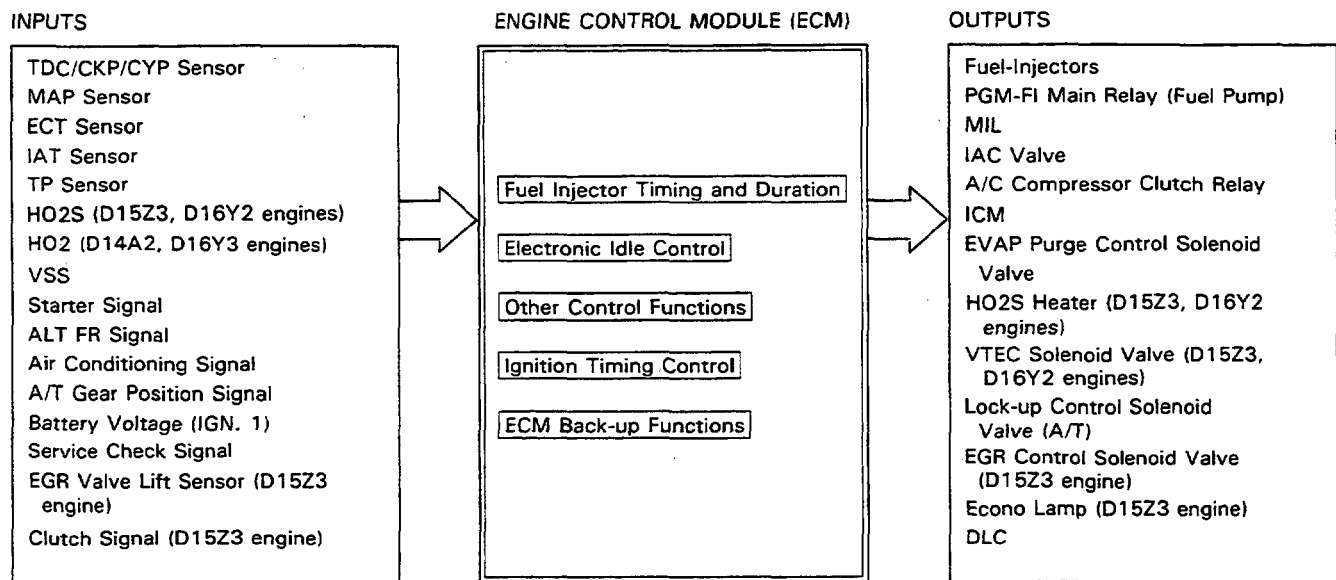


PGM-FI System

System Description



PGM-FI System

The PGM-FI system on this model is a sequential multiport fuel injection system.

Fuel Injector Timing and Duration

The ECM contains memories for the basic discharge durations at various engine speeds and manifold pressures. The basic discharge duration, after being read out from the memory, is further modified by signals sent from various sensors to obtain the final discharge duration.

Idle Air Control

Idle Air Control Valve (IAC Valve)

When the engine is cold, the A/C compressor is on, the transmission is in gear (A/T only) or the alternator is charging, the ECM controls current to the IAC Valve to maintain correct idle speed.

Ignition Timing Control

- The ECM contains memories for basic ignition timing at various engine speeds and manifold pressures. Ignition timing is also adjusted for engine coolant temperature.

Other Control Functions

1. Starting Control

When the engine is started, the ECM provides a rich mixture by increasing fuel injector duration.

2. Fuel Pump Control

- When the ignition switch is initially turned on, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump for two seconds to pressurize the fuel system.
- When the engine is running, the ECM supplies ground to the PGM-FI main relay that supplies current to the fuel pump.
- When the engine is not running and the ignition is on, the ECM cuts ground to the PGM-FI main relay which cuts current to the fuel pump.



3. Fuel Cut-off Control

- During deceleration with the throttle valve closed, current to the fuel injectors is cut off to improve fuel economy at speeds over 1,000 rpm (min^{-1}).
- Fuel cut-off action also takes place when engine speed exceeds following rpm, regardless of the position of the throttle valve, to protect the engine from over-revving.
 - D14A2 engine: 7,250 rpm (min^{-1})
 - D15Z3 engine: 6,300 rpm (min^{-1})
 - D16Y2 engine: 7,300 rpm (min^{-1})
 - D16Y3 engine: 7,250 rpm (min^{-1})

4. A/C Compressor Clutch Relay

When the ECM receives a demand for cooling from the air conditioning system, it delays the compressor from being energized, and enriches the mixture to assure smooth transition to the A/C mode.

5. Evaporative Emission (EVAP) Purge Control

When the engine coolant temperature is below 75°C (167°F), the ECM supplies a ground to the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control diaphragm valve.

6. Exhaust Gas Recirculation (EGR) Control (D15Z3 engine)

When the EGR is required for control of oxides of nitrogen (NO_x) emissions, the ECM supplies ground to the EGR control solenoid valve which supplies regulated vacuum to EGR valve.

7. Lean Fuel/Air Mixture Control (D15Z3 engine)

To achieve low fuel consumption and high output, a variable valve timing and lift mechanism and the lean-burn method have been adopted.

ECM Fail-safe/Back-up Functions

1. Fail-safe Function

When an abnormality occurs in a signal from a sensor, the ECM ignores that signal and assumes a pre-programmed value for that sensor that allows the engine to continue to run.

2. Back-up Function

When an abnormality occurs in the ECM itself, the fuel injectors are controlled by a back-up circuit independent of the system in order to permit minimal driving.

3. Self-diagnosis Function [Malfunction Indicator Lamp (MIL)]

When an abnormality occurs in a signal from a sensor, the ECM supplies ground for the MIL and stores the code in erasable memory. When the ignition is initially turned on, the ECM supplies ground for the MIL for two seconds to check the MIL bulb condition.

4. Two Trip Detection Method

To prevent false indications, the Two Trip Detection Method is used for the HO_2S and EGR self-diagnostic functions. When an abnormality occurs, the ECM stores it in its memory. When the same abnormality recurs after the ignition switch is turned OFF and ON again, the ECM informs the driver by lighting the MIL.

However, to ease troubleshooting, this function is cancelled when you short the service check connector. The MIL will then blink immediately when an abnormality occurs.