



**Diesel Particulate Filter System
With Active Diesel Burner Regeneration**

OWNER'S MANUAL

FS MK-series



HUSS, LLC

**The leading specialist in
diesel particle filtration and
systems for exhaust aftertreatment**



Achieve 99% PM collection rate

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Subject to technical modifications.
Reprinting, even partly, requires our
written consent.
Date: 01/2007




INTRODUCTION

INTRODUCTION

Dear customer,


the diesel particulate filter with Diesel burner made by HUSS have been especially developed to enable an independent operation of the diesel particulate filter in most Diesel applications.

The exhaust gas of diesel engines contains particles damaging to health which are invisible for human eyes. Diesel particulate filters made by HUSS collect such particles up to more than 99 % (relating to the particle quantity) and contribute therefore to the protection of your health and the environment.

	<p>Please read these instructions before putting into operation your diesel particulate filter. Do not operate the HUSS diesel particulate filter or operate the HUSS Control unless you have read and understood the instructions in the user manual. Improper machine operation is dangerous and could result in injury or death. We or the certified partner will be at your disposal for assistance in any question you might have.</p>
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SERIAL NUMBER:

1. When ordering repair parts, it is important to advise your certified partner of the serial numbers or your diesel particulate filter. The serial number information is located on a plate on the body of the diesel particulate filter.

	Diesel Particle Filter www.huss-filters.com		
CARB	CA/HUS/2006/PM3+/N00/OFF/DPF01		
TYPE	FS 100 MKL		
No.	2205379/70	YEAR	01 - 07
HUSS, LLC • PMB# 104 • 1717 E. Vista, Chino Suite A7 Palm Springs, CA. 92262 • Phone: 310 – 359 – 2360			

2. HUSS reserves the right to make changes or to add improvements at any time without notice or obligation. This manual was prepared with the latest production information available. HUSS, or its certified partners, accept no responsibility for variations in the actual specifications of its products and the statements and descriptions contained in this manual.

INTRODUCTION AND WARRANTY PROCEDURES

NOTE:

This manual is published for North America distribution, and the availability of equipment shown either as basic, optional, or accessory may vary according to the territory in which the diesel particulate filter is to be operated. Full details of equipment available in your area can be obtained from your HUSS certified partner. USE ONLY HUSS APPROVED ATTACHMENTS AND EQUIPMENT.

1. The purpose of this manual is to enable the owner and driver of the vehicle to operate the diesel particulate filter in the correct manner. Providing that the instructions are followed carefully, the diesel particulate filter will give years of service in the tradition of HUSS.
2. Always consult HUSS if you have questions about the manual and warranty. It is important that these instructions are understood and observed.
3. When new parts are required it is important that only genuine HUSS service parts are used. HUSS supplies genuine parts and can advice regarding their use. Extensive damage may occur as a result of using parts of inferior quality. Customers are advised to buy their service parts only from HUSS or certified partners. For more information refer to: **www.huss-filters.com**
4. The HUSS diesel particulate filters should be operated only by persons familiar with all their particular characteristics and who are acquainted with the relevant safety rules (accident prevention).



CAUTION!

Installations must be approved by HUSS or an certified partner to obtain full warranty coverage

Installations must be approved by HUSS to obtain full warranty coverage. For optimum performance, follow all the operation recommendations covered in this manual service and maintenance should always be carried out by HUSS or a certified partner.

Yours HUSS, LLC



SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS

INTRODUCTION

This safety section is intended to point out some of the basic hazardous situations, which may be encountered during normal operation and maintenance of your diesel particulate filter. This manual also suggests possible ways of dealing with these situations. Additional precautions may be necessary depending on conditions at the work site or in the service area. It is YOUR responsibility to use good safety practices in these areas.

A WORD TO THE OPERATOR

It is YOUR responsibility to read and understand the safety section in this manual before operating the HUSS diesel particulate filter. You must follow these safety instructions which take you step by step through your working day. Remember that YOU are the key to safety. Good safety practices not only protect you, but also the people around you. Study the features in this manual and make them a working part of your safety program. Practice all other usual and customary safe working precautions, and above all –

REMEMBER – SAFETY IS YOUR RESPONSIBILITY: YOU CAN PREVENT SERIOUS INJURY OR DEATH.

SAFETY ALERT SYMBOL NOTES AND TERMS

	<p>This safety alert symbol means ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!</p>
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The safety alert symbol identifies important safety messages on machine safety signs, in manuals or elsewhere. When you see this symbol, be alert to the possibility of personal injury or death. Follow the instructions in the safety message.

	<p>WARNING PERSONAL INJURY!</p>
<p>DO NOT remove or obscure Warning Signs. Replace any Warning Signs that are illegible or missing. Replacement Signs are available from your certified partner in the event of loss or damage.</p>	
<p>An operator should not use alcohol or drugs which may affect his alertness or coordination. An operator on prescription or “over the counter” drugs needs medical advice on whether or not he or she can safely operate the HUSS diesel particulate filter.</p>	

NOTE	<p>This note means READ AND UNDERSTAND! PRODUCT PERFORMANCE IS INVOLVED</p>
<p>This note identifies important messages, with influence on the performance of your product. Please read carefully and follow the instructions in the note.</p>	

IMPORTANT SAFETY NOTICE



Proper installation and maintenance is important to the safe and reliable operation of the HUSS diesel particulate filter. This Owner Manual outlines basic recommended procedures, some of which require special tools, devices or work methods. Improper installation and maintenance procedures can be dangerous and could result in injury or death.

READ AND UNDERSTAND ALL SAFETY PRECAUTIONS AND WARNINGS BEFORE PUTTING THIS FILTER INTO OPERATION

For correct operation of a HUSS diesel particulate filter, you must be a qualified operator. To be qualified you must understand the written instructions supplied in this Owner’s Manual, have training, and know the safety rules and regulations for the job. It is your responsibility to know what these regulations are, and obey them, in the operating area or situation.

OBSERVE THE FOLLOWING



**WARNING
PERSONAL INJURY!**

DO NOT permit children or others to touch and operate the HUSS diesel particulate filter system and keep them away from your area of work for safety reasons.

DO NOT modify or remove any parts of the equipment and DO NOT use attachments unless they are properly matched and approved by HUSS.

Diesel fuel under pressure can penetrate the skin or eyes and cause serious personal injury, blindness or death. Fluid leaks, under pressure, may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hands. Wear safety goggles for eye protection.

Before applying pressure to the fuel system, be sure all connections are tight and that lines, pipes, and hoses are not damaged. Before disconnecting fuel lines, be sure to relieve all pressure.

To avoid injury from hot surfaces, wear protective gloves or allow engine to cool before repairing, maintaining or removing any component of the diesel particulate filter. During regeneration, hot exhaust gases escape from the exhaust gas outlet pipe. Keep a safety distance of 60 inches at a minimum during regeneration.

To avoid injury when removing or installing a heavy engine component, ensure the component is properly supported and securely attached to an adequate lifting device to prevent the component from falling.



SAFETY INSTRUCTIONS

HUSS cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this manual are therefore not all inclusive. If a procedure, tool, device or work method not specifically recommended by HUSS is used, you must satisfy yourself that it is safe for you and others. You should also ensure that the filter will not be damaged or made unsafe by the procedures you choose.

IMPORTANT GENERAL NOTES

1. The diesel particulate filter has to be used only for the applications indicated by the manufacturer (use in accordance with purpose). Any further use is not considered to be in accordance with the purpose. The manufacturer may not take over any liability for damages resulting there from.
2. Basically, the general rules for the prevention of accidents such as other generally approved rules for technical safety and for occupational health regulations have to be kept.
3. It is not possible to compensate deficiencies of the motor with the help of diesel particulate filters. That means, the particulate filter is not made for reducing emissions of insufficiently maintained motors. Thus and prior to the retrofitting of motors with diesel particulate filters, the emissions of the motor should be reduced by means of a proper adjustment or - if necessary - by a repair. A properly working motor is the precondition for an optimal function.
4. The perfect and safe operation of the diesel particulate filter is subject to proper transport, storage, installation and assembly such as to careful handling and maintenance.
5. Working on the diesel particulate filter during operation is not admitted.
6. In case of visible damages or disorders in functioning, the diesel particulate filter has to be switched off immediately and contact HUSS or your certified partner for help.
7. Deposits of combustible materials in the filter area have to be excluded. The disposal of any waste generated by the product must be in accordance with all applicable Federal, State and local laws governing waste disposal.



It is important to use caution when performing service work. Because of the size of some of the machine components, the serviceman or mechanic should check the weights noted in our product brochure. Use proper lifting procedures when removing any components.

STARTING THE ENGINE DURING REGENERATION PROCESS (CASE OF EMERGENCY)

During the regeneration process the engine is interlocked, so you can not start the machine. If you still have to move the vehicle because of any **“case of emergency”**, than push both buttons **“M”** and **“F”** at the HUSS-control; keep them pushed and parallel start the engine of the vehicle.

Now you’ve the possibility to move your vehicle for a maximum time of 1 min. After this you’ve to start the regeneration manually again and the filter will continue the regeneration.



Void of warranty

This procedure should only be used in a “case of emergency”. If you do this to increase the filter operation time, this will overload and destroy the filter and may void your warranty.



SAFETY INSTRUCTIONS

LIST OF BASIC PRECAUTIONS THAT SHOULD ALWAYS BE OBSERVED.

1. Always wear protective glasses and protective shoes when working around filters. In particular, wear protective glasses when pounding on any part of the machine or its attachments with a hammer or sledge. Use welder's gloves, hood/goggles, apron and other protective clothing appropriate to the welding job being performed. Do not wear loose-fitting or torn clothing. Remove all rings from fingers when working on machinery.
2. Disconnect battery and discharge any capacitors before starting to work on the filter. Hang "Do Not Operate" tag in the Operator's Compartment.
3. If possible, make all repairs with the machine parked on a level, hard surface. Block the vehicle so it does not roll while working on or under it.
4. Do not work on any vehicle that is supported only by lift jacks or a hoist. Always use blocks or jack stands to support the machine before performing any disassembly.
5. Relieve all pressure in air, oil or water systems before any lines, fittings or related items are disconnected or removed. Always make sure all raised components are blocked correctly and be alert for possible pressure when disconnecting any device from a system that utilizes pressure.
6. Use steps and grab handles when mounting or dismounting a machine. Clean any mud or debris from steps, walkways or work platforms before using. When it is not possible to use the designed access system, provide ladders, scaffolds, or work platforms to perform safe repair operations.
7. To avoid back injury, use a hoist when lifting components which weigh 50lb. (23kg) or more. Make sure all chains, hooks, slings, etc., are in good conditions and are in the correct capacity. Be sure hooks are positioned correctly. Lifting eyes are not to be side loaded during a lifting operation.
8. Always use tools that are in good condition and be sure you understand how to use them before performing any service work.
9. Repairs which require welding should be performed only with the benefit of the appropriate reference information and by personnel adequately trained and knowledgeable in welding procedures and the safety regulations for welding work.
10. Do not damage wiring during removal operations. Reinstall the wiring so it is not damaged nor will it be damaged in operation by contacting sharp corners, or by rubbing against some object or hot surface. Do not connect wiring to a line containing fluid.
11. Loose or damaged fuel, lubricant and hydraulic lines, tubes and hoses can cause fires. Do not bend or strike high pressure lines or install ones which have been bent or damaged. Inspect lines, tubes and hoses carefully. Tighten connections to the correct torque. Make sure that all heat shields, clamps and guards are installed correctly to avoid excessive heat, vibration or rubbing against other parts during operation. Shields that protect against oil spray onto hot exhaust components in event of a line, tube or seal failure must be installed correctly.

PRODUCT INFORMATION

DESCRIPTION

The modular Diesel particulate filter with stainless casing cleans diesel exhaust gases from nearly all particulate pollutants of the exhaust gas. Thus, the use of a diesel particle filter ensures low-pollution and keeps clean products, production shops and working places.

HUSS diesel particulate filters are available in several series, e. g.:

FS 40-MKS, FS 40-MKM, FS 40-MKL

Series **FS 40-MK** for Diesel driven equipments with an engine output up to 80 HP.

Key:

FS = filter with quick lock bracket

40 = nominal size

M = modular

K = fuel burner

S = small, **M** = medium, **L** = large

FS 50-MKS, FS 50-MKM, FS 50-MKL

Series **FS 50-MK** for Diesel driven equipments with an engine output up to 107 HP.

FS 80-MKS, FS 80-MKM, FS 80-MKL

Series **FS 80-MK** for Diesel driven equipments with an engine output up to 121 HP (FS 80-MKS), up to 148 HP (FS 80-MKM) and up to 174 HP (FS 80-MKL).

FS 100-MKS, FS 100-MKM, FS 100-MKL

Series **FS 100-MK** for Diesel driven equipments with an engine output up to 215 HP (FS 100-MKS), up to 255 HP (FS 100-MKL) and up to 322 HP (FS 100-MKL).

FS 200-MKS, FS 200-MKM, FS 200-MKL

Series **FS 200-MK** is a double particulate filter system for Diesel driven engines with an output up to 590 HP.

FS 300-MKS, FS 300-MKL

Series **FS 300-MK** is a triple particulate filter system for Diesel driven engines with an output up to 700 HP.

PRODUCT INFORMATION



APPLICATION - USE IN ACCORDANCE WITH PURPOSE

HUSS diesel particulate filters are destined without any exception for the filtration of exhaust gases of equipments with diesel engines. For this purpose there is no need for any additives. During regeneration, the collected soot particulates a burnt.

APPLICATION RANGE

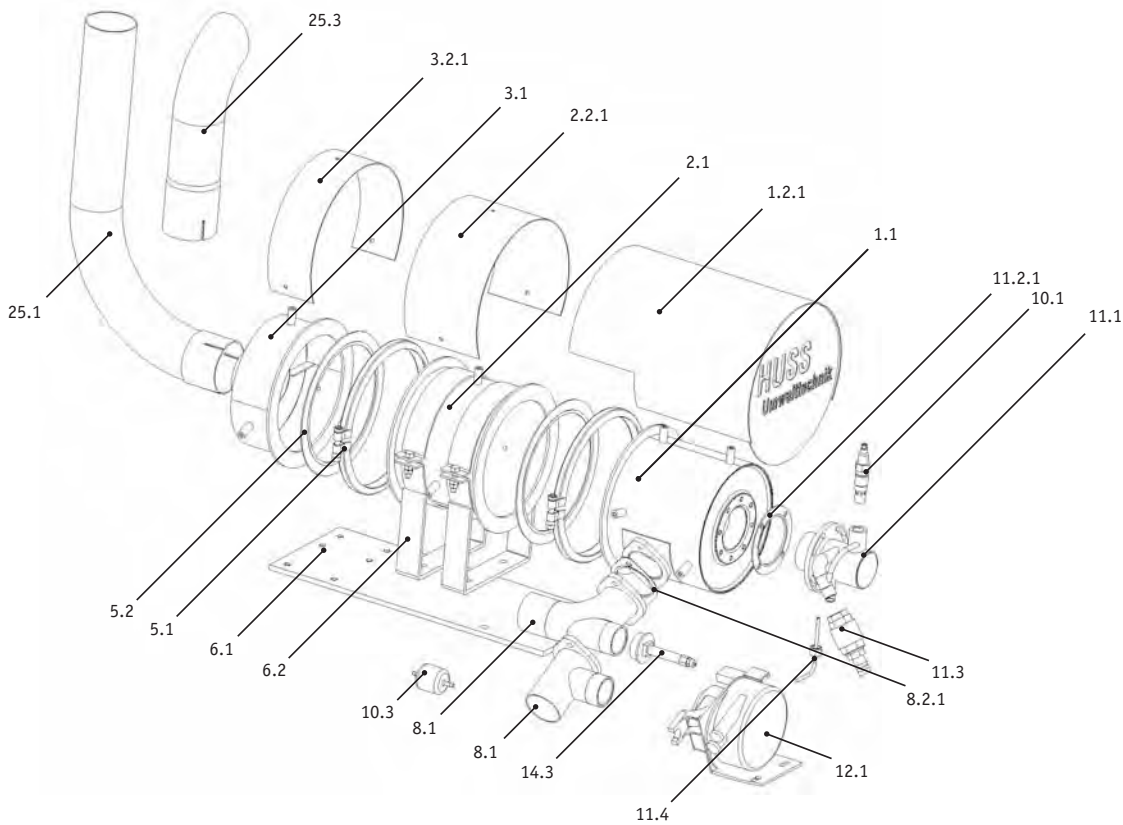
The main application for the diesel particulate filter is the exhaust aftertreatment of Diesel engines uses in e.g.

- Construction and Mining equipment
- Refuse trucks
- Industrial trucks
- Transit and school buses
- Heavy Duty on-highway vehicles

For engines with rated power higher than 700 HP please ask for additional information from HUSS.



EXPLODED DRAWING

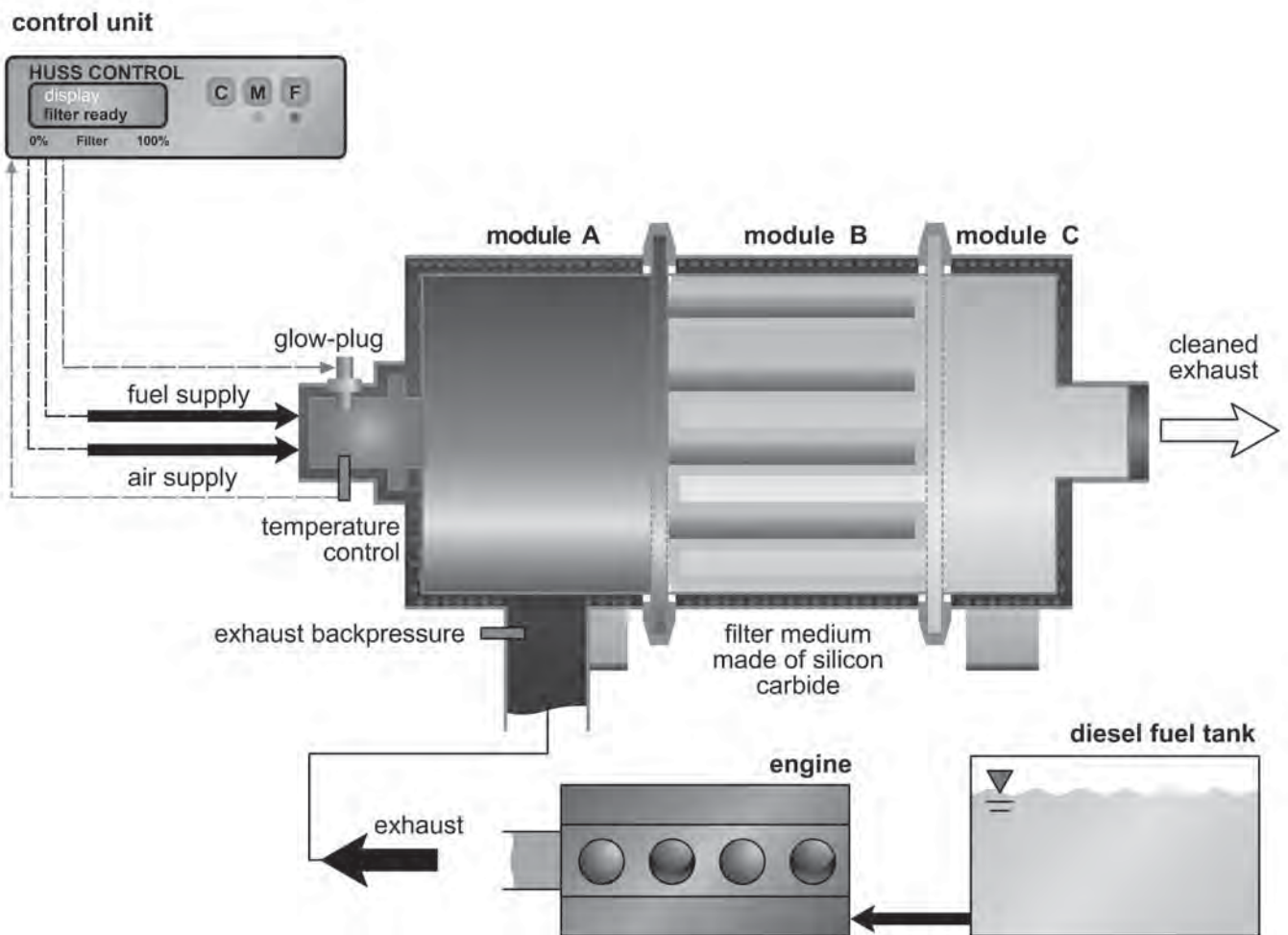


SPARE PARTS

1.1	module A	10.1	glow plug
1.2.1	shock protection module A	10.3	fuel pump
2.1	module B	11.1	burner
2.2.1	shock protection module B	11.2.1	sealing
3.1	module C	11.3	back-pressure valve
3.2.1	shock protection module C	11.4	temperature sensor
5.1	module connection bracket	12.1	blower
5.2	flange seal	14.3	back-pressure collector
6.1	basic plate	25.1	exhaust gas outlet
6.2	bracket for filter support	25.3	end fitting
8.1	exhaust gas entry pipe – bent		
8.1	exhaust gas entry pipe – straight		
8.2.1	sealing exhaust gas entry		

FUNCTION

While the engine is running, the exhaust gases of the diesel engine are flowing through the SiC-filter which collects almost completely all hazardous soot particles. With increasing operation time of the diesel engine, the filling level of the diesel particulate filter grows and thus, the exhaust gas back pressure as well. The operator can read the filling level of the diesel particulate filter on the LED-display of the operation unit and start the regeneration in time. Upon reaching a defined, maximum back pressure and / or a maximum loading time, the HUSS-Control starts the alarm "ALARM FILTER LOADED".



In order to burn the soot particles accumulated in the SiC-filter, the regeneration is started with the help of the HUSS-Control while the engine has to be stopped. A start interlock and a forced engine cut-off are integral part of the control in order to protect the engine and the diesel particulate filter.

For more information refer to: www.huss-filters.com

PROCEDURE OF REGENERATION

After having started the regeneration of the HUSS particulate filter (see chapter "Operation Instruction") the following procedure starts:

- cooling
- glow plug "ON"
- blower starts
- fuel pump starts

The fuel pump delivers an exactly dosed quantity of fuel into the combustion chamber. The blower conveys the combustion air into the combustion chamber. In the combustion chamber, fuel and combustion air are processed to a ignitable mixture and they are ignited with the glow plug.

The flame is formed in the fire tube and in the combustion chamber. The combustion gases arrive in the filter housing and equally heat up the monolith when passing through. The fuel burner is now in heating up service. Combustion of the diesel particulates is realized free of residues, that means, that all particulates such as the accumulated hydrocarbons are transformed into carbon monoxide (CO), carbon dioxide (CO₂) and steam. The exhaust gases escape through the end pipe of the filter.

Heating-up time depends on the size of the monolith. The flame is supervised by a temperature sensor. If the temperature falls below the limiting temperature, the regeneration is cut off and the start has to be repeated (request for the HUSS service).

Subsequent to the heating up of the monolith, the after-ventilation time starts. During this phase, the entire combustion of the remaining diesel particulates is realized.



PRODUCT INFORMATION

TECHNICAL DATA OF THE SERIES

DIESEL PARTICULATE FILTER	FS-SERIES
heating performance	max. 30 HP
air quantity	74 US.liq.gal/min
Diesel quantity (max.)	approx. 0,02 - 0,2 gal/regeneration
operating voltage	12 V or 24 V
filter element	SiC
filter casing	stainless steel
particulate collection efficiency (relating to the particulate quantity)	> 99%
loading time	approx. 8 - 10 working hours
ambient temperature	-4°F up to +122°F
exhaust gas back-pressure	approx. 70 - 150 mbar (1,02 - 2,18 psi)
embedding absorption	approx. 20 dB (A), depending on the engine
microprocessor control	12 V or 24 V

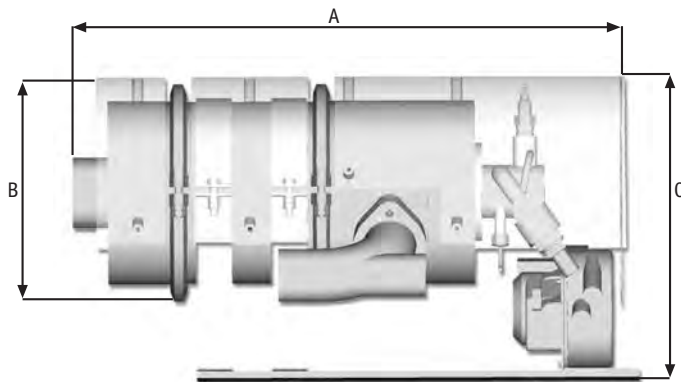
EASY FILTER SELECTION

The right sizing of the filter depends on many factors. The most important ones are the engine performance (measured in hp) and the base engine emission level. The table on page 15 shows the appropriate filter-engine combinations on the base of a EPA TIER 3, non-derated, engine. Under these conditions the filter offers a soot loading period between 8-10 hours, before it needs to be regenerated. This corresponds to a single regeneration per working day. If the emissions are higher, the soot loading time is reduced and the regeneration has to be started earlier. We recommend deciding in these cases for a bigger filter, to maintain, or re-power the engine.

PRODUCT INFORMATION

MAIN DIMENSIONS*

Diesel particulate filter FS MK-series



FILTER DATA	A (inch)	B (inch)	C (inch)	weight (lb.)	Regeneration time	Diesel quantity/ regeneration (US.liq.gal)	Engine Power in HP
FS 40 MKXS	24	7	13	50	5 min	0,0211	1 - 27
FS 40 MKS	24	7	13	55	8 min	0,0238	28 - 40
FS 40 MKM	26	7	13	60	8 min	0,0291	41 - 54
FS 40 MKL	28	7	13	65	8 min	0,0375	55 - 67
FS 50 MKS	25	9	13	66	10 min	0,0291	68 - 80
FS 50 MKM	28	9	13	71	10 min	0,0528	81 - 94
FS 50 MKL	31	9	13	76	10 min	0,0872	95 - 107
FS 80 MKS	25	11	15	78	15 min	0,0528	108 - 121
FS 80 MKM	31	11	15	93	20 min	0,0872	122 - 148
FS 80 MKL	31	11	15	101	25 min	0,106	149 - 174
FS 100 MKS	27	13	16	86	25 min	0,111	175 - 215
FS 100 MKM	30	13	16	99	30 min	0,137	216 - 255
FS 100 MKL	33	13	16	108	35 min	0,164	256 - 322
FS 160 MKL**	31	11	15	202	25 min	0,212	323 - 349
FS 200 MKS**	27	13	16	172	25 min	0,222	350 - 362
FS 200 MKM**	30	13	16	198	30 min	0,272	363 - 429
FS 200 MKL**	33	13	16	216	35 min	0,328	430 - 590
FS 300 MKS***	27	13	16	258	25 min	0,222	591 - 644
FS 300 MKL***	33	13	16	324	35 min	0,328	645 - 700

* subject to technical modifications ** double filter system *** triple filter system

OPERATION INSTRUCTIONS

OPERATION OF THE HUSS-CONTROL

Operation of the diesel particulate filter is made with the help of the control unit "HUSS-Control". The control unit is fixed in the visual field of the operator (e. g. at the dashboard).



ATTENTION!

The HUSS-Control is only in proper working condition if the ignition is switched on.



DISPLAY

The upper line shows the functioning steps, in the lower line, a bar shows the status of the filter (back-pressure and time of regeneration).

Keys:



Control



Mode




Function



OPERATION INSTRUCTIONS

REGENERATION

	<p>Regenerate once per day, even if the filter is not fully loaded.</p>
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- The vehicle should stand horizontally.
- Switch off the motor.
- Ignition: "ON": (do not start engine)
The HUSS-Control is supplied with voltage.
- Push key "M" and keep it for 5 sec. Regeneration starts after the 5 sec. have expired.



Note:

The display shows the time of 5 sec. until the start of regeneration in reverse. Release of the key "M" prior to the expiry of the 5 sec. leads to abortion - a self-test follows.

Further displays after expiry of 5 sec. during regeneration

- The compressor is started to cool down the system
- The glow plug is switched on
- The fuel-air-mixture is ignited.
- Regeneration of the diesel particulate filter is carried out. The display shows the remaining time of regeneration.
- Regeneration is finished. This information is displayed for 3 min.

NOTICE DISPLAYED

LED FUNCTION

regeneration/start in 5 sec.


green is lighting

pre cooling


start regeneration
glow plug

regeneration/
start ignition

regeneration on

regeneration finished

OPERATION INSTRUCTIONS

INTERRUPTION OF REGENERATION

A started regeneration can be interrupted by shutting-down the ignition with the help of the ignition key or by pushing the key "F" at the control. In this case, the display counts in reverse 5 sec. until the regeneration is cut off.

NOTICE DISPLAYED

regeneration/start in 5 sec.



LED FUNCTION

red LED is lighting

DEACTIVATE THE START INTERLOCK

alarm / filter laded



red LED is lighting



ATTENTION! If the keys "M" and "F" are pushed at the same time, the engine of the equipment can be started in dangerous situations even with the display "alarm/filter loaded".




Void of warranty

This procedure should only be used in a "case of emergency". If you do this to increase the filter operation time, this will overload and destroy the filter and may void your warranty.

FAULTS DISPLAYED BY THE HUSS-CONTROL

During regeneration, the single functions are controlled by hard- and software.

Disorders involve the interruption of regeneration.

	<p>CAUTION!</p> <p>If one of the following faults is shown in the display of HUSS-Control, the HUSS-service has to be called in order to eliminate the fault message.</p>
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NOTICE DISPLAYED	LED FUNCTION
fault glow plug	
fault fuel pump	
fault magnetic valve	
fault blower	
fault temperature sensor	
fault regeneration	
regeneration interrupted	
undervoltage	

ADDITIONAL OPERATOR'S DUTIES

Further operator's duties are provided below. In order to maximize the performance and operation time, these requirements must be met.

NOTE	Engine Must Meet OEM Specifications
The engine must be inspected by a qualified technician to verify the engine is operating within the engine OEM's specifications. If the engine does not meet specifications, necessary repairs must be made. The technician must document compliance on the warranty registration form. Failure to comply may void the warranty.	

SELECTING THE RIGHT HUSS DIESEL PARTICULATE FILTER FOR YOUR VEHICLE

Be sure you have selected the proper model for your vehicle. Application of the wrong model will affect exhaust system backpressure. Failure to apply the proper model may cause engine damage and void the warranty. If engine size exceeds the rating of a single unit, a dual system will be required. Please contact HUSS to get more information.

INSPECT MOUNTING HARDWARE

A diesel particulate filter weighs considerably more than the traditional OEM muffler. Inspect any mounting system hardware intended for reuse to ensure it is in good condition and can adequately support the added weight. Look for signs of rust, corrosion or fatigue. Do not reuse suspect components. Heavy-duty components should be used.

NOTE	Inspect Mounting Hardware
A HUSS diesel particulate filter is at least two times heavier than a traditional OEM truck muffler. The mounting system should be inspected to ensure it is in good condition and can adequately support the added weight. Inspect all hardware intended for reuse for rust, corrosion for fatigue. Replace all questionable components with heavy-duty components.	

INSPECT PIPING

To maximize emission aftertreatment effectiveness, exhaust tubing should be structurally sound and leak-free. Inspect the exhaust piping for leaks due to damage or corrosion, and replace defective components. Also look for flaking due to corrosion and/or soot build-up. Loose contaminants can be blown onto the filter face and cause plugging, increased backpressure and degraded engine performance.



ADDITIONAL OPERATOR'S DUTIES

NOTE	Rust, Corrosion and Soot on Existing Exhaust piping
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If you see any evidence of rust or corrosion on existing piping between the turbocharger and diesel particulate filter inlet, replace with new aluminized steel tubing. If reusing existing exhaust piping, banging and tapping on the piping may dislodge soot. Be sure to clean out any pipes prior to installing new components. Operate engine at high idle to blow out exhaust pipes prior to the installation of the diesel particulate filter. Protect yourself and others from loud straight pipe noise.

NOTE	Any Engine Problems Must be Resolved PRIOR to operation of the HUSS particulate filter
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Diesel particulate filter may plug if the engine is not properly maintained. This is especially true when operated under low-load or low ambient temperature conditions, idled for extended periods of time or if the engine is not properly calibrated for the specific fuel-type being used. To prevent the occurrence of plugging, engine problems must be resolved prior to installing the new device.

NOTE	CAUTION! Do Not Overtighten Bands or Clamps on Muffler Body
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The filter inside you be damaged if you deform the filter body by overtightening clamps.

NOTE	Avoid Excessive Force on Inlet and Outlet Piping!
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Excessive force on the inlet and outlet piping in conjunction with vehicle vibration can result in stress cracking where the pipe or pipe supports contact the emissions device inlet. Failures caused by excessive force are a result of improper installation and may not be covered under the warranty.

ADDITIONAL OPERATOR'S DUTIES

NOTE	Diesel contact with water can poison the filter
Water can also damage the filter retention material inside the device. Vertical tail pipes must be fitted with rain caps or curved outlets.	

NOTE	CARB Requirements
California ARB regulations require a product identification tag be permanently installed on the engine in a clear visible location.	

To meet CARB requirements, permanently attach the product identification tag (supplied in documentation package) in a clearly visible location on the engine. CARB regulations require a product identification tag be permanently installed on the engine in a clear, visible location. Application of the engine tag is not necessary for U.S. EPA regulations.

Fill out and return the Warranty Registration Card (included in the documentation package in the box). Failure to return the warranty registration card within 30 days after installation may void the warranty of your HUSS diesel particulate filter.

INFORMATION ABOUT THE INSTALLATION

The installation should be carried out by HUSS or a certified partner. Technical information about the installation can be received from HUSS or a certified partner.



MAINTENANCE / SERVICE

- DO NOT service the diesel particulate filter while the engine of the vehicle is running or hot, or the machine is in motion.
- Before making adjustments to, or servicing the electrical system, disconnect the battery cables, negative (-) comes first.
- To prevent fires or explosions keep open flames away from the battery or cold weather starting aids.
- When marking repairs or adjustments it is recommend that you consult your HUSS certified partner, and have the work carried out by trained personnel.
- Check all nuts and bolts periodically for tightness.

The HUSS diesel particulate filter has been designed and verified for use with most on- and off road applications. To ensure proper functioning of these products, HUSS preventive maintenance and service procedures must be incorporated into your regular vehicle maintenance routines.

Preventive maintenance recommendations during normally scheduled vehicle maintenance

1. Always consult HUSS for repairs and adjustments
2. Inspect the emissions device, exhaust piping and mounting brackets
3. Look for leaks, structural failures (cracks) and loose or missing fasteners
4. Contact HUSS if you identify defective parts

NOTE	Do Not Use Fuels Blended With Lube Oil
Engine oil must not be blended with the engine’s fuel since the oil may cause higher emissions and deposits in the filter that may cause higher backpressure, plugging and reduced engine performance and void the warranty.	

NOTE	For Electronically Controlled Engines
Electronically controlled engines are certified with a specific fuel and electronic program based on engine configuration and model year. Use only the fuel and electronic program specified for your engine. Using the incorrect fuel and/or electronic program may cause excessive soot generation and filter plugging and may void the warranty.	

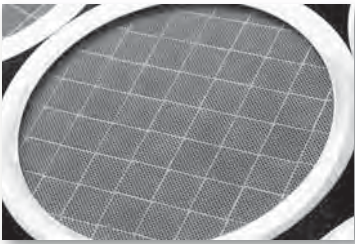
	CAUTION! Lube Oil
Certain components found in engine lube oil can poison catalysts. To protect against filter failure and/or plugging, ensure that the engine is not consuming oil at a rate higher than specified by the engine manufacturer. Use low ash oils, when possible. Do not use fuel blended with lube oil.	

MAINTENANCE WORKS WHICH CAN BE CARRIED OUT WITHOUT THE HUSS SERVICE



INSPECTION OF THE CONDENSATE COLLECTOR:

Cleaned the collector with dry air and empty the water in the collector via opening the connection at the bottom of the collector. If the collector is broken, leaky or cracked, you've to replace the old condensate collector with a new one.



FILTER CLEANING INTERVAL:

After approx. 600 – 800 working hours the filter has to be cleaned from white ash. Some applications including older, higher emission engines and applications in dirty environment may require more frequent cleaning. Executing the following ash removal guidelines will maintain performance, proper operation and durability. Failure to follow the procedure may void the warranty.



CAUTION!

Failure to follow the ash removal (filter cleaning) guidelines may void the warranty

Proper original equipment manufacturer engine maintenance procedures must be followed to ensure proper operation of your new device. Oil consumption that exceeds the original engine's manufacturer's specifications will increase filter cleaning.

1. FILTER CLEANING EQUIPMENT:



CAUTION!

Wear Protective Gear During Cleaning

A dust mask, gloves and safety glasses should be worn while performing the cleaning process


The following items are required to perform the filter cleaning process:

- A source of compressed dry air (80 – 140 psi / 600 – 900 kPA) with a standard shop air-gun
- Dust mask, gloves and safety glasses
- An industrial vacuum cleaner or a dust/ash collecting unit designed for diesel particulate filters



2. FILTER CLEANING INSTRUCTIONS:

- For this purpose, module A has to be detached from the emission device.
- Using the compressed air and blow it through the filter against the normal flow direction while capturing the ash in the vacuum cleaner.
- Avoiding direct contact of the air nozzle with the filter surface, slowly move the air nozzle across the face of the filter, directing air into each individual cell. Cleaning time depends on the filter diameter. Filters with larger diameters may require longer cleaning time.
- The filter is completely cleaned if there is no white ash or soot escaping
- Reinstall the filter in the same direction as was removed and do not forget a new gasket (sealing).
- It is recommended to carry out the complete procedure outdoors
- Please ask for the maintenance kit and recommendations of HUSS

	CAUTION! Do not breath in the diesel soot particles
Diesel soot particles are danger to your health!	

3. RECORD FILTER SERVICE

Regulatory agencies require that you maintain the following filter service and cleaning records:

- Date of installation
- Vehicle mileage at the time of installation
- Part & Serial number
- Date of filter cleaning
- Mileage at each filter cleaing

	CAUTION! Disposal of ash
Disposal of ash should be in accordance with all applicable Federal, State and local laws governing waste disposal.	

Disposal of ash should be in accordance with all local laws and regulations.

NOTE	Failure to record the maintenance may void your warranty.
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WARRANTY STATEMENTS

The Company, when selling new goods to their certified partners, gives a warranty which, subject to certain conditions, states that the goods are free from defects in material and workmanship. Purchasers of new HUSS equipment must request full warranty details from HUSS.

In accordance with the policy of continuous improvements to its filters, alterations in the specifications of filters may be made at any time without notice or obligation. The Company accepts no responsibility for discrepancies, which may occur between the specifications of its filters and the descriptions thereof, contained in its publications.

WARRANTY PROCEDURE

If operating problems are experienced during the warranty period, use the following procedure:

Immediately notify the certified partner from whom you purchased the diesel particulate filter, quoting the Model and the Serial Number. It is important that there should be no delay, and you should realize that, even where the original failure is covered by warranty, warranty coverage might not apply, unless the failure is repaired immediately. Provide your certified partner with as much background information as possible; it will help to understand the kind of work which has to be done to fix the problem.

PARTS WARNING

For expendable or waste parts e.g. wires, wire-connections, glow-plugs or gaskets, no warranty claim can be accepted. The use of non-approved parts may result in all part of substandard quality. HUSS will not accept responsibility for any loss, damage or liability resulting from the use of such parts. Using non-approved parts may result in the manufacturer's warranty being invalidated.

SERVICE AFTER WARRANTY

During the warranty period, you should have all your repairs and maintenance performed by your HUSS certified partner. This ensures that a detailed check is kept on the progress and performance of your new diesel particulate filter. In order to obtain the best results from your HUSS diesel particulate filter, it is important that regular maintenance and service checks continue after the warranty period has expired. Make use of your local HUSS certified partner for all major diesel particulate filter services; a trained mechanic should spot any problems between one service and the next. The mechanics are regularly trained and updated on the product, servicing techniques and the use of modern service tools and diagnostic equipment like the HUSS control unit. Certified partners receive regular Service Bulletins; have Workshop Manuals and other such technical information to ensure that the repair or service is to the standard required by HUSS.



WARRANTY STATEMENTS

PRODUCT WARRANTY

YOUR WARRANTY RIGHTS AND OBLIGATIONS

HUSS, LLC warrants the diesel emission control system in the application for which it is sold or leased to be free from defects in design, materials, workmanship, or operation of the diesel emission control system which cause the diesel emission control system to fail to conform to the emission control performance level it was verified to, or to the requirements in the California Code of Regulations, Title 13, Sections 2700 to 2706, and 2710, for the periods of time listed on page 31, provided there has been no abuse, neglect, or improper maintenance of your diesel emission control system, vehicle or equipment, as specified in the owner's manuals. Where a warrantable condition exists, this warranty also covers the engine from damage caused by the diesel emission control system, subject to the same exclusions for abuse, neglect or improper maintenance of your vehicle or equipment. Please review your owner's manual for other warranty information. Your diesel emission control system includes a core part (particulate filter) as well as hoses, connectors, a backpressure monitor, and other emission-related assemblies. Where a warrantable condition exists, HUSS will repair or replace your diesel emission control system at no cost to you including diagnosis, parts, and labor.

WARRANTY COVERAGE

For an engine used in an application listed in the following table, the warranty period will be the years or hours or miles of operation shown in the whichever occurs first. If any emission-related part of your diesel emission control system is defective in design, materials, workmanship, or operation of the diesel emission control system thus causing the diesel emission control system to fail to conform to the emission control performance level it was verified to, or to the requirements in the California Code of Regulations, Title 13, Sections 2700 to 2706, and 2710, within the warranty period, as defined above, HUSS will repair or replace the diesel emission control system, including parts and labor. In addition, HUSS will replace or repair the engine components to the condition they were in prior to the failure, including parts and labor, for damage to the engine proximately caused by the verified diesel emission control strategy. This also includes those relevant diagnostic expenses in the case in which a warranty claim is valid. HUSS may, at its option, instead pay the fair market value of the engine prior to the time the failure occurs.

OWNER'S WARRANTY RESPONSIBILITY

As the vehicle, engine, or equipment owner, you are responsible for performing the required maintenance described in your owner's manual. HUSS recommends that you retain all maintenance records and receipts for maintenance expenses for your vehicle, engine, or equipment, and diesel emission control system. If you do not keep your receipts or fail to perform all scheduled maintenance, HUSS may have grounds to deny warranty coverage. You are responsible for presenting your vehicle, equipment, or engine, and diesel emission control system to a HUSS-authorized certified partner as soon as a problem is detected. The warranty repair or replacement should be completed in a reasonable amount of time, not to exceed 30 days. If a replacement is needed, this may be extended to 90 days should a replacement not be available, but must be performed as soon as a replacement becomes available.

If you have questions regarding your warranty rights and responsibilities, you should contact HUSS: info@huss-filters.com or the California Air Resources Board at 9528 Telstar Avenue, El Monte, CA 91731, or (800) 363-7664, or electronic mail: helpline@arb.ca.gov.

INSTALLATION WARRANTY

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The HUSS-authorized installer warrants that the installation of the diesel emission control system is free from defects in workmanship or materials which cause the diesel emission control system to fail to conform to the emission control performance level it was verified to, or to the requirements in the California Code of Regulations, Title 13, Sections 2700 to 2706. The warranty period and the extent of the warranty coverage provided by the HUSS certified installer is the same as the product warranty provided by HUSS, and the same exclusions apply.

OWNER'S WARRANTY RESPONSIBILITY

As the vehicle, engine, or equipment owner, you are responsible for presenting your vehicle, engine, or equipment, and diesel emission control system to the HUSS-authorized installer as soon as a problem with the installation is detected. If you have questions regarding your warranty rights and responsibilities, you should contact a HUSS certified, or HUSS: info@huss-filters.com, or the California Air Resources Board at 9528 Telstar Avenue, El Monte, CA 91731, or (800) 363-7664, or electronic mail: helpline@arb.ca.gov.

WARRANTY CLARIFICATIONS

(Which do not limit or modify the provisions of the above warranty in any way)

The warranty above is the sole warranty made by HUSS, LLC. There are no other warranties, expressed or implied, or of merchantability or fitness for a particular purpose. For the purpose of this warranty, abuse or neglect includes vehicle accidents, ignoring the system indicator lights, blending lubricating oil with fuel, or any engine failure or condition that allows excess lubricating oil, coolant, contaminants or debris to enter the exhaust system. HUSS is not responsible for incidental or consequential damages, which include, but are not limited to fines, theft, vandalism, or collisions. The owner is responsible for incidental costs such as communication expenses, meals, and lodging incurred by owner or employees of owner as a result of a warrantable condition. The verified diesel emission control system must be installed and serviced by HUSS-authorized personnel. Installation or service by unauthorized personnel may result in a denial of warranty coverage.

HUSS, LLC

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WARRANTY STATEMENTS

WARRANTY PERIOD

Engine Type	Engine Size	Warranty Period
On-Road	Light heavy-duty, 70 to 170 hp, Gross Vehicle Weight Rating (GVWR) less than 19,500 lbs.	5 years or 60,000 miles
	Medium heavy-duty, 170 to 250 hp, GVWR from 19,500 lbs. to 33,000 lbs.	5 years or 100,000 miles
	Heavy heavy-duty, exceeds 250 hp, GVWR exceeds 33,000 lbs.	5 years or 150,000 miles
	Heavy heavy-duty, exceeds 250 hp, GVWR exceeds 33,000 lbs., and the truck is: 1. Typically driven over 100,000 miles per year, and 2. Has less than 300,000 miles on the odometer at the time of installation.	2 years, unlimited miles
Off Road (includes portable engines and stationary)	Under 25 hp, and for constant speed engines rated under 50 hp with rated speeds greater than or equal 3,000 rpm	3 years or 1,600 hours
	At above 25 hp and under 50 hp	4 years or 2,600 hours
	At above 50 hp	5 years or 4,200 hours

WARRANTY STATEMENTS

The following warranty statements do not limit or modify the provisions of the above warranty in any way. The aim of this warranty statement is to explain in detail under which conditions the warranty of HUSS is valid. The main focus is, to avoid problems in the communication before they arise. For all documents, mentioned in the text below, please call HUSS or refer to: www.huss-filters.com

- 1 General:** HUSS grants a warranty period of minimum 24 month. More information is listed in the table "warranty period" (page 31).
- 2 Usage of original HUSS parts/components:** For installation, maintenance work or reparation it is only allowed to use parts or components being included in the original scope of delivery or being included in the original spare part list.
- 3 Modification of HUSS parts/components:** Modification of HUSS parts or components needs to be approved by HUSS in a written form. This is also valid for modification regarding the exhaust piping e.g. the exhaust inlet or outlet.
- 4 Installation in accordance to the technical instruction manual:** The installation has to be done absolutely according to the technical instruction manual. In case of a doubt HUSS or a certified partner have to be consulted.
- 5 Settings of the HUSS Control:** The settings of the HUSS Control have to be done according to the data sheet of the particular filter type. The settings have to be equalized with the corresponding data of the engine supplier. In case of a doubt HUSS or a certified partner have to be consulted.
- 6 Dimensioning of the filter:** For the dimensioning of the filter the engine power in HP is only an approximated value. In case of a doubt HUSS or a certified partner have to be consulted.
- 7 Installation log/Checklist:** From each installation project a installation log according to the checklist has to be made. This form sheet has to be filled in completely and send back to HUSS.
- 8 Briefing of the customer/Disposal log:** After the installation is done, the customer/end-user has to be trained with the correct usage of the product. After the training the customer/end-user needs to confirm, by signing the disposal log, that he has been trained and that the product had a proper function. This form sheet has to be filled in completely and send back to HUSS.
- 9 Period of maintenance and service:** The periods of maintenance and service need to be complied during the period of warranty. The services during the period of warranty have to be done by HUSS or by an certified service partner. The form sheet about the services has to be filled in completely and sent to HUSS. The compliance with the periods of service and maintenance does not only refer to the filter but also for the machine itself.
- 10 Product identification card/Delivery report:** In case that filter systems will be completed out of components, or components will be changed, the serial numbers of all components need to be registered in the product identification card. This card needs to be send back to HUSS.



WARRANTY STATEMENTS

- 11 General issues in case of reclamation:** If in case of reclamation parts or components will be changed, they become the property of HUSS. It is up to HUSS to decide, whether new parts or overhauled parts will be used. The period of warranty for changed parts or components ends with the end of the period of warranty of the entire system. Warranty may be void in case of an accident, damages done by purpose, services by unauthorised personnel, or damages caused by inappropriate usage. There is no entitlement of system upgrade in case of changes in design or further on developments of the products.
- 12 Consumable parts:** For consumables or waste parts e.g. wires, wire-connections, glow-plugs or gaskets, no warranty claim can be accepted.
- 13 Reclamation report/ return consignments of parts/components:** If parts/components were reconsigned to HUSS a complete reclamation report has to be transmitted, too. A reclamation case has to be announced towards HUSS in a 30 working days period.
- 14 Dismounting of parts/components:** Dismounting of parts or the entire system may void your warranty.
- 15 Service in the scope of warranty:** Service work in the scope of warranty can only be accepted, if this work was known to and authorised by HUSS.
- 16 Recompensation of costs in the scope of warranty:** Labour costs in case of a warranty can only be refunded, if the service is allowed by HUSS, or if a specific service contract is in place. In all other cases the maximum refund is limited to material costs without any additional costs.
- 17 Usage of Diesel:** The use of fuels not consistent with EPA/CARB regulations, fuel other than that for which the engine is calibrated or fuels blended with used lube oil may void your warranty.
- 18 Soot emission level:** This manual refers to appropriate filter-engine combinations on the base of EPA TIER 3, non-derated, engines. Under these conditions the filter offers a soot loading period between 8-10 hours, before it needs to be regenerated. If the emissions are higher, the soot loading time is reduced and the regeneration has to be started earlier.



NOTES



HUSS, LLC

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PMB#104

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Operating Instructions FS 40/50/80/100/200-MK

