

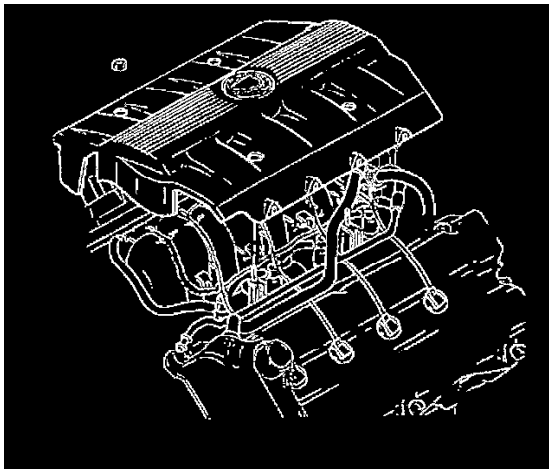
Intake Manifold: Service and Repair

Removal Procedure

- Tools Required

- J 37088-A Fuel Line Quick Connect Separator Tool Set

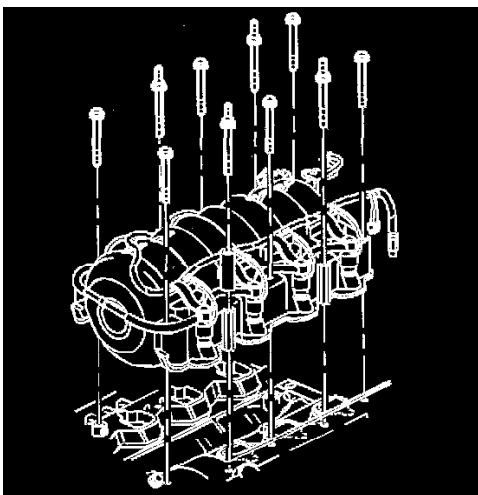
Caution: Refer to Battery Disconnect Caution in Service Precautions.



1. Remove the negative battery cable.
2. Remove the intake manifold sight shield-four nuts.
3. Relieve the fuel system pressure. Refer to Fuel Pressure Relief Procedure in Powertrain Management.
4. Remove the air intake duct from the throttle body.
5. Remove the transaxle vent hose and transaxle shift cable at the bracket.
6. Remove the TP sensor and IAC valve connectors.
7. Remove the accelerator cable and cruise control cable at the throttle body.
8. Remove the front bank spark plug wires and lay them aside.
9. Remove the throttle body coolant hoses at the throttle body and the surge tank pipe. Refer to Throttle Body Coolant Hose Replacement in Cooling System.
10. Remove the EGR pipe and the crankcase ventilation pipe at the throttle body spacer.
11. Remove the brake booster vacuum hose at the intake manifold vacuum fitting.
12. Remove the fuel rail ground wire at the rear cylinder head.
13. Remove the quick-connect fittings at the fuel rail.
 - 13.1. Grasp both sides of the fitting.
 - 13.2. Twist the female connector **1/4 turn** in each direction to loosen any dirt within fitting.

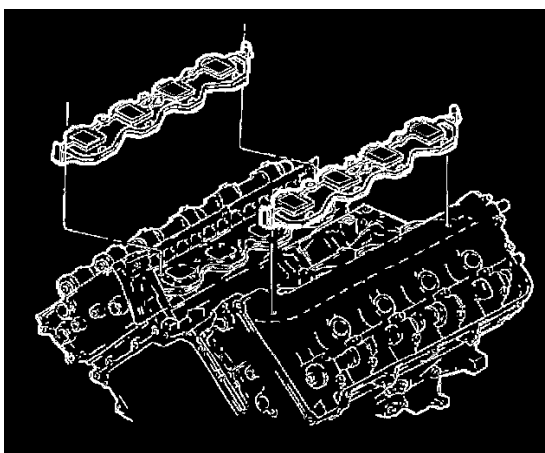
Caution: Safety glasses must be worn when using compressed air, as flying dirt particles may cause eye injury.

- 13.3. Blow the dirt out of the fitting using compressed air.
- 13.4. Choose the correct tool from the J 37088-A for the size of the fitting. Insert the tool into the female connector, then push/pull inward to release the locking tabs.
- 13.5. Pull the connection apart.
 - Using a clean shop towel, wipe off the male pipe end.
 - Inspect both ends of the fitting for dirt and burrs.
 - Clean or replace the components or assemblies as required
14. Disconnect the fuel rail bracket at the EGR valve.
15. Disconnect the PCV hose at the intake manifold.
16. Disconnect the injector harness main connector.



Important: The intake manifold carrier gaskets are attached to the intake manifold through a snap-lock feature. When removing the intake manifold, the carrier gaskets will remain attached to the manifold.

17. Remove six bolts, four studs and the intake manifold



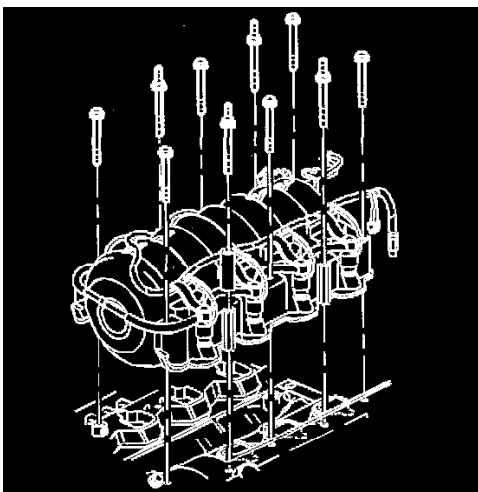
18. If replacing intake manifold, perform the following steps:

- 18.1. Remove the fuel rail.

Important: Do not replace the intake manifold gaskets after intake manifold removal. The gaskets are reusable. The gaskets should only be replaced if the plastic housing or rubber seals are damaged.

- 18.2. Remove the intake manifold carrier gaskets from the intake manifold.
- 18.3. Remove the throttle body.
- 18.4. Remove MAP Sensor.

Installation Procedure



1. If the intake manifold was replaced, perform the following steps:
 - Clean the throttle body O-ring sealing surfaces.

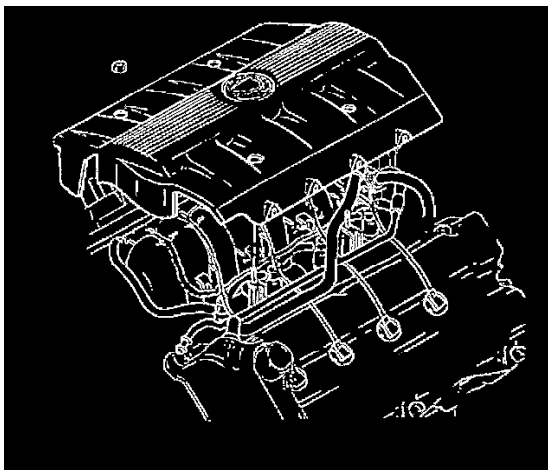
- Clean the intake manifold sealing surfaces.
- Install the MAP sensor.
- Install the throttle body.
- Install the intake manifold carrier gaskets.
- Install the fuel rail.

Important:

- When tightening the intake manifold bolts and studs, start at the center of the manifold and work your way outward in a circular pattern.
- Only tighten the intake manifold bolts when the engine and manifold are cool. Do not tighten the intake manifold bolts and studs with the engine at operating temperature.

Notice: Refer to Fastener Notice in Service Precautions.

2. Install the intake manifold, six bolts and four studs.
 - Tighten the bolts and studs to **10 Nm (89 inch lbs.)**.
3. Install the injector harness main connector.
4. Install the PCV hose at the intake manifold.
5. Install the fuel rail bracket at the EGR valve.
6. Install the quick connect fittings to the fuel rail.
 - 6.1. Apply a few drops of clean engine oil to the male ends of the engine fuel rail inlet and outlet tubes.
 - 6.2. Push both sides of the fitting together in order to snap the retaining tabs/fingers into place.
 - 6.3. Once installed, pull on both sides of the fitting to make sure the connection is secure.
7. Install the fuel rail ground wire at the rear cylinder head.
8. Install the brake booster vacuum hose at the intake manifold vacuum fitting.
9. Install the EGR pipe and crankcase ventilation pipe at the throttle body spacer.
 - Tighten the EGR pipe bolt to **28 Nm (21 ft. lbs.)**.
10. Install the throttle body coolant hoses at the throttle body and the surge tank pipe.
11. Install the front bank spark plug wires.
12. Install the accelerator cable and cruise control cable at the throttle body.
13. Install the TP sensor and IAC valve connectors.
14. Install the transaxle vent hose and the transaxle shift cable at the bracket.
15. Install the air intake duct.
16. Install the fuel filler cap.
17. Connect the negative battery cable.
18. To clean, turn the ignition switch to the ON position for two seconds, then turn to the OFF position for ten seconds. Again turn to the ON position and check for fuel leaks.



19. Install the four intake manifold sight shield nuts.
 - Tighten the intake manifold sight shield nuts to **3 Nm (27 inch lbs.)**.