



DPF most common Diagnostic Trouble Codes

Diagnostic Trouble Codes (DTC) are codes that are stored by the on-board computer diagnostic system (OBD), in response to a problem found in the car, when a sensor reports a reading that is outside the accepted or programmed range.

The codes identify a particular problem area and are intended to provide the technician with a guide to where a fault might be occurring within the car. The codes should be used in conjunction with the vehicle's service manual to discover which systems, circuits or components should be tested to fully diagnose the fault.

Any part or component should not be replaced only with reference to a DTC. The vehicle service manual should always be consulted for more information on possible causes of the fault, along with required testing. If a DTC reports a sensor fault, replacement of the sensor is unlikely to resolve the underlying problem. The fault is most likely to be caused by the systems that the sensor is monitoring, but might even be caused by the wiring to the sensor itself.

DTCs may also be triggered by faults earlier down the line. For example, a dirty mass air flow sensor might be causing the car to overcompensate in its fuel-trim adjustments. As a result, oxygen sensors are likely to report fuel mixture problems.

There is a list of DTC generally used by all vehicle manufacturers. However, all DTC named P1*** are manufacturer specific codes, and therefore, it's impossible to find any general guidance about them.

We offer below a list containing the most common DTC about Diesel Particulate Filters (DPF), including their description and some potential causes for each of them. Finally, you'll find some recommendations for clearing the codes and general advice about DPF maintenance.



P0470 - Exhaust pressure sensor malfunction

P0471 - Exhaust pressure sensor range/performance

These codes are strictly about the incoming signal from the exhaust pressure sensor not matching intake manifold pressure or ambient air pressure at key on. This can be an electrical circuit fault or it can be mechanical.

The causes for these codes may include:

- Blockage in the pipe from the exhaust manifold to the pressure sensor.
- Exhaust Gas Recirculation (EGR) system / air inlet / charge air leaks.
- Faulty exhaust gas pressure sensor.
- Failure on the powertrain control module (PCM) (highly unlikely).

If the cause for the error is not repaired, this could lead to a soot blockage in the particulate filter, which can make error code P242F appear.

P2002 - DPF efficiency below threshold (Bank 1)

P2003 - DPF efficiency below threshold (Bank 2)

A properly working DPF creates a slight back pressure. The vehicle's ECU -- computer -- has back pressure sensors on the DPF to monitor its functionality. If for any reason it senses a discrepancy in the pressure limits, it will set and store the code P2002/3, indicating a malfunction.

Theoretically, after a regeneration occurs, the light will go out and the code will clear itself. This is why it's called a soft code -- it indicates a fault in "real time" and erases as the fault corrects itself. A hard code, on the contrary, remains until the repair is completed and it must be erased manually with a scanner.

If regeneration doesn't happen, the soot amount will increase and finally, there will be a complete blockage in the dpf. It's important therefore to stay watchful in case the code doesn't clear itself.

The causes for these codes may include:

- Too much short distance driving will cause this code. It takes heat (at least 500°) to burn off the soot in the DPF. Even with the ECUs efforts in



engine management, it is nearly impossible to reach this temperature driving only for a short time.

- An air leak would change the sensor readings, thus resulting in the code.
- Fuel with a large percentage of sulfur will clog the DPF faster.
- Damaged DPF.

P2031 - Exhaust gas temperature sensor circuit (bank 1 sensor 2)

P2032 - Exhaust gas temperature sensor circuit low (bank 1 sensor 2)

P2033 - Exhaust gas temperature sensor circuit high (bank 1 sensor 2)

P2034 - Exhaust gas temperature sensor circuit (bank 2 sensor 2)

P2035 - Exhaust gas temperature sensor circuit low (bank 2 sensor 2)

P2036 - Exhaust gas temperature sensor circuit high (bank 2 sensor 2)

These diagnostic trouble code refer to the condition of the exhaust gas temperature sensor. An EGT sensor is found on most models. It monitors and regulates the regeneration cycle, and it also protects the dpf from excessive heat damage. In diesel vehicles, a controlled temperature increase within parameters will allow the DPF to regenerate itself.

The causes for these codes may include:

- Loose or corroded connectors or terminals (quite likely).
- Broken wires or missing insulation.
- Faulty sensor.
- It's possible, although not probable, that the PCM has failed.

P242F - Dpf restriction - Ash accumulation

When a P242F error code is stored, it means that the powertrain control module (PCM) has detected a level of ash restriction in the diesel particulate filter (DPF) deemed to be restrictive. Ash accumulation is a side effect of DPF filtration and regeneration. It is caused by the extended use of incombustible materials like lubricant additives, trace elements in diesel fuel/additives, as well



as debris from engine wear and corrosion. Ash typically accumulates along the DPF walls or in plugs near the rear of the filtration element. This significantly decreases the effectiveness of the filtration element and dramatically reduces the filter's soot storage capacity.

Because the ash is situated near the walls and rear of the DPF, soot particles are forced to the front, effectively reducing the filtering surface. When the PCM detects these notable, a code P242F will be stored and a malfunction indicator lamp (MIL) may be illuminated.

The conditions for causing the code P242F to be stored may also cause internal engine or fuel system severe damage and should be addressed as soon as possible.

The causes for this code may include:

- Excessive ash accumulation in the DPF.
- Defective DPF pressure sensor.
- Clogged DPF pressure sensor pipes/hoses.
- Open or shorted circuit/s in the DPF pressure sensor circuit.
- Inefficient DPF regeneration.
- Overuse of engine and/or fuel system additives.

P244A - DPF differential pressure too low (Bank 1)

P244B - DPF differential pressure too high (Bank 1)

Routinely, the ECU runs diagnostic checks to make sure that the DPF is present and functioning correctly, through the exhaust pressure. The ECU will set the fault if it detects that the DPF is not present in the exhaust system. Active regeneration of the DPF will be disabled. However, the ECU will turn off the MIL lamp immediately after the diagnostic runs and passes.

The causes for these errors code may include:

- Exhaust leaks before or near the diesel particulate filter pressure sensor.
- Leaks in the diesel particulate filter pressure sensor connecting hose.
- Faulty diesel particulate filter.
- Defective pressure sensor.

**P2452 - DPF pressure sensor A circuit****P2453 - DPF pressure sensor A circuit range/performance**

If your vehicle is exhibiting a service engine indicator, accompanied by one of these error codes, 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.

In some 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. When the PCM detects an exhaust pressure condition that doesn't coincide with manufacturer's specifications, an error code will be stored and a service engine lamp illuminated.

The causes for these codes may include:

- The diesel exhaust fluid reservoir is empty.
- Incorrect diesel exhaust fluid.
- Defective DPF pressure sensor.
- Clogged DPF pressure sensor pipes/hoses.
- Open or shorted circuit/s in the DPF pressure sensor A circuit.
- Inefficient DPF regeneration.
- Inoperative active DPF regeneration system.
- Incorrect installation of a new DPF.
- Incorrect clearance (or not clearance at all) of previous error codes.

P2454 - DPF pressure sensor A circuit low

When a code P2454 is stored, the powertrain control module (PCM) has detected a low (or at least, lower than manufacturer's specifications) pressure signal from the circuit of the diesel particulate filter (DPF) pressure sensor that has been given the designation A.

The causes for this code may include:

- Exhaust leaks.



- Clogged DPF pressure sensor tubes/hoses.
- Open or shorted circuit/s in the DPF pressure sensor A circuit.
- Faulty DPF pressure sensor.

P2455 - DPF pressure sensor A circuit high

When a code P2455 is stored, the powertrain control module (PCM) has detected a high (or at least, higher than specifications) pressure signal from the circuit of the diesel particulate filter (DPF) pressure sensor that has been given the designation A. Conditions that could lead to this code may also lead to internal engine or fuel system damage and should be considered urgent.

The causes for this code may include:

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

P2458 - DPF regeneration duration

This particular code indicates that the regeneration process has not been completed properly. If the PCM detects that the regeneration process has not been completed as specified, or if exhaust pressure fails to reach the desired level, this code could be stored and a malfunction indicator lamp may be illuminated.

The causes for this code may include:

- Insufficient/incorrect diesel exhaust fluid.
- Open or shorted circuit/s in the DPF pressure sensor A circuit.
- Defective PCM or a PCM programming error.



- Defective DPF pressure sensor.
- Faulty DPF.

P2459 - DPF regeneration frequency

The P2459 code indicates that the regeneration process has not been completed with the desired frequency, over a programmed period of time or mileage. If exhaust pressure fails to reach the desired level or if the PCM detects that the regeneration process has not occurred with the desired degree of regularity, a P2459 will be stored and a malfunction indicator lamp may be illuminated. Because DPF regeneration is critical to maintaining desired exhaust back pressure, addressing a P2459 should be considered a priority.

The causes for this code may include:

- Faulty exhaust pressure sensor.
- Insufficient/incorrect diesel exhaust fluid
- Shorted or open wiring to the DPF injection system
- Defective PCM or a PCM programming error
- Faulty DPF.

P2463 - DPF Restriction - Soot accumulation

This code means the powertrain control module (PCM) has detected a restriction (due to soot accumulation) in the diesel particulate filter (DPF) system. If the PCM detects exhaust pressure levels that rise over a programmed limit, a P2463 will be stored and a malfunction indicator lamp (MIL) may be illuminated. Since DPF restriction may lead to engine or fuel system damage, this code should be considered severe and addressed as soon as possible.

The causes for this code may include:

- Excessive soot accumulation due to insufficient DPF regeneration.
- Insufficient/incorrect diesel exhaust fluid.



- Shorted or open wiring to the DPF injection system or exhaust pressure sensor.
- Defective PCM or a PCM programming error.
- Faulty exhaust pressure sensor.



Some closing remarks

Since there are so many potential causes for every DPF error code, it's impossible to make a general rule guidance for clearing them. Therefore, it's essential that the garage staff is professional and well experienced with DPF diagnosis, repairing and replacement. Also, it's imperative for the workshop to have the necessary technical resources, as modern as possible. The DPF system is particularly complex, and it's not easy to tell where or why is failing. Moreover, the Engine Control Module (ECM) plays a key role when it's time to reset the code so it's very important to know how to manage it.

A good starting point is always checking for technical service bulletins (TSB) for the 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.

It's important to have in mind that just replacing the DPF will not solve a non-DPF related problem. If there are any issues with the EGR system (pipes and valves), the engine injectors, the engine turbo and such kind of components, they will remain no matter how many filters are installed. Bear in mind that even the quality of the diesel fuel and/or the oil may be factors in this kind of breakdown, so try to be as precise and thorough as possible.

Before replacing the DPF, you should always check:

- The conditions of pressure/temperature sensors and their wires. Consider replacing them if necessary.
- Clogged sensor ports and clogged sensor tubes are a common failure. Be sure to have them checked. Replace hoses as required.
- If sensors are functioning properly and supply lines are intact, try testing system circuits. Disconnect all related control modules prior to testing circuit resistance and/or continuity with a voltmeter. Repair or replace open or shorted circuits as required.

A popular solution for resolving DPF blockage issues is to clean the inside with an air compressor, a pressure water jet or even with ultrasound devices. Despite the advantage of being cheaper than replacing the DPF, the inner ceramic substrate can be seriously damaged. Even the tiniest crack can result in a complete fragmentation in the short/middle term. We highly advise against such procedures.



There are ways in which you can lower the chances of your DPF becoming blocked up in the first instance such as:

- **Using a premium diesel fuel:** this will give a cleaner burn and lower the soot being produced by the engine.
- **Use the correct grade oil:** engine oil absorbs soot. The better the oil, the more soot it can absorb.
- **Interim oil changes:** long life servicing pushes engine oil to the limit. An annual (or earlier, depending on the mileage) oil change will reduce the chances of the expensive repairs.
- **Keeping the tank topped up:** it's been noticed that certain vehicles will not regenerate the DPF if there is less than 10L of fuel in the tank.
- **Longer drives:** town driving contributes to more soot accumulation and prevents DPF regeneration. If this is your case, take the vehicle for a run once every three weeks or a month, for around 15-20 minutes at no less than 2000 rpm. This should enable the DPF to regenerate itself should it need to.

Note: This information guide has been extracted from several reference manuals and technical web sites. It is presented for informative purposes only. It should not be intended as technical repairing guide. We cannot and will not be held responsible for any damages caused on any vehicle due to misuse of this document.