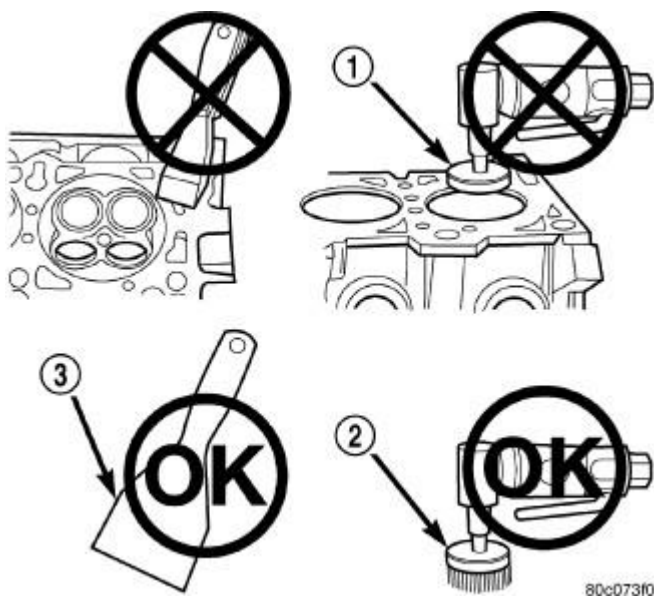


**2009 ENGINE****2.8L Diesel - Service Information - Grand Caravan, Town & Country****DESCRIPTION****DESCRIPTION**

The 2.8L (2776 cc) four-cylinder "common rail" direct injection engine is an in-line overhead valve design. The engine utilizes a cast iron cylinder block. The engine has a one piece aluminum cylinder head with four valves per cylinder and dual overhead cam shafts. The 2.8L is turbocharged, intercooled and also equipped with a EGR cooler.

The identification stamp for the 2.8L is located on the right side of the engine block, below the turbocharger. The engine code label is located on the front timing cover and is the same as the engine I.D. and serial number. There is also a fuel system label on the front timing cover used for fuel system identification during ECM programming.

**STANDARD PROCEDURE****ENGINE GASKET SURFACE PREPARATION**

**Fig. 1: Proper Tool Usage For Surface Preparation**  
Courtesy of CHRYSLER LLC

- 1 - ABRASIVE PAD
- 2 - 3M ROLOC™ BRISTLE DISC
- 3 - PLASTIC SCRAPER

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

**Never** use the following to clean gasket surfaces:

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

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

Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover
- Plastic scraper
- Sealing surfaces must be free of grease or oil residue. Clean surfaces with Mopar® brake parts cleaner (or equivalent)

### COMPRESSION TEST

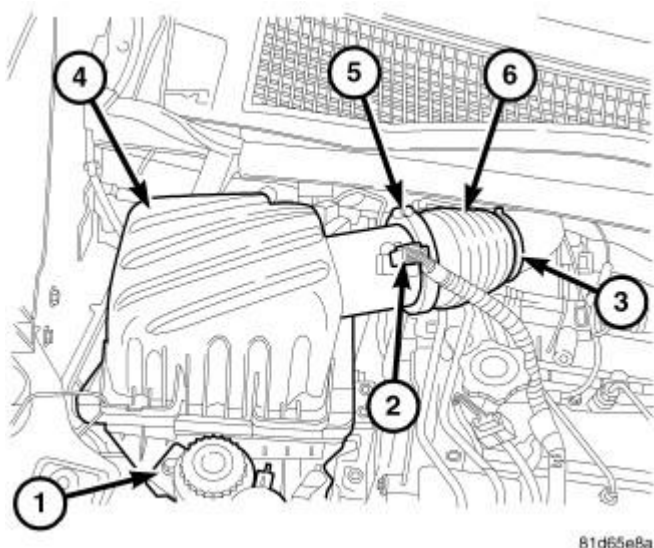
1. Warm up the engine to operating temperature (approximately 80°C).
2. Shut off the engine.
3. Remove the engine cover.
4. Disconnect the fuel feed and return lines from the fuel filter.
5. Use a vacuum pump connected to the return line until no more fuel comes out.
6. Remove the fuel injectors.
7. Cranks the engine with the starter to remove combustion residue in the cylinders.
8. Install the compression test adapter 10010 into the injector hole of the cylinder to be tested. Install the injector retainer bolts and tighten.
9. Test compression pressure by cranking the engine with the starter for at least eight revolutions.
10. Measure the pressure in all of the cylinders.
11. The maximum allowable compression difference between cylinders is 10 bar (44 psi.)
12. Remove tool 10010.
13. Replace the high pressure fuel line.
14. Install the fuel injectors.
15. Install the engine cover.

### REMOVAL

### REMOVAL

## 2009 Chrysler Town & Country LX

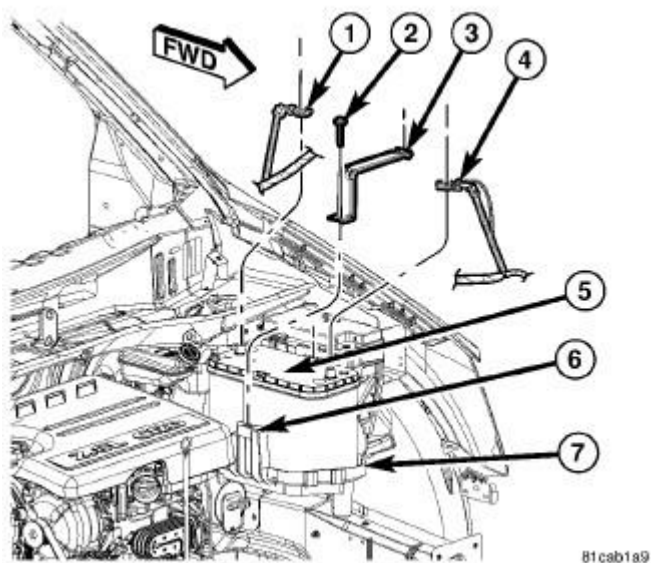
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**Fig. 2: Intake Air Box**

Courtesy of CHRYSLER LLC

1. Remove the intake air box (4). See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
2. Disconnect the harness connector from the valve (2) in the turbocharger air inlet tube.



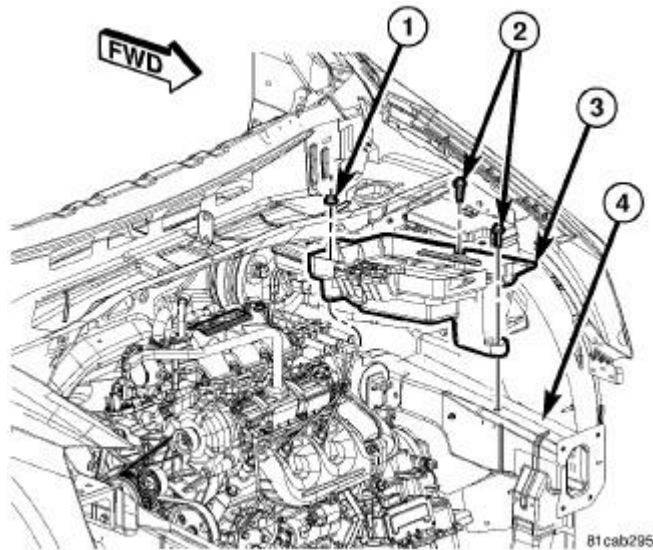
**Fig. 3: Battery Cables**

Courtesy of CHRYSLER LLC

3. Disconnect the battery cables (1) and (4).
4. Remove the battery (5). Refer to **Electrical - Engine Systems/Battery System/BATTERY - Removal**.

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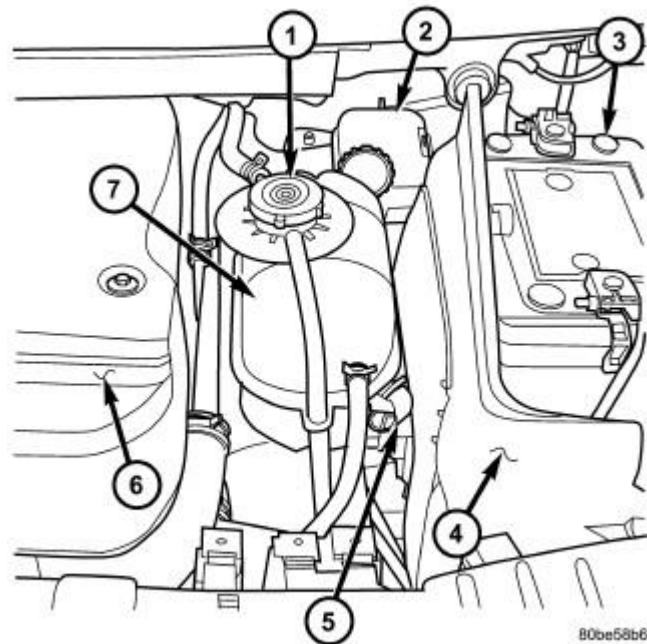
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**Fig. 4: Battery Tray**

Courtesy of CHRYSLER LLC

5. Remove the battery tray (3). Refer to **Electrical - Engine Systems/Battery System/TRAY, Battery - Removal**.



**Fig. 5: Coolant Recovery Container - Diesel**

Courtesy of CHRYSLER LLC

1 - PRESSURE/VENT CAP

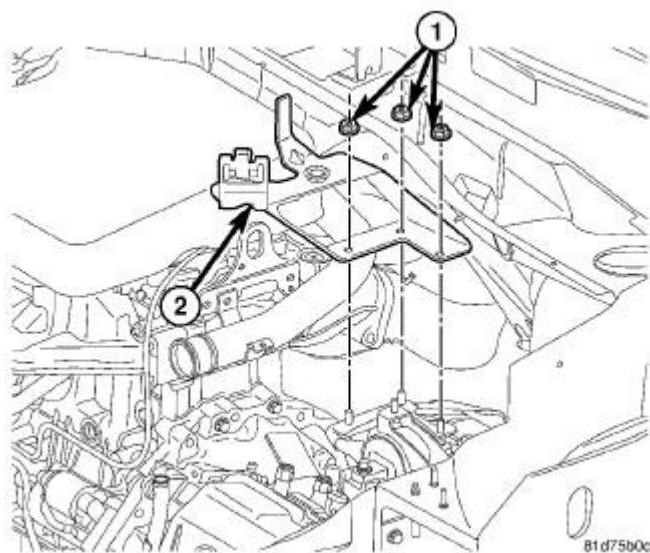


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- 2 - BRAKE MASTER CYLINDER
- 3 - BATTERY
- 4 - BATTERY SHIELD
- 5 - COOLANT RECOVERY CONTAINER RETAINING CLIP
- 6 - ENGINE COVER
- 7 - COOLANT RECOVERY CONTAINER

6. Drain the coolant. Refer to **Cooling - Standard Procedure**.
7. Remove the coolant recovery bottle. Refer to **Cooling/Engine/BOTTLE, Coolant Recovery - Removal**.

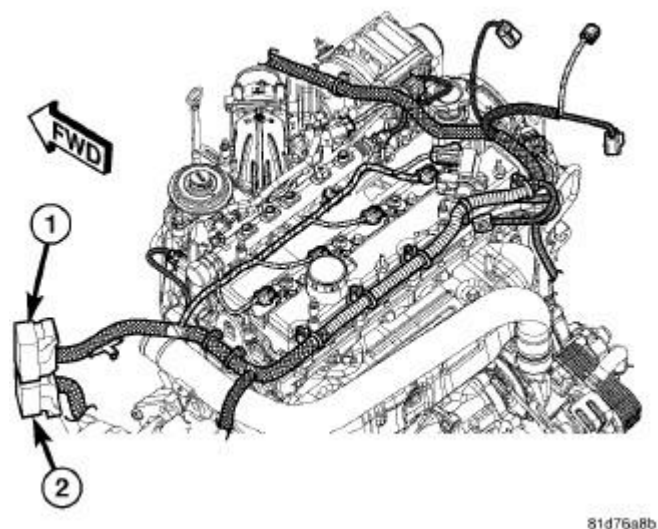


**Fig. 6: Coolant Bottle Bracket**  
**Courtesy of CHRYSLER LLC**

8. Remove the fasteners (1), and the coolant overflow bottle bracket.

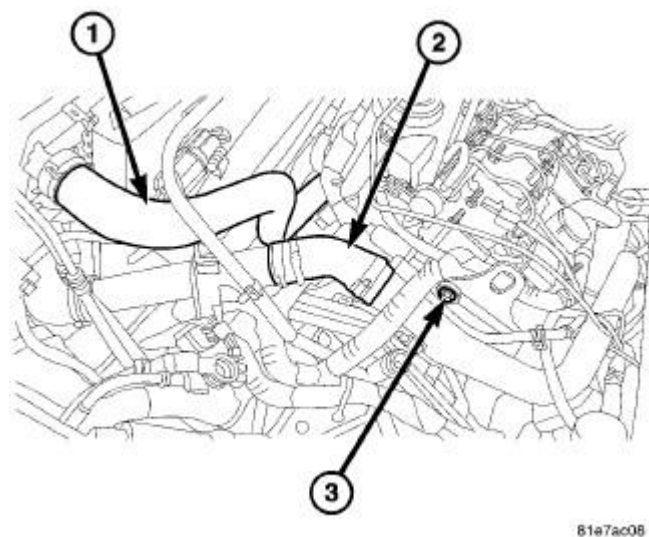
## 2009 Chrysler Town & Country LX

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**Fig. 7: Engine Harness Connectors**  
Courtesy of CHRYSLER LLC

9. Disconnect the engine harness connectors (1) and (2) from the ECM.

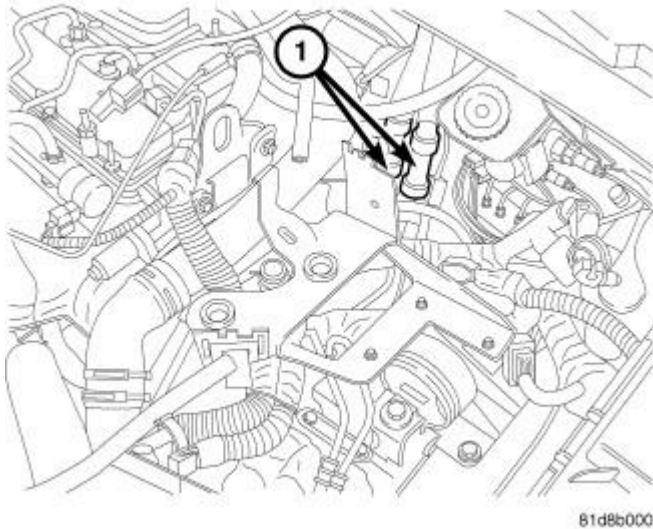


**Fig. 8: Charge Air Cooler Hoses**  
Courtesy of CHRYSLER LLC

10. Remove the fastener (3) from the cylinder head.
11. Disconnect the charge air cooler hoses (2).

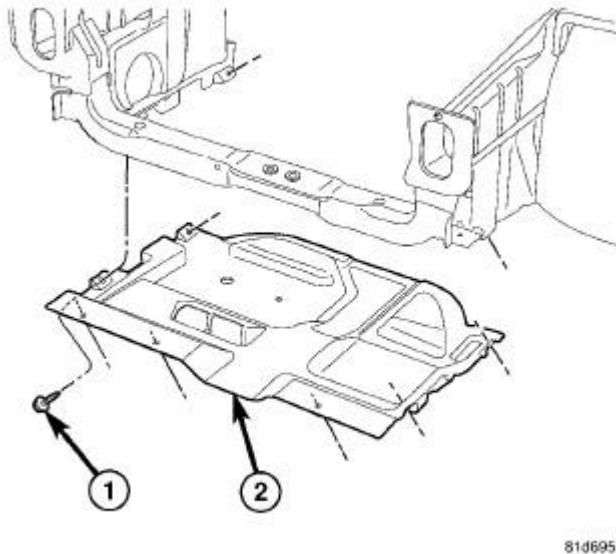
## 2009 Chrysler Town & Country LX

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**Fig. 9: Heater Core Lines**  
Courtesy of CHRYSLER LLC

12. Disconnect the heater core lines (1).

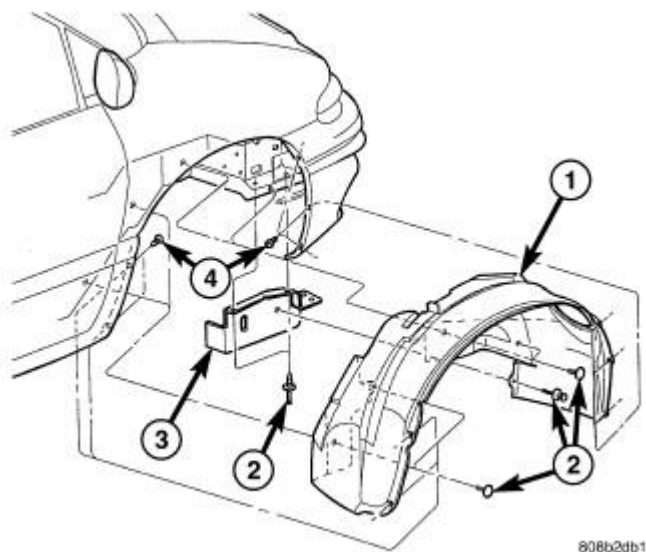


**Fig. 10: Front Lower Splash Shield**  
Courtesy of CHRYSLER LLC

13. Remove the fasteners (1) and the front lower splash shield (2).

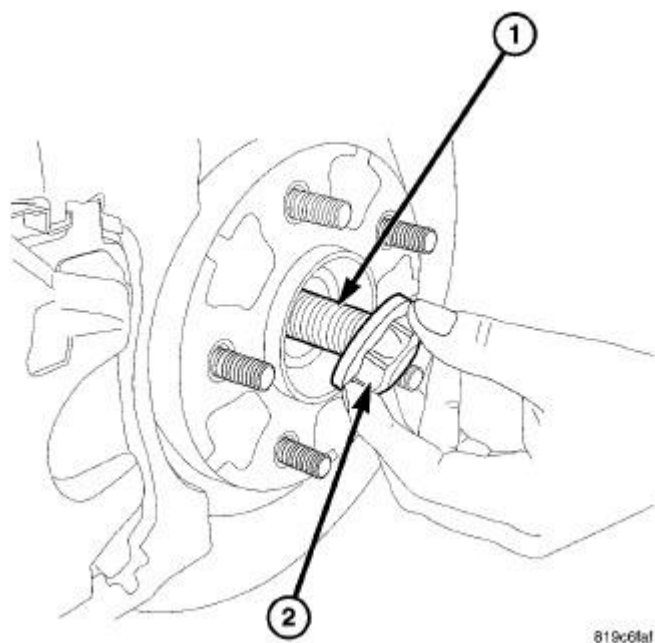
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**Fig. 11: Left & Right Front Inner Fender Well**  
Courtesy of CHRYSLER LLC

14. Remove the front tires. Refer to **Tires and Wheels - Removal** .
15. Remove the left and right front inner fender well (1). Refer to **Body/Exterior/SHIELD, Splash - Removal** .

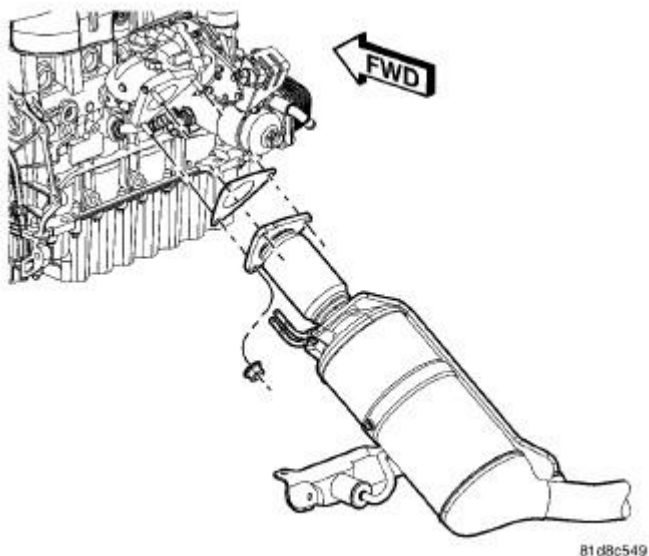


**Fig. 12: Right & Left Half Shafts**  
Courtesy of CHRYSLER LLC

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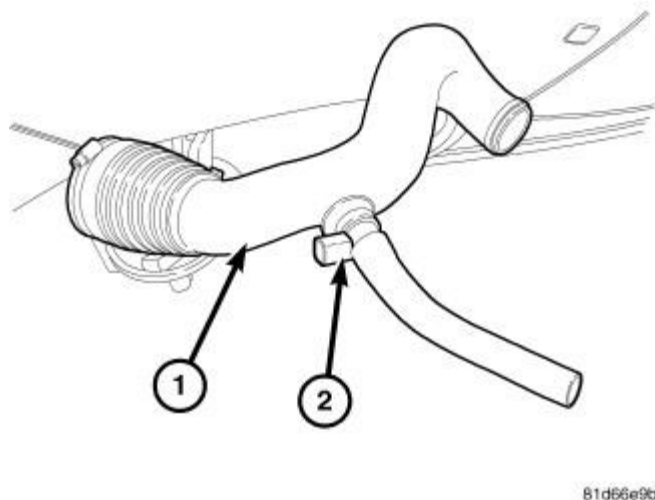
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16. Remove the axle nut (2) from the right and left half shafts (1). Then remove both half shafts from the vehicle. Refer to **Differential and Driveline/Half Shaft - Removal**.



**Fig. 13: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

17. Remove the fasteners and disconnect the exhaust system from the exhaust manifold. Refer to **Exhaust System/CONVERTER, Catalytic - Removal**
18. Disconnect the oxygen sensors.



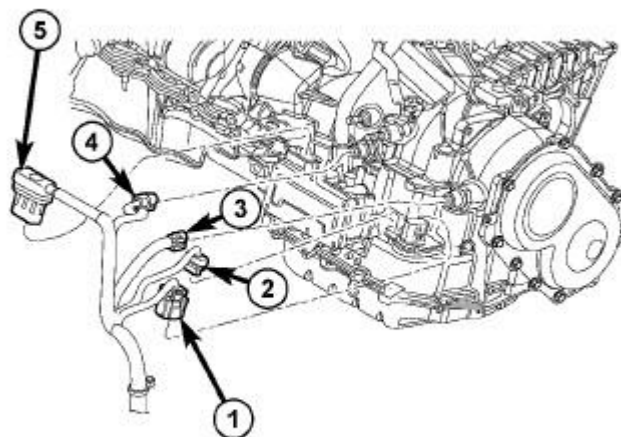
**Fig. 14: Turbocharger Air Inlet Tube & Crankcase Vent Hose Heater Electrical Connector**  
Courtesy of CHRYSLER LLC

19. Disconnect the harness connector from the PCV heater, (2) and remove the turbocharger air inlet (1).

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20. Disconnect all the injection, glow plug, EGR solenoid, Fuel pressure sensor and oxygen sensor electrical connectors or wiring harness.
21. Disconnect all the ground straps to the engine.



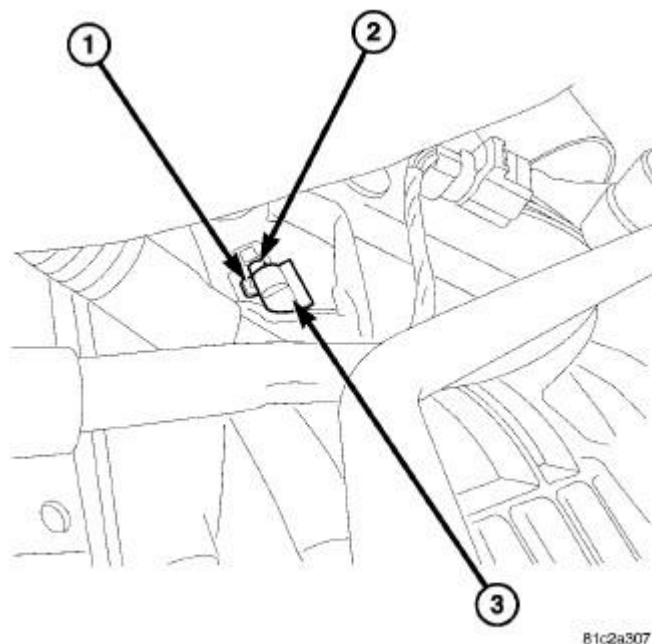
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**Fig. 15: Electrical Connectors At Case**  
Courtesy of CHRYSLER LLC

22. Disconnect the electrical connectors (1 thru 5) to the transmission.

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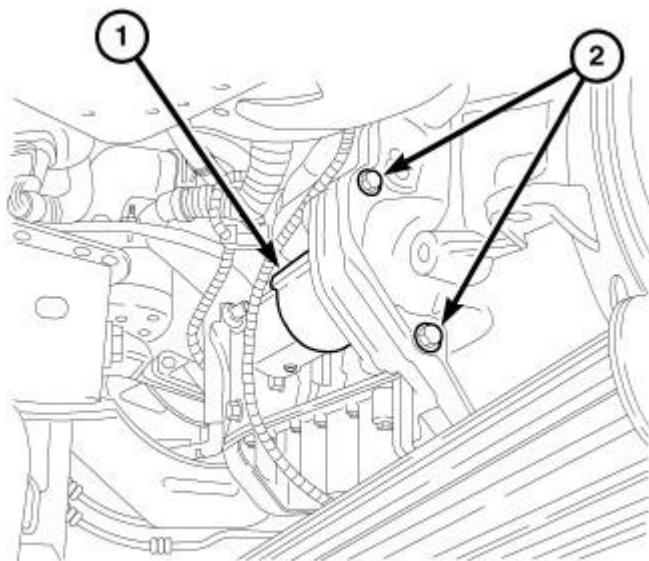


**Fig. 16: Crankshaft Position Sensor**  
Courtesy of CHRYSLER LLC

23. Raise the vehicle.
24. Disconnect the crankshaft position sensor (3).
25. Disconnect the WIF and fuel heater electrical connector from the fuel filter/water separator. Remove the harness from the oil pan.
26. Disconnect the coolant temp sensor electrical connector.

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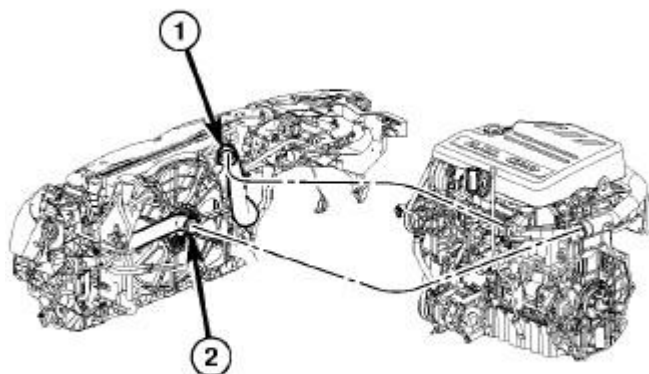
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**Fig. 17: Starter Mounting 2.8L Diesel**  
Courtesy of CHRYSLER LLC

27. Remove the starter (1). Refer to **Electrical - Engine Systems/Starting/STARTER - Removal**.
28. Lower the vehicle.



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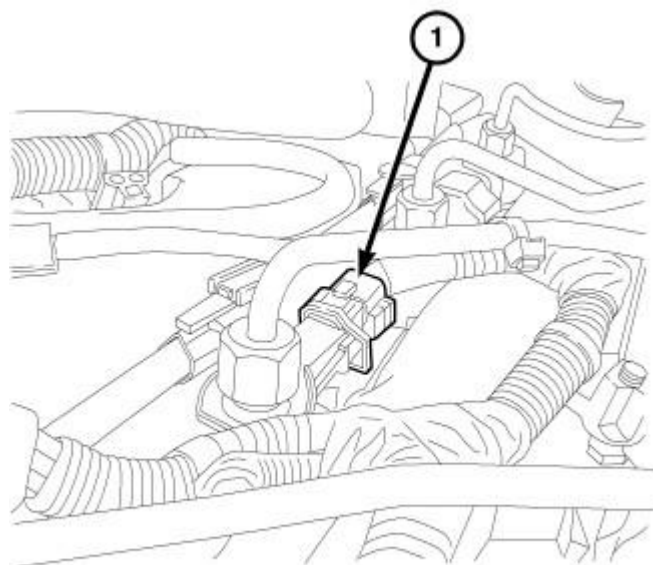
**Fig. 18: Charge Air Cooler Outlet Tube**  
Courtesy of CHRYSLER LLC

29. Remove the charge air cooler outlet tube (2).



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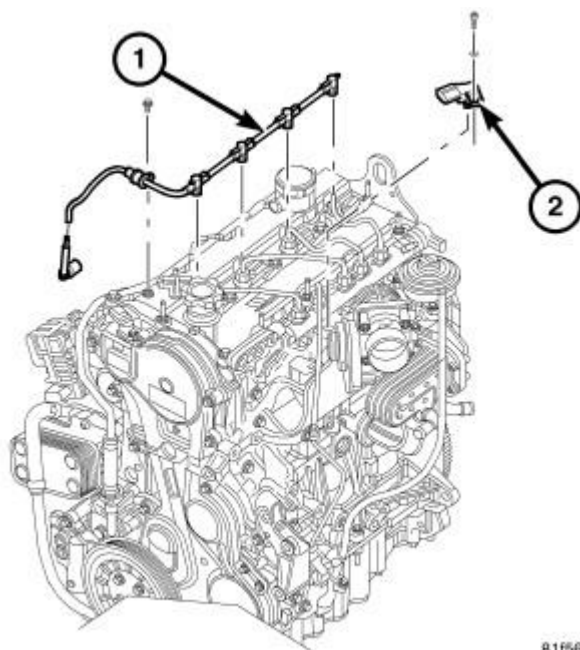
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**Fig. 19: Fuel Injector Connectors**  
Courtesy of CHRYSLER LLC

30. Disconnect the fuel injector connectors (1).

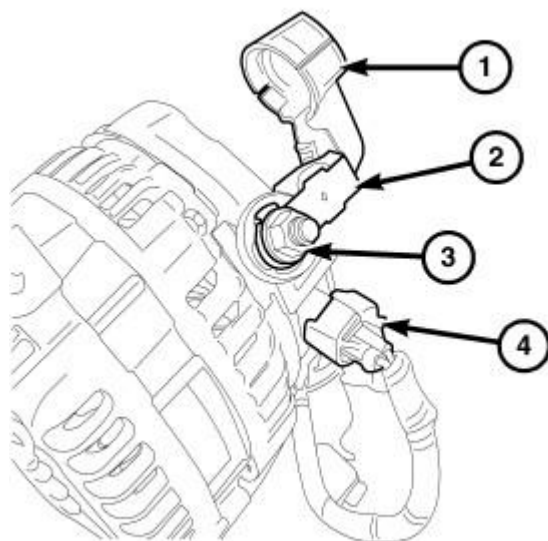


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**Fig. 20: Camshaft Position Sensor Connector**  
Courtesy of CHRYSLER LLC

31. Remove the fuel lines. Refer to **Fuel System/Fuel Delivery/TUBE(S), Fuel - Removal**.
32. Disconnect the throttle control solenoid connector.

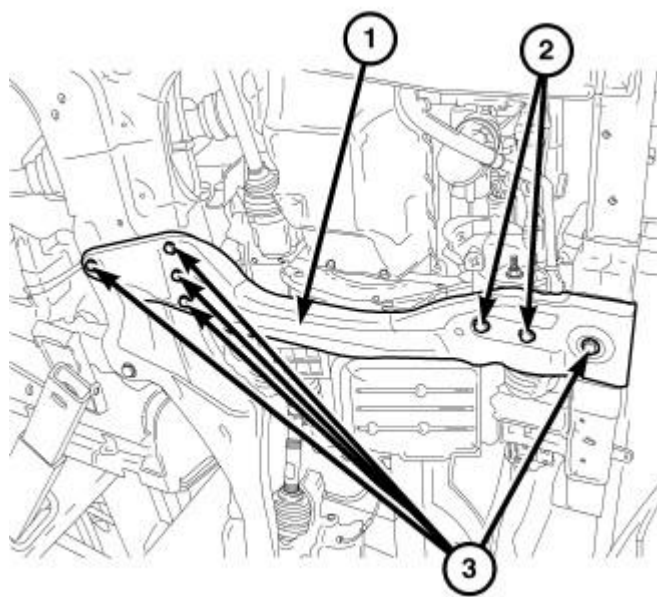
33. Disconnect the camshaft position sensor (1) connector.
34. Disconnect the turbocharger actuator connector.



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**Fig. 21: Alternator Electrical Connection**  
Courtesy of CHRYSLER LLC

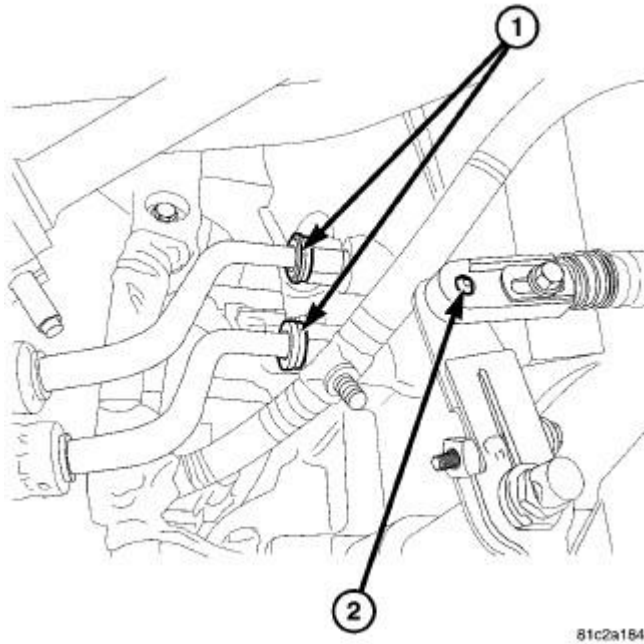
35. Remove the generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Removal**.
36. Disconnect the MAP sensor electrical connector.
37. Disconnect the EGR airflow valve harness connector.
38. Disconnect the fastener at the back of the fuel pump.
39. Disconnect the front ground strap.



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**Fig. 22: Front Fore-Aft Crossmember**  
Courtesy of CHRYSLER LLC

40. Remove the front fore-aft crossmember (1). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

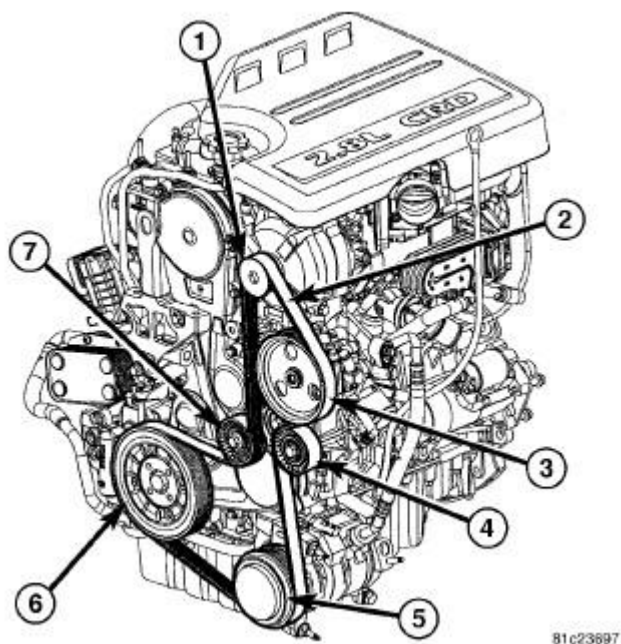


**Fig. 23: Transmission Lines**  
Courtesy of CHRYSLER LLC

41. Disconnect the transmission shift cable (2) at the transmission.  
42. Disconnect the transmission lines (1).

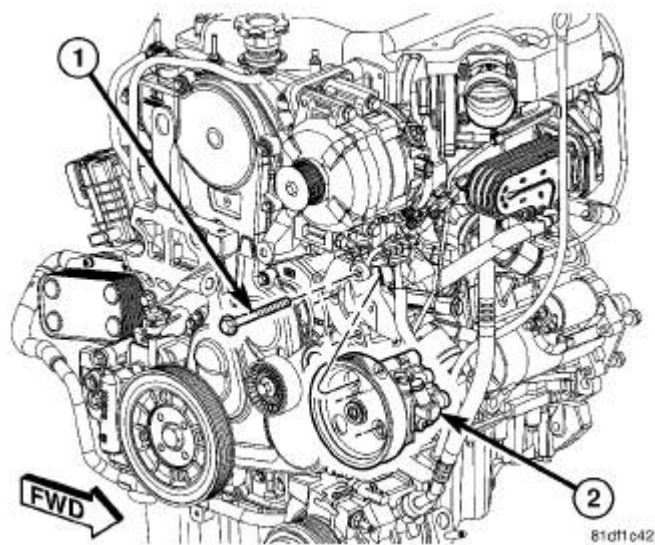
## 2009 Chrysler Town & Country LX

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**Fig. 24: Accessory Drive Belt Routing - 2.8L Diesel**  
Courtesy of CHRYSLER LLC

43. Remove the accessory drive belt (2). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .

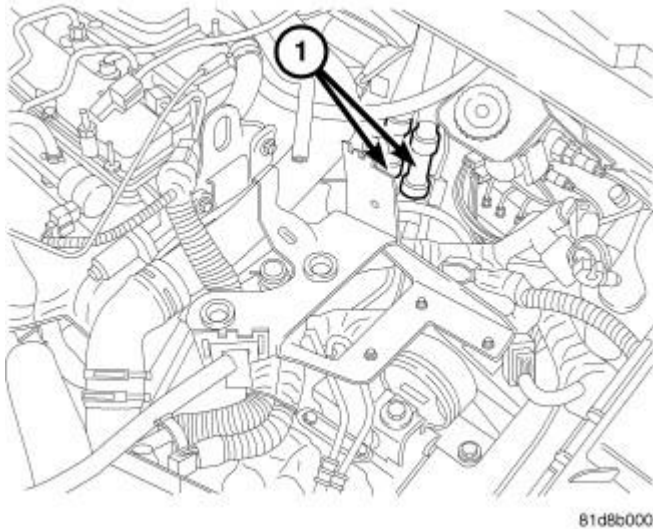


**Fig. 25: Power Steering Pump - 2.8L Diesel**  
Courtesy of CHRYSLER LLC

44. Raise the vehicle.
45. Remove the power steering pump (2). Refer to **Steering/Pump - Removal** .

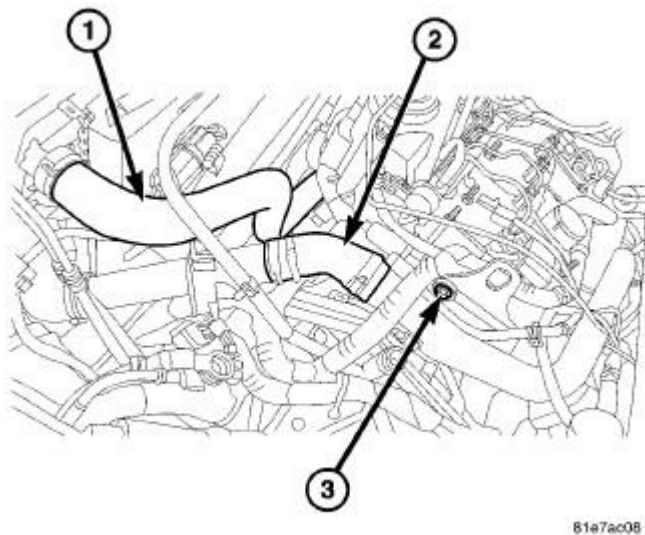
## 2009 Chrysler Town & Country LX

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**Fig. 26: Heater Core Coolant Hoses**  
Courtesy of CHRYSLER LLC

46. Disconnect the coolant hoses (1) from the heater core.

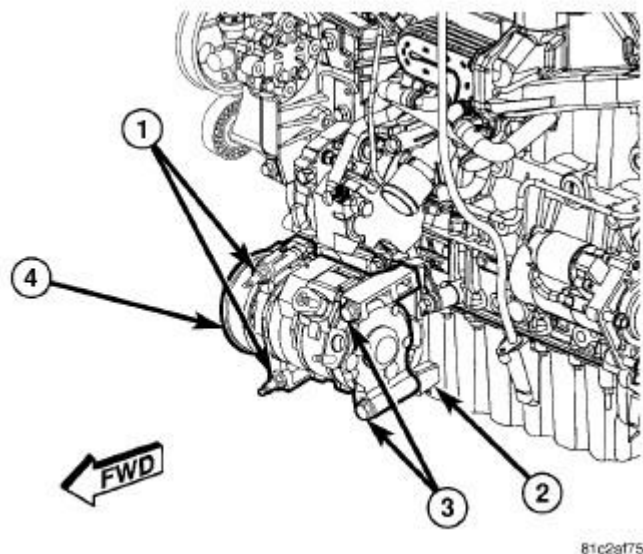


**Fig. 27: Charge Air Cooler Hoses**  
Courtesy of CHRYSLER LLC

47. Remove the upper (1) and lower radiator hoses.

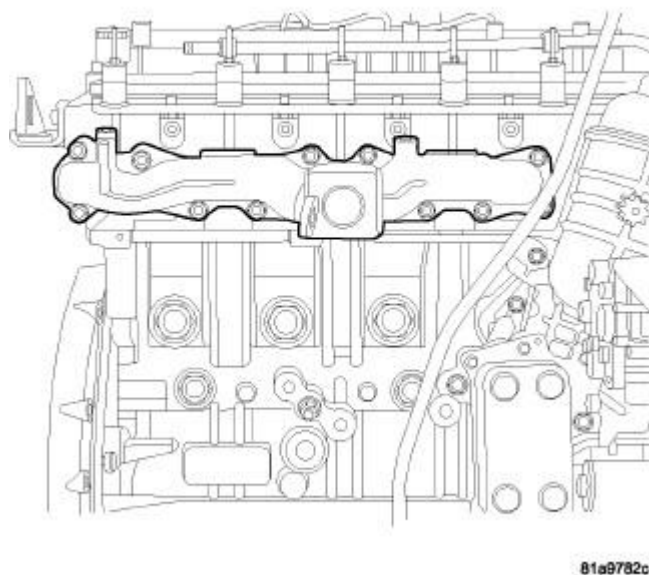
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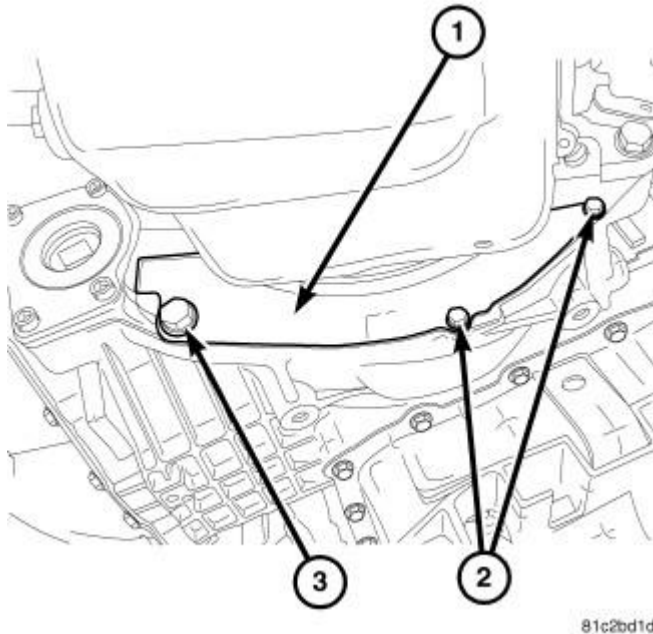
**Fig. 28: A/C Compressor To Mount 2.8L**  
Courtesy of CHRYSLER LLC

48. Evacuate the A/C system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure** .
49. Remove the A/C compressor. Refer to **Heating and Air Conditioning/Plumbing/COMPRESSOR, A/C - Removal** .
50. Remove the engine oil cooler/filter adapter. See **Engine/Lubrication/COOLER, Oil - Removal**.



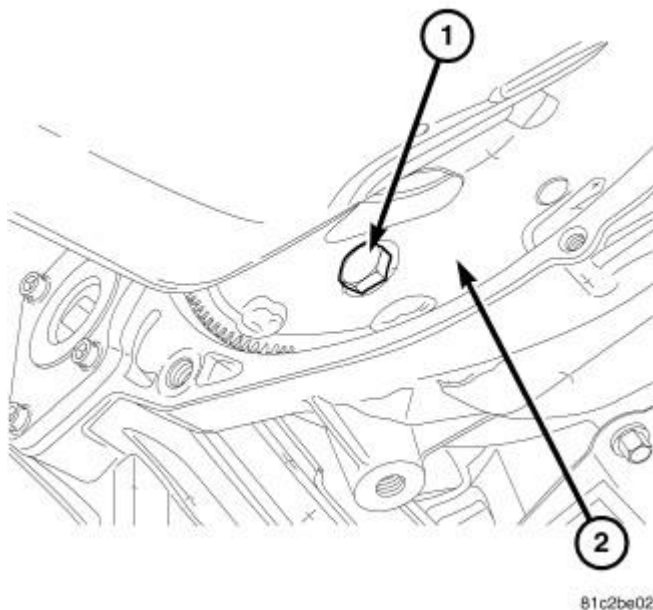
**Fig. 29: Manifold - Exhaust**  
Courtesy of CHRYSLER LLC

51. Remove the exhaust manifold and turbocharger assembly. See **Engine/Manifolds/MANIFOLD, Exhaust - Removal**.



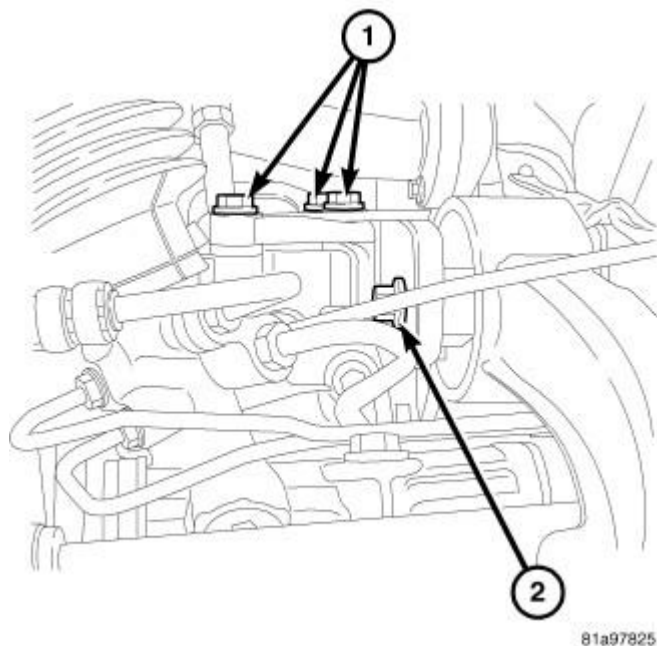
**Fig. 30: Inspection Cover**  
Courtesy of CHRYSLER LLC

52. Remove the inspection cover (1) for the transmission torque convertor bolts.



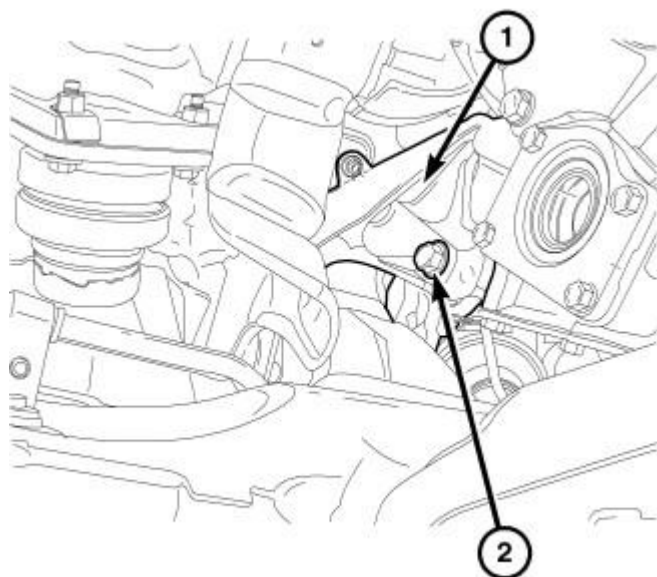
**Fig. 31: Torque Converter To Flex Plate Bolts**  
Courtesy of CHRYSLER LLC

53. Remove the torque converter to flex plate bolts (1).



**Fig. 32: Rear Mount & Bolts**  
Courtesy of CHRYSLER LLC

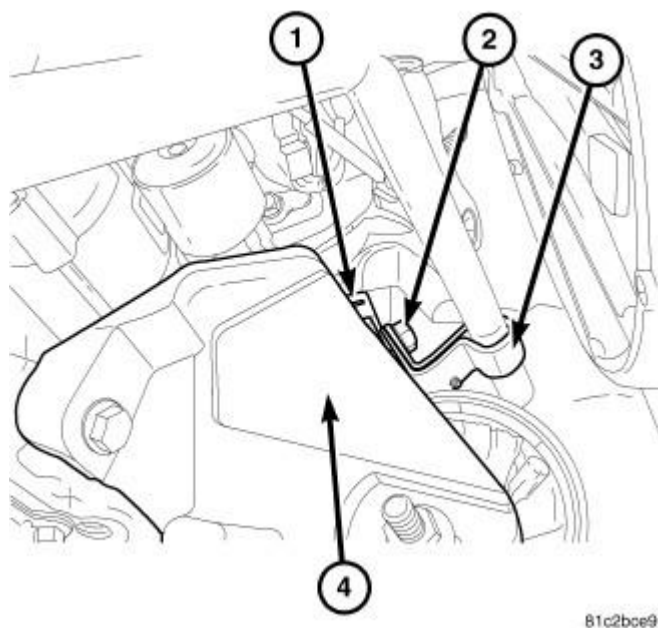
54. Position engine cradle under engine and lower vehicle over cradle.  
55. Remove the rear trans mount (1).



**Fig. 33: Rear Mount Side Bolt**  
Courtesy of CHRYSLER LLC

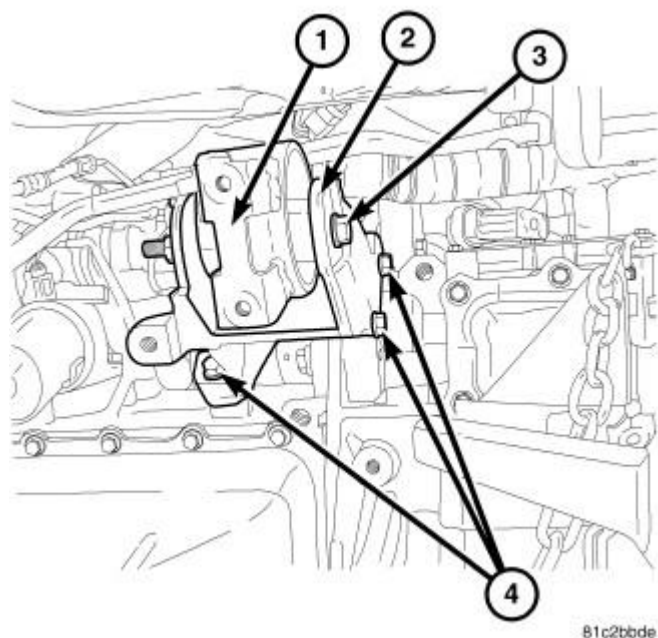


56. Remove the rear mount side bolt (2).



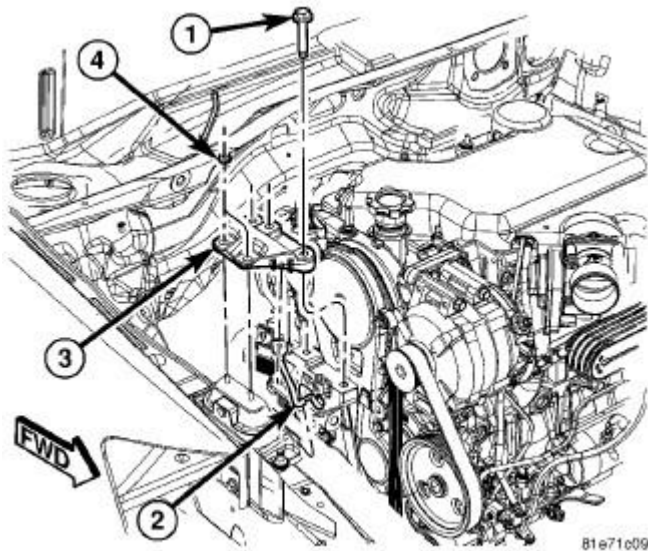
**Fig. 34: Heater Tube & Ground**  
Courtesy of CHRYSLER LLC

57. Remove the bolt (2) holding the ground cable (1) and the heater tube bracket (3) to the front mount (4).



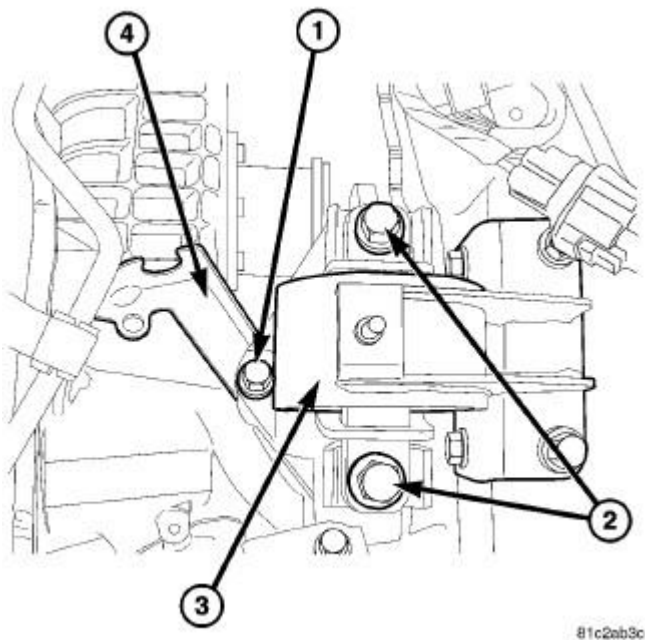
**Fig. 35: Front Mount Bolts**  
Courtesy of CHRYSLER LLC

58. Remove the bolts (4) at the front mount (2)
59. Remove the front mount (2).



**Fig. 36: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

60. Remove the engine mount bracket fasteners (1) and (4).
61. Remove the engine mount bracket (3).



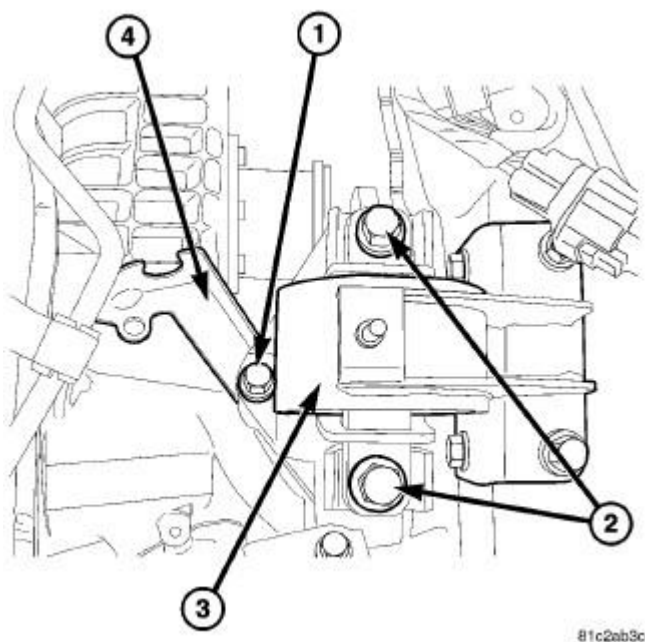
**Fig. 37: Right Engine Mount Bolts**

Courtesy of CHRYSLER LLC

62. Remove the bolt from the right engine mount.
63. Carefully raise vehicle, leaving engine and transmission on engine cradle.
64. Lift engine from engine cradle and disassemble as necessary.

## INSTALLATION

### ENGINE INSTALLATION

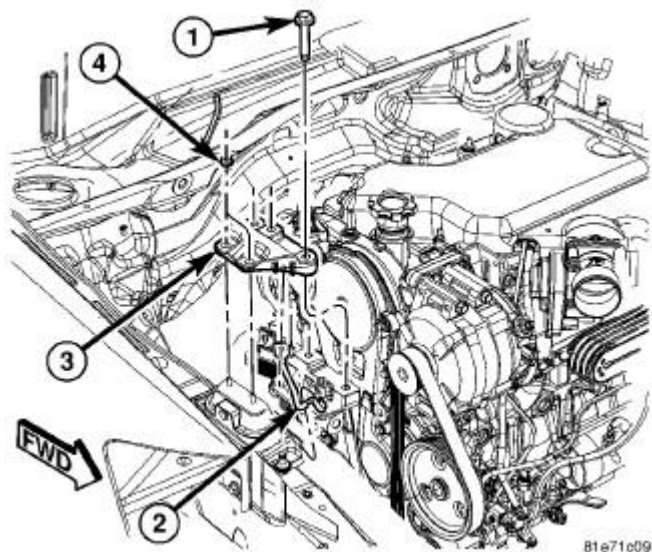


**Fig. 38: Right Engine Mount Bolts**  
Courtesy of CHRYSLER LLC

1. Position engine and transmission assembly under vehicle. Slowly lower the vehicle down over the engine and transmission. It is necessary to move the engine/transmission assembly with the dolly for clearance around body flanges.
2. Align engine and transmission mounts to attaching points.
3. Install the bolts to the right engine mount and tighten to 45 N.m (33 ft. lbs.).

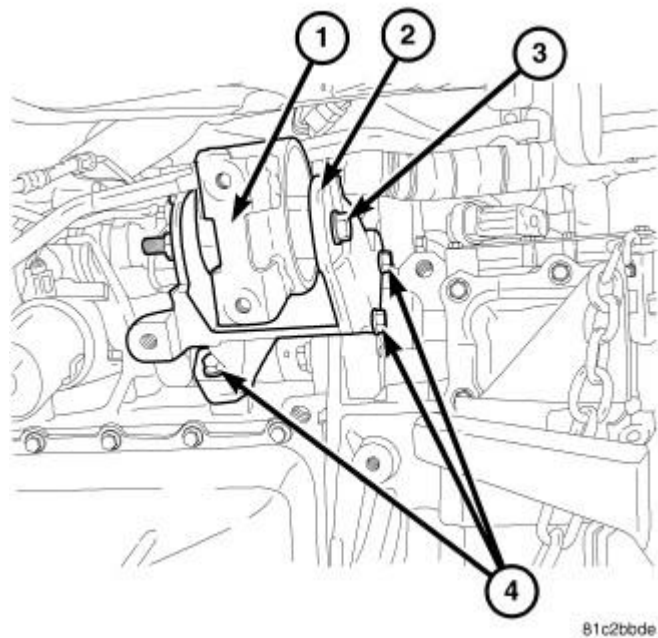
## 2009 Chrysler Town & Country LX

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**Fig. 39: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

4. Install the engine mount bracket (3).
5. Install the engine mount bracket fasteners (1) and (4) and tighten to 54 N.m (40 ft. lbs.).

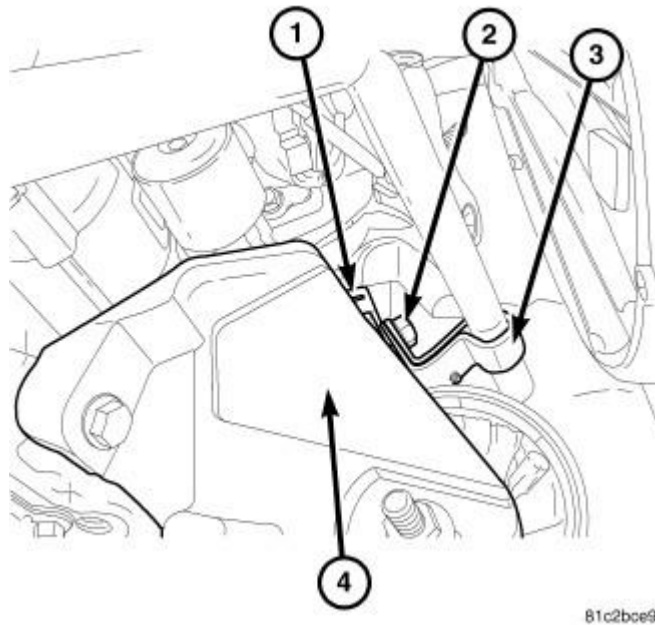


**Fig. 40: Front Mount Bolts**  
Courtesy of CHRYSLER LLC

6. Install the front mount (2).
7. Install the bolts (4) at the front mount (2) and tighten to 95 N.m (70 ft. lbs.).

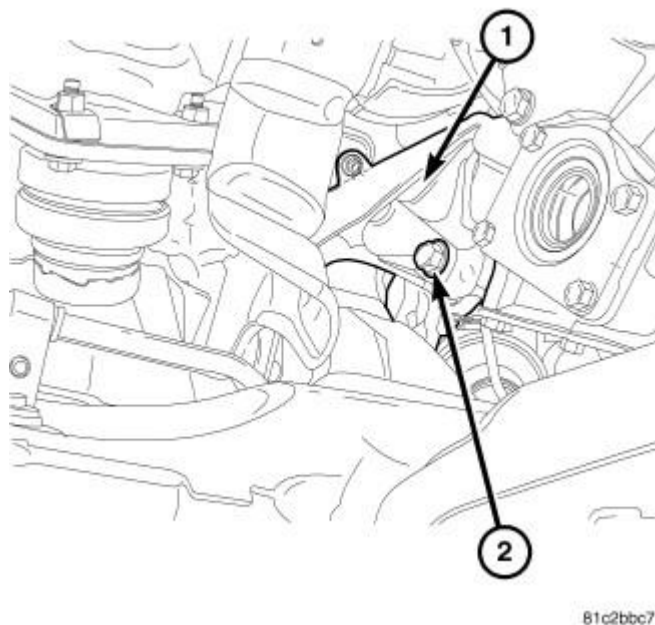
## 2009 Chrysler Town & Country LX

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**Fig. 41: Heater Tube & Ground**  
Courtesy of CHRYSLER LLC

8. Install the bolt (2) holding the ground cable (1) and the heater tube bracket (3) to the front mount (4).

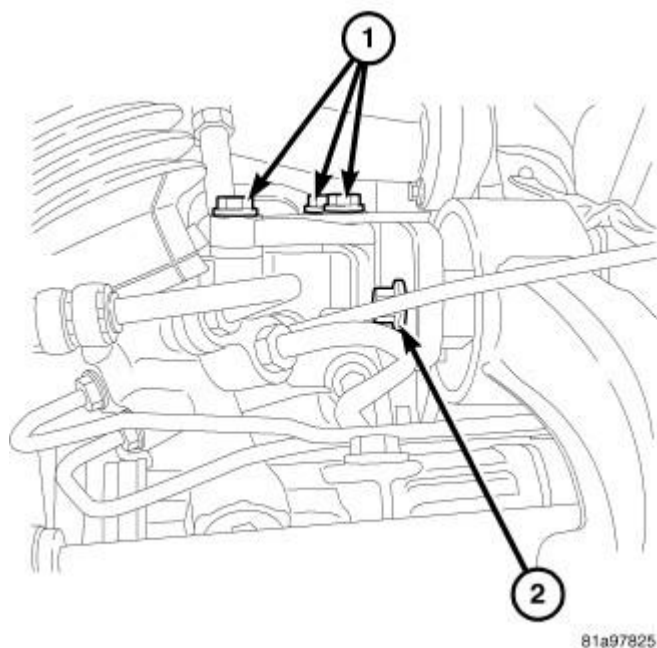


**Fig. 42: Rear Mount Side Bolt**  
Courtesy of CHRYSLER LLC

9. Install the rear mount side bolt (2).

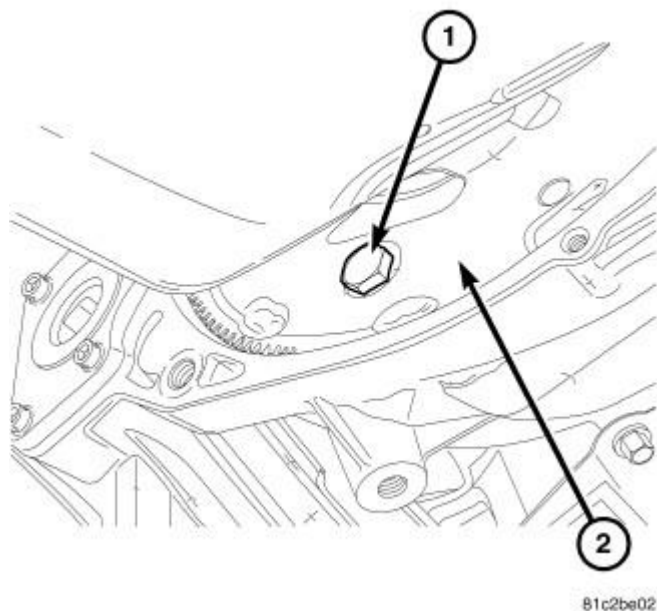
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**Fig. 43: Rear Mount & Bolts**  
Courtesy of CHRYSLER LLC

10. Install the rear trans mount (1) and tighten to 75 N.m (55 ft. lbs.).

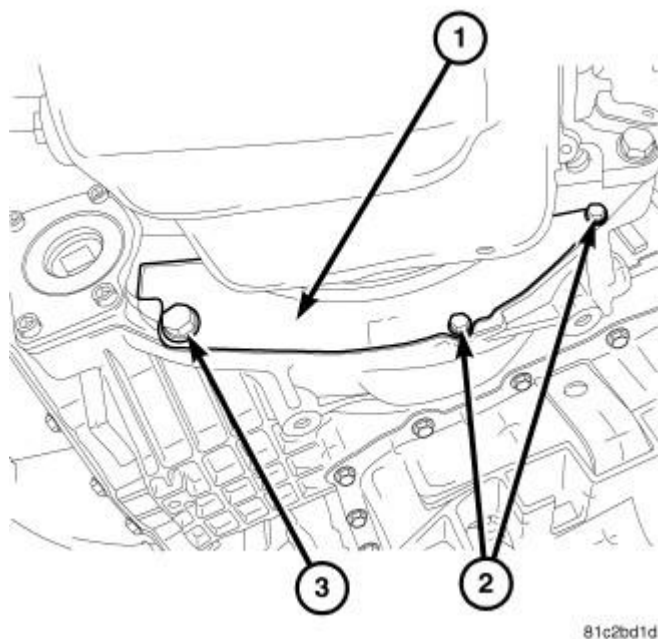


**Fig. 44: Torque Converter To Flex Plate Bolts**  
Courtesy of CHRYSLER LLC

11. Slowly raise vehicle enough to remove the engine dolly and cradle, then raise the vehicle.
12. Install the torque converter to flex plate bolts (1) and tighten to 88 N.m (65 ft. lbs.).

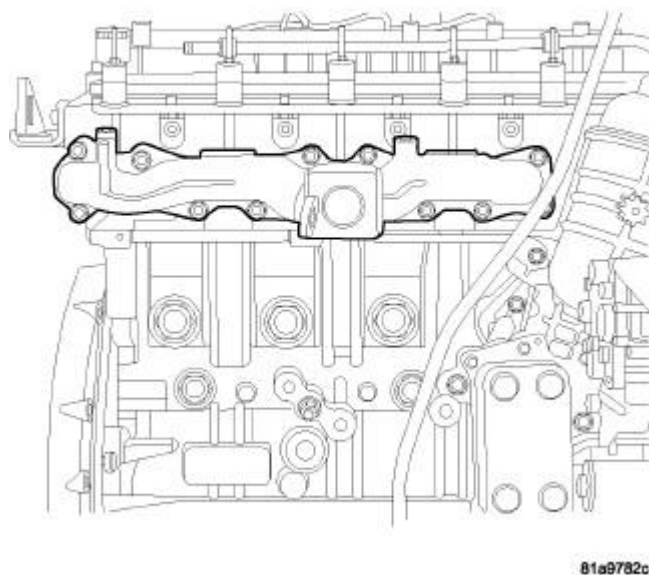
## 2009 Chrysler Town & Country LX

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**Fig. 45: Transmission Inspection Cover**  
Courtesy of CHRYSLER LLC

13. Install the transmission inspection cover (1). Tighten bolts (2 and 3) to 54 N.m (40 ft. lbs.).

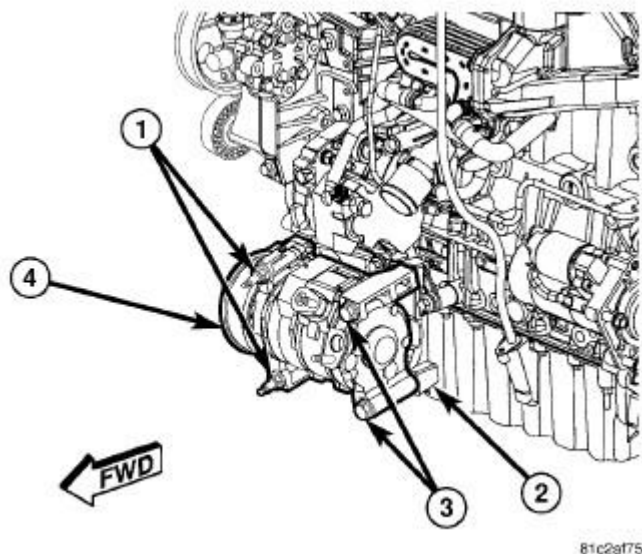


**Fig. 46: Exhaust Manifold**  
Courtesy of CHRYSLER LLC

14. Install the exhaust manifold and turbocharger assembly. See **Engine/Manifolds/MANIFOLD, Exhaust -**

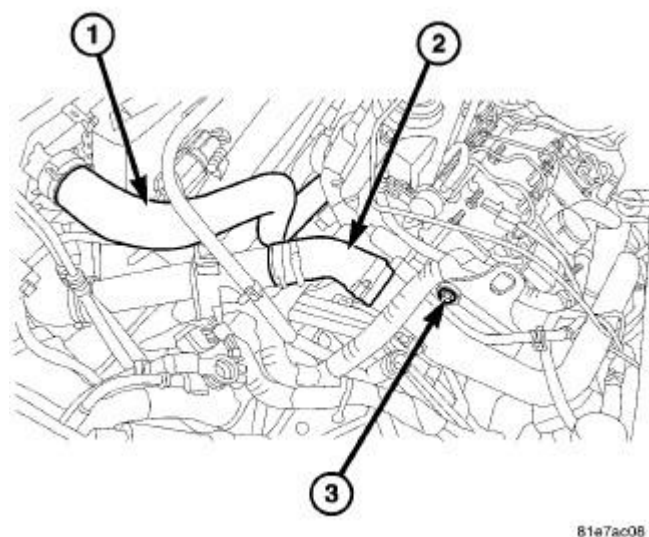
**Installation**

15. Remove the engine oil cooler/filter adapter. See **Engine/Lubrication/COOLER, Oil - Installation**.



**Fig. 47: A/C Compressor To Mount 2.8L**  
Courtesy of CHRYSLER LLC

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



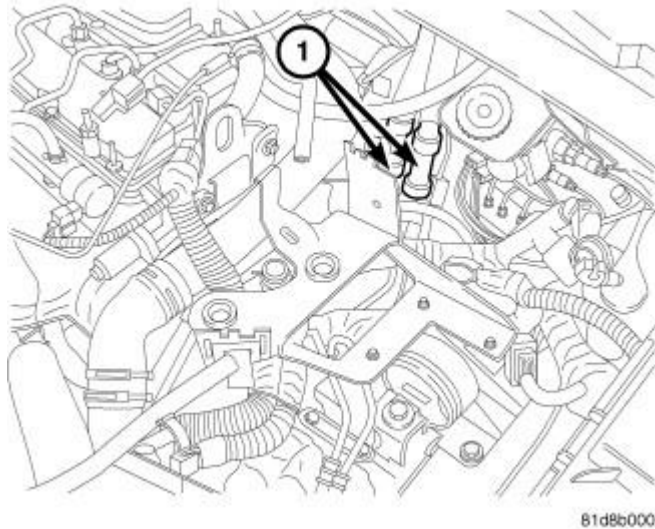
**Fig. 48: Charge Air Cooler Hoses**  
Courtesy of CHRYSLER LLC

17. Install the upper (1) and lower radiator hoses.



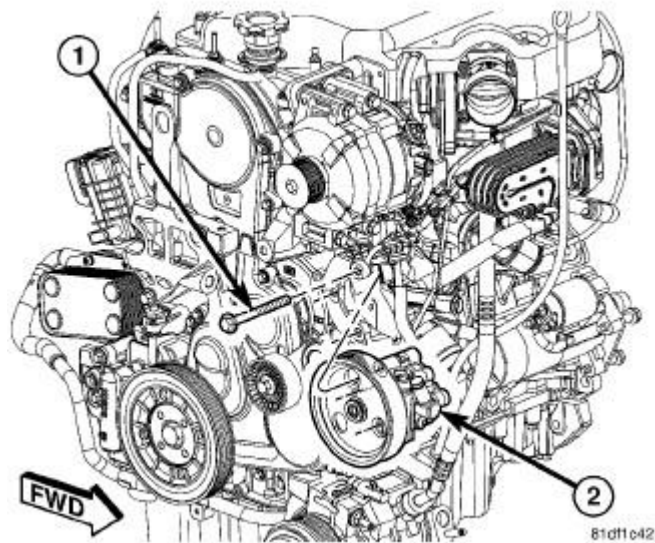
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**Fig. 49: Coolant Hoses**  
Courtesy of CHRYSLER LLC

18. Install the coolant hoses (1) to the heater core.

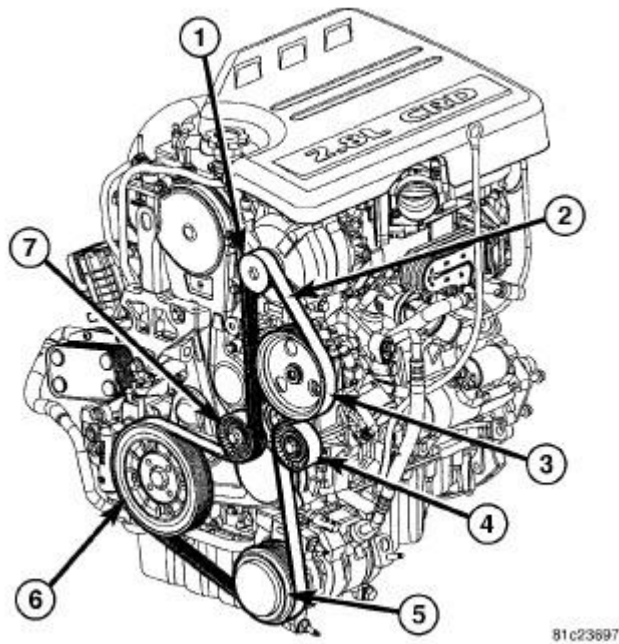


**Fig. 50: Power Steering Pump - 2.8L Diesel**  
Courtesy of CHRYSLER LLC

19. Install the power steering pump (2). Refer to **Steering/Pump - Installation** .

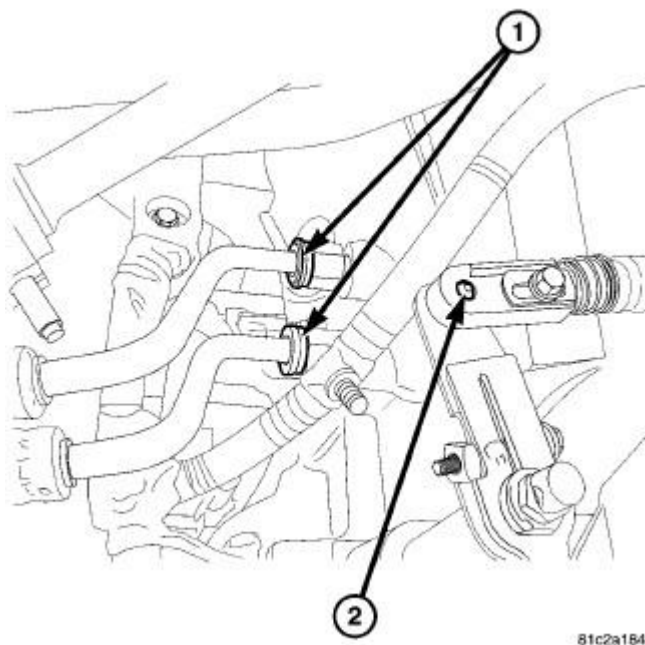
## 2009 Chrysler Town & Country LX

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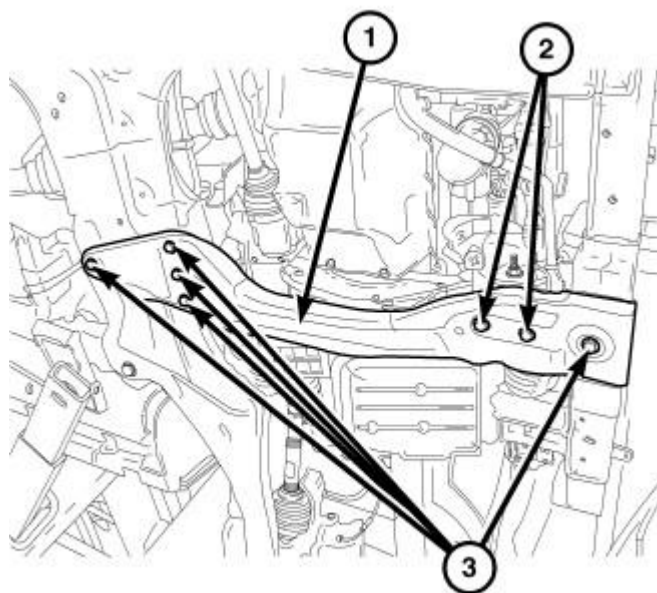
**Fig. 51: Accessory Drive Belt Routing - 2.8L Diesel**  
Courtesy of CHRYSLER LLC

20. Install the accessory drive belt (2). Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .



**Fig. 52: Transmission Lines**  
Courtesy of CHRYSLER LLC

21. Reconnect the transmission shift cable (2) at the transmission.
22. Reconnect the transmission lines (1).



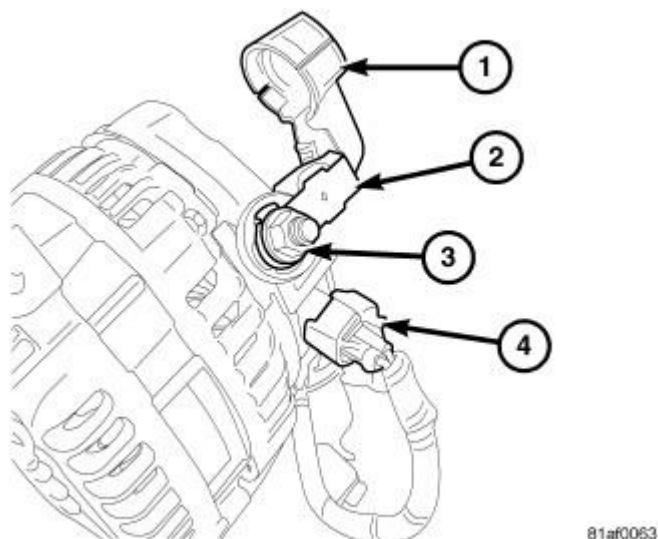
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**Fig. 53: Front Fore-Aft Crossmember**  
Courtesy of CHRYSLER LLC

23. Install the front fore-aft crossmember (1) and tighten to 40 N.m (30 ft. lbs.). Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation**.
24. Reconnect the MAP sensor electrical connector.
25. Reconnect the EGR airflow valve harness connector.
26. Reconnect the fastener at the back of the fuel pump.
27. Reconnect the front ground strap.

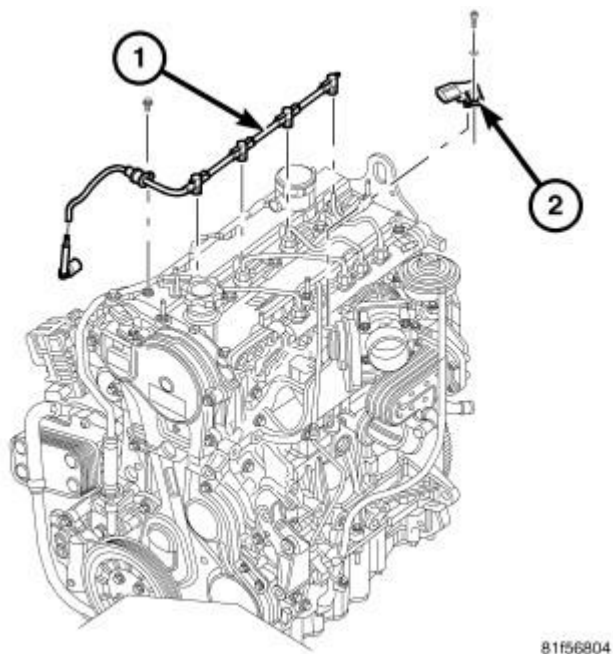
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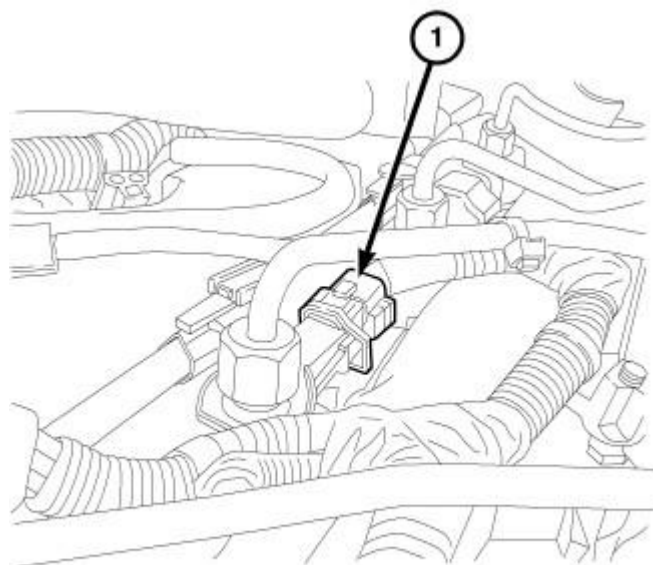
**Fig. 54: Alternator Electrical Connection**  
Courtesy of CHRYSLER LLC

28. Install the generator. Refer to **Electrical - Engine Systems/Charging/GENERATOR - Installation** .
29. Reconnect the camshaft position sensor (1) connector.
30. Reconnect the turbocharger actuator connector.



**Fig. 55: Camshaft Position Sensor Connector**  
Courtesy of CHRYSLER LLC

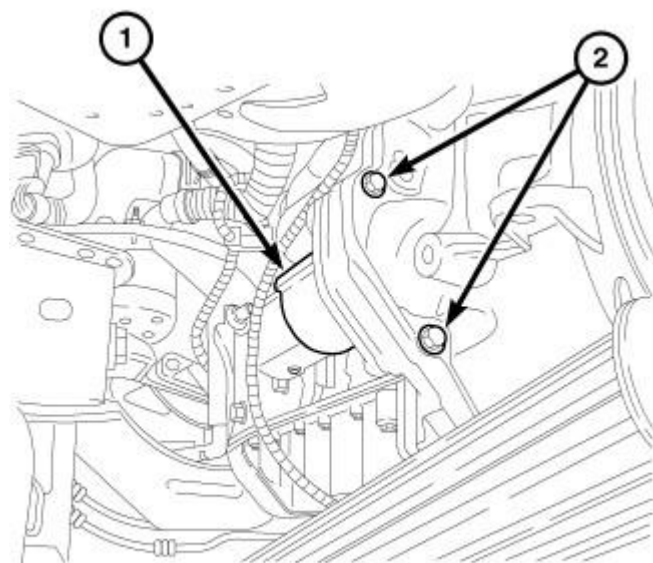
31. Install the fuel lines. Refer to **Fuel System/Fuel Delivery/TUBE(S), Fuel - Installation** .
32. Reconnect the throttle control solenoid connector.



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**Fig. 56: Fuel Injector Connectors**  
Courtesy of CHRYSLER LLC

33. Reconnect the fuel injector connectors (1).



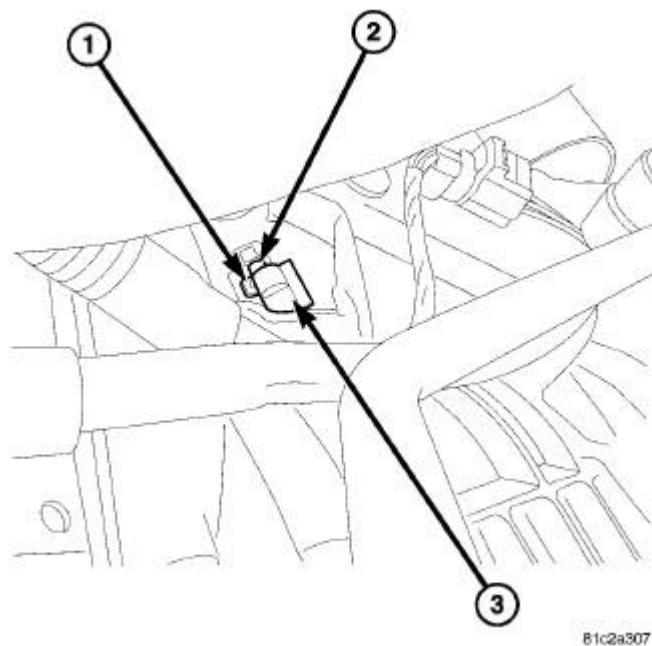
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**Fig. 57: Starter Mounting 2.8L Diesel**  
Courtesy of CHRYSLER LLC

34. Install the starter (1). Refer to **Electrical - Engine Systems/Starting/STARTER - Installation** .
35. Install the charge air cooler outlet tube.

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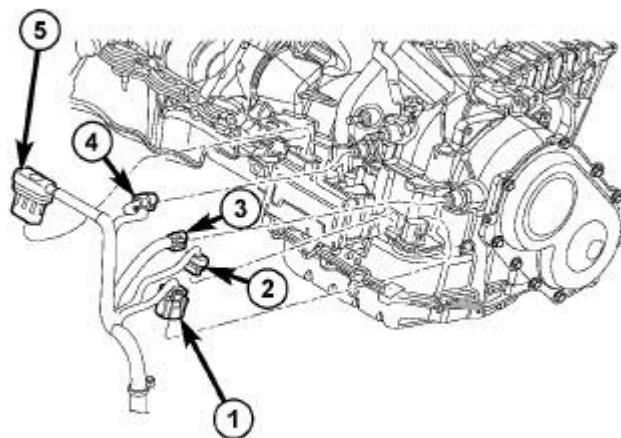


**Fig. 58: Crankshaft Position Sensor**  
Courtesy of CHRYSLER LLC

36. Reconnect the crankshaft position sensor (3).
37. Reconnect the WIF and fuel heater electrical connector to the fuel filter/water separator. Install the harness to the oil pan.
38. Reconnect the coolant temp sensor electrical connector.

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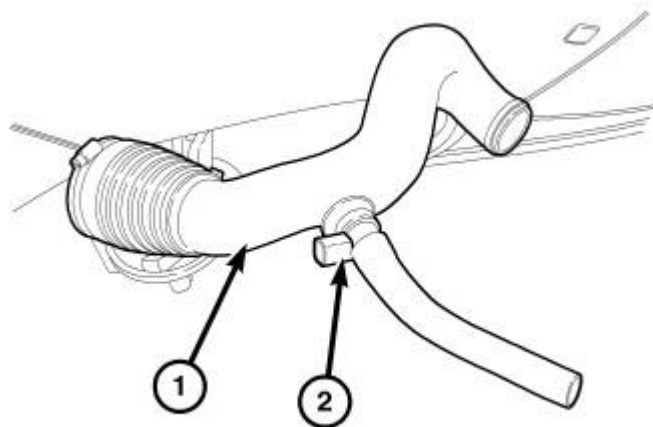
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**Fig. 59: Electrical Connectors At Case**  
Courtesy of CHRYSLER LLC

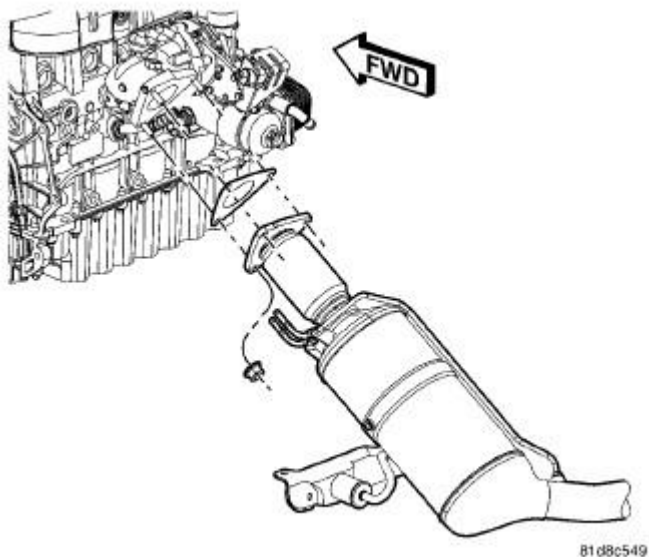
39. Reconnect the electrical connectors (1 thru 5) to the transmission.
40. Reconnect all the injection, glow plug, EGR solenoid, Fuel pressure sensor and oxygen sensor electrical connectors or wiring harness.
41. Reconnect all the ground straps to the engine.



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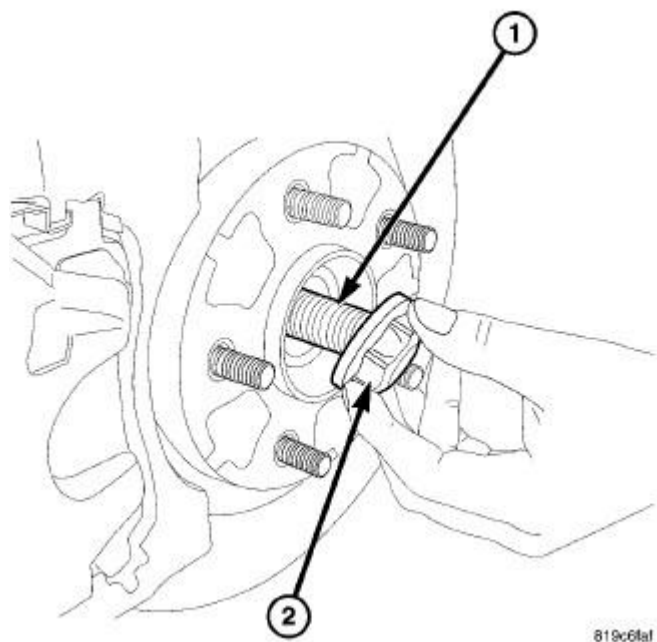
**Fig. 60: Turbocharger Air Inlet Tube & Crankcase Vent Hose Heater Electrical Connector**  
Courtesy of CHRYSLER LLC

42. Reconnect the harness connector to the PCV heater, (2) and install the turbocharger air inlet (1).



**Fig. 61: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

43. Install the fasteners and reconnect the exhaust system to the exhaust manifold. Tighten to 41 N.m (30 ft. lbs.).
44. Reconnect the oxygen sensors.

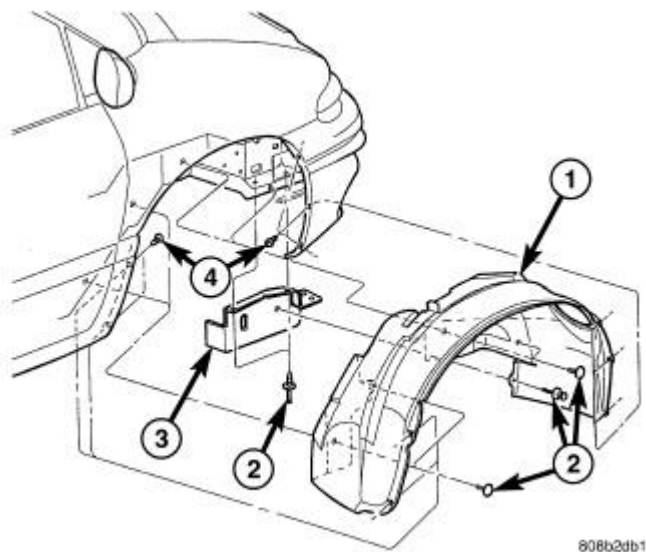


**Fig. 62: View Of Nut & Halfshaft**



Courtesy of CHRYSLER LLC

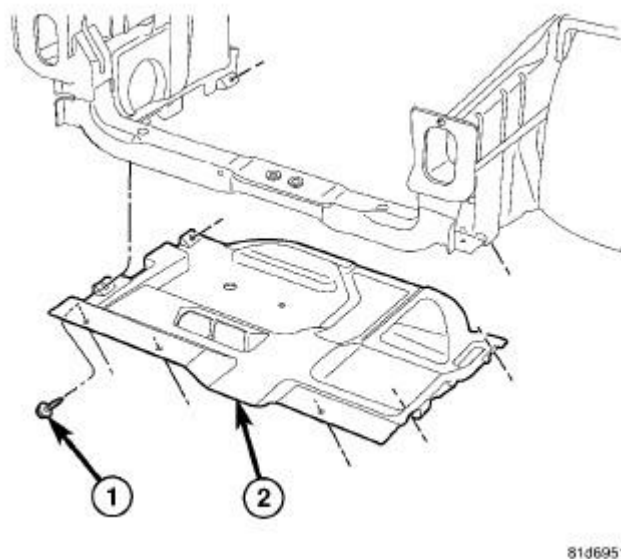
45. Install both the right and left axle shafts. Refer to **Differential and Driveline/Half Shaft - Installation**.
46. Install the axle nut (2) to the right and left half shafts (1). Tighten to 135 N.m (100 ft. lbs.).



**Fig. 63: Front Wheelhouse Splash Shield**

Courtesy of CHRYSLER LLC

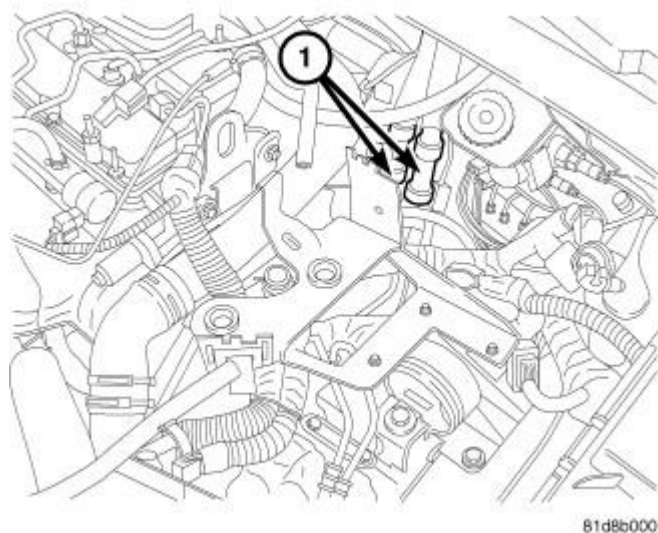
47. Install the front tires. Refer to **Tires and Wheels - Installation**.
48. Install the right and left front inner fender well (1). Refer to **Body/Exterior/SHIELD, Splash - Installation**.



**Fig. 64: Front Lower Splash Shield**

**Courtesy of CHRYSLER LLC**

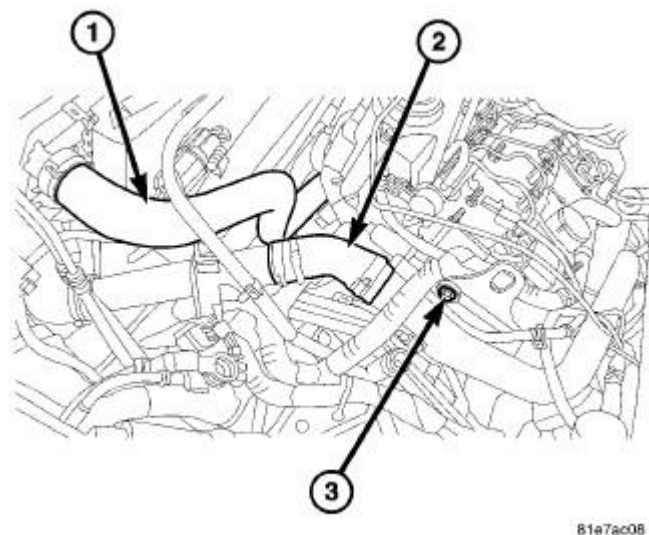
49. Install the fasteners (1) and the front lower splash shield (2).



**Fig. 65: Heater Core Lines**

**Courtesy of CHRYSLER LLC**

50. Reconnect the heater core lines (1).



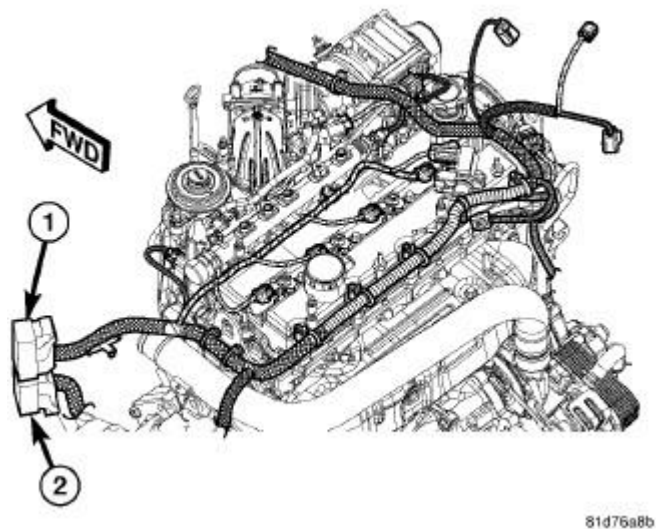
**Fig. 66: Charge Air Cooler Hoses**

**Courtesy of CHRYSLER LLC**

51. Reconnect the charge air cooler hoses (2).
52. Install the fastener (3) to the cylinder head.

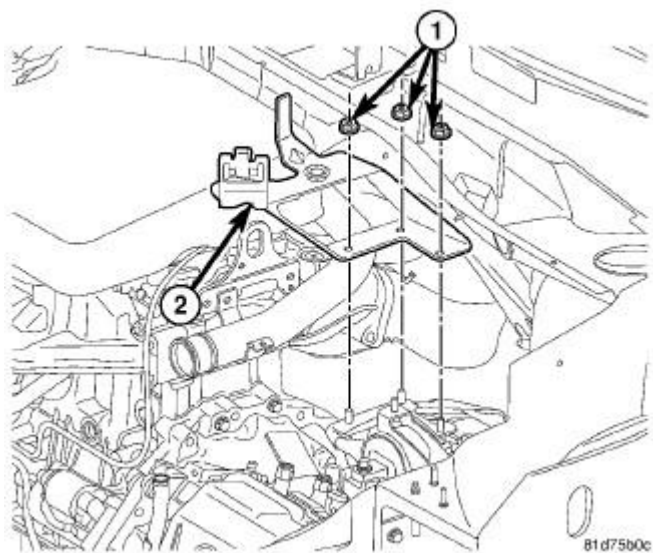
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**Fig. 67: Engine Harness Connectors**  
Courtesy of CHRYSLER LLC

53. Reconnect the engine harness connectors (1 and 2) to the ECM.

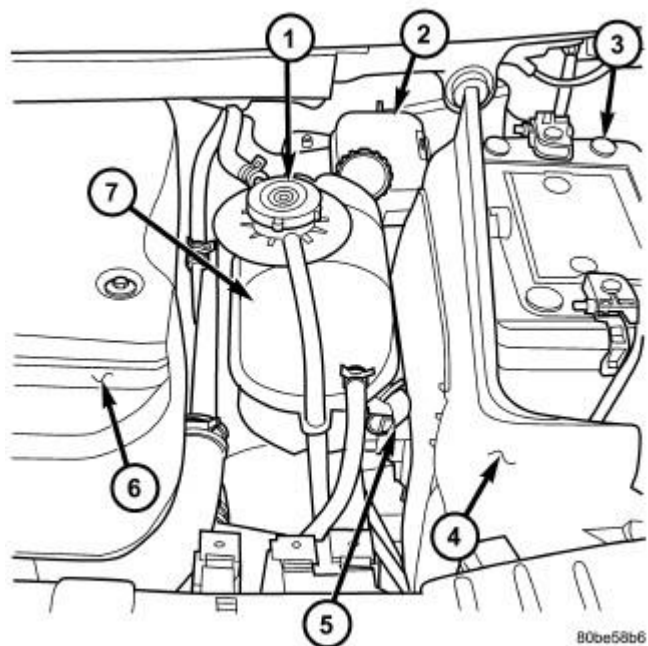


**Fig. 68: Coolant Overflow Bottle Bracket**  
Courtesy of CHRYSLER LLC

54. Install the fasteners (1), and the coolant overflow bottle bracket.

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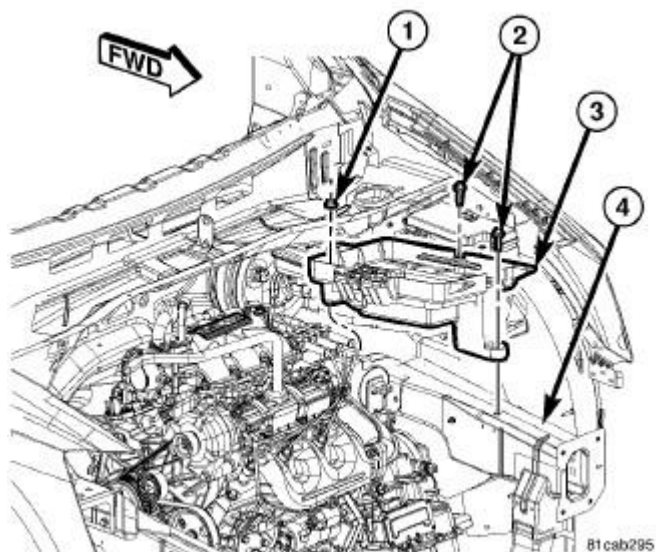
**Fig. 69: Coolant Recovery Container - Diesel**  
Courtesy of CHRYSLER LLC

- 1 - PRESSURE/VENT CAP
- 2 - BRAKE MASTER CYLINDER
- 3 - BATTERY
- 4 - BATTERY SHIELD
- 5 - COOLANT RECOVERY CONTAINER RETAINING CLIP
- 6 - ENGINE COVER
- 7 - COOLANT RECOVERY CONTAINER

55. Install the coolant recovery bottle. Refer to Cooling/Engine/BOTTLE, Coolant Recovery - Installation .

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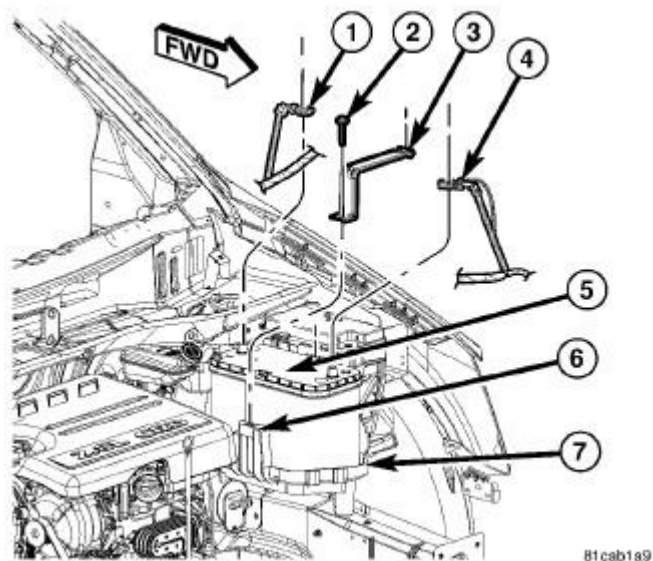
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**Fig. 70: Battery Tray**

Courtesy of CHRYSLER LLC

56. Install the battery tray (3). Refer to **Electrical - Engine Systems/Battery System/TRAY, Battery - Installation** .



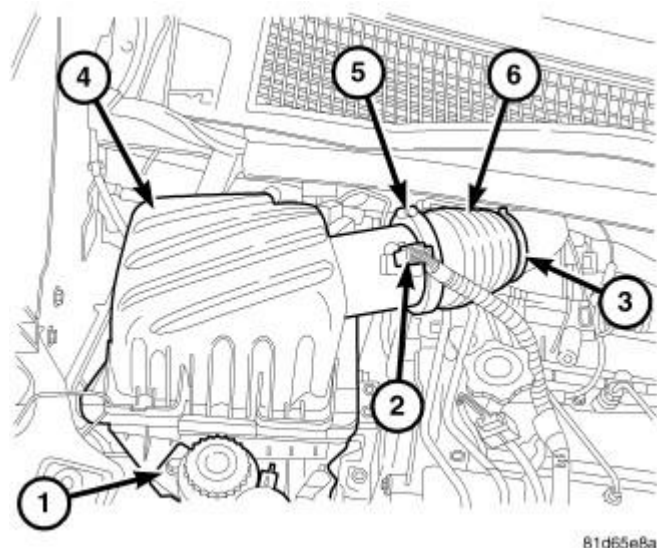
**Fig. 71: Battery Cables**

Courtesy of CHRYSLER LLC

57. Install the battery (5). Refer to **Electrical - Engine Systems/Battery System/BATTERY - Installation** .
58. Reconnect the battery cables (1 and 4).

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**Fig. 72: Intake Air Box**

Courtesy of CHRYSLER LLC

59. Reconnect the harness connector from the valve (2) in the turbocharger air inlet tube.
60. Install the intake air box (4). See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
61. Install a new oil filter. Fill the engine crankcase with the proper oil to the correct level.
62. Refill the coolant system. Refer to **Cooling - Standard Procedure**.
63. Charge the refrigerant system. Refer to **Heating and Air Conditioning/Plumbing - Standard Procedure**.
64. Start the engine and run until operating temperature is reached.
65. Adjust transmission linkage, if necessary.

## SPECIFICATIONS

### ENGINE INFORMATION

2.8L Engine Specifications	
Engine	2.8L RT
Engine Type	2.8L - 16 Valves
Displacement	2777 cc
Bore	94.00
Stroke	100.05
Power (VGT)	120 kW (177 CV) @ 3800 RPM
Torque (ATX)	360 N.m @ 1600-3000 RPM
Cylinders	4 In line
Injection Order	1-3-4-2
Compression Ratio	17.0:1
Vacuum at idle	680 mm/HG (27.5 In/HG)

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Idle Speed (ATX)	765 +/- 50 RPM
Maximum RPM in Gear	4500 RPM
Maximum RPM in neutral	ATX 2800
Belt tension	Automatic Belt Tensioner
Thermostat opening	80°C +/- 2°C
Generator Rating	Denso 12V-220A
Glow Plug	4.4 V
Emissions Level	EU4
Block configuration/Material	Open/Cast Iron
Cylinder Head	Dual Overhead Cam
Timing System	Belt
Fuel System	CP3.2+ 1,600 bar Fuel Pump, Piezo Injectors
Fuel Supply	Electric Fuel Pump In the Fuel Tank
Electronic Control Unit	EDC 16
Timing System	Belt Driven DOHC Overhead Camshaft
Air Intake	Dry Filter With turbocharger and Charge Air Cooler
Fuel System	Direct Fuel Injection Common Rail System
Emission devices	Cooled EGR (pneumatic) Electric Intake Throttle Fast Metallic Glow plugs
Combustion Cycle	4 Stroke
Cylinder Compression Difference Between Cylinders	10 bar (145 psi)
Cooling System	Water Cooling
Pressure Cap Setting	14 psi
Turbocharging:	Single VGT with REA
Intake Ports	Aluminum heads with traditional dual side intake and exhaust ports. One intake port is helical and the other has a directed entry.
Crankshaft	8 Counterweights with an incorporated balance shaft gear.
Camshafts	2 overhead camshafts with axial front bearings and identical camshaft caps, finger followers, and hydraulic lifters.
Intake AND Exhaust Valves	Flat with fire deck face.
Intake Manifold	Aluminum, with Cast-in EGR passages, intake mixer, vacuum actuated EGR valve, electric intake throttle and a U-type EGR cooler
Lubrication	Pressure Lubricated By Rotary Pump
Minimum Oil Pressure (warm)	0.7 BAR at idle / 2.5 BAR at 3800 RPM
Engine Rotation	Clockwise Viewed From Front Cover

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### 2.8L Engine Specifications

#### Cylinder Head

Cylinder head height	135.5 mm (5.334 in.)
----------------------	----------------------

Cylinder head flatness deformation tolerance	0.075 mm (0.003 in.)
--	----------------------

#### Cylinder head gasket thickness

0 Hole	1.10 mm (0.043 in)
--------	--------------------

1 Hole	1.20 mm (0.047 in)
--------	--------------------

2 Holes	1.30 mm (0.051 in)
---------	--------------------

#### Intake Manifold

Intake manifold flatness deformation tolerance	0.15 mm (0.006 in.)
--	---------------------

#### Exhaust Manifold

Exhaust manifold flatness deformation tolerance	0.1 mm (0.004 in.)
---	--------------------

#### Tappets

Hydraulic tappet outside diameters	11.994 mm +/- 0.06 mm (0.472 in +/- 0.002)
------------------------------------	--

#### Valves

Intake valve face angle	45°30'
-------------------------	--------

Exhaust valve face angle	45°30'
--------------------------	--------

Intake Valve Head Diameter	32 mm (1.25 in.)
----------------------------	------------------

Exhaust Valve Head Diameter	29.4 mm (1.15 in.)
-----------------------------	--------------------

Intake Valve Stem Diameter	5.97 mm (0.235 in.)
----------------------------	---------------------

Exhaust Valve Stem Diameter	5.96 mm (0.235 in.)
-----------------------------	---------------------

#### Intake Valve Guide Stem Clearance

Min	0.030 mm (0.0012 in.)
-----	-----------------------

Max	0.060 mm (0.0024 in.)
-----	-----------------------

#### Exhaust Valve Guide Stem Clearance

Min	0.040 mm (0.0016 in.)
-----	-----------------------

Max	0.070 mm (0.0028 in.)
-----	-----------------------

#### Valve Springs

Free Length	50.8 mm (2 in.)
-------------	-----------------

Closed Valve	38 mm (1.49 in.)
--------------	------------------

Opened Valve	29 mm (1.14 in.)
--------------	------------------

#### Camshafts

##### Camshaft End Play

Max	0.350 mm (0.013 in.)
-----	----------------------

Min	0.150 mm (0.006 in.)
-----	----------------------

Outer Journal Diameter (at crankshaft)	25.95 mm +/- 0.01 mm (1.021 mm +/- .0004 in)
--	--

Inner Journal Diameter (at cylinder head)	26.00 mm + 0.015 mm (1.027 mm .0006 in)
---	---

#### Crankshaft Journal Clearance.

Max	0.075 mm (0.003 in.)
-----	----------------------

Min	0.030 mm (0.0012 in)
-----	----------------------

#### Connecting Rods



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	32 mm (1.26 in.)
Connecting Rod Diameter (Large End)	57.563 mm (2.266 in.)
<b>Piston Pin</b>	
Diameter	32 mm (1.26 in.)
Length: Mahle Mondial	70.7 mm - 71.00 mm (2.78 in - 2.79 in.)
Length: Federal Mogul	74 mm (2.9 in.)
<b>Crankshaft</b>	
End Play	0.1 mm - 0.33 mm (0.004 in. - 0.013 in.)
Bearing Selection. Refer to <b>Standard Procedure</b> .	
<b>Engine Block</b>	
Cylinder Bore Internal Diameter	94 mm (3.700 in.)
Cylinder Bore Out-Of-Round (Roundness)	0.009 mm (0.0003 in.)
Oversized Piston	+0.40 mm (+0.015 in.)
<b>Fuel System</b>	
Injection Pressure	CRS 3.0 - 1600 Bar
High Pressure Pump	CP3.2+
ECU	EDC16CP31
Injectors	Piezo CRI 3.0
<b>Glow Plugs</b>	
Make/Type	Bosch/GLP2
Voltage	4.4 V
<b>Lubrication System</b>	
Oil Pump Outer Rotor End Play	
Min	0.01 (0.0004 in.)
Max	0.09 (0.0036 in.)
Oil Pump Inner Rotor End Play	
Max	0.01 mm (0.0004 in.)
Min	0.09 mm (0.0036 in.)
Oil Pump Outer Rotor to Body Diameter Clearance	
Max	0.130 mm (0.052 in.)
Min	0.230 mm (0.0091 in)
Oil Pressure Relief Valve	
Opening Pressure	5 Bar
Oil Pressure Valve Spring Free Length	46.8 mm (1.84 in)
Minimum Oil Pressure (Warm)	-
at Idle	0.7 Bar
at 3800 RPM	2.5 Bar
<b>Cooling System</b>	
Thermostat Opening Temperature	80°C (176°F)
Pressure Cap Setting	1.2 Bar
<b>Engine Oil</b>	

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Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

### Coolant

Specification. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Description** .

### Cylinder Head Gasket Selection

-	Millimeters	Inches
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.300 - 0.399	0.0119 - 0.0158
CYLINDER HEAD GASKET THICKNESS	1.10	0.0434
PISTON CLEARANCE	0.700 - 0.800	0.0276 - 0.0315
-		
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.400 - 0.499	0.0158 - 0.0197
CYLINDER HEAD GASKET THICKNESS	1.20	0.0473
PISTON CLEARANCE	0.700-0.800	0.0276-0.0315
-		
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.500 - 0.600	0.0197 - 0.0237
CYLINDER HEAD GASKET THICKNESS	1.30	0.0512
PISTON CLEARANCE	0.700 - 0.800	0.0276 - 0.0315

## TORQUE

### ENGINE BLOCK

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Air Temp/Pressure sensor	12	-	106
Balance Shaft	See <b><u>Engine/Engine Block/MODULE, Balance Shaft - Installation.</u></b>		
Connecting Rod Caps	See <b><u>Engine/Engine Block/ROD, Piston and Connecting - Installation.</u></b>		
Dipstick Tube (block)	11	-	97
Dipstick Tube (sump)	11	-	97
DRV Valve	Refer to <b><u>Fuel System/Fuel Delivery/RAIL, Fuel - Installation</u></b> .		
Engine Mount Bolts	45	33	-
Fuel Quantity Solenoid	11	-	97
Fuel Rail Sensor	35	26	-
Main Bearing Caps	See <b><u>Engine/Engine Block/CRANKSHAFT - Installation.</u></b>		

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Oil Cooler Coolant Line	11	-	97
Oil Drain Plug	25	18	-
Oil Filter Cap	25	18	-
Oil Jet	11	-	97
Oil Pan	See <b><u>Engine/Lubrication/PAN, Oil - Installation.</u></b>		
Oil Pickup Tube	15	-	133
Oil Pressure Sensor	14	-	124

### CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Cylinder Head Bolt	See <b><u>Engine/Cylinder Head - Installation.</u></b>		
Cylinder Head Cover	11	-	97
Camshaft Cap	See <b><u>Engine/Cylinder Head/CAMSHAFT, Engine - Installation.</u></b>		
Camshaft Sprocket	80	59	-
Charge Air Cooler Clamp - Intercooler Side	25	18	-
Charge Air Cooler Clamp - Turbocharger Side	5	-	44
Exhaust Elbow	33	24	-
Exhaust Elbow Bracket	33	24	-
Exhaust Manifold	36	27	-
Exhaust Manifold Heat Shield	33	24	-
Front Camshaft Journal	See <b><u>Engine/Cylinder Head/CAMSHAFT, Engine - Installation.</u></b>		
Fuel injector	33	24	-
Fuel Injector Lines at Fuel Injector	28	21	-
Fuel Injector Lines at Fuel Rail	5 + 75°	-	44 + 75°
High Pressure Fuel Feed Line at Fuel Rail	5 + 75°	-	44 + 75°
High Pressure Fuel Feed Line at High Pressure Pump	28	21	-
High Pressure Fuel Line Bracket bolt	15	-	133
Fuel Rail	24	18	-
Glow Plugs	14	-	124
Intake Manifold	25	18	-
Vacuum Tube	11	-	97

### FRONT ENGINE

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Accessory Drive Belt Tensioner	45	33	-
Accessory Drive Idler Pulley	45	33	-
Camshaft Position Sensor	11	-	97

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Crankshaft Damper	32	24	-
Crankshaft Sprocket	100 + 120°	74 + 120°	-
Front Cover	33	24	-
Front Engine Lifting Bracket	45	33	-
Fuel Quantity Solenoid	11	-	97
Fuel Rail Sensor	35	26	-
Inner Front Cover	11	-	97
Outer Front Cover (upper)	11	-	97
Outer Front Cover (lower)	11	-	97
Timing Belt Tensioner	28	21	-
TVA Valve	13	-	115
Water Pump	32	24	-

**REAR ENGINE**

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Crankshaft Position Sensor Cover Plate	15	-	133
Crankshaft Position Sensor	11	-	97
Flex Plate Bolt	25 + 30°	18 + 30°	-
Rear Cover	15	-	133

**ACCESSORY DRIVE**

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
A/C Compressor Bracket	45	33	-
A/C Compressor	32	24	-
EGR Cooler	15	-	133
EGR Valve	15	-	133
Generator Bracket	45	33	-
Generator	33	24	-
High Pressure Fuel Pump	24	18	-
High Pressure Fuel Pump Sprocket.	88	65	-
Oil Cooler Housing	32	24	-
Oil Cooler Feed Line	15	-	133
Power Steering and Accessory Tensioner Bracket	45	33	-
Power Steering Pump	33	24	-
Power Steering Pump Pulley	33	24	-
Turbocharger	32	24	-
Turbocharger Adapter (oil feed line to engine block connection)	54	40	-

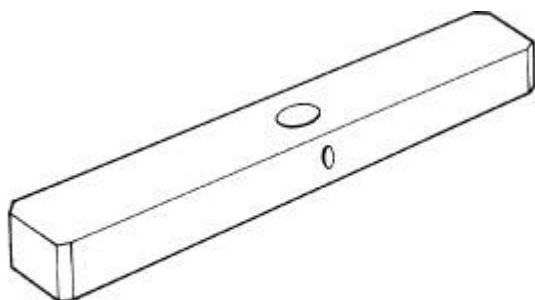
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Turbocharger Oil Feed Line at the Engine Block	32	24	-
Turbocharger Oil Feed Line at the Turbocharger	24	18	-
Turbocharger Oil Return Line	15	-	133

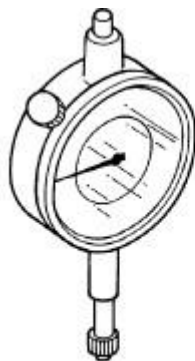
## SPECIAL TOOLS

### SPECIAL TOOLS



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**Fig. 73: VM 1010 Cylinder Liner Protrusion Tool**  
Courtesy of CHRYSLER LLC

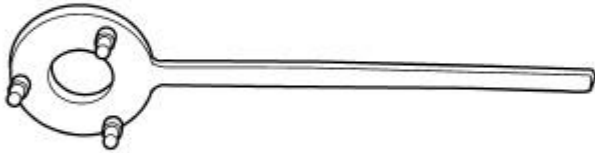


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**Fig. 74: VM 1013 Dial Indicator**  
Courtesy of CHRYSLER LLC

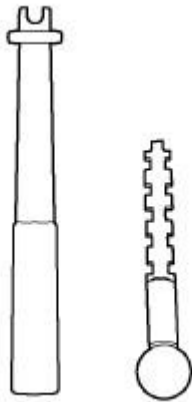
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**Fig. 75: VM 1055 High Pressure Injection Pump Gear Holder/Camshaft Gear Holder**  
Courtesy of CHRYSLER LLC

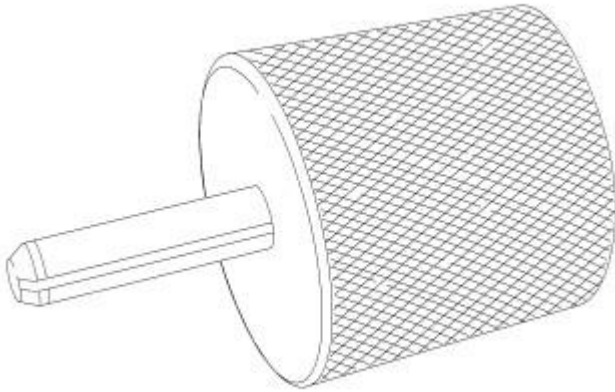


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**Fig. 76: VM 1058 Camshaft Oil Seal Remover**  
Courtesy of CHRYSLER LLC

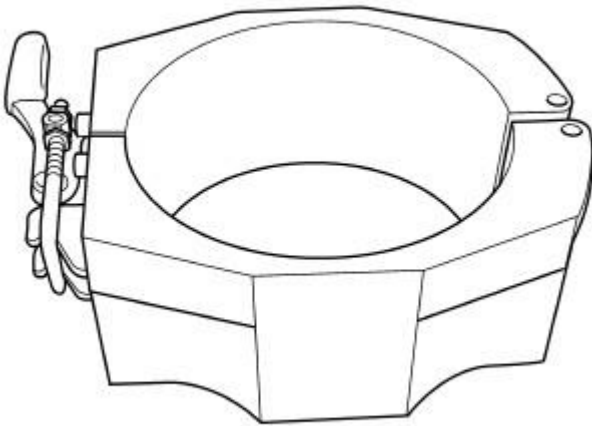
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**Fig. 77: VM 10012 Balance Shaft Lock Pin**  
Courtesy of CHRYSLER LLC

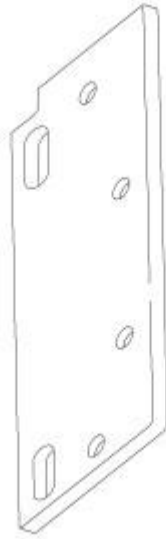


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**Fig. 78: VM 1082 2.8L Piston Installer**  
Courtesy of CHRYSLER LLC

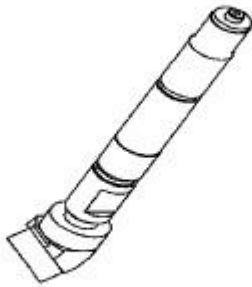
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**Fig. 79: VM 9990 Front & Rear Seal Tool**  
Courtesy of CHRYSLER LLC



**Fig. 80: VM 10010 Compression Test Adapter**  
Courtesy of CHRYSLER LLC

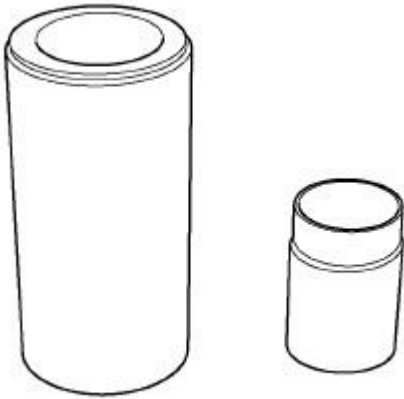


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**Fig. 81: 9937 Seal Installer**  
Courtesy of CHRYSLER LLC



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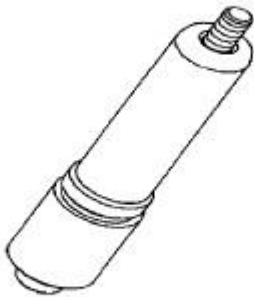
**Fig. 82: VM 1057 Seal Installer**  
Courtesy of CHRYSLER LLC

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**Fig. 83: VM 9991 Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC



**Fig. 84: VM 9992 Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

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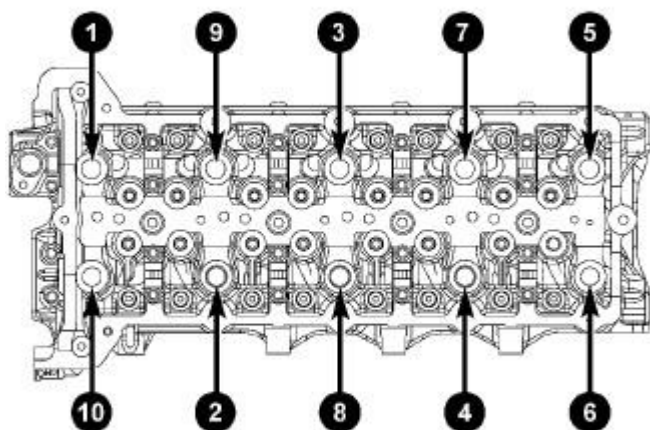
**Fig. 85: VM 9993 Crankshaft Seal Installer**

Courtesy of CHRYSLER LLC

## CYLINDER HEAD

### DESCRIPTION

### DESCRIPTION



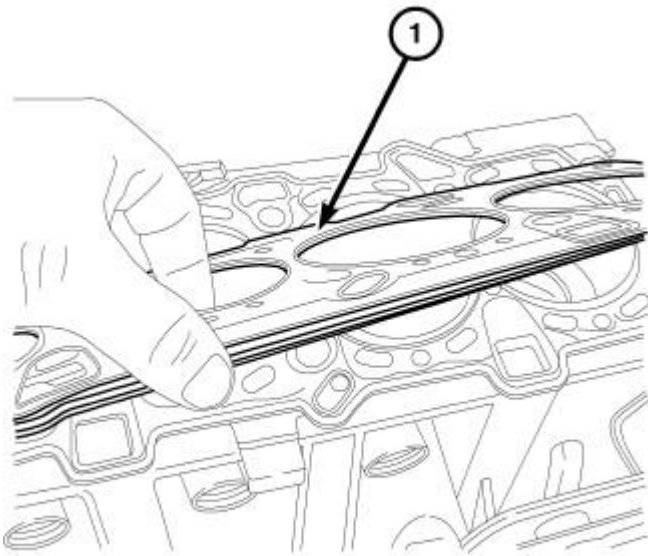
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**Fig. 86: Cylinder Head Torque**

Courtesy of CHRYSLER LLC

The 2.8L aluminum, overhead valve cylinder head is torqued in a cross pattern. The cylinder head itself is not

resurfacable.



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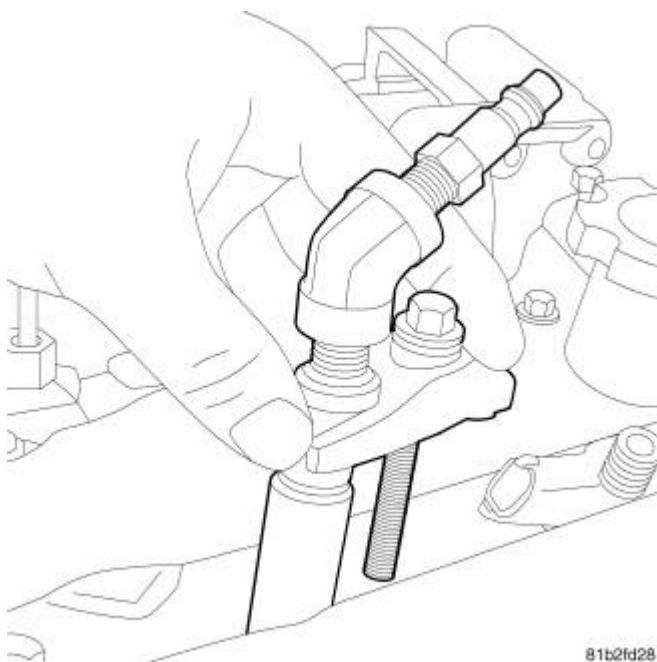
**Fig. 87: MLS Gasket**

**Courtesy of CHRYSLER LLC**

1. The cylinder head uses a selectable Multi-layered Steel gasket that is available in three sizes.

## **STANDARD PROCEDURE**

### **VALVE SEALS - IN VEHICLE**



**Fig. 88: Compression Tester**  
Courtesy of CHRYSLER LLC

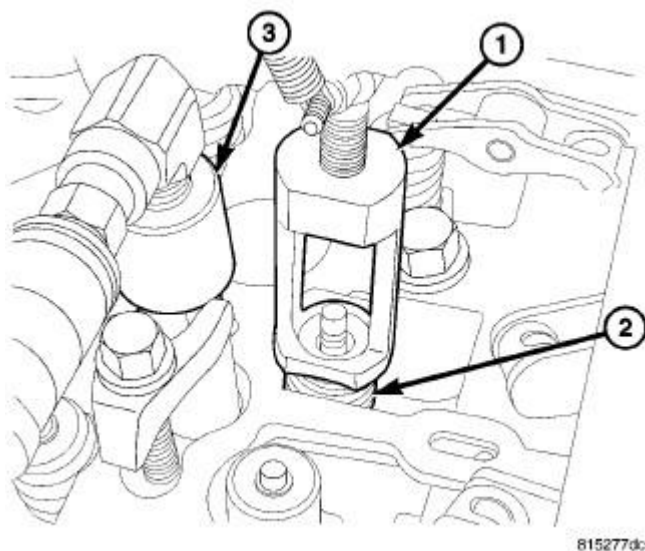
1. Disconnect the negative battery cable.
2. Remove the intake manifold/cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.

**NOTE:**        **Rocker arms and lifters must be kept in order of removal and stored in the up right position.**

3. Position the rocker arms aside. See **Engine/Cylinder Head/ROCKER ARM, Valve - Removal**.
4. Install special tool VM 1072A, compression tester adaptor into the injector hole and retain with an injector hold down (2) bolt.
5. Prepare special tool MD998772A (1) for usage by inverting the tool to cylinder head holding screws so that the thread size matches the cylinder head.
6. Install special tool MD998772A (1) onto cylinder head and using adaptor MD998772A-15 (2), place the adaptor over the valve spring.
7. Connect a regulated air supply (3) to VM 1072A (4), and pressurize the cylinder.
8. Place shop towels around the working area of the cylinder head to prevent valve locks from accidentally entering the engine.

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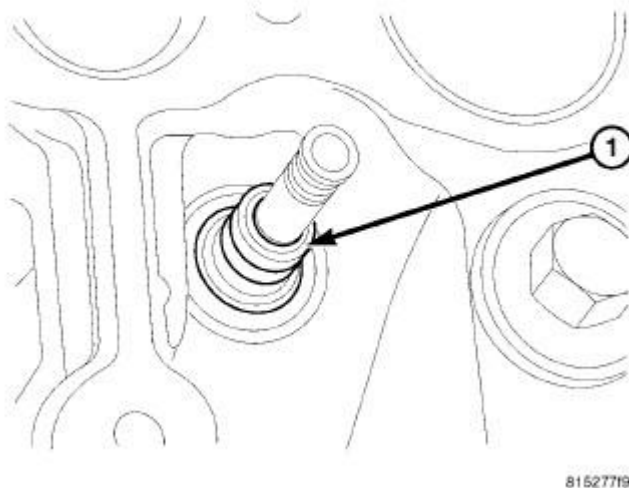
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**Fig. 89: MD998772A-15 Adaptor**  
Courtesy of CHRYSLER LLC

- |   |
|---|
| 1 - MD998772A-15 ADAPTOR                |
| 2 - VALVE SPRING                        |
| 3 - VM 1072A COMPRESSION TESTER ADAPTOR |

9. Using adaptor MD998772A-15 (1), collapse the valve spring (2) and remove the locks.
10. Remove the valve spring (2) assembly.



**Fig. 90: Valve Seal**  
Courtesy of CHRYSLER LLC

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### 1 - VALVE SEAL

11. Remove the valve seal.
12. Repeat this procedure for all cylinders.

### VALVE SERVICE

This procedure is done with the engine cylinder head removed from the block.

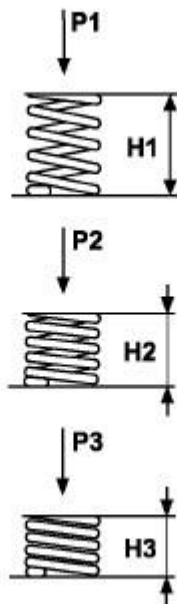
### DISASSEMBLY

1. Remove the engine cylinder head from the cylinder block. See **Engine/Cylinder Head - Removal**.
2. Use Valve Spring Compressor Tool and compress each valve spring.
3. Remove the valve locks, retainers, and springs.
4. Use a smooth stone or a jewelers file to remove any burrs on the top of the valve stem, especially around the groove for the locks.
5. Remove the valves, and place them in a rack in the same order as removed.

### VALVE CLEANING

1. Clean all carbon deposits from the combustion chambers, valve ports, valve stems, valve stem guides and head.
2. Clean all residue and gasket material from the engine cylinder head machined gasket surface.

### INSPECTION



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**Fig. 91: Valve Spring Chart**

Courtesy of CHRYSLER LLC

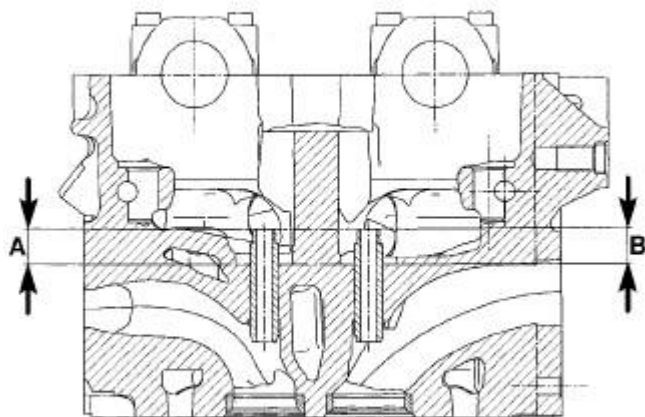
LOAD Kg		HEIGHT mm		STATE
P1	0.00	H1	50.8	FREE LENGTH
P2	182-5 +10%	H2	38.0	VALVE CLOSED
P3	395±5%	H3	29.0	VALVE OPEN

1. Inspect for cracks in the combustion chambers and valve ports.
2. Inspect for cracks on the exhaust seat.
3. Inspect for cracks in the gasket surface at each coolant passage.
4. Inspect valves for burned, cracked or warped heads.
5. Inspect for scuffed or bent valve stems.
6. Replace valves displaying any damage.
7. Check valve spring height. See **Fig. 91**.

### VALVE SEAT REFACING

1. Install a pilot of the correct size in the valve guide bore. Reface the valve seat to the specified angle with a good dressing stone. Remove only enough metal to provide a smooth finish.
2. Use tapered stones to obtain the specified seat width when required.

### VALVE GUIDES



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**Fig. 92: Valve Height**



**Courtesy of CHRYSLER LLC**

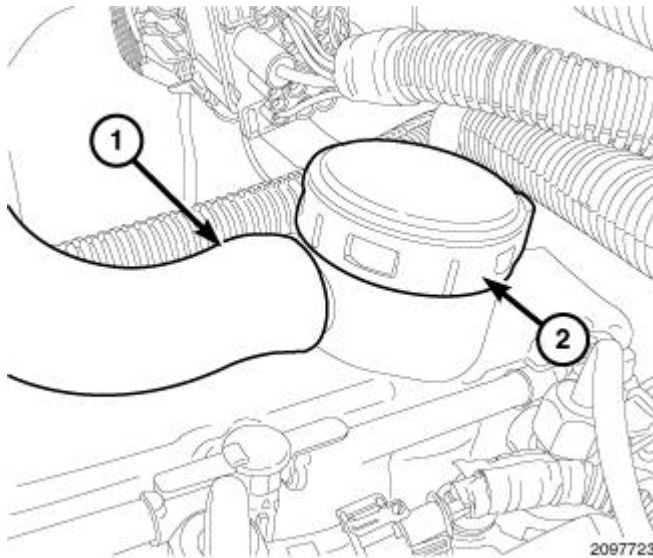
1. Valve Guides height requirement.
2. Measurement A and B: 13.50 mm - 14.00 mm. (0.570 in - 0.590 in)

**VALVE STEM-TO-GUIDE CLEARANCE MEASUREMENT**

1. Measure and record internal diameter of valve guides. Valve guide internal diameter is 6.0 to 6.012 mm (0.2362 to 0.2366 in.).
2. Measure valve stems and record diameters. Intake valve stem diameter 5.952 to 5.97 mm (0.2343 to 0.2350 in). Exhaust valve stem diameter 5.942 to 5.96 mm (0.2339 to 0.2346 in).
3. Subtract diameter of valve stem from internal diameter of its respective valve guide to obtain valve stem clearance in valve guide. Clearance of inlet valve stem in valve guide is 0.03 to 0.06 mm (.0011 to .0023 in). Clearance of exhaust valve stem in valve guide is 0.04 to 0.07 mm (.0015 to .0027 in).
4. If valve stem clearance in valve guide exceeds tolerances, new valve guides must be installed.

**REMOVAL****REMOVAL**

1. Disconnect the battery cables.
2. Drain the cooling system. Refer to Cooling - Standard Procedure .
3. Remove the air cleaner housing. See Engine/Air Intake System/BODY, Air Cleaner - Removal.

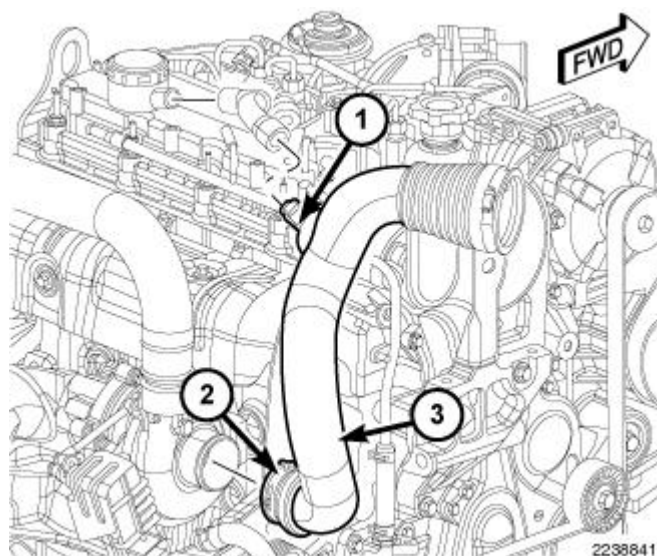


**Fig. 93: Oil Separator Cover**  
**Courtesy of CHRYSLER LLC**

4. Disconnect the crankcase vent hose (1) from the oil separator (2).

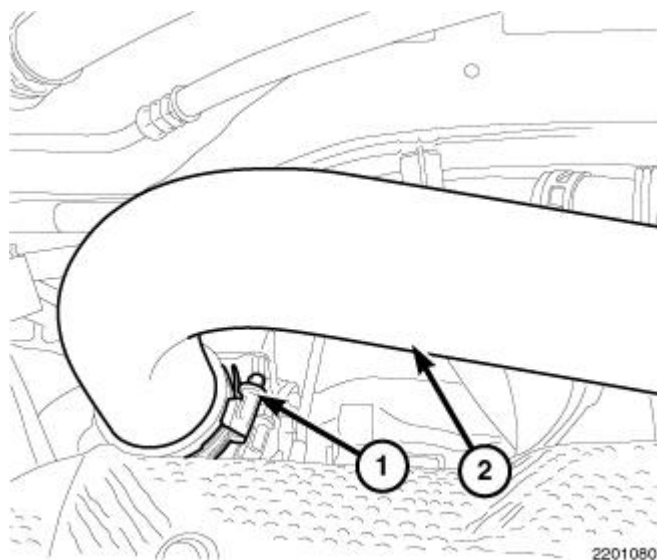
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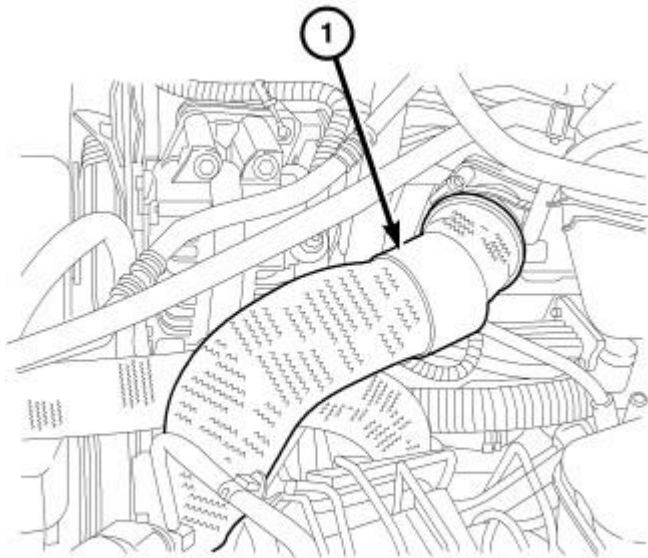
**Fig. 94: Crankcase Vent Hose Heater Electrical Connector & Turbocharger Inlet Tube**  
Courtesy of CHRYSLER LLC

5. Disconnect the crankcase vent hose heater electrical connector (1).
6. Loosen clamp (2) and remove the turbocharger inlet tube (3) from turbocharger.



**Fig. 95: Charge Air Cooler Inlet Hose**  
Courtesy of CHRYSLER LLC

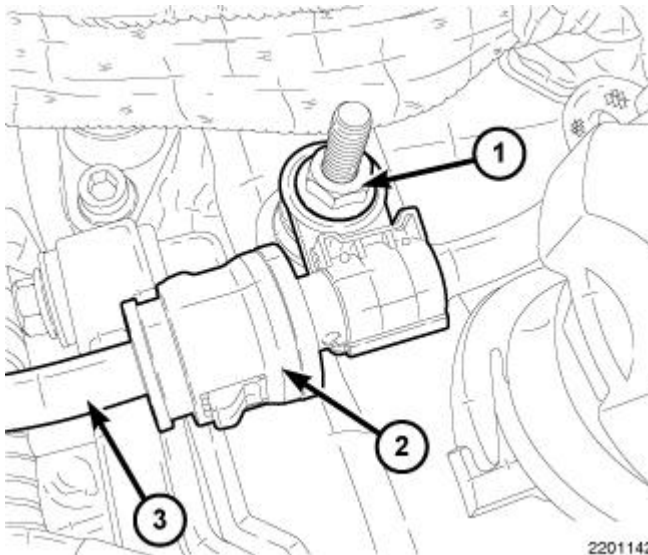
7. Loosen clamp (1) and disconnect the charge air cooler inlet hose (2) from turbocharger.



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**Fig. 96: Charge Air Cooler Outlet Hose**  
Courtesy of CHRYSLER LLC

8. Remove the charge air cooler outlet hose (1) from the EGR air flow control valve.



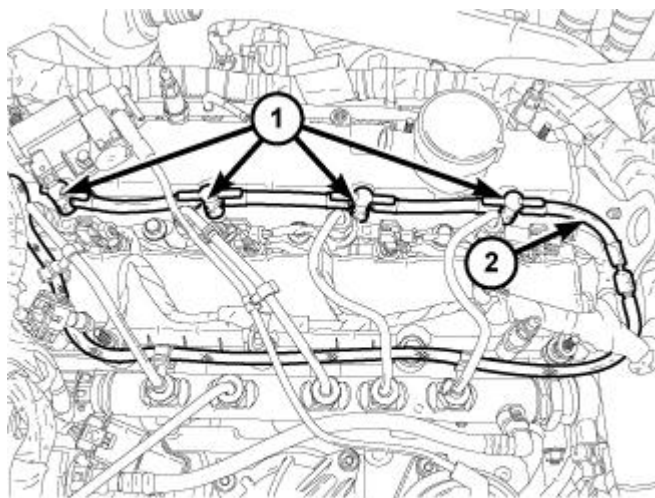
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**Fig. 97: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

9. Remove the retaining nut (1) and disconnect the fuel injector return line (2).

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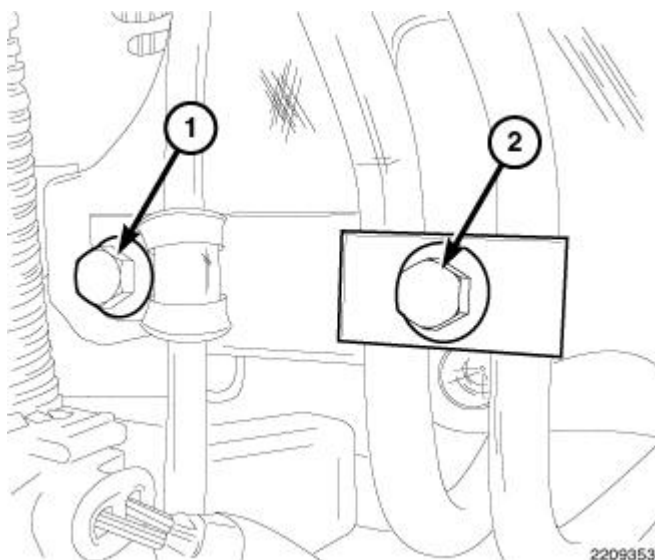
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**Fig. 98: Common Fuel Return Line**  
Courtesy of CHRYSLER LLC

10. A lock button (1) is used to secure the common fuel return line to each fuel injector. Use your fingers to lift up all four lock buttons (1) to unlock them. After unlocking all four buttons, lift fuel return line assembly and remove the fuel injector return line (2).



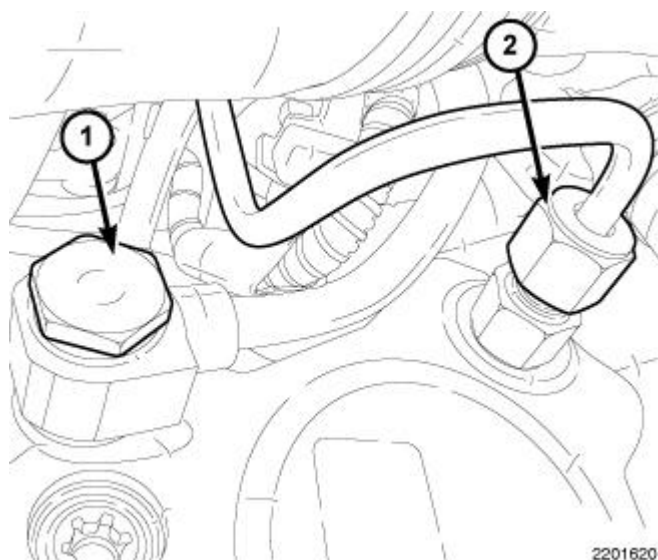
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**Fig. 99: Fuel Feed & Return Line Bracket Bolt With High Pressure Fuel Feed Line To Fuel Rail Bolt**  
Courtesy of CHRYSLER LLC

11. Remove the high pressure fuel feed line to fuel rail bolt (1) attaching fuel line to intake manifold.
12. Remove the fuel feed and return line bracket bolt (2) attaching fuel lines to intake manifold.

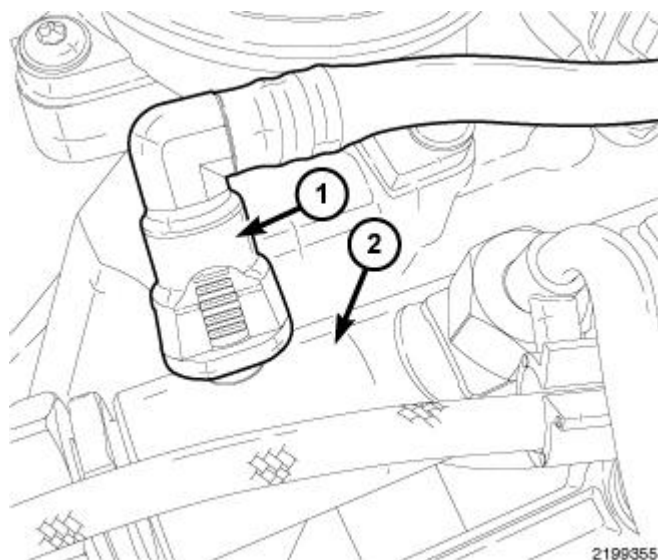
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**Fig. 100: High Pressure Fuel Rail Feed Line**  
Courtesy of CHRYSLER LLC

13. Remove bolt (1) attaching the fuel return line to high pressure fuel pump.
14. Remove the high pressure fuel rail feed line (2) from high pressure fuel pump.

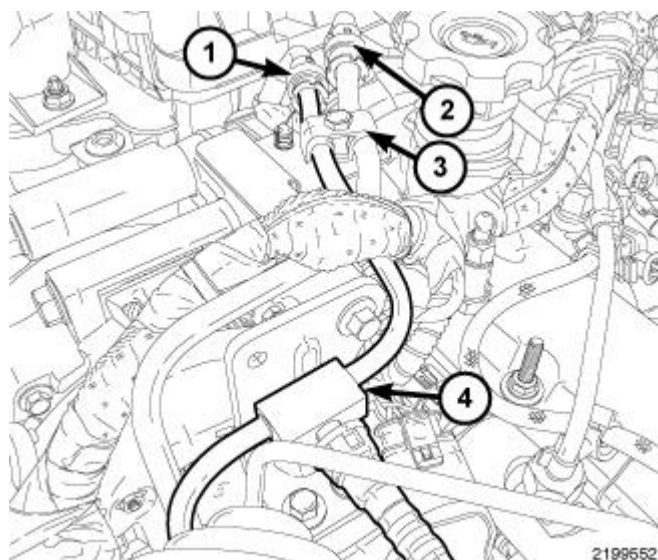


**Fig. 101: Fuel Return Line & Fuel Rail**  
Courtesy of CHRYSLER LLC

15. Disconnect the fuel return line (1) from fuel rail (2).

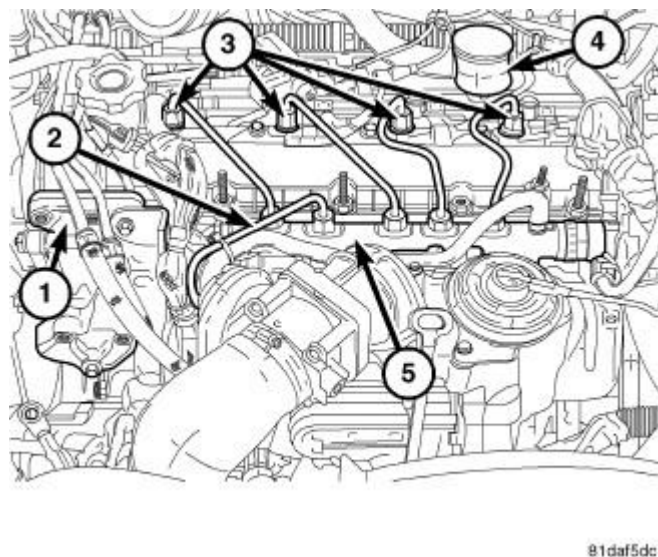
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**Fig. 102: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

16. Disconnect the fuel return line (1).
17. Disconnect the fuel feed line (2).
18. Remove the fuel line mounting bracket (3).
19. Remove the fuel return line block (4).



**Fig. 103: Fuel Rail**  
Courtesy of CHRYSLER LLC

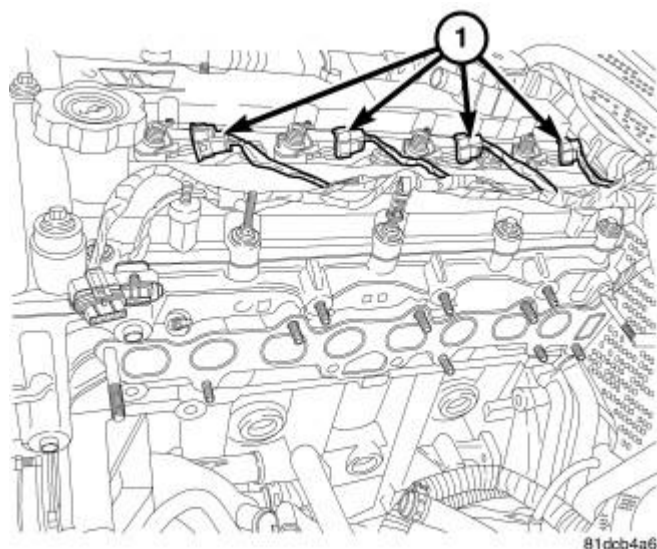
20. Disconnect the high pressure fuel line (2) from fuel rail.

**NOTE:** Protective caps should always be used on fuel injectors and fuel rail whenever fuel lines are removed.

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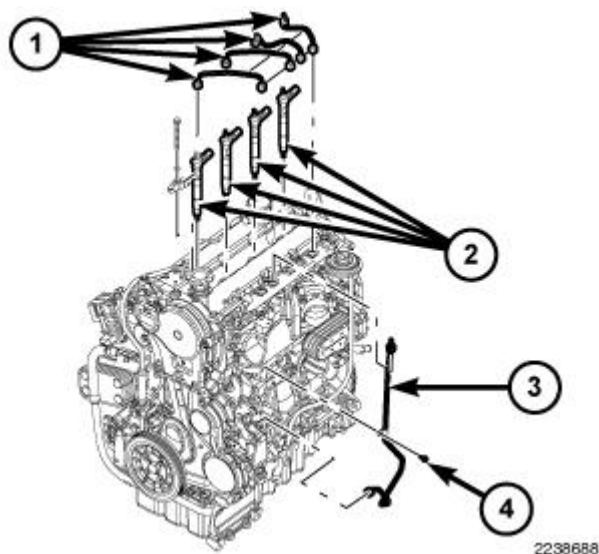
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21. Remove the high pressure fuel lines (3) from the injectors and the fuel rail.
22. Disconnect the fuel rail solenoid harness connector.
23. Disconnect the fuel rail pressure sensor harness connector.
24. Remove the fuel rail (5).



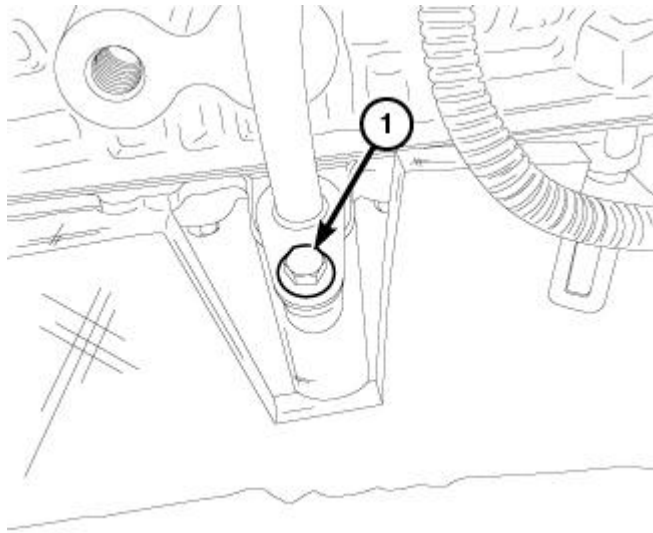
**Fig. 104: Fuel Injector Harness Connectors**  
Courtesy of CHRYSLER LLC

25. Disconnect the fuel injector harness connectors (1) from the fuel injectors.



**Fig. 105: Fuel Injectors**  
Courtesy of CHRYSLER LLC

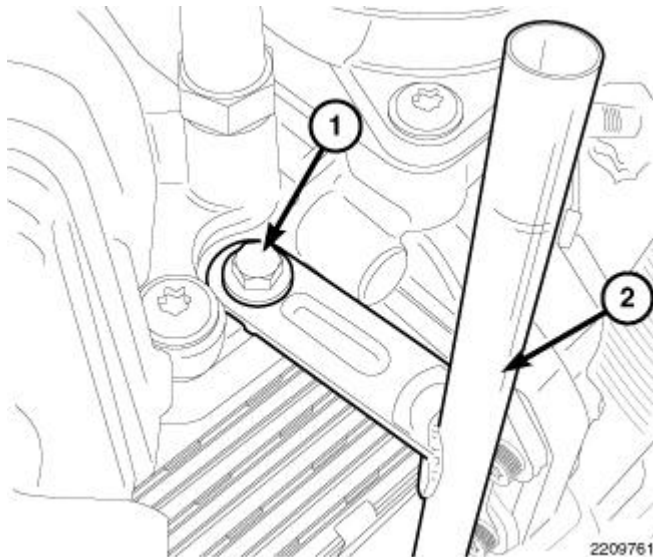
26. Remove the fuel injectors (2).



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**Fig. 106: Lower Engine Oil Indicator Tube Bolt**  
Courtesy of CHRYSLER LLC

27. Remove the lower bolt (1) from oil indicator tube.



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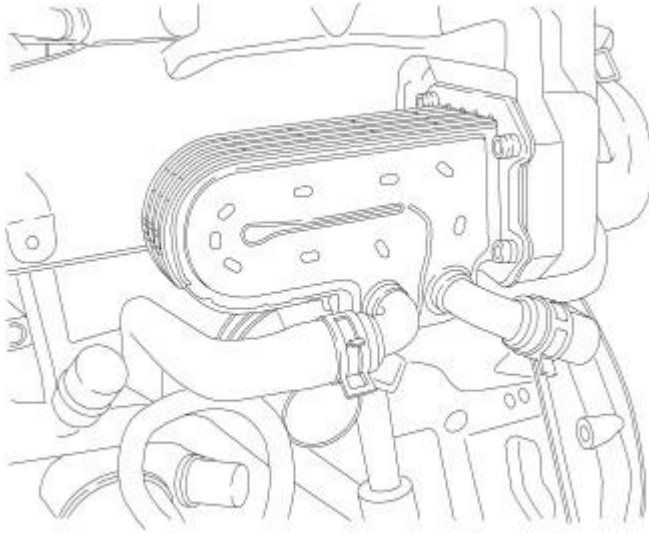
**Fig. 107: Upper Engine Oil Indicator Tube Bolt**  
Courtesy of CHRYSLER LLC

28. Remove the upper bolt (1) and the oil level indicator tube.



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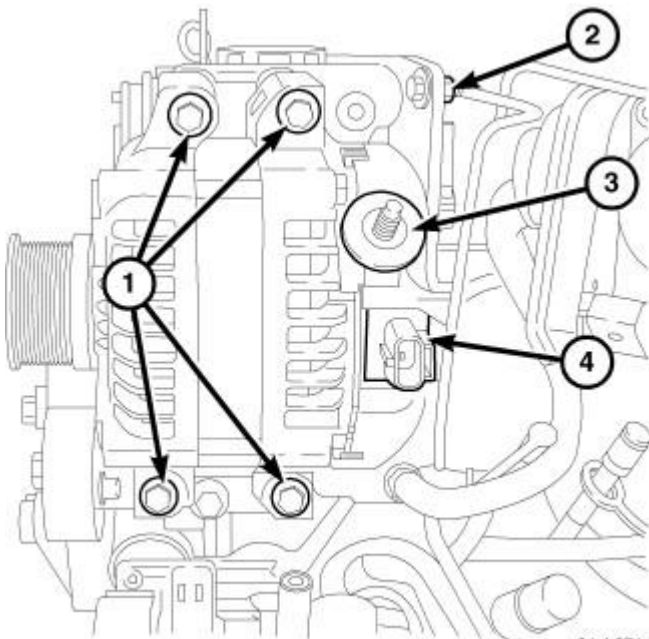
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**Fig. 108: EGR Cooler**  
Courtesy of CHRYSLER LLC

29. Remove coolant hoses from the EGR cooler.
30. Remove bolts and the EGR cooler.



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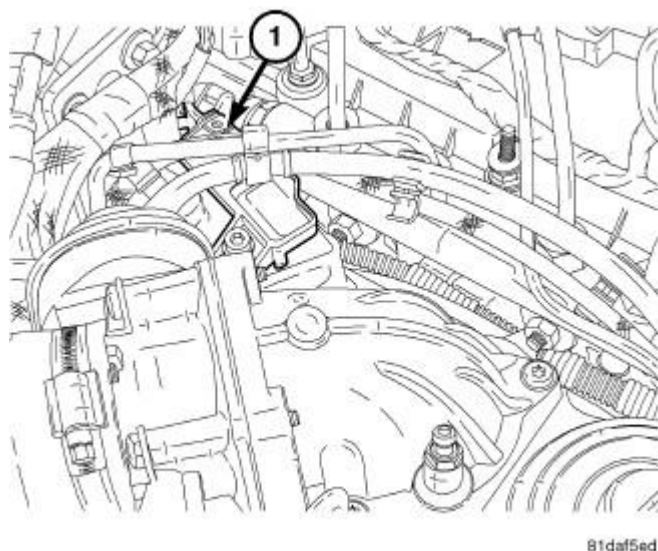
**Fig. 109: Generator**  
Courtesy of CHRYSLER LLC

31. Remove the accessory drive belt.

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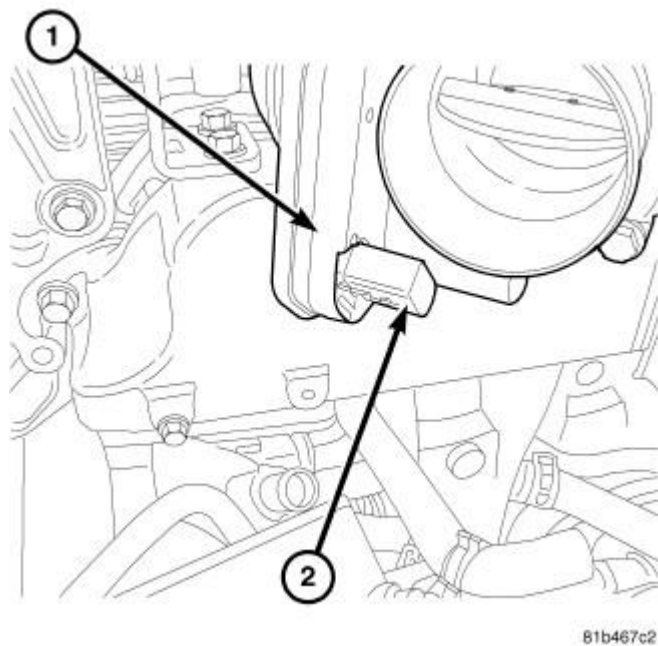
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32. Disconnect the generator harness connectors (4).
33. Disconnect the generator feed wire (3).
34. Remove bolts (1) and the generator.
35. Remove the generator brace bolt (2).
36. Remove the generator mounting bracket.



**Fig. 110: IAT/BPS Sensor Harness Connector**  
Courtesy of CHRYSLER LLC

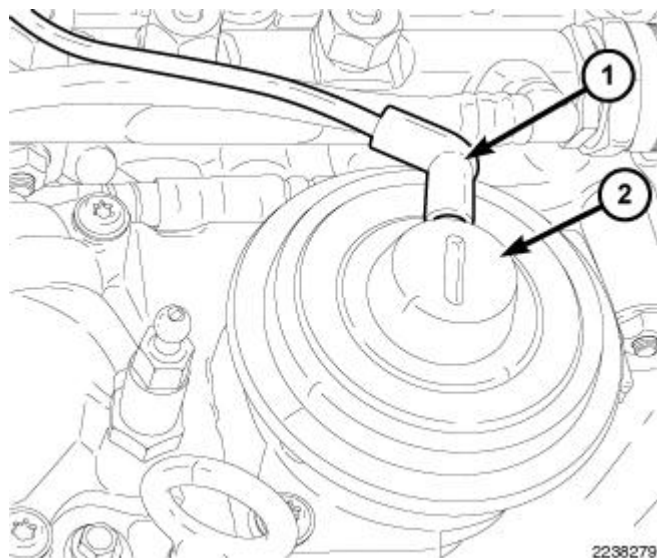
37. Disconnect the IAT/BPS sensor harness connector (1).



**Fig. 111: Electrical Connector - EGR Air Valve**

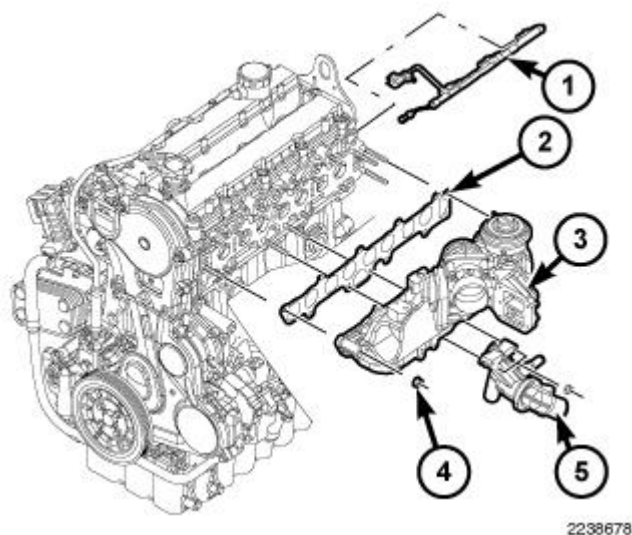
**Courtesy of CHRYSLER LLC**

38. Disconnect the EGR air flow control valve electrical connector (2).



**Fig. 112: Vacuum Line & EGR Valve**  
**Courtesy of CHRYSLER LLC**

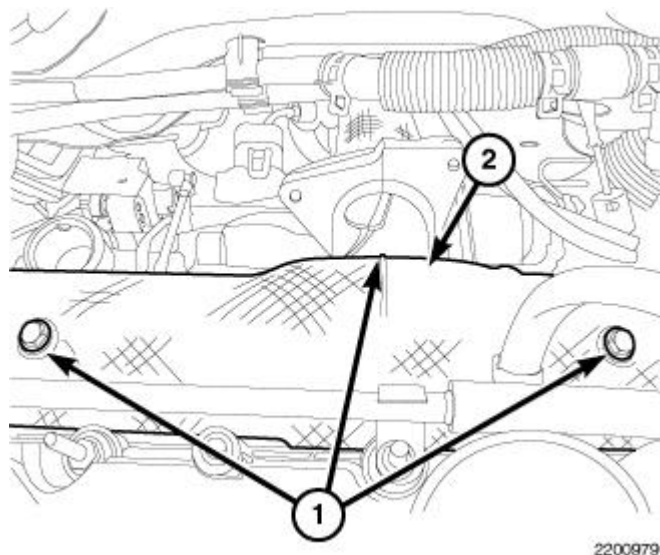
39. Disconnect the vacuum line (1) to the EGR valve (2).



**Fig. 113: Intake Manifold & Thermostat Housing**  
**Courtesy of CHRYSLER LLC**

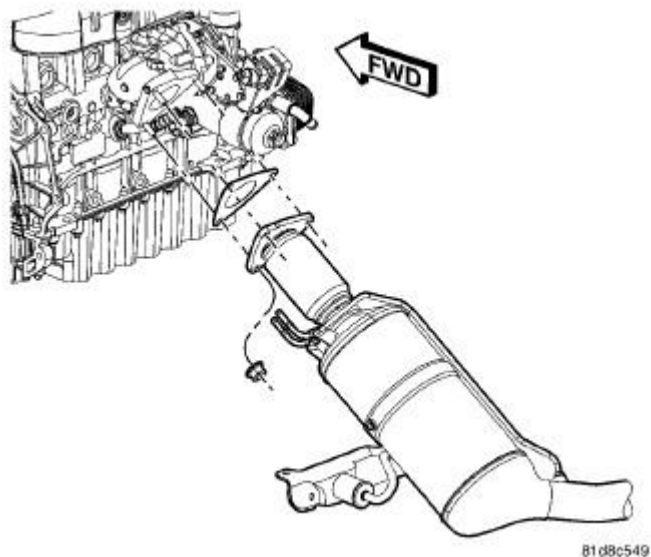
40. Disconnect and position aside the glow plug harness (1).  
41. Remove the thermostat housing (5).  
42. Remove the intake manifold fasteners (4).

43. Remove the intake manifold (3) and the gasket (2).



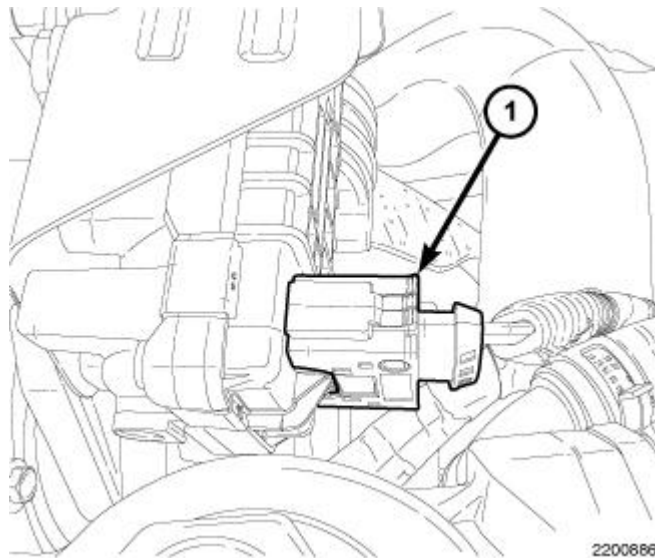
**Fig. 114: Exhaust Manifold Heat Shield Bolts**  
Courtesy of CHRYSLER LLC

44. Remove bolts (1) and the exhaust manifold heat shield (2).



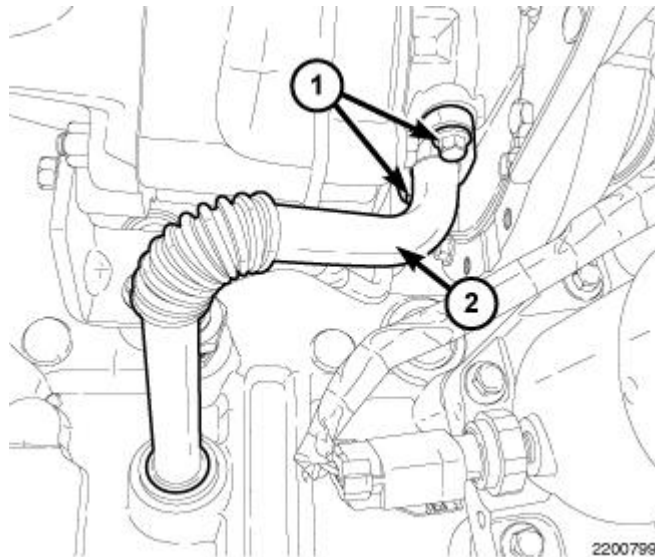
**Fig. 115: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

45. Remove the fasteners and disconnect the exhaust system from the turbocharger. Refer to **Exhaust System/CONVERTER, Catalytic - Removal**.



**Fig. 116: Turbocharger Module Connector**  
Courtesy of CHRYSLER LLC

46. Disconnect the turbocharger module connector (1).

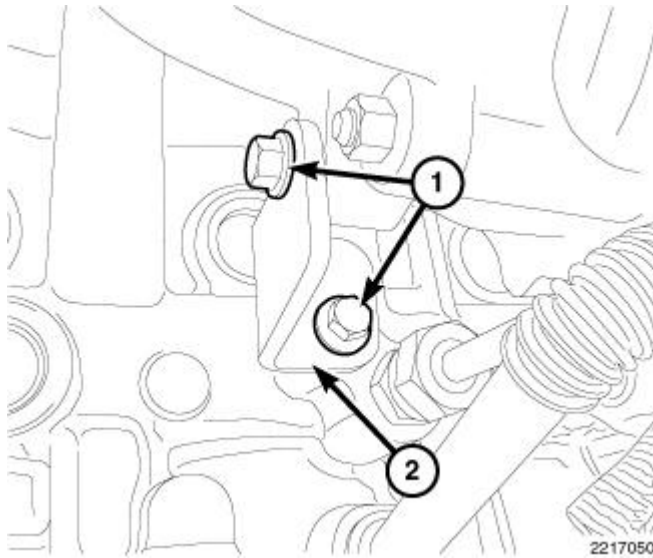


**Fig. 117: Turbocharger Oil Return Line Bolts**  
Courtesy of CHRYSLER LLC

47. Remove the bolts (1) and turbocharger oil return line (2).

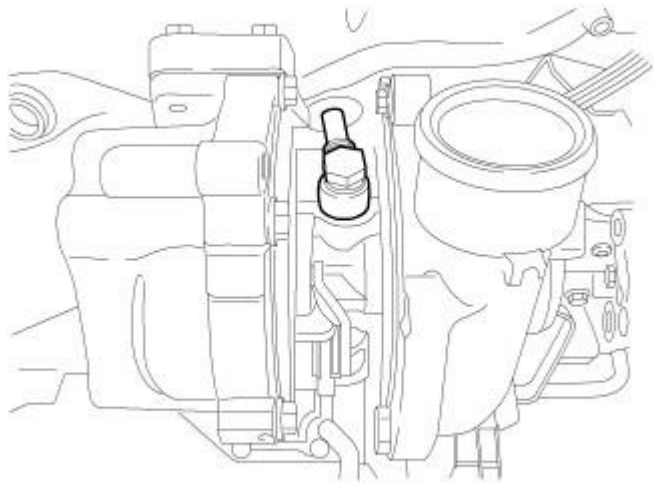
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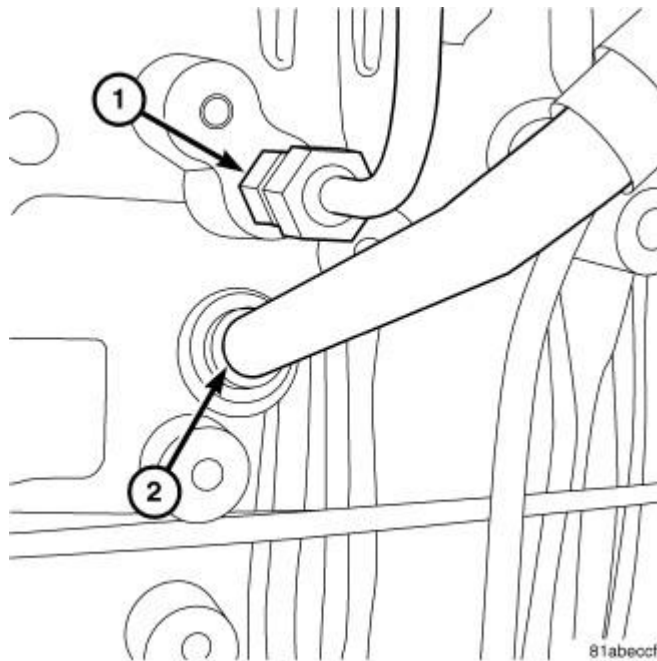
**Fig. 118: Turbocharger Support Bracket Bolts**  
Courtesy of CHRYSLER LLC

48. Remove bolts (1) and the turbocharger support bracket (2).



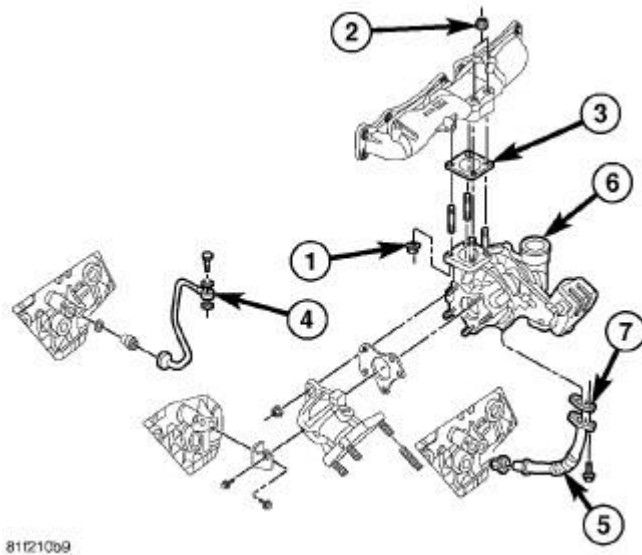
**Fig. 119: Turbocharger Feed Line**  
Courtesy of CHRYSLER LLC

49. Remove the turbocharger oil feed line.



**Fig. 120: Turbocharger Oil Feed Line**  
Courtesy of CHRYSLER LLC

50. Remove the turbocharger oil feed line from the engine block (1).

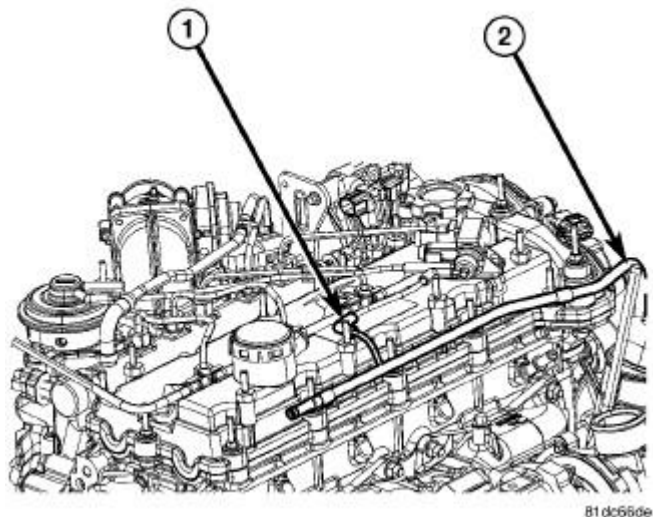


**Fig. 121: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

51. Remove retaining nuts (1), (2) and the turbocharger (6).  
52. Remove retaining nuts and the exhaust manifold.  
53. Remove the exhaust manifold gasket.

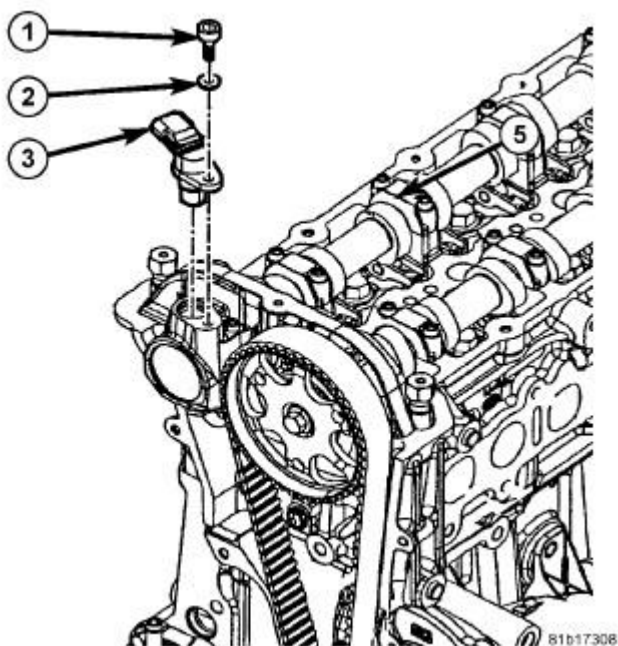
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**Fig. 122: Vacuum Lines**  
Courtesy of CHRYSLER LLC

54. Disconnect the engine wire harness retaining clips from the cylinder head cover stud bolts.
55. Disconnect the vacuum line (1).
56. Disconnect the vacuum line (2) from the vacuum pump.
57. Remove retaining nuts and remove the vacuum line (2).



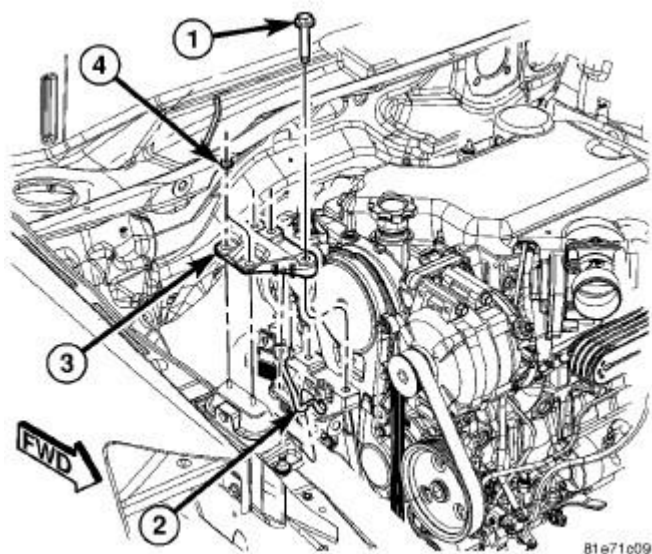
**Fig. 123: Camshaft Position Sensor (CMP)**  
Courtesy of CHRYSLER LLC



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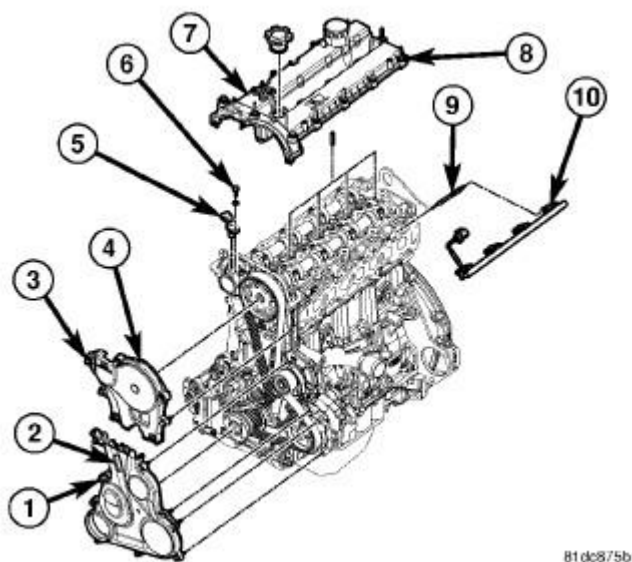
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58. Disconnect the harness connector from the Camshaft Position Sensor (CMP) (3).
59. Remove the Camshaft Position Sensor (CMP) (3).



**Fig. 124: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

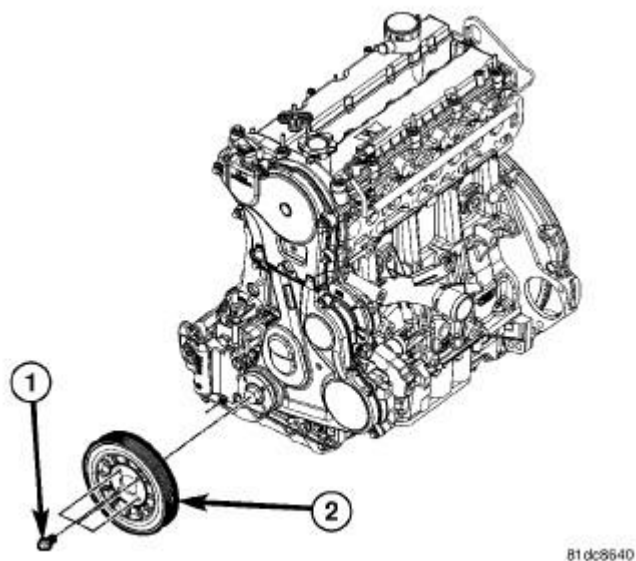
60. Support the engine from below.
61. Remove the engine mount bracket fasteners (1) and (4).
62. Remove the ground strap (2).
63. Remove the engine mount bracket (3).



**Fig. 125: Upper Front Timing Belt Cover & Cylinder Head Cover**

Courtesy of CHRYSLER LLC

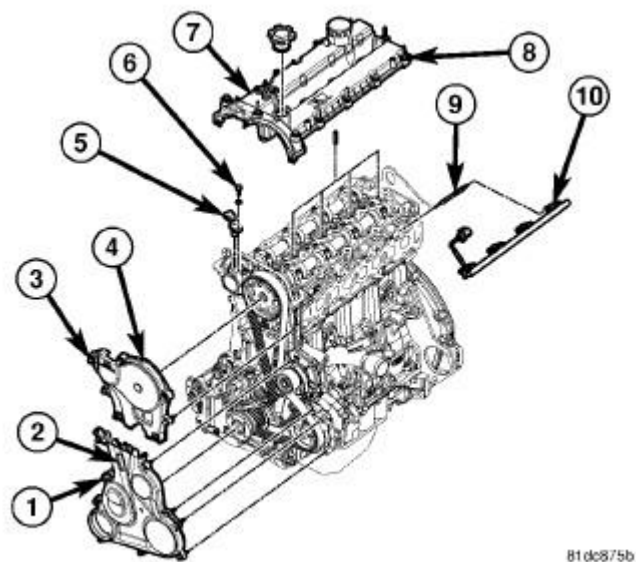
64. Remove the five bolts (3) and the upper front timing belt cover (4).
65. Remove the twelve fasteners (8) and the cylinder head cover (7).



**Fig. 126: Crankshaft Damper & Bolt**  
Courtesy of CHRYSLER LLC

**NOTE:** The crankshaft sprocket bolt is a LH thread.

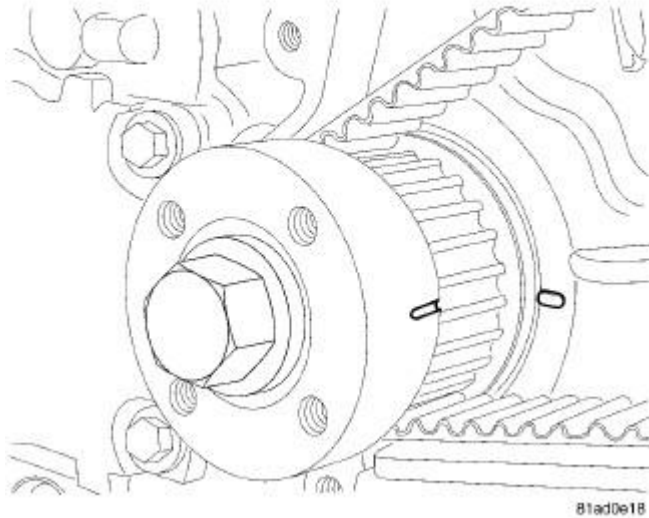
66. Remove the four crankshaft damper bolts (1), and the crankshaft damper (2).



**Fig. 127: Lower Front Cover**

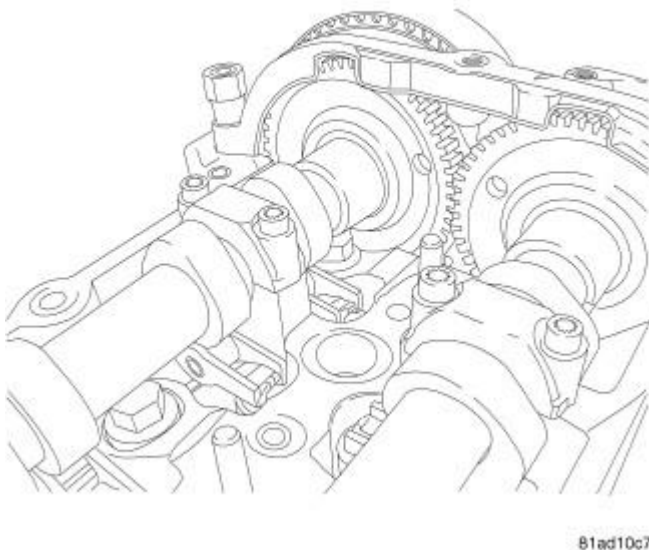
Courtesy of CHRYSLER LLC

67. Remove the nine fasteners (1), and lower front cover (2).



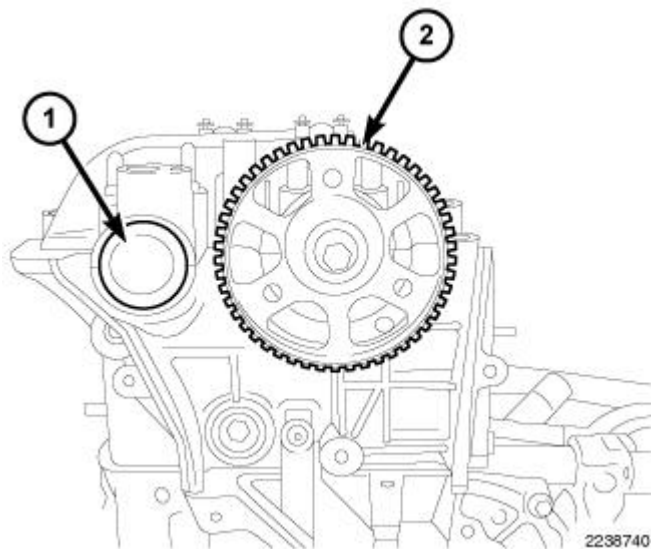
**Fig. 128: Crank Timing Mark**  
Courtesy of CHRYSLER LLC

68. Rotate the engine by hand until the crankshaft 90° ATDC marks are aligned.



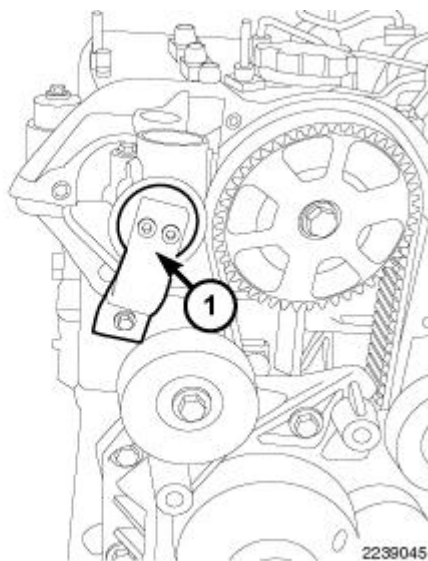
**Fig. 129: Camshaft Timing Marks**  
Courtesy of CHRYSLER LLC

69. Verify the camshaft timing alignment holes on the camshaft gears are aligned horizontally.



**Fig. 130: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

70. Remove the exhaust camshaft oil seal (1).

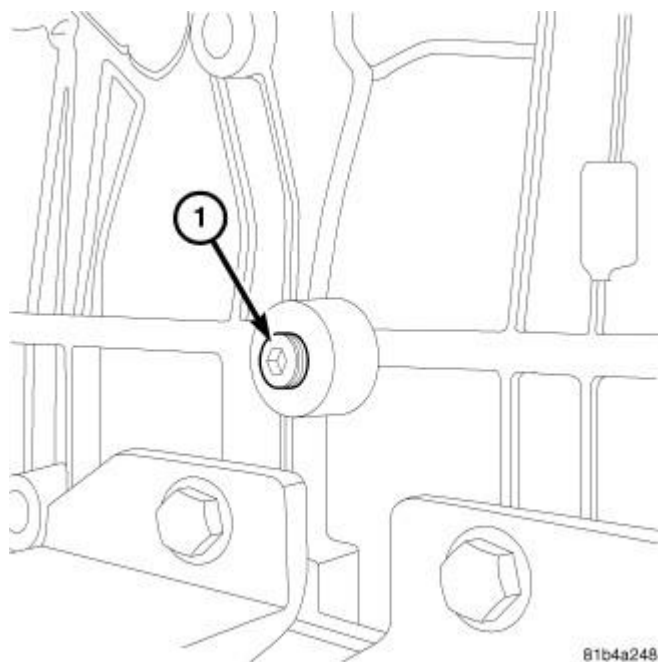


**Fig. 131: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

71. Install the camshaft locking tool VM .9991 (1).

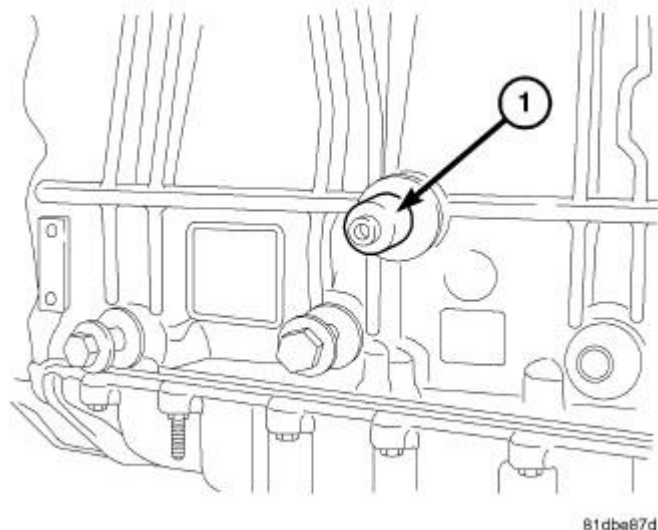
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**Fig. 132: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

72. Remove the engine block plug (1) for the crankshaft locking tool. The crankshaft locking tool is installed on the intake manifold side of the engine.

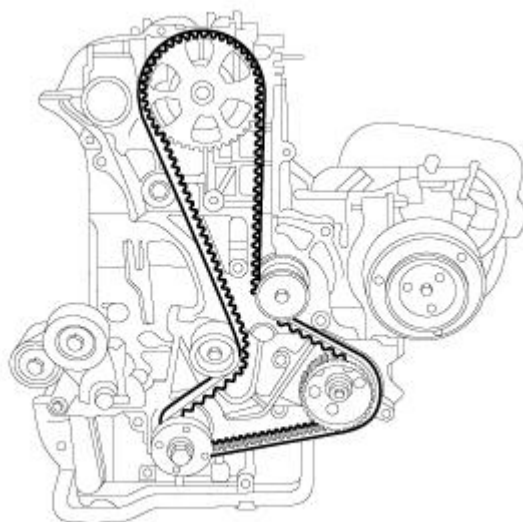


**Fig. 133: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

73. Install the crankshaft locking tool VM .9992 (1).

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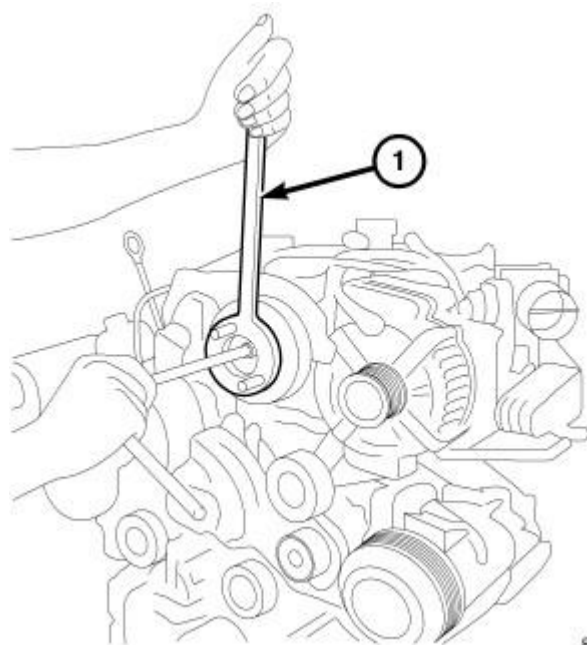
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**Fig. 134: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

74. Remove the timing belt.

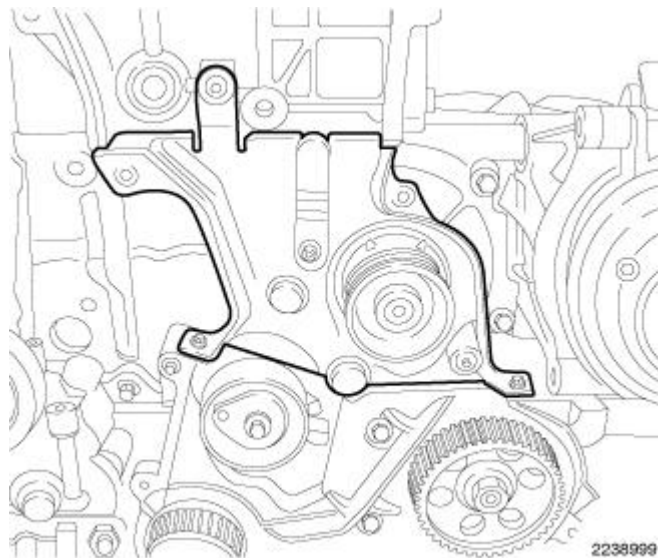


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**Fig. 135: Tightening Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

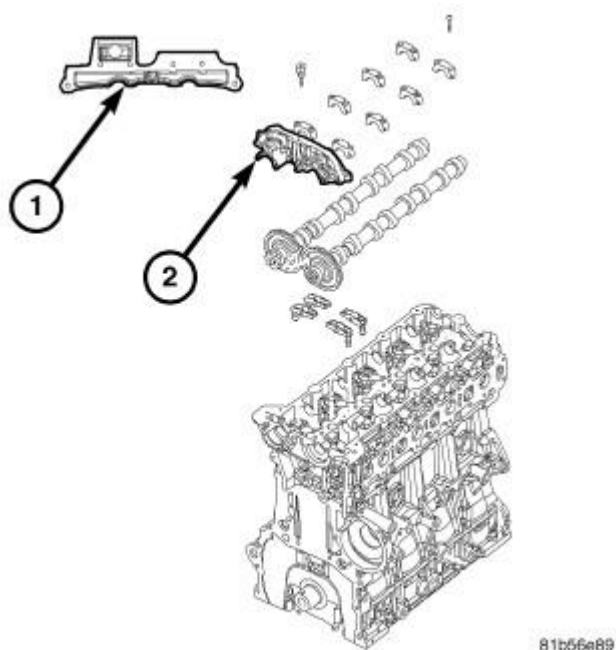
**CAUTION:** Always use VM 1055 to hold the camshaft while loosening the camshafts. Failure to use this tool can cause the camshaft holding tool to rotate the tone wheel on the camshaft. If the tone wheel is spun on the camshaft, the camshaft must be replaced.

75. Using the camshaft Gear Holder VM 1055 (1) to hold the intake camshaft sprocket. Remove bolt and the intake camshaft sprocket.



**Fig. 136: Inner Front Cover**  
Courtesy of CHRYSLER LLC

76. Remove the inner timing belt cover.

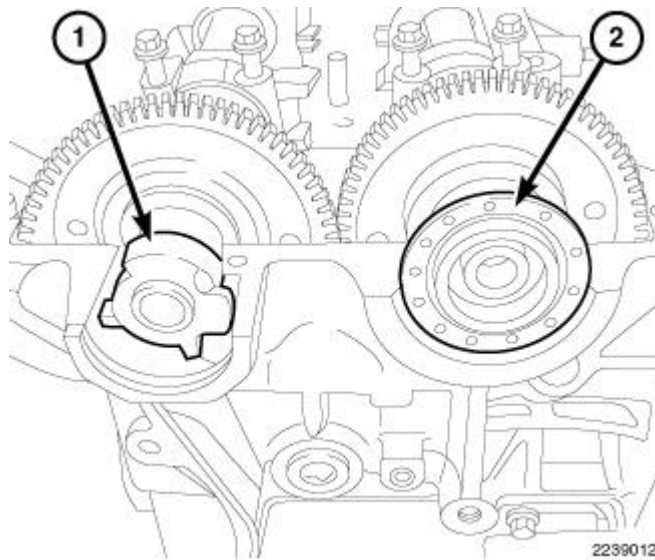


**Fig. 137: Front Camshaft Bearing Journal**  
Courtesy of CHRYSLER LLC

77. Remove the front camshaft bearing journal (2).

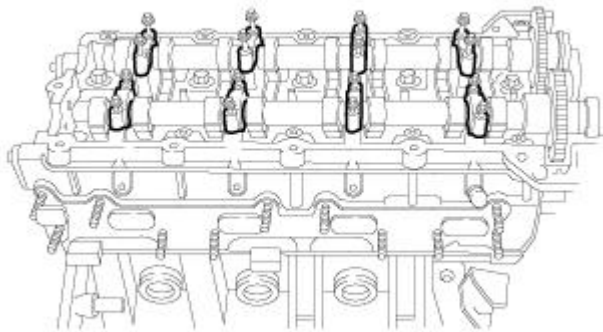
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**Fig. 138: Intake Camshaft Oil Seal**  
Courtesy of CHRYSLER LLC

78. Remove the intake camshaft oil seal (2).



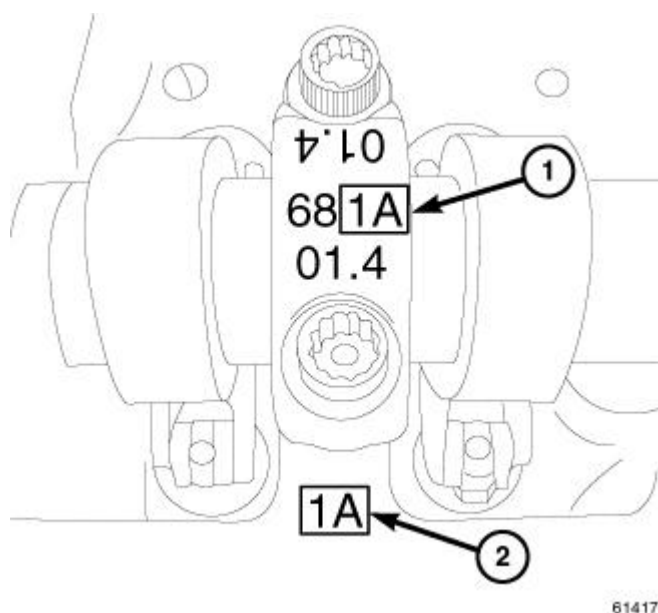
**Fig. 139: Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

79. Using a circular pattern, loosen the camshaft cap bolts.



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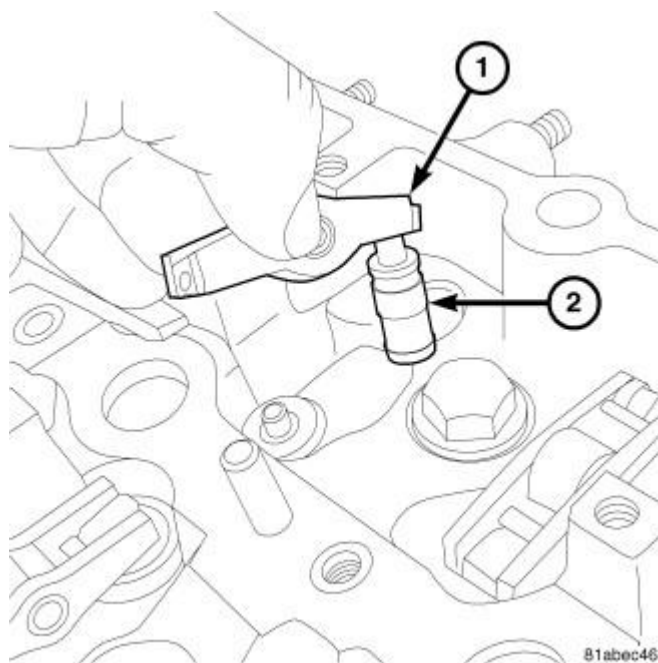
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**Fig. 140: Identifying Camshaft Cap & Cylinder Head (Intake Side) Markings**  
Courtesy of CHRYSLER LLC

**NOTE:** Observe the position marks on the cylinder head and camshaft cap. Always replace the camshaft cap to its original location. The figure is an example of the camshaft markings.

80. Remove the camshaft caps.
81. Remove the camshafts.



**Fig. 141: Rocker Arms & Hydraulic Lifters**

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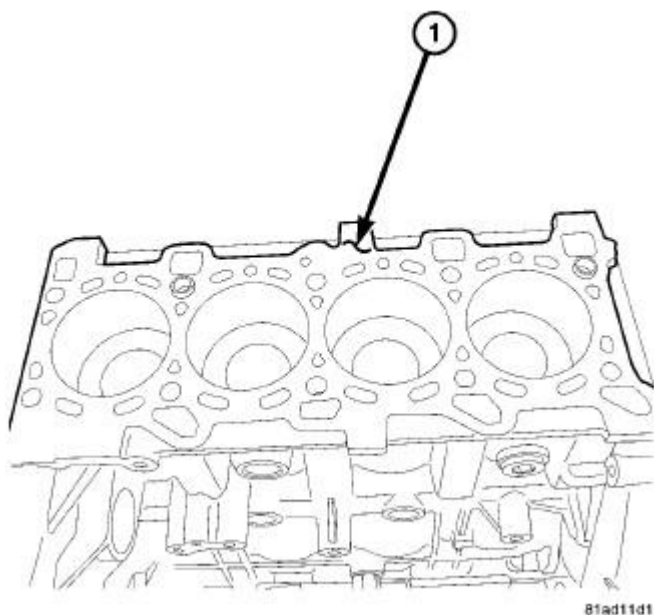
Courtesy of CHRYSLER LLC

**NOTE:** Observe the position of the rocker arms and lifters. Always return the rocker arms and lifters to their original location.

82. Remove the rocker arms (1) and hydraulic lifters (2).
83. Remove the cylinder head bolts.
84. Remove the cylinder head.

### CLEANING

### CLEANING



**Fig. 142: Engine Block**  
Courtesy of CHRYSLER LLC

Thoroughly clean the engine cylinder head and cylinder block mating surfaces. Clean the intake and exhaust manifold and engine cylinder head mating surfaces. Remove all gasket material and carbon. See **Engine - Standard Procedure**.

Check to ensure that no coolant or foreign material has fallen into the tappet bore area.

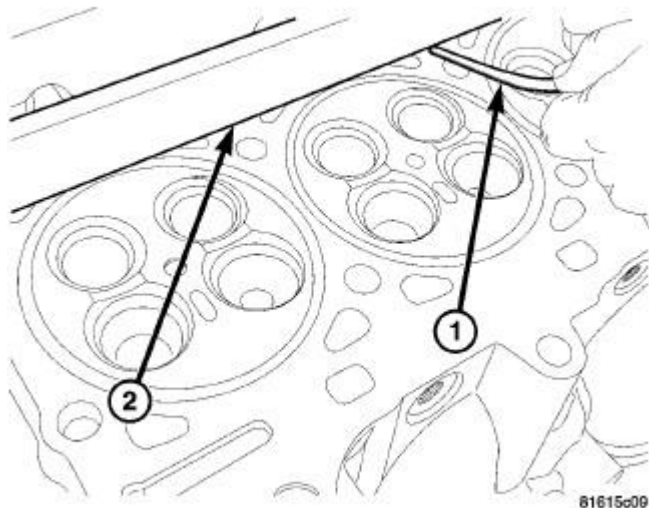
Remove the carbon deposits from the combustion chambers and top of the pistons.

### INSPECTION

### INSPECTION

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**Fig. 143: Cylinder Head Flatness (1 Of 2)**

Courtesy of CHRYSLER LLC

1 - FEELER GAUGE

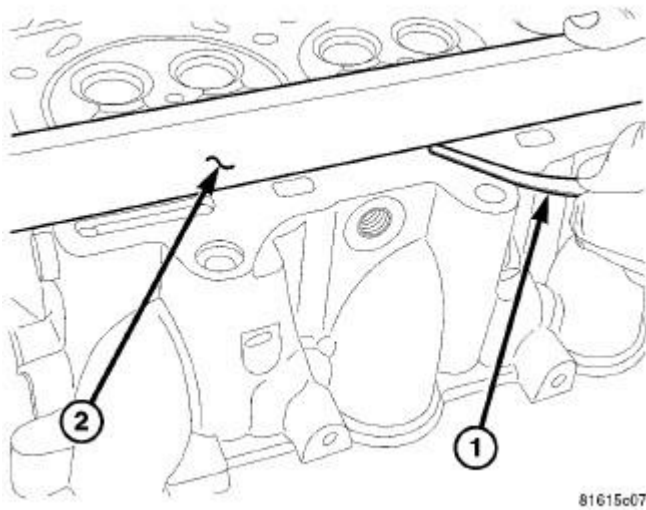
2 - STEEL STRAIGHT EDGE

**CAUTION:** The cylinder head surface and straight edge must be absolutely clean before the flatness measurement is taken. **DO NOT** check flatness across the combustion chamber area or on the marks left by the gasket stopper.

Use a cleaned straight edge (2) and feeler (1) gauge to check the flatness. Lie the straight edge (2) parallel across the cooling ports. Measure before each combustion chamber toward the outer edge of the cylinder head, above and below each combustion chamber, between each combustion chamber, top and bottom, on the cylinder head and block mating surfaces. The **maximum** allowed warpage is 0.075 mm (0.003 in.).

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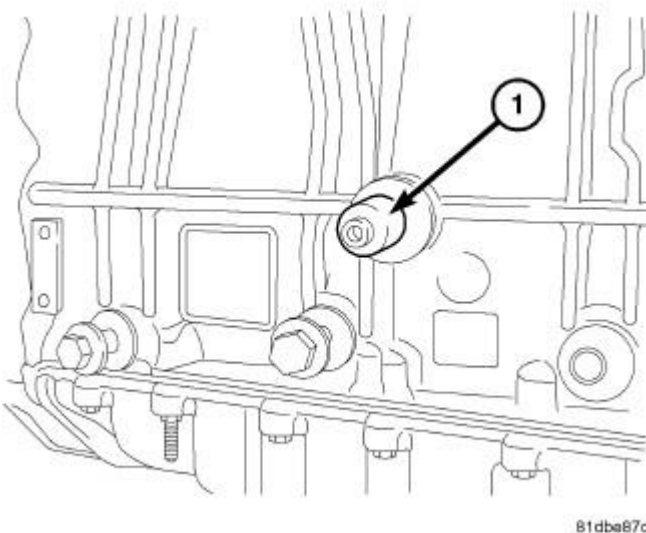
**Fig. 144: Cylinder Head Flatness (2 Of 2)**  
Courtesy of CHRYSLER LLC

- 1 - Feeler Gauge
- 2 - Straightedge

The minimum cylinder head thickness is 135.5 mm (5.33 in.).

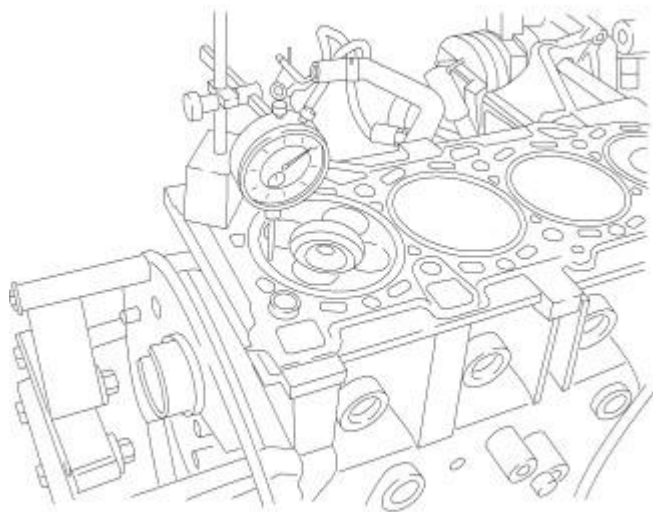
### INSTALLATION

### INSTALLATION



**Fig. 145: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

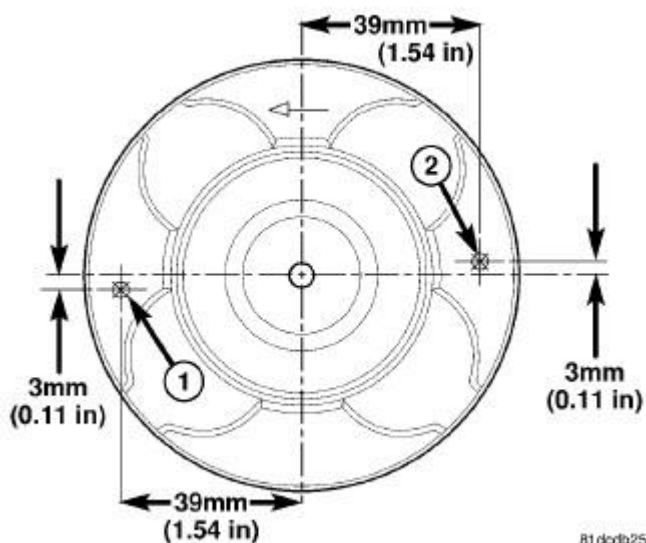
1. Remove the crankshaft locking tool (1).



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**Fig. 146: Deck Height**  
Courtesy of CHRYSLER LLC

2. Set the number one piston to top dead center (TDC).



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**Fig. 147: Piston Protrusion Measurement**  
Courtesy of CHRYSLER LLC

3. Zero the dial indicator on the top of the piston at location shown in illustration (1).

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4. Use the dial indicator to measure the height of the piston at top dead center.
5. Zero the dial indicator on the top of the piston at location shown in illustration (2).
6. Use the dial indicator to measure the height of the piston at top dead center.
7. Repeat the procedure for each cylinder.
8. Average the 4 piston protrusion readings to determine the required gasket thickness.
9. Select the appropriate cylinder head gasket from the cylinder head gasket chart.

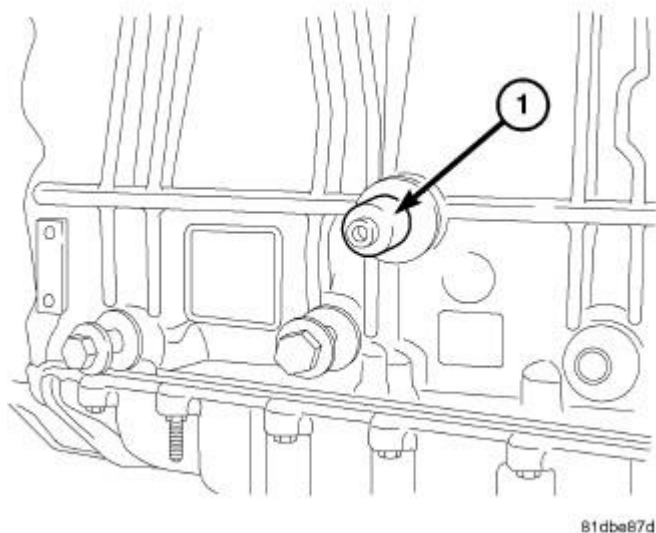
Cylinder Head Gasket Selection		
-	Millimeters	Inches
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.300 - 0.399	0.0119 - 0.0158
CYLINDER HEAD GASKET THICKNESS (No Hole)	1.10	0.0434
PISTON CLEARANCE	0.700 - 0.800	0.0276 - 0.0315
-		-
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.400 - 0.499	0.0158 - 0.0197
CYLINDER HEAD GASKET THICKNESS (One Hole)	1.20	0.0473
PISTON CLEARANCE	0.700 - 0.800	0.0276 - 0.0315
-		-
DISTANCE FROM PISTON AT TDC TO CYLINDER BLOCK	0.500 - 0.600	0.0197 - 0.0237
CYLINDER	1.30	0.0512

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HEAD GASKET THICKNESS (Two Holes)		
PISTON CLEARANCE	0.700 - 0.800	0.0276 - 0.0315

10. Return piston #1 to 90° ATDC, and align the crankshaft timing marks.

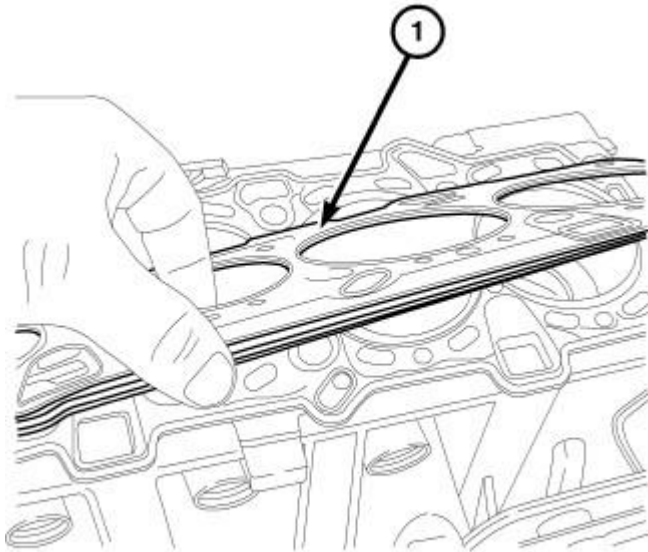


**Fig. 148: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

11. Reinstall the crankshaft locking tool (1).

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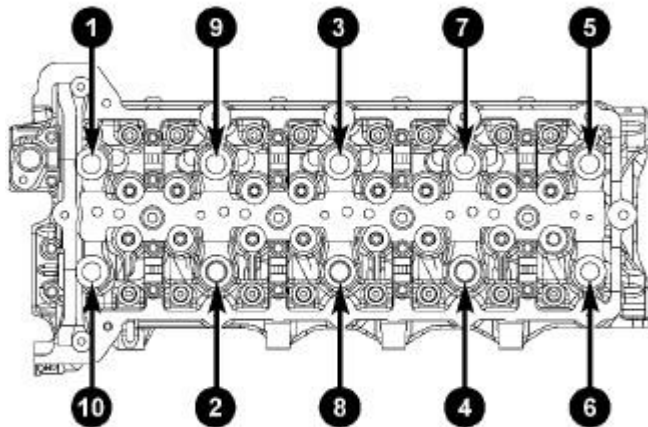
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**Fig. 149: Head Gasket**  
Courtesy of CHRYSLER LLC

12. Install the head gasket (1).
13. Install the cylinder head.



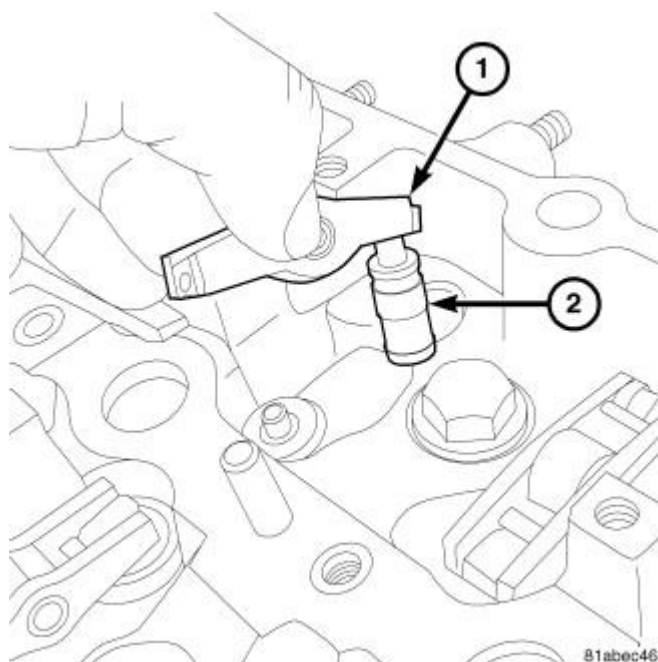
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**Fig. 150: Cylinder Head Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC



**NOTE:** Always use new cylinder head bolts whenever the existing bolts have been removed.

14. Install the cylinder head bolts in the figured pattern shown in **Fig. 150**. Torque the bolts to 30 N.m (22 ft. lbs.).
15. Repeat the pattern, turning the bolts an additional 85°. Repeat the pattern twice more, turning 85° each time for a total of 255°.



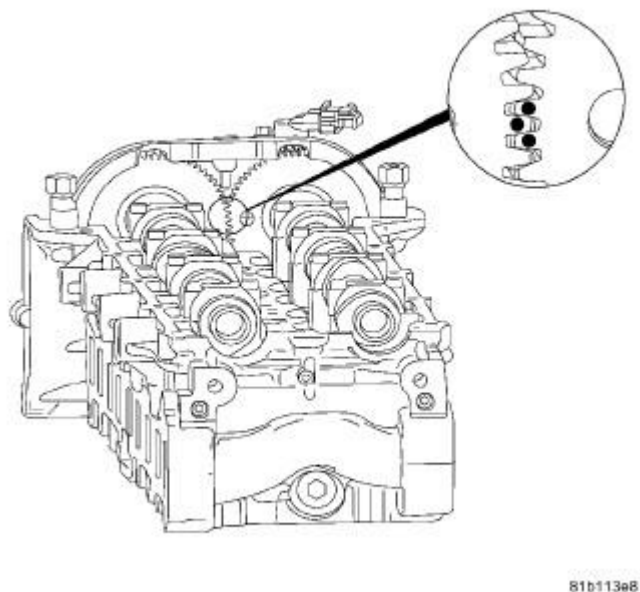
**Fig. 151: Hydraulic Lifters & Rocker Arms**  
Courtesy of CHRYSLER LLC

**NOTE:** Make sure to return the lifters and arms to their original position.

16. Install the hydraulic lifters (2) and rocker arms (1).

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**Fig. 152: Camshaft Timing Dots**  
Courtesy of CHRYSLER LLC

17. Carefully install the camshafts onto the camshaft journals.

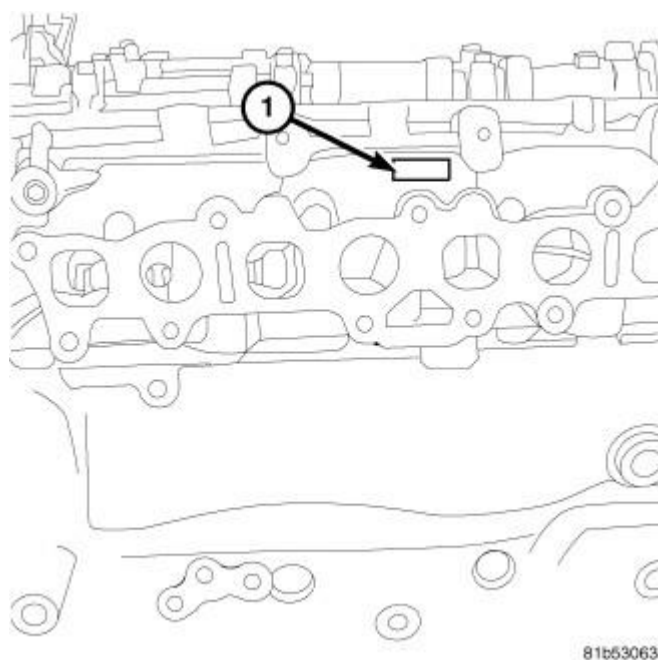
**NOTE:** The engine is not in time with the camshaft dots facing each other. The camshafts are set so that the dots face each other and then rotated until the camshaft locking tool can be bolted to the cylinder head. The camshaft locking tool properly positions the camshafts at 90° ATDC. The dots on the camshafts are used during assembly to quickly orient the camshafts so that the camshaft locking tool can be installed.

18. Make sure that the three small orientation dots on the back side of the camshaft gears are lined up horizontally.



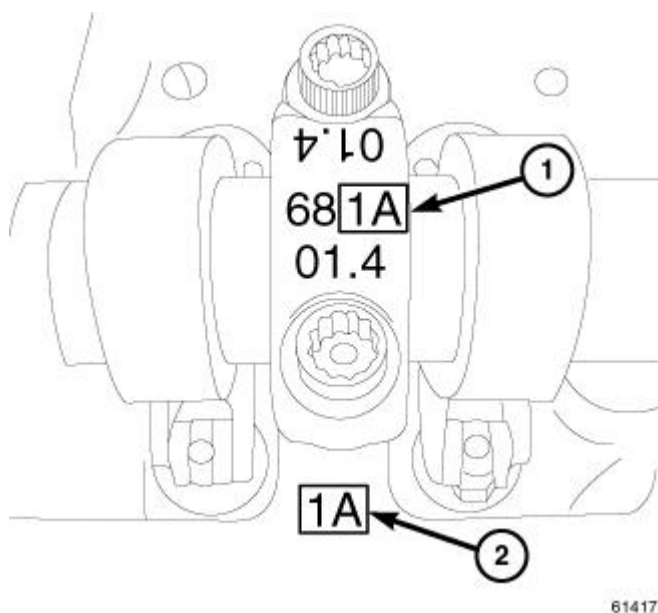
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**Fig. 155: Progressive Part Number**  
Courtesy of CHRYSLER LLC

21. The progressive part number (1) is printed on the intake side of the cylinder head. The last 2 digits are the same as the number on the camshaft caps.

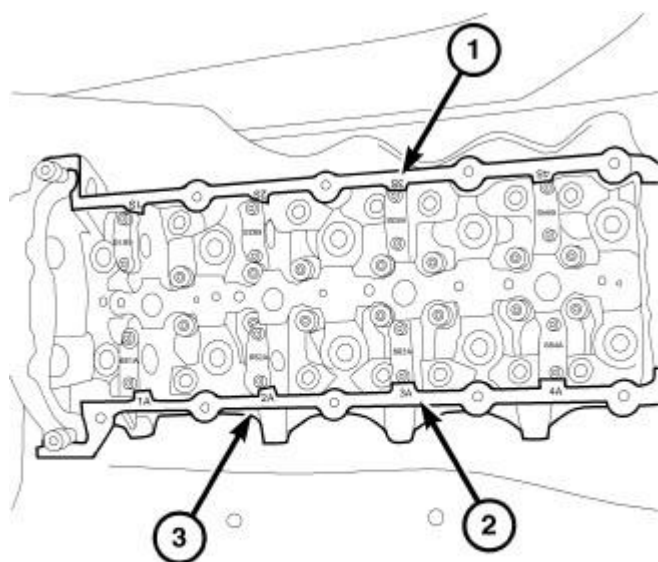


**Fig. 156: Identifying Camshaft Cap & Cylinder Head (Intake Side) Markings**  
Courtesy of CHRYSLER LLC

22. The last two digits of the progressive part number (1) are printed on the camshaft caps and will match the last two digits of the number on the side of the cylinder head and front camshaft cap. These numbers are stamped after the machining process and match the camshaft caps to the cylinder head.

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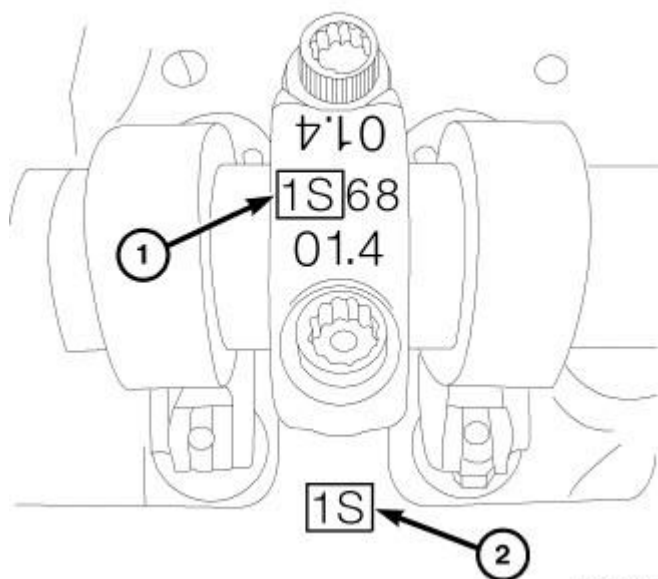
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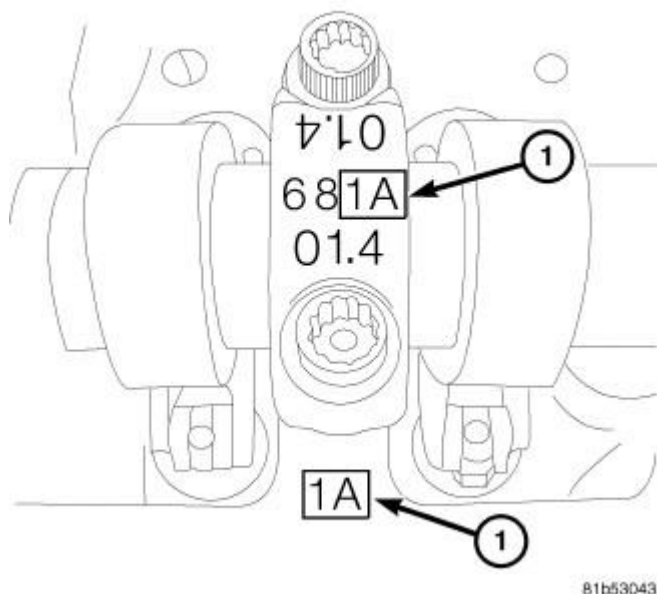
**Fig. 157: Exhaust & Intake Side**  
Courtesy of CHRYSLER LLC

23. The camshaft cap locations are marked on the cylinder head near each camshaft cap. The exhaust side (1) are marked with a number and the letter "S". The intake side (2) is marked with a number and the letter "A".

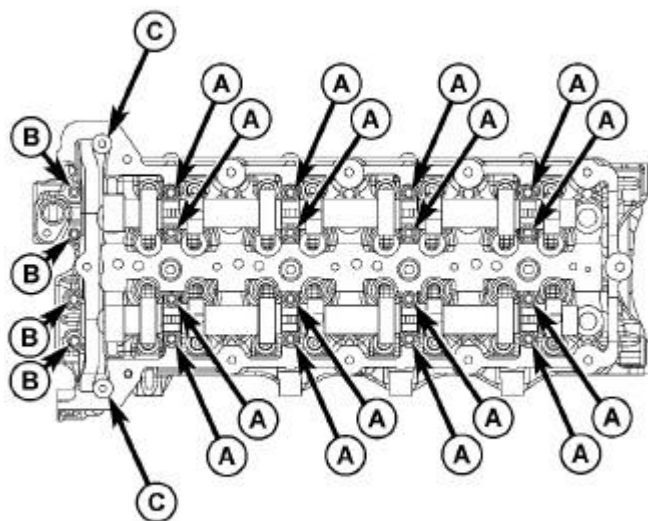


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**Fig. 158: Cylinder Head Mark**  
Courtesy of CHRYSLER LLC



25. The camshaft cap must be aligned with the mark (1) aligned in the same direction as the cylinder head mark (1). In the figure, the camshaft cap is the first cylinder (indicated by the 1A); the intake side of the cylinder head is (indicated by the 1A). Each camshaft cap location is marked in this manner on both the camshaft cap and cylinder head. It is critical that all of the camshaft caps are returned to their correct locations.



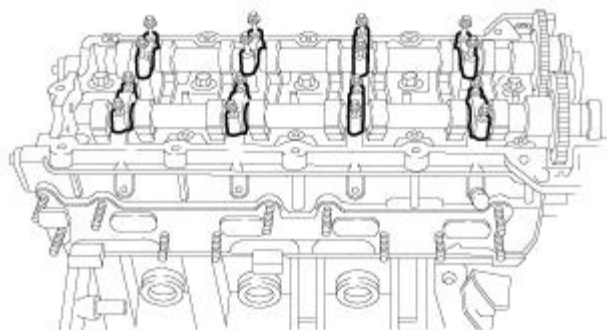
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**Fig. 160: View Of Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

**NOTE:** When the camshaft caps are removed, always replace the camshaft cap bolts.

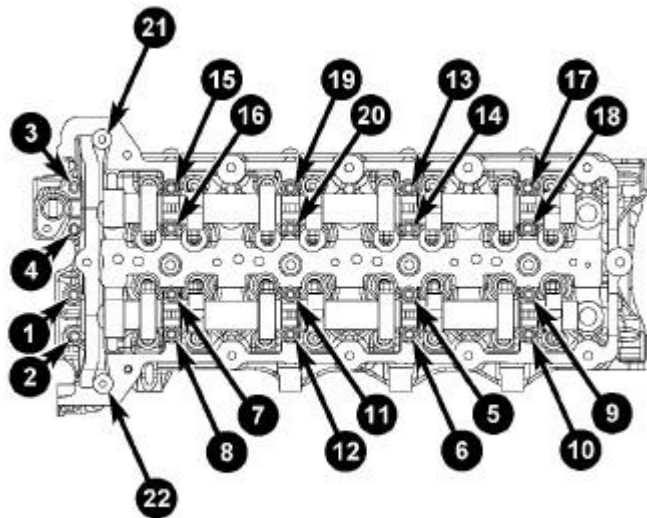
26. The camshaft bolts have 3 different bolt sizes.

- Bolts A are M6 35 mm
- Bolts B are M6 45 mm
- Bolts C are M6 stud bolts.



**Fig. 161: Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

27. Using new bolts, loosely install the camshaft bolts finger tight.

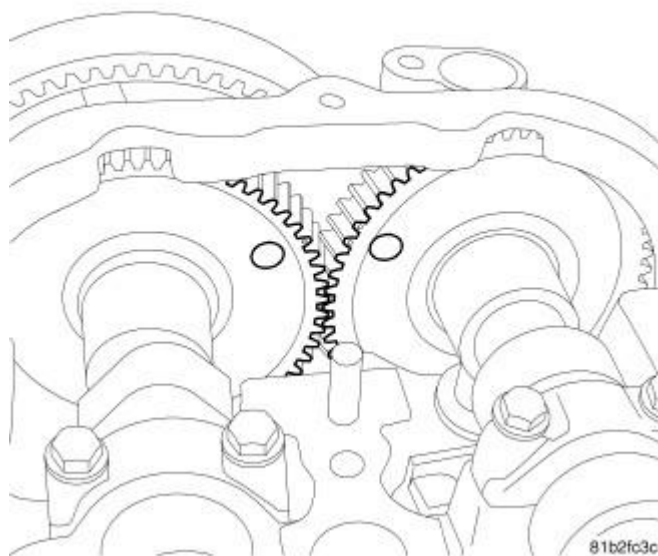


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**Fig. 162: Camshaft Cap Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC

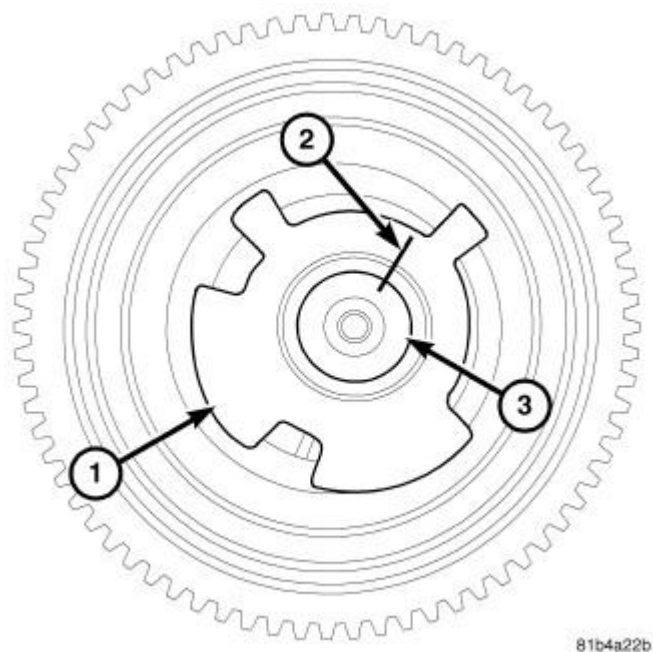
28. Following the figured pattern shown in **Fig. 162**, torque the camshaft cap bolts to 11 N.m (97 in. lbs.).





**Fig. 163: ATDC Camshaft Tool**  
Courtesy of CHRYSLER LLC

29. Turn the camshafts so that the 90° ATDC camshaft tool can be correctly installed.



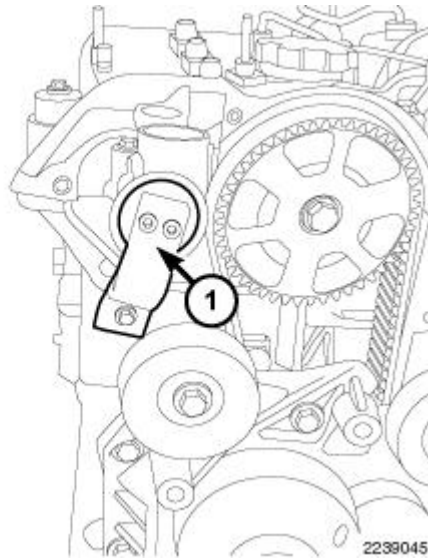
**Fig. 164: Camshaft Position Sensor (CMP) Reluctor Wheel & Exhaust Camshaft**  
Courtesy of CHRYSLER LLC

30. Make a mark (2) across the Camshaft Position Sensor (CMP) reluctor wheel (1) and the exhaust camshaft (3). This mark will be used to verify that the (CMP) reluctor wheel did not rotate on the camshaft during

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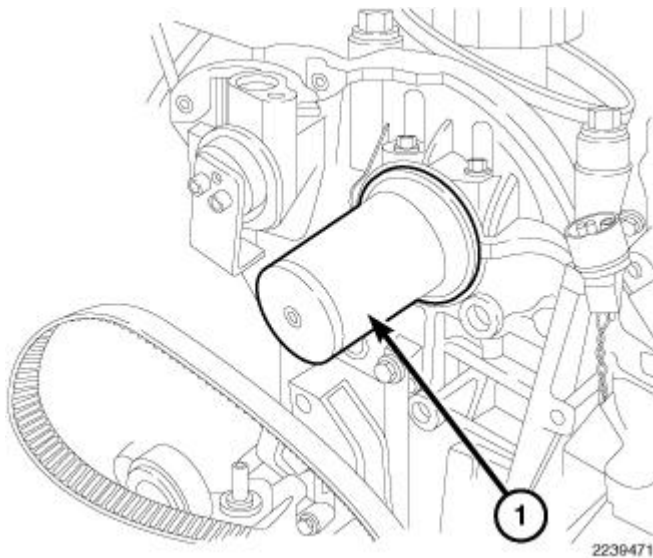
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assembly.



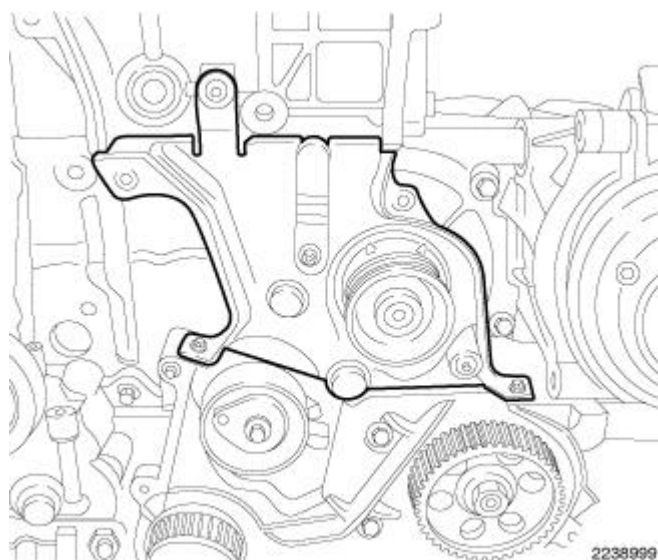
**Fig. 165: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

31. Install the camshaft locking tool VM 9991(1).



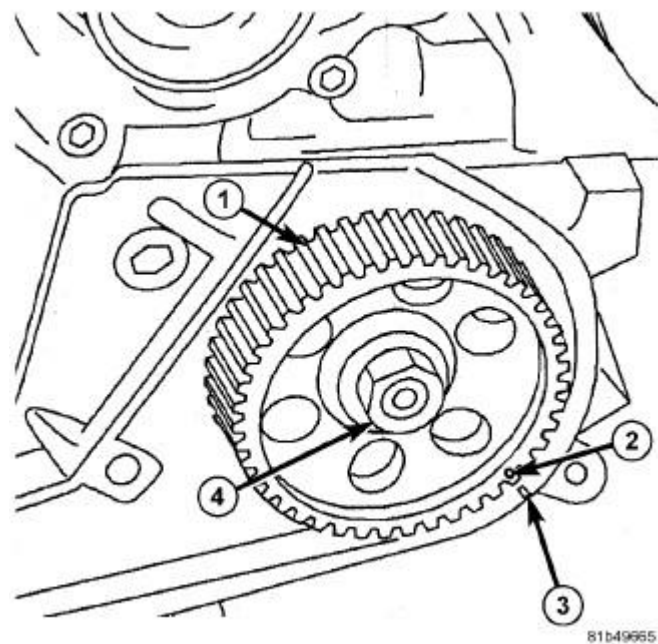
**Fig. 166: Seal Installer**  
Courtesy of CHRYSLER LLC

32. Use the 9937-1 Seal Installer (1) to install the intake camshaft oil seal.



**Fig. 167: Inner Front Cover**  
Courtesy of CHRYSLER LLC

33. Install the inner front cover. Torque the bolts to 11 N.m (97 in. lbs.).

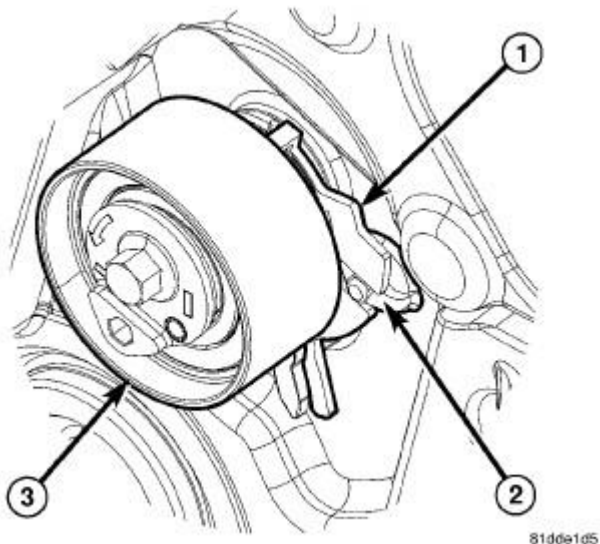


**Fig. 168: Fuel Injection Pump Timing Marks**  
Courtesy of CHRYSLER LLC

34. Align the high pressure fuel pump sprocket timing mark (2) with the timing mark (3) on the block.

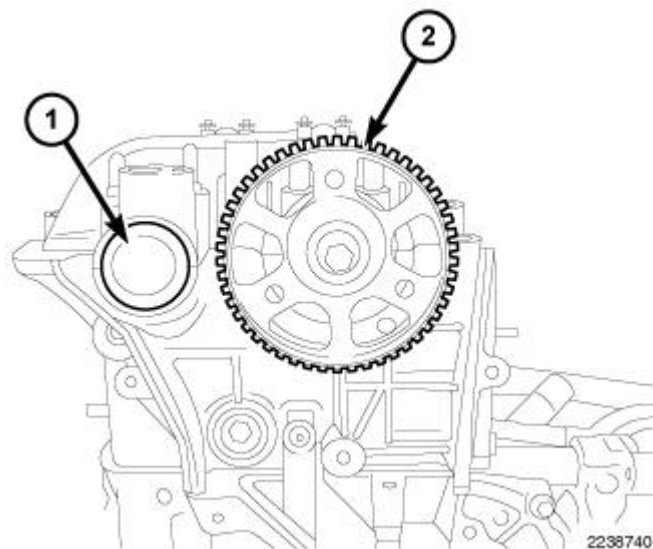
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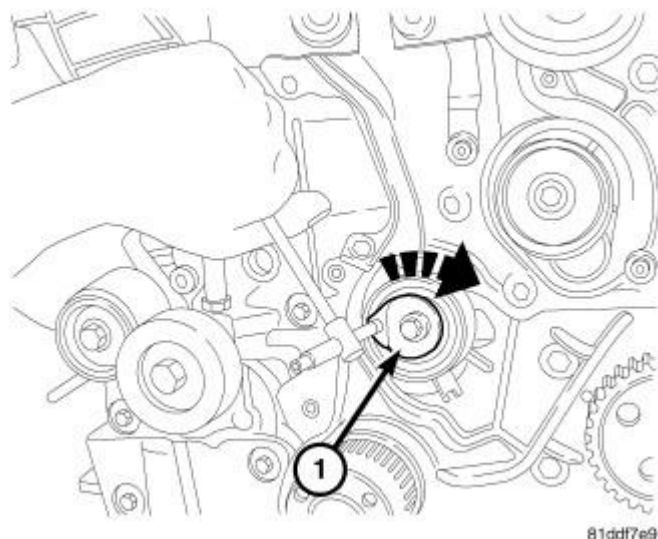
**Fig. 169: Timing Belt Tensioner & Tensioner Alignment Plate**  
Courtesy of CHRYSLER LLC

35. Install the timing belt tensioner (3). Do not tighten at this time. Verify that the slot in the tensioner alignment plate (1) is aligned with the boss (2) in the rear timing belt cover.



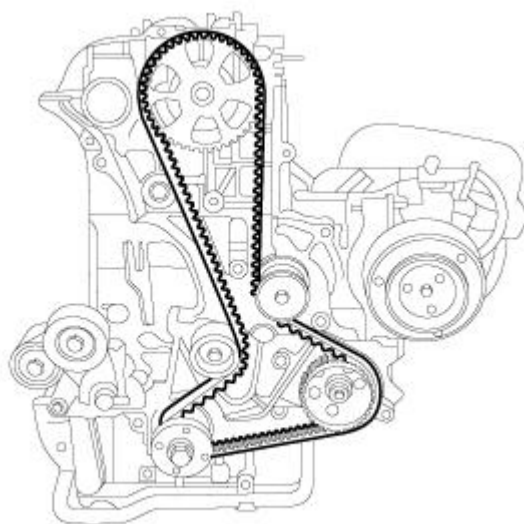
**Fig. 170: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

36. Install the camshaft sprocket (2). Do not tighten the bolt at this time.



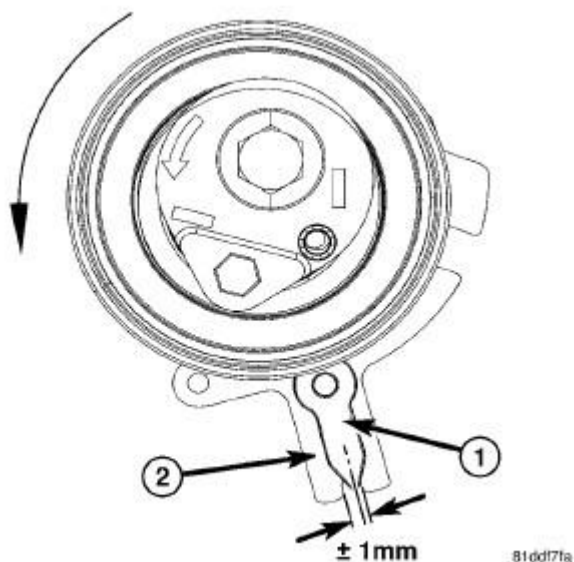
**Fig. 171: Timing Belt Tensioner**  
Courtesy of CHRYSLER LLC

37. Turn the timing belt tensioner (1) clockwise to unload the tensioner enough for the timing belt to be installed.



**Fig. 172: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

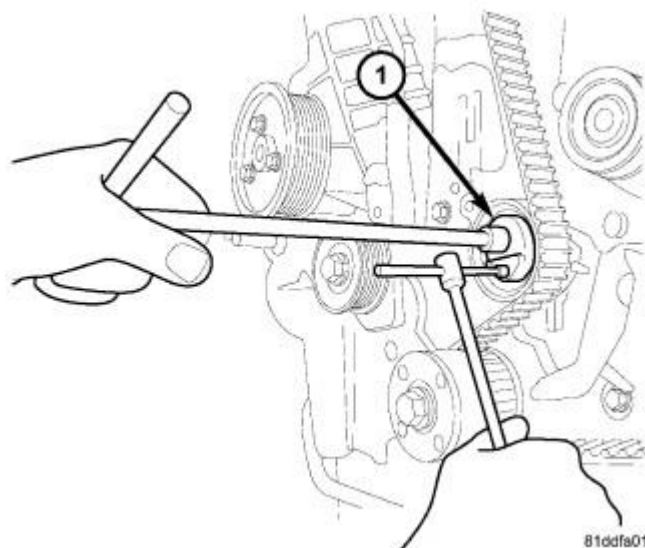
**NOTE:** DO NOT remove the timing belt from the package until it is going to be installed. DO NOT expose timing belt to oil, grease or water contamination. DO NOT crimp belt at a sharp angle. DO NOT clean belt, pulleys or tensioner with solvent. Check that pulleys and bearings are not seized or damaged before installing belt.



**Fig. 173: Adjusting Timing Belt Tensioner Using Indicator & Gauge**  
Courtesy of CHRYSLER LLC

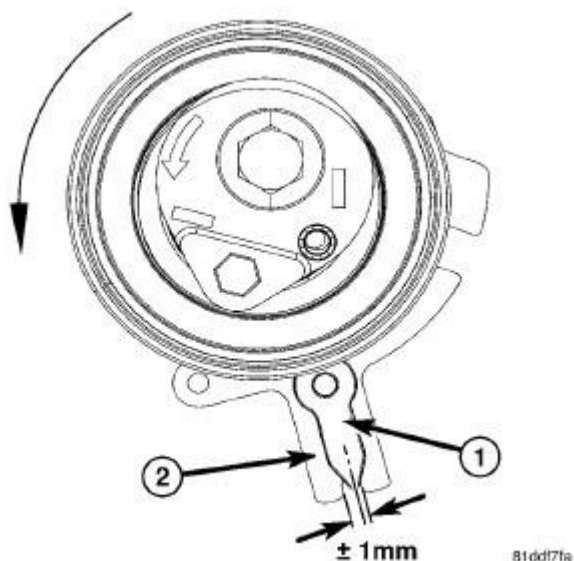
**NOTE:** Turning the belt tensioner counterclockwise moves the pointer in a clockwise direction. Also, if the tensioner bolt is too loose this will cause the tensioner alignment slot to jump off the alignment boss on timing

39. Adjust timing belt tensioner by lining up the load indicator arrow (1) to the center of the tensioner load gauge (2) as shown in illustration.
40. Verify the tensioner load indicator (1) is centered in the tensioner load gauge (2).



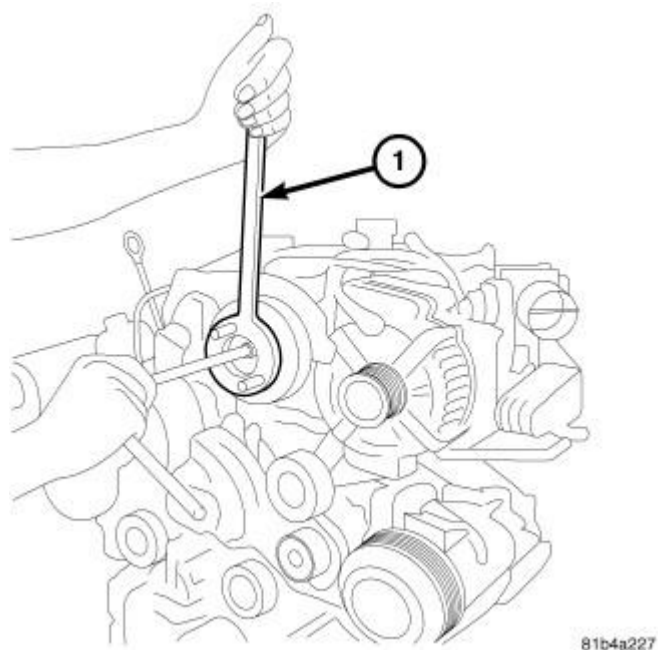
**Fig. 174: Tightening Timing Belt Tensioner Bolt**  
Courtesy of CHRYSLER LLC

41. Tighten the timing belt tensioner bolt to 28 N.m (21 ft. lbs.).



**Fig. 175: Adjusting Timing Belt Tensioner Using Indicator & Gauge**  
Courtesy of CHRYSLER LLC

42. Verify the tensioner load indicator (1) is still centered in the tensioner load gauge (2). If the indicator is not centered in the gauge as shown in illustration, see **Engine/Valve Timing/TENSIONER, Engine Timing - Adjustments**.



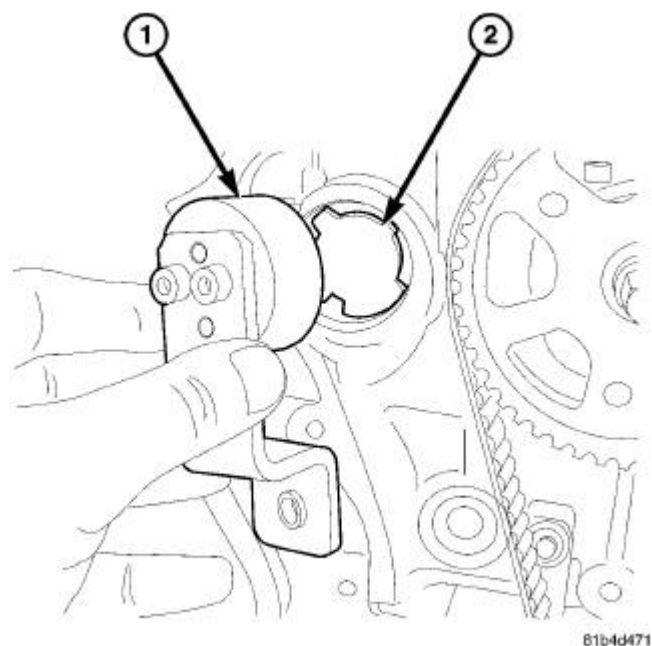
**Fig. 176: Camshaft Gear Holder VM 1055**  
Courtesy of CHRYSLER LLC

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**CAUTION:** If tool VM 1055 is not used to secure the camshaft sprocket when tightening the bolt on the intake camshaft, the reluctor wheel on the exhaust camshaft may spin resulting in reluctor wheel to exhaust camshaft being out of time. If this occurs the exhaust camshaft must be replaced.

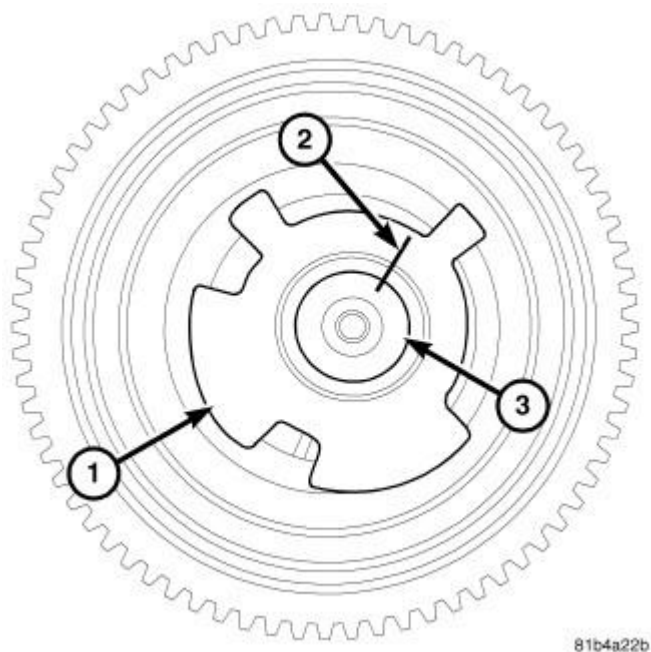
43. Using the Camshaft Gear Holder VM 1055 (1) to hold the camshaft sprocket while tightening. Tighten the intake camshaft sprocket bolt to 80 N.m (59 ft. lbs.).



**Fig. 177: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

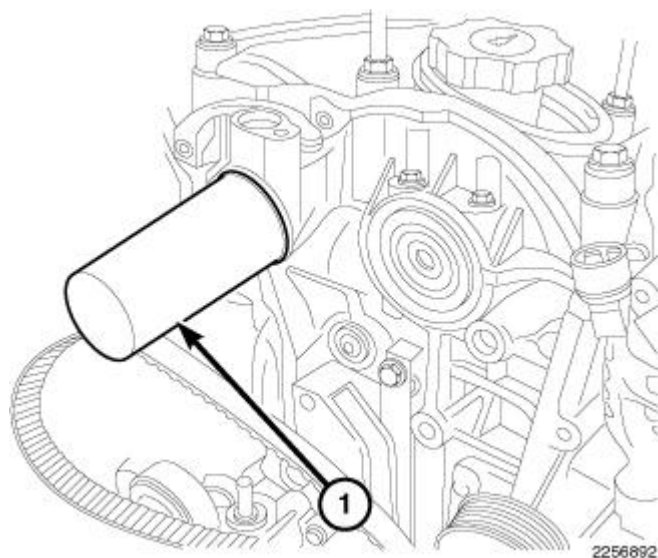
44. Remove the camshaft locking tool VM 9991 (1).





**Fig. 178: Reluctor Wheel**  
Courtesy of CHRYSLER LLC

45. Verify that the reluctor wheel (1) has not moved on the camshaft. If the witness marks are not aligned, the reluctor wheel (1) has spun on the camshaft (3) during the assembly process, and the exhaust camshaft must be replaced.

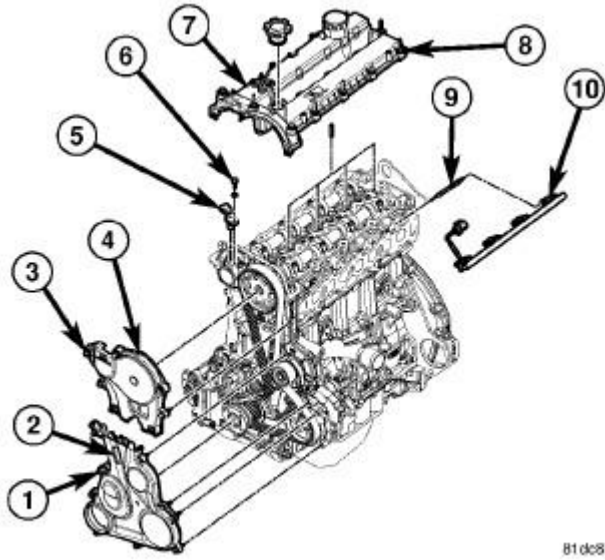


**Fig. 179: Seal Installer VM 1057**  
Courtesy of CHRYSLER LLC

46. Using Seal Installer VM 1057 (1) to install the exhaust camshaft seal.

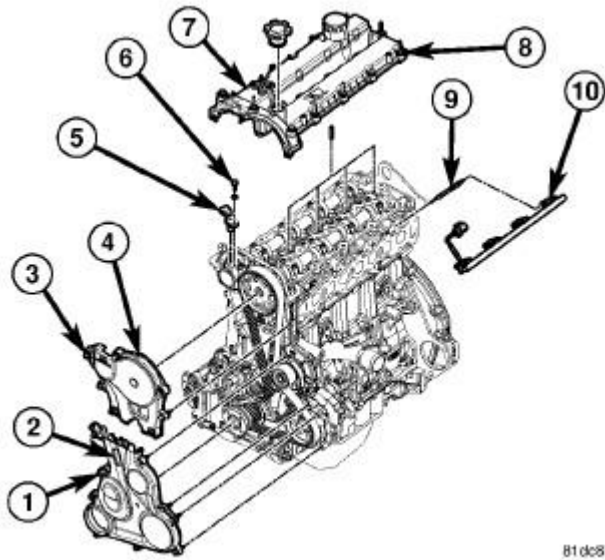
## 2009 Chrysler Town & Country LX

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**Fig. 180: Lower Front Cover**  
**Courtesy of CHRYSLER LLC**

47. Install the lower front cover (2). Tighten bolts to 11 N.m (97 in. lbs.).

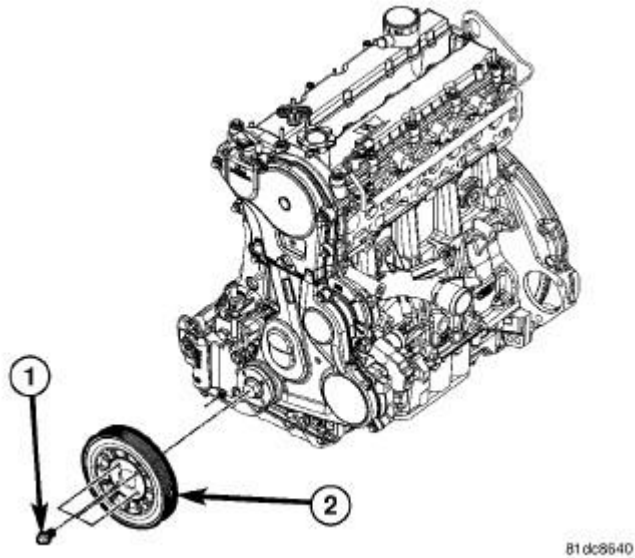


**Fig. 181: Upper Front Cover & Cylinder Head Cover**  
**Courtesy of CHRYSLER LLC**

48. Install the upper front cover (3). Tighten bolts to 11 N.m (97 in. lbs.).
49. Install the cylinder head cover (7). Tighten bolts to 11 N.m (97 in. lbs.).

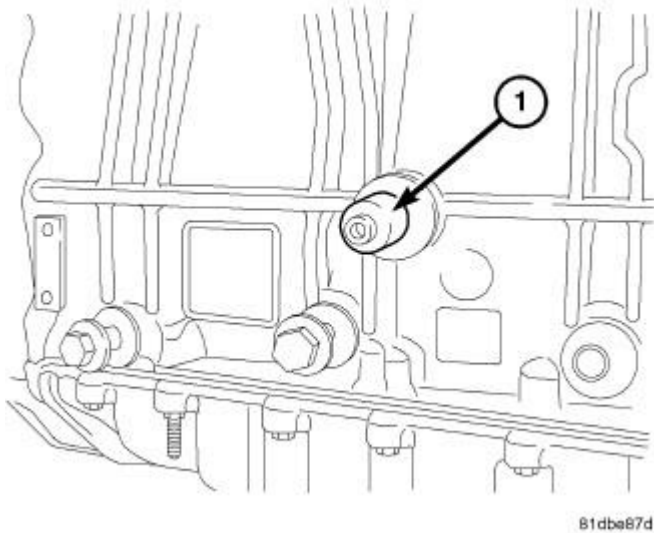
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**Fig. 182: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

50. Install the crankshaft damper (2). Tighten bolts to 32 N.m (23 ft. lbs.).

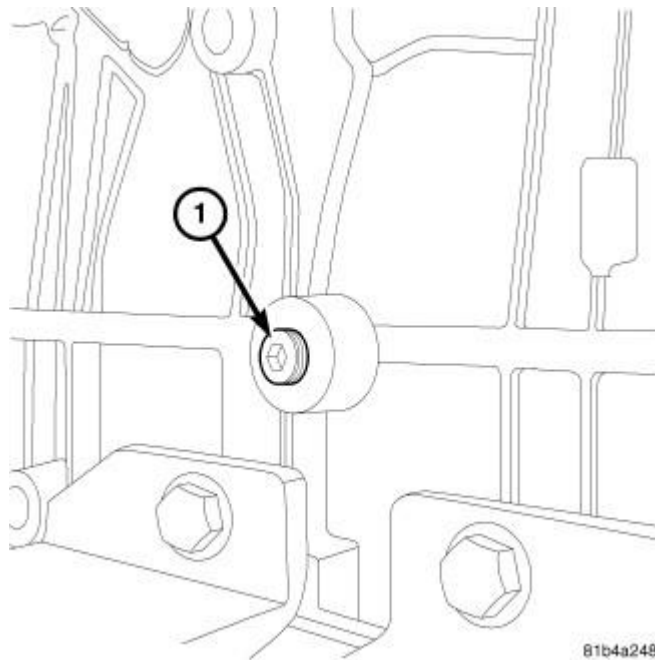


**Fig. 183: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

51. Remove crankshaft locking tool (1).

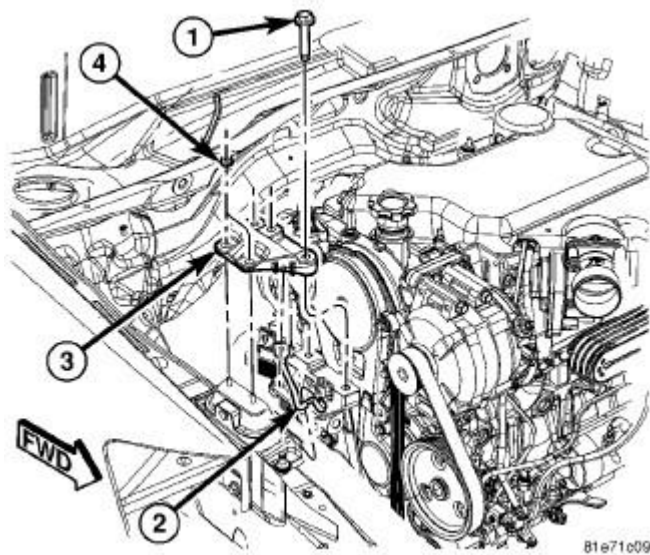
## 2009 Chrysler Town & Country LX

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**Fig. 184: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

52. Install the engine block plug (1). Tighten the engine block plug to 30 N.m (22 ft. lbs.).



**Fig. 185: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

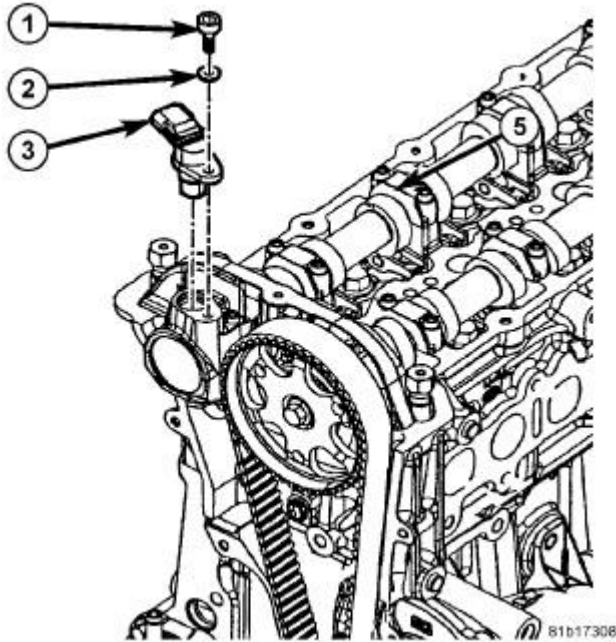
53. Install the front engine mount bracket (3).  
54. Install the ground strap (2).  
55. Install the engine mount bracket fasteners (1) and (4).

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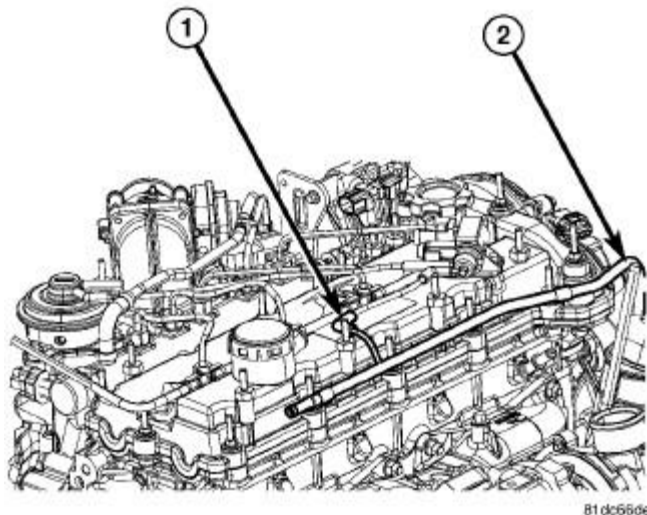
- Tighten bolts to 54 N.m (40 ft. lbs.)
- Tighten nuts to 15 N.m (133 in. lbs.).

56. Remove the support from under engine.



**Fig. 186: Cam Position Sensor**  
Courtesy of CHRYSLER LLC

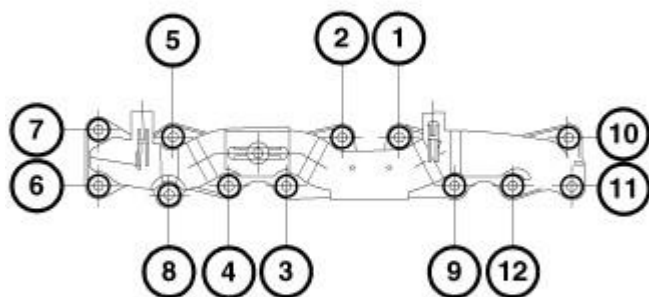
57. Install the cam position sensor (3). Tighten bolt to 11 N.m (97 in. lbs.).
58. Connect the cam position sensor harness connector.



**Fig. 187: Vacuum Lines**

Courtesy of CHRYSLER LLC

59. Install the vacuum line (2) onto the cylinder head cover and securely tighten retaining nuts.
60. Connect the vacuum line (2) to the vacuum pump.
61. Connect the vacuum line (1).
62. Connect the engine wire harness retaining clips from the cylinder head cover stud bolts.



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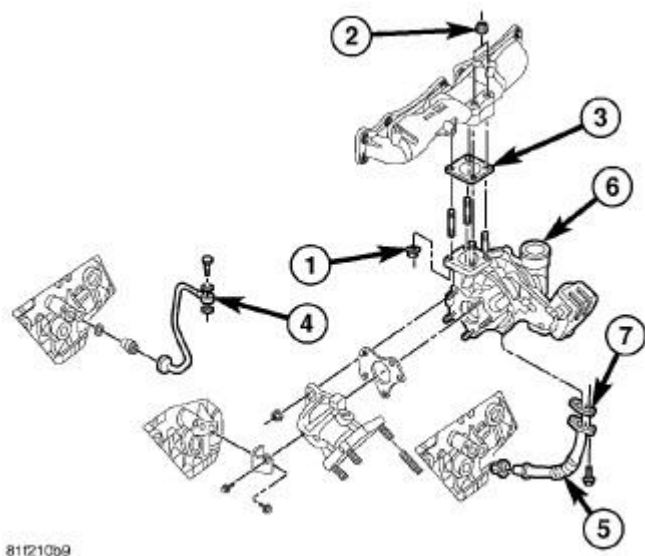
**Fig. 188: Exhaust Manifold Bolt Tightening Sequence**

Courtesy of CHRYSLER LLC

63. Clean and inspect the gasket surface of the exhaust manifold and cylinder head.
64. Install a new exhaust manifold gasket.
65. Install exhaust manifold and the retaining nuts.
66. Using the sequence shown in **Fig. 188**. Tighten nuts to 36 N.m (27 ft. lbs.).
67. Repeat the tightening procedure at the same torque.

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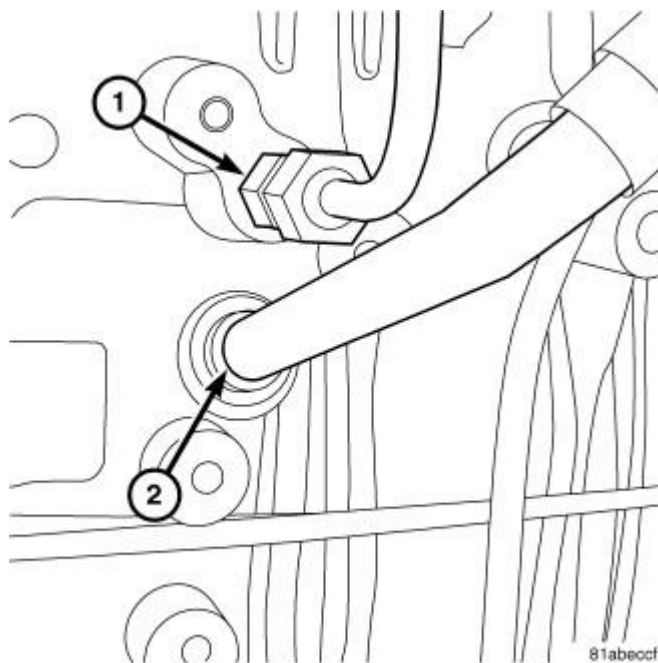
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**Fig. 189: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

68. Using a new gasket, install the turbocharger (6) and the retaining nuts (1), (2). Tighten to 32 N.m (23 ft. lbs.).



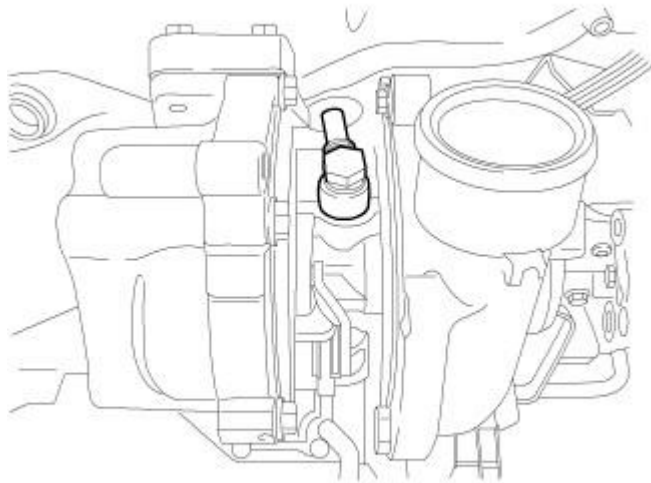
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**Fig. 190: Turbocharger Oil Lines**  
Courtesy of CHRYSLER LLC

69. Install the turbocharger oil feed line to the engine block (1). Tighten to 32 N.m (23 ft. lbs.).

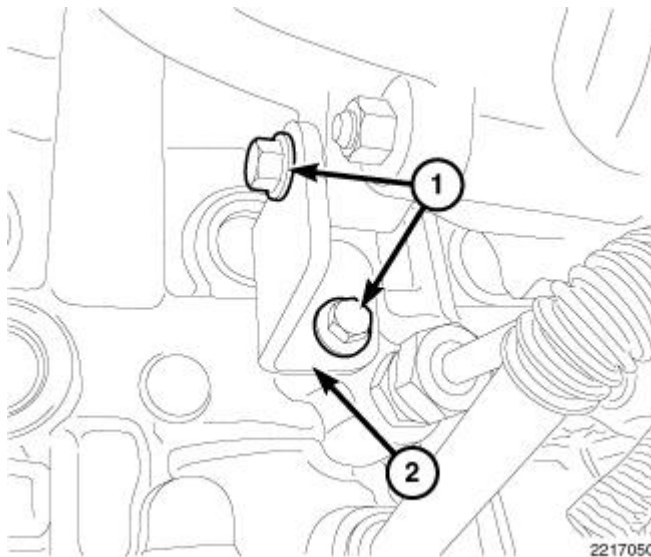
## 2009 Chrysler Town & Country LX

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**Fig. 191: Turbocharger Oil Feed Line**  
Courtesy of CHRYSLER LLC

70. Install the turbocharger oil feed line. Tighten to 24 N.m (18 ft. lbs.).



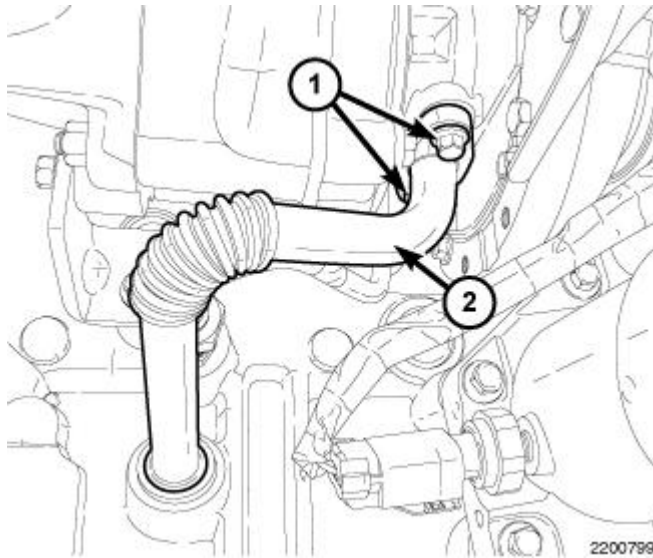
**Fig. 192: Turbocharger Support Bracket Bolts**  
Courtesy of CHRYSLER LLC

71. Install the turbocharger to engine support bracket (2). Tighten bolts to bolts to 33 N.m (24 ft. lbs.).



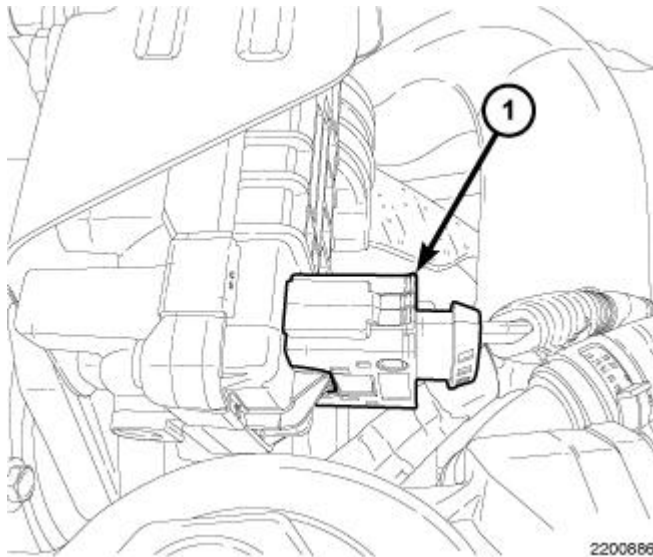
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**Fig. 193: Turbocharger Oil Return Line Bolts**  
Courtesy of CHRYSLER LLC

72. Install the turbocharger oil return line. Tighten bolts to 15 N.m (133 in. lbs.).

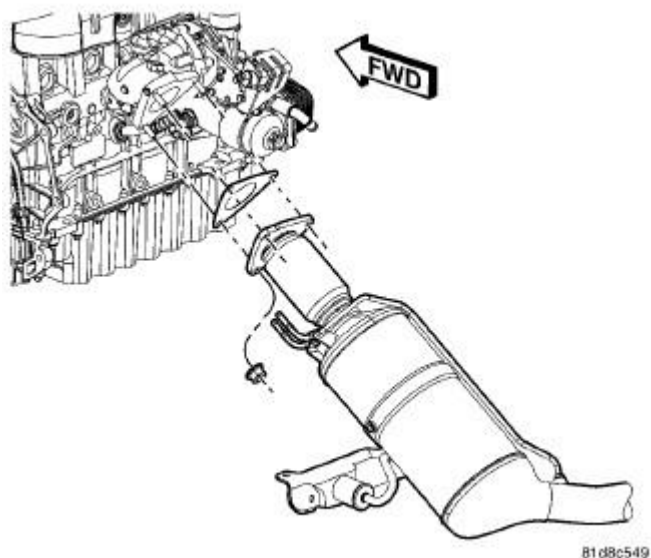


**Fig. 194: Turbocharger Module Connector**  
Courtesy of CHRYSLER LLC

73. Connect the turbocharger module connector (1).

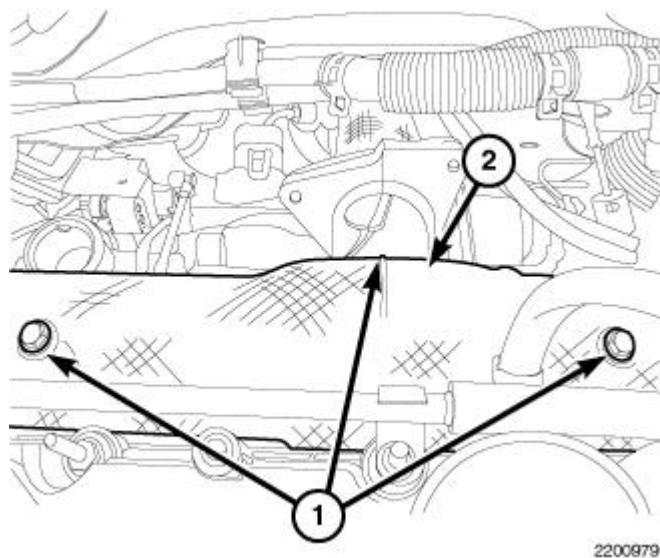
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**Fig. 195: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

74. Reconnect the exhaust system from the turbocharger and install the fasteners. Tighten to 41 N.m (30 ft. lbs.).

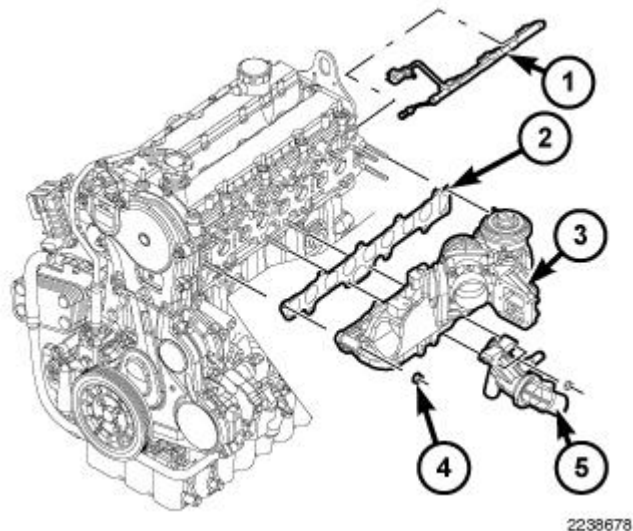


**Fig. 196: Exhaust Manifold Heat Shield Bolts**  
Courtesy of CHRYSLER LLC

75. Install the exhaust manifold heat shield (2). Tighten bolts to 33 N.m (24 ft. lbs.).

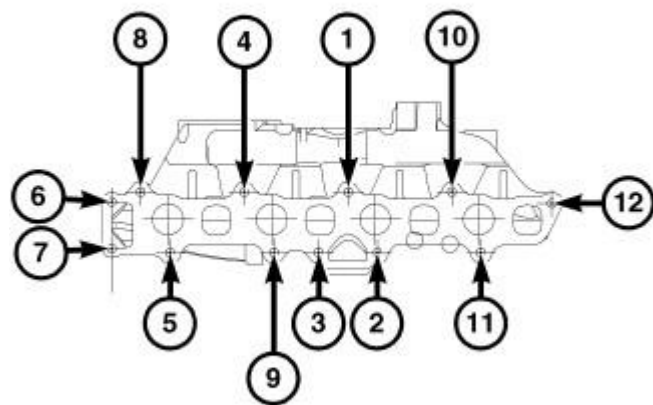
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**Fig. 197: Intake Manifold & Thermostat Housing**  
Courtesy of CHRYSLER LLC

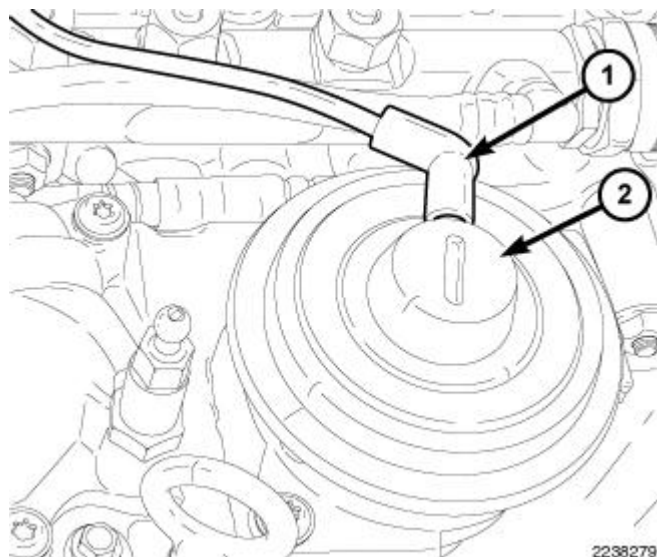
76. Clean and inspect the gasket surface of the intake manifold and cylinder head.
77. Install a new intake manifold gasket (2).
78. Install the intake manifold (3).
79. Install the thermostat housing (5).
80. Reposition the glow plug harness (1), and reconnect the glow plug harness connectors.



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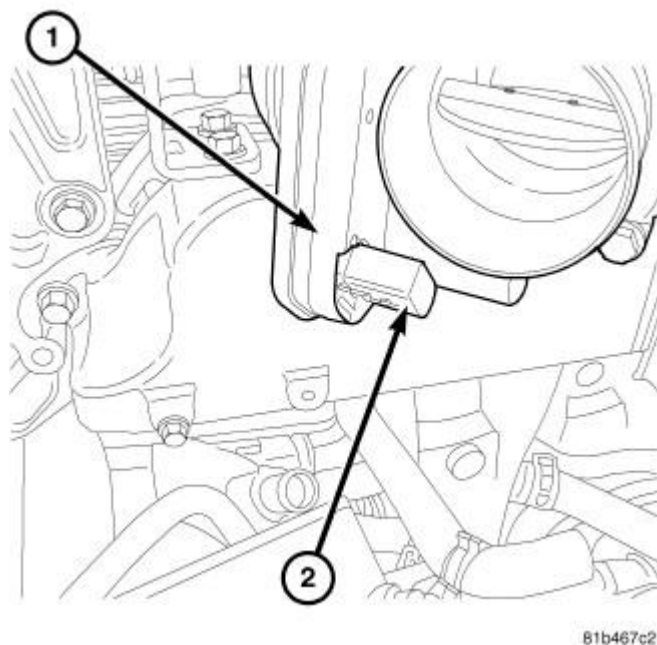
**Fig. 198: Intake Manifold Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC

81. Using the sequence shown in **Fig. 198**, tighten the intake manifold nuts to 25 N.m (18 ft. lbs.).



**Fig. 199: Vacuum Line & EGR Valve**  
Courtesy of CHRYSLER LLC

82. Connect the vacuum line (1) to the EGR valve (2).

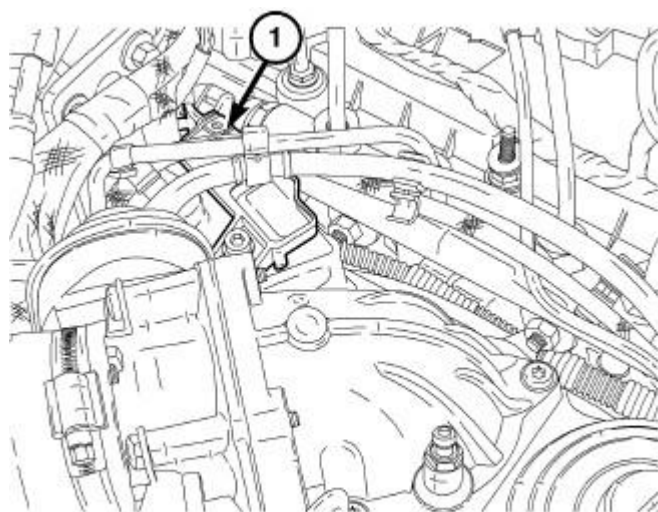


**Fig. 200: Electrical Connector - EGR Air Valve**  
Courtesy of CHRYSLER LLC

83. Connect the EGR air flow control valve electrical connector (2).

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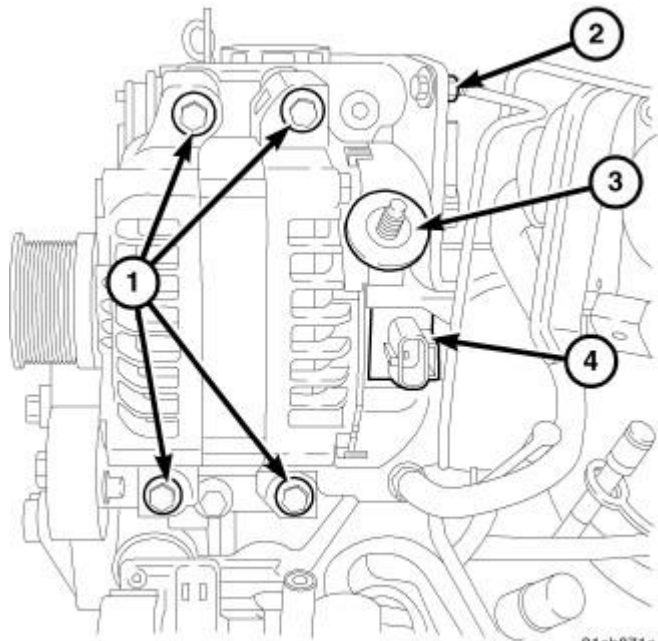
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**Fig. 201: IAT/BPS Sensor Harness Connector**  
Courtesy of CHRYSLER LLC

84. Connect the IAT/BPS sensor harness connector (1).



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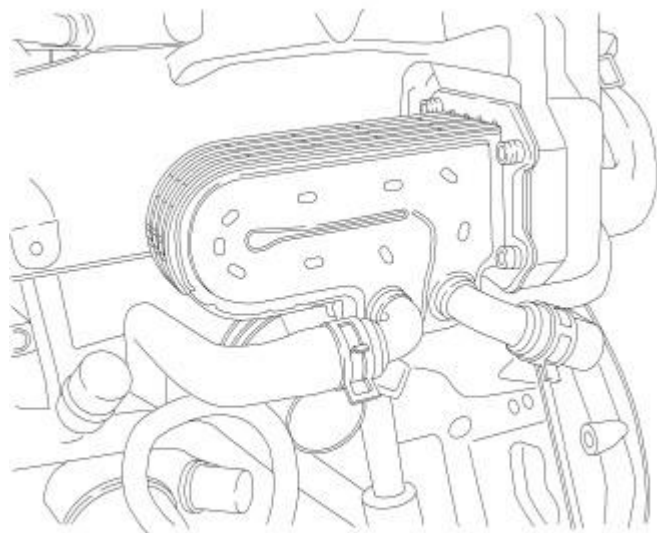
**Fig. 202: Generator**  
Courtesy of CHRYSLER LLC

85. Install the generator mounting bracket. Tighten bolts to 45 N.m (33 ft. lbs.).  
86. Install the generator brace bolt (2).  
87. Install the generator. Tighten bolts (1) to 33 N.m (24 ft. lbs.).  
88. Connect the generator harness connector (4).

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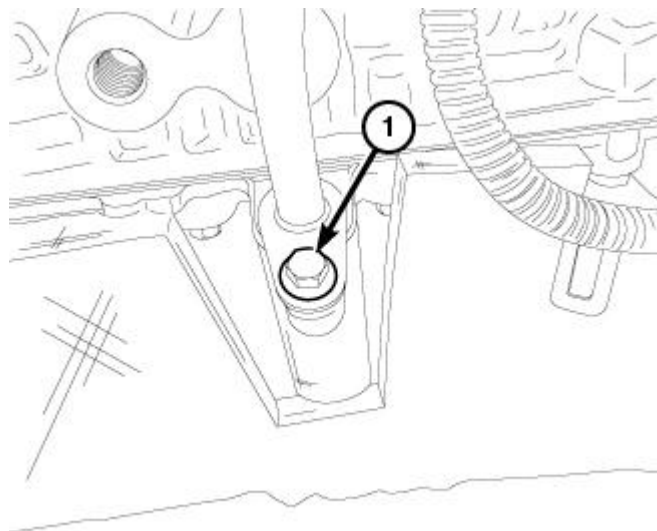
89. Connect the generator feed wire (3).
90. Install the accessory drive belt.



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**Fig. 203: EGR Cooler**  
Courtesy of CHRYSLER LLC

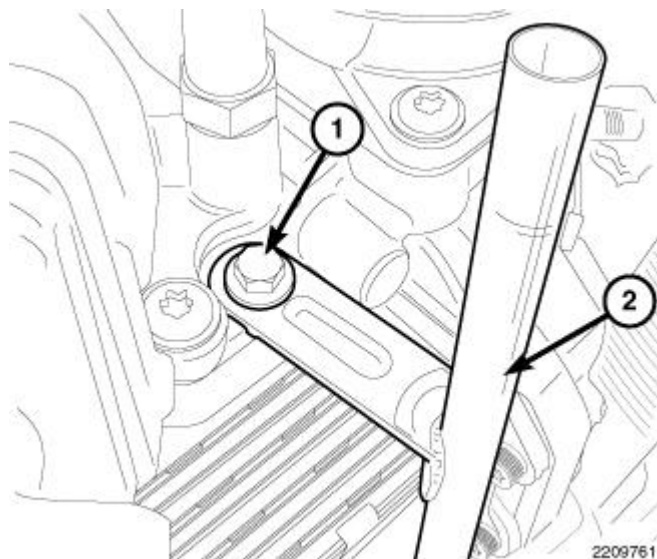
91. Install the EGR cooler. Tighten bolts to 15 N.m (133 in. lbs.).
92. Install coolant hoses to the EGR cooler.



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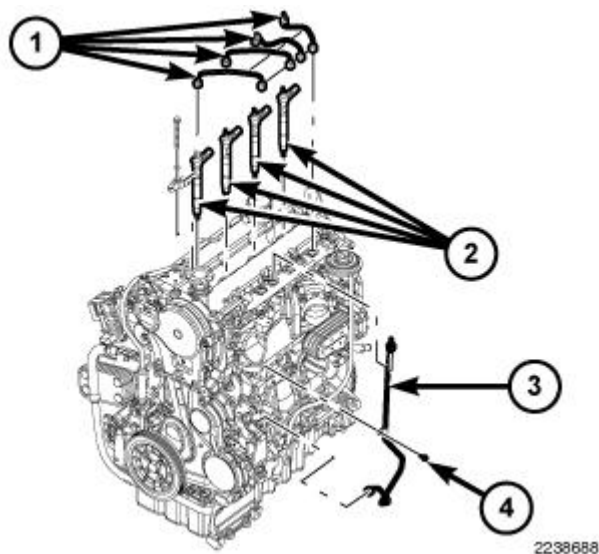
**Fig. 204: Lower Engine Oil Indicator Tube Bolt**  
Courtesy of CHRYSLER LLC

93. Install the oil level indicator tube. Tighten lower bolt to 11 N.m (97 in. lbs.).



**Fig. 205: Upper Engine Oil Indicator Tube Bolt**  
Courtesy of CHRYSLER LLC

94. Install the upper bolt (1). Tighten bolt to 11 N.m (97 in. lbs.).

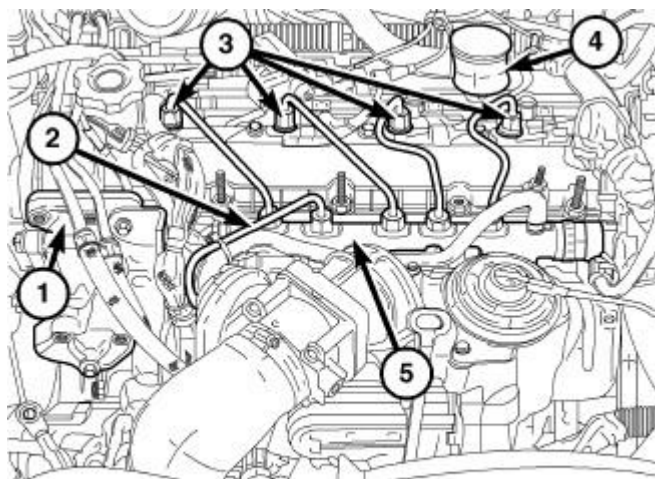


**Fig. 206: Fuel Injectors**  
Courtesy of CHRYSLER LLC

95. Using new washers, install injectors and injector retainer claw.  
96. Install the injector clamp bolts. Do not tighten at this time.

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**Fig. 207: Fuel Lines**

Courtesy of CHRYSLER LLC

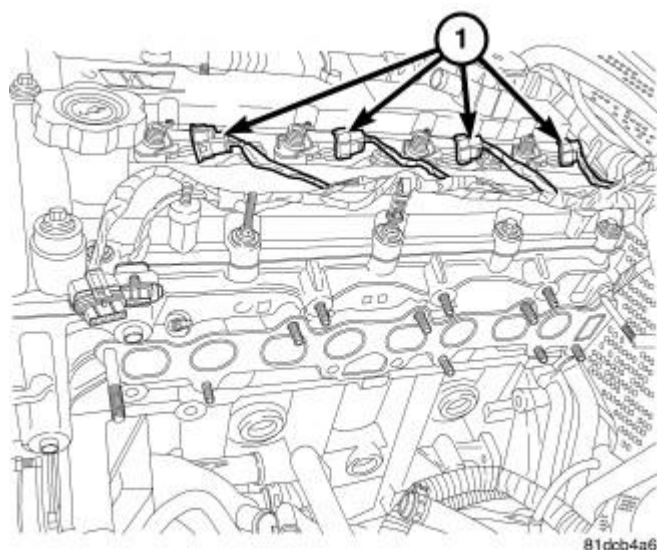
**NOTE:** High pressure fuel lines must be replaced with new lines any time they are removed.

97. Remove protective caps and loosely install the high pressure fuel lines onto the fuel injectors and the fuel rail.
98. Loosely install the high pressure fuel feed line to the high pressure pump and the fuel rail.
99. Tighten fuel injector clamp bolts to 32 N.m (24 ft. lbs.).
100. Tighten the fuel rail nuts to 24 N.m (18 ft. lbs.).
101. Tighten the fuel lines at the fuel injectors to 28 N.m (20 ft. lbs.).
102. Torque the fuel lines from the injectors to the fuel rail to 5 N.m (44 in. lbs.), plus an additional 75°.
103. Torque the high pressure line from the fuel pump to the fuel rail to 5 N.m (44 in. lbs.) plus an additional 75°.
104. Torque the high pressure line at the fuel pump to 28 N.m (20 ft. lbs.).
105. Install the high pressure fuel line bracket bolt and torque to 15 N.m (133 in. lbs.).



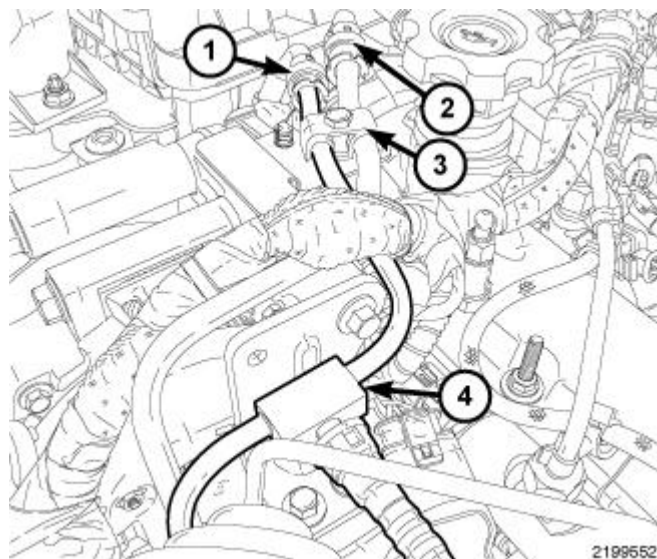
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**Fig. 208: Fuel Injector Harness Connectors**  
Courtesy of CHRYSLER LLC

106. Connect the fuel injector harness connectors (1).
107. Connect the fuel rail pressure solenoid harness connector.
108. Connect the fuel rail pressure sensor harness connector.

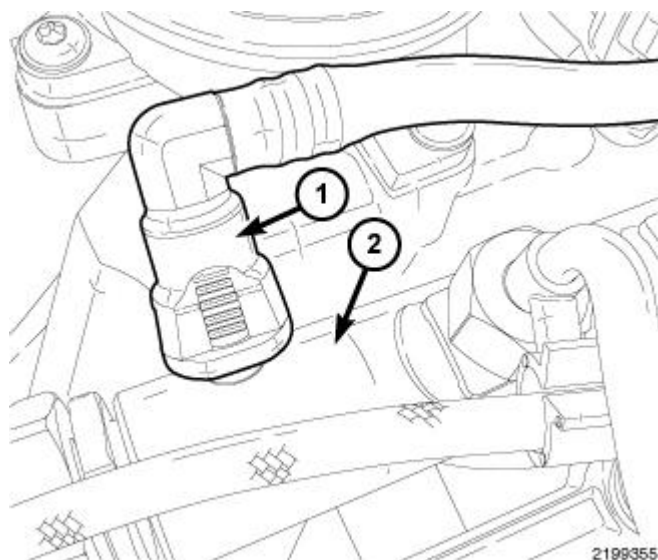


**Fig. 209: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

109. Install the fuel block (4) and reconnect the fuel lines.
110. Install the fuel line mounting bracket (3).
111. Connect the fuel feed line (2).
112. Connect the fuel return line (1).

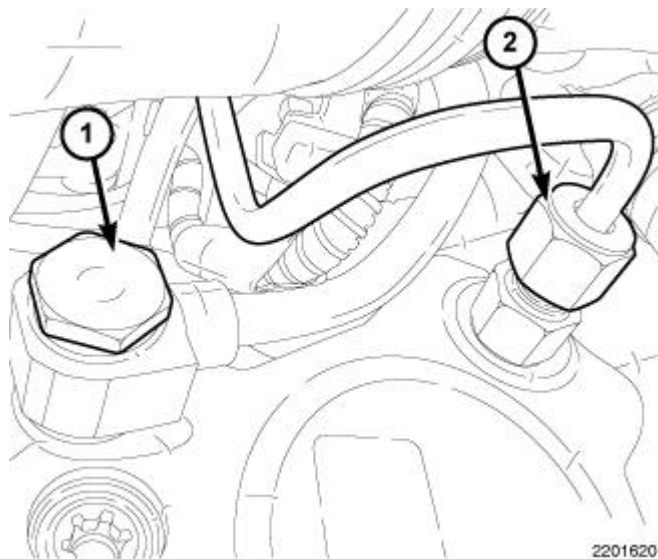
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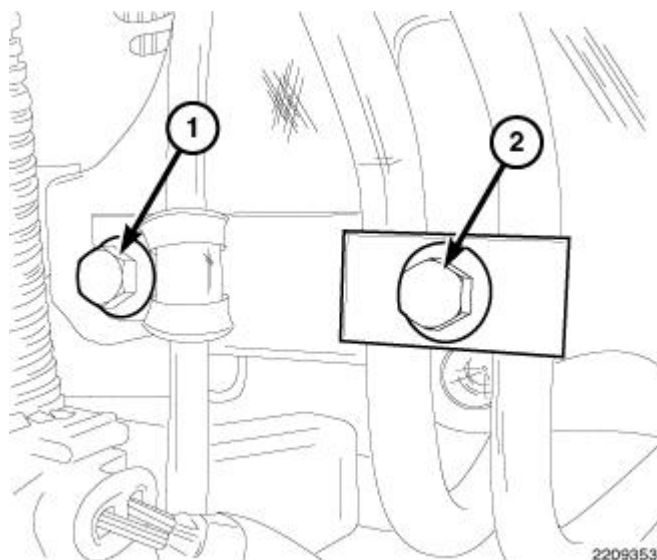
**Fig. 210: Fuel Return Line & Fuel Rail**  
Courtesy of CHRYSLER LLC

113. Connect the fuel return line (1) to the fuel rail (2).



**Fig. 211: High Pressure Fuel Rail Feed Line**  
Courtesy of CHRYSLER LLC

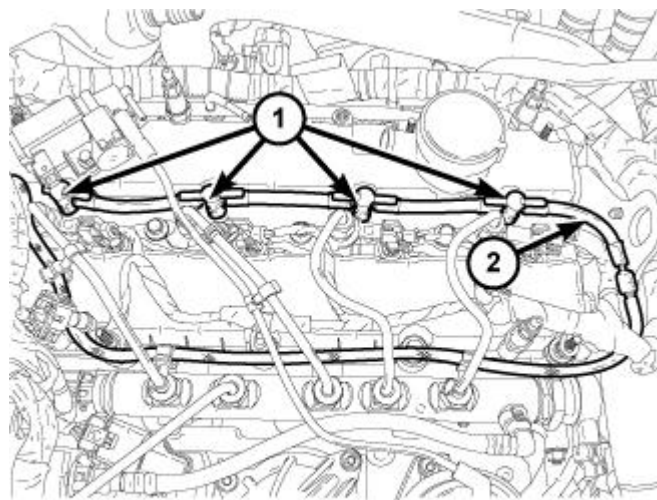
114. Install the high pressure fuel rail feed line (2) to high pressure fuel pump.  
115. Install bolt (1) attaching the fuel return line to high pressure fuel pump.



**Fig. 212: Fuel Feed & Return Line Bracket Bolt With High Pressure Fuel Feed Line To Fuel Rail Bolt**

Courtesy of CHRYSLER LLC

116. Install the fuel feed and return line bracket bolt (2) attaching fuel lines to intake manifold. Tighten bolt to 15 N.m (133 in. lbs.).
117. Install the high pressure fuel feed line to fuel rail bolt (1) attaching fuel line to intake manifold. Tighten bolt to 15 N.m (133 in. lbs.).



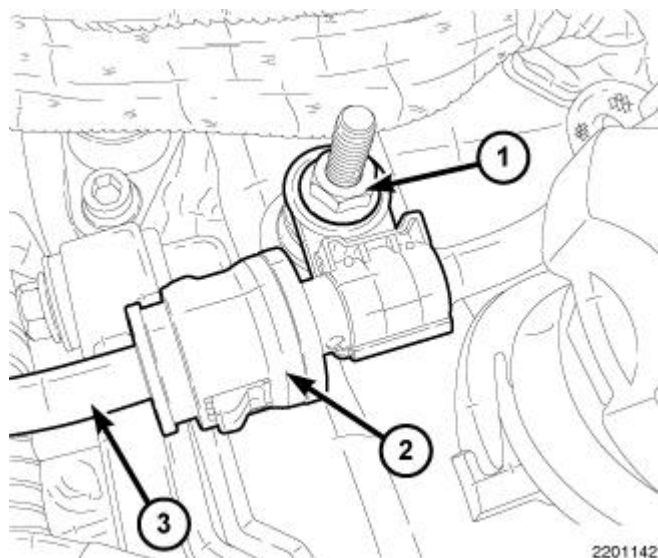
**Fig. 213: Common Fuel Return Line**

Courtesy of CHRYSLER LLC

118. Install the fuel injector fuel return line (2) onto the fuel injector and push down on the lock tab (1) to lock in place.

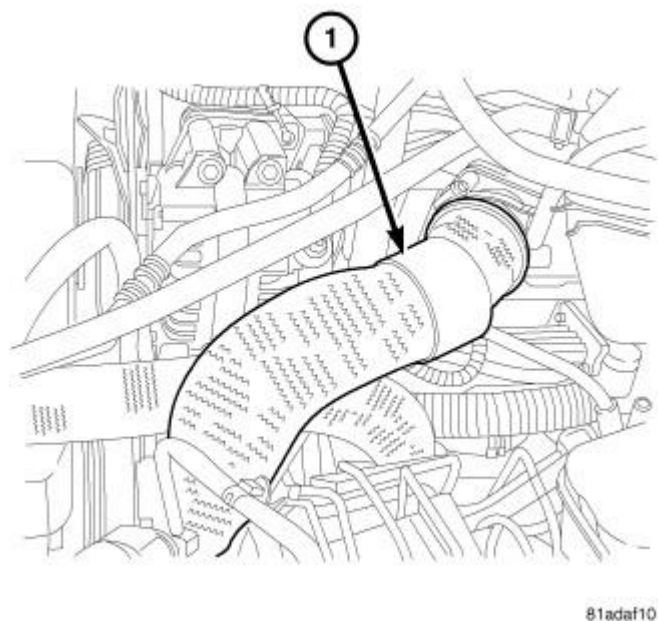
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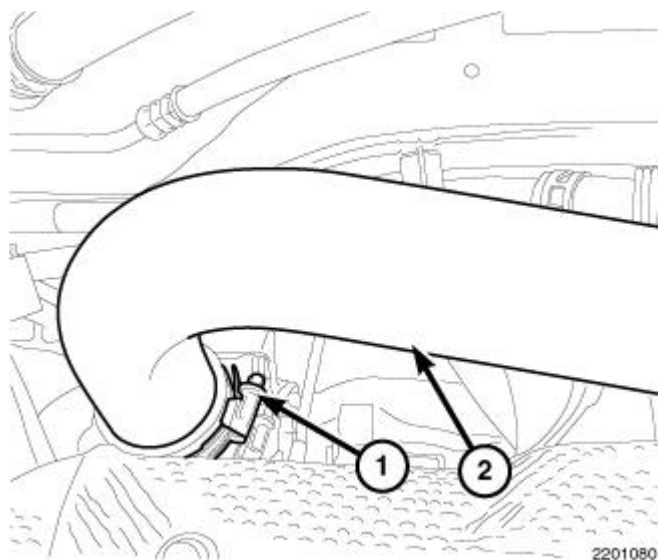
**Fig. 214: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

119. Connect the fuel injector return line (2) and securely install the retaining nut (1). Tighten nut to 15 N.m (133 in. lbs.).



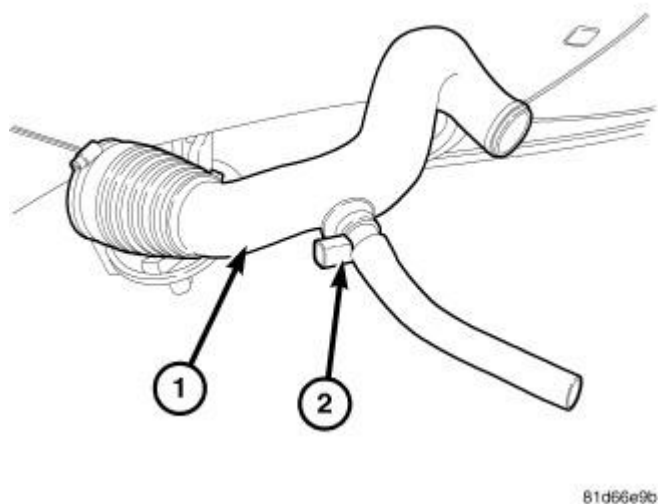
**Fig. 215: Charge Air Cooler Outlet Hose**  
Courtesy of CHRYSLER LLC

120. Install the charge air cooler outlet hose (1) top the EGR air flow control valve.



**Fig. 216: Charge Air Cooler Inlet Hose**  
Courtesy of CHRYSLER LLC

121. Install the charge air cooler inlet hose (2) to the turbocharger and tighten clamp (1).

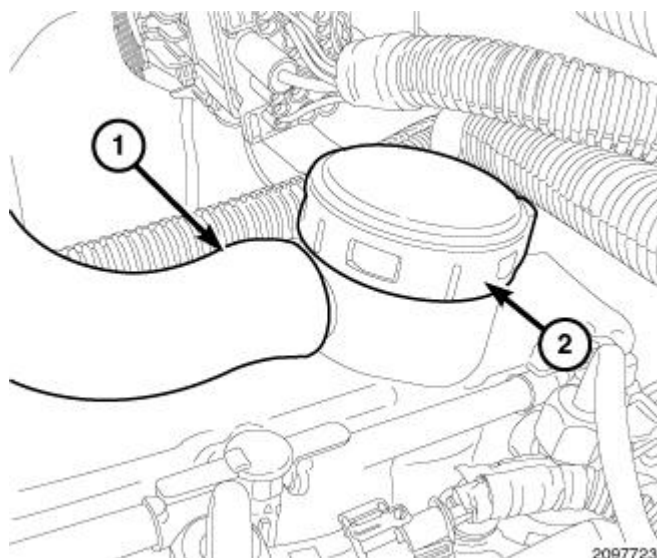


**Fig. 217: Turbocharger Air Inlet Tube & Crankcase Vent Hose Heater Electrical Connector**  
Courtesy of CHRYSLER LLC

122. Install the turbocharger inlet tube (1).
123. Connect the crankcase vent hose heater electrical connector (2).

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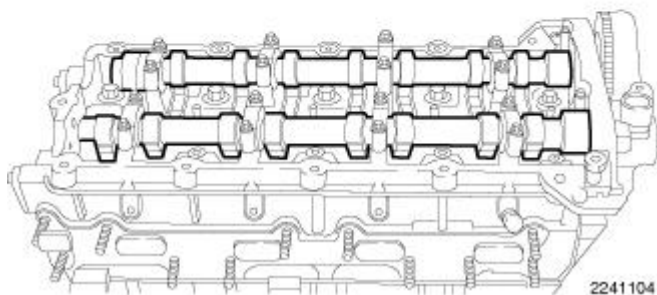
**Fig. 218: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

124. Connect the crankcase vent hose (1) to the oil separator (2).
125. Install the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
126. Fill the cooling system. Refer to **Cooling - Standard Procedure** .
127. Connect the battery cables.
128. Start the engine, and allow it to reach normal operating temperature. Inspect for leaks.

### CAMSHAFT, ENGINE

#### Description

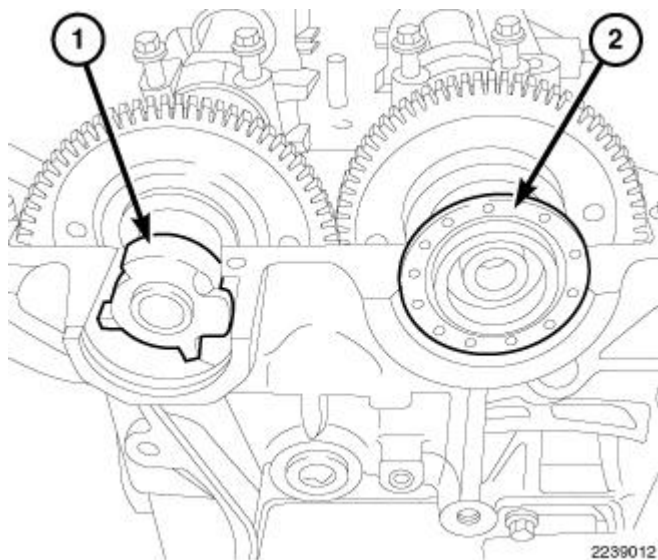
#### DESCRIPTION



**Fig. 219: Camshafts**

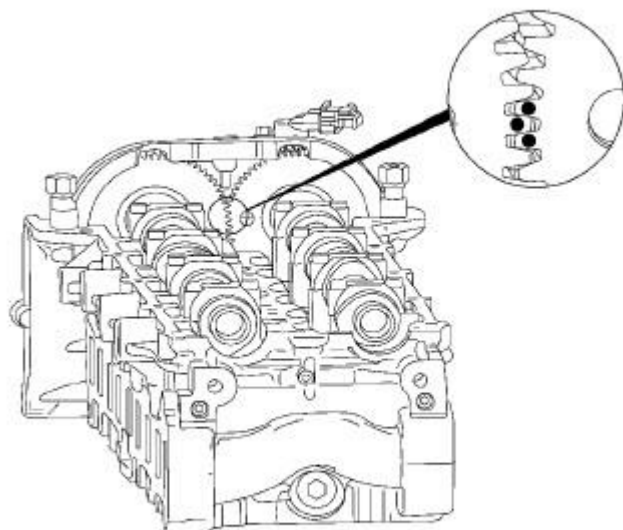
Courtesy of CHRYSLER LLC

The camshafts are made of cast iron with eight machined lobes and four bearing journals.

**Fig. 220: Intake Camshaft Oil Seal**

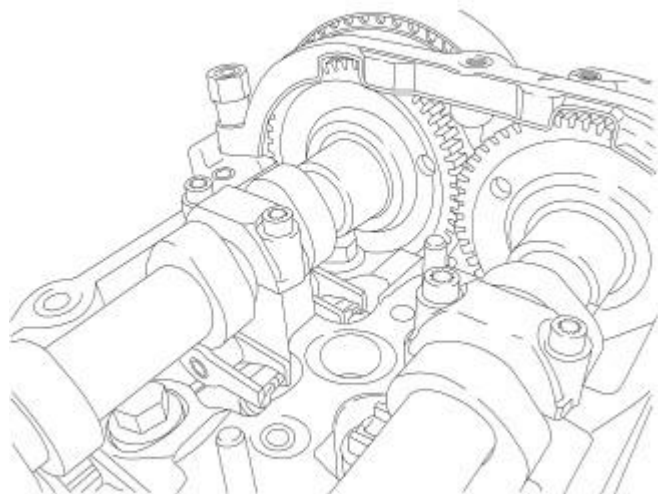
Courtesy of CHRYSLER LLC

1. The exhaust camshaft (1) incorporates the Camshaft Position (CMP) sensor reluctor wheel. The intake camshaft uses a camshaft seal (2).

**Fig. 221: Camshaft Timing Dots**

**Courtesy of CHRYSLER LLC**

2. The dots on the back of the camshaft gears are for initial timing only. These dots are for timing the camshafts to each other.



81ad10c7

**Fig. 222: Camshafts Set To 90 Degrees ATDC****Courtesy of CHRYSLER LLC**

3. To correctly set engine timing, the camshafts must be set to 90° ATDC. The camshaft locking tool VM. 9991 is used to correctly set the camshafts to their proper location. The figure above shows camshafts set at 90° ATDC.

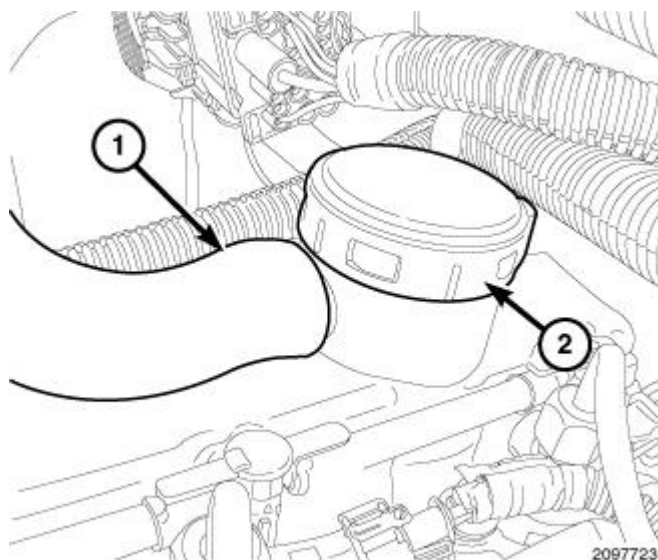
**Removal****REMOVAL**

1. Disconnect negative battery cable.
2. Remove engine cover. See **Engine - Removal**.
3. Remove the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.



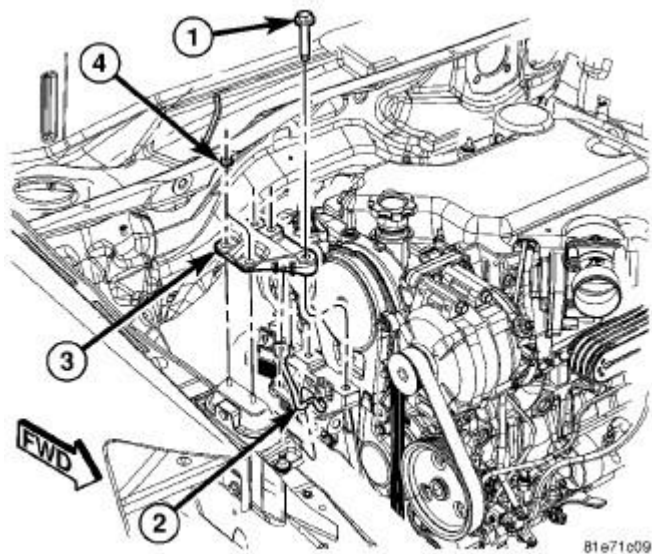
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**Fig. 223: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

4. Disconnect the crankcase vent hose (1) from the oil separator (2).

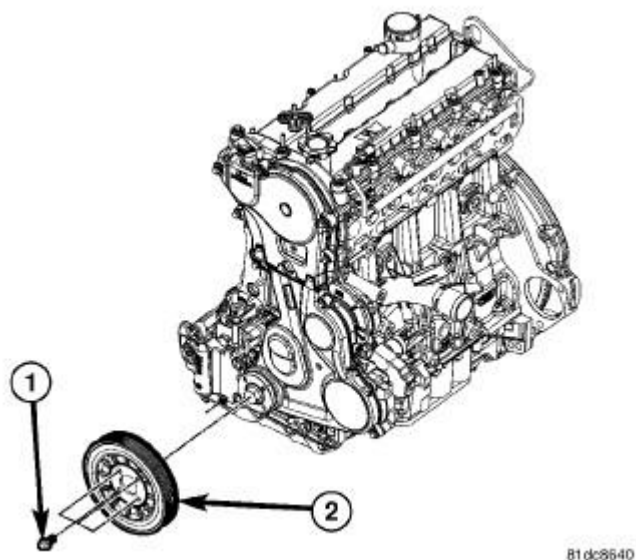


**Fig. 224: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

5. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.
6. Support the engine from below.
7. Remove the ground strap (2).
8. Remove the engine mount bracket fasteners (1) and (4).
9. Remove the right engine mount bracket (3).

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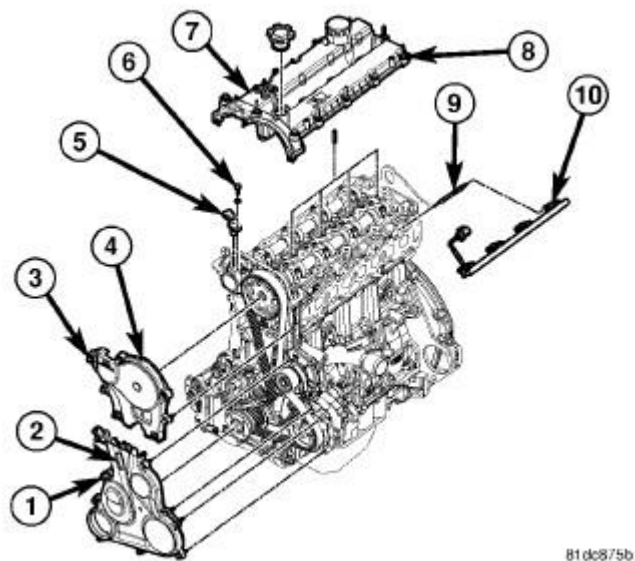
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**Fig. 225: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

**NOTE:** The crankshaft sprocket bolt is a LH thread.

10. Remove the crankshaft damper bolts (1), and the crankshaft damper (2).

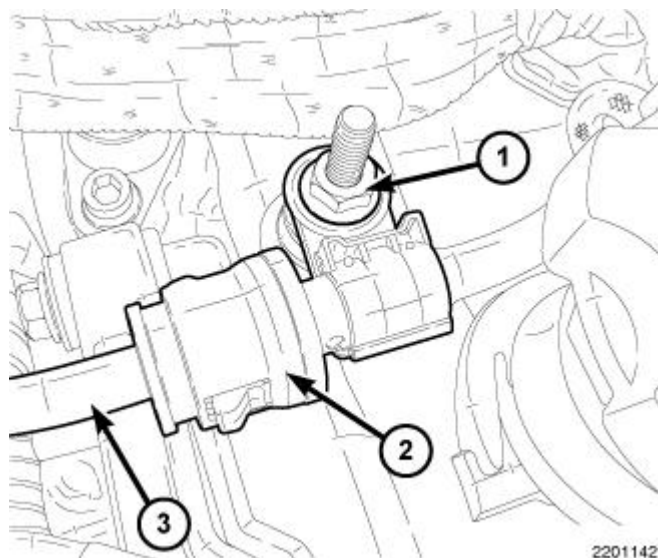


**Fig. 226: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

11. Remove the five bolts (3) and the upper front timing belt cover (4).
12. Remove the nine bolts (1) and the lower front timing belt cover (2).

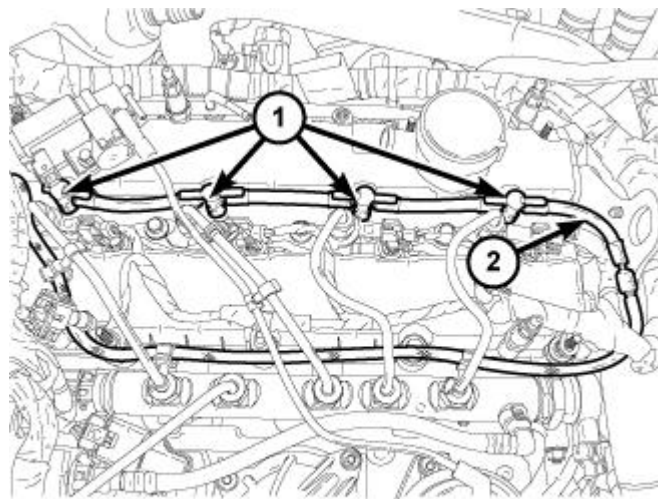
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**Fig. 227: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

13. Remove the retaining nut (1) and disconnect the fuel injector return line (2).

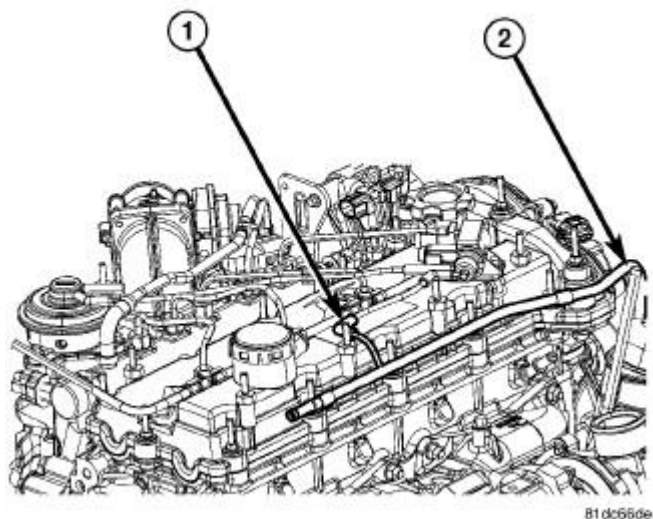


**Fig. 228: Common Fuel Return Line**  
Courtesy of CHRYSLER LLC

14. A lock button (1) is used to secure the common fuel return line to each fuel injector. Use your fingers to lift up all four lock buttons (1) to unlock them. After unlocking all four buttons, lift fuel return line assembly and remove the fuel injector return line (2).

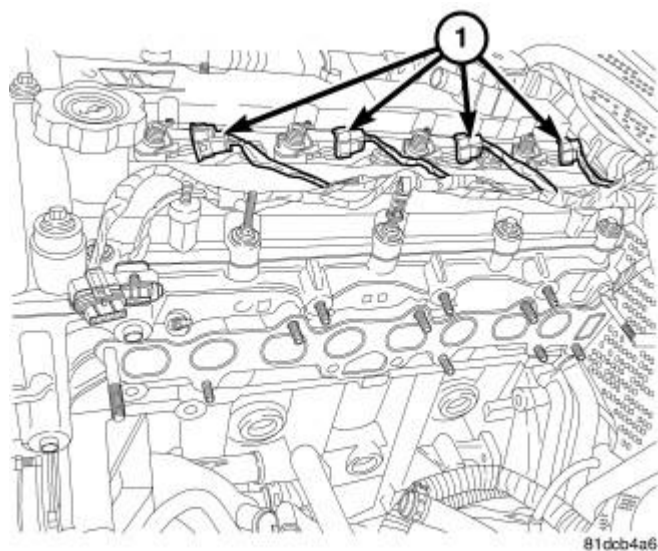
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**Fig. 229: Vacuum Supply Tube**  
Courtesy of CHRYSLER LLC

15. Disconnect the engine wire harness retaining clips from the cylinder head cover stud bolts.
16. Disconnect the vacuum line (2) from the vacuum pump.
17. Disconnect the vacuum line (1).
18. Remove retaining nuts and remove the vacuum line (2).

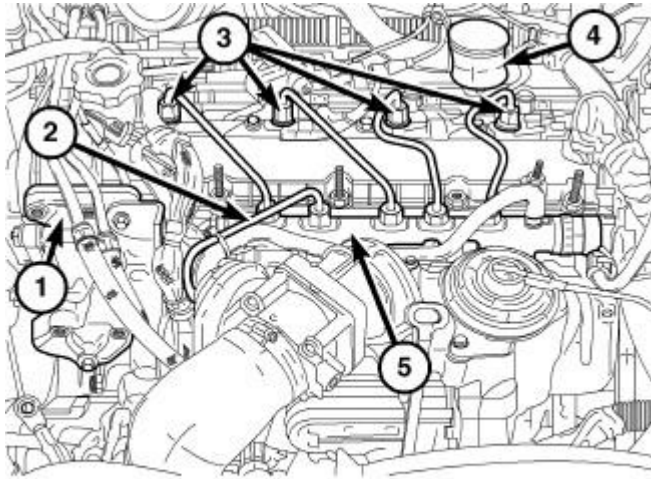


**Fig. 230: Fuel Injector Harness**  
Courtesy of CHRYSLER LLC

19. Disconnect the fuel injector harness connectors from the fuel injectors (1).

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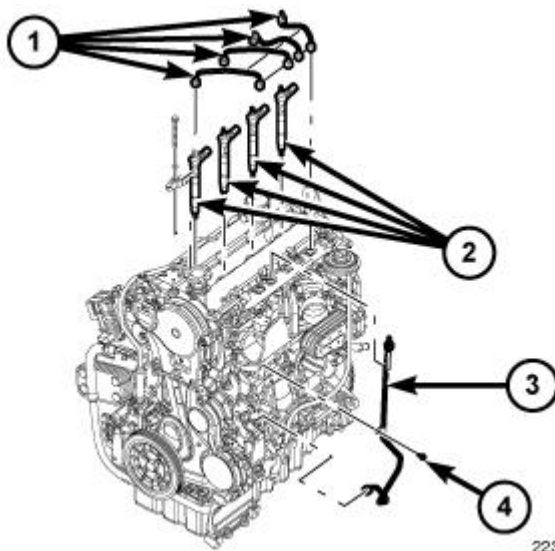
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**Fig. 231: High Pressure Fuel Lines**  
Courtesy of CHRYSLER LLC

20. Remove the high pressure fuel lines (3) from the injectors and the fuel rail.



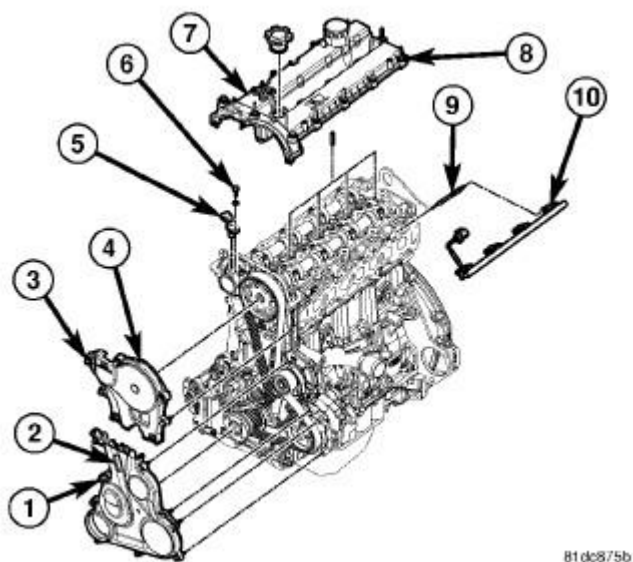
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**Fig. 232: Fuel Injectors**  
Courtesy of CHRYSLER LLC

21. Remove the fuel injectors (2).

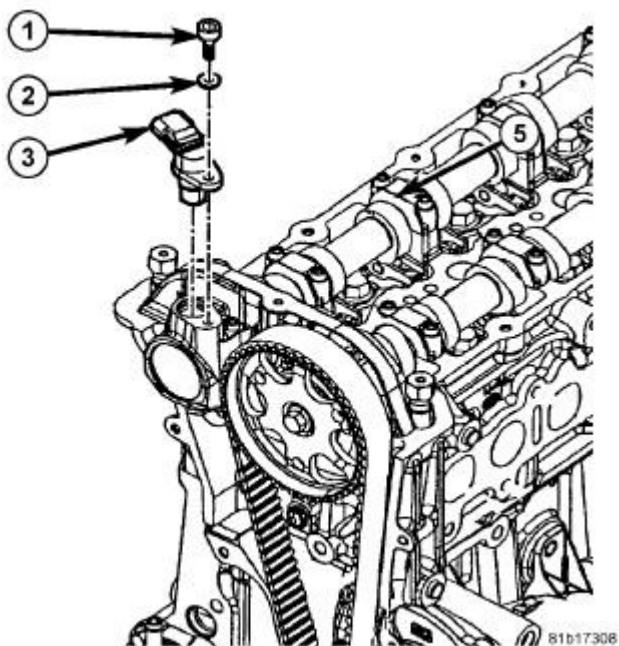
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**Fig. 233: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

22. Remove the twelve fasteners (8) and the cylinder head cover (7).

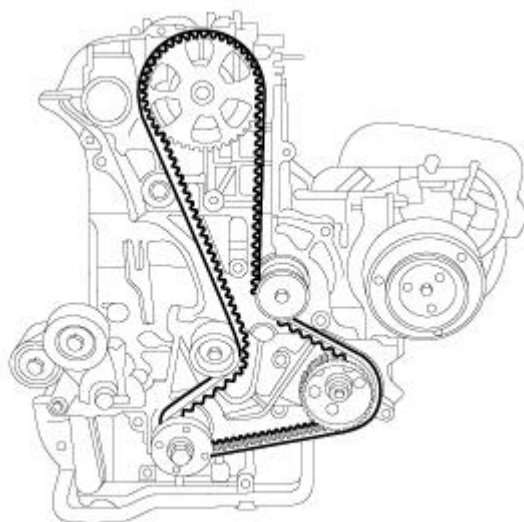


**Fig. 234: CMP Sensor**  
Courtesy of CHRYSLER LLC

23. Disconnect the Camshaft Position Sensor (CMP) (3) harness connector.
24. Remove the Camshaft Position Sensor (CMP) (3).

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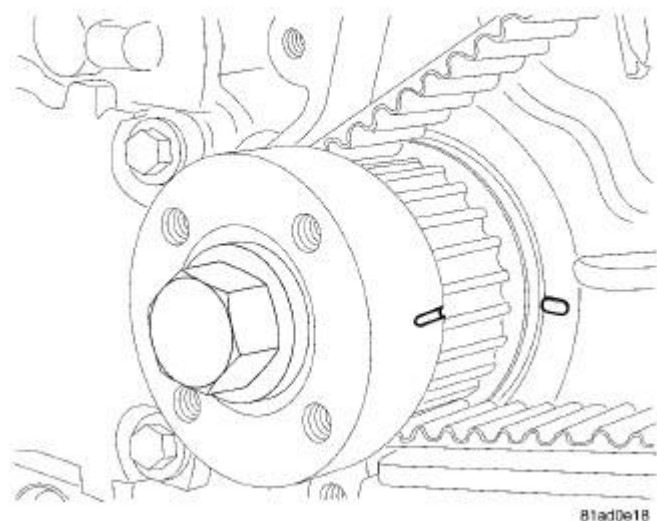
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**Fig. 235: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

**CAUTION:** Before removing the cylinder head cover/intake manifold or timing belt the engine must be rotated to the 90° ATDC. The camshafts and the crankshaft must all be set to the correct position. Failure to do so could result in valve and/or piston damage during reassembly. See Engine/Valve Timing - Standard Procedure.



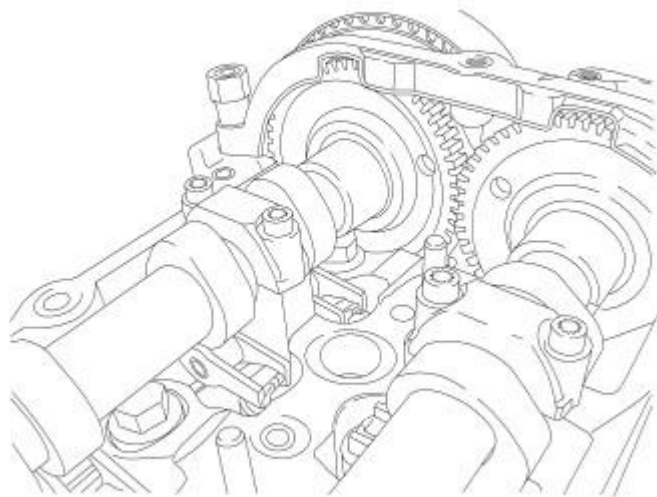
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**Fig. 236: Crankshaft Timing Marks**  
Courtesy of CHRYSLER LLC

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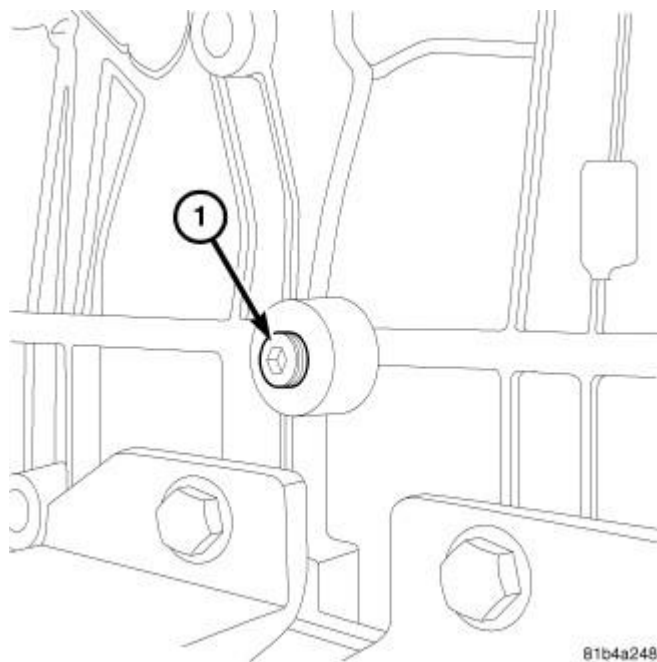
25. Rotate the engine by hand until the crankshaft 90° ATDC marks are aligned.



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**Fig. 237: Camshafts Set To 90 Degrees ATDC**  
Courtesy of CHRYSLER LLC

26. Verify the camshaft timing alignment holes on the camshaft gears are aligned as shown in illustration.

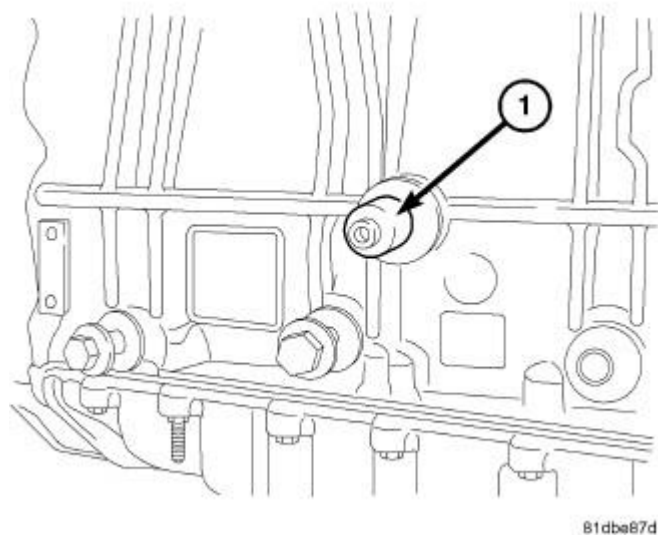


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**Fig. 238: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

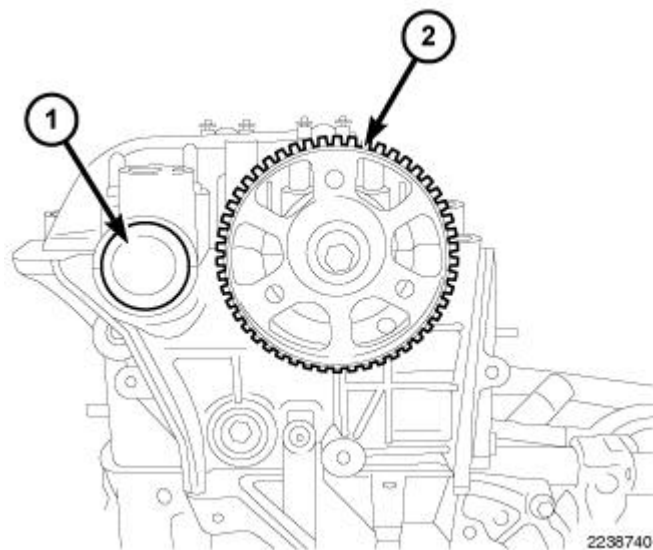


27. Remove the engine block plug (1) for the crankshaft locking tool. The crankshaft locking tool is installed on the intake manifold side of the engine.



**Fig. 239: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

28. Remove the plug from the engine block, and install the crankshaft locking tool VM. 9992 (1).

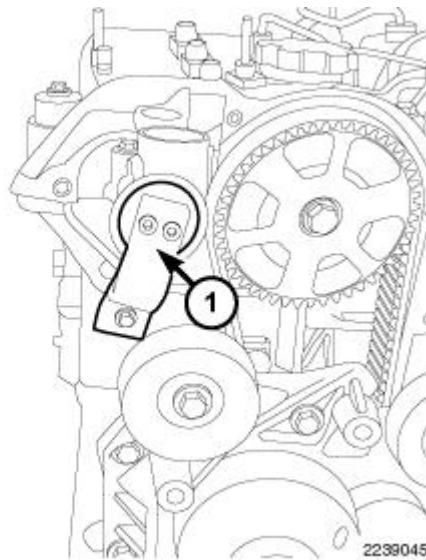


**Fig. 240: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

29. Remove the exhaust camshaft oil seal (1).

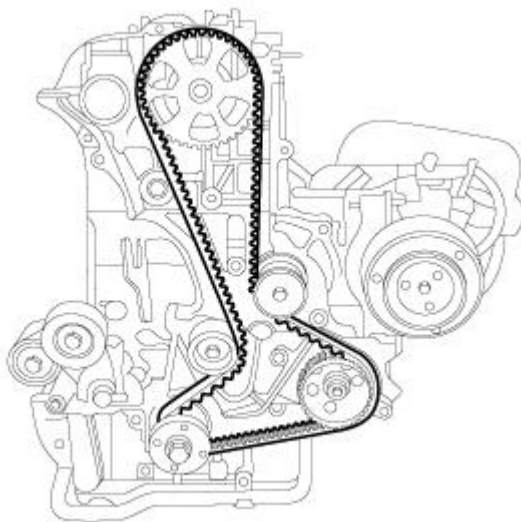
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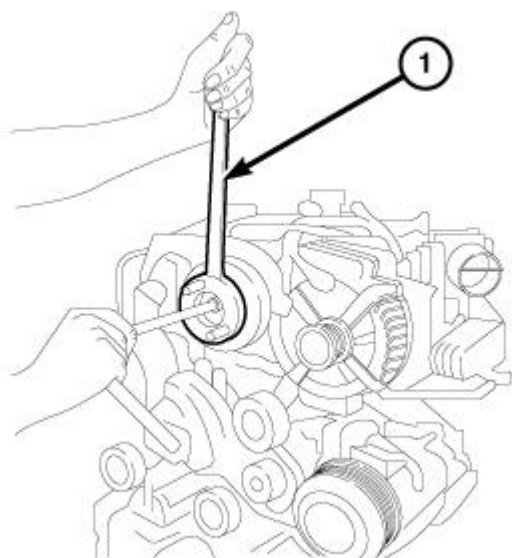
**Fig. 241: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

30. Install the camshaft locking tool VM 9991 (1).



**Fig. 242: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

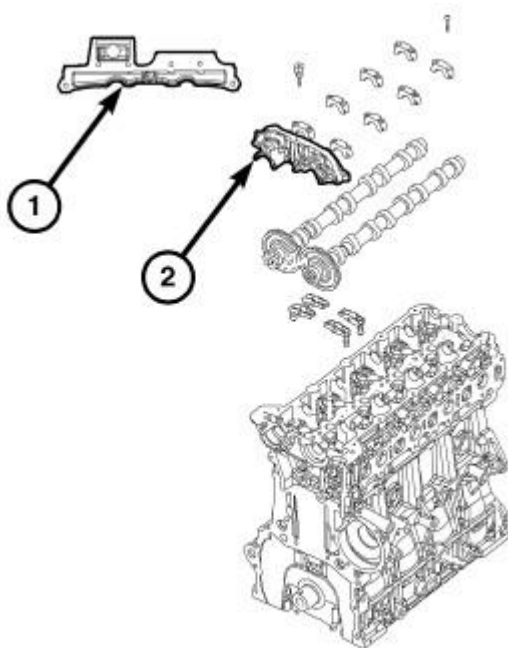
31. Loosen the timing belt tensioner bolt, release tension from the timing belt tensioner, and remove the timing belt.



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**Fig. 243: Intake Camshaft Sprocket Holder VM 1055**  
Courtesy of CHRYSLER LLC

32. Using the intake camshaft sprocket holder VM 1055 to hold the intake camshaft sprocket, remove bolt and the intake camshaft sprocket (2).



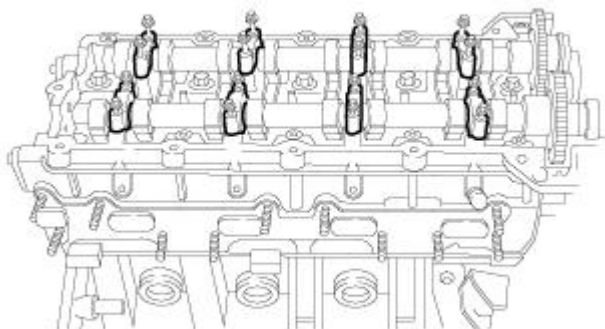
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**Fig. 244: Front Camshaft Bearing Journal**  
Courtesy of CHRYSLER LLC

33. Remove the front camshaft bearing journal (2).

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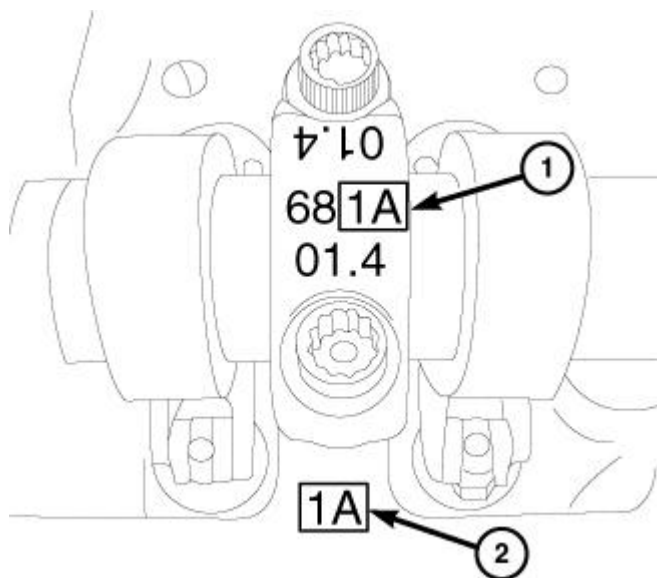
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**Fig. 245: Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

34. Using a circular pattern, loosen the camshaft caps.



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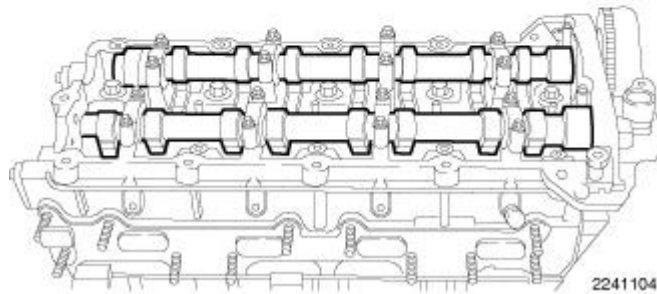
**Fig. 246: Identifying Camshaft Cap & Cylinder Head (Intake Side) Markings**  
Courtesy of CHRYSLER LLC

**NOTE:** The camshaft caps must be installed in the same location and direction as they were removed. Match the marks on the camshaft cap to the marks on the cylinder head (1). The figure is an example of a camshaft cap mark.

35. Remove the camshaft caps.

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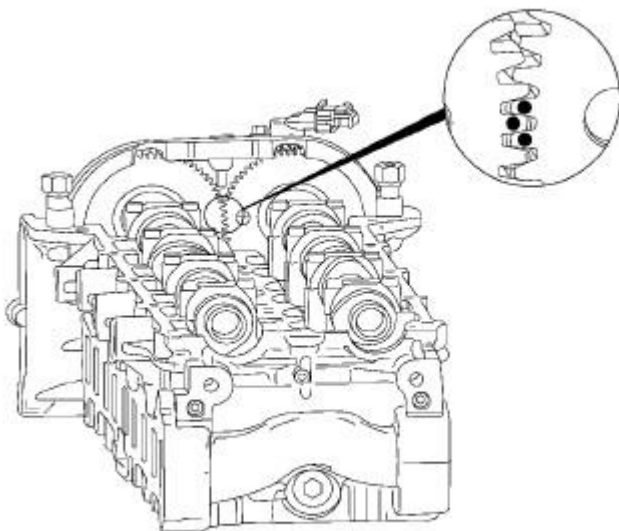


**Fig. 247: Camshafts**  
Courtesy of CHRYSLER LLC

36. Remove the camshafts.

### Installation

### INSTALLATION



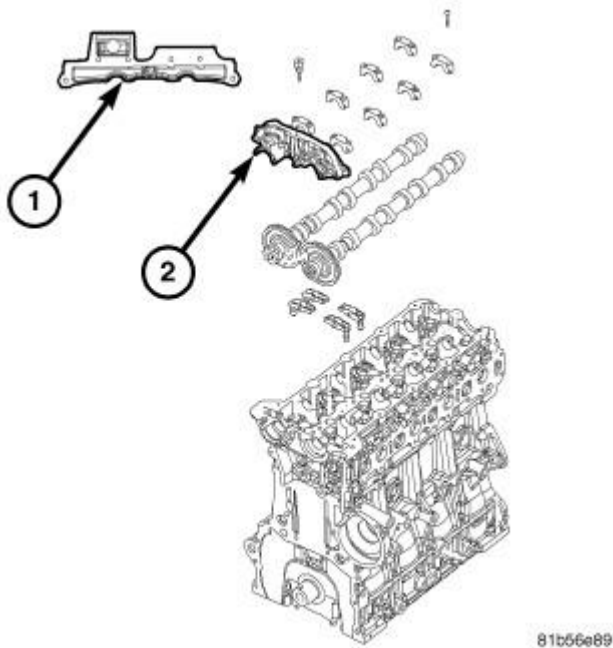
**Fig. 248: Camshaft Timing Dots**  
Courtesy of CHRYSLER LLC

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1. Lubricate the camshaft journals with Mopar® Engine Oil Supplement, or equivalent.
2. Make sure that the three small orientation dots marks on the back side of the camshaft gears are horizontal and facing each other.
3. Carefully install camshafts onto the camshaft journals.

**NOTE:** The dots on the back of the camshaft gears are for initial timing only. These dots are for timing the camshafts to each other. To correctly set engine timing, the camshafts must be set to 90° ATDC. The camshaft locking tool is used to correctly set the camshafts to their proper location.

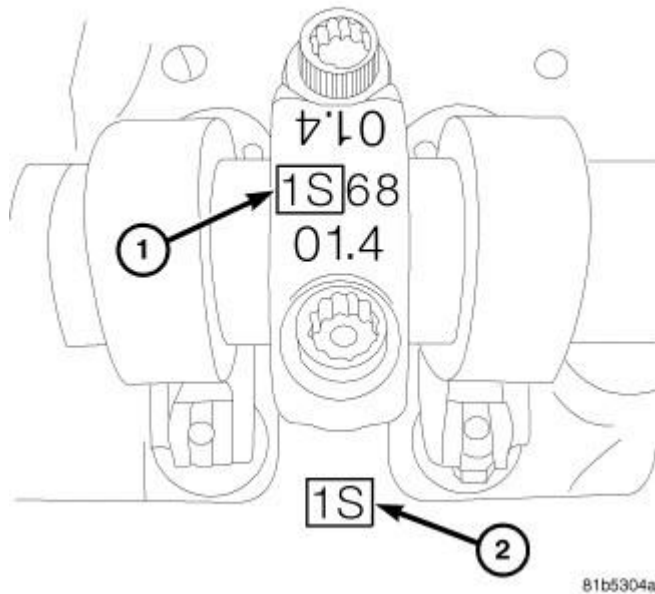


**Fig. 249: Front Camshaft Bearing Journal**  
Courtesy of CHRYSLER LLC

4. Apply a thin bead of Loctite® 510 to the front camshaft bearing journal (1) in the location shown in illustration (1).
5. Using new bolts, install the front camshaft bearing journal. Tighten bolts to 11 N.m (97 in. lbs.).

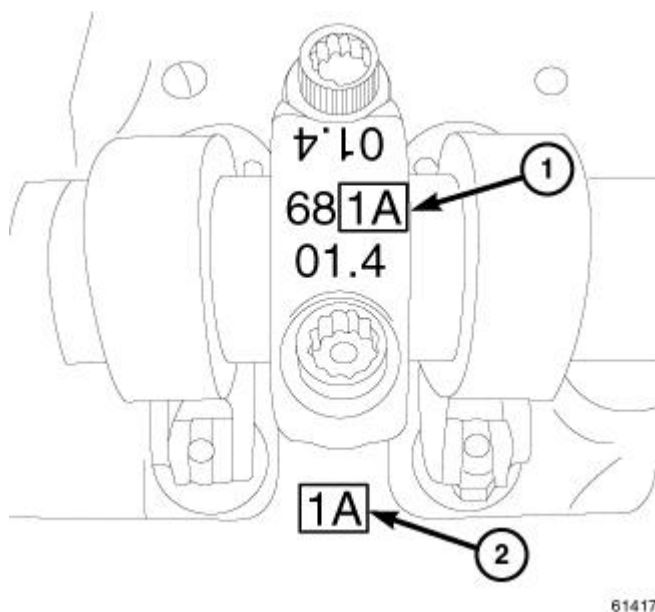
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**Fig. 250: Identifying Camshaft Cap & Cylinder Head (Exhaust Side) Markings**  
Courtesy of CHRYSLER LLC

6. The camshaft cap must be aligned with the mark (1) aligned in the same direction as the cylinder head mark (2). In the figure, the camshaft cap is the first cylinder (indicated by the 1S); the exhaust side of the cylinder head (indicated by the 1S). Each camshaft cap location is marked in this manner on both the camshaft cap and cylinder head. It is critical that all of the camshaft caps are returned to their correct.



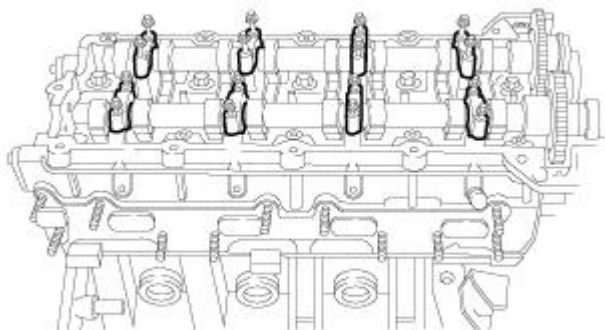
**Fig. 251: Identifying Camshaft Cap & Cylinder Head (Intake Side) Markings**  
Courtesy of CHRYSLER LLC

7. The camshaft cap must be aligned with the mark (1) aligned in the same direction as the cylinder head

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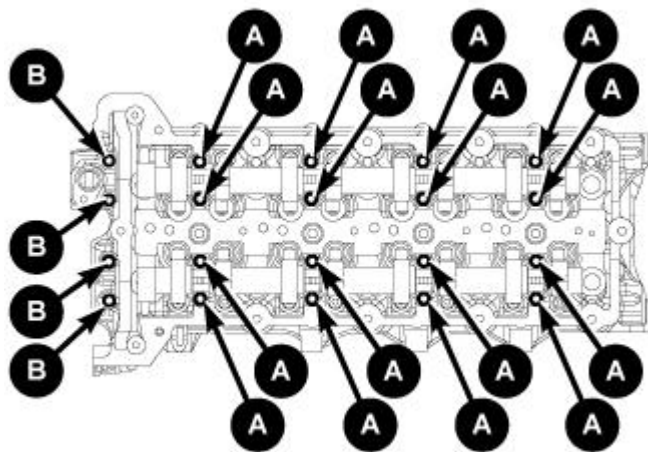
mark (1). In the figure, the camshaft cap is the first cylinder (indicated by the 1A); the intake side of the cylinder head is (indicated by the 1A). Each camshaft cap location is marked in this manner on both the camshaft cap and cylinder head. It is critical that all of the camshaft caps are returned to their correct locations.



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**Fig. 252: Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

8. Loosely install the camshaft bolts finger tight.



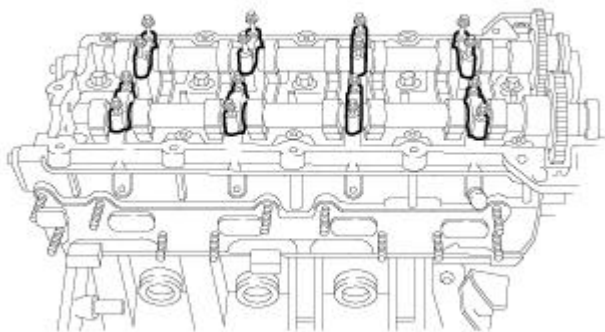
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**Fig. 253: Identifying Camshaft Bolts**  
Courtesy of CHRYSLER LLC



**NOTE:** When the camshaft caps are removed, always replace the camshaft cap bolts.

9. The camshaft bolts have 3 different bolt sizes.
  - Bolts A are M6 35 mm
  - Bolts B are M6 45 mm
  - Bolts C are M6 stud bolts.
10. Put a thin bead of silicone on the front camshaft cap (the cap that are secured by bolts "b").



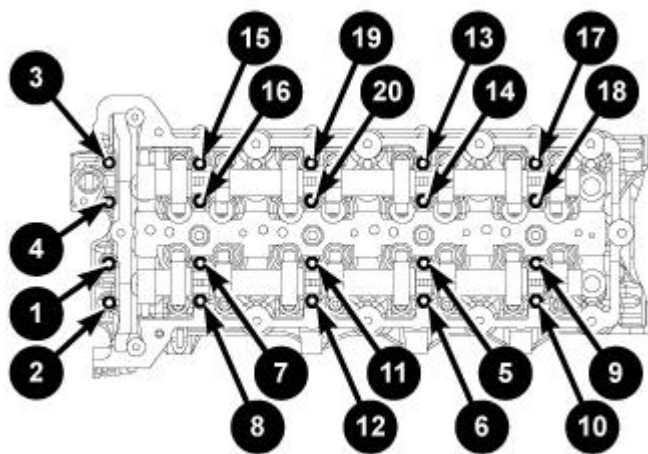
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**Fig. 254: Camshaft Cap Bolts**  
Courtesy of CHRYSLER LLC

11. Loosely install the new camshaft bolts finger tight.

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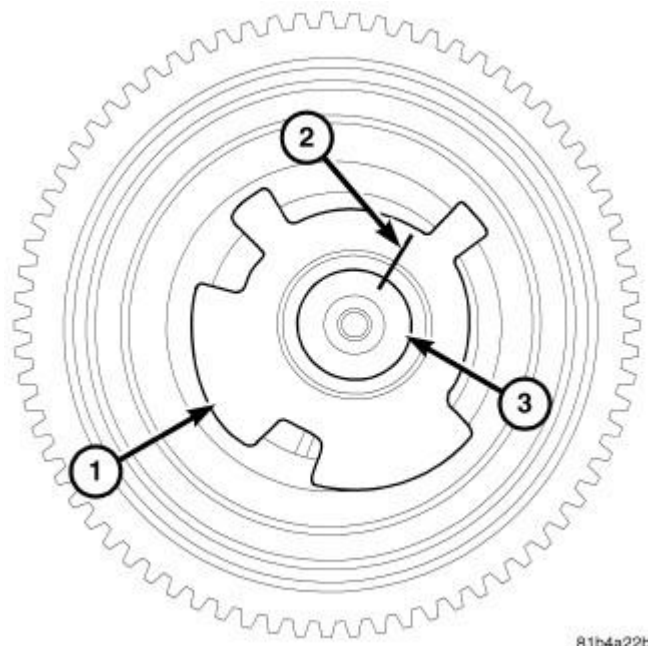
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**Fig. 255: Camshaft Cap Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC

- Following the figured pattern shown in **Fig. 255**, torque the camshaft cap bolts to 11 N.m (98 in. lbs.).



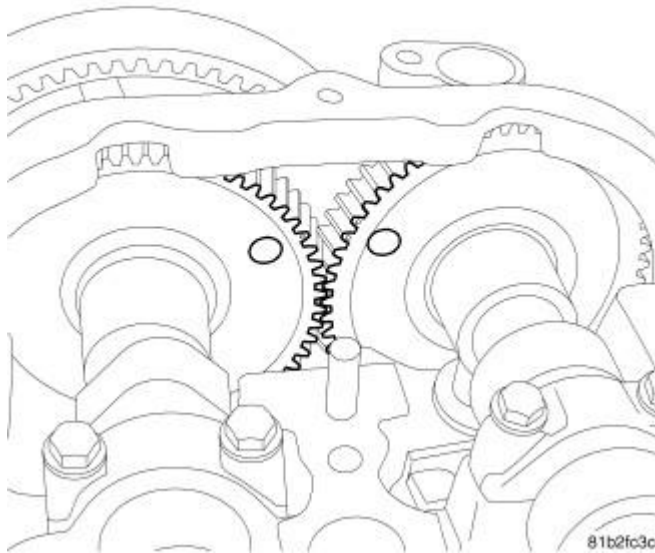
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**Fig. 256: Mark Camshaft Tone Wheel**  
Courtesy of CHRYSLER LLC

- Use a paint marker to mark the location of the camshaft tone wheel on the camshaft. It is critical that the tone wheel is not rotated on the camshaft.

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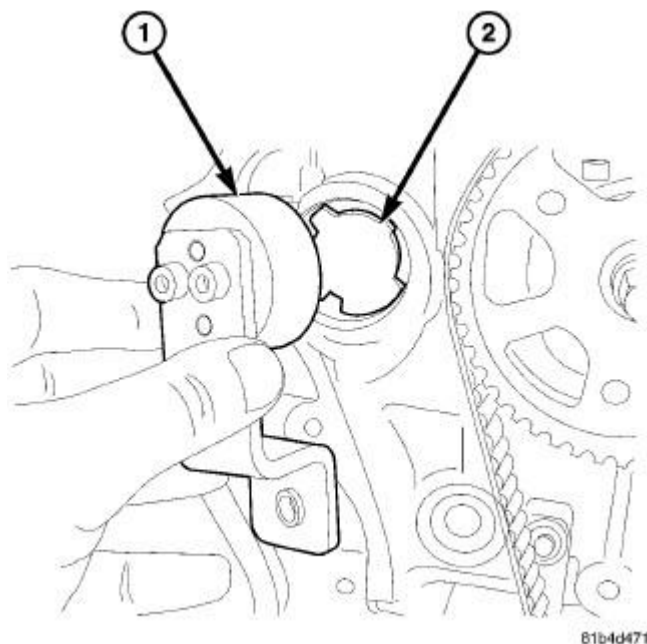
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**Fig. 257: Camshaft Marks At 90 Degrees ATDC**  
Courtesy of CHRYSLER LLC

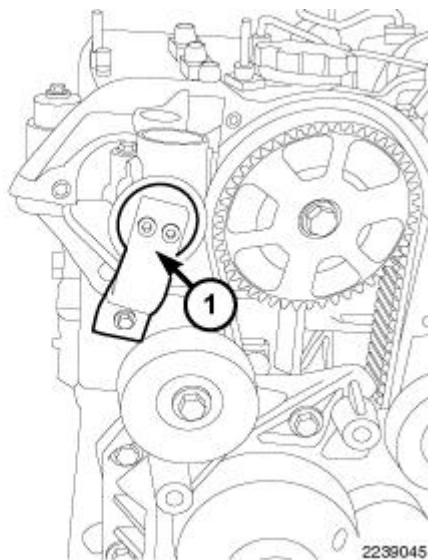
**WARNING:** Do not use special tool VM 9991 to rotate the engine. The tool may rotate the tone wheel on the camshaft. If the tone wheel is rotated on the camshaft, the camshaft must be replaced.

14. Rotate the camshafts so that the camshaft locking tool fits into place.



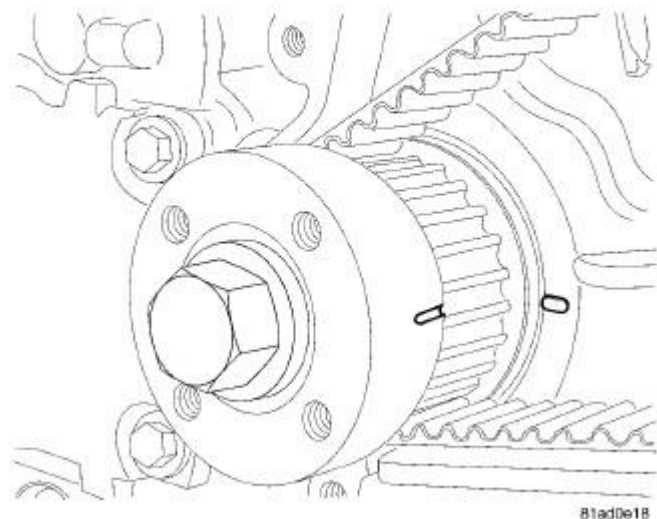
**Fig. 258: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

15. Install the camshaft locking tool VM 9991 (1).



**Fig. 259: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

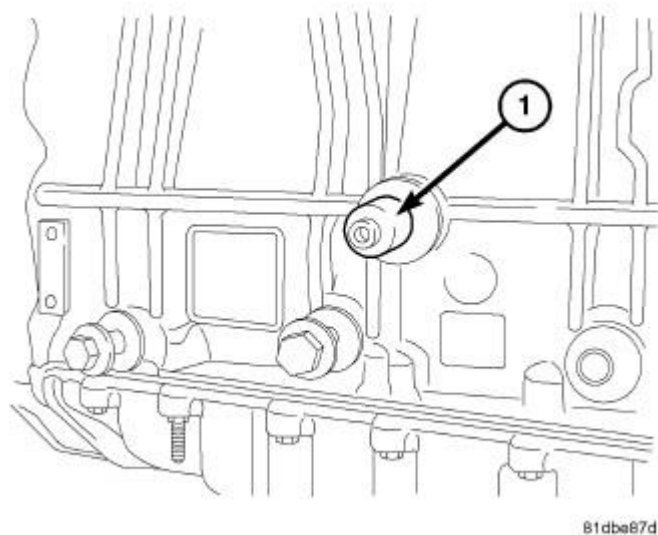
16. When the camshaft locking tool VM 9991 (1) is bolted in place, the camshafts are locked at 90 degrees ATDC.



**Fig. 260: Crankshaft Timing Marks**

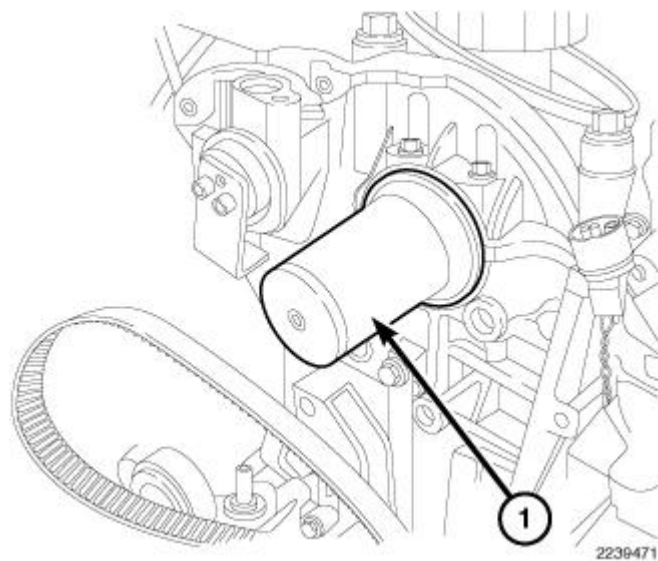
**Courtesy of CHRYSLER LLC**

17. If the crank locking tool was removed for any reason, verify the crankshaft 90° ATDC marks are aligned. Align the crankshaft 90° ATDC marks if necessary.



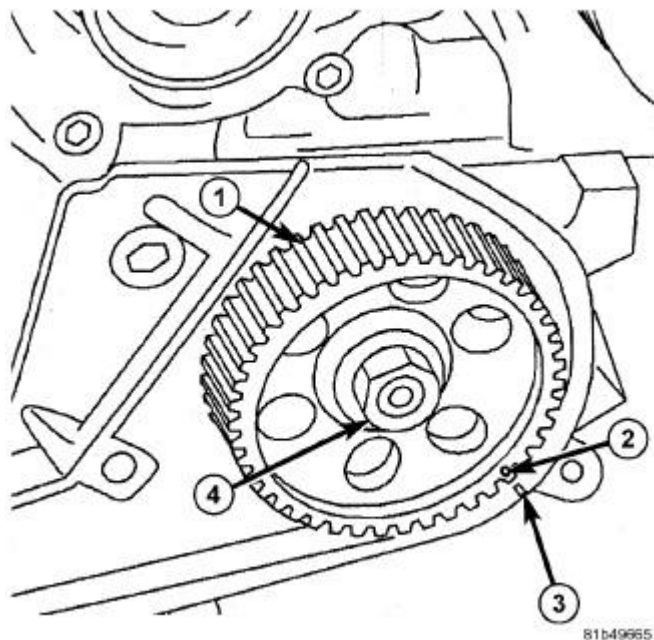
**Fig. 261: Crankshaft Locking Tool**  
**Courtesy of CHRYSLER LLC**

18. If necessary, install the crankshaft locking tool VM 9992 (1).



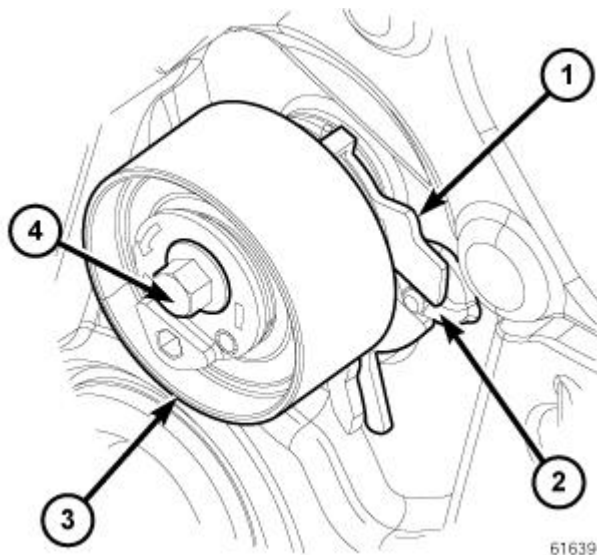
**Fig. 262: Seal Installer**  
**Courtesy of CHRYSLER LLC**

19. Using the 9937-1 seal installer (1), install the intake camshaft oil seal.



**Fig. 263: Fuel Injection Pump Timing Marks**  
Courtesy of CHRYSLER LLC

20. Align the high pressure fuel pump sprocket timing mark (2) with the timing mark (3) on the block.

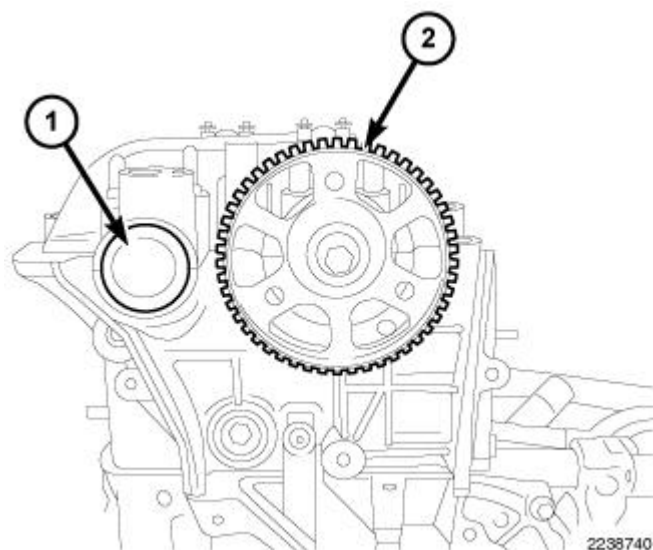


**Fig. 264: Timing Belt Tensioner**  
Courtesy of CHRYSLER LLC

21. Install the timing belt tensioner (3). Do not tighten at this time. Verify that the slot in the tensioner alignment plate (1) is aligned with the boss (2) in the rear timing belt cover.

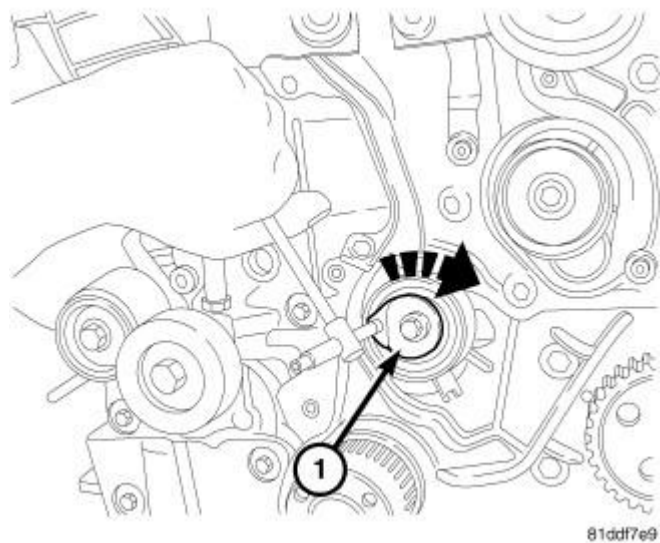
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**Fig. 265: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

22. Install the camshaft sprocket (2). Do not tighten the bolt at this time.

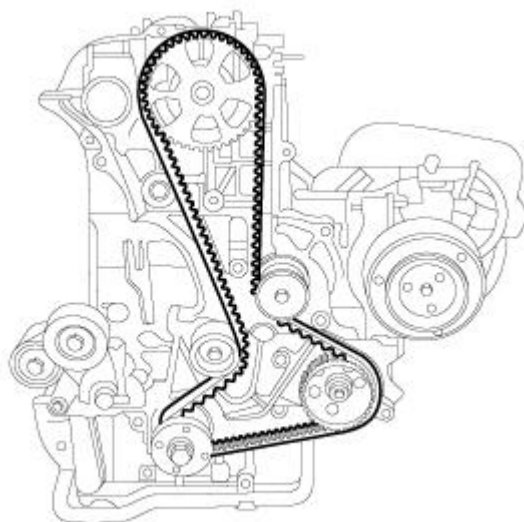


**Fig. 266: Timing Belt Tensioner Adjustment**  
Courtesy of CHRYSLER LLC

23. Turn the timing belt tensioner (1) clockwise to unload the tensioner enough for the timing belt to be installed.

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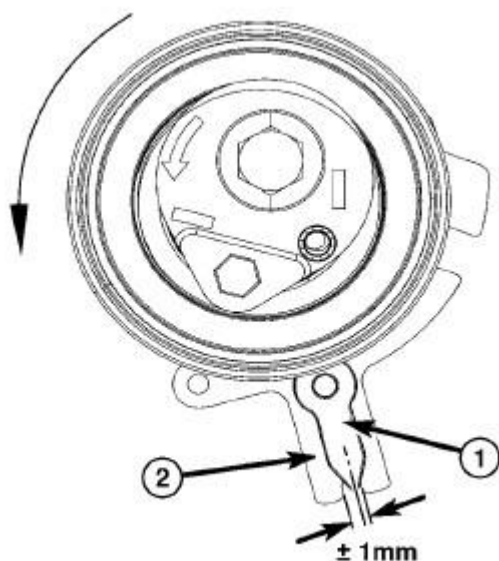
2238720

**Fig. 267: Exploded View Of Timing Belt**

Courtesy of CHRYSLER LLC

**NOTE:** DO NOT remove the timing belt from the package until it is going to be installed. DO NOT expose timing belt to oil, grease or water contamination. DO NOT crimp belt at a sharp angle. DO NOT clean belt, pulleys or tensioner with solvent. Check that pulleys and bearings are not seized or damaged before installing belt.

24. Install timing belt.



81dd171a

**Fig. 268: Adjusting Timing Belt Tensioner Using Indicator & Gauge**

Courtesy of CHRYSLER LLC

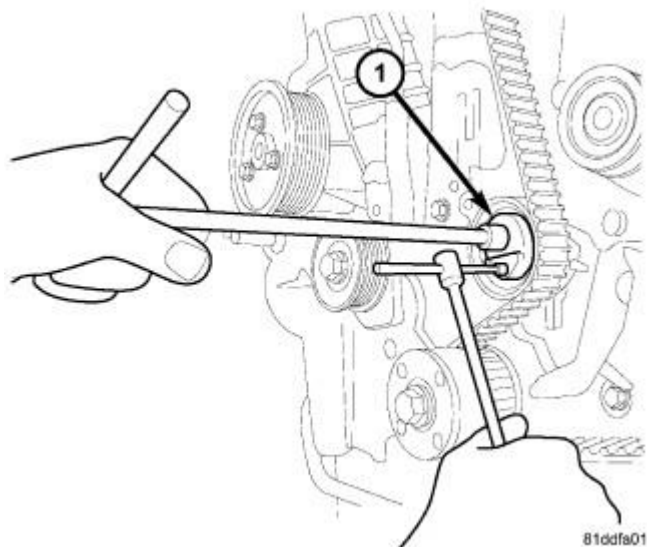


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**NOTE:** Turning the belt tensioner counter clockwise moves the pointer in a clockwise direction. Also, if the tensioner bolt is too loose, this will cause the tensioner alignment slot to jump off the alignment boss on timing cover.

25. Adjust timing belt tensioner by lining up the load indicator arrow (1) to the center of the tensioner load gauge (2) as shown in illustration.
26. Verify the tensioner load indicator (1) is centered in the tensioner load gauge (2).

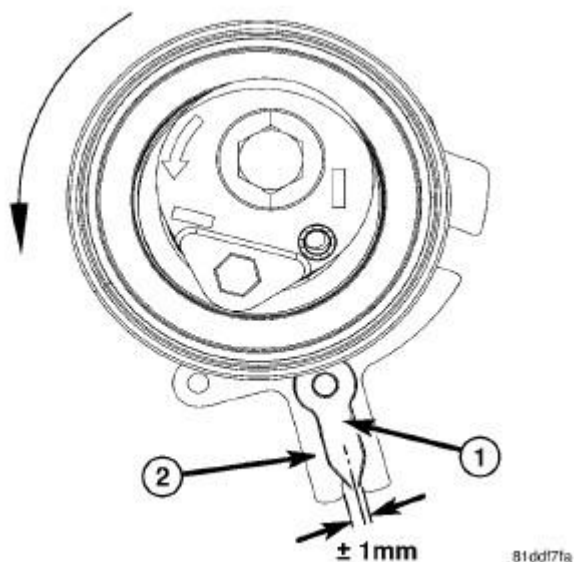


**Fig. 269: Timing Belt Tensioner Bolt**  
Courtesy of CHRYSLER LLC

27. Tighten the timing belt tensioner bolt to 28 N.m (21 ft. lbs.).

## 2009 Chrysler Town & Country LX

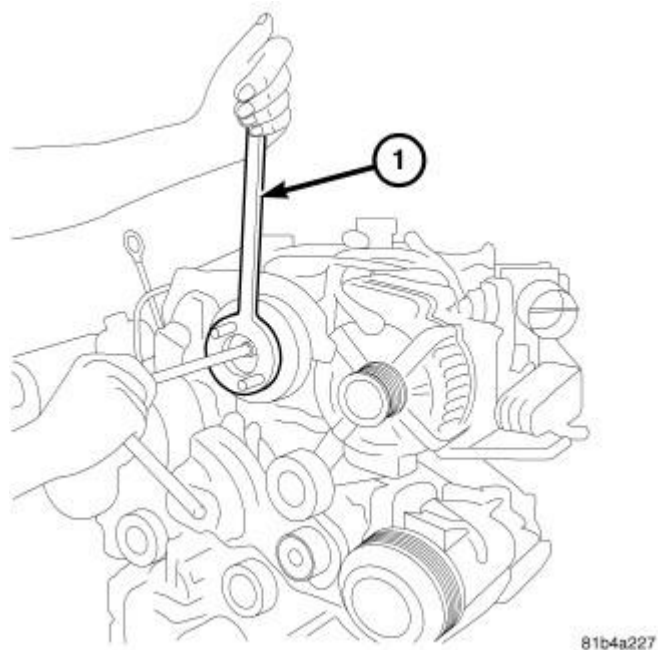
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**Fig. 270: Timing Belt Tensioner Marks**

Courtesy of CHRYSLER LLC

28. Verify the tensioner load indicator (1) is still centered in the tensioner load gauge (2). If the indicator is not centered in the gauge as shown in illustration, see **Engine/Valve Timing/TENSIONER, Engine Timing - Adjustments.**



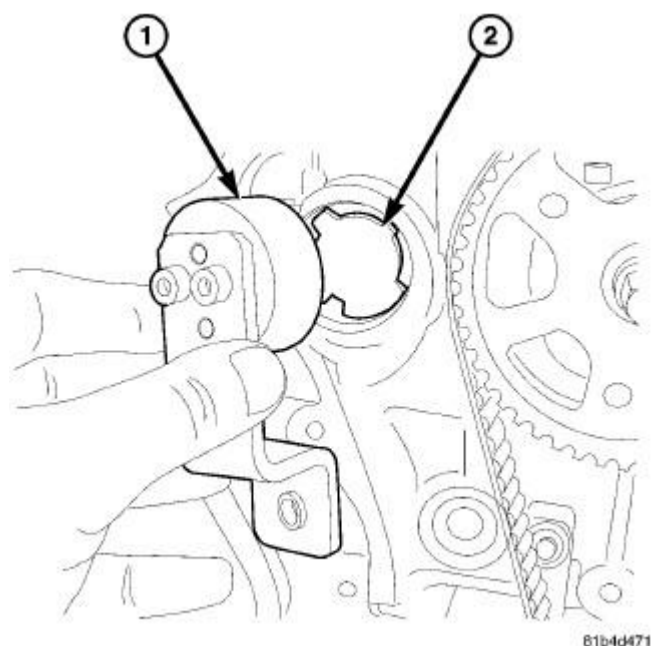
**Fig. 271: Tightening Camshaft Sprocket**

Courtesy of CHRYSLER LLC

**CAUTION:** If tool VM 1055 is not used to secure the camshaft sprocket when

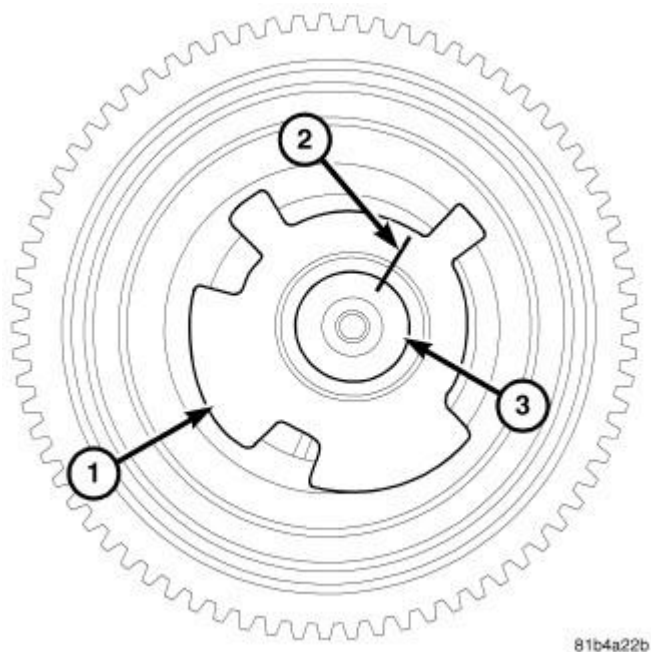
**tightening the bolt on the intake camshaft, the reluctor wheel on the exhaust camshaft may spin resulting in reluctor wheel to exhaust camshaft being out of time. If this occurs the exhaust camshaft must be replaced.**

29. Use VM 1055 Gear Holder (1) to hold the camshaft sprocket while tightening. Tighten the intake camshaft sprocket bolt to 80 N.m (59 ft. lbs.).



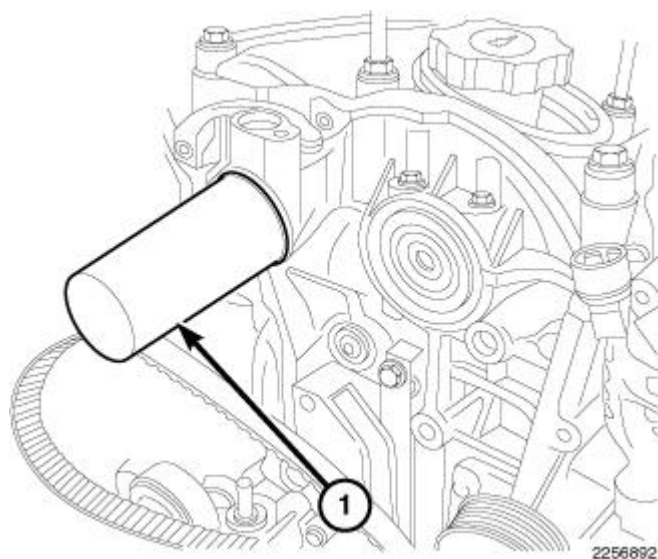
**Fig. 272: Camshaft Lock Tool**  
**Courtesy of CHRYSLER LLC**

30. Remove the camshaft locking tool (1).



**Fig. 273: Mark Camshaft Tone Wheel**  
Courtesy of CHRYSLER LLC

31. Verify that the reluctor wheel (1) has not moved on the camshaft. If the reluctor wheel (1) has spun on the camshaft (3) during the assembly process, replace the camshaft.

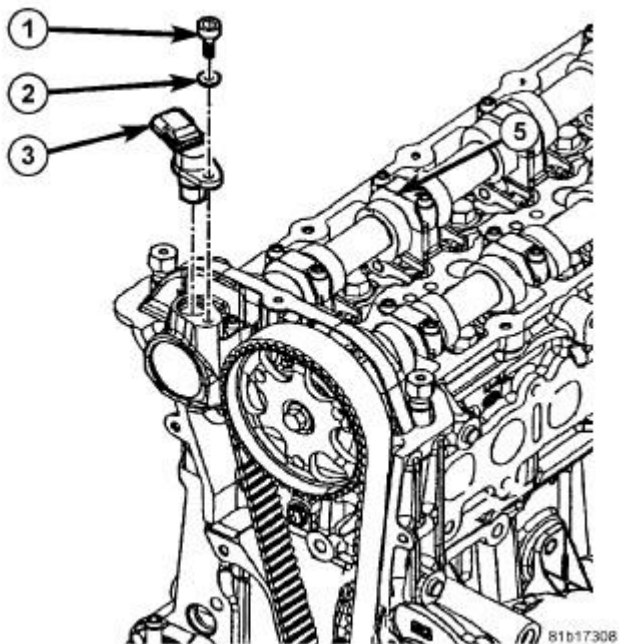


**Fig. 274: VM 1057-2 Seal Installer**  
Courtesy of CHRYSLER LLC

32. Use VM 1057-2 Seal Installer (1) to install the exhaust camshaft oil seal.

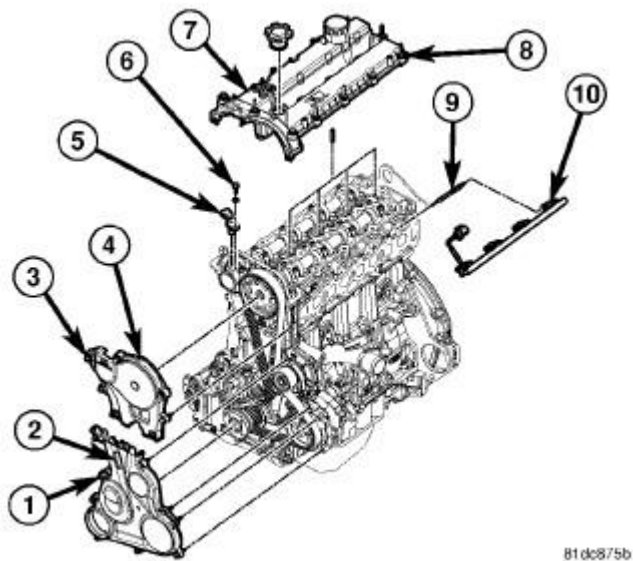
## 2009 Chrysler Town & Country LX

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**Fig. 275: CMP Sensor**  
Courtesy of CHRYSLER LLC

33. Install the cam position sensor (3), and connect the harness connector.

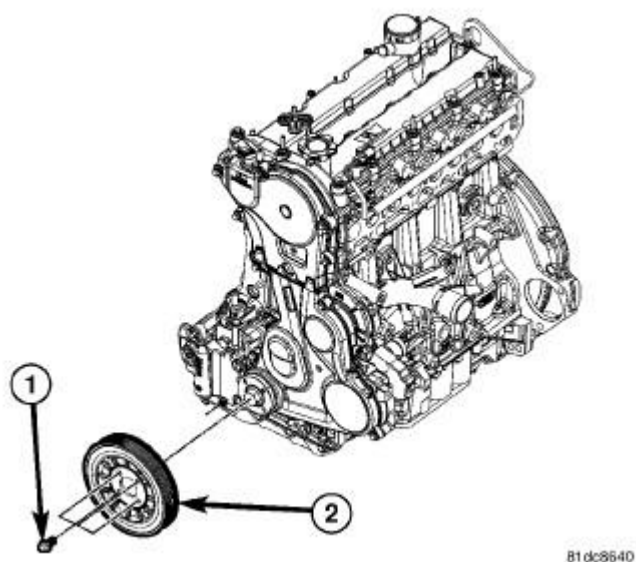


**Fig. 276: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

34. Install the lower front cover (2). Tighten the bolts to 11 N.m (97 in. lbs.).

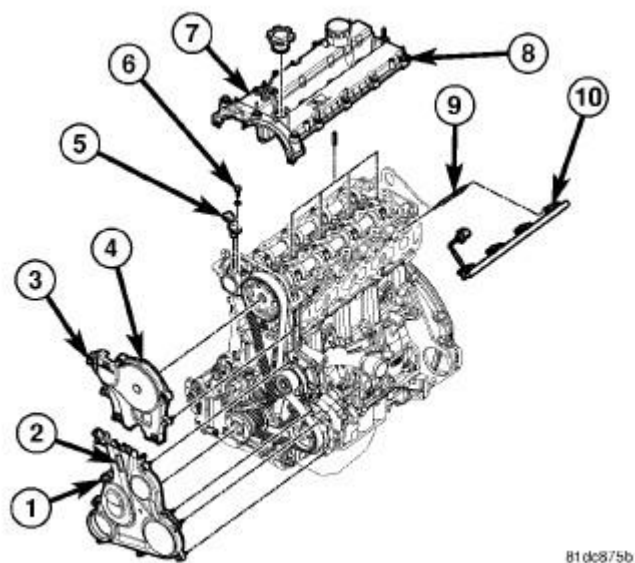
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**Fig. 277: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

35. Install the crankshaft damper (1). Tighten the bolts (1) to 32 N.m (23 ft. lbs.).

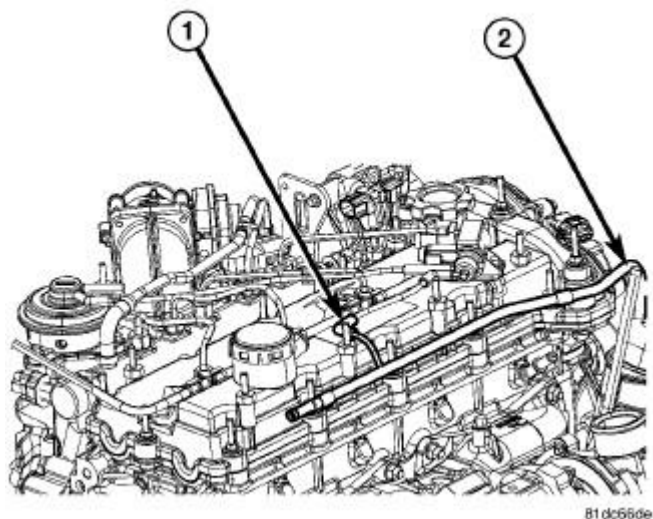


**Fig. 278: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

36. Install the upper front cover (3). Tighten the bolts to 11 N.m (97 in. lbs.).  
37. Install the cylinder head cover (7).

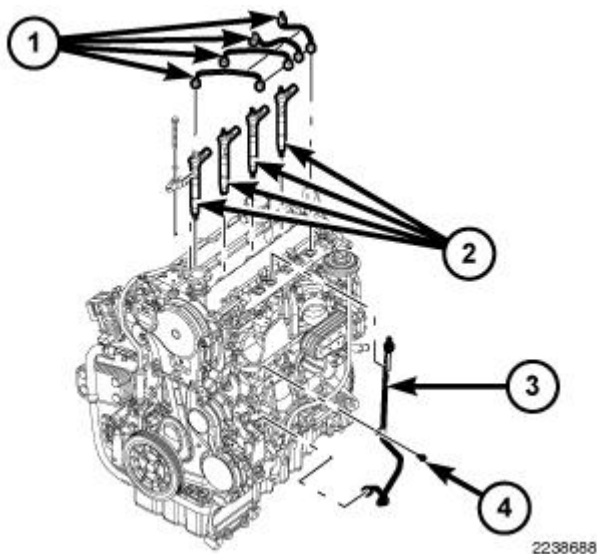
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**Fig. 279: Vacuum Supply Tube**  
Courtesy of CHRYSLER LLC

38. Install the vacuum line to the vacuum pump.
39. Install the vacuum line (2) to the camshaft cover.



**Fig. 280: Fuel Injectors**  
Courtesy of CHRYSLER LLC

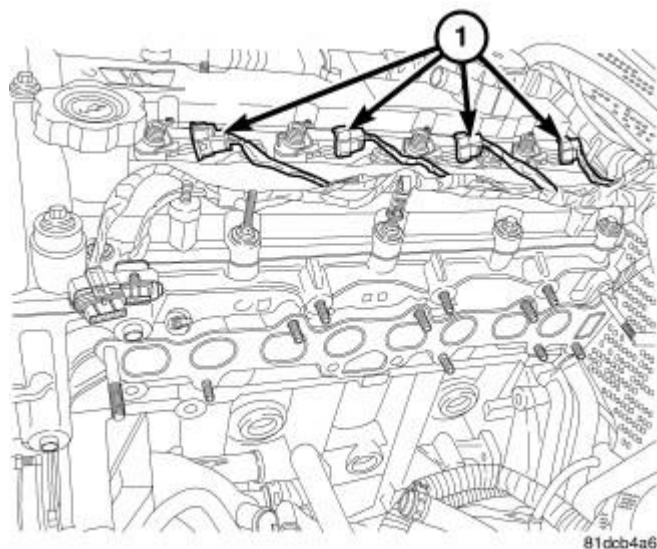
**NOTE:** Always use new washer under the fuel injectors.

40. Install injectors, washers and injector retainer claws.
41. Install the injector clamp bolts. Do not tighten at this time.

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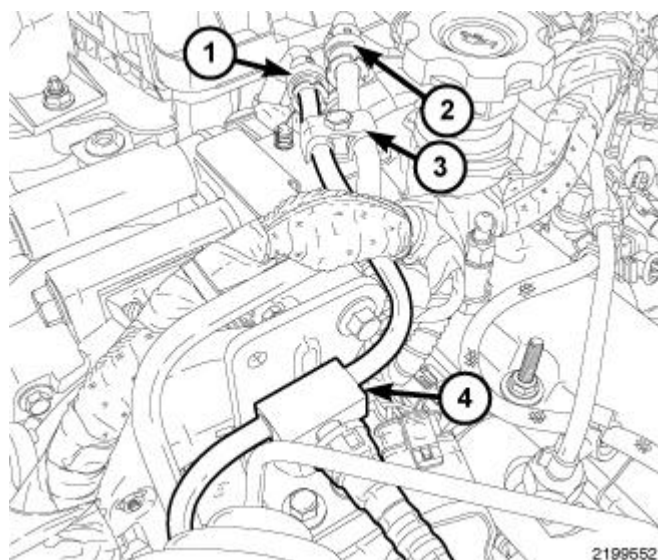
42. Loosely install the high pressure fuel lines onto the fuel injectors and the fuel rail.
43. Tighten injector clamp bolts to 32 N.m (23 ft. lbs.).
44. Tighten the fuel rail nuts to 24 N.m (18 ft. lbs.).
45. Tighten the high pressure fuel lines at the fuel injectors to 28 N.m (20 ft. lbs.).
46. Tighten the fuel lines from the injectors to the fuel rail to 5 N.m (44 in. lbs.), plus an additional 75°.
47. Tighten the high pressure line from the fuel pump to the fuel rail to 5 N.m (44 in. lbs.) plus an additional 75°.
48. Tighten the high pressure fuel line from the fuel rail to the fuel pump to 28 N.m (20 ft. lbs.).
49. Install the high pressure fuel line bracket bolt and torque to 15 N.m (133 in. lbs.).



**Fig. 281: Fuel Injector Harness**  
Courtesy of CHRYSLER LLC

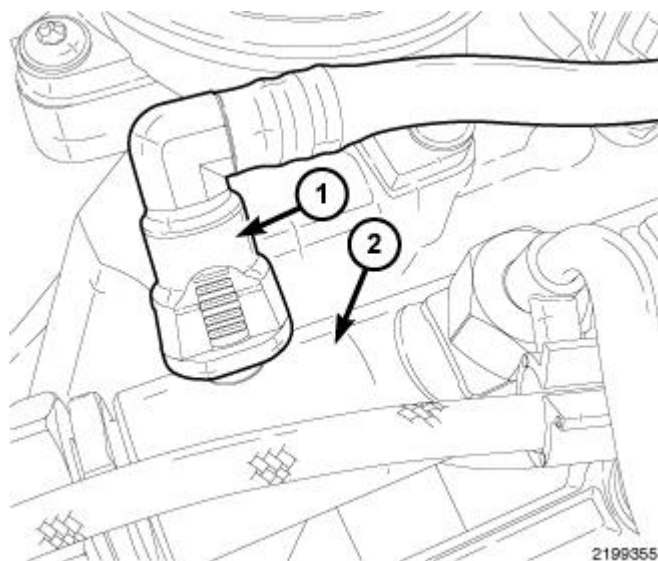
50. Connect the fuel injector harness connectors.
51. Connect the fuel rail pressure solenoid harness connector.
52. Connect the fuel rail pressure sensor harness connector.





**Fig. 282: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

53. Install the fuel block (4) and reconnect the fuel lines.
54. Install the fuel line mounting bracket (3).
55. Connect the fuel feed line (2).
56. Connect the fuel return line (1).

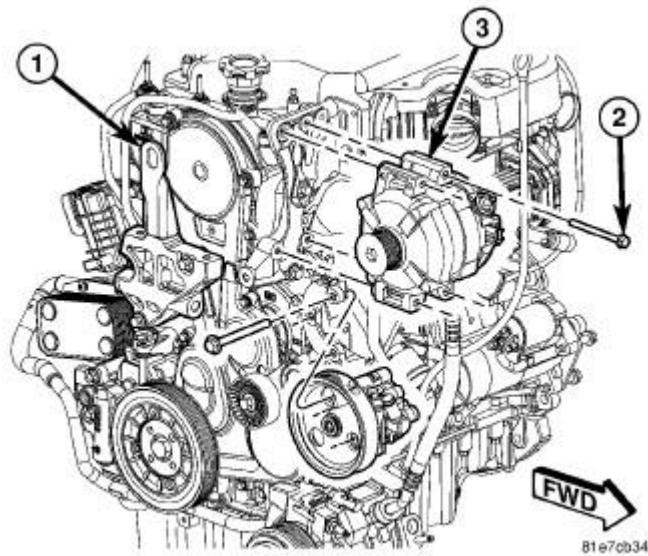


**Fig. 283: Fuel Return Line & Fuel Rail**  
Courtesy of CHRYSLER LLC

57. Connect the fuel return line (1) to the fuel rail (2).

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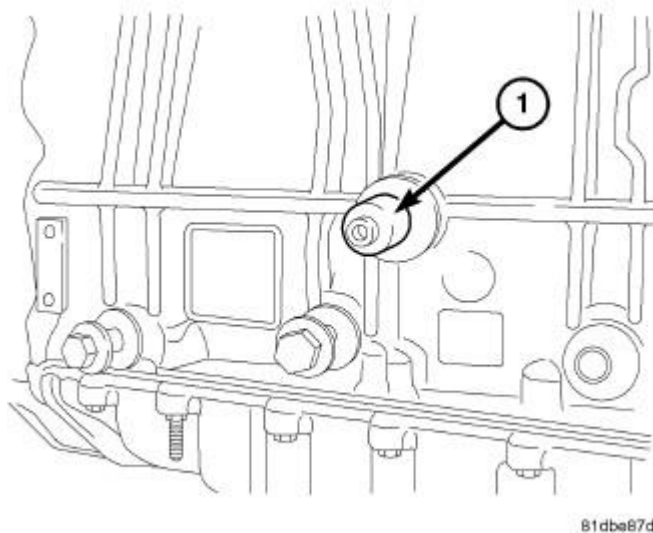
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**Fig. 284: Idler Pulley**

Courtesy of CHRYSLER LLC

58. Install the right front engine mount and lifting bracket (1). Tighten the bolts to 45 N.m (33 ft. lbs.).



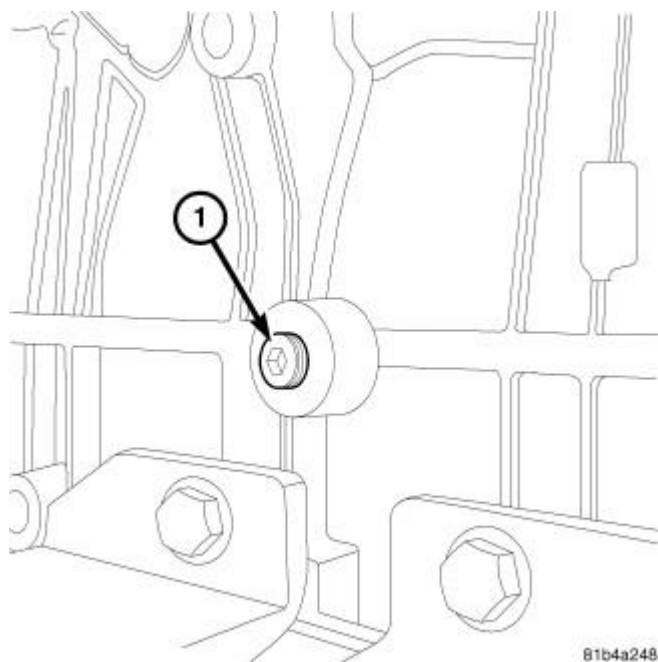
**Fig. 285: Crankshaft Locking Tool**

Courtesy of CHRYSLER LLC

59. Remove crankshaft locking tool (1).

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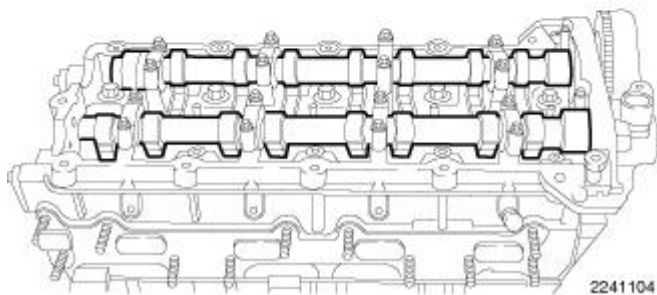
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**Fig. 286: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

60. Install the engine block plug (1). Tighten the engine block plug to 30 N.m (22 ft. lbs.).
61. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
62. Install cooling fan and fan drive viscous clutch assembly. Refer to **Cooling/Engine/FAN, Cooling - Installation** .
63. Connect negative battery cable.

### CHECKING CAMSHAFT END PLAY



**Fig. 287: Camshafts**

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### Courtesy of CHRYSLER LLC

1. After camshafts are properly installed in cylinder head cover check end play of camshafts with a dial indicator. The end play should be between 0.10 mm - 0.55 mm.

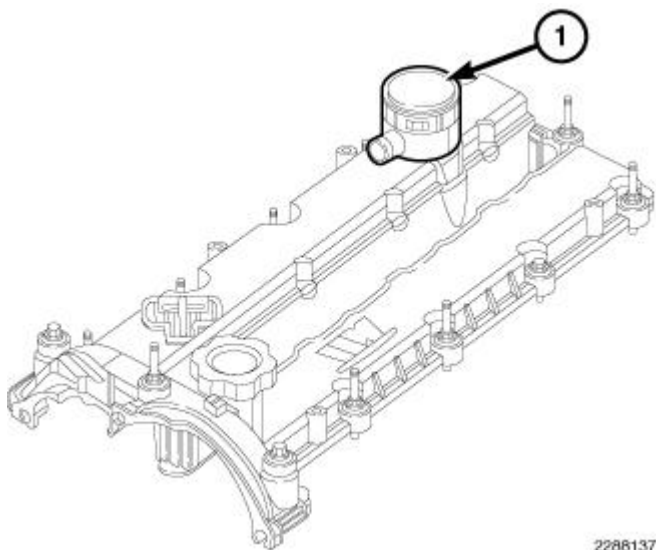
**NOTE:** If the camshaft endplay is not within specification, replace the cylinder head.

2. Measure the camshaft end play with a dial indicator. The end play should be between 0.15 mm - 0.35 mm (0.006 in - 0.0138 in.).

### COVER(S), CYLINDER HEAD

#### Description

#### DESCRIPTION



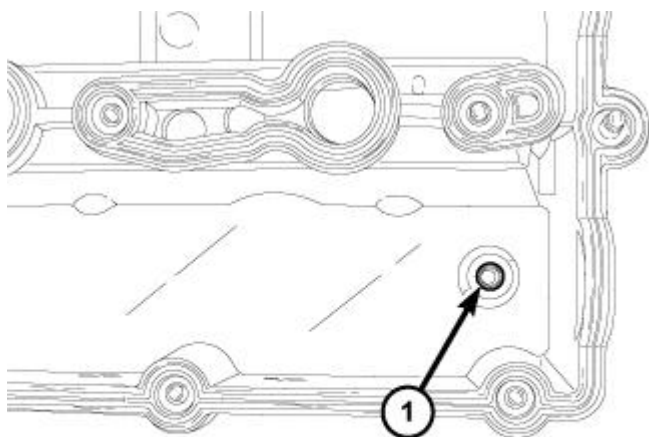
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**Fig. 288: Crankcase Ventilation (CCV) System**  
Courtesy of CHRYSLER LLC

The cylinder head cover is made of an injection molded composite and incorporates crankcase ventilation (CCV) system (1).

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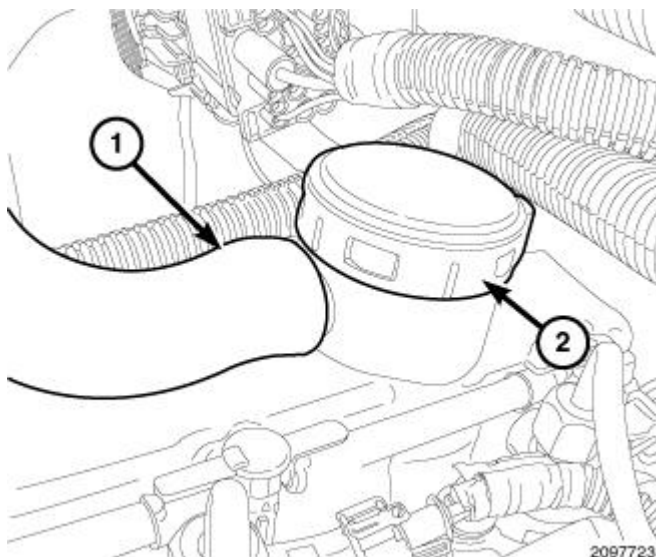
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**Fig. 289: Oil Drain Back Access Hole**  
Courtesy of CHRYSLER LLC

The cylinder head cover also incorporates a oil drain back hole (1) for the crankcase ventilation (CCV) system.

### Removal

### REMOVAL

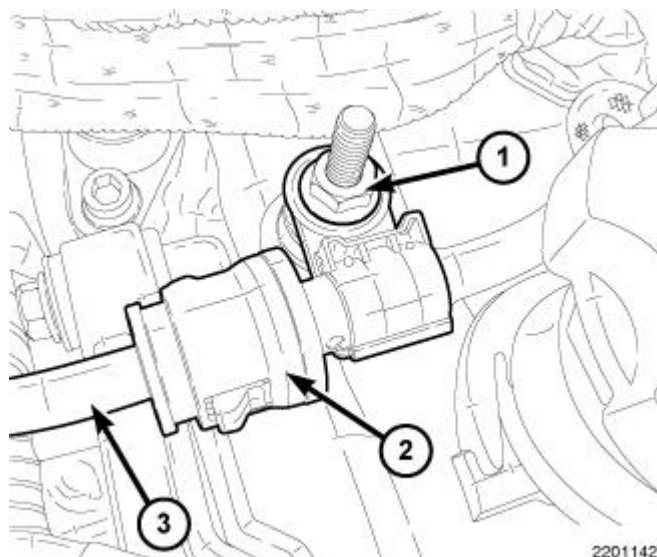


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**Fig. 290: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

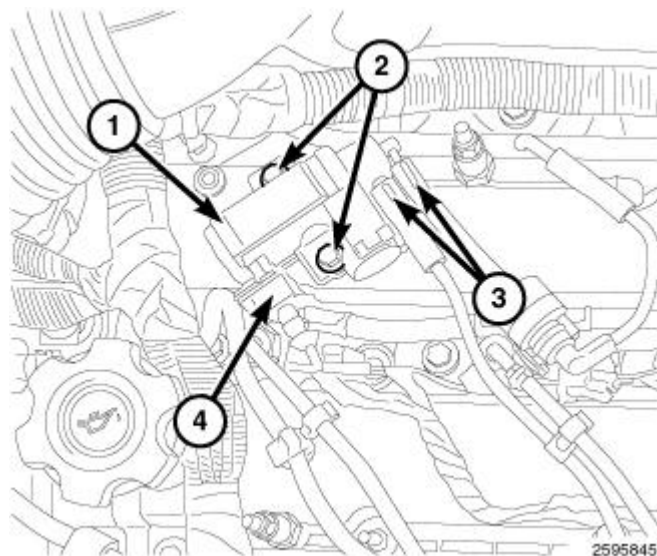
1. Disconnect the negative battery cable.
2. Remove the engine cover.
3. Remove the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal.**

4. Disconnect the crankcase vent hose (1) from the oil separator (2).



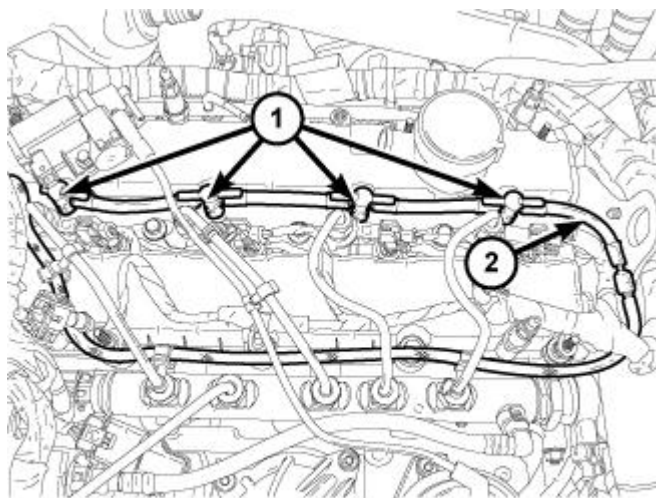
**Fig. 291: Fuel Injector Return Line & Retaining Nut**  
Courtesy of CHRYSLER LLC

5. Remove the retaining nut (1) and disconnect the fuel injector return line (2).



**Fig. 292: EGR Vacuum Solenoid Vacuum Lines & Harness Connector**  
Courtesy of CHRYSLER LLC

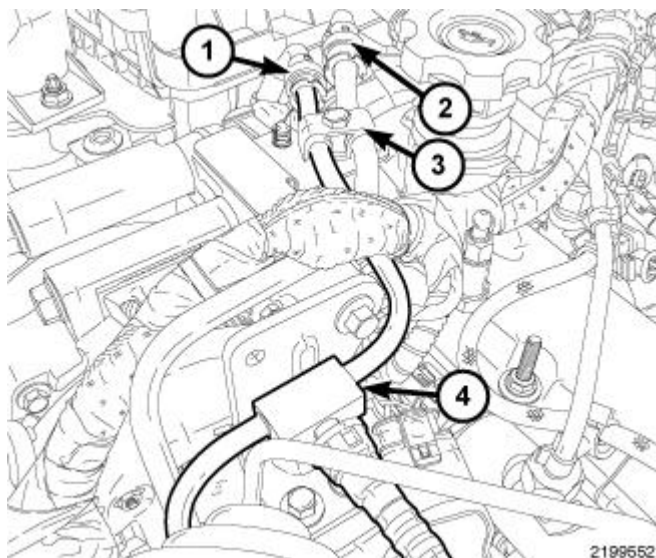
6. Disconnect the EGR vacuum solenoid vacuum lines (3).
7. Disconnect the EGR vacuum solenoid harness connector (4).
8. Remove bolts (2) and the vacuum solenoid (1).



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**Fig. 293: Common Fuel Return Line**  
Courtesy of CHRYSLER LLC

9. A lock button (1) is used to secure the common fuel return line to each fuel injector. Use your fingers to lift up all four lock buttons (1) to unlock them. After unlocking all four buttons, lift fuel return line assembly and remove the fuel injector return line (2).



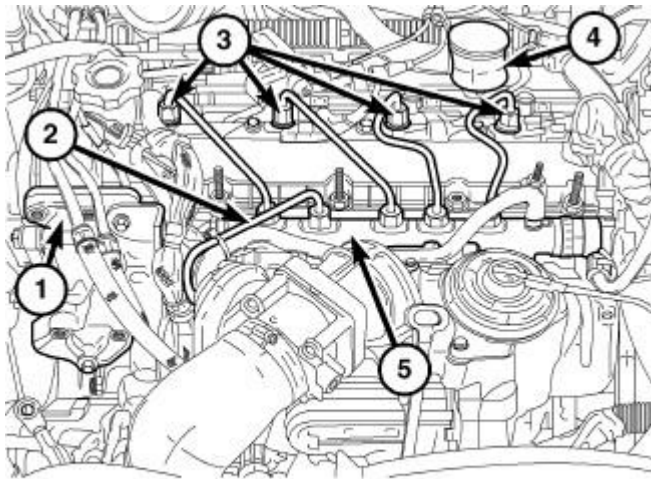
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**Fig. 294: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

10. Disconnect the fuel return line (1).
11. Disconnect the fuel feed line (2).
12. Remove the fuel line mounting bracket (3).
13. Remove the fuel return line block (4).

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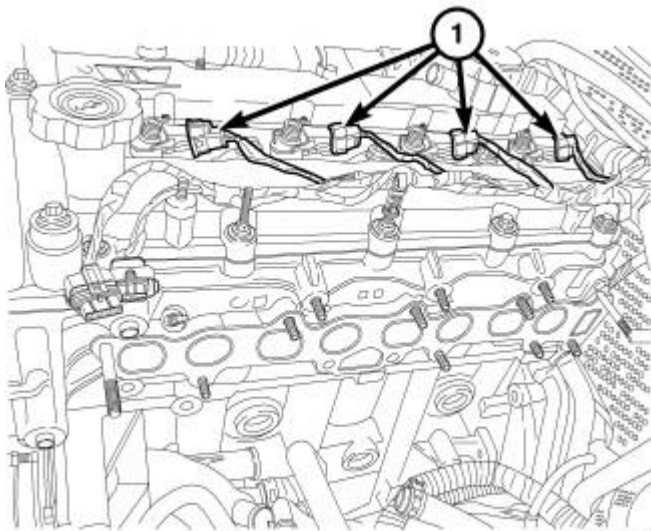
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**Fig. 295: High Pressure Fuel Lines**  
Courtesy of CHRYSLER LLC

14. Remove the injector fuel lines (3) from the injectors and the fuel rail.



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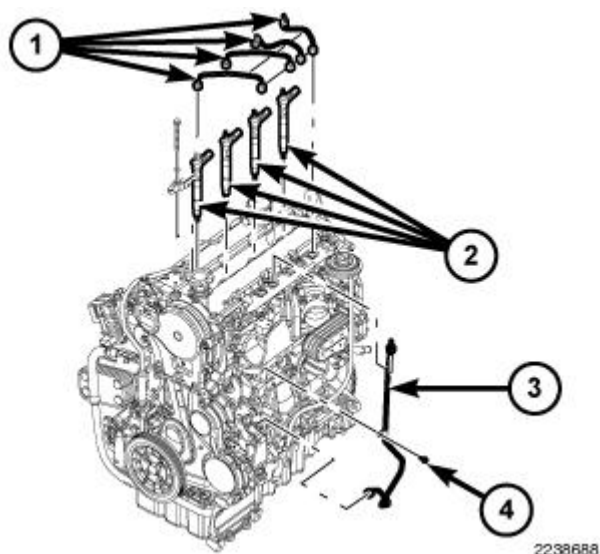
**Fig. 296: Fuel Injector Harness**  
Courtesy of CHRYSLER LLC

15. Disconnect the fuel injector harness connectors from the fuel injectors (1).



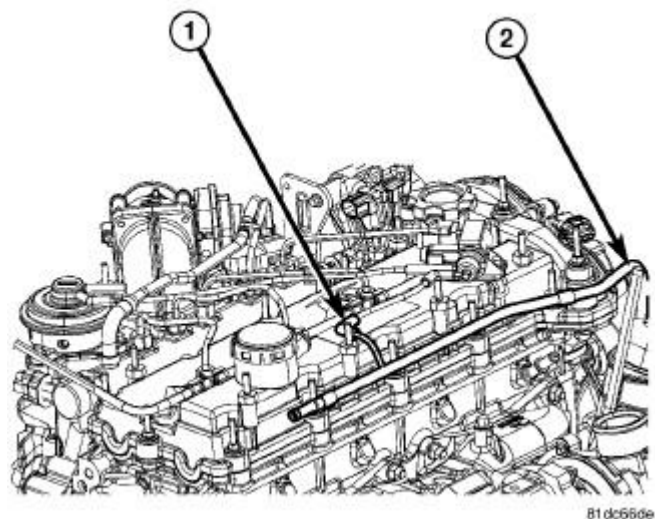
## 2009 Chrysler Town & Country LX

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**Fig. 297: Fuel Injectors**  
Courtesy of CHRYSLER LLC

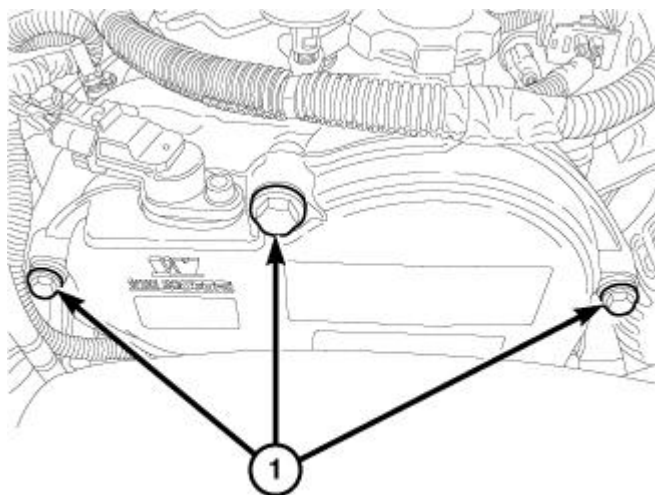
16. Remove the fuel injectors (2).



**Fig. 298: Vacuum Supply Tube**  
Courtesy of CHRYSLER LLC

17. Disconnect the vacuum lines from the EGR solenoid.
18. Disconnect the EGR solenoid electrical connector.
19. Remove the engine wire harness retaining clips from the cylinder head cover stud bolts.
20. Disconnect the vacuum line (1).
21. Disconnect the vacuum line (2) from the vacuum pump.

22. Remove retaining nuts and remove the vacuum line (2).

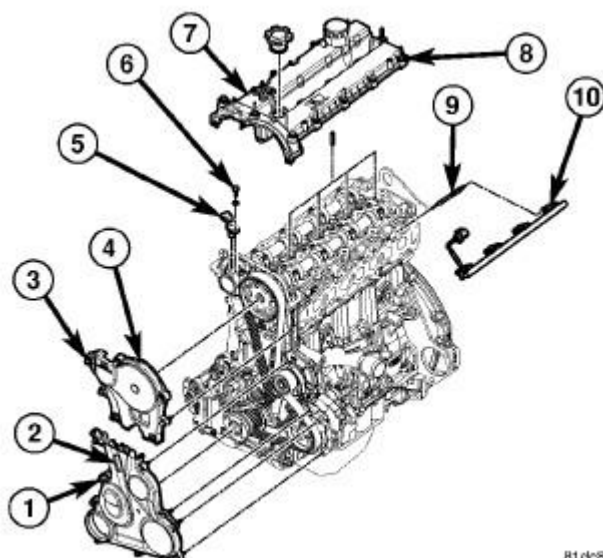


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**Fig. 299: Upper Cover Bolts**  
Courtesy of CHRYSLER LLC

**NOTE:** The upper cover bolts are encased in a collar which does not permit them to be removed.

23. Loosen the upper front timing cover bolts (1).



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**Fig. 300: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

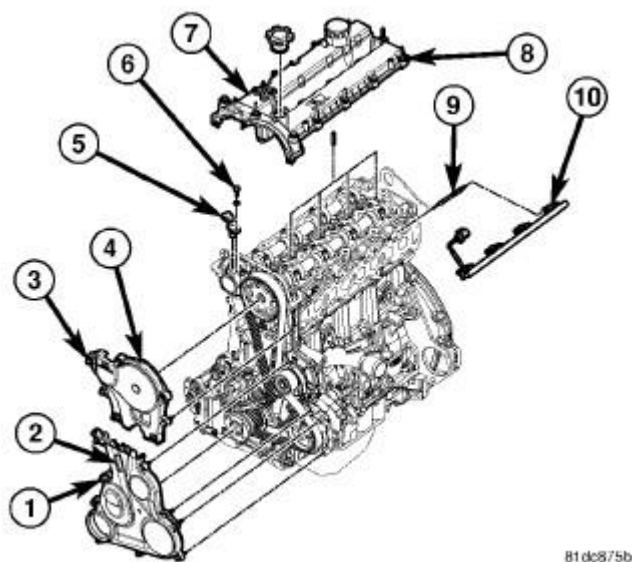
24. Remove the 12 fasteners (8) and the cylinder head cover (7).

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### Installation

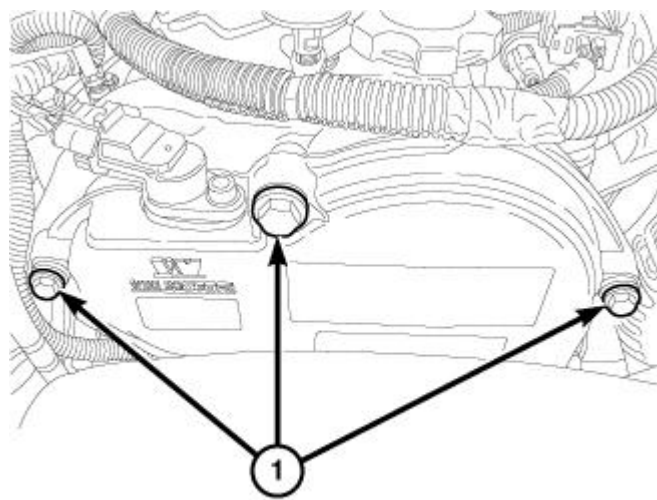
#### INSTALLATION



81dc875b

**Fig. 301: Upper And Lower Front Covers**  
Courtesy of CHRYSLER LLC

1. Clean the sealing surfaces and inspect the gasket.
2. Install the cylinder head cover (7). Tighten fasteners to 11 N.m (97 in. lbs.).



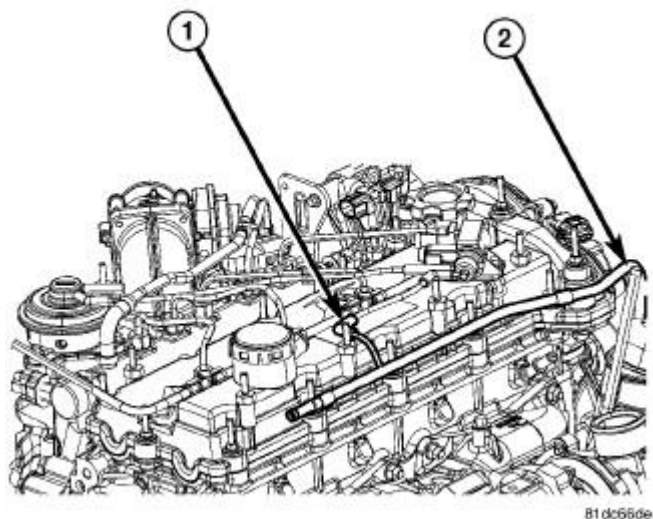
2097854

**Fig. 302: Upper Cover Bolts**  
Courtesy of CHRYSLER LLC

3. Tighten the upper front timing cover bolts (1) to 11 N.m (97 in. lbs.).

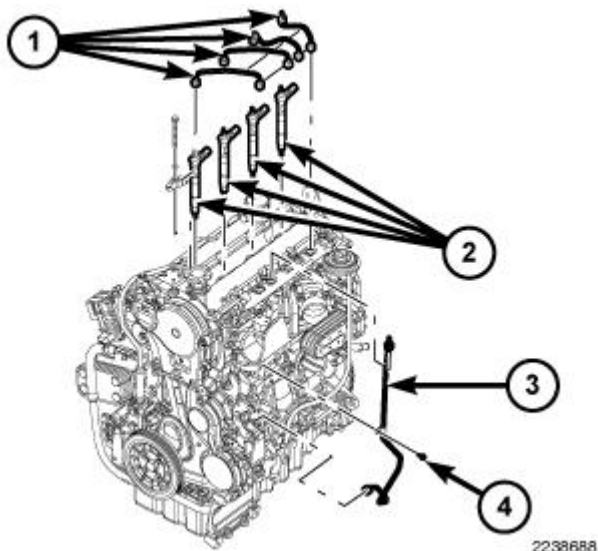
## 2009 Chrysler Town & Country LX

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**Fig. 303: Vacuum Supply Tube**  
Courtesy of CHRYSLER LLC

4. Install the vacuum line (2) and securely tighten the retaining nuts.
5. Connect the vacuum line (2) to the vacuum pump.
6. Connect the vacuum line (1) to the fitting.
7. Install the engine wire harness retaining clips from the cylinder head cover stud bolts.
8. Connect the EGR solenoid harness connector.
9. Connect the vacuum lines from the EGR solenoid.

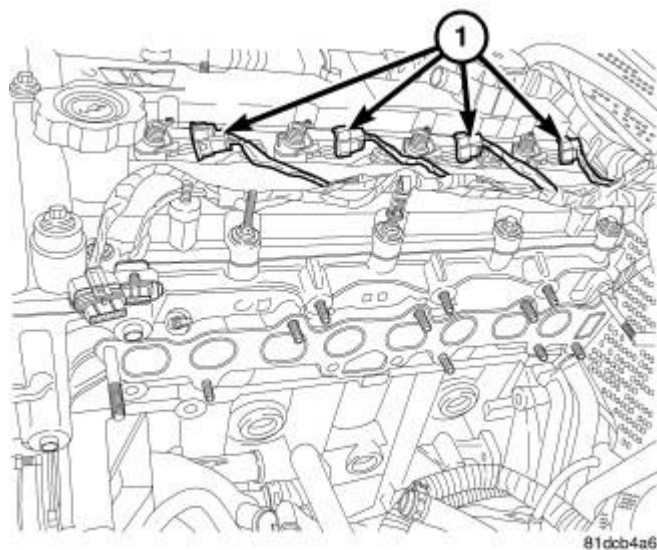


**Fig. 304: Fuel Injectors**  
Courtesy of CHRYSLER LLC

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10. Using new washers, install injectors (2) and injector retainer claw.
11. Install the injector clamp bolts. Do not tighten at this time.
12. Loosely install the high pressure fuel lines onto the fuel injectors and the fuel rail.
13. Tighten injector clamp bolts to 33 N.m (24 ft. lbs.).
14. Tighten the fuel rail nuts to 24 N.m (18 ft. lbs.).
15. Tighten the fuel lines at the fuel injectors to 28 N.m (21 ft. lbs.).
16. Torque the fuel lines from the fuel injectors to the fuel rail to 5 N.m (44 in. lbs.), plus an additional 75°.
17. Torque the high pressure line from the fuel pump to the fuel rail to 5 N.m (44 in. lbs.), plus an additional 75°.
18. Torque the high pressure line at the fuel pump to 28 N.m (21 ft. lbs.).
19. Install the high pressure fuel line bracket bolt and torque to 15 N.m (133 in. lbs.).

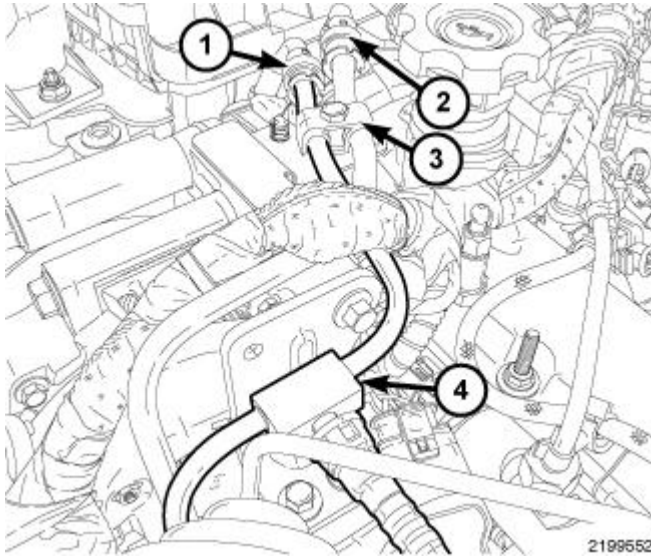


**Fig. 305: Fuel Injector Harness**  
Courtesy of CHRYSLER LLC

20. Connect the fuel injector harness connectors (1).

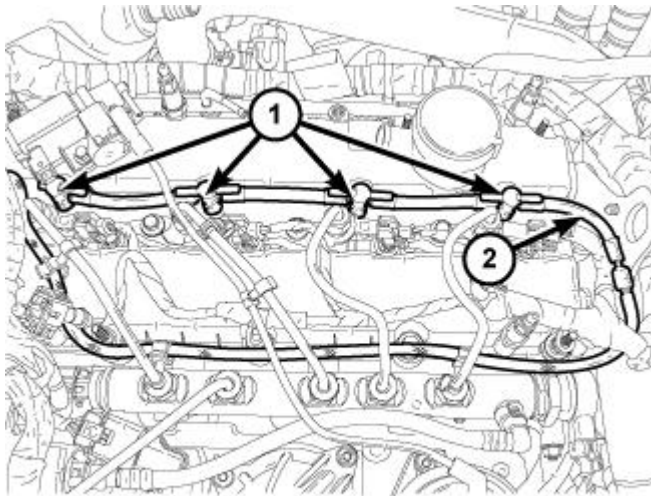
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**Fig. 306: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

21. Install the fuel return line block (4).
22. Install the fuel line mounting bracket (3).
23. Connect the fuel feed line (2).
24. Connect the fuel return line (1).

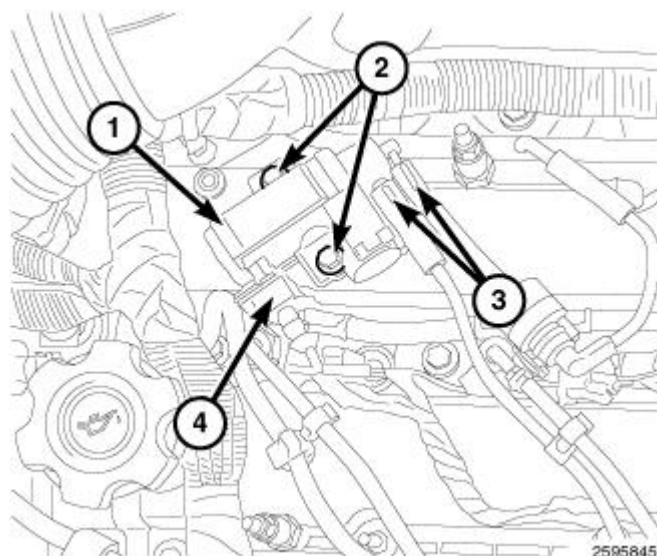


**Fig. 307: Common Fuel Return Line**  
Courtesy of CHRYSLER LLC

25. Install the fuel injector fuel return line (2) onto the fuel injector and push down on the lock tab (1) to lock in place.

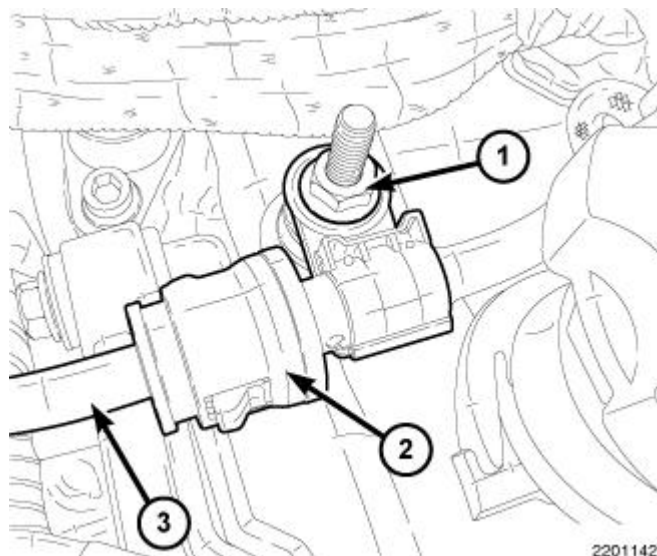
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**Fig. 308: EGR Vacuum Solenoid Vacuum Lines & Harness Connector**  
Courtesy of CHRYSLER LLC

26. Install the EGR vacuum solenoid (1). Tighten bolts to 12 N.m (106 in. lbs).
27. Connect the EGR vacuum solenoid harness connector (4).
28. Connect the EGR vacuum solenoid vacuum lines (3).

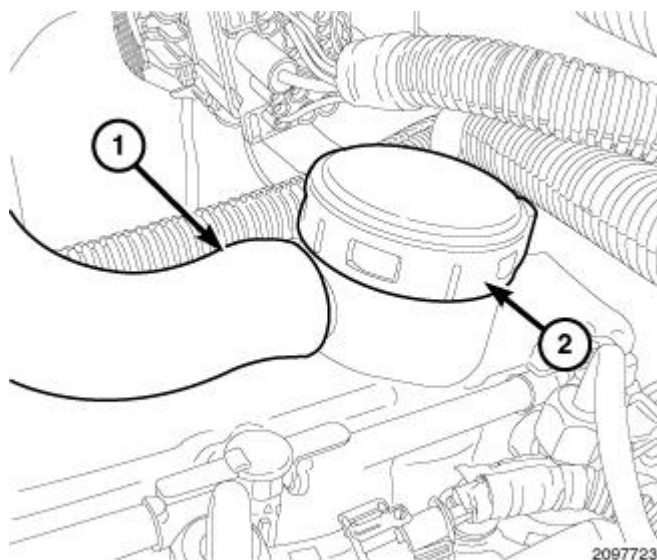


**Fig. 309: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

29. Connect the fuel injector return line (2) and securely install the retaining nut (1).

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**Fig. 310: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

30. Connect the crankcase vent hose (1) to the oil separator (2).
31. Install the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
32. Install the engine cover.
33. Connect the negative battery cable.

### **LIFTER(S), HYDRAULIC**

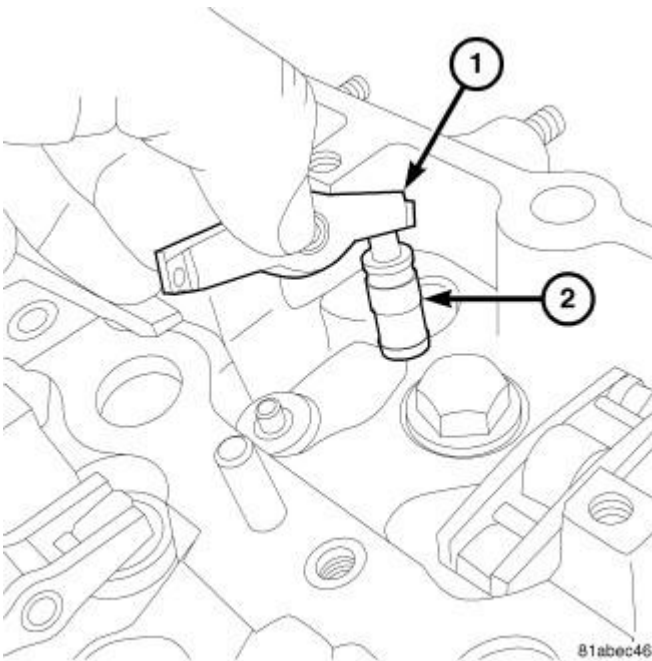
#### **Description**

#### **DESCRIPTION**



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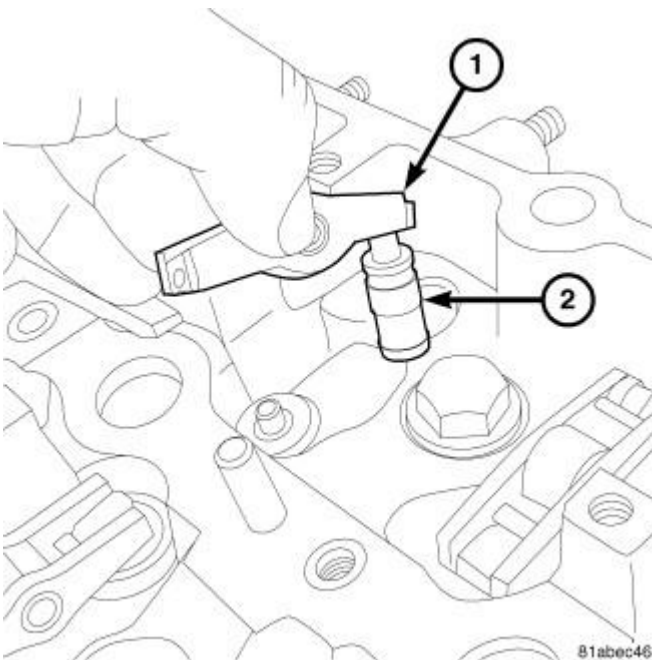


**Fig. 311: Rocker Arms & Hydraulic Lifters**  
**Courtesy of CHRYSLER LLC**

Valve lash is controlled by hydraulic tappets (2) located inside the cylinder head, in tappet bores below the camshafts.

### Removal

### REMOVAL



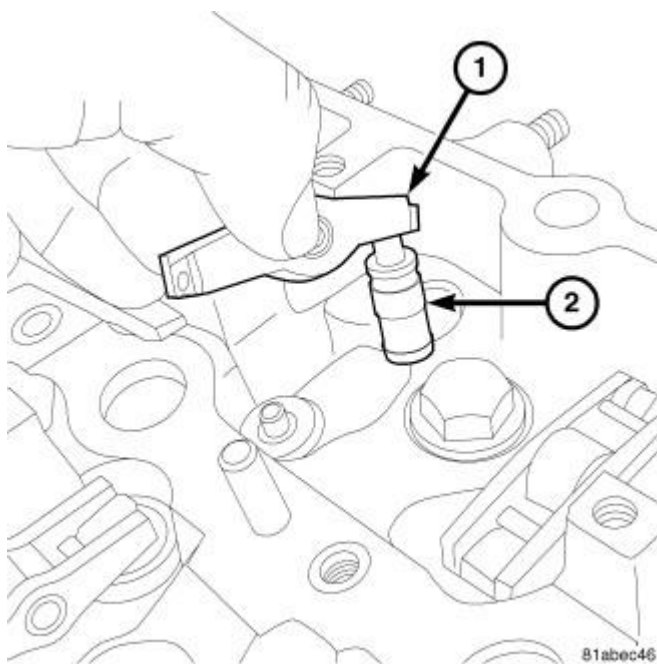
**Fig. 312: Rocker Arms & Hydraulic Lifters**

Courtesy of CHRYSLER LLC

1. Remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal.**
2. Remove the camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal.**

**NOTE:** Always return the hydraulic lifters to their original location in the cylinder head.

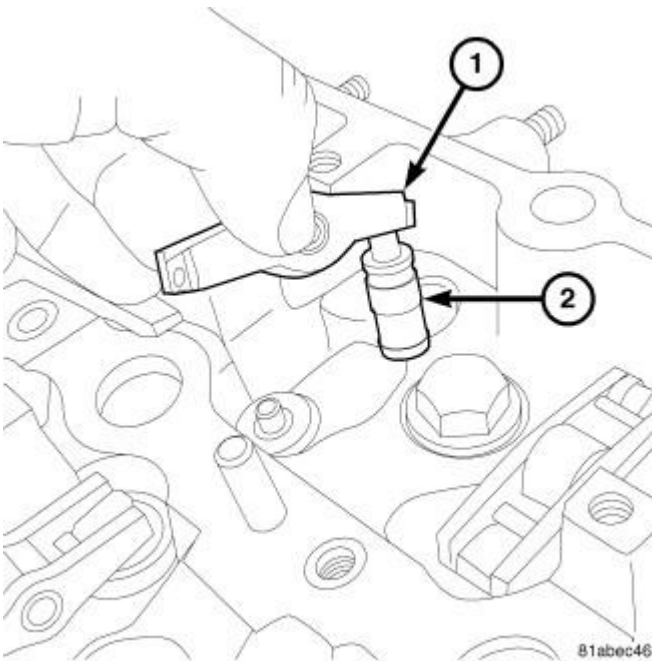
3. Remove the rocker arms (1) and hydraulic lifters (2).

**Inspection****INSPECTION****Fig. 313: Rocker Arms & Hydraulic Lifters**

Courtesy of CHRYSLER LLC

Clean each lifter assembly (1) in cleaning solvent to remove all varnish and sludge deposits. Inspect for indications of scuffing on the side and base of each lifter body.

**Installation****INSTALLATION**



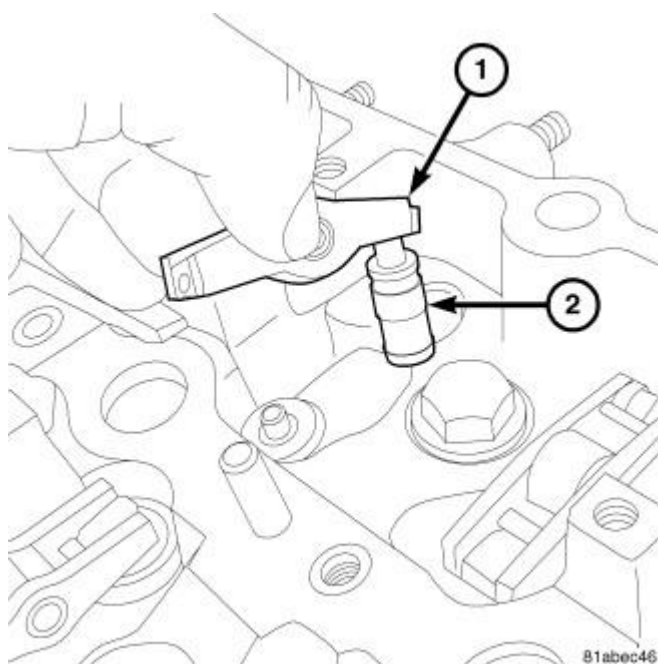
**Fig. 314: Rocker Arms & Hydraulic Lifters**  
Courtesy of CHRYSLER LLC

1. Install the rocker arms (1) and hydraulic lifters (2) into their original locations.
2. Install the camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Removal**.

## **ROCKER ARM, VALVE**

### **Description**

### **DESCRIPTION**



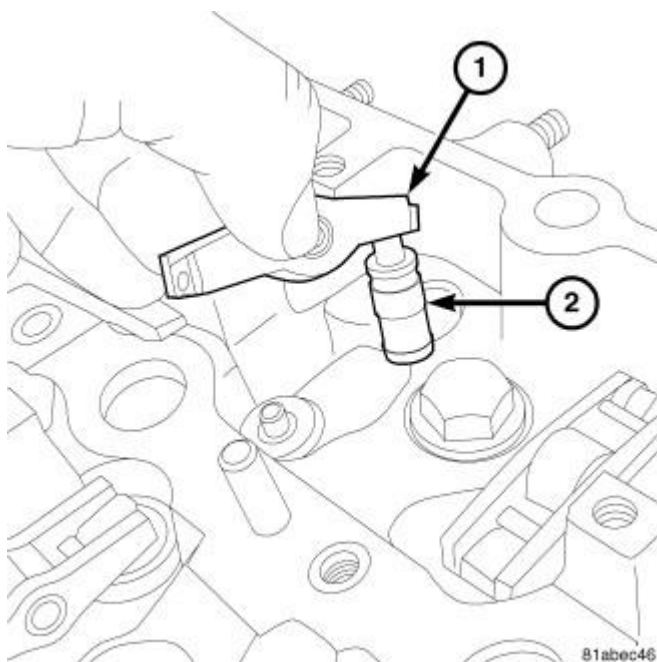
**Fig. 315: Rocker Arms & Hydraulic Lifters**  
**Courtesy of CHRYSLER LLC**

The rocker arms (1) are made of stamped steel and serviced as an assembly along with the lifter.

The rocker arms (1) are used as a link between the camshaft and valves. As the camshaft rotates, the lobes of the camshafts apply downward pressure on the rocker arms (1). This pressure is then applied to the hydraulic lifter (2) which opens the valve.

#### **Removal**

#### **REMOVAL**



**Fig. 316: Rocker Arms & Hydraulic Lifters**  
Courtesy of CHRYSLER LLC

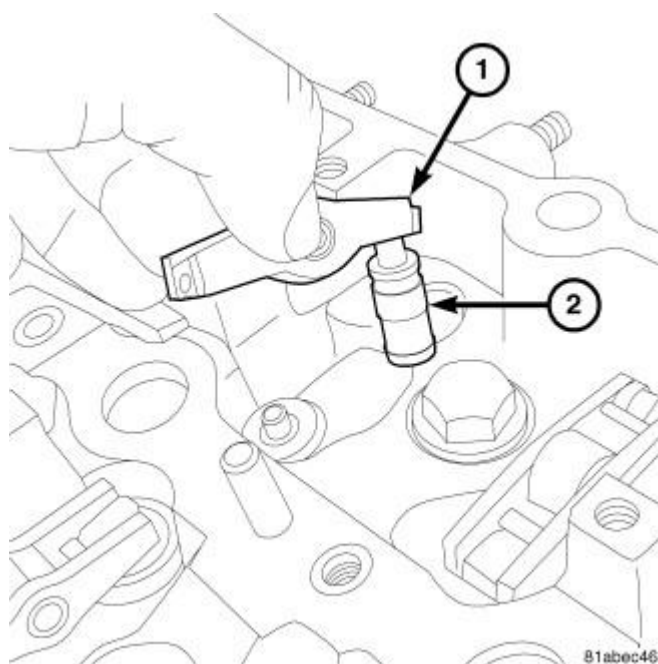
**CAUTION:** Before removing the cylinder head cover/intake manifold (2) the engine must rotated to 90° after TDC to assure proper alignment of the engine timing components. Failure to do so could result in valve and/or piston damage during reassembly. See Engine/Valve Timing - Standard Procedure.

1. Disconnect negative battery cable.
2. Rotate the crankshaft to 90 degrees ATDC. See Engine/Valve Timing - Standard Procedure.
3. Remove the camshafts. See Engine/Cylinder Head/CAMSHAFT, Engine - Removal.
4. Remove rocker arms (1) and lifters (2).

### Installation

#### INSTALLATION

1. Clean and inspect gasket sealing surfaces.



**Fig. 317: Rocker Arms & Hydraulic Lifters**  
**Courtesy of CHRYSLER LLC**

2. Lubricate lifter ball end of lifter(s), valve(s), and rocker arm roller(s) with Mopar® Engine Oil Supplement or equivalent.
3. Connect rocker arm(s) to lifter and reposition on valve(s).
4. Install the camshafts. See **Engine/Cylinder Head/CAMSHAFT, Engine - Installation.**
5. Connect negative battery cable.

## **SEAL(S), CAMSHAFT**

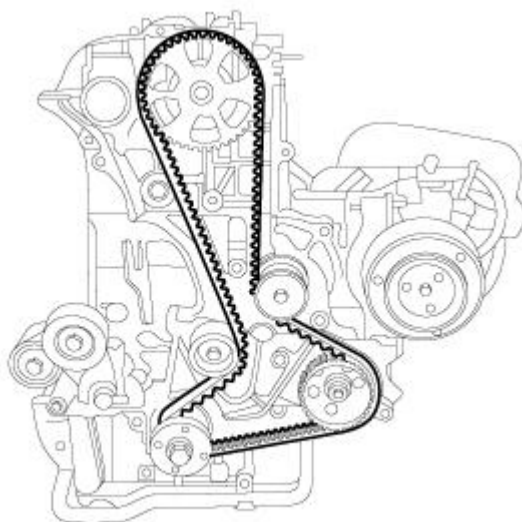
### **Removal**

### **REMOVAL**

**CAUTION:** Before removing the timing belt, the engine must be placed at 90° after TDC. Failure to do so may result in valve and/or piston damage during assembly.

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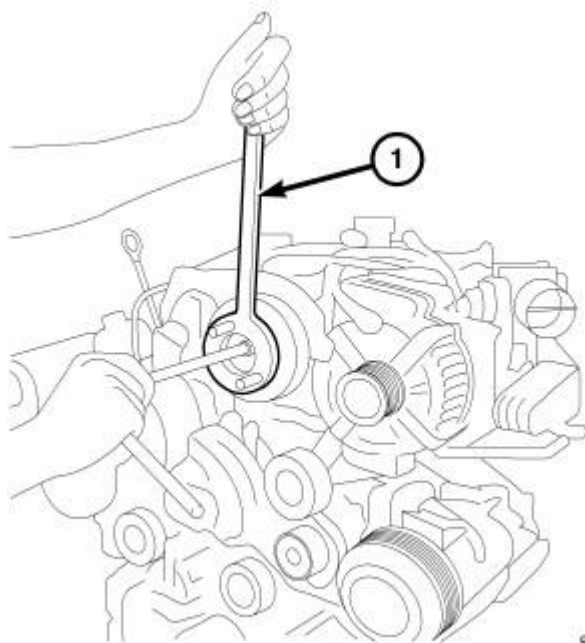
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**Fig. 318: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

1. Remove the timing belt. See **Engine/Valve Timing/BELT, Timing - Removal**.



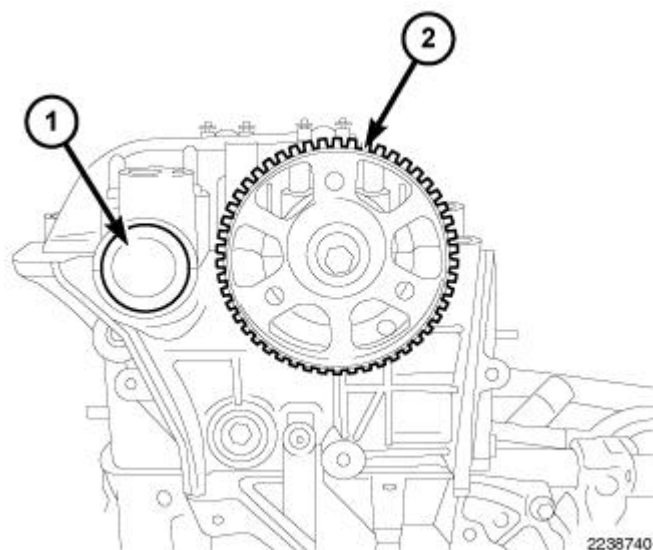
81b4a227

**Fig. 319: Tightening Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

2. Using the Camshaft Gear Holder VM. 1055 to hold the intake camshaft sprocket, Loosen the bolt.

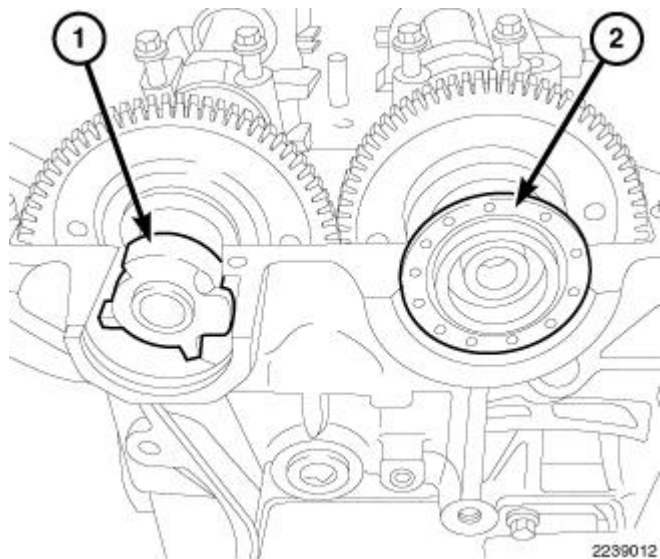
## 2009 Chrysler Town & Country LX

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**Fig. 320: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

3. Remove the bolt and the camshaft sprocket (2).



**Fig. 321: Intake Camshaft Oil Seal**  
Courtesy of CHRYSLER LLC

4. Remove the intake camshaft oil seal (2). Be careful not to scratch or damage the sealing flange on the intake camshaft.

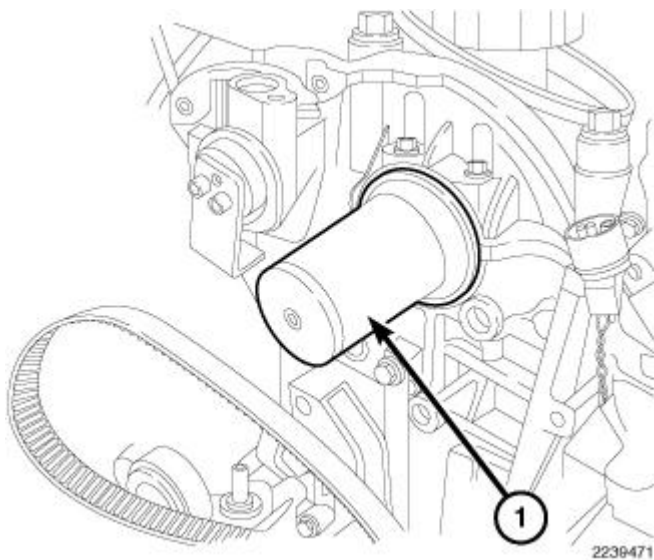
### Installation

### INSTALLATION



## 2009 Chrysler Town & Country LX

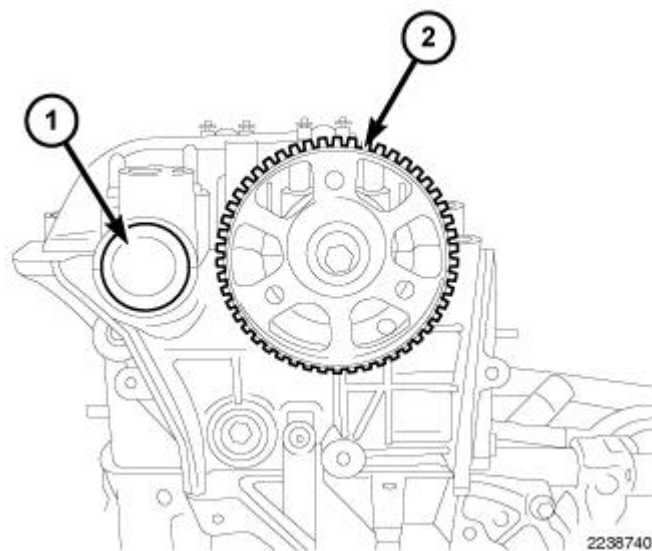
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**Fig. 322: Seal Installer**

Courtesy of CHRYSLER LLC

1. Using the 9937-1 seal installer (1), install the intake camshaft oil seal.



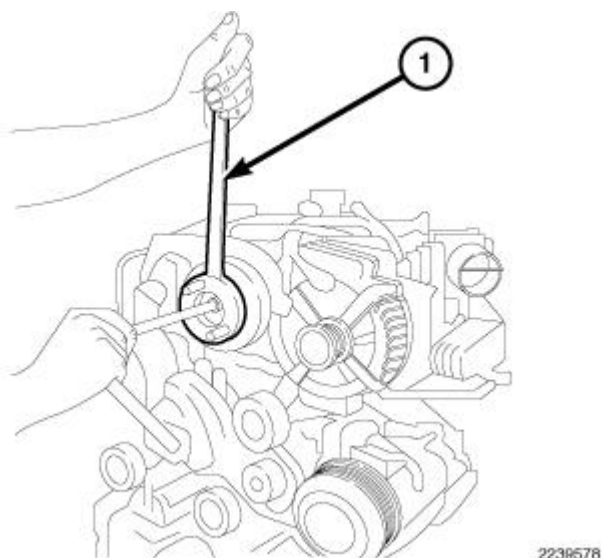
**Fig. 323: Camshaft Sprocket**

Courtesy of CHRYSLER LLC

2. Install the camshaft sprocket (2).

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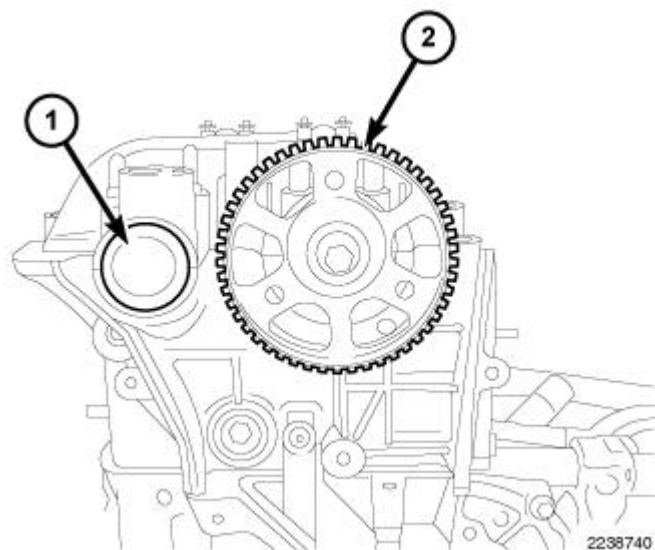
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**Fig. 324: Intake Camshaft Sprocket Holder VM 1055**  
Courtesy of CHRYSLER LLC

**CAUTION:** If tool VM 1055 is not used to secure the camshaft sprocket when tightening the bolt on the intake camshaft, the reluctor wheel on the exhaust camshaft may spin resulting in reluctor wheel to exhaust camshaft being out of time. If this occurs the exhaust camshaft must be replaced.

3. Using Camshaft Gear Holder VM 1055 (1) to secure the camshaft sprocket, tighten the camshaft sprocket bolt to 80 N.m (59 ft. lbs.)

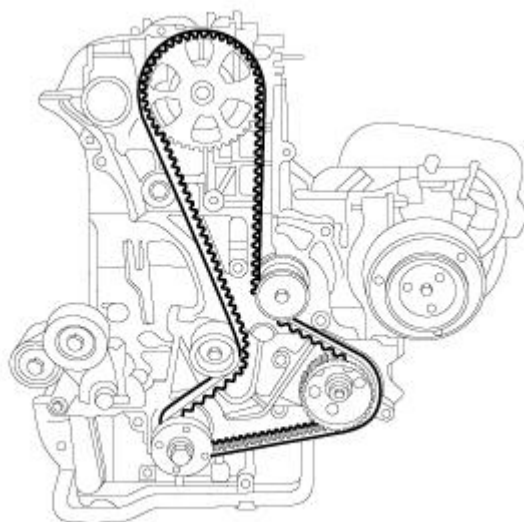


**Fig. 325: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

4. Using VM 1057-2 Seal Installer, install the exhaust camshaft seal (1)

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**Fig. 326: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

**NOTE:** DO NOT remove the timing belt from the package until it's ready to be installed. DO NOT expose timing belt to oil, grease or water contamination. DO NOT crimp belt at a sharp angle. DO NOT clean belt, pulleys or tensioner with solvent. Check that pulleys and bearings are not seized or damage before installing belt.

5. Install timing belt. See Engine/Valve Timing/BELT, Timing - Installation.

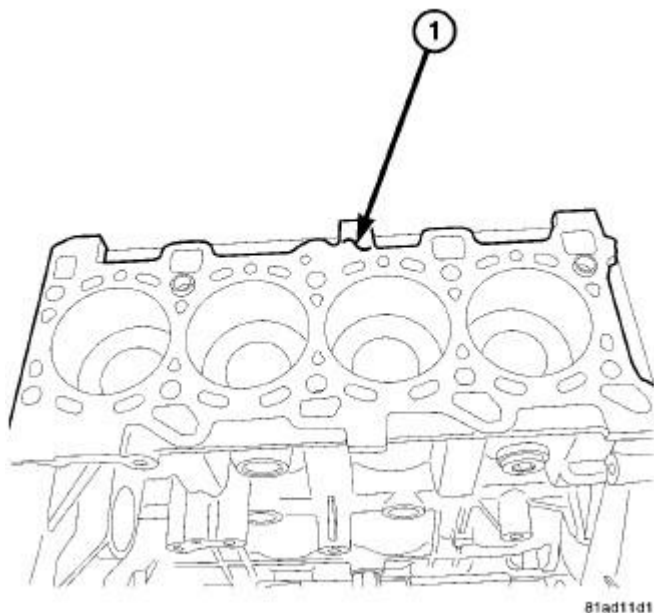
## ENGINE BLOCK

### DESCRIPTION

### DESCRIPTION

## 2009 Chrysler Town & Country LX

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**Fig. 327: Engine Block**

Courtesy of CHRYSLER LLC

The 2.8L CRD Diesel engine uses a cast iron engine block. The cylinder block has increased stiffness that reduces structural flexing and a fractured connecting rod cap design that can not distort connecting rod cap fit.

### STANDARD PROCEDURE

#### BEARING SELECTION CHARTS

##### CONNECTING ROD BEARINGS - LARGE END

Connecting Rod Journal Diameter - Connecting Rod Large End	Bearing Half	Connecting Rod Journal Diameter - Crankshaft			
		D	C	B	A
-	-	53.929 - 53.936	53.936 - 53.942	53.942 - 53.948	53.948 - 53.955
A 57.563 - 57.568	Upper Bearing Shell	Blue	Blue	Red	Red
	Lower Bearing Shell	Yellow	Blue	Blue	Red
-					
B 57.563 - 57.568	Upper Bearing Shell	Yellow	Blue	Blue	Red
	Lower Bearing	Yellow	Yellow	Blue	Blue

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	Shell				
-					
<b>C</b> <b>57.563 - 57.568</b>	Upper Bearing Shell	Yellow	Yellow	Blue	Blue
	Lower Bearing Shell	Green	Yellow	Yellow	Blue
-					
<b>D</b> <b>57.563 - 57.568</b>	Upper Bearing Shell	Green	Yellow	Yellow	Blue
	Lower Bearing Shell	Green	Green	Yellow	Yellow

### CRANKSHAFT BEARINGS

Cylinder Block Seat Diameter	Bearing Half	Crankshaft Main Journal Diameter			
-	-	D	C	B	A
		64.974 - 64.981	64.981 - 64.987	64.987 - 64.993	64.993 - 64.000
<b>A</b> <b>69.000 - 69.005</b>	Upper Bearing Shell	Blue	Blue	Red	Red
	Lower Bearing Shell	Yellow	Blue	Blue	Red
-					
<b>B</b> <b>69.005 - 69.010</b>	Upper Bearing Shell	Yellow	Blue	Blue	Red
	Lower Bearing Shell	Yellow	Yellow	Blue	Blue
-					
<b>C</b> <b>69.010 - 69.015</b>	Upper Bearing Shell	Yellow	Yellow	Blue	Blue
	Lower Bearing Shell	Green	Yellow	Yellow	Blue
-					
<b>D</b> <b>69.015 - 69.020</b>	Upper Bearing Shell	Green	Yellow	Yellow	Blue
	Lower Bearing Shell	Green	Green	Yellow	Yellow

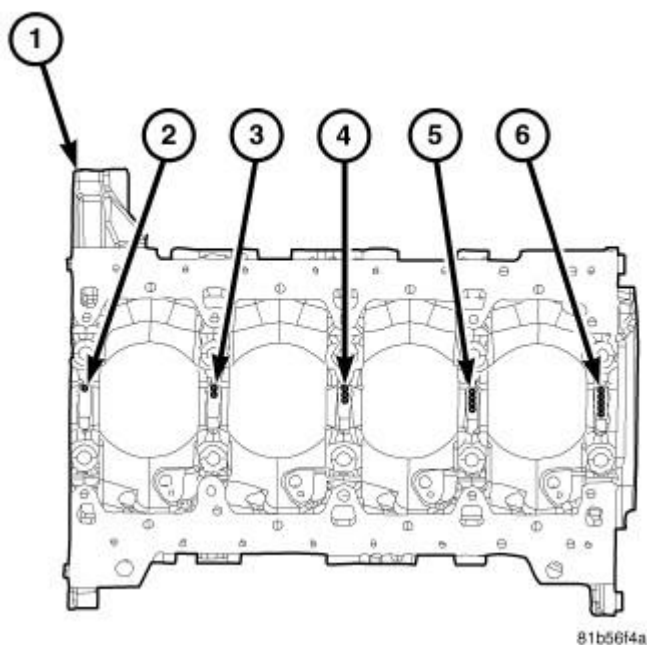
### BEARING(S), CRANKSHAFT, MAIN

Removal

REMOVAL

## 2009 Chrysler Town & Country LX

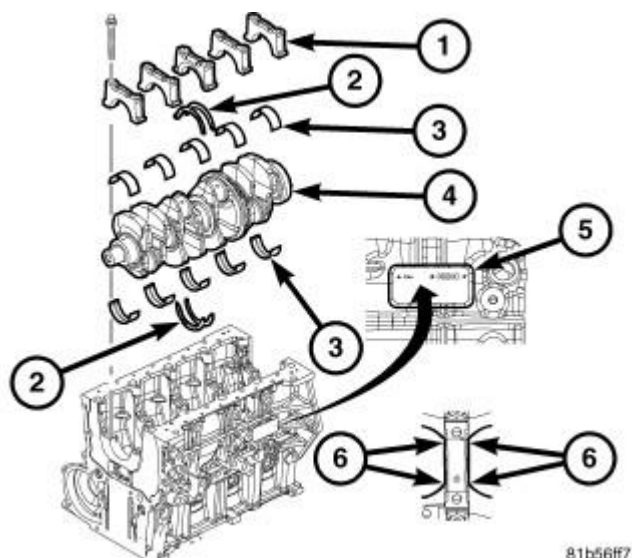
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**Fig. 328: Crankshaft Cap Location Marks**  
Courtesy of CHRYSLER LLC

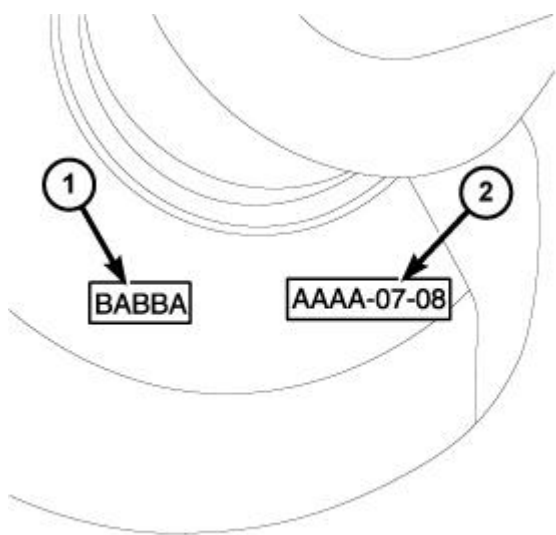
Bearing caps (2-6) are not interchangeable and are marked to ensure according to their locations (2-6) in the block (1). Upper and lower bearing halves are NOT interchangeable, and must be installed facing in the correct direction.

1. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
2. Remove the balance shaft assembly. See **Engine/Engine Block/MODULE, Balance Shaft - Removal**.
3. Identify bearing cap locations (2-6) before removal.



**Fig. 329: Crankshaft Bearing Size Mark**  
Courtesy of CHRYSLER LLC

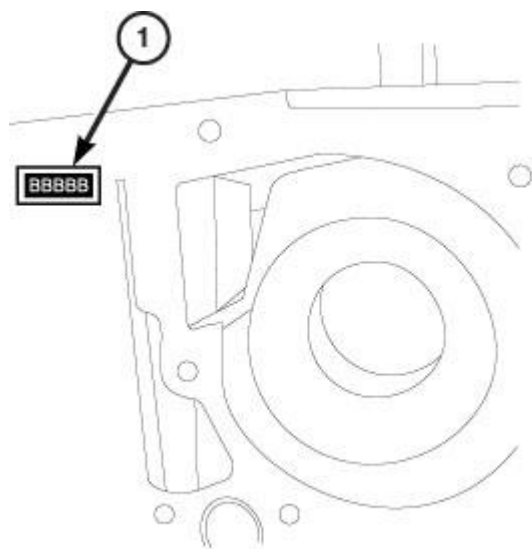
4. Remove the bearing caps (1) one at a time, and if possible, replace the crankshaft bearings (3) one at a time. Carefully rotate upper half of bearing from between the carrier and the crankshaft (4). If the upper half of the bearing does not easily slide out of position, the crankshaft must be removed for further inspection. See **Engine/Engine Block/CRANKSHAFT - Removal**.

**Installation****INSTALLATION**

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**Fig. 330: Crankshaft Connecting Rod Journal Diameter**  
Courtesy of CHRYSLER LLC

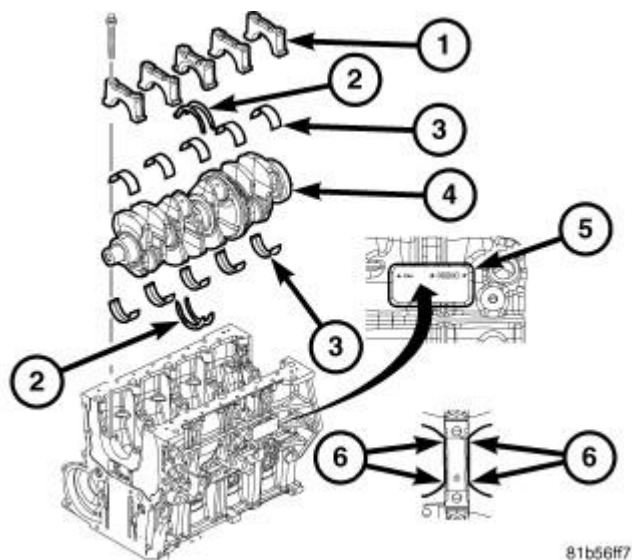
1. Locate the crankshaft journal size (1) stamp on the crankshaft weight.



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**Fig. 331: Engine Block Crankshaft Journal Size Stamp**  
Courtesy of CHRYSLER LLC

2. Locate the engine block crankshaft journal size stamp on the engine block (1).



**Fig. 332: Crankshaft Bearing Size Mark**  
Courtesy of CHRYSLER LLC

3. Use the crankshaft stamp and engine block stamp to select the correct crankshaft bearing sizes from the bearing chart. The letters stamped into the block are in the same order as the cylinders (5). The first letter corresponds to the first cylinder, the second to the second, etc. See **Engine/Engine Block - Standard Procedure**.
4. If the crankshaft was removed to install the bearings, install the crankshaft. See **Engine/Engine Block/CRANKSHAFT - Installation**.
5. Install the balance shaft assembly. See **Engine/Engine Block/MODULE, Balance Shaft - Installation**.
6. Install the oil pan.

## COVER, ENGINE, FRONT

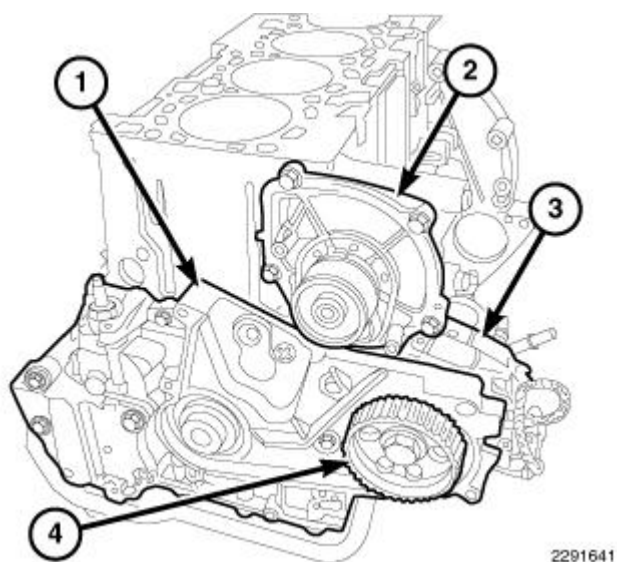
### Description

### DESCRIPTION



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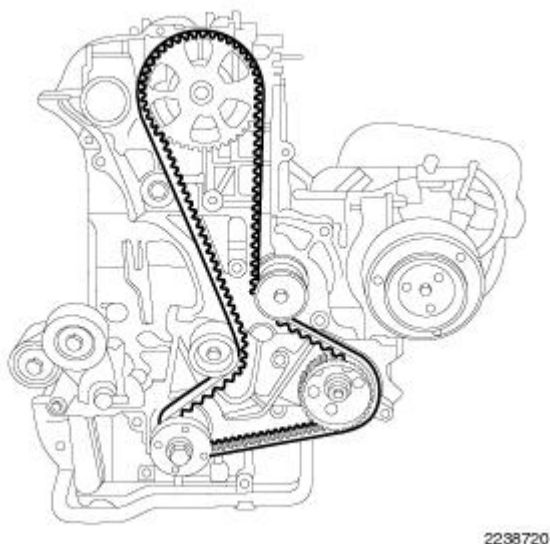


**Fig. 333: Oil Pump Cover Assembly**  
Courtesy of CHRYSLER LLC

The oil pump cover assembly on this engine is an aluminum cover that incorporates the oil pump.

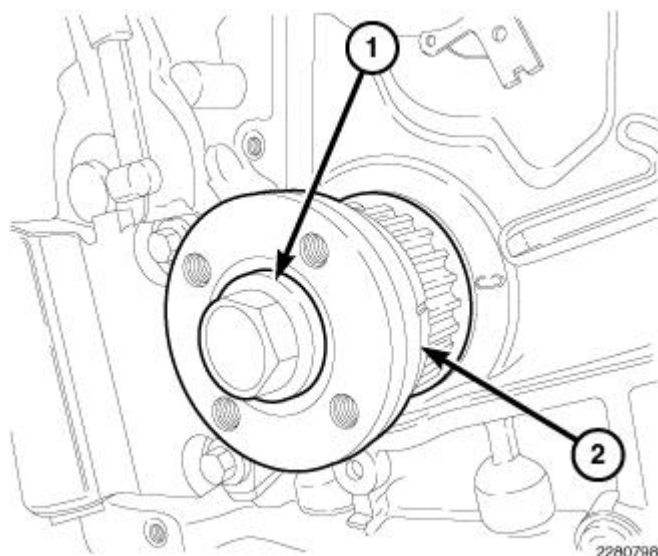
### Removal

### REMOVAL



**Fig. 334: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

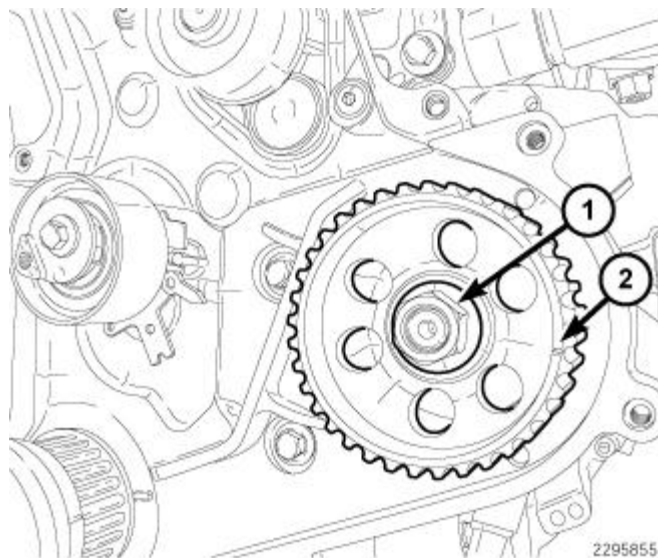
1. Disconnect negative battery cable.
2. Remove the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Removal.**



**Fig. 335: Crankshaft Sprocket Bolt**  
Courtesy of CHRYSLER LLC

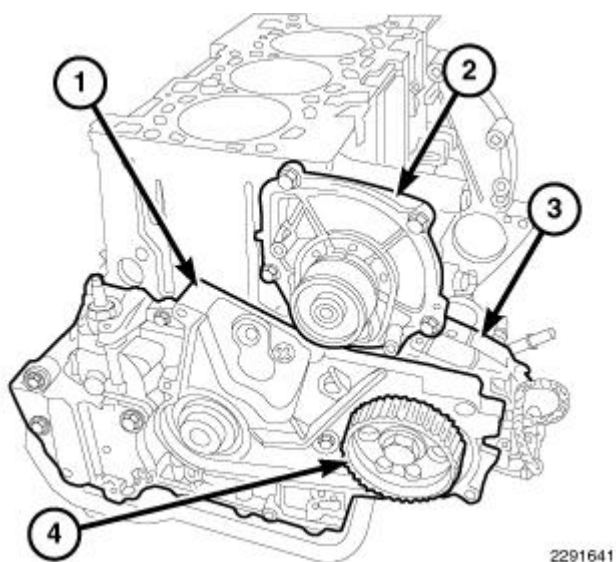
**NOTE:** The crankshaft sprocket bolt is a left handed thread.

3. Remove the bolt (1) and the crankshaft sprocket (2).



**Fig. 336: High Pressure Injection Pump Gear Holder VM 1055**  
Courtesy of CHRYSLER LLC

4. Using the High Pressure Injection Pump Gear Holder VM 1055, remove the nut (1).

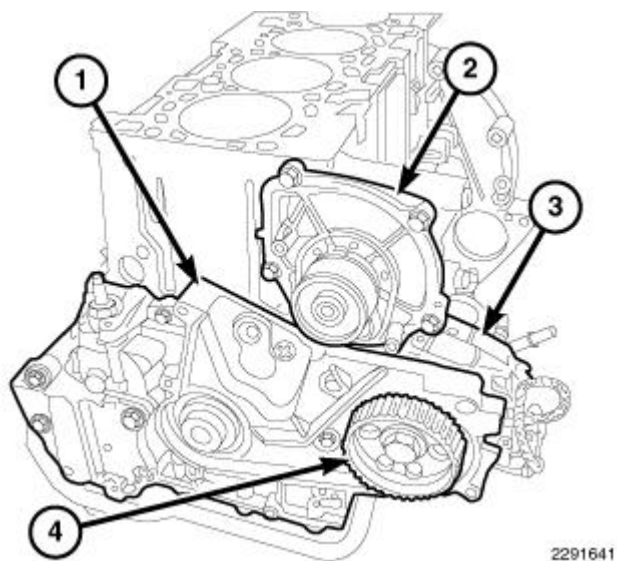


**Fig. 337: Oil Pump Cover Assembly**  
Courtesy of CHRYSLER LLC

5. Remove the high pressure fuel pump (4) sprocket.
6. Remove the oil pump cover assembly (1).

### Installation

#### INSTALLATION



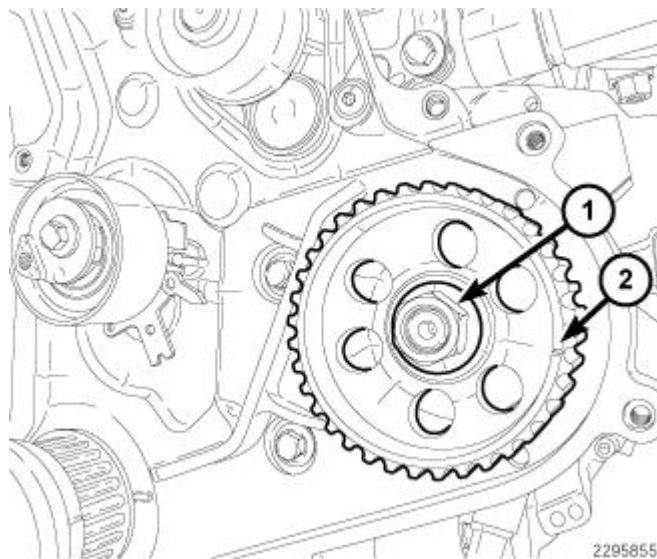
**Fig. 338: Oil Pump Cover Assembly**  
Courtesy of CHRYSLER LLC

1. Clean and inspect the gasket mating surfaces.
2. Install the oil pump gasket.

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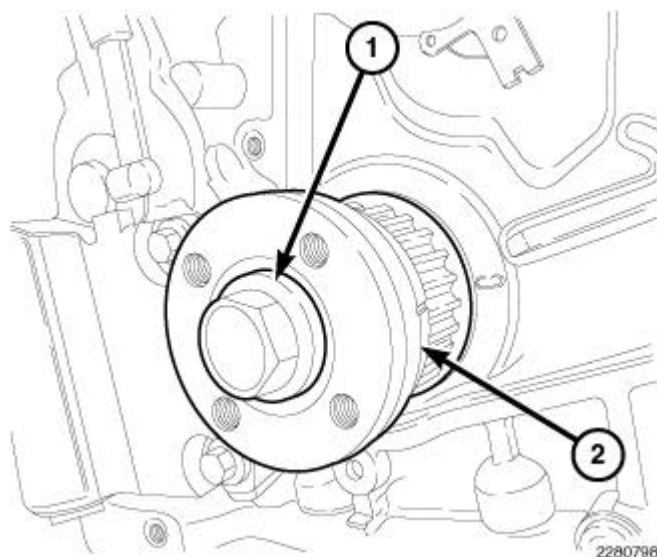
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3. Install the oil pump cover assembly (1). Tighten bolts to 33 N.m (24 ft. lbs.).
4. Install the high pressure fuel pump (4) sprocket.



**Fig. 339: High Pressure Injection Pump Gear Holder VM 1055**  
Courtesy of CHRYSLER LLC

5. Using the High Pressure Injection Pump Gear Holder VM. 1055. Tighten nut (1) to 88 N.m (65 ft. lbs.).



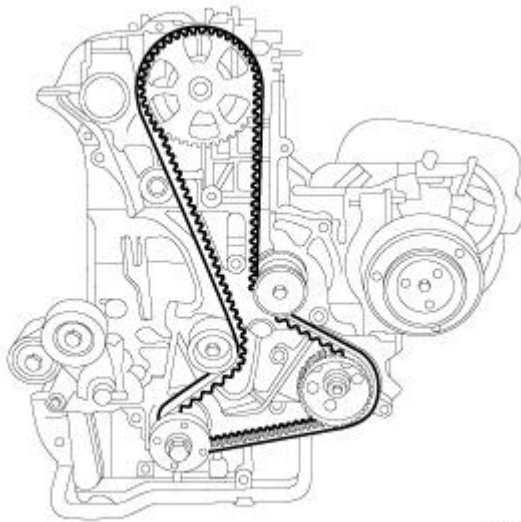
**Fig. 340: Crankshaft Sprocket Bolt**  
Courtesy of CHRYSLER LLC

**NOTE:** The crankshaft sprocket bolt is a left handed thread.

6. Install the crankshaft sprocket (2). Tighten bolt (1) to 100 N.m (74 ft. lbs.) + 120 degrees.

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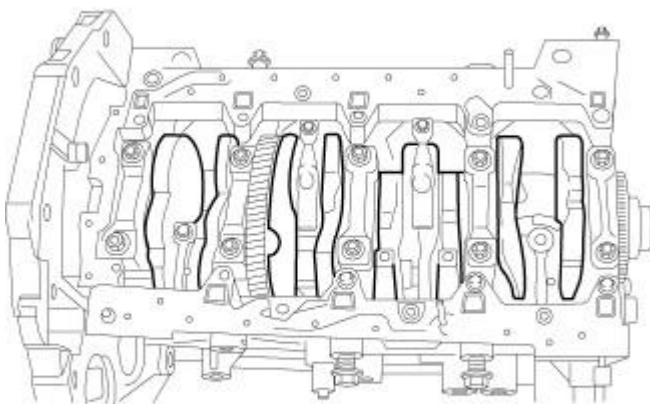
**Fig. 341: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

7. Install the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Removal**.
8. Connect negative battery cable.

## CRANKSHAFT

### Description

### DESCRIPTION



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**Fig. 342: Crankshaft**

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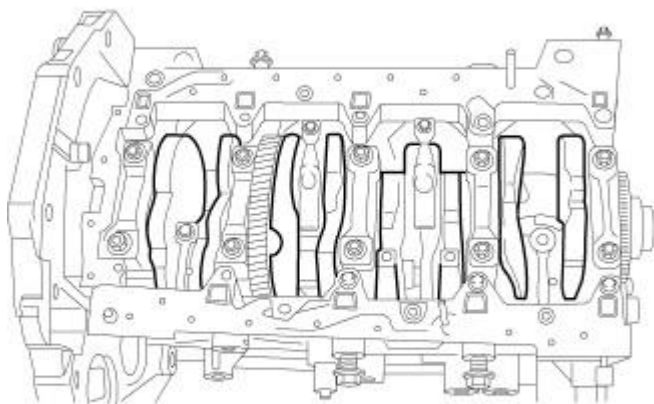
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### Courtesy of CHRYSLER LLC

The crankshaft for the 2.8L is a forged steel type design with five main bearing journals. The crankshaft is located at the bottom of the engine block.

### Standard Procedure

#### CHECKING CRANKSHAFT END PLAY



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**Fig. 343: Crankshaft**

Courtesy of CHRYSLER LLC

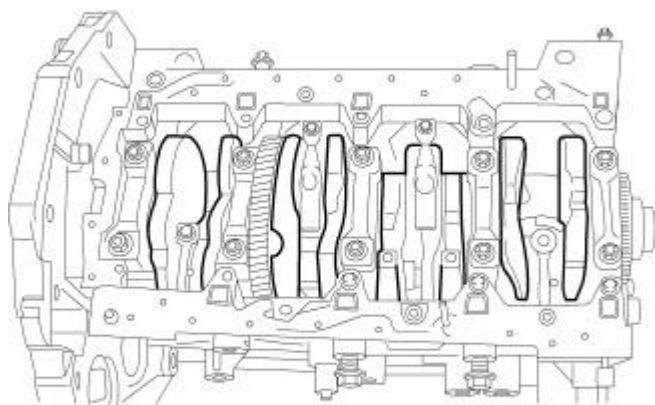
1. Mount a dial indicator to a stationary point at rear of engine. Locate the probe perpendicular against the flywheel.
2. Move the crankshaft all the way to the front of its travel.
3. Zero the dial indicator.
4. Move the crankshaft all the way to the rear and read dial indicator. For crankshaft end play clearances, see **Engine - Specifications**.

### Removal

#### REMOVAL

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**Fig. 344: Crankshaft**

Courtesy of CHRYSLER LLC

1. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.
2. Remove the balance shaft assembly. See **Engine/Engine Block/MODULE, Balance Shaft - Removal**.
3. Remove the rear crankshaft oil seal carrier. See **Engine/Engine Block/SEAL, Crankshaft Oil - Removal**.
4. Remove the front cover. See **Engine/Engine Block/COVER, Engine - Removal**.
5. Remove the bearing caps from the connecting rods.
6. Remove the bearing caps from the crankshaft journals.
7. Remove the crankshaft.

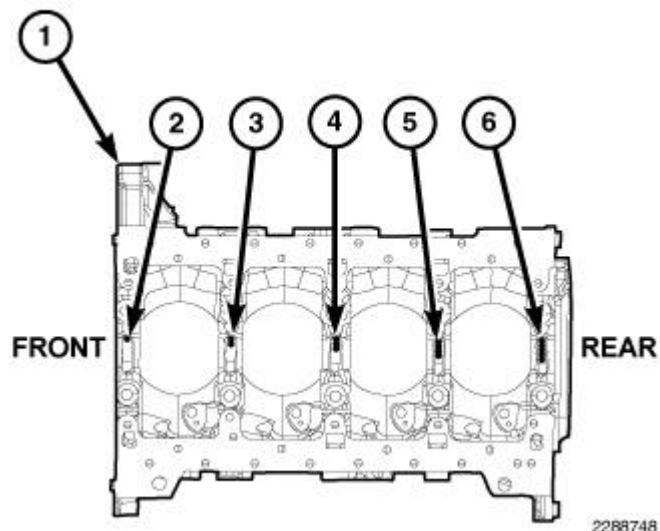
### Installation

#### INSTALLATION

1. Use the crankshaft bearing selection chart for main bearing selection. Refer to **Standard Procedure**.
2. Lubricate and install the crankshaft bearings. Make sure the thrust washer is not touching the engine block.
3. Install the crankshaft.

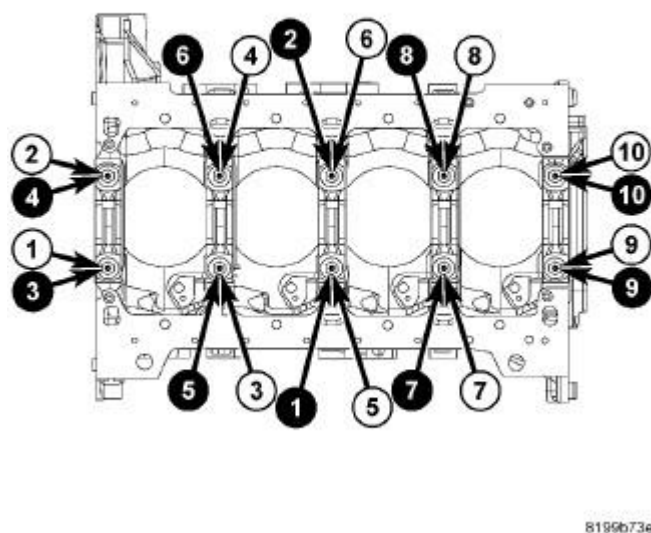
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**Fig. 345: Main Bearing Caps**  
Courtesy of CHRYSLER LLC

4. Using new bolts, install the main bearing caps in the same location as they were removed. The notches on the top of the bearing caps indicate their proper position. The front cap has one notch, the next cap two, etc.



**Fig. 346: Crankshaft Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC

5. Using the black number bubbles in the torque pattern, tighten the crankshaft bolts to 50 N.m (36 ft. lbs.).
6. Using the white number bubbles in the torque pattern. Turn the bolts an additional 90 degrees.



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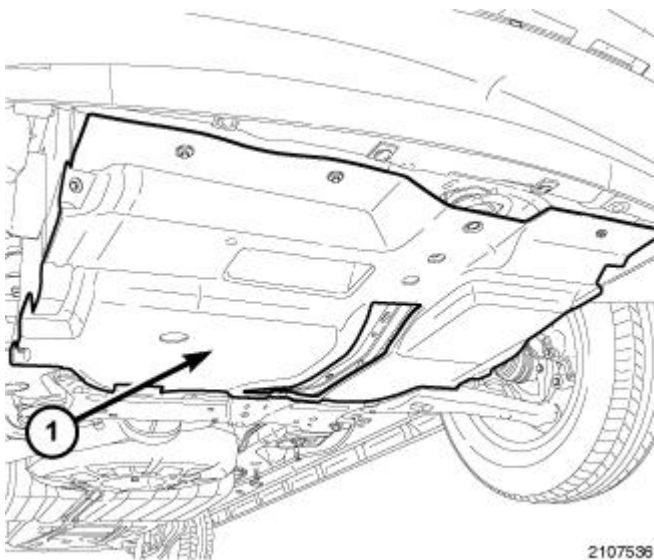
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7. Measure the crankshaft end play. Crankshaft end play must be between 0.1 mm and 0.33 mm (0.004 in - 0.13 in).
8. Using the bearing chart, select the correct bearings and install the connecting rod bearings. Using new bolts, install the connecting rod bearing caps. See **Engine/Engine Block/ROD, Piston and Connecting - Installation**.
9. Install the front cover. See **Engine/Engine Block/COVER, Engine - Installation**.
10. Install the rear crankshaft seal carrier. See **Engine/Engine Block/SEAL, Crankshaft Oil - Installation**.
11. Install the balance shaft assembly. See **Engine/Engine Block/MODULE, Balance Shaft - Installation**.
12. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.

### DAMPER, VIBRATION

#### Removal

#### VIBRATION DAMPER

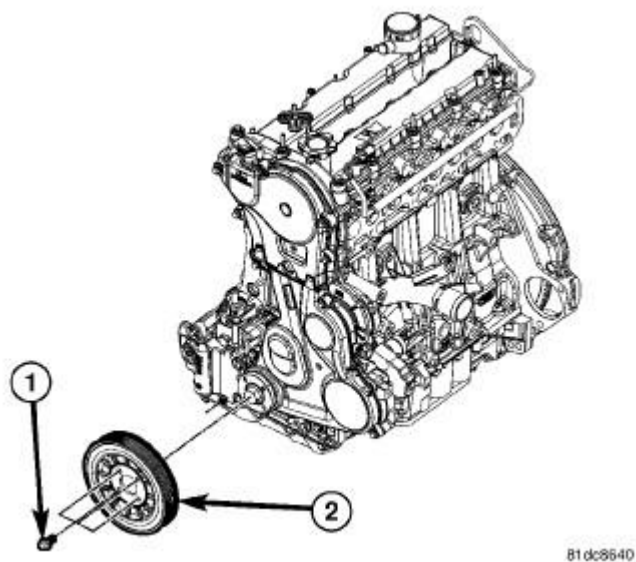


**Fig. 347: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the underbody splash shield (1).
4. Remove the right front inner splash shield.
5. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.

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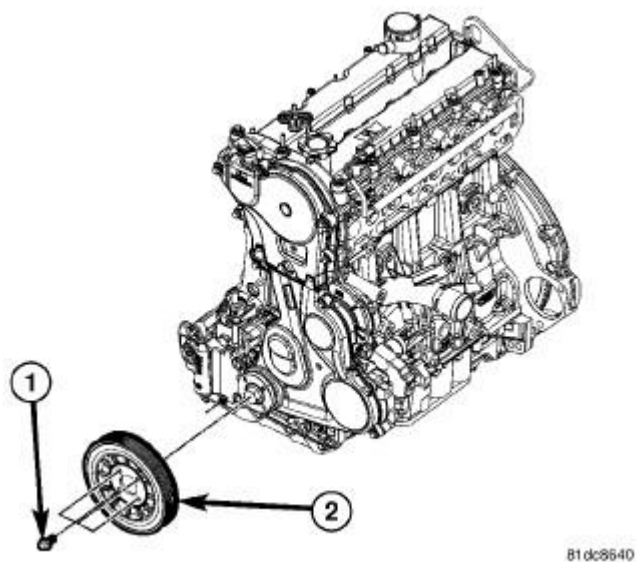


**Fig. 348: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

6. Remove the bolts (1) and the vibration damper (2).

### Installation

#### VIBRATION DAMPER

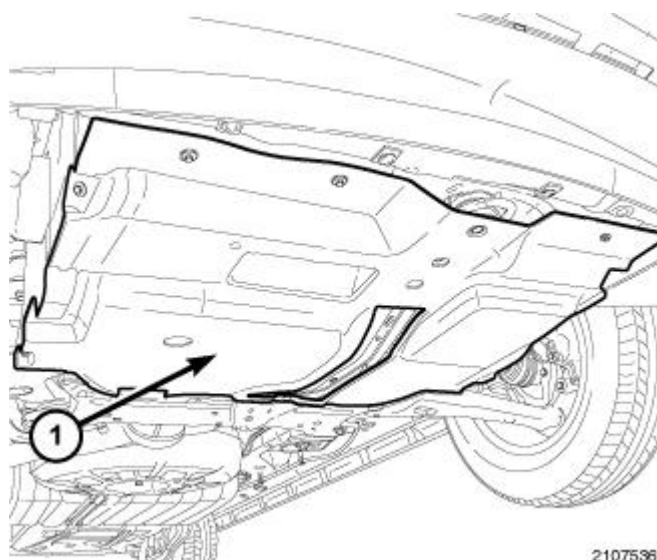


**Fig. 349: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

1. Install the vibration damper (2). Tighten bolts (1) to 32 N.m. (24 ft. lbs.).

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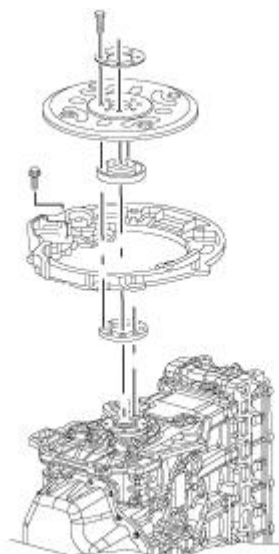
**Fig. 350: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

2. Install accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
3. Install the right front inner splash shield.
4. Install the underbody splash shield (1).
5. Lower the vehicle.
6. Connect the negative battery cable.

## FLEXPLATE

### Removal

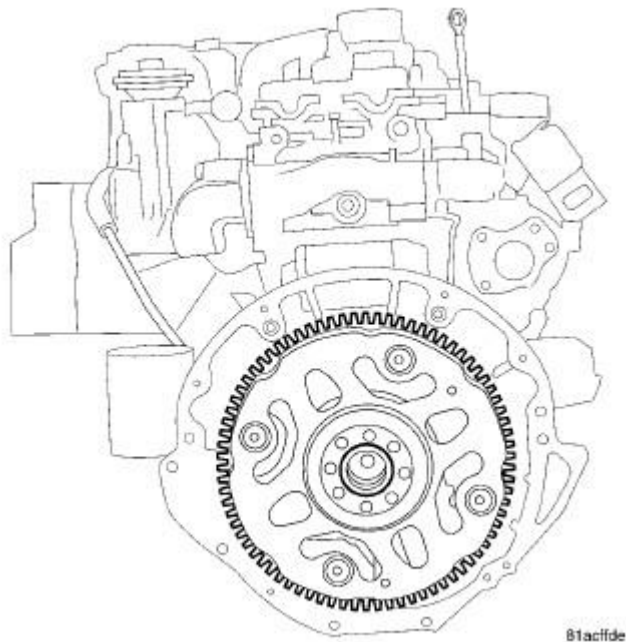
### REMOVAL



**Fig. 351: Flex Plate & Bolts**

Courtesy of CHRYSLER LLC

1. Remove the transmission. Refer to **Transmission and Transfer Case/Automatic - 62TE - Removal** .
2. Paint mark the flex plate hub to flex plate relation.
3. Remove the 40 mm flex plate bolts and flex plate.



**Fig. 352: Flex Plate**

Courtesy of CHRYSLER LLC

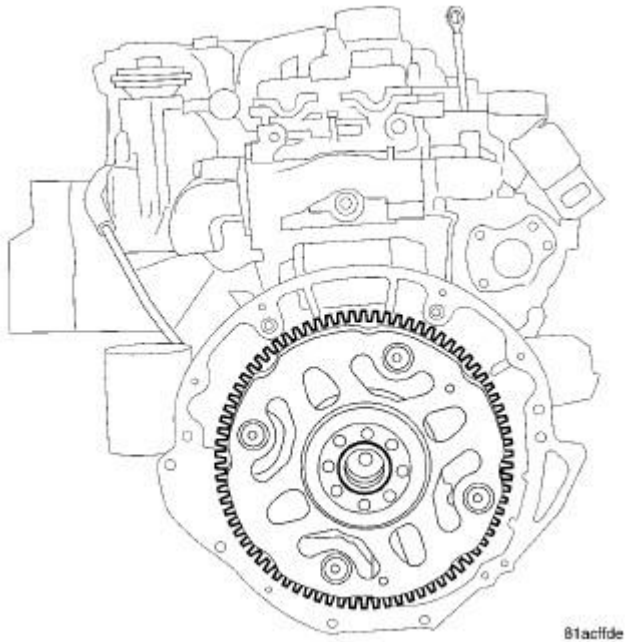
4. Inspect flex plate (2) for damage.

#### **Installation**

#### **INSTALLATION**

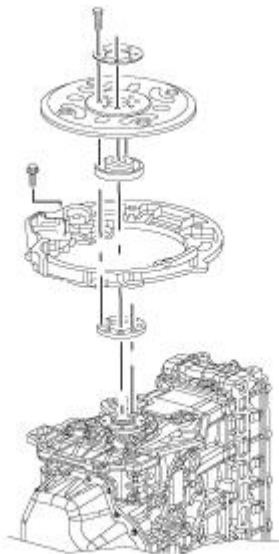
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**Fig. 353: Flex Plate**  
Courtesy of CHRYSLER LLC

1. Install the flex plate and align with the paint marks on the hub.



**Fig. 354: Flex Plate & Bolts**  
Courtesy of CHRYSLER LLC

**NOTE:** Always use new flex plate bolts.

**NOTE:** Do not lubricate new bolts as they are already coated with an anti-scuff

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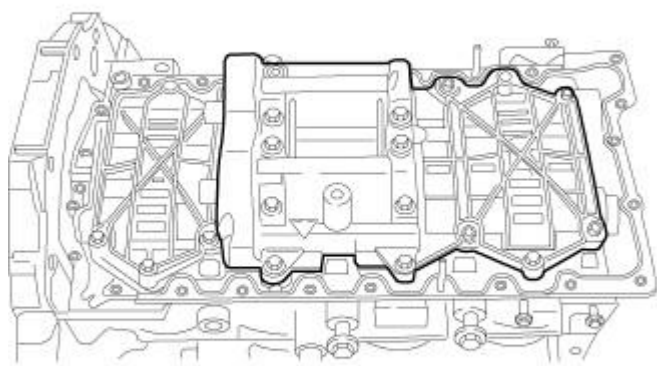
### treatment.

2. Install the flex plate bolts. Using a cross pattern, tighten bolts to 50 N.m (37 ft. lbs.).
3. Using a torque wrench fitted with a Torque Angle Gauge, (Goniometer), loosen one flex plate bolt at a time and tighten to 25 N.m (18 ft. lbs.) plus 30°.
4. Install the transmission. Refer to **Transmission and Transfer Case/Automatic - 62TE - Installation**.

## MODULE, BALANCE SHAFT

### Description

#### DESCRIPTION



81ab8223

**Fig. 355: Balance Shaft Module**  
Courtesy of CHRYSLER LLC

The balance shaft is gear-driven and is used to counteract engine vibration and roughness. The balance shaft assembly includes balancers on two shafts. It is only serviced as an assembly. Balance shafts must be timed to the crankshaft.

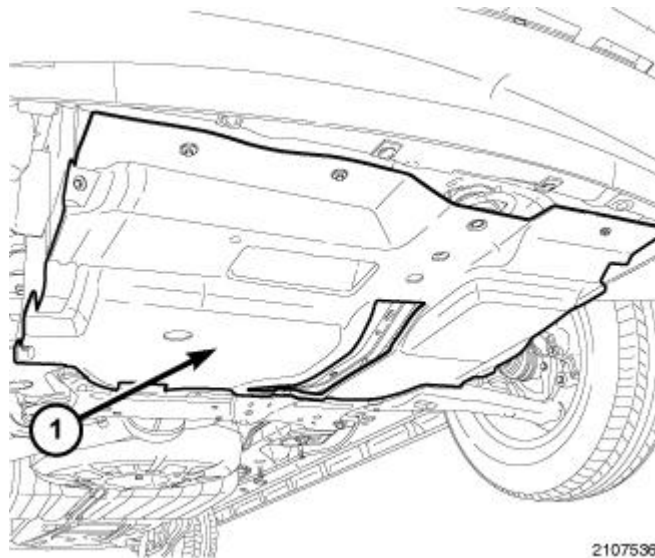
### Removal

#### REMOVAL

1. Disconnect the negative battery cable.

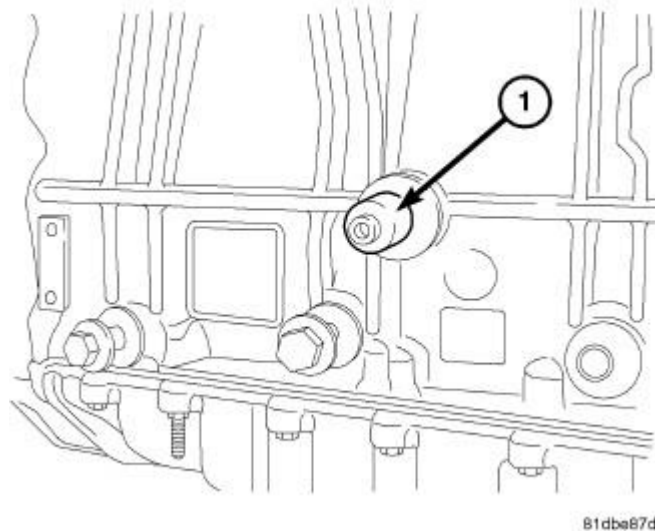
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**Fig. 356: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

2. Remove the underbody splash shield (1).
3. Drain the engine oil.

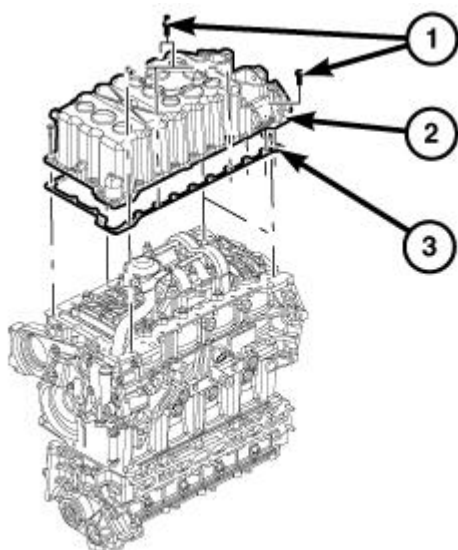


**Fig. 357: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

4. Lock the engine 90 degrees ATDC. See **Engine/Valve Timing - Standard Procedure**.

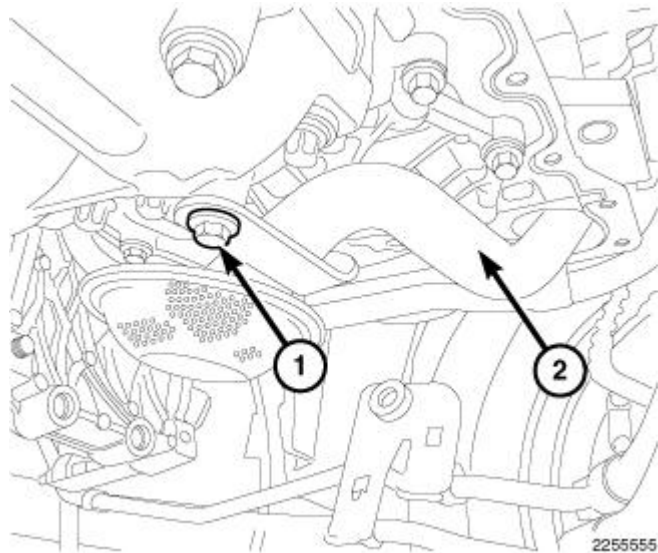
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**Fig. 358: Oil Pan Gasket With Oil Pan & Fasteners**  
Courtesy of CHRYSLER LLC

5. Remove the lower oil pan (2). See **Engine/Lubrication/PAN, Oil - Removal**.



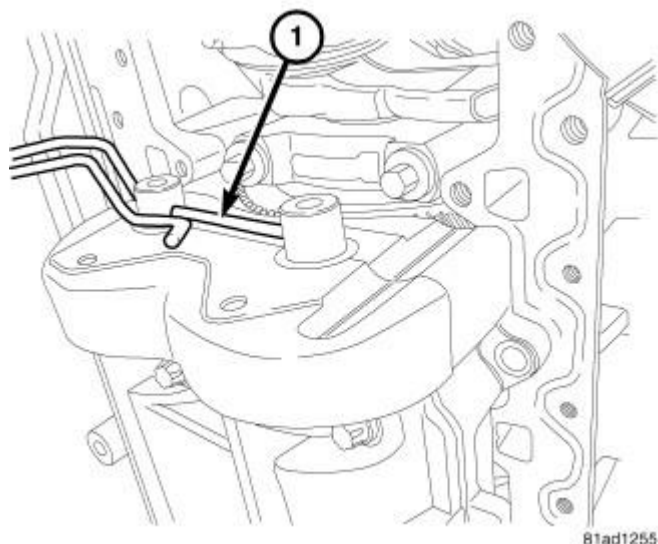
**Fig. 359: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

6. Remove retaining bolt (1) and the oil pickup tube (2) from engine. Discard O-rings.



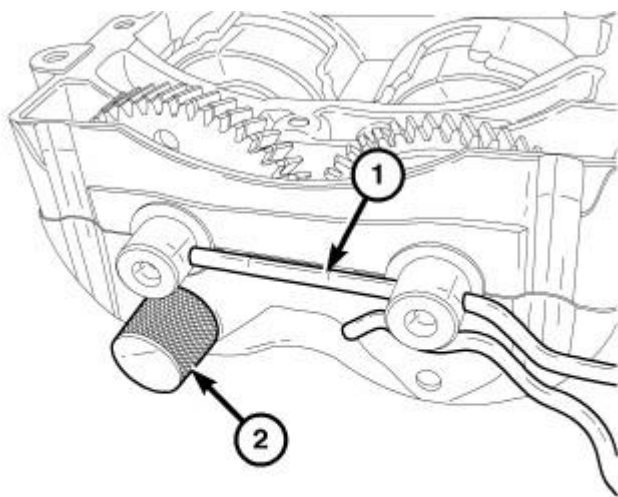
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**Fig. 360: Balance Shaft Timing Tool**  
Courtesy of CHRYSLER LLC

7. Place a dowel rod through the holes in the balance shaft axles to keep the balance shafts in the correct position for reassembly.



**Fig. 361: Balance Shaft Tool**  
Courtesy of CHRYSLER LLC

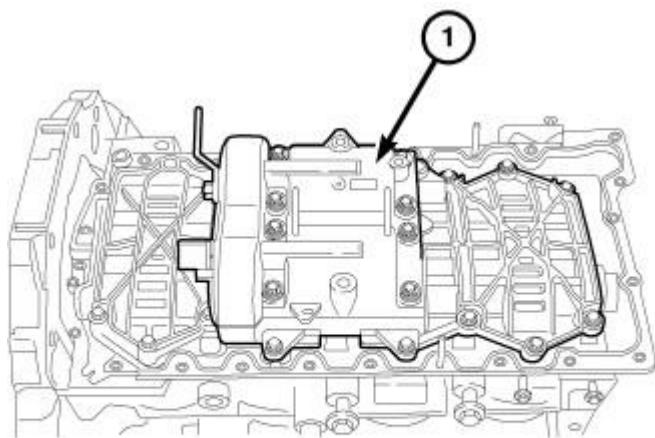
**WARNING:** The balance shaft pin must be installed before the balance shaft assembly is removed from the engine. The balance shaft pin must always remain in the balance shaft assembly while the assembly is removed from the engine. Do not remove the balance shaft pin until

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**the balance shaft assembly is completely installed on the engine, and the TDC crank locking tool is correctly installed.**

8. Insert the balance shaft locking pin VM 10012 (2) into the balance shaft assembly to lock the split gears together.



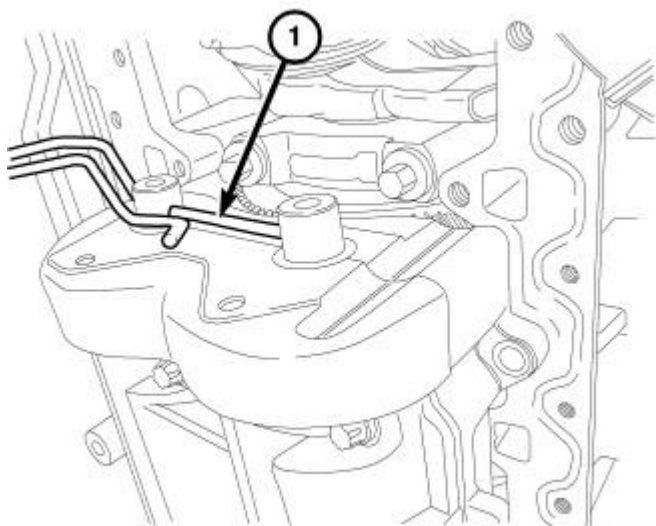
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**Fig. 362: Balance Shaft Housing**  
Courtesy of CHRYSLER LLC

9. Remove the balance shaft housing (1).

### Installation

### INSTALLATION

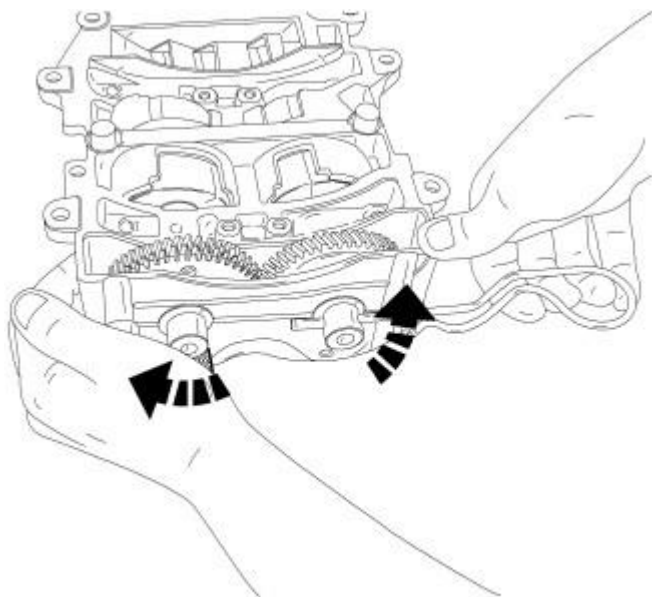


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**Fig. 363: Balance Shaft Timing Tool**

Courtesy of CHRYSLER LLC

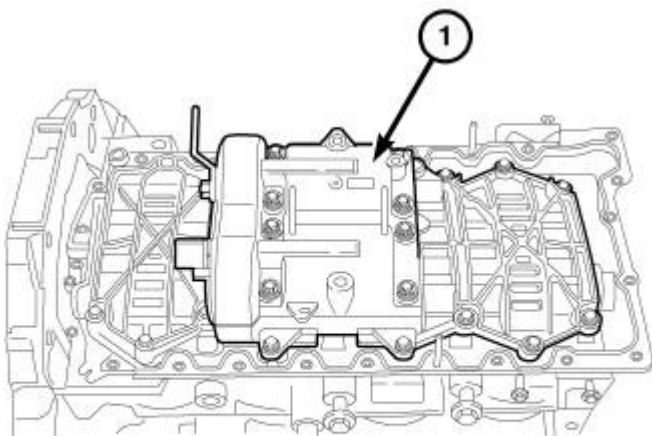
1. The balance shafts must remain aligned by the alignment dowel and the balance shaft pin must remain in the balance shaft assembly until the assembly is completely installed to the engine.



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**Fig. 364: Balance Shaft Tool**  
Courtesy of CHRYSLER LLC

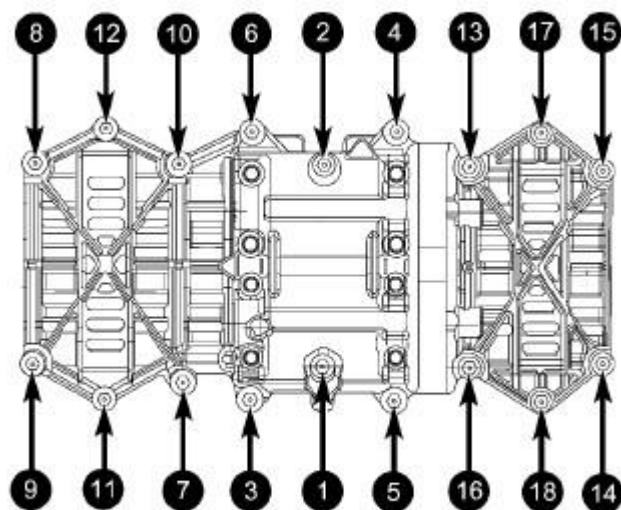
2. The balance shaft pin should never be removed from the balance shaft assembly when the balance shaft assembly is not installed in the engine. If the balance shaft was removed from the vehicle without the pin, or the pin was removed, use the dowel to load the spring while pressing the tool into place as shown in illustration.



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**Fig. 365: Balance Shaft Housing**  
**Courtesy of CHRYSLER LLC**

3. Install the balance shaft housing (1).



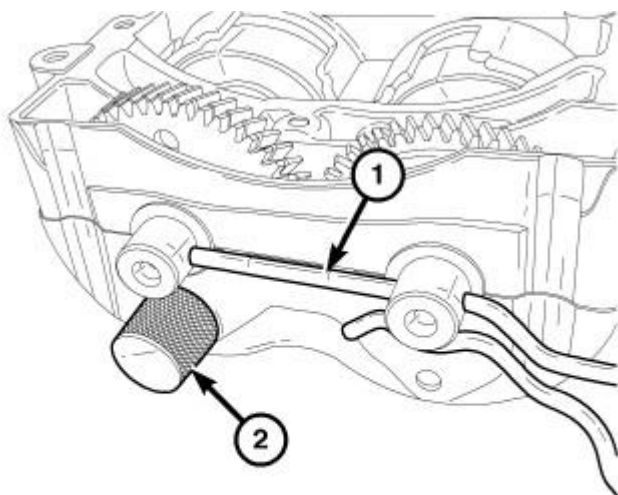
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**Fig. 366: Balance Shaft Bolt Tightening Sequence**  
**Courtesy of CHRYSLER LLC**

4. Use the torque sequence in figure shown in **Fig. 366** to tighten the balance shaft bolts to 33 N.m (24 ft. lbs.).

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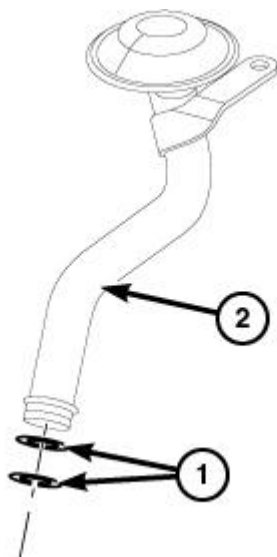
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**Fig. 367: Balance Shaft Tool**  
Courtesy of CHRYSLER LLC

5. Remove the balance shaft dowel assembly and the balance shaft locking pin VM 10012 (2).



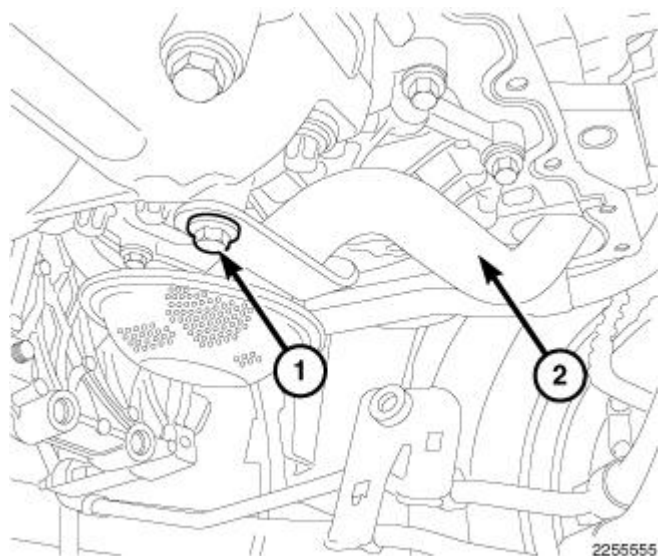
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**Fig. 368: Oil Pickup Tube O-Rings**  
Courtesy of CHRYSLER LLC

6. Using new O-rings, lubricate and install the 2 O-rings (1) on oil pickup tube (2).

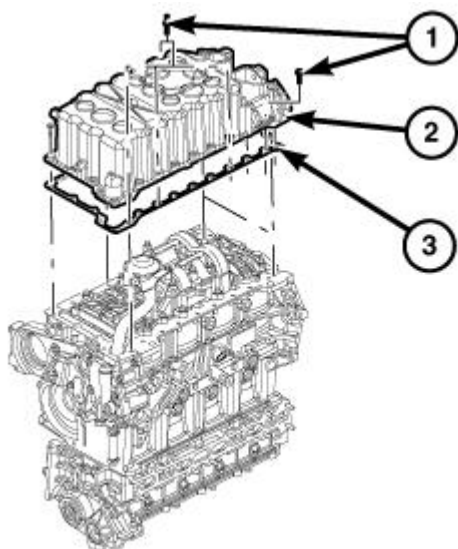
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**Fig. 369: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

7. Install the oil pickup tube. Tighten bolt to 15 N.m (133 in. lbs.).

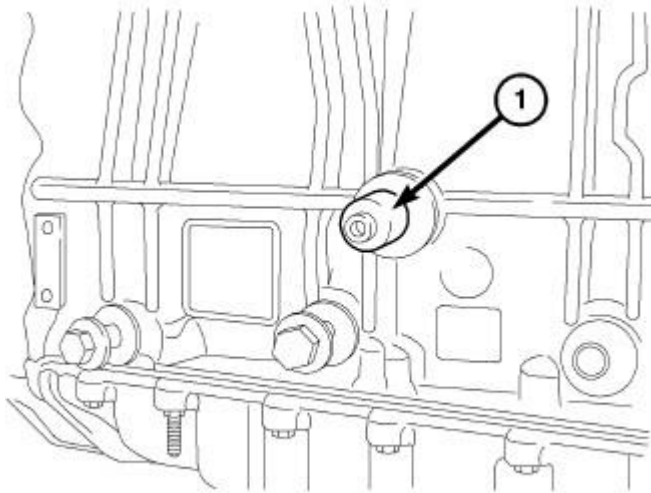


**Fig. 370: Oil Pan Gasket With Oil Pan & Fasteners**  
Courtesy of CHRYSLER LLC

8. Install the oil pan (2). See **Engine/Lubrication/PAN, Oil - Installation**.

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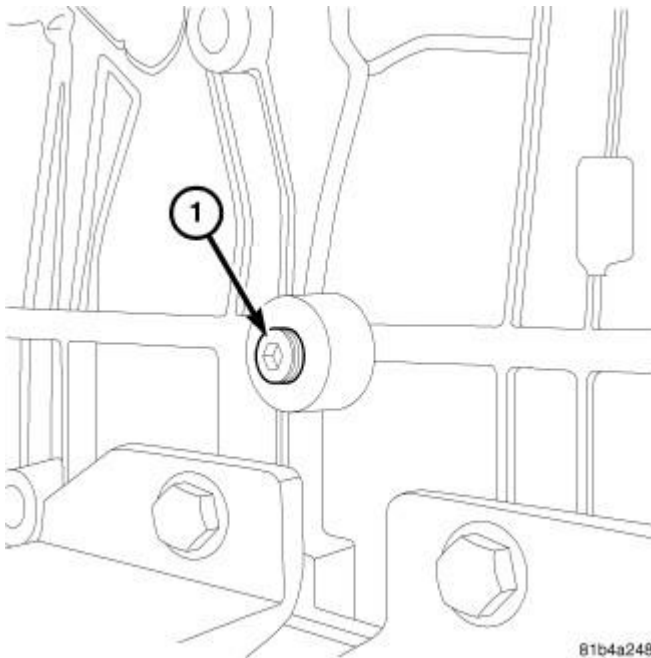
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**Fig. 371: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

9. Remove the crank locking tool VM. 9992 (1).



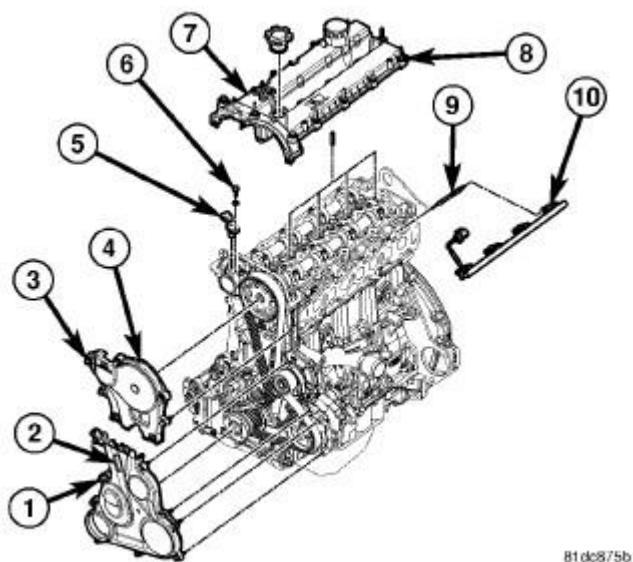
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**Fig. 372: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

10. Install the engine block plug (1). Tighten the engine block plug to 30 N.m (22 ft. lbs.).

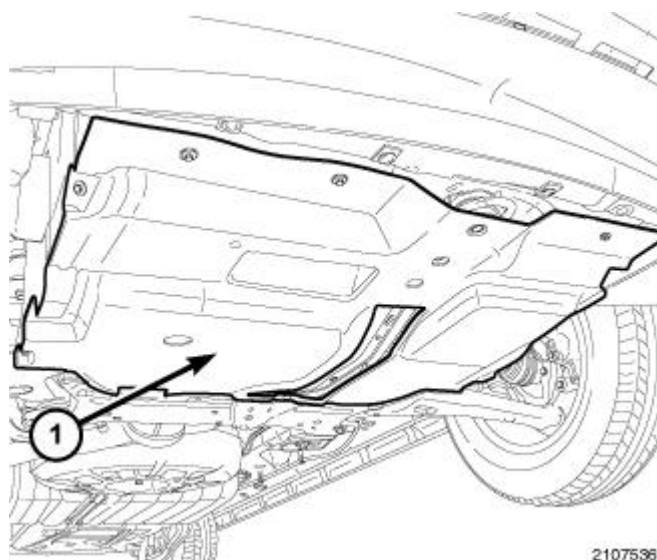
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**Fig. 373: Upper & Lower Front Covers**  
Courtesy of CHRYSLER LLC

11. Install the upper (4) and lower (2) front covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
12. Fill the engine oil.
13. Connect the negative battery cable.
14. Start the engine and check for leaks.



**Fig. 374: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

15. Install the underbody splash shield (1) and securely tighten fasteners.



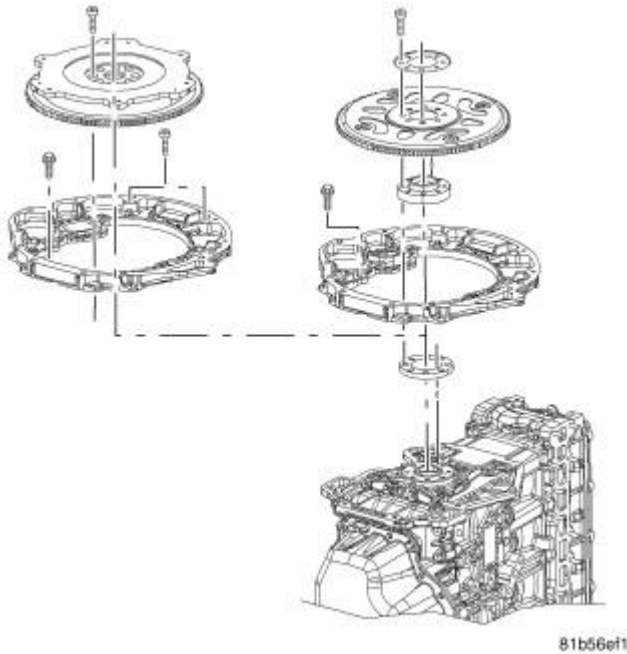
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### PLATE, TRANSMISSION ADAPTER

#### Description

#### DESCRIPTION



**Fig. 375: Flywheel & Flex Plate**  
**Courtesy of CHRYSLER LLC**

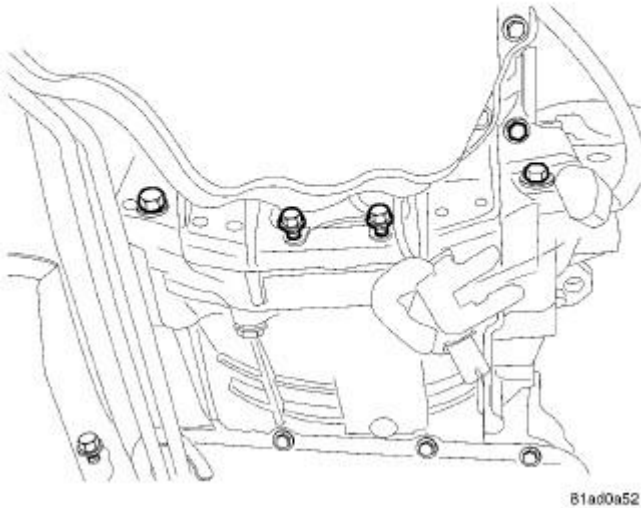
The transmission plate adapter is the component that allows the transmission to be bolted to the engine.

#### Removal

#### REMOVAL

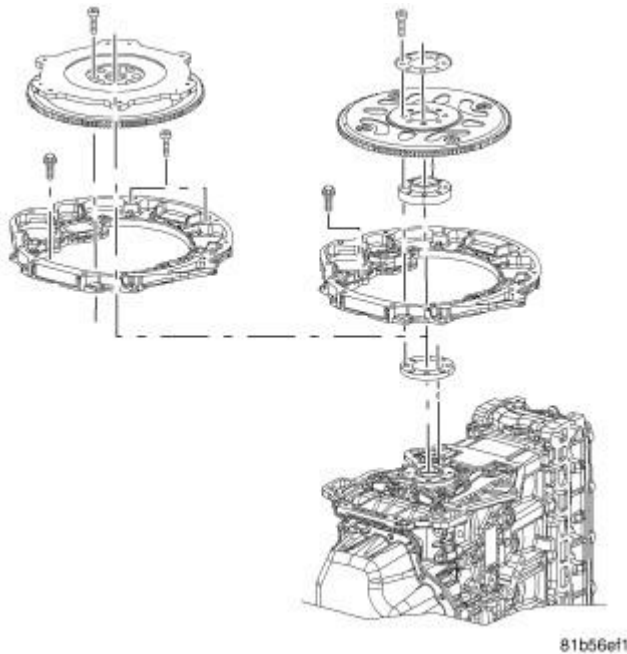
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**Fig. 376: Bell Housing Bolts**  
Courtesy of CHRYSLER LLC

1. Remove the transmission from the vehicle.



**Fig. 377: Flywheel & Flex Plate**  
Courtesy of CHRYSLER LLC

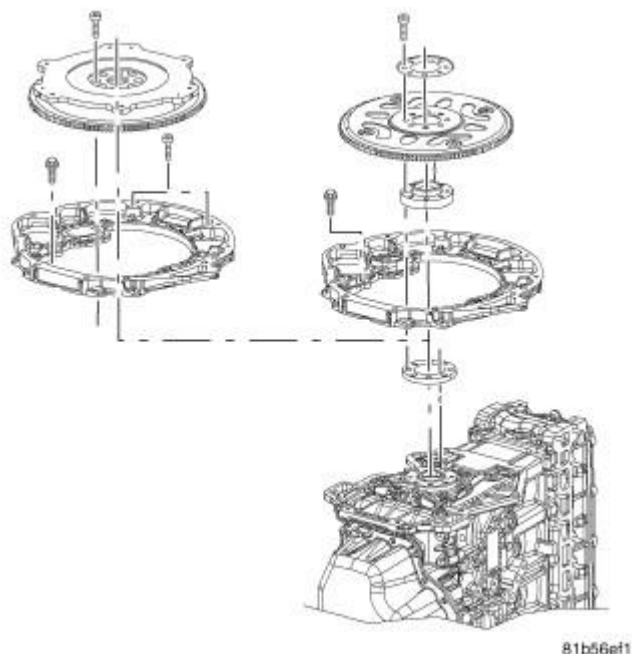
2. Remove the flex plate or flywheel.

**NOTE:** Do not use any magnetic tools near the crankshaft sensor tone ring.

3. Remove the flex plate adapter bolts.

### Installation

### INSTALLATION



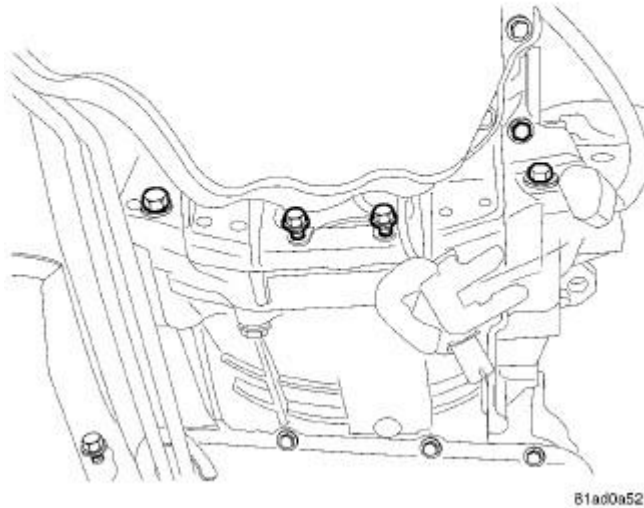
**Fig. 378: Flywheel & Flex Plate**  
Courtesy of CHRYSLER LLC

**NOTE:** Do not use any magnetic tools near the crankshaft tone ring.

1. Install the flex plate adapter.
2. Install the flex plate adapter hex head bolts and tighten to 45 N.m (ft. lbs.)
3. Install the flex plate Torx head bolts and tighten to 78 N.m (ft. lbs.)
4. Install the flex plate or flywheel. See **Engine/Engine Block/FLEXPLATE - Installation.**

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**Fig. 379: Bell Housing Bolts**  
Courtesy of CHRYSLER LLC

5. Install the transmission.

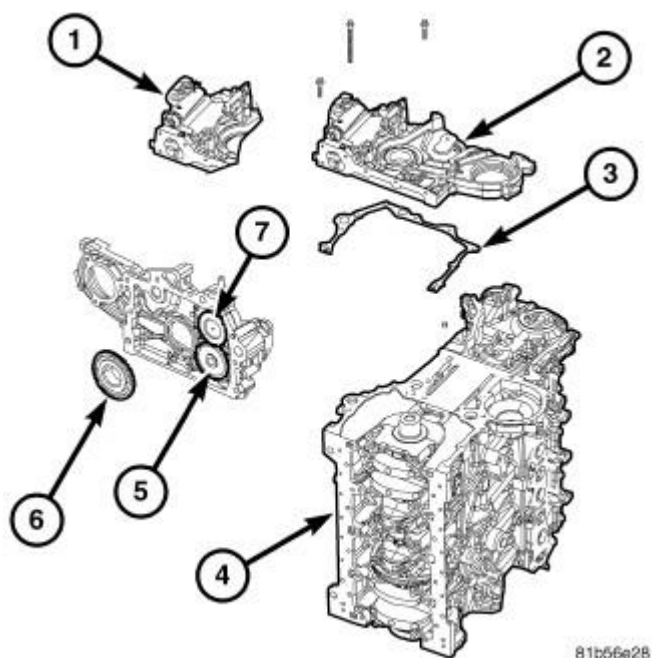
### **PUMP, INTERNAL VACUUM**

#### **Description**

#### **DESCRIPTION**

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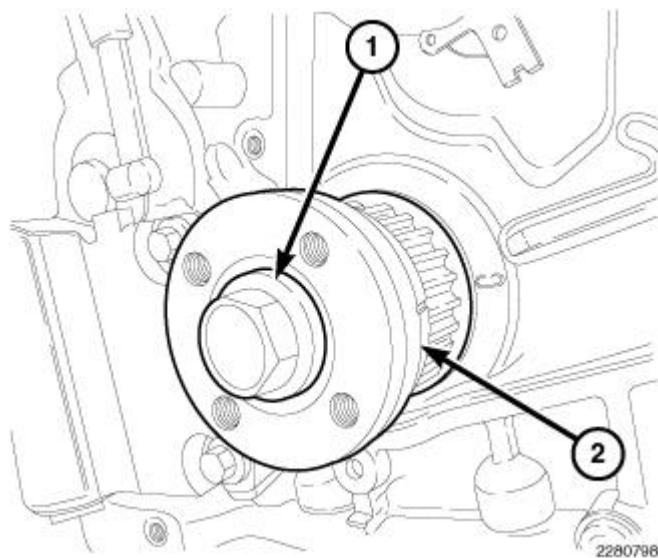
**Fig. 380: Vacuum Pump And Oil Pump**  
Courtesy of CHRYSLER LLC

The diesel engine uses a internal vacuum pump (7). This vacuum pump (7) is mounted in the engine front cover (2). The vacuum pump is driven by a sprocket (6) on the crankshaft.

### Removal

#### REMOVAL

1. Remove the timing belt. See **Engine/Valve Timing/BELT, Timing - Removal**.

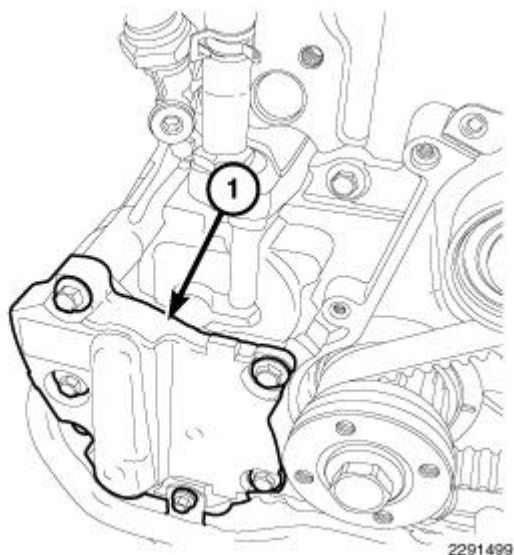


**Fig. 381: Crankshaft Sprocket Bolt**

Courtesy of CHRYSLER LLC

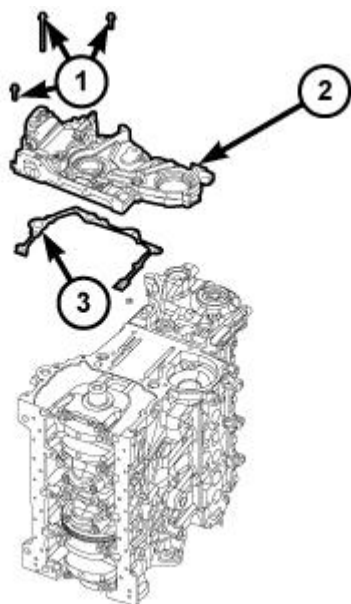
**NOTE:** The crankshaft sprocket is a left handed thread.

2. Remove the bolt (1) and the crankshaft sprocket (2).



**Fig. 382: Oil Pressure Relief Front Cover Bolts**  
Courtesy of CHRYSLER LLC

3. Remove the oil pressure relief front cover (1) bolts.

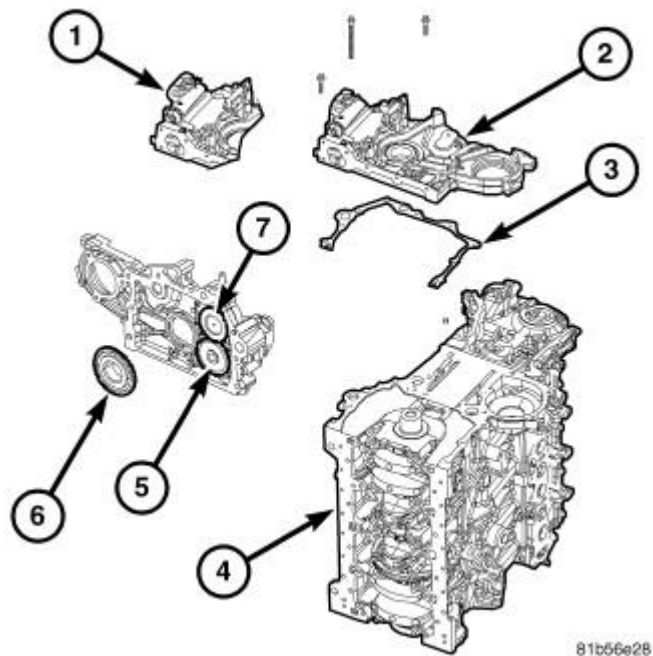


**Fig. 383: Front Cover & Gasket**  
Courtesy of CHRYSLER LLC

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4. Remove the front cover (1). See **Engine/Engine Block/COVER, Engine - Removal.**



**Fig. 384: Vacuum Pump And Oil Pump**  
Courtesy of CHRYSLER LLC

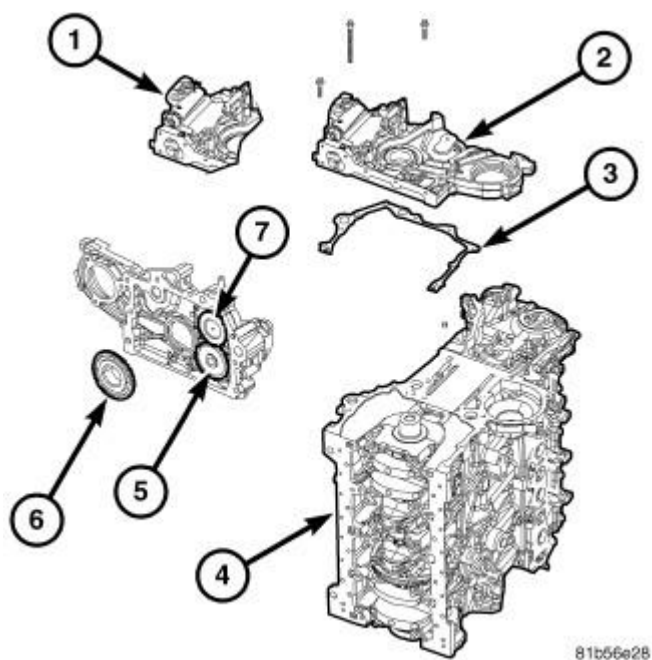
5. Remove the vacuum pump (7) from the front cover (2).

### Installation

### INSTALLATION

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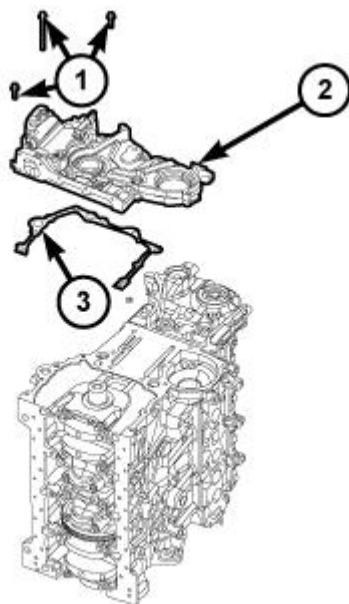
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**Fig. 385: Vacuum Pump And Oil Pump**  
Courtesy of CHRYSLER LLC

1. Install the vacuum pump (7) into the front cover (2).



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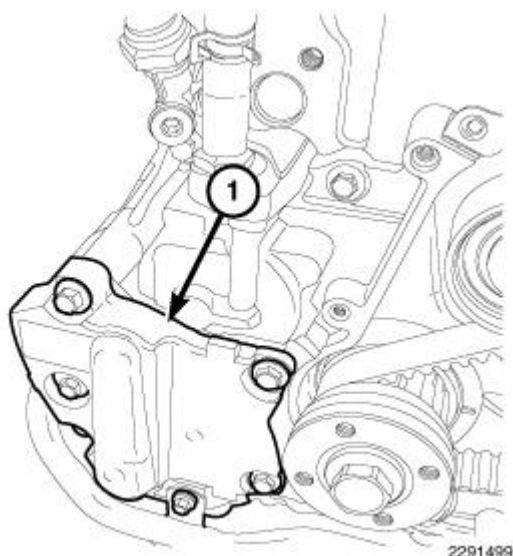
**Fig. 386: Front Cover & Gasket**  
Courtesy of CHRYSLER LLC

2. Install the front cover (1) to the engine block. See **Engine/Engine Block/COVER, Engine - Installation.**



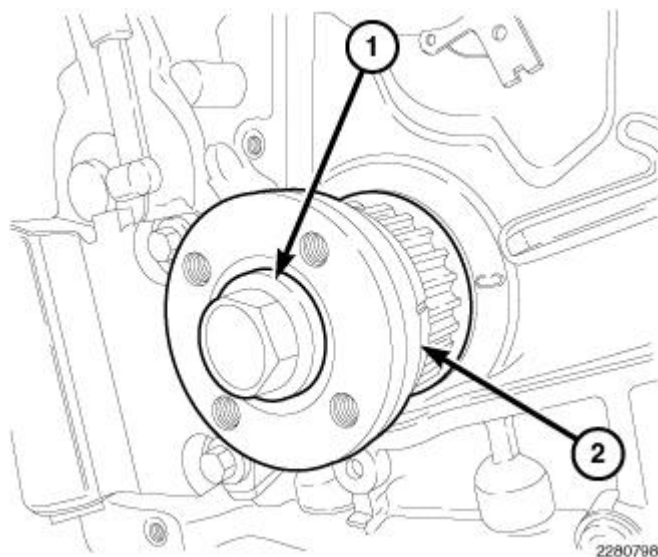
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**Fig. 387: Oil Pressure Relief Valve Cover Bolts**  
Courtesy of CHRYSLER LLC

3. Install the oil pressure relief valve cover (1). Tighten bolts to 32 N.m (23 ft. lbs.).



**Fig. 388: Crankshaft Sprocket Bolt**  
Courtesy of CHRYSLER LLC

**NOTE:** The crankshaft sprocket is a left handed thread.

4. Install the crankshaft sprocket. Tighten bolt to 100 N.m (74 ft. lbs.) plus 120 degrees.
5. Install the timing belt. See **Engine/Valve Timing/BELT, Timing - Installation.**

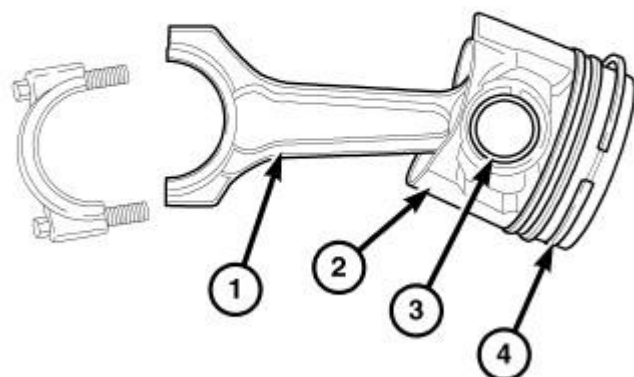
**ROD, PISTON AND CONNECTING**

## 2009 Chrysler Town & Country LX

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### Description

#### DESCRIPTION



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**Fig. 389: Piston & Connecting Rod**

Courtesy of CHRYSLER LLC

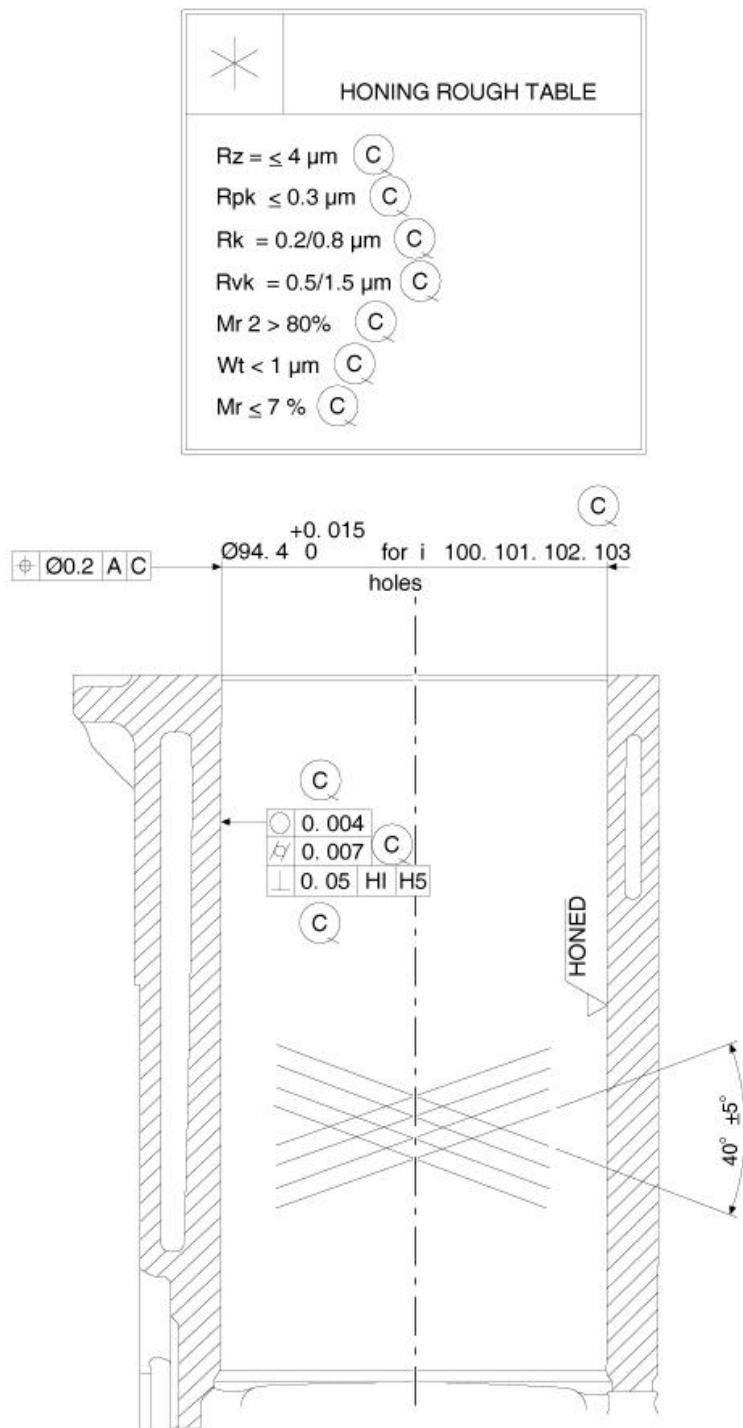
The pistons (2) are of a free floating design. Oil jets in the engine block lubricate and cool the piston and piston pin (3) assembly. The connecting rods (1) have a pressed in place wrist pin bushing which is lubricated by the oil jets. Connecting rod (7) and bearing caps have cracked mating surfaces and are not interchangeable.

### Standard Procedure

#### STANDARD PROCEDURE

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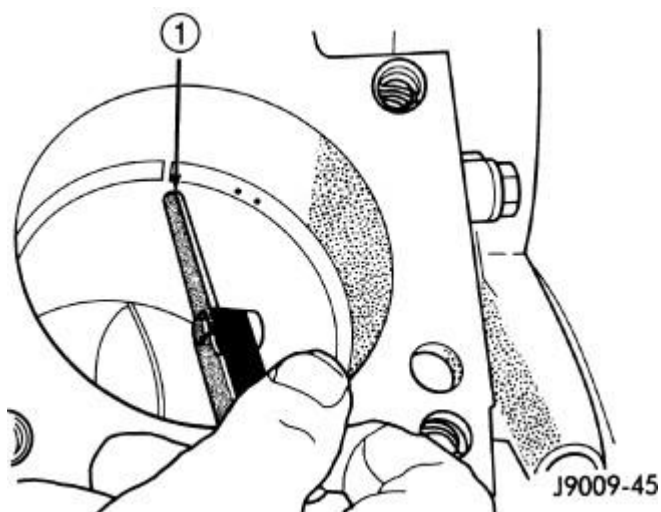
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**Fig. 390: Honing Rough Table**  
**Courtesy of CHRYSLER LLC**

## PISTON RING FITTING

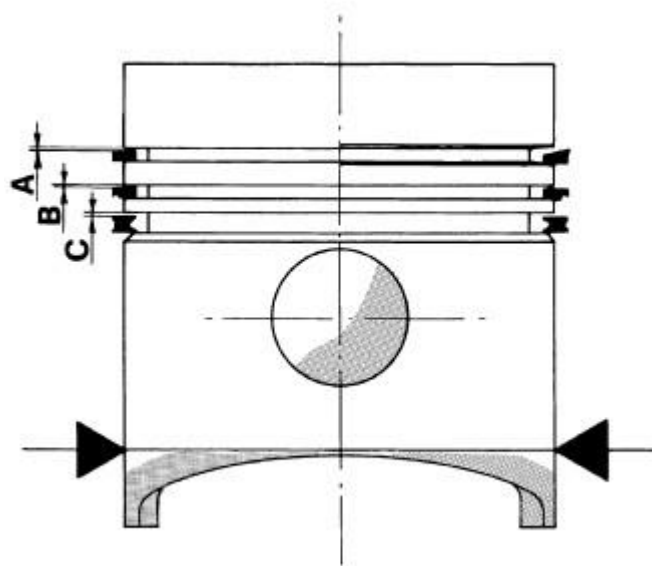
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**Fig. 391: Ring End Gap Measurement**  
Courtesy of CHRYSLER LLC

### 1 - FEELER GAUGE

1. Wipe cylinder bore clean. Insert ring and push down with piston to ensure it is square in bore. The ring gap measurement must be made with the ring positioning at least 12 mm (0.50 in.) from bottom of cylinder bore. Check gap with feeler gauge. Top compression ring gap .30 to .45 mm (.0118 to .0177 in.). Second compression ring gap .30 to .45 mm (.0118 to .0177 in.). Oil control ring gap .25 to .50 mm (.0098 to .0196 in.).
2. If ring gaps exceed dimension given, new rings or cylinder liners must be fitted. Keep piston rings in piston sets.



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### **Fig. 392: Piston Ring To Groove Clearance**

Courtesy of CHRYSLER LLC

3. Check piston ring to groove clearance. Top compression ring gap .080 to .130 mm (.0031 to .0051 in.). Second compression ring gap .070 to .110 mm (.0027 to .0043 in.). Oil control ring gap .040 to .080 mm (.0015 to .0031 in.).

#### **Removal**

#### **REMOVAL**

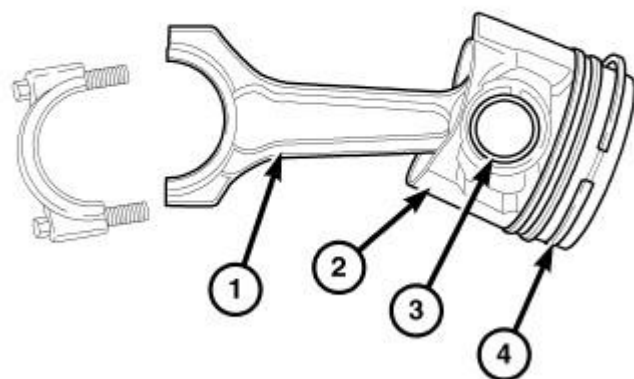
**NOTE:** Both the connecting rod and the connecting rod cap are paint marked to aid during assembly. Paint marks disappear after time. If the rod and the cap are not marked with paint, paint mark or scribe them before disassembly.

1. Disconnect negative battery cable.
2. Remove cylinder head. See Engine/Cylinder Head - Removal.
3. Raise vehicle on hoist.
4. Remove the oil jets. See Engine/Lubrication/JET, Piston Oil Cooler - Removal.
5. Remove balance shaft assembly. See Engine/Engine Block/MODULE, Balance Shaft - Removal.
6. Remove top ridge of cylinder bores with a ridge reamer before removing pistons from cylinder block. **Be sure to keep top of pistons covered during this operation .**
7. Piston and connecting rods must be removed from top of cylinder block. Rotate crankshaft so that each connecting rod is centered in cylinder bore.

**NOTE:** Be careful not to nick or scratch crankshaft journals

8. After removal, install bearing cap on the mating rod and mark pistons with matching cylinder number when removed from engine block.

#### **PISTON PIN - REMOVAL**

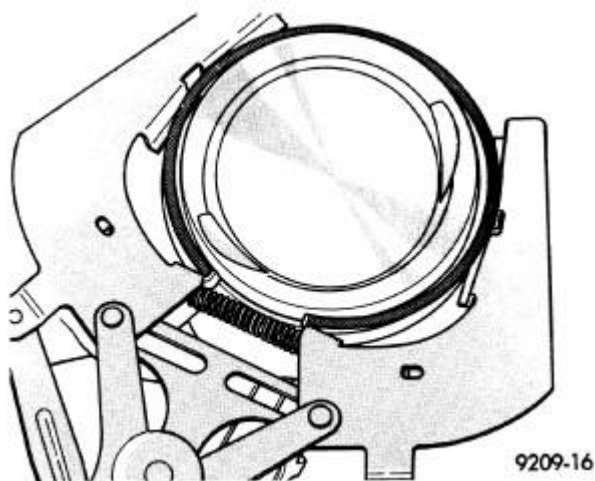


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**Fig. 393: Piston & Connecting Rod**  
Courtesy of CHRYSLER LLC

1. Secure connecting rods (1) in a soft jawed vice.
2. Remove 2 snap rings securing piston pin (3).
3. Push piston pin (3) out of piston (2) and connecting rod (1).

#### **PISTON RING - REMOVAL**



**Fig. 394: Piston Rings**  
Courtesy of CHRYSLER LLC

1. ID mark on face of top and second piston rings must point toward piston crown.
2. Using a suitable ring expander, remove top and second piston rings.

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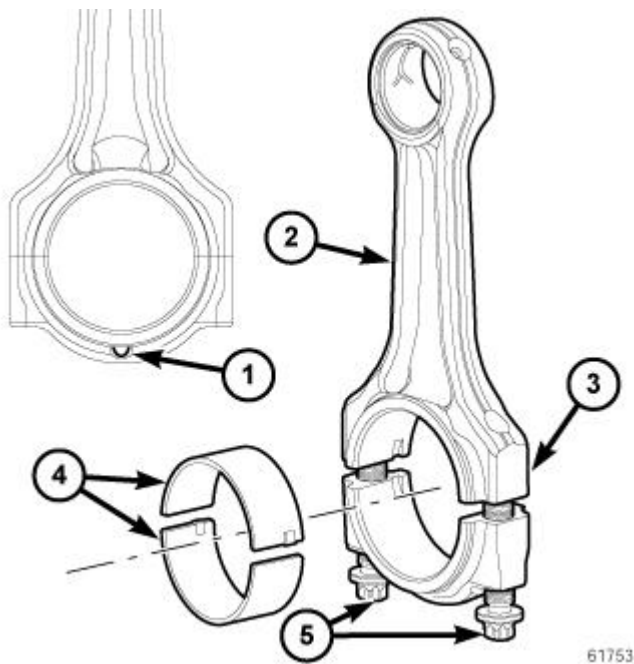
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3. Remove upper oil ring side rail, lower oil ring side rail and then the oil expander from piston.
4. Carefully clean carbon from piston crowns, skirts and ring grooves ensuring the 4 oil holes in the oil control ring groove are clear.

### Inspection

#### INSPECTION

#### PISTONS

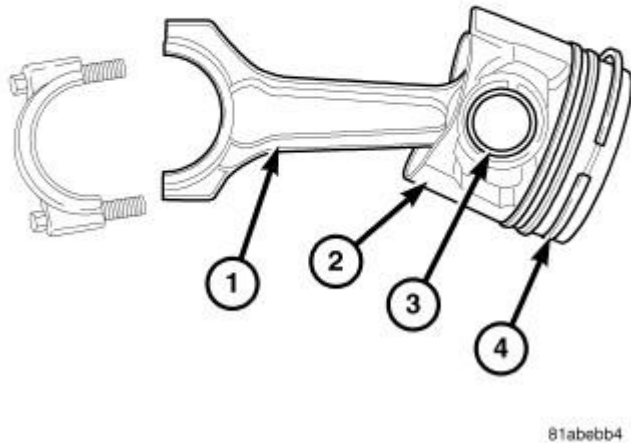


**Fig. 395: Connecting Rod Identification**  
Courtesy of CHRYSLER LLC

- 1 - CONNECTING ROD PAWL
- 2 - CONNECTING ROD
- 3 - PAINTED CYLINDER IDENTIFIER
- 4 - CONNECTING ROD BEARINGS
- 

1. Piston Diameter: Size: 91.912-91.928 mm (3.6185-3.6192 in.) Maximum wear limit .05 mm (.0019 in.).
2. Check piston pin bores in piston for roundness. Make 3 checks at 120° intervals. Maximum out of roundness .05 mm (.0019 in.).
3. The piston diameter should be measured approximately 15 mm (.590 in.) up from the base.
4. Skirt wear should not exceed 0.1 mm (.00039 in.).
5. The clearance between the cylinder liner and piston should not exceed 0.065-0.083 mm (.0025-.0032 in.).

#### CONNECTING RODS



**Fig. 396: Piston & Connecting Rod**  
Courtesy of CHRYSLER LLC

**CAUTION:** Connecting rod bolts must be replaced when disassembled. When assembling the connecting rod (2), be sure that the connecting rod pawl (1) on each of the connecting rod caps is facing the rear (flywheel) side of the engine.

**NOTE:** Do Not lubricate the new connecting rod bolts. They are already coated with a anti-scuff treatment.

1. Assemble connecting rod bearings (4) and bearing caps to their respective connecting rods (2) ensuring that the serrations on the cap and reference marks are aligned.
2. Tighten connecting cap bolts to 10 N.m (88 in. lbs.).
3. Without loosening connecting rod bolts, tighten all bolts to 30 N.m (22 ft. lbs.).
4. Using a torque angle gauge, tighten each bolt an additional 40°.
5. Recheck all bolt tightening with a torque wrench set to 88 N.m (65 ft. lbs.).
6. Check and record internal diameter of crank end of connecting rod (2).

**CAUTION:** When changing connecting rods (2), DO NOT use a stamp to mark the cylinder location. Identify the connecting rods (2) and caps location using a paint marker. All four must have the same weight and the same number. Replacement connecting rods (2) will only be supplied in sets of four.

Connecting rods (2) are supplied in sets of four since they all must be of the same weight category. Max

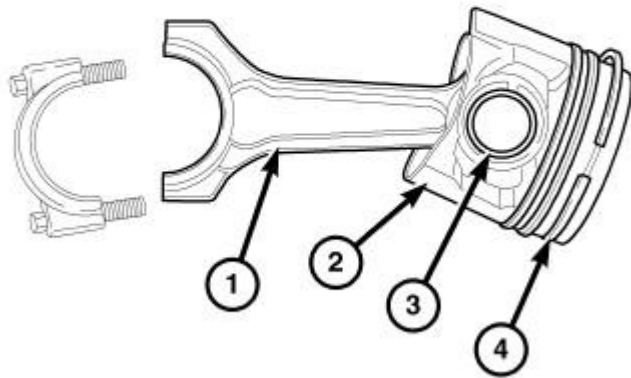


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allowable weight difference is 5 gr.

### PISTON PINS



81abebb4

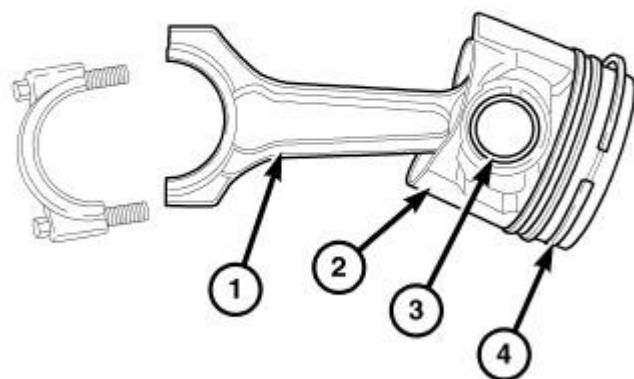
**Fig. 397: Piston & Connecting Rod**  
Courtesy of CHRYSLER LLC

1. Measure the diameter of piston pin in the center and both ends for specification. See **Engine - Specifications**.

### Installation

### INSTALLATION

### PISTON PIN INSTALLATION



81abebb4

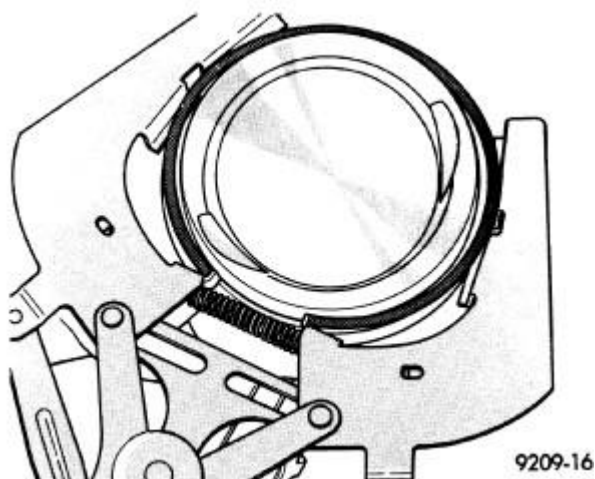
**Fig. 398: Piston & Connecting Rod**  
Courtesy of CHRYSLER LLC

1. Secure connecting rod (1) in soft jawed vice.
2. Lubricate piston pin (3) and piston (2) with clean engine oil.
3. Position piston (2) on connecting rod (1).

**CAUTION: Ensure arrow on piston crown and the bearing cap numbers on the connecting rod are on the opposite side.**

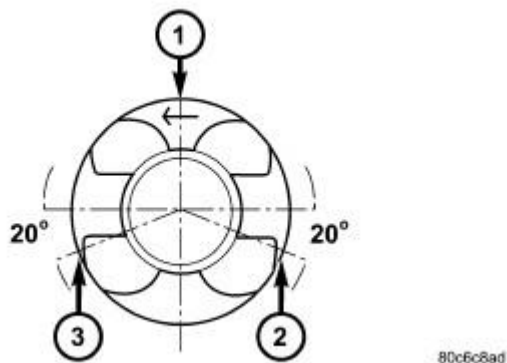
4. Install piston pin (1).
5. Install snap ring in piston (2) to retain piston pin (3).
6. Remove connecting rod (1) from vice.

#### **PISTON RINGS - INSTALLATION**

**Fig. 399: Piston Rings**

Courtesy of CHRYSLER LLC

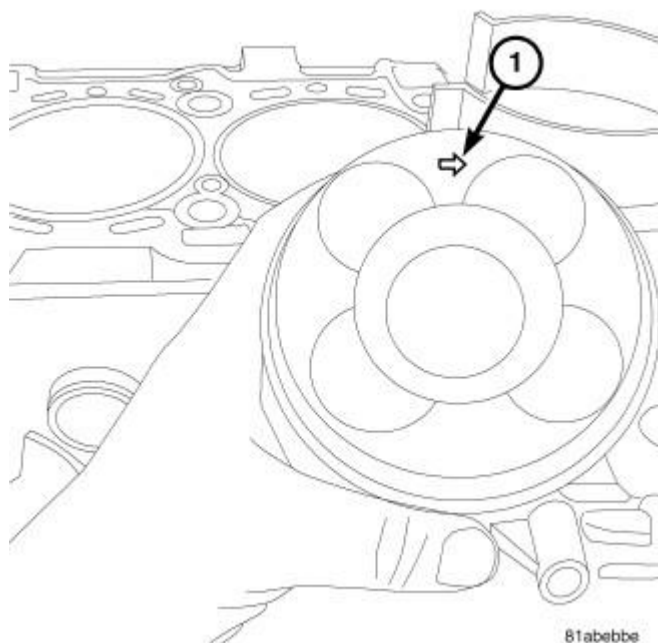
1. Install rings on the pistons using a suitable ring expander.

**Fig. 400: Piston Ring Gap Location**

Courtesy of CHRYSLER LLC

- |  |
|--|
| 1 - SECOND COMPRESSION RING GAP POSITION |
| 2 - OIL CONTROL RING GAP POSITION        |
| 3 - TOP COMPRESSION RING GAP POSITION    |

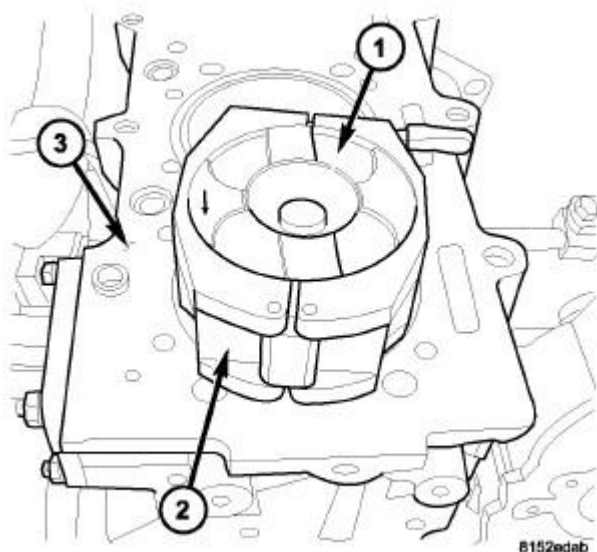
2. Top compression ring is tapered and chromium plated. The second ring is of the scraper type and must be installed with scraping edge facing bottom of the piston. The third is an oil control ring. Ring gaps must be positioned, before inserting piston into the liners, as follows .
3. Top ring gap must be positioned at the #3 position (looking at the piston crown from above).
4. Second piston ring gap should be positioned at the #1 position.
5. Oil control ring gap should be positioned at the #2 position.



**Fig. 401: Piston Direction**  
Courtesy of CHRYSLER LLC

6. When assembling pistons check that components are installed in the same position as before disassembly, determined by the numbers stamped on the crown of individual pistons. Engine cylinders are numbered starting from gear train end of the engine. **Face arrow on top of piston toward front of engine .** Therefore, the numbers stamped on connecting rod big end should face toward the injection pump side of engine. To insert piston into cylinder use a ring compressor as shown in illustration.

#### INSTALLATION



**Fig. 402: Piston, Ring Compressor & Engine Block**

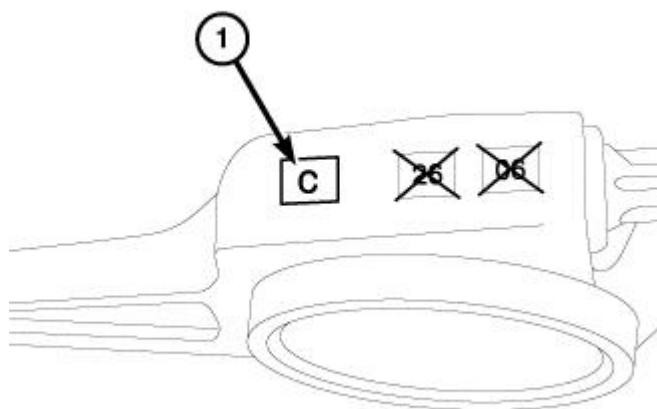
## 2009 Chrysler Town & Country LX

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Courtesy of CHRYSLER LLC

1 - PISTON  
2 - PISTON RING COMPRESSOR  
3 - ENGINE BLOCK

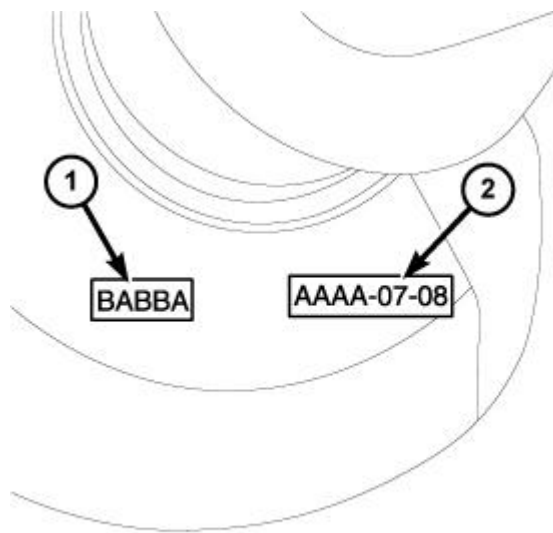
1. Before installing pistons, and connecting rod assemblies into the bore, be sure that compression ring gaps are staggered so that neither is in line with oil ring gap.
2. Before installing the ring compressor, make sure the oil ring expander ends are butted together.
3. Immerse the piston head and rings in clean engine oil, slide the piston ring compressor, over the piston and tighten. **Ensure position of rings does not change during this operation .**
4. Face arrow on piston towards front of engine.



61771

**Fig. 403: View Of Letter "C"**  
Courtesy of CHRYSLER LLC

5. The letter "C" (1) is used for connecting rod bearing selection on the bearing chart and is to be matched with the letter found on the crankshaft in order to determine the correct size bearings to be used.



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**Fig. 404: Crankshaft Connecting Rod Journal Diameter**  
 Courtesy of CHRYSLER LLC

6. Compare the crankshaft connecting rod journal diameter (2) with the bearing selection chart to determine the correct bearing size for each cylinder. The letters stamped into the crankshaft (2) are in the same order as the cylinders. The first letter corresponds to the first cylinder, the second to the second, etc. See Engine/Engine Block - Standard Procedure.

**NOTE:** The connecting rod bolts must be replaced every time they are loosened or removed.

**CAUTION:** Care must be taken not to nick crankshaft journal when installing pistons.

7. Rotate crankshaft so that the connecting rod journal is on the center of the cylinder bore. Insert rod and piston into cylinder bore and guide rod over the crankshaft journal.
8. Guide the piston down in cylinder bore, using a hammer handle. At the same time, guide connecting rod into position on connecting rod journal.
9. Install connecting rod caps. Using new bolts, install rod bolts and tighten to 10 N.m (88 in. lbs.). Tighten bolts the next stage to 30 N.m (22 ft. lbs.) plus 40°. Then with a torque wrench set at torque to 88 N.m (65 ft. lbs.), make a tightening check.
10. Install the oil jets. See Engine/Lubrication/JET, Piston Oil Cooler - Installation.
11. Install cylinder head. See Engine/Cylinder Head - Installation.
12. Install balance shaft assembly. See Engine/Engine Block/MODULE, Balance Shaft - Installation.
13. Connect negative battery cable.

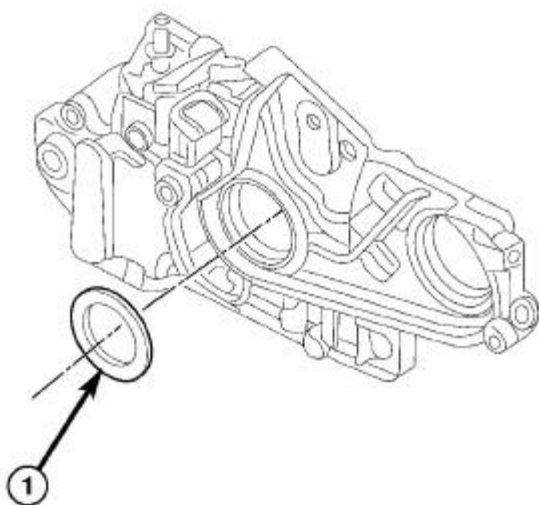
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### Removal

#### REMOVAL

1. Remove the timing belt. See Engine/Valve Timing/BELT, Timing - Removal.
2. Remove the crankshaft sprocket. See Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Removal.



81df239a

**Fig. 405: Front Crankshaft Oil Seal**  
Courtesy of CHRYSLER LLC

**NOTE:** Do not gouge or scratch the surface of the crankshaft when removing the front crankshaft oil seal.

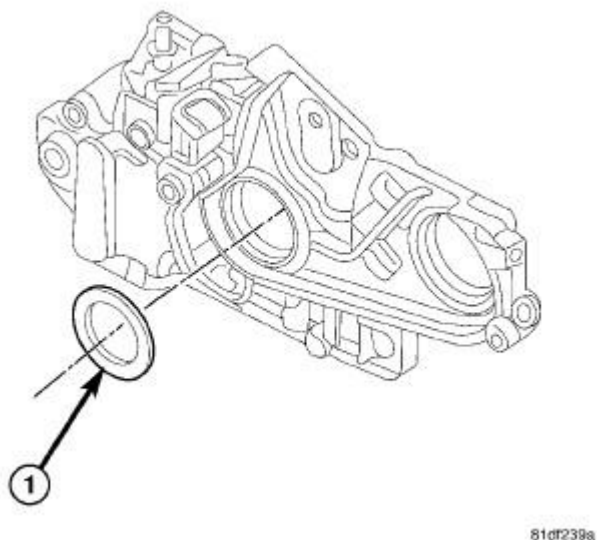
3. Remove the front crankshaft oil seal (1).

### Installation

#### INSTALLATION

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**Fig. 406: Front Crankshaft Oil Seal**  
Courtesy of CHRYSLER LLC

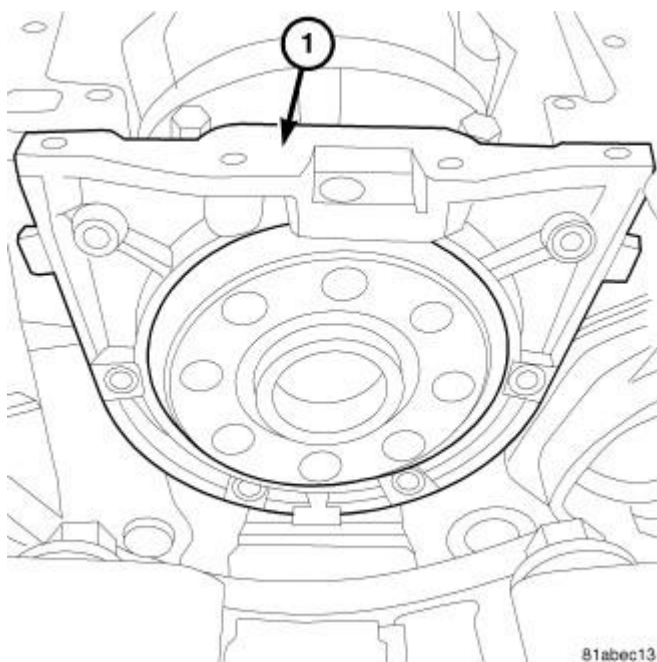
1. Use the VM 9937 seal installer to install the front crankshaft oil seal (1) into the rear timing belt cover.
2. Install the crankshaft sprocket. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Installation**.
3. Install the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Installation**.

### SEAL, CRANKSHAFT OIL, REAR

#### Description

#### DESCRIPTION





**Fig. 407: Rear Crankshaft Seal & Rear Main Oil Seal Carrier**  
**Courtesy of CHRYSLER LLC**

The rear crankshaft seal consists of a seal and a seal carrier (1). The rear seal is inserted into the carrier. Once assembled the rear main seal assembly should not be separated to reduce the possibility of damage to the internal rear seal lip.

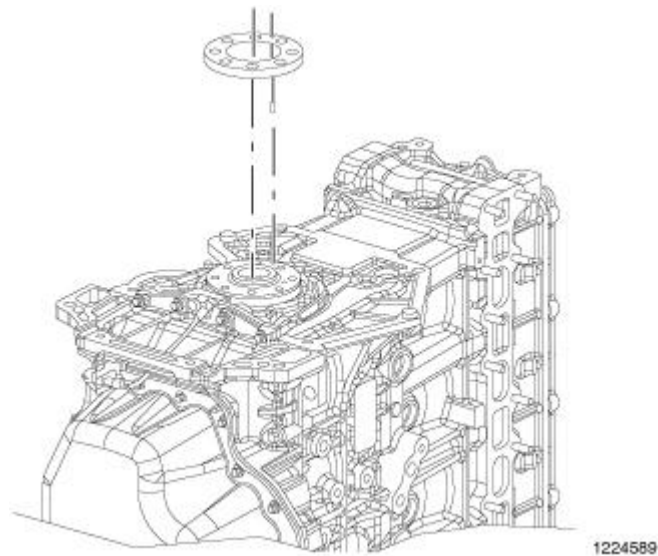
### **Removal**

#### **REMOVAL**

1. Remove the transaxle. Refer to **Transmission and Transfer Case/Automatic - 62TE - Removal** .
2. Remove flywheel assembly.
3. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.

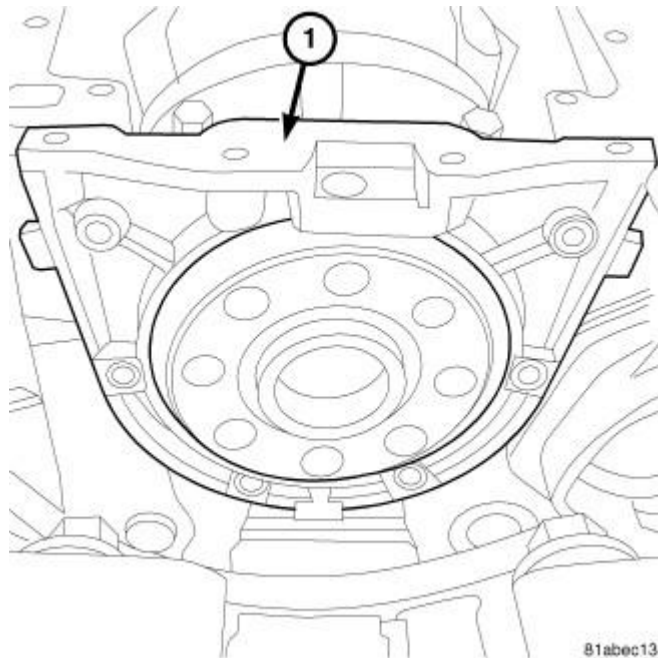
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**Fig. 408: Crankshaft Sensor Tone Wheel**  
Courtesy of CHRYSLER LLC

4. Remove the crankshaft sensor tone wheel before removing the rear main oil seal.



**Fig. 409: Rear Crankshaft Seal & Rear Main Oil Seal Carrier**  
Courtesy of CHRYSLER LLC

5. Remove the rear crankshaft seal and the rear main oil seal carrier.

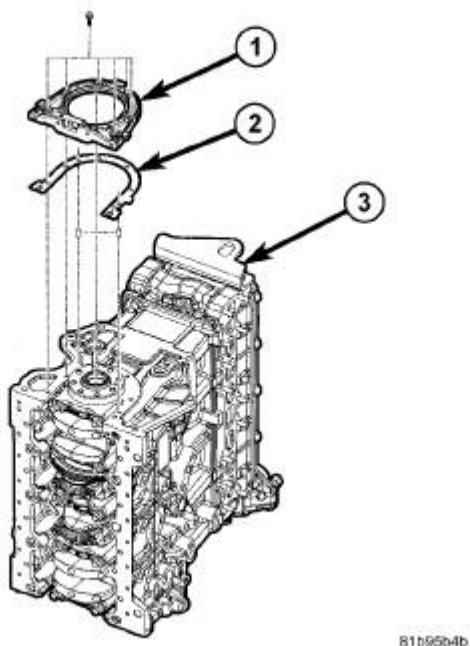
### Installation

### INSTALLATION

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1. Make sure the rear main seal sealing surfaces are free of oil and debris.

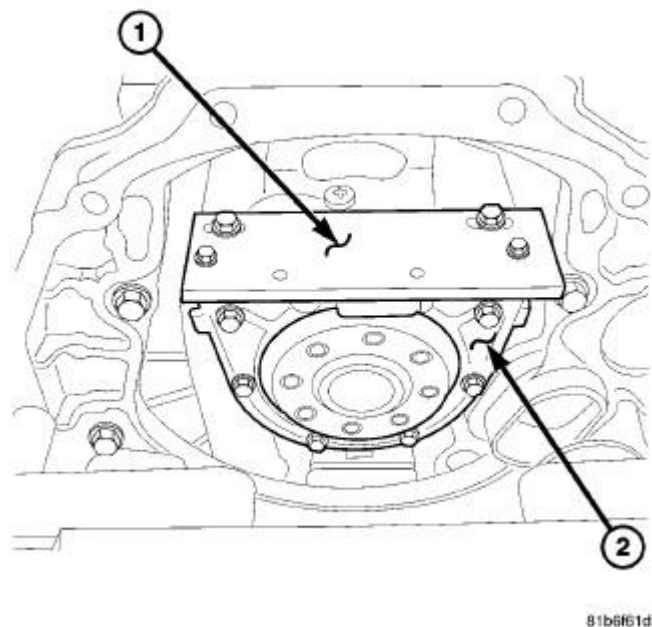


**Fig. 410: Rear Main Seal Carrier Gasket**  
Courtesy of CHRYSLER LLC

2. Position the rear main seal carrier gasket (2) onto the rear of the engine block (3).
3. Using special tool VM. 9993, install rear crankshaft oil seal into the rear main seal carrier (1).
4. Using special tool VM. 9993 install the rear main seal carrier onto the engine block (3).

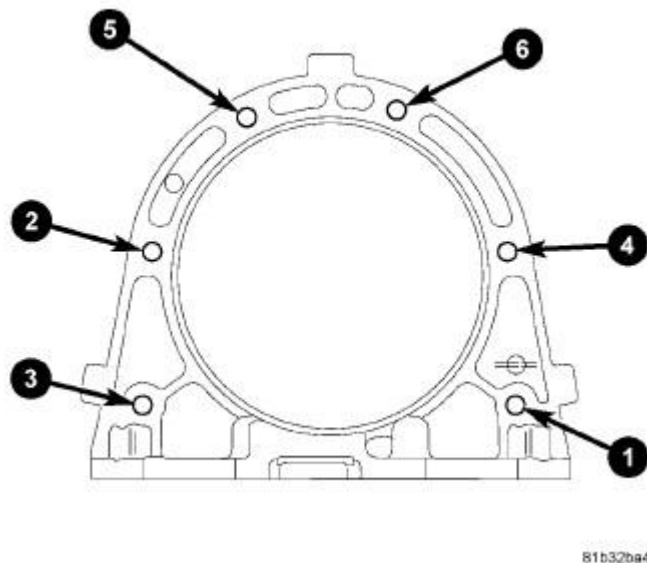
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**Fig. 411: Rear Oil Seal Carrier**  
Courtesy of CHRYSLER LLC

5. Loosely install the bolts that secure the rear oil seal carrier (2) to the engine block.
6. Use special tool VM. 9990 (1) to set the depth of the rear main seal (2).



**Fig. 412: Rear Seal Cover Bolts**  
Courtesy of CHRYSLER LLC

7. Use the figured pattern shown in **Fig. 412**, tighten the rear seal cover bolts to 15 N.m (133 in. lbs.).
8. Make sure the crankshaft sensor tone wheel is positioned correctly on the crankshaft.
9. Install the crankshaft sensor tone wheel to the rear of the crankshaft.
10. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
11. Install the flywheel. See **Engine/Engine Block/FLEXPLATE - Installation**.
12. Install the transaxle. Refer to **Transmission and Transfer Case/Automatic - 62TE - Installation**.

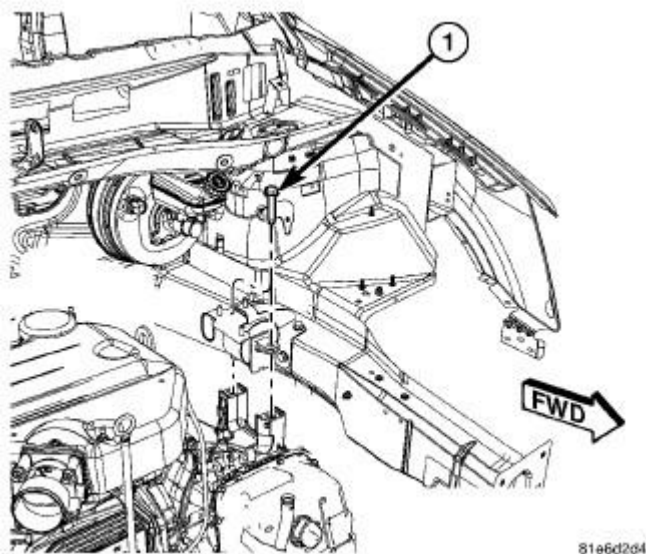
## ENGINE MOUNTING

### INSULATOR, ENGINE MOUNT, LEFT

#### Removal

#### REMOVAL

1. Support the transmission and engine from below.

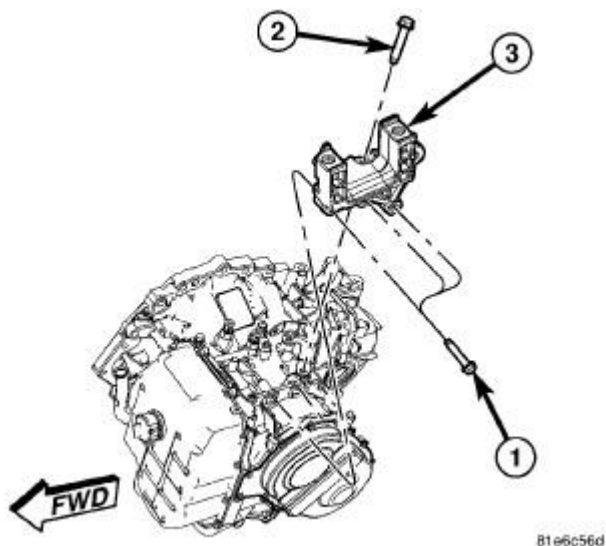


**Fig. 413: Engine Mount-To-Trans Bracket Bolts**  
Courtesy of CHRYSLER LLC

2. Remove the engine mount-to-trans bracket bolt (1).

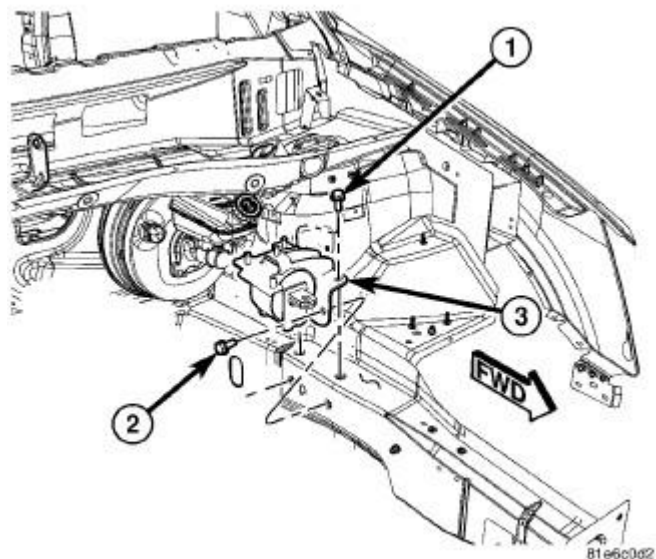
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**Fig. 414: Transmission Mount Bolts**  
Courtesy of CHRYSLER LLC

3. If replacing the transmission mount, remove the bolts (1) and (2), and remove the transmission mount (3). Otherwise, go to the next step.



**Fig. 415: Left Engine Mount**  
Courtesy of CHRYSLER LLC

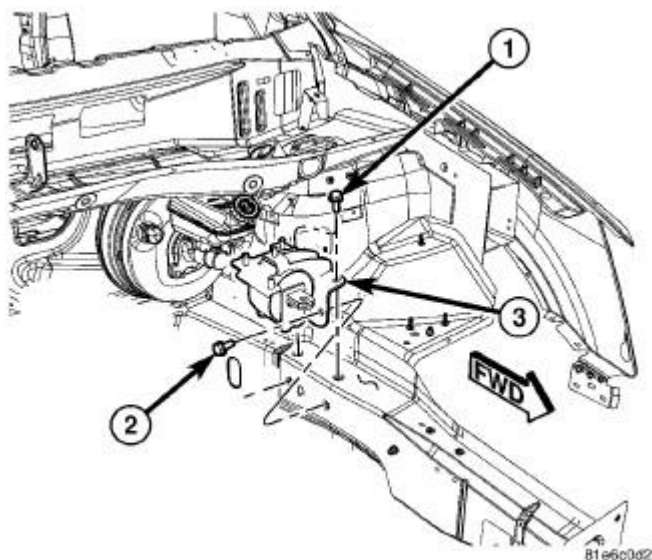
4. Remove the engine mount-to-rail bolts (1) and (2), and remove the left engine mount (3) from the rail.

### Installation

### INSTALLATION

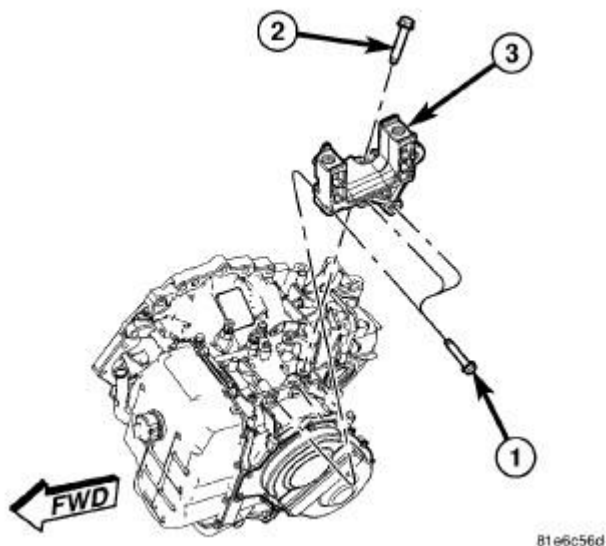
## 2009 Chrysler Town & Country LX

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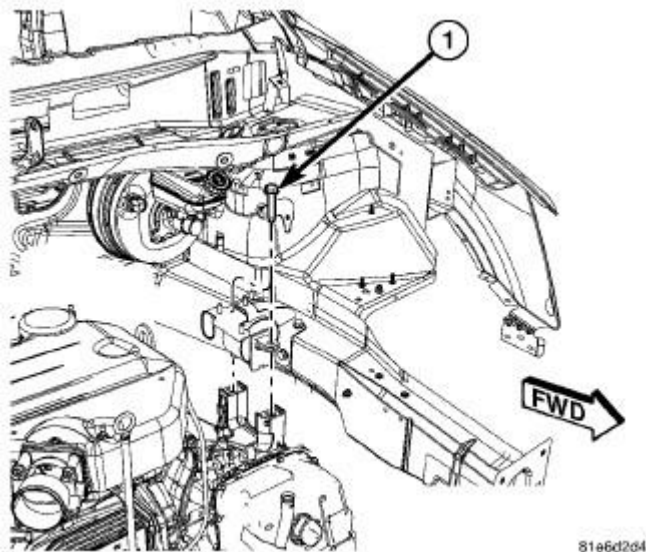
**Fig. 416: Left Engine Mount**  
Courtesy of CHRYSLER LLC

1. Install the left engine mount (3) onto the rail.
2. Install the bolts (1) and (2). Tighten the bolts to 54 N.m (40 lbs. ft.).



**Fig. 417: Transmission Mount Bolts**  
Courtesy of CHRYSLER LLC

3. If installing a new transmission mount, install the mount (3), and install the bolts (1) and (2). Tighten the bolts to 100 N.m (74 ft. lbs.). Otherwise, go to the next step.



**Fig. 418: Engine Mount-To-Trans Bracket Bolts**  
Courtesy of CHRYSLER LLC

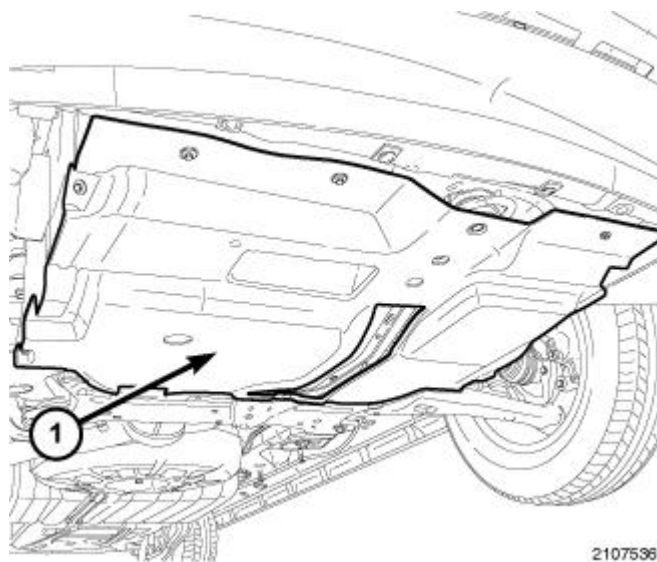
4. Align the transmission mount with the left engine mount, and install the engine mount-to-trans bracket bolts (1). Tighten to 95 N.m (70 lb. ft.).

## **INSULATOR, ENGINE MOUNT, RIGHT**

### **Removal**

### **REMOVAL**

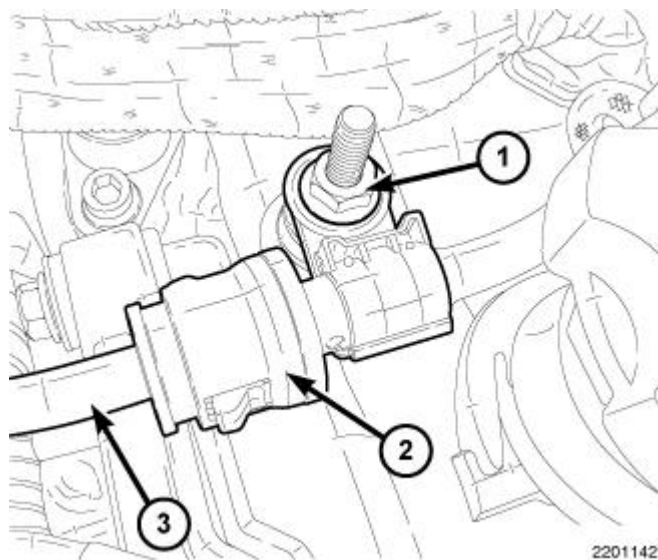
1. Disconnect the negative battery cable.
2. Remove the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal.**





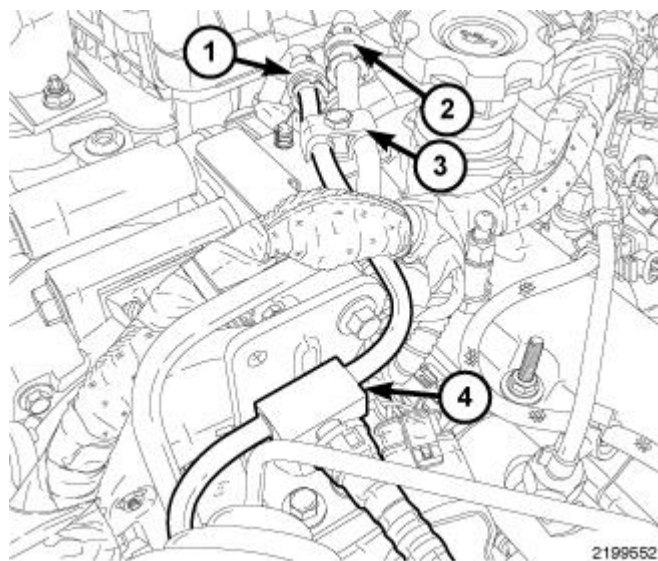
**Fig. 419: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

3. Remove the underbody splash shield (1).



**Fig. 420: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

4. Remove the retaining nut (1) and disconnect the fuel injector return line (2).

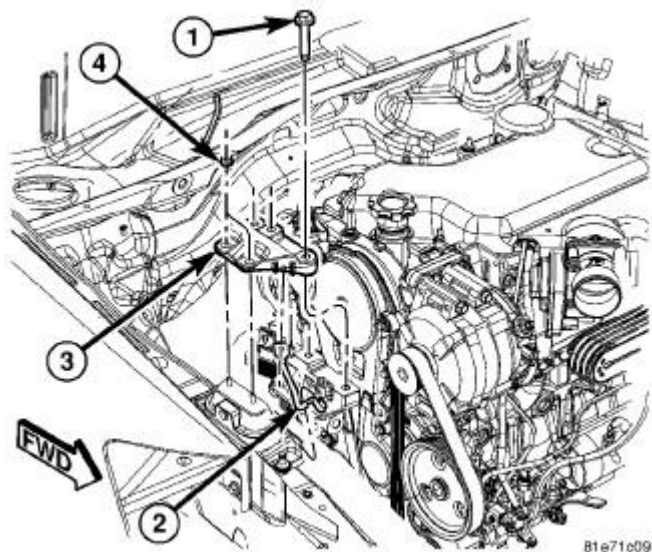


**Fig. 421: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

5. Disconnect the fuel return line (1).
6. Disconnect the fuel feed line (2).

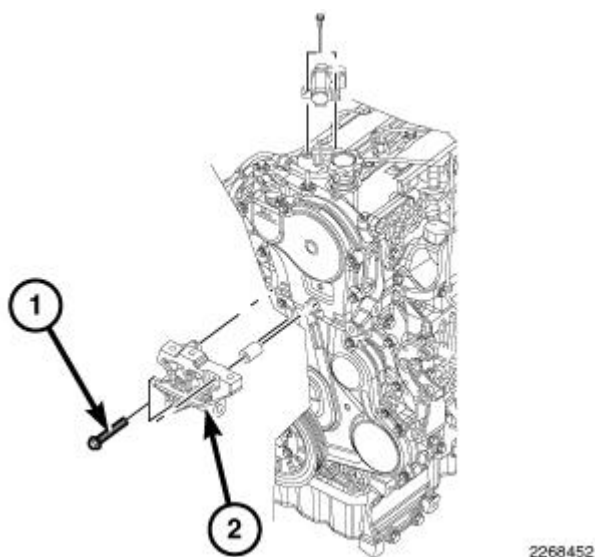
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**Fig. 422: Upper Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

7. Support the engine from below.
8. Remove the ground strap (2).
9. Remove the fasteners (1), (4) and the upper engine mount bracket (3).

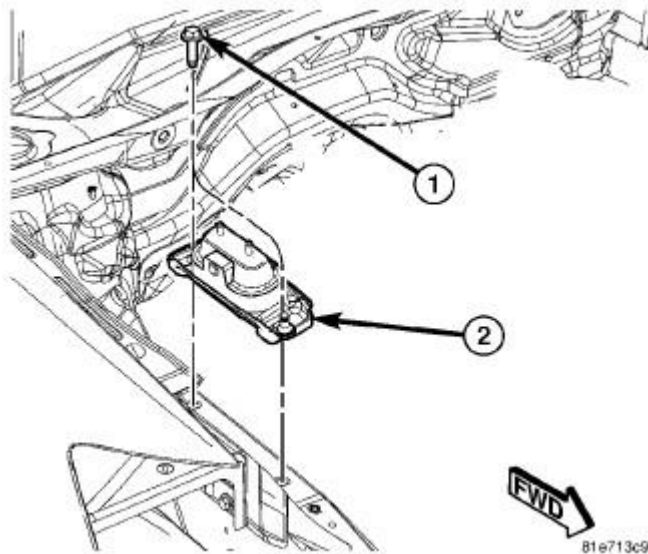


**Fig. 423: Inner Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

10. Remove fasteners (1) and the inner engine mount bracket (2).

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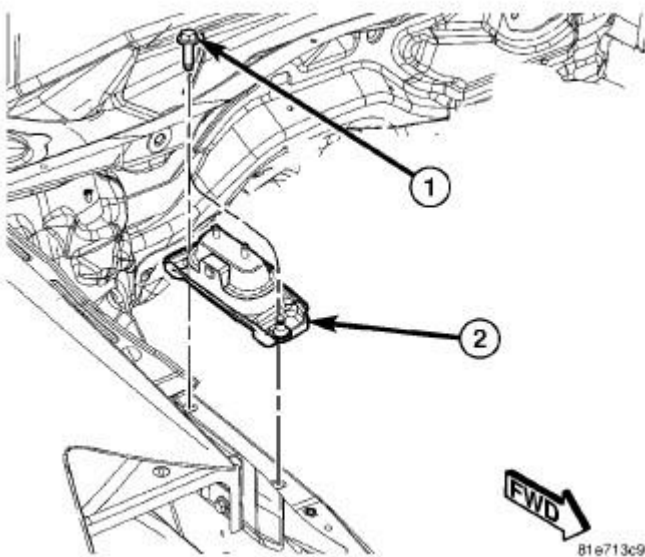


**Fig. 424: Lower Engine Mount**  
Courtesy of CHRYSLER LLC

11. Remove the fasteners (1) and the lower engine mount (2).

### Installation

#### INSTALLATION

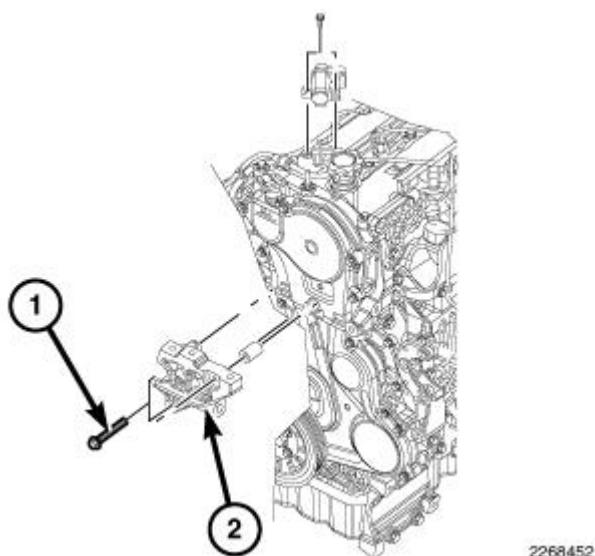


**Fig. 425: Lower Engine Mount**  
Courtesy of CHRYSLER LLC

1. Install the lower engine mount (2). Tighten the fasteners (1) to 54 N.m (40 ft. lbs.).

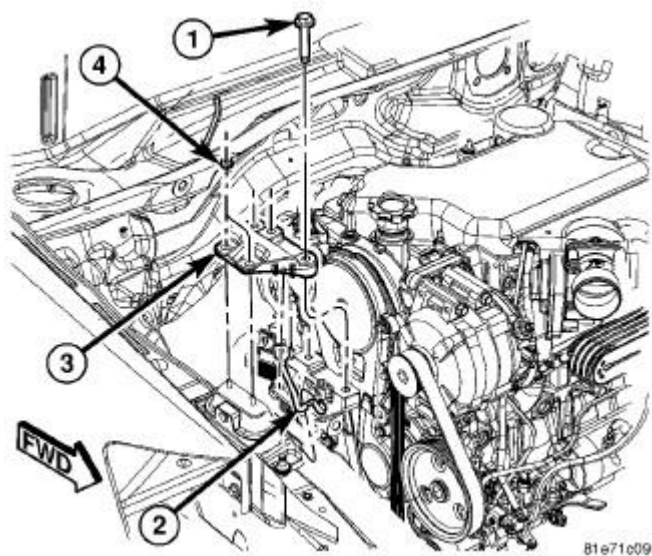
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**Fig. 426: Inner Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

2. Install the inner engine mount bracket (2). Tighten fasteners (1) to 45 N.m (33 ft. lbs.).

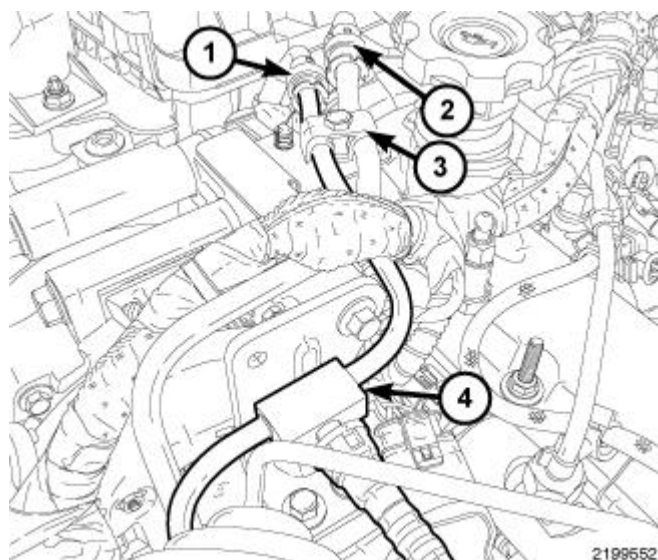


**Fig. 427: Upper Front Engine Mount**  
Courtesy of CHRYSLER LLC

3. Install the upper front engine mount bracket (3).
  - Tighten the bolts (4) to 61 N.m (44 ft. lbs.).
  - Tighten the nuts (1) to 20 N.m (177 in. lbs.).
4. Install the ground strap (2).
5. Remove the support from under engine.

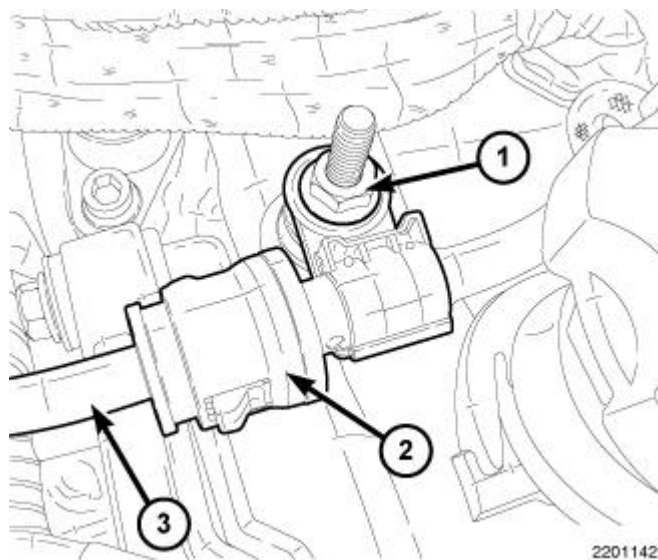
## 2009 Chrysler Town & Country LX

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**Fig. 428: Fuel Return Line Block**  
Courtesy of CHRYSLER LLC

6. Connect the fuel feed line (2).
7. Connect the fuel return line (1).

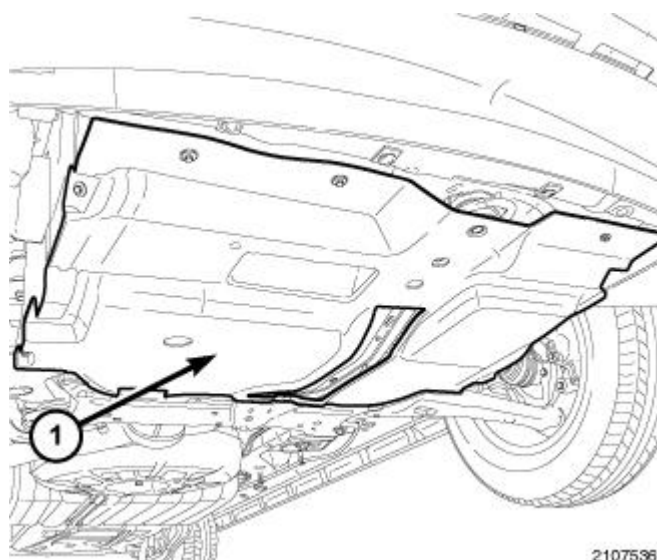


**Fig. 429: Fuel Injector Return Line**  
Courtesy of CHRYSLER LLC

8. Connect the fuel injector return line (2) and install the retaining nut (1).

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**Fig. 430: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

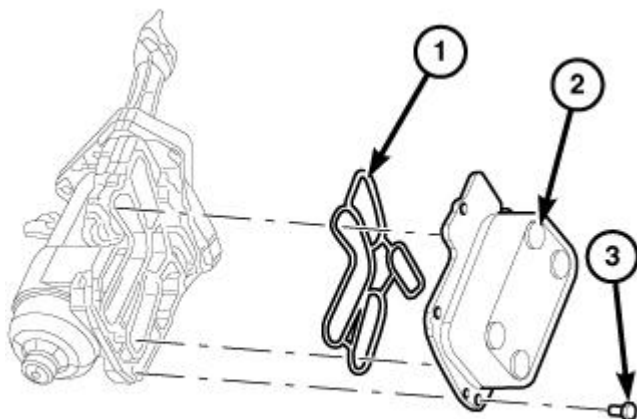
9. Install the underbody splash shield (1).
10. Install the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
11. Connect the negative battery cable.

## LUBRICATION

### COOLER, OIL

#### Description

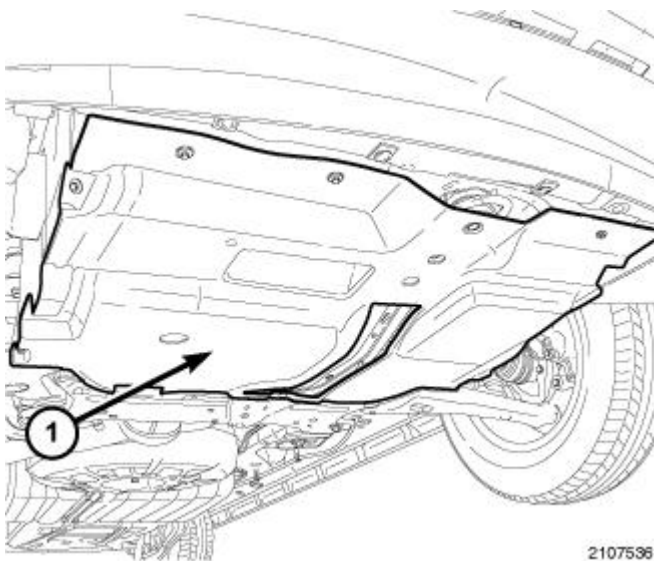
#### DESCRIPTION



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**Fig. 431: Oil Cooler Bolts****Courtesy of CHRYSLER LLC**

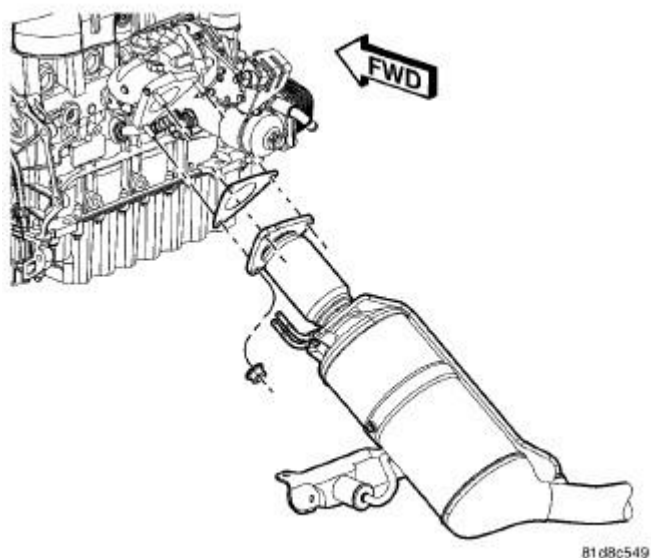
1. Engine coolant is used to cool the engine oil. A plate-style external heat exchanger (2) is located on the oil filter housing (3) which is on the right side of the engine. A gasket (1) seals the oil cooler to the oil filter housing. Replace the gasket (1) whenever the oil cooler is removed or replaced. The oil is fed to the oil cooler through the oil filter housing.

**Removal****OIL COOLER****Fig. 432: Underbody Splash Shield****Courtesy of CHRYSLER LLC**

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the underbody splash shield (1).
4. Drain the cooling system. Refer to **Cooling - Standard Procedure** .
5. Drain the engine oil.
6. Remove the right front inner splash shield.

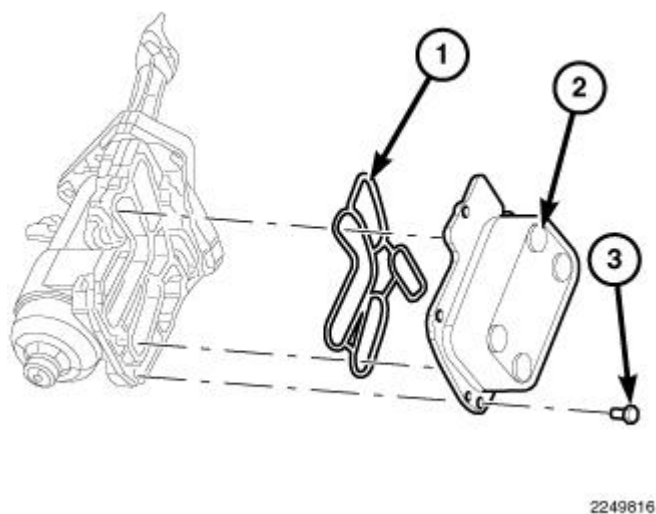
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**Fig. 433: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

7. Remove the Diesel Particulate Filter (DEF). Refer to **Exhaust System/FILTER, Diesel Particulate - Removal**.



**Fig. 434: Oil Cooler Bolts**  
Courtesy of CHRYSLER LLC

8. Remove the oil filter housing. See **Engine/Lubrication/HOUSING, Oil Filter - Removal**.
9. Remove the five bolts (3) and the oil cooler (2).

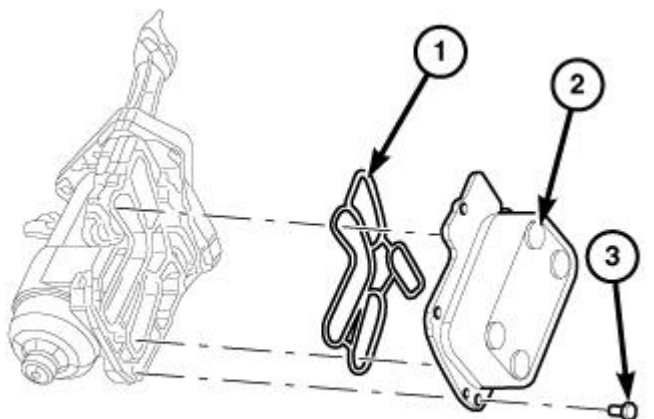
### Installation

### OIL COOLER



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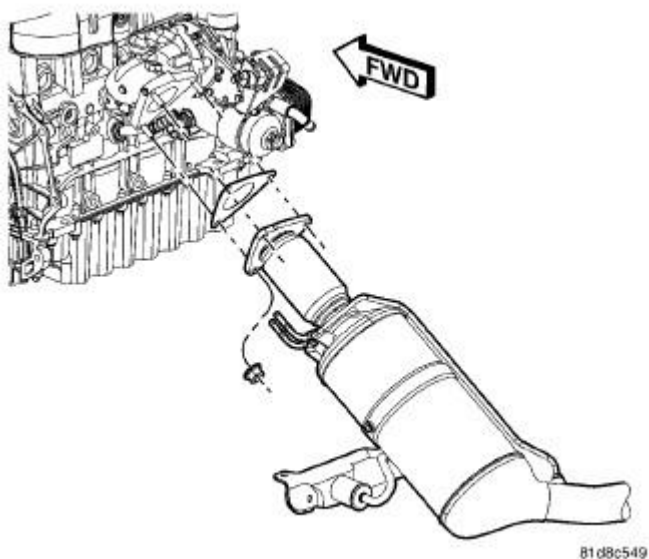


2249616

**Fig. 435: Oil Cooler Bolts**

Courtesy of CHRYSLER LLC

1. Using a new gasket (1), install the oil cooler (2). Tighten bolts (3) to 12 N.m (106 in. lbs.).
2. Install the oil filter housing. See **Engine/Lubrication/HOUSING, Oil Filter - Installation**.



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**Fig. 436: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**

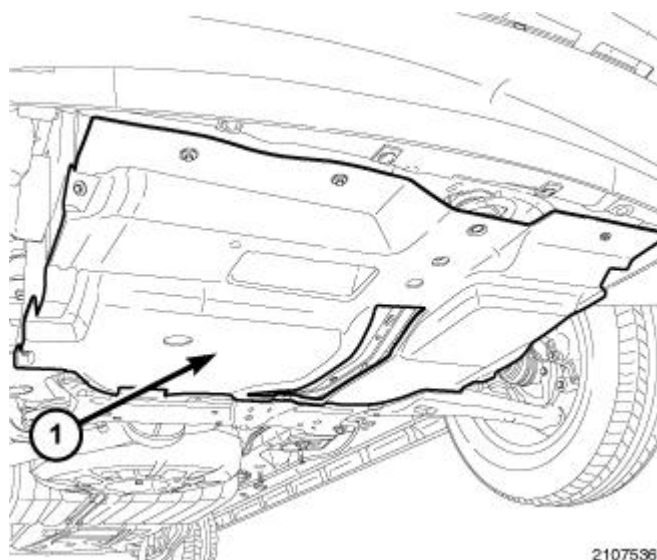
Courtesy of CHRYSLER LLC

3. Install the Diesel Particulate Filter (DEF). Refer to **Exhaust System/FILTER, Diesel Particulate - Installation**.
4. Install the right front inner splash shield. Refer to **Body/Exterior/SHIELD, Splash - Installation**.
5. Fill the engine with the recommended engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications**.

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6. Fill the cooling system. Refer to **Cooling - Standard Procedure** .
7. Connect the negative battery cable.
8. Start engine and check for leaks.



**Fig. 437: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

9. Install the underbody splash shield (1) and securely tighten the fasteners.
10. Lower the vehicle.

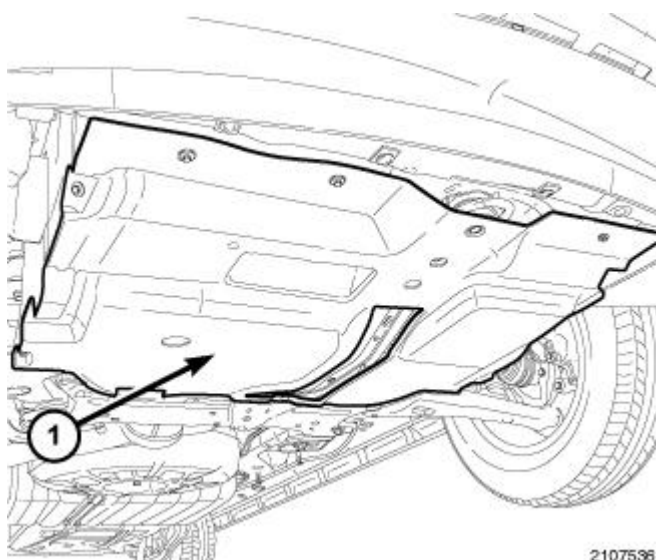
### **FILTER, ENGINE OIL**

#### **Removal**

#### **OIL FILTER**

## 2009 Chrysler Town & Country LX

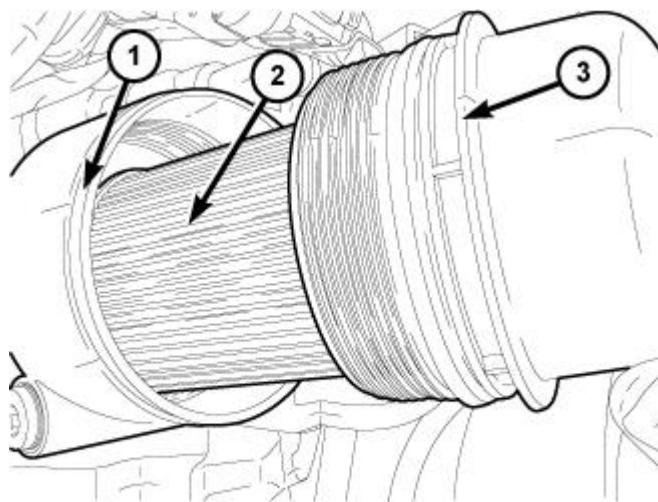
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2107536

**Fig. 438: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the underbody splash shield (1).
4. Drain the engine oil.



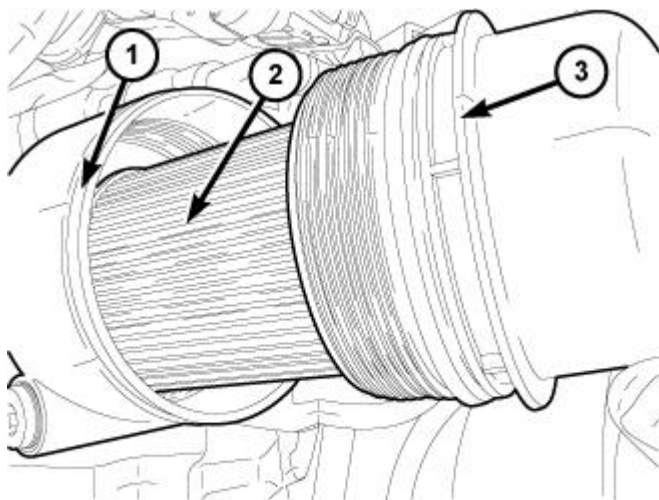
2243978

**Fig. 439: Oil Filter & Housing Adapter Cap**  
Courtesy of CHRYSLER LLC

5. Remove oil filter housing adapter cap (3) and the oil filter (2).

### Installation

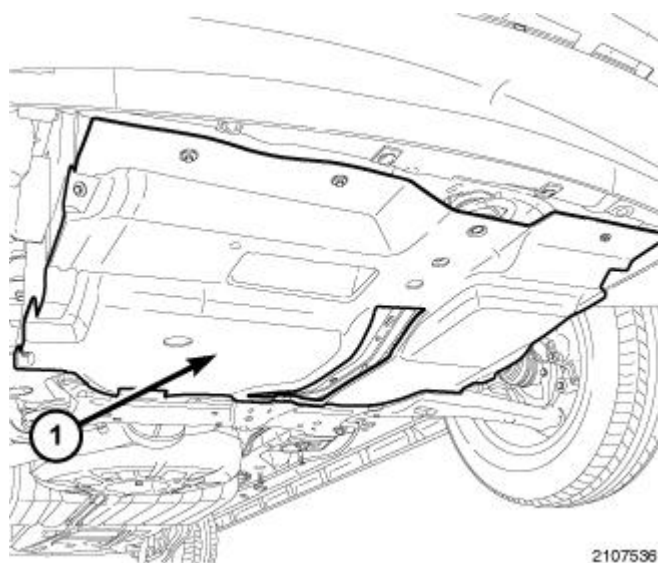
**OIL FILTER**



2243978

**Fig. 440: Oil Filter & Housing Adapter Cap**  
Courtesy of CHRYSLER LLC

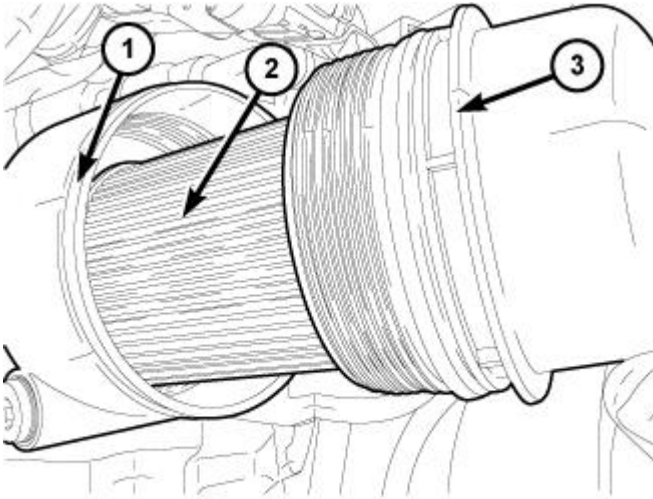
1. Install the oil filter (2) and oil filter housing adapter cap (3). Tighten cap to 25 N.m (18 ft. lbs.).



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**Fig. 441: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

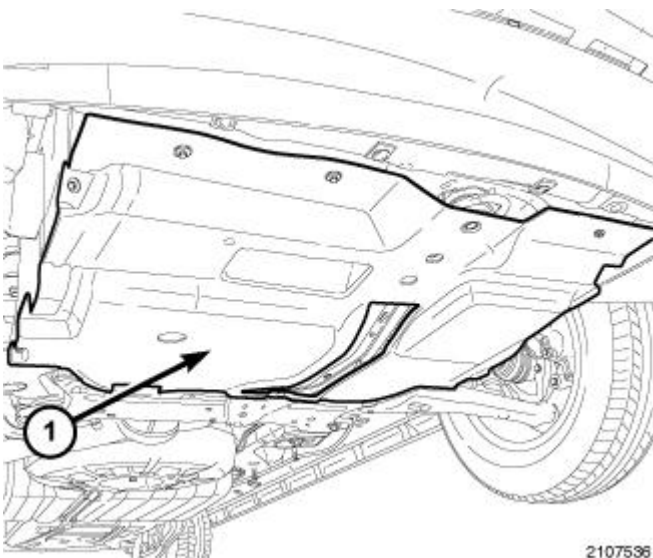
2. Install the underbody splash shield
3. Lower the vehicle
4. Fill the engine with recommended engine oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .
5. Connect the negative battery cable.

**HOUSING, OIL FILTER****Description****DESCRIPTION**

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**Fig. 442: Oil Filter & Housing Adapter Cap**  
Courtesy of CHRYSLER LLC

An oil filter adapter is used on this vehicle to relocate the oil filter for easier access when servicing.

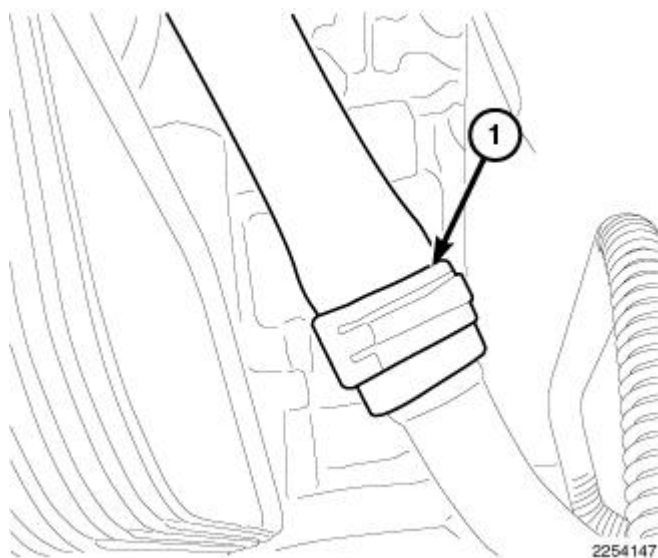
**Removal****OIL FILTER HOUSING**

2107536

**Fig. 443: Underbody Splash Shield**

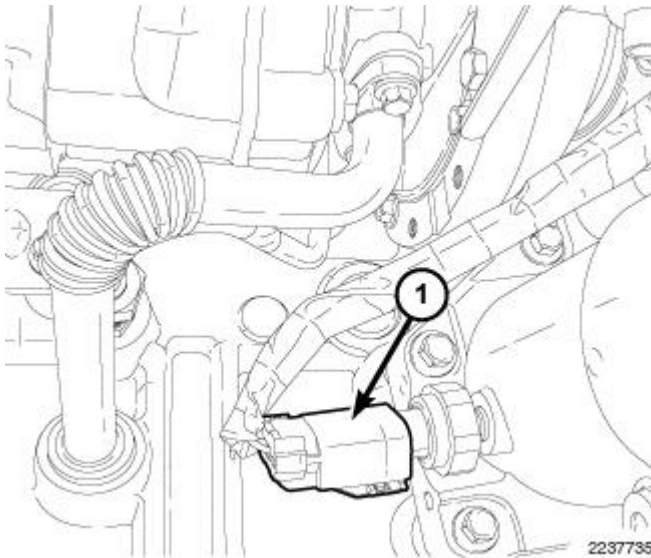
**Courtesy of CHRYSLER LLC**

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove the underbody splash shield (1).
4. Drain the cooling system. Refer to **Cooling - Standard Procedure** .
5. Drain the engine oil.
6. Remove the right front inner splash shield.
7. Remove the Diesel Particulate Filter (DEF). Refer to **Exhaust System/FILTER, Diesel Particulate - Removal** .



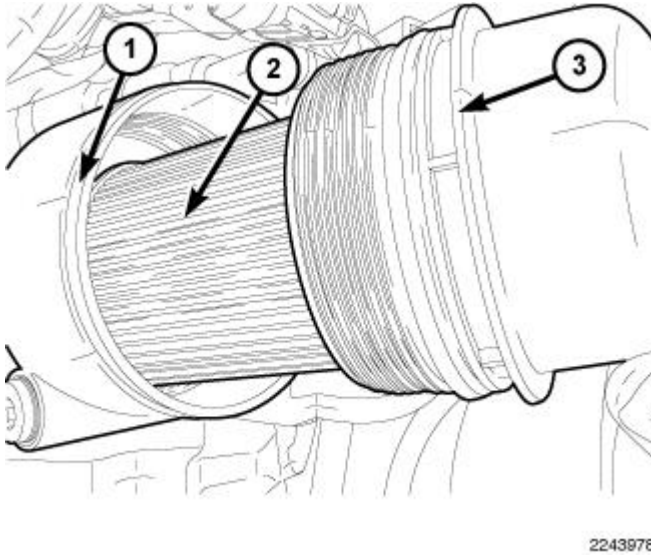
**Fig. 444: Engine Oil Coolant Hose**  
**Courtesy of CHRYSLER LLC**

8. Disconnect the engine oil coolant hose (1).



**Fig. 445: Oil Pressure Switch Harness Connector**  
Courtesy of CHRYSLER LLC

9. Disconnect the oil pressure switch harness connector (1).

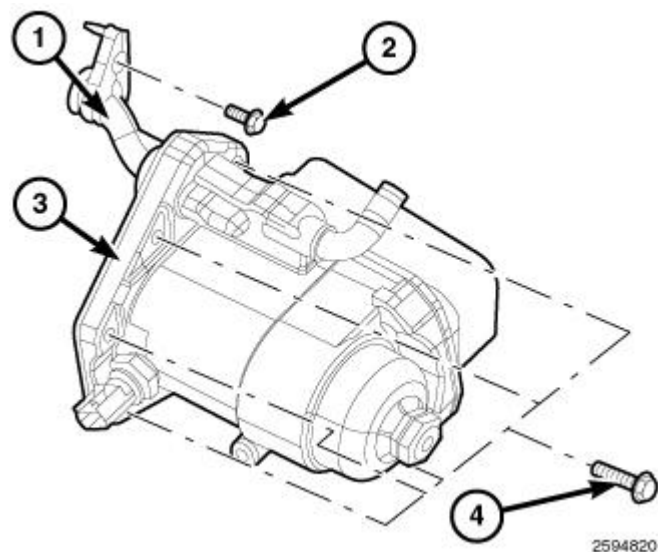


**Fig. 446: Oil Filter & Housing Adapter Cap**  
Courtesy of CHRYSLER LLC

10. Remove oil filter housing adapter cap (3) and the oil filter (2).

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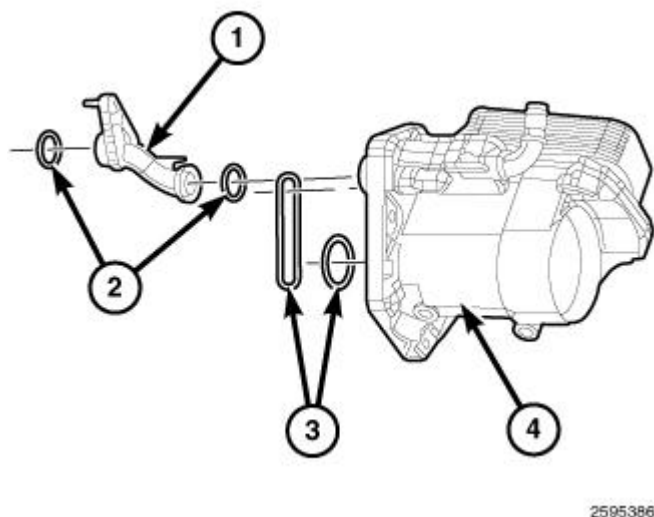


**Fig. 447: Engine Oil Filter Housing**  
Courtesy of CHRYSLER LLC

11. Remove bolts (2 and 4) along with the oil filter housing (3) and oil filter tube (1) from engine block.

### Installation

#### OIL FILTER HOUSING



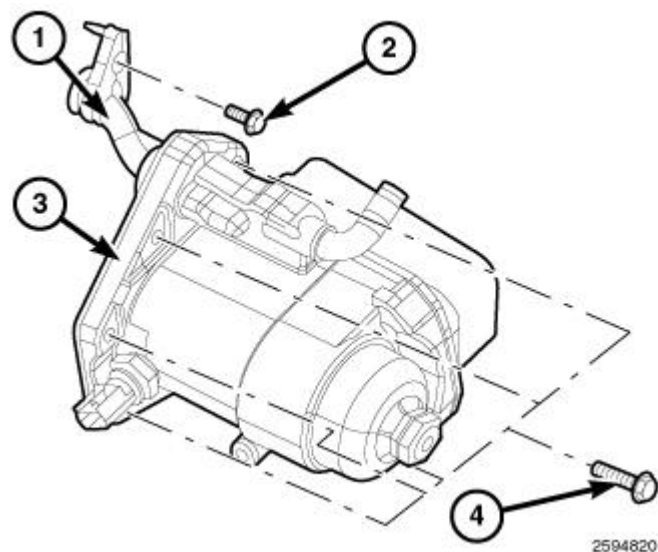
**Fig. 448: Oil Filter Tube & Housing With O-Ring Gaskets**  
Courtesy of CHRYSLER LLC

1. Install new O-ring gaskets (2) onto the oil filter tube (1).
2. Install new O-ring gaskets (3) onto the oil filter housing (4).



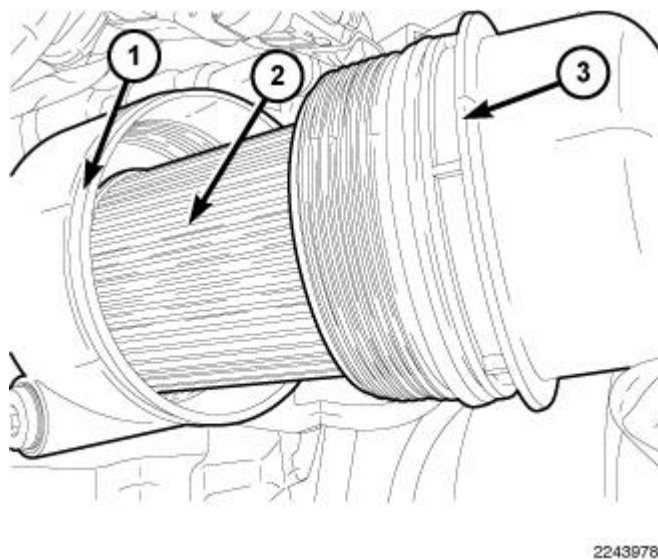
## 2009 Chrysler Town & Country LX

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**Fig. 449: Engine Oil Filter Housing**  
Courtesy of CHRYSLER LLC

3. Install the oil filter tube (1) to the engine block. Tighten bolt (2) to 11 N.m (97 in. lbs.).
4. Install the oil filter housing (3). Tighten bolts (4) to 32 N.m (24 ft. lbs.).

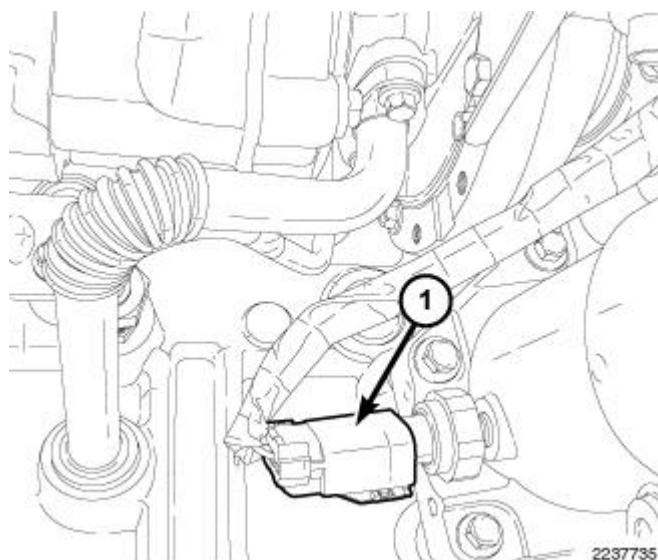


**Fig. 450: Oil Filter & Housing Adapter Cap**  
Courtesy of CHRYSLER LLC

5. Install the oil filter (2).
6. Install the oil filter housing adapter cap (3). Tighten to 25 N.m (18 ft. lbs.).

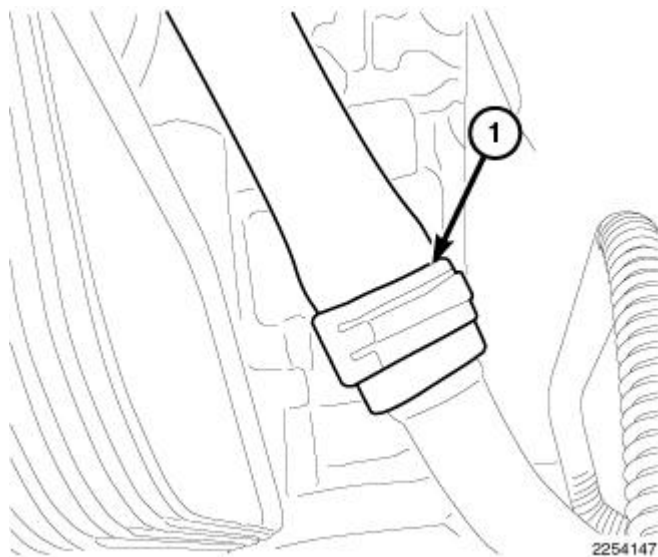
## 2009 Chrysler Town & Country LX

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**Fig. 451: Oil Pressure Switch Harness Connector**  
Courtesy of CHRYSLER LLC

7. Connect the oil pressure switch harness connector (1).

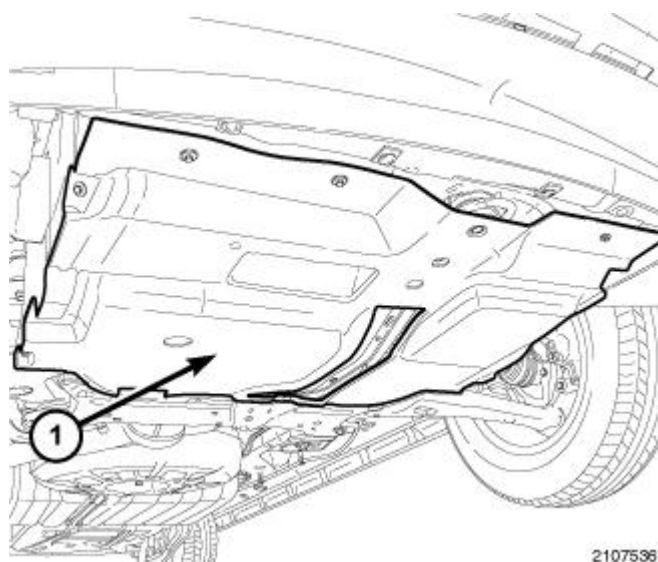


**Fig. 452: Engine Oil Coolant Hose**  
Courtesy of CHRYSLER LLC

8. Connect the engine oil coolant hose (1).
9. Install the Diesel Particulate Filter (DEF). Refer to **Exhaust System/FILTER, Diesel Particulate - Installation**.
10. Install the right front inner splash shield.
11. Fill the engine with recommended oil. Refer to **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications**.
12. Fill the cooling system. Refer to **Cooling - Standard Procedure**.

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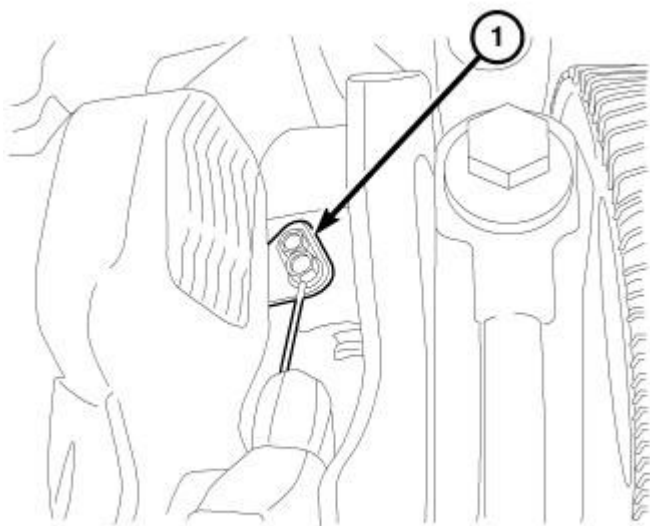
**Fig. 453: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

13. Connect the negative battery cable.
14. Start the engine and check for leaks.
15. Install the underbody splash shield (1) and securely tighten fasteners.

### JET, PISTON OIL COOLER

#### Description

#### DESCRIPTION



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**Fig. 454: Oil Jet**

Courtesy of CHRYSLER LLC

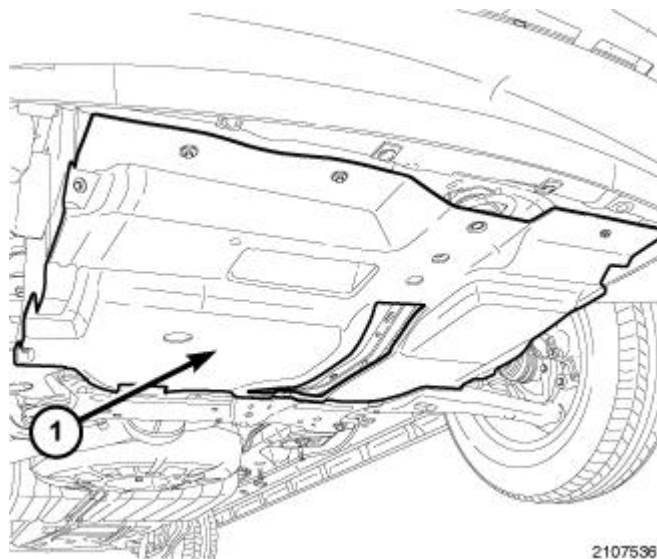
There are four oil jets installed in the engine block. These oil jets are used to cool and lubricate the piston assemblies.

**Removal****REMOVAL**

**CAUTION:** Use caution when removing and installing oil jets. Damage to oil jet nozzle could cause severe engine damage. Care must be taken not to damage the crankshaft tone ring when removing cylinder number four oil jet.

**NOTE:** To prevent damage to the oil jets, remove the oil jets before removing the pistons.

1. Disconnect negative battery cable.

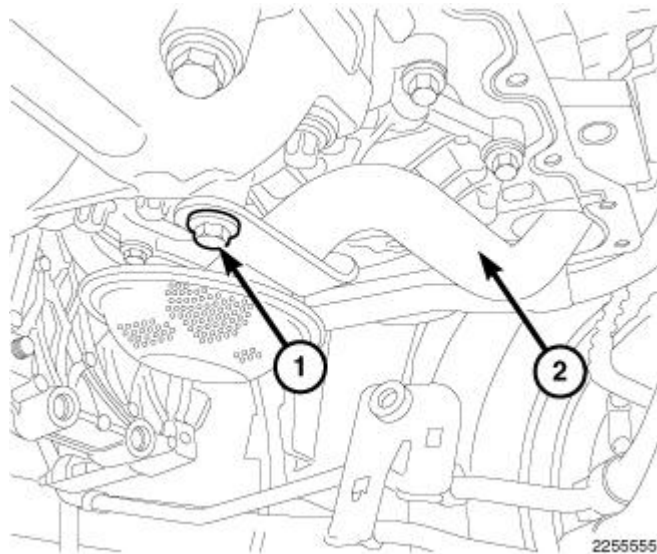
**Fig. 455: Underbody Splash Shield**

Courtesy of CHRYSLER LLC

2. Remove the underbody splash shield (1).
3. Remove the oil pan. See **Engine/Lubrication/PAN, Oil - Removal**.

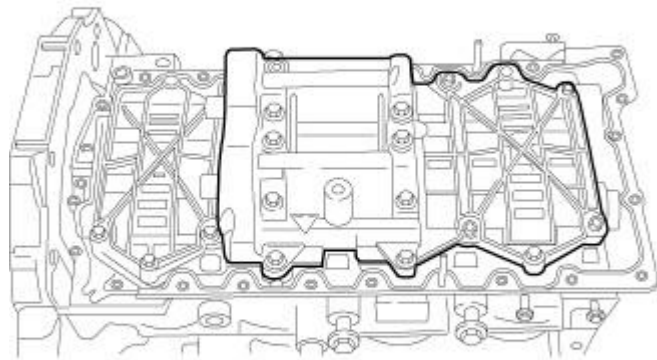
## 2009 Chrysler Town & Country LX

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**Fig. 456: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

4. Remove retaining bolt (1) and the oil pickup tube (2) from engine. Discard the O-rings.



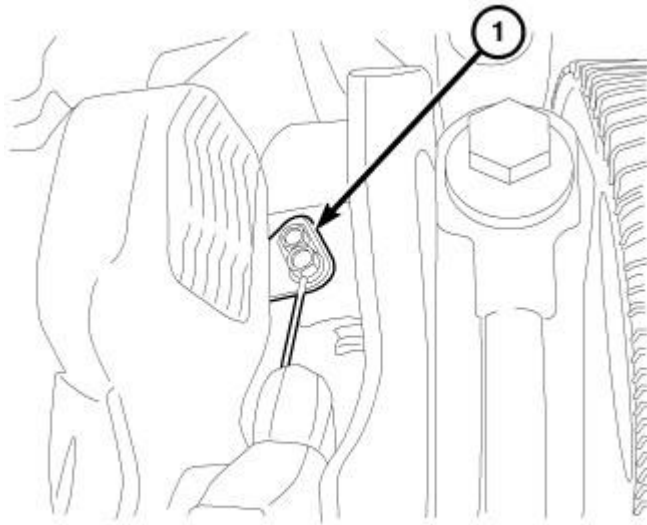
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**Fig. 457: Balance Shaft Module**  
Courtesy of CHRYSLER LLC

5. Remove the balance shaft assembly. See **Engine/Engine Block/MODULE, Balance Shaft - Removal.**

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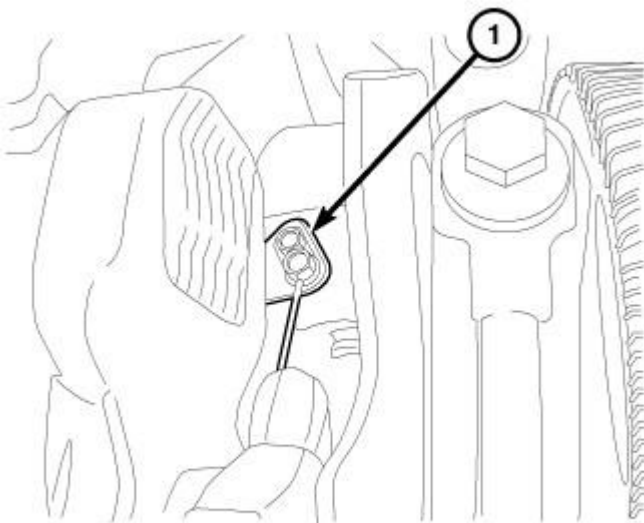
**Fig. 458: Oil Jet**

Courtesy of CHRYSLER LLC

6. Remove the oil jet (1) and discard the O-rings.

### Installation

### INSTALLATION



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**Fig. 459: Oil Jet**

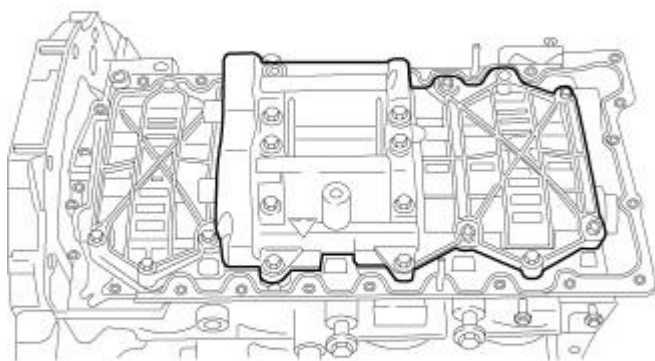
Courtesy of CHRYSLER LLC

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**CAUTION:** Use caution when removing and installing oil jets. Damage to oil jet nozzle could cause severe engine damage. Care must be taken not to damage the crankshaft tone ring when removing cylinder number four oil jet.

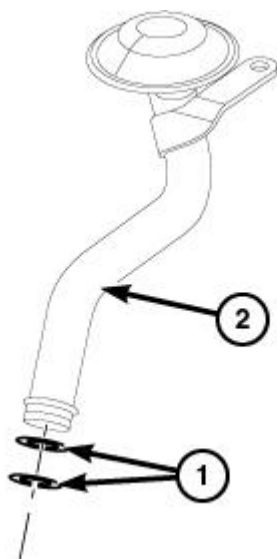
1. Using a new O-ring, lubricate and install the O-ring on oil jet.
2. Install oil jet (1). Tighten bolt to 11 N.m (97 in. lbs.).



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**Fig. 460: Balance Shaft Module**  
Courtesy of CHRYSLER LLC

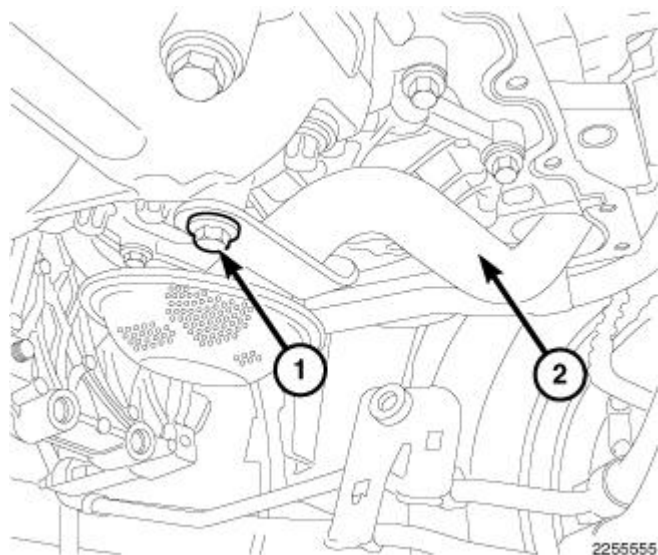
3. Install the balance shaft assembly. See [Engine/Engine Block/MODULE, Balance Shaft - Installation](#).



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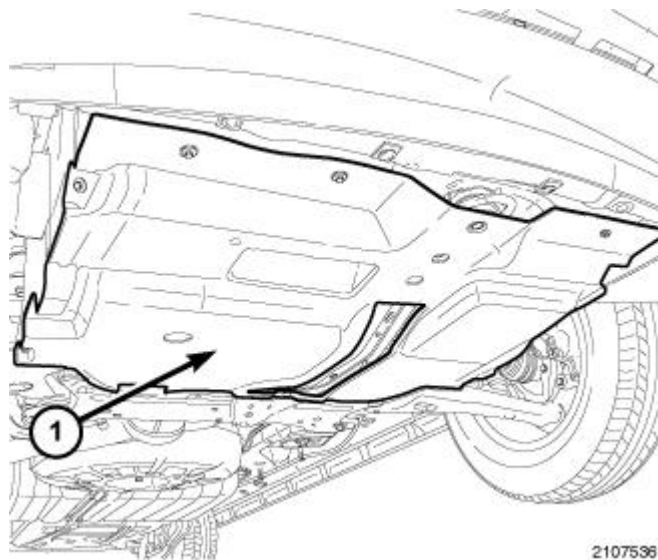
**Fig. 461: Oil Pickup Tube & O-Rings**  
Courtesy of CHRYSLER LLC

4. Using new O-rings, lubricate and install the 2 O-rings (1) on oil pickup tube (2).



**Fig. 462: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

5. Install the oil pickup tube. Tighten the bolt to 15 N.m (133 in. lbs.).
6. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
7. Fill engine with oil.
8. Connect negative battery cable.
9. Start engine and check for leaks.



**Fig. 463: Underbody Splash Shield**



**Courtesy of CHRYSLER LLC**

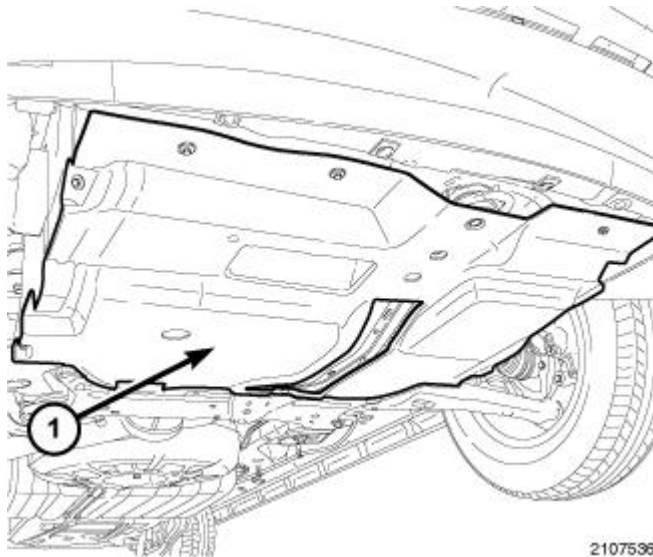
10. Install the underbody splash shield (1) and securely tighten fasteners.

**OIL****Description****DESCRIPTION**

Refer to the Vehicle Quick Reference article for oil specifications. See **Vehicle Quick Reference/Capacities and Recommended Fluids - Specifications** .

**PAN, OIL****Removal****REMOVAL**

1. Disconnect the negative battery cable.

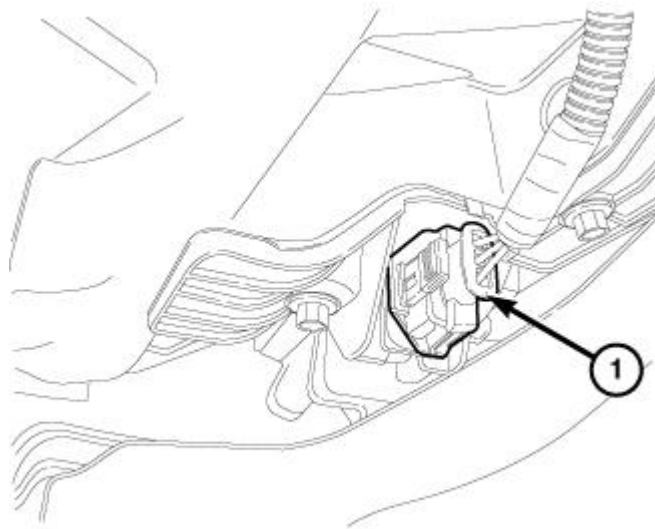


**Fig. 464: Underbody Splash Shield**  
**Courtesy of CHRYSLER LLC**

2. Remove the underbody splash shield (1).
3. Drain the engine oil.
4. Remove accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal** .
5. If equipped, remove the insulation around the oil pan.
6. Remove the front fore and aft crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Removal** .

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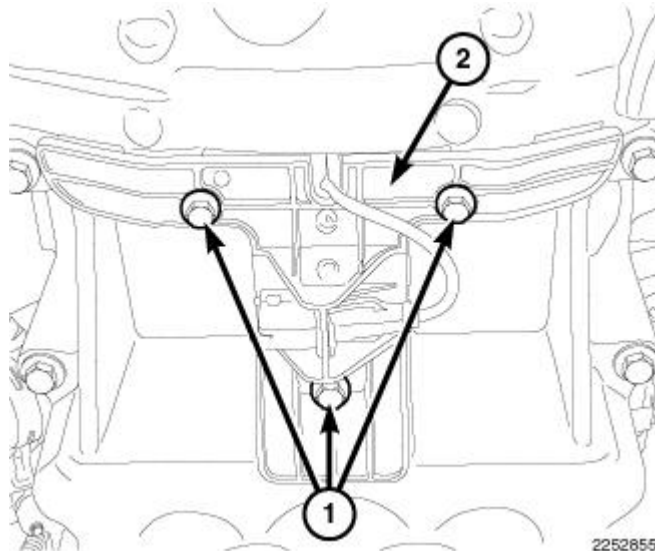
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**Fig. 465: Crankshaft Position Sensor (CKP) Harness Connector**  
Courtesy of CHRYSLER LLC

7. Disconnect the Crankshaft Position Sensor (CKP) connector (1).



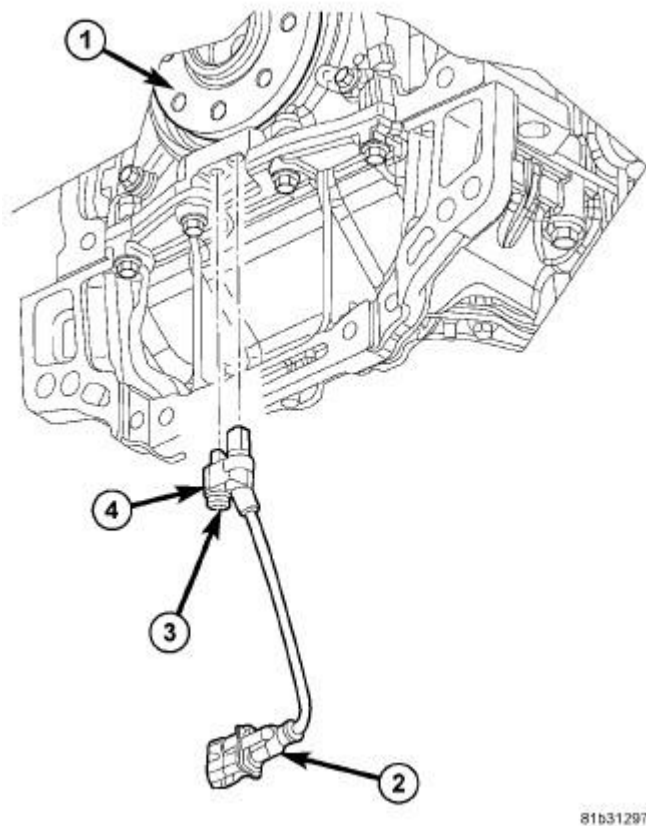
2252855

**Fig. 466: Crankshaft Position Sensor (CKP) Access Cover**  
Courtesy of CHRYSLER LLC

8. Remove bolts (1) and the Crankshaft Position Sensor (CKP) access cover (2).

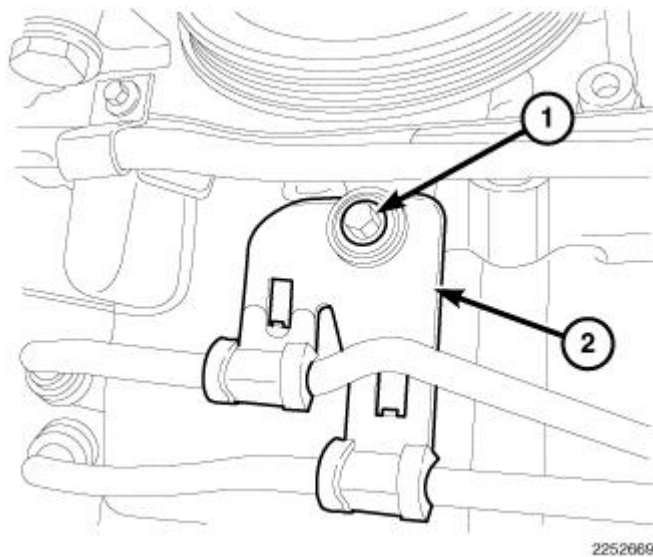
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**Fig. 467: Crankshaft Position Sensor**  
Courtesy of CHRYSLER LLC

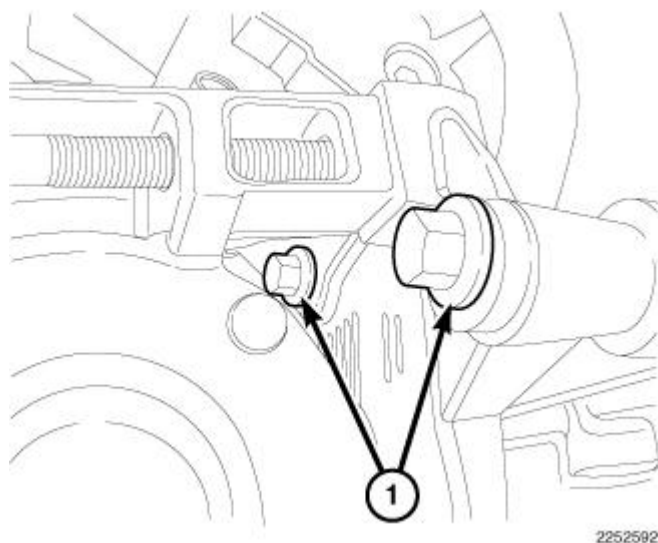
9. Remove bolt (3) and the Crankshaft Position Sensor (CKP) (4).



**Fig. 468: Retaining Bolt Securing Power Steering Lines**

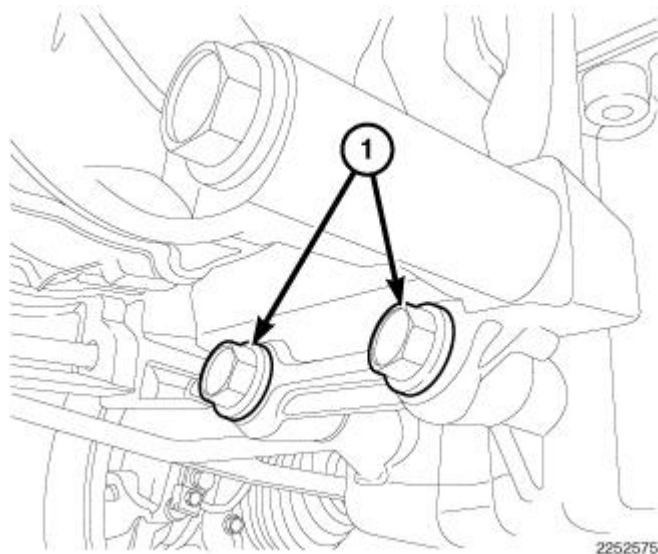
**Courtesy of CHRYSLER LLC**

10. Remove the bolt (1) securing the power steering lines.



**Fig. 469: Upper A/C Mounting Bracket Bolts**  
Courtesy of CHRYSLER LLC

11. Loosen the upper A/C mounting bracket bolts (1).

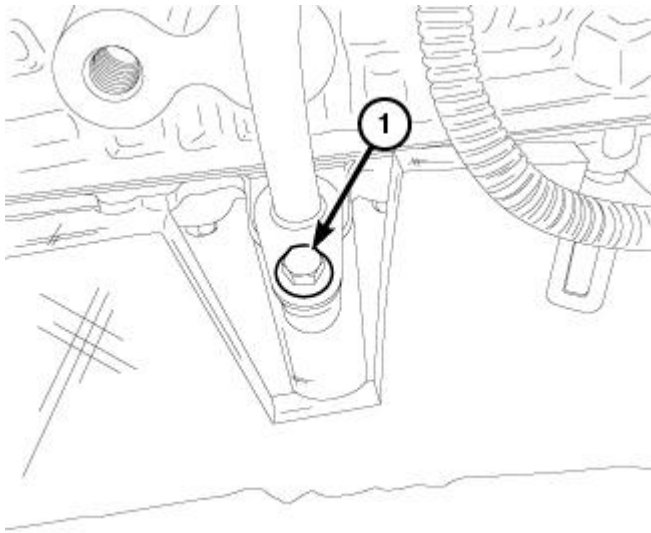


**Fig. 470: A/C Mounting Bracket Bolts**  
Courtesy of CHRYSLER LLC

12. Loosen the lower A/C mounting bracket bolts and position the A/C mounting bracket forward to clear oil pan bosses.

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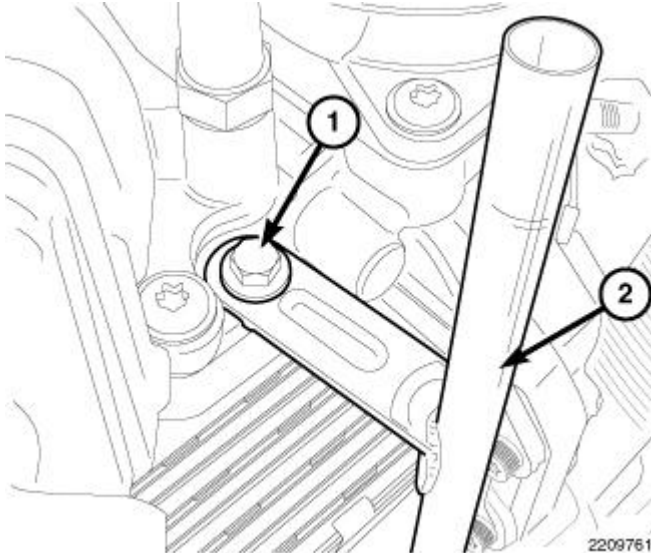
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**Fig. 471: Oil Indicator Lower Bolt**  
Courtesy of CHRYSLER LLC

13. Remove lower bolt (1) from the oil indicator tube.



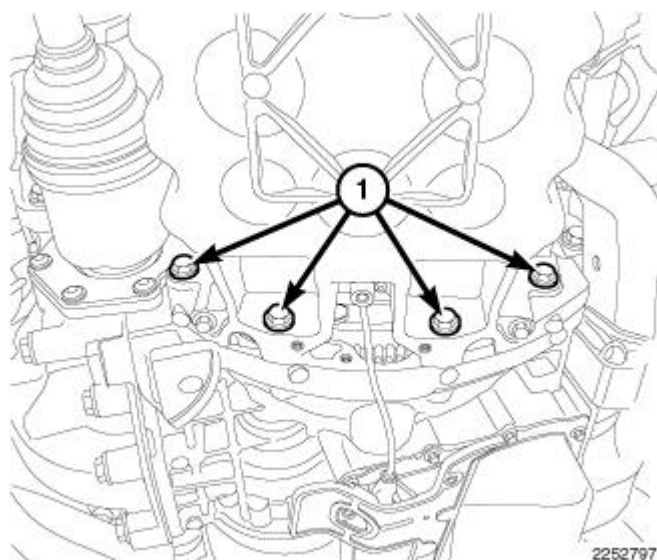
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**Fig. 472: Oil Level Indicator Tube**  
Courtesy of CHRYSLER LLC

14. Remove upper bolt (1) and the oil level indicator tube.

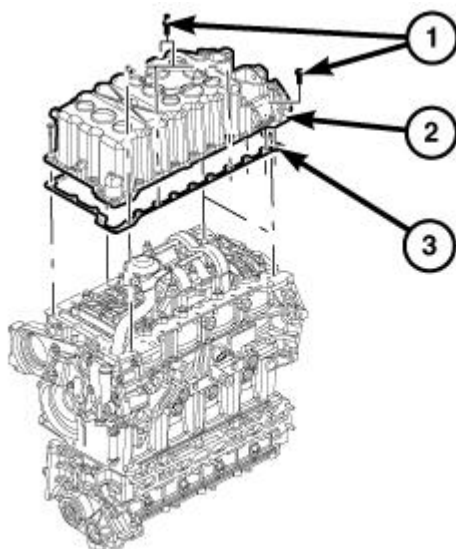
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**Fig. 473: Oil Pan To Transaxle Bolts**  
Courtesy of CHRYSLER LLC

15. Remove oil pan-to-transaxle bolts (1).



**Fig. 474: Oil Pan Gasket With Oil Pan & Fasteners**  
Courtesy of CHRYSLER LLC

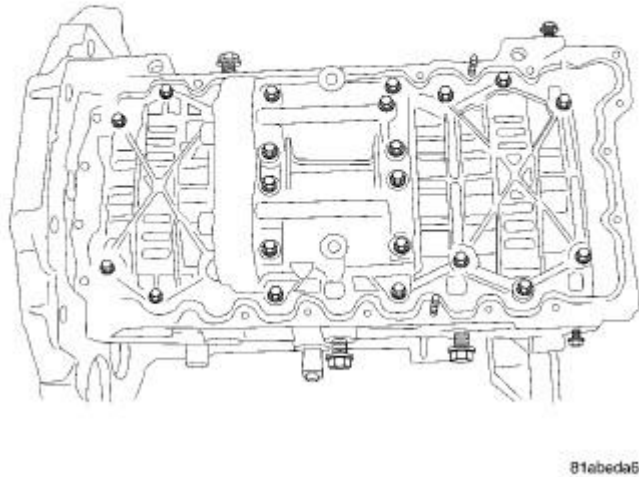
16. Remove fasteners (1) and the oil pan (2).
17. Remove the oil pan gasket (3).

### Installation

#### OIL PAN

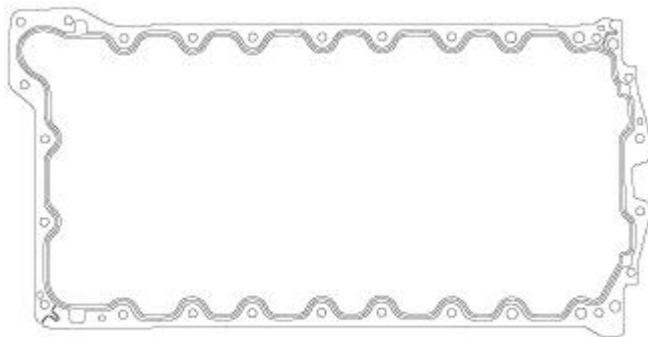
## 2009 Chrysler Town & Country LX

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**Fig. 475: Upper Oil Pan Gasket**  
Courtesy of CHRYSLER LLC

1. Clean oil pan and engine block gasket surfaces.

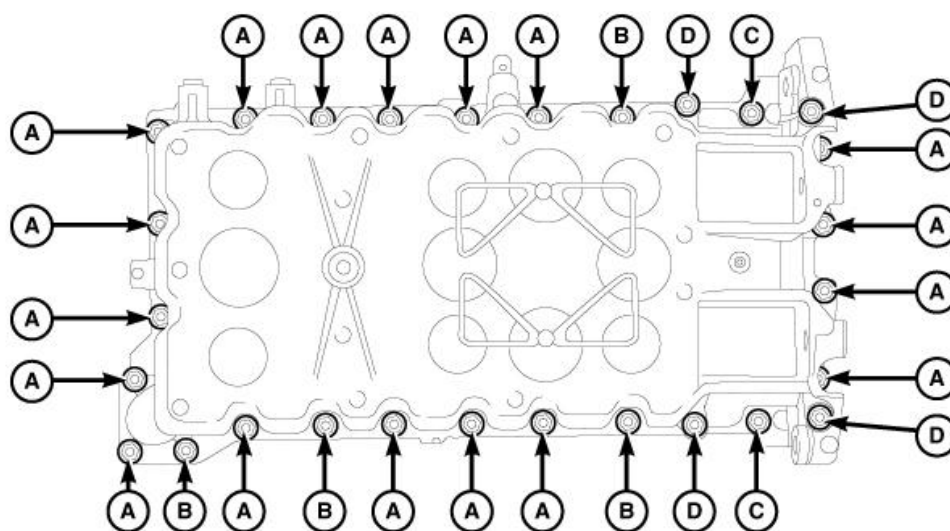


**Fig. 476: Oil Pan Gasket Surface**  
Courtesy of CHRYSLER LLC

2. Install the upper oil pan gasket.

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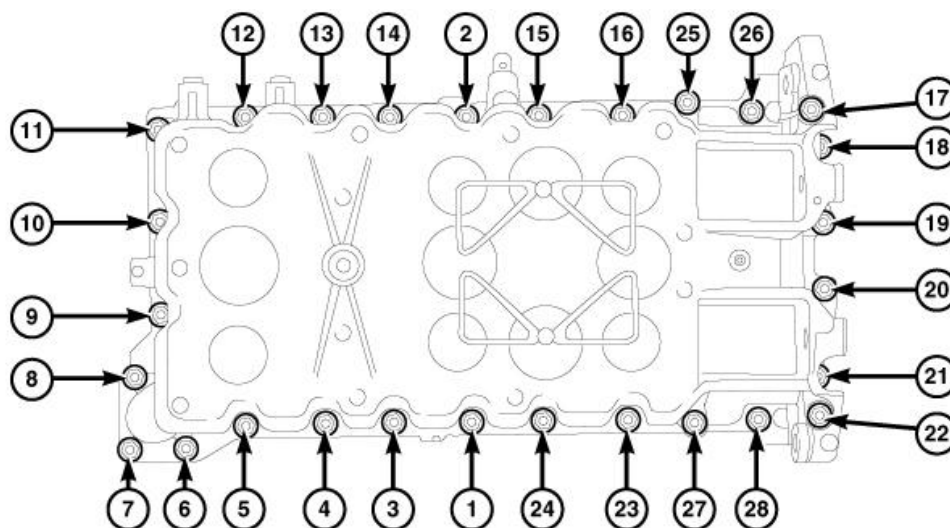


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**Fig. 477: Oil Pan Bolts**

Courtesy of CHRYSLER LLC

3. The oil pan bolts have 2 different bolt sizes:



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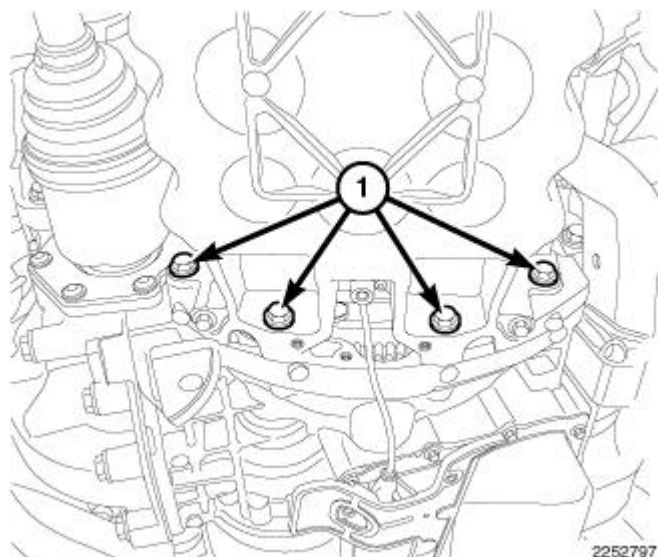
**Fig. 478: Oil Pan Bolt Tightening Sequence**

Courtesy of CHRYSLER LLC

- Bolts A are M6
  - Bolts B are M6 stud bolts
  - Bolts C are M8 short
  - Bolts D are M8 long
4. Install oil pan.
5. Tighten oil pan bolts to:
- M6 bolts to 15 N.m (133 in. lbs.)
  - M8 bolts to 32 N.m (24 ft. lbs.)

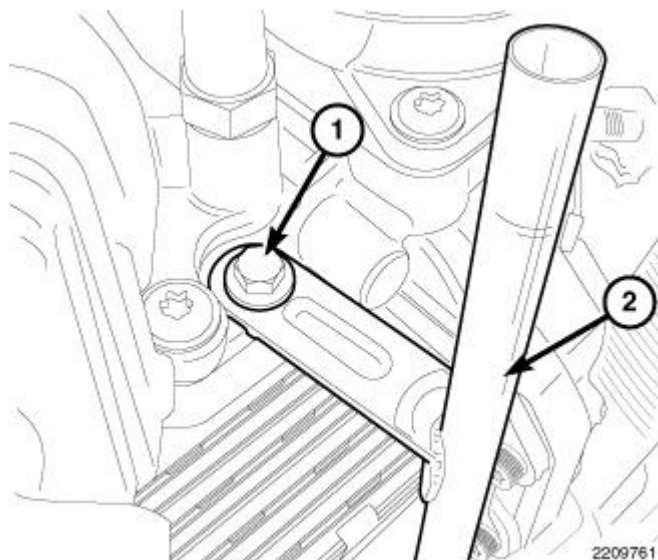


6. Loosen all of the oil pan and stud bolts 90° and retighten to.



**Fig. 479: Oil Pan To Transaxle Bolts**  
Courtesy of CHRYSLER LLC

- M6 bolts to 15 N.m (133 in. lbs.)
  - M8 bolts to 32 N.m (24 ft. lbs.)
7. Install the oil pan to transaxle bolts. Tighten to 60 N.m (44 ft. lbs.).

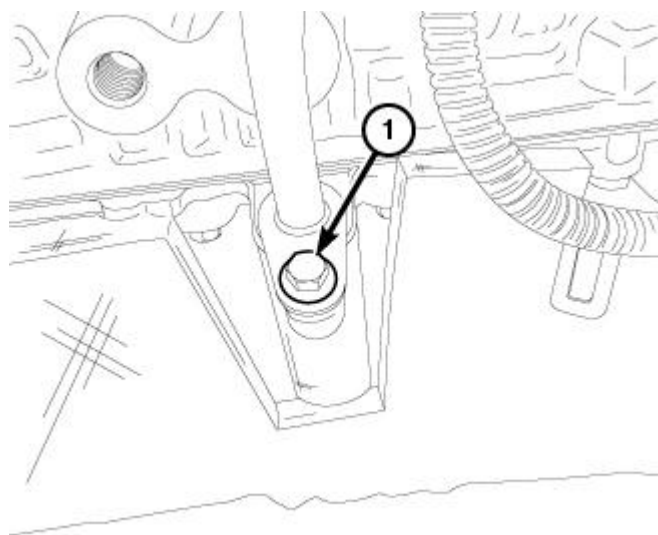


**Fig. 480: Oil Level Indicator Tube**  
Courtesy of CHRYSLER LLC

8. Install the oil level indicator tube (2). Tighten upper bolt (1) to 11 N.m (97 in. lbs.).

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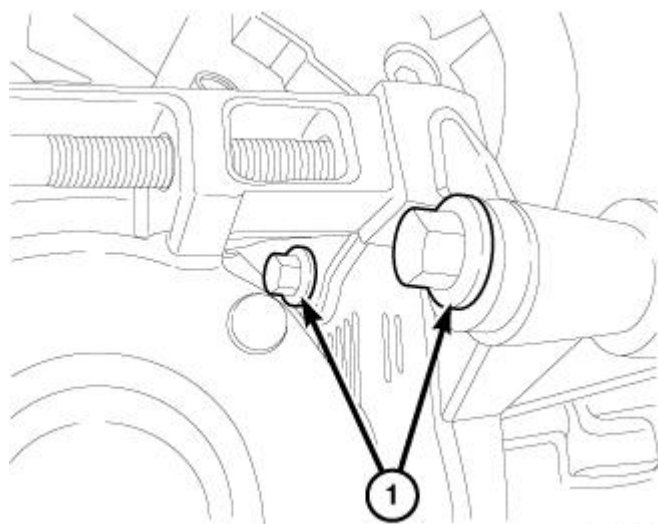
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**Fig. 481: Oil Indicator Lower Bolt**  
Courtesy of CHRYSLER LLC

9. Install the oil indicator lower bolt (1). Tighten lower bolt to 11 N.m (97 in. lbs.).



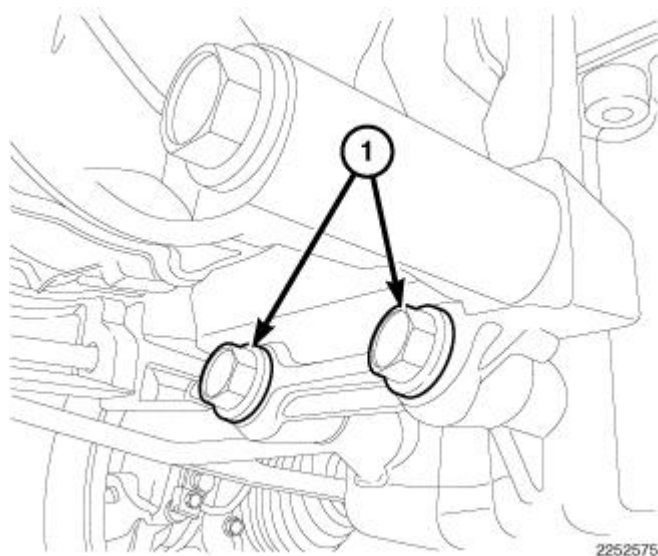
2252592

**Fig. 482: Upper A/C Mounting Bracket Bolts**  
Courtesy of CHRYSLER LLC

10. Position the A/C bracket onto oil pan bosses. Tighten the upper A/C mounting bracket bolts (1) to 23 N.m (17 ft. lbs.).

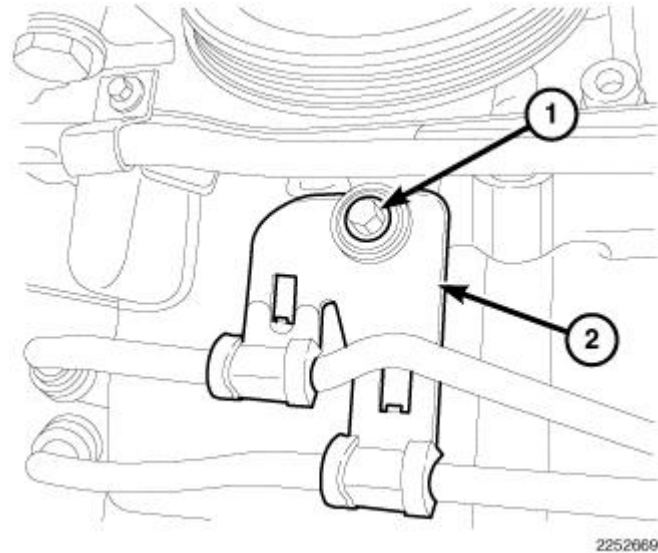
## 2009 Chrysler Town & Country LX

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**Fig. 483: A/C Mounting Bracket Bolts**  
Courtesy of CHRYSLER LLC

11. Tighten the lower A/C mounting bracket bolts (1) to 23 N.m (17 ft. lbs.).

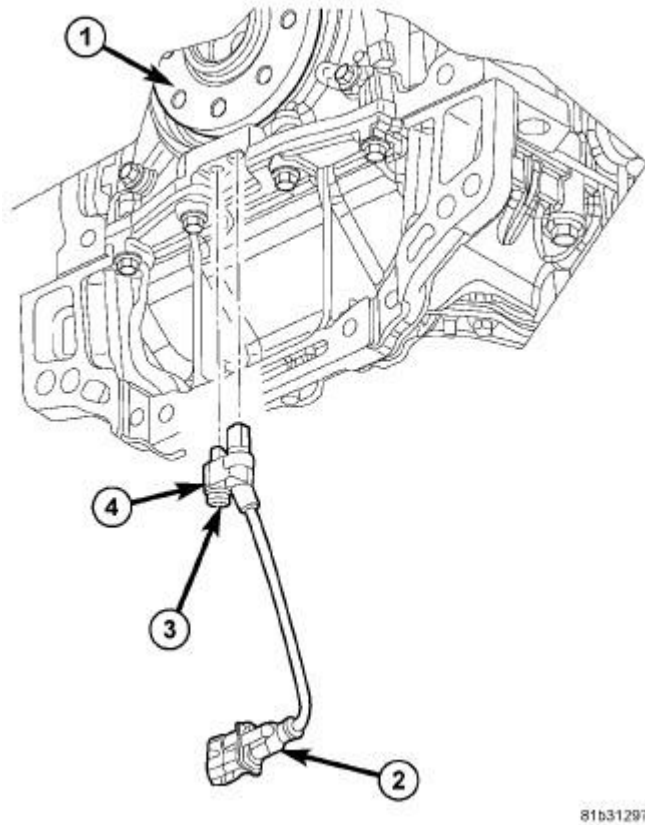


**Fig. 484: Retaining Bolt Securing Power Steering Lines**  
Courtesy of CHRYSLER LLC

12. Install the retaining bolt (1) securing the power steering lines. Tighten to 15 N.m (133 in. lbs.).

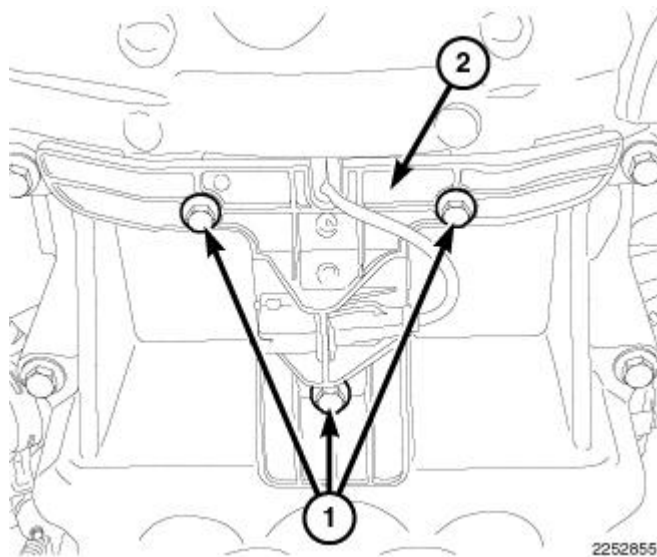
## 2009 Chrysler Town & Country LX

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**Fig. 485: Crankshaft Position Sensor**  
Courtesy of CHRYSLER LLC

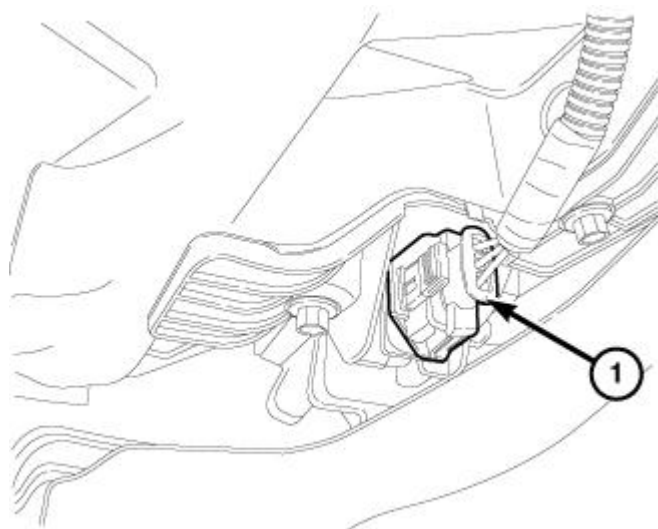
13. Install the Crankshaft Position Sensor (CKP) (4). Tighten bolts to 11 N.m (97 in. lbs.).



**Fig. 486: Crankshaft Position Sensor (CKP) Access Cover**

**Courtesy of CHRYSLER LLC**

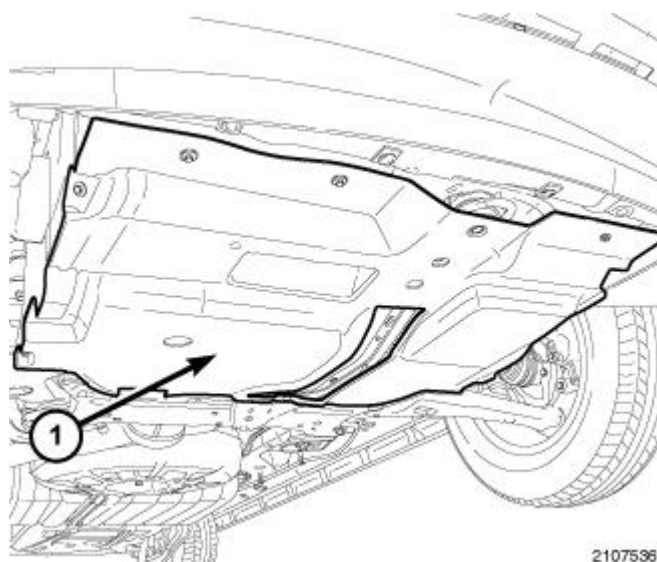
14. Install Crankshaft Position Sensor (CKP) access cover (2). Tighten bolts to 15 N.m (133 in. lbs.).



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**Fig. 487: Crankshaft Position Sensor (CKP) Harness Connector**  
**Courtesy of CHRYSLER LLC**

15. Connect the Crankshaft Position Sensor (CKP) harness connector (1).
16. Install the front fore and aft crossmember. Refer to **Frame and Bumpers/Frame/CROSSMEMBER - Installation** .
17. If equipped, install the insulation around the oil pan.
18. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation** .
19. Fill engine with oil.
20. Connect the negative battery cable.
21. Start engine and check for leaks.



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**Fig. 488: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

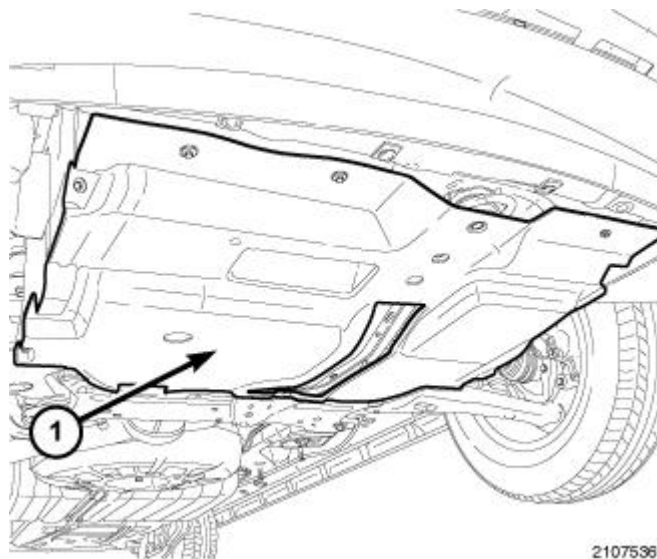
22. Install the underbody splash shield (1) and securely tighten fasteners.

## PICK-UP, OIL PUMP

### Removal

### REMOVAL

1. Disconnect negative battery cable. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Removal** .



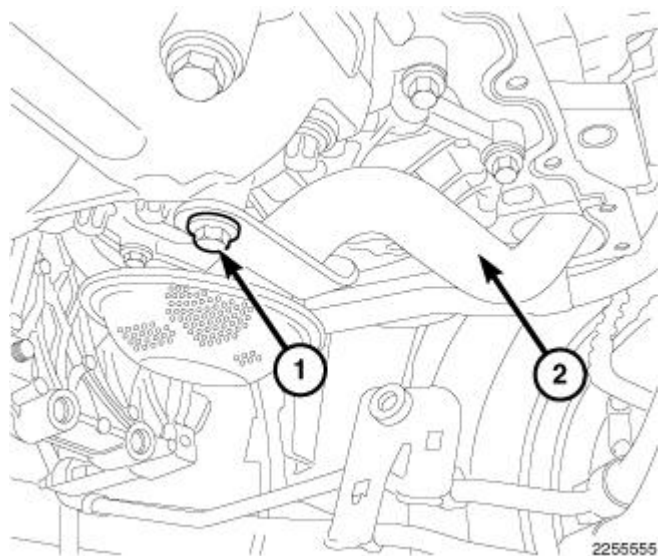
2107536

**Fig. 489: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

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2. Remove the underbody splash shield (1).
3. Drain the engine oil.
4. Remove the oil pan. See Engine/Lubrication/PAN, Oil - Removal.

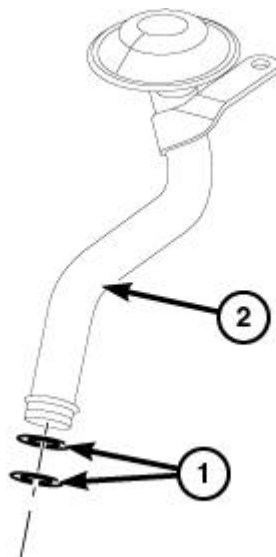


**Fig. 490: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

5. Remove retaining bolt (1) and the oil pickup tube (2) from engine. Discard O-rings.

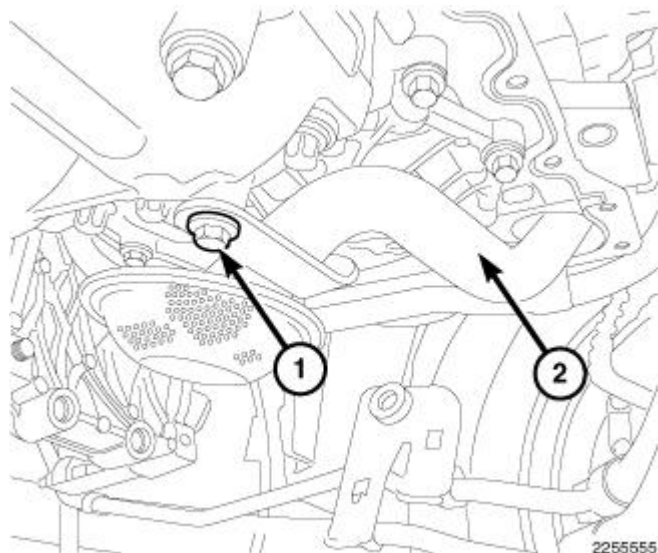
### Installation

#### INSTALLATION



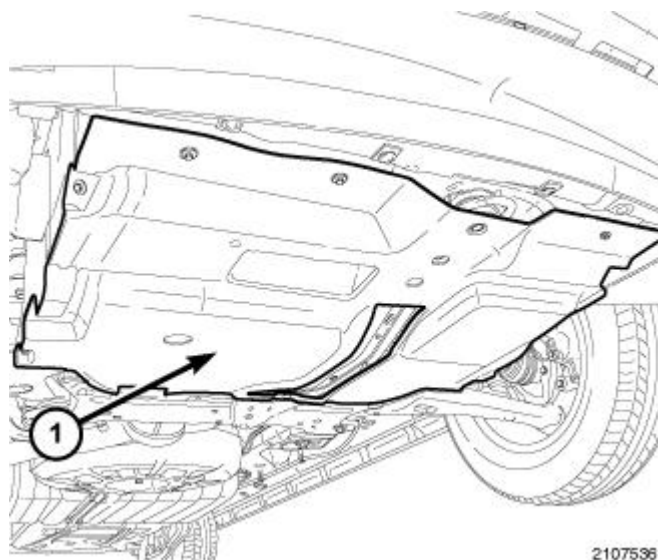
**Fig. 491: Oil Pickup Tube & O-Rings**  
Courtesy of CHRYSLER LLC

1. Using new O-rings, lubricate and install the 2 O-rings (1) on oil pickup tube (2).



**Fig. 492: Oil Pickup Tube With Bolt**  
Courtesy of CHRYSLER LLC

2. Install the oil pickup tube. Tighten bolt to 15 N.m (133 in. lbs.).
3. Install the oil pan. See **Engine/Lubrication/PAN, Oil - Installation**.
4. Fill engine with oil.
5. Connect negative battery cable.
6. Start engine and check for leaks.



**Fig. 493: Underbody Splash Shield**  
Courtesy of CHRYSLER LLC

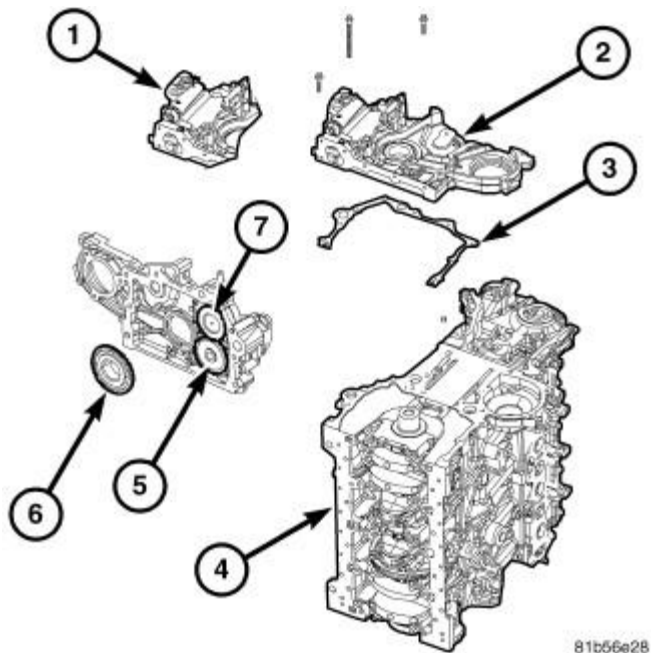


7. Install the underbody splash shield (1) and securely tighten fasteners.

## PUMP, ENGINE OIL

## Removal

## OIL PUMP



**Fig. 494: Vacuum Pump And Oil Pump**  
**Courtesy of CHRYSLER LLC**

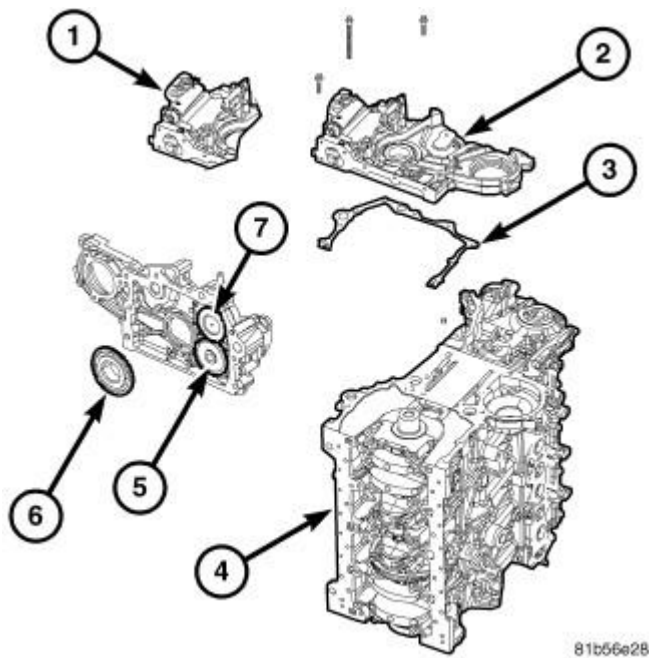
1. Disconnect negative battery cable.
2. Remove the front cover. See **Engine/Engine Block/COVER, Engine - Removal.**
3. Remove the oil pump (5) from the front cover (2).

## Installation

## OIL PUMP

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**Fig. 495: Vacuum Pump And Oil Pump**  
**Courtesy of CHRYSLER LLC**

1. Make sure that the gasket surfaces are free of oil and debris.
2. Lubricate oil pump rotor with engine oil.
3. Install the oil pump gasket.
4. Install front cover assembly. See **Engine/Engine Block/COVER, Engine - Installation**.

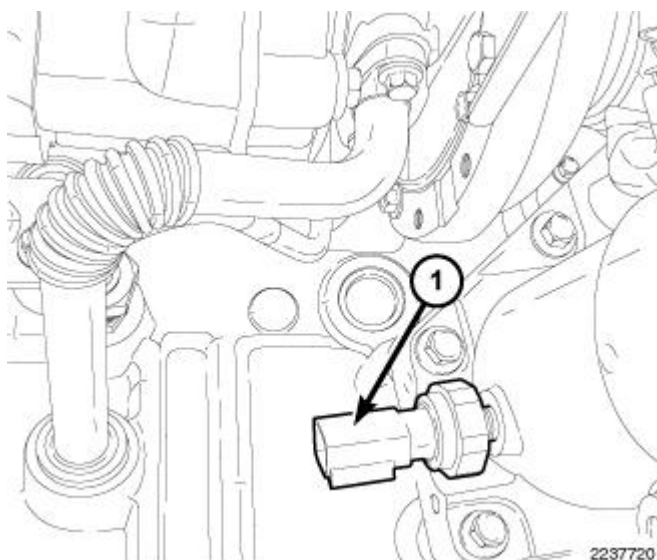
## SENSOR, OIL PRESSURE

### Description

## DESCRIPTION

## 2009 Chrysler Town & Country LX

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**Fig. 496: Oil Pressure Switch**  
Courtesy of CHRYSLER LLC

The oil pressure sending unit uses three circuits. They are:

- A signal circuit to the ECM.
- A sensor ground circuit through the ECM.
- A 5 volt reference circuit from the ECM.

The oil pressure sending unit returns a voltage signal back to the ECM relating oil pressure. Ground for the sensor is supplied by the ECM.

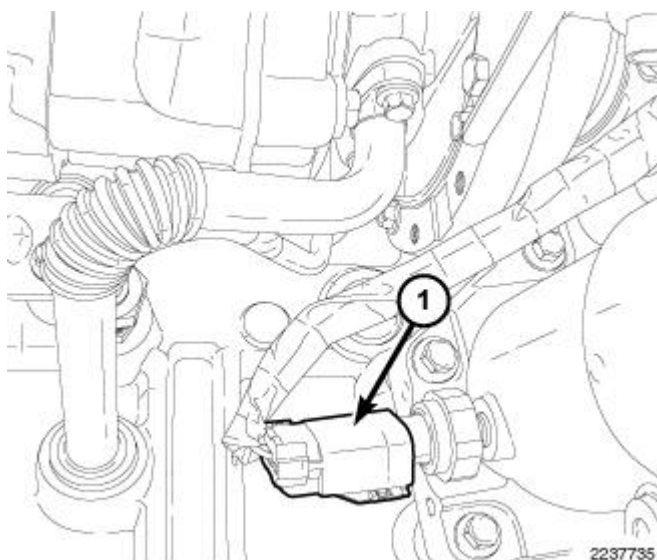
The oil pressure switch (1) is located on the left side of the oil filter housing. The switch screws into the engines main oil gallery.

### Removal

### OIL PRESSURE SENSOR

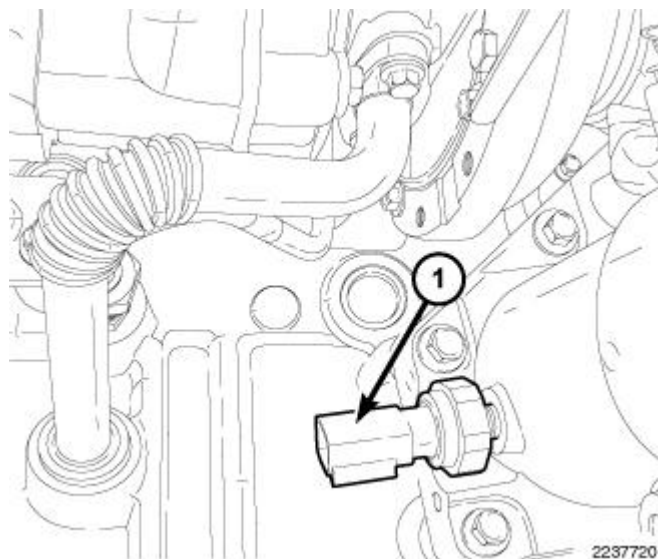
## 2009 Chrysler Town & Country LX

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**Fig. 497: Oil Pressure Switch Harness Connector**  
Courtesy of CHRYSLER LLC

1. Disconnect the negative battery cable.
2. Remove the belly pan.
3. Disconnect the oil pressure switch harness connector (1).



**Fig. 498: Oil Pressure Switch**  
Courtesy of CHRYSLER LLC

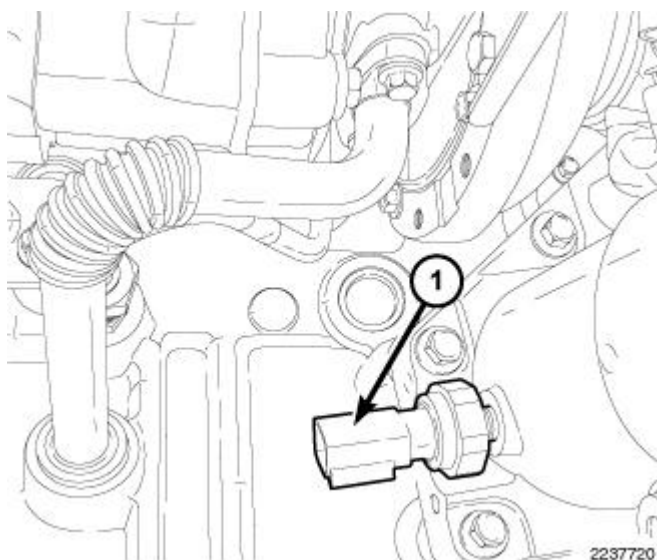
4. Remove the oil pressure switch (1).

### Installation

#### OIL PRESSURE SENSOR

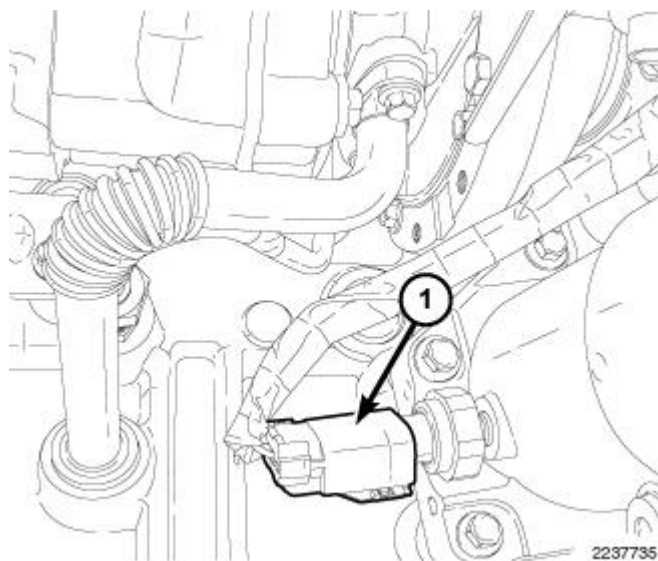
## 2009 Chrysler Town & Country LX

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**Fig. 499: Oil Pressure Switch**  
Courtesy of CHRYSLER LLC

1. Install the oil pressure switch. Tighten to 14 N.m (124 in. lbs.).



**Fig. 500: Oil Pressure Switch Harness Connector**  
Courtesy of CHRYSLER LLC

2. Connect the oil pressure switch harness connector (1).
3. Install the belly pan.
4. Connect the negative battery cable.
5. Start engine and check for oil leaks.

**SEPARATOR, OIL**

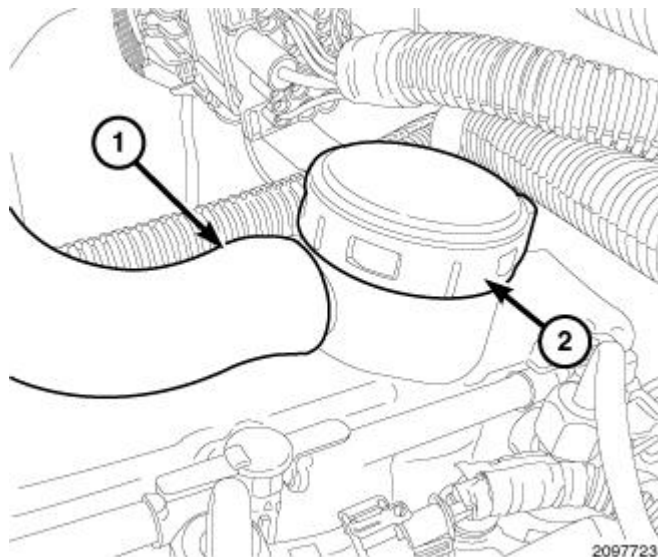
## 2009 Chrysler Town & Country LX

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### Removal

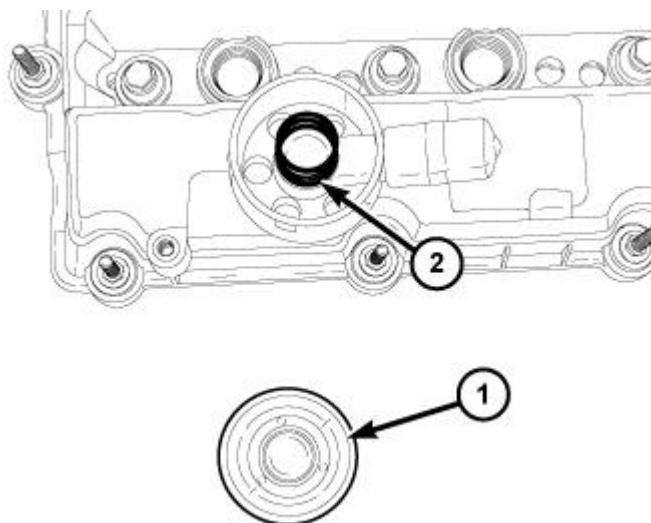
#### REMOVAL

1. Remove the engine cover.
2. Remove the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Removal**.



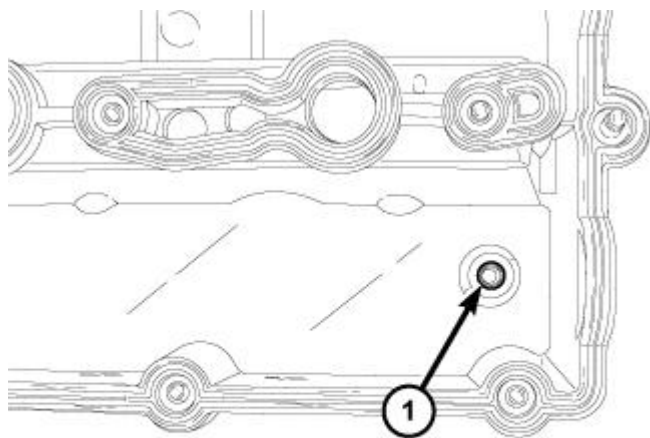
**Fig. 501: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

3. Remove the oil separator cover (2).



**Fig. 502: Diaphragm Spring**  
Courtesy of CHRYSLER LLC

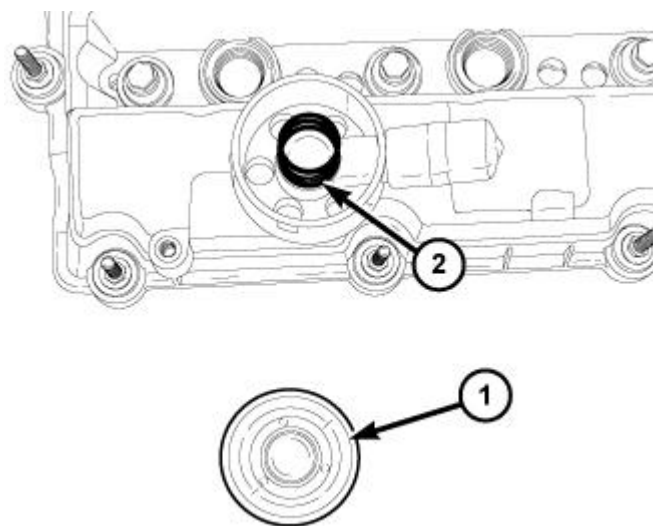
4. Remove diaphragm (1) and the diaphragm spring (2).

**Installation****INSTALLATION**

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**Fig. 503: Oil Drain Back Access Hole**  
Courtesy of CHRYSLER LLC

1. Inspect the oil drain back access hole (1) in the cylinder head cover to assure that it is free of obstruction.



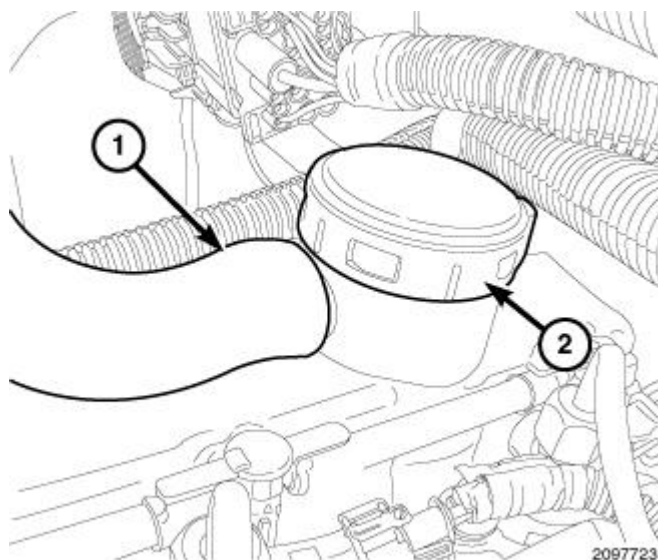
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**Fig. 504: Diaphragm Spring**  
Courtesy of CHRYSLER LLC

2. Lubricate the oil separator O-rings with clean engine oil.
3. Install the diaphragm spring (2) and the diaphragm (1).

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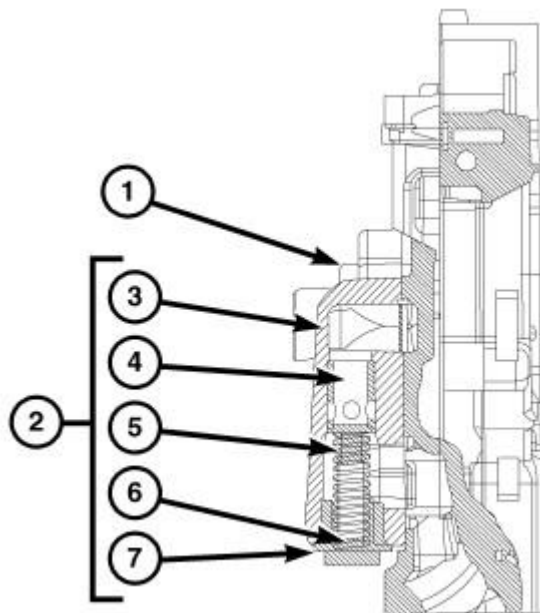
**Fig. 505: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

4. Carefully position and push down on the oil separator cover (2) to seat.
5. Install the cylinder head cover. See **Engine/Cylinder Head/COVER(S), Cylinder Head - Installation.**
6. Install the engine cover.

### VALVE, OIL PRESSURE RELIEF

#### Description

#### DESCRIPTION

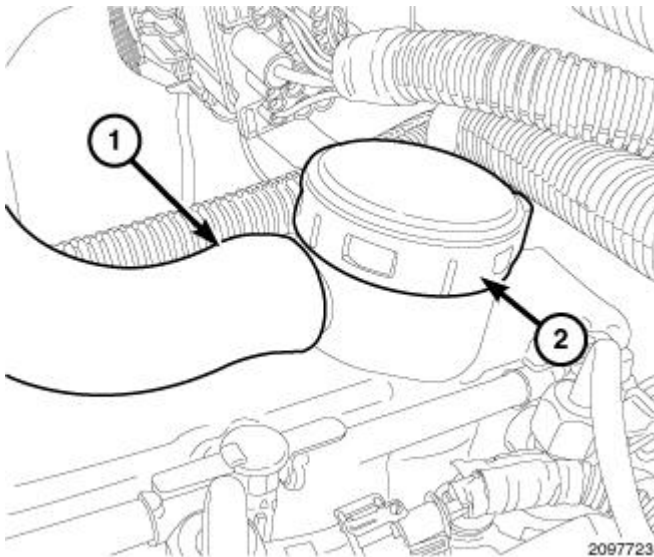




**Fig. 506: Oil Pressure Relief Valve Components****Courtesy of CHRYSLER LLC**

The oil pressure relief valve is built into the front cover (1). The oil pressure relief valve assembly (2) consists of several components. The plunger (4) is held in place by the spring (5). The plug (6) keeps the plug and spring in place, and the o-ring (7) prevents oil from leaking past the plug (6).

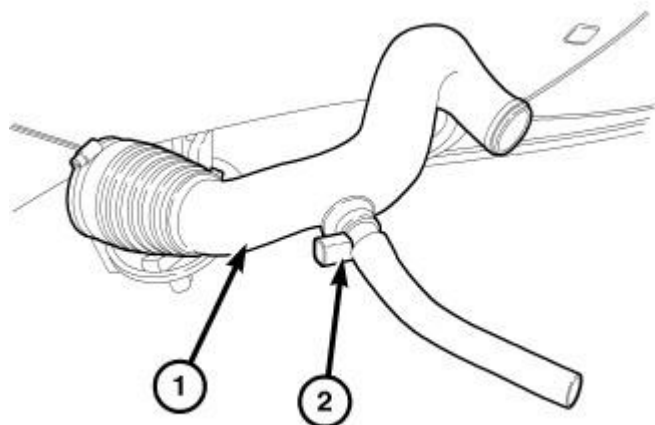
In the case of excessively high oil pressure, the oil pressure on the piston (4) overcomes the spring (5) pressure and the piston is forced off its seat. When the piston is forced off its seat, a drain back passage is opened and the excess oil pressure is vented back into the crankcase.

**MANIFOLDS****MANIFOLD, EXHAUST****Removal****EXHAUST MANIFOLD****Fig. 507: Oil Separator Cover****Courtesy of CHRYSLER LLC**

1. Disconnect the negative battery cable.
2. Remove the engine cover.
3. Remove the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
4. Disconnect the crankcase vent hose (1) from the oil separator (2).

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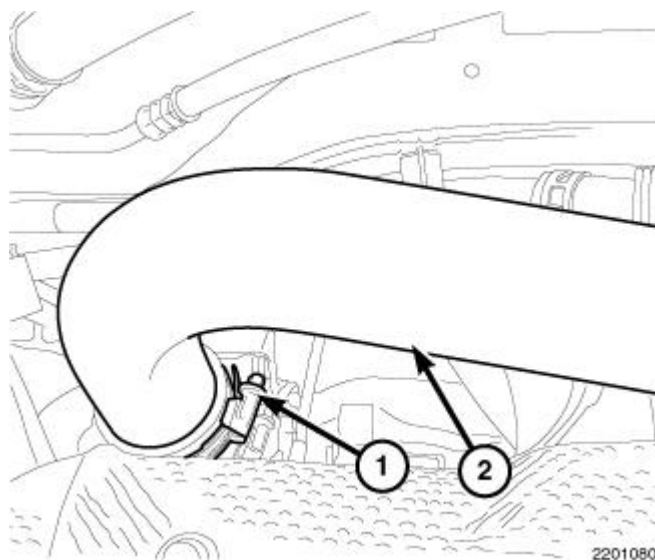
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**Fig. 508: Turbocharger Air Inlet Tube & Crankcase Vent Hose Heater Electrical Connector**  
Courtesy of CHRYSLER LLC

5. Disconnect the crankcase vent hose heater electrical connector (2).
6. Remove the turbocharger air inlet tube (1) from turbocharger.



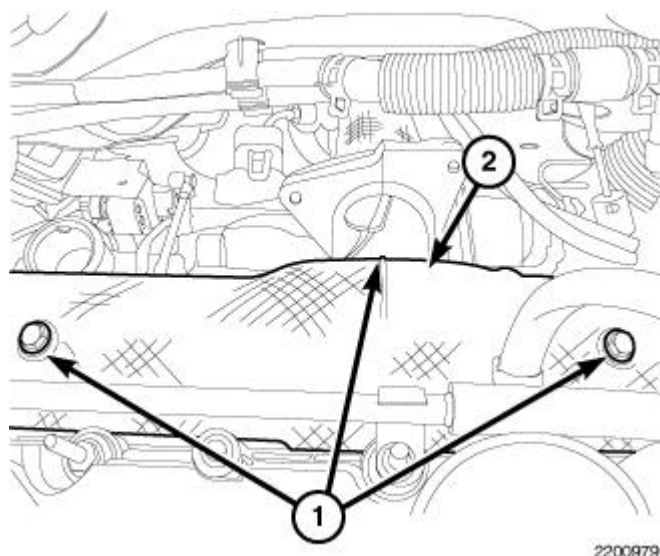
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**Fig. 509: Charge Air Cooler Inlet Hose**  
Courtesy of CHRYSLER LLC

7. Loosen clamp (1) and disconnect the charge air cooler inlet hose (2) from turbocharger.

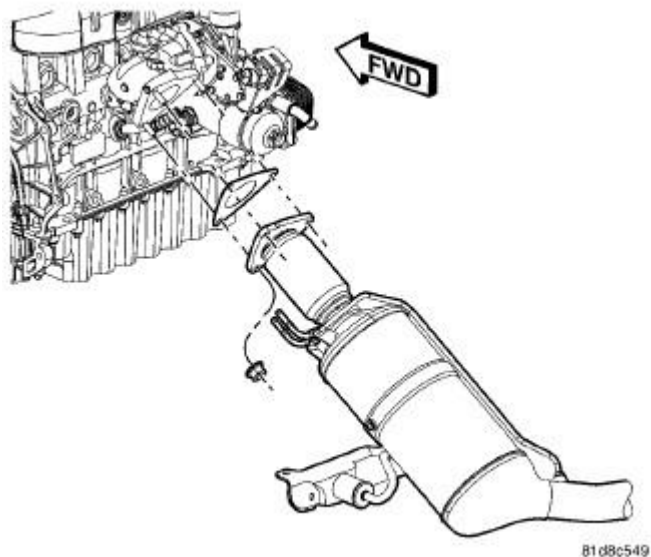
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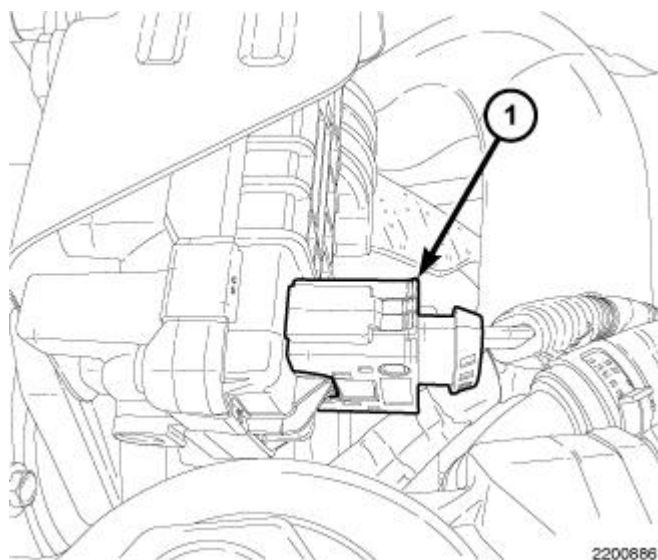
**Fig. 510: Exhaust Manifold Heat Shield Bolts**  
Courtesy of CHRYSLER LLC

8. Remove the three bolts (1) and the exhaust manifold heat shield (2).
9. Remove the belly pan.
10. Remove the right front inner splash shield.



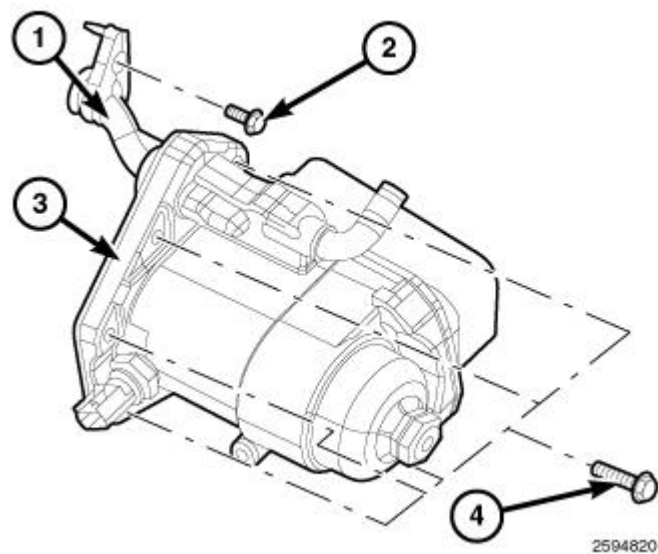
**Fig. 511: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

11. Remove the Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF). Refer to **Exhaust System/FILTER, Diesel Particulate - Removal**.



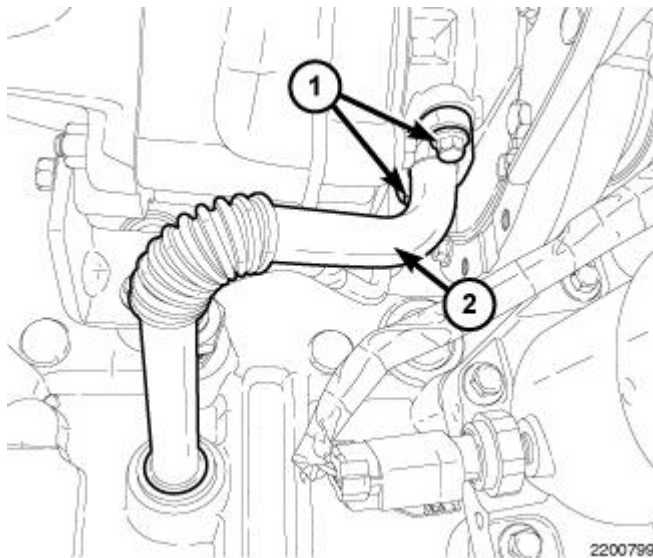
**Fig. 512: Turbocharger Module Connector**  
Courtesy of CHRYSLER LLC

12. Disconnect the turbocharger module connector (1).
13. Remove oil filter housing adapter cap (3) and the oil filter (2).



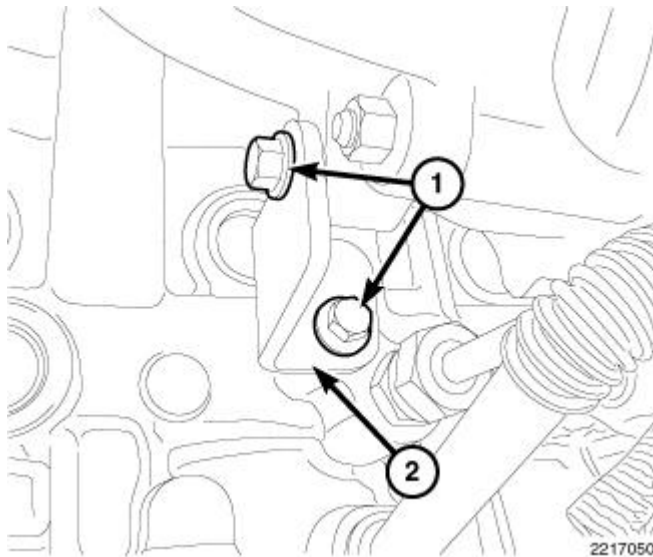
**Fig. 513: Engine Oil Filter Housing**  
Courtesy of CHRYSLER LLC

14. Remove the engine oil filter housing. See **Engine/Lubrication/HOUSING, Oil Filter - Removal**.



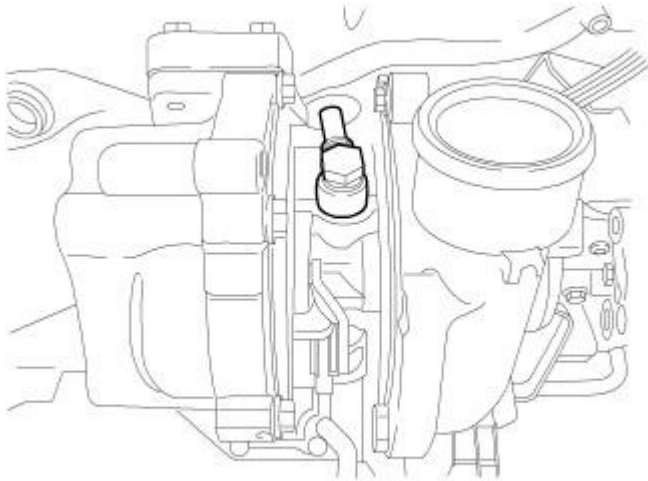
**Fig. 514: Turbocharger Oil Return Line Bolts**  
Courtesy of CHRYSLER LLC

15. Remove the bolts (1) and turbocharger oil return line (2).



**Fig. 515: Turbocharger Support Bracket Bolts**  
Courtesy of CHRYSLER LLC

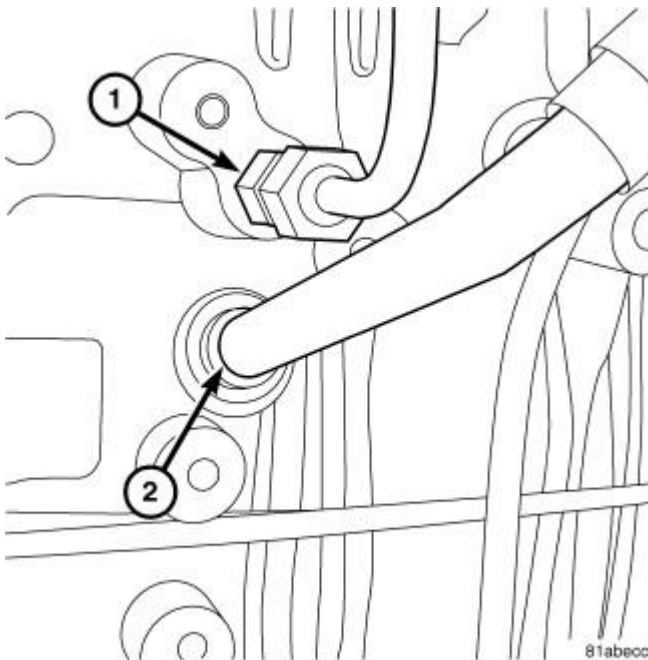
16. Remove bolts (1) and the turbocharger support bracket (2).



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**Fig. 516: Turbocharger Oil Supply Line**  
Courtesy of CHRYSLER LLC

17. Remove the turbocharger oil supply line.



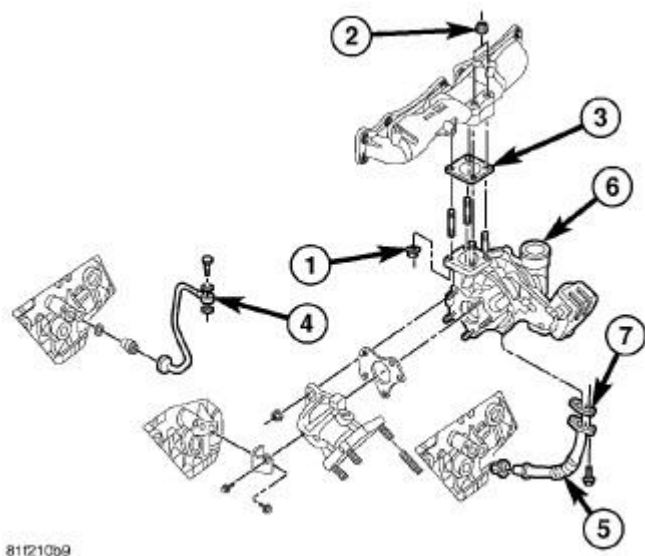
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**Fig. 517: Turbocharger Oil Lines**  
Courtesy of CHRYSLER LLC

18. Remove the turbocharger oil supply line from the engine block (1).

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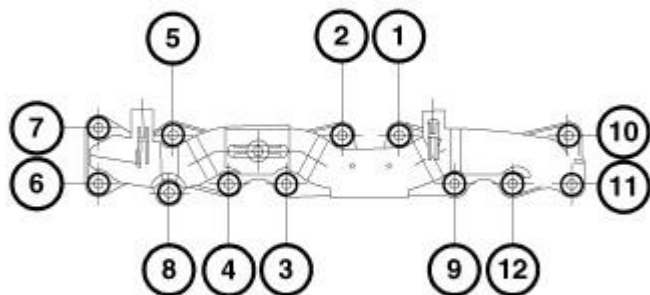
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**Fig. 518: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

19. Remove retaining nuts (1), (2) and the turbocharger (6).
20. Remove retaining nuts and the exhaust manifold.

### Installation

### INSTALLATION



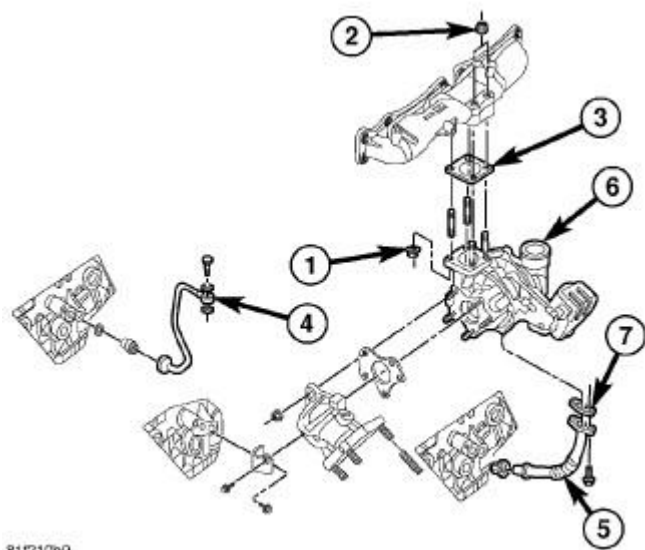
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**Fig. 519: Exhaust Manifold Bolt Tightening Sequence**  
Courtesy of CHRYSLER LLC

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1. Clean the exhaust manifold surface and remove all debris.
2. Install a new exhaust manifold gasket.
3. Install exhaust manifold and the retaining nuts.
4. Using the sequence shown in **Fig. 519**. Tighten nuts to 36 N.m (27 ft. lbs.).
5. Repeat the tightening procedure at the same torque.



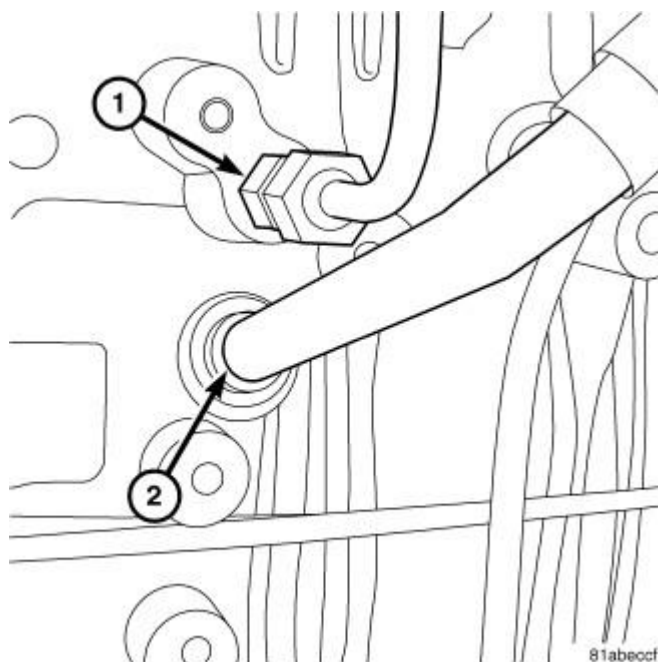
**Fig. 520: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

6. Using a new gasket, install the turbocharger (6) and the retaining nuts (1), (2). Tighten to 32 N.m (24 ft. lbs.).



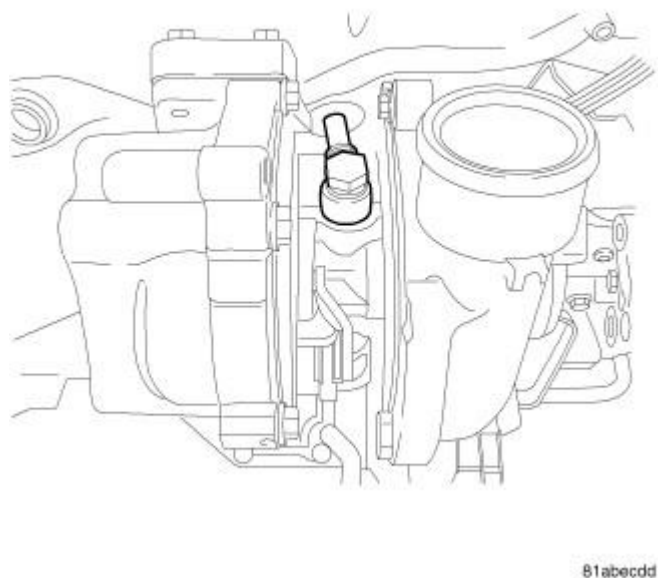
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**Fig. 521: Turbocharger Oil Lines**  
Courtesy of CHRYSLER LLC

7. Install the turbocharger oil supply line to the engine block (1). Tighten to 32 N.m (24 ft. lbs.).

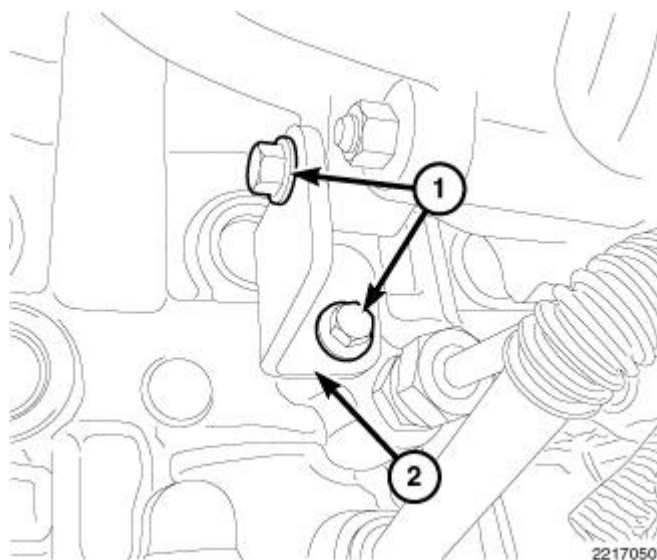


**Fig. 522: Turbocharger Oil Supply Line**  
Courtesy of CHRYSLER LLC

8. Install the turbocharger oil supply line. Tighten to 24 N.m (18 ft. lbs.).

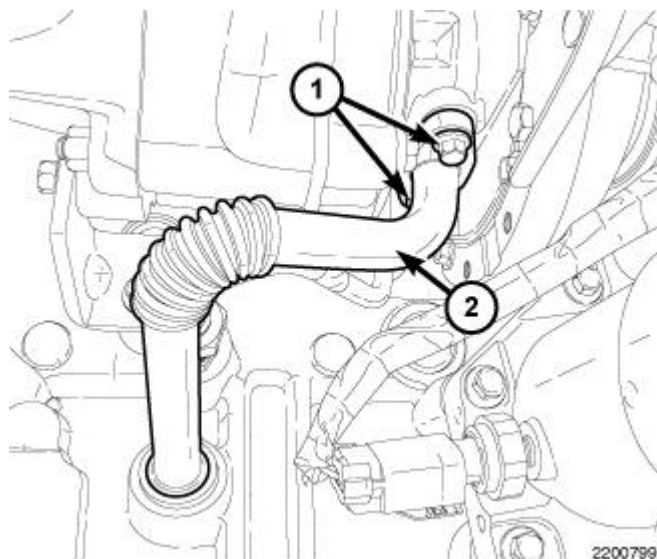
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**Fig. 523: Turbocharger Support Bracket Bolts**  
Courtesy of CHRYSLER LLC

9. Install the turbocharger to engine support bracket (2). Tighten bolts to 33 N.m (24 ft. lbs.).

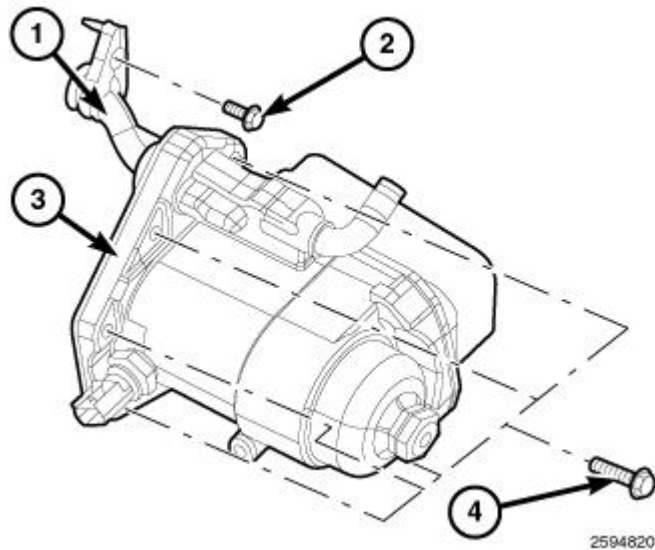


**Fig. 524: Turbocharger Oil Return Line Bolts**  
Courtesy of CHRYSLER LLC

10. Install the turbocharger oil return line. Tighten bolts to 15 N.m (133 in. lbs.).

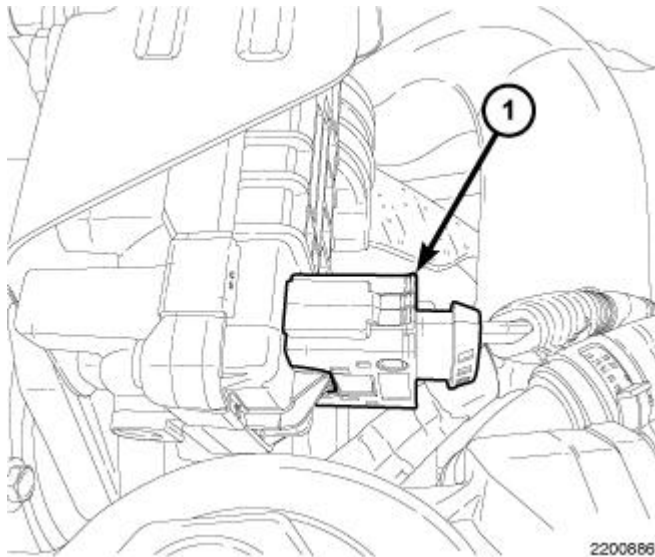
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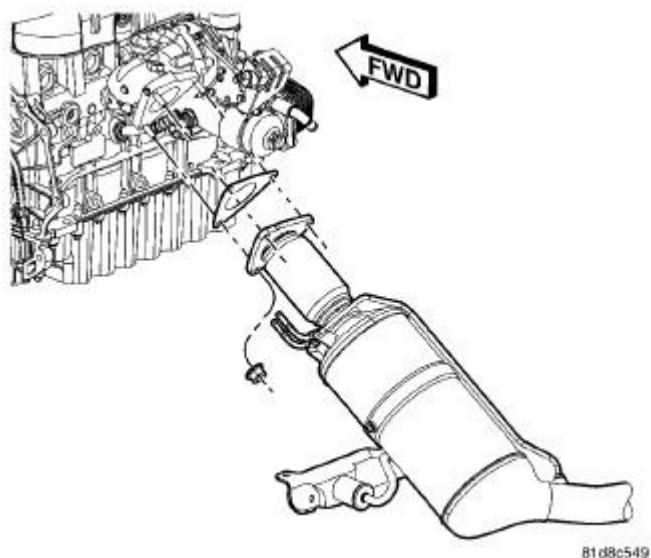
**Fig. 525: Engine Oil Filter Housing**  
Courtesy of CHRYSLER LLC

11. Install the engine oil filter housing. See **Engine/Lubrication/HOUSING, Oil Filter - Installation.**



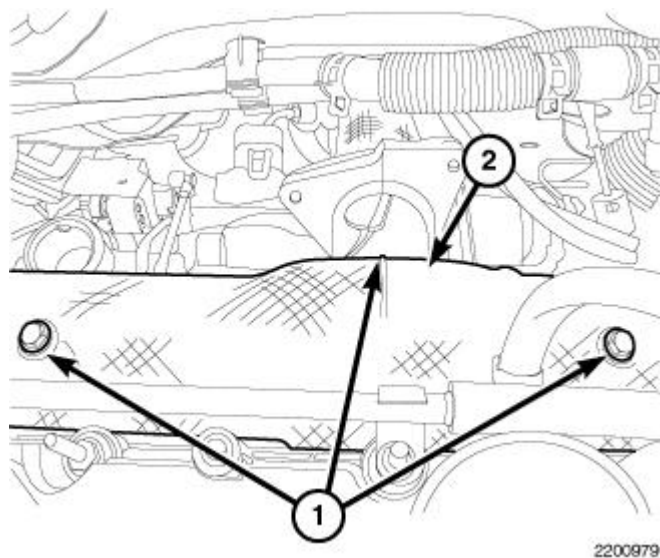
**Fig. 526: Turbocharger Module Connector**  
Courtesy of CHRYSLER LLC

12. Connect the turbocharger module connector (1).



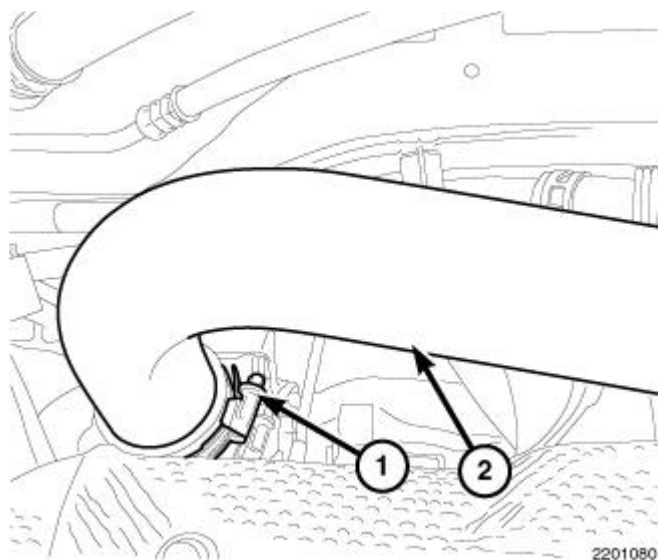
**Fig. 527: Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)**  
Courtesy of CHRYSLER LLC

13. Install the Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF). Refer to **Exhaust System/FILTER, Diesel Particulate - Installation** .



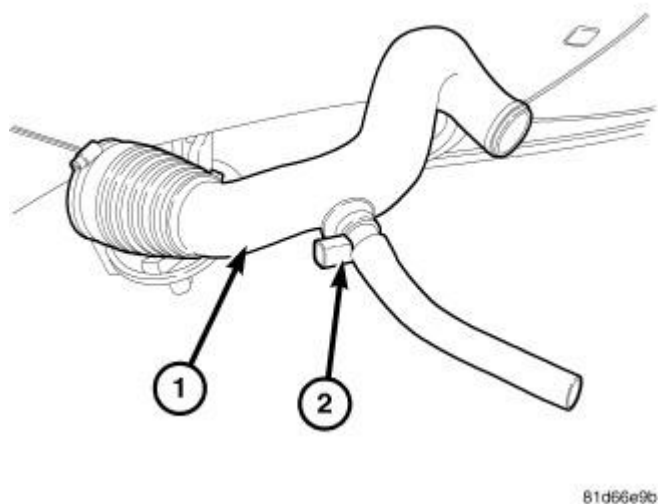
**Fig. 528: Exhaust Manifold Heat Shield Bolts**  
Courtesy of CHRYSLER LLC

14. Install the right front inner splash shield.
15. Install the belly pan.
16. Install the exhaust manifold heat shield (2). Tighten bolts to 33 N.m (24 ft. lbs.).



**Fig. 529: Charge Air Cooler Inlet Hose**  
Courtesy of CHRYSLER LLC

17. Connect the charge air cooler inlet hose (2) to the turbocharger and tighten clamp (1).

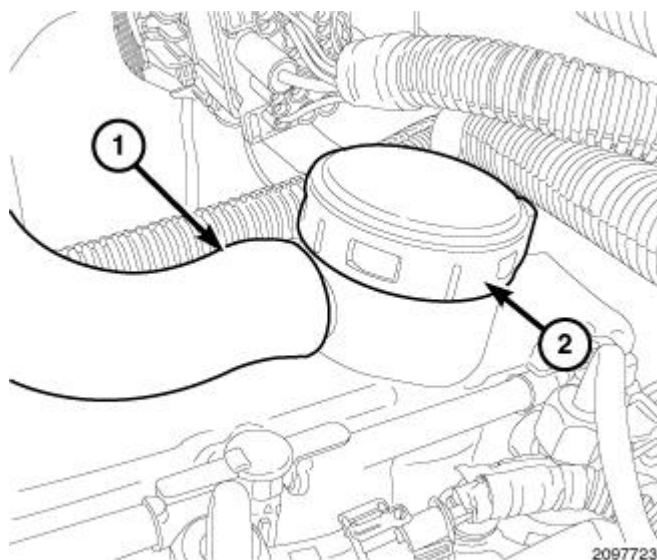


**Fig. 530: Turbocharger Air Inlet Tube & Crankcase Vent Hose Heater Electrical Connector**  
Courtesy of CHRYSLER LLC

18. Install the air inlet tube to the turbocharger.
19. Connect the crankcase vent hose heater electrical connector (2).

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**Fig. 531: Oil Separator Cover**  
Courtesy of CHRYSLER LLC

20. Connect the crankcase vent hose (1) to the oil separator (2).
21. Install the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.
22. Install the engine cover.
23. Connect the negative battery cable.

### MANIFOLD, INTAKE

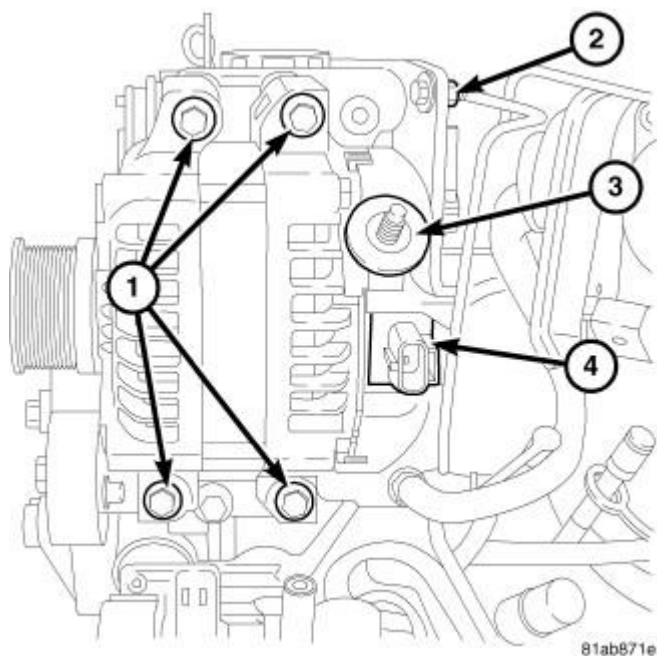
#### Removal

#### REMOVAL

1. Remove the engine cover.
2. Disconnect the battery. Refer to **Electrical - Engine Systems/Battery System/BATTERY - Removal** .
3. Drain the coolant. Refer to **Cooling - Standard Procedure** .

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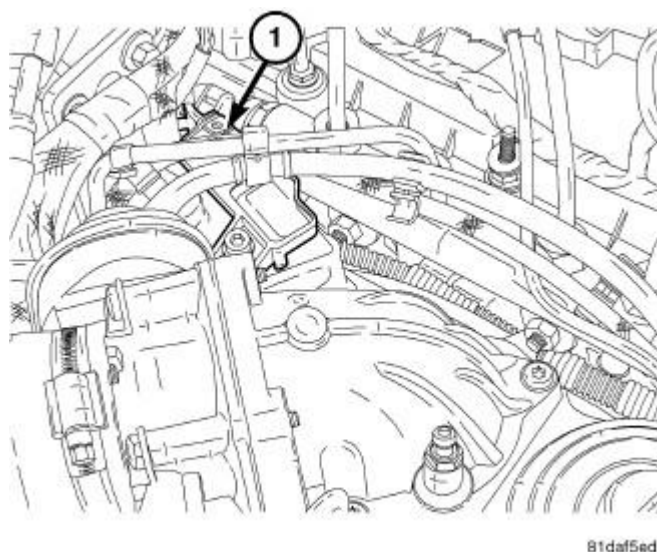
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**Fig. 532: Generator**

Courtesy of CHRYSLER LLC

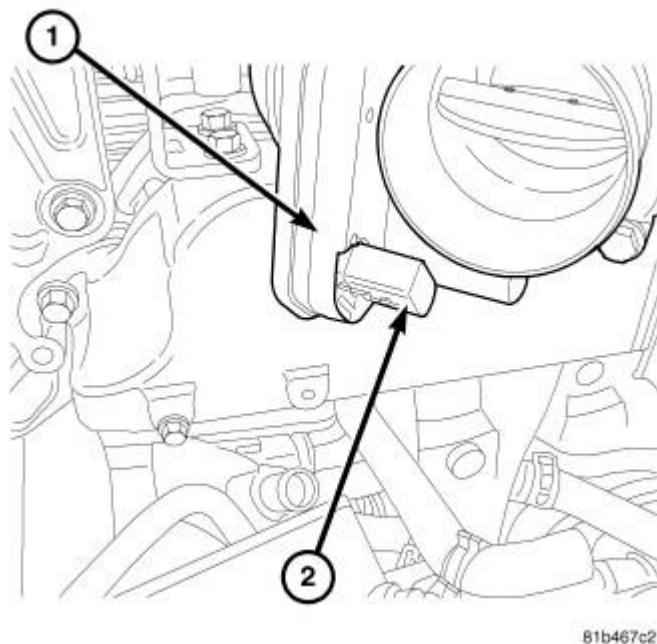
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.
5. Disconnect the generator connector (4).
6. Remove the generator feed wire (3).
7. Remove the bolts (1) and the generator.
8. Remove the generator brace bolt (2).
9. Remove the generator mounting bracket.



**Fig. 533: IAT/BPS Sensor Harness Connector**

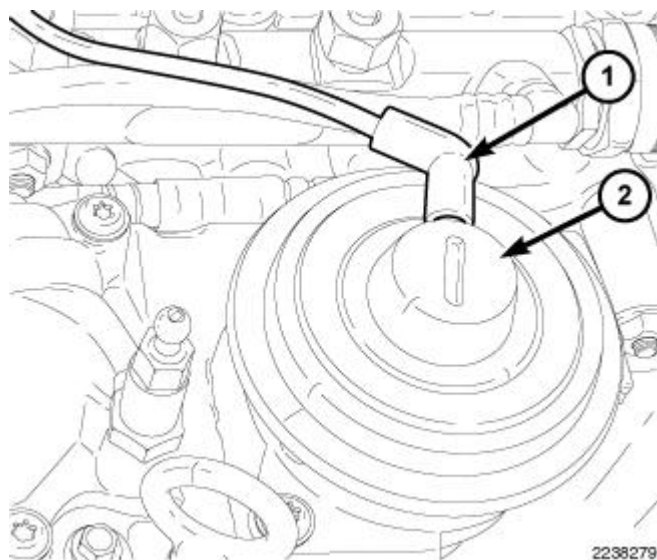
Courtesy of CHRYSLER LLC

10. Disconnect the IAT/BPS sensor harness connector (1).



**Fig. 534: Electrical Connector - EGR Air Valve**  
Courtesy of CHRYSLER LLC

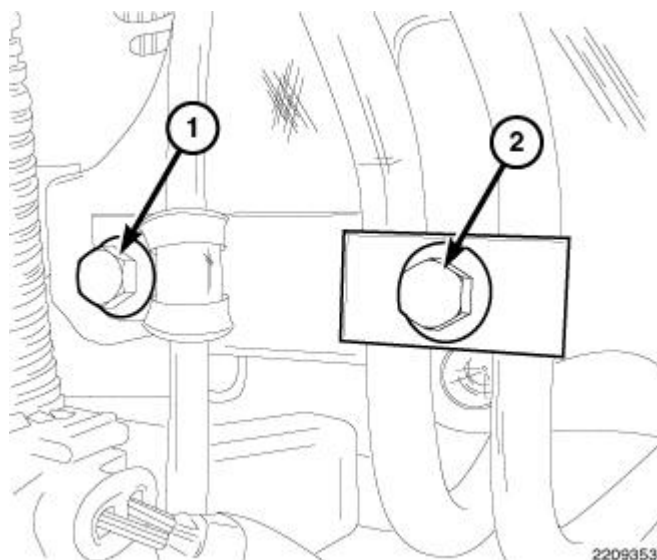
11. Disconnect the EGR air flow control valve electrical connector (2).



**Fig. 535: Vacuum Line & EGR Valve**  
Courtesy of CHRYSLER LLC

12. Disconnect the vacuum line (1) to the EGR valve (2).

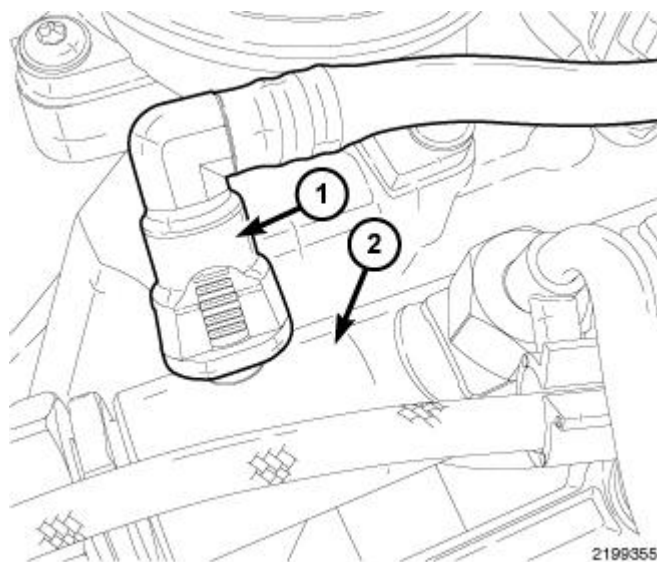




**Fig. 536: Fuel Feed & Return Line Bracket Bolt With High Pressure Fuel Feed Line To Fuel Rail Bolt**

Courtesy of CHRYSLER LLC

13. Remove the high pressure fuel feed line to fuel rail bolt (1) attaching fuel line to intake manifold.
14. Remove the fuel feed and return line bracket bolt (2) attaching fuel lines to intake manifold.



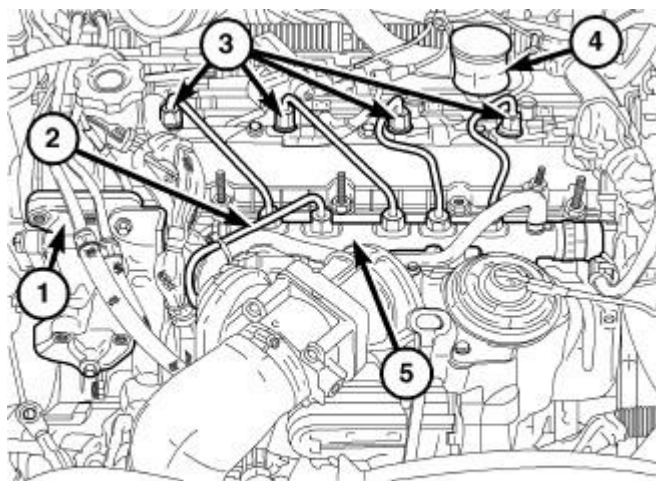
**Fig. 537: Fuel Return Line & Fuel Rail**

Courtesy of CHRYSLER LLC

15. Disconnect the fuel return line (1) from fuel rail (2).

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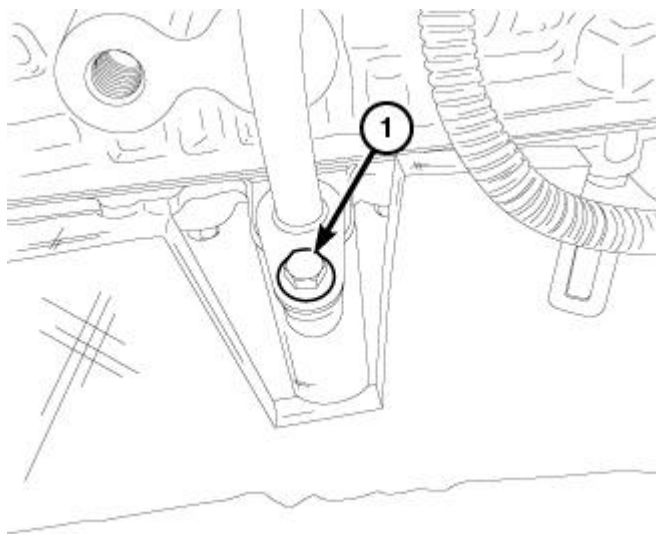


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**Fig. 538: Fuel Rail**

Courtesy of CHRYSLER LLC

16. Remove the high pressure fuel lines (2) and (3).
17. Disconnect the fuel rail solenoid harness connector.
18. Disconnect the fuel rail pressure sensor harness connector.
19. Remove the fuel rail (5).



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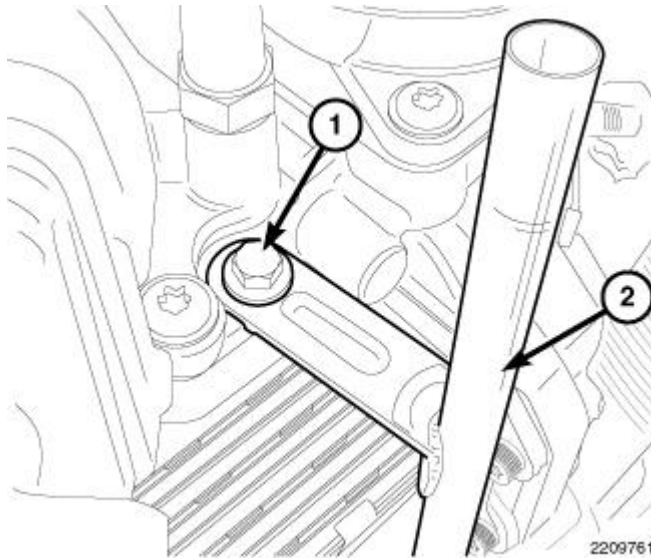
**Fig. 539: Oil Indicator Tube Lower Bolt**

Courtesy of CHRYSLER LLC

20. Remove lower bolt (1) from the oil indicator tube.

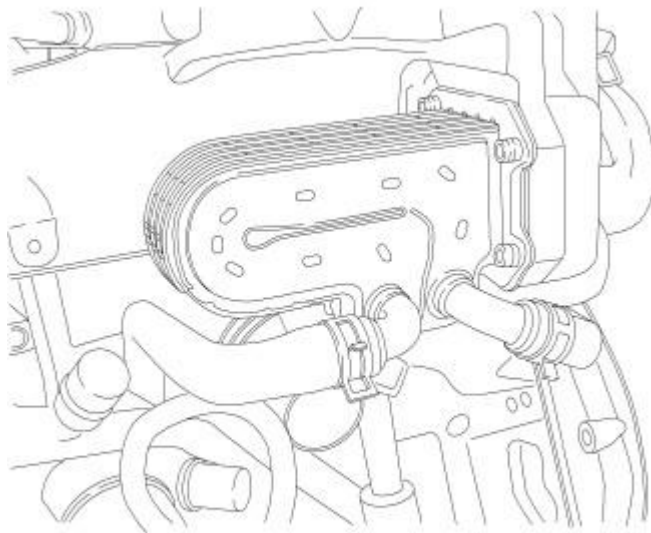
## 2009 Chrysler Town & Country LX

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**Fig. 540: Oil Lever Indicator Tube**  
Courtesy of CHRYSLER LLC

21. Remove upper bolt (1) and the oil level indicator tube.

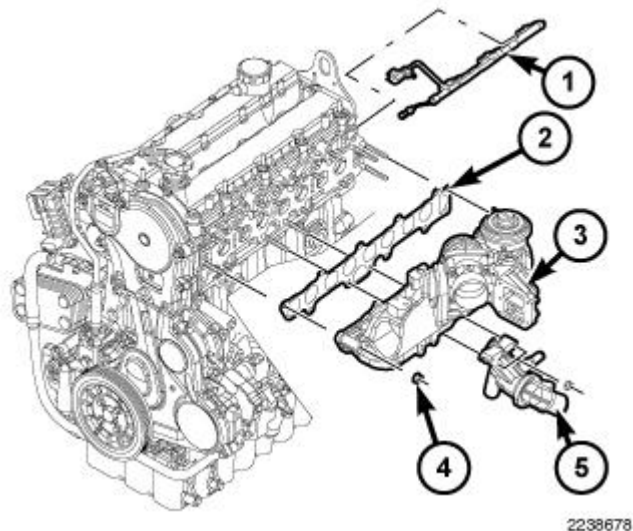


**Fig. 541: EGR Cooler**  
Courtesy of CHRYSLER LLC

22. Remove coolant hoses from the EGR cooler.
23. Remove bolts and the EGR cooler.

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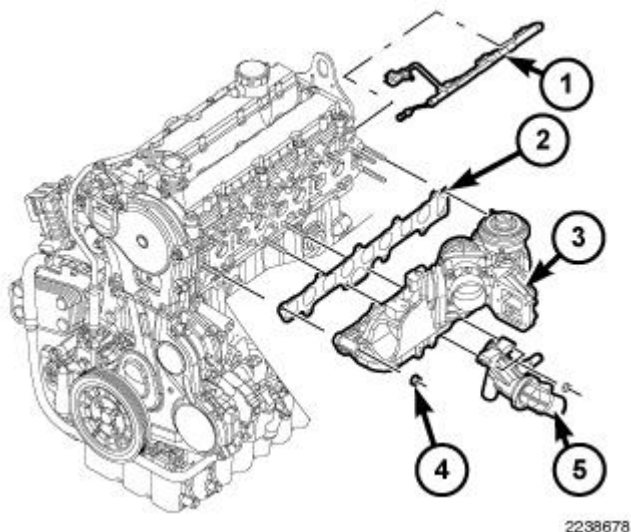


**Fig. 542: Intake Manifold & Thermostat Housing**  
Courtesy of CHRYSLER LLC

24. Disconnect and position aside the glow plug harness (1).
25. Remove the thermostat housing (5).
26. Remove the intake manifold fasteners (4).
27. Remove the intake manifold (3) and the gasket (2).

### Installation

#### INSTALLATION

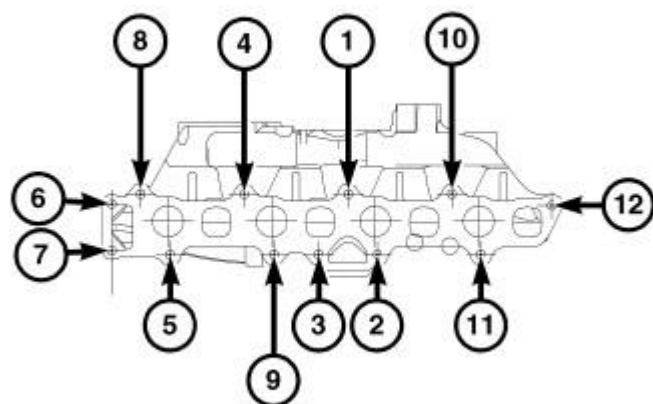


**Fig. 543: Intake Manifold & Thermostat Housing**  
Courtesy of CHRYSLER LLC

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1. Clean and inspect the gasket surface area of the intake manifold and the cylinder head.
2. Install a new intake manifold gasket (2).
3. Install the intake manifold (3).
4. Install the thermostat housing (5).
5. Reposition glow plug harness (1) and connect the glow plug connectors.



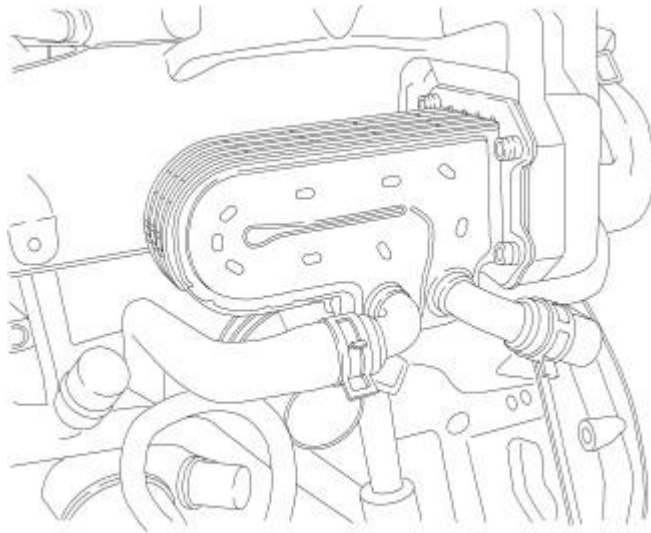
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**Fig. 544: Intake Manifold Tightening Sequence**  
Courtesy of CHRYSLER LLC

6. Using the tightening sequence in **Fig. 544** , tighten the intake manifold fasteners to 25 N.m (18 ft. lbs.).

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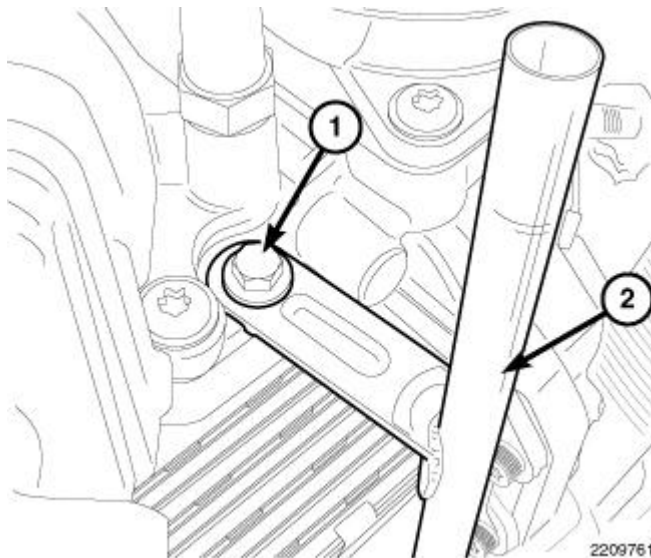
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**Fig. 545: EGR Cooler**  
Courtesy of CHRYSLER LLC

7. Install the EGR cooler. Tighten bolts to 15 N.m (133 in. lbs.).
8. Install coolant hoses to the EGR cooler.



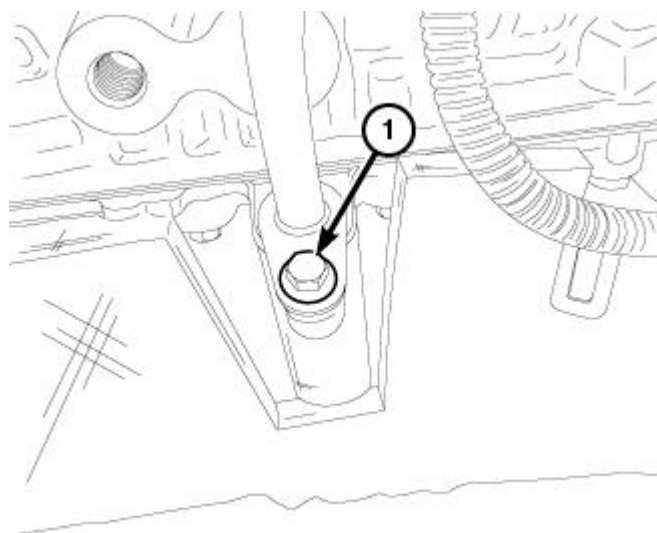
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**Fig. 546: Oil Level Indicator Tube**  
Courtesy of CHRYSLER LLC

9. Install the oil level indicator tube (2). Tighten upper bolt (1) to 11 N.m (97 in. lbs.).

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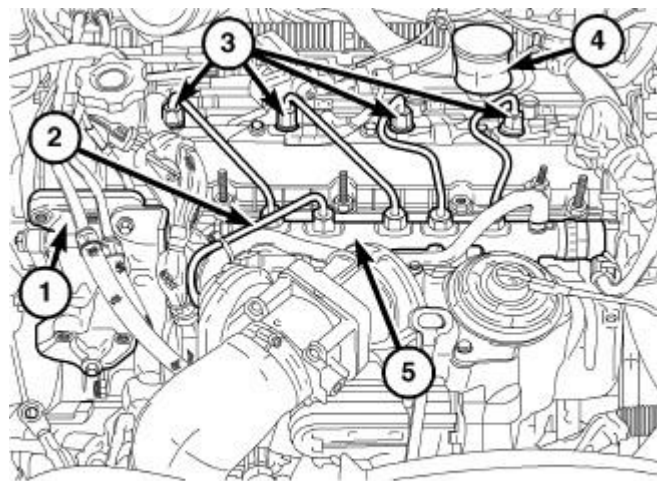
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**Fig. 547: Oil Indicator Lower Bolt**  
Courtesy of CHRYSLER LLC

10. Install the oil indicator lower bolt. Tighten to lower bolt (1) to 11 N.m (97 in. lbs.).



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**Fig. 548: Fuel Rail**  
Courtesy of CHRYSLER LLC

11. Install the fuel rail (5).

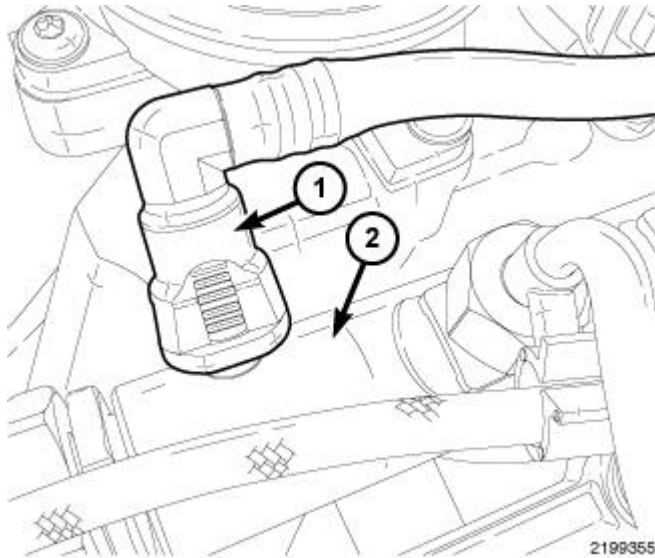
**NOTE:** High pressure fuel lines must be replaced with new lines any time they are removed.

12. Remove protective caps and loosely install the high pressure fuel lines onto the fuel injectors and the fuel rail.

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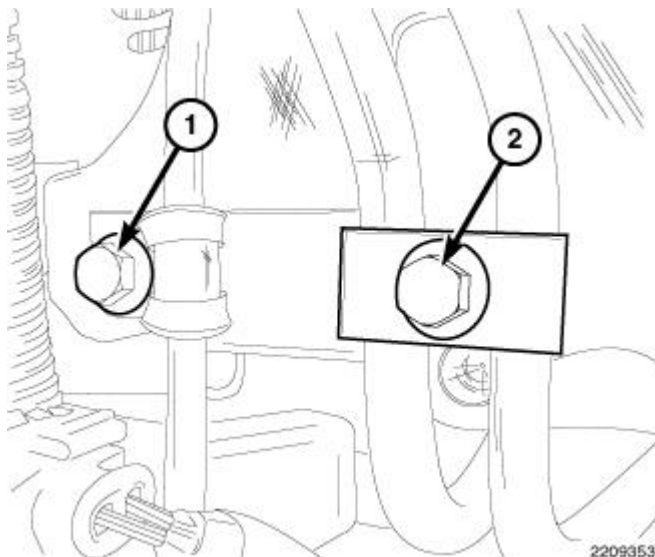
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13. Loosely install the high pressure fuel feed line to the high pressure pump and the fuel rail.
14. Tighten the fuel rail nuts to 24 N.m (18 ft. lbs).
15. Tighten the fuel lines at the fuel injectors to 28 N.m (21 ft. lbs.).
16. Tighten the fuel lines from the injectors to the fuel rail to 5 N.m (44 in. lbs), plus an additional 75°.
17. Tighten the high pressure line from the fuel pump to the fuel rail to 5 N.m (44 in. lbs) plus an additional 75°.
18. Tighten the high pressure line at the fuel pump to 28 N.m (21 ft. lbs).



**Fig. 549: Fuel Return Line & Fuel Rail**  
Courtesy of CHRYSLER LLC

19. Connect the fuel return line (1) to fuel rail (2).

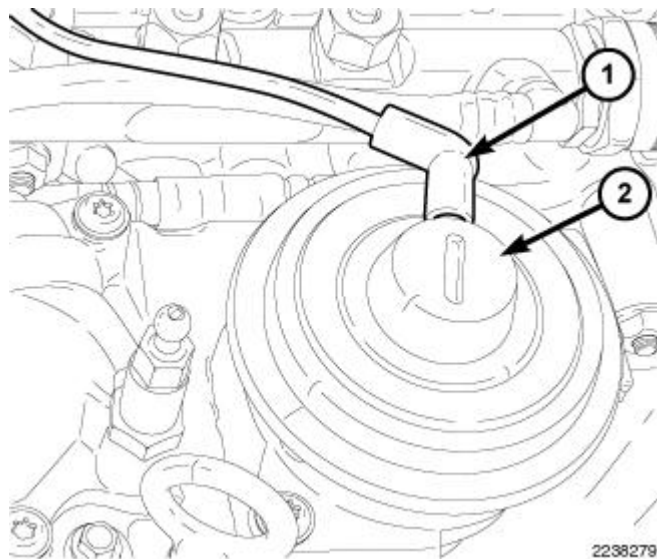


**Fig. 550: Fuel Feed & Return Line Bracket Bolt With High Pressure Fuel Feed Line To Fuel Rail**



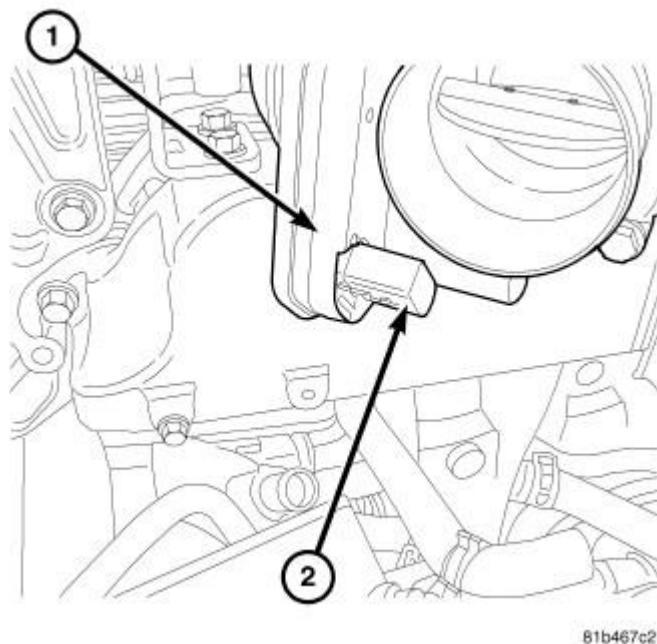
**Bolt****Courtesy of CHRYSLER LLC**

20. Install the fuel feed and return line bracket bolt (2) attaching fuel lines to intake manifold. Tighten bolt to 15 N.m (133 in. lbs.).
21. Install the high pressure fuel feed line to fuel rail bolt (1) attaching fuel line to intake manifold. Tighten bolt to 15 N.m (133 in. lbs.).



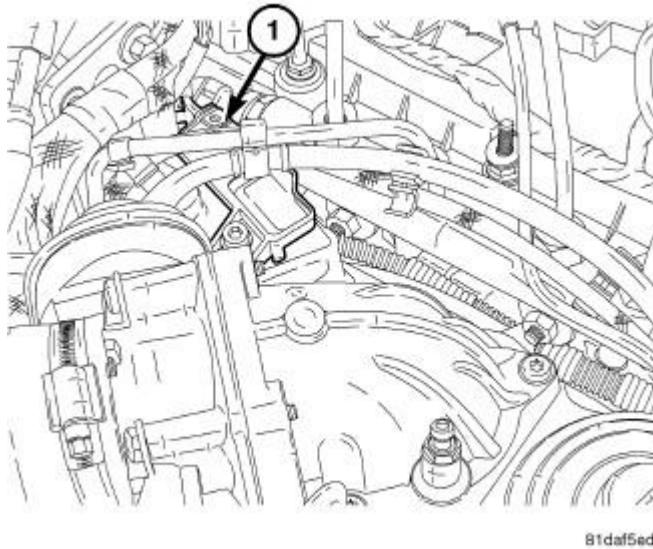
**Fig. 551: Vacuum Line & EGR Valve**  
**Courtesy of CHRYSLER LLC**

22. Connect the vacuum line (1) to the EGR valve (2).



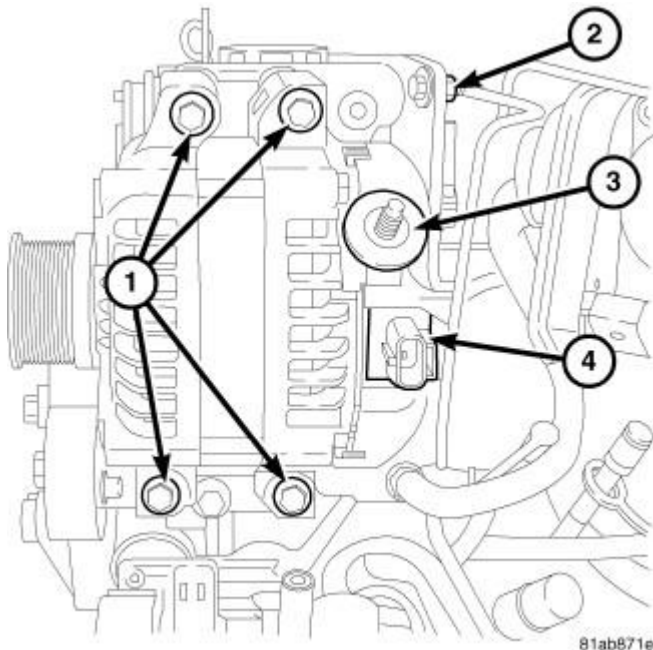
**Fig. 552: Electrical Connector - EGR Air Valve**  
Courtesy of CHRYSLER LLC

23. Connect the EGR air flow control valve electrical connector (2).



**Fig. 553: IAT/BPS Sensor Harness Connector**  
Courtesy of CHRYSLER LLC

24. Connect the IAT/BPS sensor harness connector (1).



**Fig. 554: Generator**  
Courtesy of CHRYSLER LLC

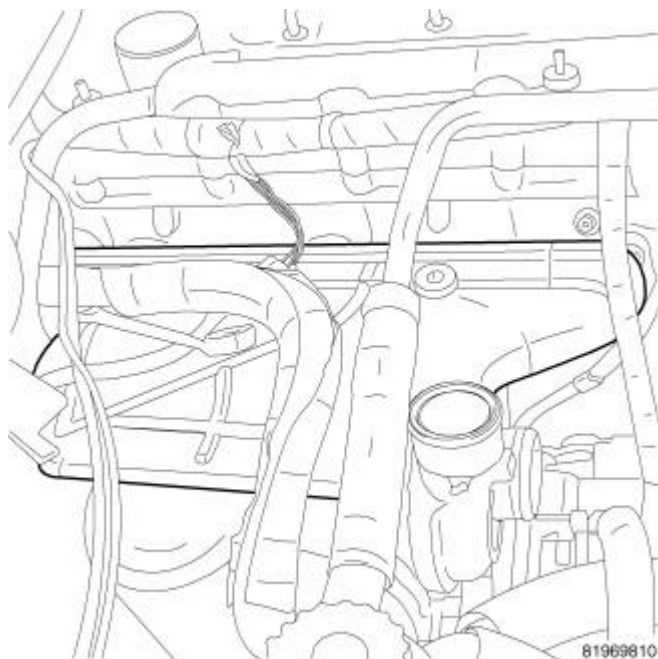
25. Install the generator mounting bracket. Tighten bolts to 45 N.m (33 ft. lbs.).
26. Install the generator brace bolt (2) Tighten bolt to 11 N.m (97 in. lbs.).
27. Install the generator. Tighten bolts (1) to 33 N.m (24 ft. lbs.).
28. Connect the generator connector (4).
29. Install the battery feed wire to the generator (3).
30. Install the accessory drive belt.
31. Fill the coolant. Refer to **Cooling - Standard Procedure** .
32. Connect the negative battery cable.
33. Install the engine cover.

## **TURBOCHARGER SYSTEM**

### **TURBOCHARGER**

#### **Removal**

#### **TURBOCHARGER**



**Fig. 555: Heat Shield**

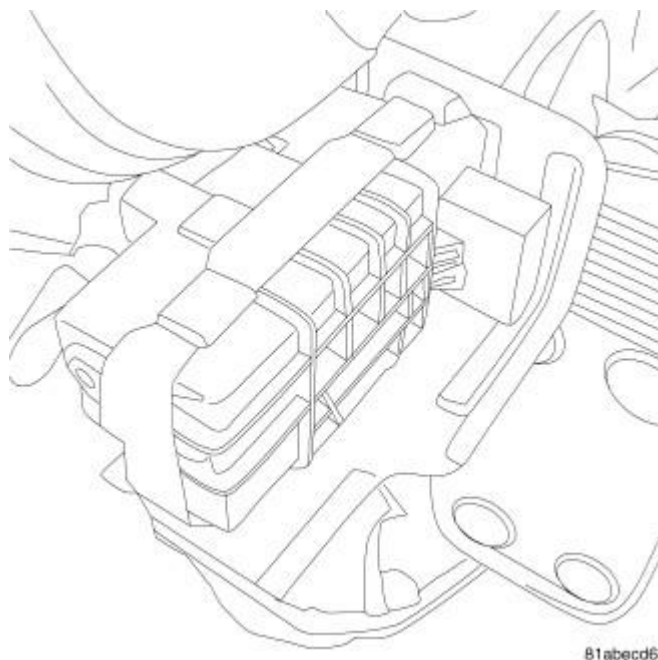
Courtesy of CHRYSLER LLC

1. Disconnect negative battery cable.
2. Remove engine cover.
3. Disconnect the inlet air pressure sensor wiring harness connector and disconnect the air outlet duct from the turbocharger.

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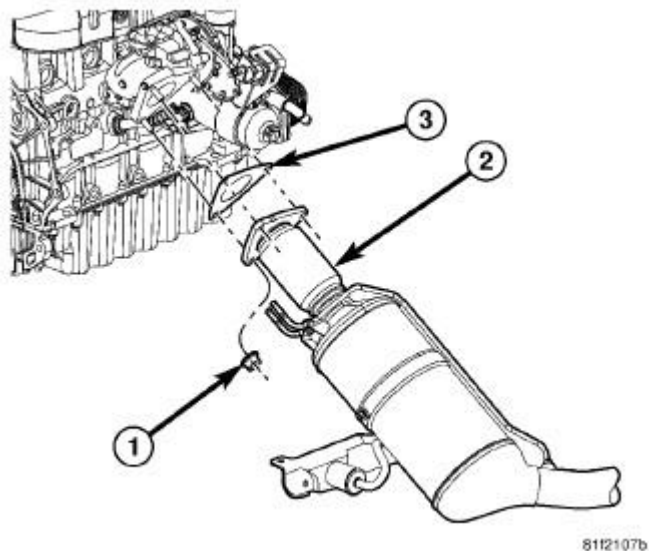
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4. Remove air inlet tube from turbocharger.
5. Remove the exhaust manifold heat shield. See [Engine/Manifolds/MANIFOLD, Exhaust - Removal](#).



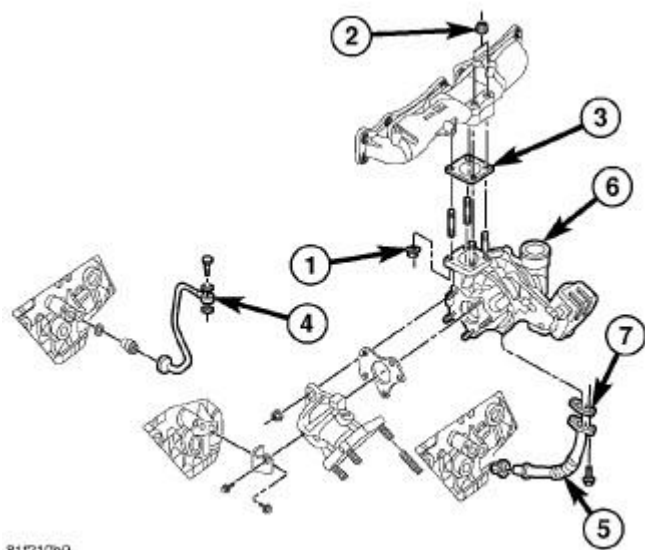
**Fig. 556: Turbocharger Module**  
Courtesy of CHRYSLER LLC

6. Disconnect the boost pressure solenoid harness connector.



**Fig. 557: Diesel Particulate Filter Fasteners**  
Courtesy of CHRYSLER LLC

7. Remove the fasteners (1) from the upstream side of the diesel particulate filter (2).



**Fig. 558: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

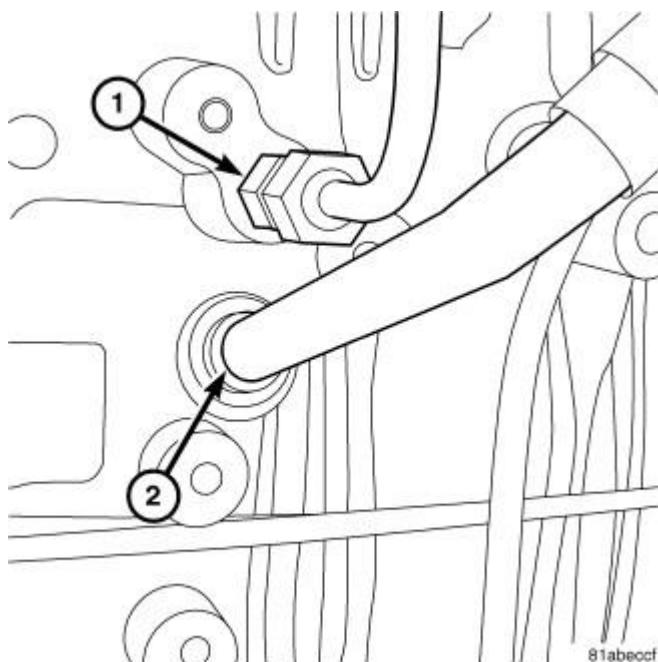
8. Remove the bolts from the turbocharger to engine bracket.
9. Remove the engine oil cooler. Refer to **Engine/Lubrication/COOLER, Oil - Removal**.
10. Remove the turbocharger oil lines (4 and 5).
11. Remove the turbocharger to exhaust manifold fasteners (1 and 2).
12. Remove turbocharger (6).
13. If damaged, remove oil line fitting from cylinder block.

## Installation

### TURBOCHARGER

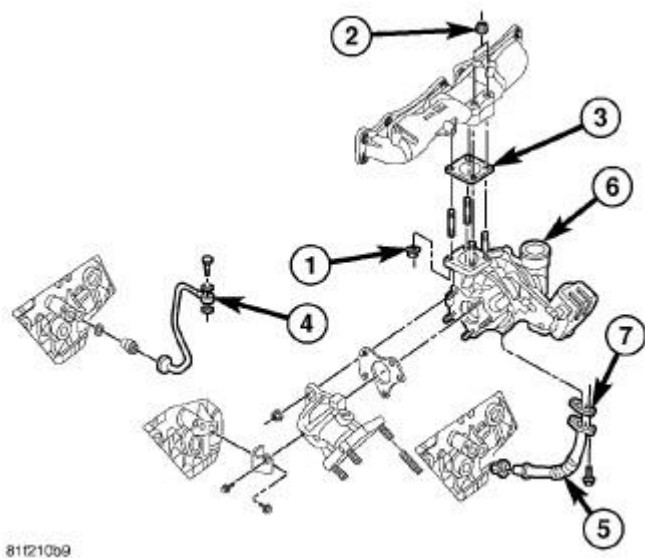
## 2009 Chrysler Town & Country LX

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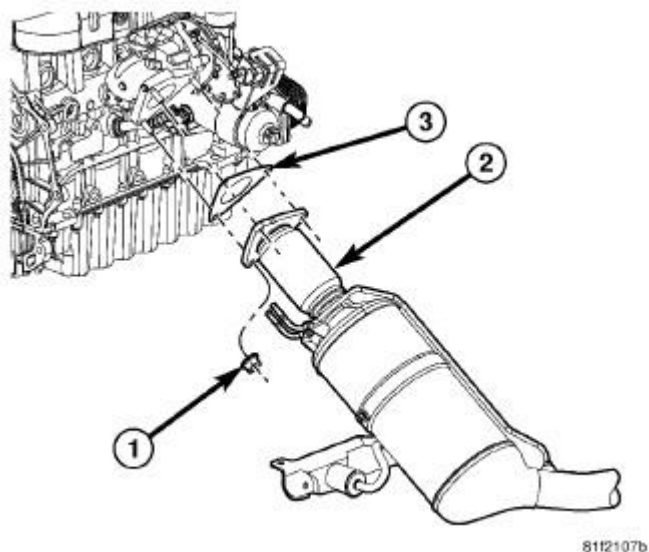
**Fig. 559: Turbocharger Oil Lines**  
Courtesy of CHRYSLER LLC

1. If removed, install oil line fitting (1). Tighten to 54 N.m (39 ft. lbs.)



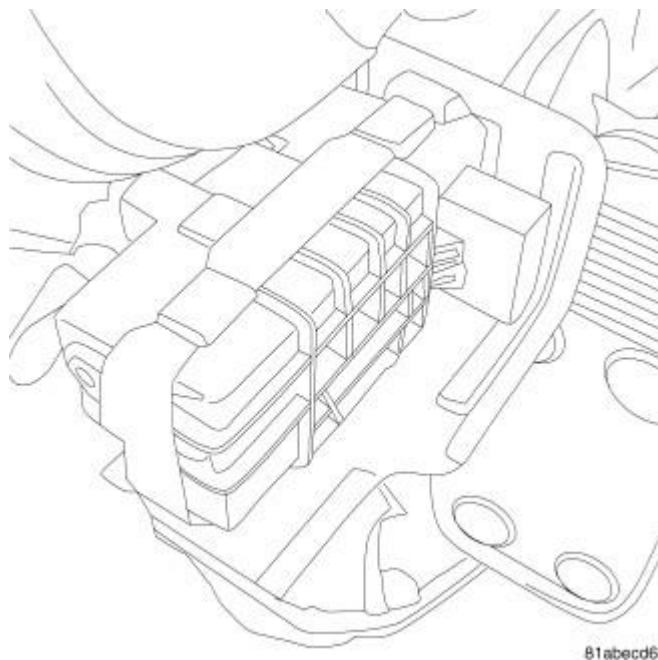
**Fig. 560: Turbocharger Retaining Nuts**  
Courtesy of CHRYSLER LLC

2. Position turbocharger (6) to exhaust manifold with new gasket (3). Tighten retaining nuts (1) and (2) to 32 N.m (24 lbs. ft.).
3. Install the turbocharger oil lines (4 and 5). Tighten to 4.7 N.m (41 in. lbs.).



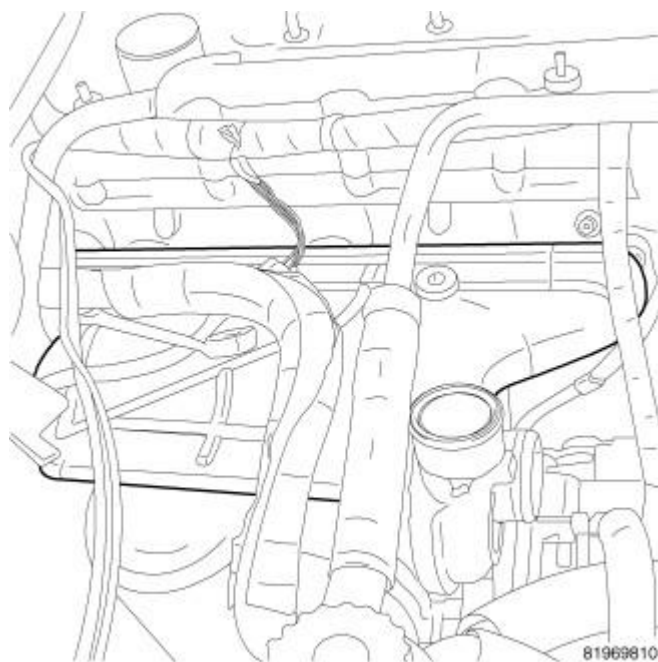
**Fig. 561: Diesel Particulate Filter Fasteners**  
Courtesy of CHRYSLER LLC

4. Install the engine oil cooler. Refer to **Engine/Lubrication/COOLER, Oil - Installation**.
5. Install the diesel particulate filter fasteners (1). Tighten to 34 N.m (25 ft. lbs.).



**Fig. 562: Turbocharger Module**  
Courtesy of CHRYSLER LLC

6. Connect the boost pressure solenoid harness connector.



**Fig. 563: Exhaust Manifold Heat Shield**  
Courtesy of CHRYSLER LLC

7. Install the exhaust manifold heat shield. See **Engine/Manifolds/MANIFOLD, Exhaust - Installation.**
8. Install the inlet air tube from the turbocharger.
9. Install the engine cover.

## **VALVE TIMING**

### **STANDARD PROCEDURE**

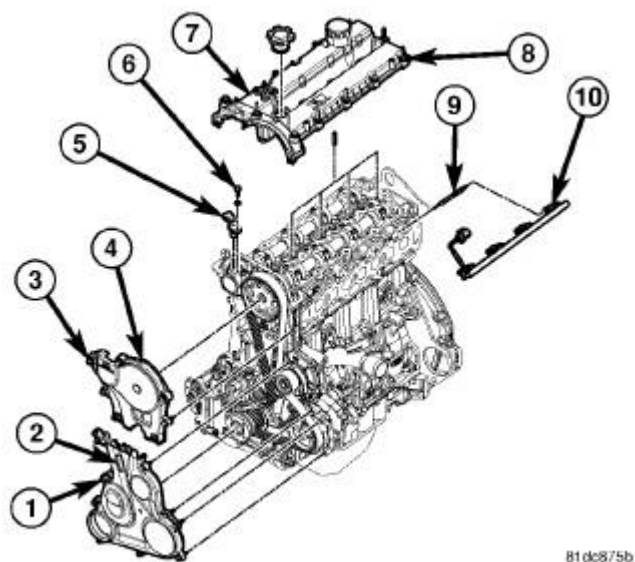
#### **LOCKING ENGINE 90 DEGREES AFTER TDC**

1. Disconnect negative battery cable.



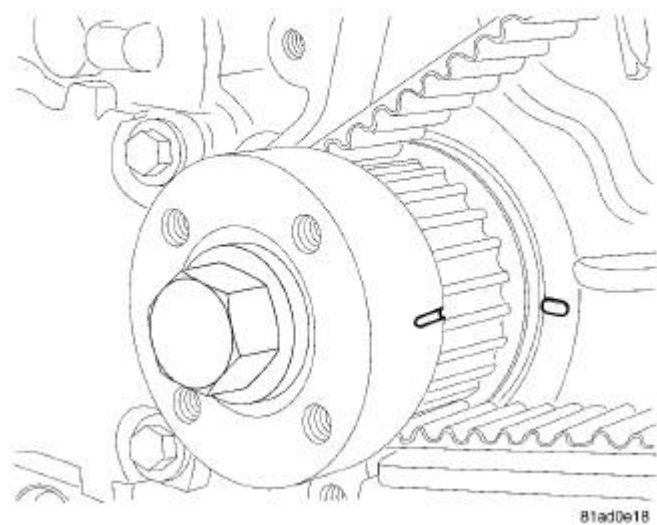
## 2009 Chrysler Town & Country LX

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**Fig. 564: Upper & Lower Front Covers**  
Courtesy of CHRYSLER LLC

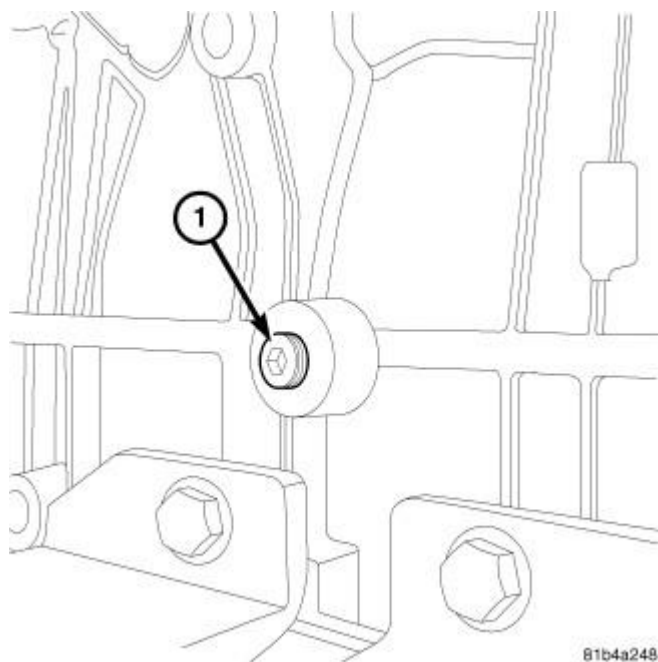
2. Remove the upper (4) and lower (2) front covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal.**



**Fig. 565: Crankshaft Timing Belt Drive Sprocket & Timing Belt Cover Aligned**  
Courtesy of CHRYSLER LLC

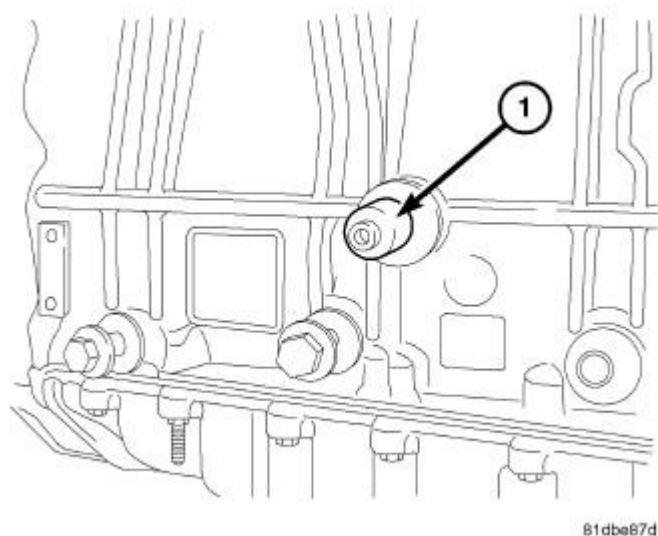
3. Rotate the engine until the 90° ATDC marks on the crankshaft timing belt drive sprocket and timing belt

cover are aligned.



**Fig. 566: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

4. Remove the engine block plug (1) for the crankshaft locking tool. The crankshaft locking tool is installed on the intake manifold side of the engine.



**Fig. 567: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

5. Install the Crankshaft locking tool VM 9992 into engine block located on the intake manifold side of the block. Make sure that the crankshaft locking tool threads into the crankshaft. If it does not thread into the

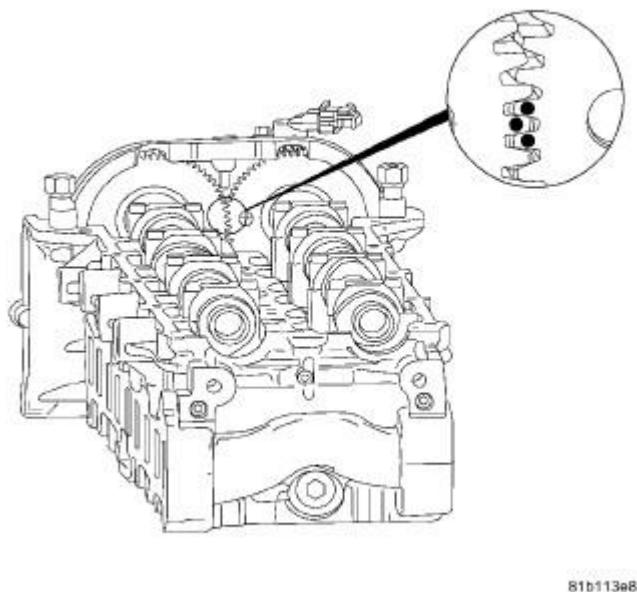
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crankshaft, the crankshaft is not at 90° ATDC. If necessary, realign the 90° ATDC marks on the crankshaft timing belt drive sprocket and timing belt cover.

### Camshaft Timing Procedure

**NOTE:** In order to validate camshaft timing, the cylinder head cover and timing belt should already have been removed.



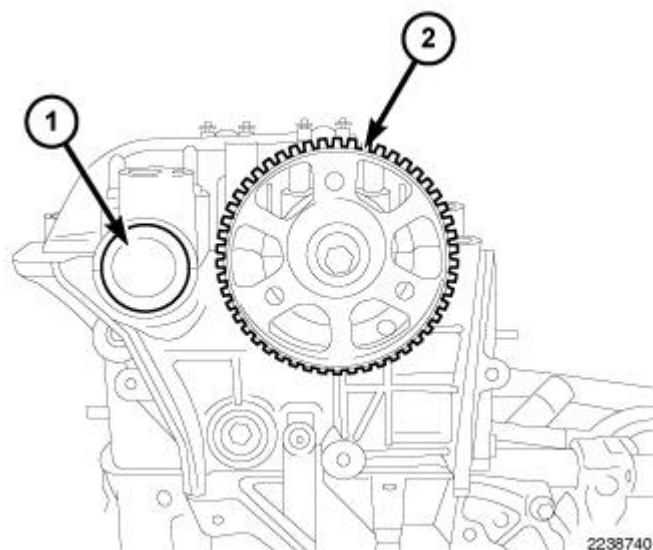
**Fig. 568: Camshaft Timing Dots**  
Courtesy of CHRYSLER LLC

**CAUTION:** The camshaft dots time the camshafts to each other. Later in the procedure we will rotate the camshafts so they are timed to the crankshaft.

1. Line up the camshaft dots.

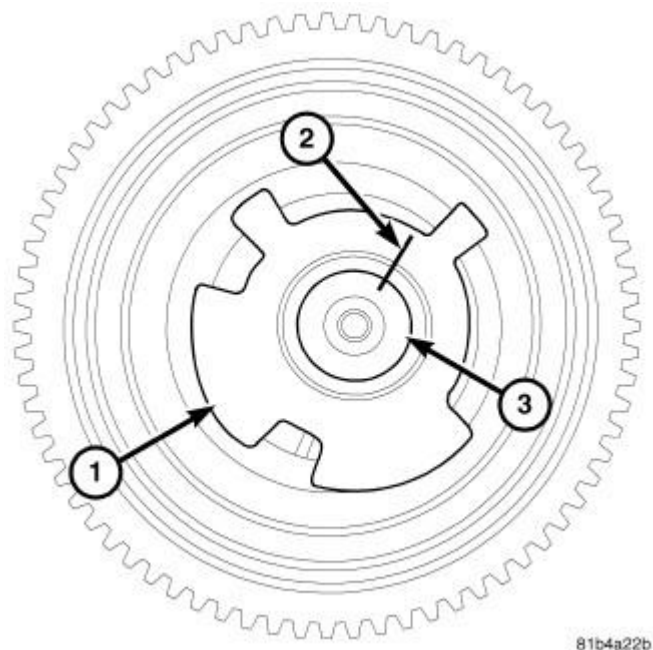
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**Fig. 569: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

2. Remove the exhaust camshaft oil seal (1).



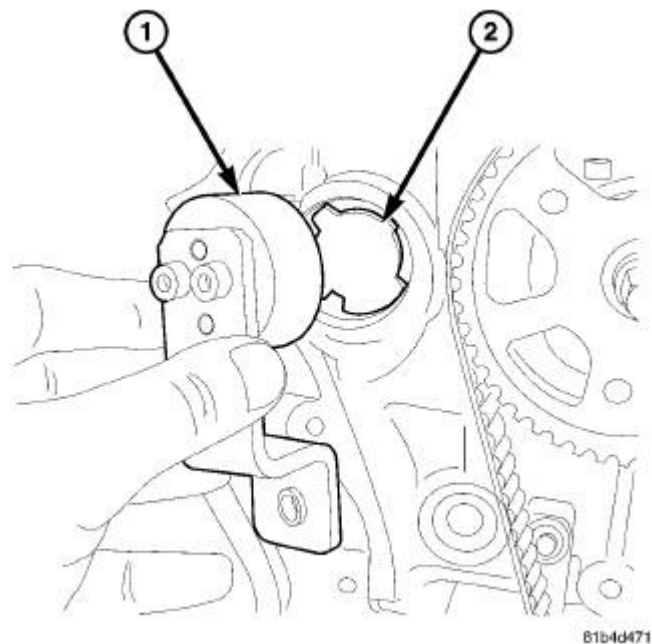
**Fig. 570: Mark Camshaft Tone Wheel**  
Courtesy of CHRYSLER LLC

**CAUTION:** Do not rotate the camshaft using the camshaft locking tool. The tone wheel may spin on the camshaft. If the tone wheel is rotated on the camshaft, the camshaft must be replaced.

3. Mark the camshaft tone wheel with a paint marker.

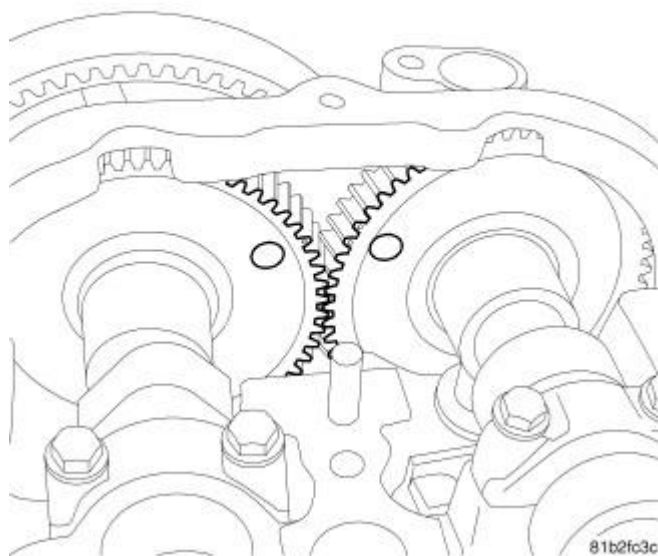
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**Fig. 571: Camshaft Lock Tool**  
Courtesy of CHRYSLER LLC

4. Rotate the camshafts until the camshaft locking tool VM 9991 can be installed.
5. Install the camshaft locking tool VM 9991 (1).



**Fig. 572: Camshaft Marks At 90 Degrees ATDC**  
Courtesy of CHRYSLER LLC

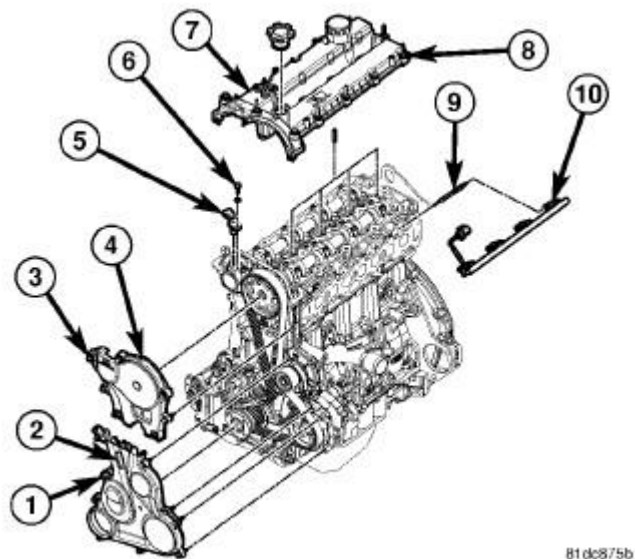
6. Verify the camshafts are set correctly at 90° ATDC as shown in illustration.

## **BELT, TIMING**

### **Removal**

#### **REMOVAL**

1. Disconnect the negative battery cable.
2. Remove the engine cover.
3. Remove the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.
4. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.

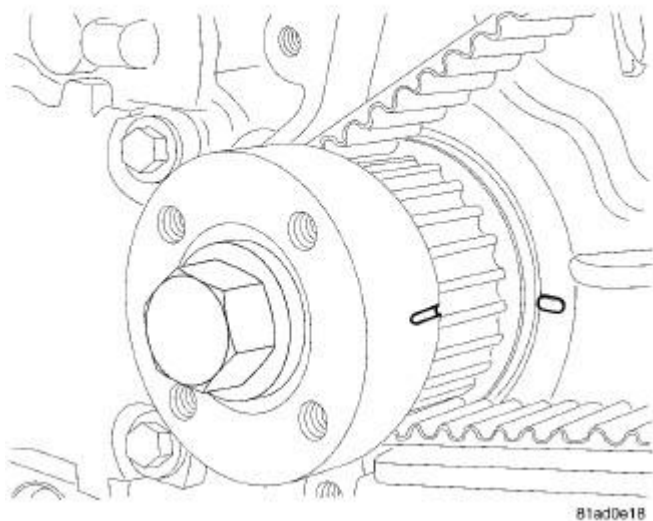


**Fig. 573: Upper & Lower Outer Timing Belt Covers**  
Courtesy of CHRYSLER LLC

5. Remove the upper (4) and lower (2) outer timing belt covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

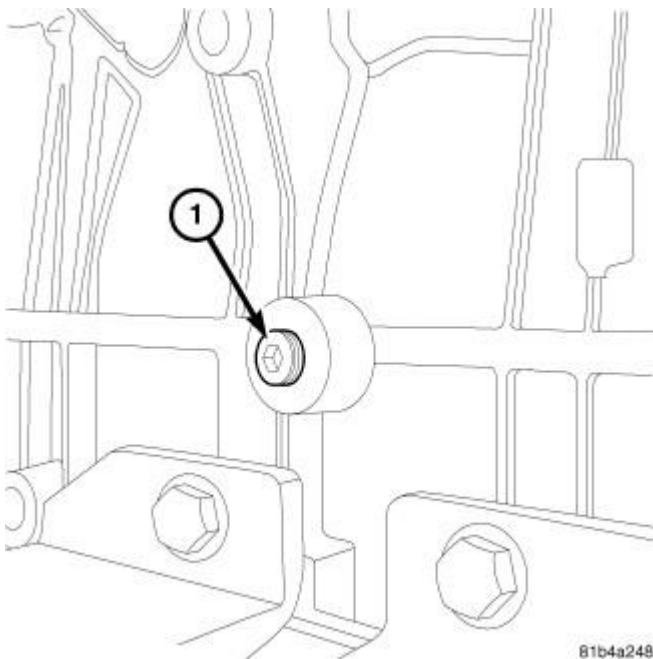
## 2009 Chrysler Town & Country LX

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**Fig. 574: Crank Timing Mark**  
Courtesy of CHRYSLER LLC

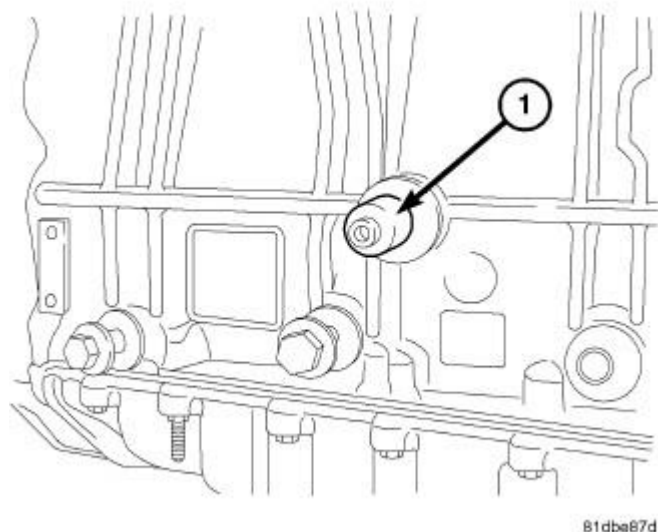
6. Rotate the engine by hand until the crankshaft 90° ATDC marks are aligned.



**Fig. 575: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

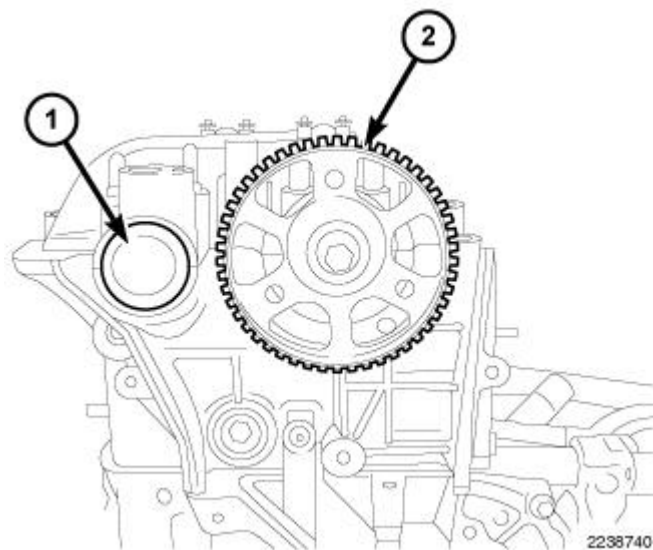
7. Remove the engine block plug (1) for the crankshaft locking tool. The crankshaft locking tool is installed

on the intake manifold side of the engine.



**Fig. 576: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

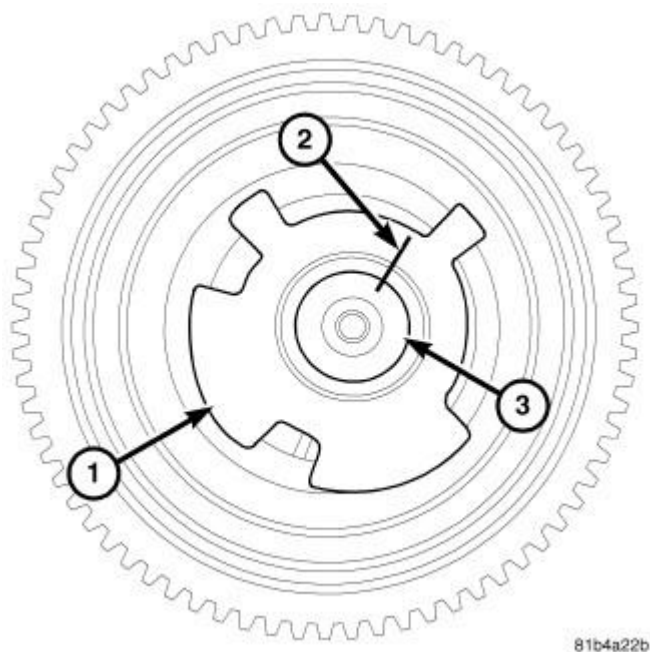
8. Install the crankshaft locking tool VM. 9992 (1).



**Fig. 577: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

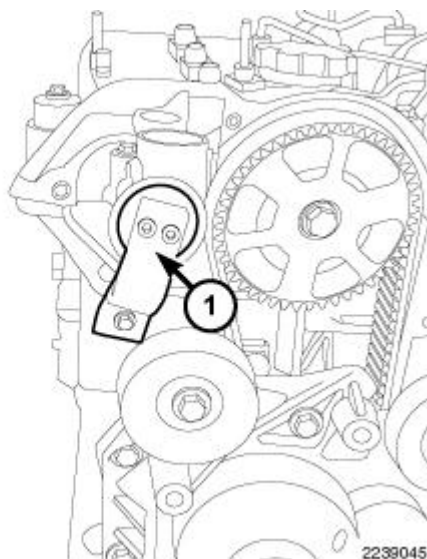
9. Remove the exhaust camshaft oil seal (1).





**Fig. 578: Mark Across Reluctor Wheel & Exhaust Camshaft**  
Courtesy of CHRYSLER LLC

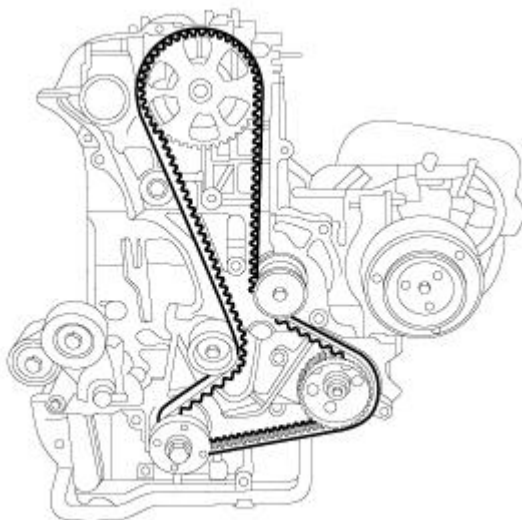
10. Make a mark (2) across the reluctor wheel (1) and the exhaust camshaft (3). This mark will be used to verify that the reluctor wheel did not rotate on the camshaft during assembly.



**Fig. 579: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

**NOTE:** If it is suspected that the camshafts are not correctly timed to each other, refer to the camshaft timing procedure to reset the camshaft timing. See Engine/Valve Timing - Standard Procedure.

11. Install the camshaft locking tool VM 9991 (1). The crankshaft and camshafts are now locked at 90° ATDC.



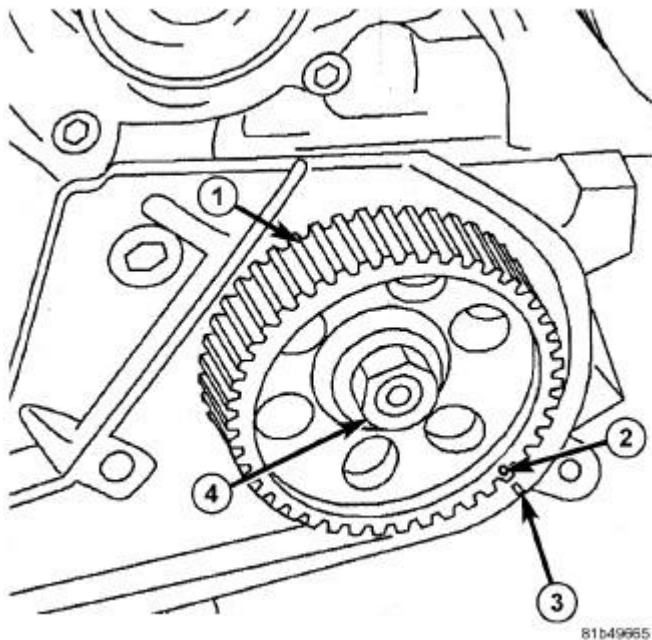
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**Fig. 580: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

12. Loosen the timing belt tensioner bolt, and remove the timing belt.

### Installation

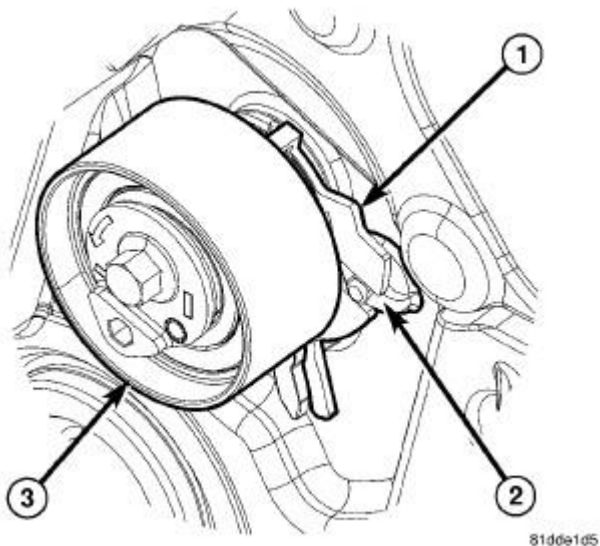
### INSTALLATION



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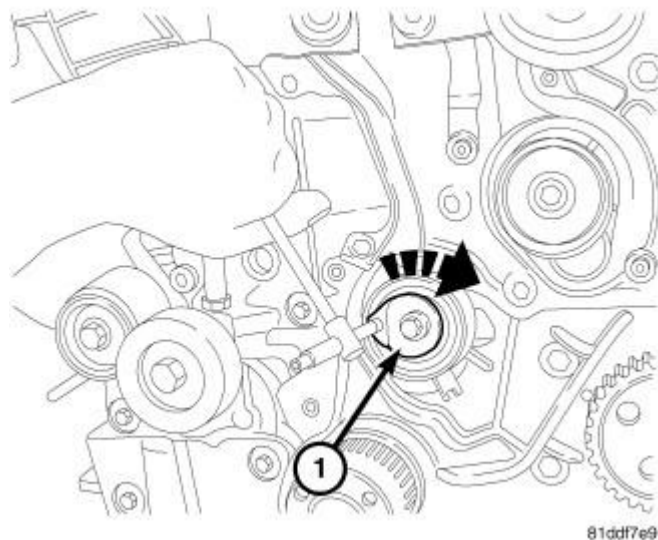
**Fig. 581: Fuel Injection Pump Timing Marks**  
Courtesy of CHRYSLER LLC

1. Align the high pressure fuel pump sprocket timing mark (2) with the timing mark (3) on the block.



**Fig. 582: Tensioner Alignment Plate**  
Courtesy of CHRYSLER LLC

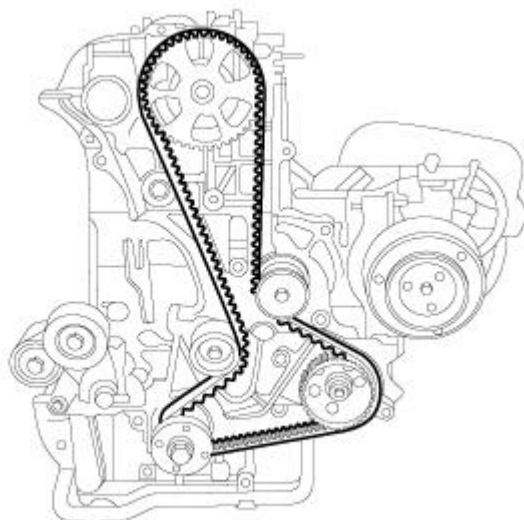
2. Verify that the bolt is finger tight and tensioner alignment plate (1) is aligned with the boss (2) on the engine cover.



**Fig. 583: Turning Timing Belt Tensioner Clockwise**  
Courtesy of CHRYSLER LLC

3. Turn the timing belt tensioner (1) clockwise to unload the tensioner enough for the timing belt to be

installed.

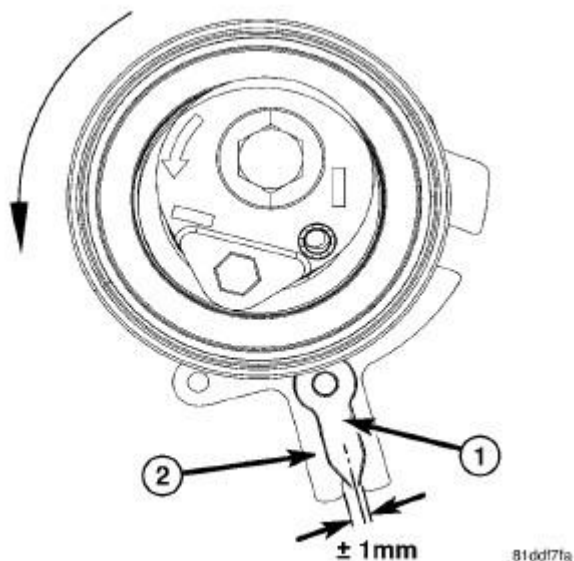


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**Fig. 584: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

**NOTE:** DO NOT remove the timing belt from the package until it is going to be installed. DO NOT expose timing belt to oil, grease or water contamination. DO NOT crimp belt at a sharp angle. DO NOT clean belt, pulleys or tensioner with solvent. Check that pulleys and bearings are not seized or damaged before installing belt.

4. Install the timing belt on the components in the following order:

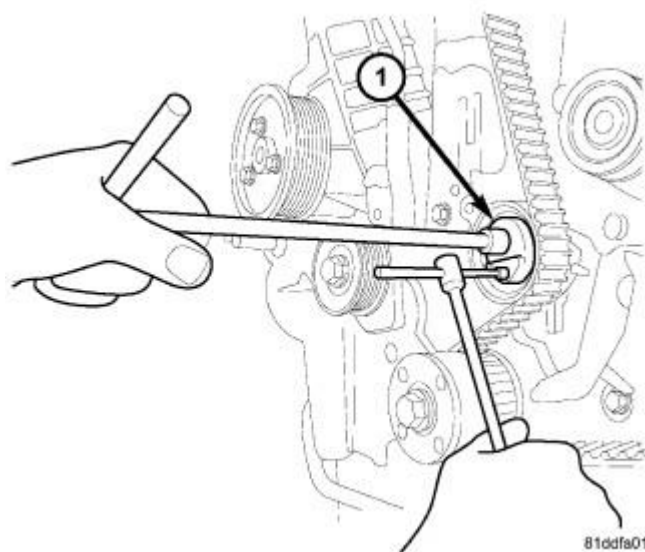


**Fig. 585: Timing Belt Tensioner Load Indicator & Gauge**

Courtesy of CHRYSLER LLC

**NOTE:** Turning the belt tensioner counterclockwise moves the pointer in a clockwise direction. Also, if the tensioner bolt is too loose this will cause the tensioner alignment slot to jump off the alignment boss on timing cover.

- Crankshaft sprocket (1)
  - High pressure fuel pump (2)
  - Water pump pulley (3)
  - Intake camshaft pulley (4)
  - Timing belt tensioner (5)
5. Adjust timing belt tensioner by lining up the load indicator arrow (1) to the center of the (2) tensioner load gauge as shown in illustration.

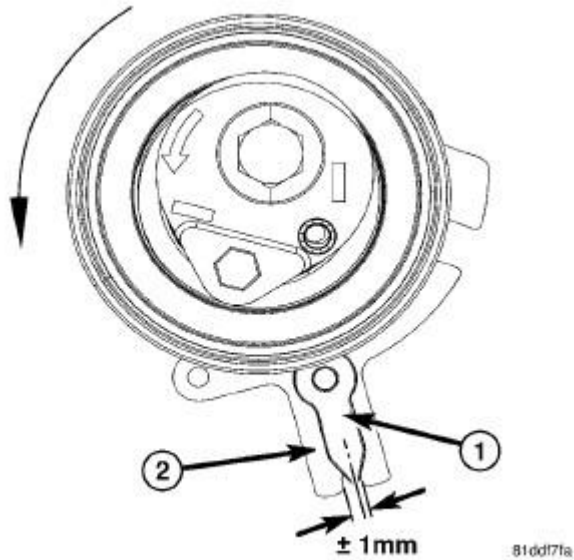


**Fig. 586: Tightening Timing Belt Tensioner Bolt**  
Courtesy of CHRYSLER LLC

6. Tighten the timing belt tensioner bolt to 28 N.m (21 ft. lbs.).

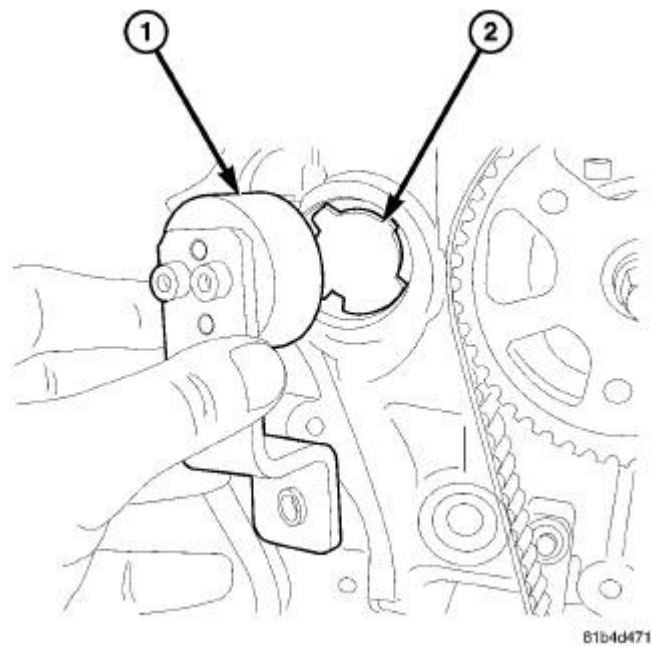
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**Fig. 587: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

7. Verify the tensioner load indicator (1) is still centered in the tensioner load gauge (2).

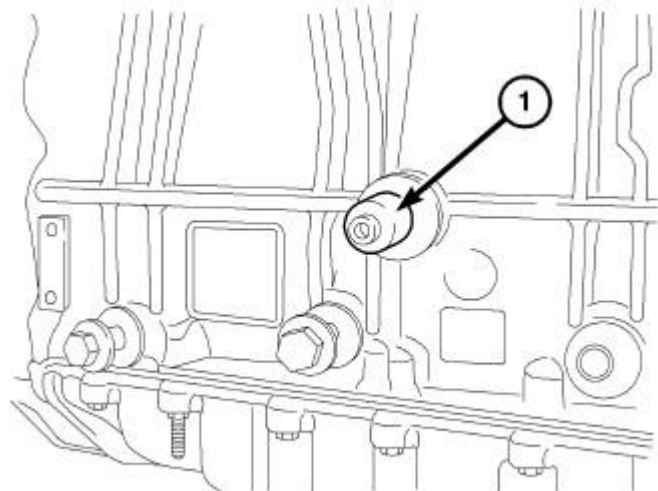


**Fig. 588: Camshaft Lock Tool**  
Courtesy of CHRYSLER LLC

8. Remove the camshaft locking tool VM 9991 (1).

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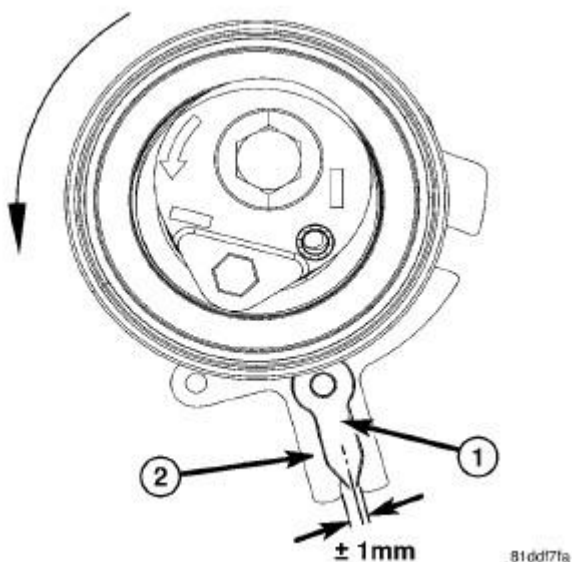
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**Fig. 589: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

9. Remove the crankshaft locking tool VM 9992 (1).



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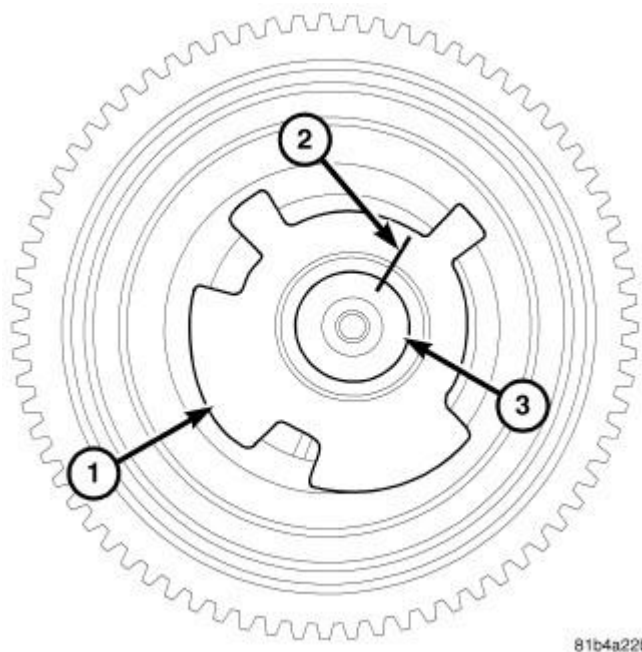
**Fig. 590: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

**NOTE:** In order to rotate the engine, the camshaft locking tool VM 9991 and the crankshaft locking tool VM. 9992 need to be removed.

10. Rotate engine 2 complete revolutions and then recheck tensioner alignment. Verify that the tension indicator (1) is centered in the slot on the tensioner gauge (2) slot as shown in illustration. Readjust tensioner alignment is necessary.

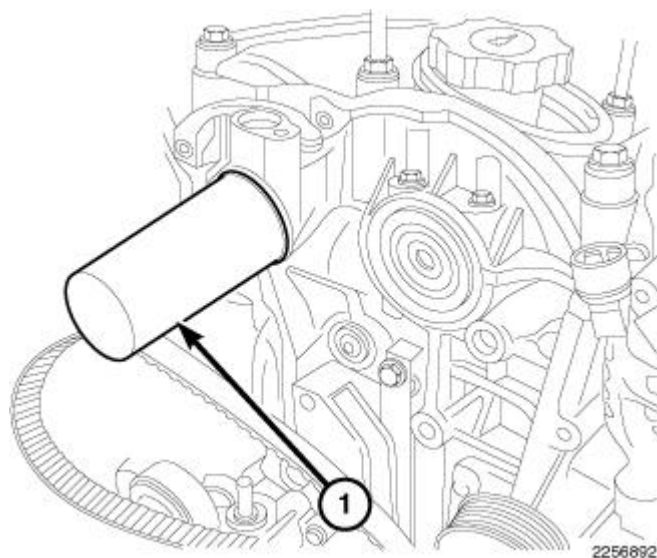
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**Fig. 591: Mark Across Reluctor Wheel & Exhaust Camshaft**  
Courtesy of CHRYSLER LLC

11. Verify that the reluctor wheel (1) has not moved on the camshaft. If the witness marks are not aligned, the reluctor wheel (1) has spun on the camshaft (3) during the assembly process. If so, the exhaust camshaft must be replaced.



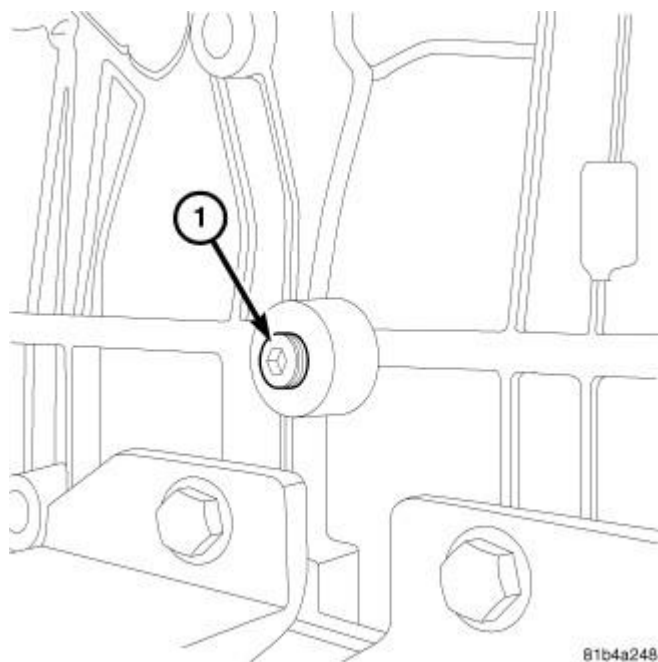
**Fig. 592: Seal Installer**  
Courtesy of CHRYSLER LLC

12. Using Seal Installer VM 1057 (1), install the exhaust camshaft seal using.



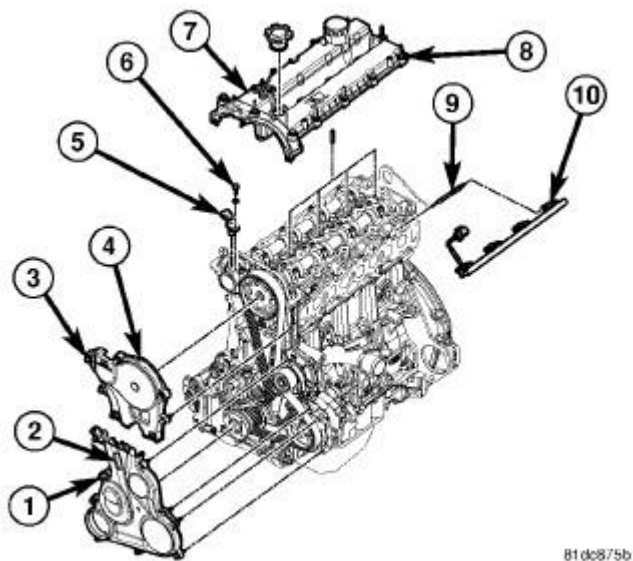
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**Fig. 593: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

13. Install the engine block plug (1). Tighten the engine block plug to 30 N.m (22 ft. lbs.).



**Fig. 594: Upper & Lower Outer Timing Belt Covers**  
Courtesy of CHRYSLER LLC

14. Install the upper (4) and lower (2) outer timing belt covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
15. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation**.

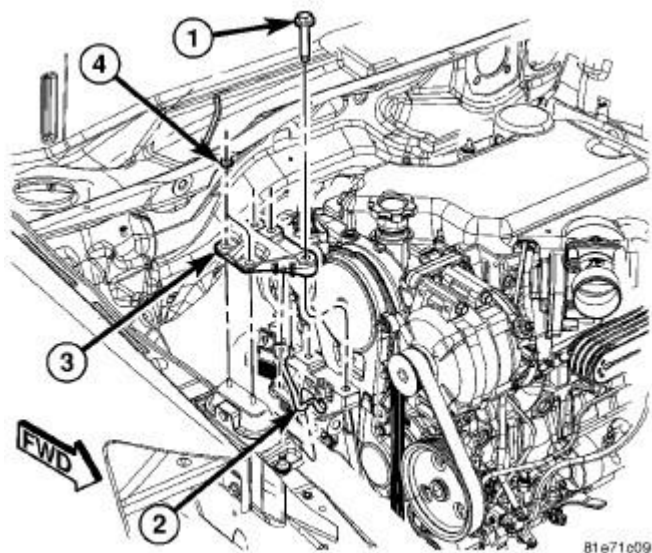
16. Install the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
17. Install the engine cover.
18. Connect the battery.

## **COVER(S), ENGINE TIMING**

### **Removal**

#### **TIMING BELT INNER COVER**

1. Disconnect the battery.
2. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.
3. Remove the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal.**

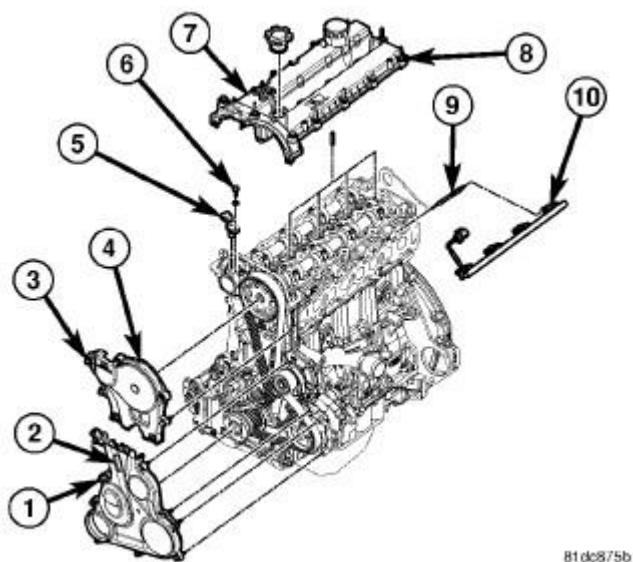


**Fig. 595: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

4. Remove the right front engine mount bracket (2). See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal.**

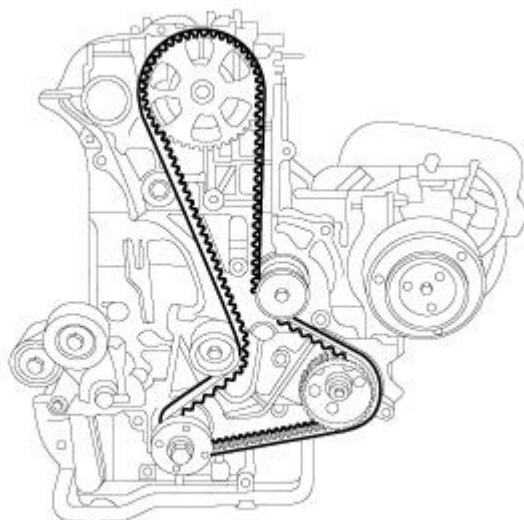
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**Fig. 596: Upper & Lower Timing Belt Cover**  
Courtesy of CHRYSLER LLC

5. Remove the upper and lower outer front covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal**.

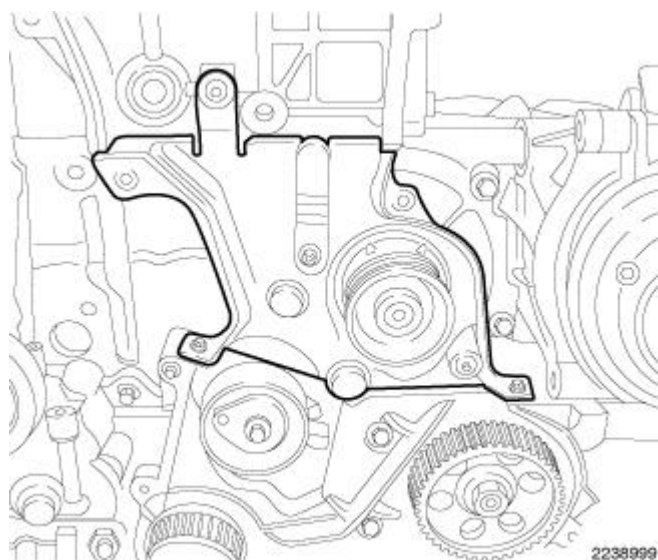


**Fig. 597: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

6. Remove the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Removal**.

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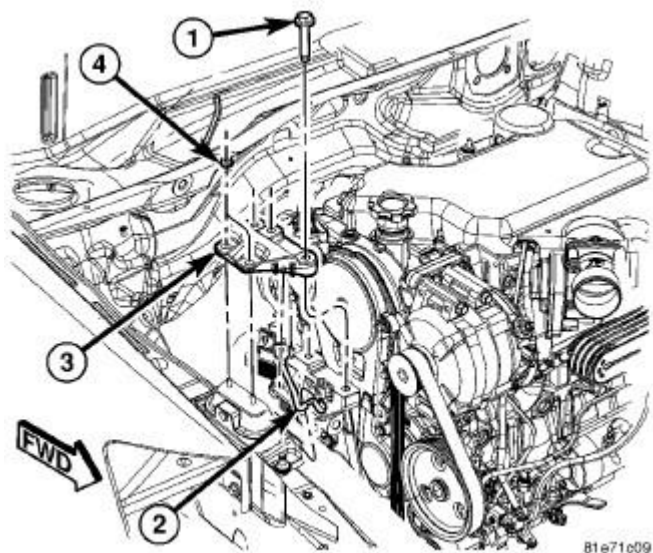


**Fig. 598: Inner Front Cover**  
Courtesy of CHRYSLER LLC

7. Remove the inner front cover.

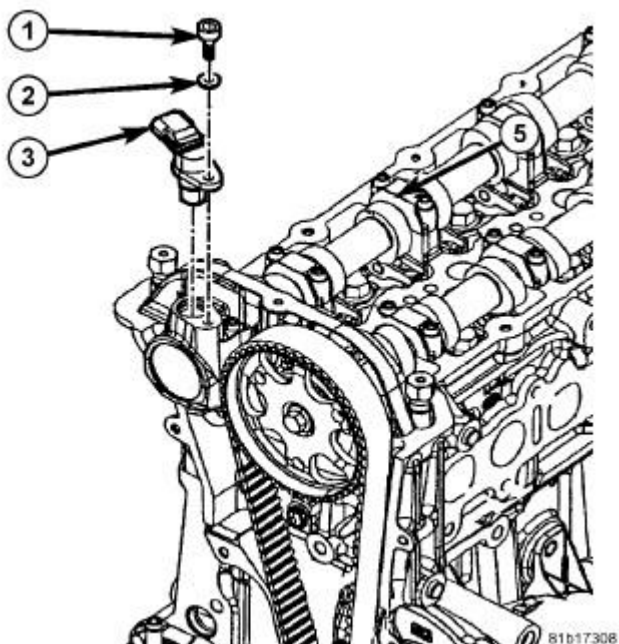
### UPPER AND LOWER TIMING BELT OUTER COVERS

1. Disconnect the negative battery cable.
2. Remove the engine cover.
3. Remove the air cleaner housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**



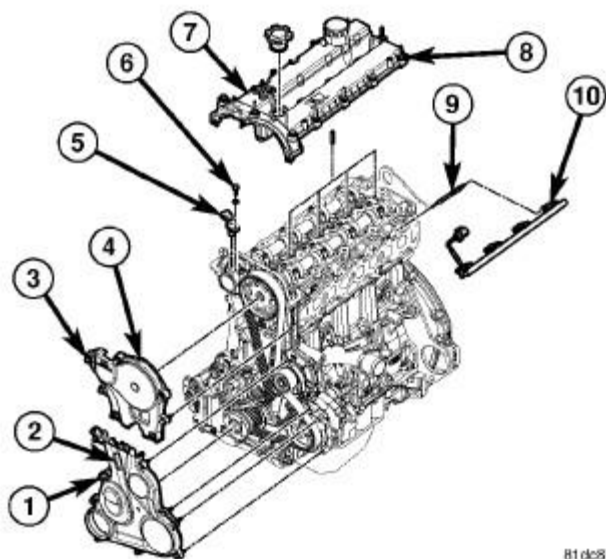
**Fig. 599: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

4. Remove the right engine mount bracket (2). See **Engine/Engine Mounting/INSULATOR, Engine Mount - Removal**.



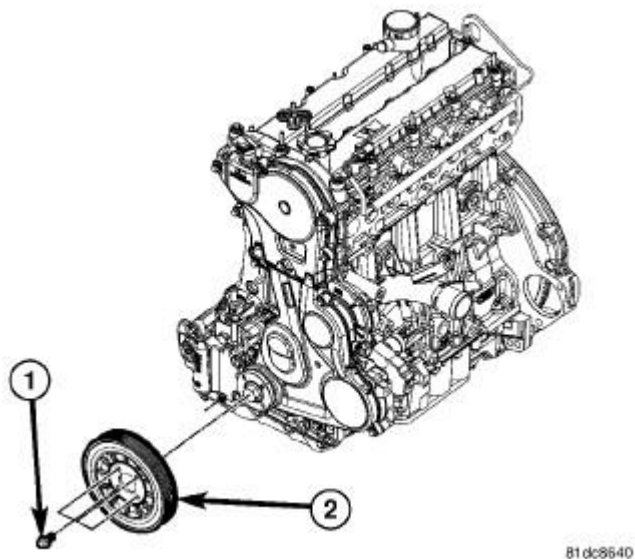
**Fig. 600: CMP Sensor Location**  
Courtesy of CHRYSLER LLC

5. Disconnect the Camshaft Position Sensor (CMP) harness connector (3).
6. Remove the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Removal**.
7. Remove the accessory drive idler pulley.



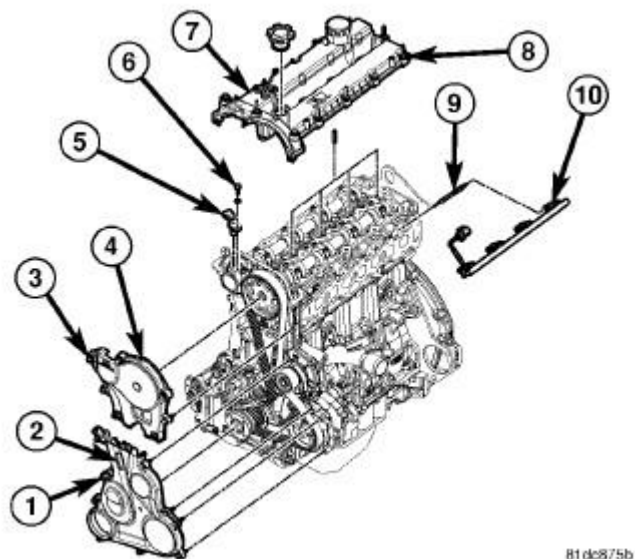
**Fig. 601: Upper Front Cover**  
Courtesy of CHRYSLER LLC

8. Remove the upper front cover (4).



**Fig. 602: Crankshaft Damper Bolts**  
Courtesy of CHRYSLER LLC

9. Remove the bolts (1) and the crankshaft damper (2).



**Fig. 603: Lower Front Cover**  
Courtesy of CHRYSLER LLC

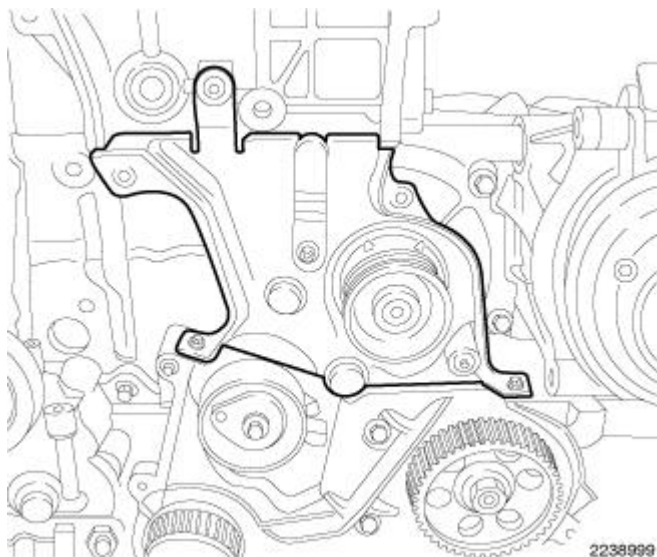
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10. Remove the bolts (1), and the lower front cover (2).

### Installation

#### TIMING BELT INNER COVER

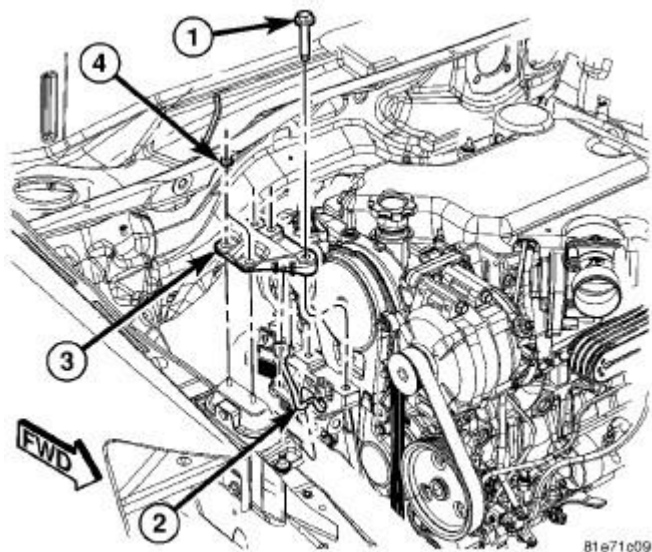


**Fig. 604: Inner Front Cover**  
Courtesy of CHRYSLER LLC

1. Install the inner front cover. Tighten the bolts to 11 N.m (97 in. lbs.).
2. Install the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Installation**.
3. Install the upper and lower outer front covers. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.

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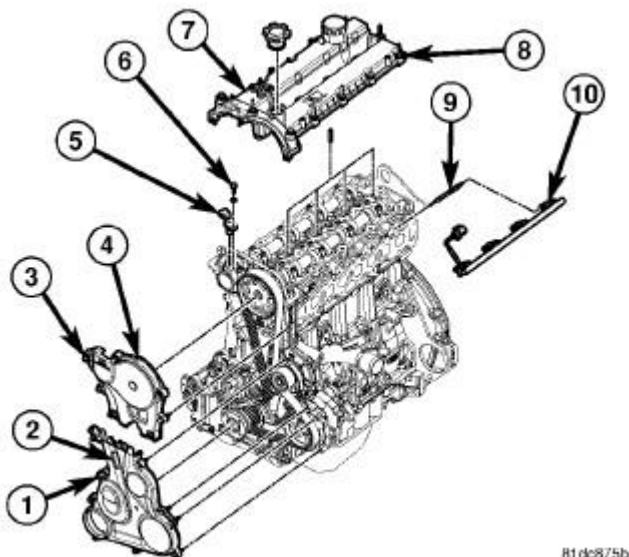
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**Fig. 605: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

4. Install the right front engine mount bracket (2). See **Engine/Engine Mounting/INSULATOR, Engine Mount - Installation.**
5. Install the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation.**
6. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation .**
7. Connect negative battery cable.

### UPPER AND LOWER OUTER TIMING BELT COVERS



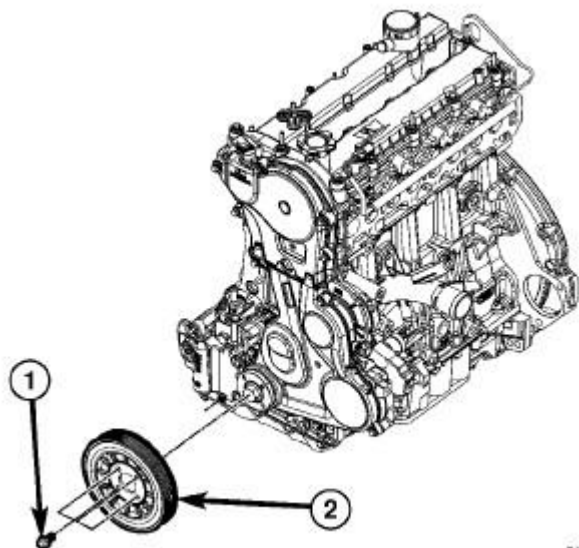
**Fig. 606: Upper Front Cover**  
Courtesy of CHRYSLER LLC



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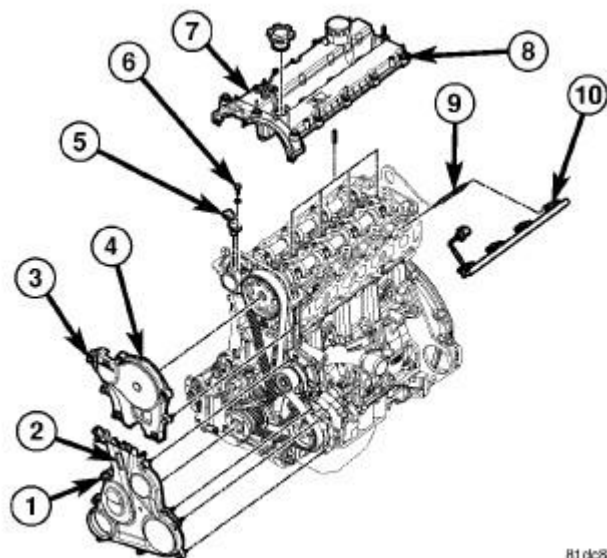
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1. Install the lower front cover (2). Tighten the bolts to 11 N.m (97 in. lbs.).



**Fig. 607: Crankshaft Damper**  
Courtesy of CHRYSLER LLC

2. Install the crankshaft damper (1). Tighten the bolts to 32 N.m (24 ft. lbs.).

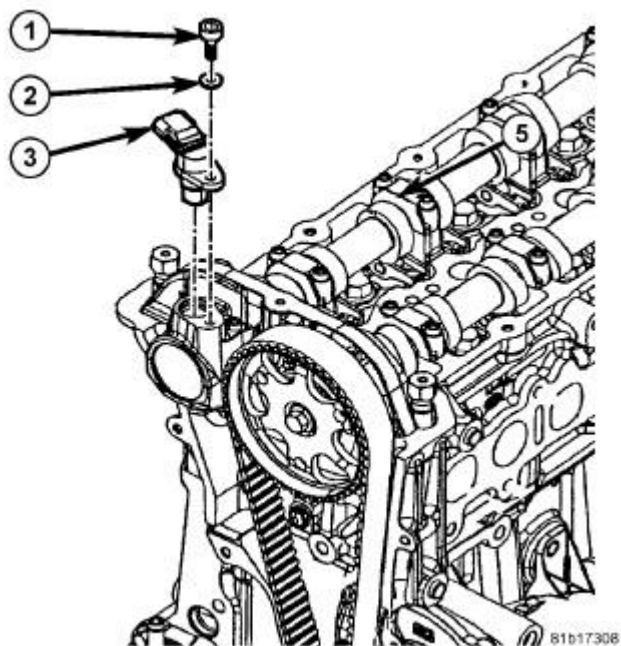


**Fig. 608: Upper Front Cover**  
Courtesy of CHRYSLER LLC

3. Install the upper front cover (4). Tighten the bolts to 11 N.m (97 in. lbs.).

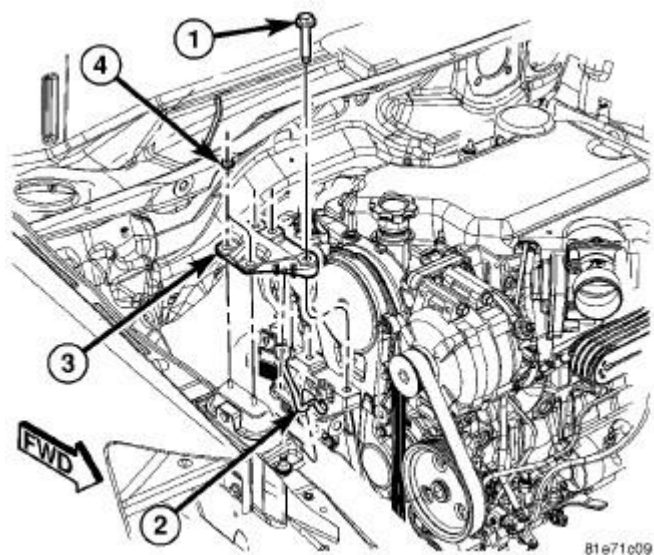
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**Fig. 609: CMP Sensor Location**  
Courtesy of CHRYSLER LLC

4. Install the accessory drive idler pulley. Tighten bolts to 45 N.m (33 ft. lbs.).
5. Install the accessory drive belt. Refer to **Cooling/Accessory Drive/BELT, Serpentine - Installation**.
6. Connect the Camshaft Position Sensor (CMP) harness connector (5).



**Fig. 610: Right Front Engine Mount Bracket**  
Courtesy of CHRYSLER LLC

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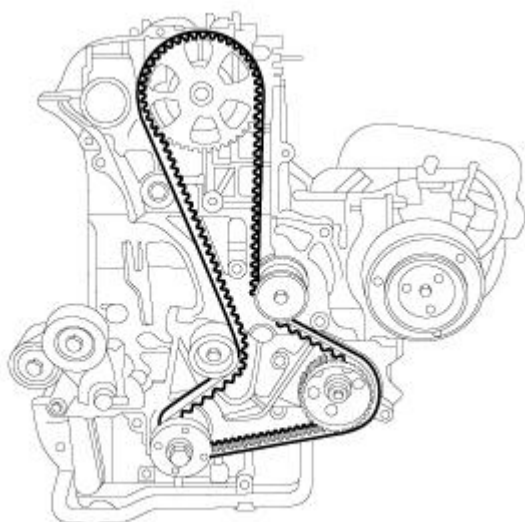
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7. Install the right front engine mount bracket (2). See Engine/Engine Mounting/INSULATOR, Engine Mount - Installation.
8. Install the air cleaner housing. See Engine/Air Intake System/BODY, Air Cleaner - Installation.
9. Install the engine cover.
10. Connect the negative battery cable.

### SPROCKET(S), TIMING BELT AND CHAIN

#### Removal

#### REMOVAL

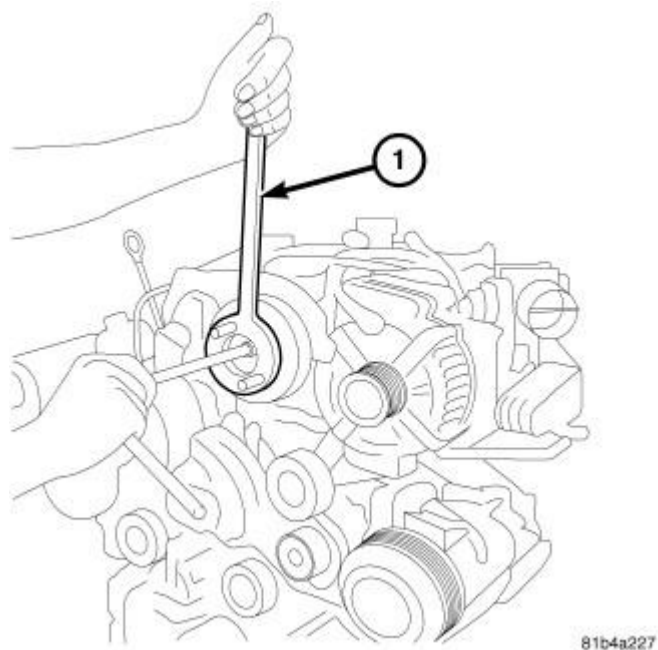


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**Fig. 611: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

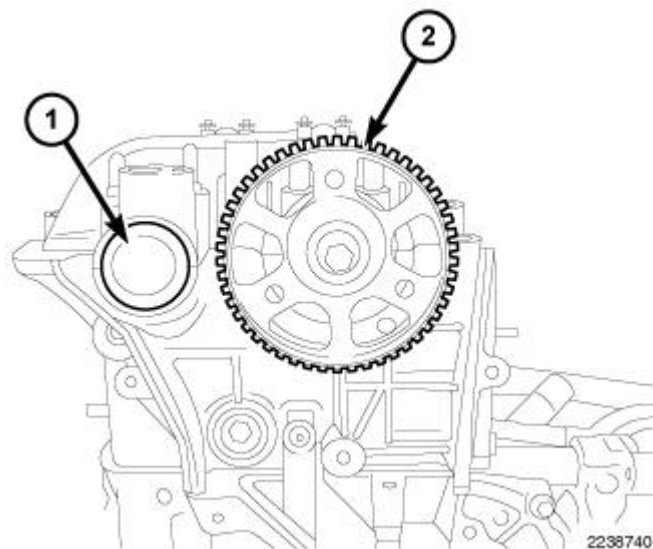
1. Remove the timing belt. See Engine/Valve Timing/BELT, Timing - Removal.

**CAUTION:** Before removing the timing belt, the engine must be placed at 90° after TDC. Failure to do so may result in valve and/or piston damage during assembly.



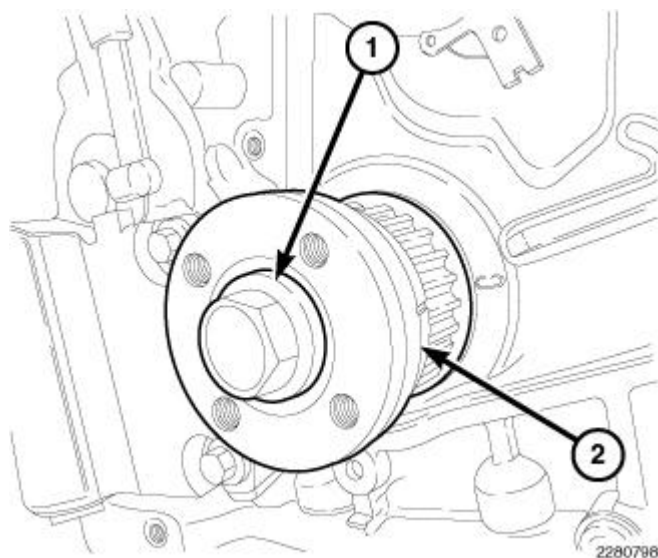
**Fig. 612: Tightening Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

2. Using the Camshaft Gear Holder VM 1055 to hold the intake camshaft sprocket, remove the bolt.



**Fig. 613: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

3. Remove the camshaft sprocket (2).



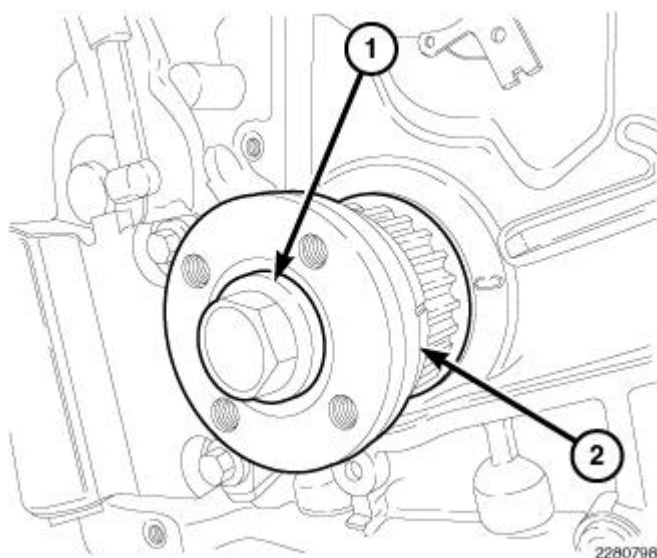
**Fig. 614: Crankshaft Sprocket Bolt**  
Courtesy of CHRYSLER LLC

**NOTE:** The crankshaft sprocket is a left handed thread.

4. Remove the bolt (1) and the crankshaft sprocket (2).

#### **Installation**

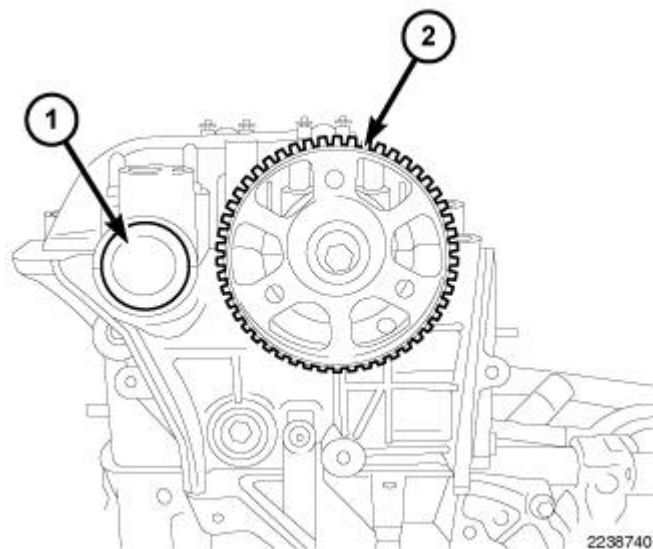
#### **INSTALLATION**



**Fig. 615: Crankshaft Sprocket Bolt**  
Courtesy of CHRYSLER LLC

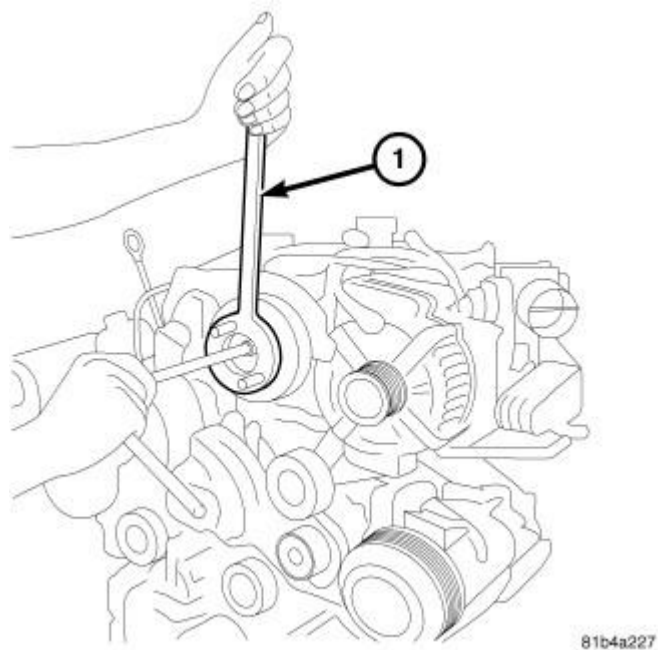
**NOTE:** The crankshaft sprocket bolt is a left handed thread.

1. Install the crankshaft sprocket. Tighten bolt to 100 N.m (74 ft. lbs.) plus 120 degrees.



**Fig. 616: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

2. Install the intake camshaft sprocket (2) and finger tighten bolt.

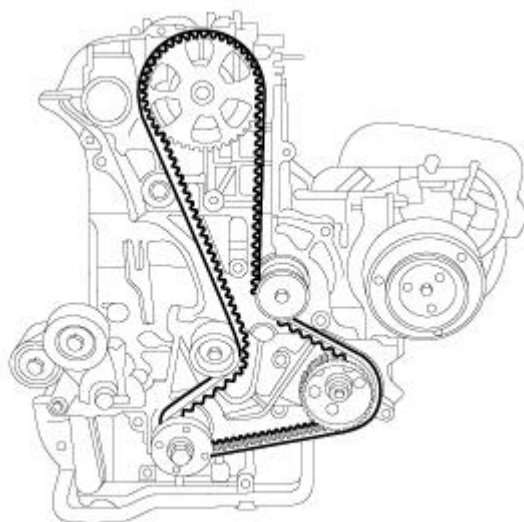


**Fig. 617: Tightening Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

3. Using the Camshaft Gear Holder VM 1055, tighten bolt to 64 N.m (47 ft. lbs.).

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**Fig. 618: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

4. Install the timing belt. See **Engine/Valve Timing/SPROCKET(S), Timing Belt and Chain - Installation**.

### TENSIONER, ENGINE TIMING

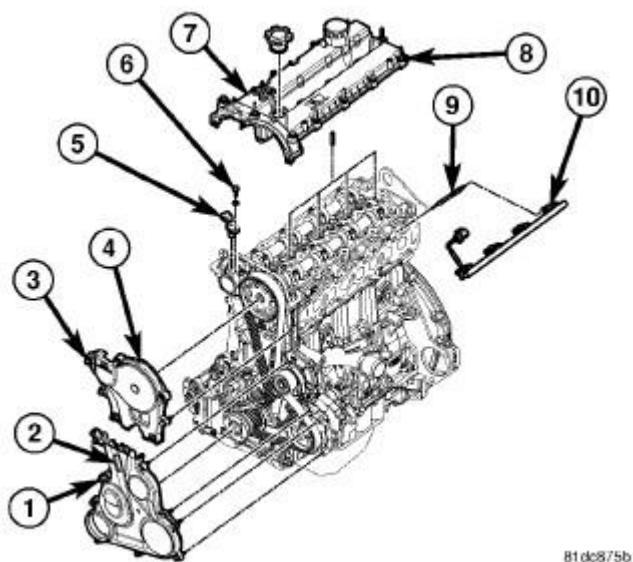
#### Removal

#### REMOVAL

1. Disconnect negative battery cable.
2. Remove the engine cover.
3. Remove the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Removal**.

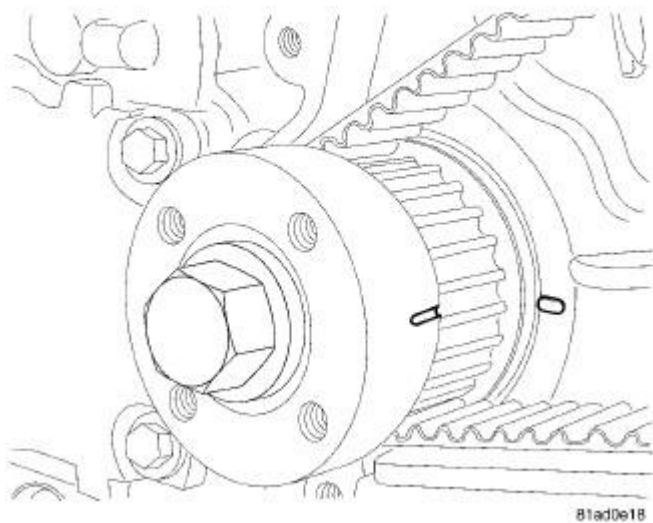
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**Fig. 619: Upper & Lower Timing Belt Cover**  
Courtesy of CHRYSLER LLC

4. Remove the upper (4) and lower (2) timing belt cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Removal.**



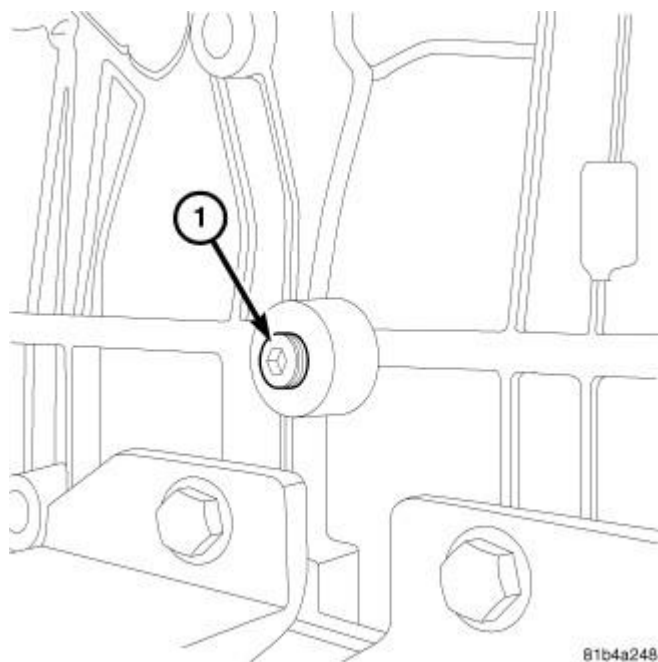
**Fig. 620: Crank Timing Mark**  
Courtesy of CHRYSLER LLC

5. Rotate the engine by hand until the crankshaft 90 degrees ATDC marks are aligned.



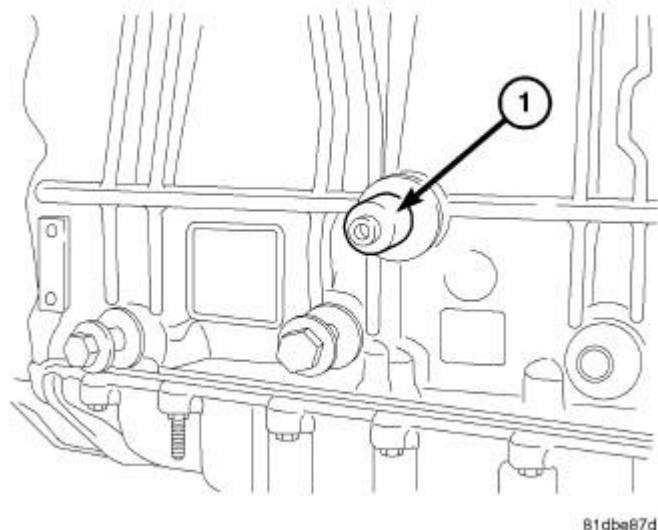
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**Fig. 621: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

6. Remove the engine block plug (1). The crankshaft locking tool is installed on the intake manifold side of the engine.

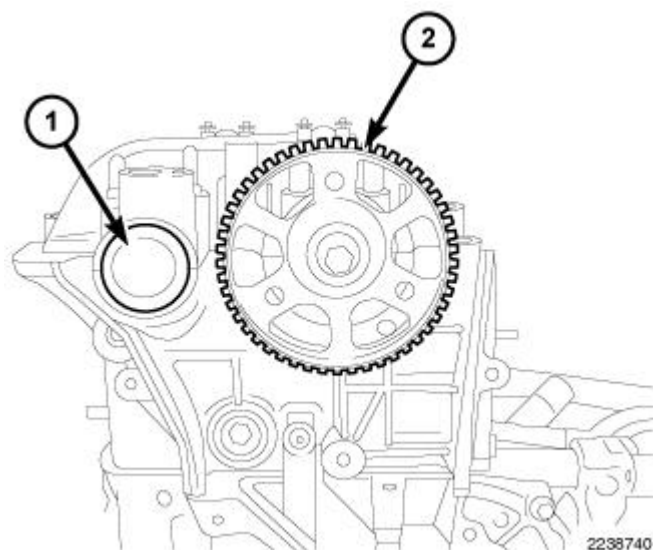


**Fig. 622: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

7. Install the Crankshaft locking tool VM 9992 into engine block located on the intake manifold side of the block. Make sure that the crankshaft locking tool threads into the crankshaft. If it does not thread into the crankshaft, the crankshaft is not at 90 degrees ATDC. If necessary, realign the 90 degrees ATDC marks on the crankshaft timing belt drive sprocket and timing belt cover.

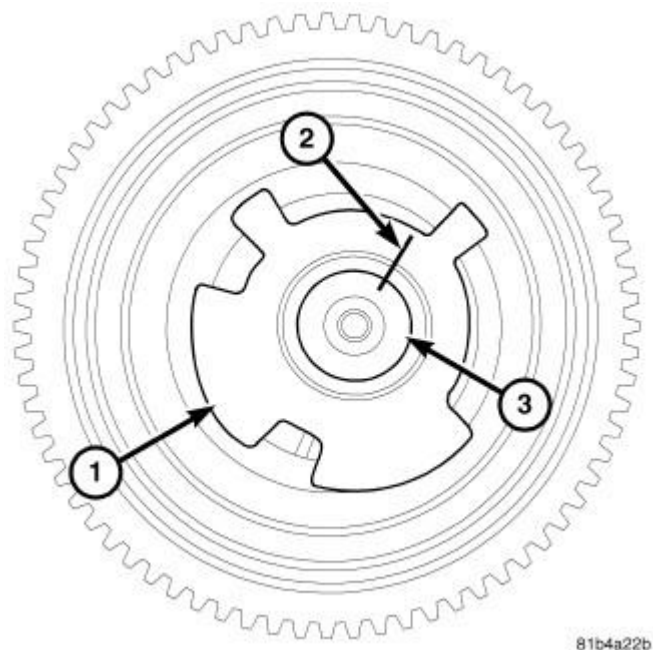
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**Fig. 623: Camshaft Sprocket**  
Courtesy of CHRYSLER LLC

8. Remove the exhaust camshaft oil seal (1).

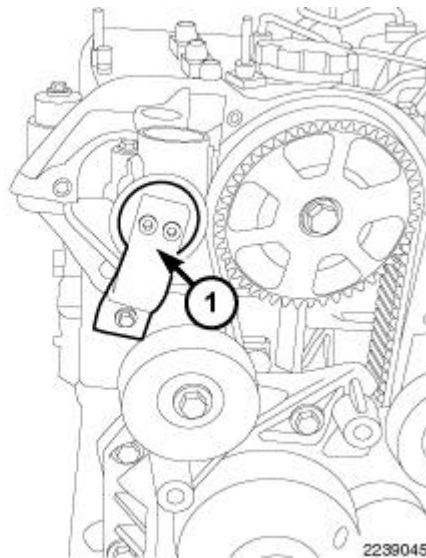


**Fig. 624: Mark Across Reluctor Wheel & Exhaust Camshaft**  
Courtesy of CHRYSLER LLC

9. Make a mark (2) across the reluctor wheel (1) and the exhaust camshaft (3). This mark will be used to verify that the reluctor wheel did not rotate on the camshaft during assembly.

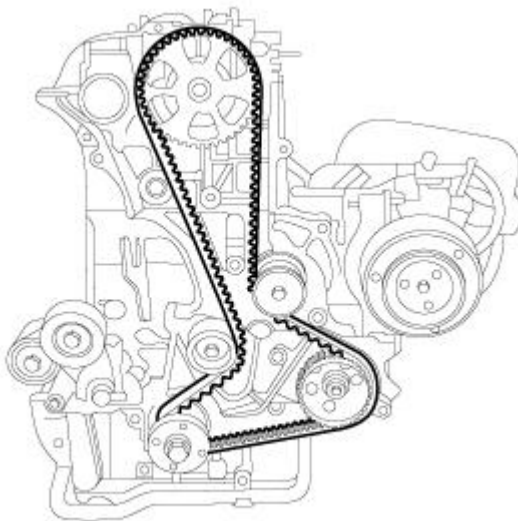
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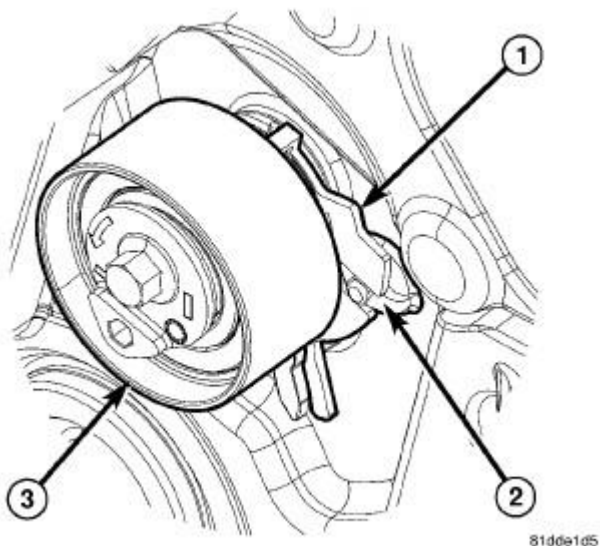
**Fig. 625: Camshaft Locking Tool**  
Courtesy of CHRYSLER LLC

10. Install the camshaft locking tool VM 9991 (1). The crankshaft and camshafts are now locked at 90 degrees ATDC.



**Fig. 626: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

11. Loosen the timing belt tensioner bolt, and remove the timing belt.

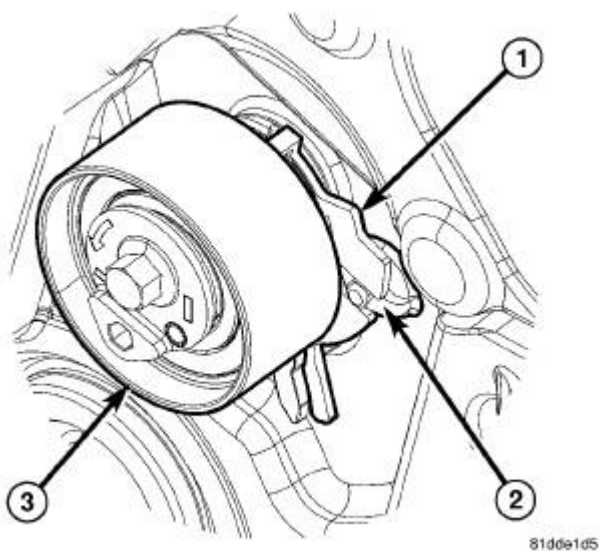


**Fig. 627: Timing Belt Tensioner & Tensioner Alignment Plate**  
Courtesy of CHRYSLER LLC

12. Remove bolt, and the timing belt tensioner (3).

### Installation

#### INSTALLATION

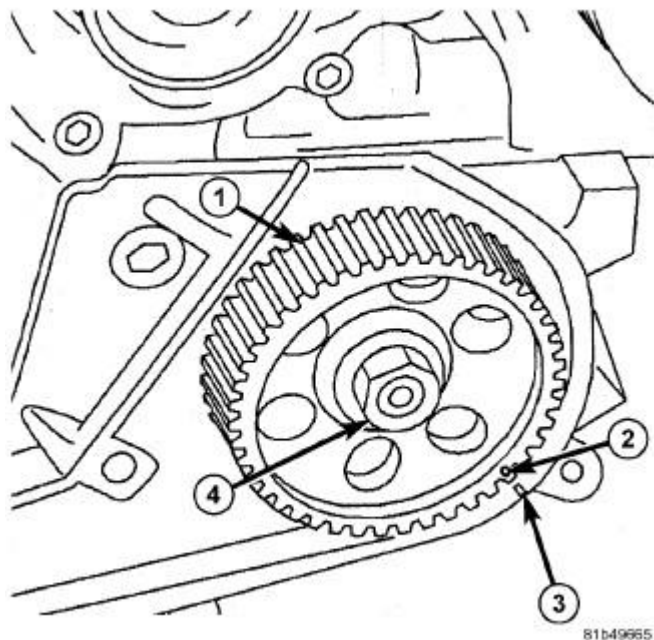


**Fig. 628: Timing Belt Tensioner & Tensioner Alignment Plate**  
Courtesy of CHRYSLER LLC

1. Install the timing belt tensioner (3). Do not tighten at this time. Verify that the slot in the tensioner alignment plate (1) is aligned with the boss (2) on the engine cover.

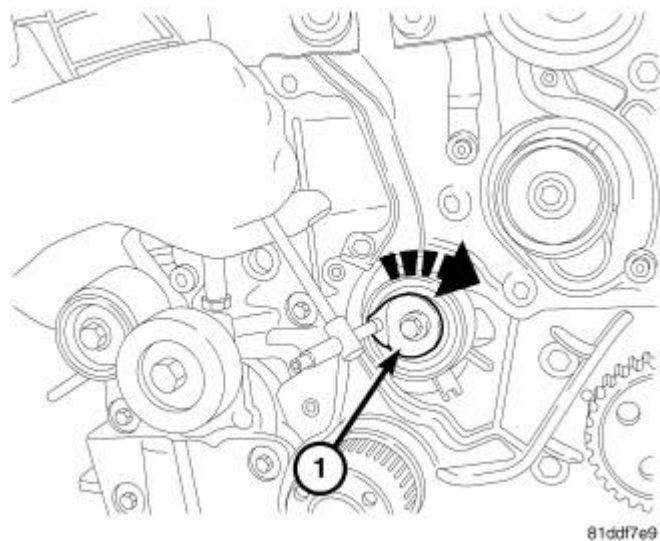
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**Fig. 629: Fuel Injection Pump Timing Marks**  
Courtesy of CHRYSLER LLC

2. Align the high pressure fuel pump sprocket timing mark (2) is aligned with the timing mark (3) on the block.

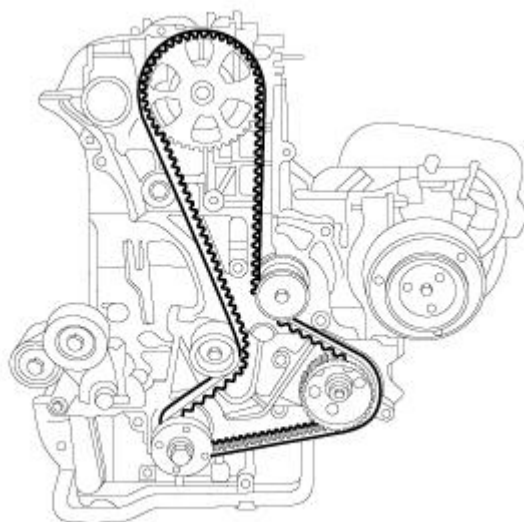


**Fig. 630: Timing Belt Tensioner**  
Courtesy of CHRYSLER LLC

3. Turn the timing belt tensioner (1) clockwise to unload the tensioner enough for the timing belt to be installed over the tensioner pulley.

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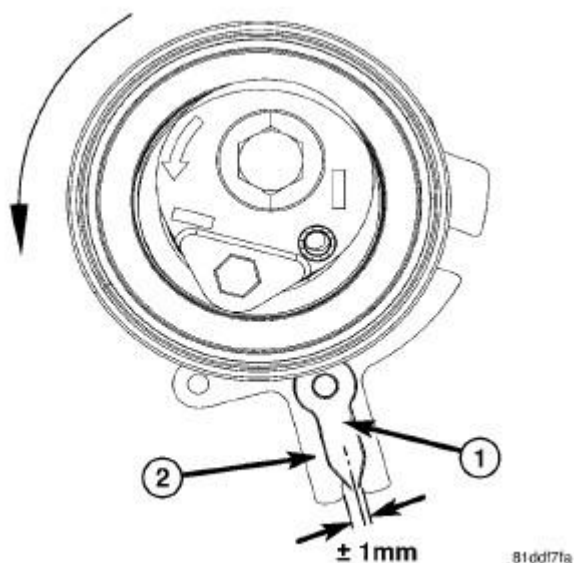


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**Fig. 631: Exploded View Of Timing Belt**  
Courtesy of CHRYSLER LLC

**NOTE:** DO NOT remove the timing belt from the package until it is going to be installed. DO NOT expose timing belt to oil, grease or water contamination. DO NOT crimp belt at a sharp angle. DO NOT clean belt, pulleys or tensioner with solvent. Check that pulleys and bearings are not seized or damaged before installing belt.

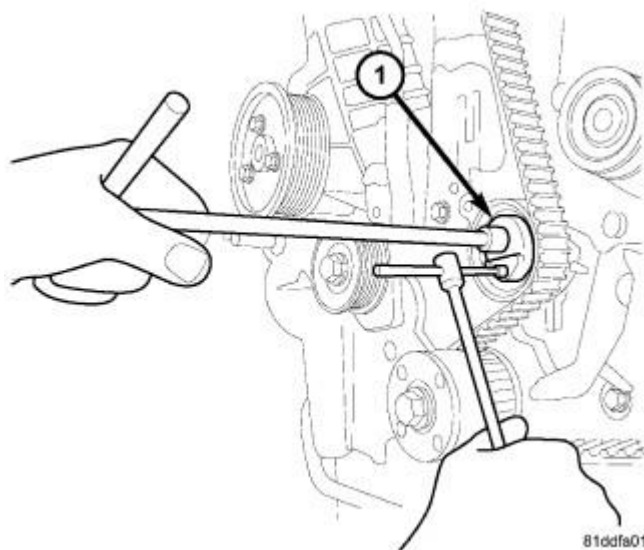
4. Install the timing belt on the components in the following order.



**Fig. 632: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

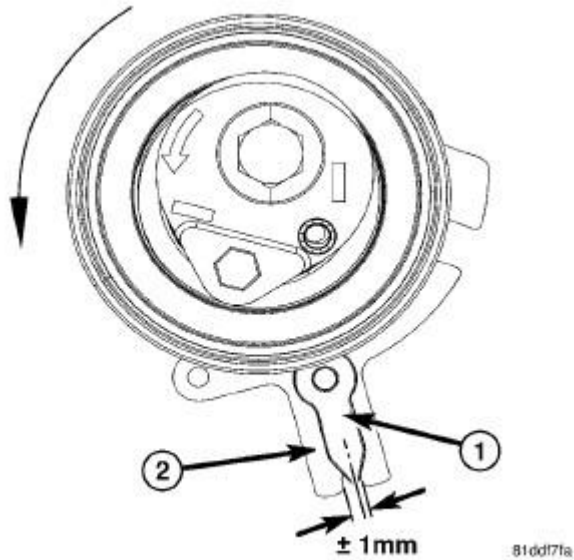
**NOTE:** Turning the belt tensioner counter clockwise moves the pointer in a clockwise direction. Also, if the tensioner bolt is too loose this will cause the tensioner alignment slot to jump off the alignment boss on timing cover.

- Crankshaft sprocket (1).
  - High pressure fuel pump (2).
  - Water pump pulley (3).
  - Intake camshaft pulley (4).
  - Timing belt tensioner (5).
5. Adjust timing belt tensioner by lining up the load indicator arrow (1) to the center of the (2) tensioner load gauge as shown in illustration.



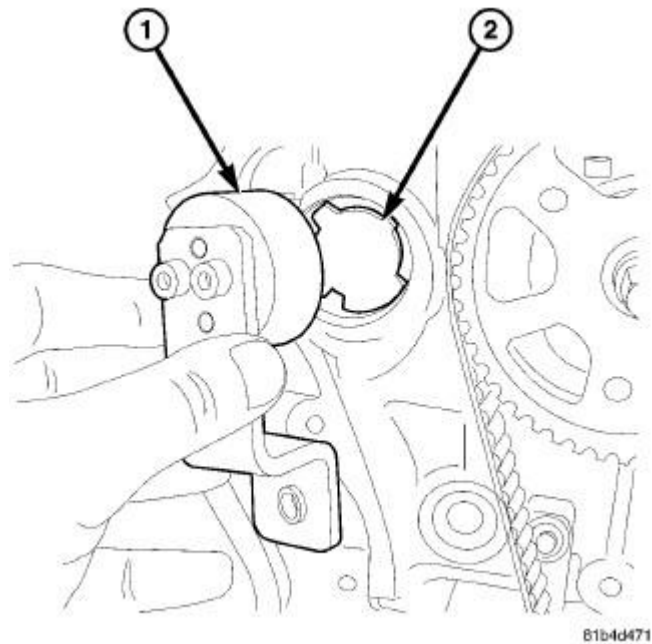
**Fig. 633: Tightening Timing Belt Tensioner Bolt**  
Courtesy of CHRYSLER LLC

6. Tighten the timing belt tensioner bolt to 28 N.m (21 ft. lbs.).



**Fig. 634: Timing Belt Tensioner Marks**  
Courtesy of CHRYSLER LLC

7. Verify the tensioner load indicator (1) is still centered in the tensioner load gauge (2).



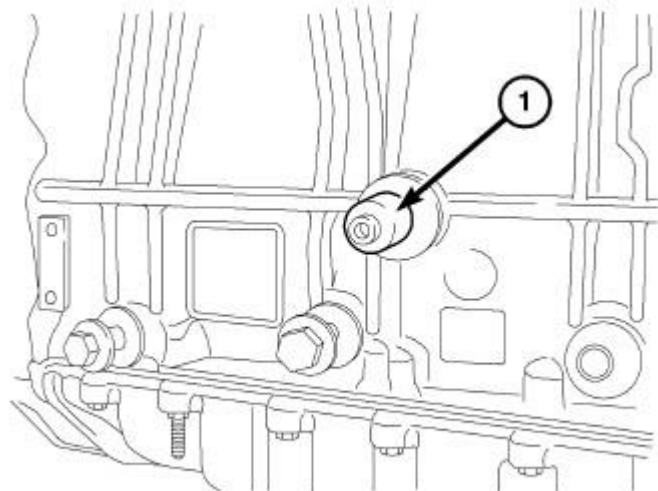
**Fig. 635: Camshaft Lock Tool**  
Courtesy of CHRYSLER LLC

8. Remove the camshaft locking tool VM 9991 (1).



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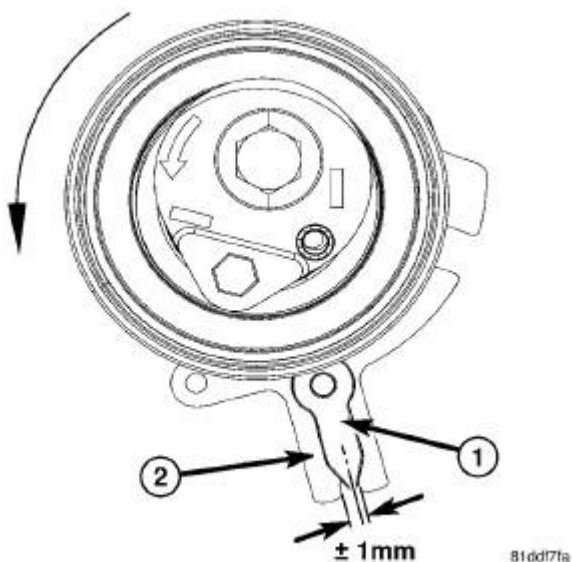
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**Fig. 636: Crankshaft Locking Tool**  
Courtesy of CHRYSLER LLC

9. Remove the crankshaft locking tool VM 9992 (1).



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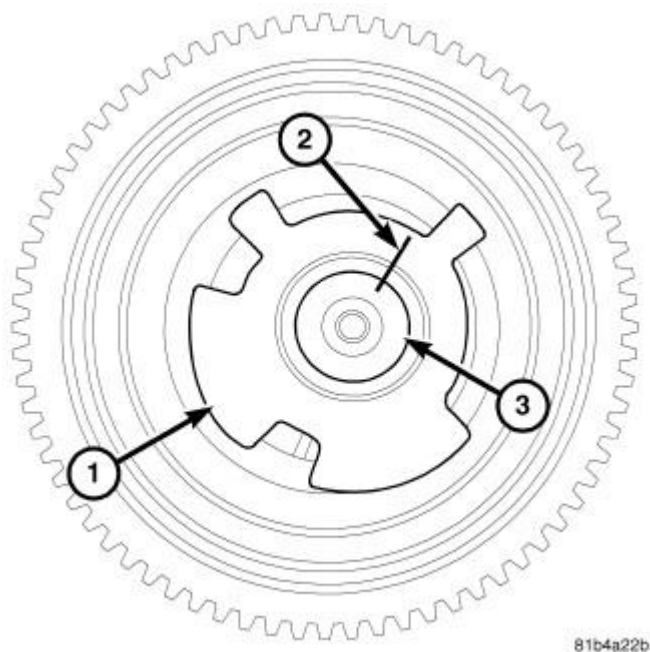
**Fig. 637: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

**NOTE:** In order to rotate the engine, the camshaft locking tool VM 9991 and the crankshaft locking tool VM 9992 need to be removed.

10. Rotate engine 2 complete revolutions and then recheck tensioner alignment. Verify that the tension indicator (1) is centered in the slot on the tensioner gauge (2) slot as shown in illustration. Readjust tensioner alignment is necessary.

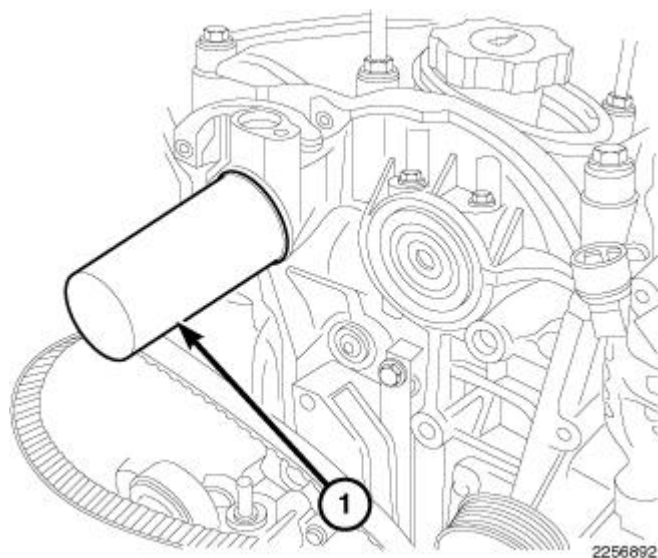
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**Fig. 638: Reluctor Wheel & Camshaft**  
Courtesy of CHRYSLER LLC

11. Verify that the reluctor wheel (1) has not moved on the camshaft. If the witness marks are not aligned, the reluctor wheel (1) has spun on the camshaft (3) during the assembly process, and the exhaust camshaft must be replaced.

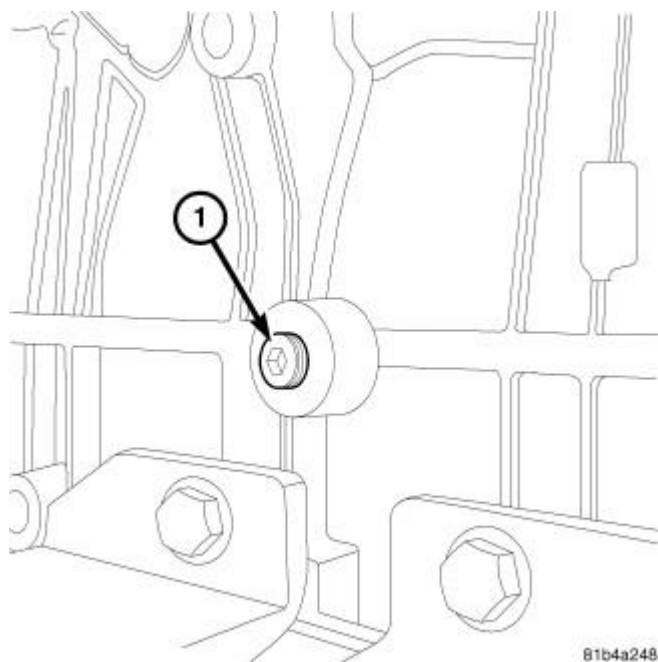


**Fig. 639: Seal Installer**  
Courtesy of CHRYSLER LLC

12. Use VM 1057 Seal Installer (1) to install the exhaust camshaft seal.

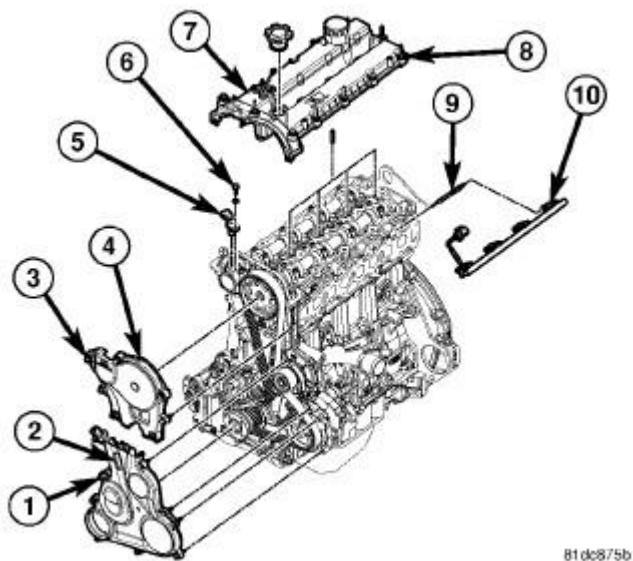
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**Fig. 640: Crank Lock Plug Location**  
Courtesy of CHRYSLER LLC

13. Install the engine block plug (1). Tighten the engine block plug to 30 N.m (22 ft. lbs.).



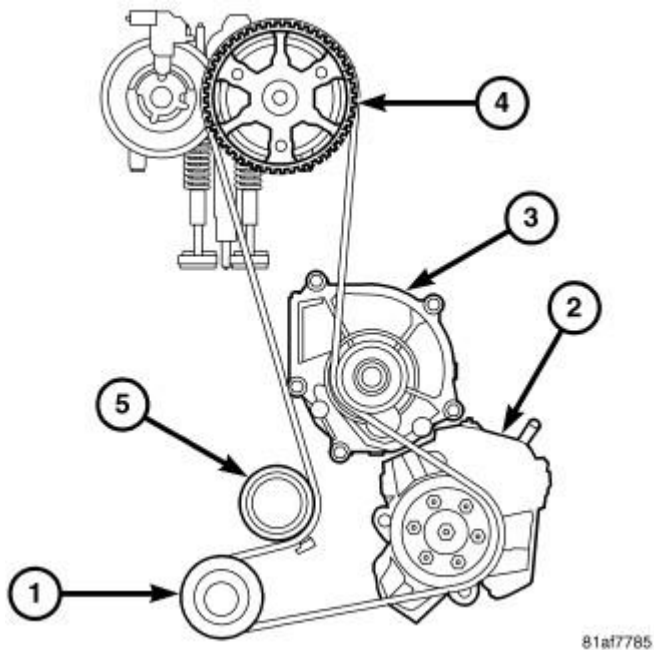
**Fig. 641: Upper & Lower Timing Cover**  
Courtesy of CHRYSLER LLC

14. Install the upper (4) and lower (2) timing cover. See **Engine/Valve Timing/COVER(S), Engine Timing - Installation**.
15. Install the intake air housing. See **Engine/Air Intake System/BODY, Air Cleaner - Installation**.

16. Install the engine cover.
17. Connect the battery.

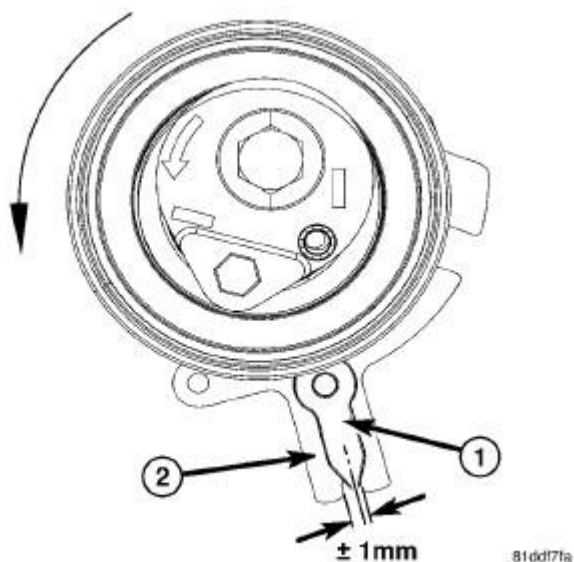
### Adjustments

#### ADJUSTMENT



**Fig. 642: Timing Belt Tensioner**  
Courtesy of CHRYSLER LLC

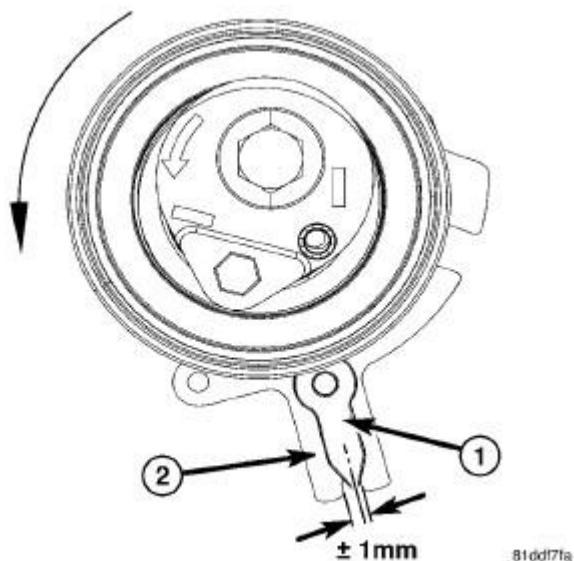
1. With the upper and lower front covers removed and the timing belt installed, loosen timing belt tensioner (5).



**Fig. 643: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

**NOTE:** Turning the belt tensioner counterclockwise moves the pointer in a clockwise direction. Also, if the tensioner bolt is too loose this will cause the tensioner alignment slot to jump off the alignment boss on timing cover.

2. Align timing belt tensioner pointer (1) so that it is centered in the notch (2) and tighten timing belt tensioner retaining bolt to 28 N.m (21 ft. lbs.).



**Fig. 644: Timing Belt Tensioner Load Indicator & Gauge**  
Courtesy of CHRYSLER LLC

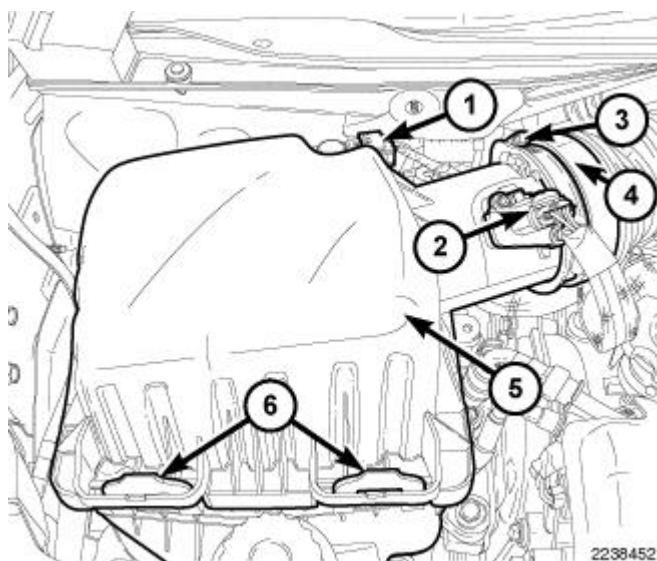
3. Rotate engine 2 complete revolutions and then recheck tensioner alignment. Verify that the tension indicator (1) is centered in the slot on the tensioner gauge (2) as shown in illustration. Readjust tensioner alignment as necessary.

## AIR INTAKE SYSTEM

### AIR CLEANER

#### Removal

#### REMOVAL

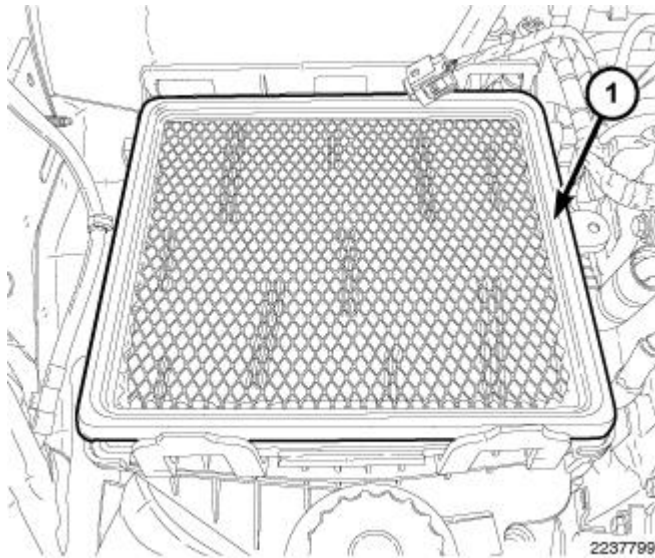


**Fig. 645: Intake Air Housing Cover**  
Courtesy of CHRYSLER LLC

1. Disconnect the Inlet Air Pressure (IAP) sensor harness connector (1).
2. Disconnect the Mass Airflow (MAF) sensor harness connector (2).
3. Release tabs (6) and remove the intake air housing cover (5).

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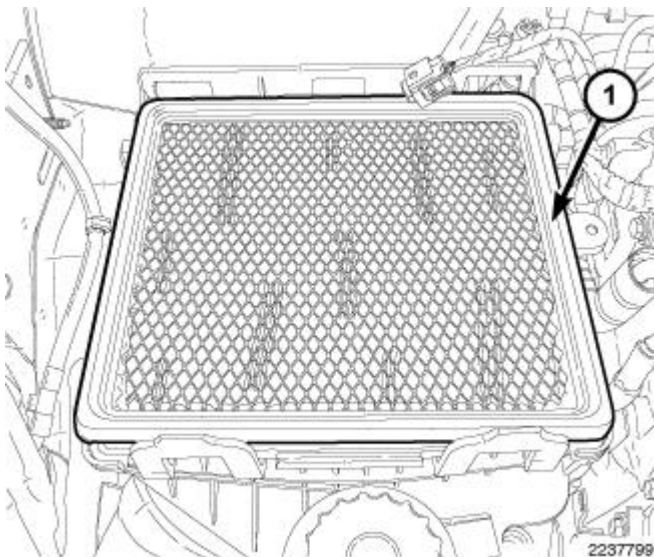
**Fig. 646: Air Filter**

Courtesy of CHRYSLER LLC

4. Lift up and remove the air filter (1).

### Installation

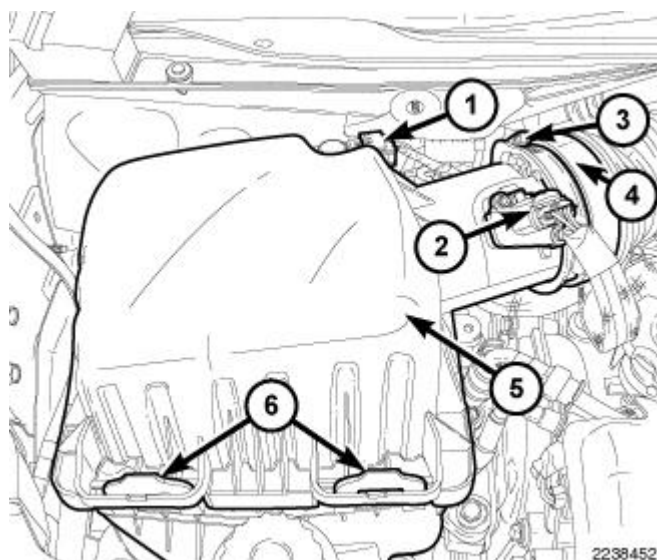
#### INSTALLATION



**Fig. 647: Air Filter**

Courtesy of CHRYSLER LLC

1. Install the new air filter (1).



**Fig. 648: Intake Air Housing**  
Courtesy of CHRYSLER LLC

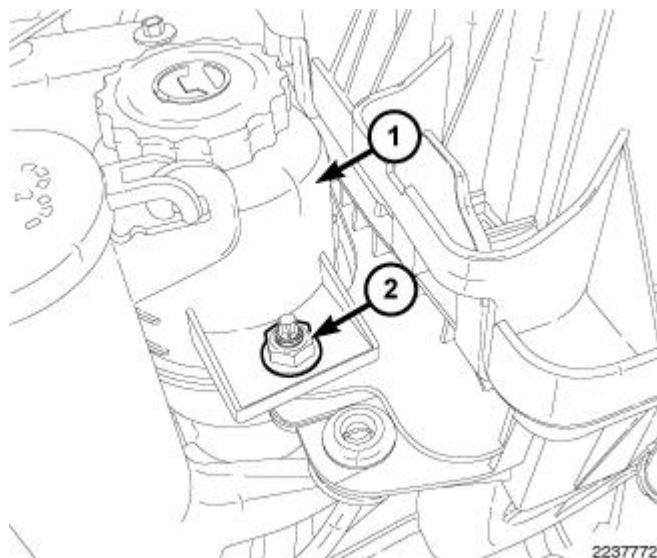
2. Install the intake air housing cover (5).
3. Connect the Mass Airflow (MAF) sensor harness connector (2).
4. Connect the Inlet Air Pressure (IAP) sensor harness connector (1).

## **BODY, AIR CLEANER**

### **Removal**

### **REMOVAL**

1. Disconnect and isolate the negative battery cable.

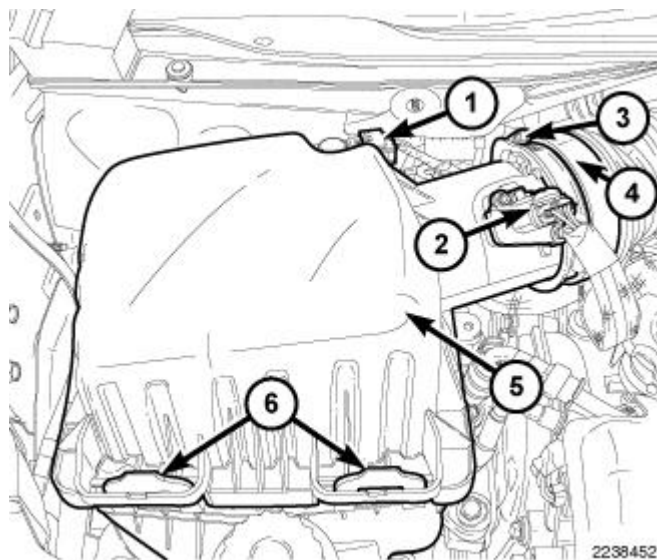


**Fig. 649: Power Steering Reservoir**



Courtesy of CHRYSLER LLC

2. Remove the retaining nut (2) and position the power steering reservoir (1) aside.



**Fig. 650: Intake Air Housing**

Courtesy of CHRYSLER LLC

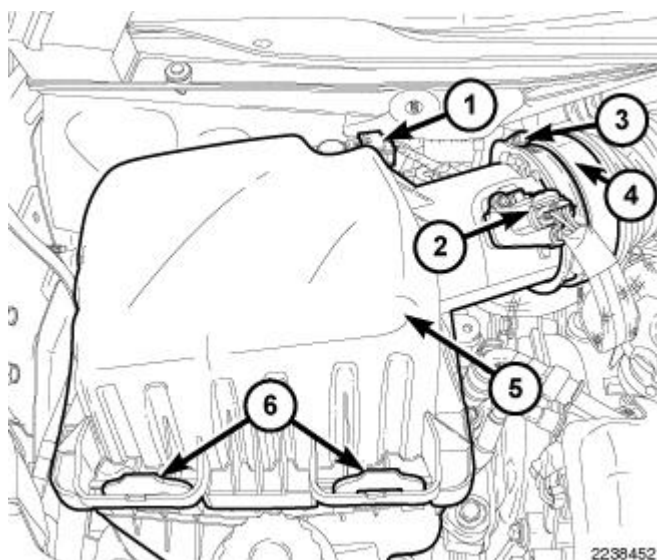
3. Disconnect the Inlet Air Pressure (IAP) sensor harness connector (1).
4. Disconnect the Mass Airflow (MAF) sensor harness connector (2).
5. Loosen clamp (3) and disconnect the turbocharger air inlet tube (4) from the intake air housing (5).
6. Pull upward on the intake air housing (5) to release it from the grommets, and remove the intake air housing.

## Installation

### INSTALLATION

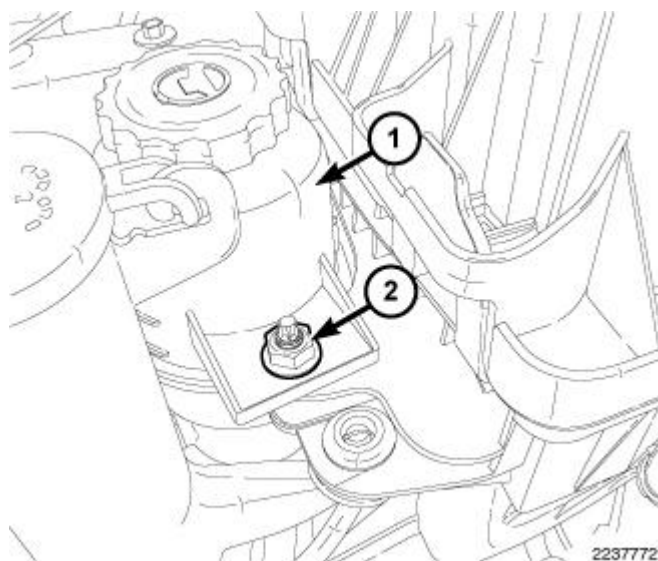
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**Fig. 651: Intake Air Housing**  
Courtesy of CHRYSLER LLC

1. Position the intake air housing (5) in the grommets, and push down on the intake air housing to seat it.
2. Connect the turbocharger air inlet tube (4) to the intake air housing (5) and tighten the clamp (3).
3. Connect the Mass Airflow (MAF) sensor harness connector (2).
4. Connect the Inlet Air Pressure (IAP) sensor harness connector (1).



**Fig. 652: Power Steering Reservoir**  
Courtesy of CHRYSLER LLC

5. Position the power steering reservoir (1) to the intake air housing. Tighten retaining nut (2) to 12 N.m (105 in. lbs.).
6. Reconnect the negative battery cable.