P2109: THROTTLE/PEDAL POSITION SENSOR A MINIMUM STOP PERFORMANCE

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$200**
Can I Still Drive?	:	**Yes**

What Does The P2109 Code Mean?

A stored code P2109 means the powertrain control module (PCM) has detected a malfunction in a the “A” throttle position sensor (TPS) or a particular pedal position sensor (PPS).

The designation “A” refers to a particular sensor. Consult a reliable vehicle information source for particulars pertaining to the vehicle in question. This code is only used in vehicles that are equipped with drive by wire (DBW) systems and is related to minimum stop or closed throttle performance.

The PCM controls the DBW system using a throttle actuator motor, multiple pedal position sensors (sometimes referred to as accelerator pedal position sensors), and several throttle position sensors. The sensors are typically supplied with a 5-volts reference, a ground, and at least one signal wire.

Generally speaking, TPS/PPS sensors are of the potentiometer type. A mechanical extension, on the accelerator pedal or the throttle plate shaft, actuates the contacts of the sensor. Sensor resistance changes, as the contacts are moved across the sensor circuit board, causing variations in circuit resistance and signal input voltage to the PCM.

If the PCM detects a minimum stop/closed throttle position sensor voltage signal (from the sensor designated A) that does not reflect the programmed parameter, a code P2109 will be stored and a malfunction indicator lamp (MIL) may be illuminated. When this code is stored, the PCM will usually

enter limp in mode. Engine acceleration could be severely limited (if not totally disabled) in this mode.

What Are The Symptoms Of The P2109 Code?

Symptoms of a P2109 trouble code may include:

- Lack of throttle response
- Limited or no acceleration
- Engine stall when allowed to idle
- Hesitation when accelerating
- Cruise control inoperative

What Are The Potential Causes Of The P2109 Code?

Causes for this P2109 throttle/pedal position sensor code may include:

- Defective TPS or PPS
- Open or shorted circuits between the TPS, PPS, and the PCM
- Corroded electrical connectors
- Faulty DBW actuator motor

How Can You Fix The P2109 Code?

Check your vehicle information source for technical service bulletins (TSB) which parallel the make, model, and engine size of the vehicle in question. The symptoms and codes stored must also match. If you find a matching TSB, it will aid you dramatically in your diagnosis.

Step 1

My diagnosis for a code P2109 would typically begin with a visual inspection of all system related wiring and connectors. I would also check the throttle plate for signs of carbon buildup or damage. Excessive carbon buildup, that holds the throttle body open at startup, may cause a code P2109 to be stored.

Clean carbon from the throttle body according to manufacturer's recommendations and repair or replace defective wiring or components as required, then retest the DBW system.

Step 2

You will need a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a reliable vehicle information source to accurately diagnose this code.

Next, connect the scanner to the vehicle diagnostic port and retrieve all stored trouble codes. Write

them down just in case you need the information later in your diagnosis. Keep any related freeze frame data, too. These notes may prove helpful, especially if the P2109 is intermittent. Now clear the codes and test-drive the vehicle to see if the code is reset.

Step 3

If the code is immediately reset, voltage spikes and inconsistencies, between the TPS, PPS, and the PCM, may be detected using the scanner data stream. Narrow the data stream to display only pertinent data for a faster response. If no spikes and/or inconsistencies are detected, use the DVOM to retrieve live data at each of the sensor signal wires. To retrieve live data with the DVOM, connect the positive test lead to the appropriate signal wire and the ground test lead to the ground circuit, then observe the DVOM display while operating the DBW.

Look for spikes in voltage as the throttle is actuated slowly from the closed position to wide open throttle. Voltage usually ranges from .5-volts at closed throttle to 4.5-volts at wide open throttle but consult your vehicle information source for exact specifications. If spikes or other irregularities are detected, suspect that the sensor being tested is defective. An oscilloscope is also a great tool for testing sensor operation.

Step 4

If the sensor is operating as designed, disconnect any related controllers and test individual circuits with the DVOM, System wiring diagrams and connector pin out charts can help you to establish which circuits to test and where to find them on the vehicle. Repair or replace system circuits as required.

Step 5

Suspect a defective PCM or a PCM programming error only if all system sensors and circuits check out.

Some manufacturers require that the throttle body, throttle actuator motor, and all throttle position sensors be replaced as a single unit

Severity Description

A P2109 should be considered severe because it can result in the vehicle being undriveable.

Reference Sources

Diagnostic Trouble Code (DTC) Charts and Descriptions for P2109 - Page 136.