P2453: DIESEL PARTICULATE FILTER PRESSURE SENSOR A CIRCUIT RANGE/PERFORMANCE

OVERVIEW

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

What Does The P2453 Code Mean?

When I encounter a code P2453, I have discovered that 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. This code should be exhibited only in vehicles that are equipped with a diesel engine.

DPF systems in OBD-II vehicles are designed to remove ninety-percent of carbon particles (soot) from diesel engine exhaust. The black smoke that billows from the exhaust of a diesel engine (under heavy acceleration) can be attributed to soot.

The DPF is housed in a steel inline exhaust housing which resembles a muffler or catalytic converter. It is positioned before the catalytic converter and/or the NOx trap. Ideally, large soot particles are trapped in the DPF element. Small particles and other (exhaust gas) compounds are allowed to flow through.

A wide array of elemental compounds are used (by the DPF) to trap large soot particles and allow engine exhaust to flow through. Included are: paper fibers, metal fibers, ceramic fibers, silicone wall fibers, and cordierite wall fibers. The most common type of fiber used in DPF applications is cordierite which is ceramic based.

Cordierite is inexpensive and has excellent filtration characteristics. Regrettably, Cordierite has

problems with overheating at higher temperatures. This makes it susceptible to malfunctions in vehicles equipped with passive DPF systems.

The core of any DPF is the filtration element. Large particles of soot are trapped between the fibers as engine exhaust flows through the element. Exhaust pressure increases as soot is accumulated. After exhaust pressure has reached a programmed degree and an adequate amount of soot is accumulated, the filtration element must be regenerated. This allows spent exhaust gases to continue flowing through the DPF.

DPF systems are regenerated automatically are called active DPF systems. The PCM is programmed to inject chemicals (including but not limited to diesel fuel and diesel exhaust fluid) into the exhaust at programmed intervals in and active DPF system. The injection causes an increase in exhaust temperature and burns trapped soot particles; releasing them as ions of nitrogen and oxygen.

Passive DPF systems utilize a similar process but require input from the owner. In some cases, a qualified repair facility must handle the regeneration. It may take hours to complete the task once the regeneration procedure has been initiated. In some cases, the DPF must be removed from the vehicle and serviced using a specialized machine that completes the process and disposes of the soot particles appropriately.

The DPF is considered regenerated when the soot particles are sufficiently removed. Afterwards, exhaust pressure should react accordingly.

The DPF pressure sensor is usually mounted in the engine compartment and away from the DPF. Exhaust back pressure is monitored as it enters the DPF. Silicon hoses (connected to the DPF and the DPF pressure sensor) are used to accomplish this task.

A code P2453 will be stored if the PCM detects an exhaust pressure condition that doesn't coincide with manufacturer's specifications or an electrical input signal from DPF pressure sensor A which exceeds programmed limitations.

What Are The Symptoms Of The P2453 Code?

Symptoms of a P2453 code may include:

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

What Are The Potential Causes Of The P2453 Code?

Potential causes for this code to set are:

- Clogged DPF pressure sensor tubes/hoses
- Faulty DPF pressure sensor
- The diesel exhaust fluid reservoir may be empty
- Improper diesel exhaust fluid
- Open or shorted circuit/s in the DPF pressure sensor A circuit
- Inept DPF regeneration
- The active DPF regeneration system is inoperative

How Can You Fix The P2453 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 manufacturer's service manual, a diagnostic scanner, and a digital volt/ohmmeter will be instrumental in diagnosing a code P2453. An infrared thermometer may also be helpful.

Step 1

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

Step 2

I would continue by connecting the scanner and retrieving all stored codes and freeze frame data. Be sure to write this information down for future reference. Clear the codes and test drive the vehicle.

Step 3

Check to make sure that diesel exhaust fluid is present (where applicable) and that it is of the correct type, especially if the code immediately resets. A lack of diesel exhaust fluid is possibly the most common cause of this code being stored. The DPF will not be regenerated effectively without the proper type of diesel exhaust fluid. Poor DPF regeneration will cause an increase in exhaust pressure.

Step 4

Using the DVOM, test the DPF pressure sensor. Consult the manufacturer's service manual for instructions. The sensor must be replaced if it fails to comply with manufacturer's resistance specifications.

Step 5

Check for clogs and/or breakage in the DPF pressure sensor supply hoses, if the sensor checks out. Clear or replace hoses as required (high temp silicon hoses must be used).

Step 6

If supply lines are intact and the sensor is operational, begin testing system circuits. Disconnect all related controllers before testing resistance and/or continuity with the DVOM. Repair or replace open or shorted circuits as necessary.

Additional diagnostic notes:

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

Severity Description

This code should be considered urgent, as it indicates conditions that could lead to internal engine or fuel system damage.

Reference Sources

P2453 Diesel Particulate Filter Pressure Sensor A Circuit Range/Performance, OBD-Codes.