

#91-384-6E: DAMAGED ECM/PCM MIS-DIAGNOSIS INCORRECT 'TAP-TESTING' - (Jul 24, 1991)

**Subject: DAMAGED ECM/PCM AND/OR MIS-DIAGNOSED
ECM/PCM SYMPTOMS DUE TO INCORRECT "TAP-TESTING"
PROCEDURES**



**Model and Year: 1982-91 ALL PASSENGER CARS AND
TRUCKS**

CONDITION: Because of the intermittent nature of some Electronic Control Module (ECM) or Powertrain Control Modules (PCM) symptoms, some service technicians have been subjecting the ECM/PCM to vibration and/or shock testing. Commonly known as tap-testing, this procedure involves tapping on the ECM/PCM case, while the engine is running. It is generally accepted that if the engine or ECM/PCM falters due to the tapping, an intermittent internal ECM/PCM defect may be indicated. However, this may not always be true. If too much force is applied to the ECM/PCM during the test the following symptoms may result:

- Immediate ECM/PCM failure.
- ECM/PCM suffers damage which may cause a failure at a later date.
- ECM/PCM Reset (or Glitch), creating a momentary stall, miss Service Engine Soon (SES) light and/or loss of serial data.

CAUSE: The ECM/PCM should be tapped using only the fingertips of one hand. Use of the palm, fist or any type of tool subjects the ECM/PCM to forces that can cause both the circuit board and the outer aluminum case to flex and distort beyond design limits. The Integrated Circuits (IC) used in today's ECM/PCMs are mounted to the circuit board using a mounting process referred to as "surface technology." There are no circuit board holes for IC leads to go through. The IC leads set on pads, (28 pads or 52 pads depending on the IC) and solder is flowed around the leads to make the electrical connection to the circuit board.

- Any flexing of the circuit board, beyond design limits, places the IC solder connections at risk of damage. Such damage may be apparent immediately, or it may appear at a future date. Circuit board deflection can occur as a result of striking the ECM/PCM, using **ONLY THE PALM OF THE HAND**.

- If struck on the bottom side (the side opposite the service label), the ECM/PCMs aluminum outer case may deflect inward far enough to contact the electrical leads attached to the circuit board. Once in contact with the case the ECM/PCM electrical components will be shorted directly to ground. Although such shorting certainly has the potential to damage the ECM/PCM, it may not be permanent damage, depending on which circuit is involved. However, even if permanent damage is avoided, a short on any of the circuits will cause a disruption of normal ECM/PCM operation for the instant that the short occurs. This disruption may cause the ECM/PCM to reset (see "reset" above), creating the false impression that it is vibration sensitive or faulty. Reset is the ECM/PCMs normal way of coping with large voltage spikes. An ECM/PCM reset does not indicate that the ECM/PCM is defective or faulty, only that it is being subjected to abnormal conditions.

CORRECTION:

----- 1. TAP THE ECM/PCM ONLY ON THE TOP SIDE (The top side is where the service label is located.)

- This will minimize the chance of deflecting the ECM/PCM case into the electrical leads on the circuit board. The clearance between the case and the circuit board is closest on the bottom side of the ECM/PCM.

2. TAP THE ECM/PCM USING ONLY THE FINGER TIPS - NO TOOLS.

- To avoid excessive case deflection, avoid tapping in the center of the case. Tapping close to the edge of the ECM/PCM, especially in the corners, is best.
- While using greater force may seem more effective, the test itself may cause the ECM/PCM to fail.

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