P050B: COLD START IGNITION TIMING PERFORMANCE

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Advanced
Repair Cost	:	**$100-$300**
Can I Still Drive?	:	**Yes**

What Does The P050B Code Mean?

If your OBD-II vehicle has stored a code P050B, it means that the powertrain control module (PCM) has detected a malfunction in the ignition timing control system. Cold start is a term used to describe an engine drivability strategy that is implemented only when the engine is at (or below) ambient temperature.

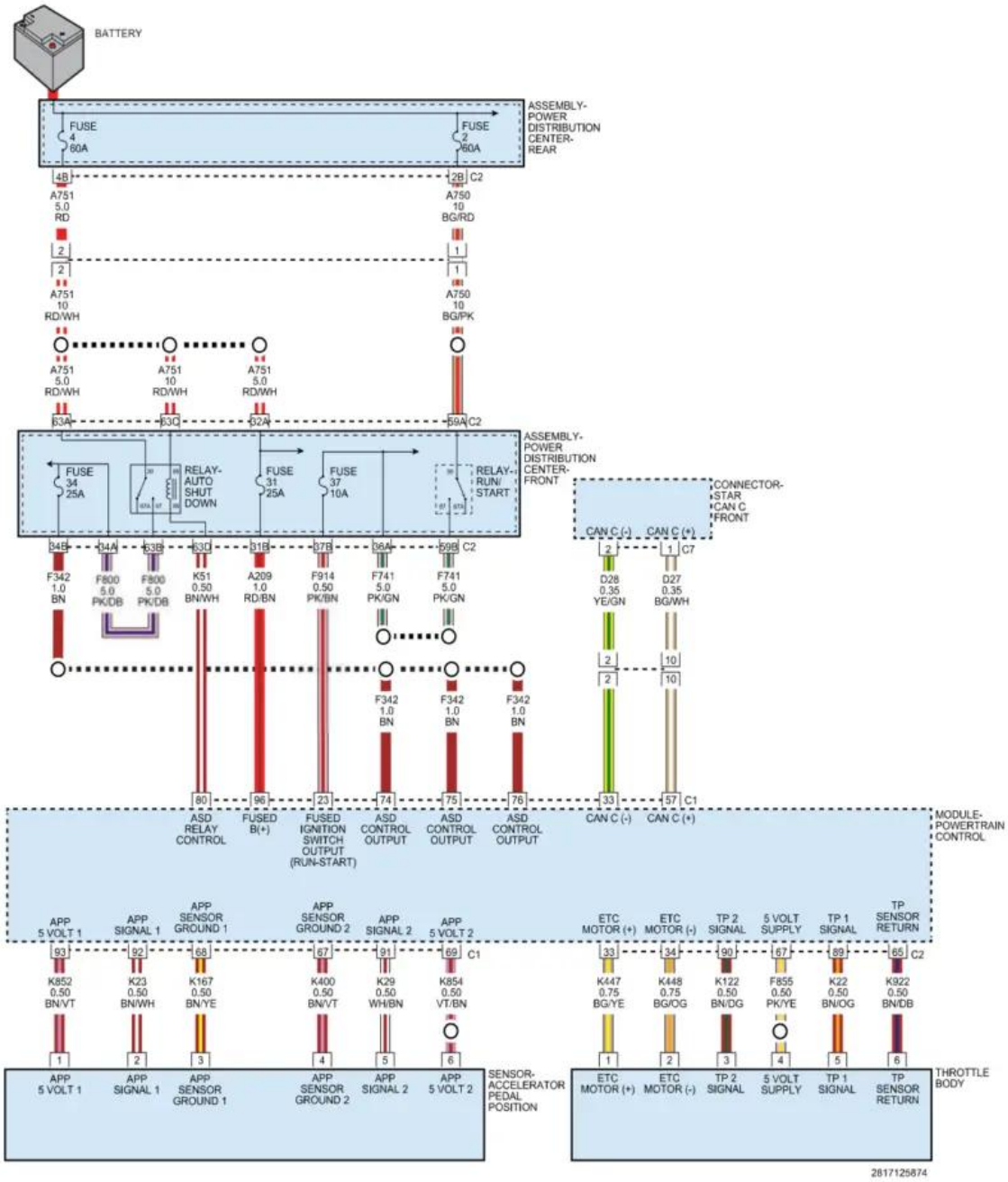
The PCM calculates ignition timing strategy (including during cold start) using input data received from the crankshaft position (CKP) sensor, the camshaft position (CMP) sensor, the engine temperature sensor (ECT), throttle position sensor (TPS), and the mass airflow (MAF) sensor, among others.

Since OBD-II vehicles are equipped with distributor-less ignition systems, the PCM is programmed to deliver a base timing strategy and to advance and retard ignition timing as required. Changes in engine load and RPM demand varying degrees of ignition timing to help optimize engine performance and maximize fuel efficiency.

When the engine is cold, timing is advanced slightly to compensate for the lower combustion chamber temperature. In the event that the engine overheats or when knock sensors are activated, ignition timing is retarded by the PCM to prevent engine damage.

If ignition timing cannot be controlled by the PCM, a code P050B will be stored and a malfunction

indicator lamp (MIL) may be illuminated. Most vehicles will require multiple ignition cycles with a failure for MIL illumination.



P050B wiring diagram

What Are The Symptoms Of The P050B Code?

Symptoms of a P050B engine code may include:

- Excessively rich exhaust
- Engine stall at idle
- Pinging noise upon acceleration
- CKP or CMP sensor related codes

What Are The Potential Causes Of The P050B Code?

Causes for this code may include:

- Defective ECT sensor
- Severe vacuum leak
- Open or shorted circuits or connectors
- Bad CKP or CMP sensor

How Can You Fix The P050B Code?

Diagnose The P050B

Diagnose and repair ECT, CKP, or CMP related codes before attempting to diagnose the P050B.

When diagnosing a code P050B, I would gain access to a source of reliable vehicle information, a diagnostic scanner with an integrated oscilloscope, and a digital volt/ohmmeter (DVOM).You will need diagnostic flow charts, wiring diagrams, connector face views, connector pin-out charts, and component testing procedures and specifications to accurately diagnose a code P050B. This information can be found in your source of vehicle information.

Note: We are aware of a few technical bulletins put out by manufacturers. For example, one is for Jeep, #18-011-13, and one for Jaguar #XJ303-014specific to this P050B diagnostic code.

Visually Inspect Of All Vacuum Lines And Hoses, Wiring Harnesses, And Related Connectors

Perform a visual inspection of all vacuum lines and hoses, wiring harnesses, and related connectors. CKP or CMP sensor connectors that are contaminated with oil should be cleaned or replaced (sensor and connector).

Connect the oscilloscope (as described below) and prepare to initiate a cold engine start. Be careful to route scope test leads away from moving parts.

Test The CKP And CMP Sensors

Test the CKP and CMP sensors using the oscilloscope:

- Probe the signal circuit of the sensor with the positive test lead of the scope

- The negative test lead should be connected to the sensor ground wire
- CKP and CMP sensor reference is typically 5-voolts. Select the appropriate voltage setting on the scope
- Start the engine and observe the wave form pattern on the scope display
- You should see an even waveform pattern with no voltage spikes or glitches at all RPM levels
- Suspect sensor failure or a poor electrical connection if there are inconsistencies in the waveform pattern

If there is no waveform pattern displayed on the oscilloscope, test CKP and CMP sensor reference voltage and ground:

- Probe the reference circuit pin of the sensor connector with the positive test lead of the DVOM. The key should be on with the engine off (KOEO) and the sensor disconnected
- Use the negative test lead of the DVOM to probe the ground pin of the same connector
- Reference voltage must be within specifications (usually 5-volts)

If no reference voltage is detected, use the DVOM (and the battery) to determine whether the reference or the ground is inadequate. If there is no reference voltage, use the test lead of the DVOM to probe the corresponding circuit at the PCM connector. If no reference voltage is discovered there, suspect a PCM problem. If there is reference voltage at the PCM and none at the sensor, you have an open circuit.

If there is no ground, trace it back to its source and make sure that it is secure. Sometimes it is better to install an auxiliary ground.

Use the DVOM to test CKP and CMP sensors:

- With the KOEO, place the DVOM on the ohms setting and unplug the sensor connector
- Probe the pins in each sensor using the test leads
- Compare your findings with sensor testing specifications
- Sensors which do not comply with specs are faulty
- Applicable technical service bulletins (TSB) will help you reach an accurate diagnosis

Severity Description

Incorrect ignition timing may contribute to catalytic converter damage, poor engine performance, and diminished fuel efficiency. A code P050B should be categorized as severe and dispatched with haste.

Reference Sources

Diagnostic Trouble Code (DTC) Charts and Descriptions for P050B - Page 83.