MANUAL

Diesel-Particulate-Filter - DPF

Tips and Tricks

This manual will explain what a diesel particulate filter is and how it works in your car. We especially focus on explaining how a DPF can be damaged and how you avoid such circumstances. We explain regeneration/burning free and specific fault codes concerning DPF.

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Normal OBD Testers are limited to a very small number of control units (ECUs) and an even smaller number of fault codes. Carly reads practically all compatible ECUs. This is usually only possible with expensive expert hardware.

On the last page of this manual you will find the most important links of Carly for BMW.

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Here we go:
Diesel-Particulate-Filter – DPF: Tips and Tricks

Safety Notes

Harmful/ Toxic Hazard
DPF regeneration and any other work connected to this system (change/replacement) are only to be performed outside or with appropriate extraction and / or ventilation system. Don´t breathe in exhaust. If necessary, please wear face mask.

Soot-Particulate contact
Eye contact: immediately rinse eye with water for several minutes. Call a doctor.
Skin contact: immediately neutralize with suds, rinse with clean water.
Inhalation: immediately get fresh air. Go see a doctor

Danger of fire

Particulate filter and exhaust system can overheat extremely while regeneration or dysfunction compared to normal operation. Don´t park vehicle on or close to flammable material after successful regeneration.

1. What´s the diesel particulate filter (DPF) and how does it work:

The diesel particulate filter, short DPF, is part of the exhaust line and exhaust aftertreatment system. It looks like a convertor / muffler.

The DPF will absorb soot and fine dust developing while diesel fuel combustion and will retain it till regeneration. Diesel exhaust particulates occur due to certain characteristics of diesel fuel and also to a special combustion behavior of a diesel engine.
Particulates in diesel exhaust consist mainly of soot and unburned carbon hydride.

The DPF can only save a certain amount of soot (and ash) and has to regenerate or burn free in individual intervals.
While burning free, a significantly higher temperature is created in the exhaust system than usual. This and the physical features of the DPF eventually result in the soot being burned away.

After this procedure, there will always be a little ash in the filter, which increases the ash content a little. The vehicle cannot eliminate the ashes by itself, at least not through an automatic regeneration process. Therefore the ashes are a good indicator for a professional cleaning (mechanical or manually) or change of the DPF. Depending on the source and service conditions, the DPF can last up to 150.000 – 200.000 kilometers in a car.

! NOTE !
Please note: above mentioned kilometer reading can be increased by good service, operational profile, fault free systems and particularly high quality operating materials. In the contrary case, it can decrease the result.
Difficulties concerning your DPF should be attended to quickly, as severe consecutive fault can arise and expensive repairing could be necessary.

2. The 2 different ways to regenerate:

> **! NOTE !**
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> An extremely worn out or mechanically faulty particulate filter cannot be repaired by running one or more regeneration processes. Repair or exchange is obligatory.

Continuous regeneration:

This happens while normal drive operation without additional assistance of the driver. The continuous regeneration is a slowly running oxidation process within the DPF. It is not generated by any control system but based on its physical characteristics. Through continuous regeneration, the exhaust backpressure and the setting will decrease. These conditions are obligatory:

- Exhaust temperature needs to be between 275 - 360 C to enable continuous regeneration.

Periodical regeneration:

This regeneration is initiated automatically by the engine control unit (ECU) after 1000 kilometers at the latest. With unfavorable operational profile like short run operation, periodical regeneration will occur earlier and more often.
Here, the soot will be burned to exhaust with residual oxygen by raising exhaust temperature up to 750 C through reducing air mass and at least one "late injection". Even though it can be performed at any speed, it will work most efficient when performed at constant speed over than 80 km/h (not full speed) and over 25-40 minutes.

Engine temperature and or cooling water temperature have to be higher than 75 C.

Exhaust temperature has to be above 245 C (if necessary, please check/change temperature sensor before and after particulate filter)

Make sure there is enough fuel in your vehicle (at least 15 l), avoid reserve mode

No fault codes of fuel injection system, exhaust system or sensors for regeneration should be saved in the ECU. (Please check and clear with Carly for BMW or check with your local repair shop)

> **! NOTE !**
>
> Fault code 480A, 481A, 452A and 4D4A with E models and 245700 und 245800 with f models require special treatment and will be explained in this manual later on.
> Generally, no regeneration can be performed with those fault codes (except 452A und 4D4A) as long as they are "static"

3. Calculation factor for periodical regeneration

> **! NOTE !**
>
> If a successful regeneration has been performed more than 1000 km ago, it´s usually a strong lead to a problem with the particulate filter system. Please check fault memory with Carly for BMW

The ECUs measure the correct time for the periodical regeneration form several data status and sensor signals. Usually you can check the last time of a successful regeneration with the diagnostic function.

- Driving profile (especially average run and speed)
- Temperature of DPF
- Number of cold stars
- Calculated soot mass in particulate filter
- Sensor values, especially exhaust pressure sensor

4. Manual Regeneration Requests with Carly for BMW

> **! NOTE !**
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> Please note, that a periodical regeneration with Carly for BMW and the DPF In App can only be performed, if above mentioned terms are met. Also, the regeneration should not be blocked by fault codes.

With our Carly for BMW app you can request a regeneration for (compatible) vehicles with a DPF. This regeneration will be performed, if above mentioned terms are met, no matter if it was intended by engine electronics or not.
We constantly expand the list of compatible vehicles and work on the possibilities for more cars.

Especially with disadvantageous driving profile like lot of short runs or seldom used vehicles, frequently performed regeneration can be helpful and preventive.

5. Special Fault Codes

Fault code = 480A with e models or fault code = 245700 with f models:
Diesel particulate filter is extremely clogged, exhaust backpressure too high!

Fault code = 481A with e models or fault code = 245800 with f models:
Diesel particulate filter extremely clogged, exhaust backpressure over maximum value!

Problem:
DPF is overloaded, the regeneration of the particulate filter is blocked through ECU and can´t be performed.
Frequent short distance trips and/or a lot of city traffic will diminish efficiency of continuous regeneration. A long lasting, inefficient continuous regeneration will activate the fault code.

As soon as the fault code is „static/active", no regeneration can be performed or successfully required. The function is blocked. If no regeneration will be performed and exhaust backpressure keeps rising, an additional fault code "filter extremely clogged, exhaust backpressure over maximum value" will show.
Usually now the board computer or check control will note "diesel particulate filter fault".

The only thing you can do, except changing the particulate filter in order to decrease exhaust backpressure and the "loading" of the filter, is to go on a regeneration run.
Please drive for approximately 45 minutes at constant speed (highway, more than 80km/h, not full speed). Additionally, please switch on electrical appliance to keep exhaust temperature between 280 - 350 C. Now a continuous regeneration can be performed, exhaust backpressure will decrease, fault codes will change to "sporadic/inactive".

Now switch off vehicle, turn off ignition. Wait a couple of seconds, then turn on ignition and engine.
Select "periodical regeneration" in your Carly for BMW app manually and drive vehicle again.
We recommend 10-20 minutes at speed over 80 km/h (not full speed!")

> ### ! NOTE !
>
> The fault code 480A/245700 or 481A/245800 might be an indication why periodical regeneration can´t be performed, but it´s not necessarily the reason. Please always check, if above mentioned terms are met and look for other engine faults.

Fault code: 452A
Particulate filter has exceeded maximum propagation and requests professional exchange.

Fault code. 4D4A
Despite the request, DPF was not changed and maximum propagation has been exceeded.

Those faults might not be erasable and will re-emerge again. You will need to exchange or possibly let it be professionally cleaned when fully removed by a shop.

> ### ! NOTE !
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> Depending on country and emission standards, such a fault memory can lead to not passing the TÜV general inspection or exhaust inspection. Also, the vehicle could switch into "emergency mode" to keep mechanical motor load and environmental impact as low as possible.

Was the manual helpful or do you have ideas for improvement?
Please write to us at bmw@mycarly.com!

We put together the most important links for you here:

- Homepage of Carly for BMW
- Diesel-Particulate-Filter Function with Carly for BMW
- Getting Started with Carly for BMW
- Support-Page

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