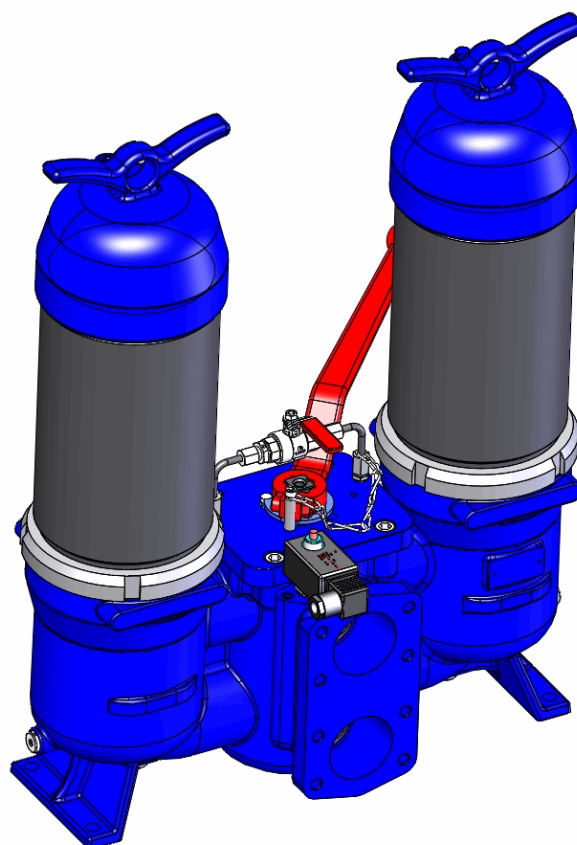


Translation of original instructions with installation instructions  
Duplex Filter

Pi 211/Pi 2110

Mat. No. of Instruction Manual  
72464548



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# 2 General safety instructions

## 2.1 Safety instructions for installation and operating personnel

This Instruction Manual contains important safety instructions which must be heeded at all times during installation, normal operation and maintenance.

Non-observance can result in the following risks to persons and the environment as well as in damage to the machine or system:

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

### Before installation/start-up:

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

### During operation of the system:

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

### If in doubt:

- Consult the manufacturer.

## 2.2 Warning structure










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

Signal word	
Possibly with symbol	<b>Nature and source of the danger</b> ⇒ Potential consequences of non-observance <ul style="list-style-type: none"> <li>• Action to avert the danger.</li> </ul>

## 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>CAUTION! (without a symbol)</b>
<b>Potentially dangerous situation!</b> ⇒ 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

### Initial differential pressure

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

### Differential pressure (delta p)

Pressure difference between the dirty side and the clean side.

### Filter cartridge

Cylindrical support structure with star-pleated filter medium. The medium to be filtered flows inward from the outside. Solids are retained on the outer surface of the cartridge.

### Filtered fluid

Substance that is filtered.

## 4 General information

### 4.1 Manufacturer

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

### 4.2 Information about the Instruction Manual

FG Mat. No.: .....72464548  
Date: .....22.07.20  
Version: .....01

### 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.

According to the type approval, these filters may be used in marine applications for filtering fuels, lubricants and hydraulic oil.

Acceptance under SOLAS is possible at any time following the notification of the specific regulation.

## 5 Intended application

**⚠ DANGER!**

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

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

**⚠ DANGER!**

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

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



**Prohibited:**

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

Standard design for liquid group 2 according to pressure equipment-directive 2014/68/EU article 4 (3) and article 13.

## 6 Functional description

### 6.1 Principle

#### Filtration

A star-pleated cartridge is mounted on a cylindrical support structure, whereby the filter rating is determined by the type of cartridge. The medium flows inward through the cartridge from the outside. Solid particles are retained. The star pleat results in a larger effective filter surface.

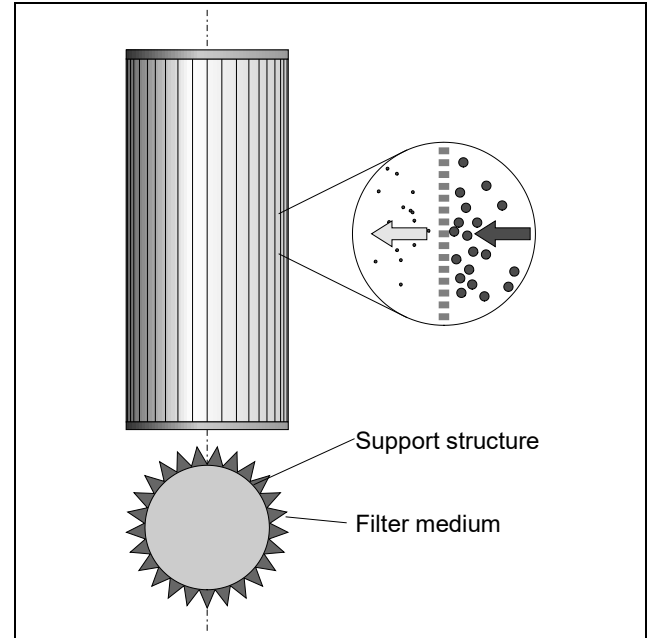


Fig. 1: Separating principle on the filter cartridge

### 6.2 Main components of the duplex filter

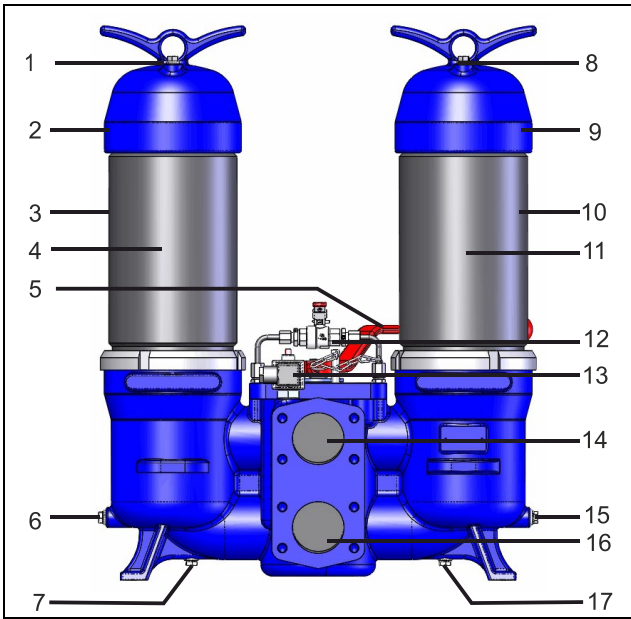


Fig. 2: Diagram of the main components (front)

1	Vent screw (filter 1)
2	Filter cover (filter 1)
3	Filter housing (filter 1)
4	Element (filter 1)
5	Switch-over handle
6	Drain plug on dirty side of filter 1 with sealing ring
7	Drain plug on clean side of filter 1 (optional)
8	Vent screw (filter 2)
9	Filter cover (filter 2)
10	Filter housing (filter 2)
11	Element (filter 2)
12	Pressure balance valve
13	Differential pressure display unit
14	Inlet
15	Drain plug on dirty side of filter 2 with sealing ring
16	Outlet
17	Drain plug on clean side of filter 2 (optional)

### 6.3 Operating principle of a duplex filter

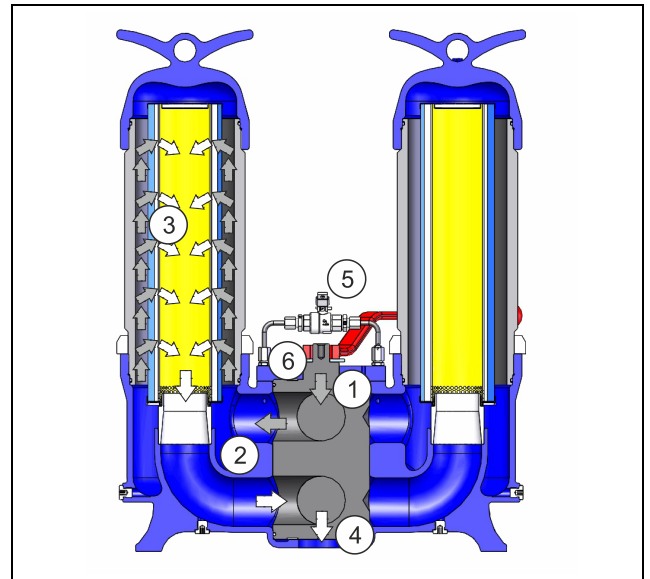


Fig. 3: Operating principle

- 1**  
Dirty liquid flows in through the inlet.
- 2**  
The medium enters on the left or right filter side, depending on the position of the switching lever. The handle position indicates the non-operational filter side.
- 3**  
The liquid flows through the filter cartridge to the clean side.
- 4**  
The filtered fluid exits the duplex filter via the outlet.
- 5**  
The maintenance indicator shows when the maximum differential pressure is reached. In addition, a visual indication is activated and the output of the maintenance indicator is switched. The other filter side must then be selected by reversing the switching lever. The spent cartridge must be exchanged and disposed of correctly.  
  
The filtration process is not interrupted.
- 6**  
The red pin (check function) on the differential pressure display unit must be pressed in again by hand after switching over the filter.

## 7 Technical data

### 7.1 Order-specific data



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

### 7.2 Technical data of the duplex filter

Nominal pressure:..... 40 bar  
 Pi 211080/Pi 211110/Pi 211063/211100:  
 $10^7$  load changes:..... 40 bar  
 Test pressure:  
 Pi 211080/Pi 211110/Pi 211063/211100:  
 ..... 60 bar  
 Temperature range:..... -10°C to +120°C  
 Bypass setting<sup>\*/\*\*</sup>:.....  $\Delta p$  3.5 bar  $\pm$  10%  
 Maintenance indicator setting<sup>\*</sup>:.....  $\Delta p$  2.2 bar  $\pm$  0.3 bar  
 Filter head material:.....Nodular cast iron  
 Filter housing material:..... Steel  
 Filter cover material:.....Nodular cast iron  
 Seal material:..... NBR

### 7.3 Technical data of the PiS 3111

Switch:..... normally open/normally closed  
 .....with reed contact  
 Protection class:..... IP65  
 NO contact load:.....max. 70 W  
 ..... max. 250 V AC/200 V DC  
 ..... max. 1 A

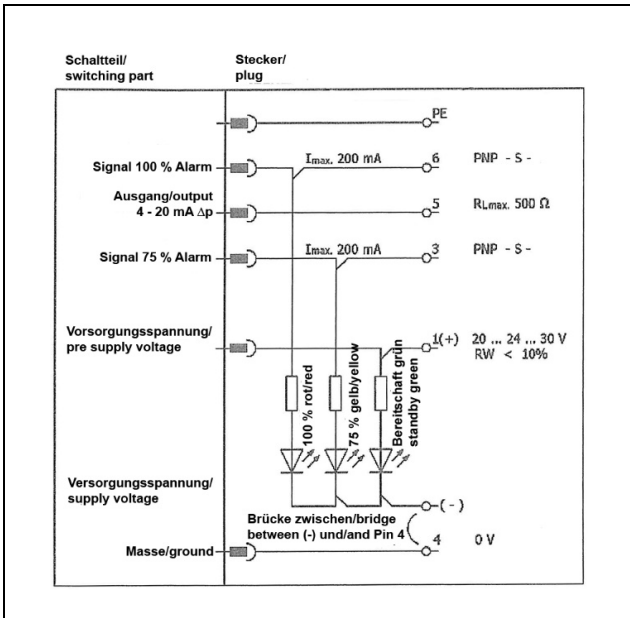


Fig. 4: Circuit diagram

\* Other pressures possible if conditions deviate from standard.

\*\* No bypass is used when filtering fuels.

## 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



The packaging is seaworthy and has a non-food declaration.

## 9 Installation

**⚠ DANGER!**

**Danger if work is carried out on the system by unauthorised persons!**

⇒ Risk of injury to persons or damage to property.

- The system is only allowed to be installed, accepted and tested by a suitably qualified person (99/98/EC).

**⚠ WARNING!**

**Danger if work is carried out on the system by unauthorised persons!**

⇒ Risk of injury to persons or damage to property.

- All installation work must be carried out by suitably qualified personnel.

### 9.1 Installation

It must be possible to remove the inner assembly in order to carry out maintenance work.

- Prepare a suitable location for installing the filter (e.g. a trough).
- Be sure to allow the required clearances for dismantling and discharging (see drawing).
- Unpack the duplex filter.
- Mount the duplex filter on bottom plates (feet) on the floor (see data sheet for dimensions).
- Remove the protection caps on the connections.
- Stress relief must be provided for all pipe connections to the duplex filter.

"In" is the dirty filter side.

"Out" is the clean filter side.

Use only suitable, chemically resistant seals for the piping.

## 9.2 Pressure relief

Design measures must be incorporated on the clean side to prevent inadmissible excess pressure on the dirty side or reverse flows.

- Install pressure relief and/or check valves if necessary.

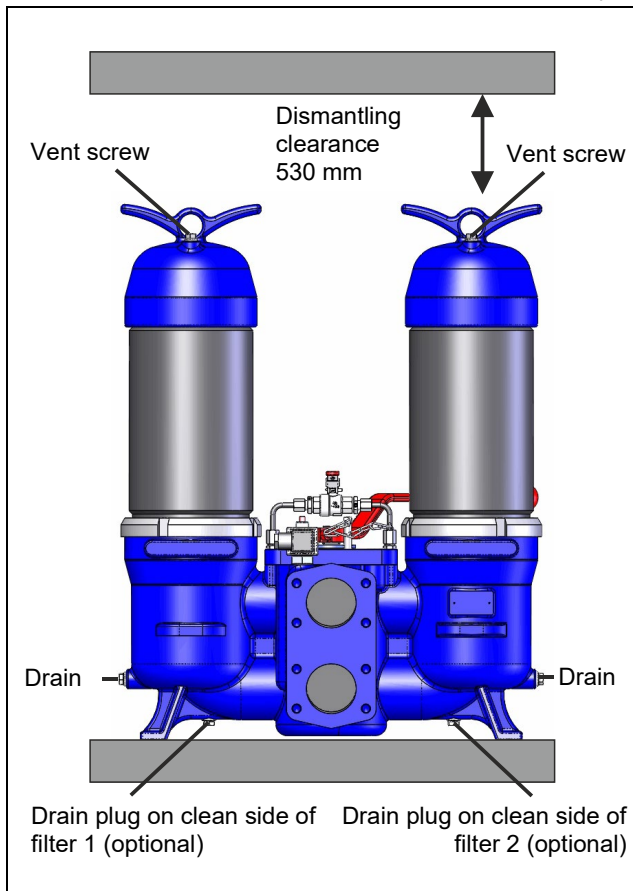


Fig. 5: Mechanical installation

## 10 Start-up

### **⚠ DANGER!**

The duplex filter must not be put into service until the relevant machinery / system / motor 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

- Check that the protection caps have been removed from the connections.
- Carefully open the vent screw on the filter side that is to be started up until liquid exits from it.
- Recover any exiting liquids in a suitable receiver flask.
- Check that the pipe connections are tight.
- Tighten all screws.
- Rinse the pipes.

## 11 Normal operation



Please always ensure that you have original FG replacement cartridges in stock. Disposable cartridges (Mic) cannot be cleaned.

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

- Differential pressure

## 12 Troubleshooting

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

## 13 Maintenance

### **⚠ CAUTION!**

**Danger if work is carried out on the system by unauthorised persons!**

⇒ Risk of injury.

- All maintenance work must be carried out by a suitably trained person.

### 13.1 Maintenance work on the filters

- Open the pressure equalising lever.
- Shift the switch-over handle (the handle position always indicates the non-operational side).  
⇒ The filter side on which the cartridge must be replaced is sealed off.
- Close the pressure equalising lever.
- Provide a suitable receiver flask.
- Open the drain plug and the vent screw.  
⇒ Discharge the filter.
- Check the seals of the drain plug and the vent screw and if necessary replace.
- Close the drain plug.
- Take steps to prevent the parallel unit from being operated by unauthorised persons.





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



- Carry out the maintenance work.
- Open the pressure equalising lever again.
- Reverse the switching lever.  
⇒ The maintained filter side is now active.
- Close the pressure equalising lever.
- Observe the duplex filter.  
Does it operate normally?

### 13.2 Inspection and maintenance schedule

- Refer also to the contract documentation.  
To be fixed individually by the owner of the plant.

	Visual inspection whenever the filter element is replaced or every six months at the latest.
	Carry out maintenance once a year.

### 13.3 Replacing the inner assembly

**⚠ DANGER!**

**The filter is pressurised!**

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

**⚠ DANGER!**

**Risk of injury!**

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

**⚠ CAUTION!**

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



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

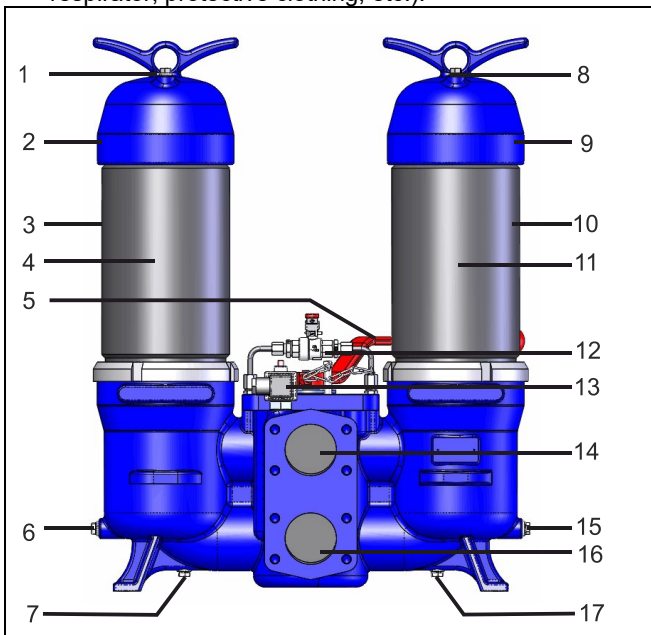


Fig. 6: Switching lever positions

- Open the pressure equalising lever (12).
- Select the other filter by reversing the switching lever (5):
  - Switching lever in position A: Filter 2 (F2) is deactivated while filter 1 (F1) is activated.
  - Switching lever in position B: Filter 1 (F1) is deactivated while filter 2 (F2) is activated.

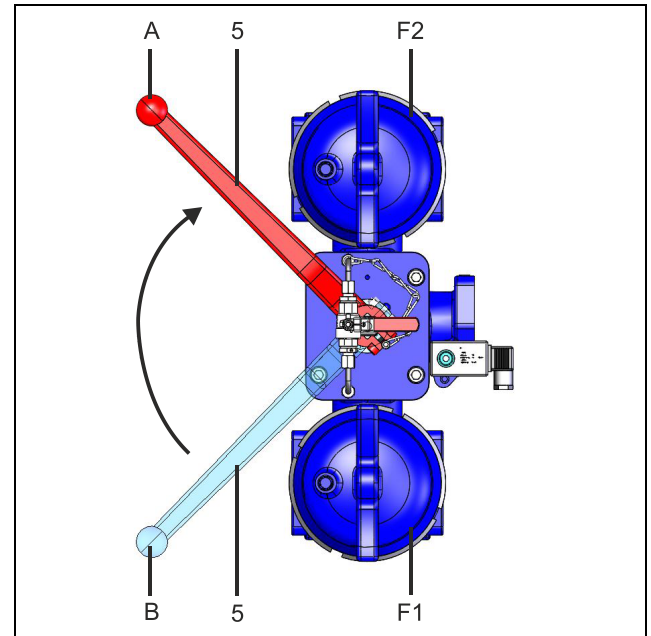


Fig. 7: Discharging the filter

- Place a trough or drip pan underneath.
- Close the pressure equalising lever (12).



- 3**
- Loosen the vent screw (1) two or three turns.

- 4**
- Open the drain plug (6).
- ⇒ The filter is discharged.

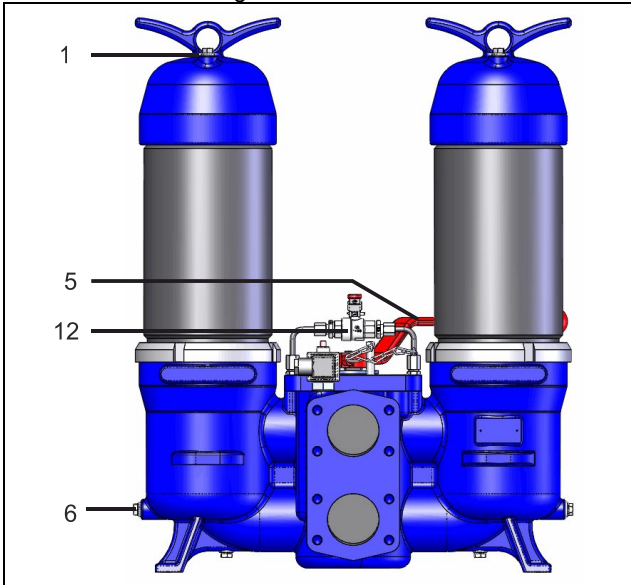


Fig. 8: Removing the filter cover

- 5**
- Unscrew the filter cover (2).
  - Remove the filter cover (2).

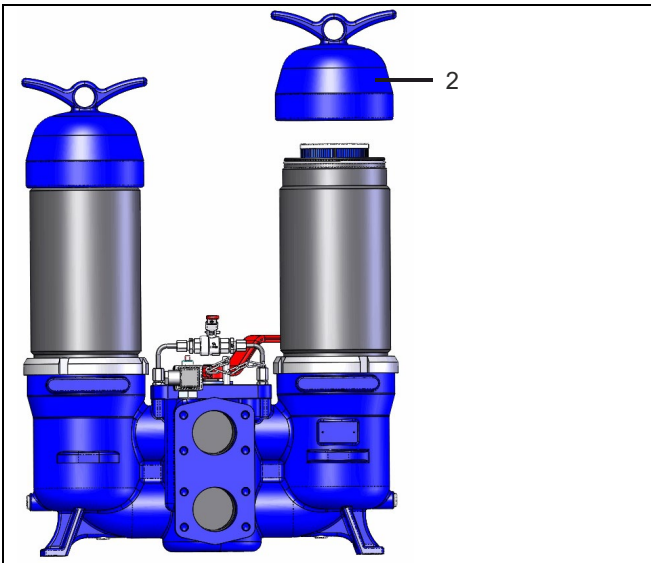


Fig. 9: Removing the filter cartridge

- 6**
- Remove the filter cartridge (4).

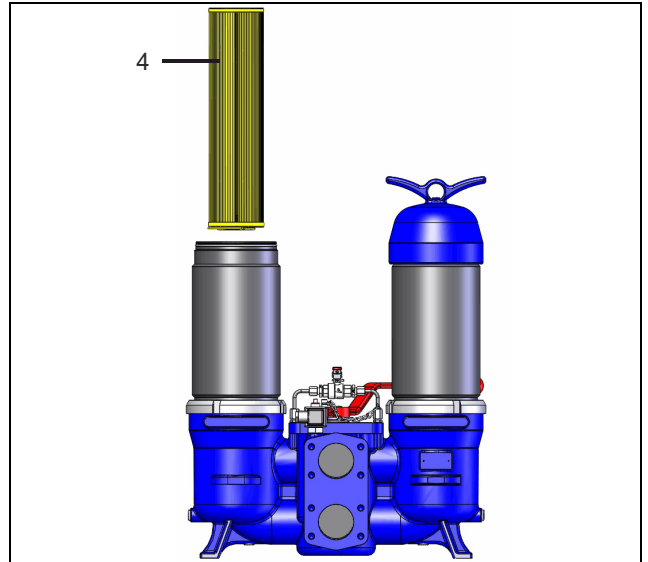



Fig. 10: Removing the filter cartridge

- Check all sealing points and seals.
- Replace the seals if necessary.
- Replace the dirty filter element (4) with a new FG element.

**To install**

- Install in reverse order.

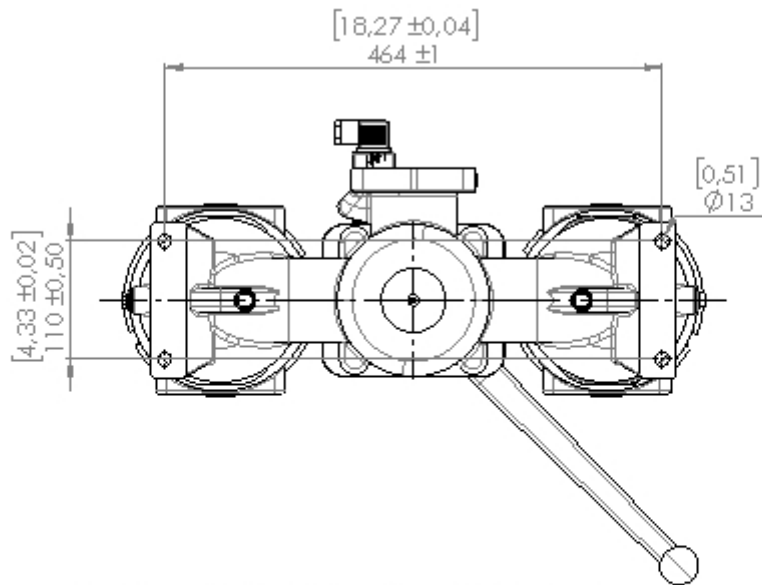
	<ul style="list-style-type: none"> <li>• After starting up one filter side, check that all sealing points are tight.</li> <li>• The system cannot be cleaned one hundred percent. The service life of the cartridges is gradually shortened.</li> </ul>
---	---

**13.4 Cleaning the filter housing**



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





**Befestigungsbohrungen / fixing hole**  
 Befestigung mit M12-12.9 Schrauben / fixing with screws M12-12.9

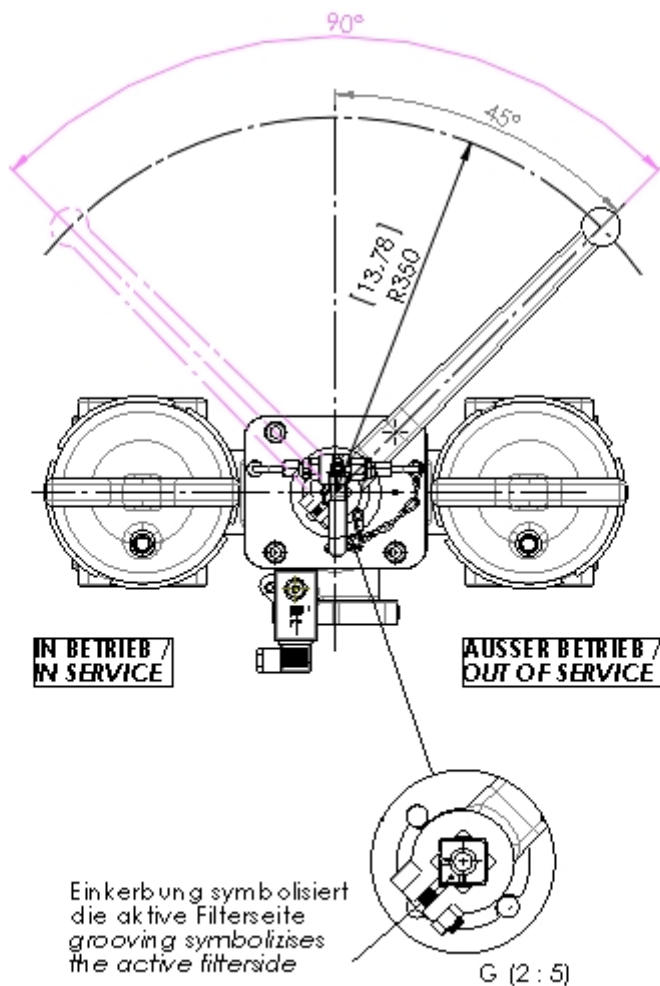


Fig. 12: Assembly drawing


## 15 Dimensions

All dimensions in mm.

Type	Port	A	B	Weight [kg]
Pi 211080	DN 64	1200	785	150
Pi 211110	DN 64	1465	1085	180
Pi 211063	DN 64	690	300	80
Pi 211100	DN 64	920	530	100

## 16 Spare parts

Qty.	Designation	Material no.	Benennung
1	Seal kit for housing NBR	70318468	Dichtungssatz Gehäuse NBR
1	Seal kit for housing FPM	70318469	Dichtungssatz Gehäuse FPM
1	Seal kit for housing EPDM	70318471	Dichtungssatz Gehäuse EPDM
1	Service indicator optical PiS 3098/2.2	77669971	Wartungsanzeiger optisch PIS 3098/2.2
1	Service indicator electrical, optical PiS 3097/2.2	77669948	Wartungsanzeiger optisch elektr. PIS 3097/2.2
1	Electrical top part	77536500	nur elektr. Oberteil
1	Seal kit for service indicator NBR	77760309	Dichtungssatz Wartungsanzeiger NBR
1	Seal kit for service indicator FPM	77760317	Dichtungssatz Wartungsanzeiger FPM
1	Seal kit for service indicator EPDM	77760325	Dichtungssatz Wartungsanzeiger EPDM

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

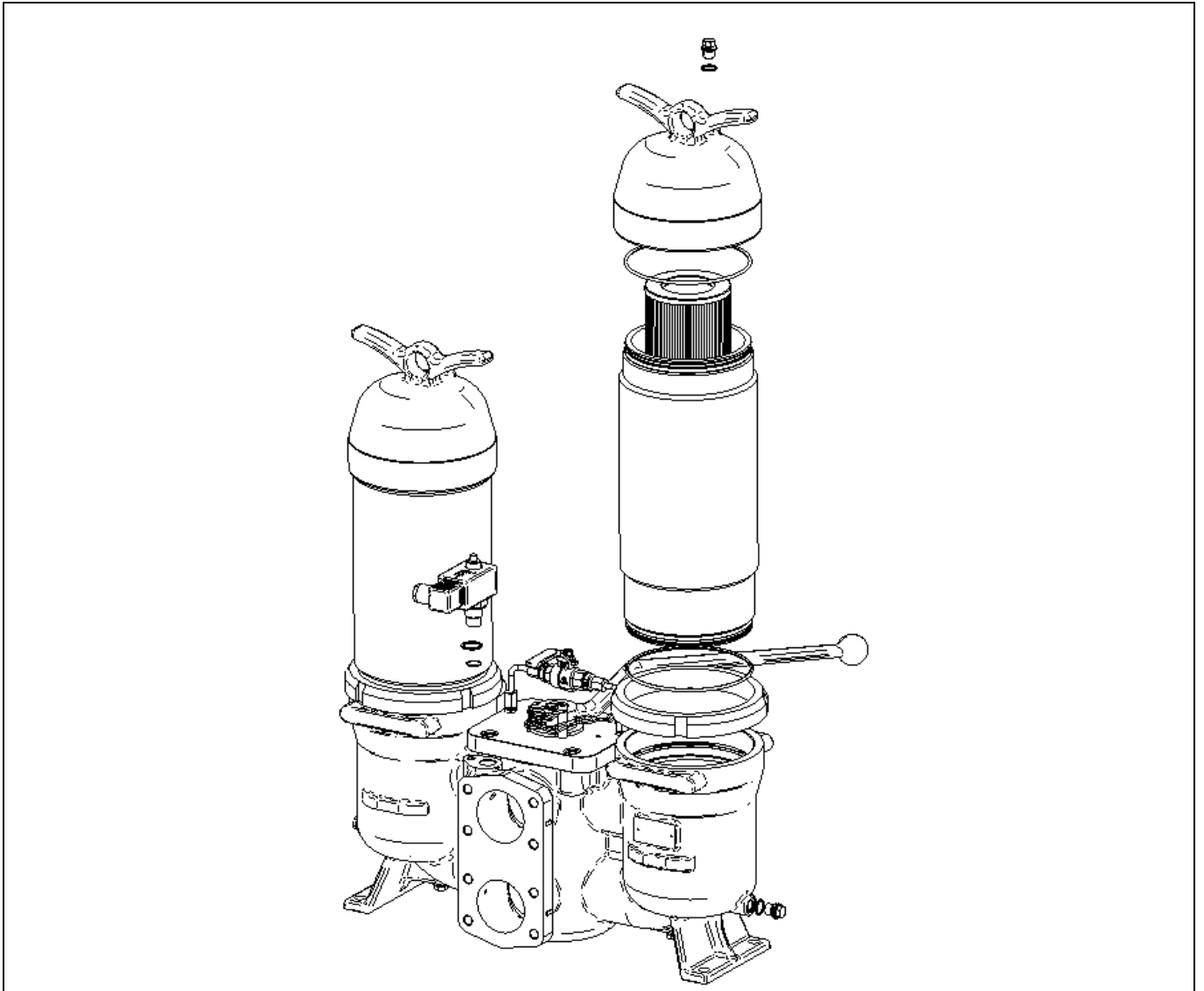


Fig. 13: Explosionszeichnung

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 :**  
**Typenbezeichnung:**  
**Type designation:**  
**Désignation du type :**

**Doppelschaltfilter**  
**Duplex filter**  
**Filtere double commutable**  
  
**Pi211/Pi 2110**

**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 is 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, libellé 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'inflammation 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:  
 Signatory:  
 Signataire :

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

Öhringen, 11/9/18  
 Datum/Date/Date

W. Zuck  
 Unterschrift/Signature/Signature

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