P0152: O2 SENSOR CIRCUIT HIGH VOLTAGE (BANK 2 SENSOR 1)

OVERVIEW

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

What Does The P0152 Code Mean?

The o2 (oxygen) sensors basically measure oxygen content in the exhaust. The PCM (powertrain control module) then uses this information to regulate fuel injector pulse. The o2 sensors are very important to proper operation of the engine. Problems with them can cause the PCM to add or take away too much fuel based on the faulty o2 sensor voltage.

A P0152 code refers to the Bank 2, sensor 1, o2 sensor. (Bank 1 would contain cylinder 1 and bank 2 is the opposite bank. Bank 2 doesn't necessarily contain cylinder 2.) "Bank 2" refers to the side of the exhaust that DOES NOT contain cylinder number 1 and "Sensor 1" indicates that it is the pre-cat sensor, or forward(first) sensor on that bank. It is a four wire sensor.

The PCM supplies a ground circuit and a reference voltage of about .5 volts on another circuit.

Also for the o2 heater there is a battery voltage supply wire and another ground circuit for that. The o2 sensor heater allows the o2 sensor to warm up faster, thus achieving closed loop in less time than it would normally take for the exhaust to warm the sensor up to operating temperature.

The O2 sensor varies the supplied reference voltage based on oxygen content in the exhaust. It is capable of varying from .1 to .9 volts, .1 indicating lean exhaust and .9 indicating rich exhaust.

NOTE: A condensed explanation of fuel trims: If the o2 sensor indicates that the oxygen voltage

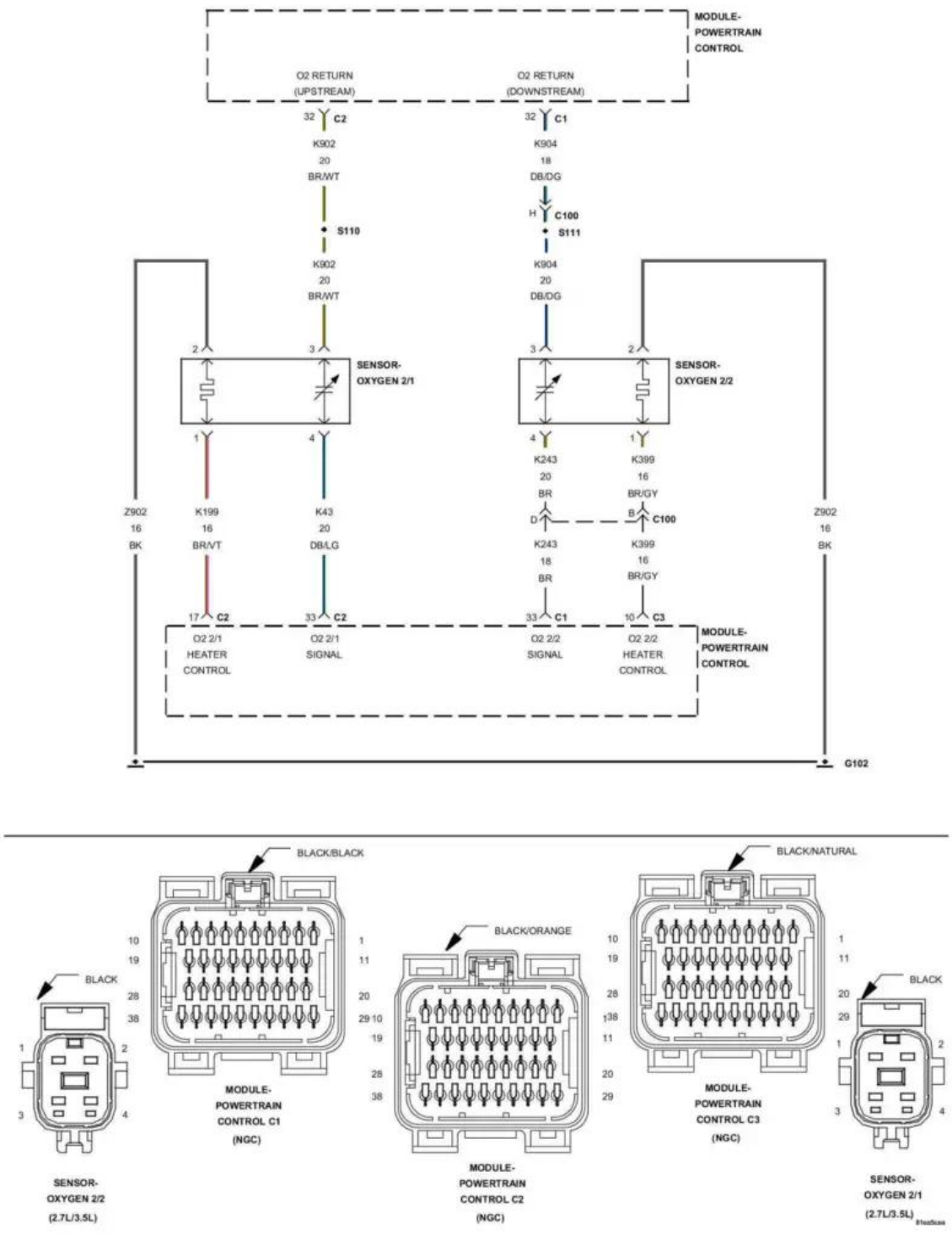
reading is .9 volts or high, the PCM interprets this as a rich condition in the exhaust and as a result decreases the amount of fuel entering the engine by shortening injector “on time”.

The STFT (short term fuel trims) would reflect this change. The opposite would occur when the PCM sees a lean condition. The PCM would add fuel which would be indicated by a single digit positive STFT reading. On a normal engine the front o2 sensors switch rapidly back and forth two or three times per second and the STFT would shift positive and negative single digits to add and remove fuel to compensate at a similar rate. This little “dance” goes on to keep the air/fuel ratio at it’s optimal level.

Short term fuel trims or STFT reflect immediate changes in fuel injector “on-time” while long term fuel trims or LTFT reflect changes in fuel over a longer period of time. If your STFT or LTFT readings are in the positive double digits (ten or above), this indicates the fuel system has been adding an abnormal amount of fuel than is necessary to keep the proper air/fuel ratio. It may be overcompentsating for a vacuum leak or a stuck lean o2 sensor, etc. The opposite would be true if the fuel trim readings are in the negative double digits.

It would indicate that the fuel system has been taking away excessive amounts of fuel, perhaps to compensate for leaking injectors or a stuck rich o2 sensor, etc. So when experiencing o2 related issues, reading your fuel trims can indicate what the PCM has been doing over the long term and short term with regard to fuel.

This code indicates that the o2 sensor was stuck too high or in the rich position. The PCM monitors this voltage and if it determines that the voltage is too high out of range for too long, P0152 may set.



P0152 wiring diagram

What Are The Symptoms Of The P0152 Code?

Symptoms may include:

- MIL (Malfunction Indicator Lamp) illumination

- Engine may run very rough
- Engine may be running lean or rich depending on if the o2 sensor is reading correctly or incorrectly
- Lack of power
- Increased fuel consumption

What Are The Potential Causes Of The P0152 Code?

Potential causes of an P0152 code include:

- Bad bank 2, 1 o2 sensor incorrectly reading rich condition
- Engine running rich and o2 sensor
- Correctly reading rich condition
- Signal shorted to voltage in harness
- Wiring harness damage/melted due to contact with exhaust components
- Vacuum leak (make have lean codes (P0171, P0174) present with it)
- Leaking injectors
- Bad fuel pressure regulator
- Bad PCM

How Can You Fix The P0152 Code?

If you have any lean or rich codes associated with this code, focus on fixing these first because these can cause the o2 sensor voltage readings to appear to be faulty when they are in fact only reading correctly.

So, with the engine running at operating temperature, use a scan tool to observe the Bank 2,1 o2 sensor voltage reading. Is it high? If so, look at the long term and short term fuel trim readings. The fuel trims are affected by the o2 sensors as noted above.

If the LTFT reading for that bank is indicating negative double digits (PCM trying to take away fuel to compensate for problem) try inducing a vacuum leak to see if the sensor voltage then goes lean and the fuel trims increase. If the o2 sensor responds, suspect a problem with the engine, not the sensor. There may be other engine codes to help you.

If the o2 sensor reading remains high (0.9 volts or above) and won't respond then shut off engine. With KOEO (Key on engine off) disconnect the o2 sensor and look for signs of corrosion or water intrustion. Repair as necessary. The voltage reading should now be about 0.5 volts. If so, replace the o2 sensor, it's shorted internally.

If after unplugging the o2 sensor the voltage reading on the scan tool doesn't change, then suspect wiring problems. Inspect the harness and look for any melted wires or anywhere that the o2 sensor harness is making contact with the exhaust components. If you are unsure, you can check for

continuity of all four wires between the sensor and the PCM with an ohmmeter. Any resistance at all indicates a problem. Repair as necessary.

Reference Sources

- Technical Service Bulletin for P0152 - Ford
- ENGINE CONTROL SYSTEM [GASOLINE ENGINE (V-6)] SERVICE MANUAL for P0152 - Pages 430-432.