

Translation of the original instructions with assembly instructions

Automatic metal-edge filters with radial scraper cleaning

AF 73 - 76 S

AF 93 - 96 S

Welded Type

Material No. of Instruction Manual
79301615



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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.

Cartridge (coiled):

Cylindrical structure consisting of a core element with triangular wires wound or welded onto it. The suspension that must be filtered flows inward. Solids are retained on the outer surface of the cartridge.

Cleaning:

The coiled cartridge is turned and cleaned by a stationary scraper.

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 coiled cartridge.

Filtered fluid:

Substance that is filtered.

Filtration mode:

The metal-edge filter operates normally and the drain valve is 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 coiled cartridge is "clean").

Precontrol:

5/2-way magnetic valves actuated by the controller, which 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.fluid.filtrationgroup.com

4.2 Information about the Instruction Manual

FG Mat. No.: 79301615

Date: 11.07.19

Version: 13

4.3 ATEX type key



	II	2	G	c	T3	
	1.	2.	3.	4.	5.	
1.	II Valid for use above ground					
2.	Use in:		Zone 1 2	Zone 2 3		
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.					

(Field for rating plate)

(Space for ATEX name-plate)

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 metal-edge 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.
- Reverse flow through the filter (pressure < 0.6 bar).

FG metal-edge filters are designed for filtering liquids or pastes with a viscosity of up to 500,000 mPas. They can be cleaned without interrupting operation. The cleaning process can be either manual or automatic.

Types of application:

- CLM filtration
- Product filtration
- Pre-separation within filter cascades
- Protective filtration before or after certain process steps
- Process filtration
- Destruction of unwanted agglomerates

6 Functional description

6.1 Principle of the process

Filtration

A triangular-shaped wire is wound immovably on a threaded, profiled support tube. The thread lead determines the gap width and thus the fineness of the filter. The suspension flows inwards through the filter element. The particles settle on the outside of the element. The triangular geometry results in a significant increase in the cross-section after the narrowest gap. Clogging is thus practically impossible.

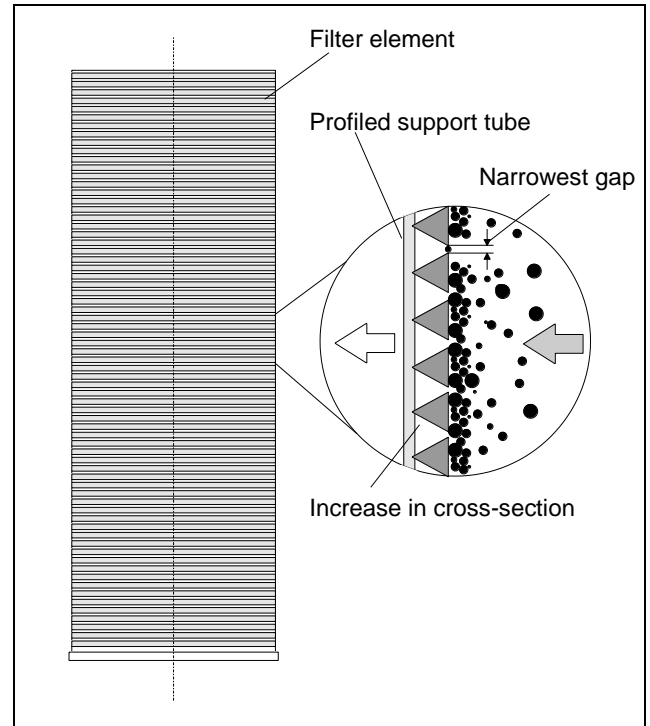


Fig. 1: Principle of separation at the filter element

Cleaning

The particles that settle on the cartridge or on the split tube cause the differential pressure between the muddy side and the clean side of the filter element to increase. If this pressure difference exceeds a (settable) limit value, a cleaning process is started. The filter element begins to rotate. The scraper scrapes the filter cake off of the filter element.

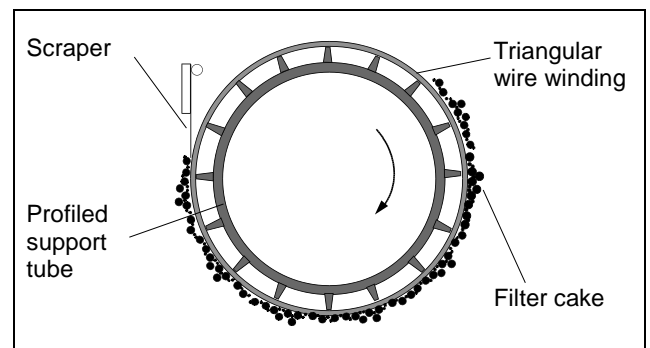


Fig. 2: Cleaning

Start of cleaning process

The cleaning process can be started in the following ways:

- manually,
- with the differential pressure switch,
- by means of a time switch,
- by the control of a machine tool.

6.2 Main components of the metal-edge filter

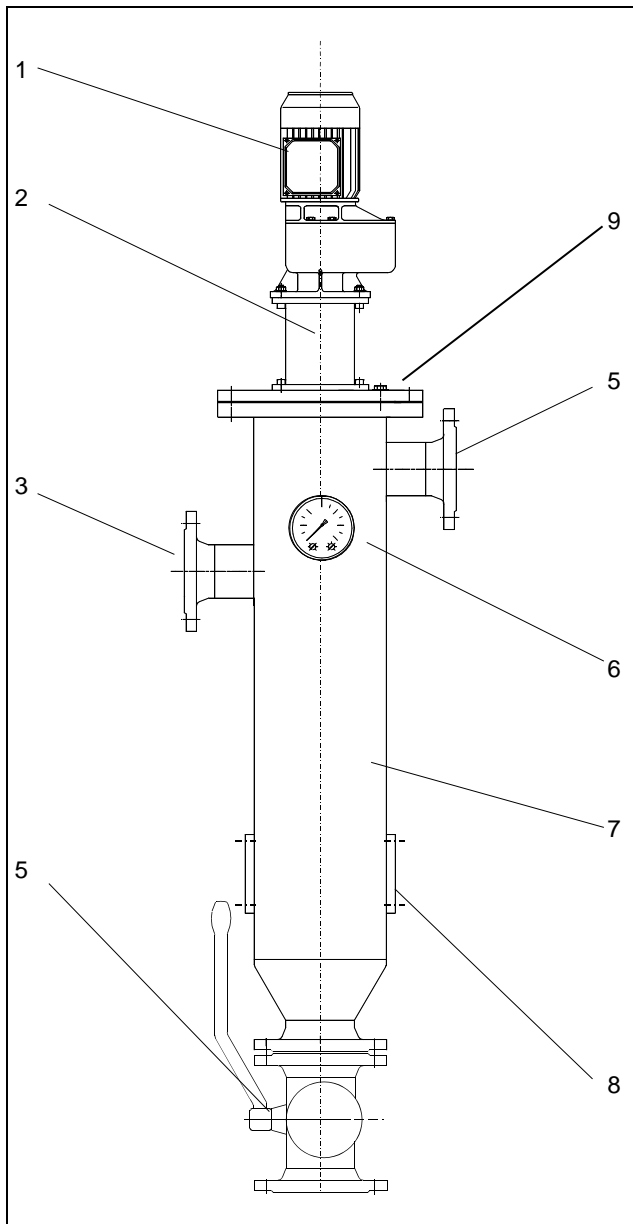


Fig. 3: Diagram of the main components

1	Gear motor for driving the filter element
2	Gear (hidden)
3	Suspension inlet
4	Pneumatically or manually actuated drain valve
5	Filtrate outlet
6	Differential pressure measuring (optional)
7	Filter casing
8	Mounting connections
9	Vent plug

6.3 Functional principle of a metal-edge filter

1

The raw suspension flows into the metal-edge filter.

2

The suspension flows through the filter element. In case of metal-edge filter with pre-separation (optional) the suspension flows into the outer space downwards and is reversed below the coils. A part of the solid matters is already separated.

3

The (pre-cleaned) suspension flows through the filter element.

The particles settle on this element.

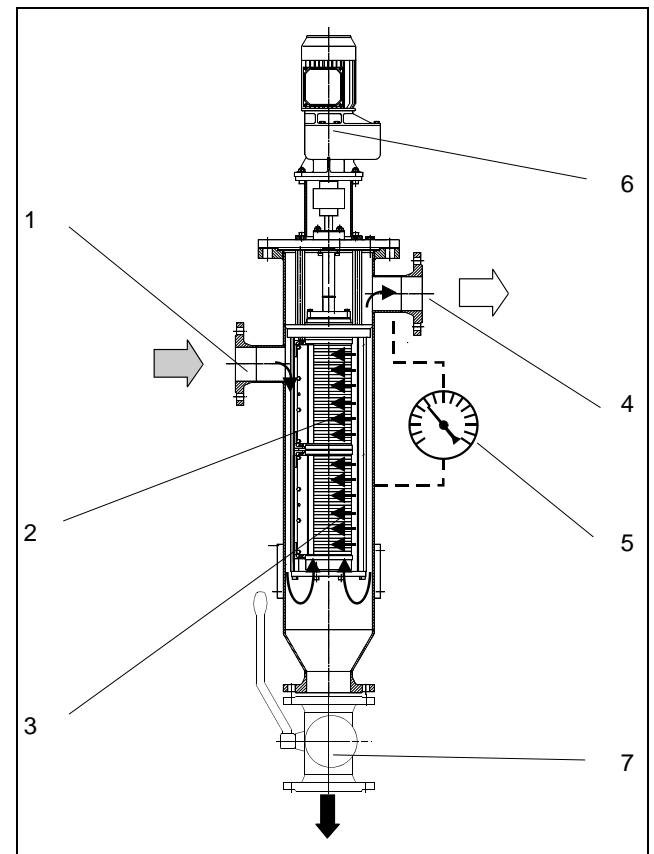


Fig. 4: Functional principle of a metal-edge filter

4

The filtrate enters the clean room and leaves the filter.

5

The cleaning process is started either when the maximum differential pressure is reached (optional) or after a preset time.

6

The filter element is rotated by means of the gear motor or the ratchet. The stationary scraper scrapes off the separated particles.

The filtration process is **not** interrupted.

7

The enriched particles on the raw side can be emptied out periodically.

Pre-separation (optional)

The rough suspension flows first tangentially into an outer space. A flow whirl moving downwards is created. Below the pre-separation bushing the flow is reversed. The whirl as well as the flow reverse cause centrifugal forces on the solid matter particles. In particular in case of liquids of low viscosity the pre-separation is improved by this procedure.

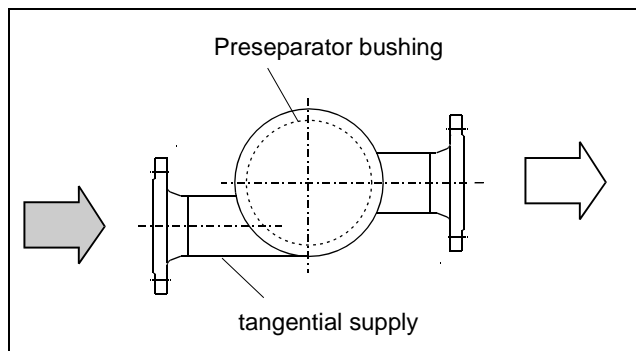


Fig. 5: Tangential supply of metal-edge filters with pre-separation (optional)

7 Technical data

7.1 General data (without options)

Electrical power demand*	250 VAC/400 V 3NPE
AF 73 S:	0,18 kW
AF 74 S, 75 S:	0,25 kW
AF 76 S:	0,55 kW
AF 93 S:	0,18 kW
AF 94 S, 95 S:	0,25 kW
AF 96 S:	0,55 kW
Noise emission (peaks):	< 70 dB(A)
Dimensions:	See data sheet
Min. height for dismantling above filter:	See data sheet
Total dry weight without valves:	See data sheet
Max. permissible operating pressure:	See data sheet
Max. permissible differential pressure in the filter cartridge:	< 30 bar
Max. permissible differential pressure in the split tube:	< 10 bar

*See also name-plate on gear motor

7.2 Order-specific data

	The name-plate is rendered invalid if the coiled cartridge or the filter insert are modified. <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.

FGC.com		Filtration Group GmbH Schulzestraße 45 D-74613 Orlingen ftr.udo.service@filtrationgroup.com		CE	
Made in Germany					
TYP TYPE					
MATERIALNUMMER PART NO.		AUFTRAGSNUMMER JOB NO.			
BEHÄLTER VESSEL		HEIZMANTEL HEATING JACKET		BAUJAHR YEAR	
MAX. ZUL. BETRIEßDRUCK MAX. ALLOWABLE PRESS.		PS		bar	
PRÜFDRUCK TEST PRESSURE		PT		bar	
BETR. TEMP. OPER. TEMP.		MIN/MAX		°C	
VOLUMEN VOLUME		V		L	
MAX. ZULÄSSIG MAX. DIFF. PRESS.		bar		FILTERELEMENT FILTER ELEMENT	
		FILTERELEMENTANZAHL FILTER ELEMENT QUANTITY			

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 metal-edge 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 metal-edge 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!	
	Explosion hazard! ⇒ 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!	
If the system is installed by unauthorised persons ⇒ Risk of injury ⇒ All warranty claims are rendered invalid <ul style="list-style-type: none">The system must be installed by a suitably trained person!	

9.1 Mechanical 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.

- Prepare a suitable seat on which to mount the filter (e.g. supports).
- Be sure to allow the required height for dismantling and draining (see data sheet).
- Replace two opposite screws at the flange cover of the metal-edge filter by lifting screws.
- Lift metal-edge filter at the lifting screws out of packaging.
- Bolt the metal-edge 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.

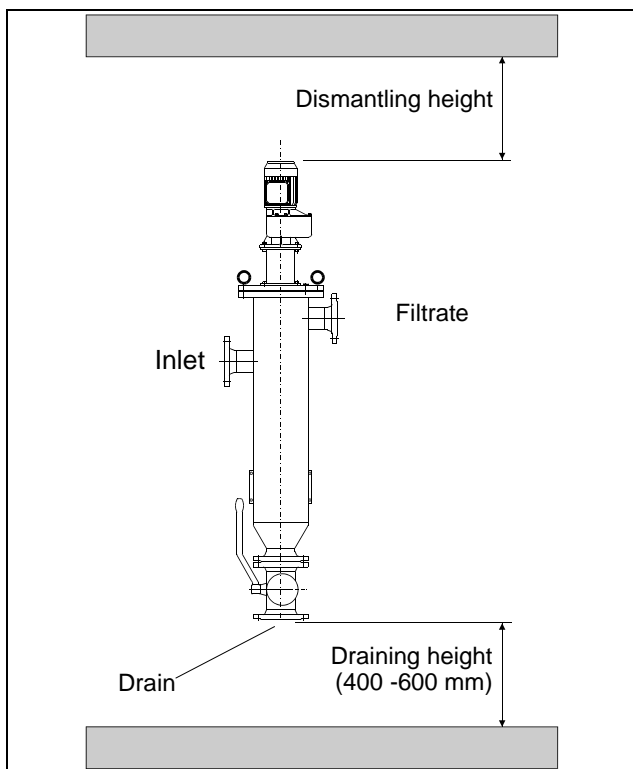



Fig. 6: Mechanical installation

9.2 Special mounting instructions for the drain pipe

⚠ WARNING!	
The full inlet pressure is present at the drain valve!	

- Make sure that the drain pipe is securely fastened.
- Do not drain concentrate into the atmosphere.
- Provide splash protection if necessary.
- Lay the pipes without a syphon if possible.
- Watch out for clogging as a result of sedimented concentrate!

9.3 Electro-pneumatic connections

⚠ DANGER!	
	Danger of electric shock! ⇒ Risk of serious or fatal injury in case of contact with electrical components. <ul style="list-style-type: none"> • All electrical installation work must be carried out by a suitably qualified electrician.

9.3.1 Connection to customer's control

Gear motor

- See the rating plate or the contract documentation for the connection data (please also refer to the connection diagram for the terminal box).
- Connect the gear motor.
- Provide adequate protection for the motor.

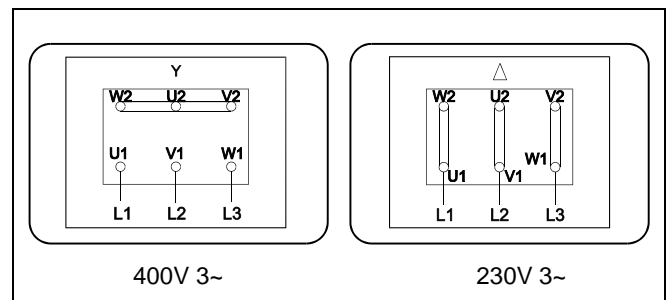



Fig. 7: Connection of the standard gear motor

Differential pressure switch (optional)

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

Automatic drain valve (optional)

- Provide a suitable compressed air supply.
- Provide a suitable 5/2-way valve for pilot control.

	Refer to the contract documentation for special types.
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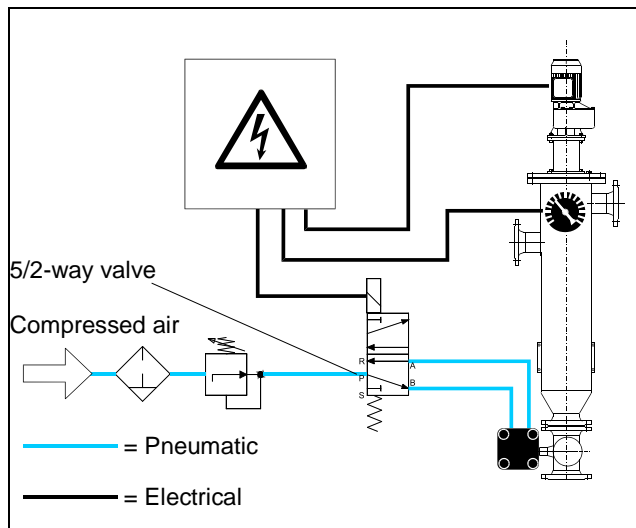


Fig. 8: Electro-pneumatic connections

	<p>Required on the switch box:</p> <ul style="list-style-type: none"> • Manual release for cleaning • Manual release for drain valve
--	--

9.3.2 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.

9.4 Control variants

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

9.4.1 Time-controlled cleaning, manual draining

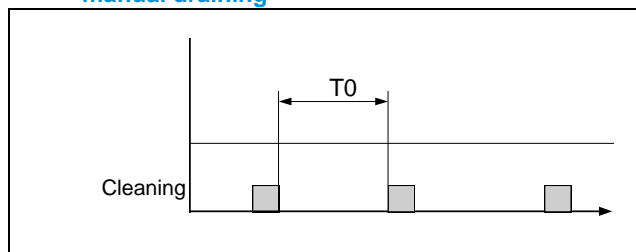


Fig. 9: Time-controlled cleaning

Parameter	Description	Recommended value
T0	Time interval	60 s - 24 h

9.4.2 Time-controlled cleaning and draining

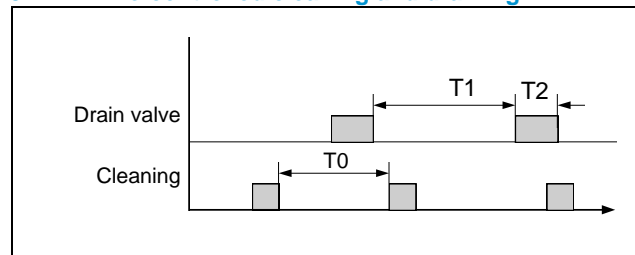


Fig. 10: Time-controlled cleaning/draining

Parameter	Description	Recommended value
T0	Time interval for cleaning	60 s - 24 h
T1	Time interval for drain valve	60 s - 24 h
T2	Opening time of drain valve	2 - 5 s

9.4.3 Time-controlled cleaning, counter-controlled draining

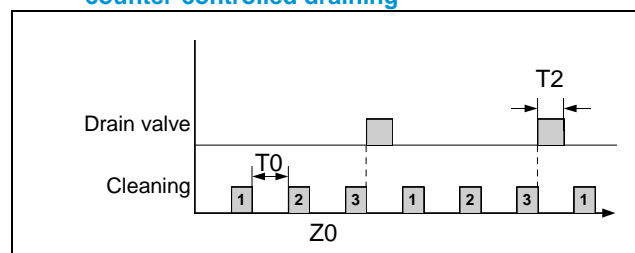


Fig. 11: Time-controlled cleaning, counter-controlled draining

Parameter	Description	Recommended value
T0	Time interval for cleaning	60 s - 24 h
Z0	Cleaning counter	3 - 5
T2	Opening time of drain valve	2 - 5 s

9.4.4 Differential pressure/time-controlled cleaning

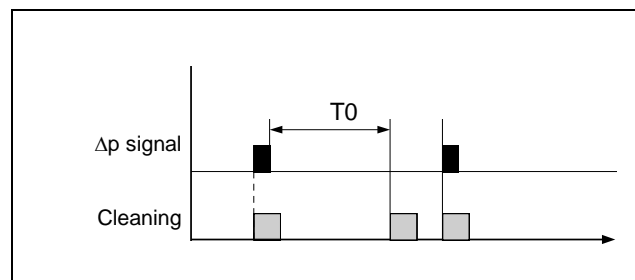


Fig. 12: Differential pressure/time-controlled cleaning

Parameter	Description	Recommended value
T0	Max. time interval	6 - 600 s

10 Start-up

⚠ DANGER!

This FG metal-edge 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 metal-edge filter must be completely vented prior to start-up for use with all media which are capable of forming explosive gases.
- The FG metal-edge 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.

- Check that all the caps have been removed from the connections.
- Remove all foreign particles from the filter.
- Check the pipe unions.
- Tighten the bolts.
- Rinse the pipes.

10.1 Functional test

Direction of rotation of the gear motor

- Unscrew the cap of the gear motor.
- Start up the gear motor briefly (<1 s).
- Compare the direction of rotation of the shaft with that shown by the arrow (clockwise direction).
- Reverse the terminal connections of the gear motor if necessary.
- Screw the cap of the gear motor back on again.

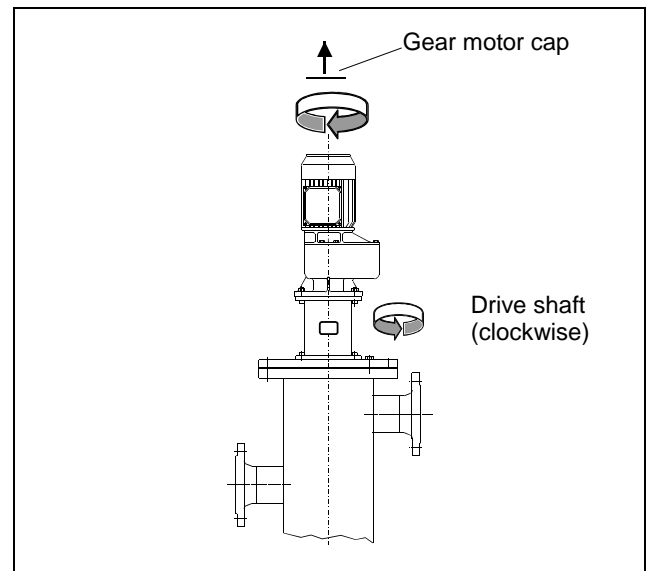


Fig. 13: Direction of rotation of the gear motor

To check the differential gauge/switch (optional)

- Refer to the enclosed manufacturer's documentation.

Check the function of the drain valve (optional)

- Supply compressed air to the pilot valve.
- Actuate the manual release for the pilot valve.
- ⇒ The drain valve opens.
- Set the manual release to the OFF position.
- The drain valve closes.

10.2 Programming the operating settings

- Switch on the control.
- Carefully open the feed valve.
- Vent the filter.
- Note 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: $\Delta p \leq 0.3 \text{ bar}$

Installation on suction side: $\Delta p \leq 0.03 - 0.1 \text{ bar}$

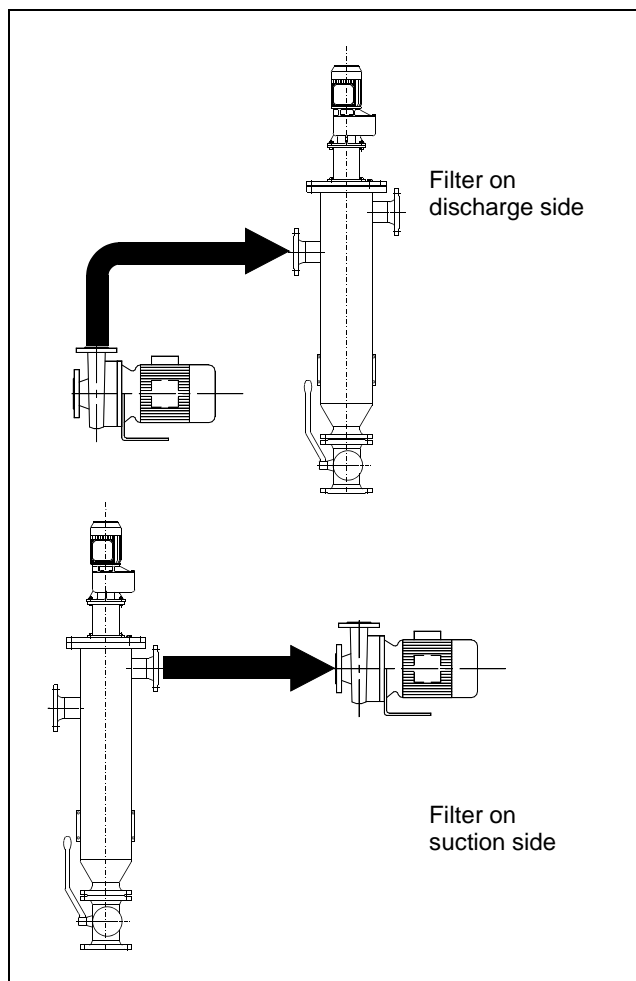


Fig. 14: Initial differential pressure

	<p>After cleaning, the differential pressure (delta p) must return almost to the original initial differential pressure. If it does not, the cleaning function is faulty (in this case, please consult the manufacturer).</p>
--	---

11 Normal operation

⚠ 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.



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 tank level,
- Control functions.

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.

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

12 Shutting down the metal-edge filter

12.1 Temporary shut-down

On the installed metal-edge filter controller:

- Switch OFF the main switch.

12.2 Prolonged shut-down (> 48 h)

- Start a cleaning process manually.
- Remove the filter insert (section 14.2).
- Clean the filter insert (section 14.3.1).
- Reinstall the filter insert.
- Fill the metal-edge 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 Troubleshooting

Fault	Possible cause	Remedy
Gear motor does not turn	Motor fuse tripped	RESET motor fuse Check gear motor
	Filtrate solidified	Clean filter
Valve does not open	Compressed air pressure too low	Increase pressure
	Pilot valve defective	Check pilot valve
	Pilot valve not connected correctly	Check electrical and pneumatic connections
Initial differential pressure no longer obtained	Solids concentration too high	Improve prefiltration process
	Gear motor rotating in wrong direction	Check direction of rotation
	Cleaning time too short	Prolong cleaning time (min. gear motor speed: 1-2 revolutions)
Increased concentration of dirt on clean side	Filter element defective	Check filter element and if necessary renew
	Seals brittle	Check seals and if necessary renew
Leakage rate at shaft seal too high Gear motor does not turn		Tighten shaft seal and if necessary renew

14 Maintenance

⚠ DANGER!



Explosion hazard!

⇒ Risk of injury to persons or damage to property.

- 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!

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!

Before all maintenance work:


- Shut down the metal-edge 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 metal-edge filter again (section 10).

14.1 Inspection and maintenance schedule

- Refer also to the contract documentation.

Interval	Component	Activity
Weekly	Metal-edge filter	Check for leakage Check the differential pressure
	Pipes	Clean
Monthly	Coiled cartridge	Check for wear and if necessary clean
	Metal-edge 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
	Metal-edge filter	Clean
	Seal kit	Check for leakage
		The necessary maintenance work is dependent on the particular application. Please consult the manufacturer if necessary.

14.2 Removing the filter insert

DANGER!

The metal-edge filter is pressurised!

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

- 1
 - Close the filter inlet and drain.
 - Relieve the pressure in the pipe if necessary.
- 2
 - Open the vent valve.
 - Open the drain valve.

⇒ The filter is drained.
- 3
 - Close the compressed air supply.
- 4
 - Disconnect the gear motor.

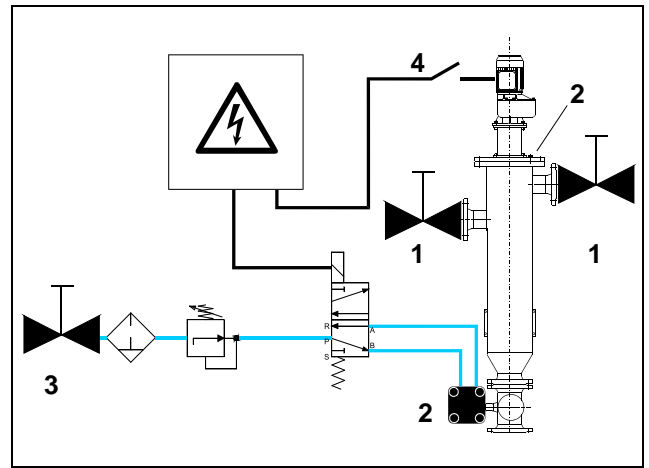


Fig. 15: Disconnecting the filter

5

- At the gear drive flange: loosen screws.
- Take of gear drive from the stand.

6

- Loosen screws at the filter cover.
- Put in ring bolts.

7

- Lift off filter insert vertically to the top.

Do not chock!

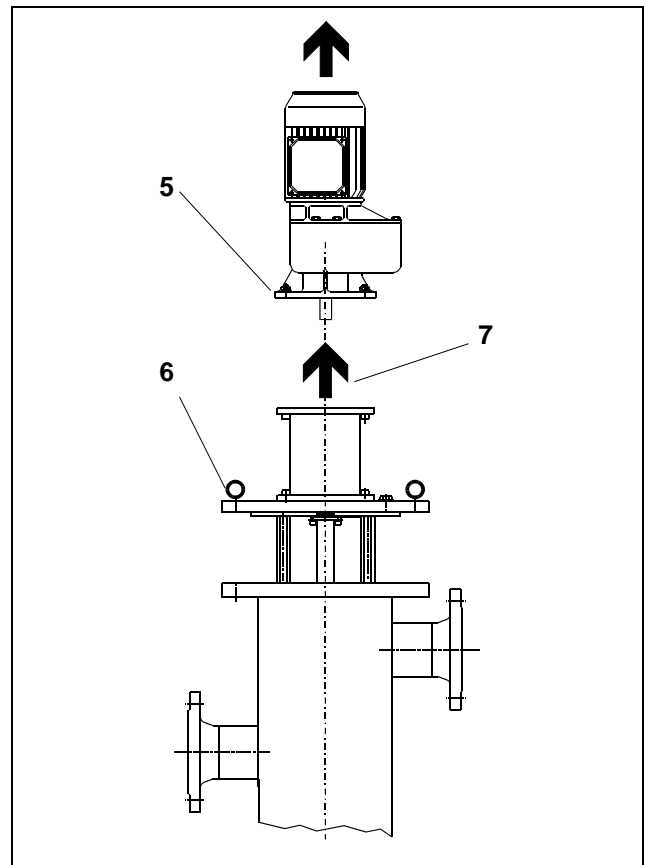


Fig. 16: Detaching the gear motor and levering off the cover

8

- Lay the filter insert down carefully on a level surface, taking care not to damage the filter element.
- Replace the cylindric bolt at the traverse by a ring bolt.

9

- Place filter insert on motor stand.

10

- Protect filter insert against falling.

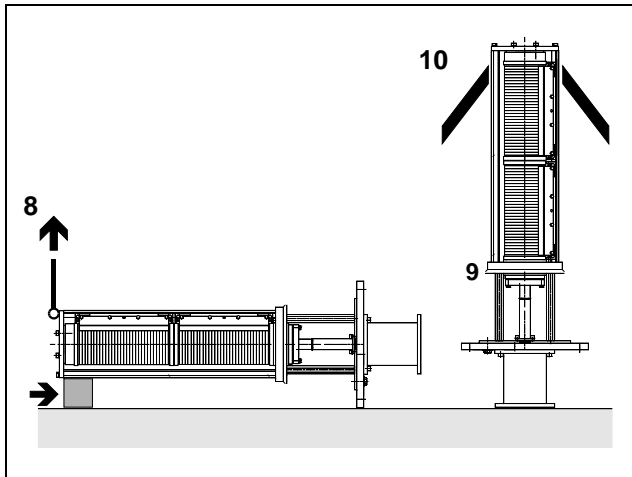


Fig. 17: Turn and protect filter insert

To install

In reverse order.

- Lower the filter insert into position without tilting it.

14.3 Cleaning the filter

- Remove the filter insert (section 14.2).

14.3.1 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.

14.3.2 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.

14.4 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!

14.4.1 To remove the filter element

⚠ CAUTION!

Danger of injury to hands!

- ⇒ Scrapers are pre-tensioned by means of springs.
- Never attempt to reach between the scraper and the coil!

- Dismount and clean filter insert (s.a.).

1

- Lift off the scraper carefully.
- Fix scraper with the screw.

2

- Loosen screws of the cartridge cover.
- Pull cartridge cover with end disc out of the cartridge body.

3

- Loosen safety nut.

4

- Pull filter cartridge carefully out of the brackets.

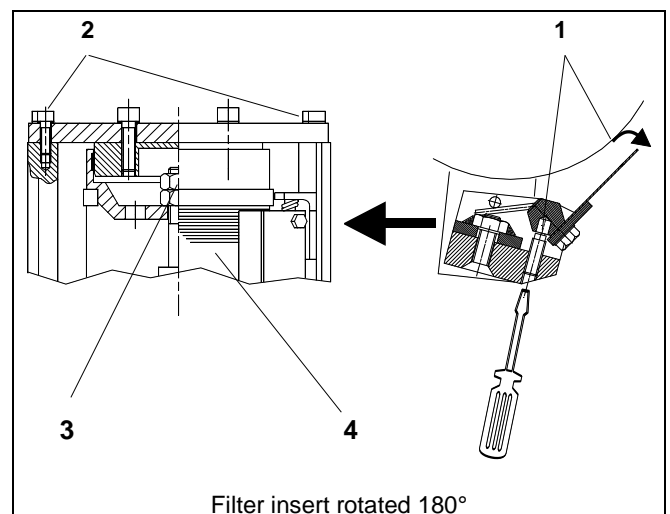


Fig. 18: Removing the filter cartridge

14.4.2 To install the filter element

- Oil the O-rings.
- Check and clean the approach disk, and if necessary renew.
- Install in reverse order.
- In case of multi-cartridge filters:
Put in properly the intermediate ring.
- Fix safety nut with the required torque (see schedule).

Typ AF	72	73	74	75	76
Drehmoment [Nm]	20	20	20	20	25

14.5 Replacing the scraper

- Remove and clean the filter insert (chapter 14.4).
- Lift off the scraper carefully.
- Fix scraper with the screw (s.a.).
- Unscrew the hexagon nuts on the scraper.
- Replace the scraper.

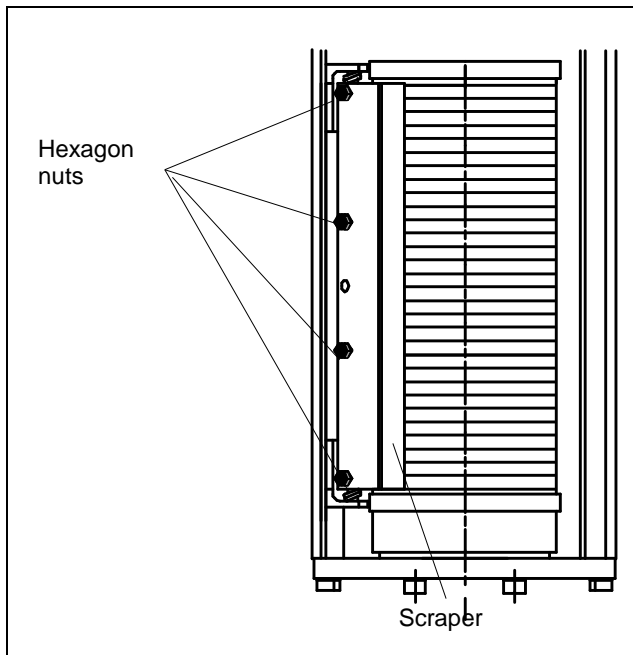


Fig. 19: Replacing the scraper

Important when installing the scraper:

- The leg springs must rest in the slots provided.
- The scraper must rest cleanly against the filter element.
- The scraper must not be tilted.
- Check all screws and bolts, and tighten them if necessary.
- Tighten the cover bolts in accordance with EN 286/ 6.4.5/ 6.

14.6 Replacing the stuffing box

⚠ DANGER!	
	<p>Danger of electric shock!</p> <p>⇒ Risk of serious or fatal injury in case of contact with electrical components.</p> <ul style="list-style-type: none"> • All electrical installation work must be carried out by a suitably qualified electrician.

- 1
 - De-energize the gear motor and disconnect it.
 - Unscrew the hexagon bolts on the motor stator.
 - Carefully lift the gear motor up and remove it from the shaft.
- 2
 - Loosen and lift off motor stand.
- 3
 - Unscrew setscrew and lift off gear.

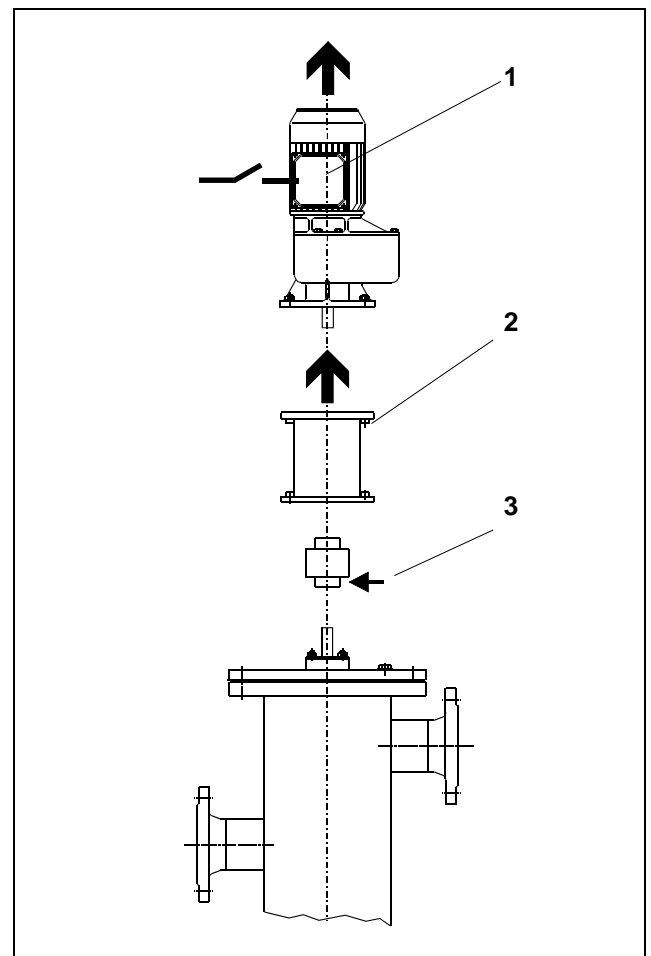


Fig. 20: Removing the gear motor

- 5
 - Loosen hexagon bolts.
- 6
 - Remove cover and cylinder.
- 7
 - Remove the Belleville springs and the gland.
- 8
 - ⇒ The packing rings are now freely accessible and can be replaced.

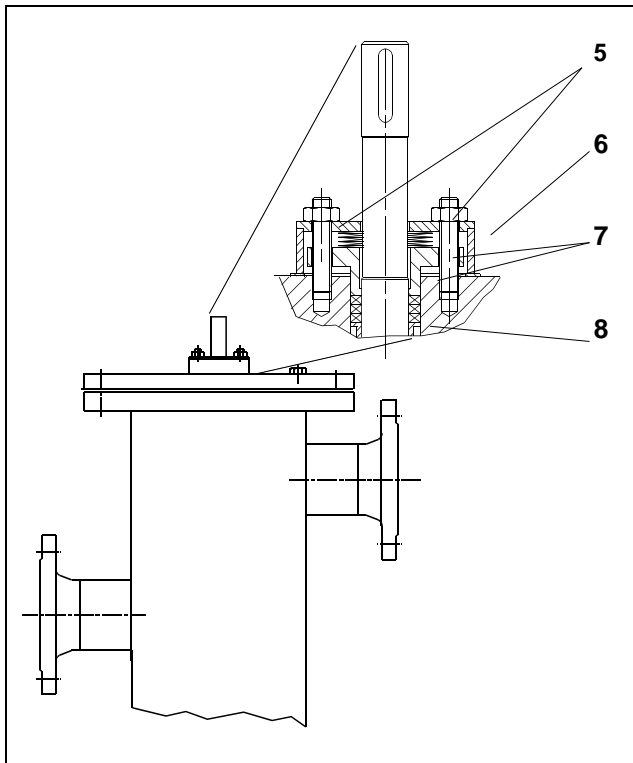


Fig. 21: Stuffing box accessible

To install the stuffing box

- Fit the stuffing box elements one at a time with an offset of 180°.
- Fit the Belleville springs, the sleeve and the cover.
- Tighten the hexagon bolts.

The stuffing box requires very little maintenance. Slight leaking is perfectly normal and serves to lubricate the unit.

14.7 Replacing the bearing bush

	<ul style="list-style-type: none"> • The bearing bush must always be replaced by a TRAINED MECHANICAL FITTER. • Keep spare part drawing of the metal-edge filter available. (It. = Item numbers of the spare part drawing)
--	--

14.7.1 Instructions for type AF 73

- Dismount gland (see section 14.6).
- Dismount and clean filter insert (see section 14.2).
- Loosen hexagon nut (It.32) and pull off the complete cartridge brackets.
- Loosen cylinder bolts (It.41) and pull off flanged ring (It.43).
- Pull off bearing bush (It.40).
- Remove bearing bush.
- Press new bearing bush with pin uniformly into the seat.
- Reinstallation in reverse order.

14.7.2 Instructions for type AF 74 - 76

- Dismount and clean filter insert (chapter 14.2).
- Loosen hexagon nut (It.58) and pull off the complete cartridge brackets.
- Remove bearing bush (It.56) and gearwheel (It.27).
- Loosen hexagon bolt (It.15) and pull off bearing flange (It.14).
- Remove bearing bush (It.9).
- Press new bearing bush with pin uniformly into the seat.
- Mount bearing flange (It.14) and gearwheel (It.27).
- Press new bearing bush (It.56) with pin uniformly into the seat.
- Mount cartridge brackets, take care of correct teeth position.
- Further reinstallation in reverse order.

14.8 Replacing the approach disk

	<ul style="list-style-type: none"> • The bearing bush must always be replaced by a TRAINED MECHANICAL FITTER. • Keep spare part drawing of the metal-edge filter available. (It. = Item numbers of the spare part drawing)
--	--

14.8.1 Instructions for type AF 73

- Dismount and clean filter insert (chapter 14.2).
- Remove all filter cartridges (chapter 14.4).
- Loosen cylinder bolts (It.10) and remove centering ring (It.9).
- Remove lower approach disk (It.8) and clean tight seat.
- Loosen hexagon nut (It.32) and pull off sealing plate (It.6).
- Remove upper approach disk (It.8) and clean tight seat.
- Reinstallation with new approach disks in reverse order.

14.8.2 Instructions for type AF 74 - 76

- Dismount and clean filter insert (chapter 14.2).
- Remove all filter cartridges (chapter 14.4).
- Loosen cylinder bolts (It.55) and remove centering ring (It.26).
- Remove lower approach disk (It.24) and clean tight seat.
- Lift segment (It.21).
- Remove upper approach disk (It.24) and clean tight seat.
- Reinstallation with new approach disks in reverse order.

15 Spare parts

TYPE AF 73

Pcs.	Designation	Mat.-No.	Benennung
1	Set of gaskets VP FPM	77982143	Dichtungssatz VP FPM
	Set of gaskets VP VMQ/FEP	77982150	Dichtungssatz VP VMQ/FEP
1	Set of bearing VP	78358947	Buchsensatz VP
1	scraper	71116805	Abstreifer
2	spring	79778846	Schenkelfeder
	filter element → see name-plate		Filterelement → siehe Typenschild

TYPE AF 74

Pcs.	Designation	Mat.-No.	Benennung
1	Set of gaskets VP FPM	78319600	Dichtungssatz VP FPM
	Set of gaskets VP VMQ	76191738	Dichtungssatz VP VMQ
1	Set of bearing VP	78318347	Buchsensatz VP
1	scraper	71116805	Abstreifer
2	spring	79778846	Schenkelfeder
	filter element → see name-plate		Filterelement → siehe Typenschild

TYPE AF 75

Pcs.	Designation	Mat.-No.	Benennung
1	Set of gaskets VP FPM	79778135	Dichtungssatz VP FPM
	Set of gaskets VP VMQ	79718206	Dichtungssatz VP VMQ
1	Set of bearing VP	78318354	Buchsensatz VP
1	scraper	71116805	Abstreifer
2	spring	79778846	Schenkelfeder
	filter element → see name-plate		Filterelement → siehe Typenschild

TYPE AF 76

Pcs.	Designation	Mat.-No.	Benennung
1	Set of gaskets VP FPM	76198816	Dichtungssatz VP FPM
	Set of gaskets VP VMQ	77982606	Dichtungssatz VP VMQ
1	Set of bearing VP	78321580	Buchsensatz VP
1	scraper	71116805	Abstreifer
2	spring	79778846	Schenkelfeder
	filter element → see name-plate		Filterelement → siehe Typenschild

TYPE AF 93 - 96 S

Pcs.	Designation	Mat.-No.	Benennung
1	scraper	71116805	Abstreifer
2	spring	79778846	Schenkelfeder
	filter element → see name-plate		Filterelement → siehe Typenschild



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

16 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 73 S - AF 76 S/AF 93 S – AF 96 S

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:
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

Das Produkt entspricht allen Bestimmungen der Richtlinie 2014/30/EU über elektromagnetische Verträglichkeit.
The product conforms to all provisions of the Electromagnetic Compatibility Directive 2014/30/EU.
Le produit répond à toutes les dispositions de la directive 2014/30/UE relative à la compatibilité électromagnétique .

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.

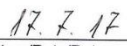
Dokumentationsverantwortlicher/Abteilung:
Responsible for documentation/department:
Responsable de la documentation/Service :

Filtration Group GmbH
Schleifbachweg 45
74613 Öhringen

Unterzeichner:
Signatory:
Signataire :

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

Öhringen,


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!

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

17 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 73 S - AF 76 S/AF 93 S – AF 96 S
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.

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