

■ 1GR-FE ENGINE

Engine Control System

Main Components of Engine Control System

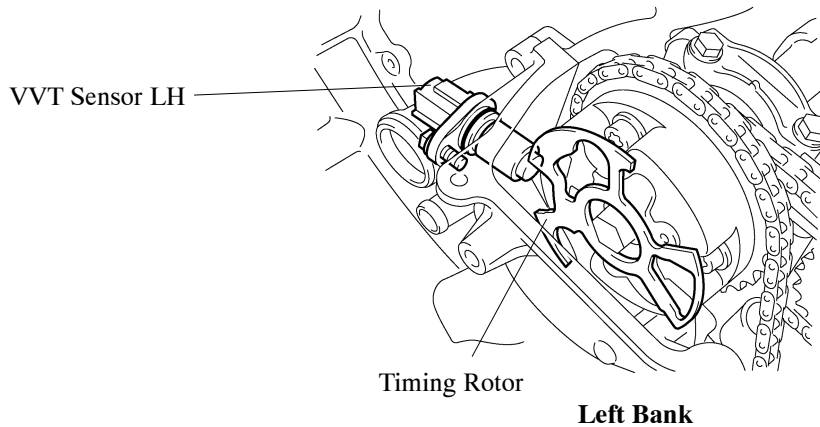
1) General

On the new Land Cruiser/ Land Cruiser Prado, the VVT sensor has been changed from the pick-up coil type of the previous Land Cruiser/ Land Cruiser Prado to an MRE (Magnetic Resistance Element) type.

2) VVT Sensor

a. General

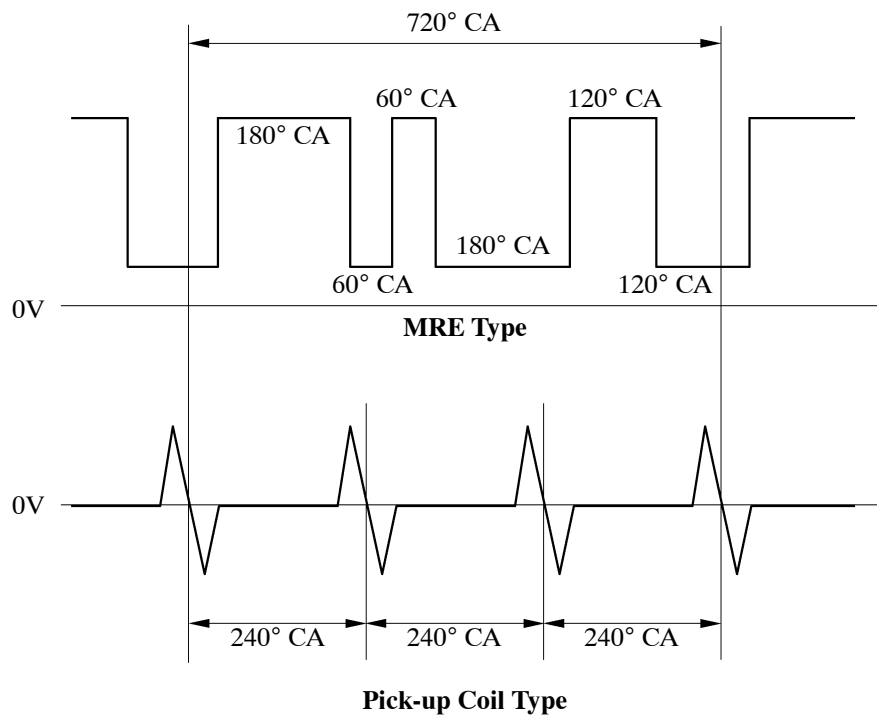
The VVT sensors have been changed from pick-up coil type to MRE type. To detect the camshaft position, a timing rotor that is secured to the camshaft in front of the VVT controller is used to generate 6 (3 Hi Output, 3 Lo Output) pulses for every 2 revolutions of the crankshaft.



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► Sensor Output Waveforms ◀



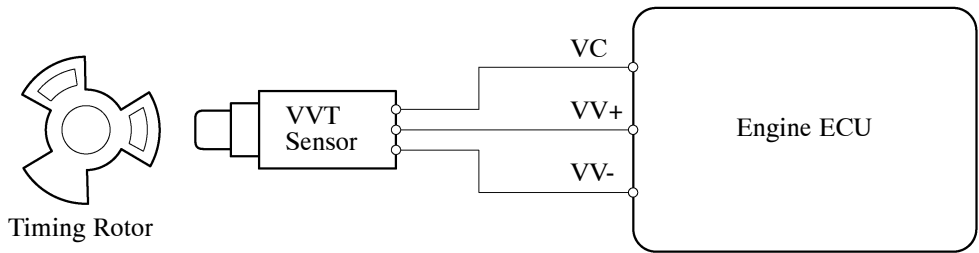
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b. MRE Type VVT Sensor

- The MRE type VVT sensor consists of an MRE, a magnet and a sensor. The direction of the magnetic field changes due to the different shapes (protruded and non-protruded portions) of the timing rotor, which passes by the sensor. As a result, the resistance of the MRE changes, and the output voltage to the engine ECU changes to Hi or Lo. The engine ECU detects the camshaft position based on this output voltage.
- The differences between the MRE type VVT sensor and the pickup coil type VVT sensor used on the conventional model are as follows.

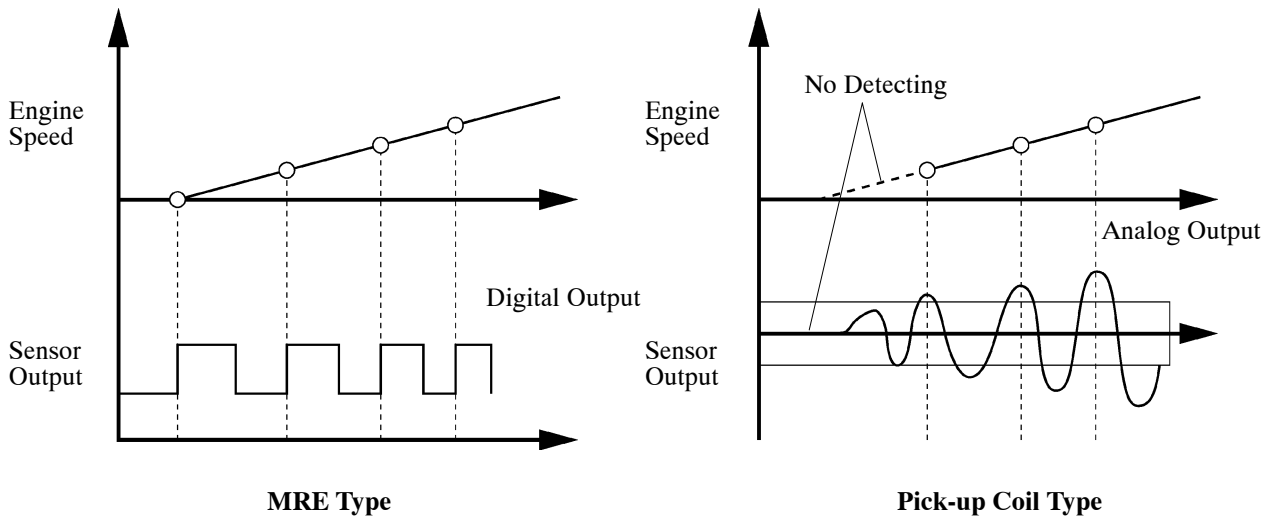
Item	Sensor Type	
	MRE	Pick-up Coil
Signal Output	Constant digital output starts from low engine speeds	Analog output changes with the engine speed
Camshaft Position Detection	Detection based on the waveforms output throughout the timing rotor speed range	Detection based on the waveforms output as the protruded portion of the timing rotor passes

► Wiring Diagram ◀



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► Output Waveform Image Comparison Between MRE Type and Pick-up Coil Type ◀



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