

Installation instructions and Operation manual

Turbo Filter

GB

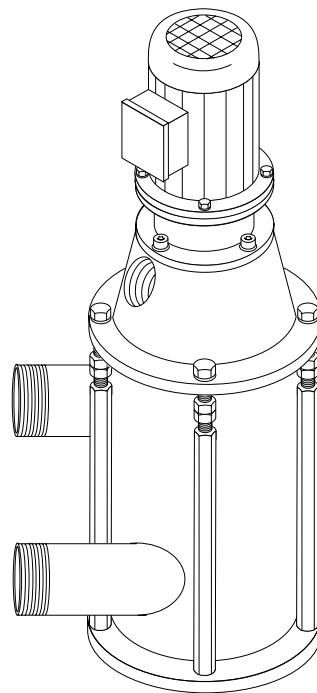


Table of contents

	Page
1 Product and function description	5
1.1 Cleaning phase	6
1.2 Reverse flow phase	6
1.3 Instructions for cooling lubricant filtration	6
2 Danger and safety instructions	7
2.1 General information	7
2.2 Information for repairs and servicing work as well as for faults	7
3 Transport	8
4 Assembly and installation	8
4.1 Assembly	8
4.2 Installing the filter	8
5 Initial startup	9
5.1 Controlling the filter	9
6 Servicing / maintenance	10
6.1 Change or clean filter element	10
6.2 Change ball bearings	11
6.3 Disassembling vane	12
6.4 Assembling the filter	12
7 Repairs and Maintenance table	13
8 Correct system faults	13

1 Product and function description

Function

- Solid filtration from low-viscosity fluids

Application range

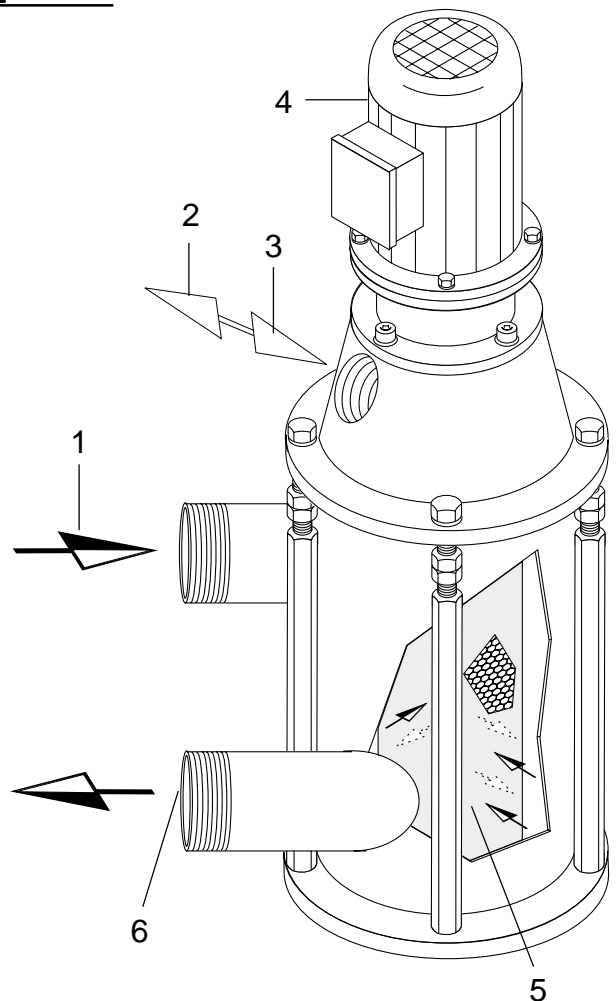
- Filter gauge according to filter use
- Suited for machining processes that involve clearing away of material



- **Filter is not intended for use with potentially explosive fluids.**

Action

- Reciprocal interaction between the cleaning phase and the reverse-flow phase. (Chapters 1.1 and 1.2)
- The pressurised fluid (1) poured into the filter is cleaned by the built-in filter element (5) and flows upwards (2) into the collecting container, whilst the discharge pipe (6) is closed via a built-in valve.
- Through the accumulated dirt on the filter element (5), the internal pressure in the filter rises.
- Via a built-in pressure sensor at the inlet (1), a reverse flow is introduced after a pressure (filter resistance) of approx. 0.4 bar.
- A valve simultaneously opens at the discharge pipe (6), whilst the motor (4) sets the water column in the filter element (5) in rotation.
- Through the rotation, a suction effect (3) occurs, that again draws the cleaned fluid into the inside of the filter element (5).
- Dirt particles are rinsed from the surface of the filter element and flow off via the open discharge pipe (6).



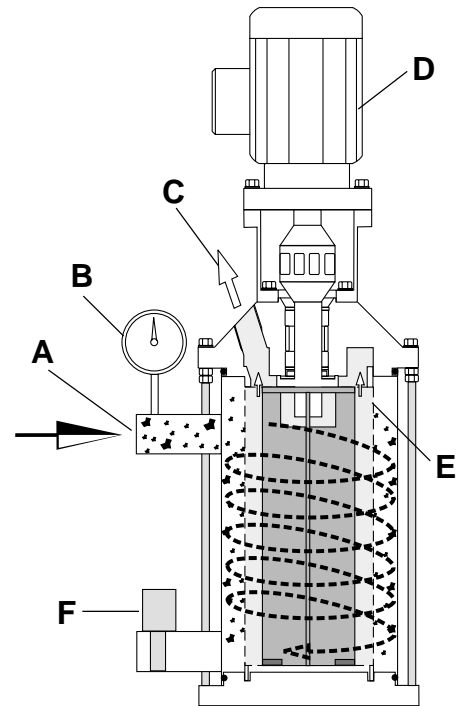
- **Risk of injury!**
- **Filter carries out the cleaning interval independently when the set internal pressure is reached.**
- **Switch off the filter and safeguard it from being accidentally switched on.**

Sound level: < 70 dB(A)

1.1 Cleaning phase


- Dirty liquid (A) enters the filter.
- Dirt particles settle on the filter fabric (E).
- Cleaned fluid (C) runs into the supply tank.
- The inner pressure of the filter (B) is within its set range.
- The valve (F) at the discharge pipe (for reverse flow) is closed.
- Motor (D) is switched off

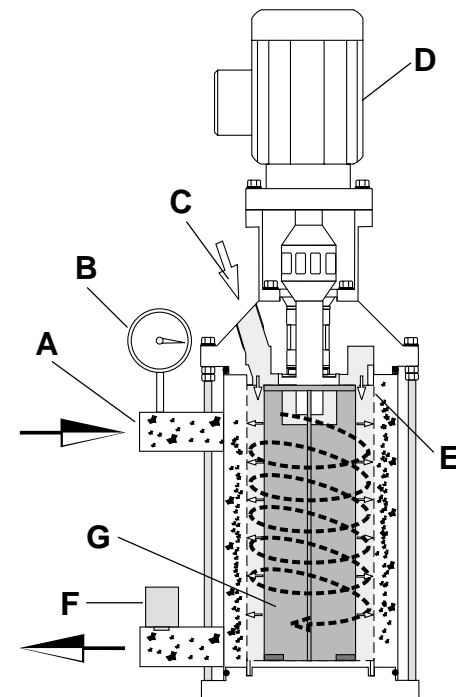
 **Feed pressure:** approx. 0.5 bar



1.2 Reverse-flow phase


- Internal pressure of the filter (B) exceeds the set value
- Motor (D) sets vane (G) in rotation
- The discharge valve (F) opens.
- Dirt particles are rinsed with the help of the cleaned fluid (C), by the activated reverse flow, from the filter fabric (E)
- The motor runs for approximately 3 seconds.
- Discharge valve (F) closes after an approx. 1 sec. delay after switching off the motor (D)
- The cleaning phase starts up (see Chapter 1.1).

 see control diagram chapter 5.1



1.3 Instructions for cooling lubricant filtration

- Use filter appropriate for pre-separation (500 to 1000 µm)
- Apply and maintain cooling lubricant in accordance with manufacturer's specifications:

 *Avoid build up of calcium (observe local water hardness)*
Avoid bacteria and mould infestations
Avoid entry of foreign oils (emulsification of cooling lubricant)

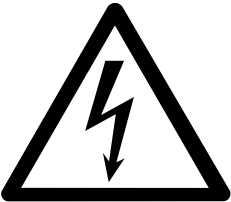
- Avoid accumulation of fine dirt
- Do not filter magnetic chippings (grinding cast iron or steel)
- Special filter cartridges must be used for filtering magnetic chippings.

2 Danger and safety instructions

2.1 General instructions

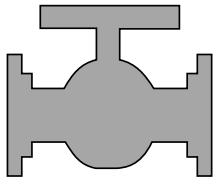


- Always follow all data and instructions for the enclosed operating manual.
- Never override safety devices (e.g. pressure limiting valves).
- The function of safety devices must always be ensured.

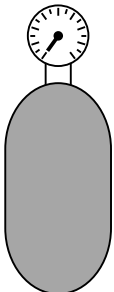


- Work on the electrical system (motors) must only be carried out by electronics experts.
- Observe the relevant VDE regulations and connection specified electrical supply company.

2.2 Instructions for repair and maintenance work, and for malfunctions



- Close the piping valve.
- Remove all hazardous materials.
- Do not allow coolant to escape into the environment.



- Depressurise the system.

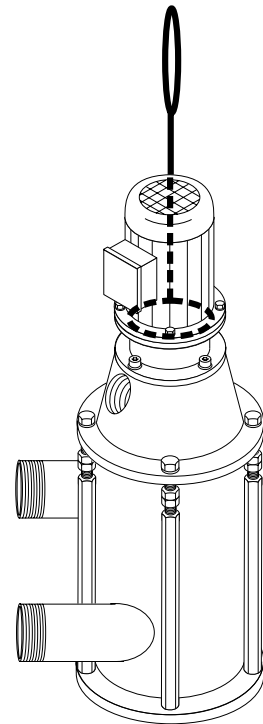


- Always wear protective clothing and protective gloves when handling hazardous substances.

3 Transportation



- Ensure that the carrying cable has a sufficient load capacity!
- Attach cable underneath the coupling flange (see diagram).
- During transportation, ensure that the filter does not slip out of the transport suspension.
- Do not stand beneath suspended loads.



4 Assembly and installation

4.1 Assembly

- Filter assembly only permitted as in diagram, with motor at top.

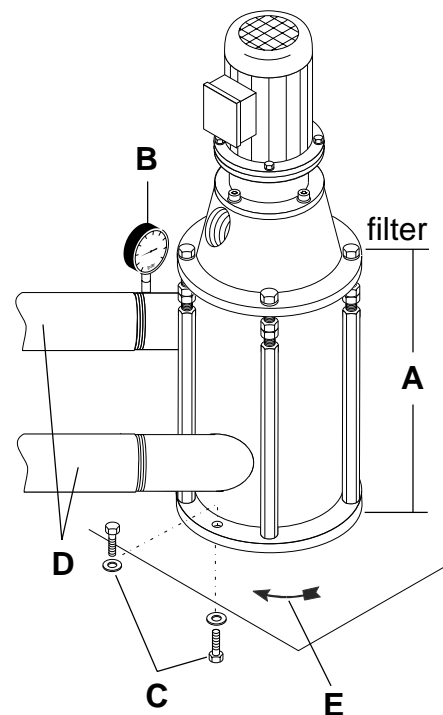
4.2 Installing the filter

- Note required disassembly height (A) for changing the element.



*Disassembly dimension A = minimum room at the top:
Disassembling filter element see chapter 6*

- Pressure gauge (B) for contamination checking should be clearly visible.
- Filter can be attached, depending on conditions, from the top or bottom (C).
- Install and connect filter according to the described flow direction (D) (see chapter 1).
- The pipelines (D) connected by the customer must not exert any force on the filter.
- Before the start-up of new systems, containers, lines and connections must be free of coarse particles.



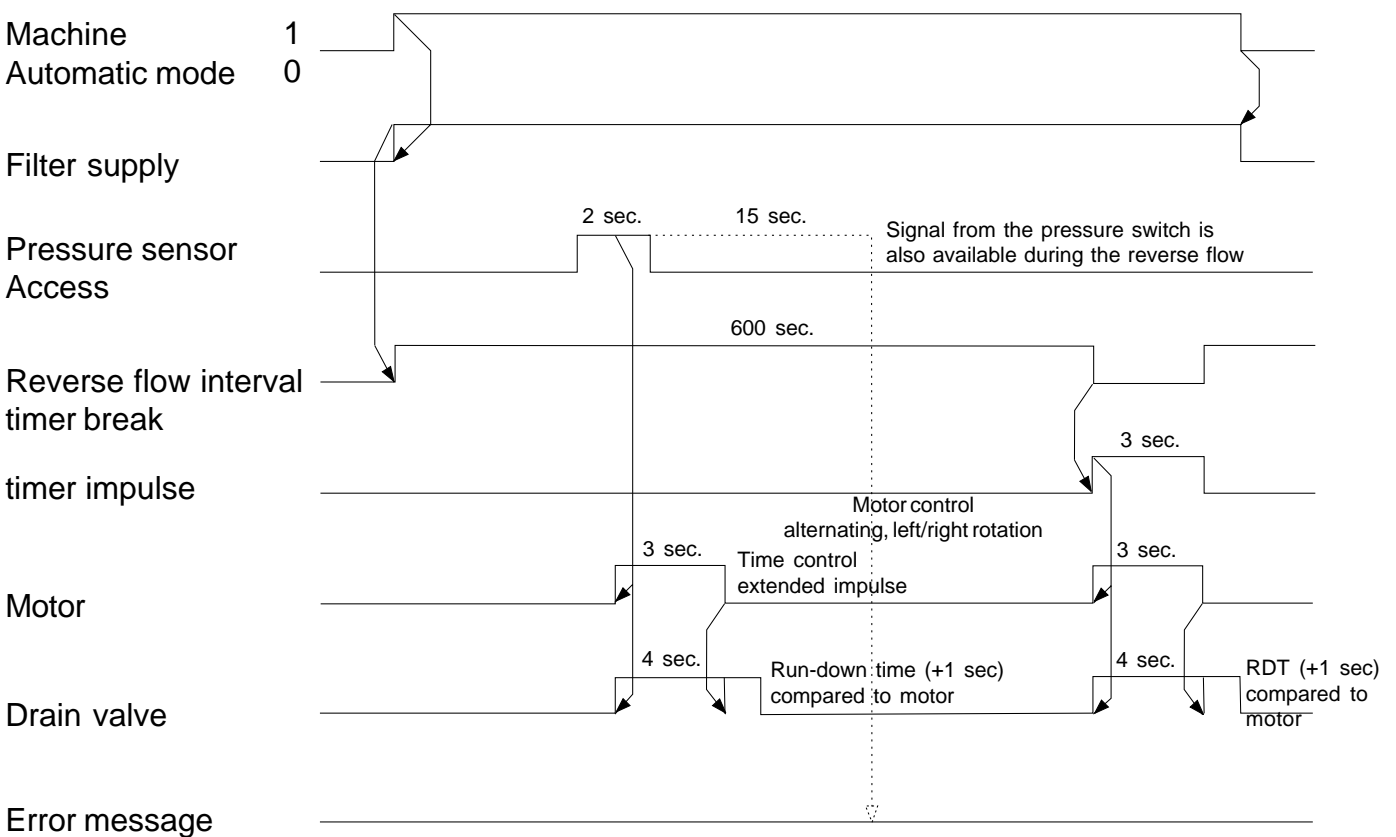
5 Initial startup

- Prior to initial start-up, observe the following points:
Is the filter connected according to all electrical requirements and with all protective equipment? Have you verified the direction of rotation (E)?
Have you checked that all lines that have been subsequently connected are securely attached and free of leakage?

5.1 Filter control

- Machine in automatic mode
- Continuous intake

Control Chart



For the filter element to achieve an effective filtering efficiency, the motor for the reverse flow must be controlled alternating between a right and left rotation

For individual adjustment of the system, the time values for motor and sludge removal valve can be changed via time relays or SPS - controls.

If the pressure at the pressure sensor is not reduced after approx. 15 sec., an error message appears.

6 Maintenance / servicing

- Work on turbofilter only when power supply is disconnected



Risk of injury.

- **Secure turbofilter against automatic start-ups and unwanted activation.**
- **If the turbofilter has produced harmful fluids, these must be removed appropriately beforehand. Hazards for people and the environment must be excluded.**

6.1 Cleaning and changing the filter insert



If reverse flow is applied frequently, the filter insert may have to be replaced or cleaned.

- Loosen hexagonal screws (1) evenly
- Hold tension strut (2) firmly in position with open-end wrench
- Through the apposite lock nuts (3), the filter top-section (4) is pushed from the filter bowl (5)
- Carefully lift the filter top-section (4) upwards
- Remove the filter element (6) from the floor plate.



Never leave filter element to dry out when dirty. Dried dirt can clog the filter insert and render it useless.

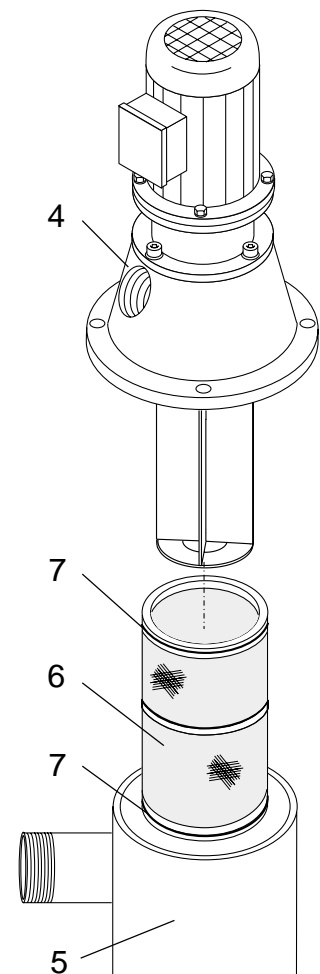
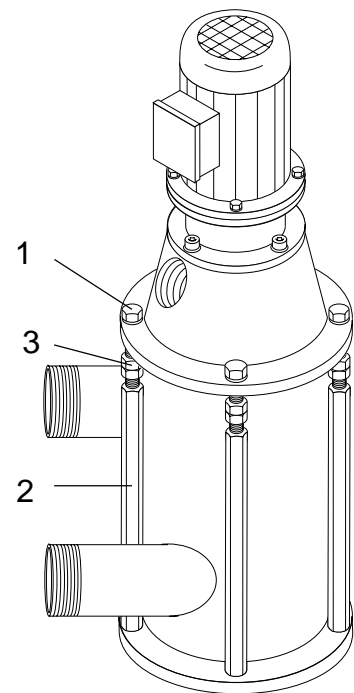
Do not clean with wire-brush or sharp objects.

Clean filter element by suction i.e. with the help of compressed air (from the inside to the outside).

- Installation is carried out in reverse order



Lightly lubricate O-rings (7) on the filter element during installation. Press filter element into base plate. In order to avoid damaging the filter element (6), the upper section of the filter (4) must not skew when inserting it into the filter element (6) (see chapter 6.4).



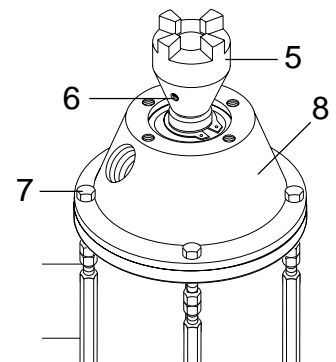
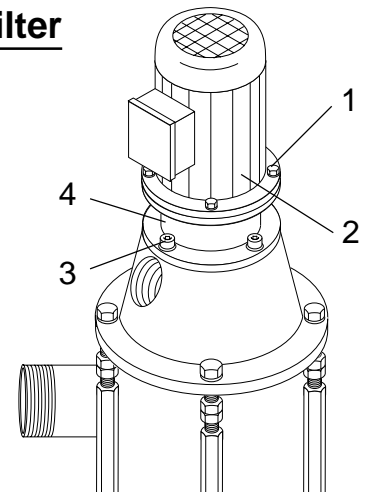
6.2 Changing ball bearings in upper section of the filter



Risk of injury!

- Secure turbofilter against automatic start-ups and unwanted activation.
- If the turbofilter has produced harmful fluids, these must be removed appropriately beforehand. Hazards for people and the environment must be excluded.

- Empty turbofilter via 2/2 multibank valve
- Unscrew the hexagon bolts (1) on the motor and remove the motor.
- Lift motor (2) up with appropriate tool (e.g. crane)
- Remove coupling flange (4) by loosening the screws (3)
- Disassemble the coupling (5) by unscrewing the stud screw (6).
- Loosen hexagonal screws (7) on the filter cover (8) and pull filter cover (8) together with drive shaft (9) completely upwards



Disassemble the drive shaft.

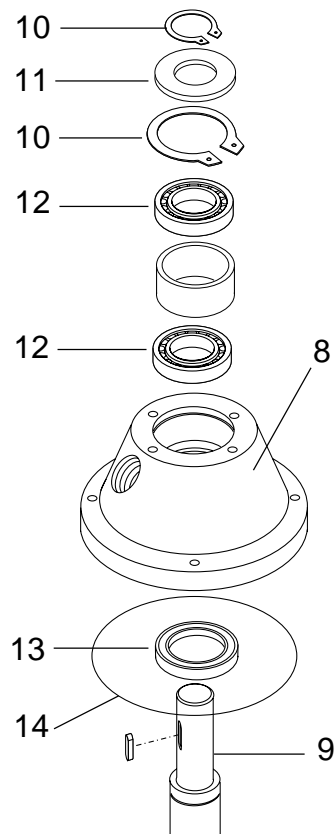
- Remove the lock rings (10) from the drive shaft (9) and out of the filter cover (8).
- Use a suitable tool to push the drive shaft (9) out of the upper section of the filter (8).
- Remove the bearing ring (11) and the rotary shaft lip seal (13).
- Ball bearings (12) can now be pressed out of the filter cover



Always change ball bearings together with radial shaft seal (13). When installing the radial shaft seal (13), apply lubricant to avoid dry operation.

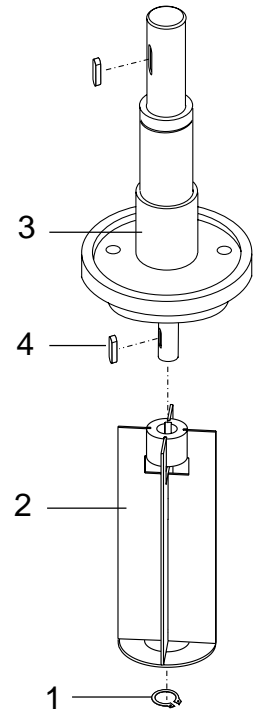
Recommended grease: OKS 220/221

- Installation is carried out in reverse order
- When installing, the O-ring (14) on the filter bowl must be checked, if necessary replaced



6.3 Disassembling vane

- Remove snap ring (1) from drive shaft (3)
- Pull vane (2) from drive shaft (3)
- Installation in reverse order
- Do not forget feather key (4) when installing

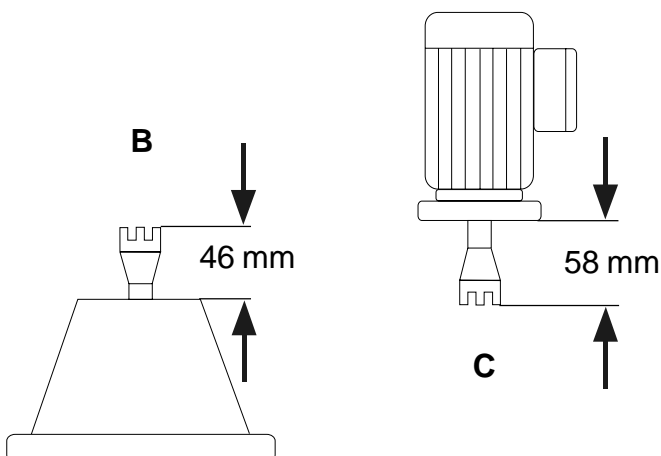
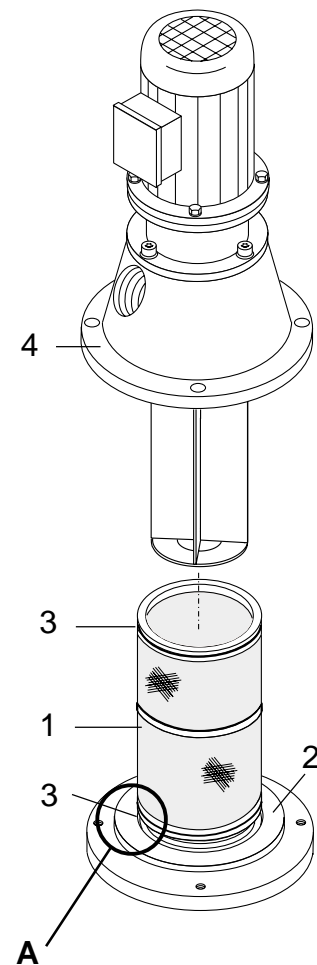


6.4 Assembling the filter



When installing the filter, the following points are particularly important:

- Filter element (1) must be locked in the filter bottom (2) in the appropriate nut (A). For this, lightly lubricate both O-rings (3) on the filter element (1)
- When inserting the upper section of the filter (4) into the filter element, the upper section of the filter must not damage the filter element
- O-rings on the upper and lower sections of the filter must not be damaged
- When installing the coupling, these must be set. For this, put coupling halves onto the drive shafts and lightly tighten grub screws. Using caliper gauge, set coupling halves to specified dimension (B/C) and tighten grub screws. Feather key must not press against the plastic ring gear on the coupling.



7 Repairs and Maintenance table

Component:	Interval:	Activity:	Note:
Electrical system: Motor	---	see manufacturer operation manual.	
Cable layout	12 months	Check for cracks and other damage.	Replace defective lines.
Filter housing	6 months	Check for proper sealing, damage and corrosion.	Environmentally-hazardous materials may not escape under any circumstances

8 Correct system faults

Fault:	Possible Cause	Solution:
Motor does not move	Defective motor Protective switch triggered.	Check motor
Lack of clean water	Pressure sensor is defective, so there is no reverse flow. The drain valve does not open. Dirt particles are not discharged.	Check the mechanics and electronics of the pressure sensor and replace if necessary. Check the drain valve. Check the air pressure supply.
Dirt particles in clean water	The filter cloth is torn.	Check filter element and replace if necessary
No pressure reduction	Filter contaminated Pressure switch setting Pressure switch defective	Clean / replace filter element Set pressure switch Replace pressure switch
Fluid leaking from filter cover (leakage hole)	Radial shaft seal faulty	Replace both radial shaft seal and ball bearing

KNOLL

Coolant cleaning systems
Chip conveying systems
Low and high-pressure pumps

KNOLL Maschinenbau GmbH
Schwarzachstr. 20, Postf. 1362
D-88342 Bad Saulgau

Phone +49 7581/2008-0
Fax +49 7581/2008-140
E-mail info@knoll-mb.de
web www.knoll-mb.de