

Fuel Systems

Overview

The fuel system supplies the fuel injectors with clean fuel at a controlled pressure. The PCM controls the fuel pump and monitors the fuel pump circuit. The PCM controls the fuel injector ON/OFF cycle duration and determines the correct timing and amount of fuel delivered. When a new fuel injector is installed it is necessary to reset the learned values contained in the keep alive memory (KAM) in the PCM. Refer to Section 2, [Resetting The Keep Alive Memory \(KAM\)](#).

The 2 types of fuel systems used are:

- electronic returnless fuel
- mechanical returnless fuel

Electronic Returnless Fuel System (ERFS)

The ERFS consists of a fuel tank with reservoir, the dual fuel pumps, the fuel rail pressure temperature (FRPT) sensor, the fuel filter, the fuel supply line, the fuel rail, and the fuel injectors. For additional information on the fuel system components, refer to Engine Control Components in this section. Operation of the system is as follows:

1. The fuel delivery system is enabled during ignition ON, engine OFF for 1 second (or until fuel rail pressure exceeds target) and during crank (if fuel rail pressure falls below target) or running mode once the PCM receives a crankshaft position (CKP) sensor signal. Commanded rail pressure is a function of fuel rail and engine coolant temperature, with different values commanded during crank vs. normal running.
2. The fuel pump logic is defined in the fuel system control strategy and executed by the PCM.
3. The PCM commands a duty cycle to the two fuel pump control modules.
4. The two fuel pump control modules modulate the voltage to the two fuel pumps (FP) required to achieve the correct fuel pressure. Voltage for the two fuel pumps is supplied by the power relay and fuel pump control module relay. For additional information, refer to Fuel Pump Control — ERFS and Fuel Pump Monitor (FPM) — ERFS in this section.
5. The FRPT sensor measures the pressure and temperature of the fuel in the fuel rail. The PCM uses this information to vary the duty cycle output to the 2 fuel pump control modules, which change the fuel pressure to compensate for varying loads and to avoid fuel system vaporization.
6. The fuel injector is a solenoid operated valve that meters the fuel flow to each combustion cylinder. The fuel injector is opened and closed a constant number of times per crankshaft revolution. The amount of fuel is controlled by the length of time the fuel injector is held open. The fuel injector is normally closed, and is operated by a 12 volt source from either the PCM power relay or the fuel pump relay. The ground signal is controlled by the PCM.
7. There are 3 filtering or screening devices in the fuel delivery system. The intake filters are fine, nylon mesh screens mounted on the intake side of the 2 fuel pumps. There is a fuel filter screen located at the fuel rail side of the fuel injector. The fuel filter assembly is located between the 2 fuel pumps and the fuel rail.
8. The FP assembly is a device that contains the 2 fuel pumps and the fuel sender assembly. The 2 fuel pumps are located inside the reservoir and supply fuel through the fuel pump assembly manifold to the engine and the fuel pump assembly jet pump.

