

## Analyzing PCM Data

### Various Data Procedures

Once the fault area is identified, the circuit must be checked to determine if the wiring or component is at fault. Use any of the following methods to diagnose a suspected PCM wire circuit or device. Some methods are particular to a certain type of PCM device.

- Change Condition to Cause Response by Input
- Change Input and Verify Output Response
- Click Testing/Output Test Mode (Solenoids/Relays)
- Coil Resistance (Solenoids/Relays)
- Harness Opens
- Harness Shorts

### Change Condition to Cause Response by Input

The purpose is to verify sensor receives and responds to changes.

1. Select, view and record the appropriate sensor PID(s).
2. Create condition or cause condition to change.
3. If reading changes appropriately, then it should be operating OK.

Examples:

- View EOT PID while engine warms up.
- It should change from a higher voltage (2.6V) for a cold engine, to a lower voltage as the engine warms up (0.6V).
- Move accelerator pedal, observe AP PID change.
- Press brake pedal, watch BOO PID change states.

### Change Input and Verify Output Response

The purpose is to verify how the PCM and actuator circuit responds to sensor input.

1. Select, view the appropriate sensor PID(s).
2. Create condition to cause input condition to change.
3. Observe change (response) in actuator PID or actuator signal circuit measured by a measuring device.

Example:

- Increase accelerator pedal position under load, observe RPM PID and circuit change.

### Click Testing/Output Test Mode (Solenoids/Relays)

The purpose is to activate solenoid or relay from PCM by entering Output Test Mode.

1. Key on.
2. Enter Output Test Mode.

3. Turn outputs on and then off.
4. Listen for relays to click on and off. If a breakout box is connected to the PCM, measure the control circuit while turning the outputs on and off.

Examples:

- IDM relay and PCM power relay.
- Glow plug relay receives on-command for 5 seconds.

## Coil Resistance (Solenoids/Relays)

The purpose is to measure the correct resistance value of device.

1. Key off.
2. DLC disconnected.
3. Disconnect component from vehicle harness.
4. Using an ohmmeter and referencing the Static Resistance Value Chart in this section, measure across the component terminals in question.

## Harness Opens

The purpose is to check harness for open circuits

1. Key off.
2. DLC disconnected from any diagnostic tools.
3. Disconnect component from vehicle harness.
4. Install breakout box.
5. Using an ohmmeter, isolate the circuit in question from the breakout box to the component connector signal pin.
6. Reading should be less than 5 ohms.

## Harness Shorts

The purpose is to check harness for short circuits (to ground or power).

1. Key off only.
2. DLC disconnected from any diagnostic tools.
3. Disconnect component from vehicle harness.
4. Using an ohmmeter, measure between the signal circuit and signal return circuit or power ground circuit or vehicle power.
5. If reading is less than 10 kohms, then the two circuits are shorted.

## Glow Plug Lamp Cycles On/Glow Plugs Recycle/Engine Stumble/Die/No Accelerator Pedal Authority Until Return to Idle Position

A powertrain control module (PCM) reset occurs when the PCM momentarily "reboots" or is turned off and on while the

engine is operating. If the condition occurs a single time, the engine will momentarily stumble and the PCM will go through a normal key on cycle, including the glow plug lamp and glow plugs on and will also attempt to validate the accelerator pedal position. If the pedal is not at the idle position when this fault occurs, pedal authority will not be allowed by the PCM until the accelerator pedal is released and the engine returns to idle.

#### Probable Causes

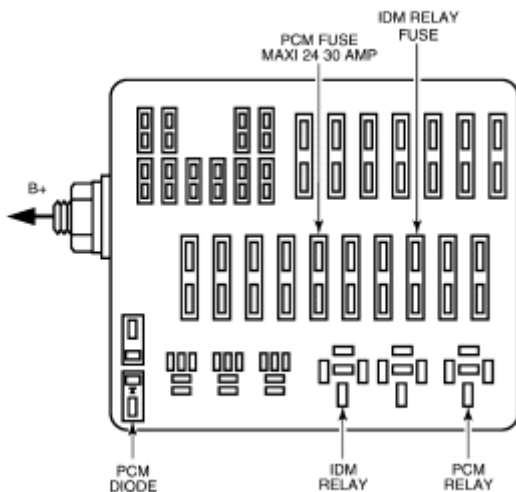
- Momentary loss of power to the PCM or IDM: Defective power relays, shorted or open harness, intermittent connectors, poor grounds.
- Momentary short to ground of VRef: Shorted harness or connector, defective sensor (sensors that use VRef include - EBP exhaust back pressure, ICP injection control pressure, CMP camshaft position sensor, MAP manifold absolute pressure sensor, BARO barometric pressure sensor, AP accelerator pedal sensor).
- Momentary short to ground of injector high side voltage: Under valve cover harness, valve cover gasket, engine harness, chassis harness are all possible sources of short to ground conditions.

#### Procedures

- Complete tests No. 4, No. 5 and No. 6 on the Performance Diagnostic Form; this will determine if the PCM has detected any fault conditions that can cause a PCM reset.

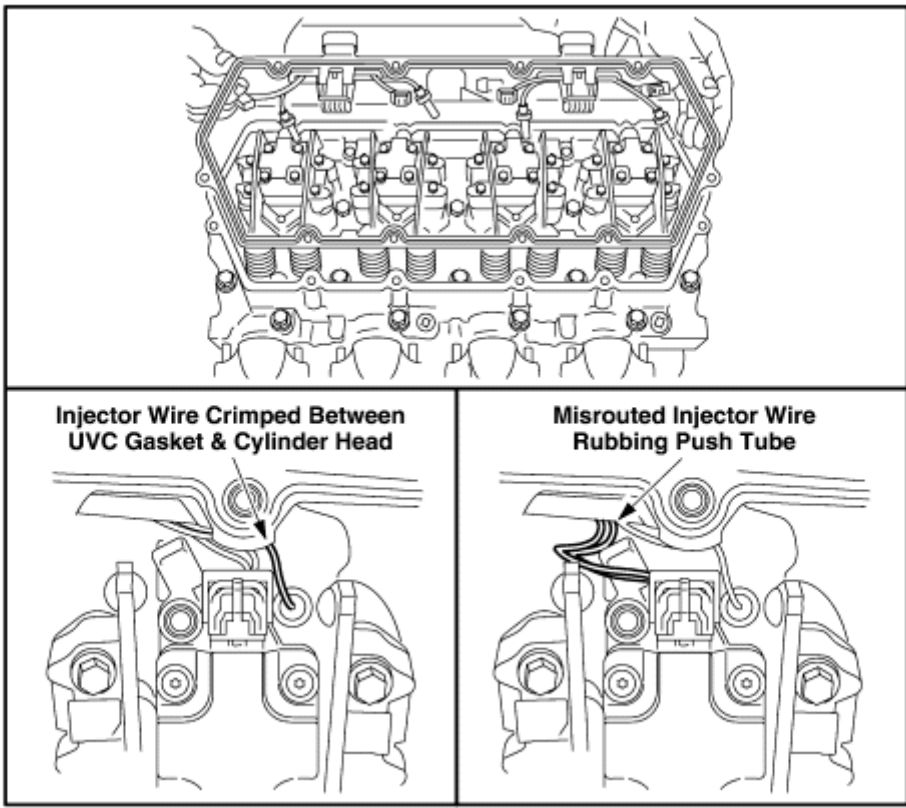
**Note:** If the PCM is unable to perform a KOEO injector electrical self test (buzz test) it may indicate an injector circuit high side short to ground condition. Disconnect pairs of injectors by removing the connector at the valve cover and attempt to perform the buzz test. If the buzz test can be accomplished with an injector pair disconnected, the high side short to ground has most likely been isolated to the under valve cover harness corresponding to the disconnected injectors.

- Check all power and ground connections for the PCM and IDM.



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- Monitor VRef (pin No. 90) and V Power (pins No. 71 and No. 97) with the breakout box installed.
- Inspect the CMP sensor harness connector and the harness (particularly around the idler pulley) for a VRef or signal short to ground condition.
- Remove and inspect the CMP camshaft position sensor for possible timing disk to CMP sensor contact.
- If the PCM reset condition is repeatable, disconnect the following sensors one at a time and operate the engine to determine if the reset will reoccur. (EBP exhaust back pressure, ICP injection control pressure, MAP manifold absolute pressure sensor, BARO barometric pressure sensor, AP accelerator pedal sensor.) Inspect each harness, including the connector upon removal.
- Remove the valve covers and inspect the under valve cover connectors for possible pinching under the valve cover gasket or rub through against the push tubes.



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