

# Gauges (cont'd)

## – How the Circuit Works

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When the ignition is in ON (II) or START (III), battery voltage is supplied through fuse 13 to the gauges in the gauge assembly.

### Engine Coolant Temperature Gauge

The engine coolant temperature (ECT) gauge is operated by two intersecting coils wound around a permanent magnet rotor. When voltage is applied to the coils, a magnetic field is generated which causes the rotor to rotate and the gauge needle to move. The magnetic fields are controlled by the ECT sending unit. As the resistance in the sending unit varies, current through the gauge coils changes, and the gauge needle moves according to the changing magnetic field.

### Fuel Gauge

The fuel gauge is operated by two intersecting coils wound around a permanent magnet rotor, and a bucking coil in series with the full coil. When voltage is applied to the coils, a magnetic field is generated which causes the rotor to rotate and the gauge needle to move. The magnetic fields are controlled by the fuel gauge sending unit in the fuel tank unit. As the resistance in the sender varies, current through the gauge coils changes, and the gauge needle moves according to the changing magnetic field. When you turn the ignition switch to LOCK (0), the needle remains at the last reading until you turn it ON again.

### Tachometer

The tachometer driver in the gauge assembly controls the tachometer. With the ignition in ON (II) or START (III), the tachometer driver receives pulses from the powertrain control module (PCM with A/T) or engine control module (ECM with M/T). The PCM or ECM determines the engine speed from the crank-cylinder sensor. The number of pulses per minute is proportional to engine speed. The tachometer driver converts those pulses to movement of the tachometer needle.

### Speedometer and Odometers

With the ignition in ON (II) or START (III), the trip/total odometer driver and the speedometer driver in the gauge assembly are supplied battery voltage through fuse 13. The trip/total odometer driver applies voltage to the speed input terminal (YEL/RED wire). The vehicle speed sensor (VSS) creates a pulsing in the YEL/RED wire by switching its connection to ground on and off. The number of pulses increases as speed increases. The trip/total odometer driver uses this input to drive the trip and odometer stepper motors, and also supplies it to the speedometer driver to control the speedometer.