

P0180: FUEL TEMPERATURE SENSOR A CIRCUIT MALFUNCTION

OVERVIEW

Severity	:	<div><div>High</div></div>
DIY Difficulty Level	:	<div><div>Intermediate</div></div>
Repair Cost	:	\$250-\$300
Can I Still Drive?	:	Yes (Short-term only)

What Does The P0180 Code Mean?

If your OBD II equipped vehicle has stored a code P0180; it simply means that the powertrain control module (PCM) has detected a voltage signal from the fuel temperature sensor/flex fuel sensor or circuit "A" that is not within a programmed range. "A" refers to an area of circuitry as opposed to a particular circuit or component.

The fuel temperature sensor is typically integrated into a single housing (along with the flex fuel sensor) known as a fuel composition sensor. It is actually a small computerized device designed to provide the PCM with an accurate fuel composition and fuel temperature reading.

Fuel which passes through the inline sensor is monitored to determine what degree of ethanol, water, and other contaminants is present. The fuel composition sensor calculates fuel composition and fuel temperature and inputs an electrical signal to the PCM that reflects not only what contaminants are present but also to what degree the fuel has been contaminated.

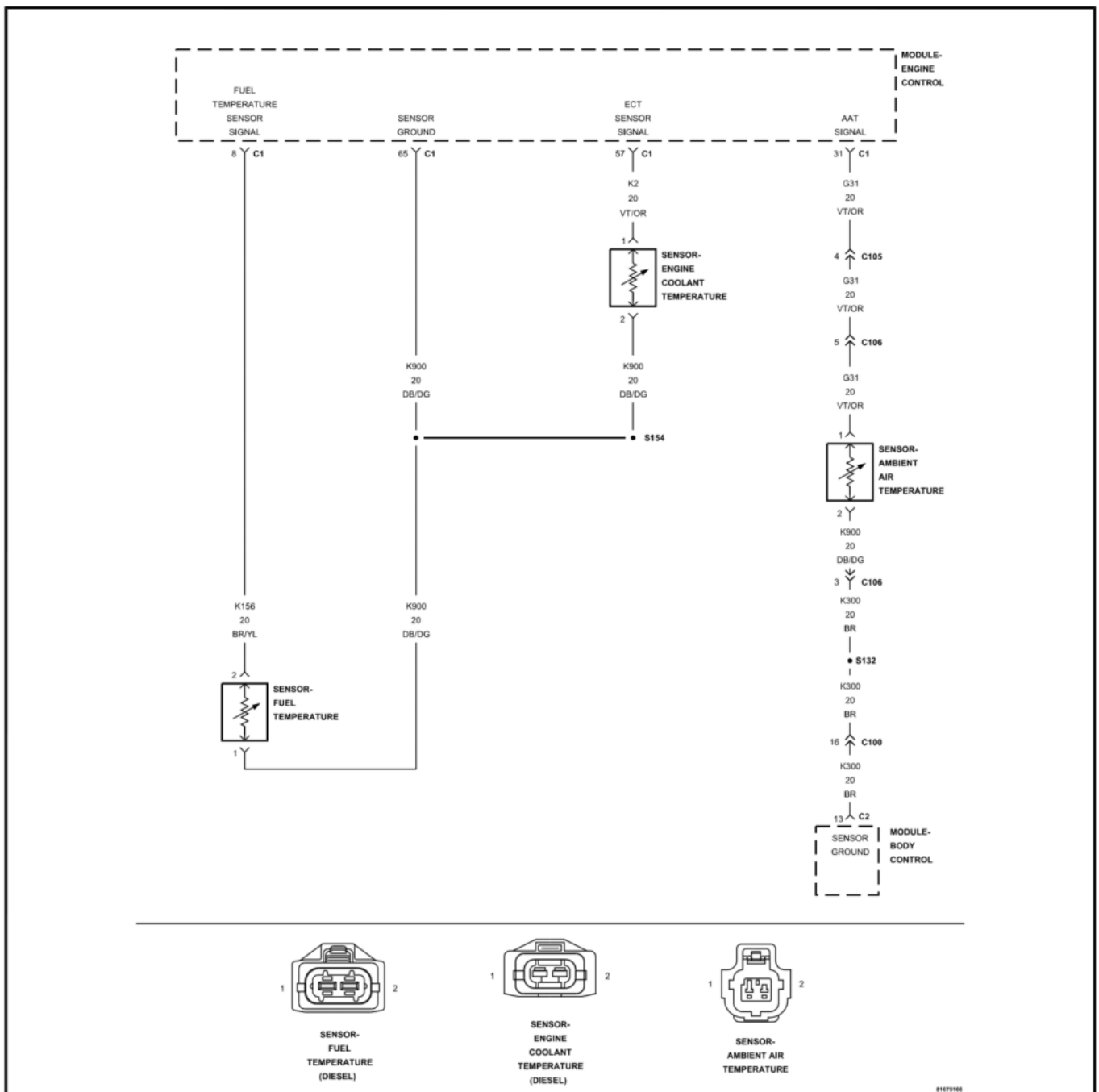
The contamination is measured according to the percentage of contaminants to fuel and is received by the PCM as a square waveform of voltage. The waveform pattern varies in frequency depending upon the degree of contaminants present in the fuel; the closer the waveform frequency, the higher the degree of fuel contamination.

This composes the vertical portion of the waveform. The fuel composition sensor monitors the

amount of ethanol present in the fuel separately from other contaminants. Flex fuel vehicles are designed to function efficiently when fuel composition levels are as high as eighty-five-percent ethanol.

The horizontal portion of the waveform, or the pulse width, indicates fuel temperature. The greater the pulse width speed, the higher the temperature of the fuel passing through the fuel composition sensor. Pulse width modulation varies (on most applications) between one and five-milliseconds (hundredths-of-a-second).

If the PCM detects an input signal from the fuel composition sensor that indicates that the fuel temperature is not within a programmed range, or if the fuel temperature varies from ambient temperature (intake air temperature on some models) by a greater degree than expected, a P0180 code will be stored and a malfunction indicator lamp (MIL) may be illuminated. Some models may require multiple ignition cycles (with a failure) for MIL illumination.



P0180 wiring diagram

What Are The Symptoms Of The P0180 Code?

Symptoms of this code may include:

- There will likely be no symptoms from the conditions for a P0180 being stored
- Other fuel composition codes may be present
- MIL illumination will eventually occur

What Are The Potential Causes Of The P0180 Code?

Potential causes for this code to set are:

- Defective fuel temperature/consumption sensor "A"
- A bad ambient temperature sensor
- Faulty intake air temperature sensor
- Open, shorted, or damaged wiring or connectors
- PCM or a PCM programming error

How Can You Fix The P0180 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.

To diagnose a code P0180, I would typically gain access to a diagnostic scanner, a digital volt/ohmmeter (DVOM), an oscilloscope, an infrared thermometer, and a vehicle information source like All Data DIY. Some scanners have a DVOM and a portable oscilloscope built-in; that would serve you well in this scenario.

Step 1

I like to begin any diagnosis with a visual inspection of all related wiring harnesses and connectors. Repair or replace damaged or burnt components as required and retest the system. When multiple failure cycles are required for MIL illumination, I have found that using OBD II readiness mode helpful. When I have completed my repairs, I clear the codes and operate the vehicle normally. If the PCM enters readiness mode, I know that my repairs were successful. If the code is reset, I know that a malfunction still exists.

Step 2

The fuel temperature sensor (integrated into the fuel composition sensor) is typically supplied with a five-volt reference voltage and a ground. The variable resistance sensor completes the circuit. Use the DVOM to test reference voltage and ground at the fuel temp sensor connector. If reference voltage is not present, use the DVOM to test the corresponding circuits at the PCM connector.

Repair open circuits as required if there is a reference voltage signal at the PCM connector. Caution: See note at the bottom of the page regarding disconnecting the controllers. If no reference voltage is present at the PCM connector, suspect a faulty PCM or a programming error.

PCM replacement or reprogramming will require professional assistance. If there is no fuel temp sensor ground, use your vehicle information source and locate the appropriate ground to make sure that it is secure.

Step 3

If the reference and ground are present at the fuel temperature sensor A connector, connect the test leads of the oscilloscope to the appropriate circuits and observe live data in the form of waveform patterns. Use the infrared thermometer to measure actual fuel temperature and compare it with the temperature reflected by the waveform patterns on the oscilloscope. If the fuel temperature reflected by the fuel temperature sensor fails to coincide with that of the thermometer, suspect that the fuel temperature sensor is defective.

Additional diagnostic notes:

- Use the DVOM to test fuel temperature sensor resistance according to manufacturer's recommendations
- Disconnect all related controllers prior to testing circuit resistance with the DVOM

Severity Description

Fuel temperature is monitored by the PCM to calculate fuel delivery strategy in flex fuel vehicles so a code P0180 should be treated as severe.

Reference Sources

[Diagnostic Trouble Code \(DTC\) Charts and Descriptions for P0180](#) - Page 43.