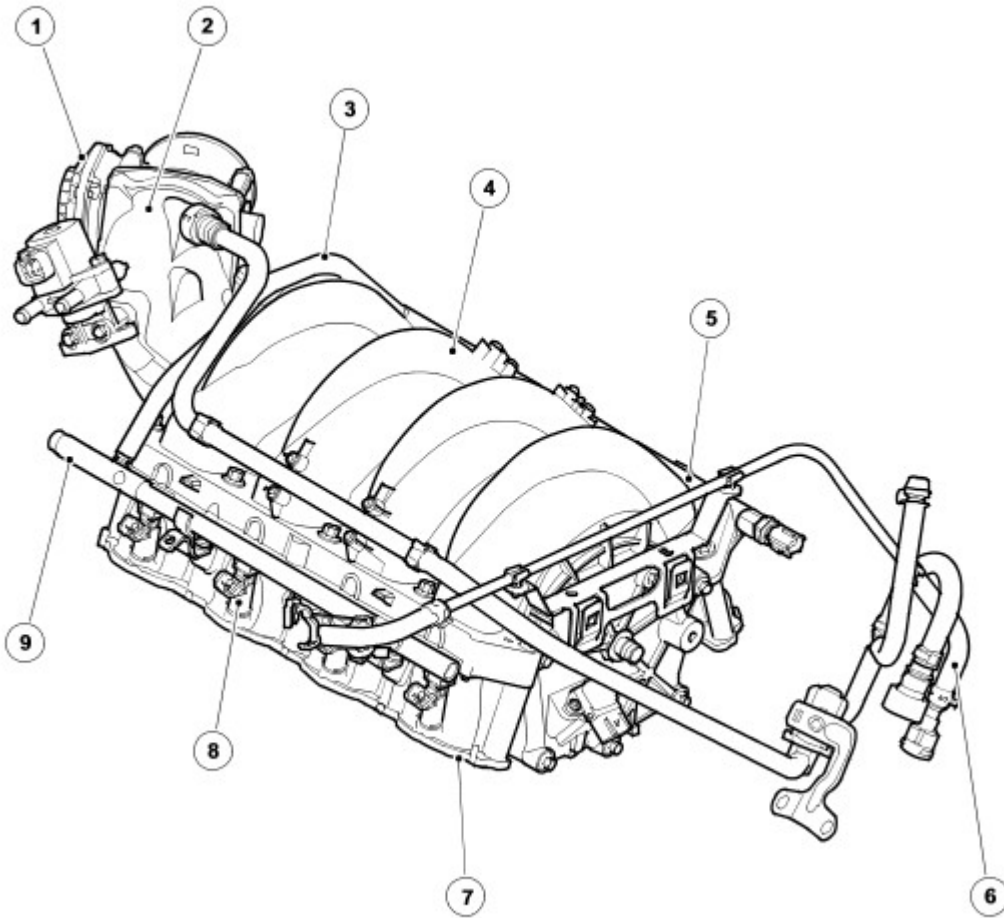


Fuel Charging and Controls

Component Location



E50214

Item	Part Number	Description
1	-	Electronic throttle body
2	-	Induction elbow
3	-	Fuel supply cross over pipe
4	-	Intake manifold
5	-	RH fuel rail
6	-	Fuel jump hose
7	-	Injector housing
8	-	Injectors (8 of)
9	-	LH fuel rail

GENERAL

The major components of the fuel charging and control system comprise an intake manifold, a fuel pump, a fuel rail and eight injectors. The fuel pump supplies fuel from the tank at a constant pressure, via a pipe routed along the side of the transmission, to the fuel rail. The fuel rail distributes the fuel equally to each of the eight injectors. The fuel injectors, which are controlled by the Engine Control Module (ECM), are installed in the fuel rails on each side of the intake manifold. A cross over pipe connects the two fuel rails together at the front of the manifold. A Schraeder valve provides a pressure test connection for maintenance.

INTAKE MANIFOLD

The intake manifold is located on top of the engine between the two cylinder banks and is manufactured from a composite material. The manifold comprises a central chamber with eight tracts leading to the inlet ports on the engine. The air intake manifold is secured to the cylinder heads via 10 bolts.

Rubber gaskets, located in channels in the intake manifold, seal the joints between the ducts and the cylinder heads. For additional information, refer to [Intake Air Distribution and Filtering](#) (303-12B Intake Air Distribution and Filtering - 4.4L)

FUEL PUMP

The submersible electric fuel pump is attached to a carrier and is located at the bottom of the swirl pot inside the fuel tank. The fuel pressure regulator, which controls the fuel pressure in the feed pipe to fuel rail, is located in the fuel manifold in the fuel tank. For additional information, refer to [Fuel Tank and Lines](#) (310-01B Fuel Tank and Lines - 4.4L)

THROTTLE BODY

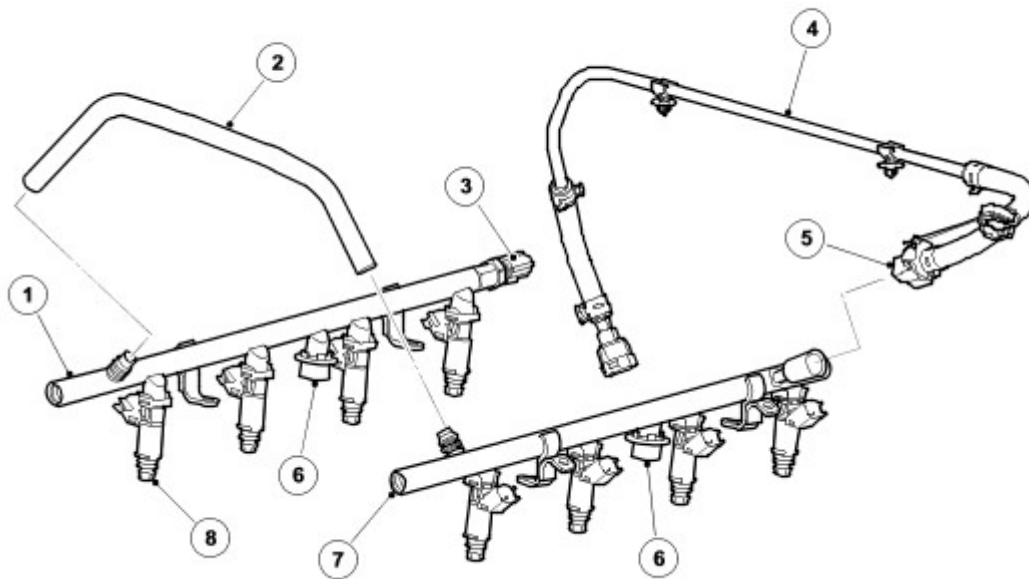
The electronic throttle body controls the engine torque and is located on the air intake manifold. It's main components are, an electronic throttle control valve, Accelerator Pedal Position (APP) sensor and the ECM.

The APP sensor determines the driver demand to control throttle opening. This value is received by the EMS and the throttle is then opened to the correct angle by means of an integral electric motor. 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](#) (303-14B Electronic Engine Controls - 4.4L)

Induction Elbow

The induction elbow provides the interface between the electronic throttle body and the intake manifold. Connections on the induction elbow provide vacuum take off's for various vehicle systems. A boss on the rear of the elbow accommodates the Exhaust Gas Recirculation (EGR) valve.

FUEL RAIL



E50216

Item	Part Number	Description
1	-	RH fuel rail
2	-	Fuel supply cross over pipe
3	-	Fuel temperature sensor
4	-	Fuel jump hose
5	-	Cooper fitting
6	-	Fuel pressure accumulators
7	-	LH fuel rail
8	-	Injectors (8 of)

Each fuel rail maintains a constant fuel pressure of 4.5bar (65 psi). Four fuel injectors are installed in each injector housing and are connected to the fuel rail. 'O' ring seals are used to seal the injectors in the fuel rails and inlet manifold. A 'Cooper' style fitting is used to connect the fuel jump hose to the LH fuel rail.

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

FUEL PRESSURE ACCUMULATOR

A fuel pressure accumulator is attached centrally to each of the fuel rails. The accumulators act as a damper to damp pulses from the pump and ensure that the fuel pressure in the rail and to the injectors is constant.

FUEL TEMPERATURE SENSOR

The fuel temperature sensor is located in the rear of the RH fuel rail. The sensor is an NTC sensor, which is connected to the ECM by two wires. For additional information, refer to [Electronic Engine Controls](#) (303-14B Electronic Engine Controls - 4.4L)

INJECTORS

Eight, top fed, eight hole, fuel injectors are installed in the fuel rails. Two 'O' rings seal each injector to the manifold interface and 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. The fuel jets from the injectors are directed onto the back of the intake valves.

The injectors are electromagnetic solenoid valves controlled by the ECM. 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 intake tract onto the back of the intake 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](#) (303-14B Electronic Engine Controls - 4.4L)