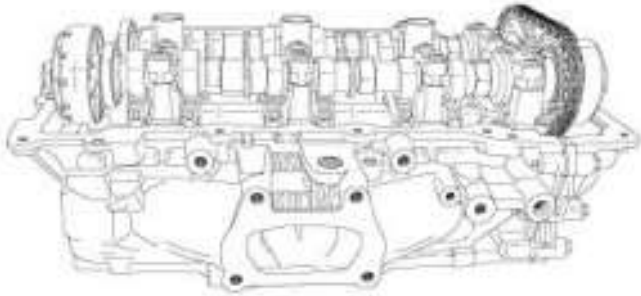


MANIFOLDS

MANIFOLD, EXHAUST

DESCRIPTION

DESCRIPTION



2790404

Fig. 621: Aluminum Cylinder Head

Courtesy of CHRYSLER GROUP, LLC

The 3.6L aluminum cylinder heads are a unique design with left and right castings. The exhaust manifolds are integrated into the cylinder heads. If any damaged is found to the exhaust manifold portion, the cylinder head must be removed for repair or replacement. Refer to **CYLINDER HEAD, REMOVAL**.

MANIFOLD, INTAKE

DESCRIPTION

DESCRIPTION

UPPER INTAKE MANIFOLD

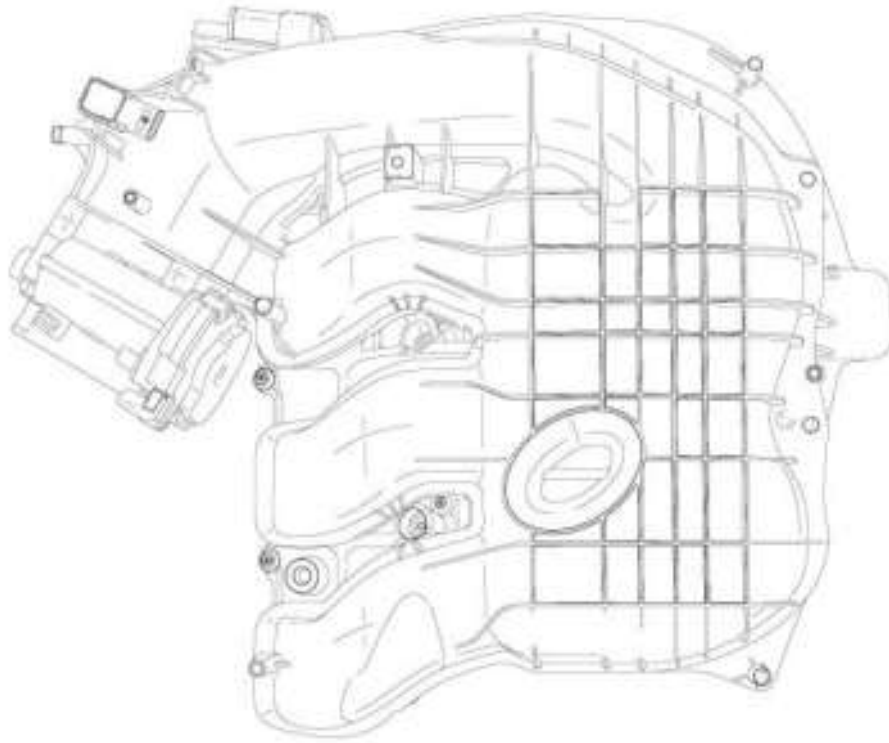


Fig. 622: Upper Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The upper intake manifold is an injection molded nylon composite design. The upper intake manifold is sealed to the lower intake manifold using six individual press-in-place port silicone gaskets. Replace the gaskets whenever the upper intake manifold is removed from the engine. There is a silencer pad positioned between the upper and lower intake manifolds for improved noise, vibration and harshness (NVH). The left cylinder head cover has two alignment posts to aid proper installation of the silencer pad. The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design. If the upper intake manifold is damaged or cracked, it must be replaced.

The Electronic Throttle Control (ETC) and Manifold Air Pressure (MAP) sensor are attached directly to the upper intake manifold. The upper intake manifold also provides vacuum ports for brake booster, positive crankcase ventilation (PCV) and emissions control.

LOWER INTAKE MANIFOLD

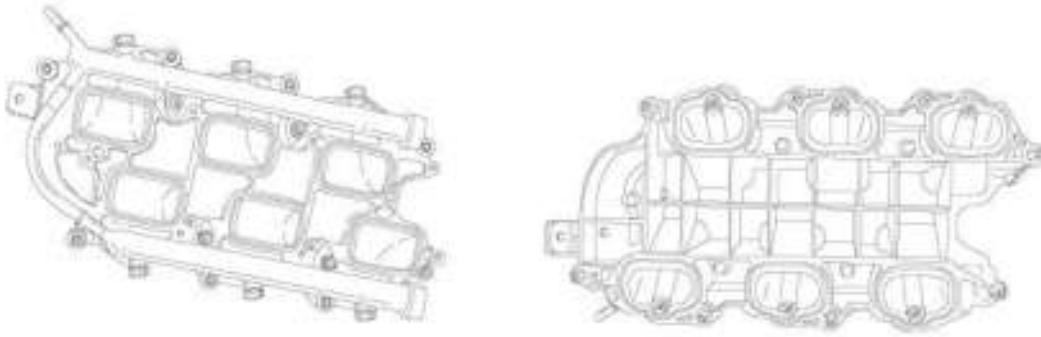


Fig. 623: Lower Intake Manifold Design
Courtesy of CHRYSLER GROUP, LLC

The lower intake manifold is an injection molded nylon composite design. The lower intake manifold is sealed to the cylinder heads using six individual press-in-place port silicone gaskets. Replace the gaskets whenever the lower intake manifold is removed from the engine. The seven upper intake manifold fasteners thread directly into the composite lower intake manifold and are a self-taping design.

The fuel injection fuel rail is also a composite design. The four fuel rail fasteners thread directly into the composite lower intake manifold and are a self-taping design. The lower intake manifold can be serviced without removing the fuel injector rail. The fuel rail and fuel injectors must be installed into the lower intake manifold as an assembly. Do not attempt to install the fuel rail when the injectors are in the manifold. Always install new O-rings on the fuel injectors.

If the lower intake manifold is damaged or cracked, it must be replaced.

DIAGNOSIS AND TESTING

DIAGNOSIS AND TESTING - INTAKE MANIFOLD LEAKS

An intake manifold air leak is characterized by lower than normal manifold vacuum. Also, one or more cylinders may not be functioning.

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 the fan. Do not wear loose clothing.

1. Start the engine.
2. Spray a small stream of water (spray bottle) at the suspected leak area.

3. If engine RPM'S change, the area of the suspected leak has been found.
4. Repair as required.

REMOVAL

UPPER

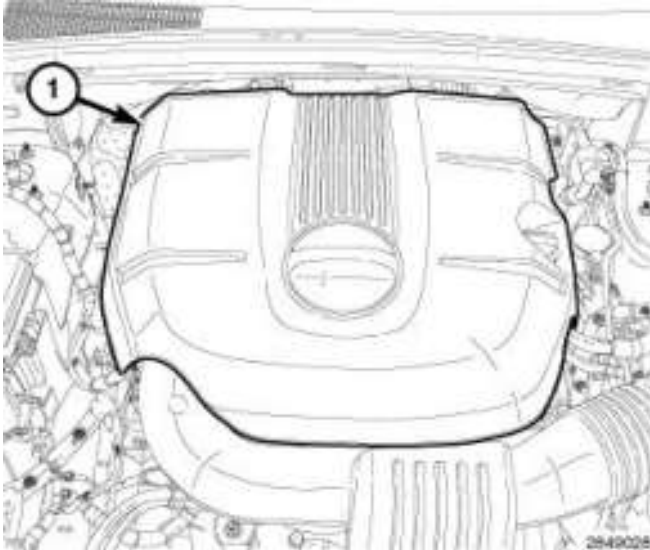


Fig. 624: Engine Cover

Courtesy of CHRYSLER GROUP, LLC

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

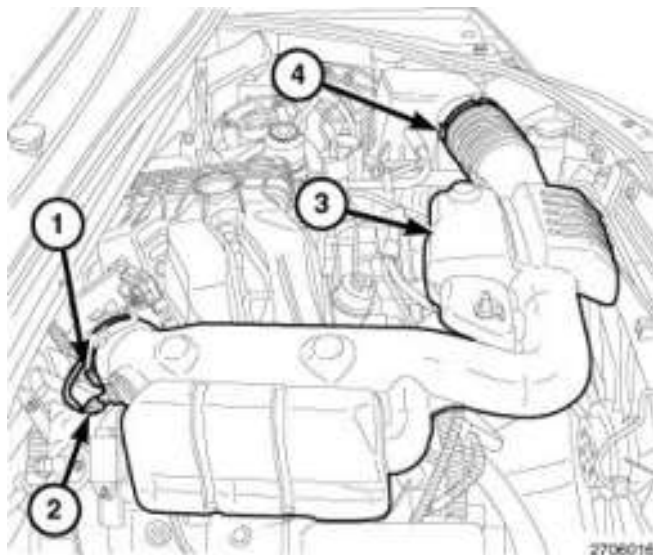


Fig. 625: Air Inlet Hose, Air Temperature (IAT) Sensor Connector & Clamps

Courtesy of CHRYSLER GROUP, LLC

3. Disconnect the electrical connector (2) from the Inlet Air Temperature (IAT) sensor.
4. Loosen the clamp (1) at the throttle body.
5. Loosen the clamp (4) at the air cleaner body.

6. Remove the resonator (3).

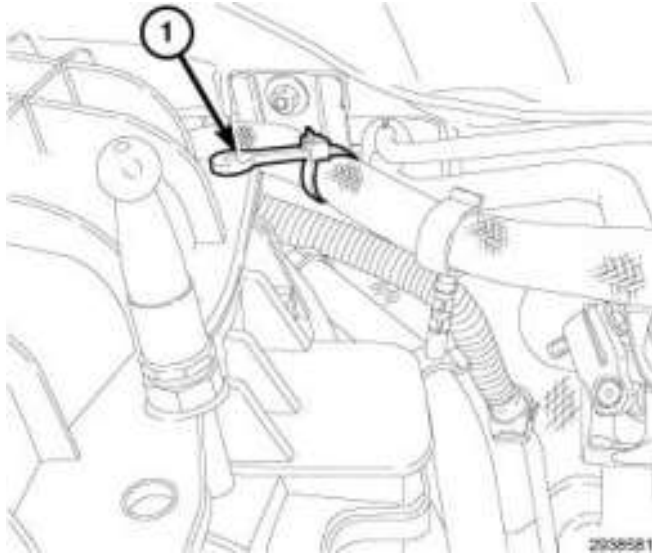


Fig. 626: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

7. Disengage the brake booster hose retainer (1) from the upper intake manifold.

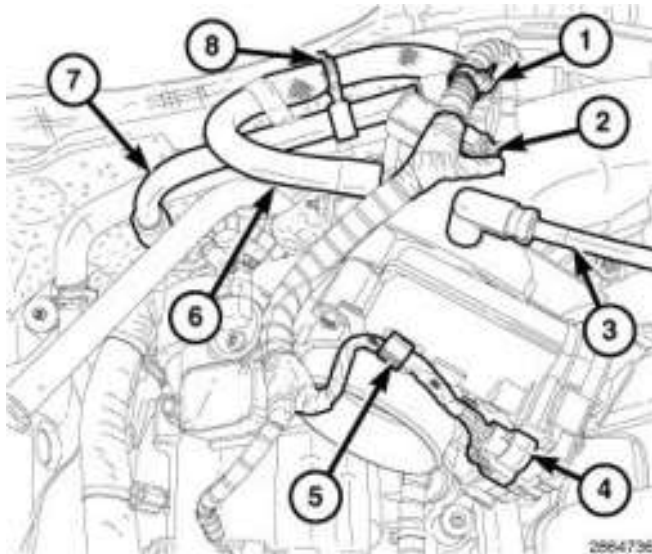


Fig. 627: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

8. Disconnect the electrical connectors from the Manifold Absolute Pressure (MAP) sensor (2) and the Electronic Throttle Control (ETC) (4).
9. Disengage the ETC harness from the clip (5) on the throttle body. Disengage the wire harness retainer (1) from the upper intake manifold near the MAP sensor and reposition the wire harness.
10. Disconnect the following hoses from the upper intake manifold:
 - Positive Crankcase Ventilation (PCV) (7)
 - vapor purge (3)
 - brake booster (6)

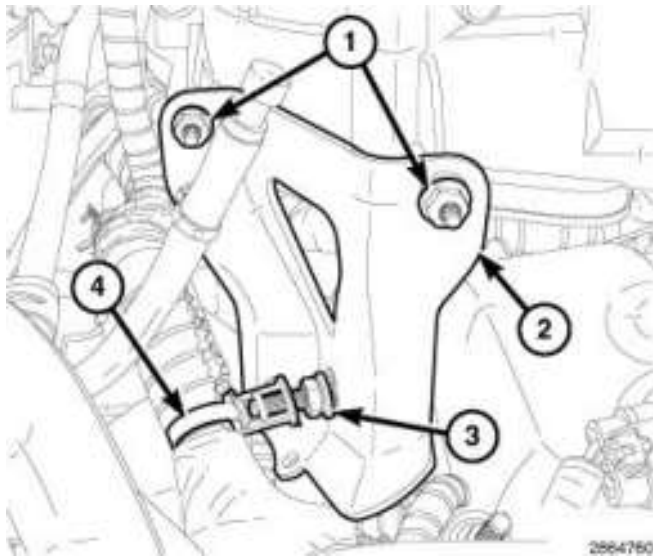


Fig. 628: Upper Intake Manifold Support Bracket, Stud & Fasteners
Courtesy of CHRYSLER GROUP, LLC

11. Disengage the wire harness retainer (4) from the studbolt (3).
12. Remove two nuts (1), loosen the studbolt (3) and reposition the upper intake manifold support bracket (2).

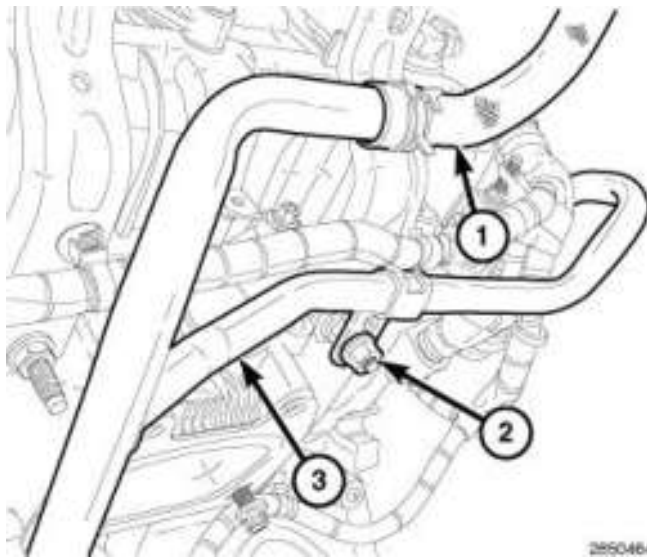


Fig. 629: Heater Core Return Hose, Heater Core Return Tube & Nut
Courtesy of CHRYSLER GROUP, LLC

13. Remove the nut (2) from the support bracket of the heater core return tube (3).

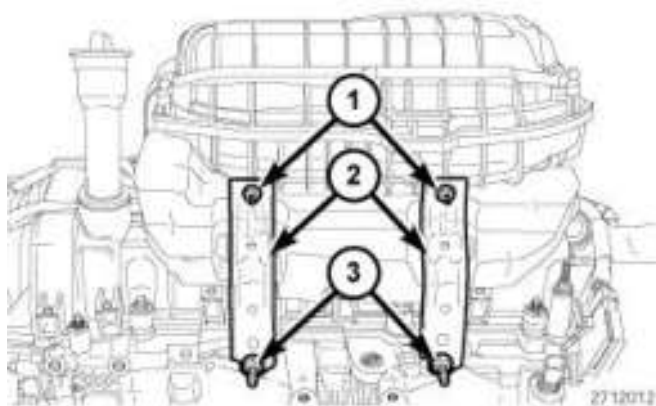


Fig. 630: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
 Courtesy of CHRYSLER GROUP, LLC

14. Remove two nuts (1), loosen two studbolts (3) and reposition the two upper intake manifold support brackets (2).

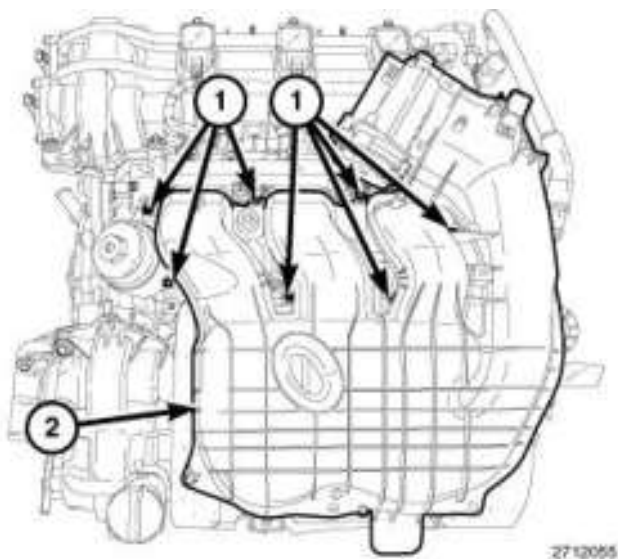


Fig. 631: Upper Intake Manifold & Bolts
 Courtesy of CHRYSLER GROUP, LLC

NOTE: The upper intake manifold attaching bolts are captured in the upper intake manifold. Once loosened, the bolts will have to be lifted out of the lower intake manifold and held while removing the upper intake manifold.

NOTE: Exercise care not to inadvertently loosen the two fuel rail attachment bolts that are in close proximity of the upper intake manifold attaching bolts.

15. Remove seven upper intake manifold attaching bolts (1) and remove the upper intake manifold (2).

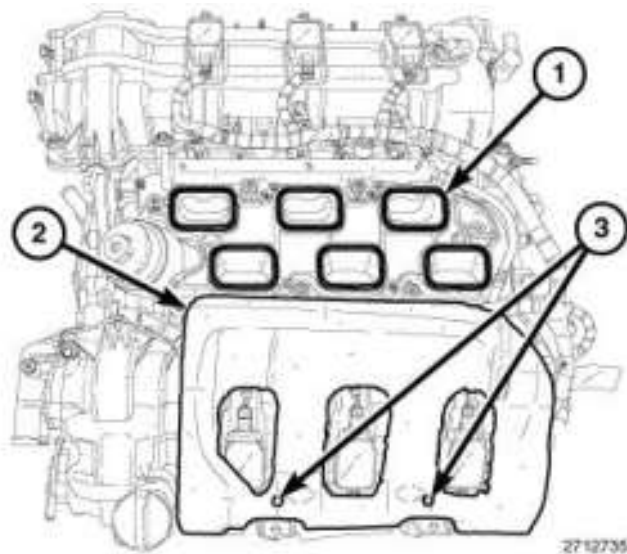


Fig. 632: Intake Ports, Insulator & Alignment Posts
 Courtesy of CHRYSLER GROUP, LLC

16. Remove and discard the six upper to lower intake manifold seals (1).
17. Cover the open intake ports to prevent debris from entering the engine.
18. If required, remove the insulator (2) from the LH cylinder head cover.

LOWER

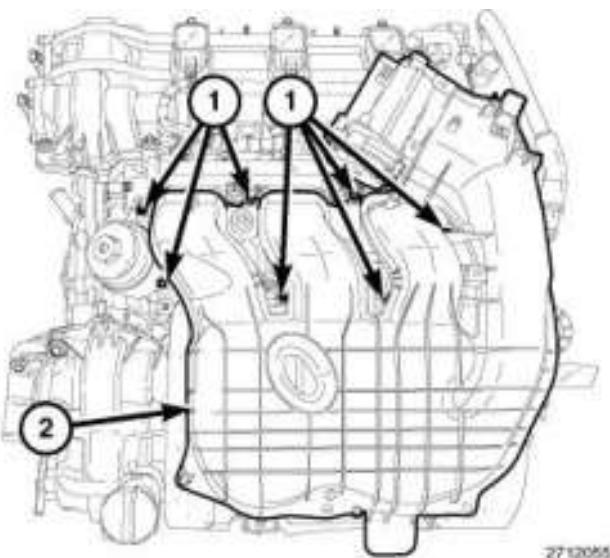


Fig. 633: Upper Intake Manifold & Bolts
 Courtesy of CHRYSLER GROUP, LLC

**WARNING: The fuel system is under constant pressure even with engine off.
 Before servicing the fuel rail, fuel system pressure must be released.**

1. Release fuel system pressure. Refer to **FUEL DELIVERY, GAS, STANDARD PROCEDURE** .
2. Disconnect and isolate the negative battery cable.
3. Remove the resonator and upper intake manifold (2). Refer to **MANIFOLD, INTAKE, REMOVAL**.

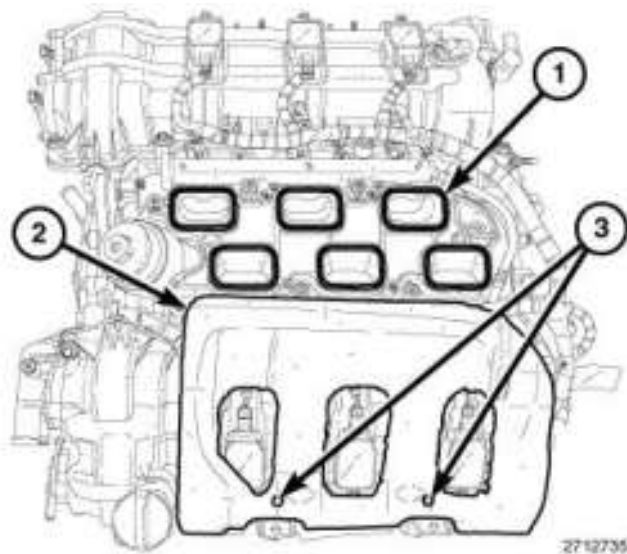


Fig. 634: Intake Ports, Insulator & Alignment Posts
 Courtesy of CHRYSLER GROUP, LLC

4. Remove the insulator (2) from the LH cylinder head cover.

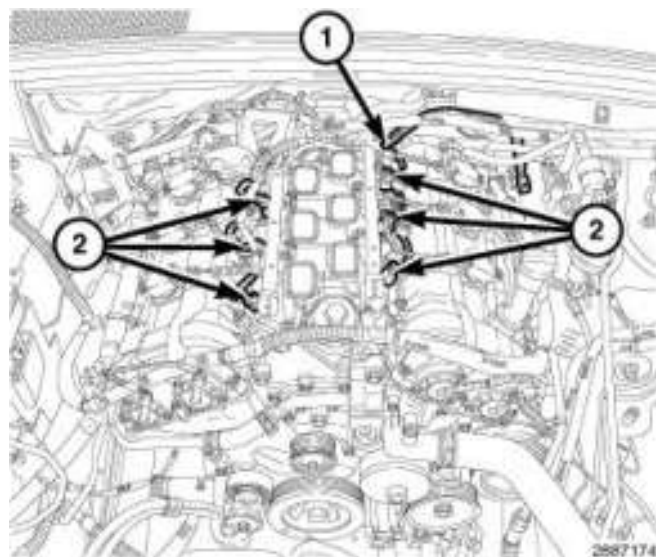


Fig. 635: Fuel Supply Hose & Fuel Injector Electrical Connectors
 Courtesy of CHRYSLER GROUP, LLC

5. Disconnect the fuel supply hose (1) from the fuel rail. Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .
6. Disconnect the fuel injector electrical connectors (2).

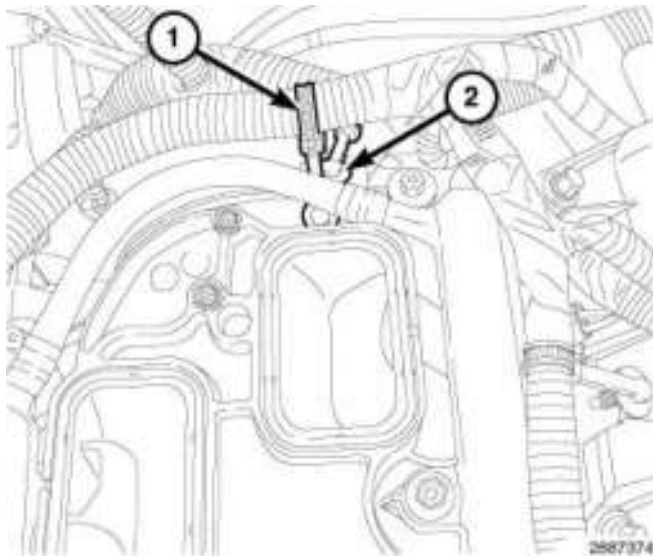


Fig. 636: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
Courtesy of CHRYSLER GROUP, LLC

7. Disengage the injection/ignition harness retainer (1) from the rear of the lower intake manifold.
8. Disengage the main wire harness retainer (2) from the rear of the lower intake manifold.

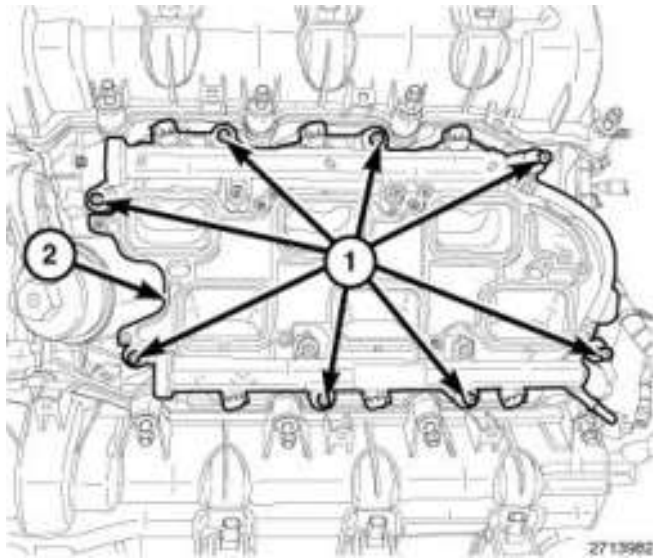
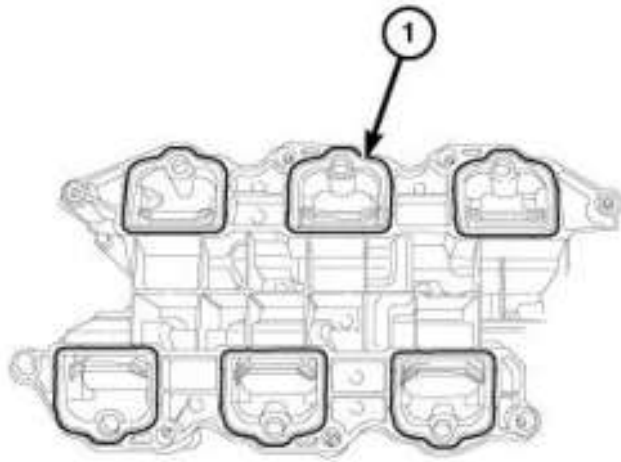


Fig. 637: Lower Intake Manifold & Attaching Bolts
Courtesy of CHRYSLER GROUP, LLC

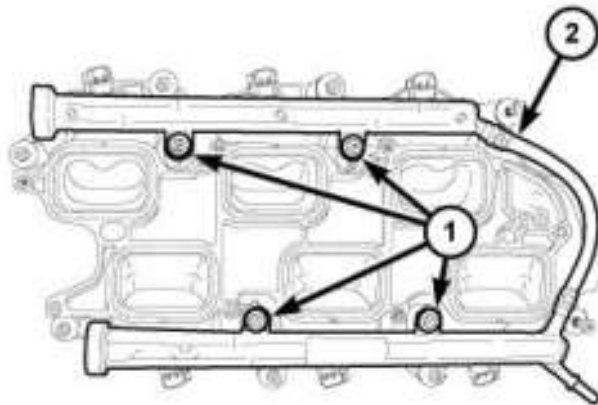
9. Remove the eight lower intake manifold attaching bolts (1).
10. Remove the lower intake manifold (2) with the fuel injectors and fuel rail.



2757244

Fig. 638: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

11. Remove and discard the six lower intake manifold to cylinder head seals (1).



2714021

Fig. 639: Fuel Rail & Retaining Bolts
Courtesy of CHRYSLER GROUP, LLC

12. If required, remove the fuel rail (2) and fuel injectors from the lower intake manifold. Refer to **RAIL, FUEL, REMOVAL** .

INSPECTION

INSPECTION

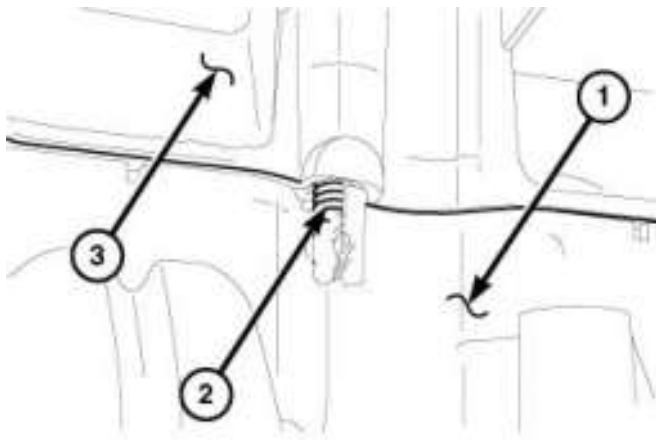


Fig. 640: Non-Repairable Damage To Lower Intake Manifold Due To Cross Threading Of An Upper Intake Manifold Attaching Bolt

Courtesy of CHRYSLER GROUP, LLC

NOTE: When the upper intake manifold (3) and lower intake manifold (1) are not aligned properly, cross threading of the upper intake manifold attaching bolts can occur. The graphic shows non-repairable damage to the lower intake manifold (1) due to cross threading of an upper intake manifold attaching bolt (2).

Check both the upper and lower intake manifolds for:

- Damage and cracks
- Gasket surface damage or warping

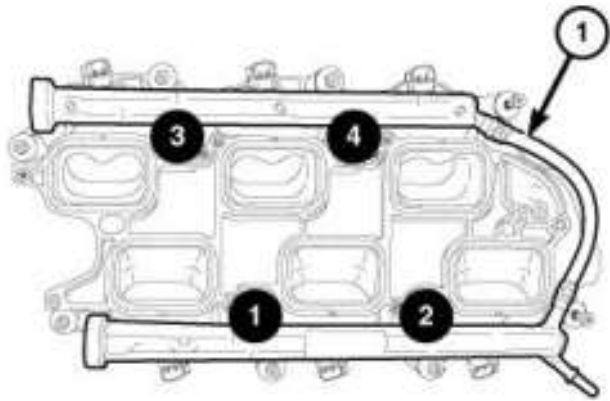
Check the lower intake manifold for:

- Damaged fuel injector ports

If either the upper or lower manifold exhibits any damaged or warped conditions, replace the manifold.

INSTALLATION

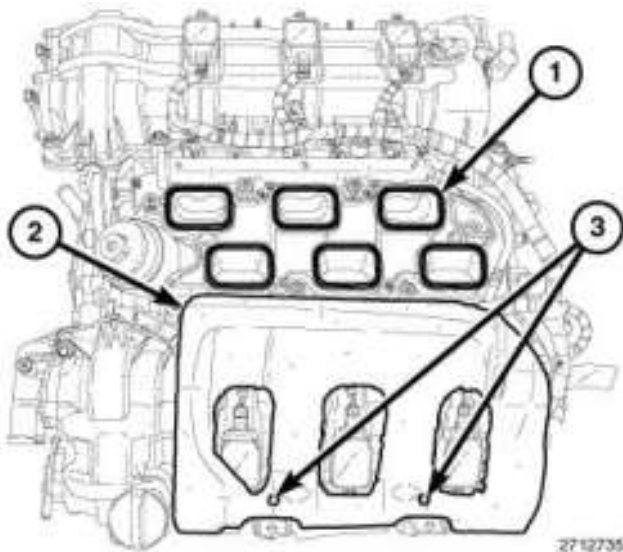
UPPER



2706534

Fig. 641: Fuel Rail Bolt Tightening Sequence
 Courtesy of CHRYSLER GROUP, LLC

NOTE: Prior to installing the upper intake manifold, verify that the four fuel rail bolts were not inadvertently loosened. The bolts must be tightened in the sequence shown in illustration to 7 N.m (62 in. lbs.). Refer to RAIL, FUEL, INSTALLATION.



2712735

Fig. 642: Intake Ports, Insulator & Alignment Posts
 Courtesy of CHRYSLER GROUP, LLC

1. Clean and inspect the sealing surfaces. Install new upper to lower intake manifold seals (1).

NOTE: Make sure the fuel injectors and wiring harnesses are in the correct position so that they don't interfere with the upper intake manifold installation.

2. If removed, install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.

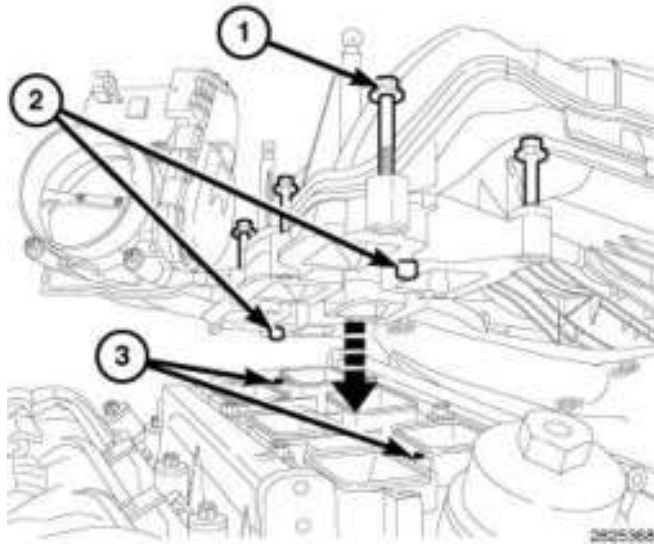


Fig. 643: Upper Intake Attaching Bolts, Locating Posts & Holes
 Courtesy of CHRYSLER GROUP, LLC

3. Lift and hold the seven upper intake attaching bolts (1) clear of the mating surface. Back the bolts out slightly or if required, use an elastic band to hold the bolts clear of the mating surface.
4. Position the upper intake manifold (1) onto the lower intake manifold so that the two locating posts (2) on the upper intake manifold align with corresponding holes (3) in the lower intake manifold.

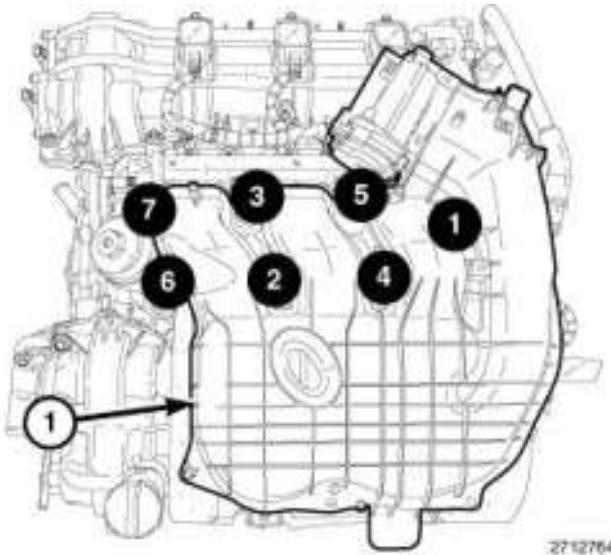


Fig. 644: Upper Intake Manifold Bolt Tightening Sequence
 Courtesy of CHRYSLER GROUP, LLC

5. Install the seven upper intake manifold attaching bolts. Tighten the bolts in the sequence shown in illustration to 8 N.m (71 in. lbs.).

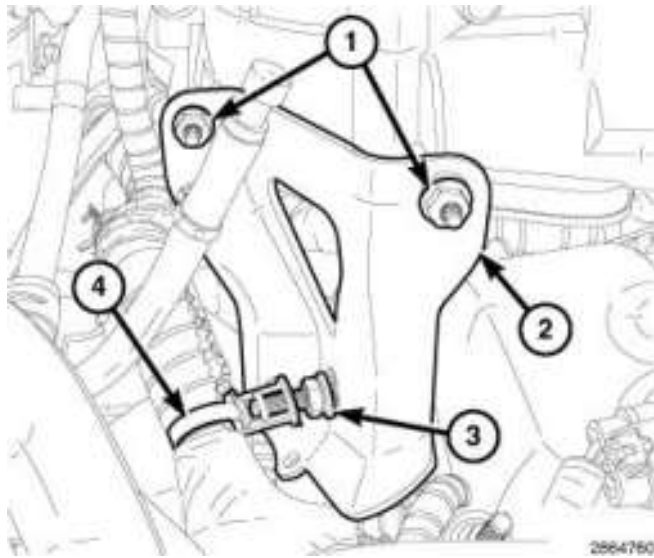


Fig. 645: Upper Intake Manifold Support Bracket, Stud & Fasteners
 Courtesy of CHRYSLER GROUP, LLC

6. Install two nuts (1) to the upper intake manifold support bracket (2). Tighten the nuts (1) to 10 N.m (89 in. lbs.) and tighten the studbolt (3) to 20 N.m (177 in. lbs.)
7. Engage the wire harness retainer (4) to the studbolt (3).

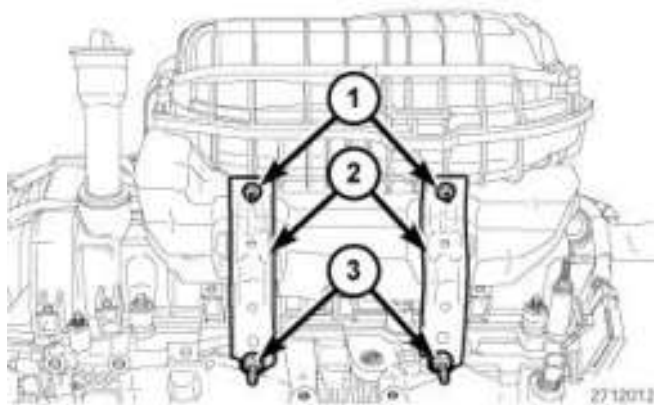


Fig. 646: Nuts, Stud Retainers & Upper Intake Manifold Support Brackets
 Courtesy of CHRYSLER GROUP, LLC

8. Install two upper intake manifold support brackets (2) with two studbolts (3) and two nuts (1). Tighten the studbolts (3) to 20 N.m (177 in. lbs.) and tighten the nuts (1) to 10 N.m (89 in. lbs.).

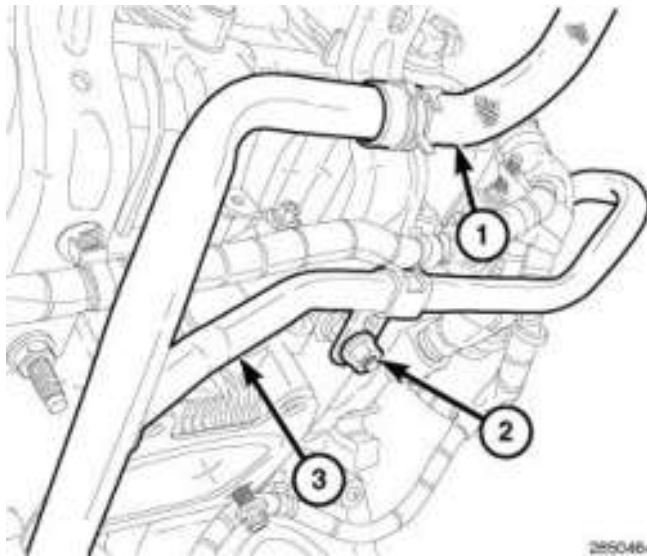


Fig. 647: Heater Core Return Hose, Heater Core Return Tube & Nut
 Courtesy of CHRYSLER GROUP, LLC

9. Install the nut (2) to the support bracket of the heater core return tube (3) and tighten to 12 N.m (106 in. lbs.).

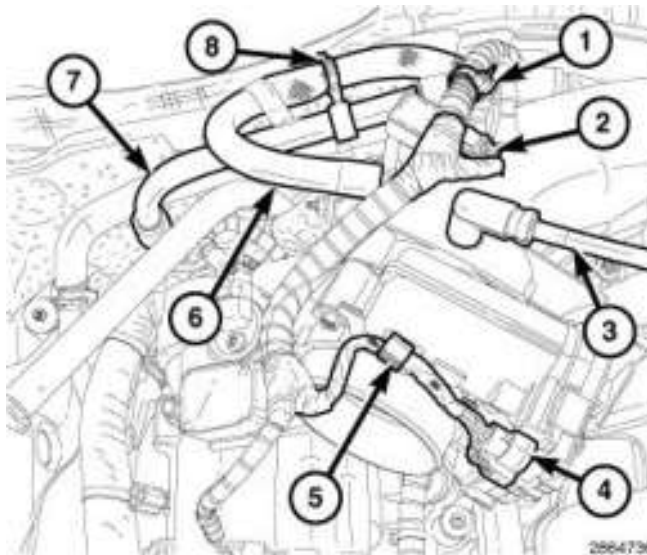


Fig. 648: MAP Sensor, ETC, PCV Hose, Brake Booster Vacuum Hose, EVAP Vapor Purge Line, Clip & Wire Harness Retainer
 Courtesy of CHRYSLER GROUP, LLC

10. Connect the following hoses to the upper intake manifold:
 - Positive Crankcase Ventilation (PCV) (7)
 - vapor purge (3)
 - brake booster (6)
11. Connect the electrical connectors to the Manifold Absolute Pressure (MAP) sensor (2) and the Electronic Throttle Control (ETC) (4).
12. Secure the ETC harness to the clip (5) on the throttle body and engage the wire harness retainer (1) to the upper intake manifold near the MAP sensor.

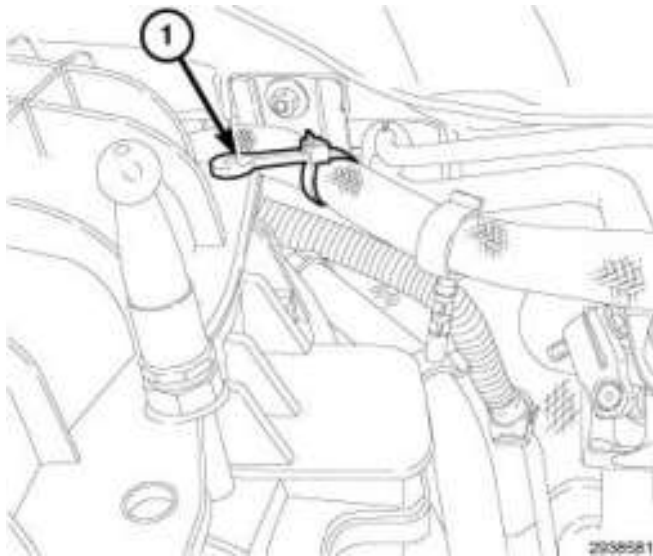


Fig. 649: Brake Booster Hose Retainer
Courtesy of CHRYSLER GROUP, LLC

13. Engage the brake booster hose retainer (1) to the upper intake manifold.

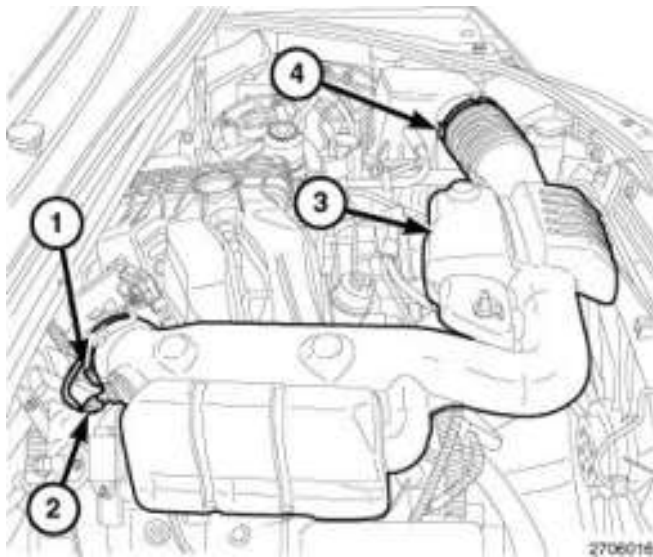


Fig. 650: Air Inlet Hose, Air Temperature (IAT) Sensor Connector & Clamps
Courtesy of CHRYSLER GROUP, LLC

14. Install the resonator (3) to the air cleaner body and the throttle body. Tighten the clamps (1) and (4) to 4 N.m (35 in. lbs.).
15. Connect the electrical connector (2) to the Inlet Air Temperature (IAT) sensor.

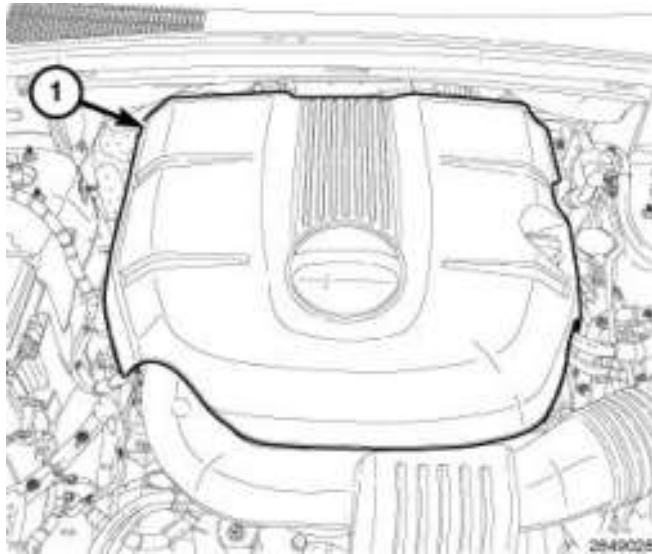


Fig. 651: Engine Cover
Courtesy of CHRYSLER GROUP, LLC

16. Install the engine cover (1).
17. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).

LOWER

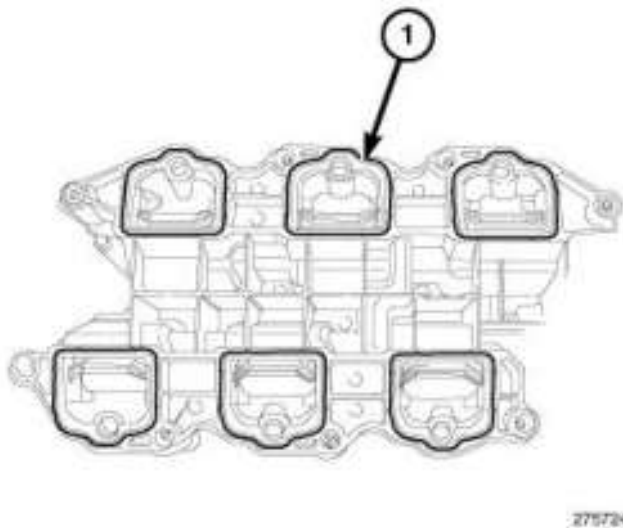
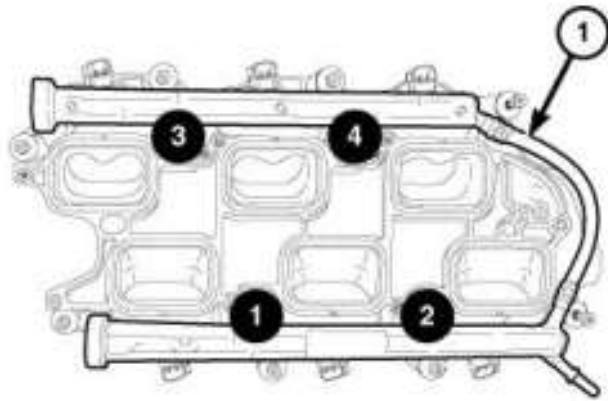


Fig. 652: Lower Intake Manifold To Cylinder Head Seals
Courtesy of CHRYSLER GROUP, LLC

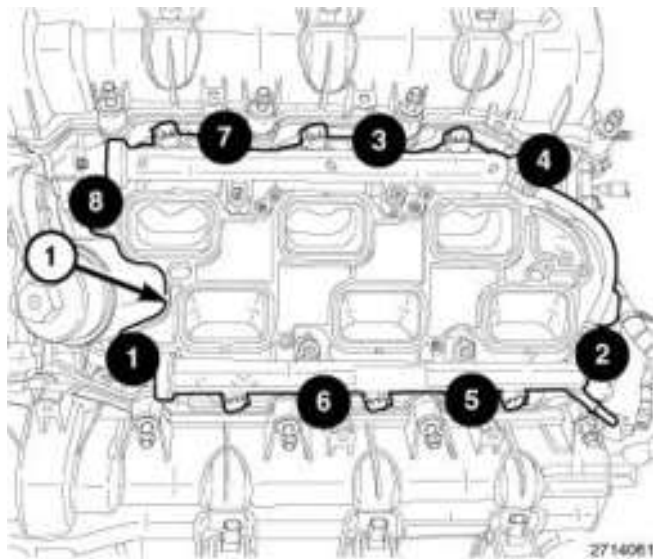
1. Clean and inspect the sealing surfaces. Install new lower intake manifold to cylinder head seals (1).



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Fig. 653: Fuel Rail Bolt Tightening Sequence
 Courtesy of CHRYSLER GROUP, LLC

2. If removed, install the fuel injectors and the fuel rail (1) to the lower intake manifold. Tighten the four bolts in the sequence shown in illustration to 7 N.m (62 in. lbs.). Refer to **RAIL, FUEL, INSTALLATION**.



2714061

Fig. 654: Intake Manifold Retaining Bolts Tightening Sequence
 Courtesy of CHRYSLER GROUP, LLC

3. Position the lower intake manifold (1) on the cylinder head surfaces.
4. Install the manifold attaching bolts and tighten in the sequence shown in illustration to 8 N.m (71 in. lbs.).

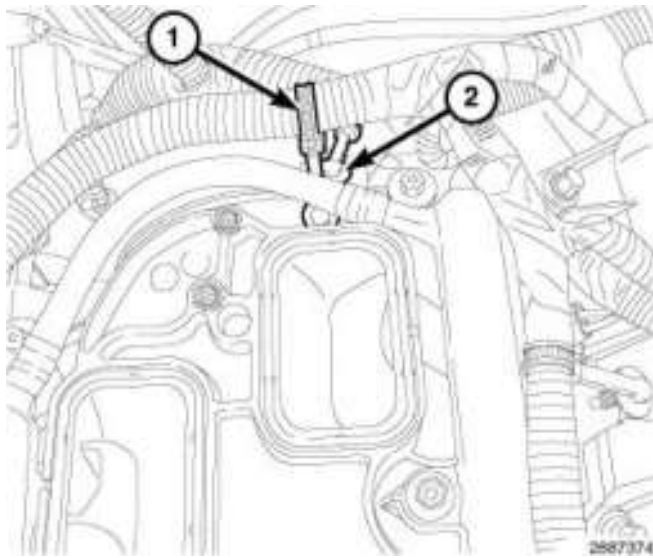


Fig. 655: Injection/Ignition Harness Retainer & Main Wire Harness Retainer
 Courtesy of CHRYSLER GROUP, LLC

5. Engage the main wire harness retainer (2) to the rear of the lower intake manifold.
6. Engage the injection/ignition harness retainer (1) to the rear of the lower intake manifold.

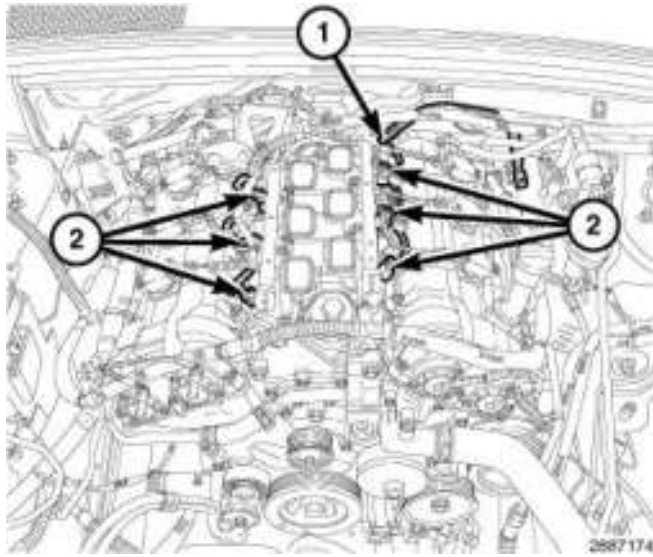


Fig. 656: Fuel Supply Hose & Fuel Injector Electrical Connectors
 Courtesy of CHRYSLER GROUP, LLC

7. Connect the fuel injector electrical connectors (2).
8. Connect the fuel supply hose to the fuel rail (1). Refer to **FITTING, QUICK CONNECT, STANDARD PROCEDURE** .

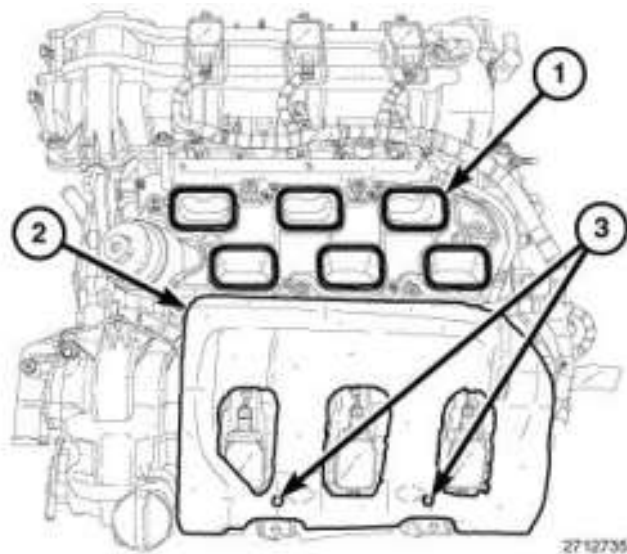


Fig. 657: Intake Ports, Insulator & Alignment Posts
 Courtesy of CHRYSLER GROUP, LLC

9. Install the insulator (2) to the two alignment posts (3) on top of the LH cylinder head cover.

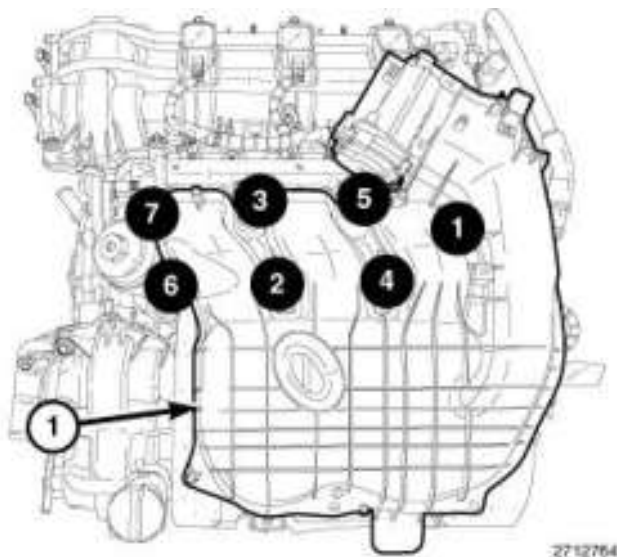


Fig. 658: Upper Intake Manifold Bolt Tightening Sequence
 Courtesy of CHRYSLER GROUP, LLC

10. Install the upper intake manifold (1), support brackets and resonator. Refer to **MANIFOLD, INTAKE, INSTALLATION**.
11. Connect the negative battery cable and tighten nut to 5 N.m (45 in. lbs.).
12. Start the engine and check for leaks.