



Translation of original instructions with installation instructions
Automatic backflush filter AF 113 G3
with internal pressure cleaning and integrated cyclone effect

Material No. of Instruction Manual
70310590



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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 that 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.

Agglomerate:

Structure made up of several small particles which have formed a ball (conglomerated) as a result of physical forces.

Cleaning:

The segmented element is cleaned. It is turned for this purpose. The filtered fluid or the external medium flows outward through the segmented element and cleans the segments one at a time.

Concentrate:

Quantity of residues enriched with solids. Is discharged from the 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 collected in the collection cone are discharged.

Filter cake:

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

Filtered fluid:

Substance that is filtered.

Filtration mode:

The automatic filter operates normally and the valves are closed.

Homogenisation:

A system of substances is given a uniform composition.

Initial differential pressure:

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

Precontrol:

5/2-way magnetic valves actuated by the controller, which switch pneumatic control valves.

Segmented element:

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

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

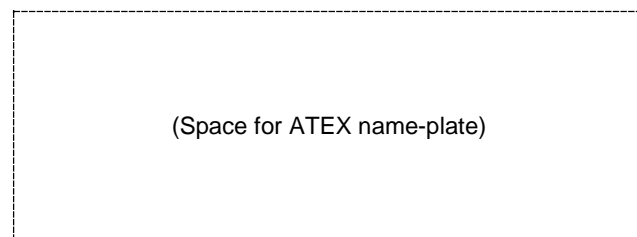
4.2 Information about the Instruction Manual

FG Mat. No.: 70310590
 Date: 23.01.18
 Version: 07

4.3 ATEX type key



	II	2	G	T3
	1.	2.	3.	4.
1.	II	Valid for use above ground		
2.	Use in:	Zone 1		
3.	Atmosphere	2		
	G = Gas	G		
4.	T3 = The maximum surface temperature on the filtration device is 200°C.			



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

5 Intended application

⚠ DANGER!

PROHIBITED:

- Use for other purposes without prior consultation with the manufacturer.
- Use in potentially explosive atmospheres, unless explicitly mentioned in the contract documentation.
- Use with smouldering, burning or adhesive particles.
- Use with highly explosive dusts (e.g. aluminium dust, explosives, etc.).

⚠ CAUTION!

This FG 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. The manufacturer shall not be liable for any damage resulting from such use.

CAUTION!

Conditionally allowed:

- Use of solvents in consultation with the manufacturer.
- 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 1000 mg/l (contact the manufacturer if necessary).
- Particle sizes greater than 2 mm (use a pre-screen).

FG automatic filters are designed for filtering solids out of low-viscosity liquids.

Main applications:

- Cooling lubricant filtration (section 13)
- Product filtration
- Preseparation in a filter cascade
- Protective filtration before or after certain process steps
- Process filtration
- Destruction of unwanted agglomerates

6 Functional description

6.1 Process principle of the AF 113 G3

The tangential inflow between a preseparator tube and the filter housing causes coarse and heavy particles in the suspension to be sedimented into the collection cone. This relieves the load in the segmented element.

When the liquid flows inward through the segmented element, the particles contained in the suspension settle on the filter medium, where they create a differential pressure. A back pressure – the internal pressure – is built up by means of a control throttle at the filtered fluid outlet.

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

The segmented element is turned past the backflush channel by the gear motor. The backflush valve is opened. The particles are removed from the filter medium one segment at a time by the internal pressure cleaning action and guided out of the filter through the backflush channel.

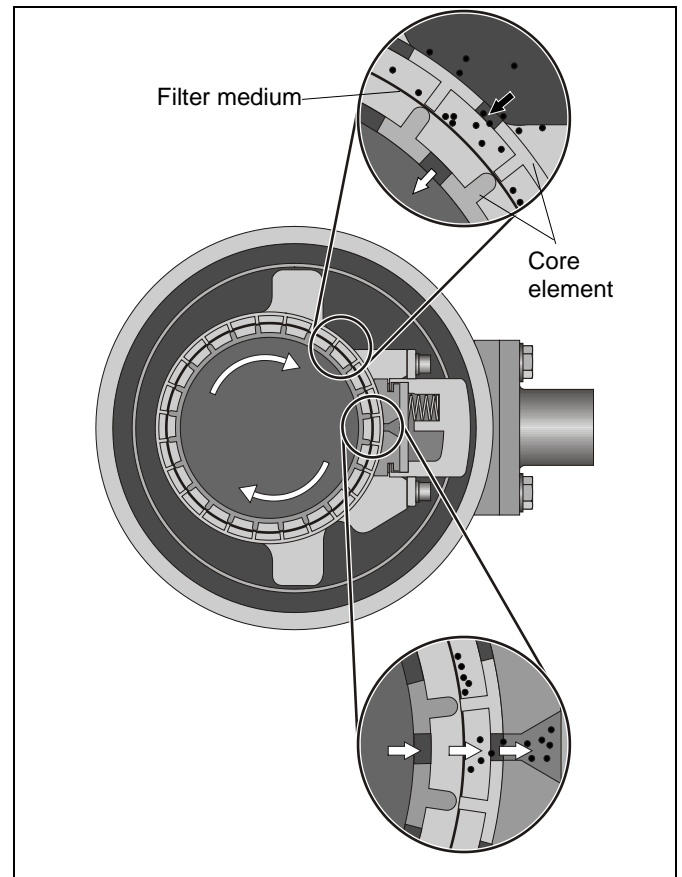


Fig. 1: Separating and cleaning principle on the segmented element

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

6.2 Main components of the AF 113 G3

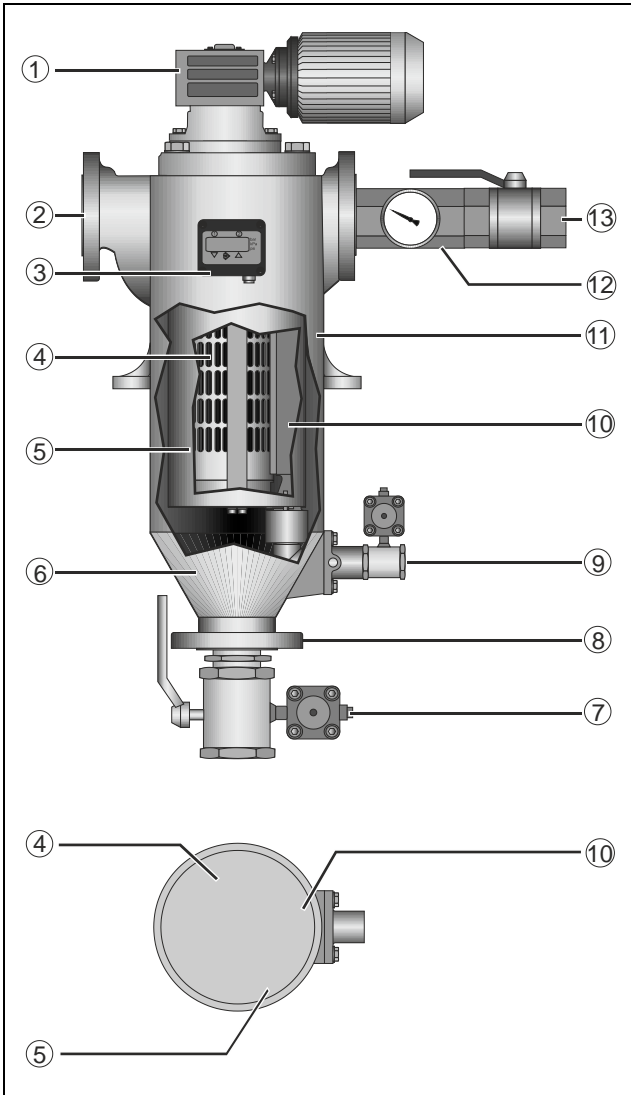


Fig. 2: Diagram of the main components

1	Electric cleaning drive
2	Inlet connection
3	Differential gauge/switch (optional)
4	Segmented element
5	Preseparator tube
6	Collection cone
7	Electro-pneumatic or manual drain valve (optional)
8	Drain opening
9	Electro-pneumatic backflush valve (optional)
10	Backflush channel
11	Filter housing
12	Control throttle cleaning flow rate with gauge (optional)
13	Outlet connection

6.3 Functional principle of the AF 113 G3

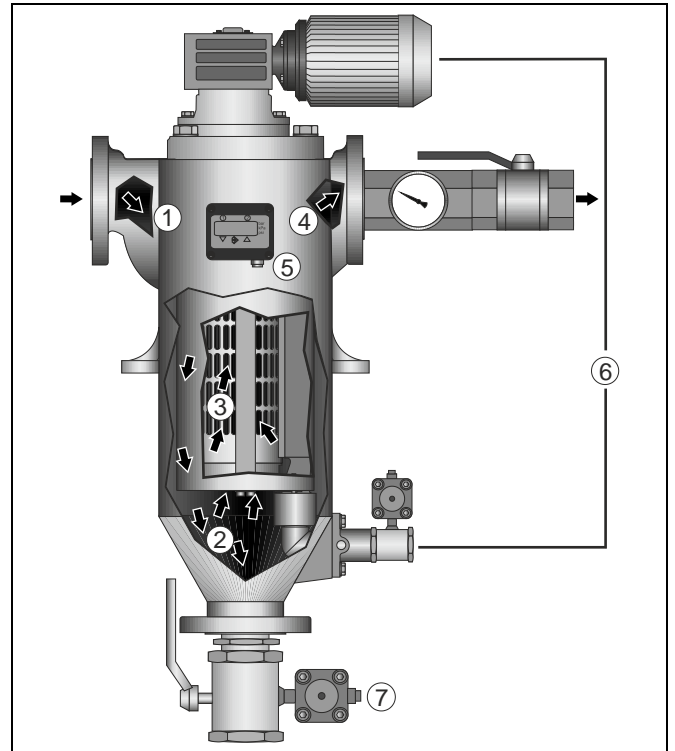



Fig. 3: Functional principle of an automatic filter

- 1**
The suspension flows tangentially downwards into the annulus between the filter housing and the preseparator tube.
- 2**
The suspension is deflected 180°. This deflection and the cyclone effect cause coarse solids to be sedimented into the collection cone prior to the actual filtration process.
- 3**
The suspension flows through the segmented element. The particles contained in the suspension settle on the outside of the element.
- 4**
The filtered fluid enters the clean side and exits the filter. A back pressure – the internal pressure – is built up by means of the “throttling point” mounted at the outlet.
- 5**
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.
- 6**
The gear motor begins to turn the segmented element. The backflush valve is opened. The particles are removed from the filter medium one segment at a time by the internal pressure cleaning action and guided out of the filter through the backflush channel.
The cleaning effect can be adjusted by means of the control throttle (optional). The filtered fluid pressure and/or volumetric flow are reduced for the duration of the cleaning process. The filtration process is not interrupted.
- 7**
The enriched particles in the collection cone can be discharged periodically either manually or automatically.

7 Technical data


7.1 General data of the AF 113 G3 (without options)

	The information indicated on the name-plate is binding.
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Electrical energy consumption*: 230 V/400 V
 Peak noise emission: < 70 dB(A)
 Dimensions: See data sheet
 Min. dismantling clearance above filter: 515 mm
 Total dry weight: 85 kg
 Max. operating temperature: 180°C
 Max. permissible operating pressure up to 100°C: 25 bar
 Max. permissible differential pressure: 10 bar

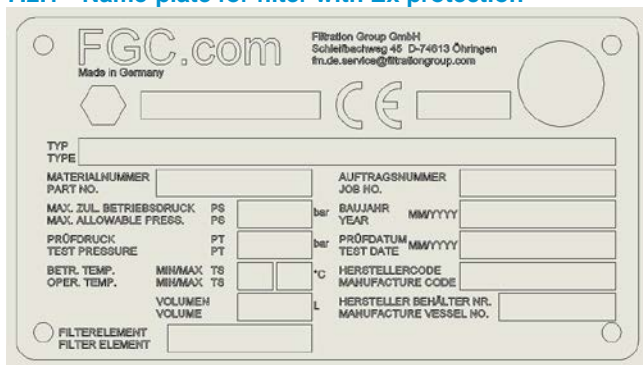
*See also name-plate on gear motor

7.2 Order-specific data

	<p>The name-plate is rendered invalid if the segmented element or the filter insert are modified.</p> <ul style="list-style-type: none"> Please request a new name-plate from the manufacturer.
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This data is order-specific and can be taken from the name-plate.

7.2.1 Name-plate for filter with Ex protection



FGC.com
 Made in Germany
 Filtration Group GmbH
 Schellbachweg 43 D-74613 Öhringen
 fm.de.service@filtrationgroup.com

FILTERELEMENT
 FILTER ELEMENT

7.2.2 Name-plate for filter without Ex protection



FGC.com
 Made in Germany
 Filtration Group GmbH
 Schellbachweg 43 D-74613 Öhringen
 fm.de.service@filtrationgroup.com

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.
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9 Assembly instructions

⚠ DANGER!	
	<p>Explosion hazard!</p> <p>⇒ Risk of injury to persons or damage to property.</p> <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!	
	<p>Explosion hazard!</p> <p>⇒ Risk of injury to persons or damage to property.</p> <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!	
<p>If the system is installed by unauthorised persons</p> <p>⇒ Risk of injury</p> <p>⇒ All warranty claims are rendered invalid</p> <ul style="list-style-type: none"> The system must be installed by a suitably trained person! 	

9.1 Installation

⚠ DANGER!	
	<p>Explosion hazard!</p> <p>⇒ Risk of injury to persons or damage to property.</p> <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.

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

⚠ DANGER!	
	<p>If the filter topples over</p> <p>⇒ Risk of injury to persons or damage to property.</p> <ul style="list-style-type: none"> • Secure the filter seat firmly in position.

- Screw the automatic filter to the prepared seat.
- Remove the caps from the connections.
- Connect the pipes.

Pressure relief

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

9.2 Installing the pipes and selecting the pump

- The filter must always be installed on the pump discharge side.
- Check the pump characteristic.
- Make sure that the pump suction opening is positioned well below the liquid level.
- Adjust the filtered fluid pressure with the control throttle if necessary.
- If required, install the control throttle in the cleaning line in order to reduce the cleaning flow rate to a minimum.
- Ensure a minimum inlet pressure of 1.0 - 2.0 bar.
- Ensure a minimum filtered fluid pressure of 1.0 - 2.0 bar.

9.3 Mechanical installation

⚠ CAUTION!	
High pressure at the drain valve!	
<p>⇒ Risk of injury to persons or damage to property</p> <ul style="list-style-type: none"> • Depressurise prior to mounting and dismantling. 	
⚠ CAUTION!	
High pressure at the backflush valve!	
<p>⇒ Risk of injury to persons or damage to property</p> <ul style="list-style-type: none"> • Depressurise prior to mounting and dismantling. 	

Special mounting instructions for the cleaning and drain lines

- Make sure that 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.

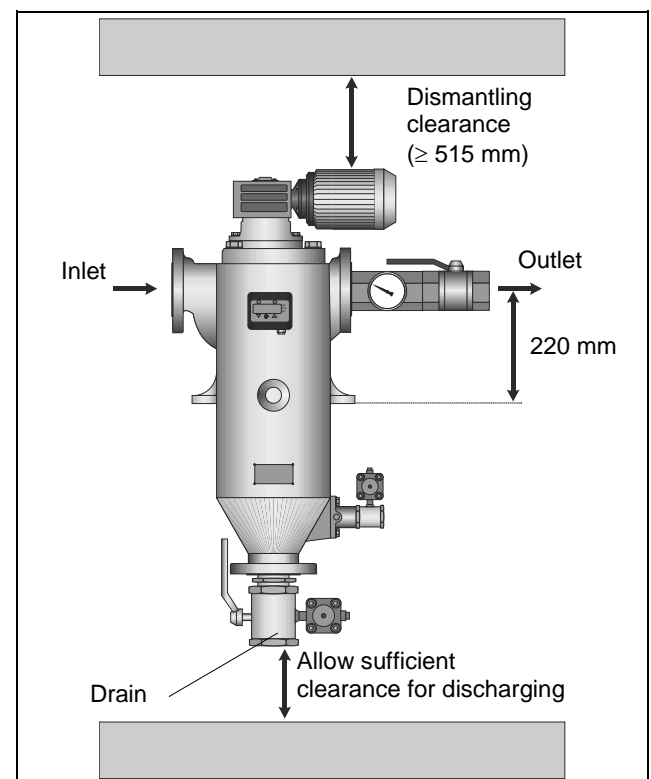


Fig. 4: Mechanical installation (cast stainless steel version)

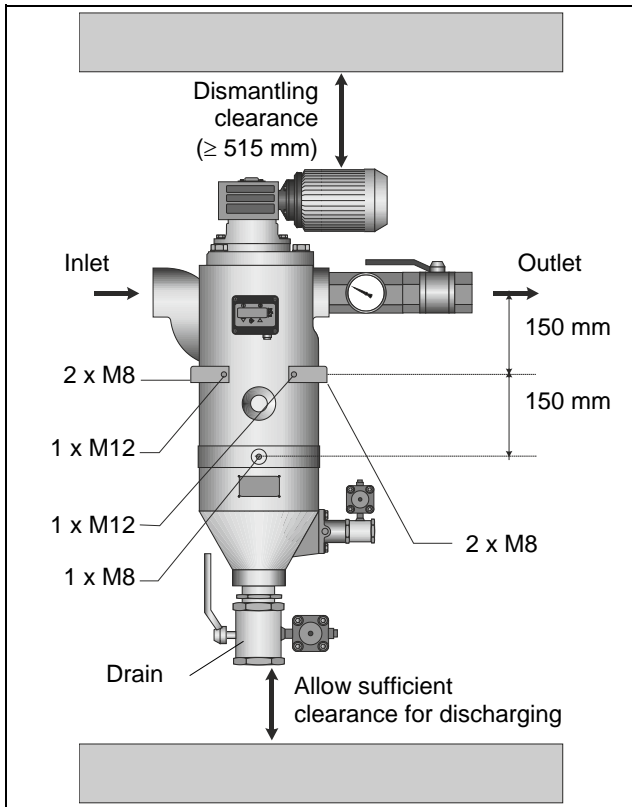


Fig. 5: Mechanical installation (nodular cast iron version)

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.

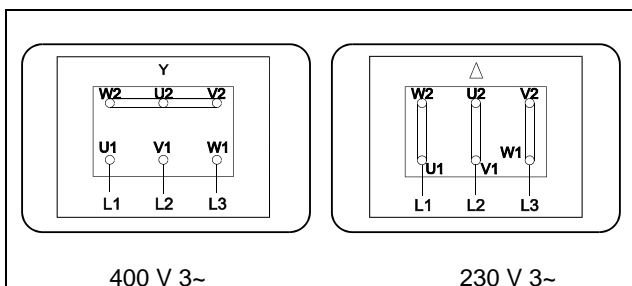


Fig. 6: Standard gear motor connections

Differential gauge/switch (optional)

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

Automatic valves (optional)

- Connect the precontrol valve (5/2-way magnetic valve) to the compressed air supply (approx. 6 bar).
- Connect the solenoid to the power supply.

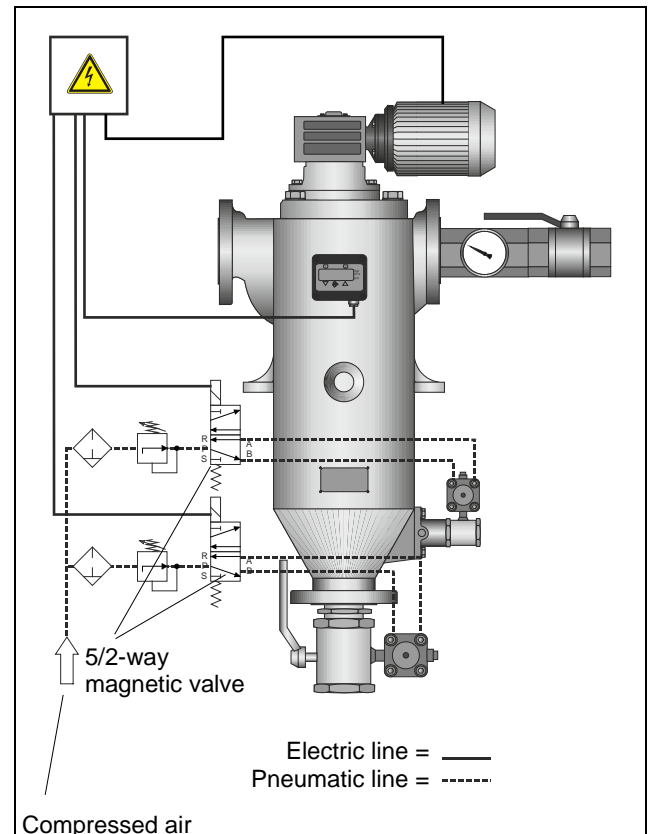
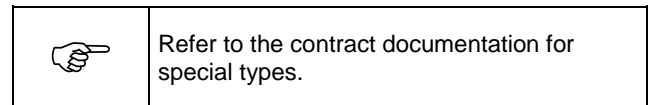
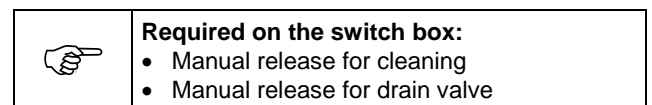


Fig. 7: Electro-pneumatic connections



9.4.2 Connection to FG controller (optional)

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

9.5 Control variants of the AF 113 G3

The cleaning process is controlled differently according to the application. The control variants and times described here are examples and are simply intended to serve as a guide.

9.5.1 Control variant 1

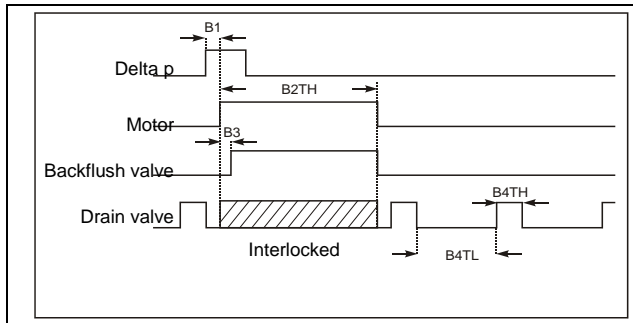


Fig. 8: Control variant 1

Parameter	Description	Recommended value
B1	Suppress differential pressure peaks	1 s
B2TH	Motor running time	7 s
B3	Backflush valve ON delay	0.5 s
B4TH	Drain valve pulse time	2 s
B4TL	Drain valve interval time	1 h

9.5.2 Control variant 2

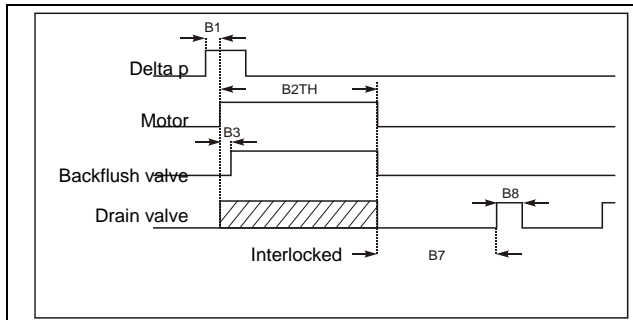


Fig. 9: Control variant 2

Parameter	Description	Recommended value
B1	Suppress differential pressure peaks	1 s
B2TH	Motor running time	7 s
B3	Backflush valve ON delay	0.5 s
B7	Drain valve starting delay	5 s
B8	Drain valve pulse time	2 s

- ⇒ If the delta p signal is still present after cleaning, the cleaning process is repeated.
- ⇒ The filter can only be cleaned when the pump is running.

10 Start-up

⚠ DANGER!

This FG automatic filter is not allowed to be put into operation until it has been established that the machine/system 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 FG automatic filter must be completely vented prior to start-up for use with all media which are capable of forming explosive gases.
- The FG automatic filter must be completely filled with liquid.
- Take steps to prevent air pockets.

⚠ DANGER!

Danger due to high pressure in the filter!

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

Make sure that:

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

10.1 Functional test

To check the 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.

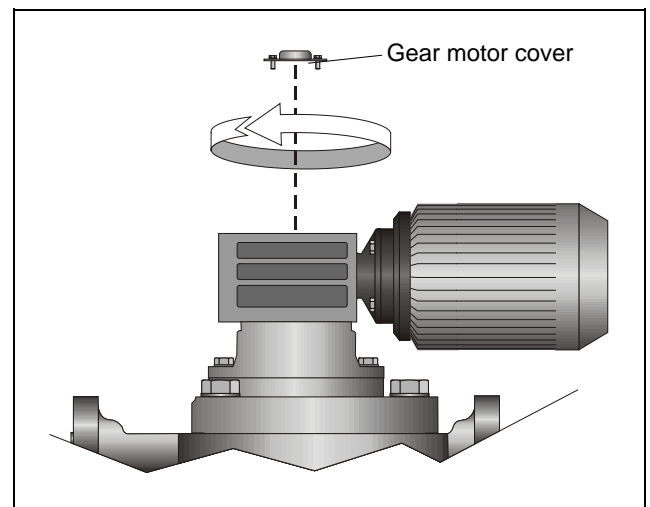


Fig. 10: Direction of rotation of the gear motor

Differential gauge/switch (optional)

- Refer to the enclosed manufacturer's documentation.

To check the function of the drain valve (optional)

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

To check the function of the backflush valve (optional)

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

10.2 Operating settings

- Switch on the controller.
- Slowly open the inlet.
- Adjust the back pressure to 1 – 1.5 bar (max. 2.5 bar) with the control throttle.
- Make a note of the initial differential pressure (optional).

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

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

Initial differential pressure

The initial differential pressure varies according to the application.

General guide:

Installation on discharge side: $\Delta p \leq 0.1 \text{ bar}$

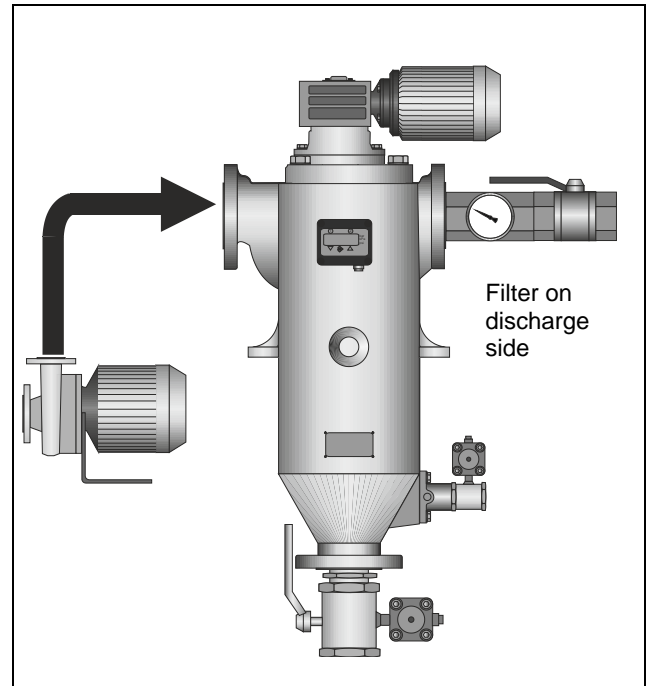



Fig. 11: Initial differential pressure



After cleaning, the differential pressure must return almost to the original initial differential pressure.
If it does not, the cleaning function is faulty (section 14).

11 Normal operation

⚠ DANGER!	
Danger due to high pressure in the filter!	
⇒ Risk of injury to persons or damage to property	
<ul style="list-style-type: none"> 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
- 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	
<ul style="list-style-type: none"> Rinse the drain line daily/weekly, depending on the application. 	

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

11.2 Rinsing the cleaning 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	
<ul style="list-style-type: none"> Rinse the cleaning line daily/weekly, depending on the application. 	

- Slowly adjust the control throttle until it is completely closed.
 - Open the backflush valve manually for approx. 10 - 15 s.
- ⇒ The pipe is rinsed.
- Adjust the control throttle to the OFF position again.

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.
- Remove the filter insert (section 15.2).
- Clean the filter insert (section 15.3.1).
- Reinstall the filter insert.
- Fill the 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

- Precipitation of constituents and microbiological loading of the cooling lubricant must be avoided.
- Do not attempt to filter magnetic chips. Exercise caution when grinding grey cast iron or steel.
- Install a suitable preseparator (800 - 1000 µm).
- Treat the cooling lubricant carefully. Take steps to prevent excessive bacterial or fungal attack.
- Cooling lubricant that has been used for the cleaning process must be treated 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 backflush and drain lines if the pressure on the filtered fluid side varies between 4 and 25 bar. The rinsing effect is impaired if the pressure difference is too high during the cleaning process.


14 Troubleshooting

Fault	Possible cause	Remedy
Gear motor does not turn	Motor circuit-breaker tripped	RESET the motor circuit-breaker
	Filtered fluid solidified	Check the gear motor
Valve does not open	Not enough compressed air	Clean the filter
	Precontrol valve defective	Increase the pressure
	Precontrol valve connected incorrectly	Check the precontrol valve
Initial differential pressure no longer reached	Solids concentration too high	Check the electrical and pneumatic connections
	Cleaning time too short	Use a suitable prefilter
	Backflush pressure too low/high	Increase the cleaning time (at least 1 - 2 revolutions of the gear motor)
	Backflush valve dirty/defective	Increase/reduce the backflush pressure with the control throttle (max. 2.5 bar)
Increased concentration of dirt on clean side	Segmented element defective	Clean/replace the backflush valve
	Seals brittle	Check the segmented element and if necessary renew it
Excessive leakage on shaft seal	Shaft seal defective	Check the seals and if necessary renew them
	Shaft seal incorrectly mounted	Renew the shaft seal



If in doubt, please consult the manufacturer.

15 Maintenance

⚠ DANGER!	
	<p>Explosion hazard!</p> <p>⇒ Risk of injury to persons or damage to property.</p> <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!	
<p>If the system is maintained by unauthorised persons</p> <p>⇒ Risk of injury</p> <p>⇒ All warranty claims are rendered invalid</p> <ul style="list-style-type: none"> • The system must be maintained by a suitably trained person! 	

Before all maintenance work:


- Shut down the automatic filter (section 12).
- Take steps to prevent the machine/system from being switched on again by unauthorised persons.



- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. goggles, respirator, protective clothing, etc.).
- Carry out the maintenance work.
- Start up the automatic filter again (section 10).

15.1 Inspection and maintenance schedule

- Refer also to the contract documentation.

Interval	Component	Activity
Weekly	Automatic filter	Check for leakage Check the differential pressure
	Pipes	Clean
Monthly	Segmented element	Check for wear and if necessary clean
	Backflush channel moulding z	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
	Segmented element	Clean
	Automatic filter	Clean
	Seal kit	Check for leakage
	<p>The necessary maintenance work is dependent on the particular application. Please consult the manufacturer if necessary.</p>	

15.2 Removing the filter insert

⚠ DANGER!

The automatic filter is pressurised!

- ⇒ Risk of injury to persons or damage to property
- Make sure that 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**
 - Make sure that the pipe is depressurised prior to opening the automatic filter.
 - Close the filter inlet and outlet.
- 2**
 - Open the drain valve.
 - Open the vent screw.
 - ⇒ The automatic filter is discharged.
- 3**
 - Turn off the compressed air supply.
- 4**
 - Switch OFF the main switch.
 - Disconnect the gear motor.

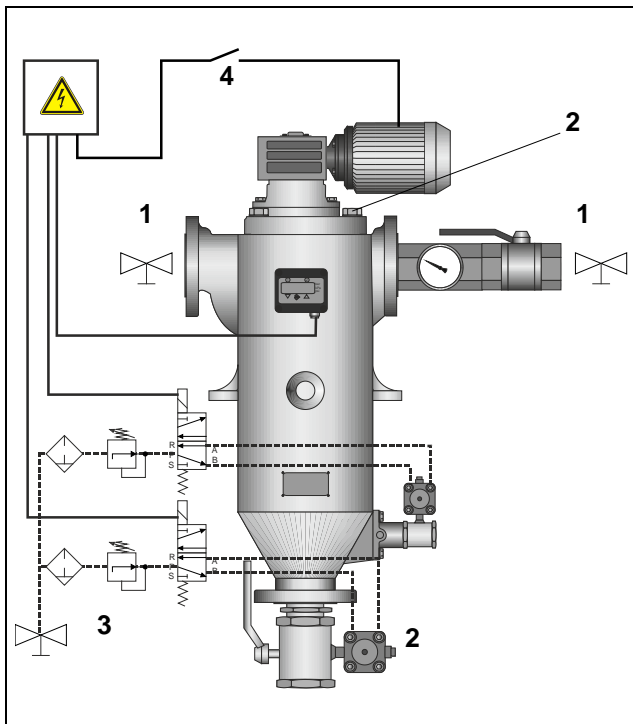


Fig. 12: Disconnecting the automatic filter

5

- Loosen and remove the hexagon screws (3.3) and the spring washers (3.4) on the bell housing of the gear motor.
- Withdraw the gear motor (1) vertically from the shaft.

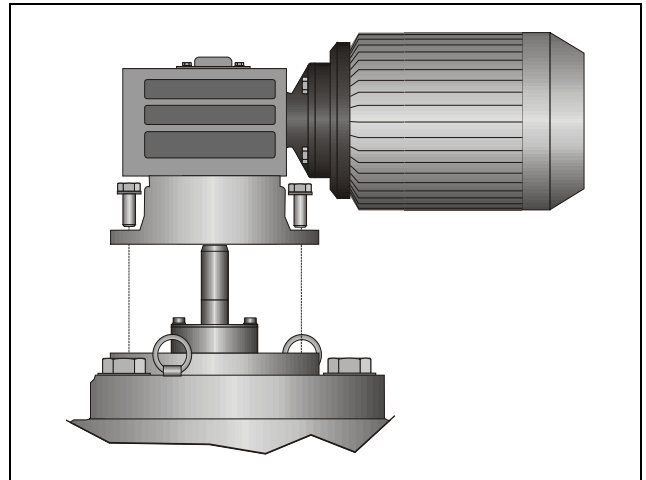


Fig. 13: Removing the gear motor

6

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

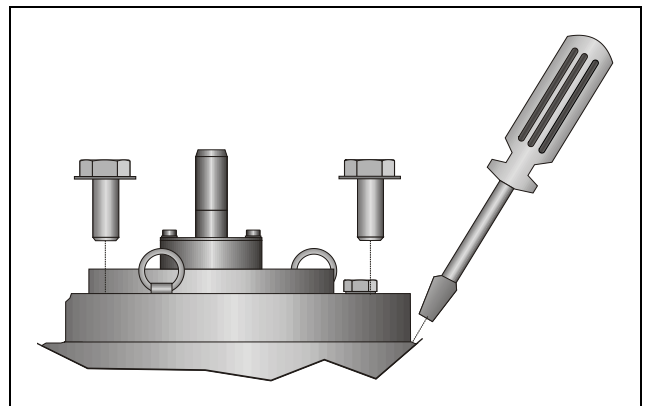


Fig. 14: Loosening and removing the hexagon screws on the filter cover

7

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

8

- Lift up the filter insert by the eyebolts and withdraw it vertically.

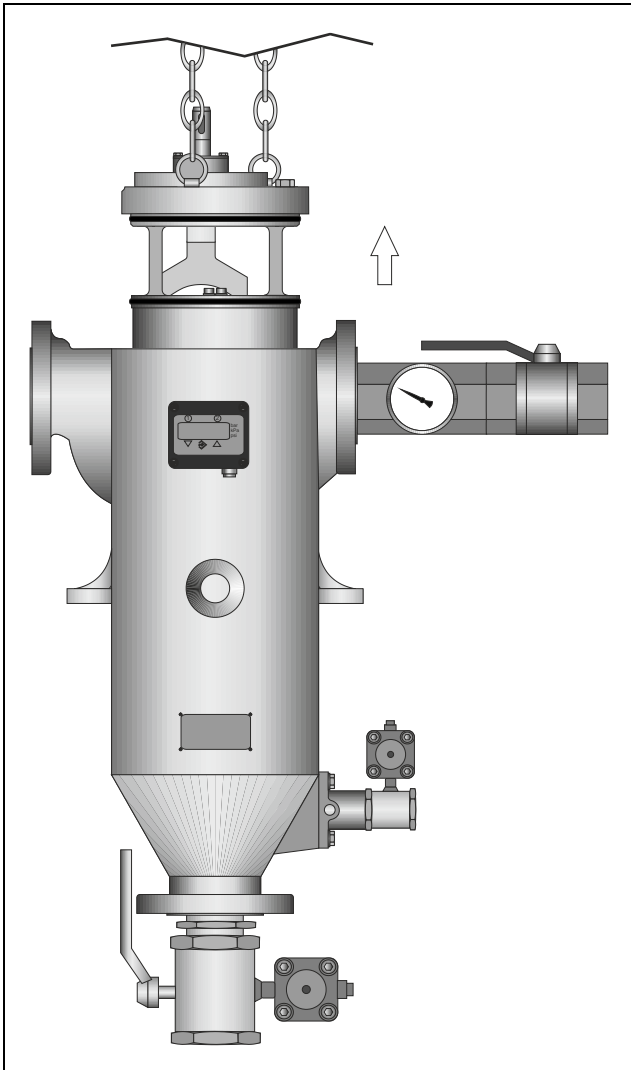


Fig. 15: Withdrawing the filter insert

- Lay the filter insert down carefully on a level surface, taking care not to damage the segmented element.

⇒ The filter insert can now be maintained.

- Install in reverse order.
- Lower the filter insert into position, making sure it is absolutely straight.

15.3 Cleaning the filter

- Remove the filter insert (section 15.2).

15.3.1 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.

15.3.2 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.

15.4 Replacing the segmented element

⚠ DANGER!

The automatic filter is pressurised!

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

⚠ 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.



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

- Remove the filter insert (section 15.2).
- Clean the filter (section 15.3).

1

- Loosen the countersunk screws (18).
- Remove the preseparator tube (19).

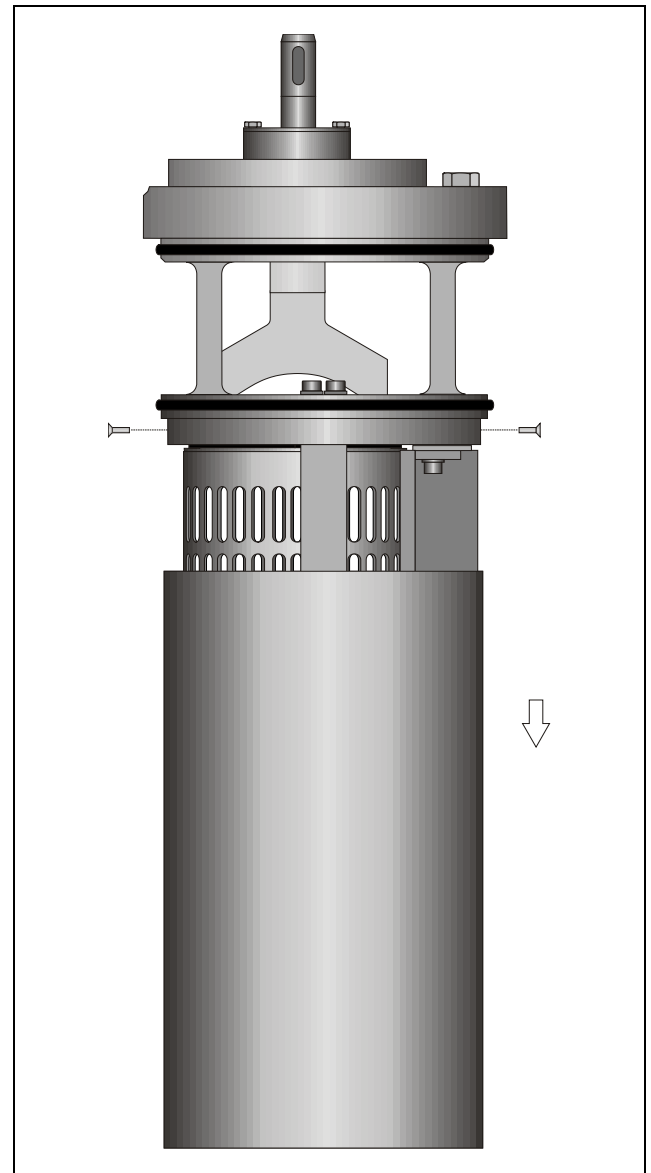


Fig. 16: Removing the preseparator tube

2

- Loosen the cylinder head screws (45.5) and remove them together with the spring washers (45.4).
- Remove the backflush channel (45) and the channel seal (85.1).

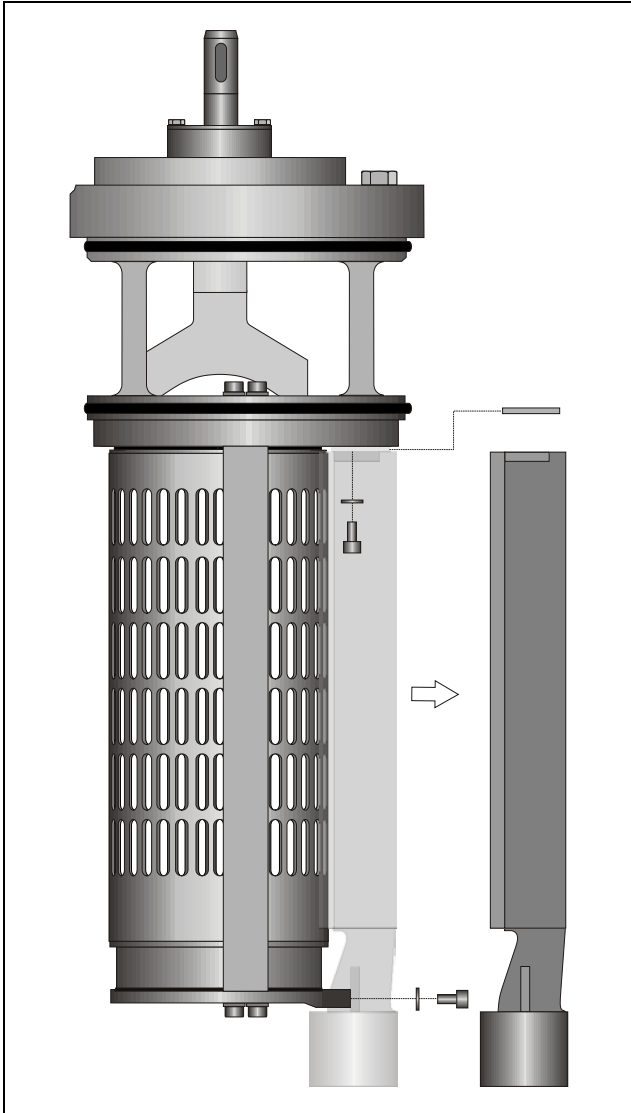


Fig. 17: Removing the backflush channel

3

- Loosen the cylinder head screws (10) and remove them together with the spring washers (9).

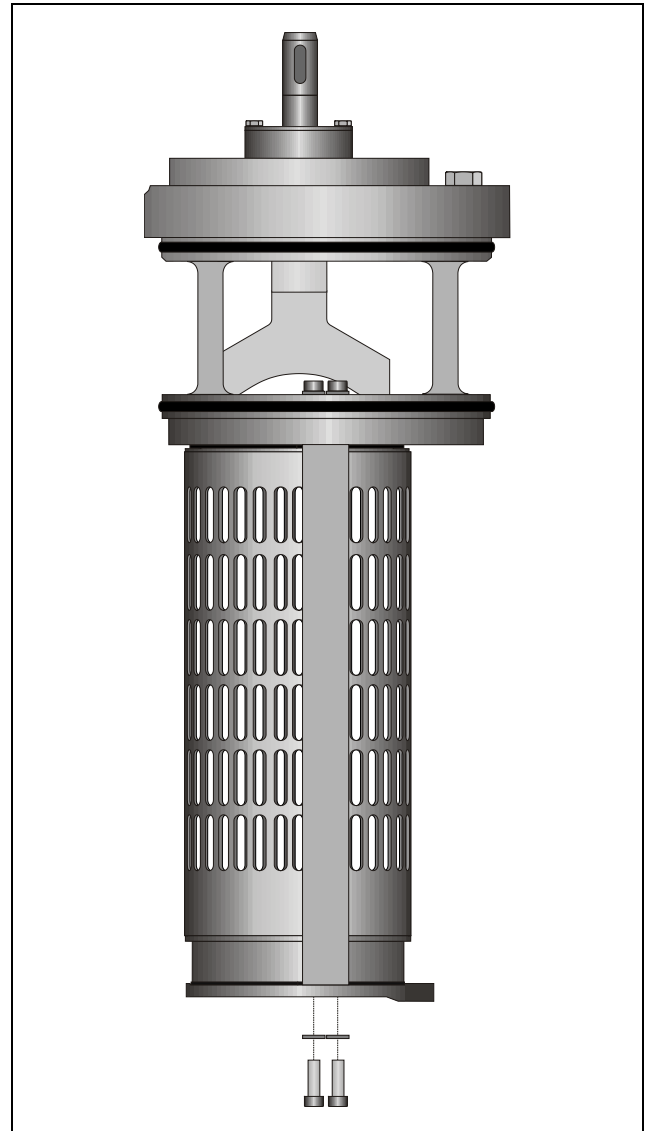


Fig. 18: Removing the cylinder head screws and the spring washers

4

- Remove the centre flange (20).

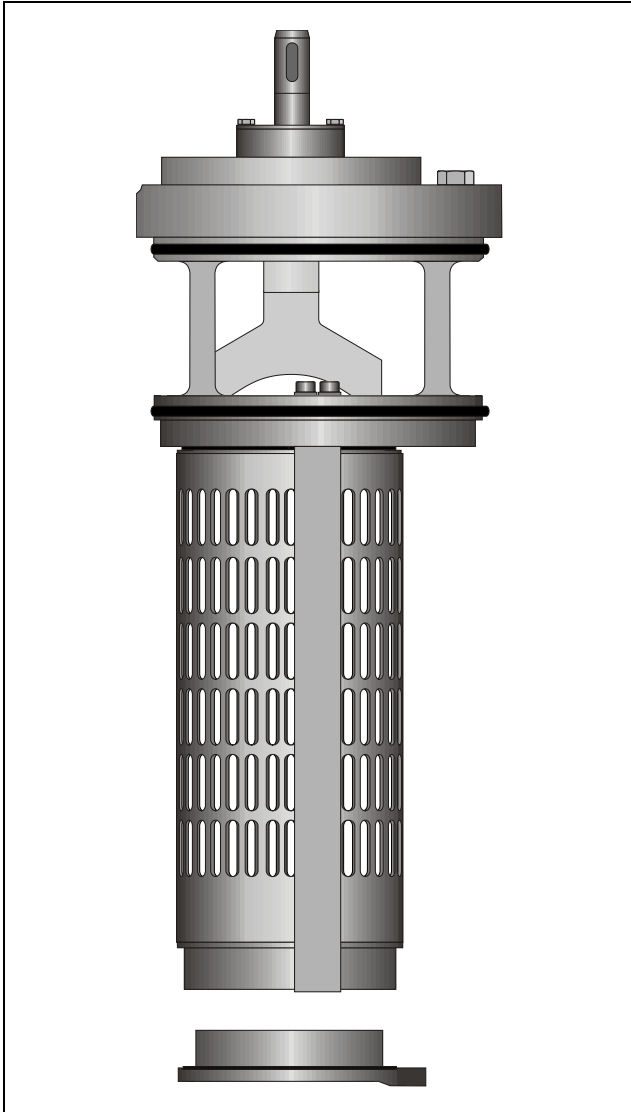


Fig. 19: Removing the centre flange

5

- Remove the segmented element.

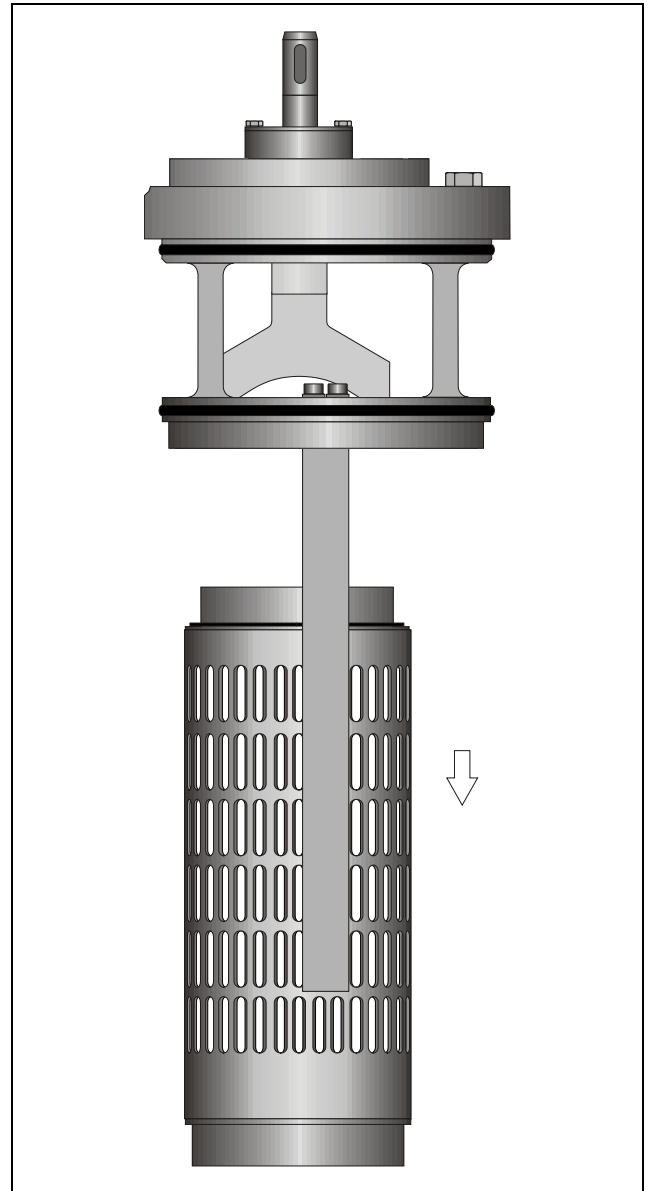



Fig. 20: Removing the segmented element

- Install in reverse order.

15.5 Replacing the element seals and guides

⚠ DANGER!	
The automatic filter is pressurised!	
⇒ Risk of injury to persons or damage to property!	
• Make sure that the pipe is depressurised prior to opening the automatic filter.	
⚠ 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 (section 15.2).
 - Clean the filter (section 15.3).
 - Remove the segmented element from the filter insert (section 15.4, steps 1 - 4).
- ⇒ The seals can now be replaced.

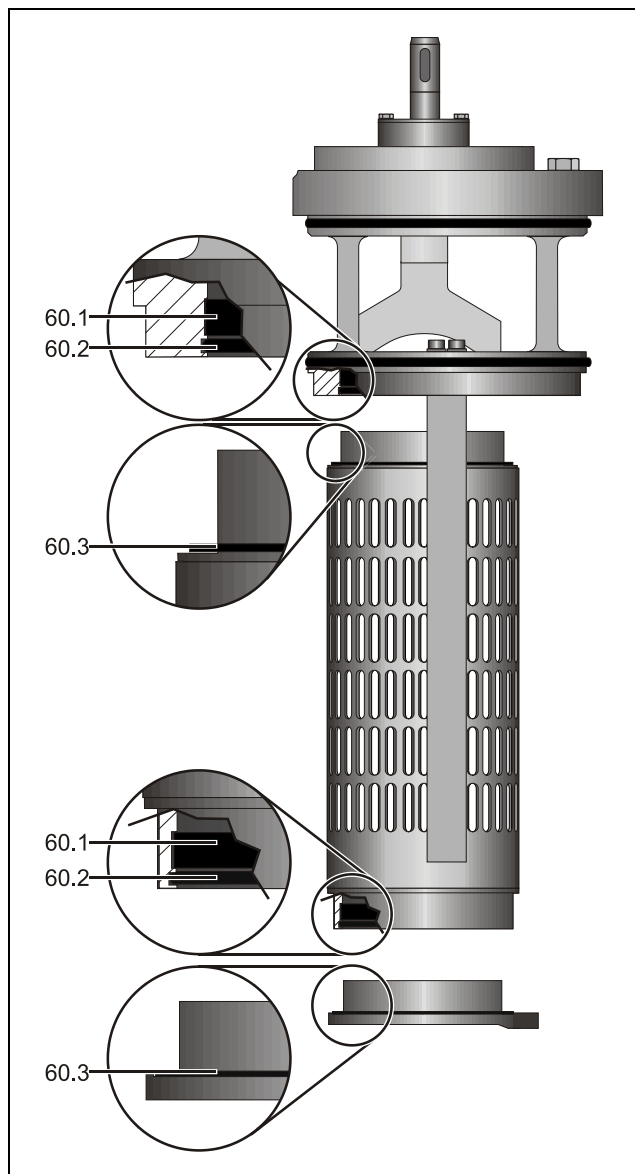



Fig. 21: Replacing the element seals and guides

15.6 Replacing the backflush channel moulding z

⚠ DANGER!	
The automatic filter is pressurised!	
⇒ Risk of injury to persons or damage to property!	
• Make sure that the pipe is depressurised prior to opening the automatic filter.	
⚠ 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 (section 15.2).
- Clean the filter (section 15.3).
- Remove the segmented element from the filter insert (section 15.4, steps 1 - 3).

1

⚠ CAUTION!	
Pressure springs loaded!	
⇒ Risk of injury to persons	
• Carefully dismantle the backflush channel moulding z.	

- Withdraw the backflush channel moulding z (45.3) from the backflush channel housing (45.1).
- Clean the backflush channel housing.
- Insert the new backflush channel moulding z (45.3) into the backflush channel housing (45.1) while pressing in the pressure springs (45.2) one at a time.

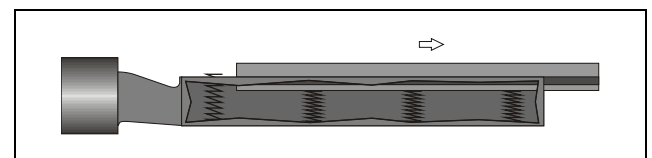


Fig. 22: Dismantling the backflush channel

- Install in reverse order.

After installing:

- Check all screws and tighten them if necessary.

15.7 Replacing the shaft seals and guide

⚠ DANGER!

The automatic filter is pressurised!

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

⚠ 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.

- Dismantle the gear motor (section 15.2, steps 1 - 5).

1

- Remove the feather key (16.1).

2

- Loosen and remove the hexagon screws (25).

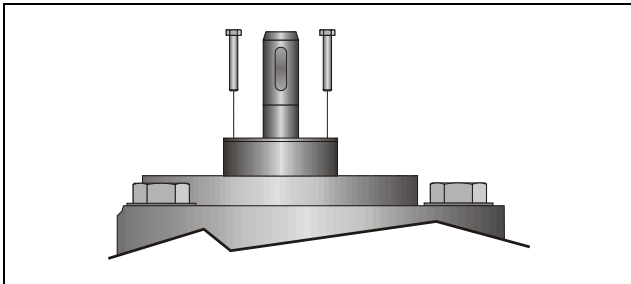


Fig. 23: Loosening and removing the hexagon screws

3

- Carefully withdraw the sealing disc (26) and the shaft seal attachment (27) from the shaft.

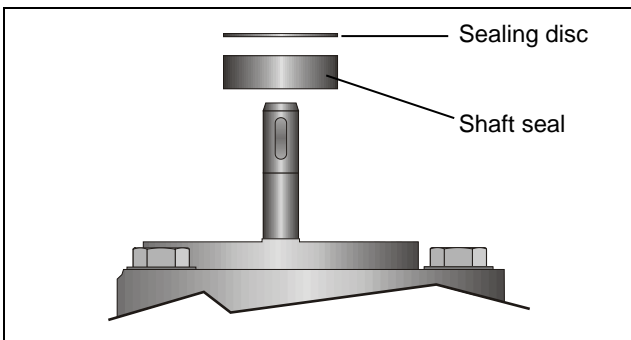


Fig. 24: Withdrawing the sealing disc and the shaft seal attachment

4

- Remove the lip seal (70.1), back-up ring (70.2) and O-ring (70.3) from the shaft seal attachment.

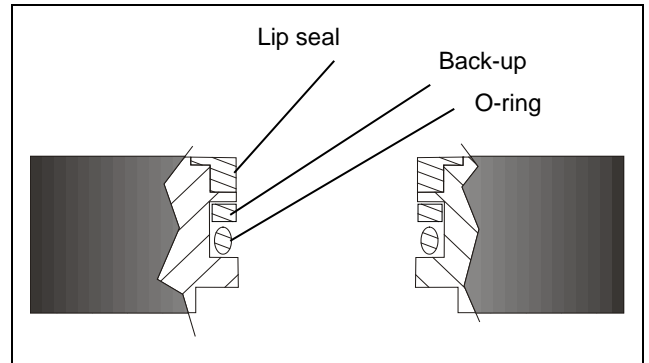


Fig. 25: Removing the seals

5

- Remove the O-ring (70.4) from the shaft bearing insert (24).

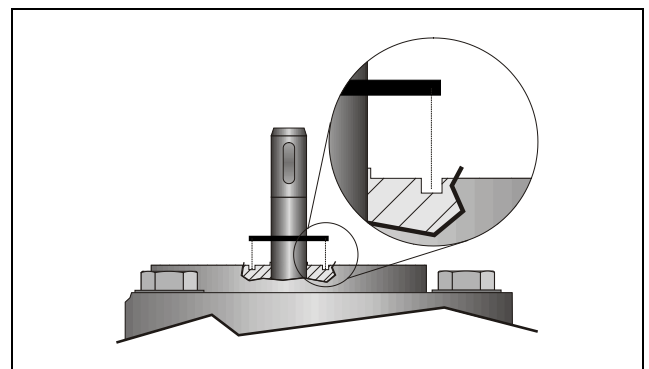


Fig. 26: Removing the O-ring

6

- Loosen and remove the cylinder head screws (23).

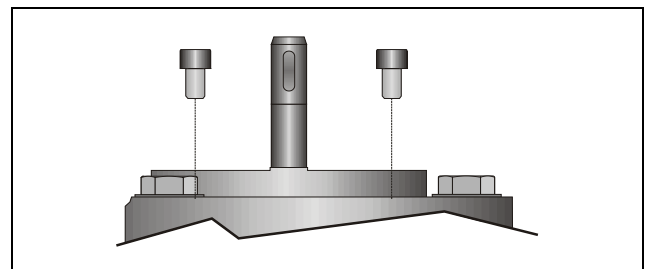


Fig. 27: Loosening and removing the cylinder head screws

7

- Remove the shaft bearing insert (24).

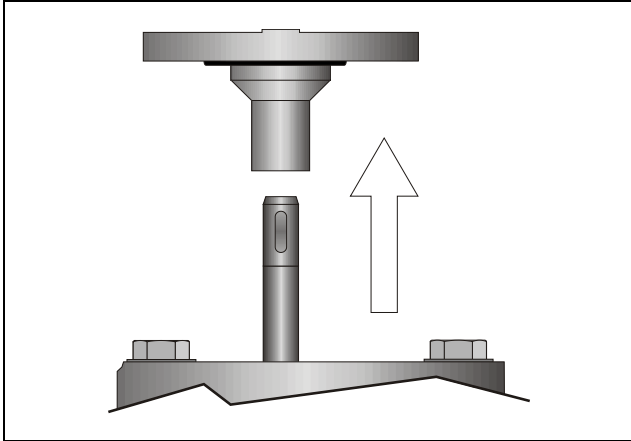


Fig. 28: Removing the shaft bearing insert

8

- Remove the O-ring (70.5) from the shaft bearing insert (24).

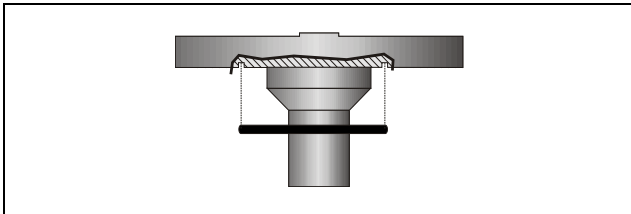


Fig. 29: Removing the O-ring

9

- Remove the bearing bushes (50.1) from the shaft bearing insert.

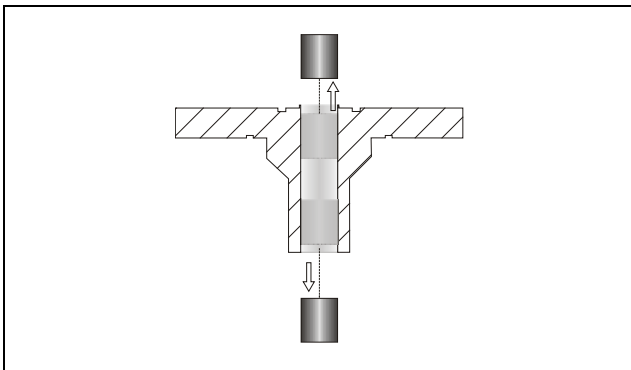


Fig. 30: Removing the bearing bushes

10

- Remove the axial bearing disc (50.2) from the shaft.

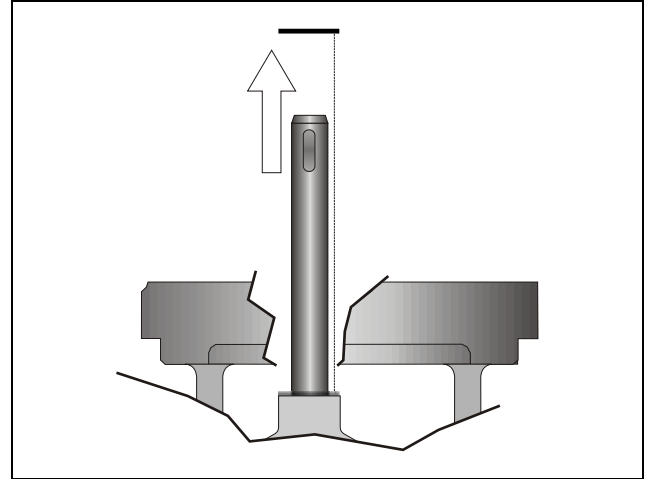


Fig. 31: Removing the axial bearing disc

11

- Clean all dismantled components.
- Oil the new sealing elements lightly and install them.

- Install in reverse order.

After installing:

- Press the shaft seal attachment and the sealing disc together and carefully push them over the shaft.
- Screw in the hexagon screws hand-tight.
- Turn the shaft slightly and pull it up.
- Tighten the hexagon screws.

16 Exploded view

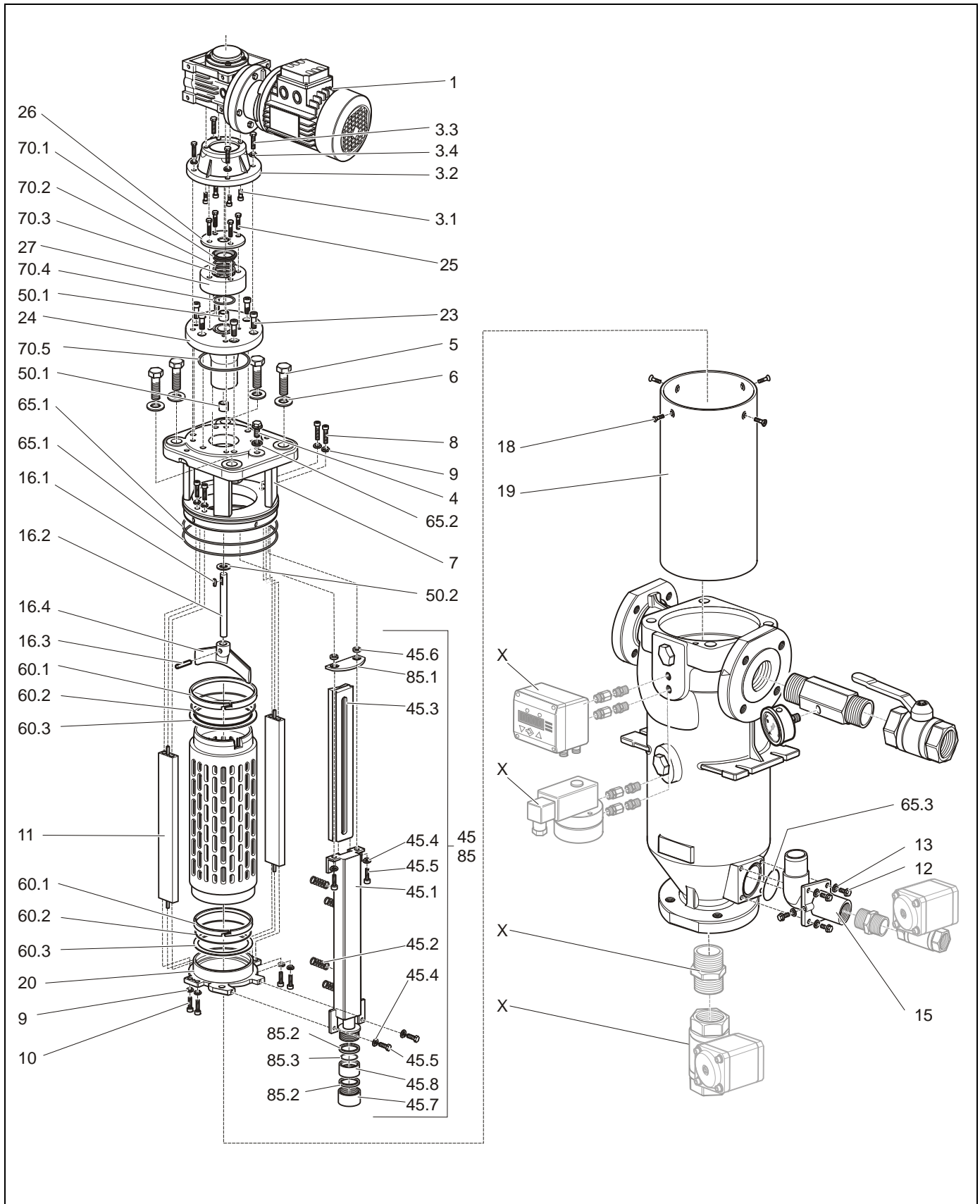


Fig. 32: Exploded view

17 List of parts

Ser. no.	Part name/DIN designation	Qty.	Benennung/DIN Bezeichnung
1	Gear motor	1	Getriebemotor
3	Bell housing with screws AF Vario/G3	1	Motoraufnahme Z AF Vario/G3
3.1	Cylinder head screw M6 x 18 ISO 4762	4	Zylinderschraube M6 x 18 ISO 4762
3.2	Bell housing	1	Motorbock
3.3	Hexagon screw M8 x 20 ISO 4017	4	6kt-Schraube M8 x 20 ISO 4017
3.4	Spring washer A8 DIN 128	4	Federring A8 DIN 128
4	Vent screw G ¼	1	Entlüftungsschraube G ¼
5	Hexagon screw M20 x 65 ISO 4014	4	6kt-Schraube M20 x 65 ISO 4014
6	Washer B21 ISO 7090	4	Scheibe B21 ISO 7090
7	Cover AF Vario/G3	1	Deckel AF Vario/G3
8	Cylinder head screw M6 x 40 ISO 4762	4	Zylinderschraube M6 x 40 ISO 4762
9	Spring washer A6 DIN127	8	Federring A6 DIN127
10	Cylinder head screw M6 x 20 ISO 4762	4	Zylinderschraube M6 x 20 ISO 4762
11	Support	2	Träger
12	Hexagon screw M8 x 20 ISO 4017	4	6kt-Schraube M8 x 20 ISO 4017
13	Spring washer A8 DIN 128	4	Federring A8 DIN 128
15	Connecting flange	1	Anschlussflansch
16	Drive shaft z AF 73-113/G3	1	Antriebswelle Z AF73-113/G3
16.1	Feather key 6 x 6 x 20 ISO 773	1	Passfeder 6 x 6 x 20 ISO 773
16.2	Drive shaft	1	Antriebswelle
16.3	Clamping pin 6 x 30 ISO 8752	1	Spannstift 6 x 30 ISO 8752
16.4	Coupling fork	1	Mitnehmer
18	Countersunk screw M5 x 8 ISO 10642 (AF 93 only)	4	Senkschraube M5 x 8 ISO 10642 (nur AF 93)
19	Preseparator tube (AF 93 only)	1	Schutzzyylinder (nur AF 93)
20	Centre flange AF 73-113/G3	1	Zentrierflansch AF73-113/G3
23	Cylinder head screw M10 x 16 ISO 4762	6	Zylinderschraube M10 x 16 ISO 4762
24	Shaft bearing insert AF 73-113/G3	1	Deckeleinsatz AF73-113/G3
25	Hexagon screw M4 x 25 ISO 4017	4	6kt-Schraube M4 x 25 ISO 4017
26	Sealing disc AF 73-113/G3	1	Dichtscheibe AF73-113/G3
27	Shaft seal attachment AF 73-113/G3	1	Dichtaufsatz AF73-113/G3
45	Backflush channel z AF 113/173/G3	1	Rückspülkanal Z AF113/173/G3
45.1	Backflush channel housing	1	Rückspülkanal-Gehäuse
45.2	Pressure spring	4	Druckfeder
45.3	Backflush channel moulding z AF 113/173	1	Abstreiferleiste Z AF113/173
45.4	Spring washer A6 DIN127	4	Federring A6 DIN127
45.5	Cylinder head screw M6 x 16 ISO 4762	4	Zylinderschraube M6 x 16 ISO 4762
45.6	Distance bush AF 113/173	2	Distanzbuchse AF113/173
45.7	Coupling nut AF 113/173	1	Überwurfmutter AF113/173
45.8	Centre ring AF 113/173	1	Zentrierkörper AF113/173
50	Bearing bush kit AF 73-113/G3	1	Buchsensatz AF73-113/G3
50.1	Bearing bush XSM-1820-15	2	Buchse XSM-1820-15
50.2	Axial bearing disc 20 x 28 x 1,5	1	Anlaufscheibe 20 x 28 x 1,5
60	Seal kit element AF Vario/G3	1	Dichtsatz Element AF Vario/G3
60.1	Radial bearing ring 101,3	2	Führungsring 101,3
60.2	O-ring 101,2 x 2,62	2	O-Ring 101,2 x 2,62
60.3	Axial bearing disc 115 x 101,4 x 1,5	2	Anlaufscheibe 115 x 101,4 x 1,5
65	Seal kit housing AF Vario/G3	1	Dichtsatz Gehäuse AF Vario/G3
65.1	O-ring 168 x 4	2	O-Ring 168 x 4
65.2	Sealing ring 14 x 18 x 1,5 DIN 7603	1	Dichtring 14 x 18 x 1,5 DIN 7603
65.3	O-ring 56,74 x 3,53	1	O-Ring 56,74 x 3,53

Ser. no.	Part name/DIN designation	Qty.	Benennung/DIN Bezeichnung
70	Seal kit shaft AF 73-113/G3	1	Dichtsatz Welle AF73-113/G3
70.1	Lip seal D18	1	Lippendichtung D18
70.2	Back up ring 17,9 x 24 x 0,7	1	Stützring 17,9 x 24 x 0,7
70.3	O-ring 18,00 x 3,53	1	O-Ring 18,00 x 3,53
70.4	O-ring 32,99 x 2,62	1	O-Ring 32,99 x 2,62
70.5	O-ring 53,57 x 3,53	1	O-Ring 53,57 x 3,53
85	Seal kit backflush channel AF 113/173/G3	1	Dichtsatz Rückspülkanal AF113/173/G3
85.1	Channel seal	1	Kanaldichtung
85.2	Sealing ring 33 x 39 x 3	2	Dichtring 33 x 39 x 3
85.3	O-ring 28,2 x 3,5	1	O-Ring 28,2 x 3,5

18 Spare parts

Nr.	Designation	Material-Nr.	Benennung
16	drive shaft z AF73-113/G3 VP (carbon steel)	70308357	Antriebswelle Z AF73-113/G3 VP (C-Stahl)
16	drive shaft z AF73-113/G3 VP (stainless steel)	70310733	Antriebswelle Z AF73-113/G3 VP (Edelstahl)
45 + 85	backflush channel z complete AF113 ST/PUR FPM VP (carbon steel/PUR, FPM-seal)	76123145	RSK Z Komplett AF113 ST/PUR FPM VP (C-Stahl/PUR, FPM-Dichtung)
45 + 85	backflush channel z complete AF113 ST/PUR PTFE VP (carbon steel/PUR, PTFE-seal)	70357773	RSK Z Komplett AF113 ST/PUR PTFE VP (C-Stahl/PUR, PTFE-Dichtung)
45 + 85	backflush channel z complete AF113 ST/PTFE FPM VP (carbon steel/PTFE, FPM-seal)	76196893	RSK Z Komplett AF113 ST/PTFE FPM VP (C-Stahl/PTFE, FPM-Dichtung)
45 + 85	backflush channel z complete AF113 ST/PTFE PTFE VP (carbon steel/PTFE, PTFE-seal)	70357629	RSK Z Komplett AF113 ST/PTFE PTFE VP (C-Stahl/PTFE, PTFE-Dichtung)
45 + 85	backflush channel z complete AF113 VA/PTFE FPM VP (stainless steel/PTFE, FPM-seal)	70357549	RSK Z Komplett AF113 VA/PTFE FPM VP (Edelstahl/PTFE, FPM-Dichtung)
45 + 85	backflush channel z complete AF113 VA/PTFE PTFE VP (stainless steel/PTFE, PTFE-seal)	70349522	RSK Z Komplett AF113 VA/PTFE PTFE VP (Edelstahl/PTFE, PTFE-Dichtung)
45	backflush channel z complete no seal AF113 ST/PUR VP (carbon steel/PUR)	70310816	RSK Z Komplett o.Dicht. AF113 ST/PUR VP (C-Stahl/PUR)
45	Backflush channel z complete no seal AF113 VA/PTFE VP (stainless steel/PTFE, no seal)	70310813	RSK Z Komplett o.Dicht. AF113 VA/PTFE VP (Edelstahl/PTFE, ohne Dichtung)
45.3	backflush channel moulding z AF113/173 (carbon steel/PUR)	79744004	Abstreiferleiste Z AF113/173 (C-Stahl/PUR)
45.3	backflush channel moulding z AF113/173 (stainless steel/PTFE)	70312375	Abstreiferleiste Z AF113/173 (Edelstahl/PTFE)
45.3	backflush channel moulding AF113/173 PTFE (wearing part)	79384868	Abstreiferleiste AF113/173 PTFE (Verschleissenteil)
50	bearing bush kit AF73-113/G3 VP (PTFE)	70308169	Buchsensatz AF73-113/G3 VP (PTFE)
60	seal-kit element AF Vario/G3 VP (FPM)	70308045	Dichtsatz Element AF Vario/G3 VP (FPM)
60	seal-kit element AF Vario/G3 VP (PTFE)	70308343	Dichtsatz Element AF Vario/G3 VP (PTFE)
65	seal-kit housing AF Vario/G3 VP (FPM)	70311595	Dichtsatz Gehäuse AF Vario/G3 VP (FPM)
65	seal-kit housing AF Vario/G3 VP (PTFE)	70311599	Dichtsatz Gehäuse AF Vario/G3 VP (PTFE)
70	seal-kit shaft AF73-113/G3 VP (FPM)	70303518	Dichtsatz Welle AF73-113/G3 VP (FPM)
70	seal-kit shaft AF73-113/G3 VP (PTFE)	70308352	Dichtsatz Welle AF73-113/G3 VP (PTFE)
85	seal-kit backflush channel AF113/173/G3 VP (FPM)	70311099	Dichtsatz RS-Kanal AF113/173/G3 VP (FPM)
85	seal-kit backflush channel AF113/173/G3 VP (PTFE)	70311100	Dichtsatz RS-Kanal AF113/173/G3 VP (PTFE)
60 + 65 + 70 + 85	seal-kit complete AF113/G3 VP (FPM)	70316068	Dichtsatz Komplett AF113/G3 VP (FPM)
60 + 65 + 70 + 85	seal-kit complete AF113/G3 VP (PTFE)	70316071	Dichtsatz Komplett AF113/G3 VP (PTFE)
segmented element → see name-plate			Segmentelement → 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 :

Automatik-Kantenspaltfilter
Automatic metal edge filter
Filtres automatiques à fentes

Typenbezeichnung:
Type designation:
Désignation du type :

AF 133 G, AF 153 G, AF 173 G, AF 113 G

Funktionsbeschreibung:
Machine description:
Description du fonctionnement :

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:

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

The following harmonised standards have been used:
Les normes harmonisées ci-dessous ont été appliquées :

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/department:
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,

17.7.17
Datum/Date/Date


Unterschrift/Signature/Signature

Anlage/Annex/Annexe

3 Seiten/pages/pages



The 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 :
Typenbezeichnung:
Type designation:
Désignation du type :
Funktionsbeschreibung:
Machine description:
Description du fonctionnement :

Automatik-Kantenspaltfilter
Automatic metal edge filter
Filtres automatiques à fentes

AF 133 G/AF 153 G/AF 173 G/AF 113 G

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-Kantenspalfilter
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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