

## Intake Manifold

### Removal & Installation

#### 5.7L Engine

##### *Upper Manifold*

##### **To Remove:**

1. Disconnect the negative battery cable.
2. Remove the air cleaner assembly.
3. Remove the vacuum brake booster hose (if equipped).
4. Disconnect the throttle and cruise control cables.
5. Remove the throttle cable bracket and set aside.
6. Disconnect the following:
  - SCFI injector harness connector
  - Canister purge solenoid
  - Ignition coil
  - Ignition control module
  - Generator
  - Idle air control motor
  - Oxygen sensor
  - Exhaust gas recirculation (EGR) valve
  - Engine coolant temperature (ECT) sensor
7. Relieve the fuel system pressure.
8. Disconnect the fuel lines at the rear of the intake manifold.
9. Remove distributor cap and position out of the way.
10. Remove the PCV valve.
11. Remove the wiring support bracket at the rear of the intake manifold.
12. Remove the canister purge valve.
13. Remove the upper intake manifold studs.
14. Remove the upper intake manifold and discard the gasket.
15. Clean all surfaces

##### **To Install:**

**Note:** Use the correct fastener in the correct location. Replacement fasteners must be the correct part number for that application. Fasteners requiring replacement or fasteners requiring the use of thread locking compound or sealant are identified in the service procedure. Do not use paints, lubricants, or corrosion inhibitors on fasteners or fastener joint surfaces unless specified. These coatings affect fastener torque and joint clamping force and may damage the fastener. Use the correct tightening sequence and specifications when installing fasteners in order to avoid damage to parts and systems.

1. Install a new gasket into the groove of the upper intake manifold.
2. Position the upper intake manifold over the lower intake manifold.
3. Apply threadlock GM P/N 12345382 (or equivalent) to the threads of the upper intake manifold attaching studs.
4. Install the upper intake manifold studs and tighten as follows:

- A. First pass in sequence; **Torque to: 44 inch lbs. (5 Nm)**
  - B. Tighten intake manifold bolts final pass in sequence; **Torque to: 89 inch lbs. (10 Nm)**
5. Apply threadlock GM P/N 12345382 (or equivalent) to the threads of the evaporative emission (EVAP) canister purge solenoid valve studs.
  6. Install the EVAP canister purge solenoid valve and studs.
    - **Torque to: 89 inch lbs. (10 Nm)**
  7. Install the engine wiring harness bracket and nut.
  8. Install the PCV valve.
  9. Install the distributor cap.
  10. Connect the fuel pipes at the rear of the engine.
  11. Connect the electrical connectors.
  12. Install the throttle cable bracket.
  13. Connect the throttle and cruise control cables.
  14. Install the vacuum brake booster hose (if equipped).
  15. Install the air cleaner assembly.
  16. Connect the negative battery cable.

### ***Lower Manifold***

#### **To Remove:**

**Note:** The intake manifold may be removed as an assembly. Do not remove the specific intake manifold components unless component service is required. It is not necessary to remove the upper intake manifold in order to remove the lower intake manifold. Do not allow dirt or debris to enter the fuel system. Ensure that the ends of the fuel system are properly sealed. Do not disassemble the Central Sequential Fuel Injection (SFI) unit, unless service is required.

1. Disconnect the negative battery cable.
2. Drain the engine coolant.
3. Remove air cleaner assembly.
4. Remove the upper radiator hose, both heater hoses and the coolant bypass hose.
5. Disconnect all electrical connectors.
6. Remove the distributor.
7. Remove the vacuum brake booster hose (if equipped).
8. Disconnect the throttle and cruise control cables.
9. Remove the drive belt.

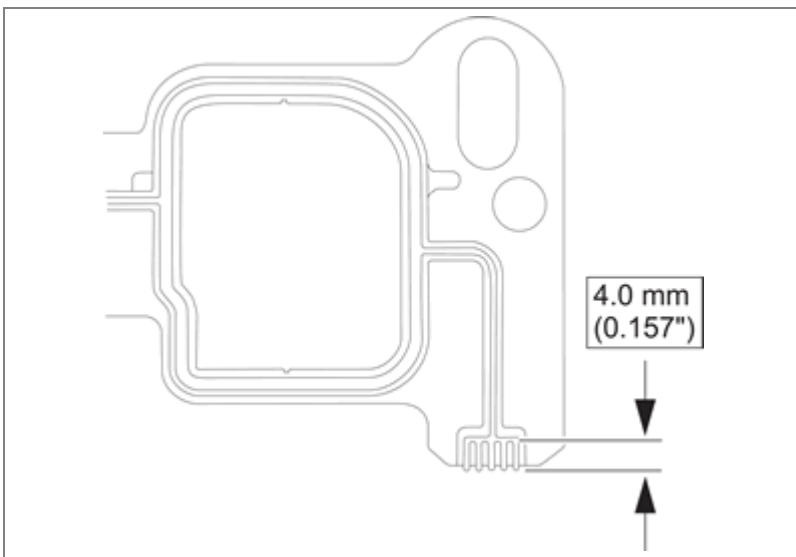
**NOTE:** It is not necessary to discharge the air conditioning system.

10. Dismount the air conditioning compressor and set it aside.
11. Disconnect the exhaust gas recirculation (EGR) pipe from bracket and front of intake manifold.
12. Remove the PCV valve.
13. Disconnect the fuel pipes at the rear of the intake manifold.
14. Disconnect the power steering pump electrical connector.
15. Remove the power steering pump pulley.
16. Remove the power steering pump mounting bracket nut and bolts.

17. Remove two nuts from back of power steering pump.
18. Slide the power steering mounting bracket forward with pump attached.
19. Disconnect the wiring bracket from rear of right cylinder head.
20. Remove one valve rocker arm cover.
21. Remove the intake manifold bolts.
22. Remove intake manifold.
23. Clean all surfaces.

**To Install:**

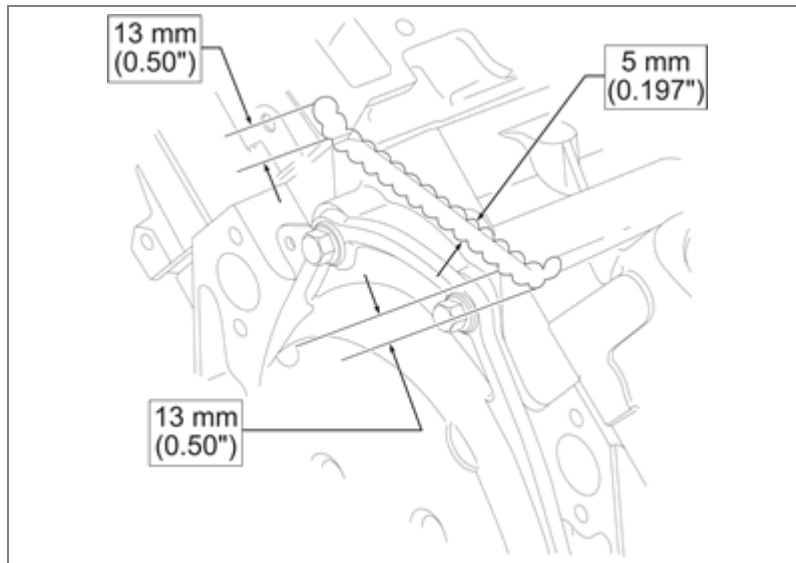
**NOTE:** Apply the proper amount of sealant when installing the intake manifold. Too much or too little sealant can prohibit the component from sealing properly and may lead to extensive engine damage.



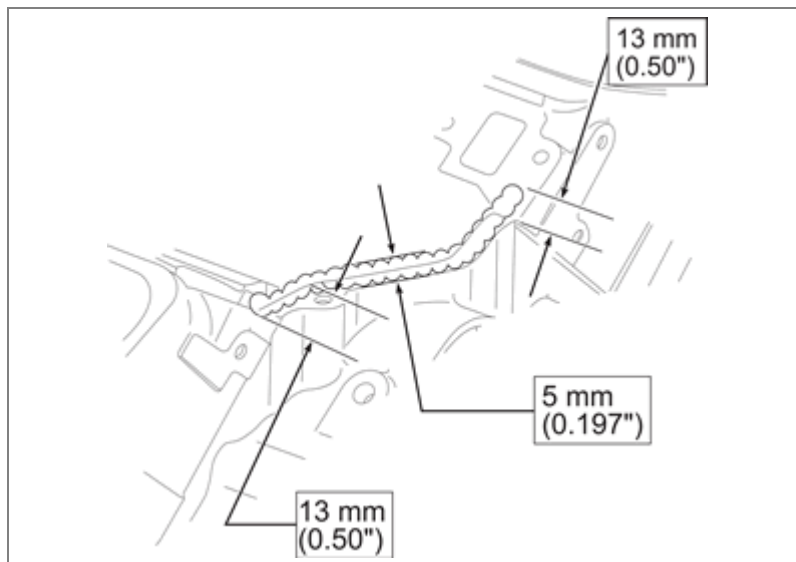
1. Apply a 4.0 mm (0.157 in) patch of adhesive GM P/N 12346141 (or equivalent) to the cylinder head side of the lower intake manifold gasket at each end.

**NOTE:** The lower intake manifold must be installed and fasteners tightened while sealant is wet to touch.

2. Install the lower intake manifold gasket onto the cylinder head and ensure that it is properly seated.



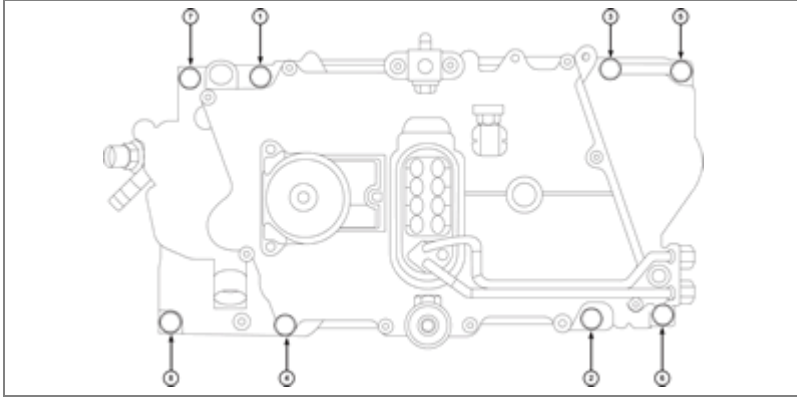
3. Apply a 0.197 in (5 mm) bead of adhesive GM P/N 12346141 (or equivalent) to the front top of the engine block.
4. Apply an additional 0.50 in (13 mm) of sealant up onto each lower intake manifold gasket.



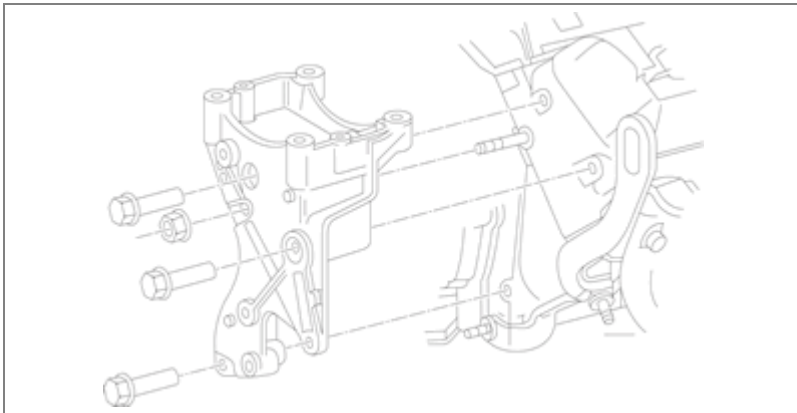
5. Apply a 0.197 in (5 mm) bead of adhesive GM P/N 12346141 (or equivalent) to the rear top of the engine block.
6. Apply an additional 0.50 in (13 mm) of sealant up onto each lower intake manifold gasket.
7. Install the lower intake manifold onto the engine.
8. Apply threadlock GM P/N 12345382 (or equivalent), to the threads of the lower intake manifold bolts.

**NOTE:** Proper lower intake manifold fastener tightening sequence and torque is critical. Failing to follow the proper tightening procedure may distort the crankshaft bearing bore alignment and damage to the crankshaft bearings.

9. Install the lower intake manifold bolts.



10. Torque the lower intake manifold bolts in sequence as follows:
  - First pass bolts 1 through 8 **Torque to: 27 in lbs. (3 Nm)**
  - Second pass bolts 1 through 8 **Torque to: 106 in lbs. (12 Nm)**
  - Third pass bolts 1 through 8 **Torque to: 11 ft lbs. (15 Nm)**
11. Install the valve rocker arm cover.



12. Install the power steering pump bracket onto the stud.
13. Install nut onto stud finger tight.
14. Install the three bolts finger tight.
15. Install two nuts on back of power steering pump.
16. Install the three bolts.
17. Tighten nuts and bolts.
  - **Torque to: 30 ft lbs. (41Nm)**
18. Install the power steering pump pulley.
19. Connect power steering pump electrical connector.
20. Connect fuel pipes at rear of intake manifold.
21. Connect the wiring bracket to rear of right cylinder head.
22. Install the PCV valve.

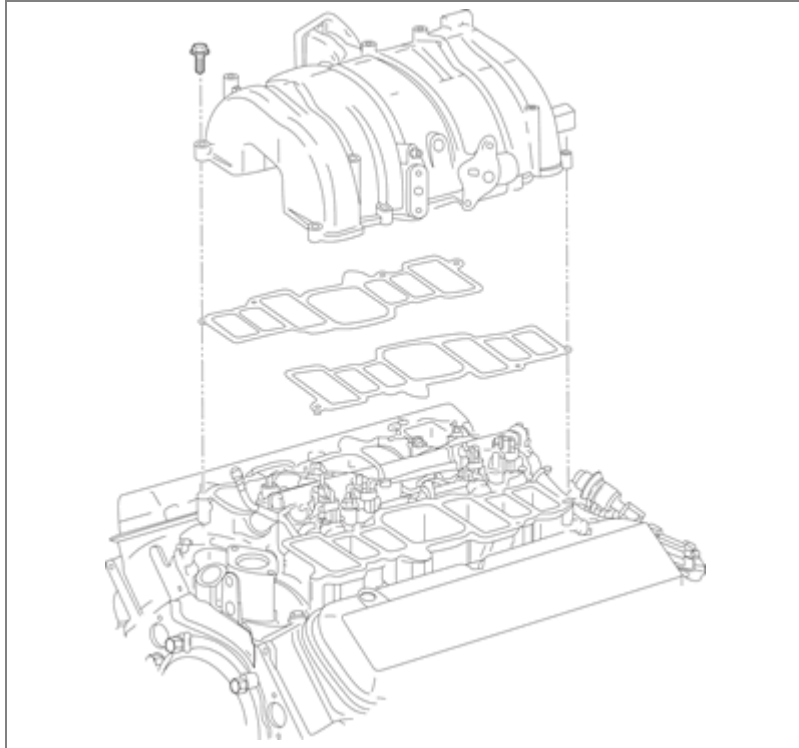
23. Connect the exhaust gas recirculation (EGR) pipe to the bracket and front of the intake manifold.
24. Install the vacuum brake booster hose.
25. Install the air conditioning compressor.
26. Install the drive belt.
27. Connect the throttle and cruise control cables.
28. Install the distributor.
29. Connect all electrical connections.
30. Install the upper radiator hose, both heater hoses and coolant bypass hose.
31. Install the air cleaner assembly.
32. Fill the cooling system.
33. Connect the negative battery cable.

## **7.4L Engine**

### ***Upper Manifold***

#### **To Remove:**

1. Disconnect the negative battery cable at the battery.
2. Remove the intake air resonator from the throttle body.
3. Remove the air cleaner intake duct from the throttle body.
4. Remove the crankcase vent tube from the throttle body.
5. Remove the PCV valve from the valve rocker arm cover.
6. Remove the EGR pipe from the upper intake manifold.
7. Remove the ignition coil from the intake manifold.
8. Remove the throttle body.
9. Remove the EVAP canister solenoid valve.
10. Remove the number 8 spark plug wire from the distributor.



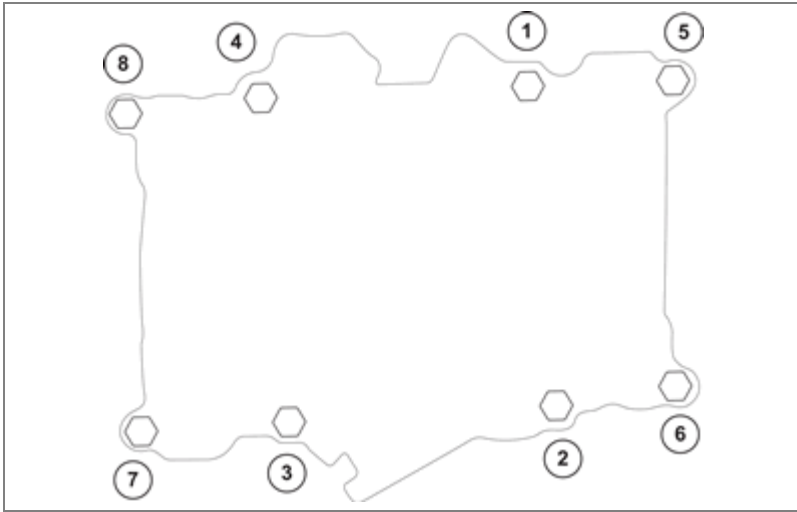
11. Remove the upper intake manifold bolts.
12. Remove the upper intake manifold and gaskets.
13. Clean carbon deposits from the exhaust and EGR valve passages.

**To Install:**

1. Clean all gasket surfaces completely.
2. Install the upper intake manifold gaskets.
3. Install the upper intake manifold.
4. Apply a coating of thread locking sealant GM P/N 12345493 (or equivalent) to a minimum of 8 threads on each intake manifold bolt.

**CAUTION**

Failure to perform the previous procedure could cause a driveability problem.



5. Tighten the intake manifold bolts in the following manner:
  - Tighten the bolts in sequence to **71 in lb (8 Nm)**
  - Re-tighten the bolts in sequence to **13 ft lb (18 Nm)**
6. Install the number 8 spark plug wire.
7. Install the ignition coil to the upper intake manifold.
8. Install the EGR valve (if required).
9. Install the EGR pipe to the upper intake manifold.
  - Tighten the fittings to **46 ft lb (60 Nm)**
10. Install the EVAP canister solenoid valve to the intake manifold.
11. Install the throttle body to the upper intake manifold.
12. Install the PCV valve to the valve rocker arm cover.
13. Install the crankcase vent tube to the valve rocker arm cover.
14. Install the air cleaner intake duct to the throttle body.
15. Install the intake air resonator to the throttle body.
16. Connect the battery negative cables to the battery.

## **Lower Manifold**

### **To Remove:**

1. Drain cooling system.
2. Disconnect the negative battery cable at the battery.
3. Remove the upper intake manifold.
4. Recover the air conditioning refrigerant.
5. Remove the suction and discharge lines from the air conditioning compressor.

**NOTE:** Mark the relationship of the distributor housing to the rotor for reinstallation.

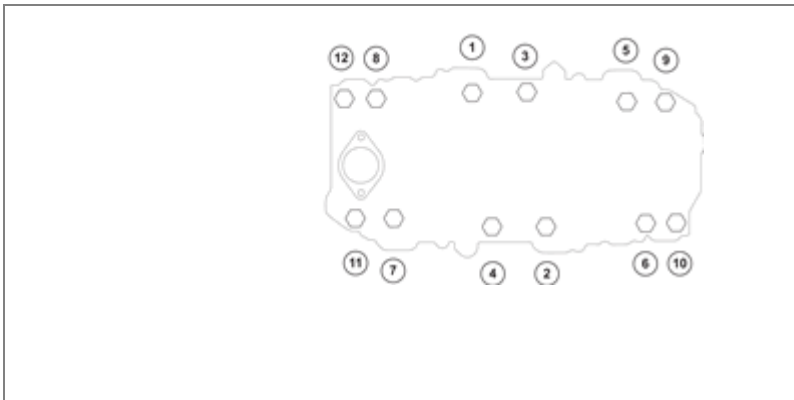
6. Remove the distributor.
7. Remove the MAP sensor.
8. Remove the radiator outlet hose.
9. Remove the thermostat housing.
10. Remove the heater hose from the heater core.
11. Remove the coolant bypass hose from the lower intake manifold and water pump.
12. Remove the fuel rail retaining bolts.
13. Remove fuel rail from lower intake manifold.
14. Remove the lower intake manifold bolts.
15. Remove the lower intake manifold.

**NOTE:** The lower intake manifold gaskets and seals are reusable. Replace only if the gaskets and seals are damaged.

16. Remove the lower intake manifold gaskets and seals.
17. Clean all sealing surfaces.

### **To Install:**

1. Install the upper intake manifold gaskets with proper side facing up.
2. Install the lower intake manifold to the engine.
3. Apply thread locker GM P/N 12345382 (or equivalent) to the lower intake manifold bolts.



4. Install the lower intake manifold bolts.
  - Torque in proper sequence to: **30 ft lbs. (40 Nm)**
5. Install the MAP sensor to the lower intake manifold.
6. Install the fuel rail to the lower intake manifold.
7. Install the fuel rail retaining bolts.
8. Install the thermostat housing.
9. Install the coolant bypass hose to the water pump.
10. Install the heater hoses to the lower intake manifold.
11. Install the radiator outlet hose to the lower intake manifold.
12. Install the upper intake manifold.
13. Install the distributor.
14. Install the suction and discharge hose to the air conditioning compressor.
15. Evacuate and recharge air conditioning system.
16. Refill the cooling system.
17. Connect the battery negative cable at the battery.