P042B: CATALYST TEMPERATURE SENSOR CIRCUIT RANGE/PERFORMANCE (BANK 1, SENSOR 2)

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$250-$350**
Can I Still Drive?	:	**Yes**

What Does The P042B Code Mean?

The catalytic converter is one of the most important pieces of emissions equipment on a vehicle. Exhaust gases pass through the catalytic converter where a chemical reaction takes place. This reaction converts carbon monoxide (CO), hydrocarbon (HO) and nitrogen oxides (NOx) – into harmless water (H2O) and carbon dioxide (CO2).

Converter efficiency is monitored by two oxygen sensors; one mounted upstream from the converter and one mounted downstream. By comparing the oxygen sensor (O2) signals, the powertrain control module (PCM) can determine if the catalytic converter is operating properly.

A standard zirconium pre-catalyst O2 sensor will rapidly switch its output signal between approximately 0.1 and 0.9 volts. A reading of 0.1 volts indicates a lean air/fuel mixture, whereas 0.9 volts indicates a rich mixture. If the converter is operating properly, the downstream sensor should ready steadily at around 0.45 volts.

Catalytic converter efficiency and temperature go hand and hand. If the converter is working as it should, the outlet temperature should be slightly higher than the inlet. The old rule of thumb was a difference of 100 degrees Fahrenheit. However, many modern vehicles might not show this much of a discrepancy.

There isn't a true "catalyst temperature sensor". What the codes outline in this article are referring

to is the oxygen sensor. The “bank 1” portion of the code indicates the problem is with the first bank of the engine. That is, the bank that includes cylinder #1. “Sensor 2” refers to the sensor mounted downstream of the catalytic converter.

Trouble code P042B is set when the PCM detects a range or performance problem in the bank 1, catalyst temperature sensor 2 circuit.

What Are The Symptoms Of The P042B Code?

Symptoms of a P042B engine code may include:

- Illuminated check engine light
- Poor engine performance
- Decreased fuel economy
- Increased emissions

What Are The Potential Causes Of The P042B Code?

Possible causes for this P042B code include:

- Faulty oxygen sensor
- Wiring problems
- Exhaust air/fuel mixture out of balance
- Faulty PCM/PCM programming

How Can You Fix The P042B Code?

Step 1: Inspect upstream oxygen sensor

Begin by visually inspecting the upstream oxygen sensor and the corresponding wiring. Look for loose connections, damaged wiring, etc. Also, check for exhaust leaks both visually and audibly. An exhaust leak can cause a false oxygen sensor code. If damage is found, repair as necessary, clear the code and see if it returns.

Step 2: Check for technical service bulletins

Next, check for technical service bulletins (TSBs) regarding the issue. If nothing is found, you will need to move forward to step by step diagnosis of the system. The following is a generalized procedure, as testing for this code varies between vehicles. To accurately test the system, you’ll want to refer to a vehicle make/model specific diagnostic flow chart.

Step 3: Check for other DTCs

Oxygen sensor codes can often be set because of engine performance problems that cause an out

of balance air/fuel mixture. If there are other DTCs stored, you'll want to address those first before proceeding with oxygen sensor diagnosis.

Step 4: Check Sensor Operation

This is best done using a scan tool, or better yet, an oscilloscope. Since most individuals don't have access to a scope, so we will cover oxygen sensor diagnosis using a scan tool. Connect the scan tool to the ODB port under the dash. Turn the scan tool on and choose the Bank 2 Sensor 1 voltage parameter from the data list.

Bring the engine up to operating temperature and view the sensor operation on the scan tool in graph mode. The sensor should rapidly switch between rich and lean (0.1 volts and 0.9 volts). If the sensor response is sluggish, it is probably faulty and should be replaced.

If the sensor reads above 0.55 volts constantly, either the sensor has failed, the air/fuel mixture is too rich or there is an open in the sensor signal circuit. If the sensor reads above 0.35 volts constantly, either the sensor has failed, the air/fuel mixture is too lean or there is high resistance or a short in the signal wire to the PCM.

Step 4: Check the circuit

Oxygen sensors produce their own voltage signal which is sent back to the PCM. Before proceeding, You'll want to consult the factory wiring diagrams to determine which wires are which. Autozone offers free online repair manuals for many vehicles and ALLDATADIY offers single vehicle subscriptions.

To check for continuity between the sensor and PCM, turn the ignition key to the "off" position and disconnect the O2 sensor connector. Connect a digital multimeter set to ohms (with the ignition off) between the O2 sensor signal terminal on the PCM and the signal wire. If the meter reads out of limits (OL) there is an open circuit between the PCM and sensor that will need to be located and repaired. If the meter reads a numeric value, there is continuity.

Next, you'll want to check the ground side of the circuit. To do this, turn the ignition key to the "off" position and disconnect the O2 sensor connector. Connect a digital multimeter set to ohms (with the ignition off) between the O2 sensor connector ground terminal (harness side) and chassis ground. If the meter reads out of limits (OL) there is an open circuit on the ground side of the circuit that will need to be located and repaired. If the meter reads a numeric value, there is continuity to ground.

Step 5: Check PCM

Finally, you'll want to check that the PCM is processing the O2 sensor signal properly. To do this, leave all the connectors attached and insert a back-probe meter lead into the signal terminal at the

PCM. Set the digital multimeter to the DC volts setting. With the engine warmed up, compare voltage reading on the meter to that on the scan tool. If the two do no match, the PCM is likely faulty or requires reprograming.

Reference Sources

P042B Catalyst Temperature Sensor Circuit Range Performance B1S2, OBD-Codes.