

P0389: CRANKSHAFT POSITION SENSOR B CIRCUIT INTERMITTENT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	\$200-\$400
Can I Still Drive?	:	No

What Does The P0389 Code Mean?

If your vehicle has a stored code P0389, it means that the powertrain control module (PCM) detected an intermittent or erratic voltage signal from the secondary crankshaft position (CKP) sensor. When an OBD II system uses multiple CKP sensors, sensor B typically refers to a secondary CKP sensor.

Engine speed (RPM) and crankshaft position are monitored using the CKP sensor. The PCM calculates ignition spark timing using the position of the crankshaft.

When you consider that the camshafts turn at half the speed of the crankshaft, you see why it is so important that the PCM is able to distinguish between engine intake and exhaust strokes (rotations). CKP sensor circuitry includes one or more circuits dedicated to providing the PCM with an input signal, a 5-volt reference signal, and a ground.

CKP sensors are most commonly of the electro magnetic, hall-effect variety. They are usually mounted to the exterior of the engine and placed in very close proximity (usually only several thousandths of an inch) to a circuit completing engine ground. The engine ground is typically a reluctor ring (with precisely machined teeth) affixed to either end of the crankshaft or integrated into the crankshaft itself.

Some systems with multiple CKP sensors may use a reluctor ring on one end of the crankshaft and

another machined into the center of the crankshaft. Others will simply mount sensors in multiple positions around one reluctor ring.

The CKP sensor is mounted so that the reluctor ring passes within several thousandths of an inch of its magnetic tip as the crankshaft rotates. Raised areas (teeth) of the reluctor ring complete an electromagnetic circuit with the sensor and the indentations between the raised areas interrupt the circuit briefly. The PCM recognizes these continual circuit completions and interruptions as a waveform pattern representing voltage fluctuations.

Input signals from the CKP sensors are constantly monitored by the PCM. If crankshaft position sensor input voltage is too low over a set period of time, a P0389 code will be stored and a MIL may be illuminated.

Other crankshaft position sensor B trouble codes include [P0385](#), [P0386](#), [P0387](#), and [P0388](#).

What Are The Symptoms Of The P0389 Code?

Symptoms of this code may include:

- The engine will not start
- The tachometer (if equipped) does not register RPM when the engine is cranked
- Hesitation upon acceleration
- Poor engine performance
- Diminished fuel efficiency

What Are The Potential Causes Of The P0389 Code?

Potential causes for this code to set are:

- Defective CKP sensor
- Open or shorted wiring to the CKP sensor
- Corroded or fluid soaked connector at the CKP sensor
- Faulty PCM or PCM programming error

How Can You Fix The P0389 Code?

I would need a diagnostic scanner, with an integrated digital volt/ohmmeter (DVOM) and oscilloscope, before diagnosing a code P0389. A reliable vehicle information source, like All Data DIY will also be required.

Visually Inspect All System Related Wiring Harnesses And Connectors

A visual inspection of all system related wiring harnesses and connectors is a good place to begin your diagnosis. Circuits which have been contaminated with engine oil, coolant, or power steering

fluid should be carefully inspected as petroleum based fluids may compromise the protective insulation on wiring and lead to shorted or open circuits (and a stored P0389).

If the visual inspection yields no results, connect the scanner to the vehicle diagnostic port and retrieve all stored trouble codes and freeze frame data. Writing this information down can prove helpful if the P0389 proves to be intermittent. If possible, test-drive the vehicle to see if the code is reset.

If the P0389 is reset, locate a system wiring diagram from your vehicle information source and check for voltage at the CKP sensor. A five-volt reference is normally used for CKP sensor operation but check manufacturer's specifications for the vehicle in question.

One or more output circuits and a ground signal will also be present. If reference voltage and ground signals are detected at the CKP sensor connector, proceed to the next step.

Test The CKP Sensor

By using the DVOM, test the CKP sensor in question according to manufacturer's recommendations. If CKP sensor resistance levels fail to comply with manufacturer's recommendations, suspect that it is defective. Should CKP sensor resistance align with manufacturer's specifications, continue to the next step.

Attach the positive test lead of the oscilloscope to the signal output wire and connect the negative lead to the CKP sensor ground circuit after reconnecting the CKP sensor in question. Choose the appropriate voltage setting on the oscilloscope and turn it on. Observe the waveform pattern on the oscilloscope with the engine idling in park or neutral. Watch for voltage spikes or glitches in the waveform pattern.

If any discrepancies are detected, wiggle-test the wiring harness and connector (for the CKP sensor) to determine whether the problem is a loose connection or a defective sensor. If the magnetic tip of the CKP sensor has excessive metallic debris, or if there is a broken or worn reluctor ring, it may cause missing voltage blocks in the waveform pattern. Go to the next step if no problems are found in the waveform pattern.

Find the PCM connector and insert the test leads of the oscilloscope to CKP sensor signal input and ground circuits, respectively. Observe the waveform pattern. If the waveform pattern near the PCM connector is dissimilar to what was seen when the test leads were connected near the CKP sensor, suspect an open or shorted circuit between the CKP sensor connector and the PCM connector.

If this is true, disconnect all related controllers and test individual circuits with the DVOM. You will need to repair or replace shorted or open circuits. The PCM may be defective, or you may have a PCM programming error, if the waveform pattern is identical to what was seen when the test leads were connected near the CKP sensor.

Additional diagnostic notes:

- Some manufacturers recommend that CKP and CMP sensors are replaced as a set
- Use technical service bulletins to help in the diagnostic process

Severity Description

A no-start condition will likely accompany a stored code P0389. Therefore this code could be categorized as severe.

Reference Sources

[P0389: Crankshaft Position Sensor B Circuit Intermittent](#), OBD-Codes.