

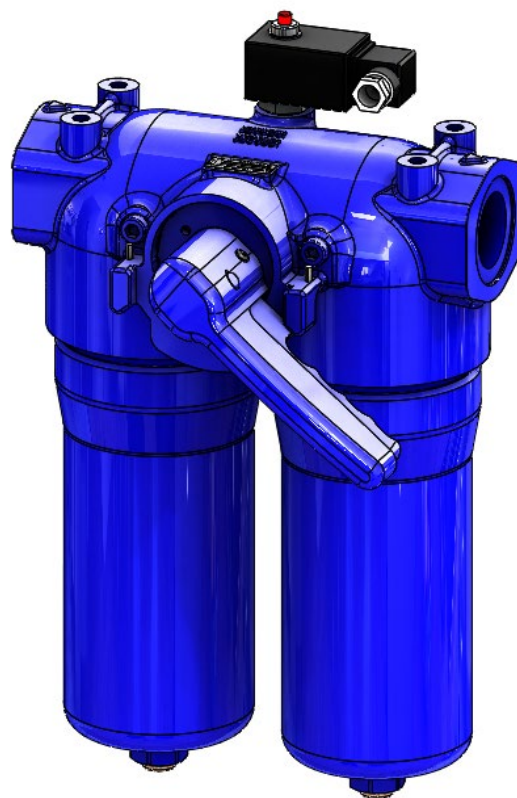
## Translation of the original instructions with installation instructions

Duplex filter

Pi 214

Mat. No. of original instructions

72464269



## 1 Contents

1	Contents.....	2
2	General safety instructions .....	2
2.1	Safety instructions for installation and operating personnel .....	2
2.2	Warning structure.....	2
2.3	Warning symbols used.....	2
2.4	Other symbols used .....	3
3	Glossary.....	3
4	General information .....	3
4.1	Manufacturer.....	3
4.2	Information about the original instructions .....	3
4.3	Negative declaration .....	3
5	Intended use .....	4
6	Functional description.....	4
6.1	Principle of the process.....	4
6.2	Main components of the duplex filter .....	5
6.3	Operating principle of the duplex filter.....	5
7	Technical data .....	6
7.1	Order-specific data.....	6
7.2	Technical data of the duplex filter .....	6
7.3	Technical data of the standard maintenance indicator (PiS 3097) .....	6
8	Transport and storage .....	6
9	Installation .....	6
9.1	Installation.....	6
9.2	Pressure relief.....	6
10	Start-up .....	7
11	Normal operation .....	7
11.1	Filters without a maintenance indicator.....	7
11.2	Filters with a maintenance indicator (optional).....	7
11.3	Filtration of cooling lubricants .....	7
12	Troubleshooting.....	7
13	Maintenance .....	7
13.1	Maintenance work on the parallel unit.....	7
13.2	Maintenance work on the duplex filter.....	8
13.3	Inspection and maintenance schedule.....	9
13.4	Replacing the filter element .....	9
13.5	Cleaning the filter housing .....	10
13.6	Cleaning the wire cloth elements .....	10
14	Assembly drawing .....	11
15	Options table .....	13
16	Spare parts drawing.....	15
17	Recommended spare parts and accessories .....	16
18	Negative declaration .....	17
19	Index.....	18

## 2 General safety instructions

### 2.1 Safety instructions for installation and operating personnel

This translation of the original instructions contains important safety information 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 this translation of the original instructions carefully.
- Make sure that installation and operating personnel are adequately trained.
- Make sure the contents of the original instructions are fully understood by the responsible persons.
- Define areas of responsibility and competence.
- Prepare a maintenance schedule.

#### During operation of the system:

- Keep this translation of the original instructions handy at the place of use.
- Heed the safety instructions. Always operate the machine or 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	<b>Nature and source of the danger</b> ⇒ Potential consequences of non-observance • Action to avert the danger.

### 2.3 Warning symbols used

 <b>DANGER!</b>
<b>Immediate danger!</b> ⇒ Non-observance will result in serious or fatal injury.
 <b>WARNING!</b>
<b>Potentially dangerous situation!</b> ⇒ Non-observance can result in serious or fatal injury.
 <b>CAUTION!</b>
<b>Potentially dangerous situation!</b> ⇒ Non-observance can result in minor or moderate injuries.
<b>IMPORTANT!</b>
<b>Potentially dangerous situation!</b> ⇒ Non-observance can result in property damage.

## 2.4 Other symbols used

	Danger: High voltage!
	Danger information about explosion protection
	Information about environmental protection
	Wear protective clothing!
	Eye protection must be worn!
	Respirator must be worn!
	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

### Initial differential pressure

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

### Differential pressure ( $\Delta p$ )

Pressure difference between the dirty side and the clean side.

### Filter element

Cylindrical support structure with star-pleated filter material. The substance to be filtered flows from the outside to the inside. Solids are retained on the outer surface of the filter element.

### Filtrate

Substance to be filtered.

### Cooling lubricant

Cooling lubricant according to DIN 51385.

## 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.industrial.filtrationgroup.com

### 4.2 Information about the original instructions

FG Mat. No. ....72464269  
Date: .....16.01.19  
Version: .....00

### 4.3 Negative declaration

Our fluid filtration and automatic filter products are designed for Group 2 fluids (not dangerous) as standard as defined by the EC Pressure Equipment Directive 2014/68/EU Article 13 and Article 4 (3), in other words a name-plate without a CE marking is affixed to these products. No declaration of conformity may be issued for this reason.

According to the criteria laid down in Article 2 of the Machinery Directive 2006/42/EC, our standard hydraulic filters are outside the scope of this directive. Under legal provisions, therefore, we are not allowed to affix a CE marking, nor are we permitted to issue a declaration of incorporation or conformity.

## 5 Intended use

### DANGER!

#### Operation contrary to the intended purpose can be dangerous!

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

### DANGER!

#### Operation contrary to the intended purpose can be dangerous!

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

#### Prohibited:

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



The standard version is designed for Group 2 fluids as defined by the EC Pressure Equipment Directive 2014/68/EU Article 4 (3) and Article 13.

## 6 Functional description

### 6.1 Principle of the process

#### Duplex filter

The parallel unit allows you to use each filter individually. Any maintenance work can thus be carried out without interrupting the filtration process.

#### Filtration

A star-pleated filter element is mounted on a cylindrical support structure; the filter rating is determined by the element type. The medium flows through the filter element from the outside to the inside. Solid particles are retained. The star pleat results in a larger effective filter surface.

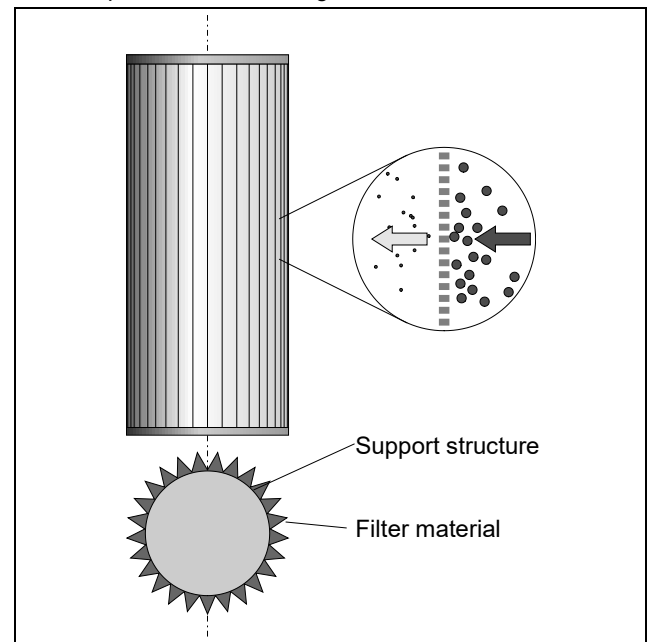


Fig. 1: Separation principle at the filter element

## 6.2 Main components of the duplex filter

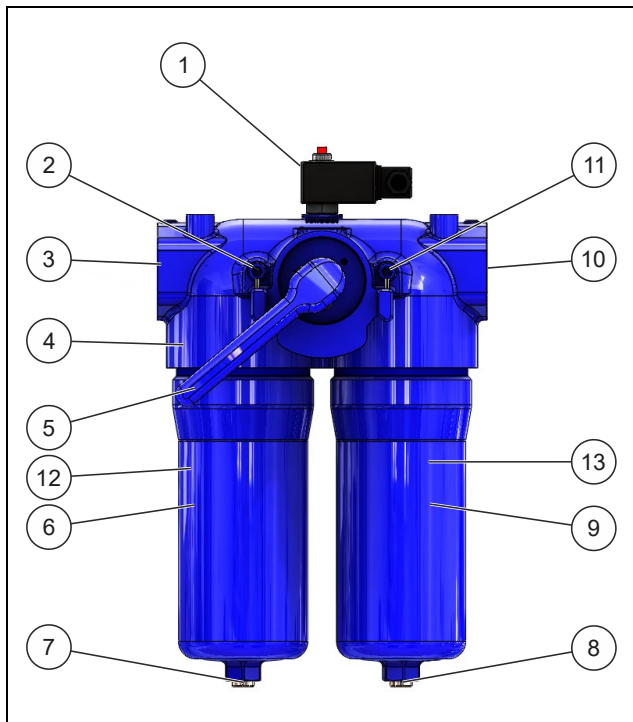


Fig. 2: Diagram of the main components

1	Maintenance indicator (optional)
2	Vent screw (filter 1)
3	Inlet
4	Filter head
5	Switch-over handle with integrated pressure compensation lever and safety catch
6	Filter housing (filter 1)
7	Drain plug on dirty side (filter 1) (standard with NG 300)
8	Drain plug on dirty side (filter 2) (standard with NG 300)
9	Filter housing (filter 2)
10	Outlet
11	Vent screw (filter 2)
12	Filter element (filter 1)
13	Filter element (filter 2)

## 6.3 Operating principle of the duplex filter

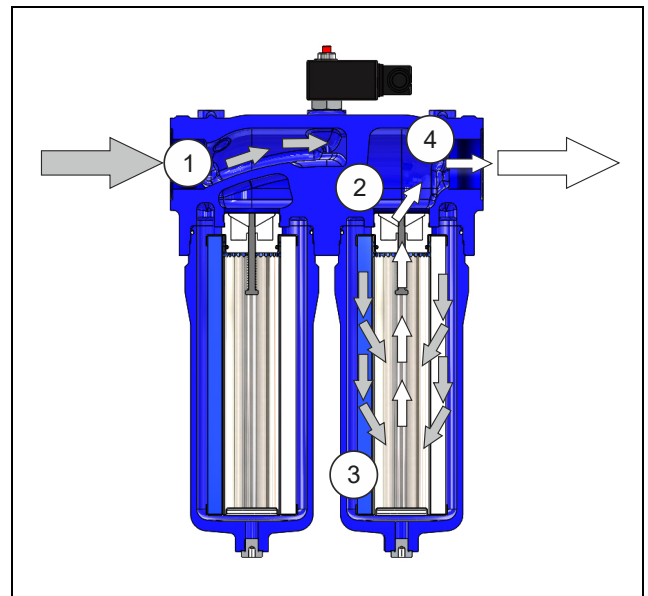


Fig. 3: Operating principle

- 1**  
Dirty fluid flows in through the inlet.
- 2**  
The fluid is fed to the left or right filter side, depending on the position of the switch-over handle. The handle position indicates the non-operational filter side.
- 3**  
The fluid flows through the filter element to the clean side.
- 4**  
The filtered fluid exits the duplex filter via the outlet.
- 5**  
When a maximum differential pressure is reached, the switch-over handle must be shifted to the other side and the dirty filter element replaced with a new FG element. Wire cloth elements can be cleaned (refer to section 13.6). Disposable filter elements (PS / MIC / SMX) must be exchanged and disposed of correctly.  
  
The filtration process is not interrupted.

### Optional

If a maintenance indicator is used, a signal is output when the maximum differential pressure is reached.

## 7 Technical data

### 7.1 Order-specific data

FGC.com		Filtration Group GmbH	
Made in Germany		Schleibachweg 45 D-74613 Öhringen	
		fm.de.service@filtrationgroup.com	
TYPE			
PART NO			JOB NO
	°C	bar	

The order-specific data can be taken from the name-plate.

### 7.2 Technical data of the duplex filter

Nominal pressure

Pi 21430:

$2 \times 10^6$  load changes: ..... 100 bar

Test pressure

Pi 21430: ..... 143 bar

Temperature range: ..... -10°C to +120°C

Bypass setting \*: .....  $\Delta p$  3.5 bar  $\pm$  10%

Maintenance indicator setting \*: .....  $\Delta p$  2.2 bar  $\pm$  10%

Filter housing material: ..... St

Filter head material: ..... GGG

Sealing material: ..... NBR / PTFE / Cu / Al

Maintenance indicator material: ..... Al

### 7.3 Technical data of the standard maintenance indicator (PiS 3097)

Switch: ..... NC / NO with reed contact

Protection class: ..... IP65

NO / NC contact load: ..... Max. 70 W

..... Max. 250 VAC / 200 VDC

..... Max. 1 A

As-delivered condition: ..... Normally closed

## 8 Transport and storage

### Transport

- Always transport in the original packaging.
- Avoid vibration.

### Storage

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



## 9 Installation

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

### 9.1 Installation

	It must be possible to remove the filter element in order to carry out maintenance work.
	Use only suitable, chemically resistant seals for the piping.

- Prepare a suitable location for installing the unit.
- Make sure sufficient free space is available for removal and draining (refer to section 14).
- Unpack the duplex filter.  
Install the duplex filter with the housings pointing downwards. Fastening threads are provided on the top (for dimensions, refer to section 14).
- Remove the protection caps from the connections.
- Connect the pipes to the duplex filter without stress (refer to the arrow on the filter head).

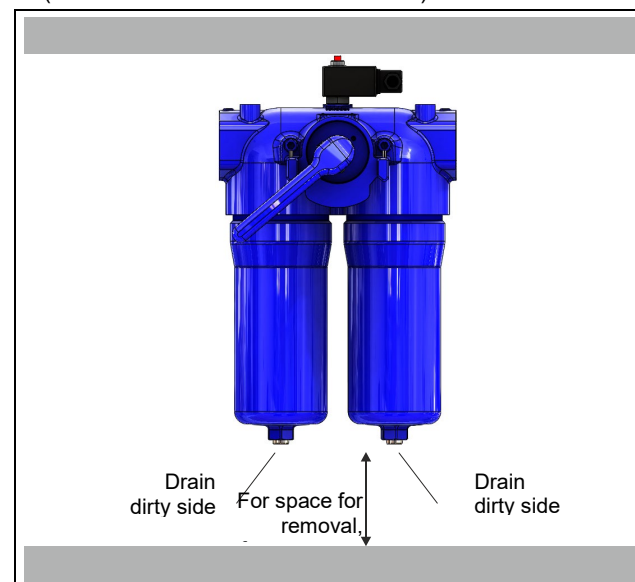


Fig. 4: Mechanical installation

### 9.2 Pressure relief

Design measures must be incorporated to prevent inadmissible excess pressure on the dirty side.

- Install pressure relief devices if necessary.

\* Other pressures possible if conditions deviate from standard.

## 10 Start-up

### DANGER!

This duplex filter must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity with the applicable EC directives, harmonised standards, European standards or equivalent national standards.

- Loosen the vent screws of the two filters at least one turn.
- Operate the switch-over handle.
  - ⇒ The safety catch is released.
  - ⇒ The pressure compensation lever opens.
- Shift the switch-over handle to the middle position.
  - ⇒ Fluid flows through both filters.
- Close the vent screws as soon as fluid exits from them (torque: 25 Nm).
- Recover any leaking fluids in a suitable vessel.
- Shift the switch-over handle to the required position so that it contacts the stop.
- Check that all pipe connections are tight.
  - ⇒ The duplex filter is ready for operation.

## 11 Normal operation



Please always ensure that you have a sufficient quantity of original FG replacement elements in stock. Disposable filter elements (PS / MIC / SMX) cannot be cleaned.

**The following parameters must be monitored daily during normal operation:**

- Differential pressure (if the optional maintenance indicator is installed)

### 11.1 Filters without a maintenance indicator

- Replace the filter element after the trial run or after flushing the unit.
- Observe the instructions provided by the system manufacturer.

### 11.2 Filters with a maintenance indicator (optional)

During cold starts, the maintenance indicator may give a warning signal (refer to the accessories documentation for the maintenance indicator).

- Do not depress the red button of the maintenance indicator until operating temperature has been reached.
  - ⇒ If it immediately pops out again and / or the electrical signal is not switched off after reaching operating temperature, the filter element must be replaced.

### 11.3 Filtration of cooling lubricants

Fine dirt particles can obstruct the parallel unit when filtering cooling lubricants.

- Operate the parallel unit regularly, even if the maintenance indicator has not tripped.

## 12 Troubleshooting

Fault	Possible cause	Remedy
Warning signal from maintenance indicator	Cold start	Reset the signal after reaching operating temperature
	Filter element dirty	Replace the filter element

## 13 Maintenance

### CAUTION!

**Danger if unauthorised work is carried out on the unit!**

- ⇒ Risk of injury.
- All maintenance work must be carried out by a suitably trained person.

### 13.1 Maintenance work on the parallel unit

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



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

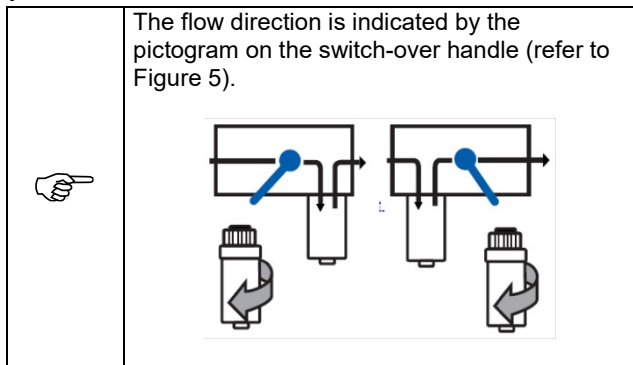


- Carry out the maintenance work.
- Start up the duplex filter again.
- Observe the duplex filter.

Does it operate normally?

## 13.2 Maintenance work on the duplex filter

1



- Operate the switch-over handle (5) and shift it to the required position:
- Switch-over handle in position A: filter 1 (F1) is deactivated while filter 2 (F2) is activated.
- Switch-over handle in position B: filter 2 (F2) is deactivated while filter 1 (F1) is activated.
- The switch-over handle indicates the deactivated filter.
- Switch-over handle in position C: fluid flows through both filters (F1 and F2).

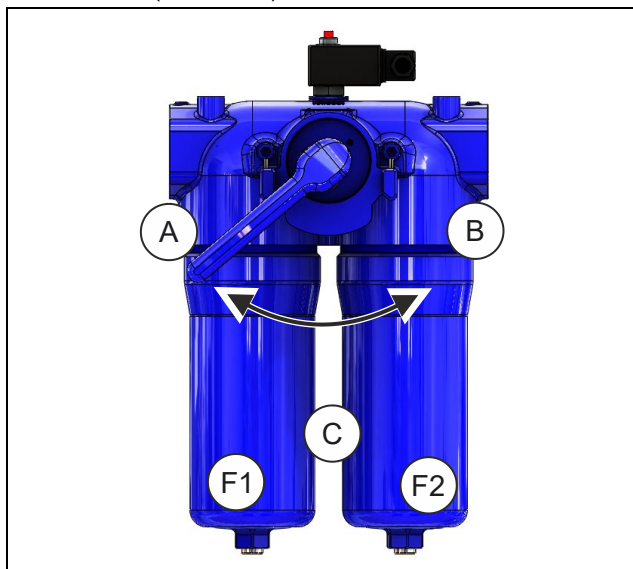


Fig. 5: Switch-over handle positions

- Make sure the switch-over handle (5) is set to the required position, so that it contacts the stop and is locked correctly by the safety catch.
- ⇒ The filter side on which the element must be replaced is sealed off.

### ⚠ CAUTION!

#### Danger: Corrosive liquids!

- Never operate the switch-over handle while carrying out maintenance work!
- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. eye protection, respirator, protective clothing, etc.).



2

- Place a trough or a drip pan underneath the unit.
- Open the vent screw (2) at least one turn.

3

- Open the drain plug on the dirty side (7) (if any).
- ⇒ The filter is drained.

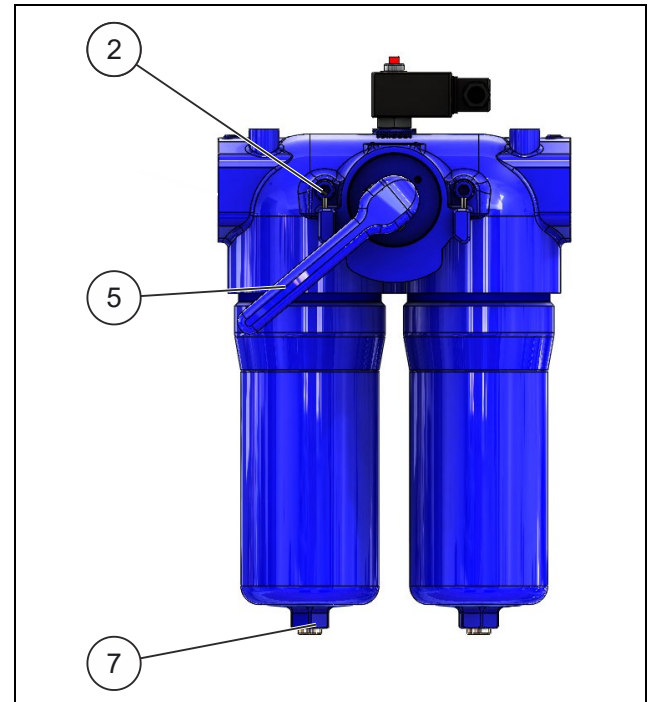


Fig. 6: Draining the filter

5

- Carry out the maintenance work.
- Check the seals at the drain plug and the vent screw (if any) and if necessary replace.

6

- Screw in the drain plug (if any, torque: 30 Nm).

7


- Operate the switch-over handle and shift it to the middle position.
- Tighten the vent screw as soon as fluid exits from the vent hole without any bubbles (torque: 25 Nm).
- Check that the filter is tight.


8

- Make sure the switch-over handle contacts the stop and is locked by the safety catch, so that the filter side that is being maintained is deactivated (as indicated by the pictogram on the handle).
- Observe the duplex filter.  
Does it operate normally?

### 13.3 Inspection and maintenance schedule

- Refer also to the contract documentation. The inspection and maintenance schedule should be fixed individually by the owner.

	<ul style="list-style-type: none"> <li>Maintenance and monitoring of the filter must be carried out as required by law and local regulations.</li> <li>A visual inspection is recommended whenever the filter element is replaced or every six months at the latest.</li> <li>Carry out maintenance once a year.</li> </ul>
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	<p>The necessary inspection and maintenance work is dependent on the particular application. Please consult the system manufacturer if necessary.</p>
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### 13.4 Replacing the filter element

#### **DANGER!**

##### **The filter is pressurised!**

- First relieve the pressure!
- Then open the filter!

#### **DANGER!**


##### **Risk of injury!**

- The element is only allowed to be replaced on the non-operational filter side.

#### **CAUTION!**

- Keep all impurities away from the clean side of the filter element.
- Be careful not to damage the wire cloth of the element or the inside with sharp or pointed objects.

1

	<p>The direction of fluid flow is determined by the position of the marking on the switch-over handle (refer to Figure 7).</p>
---	--

- Operate the switch-over handle (5) and shift it to the required position:
  - Switch-over handle in position A: filter 1 (F1) is deactivated while filter 2 (F2) is activated.
  - Switch-over handle in position B: filter 2 (F2) is deactivated while filter 1 (F1) is activated.
  - The switch-over handle indicates the deactivated filter.
  - Switch-over handle in position C: fluid flows through both filters (F1 and F2).

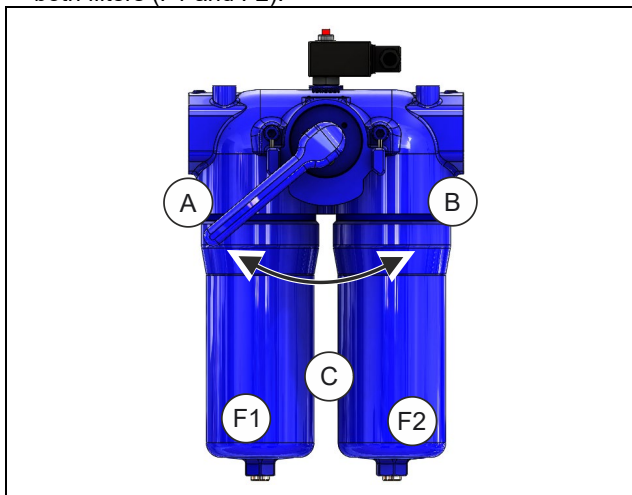


Fig. 7: Switch-over handle positions

- Make sure the switch-over handle (5) is set to the required position, so that it contacts the stop and is locked by the safety catch.
- ⇒ The filter side on which the element must be replaced is sealed off.

#### **CAUTION!**

##### **Danger: Corrosive liquids!**

- Never operate the switch-over handle while carrying out maintenance work!

- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. eye protection, respirator, protective clothing, etc.).



2

- Place a trough or a drip pan underneath the unit.
- Open the vent screw (2) at least one turn.

3

- Open the drain plug on the dirty side (7) (if any).
- ⇒ The filter is drained.

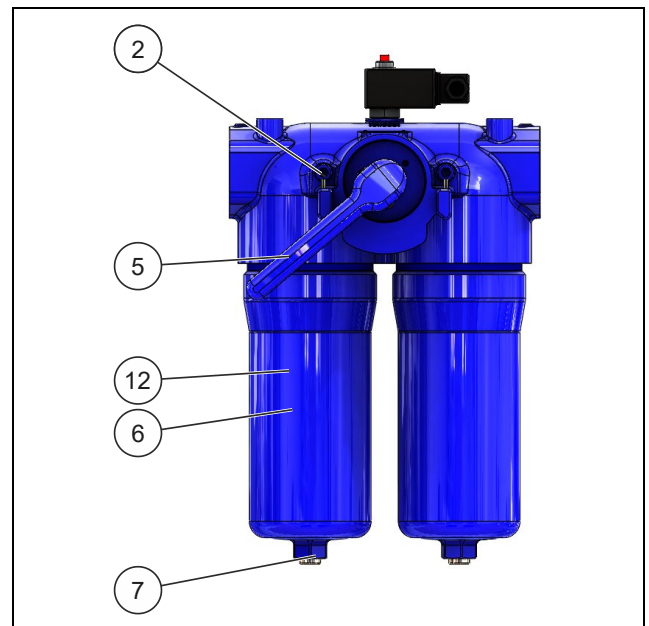


Fig. 8: Draining the filter

4

- Unscrew the filter housing (6) clockwise.
- Pull the filter housing down a hand's breadth.
- Unscrew the filter element (12) from the seat.
- Remove the filter element together with the filter housing.

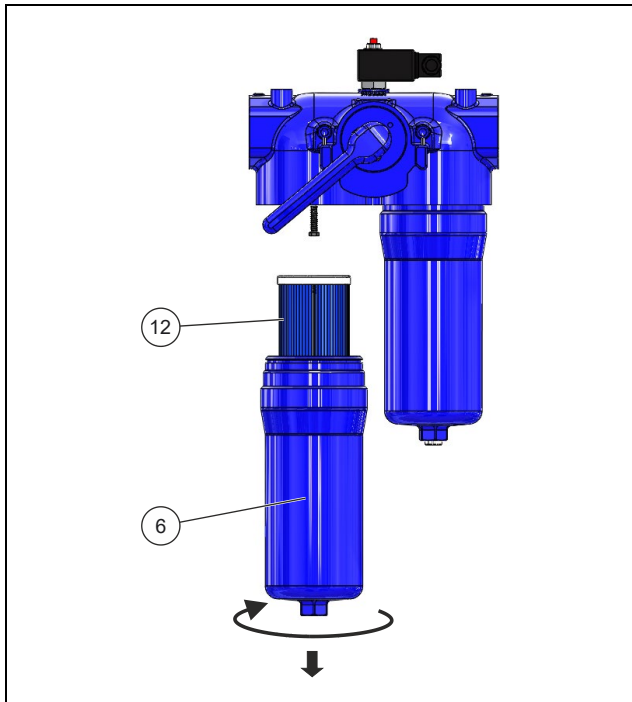


Fig. 9: Removing the filter element

5

- Check all sealing points and seals.
- Replace the seals if necessary.
- Oil the O-rings using a suitable lubricant.
- Replace dirty disposable filter elements with new FG elements (the order number on the name-plate must match the order number on the element).
- Clean the dirty wire cloth filter element (refer to section 13.6).

6

- Carefully position the open side of the filter element in the seat.
- Clean and oil the thread of the filter housing using a suitable lubricant.
- Place the filter housing in position, then screw it on anti-clockwise as far as possible (torque for NG 300: 100 Nm).

7

- Screw in the drain plugs (if any, torque: 30 Nm).

8

- Operate the switch-over handle and shift it to the middle position.
- Tighten the vent screw as soon as fluid exits from the vent hole without any bubbles (torque: 25 Nm).
- Check that the filter is tight.

9

- Make sure the switch-over handle contacts the stop and is locked by the safety catch, so that the filter side that is being maintained is deactivated (as indicated by the pictogram on the handle).



- After starting up one filter side, check that all sealing points are tight.

Observe the duplex filter.  
Does it operate normally?

### 13.5 Cleaning the filter housing



- Wear protective clothing and equipment appropriate to the hazard potential of the medium (e.g. eye protection, respirator, protective clothing, etc.).
- Open the filter and remove the filter element (refer to section 13.4).
- Remove any coarse impurities by mechanical means.
- Wash out the filter housing using a suitable cleaning solution.

### 13.6 Cleaning the wire cloth elements



- Only wire cloth elements can be cleaned. Disposable filter elements (PS / MIC / SMX) must be exchanged and disposed of correctly.
- After starting up one filter side, check that all sealing points are tight.
- Defective seals must be replaced.
- The system can never be cleaned one hundred percent. The service life of the filter elements is gradually shortened.

#### Ultrasonic cleaning

- Immerse dirty filter elements upright in an ultrasonic bath for approximately 90 to 120 minutes (turn over if necessary).
- Rinse the filter element in clean cleaning solution (e.g. naphtha).
- Carefully blow out the filter element with compressed air from the clean side to the outside.

#### Manual cleaning

Required for filter ratings coarser than 40 µm.

- Remove coarse, external impurities with a brush dipped in cleaning solution (e.g. naphtha).
- Leave the filter element to stand for approximately 20 minutes in clean cleaning solution.
- Then rinse it with cleaning solution from the clean side to the outside.
- Carefully blow out the filter element with compressed air from the clean side to the outside.

## 14 Assembly drawing

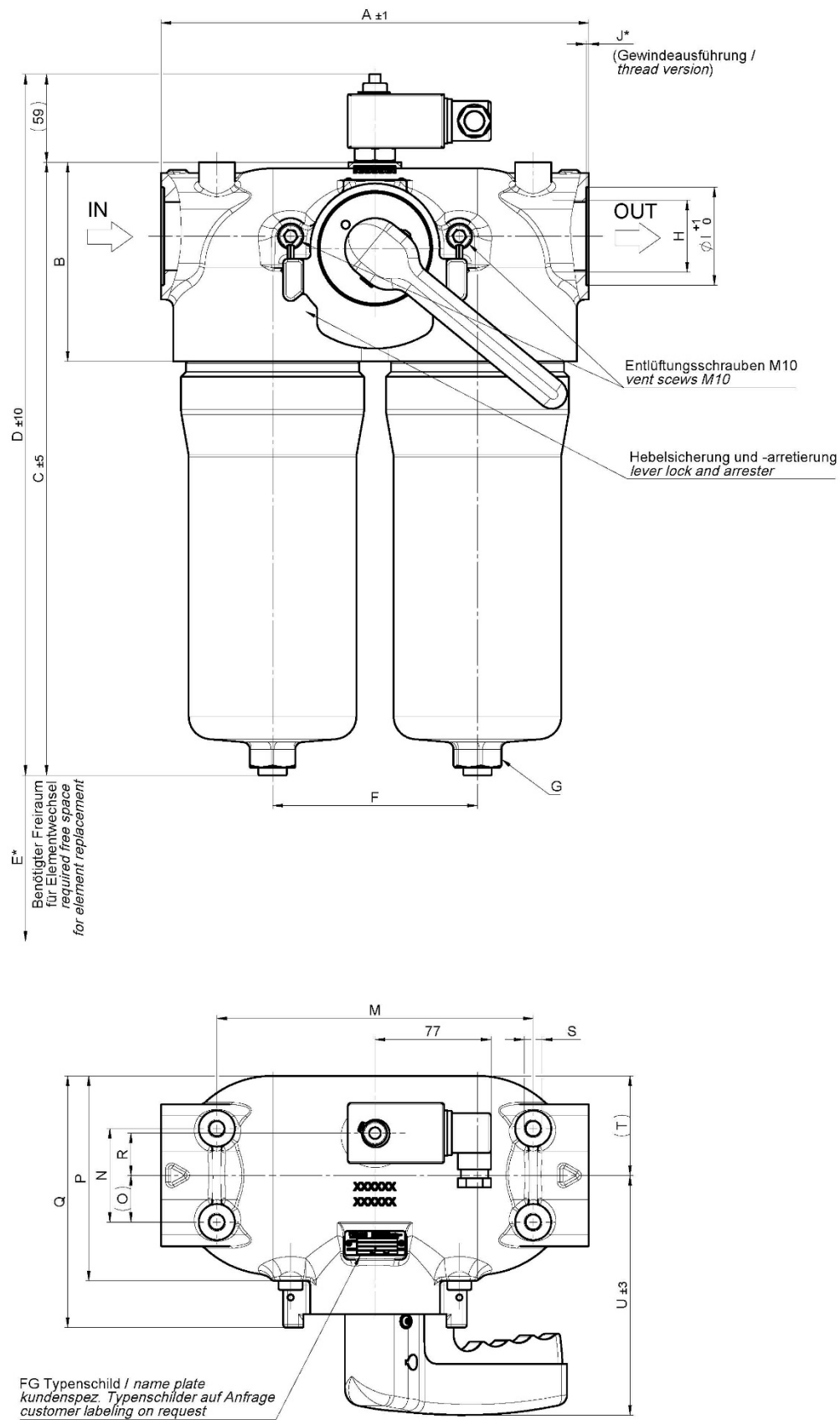


Fig. 10: Assembly drawing 1/2

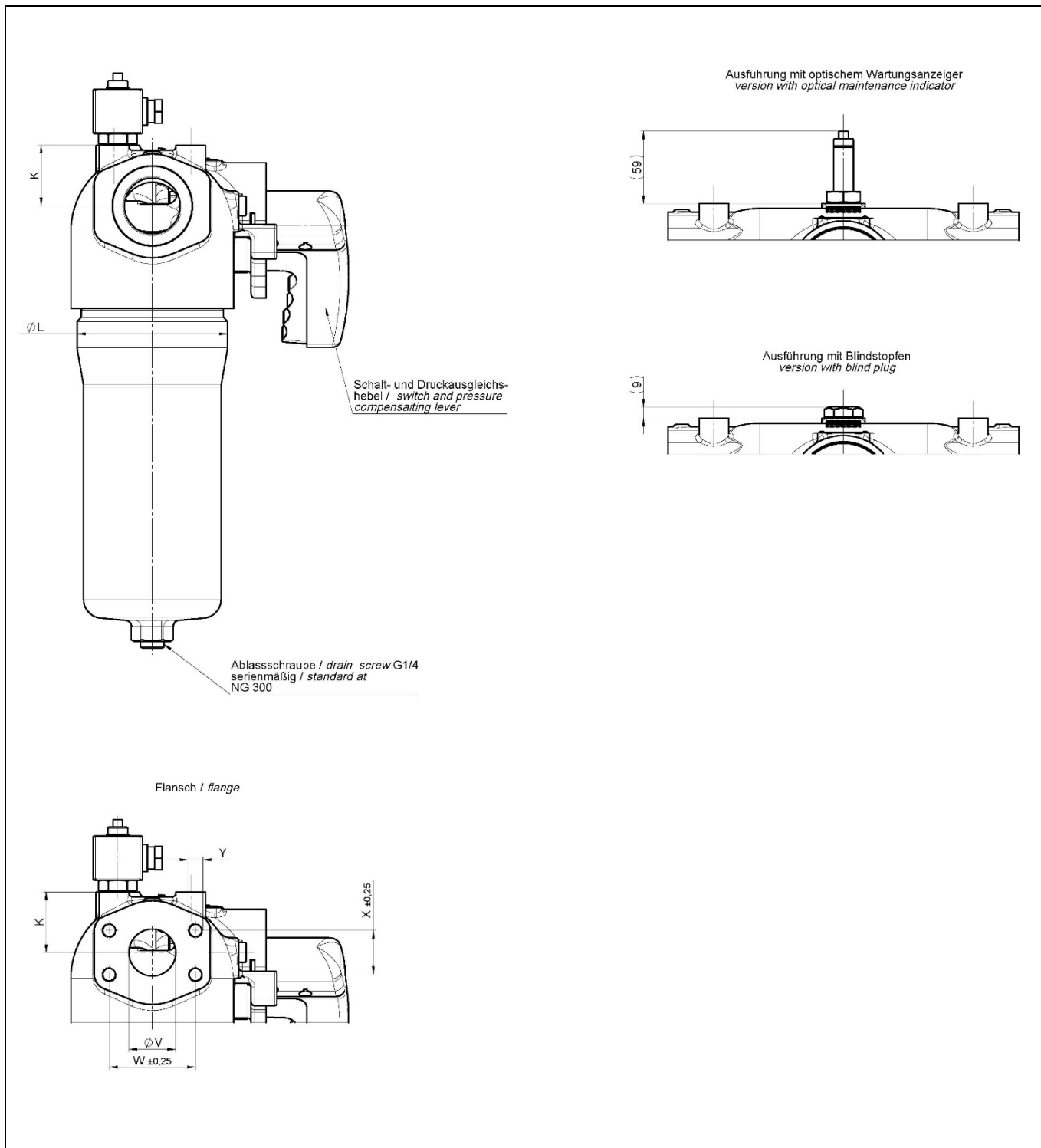


Fig. 11: Assembly drawing 2/2

15 Options table

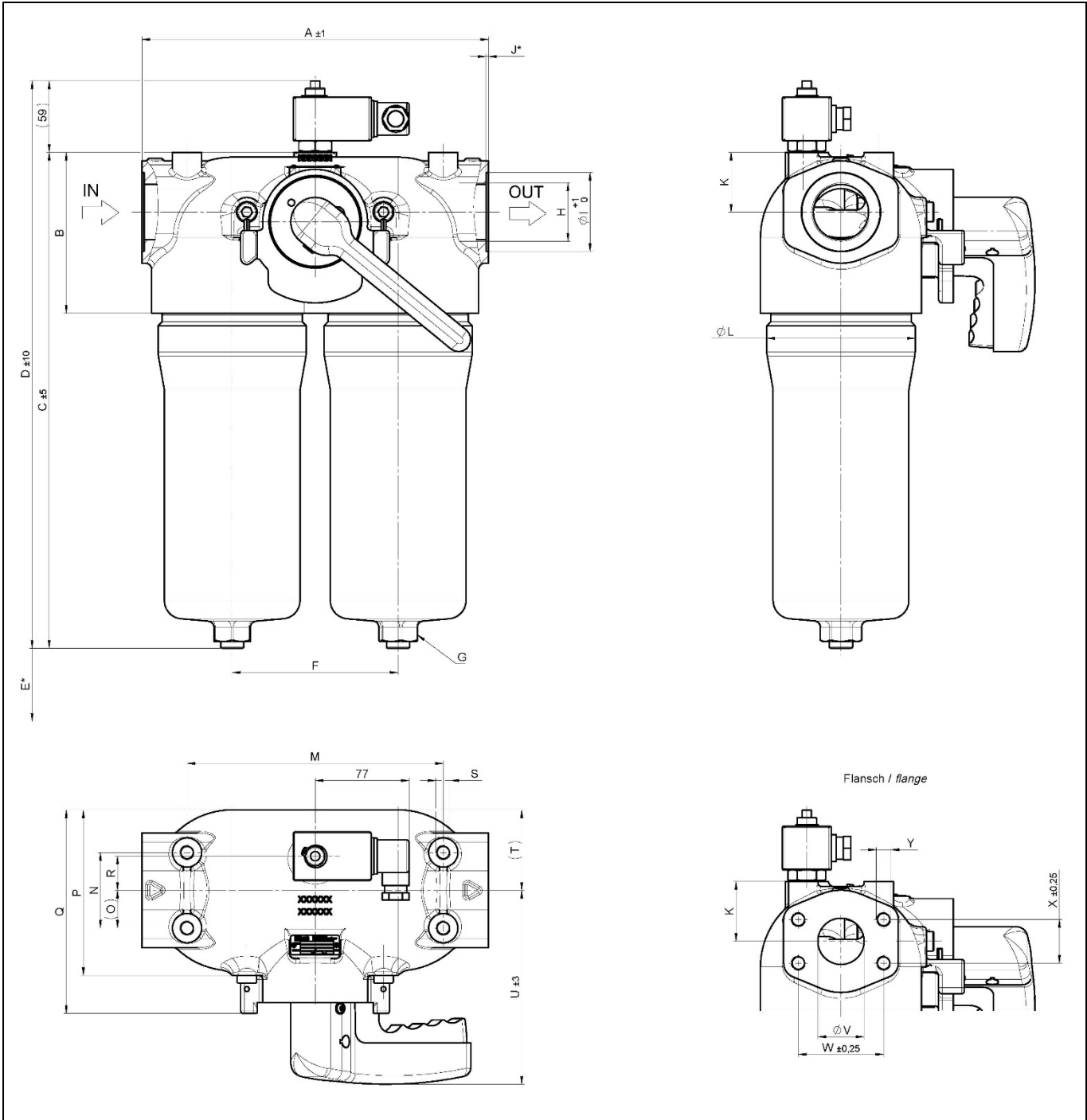


Fig. 12: Dimensions

Model	NG	A	B	C	D	E*	F	G	H	øI	J*	K	øL	M
Pi 21430	300	284	132	407	465	110	136	a/f 30	G 1½	65	2±0.5	49	121.5	210
Pi 21430 FL									-	-	-			

Model	NG	N	O	P	Q	R	S	T	U	øV	W	X	Y	Weight [kg]
Pi 21430	300	62	31	136	167	28	M12x18	66	159	-	-	-	-	Approx. 27
Pi 21430 FL										38	69.9	35.7	M12x21	

E\* – Clearance required to replace elements

J\* – Threaded version only

## 16 Spare parts drawing

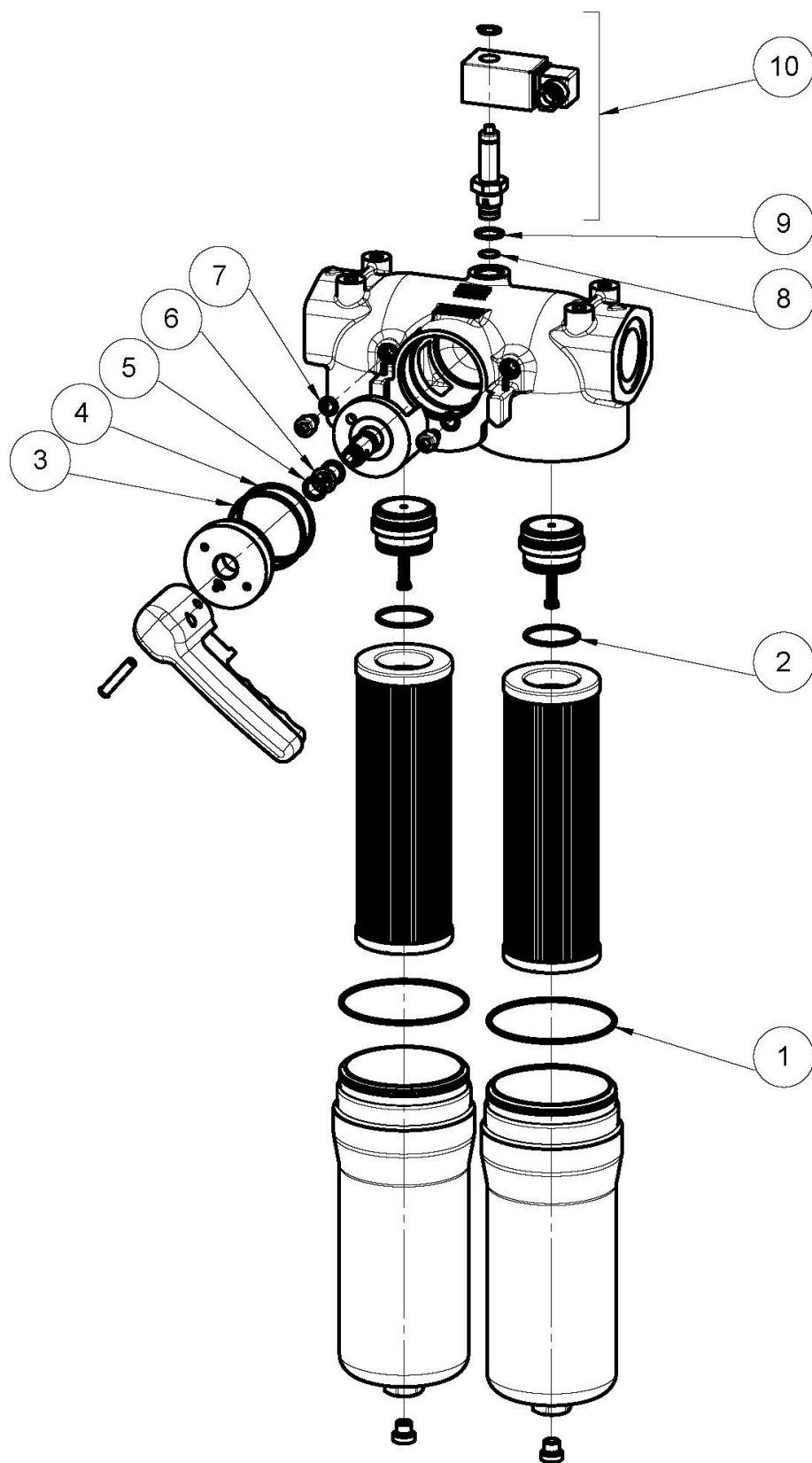


Fig. 13: Spare parts drawing

## 17 Recommended spare parts and accessories

No.	Benennung	Material no.	Designation
1-7	Dichtungssatz für Pi 21430		Seal kit for Pi 21430
	NBR	72464282	NBR
	FKM	72464283	FKM
	EPDM	72464284	EPDM
8-9	Dichtungssatz für Wartungsanzeiger		Seal kit for maintenance indicator
	NBR	77760309	NBR
	FKM	77760317	FKM
	EPDM	77760325	EPDM
11	Wartungsanzeiger		Maintenance indicator
	Optisch PiS 3098/2.2	77669971	Visual PiS 3098/2.2
	Elektrisch PiS 3097/2.2	77669948	Electrical PiS 3097/2.2
	Nur elektrisches Oberteil	77536550	Only electrical cover

Negativerklärung  
Negative declaration  
Déclaration négative



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 que le produit suivant

Produktbezeichnung:  
Product designation:  
Désignation du produit :

Doppelschaltfilter  
Duplex filter  
Filtre double commutable

Typenbezeichnung:  
Type designation:  
Désignation du type :

PI 214

Funktionsbeschreibung:  
Machine description:  
Description du fonctionnement :

Filtration von Hydraulik- und Schmieröl  
Filtration of hydraulic- and lubricating oil  
Filtration d'huile hydraulique d'huile lubrifiante

Diese Geräte sind zum Einbau bzw. Zusammenbau in eine Maschine oder Anlage bestimmt, deren Inbetriebnahme solange untersagt ist, bis festgestellt wurde, dass die Maschine oder Anlage, in die diese Filter eingebaut werden sollen, den Bestimmungen der Richtlinien 2014/68/EU und 2014/34/EU entspricht. Gemäß den Kriterien der Richtlinien 2014/68/EU und 2014/34/EU dürfen wir hier kein CE-Zeichen anbringen und keine Einbau- oder Konformitätserklärung ausstellen. Bei Anwendung der Richtlinie 2014/68/EU ist eine Zündquellenanalyse im Rahmen der gesamten Anlage vom Betreiber zu erstellen.

These devices are intended to be incorporated into machinery or assembled with other machinery to constitute machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the directive 2014/68/EU and 2014/34/EU corresponds incl. all alterations. Is according to the criteria of the directive 2014/68/EU and 2014/34/EU outside the scope of this directive. According to the legal guidelines we must not put a CE-mark on this product. When using Directive 2014/68/EU, an ignition source analysis shall be drawn up by the operator within the framework of the entire installation.

Est destinée à être incorporée dans une machine à être assemblée avec d'autres machines afin de constituer une machine et que sa mise en service est interdite avant que la machine dans laquelle elle sera incorporée n'ait été déclarée conforme aux dispositions de la directive, libellée 2014/68/UE et 2014/34/UE correspond toutes modifications inclus. Est en conformité avec les critères de la directive 2014/68/UE et 2014/34/UE en dehors du champ d'application de la présente directive. Conformément aux dispositions légales, nous n'avons donc pas le droit d'appliquer un marquage CE ni de délivrer de déclaration d'incorporation ou de déclaration de conformité. En employant la directive 2014/68/UE une analyse des sources d'incendie pour l'unité entière doit être effectuée par l'opérateur.

Die Auslegung erfolgt gemäß 2014/68/EU Art. 4, Abs. 3

- für Fluide deren Dampfdruck bei der zulässigen Temperatur um höchstens 0,5 bar über dem normalen Atmosphärendruck (1013 mbar) liegt (Art. 4/1a/ii)  
- Fluiden der Gruppe 2 Art. 13

The design is done according to 2014/68/EU art. 4, section 3

- for fluids having a vapor pressure at the maximum allowable temperature 0,5 bar above normal atmospheric pressure (1013 mbar) is (art. 4/1a/ii)  
- fluids group 2 art. 13

La conception est réalisée selon 2014/68/UE art.4, paragraph 3

- pour des fluides dont la pression de Vapeur, à la température maximale autorisée, 0,5 bar au dessus de la pression atmosphérique normale (1013 mbar) est (art. 4/1a/ii)  
- les fluides du groupe 2 art. 13

Wir bestätigen, dass die von uns gelieferten Produkte den Anforderungen der Europäischen Gemeinschaft entsprechen.

Sie erhalten ein einwandfreies Produkt nach Filtration Group-Standards.

We confirm that our products comply with the requirements of the European Community.

You get a correct product according to Filtration Group standards.

Nous confirmons que les produits fournis par nous répondent aux exigences de la Communauté européenne.

Vous recevez un produit conforme aux normes Filtration Group.

Unterzeichner:

Wolfram Zuck

Signatory:

Dipl.-Ing. (FH) Industrial Engineering

Signataire :

Managing Director, Plant Manager Öhringen

Öhringen,

Datum/Date/Date

Unterschrift/Signature/Signature

## 19 Index

<b>E</b>		
Environmental protection .....	3	
<b>F</b>		
Filter element .....	4, 6, 9, 10	
Filter housing .....	5, 9, 10	
<b>L</b>		
Leakage .....	2	
<b>M</b>		
Manufacturer .....	2	
<b>P</b>		
Pressure relief .....	6	
Protective clothing and equipment .....	8, 9, 10	
<b>R</b>		
Risks .....	2	
<b>S</b>		
Safety instructions .....	2	
Seat .....	9, 10	
Space for removal .....	6	
Switch-over handle .....	5, 7, 8, 9, 10	
<b>V</b>		
Vent screw .....	5	
<b>W</b>		
Warning .....	2	



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