■ MAIN COMPONENTS OF ENGINE CONTROL SYSTEM

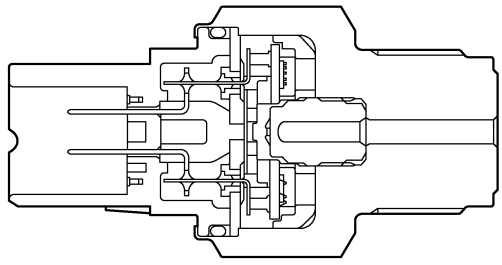
1. General

- The following table compares the main components.
- The control voltage for each component of the engine control system, including the ECM, has been set to 12 V.

Component	Outline
Intake Air Temperature Sensor	Detects the intake air temperature in the intake manifold.
Engine Coolant Temperature Sensor	Detects the water temperature.
Fuel Pressure Sensor	Detects the fuel pressure in the common-rail assembly.
Fuel Temperature Sensor	Detects the fuel temperature in the injection or supply pump assembly.
Turbo Pressure Sensor	Detects the intake air pressure in the intake manifold.
Crankshaft Position Sensor	Detects the engine speed from the crankshaft position.
Camshaft Position Sensor	Identifies the cylinder from the rotation of the rotor.
Intake Mass Air Flow Meter Sub-assembly (Atmospheric Temperature Sensor)	Use a hot wire to detect the intake air flow mass.
Starter Signal	Detects the starter voltage signal at the time the engine is started.
Vehicle Speed Sensor	Detects the vehicle speed.
Throttle Position Sensor	Detects the opening angle of the throttle valve.
Accelerator Pedal Position Sensor	Mounted on the accelerator pedal. Detects the position of the accelerator pedal.
Injector Assembly	Precisely injects fuel.
Suction Control Valve	Controls the volume of fuel to be supplied to the common-rail assembly.
Exhaust Brake Solenoid with Bracket Assembly	Opens and closes the exhaust retarder assembly.
Throttle Control Motor	Uses a step motor to restrict the intake passage.
EDU	Controls the volume of fuel injected by the injectors.

2. Fuel Pressure Sensor

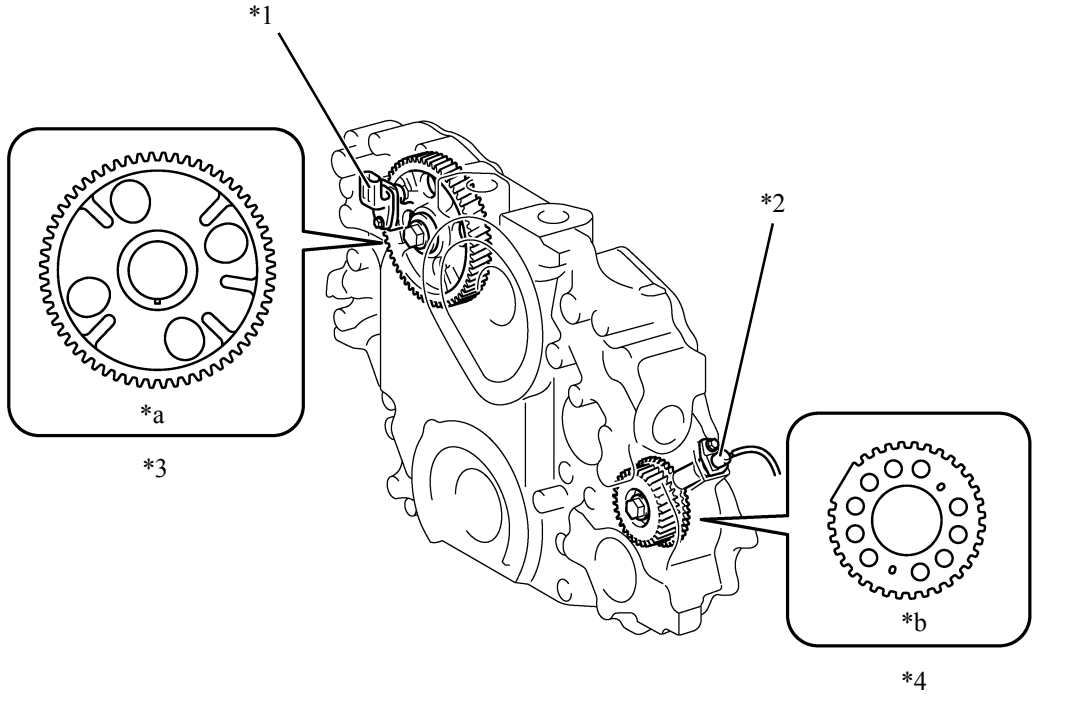
The fuel pressure sensor, which is mounted on the common-rail assembly, outputs a signal that represents the fuel pressure in the common-rail assembly to the ECM in order to constantly regulate the fuel at an optimal pressure.



0478EG13D

3. Crankshaft Position Sensor and Camshaft Position Sensor

A crankshaft position sensor is mounted on the crankshaft position sensor plate and a camshaft position sensor is mounted on the camshaft drive gear in order to detect the engine speed and identify the cylinders, respectively.



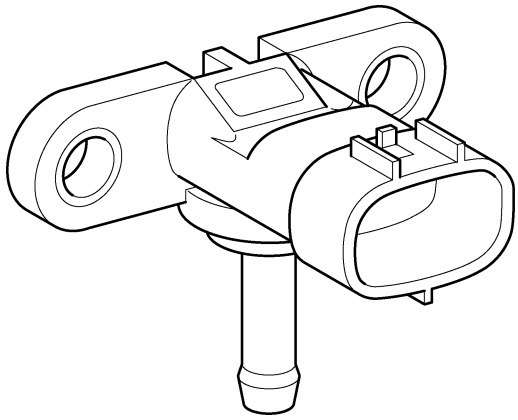
D014EG36

Text in Illustration

*1	Camshaft Position Sensor	*2	Crankshaft Position Sensor
*3	Camshaft Drive Gear	*4	Crankshaft Position Sensor Plate
*a	5 pulse/720°CA	*b	34 (36-2) pulse/360°CA

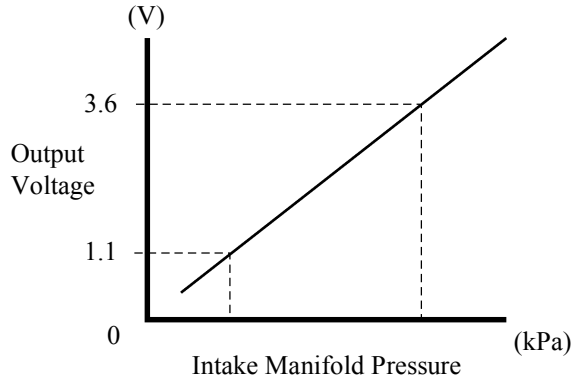
4. Turbo Pressure Sensor

- The turbo pressure sensor detects the intake air pressure in the intake manifold, which is used for calculating the maximum injection volume during the transient stage.
- The sensor contains an internal amplification circuit to stabilize the output voltage.



Turbo Pressure Sensor

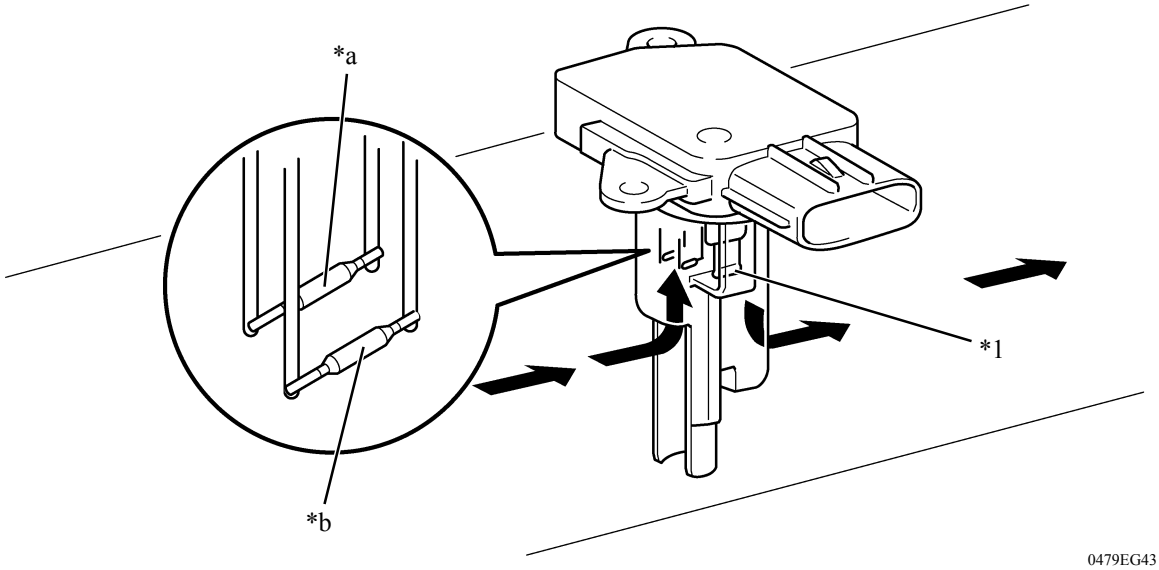
► **Output Characteristic** ◄



0479EG42

5. Air Flow Meter

- The intake mass air flow meter assembly of diesel engine uses precise fuel injection volume control and EGR control to realize clean emission.
- The plug-in type air flow meter is used, and this allows a portion of the intake mass air flow meter assembly through the detection area. By directly measuring the mass and the flow rate of the intake air, the detection precision is ensured and the intake air resistance is reduced.
- The intake mass air flow meter assembly has a built-in atmospheric temperature sensor.



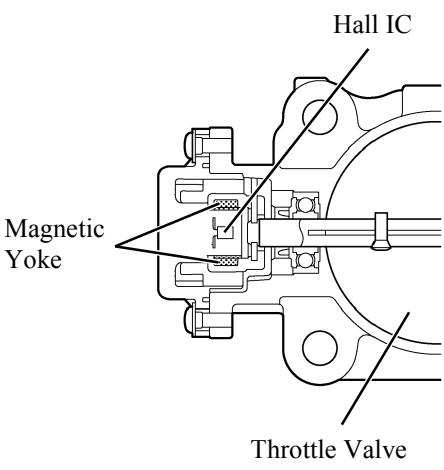
0479EG43

▸ **Text in Illustration** ◂

*1	Atmospheric Temperature Sensor	-	-
*a	Hot-wire Element	*b	Temperature Sensing Element
➡ 0479EG26	Air Flow	-	-

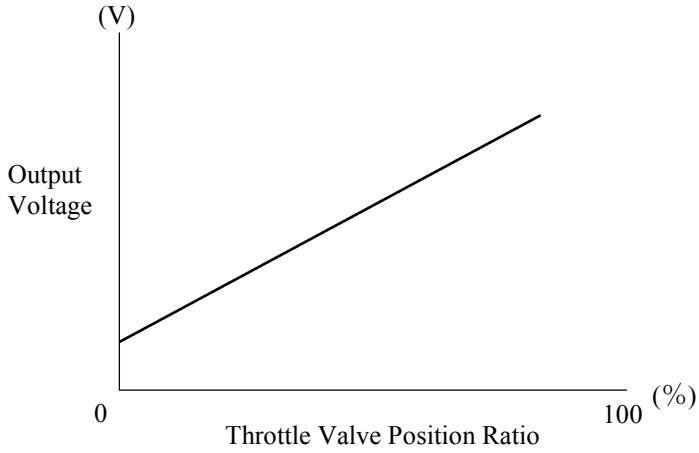
6. Throttle Position Sensor

The throttle position sensor is mounted on the throttle body, to detect the opening angle of the throttle valve. The throttle position sensor converts the magnetic flux density that changes when the magnetic yoke (located on the same axis as the throttle valve shaft) rotates around the Hall IC into electric signals to operate the throttle control motor.



047EG169

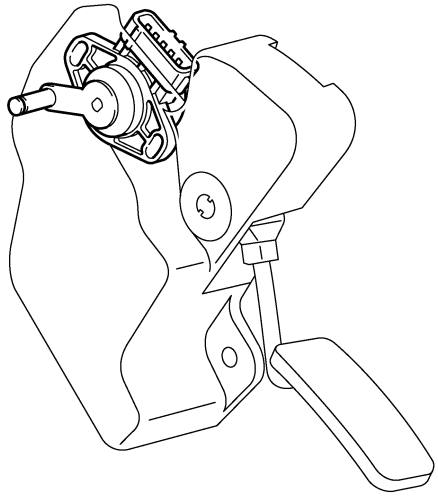
► **Output Characteristic** ◄



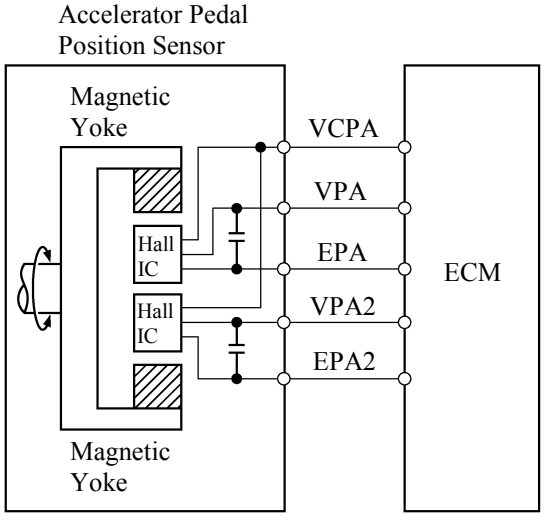
271EG83

7. Accelerator Pedal Position Sensor

This sensor converts the accelerator pedal depressed angles into electric signals with 2 differing characteristics and outputs them to the ECM. One is the VPA signal that linearly outputs the voltage along the entire range of the accelerator pedal depressed angle. The other is the VPA2 signal that outputs offset voltage.

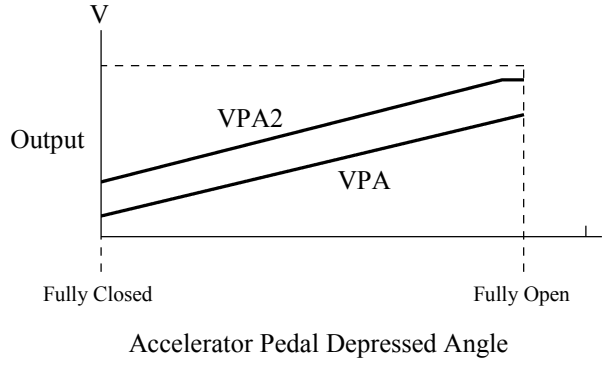


047EG55Y



047EG56Y

► **Output Characteristic** ◄



047EG57Y