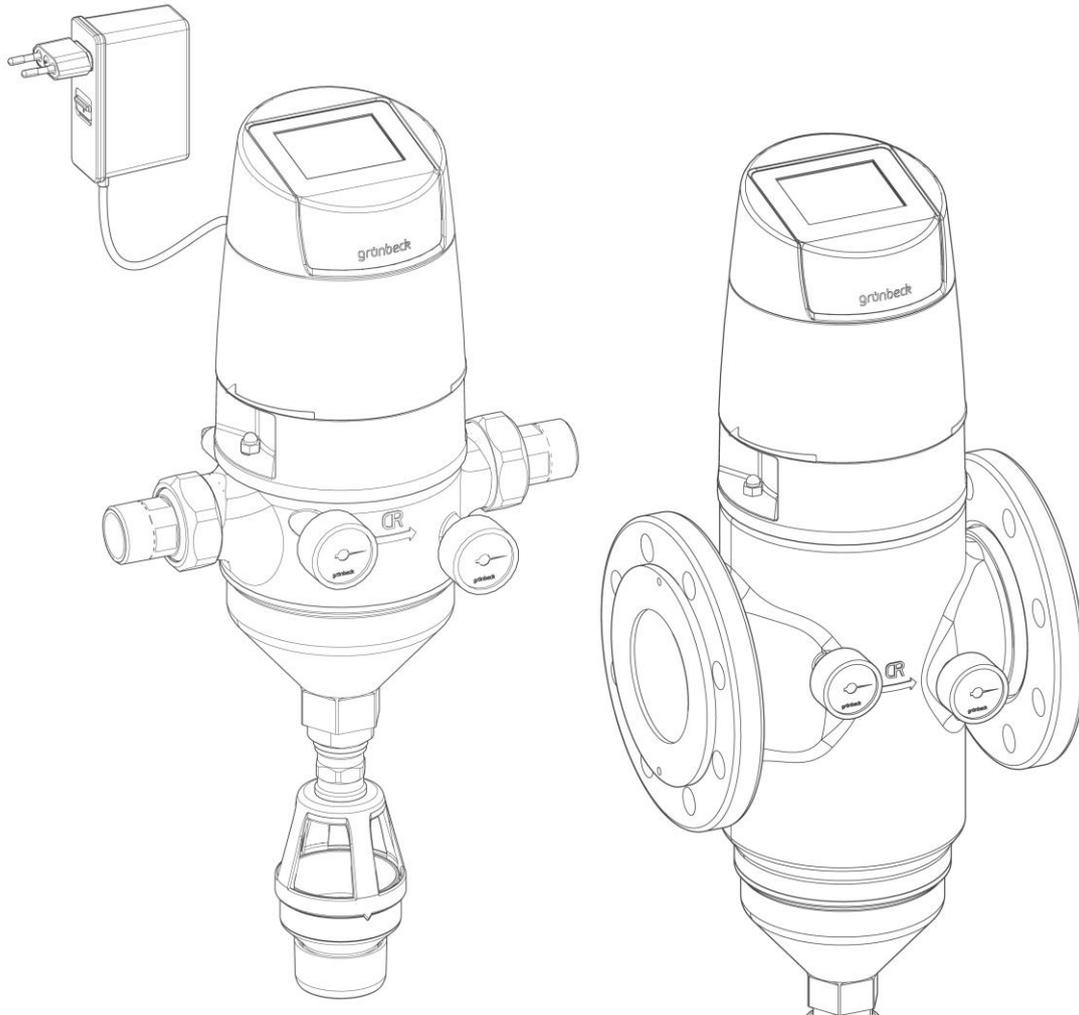




Your language  
qr.gruenbeck.de/040

We understand water.



## Backwash filter | MRA25 – MRA100

Operation manual

grünbeck

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Subject to technical modifications.  
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# 1 Introduction

This manual is intended for owners/operating companies, users, as well as qualified specialists, and ensures the safe and efficient handling of the product. The manual is an integral part of the product.

- Carefully read this manual and the component instructions contained therein before you operate your product.
- Comply with all safety information and handling instructions.
- Keep this manual and all other applicable documents, so that they are available when needed.

Illustrations in this manual are for basic understanding and can differ from the actual design.

## 1.1 Validity of the manual

This manual applies to following products:

- Backwash filter MRA25
- Backwash filter MRA32
- Backwash filter MRA40
- Backwash filter MRA50
- Backwash filter MRA65
- Backwash filter MRA80
- Backwash filter MRA100
- Special designs that essentially correspond to the standard products given above. For information on changes, please refer to the respective information sheet that is enclosed, if applicable.

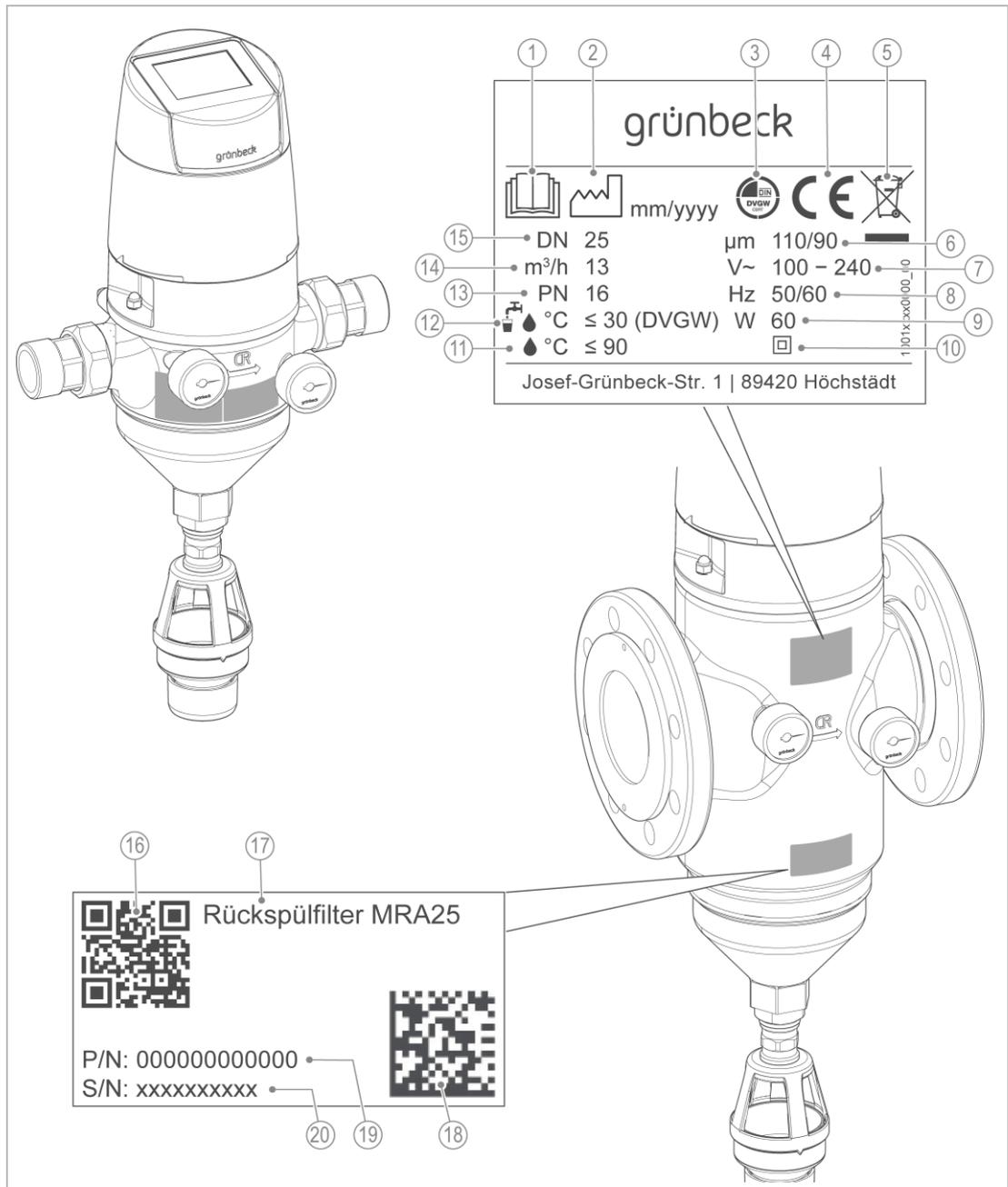
Version of control unit MRA-v. **1.000**

## 1.2 Product identification

You can identify your product by means of the product designation and the order number on the type plate.

- ▶ Check whether the products indicated in chapter 1.1 correspond to your product.

The type plate is located on the front and the rear of the filter housing.



Designation	
1	Observe the Operation Manual
2	Date of manufacture
3	DVGW test mark
4	CE mark
5	Disposal information
6	Max./min. pore size
7	Rated voltage range
8	Rated frequency
9	Rated load
10	Protection class

Designation	
11	Maximum water temperature
12	Water temperature in the drinking water sector
13	Nominal pressure
14	Nominal flow
15	Nominal connection diameter
16	QR code
17	Product designation
18	Data matrix code
19	Order no.
20	Serial no.

### 1.3 Symbols used

Symbol	Meaning
	Danger and risk
	Important information or prerequisite
	Useful information or tip
	Written documentation required
	Reference to further documents
	Work that must be carried out by qualified specialists only
	Work that must be carried out by qualified electricians only
	Work that is only allowed to be carried out by technical service personnel

### 1.4 Depiction of warnings

This manual contains information with which you must comply for your own personal safety. The information and instructions are highlighted by a warning symbol and are structured as shown below:



SIGNAL WORD	Type and source of the hazard
• Possible consequences	
▶ Preventive measures	

The following signal words are defined depending on the degree of danger and may be used in this document:

Warning symbol and signal word		Consequences if the information/instructions are ignored
<b>DANGER</b>		Death or serious injuries
<b>WARNING</b>	Personal injury	Possible death or serious injuries
<b>CAUTION</b>		Possible moderate or minor injuries
<b>NOTE</b>	Damage to property	Possible damage to components, the product and/or its functions, or anything in its vicinity

## 1.5 Demands on personnel

During the individual life cycle phases of the product, different people carry out work on the product. The respective tasks require different skills.

### 1.5.1 Qualification of personnel

Personnel	Prerequisites
Operator/user	<ul style="list-style-type: none"> <li>No special expertise</li> <li>Knowledge of the tasks assigned</li> <li>Knowledge of possible dangers in case of inappropriate behaviour</li> <li>Knowledge of necessary protective equipment and protective measures</li> <li>Knowledge of residual risks</li> </ul>
Owner/operating company	<ul style="list-style-type: none"> <li>Product-specific expertise</li> <li>Knowledge of statutory regulations on work safety and accident prevention</li> </ul>
Qualified specialist <ul style="list-style-type: none"> <li>Electrical engineering</li> <li>Sanitary engineering (HVAC and plumbing)</li> <li>Transport</li> </ul>	<ul style="list-style-type: none"> <li>Professional training</li> <li>Knowledge of relevant standards and regulations</li> <li>Knowledge of detection and prevention of potential hazards</li> <li>Knowledge of statutory regulations on accident prevention</li> </ul>
Technical service (Grünbeck's technical service/authorised service company)	<ul style="list-style-type: none"> <li>Extended product-specific expertise</li> <li>Trained by Grünbeck</li> </ul>

### 1.5.2 Authorisations of personnel

The following table describes which activities are allowed to be performed by whom.

	Operator/ user	Owner/ operating company	Qualified specialist	Technical service
Transport and storage		x	X	X
Installation and mounting			X	X
Start-up			X	X
Operation and handling	X	X	X	X
Cleaning	X	X	X	X
Inspection	X	X	X	X
Maintenance	semi-annually	X	X	X
	Annually		X	X
Troubleshooting		X	X	X
Repair			X	X
Shutdown and restart			X	X
Dismantling and disposal			X	X

### 1.5.3 Personal protective equipment

- ▶ As an owner/operating company, ensure that the required personal protective equipment is available.

The following components fall under the heading of personal protective equipment (PPE):



Protective gloves



Protective footwear

## 2 Safety

### 2.1 Safety measures

- Only operate your product if all components are installed properly.
- Obey the local regulations on drinking water protection, accident prevention and occupational safety.
- Do not make any changes, alterations or extensions on your product. Only use genuine spare parts for maintenance or repair.
- Keep the premises locked to prevent unauthorised access and to protect endangered or untrained persons from residual risks.
- Comply with the maintenance intervals (refer to chapter 8.2). Failure to comply can result in the microbiological contamination of your drinking water system.
- Be aware of a possible risk of slipping due to leaking water on the floor.

#### 2.1.1 Mechanical hazards

- You must never remove, bridge, or otherwise tamper with safety equipment.
- For all work on the product that cannot be carried out from the ground, use stable, safe and self-standing access aids (e.g. stepladders).
- Make sure that the product is properly secured, and that the stability of the product is always guaranteed.
- Potential risk of pinching and cuts on threaded connections. Use protective gloves when connecting the product and during maintenance work.

#### 2.1.2 Pressure-related hazards

- Components can be under pressure. There is a risk of injuries and damage to property due to escaping water and unexpected movement of components. Check the pressure lines and the product for leaks at regular intervals.
- Before starting repair and maintenance work, make sure that all affected components are depressurised.

### 2.1.3 Electrical dangers

There is an immediate danger of fatal injury from electric shock when touching live components. Damage to the insulation or individual components can be life-threatening.

- Only have a qualified electrician carry out electrical work on the system.
- In case of damage to live components, switch off the voltage supply immediately and arrange for repair.
- Switch off the voltage supply before working on electrical components.
- Never bridge electrical fuses. Do not disable fuses. Use the correct current ratings when replacing fuses.
- Keep moisture away from live parts. Moisture can cause short-circuiting.

### 2.1.4 Groups of persons requiring protection

- Children should be supervised to ensure that they do not play with the product.
- This product must not be used by persons (including children) with limited abilities, lack of experience or knowledge. Unless they are supervised, have been instructed on the safe use of the product and understand the resulting hazards.
- Cleaning and maintenance must not be carried out by children.

## 2.2 Product-specific safety instructions

### SELV (Safety Extra Low Voltage): Protection by means of safety extra low voltage

The product is only and exclusively designed for operation and use with SELV. By using the power supply unit supplied with the system, this requirement is fulfilled.

Do not modify the product as this can affect compliance with safety standards and result in serious injury or damage to property.



- All connected devices and signal interfaces or lines must be suitable for operation with SELV.
- ▶ Consult a qualified electrician or Grünbeck if you are unsure whether your power supply is a SELV source.



#### **WARNING** Excessive contamination of the filter element

- Health risk due to contamination of the drinking water.
- ▶ Comply with the intervals and recommendations for inspection and maintenance of the filter.

### When using the product in hot water filtration, e.g. for heating water:



#### **WARNING** Hot water and hot surfaces



- Burns due to hot surfaces of components at temperatures of more than 55 °C.
- Scalding due to escaping hot water, e.g. during backwash.
- ▶ For hot water filtration, install a fixed waste water pipe on the flushing water connection of the filter.
- ▶ Use suitable protective gloves when working on the product.

### Labels on the product



Hot surfaces/medium



In case of hot water filtration make sure that the product is labelled for risk of hot water.



The affixed information and pictograms must be clearly legible. They must not be removed, soiled, or painted over.

- ▶ Obey all warnings and safety instructions.
- ▶ Immediately replace illegible or damaged symbols and pictograms.

## 2.3 Conduct in emergencies

### 2.3.1 In case of water leaks

1. Close the shut-off valves for the water flow upstream and downstream from the product.
2. De-energise the product.
  - a Unplug the power supply unit from the socket.
3. Locate the leak.
4. Eliminate the cause of the water leak.

### 2.3.2 In case of control failure

1. De-energise the product.
  - a Unplug the power supply unit from the socket.
2. Contact technical service.

## 3 Product description

### 3.1 Intended use

- The MRA backwash filters are designed for the filtration of drinking and industrial water.
- The filters are suitable for the filtration of process, boiler feed, cooling and air conditioning water (only in partial flow).
- The filters protect the water pipes and connected water-carrying system parts from malfunctions and corrosion damage due to undissolved impurities (particles) such as rust particles, sand, etc.
- The filters are designed according to the stipulations of DIN EN 13443-1 as well as DIN 19628 and are intended for installation into drinking water system according to DIN EN 806-2 (installation immediately downstream of the water meter).

#### 3.1.1 Application limits

- Water temperature  $\leq 90$  °C
- Water temperature  $\leq 30$  °C when used in the drinking water sector (DVGW)
- Pressure range  $\leq 16$  bar
- Pressure range  $\leq 10$  bar in case of a media temperature of 90 °C

#### 3.1.2 Foreseeable misuse

The filters must not be used in the areas below:

- in the negative pressure range
- for circulation water treated with chemicals
- for media such as oils, greases, solvents, soaps and other lubricating media, nor for the separation of water-soluble substances
- for installation into vertical water pipes

### 3.2 Product components

The product components are valid for the following versions of the MRA backwash filters:

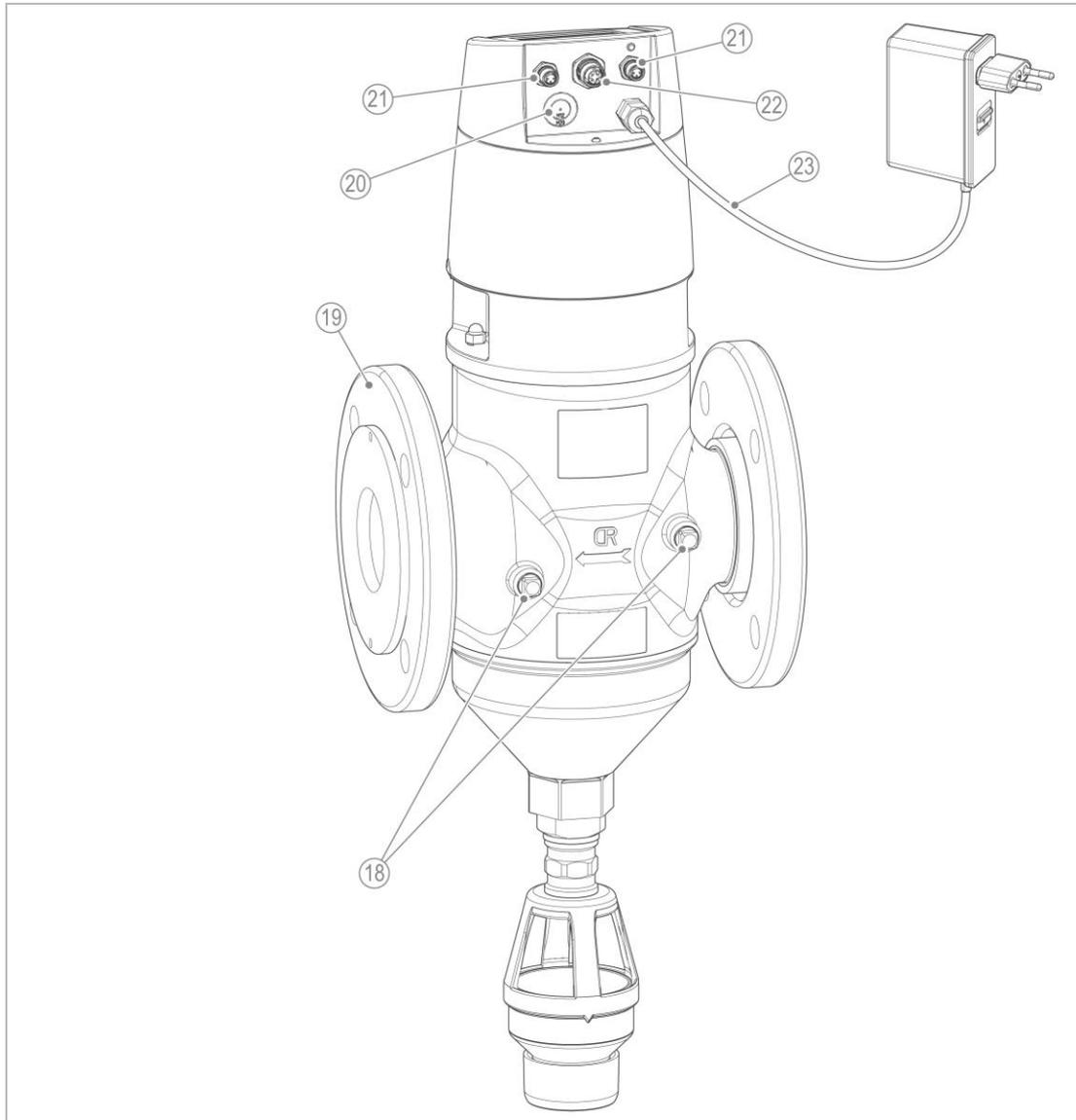
- with screw connections: 1" (DN 25), 1¼" (DN 32), 1½" (DN 40), 2" (DN 50)
- with flange connections: DN 65, DN 80, DN 100



Designation	
15	Filter funnel
16	Flat seal
17	Double socket

Designation	
18	Flushing water connection with free outlet
19	Nozzle screw

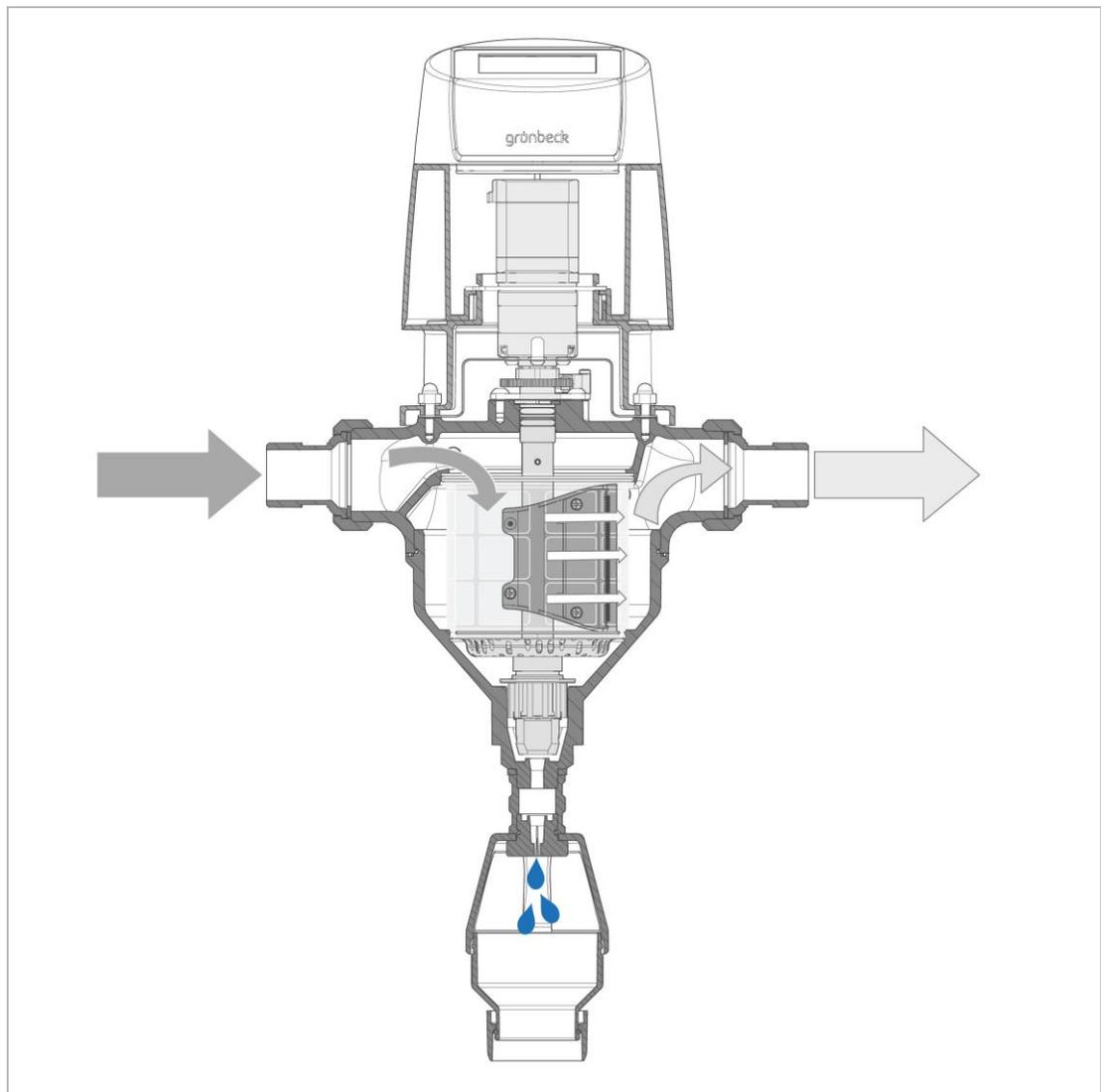
**Version with flange connections DN 65, DN 80, DN 100**



Designation	
18	Blind plug
19	Flange connection acc. to DIN EN 1092-1
20	Holes for cable gland M12/M20 (external signal line)

Designation	
21	Connections for pressure sensors
22	Connection for safety solenoid valve
23	Connection cable of power supply unit, 2 m in length

### 3.3 Functional description



The unfiltered raw water flows into the filter from the inlet side and from the inside out through the filter element and to the pure water outlet. Thus, foreign particles of > 100 µm in size are retained.

Depending on their size and weight, foreign particles stick to the filter element, or they fall straight down into the filter funnel.

Due to the growing contamination of the filter element, the differential pressure between the raw water inlet and the pure water outlet increases.

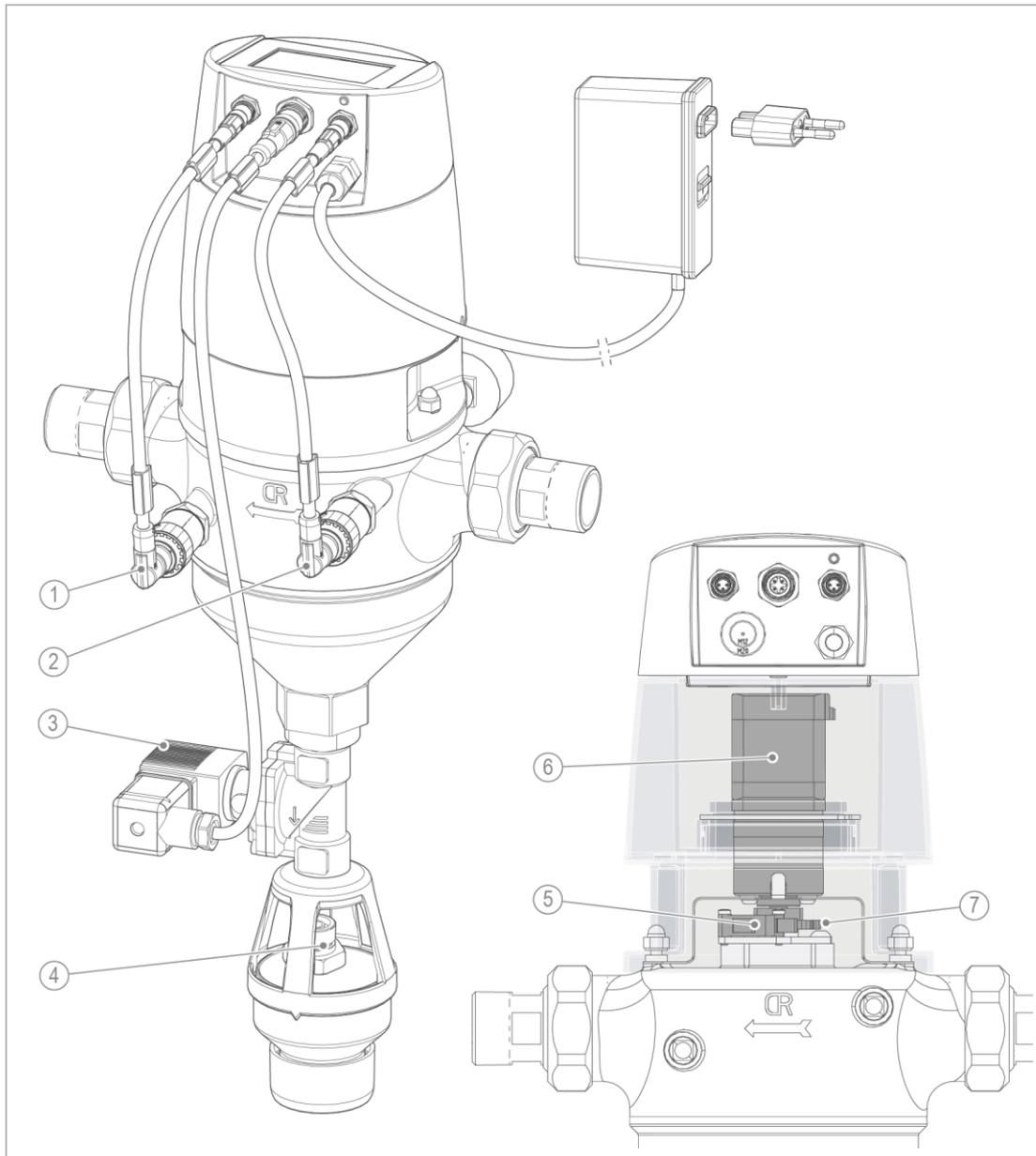
The differential pressure can be read at the pressure gauges, or on the display of the control unit by way of the pressure sensors available as an option.

The backwash process is activated by the integrated control unit and carried out by the drive unit on the filter head. The lower suction nozzle (valve) is lifted and the drain outlet is open.

During the turning motion, the brush turns as well and sweeps over the filter surface of the filter element. The filter element is cleaned. The impurities are removed by the brush and the suction nozzle sucks them into the drain outlet.

A manual backwash can be started at any time via the control unit.

### 3.3.1 Backwash via control unit



#### Designation

- 1 Outlet pressure sensor (optional)
- 2 Inlet pressure sensor (optional)
- 3 Safety solenoid valve (optional)
- 4 Nozzle screw

#### Designation

- 5 Microswitch
- 6 Drive unit
- 7 Cam disc

## Backwash process

The control unit releases backwash processes by way of set time intervals and monitors the number of backwash processes. The backwash lock can be activated by means of a lock time.

When optional pressure sensors are used, the control unit can also start a backwash via the adjustable differential pressure (preset to 0.4 bar).

The backwash process can be controlled via external inputs.

Backwash process		
	Start	Lock
Time intervals	1 h ... 180 d	Time from ... to
Differential pressure (optional)	0.2 ... 3.0 bar	Time from ... to
External inputs/bus interface	Backwash release	Backwash lock

For signal forwarding and remote monitoring, the control unit features the connection options below:

- Bus interface (Modbus RTU)
- Fault signal contact
- Programmable input

### Sequence of a backwash process

- The drive unit gradually opens the valve (suction nozzle) within 40 seconds.
- The filter is flushed for 10 seconds.
- The drive unit gradually closes the valve (suction nozzle) within 40 seconds.

If opening and closing the valves is blocked by dirt or wear and tear of the components, the control unit recognises this and reacts automatically.

If the control unit cannot resolve the issue automatically, a corresponding error message is displayed (refer to chapter 9).

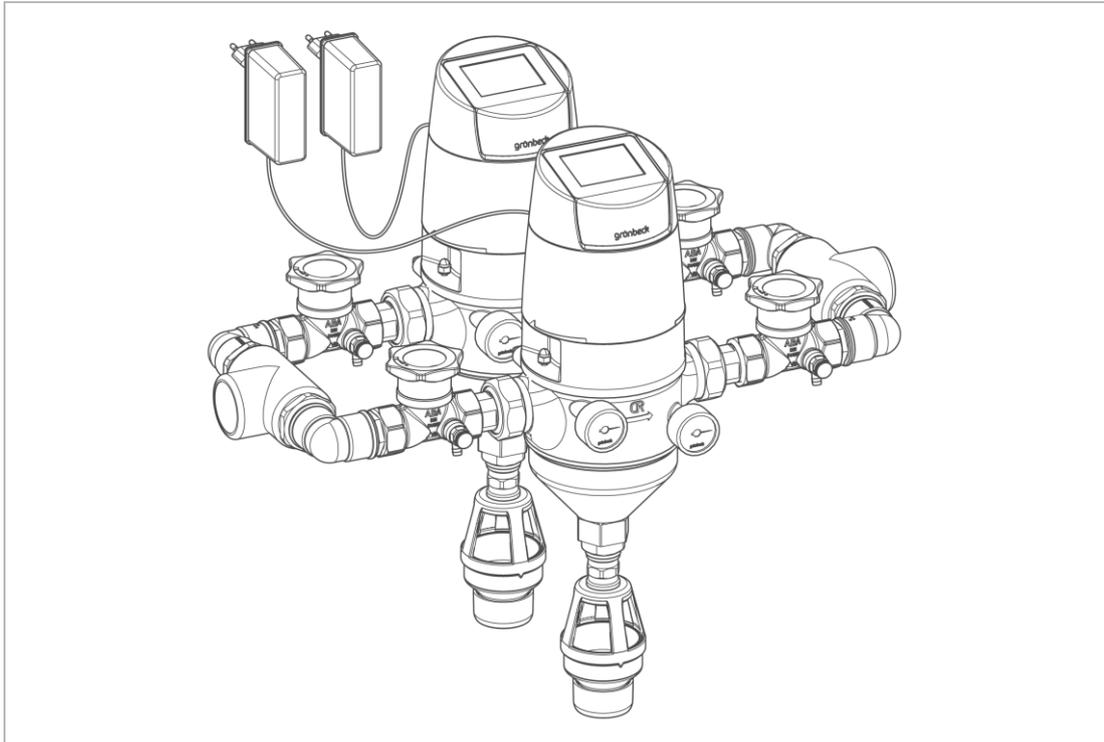


In the event of a power failure during an ongoing backwash process, the backwash will not be terminated automatically. The water continues to be flushed out until the backwash process is terminated manually.

An optional safety solenoid valve closes the drain outlet in the event of a power failure and prevents further water discharge (refer to chapter 5.4.6).

### 3.3.2 Parallel operation of two filters (cascade)

#### Parallel piping and cascade function



Parallel piping for various sizes and materials (refer to chapter Accessories 3.4).

Via the **DI1** input and the **DO1** output, two control units/filters can be operated in combination.

The inputs and outputs must be set to **cascade** mode in the software of both control units.

The two filters must be connected to the terminal strip (refer to chapter 5.4.4.1).

Due to the communication between the two filters, backwashing cannot be carried out on both filters at the same time.

- Cascade mode at the input is analogous to **backwash lock**
- Cascade mode for output is analogous to **backwash active**

### 3.4 Accessories

Your product can be retrofitted with accessories. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechstaedt/Germany for details.



Take into consideration that the availability of accessories can differ from country to country.

As per DIN EN 13433-1, filter elements with pore sizes of 50 µm, 200 µm and 500 µm are not permitted for drinking water systems and might only be used after consultation with Grünbeck.

Designation	Order no.		
	1" / 1¼"	1½" / 2" / DN 65	DN 80 / DN 100
50 µm filter element	107 052	107 053	107 054
Filter element 200 µm	107 072	107 073	107 074
Filter element 500 µm	107 082	107 083	107 084

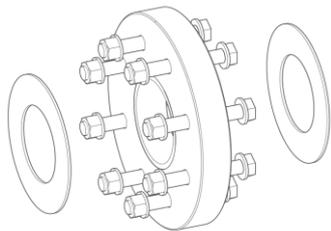
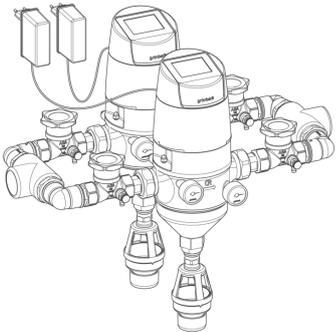
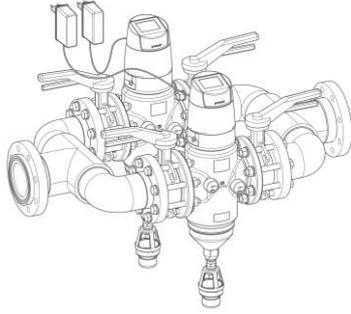
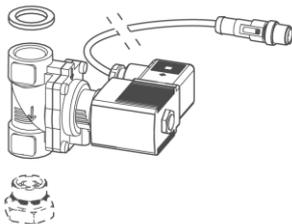
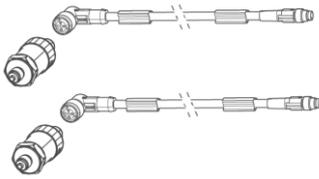
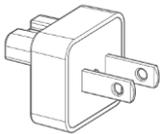
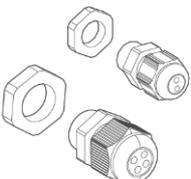
Illustration	Product	Order no.												
	<p><b>Adapter kit</b> As spacer flange, to ensure the function of the butterfly valves directly mounted on the filter. Scope of supply: 2 flanges, 4 seals, 16 screws M16x120 mm with washers and nuts</p>	<p>For DN 80 with flange connection <b>106 804e</b></p> <p>for DN 100 with flange connection <b>106 805e</b></p>												
	<p><b>Parallel piping</b> For connection in parallel (cascade) of 2 filters, with pre-assembly of parallel piping (without filter)</p>	<p><b>Brass version</b></p> <table border="1"> <tbody> <tr> <td>DN 40</td> <td>Filter connection 1"</td> <td><b>552 005</b></td> </tr> <tr> <td>DN 50</td> <td>Filter connection 1¼"</td> <td><b>552 010</b></td> </tr> <tr> <td>DN 50</td> <td>Filter connection 1½"</td> <td><b>552 015</b></td> </tr> <tr> <td>DN 80</td> <td>Filter connection 2"</td> <td><b>552 020</b></td> </tr> </tbody> </table>	DN 40	Filter connection 1"	<b>552 005</b>	DN 50	Filter connection 1¼"	<b>552 010</b>	DN 50	Filter connection 1½"	<b>552 015</b>	DN 80	Filter connection 2"	<b>552 020</b>
DN 40	Filter connection 1"	<b>552 005</b>												
DN 50	Filter connection 1¼"	<b>552 010</b>												
DN 50	Filter connection 1½"	<b>552 015</b>												
DN 80	Filter connection 2"	<b>552 020</b>												

Illustration	Product	Order no.	
	<b>PVC version</b>		
	DN 80	Filter connection DN 50	<b>552 200</b>
	DN 100	Filter connection DN 65	<b>552 201</b>
	DN 100	Filter connection DN 80	<b>552 205</b>
	DN 125	Filter connection DN 80	<b>552 210</b>
	DN 150	Filter connection DN 100	<b>552 215</b>
<b>For PP-H and PE version, please inquire</b> <b>For version without pre-assembly, please inquire</b>			
	<b>Safety solenoid valve</b>	<b>107000150000</b>	
<p>Normally closed safety solenoid valve as an additional safety device.</p> <ul style="list-style-type: none"> <li>Prevents inadmissible water discharge during a backwash, e.g. in the event of a power failure or a defect on the filter (e.g. larger dirt particles block a complete closing of the drain valve)</li> </ul>			
	<b>Pressure sensors</b>	<b>107000160000</b>	
<p>To measure the water pressure at the inlet and the outlet of the filter</p> <ul style="list-style-type: none"> <li>A backwash is released via a limit value for the differential pressure programmed in the control unit.</li> </ul>			
	<b>Interchangeable adapter Taiwan (10 pieces)</b>	<b>100212510001</b>	
<p>For plug-in power supply unit 24 VDC/60 W, optional for use in Taiwan</p> <ul style="list-style-type: none"> <li>110 V/60 Hz, type A/B</li> </ul>			
	<b>Cable gland kit</b>	<b>100221330001</b>	
<p>For the installation of the external signal lines on the control head</p> <ul style="list-style-type: none"> <li>Cable gland M12 with sealing insert for 1 or 2 cables</li> <li>Cable gland M20 with sealing insert for 3 or 4 cables</li> </ul>			

## 4 Transport and storage

### 4.1 Dispatch/delivery/packaging

The product is packed in a cardboard box at the factory and secured with a foam bag.

- ▶ Check immediately upon receipt for completeness and transport damage.
- ▶ In case of visible transport damage, proceed as follows:
  - Do not accept the delivery or only accept it under reserve.
  - Take note of the extent of damage on the transport documents or on the delivery note of the carrier.
  - Initiate a complaint.

### 4.2 Transport to/at the installation site

- ▶ Transport the product in its original packaging only.



#### CAUTION

Unhandy size of the product during transport

- Crushing due to the product falling down.
- ▶ Transport or lift the product with two people.
- ▶ Use personal protective equipment (refer to chapter 1.5.3).

### 4.3 Storage

- ▶ Protect the product from the effects of the following when storing it:
  - Moisture, wetness
  - Environmental impacts such as wind, rain, snow, etc.
  - Frost, direct sunlight, severe heat exposure
  - Chemicals, dyes, solvents and their vapours

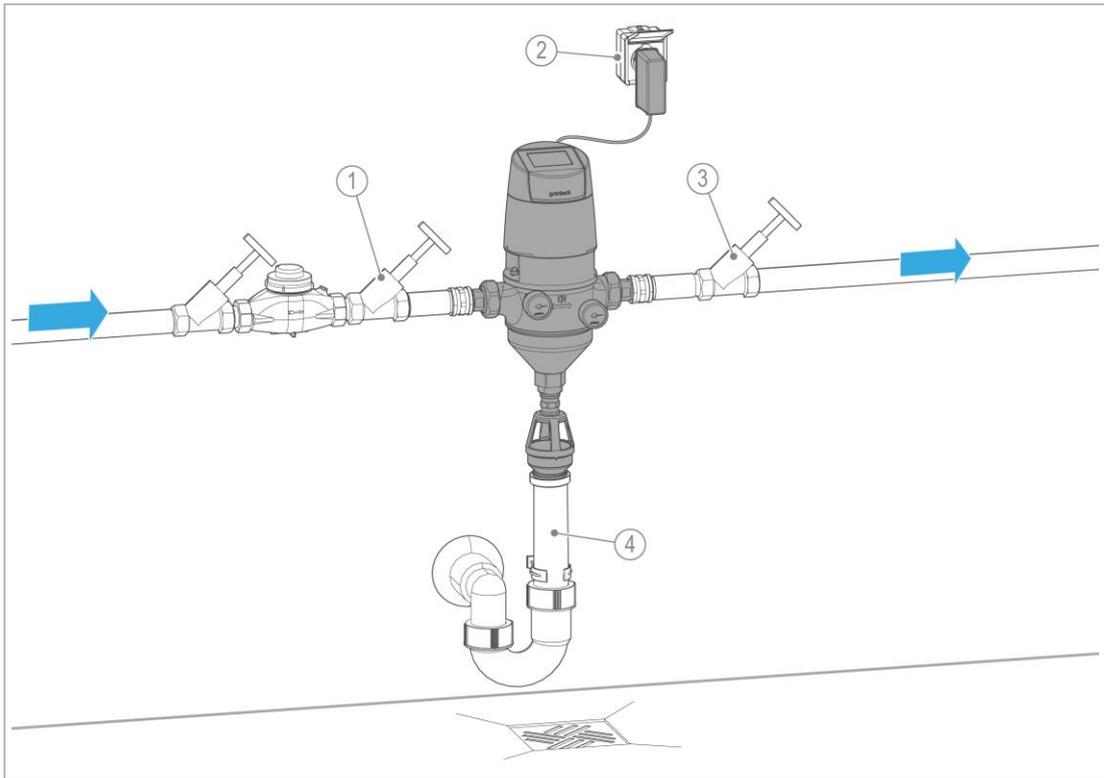
## 5 Installation



The installation of the product represents a major intervention into the drinking water system and must be carried out by a qualified specialist only.

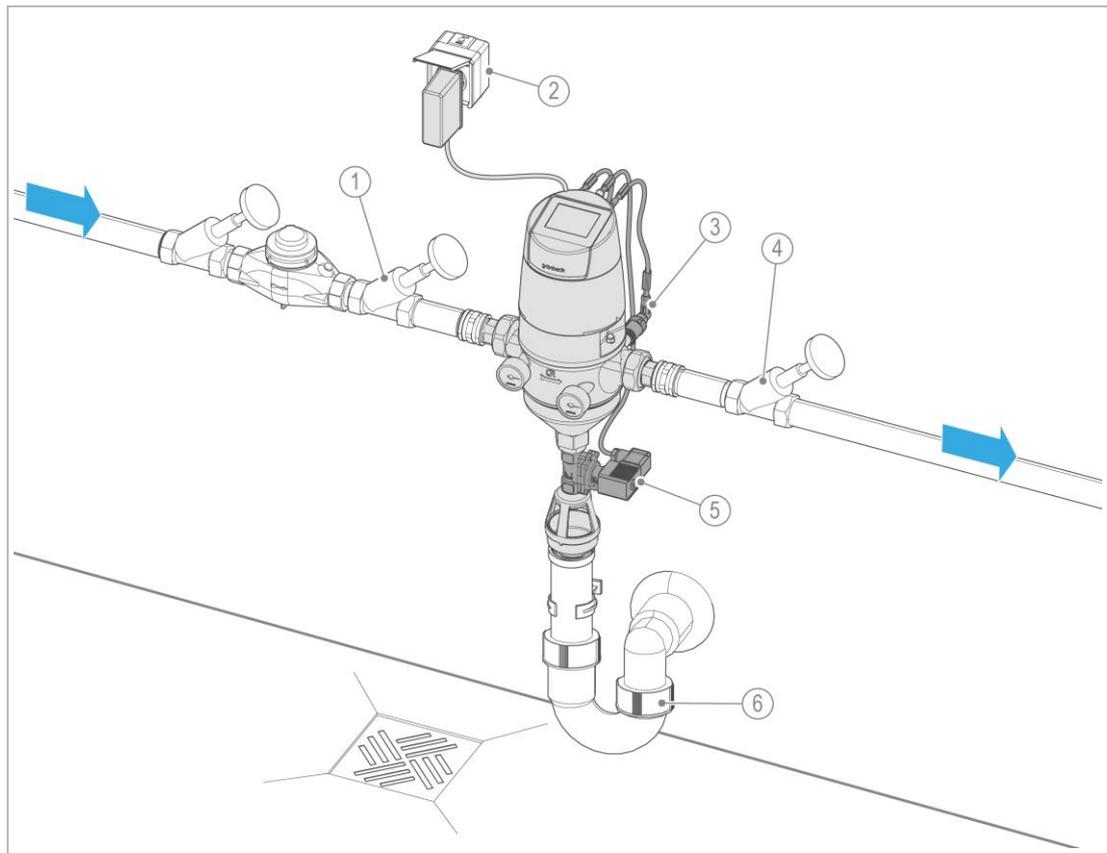
In accordance with DIN EN 806-2 and DIN EN 1717, the product is to be installed in the water pipe downstream of the water meter and upstream of distribution pipes and the appliances to be protected.

### Installation example: Backwash filter with screw connections



Designation	Designation
1 Inlet shut-off valve	3 Outlet shut-off valve
2 Socket	4 Drain connection provided by the client on site

### Installation example: Backwash filter with optional accessories



Designation	Designation
1 Inlet shut-off valve	4 Outlet shut-off valve
2 Socket	5 Safety solenoid valve (optional)
3 Inlet and outlet pressure sensors (optional)	6 Drain connection provided by the client on site

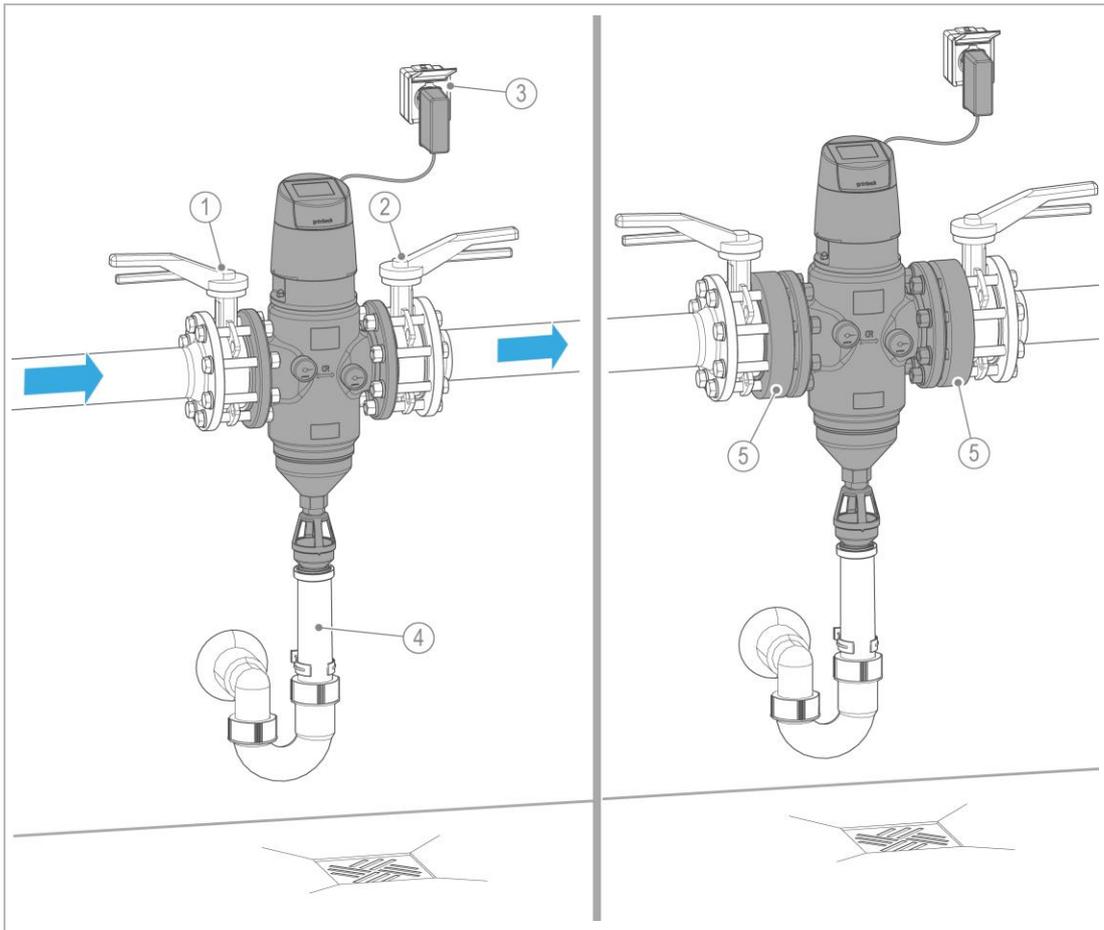
#### Optional equipment

- ▶ When installing an optional safety solenoid valve and/or pressure sensors, take into consideration the space required for installation, maintenance and operation (refer to chapter 5.4.5).



If the required space for mounting the pressure sensors on the back of the filter is not available, the pressure sensors can optionally be mounted on the front of the filter. The pressure gauges must be removed, however.

**Installation example: Backwash filter with flange connections**



**Designation**

- 1 Inlet shut-off valve
- 2 Outlet shut-off valve
- 3 Socket

**Designation**

- 4 Drain connection provided by the client on site
- 5 Optional adapter kit

## 5.1 Requirements for the installation site

Obey the local installation directives, general guidelines and technical specifications.

- Protection from frost, severe heat exposure and direct sunlight
- Protection from chemicals, dyes, solvents and their vapours
- Ambient temperature and radiation temperature in the immediate vicinity
  - $\leq 25\text{ °C}$  for applications in the drinking water sector
  - $\leq 40\text{ °C}$  for purely technical applications
- Protection from heat sources in the drinking water sector (e.g. heating systems, boilers and warm water pipes)
- Access for maintenance work (take required space into consideration)
- Sufficiently illuminated as well as aerated and ventilated

### Required space

- Clearance above the filter head for operation  $\geq 80\text{ mm}$
- Clearance downwards for removal of the filter element (refer to chapter 12)
- Clearance at the front for operation  $\geq 500\text{ mm}$

### Water installation

- Floor drain or corresponding safety device with water stop function
- Drain connection  $\geq \text{DN } 50$
- Shut-off valves upstream and downstream of the product

### Electrical installation

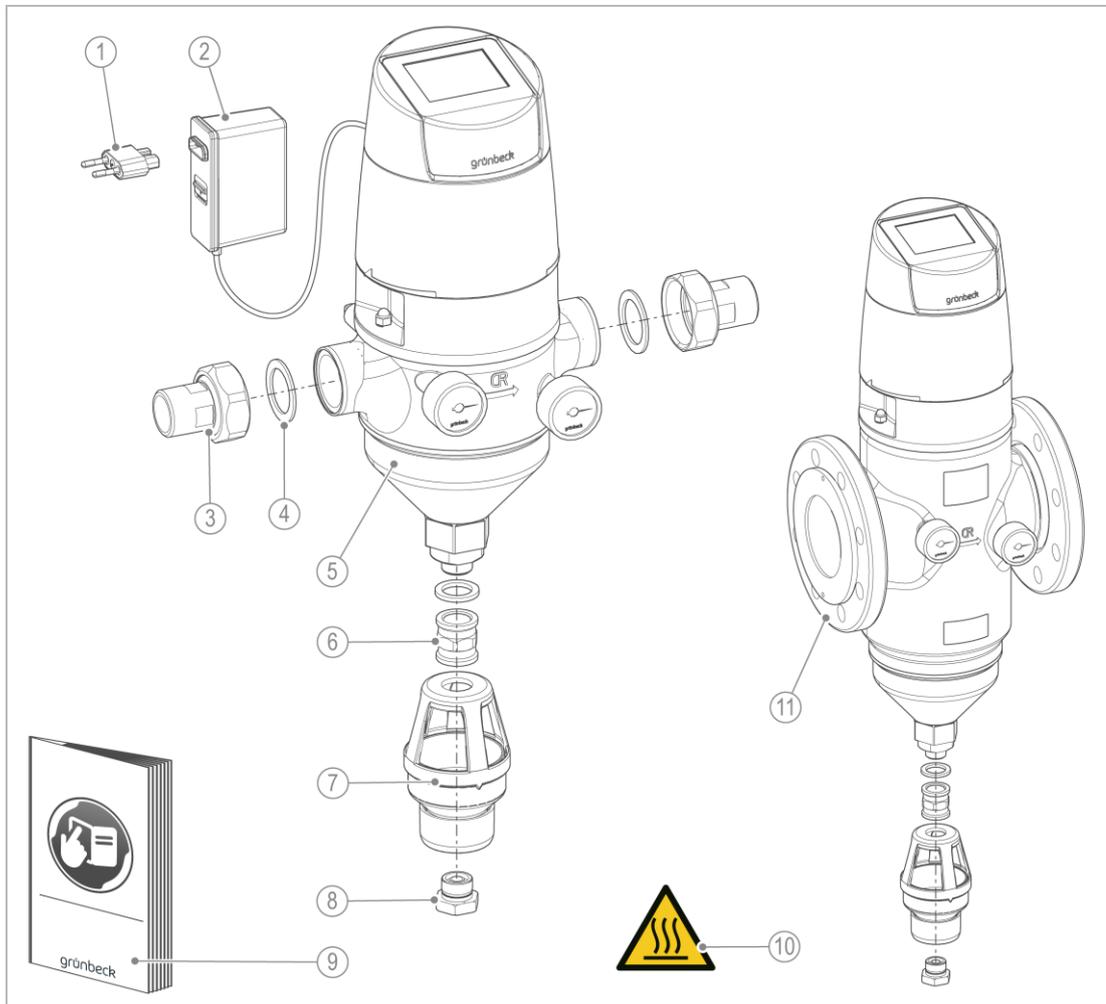
- Socket with continuous power supply (approx. 1.2 m max. from the control unit)
- The socket must not be coupled with light switches, emergency heating switches or the like.
- The product must only be operated with SELV (Safety Extra Low Voltage).
- All connected devices and signal interfaces or lines must be suitable for operation with SELV.

## 5.2 Checking the scope of supply



Filters with screw connections for sizes: 1" (DN 25), 1¼" (DN 32), 1½" (DN 40), 2" (DN 50)

Filters with flange connections for sizes: DN 65, DN 80, DN 100



### Designation

- |   |  |
|---|--|
| 1 | Universal adapter (type C), Euro plug<br>Taiwan adapter (type A/B), optional |
| 2 | Power supply unit  |
| 3 | Water meter screw connections  |
| 4 | Seals  |
| 5 | Filters with screw connections   |
| 6 | Double socket with flat gasket   |

### Designation

- |    |  |
|----|--|
| 7  | Flushing water connection                              |
| 8  | Nozzle screw   |
| 9  | Operation manual                                       |
| 10 | Adhesive label "Hot surfaces" for hot water filtration |
| 11 | Filters with flange connections                        |

► Check the scope of supply for completeness and damage.

## 5.3 Water installation



The filter must only be installed horizontally and free of mechanical stress.

- ▶ Use protective gloves and protective footwear during the installation.
- ▶ Install the filter with an auxiliary person.

### In case of hot water filtration

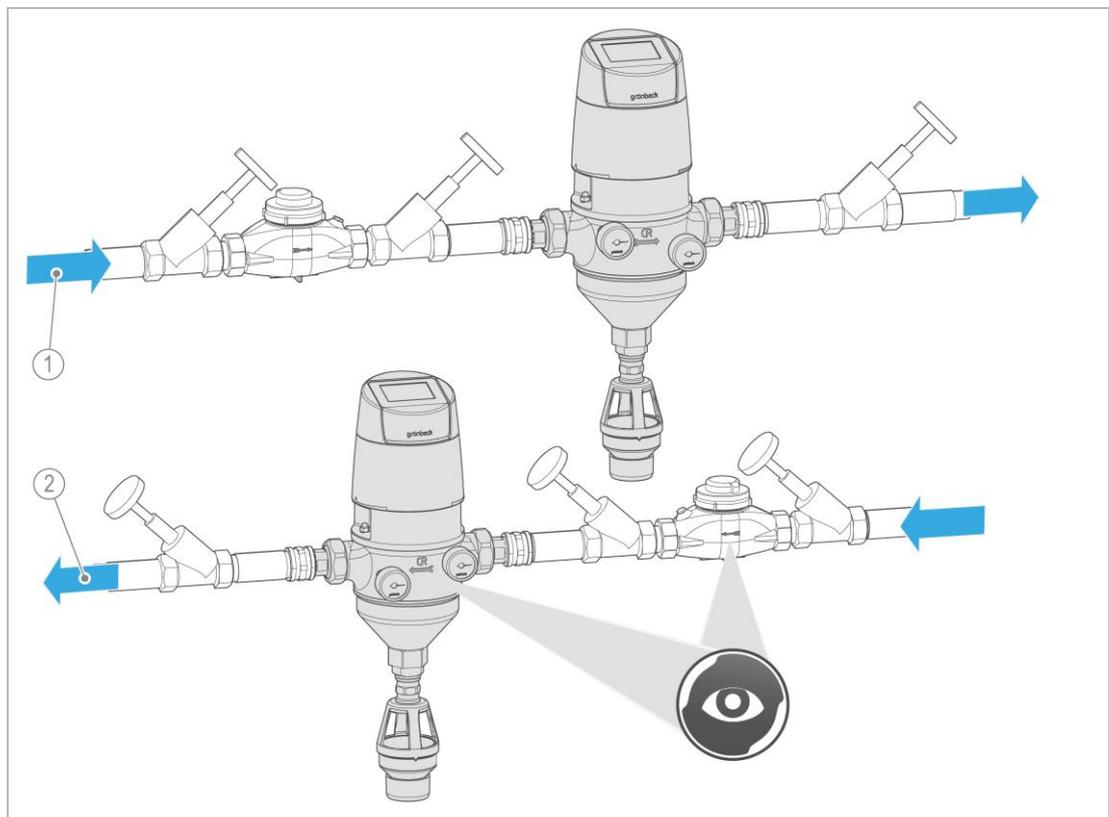


**WARNING** Hot water and hot surfaces



- Burns due to hot surfaces of components at temperatures of more than 55 °C.
- Scalding due to escaping hot water, e.g. during backwash.
- ▶ Use suitable protective gloves when working on the product.
- ▶ Provide protection from hot surfaces in case of hot water filtration.
- ▶ Visibly attach the warning label “Hot surfaces” on the filter housing (refer to chapter 2.2).

### 5.3.1 Changing the direction of flow



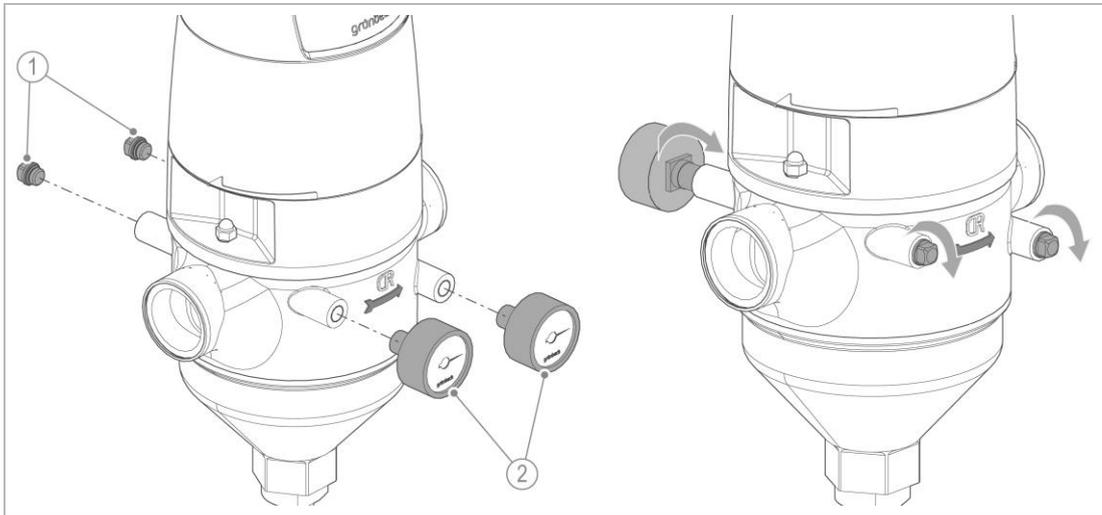
Designation

1 Flow from left to right

Designation

2 Flow from right to left

- ▶ Check the flow direction given on site.
- ▶ Refit the filter's pressure gauges, if necessary:



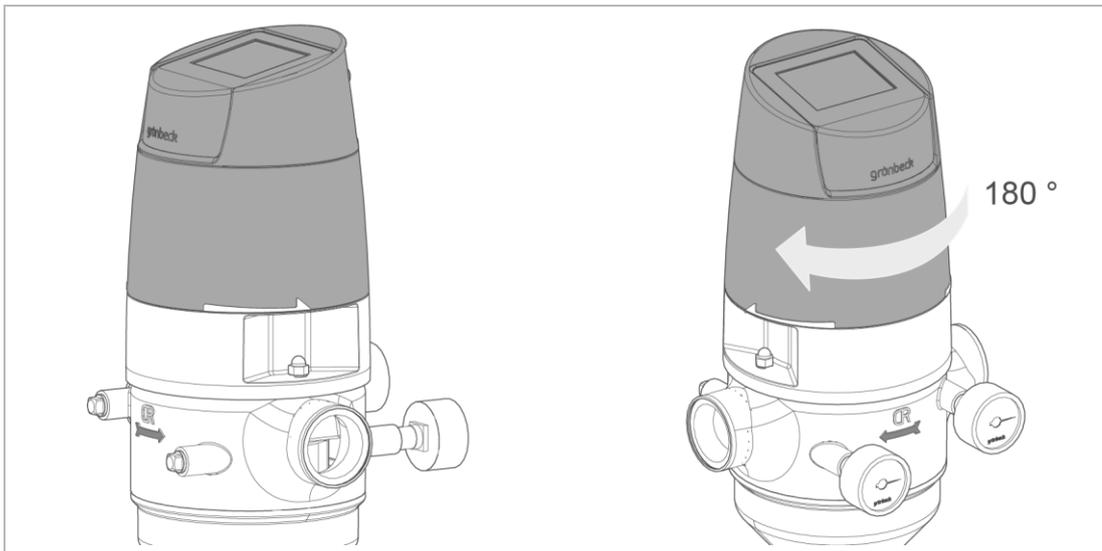
**Designation**

1 Closing plug

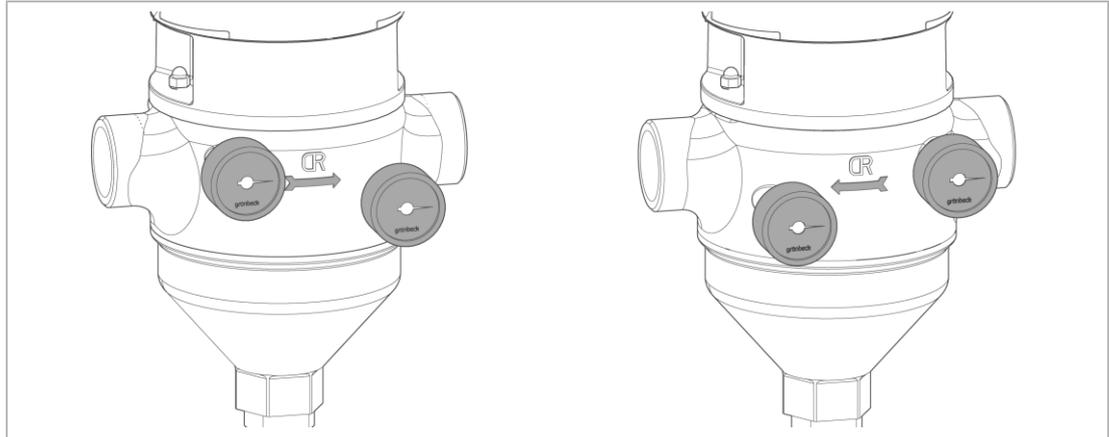
**Designation**

2 Pressure gauges for inlet and outlet pressure

1. Unscrew the closing plugs with O-ring as well as the pressure gauges.
2. Rotate the filter 180°.
3. Fit the closing plugs with O-ring and the pressure gauges.
  - a Tighten the thread of the components with Teflon.



4. Rotate the control head 180° as far as it will go.
  - a Turn the control head with both hands and make sure that the power supply unit including connection cable is not damaged in the process.
  - » The display of the control unit faces forward when the filter is installed.

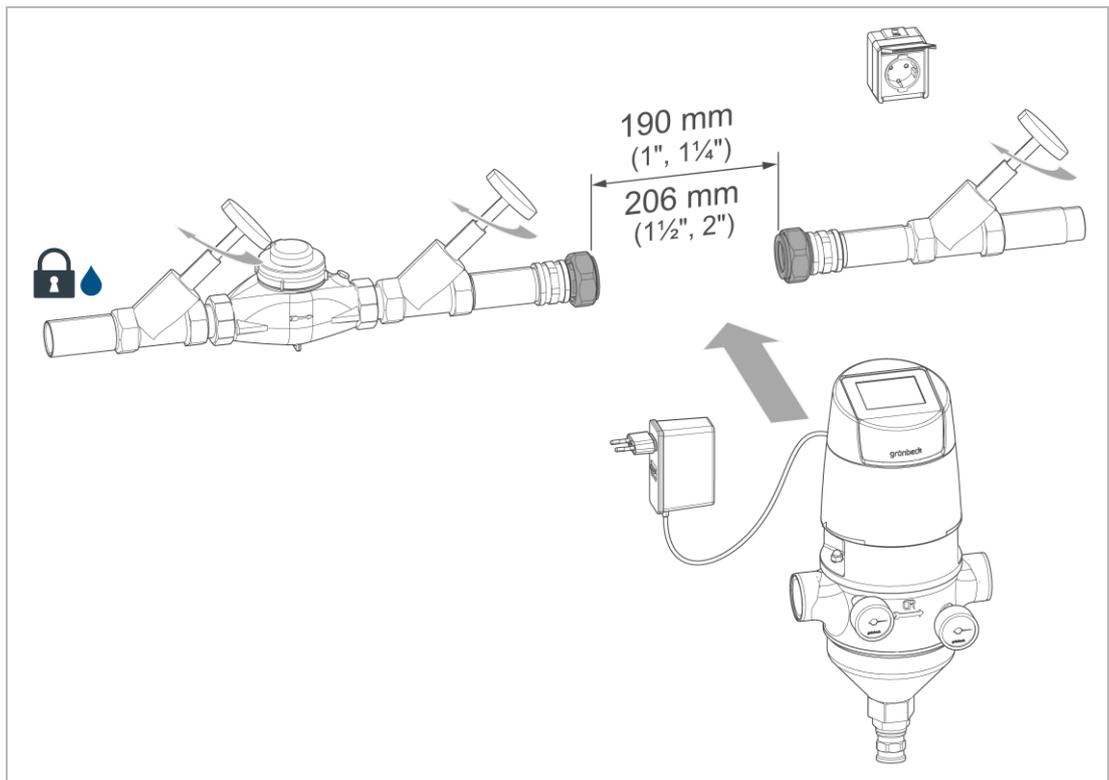


- » The filter has been modified for flow direction from right to left.
- » The pressure gauges face forward when the filter is installed.

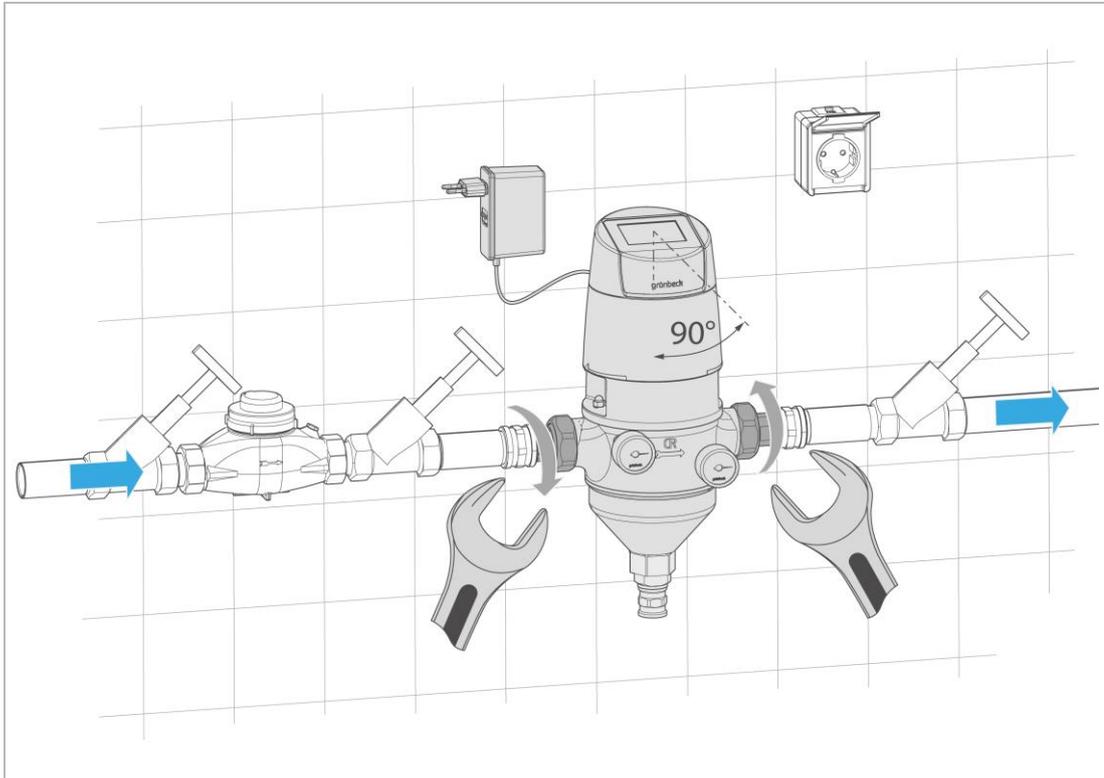


The optional pressure sensors can be mounted on the back or, alternatively, on the front of the filter (refer to chapter 5.4.5).

### 5.3.2 Installing the backwash filter (MRA 1" – 2") with screw connections



1. Install the water meter screw connection in the pipe.
  - » The distance between the two seals must have the dimensions below:  
For 1"/1¼" = 190 mm and for 1½"/2" = 206 mm
2. Position the filter in the pipe.
  - a Pay attention to the marking of the flow direction on the filter.



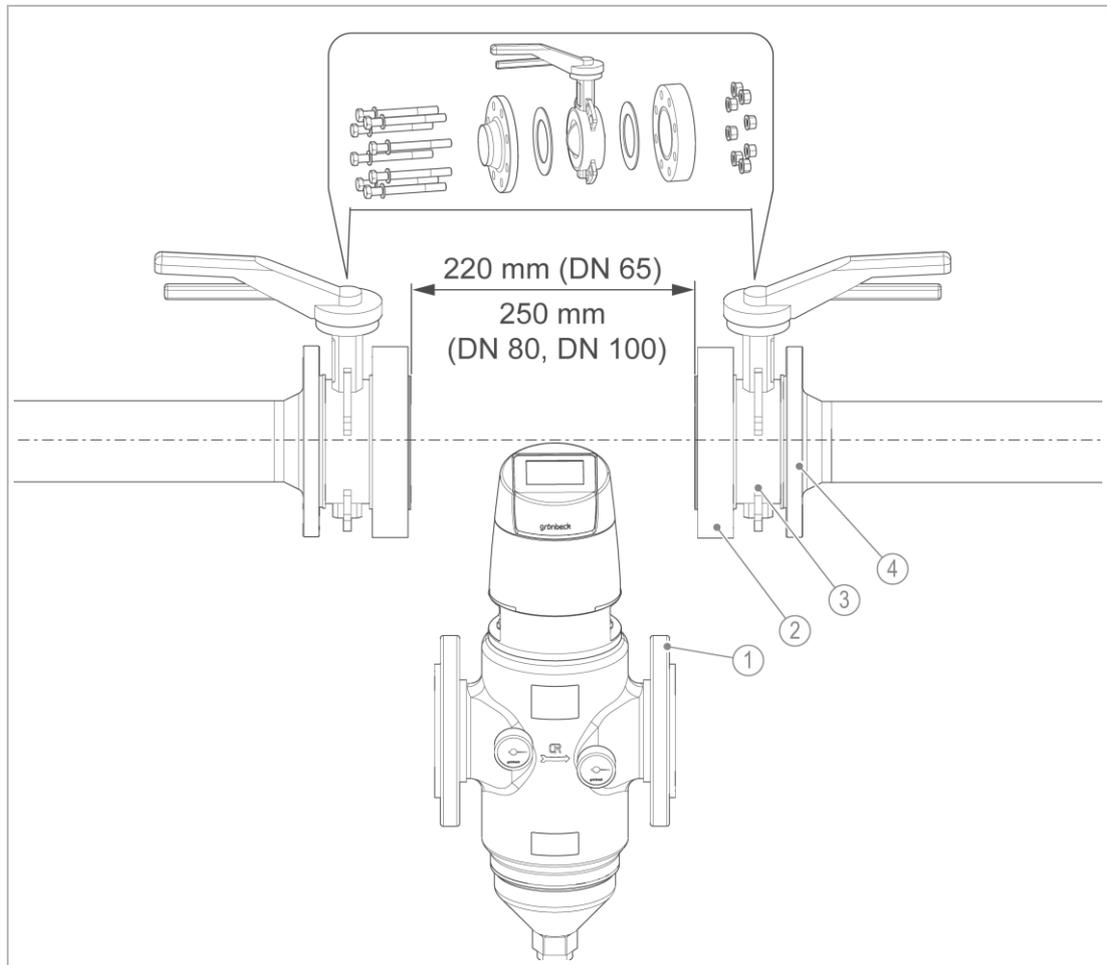
3. Install the filter without stress and tighten the union nuts.

### 5.3.3 Installing the backwash filter (MRA DN 65 – DN 100) with flange connection



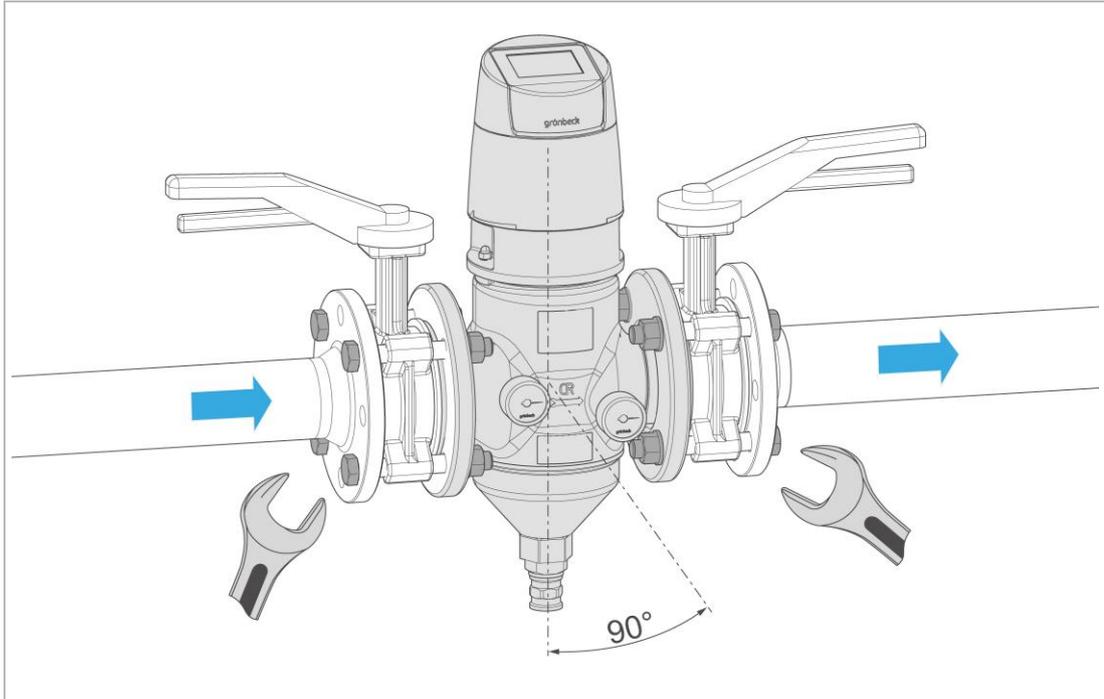
The backwash filters MRA DN 65, DN 80 and DN 100 are designed with flange connection PN 16 according to DIN EN 1092-1.

- Comply with the Technical specifications for the flange connection (refer to chapter 12.5).

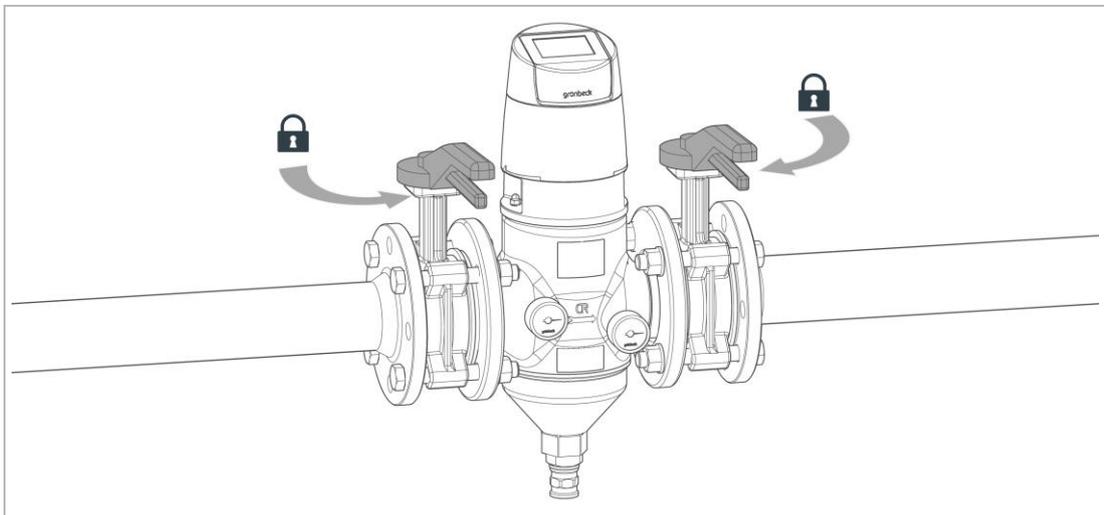


Designation	Designation
1 Loose flange on the filter	3 Butterfly valve to be provided by client on site
2 Adapter kit optional for DN 80 and DN 100	4 Fixed flange to be provided by client on site

1. Prepare the pipe with flange connection according to DIN EN 1092-1.
  - » The distance between the two seals must have the dimensions below:  
For DN 65 = 220 mm and for DN 80/DN 100 = 250 mm



2. Position the filter in the pipe.
  - a Pay attention to the marking of the flow direction on the filter.
3. Tighten the filter at the flange screw connections without applying tension.
  - a If necessary, install an (optional) adapter kit to ensure the function of the butterfly valves.



The on-site butterfly valves must open and close completely.

- a Check the butterfly valves for function after installation.

### 5.3.4 Installing the connection for the backwash water



In case of MRA backwash filters with automatic backwash, it is mandatory to install a waste water pipe with drain connection.



Refer to chapter 5.4.6, before installing an optional safety solenoid valve.

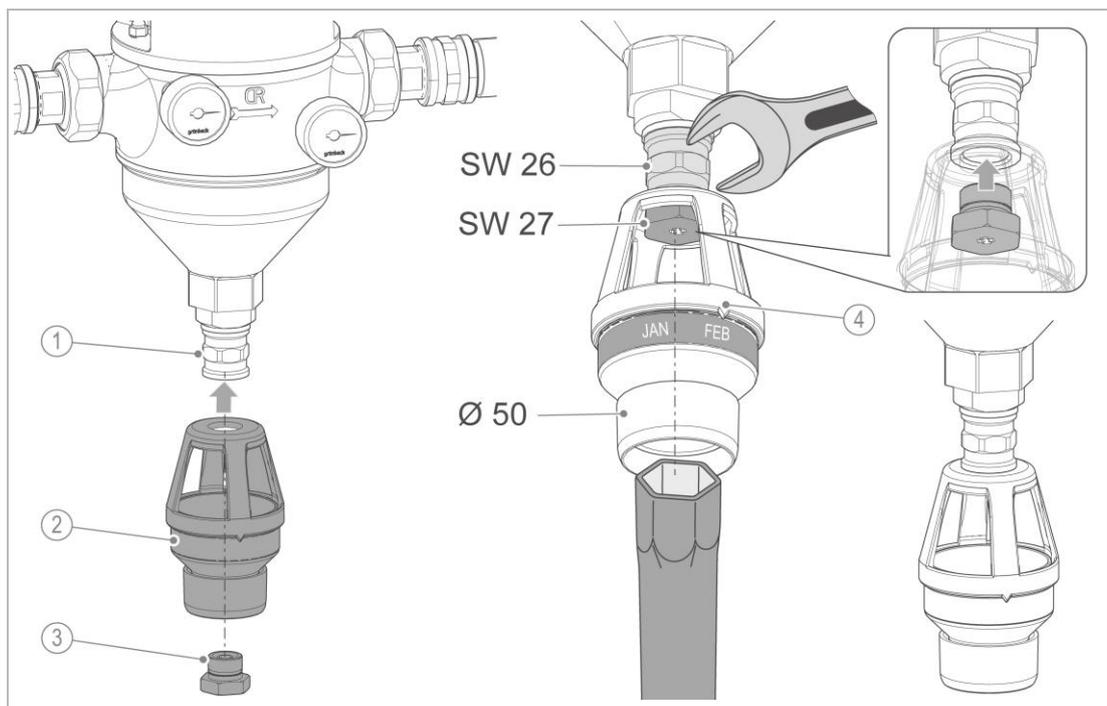


#### CAUTION Splashing hot water during backwash

- Scalding in case of hot water filtration without waste water pipe.
- ▶ For hot water filtration, install a fixed waste water pipe on the flushing water connection of the filter.

#### 5.3.4.1 Installing the flushing water connection

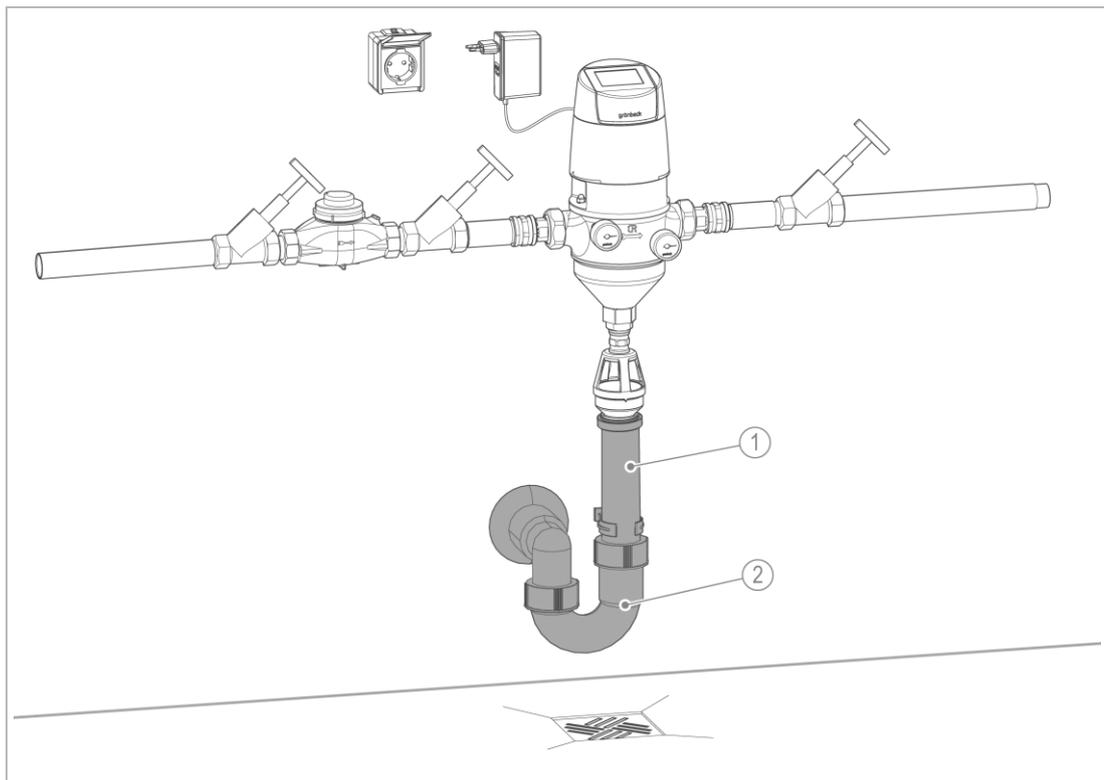
- ▶ Install the flushing water connection on the filter.



Designation	Designation
1 Double socket	3 Nozzle screw
2 Flushing water connection	4 Marking of month indicator

1. Push the nozzle screw through the flushing water connection.
2. Screw the flushing water connection to the nozzle screw in the double socket.
  - a Make sure that the marking of the month indicator is facing forward.

### 5.3.4.2 Installing the drain connection and the waste water pipe



**Designation**

**1** Waste water pipe to be provided by the client on site

**Designation**

**2** Drain connection DN 50 on site

- ▶ Install a drain connection (not included in the scope of supply).
- ▶ Install a waste water pipe as HT piping to the drain connection.

## 5.4 Electrical installation



The filters are equipped with a permanently connected power supply unit at the factory. The filters are only and exclusively designed for use with SELV (Safety Extra low Voltage).



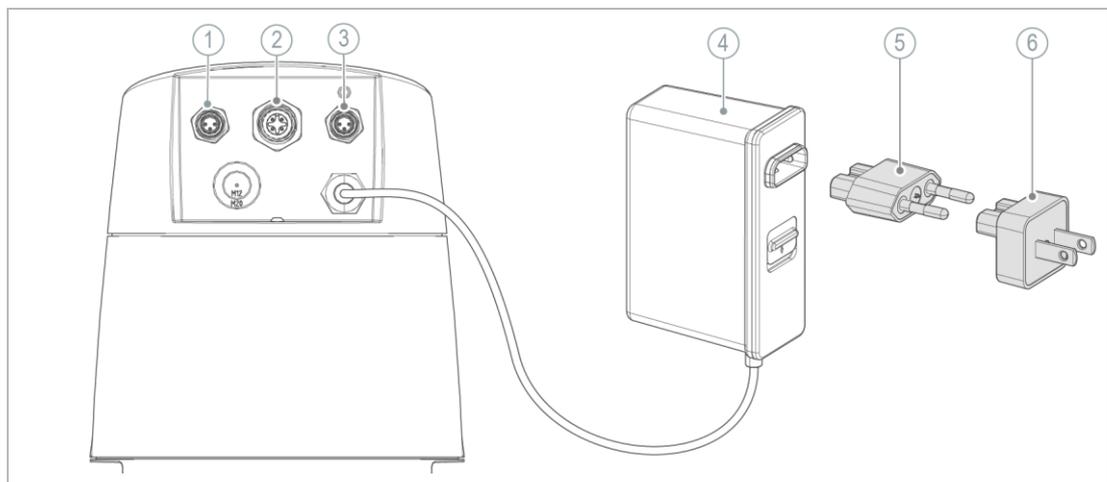
Repairs on the electrical system must be carried out by a qualified electrician only.



**DANGER** Lethal voltage of 230 V

- Risk of severe burns, cardiovascular failure, fatal electric shock
- ▶ Only have a qualified electrician carry out electrical work on the system, such as replacing a damaged power supply unit or connection cable.

### 5.4.1 Preparing the power supply



#### Designation

- |   |  |
|---|--|
| 1 | Connection for pressure sensor (outlet pressure) |
| 2 | Connection for safety solenoid valve             |
| 3 | Connection for pressure sensor (inlet pressure)  |

#### Designation

- |   |   |
|---|---|
| 4 | Power supply unit (w x h x d: 33.5 x 91 x 60 mm) with connection cable, 2 m in length |
| 5 | Universal adapter (type C), Euro plug   |
| 6 | Taiwan adapter (type A/B), optional   |

The adapter (Euro plug) for the power supply unit is suitable for use in the countries below:

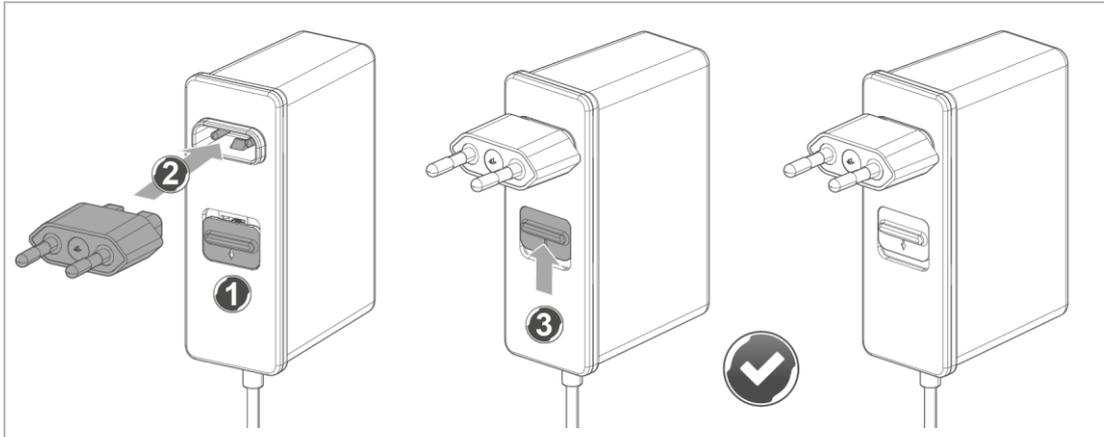
- Universal as Euro plug (230 V/50 Hz, type C): DE, AT, CH, DK, NL, I, BE, F, ES, GUS



An interchangeable adapter for Taiwan (10 pieces) is available as an option (refer to chapter 3.4).

- For plug-in power supply unit 24 VDC/60 W (110 V/60 Hz, type A/B): TW

### 5.4.1.1 Plugging the adapter into the power supply unit



1. Move the slider downwards.
2. Plug the adapter into the power supply unit.
3. Check that the slider has locked the inserted adapter.

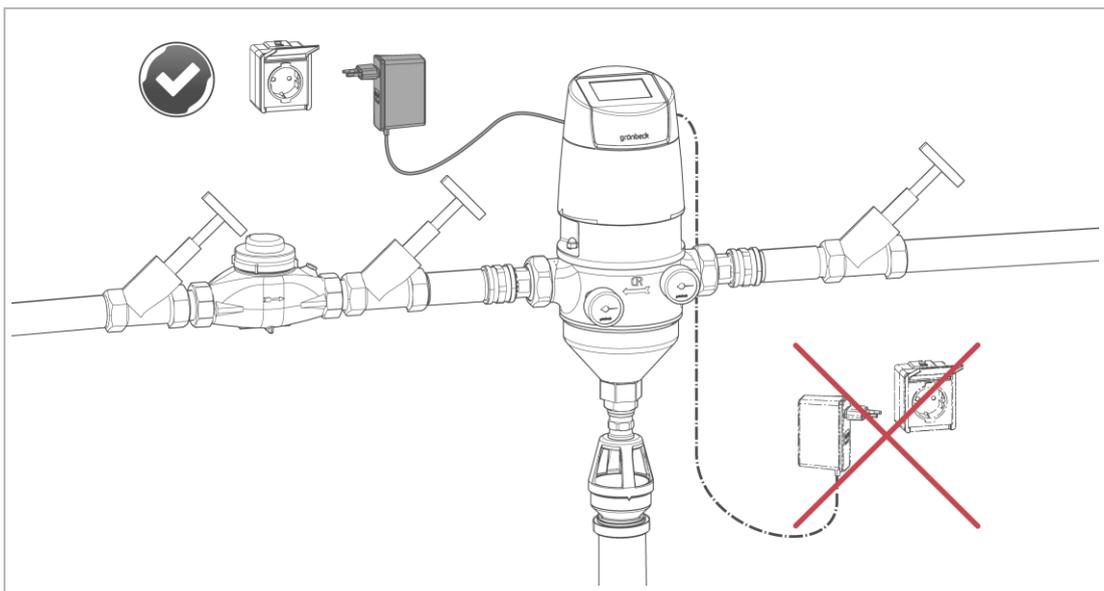
### 5.4.2 Connecting the power supply unit to the power supply

Splash water can escape at the drain outlet and damage the power supply unit/power supply due to a short-circuit.

With regard to the power supply, comply with the requirement below.



- The socket must not be located below the filter and the water pipe.
- The socket outlet must be installed in such a way that the product can be unplugged immediately and at any time in the event of malfunctions or maintenance work.



**NOTE** Incorrect routing of the connection cable

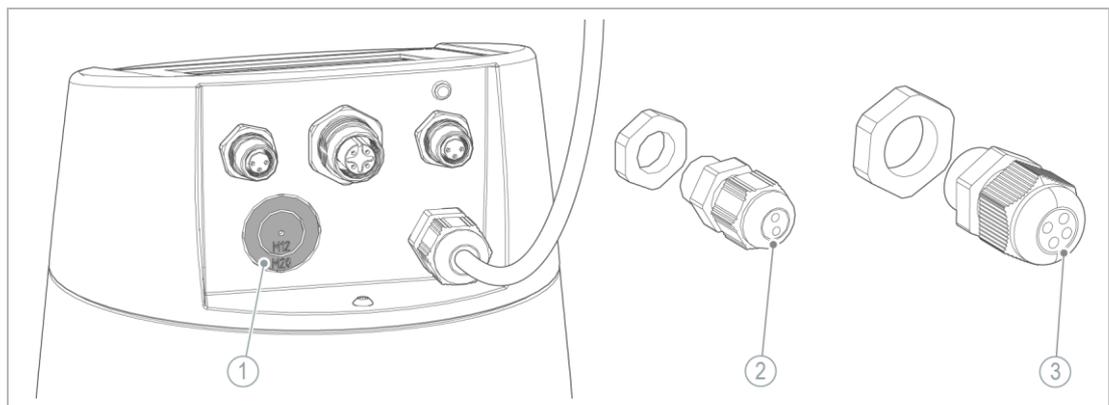
- The connection cable can be damaged. This can result in a short-circuit.
- ▶ Route the connection cable in a way that it is not crushed, kinked, entangled or forms knots.
- ▶ Make sure that the connection cable does not touch other lines such as the water pipe, for instance.
- ▶ Do not use extension cables.
- ▶ Secure the connection cable on the wall surface, if necessary.

### 5.4.3 Establishing external connections



The work below must be carried out by a qualified specialist only.

The cable bushing on the back of the control cover is provided for the connection of external signal lines by the client.



Designation	
1	Cable bushing with M12/M20 holes
2	M12 cable gland for 1 or 2 cables

Designation	
3	M20 cable gland for 3 or 4 cables

- ▶ Determine the size of the cable gland M12 or M20.

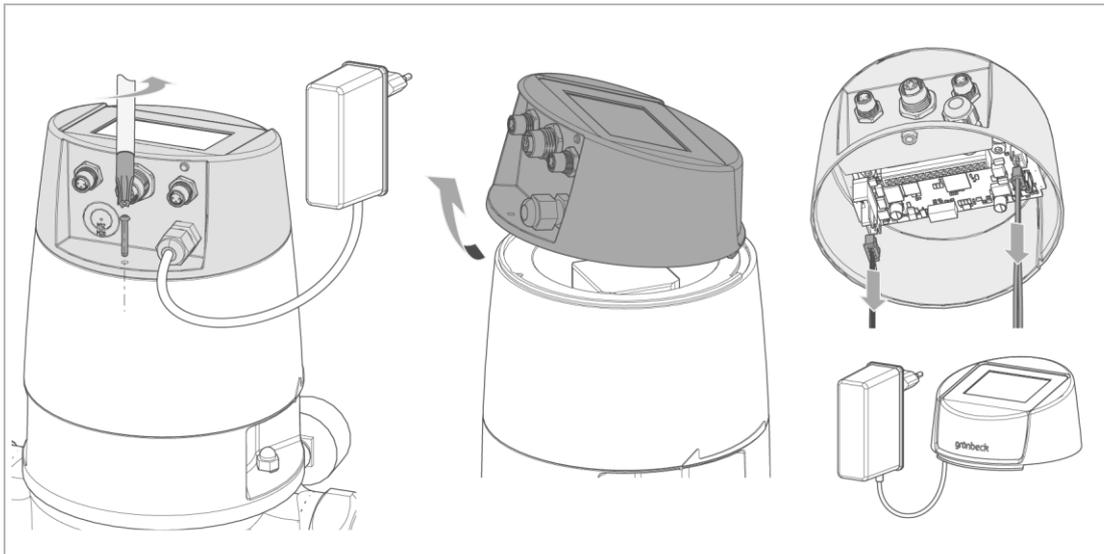


The cable glands M12 and M20 are available as a kit (refer to chapter 3.4).

The size of the cable gland depends on the number of the signal lines to be connected. In the maximum version, 4 cable lines with a diameter of ~ 3.8 mm – 5.2 mm each can be run through.

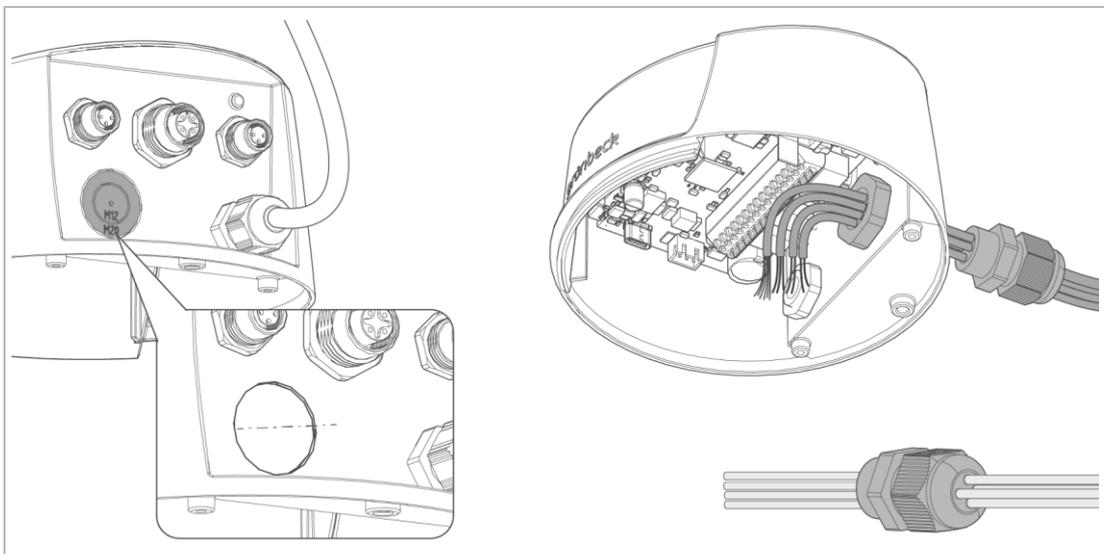
- M12 cable gland for 1 up to 2 cables
- M20 cable gland for 3 up to 4 cables

### Dismantling the control head

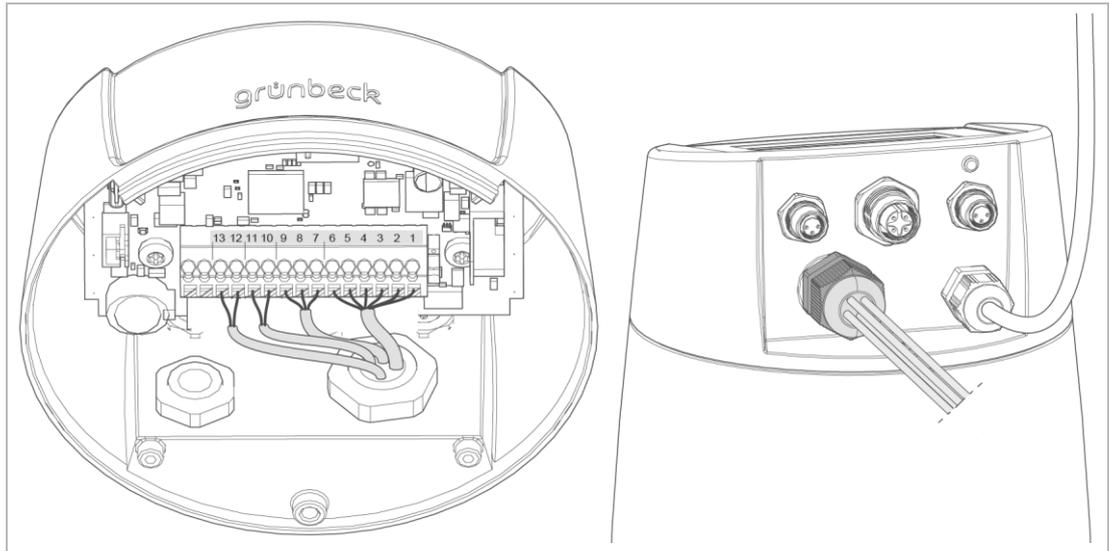


1. Loosen the rear screw of the control cover.
2. Lift the control unit by slightly tilting it forward.
3. Disconnect the plug connections of the position sensor technology **X4**, the drive unit **X3** and the functional grounding.
4. Remove the control head.

### Installing the cable gland

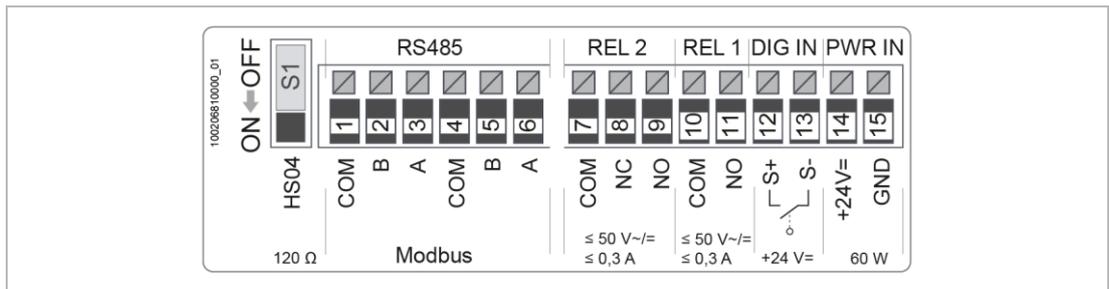


5. Drill a suitable hole for the cable gland.
6. Run the corresponding number of pre-assembled cable lines through the cable gland.
  - a Insert the appropriate sealing inserts for cable sealing.
7. Screw the prepared cable gland to the control head using the locknut.



8. Connect the signal lines to the terminal strip of the circuit board.
  - a Comply with the terminal diagram or the label on the control head.

**Label of terminal strip**



9. Set the switch S1 to ON (refer to chapter 5.4.4).
10. Make sure that all signal lines are strain relieved.
  - a Retighten the cable gland, if necessary, and check strain relief.
11. Plug the plug-in connections of the position sensor technology X4, drive unit X3 and functional grounding into the slots on the circuit board.
12. Mount the control head.
13. Program the assigned inputs and outputs during start-up/commissioning (refer to chapter 7.4).

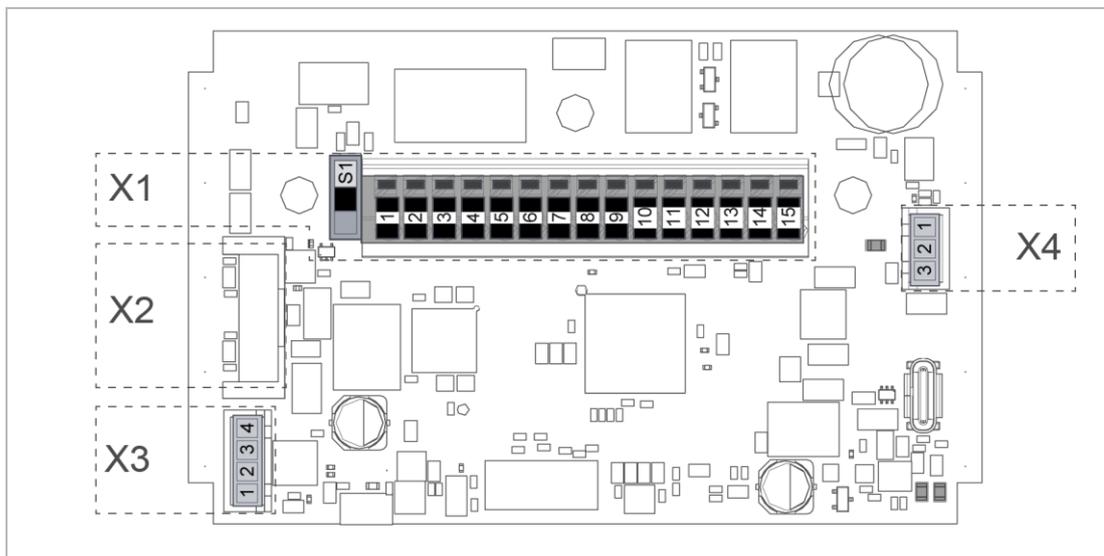


a Use the keys to select the menu level .

b Set the parameters in the **Inputs/Outputs** menu.

Parameters	Setting options	
Input	Inactive/backwash lock/backwash release/cascade	Input contact
Output 1	Inactive/backwash active/cascade/warning/fault message	Output contact
Output 2	Inactive/backwash active/cascade/warning/fault message	Fault signal, Normally closed contact/normally open contact

### 5.4.4 Terminal strip of circuit board



X1 (J5) Power supply/communication				
Terminal	Colour	Function	Signal	Comments
S1		HS04 Main switch for terminating resistor RS485 interface	OFF	If the control unit is not the last link in a bus line – set HS04 to OFF
			ON	If the control unit is the termination in a bus line – set HS04 to ON <b>120 ohms</b> terminating resistance for data line with an impedance of <b>60 ohms</b>
1		BUS01 Bus interface for Modbus RTU (half-duplex)	MOD COM	RS485 interface  Recommendation for electrical connection line: LiYCY 2x0.5 mm <sup>2</sup> or LiYCY 3x0.5 mm <sup>2</sup>
2			MOD B	
3			MOD A	
4			MOD COM	
5			MOD B	
6			MOD A	
7		DO2 Output	REL2 COM	≤ 50 V~/=
8		Voltage-free contact to forward signals	REL2 NCC	≤ 0.3 A
9			REL2 NOC	
10		DO1 Output	REL1 COM	≤ 50 V~/=
11		Voltage-free contact to forward signals	REL1 NOC	≤ 0.3 A

X1 (J5) Power supply/communication				
12		DI1 Input	DIGIN1 2	DIG IN1 2: +24 V= DIG IN1 1: GND
13			DIGIN1 1	
14	RD	PWR (power) Feed from power supply unit	+24V	60 W
15	BK		GND	

X2 (J2) Periphery (sensors and actuators)				
Connectors for pressure sensors and safety solenoid valve				

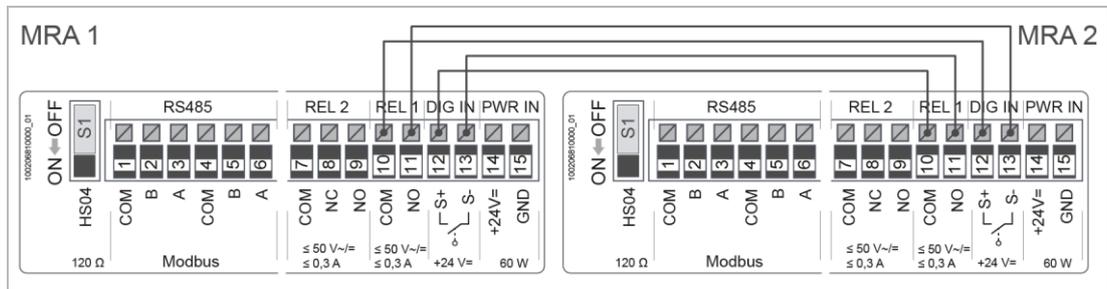
  

X3 (J1) Drive unit				
Connectors for drive unit (motor and gearing)				

X4 (J8) Position sensor technology				
Connector for the position of the microswitch				

### 5.4.4.1 Wiring in the case of cascade switching



Filter 1		Filter 2	
Input <b>DI1</b>	Terminal		Terminal
	12 (24 V=)	→	10 (COM)
	13 (GND)	←	11 (NO)
Output <b>DO1</b>	Terminal		Terminal
	10 (COM)	←	12 (24 V=)
	11 (NO)	→	13 (GND)

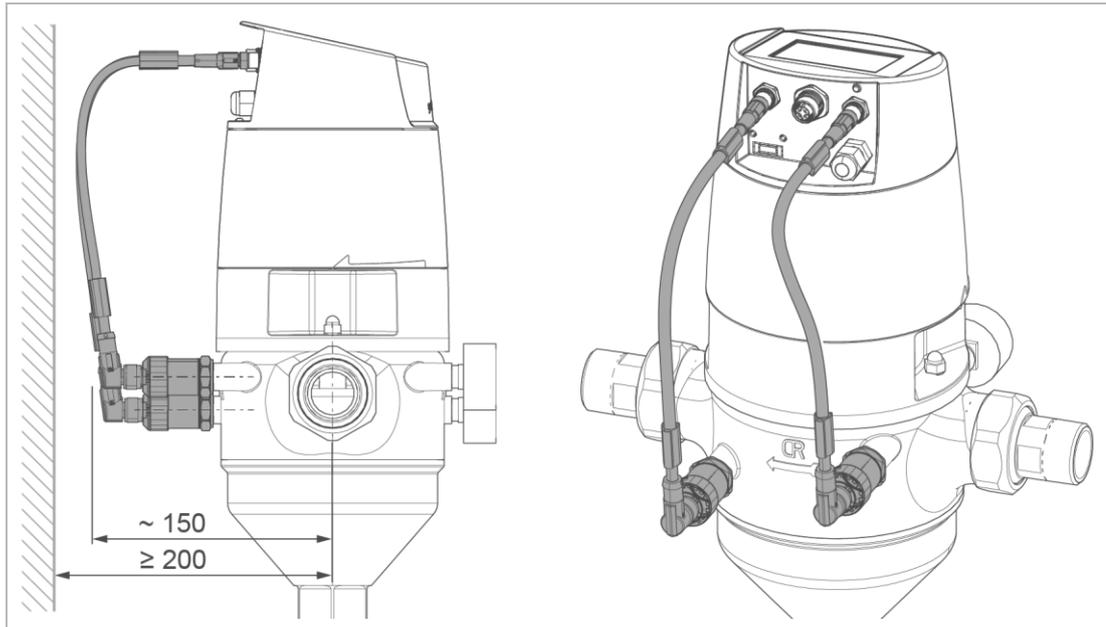
### 5.4.5 Installing the (optional) pressure sensors

In order to measure the differential pressure, one pressure sensor is installed upstream of the filter element (inlet pressure) and one pressure sensor is installed downstream of the filter element (outlet pressure).

The limit value of the differential pressure (preset at 0.4 bar) is programmed in the control unit. If the programmed differential pressure is exceeded due to clogging of the filter element, a backwash is released automatically.



Prior to retrofitting the pressure sensors, the installed filter must be depressurised and de-energised electrically.



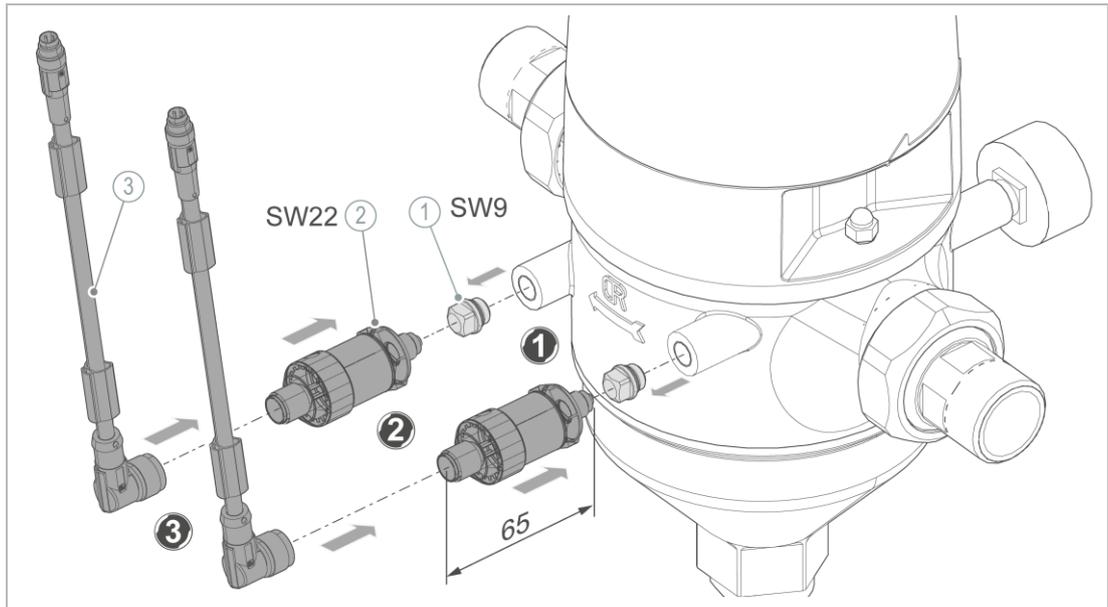
- ▶ Check whether the required minimum distance for the installation of the pressure sensors is available on the back of the filter.



If space is limited, the pressure sensors can be mounted on the front of the filter instead of the pressure gauges.

- ▶ Make sure that the filter is depressurised.
- ▶ Unplug the power supply unit from the socket, if plugged in.
- ▶ Use protective gloves.

### Mounting the pressure sensors on the back



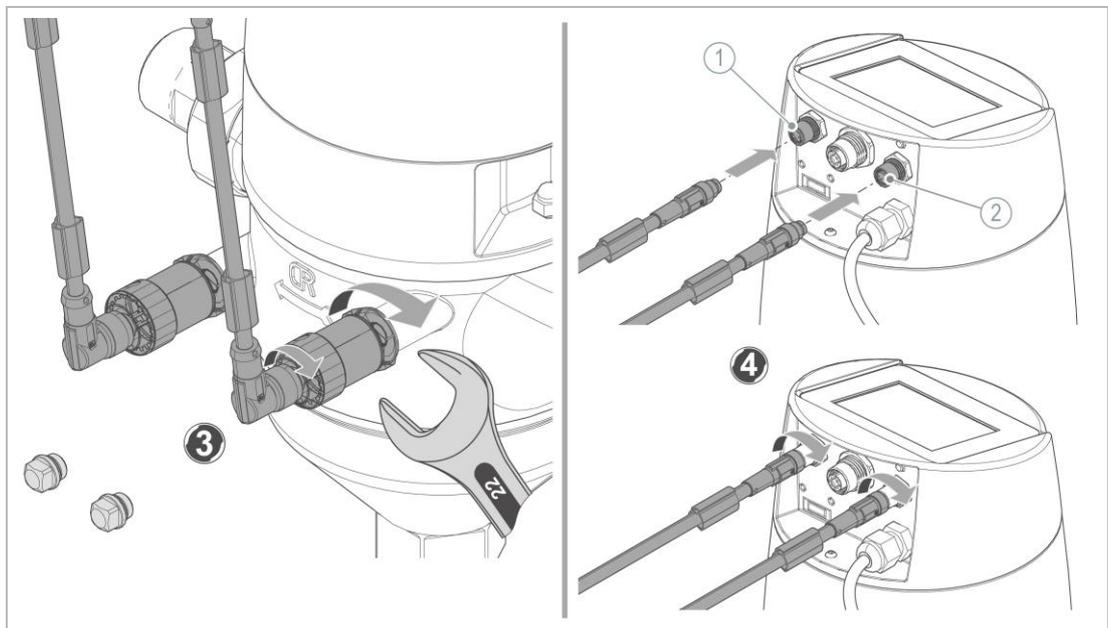
#### Designation

- 1 Blind plug
- 2 Pressure sensors

#### Designation

- 3 Connecting cable with circular connector M12x1 for pressure sensors

1. Remove both blind plugs.
2. Screw in both pressure sensors (with inserted O-rings).



#### Designation

- 1 Connection socket for inlet pressure

#### Designation

- 2 Connection socket for outlet pressure

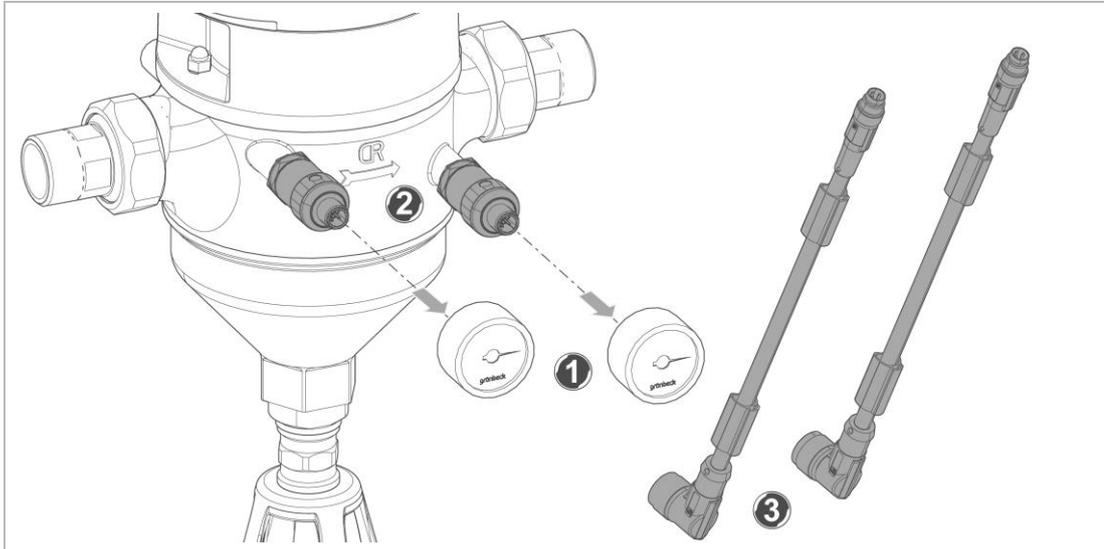
3. Plug the circular connectors onto the pressure sensors and fasten them.
4. Plug the respective connectors for input pressure and output pressure into the appropriate connection socket and fasten them.

### Mounting the pressure sensors on the front

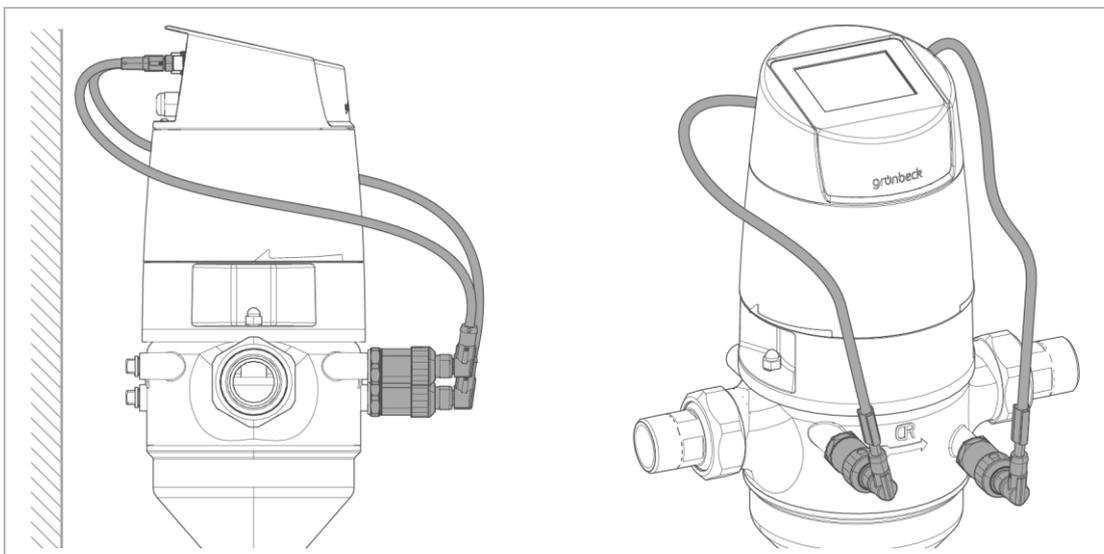


Analogue reading of the inlet and outlet pressure on the pressure gauges would no longer be possible.

► If space is limited, mount the pressure sensors on the front of the filter.



1. Remove the pressure gauges.
2. Mount the pressure sensors on the front of the filter.
3. Connect the connecting cables accordingly to the inlet and outlet pressure.



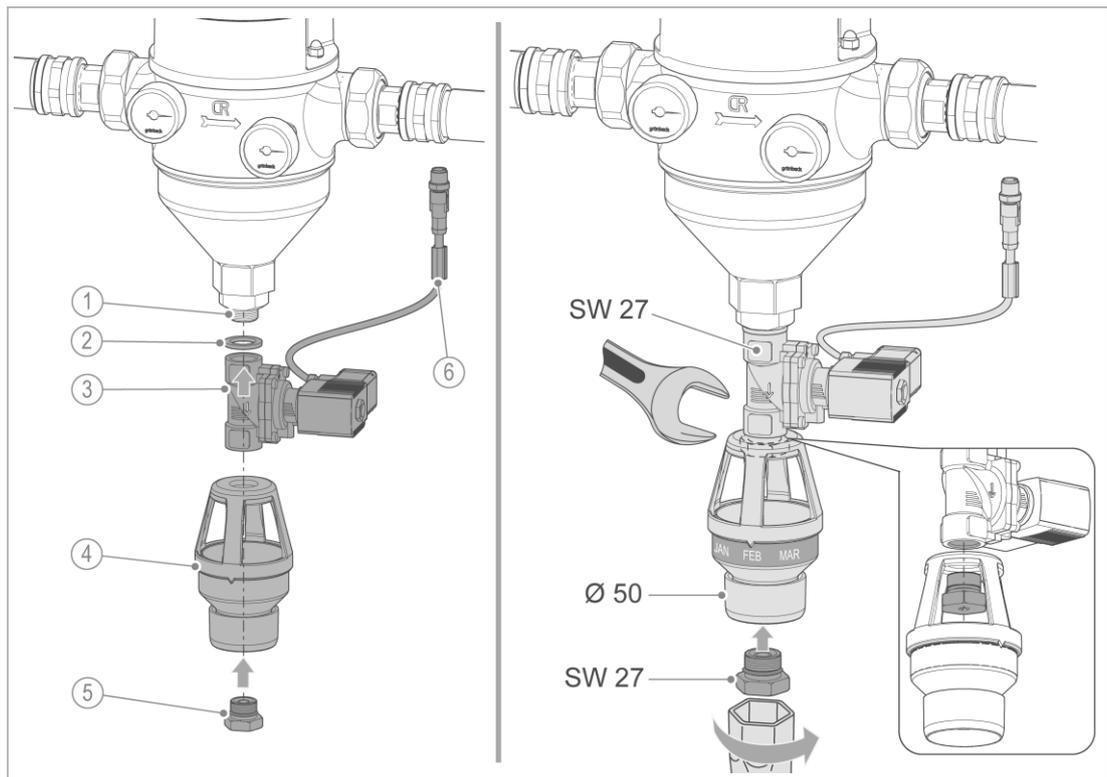
► Keep the removed blind plug and pressure gauges.

### 5.4.6 Installing the (optional) safety solenoid valve



When installing the safety solenoid valve, make sure not to damage the plug connection and the safety solenoid valve.

- The filter must be de-energised (voltage-free), so that no backwash will be released during the installation of the safety solenoid valve.
- ▶ Unplug the power supply unit from the socket.
- ▶ Use protective gloves.



Designation	
1	Threaded connection
2	Flat seal
3	Safety solenoid valve

Designation	
4	Flushing water connection
5	Nozzle screw with O-ring
6	Plug connection

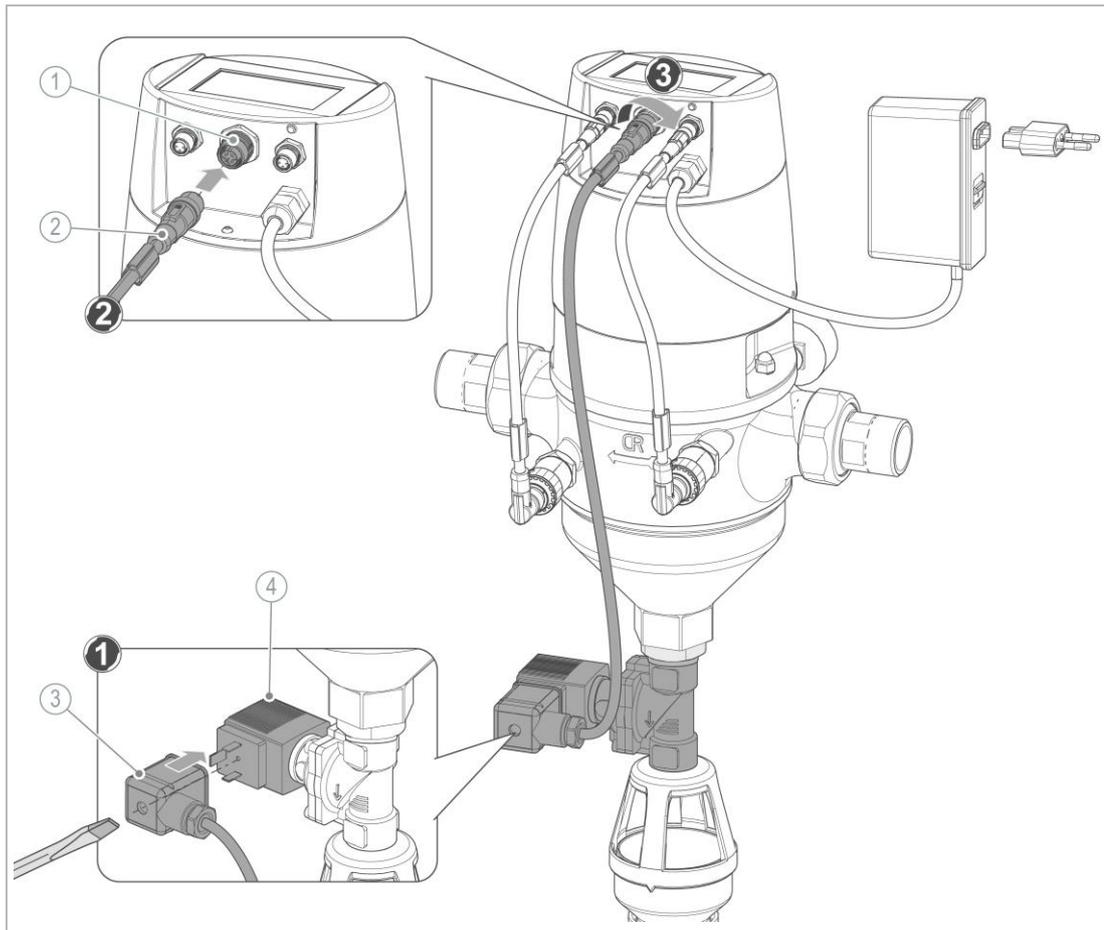
1. Remove the double socket.
2. Screw the safety solenoid valve with the flat gasket used onto the threaded connection.
  - a Comply with the flow direction and align the safety solenoid valve.
3. Screw the flushing water connection to the safety solenoid valve using the nozzle screw.
  - a Make sure that the marking of the month indicator is facing forward.

### Connecting the safety solenoid valve

In idle mode, the safety solenoid valve is normally closed. In case of a backwash, the safety solenoid valve is supplied with power and opened.

In the event of a power failure during backwash, the safety solenoid valve is closed automatically.

If an error is detected during a backwash process (defect on the filter, e.g. larger dirt particles block the complete closing of the valve), the safety solenoid valve is closed as well.



#### Designation

- 1 Connection socket
- 2 Connecting cable with circular connector M12

#### Designation

- 3 Connector socket (with seal)
- 4 Safety solenoid valve

1. Plug in the connector socket and fasten it with the screw.
2. Plug the circular plug into the middle connection socket.
3. Fasten the plug connection.

## 6 Start-up



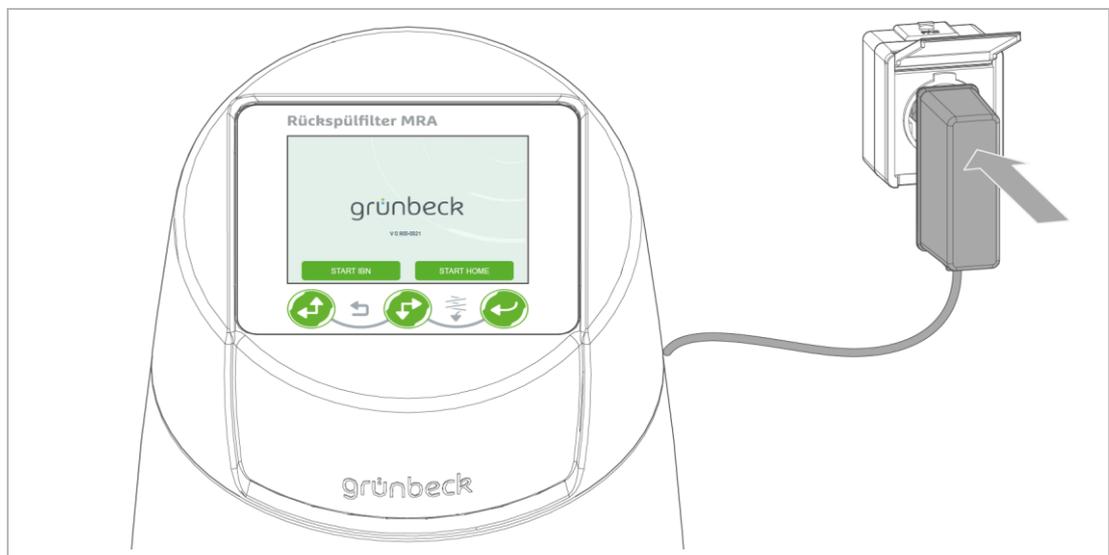
The initial start-up of the product must be carried out by a qualified specialist only.

### 6.1 How to start up the product

#### 6.1.1 Initial start-up



Upon delivery, the valve of the backwash filter is open. The valve is closed automatically during start-up/commissioning.



1. Plug the power supply unit into the socket.
  - » The control unit starts with the initial start-up program **Start IBN**.
2. Follow the instructions given in the control unit (for operation of the control unit, refer to chapter 7).
  - a Choose the **language**.
  - b Set the **Date**.
  - c Set the **Time**.
  - d Start the **Guided start-up/commissioning**.



You can also perform a guided start-up/commissioning later.

- e Confirm the query **Drain connection established?** with **OK**.
- f Set the unit **bar/psi/kPa** for the pressure measurement (with connected pressure sensors only).
- g In case of hot water filtration confirm the indication **Use with hot water** with **OK**  
– The warning label “Hot surfaces” must be visibly attached on the filter housing.
- h Confirm referencing of the filter element with **OK**.
  - » The filter valve is positioned.
- i Open the shut-off valve on the filter inlet and confirm with **OK**.
- j Confirm the indicated **Inlet pressure** for raw water with **OK**.
  - » The inlet pressure is only evaluated automatically if the pressure sensors are connected.
- k Open the shut-off valve on the filter outlet and confirm with **OK**.
- l Confirm the indicated **Outlet pressure** for pure water with **OK**.
  - » The outlet pressure is only evaluated automatically if the pressure sensors are connected.
- m Start the **Backwash** with **OK**.



**Designation**

1 Operation description

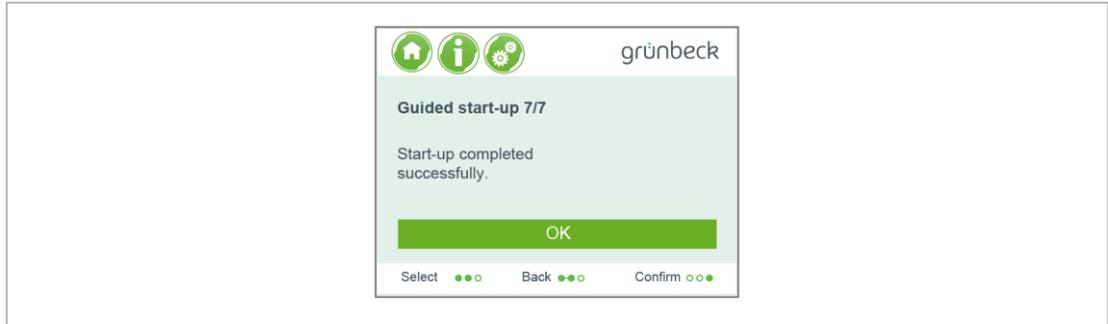
**Designation**

2 Illustration of the current step



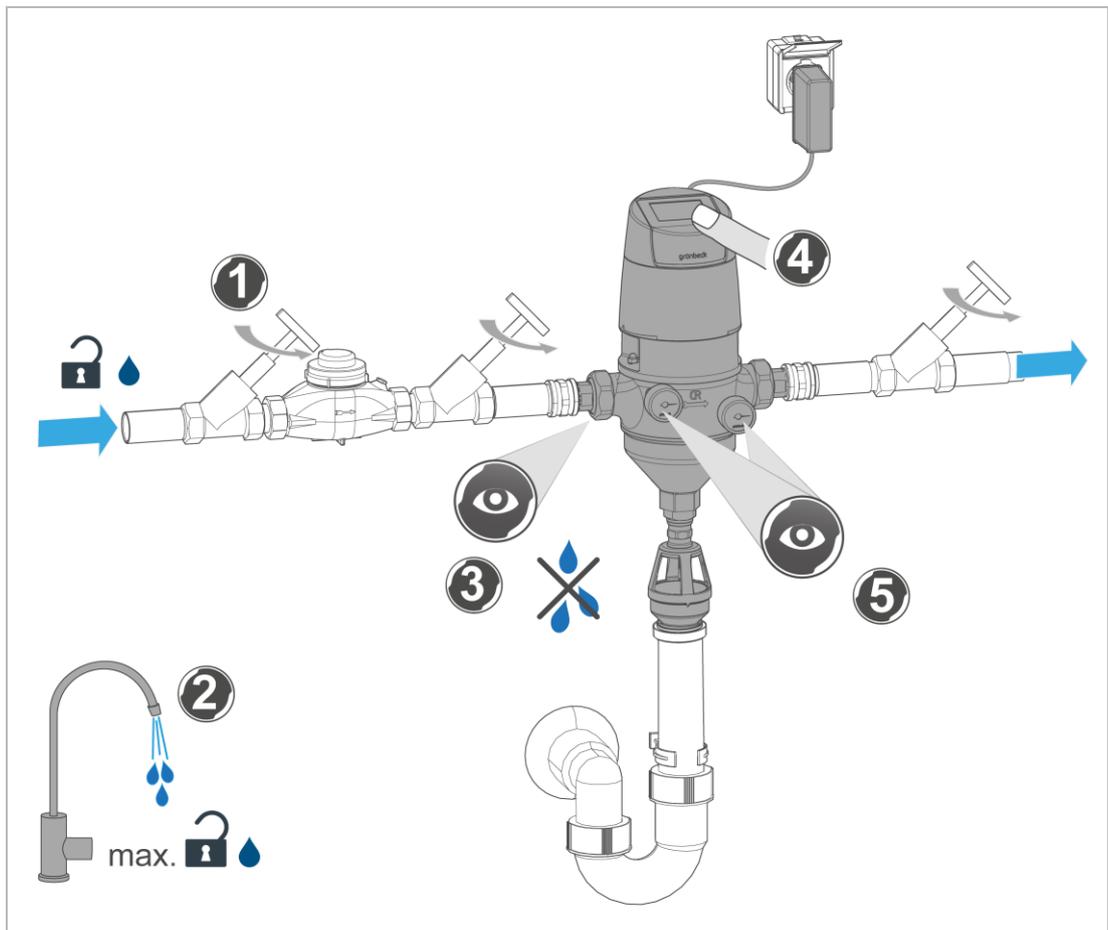
You can also perform a backwash later or cancel the process.

- » The backwash process takes place in 3 steps: 1st Open valve, 2. Backwash, 3. Close valve.
  - n Set the backwash interval to 2 d ... 180 d / 1 h ... 47 h.
  - o Set the required Differential pressure (only for version with pressure sensors, preset to 0.4 bar).
3. Terminate a successfully completed start-up/commissioning with **OK**.



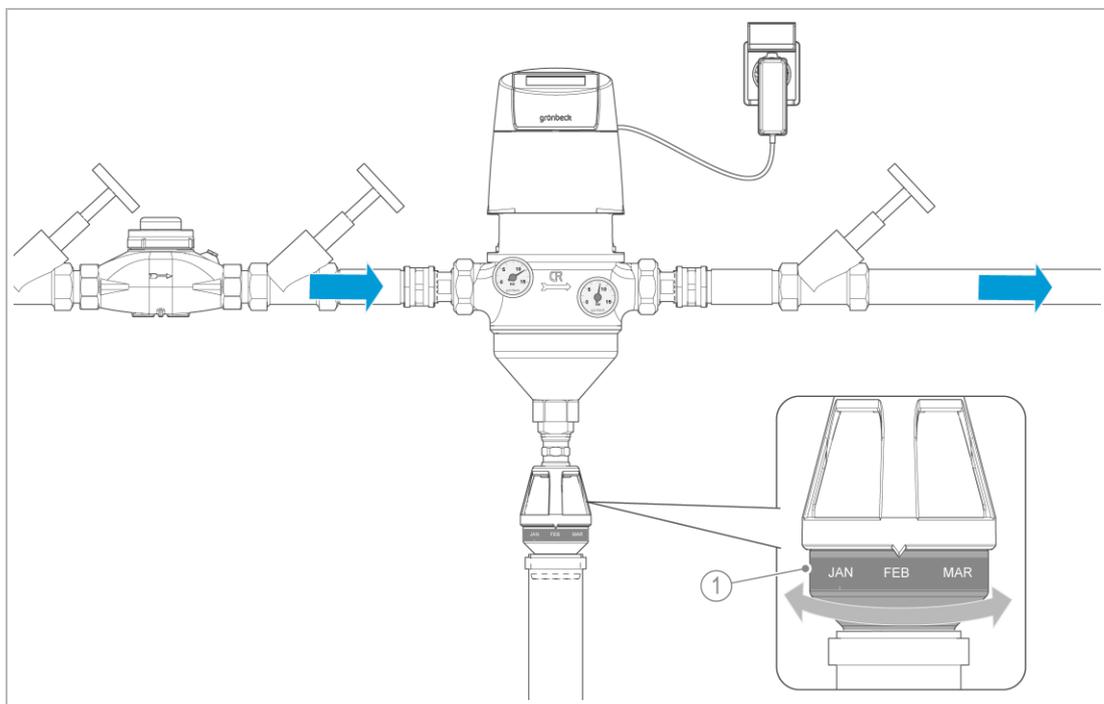
## 6.2 Checking the product

- Carry out the steps below after installation and after each maintenance:



1. Open the shut-off valves.
2. Open the nearest water withdrawal point after the filter as far as it will go.
  - a Apply the maximum operating pressure.
  - » The filter is vented.
3. Check the filter for leaks.
4. Perform a manual backwash (refer to chapter 7.7).
  - a Check that the water is properly flushed to the drain.
5. Read the inlet and outlet pressure at the pressure gauges while the water is flowing.
  - a Read the inlet and outlet pressure on the display of the control unit while the water is flowing (with connected pressure sensors only).
  - b Write down the values in the start-up/commissioning log.
6. Check the settings in the control unit (refer to chapter 7.4).
7. Check the optional digital inputs and outputs for function.
8. Record the initial start-up in the operation log (refer to chapter 13).
  - » The filter is in operation.

## 6.3 Setting the month indicator



### Designation

- 1 Maintenance ring

- Set the maintenance ring to the month of the next maintenance.

## 6.4 Handing over the product to the owner/operating company

- ▶ Explain to the owner/operating company how the product works.
- ▶ Use the manual to brief the owner/operating company and answer any questions.
- ▶ Inform the owner/operating company about the need for inspections and maintenance.
- ▶ Hand over all documents to the owner/operating company for keeping.

### 6.4.1 Disposal of packaging

- ▶ Dispose of the packaging as soon as it is no longer needed (refer to chapter 11.2).

## 7 Operation/handling

The filter is operated automatically and does not require any manual operation.

The control unit carries out the release of a backwash and issues messages in the event of a malfunction.

- ▶ Inspect the filter at regular intervals (refer to chapter 8.3).
- ▶ Perform regular maintenance on the filter (refer to chapter 8.4).

### 7.1 Operating concept

The product is operated via the control panel of the control unit.

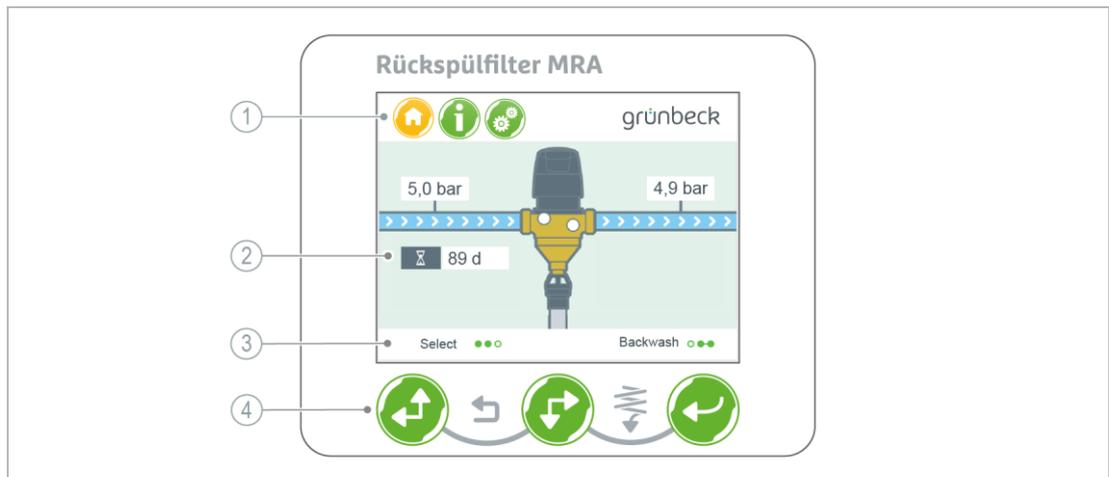
Pressing any key switches on the display.

In the control unit you can read current operating values, call up information and make parameter settings.



- » If there is no entry for 5 minutes, the control unit returns to the basic display and the display is switched off.
- » Parameters that have not been saved are discarded.

## 7.2 Operating panel



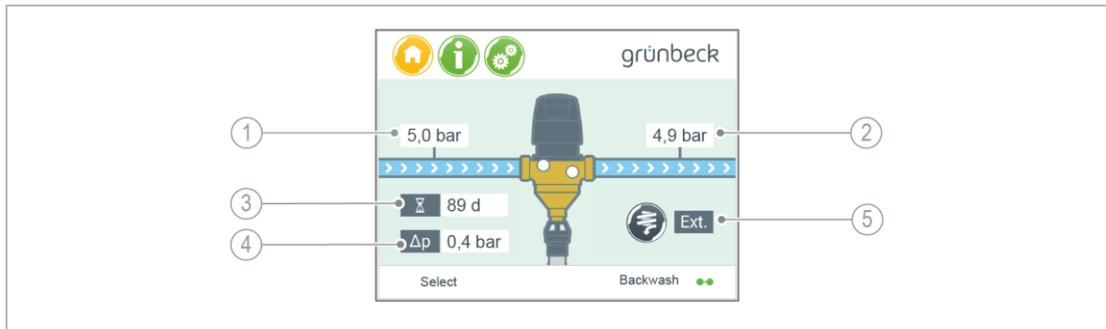
Designation		Meaning/function
1	Display	Menu levels: Home/Information/Settings
2	Display	Basic display <ul style="list-style-type: none"> <li>If there is no entry for 5 minutes, the display switches off</li> </ul> Information on possible operation by means of operating keys
3	Navigation bar	<ul style="list-style-type: none"> <li>Select, confirm, backwash</li> <li>Acknowledge, cancel, back</li> <li>Moving the selection field: upwards, downwards, to the left, to the right</li> </ul>
4	Operating button	<ul style="list-style-type: none"> <li>Selecting a menu</li> <li>Setting values</li> <li>Increasing the numerical value of a parameter</li> <li>Selecting a program step</li> </ul>
	Operating button	<ul style="list-style-type: none"> <li>Selecting a menu</li> <li>Setting values</li> <li>Decreasing the numerical value of a parameter</li> <li>Selecting a program step</li> </ul>
	Operating button	<ul style="list-style-type: none"> <li>Confirming entries</li> <li>Acknowledging malfunctions</li> <li>Saving a parameter</li> <li>Starting or cancelling a program step</li> <li>Acknowledging a message</li> </ul>
	Key combination	  +  <ul style="list-style-type: none"> <li>Starting a backwash manually</li> </ul>
	Key combination	  +  <ul style="list-style-type: none"> <li>Closing open parameter without saving (previous display value is retained)</li> <li>Returning to the basic display (press 2x)</li> <li>Returning to the menu level</li> <li>Cancelling the backwash process</li> </ul>

## 7.3 Display

### Home

- Use the keys to select the menu level .

Depending on the equipment (with/without pressure sensors) and the settings of the filter, the home screen can display different values.



#### Designation

- 1 Current value Inlet pressure
- 2 Current value Outlet pressure
- 3 Backwash via time is active

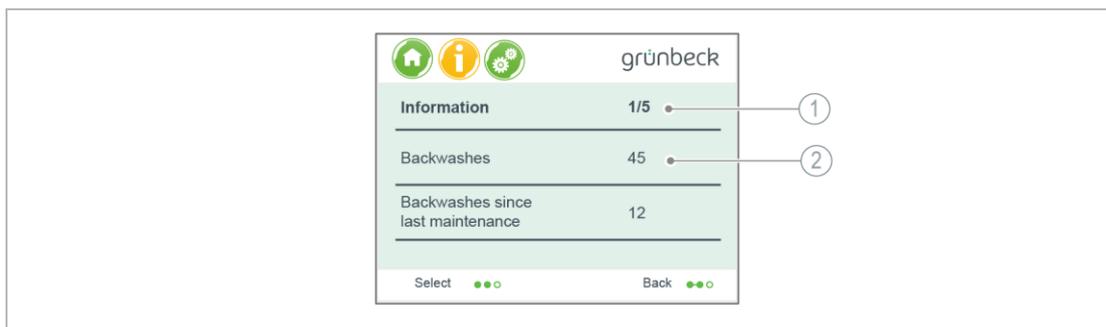
#### Designation

- 4 Backwash via differential pressure is active
- 5 Backwash via external signal is active

Depending on set values and actions, the display shows the current parameters in the menu level **Home**

### Information

- Use the keys to select the menu level .



#### Designation

- 1 Information screen

#### Designation

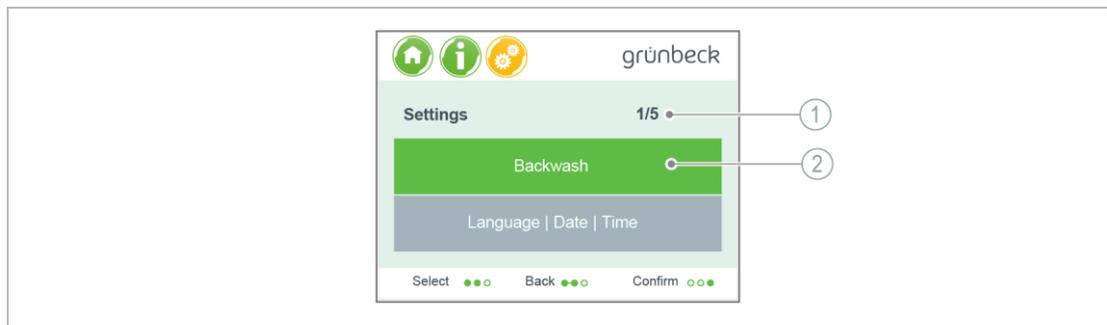
- 2 Indication of current values

In the menu level **Information**, you can call up the values below:

- Number of backwashes performed in total
- Number of backwashes since maintenance
- Days passed since last maintenance
- Maintenance carried out
- Initial start-up of the filter **Date**
- Hardware version
- Software version
- Contact data of manufacturer

## Settings

- Use the keys to select the menu level .



### Designation

1 Page/s of the corresponding setting level

### Designation

2 Parameter to be set

In the menu level **Settings**, you can select and set the parameters below:

- Backwash
- Language/date/time
- Inputs/outputs
- Acknowledge maintenance
- Messages/errors
- Error memory
- Modbus RTU
- System parameters (  )
- Reset to factory settings
- Start the start-up program

## 7.4 Making settings



Faulty operation can lead to dangerous operating states and might cause personal injury.



In the tables below, the factory settings are **greyed out**.

Level	Parameters	Setting range	Comments
Backwash	Backwash criterion $\Delta$ -p	Active Inactive	Differential pressure evaluation <ul style="list-style-type: none"> <li>Automatic detection when pressure sensors are plugged in; value is set to <b>active</b></li> <li>Can be activated and deactivated manually when pressure sensors are connected</li> </ul>
	As from pressure difference $\Delta$ -p	0.2 ... <b>0.4</b> ... 3.0 bar	Differential pressure release <ul style="list-style-type: none"> <li>Is set to 0.4 bar when the pressure sensors are detected</li> <li>Can be modified manually</li> </ul>
	Backwash interval	1 h ... 47 h 2 d ... <b>90</b> ... 180 d	90 days are factory-set <ul style="list-style-type: none"> <li>Can be modified but not deactivated</li> </ul>
	Backwash lock	Active <b>Inactive</b>	Time in which no backwashes are carried out
	Backwash lock from	<b>4:00</b> pm	Start of lock time
	Backwash lock until	<b>6:00</b> pm	End of lock time
	Language/date/time	Time	hh:mm
Date		dd:mm:yy	Set the current time
Auto. DST changeover		<b>Active</b> Inactive	Automatically adjusting the time to the desired time zone
Time zone		<b>Summer</b> Winter	Current time zone for daylight saving time or standard time
Unit		<b>bar</b> /psi/kPa	Pressure measuring unit
Language		Language selection	Select the language via the corresponding national flag
			German (de), English (en), French (fr), Italian (it), Spanish (es), Dutch (nl), Danish (da), Polish (pl), Czech (cs), Romanian (ro), Slovenian (sl), Slovakian (sk), Chinese Traditional (zh-tw), Estonian (et)
Inputs/outputs	Input	Inactive/backwash lock/backwash release/cascade	Programmable input contact
	Output 1	Inactive/backwash active/cascade/warning/fault message	Programmable output contact
	Output 2	Inactive/backwash active/cascade/warning/fault message	Fault signal NCC (normally closed contact/normally open contact)
Maintenance	Acknowledge maintenance	Yes/Cancel	Maintenance carried out?
	Maintenance interval	1 ... <b>365</b> d	Set the time until next maintenance
Messages/errors	Message Outlet pressure	< 0 ... <b>2</b> ... 16 bar  0 = Disabled = Default	Prog. outlet closes when the pressure undershoots the set value (outlet pressure) <ul style="list-style-type: none"> <li>Menu item only appears if pressure sensors are connected and activated</li> </ul>

Level	Parameters	Setting range	Comments
	Signal Backwash attempts	0 ... 3	A message appears if the differential pressure cannot undershoot the limit value within the set number of backwash attempts. <ul style="list-style-type: none"> <li>Filter element is too dirty</li> <li>Differential pressure signal is permanently pending</li> </ul>
Error memory	Message Maintenance	yy.mm.dd hh:mm	Date and time <ul style="list-style-type: none"> <li>Store 20 signals/faults</li> </ul>
	Message Outlet pressure	yy.mm.dd hh:mm	
	Drive error	yy.mm.dd hh:mm	
	Reset to factory settings	yy.mm.dd hh:mm	
Modbus RTU	Address	0 ... 225	Basic settings for Modbus interface (For further information, refer to the technical service manual)
	Baud rate	9600/19200/38400	
	Parity	None Even/odd	
	Stop bits	0 ... 1 ... 127	
	Timeout:	100 ... 60,000 ms	In milliseconds
	Frame size	128/256/512 kB	The value of 256 bytes is statically stored and cannot be changed
System parameters			For technical service personnel only
Factory settings	Reset the filter to factory settings	Yes/Cancel	If a software error occurs
Guided start-up/commissioning		Start/Later	Start the start-up program
	Date	dd:mm:yyyy	Enter the current date
	Time	hh:mm	Enter the current time
	Guided start-up/commissioning	Start/Later	Selection to be confirmed
	Drain connection established?	OK	Confirm query
	Unit	bar/psi/kPa	Select the unit for the water pressure (with connected pressure sensors only)
	Use with hot water	Cancel/OK	Comply with instructions: <ul style="list-style-type: none"> <li>Use protective gloves</li> <li>Warning label (hot surfaces) is present on the filter housing</li> </ul>
	Referencing	OK	Confirm positioning of filter valve
	Shut-off valve Open filter inlet	OK	Check that the water inlet is open and confirm
	Inlet pressure	x.xx bar	Display of inlet pressure for raw water <ul style="list-style-type: none"> <li>Evaluated automatically (with connected pressure sensors only)</li> </ul>
	Shut-off valve Open filter outlet	OK	Check that the water outlet is open and confirm
	Outlet pressure	x.xx bar	Display of outlet pressure for filtered pure water <ul style="list-style-type: none"> <li>Evaluated automatically (with connected pressure sensors only)</li> </ul>
	Start backwash?	OK/Later	Select
	Backwash 1/3 Valve opens	Cancel	To cancel the start of the backwash
	Cancel process?	Yes/No	To cancel, select Yes
	Backwash 2/3 Backwash active	Cancel	To cancel the process during the backwash
Cancel process?	Yes/No	To cancel, select Yes	

Level	Parameters	Setting range	Comments
	Backwash 3/3 Valve closes		The backwash process is terminated
	Backwash interval	2 d ... 180 d 1 h ... 47 h	Select or set the time of the backwash interval
	Differential pressure	0.2 ... 0.4 ... 3.0 bar	Set to release the backwash process (with connected pressure sensors only)
	Start-up/commissioning completed successfully	OK	After confirmation, the control unit displays Home

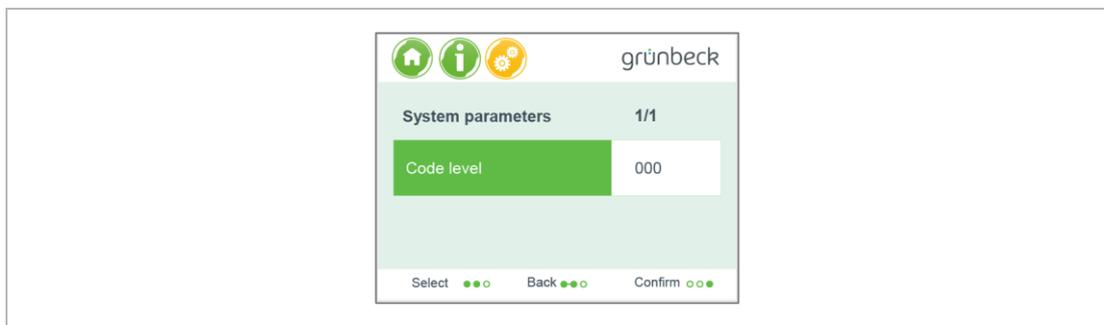
### 7.4.1 Setting the system parameters



The settings for the system parameters are code-protected.

The system parameters must be modified by technical service personnel only.

If a menu item is called up which requires a certain authorisation level, a window appears where the Code can be entered.



► Enter the respective Code **xxx**.

## 7.5 Modbus RTU

In addition to digital/binary interfaces, the control unit can be integrated via an RS485 interface using Modbus.



In order to establish a connection with the control unit, the host must have the same communication parameters (refer to parameters for Modbus RTU).

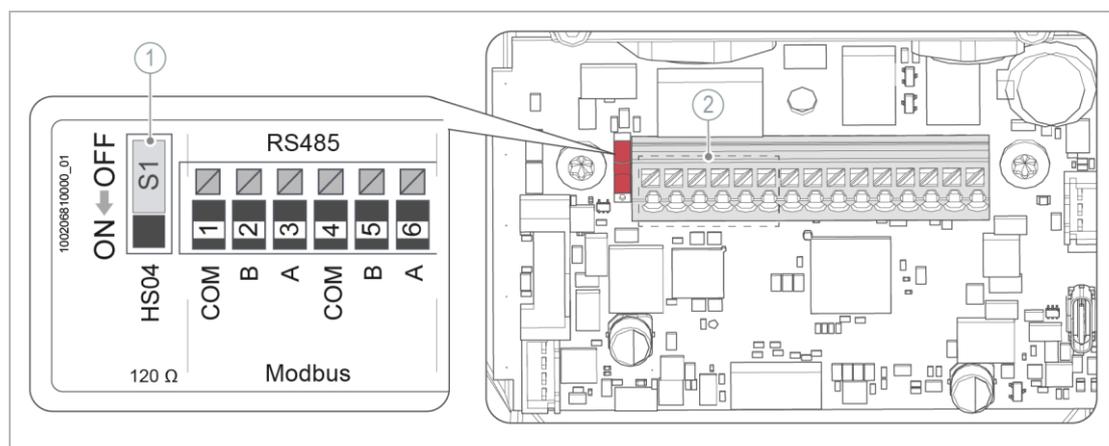
The filter can be included as a node in an existing bus that has a host. The filter itself cannot act as a host.

To guarantee an ideal connection, the data line should have an impedance of 60 ohms.

### Connection of RS485 interface

For the electrical connection, cable line type LiYCY 2x0.5 mm<sup>2</sup> or LiYCY 3x0.5 mm<sup>2</sup> are recommended the litz wires of which are twisted against each other.

- ▶ Connect the Modbus cable line to the RS485 interface of the terminal strip (refer to chapters 5.4.3 and 5.4.4).



#### Designation

1 HS04 switch

#### Designation

2 RS485 terminals for Modbus RTU

If the control unit is a participant in a bus and is **not** the last device:

- ▶ Position the HS04 switch to **OFF**.

If the control unit forms the termination of the bus, the end must be terminated with a 120 Ohm resistor.

- ▶ Enable the terminating resistor via the **ON** switch position.

### Setting the parameters

In order to establish a connection with the control unit, the host must have the same communication parameters.

► Check the set parameters in the control unit.

Modbus RTU	Address	0 ... 225	
	Baud rate	9600/19200/38400	
	Parity	None	
		Even/odd	
	Stop bits	0 ... 1 ... 127	
	Timeout:	100 ... 60,000 ms	In milliseconds
	Frame size	128/256/512 kB	The value of 256 bytes is statically stored and cannot be changed

### 7.5.1 Function Codes

The following function codes can be used to address the registers in the register areas listed below:

Code	Function
0x01	Read Discrete Output Coil
0x02	Read Discrete Input Contact
0x03	Read Holding Registers
0x05	Write Single Output Coil
0x06	Write Holding Register
0x10	Write Multiple Holding Registers

### 7.5.2 Data model

The data values are saved in register tables. The register numbers are assigned as follows:

Register number	Register address (hex)	Access	Name
1 – 9999	0000 – 270E	rw	Discrete Output Coil
10001 – 19999	0000 – 270E	r	Discrete Input Contact
30001 – 39999	0000 – 270E	r	Analogue Input Register
40001 – 49999	0000 – 270E	rw	Analogue Holding Register

### 7.5.3 Register allocation

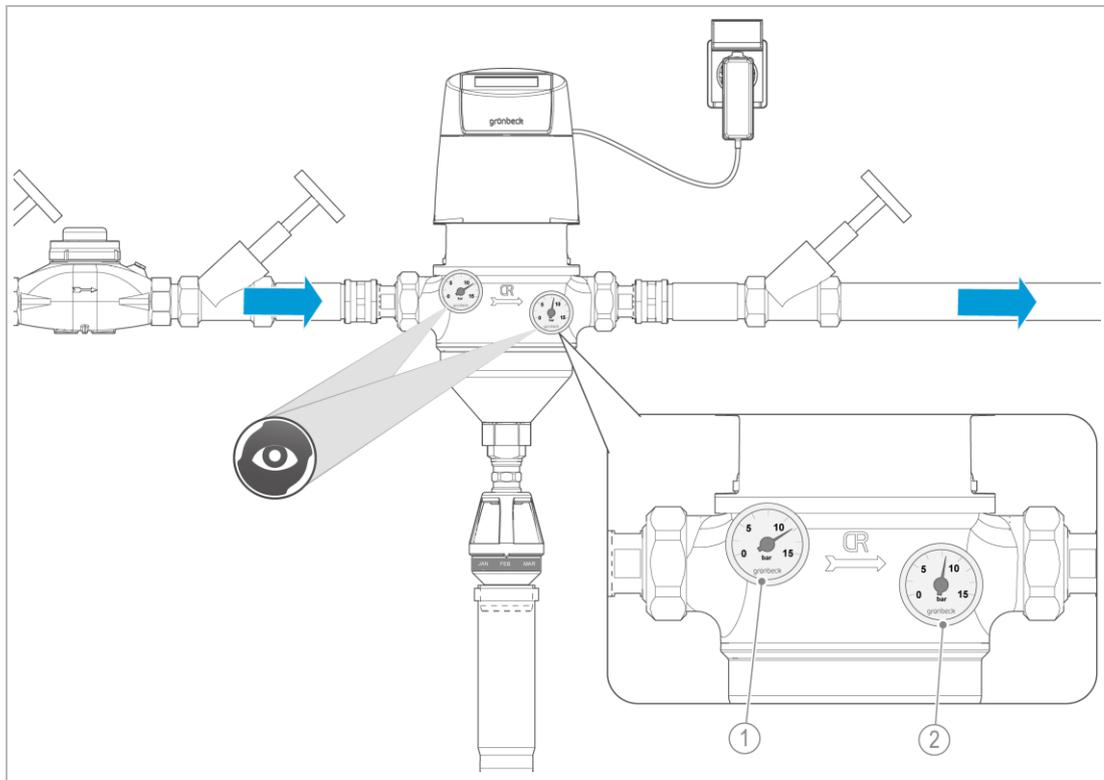
Register	Access	Size byte	Data type	Designation	Unit
1	rw		bit	Target state output 1	-
2	rw		bit	Target state output 2	-
10001	r		bit	State external input	
10002	r		bit	State microswitch stepper motor	
10003	r		bit	State button left (not debounced)	
10004	r		bit	State button centre (not debounced)	
10005	R		bit	State button right (not debounced)	

Register	Access	Size byte	Data type	Designation	Unit
30001	r	2	uint16_t	Measured value pressure sensor 1	µA
30002	r	2	uint16_t	Measured value pressure sensor 2	µA
30003	r	2	uint16_t	Scaled measured value pressure sensor 1 Fixed-point value with two decimal places	refer to pressure value unit
30004	r	2	uint16_t	Scaled measured value pressure sensor 2 Fixed-point value with two decimal places	refer to pressure value unit
30005	r	2	uint16_t	Scaled pressure difference Fixed-point value with two decimal places	refer to pressure value unit
30011	r	2	uint16_t	System voltage 3 V	mV
30012	r	2	uint16_t	System voltage 5 V	mV
30013	r	2	uint16_t	System voltage 24 V	mV
30014	r	2	uint16_t	Device temperature	0.01 °C
30015	r	2	uint16_t	Total operating duration device low word	s
30016	r	2	uint16_t	Total operating duration device high word	s
30017	r	2	uint16_t	Backwash meter low word	-
30018	r	2	uint16_t	Backwash meter high word	-
30019	r	2	uint16_t	Interval timer maintenance	?
40001	r	2	uint16_t	Main version number software	-
40002	r	2	uint16_t	Sub-version number software	-
40003	r	2	uint16_t	Main version number hardware	-
40004	r	2	uint16_t	Sub-version number hardware	-
40121	rw	2	uint16_t	Pressure value unit (bar, psi, hPa)	-
40122	rw	2	uint16_t	Backwash criterion (pressure, time-controlled)	-
40123	rw	2	uint16_t	Threshold undershooting inlet pressure Fixed-point value with two decimal places	refer to pressure value unit
40124	rw	2	uint16_t	Threshold start backwash Fixed-point value with two decimal places	refer to pressure value unit
40125	rw	2	uint16_t	Trigger time threshold backwash	s
40126	rw	2	uint16_t	Backwash lock	-
40127	rw	2	uint16_t	Backwash interval	h
40128	rw	2	uint16_t	Flag backwash active (backwashActive)	-
40129	rw	2	uint16_t	Flag backwash due (backwashDue)	-
40141	rw	2	uint16_t	Error code	-
40142	rw	2	uint16_t	Flag "Save error code"	-
40201	rw	2	uint16_t	Modbus active	-
-					
40203	rw	2	uint16_t	Flag "Save parameters"	-

## 7.6 Reading the water pressure



You can see on the pressure gauges whether the filter element is dirty.



### Designation

1 Inlet pressure

### Designation

2 Outlet pressure

1. Open several water withdrawal points (generate max. flow rate).
2. Read the inlet and outlet pressure on the pressure gauges.
3. Proceed as follows to calculate the differential pressure:  
 $\text{Inlet pressure (raw water pressure gauge)} - \text{Outlet pressure (pure water pressure gauge)} = \text{Differential pressure.}$
4. Perform a backwash if the differential pressure is  $> 0.4$  bar.



If the product's differential pressure cannot be relieved by means of one or several backwash processes, a malfunction has occurred (refer to chapter 9).

### 7.6.1 Reading the differential pressure on the display

- Read the differential pressure on the display (refer to chapter 7.3) with the pressure sensors connected.

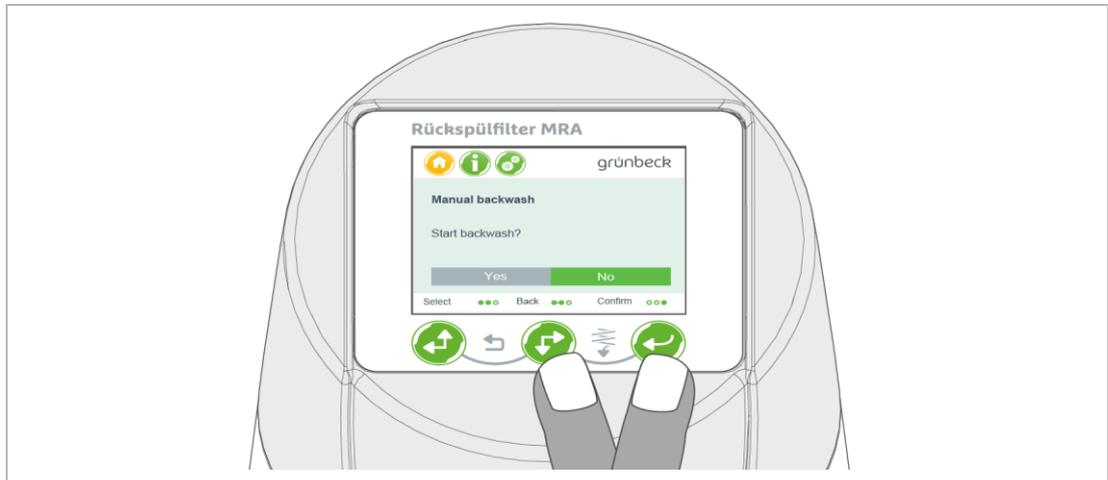
You can modify the differential pressure in the control unit (refer to chapter 7.4).

## 7.7 Starting a manual backwash



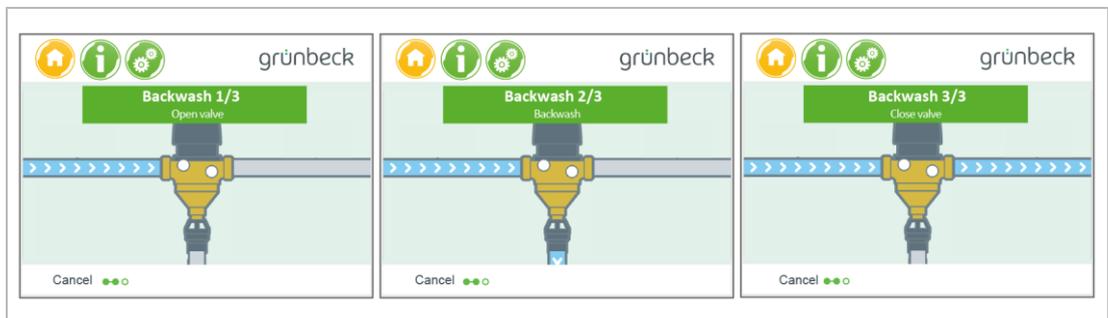
You can start a backwash manually at any time.

During the backwash, filtered pure water is still available.



1. Press key combination + simultaneously.
2. Start the backwash with the enter key Yes.

You can cancel the backwash process with key combination + .



The backwash process takes place in 3 steps:

1. Open valve (40 seconds)
2. Backwash (10 seconds)
3. Close valve (40 seconds)
  - » The backwash process is terminated automatically.



After every new start of the filter, a reference run is carried out. After successful filter referencing, a backwash is performed.

## 8 Maintenance and repair

Maintenance and repair includes cleaning, inspection and maintenance of the product.



The responsibility for inspection and maintenance is subject to local and national requirements. The owner/operating company is responsible for compliance with the prescribed maintenance and repair work.



A maintenance contract ensures that all the required maintenance work will be performed in due time.

- ▶ Only use genuine spare and wearing parts from Grünbeck.

### 8.1 Cleaning



Only have the cleaning work carried out by persons who have been instructed in the risks and dangers that can arise from the product.



**WARNING** Damp cleaning of live components.

- Risk of electric shock
- Sparking due to short circuit
- ▶ Unplug the power supply unit from the socket.
- ▶ Switch off the voltage supply – as well as any external voltage – before starting the cleaning work.
- ▶ Do not use any high-pressure equipment for cleaning and do not blast electrical/electronic devices with water.

**NOTE** Do not clean the product with cleaning agents containing alcohol/solvents.

- Plastic components are damaged
- Varnished surfaces are affected
- ▶ Use a mild/pH-neutral soap solution.
  
- ▶ Only clean the outside of the product.
- ▶ Do not use any strong or abrasive cleaning agents.
- ▶ Wipe the surfaces with a damp cloth.
- ▶ Dry the surfaces with a cloth.

## 8.2 Intervals



By way of regular inspections and maintenance, malfunctions can be detected in time and product failures might be prevented.

- ▶ As the owner/operating company, determine which components have to be inspected and maintained at which intervals (load-dependent). These intervals are subject to the actual conditions, e.g.: Water condition, degree of impurities, environmental influences, consumption, etc.

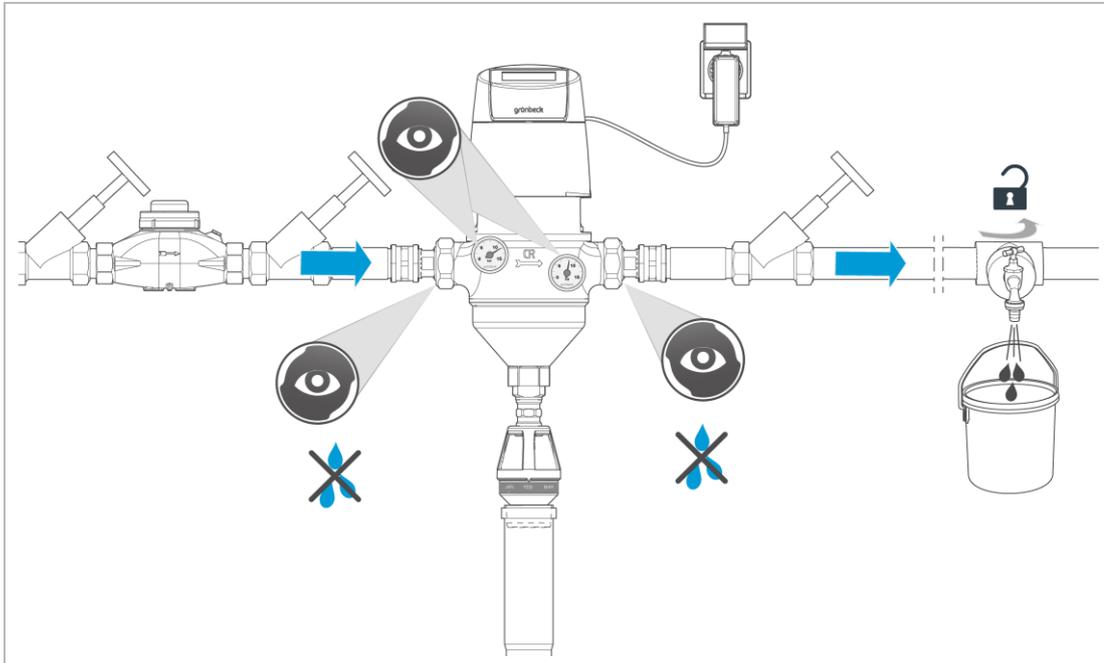
The interval table below shows the minimum intervals for the activities to be carried out.

Activity	Interval	Tasks
Inspection	2 months	<ul style="list-style-type: none"> <li>• Visual/functional check</li> <li>• Visually check the power supply unit and the connection cable for damage</li> <li>• Read operating values and messages/errors</li> <li>• Read the water pressure on the pressure gauges</li> <li>• Visually check the (optional) safety solenoid valve for damage</li> <li>• Visually check the (optional) pressure sensors for damage</li> <li>• Perform a manual backwash, if necessary</li> </ul>
Maintenance	6 months	<ul style="list-style-type: none"> <li>• Perform a manual backwash</li> <li>• Condition and leak test</li> <li>• Read the operating parameters</li> <li>• Check the (optional) safety solenoid valve for function</li> <li>• Check the (optional) pressure sensors for function</li> <li>• Check the plug-in connections and contact connections</li> </ul>
	annually	<ul style="list-style-type: none"> <li>• Check O-rings/flat gaskets for wear and tear</li> <li>• Check the filter element and the brush for wear and tear</li> <li>• Check the flushing water connection and the drain connection for a tight fit</li> <li>• Check the filter for a tight fit and for leaks</li> <li>• Check the (optional) safety solenoid valve for leaks</li> <li>• Check the (optional) pressure sensors for leaks</li> <li>• Read out the operating parameters and error memory</li> </ul>
Repair	5 years	<ul style="list-style-type: none"> <li>• Recommendation: Replace the filter element, seals and suction nozzle unit</li> </ul>

## 8.3 Inspection

You, as owner/operating company, can carry out the regular inspections yourself.

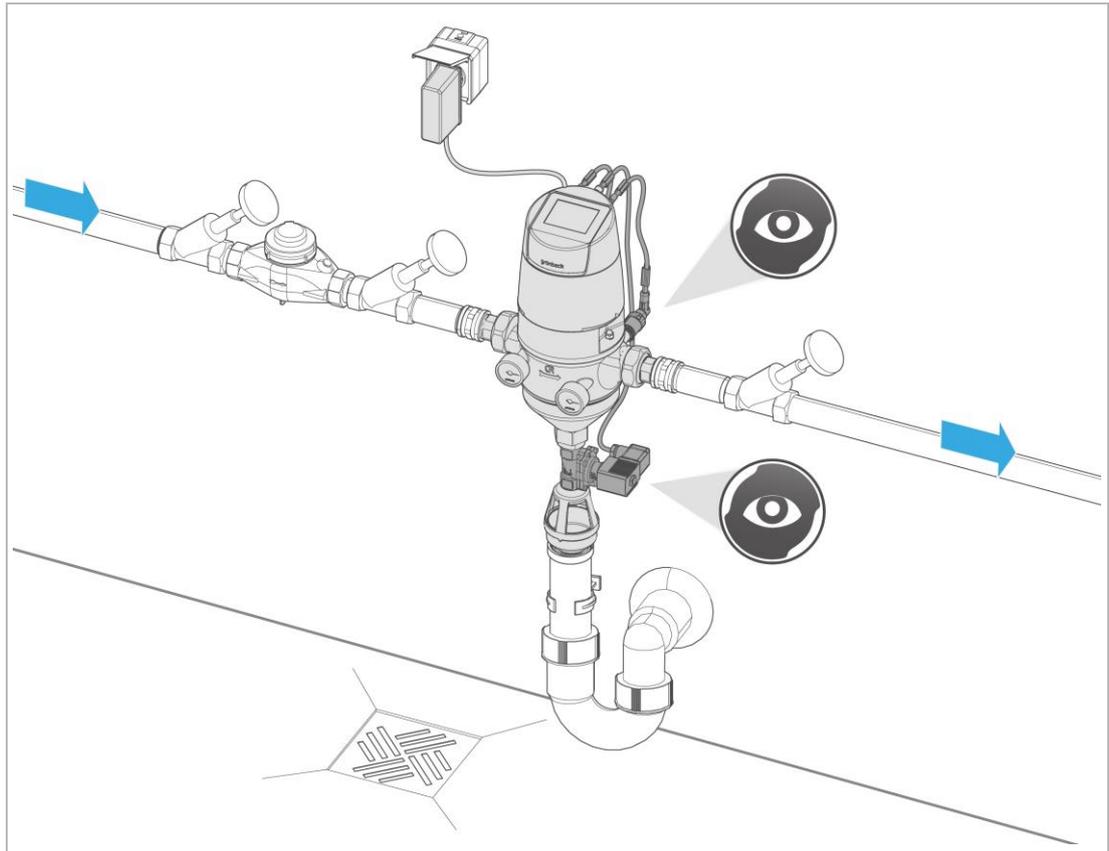
- ▶ Conduct an inspection at least every 2 months.



1. Open several water withdrawal points (generate max. flow rate).
2. Check the installation for leaks and function.
  - a Pay attention to leaks and puddles on the floor.



3. Visually check the power supply unit with adapter and the connection cable for damage.
4. Read the operating values and possible messages/errors in the control unit.
5. Read the water pressure on the pressure gauges.



6. Visually check the (optional) safety solenoid valve and the (optional) pressure sensors for damage.
  - ▶ Perform a manual backwash in case of increasing contamination of the filter element and/or decreasing water pressure in the pipe network (refer to chapter 7.7).

## 8.4 Maintenance

Some regular work is necessary to ensure the proper functioning of the product in the long term. DIN EN 806-5 recommends regular maintenance to ensure trouble-free and hygienic operation of the product.



### WARNING

Contaminated drinking water due to contamination during maintenance and repair work

- Risk of hygienic contamination
- Infectious diseases
- ▶ Use hygienic gloves during maintenance and repair work.
- ▶ Do not touch the interior components (filter element, brush) with your bare hands.



### WARNING

Hot water and hot surfaces in case of hot water filtration



- Burns due to hot surfaces of components at temperatures of more than 55 °C.
- Scalding due to escaping hot water, e.g. during backwash.
- ▶ Use suitable protective gloves when working on the product.
- ▶ Let the filter cool down prior to opening the filter funnel.

### 8.4.1 Semi-annual maintenance

In order to carry out the semi-annual maintenance, proceed as follows:

1. Perform a manual backwash (refer to chapter 7.7).
2. Check the installation for leaks and possible damage.
3. Read the inlet and outlet pressure on the pressure gauges.
4. Read the operating parameters below in the control unit:
  - Inlet and outlet pressure (with optional pressure sensors)
  - Differential pressure (with pressure sensors)
  - Error memory
5. Check the (optional) safety solenoid valve for function and leaks.
  - a Start a manual backwash.
  - b Unplug the power supply unit from the socket during the backwash.
  - c Check that the safety solenoid valve closes.
  - d During backwash, check if water sprays from flushing water connection.
  - e Clean the nozzle screw of the safety solenoid valve, if necessary.
6. Check the plug-in connections of the contact connections of the (optional) safety solenoid valve and the (optional) pressure sensors for damage.

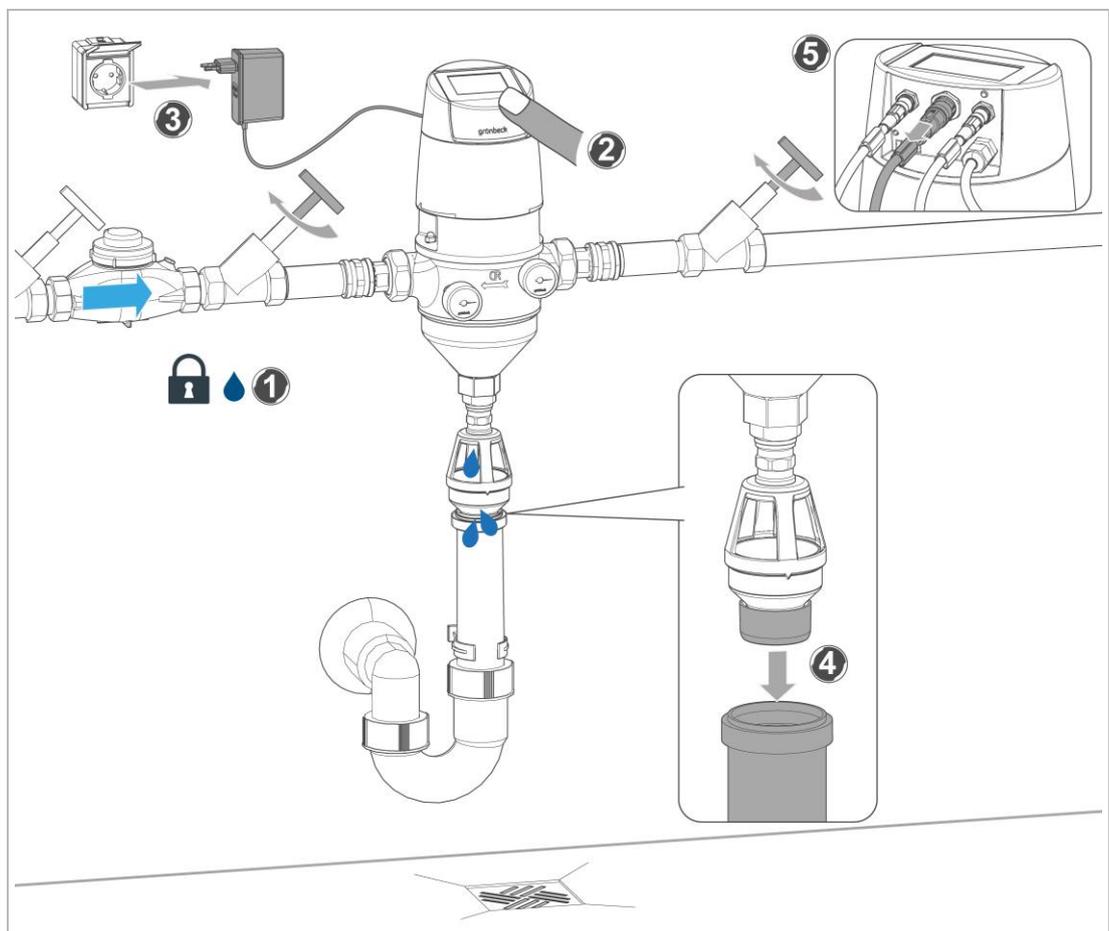
## 8.4.2 Annual maintenance



The work below must be carried out by a qualified specialist only.

- ▶ Carry out the work below in addition to the semi-annual maintenance:
  - Check the O-rings for wear and tear (refer to chapter 8.4.2.2)
  - Check the brush/es for wear and tear (refer to chapter 8.4.2.2)
  - Check the filter for leaks (refer to chapter 8.4.2.3)
  - Check the filter for a tight fit and check the optional sensor technology (refer to chapter 8.4.2.4)

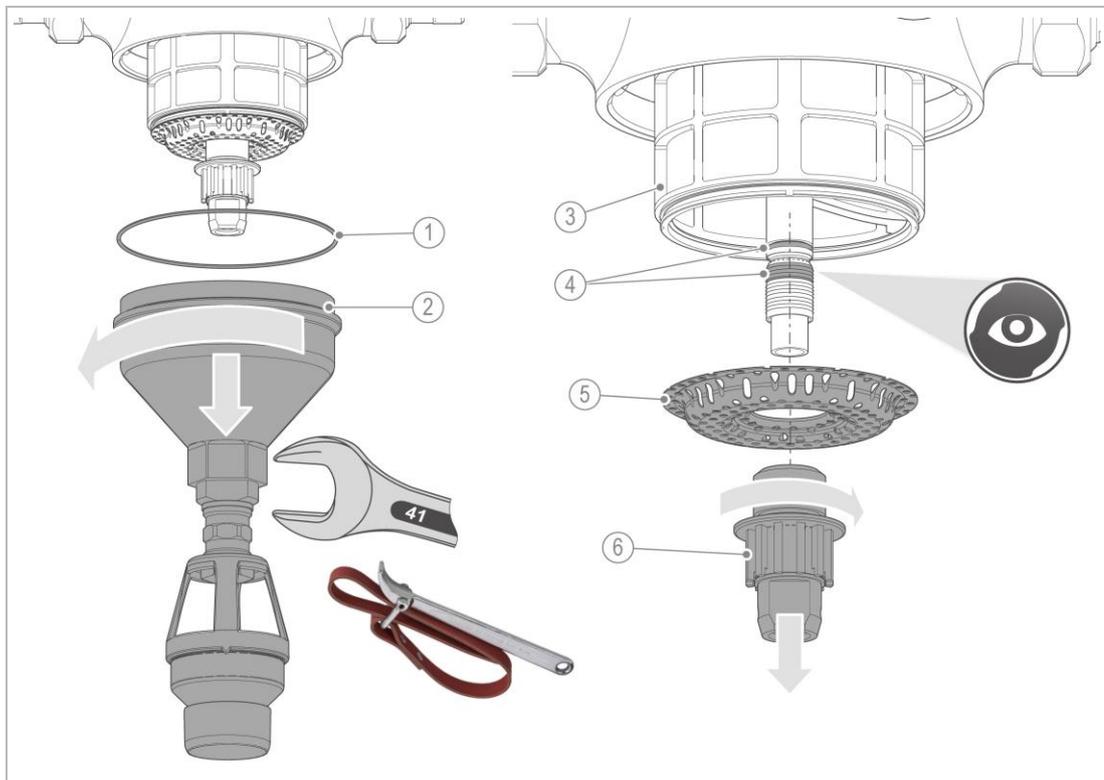
### 8.4.2.1 Preparations



1. Close the shut-off valves at the inlet and outlet.
2. Start a manual backwash.
  - » The water pressure in the filter and in the water pipe is being relieved.
3. Unplug the power supply unit from the socket after ~ 5 seconds.
  - » The suction nozzle stops in open position. The filter is drained.

- » The power supply unit remains unplugged.
- 4. Remove the drain connection.
- 5. Remove the connector socket of the optional safety solenoid valve.

### 8.4.2.2 Opening and checking the filter



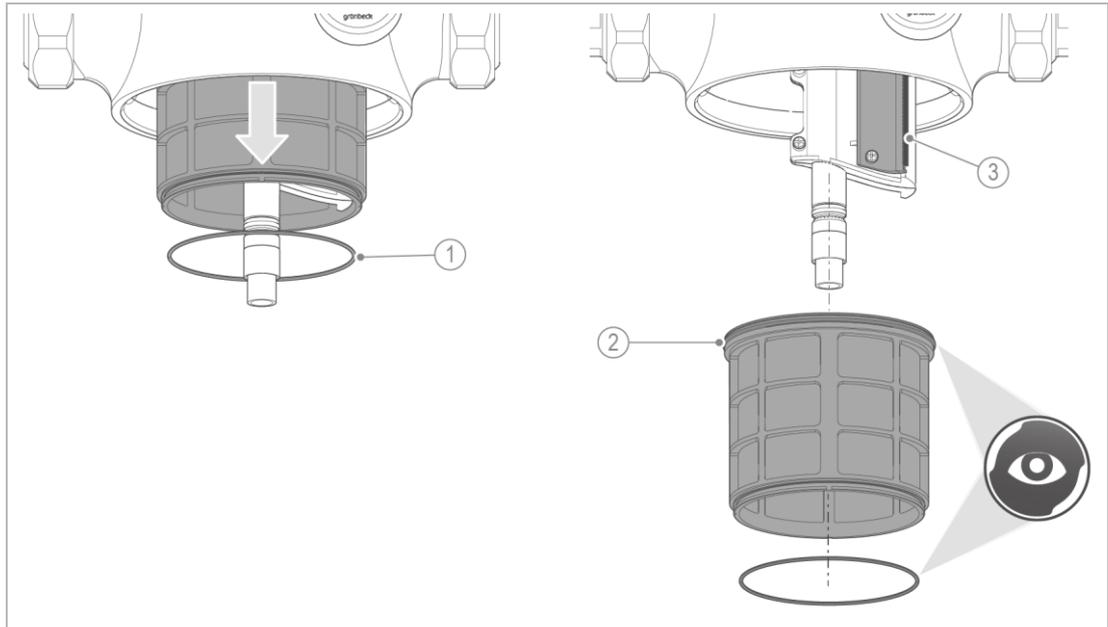
Designation	Designation
1 O-ring	4 Thread and O-ring of the pipe nozzle
2 Filter funnel	5 Sieve bottom
3 Filter element	6 Suction nozzle bottom

1. Unscrew the filter funnel - use a tool if necessary (strap spanner or open-end spanner SW41).
2. Unscrew the lower suction nozzle from the pipe nozzle.
3. Remove the sieve bottom.
4. Check the thread and the O-ring for wear and tear.



If the thread is worn, the complete suction nozzle unit must be replaced.

5. If the thread and the O-ring are not worn:
  - a Clean the thread and the O-ring and apply food-safe grease, e.g. UNI-Silicon L641 (order no. 128 619).



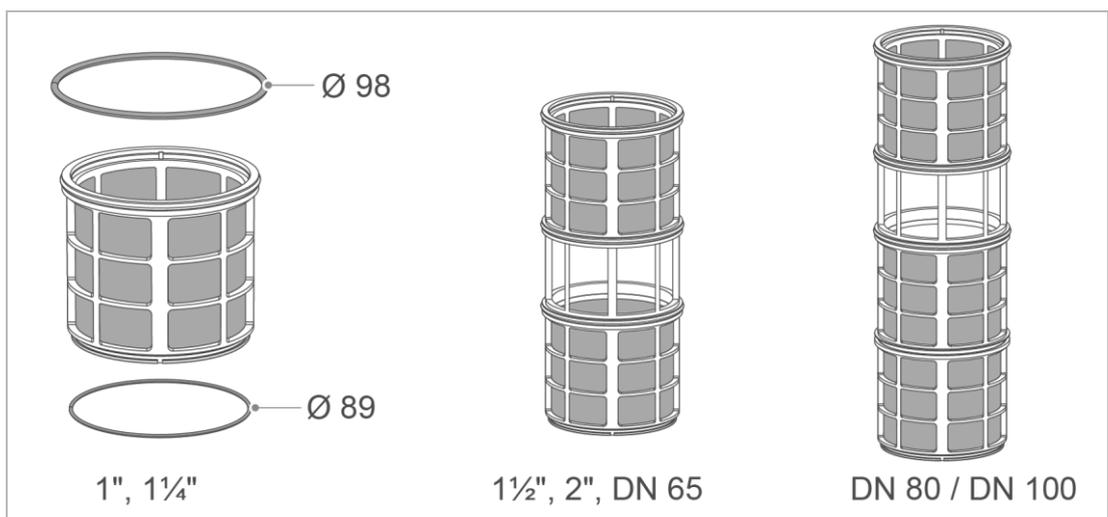
Designation
1 O-ring inside (Ø 89 mm)
2 O-ring outside (Ø 98 mm)

Designation
3 Brushes

6. Remove the filter element.
7. Check the brush/es for wear and tear.
8. Check the filter element for damage and dirt deposits.
9. Check the O-rings of the filter element (outside and inside) for wear and tear.

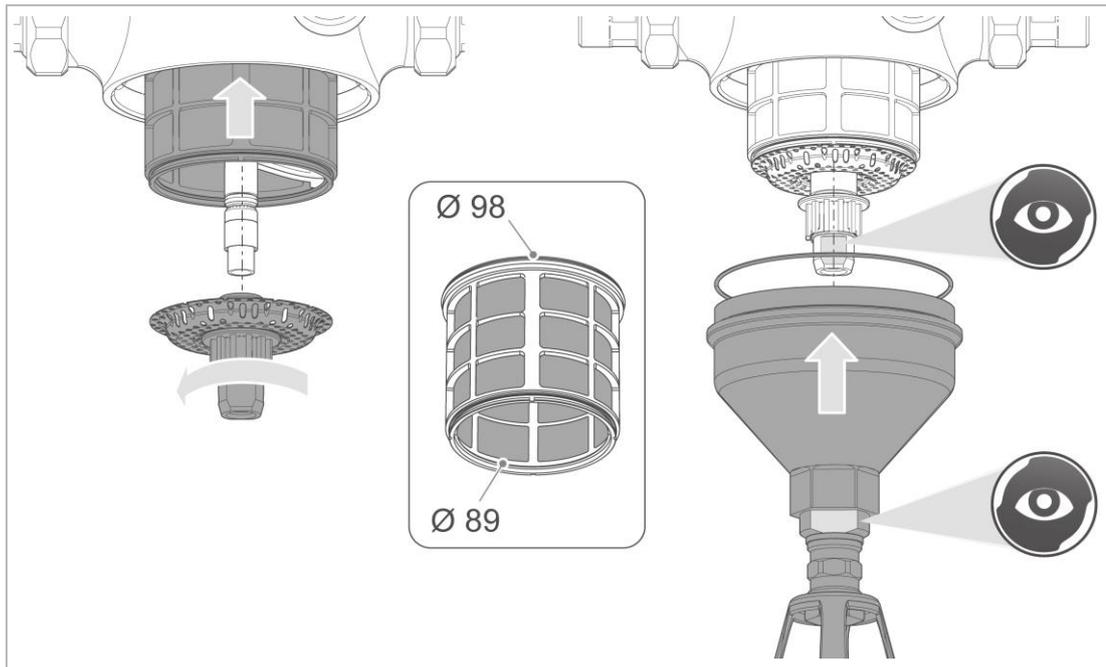


Depending on the filter size, different filter elements are combined. If one filter element is damaged, you can either replace one filter element or a complete set of filter elements. The individual filter elements are connected by means of a detachable snap connection.

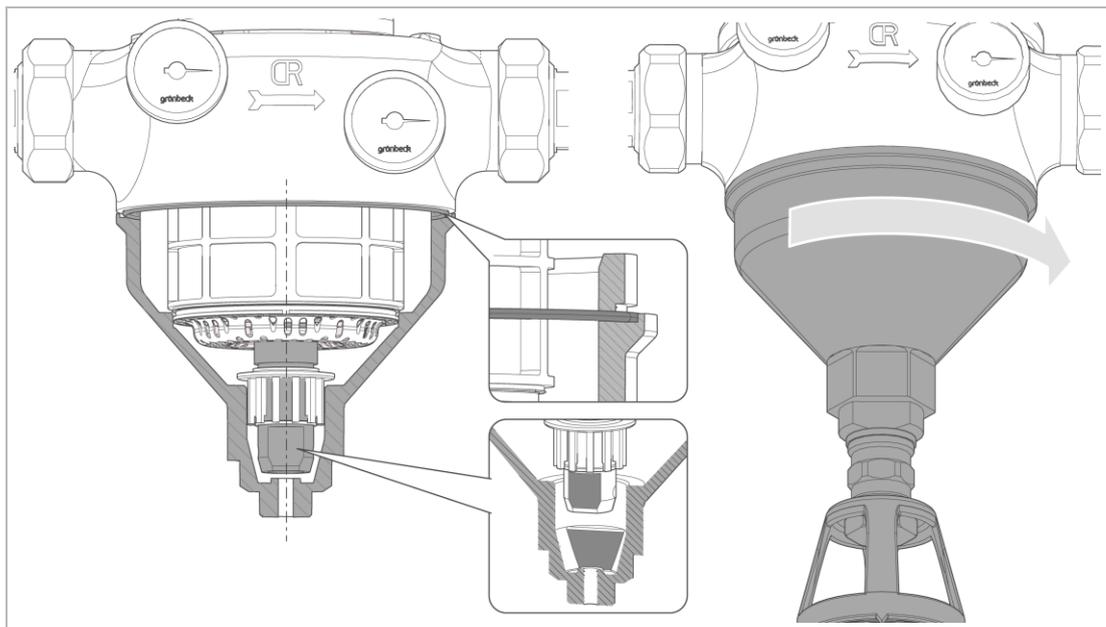


- Replace worn components.

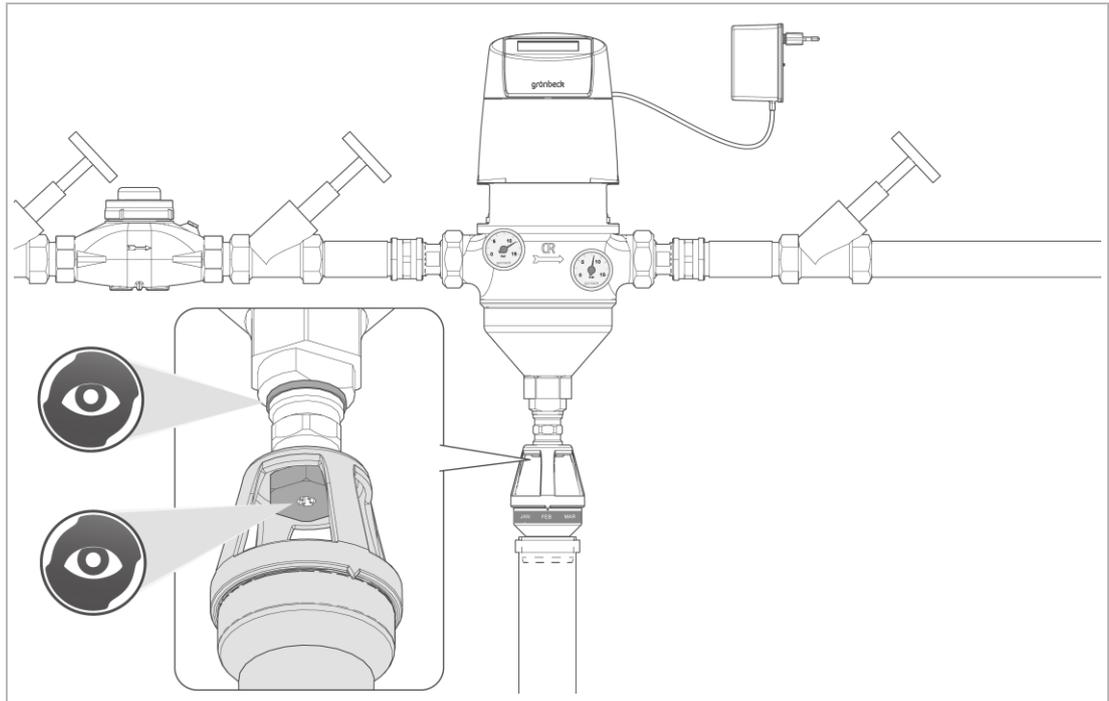
### 8.4.2.3 Closing the filter



1. Fit the O-rings to the filter elements. Slide the filter elements with the larger  $\text{Ø}$  pointing forward over the suction nozzle into the filter housing.
2. Position the sieve bottom between the pipe nozzle and the lower suction nozzle.
3. Screw the lower suction nozzle onto the pipe nozzle until the O-ring is just not visible any longer.
4. Slide the filter funnel onto the suction nozzle.
  - a Make sure that the two flat faces of the filter funnel are parallel to the wrench flat on the suction nozzle.

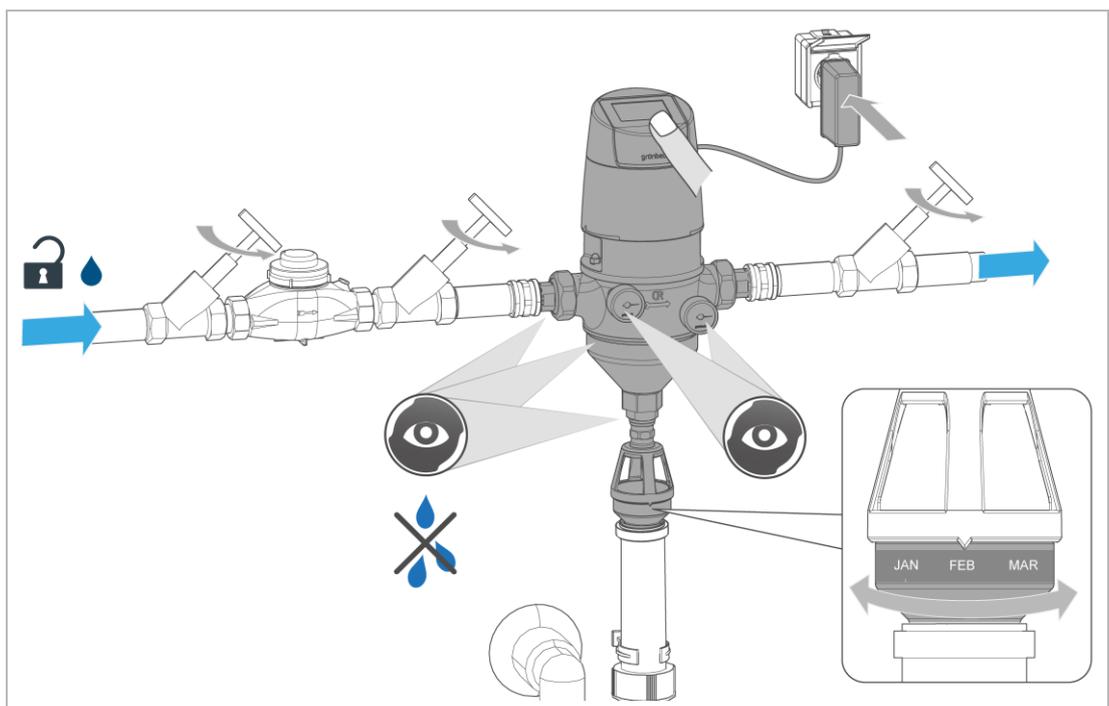


5. Screw the filter funnel onto the filter housing - tighten firmly using an open-end spanner (SW41) or strap spanner.



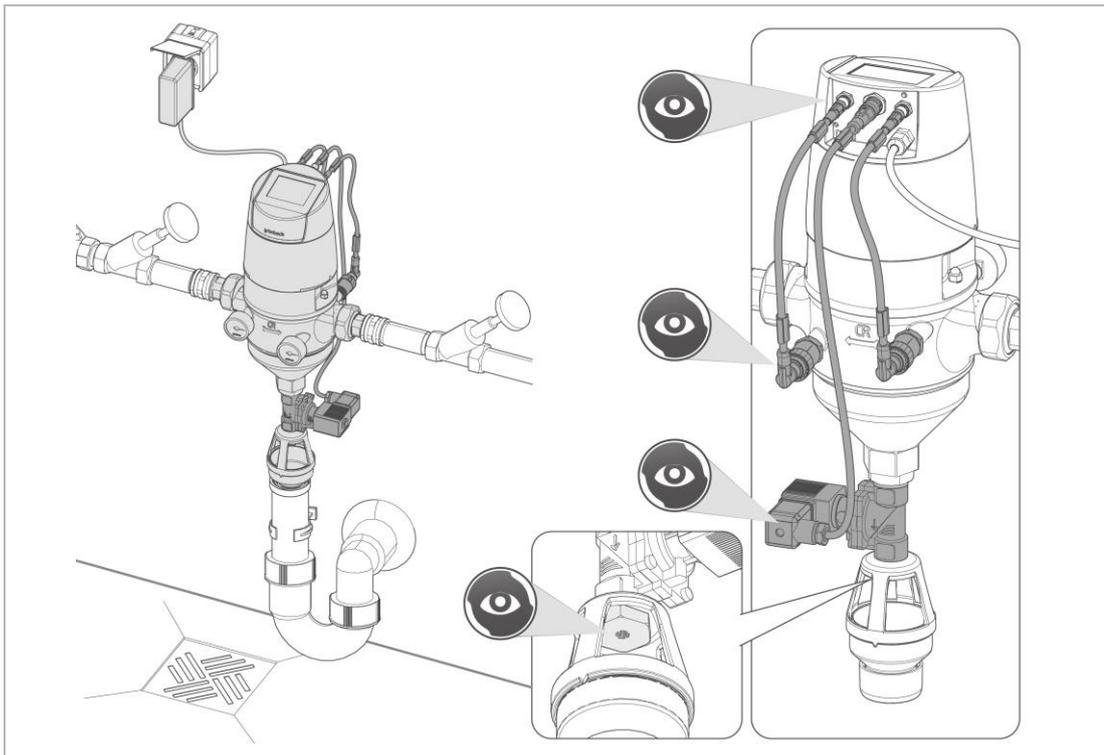
6. Check the tight fit of the flushing water connection and the double socket.
  - a Clean the nozzle screw with citric acid if there are deposits and impurities.
7. Mount the drain connection.
8. Remove the connector socket of the optional safety solenoid valve.

#### 8.4.2.4 Putting the filter back into operation



1. Check the tight fit of the filter in the pipe.

2. Open the shut-off valves on the inlet and the outlet.



3. Check the optional safety solenoid valve for leaks and integrity.
  - a Clean the nozzle screw with citric acid if there are deposits and impurities.
  - b Check the tight fit of the flushing water connection to the nozzle screw.
  - c Check the connecting cable and the connector socket for a tight fit. Retighten the connections, if necessary.
4. Check the optional pressure sensors for leaks and integrity.
  - a Check the connecting cable for a tight fit. Retighten the connections, if necessary.
5. Read the operating parameters in the control unit.
6. Read out the error memory.
7. Check the time in the control unit. Reset the time, if necessary.
8. Confirm the maintenance performed in:
  - Settings > Acknowledge maintenance
  - a Restart the maintenance interval.



The technical service personnel can confirm the performed maintenance (refer to technical service manual). Settings > System parameters > Code XXX > Confirm maintenance

» By confirming, the maintenance counter is being incremented.

9. Put the filter into operation (refer to chapter 6.1).
10. Enter the maintenance in the operation log (refer to chapter 13.2).

## 8.5 Spare parts

For an overview of the spare parts, refer to our spare parts catalogue at [www.gruenbeck.com](http://www.gruenbeck.com).

You can obtain the spare parts from your local Grünbeck representative.



As per DIN EN 13433-1, filter elements with pore sizes of 50 µm, 200 µm and 500 µm are not permitted for drinking water systems and can only be used after consultation with Grünbeck (refer to Accessories 3.4).

Designation	Order no.		
	1" / 1¼"	1½" / 2" / DN 65	DN 80 / DN 100
Filter element 100 µm	107 061	107 062	107 063

## 8.6 Wearing parts



Wearing parts are only allowed to be changed out by a qualified specialist.

Designation	Order no.		
	1" / 1¼"	1½" / 2" / DN 65	DN 80 / DN 100
Seal kit (O-rings)	107 755		
Suction nozzle bottom	107 021e		
Brush	107 860e		
(number required)	1 piece	2 pieces	3 pieces
Spiral pin CLDP 2.5 x 12 (10 pieces)	100179320001		
Nozzle screw with O-ring	100219380000		

- ▶ Have the seals replaced in the event of leaks, damage or deformations.
- ▶ Have defective or worn components replaced.

## 9 Fault



### WARNING

Contaminated drinking water due to stagnation

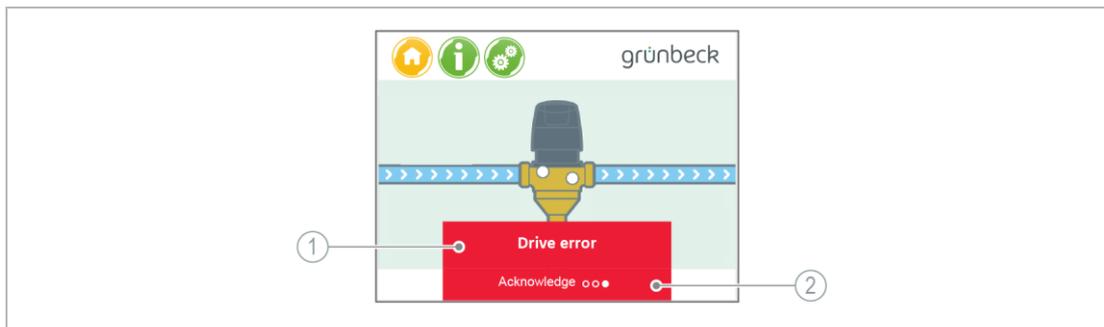
- Infectious diseases
- ▶ Have malfunctions eliminated immediately.

### 9.1 Signals

The product displays messages.

- Warning message (orange)
- Malfunction (red)

The display of the warning message or fault remains active until the condition is rectified.

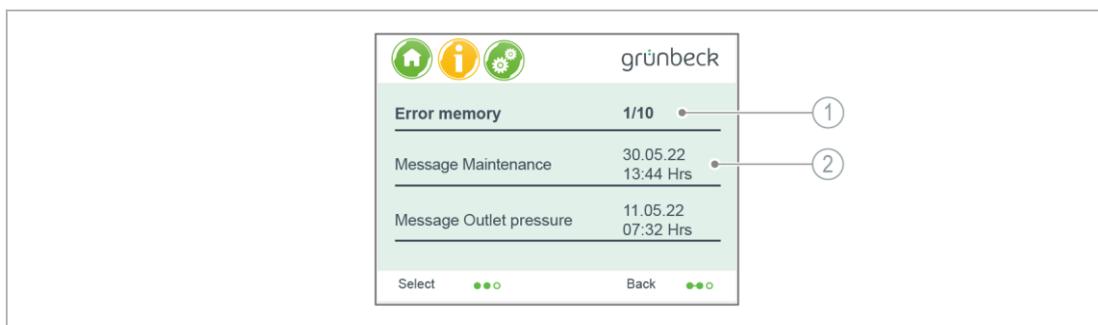


Designation	Designation
1 Current message	2 Acknowledgement

1. Rectify the warning message or malfunction (refer to the table).
2. Acknowledge the warning message or malfunction.
3. Monitor the display of the control unit.
4. If the warning message or malfunction reoccurs, compare the displayed message with the table below.



The messages stored can be read out in the error memory list in:  
`Settings> Error memory`



**Designation**

1 Error memory list

**Designation**

2 Display of the stored messages

▶ Reset the error memory list after the error message has been rectified.

### 9.1.2 Warnings (orange)

Warning	Explanation	Remedy
Check Modbus connection	Contact to Modbus RTU interrupted	<ul style="list-style-type: none"> <li>▶ Check the connection</li> <li>▶ Check the settings of Modbus RTU and correct them, if necessary.</li> <li>▶ Contact technical service</li> </ul>
Inlet pressure too low	Set limit value of inlet pressure is undershot	<ul style="list-style-type: none"> <li>▶ Check the inlet pressure and increase it, if necessary</li> </ul>
Maintenance due	Maintenance interval expired	<ul style="list-style-type: none"> <li>▶ Have maintenance performed by the after-sales service</li> </ul>

### 9.1.3 Malfunctions (red)

Fault	Explanation	Remedy
Error Temperature	Increased temperature below the control cover (> 75 °C)	<ul style="list-style-type: none"> <li>▶ De-energise the filter</li> <li>▶ Check whether the temperature increases again after re-start.</li> <li>▶ Contact technical service</li> </ul>
Drive error	Defective drive <ul style="list-style-type: none"> <li>• Motor does not rotate or is buzzing</li> <li>• Worn thread</li> <li>• Defective control unit</li> </ul> <hr/> Timeout <ul style="list-style-type: none"> <li>• Line interrupted between micro-switch, motor and control unit</li> </ul> <hr/> Blockage <ul style="list-style-type: none"> <li>• Double-flat does not rotate</li> </ul> <hr/> Positioning <ul style="list-style-type: none"> <li>• Defective microswitch</li> <li>• Cam disc is not operated correctly</li> </ul>	<ul style="list-style-type: none"> <li>▶ Contact technical service</li> </ul>

Fault	Explanation	Remedy
Error Filter element	<p>After 3 consecutive backwash processes, the differential pressure still exceeds the limit value</p> <ul style="list-style-type: none"> <li>• Filter element is dirty</li> <li>• Differential pressure signal is activated permanently</li> <li>• Flow through filter too high</li> <li>• Parameter for differential pressure too low</li> <li>• Pressure sensor defective</li> </ul>	<ul style="list-style-type: none"> <li>▶ Check the filter element for contamination</li> <li>▶ Replace the filter element, if necessary</li> <li>▶ Perform a manual backwash</li> <li>▶ Increase the parameter for differential pressure</li> <li>▶ Replace the pressure sensor</li> </ul>
Error Pressure sensor IN	<p>The pressure sensor for inlet pressure does not output a measurement</p> <p>Pressure sensor or connection line defective</p>	<ul style="list-style-type: none"> <li>▶ Check the pressure sensor for a tight fit and for leaks</li> <li>▶ Replace the pressure sensor including the connection line</li> </ul>
Error Pressure sensor OUT	<p>The pressure sensor for the outlet pressure does not output a measurement</p> <p>Pressure sensor or connection line defective</p>	<ul style="list-style-type: none"> <li>▶ Check the pressure sensor for a tight fit and for leaks</li> <li>▶ Replace the pressure sensor including the connection line</li> </ul>
Undefined error (Display is black)	<p>Power supply unit or connection line defective</p> <p>Circuit board or control unit defective</p>	<ul style="list-style-type: none"> <li>▶ Have the power supply unit including the connection line replaced by technical service</li> <li>▶ Have the control unit replaced by technical service</li> </ul>

## 9.2 Observations

Observation	Explanation	Remedy
Water pressure at the withdrawal point too low, pressure loss too high, differential pressure exceeds 0.4 bar	Shut-off valves are not fully open	▶ Fully open shut-off valves
	Filter element is dirty	▶ Carry out a manual backwash
Despite several backwash processes, the differential pressure does not decrease	Filter element is very dirty or clogged	<ul style="list-style-type: none"> <li>▶ Check the filter element for persistent impurities</li> <li>▶ Manually clean the filter element with a brush – pay attention to hygiene</li> <li>▶ Replace the filter elements, if necessary</li> </ul>
Taste of the treated water negatively affected	Inappropriately long period of non-use (downtime)	<ul style="list-style-type: none"> <li>▶ Withdraw water for several minutes</li> <li>▶ Carry out a manual backwash</li> </ul>
Solids in the filtered water	Inappropriately high flow through the filter	▶ Check filter element for damage or leaks
	Filter element damaged or not installed correctly	▶ Replace defective filter element

Observation	Explanation	Remedy
Water loss in the system	Defective connections	<ul style="list-style-type: none"> <li>▶ Check O-ring and seals for deformation or wear and tear</li> <li>▶ Check filter housing and filter funnel for damage</li> <li>▶ Check connection points (water meter screw connection or flange connection) for damage</li> <li>▶ Have leaky components replaced by a qualified specialist</li> </ul>
Water escaping via lower suction nozzle; drain nozzle cannot be closed via the control unit	A particle got stuck between lower suction nozzle and filter funnel, Mechanical blockage in the filter	<ul style="list-style-type: none"> <li>▶ Perform several manual backwash processes</li> <li>▶ If water continues to escape: Check the filter for foreign particles and damage to interior parts</li> <li>▶ Have a qualified specialist enlarge the drain nozzle to <math>\varnothing</math> 7.5 mm</li> </ul>
	Seal on lower suction nozzle is defective or worn	<ul style="list-style-type: none"> <li>▶ Check the seal of the drain nozzle</li> <li>▶ Have a qualified specialist replace the suction nozzle unit, if necessary</li> </ul>
Motor does not rotate or runs sluggishly	Mechanical blockage in the filter	<ul style="list-style-type: none"> <li>▶ Check the filter for foreign particles and damage to interior parts</li> <li>▶ Replace brush/es, if necessary</li> </ul>
	Thread of the suction nozzle worn	<ul style="list-style-type: none"> <li>▶ Check the thread of the suction nozzle for wear and tear</li> <li>▶ Have a qualified specialist replace the suction nozzle unit, if necessary</li> </ul>
Leaks between the upper pipe nozzle below the motor and the filter housing	O-ring seal of upper suction pipe nozzle is worn	<ul style="list-style-type: none"> <li>▶ Remove the upper pipe nozzle and replace the O-ring</li> </ul>
Low amount of water escaping during backwash	Sieve bottom is dirty or clogged	<ul style="list-style-type: none"> <li>▶ Open the filter funnel and clean the sieve bottom</li> </ul>



If a fault cannot be rectified, further measures can be taken by the technical service.

- ▶ Contact technical service (refer to inner cover sheet).

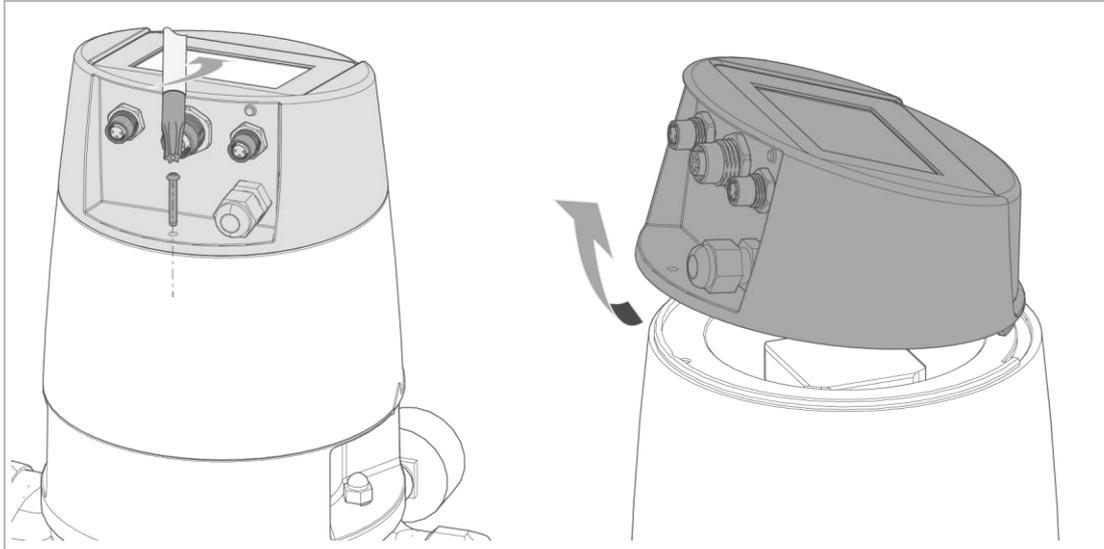
### 9.3 Manually closing the filter's suction nozzle

Due to malfunctions, it might be necessary to close the filter's suction nozzle manually to avoid unnecessary water discharge.

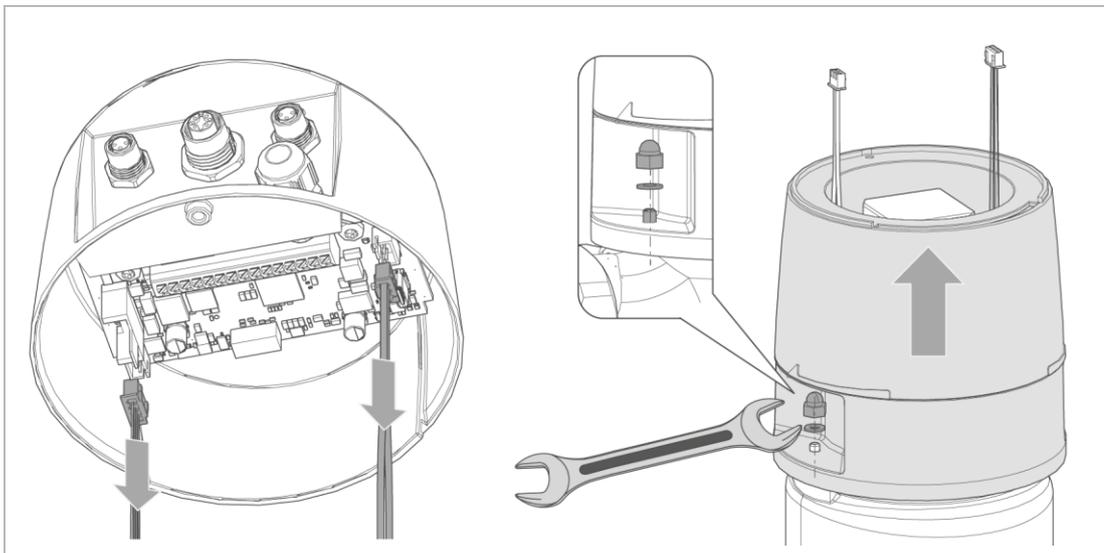
You need the tools below:

- Open-end spanner (SW22, SW11) or
  - Flat-head screwdriver
  - Screwdriver for Torx 10
- ▶ Proceed as follows:

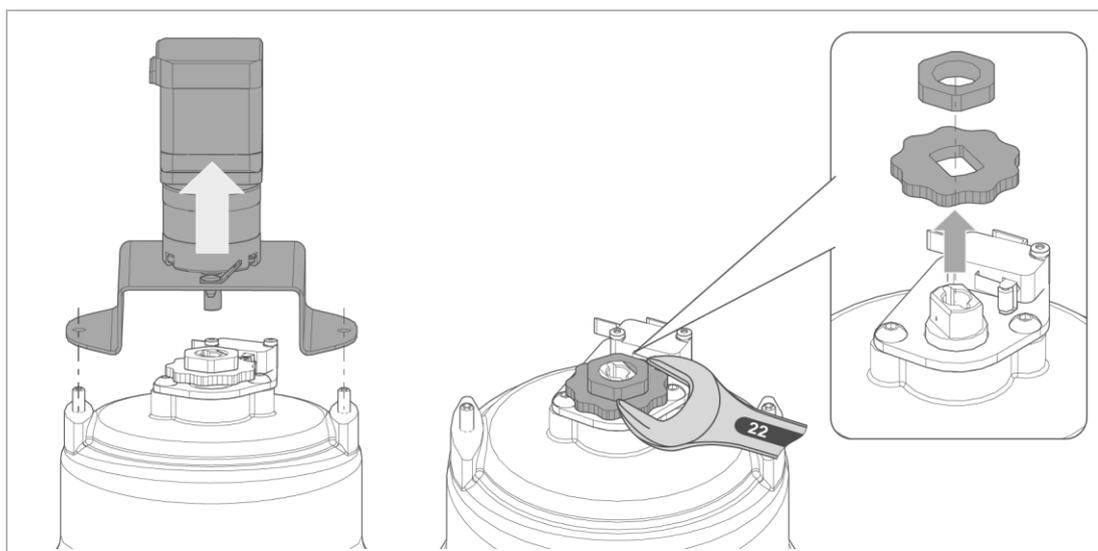
1. Unplug the power supply unit from the socket.
2. Close the shut-off valves upstream and downstream of the filter.
3. Disconnect the connecting lines from the safety solenoid valve and the pressure sensors.



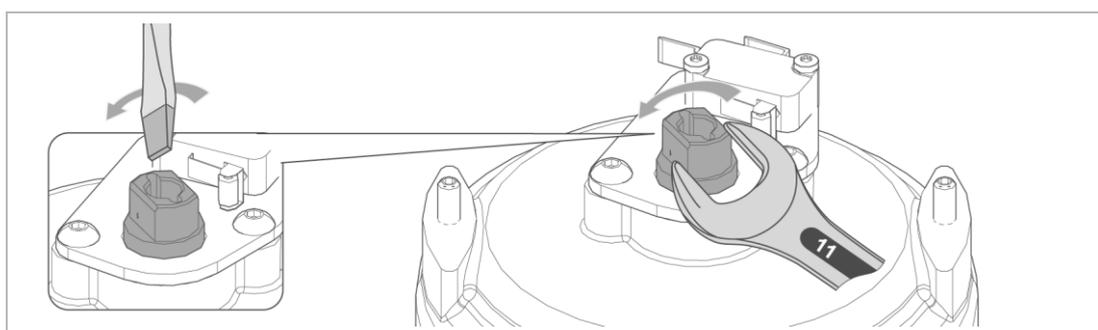
4. Loosen the rear screw of the control cover.
5. Lift the control unit by slightly tilting it forward.



6. Disconnect the plug-in connections of the position sensor technology and the drive unit from the circuit board.
7. Remove the control head.
8. Loosen the nuts of the cover.
9. Lift the cover.



10. Lift the drive unit off the filter housing.
11. Loosen the nut.
12. Remove the cam disc.



13. Use an open-end wrench or screwdriver to turn the pipe nozzle to the left until it reaches the mechanical stop.
  - » The lower suction nozzle is closed.
  - ▶ Slowly open the shut-off valves upstream and downstream of the filter.
  - » The water no longer escapes at the flushing water connection.
  - ▶ Mount the drive unit in reverse order.

**NOTE** The suction nozzle is fastened too tight and has jammed.

- The drive unit does not provide the torque required to open the suction nozzle. There is a risk of damage when the unit is put back into operation.
- ▶ After manually closing the suction nozzle, release a manual backwash.
- ▶ Make sure that the drive unit properly opens and closes the suction nozzle.

## 10 Decommissioning

It is not necessary to take your product out of operation.



In case of longer absences, e.g. holidays, precautionary hygiene measures according to VDI 3810-2 and VDI 6023-2 must be taken in order to maintain drinking water hygiene after downtimes.

### 10.1 Temporary standstill

Should you wish to temporarily shut down your water supply due to a longer period of absence, proceed as follows:

1. Keep the filter connected to mains.
2. Close the shut-off valve downstream of the filter.
  - » The filter performs the backwashes automatically in accordance with the set backwash intervals.
3. If necessary, change the setting for the backwash intervals.
  - » The product remains in an operating state generally recognised as safe.

### 10.2 Restart

1. Open the shut-off valve downstream of the filter.
2. Perform a manual backwash (refer to chapter 7.7).
3. Open a water withdrawal point and completely flush the filter and the pipes.
4. Check the settings in the control unit.

# 11 Dismantling and disposal

## 11.1 Dismantling



The following work must be carried out by qualified specialists only.

1. Close the shut-off valves upstream and downstream of the filter.
2. Open a water withdrawal point.
  - » The pressure in the pipe network is being relieved.
3. Close the water withdrawal point.
4. Perform a manual backwash.
  - » The pressure in the filter is relieved.
5. Unplug the power supply unit from the socket.
6. Disconnect the external signal lines from the terminal strip of circuit board, if connected.
7. Remove the filter from the pipe.
8. Close the gap in the pipe of your drinking water system.

## 11.2 Disposal

- ▶ Comply with the applicable national regulations.

### Packaging

#### NOTE

Risk to the environment due to incorrect disposal

- Packaging materials are valuable raw materials and can be reused in many cases.
- Incorrect disposal can cause environmental hazards.
  - ▶ Dispose of packaging material in an environmentally sound manner.
  - ▶ Comply with locally applicable disposal regulations.
  - ▶ If necessary, commission a specialist company with the disposal.
- ▶ Dispose of the filling material (foam) with the residual waste.

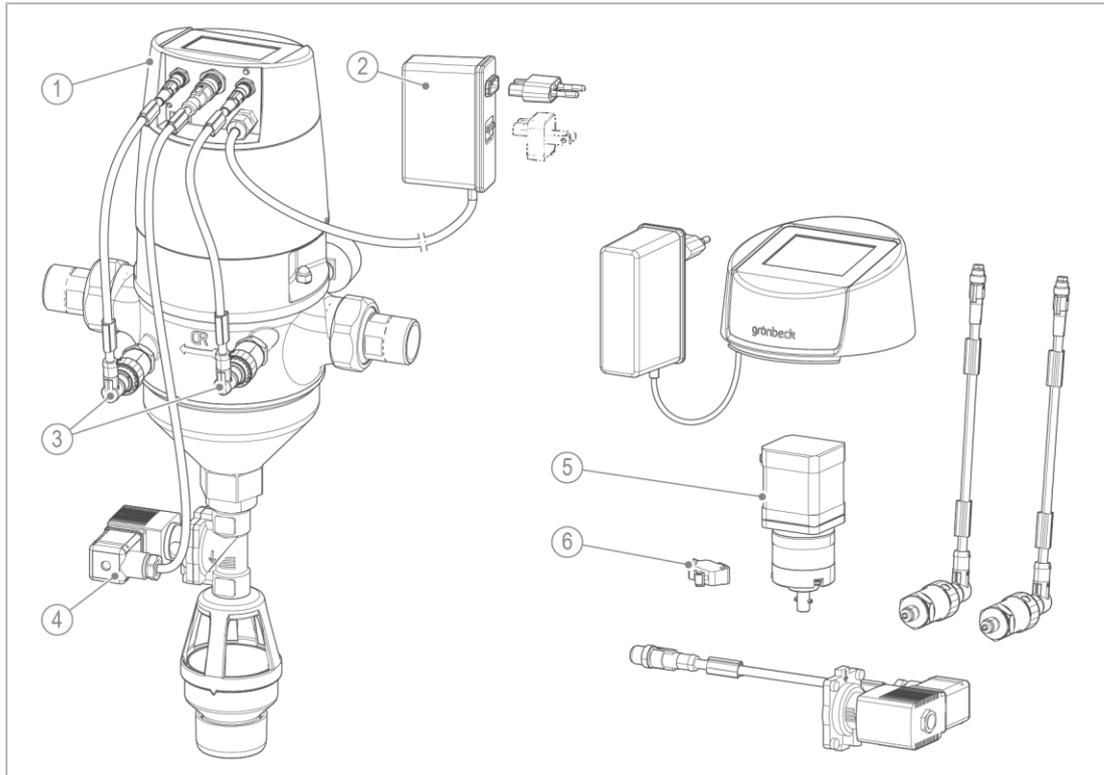
## 11.2.2 Removal of electronic components

Electrical and electronic equipment must be removed in accordance with EU Directive 2012/19/EU and disposed of separately for recycling.



If this symbol (crossed-out wheeled bin) is on the product, this product or its electrical and electronic components must not be disposed of as household waste.

► Remove the electronic components below.



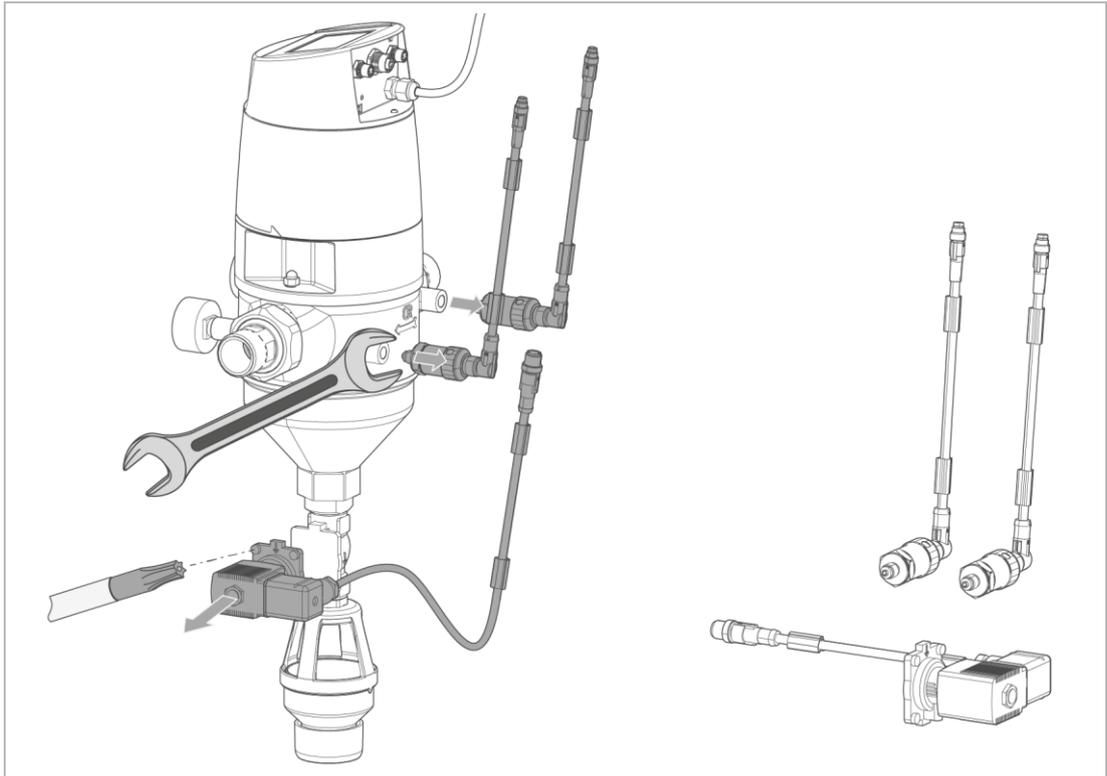
### Designation

- |   |  |
|---|--|
| 1 | Control head                                 |
| 2 | Power supply unit, connection cable, adapter |
| 3 | Pressure sensors                             |

### Designation

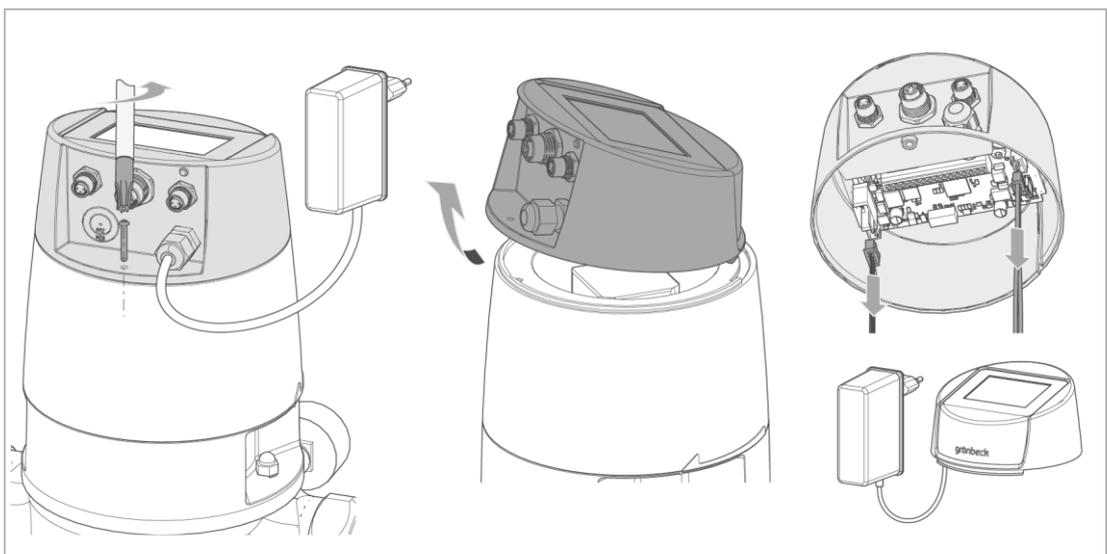
- |   |                       |
|---|-----------------------|
| 4 | Safety solenoid valve |
| 5 | Drive unit            |
| 6 | Microswitch           |

### Removing the sensor technology



1. Loosen the plug-in connections on the filter head.
2. Loosen the circular connector on the pressure sensors.
3. Remove the pressure sensors.
4. Loosen the 4 screw connections of the safety solenoid valve element.
5. Remove the safety solenoid valve from the valve housing.

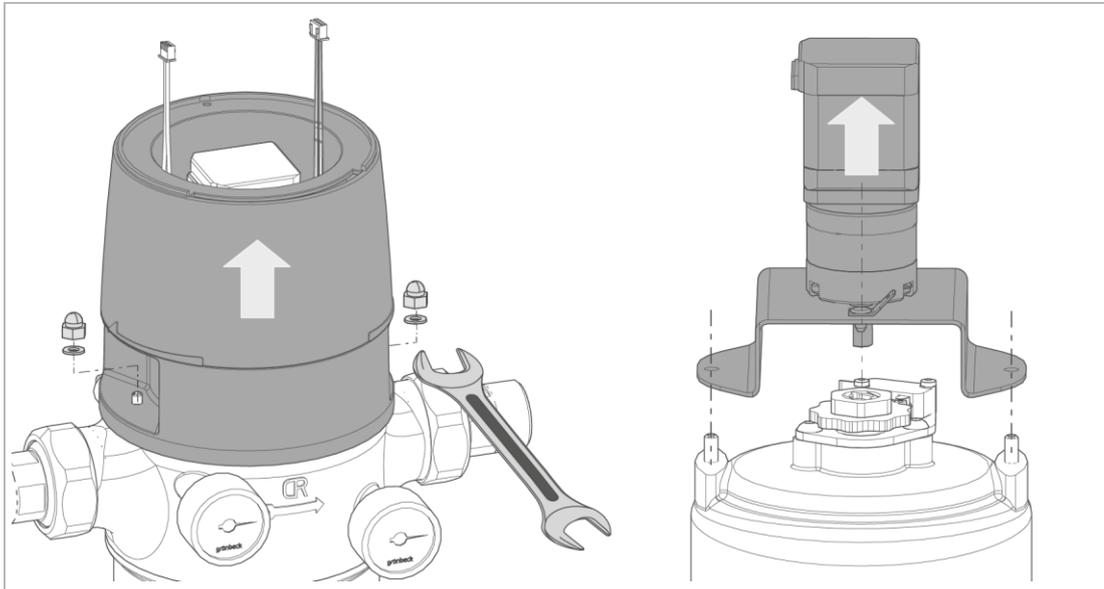
### Dismantling the control head



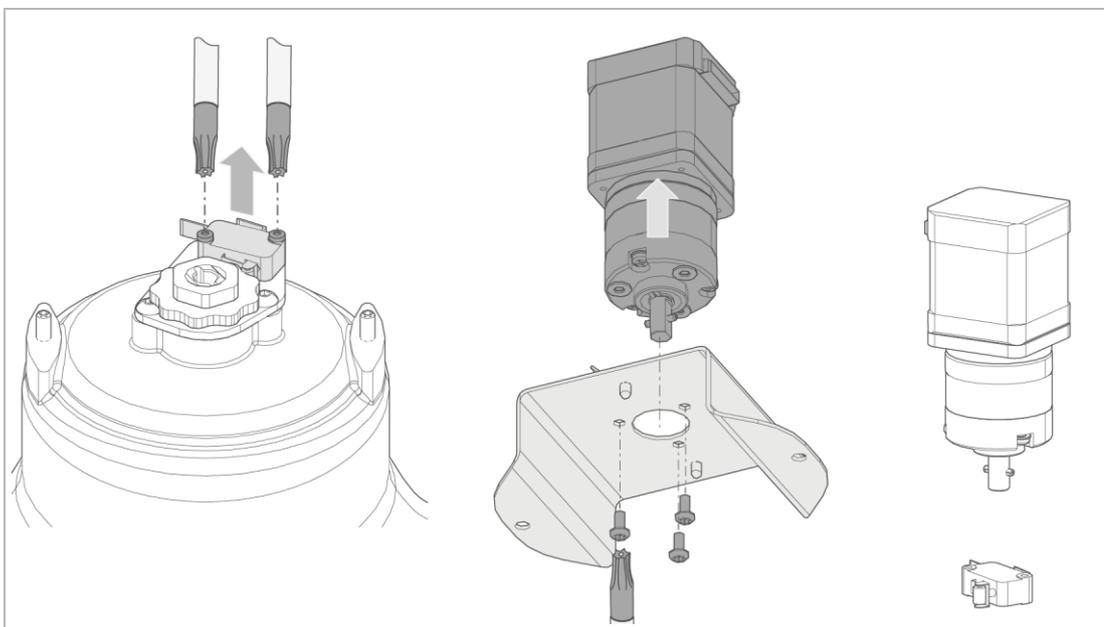
6. Loosen the rear screw of the control cover.
7. Lift the control unit by slightly tilting it forward.

8. Disconnect the plug-in connections of the position sensor technology and the drive unit from the circuit board.
9. Remove the control head.

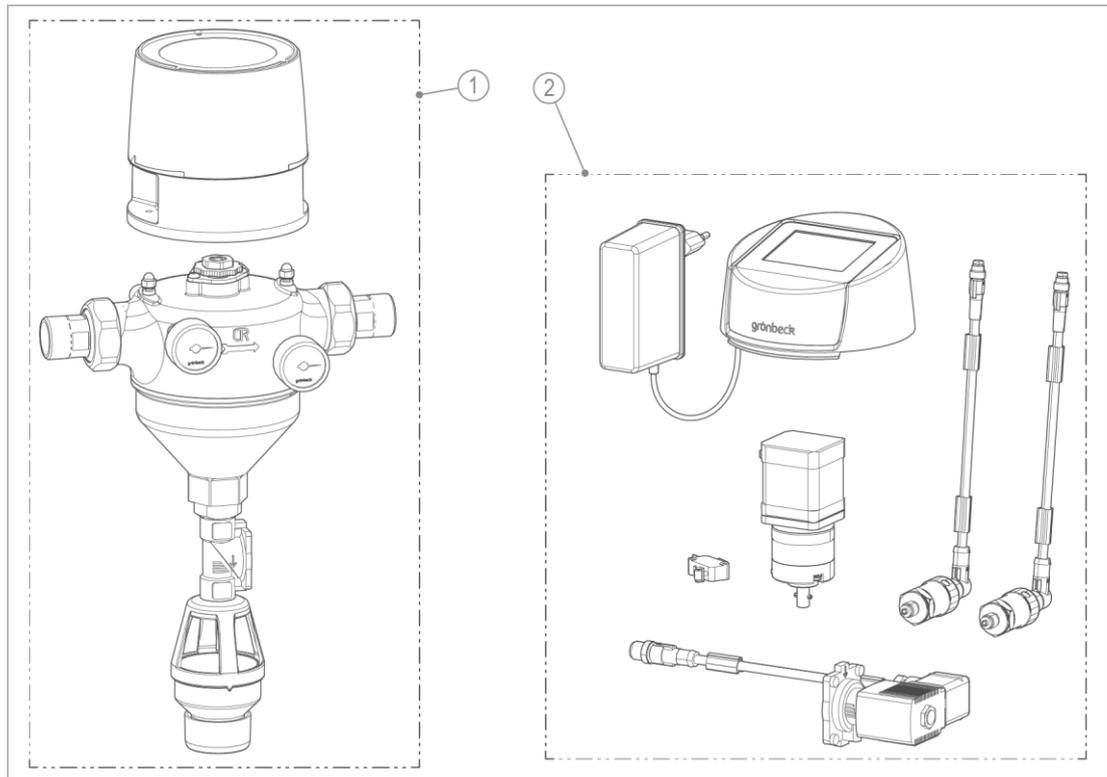
### Removing the drive unit



10. Loosen the nuts of the cover.
11. Lift the cover.
12. Lift the drive unit off the filter housing.



13. Loosen the 2 screws of the microswitch and remove it.
14. Loosen the 3 screws of the drive unit and remove the retaining plate.



**Designation**

1 Mechanical components

**Designation**

2 Electronic components

### 11.2.3 Disposal of electronic components

- ▶ Dispose of the removed electronic components according to the national regulations separately from your household waste.
- ▶ Find out about local regulations on the separate collection of electrical and electronic products.



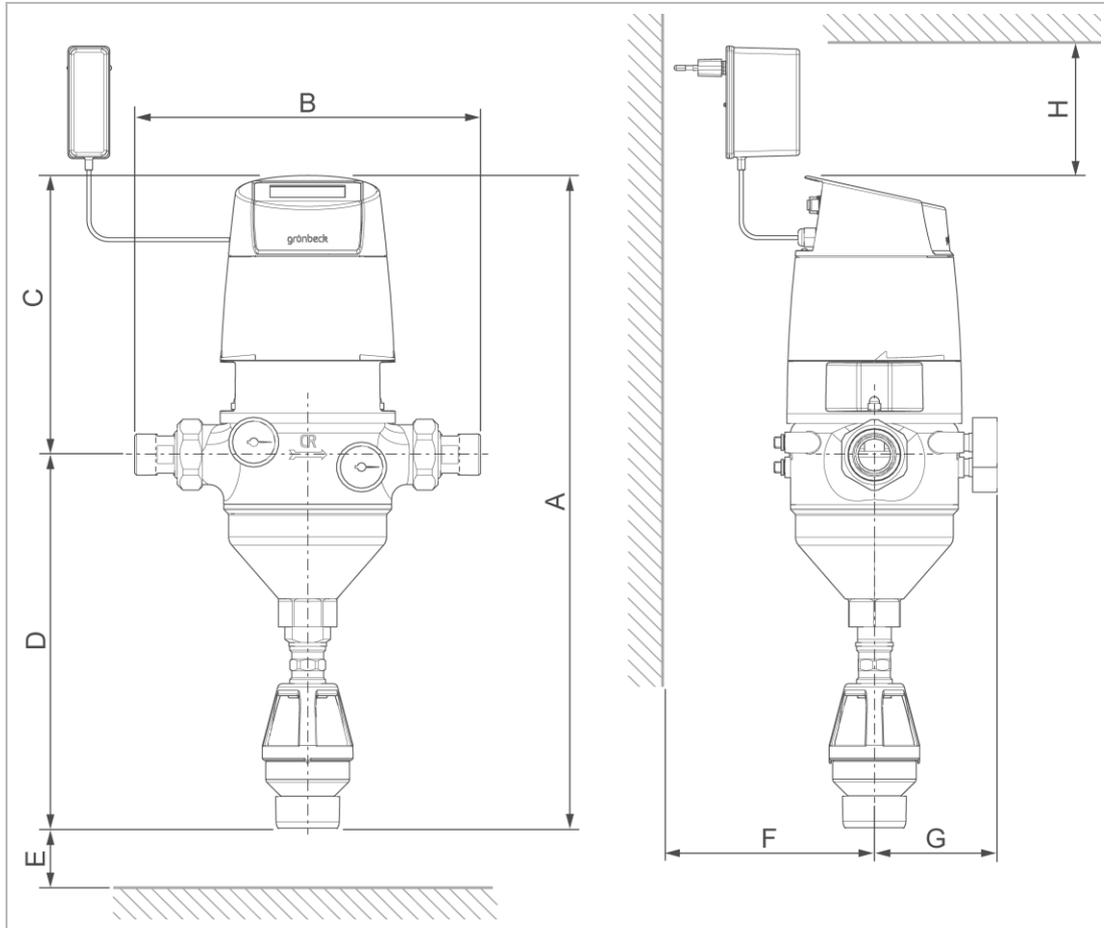
For more information on take-back and disposal, go to [www.gruenbeck.com](http://www.gruenbeck.com).

### 11.2.4 Product

- ▶ Disassemble the products into individual parts.
- ▶ Dispose of the individual parts of the product (without electronic components) according to the respective materials.
- ▶ Make use of the collection points available to you for the disposal of your product.

## 12 Technical specifications

### 12.1 Backwash filters MRA25/MRA32



Dimensions and weights			MRA25	MRA32
A	Total height	mm	526	526
B	Installation length	with screw connection	276	281
		without screw connection	190	190
C	Overall height above centre of connection	mm	225	225
D	Overall height up to centre of connection	mm	301	301
E	Clearance required for the replacement of the filter element	mm	≥ 215	≥ 215
F	Distance to wall	mm	≥ 90	
G	Overall depth up to centre of connection	mm	95	
H	Space above upper edge of filter	mm	≥ 80	
	Empty weight	kg	~ 5.6	~ 5.7

Connection data			MRA25	MRA32
Nominal connection diameter			DN 25	DN 32
Connection diameter			1"	1¼"
Drain connection			DN 50	
Mains connection				
Power supply unit	Rated voltage range	V~	100 – 240	
	Rated frequency	Hz	50/60	
Filter	Voltage	V=	24	
	Current input	A	≤ 2.5	
	Electrical power consumption	W	≤ 60.0	
Protection class			□	
Cable length		mm	~ 2000	
Adapter for power supply unit	Taiwan		A/B (110 V/60 Hz)	
	Uni Euro zone		C (230 V/50 Hz)	

Performance data			MRA25	MRA32
Nominal flow at $\Delta p$ 0.2 (0.5) bar	m <sup>3</sup> /h		8.5 (13.0)	12 (18.5)
Kv value	m <sup>3</sup> /h		18	25
Pore size	µm		100	
Largest/smallest pore size	µm		110/90	
Operating pressure	bar		2 – 16	
Operating pressure at a water temperature of 90°C	bar		≤ 10	
Nominal pressure			PN 16	

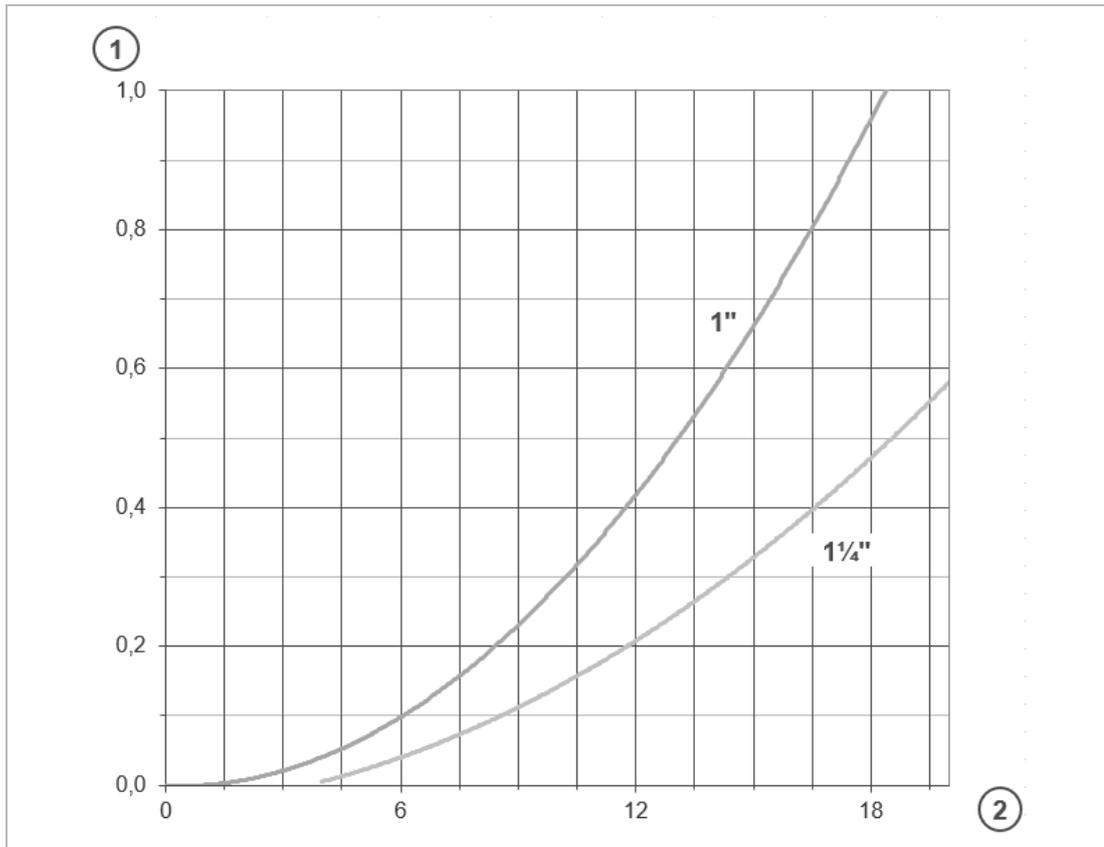
  

Consumption data			MRA25	MRA32
Backwash water volume at a water pressure of 3 bar and a backwash time of 1.5 min	l		~ 40	
Backwash volume flow at 9 bar	m <sup>3</sup> /h		~ 4.0	
Differential pressure adjustable (factory setting 0.4 bar)	bar		0.2 – 1.0	

General data			MRA25	MRA32
Water temperature (drinking water applications)	°C		5 – 30	
Water temperature	°C		5 – 90	
Ambient temperature	°C		5 – 40	
DVGW registration number			NW-9301DO0260	
ÜA registration number			R-15.2.3-21-17496 R-15.2.1-22-17624	
ÜA registration number <i>The Office of the Vienna Provincial Government – City of Vienna</i>				
<b>Order no.</b>			<b>107000080000</b>	<b>107000090000</b>

## 12.2 Pressure loss curves of MRA25 (1") and MRA32 (1¼")



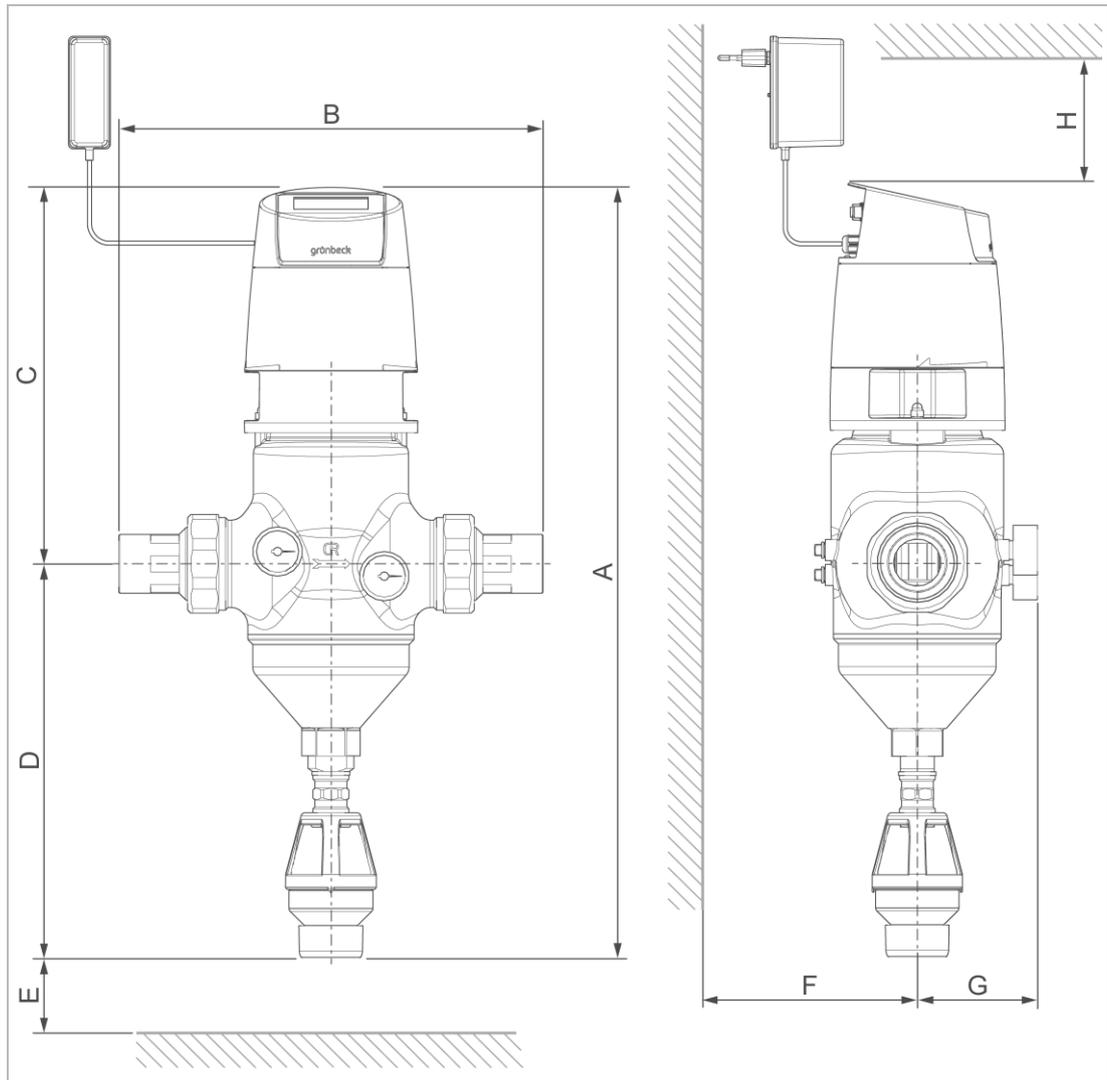
Designation

Designation

1 Pressure loss in bar

2 Flow rate in m³/h

## 12.3 Backwash filters MRA40/MRA50



Dimensions and weights			MRA40	MRA50
A	Total height	mm	624	624
B	Installation length	with screw connection	342	323
		without screw connection	206	206
C	Overall height above centre of connection	mm	305	305
D	Overall height up to centre of connection	mm	319	319
E	Clearance required for the replacement of the filter element	mm	≥ 215	≥ 215
F	Distance to wall	mm		≥ 90
G	Overall depth up to centre of connection	mm		95
H	Space above upper edge of filter	mm		≥ 80
	Empty weight	kg	~ 9.9	~ 9.8

Connection data		MRA40	MRA50
Nominal connection diameter		DN 40	DN 50
Connection diameter		1½"	2"
Drain connection		DN 50	
Mains connection			
Power supply unit	Rated voltage range	V~	100 – 240
	Rated frequency	Hz	50/60
Filter	Voltage	V=	24
	Current input	A	≤ 2.5
	Electrical power consumption	W	≤ 60.0
Protection class		□	
Cable length		mm	~ 2000
Adapter for power supply unit	Taiwan	A/B (110 V/60 Hz)	
	Uni Euro zone	C (230 V/50 Hz)	

Performance data		MRA40	MRA50
Nominal flow at Δp 0.2 (0.5) bar	m³/h	22 (32.5)	28 (45)
Kv value	m³/h	46	56
Pore size	µm	100	
Largest/smallest pore size	µm	110/90	
Operating pressure	bar	2 – 16	
Operating pressure at a water temperature of 90°C	bar	≤ 10	
Nominal pressure		PN 16	

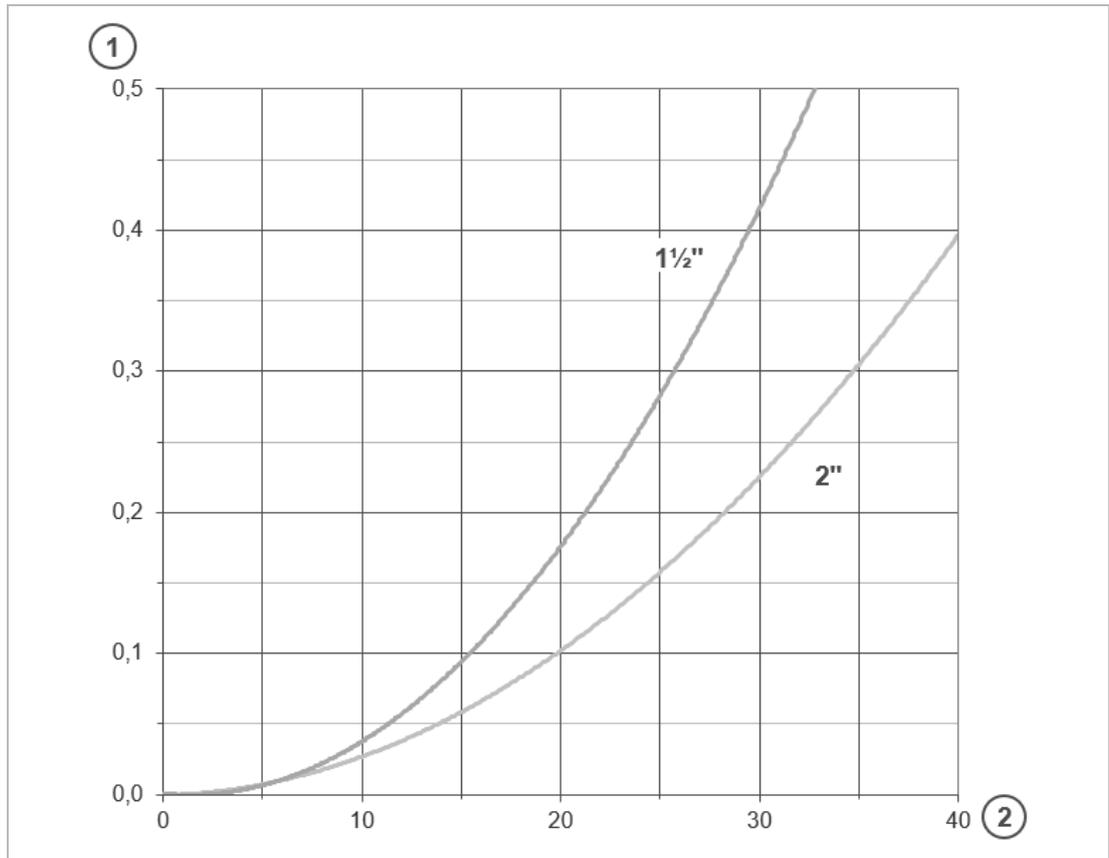
  

Consumption data		MRA40	MRA50
Backwash water volume at a water pressure of 3 bar and a backwash time of 1.5 min	l	~ 40	
Backwash volume flow at 9 bar	m³/h	~ 4.0	
Differential pressure adjustable (factory setting 0.4 bar)	bar	0.2 – 1.0	

General data		MRA40	MRA50
Water temperature (drinking water applications)	°C	5 – 30	
Water temperature	°C	5 – 90	
Ambient temperature	°C	5 – 40	
DVGW registration number		NW-9301DO0260	
ÜA registration number		R-15.2.3-21-17496	
<i>The Office of the Vienna Provincial Government – City of Vienna</i>		R-15.2.1-22-17624	
<b>Order no.</b>		<b>107000100000</b>	<b>107000110000</b>

## 12.4 Pressure loss curves of MRA40 (1½") and MRA50 (2")



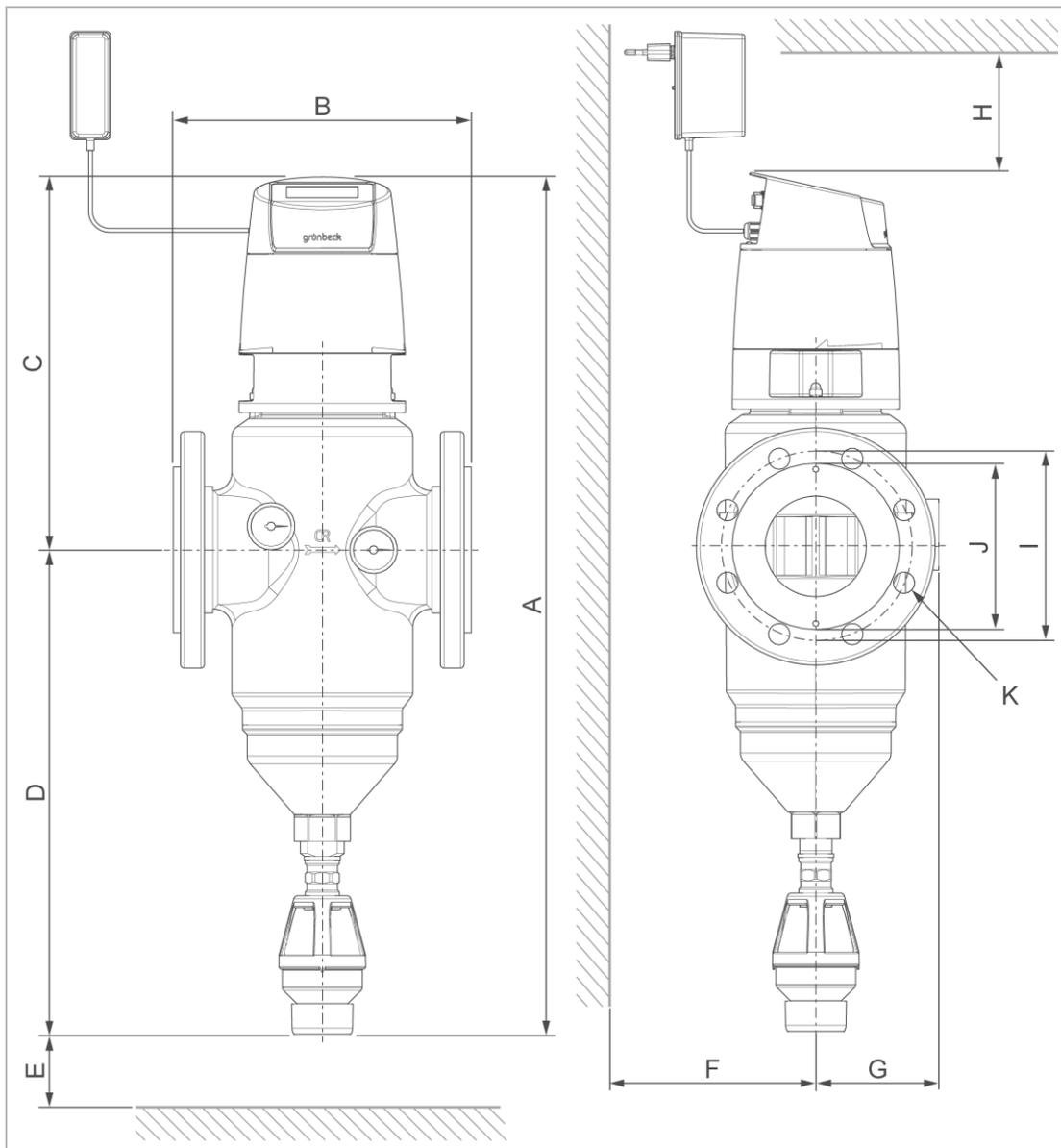
Designation

1 Pressure loss in bar

Designation

2 Flow rate in m³/h

## 12.5 Backwash filters MRA65/MRA80/MRA100



Dimensions and weights		MRA65	MRA80	MRA100
A	Total height	mm	624	724
B	Installation length without counter-flanges; flanges PN 16 acc. to DIN EN 1092-1	mm	220	250
C	Overall height above centre of connection	mm	305	315
D	Overall height up to centre of connection	mm	319	409
E	Clearance required for the replacement of the filter element	mm	≥ 215	≥ 315
F	Distance to wall	mm	≥ 95	≥ 105
G	Overall depth up to centre of connection	mm	98	105
H	Space above upper edge of filter	mm		≥ 80
I	Bolt circle diameter of flange	mm	145	160
J	Sealing surface	mm	≤ 122	≤ 140
K	Number of screws M16	pc(s)	4	8
	Empty weight	kg	~ 10.6	~ 16.8

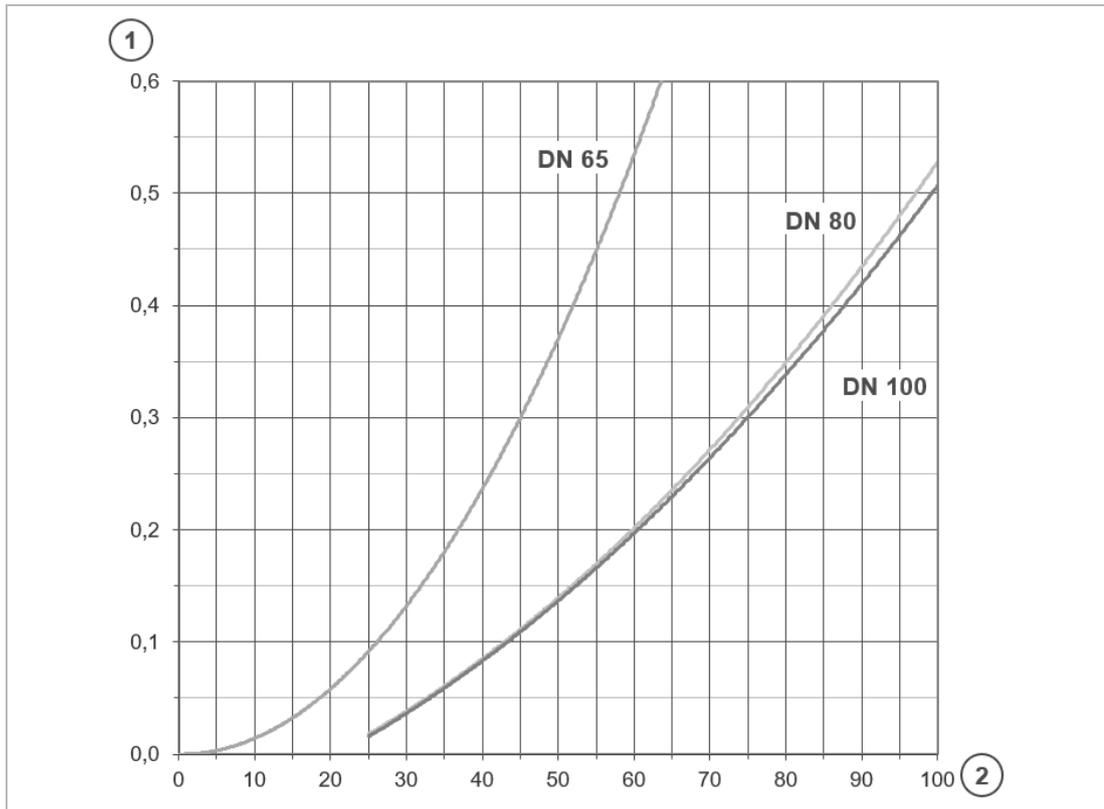
Connection data		MRA65	MRA80	MRA100
Nominal connection diameter		DN 65	DN 80	DN 100
Drain connection		DN 50		
Mains connection				
Power supply unit	Rated voltage range	V~	100 – 240	
	Rated frequency	Hz	50/60	
Filter	Voltage	V=	24	
	Current input	A	≤ 2.5	
	Electrical power consumption	W	≤ 60.0	
Protection class		□		
Cable length		mm	~ 2000	
Adapter for power supply unit	Taiwan	A/B (110 V/60 Hz)		
	Uni Euro zone	C (230 V/50 Hz)		

Performance data		MRA65	MRA80	MRA100
Nominal flow at $\Delta p$ 0.2 (0.5) bar	m <sup>3</sup> /h	37 (58)	60 (96.5)	60 (98)
K <sub>V</sub> value	m <sup>3</sup> /h	69	124	138
Pore size	µm	100		
Largest/smallest pore size	µm	110/90		
Operating pressure	bar	2 – 16		
Operating pressure at a water temperature of 90°C	bar	≤ 10		
Nominal pressure		PN 16		

Consumption data		MRA65	MRA80	MRA100
Backwash water volume at a water pressure of 3 bar and a backwash time of 1.5 min	l	~ 40		
Backwash volume flow at 9 bar	m <sup>3</sup> /h	~ 4.0		
Differential pressure adjustable (factory setting 0.4 bar)	bar	0.2 – 1.0		

General data		MRA65	MRA80	MRA100
Water temperature (drinking water applications)	°C	5 – 30		
Water temperature	°C	5 – 90		
Ambient temperature	°C	5 – 40		
DVGW registration number		NW-9301DO0260		
ÜA registration number <i>The Office of the Vienna Provincial Government – City of Vienna</i>		R-15.2.3-21-17496 R-15.2.1-22-17624		
<b>Order no.</b>		<b>107000120000</b>	<b>107000130000</b>	<b>107000140000</b>

## 12.6 Pressure loss curves of MRA65/MRA80/MRA100



Designation

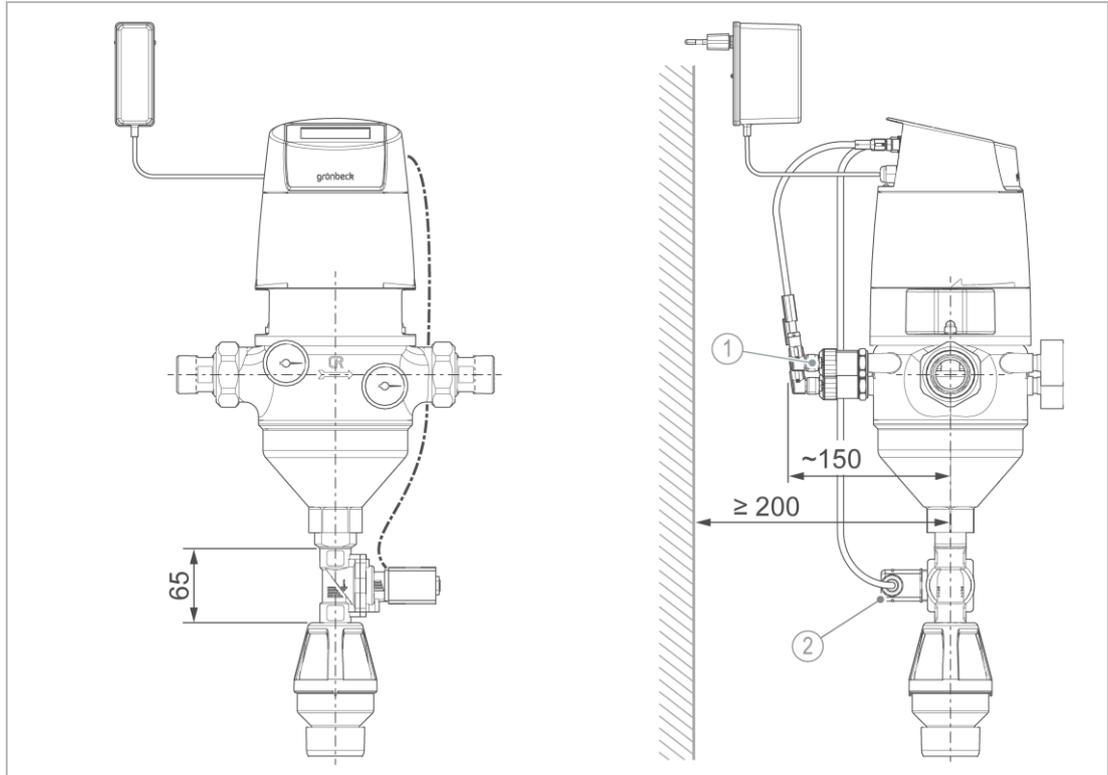
1 Pressure loss in bar

Designation

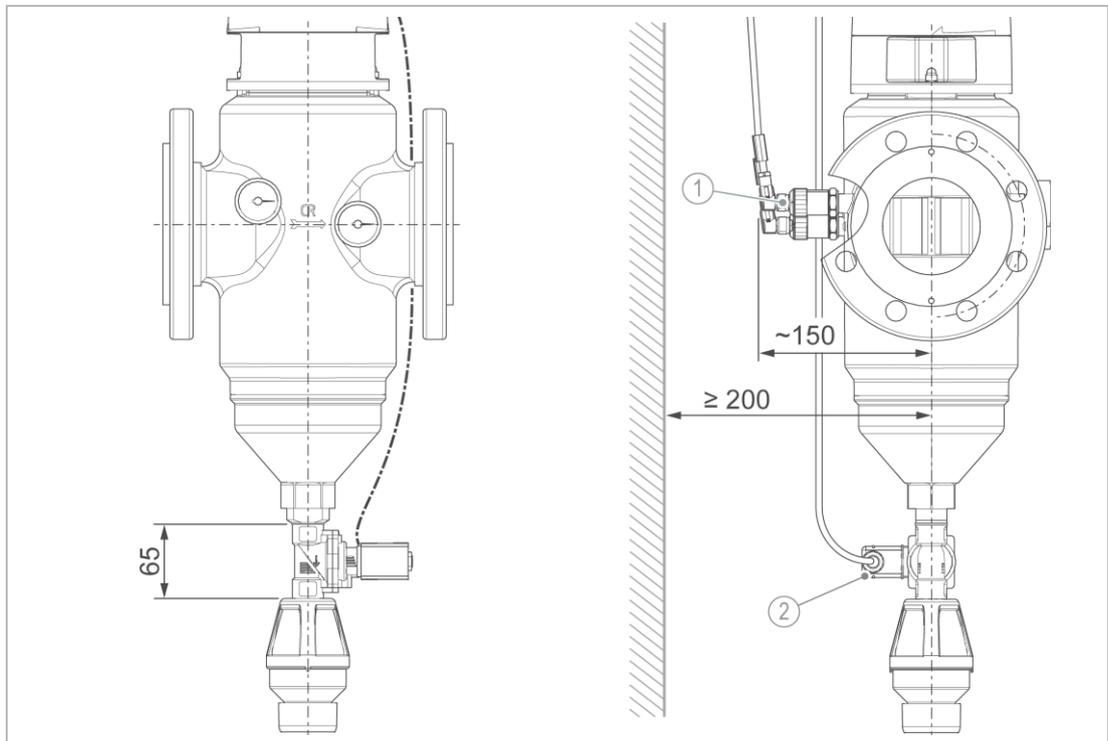
2 Flow rate in m³/h

## 12.7 Accessories

### MRA25/MRA32/MRA40/MRA50



### MRA65/MRA80/MRA100



**Designation**

1 Pressure sensors

**Designation**

2 Safety solenoid valve

Technical specifications		Pressure sensors
Threaded connection		G1/8
Pressure range	bar	0 – 16
Electrical connection		Circular connector M12 (female connector, A coding)
Output signal	mA	4 – 20
Precision		+/- 0.5 % MSP
Protection		IP67
Connecting line		M12, 3-pin (female connector, A coding) for M8 (plug, A coding)
<b>Order no.</b>		<b>107000160000</b>

Technical specifications		Safety solenoid valve
Threaded connection		G1/2
Nominal diameter		DN 13
Pressure range	bar	0.2 – 16
K <sub>v</sub> value	m <sup>3</sup> /h	3.8
Electrical connection		Connector socket type A
Voltage supply	V=	24
Wattage	W	8.0
Protection		IP65
Connecting line		2-pin connector socket (plug, type A) for M12, 4-pin (plug, A coding)
<b>Order no.</b>		<b>107000150000</b>

# 13 Operation log



- ▶ Document the initial start-up and all maintenance activities.
- ▶ Copy the maintenance report.

**Backwash filter MRA** \_\_\_\_\_

Serial no.: \_\_\_\_\_

## 13.1 Start-up log

Customer		
Name		
Address		
Installation/accessories		
Drain connection acc. to DIN EN 1717	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Floor drain present	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety device	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Operating values		
Water pressure raw water inlet	bar	
Water pressure at pure water outlet	bar	
Residential water meter reading	m <sup>3</sup>	
Parameters		
Backwash interval	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Start interval-controlled backwash	hh:mm	
Backwash lock	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Off-periods:	hh:mm	
Remarks		
Start-up		
Company		
Service technician		
Work time certificate (no.)		
Date/signature		





# EU Declaration of Conformity

In accordance with the EU Low-Voltage Directive 2014/35/EU



This is to certify that the system designated below meets the safety and health protection requirements of the applicable EU guidelines in terms of its design, construction and execution.

This certificate will become invalid if the system is modified in a way not approved by us.

## Backwash filter MRA25 – MRA100

Serial no.: refer to type plate

The aforementioned system also complies with the following directives and provisions:

- EMC Directive (2014/30/EU)
- Directive on the Restriction of Hazardous Substances RoHS (2011/65/EU)

The following harmonised standards have been applied:

- DIN EN 12100:2011-03
- EN IEC 61000-6-2:2019
- EN IEC 61000-6-3:2021
- EN 60335-1:2012 + AC:2014 + A11:2014 + A13:2017 + A14:2019 + A1:2019 + A2:2019 + A15:2021
- EN 61000-3-3:2013
- EN 61000-3-2:2019
- EN 62233:2008 + AC:2008

The following standards and regulations have been applied:

- DIN EN 13443-1:2007-12
- DIN 19628:2007-07

Responsible for documentation:

Mirjam Müller

Manufacturer:

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Josef-Grünbeck-Str. 1  
89420 Hoehstaedt; Germany

Hoehstaedt/Germany, 26.09.2023

pp Tobias Vogl

Head of Research & Development

## **Publisher's information**

### **Technical documentation**

If you have any questions or suggestions regarding this operation manual, please contact the Technical Documentation Department at Grünbeck Wasseraufbereitung GmbH

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