

2013 ENGINE**2.0L Diesel - Service Information - Journey****DESCRIPTION****DESCRIPTION**

This engine is equipped with a high pressure electronic injection system from Bosch Common Rail ECD 16 C39 fast diesel engine, fully managed by an Powertrain Control Module (PCM). The engine respects the Euro 5 regulation and is equipped with the following emission components:

- Exhaust system with oxidation catalytic converter and DPF.
- Exhaust Gas Recirculation System (EGR).
- Crankcase oil vapor recirculation system.

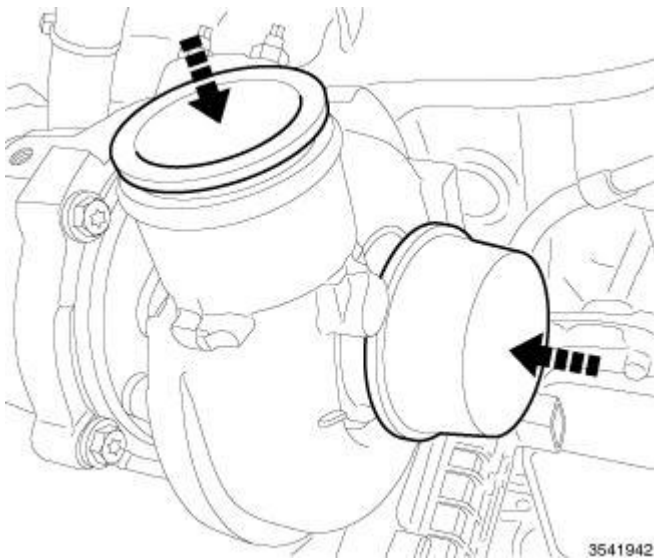
STANDARD PROCEDURE**DUST COVERS AND CAPS**

Fig. 1: Covers/Caps

Courtesy of **CHRYSLER GROUP, LLC**

Due to the high amounts of failures caused by dust, dirt, moisture and other foreign debris being introduced to the engine during service. Covers or caps are needed to reduce the possible damage that can be caused or created.

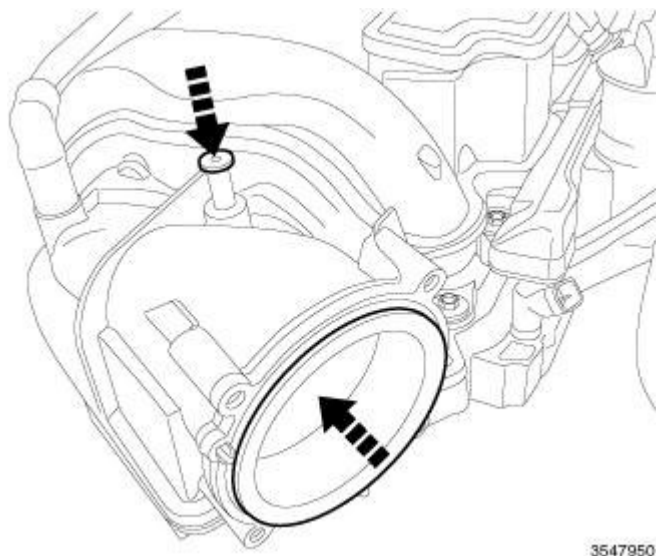


Fig. 2: Opening Cover

Courtesy of CHRYSLER GROUP, LLC

Covers over openings will reduce any possibilities for foreign materials to enter the engine systems. Using miller tool (special tool #10368, Set, Universal Protective Cap), Select the appropriated cover needed to the procedure.

FORM-IN-PLACE GASKETS AND SEALERS

There are numerous places where form-in-place gaskets are used on the engine. Care must be taken when applying form-in-place gaskets to assure obtaining the desired results. **Do not use form-in-place gasket material unless specified.** Bead size, continuity, and location are of great importance. Too thin a bead can result in leakage while too much can result in spill-over which can break off and obstruct fluid feed lines. A continuous bead of the proper width is essential to obtain a leak-free gasket.

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

MOPAR® ENGINE RTV GEN II

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

MOPAR® ATF RTV

Mopar® ATF RTV is a specifically designed black silicone rubber RTV that retains adhesion and sealing properties to seal components exposed to automatic transmission fluid, engine coolants, and moisture. This material is available in three ounce tubes and has a shelf life of one year. After one year this material will not

properly cure. Always inspect the package for the expiration date before use.

MOPAR® GASKET MAKER

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

MOPAR® GASKET SEALANT

Mopar® Gasket Sealant is a slow drying, permanently soft sealer. This material is recommended for sealing threaded fittings and gaskets against leakage of oil and coolant. Can be used on threaded and machined parts under all temperatures. This material is used on engines with multi-layer steel (MLS) cylinder head gaskets. This material also will prevent corrosion. Mopar® Gasket Sealant is available in a 13 oz. aerosol can or 4oz./16 oz. can with applicator.

MOPAR® THREEBOND ENGINE RTV SEALANT

MOPAR® THREEBOND ENGINE RTV SEALANT is a unique gasket material that is specially made to retain adhesion and sealing properties when used to seal components exposed to engine oil.

FORM-IN-PLACE GASKET AND SEALER APPLICATION

Assembling parts using a form-in-place gasket requires care but it's easier than using precut gaskets.

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

Mopar® Engine RTV GEN II or ATF RTV gasket material should be applied in a continuous bead approximately 3 mm (0.120 in.) in diameter. All mounting holes must be circled. For corner sealing, a 3.17 or 6.35 mm (1/8 or 1/4 in.) drop is placed in the center of the gasket contact area. Uncured sealant may be removed with a shop towel. Components should be torqued in place while the sealant is still wet to the touch (within 10 minutes). The usage of a locating dowel is recommended during assembly to prevent smearing material off the location.

Mopar® Gasket Sealant in an aerosol can should be applied using a thin, even coat sprayed completely over both surfaces to be joined, and both sides of a gasket. Then proceed with assembly. Material in a can with applicator can be brushed on evenly over the sealing surfaces. Material in an aerosol can should be used on engines with multi-layer steel gaskets.

ENGINE GASKET SURFACE PREPARATION

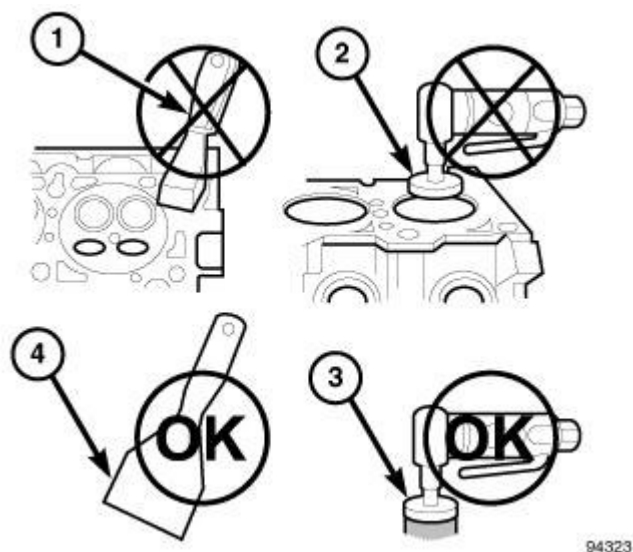


Fig. 3: Proper Tool Usage For Surface Preparation
Courtesy of CHRYSLER GROUP, LLC

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 (1).
- High speed power tool with an abrasive pad or paper to clean the cylinder block and head (2).

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

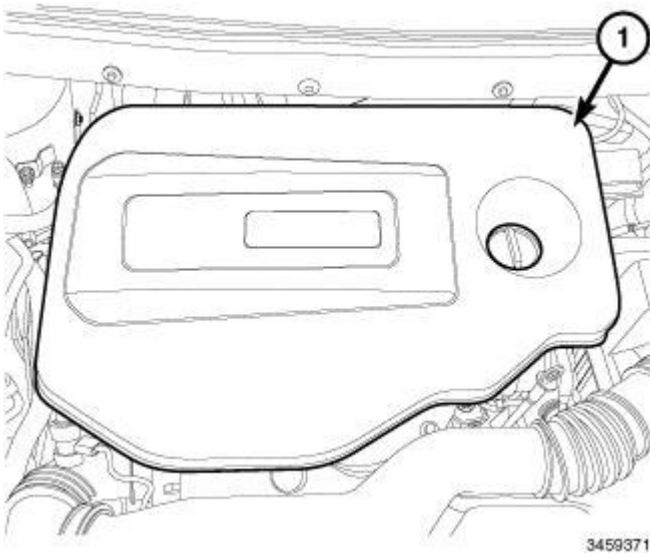
Only use the following for cleaning gasket surfaces:

- Solvent or a commercially available gasket remover.
- High speed power tool with 3M Roloc™ Bristle Disc (white or yellow) (3).
- Plastic or wood scraper (4).

REMOVAL

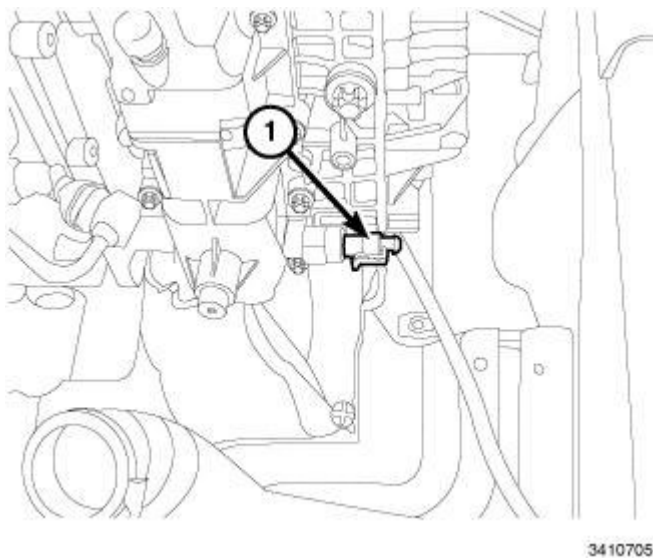
REMOVAL

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

**Fig. 4: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Recover the refrigerant from the refrigerant system. Refer to **PLUMBING, FRONT, STANDARD PROCEDURE** .
4. Remove air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .

**Fig. 5: Reverse Lamp Sensor**

Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the reverse lamp sensor.

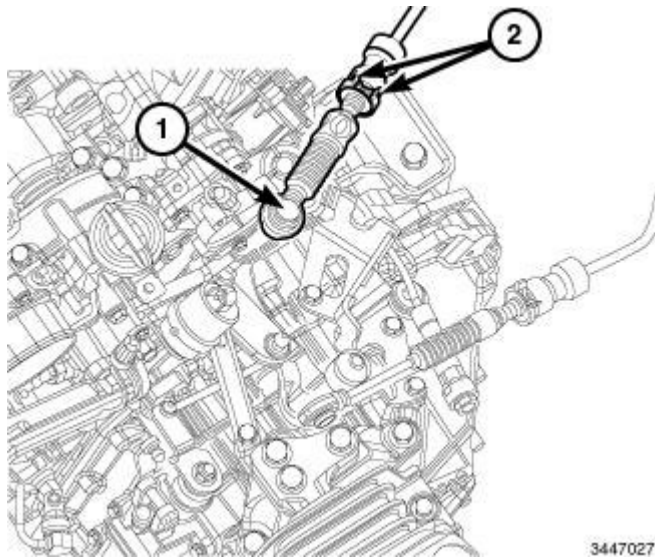


Fig. 6: Cable Connector & Release Tabs
Courtesy of CHRYSLER GROUP, LLC

6. Pry up on the cable connector (1) to disengage from the lever.
7. Disconnect the gear shift range cable at the bracket by squeezing the release tabs (2) while pulling upward.

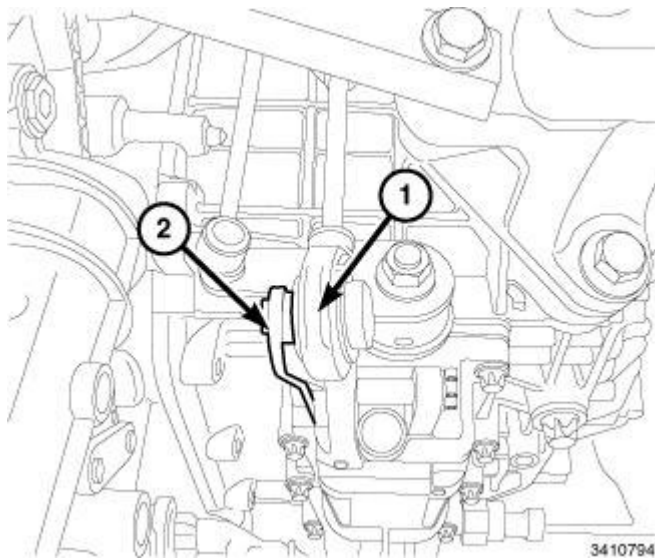


Fig. 7: Gear Shift Selector Cable & Manual Lever
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the gear shift selector cable (1) at the manual lever (2).

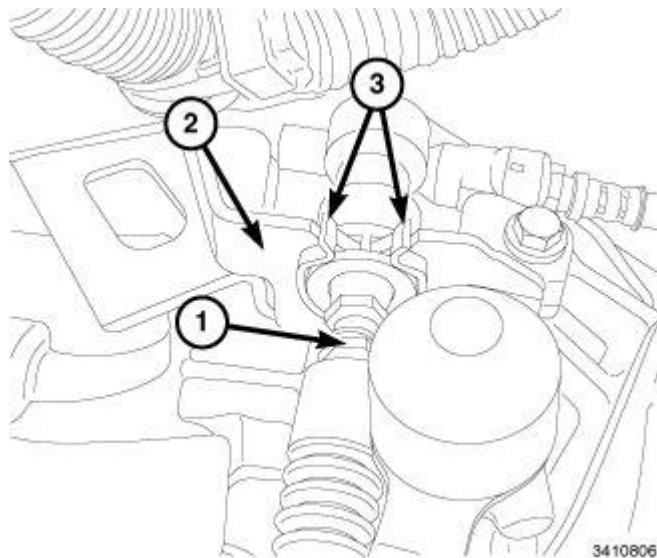


Fig. 8: Gear Shift Selector Cable & Bracket
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the gear shift selector cable (1) at the bracket (2) by squeezing the release tabs while pulling upward.

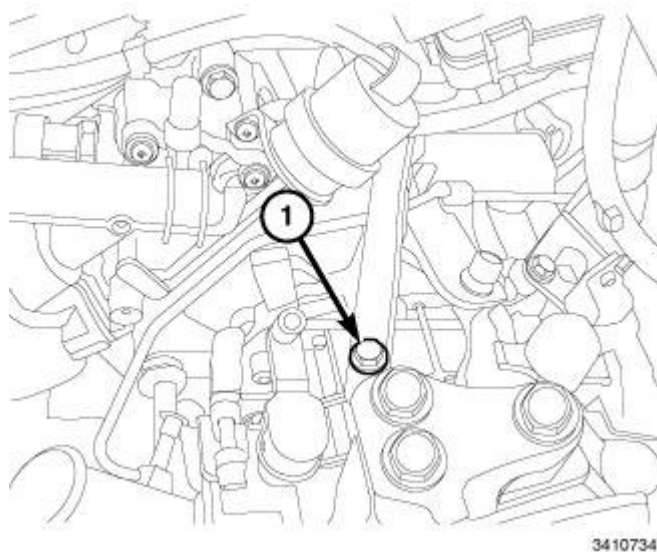


Fig. 9: Transaxle Support Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove the transaxle support bracket bolt (1).

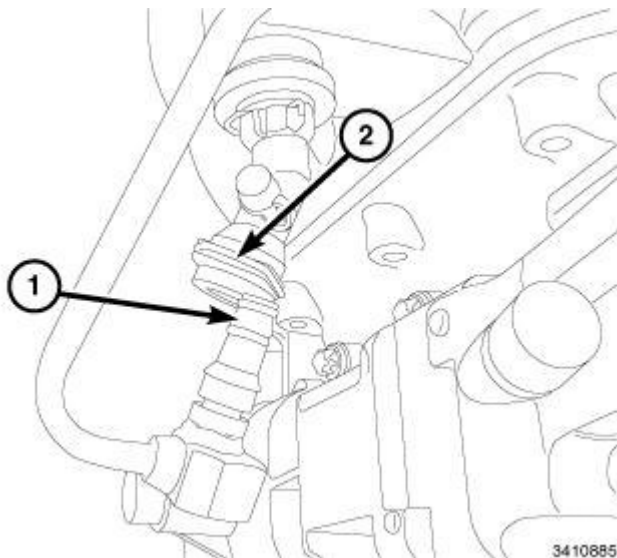


Fig. 10: Hydraulic Supply Pipe & Concentric Slave Cylinder
Courtesy of CHRYSLER GROUP, LLC

11. Disconnect the hydraulic supply pipe for the concentric slave cylinder.
12. Disconnect the brake booster hose at vacuum pump.

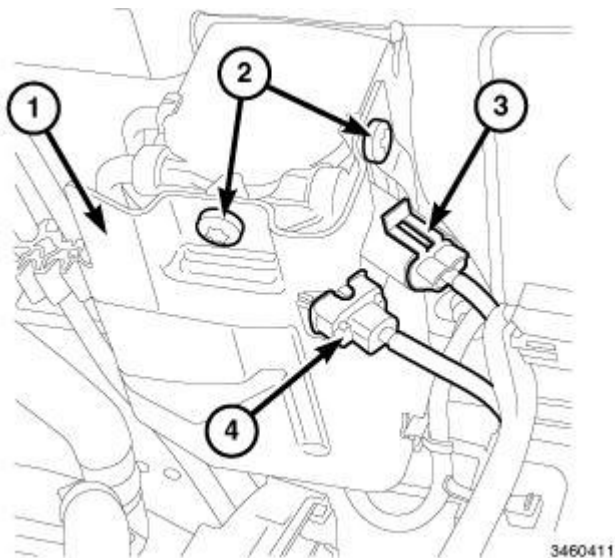
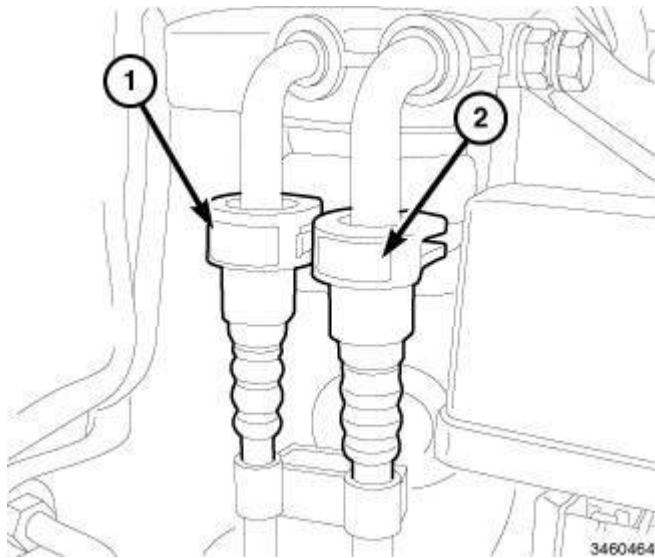


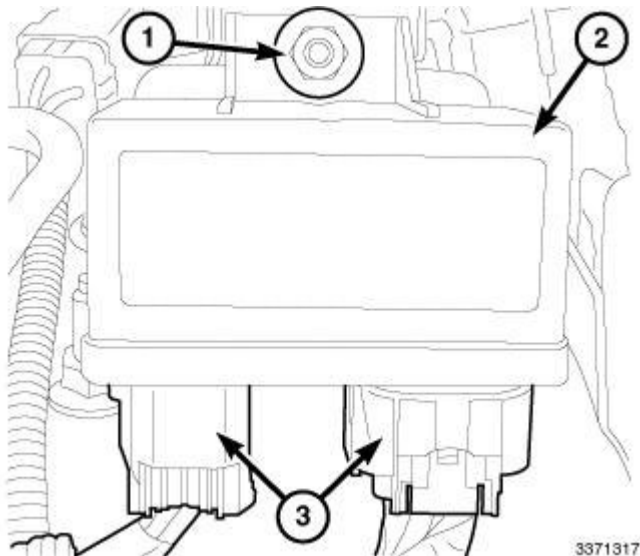
Fig. 11: Fuel Filter Protective Shield, Bolts & Connectors
Courtesy of CHRYSLER GROUP, LLC

13. Remove bolt (2) and fuel filter protective shield (1).

**Fig. 12: Quick Connect Fittings**

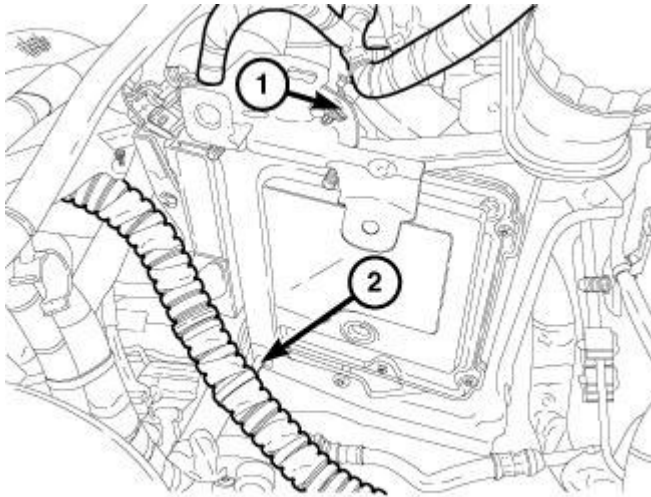
Courtesy of CHRYSLER GROUP, LLC

14. Disconnect the fuel supply (2) line quick-connect fittings at fuel filter housing. Refer to **STANDARD PROCEDURE**.
15. Disconnect the fuel return line near the high pressure injection pump.
16. Detach the fuel line routing clips.

**Fig. 13: Glow Plug Module & Connectors**

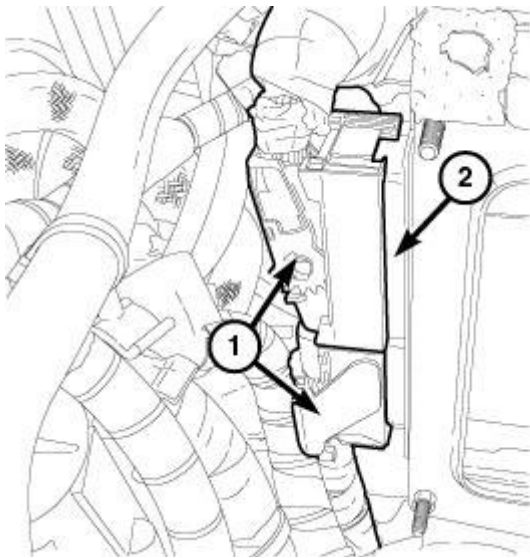
Courtesy of CHRYSLER GROUP, LLC

17. Disconnect the two glow plug harness connector (3).

**Fig. 14: Wire Harness**

Courtesy of CHRYSLER GROUP, LLC

18. Remove wire harness (1, 2) from PCM bracket.

**Fig. 15: Two PCM Harness Connectors**

Courtesy of CHRYSLER GROUP, LLC

19. Unlock and disconnect the two PCM harness connectors (1) at the PCM (2).

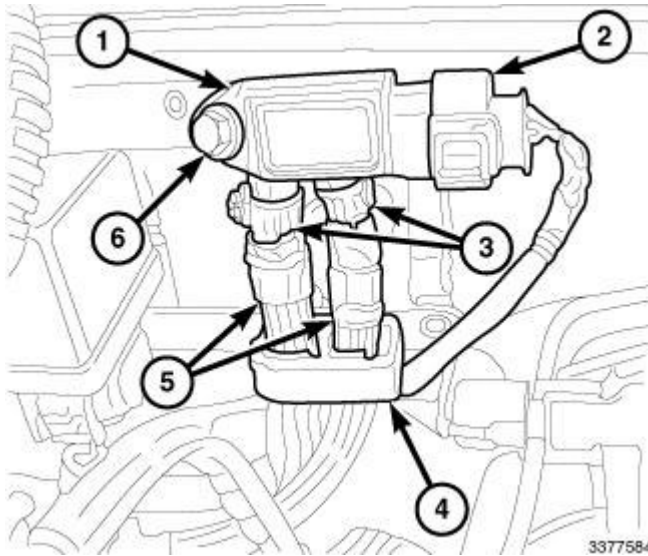


Fig. 16: Exhaust Differential Pressure Sensor, Pressure Tubes & Diesel Particulate Filter (DPF)/Diesel Oxidation Catalyst (DOC)
 Courtesy of CHRYSLER GROUP, LLC

20. Disconnect the differential pressure sensor wire harness connector (2).
21. Remove and position aside the differential pressure sensor (1) from PCM bracket.

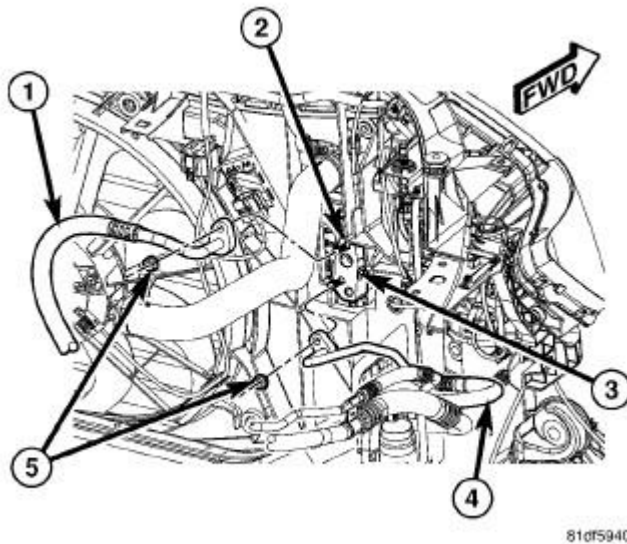
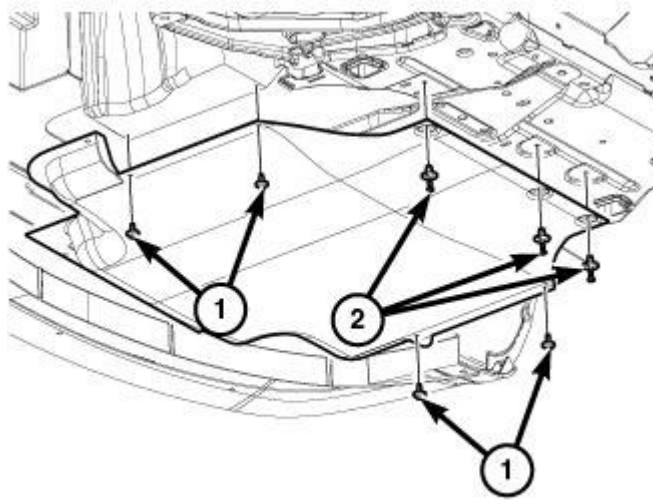


Fig. 17: A/C Discharge Line, A/C Liquid Line, Tapping Block & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

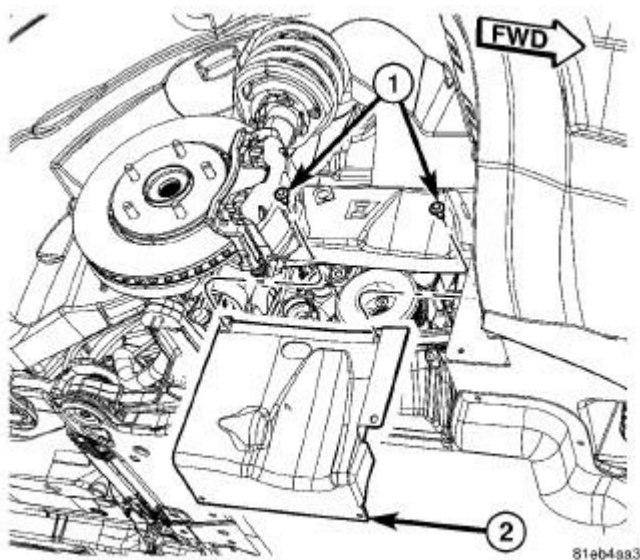
22. Remove the nut (5) that secures the A/C discharge line (1) to the condenser tapping block (2) located on the right side of the condenser.
23. Remove and discard the O-ring seals and gaskets and install plugs in, or tape over the opened discharge line fitting and the condenser port.



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Fig. 18: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

24. Raise the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
25. Remove the belly pan.



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Fig. 19: Right Lower Splash Shield
 Courtesy of CHRYSLER GROUP, LLC

26. Remove retainers (1) and the right and left lower splash shield (2).
27. Drain the transaxle fluid.
28. Remove the lower front closeout panel. Refer to **FASCIA, FRONT LOWER, CLOSEOUT, REMOVAL** .
29. Drain cooling system. Refer to **STANDARD PROCEDURE** .

30. Drain the engine oil. Using a new sealing washer tighten drain plug to 20 N.m (177 in. lbs.).

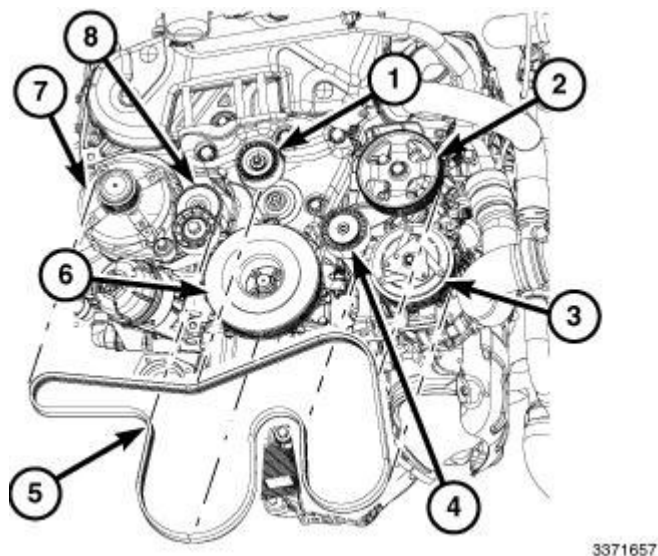


Fig. 20: Belt Tensioner & Accessory Drive Belt
Courtesy of CHRYSLER GROUP, LLC

31. Remove the accessory drive belt.
32. Remove the right, left halfshafts, and the intermediate shaft. Refer to **REMOVAL**.

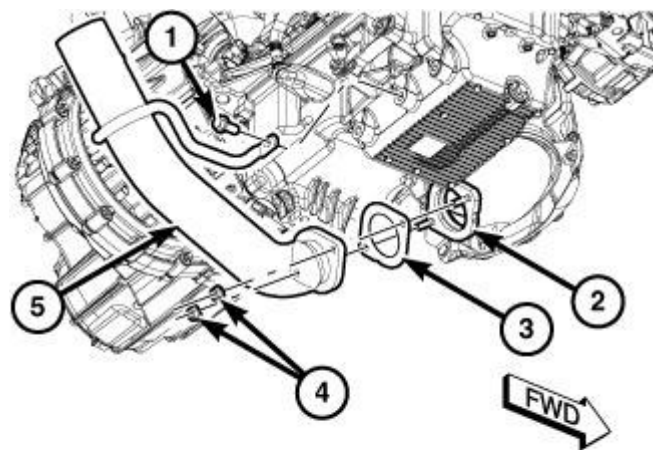


Fig. 21: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners
Courtesy of CHRYSLER GROUP, LLC

33. Remove the exhaust crossunder pipe (5). Refer to **PIPE, EXHAUST CROSSUNDER, REMOVAL**.

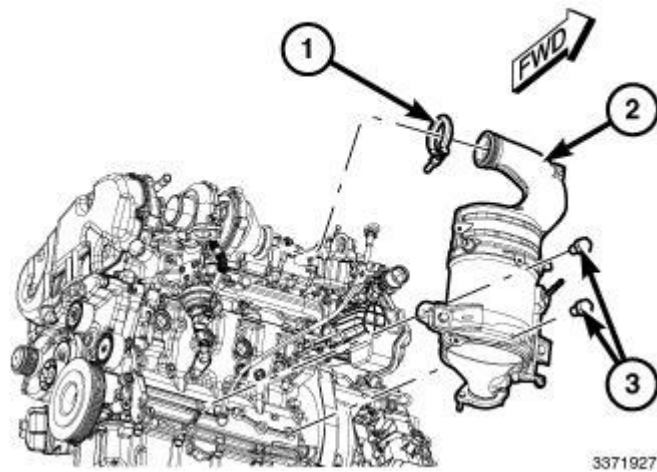


Fig. 22: Clamp, Turbocharger & Two Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

34. Remove the diesel particulate filter. Refer to **FILTER, DIESEL PARTICULATE, REMOVAL** .

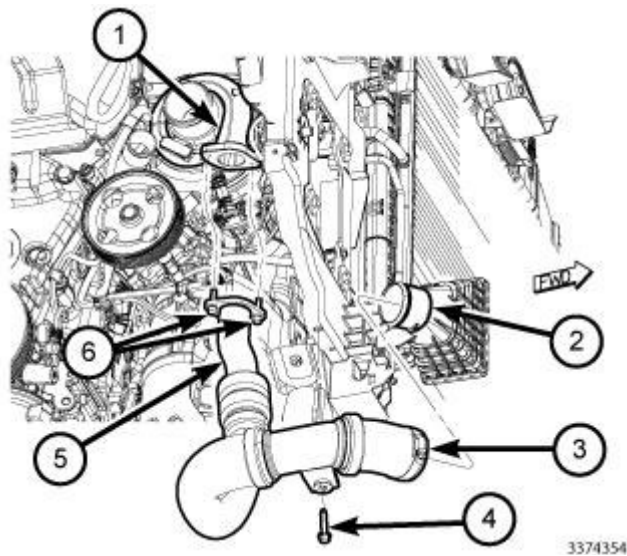


Fig. 23: Turbocharger Flange, Charge Air Cooler (CAC), Hose, Charge Air Cooler Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

35. Remove the right side Charge Air Cooler (CAC) hose (3).
36. Remove the CAC tube bolt at lower core support (4).
37. Remove the flange bolts (6) and the CAC tube-to-turbocharger.

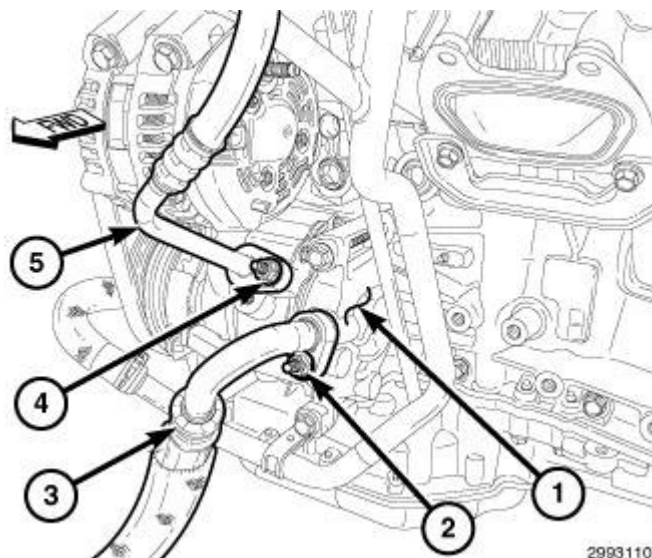


Fig. 24: Nuts, A/C Suction Line, A/C Discharge Line & A/C Compressor
Courtesy of CHRYSLER GROUP, LLC

NOTE: The A/C compressor for 2.0L diesel models has one common stud and nut retaining both A/C lines to the compressor.

38. Disconnect A/C compressor wire harness connector.
39. Remove the nut or nuts (2 and 4), depending on engine application, that secure the A/C suction line (3) and A/C discharge line (5) to the A/C compressor (1).
40. Disconnect the A/C suction and discharge lines from the A/C compressor and remove and discard the O-ring seals and gaskets.

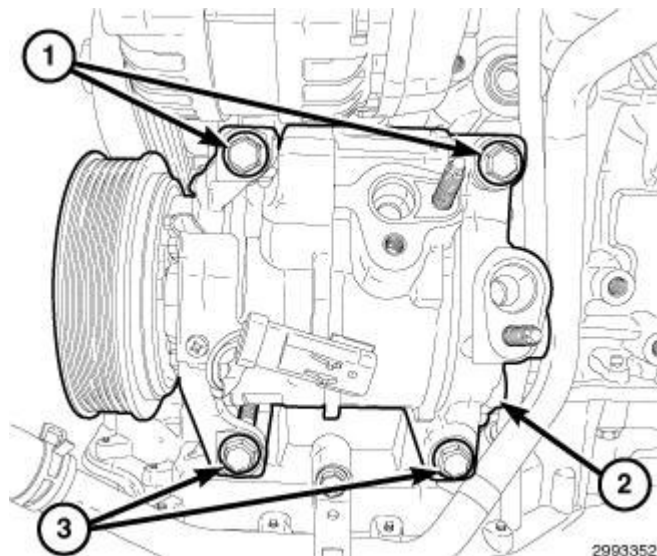


Fig. 25: A/C Compressor & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The A/C compressor for 2.0L diesel models uses three bolts to secure the A/C compressor to the engine.

41. Support the A/C compressor (2) and remove the bolts (1 and 3) that secure the compressor to the engine.
42. Remove the A/C compressor and install plugs in, or tape over, the opened compressor ports and refrigerant line fittings.

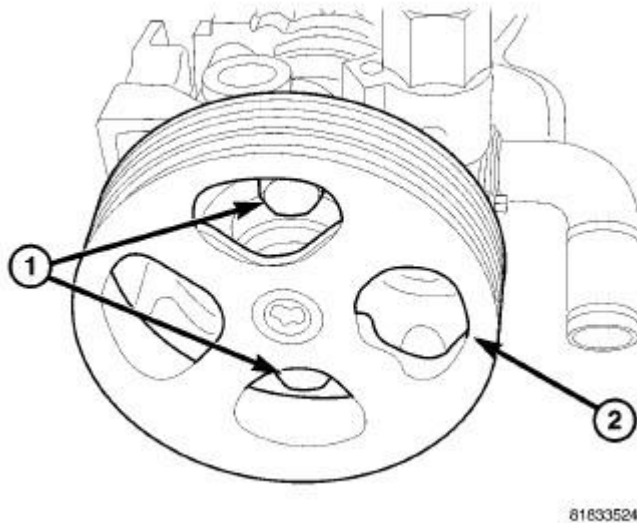


Fig. 26: Power Steering Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

43. Remove the front two bolts (1) securing power steering pump.

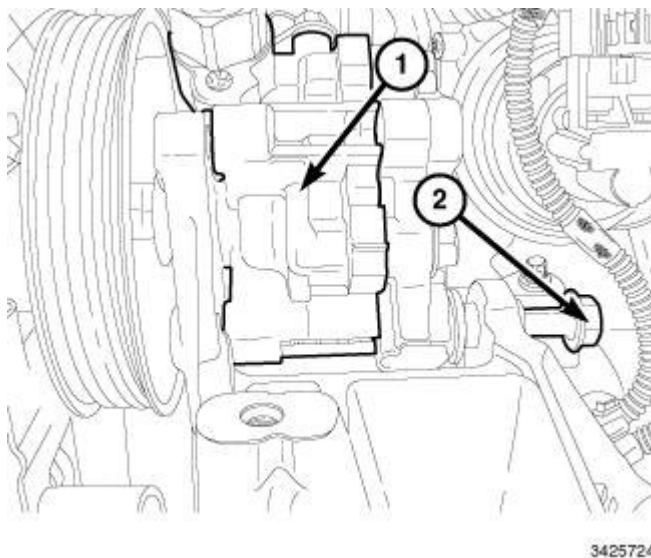


Fig. 27: Rear Pump Mounting Bolt & Pump
Courtesy of CHRYSLER GROUP, LLC

44. Remove rear bolt (2) securing power steering pump.
45. Lower the vehicle.

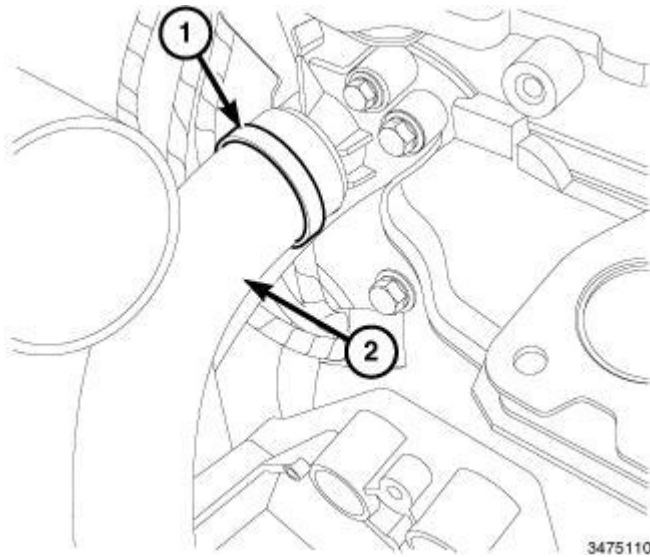


Fig. 28: Upper Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

46. Using the (special tool #10288, Pliers, Hose Clamp) to release clamp (1) and remove the upper radiator hose (2) at engine.
47. Disconnect vacuum hose at vacuum reservoir and position upper radiator and vacuum hose aside.
48. Using the (special tool #10288, Pliers, Hose Clamp) to release clamp and remove the lower radiator hose at engine.
49. Using the (special tool #10288, Pliers, Hose Clamp) to release clamp and remove the coolant reservoir hose at engine.

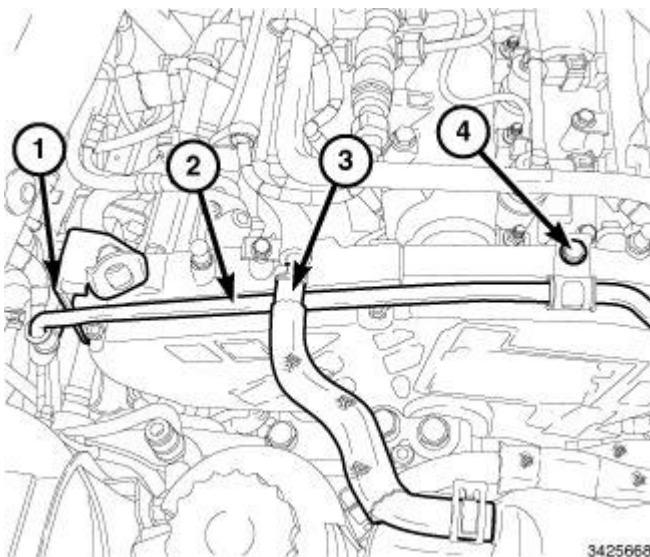


Fig. 29: Power Steering Pressure Line, Hose & Fasteners

Courtesy of CHRYSLER GROUP, LLC

50. Remove bolts (1, 4) securing power steering pressure line.
51. Remove and position aside power steering pump.
52. Disconnect the heater hose at intake manifold.
53. Remove the heater hose assembly.
54. Raise the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
55. Remove nut and the solenoid wire from starter.
56. Remove nut and the battery cable from starter.
57. Remove nut and the ground cable.
58. Remove nut and the B+ cable from generator.
59. Remove the generator field wire harness connector.
60. Remove the lower DPF mounting bracket.

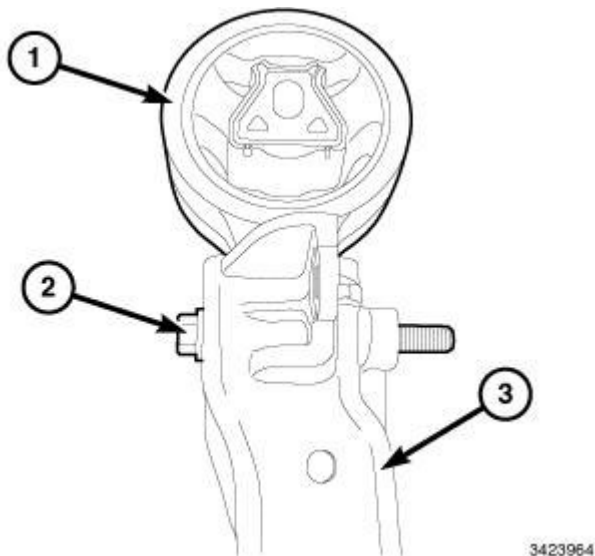


Fig. 30: Rear Mount, Engine Mount Bracket & Bolt
 Courtesy of CHRYSLER GROUP, LLC

61. Remove the rear mount assembly. Refer to **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** .
62. Remove the coolant crossover tube.
63. Disconnect the turbocharger vacuum line.

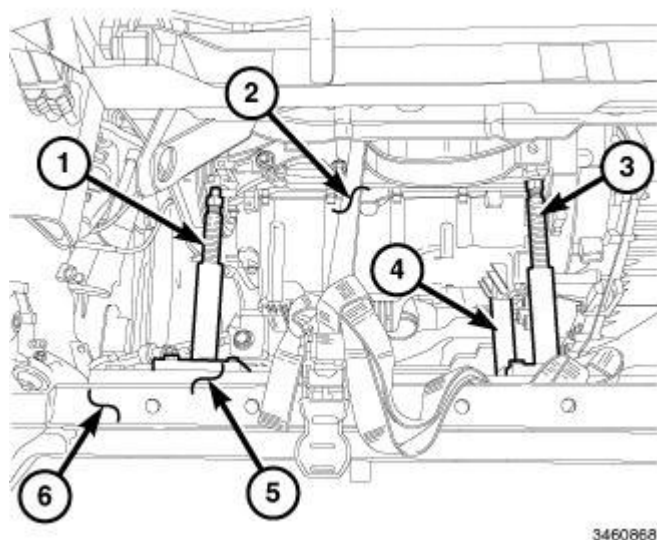


Fig. 31: Engine Support Cradle, Cradle Posts, Safety Strap & Power Train Dolly
Courtesy of CHRYSLER GROUP, LLC

64. Assemble the Dolly (special tool #6135, Dolly, Power Train), Cradle (special tool #6710A, Cradle, Engine Support)
65. Lower vehicle and position Dolly (special tool #6135, Dolly, Power Train) (6), and Cradle (special tool #6710A, Cradle, Engine Support) (5) under engine.

NOTE: The fourth post is hidden behind the support strap.

66. Adjust the Cradle Posts (special tool #6848, Posts, Cradle) (1, 3, 4) to seat engine on Cradle Posts.

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

67. Install, tighten and lock safety strap (2) around engine and attach them to the cradle.
68. Lower vehicle so that only the weight of the engine and transaxle assembly is on dolly fixture.

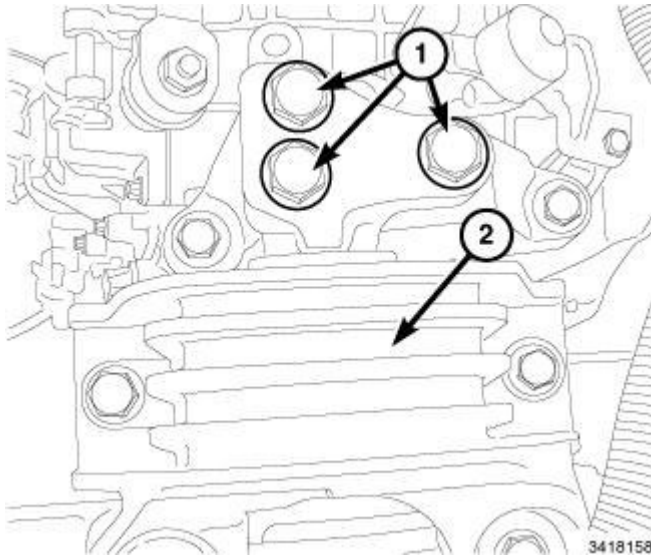


Fig. 32: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

69. Remove left mount (2) to transaxle retaining bolts (1).

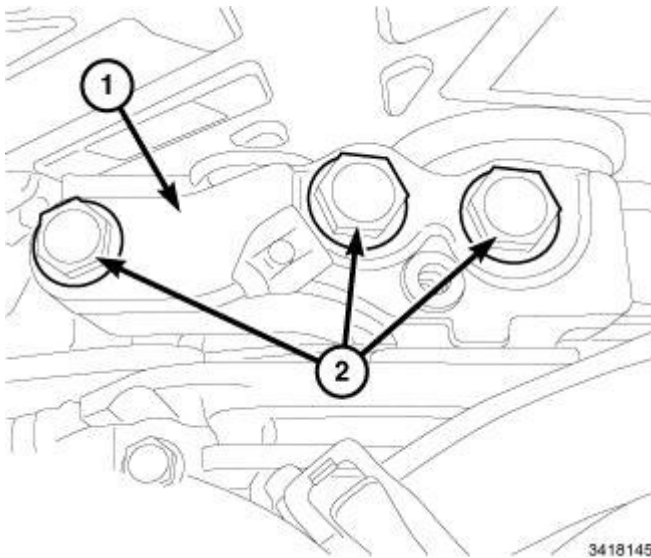


Fig. 33: Right Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

70. Remove right mount (1) to engine bracket bolts (2).

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

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

72. Separate engine and transmission.

INSTALLATION

INSTALLATION

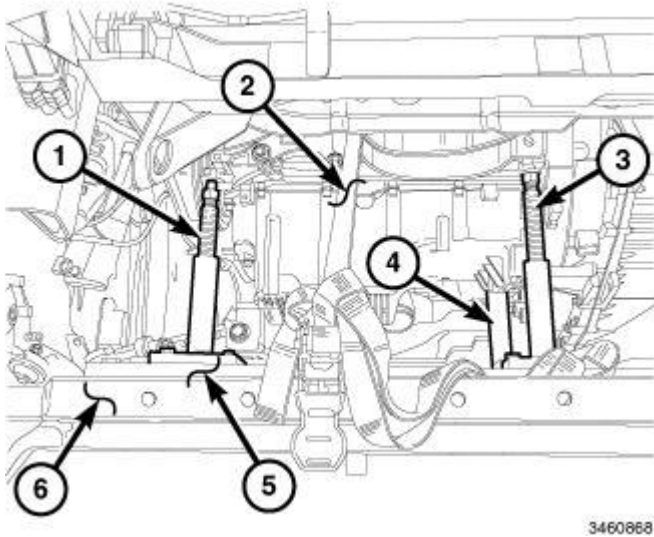


Fig. 34: Engine Support Cradle, Cradle Posts, Safety Strap & Power Train Dolly
Courtesy of CHRYSLER GROUP, LLC

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

NOTE: The fourth post is hidden behind the support strap.

1. Position the engine onto Cradle Post (special tool #6848, Posts, Cradle) (1, 3, 4), Engine Support (special tool #6710A, Cradle, Engine Support), and Dolly (special tool #6135, Dolly, Power Train) then install safety strap (2) around engine, securing it to the Dolly (6).
2. Position the engine and transmission assemblies below vehicle engine compartment.

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

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

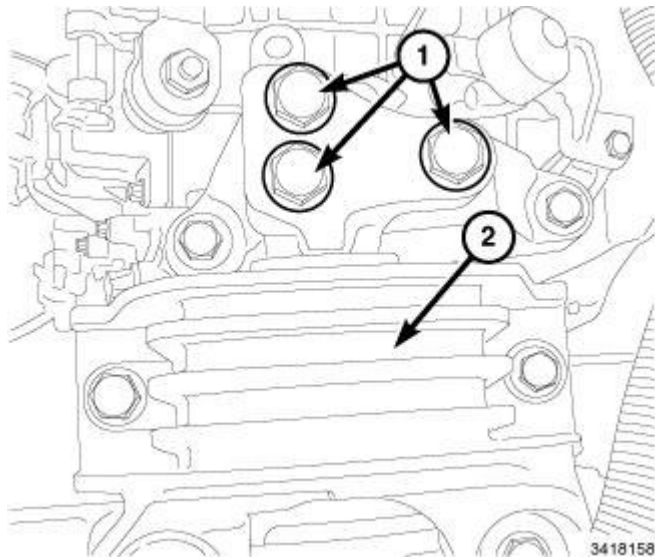


Fig. 35: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install left mount bracket (3) to transaxle retaining bolts and tighten to 110 N.m (81 ft. lbs.).

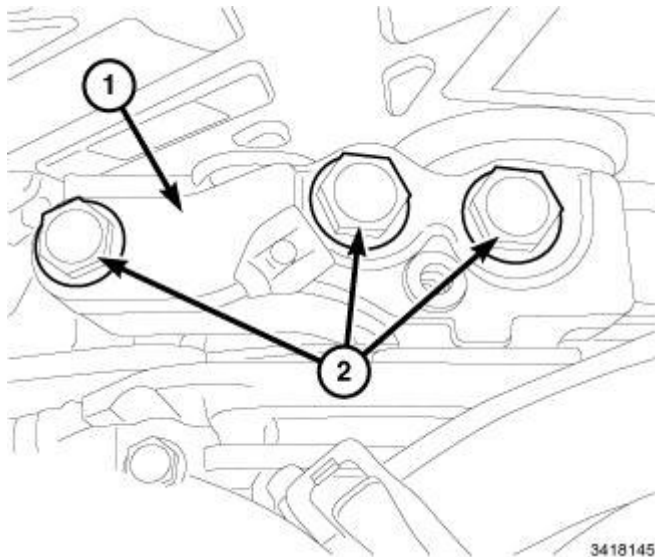
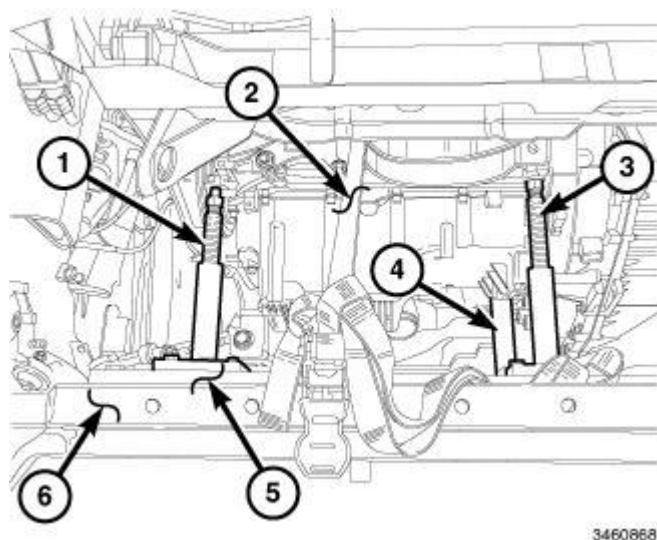


Fig. 36: Right Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

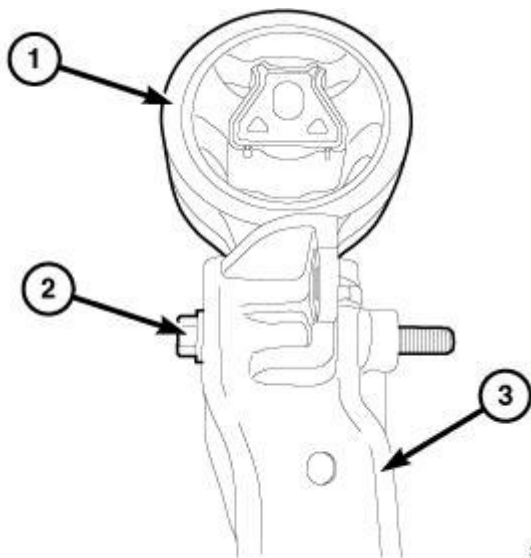
5. Install right mount bracket (1) to frame rail retaining bolts and tighten to 55 N.m (41 ft. lbs.).
6. Install the ground cable.



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Fig. 37: Engine Support Cradle, Cradle Posts, Safety Strap & Power Train Dolly
Courtesy of CHRYSLER GROUP, LLC

7. Remove safety strap (2) and the Dolly (special tool #6135, Dolly, Power Train) (6).



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Fig. 38: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Connect the turbocharger vacuum line.
9. Install the coolant crossover tube.
10. Install the rear mount assembly. Refer to **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION**.
11. Install the lower DPF mounting bracket.
12. Install the generator field wire harness connector.
13. Install the B+ cable.

14. Install the ground cable. Tighten nut to 20 N.m (177 in. lbs.).
15. Install the battery cable to starter. Tighten nut to 10 N.m (89 in. lbs.).
16. Install the solenoid wire to starter and securely tighten nut.
17. Lower the vehicle.
18. Install the heater hose assembly.
19. Connect the heater hose at intake manifold.

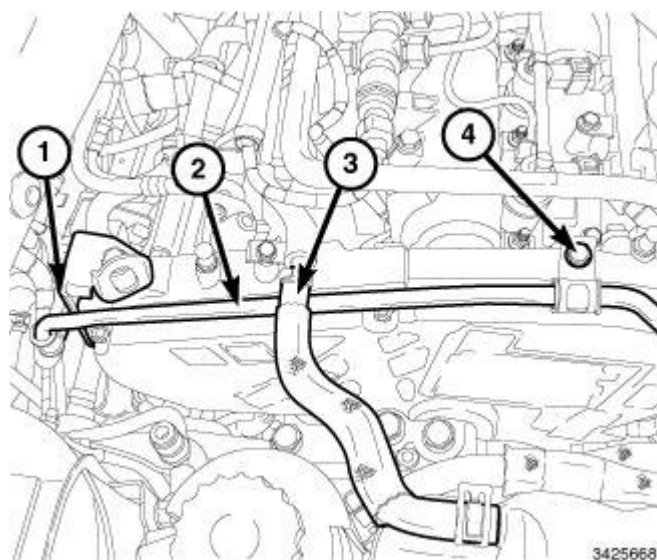


Fig. 39: Power Steering Pressure Line, Hose & Fasteners
Courtesy of CHRYSLER GROUP, LLC

20. Position the power steering pump and pressure line (2).
21. Install the pressure line mounting bolts (1, 4) and tighten to 24 N.m (18 ft. lbs.).
22. Install the coolant reservoir hose at engine. Using the (special tool #10288, Pliers, Hose Clamp) lock the clamp.
23. Install the lower radiator hose at engine. Using the (special tool #10288, Pliers, Hose Clamp) lock the clamp.
24. Disconnect vacuum hose at vacuum reservoir and position upper radiator and vacuum hose aside.

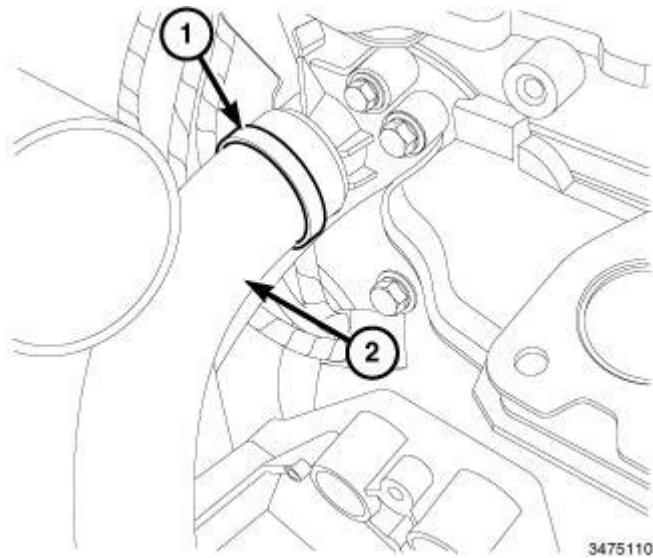


Fig. 40: Upper Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

25. Install the upper radiator (2) hose at engine. Using the (special tool #10288, Pliers, Hose Clamp) lock the clamp (1).

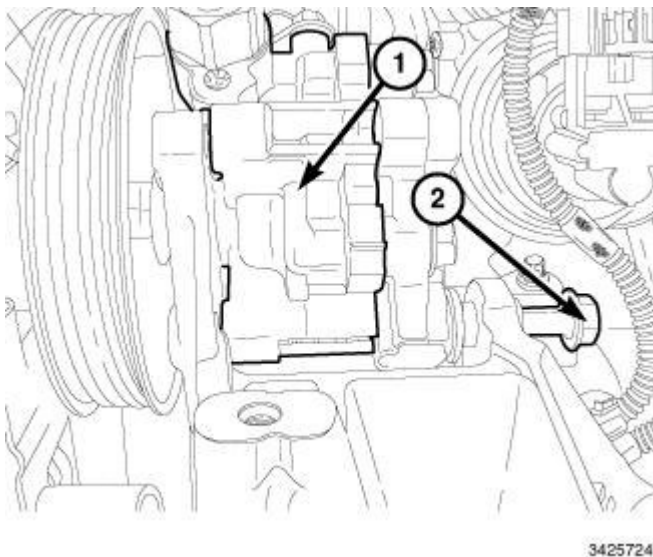


Fig. 41: Rear Pump Mounting Bolt & Pump
Courtesy of CHRYSLER GROUP, LLC

26. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
27. Install the rear bolt (2) securing power steering pump finger tight.

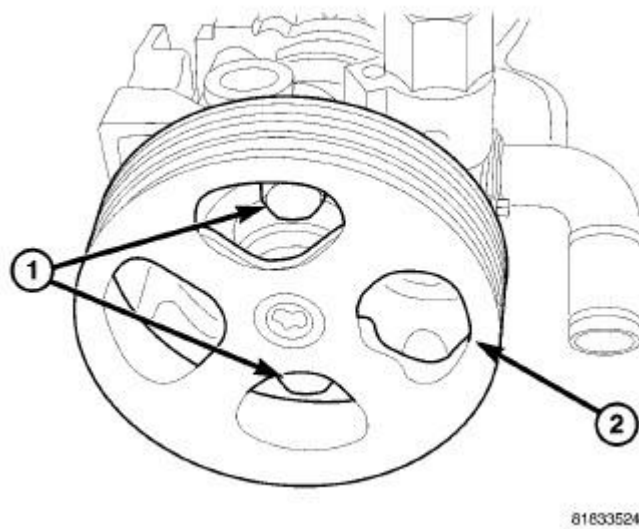


Fig. 42: Power Steering Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

28. Install bolts (1) through the pulley (2) openings. Tighten the front and rear mounting bolts to 30 N.m (22 ft. lbs.).

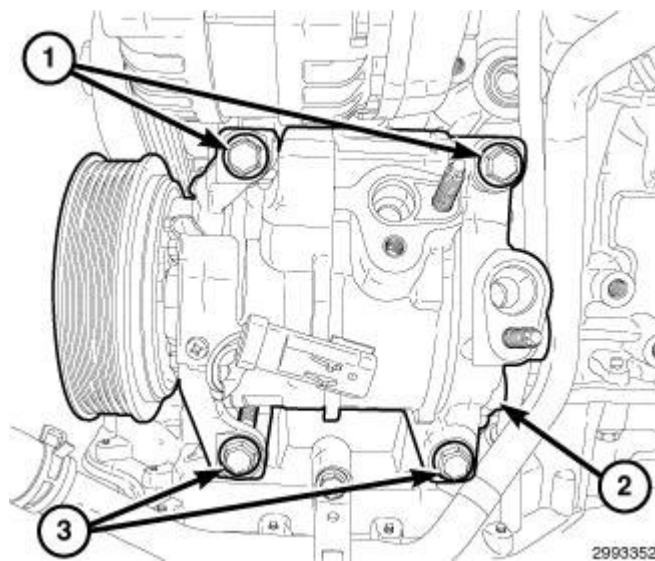


Fig. 43: A/C Compressor & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: The A/C compressor for 2.0L diesel models uses three bolts to secure the A/C compressor to the engine.

29. Install and hand tighten all the bolts (1 and 3) that secure the A/C compressor to the engine. Then tighten the bolts to 25 N.m (18 ft. lbs.).

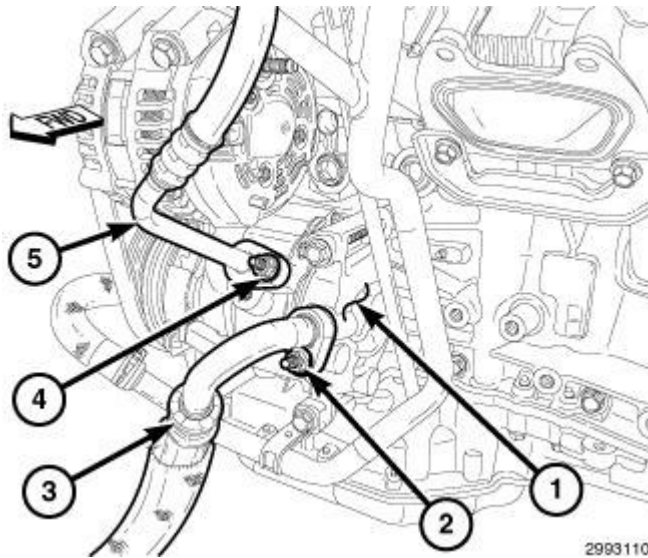


Fig. 44: Nuts, A/C Suction Line, A/C Discharge Line & A/C Compressor
 Courtesy of CHRYSLER GROUP, LLC

30. Remove the tape or plugs from the compressor ports and the refrigerant line fittings.
31. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the refrigerant line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
32. Connect the A/C suction line (3) and the A/C discharge line (5) to the A/C compressor (1).

NOTE: The A/C compressor for 2.0L diesel models has one common stud and nut retaining both A/C lines to the compressor.

33. Install the nut or nuts (2 and 4), depending on engine application, that secure the A/C suction and discharge lines to the A/C compressor. Tighten the nut(s) to 20 N.m (177 in. lbs.).
34. Connect A/C compressor wire harness connector.

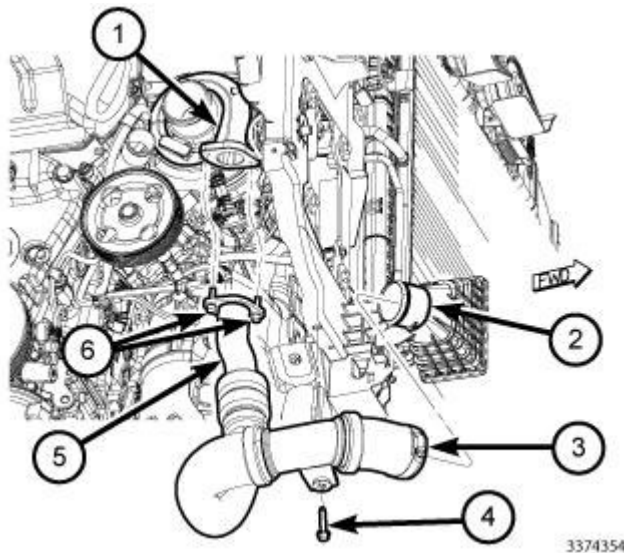


Fig. 45: Turbocharger Flange, Charge Air Cooler (CAC), Hose, Charge Air Cooler Tube & Fasteners

Courtesy of CHRYSLER GROUP, LLC

35. Install the Charge Air Cooler (CAC) tube-to-turbocharger flange (7). Tighten the bolts to 10 N.m (89 in. lbs.).
36. Install the CAC tube bolt (4). Tighten the bolt to 10 N.m (89 in. lbs.).
37. Install the right side CAC hose (3).

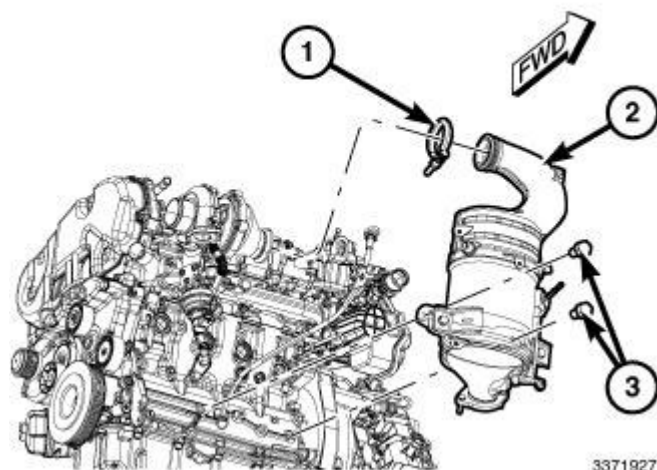


Fig. 46: Clamp, Turbocharger & Two Attaching Bolts

Courtesy of CHRYSLER GROUP, LLC

38. Install the diesel particulate filter. Refer to **FILTER, DIESEL PARTICULATE, INSTALLATION**.

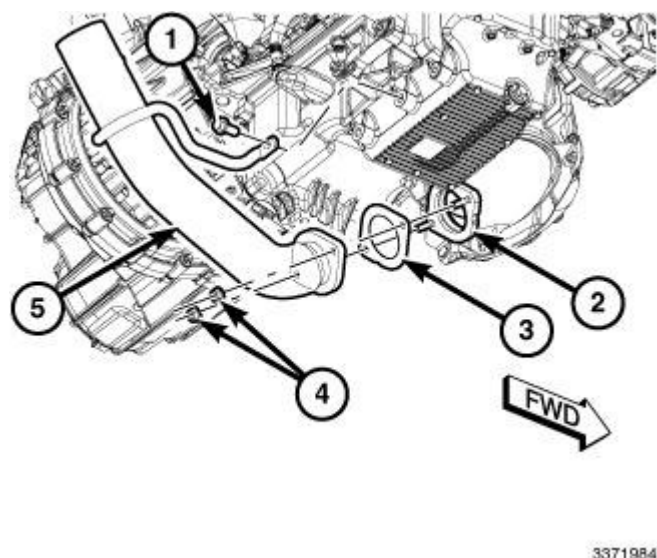


Fig. 47: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners

Courtesy of CHRYSLER GROUP, LLC

39. Install the exhaust crossunder pipe (5). Refer to **PIPE, EXHAUST CROSSUNDER, INSTALLATION**.
40. Install the right, left halfshafts, and the intermediate shaft. Refer to **INSTALLATION**.

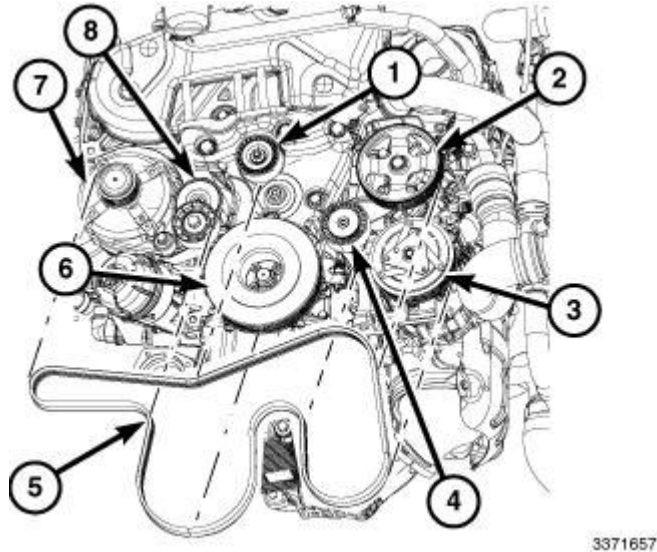


Fig. 48: Belt Tensioner & Accessory Drive Belt
Courtesy of CHRYSLER GROUP, LLC

41. Install the accessory drive belt (4).

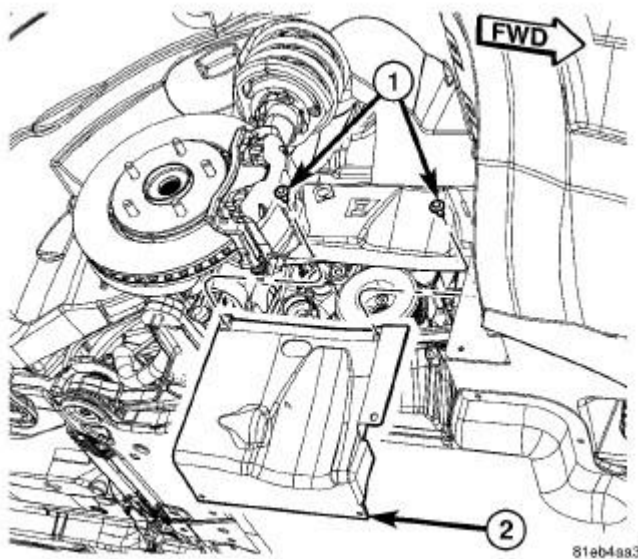
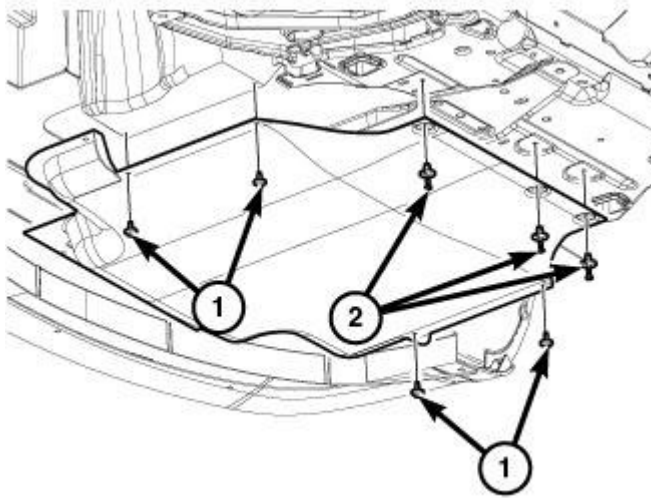


Fig. 49: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

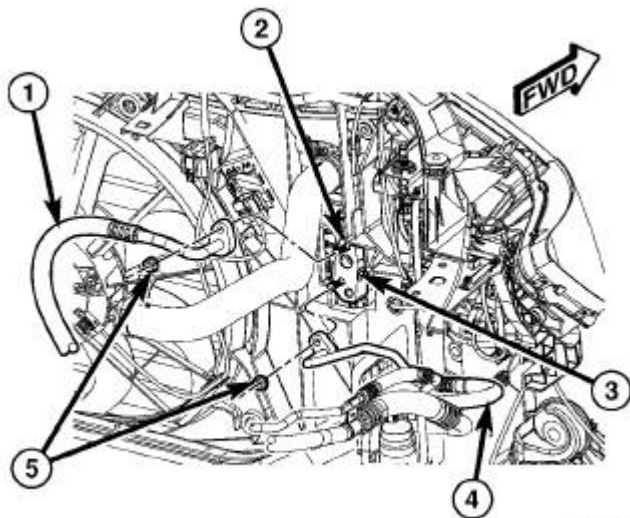
42. Install the lower front closeout panel.
43. Install the right and left lower splash shield (2) and retainers (1).



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Fig. 50: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

44. Install the belly pan.
45. Lower the vehicle.



81df5940

Fig. 51: A/C Discharge Line, A/C Liquid Line, Tapping Block & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

46. Remove the tape or plugs from the opened discharge line fittings and the condenser ports.
47. Lubricate new rubber O-ring seals with clean refrigerant oil and install them and new gaskets onto the discharge line fittings. Use only the specified O-rings as they are made of a special material for the R-134a system. Use only refrigerant oil of the type recommended for the A/C compressor in the vehicle.
48. Connect the A/C discharge line (1) to the condenser tapping block (2). Tighten the nut (5) to 20 N.m (177

in. lbs.).

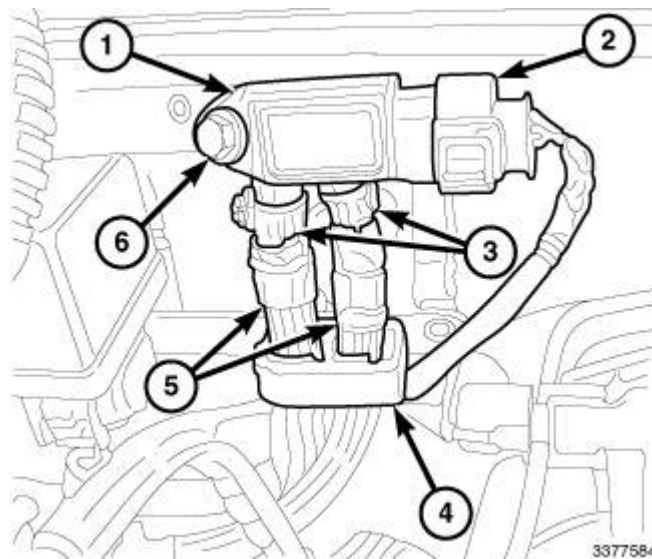


Fig. 52: Exhaust Differential Pressure Sensor, Pressure Tubes & Diesel Particulate Filter (DPF)/Diesel Oxidation Catalyst (DOC)
Courtesy of CHRYSLER GROUP, LLC

49. Install the differential pressure sensor (1) to PCM bracket.
50. Connect the differential pressure sensor wire harness connector (2).

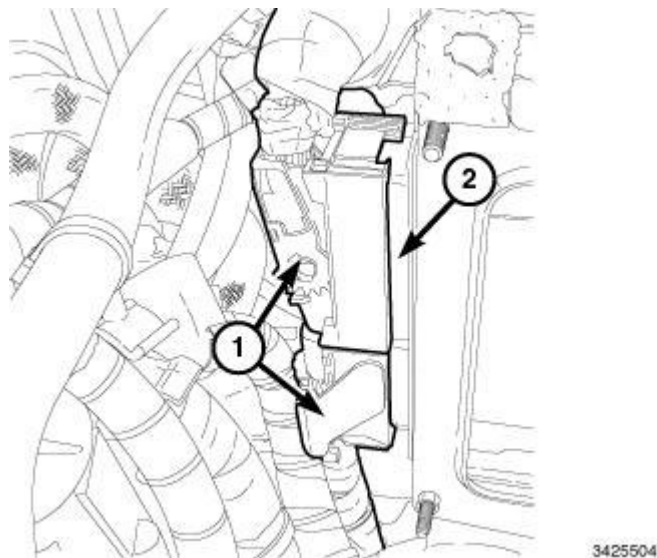
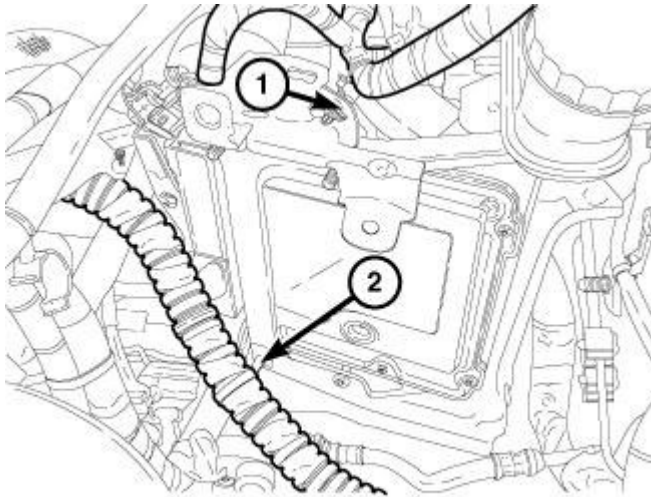


Fig. 53: Two PCM Harness Connectors
Courtesy of CHRYSLER GROUP, LLC

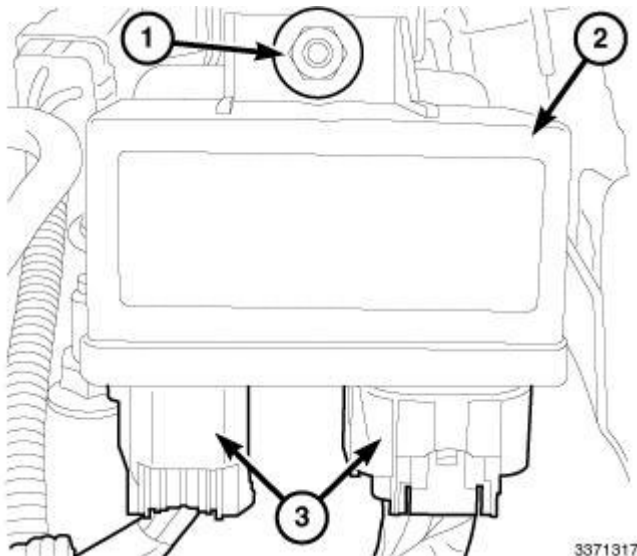
51. Connect and lock the two PCM harness connectors (1) at the PCM (2).



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Fig. 54: Wire Harness**Courtesy of CHRYSLER GROUP, LLC**

52. Install the wire harness (1, 2) to PCM bracket.



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Fig. 55: Glow Plug Module & Connectors**Courtesy of CHRYSLER GROUP, LLC**

53. Connect the two glow plug harness connector (3).

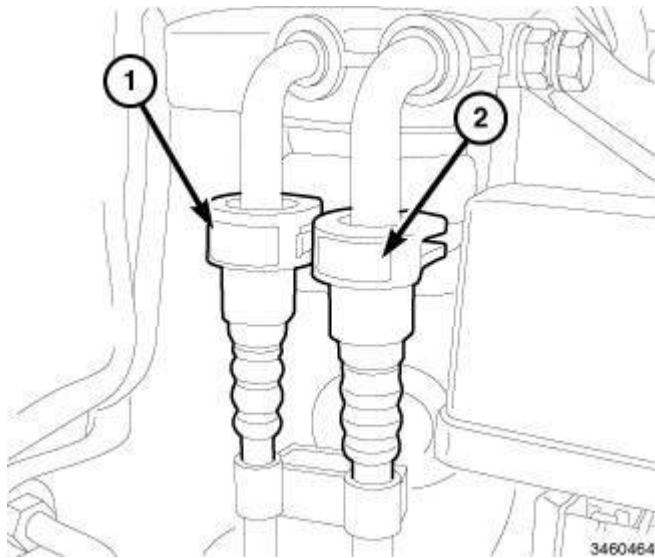


Fig. 56: Quick Connect Fittings
Courtesy of CHRYSLER GROUP, LLC

54. Attach the fuel line routing clips.
55. Connect the fuel return line near the high pressure injection pump.
56. Connect the fuel supply (2) line quick-connect fittings.

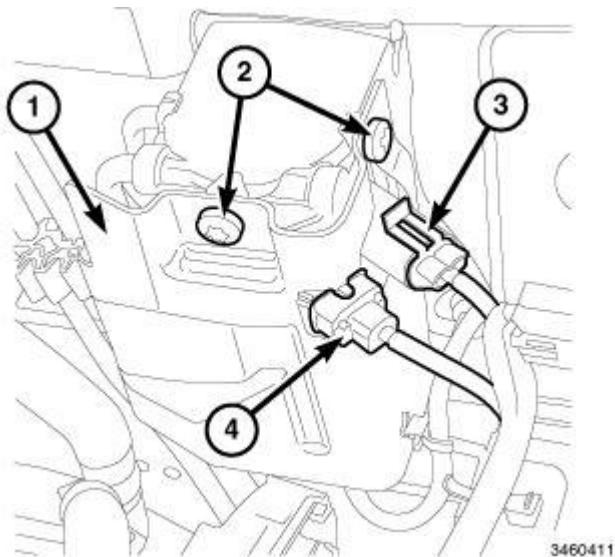


Fig. 57: Fuel Filter Protective Shield, Bolts & Connectors
Courtesy of CHRYSLER GROUP, LLC

57. Install the fuel filter protective shield (1). Tighten bolts (2) to 6 N.m (53 in. lbs.).

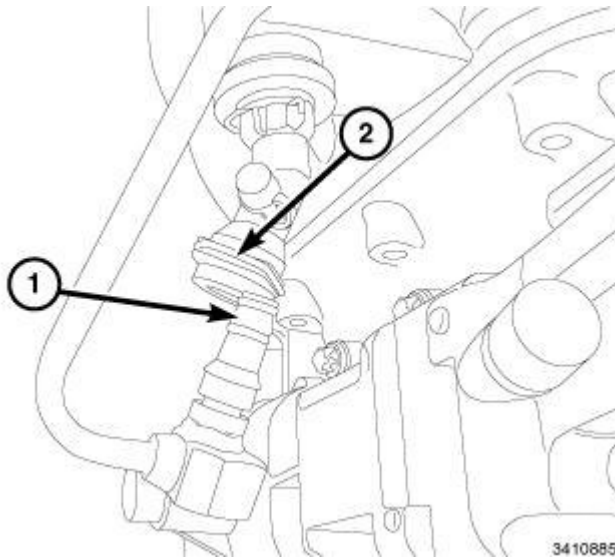


Fig. 58: Hydraulic Supply Pipe & Concentric Slave Cylinder
Courtesy of CHRYSLER GROUP, LLC

- 58. Connect the brake booster hose at vacuum pump.
- 59. Connect the hydraulic supply pipe for the concentric slave cylinder.

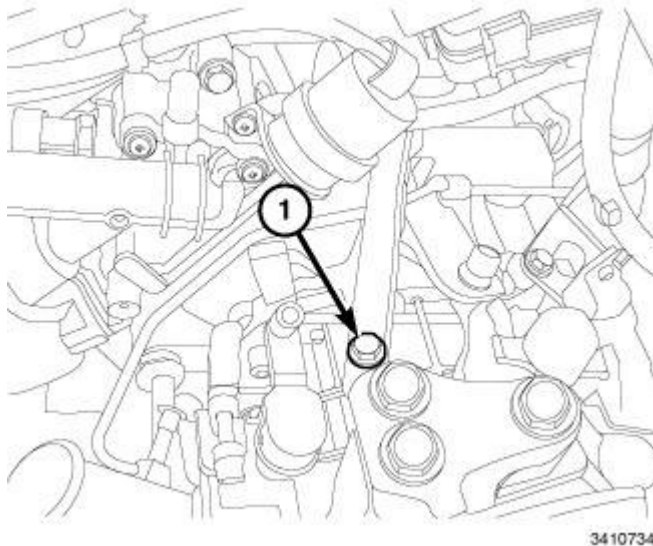


Fig. 59: Transaxle Support Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

- 60. Install the transaxle support bracket bolt (1) and tighten to 20 N.m (177 in. lbs.).

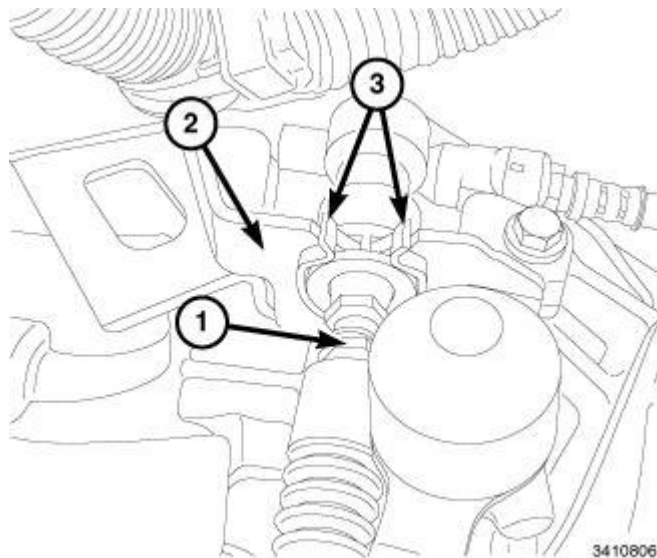


Fig. 60: Gear Shift Selector Cable & Bracket
Courtesy of CHRYSLER GROUP, LLC

61. Connect the gear shift selector cable (1) to the bracket (2).

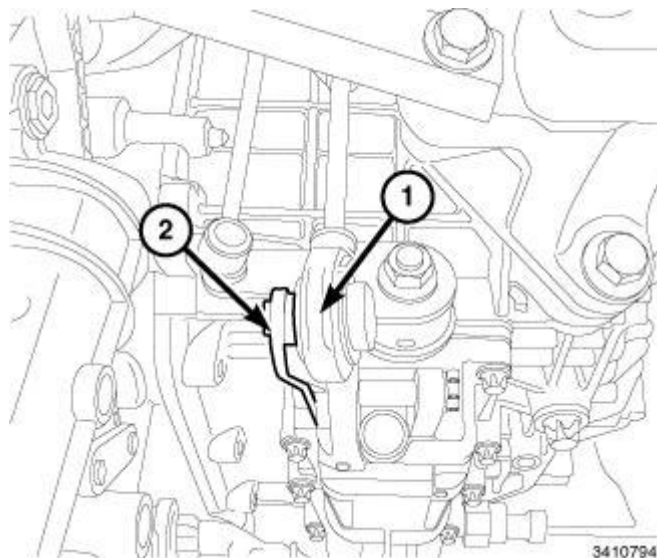
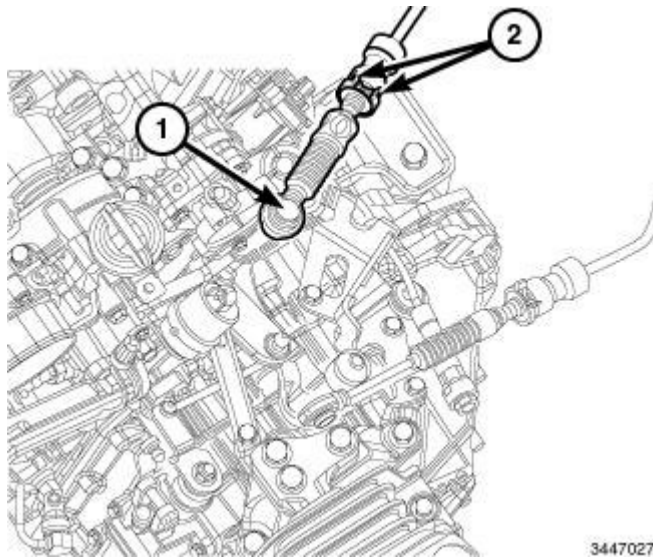


Fig. 61: Gear Shift Selector Cable & Manual Lever
Courtesy of CHRYSLER GROUP, LLC

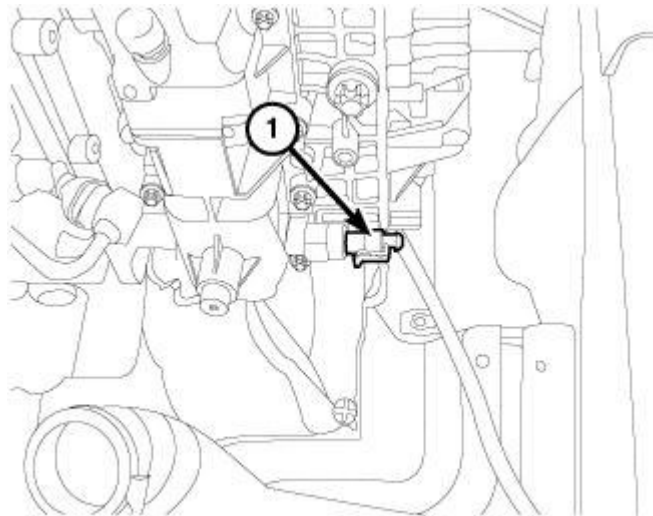
62. Connect the gear shift selector cable (1) to the manual lever (2).



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Fig. 62: Cable Connector & Release Tabs
Courtesy of CHRYSLER GROUP, LLC

63. Push the cable connector (1) to the lever.
64. Connect the gear shift range cable at the bracket.



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Fig. 63: Reverse Lamp Sensor
Courtesy of CHRYSLER GROUP, LLC

65. Connect the reverse lamp sensor.
66. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
67. Fill the transaxle with the recommended oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
68. Fill engine with coolant. Refer to **STANDARD PROCEDURE** .
69. Install a new oil filter and fill the engine with recommended oil. Refer to **CAPACITIES AND**

RECOMMENDED FLUIDS, SPECIFICATIONS .

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

70. Evacuate the refrigerant system. Refer to **PLUMBING, FRONT, STANDARD PROCEDURE .**
71. Charge the refrigerant system. Refer to **PLUMBING, FRONT, STANDARD PROCEDURE .**

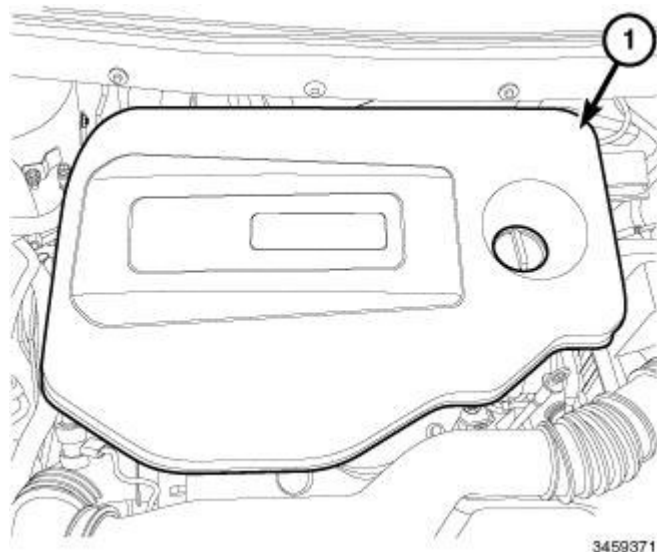


Fig. 64: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

72. Connect the negative battery cable.
73. Start engine and check for leaks.
74. Install engine cover (1).

SPECIFICATIONS**SPECIFICATIONS - 2.0L DIESEL ENGINE****GENERAL**

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Type	In-Line OHV, DOHC	
Number of Cylinders	4	
Firing Order	1 - 3 - 4 - 2	
Compression Ratio	16.5:1	
Max. Variation Between Cylinders	25%	
Displacement	2.0 L	122 CID

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CYLINDER BLOCK

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Material	Cast Iron	
Cylinder Liner Inner Diameter		
Grade A	83.000 - 83.010 mm	3.2677 - 3.2681 in.
Grade B	83.010 - 83.020 mm	3.2681 - 3.2684 in.
Grade C	83.020 - 83.030 mm	3.2684 - 3.2688 in.
Cylinder Liner Taper	< 0.005 mm	0.0002 in.
Cylinder Liner Out-of-Round	< 0.050 mm	0.002 in.
Cylinder Liner Inner Diameter Oversize	0.10 mm	0.0004 in.

CYLINDER HEAD

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Engine Cylinder Head Lower Surface Flatness	< 0.1 mm	0.0039 in.
Cylinder Head Nominal Height	107 mm \pm 0.05 mm	4.213 \pm 0.002 mm
Cylinder Head Gasket Size With Maximum Piston Projection		
Projection	+0.110 - +0.230 mm	+0.004 - +0.009 in.
Thickness (No Opening)	0.95 \pm 0.05 mm	+0.037 \pm 0.002 in.
Cylinder Head Gasket Size With Maximum Piston Projection		
Projection	+0.331 \pm 0.425 mm	+0.013 - +0.017 in.
Thickness (Two Opening)	1.15 \pm 0.05 mm	+0.045 \pm 0.002 in.

PISTONS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Permitted Weight Difference Between Pistons	\pm 5 Grams	
Piston Outer Diameter - Grade A	82.930 - 82.940	3.2649 - 3.2653 in.
Piston Outer Diameter - Grade B	82.940 - 82.950	3.2653 - 3.2657 in.
Piston Outer Diameter - Grade C	82.950 - 82.960	3.2657 - 3.2661 in.
Piston Outer Diameter Oversize	0.1	0.0039

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Permitted Difference in Weight Between Connecting Rod	\pm 2.5 Grams	

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Assemblies		
Small End Bush Inner Diameter	30.006 - 30.014	1.1813 - 1.1817 in.
Big End Inner Diameter	53.897 - 53.909	2.1220 - 2.1224 in.

PISTONS PINS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Piston Pin Outer Diameter	29.975 - 29.980	1.1801 - 1.1803 in.
Piston Pin Outer Diameter	29.985 - 29.990	1.1805 - 1.1807 in.

PISTON RINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Cylinder Compression 1st Sealing Ring Gap	0.20 - 0.35 mm	0.0080 - 0.0140 in.
Cylinder Compression 2nd Sealing Ring Gap	0.60 - 0.80	0.0240 - 0.0314 in.
Engine Piston Oil Scraper Ring Gap	0.25 - 0.50 mm	0.0100 - 0.0200 in.
Sealing Ring Seat in Piston - 1st Groove	1.620 - 1.640 mm	0.0638 - 0.0645 in.
Sealing Ring Seat in Piston - 2nd Groove	1.550 - 1.570 mm	0.0610 - 0.0618 in.
Sealing Ring Seat in Piston - 3rd Groove	2.020 - 2.040 mm	0.07952 - 0.0803 in.
Cylinder Compression 1st Sealing Ring Thickness	1.470 - 1.495 mm	0.0579 - 0.0589 in.
Cylinder Compression 2nd Sealing Ring Thickness	1.470 - 1.495 mm	0.0579 - 0.0589 in.
Engine Piston Oil Scraper Ring Thickness	1.970 - 1.990 mm	0.0776 - 0.0783 in.
Cylinder Compression 1st Sealing Ring End Float	0.125 - 0.170 mm	0.0049 - 0.0067 in.
Cylinder Compression 2nd Sealing Ring End Float	0.055 - 0.100 mm	0.0022 - 0.0039 in.
Engine Piston Oil Scraper Ring End Float	0.030 - 0.070 mm	0.0012 - 0.0028 in.

CONNECTING RODS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Bearing Clearance	0.03 - 0.08 mm	0.001 - 0.003 in.
Side Clearance	0.37 mm	0.014 in.

CRANKSHAFT/MAIN JOURNALS/CRANKPINS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Crankshaft End Float	0.049 - 0.211 mm	0.0019 - 0.0083 in.
Main Journal Seat Diameter	63.705 - 63.718 mm	2.508 - 2.509 in.
Main Journal Diameter - Grade A	59.995 - 60.002 mm	2.3620 - 2.3623 in.
Main Journal Diameter - Grade B	59.988 - 59.995 mm	2.3617 - 2.3620 in.
Main Journal Diameter - Grade C	59.981 - 59.988 mm	2.3615 - 2.3617 in.
Main Journal Diameter Undersized	0.127 mm	0.005 in.
Crankpin Diameter - Grade A	50.800 - 50.807 mm	1.9999 - 2.0002 in.
Crankpin Diameter - Grade B	50.793 - 50.800 mm	1.9997 - 1.9999 in.
Crankpin Diameter - Grade C	50.786 - 50.793 mm	1.9994 - 1.9997 in.
Crankpin Diameter undersized	0.127 mm	0.005 in.
Main journal half-bearings - Grade A (Red)	1.832- 1.836 mm	0.0721 - 0.0723 in.
Main Journal Half-Bearings - Grade B (Blue)	1.835 - 1.839 mm	0.0722 - 0.0724 in.
Main Journal Half-Bearings - Grade C (Yellow)	1.838 - 1.842 mm	0.0724 - 0.0725 in.
Main Journal/Crankpin Half-Bearings oversize - Grade A (Brown)	0.127 mm	0.005 in.
Main Journal/Crankpin Half-Bearings Oversize - Grade B (Green)	0.127 mm	0.005 in.
Main Journal/Crankpin Half-Bearings Oversize - Grade C (Black)	0.127 mm	0.005 in.
Main Journal/Crankpin Half-Bearing Oversize	0.254 mm	0.010 in.
Clearance Between Main Bearings - Crankshaft Main Journals	0.031 - 0.051 mm	0.0012 - 0.0020 in.
Crankpin Half-Bearings - Grade A (Red)	1.528 - 1.532 mm	0.0602 - 0.0603 in.
Crankpin Half-Bearings - Grade B (Blue)	1.532 - 1.536 mm	0.0603 - 0.0605 in.
Crankpin Half-Bearings - Grade C (Yellow)	1.535 - 1.539 mm	0.0604 - 0.0606 in.
Clearance Between Connecting Rod Bearings - Crankpin Bearings	0.030 - 0.056 mm	0.0012 - 0.0022 in.

CAMSHAFT

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Camshaft First Journal Diameter	43.600 - 43.615	1.7165 - 1.7171 in.
Camshaft Second Journal Diameter	43.400 ÷ 43.415	1.7087 - 1.7092 in.

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Camshaft Third Journal Diameter	43.200 - 43.215	1.7010 - 1.7014 in.
Camshaft Fourth Journal Diameter	43.000 - 43.015	1.6930 - 1.6935 in.
Camshaft Fifth Journal Diameter	30.000 - 30.015	1.1811 - 1.1817 in.
Nominal Exhaust Cam Lift	8.0	0.3150 in.
Nominal Intake Cam Lift	8.0	0.3150 in.
Camshaft First Support Diameter	43.646 - 43.671	1.7183 - 1.7193 in.
Camshaft Second Mounting Diameter	43.446 - 43.471	1.7105 - 1.7115 in.
Camshaft Third Support Diameter	43.246 - 43.271	1.7026 - 1.7036 in.
Camshaft Fourth Support Diameter	43.046 - 43.071	1.6947 - 1.6957 in.
Camshaft Fifth Support Diameter	30.045 - 30.070	1.1829 - 1.1839 in.
Camshaft End Float	0.100 - 0.230	0.0039 - 0.0091 in.

VALVES

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Intake Valve Stem Diameter	4.982 - 5.000 mm	0.1961 - 0.1968 in.
Exhaust Valve Stem Diameter	4.972 - 5.990 mm	0.1957 - 0.2358 in.

VALVE GUIDE

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Guide Inner Diameter	5.015 - 5.033 mm	0.051 in.
Valve Guide Inner Diameter	10.010 - 10.030 mm	0.3941 - 0.3950 in.
Valve Guide Outer Diameter Oversize	0.05 - 0.10 - 0.25 mm	0.002 - 0.004 - 0.010 in.

VALVES SPRINGS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Valve Spring Free Length	44.1 mm	1.736 in.
Length of Valve Springs Under a Load of 228 - 252 N.m	34.0 mm	1.339 in.
Length of Valve Springs Under a Load of 439 - 481 N.m	25.5	1.004 in.

ENGINE OIL PUMP

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Clearance Between Pump Casing Support Plane and Top of Gears	0.080 - 0.186 mm	0.0031 - 0.0073 in.
Endfloat Between Pump Casing	0.025 - 0.070 mm	0.0010 - 0.0028 in.

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Support Plane and Top of Gears		
Height of Engine Oil Pressure Limit Valve Spring Under Load of 88 - 97 N.m	36.0 mm	1.4173 in.

VALVES SEATS

DESCRIPTION	SPECIFICATION	
	Metric	Standard
Intake Valve Seat Outer Diameter	29.600 - 29.611	1.1653 - 1.1660 in.
Exhaust Valve Seat Outer Diameter	26.100 - 26.111	1.0275 - 1.0280 in.
Valve Seat Band Angle in Contact With Valves - Inlet	45° 30' ± 1°	
Valve Seat Band Angle in Contact With Valves - Exhaust	45° 0' ± 1°	

OIL PRESSURE

DESCRIPTION	SPECIFICATION	
	Metric	Standard
At Curb Idle Speed*	1.0 bar	14.50 psi
At 4000 RPM*	4.5 bar	65.27 psi
CAUTION: *If pressure is ZERO at curb idle, DO NOT run engine at 4000 rpm.		

TORQUE**ENGINE MOUNTS**

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Gearbox Lower Reaction Rod - Bracket Side on Gearbox - Bolt (M12)	100 + 90°	74 + 90°	-
Gearbox Lower Reaction Rod - Suspension Crossmember Side - Screw (M12)	100 + 45°	74 + 45°	-
Right Engine Mount Bolts	55	41	-
Right Engine Mount Nuts	55	41	-
Rear Engine Mount-to-Engine Mount Bracket Bolt	90	66	-
Rear Support Bracket-to-Engine Bracket Nut	102	75	-
Rear Engine Mount Bracket-to-Transaxle Bolt	40	30	-
Rear Engine Mount Bracket-to-Oil Pan Bolts	50	37	-
Rear Engine Mount Bolt	110	81	-
Left Mount Bracket-to-Transaxle	50	37	-
Left Engine Mount Bolt	55	40	-
Gearbox Side Flexible Support Mounting to Gearbox Casing - Screw (M10)	50 + 45°	37 + 45°	-
Gearbox Side Power Unit Rigid Support - Screw			

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(M12)	90	67	-
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CYLINDER HEAD

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Camshaft Housing - Plug (M12)	15	-	133
Cylinder Head - Screw (M12)	66 + 90° + 90° + 90°	49 + 90° + 90° + 90°	-
Camshaft Housing - Screw (M8)	25	18	-
Tappet Cover - Screw (M6)	9	-	80

CRANKCASE SUMP AND COVERS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Engine Oil Sump - Side Screws (M8)	25	18	-
Engine Oil Sump - Timing Side and Gearbox Side Screws (M6)	9	-	80
Crankshaft Oil Seal Front Cover - Screw (M6)	9	-	80
Crankshaft Oil Seal Front Cover - Screw (M6)	9	-	80
Engine Oil Drain Plug - Plug (M14)	25	18	-
Flywheel Side Oil Seal Cover - Screw (M6)	9	-	80

CRANKSHAFT AND FLYWHEEL

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Engine Flywheel - Screw (M12)	160	118	-
Bearing Caps - Screw (M12)	25 + 100°	18 + 100°	-

PISTONS AND CONNECTING RODS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Connecting Rod Caps - Screw (M9)	25 + 60°	18 + 60°	-

TIMING SYSTEM

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Timing Belt Tensioners Support - Screw (M10)	25	18	-
Toothed Drive Pulley - Left Hand Screw (M16)	340	251	-
Driven Timing Tooted Pulley - Screw (M12)	30 + 40°	22 + 40°	-
Timing Control Moving Tensioner - Screw (M8)	25	18	-
Timing System Fixed Tensioner - Screw (M8)	25	18	-
Camshaft Gears - Screw (M12)	30 + 40°	22 + 40°	-

FUEL TANK AND PIPES

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Fuel Pump Assembly Fastening Ring Nut	60	44	-

DIESEL FUEL INJECTION SYSTEM

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Throttle Body - Screw (M6)	9	-	80
Pressure Pump - Nut (M8)	25	18	-
Pressure Pump Drive Pulley - Nut (M14)	50	37	-
Pressure Pump Support - Engine Block Side - Upper Screw (M8 x 125 x 110)	25	18	-
Pressure Pump Support - Engine Block Side - Screw (M8)	25	18	-
Pressure Pump Support - Cylinder Head Side - Screw (M8)	25	18	-
Cam Angle Sensor - Screw (M6)	9	-	80
RPM Sensor - Screw (M6)	9	-	80
Fuel Pressure Sensor - Fuel Manifold Side	70	52	-
Water Presence - Fuel Temperature Sensor	3	-	27
Injector Brackets - Nut (M8)	25	18	-
Pipe from Pressure Pump to Fuel Manifold - Pressure Pump Side - Connector (M12)	23	17	-
Pipes from Pressure Pump to Fuel Manifold - Fuel Manifold Side - Connector (M14)	19	-	168
Pipes from Fuel Manifold to Injectors - Fuel Manifold Side - Connector (M14)	19	-	168
Pipes from Fuel Manifold to Injectors - Injectors Side - Connector (M12)	23	17	-
Single Fuel Manifold Pipe (rail) - Screw (M8)	25	18	-
Engine Water Temperature Sensor - (M12)	19	-	168

ENGINE SUPERCHARGING SYSTEM

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Turbocharger to Exhaust Manifold - Nut (M8)	25	18	-
Turbocharger and Exhaust Manifold Assembly - Cylinder Head Side - Nut (M8)	20	-	177
Engine Oil Supply Pipe to Turbocharger - Screw (M10)	50	37	-
Engine Oil Supply Pipe to Turbocharger - Turbocharger Side - Connector (M10)	15	-	133
Engine Oil Supply Pipe to Turbocharger - Cylinder Head Extension side - Connector (M12)	25	18	-

INLET AND EXHAUST MANIFOLDS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Air Chamber - Nut (M8)	25	18	-

EXHAUST PIPES AND SILENCERS

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Middle Exhaust Pipe - Nut (M8)	25	18	-
Intermediate Exhaust Pipe with Flexible Section to Catalytic Converter - Nut (M8)	25	18	-
Front/Rear Exhaust Pipe Collar - Nut (M10)	45	33	-
Flange connecting central exhaust pipe to intermediate exhaust pipe with flexible section - Nut (M8)	25	18	-
Mounting Bracket for Central Exhaust Pipe - Screw (M10)	50	37	-
Rear Exhaust Silencer Mounting Bracket - Screw (M10)	50	37	-

EMISSION CONTROL SYSTEM

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Oxygen Sensor - (M18)	45	33	-
Exhaust Pipe Side Particulate Filter (DPF) - Nut (M8)	25	18	-
Turbocharger Side Particulate Filter (DPF) - Collar Nut (M10)	25	18	-
Exhaust Gas Temperature Sensor on Particle Filter - Connector (M14)	5	33	-
Exhaust Gas/Water Heat Exchanger for EGR System - Screw	10	-	89
EGR System Solenoid Valve - Screw (M8)			
Pre-Torque	6	-	53
Final Tightening	10	-	89
EGR Valve - Heat Exchanger - Connector Pipes Assembly - Screw (M8)	25	18	-
EGR Valve - Heat Exchanger - Connector Pipes Assembly - Nut (M8)	25	18	-

ENGINE LUBRICATION

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Engine Oil Pressure Warning Light Switch - (M14)	25	18	-
Engine Oil Pressure Switch No. 2	20	-	177
Engine Oil Pressure Manifold Bolt	25	18	-
Engine Oil Filter Cover	25	18	-
Engine Oil Supply Pipe to Turbocharger - Screw (M10)	50	37	-
Engine Oil Supply Pipe to Turbocharger - Connector (M10)	18	-	159
Engine Oil Filter - Screw (M6)	9	-	80

2013 Dodge Journey SE

2013 ENGINE 2.0L Diesel - Service Information - Journey

Engine Oil Supply Pipe to High Pressure Turbocharger - Connector (M10)	18	-	159
Engine Oil Level Sensor	25	18	-

ENGINE COOLING SYSTEM


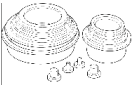





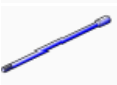
DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Water pump - Screw (M8)	25	18	-
Thermostat - Screw (M8)	25	18	-

ENGINE COMPONENT MISCELLANEOUS DRIVES

DESCRIPTION	N.m	Ft. Lbs.	In. Lbs.
Service Pulley on Crankshaft - Screw (M8)	30	22	-
Engine Component Single Belt Moving Tensioner - Screw (M10)	50	37	-
Engine Component Single Belt Fixed Tensioner - Screw (M10)	50	37	-

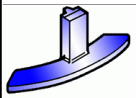
SPECIAL TOOLS

SPECIAL TOOLS

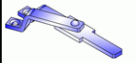
	10288 - Pliers, Hose Clamp
	10368 - Set, Universal Protective Cap
	20106 - Fixture, Cylinder Head Holding
	20107 - Compressor, Valve Spring
	20108 - Support, Cylinder Head Bench Valve
	20109 - Tool, Crankshaft Rotation
	20110 - Remover/Installer, Crankshaft Sump
	20111 - Remover/Installer, Cylinder Head Bolt

2013 Dodge Journey SE

2013 ENGINE 2.0L Diesel - Service Information - Journey



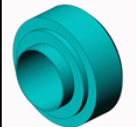
20115 - Tool, Flywheel Locking



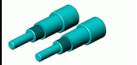
20126 - Remover/Installer, Camshaft Pulley



20127 - Pins, Camshaft Pulley Remover/Installer



20131 - Installer, Camshaft Oil Seal



20132 - Tool, Timing Belt Locking



20133 - Remover/Installer, Valve Guide Oil Seal



20145 - Installer, Crankshaft Front Oil Seal



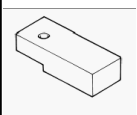
20149 - Adapter, Valve Spring Compressor



20150 - Remover/Installer, High Pressure Fuel Pump



20164 - Tool, Crankshaft Timing Locking

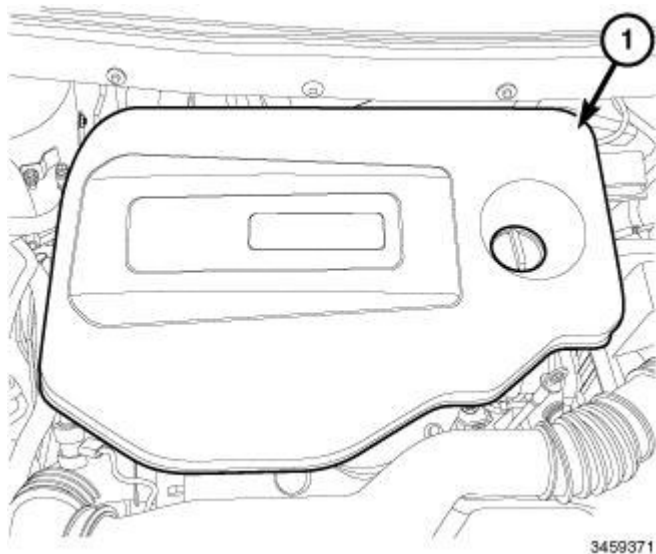


D-115-2A - Block, Scooter
(Originally Shipped In Kit Number(s) 9329-SUP, 9515-SUP,
9516-SUP, 9517-SUP, 9518, 9519, 9540-SUP, 9541-SUP, 9694,
9926.)

COVER, ENGINE

REMOVAL

ENGINE COVER

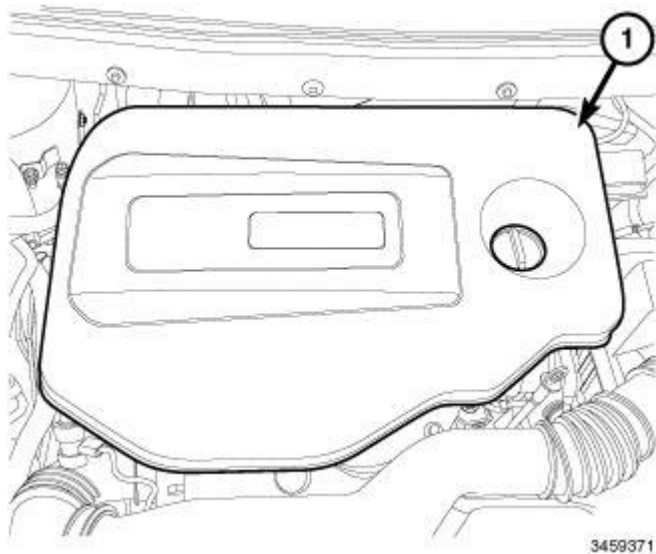
**Fig. 65: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

ENGINE COVER

**Fig. 66: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

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

CYLINDER HEAD

DESCRIPTION

DESCRIPTION

The cylinder head is a one-piece design and is made from aluminum alloy and silicon.

Two, ductile cast iron, overhead camshafts in a camshaft housing; they are operated by a belt and gears.

The four valves per cylinder, parallel and vertical, are positioned in the valve guides and are controlled by rocker arms operated by camshaft cams and kept in contact with the valves through hydraulic tappets.

Valve guides are press-fitted in the cylinder head seats. A special reamer is used to produce the inner diameter after fitting.

Unlike cylinder heads with ante-chambers, the entire combustion process takes place in the combustion chamber on the piston.

The gasket between the cylinder head and crankcase is made of metal. No cylinder head tightening is required throughout the life of the engine.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL**.

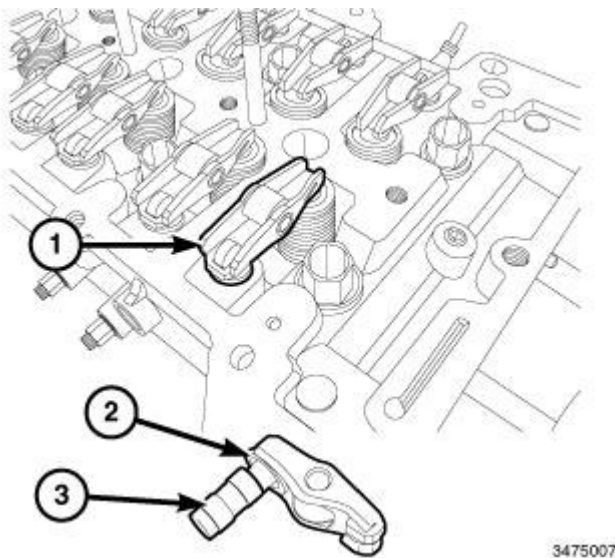


Fig. 67: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

3. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

NOTE: Number the position of each rocker arm and lifter as it is removed.

4. Remove all the rocker arm (1) and lifters (3).
5. Remove the intake manifold. Refer to **MANIFOLD, INTAKE, REMOVAL** .
6. Remove the exhaust manifold. Refer to **MANIFOLD, EXHAUST, REMOVAL** .
7. Remove the EGR cooler manifold assembly. Refer to **COOLER, EGR, REMOVAL** .

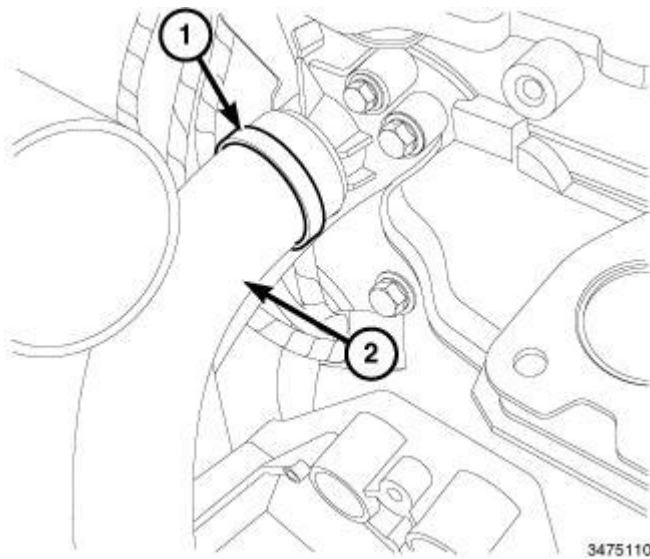


Fig. 68: Upper Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

8. Using the (special tool #10288, Pliers, Hose Clamp) to release clamp (1) and remove the upper radiator hose (2) at engine.

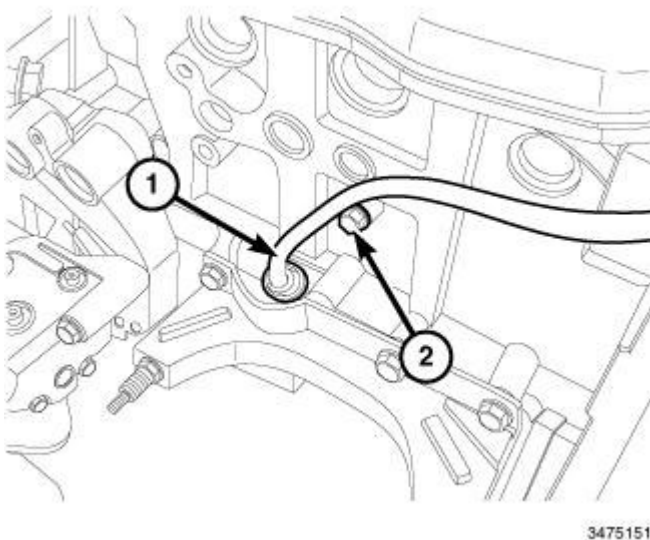


Fig. 69: Engine Oil Dipstick Tube & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove bolt (2) and the engine oil dipstick tube (1).

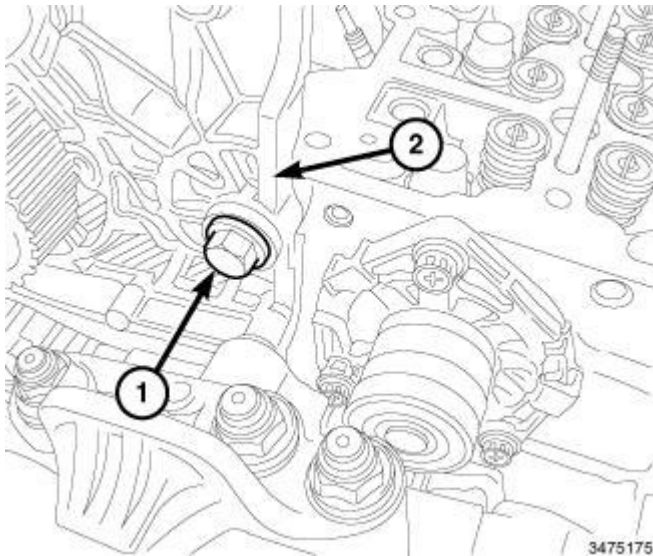


Fig. 70: Fuel Injection Pump Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove bolt (1) and the fuel injection pump mounting bracket (2) from the cylinder head.
11. Remove power steering pump and support bracket.

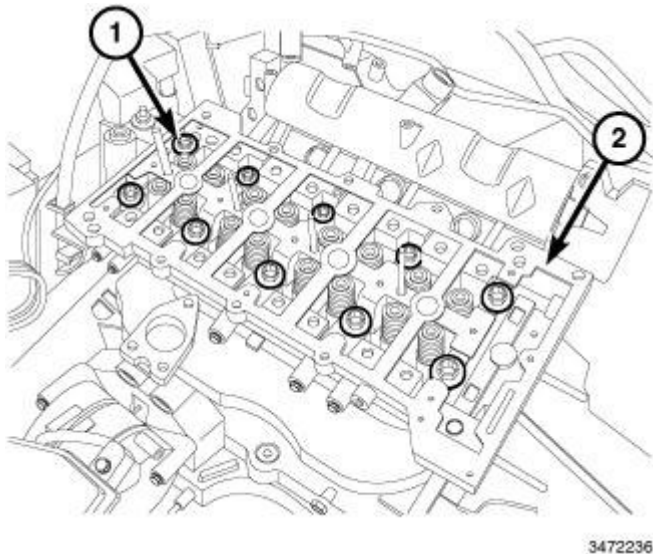


Fig. 71: Cylinder Head Assembly & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove bolts (1) and the cylinder head assembly (2).

CLEANING

CLEANING

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.

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

Remove all gasket material from cylinder head and block. Refer to **ENGINE GASKET SURFACE PREPARATION** . Be careful not to gouge or scratch the aluminum head sealing surface.

Clean all engine oil passages.

INSPECTION

INSPECTION

NOTE: Cylinder head cannot be resurfaced.

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

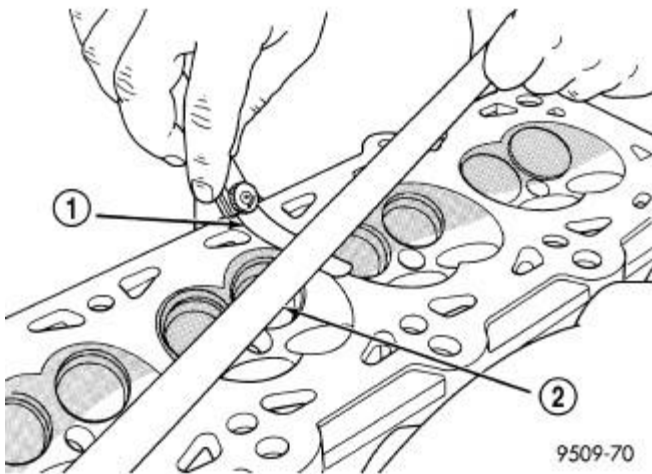
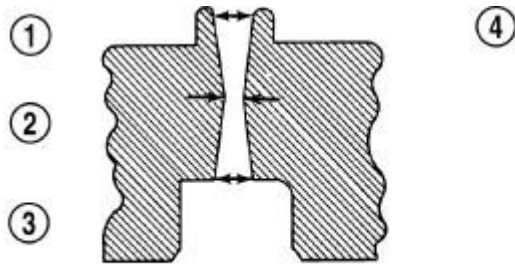


Fig. 72: Checking Cylinder Head Flatness

Courtesy of CHRYSLER GROUP, LLC

- | |
|---------------------------------------|
| 1 - FEELER GAUGE
2 - STRAIGHT EDGE |
|---------------------------------------|

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



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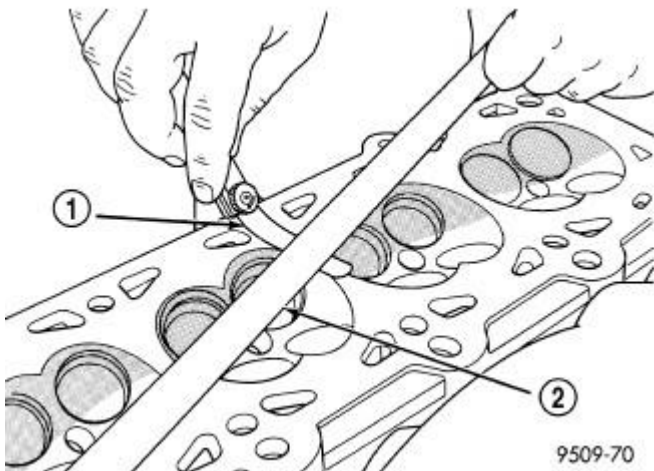
Fig. 73: Checking Wear On Valve Guide
 Courtesy of CHRYSLER GROUP, LLC

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

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

INSTALLATION

INSTALLATION



9509-70

Fig. 74: Checking Cylinder Head Flatness

Courtesy of CHRYSLER GROUP, LLC

NOTE: If piston or connecting rods have been replaced, measure piston projection to ensure proper head gasket selection. Refer to STANDARD PROCEDURE .

1. Clean the old gasket from the cylinder head and engine block. Refer to ENGINE GASKET SURFACE PREPARATION .
2. Check that the flatness of the cylinder head lower surface corresponds to the recommended values.

Cylinder Head	Value
Engine cylinder head lower surface flatness	0.1 mm (0.004 in.)
Cylinder head nominal height	107 +/- 0.05

NOTE: The locating dowel pins between the engine block and cylinder head are shorter (12.5 mm) than the dowel pins between the cylinder head and the camshaft housing. Take great care not to reverse them as this could impair engine operation.

3. If removed, install the engine block dowel pins.
4. Use a new gasket that is the same thickness as the one removed. If this is not the case, the thickness of the new cylinder head gasket must be determined by checking piston protrusion. Refer to STANDARD PROCEDURE .
5. Position the first cylinder at TDC; rotate the crankshaft a further two teeth of the toothed drive pulley to lower the pistons, thereby preventing any resistance of the valves whilst fitting the cylinder head.

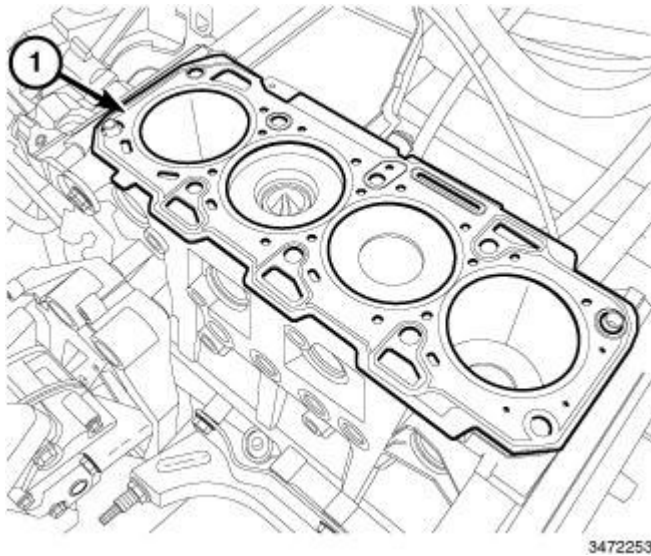


Fig. 75: Cylinder Head Gasket
 Courtesy of CHRYSLER GROUP, LLC

6. Install the cylinder head gasket (1).

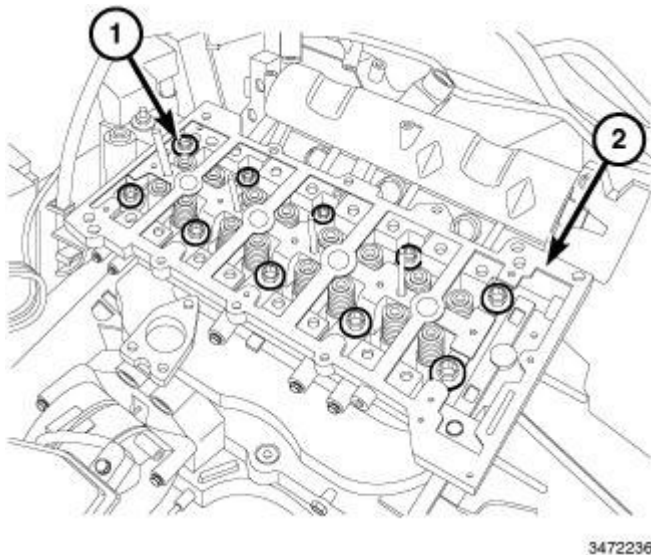


Fig. 76: Cylinder Head Assembly & Bolts
 Courtesy of CHRYSLER GROUP, LLC

NOTE: Do not reuse the cylinder head bolts more than four times because they undergo permanent lengthening whenever they are tightened. If the previous tightening torque is unknown, a replacement is necessary.

7. Install the cylinder head (2) onto the engine block and tighten the bolts (1) finger tight.

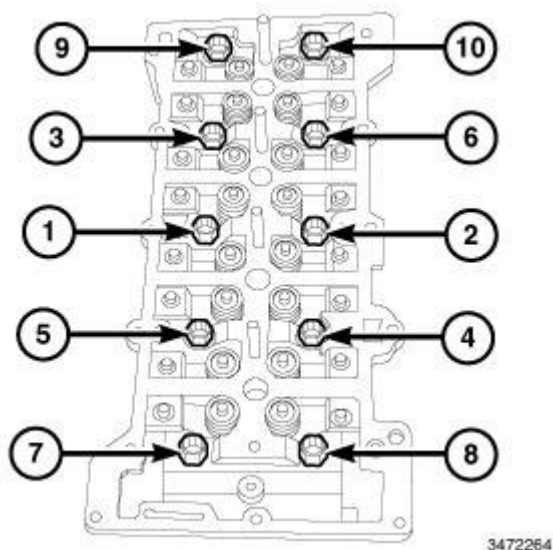


Fig. 77: Cylinder Head Bolt Tightening Sequence
Courtesy of CHRYSLER GROUP, LLC

8. Tighten the cylinder head bolts in the following order shown to:
 - a. Tighten bolts to 62 N.m (46 ft. lbs.).
 - b. Tighten bolts to 69 N.m (51 ft. lbs.).
 - c. Tighten bolts an additional 90° turn.
 - d. Tighten bolts an additional 90° turn.
 - e. Tighten bolts an additional 90° turn.

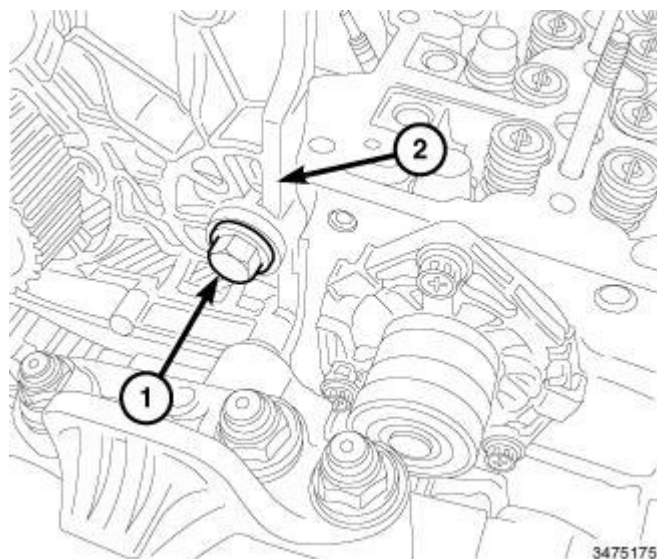


Fig. 78: Fuel Injection Pump Mounting Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Install the power steering pump support bracket. Tighten bolts to 30 N.m (22 ft. lbs.).
10. Install the fuel injection pump and mounting bracket (2) to the cylinder head. Tighten bolt (1) to 25 N.m

(18 ft. lbs.).

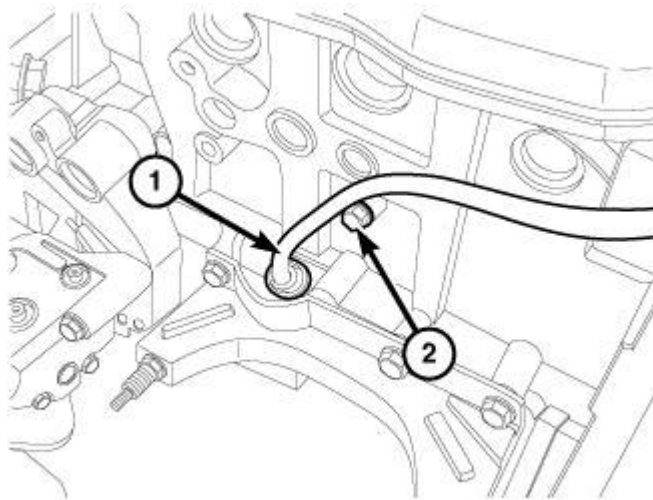


Fig. 79: Engine Oil Dipstick Tube & Bolt
Courtesy of CHRYSLER GROUP, LLC

11. Install the oil dipstick tube (1). Tighten bolt (2) to 9 N.m (80 in. lbs.).

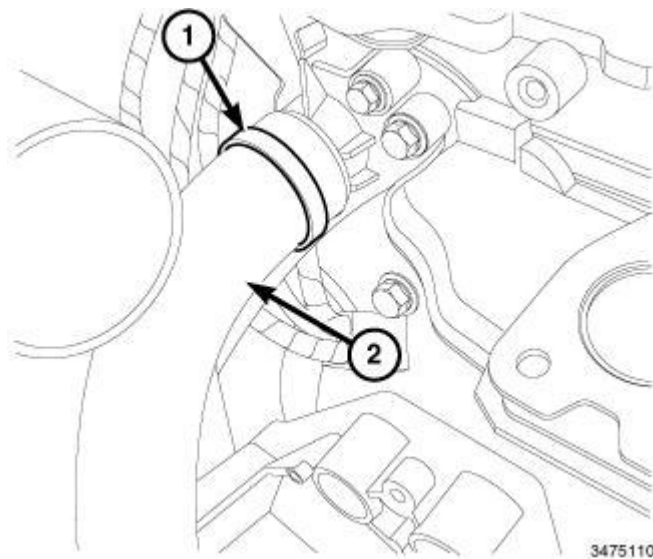


Fig. 80: Upper Radiator Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

12. Install the upper radiator (2) hose at engine. Using the (special tool #10288, Pliers, Hose Clamp) lock the clamp (1).
13. Install the EGR cooler manifold. Refer to **COOLER, EGR, INSTALLATION** .
14. Install exhaust manifold. Refer to **MANIFOLD, EXHAUST, INSTALLATION** .
15. Install intake manifold. Refer to **MANIFOLD, INTAKE, INSTALLATION** .

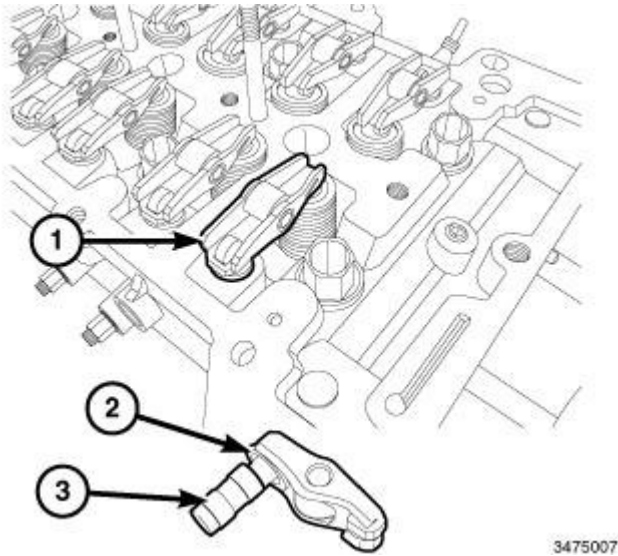


Fig. 81: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Install the lifters and rocker arm into the original location as noted from removal.

16. Install all the lifters (3) and rocker arms (1) back into their original location.
17. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION** .
18. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
19. Install new oil filter and fill with oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
20. Install air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .
21. Connect the negative battery cable.
22. Start engine and check for leaks.

CAMSHAFT, ENGINE

DESCRIPTION

DESCRIPTION

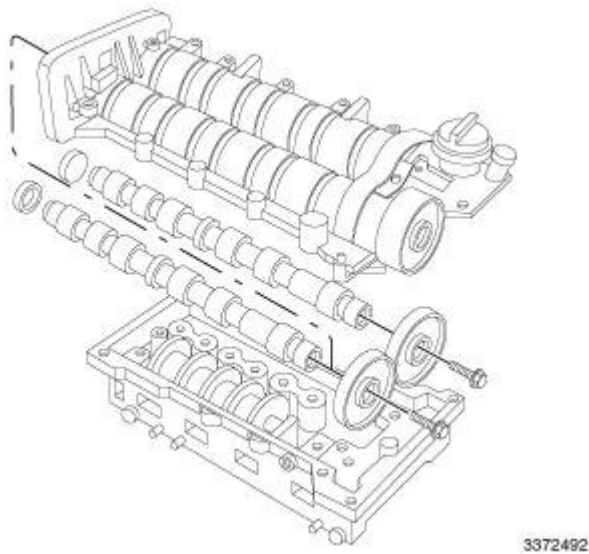


Fig. 82: Camshaft Assembly

Courtesy of CHRYSLER GROUP, LLC

The exhaust camshaft is controlled directly by the timing belt and transmits power to the inlet camshaft by means of a pair of straight toothed gears.

The exhaust camshaft also controls the vacuum unit fitted on the gears side.

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

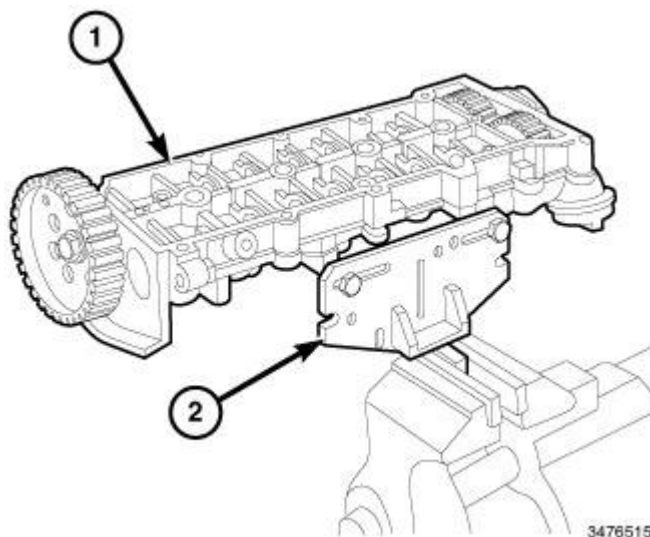


Fig. 83: Cylinder Head Cover & Cylinder Head Holding Fixture

Courtesy of CHRYSLER GROUP, LLC

3. Using the Mount Tool (2) (special tool #20106, Fixture, Cylinder Head Holding), position the cylinder head cover (1) in a vice.

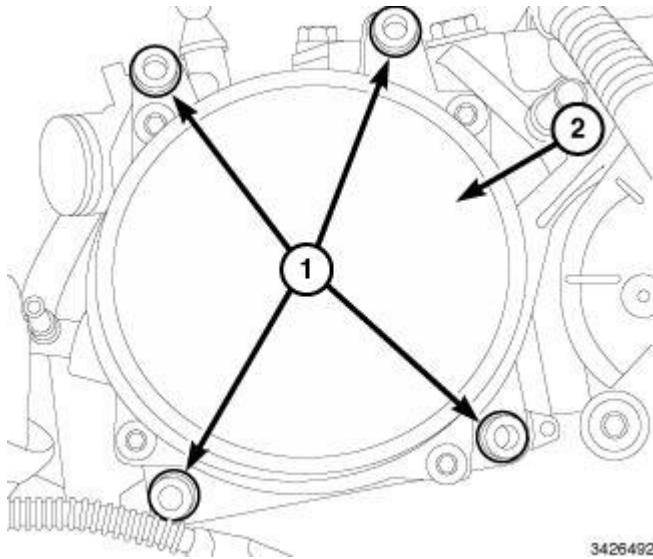


Fig. 84: Vacuum Pump & Bolts

Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and the vacuum pump (2).

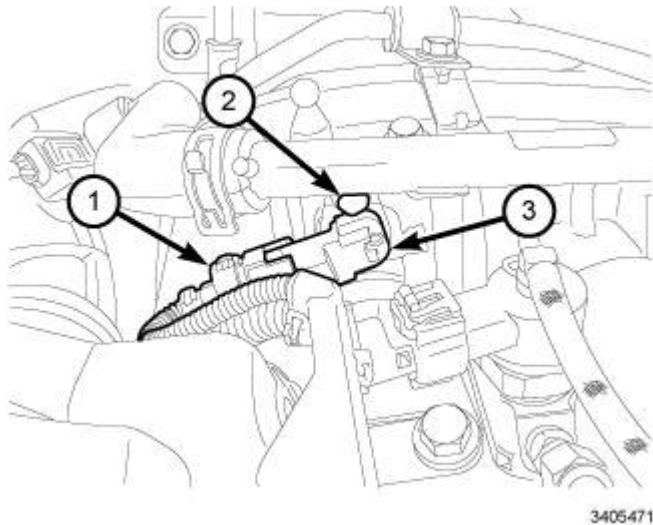
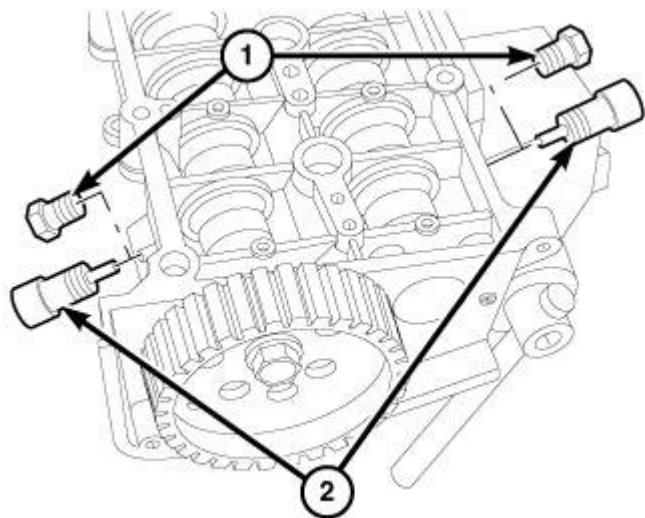


Fig. 85: Camshaft Position Sensor, Connector & Bolt

Courtesy of CHRYSLER GROUP, LLC

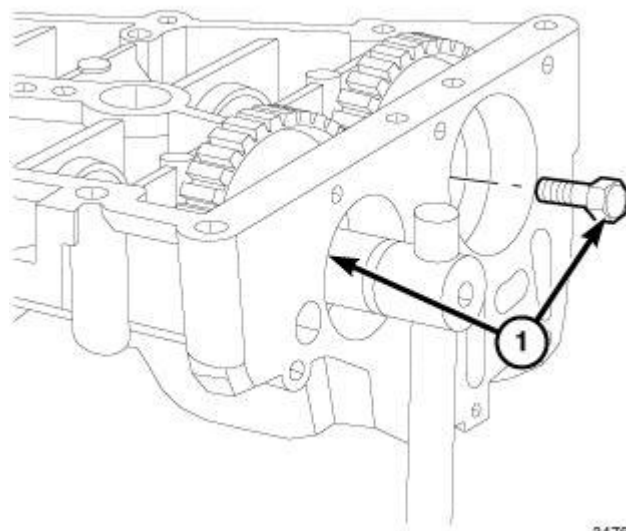
5. Remove bolt (2) and the camshaft position sensor (3).



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Fig. 86: Plugs & Camshaft Timing Tools
Courtesy of CHRYSLER GROUP, LLC

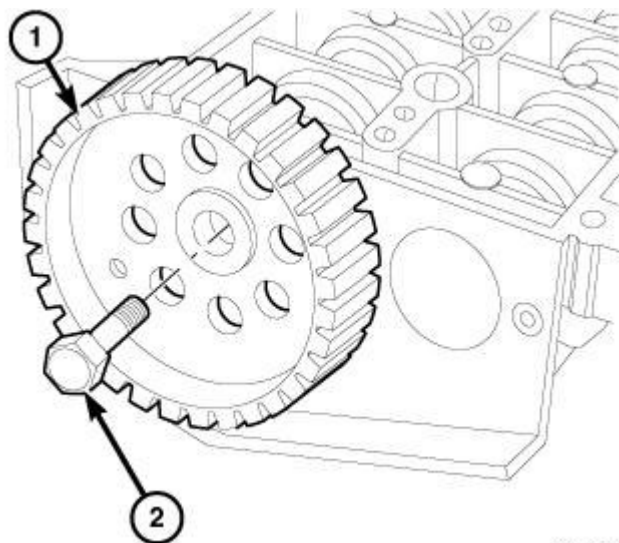
6. Remove plugs (1) and install the Camshaft Timing Tools (2) (special tool #20132, Tool, Timing Belt Locking) into the camshaft housing.



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Fig. 87: Camshaft Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

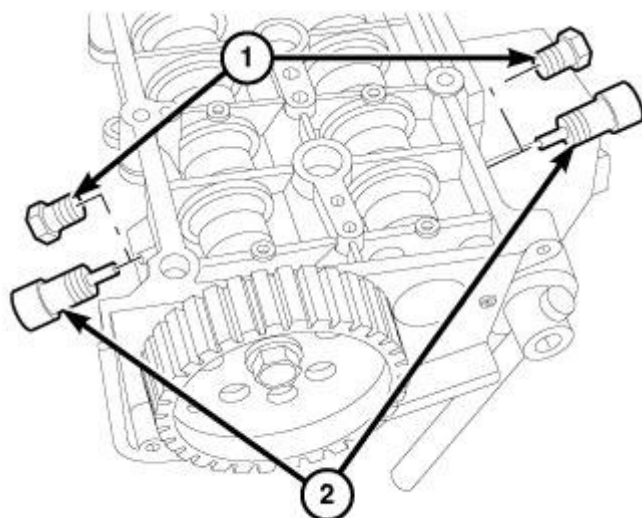
7. Remove the bolts (1) securing the camshaft gears.



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Fig. 88: Camshaft Timing Belt Sprocket & Bolt
 Courtesy of CHRYSLER GROUP, LLC

8. Remove bolt (2) and the camshaft timing belt sprocket (1).



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Fig. 89: Plugs & Camshaft Timing Tools
 Courtesy of CHRYSLER GROUP, LLC

9. Remove the Camshaft Timing Tools (2) (special tool #20132, Tool, Timing Belt Locking).

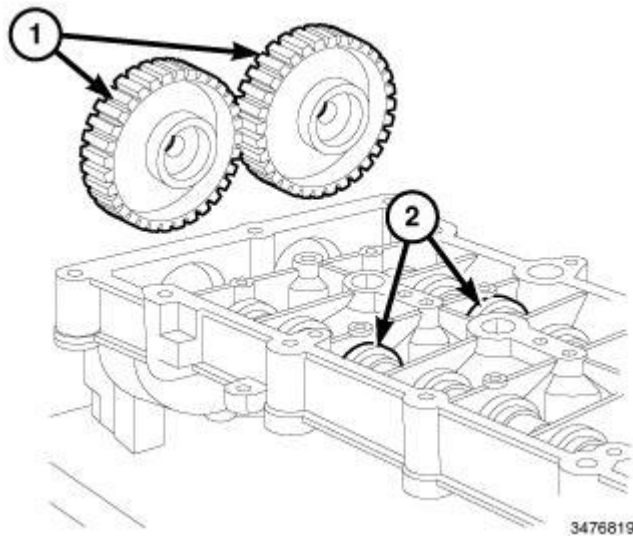


Fig. 90: Camshaft Gears & Camshafts
 Courtesy of CHRYSLER GROUP, LLC

10. Withdraw the camshafts (2) as far as necessary and remove the camshaft gears (1).

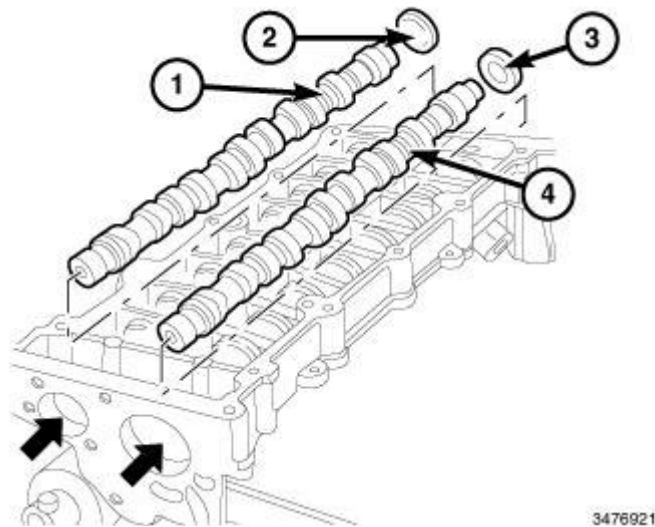


Fig. 91: Intake Camshaft, Plug, Exhaust Camshaft & Oil Seal
 Courtesy of CHRYSLER GROUP, LLC

11. Using a suitable drift, extract the intake camshaft (1) and plug (2).
12. Using a suitable drift, extract the exhaust camshaft (4) and the oil seal (3).

INSTALLATION

INSTALLATION

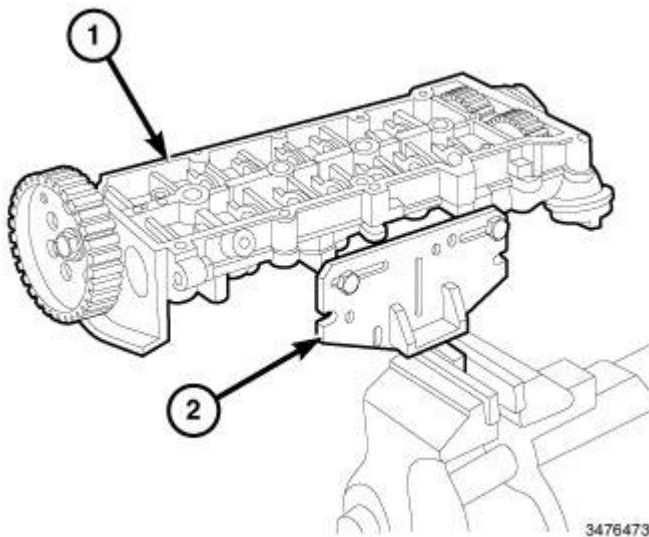


Fig. 92: Cylinder Head Cover & Cylinder Head Holding Fixture
Courtesy of CHRYSLER GROUP, LLC

1. Using the Mount Tool (2) (special tool #20106, Fixture, Cylinder Head Holding), and position the cylinder head cover (1) in a vice.

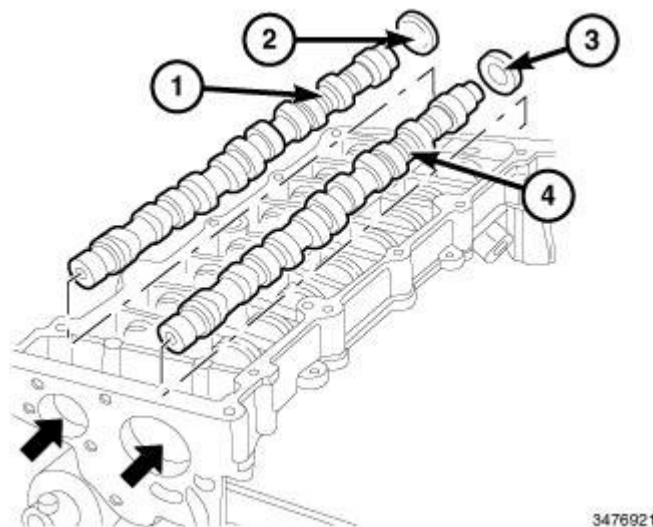


Fig. 93: Intake Camshaft, Plug, Exhaust Camshaft & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

2. Lubricate the camshaft bearings with clean engine oil.
3. Install the camshafts (1 and 4) in their housings.

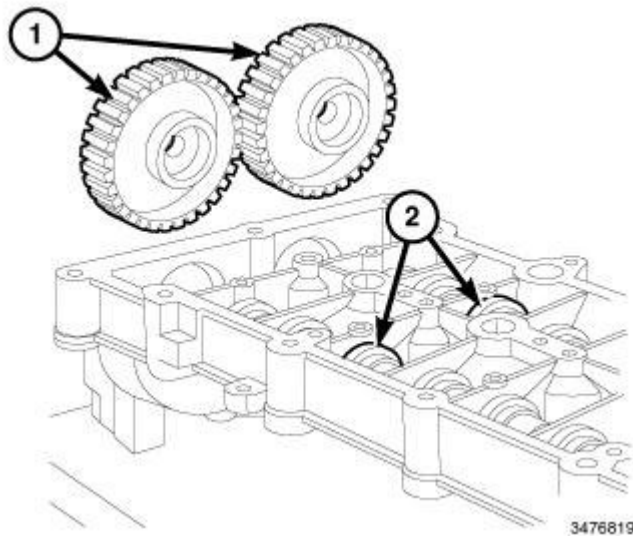


Fig. 94: Camshaft Gears & Camshafts
 Courtesy of CHRYSLER GROUP, LLC

4. Install the camshaft gears (1) in their housings and secure them without tightening the bolts.

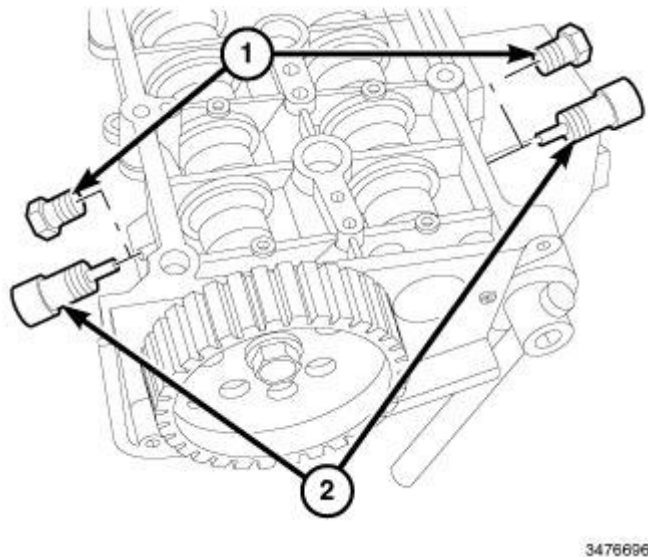


Fig. 95: Plugs & Camshaft Timing Tools
 Courtesy of CHRYSLER GROUP, LLC

NOTE: Check that the tools are correctly fitted in the housings in the camshafts.

5. Install the Camshaft Timing Shaft Tools (2) (special tool #20132, Tool, Timing Belt Locking) into the camshaft housing.

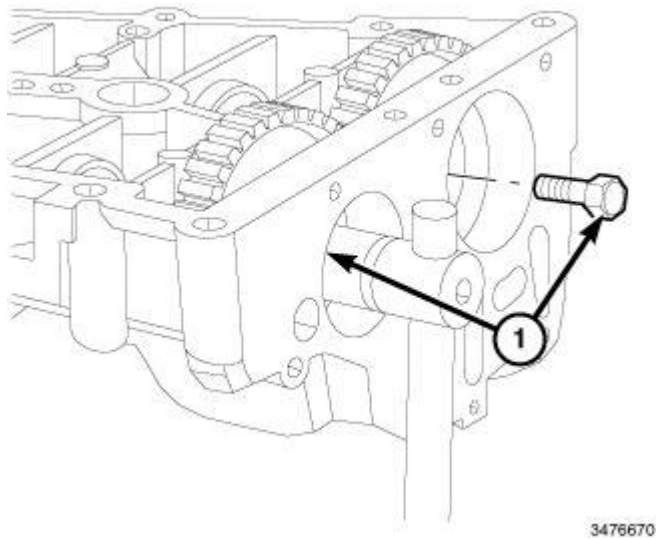


Fig. 96: Camshaft Gear Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Tighten the camshaft gear bolts to 30 N.m (22 ft. lbs.) plus an additional 40° turn.

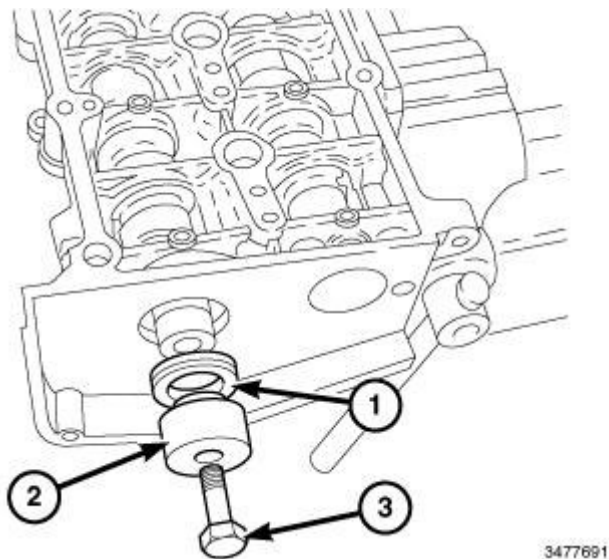
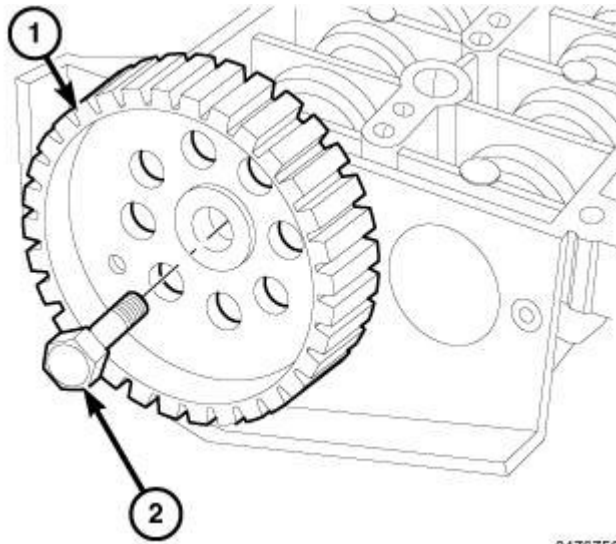


Fig. 97: Camshaft Oil Seal, Fitting Tool & Bolt
Courtesy of CHRYSLER GROUP, LLC

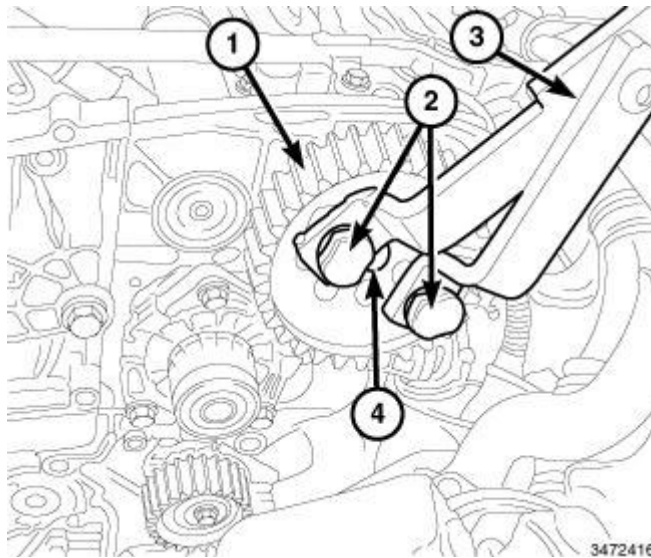
7. Using the Fitting Tool (2) (special tool #20131, Installer, Camshaft Oil Seal) position new camshaft seal (1) onto Fitting Tool (2) and install the camshaft oil seal (1) by drawing in the seal using the bolt (3).
8. Remove the Fitting Tool (2).



3476756

Fig. 98: Camshaft Timing Belt Sprocket & Bolt
Courtesy of CHRYSLER GROUP, LLC

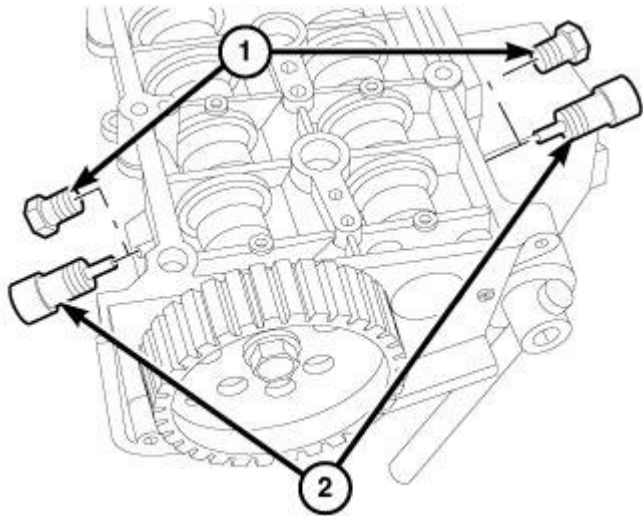
9. Install the camshaft sprocket (1) and tighten bolt finger tight (2).



3472416

Fig. 99: Camshaft Sprocket, Pins, Counter Torque Tool & Bolt
Courtesy of CHRYSLER GROUP, LLC

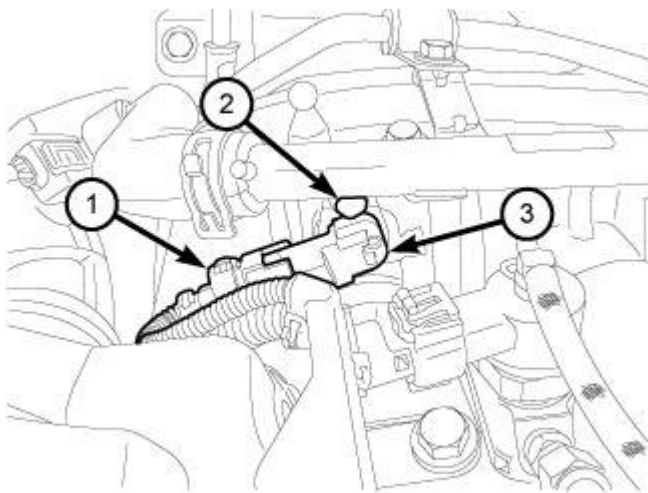
10. Using the Counter Torque Tool (3) (special tool #20126, Remover/Installer, Camshaft Pulley) and Pins (2) (special tool #20127, Pins, Camshaft Pulley Remover/Installer) to hold camshaft sprocket (1) and tighten the bolt (4) to 30 N.m (22 ft. lbs.) plus an additional 40° turn.



3476696

Fig. 100: Plugs & Camshaft Timing Tools
Courtesy of CHRYSLER GROUP, LLC

11. Install the inlet side camshaft plug (1).
12. Place the exhaust side camshaft timing belt sprocket in its housing and secure it without tightening the bolt.
13. Remove the Camshaft Timing Shaft Tools (2) (special tool #20132, Tool, Timing Belt Locking).



3405471

Fig. 101: Camshaft Position Sensor, Connector & Bolt
Courtesy of CHRYSLER GROUP, LLC

14. Install the camshaft position sensor (3). Tightening bolt (2) to 9 N.m (80 in. lbs.).

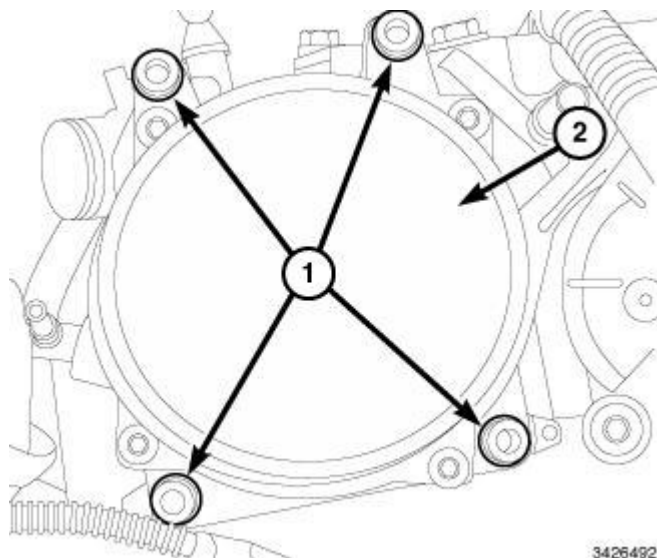


Fig. 102: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Using a new gasket, position driver gear on rear of pump and install vacuum pump (2). Tighten bolts (1) to 18 N.m (159 in. lbs.).
16. Using a new gasket, install the engine oil filler. Tighten the bolts to 8 N.m 71 in. lbs).

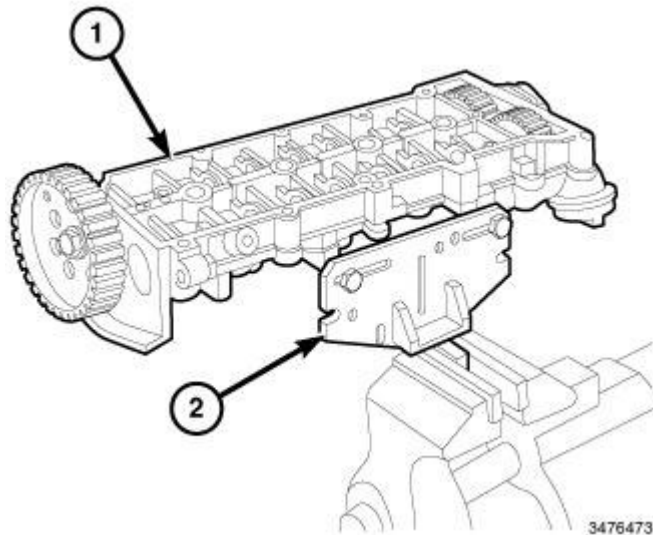
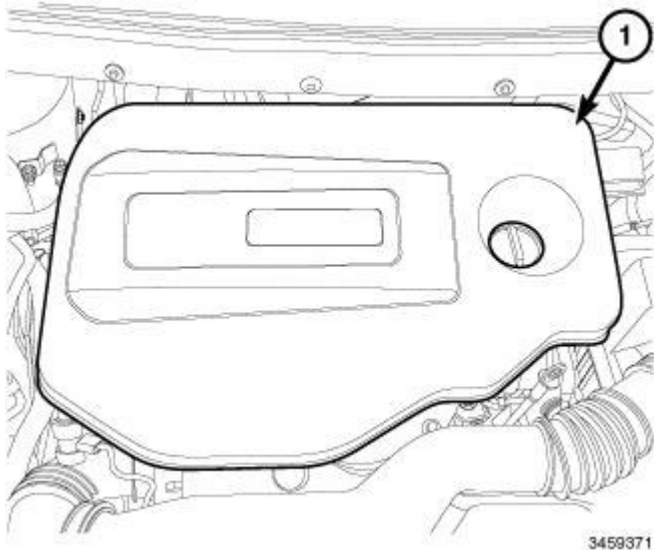


Fig. 103: Cylinder Head Cover & Cylinder Head Holding Fixture
Courtesy of CHRYSLER GROUP, LLC

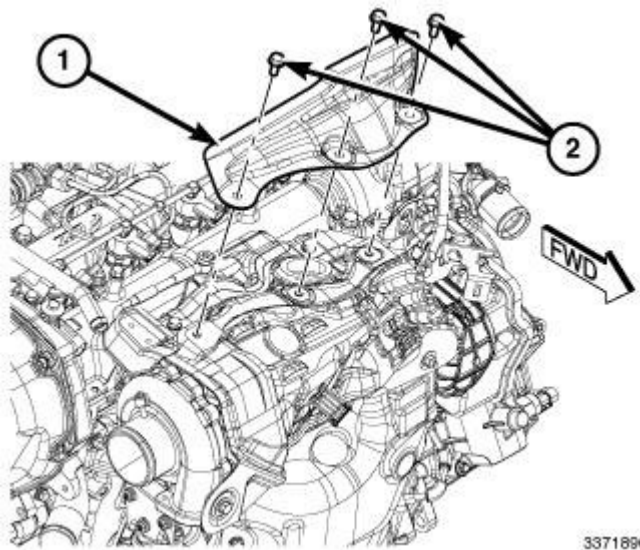
17. Remove the cylinder head cover from the Mount Tool (2) (special tool #20106, Fixture, Cylinder Head Holding) tool.
18. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION** .
19. Connect negative battery cable.

COVER(S), CYLINDER HEAD

REMOVAL**REMOVAL****Fig. 104: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

**Fig. 105: Upper Turbocharger Heat Shield & Mid Upper Turbocharger Heat Shield**

Courtesy of CHRYSLER GROUP, LLC

3. Remove the upper turbocharger heat shield (1).

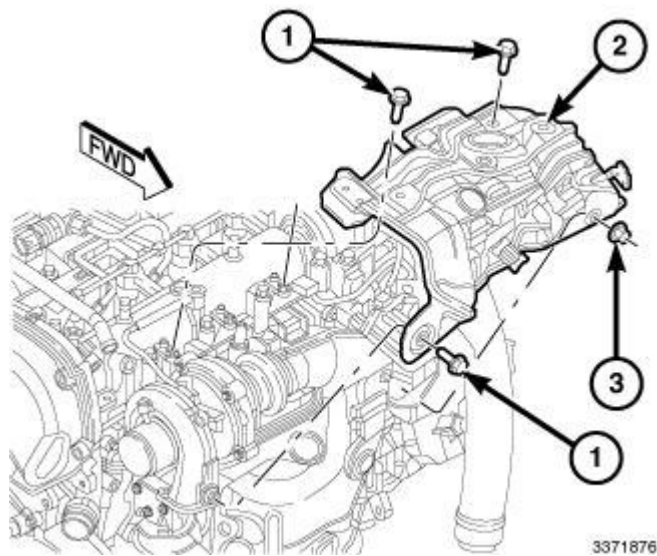


Fig. 106: Turbocharger Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the bolts (1), the nut (3), and the turbocharger heat shield (2).

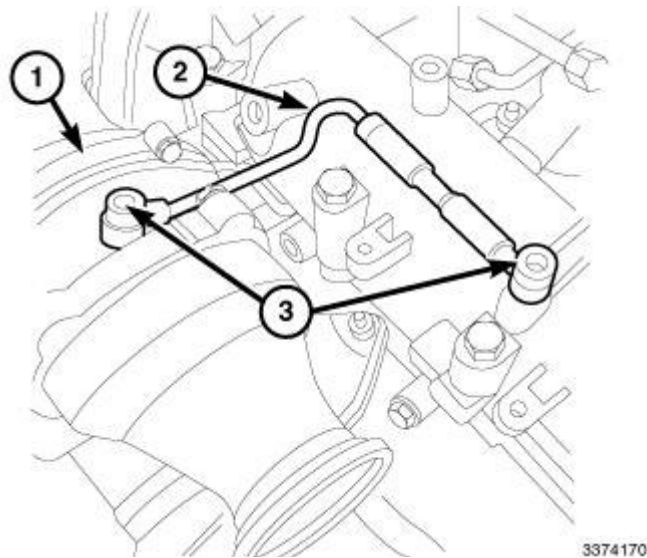
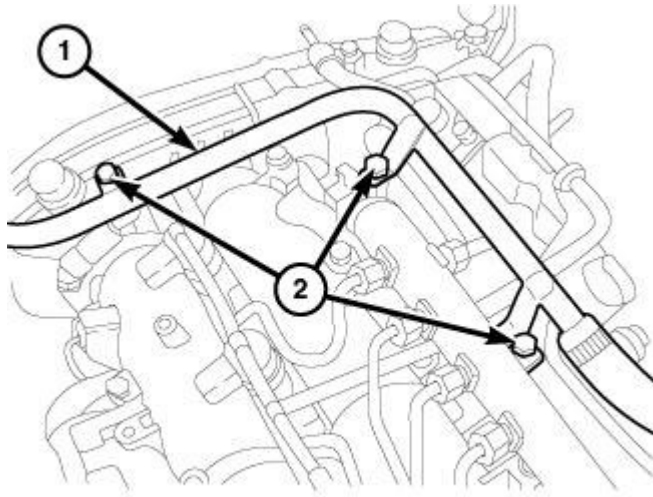


Fig. 107: Turbocharger, Oil Feed Line & Banjo Bolts
Courtesy of CHRYSLER GROUP, LLC

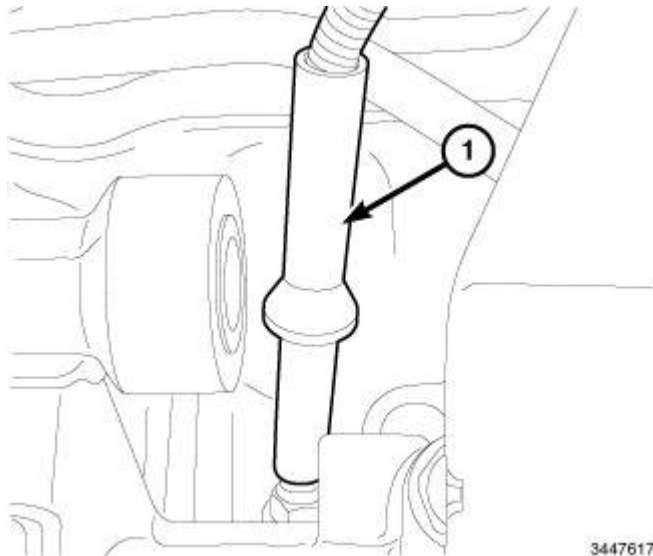
5. Remove Banjo bolts (3) and the engine oil feed line (2) to the turbocharger (3).
6. Remove the timing belt. Refer to **BELT, TIMING, REMOVAL**.



3374607

Fig. 108: Oil Vapor Recovery Pipe & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Using the (special tool #10288, Pliers, Hose Clamp) loosen band clamp and disconnect hose from vapor recovery pipe.
8. Remove bolts (2) securing the engine oil vapor recovery pipe (1) to the camshaft housing.
9. Remove the screws securing the engine oil recovery pipe to the air chamber.



3447617

Fig. 109: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect the glow plug wire harness connector (1) from each glow plug.
11. Remove the bolts, and release the degassing pipe retaining clip and remove the intake chamber reinforcement bracket.

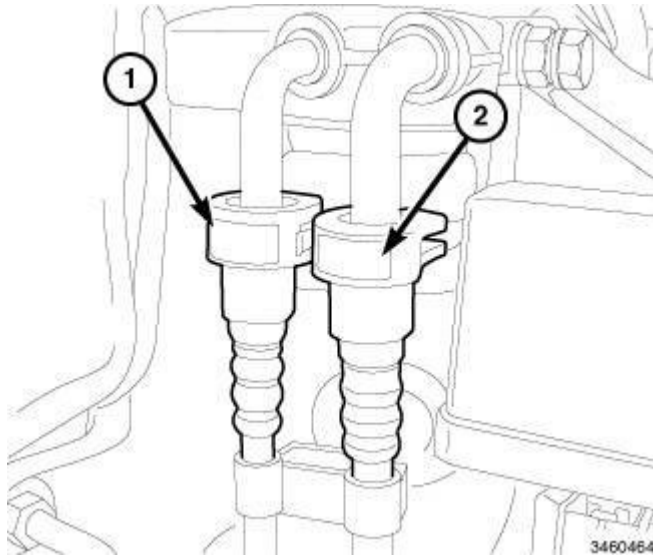


Fig. 110: Quick Connect Fittings
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect the fuel supply (2) line quick-connect fittings at fuel filter housing. Refer to **STANDARD PROCEDURE** .
13. Disconnect the fuel return line near the high pressure injection pump.
14. Detach the fuel line routing clips.
15. Remove the fuel injectors. Refer to **INJECTOR(S), FUEL, REMOVAL** .

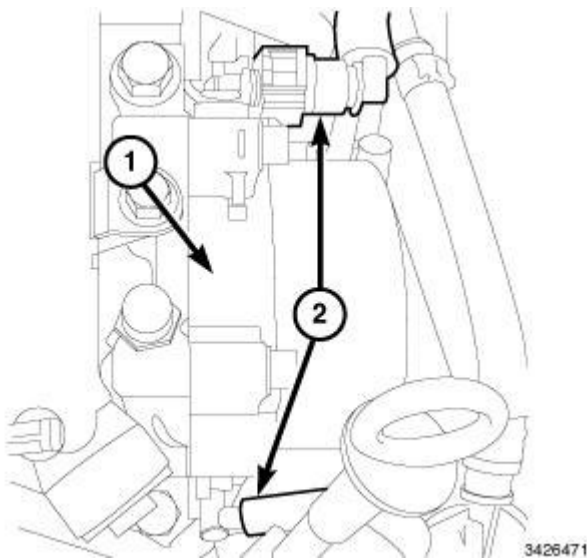


Fig. 111: Vacuum Pump & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

16. Remove the vacuum lines (2) at vacuum pump (1).

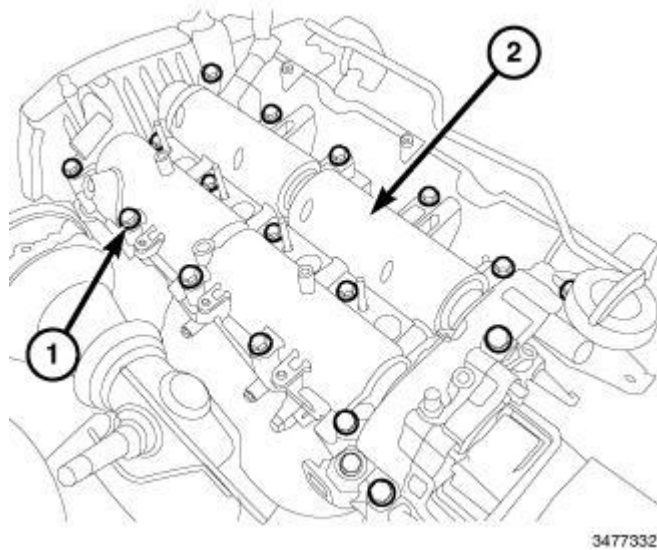


Fig. 112: Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the bolts (1) and the cylinder head cover (2).
18. Remove and discard the gasket.

INSTALLATION

INSTALLATION

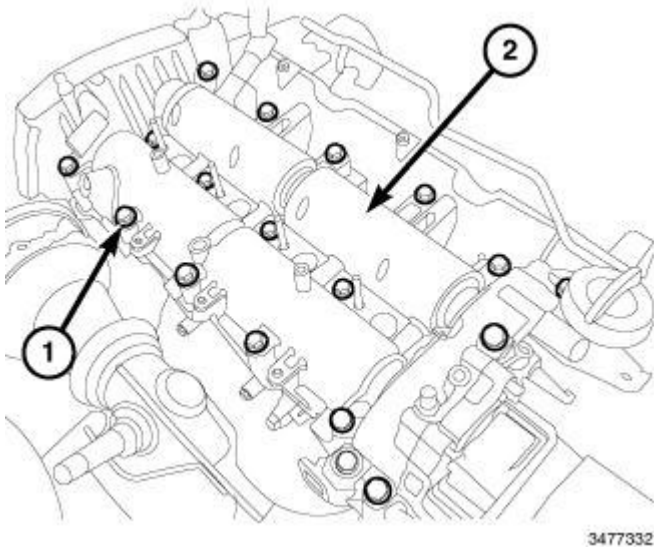


Fig. 113: Cylinder Head Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Clean sealing surfaces. Refer to **ENGINE GASKET SURFACE PREPARATION**.
2. Install new cylinder head cover gasket.
3. Install cylinder head cover (2). Tighten bolts (1) to 25 N.m (18 ft. lbs.).

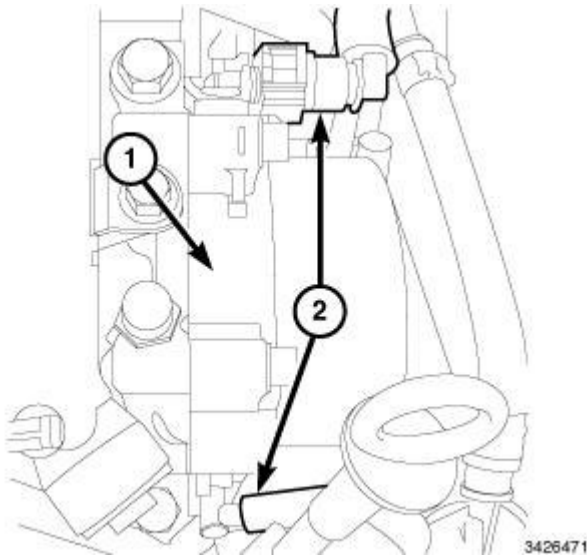


Fig. 114: Vacuum Pump & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

4. Install the vacuum lines (2) to the vacuum pump (1).

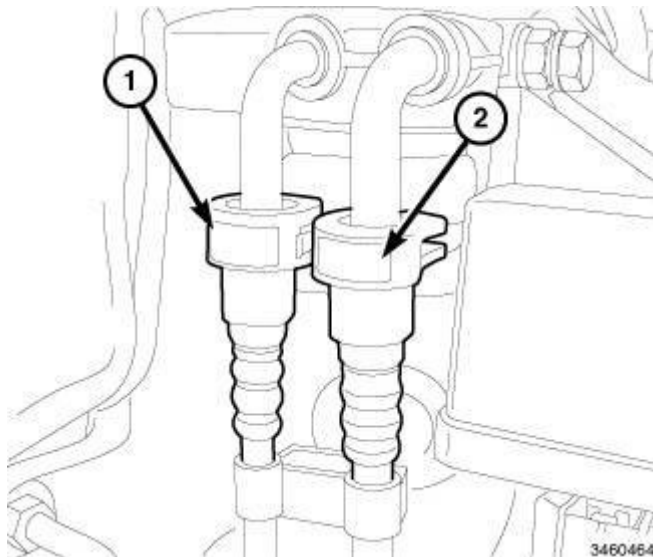
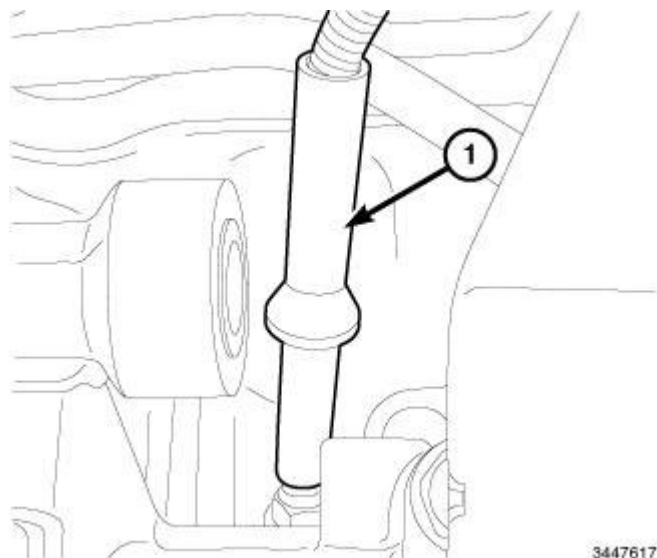


Fig. 115: Quick Connect Fittings
Courtesy of CHRYSLER GROUP, LLC

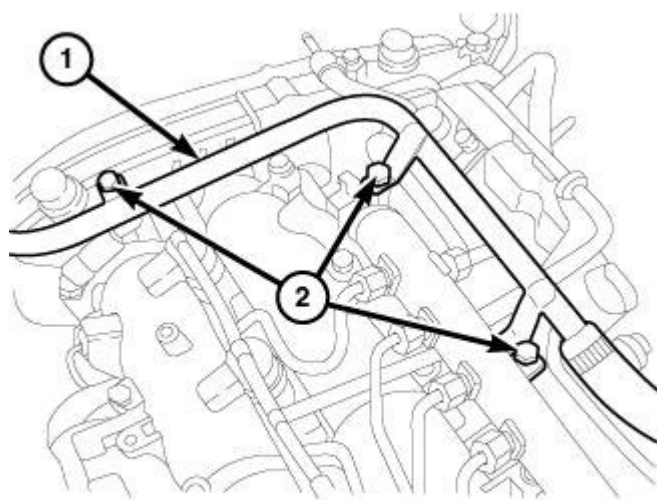
5. Install the fuel injectors. Refer to **INJECTOR(S), FUEL, INSTALLATION** .
6. Attach the fuel line routing clips.
7. Connect the fuel return line near the fuel injection pump.
8. Connect the fuel supply (2) line quick-connect fittings at fuel filter housing.



3447617

Fig. 116: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

9. Install the intake chamber reinforcement bracket and the degassing pipe retaining clip and securely tighten bolt.
10. Disconnect the glow plug wire harness connector (1) from each glow plug.



3374607

Fig. 117: Oil Vapor Recovery Pipe & Bolts
Courtesy of CHRYSLER GROUP, LLC

11. Install the screws securing the engine oil recovery pipe to the air chamber and securely tighten.
12. Install the bolts (2) securing the engine oil vapor recovery pipe (1) to the camshaft housing.
13. Connect the hose to the vapor recovery pipe
14. Using the (special tool #10288, Pliers, Hose Clamp) to crimp band clamp.

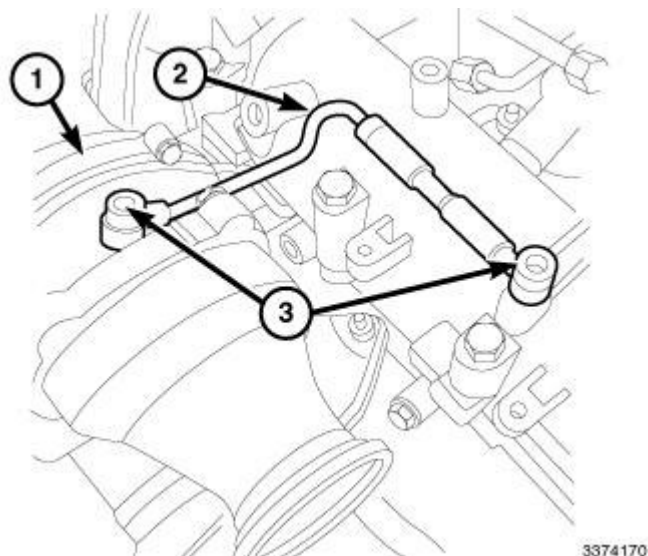


Fig. 118: Turbocharger, Oil Feed Line & Banjo Bolts
 Courtesy of CHRYSLER GROUP, LLC

15. Install the timing belt. Refer to **BELT, TIMING, INSTALLATION**.
16. Install the engine oil feed line (2) to the turbocharger (3). Tighten the Banjo bolts (3) to 18 N.m (159 in. lbs.).

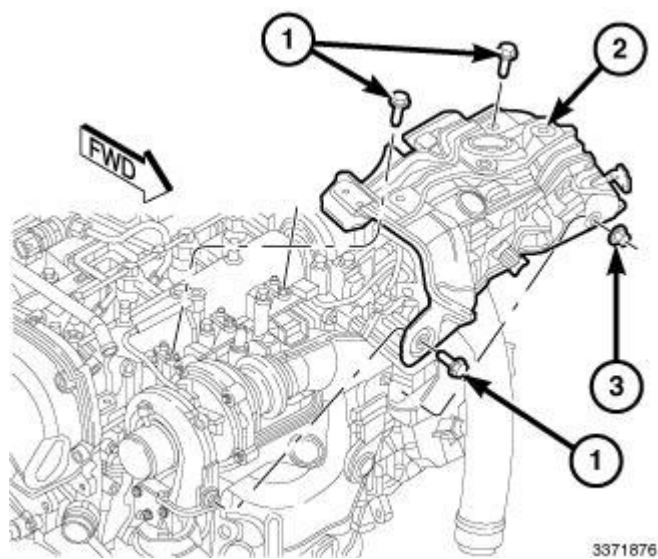


Fig. 119: Turbocharger Heat Shield & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

17. Install the turbo heat shield. Tighten the bolts (1) to 12 N.m (106 in. lbs.) and the nut (3) to 8 N.m (71 in. lbs.).

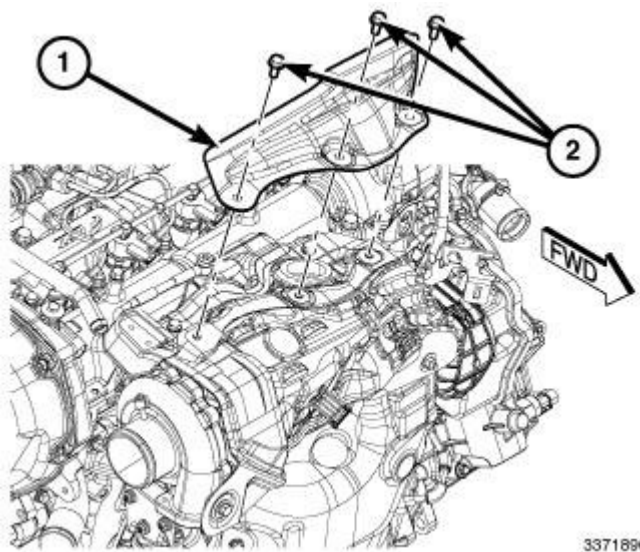


Fig. 120: Upper Turbocharger Heat Shield & Mid Upper Turbocharger Heat Shield
Courtesy of CHRYSLER GROUP, LLC

18. Install the upper turbo heat shield (2) Tighten the bolts (1) to 12 N.m (106 in. lbs.).

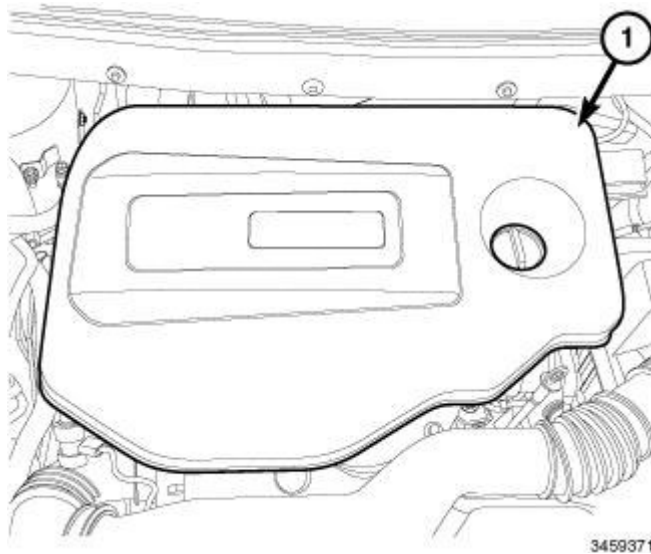


Fig. 121: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

19. Install engine cover (1).
20. Connect the negative battery cable.

LIFTER(S), HYDRAULIC

REMOVAL

REMOVAL

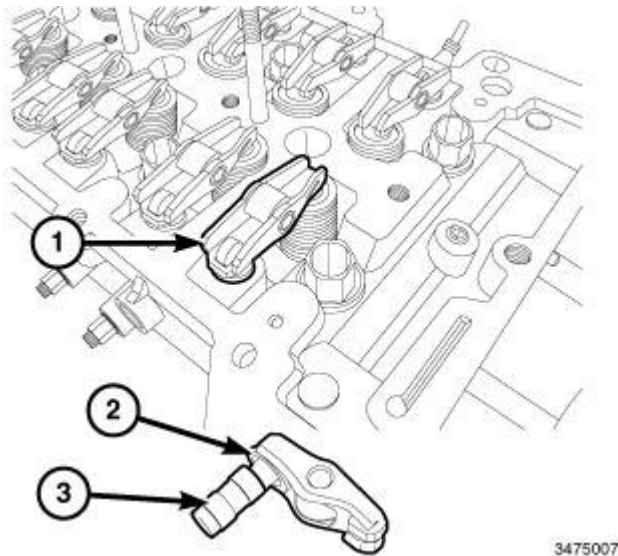


Fig. 122: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the rocker arm and lifter. Refer to **ROCKER ARM, VALVE, REMOVAL** .
3. Remove retaining clip (2) and separate the rocker arm (1) from lifter (3).

INSTALLATION

INSTALLATION

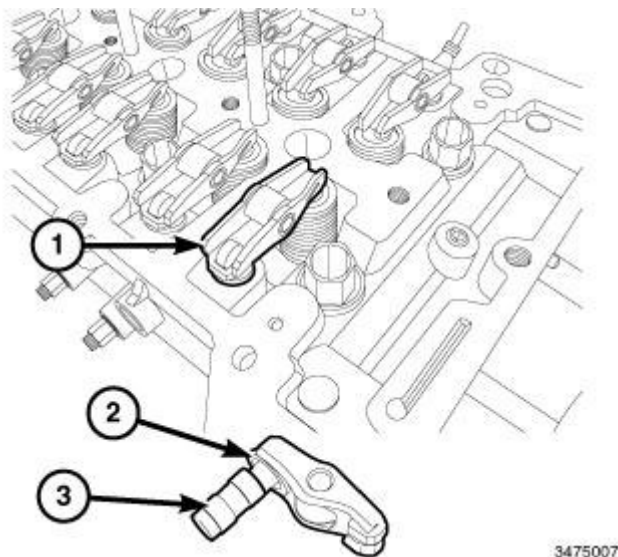


Fig. 123: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

1. Assemble the rocker arm (1) to the lifter (3) and install the retaining clip (2).
2. Install the rocker arm and lifter. Refer to **ROCKER ARM, VALVE, INSTALLATION** .

3. Connect the negative battery cable.

ROCKER ARM, VALVE

REMOVAL

REMOVAL

1. Disconnect the negative battery cable.
2. Remove the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, REMOVAL**.

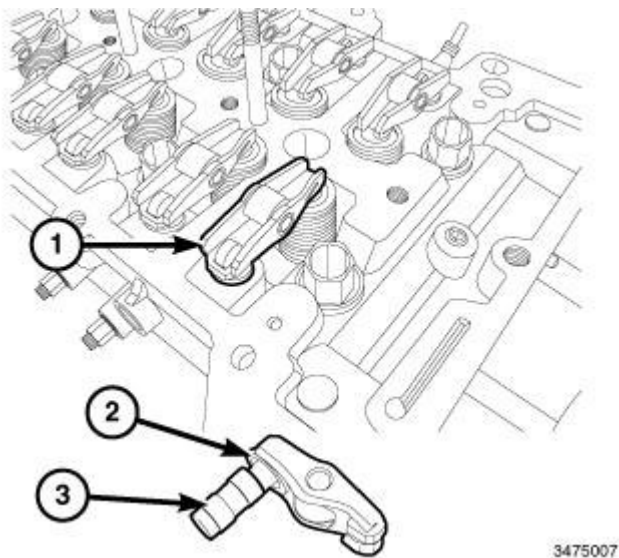


Fig. 124: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

NOTE: Label the order in which the rocker arms were removed.

3. Remove the rocker arm and lifter assembly (1).

INSTALLATION

INSTALLATION

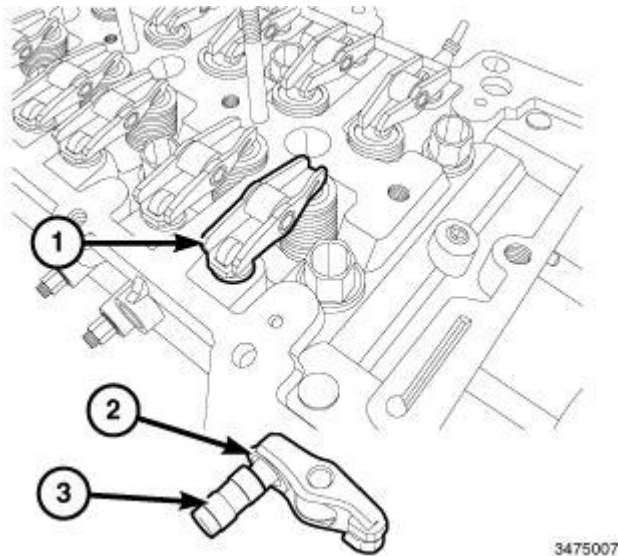


Fig. 125: Rocker Arm, Retaining Clip & Lifter
Courtesy of CHRYSLER GROUP, LLC

1. Install the rocker arm and lifter assembly back to its original location as noted during the removal process.
2. Install the cylinder head cover. Refer to **COVER(S), CYLINDER HEAD, INSTALLATION** .
3. Connect the negative battery cable.

SEAL(S), CAMSHAFT

REMOVAL

REMOVAL

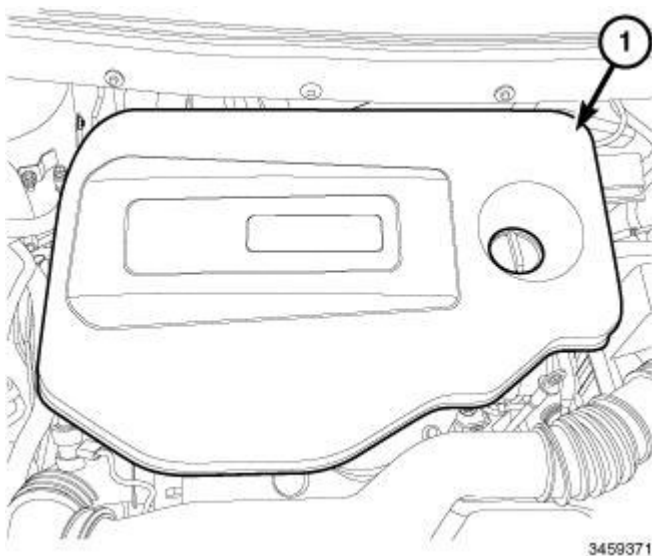


Fig. 126: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

1. Remove the engine cover (1).

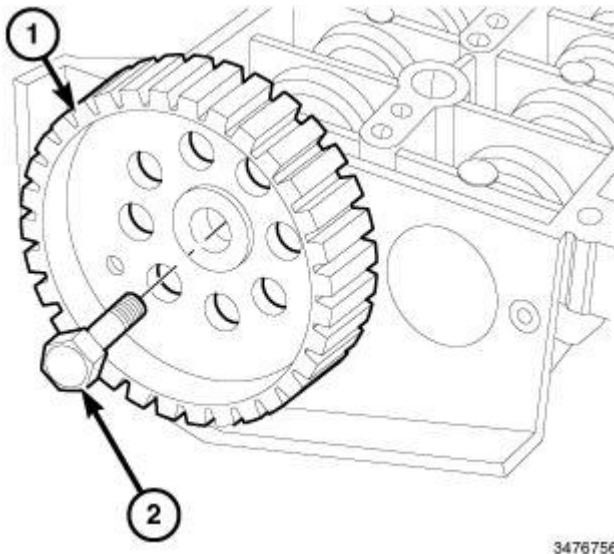


Fig. 127: Camshaft Timing Belt Sprocket & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Remove the camshaft timing belt sprocket (1). Refer to **BELT AND SPROCKETS, TIMING, REMOVAL**.

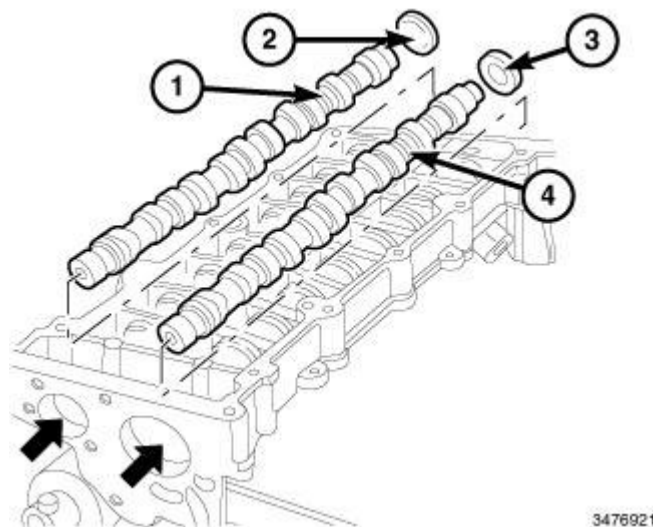


Fig. 128: Intake Camshaft, Plug, Exhaust Camshaft & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

3. Using a suitable tool, remove the camshaft oil seals.

INSTALLATION

INSTALLATION

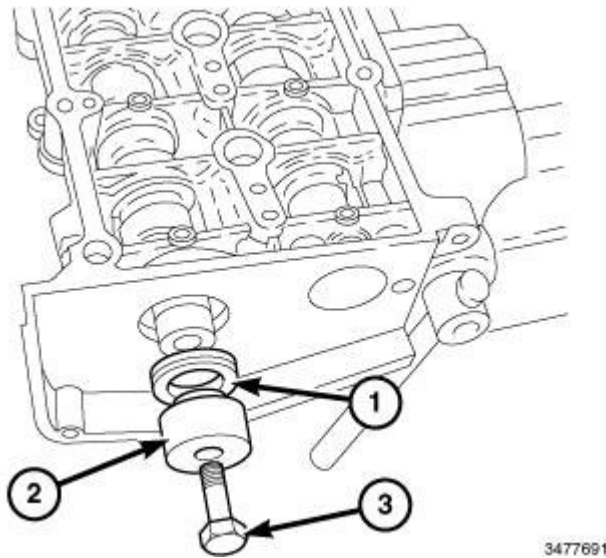


Fig. 129: Camshaft Oil Seal, Fitting Tool & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Using the Fitting Tool (2) (special tool #20131, Installer, Camshaft Oil Seal), position new camshaft seal (1) onto Fitting Tool (2) and install the camshaft oil seal (1) by drawing in the seal using the bolt (3).
2. Remove the Fitting Tool.

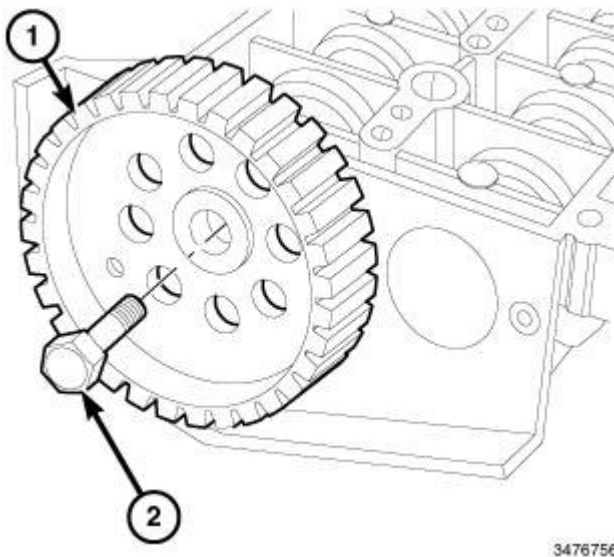


Fig. 130: Camshaft Timing Belt Sprocket & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the camshaft timing belt sprocket (1). Refer to **BELT AND SPROCKETS, TIMING, INSTALLATION**.

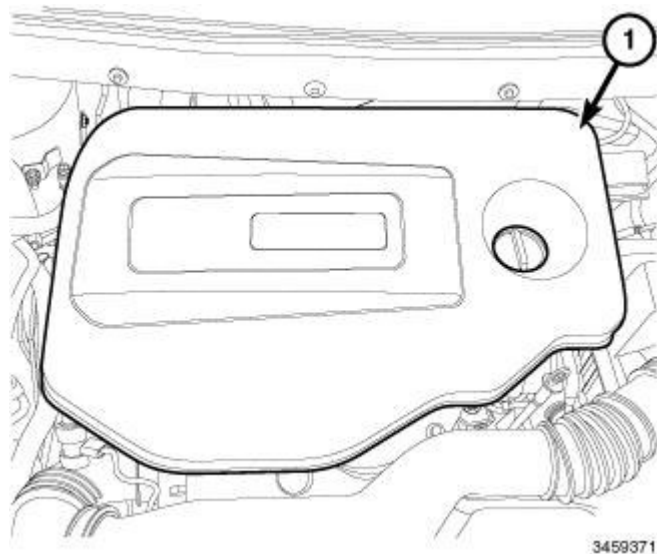


Fig. 131: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

4. Install the engine cover (1).

SPRING(S), VALVE

REMOVAL

REMOVAL

1. Disconnect negative battery cable.
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL**.

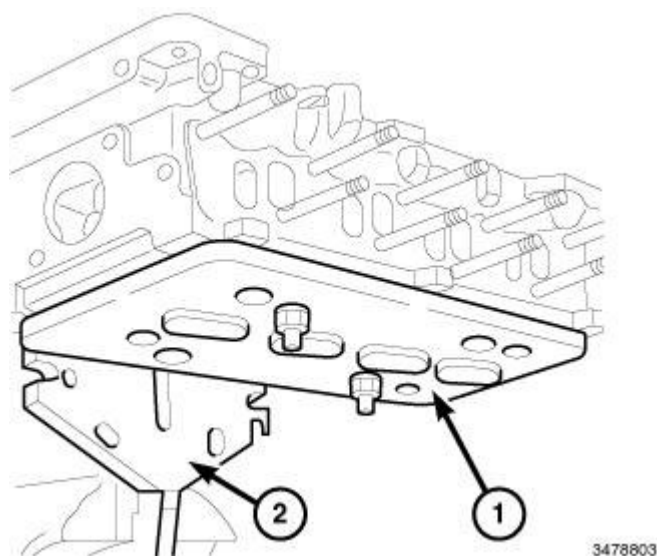


Fig. 132: Support Tool & Mount Tool
Courtesy of CHRYSLER GROUP, LLC

3. Install the (special tool #20106, Fixture, Cylinder Head Holding) onto the cylinder head and clamp in vice.
4. Install the Mount Tool (1) (special tool #20106, Fixture, Cylinder Head Holding) onto the cylinder head.
5. Install the (special tool #20108, Support, Cylinder Head Bench Valve) tool and bolt to cylinder head.
6. Assemble the (special tool #20107, Compressor, Valve Spring) to the (special tool #20149, Adapter, Valve Spring Compressor) and install onto cylinder head.

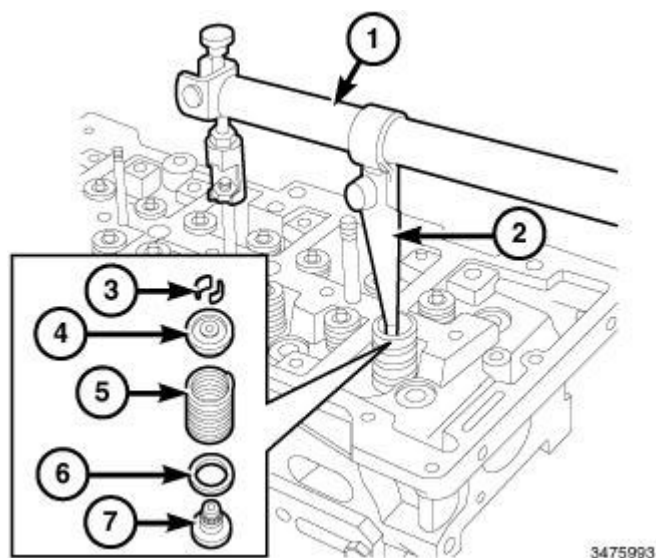


Fig. 133: Valve Spring Compressor & Valve Configuration
Courtesy of CHRYSLER GROUP, LLC

7. Compress the valve spring (5) and remove the valve keepers (3).
8. Remove the valve upper shim (4).
9. Remove the valve spring (5).
10. Remove the lower shim (6) (exhaust valve only).
11. Repeat procedure for each cylinder as necessary.

INSTALLATION

INSTALLATION

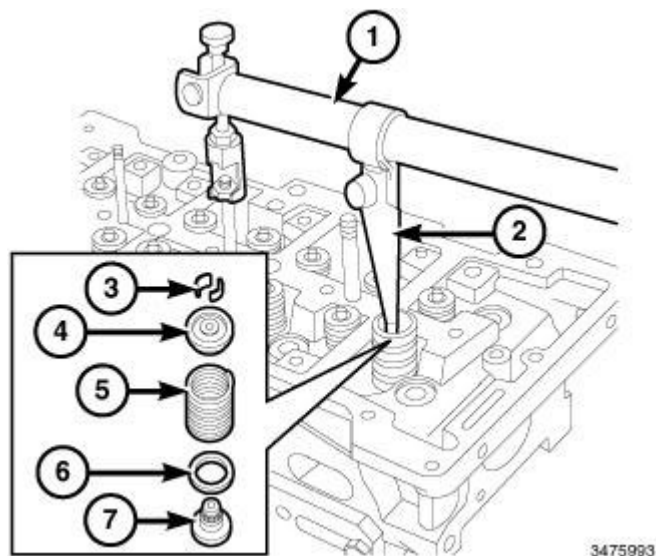


Fig. 134: Valve Spring Compressor & Valve Configuration
 Courtesy of CHRYSLER GROUP, LLC

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

1. Install the lower shim (6) (exhaust valve only).
2. Install valve spring (5).
3. Install valve upper shim (4).
4. Assemble the (special tool #20107, Compressor, Valve Spring) to the (special tool #20149, Adapter, Valve Spring Compressor) and install onto cylinder head.

NOTE: **Ensure that the valve keepers are seated properly.**

5. Compress valve spring (5) and install valve keepers (3).
6. Repeat procedure for each cylinder as necessary.

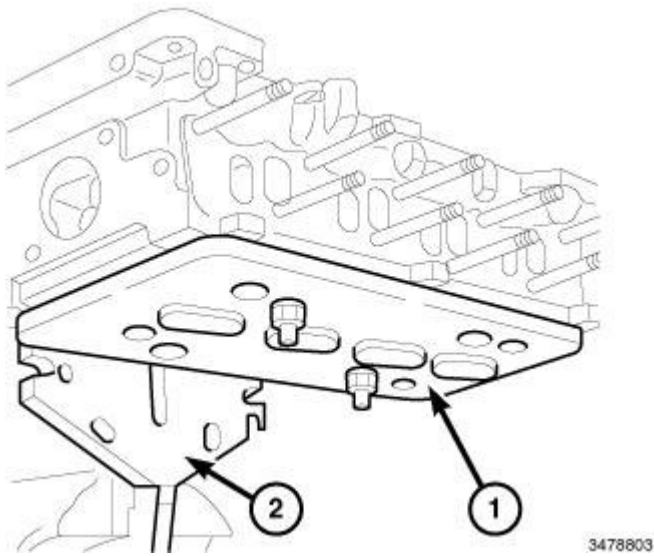


Fig. 135: Support Tool & Mount Tool
 Courtesy of CHRYSLER GROUP, LLC

7. Remove the bolt and the Support Tool (1) (special tool #20108, Support, Cylinder Head Bench Valve) from the cylinder head.
8. Unclamp from vice and remove the Mount Tool (special tool #20106, Fixture, Cylinder Head Holding) from cylinder head.
9. Install the cylinder head. Refer to **CYLINDER HEAD, INSTALLATION** .
10. Connect negative battery cable.

VALVES, INTAKE AND EXHAUST

REMOVAL

REMOVAL

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

1. Disconnect negative battery cable.
2. Remove cylinder head. Refer to **CYLINDER HEAD, REMOVAL** .

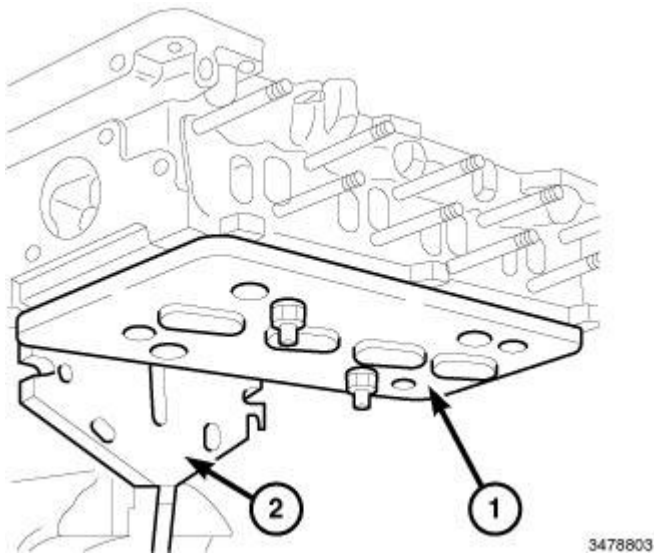


Fig. 136: Support Tool & Mount Tool
Courtesy of CHRYSLER GROUP, LLC

3. Install the Mount Tool (2) (special tool #20106, Fixture, Cylinder Head Holding) onto the cylinder head and clamp in vice.
4. Install the Support Tool (1) (special tool #20108, Support, Cylinder Head Bench Valve) and bolt to cylinder head.
5. Assemble the (special tool #20107, Compressor, Valve Spring) to the (special tool #20149, Adapter, Valve Spring Compressor) and install onto cylinder head.

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

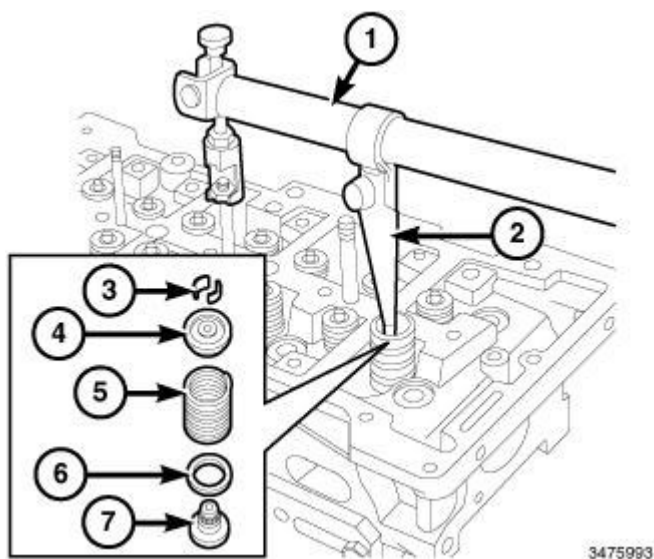


Fig. 137: Valve Spring Compressor & Valve Configuration
Courtesy of CHRYSLER GROUP, LLC

6. Compress the valve spring (5) and remove the valve keepers (3).
7. Remove the valve upper shim (4).
8. Remove the valve spring (5).
9. Remove the lower shim (6) (exhaust valve only).

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

10. Remove valve stem seal (7).
11. Repeat steps 3 through 7 for each valve as necessary.
12. Remove the bolt and (special tool #20108, Support, Cylinder Head Bench Valve) tool from the cylinder head.
13. Remove the valves and replace as necessary.

INSTALLATION

INSTALLATION

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

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

1. Install valves in their original position in the cylinder head.

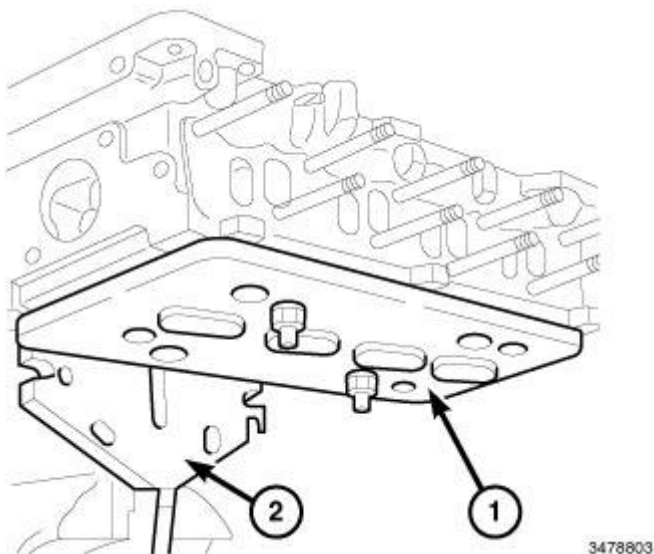


Fig. 138: Support Tool & Mount Tool
Courtesy of CHRYSLER GROUP, LLC

2. Install the Support Tool (1) (special tool #20108, Support, Cylinder Head Bench Valve) tool and bolt to cylinder head.

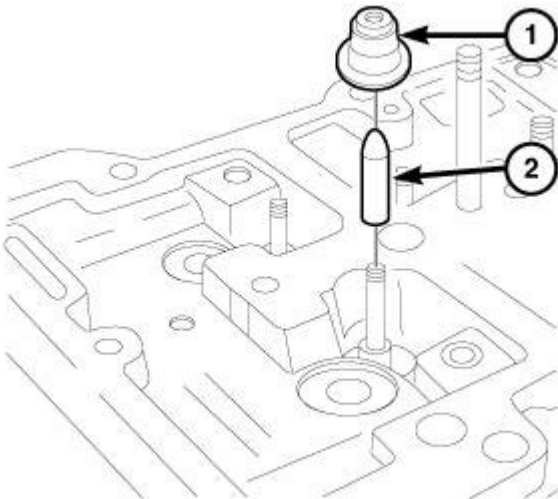


Fig. 139: Valve Stem Seal & Fitting Tool
Courtesy of CHRYSLER GROUP, LLC

3. Install the valve seal Fitting Tool (2) (special tool #20133, Remover/Installer, Valve Guide Oil Seal) onto valve stem.
4. Install valve stem seal (7).
5. Remove the valve seal Fitting Tool (2) (special tool #20133, Remover/Installer, Valve Guide Oil Seal) from the valve stem.

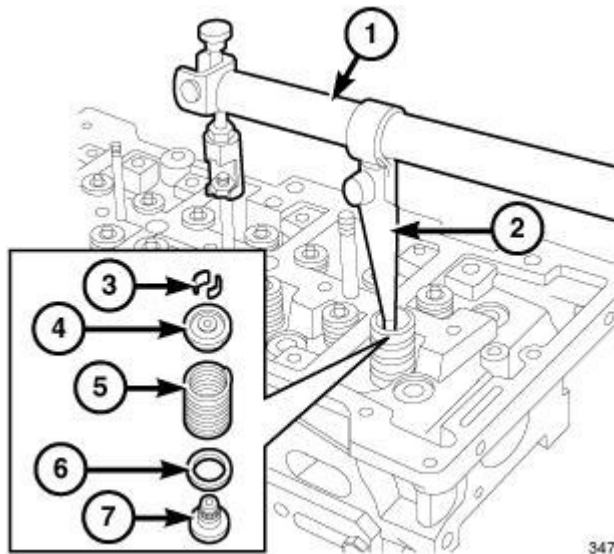


Fig. 140: Valve Spring Compressor & Valve Configuration
Courtesy of CHRYSLER GROUP, LLC

6. Install the lower shim (6) (exhaust valve only).

7. Install the valve spring (5).
8. Install the valve upper shim (4).
9. Assemble the (special tool #20107, Compressor, Valve Spring) to the (special tool #20149, Adapter, Valve Spring Compressor) and install onto cylinder head.

NOTE: Ensure that the valve keepers are seated properly.

10. Compress the valve spring (5) and Install the valve keepers (3).
11. Repeat steps 3 through 10 for each valve as necessary.

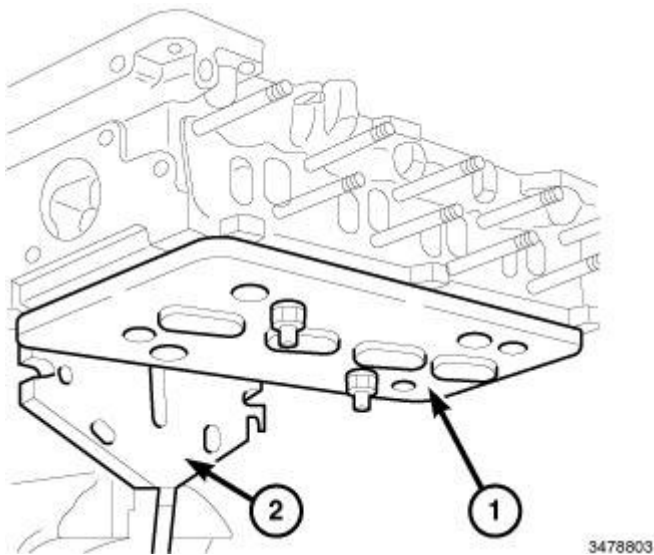


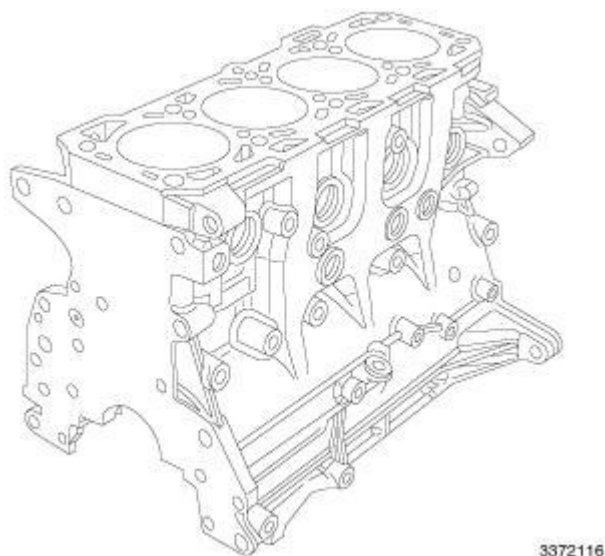
Fig. 141: Support Tool & Mount Tool
Courtesy of CHRYSLER GROUP, LLC

12. Remove the bolt and the Support Tool (1) (special tool #20108, Support, Cylinder Head Bench Valve) from the cylinder head.
13. Remove the Mount Tool (2) (special tool #20106, Fixture, Cylinder Head Holding) from cylinder head and unclamp from vice.
14. Install cylinder head. Refer to **CYLINDER HEAD, INSTALLATION** .
15. Connect negative battery cable.

ENGINE BLOCK

DESCRIPTION

DESCRIPTION

**Fig. 142: Engine Block**

Courtesy of CHRYSLER GROUP, LLC

The crankcase (engine block) is made from ductile cast iron.

The cylinders are formed directly in the crankcase and graded in three size categories plus one over size.

The crankshaft is supported by five main bearings.

Special channels in the crankcase walls allow the passage of coolant and lubrication oil.

The lower part of each cylinder contains a jet that sprays oil onto the piston crown to cool it and to ensure that the piston pin is lubricated.

STANDARD PROCEDURE

BEARING SELECTION CHARTS

CRANKSHAFT BEARINGS

Crankshaft Main Journal Diameter	
Bearing Size	Specification
Main journal half-bearings - Grade A (Red) numerical code 1 (94 00)	1.832 - 1.836 mm (0.0721 - 0.0722 in.)
Main journal half-bearings - Grade B (Blue) numerical code 2 (88 94)	1.835 - 1.839 mm (0.0722 - 0.0724 in.)
Main journal half-bearings - Grade C (Yellow) numerical code 3 (82 88)	1.838 - 1.842 mm (0.0723 - 0.0725 in.)
Crankshaft Main Journal Diameter (Oversize)	
Main journal/crankpin half-bearings oversize - Grade A (brown)	0.127 mm (0.0049 in.)
Main journal/crankpin half-bearings oversize - Grade	

2013 Dodge Journey SE

2013 ENGINE 2.0L Diesel - Service Information - Journey

B (green)	0.127 mm (0.0049 in.)
Clearance between connecting rod bearings - crankpin bearings	0.030 - 0.056 mm (0.0011 - 0.0022 in.)
Main Journal Identification	
Main journal grade A (normal), RED paint mark, numerical code 1 (94 00)*	52.994 - 53.000 mm (2.0863 - 2.0866 in.)
Main journal grade B (normal), BLUE paint mark, numerical code 2 (88 94)*	52.982 - 52.994 mm (2.0858 - 2.0863 in.)
Main journal grade C (normal), YELLOW paint mark, numerical code 3 (82 88)*	52.982 - 52.998 mm (2.0858 - 2.0865 in.)
Main journal grade D (0.127 mm undersize), BROWN paint mark, numerical code 6 (67 73)*	52.867- 52.873 mm (2.0813 - 2.0816 in.)
Main journal grade E (0.127 mm undersize), GREEN paint mark, numerical code 7 (61 67)*	52.861 - 52.867 mm (2.0811 - 2.0813 in.)
Main journal grade F (0.127 mm undersize), BLACK paint mark, numerical code 8 (55 61)*	52.855 - 52.861 mm (2.0808 in.)

NOTE: (*) Last two numbers (thousandth part) of the main journal dimensions.

NOTE: If using a crankshaft where the maximum undersize for the bearings is 0.127 mm through grindings, the grade should be selected by measuring the diameter of the bearing using the above as a reference.

NOTE: Having defined the grade and the color of each new or reground crankshaft bearing, it is necessary to select the bearing pair or thickness; these should be the same color as the corresponding journal; the pair of half-bearings required can be ordered from the Parts Dept. by quoting the order number.

NOTE: The above is designed to guarantee the optimum operational clearances for all pins.

NOTE: Lastly, we wish to point out that, in general, the clearance between the main journal and the half-bearing, produced through the selection method described above, should be min. 0.011 - max; 0.071 mm; this figure can be measured, as part of the final check, using the calibrated wire (Plastigage) following the instructions described below.

ROD BEARINGS

Connecting Rod Journal Diameter	
Bearing Size	Specification
Crankpin half-bearings - Grade A (red)	1.525 - 1.532 mm (0.0600 - 0.0603 in.)
Crankpin half-bearings - Grade B (blue)	1.532 - 1.536 mm (0.0603 - 0.0605 in.)
Crankpin half-bearings - Grade C (yellow)	1.535 - 1.539 mm (0.0604 - 0.0606 in.)

Connecting Rod Journal Diameter (Oversize)	
Main journal/crankpin half-bearings oversize - Grade A (brown)	0.127 mm (0.0049 in.)
Main journal/crankpin half-bearings oversize - Grade B (green)	0.127 mm (0.0049 in.)
Clearance between connecting rod bearings - crankpin bearings	0.030 - 0.056 mm (0.0011 - 0.0022 in.)
Main journal/crankpin half-bearing oversize	0.254 mm (0.0099 in.)

REPLACING ENGINE CORE AND OIL GALLERY PLUGS

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

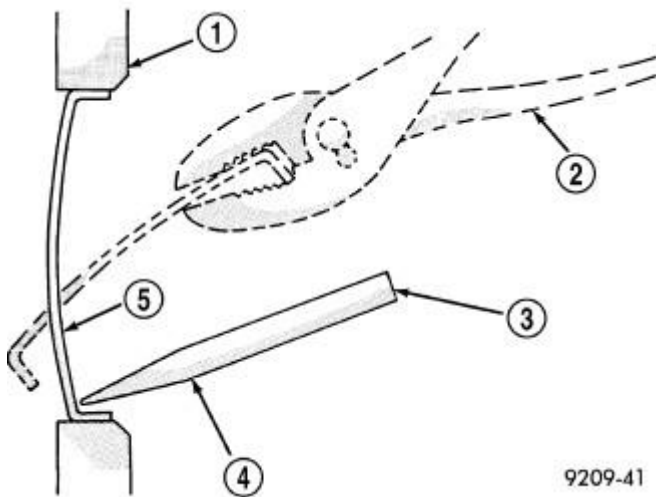


Fig. 143: Core Hole Plug Removal
 Courtesy of CHRYSLER GROUP, LLC

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

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

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

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

MEASURING CYLINDER BORES

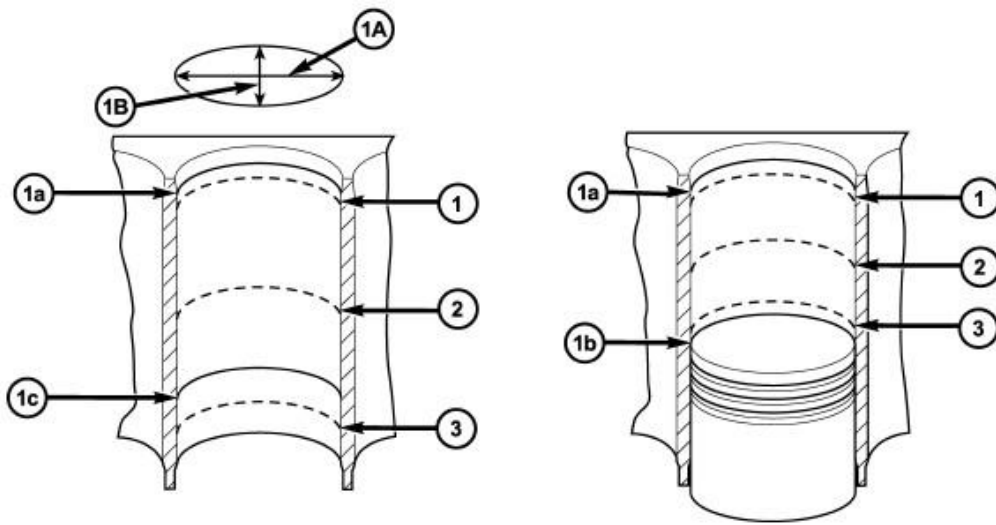


Fig. 144: Measuring Cylinder Bores
Courtesy of CHRYSLER GROUP, LLC

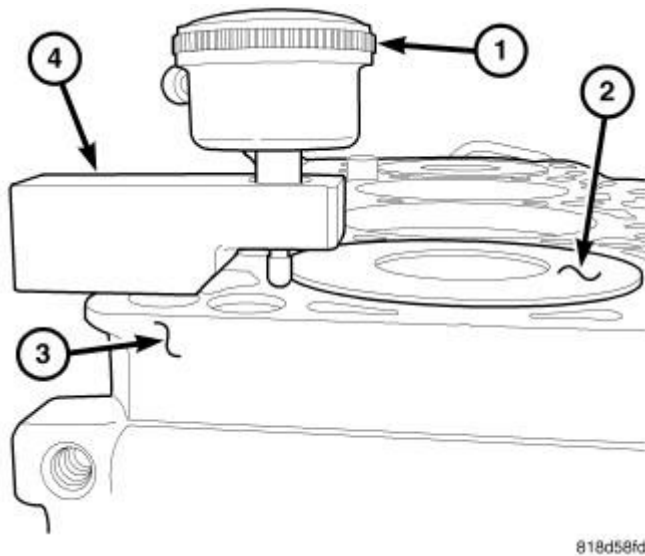
- 1 - MEASURING POINT OF CYLINDER BORE
- 2 - MEASURING POINT OF CYLINDER BORE
- 3 - MEASURING POINT OF CYLINDER BORE
- 1a - UPPER REVERSAL POINT OF #1 PISTON RING
- 1b - BOTTOM DEAD CENTER OF PISTON
- 1c - BOTTOM REVERSAL POINT OF OIL SCRAPER RING
- 1A - LONGITUDINAL DIRECTION
- 1B - TRANSVERSE DIRECTION

NOTE: This must be done with engine completely disassembled.

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

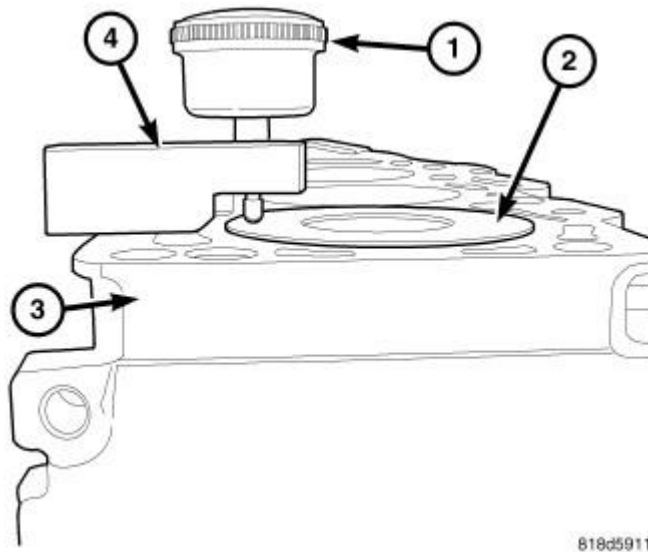
PISTON PROTRUSION

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

**Fig. 145: Zero Dial Indicator**

Courtesy of CHRYSLER GROUP, LLC

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

**Fig. 146: Piston Height**

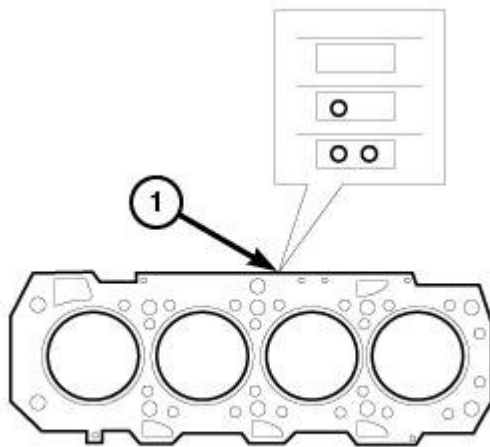
Courtesy of CHRYSLER GROUP, LLC

2. Slide Scooter block (special tool #D-115-2A, Block, Scooter) (4) so that the dial indicator (1) is now on the piston (2).
3. Read measurement and refer to the chart below for the correct head gasket.

HEAD GASKET SELECTION

Piston Protrusion	Head Gasket Identification
-------------------	----------------------------

0.110 - 0.203 mm	0.035 - 0.039 in.	No Hole
0.231 - 0.330 mm	0.040 - 0.043 in.	One Hole
0.331 - 0.425 mm	0.044 - 0.047 in.	Two Hole



3479040

Fig. 147: Head Gasket Identification
Courtesy of CHRYSLER GROUP, LLC

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

COVER, ENGINE, FRONT

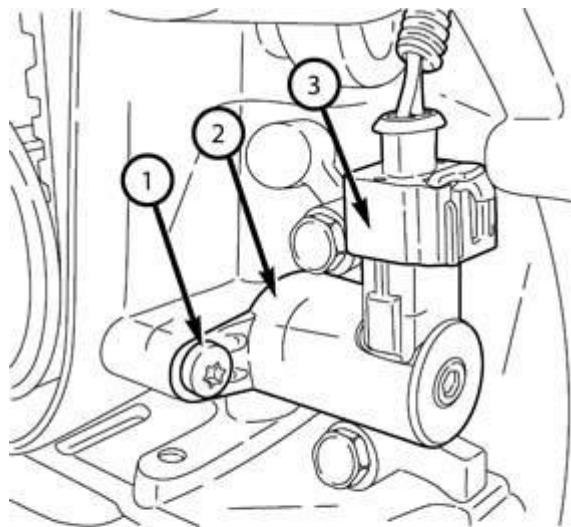
REMOVAL

REMOVAL

- Disconnect the negative battery cable.

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

- Remove the crankshaft sprocket. Refer to **BELT AND SPROCKETS, TIMING, REMOVAL.**



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Fig. 148: Oil Pressure Regulator, Bolt & Connector
 Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the oil pressure regulator wire harness connector (3).

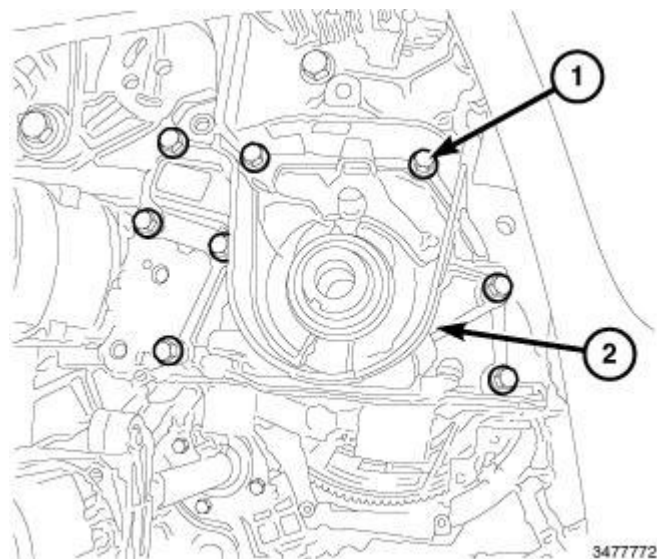


Fig. 149: Front Cover & Bolts
 Courtesy of CHRYSLER GROUP, LLC

4. Remove bolts (1) and the front cover (2).

INSTALLATION

INSTALLATION

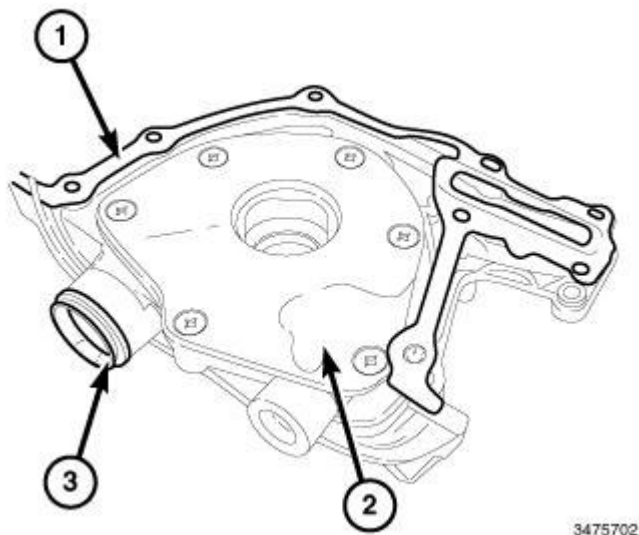


Fig. 150: Front Cover, Gasket & Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean all gasket mating surfaces. Refer to ENGINE GASKET SURFACE PREPARATION .
2. Install the front cover gasket (1) and Seal (3).

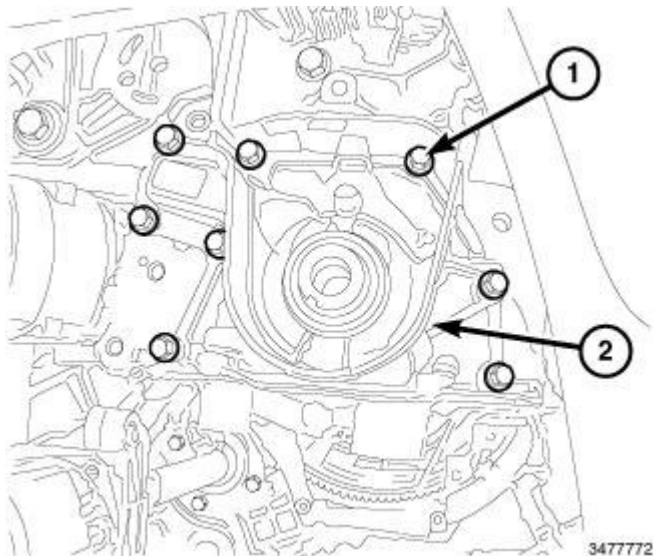
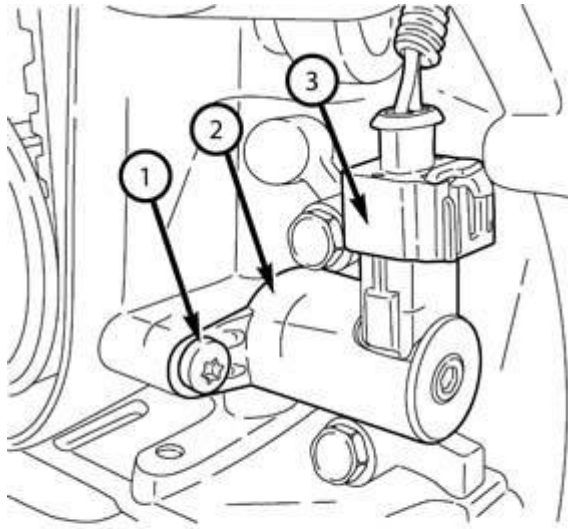


Fig. 151: Front Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the front cover assembly (2). Tighten bolts (1) 8 N.m (71 in. lbs.).



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Fig. 152: Oil Pressure Regulator, Bolt & Connector
Courtesy of CHRYSLER GROUP, LLC

4. Connect the oil pressure regulator wire harness connector (3).
5. If necessary, install a new front crankshaft oil seal. Refer to **SEAL, CRANKSHAFT OIL, FRONT, INSTALLATION**.

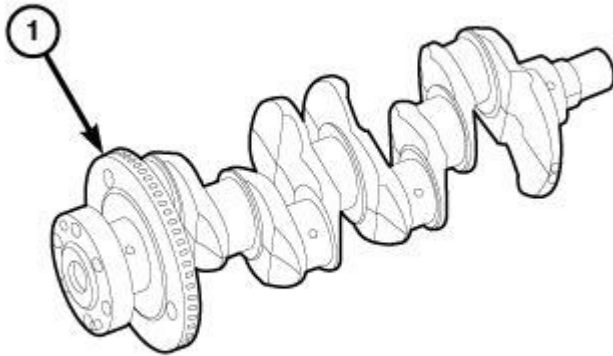
NOTE: The crankshaft sprocket bolt is a left handed thread.

6. Install the crankshaft sprocket. Refer to **BELT AND SPROCKETS, TIMING, INSTALLATION**.
7. Connect the negative battery cable.

CRANKSHAFT

DESCRIPTION

DESCRIPTION



3372268

Fig. 153: Crankshaft Tone Wheel
Courtesy of CHRYSLER GROUP, LLC

The crankshaft is made of cast iron and rests on five main bearings. Shaft axial clearance is governed by two half-rings housed in the rear main bearing.

Eight counterweights accurately balance the crankshaft rotating masses.

A set of ducts runs along the crankshaft to lubricate the main journals and crankpins.

A tone wheel (1) is fitted at the rear of the crankshaft and is used for the RPM sensor.

STANDARD PROCEDURE

STANDARD PROCEDURE - MEASURE CRANKSHAFT AND BLOCK JOURNALS

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

1. Remove crankshaft. Refer to **CRANKSHAFT, REMOVAL** .
2. Clean all engine parts thoroughly.

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

3. Inspect connecting rod. If damage is present, inspect crankshaft, replace as necessary.
4. Inspect crankcase.
5. Inspect standard size of crankshaft bearing shells.

6. Inspect crankshaft bearing cap.
7. Mount crankshaft radially.
8. Inspect crankshaft bearing play.

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

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

ASSIGN CRANKSHAFT BEARING SHELLS

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

REMOVAL

REMOVAL

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

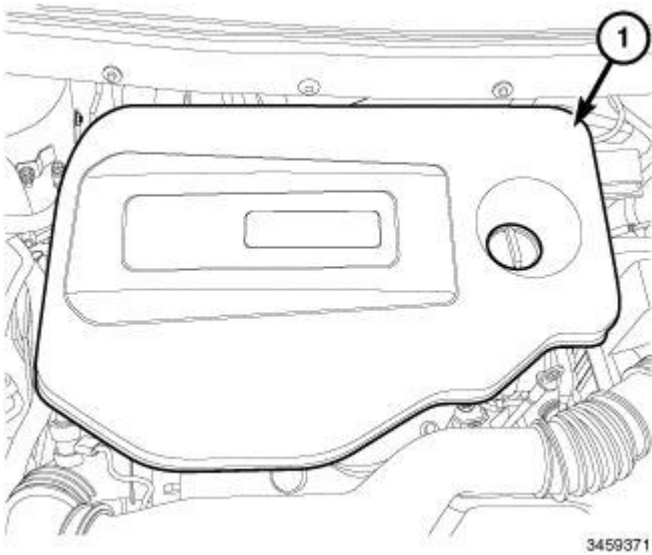
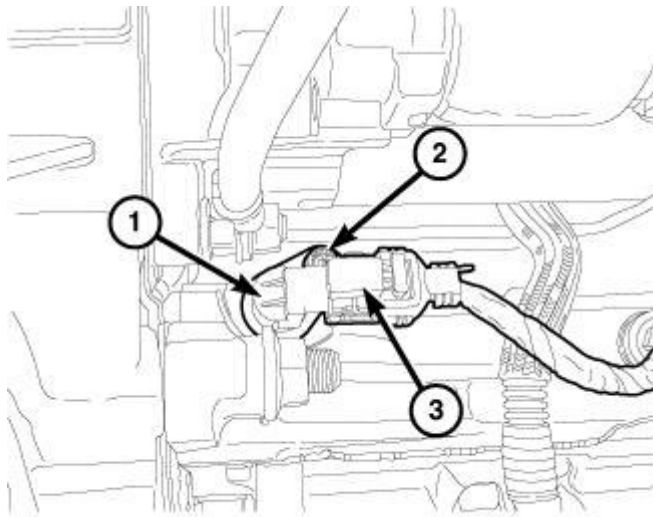


Fig. 154: Engine Cover

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove engine cover (1).
3. Remove the engine from the vehicle and place on an overhaul stand. Refer to **REMOVAL** .
4. Unscrew the drain plug from the engine oil pan and drain the engine oil. Tighten drain plug to 20 N.m (177 in. lbs.).

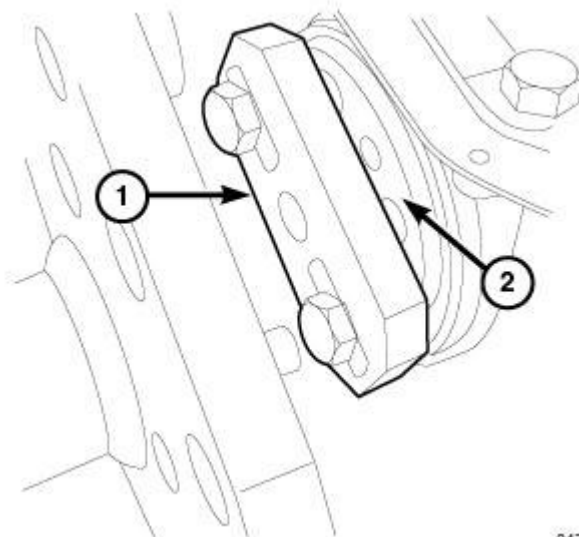
5. Remove the cylinder head assembly. Refer to **CYLINDER HEAD, REMOVAL** .
6. Remove the oil pan. Refer to **PAN, OIL, REMOVAL** .
7. Remove the catalytic converter DPF support.
8. Remove the wiring retaining bracket.



3405642

Fig. 155: Crankshaft Position Sensor, Connector & Bolt
 Courtesy of CHRYSLER GROUP, LLC

9. Remove the crankshaft position sensor.
10. Remove the engine oil cooler.
11. Remove the alternator.
12. Remove the front cover. Refer to **COVER, ENGINE, FRONT, REMOVAL**.



3478850

Fig. 156: Crankshaft Rotation Flange Tool & Crankshaft
 Courtesy of CHRYSLER GROUP, LLC

13. Attach the Crankshaft Rotation Flange Tool (1) (special tool #20109, Tool, Crankshaft Rotation) to the back of crankshaft (2).

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

14. Rotate the crankshaft until connecting rod number one is at bottom dead center.
15. Remove piston and connecting rod assemblies. Refer to **ROD, PISTON AND CONNECTING, REMOVAL**.
16. Remove rear crankshaft oil seal cover.

NOTE: Crankshaft end play specification is 0.049 mm. If the value for the crankshaft end play does not correspond with the specification, when refitting, regrind the engine block seat and use suitable oversize thrust half-washers.

17. Check the amount of end play in the crankshaft using a dial indicator.

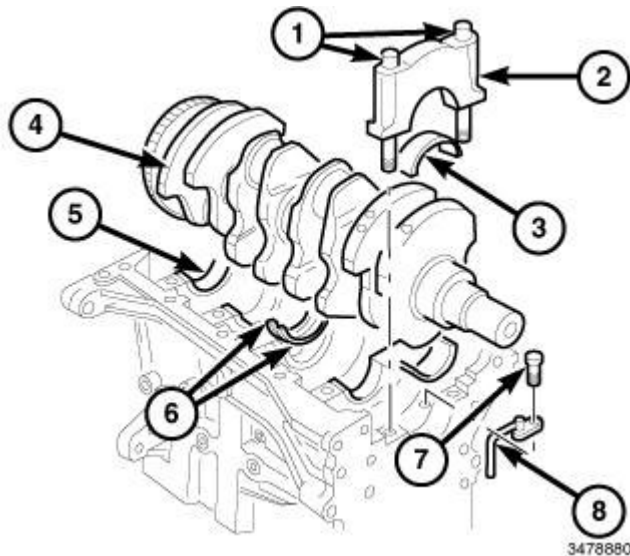


Fig. 157: Crankshaft Assembly
Courtesy of CHRYSLER GROUP, LLC

18. Unbolt crankshaft bearing caps (10).
19. Remove the bearing caps (2).
20. Remove the lower main half-bearings (3).
21. Inspect crankshaft bearing caps and bolts for wear and stretching.
22. Remove crankshaft (4) from engine block.
23. Remove the upper main half-bearings (5).
24. Remove the thrust half-washers (6).
25. Undo the bolts (7) and remove the oil jets (8) from the engine block.

26. Remove the engine block from the overhaul stand, and place it on a workbench.
27. Drill and remove the water/oil sealing plugs from the engine block to allow for washing the ducts.
28. Wash the dismantled components.
29. Fit the water/oil sealing plugs in the engine block using suitable fitting tools.

INSTALLATION

INSTALLATION

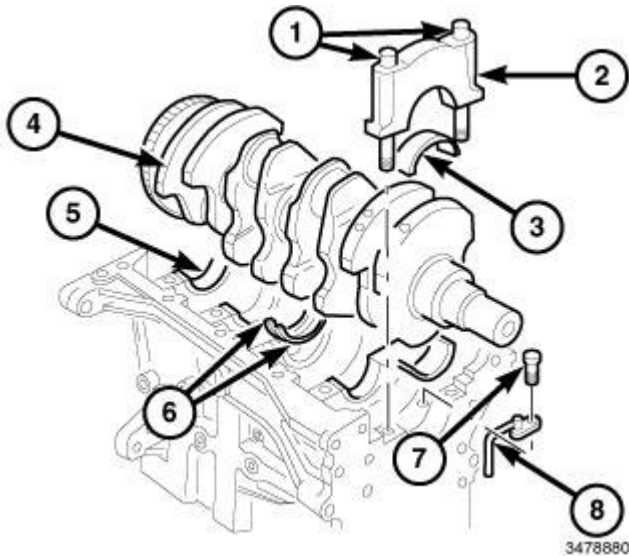
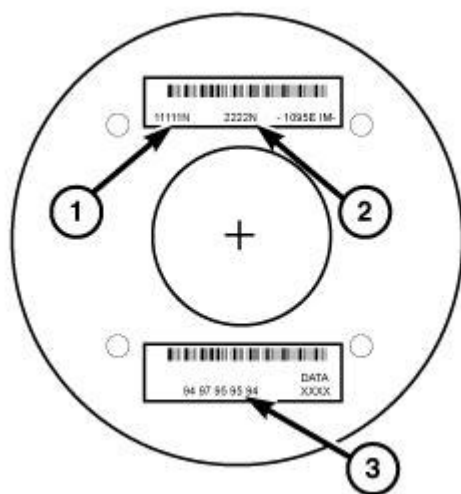


Fig. 158: Crankshaft Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Replace the engine block on the overhaul stand using the mounting bracket.
2. Install the oil jets (8) in the engine block and securely tighten bolts (7).
3. Fit the main bearing caps into the block.
4. Torque the main bearing caps to specification. 25 N.m (18 ft. lbs), then an additional 100° turn.
5. Check that there are no deposits or blockages in the crankshaft lubrication ducts.
6. Measure the diameter of the main journals and compare them to the specifications. (Class A - 59.995 mm, Class B - 59.998 mm, Class C - 59.981 mm).

NOTE: If the diameter of the main journals is not correct, stop reassembly and replace the engine assembly.

7. Remove the main bearing caps (1).



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Fig. 159: Crankshaft Bearing Identification & Size Identification

Courtesy of CHRYSLER GROUP, LLC

8. Locate the crankshaft journal letter class stamp on the toothed wheel at the rear of the crankshaft.

NOTE: In the case of the example, the numbers 11111N indicate that all five main bearings are Grade A (red) as indicated (1). Numerical code of main journal identification: the first number on the left refers to the first timing side bearing; the final "N" has no value.

NOTE: In the case of the example, the numbers 2222N indicate that all four connecting rod bearings as indicated (2). Numerical code of main journal identification: the first number on the left refers to the first timing side bearing; the final "N" has no value.

NOTE: In the case of the example, the number 94 (first on the left) (3) corresponds to the dimensions 52.994 for the first timing side bearing which identifies Grade A (red); the same method should be applied for other groups of two digits for the same reference 3 (97 -95 -95 -94).

9. Select the proper bearing sizes for the main bearings and connecting rod bearings. Refer to **BEARING SELECTION CHARTS**.

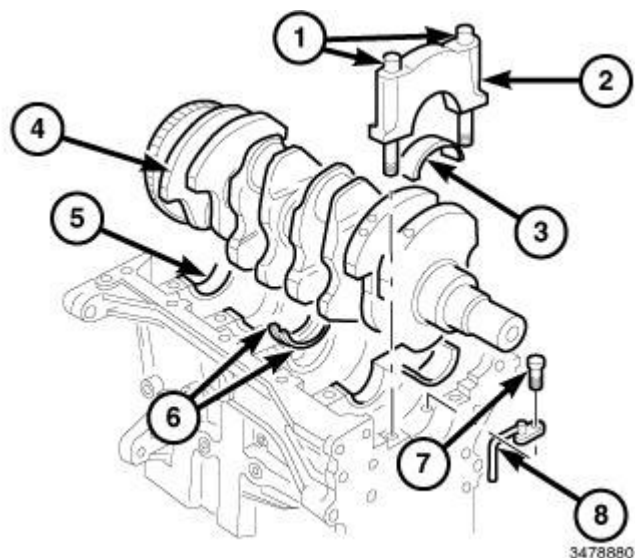


Fig. 160: Crankshaft Assembly
 Courtesy of CHRYSLER GROUP, LLC

10. Install the upper bearing halves (5) into the engine block.
11. Lubricate the upper bearing halves with engine oil.
12. Install the upper thrust bearing (7) into the engine block.
13. Install the crankshaft (4) into the engine block.
14. Install the lower thrust bearing.
15. Install the lower main bearing halves into the main bearing caps.
16. Lubricate the lower bearing halves with engine oil
17. Install the main bearing caps into the block. Tighten bolts to 25 N.m (18 ft. lbs), then 100° additional turn.
18. Install the piston and connecting rod assemblies. Refer to **ROD, PISTON AND CONNECTING, INSTALLATION** .
19. Place the crankshaft front oil seal cover in its seat complete with gasket and tighten the bolts to 9 N.m (80 in lbs).
20. Place the front crank seal in its seat on the crankshaft oil seal front cover using the (special tool #20145, Installer, Crankshaft Front Oil Seal).
21. Install the crankshaft position sensor and tighten bolt to 9 N.m (80 in lbs).
22. Place the timing belt tensioner mounting assembly in position and tighten the bolts to 25 N.m (18 ft. lbs).
23. Install rear crankshaft oil seal and cover.
24. Apply silicone sealant to the entire perimeter of the engine oil pan assembly.

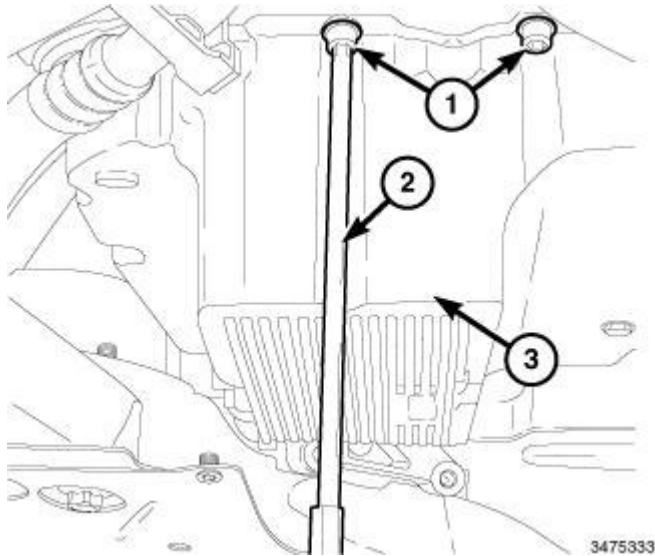


Fig. 161: Oil Pan, Key Tool & Bolts
 Courtesy of CHRYSLER GROUP, LLC

25. Position oil pan (3) and using the Key Tool (2) (special tool #20111, Remover/Installer, Cylinder Head Bolt), install bolts (1) and tighten bolts to 25 N.m (18 ft. lbs.).
26. Using the Key Tool (1) (special tool #20110, Remover/Installer, Crankshaft Sump), Install the two oil pan-to-rear oil seal carrier bolts and tighten bolts to 9 N.m (80 in. lbs.).

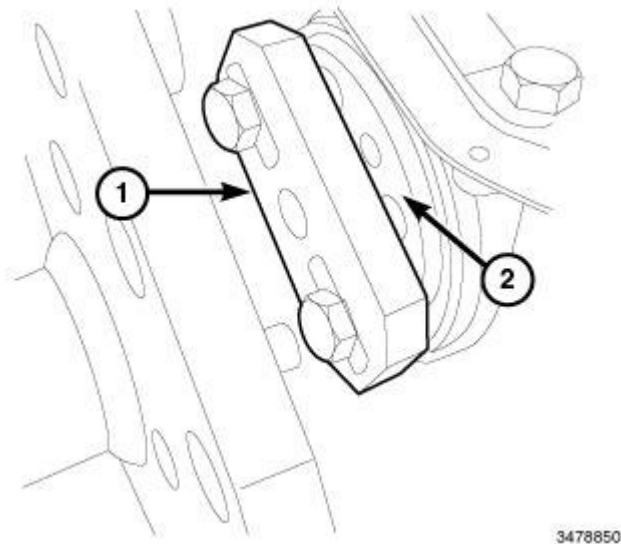


Fig. 162: Crankshaft Rotation Flange Tool & Crankshaft
 Courtesy of CHRYSLER GROUP, LLC

27. Attach the Crankshaft Rotation Flange Tool (1) (special tool #20109, Tool, Crankshaft Rotation) to the back of crankshaft (2) for rotation, to be used as counter-torque to tighten the toothed drive pulley fixing screw.
28. Install the front crankshaft gear. Tighten bolt to 340 N.m (251 ft. lbs.).
29. Remove the Crankshaft Rotation Flange Tool (1) 20109.

30. Install cylinder head. Refer to **CYLINDER HEAD, INSTALLATION** .
31. Install the engine. Refer to **INSTALLATION** .
32. Fill crankcase with the correct engine oil, to the proper level.
33. Fill cooling system with the proper coolant, to the proper level. Refer to **STANDARD PROCEDURE** .
34. Connect negative battery cable.

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

35. Start engine and inspect for leaks.

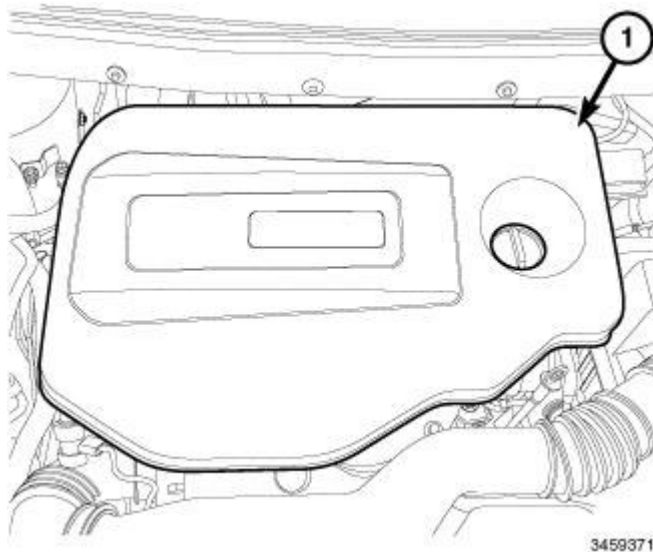


Fig. 163: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

36. Install engine cover (1). Refer to **INSTALLATION** .

DAMPER, VIBRATION

REMOVAL

REMOVAL

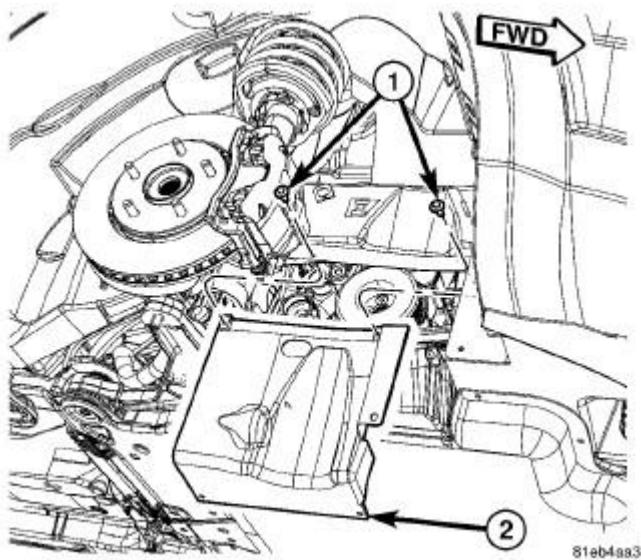


Fig. 164: Right Lower Splash Shield

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove fasteners (1) and the right lower splash shield (2).
4. Remove the accessory drive belt. Refer to **BELT, SERPENTINE, REMOVAL** .

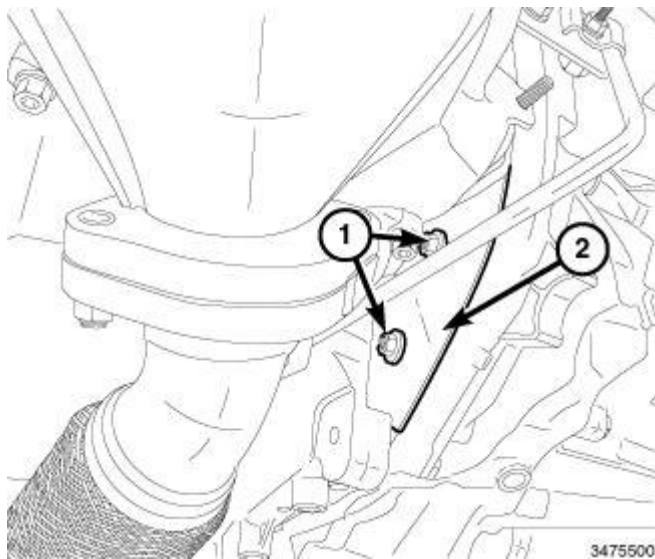


Fig. 165: Lower Flywheel Guard & Nuts

Courtesy of CHRYSLER GROUP, LLC

5. Remove nuts (1) and the lower flywheel guard (2).

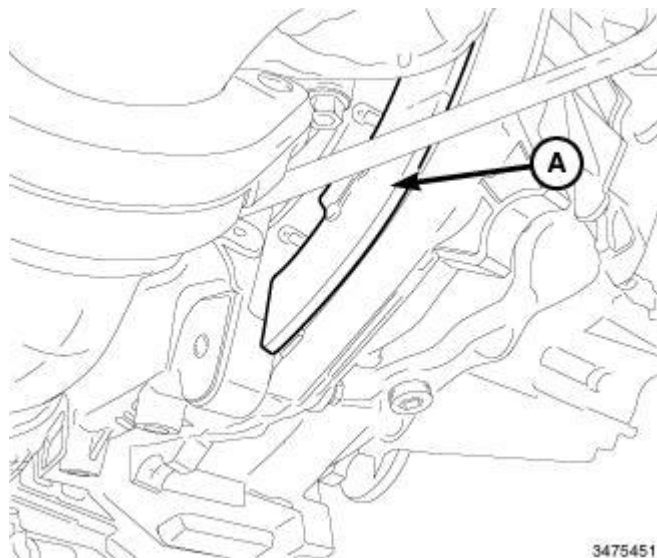


Fig. 166: Flywheel Locking Tool
 Courtesy of CHRYSLER GROUP, LLC

6. Install the Flywheel Locking Tool (1) (special tool #20115, Tool, Flywheel Locking).

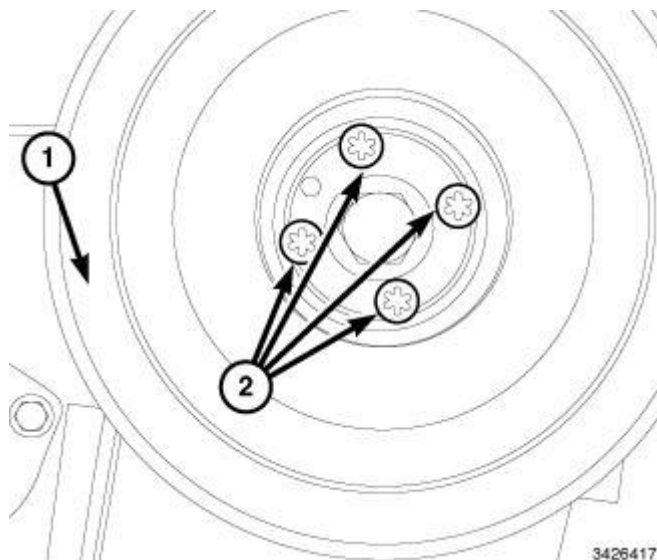


Fig. 167: Vibration Damper & Bolts
 Courtesy of CHRYSLER GROUP, LLC

7. Remove bolt (2) and the vibration damper (1).

INSTALLATION

INSTALLATION

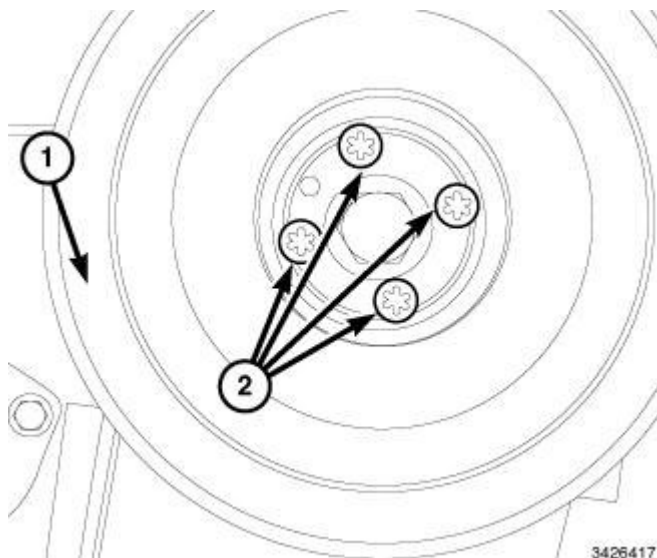


Fig. 168: Vibration Damper & Bolts

Courtesy of CHRYSLER GROUP, LLC

1. Install the vibration damper (1). Tighten bolt (2) to 30 N.m (22 ft. lbs.).

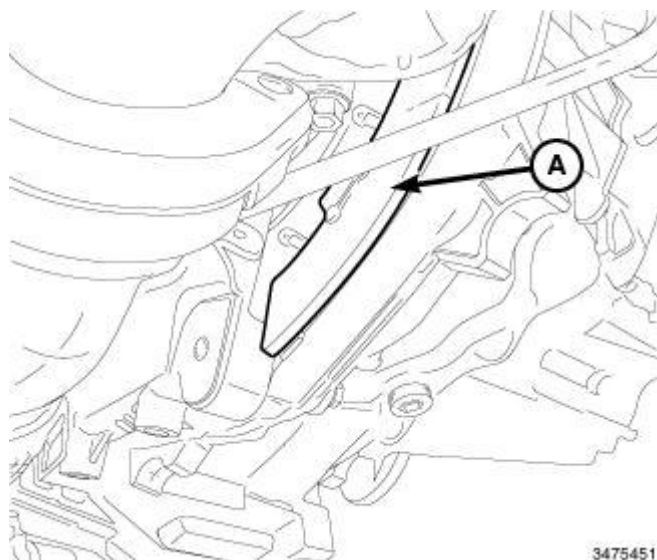


Fig. 169: Flywheel Locking Tool

Courtesy of CHRYSLER GROUP, LLC

2. Remove the Flywheel Locking Tool (1) (special tool #20115, Tool, Flywheel Locking).

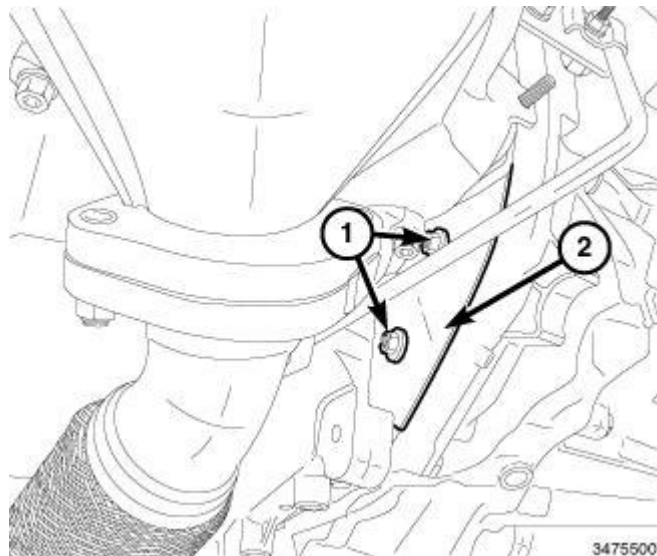


Fig. 170: Lower Flywheel Guard & Nuts
Courtesy of CHRYSLER GROUP, LLC

3. Install the lower flywheel guard (2) and securely tighten nuts.

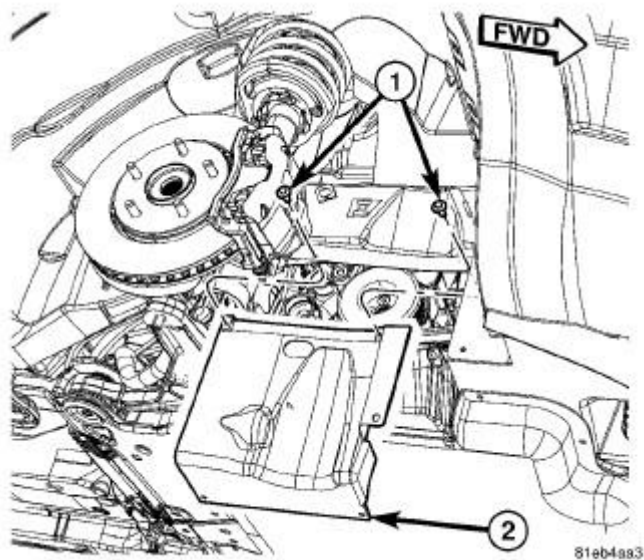


Fig. 171: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

4. Installed the accessory drive belt. Refer to **BELT, SERPENTINE, INSTALLATION**.
5. Install the right lower splash shield (2) and fasteners (1).
6. Lower the vehicle.
7. Connect the negative battery cable.

PUMP, VACUUM

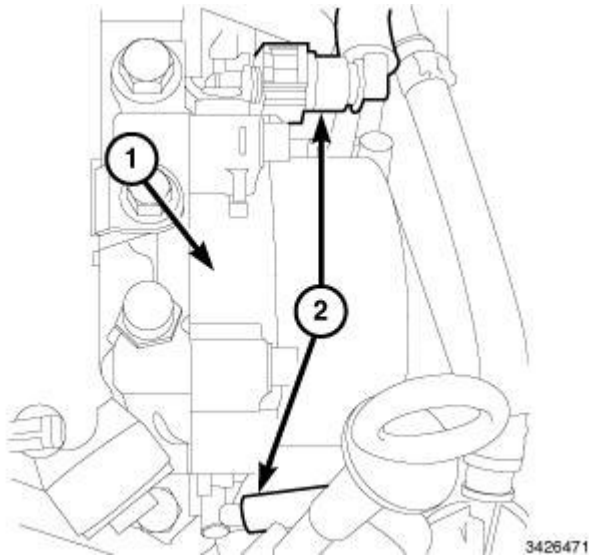
REMOVAL**REMOVAL**

Fig. 172: Vacuum Pump & Vacuum Lines
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect negative battery cable.
2. Remove the engine cover.
3. Remove the vacuum line (2) at vacuum pump (1).
4. Remove the thermostat housing. Refer to **THERMOSTAT, REMOVAL** .

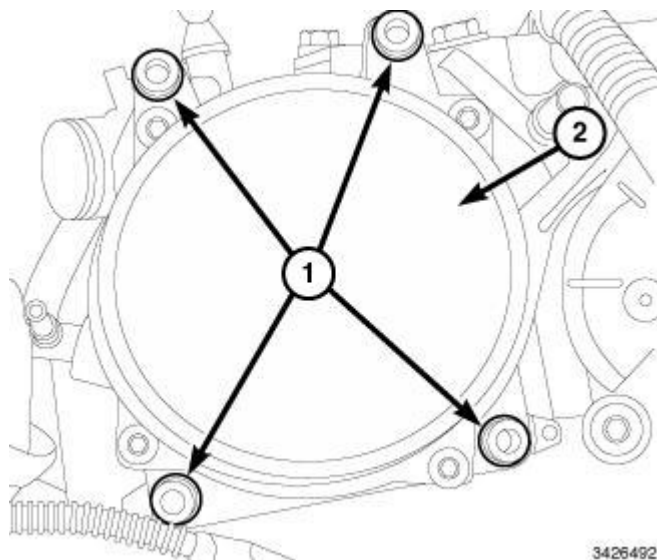


Fig. 173: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: Observe the position of drive gear on rear of pump upon removal.

5. Remove bolts (1) and the vacuum pump (2).
6. Remove and discard gasket.

INSTALLATION

INSTALLATION

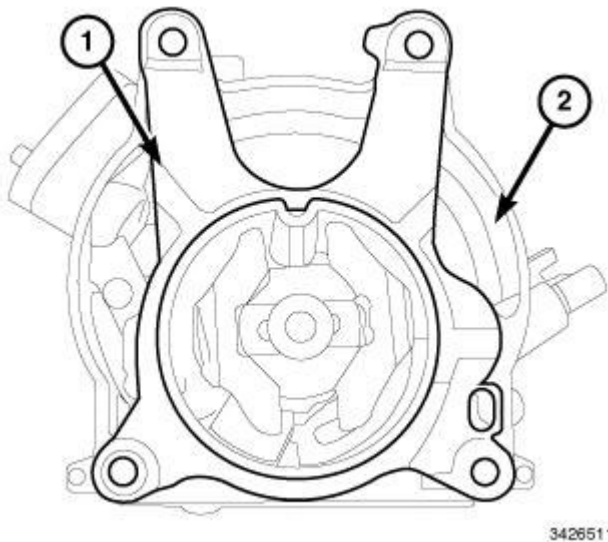


Fig. 174: Vacuum Pump & Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Clean all gasket sealing surfaces.
2. Install new gasket (1) onto the vacuum pump (2).

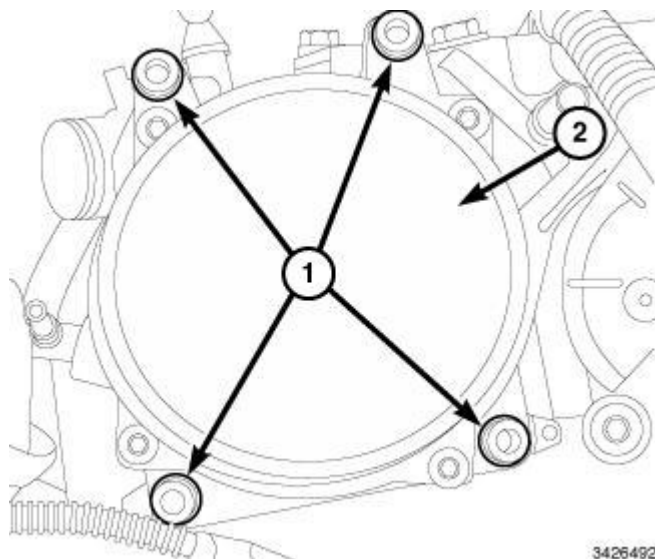


Fig. 175: Vacuum Pump & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Position driver gear on rear of pump and install vacuum pump (2) and securely tighten bolts.
4. Install the thermostat. Refer to **THERMOSTAT, INSTALLATION** .

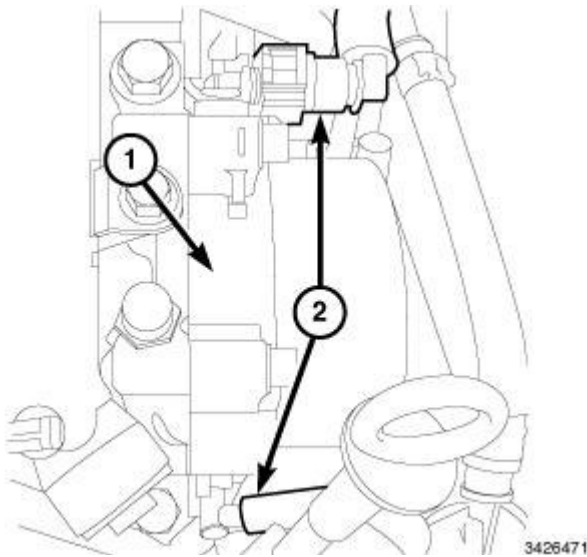


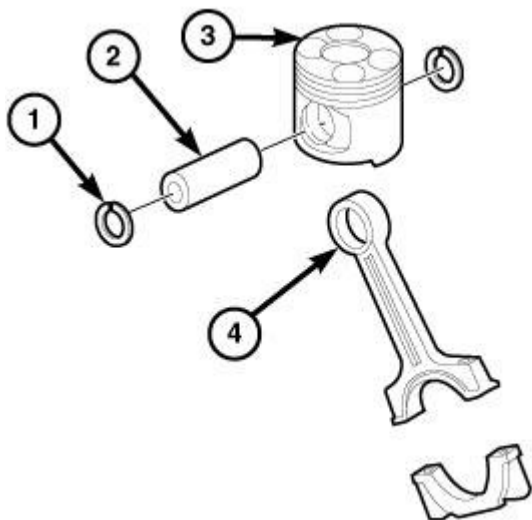
Fig. 176: Vacuum Pump & Vacuum Lines
 Courtesy of CHRYSLER GROUP, LLC

5. Install vacuum lines (2) onto the vacuum pump (1).
6. Install the engine cover.
7. Connect the negative battery cable.

ROD, PISTON AND CONNECTING

DESCRIPTION

DESCRIPTION



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Fig. 177: Piston & Connecting Rod Assembly
Courtesy of CHRYSLER GROUP, LLC

The pistons (3) are made of silicon aluminum alloy with self-heating inserts and are divided into three size categories.

An OMEGA-shaped combustion chamber in the piston crown improves combustion efficiency.

There is a channel inside the piston through which the oil, sent by the jet, flows, ensuring improved piston cooling.

The piston (3) is coupled to the pin by means of two copper alloy bushes.

The connecting rods (4) are made of hardened and tempered steel with a copper bush fitted for matching with the pin (2).

The floating pins are held in place by two expansion retaining rings (1) that are housed in the grooves in the piston hubs.

REMOVAL

REMOVAL

1. Remove the engine from the vehicle. Refer to **REMOVAL** .
2. Remove the cylinder head. Refer to **CYLINDER HEAD, REMOVAL** .
3. Remove the oil pan. Refer to **PAN, OIL, REMOVAL** .

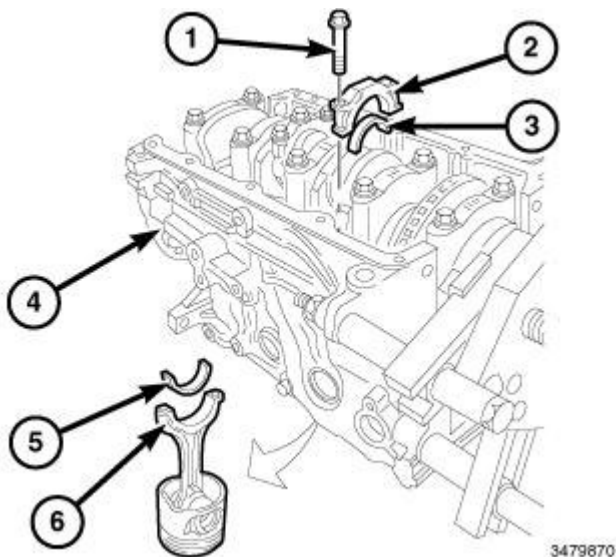


Fig. 178: Piston-Connecting Rods Assembly
Courtesy of CHRYSLER GROUP, LLC

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

4. Mark connecting rods with paint marker.
5. Remove the bolts (1) and remove the connecting rod caps (2) complete with bearings (3).
6. Withdraw and remove the piston-connecting rods assemblies (6) with bearings (5).

PISTON RINGS

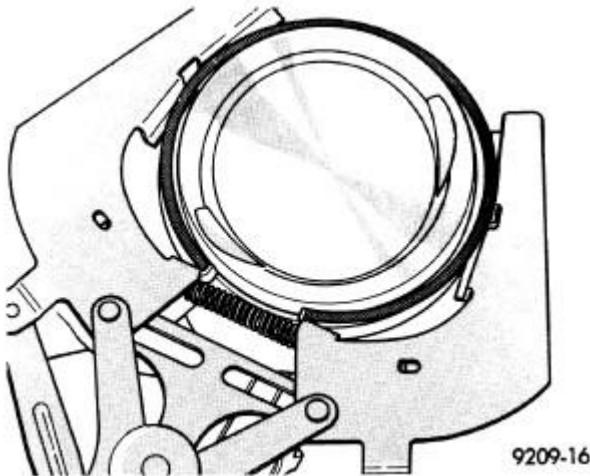


Fig. 179: Piston Rings - Removal/Installation
 Courtesy of CHRYSLER GROUP, LLC

1. Using a suitable ring expander, remove the top and second piston rings.
2. Remove the upper oil ring side rail, lower oil ring side rail and then the oil expander from the piston.
3. Carefully clean carbon from the piston crowns, skirts and ring grooves.
4. Repeat this procedure for the remaining pistons and connecting rod assemblies.

PISTON PIN

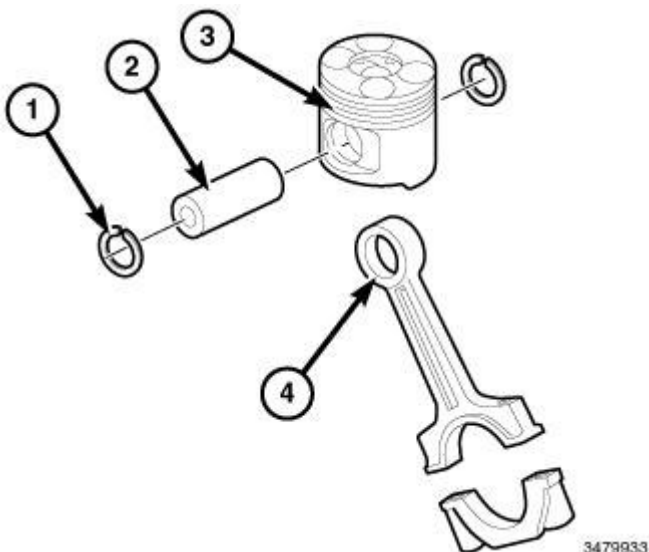
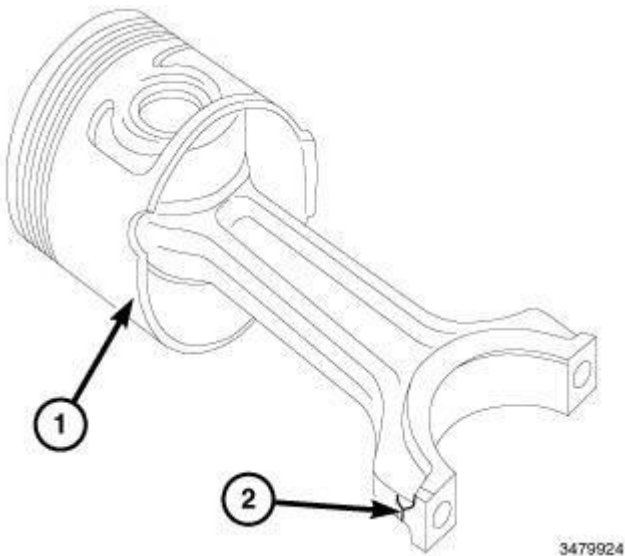


Fig. 180: Piston & Connecting Rod Assembly

Courtesy of CHRYSLER GROUP, LLC

1. Secure the connecting rod (4) in a soft jawed vice.
2. Remove the two snap rings (1) securing the piston pin (2).
3. Push the piston pin (2) out of the piston (3) and the connecting rod (4).
4. Remove the piston (3) from the connecting rod (4).
5. Measure the diameter of the piston pin in the center and on both ends. Refer to **SPECIFICATIONS**.
6. Repeat this procedure for the remaining pistons and connecting rod assemblies.

INSTALLATION**INSTALLATION****PISTON PIN****Fig. 181: Piston & Connecting Rod****Courtesy of CHRYSLER GROUP, LLC**

1. Join the connecting rods to the pistons so that the number printed on connecting rod head (2) is facing notch (1) on the piston skirt for the oil jet housing.

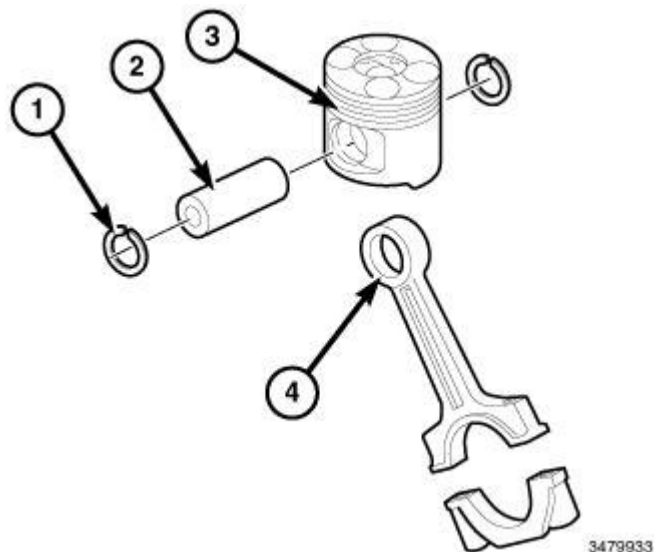


Fig. 182: Piston & Connecting Rod Assembly
Courtesy of CHRYSLER GROUP, LLC

2. Install the pins (2) into the piston (3) and rod (4) assembly and secure them using the retaining rings (1).

PISTON RINGS

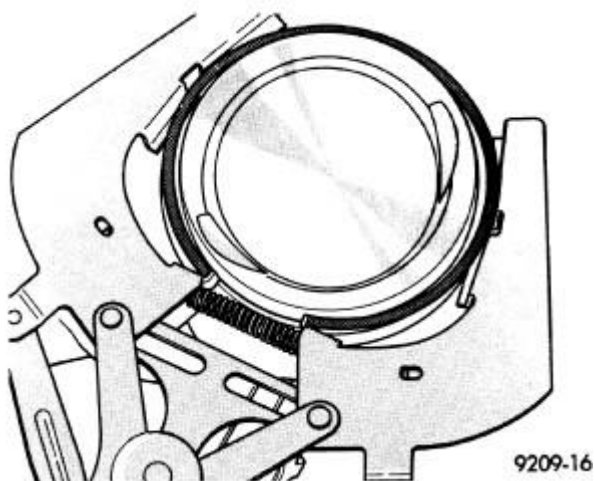
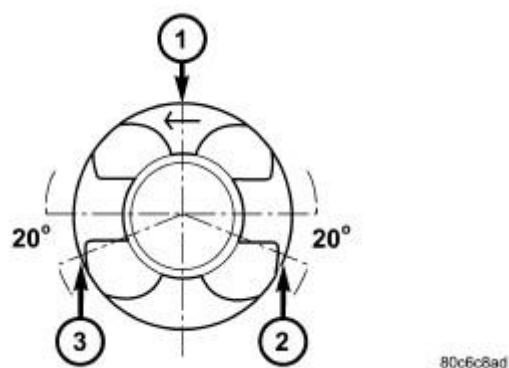


Fig. 183: Piston Rings - Removal/Installation
Courtesy of CHRYSLER GROUP, LLC

1. Install rings on the pistons using a suitable ring expander.

**Fig. 184: Piston Ring Gap Location**

Courtesy of CHRYSLER GROUP, 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 No. 3 position (looking at the piston crown from above).
4. Second piston ring gap should be positioned at the No. 1 position.
5. Oil control ring gap should be positioned at the No. 2 position.

INSTALLATION - CONNECTING ROD

NOTE: The piston-connecting rod assemblies should be fitted in the cylinder block/crankcase so that the drain on the piston skirt is aligned with the oil jet on the crankcase.

1. Make sure the ring end gaps are properly staggered.
2. Lubricate the piston and rings with clean engine oil.
3. Compress piston rings with a ring compressor.

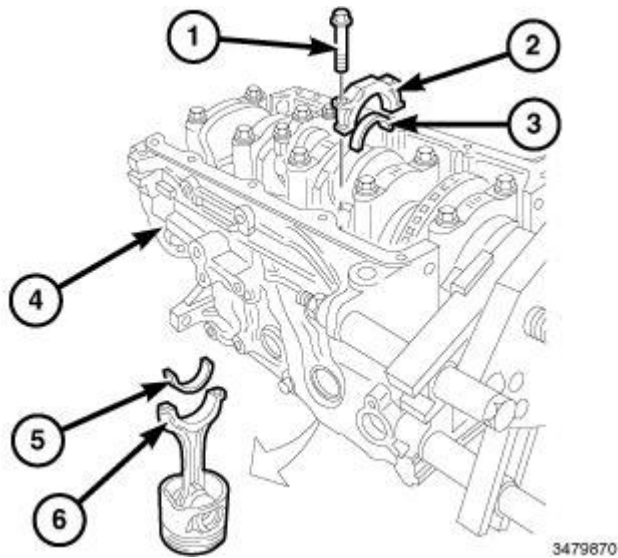


Fig. 185: Piston-Connecting Rods Assembly

Courtesy of CHRYSLER GROUP, LLC

4. Install the upper rod bearing shell (5) into connecting rod (6) and oil bearing shell.

NOTE: The piston-connecting rod assemblies should be fitted in the cylinder block/crankcase so that the drain on the piston skirt is aligned with the oil jet on the crankcase.

5. Push piston into cylinder.

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

NOTE: Fit the connecting rod caps so that the number stamped on each rod faces toward the same side as the number stamped on the big end (inlet side).

6. Install lower bearing shell (3) into connecting rod cap (2).
7. Lubricate lower bearing shell and position rod cap.
8. Install new rod bolts and tighten to 25 N.m (18 ft. lbs.) plus an additional 60° turn.
9. Install oil pan. Refer to **PAN, OIL, INSTALLATION** .
10. Install cylinder head. Refer to **CYLINDER HEAD, INSTALLATION** .
11. Install engine into vehicle Refer to **INSTALLATION** .
12. Replace oil filter and fill with oil. Refer to **FILTER, ENGINE OIL, INSTALLATION** .
13. Fill cooling system. Refer to **STANDARD PROCEDURE** .
14. Start engine and check for leaks.

SEAL, CRANKSHAFT OIL, FRONT

REMOVAL

REMOVAL

1. Disconnect negative battery cable.
2. Remove the front engine cover. Refer to **COVER, ENGINE, FRONT, REMOVAL**.
3. Using suitable prybar, remove the front crankshaft seal.

INSTALLATION**INSTALLATION**

1. Install the front cover. Refer to **COVER, ENGINE, FRONT, INSTALLATION**.

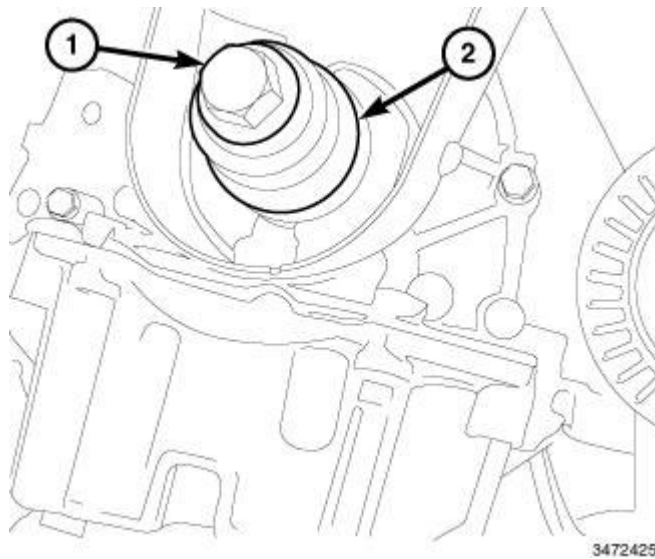


Fig. 186: Crankshaft Sprocket Bolt & Oil Seal
Courtesy of CHRYSLER GROUP, LLC

2. Using the (special tool #20145, Installer, Crankshaft Front Oil Seal), install the front crankshaft oil seal (2) using the crankshaft sprocket bolt (1) to draw the seal in place.
3. Remove bolt (1) and the (special tool #20145, Installer, Crankshaft Front Oil Seal).
4. Install the front engine cover. Refer to **COVER, ENGINE, FRONT, INSTALLATION**.
5. Connect negative battery cable.

LUBRICATION**DIAGNOSIS AND TESTING****DIAGNOSIS AND TESTING - CHECKING ENGINE OIL PRESSURE**

1. Disconnect and remove oil pressure switch. Refer to **SENSOR, OIL PRESSURE, REMOVAL**.
2. Install oil pressure gauge.
3. Start engine and record oil pressure. Refer to Specifications for correct oil pressure requirements. Refer to

SPECIFICATIONS .

CAUTION: *If pressure is ZERO at curb idle, DO NOT run engine at 4000 rpm.

4. If oil pressure is 0 at idle, shut off engine. Check for a failed oil pressure regulator, a clogged oil pickup screen or a damaged oil pickup tube gasket.
5. Remove the oil pressure regulator and inspect the regulator and wire harness. Refer to **REGULATOR, OIL PRESSURE, REMOVAL**.
6. Remove oil pan and inspect for debris and repair as necessary. Refer to **PAN, OIL, REMOVAL**.
7. After test is complete, remove test gauge and fitting.
8. Install oil pressure switch. Refer to **SENSOR, OIL PRESSURE, INSTALLATION**.

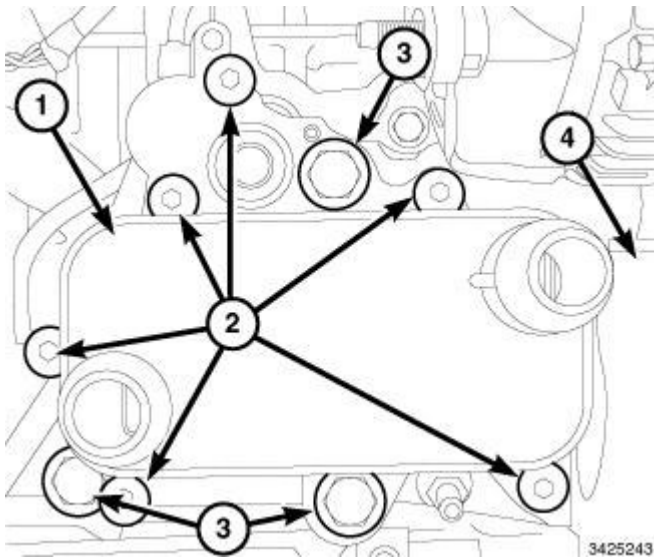
COOLER, OIL**REMOVAL****REMOVAL**

Fig. 187: Engine Oil Cooler, Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the oil filter housing (4). Refer to **HOUSING, OIL FILTER, REMOVAL**.
2. Remove bolts (2) and the engine oil cooler (1).
3. Remove and discard gasket.

INSTALLATION**INSTALLATION**

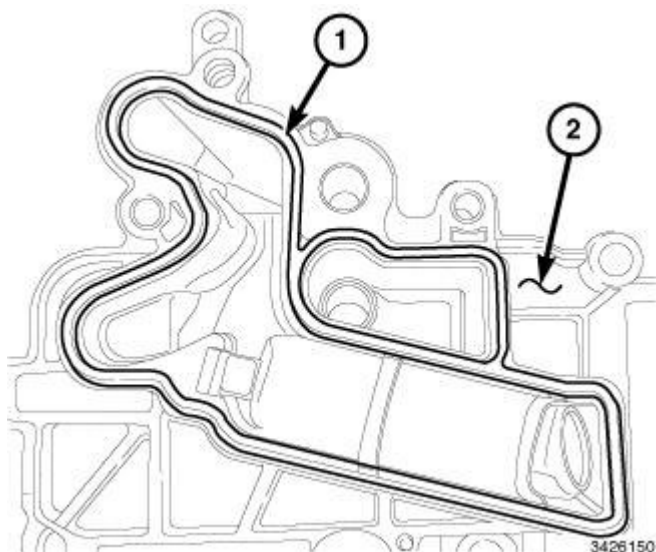


Fig. 188: Oil Filter Housing & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean all engine mating surfaces.
2. Install a new oil cooler O-ring seal (1) onto the oil filter housing (2).

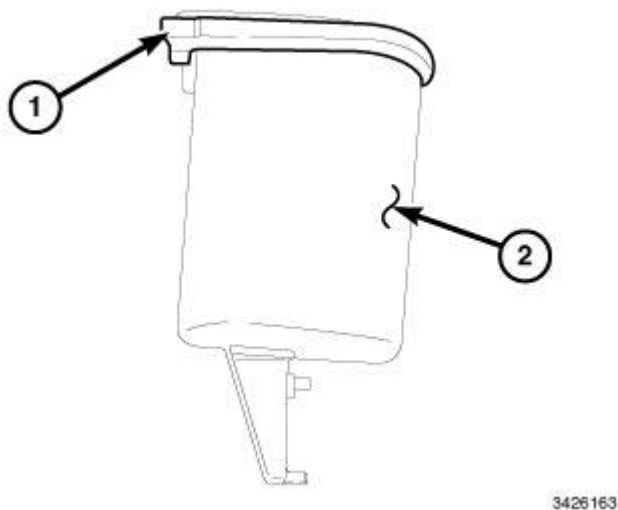


Fig. 189: Oil Filter Housing Baffle & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

3. Install a new O-ring seal (1) onto the oil filter housing baffle (2).

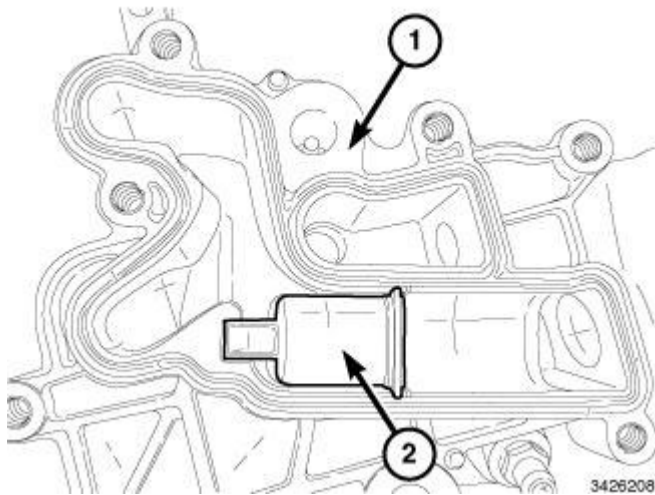


Fig. 190: Oil Filter Housing & Baffle
Courtesy of CHRYSLER GROUP, LLC

4. Install baffle (2) into the oil filter housing (1).

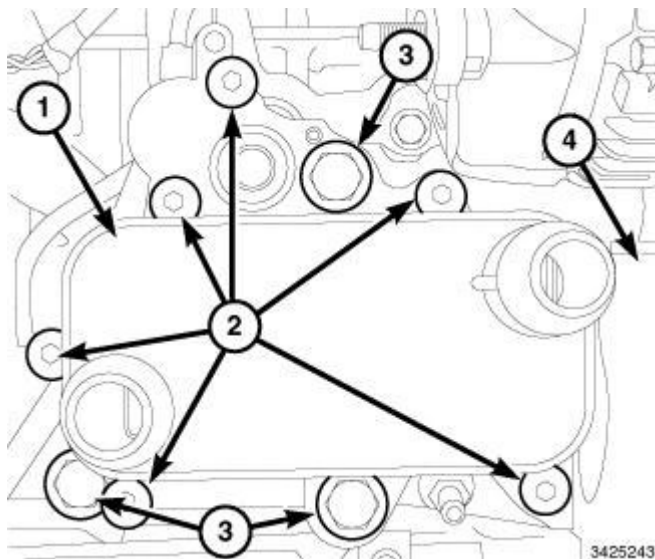


Fig. 191: Engine Oil Cooler, Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the engine oil cooler. Tighten bolts to 30 N.m (22 ft. lbs.).
6. Install the oil filter housing (4). Refer to **HOUSING, OIL FILTER, INSTALLATION**.

FILTER, ENGINE OIL

REMOVAL

REMOVAL

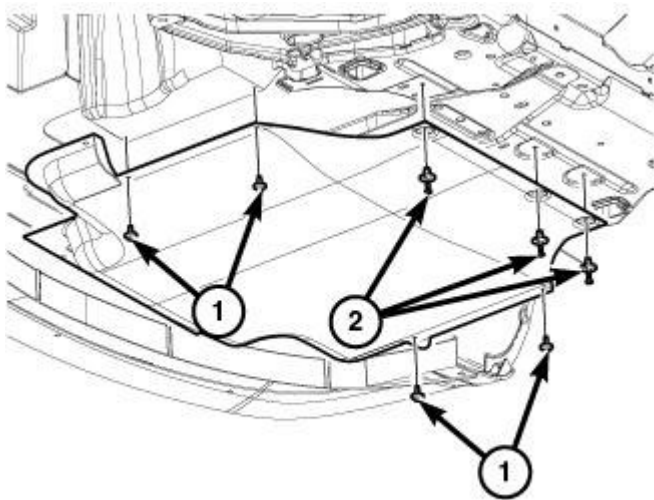


Fig. 192: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the bellypan.

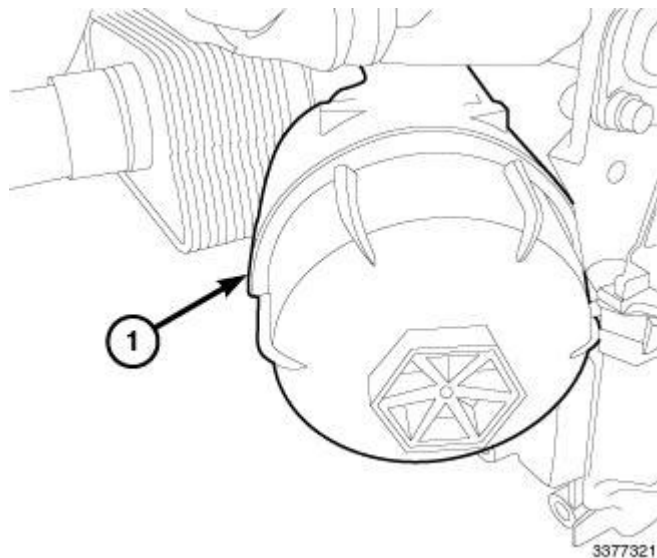
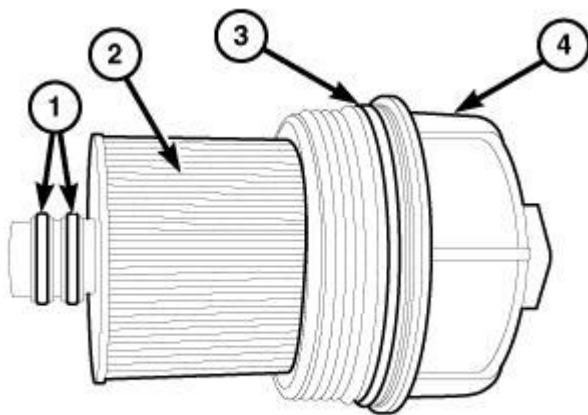


Fig. 193: Oil Filter Housing
 Courtesy of CHRYSLER GROUP, LLC

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

INSTALLATION

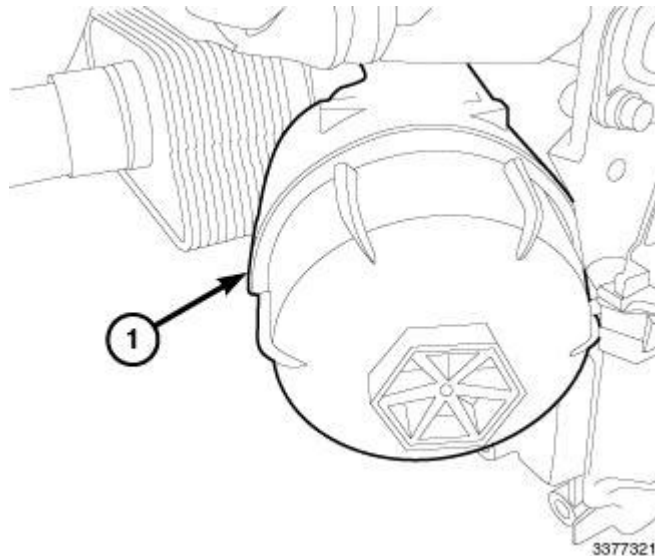
INSTALLATION



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Fig. 194: O-Ring Seals, Oil Filter Cartridge, O-Ring & Cover
Courtesy of CHRYSLER GROUP, LLC

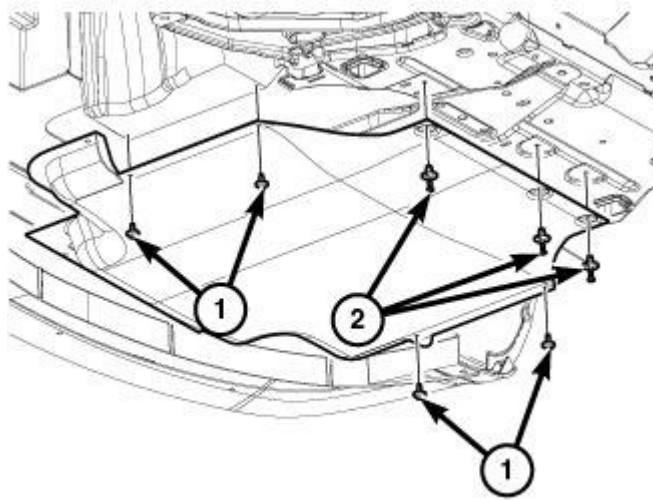
1. Lubricate and install new O-ring (3) onto cover (4).
2. position the oil filter cartridge (2) into cover and lubricate O-ring seals (1).



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Fig. 195: Oil Filter Housing
Courtesy of CHRYSLER GROUP, LLC

3. Install oil filter housing cover. Tighten cover to 25 N.m (18 ft. lbs.).



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Fig. 196: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

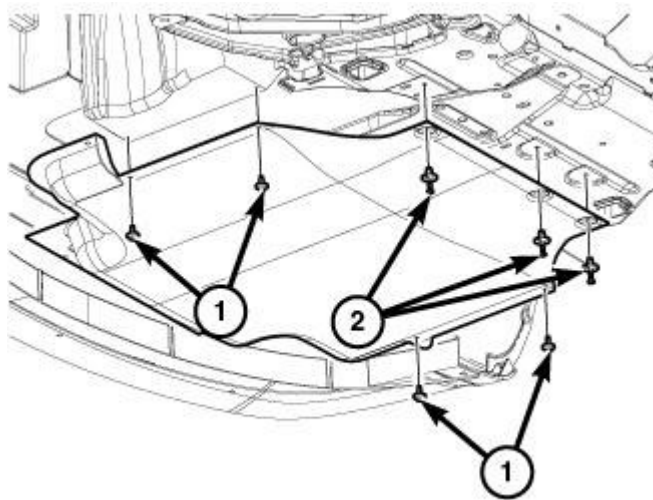
4. Install the bellypan.
5. Lower the vehicle.

HOUSING, OIL FILTER

REMOVAL

REMOVAL

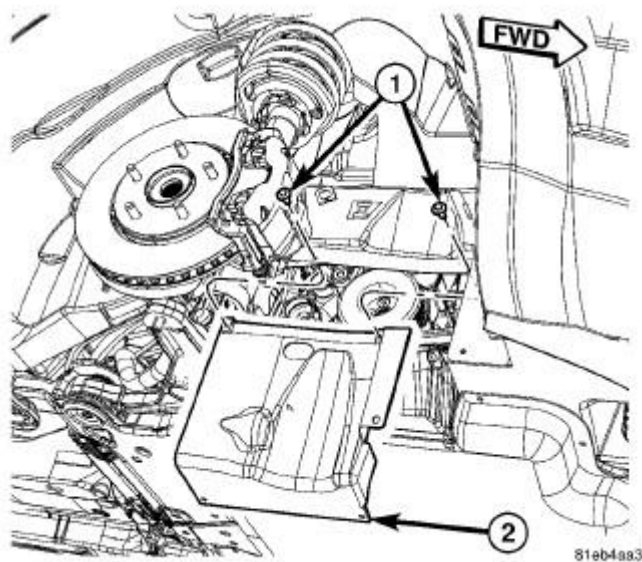
1. Disconnect the negative battery cable.
2. Raise and support the vehicle Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove the front lower closeout panel fascia. Refer to **FASCIA, FRONT LOWER, CLOSEOUT, REMOVAL** .
4. Drain the cooling system. Refer to **STANDARD PROCEDURE** .



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Fig. 197: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

5. Remove the belly pan.



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Fig. 198: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

6. Remove the right lower splash shield (2).
7. Remove the serpentine belt. Refer to **BELT, SERPENTINE, REMOVAL** .
8. Remove the right front half shaft and intermediate shaft. Refer to **REMOVAL** .

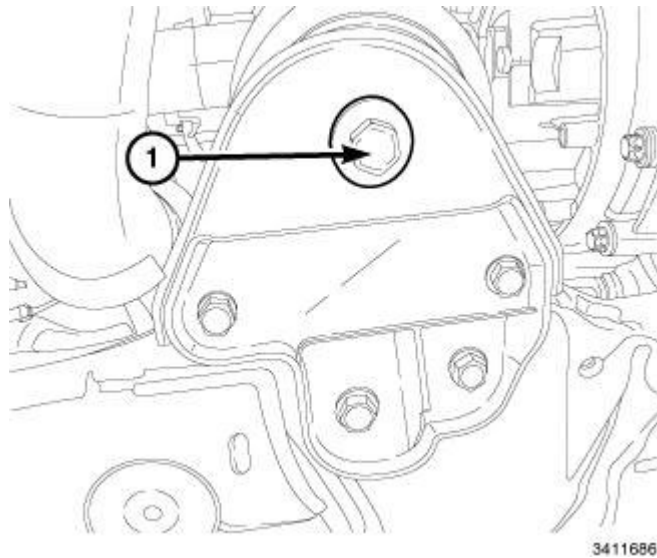


Fig. 199: Rear Transmission Mount Through Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Remove the rear engine mount through bolt.

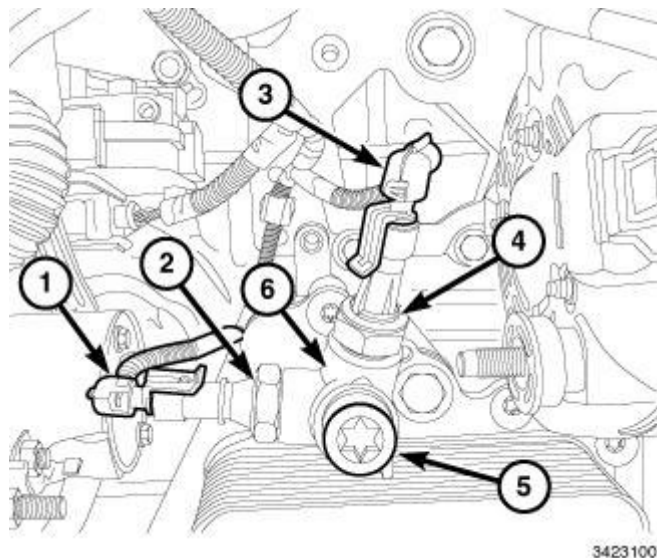


Fig. 200: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Disconnect oil pressure sensor harness connectors (1, 3) and detach harness from oil filter housing.
11. Remove bolt (5) and the oil pressure switch manifold (6).

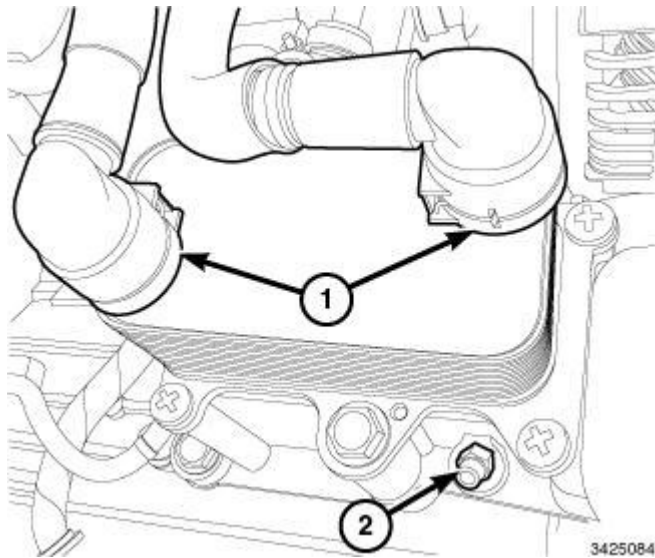


Fig. 201: Oil Cooler Hoses & Drain Valve
Courtesy of CHRYSLER GROUP, LLC

12. Disconnect both oil cooler hoses (1).
13. Open drain valve (2) to drain the oil filter housing and securely tighten drain valve.

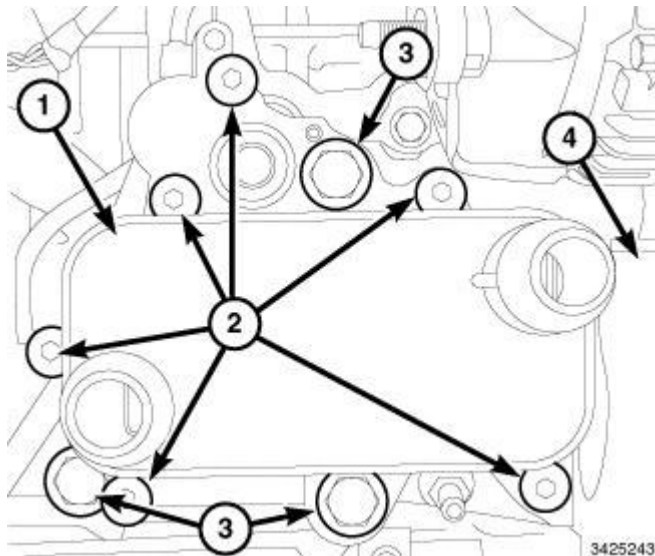


Fig. 202: Engine Oil Cooler, Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove bolts (1) and the oil filter housing (4).

INSTALLATION

INSTALLATION

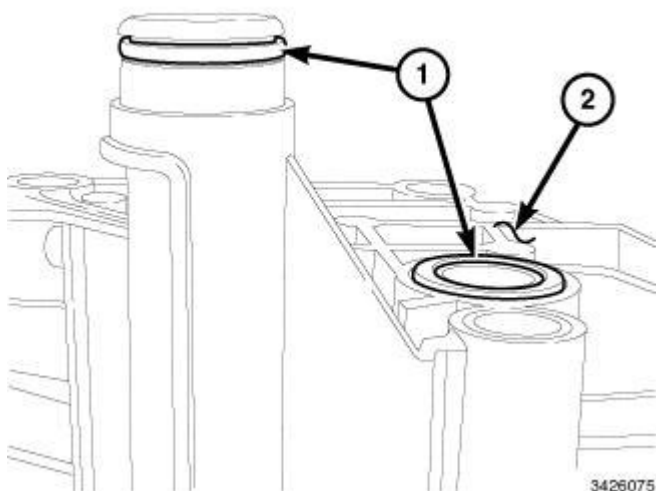


Fig. 203: Oil Filter Housing & O-Ring Seal
Courtesy of CHRYSLER GROUP, LLC

1. Clean the gasket sealing surfaces.
2. Install new O-ring seal (1) onto the oil filter housing (2).

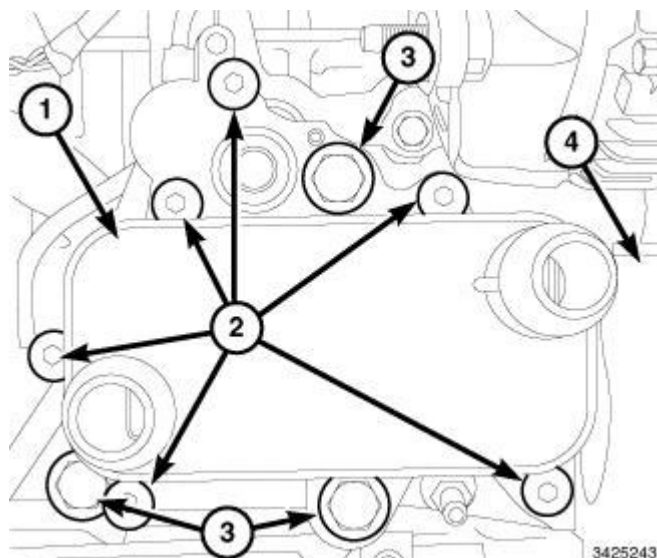


Fig. 204: Engine Oil Cooler, Oil Filter Housing & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install oil filter housing (1). Tighten bolts (2) to 30 N.m (22 ft. lbs.).

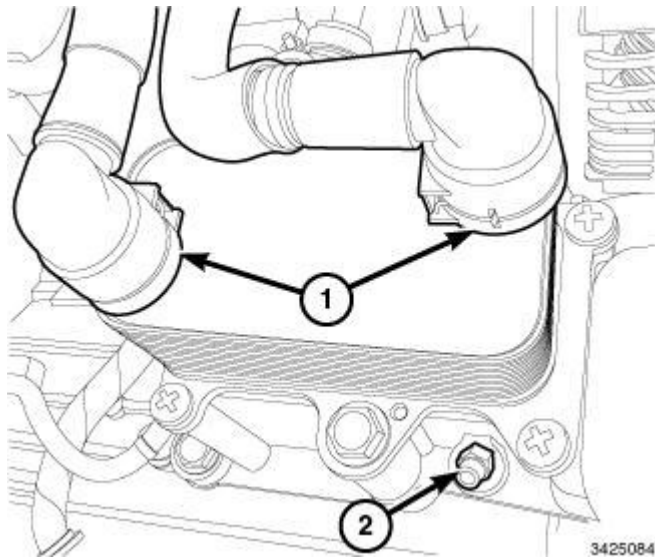


Fig. 205: Oil Cooler Hoses & Drain Valve
Courtesy of CHRYSLER GROUP, LLC

4. Connect both oil cooler hoses (1).

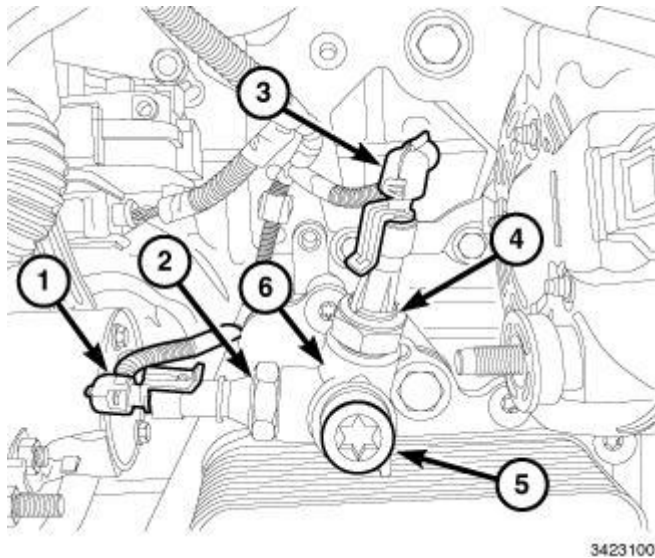


Fig. 206: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

5. Using new sealing washers, install the oil pressure switch manifold (5). Tighten bolt (6) to 25 N.m (18 ft. lbs.).
6. Attach the wire harness to oil filter housing and connect oil pressure sensor harness connectors (1, 3).

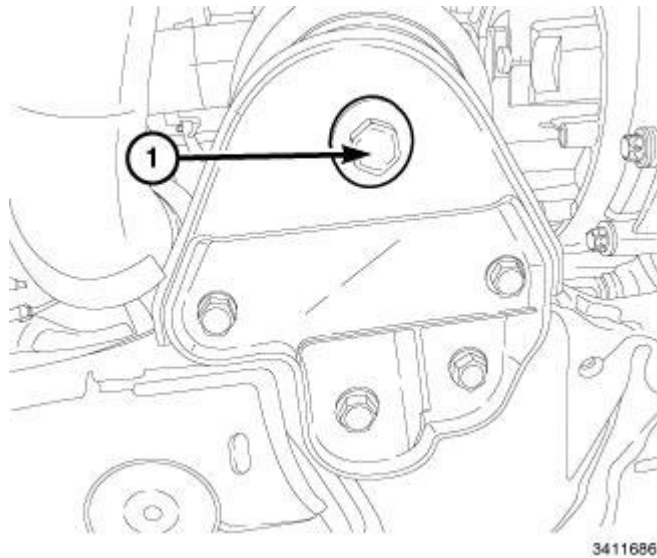


Fig. 207: Rear Transmission Mount Through Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Install the rear mount bolt (1) and tighten to 110 N.m (81 ft. lbs.).

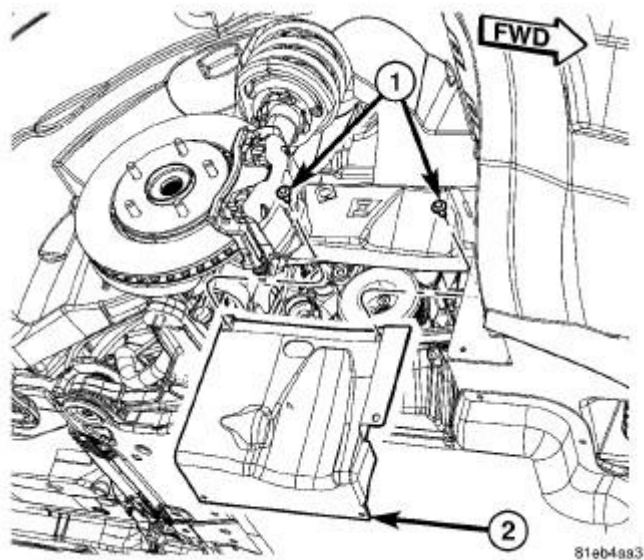
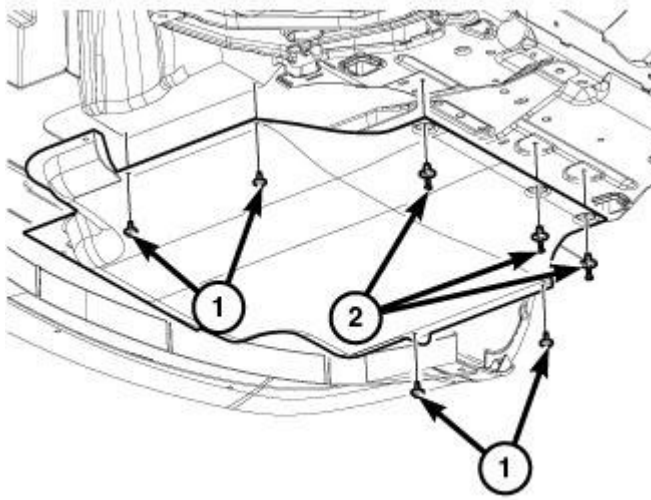


Fig. 208: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

8. Install the right front half shaft and intermediate shaft. Refer to INSTALLATION .
9. Install the serpentine belt. Refer to BELT, SERPENTINE, INSTALLATION .
10. Install the right lower splash shield (2).



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Fig. 209: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Install the belly pan.
12. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
13. Install the front lower closeout panel fascia. Refer to **FASCIA, FRONT LOWER, CLOSEOUT, INSTALLATION** .
14. Lower the vehicle.
15. Connect the negative battery cable.

OIL

STANDARD PROCEDURE

STANDARD PROCEDURE - ENGINE OIL AND FILTER CHANGE

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

Change engine oil at mileage and time intervals described in the Maintenance Schedule. Refer to **MAINTENANCE SCHEDULES, DESCRIPTION** .

1. Run engine until achieving normal operating temperature.
2. Position the vehicle on a level surface and turn engine off.
3. Remove oil fill cap.

4. Raise vehicle on hoist. Refer to **JUMP STARTING, STANDARD PROCEDURE** .
5. Place a suitable oil collecting container under oil pan drain plug.
6. Remove oil pan drain plug or and allow oil to drain into collecting container. Inspect drain plug threads for stretching or other damage. Replace drain plug and gasket if damaged.
7. Remove oil filter. Refer to **FILTER, ENGINE OIL, REMOVAL** .
8. Using a new sealing washer, install oil pan drain plug and to 25 N.m (18 ft. lbs.).
9. Install new oil filter. Refer to **FILTER, ENGINE OIL, INSTALLATION** .
10. Lower vehicle and fill crankcase with specified type and amount of engine oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS** .
11. Install oil fill cap.
12. Start engine and inspect for leaks.
13. Stop engine and inspect oil level.

OIL FILTER SPECIFICATION

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

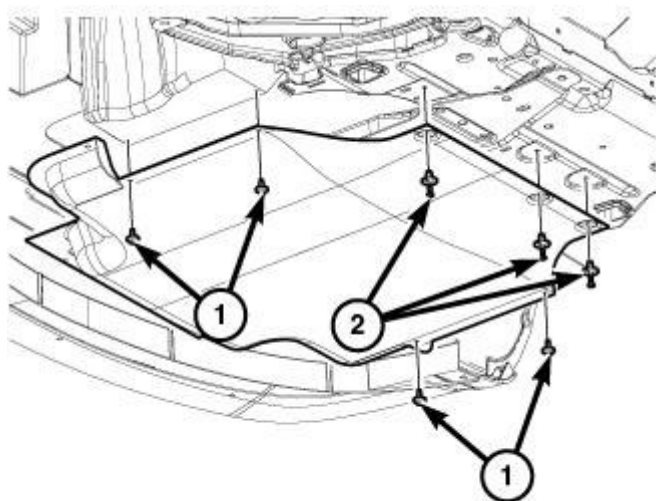
USED ENGINE OIL DISPOSAL

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

PAN, OIL

REMOVAL

REMOVAL



3371968

Fig. 210: Engine Belly Pan & Fasteners

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Raise vehicle on hoist. Refer to **HOISTING, STANDARD PROCEDURE** .
3. Remove fasteners (1, 2) and the belly pan.
4. Drain engine oil using a new sealing washer tighten drain plug to 25 N.m (18 ft. lbs.).
5. Remove fasteners and the oil dipstick.

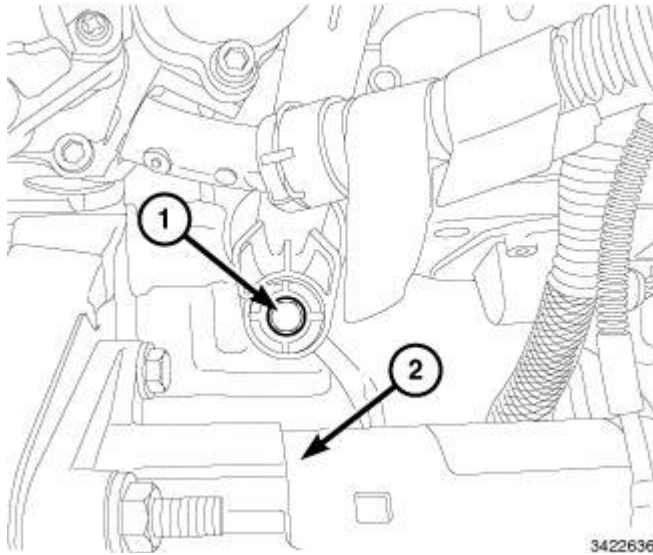


Fig. 211: CCV Housing Lower Bolt & Starter
Courtesy of CHRYSLER GROUP, LLC

6. Remove the starter (2). Refer to **STARTER, REMOVAL** .

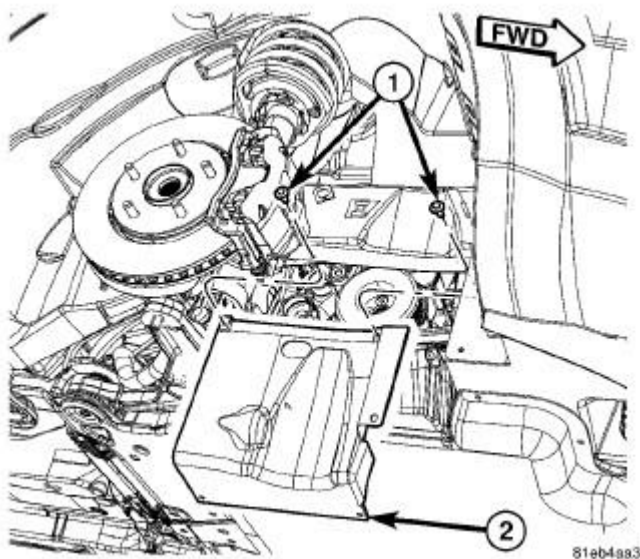


Fig. 212: Right Lower Splash Shield

Courtesy of CHRYSLER GROUP, LLC

7. Remove retainers (1) and the right lower splash shield (2).
8. Remove the right halfshafts and intermediate shaft. Refer to **REMOVAL** .

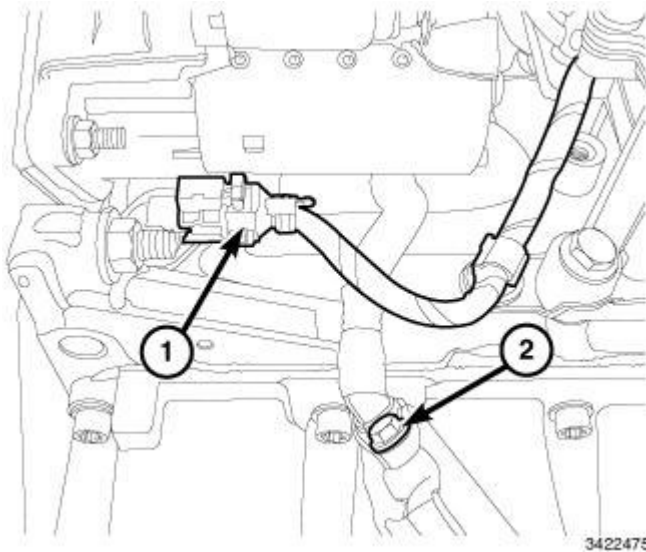


Fig. 213: Crankshaft Position Sensor Harness Connector & CCV Tube Bolt
Courtesy of CHRYSLER GROUP, LLC

9. Disconnect the Crankshaft Position (CKP) Sensor wire harness connector (1).
10. Remove bolt (2) and the lower CCV tube.

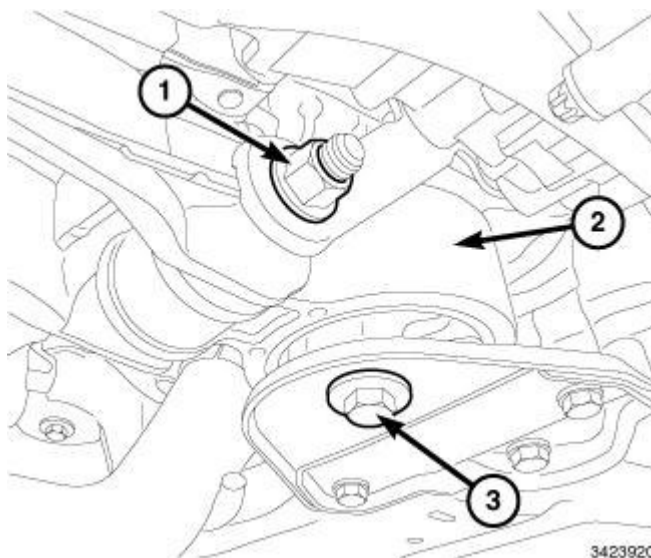
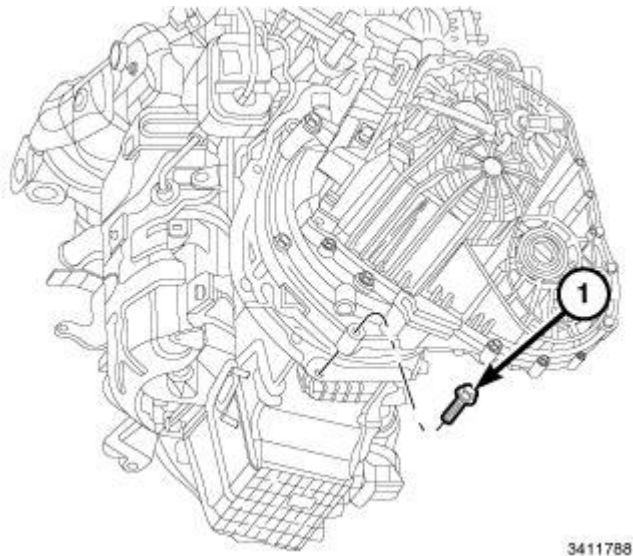


Fig. 214: Support Bracket-To-Engine Mount Bracket Nut, Rear Mount & Bolt
Courtesy of CHRYSLER GROUP, LLC

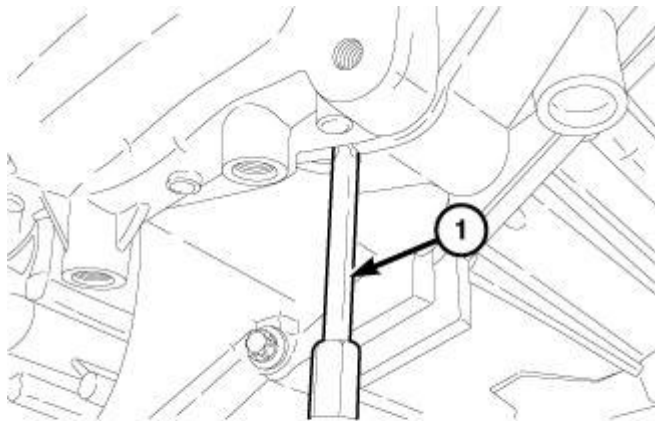
11. Remove the rear mount (2). Refer to **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** .



3411788

Fig. 215: Lower Bellhousing Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Remove the lower bell housing-oil pan bolts (1).



3475342

Fig. 216: Crankshaft Sump Remover/Installer
Courtesy of CHRYSLER GROUP, LLC

13. Using the (special tool #20110, Remover/Installer, Crankshaft Sump) Tool (1), remove the two oil pan-to-rear oil seal carrier bolts.

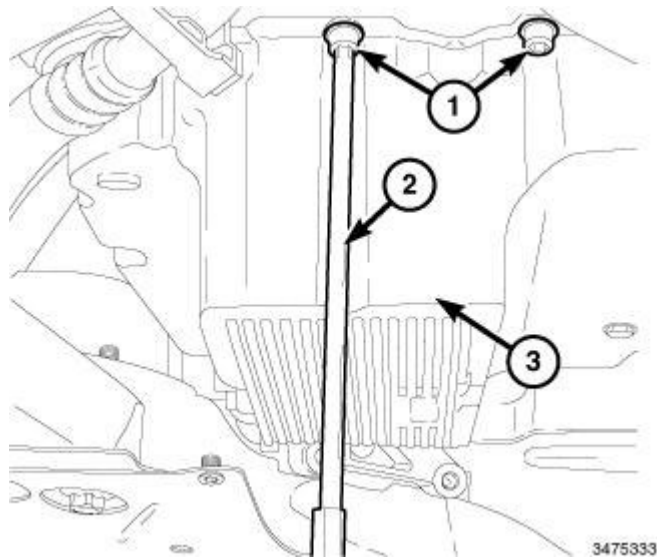


Fig. 217: Oil Pan, Key Tool & Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Using the (special tool #20111, Remover/Installer, Cylinder Head Bolt) Tool (2), remove the oil pan bolts (1).
15. Remove oil pan (3) by prying off with suitable pry bar.
16. Remove the oil pump intake connector gasket.
17. Clean oil pan and engine block sealing surfaces.

INSTALLATION

INSTALLATION

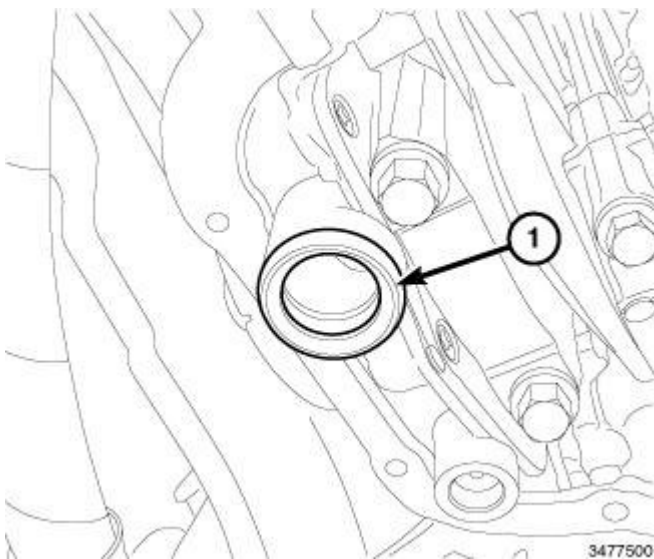


Fig. 218: Oil Pump Intake Gasket
Courtesy of CHRYSLER GROUP, LLC

1. Clean oil pan and all sealing surfaces. Refer to **STANDARD PROCEDURE** .
2. Install a new gasket (1) onto the oil pump intake.
3. Apply a 3 mm bead of RTV to oil pan. Refer to **STANDARD PROCEDURE** .

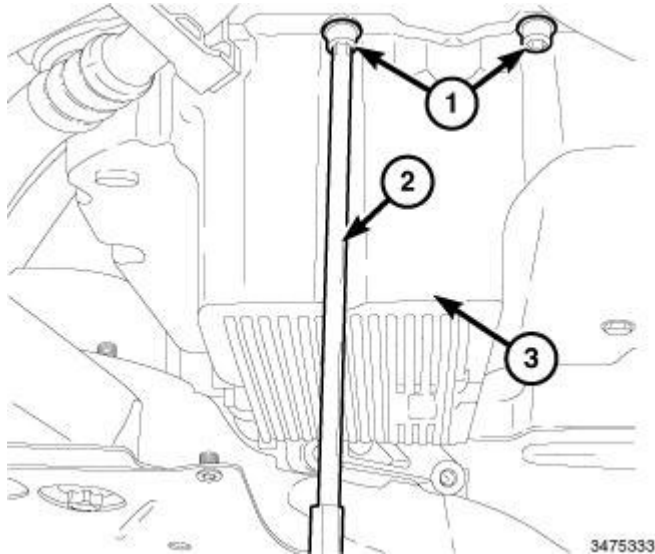


Fig. 219: Oil Pan, Key Tool & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Position oil pan (3), using the (special tool #20111, Remover/Installer, Cylinder Head Bolt) Tool (2) install bolts (1) and tighten to 25 N.m (18 ft. lbs.).

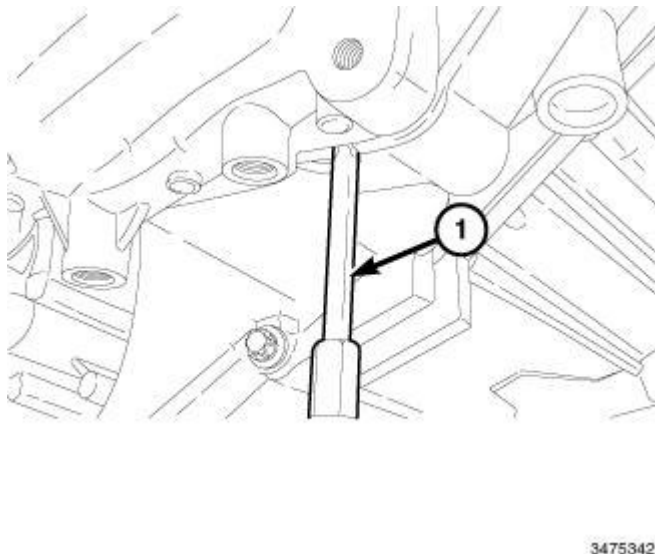


Fig. 220: Crankshaft Sump Remover/Installer
Courtesy of CHRYSLER GROUP, LLC

5. Using the (special tool #20110, Remover/Installer, Crankshaft Sump) Tool (1), install the two oil pan-to-rear oil seal carrier bolts and tighten to 9 N.m (80 in. lbs.).

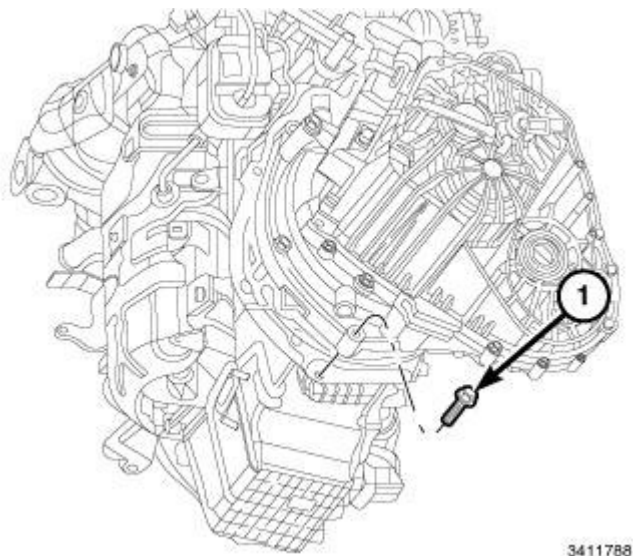


Fig. 221: Lower Bellhousing Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install bell housing-to-oil pan to bolts and tighten to 40 N.m (30 ft. lbs.).

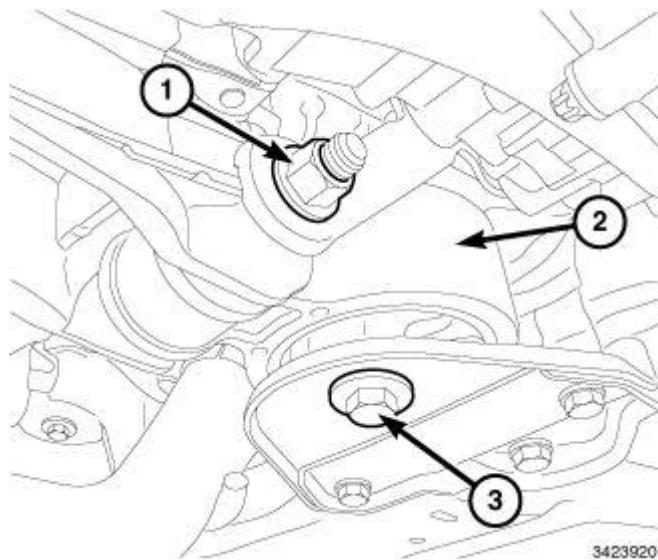


Fig. 222: Support Bracket-To-Engine Mount Bracket Nut, Rear Mount & Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Install the rear mount (2). Refer to **INSULATOR, ENGINE MOUNT, REAR, INSTALLATION** .

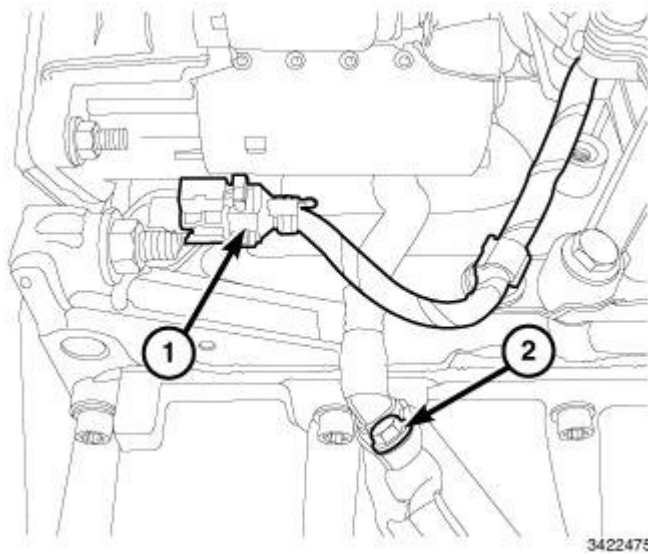


Fig. 223: Crankshaft Position Sensor Harness Connector & CCV Tube Bolt
Courtesy of CHRYSLER GROUP, LLC

8. Install the lower CCV tube. Tighten bolt (2) to 9 N.m 80 in. lbs.).
9. Connect the Crankshaft Position (CKP) Sensor wire harness connector (1).

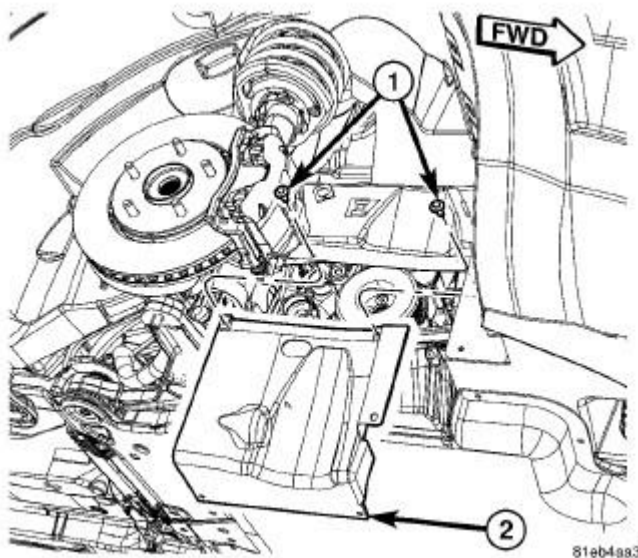


Fig. 224: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

10. Install the right intermediate shaft and halfshafts. Refer to **INSTALLATION**.
11. Position the right lower splash shield (2) and install retainers (1).

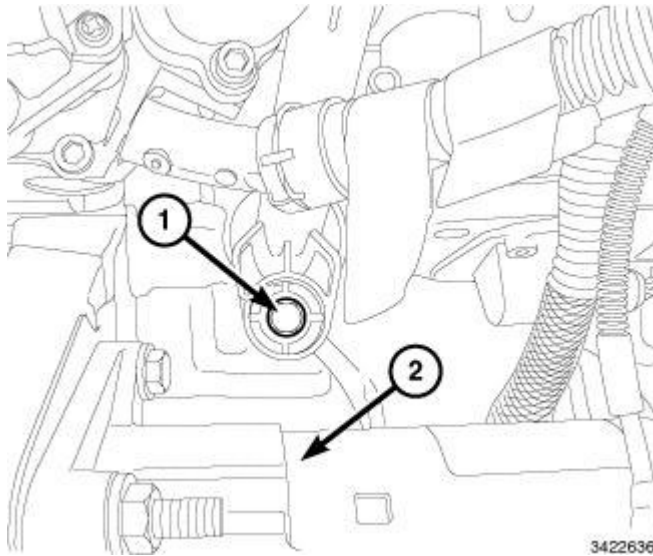


Fig. 225: CCV Housing Lower Bolt & Starter
Courtesy of CHRYSLER GROUP, LLC

12. Install the starter (2). Refer to **STARTER, INSTALLATION**.

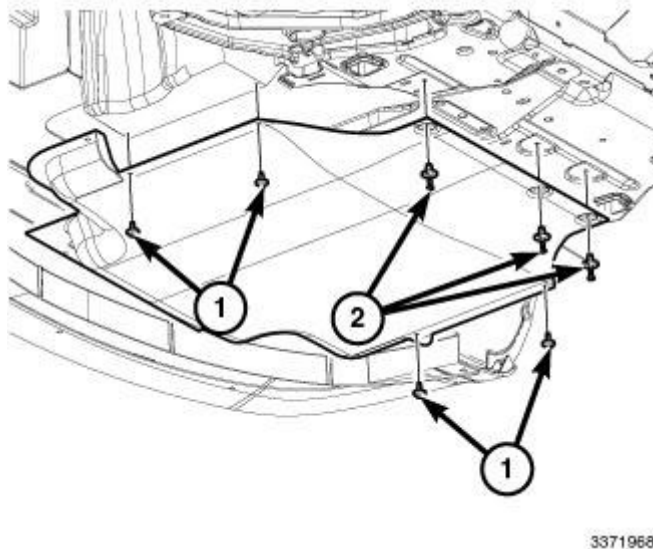
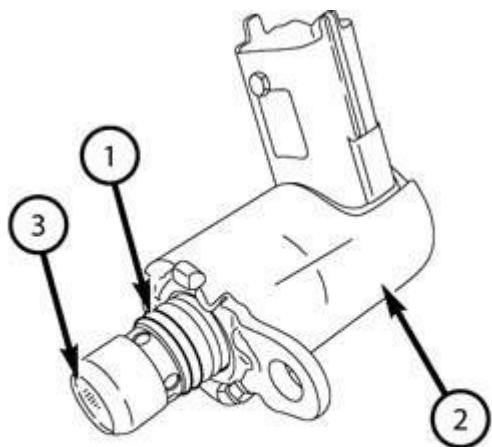


Fig. 226: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Install the oil dipstick tube and securely tighten fasteners.
14. Install the belly pan and the fasteners (1, 2).
15. Lower the vehicle.
16. Fill the engine with recommended oil. Refer to **CAPACITIES AND RECOMMENDED FLUIDS, SPECIFICATIONS**.
17. Connect the negative battery cable.
18. Start engine and check for leaks.

REGULATOR, OIL PRESSURE**DESCRIPTION****DESCRIPTION**

091174655

Fig. 227: Oil Pressure Regulator**Courtesy of CHRYSLER GROUP, LLC**

The oil pressure regulator (2) regulates oil pressure at the variable rate oil pump and is located on the engine front cover. The PCM energize the Variable Oil Pump Solenoid to increase the oil pressure to the upper limit.

REMOVAL**REMOVAL**

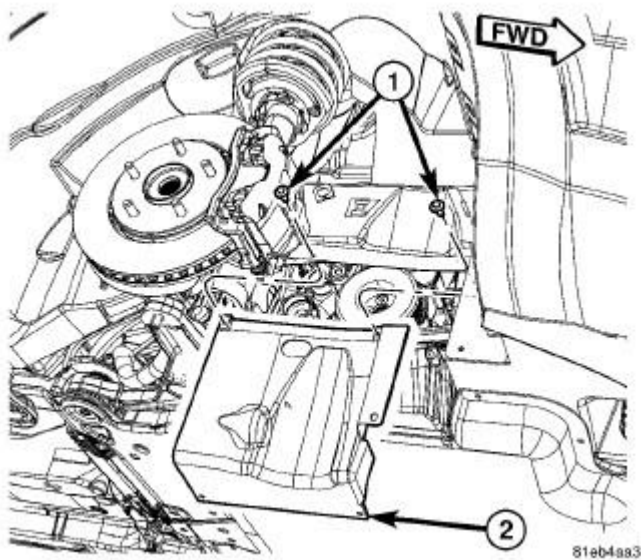


Fig. 228: Right Lower Splash Shield

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect and isolate the negative battery cable.
2. Remove the right front wheel and tire. Refer to **REMOVAL**.
3. Remove fasteners (1) and the right lower splash shield (2).

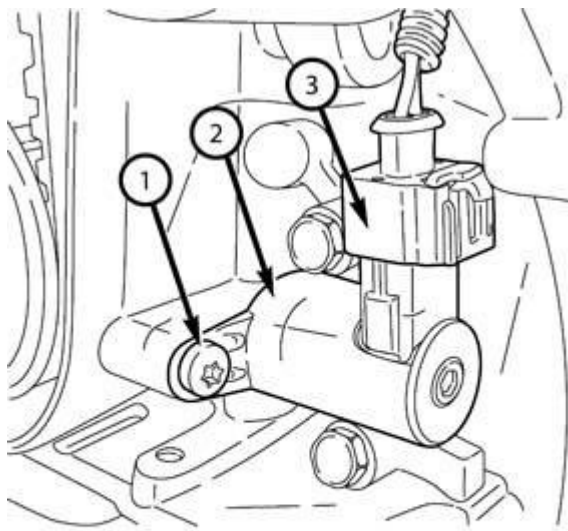


Fig. 229: Oil Pressure Regulator, Bolt & Connector

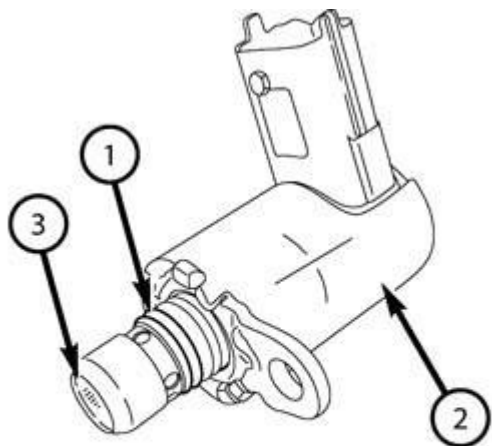
Courtesy of CHRYSLER GROUP, LLC

4. Disconnect oil pressure regulator wire harness connector (3).

5. Remove bolt (1) and oil pressure regulator (2).

INSTALLATION

INSTALLATION

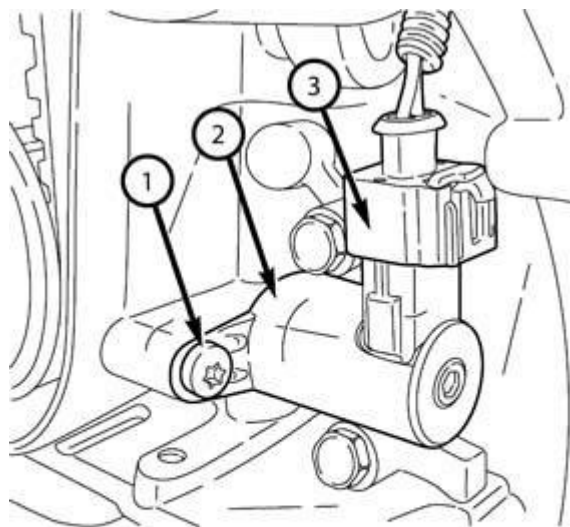


091174655

Fig. 230: Oil Pressure Regulator

Courtesy of CHRYSLER GROUP, LLC

1. Replace the oil pressure regulator O-ring seal (1) and clean and inspect the inlet screen (3).



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Fig. 231: Oil Pressure Regulator, Bolt & Connector
Courtesy of CHRYSLER GROUP, LLC

2. Install oil pressure regulator (3) and tighten bolt (1) to 25 N.m (18 ft. lbs.).
3. Connect oil pressure regulator wire harness connector (3).

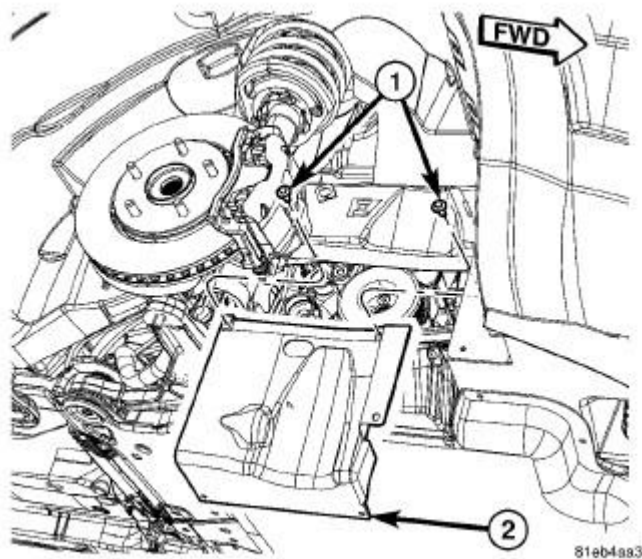


Fig. 232: Right Lower Splash Shield
Courtesy of CHRYSLER GROUP, LLC

4. Install the right lower splash shield (2) and fasteners (1).
5. Install the right front wheel and tire. Refer to **INSTALLATION** .
6. Connect the negative battery cable.

PICK-UP, OIL PUMP

REMOVAL

REMOVAL

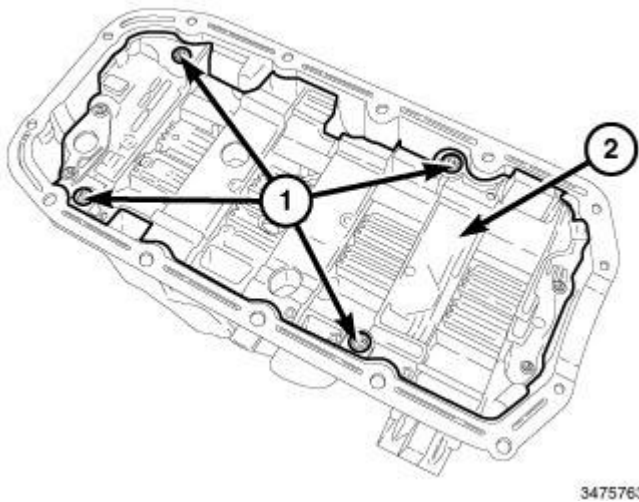


Fig. 233: Crankcase Oil Pickup Tube/Anti-Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the oil pan. Refer to **PAN, OIL, REMOVAL** .
3. Remove bolts (1) and the crankcase oil pickup tube/anti-splash shield (2) from oil pan.

INSTALLATION

INSTALLATION

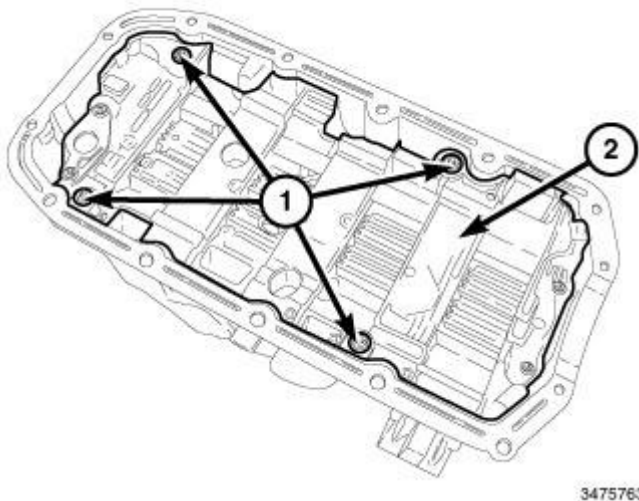


Fig. 234: Crankcase Oil Pickup Tube/Anti-Splash Shield & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the crankcase oil pickup tube/anti-splash shield (2) into oil pan and securely tighten bolts (1).
2. Install the oil pan. Refer to **PAN, OIL, INSTALLATION** .

3. Connect the negative battery cable.

PUMP, ENGINE OIL

REMOVAL

REMOVAL

NOTE: The oil pump is part of the front engine cover and if diagnosis has lead you to replace the oil pump then the front engine cover needs to be replaced.

1. Disconnect the negative battery cable.
2. Remove the front engine cover. Refer to COVER, ENGINE, FRONT, REMOVAL.

INSTALLATION

INSTALLATION

1. Install the front engine cover. Refer to COVER, ENGINE, FRONT, INSTALLATION.
2. Connect the negative battery cable.

SENSOR, OIL PRESSURE

DESCRIPTION

DESCRIPTION

There are two oil pressure switch is located on the backside of the engine attached to the oil cooler housing. The oil pressure switch is a pressure sensitive switch that is activated by the engine's oil pressure (in the main oil gallery). The switch is a single terminal device.

OPERATION

OPERATION

The Powertrain Control Module sends a pull up signal to both Oil Pressure Switches. The Oil Pressure Switches are normally closed (connected to ground) with no oil pressure. When oil pressure surpasses a certain threshold for each switch, the switch becomes open. The PCM interprets the Oil Pressure Switch inputs as follows in the chart below.

Oil Pressure Switch inputs to PCM		
Oil Pressure Switch 1	Oil Pressure Switch 2	PCM INTERPRETATION
Closed	Closed	Oil Pressure below 0.5 bar (7.25 psi)
Open	Closed	Oil pressure between 0.5 bar (7.25 psi) and 1.5 bar (21.75 psi)
Open	Open	Oil pressure above 1.5 bar (21.75 psi)

Closed

Open

switches implausible

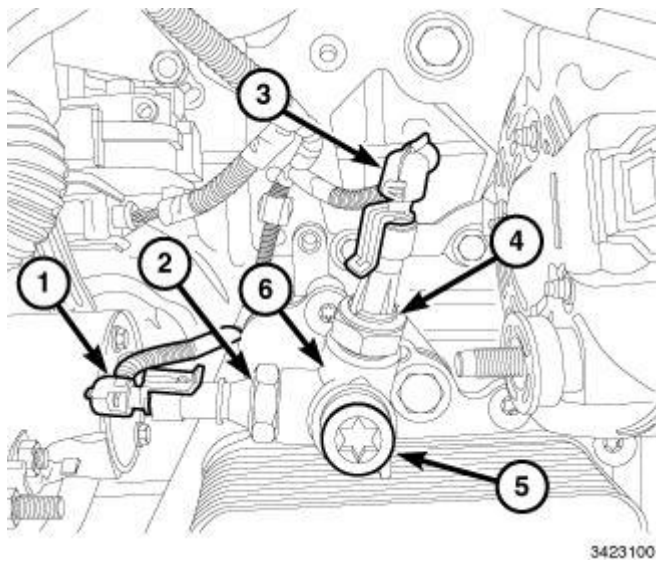
REMOVAL**OIL PRESSURE SWITCH 1**

Fig. 235: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Engine Oil Cooler Hoses Removed for Clarity.

1. Disconnect oil pressure sensor harness connector (3).
2. Remove oil pressure sensor (4).
3. If necessary, remove bolt (5) and the oil pressure switch manifold (6).

OIL PRESSURE SWITCH 2

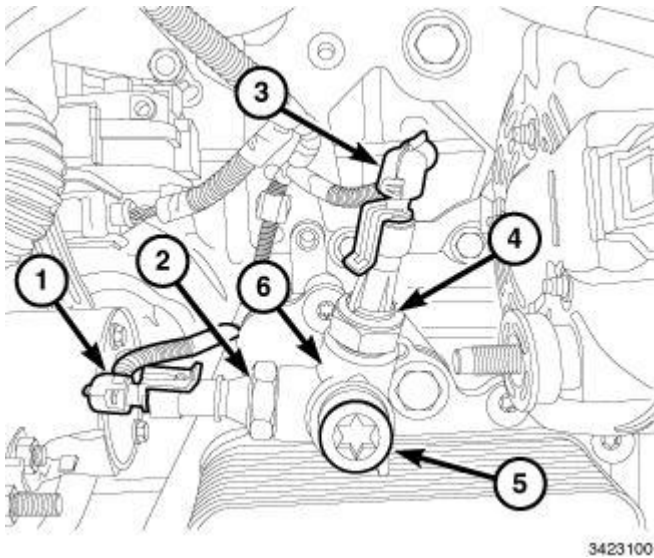


Fig. 236: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: Engine Oil Cooler Hoses Removed for Clarity.

1. Disconnect oil pressure sensor harness connector (1).
2. Remove oil pressure sensor (2).
3. If necessary, remove bolt (5) and the oil pressure switch manifold (6).

INSTALLATION

OIL PRESSURE SWITCH 1

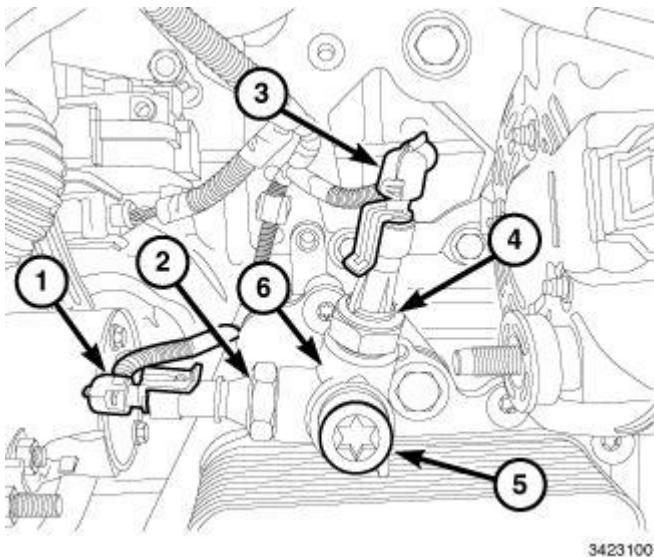


Fig. 237: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install new sealing washers and the oil pressure switch manifold (6). Tighten bolt (5) to 25 N.m (18 ft. lbs.).

NOTE: Engine Oil Cooler Hoses Removed for Clarity.

2. Install oil pressure sensor (4) and tighten to 25 N.m (18 ft. lbs.).
3. Connect oil pressure sensor harness connector (3).

OIL PRESSURE SWITCH 2

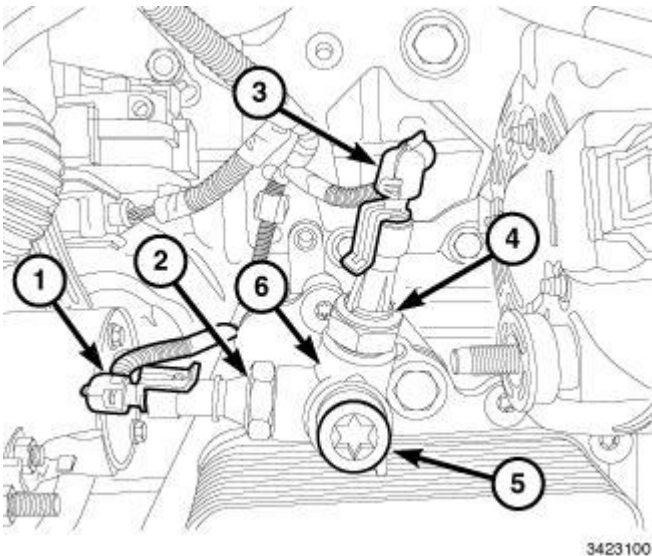


Fig. 238: Oil Pressure Sensor, Connectors, Oil Pressure Switch Manifold & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. If removed, install new sealing washers and the oil pressure switch manifold (6). Tighten bolt (5) to 25 N.m (18 ft. lbs.).

NOTE: Engine Oil Cooler Hoses Removed for Clarity.

2. Install oil pressure sensor (1) and tighten to 20 N.m (177 in. lbs.).
3. Connect oil pressure sensor harness connector (2).

VALVE TIMING

BELT AND SPROCKETS, TIMING

REMOVAL

CAMSHAFT SPROCKET

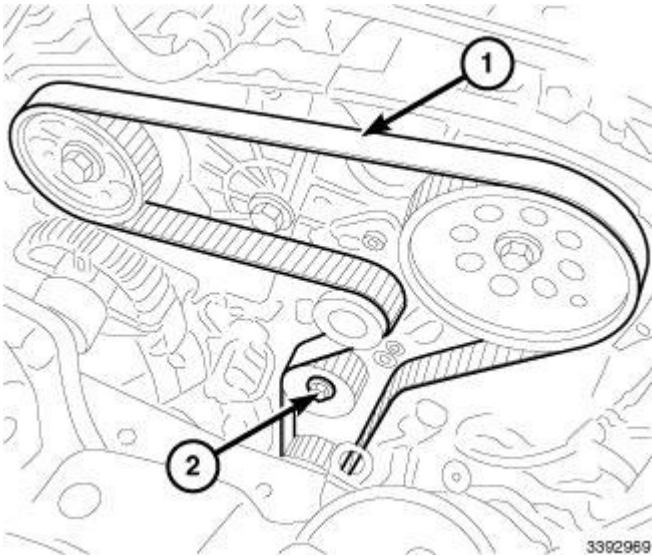


Fig. 239: Timing Belt & Tensioner Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove timing belt (1). Refer to **BELT, TIMING, REMOVAL**.
3. Assemble the Counter Torque Tool (special tool #20126, Remover/Installer, Camshaft Pulley) and Pins (special tool #20127, Pins, Camshaft Pulley Remover/Installer).

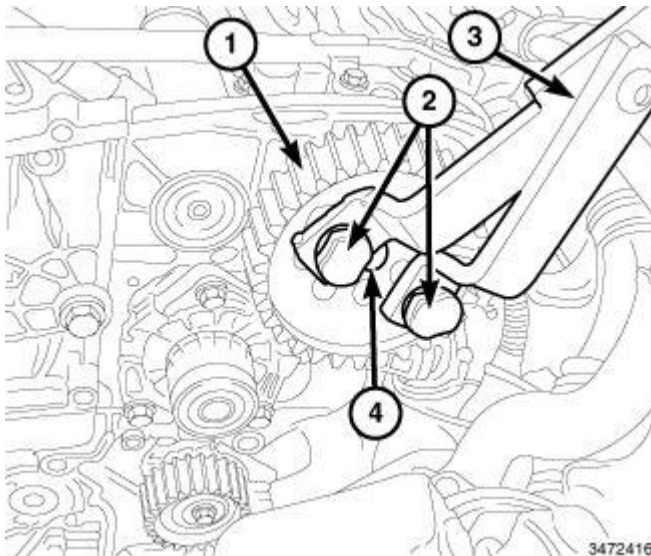


Fig. 240: Camshaft Sprocket, Pins, Counter Torque Tool & Bolt
Courtesy of CHRYSLER GROUP, LLC

4. Using the Counter Torque Tool 20126 (2) and Pins 20127 (3) to hold camshaft sprocket (1), remove bolt (4) and the camshaft sprocket.

CRANKSHAFT SPROCKET

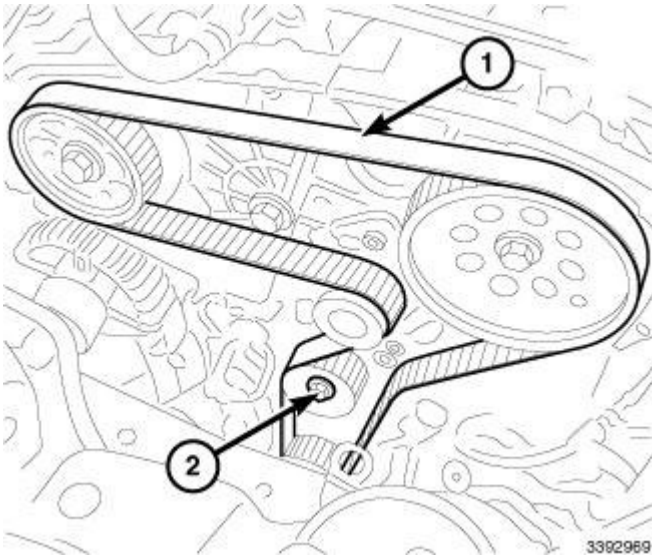


Fig. 241: Timing Belt & Tensioner Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the timing belt (1). Refer to **BELT, TIMING, REMOVAL**.
3. Remove the nuts and the flywheel lower guard.
4. Install the Flywheel Locking Tool 20115.

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

5. Remove bolt and the crankshaft sprocket.

INSTALLATION

CAMSHAFT SPROCKET

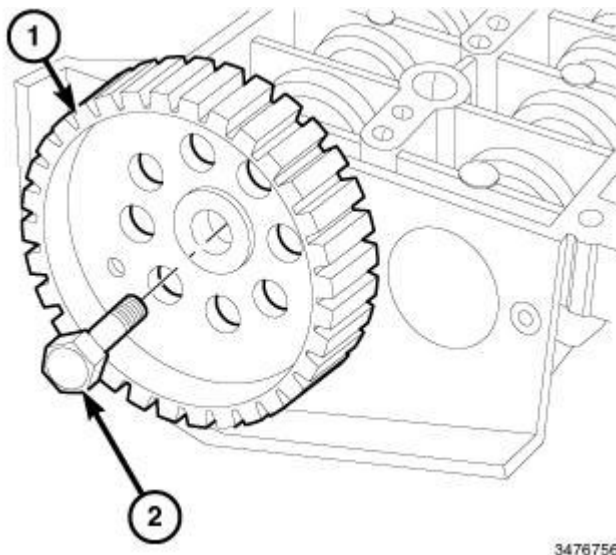


Fig. 242: Camshaft Timing Belt Sprocket & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the camshaft (1) sprocket and tighten bolt finger tight (2).

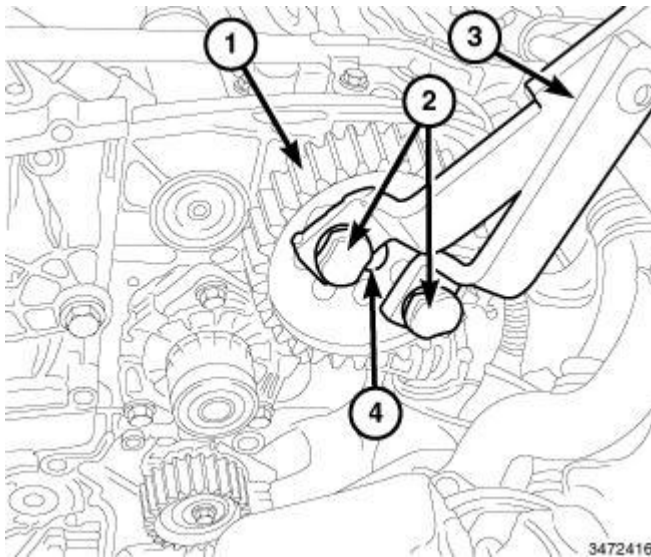


Fig. 243: Camshaft Sprocket, Pins, Counter Torque Tool & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Using the Counter Torque Tool (3) (special tool #20126, Remover/Installer, Camshaft Pulley) and Pins (2) (special tool #20127, Pins, Camshaft Pulley Remover/Installer) to hold camshaft sprocket (1) and tighten the bolt (4) to 30 N.m (22 ft. lbs.) plus an additional 40° turn.
3. Remove the Counter Torque Tool 20126 and Pins 20127.

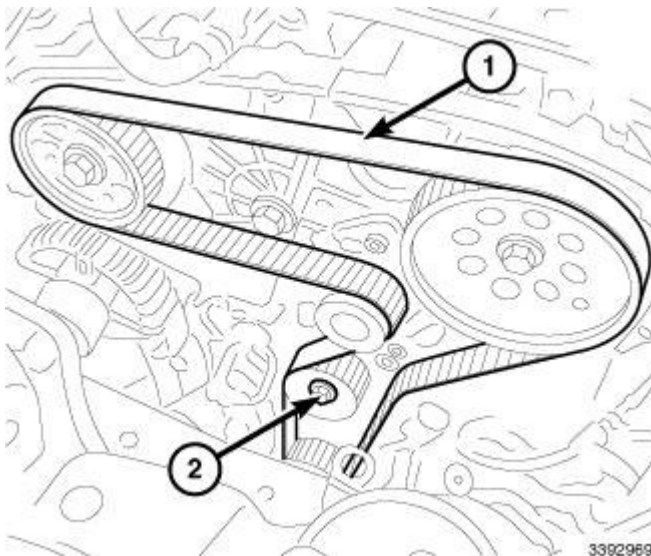


Fig. 244: Timing Belt & Tensioner Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

4. Install the timing belt (1). Refer to **BELT, TIMING, INSTALLATION**.
5. Connect the negative battery cable.

CRANKSHAFT SPROCKET

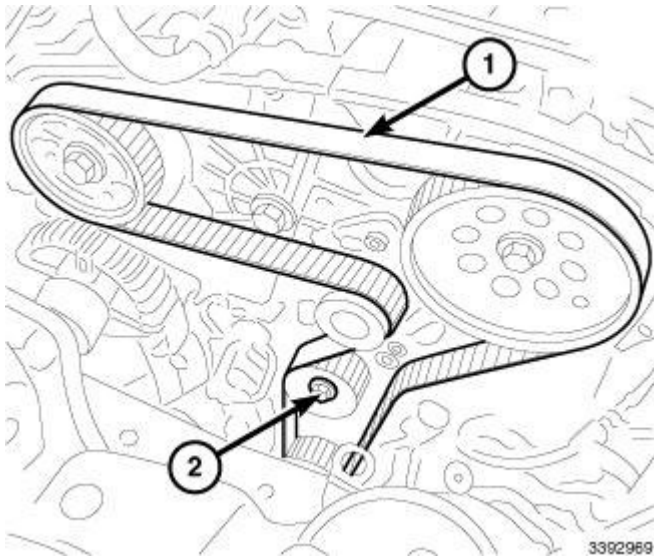


Fig. 245: Timing Belt & Tensioner Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

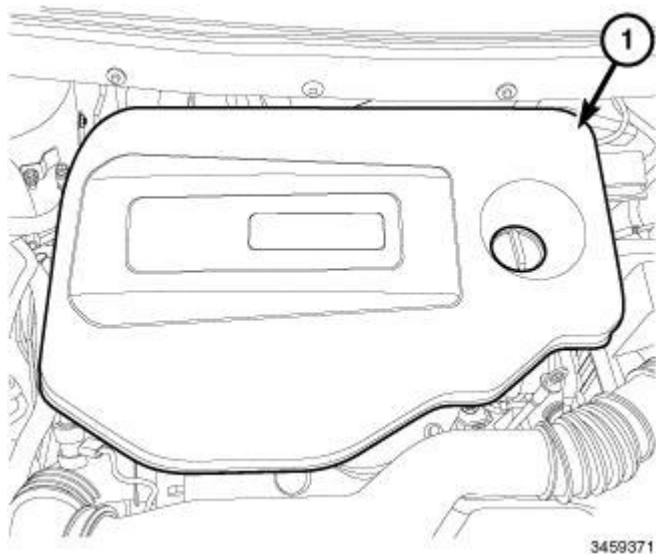
NOTE: The crankshaft sprocket bolt is a left handed thread.

1. Install the crankshaft sprocket (2). Tighten bolt to 340 N.m (251 ft. lbs.).
2. Remove the Flywheel Locking Tool 20115.
3. Install the flywheel lower guard and securely tighten the nuts.
4. Install the timing belt. Refer to **BELT, TIMING, INSTALLATION**.
5. Connect the negative battery cable.

BELT, TIMING

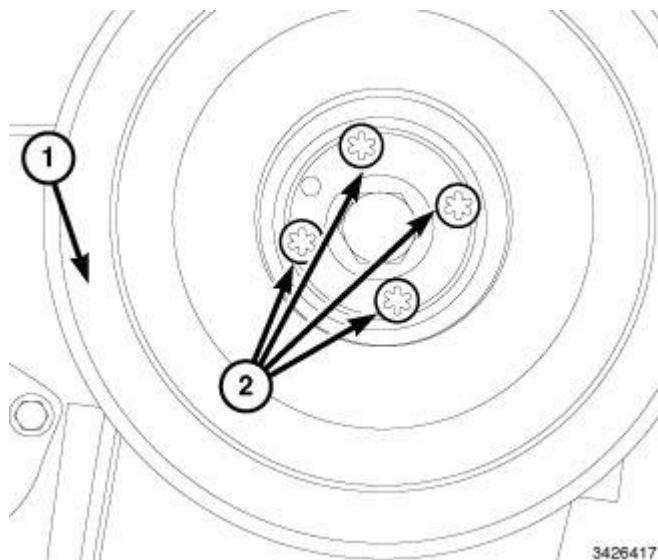
REMOVAL

REMOVAL

**Fig. 246: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

**Fig. 247: Vibration Damper & Bolts**

Courtesy of CHRYSLER GROUP, LLC

3. Remove the vibration damper. Refer to **DAMPER, VIBRATION, REMOVAL**.

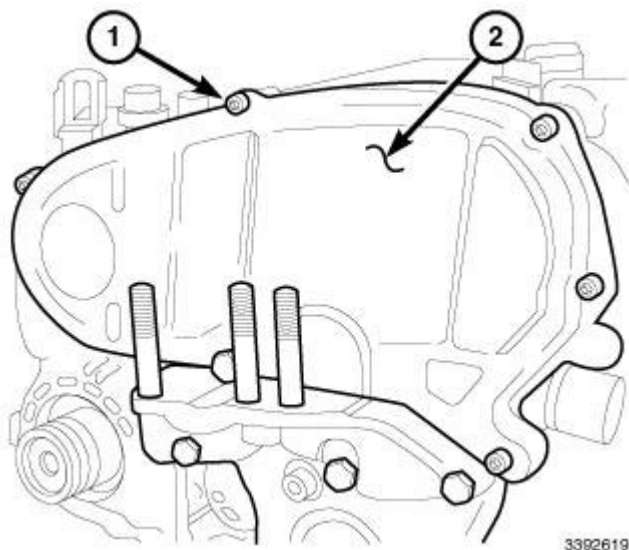


Fig. 248: Upper Timing Belt Cover & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Remove the seven upper timing cover fasteners.

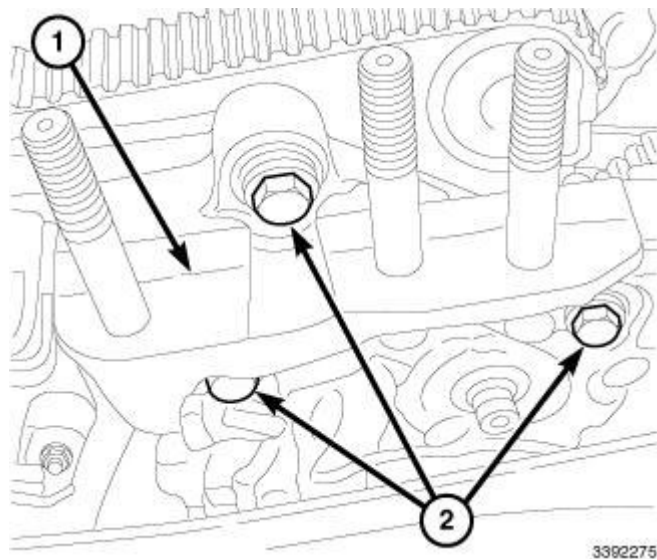


Fig. 249: Timing Belt Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Remove the lower timing belt cover (1). Refer to COVER(S), ENGINE TIMING, REMOVAL .

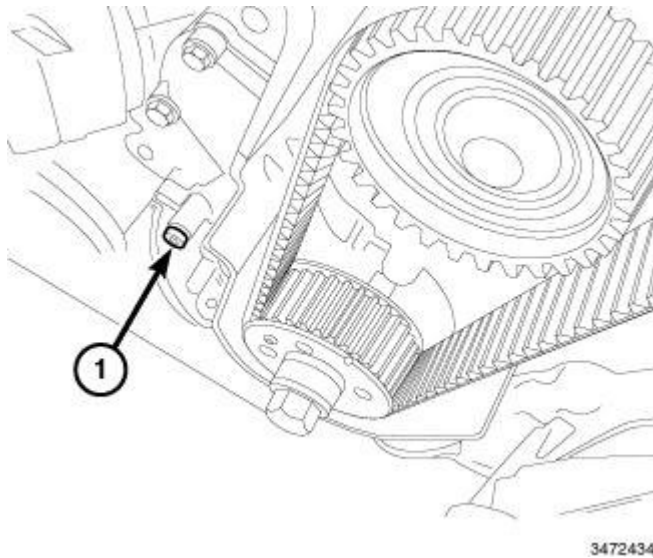


Fig. 250: Engine Block Front Cover Left Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

NOTE: The crankshaft must be rotated, with small movements, to allow the locating dowel on the toothed timing drive belt pulley to be inserted in the opening in the tool.

6. Remove the left lower bolt (1) from the engine block front cover.

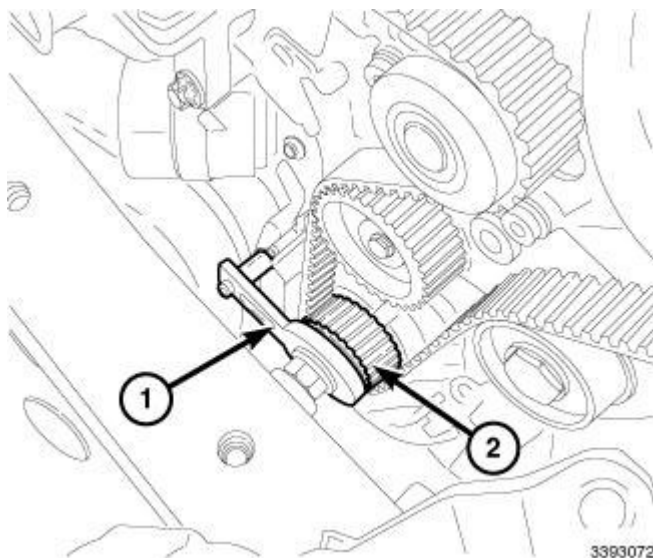


Fig. 251: Crankshaft Locking Tool & Sprocket
Courtesy of CHRYSLER GROUP, LLC

NOTE: The timing marks are located on the timing belt. Proper positioning of the timing marks is required before installation of a new belt can be performed.

7. Rotate engine to TDC and verify the timing marks on the belt are aligned to their respective gear. Insert the Crankshaft Locking Tool (1) (special tool #20164, Tool, Crankshaft Timing Locking) temporarily to check crankshaft timing.
8. Disconnect the fuel pressure sensor wire harness connector.

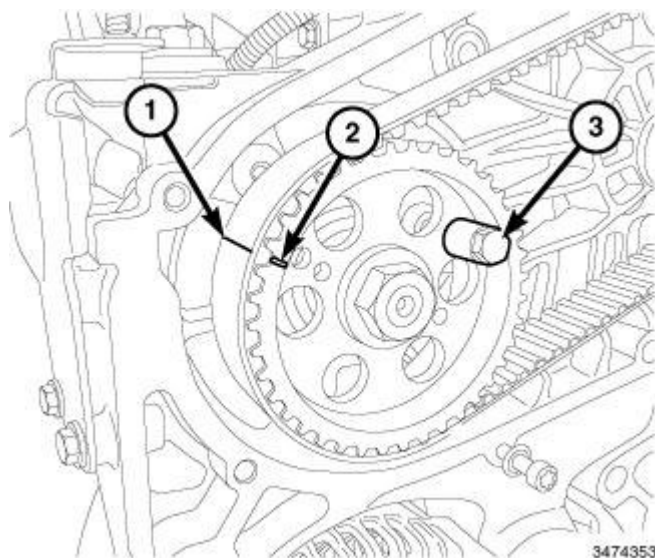


Fig. 252: Aligning Timing Marks On Belt & Sprocket Using Removal/Refitting Tool
Courtesy of CHRYSLER GROUP, LLC

9. Install the Removal/Refitting Tool (3) (special tool #20150, Remover/Installer, High Pressure Fuel Pump) to lock the pressure pump sprocket.

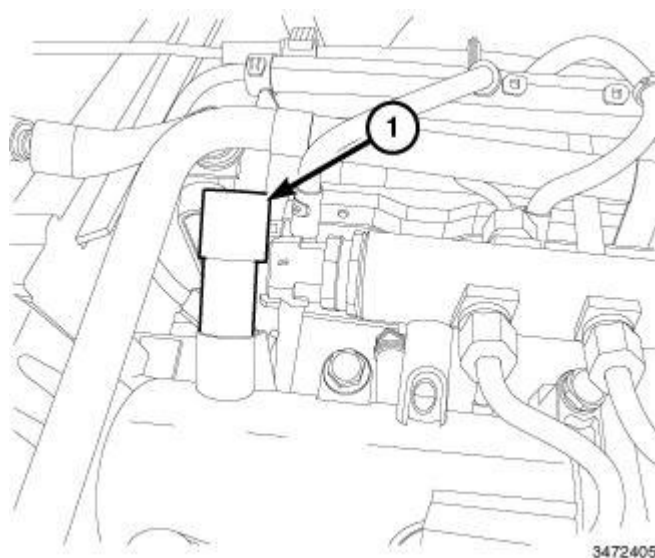


Fig. 253: Camshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

10. Remove the threaded plug from the camshaft housing.

NOTE: Check that the tool is correctly inserted in the housing in the inlet side camshaft, rotating the crankshaft until the pin for the tool can be heard engaging correctly in the housing in the camshaft.

11. Install the Camshaft Timing Tool (1) (special tool #20132, Tool, Timing Belt Locking), (intake side).
12. Remove the Crankshaft Timing Tool.

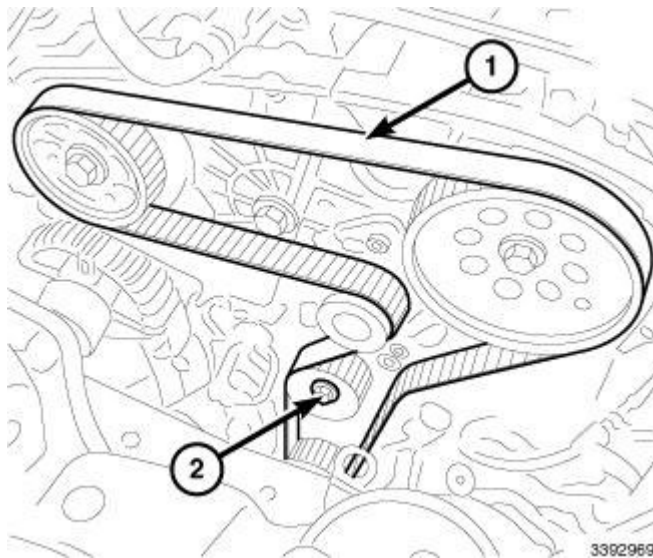


Fig. 254: Timing Belt & Tensioner Retaining Nut
Courtesy of CHRYSLER GROUP, LLC

13. Loosen tensioner retaining nut (2).
14. Remove timing belt (1).

INSTALLATION

INSTALLATION

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

NOTE: The timing marks are located on the timing belt. Proper positioning of the timing marks is required before installation of a new belt can be performed.

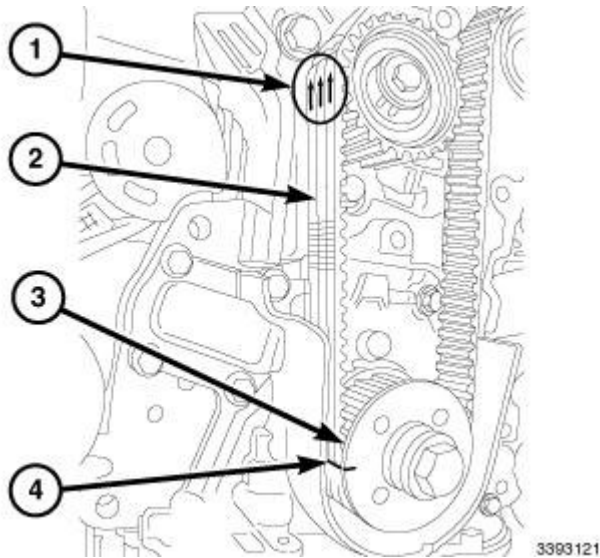


Fig. 255: Rotation Arrows, Timing Belt, Crankshaft Sprocket & Timing Mark On Belt
Courtesy of CHRYSLER GROUP, LLC

1. Start the timing belt (2) around the crankshaft sprocket (3) with the rotation arrows (1) pointing clockwise.
2. Align the timing mark on the belt (4) with the mark on the crankshaft gear.
3. Wrap belt around water pump pulley and tensioner.

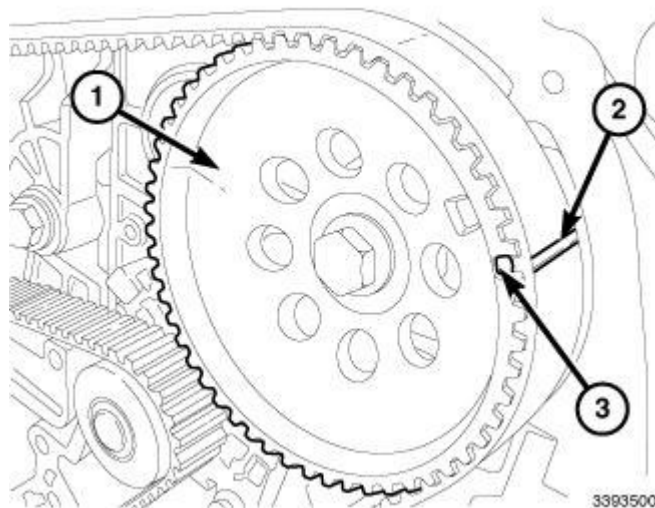


Fig. 256: Camshaft Sprocket, Timing Marks On Belt & Camshaft Drive Gears
Courtesy of CHRYSLER GROUP, LLC

4. Position belt over camshaft sprocket (1) and align the timing marks on the belt (2) with the marks on the camshaft drive gears (3).

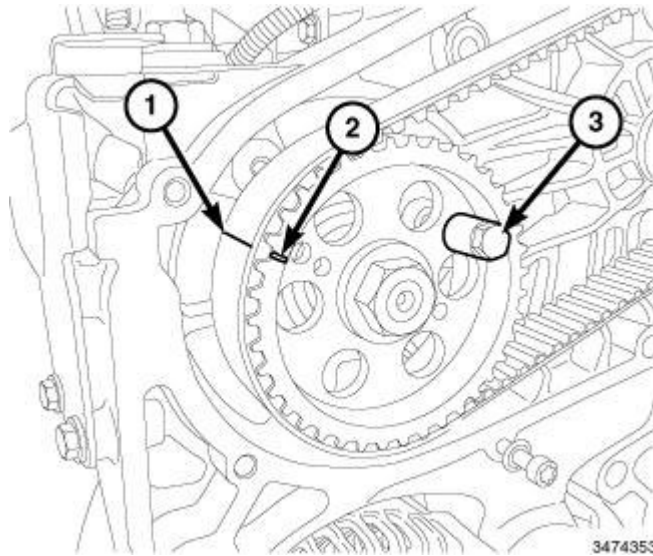


Fig. 257: Aligning Timing Marks On Belt & Sprocket Using Removal/Refitting Tool
 Courtesy of CHRYSLER GROUP, LLC

5. Position belt over pressure pump sprocket and align the timing marks on the belt (1) with the marks on the pressure pump sprocket (2).

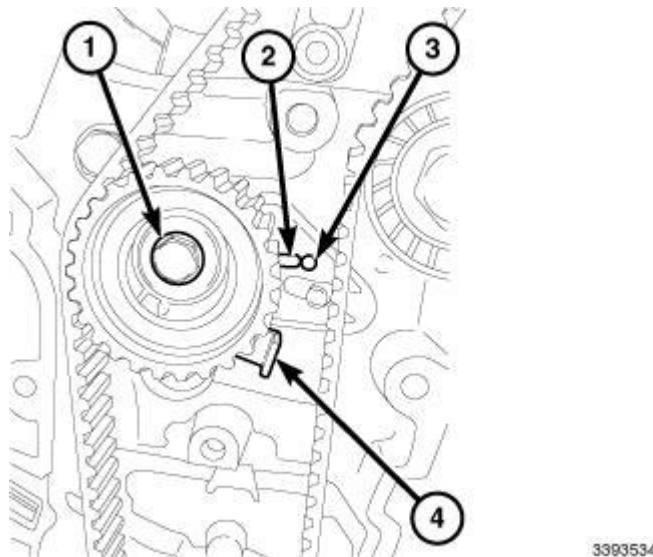


Fig. 258: Bolt, Tensioner Arrow, Mark & Tensioner Tab
 Courtesy of CHRYSLER GROUP, LLC

6. Using a screwdriver. Pry down on the tensioner tab (4) till the tensioner arrow (3) aligns with the mark (3).
7. Tighten tensioner nut to 28 N.m (21 ft. lbs.) plus an additional 40° turn.

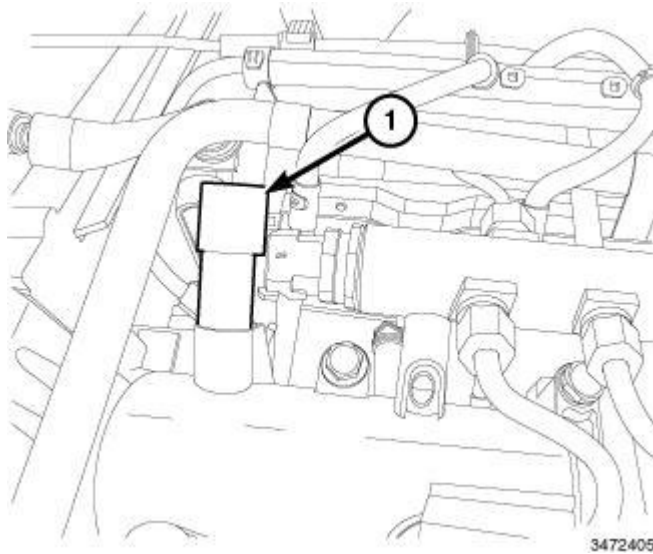


Fig. 259: Camshaft Timing Tool
Courtesy of CHRYSLER GROUP, LLC

8. Remove the Camshaft Timing Tool 20132, (intake side).

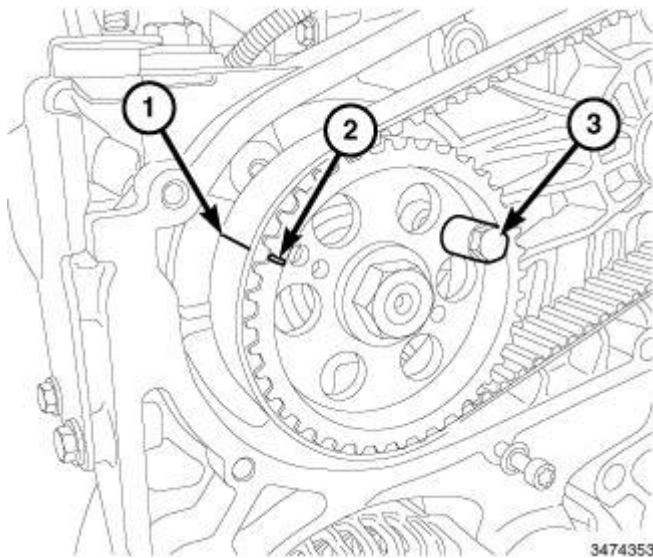


Fig. 260: Aligning Timing Marks On Belt & Sprocket Using Removal/Refitting Tool
Courtesy of CHRYSLER GROUP, LLC

9. Remove the Removal/Refitting Tool (3)

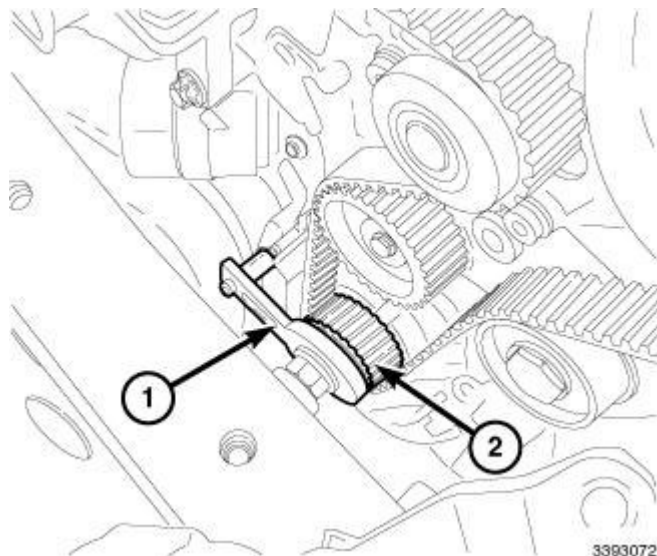


Fig. 261: Crankshaft Locking Tool & Sprocket
Courtesy of CHRYSLER GROUP, LLC

10. Remove Crankshaft Locking Tool (1).
11. Rotate the crankshaft two full revolutions to allow for the timing belt to settle.
12. Loosen the timing belt tensioner and repeat step 5 and 6 .
13. Install the right lower screw for the engine block front cover and tighten to 9 N.m (80 in. lbs.).
14. Install the threaded plug from the camshaft housing and securely tighten.
15. Connect the fuel pressure sensor wire harness connector.

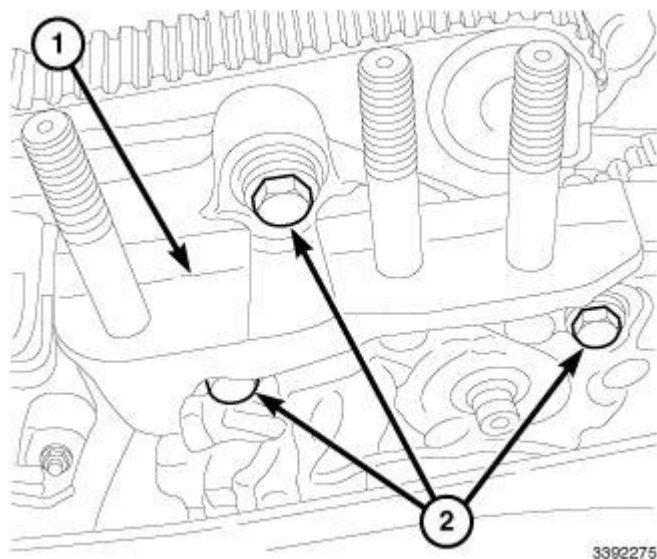


Fig. 262: Timing Belt Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

16. Install lower timing belt cover (1). Refer to **COVER(S), ENGINE TIMING, INSTALLATION** .

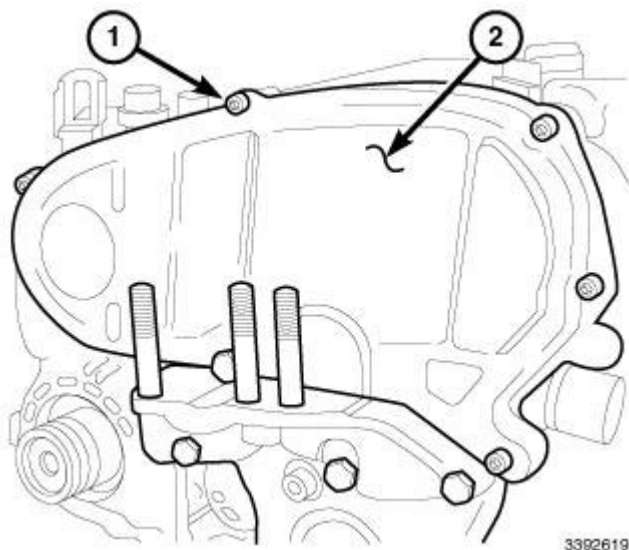


Fig. 263: Upper Timing Belt Cover & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

17. Install upper timing belt cover (2). Tighten the seven fasteners (1) securely.

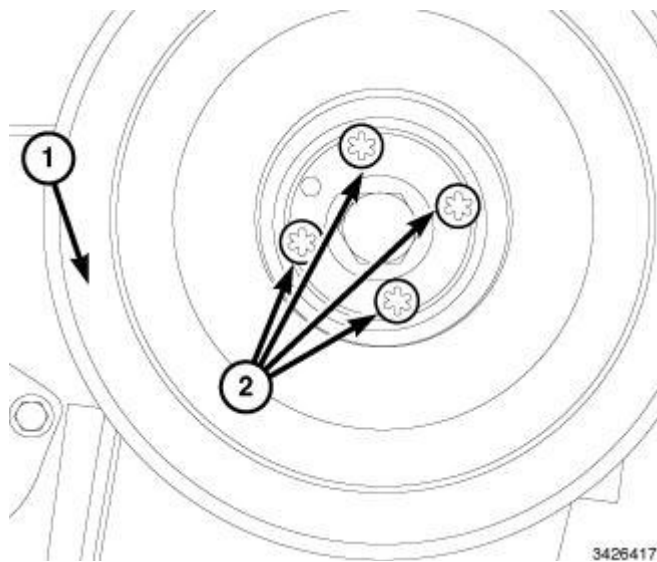


Fig. 264: Vibration Damper & Bolts
 Courtesy of CHRYSLER GROUP, LLC

18. Install the vibration damper. Refer to **DAMPER, VIBRATION, INSTALLATION** .

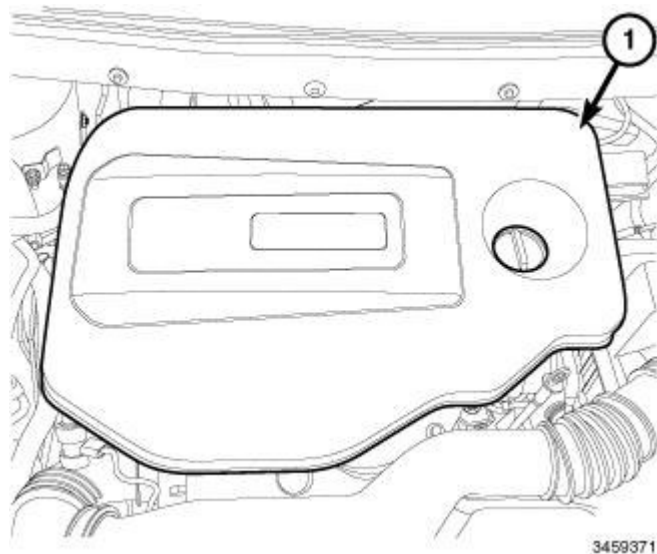


Fig. 265: Engine Cover
 Courtesy of CHRYSLER GROUP, LLC

19. Install the engine cover. Refer to **INSTALLATION**.
20. Connect the negative battery cable.

COVER(S), ENGINE TIMING

REMOVAL

UPPER TIMING COVER

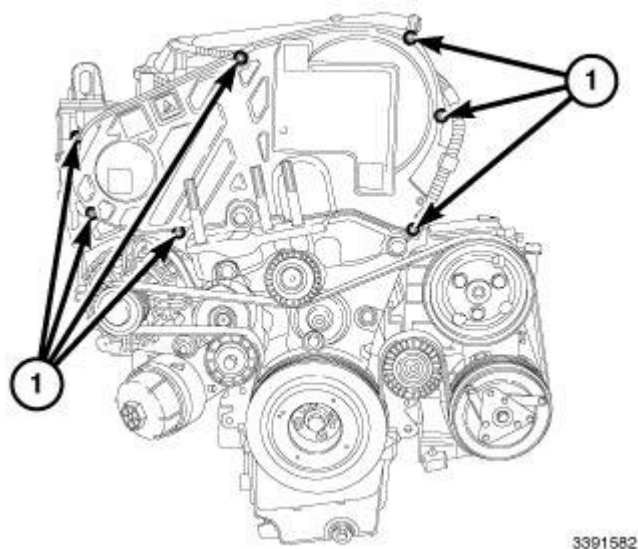


Fig. 266: Upper Timing Cover Fasteners
 Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.

2. Remove the engine cover.
3. Remove the seven fasteners (1) that secure the upper timing belt cover.

LOWER TIMING COVER

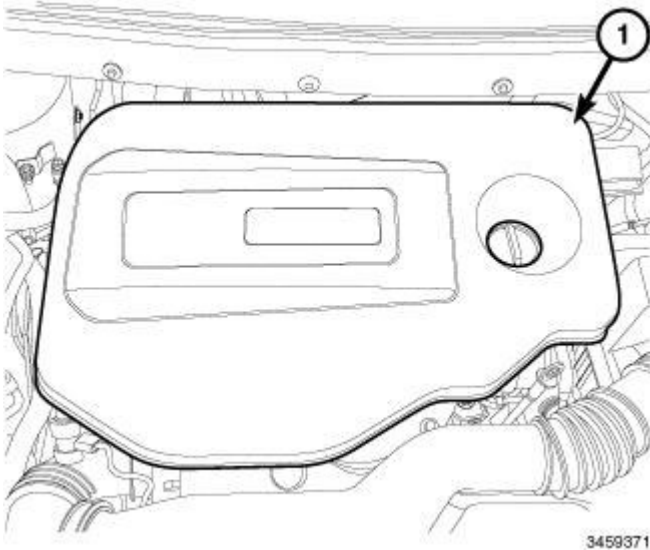


Fig. 267: Engine Cover
 Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover (1).

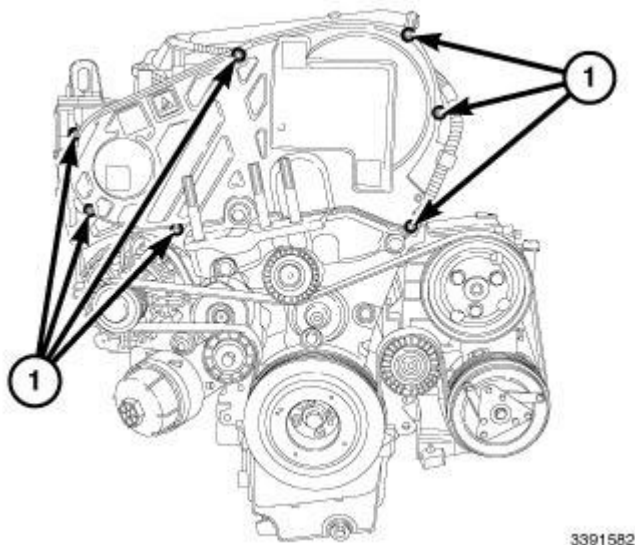
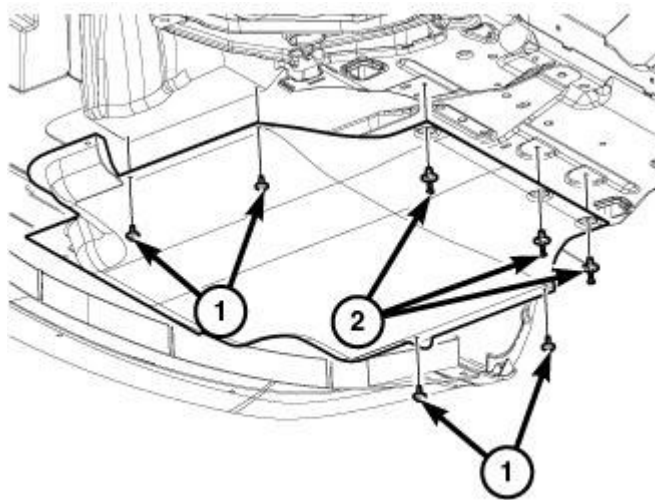


Fig. 268: Upper Timing Cover Fasteners
 Courtesy of CHRYSLER GROUP, LLC

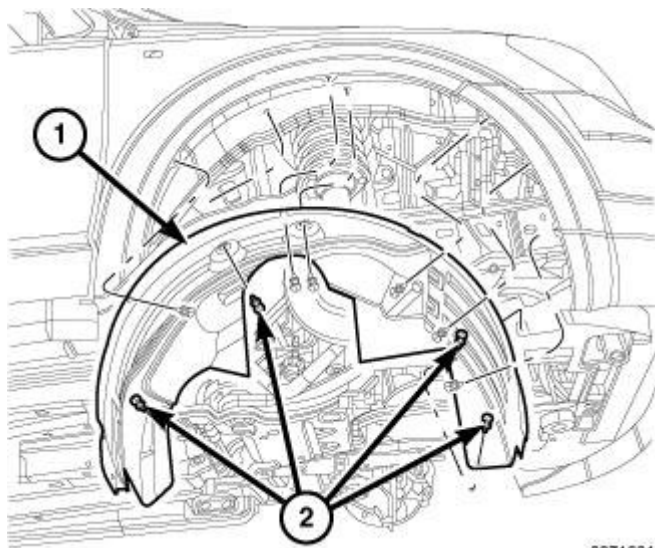
3. Remove the seven bolts (1) that secure the upper timing belt cover.
4. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .



3371968

Fig. 269: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

5. Remove the lower engine bellypan cover.



3371601

Fig. 270: Inner Fender Splash Shield
 Courtesy of CHRYSLER GROUP, LLC

6. Remove the right side wheel and tire.
7. Remove the inner fender splash shield (1).

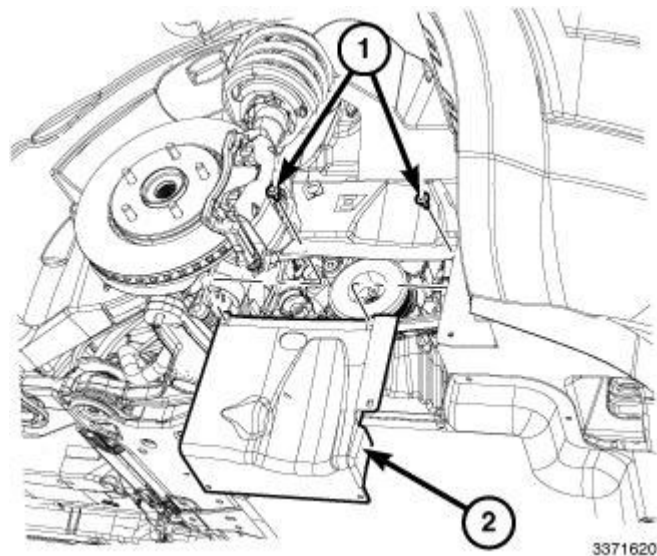


Fig. 271: Lower Splash Belt Shield
Courtesy of CHRYSLER GROUP, LLC

8. Remove the lower belt splash shield (2).

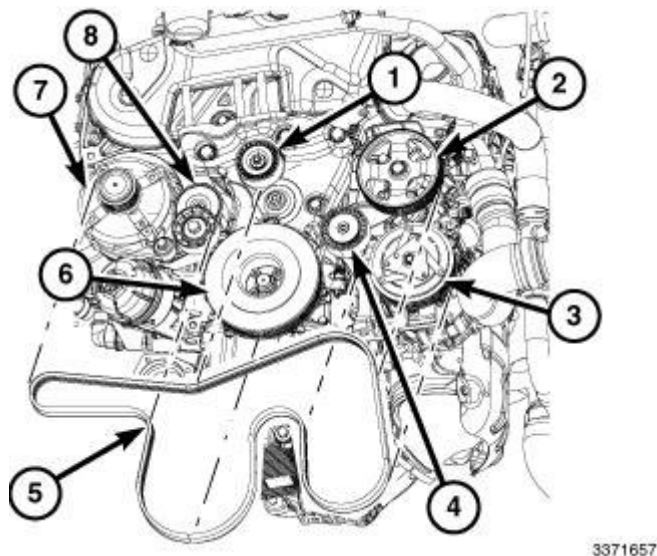
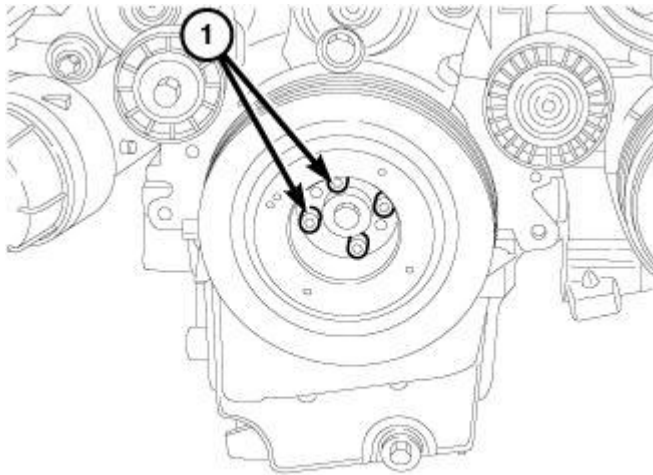


Fig. 272: Belt Tensioner & Accessory Drive Belt
Courtesy of CHRYSLER GROUP, LLC

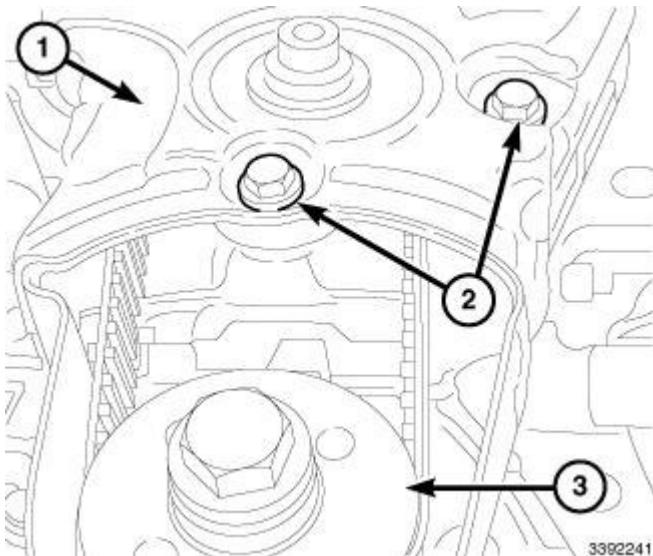
9. Remove the accessory drive belt (5).



3391682

Fig. 273: Front Crankshaft Vibration Dampener Pulley Bolts
 Courtesy of CHRYSLER GROUP, LLC

10. Remove the front crankshaft vibration dampener pulley bolts (1).
11. Remove the vibration dampener from the crankshaft.



3392241

Fig. 274: Lower Timing Belt Cover & Bolts
 Courtesy of CHRYSLER GROUP, LLC

12. Remove the lower timing belt cover bolts (2).
13. Lower the vehicle.

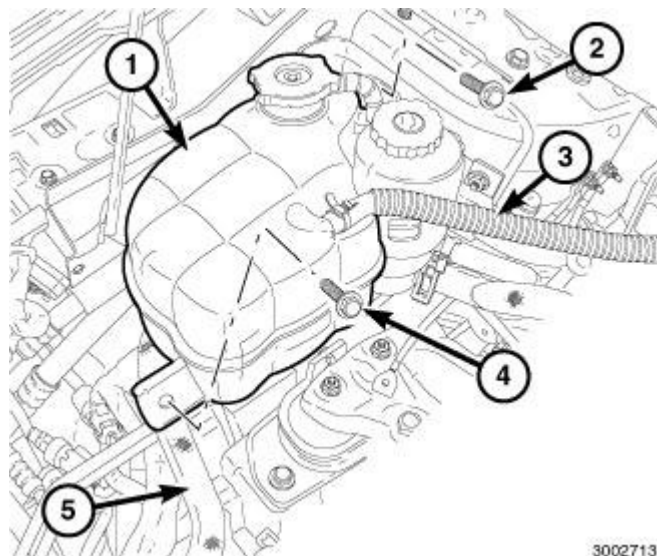


Fig. 275: Coolant Recovery Container, Return Hose, Lower Supply Hose & Mount Bolts
Courtesy of CHRYSLER GROUP, LLC

14. Remove the coolant bottle (1) and position aside.

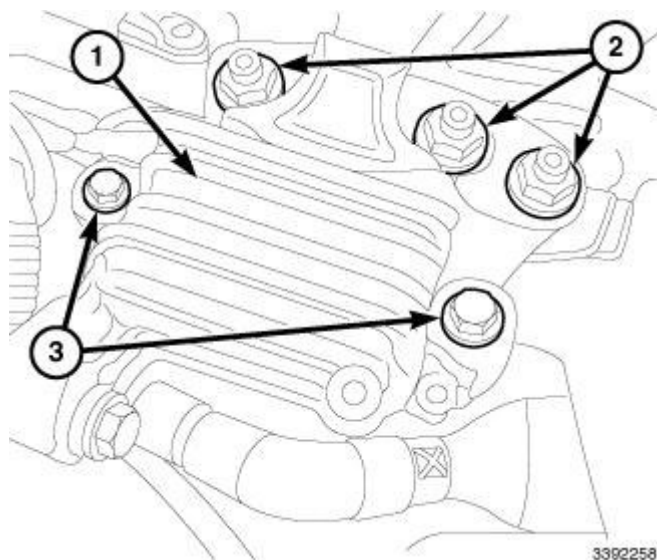


Fig. 276: Right Side Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Using a suitable jack. Support the engine.
16. Remove the right side engine mount (1).

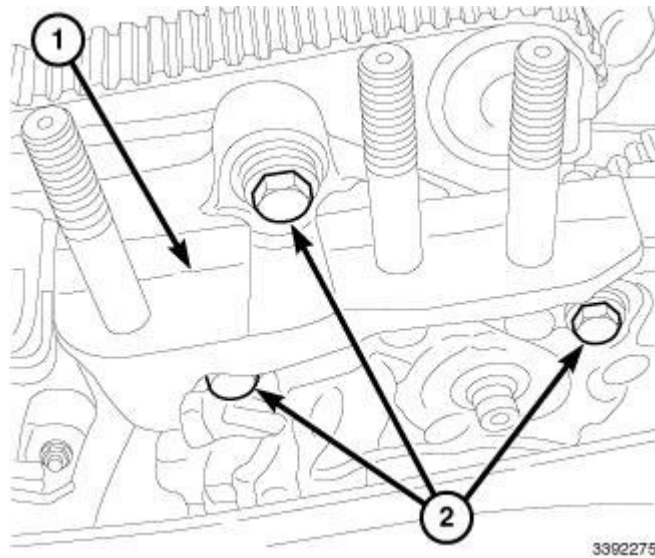


Fig. 277: Timing Belt Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

17. Remove the four upper timing belt cover bolts (2).
18. Remove the timing belt cover from the vehicle (1).

INSTALLATION

UPPER TIMING COVER

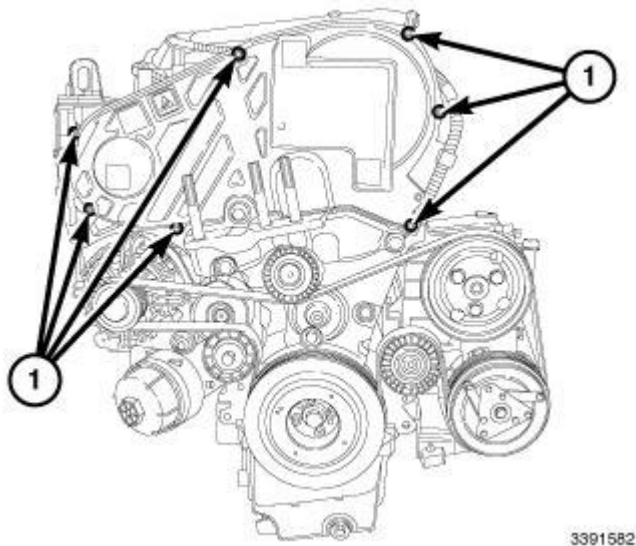
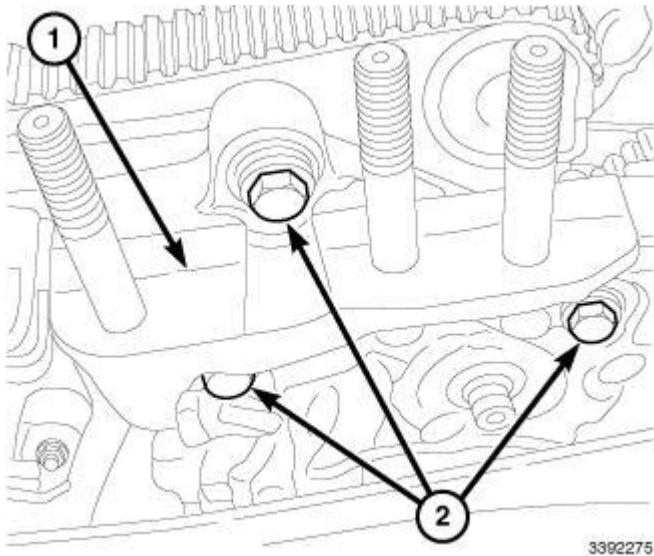


Fig. 278: Upper Timing Cover Fasteners
Courtesy of CHRYSLER GROUP, LLC

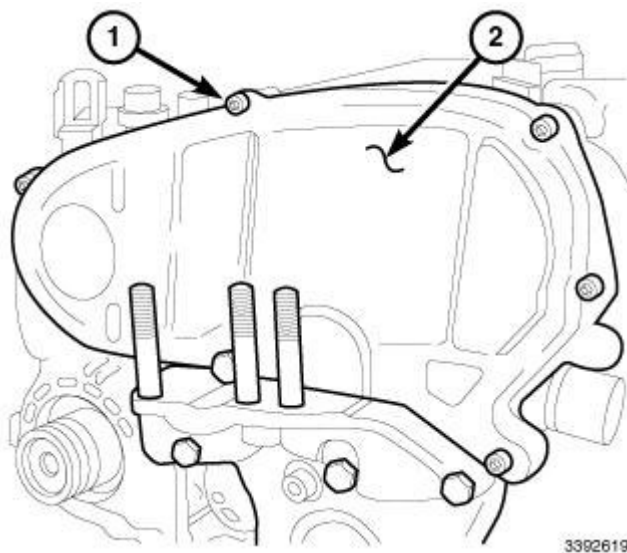
1. Position the upper timing belt cover.
2. Install the seven fasteners (1) into the cover. Hand tighten the fasteners.
3. Install the engine cover.

4. Connect the negative battery cable.

LOWER TIMING COVER**Fig. 279: Timing Belt Cover & Bolts**

Courtesy of CHRYSLER GROUP, LLC

1. Position the upper timing belt cover onto the engine.
2. Install the four upper retainer bolts (2) into the cover (1):
 - Tighten the M8 bolts to 25 N.m (18 ft. lbs.).
 - Tighten the M10 bolts to 54 N.m (40 ft. lbs.).

**Fig. 280: Upper Timing Belt Cover & Fasteners**

Courtesy of CHRYSLER GROUP, LLC

3. Install the upper timing belt cover (2). Tighten the seven bolts (1) to 6 N.m (53 in. lbs.).

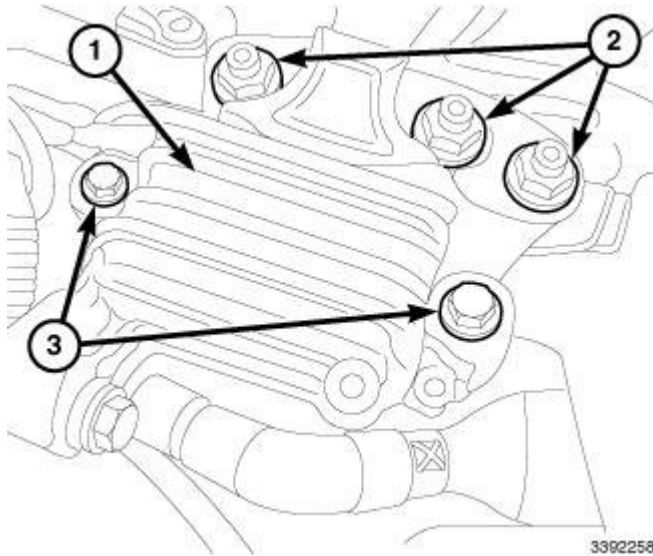


Fig. 281: Right Side Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the upper engine mount (1). Tighten the bolts (3) to 54 N.m (40 ft. lbs.). Tighten the nuts (2) to 9 N.m + 45° (80 in. lbs + 45°).

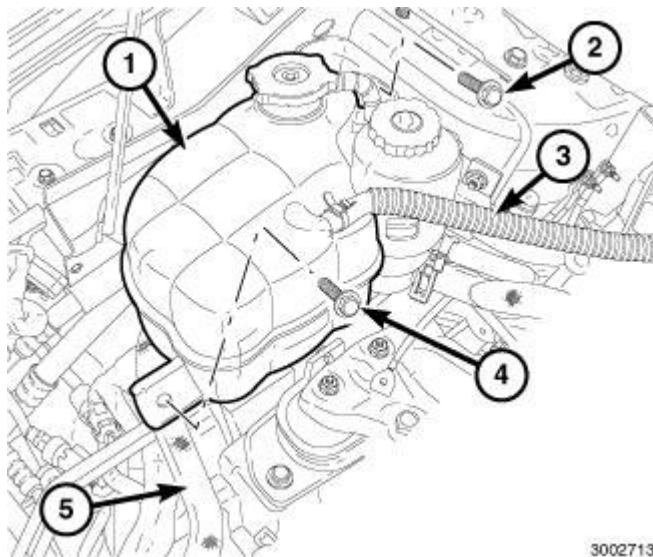


Fig. 282: Coolant Recovery Container, Return Hose, Lower Supply Hose & Mount Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the coolant bottle (1).
6. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

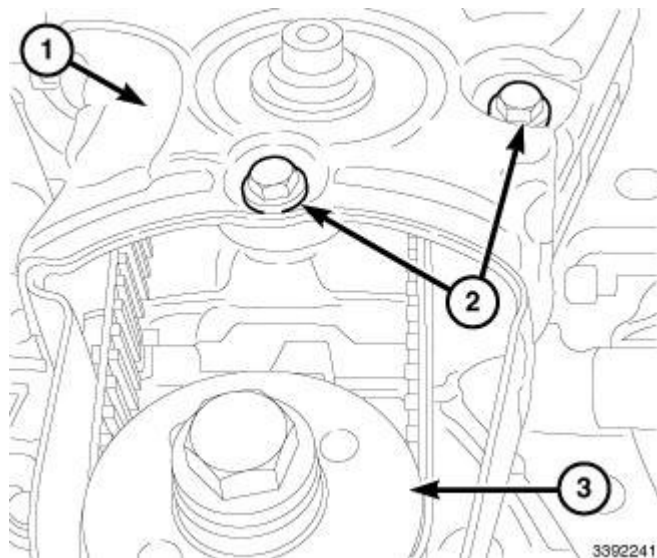


Fig. 283: Lower Timing Belt Cover & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Install the lower timing belt cover bolts (2). Tighten the bolts to 25 N.m (18 ft. lbs.).

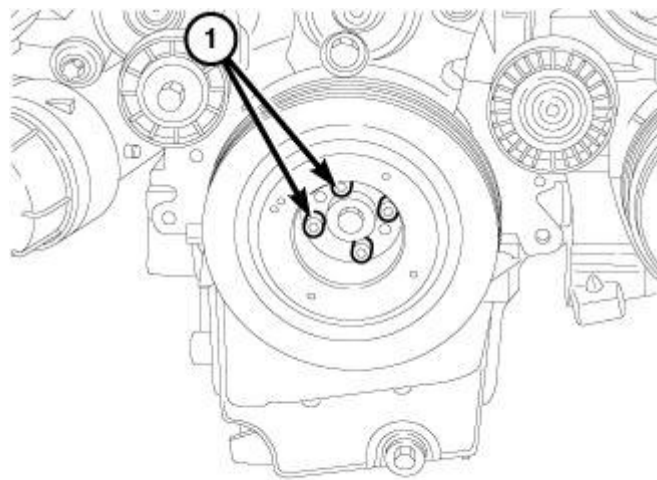


Fig. 284: Front Crankshaft Vibration Dampener Pulley Bolts
Courtesy of CHRYSLER GROUP, LLC

8. Install the crankshaft vibration dampener pulley. Tighten the bolts to 26 N.m (19 ft. lbs.).

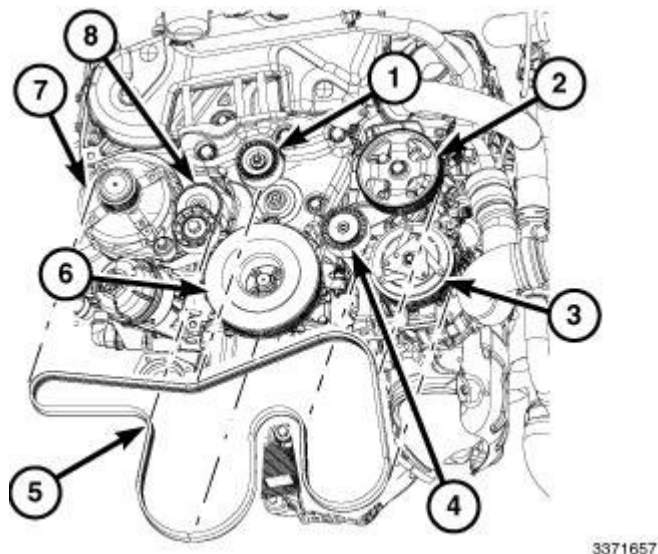


Fig. 285: Belt Tensioner & Accessory Drive Belt
Courtesy of CHRYSLER GROUP, LLC

9. Install the accessory drive belt (5).

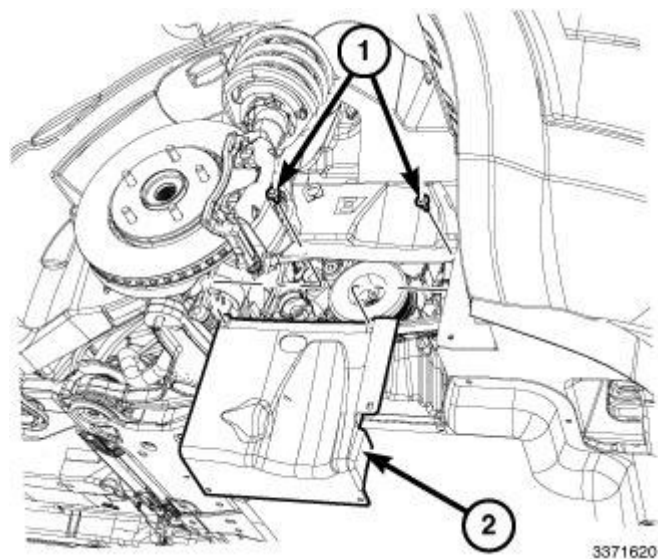


Fig. 286: Lower Splash Belt Shield
Courtesy of CHRYSLER GROUP, LLC

10. Install the lower belt splash shield (2).

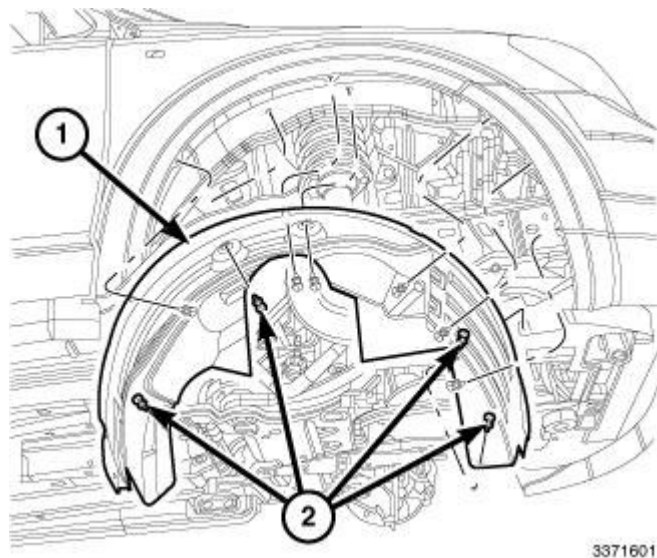


Fig. 287: Inner Fender Splash Shield
Courtesy of CHRYSLER GROUP, LLC

11. Install the inner fender splash shield (1).
12. Install the front wheel.

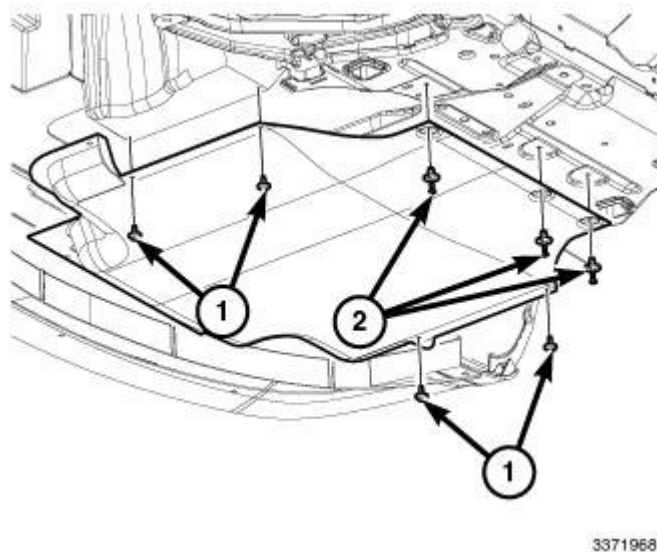


Fig. 288: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

13. Install the lower engine bellypan cover.
14. Lower the vehicle.

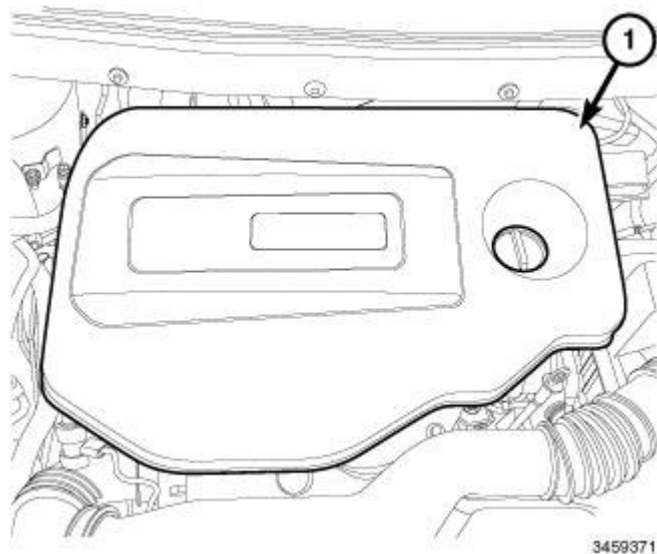


Fig. 289: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

15. Install the engine cover (1).
16. Connect the negative battery cable.

TENSIONER, ENGINE TIMING

REMOVAL

REMOVAL

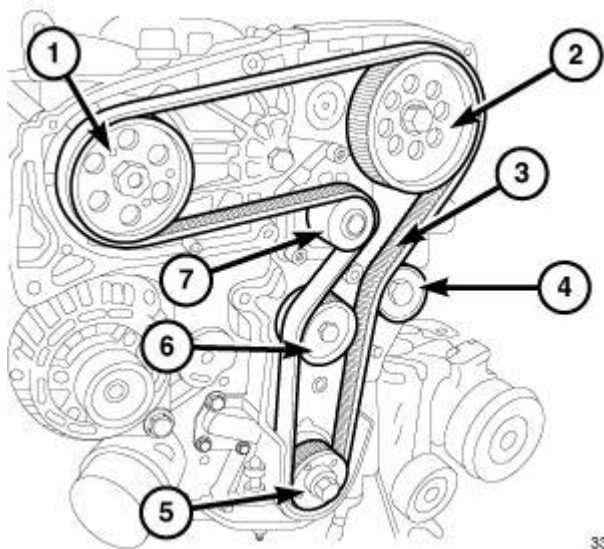


Fig. 290: Timing Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.

2. Remove the timing belt (3). Refer to **BELT, TIMING, REMOVAL**.

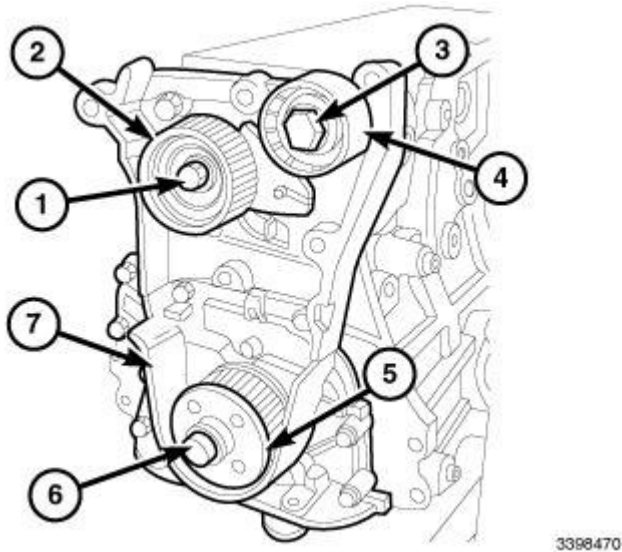


Fig. 291: Timing Belt Tensioner, Pulley & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove the timing belt tensioner bolt (1).
4. Remove timing belt tensioner (3).

INSTALLATION

INSTALLATION

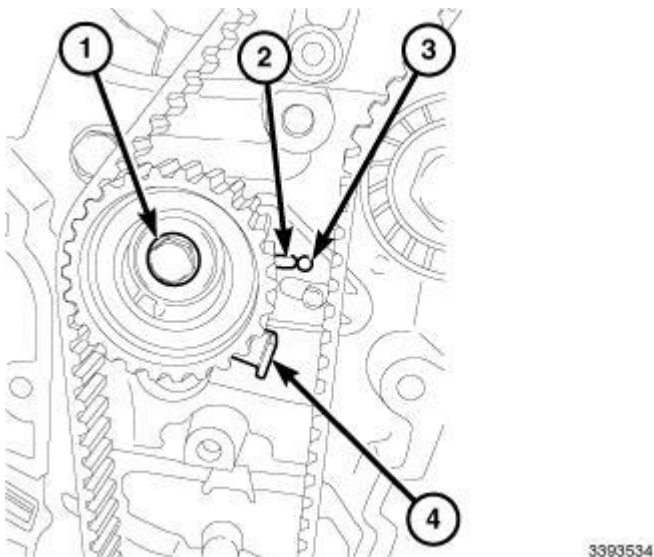


Fig. 292: Bolt, Tensioner Arrow, Mark & Tensioner Tab
Courtesy of CHRYSLER GROUP, LLC

1. Position timing belt tensioner so the guide finger is in slot and hand tighten the bolt (1).

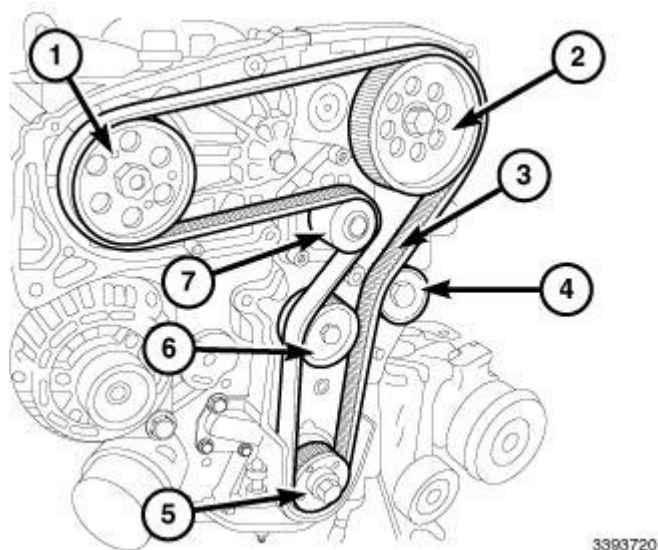


Fig. 293: Timing Belt Routing, Tensioner & Pulleys
Courtesy of CHRYSLER GROUP, LLC

2. Install the timing belt (3). Refer to **BELT, TIMING, INSTALLATION**.
3. Connect the negative battery cable.

MANIFOLDS

MANIFOLD, EXHAUST

REMOVAL

REMOVAL

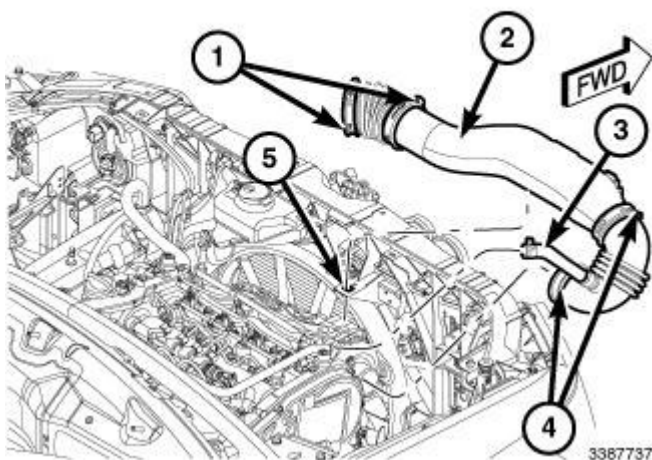


Fig. 294: Clean Air Intake Hose Assembly & Front Mount
Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine cover.
3. Remove the turbo air inlet hose (2) at the air cleaner.
4. Remove the PCV air makeup hose (3).

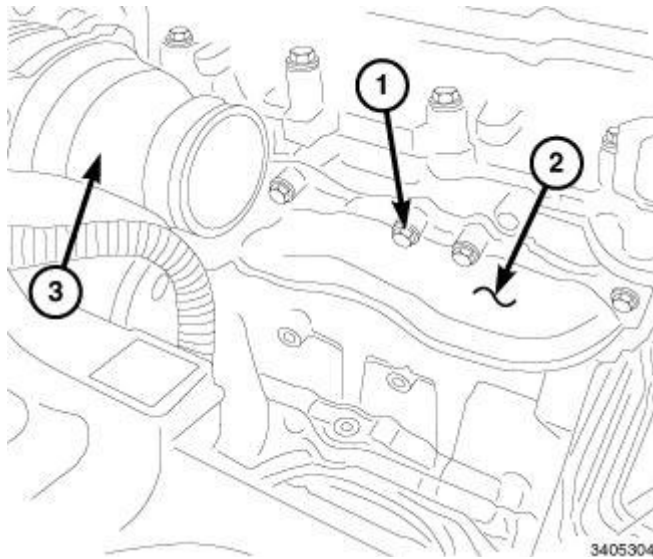


Fig. 295: Turbocharger & Manifold Assembly
Courtesy of CHRYSLER GROUP, LLC

5. Remove the turbocharger (3). Refer to **TURBOCHARGER, REMOVAL.**

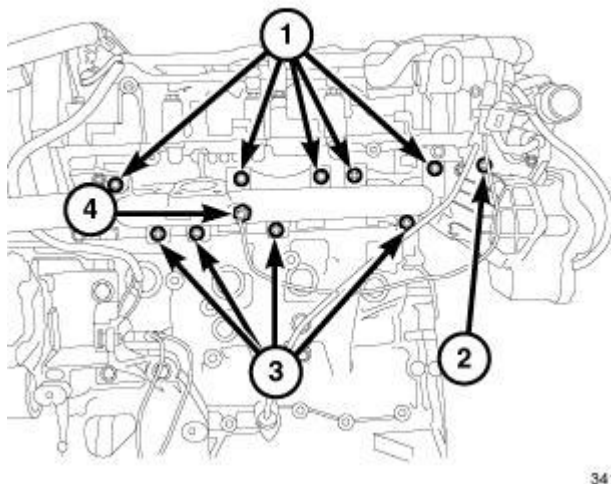


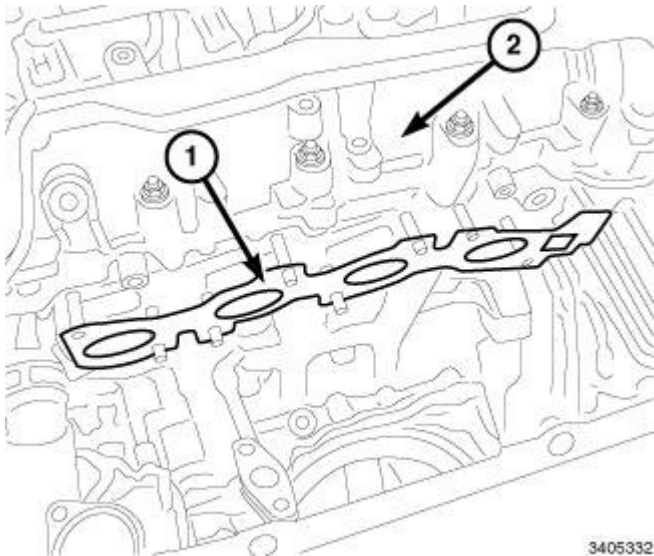
Fig. 296: Upper And Bottom Exhaust Manifold Nuts, Upper Oil Indicator Tube Bolt & Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

6. Remove the temperature sensor (4).

7. Remove the upper exhaust manifold nuts (1).
8. Remove the upper oil indicator tube bolt (2).
9. Remove the bottom exhaust manifold nuts (3) from the exhaust manifold.
10. Remove the exhaust manifold and discard the gasket.

INSTALLATION

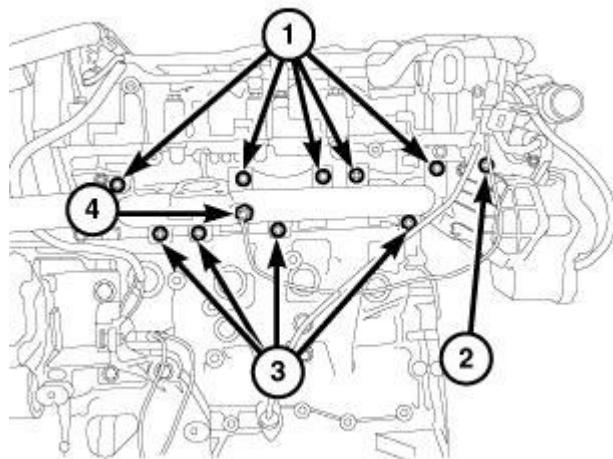
INSTALLATION



3405332

Fig. 297: Exhaust Manifold Gasket & Manifold Assembly
Courtesy of CHRYSLER GROUP, LLC

1. Install a new exhaust manifold gasket.
2. Position the exhaust manifold assembly in place.



3419008

Fig. 298: Upper And Bottom Exhaust Manifold Nuts, Upper Oil Indicator Tube Bolt & Temperature Sensor
Courtesy of CHRYSLER GROUP, LLC

3. Install the exhaust manifold nuts (1 and 3). Tighten the nuts to 21 N.m (15 ft. lbs.).
4. Install the temperature sensor (4).
5. Install the oil indicator tube upper bolt (2). Tighten the nuts to 10 N.m (89 in. lbs.).

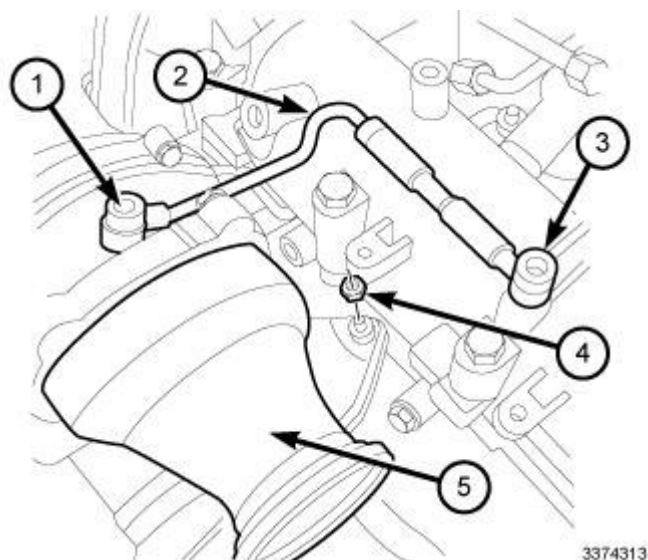


Fig. 299: Turbocharger, Oil Supply Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Install the turbocharger (5). Refer to **TURBOCHARGER, INSTALLATION.**

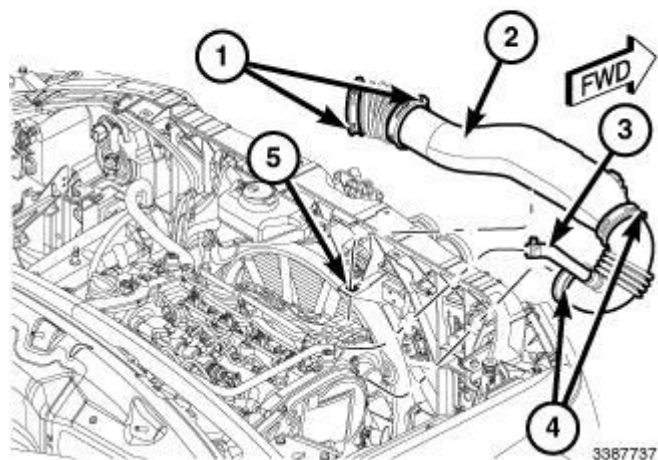


Fig. 300: Clean Air Intake Hose Assembly & Front Mount
Courtesy of CHRYSLER GROUP, LLC

7. Install the air inlet tube at the turbocharger (2).
8. Install the PCV air makeup hose (3).
9. Install the engine cover by pushing downward.
10. Connect the negative battery cable (1).

MANIFOLD, INTAKE

REMOVAL

REMOVAL

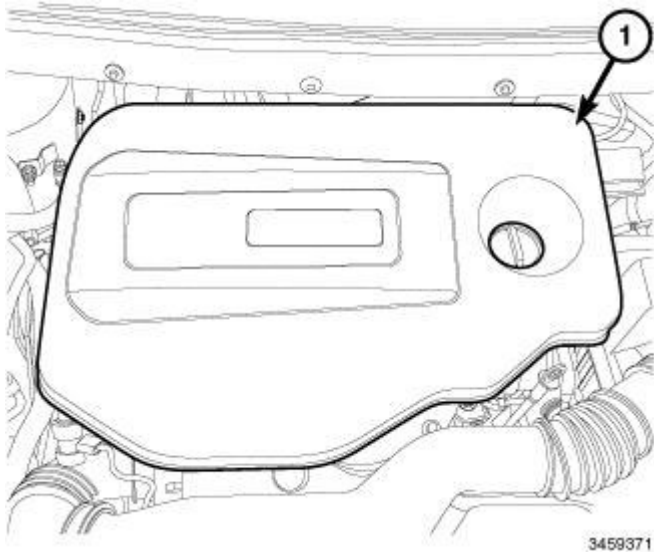
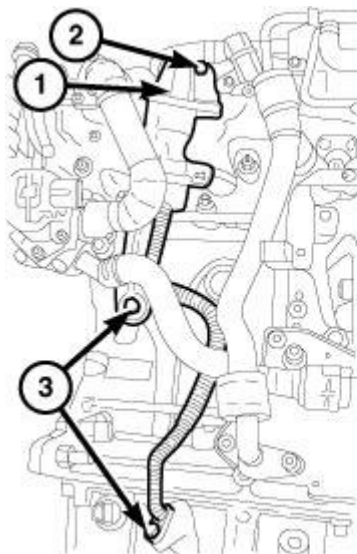


Fig. 301: Engine Cover

Courtesy of CHRYSLER GROUP, LLC

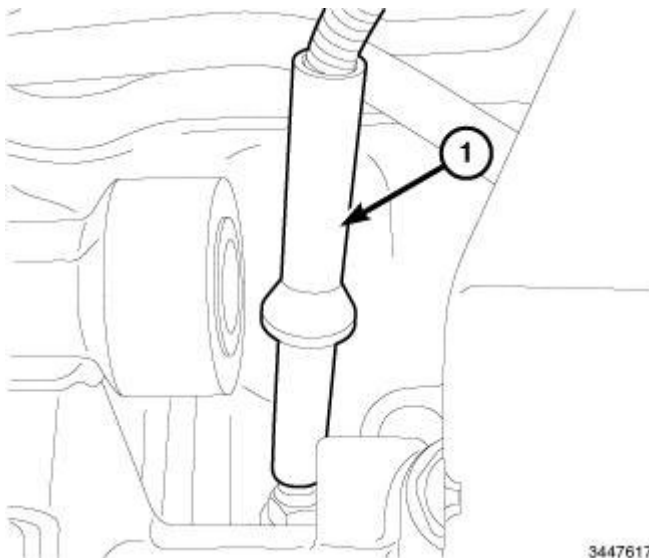
1. Disconnect the negative battery cable.
2. Remove the engine cover (1).
3. Partially drain the cooling system. Refer to **STANDARD PROCEDURE** .



3374615

Fig. 302: Oil Vapor Separator & Bolts
Courtesy of CHRYSLER GROUP, LLC

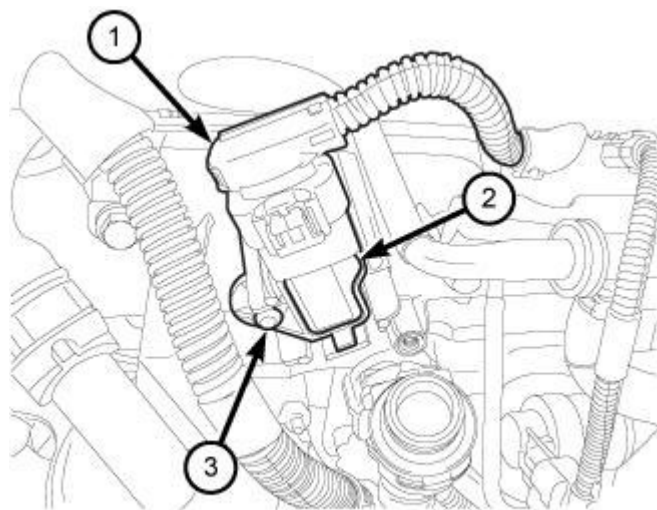
4. Remove bolts (2, 3) and the oil vapor separator (1) complete with pipes.



3447617

Fig. 303: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

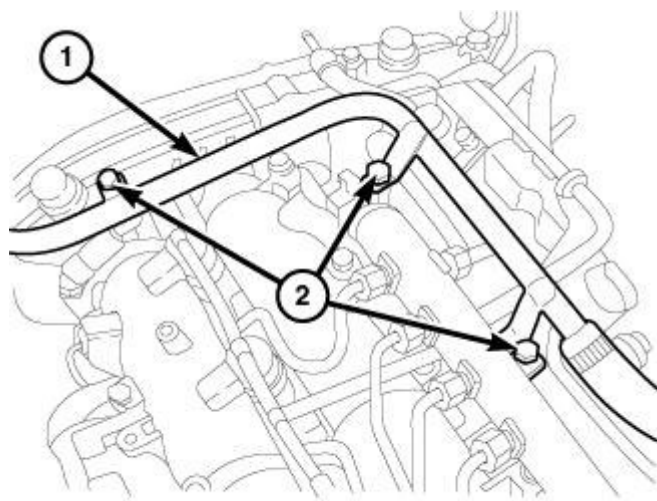
5. Disconnect the glow plug wire harness connector from each glow plug.



3405406

Fig. 304: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

6. Disconnect the boost pressure wire harness connector.



3374607

Fig. 305: Oil Vapor Recovery Pipe & Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove bolts (2) securing the engine oil vapor recovery pipe (1) to the camshaft housing.
8. Remove fasteners and position aside the engine wire harness.
9. Remove the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, REMOVAL**.
10. Remove the EGR air flow control valve. Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR) AIRFLOW CONTROL, REMOVAL**.

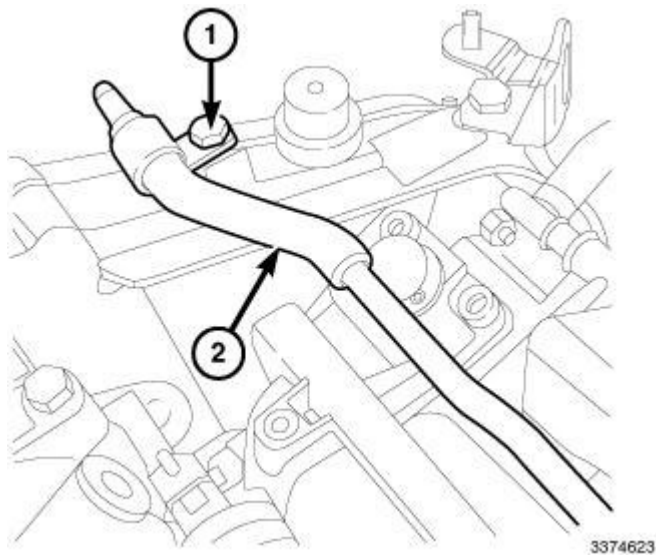


Fig. 306: Degassing Pipe & Bolt
 Courtesy of CHRYSLER GROUP, LLC

11. Remove bolt (1) securing the degassing pipe (2) to the pressure pump mounting.

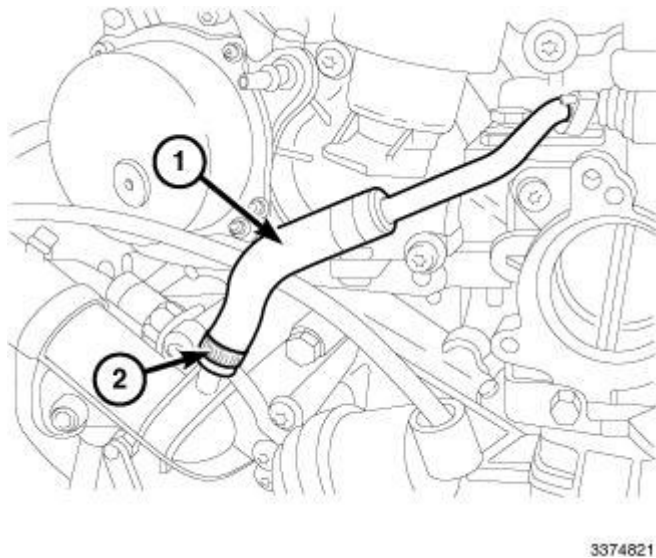


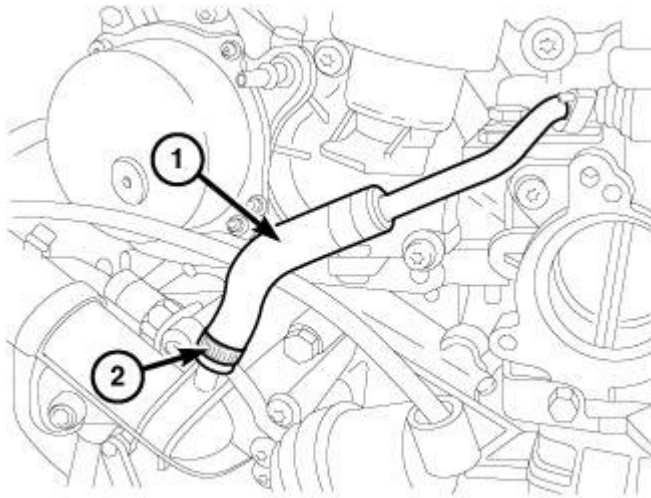
Fig. 307: Degassing Pipe, Clamp & Support Bracket
 Courtesy of CHRYSLER GROUP, LLC

12. Loosen the gear clamp (2) and remove the degassing pipe (1).
13. Disconnect the swirl valve wire harness connector.
14. Remove fasteners and the support bracket.
15. Remove fasteners and the intake manifold.

INSTALLATION

INSTALLATION

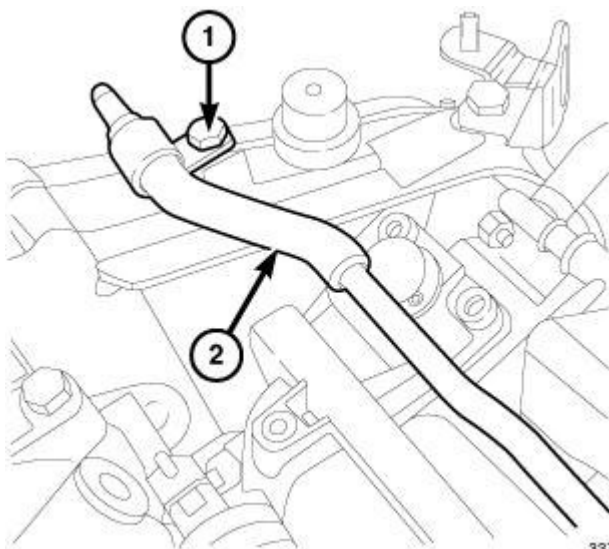
1. Clean gasket mating surfaces. Refer to **ENGINE GASKET SURFACE PREPARATION**.
2. Install new gasket onto the intake manifold.
3. Install the intake manifold. Tighten fasteners to 25 N.m (18 ft. lbs.).
4. Install the support bracket and securely tighten fasteners.
5. Connect the swirl valve wire harness connector.



3374821

Fig. 308: Degassing Pipe, Clamp & Support Bracket
Courtesy of CHRYSLER GROUP, LLC

6. Install the degassing pipe (1) and tighten the gear clamp (2).

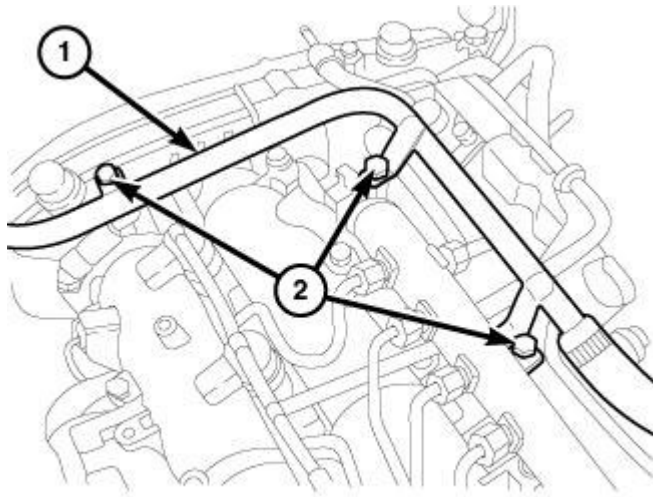


3374623

Fig. 309: Degassing Pipe & Bolt
Courtesy of CHRYSLER GROUP, LLC

7. Install bolt (1) securing the degassing pipe (2) to the pressure pump mounting and securely tighten.

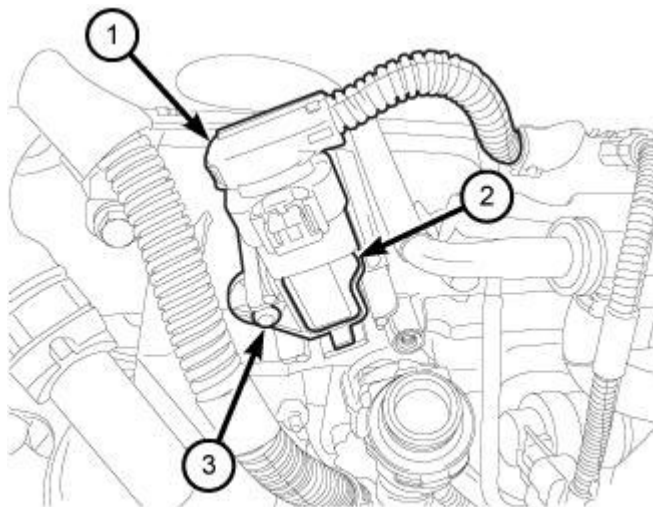
8. Install EGR air flow control valve. Refer to **VALVE, EXHAUST GAS RECIRCULATION (EGR) AIRFLOW CONTROL, INSTALLATION**.
9. Install right and left engine cover brackets.
10. Install the fuel injection pump. Refer to **PUMP, FUEL INJECTION, HIGH PRESSURE, INSTALLATION**.
11. Position the engine wire harness and securely tighten fasteners.



3374607

Fig. 310: Oil Vapor Recovery Pipe & Bolts
Courtesy of CHRYSLER GROUP, LLC

12. Install the engine oil vapor recovery pipe (1) to the camshaft housing and securely tighten bolts (2).



3405406

Fig. 311: Fuel Quantity Solenoid Wire Harness Connector
Courtesy of CHRYSLER GROUP, LLC

13. Disconnect the boost pressure wire harness connector.

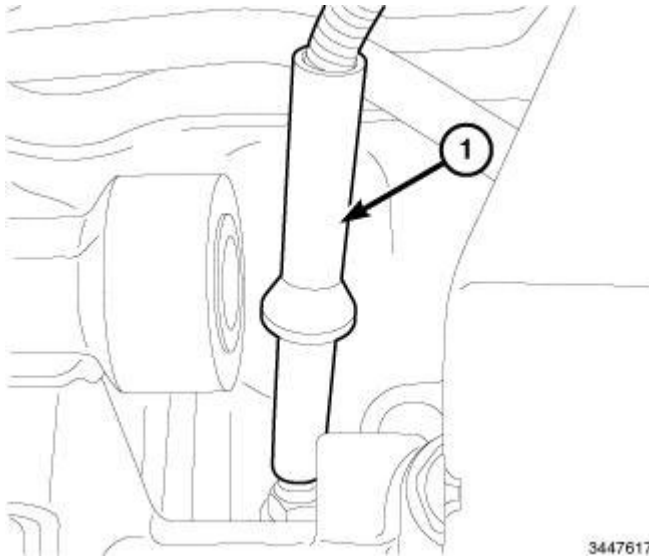


Fig. 312: Glow Plug Harness Connector
Courtesy of CHRYSLER GROUP, LLC

14. Connect the glow plug wire harness connector from each glow plug.

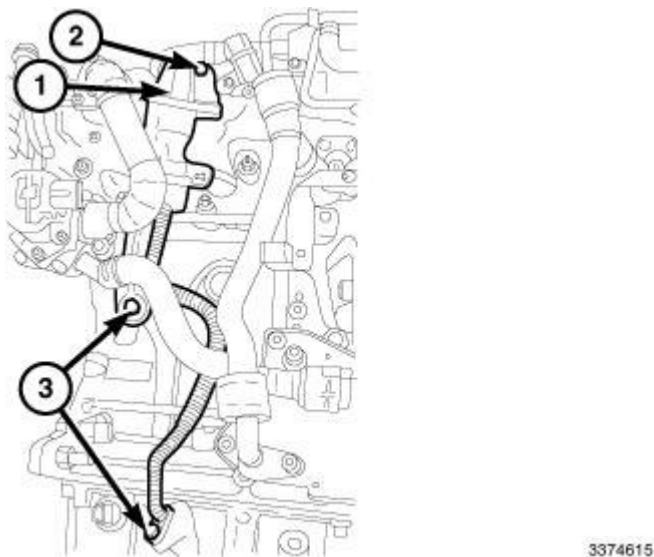


Fig. 313: Oil Vapor Separator & Bolts
Courtesy of CHRYSLER GROUP, LLC

15. Remove bolts (2, 3) and the oil vapor separator (1) complete with pipes.
16. Install EGR pipe support bracket.
17. Fill the cooling system. Refer to **STANDARD PROCEDURE** .
18. Connect the negative battery cable (1).
19. Start the engine and check for leaks.

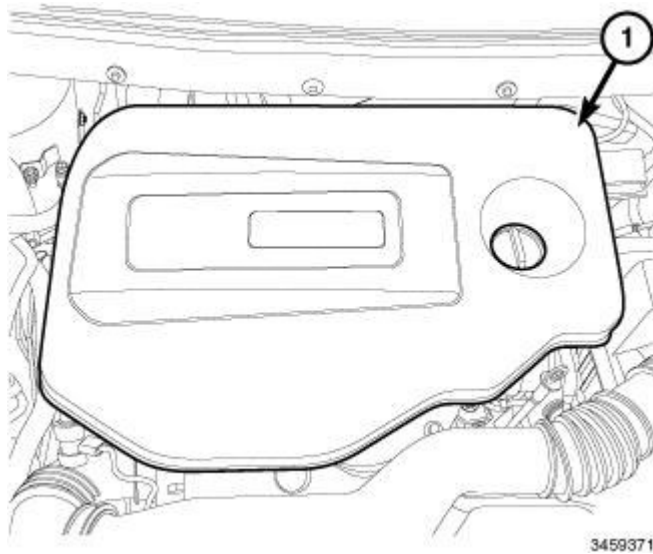


Fig. 314: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

20. Install the engine cover (1).

AIR INTAKE SYSTEM

AIR CLEANER

REMOVAL

REMOVAL

1. Loosen the four fasteners and position aside the air cleaner cover.

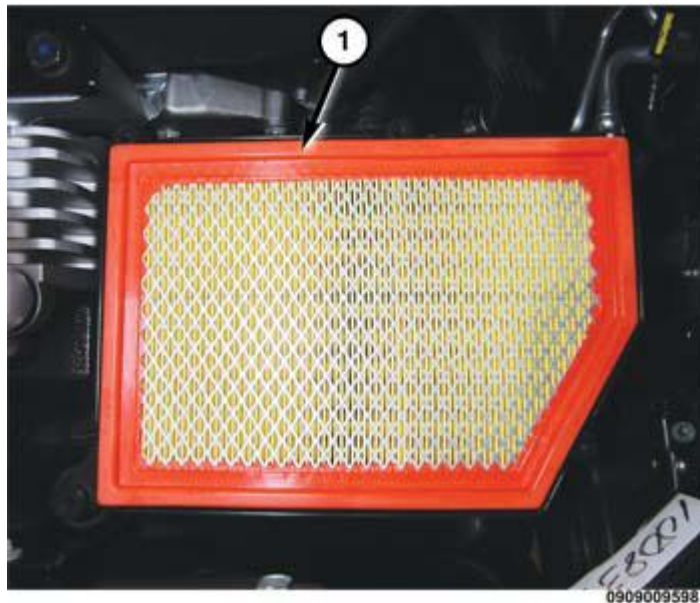
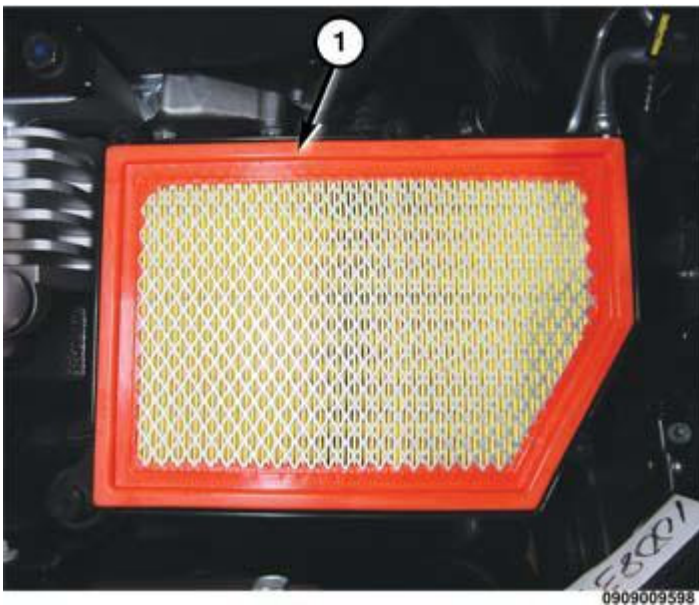


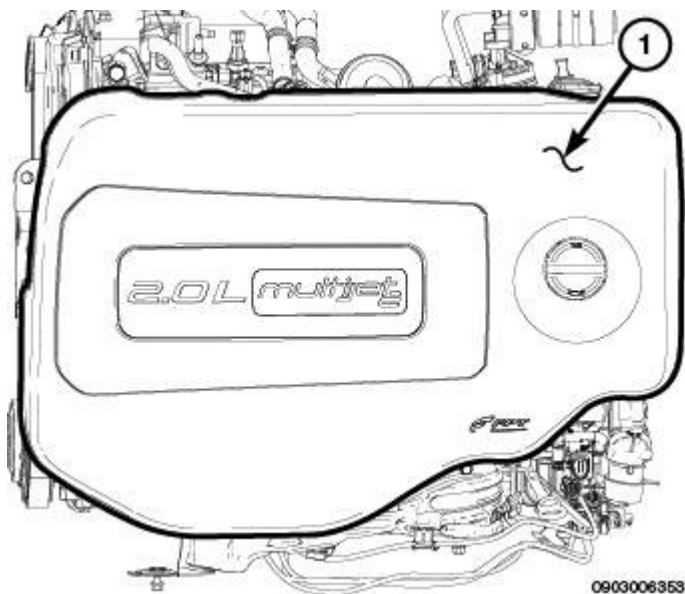
Fig. 315: Air Filter Element**Courtesy of CHRYSLER GROUP, LLC**

2. Remove the air filter element (1).
3. If necessary, clean the inside of the air cleaner housing.

INSTALLATION**INSTALLATION****Fig. 316: Air Filter Element****Courtesy of CHRYSLER GROUP, LLC**

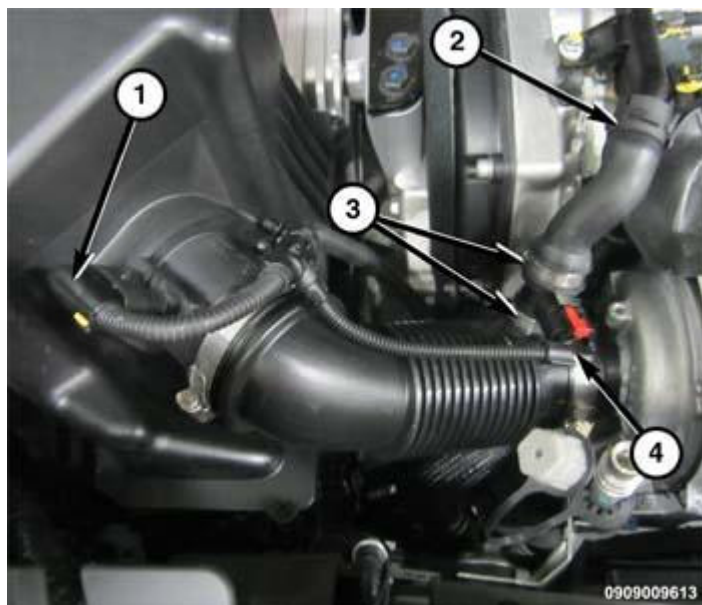
1. Install the new air filter element (1).
2. Position the air cleaner cover and securely tighten fasteners.

BODY, AIR CLEANER**REMOVAL****REMOVAL**

**Fig. 317: Engine Cover**

Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Removal the engine cover (1).

**Fig. 318: MAF Sensor Harness Connector**

Courtesy of CHRYSLER GROUP, LLC

3. Disconnect MAF sensor harness connector (1).

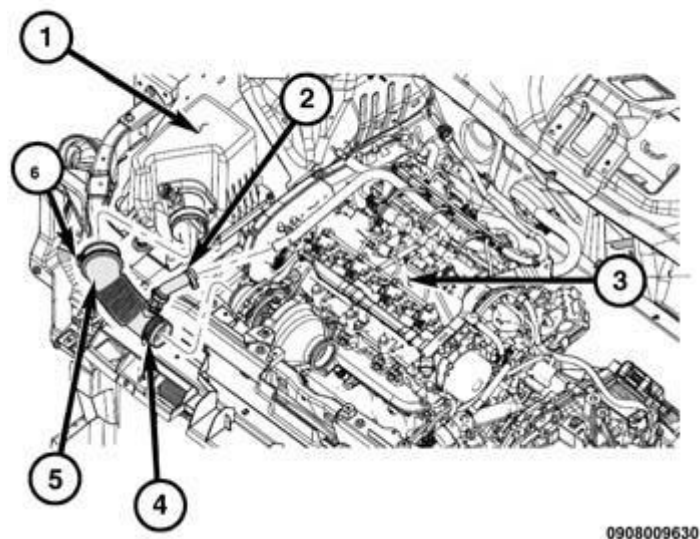


Fig. 319: Turbocharger Inlet Hose & Clamp
Courtesy of CHRYSLER GROUP, LLC

4. Loosen clamp (6) and disconnect turbocharger inlet hose (5) from the Mass Air Flow (MAF) sensor.

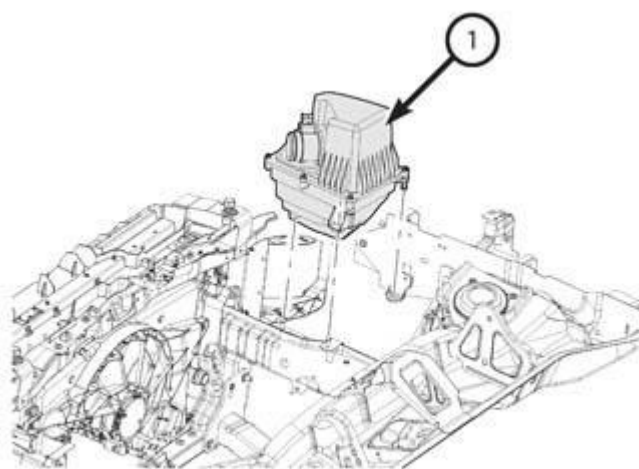
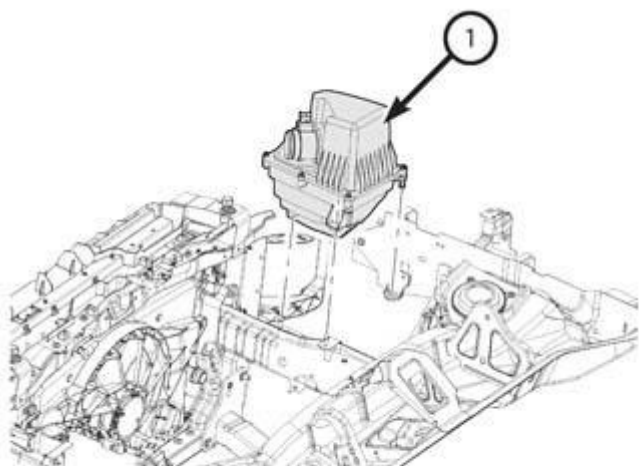


Fig. 320: Air Cleaner Body
Courtesy of CHRYSLER GROUP, LLC

5. Pull air cleaner body (1) straight up to remove.

INSTALLATION

INSTALLATION

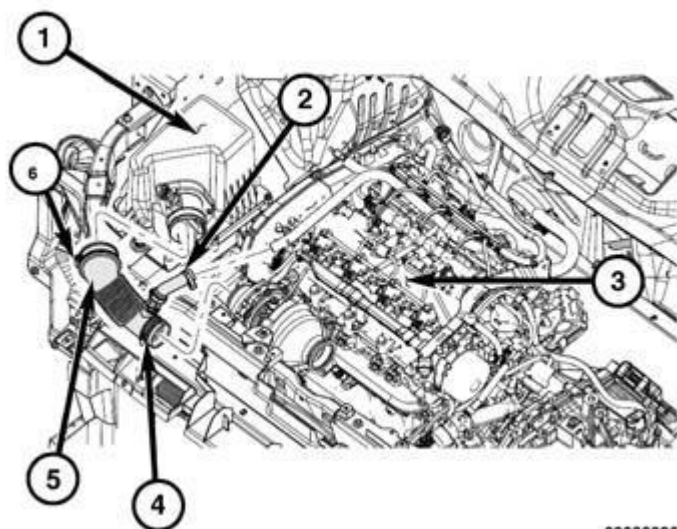


0909010420

Fig. 321: Air Cleaner Body

Courtesy of CHRYSLER GROUP, LLC

1. Position the air cleaner body into the grommets and push the air cleaner body (1) down until fully seated.



0908009630

Fig. 322: Turbocharger Inlet Hose & Clamp

Courtesy of CHRYSLER GROUP, LLC

2. Connect turbocharger inlet hose (5) to the (MAF) sensor and securely tighten clamp (6).

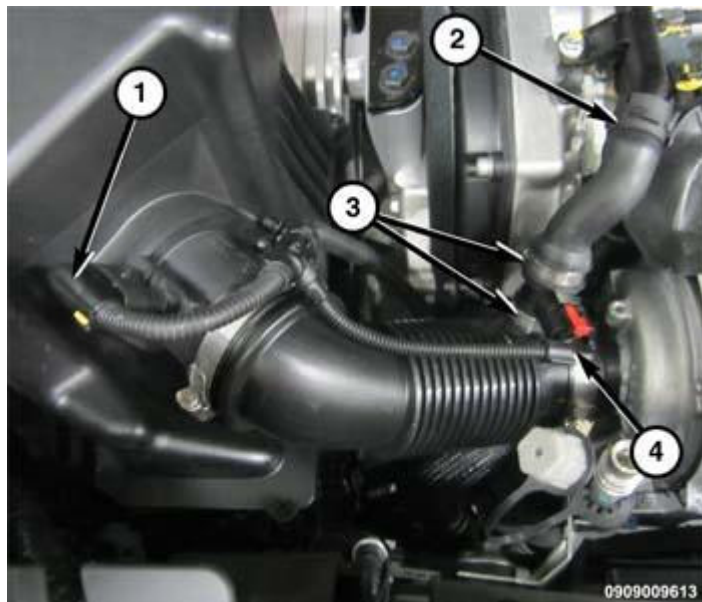


Fig. 323: MAF Sensor Harness Connector
Courtesy of CHRYSLER GROUP, LLC

3. Connect Mass Air Flow (MAF) sensor connector (2).
4. Install the engine cover (1).
5. Connect the negative battery cable.

ENGINE MOUNTING

DESCRIPTION

DESCRIPTION

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

OPERATION

OPERATION

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

BRACKET, ENGINE MOUNT, LEFT

REMOVAL

MTX

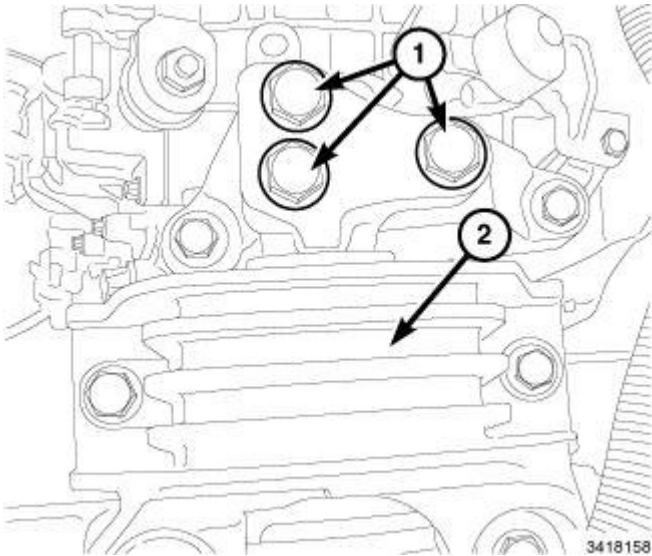


Fig. 324: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove the air cleaner body. Refer to **BODY, AIR CLEANER, REMOVAL** .
2. Using a suitable jack. Support the transaxle.
3. Remove left mount (2) to transaxle retaining bolts (1).

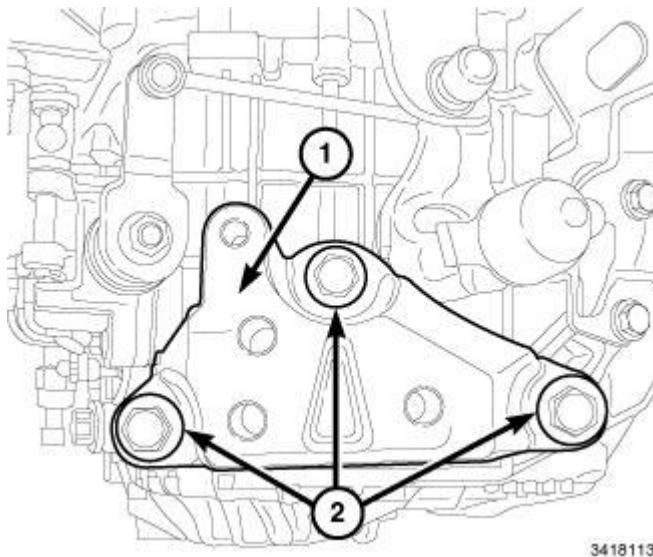


Fig. 325: Left Transaxle Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Lower the transaxle.
5. Remove bolts (2) and the left transaxle mount bracket (1).

INSTALLATION

MTX

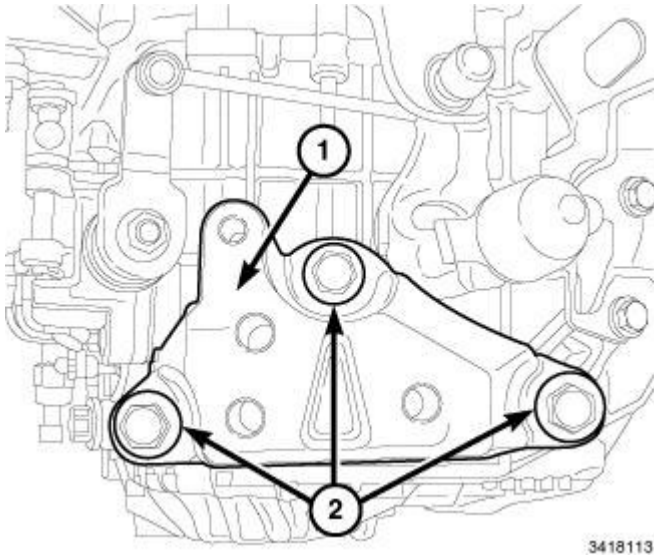


Fig. 326: Left Transaxle Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the left transaxle mount bracket (1). Tighten bolts to 50 N.m (37 ft. lbs.).
2. Using a suitable jack, raise the transaxle.

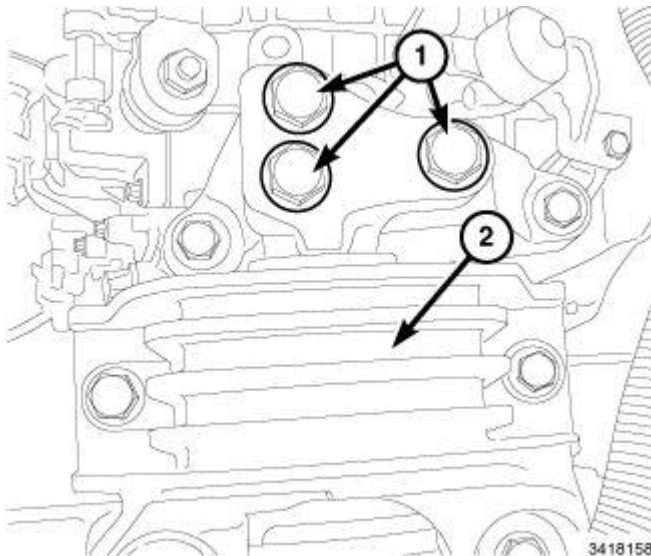


Fig. 327: Left Engine Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install the left mount (2) to transaxle retaining bolts (1) and tighten to 110 N.m (81 ft. lbs.).
4. Remove the jack.
5. Install the air cleaner body. Refer to **BODY, AIR CLEANER, INSTALLATION** .

BRACKET, ENGINE MOUNT, REAR MOUNT

REMOVAL

REMOVAL

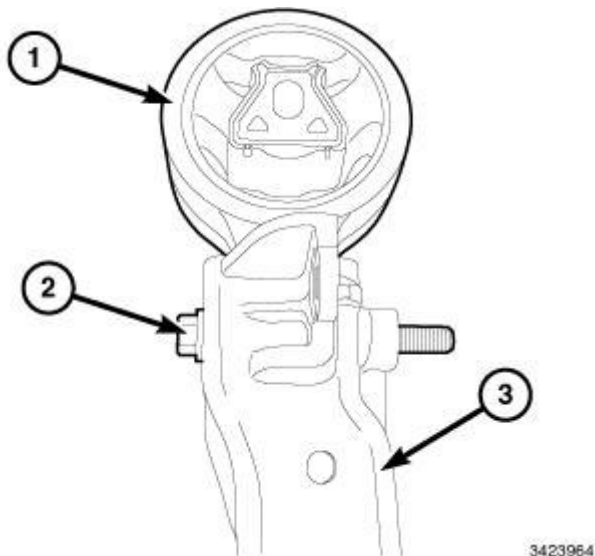


Fig. 328: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Remove the rear mount (1). Refer to **INSULATOR, ENGINE MOUNT, REAR, REMOVAL** .

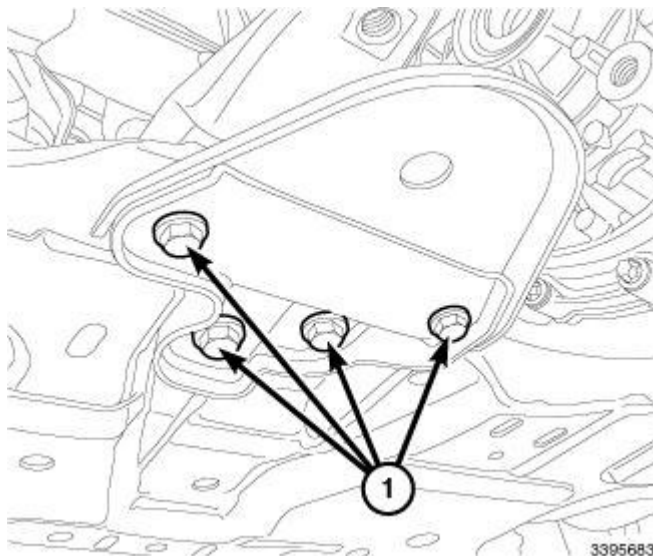


Fig. 329: Rear Transmission Frame Mount Lower Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Remove bolts (1) and the lower rear transaxle frame mount bracket.

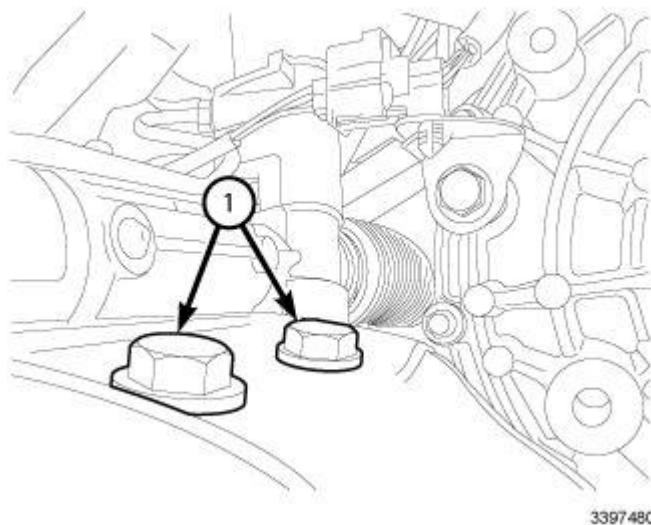


Fig. 330: Rear Transmission Frame Mount Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Remove upper bolts (1) and the rear transaxle frame bracket.

INSTALLATION

INSTALLATION

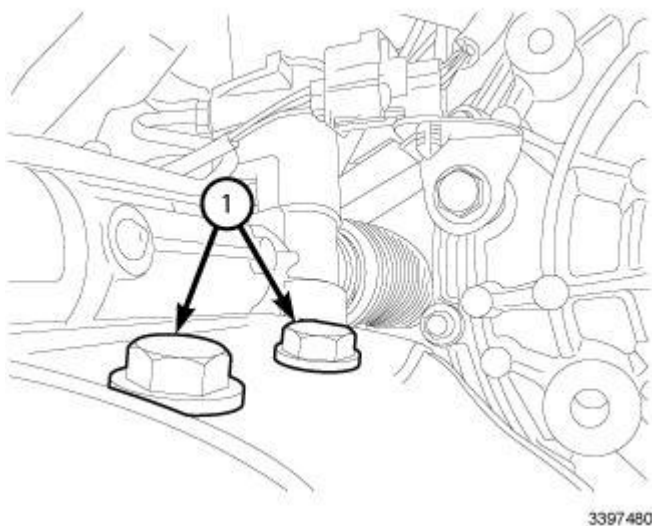


Fig. 331: Rear Transmission Frame Mount Upper Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear transaxle frame bracket. Tighten bolts (1) to 50 N.m (37 ft. lbs.).

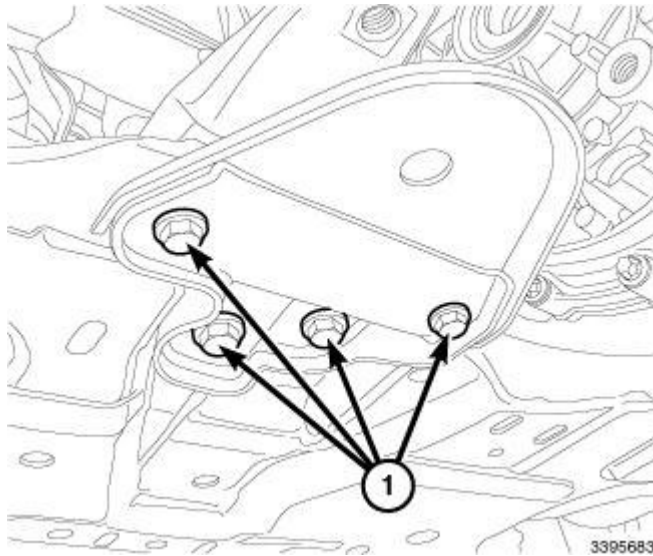


Fig. 332: Rear Transmission Frame Mount Lower Bolts
Courtesy of CHRYSLER GROUP, LLC

2. Install the lower rear transaxle frame mount bracket. Tighten bolts (1) to 50 N.m (37 ft. lbs.).

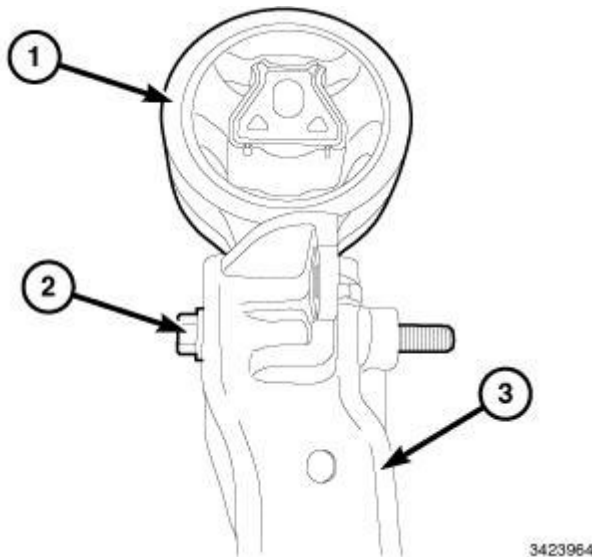


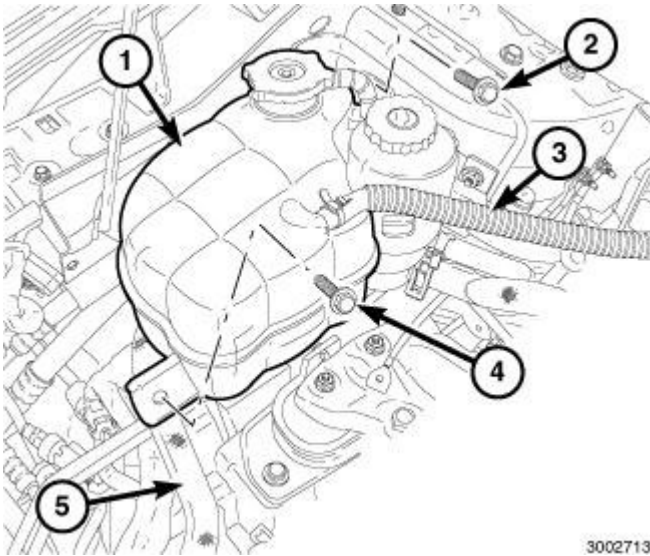
Fig. 333: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install the rear mount. Refer to INSULATOR, ENGINE MOUNT, REAR, INSTALLATION.

INSULATOR, ENGINE MOUNT, RIGHT

REMOVAL

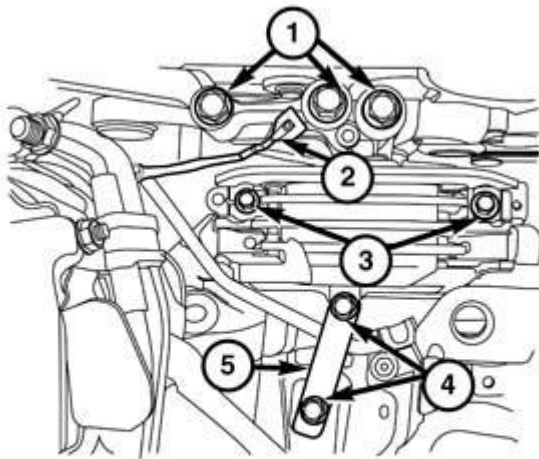
REMOVAL



3002713

Fig. 334: Coolant Recovery Container, Return Hose, Lower Supply Hose & Mount Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Remove bolts (2, and 4) and position aside the coolant bottle (1).



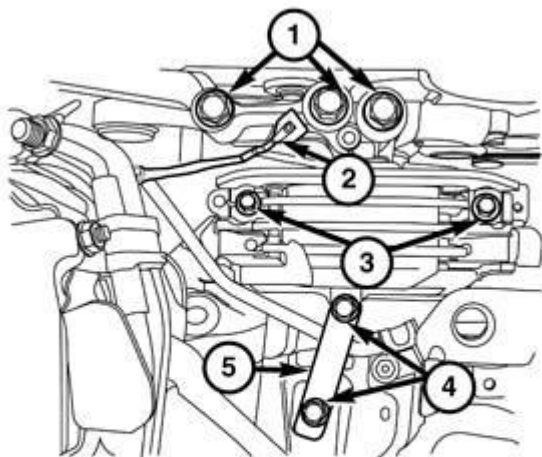
091068618

Fig. 335: Right Side Engine Mount, Right Mount Support Bracket, Bolts & Ground Strap
Courtesy of CHRYSLER GROUP, LLC

2. Using a suitable jack. Support the engine.
3. Remove the ground strap (2).
4. Remove bolts (4) and the right mount support bracket (5).
5. Remove bolts (1 and 3) and the right side engine mount.

INSTALLATION

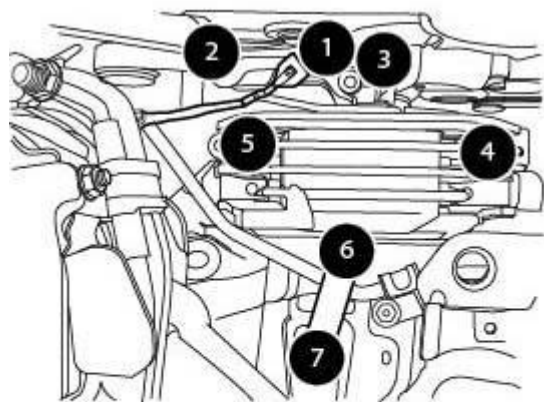
INSTALLATION



091068618

Fig. 336: Right Side Engine Mount, Right Mount Support Bracket, Bolts & Ground Strap
 Courtesy of CHRYSLER GROUP, LLC

1. Install the right side engine mount and. Tighten bolts (1, 3) finger tight.
2. Install the right mount support bracket (5) and tighten bolts (4) finger tight.
3. Install the ground strap (2).



091270467

Fig. 337: Tightening Sequence

Courtesy of CHRYSLER GROUP, LLC

4. Using the tightening sequence shown in the illustration, tighten bolts to:
 - Tighten bolts (4, 5) to 61 N.m (45 ft. lbs.).
 - Tighten bolts (6, 7) to 25 N.m (18 ft. lbs.).
 - Tighten bolts (1, 2, and 3) to 130 N.m (96 ft. lbs.).
5. Remove the jack.

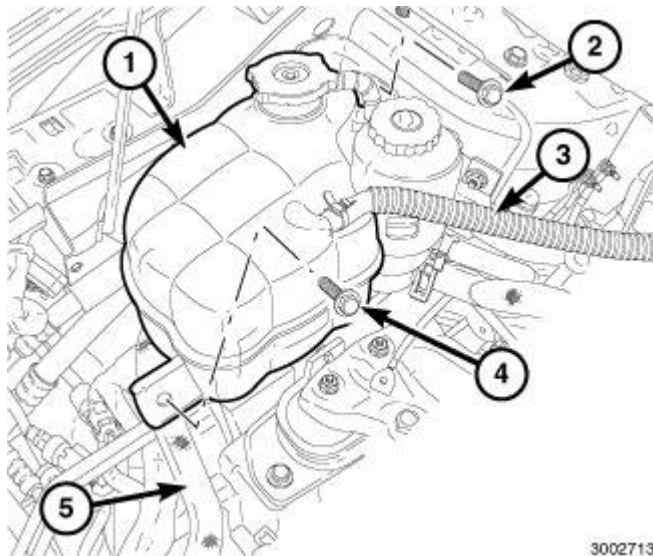
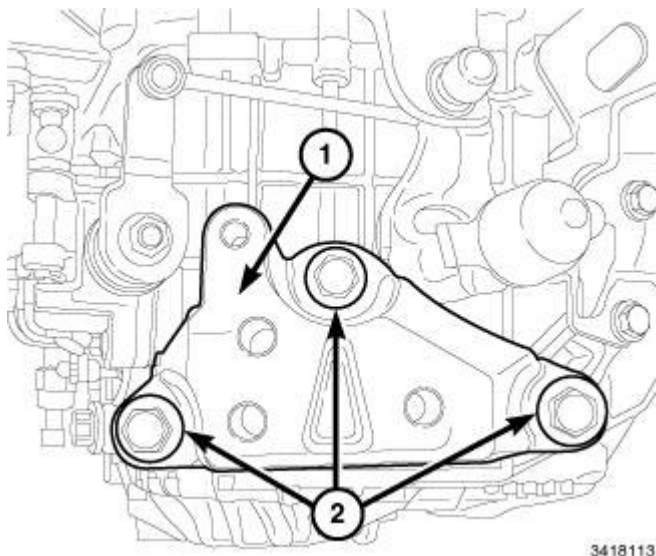


Fig. 338: Coolant Recovery Container, Return Hose, Lower Supply Hose & Mount Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Install the coolant bottle (1). Tighten bolts (2 and 4) to 8 N.m (71 in. lbs.).

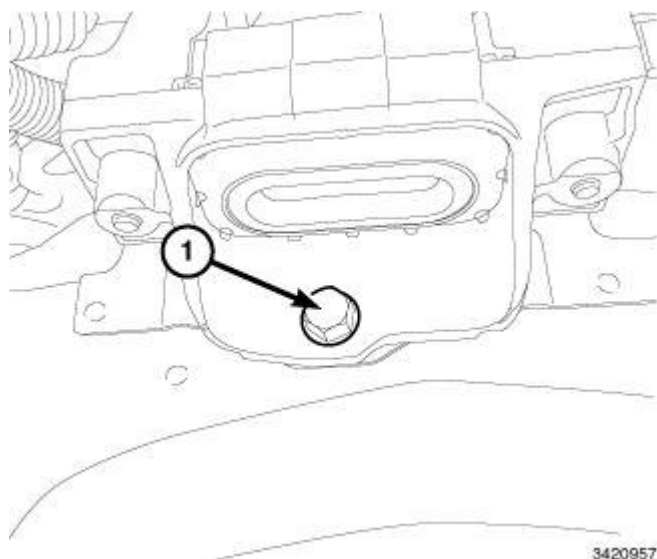
INSULATOR, ENGINE MOUNT, LEFT**REMOVAL****MTX**



3418113

Fig. 339: Left Transaxle Mount Bracket & Bolts
 Courtesy of CHRYSLER GROUP, LLC

1. Remove the mount bracket (1) from transaxle. Refer to **BRACKET, ENGINE MOUNT, LEFT, REMOVAL**.



3420957

Fig. 340: Frame Rail Lower Bolt
 Courtesy of CHRYSLER GROUP, LLC

2. Remove mount to frame rail lower bolt (1).

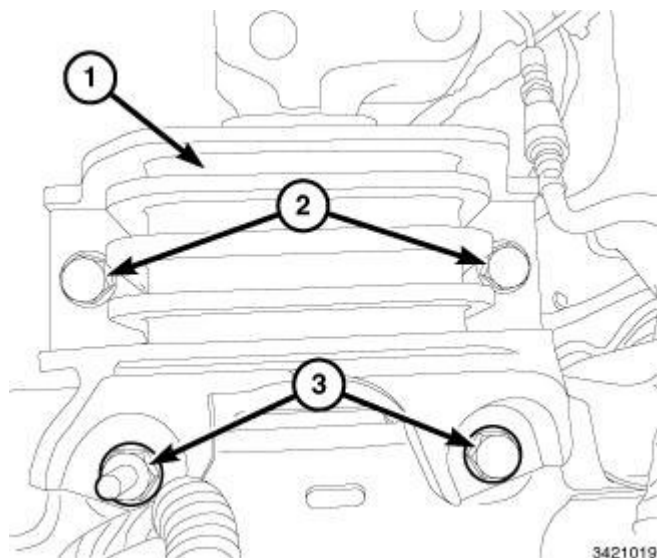


Fig. 341: Left Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: DO NOT REMOVE THESE BOLTS (2).

3. Remove bolts (3) and the left mount (1).

AWD/ATX

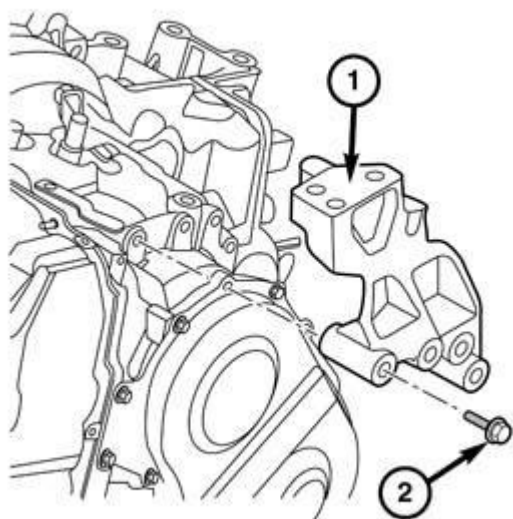


Fig. 342: Left Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Remove the left mount bracket (1) from transaxle. Refer to **BRACKET, ENGINE MOUNT, LEFT, REMOVAL**.

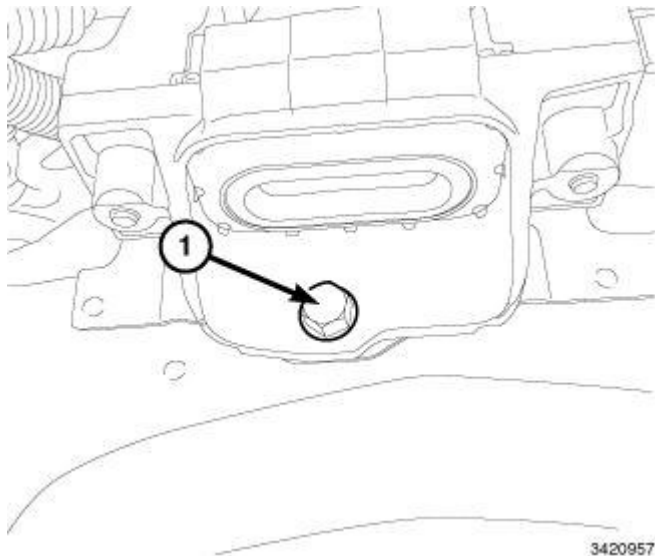


Fig. 343: Frame Rail Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Remove mount to frame rail lower bolt (1).

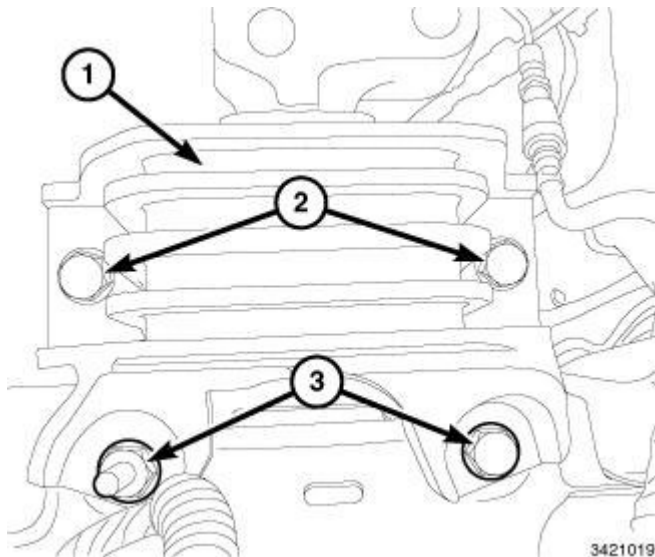


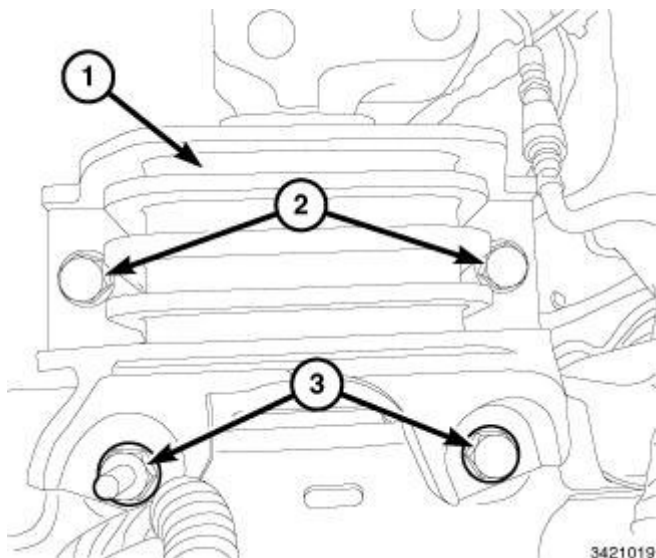
Fig. 344: Left Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

NOTE: DO NOT REMOVE THESE BOLTS (2).

3. Remove bolts (3) and the left mount (1).

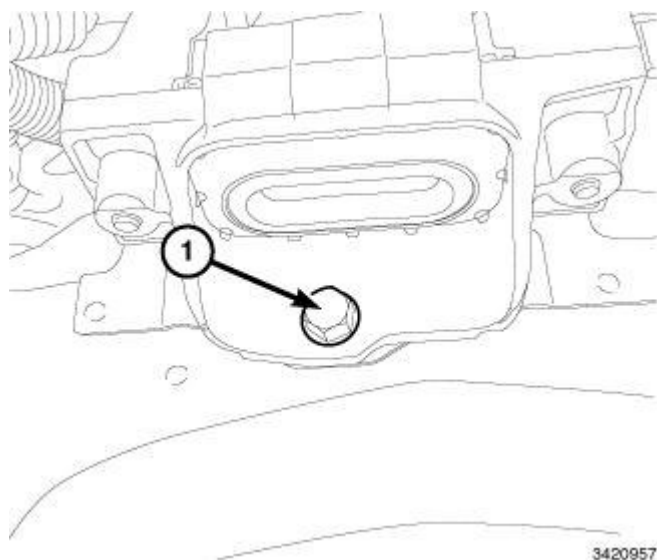
INSTALLATION

MTX

**Fig. 345: Left Mount & Bolts**

Courtesy of CHRYSLER GROUP, LLC

1. Position the left mount (1) on frame rail. Tighten bolts (3) to 55 N.m (40 ft. lbs.).

**Fig. 346: Frame Rail Lower Bolt**

Courtesy of CHRYSLER GROUP, LLC

2. Install mount to frame rail lower bolt (1) and tighten to 55 N.m (40 ft. lbs.).

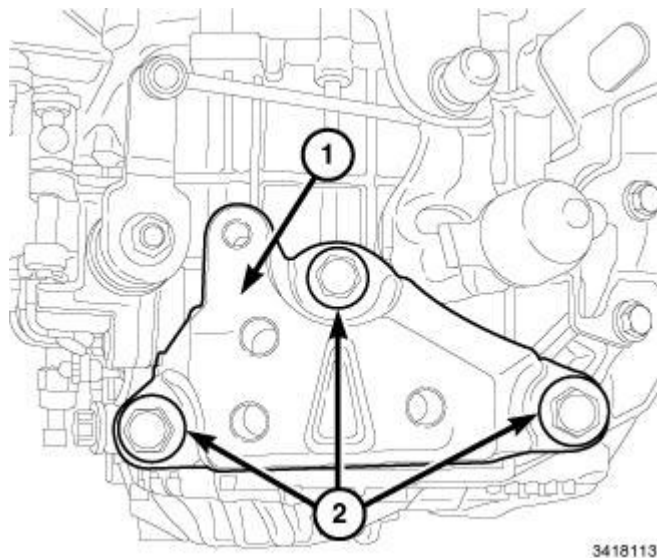


Fig. 347: Left Transaxle Mount Bracket & Bolts
Courtesy of CHRYSLER GROUP, LLC

3. Install left mount bracket (1) to transaxle. Refer to **BRACKET, ENGINE MOUNT, LEFT, INSTALLATION**.

AWD/ATX

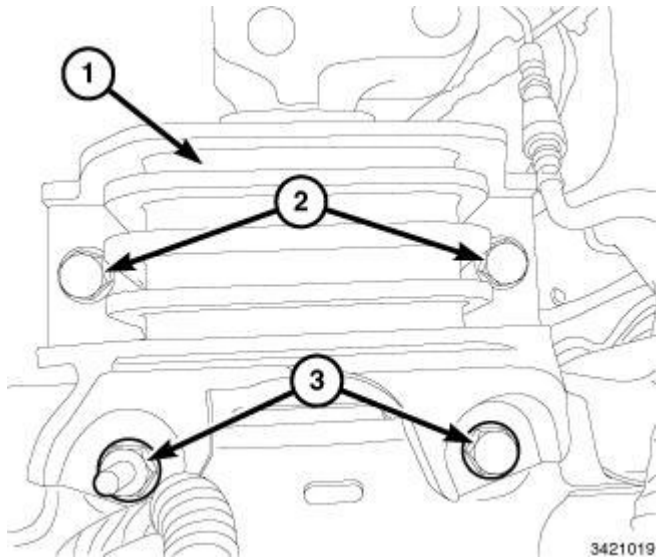


Fig. 348: Left Mount & Bolts
Courtesy of CHRYSLER GROUP, LLC

1. Position the left mount (1) on frame rail. Tighten bolts (3) to 55 N.m (40 ft. lbs.).

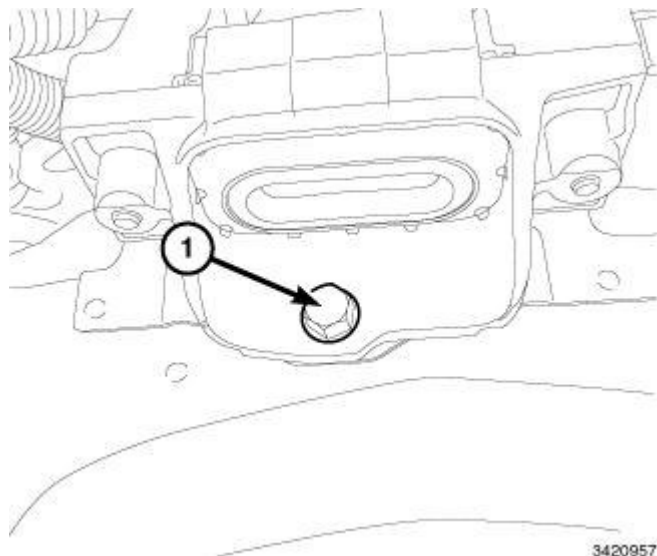


Fig. 349: Frame Rail Lower Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install mount to frame rail lower bolt (1) and tighten to 55 N.m (40 ft. lbs.).

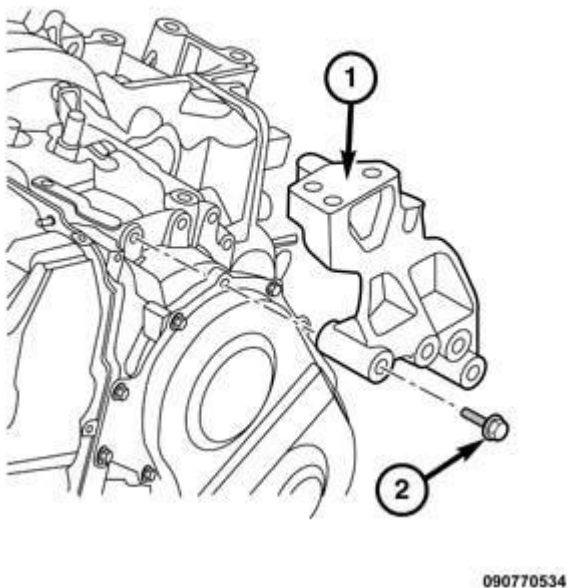
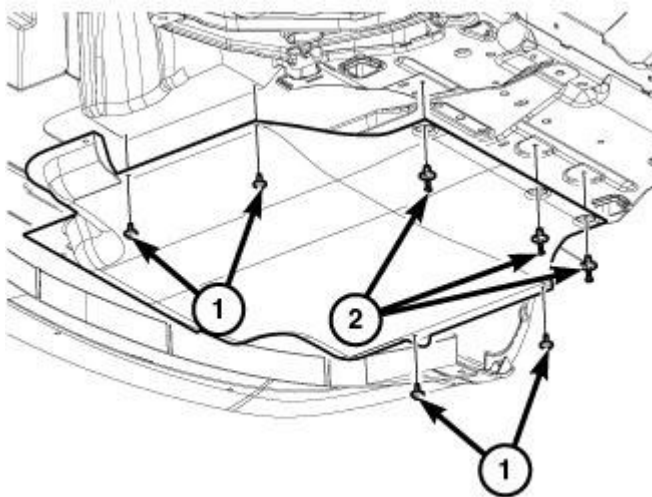


Fig. 350: Left Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

3. Install left mount bracket (1) to transaxle. Refer to **BRACKET, ENGINE MOUNT, LEFT, INSTALLATION**.

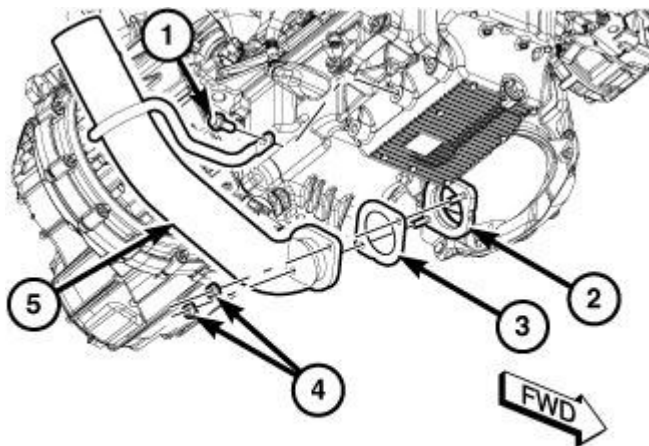
INSULATOR, ENGINE MOUNT, REAR

REMOVAL**MTX**

3371968

Fig. 351: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

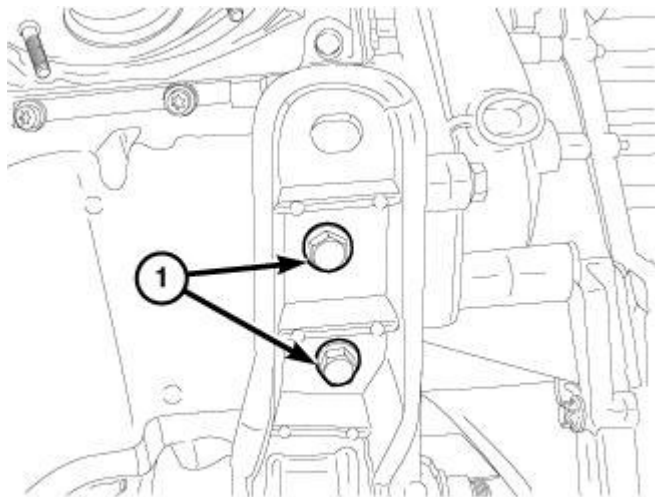
1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE**.
2. Remove the belly pan.



3371984

Fig. 352: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners
Courtesy of CHRYSLER GROUP, LLC

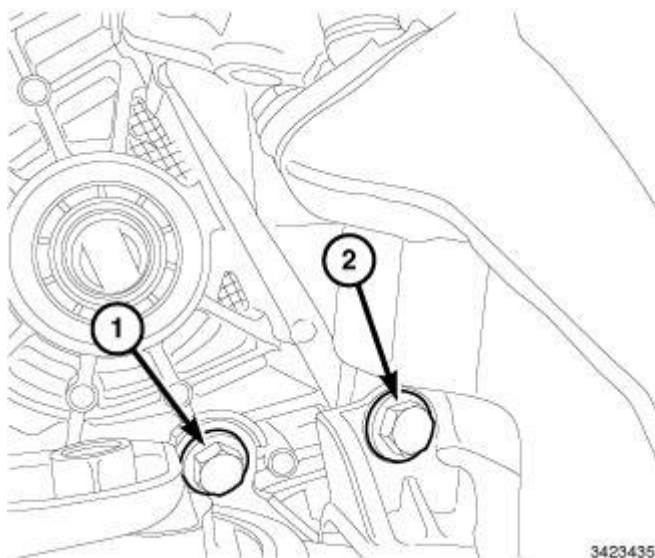
3. Remove nuts (4) securing the exhaust crossunder pipe (5).
4. Remove support bracket bolt (1) and disconnect the exhaust crossunder pipe (5) and position aside.
5. Remove and discard gasket (3).



3411678

Fig. 353: Rear Transaxle Mount Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

6. Remove the rear transaxle mount bracket bolts at the transaxle (1).



3423435

Fig. 354: Engine Mount Bracket-To-Transaxle Bolts
Courtesy of CHRYSLER GROUP, LLC

7. Remove the rear transaxle mount bracket bolt on the side of transaxle (2).

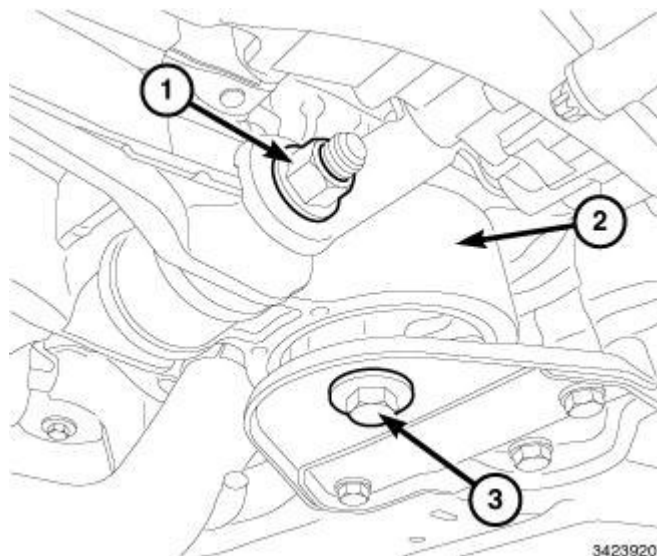


Fig. 355: Support Bracket-To-Engine Mount Bracket Nut, Rear Mount & Bolt
 Courtesy of CHRYSLER GROUP, LLC

8. Remove the support bracket-to-engine mount bracket nut (1).
9. Remove bolt (3) and the rear mount (2).

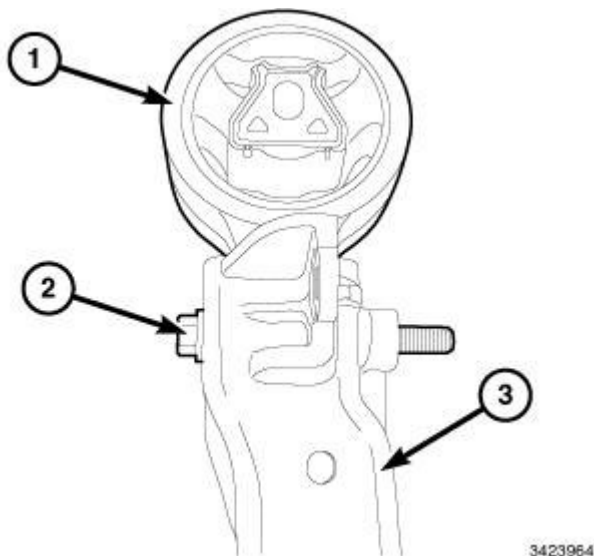
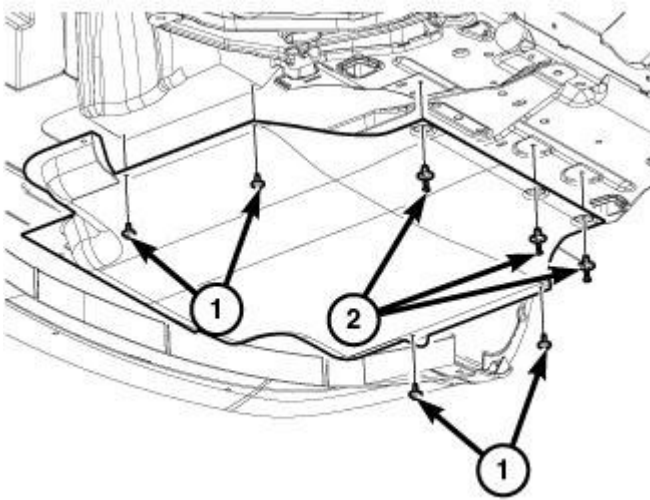


Fig. 356: Rear Mount, Engine Mount Bracket & Bolt
 Courtesy of CHRYSLER GROUP, LLC

10. Remove bolt (2) and rear mount (1) from engine mount bracket (3).

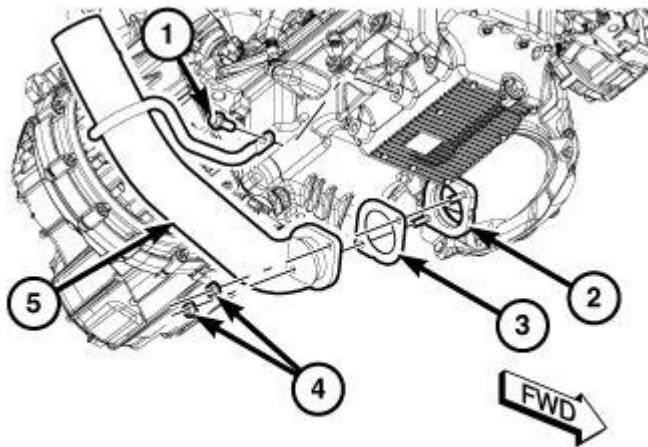
AWD/ATX



3371968

Fig. 357: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

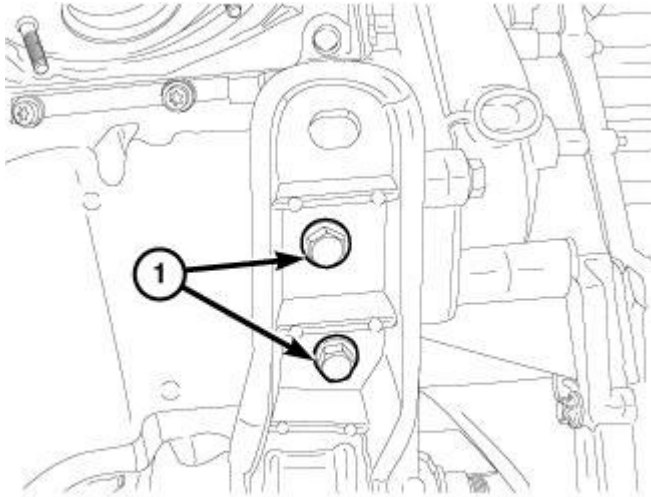
1. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove the belly pan.



3371984

Fig. 358: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

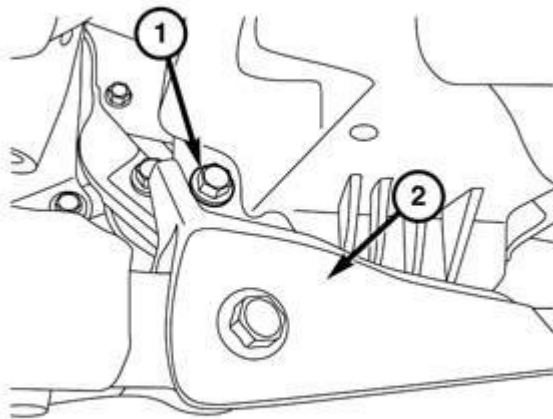
3. Remove nuts (4) securing the exhaust crossunder pipe (5).
4. Remove support bracket bolt (1) and disconnect the exhaust crossunder pipe (5) and position aside.
5. Remove and discard gasket (3).



3411678

Fig. 359: Rear Transaxle Mount Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

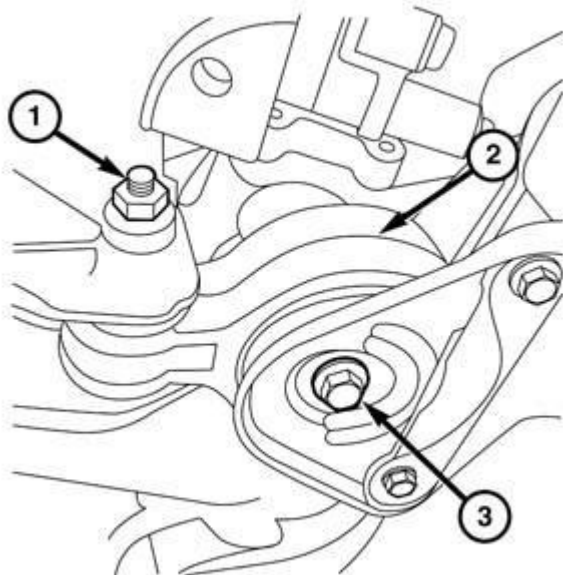
6. Remove the rear transaxle mount bracket bolts at the transaxle (1).



090770530

Fig. 360: Rear Transaxle Mount Bracket Bolt
Courtesy of CHRYSLER GROUP, LLC

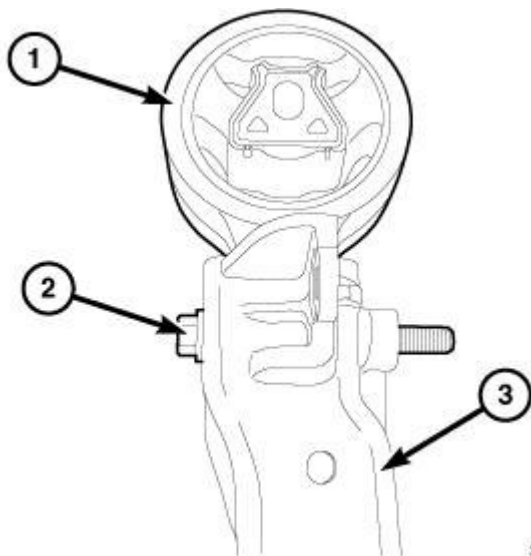
7. Remove the rear transaxle mount bracket bolt (1) on the side of transaxle (2).



111072355

Fig. 361: Support Bracket-To-Engine Mount Bracket, Rear Mount, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

8. Remove the support bracket-to-engine mount bracket nut (1).
9. Remove bolt (3) and the rear mount (2).



3423964

Fig. 362: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

10. Remove bolt (2) and rear mount (1) from engine mount bracket (3).

INSTALLATION

MTX

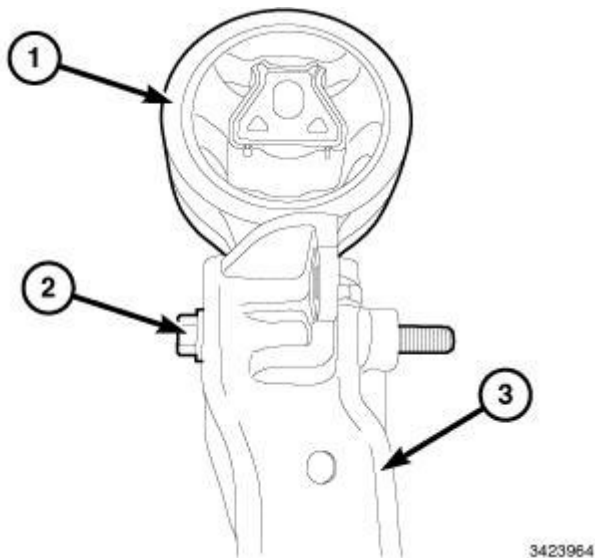


Fig. 363: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

1. Install the rear mount (1) into the engine mount bracket (3). Tighten bolt (2) to 90 N.m (66 ft. lbs.).

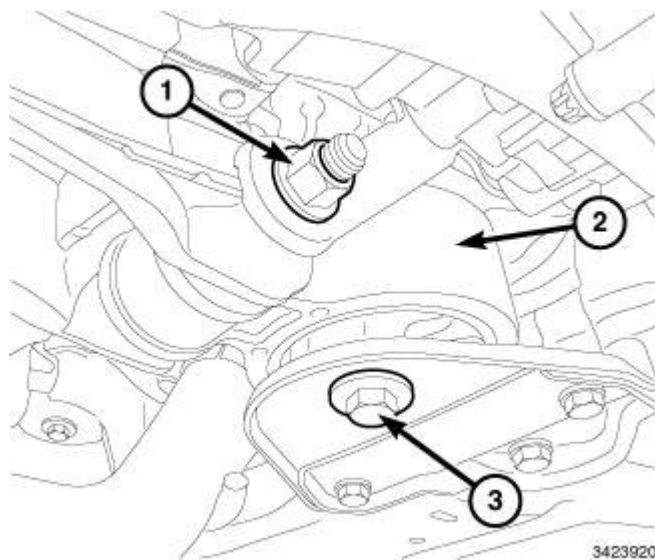


Fig. 364: Support Bracket-To-Engine Mount Bracket Nut, Rear Mount & Bolt
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear mount (2) and tighten bolt (3) finger tight.
3. Install the support bracket-to-engine mount bracket nut (1). Using a backing wrench to hold bolt, and tighten nut (1) to 102 N.m (75 ft. lbs.).

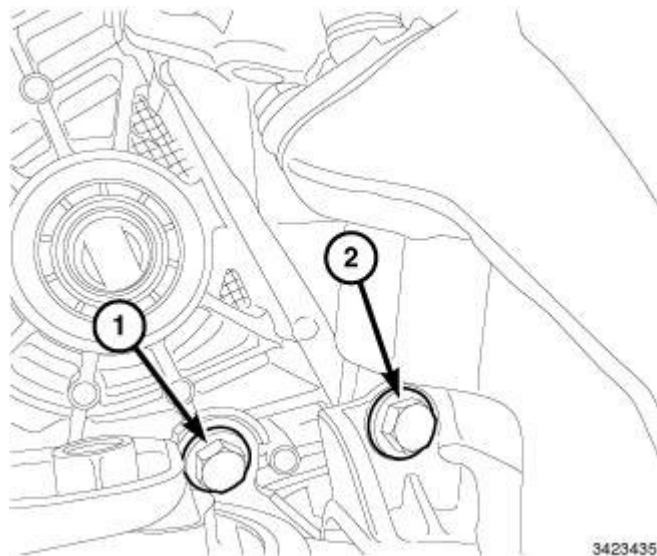


Fig. 365: Engine Mount Bracket-To-Transaxle Bolts
Courtesy of CHRYSLER GROUP, LLC

4. Install the engine mount bracket-to-transaxle bolt (2) and tighten to 40 N.m (30 ft. lbs.).

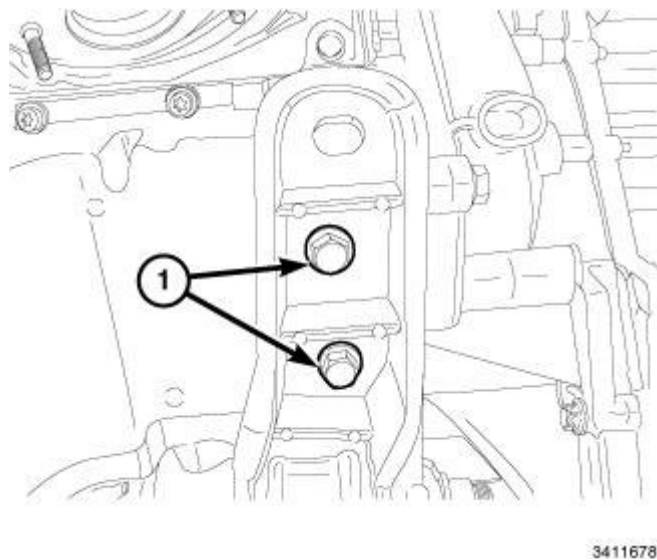


Fig. 366: Rear Transaxle Mount Bracket Bolts
Courtesy of CHRYSLER GROUP, LLC

5. Install the rear engine mount bracket-to-oil pan bolts (1) and tighten to 50 N.m (37 ft. lbs.).

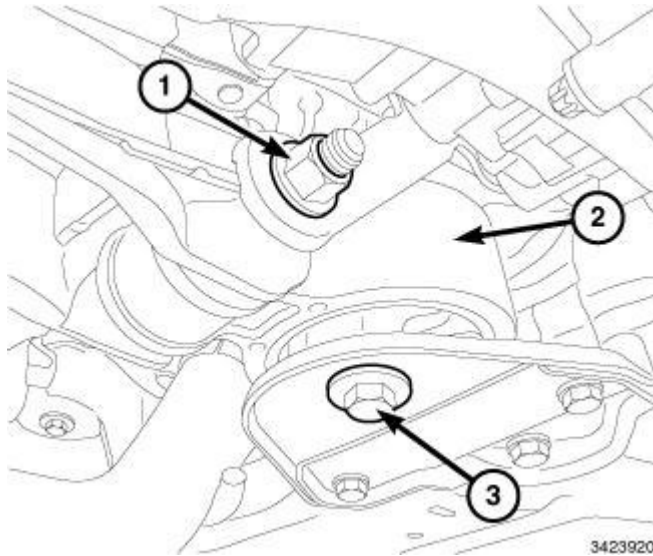


Fig. 367: Support Bracket-To-Engine Mount Bracket Nut, Rear Mount & Bolt
Courtesy of CHRYSLER GROUP, LLC

6. Install the rear mount bolt (1) and tighten to 110 N.m (81 ft. lbs.).

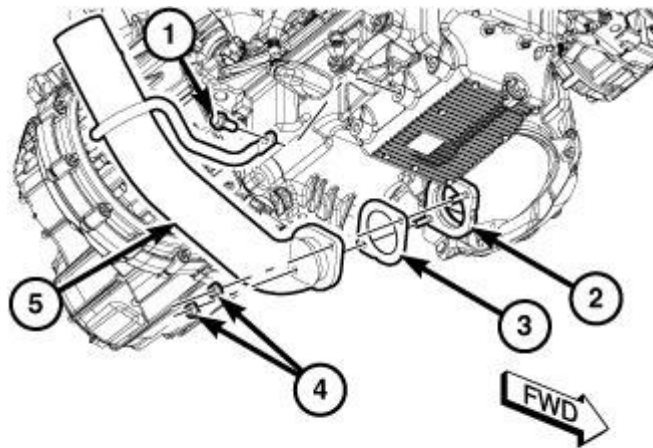
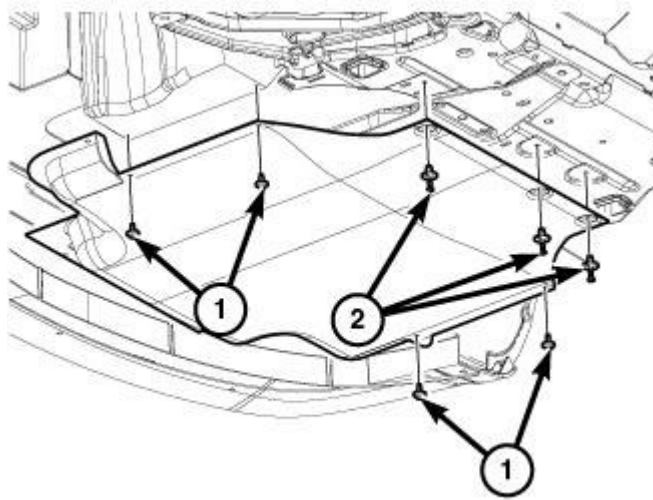


Fig. 368: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners
Courtesy of CHRYSLER GROUP, LLC

7. Install a crossunder pipe new gasket (3).
8. Position the exhaust crossunder pipe (5). Tighten the support bracket bolt (1) to 30 N.m (22 ft. lbs.).
9. Install the exhaust crossunder pipe (5) nuts (4) and tighten to 27 N.m (20 ft. lbs.).

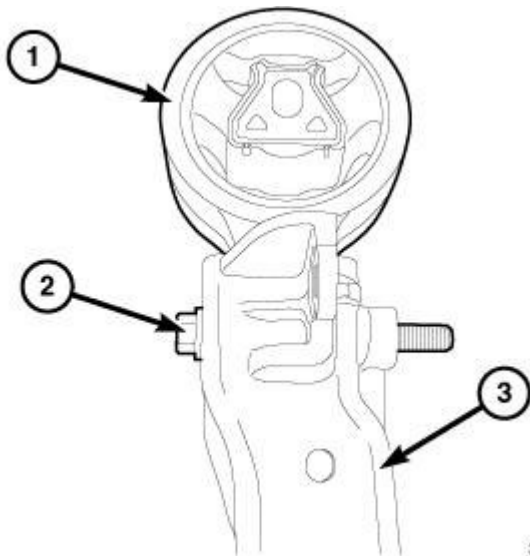


3371968

Fig. 369: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

10. Install the belly pan.
11. Lower the vehicle.

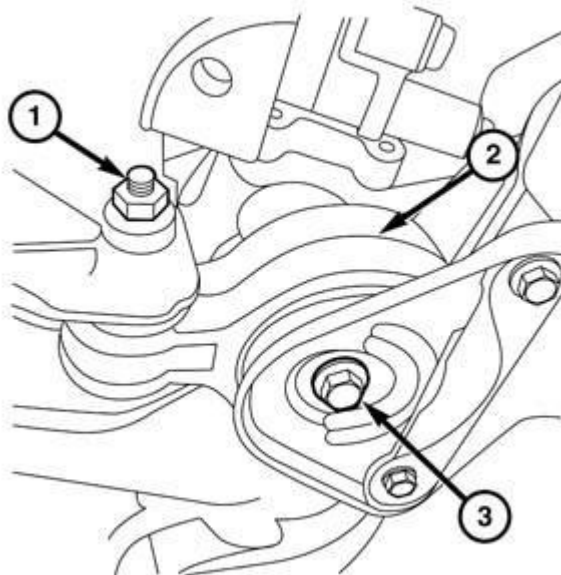
AWD/ATX



3423964

Fig. 370: Rear Mount, Engine Mount Bracket & Bolt
Courtesy of CHRYSLER GROUP, LLC

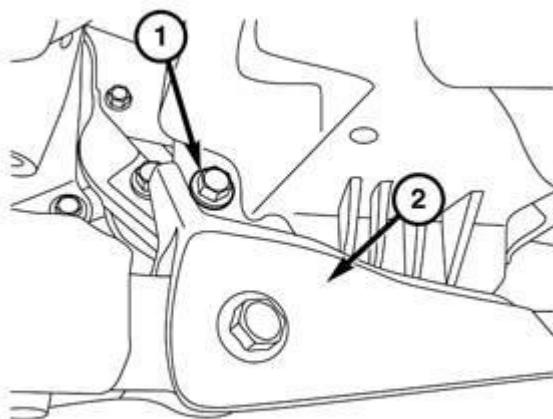
1. Install the rear mount (1) into the engine mount bracket (3). Tighten bolt (2) to 90 N.m (66 ft. lbs.).



111072355

Fig. 371: Support Bracket-To-Engine Mount Bracket, Rear Mount, Bolt & Nut
Courtesy of CHRYSLER GROUP, LLC

2. Install the rear mount (2) and tighten bolt (3) finger tight.
3. Install the support bracket-to-engine mount bracket nut (1). Using a backing wrench to hold bolt, tighten nut (1) to 102 N.m (75 ft. lbs.).

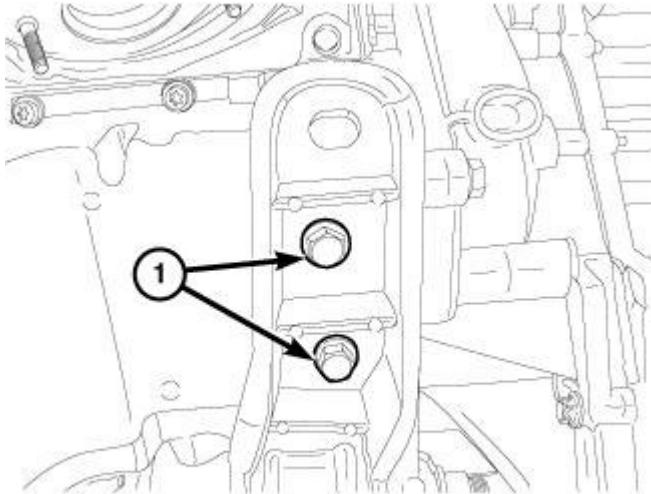


090770530

Fig. 372: Rear Transaxle Mount Bracket Bolt

Courtesy of CHRYSLER GROUP, LLC

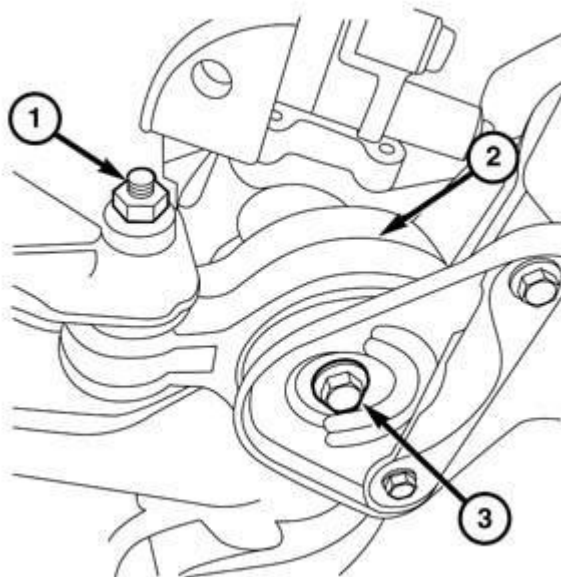
4. Install the engine mount bracket-to-transaxle bolt (2) and tighten to 40 N.m (30 ft. lbs.).



3411678

Fig. 373: Rear Transaxle Mount Bracket Bolts
 Courtesy of CHRYSLER GROUP, LLC

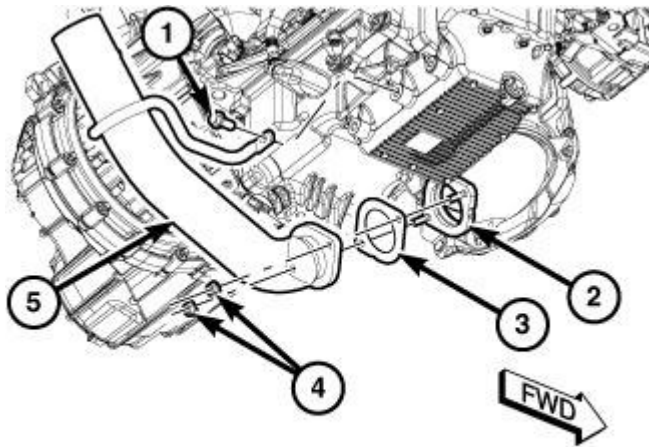
5. Install the rear engine mount bracket-to-oil pan bolts (1) and tighten to 50 N.m (37 ft. lbs.).



111072355

Fig. 374: Support Bracket-To-Engine Mount Bracket, Rear Mount, Bolt & Nut
 Courtesy of CHRYSLER GROUP, LLC

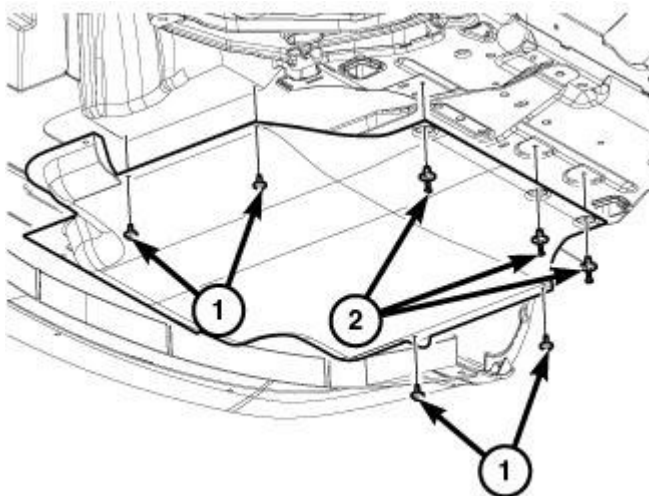
6. Install the rear mount bolt (3) and tighten to 110 N.m (81 ft. lbs.).



3371984

Fig. 375: DPF Flange, Gasket, Exhaust Crossunder Pipe & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

7. Install a crossunder pipe new gasket (3).
8. Position the exhaust crossunder pipe (5). Tighten the support bracket bolt (1) to 30 N.m (22 ft. lbs.).
9. Install the exhaust crossunder pipe (5) nuts (4) and tighten to 27 N.m (20 ft. lbs.).



3371968

Fig. 376: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

10. Install the belly pan.
11. Lower the vehicle.

TURBOCHARGER SYSTEM

COOLER AND HOSES, CHARGE AIR

REMOVAL

REMOVAL

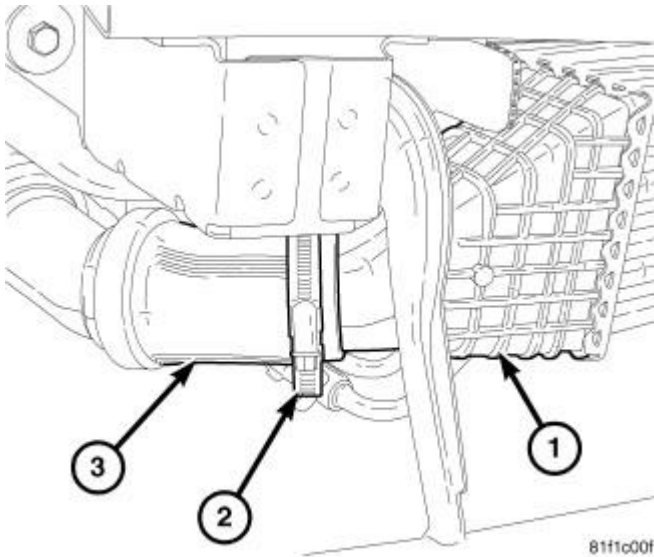


Fig. 377: Charge Air Cooler LH Clamp
Courtesy of CHRYSLER GROUP, LLC

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

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

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

1. Raise and support vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .
2. Remove belly pan (if equipped).
3. Remove front fascia lower closeout panel. Refer to **FASCIA, FRONT LOWER, CLOSEOUT, REMOVAL** .
4. Remove the front fascia. Refer to **FASCIA, FRONT, REMOVAL** .
5. Remove RH tubing clamp (2) and tubing (1) at charge air cooler (3).

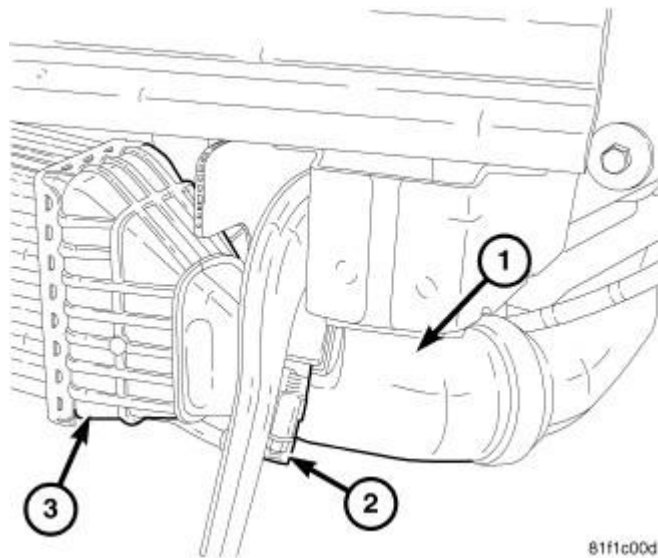


Fig. 378: Charge Air Cooler RH Clamp
Courtesy of CHRYSLER GROUP, LLC

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

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

INSTALLATION

INSTALLATION

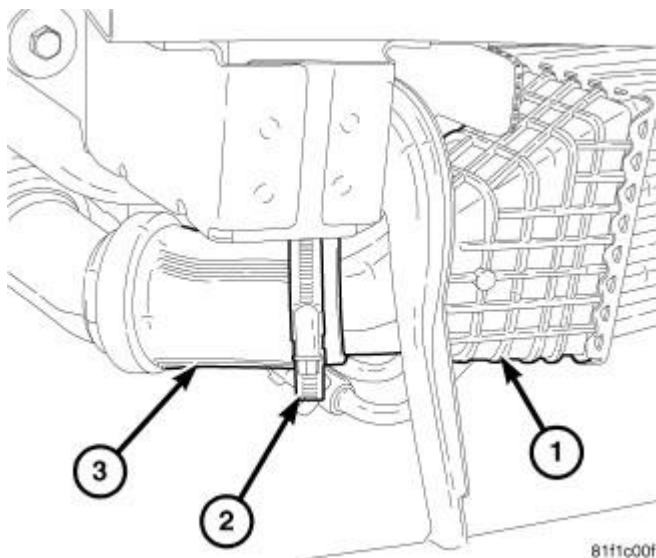


Fig. 379: Charge Air Cooler LH Clamp

Courtesy of CHRYSLER GROUP, LLC

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

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

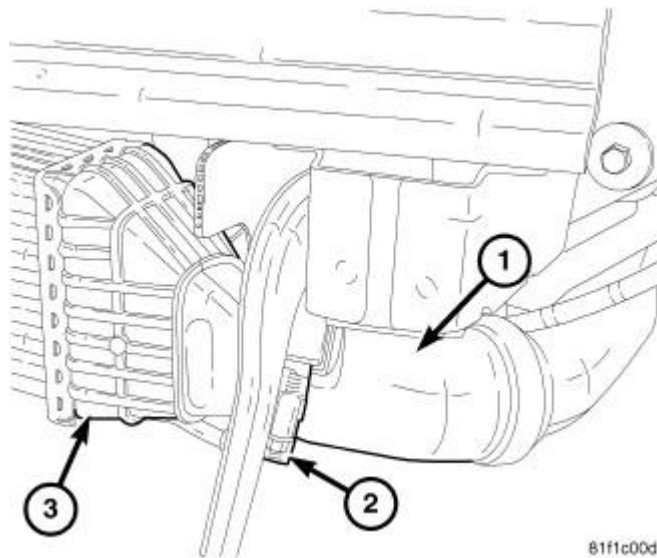


Fig. 380: Charge Air Cooler RH Clamp
Courtesy of CHRYSLER GROUP, LLC

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

3. Install RH tubing (1) and clamp (2) at charge air cooler (3). Tighten clamp to 10 N.m (89 in. lbs.).
4. Install the front fascia. Refer to **FASCIA, FRONT, INSTALLATION** .
5. Install front fascia lower closeout panel. Refer to **FASCIA, FRONT LOWER, CLOSEOUT, INSTALLATION** .
6. Lower the vehicle.

TURBOCHARGER

REMOVAL

REMOVAL

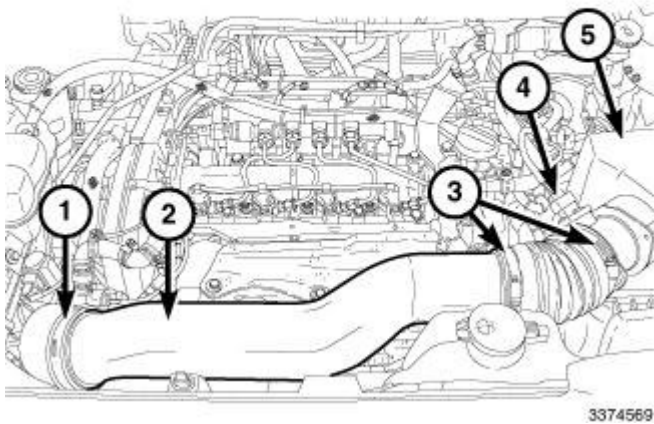


Fig. 381: Upper Clean Air To Turbocharger Tube & Air Cleaner Assembly
 Courtesy of CHRYSLER GROUP, LLC

1. Disconnect the negative battery cable.
2. Remove the engine trim cover.
3. Remove the air cleaner assembly (5). Refer to **BODY, AIR CLEANER, REMOVAL** .
4. Remove the upper clean air to turbocharger tube (2).

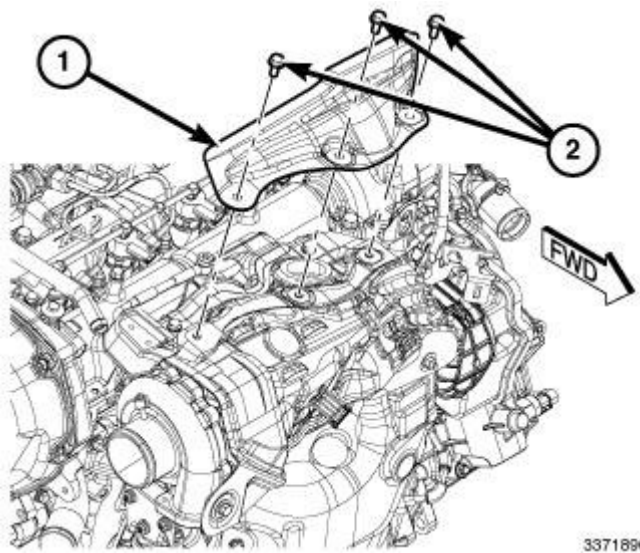


Fig. 382: Upper Turbocharger Heat Shield & Mid Upper Turbocharger Heat Shield
 Courtesy of CHRYSLER GROUP, LLC

5. Remove the upper turbocharger heat shield (1).

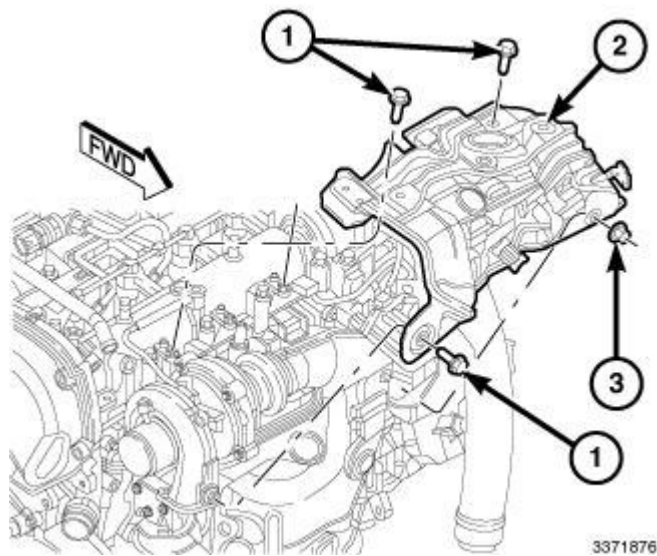


Fig. 383: Turbocharger Heat Shield & Fasteners
Courtesy of CHRYSLER GROUP, LLC

6. Remove the turbocharger heat shield (2).

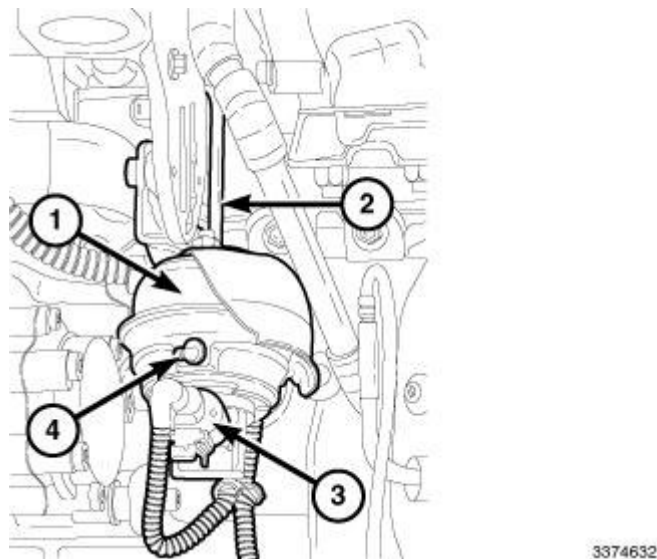


Fig. 384: Turbocharger Actuator, Bracket, Connector & Vacuum Line
Courtesy of CHRYSLER GROUP, LLC

7. Disconnect the vacuum line (4).
8. Disconnect the turbocharger actuator (1) wire harness connector (3).

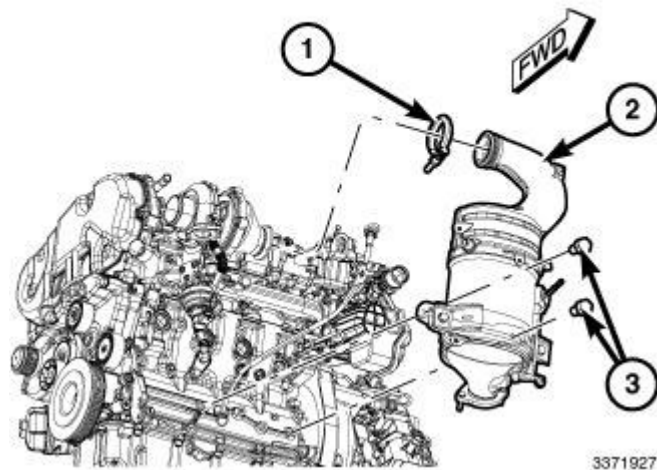


Fig. 385: Clamp, Turbocharger & Two Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

9. Loosen the turbocharger to diesel particulate filter clamp (1).
10. Raise and support the vehicle. Refer to **HOISTING, STANDARD PROCEDURE** .

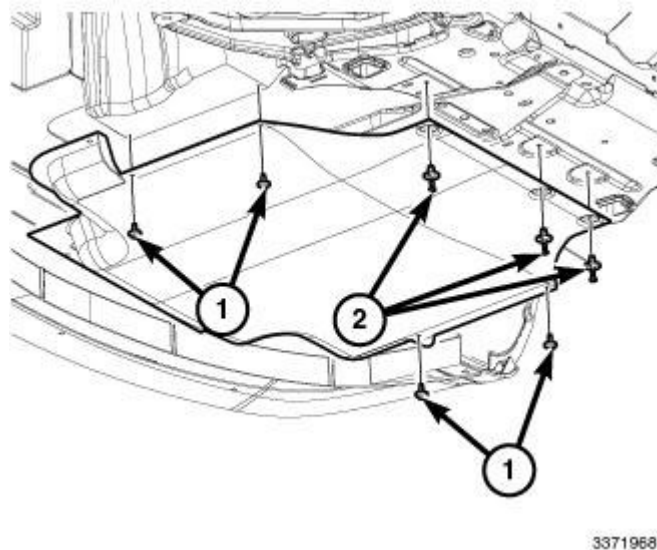


Fig. 386: Engine Belly Pan & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Remove the lower engine bellypan.

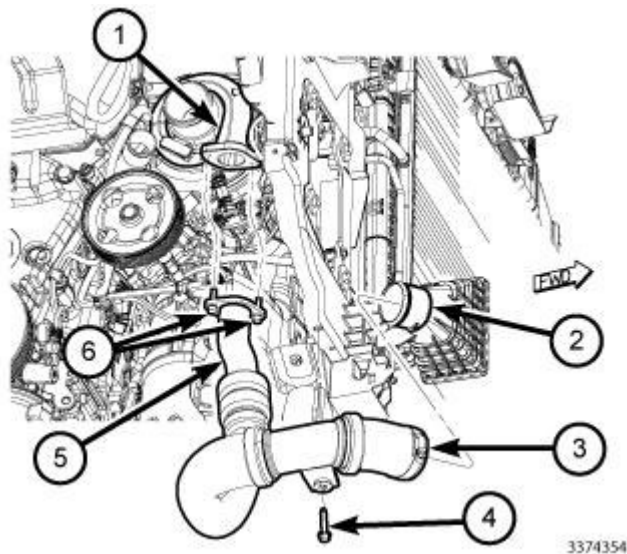


Fig. 387: Turbocharger Flange, Charge Air Cooler (CAC), Hose, Charge Air Cooler Tube & Fasteners

Courtesy of CHRYSLER GROUP, LLC

12. Remove the CAC tube support bolt (4).
13. Remove the flange bolts (6).
14. Lower the vehicle.

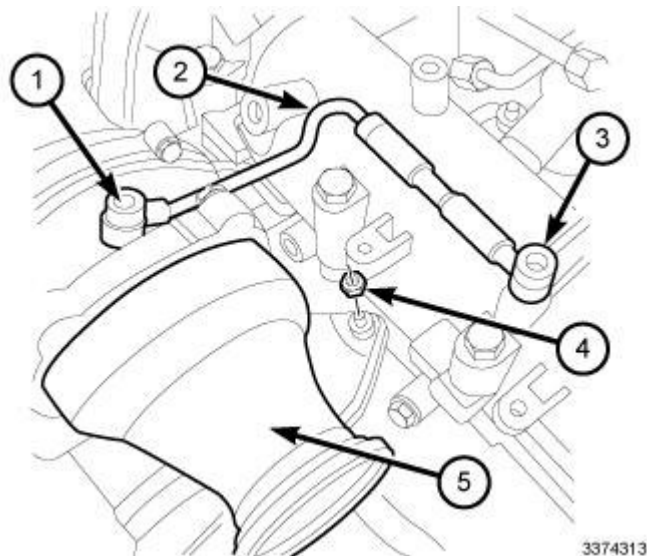


Fig. 388: Turbocharger, Oil Supply Line & Fasteners

Courtesy of CHRYSLER GROUP, LLC

15. Remove the turbocharger oil supply line (2) at the turbocharger (1).
16. Remove the upper turbocharger flange nut (4).

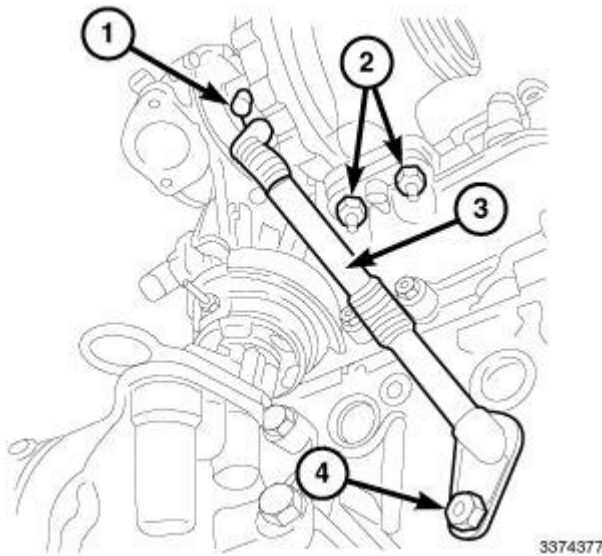


Fig. 389: Turbocharger, Oil Send And Return Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

17. Remove the turbocharger oil return line (3) from the turbocharger (1).
18. Remove the turbocharger flange nuts (2) from under the exhaust manifold.
19. Remove the turbocharger from the vehicle.

INSTALLATION

INSTALLATION

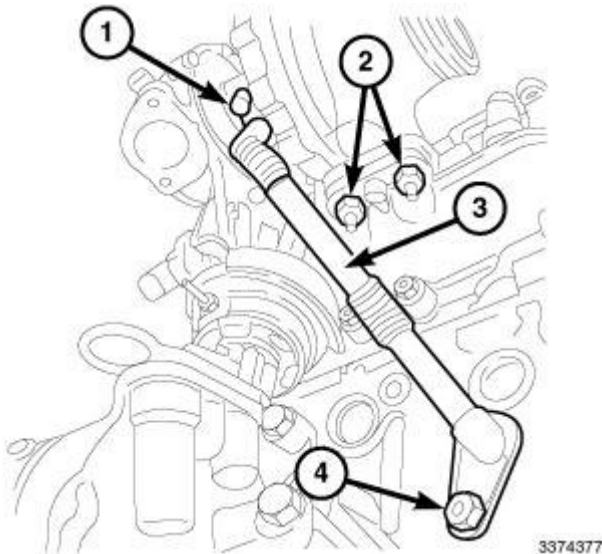


Fig. 390: Turbocharger, Oil Send And Return Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

1. Position a new gasket onto the exhaust manifold to turbocharger flange and install the turbocharger.
2. Install the turbocharger flange nuts (2) and torque to 24 N.m (18 ft. lbs.).

3. Install the turbocharger oil send and return line (2) to the turbocharger (1). Tighten the bolts to 9 N.m (80 in. lbs.).

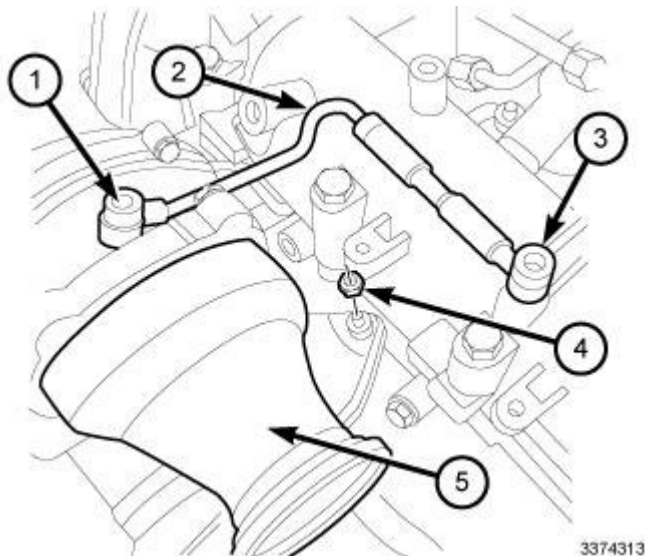


Fig. 391: Turbocharger, Oil Supply Line & Fasteners
Courtesy of CHRYSLER GROUP, LLC

4. Install the upper turbocharger flange nut (4). Tighten nut to 24 N.m (18 ft. lbs.).
5. Install new copper washers to the turbocharger oil feed line (2). Tighten the banjo bolt (1) to 24 N.m (18 ft. lbs.).

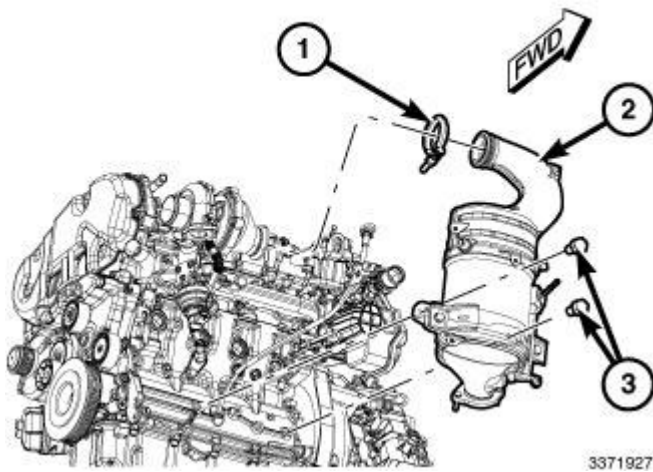
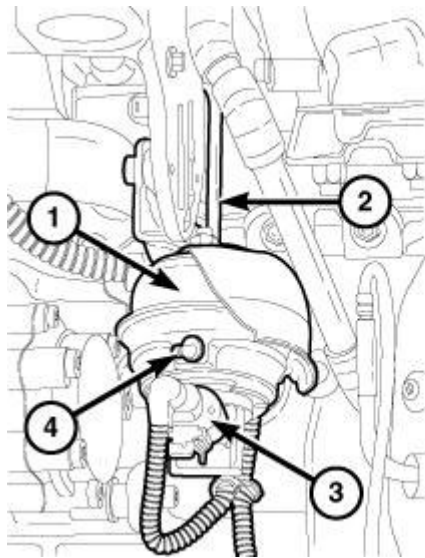


Fig. 392: Clamp, Turbocharger & Two Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

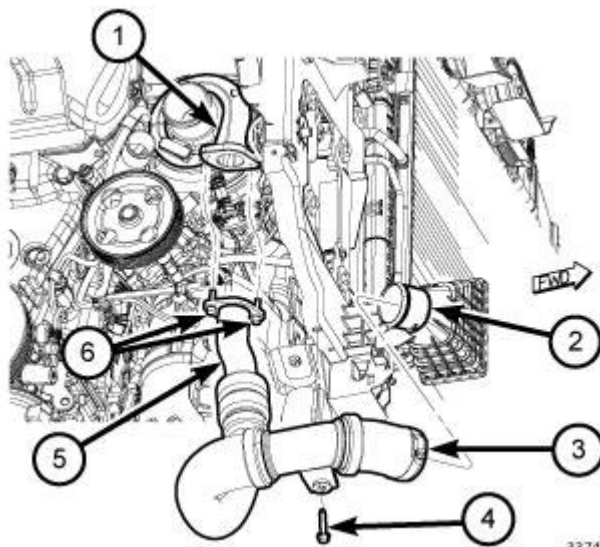
6. Align the diesel particulate filter to the turbocharger outlet nozzle and tighten the clamp (1) to 25 N.m (18 ft. lbs.).



3374632

Fig. 393: Turbocharger Actuator, Bracket, Connector & Vacuum Line
Courtesy of CHRYSLER GROUP, LLC

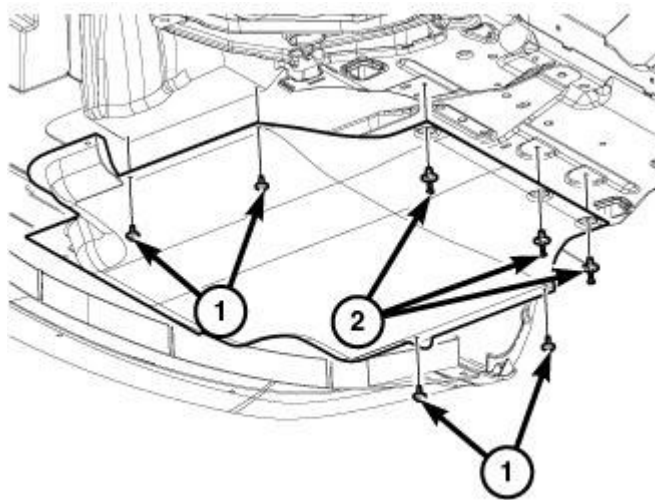
7. Install the vacuum line to the actuator (4).
8. Connect the electrical connector (3) to the turbocharger actuator (1).
9. Lift the vehicle.



3374354

Fig. 394: Turbocharger Flange, Charge Air Cooler (CAC), Hose, Charge Air Cooler Tube & Fasteners
Courtesy of CHRYSLER GROUP, LLC

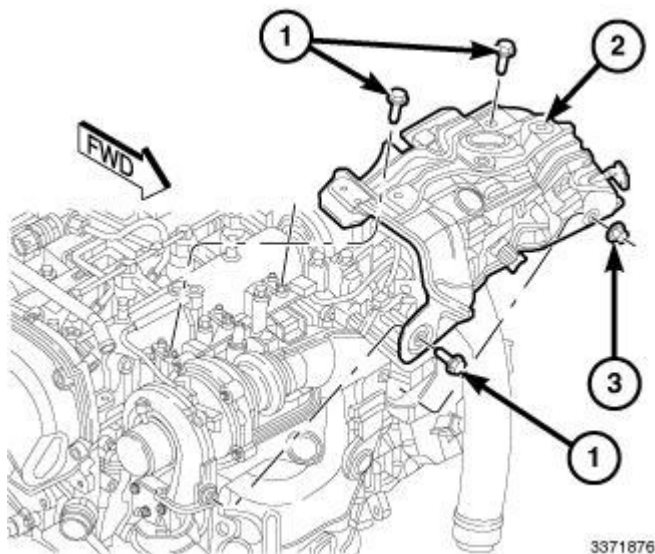
10. Install the CAC tube to the turbocharger flange (7). Tighten the bolts to 10 N.m (89 in. lbs.).
11. Install the support bolt (4). Tighten the bolt to 10 N.m (89 in. lbs.).



3371968

Fig. 395: Engine Belly Pan & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

12. Install the lower engine bellypan cover.
13. Lower the vehicle.



3371876

Fig. 396: Turbocharger Heat Shield & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

14. Install the turbo heat shield. Tighten the bolts (1) to 12 N.m (106 in. lbs.) and the nut (3) to 8 N.m (71 in. lbs.).

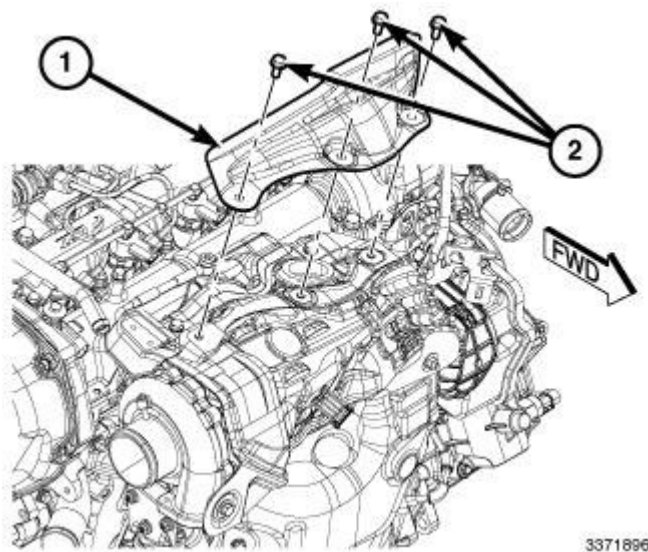


Fig. 397: Upper Turbocharger Heat Shield & Mid Upper Turbocharger Heat Shield
Courtesy of CHRYSLER GROUP, LLC

15. Install the upper turbo heat shield (2) Tighten the bolts (1) to 12 N.m (106 in. lbs.).

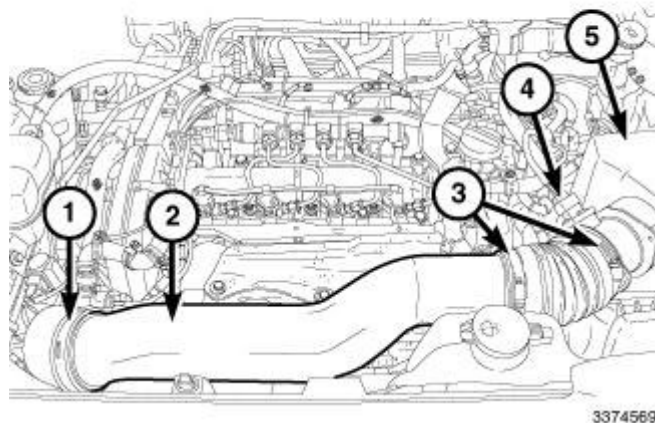


Fig. 398: Upper Clean Air To Turbocharger Tube & Air Cleaner Assembly
Courtesy of CHRYSLER GROUP, LLC

16. Install the upper clean air to turbocharger tube (2).
17. Install the air cleaner assembly (5). Refer to **BODY, AIR CLEANER, INSTALLATION** .
18. Install the engine trim cover.
19. Connect the negative battery cable.