

5. Engine Control System

General

The engine control system for the 1NZ-FE and 2NZ-FE engines in the new model and previous model are compared below.

System	Outline	Model	
		New	Previous
EFI (Electronic Multiport Fuel Injection)	<ul style="list-style-type: none"> An L-type EFI system detects the intake air volume with a hot-wire type air flow meter. The fuel injection system is a sequential multiport fuel injection system. 	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the Engine ECU based on signals from various sensors. The Engine ECU corrects ignition timing in response to engine knocking.	○	○
ISC (Idle Speed Control)	A rotary solenoid type ISC valve controls the fast idle and idle speeds.	○	○
VVT-i (Variable Valve Timing-intelligent)	Controls the intake camshaft to optimal valve timing in accordance with the engine condition.	○	○
Fuel Pump Control	Fuel pump operation is controlled by signals from the Engine ECU.	○	○
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensors at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Evaporative Emission Control	The Engine ECU controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.	○	○
Air Conditioner Cut-off Control*	By turning the air conditioner compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Cooling Fan Control	Cooling fan operation is controlled by signals from the Engine ECU based on the water temperature sensor signal and the condition of the air conditioner operation.	○	—
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.	○	○
Diagnosis	When the Engine ECU detects a malfunction, the Engine ECU diagnoses and memorizes the failed section.	○	○
Fail-Safe	When the Engine ECU detects a malfunction, the Engine ECU stops or controls the engine according to the data already stored in memory.	○	○

*: with Air Conditioner Models

Main Component of Engine Control System

1) General

The main components for the 1NZ-FE and 2NZ-FE engines on the new and Previous models are compared below:

Engine	1NZ-FE and 2NZ-FE	
Model	New	Previous
Engine ECU	32-bit	16-bit
Air Flow Meter	Hot-wire Type	←
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36 – 2)	←
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (3)	←
Throttle Position Sensor	Linear Type	←
Knock Sensor	Built-in Piezoelectric Element Type	←
Oxygen Sensor (Bank 1, Sensor 1 and 2)	with Heater	←
Injector	12-Hole Type	←
ISC Valve	Rotary Solenoid Type (1-coil Type)	←

2) Engine ECU

The 32-bit CPU of the Engine ECU has been changed from the 16-bit CPU of the Engine ECU to increase the speed for processing the signals.

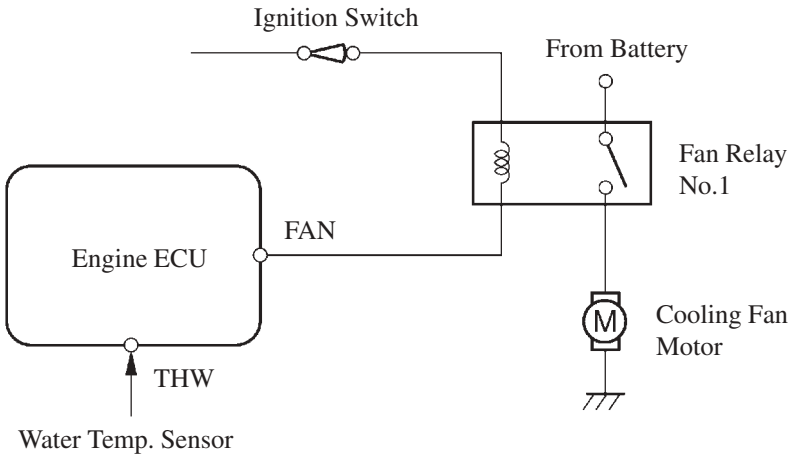
Service Tip

The length of time to clear the DTC via the battery terminal has been changed from 10 seconds to 1 minute.

Cooling Fan Control

- On the models without an air conditioner, the Engine ECU controls the operation of the cooling fan based on the water temp. sensor signal.

► Wiring Diagram ◀

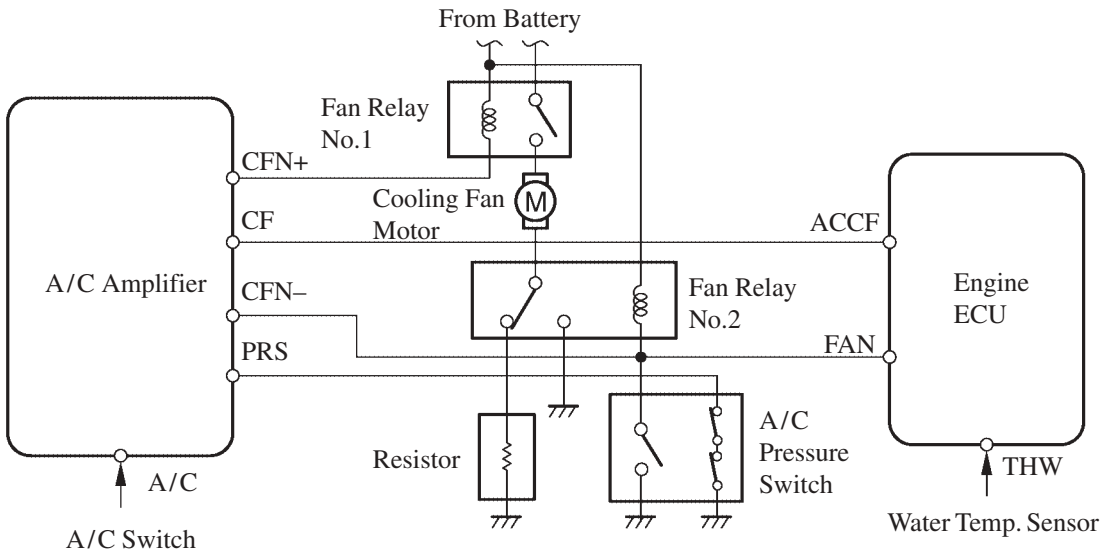


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Cooling Fan Operation		OFF	ON
Water Temp.	°C (°F)	94.5 (202.1) or lower	96 (204.8) or higher

- On the models with an air conditioner, the Engine ECU controls the operation of the cooling fan in two speeds (Lo and Hi) based on the water temp. sensor signal and the A/C pressure switch signal. The Lo speed operation is accomplished by applying the current through a resistor, which reduces the speed of the cooling fan.

► Wiring Diagram ◀



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► Cooling Fan Operation ◀

Air Conditioning Condition		Water Temp. °C (°F)	
Compressor	Refrigerant Pressure MPa (kgf/cm ² , PSI)	94.5 (202.1) or lower	96 (204.8) or higher
OFF	1.2 (12.5, 178) or lower	OFF	High
ON	1.2 (12.5, 178) or lower	Low	High
	1.5 (15.5, 220) or higher	High	High