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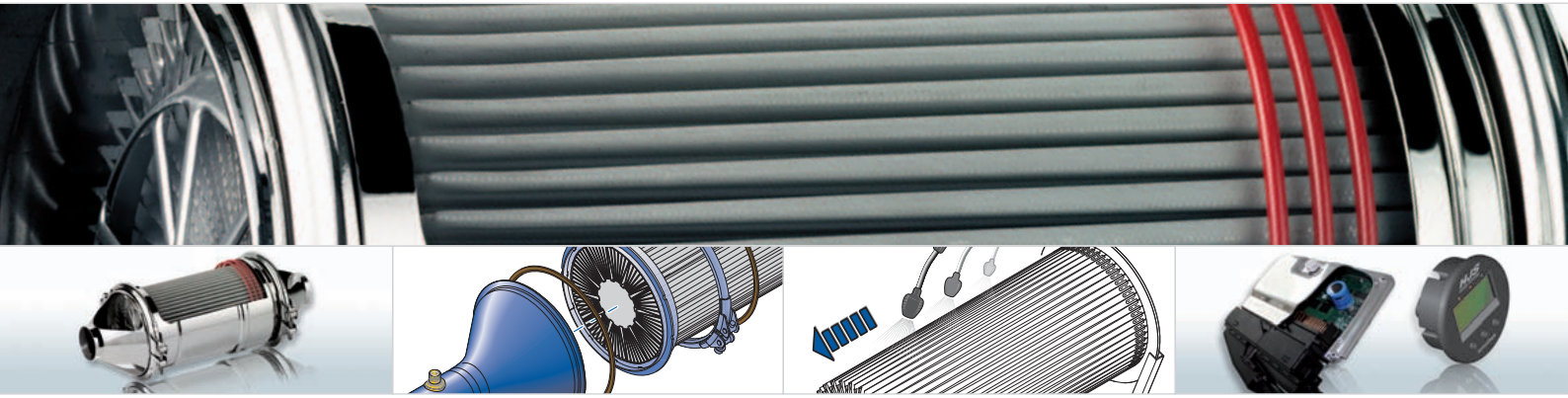
Diesel Exhaust Systems
SMF®-AR System



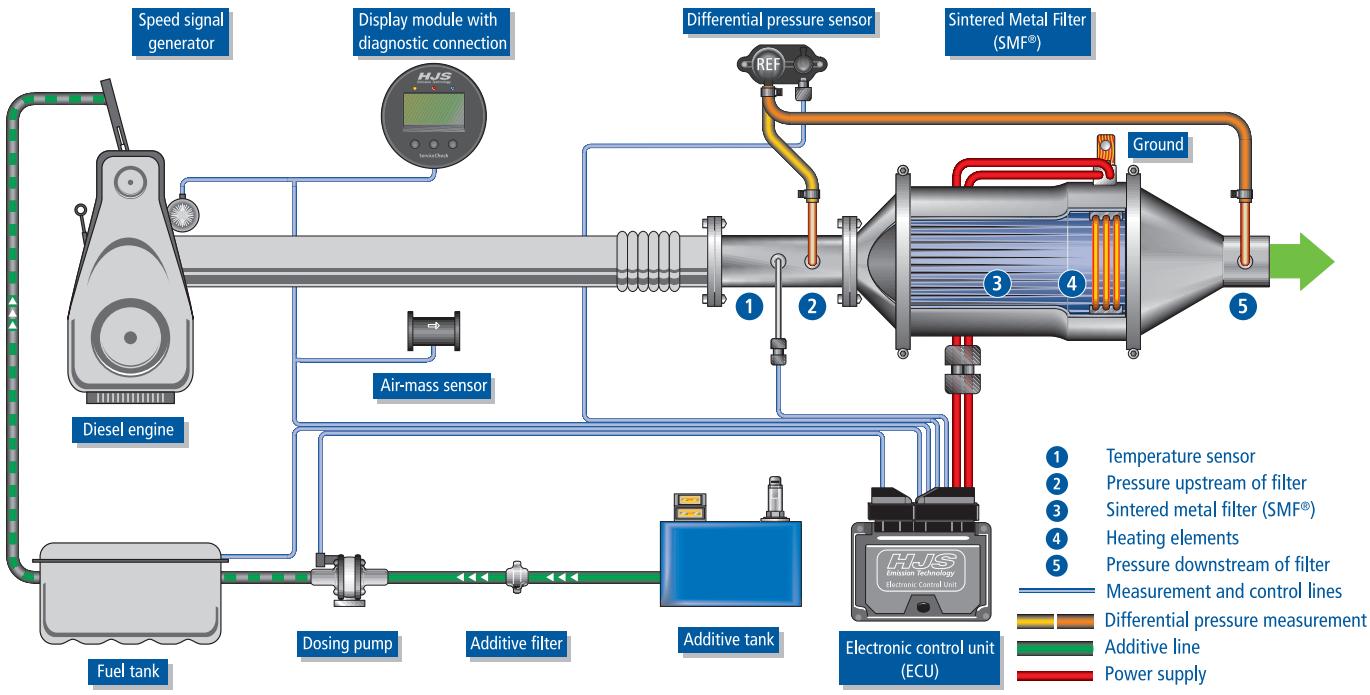
Flex-Fit Systems

Maintenance Manual

HJS Emission Technology

Contents

System overview



General

Please read this Maintenance Manual carefully before carrying out maintenance work on a SMF®-AR system. It is intended solely as an instruction manual containing the maintenance procedures for SMF®-AR systems.

The instructions described in this Maintenance Manual and stipulated by the manufacturer must be complied with. When carrying out maintenance work on the SMF®-AR system, always handle all components with great care because improper handling can cause permanent damage to the SMF®-AR system.

The general accident prevention regulations and all other generally recognised rules pertaining to safety and industrial health are to be complied with at all times.

Non-compliance with the Maintenance Manual will result in the exclusion of all claims for warranty and of all liability on the part of HJS Fahrzeugtechnik GmbH & Co KG.

Date: 05/2011

Information

This manual describes the various work steps and guides you through all necessary maintenance procedures and the HJS diagnostics software. When carrying out this work, make sure that you perform all the different work steps as described, otherwise the whole SMF®-AR filter system may suffer damage.

When must maintenance work be carried out?

The fully automatic self-regeneration unit of the SMF®-AR system is monitored by its own electronic control unit. The red indicator lamp comes on if a fault arises, damage occurs and whenever scheduled maintenance work is due to be carried out. In this case, the operator must take the vehicle to a specialist workshop immediately. In the case of vehicles whose SMF®-AR system has **software release** 0 10 127 **or earlier installed**, the timing of maintenance work on the filter module depends on the length of the filter and the mileage or consumption of additive:

> Filter length 27 cm: every 30,000 km
or when 2 litres of additive have been consumed
> Filter length 40 cm: every 60,000 km
or when 4 litres of additive have been consumed

Waste disposal codes for Germany, Austria and Switzerland:

13 05 02 Sludge from oil/water separators
13 05 06 Oils from oil/water separators

As of **software release** 0 10 128, the specialist workshop must conduct fault diagnostics. The messages displayed indicate the following maintenance procedures must be carried out:

If the message displayed is **Filter cleaning**, the **Filter module maintenance** procedure described on pages 4 – 9 must be carried out.

If the message displayed is Fill additive tank, the **Filling additive tank** procedure described on pages 10 – 13 must be carried out.

Requirements for the various maintenance procedures:

Filter cleaning

> Cleaning facility (washing station) with oil separator
> Industrial high-pressure cleaner (commercially available version); see "Requirements for the high-pressure cleaner"
> Cleaning cover
> Dust mask
> New gaskets
> Clamp for differential pressure sensor

Requirements for the high-pressure cleaner

> With max. pressure of 150 bar
> With hot or cold water without chemical cleaning additives
> Set the nozzle to a wide jet of water.
> The minimum clearance that must be maintained between the nozzle of the cleaner and the filter is 15 cm.

Replacing the additive filter

> Additive filter and hose clamps
> Crimping tool, Drip pan

Filling the additive tank

> Specified additive (HJS F51 / 1 sales unit = 1litre) Minimum quantity required = 2 litres
> Funnel

Adapting the control unit

> PC with HJS diagnostics software installed
> HJS diagnostics cable
> Request password from HJS

Information about and conventions applied in the Installation Instructions and Maintenance Manual sections

This documentation describes the installation and maintenance procedures for a SMF®-AR system. Further information on installation and operation of the HJS Service Unit can be found in the relevant documents from HJS.

> Work instruction or listing

(1) / **1** Legend entry in text or a figure/photo

Safety instructions and warnings

These safety instructions must be observed for the sake of your own safety and the safety of others.

General instructions and additional pieces of information must be observed in order to prevent damage to the vehicle or the SMF®-AR system.

All work procedures must be carried out by qualified staff of a vehicle workshop.

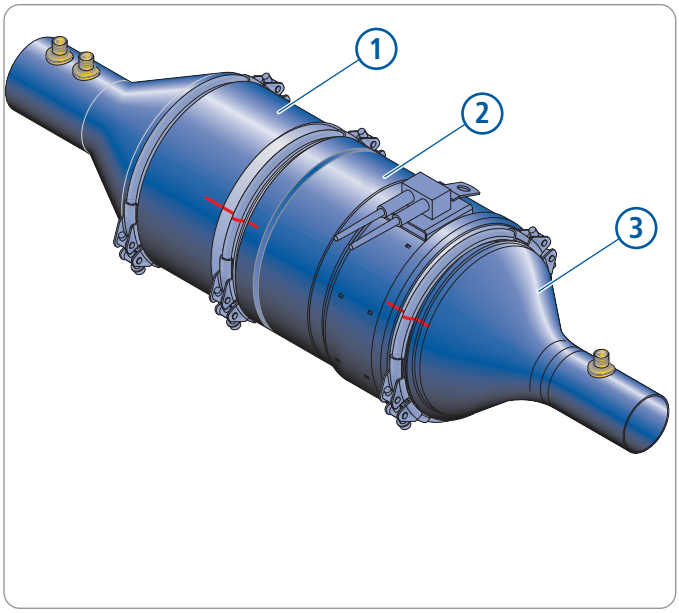
Filter module maintenance

Filter

Prior to system upgrade

> A permanent marking must be made on the housing (1), heater module (2) and outlet taper (3) to enable correct reassembly later.
> This can be done using either a scriber or a water-resistant marker pen.

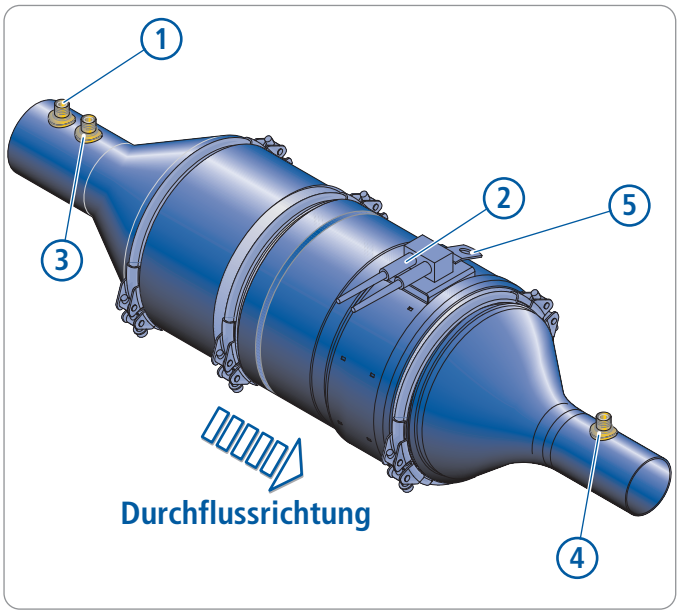
The marking must be clearly visible so that the filter can be reassembled in exactly the same position it was in before!



System upgrade

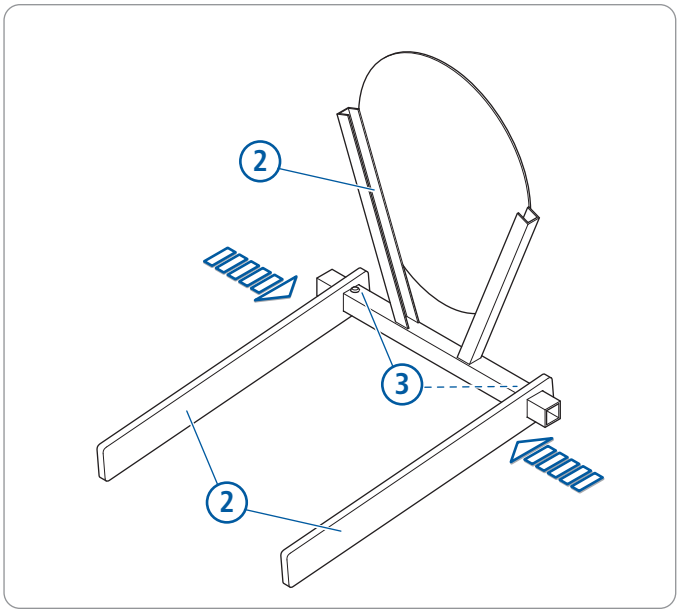
> To upgrade the system, first disconnect the electrical connectors from the temperature sensor (1) and the heater (2).
> Disconnect the differential pressure sensor connectors upstream (3) and downstream (4) of the filter.
> Detach the earthing strap (5) from the filter housing.
> Remove the filter from the exhaust gas system.

Wear a dust mask over your nose and mouth to avoid inhaling soot and ash!



Assembling the cleaning plate

> Push the two support arms (1) onto the filter bracket (2) right up to the attachment points (3).



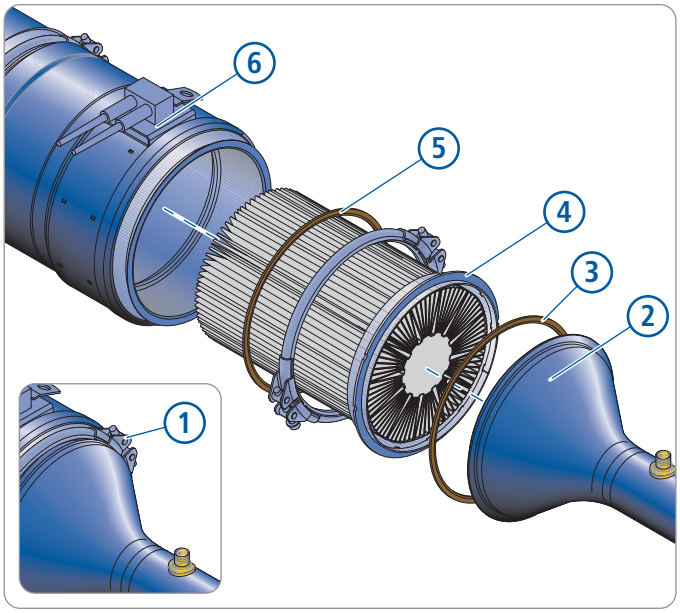
Filter module maintenance

Filter

Disassembling the SMF® filter

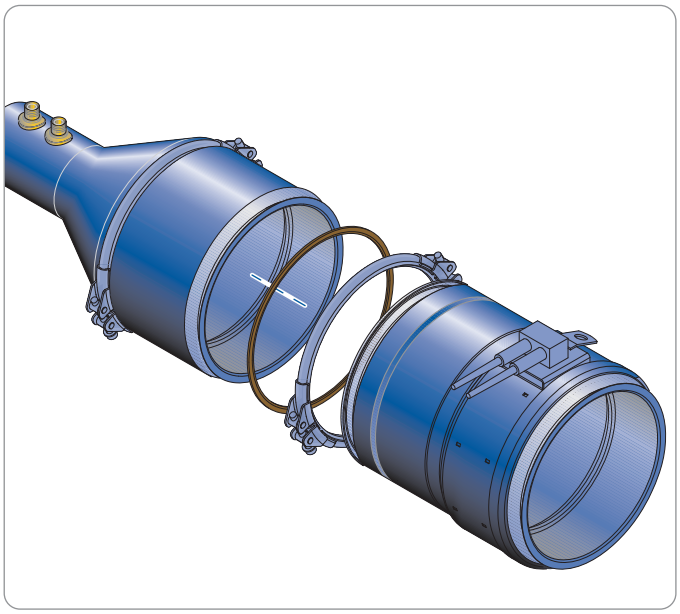
> Working at a suitable workplace (e.g. at a workbench), disassemble the system clamp (1).
> Remove the outlet taper (2) and gasket (3).
> Pull the SMF® filter (4) together with the 2nd gasket (5) carefully out of the heater module (6) and put it down on the filter flange end to prevent it from becoming damaged.

Only ever carry the SMF® filter by its flange ring!
Make sure the filter pockets do not become damaged!



Disassembling the SMF® filter

➢ Disassemble the heater module, including the gasket and connecting clamp.

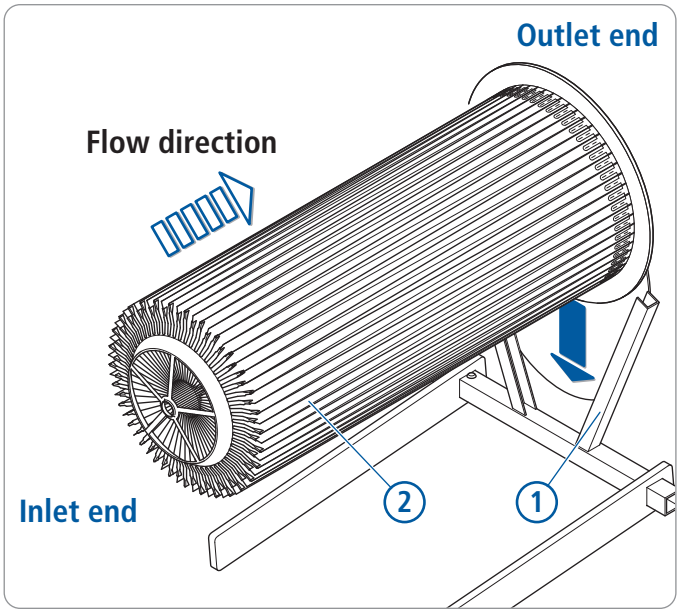


Mounting the cleaning plate

The SMF® filter may only be cleaned when the HJS cleaning plate (1) is fitted!

> When cleaning the sintered metal filter, handle it with great care. If the filter pockets of the SMF® filter are not handled or cleaned properly, the filter can suffer permanent damage. For this reason, the filter must be mounted on the cleaning plate.
> The cleaning plate (1) must be held firmly in place.
> Push the outlet end of the SMF® filter carefully into the cleaning plate (2).

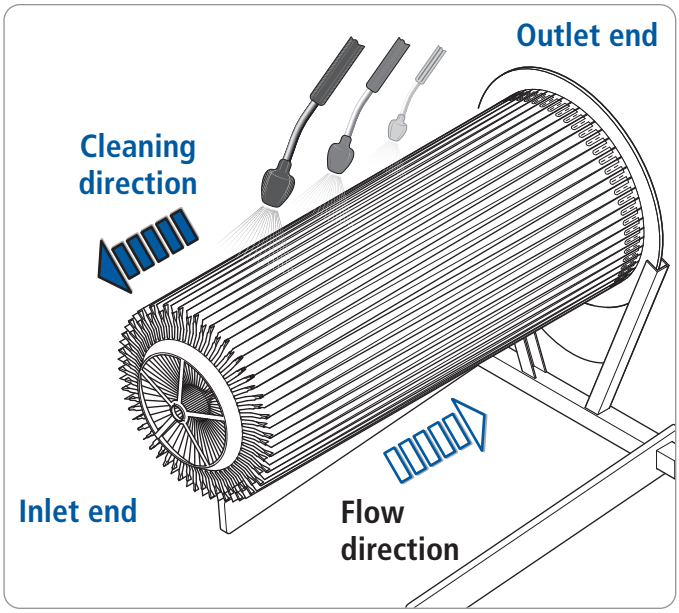
The following cleaning steps must be followed!



Filter module maintenance

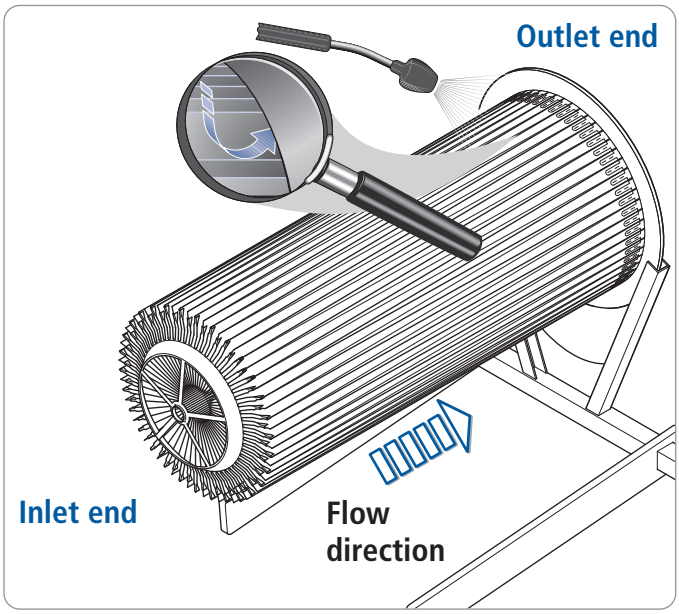
Cleaning step 1

> Clean the SMF® filter by guiding the water jet in the opposite direction to that of the exhaust gas flow. Make sure you clean the spaces between the filter pockets.
> Rotate the SMF® filter carefully and clean it all round.



Cleaning step 2

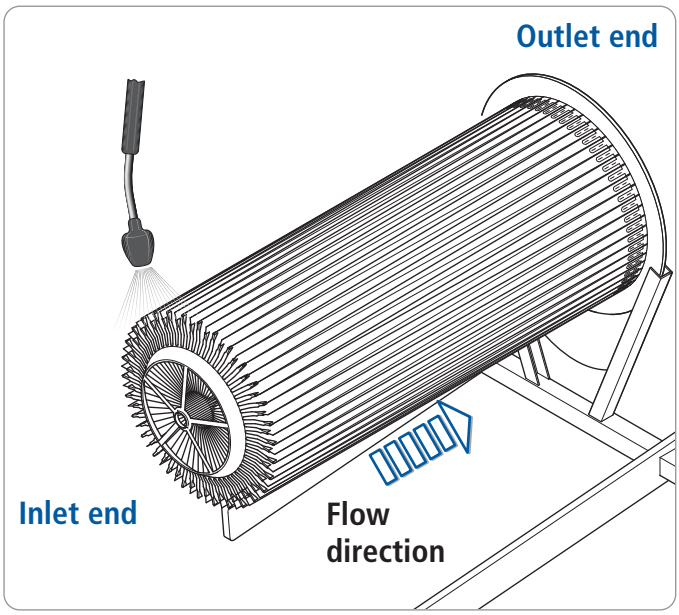
> Clean the filter aiming the water jet towards the outlet end in order to remove the soot and ash that is under the flange.
> Rotate the SMF® filter carefully and clean it all round.



Cleaning step 3

> Clean the inlet end of the filter.
> Rotate the SMF® filter carefully and clean the inlet area of the end face.
> Disassemble the cleaning plate. Observe the instructions in the section entitled "Mounting the cleaning plate".
> After completing the cleaning procedure, leave the filter for approx. 2 hours to dry in the air or blow it dry with compressed air.

NOTE: Avoid below-zero temperatures at all costs!



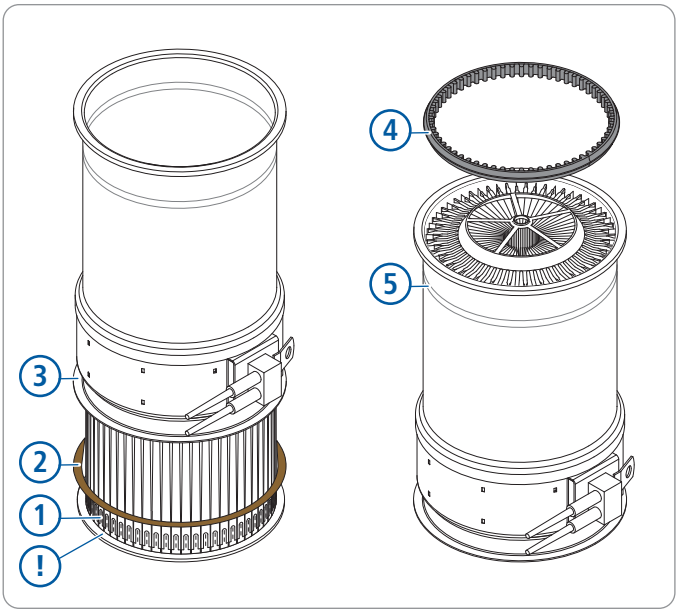
Filter module maintenance

Filter

Installing the SMF® filter

Clean the mating surfaces before assembling!

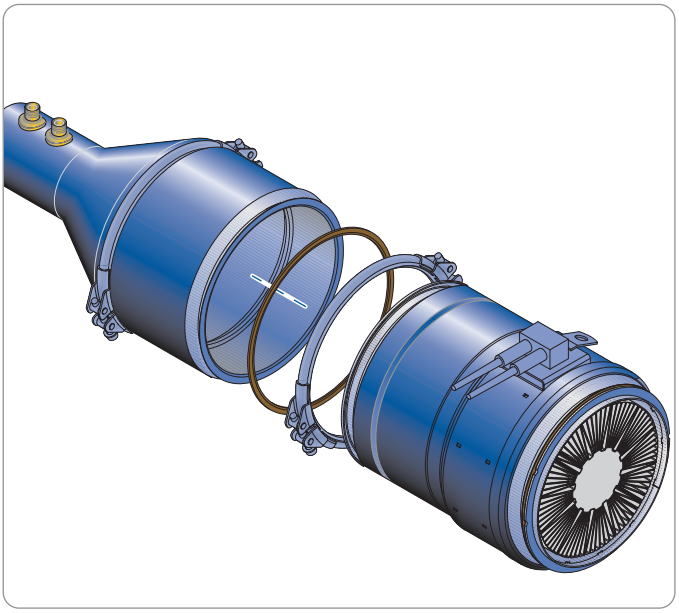
> Push the SMF® filter (1) together with the new gasket (2) carefully into the filter housing (3).
> Insert the new wire mesh(4) evenly around the edge of the SMF® filter in order to centre the filter in the filter unit. Carefully push the 'teeth' of the wire mesh between the individual filter pockets by hand, jiggling the SMF® filter gently in the process to make sure you do not damage the pockets.
> Push the wire mesh down to the level of the bead (5).



Final assembly of the filter housing

> Assemble the heater module together with the new gasket and connecting clamp to the housing.
> Tighten the clamp connection to a torque of 25 Nm.

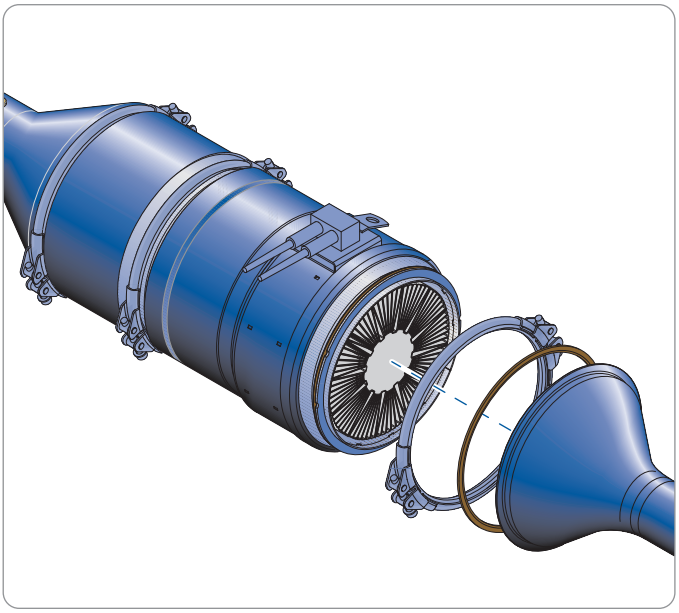
The markings must coincide with one another when the components are put back together again!



Final assembly of the filter housing

> Assemble the outlet module together with the new gasket and connecting clamp to the heater module.
> Tighten the clamp connection to a torque of 25 Nm.

The markings must coincide with one another when the components are put back together again!



Filter module maintenance

Filter

Cleaning the differential pressure hoses

Da sich Differenzdruckleitungen mit der Zeit mit Ruß und Kondenswasser zusetzen können, müssen diese im Rahmen der Filterreinigung ebenfalls gewartet werden.

Do not mix up the pressure hoses connected to the pressure sensor! Mark them before disassembling!
If the hoses are porous or damaged in some way, replace them with hose material approved for the purpose by HJS.
Make sure the hoses are free of kinks!

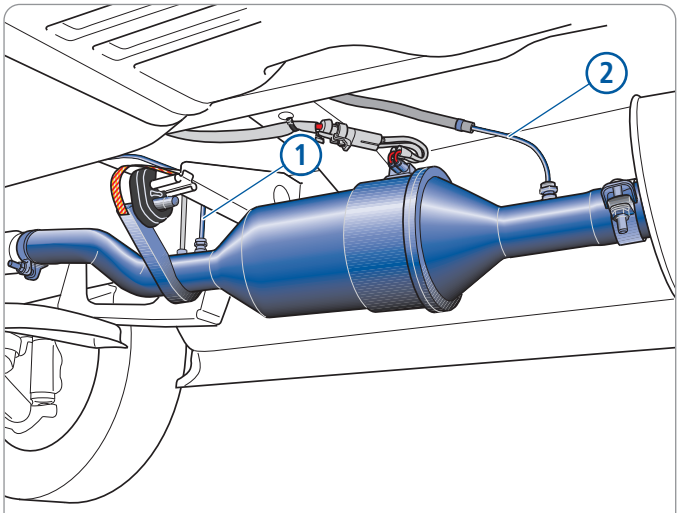
> When cleaning the hoses, only ever blow them out from the differential pressure sensor end (see fig.).
> After cleaning the hoses, run them to the pressure sensor again free of kinks and connect them to the sensor.

Installing the system

> Install the SMF® filter in the exhaust gas system.

Make sure you run all the connection hoses free of kinks and such that they have no contact with other components!
Do not mix up the differential pressure sensor connectors upstream (1) and downstream (2) of the filter.

> Reconnect the electrical connectors to the temperature sensor and the heater.
> Reconnect the differential pressure sensor connectors upstream) and downstream of the filter.
> Secure the earthing strap to the filter housing.

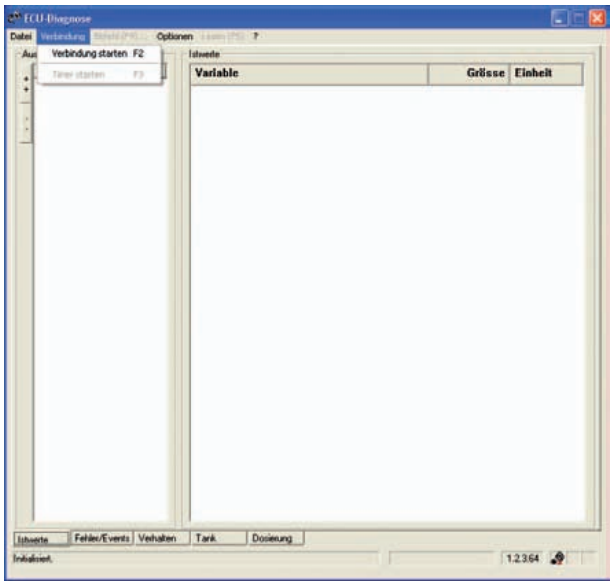


Sample of configuration

Installing the system

Nach Abschluss der Reinigungsarbeiten sind weitere Maßnahmen notwendig!

> Other measures must be carried out after completing the cleaning work!
> After cleaning the filter, a diagnosis test must be carried out. The following sections in this Maintenance Manual must be complied with in this regard.
> Connect the diagnostics cable to the diagnostics connector of the cable harness and to a PC.
> Install the diagnostics software on the PC and start the program. Switch on the vehicle's ignition.
> When you start the diagnostics software, the start screen of the program appears on the monitor of the PC. To make a connection to the vehicle, open the "Connect" menu and select the "Start Connection" option.



Filter module maintenance

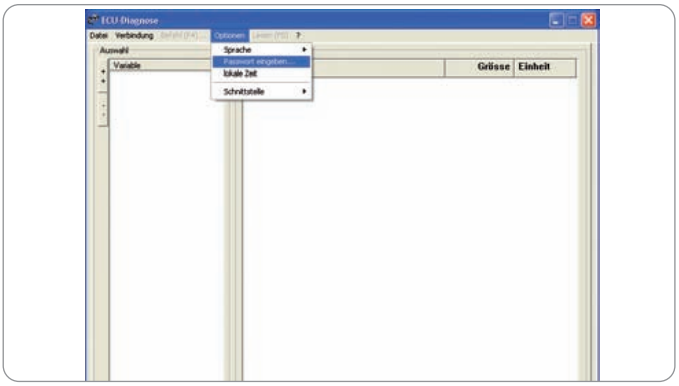
Filter

Entering the password

> ECU password:

A number of functions/commands of the ECU diagnostics program are protected by a password. You have to ask HJS for a password before you use the program for the first time. This password is stored by HJS in a database and is unique to one person. The password must never be divulged to a third party.

> You enter the password via the "Options" menu.



Entering the password

> When you call up the command, the following window appears.

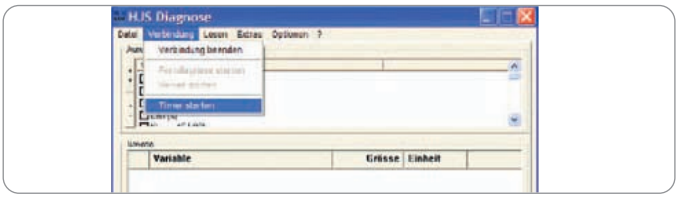
> Enter the password in the text box and then confirm by clicking the "OK" button.

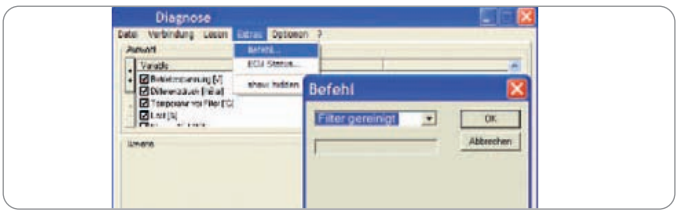
The password remains permanently set.

Confirming filter maintenance

> Open the "Connect" menu and select the "Start Timer" option.

> Then open the "Order (F4)" menu, select the "Filter changed/cleaned" option and click the "OK" button.





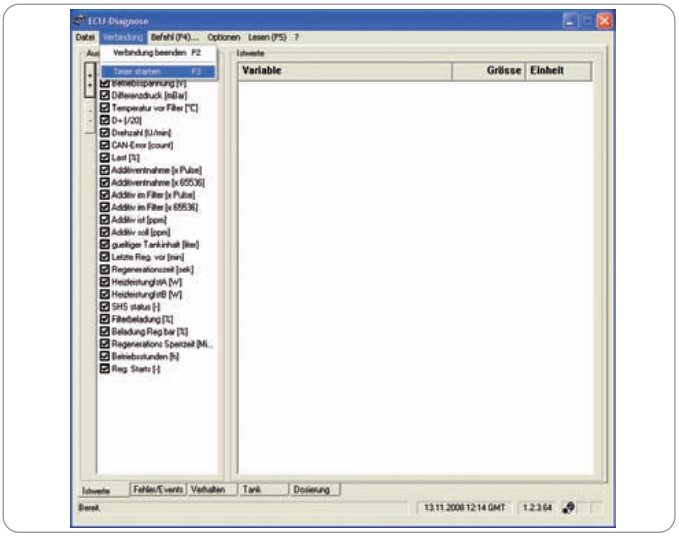
Checking the settings after maintenance work on the filter

> To display the values on the monitor, click the "++" button (1) under "Select".

> To check the command has been carried out, check the "Additive in filter" value on the "Actual Values" tab. If it has been reset to zero, the command has been carried out and the vehicle is ready for operation again.

> Close the diagnostics program and disconnect the diagnostics cable.

> Enter the data for "Filter module maintenance" in the section entitled Maintenance Record.



Filling the additive tank

Additive

R-phrases:

R48/22 – Harmful:

danger of serious damage to health by prolonged exposure if swallowed

R65 – Harmful:

may cause lung damage if swallowed

R66 – Harmful:

Repeated exposure may cause skin dryness or cracking

Contains: ferrocene derivate

General Information

Before you fill the additive tank (1), you must always replace the additive filter (2).

> Pay attention to the flow direction when replacing the additive filter. It is marked on the filter itself by an arrow.

If you spill additive in the engine compartment, clean the engine taking into account the hazard warnings and safety advice!

Replacing the additive filter

Seal the hose from the additive tank to the additive filter with the aid of a crimping tool to prevent any additive from escaping.
Attention: Do not damage the hose!

> After completing replacement of the additive filter, clean up any additive that may have escaped. Replace the clamps on the filter. When installing the filter, make sure that the arrow indicating the direction of flow is pointing towards the additive pump. Check the hoses for chafing and leaks.

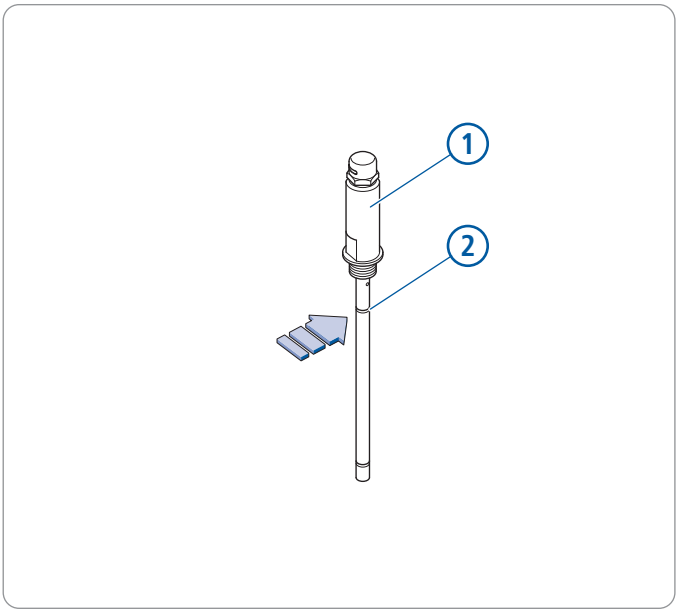
> If leaks and chafing occur in the system, replace the hoses with hose material from HJS.

Filling the additive tank

Additive

Measurement function of the tank vent

> A dipstick is inserted at the tank vent (1).
> Fill the additive tank up to the top marking (2) on the dipstick.



Filling the additive tank (example)

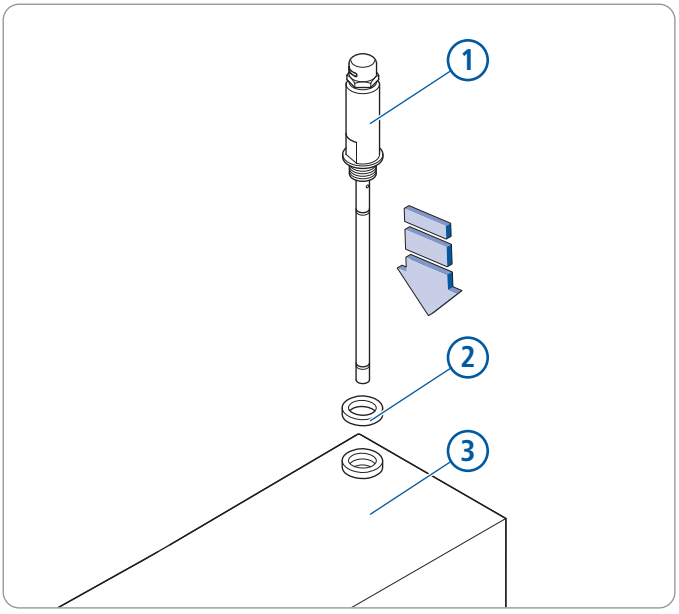
> To fill the additive tank, insert a clean funnel into the filler neck to make sure you do not spill any additive.

Contamination in the additive leads to failure of or damage to the system!

Use the specified additive (HJS F51) only!

Additive tank

> After filling up, install the tank vent (1) with a new 18 x 22 copper gasket (2) in the additive tank (3).



Filling the additive tank

Additive

Bleeding the dosing system by means of the diagnostics software "Dosing pulse"

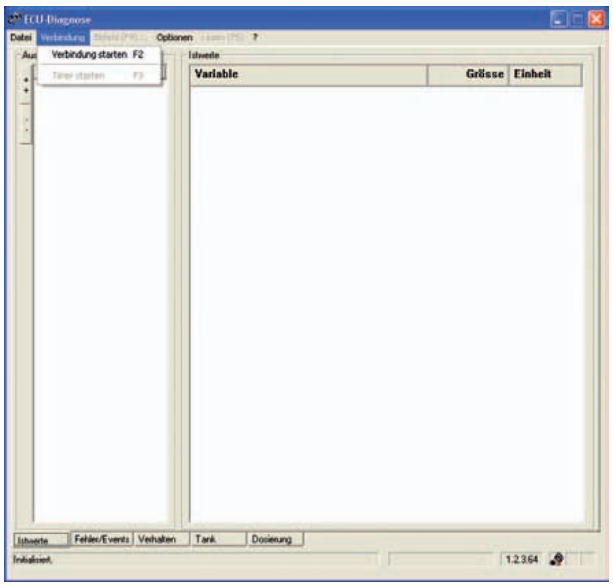
After replacing the additive filter or an additive hose, the dosing system must be bled.

> Connect the diagnostics cable to the diagnostics connector of the cable harness and to a PC.

The system must be bled while the engine is running.

> Install the diagnostics software on the PC and start the program.

> When you start the diagnostics software, the start screen of the program appears on the monitor of the PC. To make a connection to the vehicle, open the "Connect" menu and select the "Start Connection" option.



Entering the password

> ECU password:

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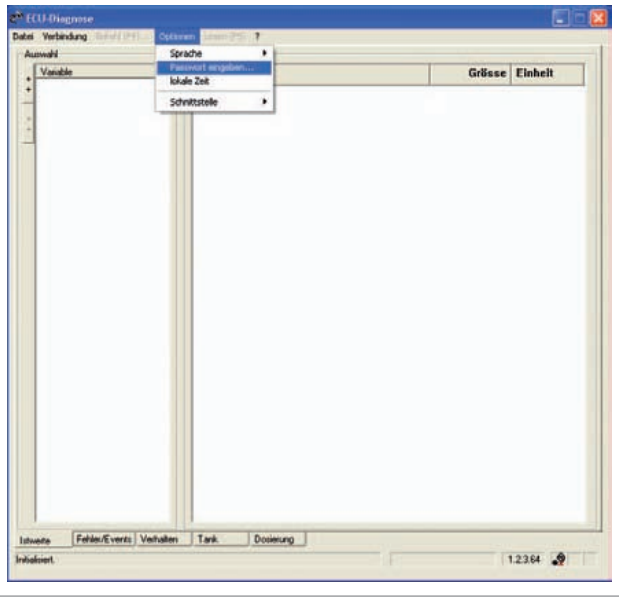

Entering the password

Entering the password

> When you call up the command, the following window appears.

> Enter the password in the text box and then confirm by clicking the "OK" button.

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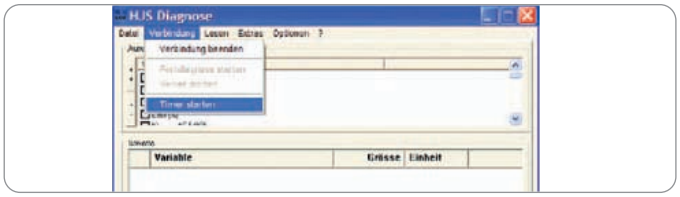
Filling the additive tank

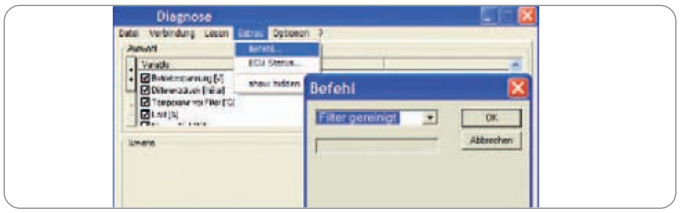
Additive

Confirming filter maintenance

> Open the "Connect" menu and select the "Start Timer" option.

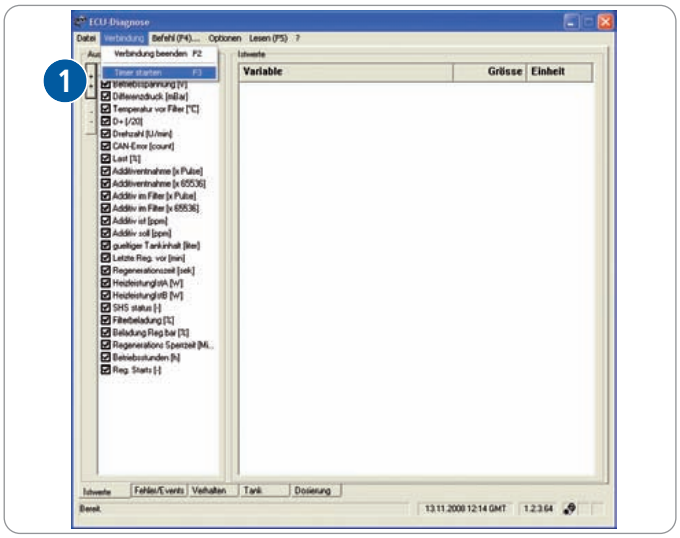


> Then open the "Order (F4)" menu, select the "Additive refilled" option and click the "OK" button.



Checking the settings after refilling additive

> To display the values on the monitor, click the "++" button (1) under "Select".
> To check the command has been carried out, check the "Additive taken" value on the "Actual Values" tab. If it has been reset to 20 (self-venting), the command has been carried out and the vehicle is ready for operation again.
> Close the diagnostics program and disconnect the diagnostics cable.
> Enter the data for "Filter module maintenance" in the section entitled Maintenance Record.



Notes

HJS Emission Technology GmbH & Co. KG is a medium-sized company based in Menden in central Germany and has many years of experience and expertise in the field of exhaust-gas aftertreatment. Some 500 employees are engaged in the development, production and marketing of modular systems for reducing pollutant emissions. These innovative environmental protection technologies can be used either as original equipment or for retrofitting in passenger cars, commercial vehicles as well as a wide range of non-road mobile machinery and stationary applications.

In addition to systems for spark-ignition engines, HJS today focuses on solutions for diesel engines – especially for reducing the emissions of soot particles (PM) and nitrogen oxides (NO_X). With extensive patents for DPF® (diesel particulate filter) and SCRT® (Selective Catalytic Reduction Technology) systems, HJS sets benchmarks.




HJS technology portfolio for OE and retrofitting

> Diesel Particulate Filters (DPF®)
Reduction of soot-particle emissions (PM)

> SCR-Systems
Reduction of nitrogen-oxide (NO_X) emissions

> SCRT®-Systems
Simultaneous reduction of soot-particle (PM) and nitrogen-oxide (NO_X) emissions

> Thermal Management
For DPF®-regeneration and SCR-functionality

> Electronic Control Units and Software
Monitoring and controlling of all system functions

A clean future with HJS!

See www.hjs.com

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