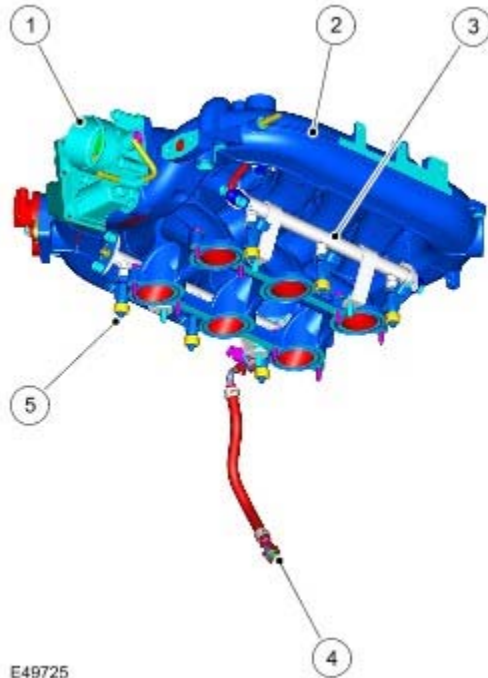


Fuel Charging and Controls

Component Locations



E49725

Item	Part Number	Description
1	-	Throttle body
2	-	Intake manifold
3	-	Fuel rail
4	-	Fuel jump hose
5	-	Fuel injectors (6 of)

GENERAL

The major components of the fuel charging and control system comprise an intake manifold, a fuel pump, a fuel rail and six injectors. The fuel pump supplies fuel from the tank at a constant pressure, via a pipe routed along the underside of the vehicle, to the fuel rail. The fuel rail distributes the fuel equally to each of the six injectors.

INTAKE MANIFOLD

The intake manifold is located on top of the engine. The manifold is manufactured from a composite material with metal insert fixings. The manifold comprises a central chamber with six tracts leading to the inlet ports on the engine. For additional information, refer to [Intake Air Distribution and Filtering](#) (303-12A Intake Air Distribution and Filtering - 4.0L)

FUEL PUMP

The submersible electric pump fuel pump and the fuel pressure regulator are located in the fuel tank. A pump module flange on top of the fuel tank allows access to the fuel pump for removal and installation.

The fuel pump, when running, outputs fuel at a constant pressure to the fuel rail. The pressure regulator controls the

pressure. Excess fuel from the pressure regulator is directed to the front jet pump. The controlled pressure provides more fuel to the fuel rail than the maximum requirement of the engine; therefore a constant pressure is maintained in the rail under all operating conditions. For additional information, refer to [Fuel Tank and Lines](#) (310-01A Fuel Tank and Lines - 4.0L)

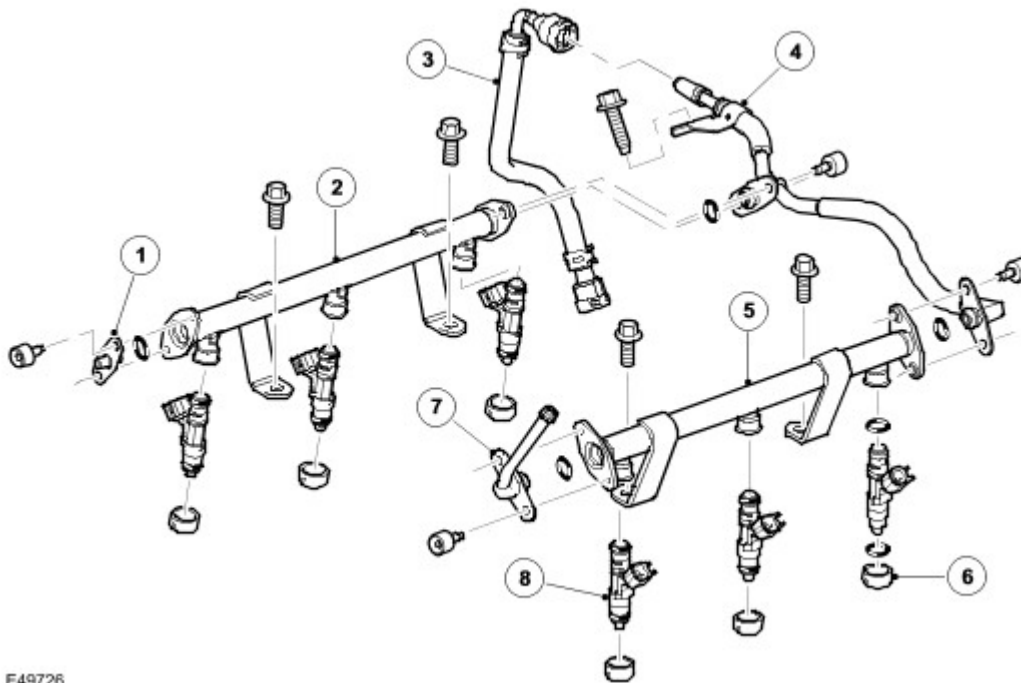
The fuel pump is controlled by the ECM via a fuel pump relay, which is located in the Battery Junction Box (BJB).

When the ignition is switched to position II, the ECM provides an earth path for the coil of the fuel pump relay on pin 95 of ECM connector C0634. The relay is energised for a short period to pressurise the fuel system. When the ECM senses that the engine is being cranked by receipt of a valid signal from the Crankshaft Position (CKP) sensor, the ECM energises the fuel pump relay for as long as the engine is running. For additional information, refer to [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - 4.0L)

THROTTLE BODY

The throttle body is located centrally at the front of the intake manifold. The engine torque is controlled by the electronic throttle body. An electronic pedal assembly determines throttle opening. The signal from the pedal assembly is sent to the EMS and the throttle is opened to the correct angle by means of an electric motor integrated into the throttle body. Sensors in the throttle body are used to determine the position of the throttle plate and the rate of change in its angle. For additional information, refer to [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - 4.0L)

FUEL RAIL



E49726

Item	Part Number	Description
1	-	Fuel pressure regulator
2	-	RH fuel rail
3	-	Fuel jump hose
4	-	Fuel supply pipe
5	-	LH fuel rail
6	-	Injector seat inserts
7	-	Schraeder valve

8	-	Injectors (6 of)
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Each fuel rail maintains a constant fuel pressure of 4.5bar (65 psi) and is attached to each cylinder head with two bolts. Three fuel injectors are installed in each cylinder head and connected to the fuel rail. 'O' ring seals are used to seal the injectors in both the fuel rails and cylinder heads. A quick release coupling connects the feed pipe from the fuel tank to the fuel rail via the fuel jump hose.

A flange with two threaded holes on the rear of the LH and RH fuel rails provide attachment for the fuel supply pipe. The fuel supply pipe has two metal-flanged ends, which locate on the fuel rail. A seal prevents leakage and each flange is secured with two bolts.

A fuel pressure regulator is attached to the front end of the RH fuel rail and a Schraeder valve is installed in the front end of the LH fuel rail to provide a pressure test connection for maintenance.

INJECTORS

Six injectors are held between the fuel rails and each cylinder head. The injectors are sealed to the fuel rail and cylinder head by 'O' ring seals, which should be renewed whenever an injector is refitted to an engine. A small amount of engine oil can be applied to the 'O' rings to aid installation. No other form of lubrication should be used. Each injector sits on an insert that also needs to be renewed each time an injector is replaced.

Each injector contains a solenoid-operated needle valve, which is closed while the solenoid winding is de-energised. The solenoid winding is connected to a power feed from the main relay and to an earth through the ECM. The ECM switches the earth to control the opening and closing of the needle valve. While the needle valve is open, fuel is sprayed into the cylinder inlet tract onto the back of the inlet valves. The ECM meters the amount of fuel injected by adjusting the time that the needle valve is open. For additional information, refer to [Electronic Engine Controls](#) (303-14A Electronic Engine Controls - 4.0L)