

Operating manual

EN



REFILL plus **Water filter system for deionisation**

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Chapter 1 - General / Safety instructions

1.1 General information

The water filter system REFILL plus is used for the deionisation (demineralisation) of top-up or filling water for heating systems according to the guidelines VDI 2035, SWKI and ÖNORM H5195-1. Deionised water helps to avoid damage caused by the formation of limescale and corrosion.

The functional parts are made of corrosion-resistant stainless steel, chrome-plated and tinned brass fittings and high-quality plastic parts. Depending on the product version, the ion exchange cartridge consists of pressure-resistant glass fibre material with an inner plastic tank or high-quality stainless steel, all rubber parts are made of aging-resistant elastomers. The materials used correspond to the recognised rules of technology.

The information in this user manual enables you to operate the device safely, properly and economically. In particular, basic information on installation, operation and maintenance must be observed.

Every person who works with this device must read these operating instructions in full and observe and apply the listed instructions.

In addition to the operating instructions, the locally applicable regulations for accident prevention and for safe and professional work must be observed.

The manufacturer of the water filter system also recommends to keep a written documentation on site. The form at the end of this user manual can be used.

These operating instructions must always be available at the place of use.

1.2 Field of application

This water filter system is used to treat natural tap water in accordance with guidelines such as the VDI 2035, SWKI and ÖNORM H5195-1 so that it can be used as top-up or filling water for heating systems. REFILL plus produces deionised water by ion-exchange using a high quality ion-exchange mixed bed resin as water filter material.

Depending on its quality, untreated tap water cannot be used as filling water for heating systems, as dissolved salts can damage the heating system. Damage can be corrosion on metallic components, silting of fittings and pipes or deterioration in heat transfer due to the formation of limescale.

The water treated with REFILL plus contains only the smallest amounts of dissolved salts and has an electrical conductivity of $<10 \mu\text{S}/\text{cm}$ and a total hardness of $<0.01 \text{ }^\circ \text{dH}$ within the filter's capacity limit. These quality attributes meet the essential requirements of the guidelines for the filling and top-up water of modern heating systems with the purpose to prevent water side damage caused by limescale and corrosion.

1.3 Safety instructions

Please read these operating instructions carefully before starting up the device and follow the instructions. The operating instructions must be kept at hand at all times.

Personal injury and damage to property caused by failure to observe these operating instructions are not covered by the Product Liability Act. The manufacturer assumes no liability for other damage caused by failure to observe these operating instructions.

Safety instructions warn of dangers and help to avoid personal injury and property damage. For your own safety, compliance with the safety instructions in this operating manual is essential.

The applicable national and international safety regulations must be observed. Each operator is responsible for compliance with the regulations applicable to them and must independently strive for the latest regulations.

1.4 Safety regulations

The water filter system may only be commissioned by specialist. The manufacturer's instructions for maintenance and replacement of the consumables in the system must be observed. The manufacturer's warranty is void if the device is modified. The manufacturer accepts no liability for damage caused by improper commissioning. It also voids the warranty.

The water filter system must not be operated in potentially explosive areas. The filter system may only be put into operation if it is in perfect condition.

The water filter system may only be used for the treatment of tap water in accordance with the applicable drinking water regulations. Treatment of acids, bases, etc. is not permitted.

Check the system for possible damage before commissioning. The intended use within the performance limits must be ensured.

Before carrying out any repair work, the device must be disconnected from the water pressure or the mains.

Damaged devices must be taken out of operation immediately. Have defective or damaged devices repaired only by specialists authorised by the manufacturer. It is in your own interest. This prevents defective repairs.

Observe the relevant and binding standards, such as DIN EN 1717; DIN 1988 etc.

1.5 Disclaimer of liability

The use of the product must be carried out exactly as described in this manual. The manufacturer is not liable for any damage, including consequential damage, that may result from incorrect installation or incorrect use of the product.

1.6 Specific safety and work instructions

The REFILL plus water filter system is only suitable for treating water for technical applications. The treated water is not suitable for human consumption.

The treated water may only be used if the filter is operated within its capacity limit ($<10 \mu\text{S}/\text{cm}$ conductivity to be measured at the outflow of the cartridge). When operating above the specified capacity limit, the water can have an acidic pH value, which can lead to damage in the downstream pipeline network.

When starting up and if the water filter system is not used for a long time, the filter should be flushed with a quantity of water corresponding to twice the filter volume before use. To avoid microbiological contamination, the filter should be rinsed and the ion exchange resin should be replaced once a year.

Please note the safety data sheets for the ion exchange resin.

Only water of tap water quality may be used as feed water for the REFILL plus water filter system. The water filter system is only suitable for cold water applications within the water inlet temperature range specified in the technical data. Under no circumstances may microbiologically contaminated water or water of unknown quality be used without adequate disinfection.

The filter system is not resistant to highly concentrated cleaning agents.

The filter system must not be opened or dismantled during operation. The filter cartridge must not be opened without relieving pressure first.

Depending on the version, the Polyglass container is designed for a service life of 10 years. An exchange should take place after this time.

Protect the water filter system from sunlight and mechanical damage. Do not use near heat sources and open flames. A safety valve must be installed in front of the inlet connection in accordance with the European standard DIN EN 1717.

If the water pressure on the inlet side is greater than 6 bar, a pressure reducer must be installed in front of the water filter system.

To avoid contamination from particles, a filter $<50 \mu\text{m}$ should be installed in front of the filter system.

All parts must be installed in accordance with the country-specific guidelines.

REFILL plus must be operated within the specified ambient temperatures.

Caution in the event of frost:

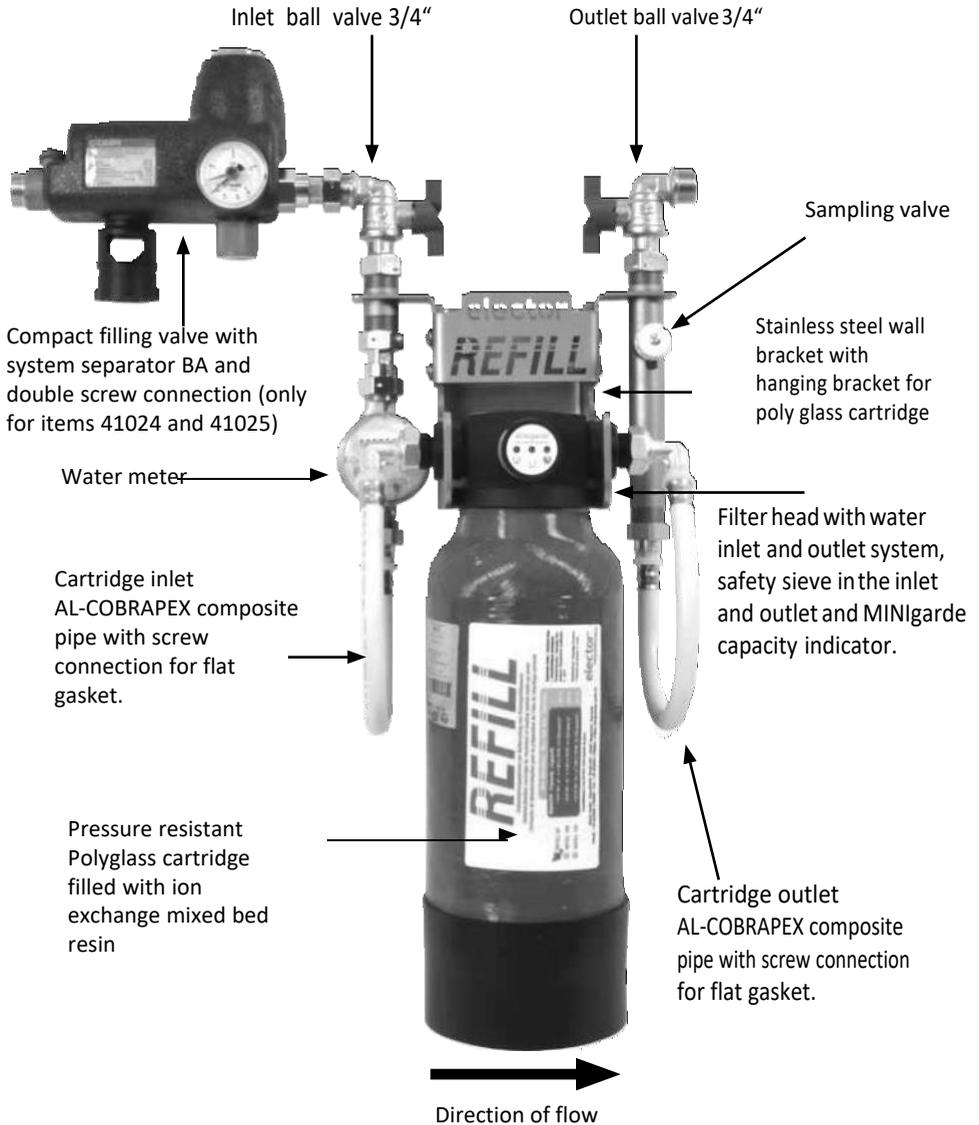
After commissioning, storage and transport of water-filled systems below 4°C should be avoided. Frost can destroy the water filter system.

Chapter 2 - System overview

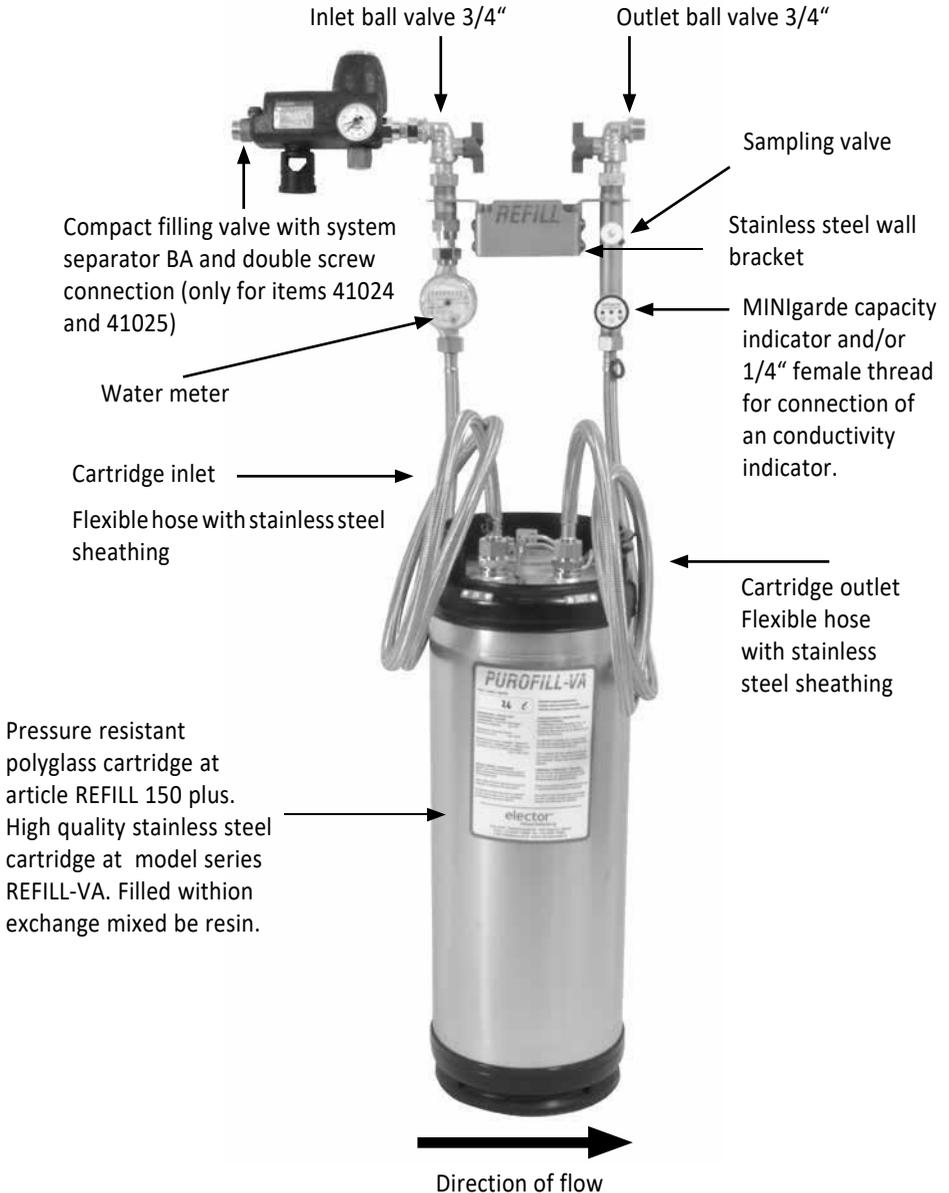
2.1 Construction of the water filter system

2.1.1 REFILL 50 plus and REFILL 100 plus

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2.1.2 REFILL 150 plus, REFILL-VA.14, REFILL-VA.26 and REFILL-VA.40



2.2 Technical specifications

2.2.1 Physical data - REFILL 50plus, REFILL 100plus

Operating pressure 6 bar at 20°C, 3 bar at 50°C
 Operating / water temperature5 - 50°C
 Ambient temperature when
 filter is in operation4 - 30°C
 Storage temperature new filter-20 - 50°C
 Recommended nominal flow 2 l/min – REFILL 50 plus
5 l/min – REFILL 100 plus
 Inlet connection 3/4" G
 Outlet connection 3/4" G
 Assembly Connection fitting - wall, polyglass cartridge hanging
 Operating situation vertical

2.2.2 Physical data - REFILL 150plus

Operating pressure 6 bar at 20°C, 3 bar at 50°C
 Betriebs- / Wassertemperatur..... ..5 - 50°C
 Ambient temperature when
 filter is in operation4 - 30°C
 Storage temperature new filter-20 - 50°C
 Recommended nominal flow 7 l/min – REFILL 150 plus
 Inlet connection 3/4" G
 Outlet connection 3/4" G
 Assembly Connection fitting - wall, polyglass cartridge floor standing
 Operating situation vertical

2.2.3 Physical data - REFILL-VA

Operating pressure 10 bar at 20°C, 6 bar at 50°C
 Betriebs- / Wassertemperatur..... ..5 - 50°C
 Ambient temperature when
 filter is in operation4 - 30°C
 Storage temperature new filter-20 - 50°C
 Recommended nominal flow.....9 l/min – REFILL-VA.14
17 l/min – REFILL-VA.26
26 l/min – REFILL-VA.40
 Inlet connection3/4" G
 Outlet connection 3/4" G
 Assembly Connection fitting - wall, Stainless steel cartridge floor standing
 Operating situation vertical

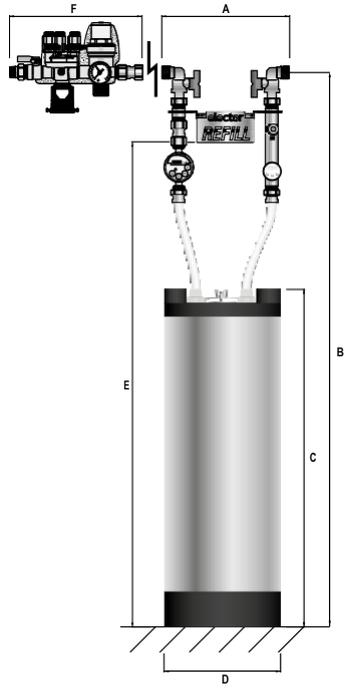
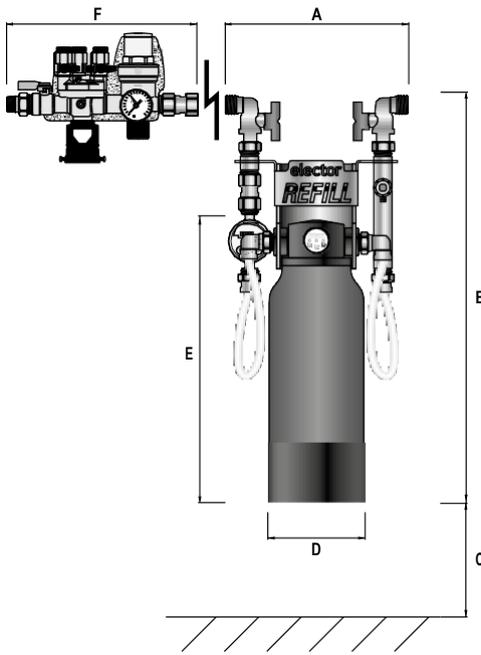
2.2.4 Electrical data MINIGarde capacity indicator

The MINIGarde conductivity indicator for capacity monitoring is battery operated.

Power supply: integrated battery V

2.2.5 Dimensions

| Item | Model | Assembly | A | B | C | D | E | F |
|-------|-----------------------|--|-----|----------|------|----------|----------|-----|
| 41004 | REFILL 50 plusbasic | Wall, Cartridge hanging | 265 | 600 | ~260 | 140 | 420 | - |
| 41024 | REFILL 50 plus | | | | | | | 255 |
| 41005 | REFILL100plusbasic | | | 725 | 159 | 560 | - | |
| 41025 | REFILL 100 plus | | | | | | 255 | |
| 41009 | REFILL 150 plus basic | Wall, Cartridge floor- standing | 265 | variable | 530 | 219 | 530 | - |
| 41026 | REFILL 150 plus | | | | | | | 255 |
| 41018 | REFILL-VA.14 basic | | | | 398 | 239 | variable | - |
| 41029 | REFILL-VA.14 plus | | | | | | | 255 |
| 41007 | REFILL-VA.26 basic | | | 703 | 239 | variable | - | |
| 41027 | REFILL-VA.26 plus | | | | | | 255 | |
| 41008 | REFILL-VA.40 basic | | | 1029 | 239 | variable | - | |
| 41028 | REFILL-VA.40 plus | | | | | | 255 | |



2.3 Filter capacity

The real filter capacity is strongly influenced by the operating temperature and the flow rate and can therefore vary.

The capacity end point is indicated by the electrical conductivity of the water to be measured at the outflow the water filter system.

The capacity endpoint of the resin in the REFILL water filter system is to be considered at 10 µS/cm, which is indicated by the MINlgarde capacity indicator with a flashing yellow LED.

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| Designation | Total hardness of the tap water | Electrical conductivity of the tap water | Filter capacity in m ³ |
|-----------------|--|--|-----------------------------------|
| REFILL 50 plus | 10°dH / 17,8°FH / 178 ppm CaCO ₃ | 330 µS/cm | 0.3 |
| REFILL 100 plus | | | 0.8 |
| REFILL 150 plus | | | 1.2 |
| REFILL-VA.14 | | | 2 |
| REFILL-VA.26 | | | 3.9 |
| REFILL-VA.40 | | | 6 |

Please note: Softening the water prior to deionisation does not increase the capacity, as the total amount of dissolved salts does not change. If there is a water softening system in the tap water installation, always use the water in direction of flow in front of the softening system for deionisation of heating system filling water.

2.3.1 Capacity calculation

The deionisation capacity of REFILL plus depends on the salinity of the water. You can calculate the capacity using the formula below.

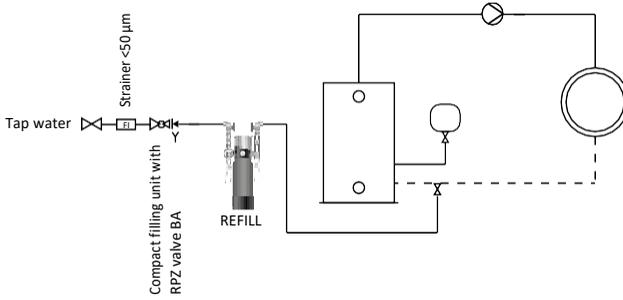
$$\frac{\text{Stated capacity} \times 330 \text{ Tap water conductivity} \mu\text{S/cm}}{\text{water conductivity} \mu\text{S/cm}} = \text{approximate capacity}$$

2.4 Scope of delivery

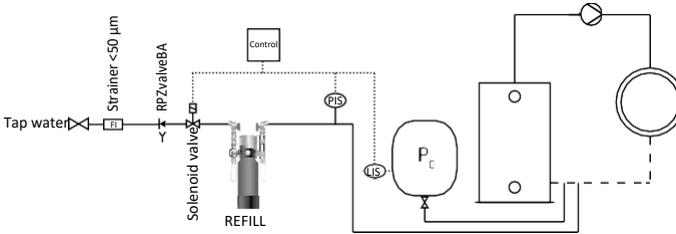
- 2 pieces 3/4 "corner ball valves incl. EPDM gasket.
- 1 piece of stainless steel connection fitting with water meter and sampling valve.
- 2 curved AL-COBRAPEX composite pipes with flat gasket screw connection for connecting the cartridge or 2 flexible hoses (depending on the REFILL version).
- 1 piece ion exchange demineralisation cartridge.
- 1 piece of MINlgarde conductivity indicator.
- 1 piece funnel for filling the demineralisation cartridge.
- Screws for wall mounting.
- Safety sieve for 3/4 "hoses
- Compact filling valve with system separator according to DIN EN 1717 (only for articles 41024, 41025, 41026, 41029, 41027, 41028)

Chapter 3 - Installation instructions

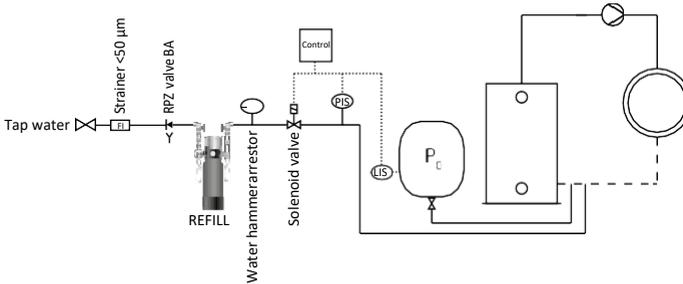
3.1 Installation example – System with membrane expansion tank



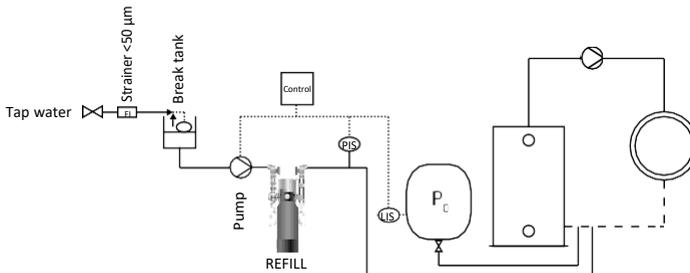
3.2 Installation example – System with automatic top-up and pressure maintenance



3.3 Installation example – System with automatic top-up and pressure maintenance Alternative installation with water hammer arrestor



3.4 Installation example – System with pressure less water tank in automatic top-up system



PIS = Pressure sensor
LIS = Level sensor

3.5 Installation note - ATTENTION !!! Solenoid valve

Solenoid valves must always be installed upstream to the REFILL plus water filter system.

This applies in particular to solenoid valves from automatic top-up systems. These have to be converted. When closing, solenoid valves cause water hammers with high pressures in the upstream pipework installation, which may exceed the operating pressure of the REFILL plus water filter system and can cause leaks.

However, other solenoid valves, such as those from measuring devices for capacity monitoring, must always be installed in the flow direction in front of the water filter system.

If it is not possible to install the solenoid valve upstream to the REFILL water filter station, we recommend installing a water hammer arrestor downstream to the REFILL water filter station, but upstream to the solenoid valve.

3.6 Installation note - safety valve

In the scope of DIN EN 1717, a safety valve must be installed in front of the water filter system to prevent the backflow of heating water into the tap water installation.

In systems without automatic pressure maintenance, the installation of a compact filling valve is recommended, as this allows semi-automatic filling due to the adjustable pressure control valve.

In systems with automatic pressure maintenance and make-up water control, only a non-return valve should be installed without an additional pressure reducer.

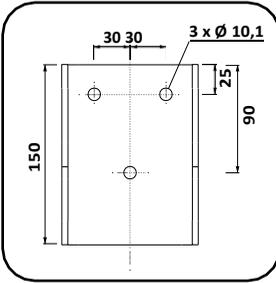
3.7 Installation note - safety sieve



The safety sieve, included in the scope of delivery, prevents the resins from breaking out of the ion exchanger cartridge in case of any damage. Before installing the ball valve, place the safety strainer on the 3/4 "screw connection at the outlet of the connection fitting.

Chapter 4 - Assembly / Operation / Maintenance

4.1 Wall assembly



Select an easily accessible location for wall mounting of the stainless steel connection fitting. The masonry to which the water filter system is to be installed must have sufficient strength and load capacity of at least 20 kg. We do not recommend mounting the station on walls with old sanding plasters.

The wall bracket has three holes for wall mounting according to the adjacent drawing. Please use these for attaching it to the wall by using the enclosed screws.

4.2 Installation of the wall-mounted ion exchange cartridge

Hold the cartridge horizontally in front of the wall bracket and place it with the connection nipples in the bracket. Then rotate the cartridge to a vertical position.



The connecting pipes are delivered bent, but may have been bent to an unsuitable shape during transport.

You may have to carefully adjust the bending radius by hand.

4.3 Assembly of the floor-standing ion exchange cartridges



The ion exchanger cartridge is placed on the floor in front of the connection fitting that has been mounted on the wall.

Connect the cartridge inlet (IN) via the flexible hose to the water meter. Please connect the cartridge outlet (OUT) with the connector of the connection fitting in which the MINIGarde capacity indicator is installed.

Please note point 3.6!

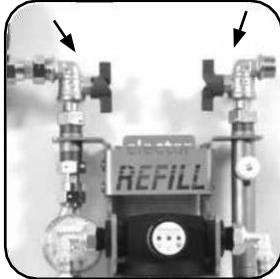
4.4 General operation

After installation, fill the water filter system with water and rinse it twice with the volume of the cartridge before use. The ion exchange resin must not dryout. Always leave the water filter system filled with water. Make sure that you always shut off the ball valves in the inlet and outlet after using the water filter system. Never use a compact filling valve for automatic top-up without leakage monitoring. You should only use the water filter system with open ball valves for automatic refilling of the heating system if the system has a top-up system with leakage monitoring.

4.5 Replacement of the ion exchange mixed bed resin

If the capacity of the water filter system is exhausted (MINIgarde flashes yellow or red), the mixed ion resin exchange resin must be replaced.

4.5.1 Wall-mounted cartridges



Close ball valves. Place a bucket below the cartridge.



Relieve pressure by opening the sampling valve.



Loosen the screw connection. Unhook cartridge.



Unscrew the connection head from the cartridge and pull it upwards.



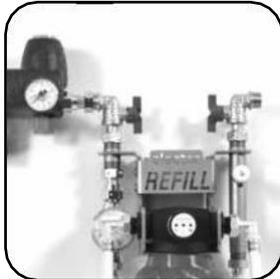
Rinse old resin in a porous sack and discard.



Place the funnel on the empty cartridge and fill in new resin.



Filter nozzle must be present on the riser pipe.



Reassemble everything. Fill the system with water.

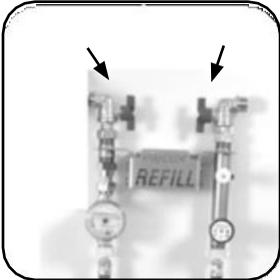
Note:

Only use resin suitable for treatment of top-up water for heating systems!

After changing the resin, the cartridge should be flushed twice with a water volume corresponding to the cartridge content. This water should be drained.

Do not let the resin dry out.

4.5.2 Floor-standing cartridges



Close ball valves.



Relieve pressure by opening the sampling valve.



Loosen the screw connection.



Open the oval closure.



Rinse out resin and rinse in barrel or sack.



Place the funnel on the empty cartridge and fill in new resin.



Ensure clean sealing surfaces when closing.



Reassemble everything. Fill the system with water.

Note:

Only use resin suitable for treatment of top-up water for heating systems!

After changing the resin, the cartridge should be flushed twice with a water volume corresponding to the cartridge content. This water should be drained.

Do not let the resin dry out.

4.5.3 Notes on the ion exchanger mixed bed resin

Only use resin that is suitable treating the top-up or filling water for heating systems. The ion exchange resin should have a proportion of the anion resin of at least 60%.

If the water filter system has not been used for a long period of time, rinse twice with a volume of water corresponding to the volume of the cartridge before using it again.

To avoid contamination, we recommend an annual resin change.

4.6 Capacity monitoring with the MINIgarde conductivity indicator

MINIgarde is a flashing conductivity indicator that has three LEDs.

Green LED flashes = $<10 \mu\text{S} / \text{cm}$ conductivity = filter has full capacity.

Yellow LED flashes = $10 - 50 \mu\text{S} / \text{cm}$ conductivity = filter shows exhaustion.

Red LED flashes => $50 \mu\text{S} / \text{cm}$ conductivity = replace resin in any case.

Note: Ideally, the reading of the capacity takes place while water is flowing. If necessary, open the sampling valve to create a water flow.

MINIgarde has an integrated battery with a lifespan of 10 years. The entire measuring device must be replaced at the end of its service life.

4.7 Maintenance instructions

Apart from the capacity control and the regular resin change, only little maintenance is necessary. However, please note the following information.

4.7.1 Safety sieves in the connection fitting for wall-hanging cartridges

A safety sieve is installed in the inlet and outlet of the black connection fitting. This sieve prevents the mixed bed resin from breaking through if the cartridge is installed without the riser pipe, the riser pipe is defective or a suction effect occurs.

To clean or replace the safety sieves, you must unscrew the black double nipples from the connection fitting.

A reduced flow rate can be an indication that the safety sieves are contaminated and need to be cleaned or replaced.

4.8 Disposal

The mixed resin ion exchanger can be disposed of with normal household waste.

The water filter system must be disposed of in accordance with local regulations.



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