■ENGINE CONTROL SYSTEM

1. General

The engine control system of the 1NZ-FXE engine on the '04 Prius has following system.

System	Outline	'04	'03
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
ETCS-i (Electronic Throttle Control System-intelligent)	The ECM optimally controls the throttle valve opening in accordance with the engine conditions and the ETCS-i control request received from the HV ECU.	○	○
VVT-i (Variable Valve Timing-intelligent)	Controls the intake camshaft to an optimal valve timing in accordance with the engine conditions and the control request received from the HV ECU.	○	○
	The maximum retard closing timing of the intake valve has been changed from 115° to 105° ABDC (After Bottom-Dead-Center). As a result, the cold-starting performance of the engine has been improved.	○	—
Coolant Heat Storage System (See page EG-22)	The ECM actuates a electric water pump in the coolant heat storage system to recover the coolant heated by the engine, store the hot coolant in the coolant heat storage tank, and supply it to the engine before starting a cold engine. This optimizes the combustion performance of the engine during cold-starting and reduces HC exhaust emissions.	○	—
Air Fuel Ratio Sensor, Oxygen Sensor Heater Control	Maintains the temperature of the air fuel ratio sensor or oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Fuel Pump Control	• Fuel pump operation is controlled by signal from the ECM. • A fuel cut control is adopted to stop the fuel pump when the airbag is deployed during front or side collision.	○	○
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	—	○
Cooling Fan Control	The ECM steplessly controls the speed of the fans in accordance with the engine coolant temperature, vehicle speed, engine speed, and air conditioning operating conditions. As a result, the cooling performance has been improved.	○	○
Evaporative Emission Control	The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions.	○	○
TOYOTA HCAC System	The ECM controls the VSV (for TOYOTA HCAC System) to improve the clean emission performance of the exhaust gas when the temperature of the TWC is low.	—	○
HV Immobiliser	Prohibits fuel delivery, ignition, and starting the hybrid system if an attempt is made to start the hybrid system with an invalid card key (ignition key).	○	○
Diagnosis (See page EG-32)	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	All the DTCs (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes.	○	—
Fail-Safe (See page EG-32)	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	○