

**Subject:** Testing ground continuity in electronic circuits

**Symptom:** ECM resets, clears stored codes, and briefly goes to open loop  
CHECK ENGINE lamp flickers or flashes, but no codes are stored  
Oxygen sensor voltage stays high  
Other sensor readings offset from normal values  
False trouble codes  
Reference voltage above normal 5.0 to 5.3-volt range  
Other unexplained driveability problems

**Source:** General Motors service and training publications

High resistance in ground circuits create many frustrating problems in electronic systems. Any of the symptoms listed above may be due to poor ground connections. Additionally, an open ground connection for the ECM may cause a no-start condition.

Most ground problems occur after heavy repairs have been made to the vehicle or the engine. These repairs include:

- Collision repair
- Engine or transmission removal
- Head removal
- Intake manifold removal or other service

To test ground continuity, or resistance, use a voltmeter to measure the voltage drop across the ground connection. A voltmeter is preferable to an ohmmeter, because voltage-drop testing lets you check a “live” circuit carrying current. Often, poor ground connections are not apparent until the circuit is energized. Testing resistance with an ohmmeter is a static test with no load on the circuit. Voltage drop across a good ground should be 0.05 volt or less for any electronic circuit.

To check voltage drop across a ground connection, connect the meter positive (+) lead to the more positive side of the connection. Connect the meter negative (–) lead to the ground point. Often, this means connecting the negative lead to the battery negative (ground) terminal. Wiggle the connection while testing to check for intermittent high resistance in the circuit.

## Testing Engine Grounds

Electronic system grounds are usually tied to the engine in one or more locations. Figure G005-1 shows typical ground connection locations for front-wheel-drive models, and Figure G005-2 shows rear-wheel-drive locations. Wire color codes for ground connections are usually either black, black with a white tracer, tan, or brown.

Inspect all ground connections for looseness, damaged connectors, and frayed, damaged, or corroded wires. Then check voltage drop test with the ignition on but the engine not running.

Figure G005-3 shows typical ECM grounds at the rear of a 5.0 or 5.7L V8 engine. As shown at ground number G118, connect the positive (+) voltmeter lead to the wiring connector. Connect the negative (–) lead to the battery negative terminal, not to the engine ground.

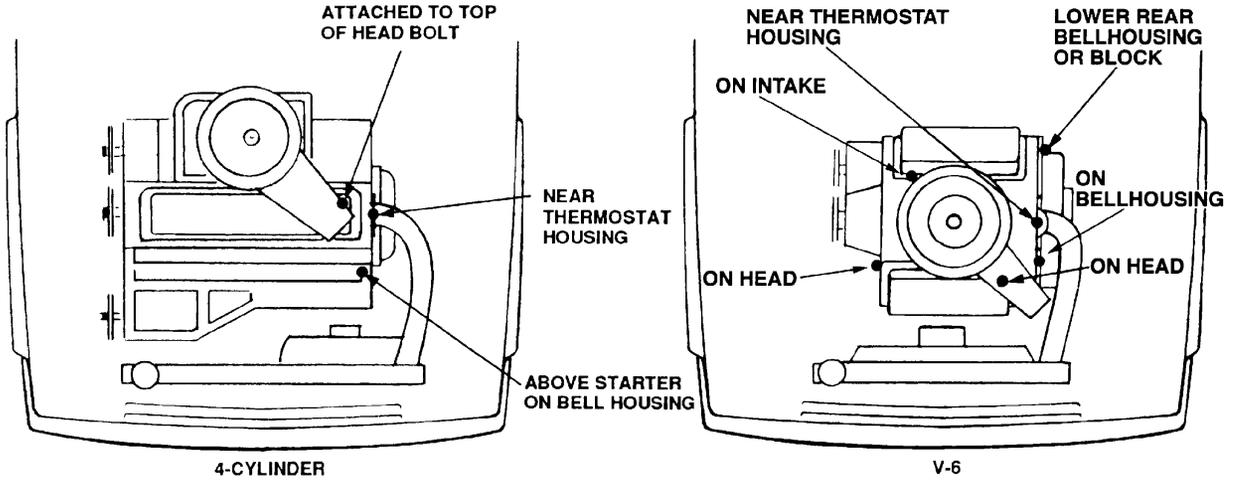


Figure G005-1

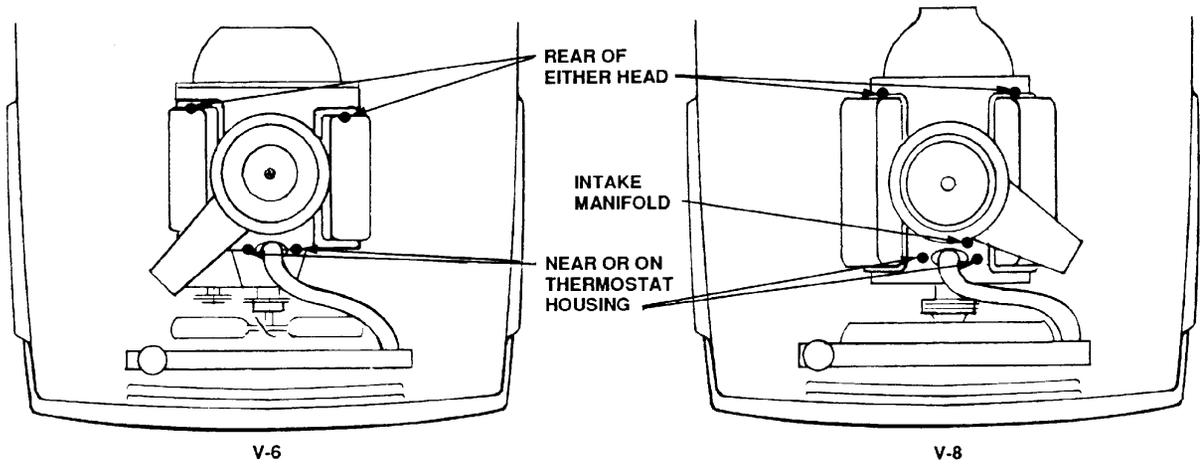


Figure G005-2

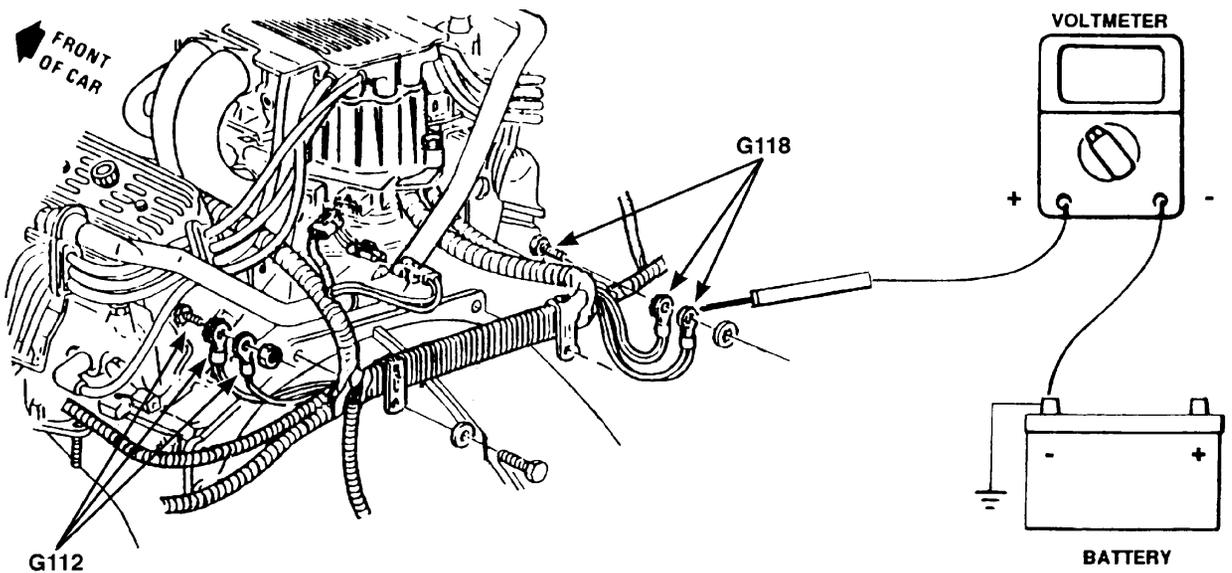


Figure G005-3

## Checking The ECM Ground At The ALDL Connector

You can check the ECM ground continuity at the ALDL connector. This can be a critical point in diagnosing a no-start condition or failure of the ECM to communicate with the Scanner™. Connect the voltmeter positive (+) lead to ALDL pin A (pin E on the early 5-pin connector). Connect the negative (-) lead to the battery negative terminal. Do not connect to a body or chassis ground; go directly to the battery ground terminal. With the ignition on, voltage drop should be 0.05 volt or less. An open or high resistance ground can impair ECM operation.

To test for an open ground at ALDL pin A (or E), turn the ignition on and then jumper pin B to pin A in the 12-pin ALDL connector. Jumper pin D to pin E in the 5-pin ALDL connector. Connect the voltmeter positive lead to the jumper wire and the negative lead to a known good ground, the battery negative terminal if possible (Figure G005-4). Turn the ignition on. The meter should read 50 millivolts (0.050V) or less for a good ground. If the reading is higher, high resistance exists in the ECM ground connection. If the voltmeter reads 5 volts, the ALDL ground connection for pin A is open. See Appendix B in the General Motors Test Manual for more information.

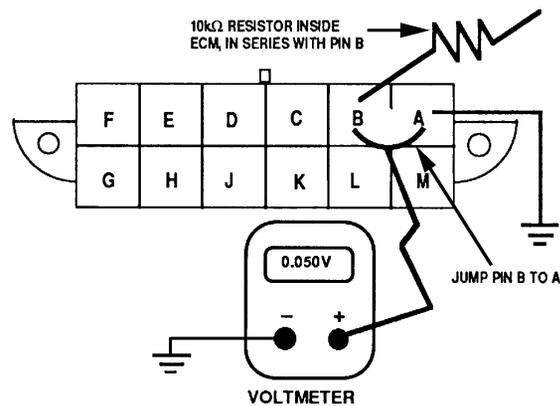


Figure G005-4

## Checking Ground For Engine Sensors

To check for ground continuity at engine sensors, connect a voltmeter as shown in Figure G005-5. Backprobe the connector or use jumper wires between the connector and the sensor to allow meter connection. The ground wire at engine sensors is usually black. Again, voltage drop should not exceed 0.05 volt with the ignition on.

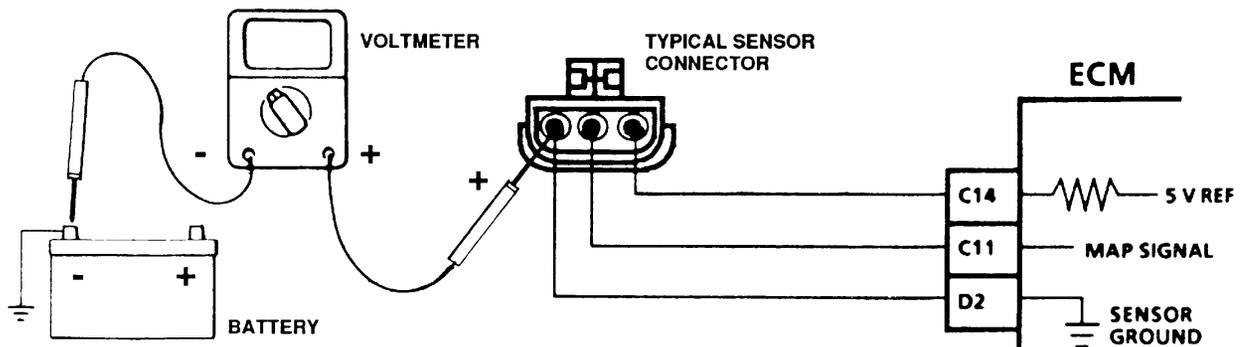


Figure G005-5