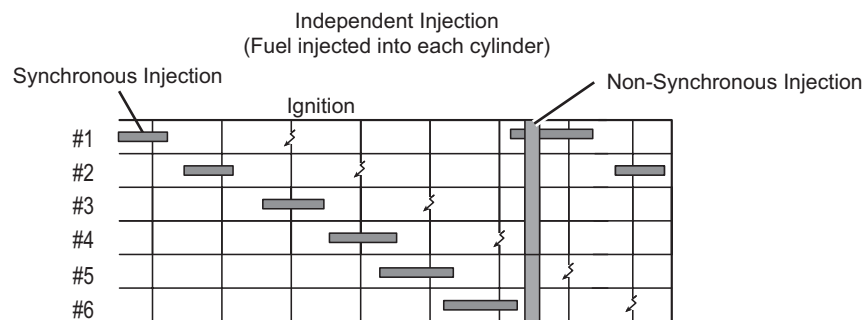


Name	Function and Construction
Heated Oxygen Sensor Heater	Heats the heated oxygen sensor to promote feedback control when the engine is cold.
Igniter	Turns the current to the ignition coil ON/OFF at an optimal timing.
Electronically Controlled Throttle Motor	Controls the position of the throttle valve in accordance with driving conditions.
Intake Camshaft Timing OCV	Controls the intake VVT-i at an optimal valve timing.
Exhaust Camshaft Timing OCV	Controls the exhaust VVT-i at an optimal valve timing.
Rotary Solenoid for ACIS	Opens and closes the ACIS valve in accordance with driving conditions.
Evaporative Purging VSV	Regulates the purge volume of the canister.

EFI (Electronic Fuel Injection) System

- An L-type EFI system directly detects the intake air mass with a hot wire type air flow meter.
- An independent injection system (in which fuel is injected once into each cylinder for each two revolutions of the crankshaft) has been adopted.
- There are two types of fuel injection: One is synchronous injection in which corrections based on the signals from the sensors are added to the basic injection time so that injection occurs always at the same position. The other is non-synchronous injection in which injection is effected by detecting the requests from the signals of the sensors regardless of the crankshaft angle. Furthermore, to protect the engine and improve fuel economy, the system effects fuel cutoff in which the injection of fuel is stopped temporarily in accordance with the driving conditions.



Synchronous Injection

- The synchronous injection time can be expressed by the formula given below. During the starting of the engine, the injection time is determined in accordance with the engine speed, battery voltage, and the water temperature. To prevent excessive amounts of fuel from being injected during starting, the injection volume is regulated in accordance with the cranking time.

Synchronous Injection = A. Basic Injection Time + B. Correction Injection Time + C. Ineffective Injection Coefficient

A. Basic Injection Time	It is the basic injection time that is determined by the intake air volume and the engine speed.
B. Correction Injection	It is a coefficient that is used to achieve the air-fuel mixture that is appropriate for the engine condition at that time, in accordance with the signals from the sensors.
B-1 Intake Temperature Correction	Enriches the mixture when the intake air temperature is low because the air density is high.
B-2 Post-Warm-Up Enrichment Correction	Enriches the mixture when the water temperature is low to ensure drivability during cold operation.
B-3 Post-Start Enrichment Correction	Enriches the mixture after the engine is started in accordance with the water temperature and the engine speed in order to ensure a stable engine operation after starting. The enrichment is at the highest ratio immediately after the engine is started, and decreases gradually thereafter.
B-4 Transient Air-Fuel Ratio Correction	Enriches or leans the mixture in accordance with the acceleration or deceleration conditions determined by the changes in the intake air volume.
B-5 Wall Adhesion Correction	Correction is made by calculating the adhesion of fuel to the wall surface based on the water temperature, engine speed, and throttle valve opening.
B-6 High-Load Enrichment Correction	Prevents the exhaust temperature from rising by detecting the high-load driving conditions in accordance with the signals from the sensors and enriching the mixture.
B-7 Constant Fuel Pressure Control	Corrects the deviation of the fuel injection volume that results from the changes in the intake manifold pressure to achieve a constant pressure.
B-8 Air-Fuel Ratio Feedback Control	Controls the air-fuel ratio to a narrow range near the stoichiometric ratio (in which the cleaning performance of the three-way catalyst is at the highest level) by making corrections based on the signals from the heated oxygen sensor.
C. Ineffective Injection	Corrects the operation lag of the injectors.

Non-Synchronous Injection

- Apart from the normal (synchronous) fuel injection, this function simultaneously injects a prescribed volume of fuel to all the cylinders only immediately after the signals from the sensors are input, in order to ensure the proper startability and acceleration response.
- During synchronous injection, the injection time is extended for the amount of non-synchronous injection.

The following are the three types of non-synchronous injection

Starting Non-Synchronous Injection	Effects non-synchronous injection immediately after the starter signal is input, thus improving startability.
Acceleration Non-Synchronous Injection	Effects non-synchronous injection when the increased amount of the throttle valve opening is greater than the preset value, to improve response during acceleration.
Engine Speed Drop Non-Synchronous Injection	Effects non-synchronous injection when the engine speed drops suddenly during a fuel cutoff or when resuming from a fuel cutoff, thus ensuring the proper drivability.

Fuel Cut

- Temporarily stops the injection of fuel to protect the engine and improve fuel economy.

The following are the three types of fuel cutoff

Deceleration Fuel Cutoff	Stops the injection of fuel when the engine speed is higher than the specified value during deceleration (throttle OFF detected by engine ECU). This prevents the TWC (Three-Way Catalyst) from overheating due to misfiring and improves fuel economy. The fuel cutoff and resumption speeds are higher when the coolant temperature is low.
Engine Speed Fuel Cutoff	Stops the injection of fuel when the engine speed is higher than the specified value to prevent over-revolution.
N → D Shift Fuel Cutoff	Stops the injection of fuel for a prescribed length of time when shifting from N→ D, if the engine speed is higher than the specified value to reduce shift shock.

Fuel Cut Resumption Speed During Deceleration

While lockup control is operating [rpm]	1000
While lockup control is not operating [rpm]	1200

Fuel Cut Speed During High-Speed Operation

Engine Speed [rpm]	6500
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