P2452: DIESEL PARTICULATE FILTER PRESSURE SENSOR A CIRCUIT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$200-$450**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P2452 Code Mean?

If your vehicle is exhibiting a service engine soon indicator, accompanied by a code P2452, the powertrain control module (PCM) has detected a malfunction in the electrical circuit of the diesel particulate filter (DPF) pressure sensor that has been given the designation A. Obviously, this code should be presented only in vehicles that are powered by a diesel engine.

The DPF is designed to remove ninety-percent of carbon particles (soot) from diesel engine exhaust. Soot is most commonly associated with the black smoke that billows from the exhaust when a diesel engine is under heavy acceleration. The DPF is contained in a steel inline exhaust housing that resembles a muffler or catalytic converter. It is positioned ahead of the catalytic converter and/or the NOx trap.

While large soot particles are trapped in the DPF element, small particles and other (exhaust gas) compounds are allowed to pass through. The DPF utilizes a wide variety of elemental compounds to trap soot and still allow engine exhaust to pass through. They include paper, metal fibers, ceramic fibers, silicone wall fibers, and cordierite wall fibers.

Cordierite is a type of ceramic based filtration and the most common type of fiber used in DPF applications. It is relatively inexpensive and possesses excellent filtration characteristics. Unfortunately Cordierite has issues with melting down at high temperatures, making it susceptible to malfunctions when used in passive DPF systems.

The heart of any DPF is the filtration element. As engine exhaust passes through the element, large particles of soot are trapped between the fibers. As soot is accumulated, exhaust pressure increases accordingly. After an adequate amount of soot is accumulated (and exhaust pressure has reached a programmed degree), the filtration element must be regenerated in order to allow spent exhaust gases to continue flowing through the DPF.

Active DPF systems are regenerated automatically. In other words, the PCM is programmed to inject chemicals (including but not limited to diesel fuel and diesel exhaust fluid) into the exhaust at programmed intervals. This action causes an increase in exhaust temperature and burns trapped soot particles; releasing them as ions of nitrogen and oxygen.

A similar process is used in passive DPF systems but requires input from the owner and (in some instances) a qualified repair facility. Once the regeneration procedure has been initiated, it may take hours to complete. Other passive regeneration systems require that the DPF be removed from the vehicle and serviced using a specialized machine that completes the process and disposes of soot particles appropriately. When soot particles are removed sufficiently, the DPF is considered regenerated and exhaust pressure should react accordingly.

In most cases, the DPF pressure sensor is mounted in the engine compartment, away from the DPF. It monitors exhaust back pressure before it enters the DPF. This is accomplished using (one or more) silicon hoses that are connected to the DPF (near the inlet) and the DPF pressure sensor.

When the PCM detects an exhaust pressure condition that doesn't coincide with manufacturer's specifications, or an electrical input signal from the DPF pressure sensor A that exceeds programmed limitations, a code P2452 will be stored and a service engine soon lamp illuminated.

What Are The Symptoms Of The P2452 Code?

Symptoms of a P2452 code may include:

- Excessive black smoke from the exhaust
- Diminished engine performance
- Higher engine temperatures
- Higher transmission temperatures

What Are The Potential Causes Of The P2452 Code?

Potential causes for this code to set are:

- The diesel exhaust fluid reservoir is empty
- Incorrect diesel exhaust fluid
- Defective DPF pressure sensor
- Clogged DPF pressure sensor tubes/hoses

- Open or shorted circuit/s in the DPF pressure sensor A circuit
- Inefficient DPF regeneration
- Inoperative active DPF regeneration system

How Can You Fix The P2452 Code?

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, a digital volt/ohmmeter, and a manufacturer's service manual will be needed to diagnose a code P2452. An infrared thermometer may also be of use.

Step 1

I typically begin my diagnosis with a visual inspection of related harnesses and connectors. I would pay particular attention to wiring that is routed near hot exhaust components and sharp edges. Test the battery and battery terminal ends at this time and check alternator output.

Step 2

Next, I would connect the scanner and retrieve all stored codes and freeze frame data. I would write it down for future reference. It may come in handy if this code proves to be intermittent. Now, clear the codes and test drive the vehicle.

If the code immediately resets, check to make sure that diesel exhaust fluid is present (where applicable) and that it is of the correct type. The most common cause of this code being stored is a lack of diesel exhaust fluid. Without the proper type of diesel exhaust fluid, the DPF will not be regenerated effectively, causing a potential increase in exhaust pressure.

Step 3

Consult the manufacturer's service manual for instructions on how to test the DPF pressure sensor using the DVOM. If the sensor fails to comply with manufacturer's resistance specifications, it must be replaced.

If the sensor seems good, check for clogs and/or breakage in the DPF pressure sensor supply hoses. Clean or replace hoses as required. High temp silicon hoses must be used.

If the sensor is operational and supply lines are intact, begin testing system circuits. Disconnect all related control modules prior to testing resistance and/or continuity with the DVOM. Repair or replace open or shorted circuits as needed.

Additional diagnostic notes:

- If DPF pressure sensor hoses are melted or cracked, they may need to be rerouted after replacement
- Consult the owners/service manual to find out if your vehicle is equipped with an active DPF regeneration system or a passive system
- Clogged sensor ports and clogged sensor tubes are common

Severity Description

The conditions for causing this code to be stored could lead to internal engine or fuel system damage and should be addressed immediately.

Reference Sources

P2452 Diesel Particulate Filter Pressure Sensor A Circuit, OBD-Codes.