

#87-6-117: ECM RESET/ FAILURE DIAGNOSIS INFORMATION - (Sep 4, 1987)

MISFIRE, CEL FLASHES ON AND OFF, NO CODES, ERRATIC SCAN DATA.
PROBABLE E.C.M. RESET



VEHICLES AFFECTED: 1982 THRU 1987 ECM EQUIPPED VEHICLES

Resets appear to the customer as a Check Engine Light or a Service Engine Soon Light that flashes or comes on for just a few seconds then goes out. Resets are a result of voltage spikes entering the E.C.M. power lines or voltage spikes or noise being "induced" into the distributor reference signal to the E.C.M.

During a reset all E.C.M. outputs are turned off, including spark and fuel. This causes a momentary loss of power and is usually accompanied by the flashing S.E.S./C.E.L. No codes will be set during a reset. If the SCAN tool is attached to the ALCL connector during a reset, no information will be displayed. A reset only lasts a fraction of a second but the number of times that an E.C.M. can cycle in and out of reset is unlimited.

IDENTIFYING AN E.C.M. RESET ----- To check for a reset condition back probe the EST bypass wire at the E.C.M. Voltage at this terminal will normally be high (2.5 - 4.5V) when the engine is running. If voltage at the terminal drops momentarily when the S.E.S./C.E.L. flashes, the E.C.M. is resetting.

CAUSES, OF E.C.M. RESETS ----- A) Disturbances on E.C.M. Power or Ground Connections

1. Poor E.C.M. to engine ground connection (especially if ground is at the engine thermostat housing).
2. Poor chassis to engine block ground.
3. Loose battery connection at starter solenoid.
4. Poor battery connection at E.C.M. memory lead or fuse block.
5. Faulty diodes in alternator.
6. Poor battery terminal connections.
7. Any other connection between E.C.M. power/ground and battery.

B) Disturbances on E.C.M. Distributor Reference Signal

1. Poor connections between E.C.M. and distributor on either Dist. Ref. HI or Dist. Ref. Lo (GND). Ground connection must be tight at distributor housing.
2. Spikes induced into distributor ref. signal by close proximity to spark plug wires, alternator wires, etc.
3. Spikes induced into distributor ref. signal by faulty secondary ignition system (faulty ignition coil, spark plug wires, etc.).
4. Inaccurate distributor ref. signal due to mechanically worn distributor assembly.

C) Damaged E.C.M. Drivers (Applies to 1983-UP Only)

1. A partially or completely damaged E.C.M. Quad driver (Qdr) can cause an E.C.M. reset. This reset may or may not be related to operation of an E.C.M. output.
2. This problem is caused by a vehicle electrical system defect which results in E.C.M. Qdr damage. Therefore, replacing the E.C.M. may not solve problem.

WHAT IS A QUAD DRIVER

Since 1982 E.C.M.'s have used an internal "CHIP" in place of separate transistors to turn on or off different items controlled by the E.C.M. These "chips" are called quad drivers. Each quad driver (Qdr) has four separate outputs, meaning it can turn on or off four different items independently. Examples: U15 quad may operate the C.E.L. the canister control solenoid the A/C relay and the EGR solenoid. A situation can arise where one output of a Qdr may become shorted causing the entire Qdr to be damaged. In this case the Qdr may not be able to turn on any of its outputs. Using our example above, if the canister control solenoid resistance became less than 20 ohms that solenoid would pass too much current for the Qdr to ground when it tried to turn on. This would short the Qdr internally. When this happens the Qdr may either ground all of its outputs or open all outputs. If all outputs were grounded the customer would have a solid C.E.L. But if the Qdr opened the C.E.L. would not operate, neither would the A/C, the canister purge solenoid or the EGR solenoid. So if you're trying to diagnose the A/C you may replace the E.C.M. and get the A/C to work but burn another Qdr when the canister purge solenoid turns on again.

DIAGNOSING RESETS

A) Disturbances on E.C.M. Power or Ground Connections

Ensure all power and ground connections are tight. If alternator diodes are suspected (dim glowing generator light) check the diode trio by method outlined in Section 6D of the Service Manual.

B) Disturbances on E.C.M. Distributor Reference Signal

Voltage spikes induced into the Dist. Ref. signal may cause the E.C.M. to reset by producing incorrect RPM and timing reference. Try moving the 4 wires coming from the Dist. 4-Way connector to allow at least one inch clearance from plug wires, coil or alternator harness. If the problem is still suspected of being on the Dist. Ref., you may replace the Dist. Ref. High and Ref. Low wires with shielded microphone wire. This type of wire can usually be obtained from a radio supply store.

C) Damaged E.C.M. Quad Drivers

The attached charts will assist in determining which outputs are controlled by Qdr. The charts list E.C.M. part number, application, Qdr No. and the E.C.M. terminal that ties the output to the Qdr. The Shop Manual must be used to determine what particular E.C.M. output is associated with a terminal listed in the chart.

There are several methods to be used in determining if a particular Qdr is causing the E.C.M. to reset:

1. Jumper each solenoid/relay output (excluding fuel pump relay) to ground one at a time. If this stops the reset then the Qdr is damaged, very likely by the circuit which was affected by the ground.
2. If Step (1) above does not affect reset, try disconnecting all E.C.M. Qdr output terminals.

(Sometimes if the Qdr is severely damaged grounding a single output won't help.)

3. A fairly simple test is to measure the voltage at each E.C.M. Qdr output terminal with the key on and engine off. Measure the voltages again with the diagnostic lead grounded at the ALCL. The voltages measured after grounding the test lead should be opposite the readings recorded originally. Any great discrepancy between readings, ie. one output is 2.5 volts and the others are 0 volts, indicates a damaged Qdr.

4. Another method that may work is to measure the resistance from the E.C.M. Qdr terminal (with the E.C.M. disconnected) to the E.C.M. case. The resistance on output terminals that control relays, solenoids or the C.E.L. measure between 2.3 to 3.0 M (Mega Ohms). (The resistance on terminals controlling the serial data line measure considerably lower.) However, if a particular relay solenoid or C.E.L. terminal resistance measures lower than the others it indicates a damaged Qdr.

If any of the above procedures indicate a damaged Qdr the device that is controlled by that Driver must be repaired prior to replacing an E.C.M.

If you replace multiple E.C.M.'s in a car with the same results the following chart will show you what pin of the E.C.M. is driven by a particular Qdr. Check the E.C.M. application of the vehicle you're working on. Test all solenoids or relays controlled by the Qdr for 20 Ohms of resistance or more. Any circuit under 20 Ohms will damage the E.C.M.

Some Qdr have two legs of their output tied to the same pin. Those are represented by the ----XX----. These are circuits that place a higher demand on the Qdr. They still must have over 20 Ohms of resistance on the circuit. Some E.C.M.'s have only one Qdr, others have up to three.

For additional information on E.C.M. testing, see Canadian PSB 87-6-115.

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