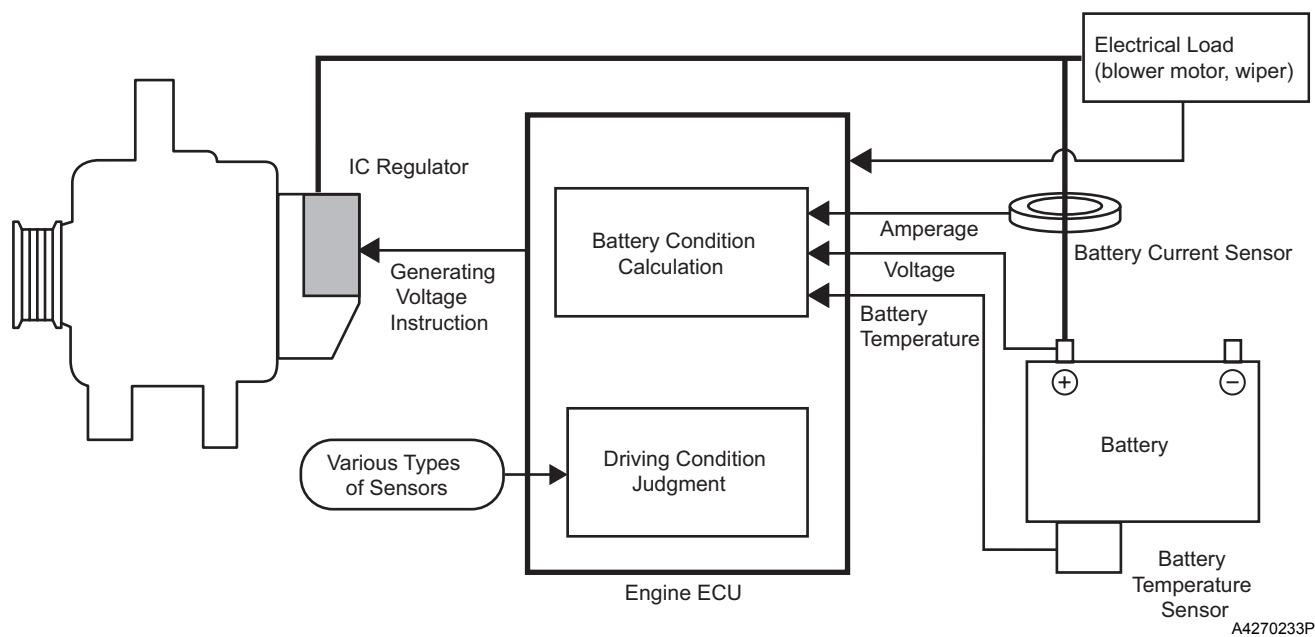


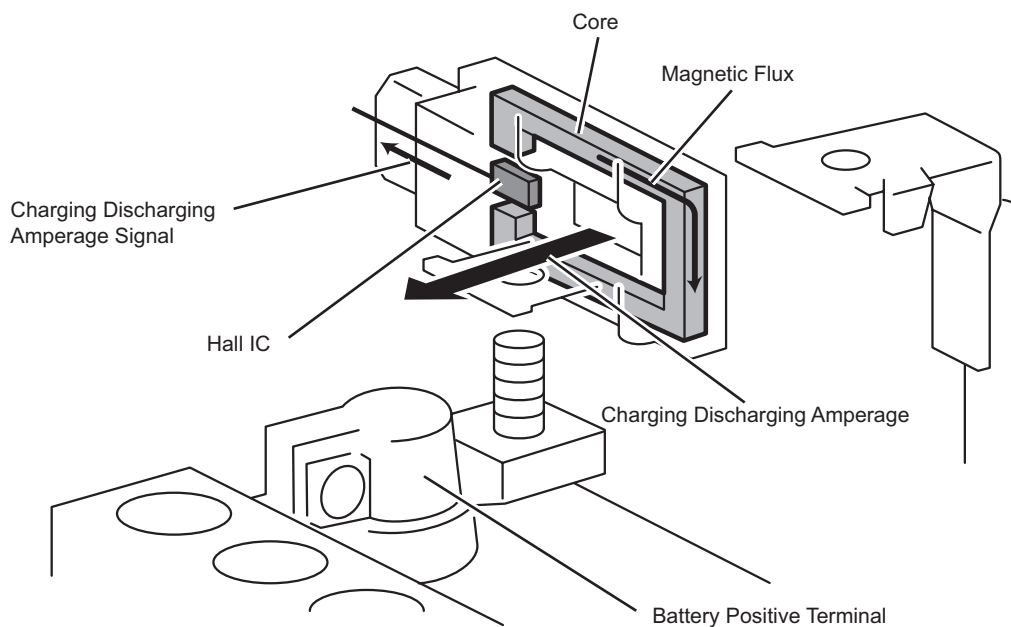
Charging Control System

- This system lowers the generating voltage when the vehicle is idling or is being driven at a constant speed, and raises the generating voltage when the vehicle is decelerating. This reduces the load on the engine as a result of the electric generation of the alternator, thus contributing to the fuel economy of the engine. During acceleration, this system regulates the generating voltage in order to place the amperage estimation value* close to the target value.



Battery Current Sensor

- Installed on the positive terminal of the battery, this sensor detects the amount of charging and discharging amperage of the battery and sends a signal to the engine ECU. Based on this signal, the engine ECU calculates the battery capacity. A Hall IC is used for detecting the amount of charging and discharging amperage. The changes that occur in the magnetic flux density in the core as a result of the charging and discharging amperage of the battery are converted and output as voltage.

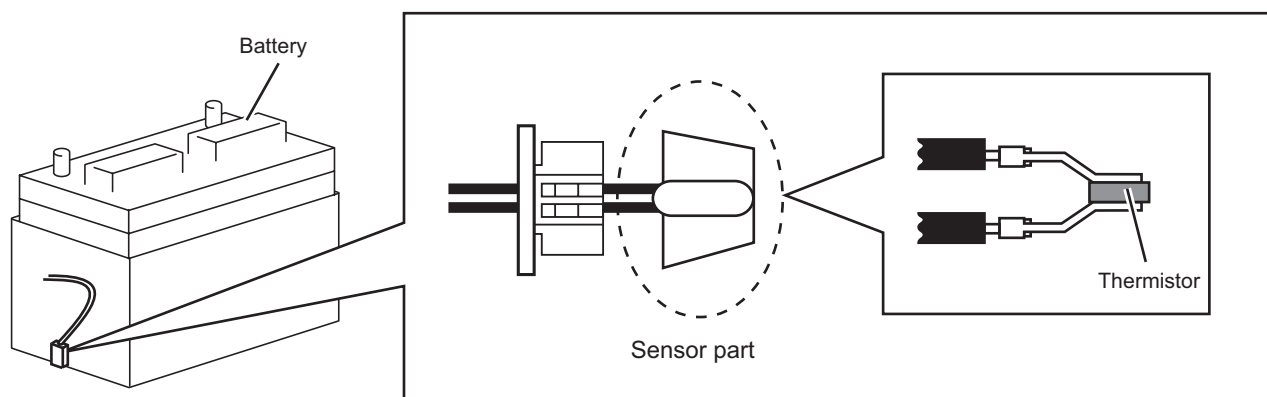


*The illustration shows a conceptual image.

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Battery Temperature Sensor

- A battery fluid temperature that is too low or too high can accelerate the deterioration of the battery or cause the battery to become discharged. In addition, the characteristics of the battery to accept current changes with the temperature of the battery fluid. For these reasons, the battery temperature sensor detects the battery fluid temperature and sends a signal to the engine ECU, in order to protect the battery. This sensor is installed on the side of the battery insulator.



*The illustration shows a conceptual image.

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Fail Safe

- Due to a failure in the sensors, the condition of the battery, or the operating state of electrical loads, the engine ECU may determine the necessity of performing a failsafe operation. Then, the engine ECU stops the alternator charging control and transfers the operation to the constant voltage generation mode.

Conditions for Transferring to Failsafe Mode

Condition	Control
Low battery capacity	The engine ECU determines the state of charge of the battery through its capacity or fluid temperature. If the battery is excessively charged or discharged, the engine ECU stops the charging control to protect the battery, as well as to prevent the capacity from dropping
Low or high battery temperature	
Wipers operating or blower motor operating at high load	When a particular electrical load is operating, the engine ECU stops the changes in voltage through charging control, in order to prevent the unpleasant operation of the electrical load due to the fluctuations in voltage.
Malfunction detected in the following sensors and switches: current sensor, temperature sensor, throttle position sensor, vehicle speed sensor, crankshaft position sensor, stoplight switch, or shift position switch	During a failure of a sensor system, the engine ECU stops the charging control to prevent the battery capacity from dropping.