

PGM-FI System

System Description



INPUTS

Front Primary HO2S
Rear Primary HO2S
Front Secondary HO2S
Rear Secondary HO2S
MAP Sensor
CKP/CYP Sensor
ECT Sensor
TP Sensor
AP Sensor
IAT Sensor
VSS
Front KS
Rear KS
EGR Valve Lift Sensor
A/TFI Signals
TCS Signals
Spark Plug Voltage
Detection Module Signal
Starter Signal
Brake Switch Signal
ALT FR Signal
Air Conditioning Signal
A/T Gear Position Switch Signal
Neutral Switch Signal (M/T)
Clutch Switch Signal (M/T)
VTEC Pressure Switch
Battery Voltage (IGN. 1)
Fuel Tank Pressure Sensor
Cruise Control Main Switch Signal
Set Switch Signal
Resume Switch Signal

ENGINE CONTROL MODULE (ECM)

Fuel Injector Timing and Duration

Throttle Valve Control

Cruise Control

Other Control Functions

Ignition Timing Control

ECM Back-up Functions

OUTPUTS

Fuel Injectors
PGM-FI Main Relay (Fuel Pump)
Malfunction Indicator Lamp
Throttle Valve Control Motor
A/C Compressor Clutch Relay
ICM
EVAP Purge Control Solenoid Valve
EVAP Bypass Solenoid Valve
EVAP Control Canister
Vent Shut Valve
Fuel Pump Relay
EGR Control Solenoid Valve
IAB Control Solenoid Valve
VTEC Solenoid Valves
Front Primary HO2S Heater
Rear Primary HO2S Heater
Front Secondary HO2S Heater
Rear Secondary HO2S Heater
Cruise Control Indicator Light
Reverse Lockout Relay
DLC

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.

Throttle Valve Control

The ECM controls the throttle valve control motor based on accelerator pedal position, TCS control unit signals, and various other signals. The ECM also controls the idle control function, cruise control function, and other functions with the throttle valve control.

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.
- A knock control system is also used. When detonation is detected by the knock sensor (KS), the ignition timing is retarded.

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 (II), 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.
 - Excellent engine performance is achieved through the use of VTEC (Variable Valve Timing and Valve Lift Electronic Control System), intake air bypass control and discharge volume control of the fuel pump.

(cont'd)

PGM-FI System

System Description (cont'd)

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 1,500 rpm.
 - Fuel cut-off action also takes place when engine speed exceeds 8,300 rpm, regardless of the position of the throttle valve, to protect the engine from over-revving.
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 translation to the A/C mode.
5. Evaporative Emission (EVAP) Purge Control Solenoid Valve

When the engine coolant temperature is below 153°F (67°C), the ECM controls the EVAP purge control solenoid valve which cuts vacuum to the EVAP purge control canister diaphragm.
6. Intake Air Bypass (IAB) Control Solenoid Valve

When the engine speed is below 4,800 rpm, the IAB control solenoid valve is activated by a signal from the ECM. Intake air then flows through the smaller chamber, and high torque is delivered. To increase air flow at engine speeds higher than 4,800 rpm, the solenoid valve is deactivated by the ECM, and the intake air flows through the larger chamber.
7. Exhaust Gas Recirculation (EGR) Control Solenoid Valve

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

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 lights the MIL and stores the diagnostic trouble 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 H02S, fuel metering-related, idle control system, ECT sensor, EGR system self-diagnostic functions and EVAP control system. 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 (II) 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.
5. Two (or three) Driving Cycle Detection Method

A "Driving Cycle" consists of starting the engine, beginning closed loop operation, and stopping the engine. If misfiring that increases emissions or EVAP control system malfunction is detected during two consecutive driving cycles, or TWC deterioration is detected during three consecutive driving cycles, the ECM turns the MIL on.

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.