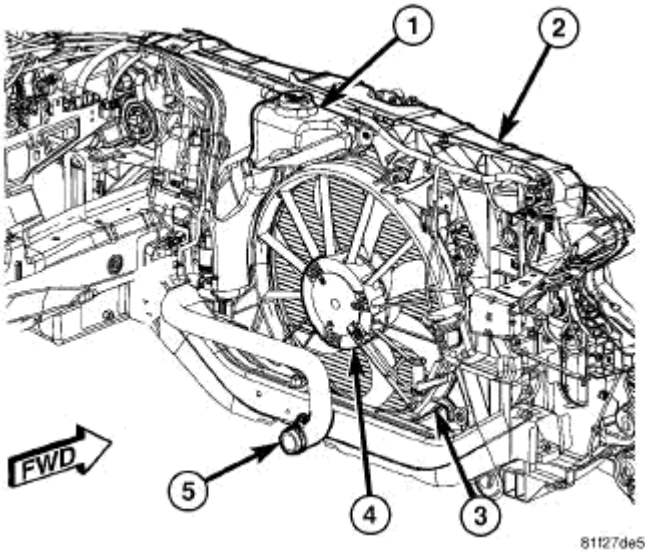


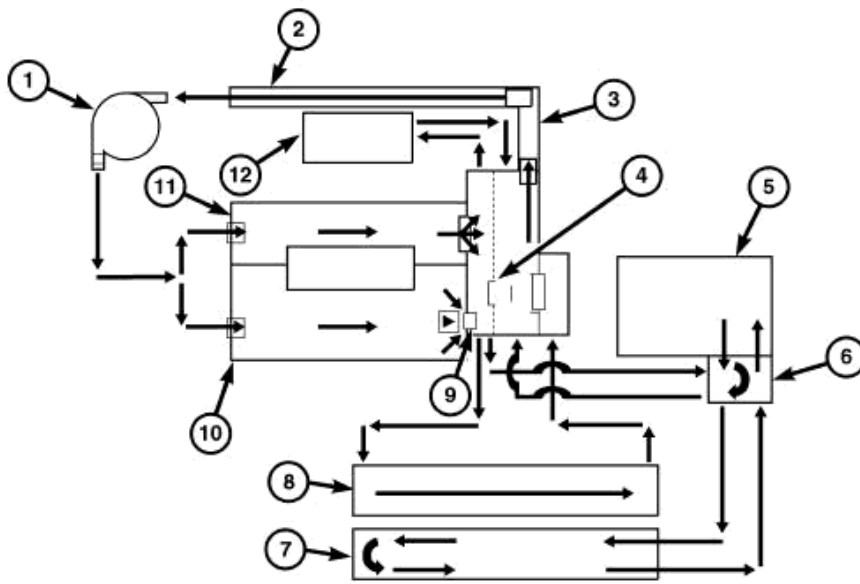
2009 ENGINE**Cooling - Journey****DESCRIPTION****DESCRIPTION****Fig. 1: COOLING SYSTEM - OVERVIEW**

Courtesy of CHRYSLER LLC

- | |
|---------------------------------|
| 1 - WINDSHIELD WASHER RESERVOIR |
| 2 - UPPER SUPPORT |
| 3 - FAN SHROUD |
| 4 - FAN MOTOR |
| 5 - LOWER RADIATOR HOSE |

The cooling system consists of an engine cooling module, thermostat, non-pressure coolant recovery container on the 2.4L engine, or pressurized coolant recovery container on the 2.7L, 3.5L, and 2.0L Diesel engines, coolant, hoses, and a water pump to circulate the coolant. The engine cooling module consists of a radiator, electric fan, shroud, transmission oil cooler, and air conditioning condenser.

OPERATION**GAS ENGINE**

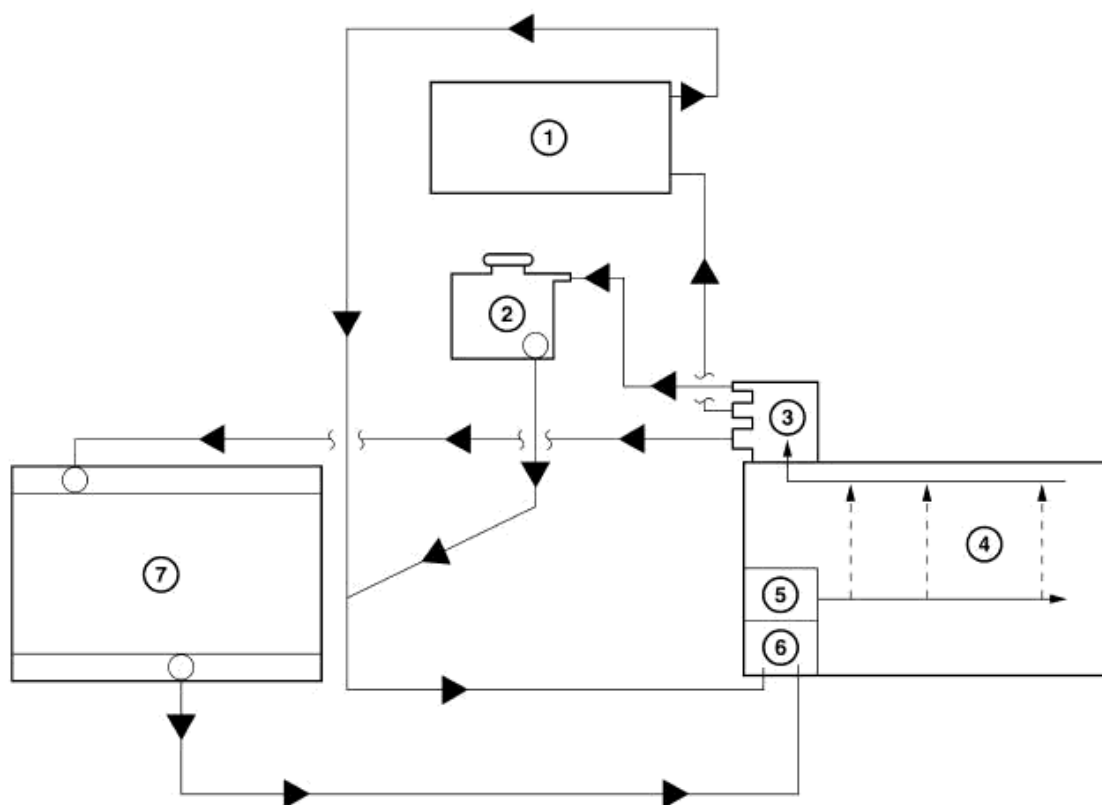


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Fig. 2: COOLING SYSTEM FLOW - 2.4L
 Courtesy of CHRYSLER LLC

1 - WATER PUMP	7 - COMBINATION COOLER
2 - RETURN TUBE	8 - RADIATOR
3 - WATER PLENUM	9 - SECONDARY THERMOSTAT
4 - PRIMARY THERMOSTAT	10 - CYLINDER BLOCK
5 - TRANSMISSION	11 - CYLINDER HEAD
6 - INTERNAL TRANSMISSION COOLER	12 - HEATER CORE

The primary purpose of a cooling system is to maintain engine temperature in a range that will provide satisfactory engine performance and emission levels under all expected driving conditions.

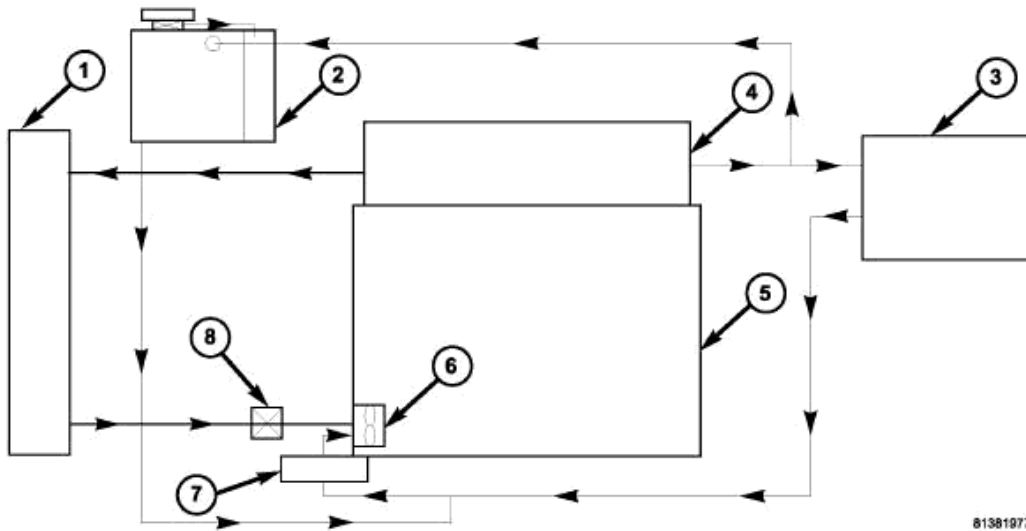


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Fig. 3: Cooling System Operation - 2.7L
Courtesy of CHRYSLER LLC

- 1 - HEATER CORE
- 2 - COOLANT PRESSURE CONTAINER
- 3 - COOLANT OUTLET CONNECTOR
- 4 - ENGINE
- 5 - WATER PUMP
- 6 - THERMOSTAT
- 7 - RADIATOR

The cooling system also provides hot water (coolant) for heater performance.



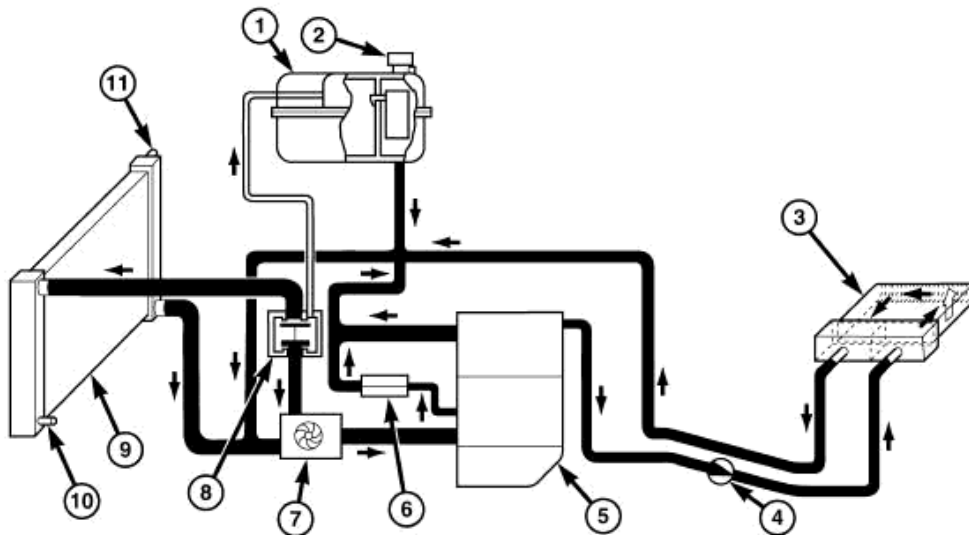
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Fig. 4: COOLING FLOW - 3.5L W/ENGINE OIL COOLER ENGINE

Courtesy of CHRYSLER LLC

- 1 - RADIATOR
- 2 - HOT BOTTLE/COOLANT RECOVERY BOTTLE
- 3 - HEATER CORE
- 4 - CYLINDER HEAD
- 5 - CYLINDER BLOCK
- 6 - WATER PUMP
- 7 - ENGINE OIL COOLER
- 8 - THERMOSTAT

DIESEL ENGINE



80ee9390

Fig. 5: COOLING SYSTEM FLOW

Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY PRESSURE CONTAINER	7 - WATER PUMP
2 - PRESSURE CAP	8 - THERMOSTAT HOUSING
3 - HEATER CORE	9 - RADIATOR
4 - AUXILIARY HEATER	10 - COOLANT DRAIN VALVE
5 - ENGINE	11 - SERVICE FILL VENT VALVE
6 - OIL COOLER	

The water pump draws coolant from the radiator and delivers it to the engine block. The coolant travels through the engine block into the cylinder head. Coolant exits the engine at the thermostat. If the coolant temperature is less than 87°C (189°F) the thermostat directs all of the coolant back to the water pump. If the coolant temperature is between 87°C (189°F) and 102°C (216°F) the thermostat is in the mix mode and directs the coolant to the radiator and the water pump. If the coolant is greater than 102°C (216°F), the thermostat directs all of the coolant to the radiator.

The thermostat also feeds excess coolant and bleeds air from the system through a hose leading to the coolant reservoir. The reservoir returns coolant to the inlet side of the water pump. A port and hose at the rear of the engine block provides coolant to the heater core. This coolant is returned to the engine at the intake side of the water pump.

The oil cooler receives coolant directly from the engine block. A hose returns this coolant to the inlet side of the water pump.

DIAGNOSIS AND TESTING

PRELIMINARY CHECKS

ENGINE COOLING SYSTEM OVERHEATING

Establish what driving conditions caused the complaint. Abnormal loads on the cooling system such as the following may be the cause:

- Prolonged idle
- Very high ambient temperature
- Slight tail wind at idle
- Slow traffic
- Traffic jams
- High speed or steep grades

Driving techniques that avoid overheating are:

- Idle with A/C off when temperature gauge is at end of normal range.

TRAILER TOWING:

Consult Trailer Towing information of owner's manual. Do not exceed limits.

RECENT SERVICE OR ACCIDENT REPAIR:

Determine if any recent service has been performed on vehicle that may affect the cooling system. This may be:

- Engine adjustments (incorrect timing)
- Slipping engine accessory drive belt(s)
- Brakes (possibly dragging)
- Changed parts. Incorrect water pump or pump rotating in wrong direction due to belt not correctly routed
- Reconditioned radiator or cooling system refilling (possibly under filled or air trapped in system).

NOTE: If investigation reveals none of the previous items as a cause for an engine overheating complaint, refer to **COOLING SYSTEM DIAGNOSIS CHART**

These charts are to be used as a quick-reference only.

COOLING SYSTEM DIAGNOSIS CHART

CONDITION	POSSIBLE CAUSE	CORRECTION
TEMPERATURE GAUGE READS LOW	1. Diagnostic Trouble Code (DTC) set indicating a stuck open engine thermostat. 2. Problem with Engine Coolant Temperature (ECT) sensor or circuit. 3. Problem with temperature gauge. 4. Coolant level low during cold ambient temperature, accompanied by poor heater performance.	1. (Refer to <u>THERMOSTAT</u>) Replace thermostat, if necessary. If a (DTC) has not been set, the problem may be with the temperature gauge. 2. Refer to <u>SENSOR, Coolant Temperature</u> for checking the ECT sensor 3. Check Gauge operation. (Refer to Appropriate Service Information) 4. Check coolant level. Inspect the system for leaks. See <u>Diagnosis and Testing</u> . Repair as necessary.
TEMPERATURE GAUGE READS HIGH OR ENGINE COOLANT WARNING LAMP ILLUMINATES. COOLANT MAY OR MAY NOT BE LOST FROM SYSTEM.	1. Trailer being towed, a steep hill being climbed, vehicle being operated in slow moving traffic, or engine idling during high ambient (outside) temperatures with air conditioning on. High altitudes could cause these conditions.	1. This may be a temporary condition and repair is not necessary. Turn off the air conditioning and drive the vehicle without any of the previous conditions. Observe the temperature gauge. The gauge should return to the normal range. If the gauge does not return to the

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		normal range, determine the cause of the overheating and repair. Refer to POSSIBLE CAUSES in this service information .
2. Is temperature gauge (if equipped) reading correctly?	2. Check the gauge. (Refer to the Appropriate Diagnostic Information) Repair as necessary.	
3. Is temperature warning lamp (if equipped) illuminating unnecessarily?	3. Check warning lamp operation. (Refer to the Appropriate Diagnostic Information) Repair as necessary.	
4. Low coolant level.	4. Check for coolant leaks. See Diagnosis and Testing . Repair as necessary.	
5. Pressure cap not installed tightly. If cap is loose, boiling point of coolant will be lowered. Also refer to the following step 6.	5. Tighten pressure cap.	
6. Poor seals at pressure cap.	6. (a) Check condition of cap and cap seals. See Inspection Replace cap if necessary. (b) Check condition of filler neck. If neck is damaged, replace as necessary.	
7. Wrong pressure cap installed.	7. Vehicles equipped with 2.4L engines use different pressure caps than vehicles equipped with 2.7L/3.5L/2.0L Diesel engines. Verify proper pressure cap part number.	
8. 2.4L Vehicles: Coolant level low in radiator, but not in coolant recovery container. This indicates the radiator is not drawing coolant from the coolant recovery container as the engine cools. As the engine cools, a vacuum is formed inside the cooling system. If the radiator cap seals are defective, or the cooling system has a leak, a vacuum cannot be formed.	8. (a) Check condition of pressure cap and seals. Replace cap if necessary. (b) Check condition of filler neck. Replace if damaged. (c) Check condition of hose from filler neck to coolant container. It should be tight at both ends without any kinks or tears. Replace hose as necessary. (d) Check coolant recovery container and hose for blockage. Repair as necessary.	
9. Freeze point of coolant not correct. Mixture ratio may be too rich.	9. Check coolant concentration. See Diagnosis and Testing Adjust glycol-to-water ratio as required.	

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	10. Coolant not flowing through system. 11. Radiator or A/C condenser fins are dirty or clogged. 12. Radiator core is plugged or corroded. 13. Fuel or ignition system problems. 14. Dragging Brakes. 15. Bug screen or other aftermarket accessory is being used causing reduced air flow. 16. Thermostat partially or completely closed. 17. Electric radiator fan not operating properly. 18. Cylinder head gasket leaking. 19. Heater core leaking.	10. (a) 2.4L Vehicles: Check for coolant flow at filler neck with some coolant removed, engine warm, and thermostat open. Coolant should be observed flowing through filler neck. If flow is not observed, determine reason for lack of flow and repair as necessary. (b) 2.7L/3.5L/2.0L Diesel Vehicles: Engine coolant motion should be observable in coolant pressure container when revving the engine while running. 11. Clean obstruction from fins. 12. Clean or replace radiator as necessary. 13. (Refer to <u>IGNITION CONTROL - SERVICE INFORMATION</u>) 14. Inspect brake system and repair as necessary. 15. Remove bug screen or accessory. 16. Check thermostat operation and replace as necessary. See <u>Diagnosis and Testing</u> 17. Check electric fan operation and repair as necessary. 18. Check cylinder head gasket for leaks. Refer to <u>Engine/Cylinder Head - Diagnosis and Testing</u> 19. Check heater core for leaks. Repair as necessary.
TEMPERATURE GAUGE READING IS INCONSISTENT (FLUCTUATES, CYCLES OR IS ERRATIC)	1. The gauge may cycle up and down. This is due to the cycling of the electric radiator fan and/or changing vehicle operating conditions. 2. During cold weather operation with the heater blower in the high position, the gauge reading may drop slightly. 3. Temperature gauge or engine	1. A normal condition. No correction is necessary. If gauge cycling is going into the hot zone, check electric fan operation and repair as necessary. 2. A normal condition. No correction is necessary. 3. Check operation of gauge and

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	coolant temperature sensor is defective or shorted. 4. Gauge reading rises when vehicle is brought to a stop after heavy use (engine still running). 5. Gauge reading high after restarting a warmed-up (hot) engine. 6. Coolant level low (air will build up in the cooling system causing the thermostat to open late). 7. Cylinder head gasket leaking allowing exhaust gas to enter cooling system. This will cause thermostat to open late. 8. Water pump impeller or pulley loose on shaft. 9. Air leak on the suction side of water pump allows air to build up in cooling system. This will cause the thermostat to open late.	repair as necessary. (Refer to the Appropriate Diagnostic Information) 4. A normal condition. No correction is necessary. The gauge should return to normal range after vehicle is driven. 5. A normal condition. No correction is necessary. The gauge should return to normal range after a few minutes of engine operation. 6. Check cooling system for leaks. See <u>Diagnosis and Testing</u> . Repair as necessary. 7. (a) Check for cylinder head gasket leaks. Repair as necessary. Refer to <u>Engine/Cylinder Head - Diagnosis and Testing</u> (b) Check for coolant in the engine oil. Inspect for white steam emitting from exhaust system. Repair as necessary. 8. Check water pump and replace as necessary. 9. Locate leak and repair as necessary.
PRESSURE CAP IS BLOWING OFF STEAM AND/OR COOLANT FLOWING INTO RECOVERY CONTAINER. TEMPERATURE GAUGE READING MAY BE ABOVE NORMAL, BUT NOT HIGH. COOLANT LEVEL MAY BE HIGH IN RECOVERY CONTAINER.	1. Pressure relief valve in pressure cap defective or wrong pressure cap installed. 2. Cooling system over filled.	1. Verify proper pressure cap part number. Check condition of pressure cap and seals. Replace as necessary. See <u>Diagnosis and Testing</u> 2. Drain cooling system to proper level.
COOLANT LOSS TO THE GROUND WITHOUT PRESSURE CAP BLOWOFF. GAUGE IS READING HIGH OR HOT.	1. Coolant leaks in radiator, cooling system hoses, water pump or engine.	1. Pressure test and repair as necessary. See <u>Diagnosis and Testing</u>
DETONATION OR PRE-IGNITION (NOT CAUSED BY IGNITION SYSTEM). GAUGE	1. Engine overheating. 2. Freeze point of coolant not	1. Check reason for overheating and repair as necessary. 2. Check the freeze point of the

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MAY OR MAY NOT BE READING HIGH.	correct. 3. Coolant level low.	coolant. See <u>Diagnosis and Testing</u> . 3. Fill cooling system to proper level.
HOSE OR HOSES COLLAPSE WHEN ENGINE IS COOLING	1. Vacuum created in cooling system on engine cool-down is not being relieved through coolant recovery container system.	1. (a) Radiator pressure cap relief valve stuck. See <u>Diagnosis and Testing</u> Replace as necessary. (b) Hose between coolant recovery container and radiator is kinked. Repair as necessary. (c) Vent at coolant recovery container is plugged. Clean vent and repair as necessary. (d) Coolant recovery container is internally blocked or plugged. Check for blockage and repair as necessary.
ELECTRIC RADIATOR FAN OPERATES ALL THE TIME.	1. Fan relay, Powertrain Control Module (PCM) or engine coolant temperature sensor defective. 2. Check for low coolant level.	1. (Refer to the Appropriate Diagnostic Information) Repair as necessary. 2. See <u>Standard Procedure</u> Repair as necessary.
	3. Defective transmission temperature sensor.	3. Check for transmission related diagnostic trouble codes. Refer to 41TE Transmission Diagnostics.
	4. Defective A/C pressure transducer.	4. Refer to appropriate Powertrain Diagnostic Service Information for any related trouble codes.
ELECTRIC RADIATOR FAN WILL NOT OPERATE. GAUGE READING HIGH OR HOT	1. Radiator fan motor defective. 2. Radiator fan relay, Powertrain Control Module (PCM) or engine coolant temperature sensor defective. 3. Blown fuse in Power Distribution Center (PDC).	1. Refer to the Appropriate Diagnostic Information. Repair as necessary. 2. Refer to the Appropriate Diagnostic Information. Repair as necessary. 3. Determine reason for blown fuse and repair as necessary.
NOISY FAN	1. Radiator fan blade loose. 2. Radiator fan blade striking a surrounding object. 3. Air obstructions at radiator or A/C condenser. 4. Radiator fan motor defective.	1. Replace fan assembly. 2. Locate point of fan blade contact and repair as necessary. 3. Remove obstructions and/or clean debris from radiator and/or A/C condenser. 4. Replace as necessary. See <u>Removal</u> .

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INADEQUATE AIR CONDITIONER PERFORMANCE (COOLING SYSTEM SUSPECTED)	1. Radiator and/or air conditioning condenser is restricted, obstructed or dirty. 2. Electric radiator fan not operating when A/C is on. 3. Engine is overheating (heat may be transferred from radiator to A/C condenser). High under hood temperature due to engine overheating may also transfer heat to A/C components.	1. Remove restriction and/or clean as necessary. 2. Refer to the Appropriate Diagnostic Information. Repair as necessary. 3. Correct overheating condition.
INADEQUATE HEATER PERFORMANCE.	1. Has a Diagnostic Trouble Code (DTC) been set? 2. Coolant level low. 3. Obstructions in heater hose fittings at engine. 4. Heater hose kinked. 5. Water pump is not pumping coolant to heater core. When the engine is fully warmed up, both heater hoses should be hot to the touch.	1. Refer to the Appropriate Diagnostic Information. 2. Repair as necessary. 3. Remove heater hoses at both ends and check for obstructions. Repair as necessary. 4. Locate kinked area and repair as necessary. 5. Repair as necessary.
HEAT ODOR	1. Various heat shields are used at certain driveline components. One or more of these shields may be missing. 2. Is temperature gauge reading above the normal range? 3. Radiator fan operating incorrectly. 4. Has undercoating been applied to any unnecessary component? 5. Engine may be running rich causing the catalytic converter to overheat.	1. Locate missing shields and replace or repair as necessary. 2. Refer to the previous TEMPERATURE GAUGE READS HIGH . Repair as necessary. 3. See <u>Diagnosis and Testing</u> Repair as necessary. 4. Clean undercoating as necessary. 5. Refer to the Appropriate Diagnostic Information. Repair as necessary.
POOR DRIVEABILITY (THERMOSTAT POSSIBLY STUCK OPEN). GAUGE MAY BE READING LOW	1. For proper driveability, good vehicle emissions and for preventing build-up of engine oil sludge, the thermostat must be operating properly. Has a Diagnostic Trouble Code (DTC)	1. Refer to the Appropriate Diagnostic Information. Replace thermostat if necessary.

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	been set?	
STEAM IS COMING FROM FRONT OF VEHICLE NEAR GRILL AREA WHEN WEATHER IS WET, ENGINE IS WARMED UP, RUNNING, AND VEHICLE IS STATIONARY. TEMPERATURE GAUGE IS IN NORMAL RANGE.	1. During wet weather, moisture (snow, ice or rain condensation) on the radiator will evaporate when the thermostat opens. This opening allows heated water into the radiator. When the moisture contact the hot radiator, steam may be emitted. This usually occurs in cold weather with no fan or airflow to blow it away.	1. Occasional steam emitting from this area is normal. No repair is necessary.
COOLANT COLOR	1. Coolant color is not necessarily an indication of adequate corrosion or temperature protection. Do not rely on coolant color for determining condition of coolant.	1. Check the freeze point of the coolant. See <u>Diagnosis and Testing</u> .
COOLANT LEVEL CHANGES IN COOLANT RECOVERY CONTAINER	1. Level changes are to be expected as coolant volume fluctuates with engine temperature. If the level in the container was between the MIN and MAX marks when the engine was cold, the level should return to within that range after operation at elevated temperatures.	1. A normal condition. No repair is necessary.

FLOW CHECK

To determine whether coolant is flowing through the cooling system, use one of the following procedures:

PREFERRED METHOD

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

- **2.4L:** Remove pressure cap when engine is cold. Remove small amount of coolant. Idle engine until thermostat opens. You should observe coolant flow while looking down the filler neck. Once flow is detected install the pressure cap. Replace removed coolant into coolant recovery container.
- **2.7L/3.5L/2.0L Diesel:** Start engine, coolant flow should be observable in coolant pressure container when revving the engine.

ALTERNATIVE METHOD

- If engine is cold, idle engine until normal operating temperature is reached. Feel the upper radiator hose.

If it is hot, coolant is circulating.

LEAK TESTING

WARNING: If vehicle has been run recently, wait 15 minutes before removing pressure cap. Place a shop towel over the cap, and without pushing down, rotate it counterclockwise to the first stop. Allow fluids to escape through the overflow tube. When the system stops pushing coolant and steam into the coolant recovery bottle and pressure drops, push down on the cap and remove it completely. Squeezing the radiator inlet hose with a shop towel (to check pressure) before and after turning to the first stop is recommended.

Coolant level should be full. Add coolant if necessary. With engine not running, remove pressure cap and wipe the coolant filler neck sealing seat clean.

Attach a cooling system pressure tester Tool 7700 (or equivalent) to the coolant filler neck, apply 104 kPa (15 psi) pressure. If the pressure drops more than 13.7 kPa (2 psi) in 2 minutes inspect all points for external leaks.

All hoses, radiator and heater, should be moved while at 104 kPa (15 psi) since some leaks occur while driving due to engine rock, etc.

If there are no external leaks after the gauge dial shows a drop in pressure, detach the tester. Start engine and run the engine to normal operating temperature in order to open the thermostat and allow the coolant to expand. Reattach the tester. If the needle on the dial fluctuates, it indicates a combustion leak and is usually a head gasket leak.

WARNING: With tool in place pressure builds up fast. Any excessive amount of pressure built up by continuous engine operation must be released to a safe pressure point. never permit pressure to exceed 138 kPa (20 psi).

If the needle on the dial does not fluctuate, race the engine a few times. If an abnormal amount of coolant or steam is emitted from the tailpipe, it may indicate a faulty head gasket, cracked engine block or cylinder head.

There may be internal leaks which can be determined by removing the oil dipstick. If water globules appear intermixed with the oil, it will indicate a internal leak in the engine. If there is an internal leak, the engine must be disassembled for repair.

AERATION

Low coolant level in a cross flow radiator will equalize in both tanks with engine off. With engine at running and at operating temperature, the high pressure inlet tank runs full and the low pressure outlet tank drops, resulting in cooling system aeration. Aeration will draw air into the water pump resulting in the following:

- High reading shown on the temperature gauge.
- Loss of coolant flow through the heater core.

- Corrosion in the cooling system.
- Water pump seal may run dry, increasing the risk of premature seal failure.
- Combustion gas leaks into the coolant can also cause the above problems.

DEAERATION

2.4L

Removal of air from the engine cooling system only occurs when the engine is first warming up. Air in the cooling system will collect under the cooling system pressure cap while the engine is run and will be pushed into the coolant recovery container. When the engine cools down, coolant will be drawn from the coolant recovery container back into the active cooling system. Once the thermostat opens, deaeration no longer occurs. Multiple warm up and cool down cycles may be required to remove all the air in the cooling system. If the system is very low on coolant, deaeration will not occur. Following the proper cooling system fill procedure is essential for proper operation. This system will not function if the wrong cooling system pressure cap is installed. Ensure proper cooling system pressure cap is used. Verify proper pressure cap part number.

2.7L/3.5L/2.0L DIESEL

This engine has a pressure system to remove air from the engine cooling system. Removal of air from the engine cooling system occurs continuously when the engine is run at speeds above idle. Thirty minutes of normal driving after a properly completed service fill will deaerate the engine cooling system. This system will not function if the wrong cooling system pressure cap is installed. Ensure proper cooling system pressure cap is used. Verify proper pressure cap part number.

STANDARD PROCEDURE

DRAINING

When servicing the cooling system, it is essential that coolant does not drip onto the accessory drive belts and/or pulleys. Shield the belts with shop towels before working on the cooling system. If coolant contacts the belts or pulleys, flush both with clean water.

WARNING: Make sure engine cooling system is cool before servicing. Do not remove any clamps or hoses , pressure cap, or open the radiator draincock. When the system is hot and under pressure serious burns from coolant can occur.

1. Position a clean collecting container under draincock location.
2. Open radiator draincock located at the lower right side of radiator. Turn draincock counterclockwise until it stops.
3. Remove coolant pressure cap.
4. Raise vehicle on hoist.
5. **2.7L/3.5L:** Remove heater hose at heater tube located at the right front inner frame rail and direct coolant flow into container.

FILLING

NOTE: Make sure all hoses are connected and radiator draincock is closed. Draincock should be hand tightened only.

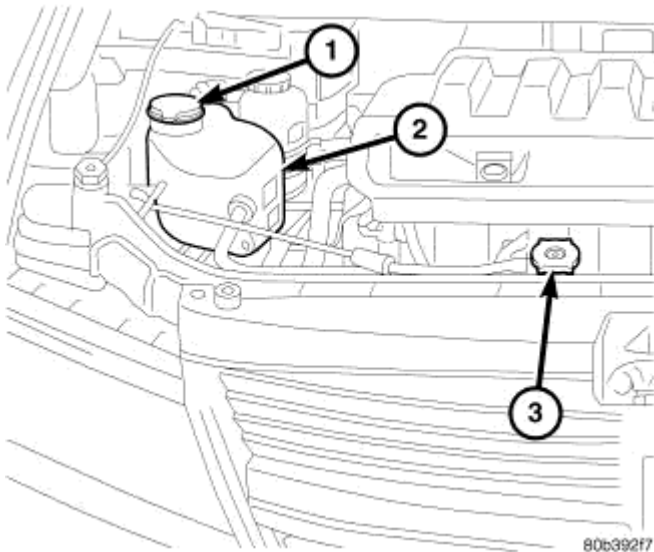
2.4L

Fig. 6: Cooling System Filling - 2.4L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - COOLANT RECOVERY CONTAINER
2 - FILL LINE
3 - RADAITOR PRESSURE CAP |
|--|

1. Close radiator draincock by turning clockwise.
2. Remove cooling system pressure cap and fill cooling system with recommended coolant mixture. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .
3. Fill coolant to the top of pressure cap neck.
4. Install cooling system pressure cap.
5. Fill coolant recovery container to the MAX mark.
6. Start engine and allow to run until thermostat opens and radiator fans cycle.

NOTE: It may be necessary to add additional coolant to the coolant recovery container after three or four warm-up/cool down cycles to maintain coolant level between the MIN and MAX marks; as additional trapped air is removed from the system.

2.7L/3.5L/2.0L

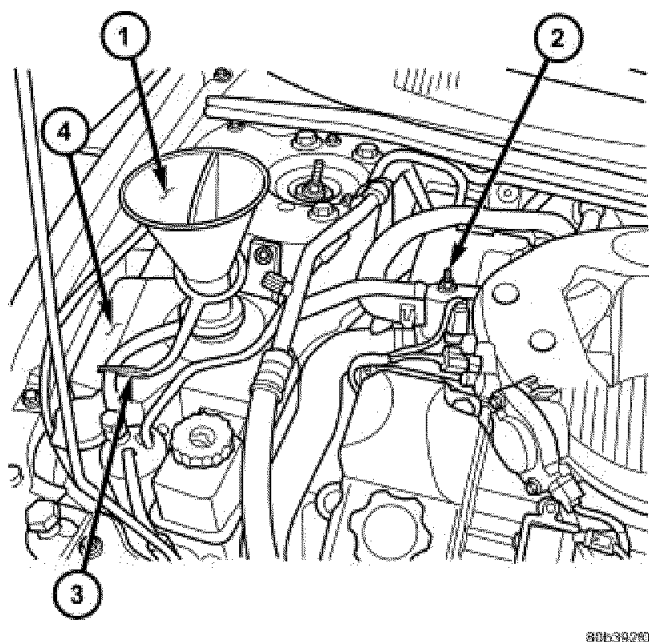


Fig. 7: Cooling System Filling - 2.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - SPECIAL TOOL 8195
2 - COOLING SYSTEM BLEED VALVE
3 - PINCH OVERFLOW HOSE
4 - COOLANT PRESSURE CONTAINER |
|--|

NOTE: Draincock should be hand tightened only.

1. Close radiator draincock by turning clockwise.

NOTE: It is imperative that the cooling system air bleed valve be opened before any coolant is added to the cooling system. Failure to open the bleed valve first will result in an incomplete fill of the system.

2. Open cooling system bleed valve.
3. Attach a 6.35 mm (0.250 in.) inside diameter clear hose that is 120.0 cm (48 in.) long to the bleed valve. Route the hose away from accessory drive belts and radiator fan. Position the other end of hose into a clean collecting container. The hose will prevent coolant from contacting accessory drive belts and other components.
4. Remove cooling system pressure cap. Attach Filling Aid Funnel 8195, to coolant pressure container filler neck.
5. Use the supplied clip to pinch overflow hose that connects between the two chambers of the pressure container.

6. Pour coolant into the larger section of Filling Aid Funnel (the smaller section of funnel is to allow air to escape).
7. Slowly continue filling until a steady stream of coolant flows from attached hose on bleed valve.
8. Close bleed valve and continue filling system to top of Filling Aid Funnel. DO NOT overtighten. Tighten to 12.4 N.m (110 lbs. in.).
9. Remove clip from overflow hose.
10. Allow coolant in Filling Aid Funnel to drain into overflow chamber of pressure container.
11. Remove Filling Aid Funnel 8195 and install pressure cap on pressure container.
12. Remove hose from bleed valve.
13. Start engine and allow to run until thermostat opens and radiator fans cycle.

NOTE: The engine cooling system will push any remaining air into the pressure container within about one half hour of normal driving. As a result, a drop in coolant level in the pressure container may occur.

If the engine cooling system overheats and pushes coolant into the overflow chamber of the pressure container, this coolant will be sucked back into the cooling system **ONLY IF THE PRESSURE CAP IS LEFT ON THE PRESSURE CONTAINER**. Removing the pressure cap breaks the vacuum path between the two chambers of the pressure container and the coolant will not return to the cooling system.

14. Shut off engine and allow it to cool down. This permits coolant to be drawn into the pressure chamber.
15. With engine COLD, observe coolant level in pressure chamber. Coolant level should be within MIN and MAX marks. Adjust coolant level as necessary.

LEVEL CHECK

NOTE: Do not remove pressure cap for routine coolant level inspections.

The coolant bottle provides a quick visual method for determining the coolant level without removing the pressure cap. **With the engine cold and not running**, simply observe the level of the coolant in the coolant recovery container. The level should be between the MIN and MAX marks.

ADDING ADDITIONAL COOLANT

NOTE: 2.4L - The pressure cap should only be removed if the coolant recovery container is empty.

When additional coolant is needed, it should be added to the coolant recovery container, 2.4L, pressurized coolant recovery container, 2.7L, 3.5L, and 2.0L Diesel.

Refer to Vehicle Quick Reference/Capacities and Recommended Fluids - Description for the proper type of coolant.

REVERSE FLUSHING

REVERSE FLUSHING DESCRIPTION

Reverse flushing of the cooling system is the forcing of water through the cooling system. This is done using air pressure in the opposite direction of normal coolant flow. It is usually only necessary with very dirty systems with evidence of partial plugging.

REVERSE FLUSHING RADIATOR

Disconnect the radiator hoses from the radiator inlet and outlet. Attach a section of the radiator hose to the radiator bottom outlet fitting and insert the flushing gun. Connect a water supply hose and air supply hose to the flushing gun.

CAUTION: Internal radiator pressure must not exceed 138 kPa (20 psi) as damage to radiator may result.

Allow the radiator to fill with water. When the radiator is filled, apply air in short blasts. Allow the radiator to refill between blasts. Continue this reverse flushing until clean water flows out through the rear of the radiator cooling tube passages.

REVERSE FLUSHING SYSTEM

Drain the cooling system. Remove the thermostat housing and thermostat. Install the thermostat housing. Disconnect the radiator upper hose from the radiator and attach the flushing gun to the hose. Disconnect the radiator lower hose from the water pump and attach a lead-away hose to the water pump inlet fitting.

Connect the water supply hose and air supply hose to flushing gun. Allow the engine to fill with water. When the engine is filled, apply air in short blasts, allowing the system to fill between air blasts. Continue until clean water flows through the lead away hose.

Remove the lead away hose, flushing gun, water supply hose and air supply hose. Remove the thermostat housing and install the thermostat. Install the thermostat housing with a replacement gasket. Refer to **THERMOSTAT** for replacement. Connect the radiator hoses. Refill the cooling system with the correct antifreeze/water mixture. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** . Refer to **FILLING** .

CHEMICAL CLEANING

In some instances, use a radiator cleaner (Mopar® Radiator Kleen or equivalent) before flushing. This will soften scale and other deposits and aid flushing operation.

CAUTION: Follow manufacturers instructions when using these products.

CLEANING

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

CLEANING

Drain cooling system and refill with clean water. Refer to drain and fill procedures in this service information . Run engine with radiator cap installed until upper radiator hose is hot. Stop engine and drain water from system. If water is dirty; fill, run, and drain system again, until water runs clear. Refill cooling system with a 50/50 mixture of the recommended ethylene-glycol and distilled water. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

INSPECTION

INSPECTION

After performing a cleaning/flush procedure, inspect all hoses, clamps and connections for deterioration and leaks. Inspect radiator and heater core for leaks.

SPECIFICATIONS

FILL VOLUMES

FILL VOLUMES

DESCRIPTION	SPECIFICATION	
	Metric	US
-		
2.4L Engine	7.3L	7.7 qts
2.7L Engine	9.3L	9.8 qts.
3.5L Engine	11L	11.6 qts
2.0L Diesel*	7.3L	7.7 qts
* All Diesel Engines use Glysantin G 30-91 coolant		

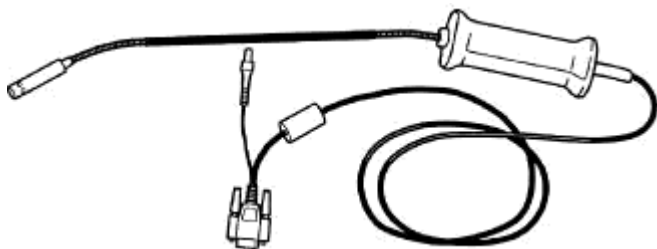
TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fasteners-Accessory Drive Belt Tensioner Bracket (2.0L Diesel)	30	22	-
Fastener-Accessory Drive Belt Tensioner Assembly(2.4L)	54	40	-
Fasteners-Accessory Drive Belt Tensioner Bracket (2.7L)	28	21	-
Fastener-Accessory Drive Belt Tensioner (2.4L)	24	18	-
Fastener-Accessory Drive Belt Tensioner (3.5L)	41	30	-
Fastener-Idler Pulley (2.4L)	35	26	-
Fastener-Idler Pulley (2.5L)	35	26	-
Fastener-Idler Pulley (2.0L Diesel)	35	26	-
Fasteners-A/C Condenser to Radiator	5	-	44
Fastener-Block Heater (2.7L)	12	9	106
Fastener-Block Heater (3.5L)	12	9	106

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

Bolts-Coolant Outlet Connector (3.5L)	12	9	106
Cooling System Bleed Valve	12	9	106
ETC Sensor (2.4L)	19	14	-
ETC Sensor (2.7L)	19	14	-
ETC Sensor (3.5L)	28	20	-
Fasteners-Fan Module to Radiator	5	-	44
Fasteners-Fan Motor to Shroud	5	-	44
Bolts-Thermostat Housing (3.5L)	12	9	106
Bolts-Thermostat Housing to cylinder head (2.0L Diesel/2.4L)	28	21	-
Bolts-Thermostat Housing (2.7L)	12	9	106
Fastener-Transmission Cooler Tube Bracket	5	-	44
Fastener-Transmission Cooler Tube	9	-	80
Fitting - Transmission oil cooler quick connect fitting	15	11	-
Bolts-Water Pump (2.7L/3.5L)	12	9	106
Hose Clamps-Transmission Cooler	3	-	27
Bolts-Water Pump Mounting (2.0L Diesel/2.4L)	24	18	-
Bolts-Water Pump Inlet Tube to Block (2.0L Diesel/2.4L)	12	9	106
Bolts-EGR Bypass assembly-to EGR Cooler body	10	7	89
Bolts-EGR Tube -to-Exhaust manifold	20	15	-
Bolts, Water Pump Inlet Tube to water pump housing (2.0L Diesel/2.4L)	24	18	-
Bolts, Water Pump to Water Pump Adapter (2.4L)	22	16	-
Bolts, Water Pump Pulley to Water Pump (2.4L)	9	-	80

SPECIAL TOOLS**SPECIAL TOOLS****Fig. 8: BELT TENSION GAUGE ADAPTER - 8371**

Courtesy of CHRYSLER LLC

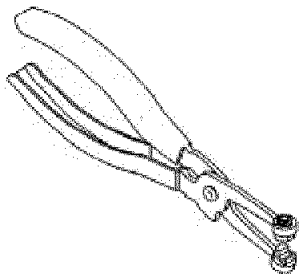


Fig. 9: HOSE CLAMP PLIERS 8495
Courtesy of CHRYSLER LLC

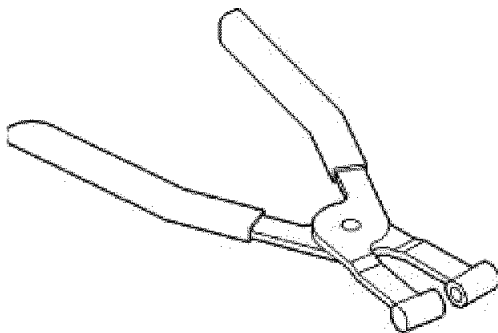


Fig. 10: HOSE CLAMP PLIERS 6094
Courtesy of CHRYSLER LLC

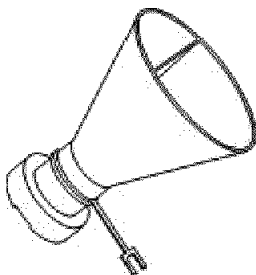


Fig. 11: FILLING AID FUNNEL 8195
Courtesy of CHRYSLER LLC

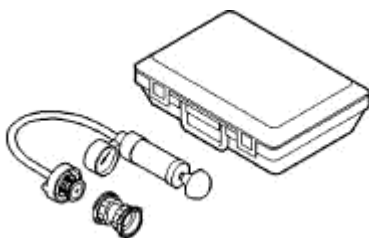


Fig. 12: COOLING SYSTEM TESTER 7700
Courtesy of CHRYSLER LLC

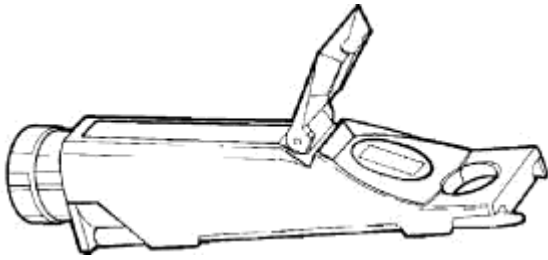


Fig. 13: COOLANT REFRACTOMETER 8286
Courtesy of CHRYSLER LLC

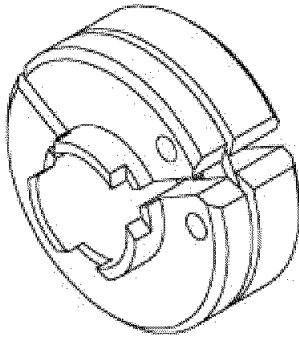


Fig. 14: RELEASE TOOL 8875A
Courtesy of CHRYSLER LLC

ACCESSORY DRIVE

BELT, SERPENTINE

Description

DESCRIPTION

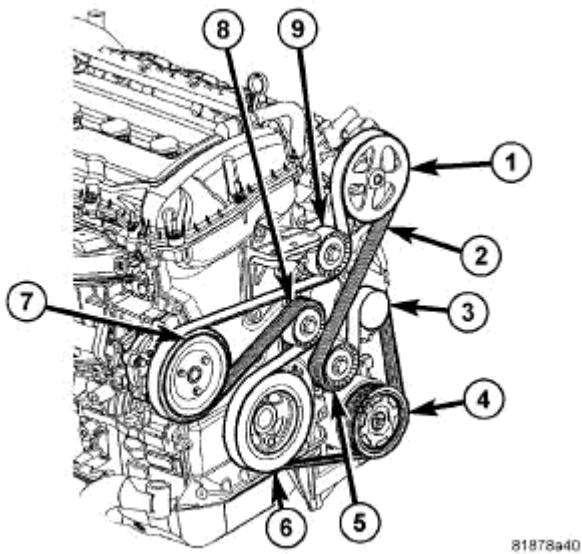


Fig. 15: ACCESSORY DRIVE BELT - WORLD ENGINE
 Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP
2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

The accessory drive belt is a Poly-V type belt. On the 2.4L engine, the accessory drive belt drives the generator, P/S pump and air conditioning compressor.

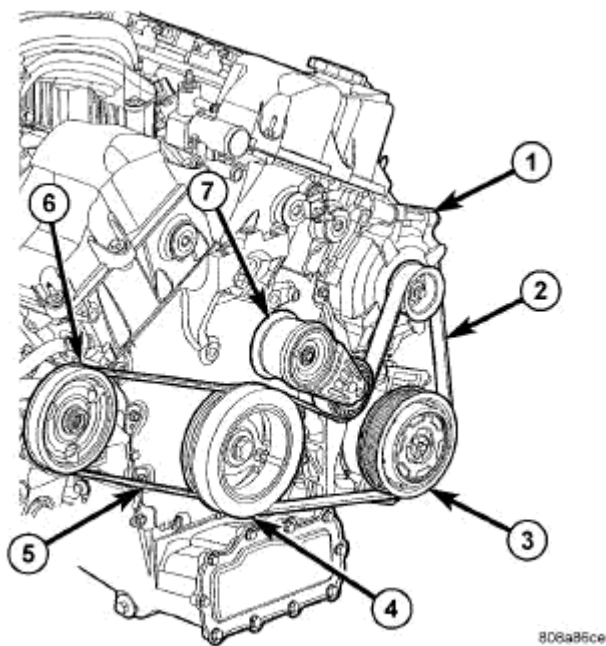


Fig. 16: ACCESSORY DRIVE BELT SYSTEM - 2.7L
Courtesy of CHRYSLER LLC

- 1 - GENERATOR
- 2 - IDLER/TENSIONER

On the 2.7L engine, the accessory drive belt drives the generator, and air conditioning compressor. The P/S is driven by a separate, stretch to fit drive belt.

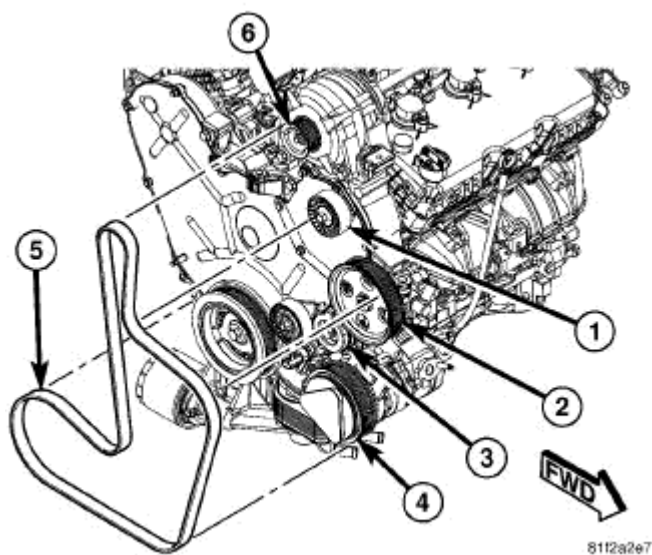


Fig. 17: ACCESSORY DRIVE BELT - 3.5L

Courtesy of CHRYSLER LLC

- | |
|------------------------------------|
| 1 - IDLER PULLEY |
| 2 - P/S PUMP PULLEY |
| 3 - ACCESSORY DRIVE BELT TENSIONER |
| 4 - A/C COMPRESSOR PULLEY |
| 5 - ACCESSORY DRIVE BELT |
| 6 - GENERATOR PULLEY |

On the 3.5L, the accessory drive belt drives the generator, P/S pump, and A/C compressor.

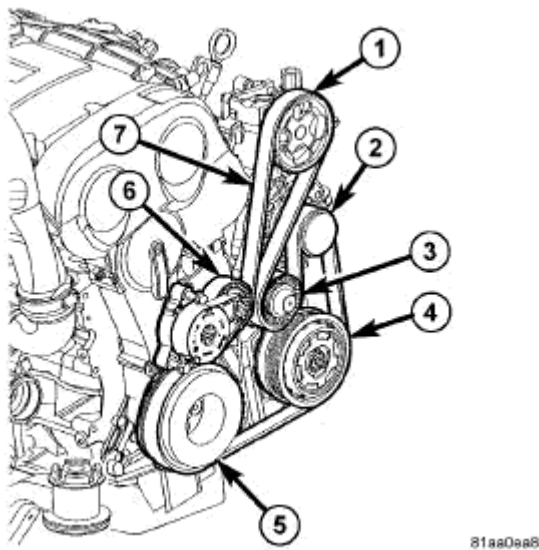


Fig. 18: 2.0L DIESEL ACCESSORY DRIVE BELT
Courtesy of CHRYSLER LLC

- | |
|------------------------------------|
| 1 - P/S PULLEY |
| 2 - GENERATOR PULLEY |
| 3 - IDLER PULLEY |
| 4 - A/C COMPRESSOR |
| 5 - CRANKSHAFT PULLEY |
| 6 - ACCESSORY DRIVE BELT TENSIONER |
| 7 - ACCESSORY DRIVE BELT |

The 2.0L Diesel engine accessory drive belt drives the P/S pump, Generator, and A/C compressor. Belt tension is maintained by an automatic accessory drive belt tensioner.

Diagnosis and Testing

ACCESSORY DRIVE BELTS

Satisfactory performance of the belt driven accessories depends on belt condition and proper belt tension.

ACCESSORY DRIVE BELT DIAGNOSIS

CONDITION	POSSIBLE CAUSE	CORRECTION
INSUFFICIENT ACCESSORY OUTPUT DUE TO BELT SLIPPAGE	1. Belt too loose. 2. Belt excessively glazed or worn.	1. Adjust belt tension. 2. Replace and tighten as specified.
BELT SQUEAL WHEN ACCELERATING ENGINE	1. Belts too loose. 2. Belts glazed.	1. Adjust belt tension. 2. Replace belts.
BELT CHIRP AT IDLE	1. Belts too loose. 2. Foreign material imbedded in belt. 3. Non-uniform belt. 4. Misaligned pulley(s). 5. Non-uniform groove or eccentric pulley.	1. Adjust belt tension. 2. Replace belt. 3. Replace belt. 4. Align accessories. 5. Replace pulley(s).
BELT ROLLED OVER IN GROOVE OR BELT JUMPS OFF	1. Broken cord in belt. 2. Belt too loose, or too tight. 3. Misaligned pulleys. 4. Non-uniform grooves or eccentric pulley.	1. Replace belt. 2. Adjust belt tension. 3. Align accessories. 4. Replace pulley(s).

Removal

2.4L ENGINE

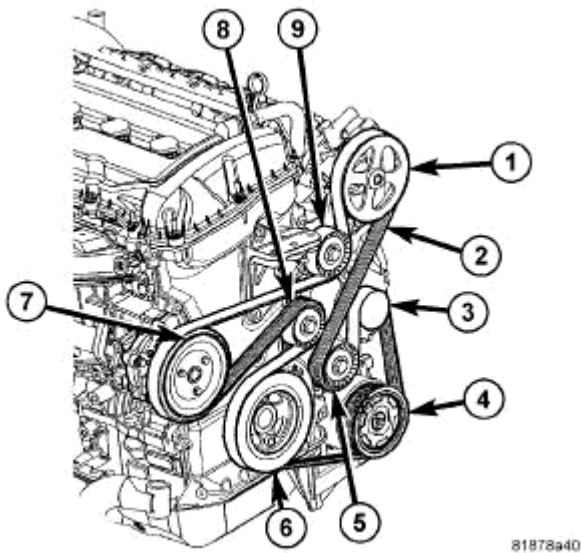


Fig. 19: ACCESSORY DRIVE BELT - WORLD ENGINE
Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP
2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

1. Using a wrench, rotate accessory drive belt tensioner (8) counterclockwise until accessory drive belt (2) can be removed from pulleys (5 and 9).
2. Remove accessory drive belt (2).

2.7L ENGINE

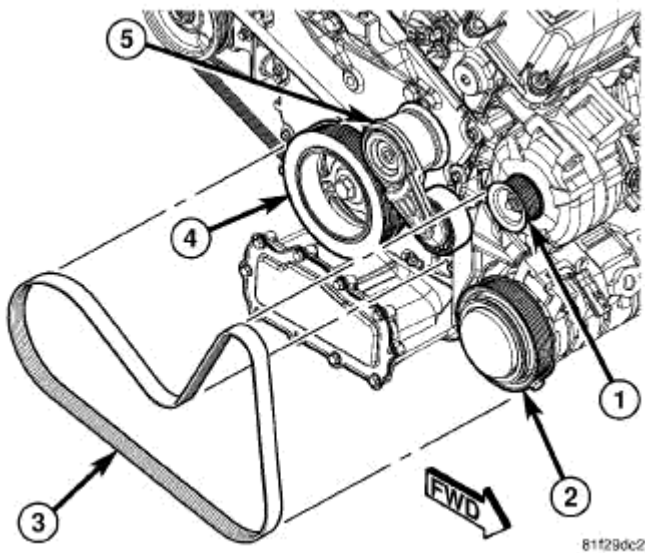


Fig. 20: ACCESSORY DRIVE BELT - 2.7L
 Courtesy of CHRYSLER LLC

1 - GENERATOR PULLEY
2 - A/C PULLEY
3 - ACCESSORY DRIVE BELT
4 - CRANKSHAFT PULLEY
5 - ACCESSORY DRIVE BELT TENSIONER

1. Raise vehicle on hoist.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**

3. Rotate accessory drive belt tensioner (5) clockwise to allow enough slack to remove accessory drive belt (3).

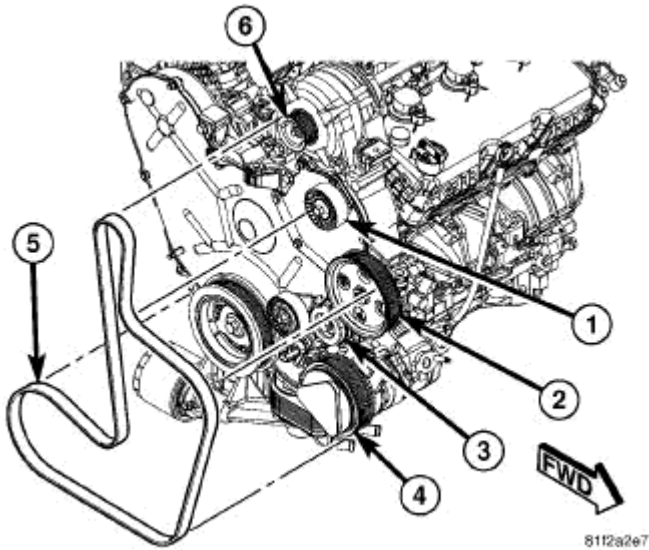
3.5L ENGINE

Fig. 21: ACCESSORY DRIVE BELT - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY
2 - P/S PUMP PULLEY
3 - ACCESSORY DRIVE BELT TENSIONER
4 - A/C COMPRESSOR PULLEY
5 - ACCESSORY DRIVE BELT
6 - GENERATOR PULLEY

1. Raise vehicle on hoist.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Rotate accessory drive belt tensioner (3) clockwise to allow enough slack to remove accessory drive belt (5).

2.0L DIESEL ENGINE

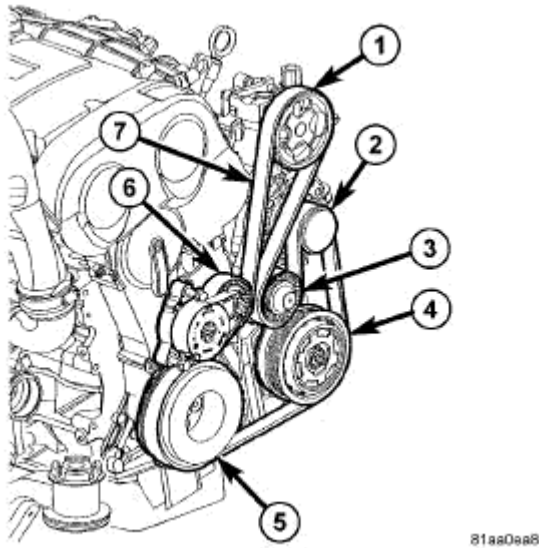


Fig. 22: 2.0L DIESEL ACCESSORY DRIVE BELT
 Courtesy of CHRYSLER LLC

1 - P/S PULLEY
2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Disconnect negative battery cable.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Working through wheelhouse, using a suitable wrench, rotate accessory drive belt tensioner (6) counterclockwise.
4. Remove accessory drive belt (7).

Cleaning

CLEANING

Clean all foreign debris from belt pulley grooves. The belt pulleys must be free of oil, grease, and coolants before installing the drive belt.

Inspection

INSPECTION

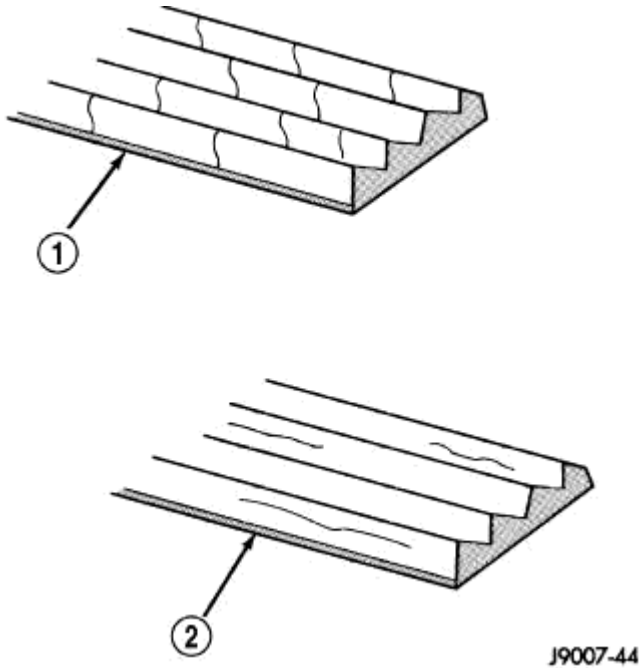


Fig. 23: DRIVE BELT WEAR PATTERN
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - NORMAL CRACKS - BELT OK
2 - NOT NORMAL CRACKS - REPLACE BELT |
|---|

Belt replacement under any or all of the following conditions is required:

- Excessive wear
- Frayed cords
- Severe glazing

Poly-V Belt system may develop minor cracks across the ribbed side (due to reverse bending). These minor cracks are considered normal and acceptable. Parallel cracks are not .

NOTE: Do not use any type of belt dressing or restorer on Poly-V Belts.

Installation

2.4L ENGINE

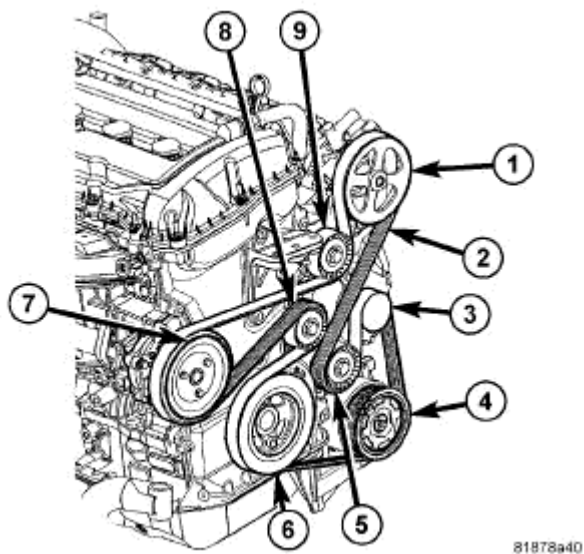


Fig. 24: ACCESSORY DRIVE BELT - WORLD ENGINE
 Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP
2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY
7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

NOTE: When installing drive belt on the pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulley grooves.

1. Install the accessory drive belt (2) around all the pulleys except for the generator pulley (3).
2. Using a wrench, rotate accessory drive belt tensioner (8) counterclockwise until accessory drive belt (2) can be installed on the generator pulley (3). Release spring tension onto accessory drive belt (2).

2.7L ENGINE

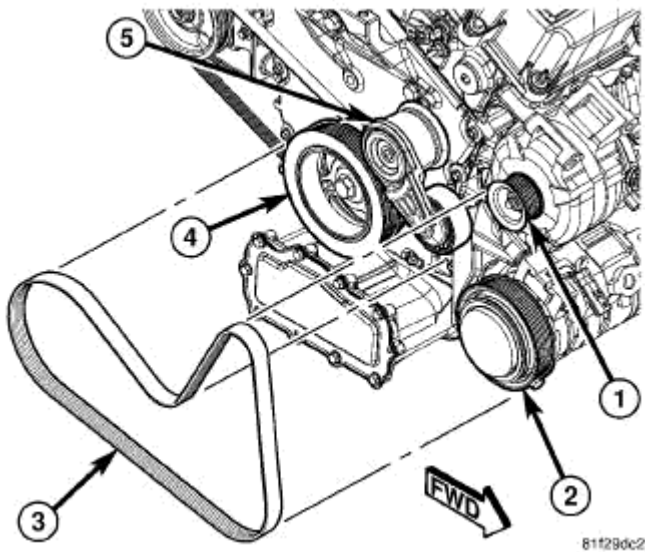


Fig. 25: ACCESSORY DRIVE BELT - 2.7L
Courtesy of CHRYSLER LLC

1 - GENERATOR PULLEY
2 - A/C PULLEY
3 - ACCESSORY DRIVE BELT
4 - CRANKSHAFT PULLEY
5 - ACCESSORY DRIVE BELT TENSIONER

NOTE: When installing drive belt onto pulleys, make sure that belt is properly routed and all V-grooves make proper contact with pulley.

1. Position accessory drive belt (3) on all pulleys except generator (1).
2. Rotate accessory drive belt tensioner (5) clockwise.
3. Position accessory drive belt (3) on generator pulley (1).
4. Slowly release accessory drive belt tensioner (5).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**
6. Lower vehicle.

3.5L ENGINE

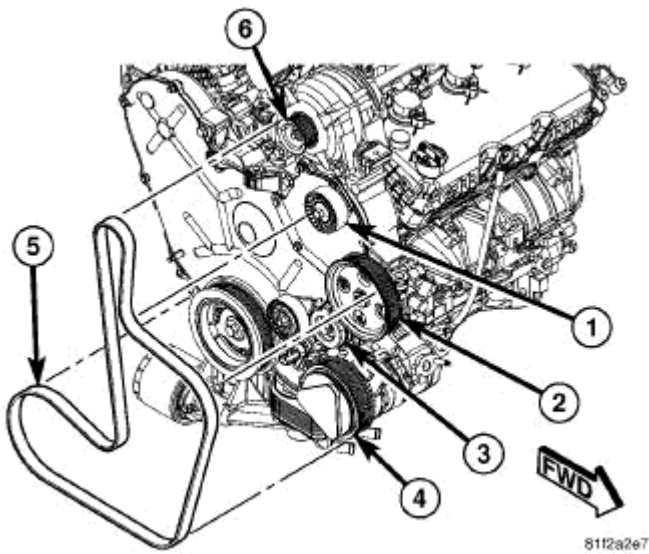


Fig. 26: ACCESSORY DRIVE BELT - 3.5L
Courtesy of CHRYSLER LLC

1 - IDLER PULLEY
2 - P/S PUMP PULLEY
3 - ACCESSORY DRIVE BELT TENSIONER
4 - A/C COMPRESSOR PULLEY
5 - ACCESSORY DRIVE BELT
6 - GENERATOR PULLEY

1. Position accessory drive belt (5) on all pulleys except generator (6).
2. Rotate accessory drive belt tensioner (3) clockwise.
3. Position accessory drive belt (5) on generator pulley (6).
4. Slowly release accessory drive belt tensioner (3).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**
6. Lower vehicle.

2.0L DIESEL ENGINE

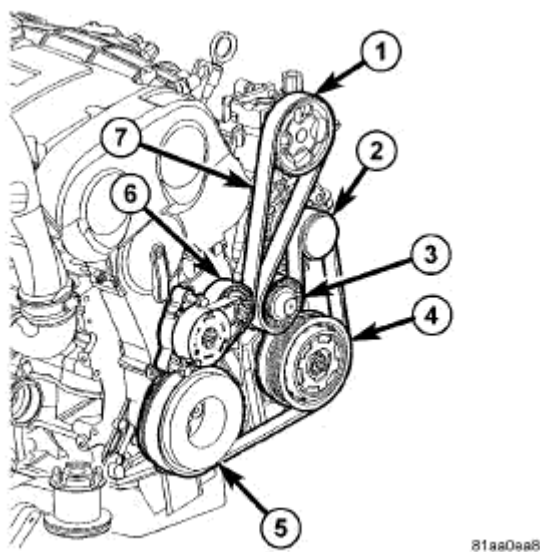


Fig. 27: 2.0L DIESEL ACCESSORY DRIVE BELT
 Courtesy of CHRYSLER LLC

1 - P/S PULLEY
2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Route accessory drive belt (7) around all pulleys except accessory drive belt tensioner (6). Rotate the tensioner arm (6) until it contacts its stop position. Route the belt (7) around the idler (3) and slowly let the tensioner (6) rotate into the belt. Make sure the belt (7) is seated onto all pulleys.
2. Working through RH wheelhouse, using suitable wrench, rotate accessory drive belt tensioner (6) counterclockwise.
3. Position accessory drive belt (7).
4. Slowly release accessory drive belt tensioner (6) against accessory drive belt (7).
5. Install RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**

BELT, SERPENTINE, POWER STEERING

Removal

2.7L ENGINE

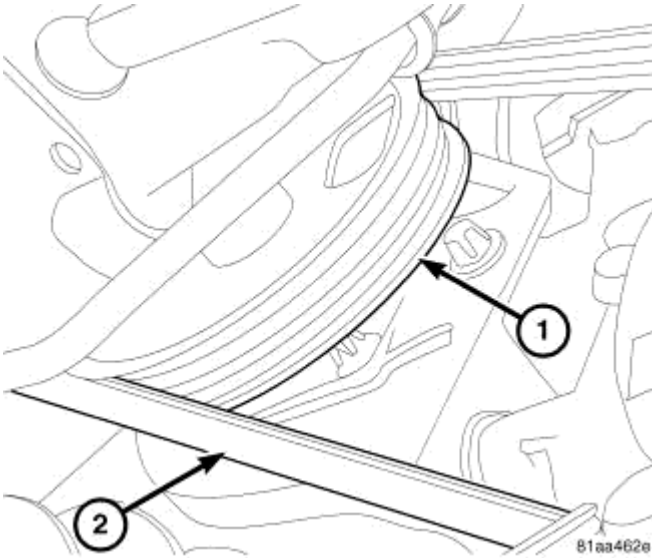


Fig. 28: STRETCH TO FIT POWER STEERING BELT REMOVAL
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - POWER STEERING PULLEY
2 - STRETCH TO FIT POWER STEERING BELT |
|---|

1. Raise and support the vehicle.
2. Remove RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Removal**
3. Use a socket and ratchet to rotate the crankshaft clockwise.
4. While rotating the crankshaft clockwise, walk the power steering drive belt (2) off of the power steering pulley (1).
5. Remove the power steering drive belt (2).

Installation

2.7L ENGINE

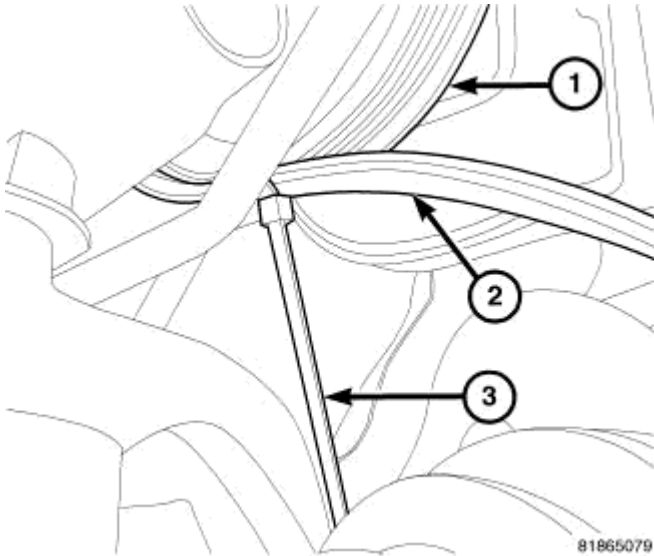


Fig. 29: POWER STEERING DRIVE BELT INSTALLATION

Courtesy of CHRYSLER LLC

- | |
|-------------------------|
| 1 - P/S PUMP PULLEY |
| 2 - POWER STEERING BELT |
| 3 - NYLON WIRE TIE |

1. Position the power steering drive belt (2) on the crankshaft pulley. Make sure the belt (2) is fully seated in the crankshaft pulley grooves.
2. Position the bottom of the drive belt (2) on the bottom of the power steering pulley (1).

NOTE: Use only wire ties with nylon locks, not metal.

3. Working from the back side of the power steering pulley (1), insert a nylon wire tie (3), 7.75X1/8x0.050 in. through one of the holes in the pulley (1).
4. Tighten the wire tie to hold the drive belt (2) in position.
5. While holding the drive belt (2) to make sure it stays in position, slowly rotate the engine clockwise.
6. Once the belt is in position on the pulley (1), continue rotating the engine until the wire tie snaps (3).
7. Remove the wire tie (3) from the vehicle.
8. Install the RH wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**

PULLEY, IDLER

Removal

2.4L ENGINE

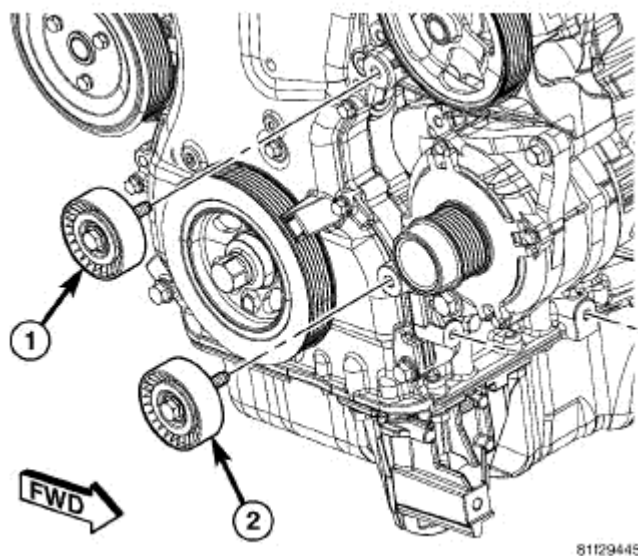


Fig. 30: ACCESSORY DRIVE BELT IDLER PULLEY - 2.4L
Courtesy of CHRYSLER LLC

- | |
|--------------------------------------|
| 1 - UPPER PULLEY
2 - LOWER PULLEY |
|--------------------------------------|

1. Remove accessory drive belt. See **Removal**
2. Remove upper idler pulley (1) and bolt.
3. Remove lower idler pulley (2) and bolt.

3.5L ENGINE

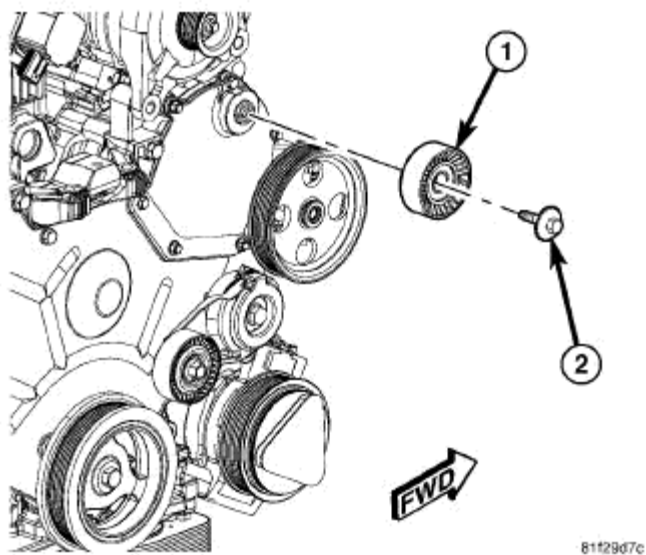


Fig. 31: IDLER PULLEY - 3.5L
 Courtesy of CHRYSLER LLC

- 1 - IDLER PULLEY
 2 - BOLT

1. Remove accessory drive belt. See **Removal** .
2. Remove mounting bolt (2) and idler pulley (1).

2.0L DIESEL ENGINE

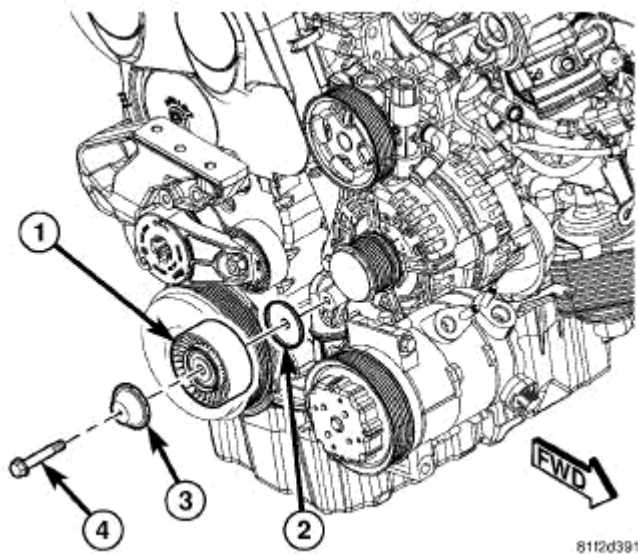


Fig. 32: IDLER PULLEY - 2.0L DIESEL
 Courtesy of CHRYSLER LLC

- 1 - IDLER PULLEY
 2 - DUST SHIELD
 3 - CAP
 4 - BOLT

1. Remove accessory drive belt. See **Removal** .
2. Remove bolt (4), cap (3), idler pulley (1), and dust shield (2).

Installation

2.4L ENGINE

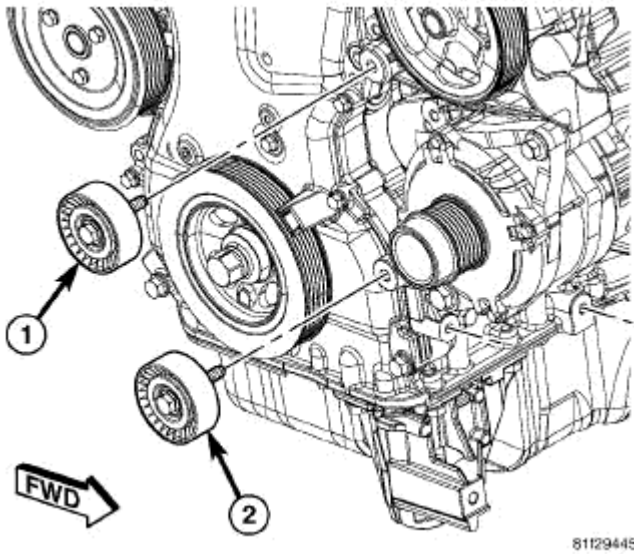


Fig. 33: ACCESSORY DRIVE BELT IDLER PULLEY - 2.4L
Courtesy of CHRYSLER LLC

1 - UPPER PULLEY
2 - LOWER PULLEY

1. Position lower idler pulley (2) and bolt.
2. Tighten bolt to 35 N.m (25 ft. lbs.).
3. Position upper idler pulley (1) and bolt.
4. Tighten bolt to 35 N.m (25 ft. lbs.).
5. Install accessory drive belt. See **Installation** .

3.5L ENGINE

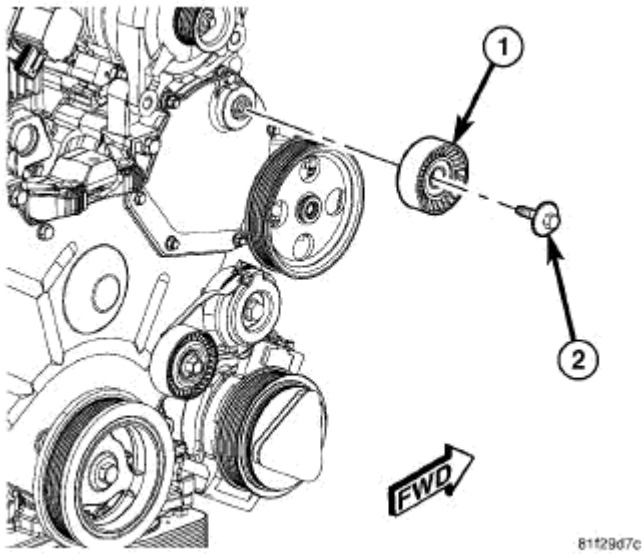


Fig. 34: IDLER PULLEY - 3.5L
Courtesy of CHRYSLER LLC

- | |
|------------------------------|
| 1 - IDLER PULLEY
2 - BOLT |
|------------------------------|

1. Position idler pulley and bolt.
2. Tighten bolt to 35 N.m (25 ft. lbs.).
3. Install accessory drive belt. See **Installation** .

2.0L DIESEL ENGINE

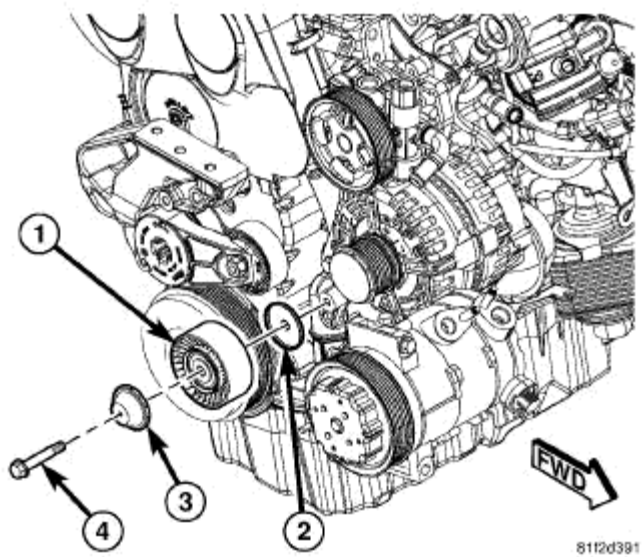
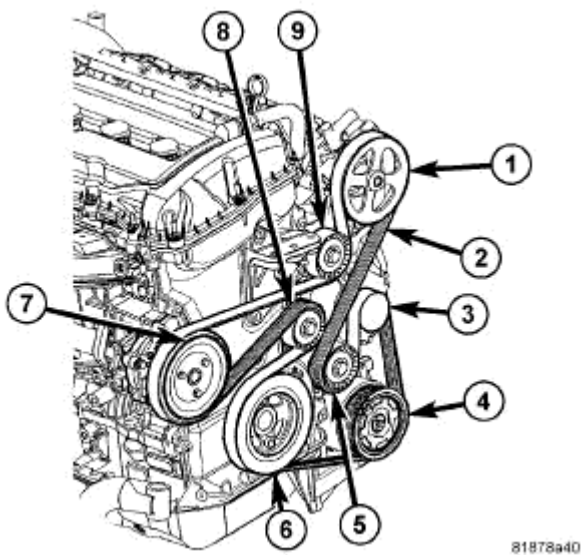


Fig. 35: IDLER PULLEY - 2.0L DIESEL

Courtesy of CHRYSLER LLC

- | |
|------------------|
| 1 - IDLER PULLEY |
| 2 - DUST SHIELD |
| 3 - CAP |
| 4 - BOLT |

1. Position bolt (4), cap (3), idler pulley (1) and dust shield (2) on front engine cover.
2. Tighten bolt to 35 N.m (25 ft.lbs.).
3. Install accessory drive belt. See **Installation** .

TENSIONER, BELT**Removal****2.4L ENGINE****Fig. 36: ACCESSORY DRIVE BELT - WORLD ENGINE**

Courtesy of CHRYSLER LLC

- | |
|--------------------------|
| 1 - POWER STEERING PUMP |
| 2 - ACCESSORY DRIVE BELT |
| 3 - GENERATOR |
| 4 - CRANKSHAFT PULLEY |
| 5 - LOWER IDLER PULLEY |
| 6 - CRANKSHAFT PULLEY |
| 7 - WATER PUMP PULLEY |

8 - ACCESSORY DRIVE BELT TENSIONER

9 - UPPER IDLER PULLEY

1. Raise vehicle on hoist.
2. Remove belt splash shield.
3. Remove accessory drive belt (2). See **Removal** .
4. Remove accessory drive belt tensioner mounting bolt. Remove accessory drive belt tensioner (8).

2.7L ENGINE

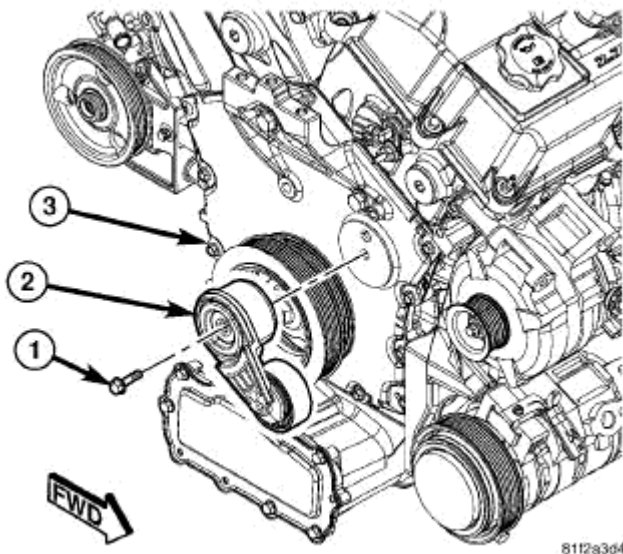


Fig. 37: ACCESSORY DRIVE BELT TENSIONER - 2.7L
Courtesy of CHRYSLER LLC

1 - BOLT

2 - ACCESSORY DRIVE BELT TENSIONER

3 - FRONT ENGINE COVER

WARNING: Because of high spring pressure, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly.

1. Remove accessory drive belt. See **Removal** .
2. Remove accessory drive belt tensioner bolt (1).
3. Remove accessory drive belt tensioner (2) from front engine cover (3).

3.5L ENGINE

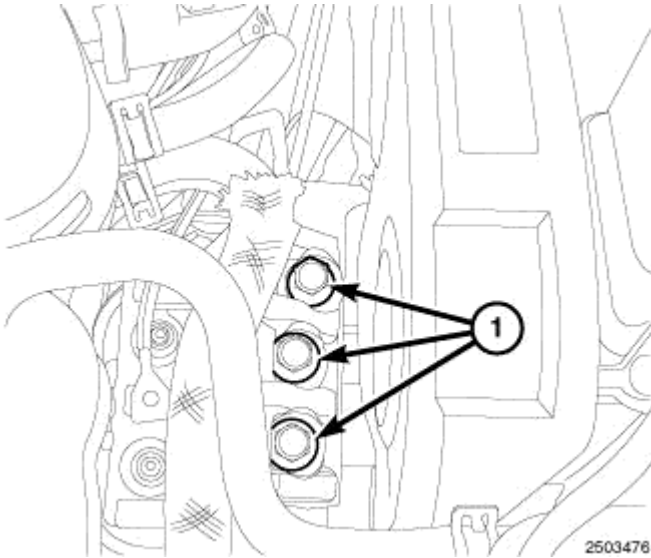


Fig. 38: ENGINE SUPPORT BRACKET BOLTS
Courtesy of CHRYSLER LLC

WARNING: Because of high spring pressure, do not attempt to disassemble automatic tensioner. Unit is serviced as an assembly.

1. Remove the passenger side engine support bracket bolts (1).

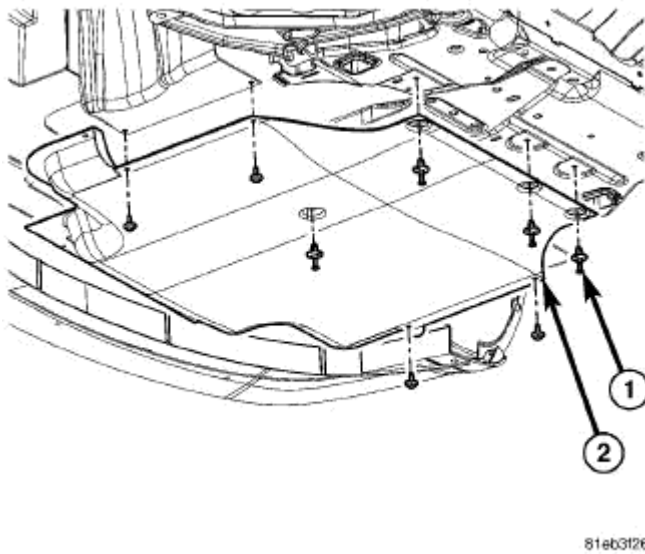


Fig. 39: BELLY PAN
Courtesy of CHRYSLER LLC

2. Raise and support the vehicle.
3. Remove the accessory drive belt. See **Removal** .

4. Remove the belly pan retainers (1).
5. Remove the belly pan (2).

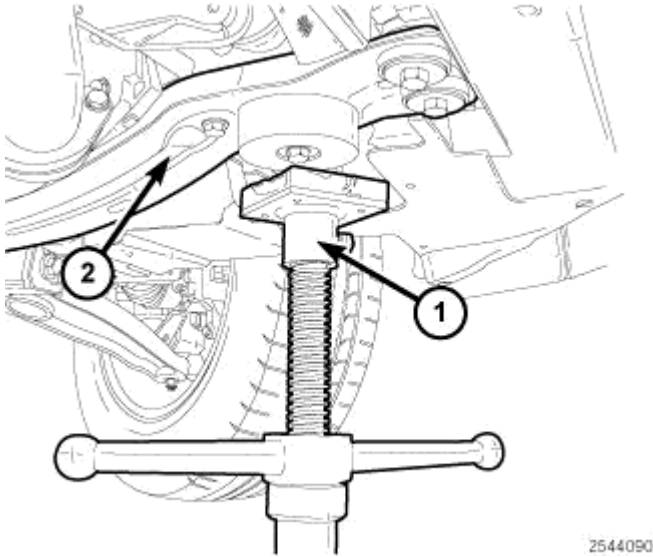


Fig. 40: ENGINE FORE/AFT CROSSMEMBER
 Courtesy of CHRYSLER LLC

6. Support the engine fore/aft crossmember (2) with an appropriate stand (1).

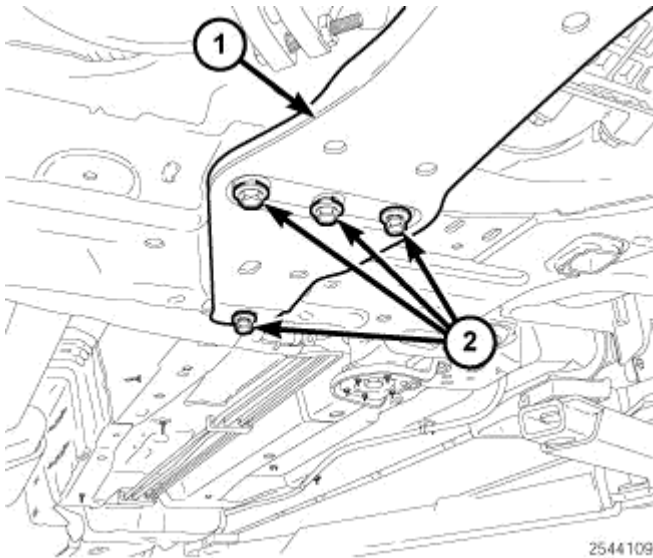


Fig. 41: REAR BOLTS & FORE/AFT CROSSMEMBER
 Courtesy of CHRYSLER LLC

7. Loosen the rear bolts (2) from the fore/aft crossmember (1).
8. Remove the front bolts from the fore/aft crossmember.

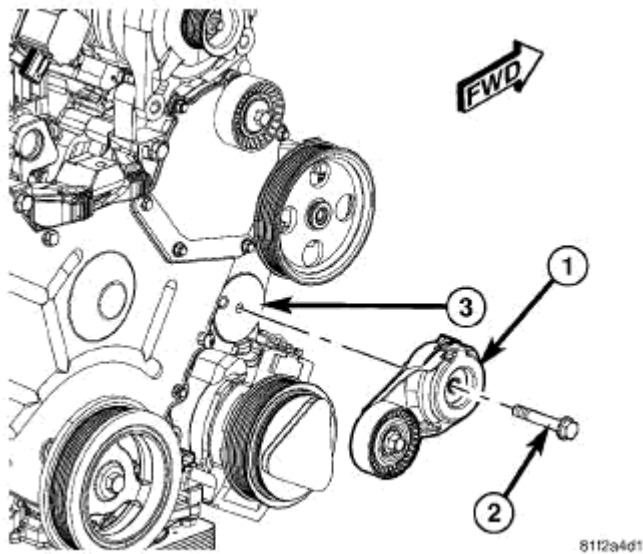


Fig. 42: ACCESSORY DRIVE BELT TENSIONER - 3.5L
Courtesy of CHRYSLER LLC

1 - ACCESSORY DRIVE BELT TENSIONER
2 - BOLT
3 - FRONT ENGINE COVER

9. Lower the stand supporting the fore/aft crossmember approximately 3/4" to 1".
10. Remove the tensioner assembly bolt (2).
11. Remove the accessory drive belt tensioner (1) from the vehicle.

2.0L DIESEL

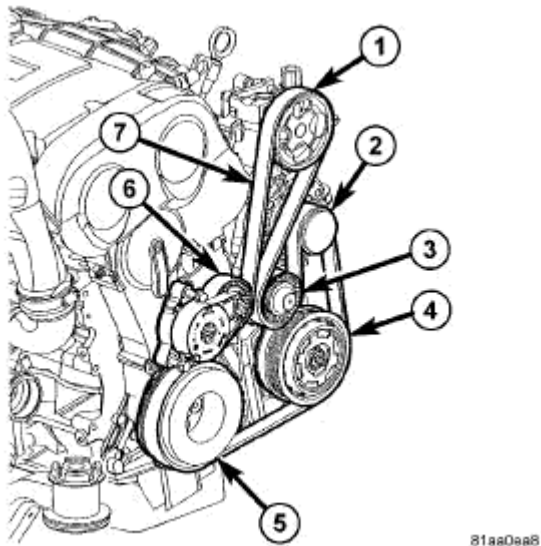
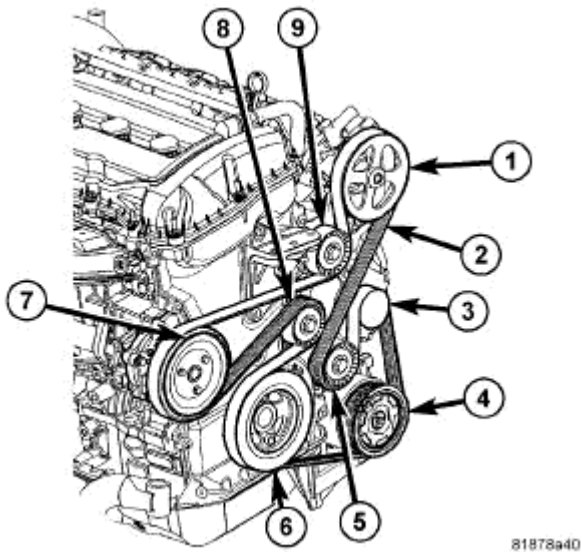


Fig. 43: 2.0L DIESEL ACCESSORY DRIVE BELT

Courtesy of CHRYSLER LLC

1 - P/S PULLEY
2 - GENERATOR PULLEY
3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Remove accessory drive belt. See **Removal** .
2. Remove accessory drive belt tensioner mounting bolts.
3. Remove accessory drive belt tensioner (6)

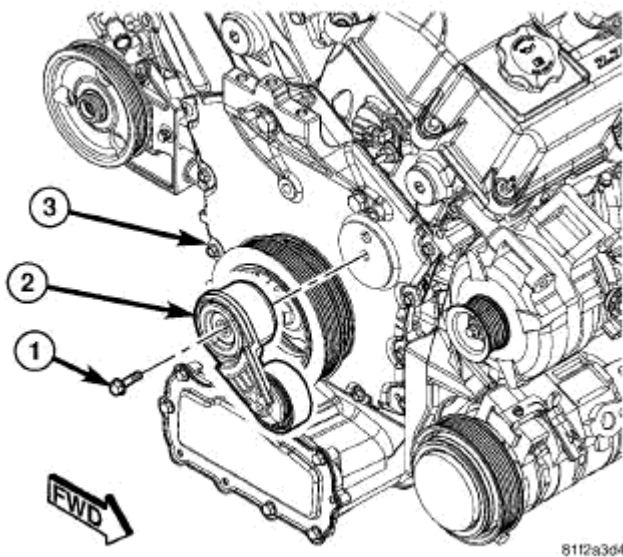
Installation**2.4L ENGINE****Fig. 44: ACCESSORY DRIVE BELT - WORLD ENGINE**

Courtesy of CHRYSLER LLC

1 - POWER STEERING PUMP
2 - ACCESSORY DRIVE BELT
3 - GENERATOR
4 - CRANKSHAFT PULLEY
5 - LOWER IDLER PULLEY
6 - CRANKSHAFT PULLEY

7 - WATER PUMP PULLEY
8 - ACCESSORY DRIVE BELT TENSIONER
9 - UPPER IDLER PULLEY

1. Position accessory drive belt tensioner (8) and install mounting bolt. Tighten bolt to 24 N.m (212 in. lbs.).
2. Install accessory drive belt (2). See **Installation** .
3. Install belt splash shield
4. Lower vehicle.

2.7L ENGINE**Fig. 45: ACCESSORY DRIVE BELT TENSIONER - 2.7L**

Courtesy of CHRYSLER LLC

1 - BOLT
2 - ACCESSORY DRIVE BELT TENSIONER
3 - FRONT ENGINE COVER

1. Position accessory drive belt tensioner (2).
2. Install tensioner mounting bolt (1). Tighten bolt (1) to 34 N.m (40 ft. lbs.).
3. Install accessory drive belt. See **Installation** .

3.5L ENGINE

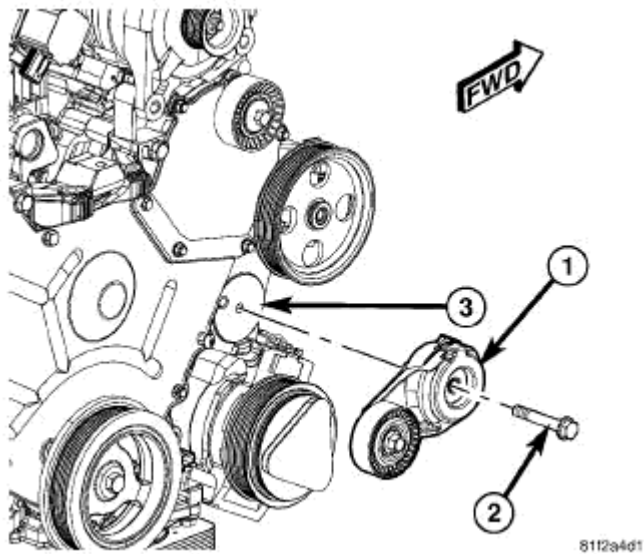


Fig. 46: ACCESSORY DRIVE BELT TENSIONER - 3.5L
 Courtesy of CHRYSLER LLC

1. Position the accessory drive belt tensioner (1) on the front engine cover (3).
2. Install the mounting bolt (2). Tighten the bolt to 41 N.m (30 ft. lbs.).

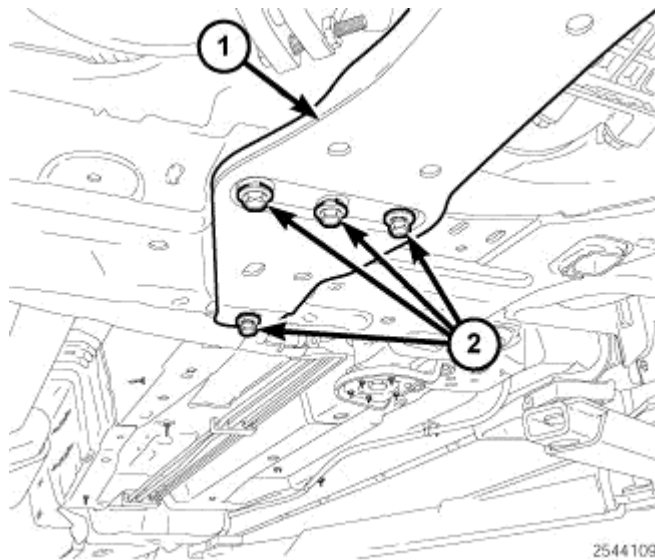
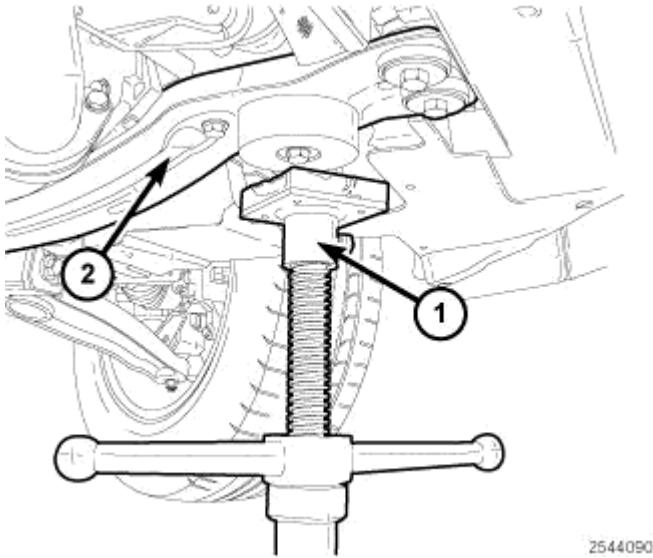


Fig. 47: REAR BOLTS & FORE/AFT CROSSMEMBER
 Courtesy of CHRYSLER LLC

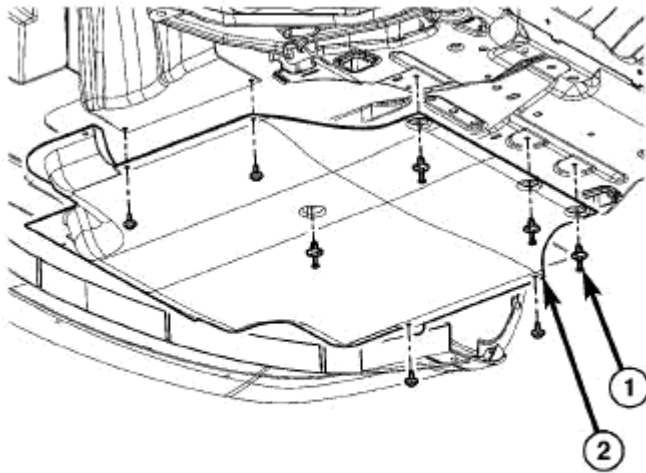
3. Raise the fore/aft crossmember (1) approximately 3/4" to 1".
4. Install the front fore/aft crossmember bolts. Tighten the bolts to 55 N.m (41 ft. lbs.).
5. Tighten the rear fore/aft crossmember bolts (2) to 55 N.m (41 ft. lbs.).



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Fig. 48: ENGINE FORE/AFT CROSSMEMBER
Courtesy of CHRYSLER LLC

6. Remove the stand (1) from the fore/aft crossmember (2).



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Fig. 49: BELLY PAN
Courtesy of CHRYSLER LLC

7. Install the belly pan (2).
8. Install accessory drive belt. See **Installation**

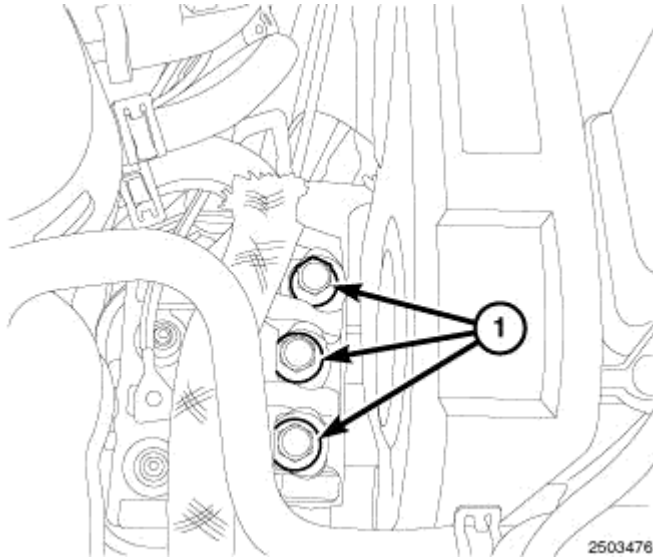


Fig. 50: ENGINE SUPPORT BRACKET BOLTS

Courtesy of CHRYSLER LLC

9. Lower the vehicle.
10. Install the three bolts (1) at the passenger side engine support bracket. Tighten the bolts to 45 N.m (33 ft. lbs.)

2.0L DIESEL

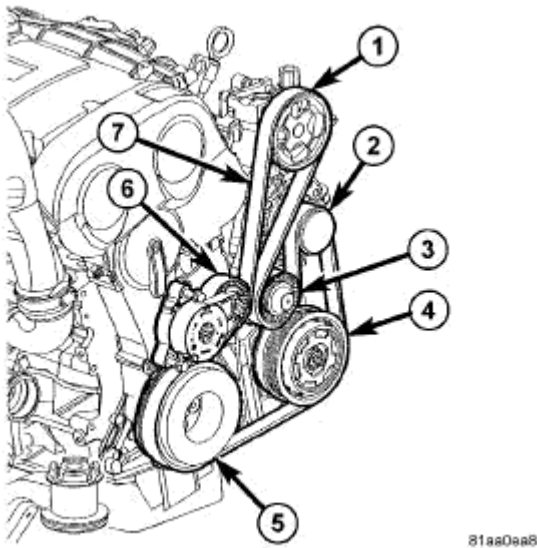


Fig. 51: 2.0L DIESEL ACCESSORY DRIVE BELT

Courtesy of CHRYSLER LLC

- | |
|----------------------|
| 1 - P/S PULLEY |
| 2 - GENERATOR PULLEY |

3 - IDLER PULLEY
4 - A/C COMPRESSOR
5 - CRANKSHAFT PULLEY
6 - ACCESSORY DRIVE BELT TENSIONER
7 - ACCESSORY DRIVE BELT

1. Position accessory drive belt tensioner (6).
2. Install mounting bolts. Tighten bolts to 28 N.m (250 in. lbs.).
3. Install accessory drive belt. See **Installation** .

ENGINE

BOTTLE, COOLANT RECOVERY

Description

NON-PRESSURE

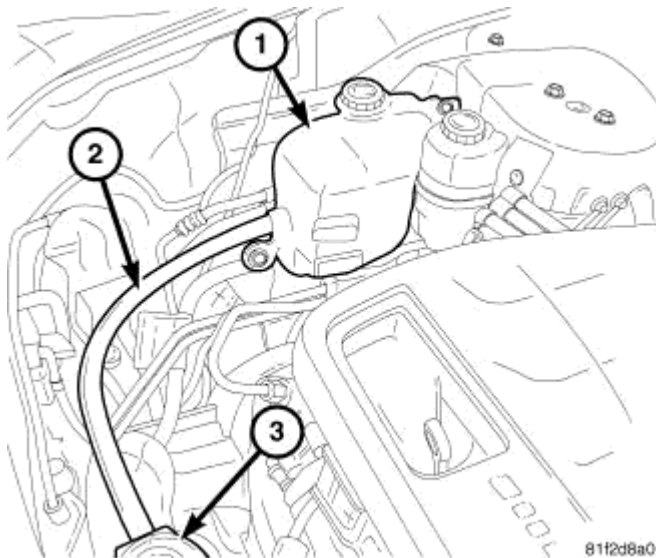
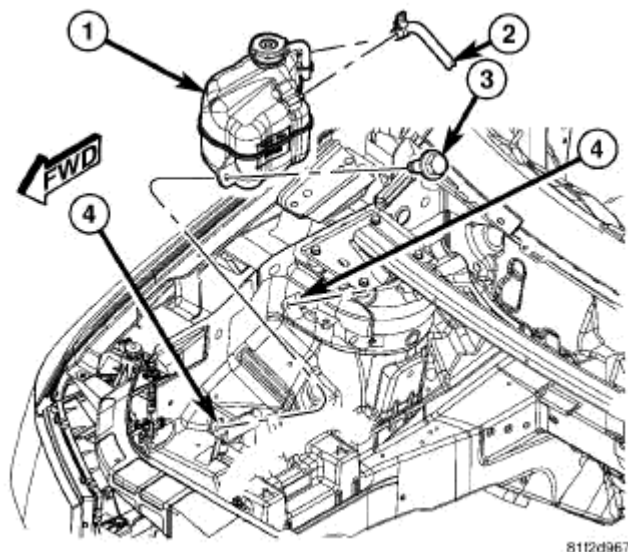


Fig. 52: NON-PRESSURE COOLANT RECOVERY CONTAINER
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER
2 - OVERFLOW HOSE
3 - RADIATOR PRESSURE CAP

The coolant recovery system used on 2.4L engine consists of a coolant recovery container and an overflow hose that is connected to the radiator. The coolant recovery container is mounted in the right side engine compartment.

PRESSURE SYSTEM**Fig. 53: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM****Courtesy of CHRYSLER LLC**

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM
2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

The coolant pressure container consists of a pressure chamber and a overflow chamber. The coolant pressure container is mounted in the right side engine compartment.

NOTE: Coolant will normally be in the pressure chamber side of the coolant bottle. The overflow chamber should normally be empty

Operation**NON-PRESSURE SYSTEM**

This system works in conjunction with the pressure cap to utilize thermal expansion and contraction of the coolant to keep the coolant free of trapped air. It provides a volume for expansion and contraction, provides a convenient and safe method for checking coolant level, and adjusting level at atmospheric pressure without removing the pressure cap. It also provides some reserve coolant to cover minor leaks and evaporation or boiling losses.

PRESSURE SYSTEM

The pressure chamber keeps the coolant free of trapped air, provides a volume for expansion and contraction, and provides a convenient and safe method for checking and adjusting coolant level at atmospheric pressure. It

also provides some reserve coolant to cover minor leaks, evaporation or boiling losses. The overflow chamber allows coolant recovery in case of an overheat.

Removal

NON-PRESSURE SYSTEM

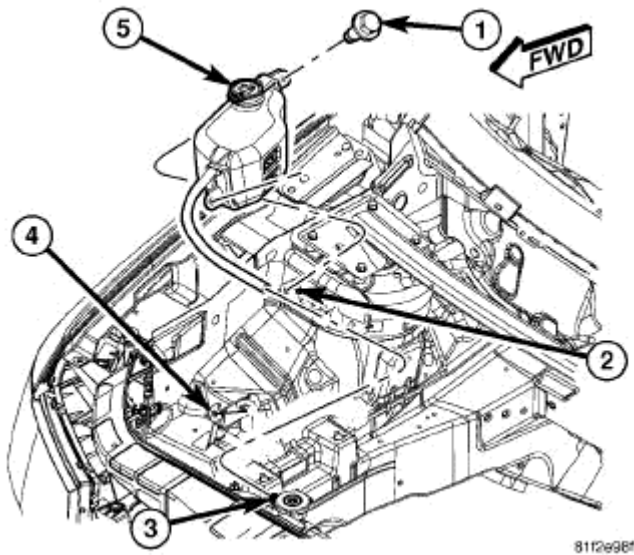


Fig. 54: COOLANT RECOVERY CONTAINER - NON-PRESSURE

Courtesy of CHRYSLER LLC

1 - BOLT
2 - OVERFLOW TUBE
3 - RADIATOR NIPPLE
4 - MOUNTING TAB
5 - COOLANT RECOVERY CONTAINER

1. Disconnect the over flow tube (2) from radiator nipple (3).
2. Remove coolant recovery container mounting bolts (1).
3. Remove coolant recovery container (5).

PRESSURE SYSTEM

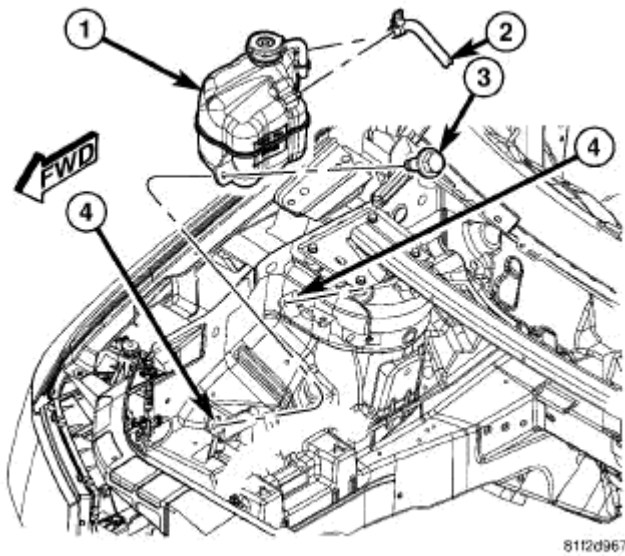


Fig. 55: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM
2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

1. Drain coolant below the coolant recovery container level. See **Standard Procedure** .
2. Disconnect the return hose from coolant recover container (1).
3. Remove coolant recovery container mounting bolts (3).
4. Disconnect supply hose (2) from the bottom of the coolant recovery container (1).
5. Remove coolant recovery container (1).

Installation

NON-PRESSURE SYSTEM

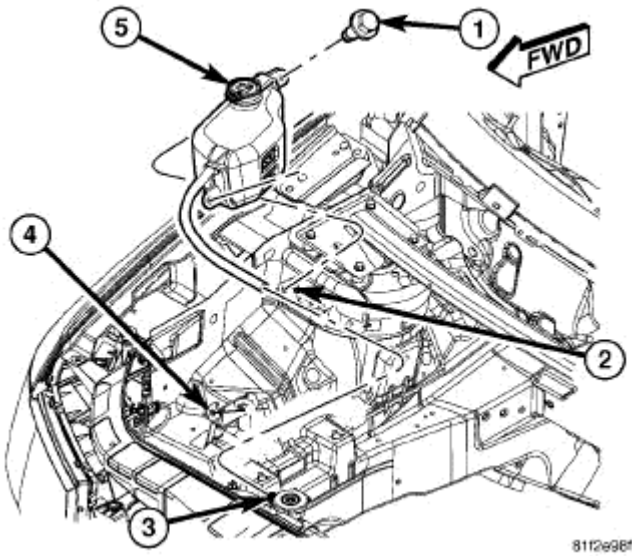


Fig. 56: COOLANT RECOVERY CONTAINER - NON-PRESSURE
Courtesy of CHRYSLER LLC

1 - BOLT
2 - OVERFLOW TUBE
3 - RADIATOR NIPPLE
4 - MOUNTING TAB
5 - COOLANT RECOVERY CONTAINER

1. Connect the overflow tube (2) to the radiator nipple (3).
2. Position coolant recovery container on mounting tab (4). Install mounting bolts (1).
3. Tighten mounting bolts to 10 N.m (89 in. lbs.).
4. Fill cooling system. See **Standard Procedure** .

PRESSURIZED SYSTEM

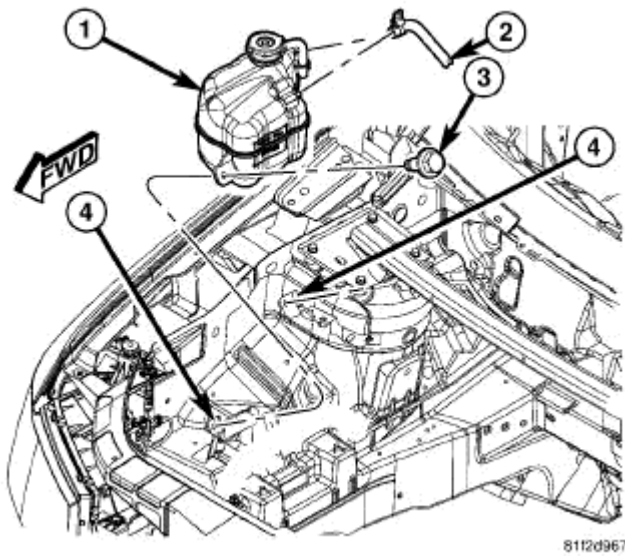


Fig. 57: COOLANT RECOVER CONTAINER - PRESSURE SYSTEM
Courtesy of CHRYSLER LLC

1 - COOLANT RECOVERY CONTAINER - PRESSURE SYSTEM
2 - SUPPLY HOSE
3 - MOUNTING BOLT
4 - COOLANT RECOVERY CONTAINER MOUNTING TABS

1. Connect hose (3) to coolant recovery container (4).
2. Install coolant recovery container (4) in mounting position and install mounting bolts (1) Tighten bolts to 10 N.m (89 in. lbs.).
3. Connect return hose (2) to the coolant recovery container (4).
4. Fill cooling system. See **Standard Procedure** .

CAP, RADIATOR

Description

DESCRIPTION

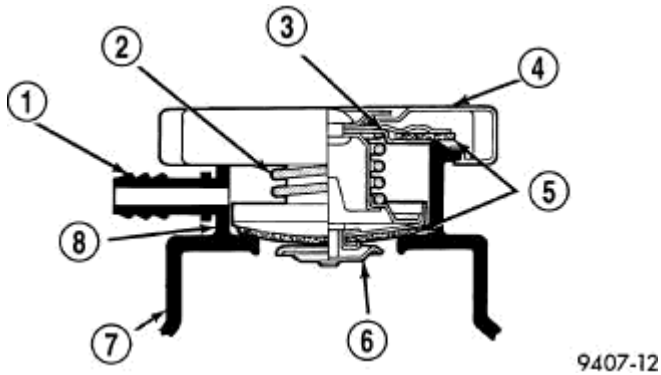


Fig. 58: Cooling System Pressure Cap
 Courtesy of CHRYSLER LLC

- 1 - OVERFLOW NIPPLE
- 2 - MAIN SPRING
- 3 - GASKET RETAINER
- 4 - STAINLESS-STEEL SWIVEL TOP
- 5 - RUBBER SEALS
- 6 - VENT VALVE
- 7 - COOLANT OUTLET CONNECTOR (2.0L/2.4L)/PRESSURE CONTAINER (2.7L)
- 8 - FILLER NECK

The cooling system is equipped with a pressure cap that releases built up pressure, maintaining a range of 97-124 kPa (14-18 psi).

There is also a vent valve in the center of the cap. This valve also opens when coolant is cooling and contracting, allowing coolant to return to radiator from coolant reserve/recovery system container by vacuum through connecting hose. **If valve is stuck shut, the radiator hoses will be collapsed on cool down. Clean the vent valve to ensure proper sealing when boiling point is reached.**

Operation

OPERATION

The pressure cap allows the cooling system to operate at higher than atmospheric pressure. The higher pressure raises the coolant boiling point; this allows increased radiator cooling capacity.

The gasket in the cap seals the filler neck, so that vacuum can be maintained, allowing coolant to be drawn back into the cooling system from the reserve container.

Diagnosis and Testing

RADIATOR PRESSURE CAP TESTING

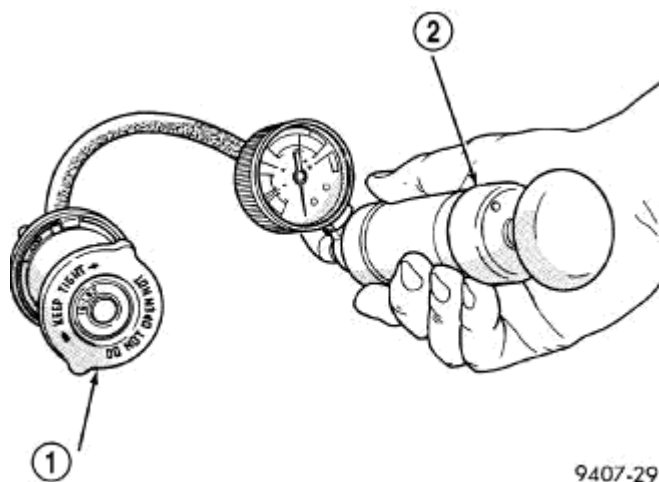


Fig. 59: Testing Cooling System Pressure Cap
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - PRESSURE CAP
2 - PRESSURE TESTER |
|---|

CAUTION: Vehicles equipped with 2.4L engines use a different pressure cap than vehicles equipped with 2.7L engines. The pressure caps are NOT interchangeable. Verify proper pressure cap part number.

Dip the pressure cap in water. Clean any deposits off the vent valve or its seat and apply cap to end of the Pressure Cap Test Adaptor that is included with the Cooling System Tester 7700. Working the plunger, bring the pressure to 104 kPa (15 psi) on the gauge. If the pressure cap fails to hold pressure of at least 97 kPa (14 psi), replace the pressure cap.

CAUTION: The Cooling System Tester Tool is very sensitive to small air leaks that will not cause cooling system problems. A pressure cap that does not have a history of coolant loss should not be replaced just because it leaks slowly when tested with this tool. Add water to the tool. Turn tool upside down and recheck pressure cap to confirm that cap is bad.

If the pressure cap tests properly while positioned on Cooling System Tester but will not hold pressure or vacuum when positioned on the filler neck. Inspect the filler neck and cap top gasket for irregularities that may prevent the cap from sealing properly.

PRESSURE RELIEF TESTING

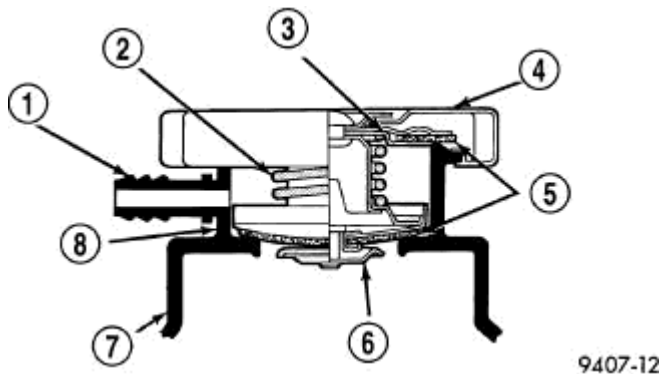


Fig. 60: Cooling System Pressure Cap
Courtesy of CHRYSLER LLC

- 1 - OVERFLOW NIPPLE
- 2 - MAIN SPRING
- 3 - GASKET RETAINER
- 4 - STAINLESS-STEEL SWIVEL TOP
- 5 - RUBBER SEALS
- 6 - VENT VALVE
- 7 - COOLANT OUTLET CONNECTOR (2.0L/2.4L)/PRESSURE CONTAINER (2.7L)
- 8 - FILLER NECK

WARNING: The warning words "DO NOT OPEN HOT" on the pressure cap is a safety precaution. When hot, the cooling system builds up pressure. To prevent scalding or other injury, the pressure cap should not be removed while the system is hot and/or under pressure.

CAUTION: Vehicles equipped with 2.4L engines use a different pressure cap than vehicles equipped with 2.7L engines. The pressure caps are NOT interchangeable. Verify proper pressure cap part number.

The pressure cap upper gasket to filler neck seal can be checked by removing the overflow hose at the filler neck overflow nipple. Attach the radiator pressure tester to the **filler neck overflow nipple**, and pump air into the system. The pressure cap upper gasket should relieve pressure at 69-124 kPa (10-18 psi), and hold pressure at 55 kPa (8 psi) minimum.

There is no need to remove the pressure cap at any time **except** for the following purposes:

- Check and adjust coolant freeze point
- Refill system with new coolant
- Conducting service procedures
- Checking for leaks

WARNING: If vehicle has been run recently, wait 15 minutes before removing cap.

Place a shop towel over the cap, and without pushing down, rotate it counterclockwise to the first stop. Allow fluids to escape through the overflow tube. When the system stops pushing coolant and steam into the coolant recovery tank and pressure drops, push down on the cap and remove it completely. Squeezing the radiator inlet hose with a shop towel (to check pressure) before and after turning to the first stop is recommended.

Cleaning

CLEANING

Use only a mild soap to clean the pressure cap.

Inspection

INSPECTION

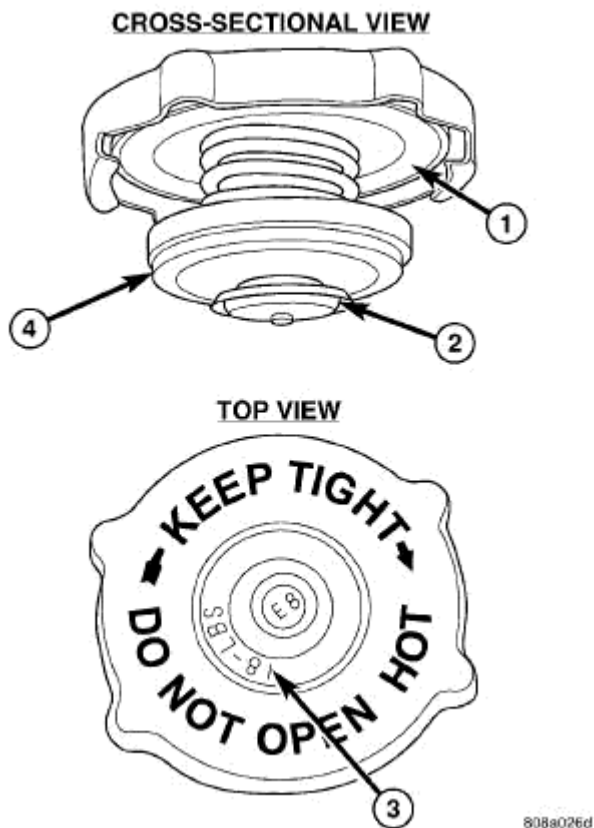


Fig. 61: Cooling System Pressure Cap - Typical
Courtesy of CHRYSLER LLC

1 - FILLER NECK SEAL

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

2 - VACUUM VENT VALVE

3 - PRESSURE RATING

4 - PRESSURE VALVE

Hold the cap in your hand, **right side up** . The vent valve at the bottom of the cap should fall open. Turn the cap upside down. The vent valve should close.

Replace the cap for any of the following conditions:

- Rubber gasket has swollen, preventing the valve from opening.
- Any light can be seen between the vent valve and the rubber gasket (with cap upside down).
- Gasket on the bottom of the cap shows noticeable thinning.
- Cap has been through more than one engine overheat.

COOLANT

Description

ENGINE COOLANT

GAS ENGINES

WARNING: Antifreeze is an ethylene glycol based coolant and is harmful if swallowed or inhaled. If swallowed, drink two glasses of water and induce vomiting. If inhaled, move to fresh air area. Seek medical attention immediately. Do not store in open or unmarked containers. Wash skin and clothing thoroughly after coming in contact with ethylene glycol. Keep out of reach of children. Dispose of glycol based coolant properly, contact your government agency for location of collection center in your area. Do not open a cooling system when the engine is at operating temperature or hot under pressure, personal injury can result. Avoid radiator cooling fan when engine compartment related service is performed, personal injury can result.

CAUTION: Use of propylene glycol based coolants is not recommended, as they provide less freeze protection and less boiling protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769), or the equivalent ethylene glycol based coolant with hybrid organic corrosion inhibitors (called HOAT, for Hybrid Organic Additive Technology) is recommended. This coolant offers the best engine cooling without corrosion when mixed with 50% Ethylene

Glycol and 50% distilled water to obtain a freeze point of -37°C (-35°F). If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

The green coolant **MUST NOT BE MIXED** with the orange or magenta coolants. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CAUTION: Mopar® Antifreeze/Coolant, 5 Year/100,000 Mile Formula (MS-9769) may not be mixed with any other type of antifreeze. Doing so will reduce the corrosion protection and may result in premature water pump seal failure. If non-HOAT coolant is introduced into the cooling system in an emergency, it should be replaced with the specified coolant as soon as possible.

DIESEL ENGINE

CAUTION: Use of propylene glycol based coolants is not recommended, as they provide less freeze protection and less boiling protection.

The cooling system is designed around the coolant. The coolant must accept heat from engine metal, in the cylinder head area near the exhaust valves and engine block. Then coolant carries the heat to the radiator where the tube/fin radiator can transfer the heat to the air.

The use of aluminum cylinder blocks, cylinder heads, and water pumps requires special corrosion protection. Glysantin G 30-91 Antifreeze/Coolant, 5 Year/150,000 Mile Formula (ASTM D3306), or the equivalent ethylene glycol based coolant. This coolant offers the best engine cooling without corrosion when mixed with 50% coolant and 50% distilled water to obtain a freeze point of -36°C (-34°F). It is dyed purple to distinguish its unique chemistry from traditional green and yellow silicate coolants. If it loses color or becomes contaminated, drain, flush, and replace with fresh properly mixed coolant solution.

The purple coolant **MUST NOT BE MIXED** with the orange, green or magenta coolants. When replacing coolant the complete system flush must be performed before using the replacement coolant.

CAUTION: Glysantin G 30-91 Antifreeze/Coolant, 5 Year/150,00 Mile Formula (ASTM D3306) may not be mixed with any other type of antifreeze. Doing so will reduce the corrosion protection and may result in premature water pump seal failure.

Operation

COOLANT

Coolant flows through the engine block absorbing the heat from the engine, then flows to the radiator where the cooling fins in the radiator transfers the heat from the coolant to the atmosphere. During cold weather the ethylene-glycol or coolant prevents water present in the cooling system from freezing within temperatures indicated by mixture ratio of coolant to water.

Diagnosis and Testing

COOLANT CONCENTRATION TESTING

Check coolant concentration when any additional coolant is added to the system, or after a coolant drain, flush and refill. Use of a hydrometer or Refractometer Tool 8286, refractometer can be used to test coolant concentration.

A hydrometer tests the amount of glycol in a mixture by measuring the specific gravity of the mixture. The higher the concentration of ethylene glycol, the larger the number of balls that will float, and the higher the freeze protection (up to a maximum of 60% by volume glycol).

A Refractometer Tool 8286 tests the amount of glycol in a coolant mixture by measuring the amount a beam of light bends as it passes through the fluid.

Some coolant manufacturers use other types of glycols into their coolant formulations. Propylene glycol is the most common new coolant. However, propylene glycol based coolants do not provide the same freezing protection and corrosion protection and are not recommended.

CAUTION: Do not mix types of coolant - corrosion protection will be severely reduced.

COOLER, EGR

Description

DESCRIPTION

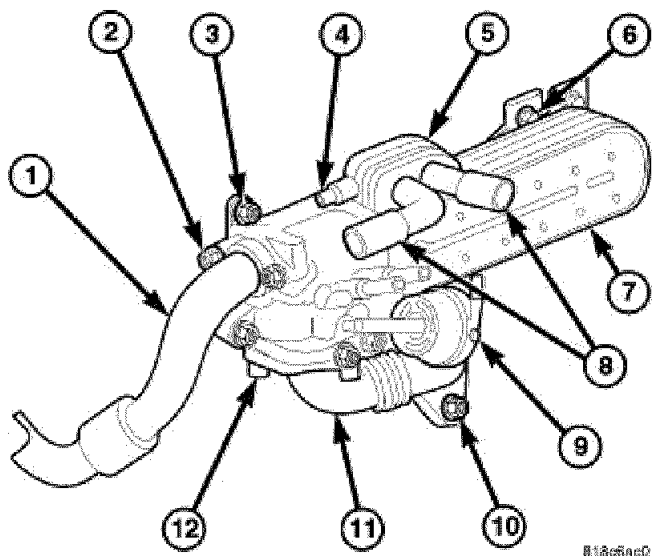


Fig. 62: EGR COOLER

Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - EGR COOLER TO EGR VALVE TUBE |
| 2 - MOUNTING SCREWS |
| 3 - EGR COOLER MOUNTING SCREW |
| 4 - MOUNTING SCREW |
| 5 - EGR COOLER BODY |
| 6 - EGR COOLER MOUNTING NUT |
| 7 - EGR COOLER |
| 8 - INLET TUBES |
| 9 - VACUUM CONTROL UNIT |
| 10 - EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT |
| 11 - EGR COOLER TO EXHAUST MANIFOLD TUBE |
| 12 - MOUNTING SCREW |

The EGR cooler (7) cools recirculated exhaust gasses to reduce combustion temperature and a greater mass of exhaust gases can thus be circulated. There is less nitrogen oxides as a result.

The EGR cooler (7) allows the engine and catalytic converter to reach their operating temperature quickly.

Removal

REMOVAL

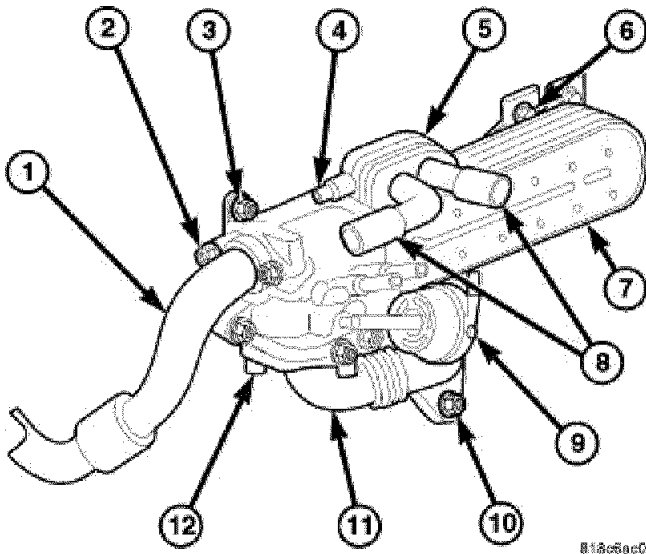


Fig. 63: EGR COOLER

Courtesy of CHRYSLER LLC

- | |
|----------------------------------|
| 1 - EGR COOLER TO EGR VALVE TUBE |
| 2 - MOUNTING SCREWS |
| 3 - EGR COOLER MOUNTING SCREW |

- 4 - MOUNTING SCREW
- 5 - EGR COOLER BODY
- 6 - EGR COOLER MOUNTING NUT
- 7 - EGR COOLER
- 8 - INLET TUBES
- 9 - VACUUM CONTROL UNIT
- 10 - EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT
- 11 - EGR COOLER TO EXHAUST MANIFOLD TUBE
- 12 - MOUNTING SCREW

1. Remove engine cover. Refer to **Engine - Removal** .
2. Drain cooling system. See **Standard Procedure** .
3. Remove EGR cooler coolant hoses (8).
4. Remove EGR cooler to exhaust manifold tube (11).
5. Remove EGR cooler to EGR valve tube (1).
6. Remove EGR cooler mounting nuts (6).
7. Remove EGR cooler (7).
8. Remove the bypass valve mounting screws (3).
9. Separate the bypass valve assembly from the EGR cooler body (5).

Installation

INSTALLATION

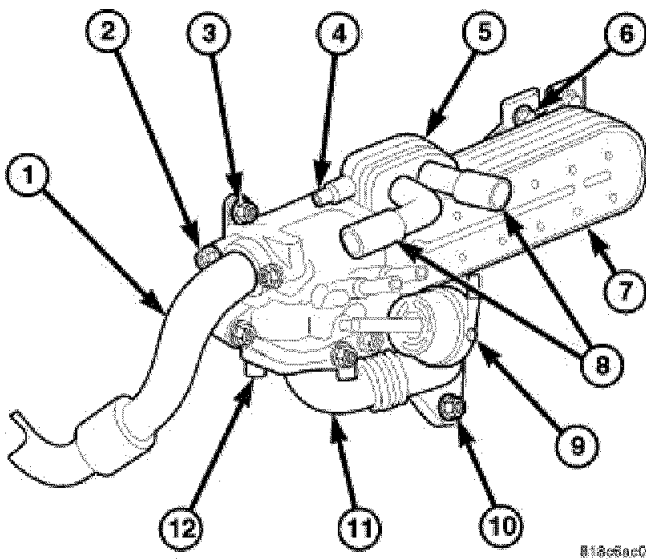


Fig. 64: EGR COOLER

Courtesy of CHRYSLER LLC

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

1 - EGR COOLER TO EGR VALVE TUBE
2 - MOUNTING SCREWS
3 - EGR COOLER MOUNTING SCREW
4 - MOUNTING SCREW
5 - EGR COOLER BODY
6 - EGR COOLER MOUNTING NUT
7 - EGR COOLER
8 - INLET TUBES
9 - VACUUM CONTROL UNIT
10 - EGR COOLER TO EXHAUST MANIFOLD TUBE MOUNTING NUT
11 - EGR COOLER TO EXHAUST MANIFOLD TUBE
12 - MOUNTING SCREW

1. Using a new gasket, position the bypass valve assembly to the EGR cooler body (5). Tighten screws to 10 N.m (88 in. lbs.).
2. Position EGR cooler (7) and install mounting screws. Tighten to 10 N.m (88 in. lbs.).
3. Install EGR cooler to exhaust manifold tube (11). Tighten bolts to 20 N.m (14 ft. lbs.) and nuts to 20 N.m (14 ft. lbs.).
4. Install EGR cooler to EGR valve tube (1). Tighten bolts to 20 N.m (14 ft. lbs.).
5. Install coolant hoses.
6. Install vacuum line.
7. Fill cooling system. See **Standard Procedure** .
8. Install engine cover. Refer to **Engine - Installation** .

DRAINCOCK, RADIATOR

Removal

DRAINCOCK

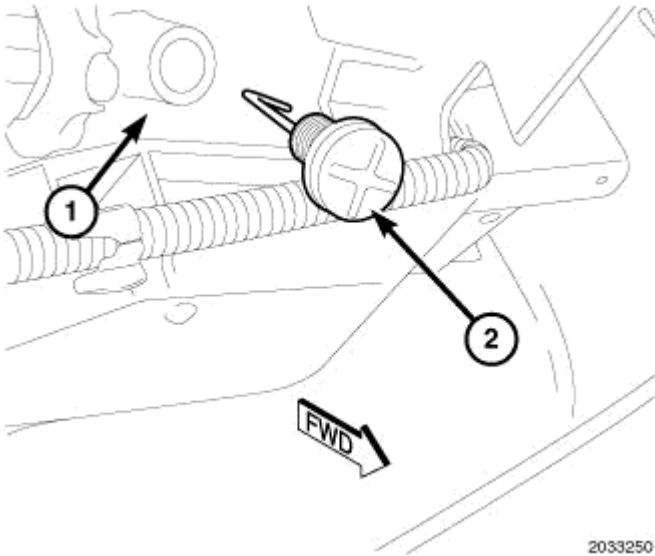


Fig. 65: DRAINCOCK & RADIATOR TANK

Courtesy of CHRYSLER LLC

CAUTION: Use of pliers on draincock is not recommended. Damage may occur to radiator or draincock.

NOTE: It is not necessary to remove draincock during a routine coolant drain.

1. Remove belly pan (if equipped).
2. Drain the cooling system. See Standard Procedure .
3. Open the draincock (2) by turning it counterclockwise until it stops.
4. Turn the draincock (2) back (clockwise) 1/8 turn.
5. Pull the draincock (2) from the radiator tank (1).

Installation

DRAINCOCK

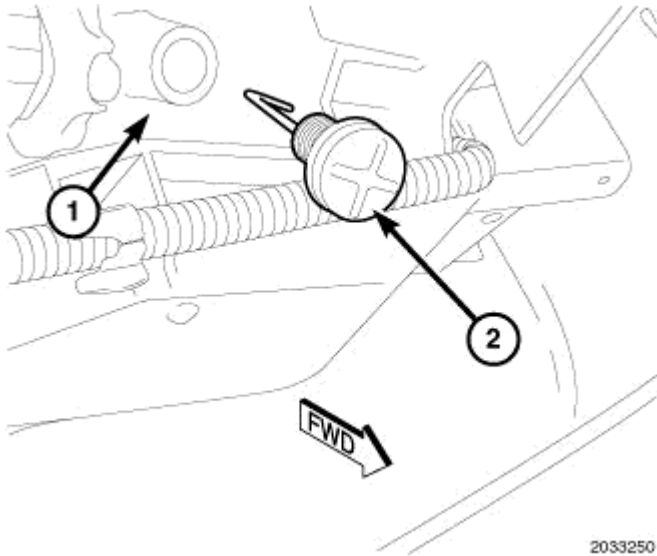


Fig. 66: DRAINCOCK & RADIATOR TANK

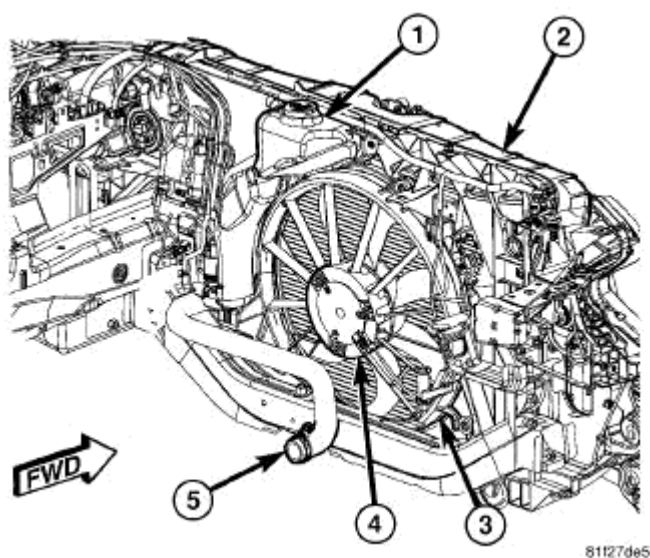
Courtesy of CHRYSLER LLC

1. Align draincock (2) stem to radiator tank (1) opening.
2. Push draincock (2) into the radiator tank (1) opening.
3. Tighten the draincock (2) by turning clockwise until it stops.
4. Fill the cooling system. See **Standard Procedure** .
5. Install belly pan (if equipped).

FAN, COOLING

Description

DESCRIPTION

**Fig. 67: COOLING SYSTEM - OVERVIEW**

Courtesy of CHRYSLER LLC

- | |
|---------------------------------|
| 1 - WINDSHIELD WASHER RESERVOIR |
| 2 - UPPER SUPPORT |
| 3 - FAN SHROUD |
| 4 - FAN MOTOR |
| 5 - LOWER RADIATOR HOSE |

The radiator fan module includes a support shroud (2) with an electrically driven motor (1) with a fan blade. The radiator fan module is attached to the radiator.

Operation

OPERATION

The radiator fans are controlled by the Powertrain Control Module (PCM) which energizes a high speed or low speed fan relay. The electric motor drives the cooling fan to produce air flow across the radiator fins.

Diagnosis and Testing

RADIATOR FAN CONTROL

Fan control is accomplished three ways. The fan runs when the air conditioning pressure reaches a set pressure, refer to RADIATOR FAN OPERATION charts. In addition to this control, the fan is turned on by the temperature of the coolant which is sensed by the coolant temperature sensor which sends the message to the Powertrain Control Module (PCM). The PCM turns on the fan through a fan relay. On models equipped with automatic transmission, a transmission fluid thermistor may have some influences on fan operation. See **WIRING HARNESS - SERVICE INFORMATION** for circuitry and diagnostics provided.

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

The Powertrain Control Module (PCM) provides fan control for the following conditions:

- The fan will not run during cranking until the engine starts no matter what the coolant temperature is.
- Fan will run when the air conditioning clutch is engaged, and once set compressor head pressure is reached. See charts.
- Fan will run according to the following information charts.

RADIATOR FAN OPERATION - 2.4L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	Low	High	N/A	N/A
Fan On:	104°C (219°F)	110°C (230°F)	N/A	N/A
Fan Off:	99°C (210°F)	105°C (221°F)	N/A	N/A
A/C On	Low	High	Low	High
Fan On:	99°C (210°F)	110°C (230°F)	1,448 Kpa (210 psi)	1,718 Kpa (249 psi)
Fan Off:	93°C (199°F)	105°C (221°F)	1,207 Kpa (175 Psi)	1,585 Kpa (229 Psi)

EATX Fluid Temperature		Low Speed	High Speed
Fan On:		109°C (228°F)	111°C (232°F)
Fan Off:		104°C (220°F)	109°C (228°F)

RADIATOR FAN OPERATION - 2.7L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	Low	High	N/A	N/A
Fan On:	104°C (220°F)	110°C (230°F)	N/A	N/A
Fan Off:	98°C (208°F)	105°C (221°F)	N/A	N/A
A/C On	Low	High	Low	High
Fan On:	99°C (210°F)	110°C (230°F)	1,448 Kpa (210 psi)	1,718 Kpa (249 psi)
Fan Off:	93°C (199°F)	105°C (221°F)	1,207 Kpa (175 psi)	1,585 kpa (229 psi)

EATX Fluid Temperature		Low Speed	High Speed
Fan On:		109°C (228°F)	111°C (232°F)
Fan Off:		104°C (220°F)	109°C (228°F)

RADIATOR FAN OPERATION - 3.5L ENGINE

Radiator Fan Control			A/C Pressure	
A/C Off	Low	High	N/A	N/A
Fan On:	102°C (215°F)	104°C (219°F)	N/A	N/A
Fan Off:	98°C (208°F)	100°C (212°F)	N/A	N/A

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

A/C On	Low	High	Low	High
Fan On:	102°C (215°F)	104°C (219°F)	1,526 Kpa (221 psi)	1,932 Kpa (280 psi)
Fan Off:	98°C (208°F)	100°C (212°F)	1,246 Kpa (180 psi)	1,666 Kpa (224 psi)

EATX Fluid Temperature	Low Speed	High Speed
Fan On:	102°C (215°F)	110°C (230°F)
Fan Off:	97°C (206°F)	107°C (224°F)

ELECTRIC FAN MOTOR TEST

Refer to the appropriate Diagnostic Service Information for testing the fan motor with the scan tool.

For wiring diagrams of the fan motor systems refer to **WIRING HARNESS - SERVICE INFORMATION** .

Removal

REMOVAL

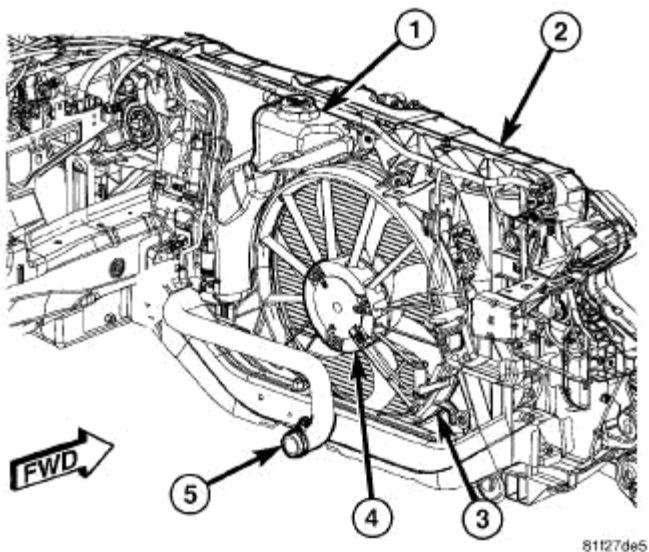


Fig. 68: COOLING SYSTEM - OVERVIEW

Courtesy of CHRYSLER LLC

- | |
|---------------------------------|
| 1 - WINDSHIELD WASHER RESERVOIR |
| 2 - UPPER SUPPORT |
| 3 - FAN SHROUD |
| 4 - FAN MOTOR |
| 5 - LOWER RADIATOR HOSE |

1. Disconnect and isolate negative battery cable.
2. Remove windshield washer reservoir.
3. Drain cooling system below level of the upper radiator hose. See **Standard Procedure** .
4. Remove upper radiator hose at radiator and position aside.
5. Disconnect radiator fan electrical connector.
6. Remove fasteners and un-clip radiator fan assembly from radiator.
7. Remove radiator fan assembly by lifting upward.

Inspection

INSPECTION

Inspect fan blades for damage. If the fan blades are warped, cracked, or otherwise damaged, it must be replaced with **only** the recommended replacement part for adequate strength, performance and safety.

Check fan motor operation. If fan motor is inoperative, and the fan blades are not damaged, the fan motor can be replaced separately.

Installation

INSTALLATION

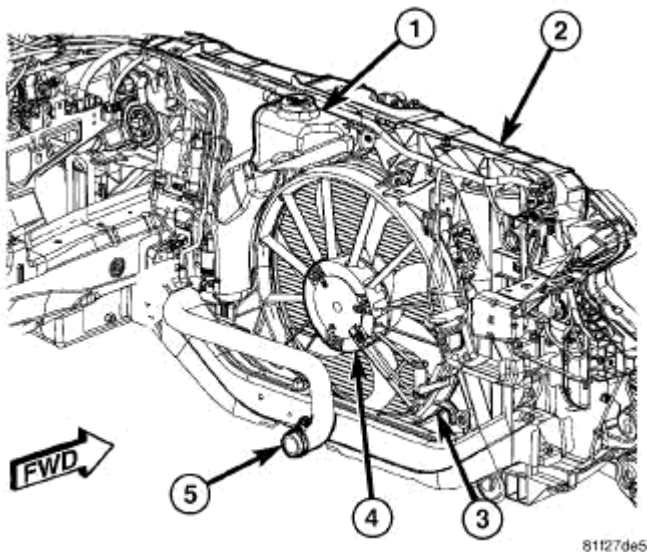


Fig. 69: COOLING SYSTEM - OVERVIEW

Courtesy of CHRYSLER LLC

- | |
|---------------------------------|
| 1 - WINDSHIELD WASHER RESERVOIR |
| 2 - UPPER SUPPORT |
| 3 - FAN SHROUD |

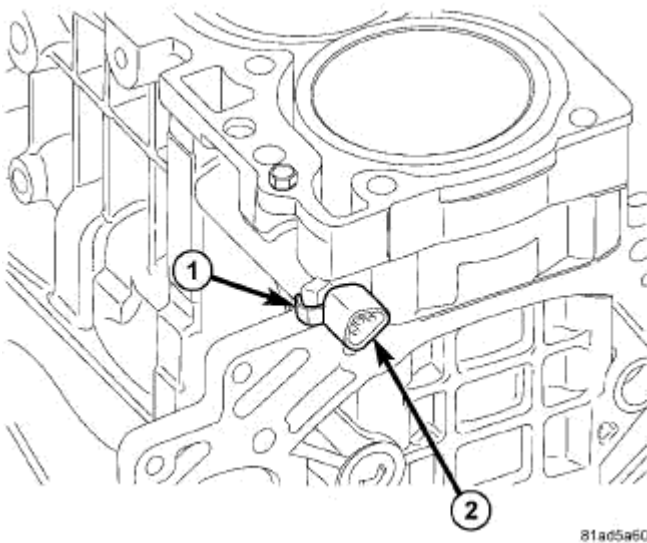
4 - FAN MOTOR

5 - LOWER RADIATOR HOSE

1. Position radiator fan into retaining clips.
2. Install mounting bolts. Tighten bolts to 35 N.m (25 ft. lbs.)
3. Connect radiator fan electrical connector.
4. Install windshield washer reservoir.
5. Install upper radiator hose at radiator.
6. Fill cooling system. See **Standard Procedure**.
7. Connect negative battery cable.

HEATER, ENGINE BLOCK**Description**

2.4L

**Fig. 70: BLOCK HEATER 2.4L ENGINE**

Courtesy of CHRYSLER LLC

1 - RETAINING CLIP

2 - BLOCK HEATER

CAUTION: The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.

The block heater is operated by ordinary house current (110 Volt A.C.) through a power cord and connector

located in the engine compartment. The heater is mounted in a bore in the engine block and held in place by a retaining clip.

2.7L

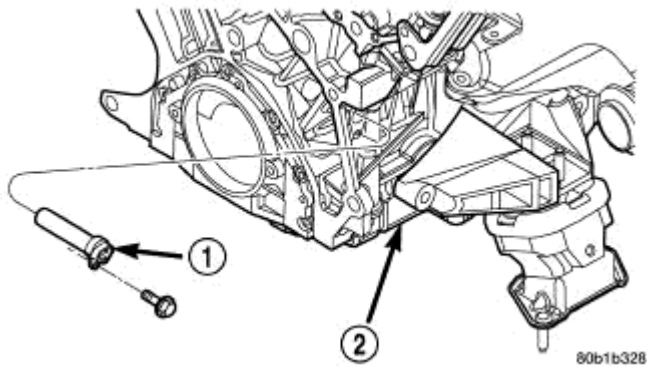


Fig. 71: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - BLOCK HEATER
2 - ENGINE - RIGHT SIDE |
|---|

The engine block heater is mounted in the cylinder block, near the right rear corner. The block heater is a dry cylinder type design and is powered by 110 volt AC. **The power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds and become damaged.**

Operation

OPERATION

When power is applied (110 volt A.C.) to the block heater, the heating element transfers heat through the aluminum engine block and into the coolant without directly penetrating the cooling system.

Diagnosis and Testing

ENGINE BLOCK HEATER TESTING

If unit does not operate, test power cord for continuity with a 110-volt voltmeter or 110-volt test light. Test heater element continuity with an ohmmeter or 12-volt test light.

Removal

2.4L

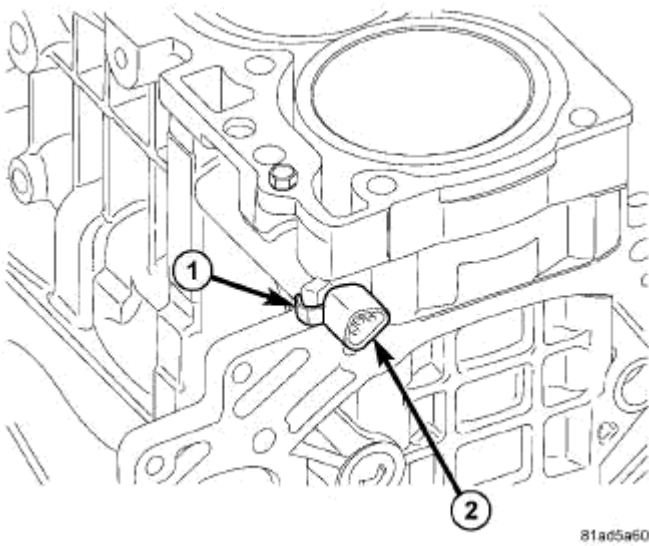


Fig. 72: BLOCK HEATER 2.4L ENGINE
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - RETAINING CLIP
2 - BLOCK HEATER |
|--|

1. Detach power cord plug from block heater.
2. Unclip retainer clip. Remove block heater assembly.

2.7L

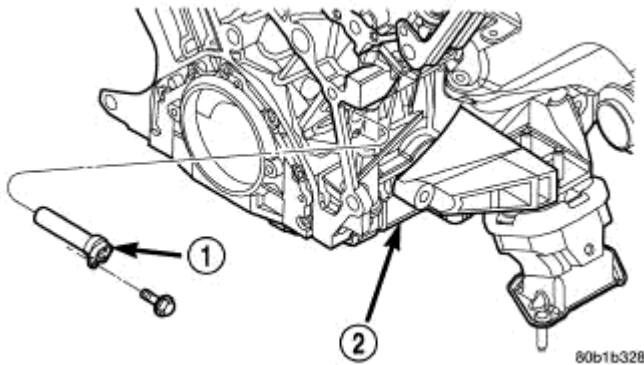


Fig. 73: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - BLOCK HEATER
2 - ENGINE - RIGHT SIDE |
|---|

1. Raise vehicle on hoist.

2. Detach power cord plug from heater.
3. Remove block heater attaching screw located below heater terminals.
4. Remove block heater from cylinder block.

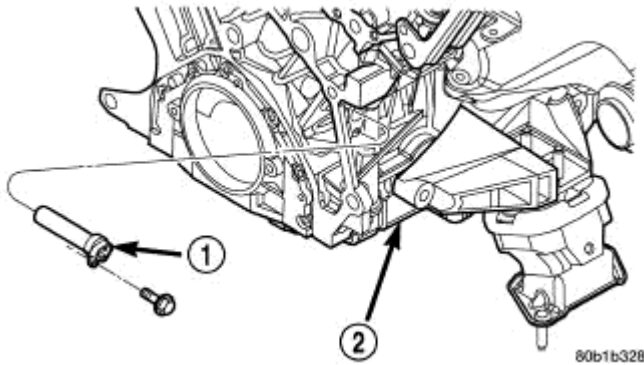
3.5L

Fig. 74: Engine Block Heater
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - BLOCK HEATER
2 - ENGINE - RIGHT SIDE |
|---|

1. Raise vehicle on hoist.
2. Detach power cord plug from heater.
3. Remove block heater attaching screw located below heater terminals.
4. Remove block heater from cylinder block.

Installation**2.4L**

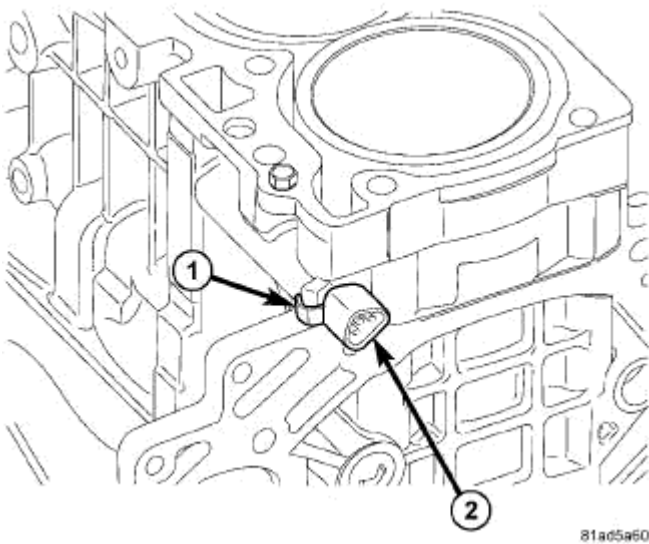


Fig. 75: BLOCK HEATER 2.4L ENGINE
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - RETAINING CLIP
2 - BLOCK HEATER |
|--|

CAUTION: To prevent damage, the power cord must be secured in it's retaining clips, and not positioned so it could contact linkages or exhaust manifold.

1. Thoroughly clean block heater bore.
2. Insert block heater assembly. Make sure retaining clip engages on cylinder block.
3. Connect power cord to heater.
4. Lower vehicle.

2.7L

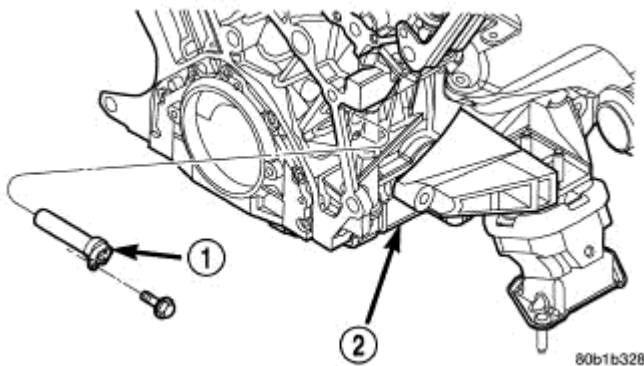


Fig. 76: ENGINE BLOCK HEATER

Courtesy of CHRYSLER LLC

- 1 - BLOCK HEATER
- 2 - ENGINE - RIGHT SIDE

1. Thoroughly clean cylinder block heater cavity.
2. Insert heater assembly into block such that mounting hole is located below heater terminals.
3. Install mounting screw and tighten to 12 N.m (105 in. lb.).

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

4. Attach power cord to heater.
5. Lower vehicle.

3.5L

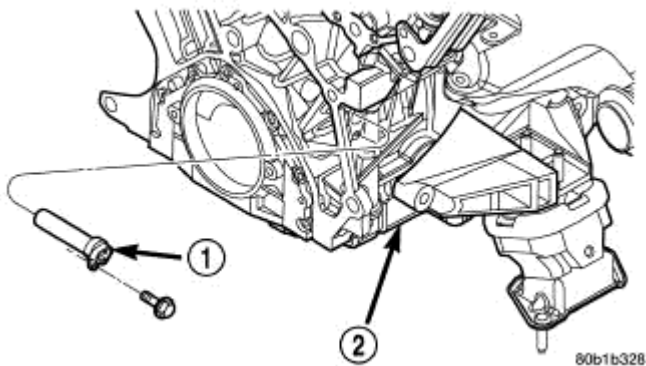


Fig. 77: ENGINE BLOCK HEATER
Courtesy of CHRYSLER LLC

- 1 - BLOCK HEATER
- 2 - ENGINE - RIGHT SIDE

1. Thoroughly clean cylinder block heater cavity.
2. Insert heater assembly into block such that mounting hole is located below heater terminals.
3. Install mounting screw and tighten to 12 N.m (105 in. lb.).

CAUTION: To prevent damage, the power cord must be secured in its retainer clips, and not positioned so it could contact linkages or exhaust manifolds.

4. Attach power cord to heater.

5. Lower vehicle.

HOUSING, COOLANT OUTLET

Removal

REMOVAL

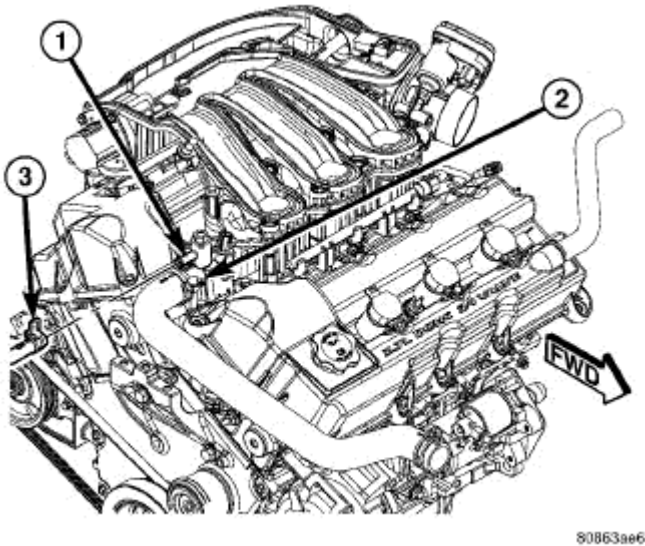


Fig. 78: COOLANT OUTLET CONNECTOR - 2.7L

Courtesy of CHRYSLER LLC

- | |
|--|
| <ul style="list-style-type: none">1 - BOLT (2)2 - BOLT (2)3 - COOLANT OUTLET CONNECTOR |
|--|

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

1. Drain cooling system. See **Standard Procedure**
2. Disconnect engine coolant temperature sensor connector.
3. Disconnect hoses at coolant outlet connector.
4. Remove bolts attaching coolant outlet connector.
5. Remove coolant outlet connector.

Installation

INSTALLATION

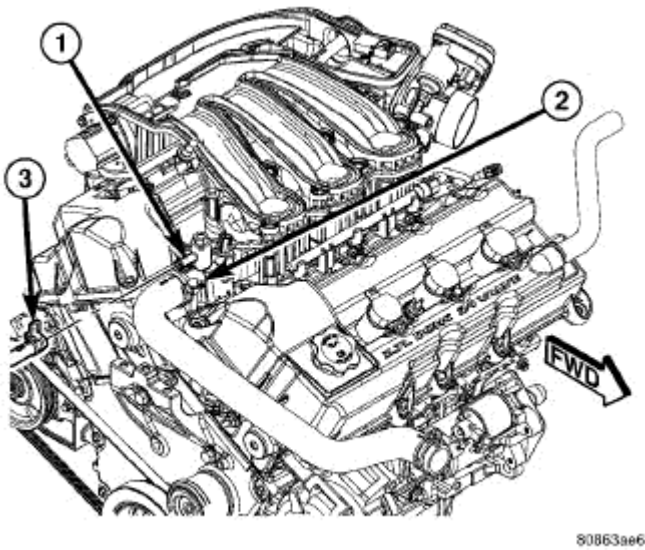


Fig. 79: COOLANT OUTLET CONNECTOR - 2.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - BOLT (2)
2 - BOLT (2)
3 - COOLANT OUTLET CONNECTOR |
|--|

1. Clean sealing surfaces. Inspect gaskets for tears and cuts. Replace as necessary.
2. Install coolant outlet connector and tighten bolts to 12 N.m (105 in. lbs.).
3. Connect hoses at coolant outlet connector.
4. Connect engine coolant temperature sensor connector.
5. Fill cooling system. See **Standard Procedure**

PUMP, WATER

Description

2.4L

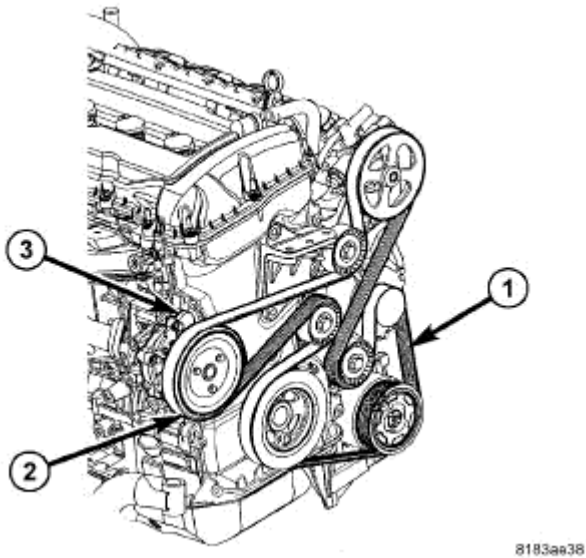


Fig. 80: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

- | |
|--------------------------|
| 1 - ACCESSORY DRIVE BELT |
| 2 - WATER PUMP PULLEY |
| 3 - WATER PUMP |

The water pump (3) on the world engine is attached to the water pump adapter on the front of the cylinder block.

The water pump is driven by the accessory drive belt. The water pump is connected to the water plenum by the return tube.

DESCRIPTION - 2.7L

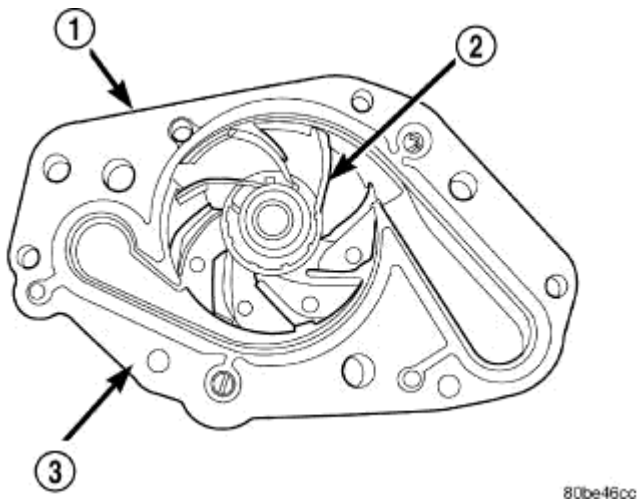


Fig. 81: Water Pump - 2.7L Engine

Courtesy of CHRYSLER LLC

- 1 - WATER PUMP BODY
- 2 - IMPELLER
- 3 - GASKET

The 2.7L pump has a die cast aluminum housing and a plastic swept vane impeller. It bolts directly to the cylinder block, behind the timing chain cover. The water pump is driven by the back side of the engine's primary timing chain.

Standard Procedure

COOLANT AIR EVACUATION

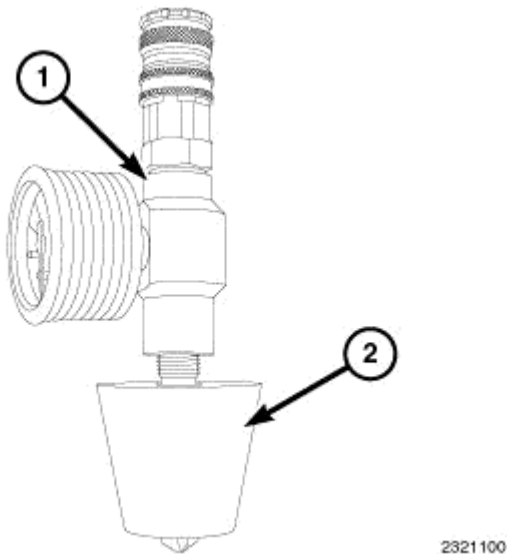


Fig. 82: PRESSURIZED AIR OPERATED VACUUM GENERATOR
Courtesy of CHRYSLER LLC

Evacuating or purging air from the cooling system involves the use of a pressurized air operated vacuum generator. The vacuum created allows for a quick and complete coolant refilling while removing any airlocks present in the system components.

NOTE: To avoid damage to the cooling system, ensure that no component would be susceptible to damage when a vacuum is drawn on the system.

WARNING: ANTIFREEZE IS AN ETHYLENE GLYCOL BASE COOLANT AND IS HARMFUL IF SWALLOWED OR INHALED. IF SWALLOWED, DRINK TWO GLASSES OF WATER AND INDUCE VOMITING. IF INHALED, MOVE TO FRESH AIR AREA. SEEK MEDICAL ATTENTION IMMEDIATELY. DO NOT STORE IN OPEN OR UNMARKED CONTAINERS. WASH SKIN AND CLOTHING THOROUGHLY AFTER COMING IN CONTACT WITH

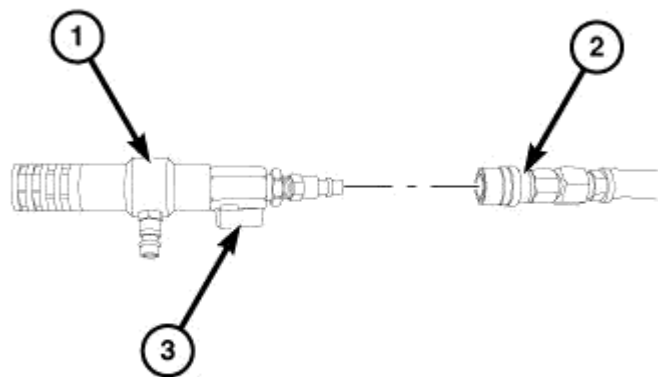
ETHYLENE GLYCOL. KEEP OUT OF REACH OF CHILDREN. DISPOSE OF GLYCOL BASED COOLANT PROPERLY. CONTACT YOUR DEALER OR GOVERNMENT AGENCY FOR LOCATION OF COLLECTION CENTER IN YOUR AREA. DO NOT OPEN A COOLING SYSTEM WHEN THE ENGINE IS AT OPERATING TEMPERATURE OR HOT UNDER PRESSURE; PERSONAL INJURY CAN RESULT. AVOID RADIATOR COOLING FAN WHEN ENGINE COMPARTMENT RELATED SERVICE IS PERFORMED; PERSONAL INJURY CAN RESULT.

WARNING: WEAR APPROPRIATE EYE AND HAND PROTECTION WHEN PERFORMING THIS PROCEDURE.

NOTE: The service area where this procedure is performed should have a minimum shop air requirement of 80 PSI (5.5 bar) and should be equipped with an air dryer system.

NOTE: For best results, the radiator should be empty. The vehicle's heater control should be set to the heat position (ignition may need to be turned to the on position but do not start the motor).

1. Refer to the Chrysler Pentastar Service Equipment (Chrysler PSE) Coolant Refiller #85-15-0650 or equivalent tool's operating service specification for specific assembly steps.
2. Choose an appropriate adapter cone that will fit the vehicle's radiator filler neck or reservoir tank.
3. Attach the adapter cone (2) to the vacuum gauge (1).



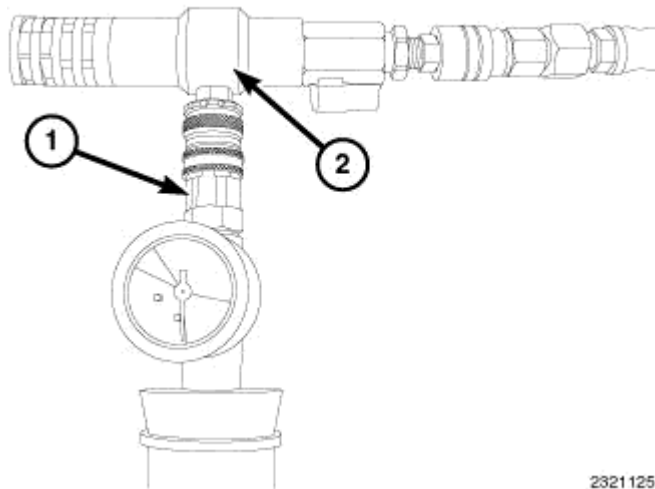
2321148

Fig. 83: VACUUM GENERATOR/VENTURI BALL VALVE
Courtesy of CHRYSLER LLC

4. Make sure the vacuum generator/venturi ball valve (3) is closed and attach an airline hose (2) (minimum

shop air requirement of 80 PSI/5.5 bar) to the vacuum generator/venturi (1).

5. Position the adaptor cone/vacuum gauge assembly into the radiator filler neck or reservoir tank. Ensure that the adapter cone is sealed properly.



2321125

Fig. 84: VACUUM GENERATOR/VENTURI
Courtesy of CHRYSLER LLC

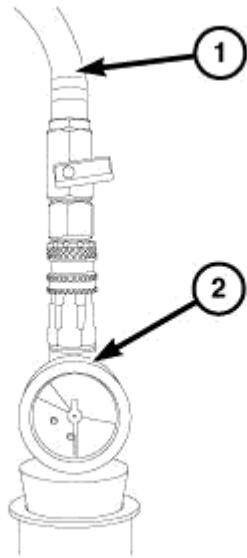
6. Connect the vacuum generator/venturi (2) to the positioned adaptor cone/vacuum gauge assembly (1).
7. Open the vacuum generator/venturi ball valve.

NOTE: Do not bump or move the assembly as it may result in loss of vacuum. Some radiator overflow hoses may need to be clamped off to obtain vacuum.

8. Let the system run until the vacuum gauge shows a good vacuum through the cooling system. Refer to the tool's operating service information for appropriate pressure readings.

NOTE: If a strong vacuum is being created in the system, it is normal to see the radiator hoses to collapse.

9. Close the vacuum generator/venturi ball valve.



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Fig. 85: VACUUM GENERATOR/VENTURI AND AIR LINE
Courtesy of CHRYSLER LLC

10. Disconnect the vacuum generator/venturi and airline from the adaptor cone/vacuum gauge assembly.
11. Wait approximately 20 seconds, if the pressure readings do not move, the system has no leaks. If the pressure readings move, a leak could be present in the system and the cooling system should be checked for leaks and the procedure should be repeated.
12. Place the tool's suction hose into the coolant's container.

NOTE: Ensure there is a sufficient amount of coolant, mixed to the required strength/protection level available for use. For best results and to assist the refilling procedure, place the coolant container at the same height as the radiator filler neck. Always draw more coolant than required. If the coolant level is too low, it will pull air into the cooling system which could result in airlocks in the system.

13. Connect the tool's suction hose (1) to the adaptor cone/vacuum gauge assembly (2).

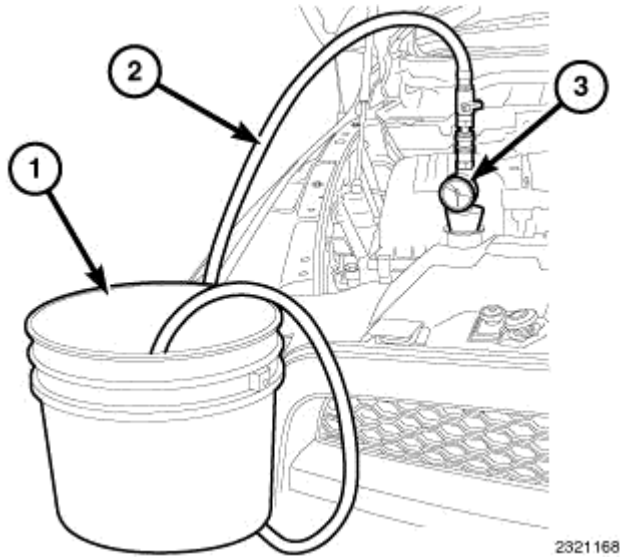


Fig. 86: SUCTION HOSE BALL VALVE
Courtesy of CHRYSLER LLC

14. Open the suction hose's ball valve to begin refilling the cooling system.
15. When the vacuum gauge reads zero, the system is filled.

NOTE: On some remote pressurized tanks, it is recommended to stop filling when the proper level is reached.

16. Close the suction hose's ball valve and remove the suction hose from the adaptor cone/vacuum gauge assembly.
17. Remove the adaptor cone/vacuum gauge assembly from the radiator filler neck or reservoir tank.
18. With heater control unit in the HEAT position, operate engine with container cap in place.
19. After engine has reached normal operating temperature, shut engine off and allow it to cool. When engine is cooling down, coolant will be drawn into the radiator from the pressure container.
20. Add coolant to the recovery bottle/container as necessary. **Only add coolant to the container when the engine is cold. Coolant level in a warm engine will be higher due to thermal expansion.** Add necessary coolant to raise container level to the COLD MINIMUM mark after each cool down period.
21. Once the appropriate coolant level is achieved, attach the radiator cap or reservoir tank cap.

Removal

2.4L ENGINE

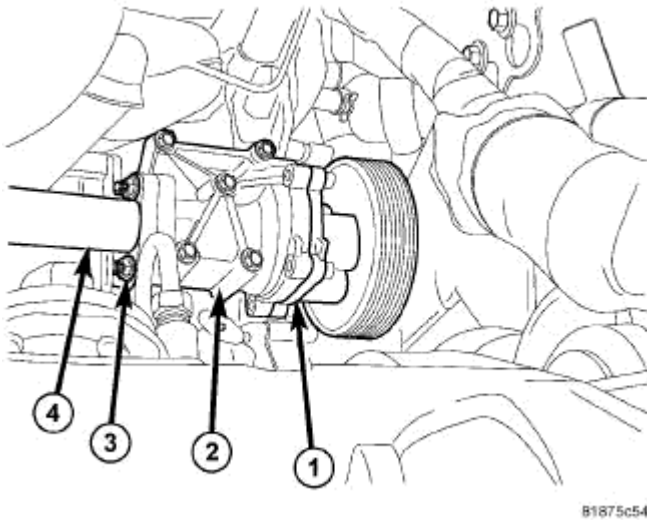


Fig. 87: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

- 1 - WATER PUMP
- 2 - MOUNTING BOLT
- 3 - WATER INLET TUBE NUTS
- 4 - INLET WATER TUBE

1. Remove the accessory drive belt. See **Removal** .
2. Raise vehicle. Refer to **Vehicle Quick Reference/Hoisting - Standard Procedure** .
3. Remove accessory drive belt splash shield.
4. Drain cooling system. See **Standard Procedure** .
5. Remove screws attaching water pump pulley (1). Remove pulley (1).
6. Remove water pump mounting bolts (2).
7. Remove water pump (3).

2.7L ENGINE

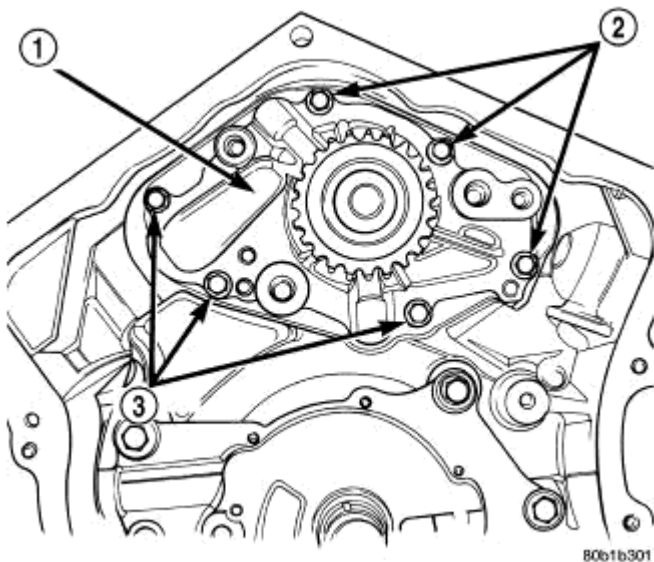


Fig. 88: WATER PUMP - 2.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - WATER PUMP
2 - BOLTS
3 - BOLTS |
|--|

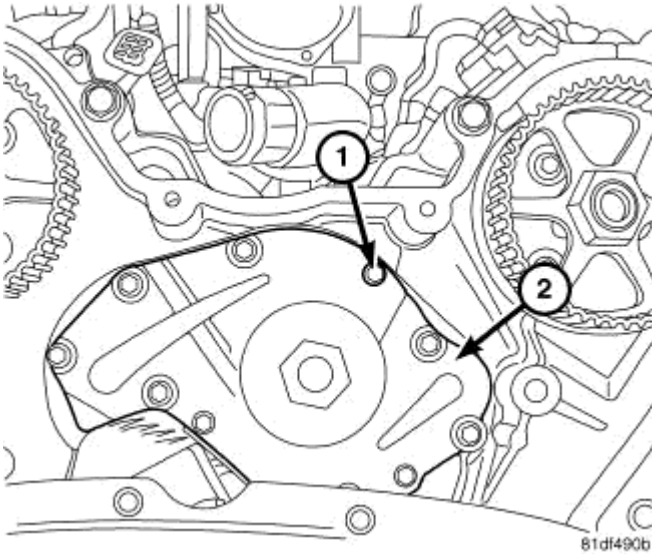
WARNING: Do not remove pressure cap with the system hot and pressurized. Serious burns from coolant can result.

1. Disconnect negative battery cable.
2. Drain cooling system. See Standard Procedure.

NOTE: The water pump is driven by the primary timing chain.

3. Remove the timing chain cover, timing chain, and all chain guides. Refer to Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Removal.
4. Remove bolts attaching water pump to block.
5. Remove water pump and gasket.

3.5L ENGINE

**Fig. 89: WATER PUMP - 3.5L**

Courtesy of CHRYSLER LLC

1 - MOUNTING BOLTS

2 - WATER PUMP

NOTE: It is normal for the water pump to weep a small amount of coolant from the weep hole (black stain on water pump body). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident on water pump body from the weep hole (shaft seal failure). Be sure to perform a thorough analysis before replacing water pump.

1. Drain cooling system. See **Standard Procedure** .
2. Remove engine timing belt. Refer to **Engine/Valve Timing/BELT and SPROCKETS, Timing - Removal** .
3. Remove water pump mounting bolts. Note position of longer bolt for proper re-installation.
4. Remove water pump body from engine.
5. Clean water pump mounting surface.

2.0L DIESEL

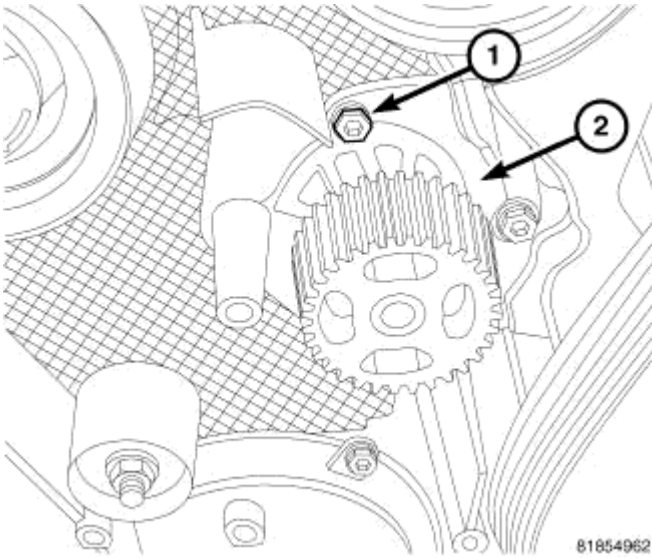


Fig. 90: WATER PUMP - 2.0L DIESEL
Courtesy of CHRYSLER LLC

- | |
|----------------------------|
| 1 - BOLT
2 - WATER PUMP |
|----------------------------|

1. Remove timing chain. Refer to **Engine/Valve Timing/BELT, Timing - Removal** .
2. Remove water pump mounting bolts (1).
3. Remove water pump (2).
4. Remove O-ring from water pump.

Cleaning

CLEANING

Clean gasket mating surfaces as necessary.

Inspection

INSPECTION - 2.7L

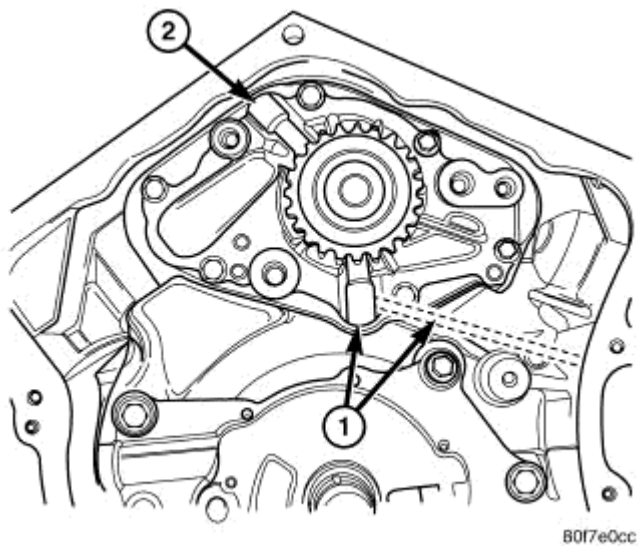


Fig. 91: WATER PUMP WEEP PASSAGES - 2.7L
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - PRIMARY WEEP PASSAGE
2 - SECONDARY WEEP PASSAGE |
|--|

Inspect and replace the water pump if it has any of the following defects:

1. Damage or cracks on the pump body.
2. Coolant leaks: If the shaft seal is leaking, this will be evident by traces of thick deposits of dried glycol running down from the pump primary weep passage. A thin black stain below the pump primary weep hole/passage is considered normal operation.
3. Coolant leaks: If the pump primary weep passage is plugged, coolant may come from the secondary weep passage and collect in the valley of the engine. The coolant will eventually run out the back side of the engine. Leakage from the secondary weep passage may give false indications that core plug(s) may be leaking on the back side of the engine block. If this condition is found, clean the primary weep passage of debris.
4. Impeller rubs inside of cylinder block.
5. Excessively loose or rough turning bearing.

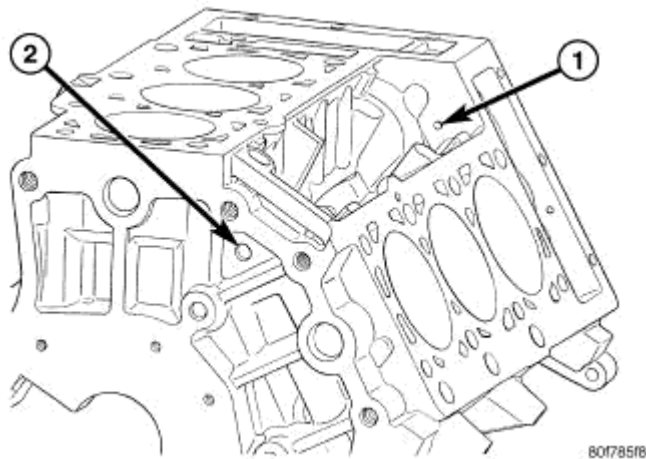


Fig. 92: SECONDARY WATER PUMP WEEP PASSAGE - 2.7L
Courtesy of CHRYSLER LLC

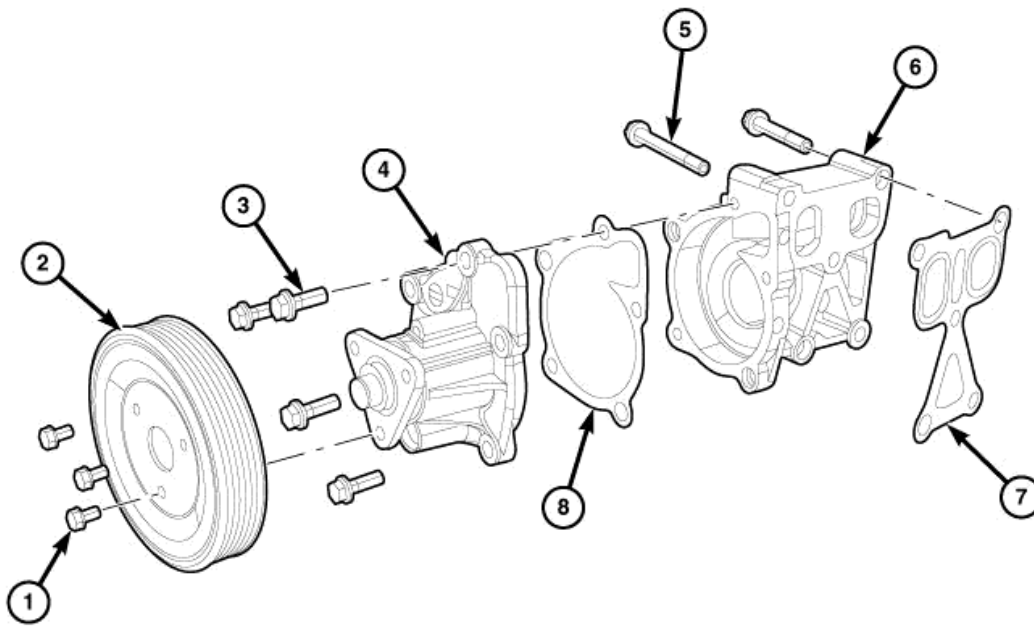
- | |
|--|
| 1 - WEEP PASSAGE TO VALLEY OF BLOCK
2 - HOLE IN REAR OF BLOCK |
|--|

NOTE:

It is normal for the water pump to weep a small amount of coolant from the primary weep hole (black stain at weep passage). Do not replace the water pump if this condition exists. Replace the water pump if a heavy deposit or a steady flow of engine coolant is evident from the primary weep passage. This indicates a shaft seal failure and pump must be replaced. Coolant may leak from the secondary weep passage and fill the valley of the engine. If this condition is found, clean the primary weep passage of debris. Be sure to perform a thorough analysis before replacing water pump.

Disassembly

WATER PUMP - GAS ENGINE



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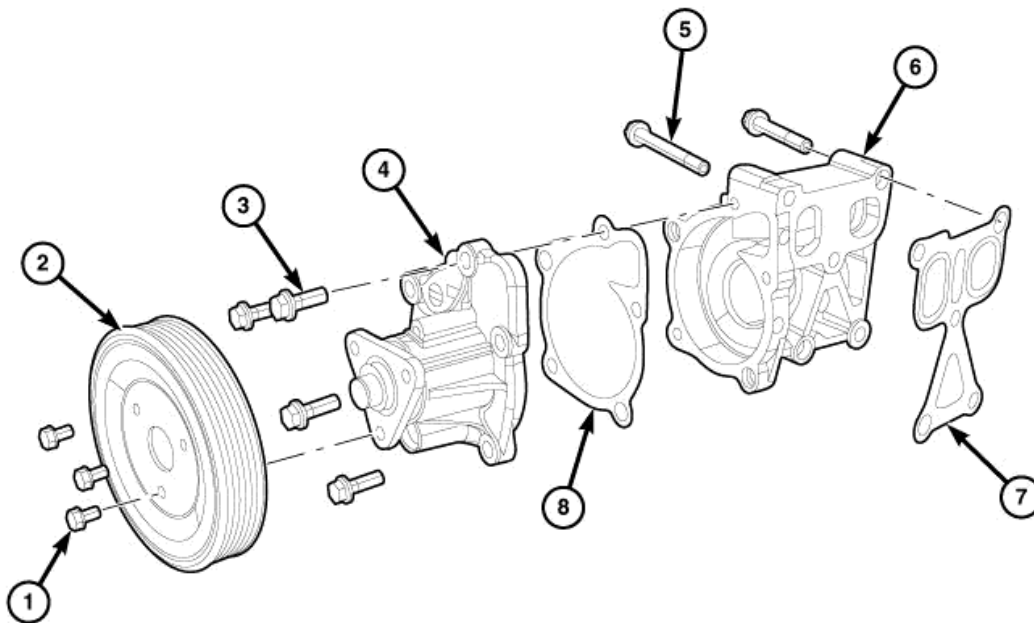
Fig. 93: WATER PUMP ASSEMBLY

Courtesy of CHRYSLER LLC

1. Remove the water pump assembly from the vehicle. See **Removal**
2. Discard the water pump outlet gasket (7).
3. Remove the three bolts (1) attaching the water pump pulley (2) to the water pump (4).
4. Remove the water pump pulley (2).
5. Remove the five bolts (3) attaching the water pump (4) to the water pump adapter (6).
6. Remove and discard the gasket (8).
7. Remove the water pump (4) and inspect carefully for any damage. See **Inspection**

Assembly

WATER PUMP - GAS ENGINE



2109355

Fig. 94: WATER PUMP ASSEMBLY

Courtesy of CHRYSLER LLC

1. Thoroughly clean all gasket mating surfaces before assembling.
2. Inspect water pump and components for any damage. See **Inspection**
3. Using bolts (3), install the water pump (4) and gasket (8) to the water pump adapter (6). Tighten the bolts (3) to 22 N-m (16 lbs. ft.)
4. Using bolts (1), install the water pump pulley (2) to the water pump (4). Tighten the bolts (1) to 9 N-m (80 lbs. in.)
5. Using bolts (5), install the water pump assembly and gasket to the engine block. Tighten the bolts to 24 N.m (18 lbs. ft.). See **Cooling/Engine/PUMP, Water - Installation**
6. Start the engine and check for leaks. See **Diagnosis and Testing**

Installation**2.4L ENGINE**

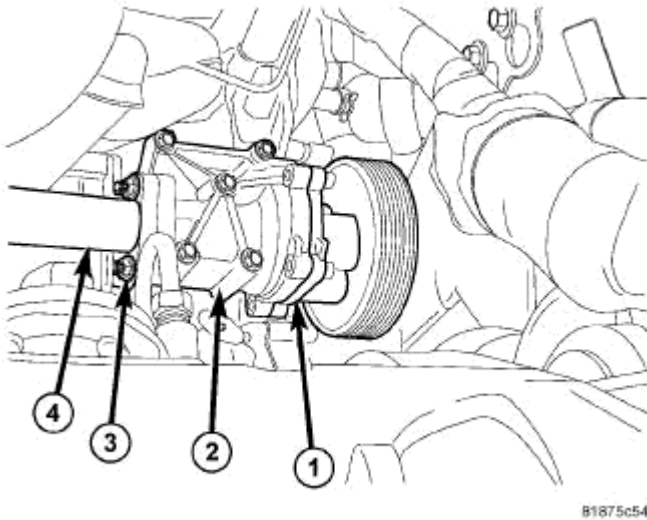


Fig. 95: WATER PUMP - WORLD ENGINE
Courtesy of CHRYSLER LLC

- 1 - WATER PUMP
- 2 - MOUNTING BOLT
- 3 - WATER INLET TUBE NUTS
- 4 - INLET WATER TUBE

1. Position water pump assembly (1) and gasket onto cylinder block.
2. Position water inlet tube (4) and gasket onto water pump (1).
3. Install mounting bolts (2). Tighten bolts to 25.5 N.m (225 in. lbs.).
4. Install drive belt splash shield.
5. Lower vehicle.
6. Install accessory drive belt. See **Installation** .
7. Evacuate air and refill cooling system. See **Standard Procedure**
8. Check cooling system for leaks. See **Diagnosis and Testing**

2.7L ENGINE

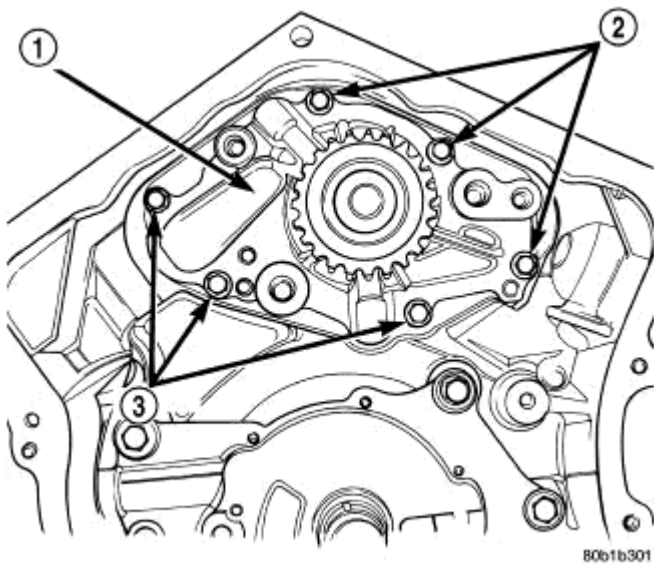


Fig. 96: WATER PUMP - 2.7L
Courtesy of CHRYSLER LLC

- 1 - WATER PUMP
- 2 - BOLTS
- 3 - BOLTS

1. Clean all sealing surfaces.
2. Install water pump and gasket. Tighten mounting bolts to 12 N.m (105 in. lbs.).
3. Install timing chain guides, timing chain, and timing chain cover. Refer to **Engine/Valve Timing/CHAIN and SPROCKETS, Timing - Installation** .
4. Reconnect negative battery cable.
5. Evacuate air and refill cooling system. See **Standard Procedure**
6. Check cooling system for leaks. See **Diagnosis and Testing**

3.5L ENGINE

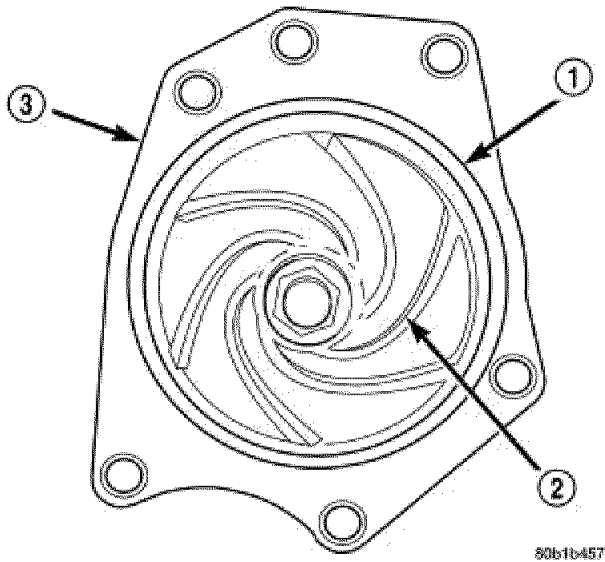


Fig. 97: WATER PUMP - 3.5L ENGINE
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - O-RING
2 - IMPELLER
3 - WATER PUMP BODY |
|---|

1. Clean all O-ring surfaces on pump and cover.
2. Install new O-ring on water pump.
3. Position water pump to engine.
4. Install mounting bolts and tighten to 12 N.m (105 in. lbs.).
5. Install timing belt. Refer to **Engine/Valve Timing/BELT and SPROCKETS, Timing - Installation** .
6. Evacuate air and refill cooling system. See **Standard Procedure**
7. Check cooling system for leaks. See **Diagnosis and Testing**

2.0L DIESEL

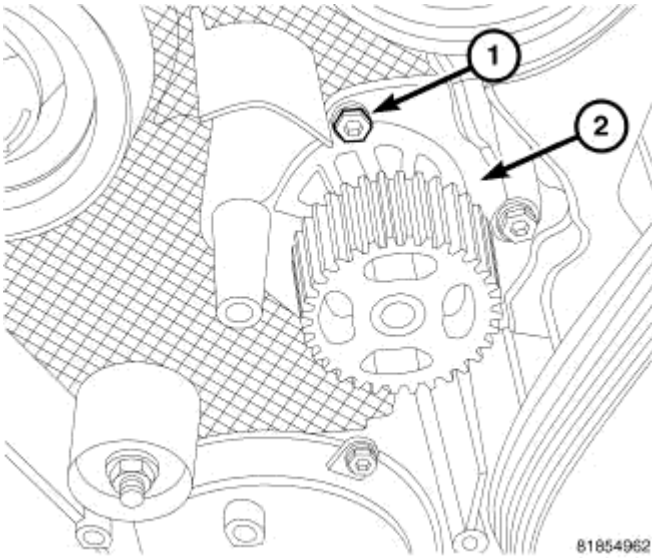


Fig. 98: WATER PUMP - 2.0L DIESEL
Courtesy of CHRYSLER LLC

- | |
|----------------------------|
| 1 - BOLT
2 - WATER PUMP |
|----------------------------|

1. Clean the O-ring mating surfaces on water pump (2) and front of timing chain cover.
2. Install O-ring onto water pump (2).
3. Apply a small amount of petroleum jelly to lubricate O-ring.
4. Install water pump and mounting bolts. Tighten bolts (1) to mounting bolts to 24 N.m (18 ft. lbs.).
5. Install timing belt. Refer to **Engine/Valve Timing/BELT, Timing - Installation** .
6. Evacuate air and refill cooling system. See **Standard Procedure**
7. Check cooling system for leaks. See **Diagnosis and Testing**

RADIATOR, ENGINE COOLING

Description

DESCRIPTION

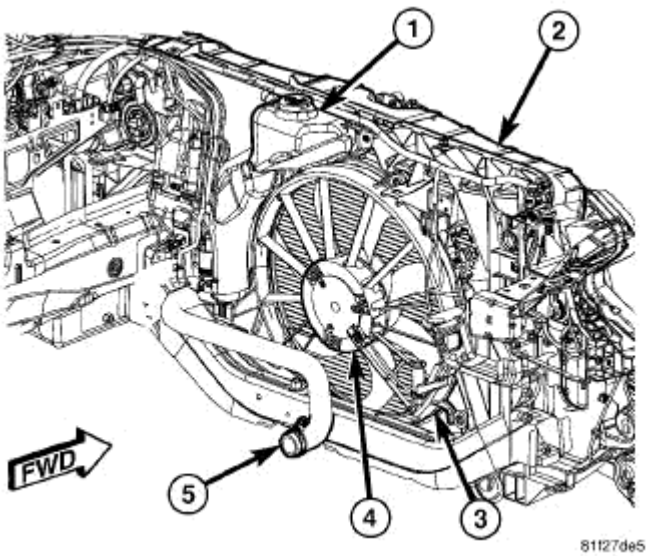


Fig. 99: COOLING SYSTEM - OVERVIEW
Courtesy of CHRYSLER LLC

- | |
|---------------------------------|
| 1 - WINDSHIELD WASHER RESERVOIR |
| 2 - UPPER SUPPORT |
| 3 - FAN SHROUD |
| 4 - FAN MOTOR |
| 5 - LOWER RADIATOR HOSE |

All vehicles are equipped with a cross flow type radiator with plastic side tanks.

Plastic tanks, while stronger than brass, are subject to damage by impact, such as from tools or wrenches. Handle radiator with care.

Removal

RADIATOR

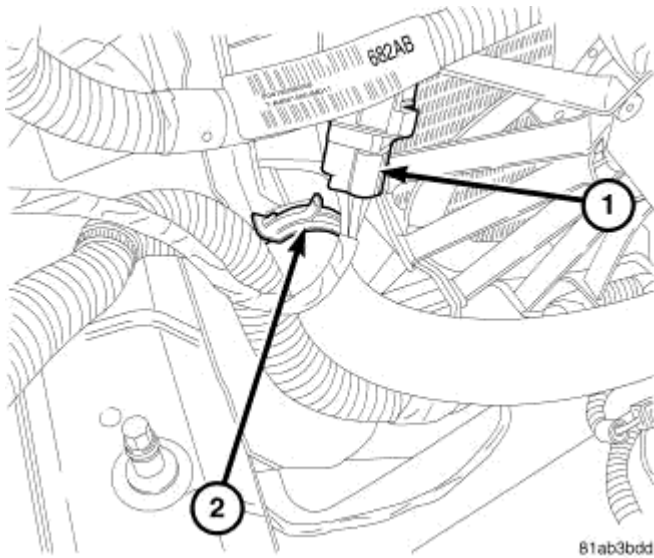


Fig. 100: UPPER RADIATOR HOSE

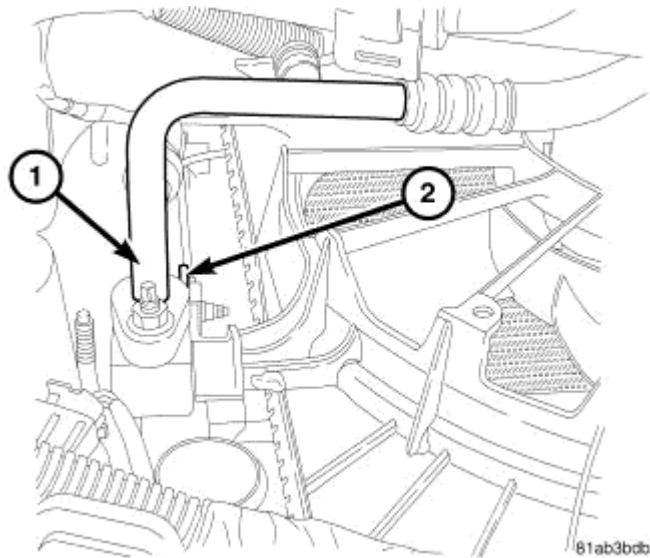
Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - ELECTRICAL CONNECTOR
2 - UPPER RADIATOR HOSE |
|---|

1. Disconnect negative cable from auxiliary jumper terminal.
2. Remove engine cover.
3. Remove air box assembly. Refer to Engine/Air Intake System/BODY, Air Cleaner - Removal .
4. Recover A/C system. Refer to Heating and Air Conditioning/Plumbing - Standard Procedure .

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

5. Drain cooling system. See Standard Procedure .
6. Remove the grille.
7. Remove under belly pan (if equipped).
8. Remove front bottom splash shield (if equipped).
9. Remove upper and lower radiator hoses at radiator.
10. Disconnect radiator fan electrical connector (1).

**Fig. 101: A/C LINE****Courtesy of CHRYSLER LLC**

- | |
|---------------------|
| 1 - A/C LINE |
| 2 - SUPPORT BRACKET |

11. Separate radiator cooling fans from radiator.
12. Disconnect A/C line (1) at condenser/cooler.
13. Remove transmission oil cooler tubes support bracket at left side of radiator (if equipped) (2).

CAUTION: Plastic tanks, while stronger than brass are subject to damage by impact, such as wrenches.

14. Remove the two torx screws located on the upper radiator support that hold the upper radiator mounting brackets.
15. Tilt the top of the radiator rearward so the mounting brackets slide out of the upper core support.
16. Remove radiator/condenser assembly by lifting the assembly out of the vehicle between the engine and the core support.
17. Separate the A/C condenser from the radiator.

Cleaning

CLEANING

Clean radiator fins are necessary for good heat transfer. The radiator and air conditioning fins should be cleaned when an accumulation of debris has occurred. With the engine cold, apply cold water and compressed air to the back (engine side) of the radiator to flush the radiator and/or A/C condenser of debris.

Inspection

INSPECTION

Inspect the radiator tanks for cracks, broken or missing fittings also inspect the joint where the tanks seam up to the radiator core for signs of leakage and/or deteriorating seals.

Inspect radiator core for corroded, bent or missing cooling fins. Inspect the core for bent or damaged cooling tubes.

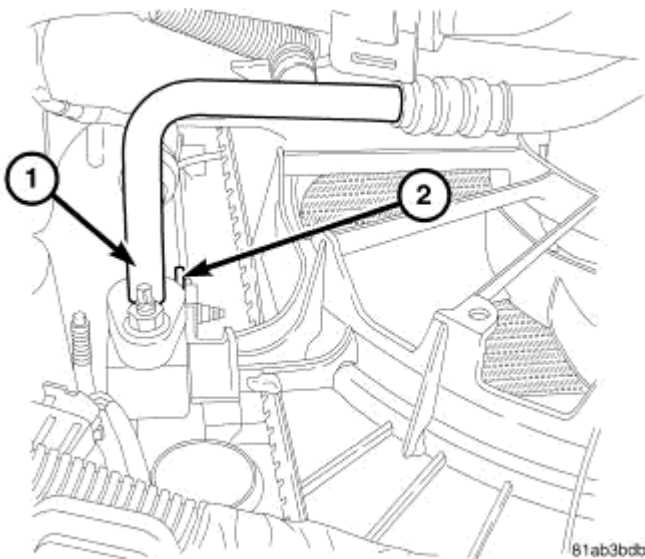
Installation**RADIATOR**

Fig. 102: A/C LINE

Courtesy of CHRYSLER LLC

- | |
|-------------------------------------|
| 1 - A/C LINE
2 - SUPPORT BRACKET |
|-------------------------------------|

1. Position radiator cooling fans on radiator.
2. Position combination A/C condenser/cooler on radiator.
3. Slide radiator into position and seat the radiator assembly lower rubber isolators in the mount holes.
4. Install A/C lines (1) to condenser.
5. Install support bracket (2) to radiator. Tighten mounting screws to 5 N.m (45 in. lbs.).
6. Connect cooling fan electrical connector (1).
7. Install lower radiator hose at radiator.
8. Install upper radiator mount.
9. Install front bottom splash shield

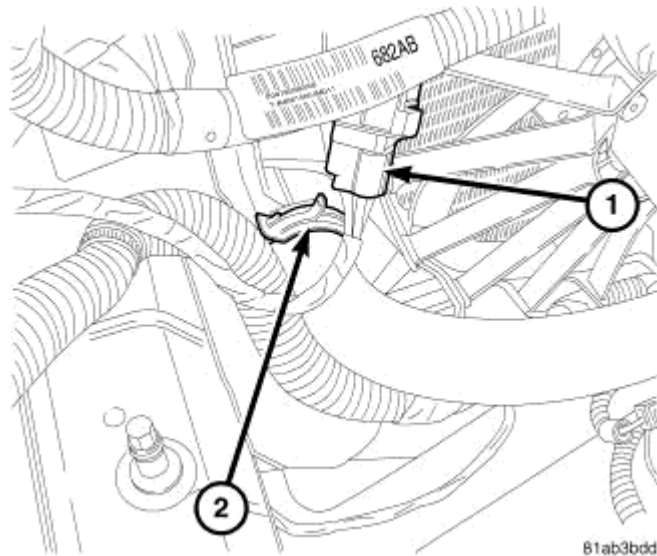


Fig. 103: UPPER RADIATOR HOSE
Courtesy of CHRYSLER LLC

- | |
|--------------------------|
| 1 - ELECTRICAL CONNECTOR |
| 2 - UPPER RADIATOR HOSE |

10. Install under engine splash shield.
11. Fill cooling system. See **Standard Procedure** .
12. Charge A/C system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
13. Install air filter housing. Refer to **Engine/Air Intake System/BODY, Air Cleaner - Installation** .
14. Install engine cover.
15. Install transmission oil cooler tube support bracket and attaching screw to left side of radiator. Tighten mounting screw to 5 N.m (45 in. lbs.).
16. Connect hoses to radiator.
17. Install radiator fan.
18. Connect radiator fan electrical connector.
19. Connect negative cable.

SENSOR, COOLANT TEMPERATURE

Description

DESCRIPTION

There are two Engine Coolant Temperature (ECT) Sensors. One of the sensors threads into the block. The other sensor is located at the top of the coolant adapter housing. The ECT Sensor is a negative thermal coefficient sensor.

2.7L ENGINE

The Engine Coolant Temperature (ECT) Sensor threads into the coolant outlet connector. The ECT Sensor is a negative thermal coefficient sensor.

3.5L ENGINE

The Engine Coolant Temperature (ECT) Sensor threads into the lower intake manifold. The ECT Sensor is a negative thermal coefficient sensor.

Operation

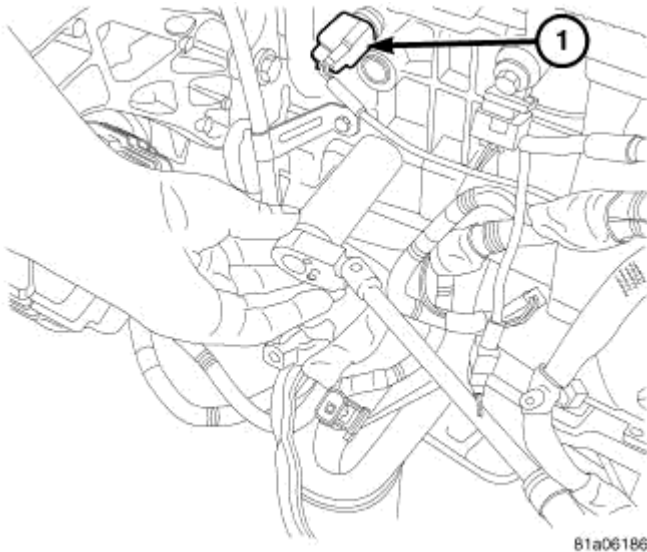
OPERATION

The ECT sensor provides an input to the PCM. As temperature increases, resistance of the sensor decreases. As coolant temperature varies, the ECT sensor resistance changes resulting in a different voltage value at the PCM ECT sensor signal circuit. The ECT sensor provides input for various PCM operations. The PCM uses the input to control air-fuel mixture, timing, and radiator fan on/off times. The PCM uses ECT sensor input to send messages over the CAN bus to various modules for other functions such as temperature gauge and AC operation.

Removal

2.4L

CYLINDER BLOCK MOUNTED



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Fig. 104: ECT Sensor
Courtesy of CHRYSLER LLC

1 - ECT

1. Disconnect negative battery cable.
2. Partially drain cooling system below level of ECT Sensor.

3. Disconnect ECT Sensor electrical connector.
4. Remove ECT Sensor.

COOLANT ADAPTER MOUNTED

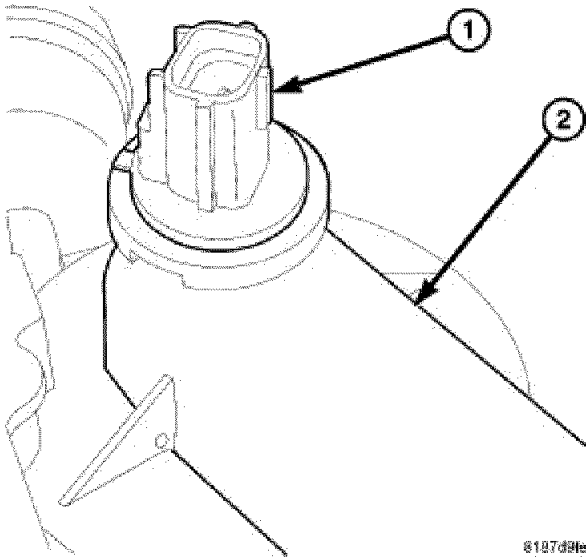


Fig. 105: ECT SENSOR AND COOLANT ADAPTER
Courtesy of CHRYSLER LLC

- | |
|--------------------------------|
| 1 - ETC
2 - COOLANT ADAPTER |
|--------------------------------|

1. Disconnect negative battery cable.
2. Partially drain cooling system below level of ECT Sensor (1).
3. Disconnect ECT Sensor electrical connector.
4. Remove ECT Sensor (1).

2.7L ENGINE

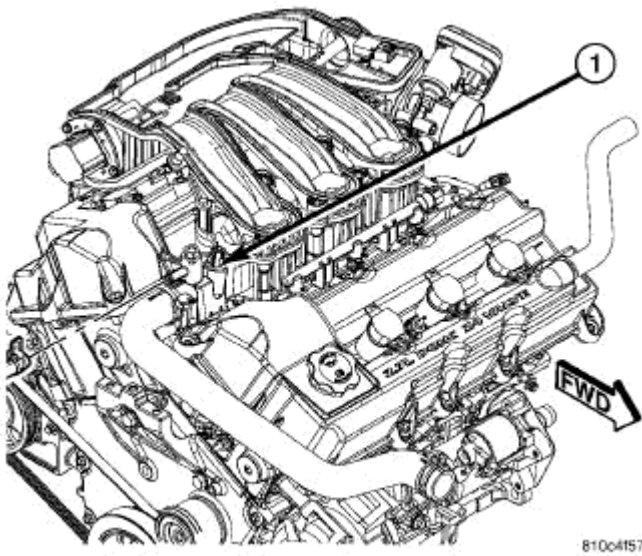


Fig. 106: ECT SENSOR 2.7L
Courtesy of CHRYSLER LLC

1 - ECT SENSOR

1. Partially drain cooling system below level of ECT sensor.
2. Remove upper intake manifold. Refer to **Engine/Manifolds/MANIFOLD, Intake - Removal**.
3. Disconnect ECT sensor electrical connector.
4. Remove ECT sensor.

3.5L ENGINE

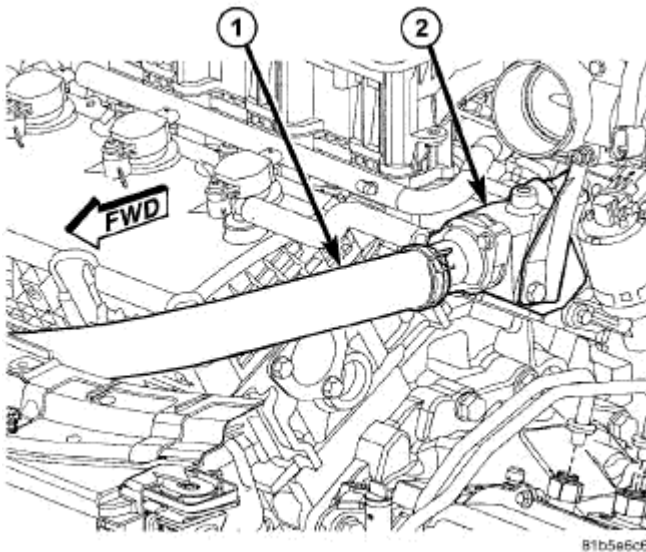


Fig. 107: 3.5L THERMOSTAT HOUSING

Courtesy of CHRYSLER LLC

- 1 - THERMOSTAT HOUSING
- 2 - RADIATOR HOSE

1. Disconnect negative battery cable.
2. Partially drain cooling system. See **Standard Procedure** .
3. Disconnect coolant sensor electrical connector.
4. Remove coolant temperature sensor.

DIESEL ENGINE

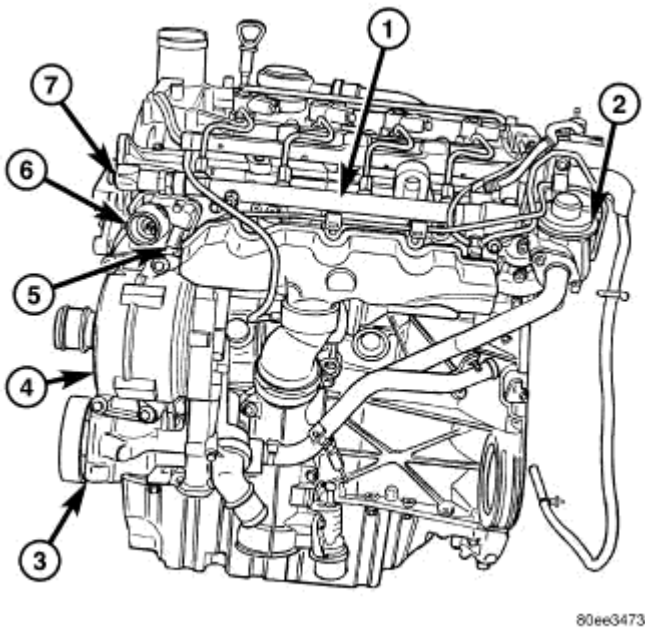


Fig. 108: THERMOSTAT AND SENSOR

Courtesy of CHRYSLER LLC

- 1 - FUEL RAIL
- 2 - EGR VALVE
- 3 - POWER STEERING PUMP
- 4 - GENERATOR
- 5 - COOLANT TEMPERATURE SENSOR
- 6 - THERMOSTAT HOUSING
- 7 - FUEL RAIL PRESSURE SENSOR

1. Disconnect negative battery cable.

2. Remove engine cover. Refer to **Engine - Removal** .
3. Partially drain coolant system below pressurized coolant recovery container. See **Standard Procedure** .
4. Unplug coolant temperature sensor electrical connector.

NOTE: **Capture any residual coolant that may flow.**

5. Remove coolant temperature sensor (5).

Installation

2.4L

COOLANT ADAPTER MOUNTED

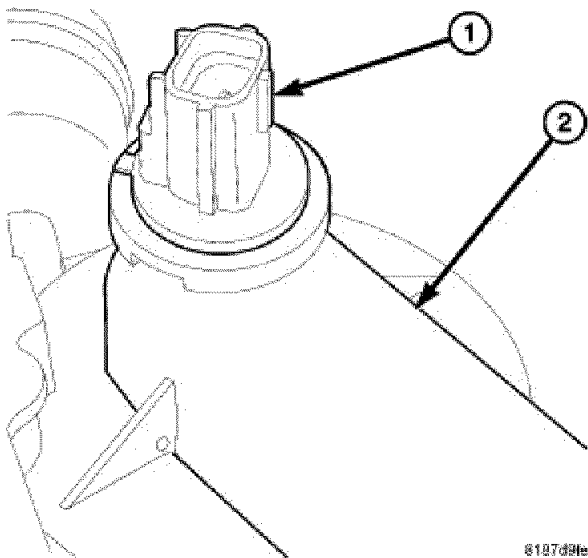


Fig. 109: ECT SENSOR AND COOLANT ADAPTER
Courtesy of CHRYSLER LLC

1 - ETC

2 - COOLANT ADAPTER

1. Install ECT Sensor (1). Make sure coolant sensor is locked in place
2. Reconnect ECT Sensor electrical connector.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

CYLINDER BLOCK MOUNTED

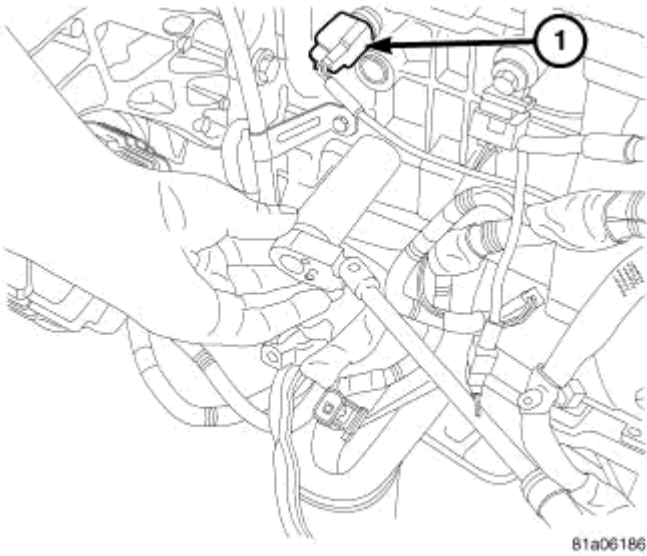


Fig. 110: ECT Sensor
Courtesy of CHRYSLER LLC

1 - ECT

1. Install ECT Sensor. Tighten sensor to 19 N.m (168 in. lbs.).
2. Reconnect ECT Sensor electrical connector.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

2.7L ENGINE

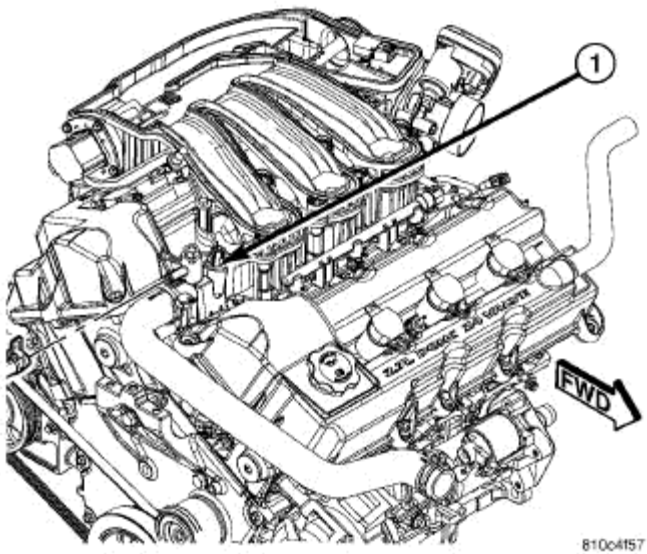


Fig. 111: ECT SENSOR 2.7L
Courtesy of CHRYSLER LLC

1 - ECT SENSOR

1. Install ECT sensor. Tighten sensor to 19 N.m (168 in. lbs.).
2. Reconnect ECT sensor electrical sensor.
3. Fill cooling system. See **Standard Procedure** .

3.5L ENGINE

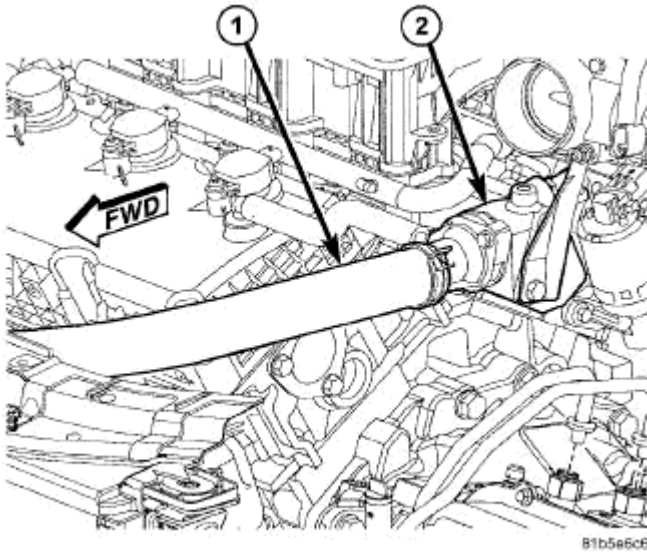
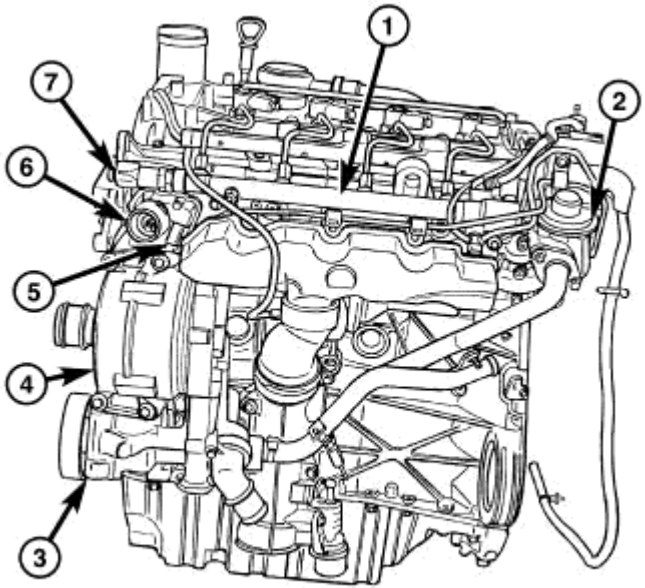


Fig. 112: 3.5L THERMOSTAT HOUSING
Courtesy of CHRYSLER LLC

1 - THERMOSTAT HOUSING
2 - RADIATOR HOSE

1. Install engine coolant temperature sensor. Tighten sensor to 28 N.m (20 ft. lbs.) torque.
2. Attach electrical connector to sensor.
3. Fill cooling system. See **Standard Procedure** .
4. Connect negative battery cable.

DIESEL ENGINE

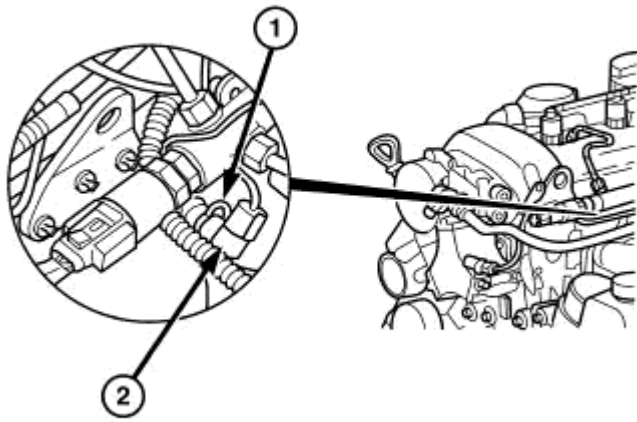


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Fig. 113: THERMOSTAT AND SENSOR
Courtesy of CHRYSLER LLC

- 1 - FUEL RAIL
- 2 - EGR VALVE
- 3 - POWER STEERING PUMP
- 4 - GENERATOR
- 5 - COOLANT TEMPERATURE SENSOR
- 6 - THERMOSTAT HOUSING
- 7 - FUEL RAIL PRESSURE SENSOR

1. Position and install coolant temperature sensor (5).
2. Connect coolant temperature sensor electrical connector.



80e1b7b5

Fig. 114: ENGINE COOLANT TEMPERATURE SENSOR
Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - RETAINING CLAMP
2 - ENGINE COOLANT TEMPERATURE SENSOR |
|--|

3. Refill coolant system to proper level with proper mixture of coolant. See **Standard Procedure** .
4. Install engine cover. Refer to **Engine - Installation** .
5. Connect negative battery cable.

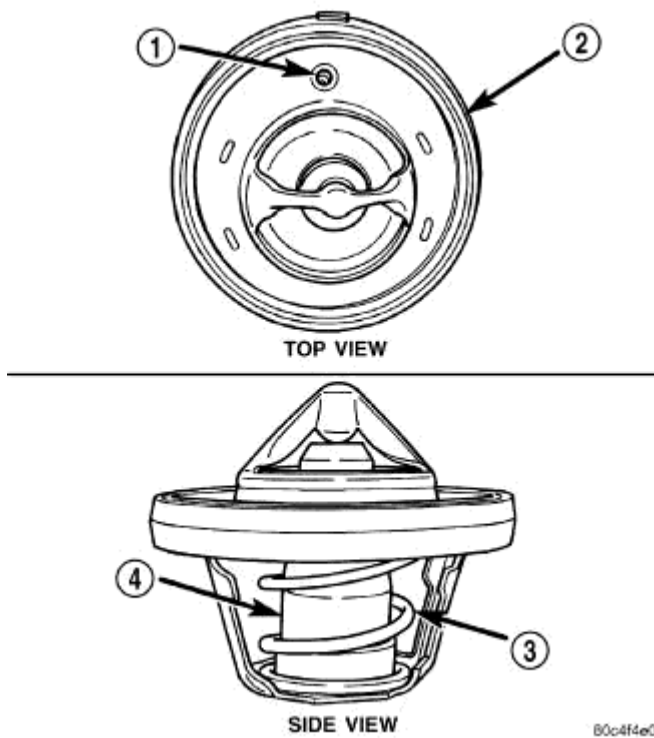
WARNING: Use extreme caution when engine is operating. Do not stand in a direct line with fan. Do not put your hands near pulleys, belts or fan. Do not wear loose clothes.

6. Start engine and inspect for leaks.

THERMOSTAT

Description

2.0L DIESEL/2.4L ENGINE

**Fig. 115: THERMOSTAT**

Courtesy of CHRYSLER LLC

- 1 - AIR BLEED
- 2 - SEAL
- 3 - RETURN SPRING
- 4 - PELLET CHAMBER

The primary thermostat for the 2.0L diesel and 2.4L gas engines are located on the front of the water plenum in the thermostat housing/coolant inlet. The thermostat has an air bleed vent located on its flange. The air bleed vent (1) and the locator dimple on thermostat seal provide for proper positioning of thermostat in inlet housing.

The 2.4L engine has a secondary thermostat. The secondary thermostat is located in the cylinder head under the water plenum.

2.7L/3.5L

The thermostat is located on the lower left side of engine, near the front. The thermostat is on the inlet side of the water pump. It has an air bleed located in the thermostat flange. The air bleed allows internal trapped air during cooling system filling to be released.

Operation

OPERATION

The engine cooling thermostat is a wax pellet driven, reverse poppet choke type. The thermostat is designed to provide the fastest warm up possible by preventing leakage through it and to guarantee a minimum engine operating temperature of 88 to 93°C (192 to 199°F). The thermostat also will automatically reach wide open so it will not restrict flow to the radiator as temperature of the coolant rises in hot weather to around 104°C (220°F). Above this temperature the coolant temperature is controlled by the radiator, fan, and ambient temperature, not the thermostat.

Diagnosis and Testing

ENGINE COOLANT THERMOSTAT TESTING

The thermostat is operated by a wax filled container (pellet) which is sealed. When heated coolant reaches a predetermined temperature the wax pellet expands enough to overcome the closing spring and water pump pressure, which forces the valve to open. Coolant leakage into the pellet will cause a thermostat to fail open. Do not attempt to free up a thermostat with a screwdriver.

The thermostat that opens too soon type failure mode is included in the on-board diagnosis. The check engine light will be lit by an open too soon condition. If it has failed open, a Diagnostic Trouble Code (DTC) will be set. Do not change a thermostat for lack of heater performance or temperature gauge position, unless a DTC is present. For other probable causes. See **Diagnosis and Testing**. Thermostat failing shut is the normal long term mode of failure, and normally, only on high mileage vehicles. The temperature gauge will indicate this.

Removal

2.4L - PRIMARY THERMOSTAT

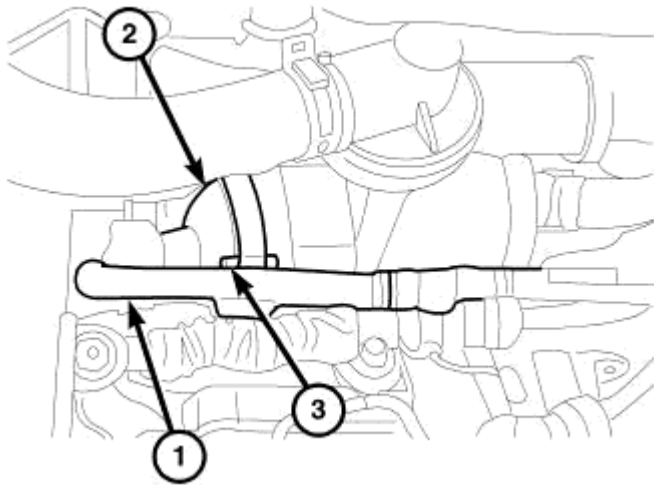


Fig. 116: PRIMARY THERMOSTAT
Courtesy of CHRYSLER LLC

- | |
|-------------------|
| 1 - COOLANT HOSE |
| 2 - INLET HOUSING |

3 - BOLT

1. Partially drain cooling system. See **Standard Procedure** .
2. Remove air filter housing.
3. Disconnect coolant hose (1) from inlet housing (2).
4. Remove inlet housing bolts (3).
5. Remove thermostat assembly, and clean sealing surfaces.

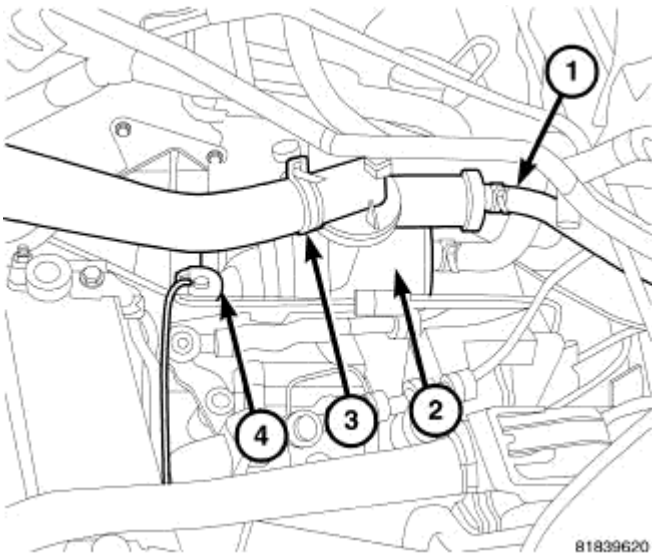
2.4L - SECONDARY THERMOSTAT

Fig. 117: SECONDARY THERMOSTAT
Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - COOLANT HOSE (REAR) |
| 2 - COOLANT ADAPTER |
| 3 - RADIATOR HOSE |
| 4 - RADIATOR HOSE (FRONT) |

1. Partially drain cooling system. See **Standard Procedure** .
2. Remove air filter housing.
3. Disconnect coolant hoses (1) from rear of coolant adapter (2).
4. Remove radiator hose (3).
5. Remove radiator hose (4) from front of coolant adapter (2).
6. Remove coolant adapter mounting bolts.
7. Carefully slide coolant adapter off water pump inlet tube and remove coolant adapter (2) and secondary thermostat.

2.7L ENGINE

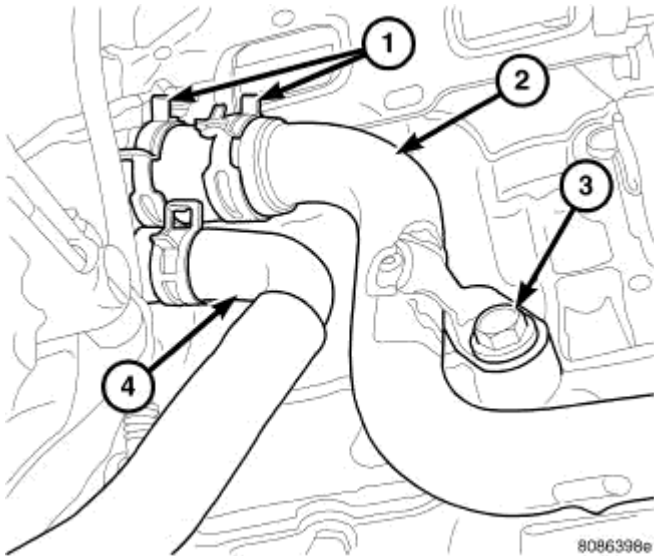


Fig. 118: THERMOSTAT AND HOUSING - 2.7L ENGINE

Courtesy of CHRYSLER LLC

- | |
|--|
| <ul style="list-style-type: none">1 - HOSE CLAMPS2 - RADIATOR HOSE TUBE3 - MOUNTING BOLT4 - RADIATOR HOSE |
|--|

1. Disconnect negative cable from remote jumper terminal.
2. Drain cooling system. See **Standard Procedure** .
3. Raise vehicle on hoist.
4. Remove right front wheel and belt splash shield.
5. Remove accessory drive belts. See **Removal** .
6. Remove lower generator mounting bolt.
7. Lower vehicle.
8. Disconnect generator electrical connectors.
9. Disconnect AC clutch and AC pressure sensor electrical connectors. Reposition wiring harness.
10. Remove oil dipstick and tube. Plug hole in oil pan where dipstick tube mounts with water tight stopper.

WARNING: If hole for dipstick tube in oil pan is not plugged, coolant will enter oil pan. Serious engine damage can occur.

11. Remove remaining generator mounting bolts. Remove generator.
12. Remove radiator hose tube mounting bolt (3).
13. Disconnect hose clamps (1) at thermostat housing.
14. Remove thermostat housing bolts.
15. Remove thermostat and housing.

3.5L ENGINE

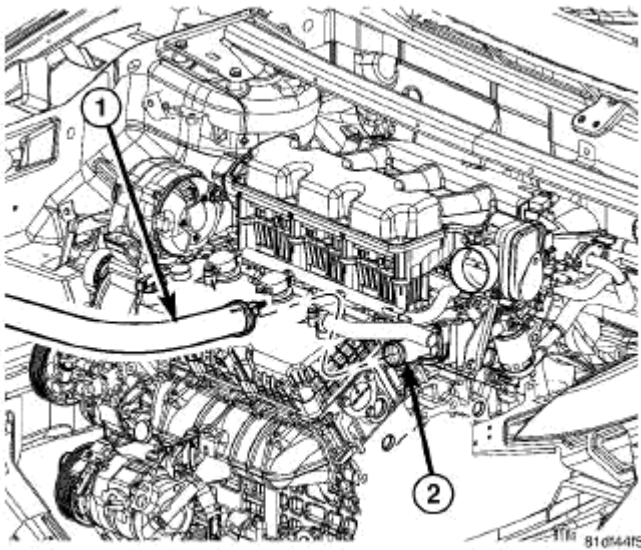


Fig. 119: THERMOSTAT HOUSING & RADIATOR HOSE

Courtesy of CHRYSLER LLC

- | |
|---|
| 1 - RADIATOR HOSE
2 - THERMOSTAT HOUSING |
|---|

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

1. Disconnect negative battery cable.
2. Drain cooling system. See **Standard Procedure** .
3. Remove engine cover.
4. Disconnect radiator upper hose from thermostat housing.
5. Remove thermostat housing bolts.
6. Remove housing, thermostat, and gasket.

2.0L DIESEL ENGINE

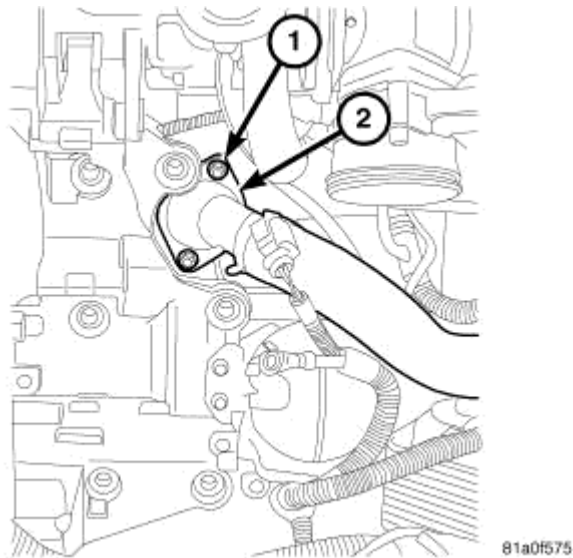


Fig. 120: THERMOSTAT HOUSING - DIESEL
Courtesy of CHRYSLER LLC

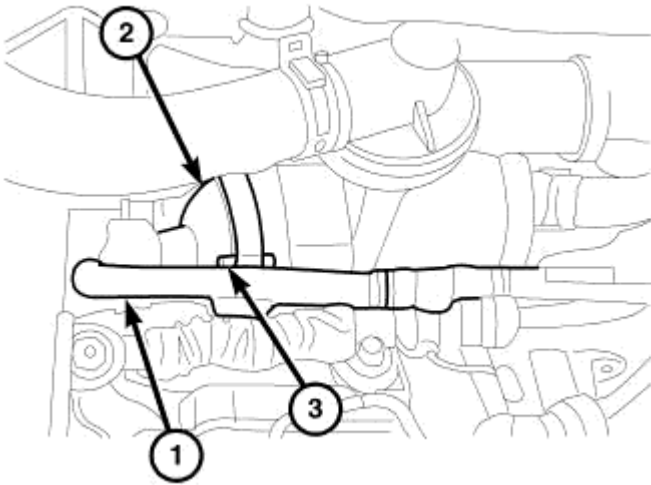
- | |
|---|
| 1 - MOUNTING BOLT
2 - THERMOSTAT HOUSING |
|---|

WARNING: Do not loosen the radiator cap with the cooling system hot and pressurized. Serious burns from the coolant can occur.

1. Disconnect negative battery cable.
2. Remove engine cover. Refer to **Engine - Removal**.
3. Drain engine coolant below thermostat level using draincock only. See **Standard Procedure**.
4. Disconnect coolant temperature sensor electrical connector.
5. Remove coolant hoses and by-pass hose from thermostat housing.
6. Loosen accessory drive belt and reposition generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal**.
7. Remove thermostat housing (2) and O-ring.
8. Clean all sealing surfaces.

Installation

2.4L - PRIMARY THERMOSTAT



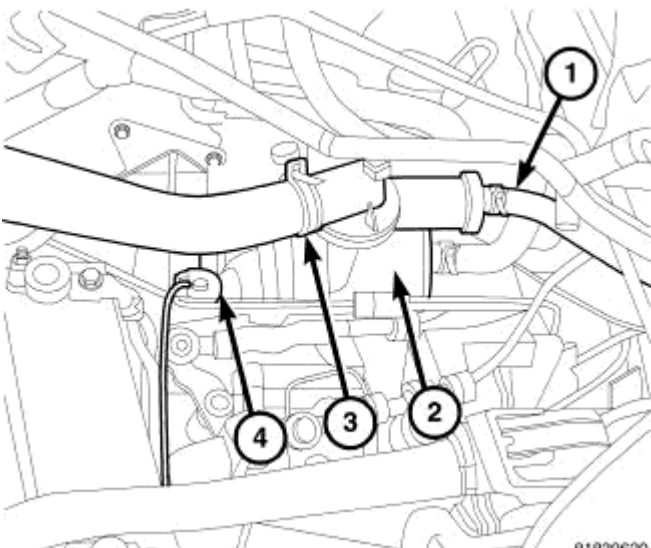
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Fig. 121: PRIMARY THERMOSTAT

Courtesy of CHRYSLER LLC

- | |
|-------------------|
| 1 - COOLANT HOSE |
| 2 - INLET HOUSING |
| 3 - BOLT |

1. Position thermostat into the water plenum, aligning air bleed with the location notch on inlet housing (2).
2. Install inlet housing (2) onto coolant adapter. Tighten bolts to 9 N.m (79 in. lbs.).
3. Connect coolant hose (1).
4. Install air filter housing.
5. Fill cooling system. See **Standard Procedure** .

2.4L - SECONDARY THERMOSTAT

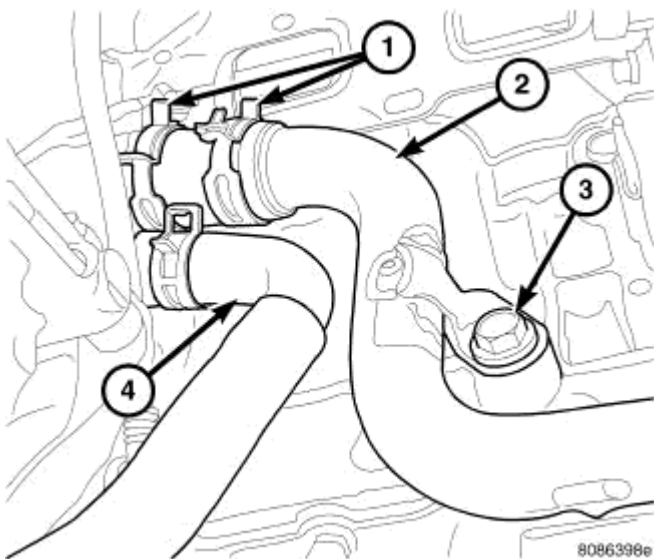
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Fig. 122: SECONDARY THERMOSTAT

Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - COOLANT HOSE (REAR) |
| 2 - COOLANT ADAPTER |
| 3 - RADIATOR HOSE |
| 4 - RADIATOR HOSE (FRONT) |

1. Position thermostat into the cylinder head.
2. Inspect the water pump inlet tube O-rings for damage before installing the tube in the coolant adapter. Replace O-ring as necessary.
3. Lubricate O-rings with soapy water.
4. Position coolant adapter on water pump inlet tube and cylinder head.
5. Install coolant adapter mounting bolts. Tighten bolts to 18.1 N.m (159 in. lbs.).
6. Connect front coolant hose (1).
7. Connect two rear coolant hoses (1).
8. Connect radiator hose (3).
9. Install air filter housing.
10. Fill cooling system. See **Standard Procedure** .

2.7L ENGINE**Fig. 123: THERMOSTAT AND HOUSING - 2.7L ENGINE**

Courtesy of CHRYSLER LLC

- | |
|------------------------|
| 1 - HOSE CLAMPS |
| 2 - RADIATOR HOSE TUBE |
| 3 - MOUNTING BOLT |

4 - RADIATOR HOSE

1. Clean gasket sealing surfaces.

NOTE: Install thermostat with the bleed valve located at the 12 o'clock position.

2. Install thermostat and gasket into the thermostat housing.
3. Install thermostat and housing to cylinder block. Tighten attaching bolts to 12 N.m (105 in. lbs.).
4. Connect hoses at thermostat housing.
5. Install generator and attaching bolts.

CAUTION: Before removing plug in oil pan, clean residual coolant from area.

6. Remove plug in oil pan and install engine oil dipstick tube.
7. Reconnect AC clutch and AC pressure sensor connectors.
8. Reconnect generator connectors.
9. Raise vehicle on hoist.
10. Install accessory drive belts. See **Cooling/Accessory Drive/BELT, Serpentine - Installation**.
11. Install belt splash shield and right front wheel.
12. Lower vehicle.
13. Reconnect negative battery cable.
14. Fill cooling system. See **Standard Procedure**.

3.5L ENGINE

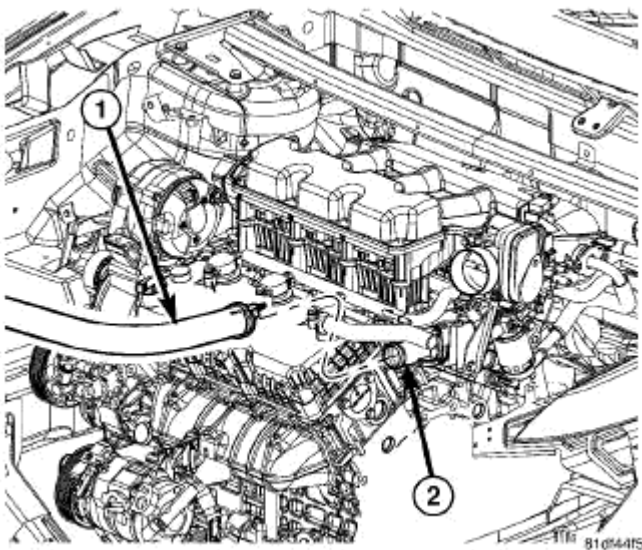
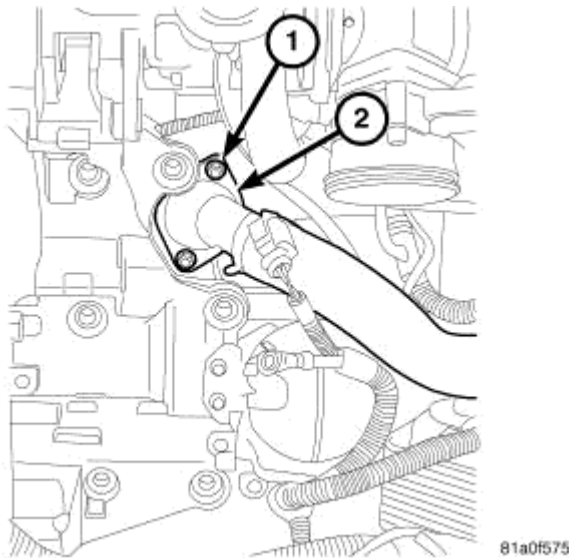


Fig. 124: THERMOSTAT HOUSING & RADIATOR HOSE

Courtesy of CHRYSLER LLC

- 1 - RADIATOR HOSE
- 2 - THERMOSTAT HOUSING

1. Clean gasket sealing surfaces.
2. Install thermostat and gasket into thermostat housing. For ease of installation, install bolts in housing for thermostat and gasket retention.
3. Install thermostat and housing to Intake manifold. Tighten bolts to 12 N.m (105 in. lbs.).
4. Connect radiator hoses and install hose clamp.
5. Install engine cover.
6. Refill cooling system. See **Standard Procedure** .
7. Connect negative cable.

2.0L DIESEL ENGINE**Fig. 125: THERMOSTAT HOUSING - DIESEL**

Courtesy of CHRYSLER LLC

- 1 - MOUNTING BOLT
- 2 - THERMOSTAT HOUSING

1. Clean all sealing surfaces.
2. Position and install thermostat housing (2). Tighten bolts to 9N.m (80 lbs.in.).

NOTE: **Inspect condition of all clamps and hoses, replace as necessary.**

3. Connect coolant temperature sensor electrical connector.
4. Install generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Installation** .
5. Install engine cover. Refer to **Engine - Installation** .
6. Connect negative battery cable.
7. Fill coolant system to proper level with appropriate coolant mixture. See **Standard Procedure** .
8. Start engine and inspect for leaks.

TUBE, WATER INLET

Removal

WATER INLET TUBE

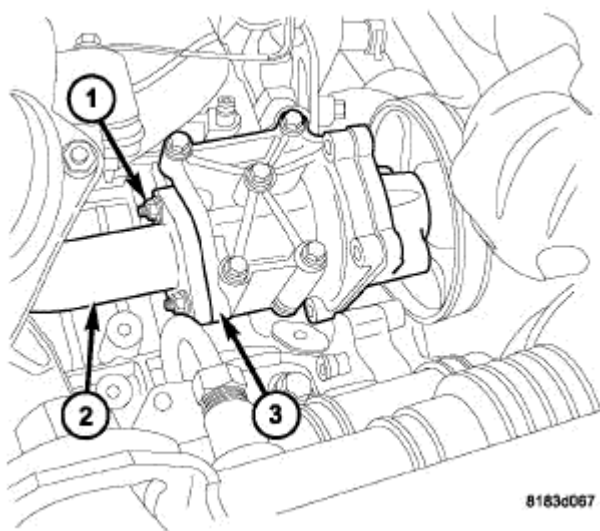


Fig. 126: WATER PUMP INLET TUBE WORLD ENGINE

Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - NUTS |
| 2 - WATER PUMP INLET TUBE |
| 3 - WATER PUMP HOUSING |

The water pump inlet tube (2) connects the water pump to the coolant adapter. This tube is sealed by an O-ring and held in place by fasteners to the water pump housing.

1. Drain cooling system. See **Standard Procedure** .
2. Remove the coolant adapter and secondary thermostat. See **Removal** .
3. Raise and support vehicle.
4. Remove inlet tube mounting nuts (1).

5. Remove inlet tube (2).

Installation

WATER INLET TUBE

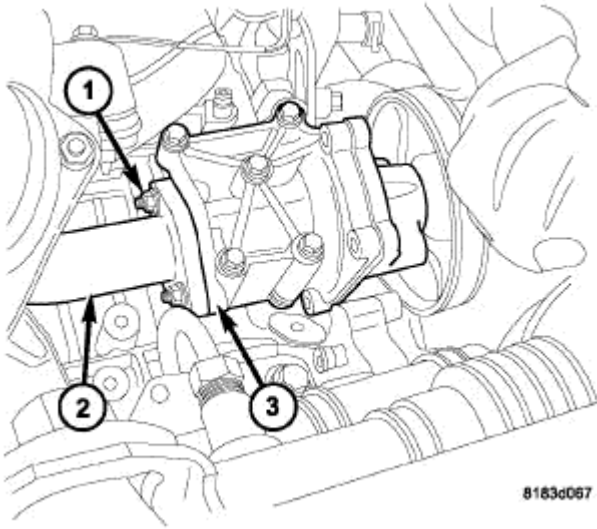


Fig. 127: WATER PUMP INLET TUBE WORLD ENGINE

Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - NUTS |
| 2 - WATER PUMP INLET TUBE |
| 3 - WATER PUMP HOUSING |

1. Inspect the O-ring for damage before installing the tube. Replace O-ring as necessary.
2. Lubricate O-rings with soapy water.
3. Install new water inlet gasket between tube and water pump housing (2).
4. Position water pump inlet tube (3) on water pump housing (2). Hand tighten nuts to aide in tube alignment.
5. Install secondary thermostat and coolant adapter. See **Installation** .
6. Tighten coolant tube nuts (1) to 24 N.m (212 in. lbs.).
7. Fill cooling system. See **Standard Procedure** .

TRANSMISSION

COOLER, TRANSMISSION OIL

Description

DESCRIPTION

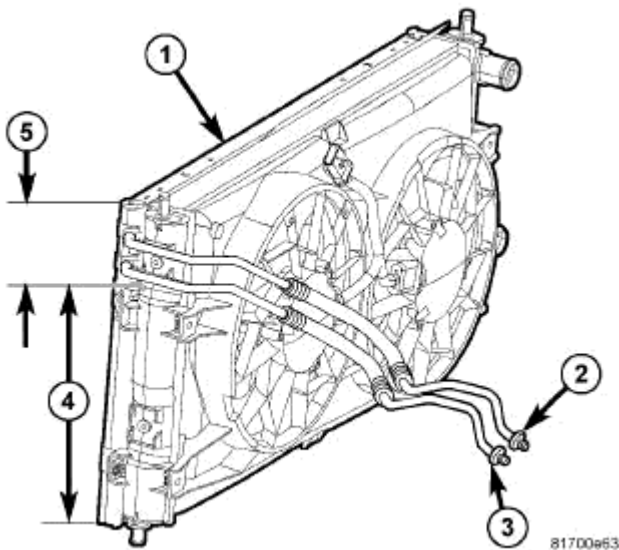


Fig. 128: TRANSMISSION OIL COOLER
 Courtesy of CHRYSLER LLC

- | |
|--|
| 1 - Air Conditioning Condenser/Transmission Oil Cooler
2 - Transmission Cooler Outlet
3 - Transmission Cooler Inlet
4 - Air Conditioning Condenser Portion
5 - Transmission Cooler Portion |
|--|

An external oil-to-air type automatic transmission oil cooler is mounted to the front of the radiator and is integral to the A/C condenser. The six upper tubes are used for transaxle oil cooling, and the remaining tubes below are for the A/C system.

The cooler uses tubes and rubber hoses to feed oil to and from the automatic transaxle. The replaceable inlet and outlet tubes use quick-connect type fittings. The trans oil cooler is replaced with the A/C condenser.

Operation

OPERATION

The oil flows from the transmission to the oil-to-air cooler. Heat is then transferred into the air.

Removal

TRANSMISSION OIL COOLER

1. The transmission oil cooler is integral to the A/C condenser. To remove the AC condenser assembly. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Removal** .

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

Cleaning

CLEANING

Check the AC condenser for debris on the cooling fin surfaces. Clean as necessary.

Inspection

INSPECTION

Inspect all hoses, tubes, clamps and connections for leaks, cracks, or damage. Replace as necessary. Use only approved transmission oil cooler hoses that are molded to fit the space available.

Installation

TRANSMISSION OIL COOLER

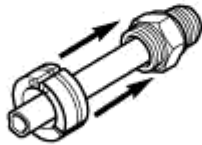
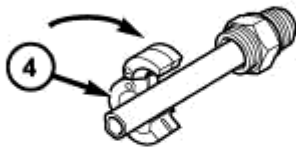
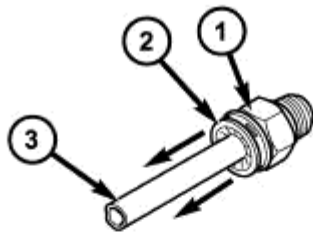
1. The transmission oil cooler is integral to the A/C condenser. To install the AC condenser assembly. Refer to **Heating and Air Conditioning/Plumbing/CONDENSER, A/C - Installation** .

TUBES AND HOSES, TRANSMISSION OIL COOLER

Standard Procedure

QUICK CONNECT FITTING DISASSEMBLY/ASSEMBLY

DISCONNECT



81019138

Fig. 129: OIL COOLER LINE QUICK CONNECT FITTING - DISASSEMBLY

Courtesy of CHRYSLER LLC

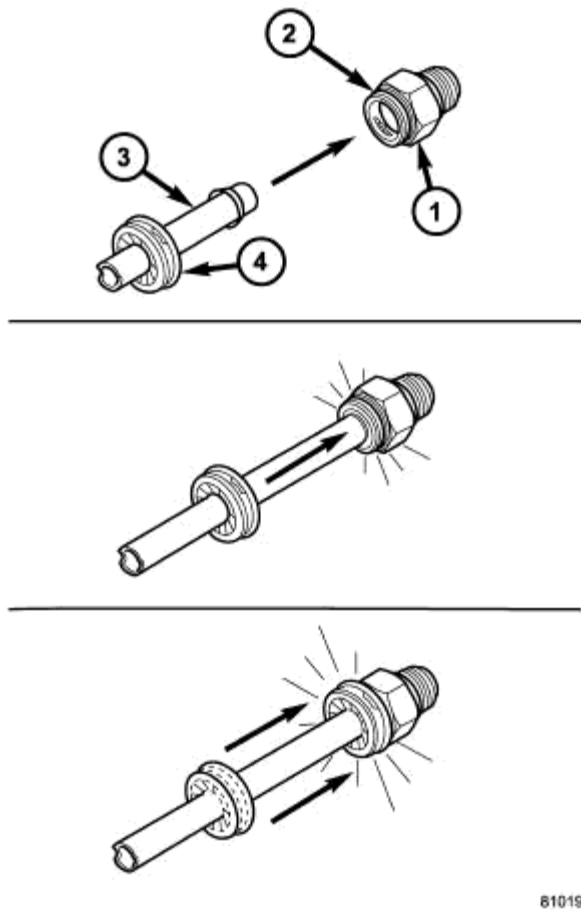
- | |
|--|
| 1 - QUICK CONNECT FITTING
2 - DUST CAP
3 - OIL COOLER LINE
4 - SPECIAL TOOL 8875A |
|--|

1. Remove the dust cap by pulling it straight back off of the quick connect fitting (1).
2. Place the properly sized release tool (4) onto the transmission cooler line with the fingers of the tool facing the quick connect fitting.
3. Slide the release tool down the transmission line and engage the fingers of the tool into the retaining clip.

When properly engaged in the clip, the tool will fit flush against the quick connect fitting.

4. Rotate the release tool 60° to expand the retaining clip.
5. While holding the release tool against the quick connect fitting, pull back on the transmission cooler line to remove it.
6. If the quick connect fitting is damaged or leaking at the transmission oil cooler or transmission, remove the fitting.

CONNECT



8101913a

Fig. 130: OIL COOLER LINE QUICK CONNECT FITTING - ASSEMBLY
Courtesy of CHRYSLER LLC

- | |
|---------------------------|
| 1 - QUICK CONNECT FITTING |
| 2 - CLIP |
| 3 - OIL COOLER LINE |
| 4 - DUST CAP |

1. If removed, install the quick connect fitting into the transmission oil cooler or the transmission. Tighten

2009 Dodge Journey R/T

2009 ENGINE Cooling - Journey

the fitting to 15 N.m (132 in. lbs.).

2. Align the cooler line (3) with the quick connect fitting while pushing straight into the fitting.
3. Push in on the transmission cooler line until a clicks heard or felt.
4. Slide the dust cap (4) down the transmission cooler line and snap it over the quick connect fitting until it is fully seated and rotates freely. The dust cap will only snap over the quick connect fitting when the transmission cooler line is properly installed.

NOTE: **If the dust cap will not snap into place, repeat step 2.**