SECTION 2: Diagnostic Methods
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# **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.

- Select, view the appropriate sensor PID(s).
- 2. Create condition to cause input condition to change.
- 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.
- 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.
- 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.