

2005 Dodge RAM 2500 PICKUP

Submodel: | Engine Type: L6 | Liters: 5.9

Fuel Delivery: FI | Fuel: DIESEL

DESCRIPTION - DIESEL FUEL SYSTEM

The fuel system used on the Cummins engine is an electronically controlled, Bosch HPCR (High-Pressure Common Rail) system. The HPCR system consists of five main components:

- Electric Fuel Transfer (lift) Pump Located in the Fuel Tank
- Fuel Pump/Gear Pump (attached to fuel injection pump)
- High-Pressure Fuel Injection Pump
- Fuel Injection Rail
- Fuel Injectors

Also to be considered as part of the overall fuel system are:

- Accelerator Pedal
- Air Cleaner Housing/Element
- Check Valve Banjo Fitting at Rear of Cylinder Head
- Fuel Connector Tubes
- Fuel Drain Manifold (passage)
- Fuel Drain Valve (at filter)
- Fuel Filter/Water Separator
- Fuel Heater
- Fuel Heater Relay
- Fuel Transfer Pump Relay
- Fuel Level (gauge) Sending Unit
- Fuel Pressure Limiting Valve
- Fuel Tank
- Fuel Tank Module (containing a fuel gauge sending unit, separate fuel filter located at bottom of tank module, and fuel transfer pump)
- Fuel Tank Filler/Vent Tube Assembly
- Fuel Tank Filler Tube Cap
- Fuel Tubes/Lines/Hoses
- High-Pressure Fuel Injector Lines
- In-Tank Fuel Filter (at bottom of fuel tank module)
- Low-Pressure Fuel Supply Lines
- Low-Pressure Fuel Return Line
- Overflow Valve
- Quick-Connect Fuel Line Fittings
- Accelerator Pedal Position Sensor (APPS) Located in Cab
- Water Draining (maintenance)
- Water-In-Fuel (WIF) Sensor

The fuel injection pump supplies high pressure to the fuel rail independent of engine speed. This high pressure fuel is then accumulated in the fuel rail. High pressure fuel is constantly supplied to the injectors by the fuel rail. The Engine Control Module (ECM) controls the fueling and timing of the engine by actuating the injectors.

Fuel enters the system from the electric fuel transfer (lift) pump, which is located inside of the fuel tank and attached to the fuel tank module (the fuel transfer pump is no longer attached to the engine). Fuel is forced through the fuel filter element and then enters the Fuel Pump/Gear Pump, which is attached to the rear of the fuel injection pump. The Fuel Pump/Gear Pump is a low-pressure pump and produce pressures ranging from 551.5 kpa (80 psi) to 1241 kpa (180) psi. Fuel then enters the fuel injection pump. Low pressure fuel is then supplied to the FCA (Fuel Control Actuator).

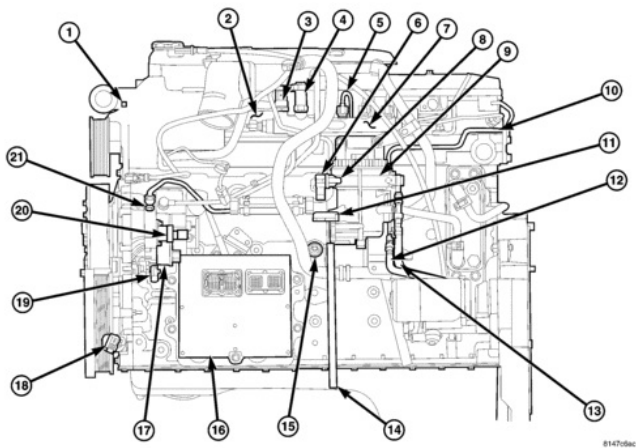
The FCA is an electronically controlled solenoid valve. The ECM controls the amount of fuel that enters the high-pressure pumping chambers by opening and closing the FCA based on a demanded fuel pressure. The FPS (Fuel Pressure Sensor) on the fuel rail monitors the actual fuel pressure and provides it as an input to the ECM. When the actuator is opened, the maximum amount of fuel is being supplied to the fuel injection pump. Any fuel that does not enter the injection pump is directed to the overflow valve. The overflow valve regulates how much excess fuel is used for lubrication of the pump and how much is returned to the tank through the drain manifold.

Fuel entering the injection pump is pressurized to between 300-1600 bar (4351-23,206 psi) by three radial pumping chambers. The pressurized fuel is then supplied to the fuel rail.

Warning:

HIGH-PRESSURE FUEL LINES DELIVER DIESEL FUEL UNDER EXTREME PRESSURE FROM THE INJECTION PUMP TO THE FUEL INJECTORS. THIS MAY BE AS HIGH AS 160,000 KPA (23,206 PSI) . USE EXTREME CAUTION WHEN INSPECTING FOR HIGH-PRESSURE FUEL LEAKS. INSPECT FOR HIGH-PRESSURE FUEL LEAKS WITH A SHEET OF CARDBOARD. HIGH FUEL INJECTION PRESSURE CAN CAUSE PERSONAL INJURY IF CONTACT IS MADE WITH THE SKIN.

Certain fuel system components can be found in .



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CUMMINS FUEL SYSTEM COMPONENTS

- | | |
|--|--|
| 1 - ENGINE COOLANT TEMPERATURE (ECT) SENSOR | 14 - FUEL DRAIN TUBE |
| 2 - INTAKE MANIFOLD AIR HEATER/ELEMENTS | 15 - OIL PRESSURE SWITCH |
| 3 - FUEL PRESSURE SENSOR | 16 - ENGINE CONTROL MODULE (ECM) |
| 4 - FUEL PRESSURE LIMITING VALVE | 17 - FUEL INJECTION PUMP |
| 5 - HIGH-PRESSURE FUEL LINES | 18 - CRANKSHAFT POSITION (ENGINE SPEED) SENSOR |
| 6 - FUEL HEATER | 19 - CAMSHAFT POSITION SENSOR (CMP) |
| 7 - HIGH-PRESSURE FUEL RAIL | 20 - FUEL CONTROL ACTUATOR (FCA) |
| 8 - FUEL HEATER TEMPERATURE SENSOR (THERMOSTAT) | 21 - CASCADE OVERFLOW VALVE |
| 9 - FUEL FILTER/WATER SEPARATOR | |
| 10 - FUEL DRAIN MANIFOLD (CYLINDER HEAD FUEL RETURNLINE) | |
| 11 - DRAIN VALVE | |
| 12 - FUEL RETURN LINE CONNECTION (TO FUEL TANK) | |
| 13 - FUEL SUPPLY LINE (LOW-PRESSURE, TO ENGINE) | |