

Translation of the original instructions with assembly instructions
Automatic filter with pressure cleaning
AF 132 G2

Cast design

Mat. No. of Instruction Manual
70350551



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2 General safety instructions

2.1 Safety instructions for installation and operating personnel

This Instruction Manual contains important safety instructions which must be heeded at all times during installation, normal operation and maintenance. Non-observance can result in the following risks to persons and the environment as well as in damage to the machine or system:

- ⇒ Failure of critical functions of the machine or system or of its component parts.
- ⇒ Danger to persons from electrical or mechanical effects as well as from chemical reactions.
- ⇒ Danger to the environment owing to the leakage of hazardous substances.

Before installation/start-up:

- Read the Instruction Manual carefully.
- Make sure that installation and operating personnel are adequately trained.
- Make sure the contents of the Instruction Manual are fully understood by the responsible persons.
- Define areas of responsibility and competence.
- Prepare a maintenance schedule.

During operation of the system:

- Keep the Instruction Manual handy at the place where the system is used.
- Heed the safety instructions. Always operate the machine/system in accordance with its ratings.

If in doubt:




- Consult the manufacturer.

2.2 Warning structure








Where possible, warnings are structured according to the following system:

Signal word	
Possibly with symbol	Nature and source of the danger ⇒ Potential consequences of non-observance • Action to avert the danger.

2.3 Warning symbols used

 DANGER!
Immediate danger! ⇒ Non-observance will result in serious or fatal injury.
 WARNING!
Potentially dangerous situation! ⇒ Non-observance can result in serious or fatal injury.
 CAUTION!
Potentially dangerous situation! ⇒ Non-observance can result in minor or moderate injuries.
CAUTION! (without a symbol)
Potentially dangerous situation! ⇒ Non-observance can result in property damage.

2.4 Other symbols used

	Danger from high voltage
	Danger information about explosion protection
	Information about environmental protection
	Wear protective clothing!
	Wear goggles!
	Wear a respirator!
	Hand symbol: Indicates general information and recommendations
•	Bullet: Indicates the order in which actions are to be carried out
⇒	Arrow: Indicates responses to actions

3 Glossary

Aerosol:

Distribution of minute liquid droplets (or solid particles) in a gas acting as the outer phase.

Cleaning:

The filter element is cleaned. The cleaning valve and the external pressure valve are opened and the filter element is turned. The filtered fluid and/or the external medium flow backwards through the filter element and clean the filter segments.

Concentrate:

Quantity of residues enriched with solids. Is discharged from the automatic filter periodically. Further treatment may be necessary, depending on the application.

Cooling lubricant:

Cooling lubricant acc. to DIN 51385.

Differential pressure (delta p):

Difference between the pressure on the dirty side and the clean side.

Draining:

The drain valve is opened. The solids that have been separated by the cyclone preseparator are discharged.

Filter cake:

Layer that is built up by the solids retained on the surface of the filter element.

Filtered fluid:

Substance that is filtered.

Filter element, coiled cartridge:

Cylindrical structure consisting of two concentric, profiled elements. The actual filter media are located between the profiled elements. The suspension that must be filtered flows inward. Solids are retained on the outer surface of the filter element.

Filtration mode:

The automatic filter operates normally and the drain and external pressure valves are closed.

Initial differential pressure:

Differential pressure at the start of the filtration process (when the filter element is "clean").

Machine cycle:

The cycle of a machine tool is defined by part changes, pump starts, etc. In some cases, a machine tool can only be cleaned during the interval between two cycles.

Pilot control:

5/2-way valves piloted by the controller that switch pneumatic control valves.

Siphon:

U-shaped pipe. A siphon cannot be discharged without a valve.

Suspension (raw suspension):

System of substances that must be filtered, generally consisting of solids in a liquid.

4 General information

4.1 Manufacturer

Filtration Group GmbH
Schleifbachweg 45
D-74613 Öhringen
Phone +49 7941 6466-0
Fax +49 7941 6466-429
fm.de.sales@filtrationgroup.com
www.filtrationgroup.com

4.2 Information about the Instruction Manual

FG Mat. No.:70350551
Date:05.02.18
Version:03

4.3 ATEX type key



II	2	G	c	T3
1.	2.	3.	4.	5.
1.	II	Valid for use above ground		
2.		Category 2	Category 3	
	Use in:	Zone 1	Zone 2	
3.	Atmosphere G = Gas D = Dust	G	G	
4.	Types of protection c = Constructional safety			
5.	T3 = The maximum surface temperature on the filtration device is 200°C.			

(Space for ATEX name-plate)

The Ex protection class is only valid in conjunction with the declaration of conformity.

5 Intended application

⚠ DANGER!

Operation contrary to the intended purpose can be dangerous!

- ⇒ The manufacturer is discharged from all liability and all warranty claims are rendered invalid.
 - This automatic filter is only allowed to be used in accordance with the operating conditions specified in the contract documentation and in the Instruction Manual.
- All forms of use which deviate from or exceed the limits of use described above are considered to be contrary to the intended purpose.

⚠ DANGER!

Operation contrary to the intended purpose can be dangerous!

- ⇒ The manufacturer is discharged from all liability and all warranty claims are rendered invalid.



Prohibited:

- Use for other purposes without prior consultation with the manufacturer.
- Use in hazardous areas, unless explicitly mentioned in the contract documentation.
- Use with smouldering, burning or adhesive particles.
- Use with highly explosive liquids or pastes.

⚠ CAUTION!

Conditionally allowed:

- Use with solvents in consultation with the manufacturer.
- Reverse flow through the filter (pressure < 0.6 bar).
- Continuous operation of the cleaning line (leads to increased wear with abrasive media).
- Cleaning cycles shorter than 5 minutes (leads to increased wear).
- Pressure surges greater than 4 bar.
- Particle concentrations greater than 3000 mg/l (contact the manufacturer if necessary).

FG automatic filters are designed to filter solids from coolants and lubricants, e.g.:

- Cooling lubricant filtration
- Product filtration
- Preseparation in a filter cascade
- Protective filtration before or after certain process steps
- Process filtration

6 Functional description

6.1 Principle of the process

When the liquid flows inward through the filter element, the particles contained in the suspension settle on the filter medium, where they create a differential pressure.

The filter element is cleaned when the preset differential pressure is reached or after a defined time interval has elapsed.

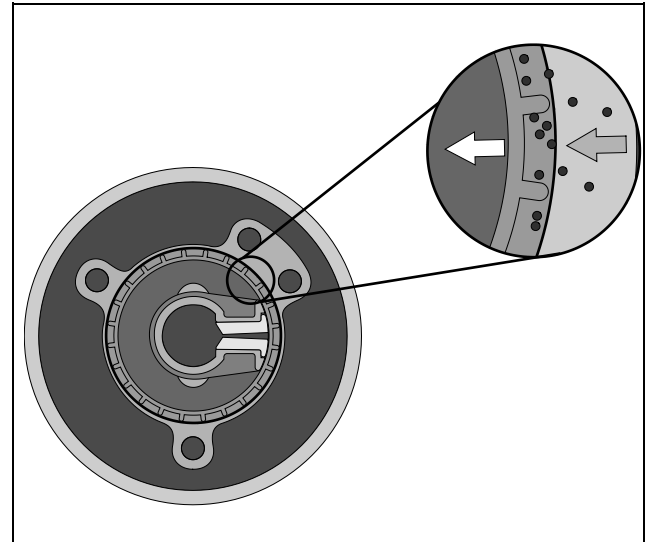


Fig. 1: Separating principle on the filter element (top view)

The filter element is turned past the pressure channel housing by the gear motor. The external pressure valve and the drain valve are opened. The particles are removed from the filter medium one segment at a time by the external pressure cleaning action and guided directly out of the automatic filter.

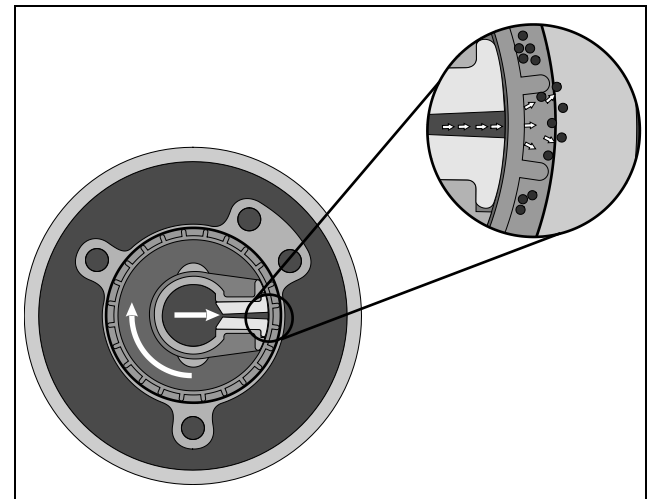


Fig. 2: Pressure cleaning (top view)

To start a cleaning process

A cleaning process can be started in the following ways:

- Manually,
- By means of a differential pressure switch,
- By means of a time switch,
- By means of a higher-level controller (machine cycles).

6.2 Main components of the automatic filter

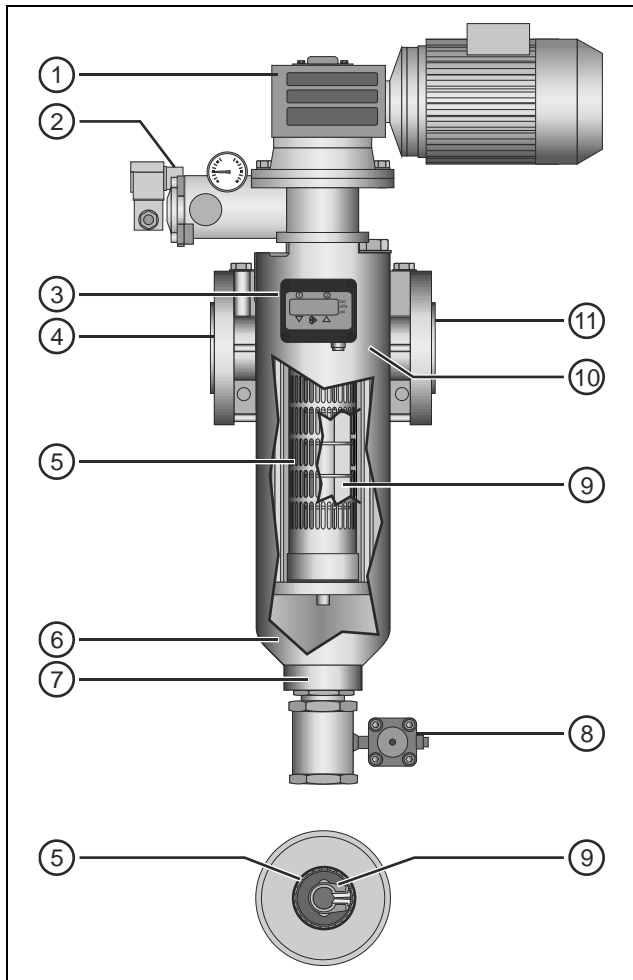


Fig. 3: Diagram of the main components

1	Gear motor for driving the filter element
2	Backflush adapter: external pressure medium inlet with external pressure and check valves
3	Differential gauge/switch (optional)
4	Inlet connection
5	Filter element
6	Collection cone
7	Drain opening
8	Electro-pneumatic drain valve (optional)
9	Pressure channel housing
10	Filter housing
11	Outlet connection

6.3 Functional principle of the automatic filter

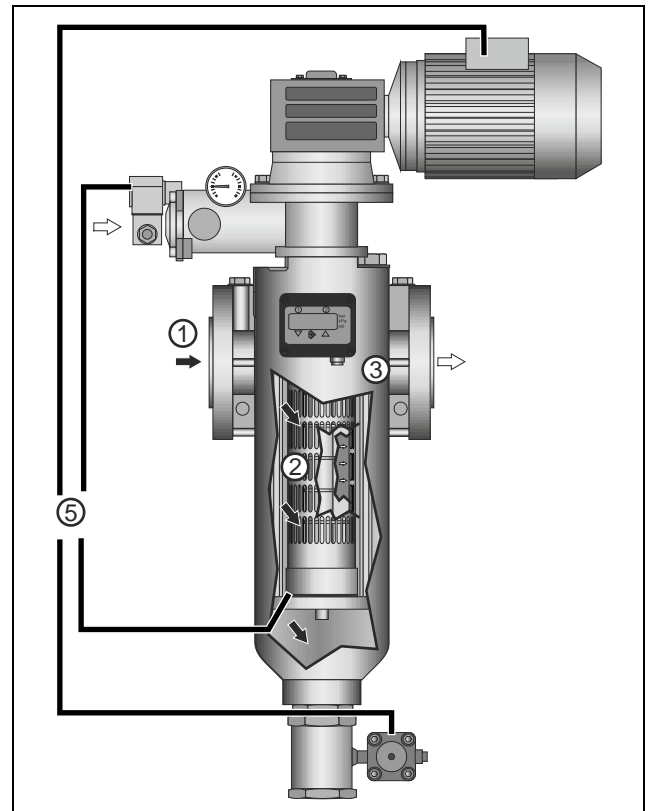


Fig. 4: Functional principle of the automatic filter

1

The suspension flows tangentially into the automatic filter.

2

The suspension flows through the filter element. The particles contained in the suspension settle on the outside of the filter element.

3

The filtered fluid reaches the clean side and exits the automatic filter.

4

A cleaning process is started when the maximum differential pressure is reached (if an optional differential gauge/switch is installed) or after a preset time.

5

The filter element is turned by the gear motor. The drain valve and the external pressure valve are opened. The particles are removed from the filter medium one segment at a time by the external pressure cleaning action and guided out of the automatic filter through the drain opening. The filtered fluid pressure and/or volumetric flow are reduced for the duration of the cleaning process.

7 Technical data

7.1 General data

Electrical energy consumption*: 230 V/400 V
 Noise emission (peaks): < 70 dB(A)
 Dimensions: See data sheet
 Min. clearance required above automatic filter: ... 470 mm
 Total dry weight without valves: 30 kg
 Max. permissible differential pressure: < 16 bar
 Max. permissible operating pressure: < 16 bar
 Max. perm. differential pressure
 for welded cartridge: < 10 bar

*See also name-plate on gear motor

External medium

⚠ CAUTION!

Contaminated medium leads to a risk of clogging!

⇒ Risk of failure of the external pressure valve.

- Use clean or filtered external pressure medium.
- The external pressure must be 1.5 to 4 bar higher than the inlet pressure P1 during the external pressure cleaning process, but must not exceed 10 bar.

Operating pressure	External medium	Connection
< 6 bar	Compressed air	1/2"
	Liquid	1"
6 - 16 bar	Liquid	1"

7.2 Order-specific data



The name-plate is rendered invalid if the filter element or the filter insert are modified. Please request a new name-plate from the manufacturer.

This data is order-specific and can be taken from the name-plate.

7.2.1 Name-plate for automatic filter with Ex protection

FGC.com
Made in Germany

Filtration Group GmbH
Schleibachweg 45 D-74613 Öhringen
fm.de.service@filtrationgroup.com

TYPE _____

MATERIALNUMBER PART NO. _____

AUFTRAGSNUMMER JOB NO. _____

MAX. ZUL. BETRIEßDRUCK PS _____ bar

MAX. ALLOWABLE PRESS. PS _____ bar

BAUJAHR YEAR MM/YYYY _____

PROFDATUM TEST DATE MM/YYYY _____

PRÜFDRUCK TEST PRESSURE PT PT _____ bar

BETR. TEMP. MINMAX TS _____ °C

OPER. TEMP. MINMAX TS _____ °C

HERSTELLERCODE MANUFACTURE CODE _____

VOLUMEN VOLUME L _____

HERSTELLER BEHÄLTER NR. MANUFACTURE VESSEL NO. _____

○ FILTERELEMENT FILTER ELEMENT _____

7.2.2 Name-plate for automatic filter without Ex protection

FGC.com
Made in Germany

Filtration Group GmbH
Schleibachweg 45 D-74613 Öhringen
fm.de.service@filtrationgroup.com

TYPE _____

MATERIALNUMBER PART NO. _____

AUFTRAGSNUMMER JOB NO. _____

MAX. ZUL. BETRIEßDRUCK PS _____ bar

MAX. ALLOWABLE PRESS. PS _____ bar

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PRÜFDRUCK TEST PRESSURE PT PT _____ bar

BETR. TEMP. MINMAX TS _____ °C

OPER. TEMP. MINMAX TS _____ °C

HERSTELLERCODE MANUFACTURE CODE _____

VOLUMEN VOLUME L _____

HERSTELLER BEHÄLTER NR. MANUFACTURE VESSEL NO. _____

○ FILTERELEMENT FILTER ELEMENT _____

8 Transport and storage

Transport

- Always transport horizontally in the original packaging
- Avoid vibrations

Storage

- Always store horizontally in the original packaging
- Always store in a dry, frost-free room




	Seaworthy packaging is specified in the contract documentation as an option.
--	--

9 Assembly instructions

⚠ DANGER!	
	Explosion hazard! ⇒ Risk of injury to persons or damage to property
	<ul style="list-style-type: none">• This FG automatic filter is only allowed to be installed and operated in the category specified in the contract documentation (offer/order confirmation).• If no category is specified: Do not operate the FG automatic filter in a hazardous area!• The owner is responsible for zoning.• The owner of the plant is solely responsible for implementing the appropriate explosion protection measures!• If in doubt, please consult the responsible authorities.

⚠ DANGER!	
	Danger if work is carried out on the system by unauthorised persons! ⇒ Risk of injury to persons or damage to property.
	<ul style="list-style-type: none">• The system is only allowed to be installed, accepted and tested by a suitably qualified person (99/98/EC).

 WARNING!	
Danger if work is carried out on the system by unauthorised persons!	
⇒ Risk of injury to persons or damage to property.	
<ul style="list-style-type: none">• All installation work must be carried out by suitably qualified personnel.	

9.1 Installation

⚠ DANGER!	
	Explosion hazard! ⇒ Risk of injury to persons or damage to property
	<ul style="list-style-type: none">• Check the conductivity between all components!• Note the maximum permissible resistance: $R < 10 \Omega$.• Make sure that earthing is provided by the customer.
	It must be possible to remove the filter insert in order to carry out maintenance work.
	Provide suitable hoisting gear above the automatic filter (for information about the weight, refer to section 7)!

- Prepare a suitable seat on which to mount the filter (e.g. supports, refer to data sheet).
- Be sure to allow the required clearance for dismantling and discharging (refer to data sheet).
- Lift up the automatic filter using the eyebolts and remove it from the packaging.

⚠ DANGER!	
	If the automatic filter topples over: ⇒ Risk of injury to persons or damage to property
	Secure the filter seat firmly in position.

- Bolt the automatic filter to the prepared seat (2 x mounting holes $D = 13 \text{ mm}$).
- Remove the caps from the connections.
- Remove all foreign bodies from the automatic filter.
- Connect the pipes.

Pressure relief

- Design measures must be incorporated to prevent inadmissible excess pressure on the dirty side.
- Install pressure relief devices if necessary.

9.2 Installing the pipes and selecting the pump

- Check the pump characteristic.
- Make sure the pump suction opening is positioned well below the liquid level.
- Ensure a minimum inlet pressure of 1 bar.

9.3 Mechanical installation

⚠ CAUTION!

High pressure at the drain valve!

- ⇒ Risk of injury to persons or damage to property
- Depressurise the drain valve prior to mounting and dismantling.

⚠ CAUTION!

High pressure at the external pressure valve!

- ⇒ Risk of injury to persons or damage to property
- Depressurise the external pressure valve prior to mounting and dismantling.

Special mounting instructions for the external pressure and drain lines



Cleaning with compressed air:

- Ensure sufficient pressure for cleaning and for operating the drain valve (provide separate compressed air connections if necessary).

- Make sure the drain line is securely fastened.
- Provide splash protection if necessary.
- Lay the pipes without a siphon if possible, to prevent any risk of clogging due to sedimented concentrate.

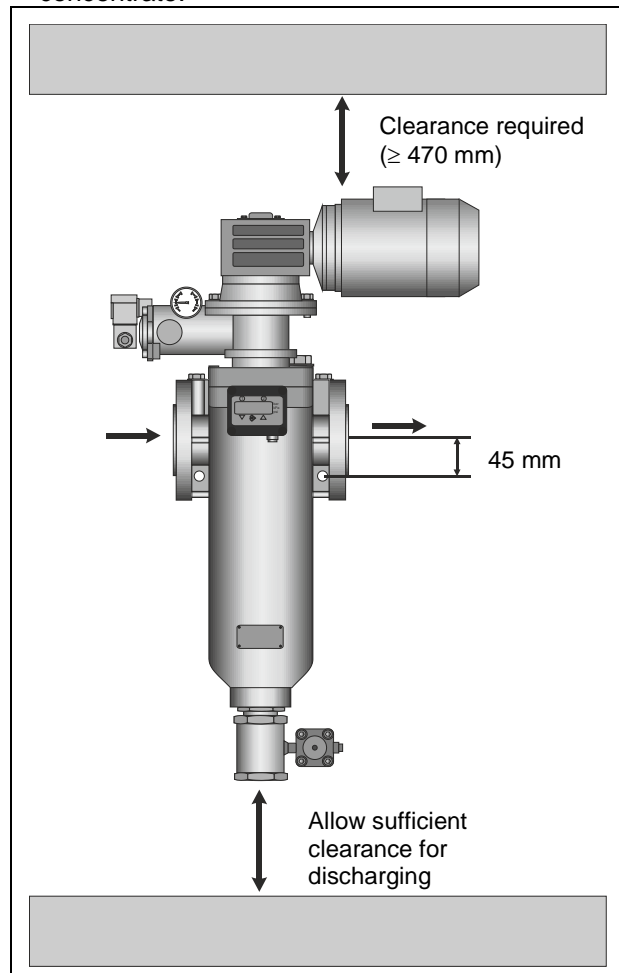


Fig. 5: Mechanical installation

9.4 Electro-pneumatic connections

⚠ DANGER!



Danger of electric shock!

- ⇒ Risk of serious or fatal injury in case of contact with electrical components.
- All electrical installation work must be carried out by a suitably qualified electrician.

9.4.1 Connection to customer's controller

Gear motor

- Refer to the name-plate and/or the contract documentation for details of the ratings (see also terminal box connection diagram).
- Install a suitable motor circuit-breaker.
- Connect the gear motor.

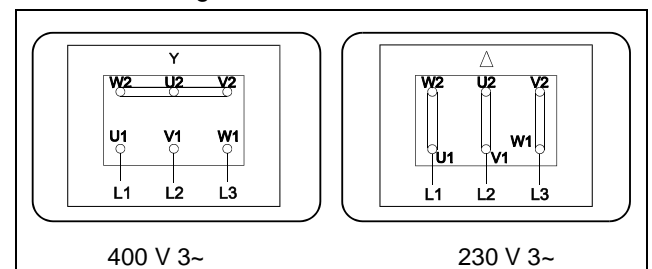


Fig. 6: Connection of a standard gear motor

Differential gauge/switch (optional)

- Refer to the enclosed manufacturer's documentation for details of the connections.

Drain valve (optional)

- Provide a suitable compressed air supply.
- Provide 5/2-way valves for pilot control.
- Refer to the documentation in the Appendix for connection instructions.

External pressure valve

- Connect the solenoid to the power supply.



Refer to the contract documentation for special types.

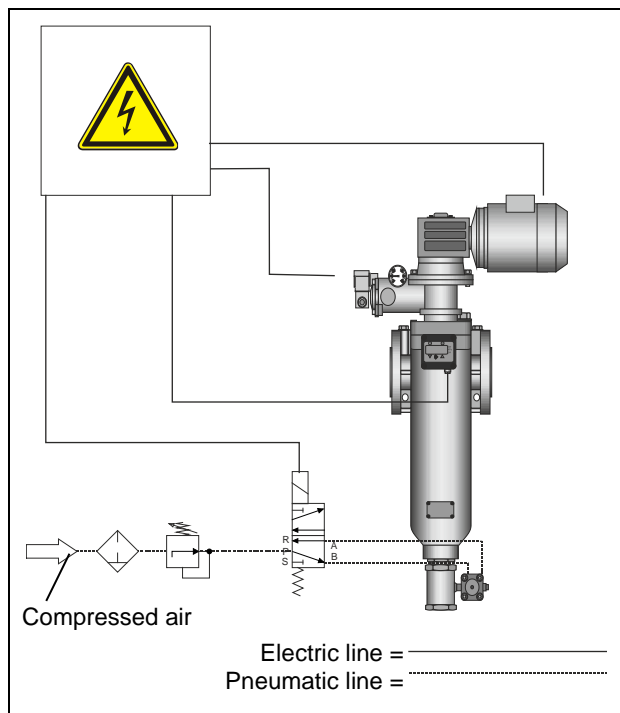


Fig. 7: Electro-pneumatic connections

	<ul style="list-style-type: none"> Provide a manual release for the cleaning valve and a manual release for the drain valve on the switch box.
	<p>Cleaning with compressed air:</p> <ul style="list-style-type: none"> Ensure sufficient pressure for cleaning and for operating the drain valve; if not, adequate cleaning for the process cannot be guaranteed.

9.4.2 Connection to FG controller (optional)

- Connect the incoming feeder, gear motor, differential gauge/switch (optional) and pilot valves (optional) in accordance with the enclosed circuit diagram.

9.5 Control variant: AF 132 G2

The cleaning process is controlled differently according to the application. The control variant described here is an example and is simply intended to serve as a guide.

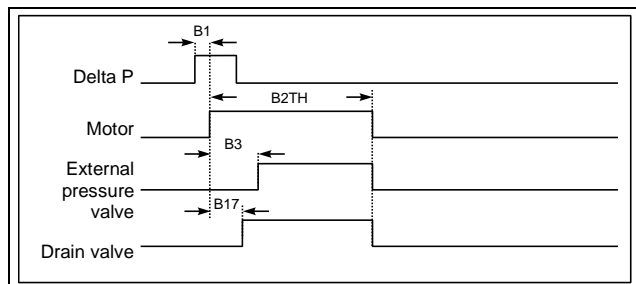


Fig. 8: Control variant

Parameter	Description	Recommended value
B1	Suppress differential pressure peaks	1 s
B2TH	Motor running time	4 s
B3	External pressure valve ON delay	1 s
B17	Drain valve ON delay	0.5 s

10 Start-up

⚠ DANGER!

This automatic filter is not allowed to be put into operation until it has been established that the machine in which it is to be installed complies with the requirements of the applicable EC directives, harmonised standards, European standards or equivalent national standards.

⚠ DANGER!



Explosion hazard!

- ⇒ Risk of injury to persons or damage to property.
- The automatic filter must be completely vented for use with all media which are capable of forming explosive gases.
 - The automatic filter must be completely filled with liquid.
 - Take steps to prevent air pockets.

⚠ DANGER!

Danger due to high pressure in the automatic filter!

- ⇒ Risk of injury to persons or damage to property
- Do not allow concentrate to spatter into the atmosphere.

Make sure that:

- All foreign particles are removed from the automatic filter.
- All pipe connections are tightened securely.
- All screws are tightened.
- All pipes and the automatic filter are rinsed.

10.1 Functional test

Direction of rotation of the gear motor

- Remove the screws on the cover of the gear motor.
- Remove the cover of the gear motor.
- Start up the gear motor briefly (< 1 s).
- Compare the actual direction of rotation of the shaft with that indicated by the arrow (clockwise rotation).
- Reverse the terminal connections of the gear motor if necessary.
- Fit the gear motor cover again and screw it tight.

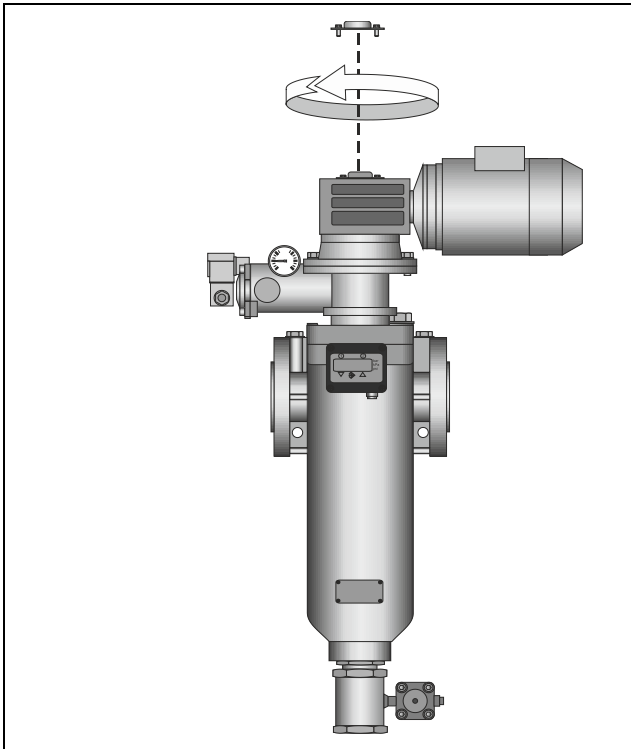


Fig. 9: Direction of rotation of the gear motor

To check the differential gauge/switch (optional)

- Refer to the enclosed manufacturer's documentation.

To check the function of the drain valve (optional)

- Connect compressed air to the pilot valve.
- Operate the manual release for the pilot valve.
 - ⇒ The drain valve is opened.
- Set the manual release to the OFF position.
 - ⇒ The drain valve is closed.
- Refer to the enclosed manufacturer's documentation.

10.2 Operating settings

- Switch on the controller.
- Open the inlet.
- Make a note of the initial differential pressure (optional).
- Using a suitable throttle valve, set the pressure of the external medium to the required value (between 1 and 3 bar) for the duration of the cleaning process.

Settings for time-controlled cleaning

- Set the times according to the operating conditions and correct them if necessary.

Settings for differential pressure-controlled cleaning with a differential gauge/switch (optional)

- Refer to the manufacturer's documentation.
- Adjust the set differential pressure to the setpoint (see contract documentation).

Initial differential pressures

The initial differential pressures vary according to the application.

General guide: $\Delta p \leq 0.3$ bar.



After cleaning, the differential pressure must return almost to the original initial differential pressure. If it does not, the cleaning process was unsuccessful (in this case, please consult the manufacturer).

11 Normal operation

⚠ DANGER!

Danger due to high pressure in the automatic filter!

- ⇒ Risk of injury to persons or damage to property
- Do not allow concentrate to spatter into the atmosphere!



Always dispose of concentrate in a manner which does not pollute the environment! Consult the responsible authorities before deciding upon the most suitable disposal method.

The following must be monitored daily during normal operation:

- Differential pressure
- Concentrate bowl level
- Controller functions

11.1 Rinsing the drain line

⚠ CAUTION!

A high proportion of fine dirt particles in a long pipe can lead to clogging!

- ⇒ Risk of injury to persons or damage to property
- Rinse the drain line daily/weekly, depending on the application.

To rinse the drain line

- Open the drain valve manually for approx. 10 to 15 s.
 - ⇒ The drain line is rinsed.

12 Shutting down the automatic filter

12.1 Temporary shut-down

On the installed automatic filter controller:

- Switch OFF the main switch.

12.2 Prolonged shut-down (> 48 h)

- Start a cleaning process manually.
- Clean the automatic filter (refer to section 15.7).
- Fill the automatic filter completely with liquid.
- Switch OFF the main switch.

12.3 Emergency shut-down

- Switch OFF the main switch.
- ⇒ The power supply is interrupted.




13 Notes on cooling lubricant filtration

- Do not attempt to filter magnetic chips. Exercise caution when grinding grey cast iron or steel.
- Install a suitable preseparator.
- Treat the cooling lubricant carefully. Take steps to prevent bacterial or fungal attack.
- Cooling lubricant that has been used for the cleaning process must be re-processed separately. There is a risk of enrichment with fine dirt if it is returned to the cooling lubricant cycle.
- Provide constant-pressure valves in the cleaning and drain lines if the pressure on the filtered fluid side varies between 4 and 16 bar. The rinsing effect is impaired if the operating pressure is too high during the cleaning process.
- Splash protection may be necessary for cleaning into open systems.

14 Troubleshooting

Fault	Possible cause	Remedy
Gear motor does not turn	Motor circuit-breaker tripped	Reset the motor circuit-breaker
		Check the gear motor
	Filtered fluid solidified	Clean the automatic filter
Valves do not open	Not enough compressed air	Increase the pressure
	Pilot valves defective	Check the pilot valves
	Pilot valves connected incorrectly	Check the electrical and pneumatic connections
	Same compressed air line used for external pressure and valves	Provide a separate compressed air line for the valves
Initial differential pressure no longer reached	Solids concentration too high	Use a suitable prefilter
	Backflush pressure too low/high	Adjust the backflush pressure so that it is 1.5 to 4 bar higher than the filter internal pressure during the cleaning process
	Backflush flow rate too low/high	Increase/reduce the backflush flow rate
	Cleaning time too short	Increase the cleaning time (at least 1 to 2 revolutions of the gear motor)
Increased concentration of dirt on clean side	Filter element defective	Check the filter element and if necessary renew it
	Seals brittle	Check the seals and if necessary renew them
Leakage on shaft seal		Renew the sealing rings

15 Maintenance

 DANGER!	
	Explosion hazard! ⇒ Risk of injury to persons or damage to property.
	<ul style="list-style-type: none"> • Work is only allowed to be carried out in hazardous areas if appropriate safety precautions are implemented. • Safety precautions must be implemented by the owner.
 WARNING!	
Danger if work is carried out on the system by unauthorised persons! ⇒ Risk of injury to persons or damage to property.	
<ul style="list-style-type: none"> • All maintenance work must be carried out by suitably qualified personnel. 	

Before all maintenance work:

- Shut down the automatic filter.
- Take steps to prevent the system from being switched on again by unauthorised persons.





- Take any necessary safety precautions (protective clothing, goggles, etc.).



- Carry out the maintenance work.
- Start up the automatic filter again.

15.1 Inspection and maintenance schedule

- Refer also to the contract documentation.

	Assembly	Activity
Weekly	Automatic filter	Visual inspection for leakage Check the differential pressure
	Pipes	Clean
Monthly	Filter element	Check for wear and if necessary clean
	Automatic filter	Check the conductivity between all components. Note the maximum permissible resistance: $R < 10 \Omega$
Yearly or when cooling lubricant replaced	Bearings	Check the clearance
	Valves	Check correct functioning
	Automatic filter	Clean
	Seal kit	Check for leakage and if necessary replace the seals
	External pressure valve	Check correct functioning and if necessary clean
	Check valve	Check correct functioning and if necessary clean
	The necessary inspection and maintenance work is dependent on the particular application. Please consult the manufacturer if necessary.	

15.2 Preliminary maintenance steps

⚠ DANGER!

The automatic filter is pressurised!

- ⇒ Risk of injury to persons or damage to property!
- Make sure the pipe is depressurised prior to opening the automatic filter.

- 1
 - Close the filter inlet and outlet.
 - Relieve the pressure in the pipe if necessary.

- 2
 - Open the drain valve.
 - Open the vent screw.

⇒ The automatic filter is discharged.

- 3
 - Turn off the compressed air supply.
 - Close the inlet for the external medium.

- 4
 - Switch off the main switch.

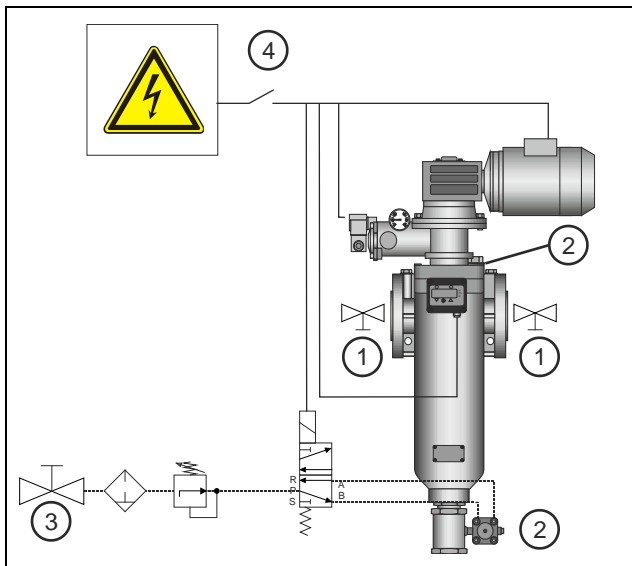


Fig. 10: Disconnecting the automatic filter

15.3 Removing the gear motor

⚠ DANGER!

The automatic filter is pressurised!

- ⇒ Risk of injury to persons or damage to property!
- Make sure the pipe is depressurised prior to opening the automatic filter.



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- 1
 - Carry out the preliminary maintenance steps (refer to section 15.2).
 - Switch off the main switch.

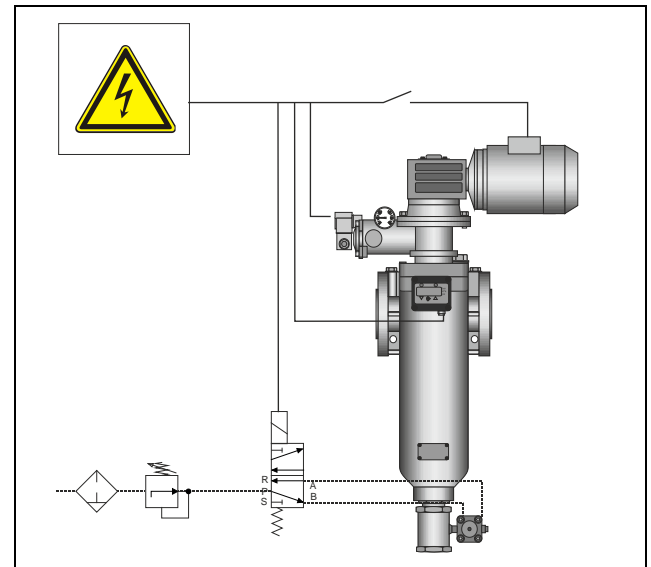


Fig. 11: Disconnecting the gear motor

- 2
 - Loosen and remove the hexagon screws (3.3) and the spring washers (3.2) on the bell housing of the gear motor.
 - Withdraw the gear motor (1) vertically from the shaft.

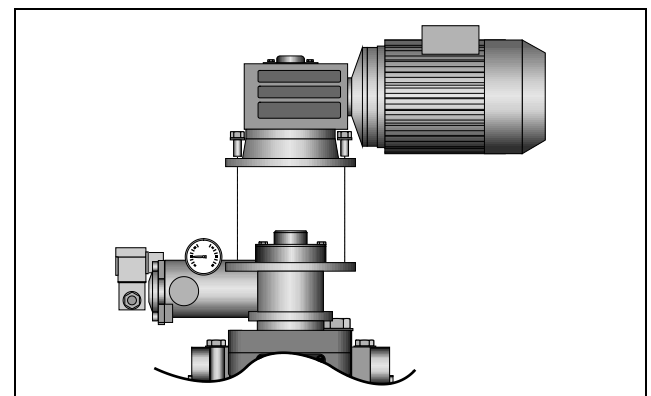


Fig. 12: Removing the gear motor

- 3
 - Mount in reverse order.
 - Connect the gear motor (refer to section 9.4.1).

15.4 Replacing the motor shaft z



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the gear motor (refer to section 15.3).

1

- Remove the screws on the cover of the gear motor.
- Remove the cover of the gear motor.
- Remove the snap ring (3.1) and the axial bearing disc (55.2).
- Withdraw the motor shaft (17) and the feather key from the gear motor (flange side).

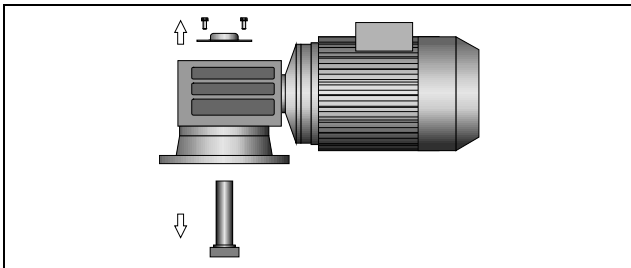


Fig. 13: Replacing the motor shaft z

2

- Install in reverse order.

15.5 Maintaining the backflush adapter

⚠ DANGER!

The automatic filter is pressurised!

- ⇒ Risk of injury to persons or damage to property!
- Make sure the pipe is depressurised prior to opening the automatic filter.



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

15.5.1 Replacing the solenoid

- Carry out the preliminary maintenance steps (refer to section 15.2).

1

- Unplug the connector from the solenoid (30.3).

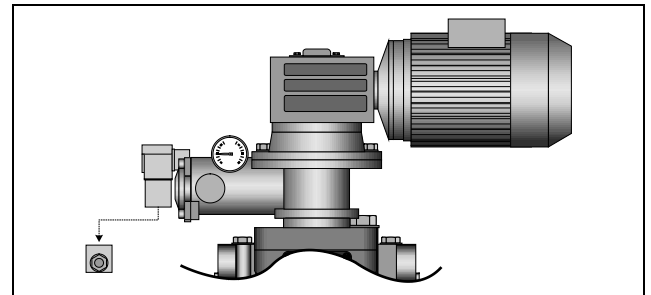


Fig. 14: Unplugging the connector

2

- Remove the solenoid (30.3).

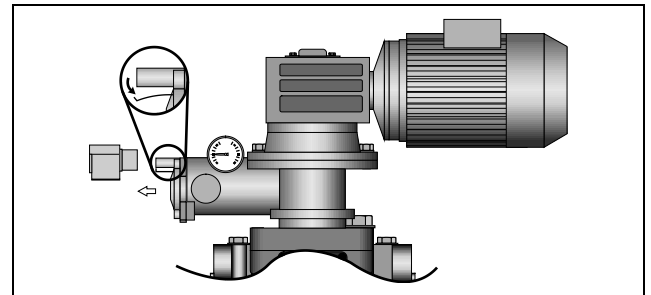


Fig. 15: Removing the solenoid

3

- Install in reverse order.

15.5.2 Maintaining the magnetic valve



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the solenoid (30.3) (refer to section 15.5.1, steps 1 to 2).

1

- Remove the cylinder head screws (30.5).

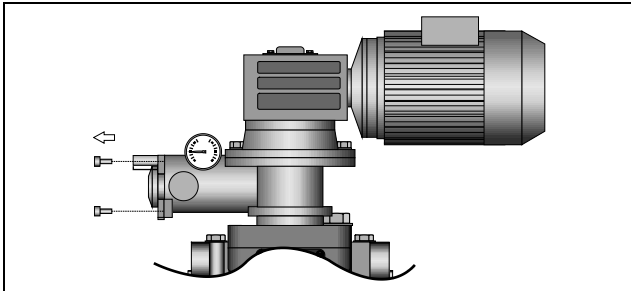


Fig. 16: Removing the cylinder head screws

2

- Carefully loosen and remove the magnetic valve (30.4).

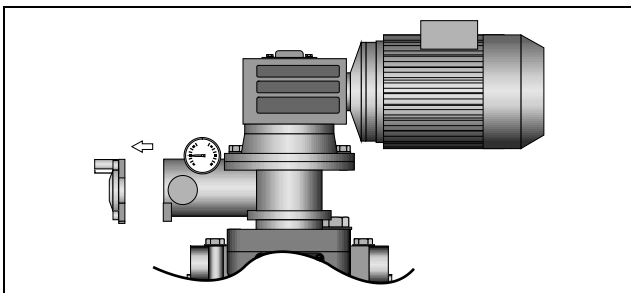


Fig. 17: Removing the magnetic valve

3

- Clean the sealing faces.
- Clean or replace the magnetic valve.
- Install in reverse order.

15.5.3 Maintaining the valve seat

CAUTION!

Pressure spring loaded!

⇒ Risk of injury to persons

- Dismantle the snap ring carefully.



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the solenoid (30.3) (refer to section 15.5.1, steps 1 to 2).
- Remove the magnetic valve (30.4) (refer to section 15.5.2, steps 1 to 2).

1

- Remove the snap ring (30.6) using a suitable tool.
- Carefully remove the valve seat (30.6).

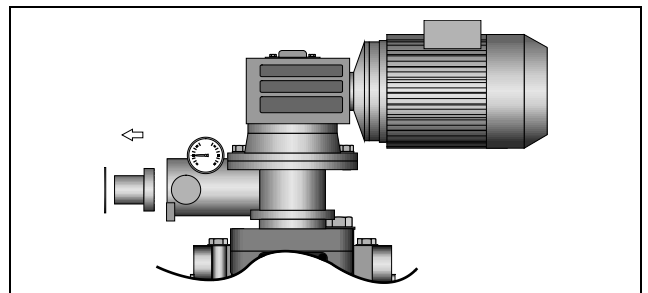


Fig. 18: Replacing the valve seat

2

- Clean the interior of the backflush adapter.
- Clean or replace the valve seat.
- Install in reverse order.

15.5.4 Maintaining the check valve

⚠ CAUTION!

Pressure spring loaded!

⇒ Risk of injury to persons

- Dismantle the snap ring carefully.



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the solenoid (30.3) (refer to section 15.5.1, steps 1 to 2).
- Remove the magnetic valve (30.4) (refer to section 15.5.2, steps 1 to 2).
- Remove the valve seat (30.6) (refer to section 15.5.3, step 1).

1

- Remove the snap ring (30.7) using a suitable tool.
- Carefully remove the check valve (30.7).

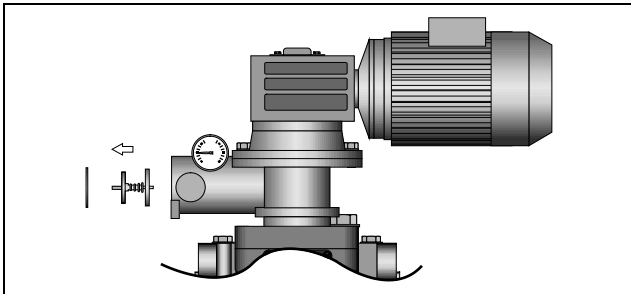


Fig. 19: Replacing the check valve

2

- Clean the interior of the backflush adapter.
- Clean or replace the check valve.
- Install in reverse order.

15.6 Removing the filter insert

⚠ DANGER!

The automatic filter is pressurised!

⇒ Risk of injury to persons or damage to property

- Make sure the pipe is depressurised prior to opening the automatic filter.



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the gear motor (refer to section 15.3).
- Remove the solenoid (30.3) (refer to section 15.5.1).

1

- Loosen and remove the hexagon screws (5) and the washer (6) on the filter cover.

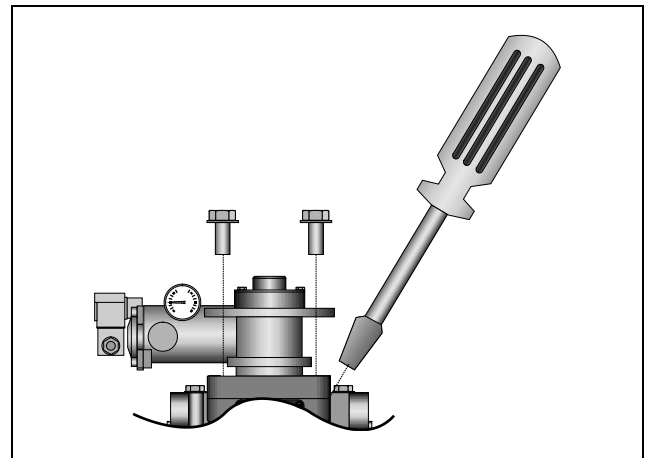


Fig. 20: Loosening and removing the hexagon screws on the filter cover

2

- Apply a large screwdriver to the notch.
- Lever off the filter cover.

3

- Withdraw the filter insert vertically.

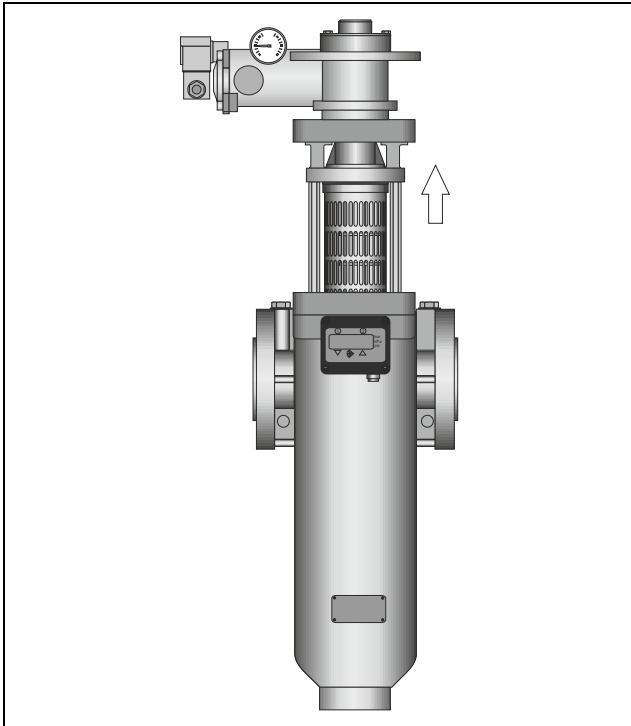


Fig. 21: Withdrawing the filter insert

- Lay the filter insert down carefully on a level surface, taking care not to damage the filter element or the backflush adapter.
- ⇒ The filter insert can now be maintained.
- Install in reverse order.
 - Lower the filter insert into position, making sure it is absolutely straight.

15.7 Cleaning the automatic filter

- Remove the filter insert (refer to section 15.6).

15.7.1 Cleaning the filter insert

⚠ WARNING!

Danger of aerosol formation!

- All work must be carried out in a room with a suitable extraction system!



- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. goggles, respirator, protective clothing, etc.).
- Remove any coarse impurities by mechanical means.
- Wash the filter insert in a suitable cleaning solution.
- Carefully blow out the filter insert with a steam jet or compressed air.
- Clean (or if necessary renew) and oil the seals.

15.7.2 Cleaning the filter housing



- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. goggles, respirator, protective clothing, etc.).
- Remove any coarse impurities by mechanical means.
- Wash the filter housing in a suitable cleaning solution.

15.8 Replacing the filter element

⚠ WARNING!

If the system is maintained by unauthorised persons:

- ⇒ Risk of injury
- ⇒ All warranty claims are rendered invalid
- The system must be maintained by a suitably trained person!

15.8.1 Removing the filter element



The numbers indicated in parentheses correspond to those used in the spare parts drawing.



The filter element can be dismantled and mounted again more easily if it is stood upright on the cover (filter element on top).

- Remove the filter insert (refer to section 15.6).
- Clean the automatic filter (refer to section 15.7).

1

- Loosen the cylinder head screws (29) and remove them together with the spring washers (9).

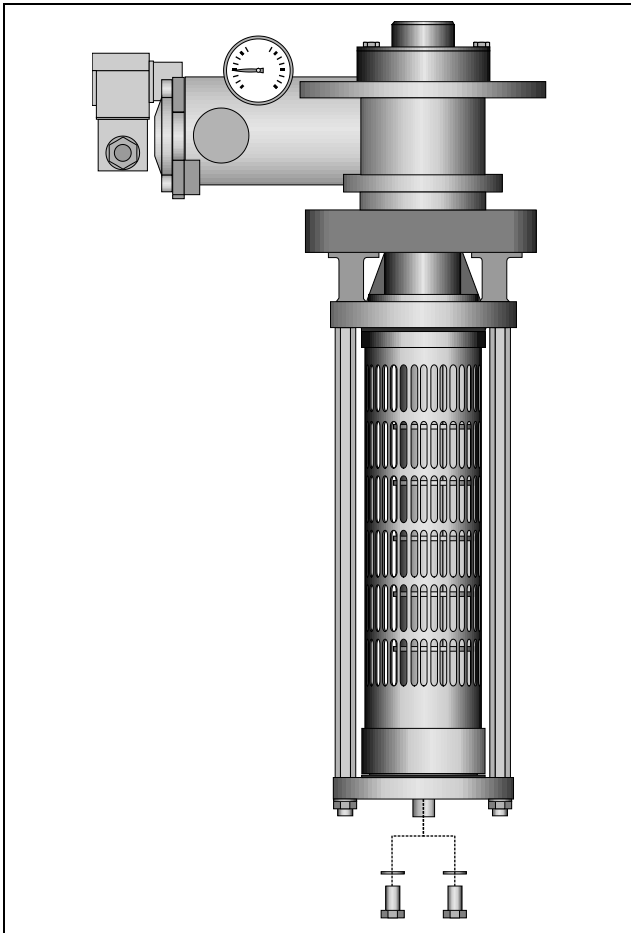


Fig. 22: Removing the cylinder head screws and the spring washers

2

- Loosen the hexagon nuts (8) and remove them together with the spring washers (10).

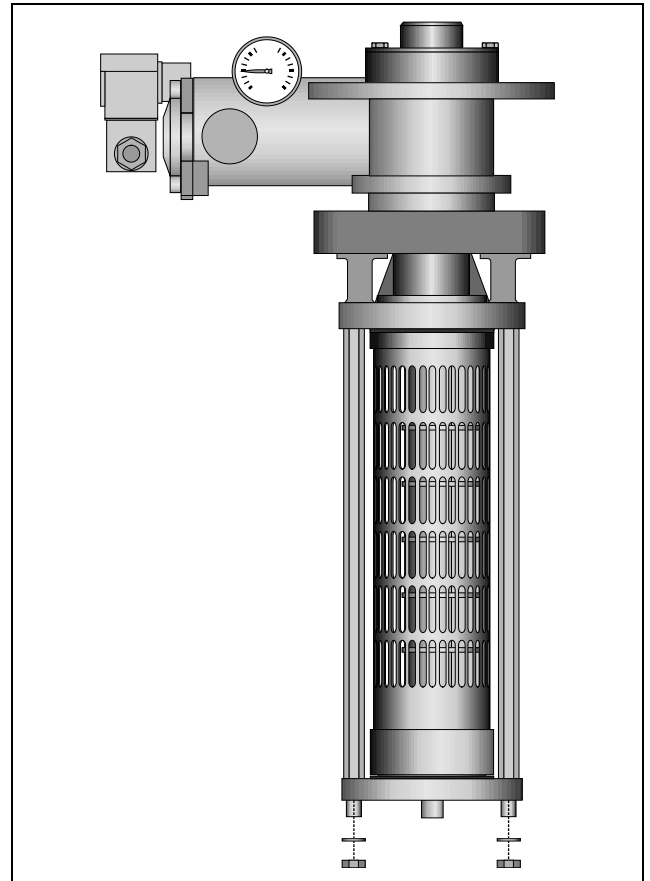


Fig. 23: Removing the hexagon nuts and the spring washers

3

- Remove the centre flange (21).

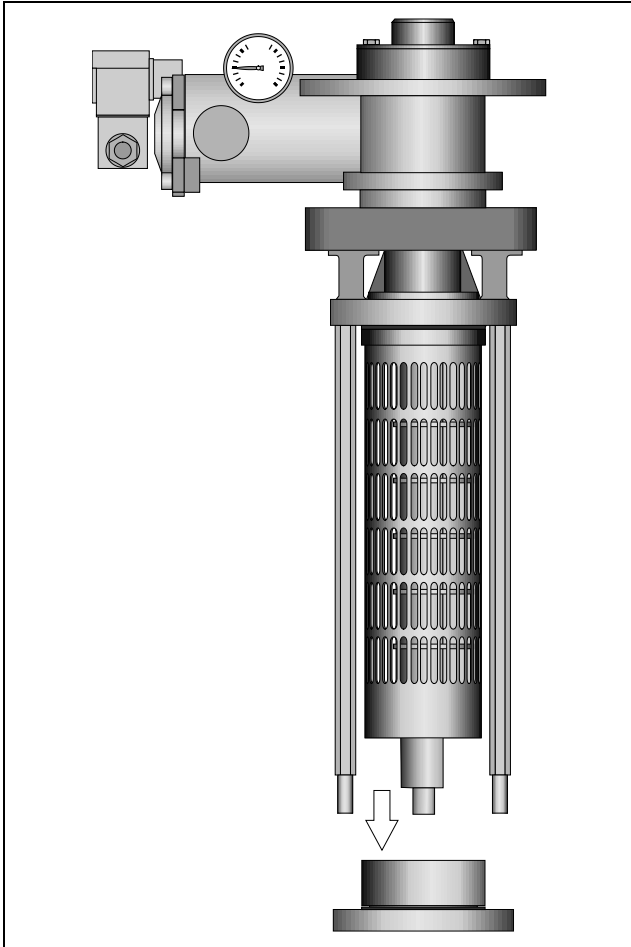


Fig. 24: Removing the centre flange

4

- Carefully withdraw the filter element from the cover (7) together with the pressure channel housing (28).

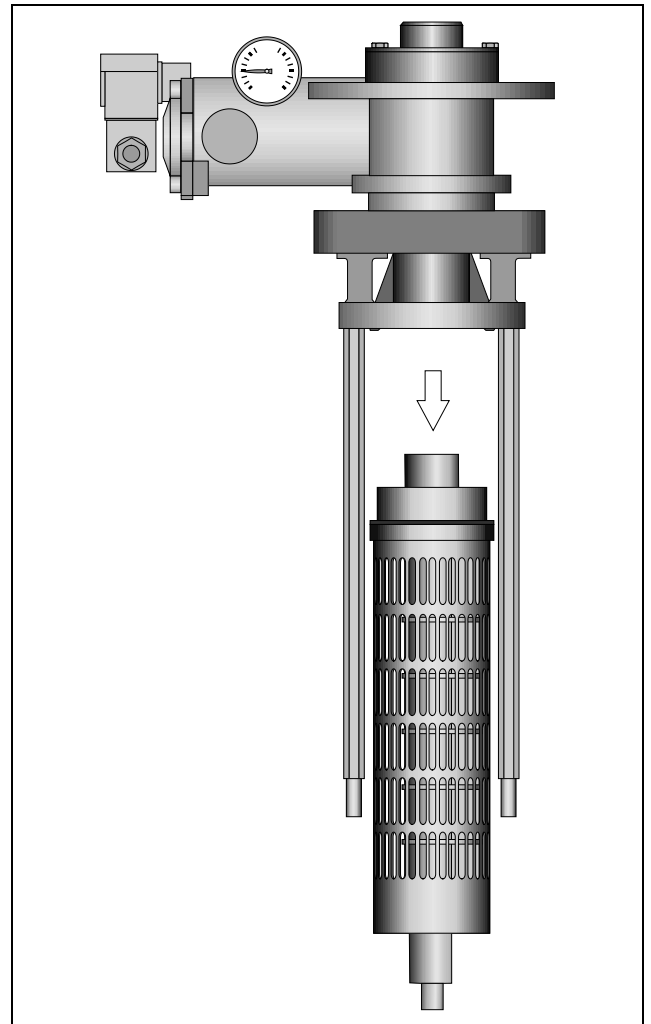


Fig. 25: Withdrawing the filter element and the pressure channel housing

5

- Remove the pressure channel housing (28) from the filter element.

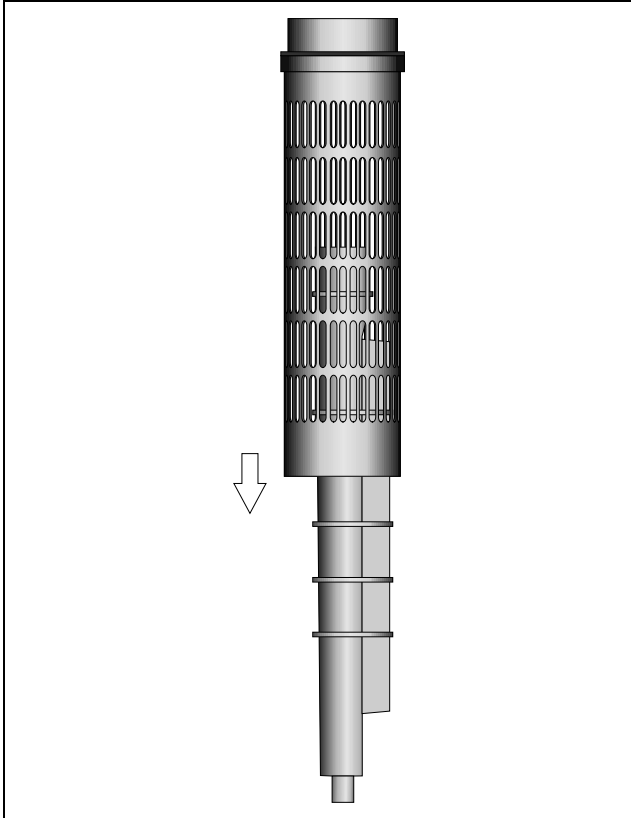


Fig. 26: Removing the pressure channel housing

6

- Clean all dismantled components.
- Replace the element seals and guides (refer to section 15.9) or the pressure channel insert (refer to section 15.10).

15.8.2 Installing the filter element



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Check the seals for completeness.

1

- Carefully insert the filter element into the cover (7).

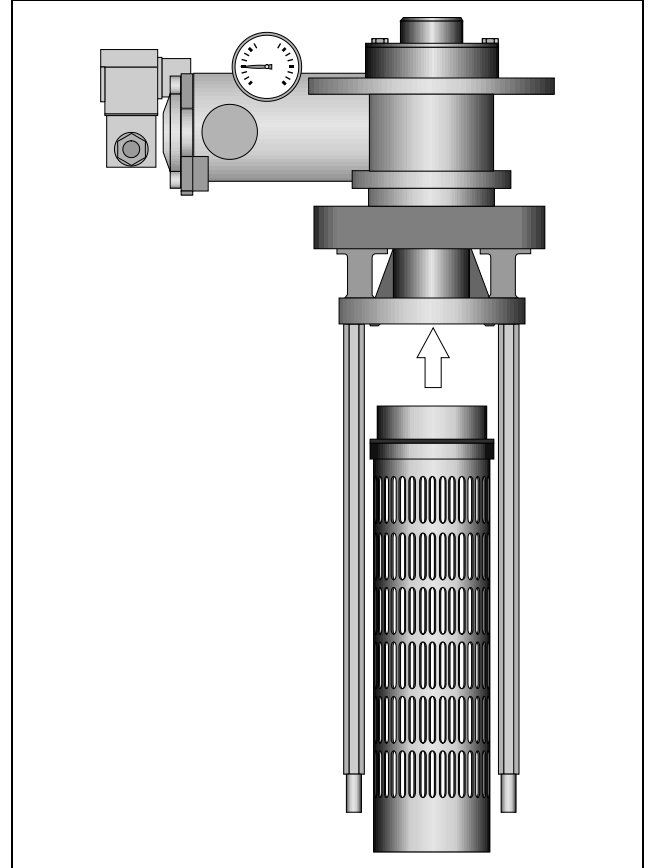


Fig. 27: Inserting the filter element into the cover

2

- Preassemble the pressure channel housing (28) and the centre flange (22) with the cylinder head screws (29) and the spring washers (9).

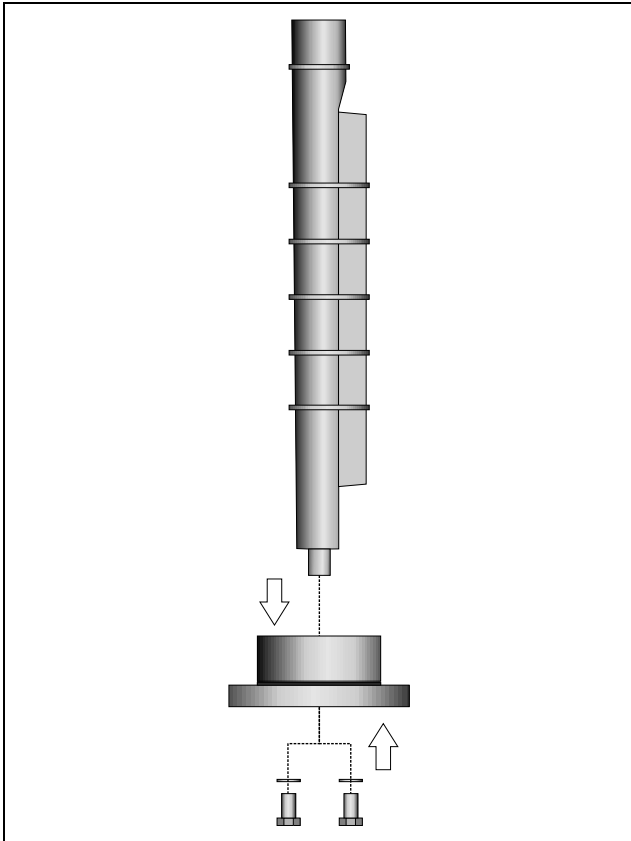


Fig. 28: Preassembling the pressure channel housing and the centre flange

3

- Carefully insert the preassembled unit (pressure channel housing and centre flange) through the filter element into the motor shaft (17).
- Screw the cylinder head screws (10) and the spring washers (9) tight.

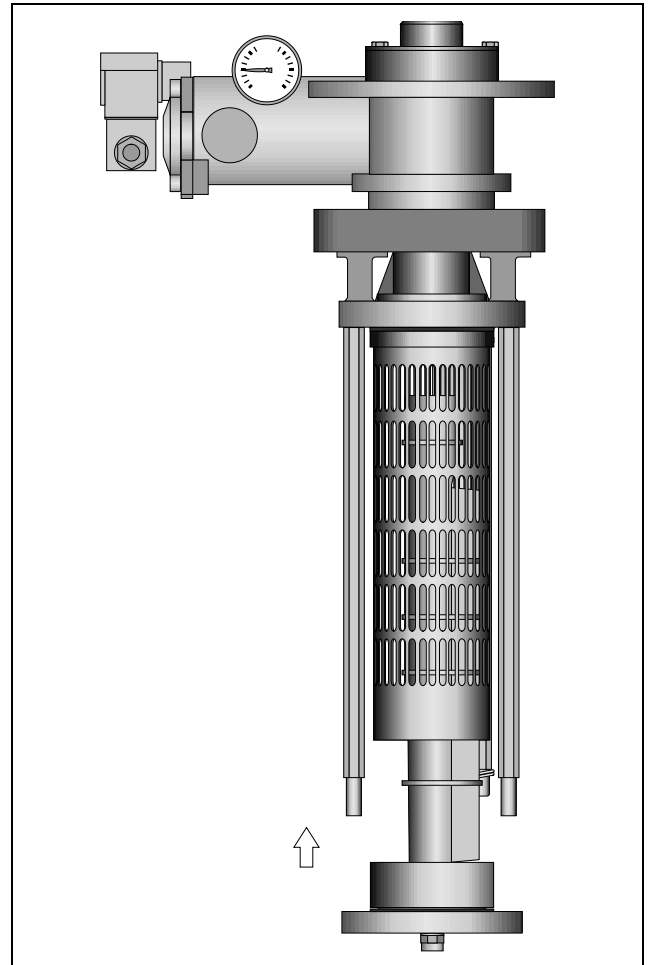


Fig. 29: Installing the preassembled unit in the filter element

15.9 Replacing the element seals and guides

⚠ WARNING!

If the system is maintained by unauthorised persons:

- ⇒ Risk of injury
- ⇒ All warranty claims are rendered invalid
- The system must be maintained by a suitably trained person!



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Remove the filter insert (refer to section 15.6).
 - Clean the automatic filter (refer to section 15.7).
 - Remove the filter element (refer to section 15.8.1).
- ⇒ The seals can now be replaced.

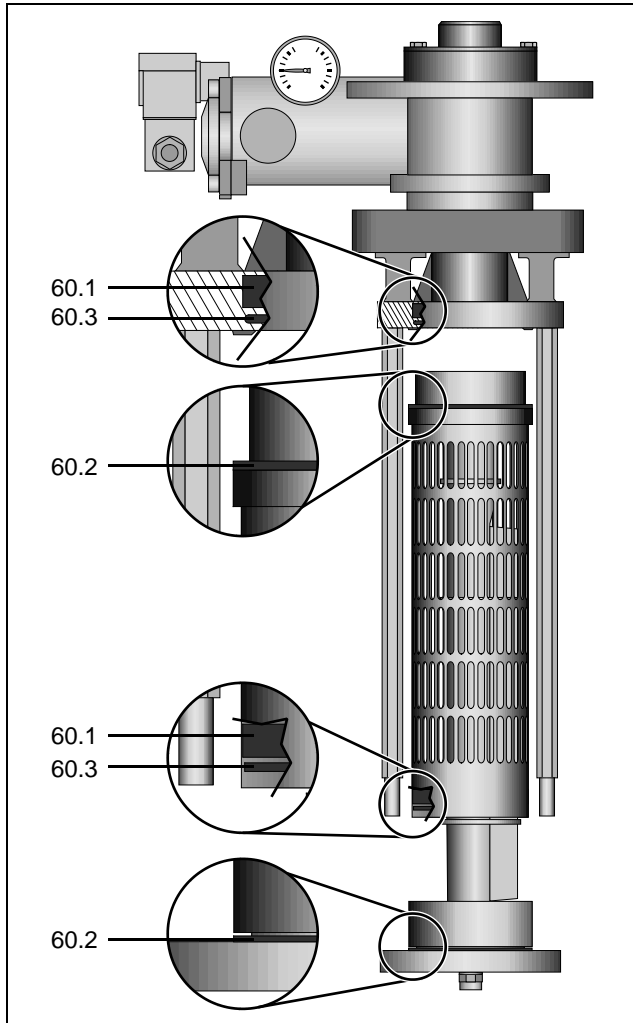


Fig. 30: Replacing the element seals and guides

15.10 Replacing the shaft seals and guide

⚠ WARNING!

If the system is maintained by unauthorised persons:

- ⇒ Risk of injury
- All warranty claims are rendered invalid
- The system must be maintained by a suitably trained person!



The numbers indicated in parentheses correspond to those used in the spare parts drawing.

- Carry out the preliminary maintenance steps (refer to section 15.2).
- Remove the gear motor (refer to section 15.3).
- Remove the solenoid (30.3).
- Remove the filter insert (refer to section 15.6).
- Clean the automatic filter (refer to section 15.7).
- Remove the filter element (refer to section 15.8.1).

1

- Carefully withdraw the motor shaft (17) and the axial bearing disc (55.2) from the cover (7).
- Remove the O-ring (75.8), back-up rings (75.7) and bearing bush (55.3) from the motor shaft.

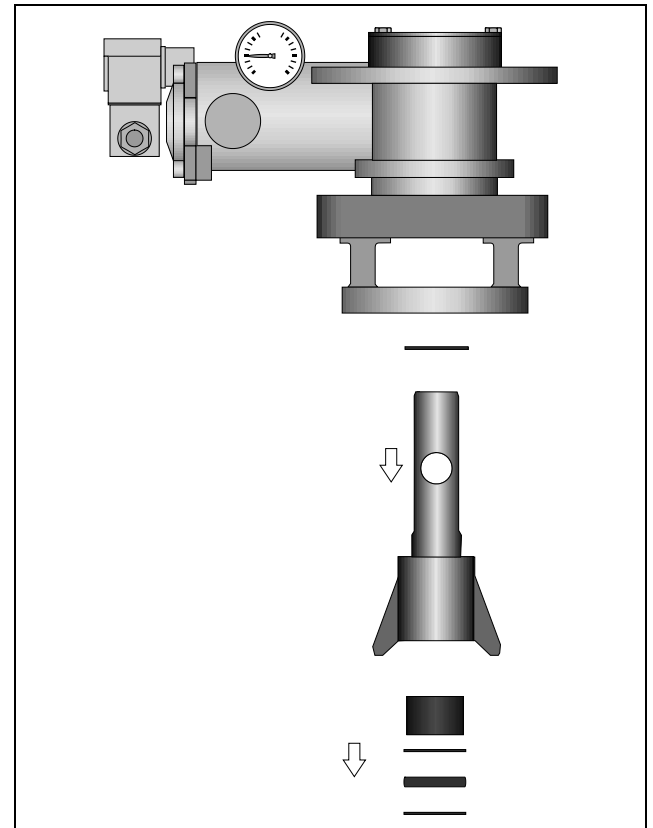


Fig. 31: Removing the motor shaft with the seals and bearing bush

2

- Loosen and remove the hexagon screws (25).

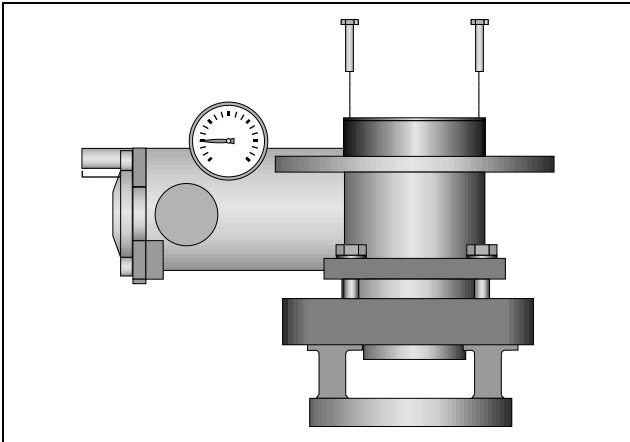


Fig. 32: Loosening and removing the hexagon screws

3

- Remove the sealing disc (31) and the shaft seal attachment (32).

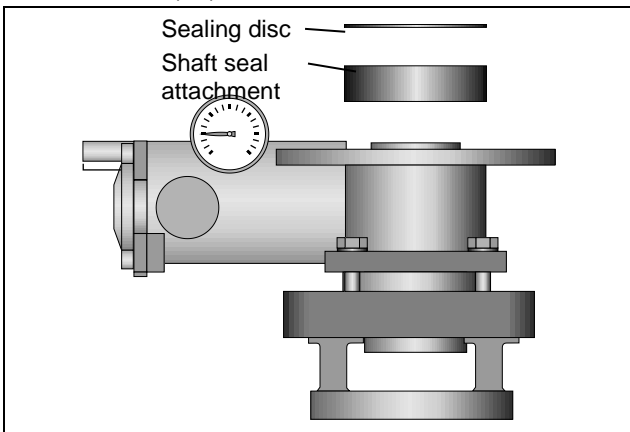


Fig. 33: Removing the sealing disc and the shaft seal attachment

4

- Remove the lip seal (75.1), back-up ring (75.2) and O-ring (75.3) from the shaft seal attachment.

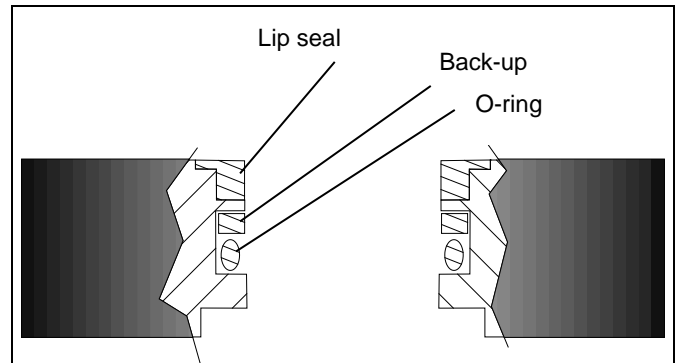


Fig. 34: Removing the seals

5

- Remove the O-ring (75.4).

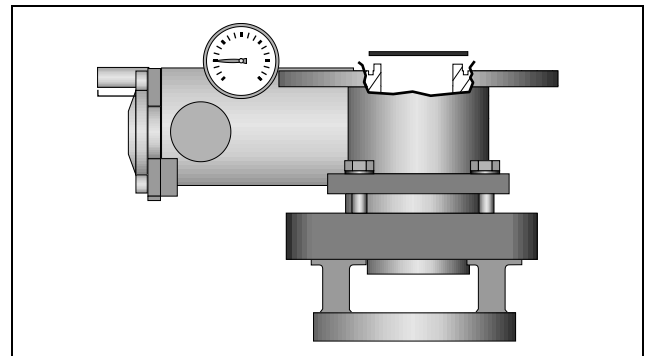


Fig. 35: Removing the O-ring

6

- Loosen the hexagon screws (12) and remove them together with the spring washers (13).
- Withdraw the backflush adapter housing (30.1) from the cover (7).

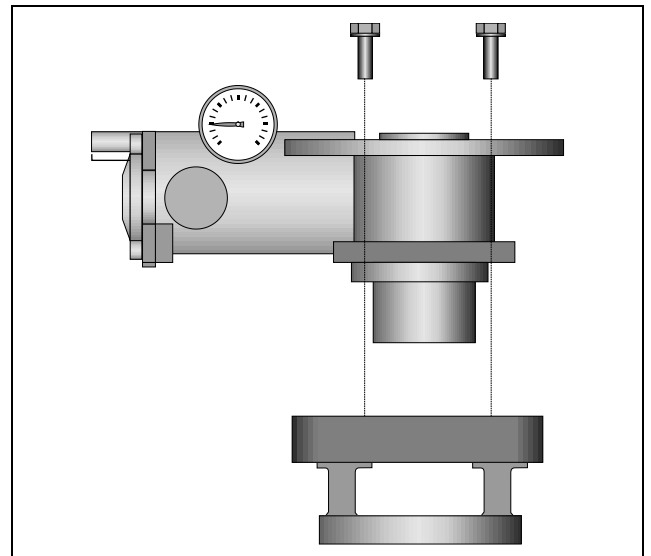


Fig. 36: Removing the backflush adapter housing

7

Remove the O-ring (75.5).

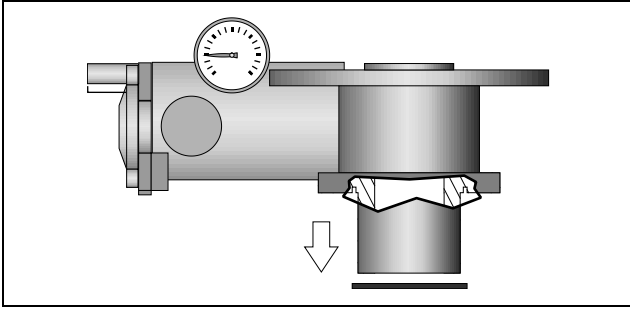


Fig. 37: Removing the O-ring

8

Remove the bearing bushes (55.1).

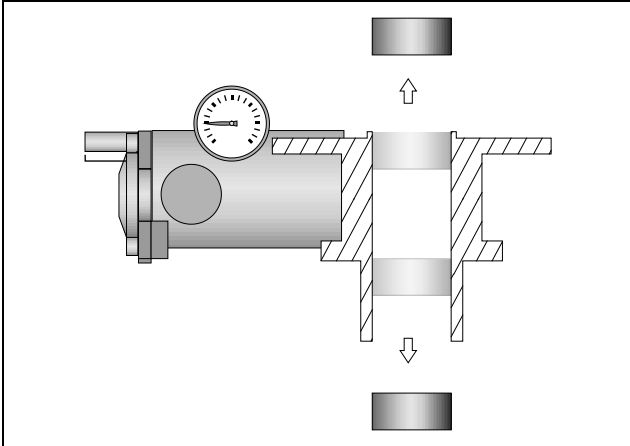


Fig. 38: Removing the bearing bushes

9

- Clean the shaft seal attachment, motor shaft and backflush adapter.
- Oil the new sealing and guiding elements lightly and install them.
- Install in reverse order.

After installing:

- Screw in the hexagon screws (25) hand-tight.
- Turn the motor shaft (17) slightly and pull it up.
- Tighten the hexagon screws (25).

16 Exploded view

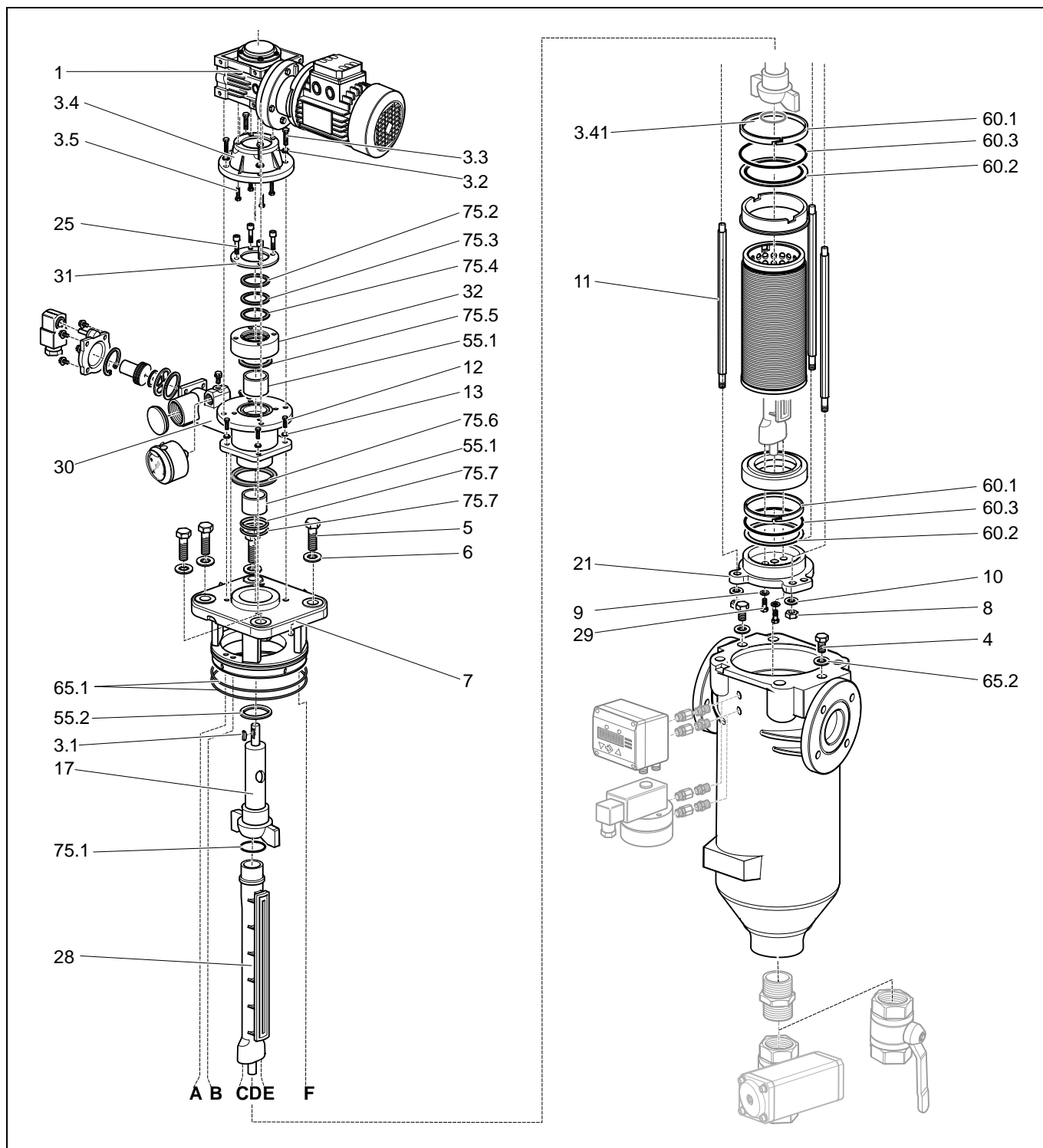


Fig. 39: Exploded view

17 List of parts

Ser. no.	Part name/DIN designation	Qty.	Benennung/DIN Bezeichnung
1	Gear motor	1	Getriebemotor
3	Bell housing Z AF 132-152/G	1	Motoraufnahme Z AF 132-152/G
3.1	Feather key DIN 6885 A6x6x30	1	Passfeder DIN 6885 A6x6x30
3.2	Spring washer A8 DIN 128	4	Federring A8 DIN 128
3.3	Hexagon screw ISO 4017 M8x20	4	6kt.-Schraube ISO 4017 M8x20
3.4	Bell housing	1	Motorbock
3.5	Cylinder screw M6 x 20 ISO 4762	4	Zylinderschraube M6 x 20 ISO 4762
4	Vent screw G 1/4	2	Entlüftungsschraube G 1/4
5	Hexagon screw ISO 4017 M16x45	4	6kt.-Schraube ISO 4017 M16x45
6	Washer A17 DIN 125	4	Scheibe A17 DIN 125
7	Cover AF 132-152	1	Deckel AF 132-152
8	Hexagon nut ISO 4017 M8	3	6kt.-Mutter ISO 4017 M8
9	Spring washer A6 DIN 128	2	Federring A6 DIN 128
10	Spring washer A8 DIN 128	3	Federring A8 DIN 128
11	Distance bolt	3	Distanzbolzen
12	Hexagon screw ISO 4017 M8x30	4	6kt.-Schraube ISO 4017 M8x30
13	Spring washer A8 DIN 128	4	Federring A8 DIN 128
17	Motor shaft AF 132 - 152	1	Antriebswelle AF 132 - 152
21	Centre flange AF 132-152	1	Zentrierflansch AF 132-152
25	Hexagon screw ISO 4017 M4x25	4	6kt.-Schraube ISO 4017 M4x25
28	Pressure channel Z AF 132-152	1	Verteiler Z AF 132-152
29	Cylinder head screw M6 x 16 ISO 4762	2	Zylinderschraube M6 x 16 ISO 4762
30	Backflush adapter Z	1	RSA Z
30.1	Backflush adapter housing	1	Gehäuse RSA
30.2	Backflush adapter manometer	1	Manometer RSA
30.3	Backflush adapter solenoid	1	Magnetspule RSA
30.4	Backflush adapter magnetic valve	1	Magnetventil RSA
30.5	Cylinder head screw M6 x 12 ISO 4762	4	Zylinderschraube M6 x 12 ISO 4762
30.6	Backflush adapter valve seat	1	Ventilsitz RSA
30.7	Backflush adapter check valve	1	Rückschlagventil RSA
31	Sealing disc AF 133 - 173 G3	1	Dichtscheibe AF 133 - 173 G3
32	Shaft seal attachment AF 133 - 173 G3	1	Dichtaufsatz AF 133 - 173 G3
55	Bearing bush kit AF 132-152/G VP	1	Buchsensatz AF 132-152/G VP
55.1	Bearing bush XSM-3539-19	2	Buchse XSM-3539-19
55.2	Axial bearing disc 50 x 39 x 2	1	Anlaufscheibe 50 x 39 x 2
60	Seal kit element AF 132-152/G VP	1	Dichtsatz Element AF 132-152/G VP
60.1	Radial bearing ring	2	Führungsring
60.2	Axial bearing disc 70 x 62 x 1.5	2	Anlaufscheibe 70 x 62 x 1,5
60.3	O-ring 62,0 x 2,0	2	O-Ring 62,0 x 2,0
65	Seal kit housing AF 132-152/G VP	1	Dichtsatz Gehäuse AF 132-152/G VP
65.1	O-ring 98,02 x 3,53	2	O-Ring 98,02 x 3,53
65.2	Sealing ring 14 x 18 x 1,5 DIN 7603	2	Dichtring 14 x 18 x 1,5 DIN 7603
65.3	Sealing ring 10 x 13,5 DIN 7603	2	Dichtring 10 x 13,5 DIN 7603

Ser. no.	Part name/DIN designation	Qty.	Benennung/DIN Bezeichnung
75	Seal kit shaft AF 132-152/G VP	1	Dichtsatzwelle Welle AF 132-152/G VP
75.1	O-ring 29.82 x 2.62	1	O-Ring 29,82 x 2,62
75.2	Lip seal D35	1	Lippendichtung D35
75.3	Back up ring 44.4 x 35 x 1.7	1	Stützring 44,4 x 35 x 1,7
75.4	O-ring 34.29 x 5.33	1	O-Ring 34,29 x 5,33
75.5	O-ring 44.04 x 3.53	1	O-Ring 44,04 x 3,53
75.6	O-ring 53.57 x 3.53	1	O-Ring 53,57 x 3,53
75.7	O-ring 38.70 x 2.65	2	O-Ring 38,70 x 2,65

18 Spare parts

Designation	Material no.	Benennung
Seal kit complete FPM (VP)	70349861	Dichtsatz komplett FPM (VP)
Seal kit complete PTFE (VP)	70349909	Dichtsatz komplett PTFE (VP)
Seal kit shaft FPM (VP)	70349595	Dichtsatz Welle FPM (VP)
Seal kit shaft PTFE (VP)	70349898	Dichtsatz Welle PTFE (VP)
Seal kit housing FPM (VP)	70349584	Dichtsatz Gehäuse FPM (VP)
Seal kit housing PTFE (VP)	70349899	Dichtsatz Gehäuse PTFE (VP)
Seal kit element FPM (VP)	70349580	Dichtsatz Element FPM (VP)
Seal kit element PTFE (VP)	70349908	Dichtsatz Element PTFE (VP)
Bearing kit (VP)	70320691	Buchsensatz (VP)
Filter element → see name-plate		Filterelement → siehe Typenschild



Please request a separate spare parts drawing and list of spare parts for special versions.

19 Declaration of incorporation

As defined by the EC Machinery Directive

EU – Einbauerklärung
EU Declaration of incorporation
Déclaration relative au montage UE



Der Hersteller
The manufacturer
Le producteur

Filtration Group GmbH
Schleifbachweg 45
74613 Öhringen
Telefon 07941 6466-0
Telefax 07941 6466-429

erklärt hiermit, dass das folgende Produkt
hereby declares that the following product
déclare par la présente que le produit suivant

Produktbezeichnung:
Product designation:
Désignation du produit :
Typenbezeichnung:
Type designation:
Désignation du type :
Funktionsbeschreibung:
Machine description:
Description du fonctionnement :

Automatik-Kantenspaltfilter
Automatic metal edge filter
Filtres automatiques à fentes

AF 132 G, AF 152 G, AF 172 G, AF 112 G

Filtration von Feststoffen
Filtration of solids
Filtration de solides

den in der Anlage dargestellten grundlegenden Anforderungen der Richtlinie 2006/42/EU entspricht.
conforms to the essential requirements of the Machinery Directive 2006/42/EU pursuant to the Annex.
répond aux exigences fondamentales de la directive 2006/42/UE, décrites en annexe.

Die unvollständige Maschine darf erst dann in Betrieb genommen werden, wenn festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Richtlinie 2006/42/EU über Maschinen entspricht.
The partly completed machinery must not be put into service until the relevant machinery into which this partly completed machinery is to be incorporated has been declared in conformity with the Machinery Directive 2006/42/EU.
La machine incomplète ne doit être mise en service qu'après avoir déterminé que la machine, dans laquelle la machine incomplète doit être montée, correspond aux dispositions de la directive machines 2006/42/UE.

Folgende harmonisierten Normen wurden angewandt:
The following harmonised standards have been used:
Les normes harmonisées ci-dessous ont été appliquées :

DIN EN ISO 12100:2011-03, DIN EN ISO 4414:2011-04

Der Hersteller verpflichtet sich, die speziellen Unterlagen zur unvollständigen Maschine, einzelstaatlichen Stellen auf Verlangen schriftlich zu übermitteln. Die zur Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.
The manufacturer undertakes to transmit any specific documentation on the partly completed machinery to the appropriate national authorities in writing on request. All specific technical documentation belonging to the machinery has been compiled pursuant to Annex VII Section B.
Le fabricant s'engage à transmettre les documents spécifiques à la machine incomplète par écrit aux administrations nationales respectives sur leur demande. Les documents techniques spécifiques selon Annexe VII partie B faisant partie de la machine ont été établis.

Dokumentationsverantwortlicher/Abteilung:
Responsible for documentation/departement:
Responsable de la documentation/Service :

Filtration Group GmbH
Schleifbachweg 45
74613 Öhringen

Unterzeichner:
Signatory:
Signataire :

Wolfram Zuck
Dipl.-Ing. (FH) Industrial Engineering
Managing Director, Plant Manager Öhringen

Öhringen,

AF 132 G
Datum/Date/Date

[Signature]
Unterschrift/Signature/Signature

Anlage/Annex/Annexe

3 Seiten/pages/pages



The automatic filter is only allowed to be started if the complete machine is also started up!

20 Declaration of conformity

EU – Konformitätserklärung
EU declaration of conformity
Déclaration de conformité UE



Der Hersteller
The manufacturer
Le producteur

Filtration Group GmbH
Schleifbachweg 45
74613 Öhringen
Telefon 07941 6466-0
Telefax 07941 6466-429

erklärt hiermit, dass das folgende Produkt
hereby declares that the following product
déclare par la présente que le produit suivant

Produktbezeichnung:
Product designation:
Désignation du produit :

Automatik-Kantenspaltfilter
Automatic metal edge filter
Filtres automatiques à fentes

Typenbezeichnung:
Type designation:
Désignation du type :

AF 132 G, AF 152 G, AF 172 G, AF 112 G

Funktionsbeschreibung:

Machine description:

Description du fonctionnement :

Filtration von Feststoffen
Filtration of solids
Filtration de solides

allen einschlägigen Bestimmungen der Druckgeräterichtlinie 2014/68/EU, Anhang 1 entspricht.
conforms to all relevant provisions of the pressure equipment directive 2014/68/EU, annex I.
répond à toutes les dispositions applicables de la directive équipements sous pression 2014/68/UE, annexe I.

Angewendete harmonisierte Normen, insbesondere
Applied harmonized standards in particular
Normes harmonisées utilisées, notamment

AD 2000

Angewendete nationale Normen und technische Spezifikationen, insbesondere
Applied national norms and techn. specifications, especially
Normes et spécifications nationales utilisées, notamment

HP0, TRD/TRB

Und allen wesentlichen Schutzanforderungen der Ex-Richtlinie 2014/34/EU entspricht.
Conforms to all the basic requirements of the Ex-directive 2014/34/EU.
Répond à toutes les exigences essentielles de la Ex-directive 2014/34/UE.

Folgende harmonisierten Normen wurden angewandt:
The following harmonised standards have been used:
Les normes harmonisées ci-dessous ont été appliquées :

EN 1127-1 und EN 13463-1

Unterzeichner:
Signatory:
Signataire :

Wolfram Zuck
Dipl.-Ing. (FH) Industrial Engineering
Managing Director, Plant Manager Öhringen

Öhringen,

17.7.17
Datum/Date/Date

Unterschrift/Signature/Signataire



The enclosed declaration of conformity only applies to discharge casings with a CE mark for categories I - IV or to complete filters in accordance with the Ex directive for categories 3G/2G.
The standard version is designed for Group 2 liquids as defined by the EC Pressure Equipment Directive 97/23/EC Article 9.

Anlage zur Einbauerklärung gemäß Richtlinie
2006/42/EU für Automatik-Kantenspaltfilter
Annex to the Declaration of Incorporation pursuant to
the Machinery Directive 2006/42/EU for automatic metal
edge filter



Annexe à la déclaration de montage selon la directive
2006/42/UE pour filtres automatiques à fentes
Beschreibung der grundlegenden Sicherheits- und Gesundheits-
schutzanforderungen (soweit zutreffend) gemäß 2006/42/EU, An-
hang 1, die zur Anwendung kommen und eingehalten wurden.
List of the essential health and safety requirements (where applicable)
pursuant to 2006/42/EU, Annex 1, applied and fulfilled.
Description des exigences fondamentales relatives à la sécurité et à
la protection de la santé (si applicables) selon 2006/42/UE, annexe 1,
appliquées et respectées.

Grundlegende Anforderung Essential requirements Exigence fondamentale	Erfüllt Fulfilled Remplie
Grundsätze für die Integration der Sicherheit Principles of safety integration Principes d'intégration de la sécurité	ja yes oui
Materialien und Produkte Materials and products Matériaux et produits	ja yes oui
Konstruktion der Maschine im Hinblick auf die Handhabung Design of machinery to facilitate its handling Construction de la machine au regard de sa manipulation	ja yes oui
Steuerungen und Befehlseinrichtungen Control systems Commandes et dispositifs de commande	nein no non
Risiko des Verlusts der Standsicherheit Risk of loss of stability Risque de perte de la stabilité statique	ja yes oui
Bruchrisiko beim Betrieb Risk of break-up during operation Risque de rupture en fonctionnement	ja yes oui
Risiken durch herabfallende oder herausgeschleuderte Gegenstände Risks due to falling or ejected objects Risques dus à la chute ou à l'éjection d'objets	ja yes oui
Risiken durch Oberflächen, Kanten und Ecken Risks due to surfaces, edges or angles Risques dus aux surfaces, arêtes et angles	ja yes oui
Risiken durch Änderung der Verwendungsbedingungen Risks related to variations in operating conditions Risques dus à la modification des conditions d'utilisation	ja yes oui
Risiken durch bewegliche Teile Risks related to moving parts Risques dus à des parties mobiles	ja yes oui
Wahl der Schutzeinrichtung gegen Risiken durch bewegliche Teile Choice of protection against risks arising from moving parts Choix du dispositif de protection contre les risques dus à des parties mobiles	ja yes oui
Risiko unkontrollierter Bewegungen Risks of uncontrolled movements Risque de mouvements incontrôlés	ja yes oui
Anforderungen an Schutzeinrichtungen Required characteristics of guards and protective devices Exigences relatives aux dispositifs de protection	nein no non
Elektrische Energieversorgung Electricity supply Alimentation électrique	ja yes oui
Statische Elektrizität Static electricity Electricité statique	ja yes oui

Nichtelektrische Energieversorgung Energy supply other than electricity Alimentation en énergie non-électrique	ja yes oui
Montagefehler Errors of fitting Erreurs de montage	ja yes oui
Extreme Temperaturen Extreme temperatures Températures extrêmes	ja yes oui
Brand Fire Incendie	ja yes oui
Explosion Explosion Explosion	ja yes oui
Lärm Noise Bruit	ja yes oui
Vibrationen Vibrations Vibrations	ja yes oui
Strahlung Radiation Rayonnement	ja yes oui
Strahlung von außen External radiation Rayonnement depuis l'extérieur	ja yes oui
Emission gefährlicher Werkstoffe und Substanzen Emissions of hazardous materials and substances Emission de substances et matériaux dangereux	ja yes oui
Risiko, in eine Maschine eingeschlossen zu werden Risk of being trapped in a machine Risque de se faire enfermer dans une machine	nein no non
Ausrutsch-, Stolper- und Sturzrisiko Risk of slipping, tripping or falling Risque de dérapage, de trébuchement et de chute	nein no non
Blitzschlag Lightning Foudre	nein no non
Wartung der Maschine Machinery maintenance Entretien de la machine	nein no non
Zugang zu den Bedienungsständen und den Eingriffspunkten für die Instandhaltung Access to operating positions and servicing points Accès aux postes de commande et aux points d'intervention pour la maintenance	nein no non
Trennung von den Energiequellen Isolation of energy sources Séparation des sources d'énergie	nein no non
Eingriffe des Bedienungspersonals Operator intervention Interventions des opérateurs	ja yes oui
Reinigung innen liegender Maschinenteile Cleaning of internal parts Nettoyage de parties internes de la machine	nein no non
Informationen und Warnhinweise an der Maschine Information and warnings on the machinery Informations et avertissements sur la machine	ja yes oui
Warnung vor Restrisiken Warning of residual risks Avertissement quant aux risques résiduels	ja yes oui
Kennzeichnung der Maschinen Marking of machinery Marquage des machines	nein no non

Betriebsanleitung Instructions Mode d'emploi	ja yes oui
Nahrungsmittelmaschinen und Maschinen für kosmetische oder pharmazeutische Erzeugnisse Foodstuffs machinery and machinery for cosmetics or pharmaceutical products Machines pour denrées alimentaires et machines pour produits cosmétiques ou pharmaceutiques	nein no non
Handgehaltene und/oder handgeführte tragbare Maschinen Portable hand-held and/or hand-guided machinery Machines tenues à la main et/ou portables guidées à la main	ja yes oui

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