Emifree GmbH Produktion von Filteranlagen
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Operation and Maintenance Manual

ECO - AIR CLEANER

Mechanical oil mist collector
with integrated self-cleaning system

(Models: EAC12-XXX – EAC15-XXX)

Picture of ECO - AIR CLEANER Premium

Caution!

Before starting, maintenance or inspecting the unit be sure to peruse this manual and understand how the unit works. Follow instructions herein during any of commissioning.

Operation and Maintenance Manual EG – 2006/42/EG

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Preface

We thank you for purchasing the ECO - AIR CLEANER oil mist collector. You are going to have now more spare time with our low maintenance system. You are also making this world better by choosing environment-friendly technology with recycling capabilities.

The aim of this manual is to provide for our customers the concise information about using our products, the maintenance and inspection for a safe and long lasting operation.

For safe and proper use, please read this manual and come back to it anytime you need.

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Contents

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1 Safety

1.1 Warnings

In this manual, the following warnings are used to indicate specific danger levels:

Warning sign	Definition
Danger	Dangerous situation which necessarily require correction or attention. The neglect of the instructions may cause serious injury or death.
Warning	Potential hazards. The neglect of the instructions may cause serious injury or death.
Caution	Potential hazards. The neglect of the instructions may cause minor or moderate injury or damage to the system.
Note	Important note or information.

1.2 Safety operations

1.2.1 Operation

1. The cover for electric connection of the motor must be put and made secure. The ECO - AIR CLEANER functions with an industrial voltage. If you treat it improperly, it may cause a dangerous electric shock.
2. This system is equipped with one fan, which is used for air intake of the raw gas.
3. Make sure that the fan is protected by adequate covering. Without it, the fan may cause serious injury and damage to the plant.
4. Do not apply water on the motor. This can cause a short circuit or a deterioration in the insulation and poses a threat to a plant and people.
5. Give appropriate warnings to your employees.
6. Do not perform unnecessary changes during operation of the plant.

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7. Improper use of the unit can damage the system and cause error messages. Only specially trained and authorized personnel should perform the operation of the unit.
8. Do not leave any tools on the unit while commissioning.
9. Do not run the unit with damaged components.
10. Do not operate the machine without the pre-filter (stainless-steel).

1.2.2 Installation and maintenance

1. Installation, maintenance and inspection shall be performed only by trained personnel. Electrical wiring must be done by an electrician.
2. Before the first service, make sure your staff is trained professionally.
3. Turn off both the system and the power supply during maintenance and inspection by means of the main switch on the control panel. Neglect can result in serious injury. Make sure that the ground wire is connected.

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2 Design and function

2.1 Specifications

Following parameters are specified for the ECO - AIR CLEANER.

Phase(n)	*3*
Rated Voltage	*400 VAC*
Frequency	*50 Hz*
Amperage	*2,3 A*
Weight	*100 kg*
Housing material	*Steel sheet powder-coated*
Housing paint	*RAL 9002 (Standard)*

2.1.1 Control system (only for premium version)

PLC	SIEMENS S7-Simatic
HMI	*Touch Panel with 3.8" monochrome display*

Control system features adjustable via touch display manual and automatic modes.

2.1.2 Interfaces

Air inlet	*DN 200*
Oil outlet	*G 1" outer thread*
Flushing inlet	*G 1/4" outer thread*

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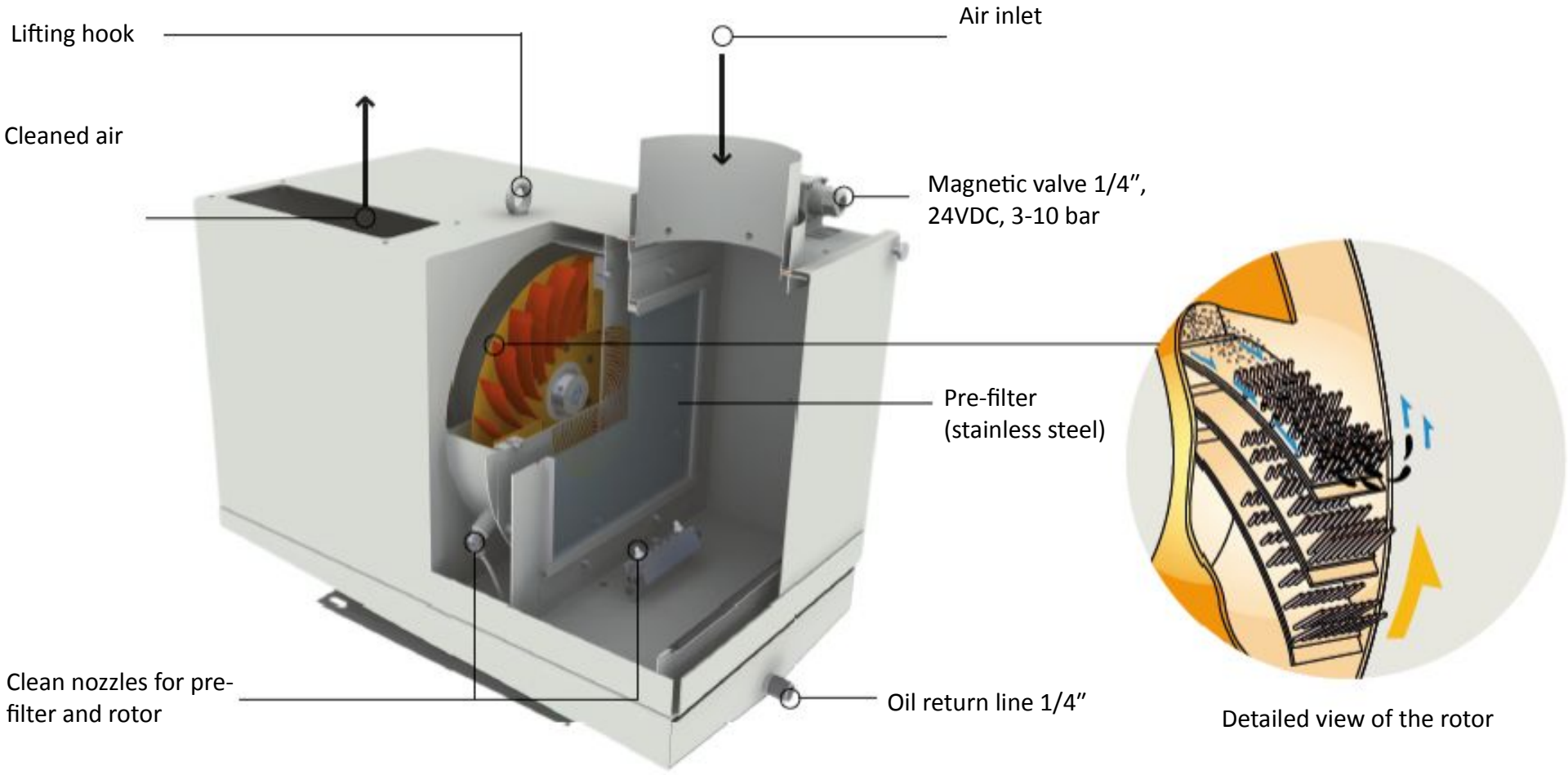
2.2 Schematic Description



Detailed view of the rotor

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3 Installation

3.1 Before use of the device

Check the following points before commissioning the system. In case of any irremediable defects please contact the manufacturer or a dealer.

1. Check for transport damages.
2. Check for loose screw.
3. Make sure you received all ordered components and accessories.

3.2 Installation instructions

1. The installation should have the following conditions:

- The unit is intended for indoor use and should be protected from wind, rain and water.
- Ventilation has to be sufficient and humidity low.
- Temperature at the installation has to be greater than 5° C.

2. The unit must be securely fastened
3. If the unit is mounted on a machine, you should minimize vibrations by employing vibration dampers.

Caution!

Before you lift the unit, pay attention to the weight indicated on the type plate.
Suitable lifting equipment should be considered in order to avoid injuries.

3.3 Inlet and outlet pipe installation

1. Use suitable pipe or connecting material for guiding air. The compatibility with the used coolant should be ensured.
2. Seal properly to avoid connection to leaks in the pipe. In installation of the suction tube the

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prevention of "collection centers" for the oil or emulsion should be concerned. Therefore, keep the slope of the whole pipe and use compounds with smooth the edges.

3. A minimum distance of 1 m between master machine and the ECO - AIR CLEANER unit should be ensured. If this is not possible due to technical reasons, a pre-filter must be installed.

3.4 Oil drain tube installation

The filtered oil or emulsion mist accumulates as liquid in the return container. The recirculation of the fluid may be achieved by means of a pipe connection of 3/4 or 1 inch (depending on model) with a coolant tank or a separate recycling container.

3.5 Electric issues

For a safety reasons install overload protection and make sure that the earthing of the unit is installed properly.

Caution!

Let perform the electrical installation in accordance with the legal requirements only by qualified personnel. The grounding cable can not stick to to a gas or water pipes.

The power supply should be stable with +/- 5%. Otherwise please specify special voltages when ordering so that the unit will be equipped with other motors and control components.

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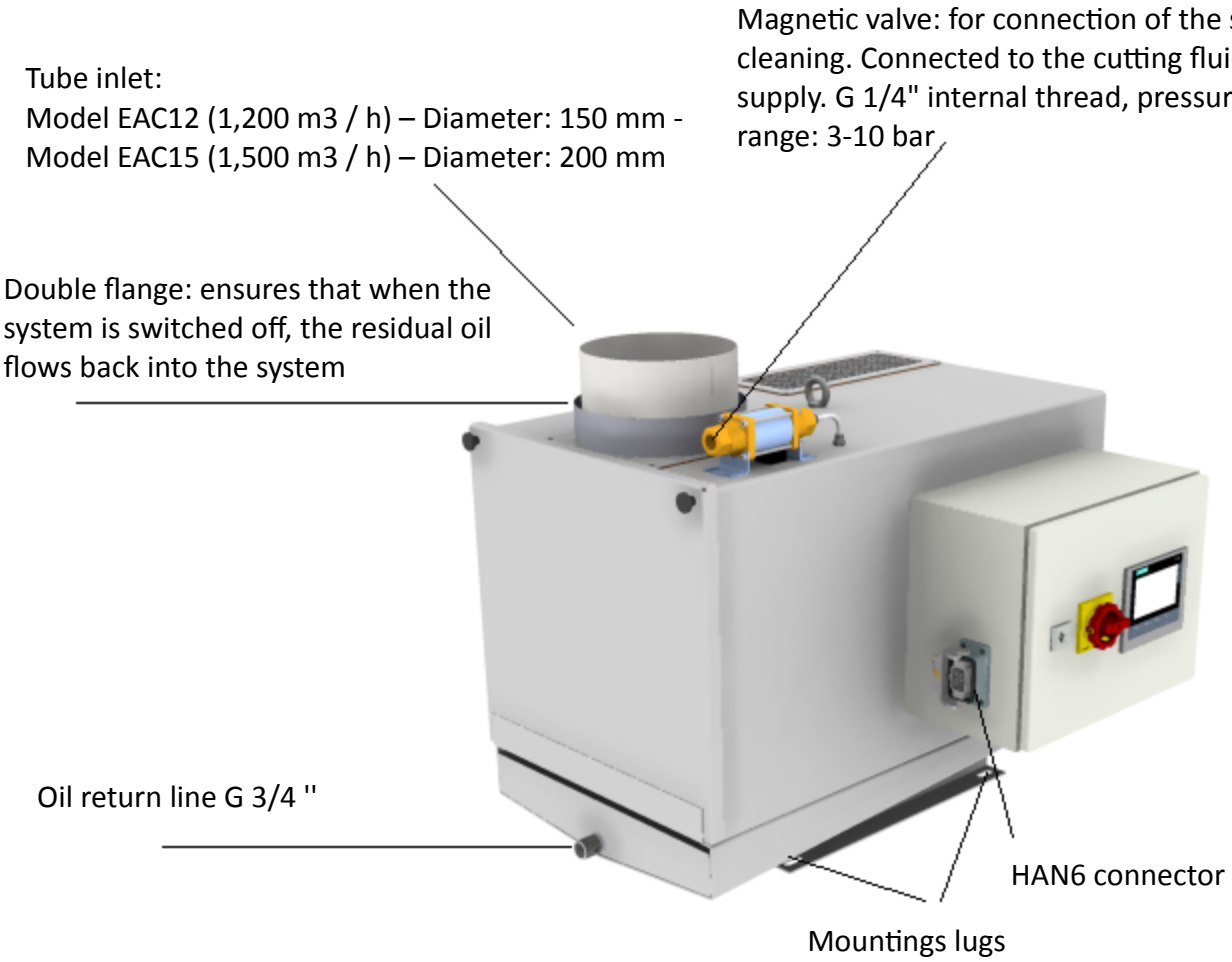
3.6 Installation diagram



Tubing and flanges can also be supplied as accessories from Emifree.

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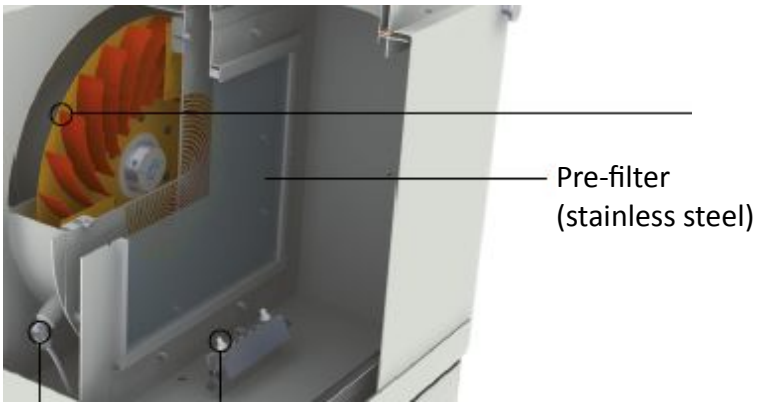
4 Commissioning

4.1 Verification of the electrical system

1. All 3 phases are connected.
2. All wires are firmly connected to the jacks.
3. Grounding is connected properly.
4. Overload protection is selected according to the motor power.

4.2 Verification of the unit

Check weather the pre-filter is installed correctly.



4.3 Testing

1. Check the rotation direction (see arrow at motor). In premium version the rotation direction will be automatically correct due to the installed frequency converter.
2. If the rotation direction is not correct please change electrical phase sequence.
3. Assure that all covers are closed properly and that no tools are on or in the unit.
4. Check if there are no abnormal vibrations on the unit. The units are balanced so there is no huge vibration level.

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4.4 Touch Panel (only for premium version)

4.4.1 Operation

This unit can be operated either in automatic mode or in hand mode (manual). Button F1 allows switching between these two operations.

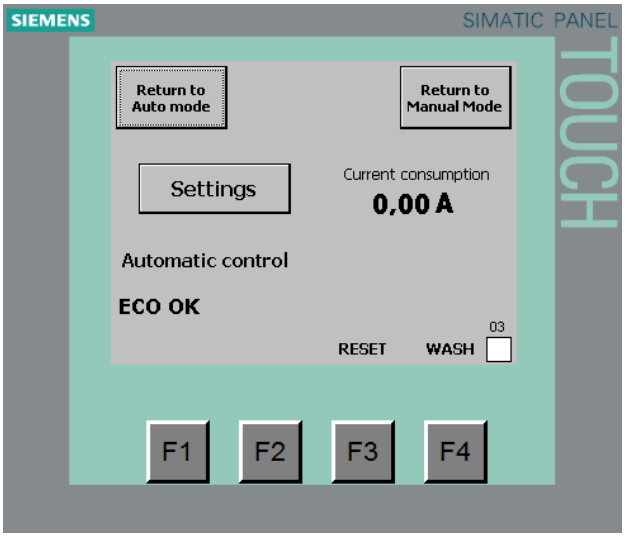
An external “start/stop” function can be done either via a potential free contact or via PROFINET or PROFIBUS connection. Obviously, It is reasonable to switch the unit to a standby mode when for example during a longer stay of the tool machine (because of tool or part change).

Functionality of other keys are following:

- With the F2 button (start/stop) the unit can be stopped at manual mode.
- F3 button clears the failure notification if the failure cause is not present anymore. If the failure appears again please have a look at the failure analysis table in the last chapter.
- F4 button starts manual washing. It is recommended to perform manual washing after long stopping periods (i.e. vacation or summer closing).

4.4.2 Changing of parameters

If you touch on the service button, the following screen will appear:



Service view

There is visible the amperage level of the filtration unit. If the filter unit is clocked, i.e. through light

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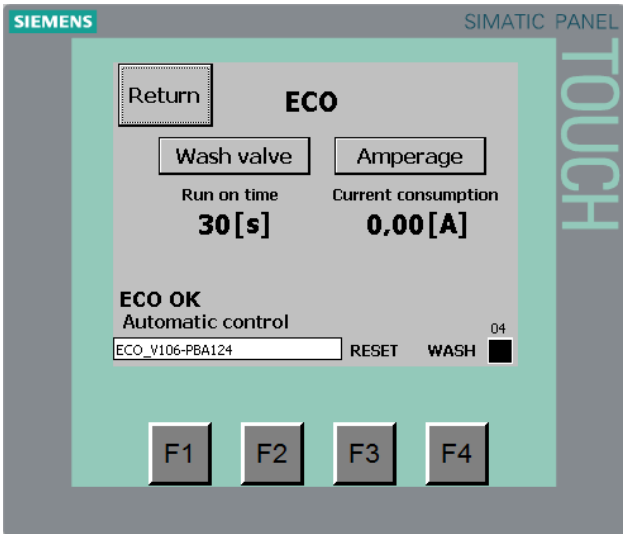
metal chips, the amperage level will fall automatically due to the fact that less air volume will be transported. Depending on the setted alarm value the unit will send a failure message. If the amperage level reaches a high value, this can be a sign of a failure of motor (e.g. problem with bearing of the motor).

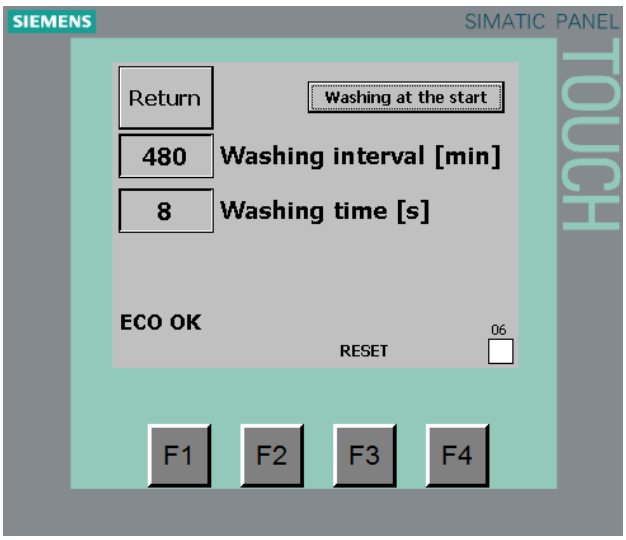
By a click on the button “Settings” the Run on time (delay time of the turning off machine after receiving external stop signal) can be adjusted. It prevents the oil coming back to the tool machine.



Settings view

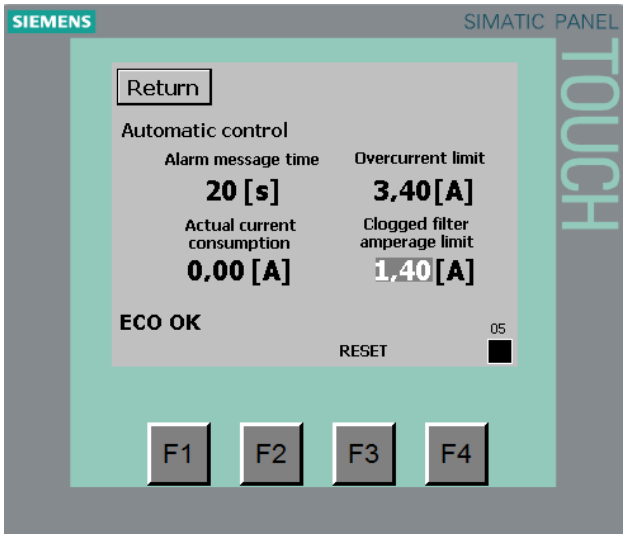
The cleaning intervals (after clicking on the button WASH VALVE) can be setted flexible (depending on the machine operation i.e. Grinding, milling, etc.). The more particles and harder the operation is, more frequent auto washing is required.

As standard value every 12 h (720min) for 8-10 seconds there should be cleaned. At operations with high particle contamination (i.e. Grinding) the washing cycle can be setted to every 480 min.



Wash valve view

Settings of the filter status detection via the amperage level can be viewed by clicking on the Amperage button.



Amperage view

Attention: The amperage level will also be changed by closing a volume throttle.

The best way to determine the limit amperage level is to first close the volume throttle totally and watch at the amperage level. This would be the value for total clocking (if the pre-filter would be clocked totally).

Example:

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Normal operation: 2,4A with 400V/50Hz.
Throttle completely closed (as clocked): 1,8 A.
Due to the fact that we would like to have a preventive warning, in this case we would set 2,0 A.
Clogged filter amperage limit: 2,0 A.
Overcurrent limit (bearings damaged or motor defect): Normal value x factor 1,3 => 3,12 A.

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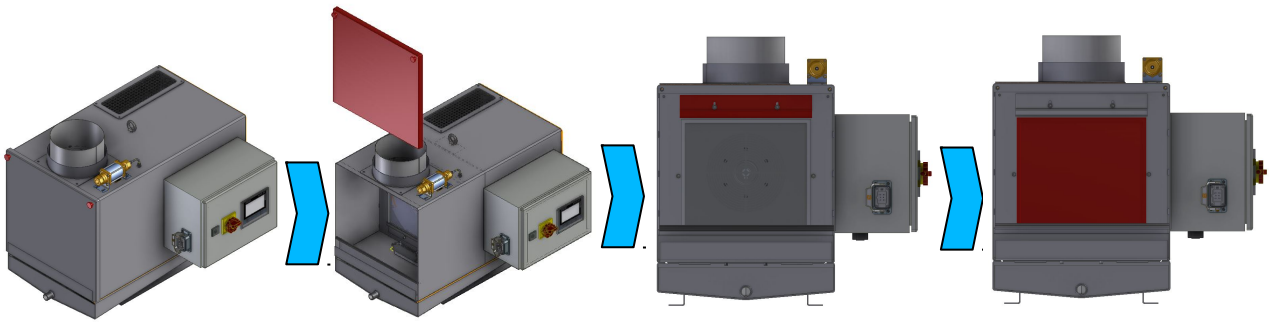
5 Maintenance and inspection

5.1 Exchange of the pre-filter

1. Unscrew the 2 screws of the pre-filter.
2. Lift the cover (red) to open.
3. Open the thumbscrew (red) and lift the small cover of the pre-filter.
4. Remove the pre-filter (red).



If the pre-filter is dirty please clean and insert again.

5.2 Maintenance components

Product name	Model – part no.	Dimensions [mm]	Interchangeability
Pre-filter (stainless steel)	12731	330 x 300 x 10	EAC12 / EAC15

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5.3 HEPA Filter exchange

HEPA Filter exchange: signal “Filter clogged”.

Open lateral hinge

Lift cover

Take out HEPA Filter

Insert new HEPA Filter

Mount the cover

Close the hinge

Ready

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5.4 Recommended inspections

Item	Subject	Measuring subject	Method	Criteria	Cycle for Inspection			Spare parts
					monthly	1/2 yearly	yearly	
Environment	Ambient air	Temperature	Measure	Between 1-40°C				
		Humidity	Measure	max. 85% RH				
Power	Main connection	Voltage	Measure	400 VAC				
		Voltage fluctuation	Measure	+/- 5%		x		
		Cable fixture	Tighten	Condition		x		
	Turbo Ventilator	Smooth running	Measure	Volume flow			x	
Main unit	Drive Motor	Smooth running	Rotor shaft	Rotation			X	
	Motor bearings	Temperature	Max. 40-45°C	> 50°C			x	Bearings
	Pre-filter	Condition	see page 16	volume flow	x			Pre-filter (part no.: 12731)
	Isolation	Resistance	Measure	> 1MΩ			x	
	Oil drainage	Connection	Visual	Flow	x			
	Spray nozzle	Condition	Visual	Flow	x			

Note

In case of a long production stop it can happen that the rest of the liquid emulsion which remains in the pre-filter is getting hard. Due to this fact it is recommended that before a long stop the unit will be washed. It is also possible to interchange the pre-filter easily

Danger!

Do not use the unit in explosive environments.
The installed standard motor is not ATEX/API proofed.
If you would like to use the unit in such areas please contact the producer in advance.

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6 Failure analysis

When errors occurred, please go through the following list. If you can not fix the error, please contact the manufacturer or authorized distributor.

Failure	Cause, symptom	Solution
Slow, interrupted or no rotation of main drive motor	Electrical connection interrupted	Check the cable connection
	Fuse	Check the fuse of the cable connection
	Voltage drop	Check the power supply connection
	Loud motor noise	Check the motor and bearings
	Foreign objects inside rotor	Dismantle the rotor
Motor rotates but there is no volume flow	Tubing is damaged or not connected	Connect, repair or exchange
	The pre-filter is clocked	Exchange or clean the pre-filter
	Main cover is open	Close the main cover
Motor rotates but there is low suction power	Pressure loss, long tubing	Check the tubing
	Wrong rotation direction	Change the phase sequence in the connection
	Foreign objects damaged the unit	Dismantle, repair, clean
	Closed throttle	Open the throttle
	The pre-filter is clocked	Exchange or clean the pre-filter
No drained oil	Drainage line blocked	Please check outlet at oil pan
	In the oil pan there is no liquefied oil mist	Clean the return holes
	Rising return line	Change the path of return line
	Closed return line of cutting fluid supply	Open return line of cutting fluid supply
Motor overloaded	Too high motor speed	Check the power supply connection
	Loud motor noise	Check the motor and bearings
Cleaning unit	Little amount of cleaning fluid	Increase the pressure of cleaning fluid
	Nozzles are clocked	Clean the nozzles

Instruction no.: BDL-EACXX-1CS-C-F

This manual underlies subject to changes!

All products can only be used as described. No responsibility of improper use of the purchased units.

Special advice, that dangerous substances of any origin especially those ones which are categorized under ER RL 64/548/EWG article 2, part 2 can be filtered only after consultation with Emifree.

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