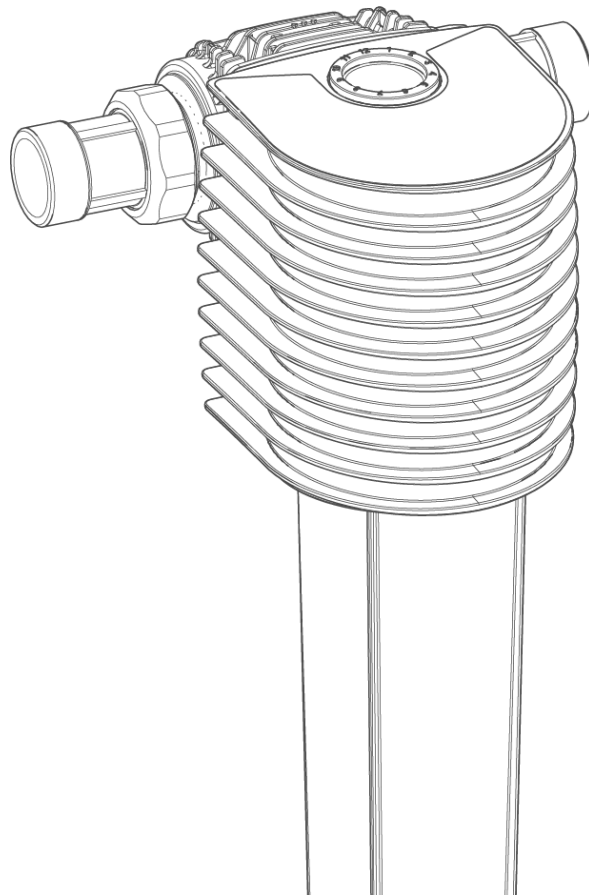


We understand water.



Fine filter | BOXER KX 1½" – 2" (5 µm)

Operation manual

grünbeck

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# 1 Introduction

This manual is intended for owners/operators/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 included manuals on the components before you operate your product.
- Obey all safety 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 the products below:

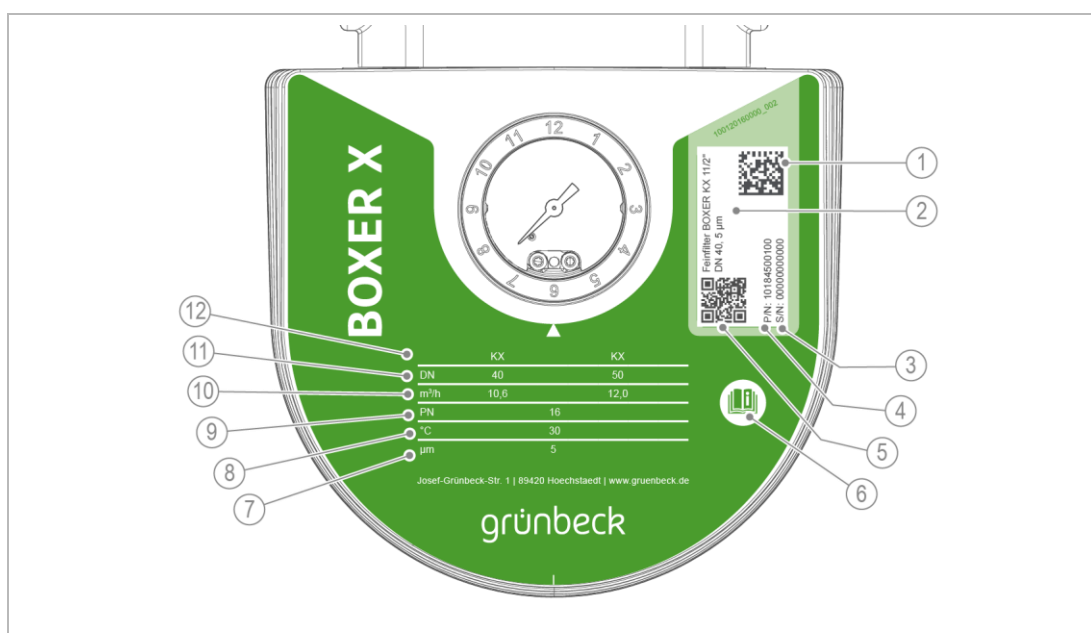
- Fine filter BOXER KX 1½" (DN 40), 5 µm
- Fine filter BOXER KX 2" (DN 50), 5 µm

## 1.2 Product identification

You can identify your product based on the product designation and the order no. indicated on the type plate.

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

The type plate is located on the filter head.



| Designation |                           |
|-------------|---------------------------|
| 1           | Data matrix code          |
| 2           | Product designation       |
| 3           | Serial no.                |
| 4           | Order no.                 |
| 5           | QR code                   |
| 6           | Obey the operation manual |

| Designation |                             |
|-------------|-----------------------------|
| 7           | Pore size                   |
| 8           | Water temperature           |
| 9           | Nominal pressure            |
| 10          | Flow rate                   |
| 11          | Nominal connection diameter |
| 12          | Product type                |

## 1.3 Symbols used

| Symbol | Meaning   |
|--------|---|
|        | Danger and risk   |
|        | Important information or requirement                              |
|        | 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 technical service personnel only |

## 1.4 Depiction of warnings

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






### SIGNAL WORD

Type and source of hazard

- Possible consequences
- Preventive measures

The signal words below are defined subject to the degree of danger and might be used in the present document:

| Warning symbol and signal word  |                | Consequences if the information/instructions are ignored                                     |
|---|----------------|--|
|  | <b>DANGER</b>  | Death or serious injuries  |
|  | <b>WARNING</b> | Possible death or serious injuries   |
|  | <b>CAUTION</b> | Possible moderate or minor injuries  |
|   | <b>NOTE</b>    | Possible damage to components, the product and/or its functions or an object 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  | Requirements   |
|--|--|
| User   | <ul style="list-style-type: none"> <li>• No special expertise required</li> <li>• Knowledge of the tasks assigned</li> <li>• Knowledge of possible dangers in case of incorrect behaviour</li> <li>• Knowledge of necessary protective equipment and protective measures</li> <li>• Knowledge of residual risks</li> </ul> |
| Owner/operator/<br>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<br>(Grünbeck's technical service/<br>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 table below describes which tasks may be carried out by whom.

|  | User | Owner/<br>operator/<br>operating<br>company | Qualified<br>specialist | Technical<br>service |
|--|------|---|-------------------------|----------------------|
| Transport and storage                          |      | x   | x                       | x                    |
| Installation and mounting                      |      |   | x                       | x                    |
| Start-up/commissioning                         |      |   | x                       | x                    |
| Operation and handling                         | x    | x   | x                       | x                    |
| Cleaning                                       | x    | x   | x                       | x                    |
| Inspection                                     | x    | x   | x                       | x                    |
| Maintenance                                    |      | x   | x                       | x                    |
| Troubleshooting                                |      | x   | x                       | x                    |
| Repair   |      |   | x                       | x                    |
| Decommissioning and<br>restart/recommissioning |      |   | x                       | x                    |
| Dismantling and disposal                       |      |   | x                       | x                    |

## 1.5.3 Personal protective equipment

You do not need any protective equipment to operate the product.

- Recommendation:  
Use hygienic gloves when replacing the filter element and cleaning the support mesh in order to prevent bacterial growth.



Protective gloves

## 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 against unauthorised access to protect imperilled or untrained persons from residual risks.
- Comply with the maintenance intervals (refer to chapter 8.2).

#### 2.1.1 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 any repair and maintenance work, make sure that all affected components are depressurised.

### 2.2 Product-specific safety instructions

#### **NOTE**

Excessive contamination of the filter element

- Malfunctions and failure of the system to be protected
- ▶ Comply with the intervals for the replacement of the filter element.

### 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 of the filter.
2. Locate the leak.
3. Eliminate the cause of the water leak.



## 3 Product description

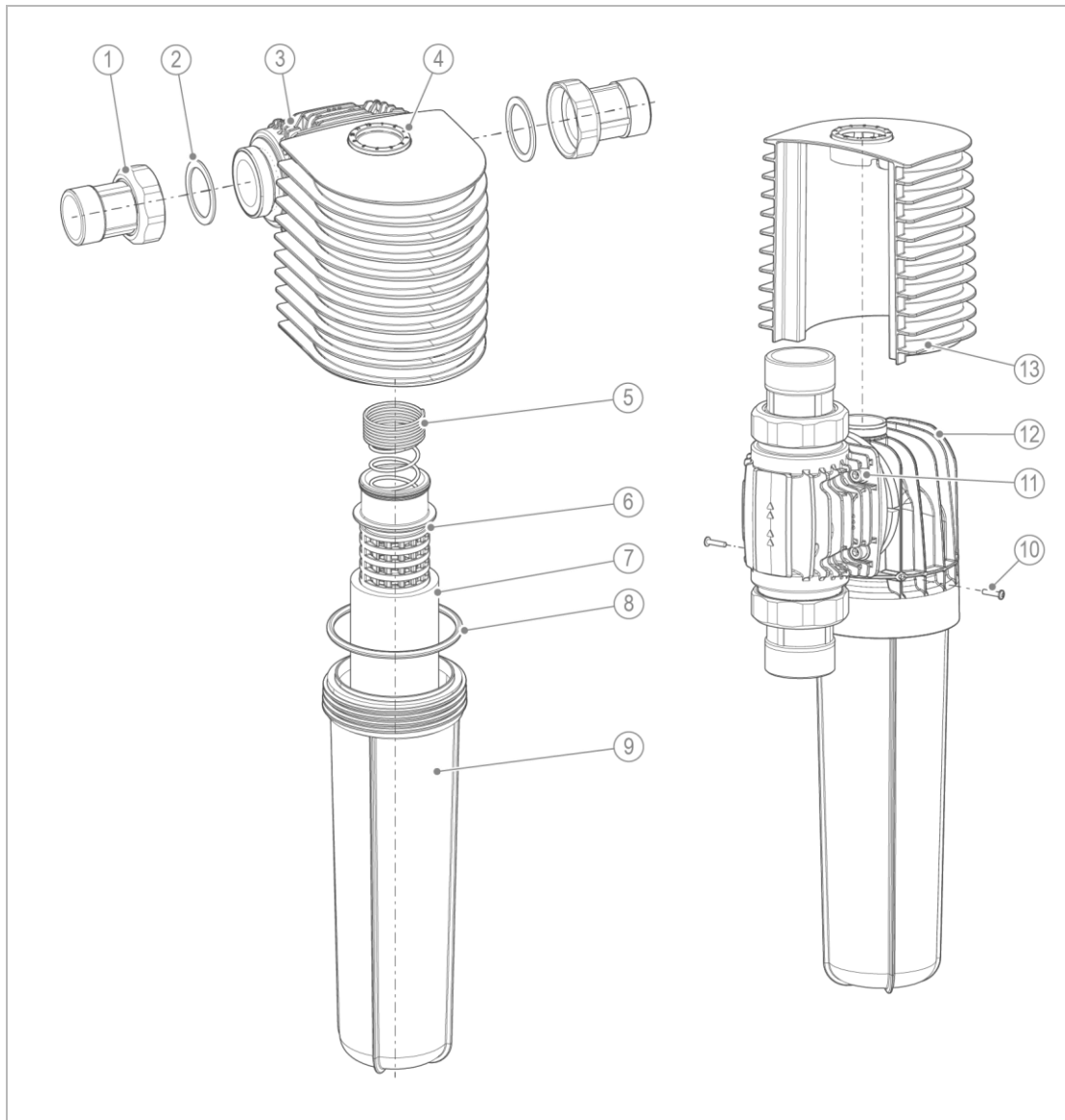
### 3.1 Intended use

- The fine filters BOXER KX with 5 µm filter element are designed for the filtration of water in modular systems such as reverse osmosis systems.
- The filters can be used for positive and negative pressure applications.
- The filters are designed according to the stipulations of DIN EN 13443-1 and DIN 19628.
- They 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.

#### 3.1.1 Foreseeable misuse

- The filters cannot be used for circulation water that has been treated with chemicals.
- The filters are neither suitable for oils, greases, solvents, soaps and other lubricating media, nor for the separation of water-soluble substances.

## 3.2 Product components



### Designation

Water meter screw connection

Seal

Connection flange

Maintenance ring and pressure gauge

Filter spring

Support mesh

Filter element with a pore size of 5 µm

### Designation

O-ring

Black filter cylinder

Fixing screws for cover

Cylinder screws for connection flange

Filter head

Cover

### 3.3 Functional description

The unfiltered feed water flows into the filter through the inlet side and from the outside in through the filter element and to the pure water outlet. Thus, foreign particles of a size  $> 5 \mu\text{m}$  are retained.

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

The water pressure can be read off the pressure gauge.

## 4 Transport and storage

### 4.1 Transport

- ▶ Transport the product in its original packaging only.

### 4.2 Storage

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

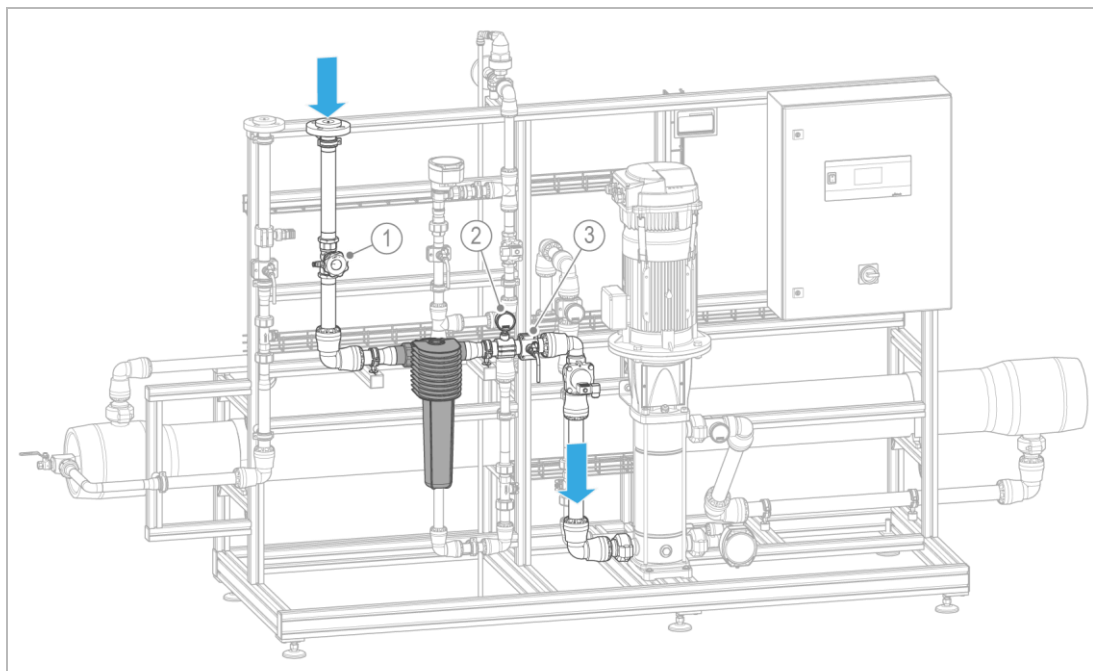
## 5 Installation



The installation of the product must be carried out by a qualified specialist only.

The product must be installed in the cold water supply pipe upstream of the appliances to be protected.

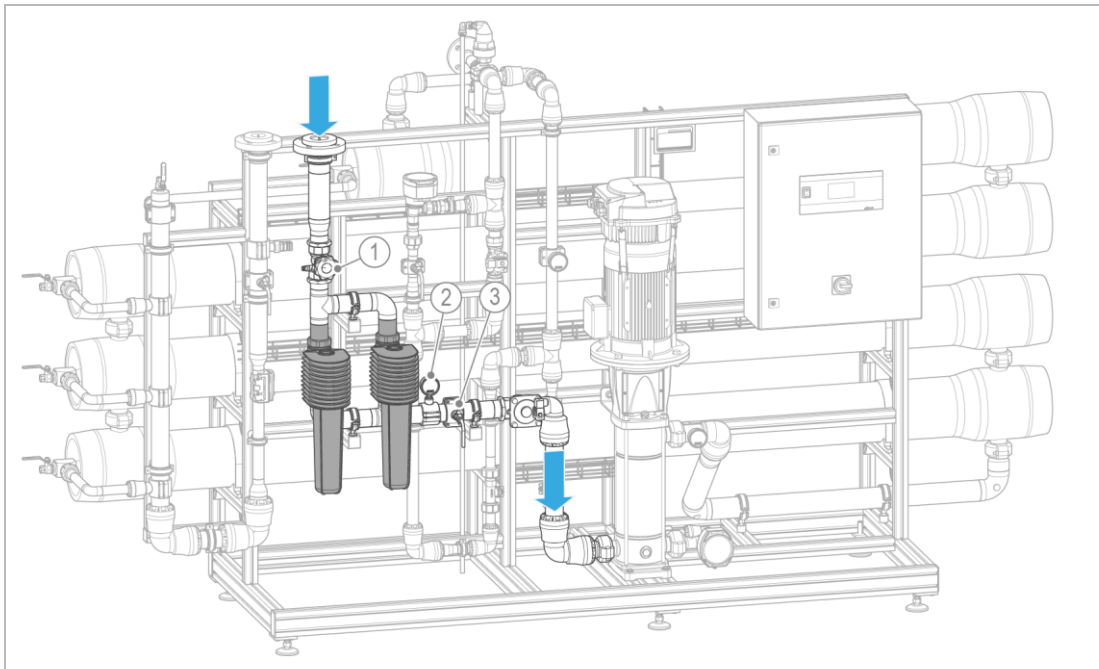
### Installation example: Fine filter DN 40, single, in horizontal pipe



| Designation |                                 |
|-------------|---------------------------------|
| 13          | Shut-off valve Feed water inlet |
| 14          | Pressure gauge Feed water       |

| Designation |                           |
|-------------|---------------------------|
| 15          | Sampling valve Feed water |

### Installation example: Fine filter DN 50, double, in vertical pipe



#### Designation

- 16 Shut-off valve Feed water inlet
- 17 Pressure gauge Feed water

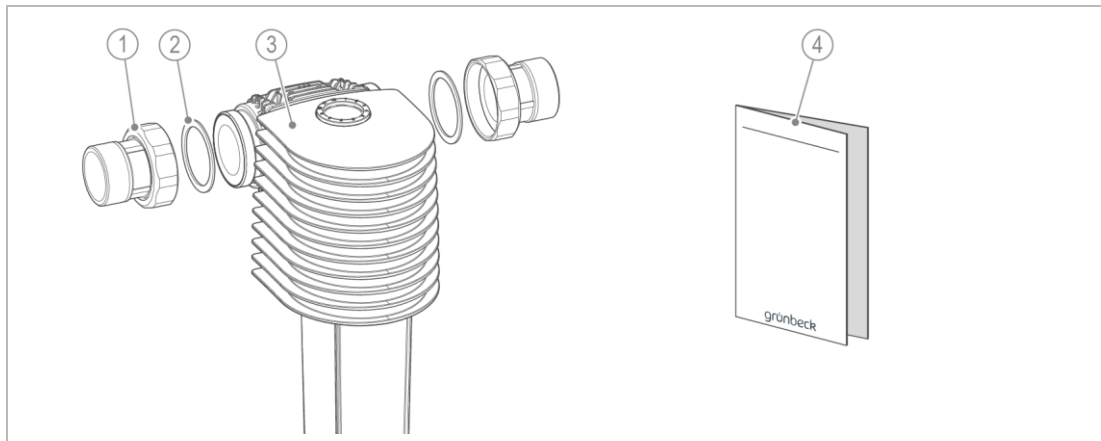
#### Designation

- 18 Sampling valve Feed water

## 5.1 Requirements for the installation site

- The installation site must be frost-proof and ensure the filter's protection from chemicals, dyes, solvents and their vapours as well as from direct sunlight.
- The installation room must provide a floor drain. If no floor drain is available, an appropriate safety device must be installed in order to prevent water damage.
- The installation site must be adequately illuminated and ventilated.
- The installation site must be easily accessible for maintenance purposes.

## 5.2 Checking the scope of supply

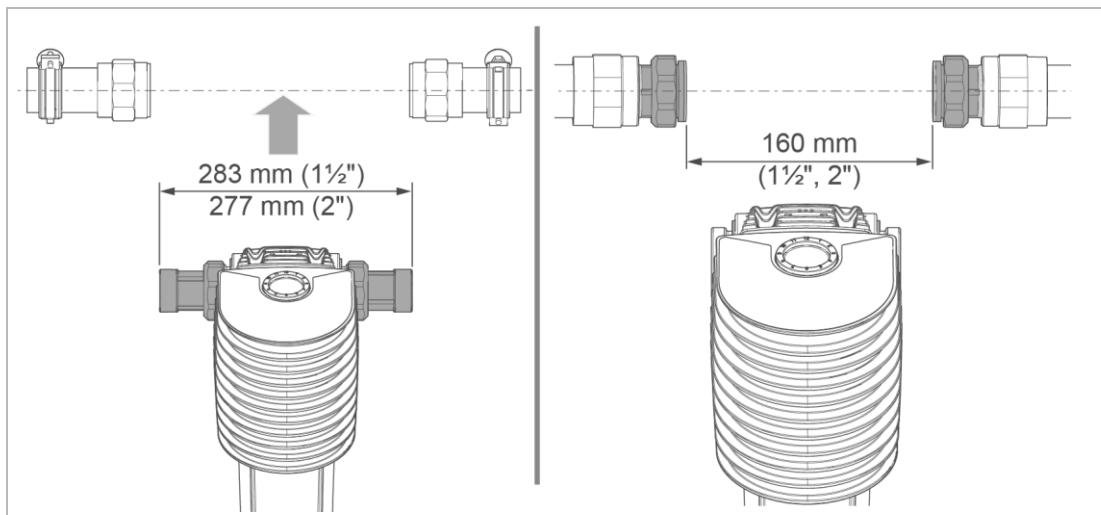


| Designation                      | Designation               |
|----------------------------------|---------------------------|
| 19 Water meter screw connections | 21 Fine filter BOXER KX   |
| 20 Seals                         | 22 Quick reference manual |

- Check the scope of supply for completeness and damage.

## 5.3 Water installation

### 5.3.1 Preparing the pipe



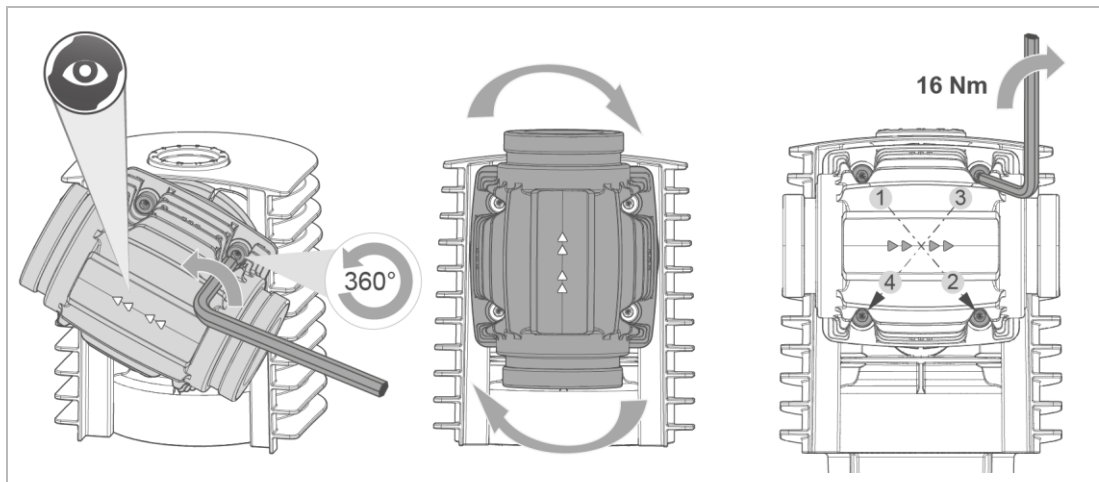
- Install the water meter screw connection in the pipe.  
The distance between the two seals must be 160 mm.

### 5.3.2 Mounting the filter

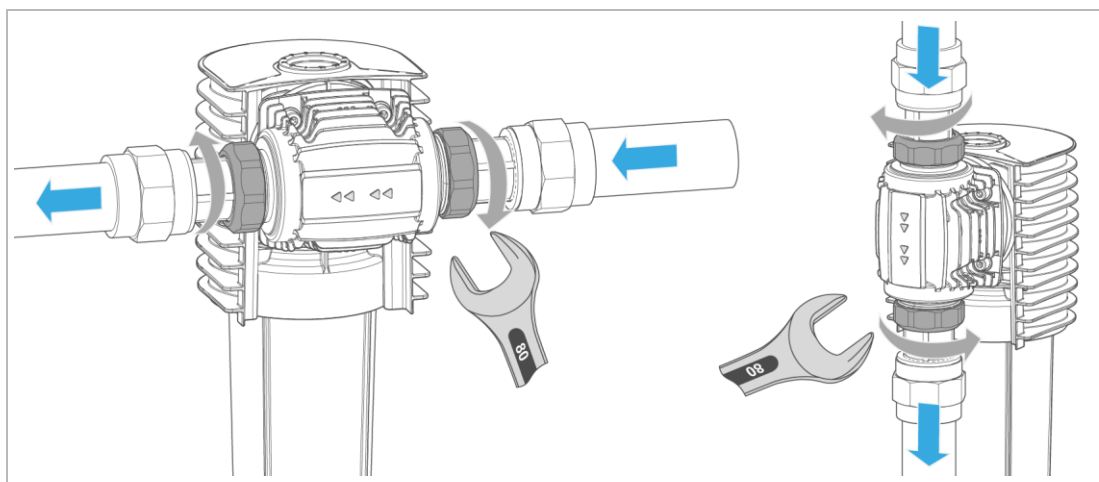


The rotatable connection flange enables the filter to be adapted to any flow direction given on site.

- Check the flow direction given on site.
- Proceed as follows to readjust the connection flange, if necessary:



1. Loosen the 4 cylinder screws (SW 6) with an Allen key – approx. 1 full turn counterclockwise (do not unscrew).
2. Rotate the connection flange into the position matching your flow direction (refer to the marking on the connection flange).
3. Tighten the 4 cylinder screws crosswise (torque 16 Nm) – tighten them clockwise.



4. Install the filter without mechanical stress and firmly tighten the union nuts.

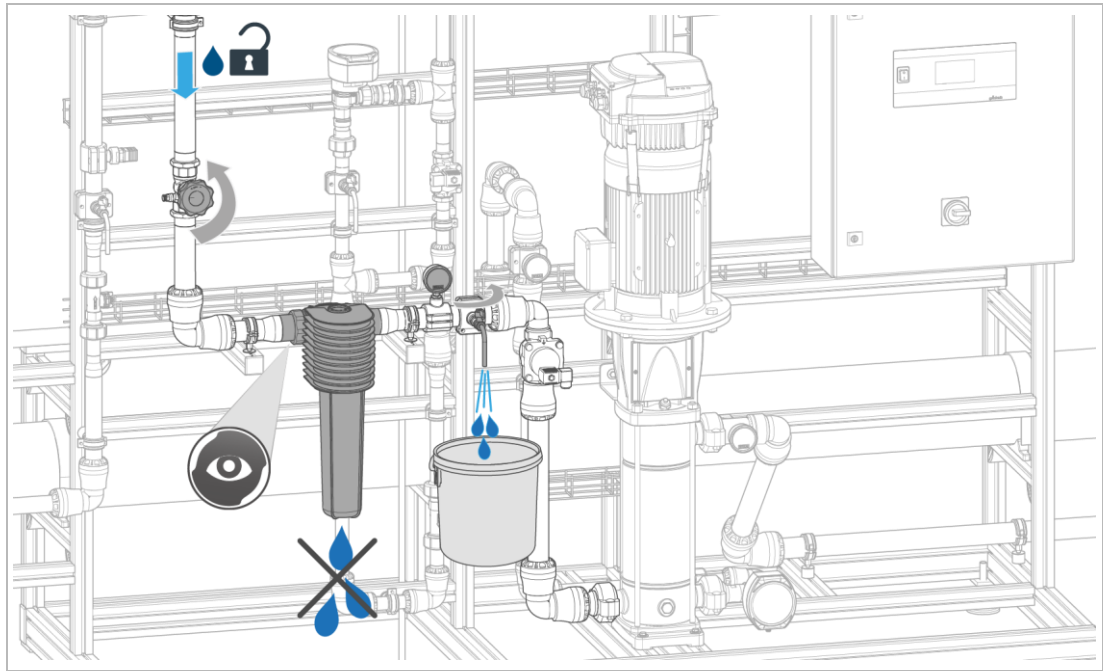


## 6 Start-up/commissioning



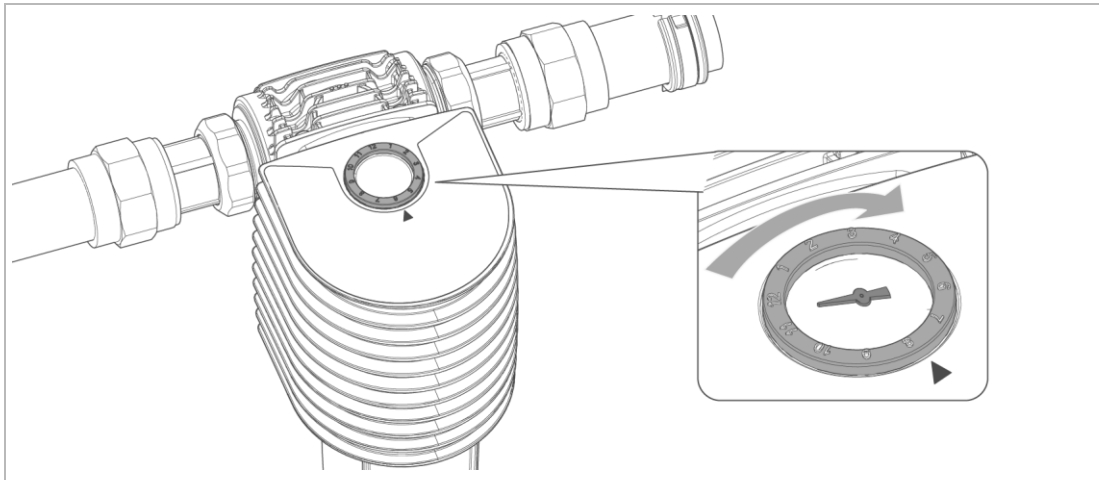
The initial start-up of the product must be carried out by a qualified specialist only.

### 6.1 Checking the product



1. Open the shut-off valve of the feed water inlet.
2. Open the sampling valve downstream of the filter to the maximum.  
» The filter is being vented.
3. Check the filter for leaks.
4. Read the water pressure at the pressure gauge downstream of the filter.
5. Record the initial start-up in the operation log (refer to chapter 13).

## 6.2 Setting the month indicator



- ▶ Set the maintenance ring to the month of the next maintenance (alternatively, to the month of the next replacement of the filter element).

## 6.3 Handing over the product to the owner/operator/operating company

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

### 6.3.1 Disposal of packaging

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

## 7 Operation

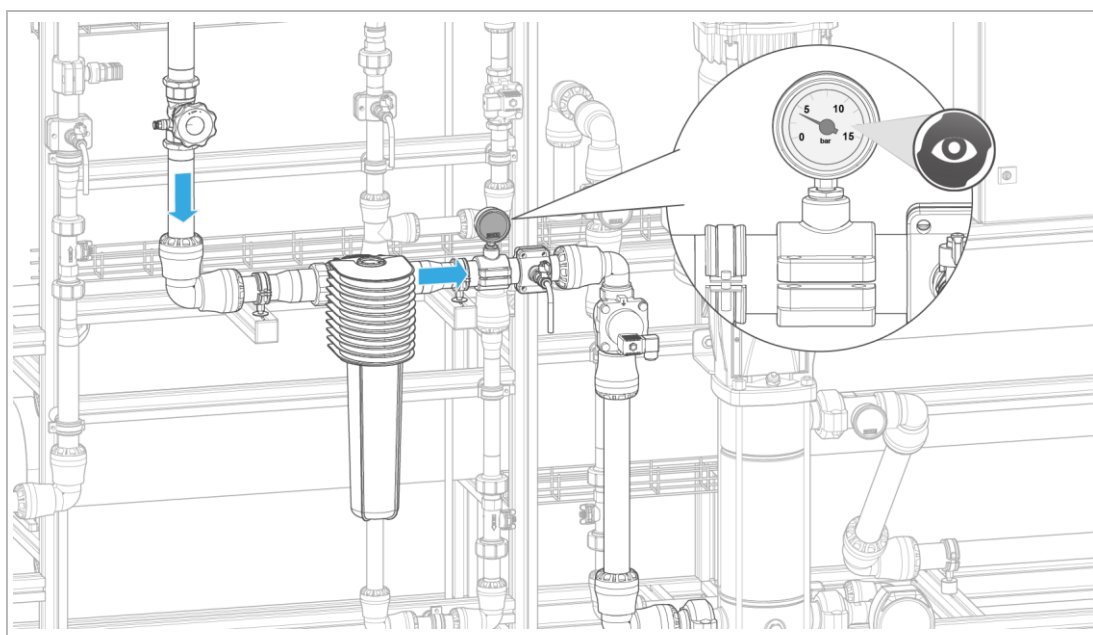
The filter is operated automatically and does not require any manual operation.

- ▶ Inspect the filter and read the water pressure at regular intervals.
- ▶ Replace the filter element at regular intervals (refer to chapter 8.3).
- ▶ Flush the filter after a temporary standstill and replace the filter element, if necessary (refer to chapter 10.1).
- ▶ Have maintenance carried out on the filter annually (refer to chapter 8.4).

### 7.1 Reading the water pressure



On the pressure gauge, you can quickly see whether the filter element is contaminated.



1. Open a water withdrawal point (generate max. flow).
2. Read the flow pressure at the pressure gauge downstream of the filter.
3. Compare the required inlet pressure (feed water) and outlet pressure (pure water) downstream of the filter.
4. Replace the filter element in case of contamination and/or increased pressure loss (refer to chapter 8.3).

## 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/operator/operating company is responsible for compliance with the prescribed maintenance and repair work.



By concluding a maintenance contract, you make sure that all maintenance work is done on time.

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

### 8.1 Cleaning



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

#### 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.

## 8.2 Intervals



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

- Determine (as owner/operator/operating company) at which intervals (load-dependent) the product must be inspected and maintained. These intervals are subject to the actual conditions such as: water condition, degree of contamination, environmental impacts, consumption, etc.

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

| Activity    | Interval | Tasks   |
|-------------|----------|---|
| Inspection  | 6 weeks  | <ul style="list-style-type: none"> <li>• Replace the filter element</li> <li>• Visual/functional check</li> </ul>   |
| Maintenance | annually | <ul style="list-style-type: none"> <li>• Replace the filter element</li> <li>• Clean the support mesh</li> <li>• Check O-rings/flat seals for wear and tear</li> <li>• Check for a tight fit</li> <li>• Condition and leak check</li> <li>• Set the maintenance ring</li> </ul> |
| Repair      | 5 years  | <ul style="list-style-type: none"> <li>• Recommendation: replace support mesh and seals</li> </ul>  |
|             | 10 years | <ul style="list-style-type: none"> <li>• Recommendation: in addition to the 5-year interval – replace the filter cylinder</li> </ul>  |

## 8.3 Inspection

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

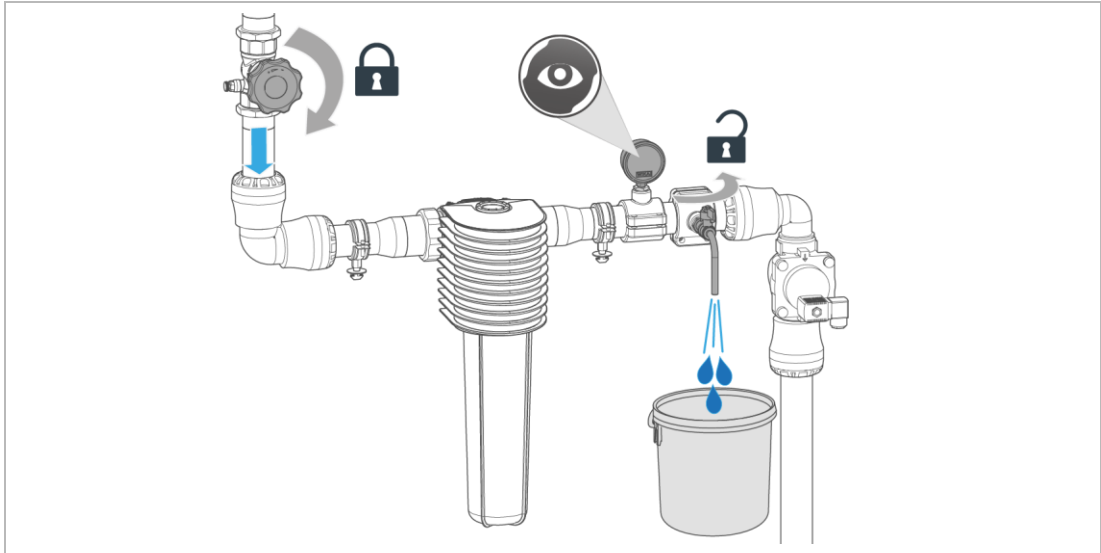
- Carry out an inspection and replace the filter element at least every six weeks.

### 8.3.1 Replacing the filter element hygienically

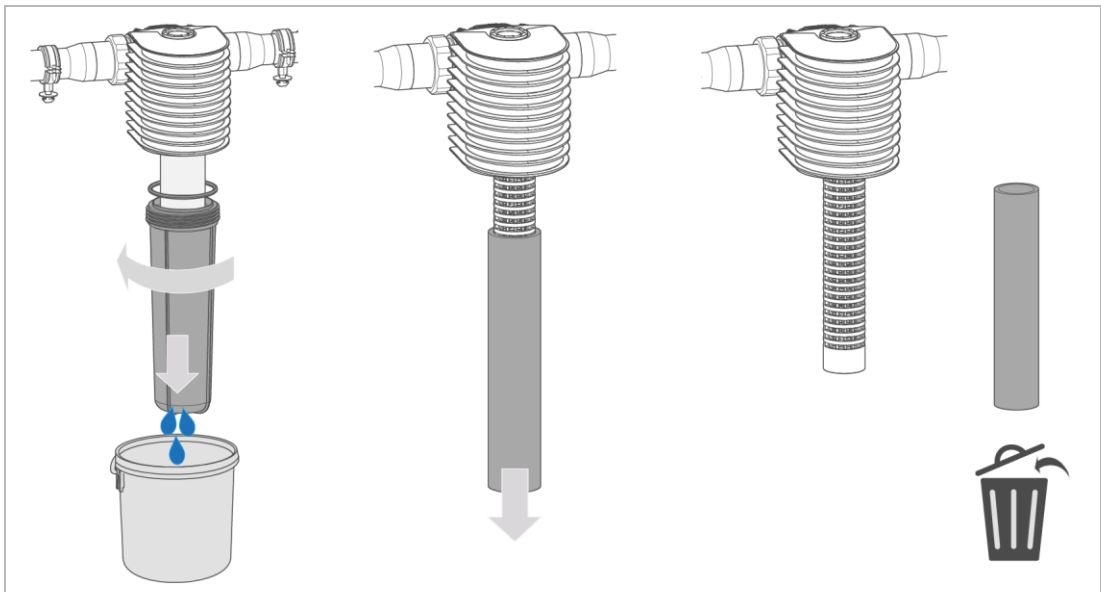
#### NOTE

Excessive contamination of the filter element and contaminated support mesh

- Malfunctions and failure of the appliances to be protected
- Comply with the intervals for inspection and replacement of the filter element.
- Dispose of the used filter element.



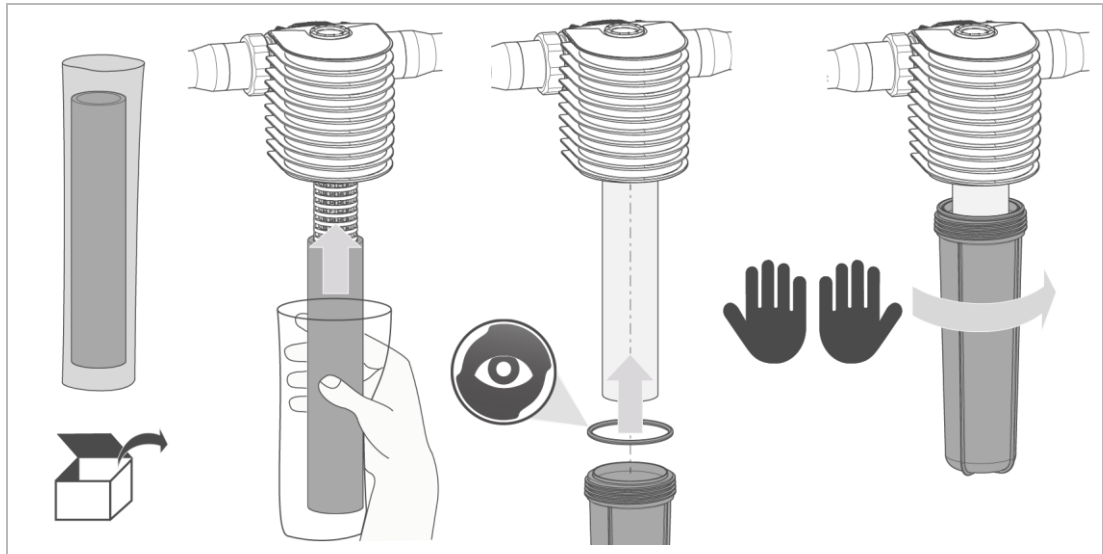
1. Use a bucket (min. 10 litres) to collect the water.
  2. Close the shut-off valve of the feed water inlet.
  3. Open the sampling valve downstream of the filter and let the remaining water flow from the pipe.
- » The pressure in the product and the pipe network is being relieved.



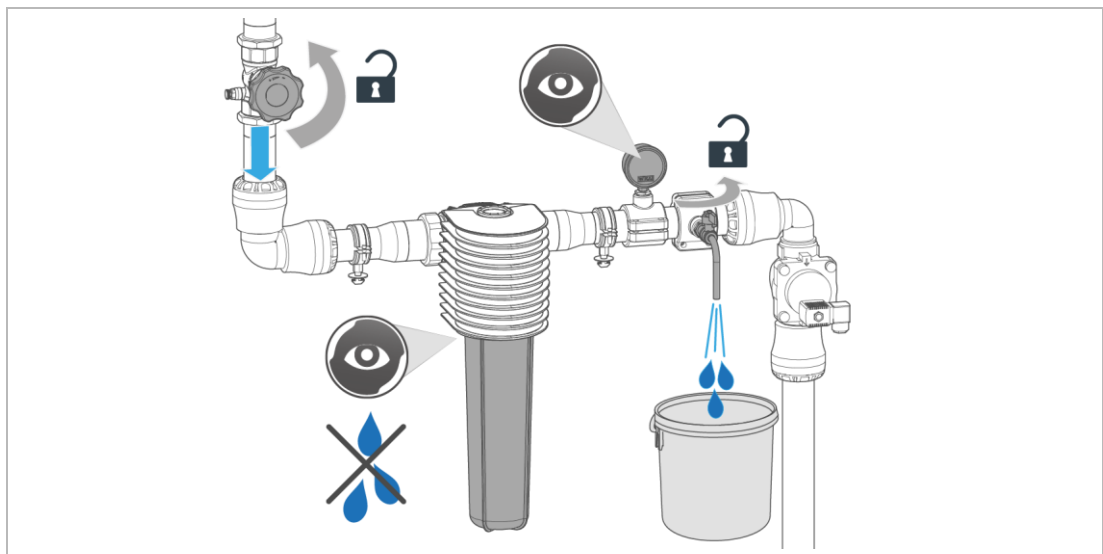
4. Unscrew the filter cylinder by hand. Use a strap wrench, if needed.
5. Pull off the O-ring with the filter cylinder.
6. Pull off the used filter element from the support mesh.
7. Dispose of the used filter element (refer to chapter 11.2).



For hygienic reasons, do not touch the new filter element and the support mesh with bare hands – use hygienic gloves.



8. Slide the new filter element in its foil packaging over the support mesh.
9. Check the sealing surfaces and the O-ring of the filter cylinder for cleanliness.
10. Clean the filter cylinder with clear water.
11. Screw in the filter cylinder by hand as far as it will go. Do not use a strap wrench.



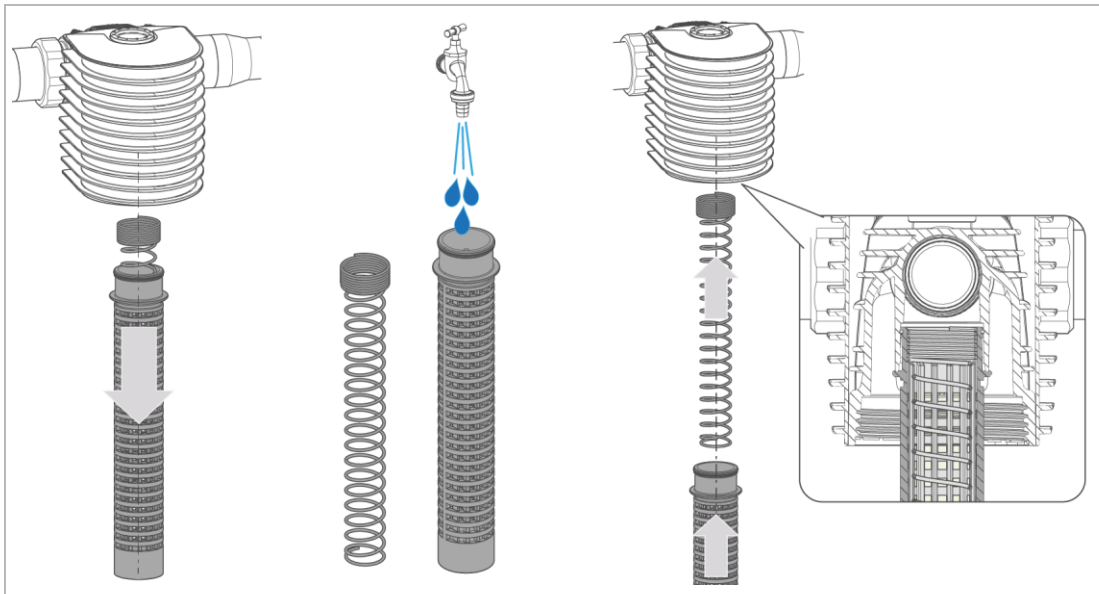
12. Open the shut-off valve of the feed water inlet.
13. Open the sampling valve downstream of the filter to the maximum.
  - » The filter is being vented.
14. Check the installation for leaks and function.
15. Read the outlet pressure on the pressure gauge downstream of the filter and compare it with the inlet pressure.
16. Close the sampling valve.
  - » The filter is ready to use.

## 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.

### 8.4.1 Annual maintenance

1. Replace the filter element (refer to chapter 8.3.1).
2. Proceed as follows to clean the support mesh:



- a Pull off the support mesh downwards and remove the filter spring.
  - b Rinse the support mesh.
  - c Insert the filter spring into the support mesh.  
Pay attention to the proper direction.
  - d Insert the support mesh into the filter head as far as it will go.
3. Check the O-rings and flat seals for wear and tear.
  5. Replace worn components (refer to chapter 8.7).
  6. Check for a tight fit of the filter in the pipe.
  7. Put the filter back into operation again (refer to chapter 6.1).
  8. Set the date for the next maintenance (refer to chapter 6.2).

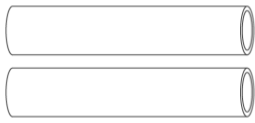


## 8.5 Consumables

### NOTE

The filter element must not be cleaned

- Risk of hygienic contamination
- Dispose of the used filter element.

| Illustration  | Product             | Quantity | Order no. |
|---|---------------------|----------|-----------|
|  | 5 µm filter element | 2 pieces | 103 083   |

## 8.6 Spare parts

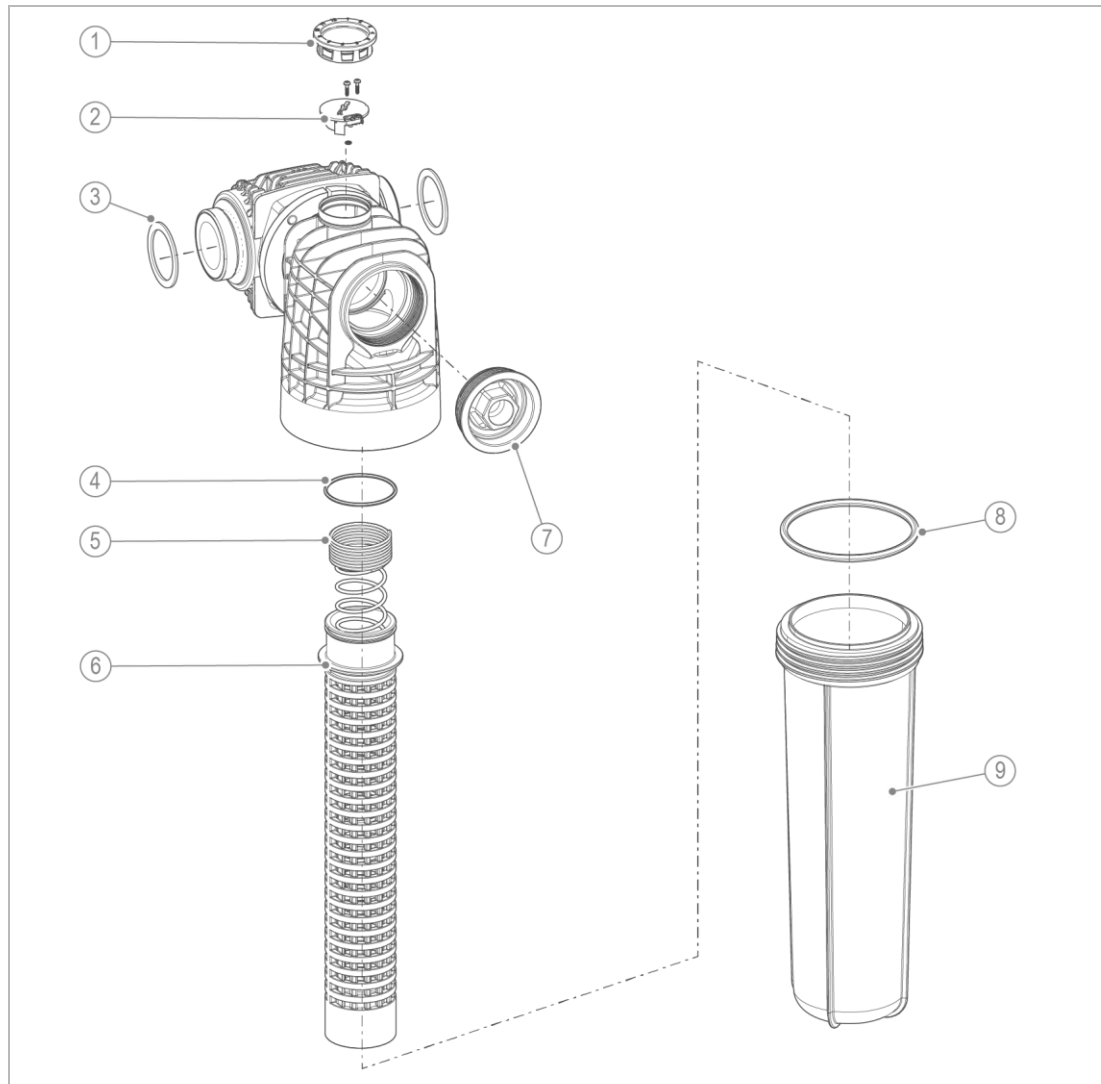
For an overview of the spare parts, refer to our spare parts catalogue at [www.gruenbeck.com](http://www.gruenbeck.com). You can order the spare parts from your local Grünbeck representative.

## 8.7 Wearing parts



Wearing parts must be replaced by qualified specialists only.

The wearing parts are listed below:



#### Designation

Maintenance ring

Pressure gauge

Flat seal

O-ring of support mesh

Filter spring

#### Designation

Support mesh

Blind plug with flat seal

O-ring of filter cylinder

Filter cylinder

#### Tools required

Strap wrench (to remove the filter cylinder)

#### Order no.

105 805

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

## 9 Troubleshooting

### 9.1 Observations

| Observation   | Explanation  | Remedy  |
|---|--|---|
| The water pressure is too low<br>(pressure loss too high) | The shut-off valves are not fully open                               | ► Fully open the shut-off valves  |
|   | The filter element is contaminated                                   | ► Replace the filter element  |
| Solids contained in the<br>filtered water                 | Inappropriately high flow through<br>the filter                      | ► Check support mesh and filter<br>element for damage and leaks   |
|   | Filter element or support mesh damaged<br>or not installed correctly | ► Check the installation of<br>filter element and support<br>mesh<br>► Components: replace filter element,<br>support mesh and seals  |
| Water loss in the system                                  | Faulty joint   | ► Check O-ring and flat seals for<br>deformations or wear and tear<br>► Check the filter head for<br>damage<br>► Check the connection flange<br>for damage<br>► Have leaky components replaced by a<br>qualified specialist |



If a malfunction cannot be eliminated, the technical service personnel can take further measures.

- Contact technical service (refer to inner cover sheet for contact data).

## 10 Decommissioning

### 10.1 Temporary standstill

- Perform the activities below if the filter has not been in operation for a longer period of time:

#### After a standstill of $\leq 4$ weeks

1. Open a water withdrawal point and completely flush the filter and the pipes.

#### After a standstill of $> 4$ weeks

1. Replace the filter element.
2. Open a water withdrawal point and completely flush the filter and the pipes.

### 10.2 Decommissioning



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

1. Make sure that the system is disconnected from the power supply.
2. Make sure that all components are depressurised.
3. Remove the filter cylinder and collect the escaping residual water in a container.
4. Remove and dispose of the used filter element.
5. Clean the support mesh, if necessary.
6. Let the filter components dry.
7. Mount the filter cylinder.

### 10.3 Restart/recommissioning



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

1. Remove the filter cylinder and insert a new filter element.
2. Mount the filter cylinder.
3. Put the filter back into operation again (refer to chapter 6).

# 11 Dismantling and disposal

## 11.1 Dismantling



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

1. Close the shut-off valves upstream and downstream of the filter.
2. Open a water withdrawal point and wait for a few seconds.
  - » The pressure in the product and the pipe network is being relieved.
3. Close the water withdrawal point.
4. Remove the filter cylinder and collect the escaping residual water in a container.
5. Remove the filter from the pipe.

## 11.2 Disposal

- Obey the applicable national regulations.

### Packaging

#### NOTE

Danger to the environment due to incorrect disposal

- Packaging materials are valuable raw materials that can be reused in many cases
- Incorrect disposal can cause hazards to the environment
- Dispose of packaging materials in an environmentally sound manner.
- Obey the local disposal regulations.
- If necessary, commission a specialist company with the disposal.

### Filter element

- Dispose of the used filter element with your household waste.

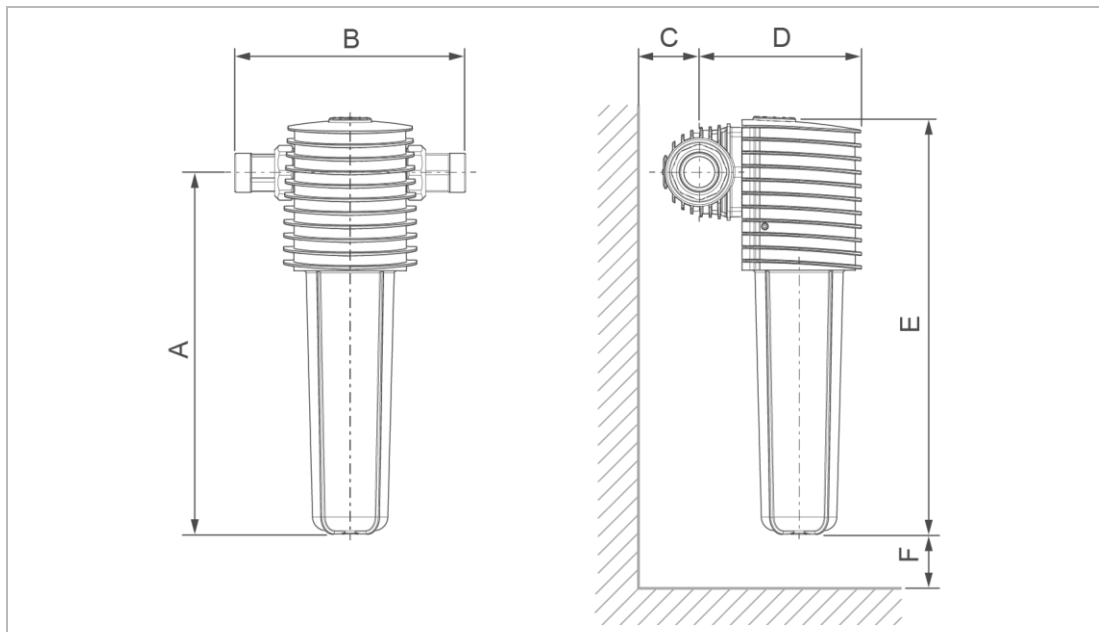
### Product

- Find out about the local regulations on the separate collection of electrical and electronic products.
- Make use of the collection points available to you for the disposal of your product.
- If your product contains batteries or rechargeable batteries, dispose of them separately from your product.



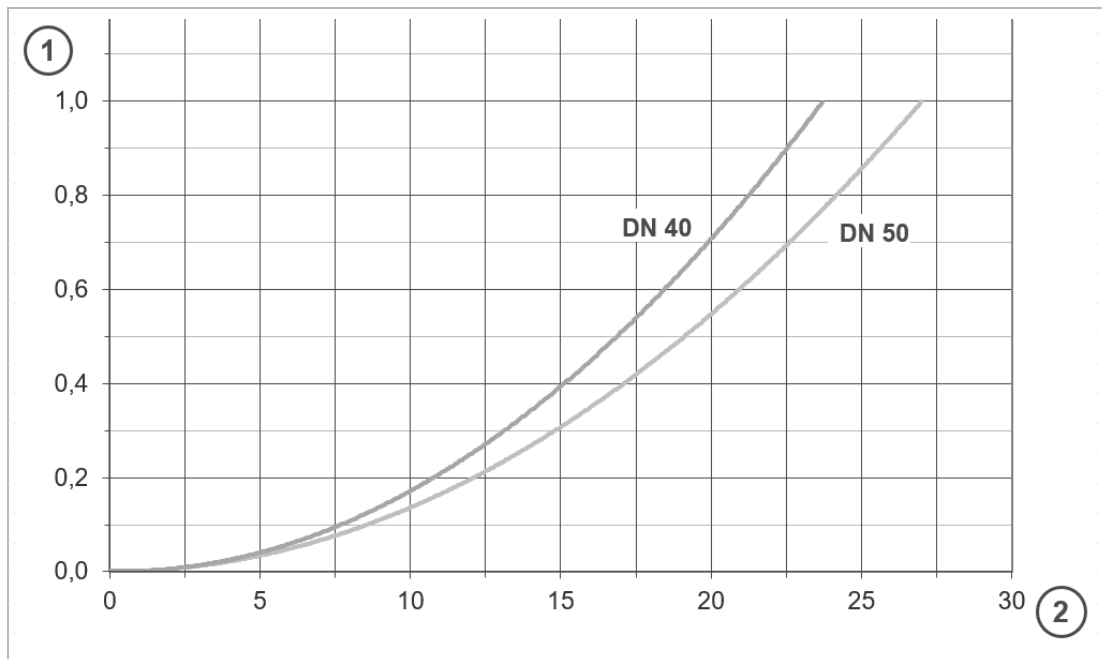
For more information on take-back and disposal, go to [www.gruenbeck.com](http://www.gruenbeck.com).

## 12 Technical specifications



| Dimensions and weights |   | KX 1½"       | KX 2"        |
|------------------------|---|--------------|--------------|
| A                      | Overall height up to centre of connection         | mm           | 441          |
| B                      | Installation length with/without screw connection | mm           | 283/160      |
| C                      | Distance to wall                                  | mm           | ≥ 90         |
| D                      | Overall depth up to centre of connection          | mm           | 200          |
| E                      | Total height                                      | mm           | 509          |
| F                      | Height required for replacement of filter element | mm           | > 390        |
|                        | Empty weight                                      | kg           | ~ 4.80       |
|                        |   |              | ~ 5.15       |
| Connection data        |   | KX 1½"       | KX 2"        |
|                        | Nominal connection diameter                       | DN 40        | DN 50        |
|                        | Connection diameter                               | 1½"          | 2"           |
| Performance data       |   | KX 1½"       | KX 2"        |
|                        | Nominal flow at Δp 0.2 (0.5) bar                  | m³/h         | 10.6 (17.0)  |
|                        | K <sub>v</sub> value                              | m³/h         | 23.7         |
|                        | Pore size   | μm           | 5            |
|                        | Operating pressure                                | bar          | 2 – 16       |
|                        | Nominal pressure                                  |              | PN 16        |
| General data           |   | KX 1½"       | KX 2"        |
|                        | Water temperature                                 | °C           | 5 – 30       |
|                        | Ambient temperature                               | °C           | 5 – 40       |
|                        | Order no.   | 101845000100 | 101885000100 |

## 12.1 Pressure loss curves BOXER KX



Designation

Pressure loss in bar

Designation

Flow rate in m³/h

## 13 Operation log



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

Fine filter BOXER \_\_\_\_\_

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

### 13.1 Start-up/commissioning log

| Customer                            |                              |                             |
|-------------------------------------|------------------------------|-----------------------------|
| Name                                |                              |                             |
| Address                             |                              |                             |
| Installation/Accessories            |                              |                             |
| 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 at raw water inlet   | bar                          |                             |
| Water pressure at pure water outlet | bar                          |                             |
| Water meter reading                 | m <sup>3</sup>               |                             |
| Remarks                             |                              |                             |
|                                     |                              |                             |
|                                     |                              |                             |
|                                     |                              |                             |
|                                     |                              |                             |
|                                     |                              |                             |
| Start-up/commissioning              |                              |                             |
| Company                             |                              |                             |
| Service technician                  |                              |                             |
| Work time certificate (no.)         |                              |                             |
| Date/signature                      |                              |                             |



## 13.2

[illegible]

[illegible]

## **Publisher's information**

### **Technical documentation**

Should you have any questions or suggestions regarding this operation manual, please contact Grünbeck Wasseraufbereitung GmbH's Department for Technical Documentation directly.

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