

**BASIC FUEL SYSTEM DIAGNOSIS 5-2**

**FUEL LINES AND FITTINGS 5-2**

FUEL LINE FITTINGS 5-2

REMOVAL & INSTALLATION 5-2

**MULTI-POINT FUEL INJECTION**

**SYSTEM (MPI) 5-3**

GENERAL INFORMATION 5-3

FUEL SYSTEM SERVICE

PRECAUTIONS 5-3

RELIEVING FUEL SYSTEM

PRESSURE 5-3

THROTTLE BODY 5-3

REMOVAL & INSTALLATION 5-3

FUEL RAIL AND INJECTORS(S) 5-4

REMOVAL & INSTALLATION 5-4

TESTING 5-8

FUEL PRESSURE REGULATOR 5-9

REMOVAL & INSTALLATION 5-9

PRESSURE RELIEF VALVE 5-9

REMOVAL & INSTALLATION 5-9

**FUEL TANK 5-10**

TANK ASSEMBLY 5-10

REMOVAL & INSTALLATION 5-10

# 5

## FUEL SYSTEM

BASIC FUEL SYSTEM DIAGNOSIS 5-2  
FUEL LINES AND FITTINGS 5-2  
MULTI-POINT FUEL INJECTION  
SYSTEM (MPI) 5-3  
FUEL TANK 5-10

## BASIC FUEL SYSTEM DIAGNOSIS

When there is a problem starting or driving a vehicle, two of the most important checks involve the ignition and the fuel systems. The questions most mechanics attempt to answer first, "is there spark?" and

"is there fuel?" will often lead to solving most basic problems. For ignition system diagnosis and testing, please refer to the information on engine electrical components and ignition systems found earlier in

this manual. If the ignition system checks out (there is spark), then you must determine if the fuel system is operating properly (is there fuel?).

## FUEL LINES AND FITTINGS

### Fuel Line Fittings

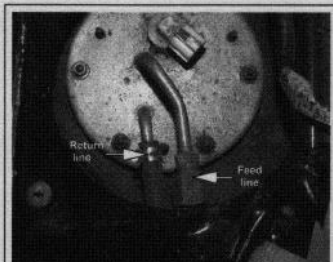
#### REMOVAL & INSTALLATION

▶ See Figures 1 thru 7

The fuel lines used on all models covered by this manual are quite straight forward. Typically the fittings are either rubber hoses connecting to steel lines with clamps, or steel lines connecting to steel lines using retaining bolts or flare fittings. Several fittings are unique such as the banjo-bolt fitting on the fuel feed line from the fuel filter.

#### CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.



**Fig. 1** This photo of the fuel pump lines is an example of the type of fittings found on most models. The return line utilizes a rubber hose and a hose clamp, while the feed line utilizes a flare fitting



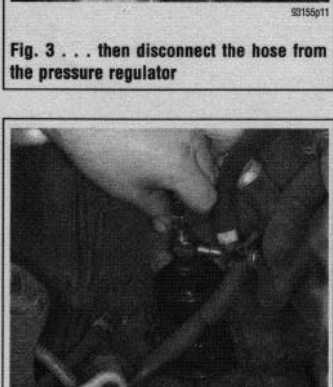
**Fig. 2** This fitting on the fuel pressure regulator utilizes a rubber hose and a hose clamp. Remove the hose clamp . . .



**Fig. 3** . . . then disconnect the hose from the pressure regulator



**Fig. 4** The fuel feed line-to-fuel rail fitting is held by retaining bolts. Unfasten the bolts . . .



**Fig. 5** . . . then remove the fuel feed line from the fuel injector rail



**Fig. 6** The fitting on the top of the fuel filter utilizes a banjo-bolt type fitting. Remove the bolt from the filter feed line on the top of the filter



**Fig. 7** On the banjo-bolt type fitting, it is crucial that the copper washers are replaced every time the fitting is removed

## MULTI-POINT FUEL INJECTION SYSTEM (MPI)

## General Information

The Multi-Point Injection (MPI) system is electronically controlled by the Engine Control Module (ECM), based on data from various sensors. The ECM controls the fuel flow, idle speed and ignition timing.

Fuel is supplied to the injectors by an electric intake fuel pump and is distributed to the respective injectors via the main fuel pipe. The fuel pressure applied to the injector is constant and higher than the pressure in the intake manifold. The pressure is controlled by the fuel pressure regulator. The excess fuel is returned to the fuel tank through the fuel return pipe.

When an electric current flows in the injector, the injector valve is fully opened to supply fuel. Since the fuel pressure is constant, the amount of the fuel injected from the injector into the manifold is increased or decreased in proportion to the time the electric current flows. Based on ECM signals, the injectors inject fuel to the cylinder manifold ports in firing order.

The flow rate of the air drawn through the air cleaner is measured by the air flow sensor. The air enters the air intake plenum or manifold through the throttle body. In the intake manifold, the air is mixed with the fuel from the injectors and is drawn into the cylinder. The air flow rate is controlled according to the degree of the throttle valve and the servo motor openings. The system is monitored through a number of sensors which feed information on engine conditions and requirements to the ECM. The ECM calculates the injection time and rate according to the signals from the sensors.

## Fuel System Service Precautions

Safety is the most important factor when performing not only fuel system maintenance but any type of maintenance. Failure to conduct maintenance and repairs in a safe manner may result in serious personal injury or death. Maintenance and testing of the vehicle's fuel system components can be accomplished safely and effectively by adhering to the following rules and guidelines.

- To avoid the possibility of fire and personal injury, always disconnect the negative battery cable unless the repair or test procedure requires that battery voltage be applied.

- Always relieve the fuel system pressure prior to disconnecting any fuel system component (injector, fuel rail, pressure regulator, etc.), fitting or fuel line connection. Exercise extreme caution whenever relieving fuel system pressure to avoid exposing skin, face and eyes to fuel spray. Please be advised that fuel under pressure may penetrate the skin or any part of the body that it contacts.

- Always place a shop towel or cloth around the fitting or connection prior to loosening to absorb any excess fuel due to spillage. Ensure that all fuel spillage (should it occur) is quickly removed from engine surfaces. Ensure that all fuel soaked cloths or towels are deposited into a suitable waste container.

- Always keep a dry chemical (Class B) fire extinguisher near the work area.

- Do not allow fuel spray or fuel vapors to come into contact with a spark or open flame.

- Always use a backup wrench when loosening and tightening fuel line connection fittings. This will prevent unnecessary stress and torsion to fuel line piping. Always follow the proper torque specifications.

- Always replace worn fuel fitting O-rings with new. Do not substitute fuel hose or equivalent, where fuel pipe is installed.

## Relieving Fuel System Pressure

## \*\*\* CAUTION

**Fuel injection systems remain under pressure after the engine has been turned OFF. Properly relieve fuel pressure before disconnecting any fuel lines. Failure to do so may result in fire or personal injury.**

1. Turn the ignition to the **OFF** position.
2. Loosen the fuel filler cap to release fuel tank pressure.

## \*\*\* CAUTION

**Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.**

3. For the Mirage, Diamante, and 1994-00 Galant, remove the rear seat cushion, then remove the service cover and detach the fuel pump harness connector.
4. For the 1990-93 FWD Galant, detach the fuel pump harness connector located in the area of the fuel tank. It may be necessary to raise the vehicle to access the connector.
5. For the 1990-93 AWD Galant, remove the carpet from the trunk, locate the fuel tank wiring at the pump access cover, then detach the wiring.
6. Start the vehicle and allow it to run until it stalls from lack of fuel. Turn the key to the **OFF** position.
7. Disconnect the negative battery cable, then attach the fuel pump connector. Install the access cover, cushion or carpet as necessary.
8. Wrap shop towels around the fitting that is being disconnected to absorb residual fuel in the lines.
9. Place shop towels into proper safety container.

## Throttle Body

## REMOVAL &amp; INSTALLATION

## ♦ See Figures 8 thru 16

1. Properly relieve the fuel system pressure as outlined earlier in this section.
2. Drain the engine cooling system into a suitable container.
3. Matchmark the location of the adjuster bolt on the accelerator cable mounting flange. This will assure that the cable is installed in its original location. Remove the throttle cable adjusting bolt and disconnect the cable from the lever on the throttle body. Position cable aside.

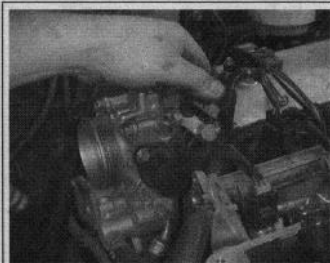


Fig. 8 Detach the connector for the throttle position (TP) sensor

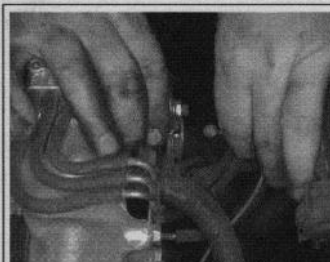


Fig. 9 Remove the accelerator cable end from the throttle lever

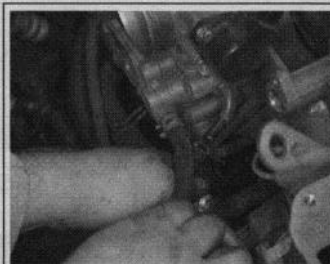


Fig. 10 Remove the hose shown here from the throttle body

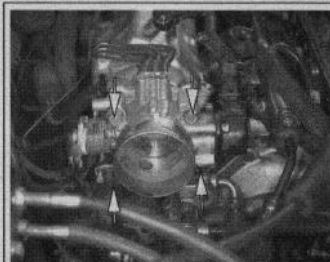
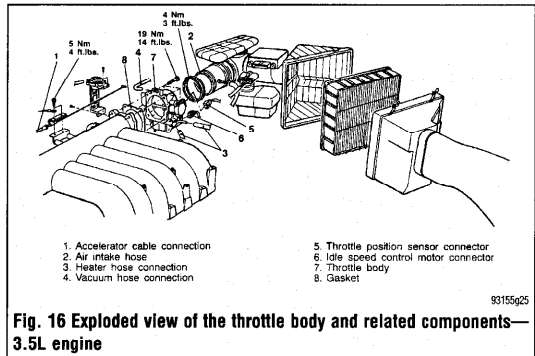
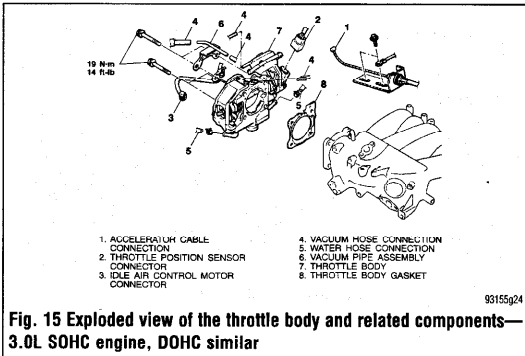
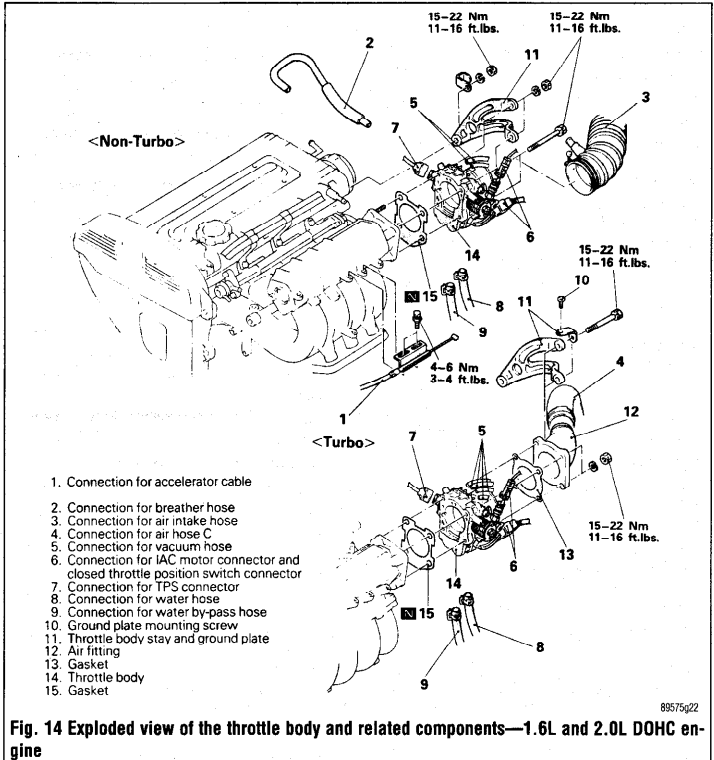
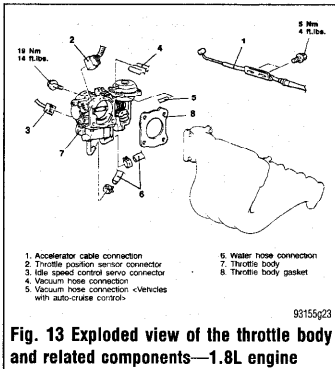
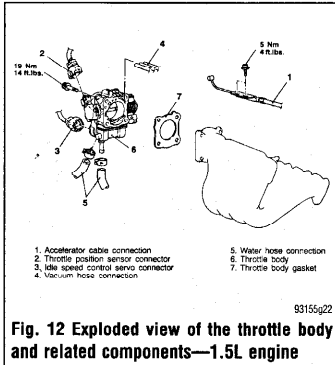


Fig. 11 The throttle body is retained by four bolts—2.4L engine



- Remove the connection for the breather hose and the air intake hose from the throttle body and position aside.
- Tag and disconnect the necessary vacuum hoses.
- Label and detach the electrical connectors at the throttle body, as necessary.
- Disconnect the water and water by-pass hoses at the base of the throttle body.
- If equipped, unfasten the ground plate mounting screws, then remove the throttle body stay and ground plate from the engine.
- Remove the air fitting and gasket.

- Unfasten the throttle body mounting bolts, then remove the throttle body from the engine. Remove and discard the gasket.
- To install:**
- Clean all old gasket material from the both throttle body mounting surfaces. Install new gasket onto the intake manifold plenum mounting surface.
- Poor idling quality and poor performance may be experienced if the gasket is installed incorrectly.**
- Install the throttle body to the intake manifold plenum and tighten the mounting bolts.
  - Install the air fitting, if equipped, making sure new gasket is in place.

- If equipped, install the throttle body stay and ground plate. Secure with retainers tightened to 11–16 ft. lbs. (15–22 Nm).
- Install the ground plate mounting screw.
- Connect the water hoses to the throttle body. Install new hose clamps if required.
- Attach the electrical and vacuum connectors to the throttle body, as tagged during removal.
- Connect the accelerator cable to the throttle body and install the adjusting bolt in original position. Check adjustment of cable.
- Install the air intake and breather hoses.
- If removed, install the battery and connect the positive cable.

21. Connect the negative battery cable. Refill the cooling system.

## Fuel Rail and Injector(s)

### REMOVAL & INSTALLATION

#### 1.5L, 1.8L, And 2.0L SOHC Engines

♦ See Figures 17, 18, and 19

1. Relieve the fuel system pressure as described in this section.
2. Disconnect the PCV hose from the valve cover. Also disconnect the breather hose at the opposite end of the valve cover.
3. Remove the bolts holding the high pressure fuel line to the fuel rail and disconnect the line. Be prepared to contain fuel spillage; plug the line to keep out dirt and debris.

### \*\* CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

4. Remove the vacuum hose from the fuel pressure regulator.
5. Disconnect the fuel return hose from the pressure regulator.
6. Label and detach the electrical connectors from each injector.
7. Remove the bolt(s) holding the fuel rail to the manifold. Carefully lift the rail up and remove it with the injectors attached. Take great care not to drop an injector. Place the rail and injector in a safe location on the workbench; protect the tips of the injectors from dirt and/or impact.
8. Remove and discard the injector insulators from the intake manifold. The insulators are not reusable.
9. Remove the injectors from the fuel rail by pulling gently in a straight outward motion. Make certain the grommet and O-ring come off with the injector.

#### To install:

10. Install a new insulator in each injector port in the manifold.
11. Remove the old grommet and O-ring from each injector. Install a new grommet and O-ring; coat the O-ring lightly with clean, thin oil.
12. If the fuel pressure regulator was removed, replace the O-ring with a new one and coat it lightly with clean, thin oil. Insert the regulator straight into the rail, then check that it can be rotated freely. If it does not rotate smoothly, remove it and inspect the O-ring for deformation or jamming. When properly installed, align the mounting holes and tighten the retaining bolts to 7 ft. lbs. (9 Nm). This procedure must be followed even if the fuel rail was not removed.
13. Install the injector into the fuel rail, constantly turning the injector left and right during installation.

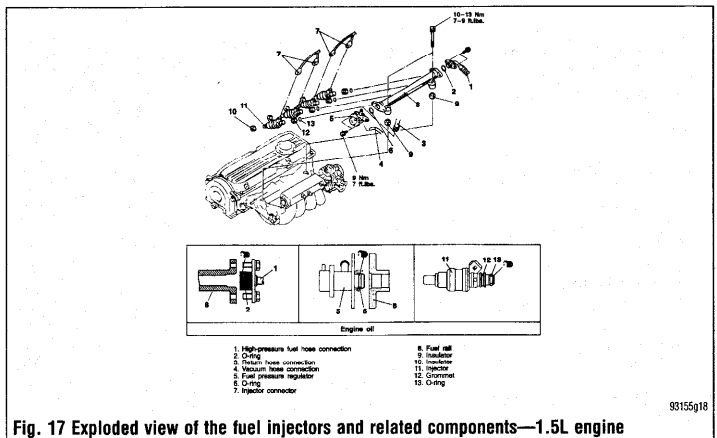


Fig. 17 Exploded view of the fuel injectors and related components—1.5L engine

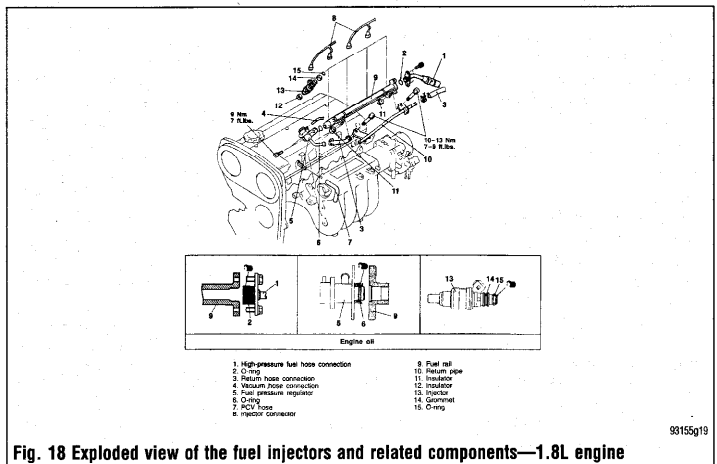


Fig. 18 Exploded view of the fuel injectors and related components—1.8L engine

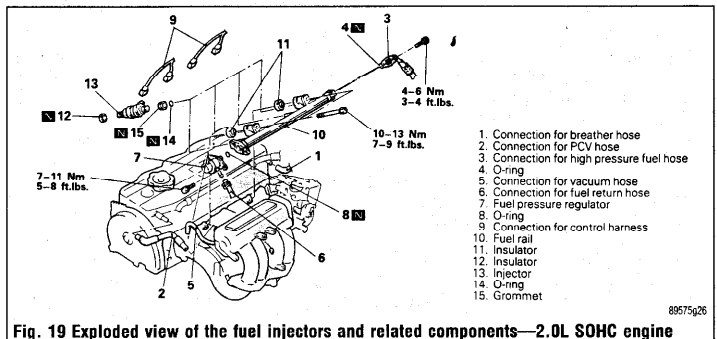


Fig. 19 Exploded view of the fuel injectors and related components—2.0L SOHC engine

When fully installed, the injector should still turn freely in the rail. If it does not, remove the injector and inspect the O-ring for deformation or damage.

14. Install the delivery pipe and injectors to the engine. Make certain that each injector fits correctly into its port and that the rubber insulators for the fuel rail mounts are in position.

15. Install the fuel rail retaining bolts and tighten them to 9 ft. lbs. (12 Nm).
16. Connect the wiring harnesses to the appropriate injector.
17. Connect the fuel return hose to the pressure regulator, then connect the vacuum hose.
18. Replace the O-ring on the high pressure fuel line, coat the O-ring lightly with clean, thin oil and

# 5-6 FUEL SYSTEM

install the line to the fuel rail. Tighten the mounting bolts.

19. Attach the PCV hose and the breather hose if they were disconnected.

20. Connect the negative battery cable. Pressurize the fuel system and inspect all connections for leaks.

## 1.6L and 2.0L DOHC Engines

### ♦ See Figure 20

1. Relieve the fuel system pressure as described in this section.

2. Disconnect the negative battery cable.

3. Wrap the connection with a shop towel and disconnect the high pressure fuel line at the fuel rail.

### \*\*\* CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

4. Disconnect the fuel return hose and remove the O-ring.

5. Disconnect the vacuum hose from the fuel pressure regulator.

6. Disconnect the PCV hose. On 2.0L engine, remove the center cover.

7. Label and detach the electrical connectors from each injector.

8. Remove the injector rail retaining bolts. Make sure the rubber mounting bushings do not get lost.

9. Lift the rail assembly up and away from the engine.

10. Remove the injectors from the rail by pulling gently. Discard the lower insulator. Check the resistance through the injector. The specification for 2.0L turbocharged engine is 2-3 ohms at 70°F (20°C). The specification for the others is 13-15 ohms at 70°F (20°C).

#### To install:

11. Install a new grommet and O-ring to the injector. Coat the O-ring with light oil.

12. Install the injector to the fuel rail.

13. Replace the seats in the intake manifold. Install the fuel rail and injectors to the manifold. Make sure the rubber bushings are in place before tightening the mounting bolts.

14. Tighten the retaining bolts to 72 inch lbs. (11 Nm).

15. Attach the connectors to the injectors and install the center cover. Connect the PCV hose.

16. Connect the fuel pressure regulator vacuum hose.

17. Connect the fuel return hose.

18. Replace the O-ring, lightly lubricate it and connect the high pressure fuel line.

19. Connect the negative battery cable and check the entire system for proper operation and leaks.

## 2.4L Engine

### ♦ See Figures 21 thru 30

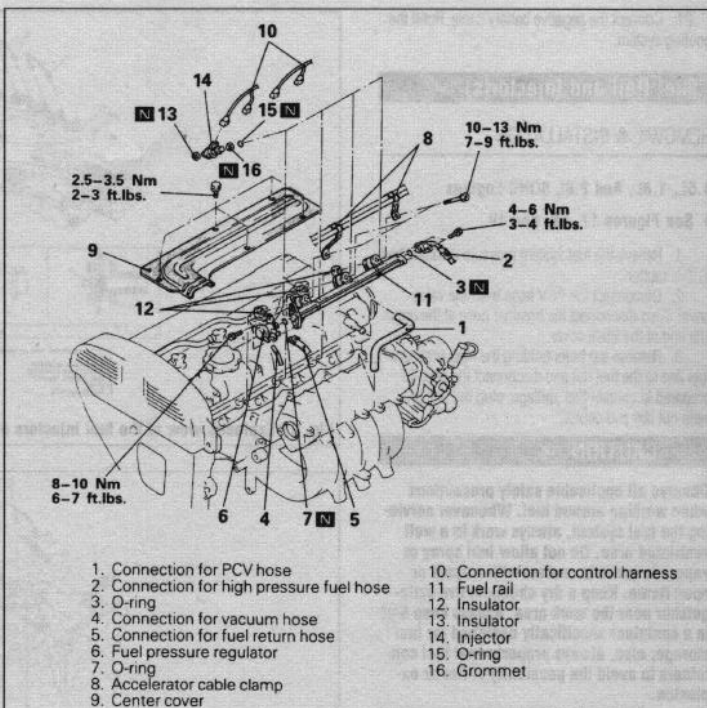


Fig. 20 Exploded view of the fuel injectors and related components — 1.6L and 2.0L DOHC engines



Fig. 21 Remove the fuel feed line-to-fuel rail retaining fitting bolts . . .



Fig. 22 . . . then remove the fuel feed line from the fuel injector rail



Fig. 23 Remove the hose clamp on the fuel return line . . .



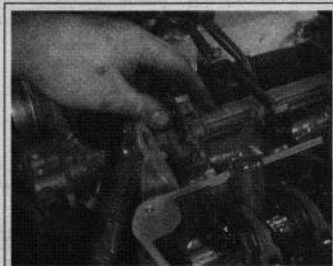
Fig. 24 . . . then disconnect the hose from the pressure regulator





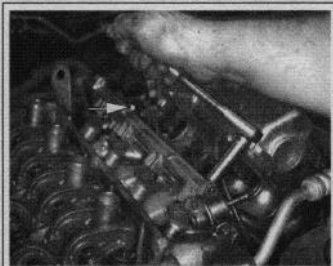
93155p17

**Fig. 25** Remove the vacuum hose from the pressure regulator



93155p48

**Fig. 26** Detach the connectors from all of the fuel injectors



93155p13

**Fig. 27** Remove the two fuel rail retaining bolts . . .



93155p14

**Fig. 28** . . . then lift the rail and the injectors from the intake manifold



93155p15

**Fig. 29** Remove the fuel injectors from the rail by gently rocking them loose



93155p16

**Fig. 30** Always replace the O-rings on the injectors before reinstalling them

1. Relieve the fuel system pressure as described in this section.

2. Label and disconnect the spark plug wires. Position the wires aside.

3. Disconnect the PCV hose from the valve cover.

4. Remove the bolts holding the high pressure fuel line to the fuel rail, then disconnect the line. Be prepared to contain fuel spillage; plug the line to keep out dirt and debris.

## ⚠ CAUTION

**Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.**

5. Remove the vacuum hose from the fuel pressure regulator.

6. Disconnect the fuel return hose from the pressure regulator.

7. Label and detach the electrical connectors from each injector.

8. Remove the bolt(s) holding the fuel rail to the manifold. Carefully lift the rail up and remove it with the injectors attached. Take great care not to drop an injector. Place the rail and injectors in a safe location

on the workbench; protect the tips of the injectors from dirt and/or impact.

9. Remove and discard the injector insulators from the intake manifold. The insulators are not reusable.

10. Remove the injectors from the fuel rail by pulling gently in a straight outward motion. Make certain the grommet and O-ring come off with the injector.

### To install:

11. Install a new insulator in each injector port in the manifold.

12. Remove the old grommet and O-ring from each injector. Install a new grommet and O-ring, coat the O-ring lightly with clean, thin oil.

13. If the fuel pressure regulator was removed, replace the O-ring with a new one and coat it lightly with clean, thin oil. Insert the regulator straight into the rail, then check that it can be rotated freely. If it does not rotate smoothly, remove it and inspect the O-ring for deformation or jamming. When properly installed, align the mounting holes and tighten the retaining bolts to 7 ft. lbs. (9 Nm). This procedure must be followed even if the fuel rail was not removed.

14. Install the injector into the fuel rail, constantly turning the injector left and right during installation. When fully installed, the injector should still turn freely in the rail. If it does not, remove the injector and inspect the O-ring for deformation or damage.

15. Install the delivery pipe and injectors to the engine. Make certain that each injector fits correctly into its port and that the rubber insulators for the fuel rail mounts are in position.

16. Install the fuel rail retaining bolts and tighten them to 9 ft. lbs. (12 Nm).

17. Connect the wiring harnesses to the appropriate injector.

18. Connect the fuel return hose to the pressure regulator, then connect the vacuum hose.

19. Replace the O-ring on the high pressure fuel line, coat the O-ring lightly with clean, thin oil and install the line to the fuel rail. Tighten the mounting bolts to 4 ft. lbs. (6 Nm).

20. Connect the PCV hose and spark plug wires.

21. Connect the negative battery cable. Pressurize the fuel system and inspect all connections for leaks.

## 3.0L and 3.5L Engines

### ♦ See Figures 31 and 32

1. Relieve the fuel system pressure.

2. Disconnect the negative battery cable.

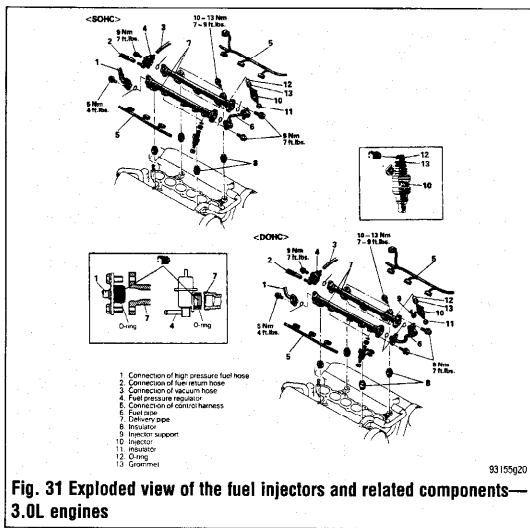
## ⚠ CAUTION

**Work MUST NOT be started until at least 90 seconds after the ignition switch is turned to the LOCK position and the negative battery cable is disconnected from the battery. This will allow time for the air bag system backup power supply to deplete its stored energy, preventing accidental air bag deployment which could result in unnecessary air bag system repairs and/or personal injury.**

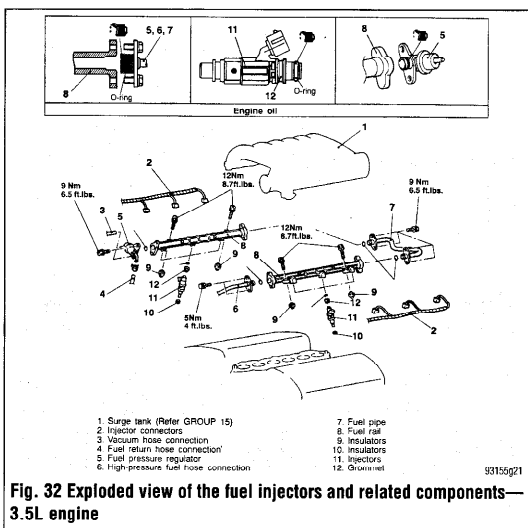
3. Drain the cooling system.

4. Disconnect all components from the air intake plenum and remove the plenum from the intake manifold. Refer to Section 3.

5. Wrap the connection with a shop towel and disconnect the high pressure fuel line at the fuel rail.



**Fig. 31 Exploded view of the fuel injectors and related components—3.0L engines**



**Fig. 32 Exploded view of the fuel injectors and related components—3.5L engine**

## CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

6. Disconnect the fuel return hose and remove the O-ring.
7. Disconnect the vacuum hose from the fuel pressure regulator.
8. Detach the electrical connectors from each injector.
9. Remove the fuel pipe connecting the fuel rails. Remove the injector rail retaining bolts. Make sure the rubber mounting bushings do not get lost.
10. Lift the rail assemblies up and away from the engine.
11. Remove the injectors from the rail by pulling gently. Discard the lower insulator.

### To install:

Some of the vehicles may have a clip that secures the injector to the fuel rail. Be sure to remove or install the injector clip where necessary.

12. Install a new grommet and O-ring to the injector. Coat the O-ring with light oil.
13. Install the injector to the fuel rail.
14. Replace the seats in the intake manifold. Install the fuel rails and injectors to the manifold. Make sure the rubber bushings are in place before tightening the mounting bolts.
15. Tighten the retaining bolts to 7–9 ft. lbs. (10–13 Nm). Install the fuel pipe with new gasket.
16. Attach the electrical connectors to the injectors.

17. Connect the fuel return hose.
18. Replace the O-ring, lightly lubricate it and connect the high pressure fuel line.
19. Using new gaskets, install the intake plenum and all related items. Refer to Section 3.
20. Fill the cooling system.
21. Connect the negative battery cable and check the entire system for proper operation and leaks.

## TESTING

The easiest way to test the operation of the fuel injectors is to listen for a clicking sound coming from the injectors while the engine is running. This is accomplished using a mechanic's stethoscope, or a long screwdriver. Place the end of the stethoscope or the screwdriver (tip end, not handle) onto the body of the injector. Place the ear pieces of the stethoscope in your ears, or if using a screwdriver, place your ear on top of the handle. An audible clicking noise should be heard; this is the solenoid operating. If the injector makes this noise, the injector driver circuit and computer are operating as designed. Continue testing all the injectors this way.

## CAUTION

Be extremely careful while working on an operating engine, make sure you have no dangling jewelry, extremely loose clothes, power tool cords or other items that might get caught in a moving part of the engine.

### All Injectors Clicking

If all the injectors are clicking, but you have determined that the fuel system is the cause of your driveability problem, continue diagnostics. Make sure that you have checked fuel pump pressure as outlined earlier in this section. An easy way to determine a weak or unproductive cylinder is a cylinder drop test. This is accomplished by removing one spark plug wire at a time, and seeing which

cylinder causes the least difference in the idle. The one that causes the least change is the weak cylinder.

If the injectors were all clicking and the ignition system is functioning properly, remove the injector of the suspect cylinder and bench test it. This is accomplished by checking for a spray pattern from the injector itself. Install a fuel supply line to the injector (or rail if the injector is left attached to the rail) and momentarily apply 12 volts DC and a ground to the injector itself; a visible fuel spray should appear. If no spray is achieved, replace the injector and check the running condition of the engine.

### One or More Injectors Are Not Clicking

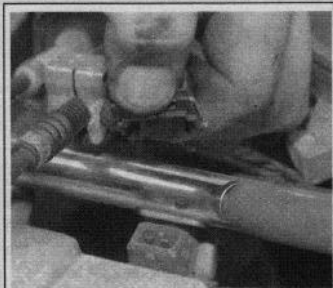
See Figures 33, 34, 35, and 36

If one or more injectors are found to be not operating, testing the injector driver circuit and computer can be accomplished using a "noid" light. First, with the engine not running and the ignition key in the OFF position, remove the connector from the injector you plan to test, then plug the "noid" light tool into the injector connector. Start the engine and the "noid" light should flash, signaling that the injector driver circuit is working. If the "noid" light flashes, but the injector does not click when plugged in, test the injector's resistance. Resistance should be between:

- All non-turbo engines: 13–16 ohms at 68°F (20°C)
- Turbocharged engines: 2–3 ohms at 68°F (20°C)

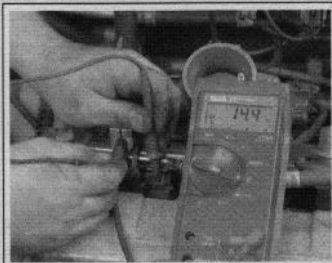
If the "noid" light does not flash, the injector driver circuit is faulty. Disconnect the negative battery cable. Unplug the "noid" light from the injector connector and also unplug the PCM. Check the harness between the appropriate pins on the harness side of the PCM connector and the injector connector. Resistance should be less than 5.0 ohms; if not, repair the circuit. If resistance is within specifications, the injector driver inside the PCM is faulty and replacement of the PCM will be necessary.





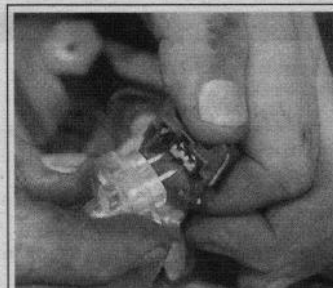
**Fig. 33 Unplug the fuel injector connector**

91055p01



**Fig. 34 Probe the two terminals of a fuel injector to check its resistance**

91055p04



**Fig. 35 Plug the correct "noid" light directly into the injector harness connector**

91055p02



**Fig. 36 If the correct "noid" light flashes while the engine is running, the injector driver circuit inside the PCM is working**

91055p03



**Fig. 37 Remove the hose clamp on the fuel return line . . .**

93155p10



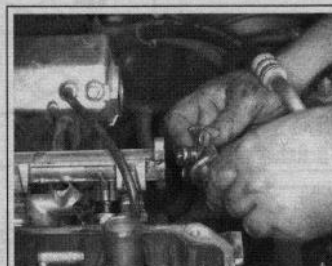
**Fig. 38 . . . then disconnect the hose from the pressure regulator**

93155p19



**Fig. 39 Remove the vacuum hose from the pressure regulator**

93155p17



**Fig. 40 Remove the regulator-to-fuel rail retaining bolts, then remove the pressure regulator from the fuel rail**

93155p20

## Fuel Pressure Regulator

### REMOVAL & INSTALLATION

♦ See Figures 37, 38, 39, 40, and 41

1. Properly relieve the fuel system pressure as outlined earlier in this section.
2. Remove the vacuum hose from the fuel pressure regulator.
3. Disconnect the fuel return hose from the pressure regulator.

### ⚠ CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

4. Remove the fuel regulator retaining bolts or remove the retaining snapping, then remove the fuel regulator from the fuel rail.

#### To install:

5. Replace the O-ring on fuel pressure regulator with a new one and coat it lightly with clean, thin oil.
6. Insert the regulator straight into the rail, then check that it can be rotated freely.

➔ If it does not rotate smoothly, remove it and inspect the O-ring for deformation or damage.

7. When properly installed, align the mounting holes. If equipped, install and tighten the retaining bolts to 8 ft. lbs. (11 Nm). If equipped, install the regulator retaining snapping.

8. Connect the fuel return hose to the pressure regulator.
9. Install the vacuum hose to the fuel pressure regulator.
10. Connect the negative battery cable and pressurize the fuel system. Inspect for leaks.



**Fig. 41 Always replace the O-ring on the pressure regulator before reinstalling it**

93155p12

## Pressure Relief Valve

### REMOVAL & INSTALLATION

♦ See Figures 42 and 43

1. Raise and safely support the vehicle securely on jackstands.
2. Remove the hoses and remove the pressure relief valve.
3. The installation is the reverse of removal.

► Always install the pressure relief valve with the arrow pointing toward the EVAP canister side, not the fuel tank

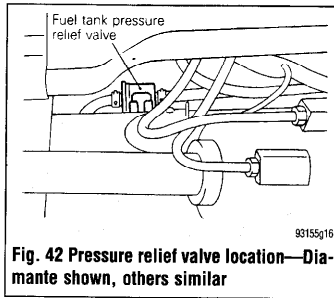


Fig. 42 Pressure relief valve location—Diamante shown, others similar

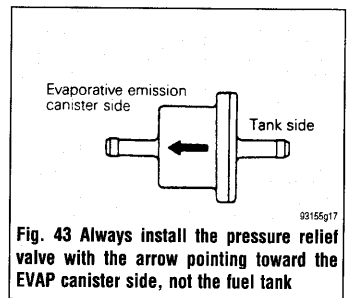


Fig. 43 Always install the pressure relief valve with the arrow pointing toward the EVAP canister side, not the fuel tank

## FUEL TANK

### Tank Assembly

### REMOVAL & INSTALLATION

♦ See Figures 44 thru 58

1. Properly relieve the fuel system pressure using proper procedures.
2. Disconnect the negative battery cable.
3. Raise the vehicle and support safely.
4. Drain the fuel from the fuel tank into an approved container.

### CAUTION

Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to reduce the possibility of fire or explosion.

5. On Diamante models:
    - a. Remove the left rear wheel well liner.
    - b. Disconnect the center exhaust system from the main muffler. Disconnect the rear exhaust hangers, lower the exhaust and secure aside.
    - c. On models equipped with 4-wheel steering, remove the mounting bolts and lower the rear steering gear.
  6. Disconnect the return hose, high pressure hose and vapor hoses from the fuel pump.
  7. Detach the electrical connectors at the pump/sending unit.
  8. Disconnect the filler and vent hoses.
  9. Place a suitable jack under the center of the fuel tank and apply a slight upward pressure. Remove the fuel tank strap retaining nuts.
  10. Lower the tank slightly and detach any remaining electrical or hose connectors at the fuel tank.
  11. Remove the fuel tank from the vehicle.
- To install:**
12. If replacing the tank, transfer any necessary components to the new tank including any heat shields, hoses, valves, and the fuel pump.
  13. Install the fuel tank onto the jack. Raise the tank in position under the vehicle. Leave enough

- clearance to attach the electrical and hose connections to the top of the fuel pump.
14. Attach all connections to the top of the tank.
  15. Raise the tank completely and position the retainer straps around the fuel tank. Install new fuel tank self-locking nuts and tighten the nuts.
  16. Connect the return hose and high pressure hoses.
  17. Install the vapor hose and the filler hose. Install the filler hose retainer screws to the fender, if removed.
  18. On Diamante models:
    - a. If equipped with 4-wheel steering, install the filler cylinder unit and tighten the mounting bolts to 31 ft. lbs. (43 Nm).
    - b. Connect the exhaust pipe and secure the rear hangers.
    - c. Install the left rear wheel well liner, if removed.
  19. Lower the vehicle and pour the drained fuel into the gas tank.
  20. Connect the negative battery cable. Check the fuel pump for proper pressure and inspect the entire system for leaks.

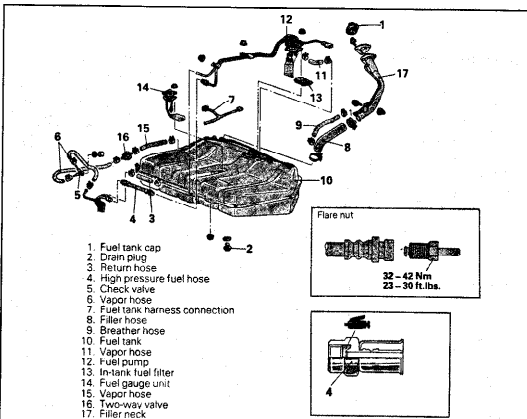


Fig. 44 Fuel tank and related components exploded view—1990-92 Mirage

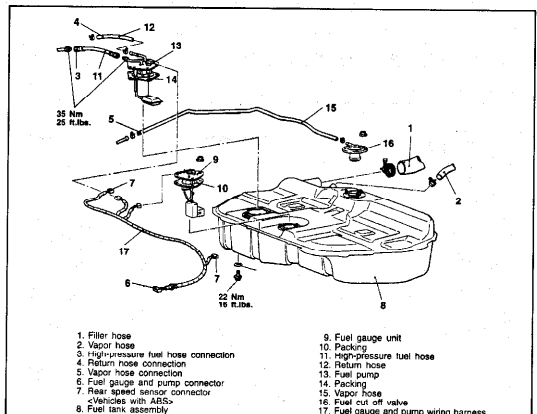
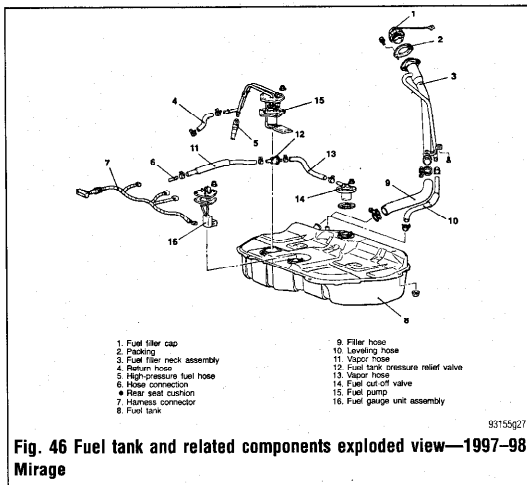
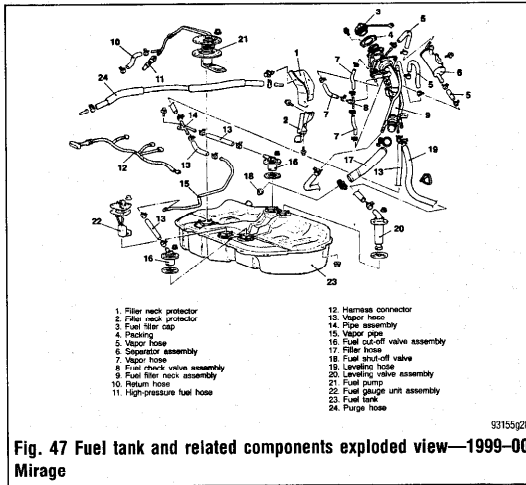


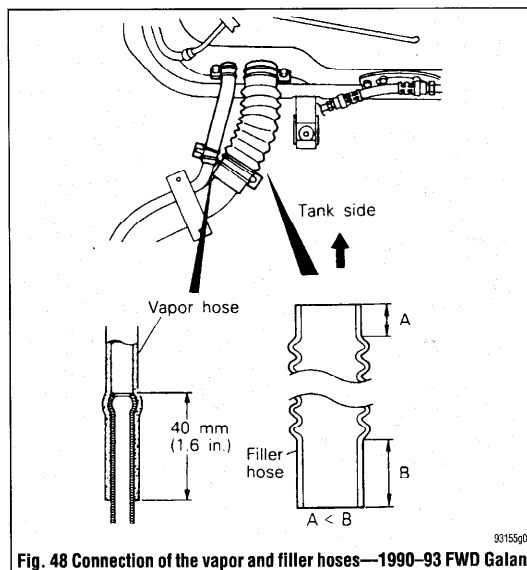
Fig. 45 Fuel tank and related components exploded view—1993-96 Mirage



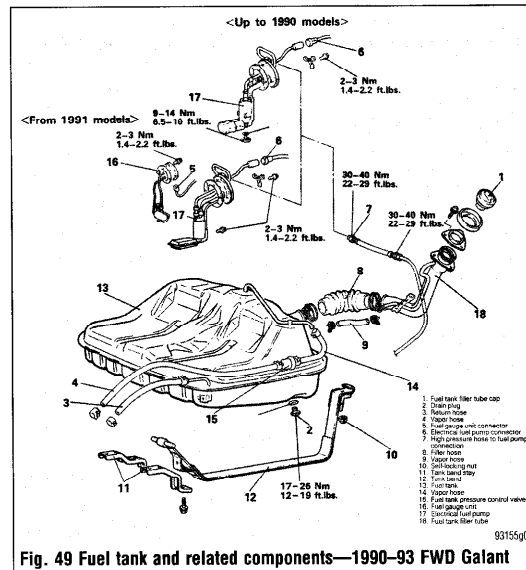
**Fig. 46 Fuel tank and related components exploded view—1997-98 Mirage**



**Fig. 47 Fuel tank and related components exploded view—1999-00 Mirage**



**Fig. 48 Connection of the vapor and filler hoses—1990-93 FWD Galant**



**Fig. 49 Fuel tank and related components—1990-93 FWD Galant**

## Electric Fuel Pump

### REMOVAL & INSTALLATION

#### \*\*\* CAUTION

Fuel injection systems remain under pressure after the engine has been turned OFF. Properly relieve fuel pressure before disconnecting any fuel lines. Failure to do so may result in fire or personal injury.

➔ Cover all fuel hose connections with a shop towel, prior to disconnecting, to prevent splash of fuel that could be caused by residual pressure remaining in the fuel line.

### 1990-92 Mirage

#### ➔ See Figure 44

1. Properly relieve the fuel system pressure using proper procedures. Disconnect the negative battery cable.
2. Raise the vehicle and support safely.
3. Drain the fuel from the fuel tank into an approved container.

#### \*\*\* CAUTION

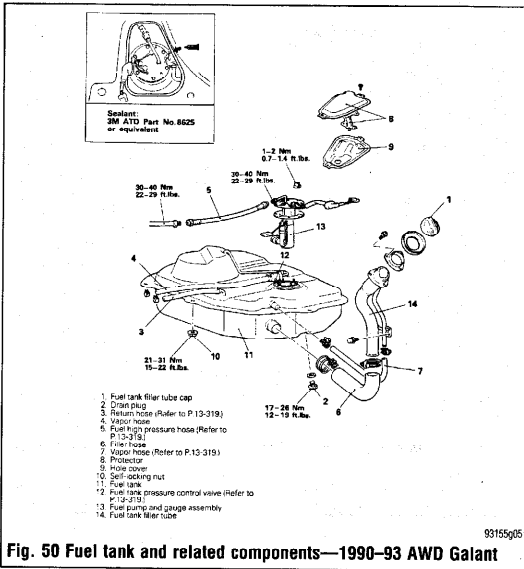
Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extin-

guisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

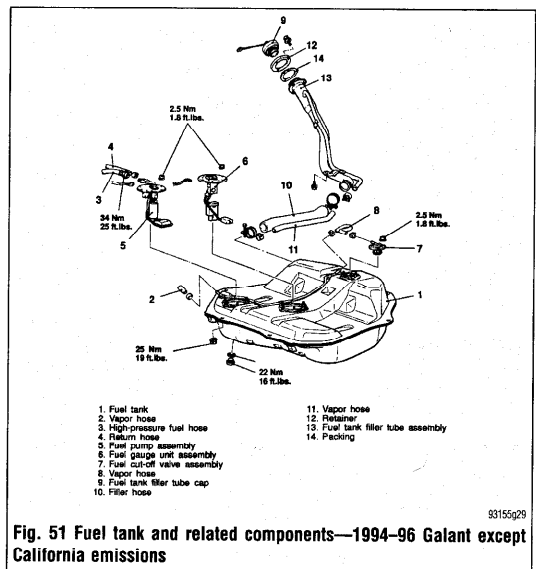
4. Lower the tank slightly and detach any remaining electrical or hose connectors at the fuel tank.
5. Remove the fuel tank from the vehicle as described in this section.
6. Remove the five nuts securing the fuel pump to the fuel tank and remove the pump assembly.

#### To install:

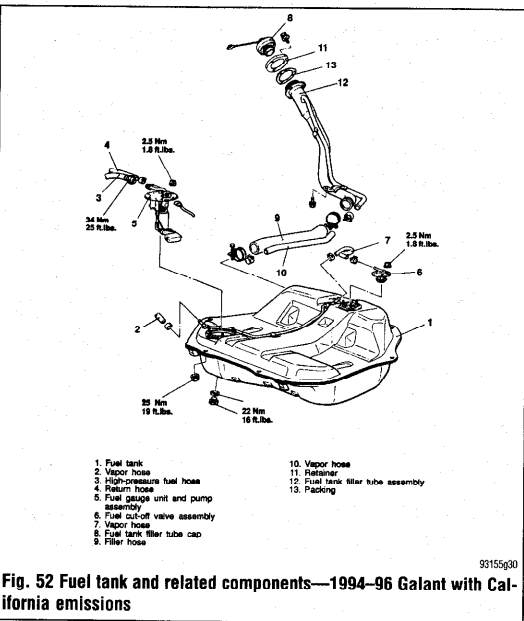
7. Install fuel pump into fuel tank, with new packing gasket, and tighten mounting nuts.
8. Install the fuel tank into the vehicle. Refer to the procedure in this section.



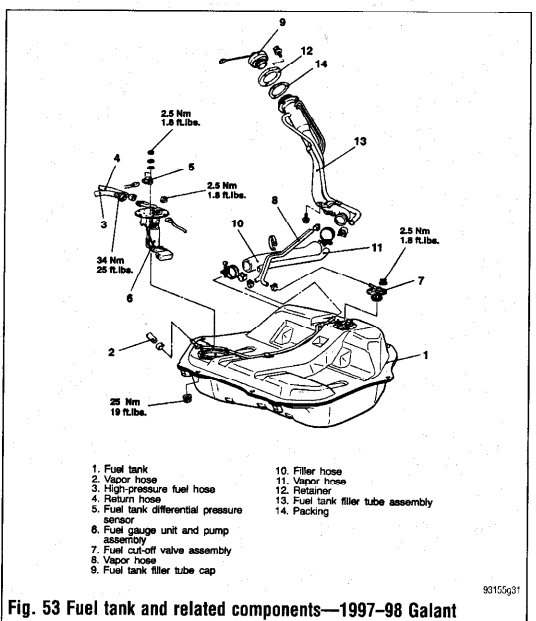
**Fig. 50 Fuel tank and related components—1990-93 AWD Galant**



**Fig. 51 Fuel tank and related components—1994-96 Galant except California emissions**



**Fig. 52 Fuel tank and related components—1994-96 Galant with California emissions**



**Fig. 53 Fuel tank and related components—1997-98 Galant**

9. Lower the vehicle and pour the drained fuel into the gas tank.

10. Connect the negative battery cable.

11. Check the fuel pump for proper pressure and inspect the entire system for leaks.

## 1990-93 Galant

### FRONT WHEEL DRIVE (FWD)

♦ See Figures 59, 60, and 61

1. Relieve the fuel system pressure using proper procedure.

2. Disconnect negative battery cable.

3. Raise and safely support the vehicle.

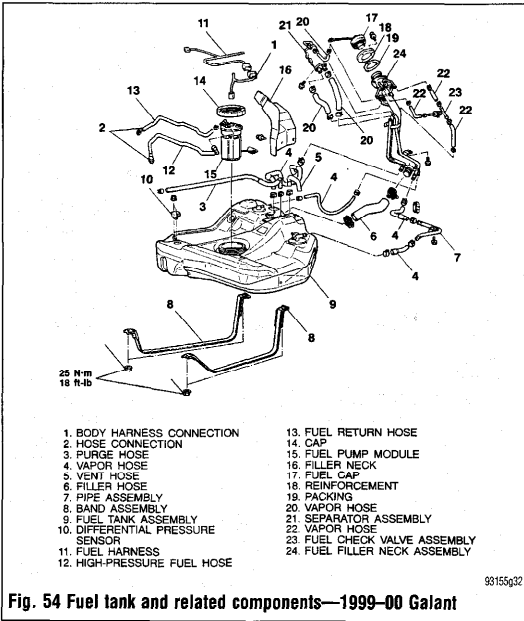
4. Drain the fuel from the fuel tank into an approved gasoline container.

## \*\*\* CAUTION \*\*\*

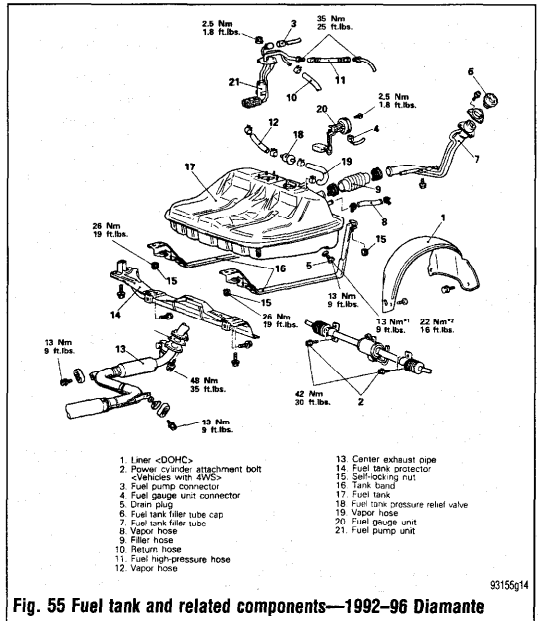
Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well

ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

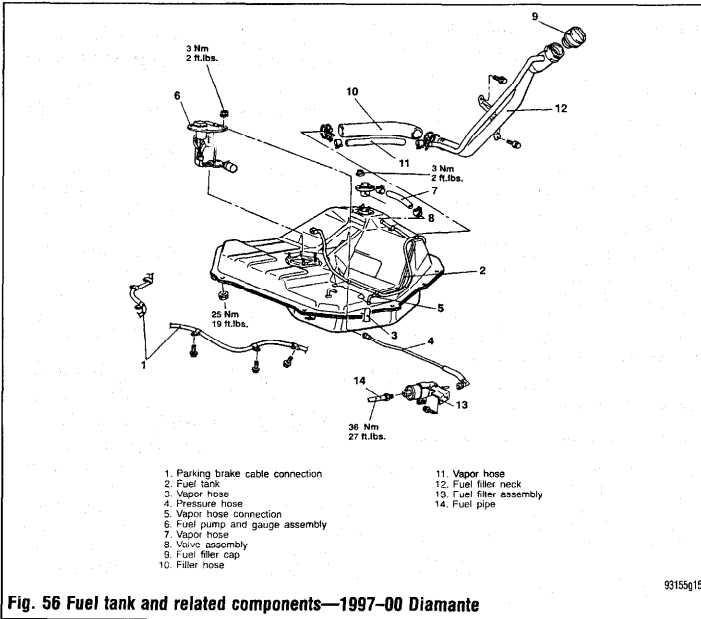
5. Remove the electrical connectors at the fuel pump. Make sure there is enough slack in the electrical



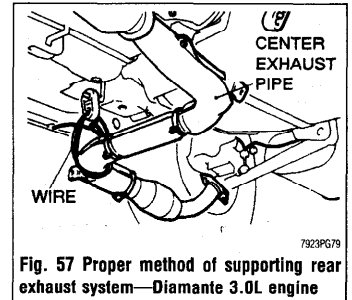
**Fig. 54 Fuel tank and related components—1999-00 Galant**



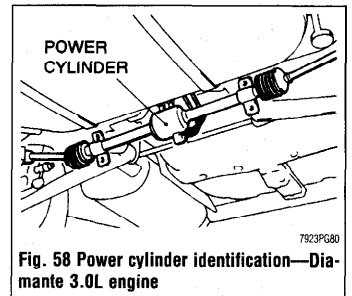
**Fig. 55 Fuel tank and related components—1992-96 Diamante**



**Fig. 56 Fuel tank and related components—1997-00 Diamante**



**Fig. 57 Proper method of supporting rear exhaust system—Diamante 3.0L engine**



**Fig. 58 Power cylinder identification—Diamante 3.0L engine**

cal harness of the fuel gauge unit to allow for the fuel tank to be lowered slightly. If not, label and disconnect the electrical harness at the fuel gauge unit.

6. Detach the high pressure fuel line connector at the pump.

7. Loosen self-locking nuts on tank support straps to the end of the stud bolts.

8. Remove the right side lateral rod attaching bolt and disconnect the arm from the right body cou-

pling. Lower the lateral rod and suspend from the axle beam using wire.

9. Remove the six retaining bolts and gasket from the base of the tank.

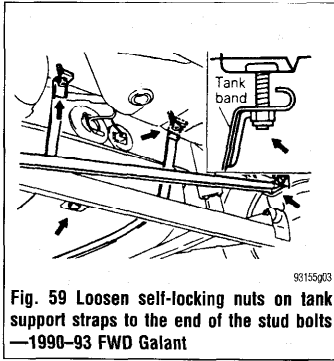
10. Remove the fuel pump assembly.

**To install:**

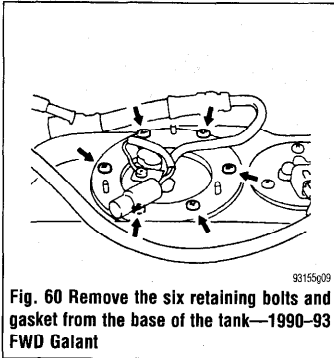
➔ If the packing material is damaged or deformed, replace it with new packing.

11. Align the 3 projections on packing with the holes on the fuel pump and the nipples on the pump facing the same direction as before removal.

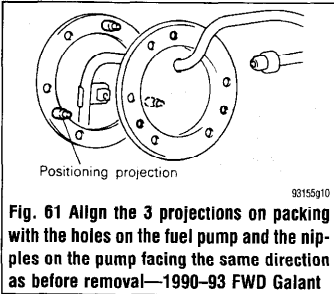
12. Install the holding bolt through the bottom of the tank. Make sure the gasket on the bolt is replaced and is not pinched during installation. Torque to 10 ft. lbs. (14 Nm).



**Fig. 59** Loosen self-locking nuts on tank support straps to the end of the stud bolts—1990-93 FWD Galant



**Fig. 60** Remove the six retaining bolts and gasket from the base of the tank—1990-93 FWD Galant



**Fig. 61** Align the 3 projections on packing with the holes on the fuel pump and the nipples on the pump facing the same direction as before removal—1990-93 FWD Galant

13. Install the right side lateral rod and attaching bolt into the right body coupling. Tighten loosely only, at this time.
14. Tighten the self-locking nuts on the tank support straps until the tank is fully seated. Torque the nuts to 22 ft. lbs. (31 Nm).
15. Install the high pressure fuel hose connector and tighten to 29 ft. lbs. (40 Nm).
16. Install the electrical connectors onto the fuel pump and gauge unit assemblies.
17. Lower the vehicle so the suspension supports the weight of the vehicle. Tighten the lateral rod attaching bolt to 58-72 ft. lbs. (80-100 Nm).
18. Refill the fuel tank with fuel drained during this procedure.
19. Connect the negative battery cable and check the entire system for proper operation and leaks.

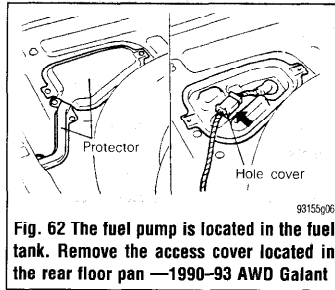
## ALL WHEEL DRIVE (AWD)

♦ See Figures 62, 63, and 64

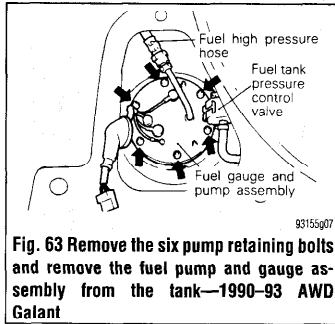
1. Relieve the fuel system pressure using proper procedure.
2. Disconnect negative battery cable.
3. The fuel pump is located in the fuel tank. Remove the access cover located in the rear floor pan.
4. Partially drain the fuel tank into an approved gasoline container.

### \*\*\* CAUTION

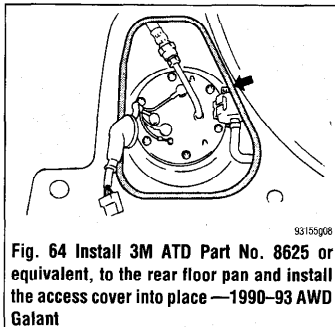
Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel



**Fig. 62** The fuel pump is located in the fuel tank. Remove the access cover located in the rear floor pan—1990-93 AWD Galant



**Fig. 63** Remove the six pump retaining bolts and remove the fuel pump and gauge assembly from the tank—1990-93 AWD Galant



**Fig. 64** Install 3M ATD Part No. 8625 or equivalent, to the rear floor pan and install the access cover into place—1990-93 AWD Galant

storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

5. Remove the electrical connector from the fuel pump.
6. Remove the overfill limiter (two-way valve), as required.
7. Remove the high pressure fuel hose connector.
8. Remove the six pump retaining bolts and remove the fuel pump and gauge assembly from the tank. Note positioning of pump prior to removal from tank.

To install:

⚠ If the packing material is damaged or deformed, replace it with new packing.

9. Align the 3 projections on the packing with the holes on the fuel pump and the nipples on the pump facing the same direction as before removal. Install the retainers and tighten to 2 ft. lbs. (3 Nm).
10. Install the high pressure hose connection and tighten to 29 ft. lbs. (40 Nm).
11. Install the overfill limiter (two-way valve) and the electrical connector to the fuel pump.
12. Fill the fuel tank with the gasoline removed during this procedure.
13. Reconnect the negative battery cable and check the entire system for leaks.
14. Install 3M ATD Part No. 8625 or equivalent, to the rear floor pan and install the access cover into place.

**Diamond, 1993-00 Mirage, and 1994-98 Galant**

♦ See Figures 65 thru 72

1. Properly relieve the fuel system pressure.
2. Disconnect the negative battery cable.
3. Remove the rear seat cushion, by pulling the seat stopper outward and lifting the lower cushion upward.
4. Remove the access cover.
5. Disconnect the fuel pump wiring.
6. Disconnect the return hose and the high pressure fuel hose.
7. Remove the pump mounting nuts and remove the pump assembly.

### \*\*\* CAUTION

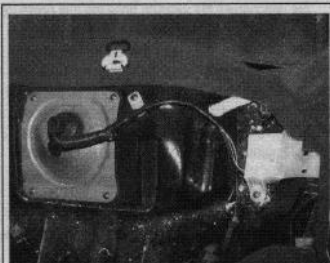
Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.

To install:

⚠ If the packing material is damaged or deformed, replace it with new packing.

8. Install the packing to the fuel tank.
9. Install the fuel pump assembly to the tank and tighten the retaining nuts to 22 inch lbs. (2.5 Nm).





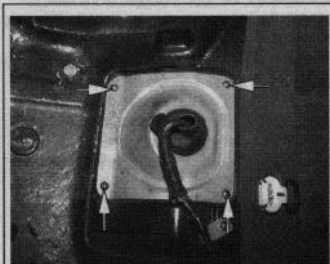
93155g04

**Fig. 65** After the seat cushion is removed, the access cover for the fuel pump is visible



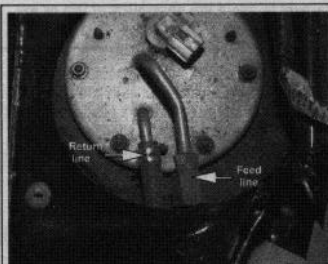
93155g02

**Fig. 69** Detach the electrical connector from the fuel pump



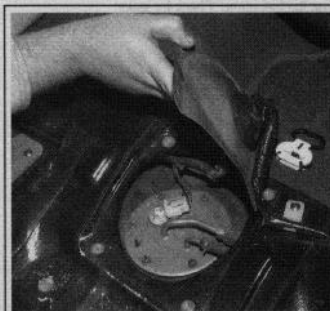
93155g08

**Fig. 66** Remove the four access cover retaining screws . . .



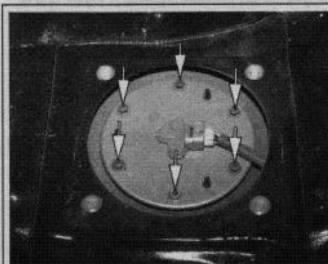
93155g01

**Fig. 70** Remove the return and feed lines from the fuel pump



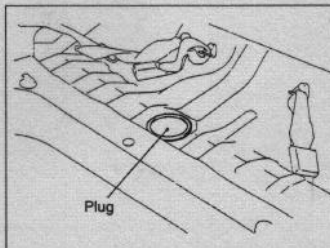
93155g03

**Fig. 67** . . . then lift the cover from the floorpan



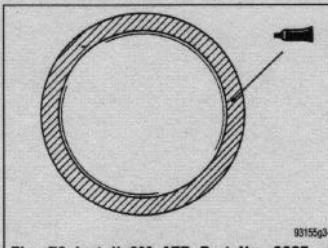
93155g05

**Fig. 71** The fuel pump, just like the sending unit (shown here), is held by six retaining nuts; remove them and lift the pump out of the fuel tank



93155g03

**Fig. 68** On Mirage models there is a plug rather than an access cover



93155g04

**Fig. 72** Install 3M ATD Part No. 8625 or equivalent, to the rear floor pan and install the access cover or plug into place

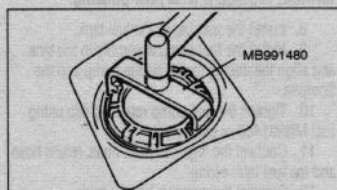
**➔Tilt the float to the left of the vehicle, when installing the pump assembly.**

10. Connect the high pressure hose, return hose and the fuel tank wiring.
11. Connect the negative battery cable.
12. Check the fuel pump for proper pressure and inspect the entire system for leaks.
13. Apply sealant to the access cover and install the cover.
14. Install the rear seat cushion.

## 1999-00 Galant

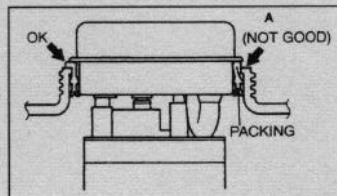
▶ See Figures 65 thru 75

1. Properly relieve the fuel system pressure.
2. Disconnect the negative battery cable.
3. Remove the rear seat cushion, by pulling the seat stopper outward and lifting the lower cushion upward.
4. Remove the access cover.
5. Disconnect the fuel pump wiring.



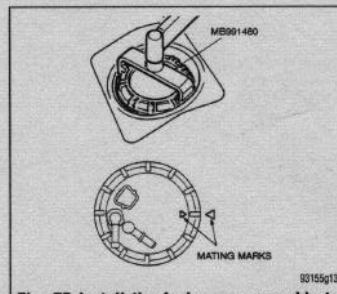
93155g11

**Fig. 73** Using special tool MB991480 or equivalent, remove the fuel pump retaining cap and remove the pump assembly — 1999-00 Galant



93155g12

**Fig. 74** Install the packing to the fuel tank — 1999-00 Galant



93155g13

**Fig. 75** Install the fuel pump assembly to the tank and align the mating marks on the pump and the floorpan — 1999-00 Galant

6. Disconnect the return hose and the high pressure fuel hose.
7. Using special tool MB991480 or equivalent, remove the fuel pump retaining cap and remove the pump assembly.

## \*\*\* CAUTION

**Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.**

### To install:

**► If the packing material is damaged or deformed, replace it with new packing.**

8. Install the packing to the fuel tank.
9. Install the fuel pump assembly to the tank and align the mating marks on the pump and the floorpan.
10. Tighten the fuel pump retaining cap using tool MB991480 or equivalent.
11. Connect the high pressure hose, return hose and the fuel tank wiring.
12. Connect the negative battery cable.
13. Check the fuel pump for proper pressure and inspect the entire system for leaks.
14. Apply sealant to the access cover and install the cover.
15. Install the rear seat cushion.

## TESTING

1. Relieve fuel system pressure.
2. Disconnect the battery negative cable.
3. Disconnect the fuel high pressure hose at the delivery pipe side.

## \*\*\* CAUTION

**Observe all applicable safety precautions when working around fuel. Whenever servicing the fuel system, always work in a well ventilated area. Do not allow fuel spray or vapors to come in contact with a spark or open flame. Keep a dry chemical fire extinguisher near the work area. Always keep fuel in a container specifically designed for fuel storage; also, always properly seal fuel containers to avoid the possibility of fire or explosion.**

4. Connect a fuel pressure gauge to tools MD998709 and MD998742 or exact equivalent, with appropriate adapters, seals and/or gaskets to prevent leaks during the test. Install the gauge and adapter between the delivery pipe and high pressure hose. Install carefully to prevent leaks.
5. Connect the negative battery cable.
6. Apply battery voltage to the terminal for fuel pump activation (located in the engine compartment) to run the fuel pump, and check for leaks.
7. Start the engine and run at curb idle speed.
8. Measure the fuel pressure and compare to the specifications listed in the chart in Section 1.
9. Locate and disconnect the vacuum hose running to the fuel pressure regulator. Plug the end of the hose and record the fuel pressure again. The fuel pressure should have increased approximately 10 psi.

10. Reconnect the vacuum hose the fuel pressure regulator. After the fuel pressure stabilizes, race the engine 2-3 times and check that the fuel pressure does not fall when the engine is running at idle.

11. Check to be sure there is fuel pressure in the return hose by gently pressing the fuel return hose with fingers while racing the engine. There will be no fuel pressure in the return hose when the volume of fuel flow is low.

12. If fuel pressure is too low, check for a clogged fuel filter, a defective fuel pressure regulator or a defective fuel pump, any of which will require replacement.

13. If fuel pressure is too high, the fuel pressure regulator is defective and will have to be replaced or the fuel return is bent or clogged. If the fuel pressure reading does not change when the vacuum hose is disconnected, the hose is clogged or the valve is stuck in the fuel pressure regulator and it will have to be replaced.

14. Stop the engine and check for changes in the fuel pressure gauge. It should not drop. If the gauge reading does drop, watch the rate of drop. If fuel pressure drops slowly, the likely cause is a leaking injector which will require replacement. If the fuel pressure drops immediately after the engine is stopped, the check valve in the fuel pump isn't closing and the fuel pump will have to be replaced.

15. Relieve fuel system pressure.

16. Disconnect the high pressure hose and remove the fuel pressure gauge from the delivery pipe.

17. Install a new O-ring in the groove of the high pressure hose. Connect the hose to the delivery pipe and tighten the screws. After installation, apply battery voltage to the terminal for fuel pump activation to run the fuel pump. Check for leaks.