

2009 ELECTRICAL

Charging - Service Information - Journey

DESCRIPTION

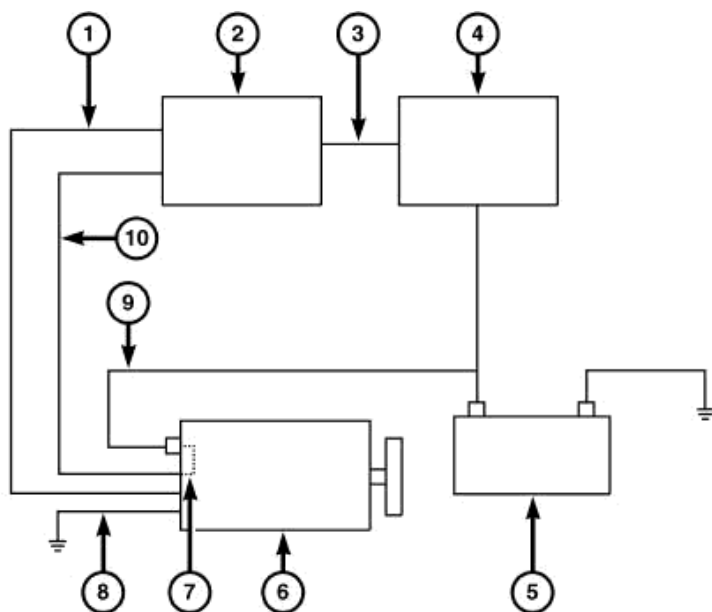
DESCRIPTION

The charging system consists of:

- Generator
- Decoupler Pulley (2.4L and Diesel Only)
- Electronic Voltage Regulator (EVR) circuitry within the Powertrain Control Module (PCM)
- Ignition switch (refer to **IGNITION CONTROL - SERVICE INFORMATION** for information)
- Battery (refer to **BATTERY SYSTEM** for information)
- Inlet Air Temperature (calculated battery temperature) (If equipped)
- Voltmeter (refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION** for information if equipped)
- Wiring harness and connections (refer to **SYSTEM WIRING DIAGRAMS** for information)
- Accessory drive belt (refer to **COOLING** for more information)

OPERATION

OPERATION



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Fig. 1: Charging System Operation
Courtesy of CHRYSLER LLC

2009 Dodge Journey R/T

2009 ELECTRICAL Charging - Service Information - Journey

1 - Generator Field Circuit	6 - Generator
2 - Powertrain Control Module (PCM)	7 - Resistor (Gasoline Engines Only)
3 - Battery Sense Input	8 - Generator Case Ground
4 - Gateway (Totally Integrated Power Module, Integrated Power Module)	9 - B+ Circuit (Generator Output)
5 - Battery	10 - B+ Sense Circuit

The charging system is turned on and off with the Powertrain Control Module (PCM) (2) and ignition switch with engine running. The field circuit will not be energized until engine is running and ignition switch is on. This voltage is connected through the PCM (2) and supplied to the generator field circuit (1) at the back of the generator (6). The generator (6) is internally grounded through the generator case ground (8). The generator (6) regulates the field using Pin 1 of the field connector (High side driver).

The generator (6) is driven by the engine through a serpentine belt and pulley or decoupler pulley arrangement.

The PCM (2) receives a voltage input from the generator (6) via the B+ sense circuit (10) and also a battery sense input (3) from the Gateway (Totally Integrated Power Module, Integrated Power Module) (4), it then compares the voltages to the desired voltage programed in the Electronic Voltage Regulator (EVR) software and if there is a difference it sends a signal to the generator EVR circuit to increase or decrease output. It uses Pulse Width Modulation (PWM) to send signals to the generator circuitry to control the amount of output from the generator. The amount of DC current produced by the generator is controlled by the EVR circuitry contained within the PCM (2).

All vehicles are equipped with On-Board Diagnostics (OBD). All OBD-sensed systems, including EVR circuitry, are monitored by the PCM. Each monitored circuit is assigned a Diagnostic Trouble Code (DTC). The PCM will store a DTC in electronic memory for certain failures it detects.

The Check Gauges Lamp (if equipped) monitors: **charging system voltage**, engine coolant temperature and engine oil pressure. If an extreme condition is indicated, the lamp will be illuminated. This is done as reminder to check the three gauges. The lamp is located on the instrument panel. Refer to **INSTRUMENT CLUSTER - SERVICE INFORMATION** for additional information.

Voltage is monitored at B+ sense circuit (10) to insure the cable is connected. If the B+ circuit (generator output) (9) cable is loose anywhere in the circuit the B+ sense circuit (10) will show high voltage. This condition causes the PCM (2) to shut down the generator field circuit (1). Because of this feature, pin 2 of the field connector is internally connected to the B+ circuit (9).

The diesel generator is internally regulated. The generator and PCM communicate for diagnostics, etc. If the generator regulator becomes disconnected from the PCM it will operate, but in a default mode.

DIAGNOSIS AND TESTING

ON-BOARD DIAGNOSTIC SYSTEM

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit

monitored by the OBD system. Some circuits are checked continuously and some are checked only under certain conditions.

If the OBD system senses that a monitored circuit is bad, it will put a DTC into electronic memory. The DTC will stay in electronic memory as long as the circuit continues to be bad. The PCM is programmed to clear the memory after 40 good trips if the problem does not occur again.

DIAGNOSTIC TROUBLE CODES

A DTC description can be read using the scan tool. Refer to the appropriate Powertrain Diagnostic article for information.

A DTC does not identify which component in a circuit is bad. Thus, a DTC should be treated as a symptom, not as the cause for the problem. In some cases, because of the design of the diagnostic test procedure, a DTC can be the reason for another DTC to be set. Therefore, it is important that the test procedures be followed in sequence, to understand what caused a DTC to be set.

ERASING DIAGNOSTIC TROUBLE CODES

The scan tool must be used to erase a DTC.

The following procedures may be used to diagnose the charging system if:

- the check gauges lamp or battery lamp is illuminated with the engine running
- the voltmeter (if equipped) does not register properly
- an undercharged or overcharged battery condition occurs.

Remember that an undercharged battery is often caused by:

- accessories being left on with the engine not running
- a faulty or improperly adjusted switch that allows a lamp to stay on. Refer to Ignition-Off Draw Test. Refer to **Electrical/Battery System/BATTERY - Standard Procedure**
- loose generator belt.

INSPECTION

The Powertrain Control Module (PCM) monitors critical input and output circuits of the charging system, making sure they are operational. A Diagnostic Trouble Code (DTC) is assigned to each input and output circuit monitored by the On-Board Diagnostic (OBD) system. Some charging system circuits are checked continuously, and some are checked only under certain conditions.

Refer to Diagnostic Trouble Codes in; Powertrain Diagnostic service information for more DTC information. This will include a complete list of DTC's including DTC's for the charging system.

To perform a complete test of the charging system, refer to the appropriate Powertrain Diagnostic Procedures service information and the scan tool. Perform the following inspections before attaching the scan tool.

2009 Dodge Journey R/T

2009 ELECTRICAL Charging - Service Information - Journey

1. Inspect the battery condition. Refer to **Electrical/Battery System - Diagnosis and Testing** for procedures.
2. Inspect condition of battery cable terminals, battery posts, connections at engine block, starter solenoid and relay. They should be clean and tight. Repair as required.
3. Inspect all fuses in the fuseblock for tightness in receptacles. They should be properly installed and tight. Repair or replace as required.
4. Inspect generator mounting bolts for tightness. Replace or tighten bolts if required. Refer to **Specifications**. Also refer to **GENERATOR** Removal/Installation procedures. .
5. Inspect generator drive belt condition and tension. Tighten or replace belt as required.
6. Inspect decoupler pulley (if equipped). Ensure decoupler pulley is driving the alternator rotor.
7. Inspect automatic belt tensioner (if equipped). Refer to **BELT, SERPENTINE** for more information.
8. Inspect generator electrical connections at generator field, battery output, and ground terminal (if equipped). Also check generator ground wire connection at engine (if equipped). They should all be clean and tight. Repair as required.

SPECIFICATIONS

GENERATOR

GENERATOR

MANUFACTURER	ENGINE	NOMINAL RATING	MINIMUM OUTPUT (AMPS) (@ SPECIFIED TEST CONDITIONS)
BOSCH	2.0L Diesel	150A	100A
BOSCH	2.0L Diesel	200A	150A
MITSUBISHI ELECTRIC	2.4L	160A	110A
DENSO	2.7, 3.5L	140A	90A
DENSO	2.7, 3.5L	160A	110A
TEST CONDITIONS			
1. Engine RPM : 2500 RPM (ENGINE HOT)			
2. Voltage Output : 13.0 - 16.0 V			

TORQUE

TORQUE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Battery Terminal Nut	4.5	-	40
Generator B+ Nut	10	-	88.5
Generator Mounting Bolt - 2.4L	61	45	-
Generator Mounting Bolt - 2.7L	27	20	-

2009 Dodge Journey R/T

2009 ELECTRICAL Charging - Service Information - Journey

Generator Mounting Bolt - 3.5L	42	31	-
Lower Idler Pulley Bolt - 2.4L	50	37	-

GENERATOR

DESCRIPTION

DESCRIPTION

The generator is belt-driven by the engine. It is serviced only as a complete assembly. If the generator fails for any reason, the entire assembly must be replaced. The generator produces DC voltage.

OPERATION

OPERATION

As the energized rotor begins to rotate within the generator, the spinning magnetic field induces a current into the windings of the stator coil.

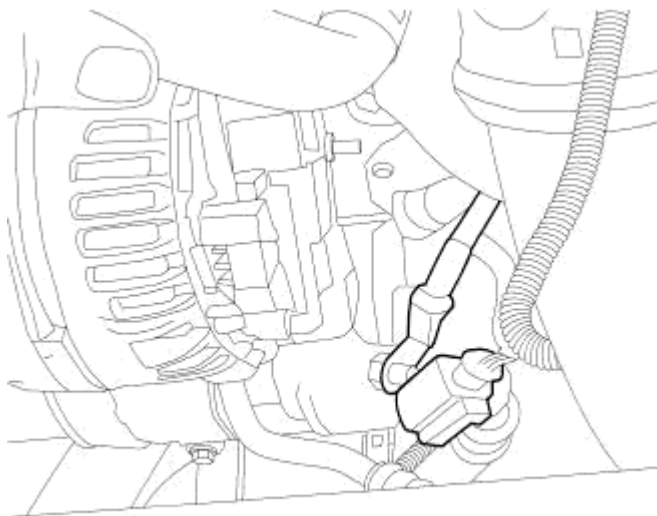
The Y type stator winding connections deliver the induced AC current to positive and negative diodes for rectification. From the diodes, rectified DC current is delivered to the vehicles electrical system through the generator, battery, and ground terminals.

Noise emitting from the generator may be caused by:

- Worn, loose or defective bearings
- Loose or defective drive pulley
- Incorrect, worn, damaged or misadjusted drive belt
- Loose mounting bolts
- Misaligned drive pulley
- Defective stator or diode
- Damaged internal fins

REMOVAL

2.0L TURBO DIESEL

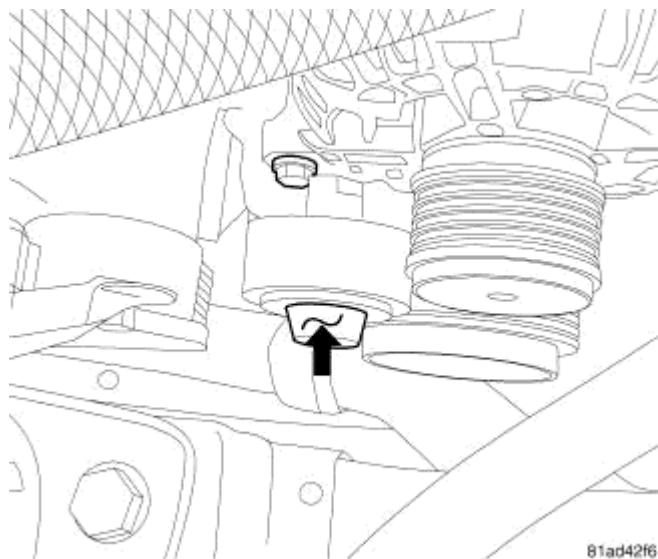


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Fig. 2: Generator Cables

Courtesy of CHRYSLER LLC

1. Remove engine cover.
2. Disconnect and isolate the negative battery cable.
3. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
4. Disconnect battery cable from generator.
5. Disconnect electrical connector from generator.



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Fig. 3: Idler Cap Location

Courtesy of CHRYSLER LLC

6. Remove cap from idler pulley mounting bolt.

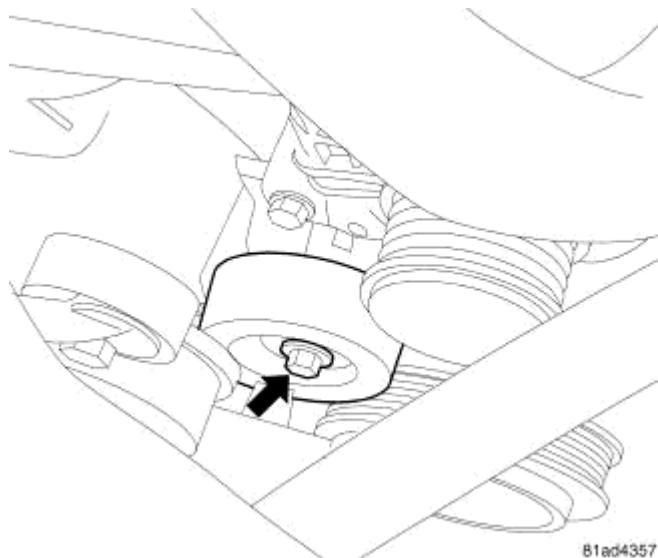


Fig. 4: Idler Pulley Bolt Location
Courtesy of CHRYSLER LLC

7. Remove idler pulley bolt.

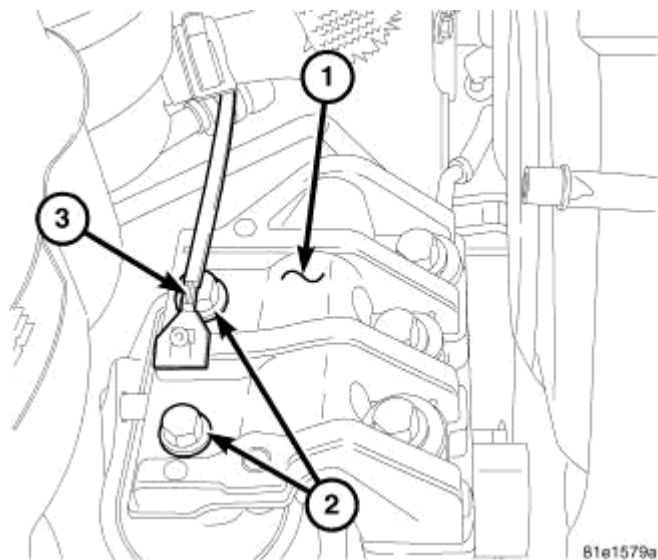


Fig. 5: Right Engine Mount
Courtesy of CHRYSLER LLC

8. It may be necessary to remove the two engine mounting bolts (2) from the right engine mount (1) and reposition engine in order to remove the lower generator mounting bolt. Reposition ground strap (3) if required. Refer to **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.

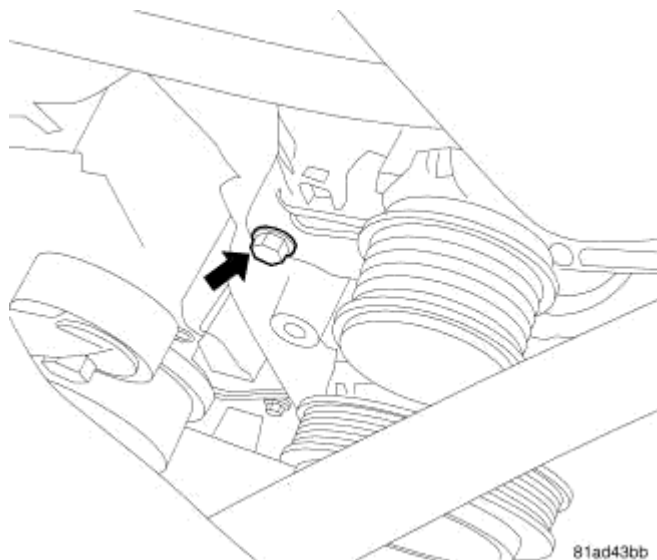


Fig. 6: Generator Lower Mounting Bolt
Courtesy of CHRYSLER LLC

9. Remove lower generator mounting bolt.

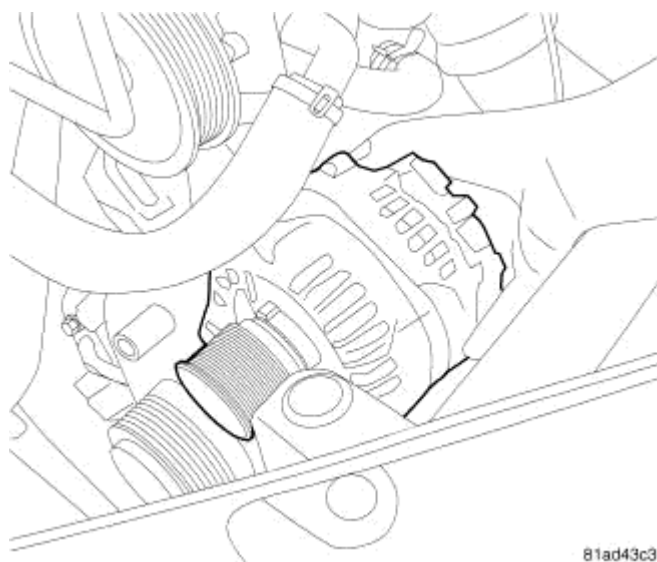
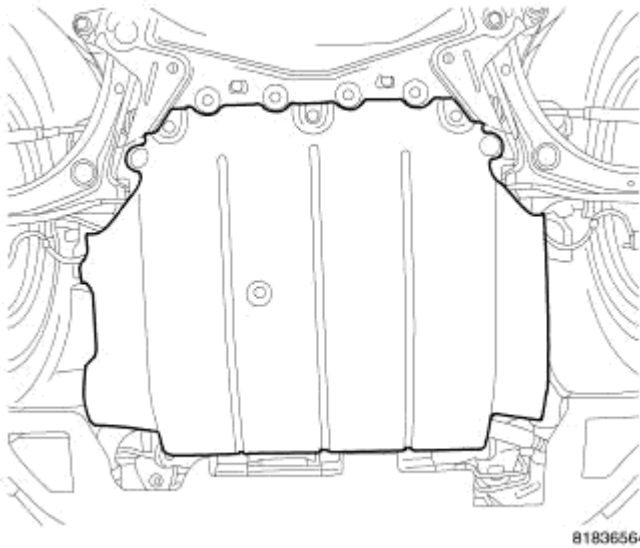


Fig. 7: Removing/Installing Generator
Courtesy of CHRYSLER LLC

10. Remove upper generator mounting bolt.
11. Remove generator.

2.4L

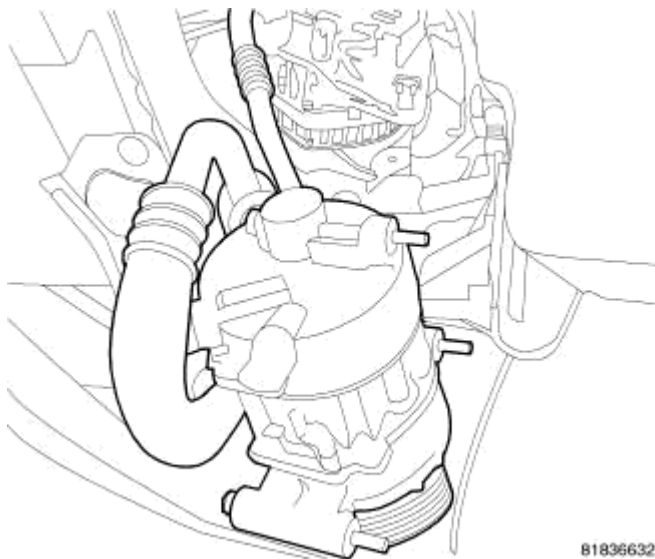


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Fig. 8: Removing/Installing Underbody Air Dam
Courtesy of CHRYSLER LLC

CAUTION: Disconnect the negative battery cable before removing the battery output wire from generator. Failure to do so can result in injury or damage to electrical system.

1. Disconnect and isolate negative battery cable.
2. Remove underbody air dam.
3. Remove right front wheelhouse splash shield. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
4. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .



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Fig. 9: Identifying A/C Compressor
Courtesy of CHRYSLER LLC

NOTE: Do not disconnect the A/C lines when relocating the A/C compressor.

CAUTION: Support the A/C compressor when relocating. Failure to properly support the A/C compressor can cause damage to the lines and or seals. This can cause a leak in the A/C system.

5. Relocate A/C compressor. Refer to Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal .

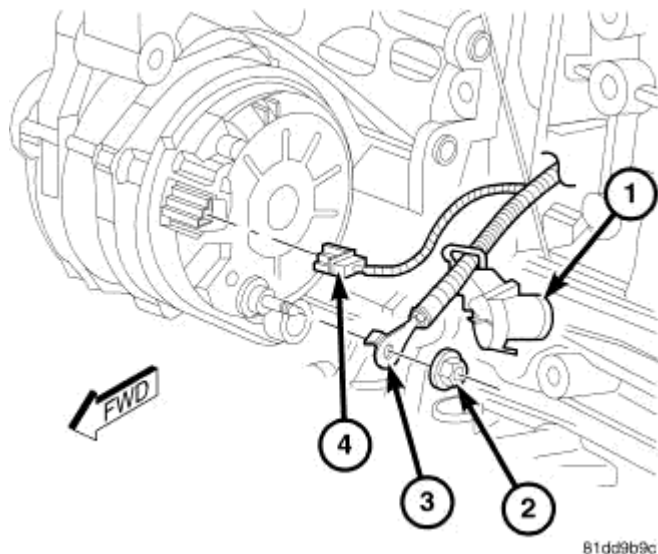


Fig. 10: 2.4L Generator Electrical Connector
Courtesy of CHRYSLER LLC

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

6. Unsnap plastic protective cover (1) from B+ mounting stud.
7. Remove B+ terminal mounting nut (2) and B+ terminal (3) from generator.
8. Disconnect field wire electrical connector (4) by pushing on connector tab.

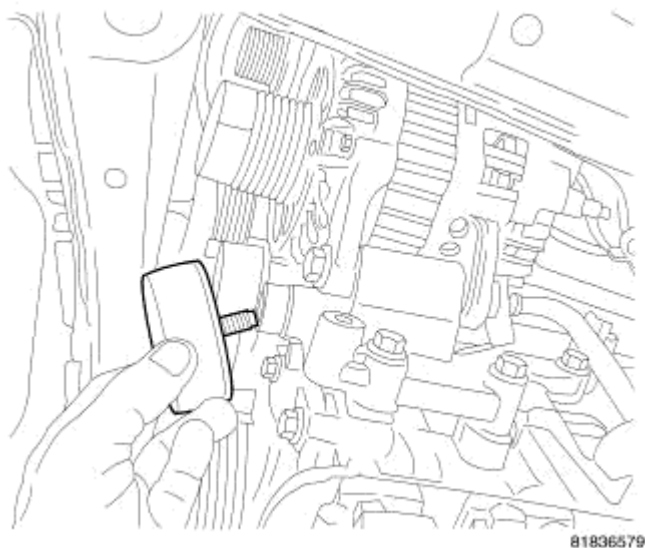


Fig. 11: Removing/Installing Idler Pulley
Courtesy of CHRYSLER LLC

9. Remove bolt and lower idler pulley.

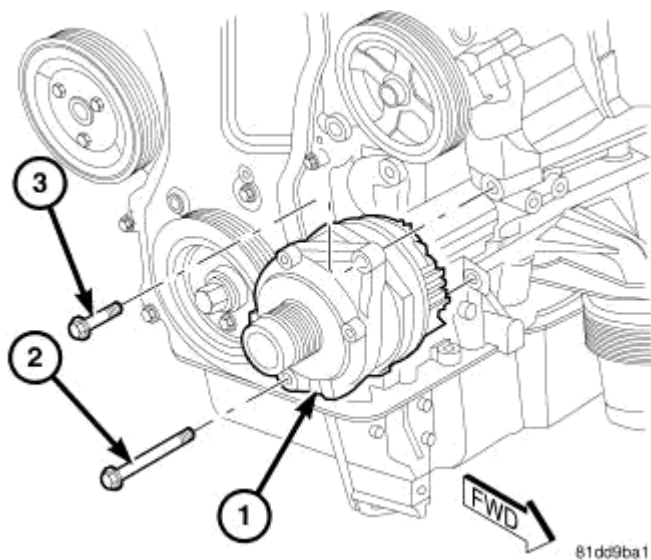
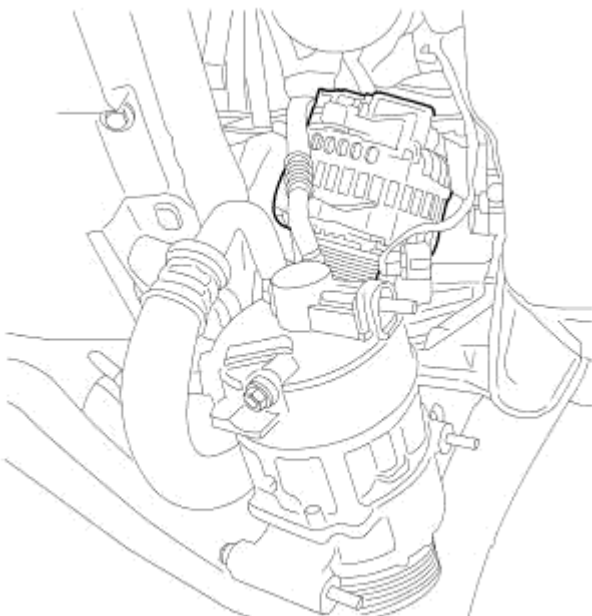


Fig. 12: Removing/Installing Generator
Courtesy of CHRYSLER LLC

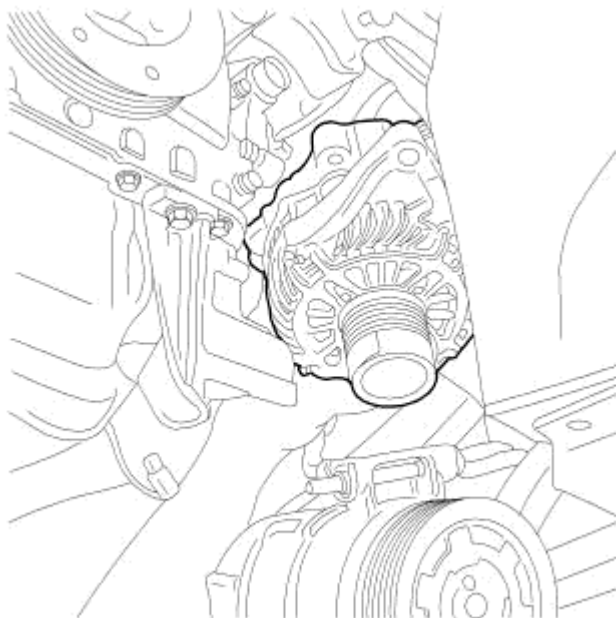
10. Remove upper mounting bolt (3) from generator (1).
11. Remove lower mounting bolt (2) from generator (1).
12. Remove generator (1) from engine mounting bracket.



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Fig. 13: Identifying Generator Pulley
Courtesy of CHRYSLER LLC

13. Rotate generator so that the pulley faces down.



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Fig. 14: Removing/Installing Generator
Courtesy of CHRYSLER LLC

14. Position generator in order to move past the A/C compressor and out of vehicle.

2.7L

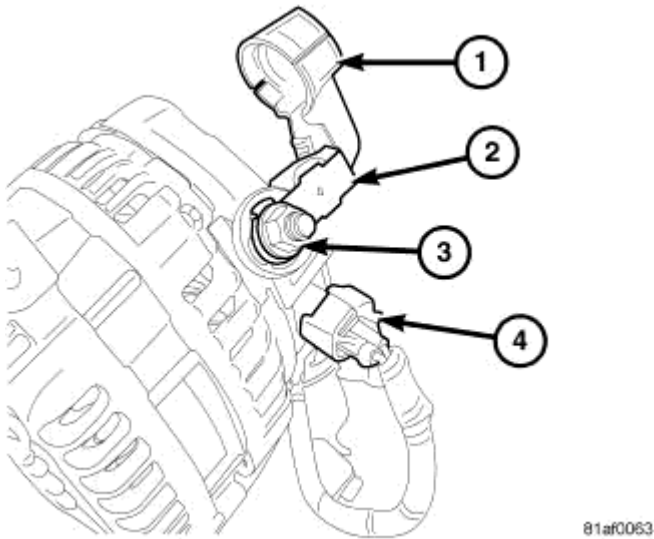


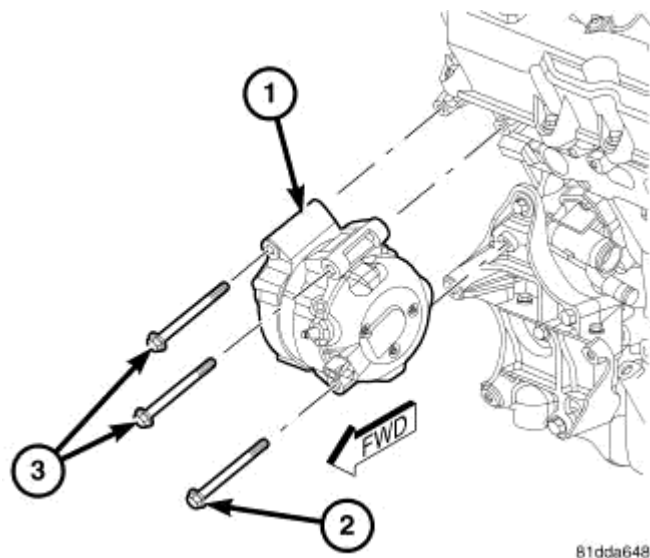
Fig. 15: Alternator Electrical Connection
Courtesy of CHRYSLER LLC

CAUTION: Disconnect the negative battery cable before removing the battery output wire from generator. Failure to do so can result in injury or damage to electrical system.

1. Disconnect and isolate negative battery cable.

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

2. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
3. Unsnap plastic protective cover (1) from B+ mounting stud.
4. Remove B+ terminal mounting nut (2) and B+ terminal (3) at top of generator.
5. Disconnect field wire electrical connector (4) by pushing on connector tab.

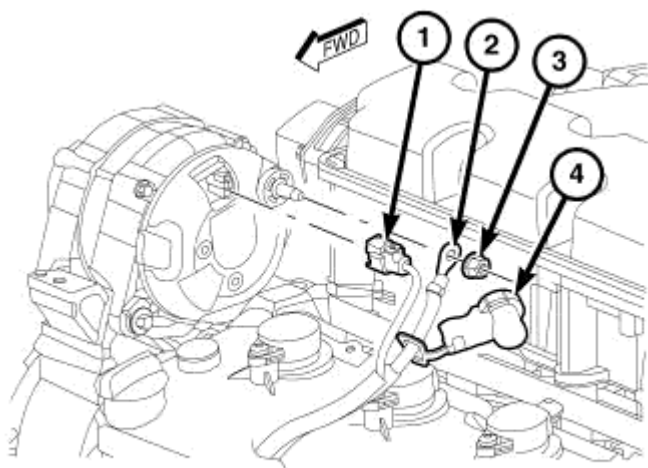


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Fig. 16: 2.7L Removing/Installing Generator
Courtesy of CHRYSLER LLC

6. Remove upper mounting bolts (3) from generator (1).
7. Remove lower mounting bolt (2) from generator (1).
8. Remove generator (1) from engine mounting bracket.

3.5L



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Fig. 17: 3.5L Generator Electrical Connector
Courtesy of CHRYSLER LLC

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

1. Disconnect and isolate negative battery cable.
2. Remove generator drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.
3. Unsnap plastic protective cover (4) from B+ mounting stud.
4. Remove B+ terminal mounting nut (3) and B+ terminal (2) at top of generator.
5. Disconnect field wire electrical connector (1) by pushing on connector tab.

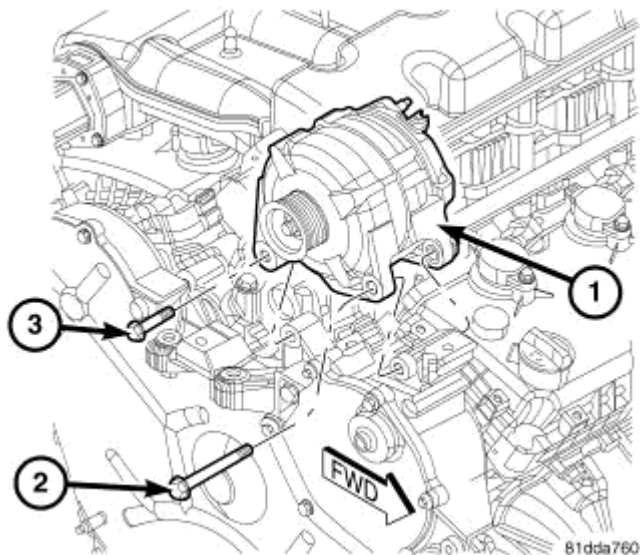
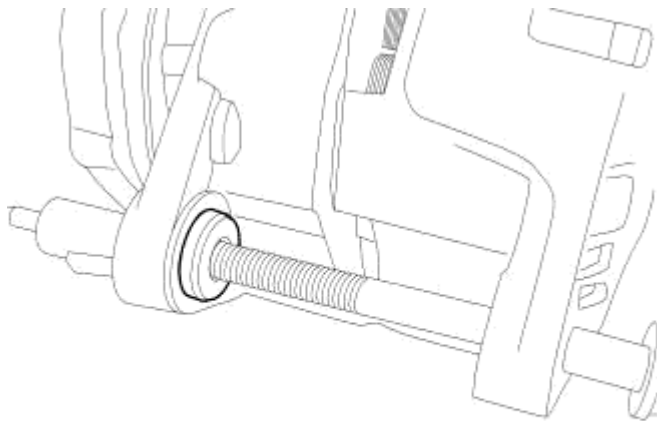


Fig. 18: 3.5L Removing/Installing Generator
Courtesy of CHRYSLER LLC

6. Remove short mounting bolt (3) from generator (1).
7. Remove long mounting bolt (2) from generator (1).
8. Remove generator (1) from engine mounting bracket.

INSTALLATION

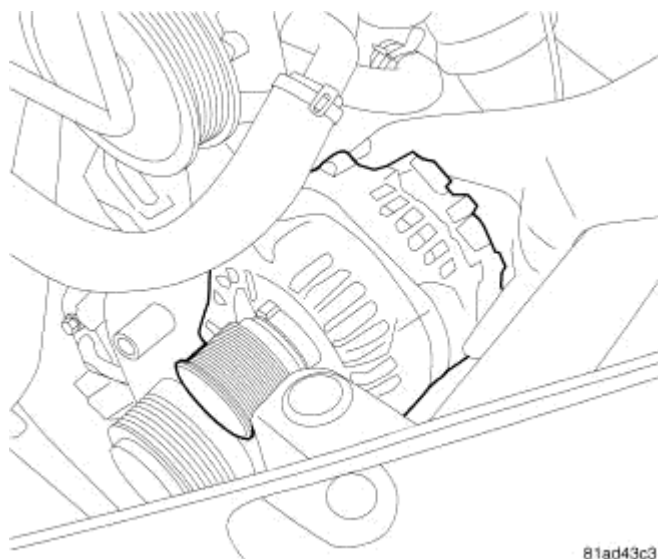
2.0L TURBO DIESEL



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Fig. 19: Generator Bushing
Courtesy of CHRYSLER LLC

1. If reinstalling the old generator, install a generator mounting bolt and tap bushing out slightly to ease mounting of generator.



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Fig. 20: Removing/Installing Generator
Courtesy of CHRYSLER LLC

2. Install generator.

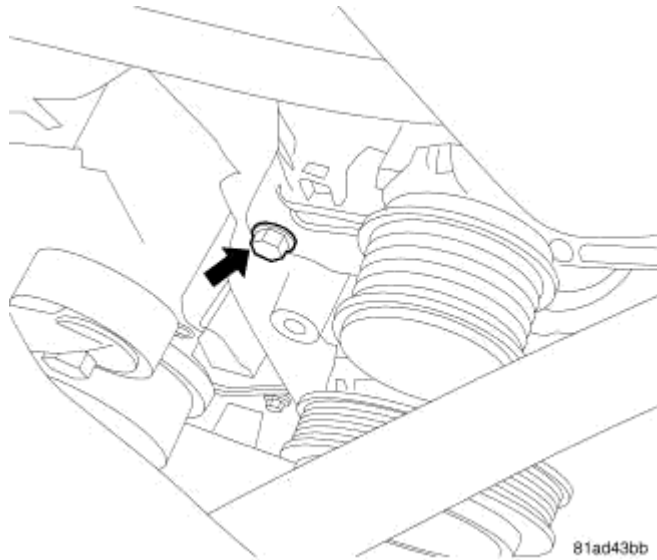


Fig. 21: Generator Lower Mounting Bolt
Courtesy of CHRYSLER LLC

3. Loosely install lower generator mounting bolt.
4. Install upper generator mounting bolt.
5. Tighten generator mounting bolts to 54 N.m (40 ft. lbs.).

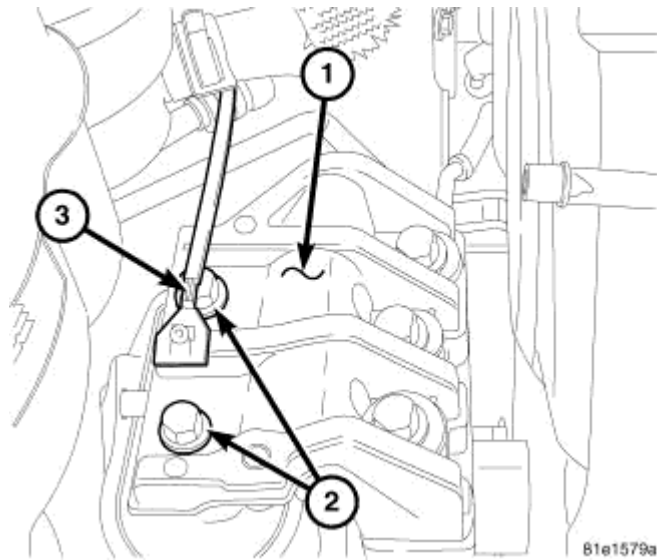


Fig. 22: Right Engine Mount
Courtesy of CHRYSLER LLC

6. If removed, install two engine mounting bolts (2) to right engine mount (1). Reposition ground strap (3) if required. Refer to **Engine/Engine Mounting/BRACKET, Engine Mount - Installation** .

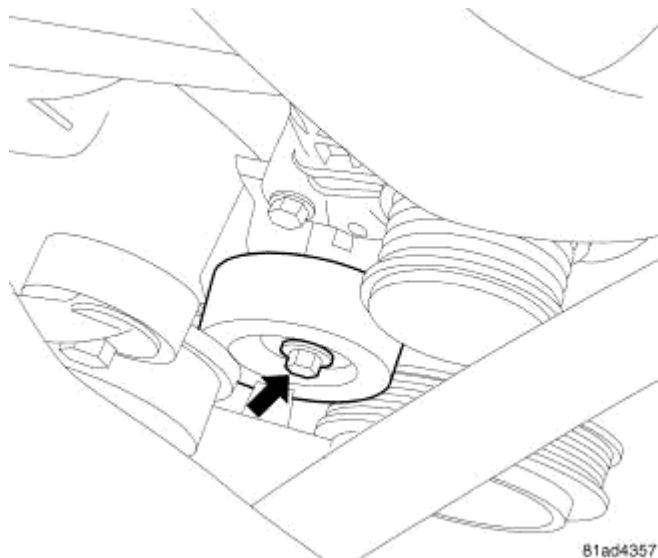


Fig. 23: Idler Pulley Bolt Location
Courtesy of CHRYSLER LLC

7. Install idler pulley and tighten bolt. Refer to **Cooling/Accessory Drive/PULLEY, Idler - Installation** .

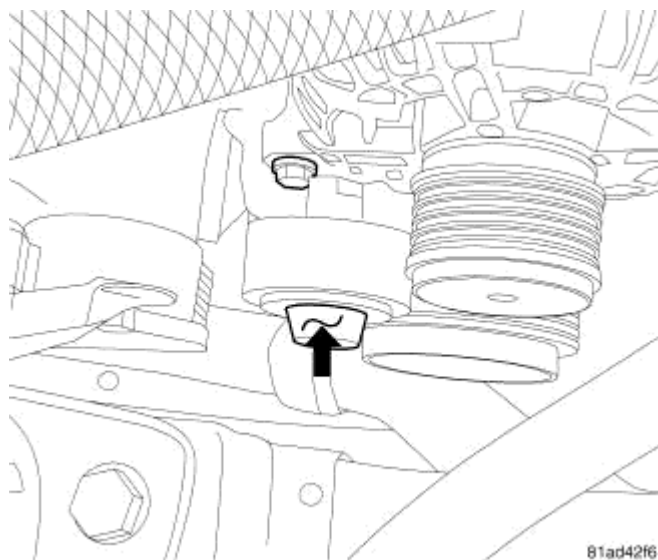
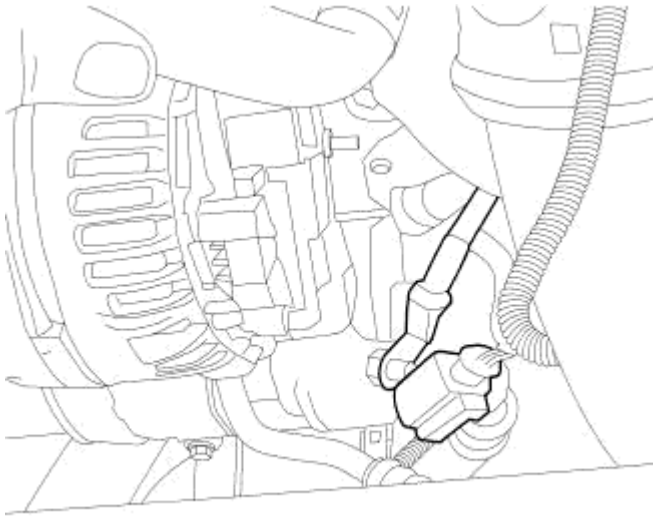


Fig. 24: Idler Cap Location
Courtesy of CHRYSLER LLC

8. Install idler bolt cap.

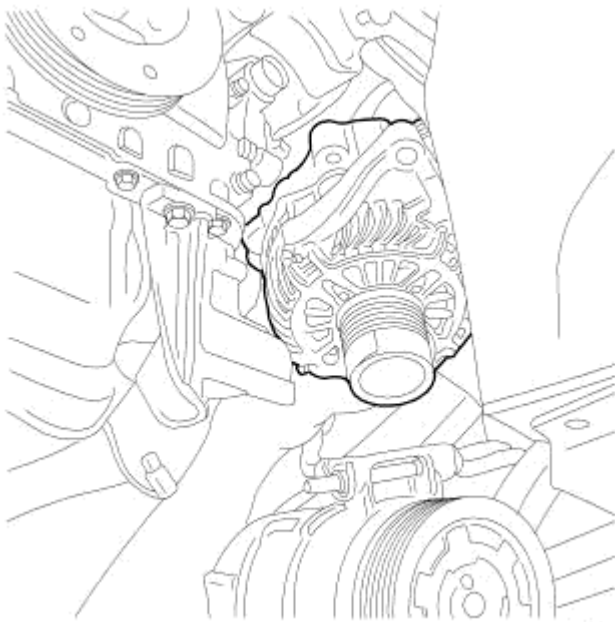


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Fig. 25: Generator Cables
Courtesy of CHRYSLER LLC

9. Connect battery cable to generator and tighten nut to 10 N.m (88.5 in. lbs.).
10. Connect electrical connector to generator.
11. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation**.
12. Reconnect negative battery cable.
13. Install engine cover.

2.4L

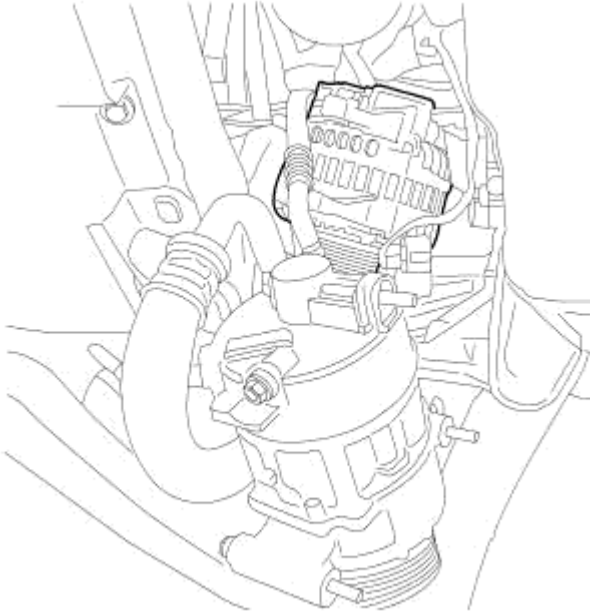


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Fig. 26: Removing/Installing Generator

Courtesy of CHRYSLER LLC

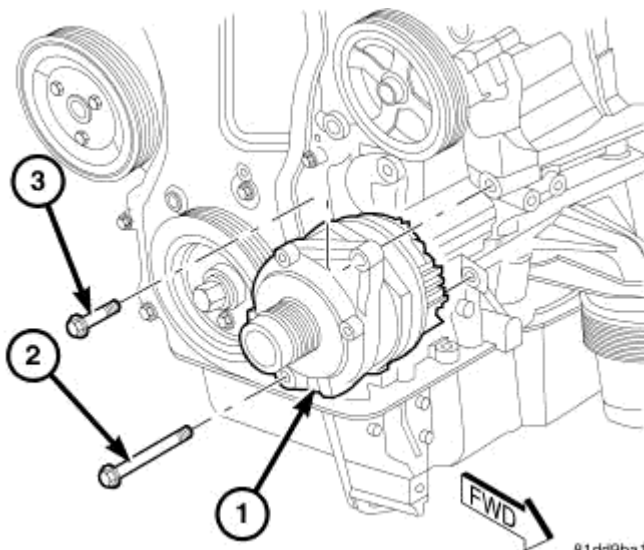
1. Position generator in order to move past the A/C compressor and up toward generator mounting bracket.



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Fig. 27: Identifying Generator Pulley
Courtesy of CHRYSLER LLC

2. Continue moving generator up towards generator mounting bracket.



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Fig. 28: Removing/Installing Generator
Courtesy of CHRYSLER LLC

3. Install generator (1) to engine mounting bracket.

4. Install lower mounting bolt (2) and upper mounting bolt (3) to generator (1). Tighten bolts to 61 N.m (45 ft. lbs.).

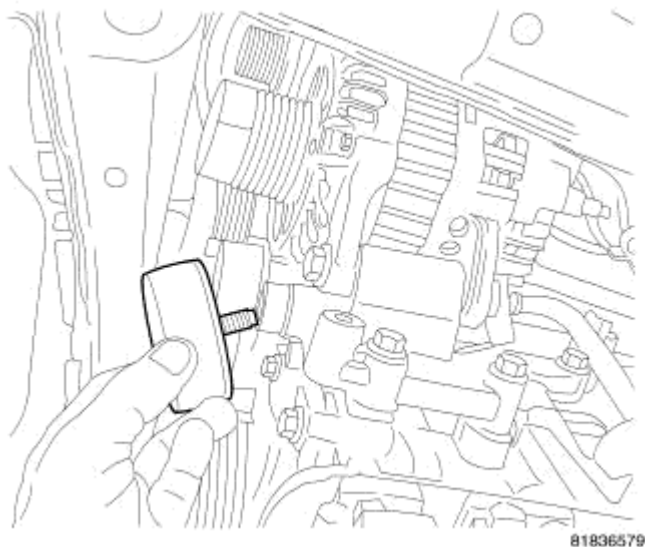


Fig. 29: Removing/Installing Idler Pulley
Courtesy of CHRYSLER LLC

5. Install lower idler pulley and bolt. Tighten bolt to 50 N.m (37 ft. lbs.).

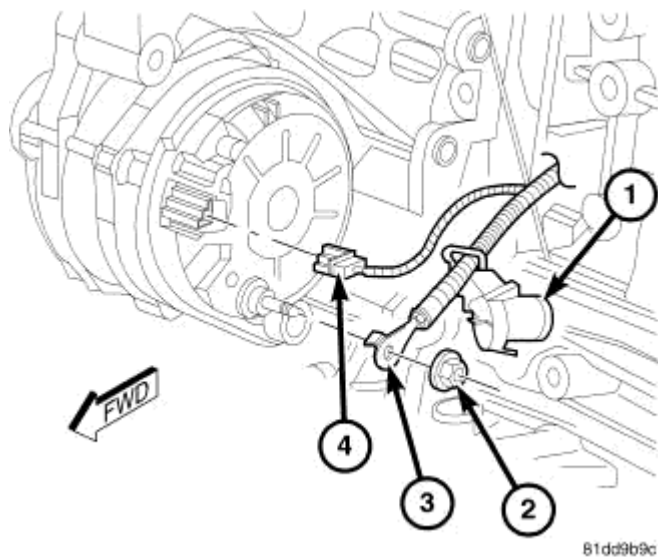


Fig. 30: 2.4L Generator Electrical Connector
Courtesy of CHRYSLER LLC

6. Connect field wire connector (4) into generator.
7. Install B+ terminal (3) and nut (2) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
8. Snap plastic protective cover (1) to B+ terminal.

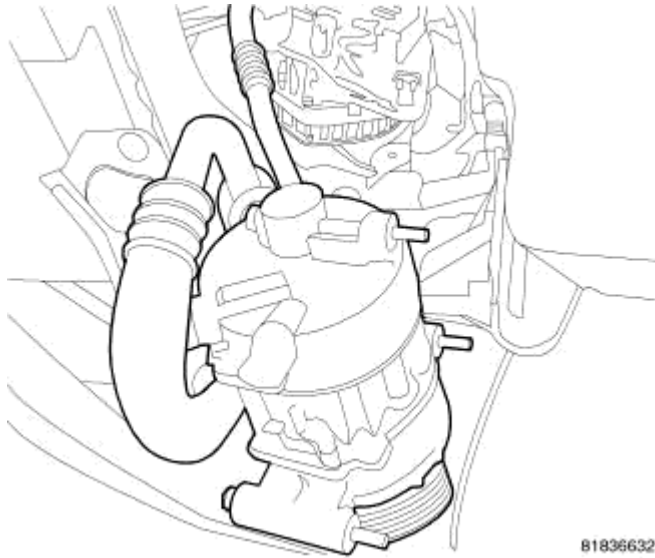


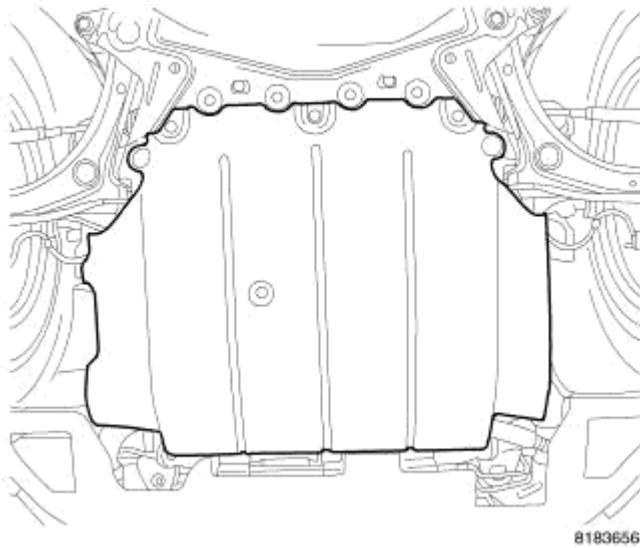
Fig. 31: Identifying A/C Compressor
Courtesy of CHRYSLER LLC

9. Install A/C compressor. Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Installation** .

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt **MUST** be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to **BELT, SERPENTINE** .

10. Install drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .

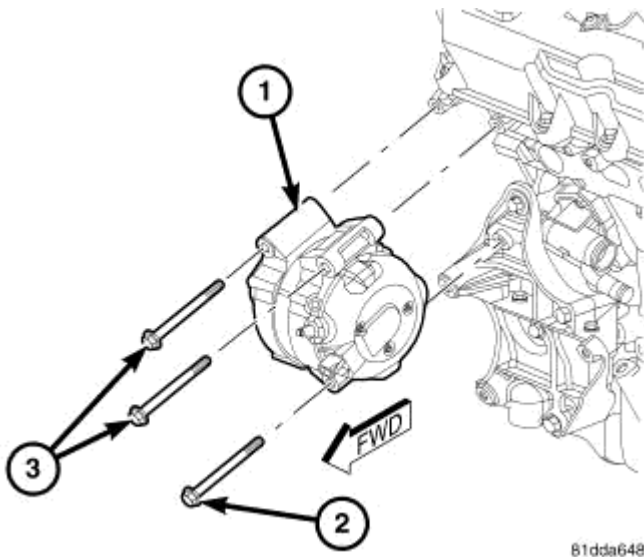


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Fig. 32: Removing/Installing Underbody Air Dam
Courtesy of CHRYSLER LLC

11. Install right front wheelhouse splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**.
12. Install underbody air dam.
13. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

2.7L



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Fig. 33: 2.7L Removing/Installing Generator
Courtesy of CHRYSLER LLC

1. Install generator (1) to engine mounting bracket.
2. Install lower mounting bolt (2) and upper mounting bolt (3) to generator (1). Tighten bolts to 27 N.m (20 ft. lbs.).

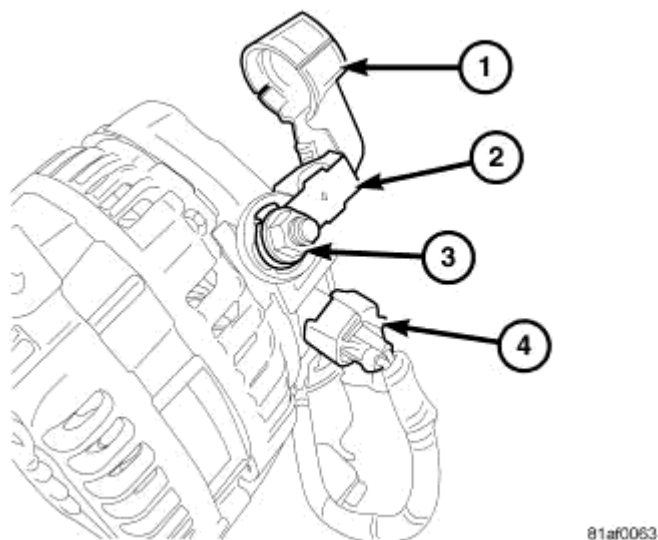


Fig. 34: Alternator Electrical Connection
Courtesy of CHRYSLER LLC

3. Connect field wire connector (4) into generator.
4. Install B+ terminal (3) and nut (2) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
5. Snap plastic protective cover (1) to B+ terminal.

CAUTION: Never force a belt over a pulley rim using a screwdriver. The synthetic fiber of the belt can be damaged.

CAUTION: When installing a serpentine accessory drive belt, the belt **MUST** be routed correctly. The water pump will be rotating in the wrong direction if the belt is installed incorrectly, causing the engine to overheat. Refer to belt routing label in engine compartment, or refer to **BELT, SERPENTINE** .

6. Install drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
7. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).

3.5L

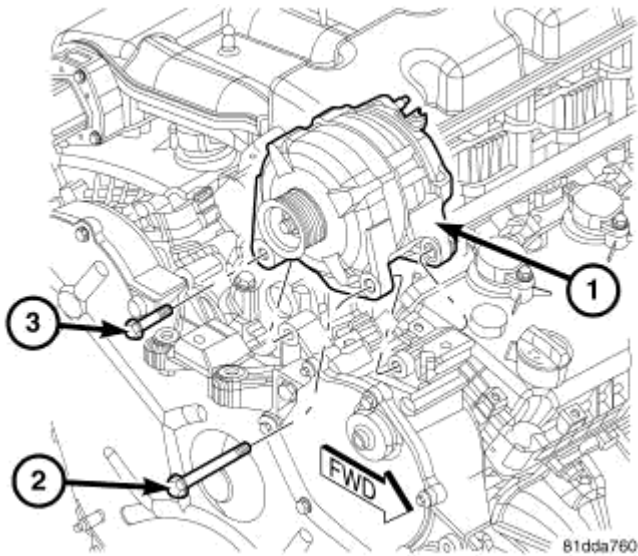


Fig. 35: 3.5L Removing/Installing Generator
Courtesy of CHRYSLER LLC

1. Install generator (1) to engine mounting bracket.
2. Install long mounting bolt (2) and short mounting bolt (3) to generator (1). Tighten bolts to 42 N.m (31 ft. lbs.).

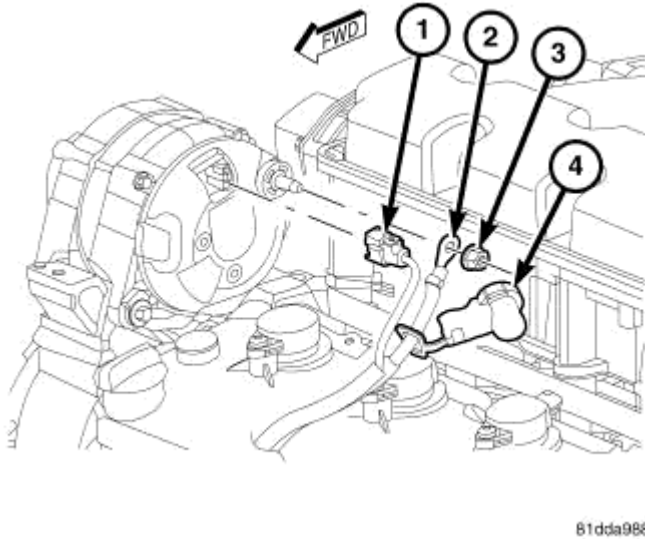


Fig. 36: 3.5L Generator Electrical Connector
Courtesy of CHRYSLER LLC

3. Connect field wire connector (1) into generator.
4. Install B+ terminal (2) and nut (3) to generator mounting stud. Tighten nut to 10 N.m (88.5 in. lbs.)
5. Snap plastic protective cover (4) to B+ terminal.
6. Install drive belt. Refer to **BELT, SERPENTINE** for belt routing, belt adjustment and bolt tightening procedures.

2009 Dodge Journey R/T

2009 ELECTRICAL Charging - Service Information - Journey

7. Connect negative battery cable, tighten nut to 4.5 N.m (40 in. lbs.).