P0165: O2 SENSOR CIRCUIT SLOW RESPONSE (BANK 2 SENSOR 3)

OVERVIEW

Severity	:	Medium
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$300**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P0165 Code Mean?

This diagnostic trouble code (DTC) is a generic powertrain code, which means that it applies to all 1996-newer vehicles (Mitsubishi, Nissan, Volkswagen, Inifiniti, etc.). Although generic, the specific repair steps may vary depending on make/model.

If your OBD-II equipped vehicle has a stored P0165 code, it means that the powertrain control module (PCM) has detected a slow response time from a downstream (or post catalytic converter) oxygen (O2) sensor or circuit.

Bank 2 denotes the bank of the engine that does not contain the number one cylinder and Sensor 3 indicates that the malfunction is related to the downstream sensor in a system equipped with only three sensors (as opposed to a four-sensor system).

O2 sensors are constructed using a zirconium dioxide sensing element which is protected by a vented steel housing. The sensing element is connected to wire leads in the O2 sensor wiring harness using platinum electrodes.

The PCM is connected to the O2 sensor wiring harness using the controller area network (CAN). The PCM is supplied with data, pertaining to the percentage of oxygen particles in the engine exhaust as compared to the oxygen content of ambient air, by the O2 sensor.

Exhaust gases are pushed into the exhaust pipe and through the catalytic converter; afterward, they pass over the downstream O2 sensor. As exhaust flows through vent holes (in the steel housing) and across the sensing element, ambient air is drawn through the wire lead cavities and into a small chamber in the middle of the sensor.

The ambient air (in the chamber) is heated by the exhaust, forcing the oxygen ions to produce (energy) voltage. Deviations between the number of oxygen molecules in ambient air (drawn into the O2 sensor) and the concentration of oxygen ions in the spent exhaust gases cause the voltage to change. These changes cause the oxygen ions inside the O2 sensor to jump between platinum layers very rapidly and repetitiously.

Voltage variations occur as the rushing oxygen ions jump between platinum layers. The PCM identifies these variations in voltage as changes in exhaust oxygen concentration. These changes indicate that the engine is either running lean (too little fuel) or rich (too much fuel).

The voltage signal from the O2 sensor is low when more oxygen is present in the exhaust (lean condition) and high when less oxygen is present in the exhaust (rich condition). This data is used by the PCM primarily to monitor catalytic converter efficiency.

If the downstream O2 sensor circuit fails to cycle as expected, over a set period of time and under certain programmed circumstances, a P0165 code will be stored and a malfunction indicator lamp may be illuminated.

What Are The Symptoms Of The P0165 Code?

Symptoms of a P0165 code may include:

- A lack of general engine performance
- Diminished fuel efficiency
- Other related diagnostic trouble codes may also be stored
- Service engine soon lamp illumination

What Are The Potential Causes Of The P0165 Code?

Possible causes for this engine code include:

- Defective O2 sensor/s
- Burnt, broken, or disconnected wiring and/or connectors
- Clogged catalytic converter
- Engine exhaust leaks

How Can You Fix The P0165 Code?

Preparation

A good starting point is always to check for technical service bulletins (TSB) for your particular vehicle. Your issue may be a known issue with a known fix put out by the manufacturer and can save you time and money during diagnosis.

A diagnostic scanner, digital volt ohmmeter (DVOM), and a reliable vehicle information source are tools that I would require when diagnosing a code P0165.

Misfire codes, throttle position sensor codes, manifold air pressure code, and mass air flow sensor codes must be diagnosed and repaired prior to attempting to diagnose a code P0165. If the engine is not running efficiently a successful diagnosis cannot be reached.

Step 1

Most skilled technicians begin with a visual inspection of system wiring harnesses and connectors. I would focus on harnesses that are routed near hot exhaust pipes and manifolds, as well as those that are routed near sharp edges like the ones found on exhaust shields.

Step 2

Retrieve all stored trouble codes and freeze frame data by connecting the scanner to the vehicle diagnostic port. Write this information down because it may be helpful if the P0165 proves to be intermittent. Clear the codes and see if the P0165 is reset.

If the P0165 is reset, start the engine and let it idle (with the transmission in neutral or park), after allowing it to reach normal operating temperature. Observe O2 sensor input data on the scanner data stream. By narrowing the data stream display to include only pertinent data you can get a more accurate data response. If the engine is running efficiently, downstream O2 sensor data should reach a mid-line and only fluctuate slightly. If there is little or no fluctuation, a P0165 will be stored.

Step 3

To monitor live data from the O2 sensor, connect the DVOM test leads to the sensor ground and signal wires. The DVOM may also be used to check resistance of the O2 sensor in question, as well as voltage and ground signals. Disconnect related controllers prior to testing system circuit resistance with the DVOM.

Additional diagnostic notes:

- Once the PCM has entered closed loop operation, the downstream O2 sensor should not cycle as dramatically as upstream sensors but it should cycle regularly
- Low grade replacement catalytic converters are prone to repeated failure and should be avoided

Severity Description

Since a P0165 code means that the post catalytic converter O2 sensor has remained slow or unresponsive, it should be addressed at your earliest convenience.

Reference Sources

P0165: O2 Sensor Circuit Slow Response B2S3, OBD-Codes.