

## CENTRAL FUEL INJECTION (CFI)

### General Description

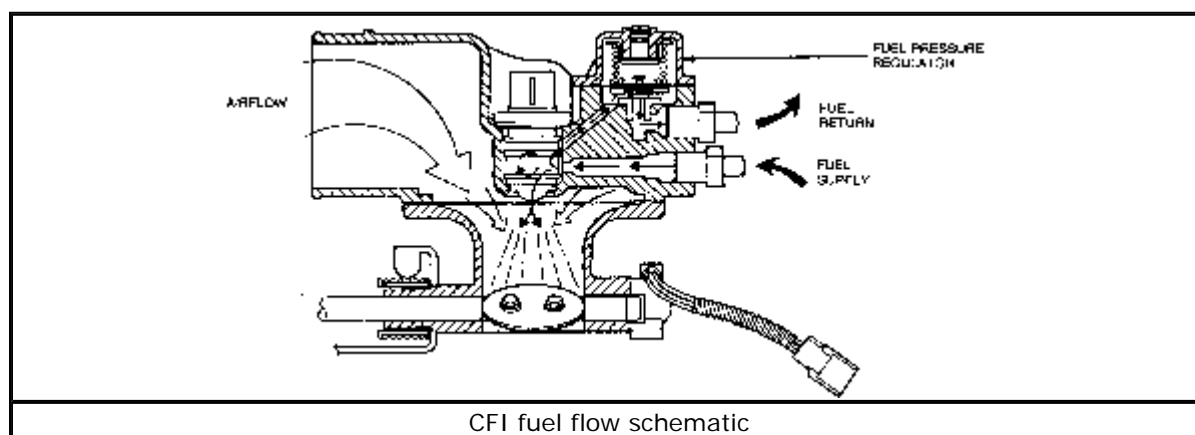
The Central Fuel Injection (CFI) system is a single point, pulse time modulated injection system which was used on 1986-90 2.5L engines. Fuel is metered into the air intake stream according to engine demands by one or two solenoid injection valves, mounted in a throttle body on the intake manifold. Fuel is supplied from the fuel tank by a single low-pressure pump. The fuel is filtered and sent to the air throttle body, where a regulator keeps the fuel delivery pressure at a constant 39 psi (269 kPa) on high-pressure systems, or 14.5 psi (100 kPa) on low-pressure systems. One or two injector nozzles are mounted vertically above the throttle plates and connected in parallel with the fuel pressure regulator. Excess fuel supplied by the pump, but not needed by the engine, is returned to the fuel tank by a steel fuel return line.

The fuel charging assembly controls air/fuel ratio. It consists of a typical carburetor type throttle body, and has one or two bores without venturis. The throttle shaft and valves control engine air flow based on driver demand. The throttle body attaches to the intake manifold mounting pad.

A throttle position sensor is attached to the throttle shaft. It includes a potentiometer (or rheostat) that electrically senses throttle opening. A throttle kicker solenoid fastens opposite the throttle position sensor. During air conditioning operation, the solenoid extends to slightly increase engine idle speed.

Cold engine speed is controlled by an automatic kick-down vacuum motor. There is also an all-electric, bimetal coil spring which controls cold idle speed. The bimetal electric coil operates like a conventional carburetor choke coil, but the fuel injection system uses no choke. Fuel enrichment for cold starts is controlled by the computer and injectors.

The fuel pressure regulator controls critical injector fuel pressure. The regulator receives fuel from the electric fuel pump and then adjusts the fuel pressure for uniform fuel injection. The regulator sets fuel pressure at 39 psi (269 kPa) on high pressure systems, or 14.5 psi (100 kPa) on low pressure systems.



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The fuel manifold (or fuel rail) evenly distributes fuel to each injector. Its main purpose is to equalize the fuel flow. One end of the fuel rail contains a relief valve for testing fuel pressure during engine operation.

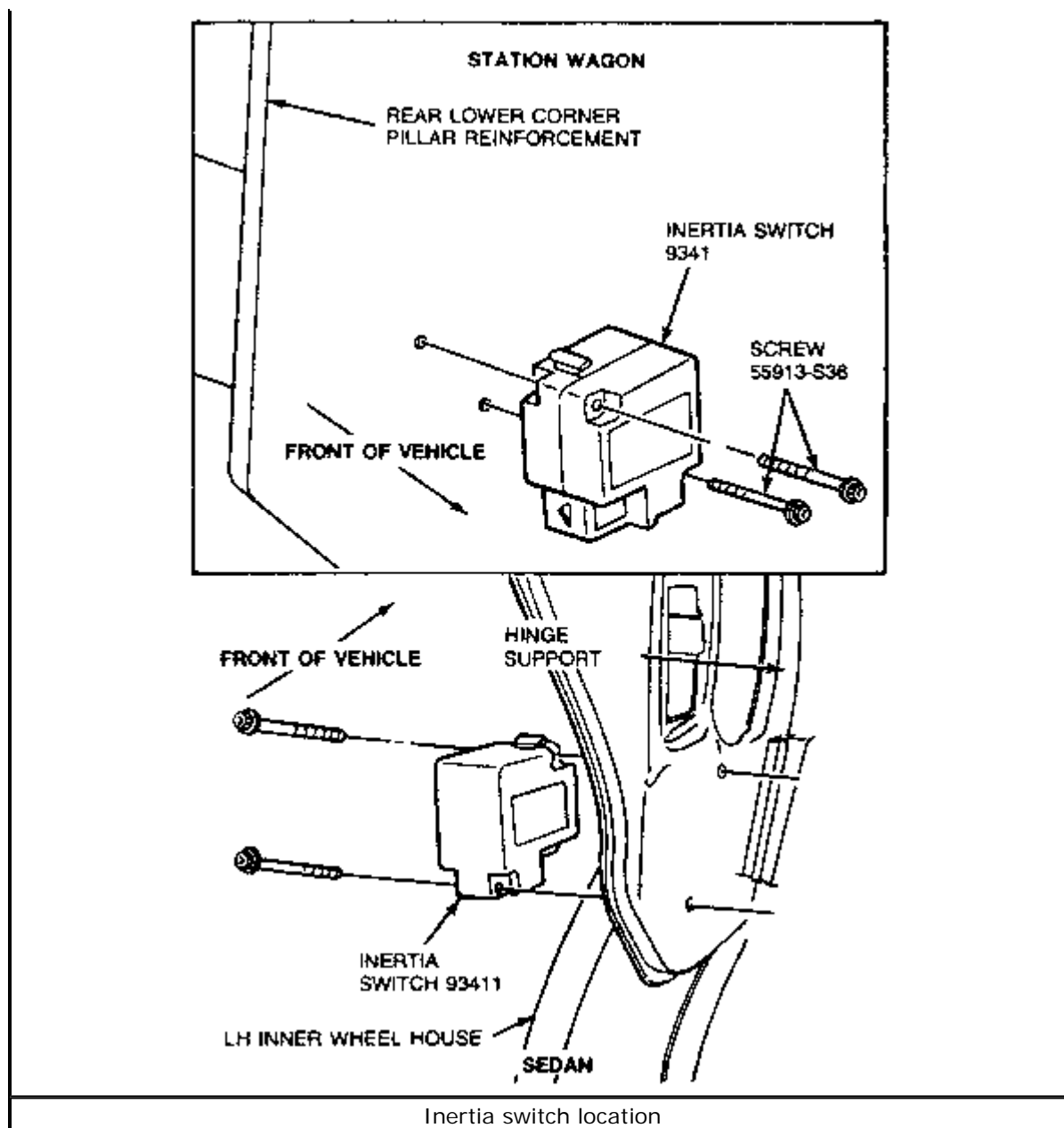
The fuel injectors are electromechanical devices. The electrical solenoid operates a pintle or ball metering valve which always travels the same distance from closed to open to closed. Injection is controlled by varying the length of time the valve is open.

The computer, based on voltage inputs from the crank position sensor, operates each injector solenoid two times per engine revolution. When the injector metering valve unseats, fuel is sprayed in a fine mist into the intake manifold. The computer varies fuel enrichment based on voltage inputs from the exhaust gas oxygen sensor, barometric pressure sensor, manifold absolute pressure sensor, etc., by calculating how long to hold the injectors open. The longer the injectors remain open, the richer the mixture. This injector ON time is called pulse duration.

## Relieving Fuel System Pressure

1. **Disengage the electrical connector from the inertia switch located on the left side of the storage compartment.**





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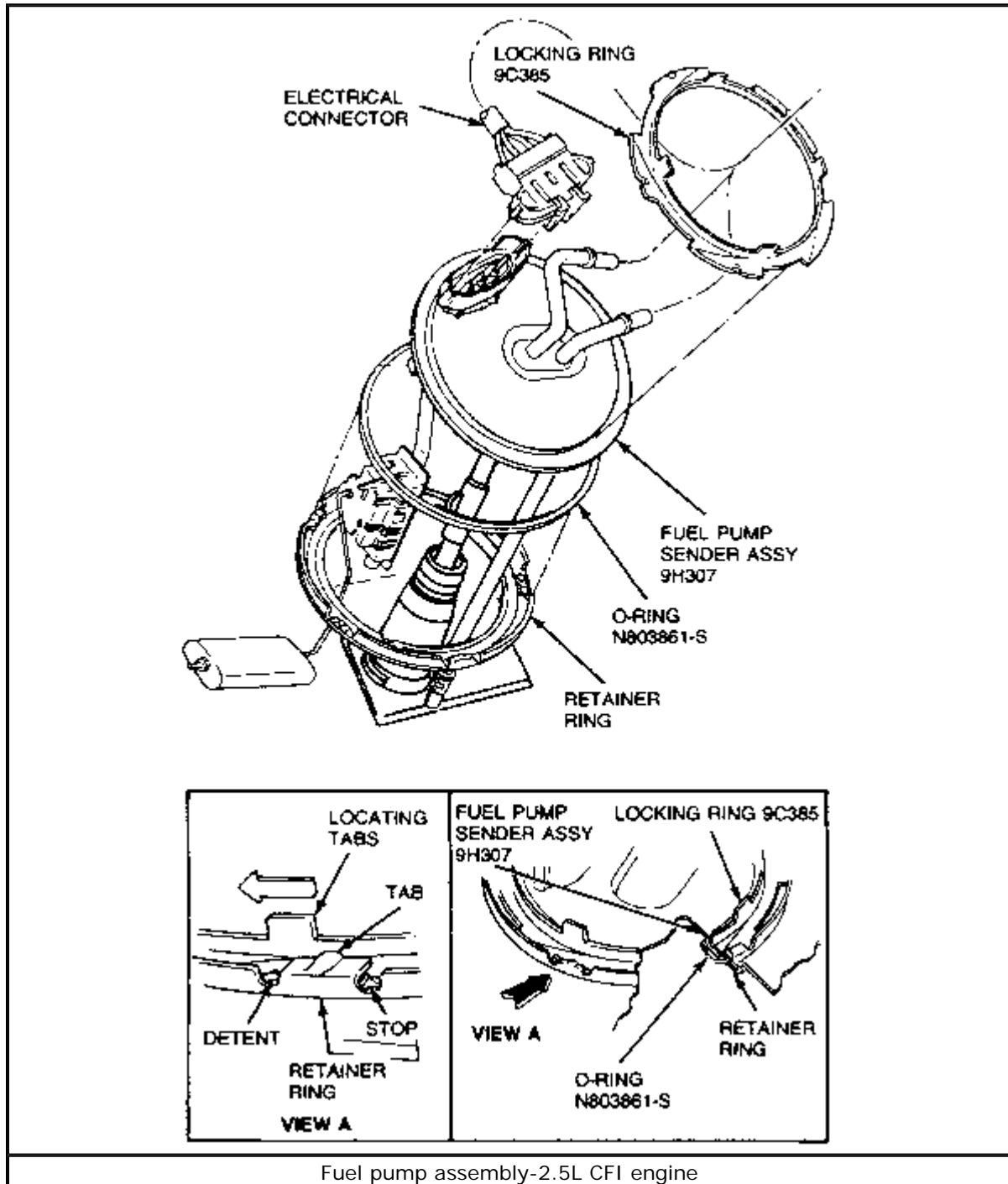
2. Crank the engine for 15 seconds.
3. Engage the electrical connector to the inertia switch located on the left side of the storage compartment.

## Electric Fuel Pump

### REMOVAL & INSTALLATION

1. Relieve the fuel system pressure. For details, please refer to the procedure located earlier in this section.
2. Disconnect the negative battery cable.
3. Remove the fuel from the fuel tank by pumping it out through the filler neck using Rotunda Fuel Storage Tanker 034-00002 and Adapter Hose 034-00011, or equivalent.

4. Raise and safely support the vehicle, then disconnect and remove the fuel filler tube.
5. Support the fuel tank, then remove the fuel tank support straps. Partially lower the fuel tank, then remove the fuel lines, electrical connectors and vent lines from the tank. Remove the fuel tank from the vehicle, then place it on a work bench. Remove any dirt around the fuel pump attaching flange, so it will not get into the fuel tank.
6. Using Fuel Tank Sender Wrench D84P-9275-A or equivalent, turn the fuel pump locking ring counterclockwise, then remove the lock ring.
7. Remove the fuel pump and bracket assembly from the fuel tank, then remove and discard the flange gasket.



[Click to enlarge](#)

**To install:**

8. Clean the fuel pump mounting flange, along with the fuel tank mounting surface and seal ring groove.
9. Put a light coating of grease on the new seal gasket to hold it in place during assembly, then install the gasket in the fuel ring groove.
10. Carefully install the fuel pump and sender assembly, making sure that the filter is not damaged. Make sure that the locating keys are in the keyways and that the seal ring stays in place.
11. Hold the assembly in place, then install the lock ring finger-tight, making sure all locking tabs are under the tank lock ring tabs.
12. Tighten the lock ring using Fuel Tank Sender Wrench D84P-9275-A, by turning it clockwise until the the ring is up against the stops.
13. Remove the fuel tank from the bench and support the tank while connecting the fuel lines, vent lines and electrical connectors to their proper locations.
14. Install the tank in the vehicle, then secure with the retaining straps. Carefully lower the vehicle.
15. Install the filler tube and tighten the retaining screws.
16. Fill the tank with at least 10 gallons of fuel, then check for leaks.
17. Connect the negative battery cable.
18. Connect a suitable fuel pressure gauge. Turn the ignition switch to the ON position 5-10 times, leaving it on for 3 seconds at a time, until the pressure gauge reads at least 30 psi (270 kPa). Check for leaks at the fittings.
19. Remove the pressure gauge, start the engine and recheck for leaks.

**TESTING**

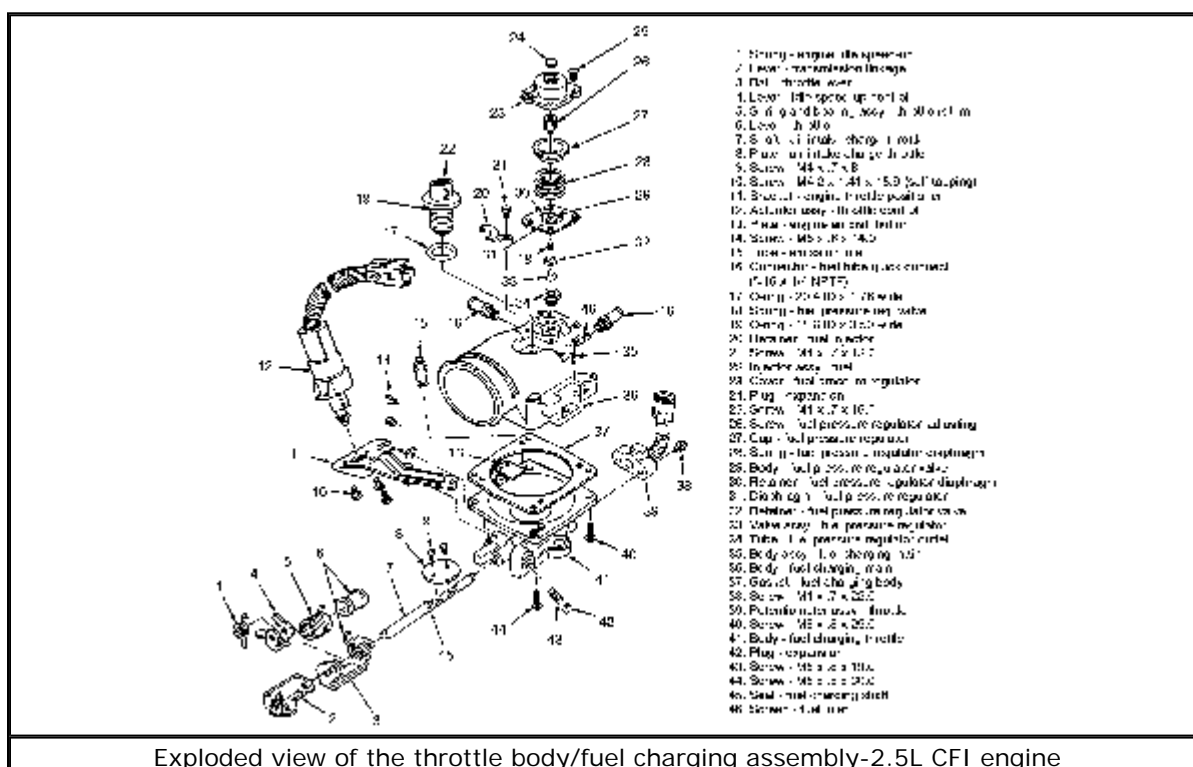
1. Ground the fuel pump lead of the self-test connector through a jumper wire at the FP lead.
2. Connect a suitable fuel pressure tester to the fuel pump outlet.
3. Turn the ignition key to the RUN position to operate the fuel pump.
4. Note the pressure reading. The fuel pressure should be 13-17 psi (90-117 kPa) for the CFI engine.

A safety inertia switch is installed to shut off the electric fuel pump in case of collision. The switch is located on the left-hand side (driver's side) of the car, behind the rearmost seat side trim panel, or inside the rear quarter shock tower access door. If the pump shuts off, or if the vehicle has been hit and will not start, check for leaks first, then reset the switch. The switch is reset by pushing down on the button provided.

**Throttle Body/Fuel Charging Assembly****REMOVAL & INSTALLATION**

1. Remove the air tube clamp at the fuel charging/throttle body assembly air inlet.
2. Disengage the electrical connector at the inertia switch located on the left-hand side of the luggage compartment.

3. Remove the fuel cap and release the fuel tank pressure. Release the fuel system pressure by disengaging the inertia switch electrical connector, then cranking the engine for 15 seconds.
4. Disconnect the negative battery cable.
5. Disconnect the throttle cable and transmission throttle valve lever.
6. Disengage the electrical connector at the idle speed control (ISC), the throttle position (TP) sensor and the fuel injector.
7. Disconnect the fuel inlet and outlet connections, and the PCV vacuum lines at the throttle body assembly.
8. Remove fuel charging assembly retaining nuts, then remove the fuel charging assembly/throttle body.
9. Remove the mounting gasket from the intake manifold. Always use a new gasket for installation.



Exploded view of the throttle body/fuel charging assembly-2.5L CFI engine

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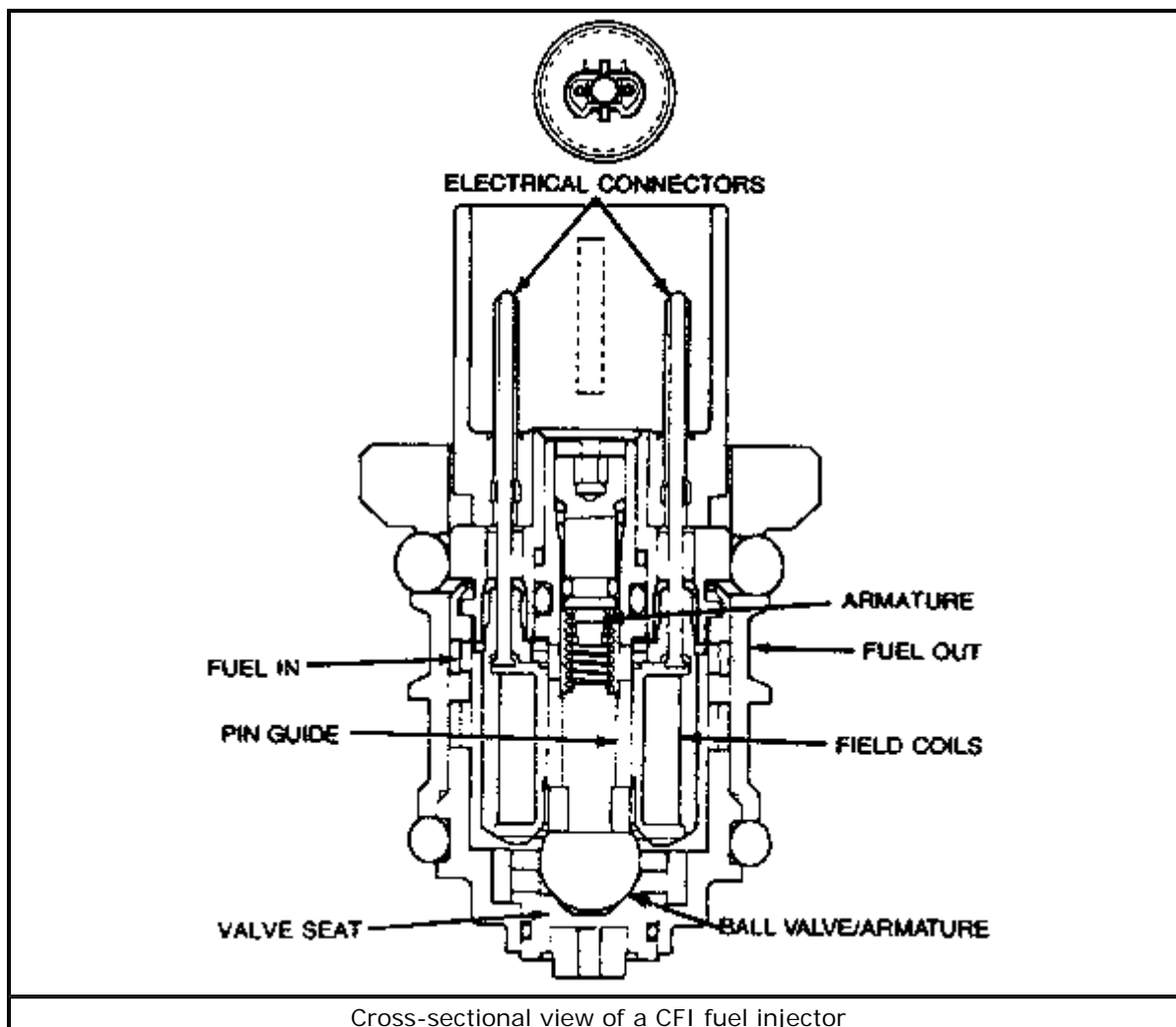
#### To install:

10. Clean the mounting surfaces, then position a new gasket on the intake manifold.
11. Position the throttle body/fuel charging assembly on the intake manifold, then secure with the two retaining nuts. Tighten the nuts to 15-25 ft. lbs. (20-34 Nm).
12. Engage the ISC, TP sensor and fuel injector electrical connectors.
13. Fasten the fuel inlet and outlet connections, then connect the PCV vacuum line at the throttle body/fuel charging assembly.
14. Connect the throttle cable and transaxle throttle valve lever.
15. Engage the electrical connector at the inertia switch. Install the air tube and clamp at the fuel charging assembly.
16. Connect the negative battery cable, then start the engine and check for leaks.

Adjust the engine idle speed if necessary. Refer to the Engine/Emission Control Decal for idle speed specifications.

## INJECTOR REPLACEMENT

1. Remove the fuel injector retaining screw and retainer.
2. Remove the injector and the lower O-ring. Discard the O-ring.



[Click to enlarge](#)

To install:

3. Lubricate a new lower O-ring and the injector seat area with clean engine oil. Do NOT use transmission oil!
4. Install the lower O-ring on the injector.
5. Lubricate the upper O-ring, then clean and lubricate the throttle body O-ring seat.
6. Install the injector by centering and applying a steady downward pressure with a slight rotational force.
7. Install the injector and the injector retaining screw. Tighten the retaining screw to 18-22 inch lbs. (2.0-2.5 Nm).

## TESTING

1. Disengage the electrical connector from inertia switch on the left-hand side of the luggage compartment.
2. Crank the engine for 15 seconds to reduce fuel system pressure.
3. Disconnect the fuel supply line at the throttle body using Spring Lock Coupling Adapter D85L-9974-C or equivalent.
4. Connect a fuel pressure gauge that is suitable for reading 0-60 psi (0-300 kPa) to the adapter.
5. Connect the inertia switch in the luggage compartment.
6. Start the engine and check for fuel system pressure, then accelerate the engine. The pressure should remain stable throughout acceleration.

## Fuel Pressure Regulator

### REMOVAL & INSTALLATION

1. Relieve the fuel system pressure. For details, please refer *Relieving Fuel System Pressure*.

The fuel pressure regulator cover is spring loaded. Apply downward pressure when removing it to avoid losing any of the components.

2. Remove the four fuel pressure regulator retaining screws.
3. Remove the cover assembly, cup, spring, and diaphragm assembly, then remove the regulator valve seat.

To install:

4. Install the fuel pressure regulator valve seat.
5. Install the fuel pressure regulator diaphragm assembly, spring and spring cover.
6. While applying downward pressure to the cover, install the four retaining screws, then tighten them to 27-35 inch lbs. (3.1-3.9 Nm).

## Pressure Relief Valve

### REMOVAL & INSTALLATION

1. If the fuel charging assembly is mounted to the engine, remove the fuel tank gas cap.
2. Properly release the fuel system pressure. For details, please refer to the procedure located earlier in this section.
3. Using the proper wrench, remove the pressure relief valve from the fuel injection manifold.

To install:

4. Install the pressure relief valve to the fuel injection manifold. Tighten the valve to 4-6 inch lbs. (0.5-0.7 Nm).
5. Install the fuel tank gas cap.

## Throttle Position (TP) Sensor



## REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. Disconnect the Throttle Position (TP) sensor from the wiring harness.
3. Scribe a reference mark across the edge of the sensor where it meets the throttle body to ensure correct position during installation.
4. Unfasten the retaining screws, then remove the TP sensor.

### To install:

5. Position the TP sensor according to the marks made during removal, then install the retaining screws. Tighten the the screws to 11-16 inch lbs. (1.2-1.8 Nm).
6. Connect the negative battery cable.

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