■CHARGING SYSTEM

The output of the alternator has been changed.

▶ Specifications ◀

Model	New	Previous
Type	SC2	SC1
Rated Voltage	12 V	←
Rated Output	150 A	130 A
Initial Output Starting Speed	Max. 1300 rpm	←

■ENGINE CONTROL SYSTEM

1. General

The following list shows engine control comparison between new and previous 2AD-FTV engine.

System	Outline	New	Previous
Fuel Injection Volume Control	Based on the signals received from the sensors, the ECM determines the fuel injection volume in accordance with the engine condition.	○	○
Fuel Injection Timing Control	Based on the signals received from the sensors, the ECM determines the fuel injection timing in accordance with the engine condition.	○	○
Fuel Pressure Control (See page 119)	Based on the signals received from the sensors, the ECM controls fuel pressure using the Suction Control Valve (SCV) and pressure discharge valve according to engine operating conditions.	○	—
	Based on the signals received from the sensors, the ECM controls fuel pressure using the SCV according to engine conditions.	—	○
Pilot Injection Control	Based on the signals received from the various sensors, the ECM determines pilot injection volume, timing, and interval (between pilot injection and main injection) in accordance with the engine condition.	○	○
Catalyst Support Control*1	Based on the signals received from the sensors, the ECM controls exhaust fuel addition injector to purify Particulate Matter (PM).	○	○
Idle Speed Control	The ECM determines the idle speed in accordance with the engine condition, and controls the fuel injection volume in order to maintain the target idle speed.	○	○
Glow Plug Control	Controls the length of time when the current is applied to the glow plugs, in accordance with water temperature.	○	○

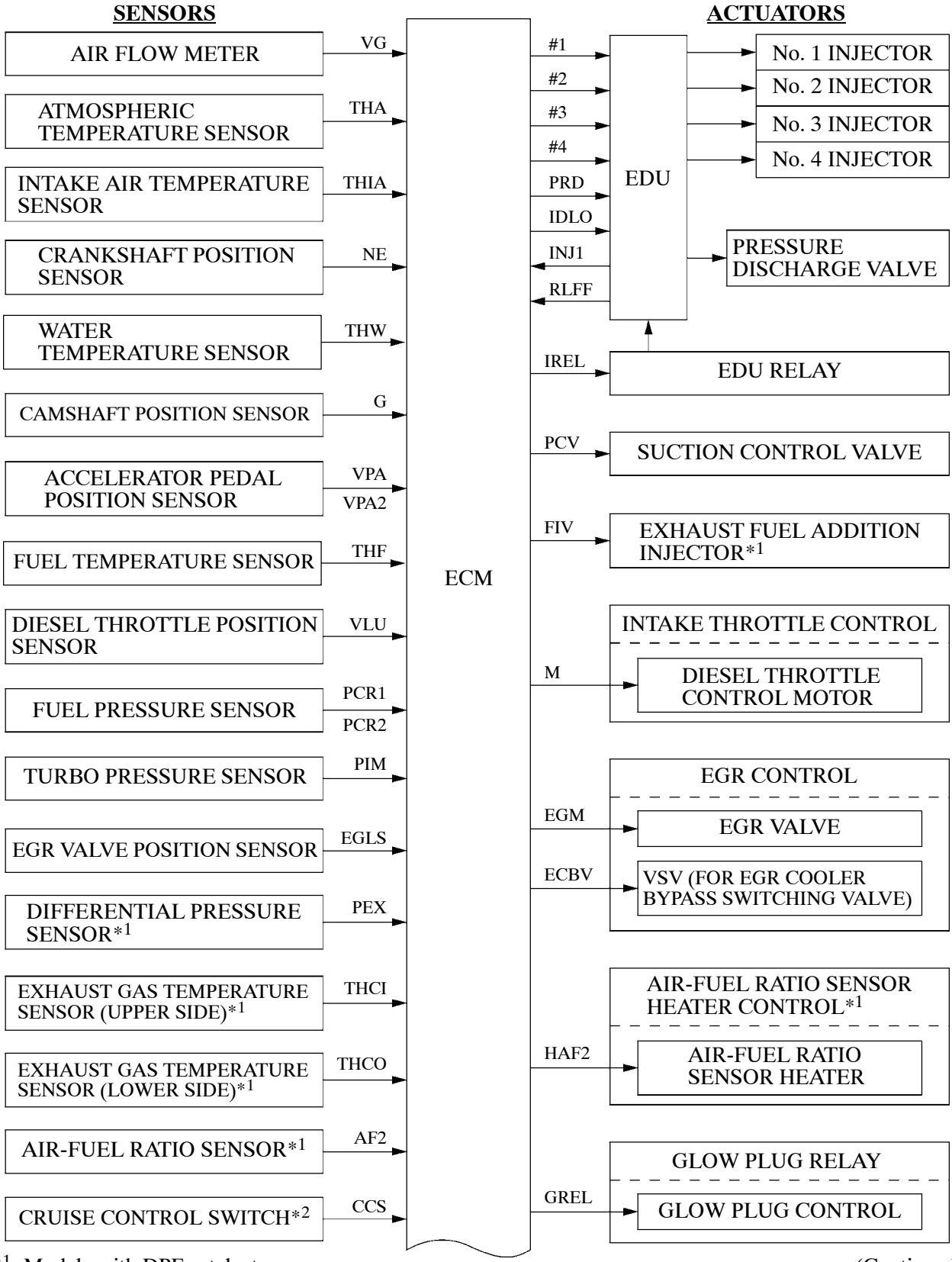
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System	Outline	New	Previous
EGR Control	Based on the signals received from the sensors, the ECM determines the EGR volume via EGR valve, EGR cooler bypass switching valve and diesel throttle control valve in accordance with the engine condition.	○	○
Turbo Pressure Control	Based on the signals received from the sensors, the ECM controls the actuator via E-VRV in accordance with the engine condition.	○	○
Cooling Fan Control	Cooling fan operation is controlled by signals from the ECM based on the water temperature, air conditioning condition*3, engine speed and vehicle speed.	○	○
Intake Throttle Control	● Based on the signals received from the various sensors, the ECM determines throttle position in accordance with engine condition. ● Fully closes the diesel throttle control valve in order to reduce the vibration when the engine is stopped.	○	○
Starter Control*2	Once the engine switch is pushed, this control continues to operate the starter until the engine is started.	○	○
Charging Control	The ECM regulates the charging voltage of the alternator in accordance with the driving conditions and the charging state of the battery	○	○
Air-fuel Ratio Sensor Heater Control*1	Maintains the temperature of the air-fuel ratio sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Air Conditioning Cut-off Control*3	By controlling the air conditioning compressor on or off in accordance with the engine condition, drivability is maintained.	○	○
Engine Immobiliser	Prohibits fuel injection if an attempt is made to start the engine with an invalid key.	○	○
Oil Maintenance Management System	When the ECM determines engine oil deterioration, the engine oil change reminder light turns ON to inform the driver.	○	○
Diagnosis	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
Fail-safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	○

*1: Models with DPF catalyst
*2: Models with entry & start system
*3: Models with air conditioning

2. Construction

The configuration of the engine control system is as shown in the following chart:



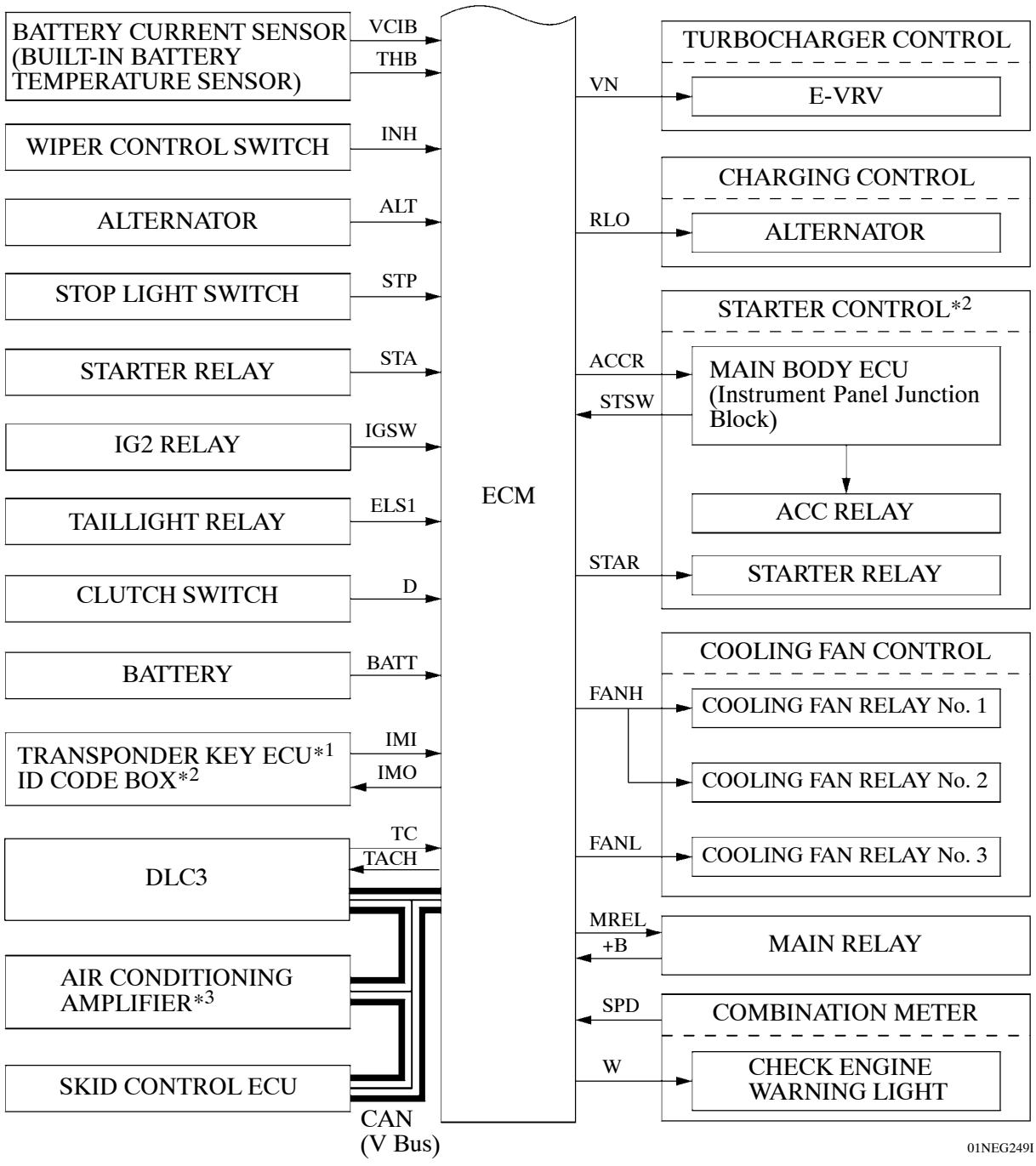
*1: Models with DPF catalyst

*2: Models with cruise control system

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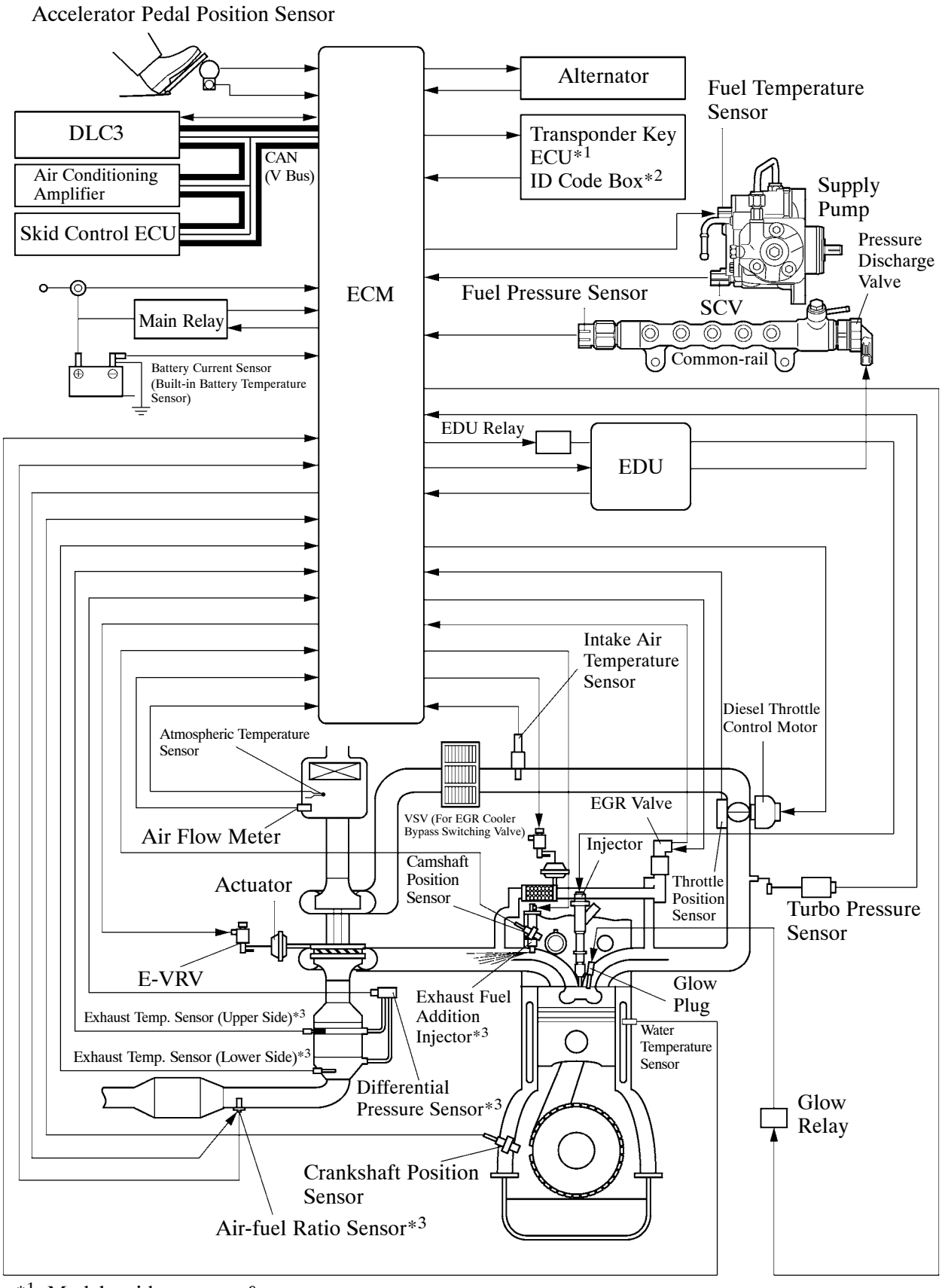
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*1: Models without entry & start system
*2: Models with entry & start system
*3: Models with air conditioning

3. Engine Control System Diagram

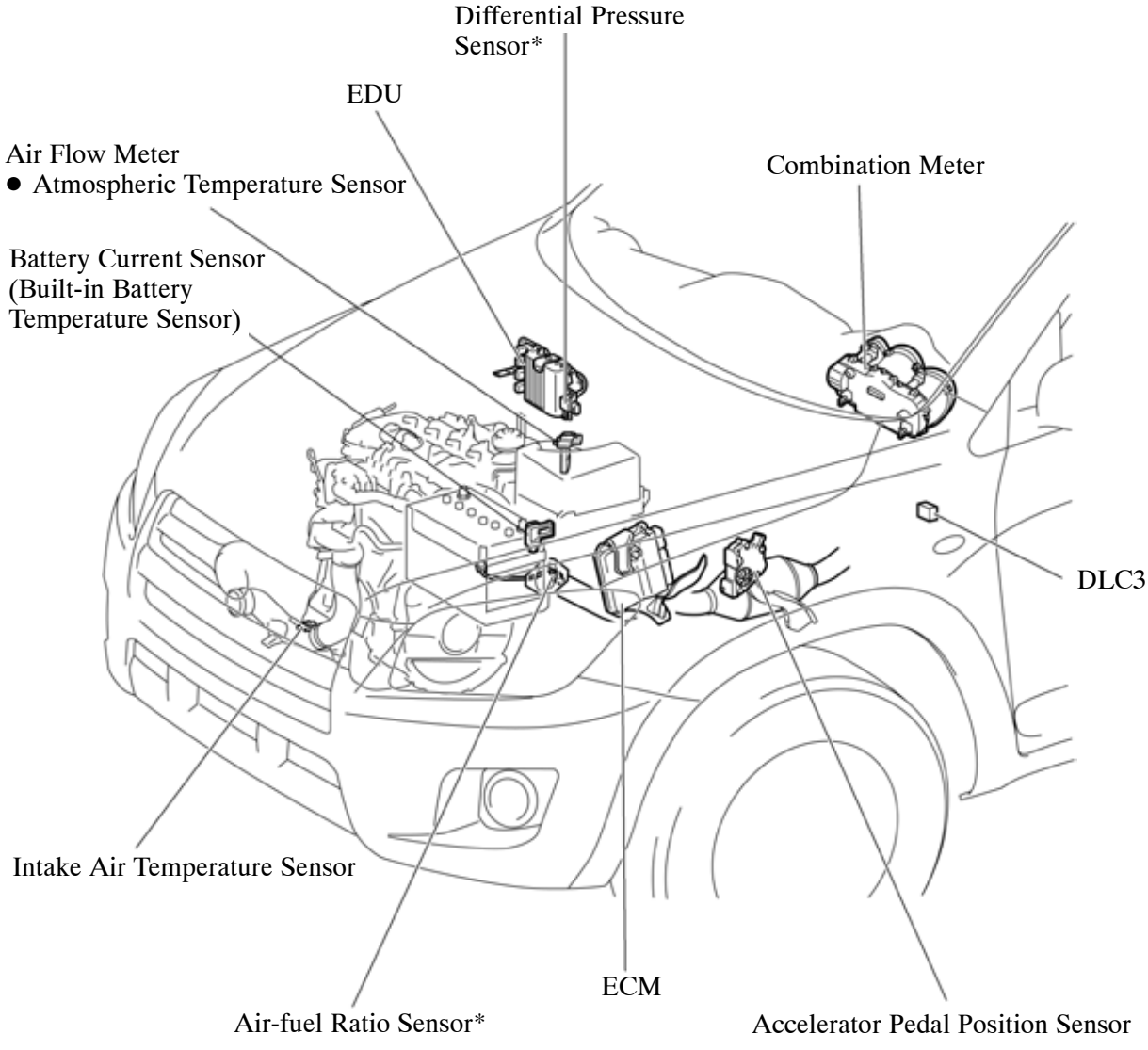


*1: Models without entry & start system
*2: Models with entry & start system
*3: Models with DPF catalyst

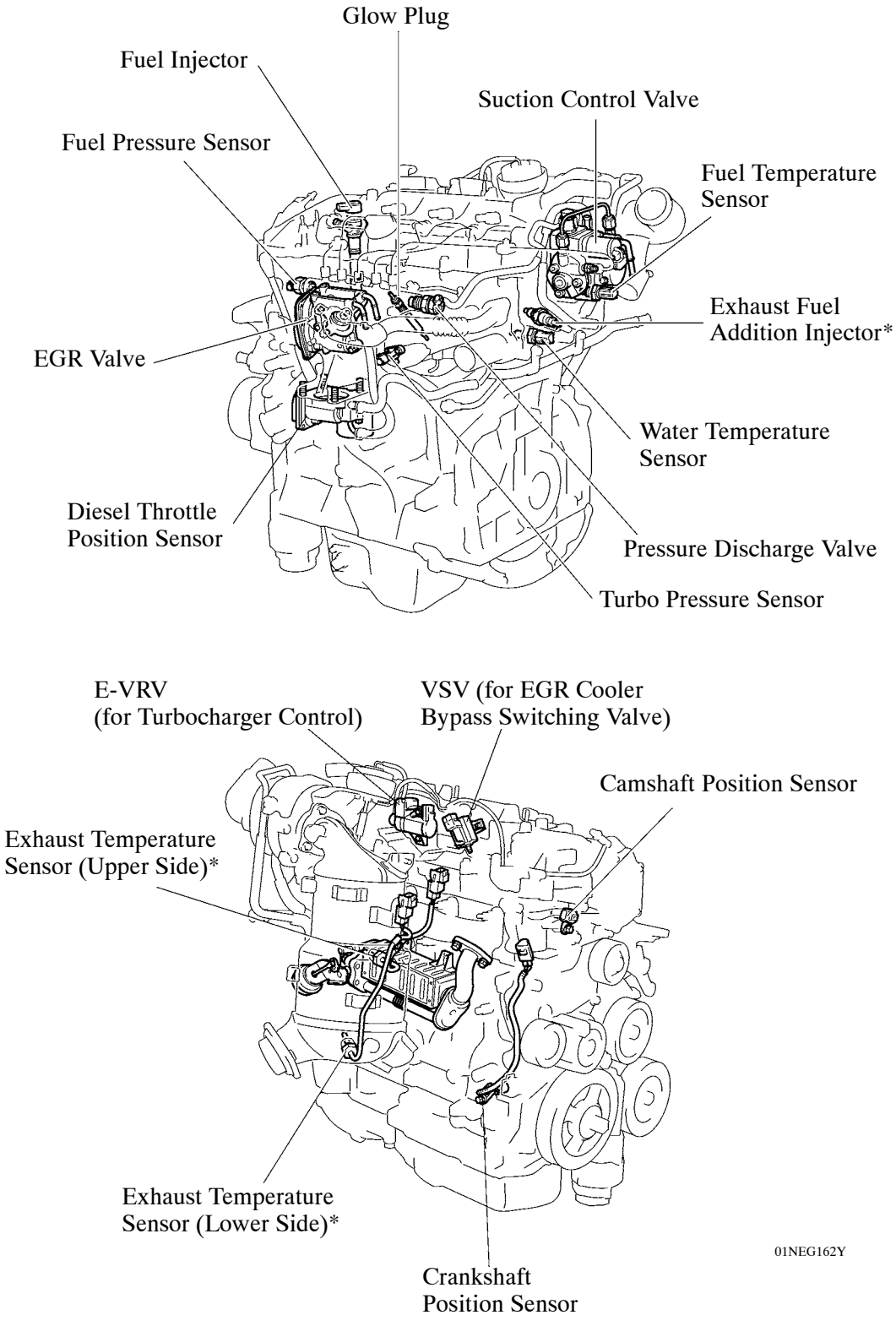
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4. Layout of Main Components



*: Models with DPF catalyst

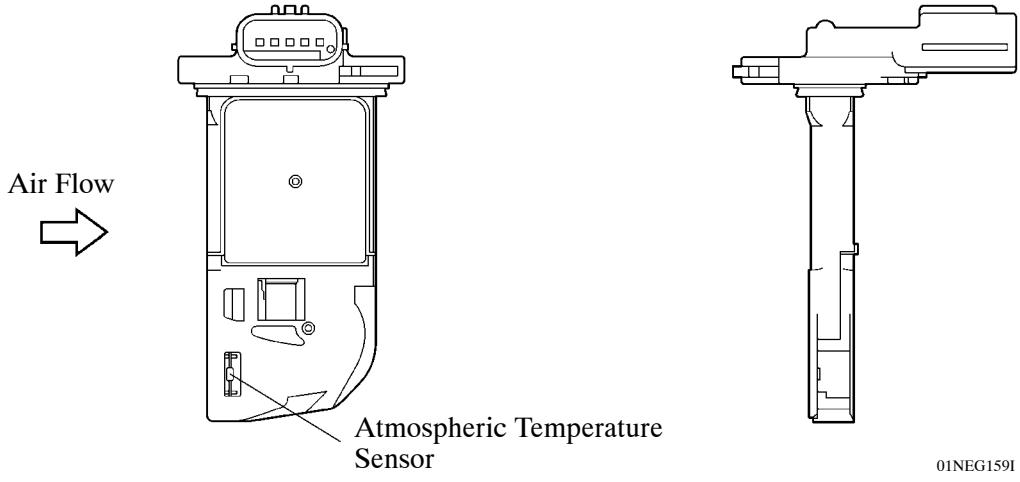


*: Models with DPF catalyst

5. Main Component of Engine Control System

Air Flow Meter

- The air flow meter has been changed from the plug-in type to the slot-in type.
- This air flow meter, which is a slot-in type, allows passage of the intake air through the detection area. By directly measuring the mass and the flow rate of the intake air, the detection precision is improved and the intake air resistance is reduced.
- This air flow meter has a built-in atmospheric temperature sensor.



6. Fuel Pressure Control

The ECM calculates the target injection pressure (35 – 200 MPa) based on the engine operating conditions, which include the signals from the accelerator pedal position sensor and the crankshaft position sensor. In order to control the fuel pressure, the SCV of the supply pump controls the pumping volume. Also, when the pressure is extremely high, when sudden deceleration occurs, or when the engine is stopped, the pressure discharge valve installed on the common-rail controls the discharge volume. This ensures that the pressure detected by the fuel pressure sensor matches the target injection pressure.

