

Intermittent Diagnostic Techniques

Intermittent diagnostic techniques help find and isolate the root cause of intermittent concerns associated with the electronic engine control (EEC) system. The information is organized to help find the concern and carry out the repair. The process of finding and isolating an intermittent concern starts with recreating a fault symptom, accumulating PCM data, and comparing that data to typical values, then analyzing the results. Refer to the scan tool manufacturer's instruction manual for the functions described below.

Before proceeding, be sure that:

- Customary mechanical system tests and inspections do not reveal a concern. Mechanical component conditions can make a PCM system react abnormally.
- Technical Service Bulletins (TSBs) and Online Automotive Service Information System (OASIS) messages, if available, are reviewed.
- Quick Test and associated diagnostic subroutines have been completed without finding a concern, and the symptom is still present.

Recreating the Fault

Recreating the concern is the first step in isolating the cause of the intermittent symptom. If freeze frame data is available, it may help in recreating the conditions at the time of a malfunction indicator lamp diagnostic trouble code (MIL DTC). Listed below are some of the conditions for recreating the concern:

CONDITIONS TO RECREATE FAULT

Engine Type Conditions	Non-Engine Type Conditions
Engine Temperature	Ambient Temperature
Engine RPM	Moisture Conditions
Engine Load	Road Conditions (Smooth-Bumpy)
Engine Idle/Accel/Deceleration	

Accumulating PCM Data

PCM data can be accumulated in a number of ways. This includes circuit measurements with a digital multimeter (DMM) or scan tool parameter identification (PID) data. Acquisition of PCM PID data using a scan tool is one of the easiest ways to gather information. Gather as much data as possible when the concern is occurring to prevent improper diagnosis. Data should be accumulated during different operating conditions and based on the customer description of the intermittent concern. Compare this data with the known good data values. Refer to Section 6, [Typical Diagnostic Reference Values](#). This requires recording data in four conditions for comparison: 1) KOEO, 2) Hot Idle, 3) 48 km/h (30 mph), and 4) 89 km/h (55 mph).

Peripheral Inputs

Some signals may require certain peripherals or auxiliary tools for diagnosis. In some cases, these devices can be inserted into the measurement jacks of the scan tool or DMM. For example, connecting an electronic fuel pressure gauge to monitor and record the fuel pressure voltage reading and capturing the data would help find the fault.

Comparing PCM Data

After the PCM values are acquired, it is necessary to determine the concern area. This typically requires the comparison of the actual values from the vehicle to the typical values from Section 6. Refer to Section 6, [Typical Diagnostic Reference Values](#). The charts apply to different vehicle applications (engine, model, transmission).

Analyzing PCM Data

Look for abnormal events or values that are clearly incorrect. Inspect the signals for abrupt or unexpected changes. For example, during a steady cruise most of the sensor values should be relatively stable. Sensors such as throttle position (TP) and mass airflow (MAF), as well as an RPM that changes abruptly when the vehicle is traveling at a constant speed, are clues to a possible concern area.

Look for an agreement in related signals. For example, if the APP1 or APP2 changes during acceleration, a corresponding change should occur in RPM and SPARK ADV PID.

Make sure the signals act in proper sequence. An increase in RPM after the TP1 and TP2 increases is expected. If the RPM increases without a TP1 and TP2 change, a concern may exist.

The PID values are not always captured from the same execution loop. Depending on the number of PIDs acquired, the sample rate may be 60 ms or longer. For example, the ETC_ACT reading will always lag behind the ETC_DSD reading due to the physical time to move the throttle plate. This is an expected difference between ETC_ACT and ETC_DSD during these events.

Scroll through the PID data while analyzing the information. Look for sudden drops or spikes in the values.

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