Fluids, Lubricants and Genuine Parts
Automatic Transaxle	Mopar® ATF+4 Automatic Transmission Fluid
Power Transfer Unit (PTU)	Mopar® Gear Lubricant 75W-90 or equivalent
Rear Drive Assembly (RDA)	Mopar® Gear Lubricant 75W-90 or equivalent.
Brake Master Cylinder	Mopar® DOT 3, SAE J1703 or equivalent should be used. If DOT 3 brake fluid is not available, then DOT 4 is acceptable. Use only recommended brake fluids.
Power Steering Reservoir	Mopar® Power Steering Fluid + 4, Mopar® ATF+4 Automatic Transmission Fluid

MAINTENANCE SCHEDULES

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■ Maintenance Schedule 478
□ Required Maintenance Intervals 481

EMISSIONS CONTROL SYSTEM MAINTENANCE

The Scheduled Maintenance services listed in **bold type,** must be done at the times or mileages specified to ensure the continued proper functioning of the Emissions Control System. These, and all other maintenance services included in this manual, should be done to provide best vehicle performance and reliability. More frequent maintenance may be needed for vehicles in severe operating conditions, such as dusty areas and very short trip driving.

Inspection and service should also be done anytime a malfunction is suspected.

NOTE: Maintenance, replacement, or repair of the emissions control devices and systems on your vehicle may be performed by any automotive repair establishment or individual using any automotive part that has been certified pursuant to U.S. EPA or in the State of California, California Air Resources Board regulations.

MAINTENANCE SCHEDULE

The oil change indicator system will remind you that it is time to take your vehicle in for scheduled maintenance.

On Electronic Vehicle Information Center (EVIC) equipped vehicles, “Oil Change Required” will be displayed in the EVIC and a single chime will sound, indicating that an oil change is necessary.

On Non-EVIC equipped vehicles, “Change Oil” will flash in the instrument cluster odometer and a single chime will sound, indicating that an oil change is necessary.

Based on engine operation conditions, the oil change indicator message will illuminate. This means that service is required for your vehicle. Have your vehicle serviced as soon as possible, within the next 500 mi (805 km).

NOTE:

- The oil change indicator message will not monitor the time since the last oil change. Change your vehicles oil if it has been six months since your last oil change, even if the oil change indicator message is NOT illuminated.
- Change your engine oil more often if you drive your vehicle off-road for an extended period of time.
- Under no circumstances should oil change intervals exceed 6,000 mi (10,000 km) or six months, whichever comes first.

Your authorized dealer will reset the oil change indicator message after completing the scheduled oil change. If this scheduled oil change is performed by someone other than your authorized dealer, the message can be reset by referring to the steps described under "Oil Change Required" under "Electronic Vehicle Information Center (EVIC)" in Section 4 or under "Odometer/Trip Odometer" under "Instrument Cluster Descriptions" in Section 4.

At Each Stop for Fuel

- Check the engine oil level. Refer to "Engine Oil" under "Maintenance Procedures" in Section 7.
- Check the windshield washer solvent and add if required.

Once a Month

- Check tire pressure and look for unusual wear or damage.
- Inspect the battery, and clean and tighten the terminals as required.
- Check the fluid levels of coolant reservoir, brake master cylinder, power steering, and transaxle, and add as needed.
- Check all lights and other electrical items for correct operation.

At Each Oil Change

- Change the engine oil filter.
- Inspect the brake hoses and lines.

CAUTION!

Failure to perform the required maintenance items may result in damage to the vehicle.

Required Maintenance Intervals

Maintenance Items	Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)		
	Miles	Kilometers	or Months
Change the engine oil and engine oil filter.	6,000	10 000	6
Rotate the tires.	6,000	10 000	6
If using your vehicle in dusty or off-road conditions, inspect the engine air cleaner filter, and replace if necessary.	12,000	20 000	12
Inspect the brake linings, and replace if necessary.	12,000	20 000	12
Replace the air conditioning filter (if equipped).	12,000	20 000	12
Inspect the CV Joints. Perform the first inspection at 12,000 mi (20 000 km) or 12 months.	24,000	40 000	24
Inspect the exhaust system. Perform the first inspection at 12,000 mi (20 000 km) or 12 months.	24,000	40 000	24
Inspect the front suspension, tie rod ends and boot seals, and replace if necessary.	24,000	40 000	24
Replace the engine air cleaner filter.	30,000	50 000	30

Maintenance Items	Perform Maintenance Every (Where time and mileage are listed, follow the interval that occurs first.)		
	Miles	**Kilometers**	**or Months**
Replace the spark plugs on 2.4L and 2.7L engines.	30,000	50 000	30
Change Rear Drive Assembly (RDA) fluid.	60,000	100 000	60
Change Power Transfer Unit (PTU) fluid.	60,000	100 000	60
Change the automatic transaxle fluid and filter if using your vehicle for any of the following: police, taxi, fleet, or frequent trailer towing.	60,000	100 000	60
Inspect and replace PCV valve if necessary. †	90,000	150 000	90
Flush and replace the engine coolant.	102,000	170 000	60
Replace the spark plugs on 3.5L engines.	102,000	170 000	102
Replace the timing belt on 3.5L engines.	102,000	170 000	102
Change the automatic transaxle fluid and filter.	120,000	200 000	120
Replace the accessory drive belt on 2.4L and 2.7L engines.	120,000	200 000	120

† This maintenance is recommended by the manufacturer to the owner, but is not required to maintain emissions warranty.

WARNING!

You can be badly injured working on or around a motor vehicle. Do only service work for which you have the knowledge and the right equipment. If you have any doubt about your ability to perform a service job, take your vehicle to a competent mechanic.

IF YOU NEED CONSUMER ASSISTANCE

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SUGGESTIONS FOR OBTAINING SERVICE FOR YOUR VEHICLE

Prepare For The Appointment

If you're having warranty work done, be sure to have the right papers with you. Take your warranty folder. All work to be performed may not be covered by the warranty. Discuss additional charges with the service manager. Keep a maintenance log of your vehicle's service history. This can often provide a clue to the current problem.

Prepare A List

Make a written list of your vehicle's problems or the specific work you want done. If you've had an accident or work done that is not on your maintenance log, let the service advisor know.

Be Reasonable With Requests

If you list a number of items and you must have your vehicle by the end of the day, discuss the situation with the service advisor and list the items in order of priority. At many authorized dealers, you may obtain a rental vehicle at a minimal daily charge. If you need a rental, it is advisable to make these arrangements when you call for an appointment.

IF YOU NEED ASSISTANCE

The manufacturer and its authorized dealers are vitally interested in your satisfaction. We want you to be happy with our products and services.

Warranty service must be done by an authorized dealer. We strongly recommend that you take the vehicle to an authorized selling dealer. They know you and the vehicle best, and are most concerned that you get prompt and

high quality service. The manufacturer's authorized dealers have the facilities, factory-trained technicians, special tools, and the latest information to ensure the vehicle is fixed correctly and in a timely manner.

This is why you should always talk to an authorized dealer's service manager first. Most matters can be resolved with this process.

- If for some reason you are still not satisfied, talk to the general manager or owner of the authorized dealership. They want to know if you need assistance.
- If an authorized dealership is unable to resolve the concern, you may contact the Manufacturer's Customer Center.

Any communication to the Manufacturer's Customer Center should include the following information:

- Owner's name and address
- Owner's telephone number (home and office)
- Authorized dealership name
- Vehicle Identification Number (VIN)
- Vehicle delivery date and mileage

Chrysler LLC Customer Center
P.O. Box 21–8004
Auburn Hills, MI 48321–8004
Phone: (800) 992-1997

Chrysler Canada Inc. Customer Center
P.O. Box 1621
Windsor, Ontario N9A 4H6
Phone: (800) 465–2001

In Mexico contact:

Av. Prolongacion Paseo de la Reforma, 1240
Sante Fe C.P. 05109
Mexico, D. F.
In Mexico City: 5081-4568
Outside Mexico City: 1-800-505-1300

Customer Assistance For The Hearing Or Speech Impaired (TDD/TTY)

To assist customers who have hearing difficulties, the manufacturer has installed special TDD (Telecommunication Devices for the Deaf) equipment at its Customer Center. Any hearing or speech impaired customer, who has access to a TDD or a conventional teletypewriter (TTY) in the United States, can communicate with the manufacturer by dialing 1–800–380–CHRY.

Service Contract

You may have purchased a service contract for an vehicle to help protect you from the high cost of unexpected repairs after the manufacturer's New Vehicle Limited Warranty expires. The manufacturer stands behind only the manufacturer's Service Contracts. If you purchased a manufacturer's Service Contract, you will receive Plan Provisions and an Owner Identification Card in the mail within three weeks of the vehicle delivery date. If you have any questions about the service contract, call the manufacturer's Service Contract National Customer Hotline at 1-800-521-9922.

The manufacturer will not stand behind any service contract that is not the manufacturer's Service Contract. It is not responsible for any service contract other than the manufacturer's Service Contract. If you purchased a service contract that is not a manufacturer's Service

Contract, and you require service after the manufacturer's New Vehicle Limited Warranty expires, please refer to the contract documents, and contact the person listed in those documents.

We appreciate that you have made a major investment when you purchased the vehicle. An authorized dealer has also made a major investment in facilities, tools, and training to assure that you are absolutely delighted with the ownership experience. You'll be pleased with their sincere efforts to resolve any warranty issues or related concerns.

WARNING!

Engine exhaust, some of its constituents, and certain vehicle components contain, or emit, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. In addition, certain fluids contained in vehicles and certain products of component wear contain, or emit, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

WARRANTY INFORMATION (U.S. Vehicles Only)

See the Warranty Information Booklet for the terms and provisions of Chrysler LLC warranties applicable to this vehicle.

MOPAR® PARTS

Mopar® fluids, lubricants, parts, and accessories are available from an authorized dealer. They will help keep the vehicle operating at its best.

REPORTING SAFETY DEFECTS

In The 50 United States And Washington, D.C.

If you believe that your vehicle has a defect that could cause a crash or cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying the manufacturer.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your authorized dealer, and the manufacturer.

To contact NHTSA, you may either call the Auto Safety Hotline toll free at 1–888–327–4236 (TTY: 1–800–424– 9153), or go to http://www.safercar.gov; or write to: Administrator, NHTSA, 400 Seventh Street, SW., Washington, D.C. 20590. You can also obtain other information about motor vehicle safety from http://www.safercar.gov.

In Canada

If you believe that your vehicle has a safety defect, you should contact the Customer Service Department immediately. Canadian customers who wish to report a safety defect to the Canadian government should write to: Transport Canada, Motor Vehicle Defect Investigations and Recalls, 2780 Sheffield Road, Ottawa, Ontario K1B 3V9.

PUBLICATION ORDER FORMS

To order the following manuals, you may use either the website or the phone numbers listed below. Visa, Mastercard, American Express, and Discover orders are accepted. If you prefer mailing your payment, please call for an order form.

NOTE: A street address is required when ordering manuals (no P.O. Boxes).

- *Service Manuals*

  These comprehensive Service Manuals provide the information that students and professional technicians need in diagnosing/troubleshooting, problem solving, maintaining, servicing, and repairing Chrysler LLC vehicles. A complete working knowledge of the vehicle, system, and/or components is written in straightforward language with illustrations, diagrams, and charts.

- *Diagnostic Procedure Manuals*

  Diagnostic Procedure Manuals are filled with diagrams, charts and detailed illustrations. These practical manuals make it easy for students and technicians to find and fix problems on computer-controlled vehicle systems and features. They show exactly how to find and correct problems the first time, using step-by-step troubleshooting and drivability procedures, proven diagnostic tests and a complete list of all tools and equipment.

- *Owner's Manuals*

  These Owner's Manuals have been prepared with the assistance of service and engineering specialists to acquaint you with specific Chrysler LLC vehicles. Included are starting, operating, emergency and maintenance procedures as well as specifications, capabilities and safety tips.

Call toll free at:

- **1–800–890–4038 (U.S.)**
- **1–800–387–1143 (Canada)**

Or

Visit us on the Worldwide Web at:

- **www.techauthority.com**

DEPARTMENT OF TRANSPORTATION UNIFORM TIRE QUALITY GRADES

The following tire grading categories were established by the National Highway Traffic Safety Administration. The specific grade rating assigned by the tire's manufacturer in each category is shown on the sidewall of the tires on your vehicle.

All passenger car tires must conform to Federal safety requirements in addition to these grades.

Treadwear

The Treadwear grade is a comparative rating, based on the wear rate of the tire when tested under controlled conditions on a specified government test course. For example, a tire graded 150 would wear one and one-half times as well on the government course as a tire graded 100. The relative performance of tires depends upon the actual conditions of their use, however, and may depart significantly from the norm due to variations in driving habits, service practices, and differences in road characteristics and climate.

Traction Grades

The Traction grades, from highest to lowest, are AA, A, B, and C. These grades represent the tire's ability to stop on wet pavement, as measured under controlled conditions on specified government test surfaces of asphalt and concrete. A tire marked C may have poor traction performance.

WARNING!

The traction grade assigned to this tire is based on straight-ahead braking traction tests, and does not include acceleration, cornering, hydroplaning, or peak traction characteristics.

Temperature Grades

The temperature grades are A (the highest), B, and C, representing the tire's resistance to the generation of heat and its ability to dissipate heat, when tested under controlled conditions on a specified indoor laboratory test wheel. Sustained high temperature can cause the material of the tire to degenerate and reduce tire life, and excessive temperature can lead to sudden tire failure. The grade C corresponds to a level of performance, which all passenger car tires must meet under the Federal Motor Vehicle Safety Standard No. 109. Grades B and A represent higher levels of performance on the laboratory test wheel, than the minimum required by law.

WARNING!

The temperature grade for this tire is established for a tire that is properly inflated and not overloaded. Excessive speed, under-inflation, or excessive loading, either separately or in combination, can cause heat buildup and possible tire failure.

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INSTALLATION OF RADIO TRANSMITTING EQUIPMENT

Special design considerations are incorporated into this vehicle's electronic system to provide immunity to radio frequency signals. Mobile two-way radios and telephone equipment must be installed properly by trained personnel. The following must be observed during installation.

The positive power connection should be made directly to the battery and fused as close to the battery as possible. The negative power connection should be made to body sheet metal adjacent to the negative battery connection. This connection should not be fused.

Antennas for two-way radios should be mounted on the roof or the rear area of the vehicle. Care should be used in mounting antennas with magnet bases. Magnets may affect the accuracy or operation of the compass on vehicles so equipped.

The antenna cable should be as short as practical and routed away from the vehicle wiring when possible. Use only fully shielded coaxial cable.

Carefully match the antenna and cable to the radio to ensure a low Standing Wave Ratio (SWR).

Mobile radio equipment with output power greater than normal may require special precautions.

All installations should be checked for possible interference between the communications equipment and the vehicle's electronic systems.

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