



# INSTRUCTIONS

SILEX demineralizers

Type 1 B and 2 B



# INSTALLATION AND OPERATING INSTRUCTIONS

## SILEX DEMINERALIZERS

### TYPE 1 B AND 2 B

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## **PREFACE**

The instructions are made so that they can be followed section by section. It is recommended to follow the instructions carefully since any service calls due to faulty installation, plant start, operation or insufficient maintenance are not covered by our guarantee.

## **LIST OF FIGURES**

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## GENERAL INFORMATION

### PLANT DESCRIPTION

A complete SILEX plant comprises a tank, a cartridge, and a wall-mounted conductivity meter that continuously indicates the conductivity of the demineralized water.

The SILEX cartridge contains cation and anion exchange resins with a certain demineralization capacity. At exhausted capacity the used cartridge is exchanged for a regenerated cartridge. The used cartridge is sent in the original packing to **the address of the regeneration centre:**

Here the cartridge will be regenerated and returned ready for use.

### QUALITY REQUIREMENTS OF THE UNTREATED WATER

The temperature of the water to be demineralized must not exceed 35°C and must not contain iron, manganese, oil, or large quantities of organic matter. Common mains water will normally meet these requirements.

### THE CONTENTS OF DISSOLVED SALTS IN THE WATER - CONDUCTIVITY

The electronic conductivity meter continuously indicates the conductivity of the demineralized water in  $\mu\text{S}/\text{cm}$ . The conductivity is a measure for the contents of dissolved solids in the water. The lower the conductivity, the smaller the contents of dissolved solids.

Examples:

Distilled water	7-10 $\mu\text{S}/\text{cm}$
Demineralized SILEX water	less than 0.1 $\mu\text{S}/\text{cm}$ .

### STORAGE OF A SILEX CARTRIDGE

On account of the ion exchange resins the SILEX cartridge must be stored in a frost-free room. An unused cartridge must be stored as cool as possible – best at refrigerator temperature i.e. 4-8°C. Storage at higher temperatures adds to the risk of growth of micro-organisms just like the cartridge's ability to produce water of low conductivity is reduced.

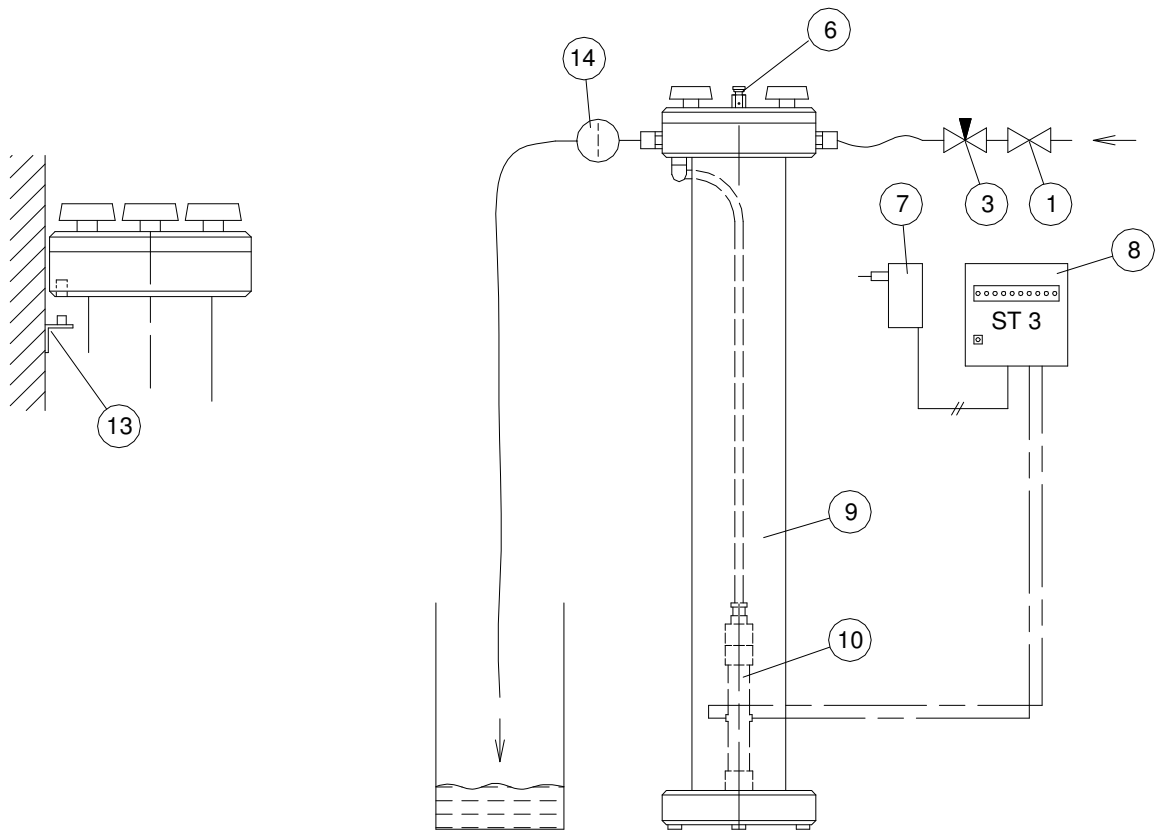
### LIFE

Cartridges that are stored at refrigerator temperature should be used within six months from the delivery date. When stored at room temperature the cartridges should be used within three months. It is of greatest importance for the life of the cartridges that they are stored and exchanged under so sterile conditions as possible so that the risk of contamination from the surroundings and the operator is minimized.

## INSTALLATION INSTRUCTIONS

### A. SILEX TYPE 1 B - GRAVITY FLOW INSTALLATION (Fig. 1)

1. By means of the angle fittings supplied mount the SILEX plant on the wall close to a stop valve, e.g. a tap cock. The water feed to the plant is regulated with the stop valve, see Fig. 1.
2. Max. plant flow must not exceed 2 l of water per minute. If the flow can increase above this load, on the inlet provide a valve set at a max. flow of 2 l/minute at max. mains pressure and lock the valve in this position.
3. The water is supplied through the hose coupling (1/2") on the right side of the plant. The demineralized water is tapped through a hose connected to the coupling on the left side of the plant. This hose must not be fitted with any closing device and must be of synthetic or other corrosion-resistant material.
4. The plant must be equipped with a conductivity meter to control the quality of the demineralized water.
5. **N.B.:** By use of a SILEX plant a small and limited discharge of small particles (under 0.5 mm) of ion exchange media cannot be excluded. If such a discharge can harm the subsequent installation in any way, a suitable filter must be installed in the outlet line of the SILEX plant, see Fig. 1 pos. 14.
6. Provide an adjustable check valve between the mains piping and the SILEX installation. Check and follow local regulations.



- |                         |                     |
|-------------------------|---------------------|
| 1. STOP VALVE.          | 9. SILEX UNIT.      |
| 3. REGULATING VALVE.    | 10. MEASURING CELL. |
| 6. AIR SCREW.           | 13. ANGLE FITTINGS. |
| 7. TRANSFORMER 230/12V. | 14. FILTER.         |
| 8. CONDUCTIVITY METER.  |                     |

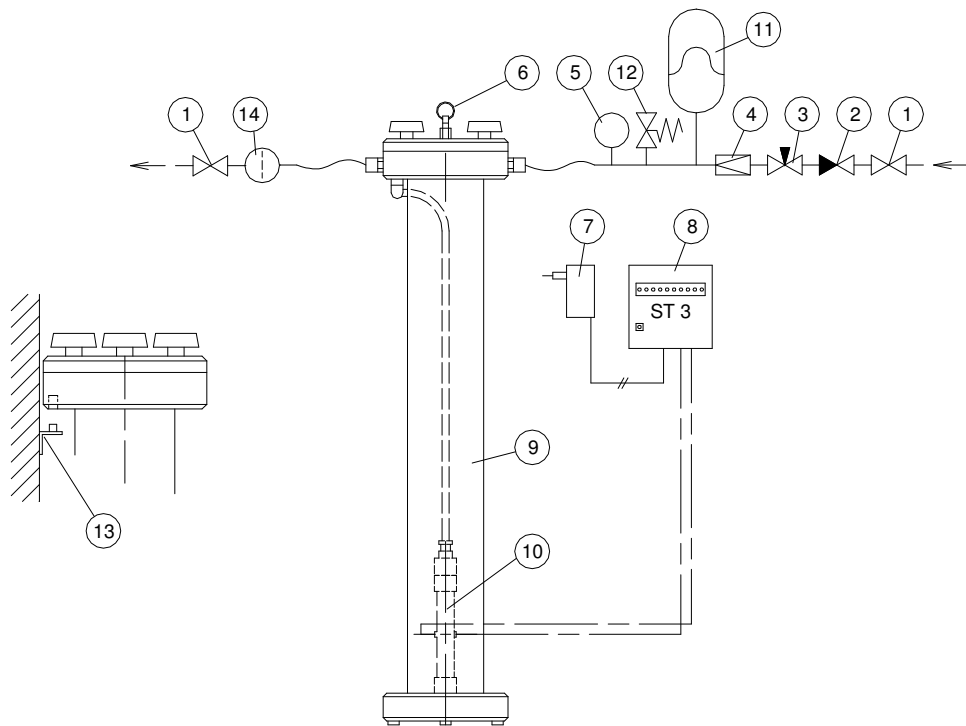
ACCORDING TO EN 61010-1 ITEM 1.4 THE PLANT IS INSTALLED UNDER INSTALLATION CATEGORY II. TRANSFORMER SHALL COMPLY WITH EN 60742.

Fig. 1.

## **B. SILEX TYPE 1 B - PRESSURE INSTALLATION (Fig. 2)**

1. Bolt the SILEX plant on the wall with the fittings supplied.
2. The plant is designed for a max. pressure of six bar. If, due to operating pressure, reflux in the installation, or temperature increase in the liquid during a standstill, the max. operating pressure of the plant may be exceeded, install a pressure reducing valve, a diaphragm pressure extension tank, or a relief valve on the plant inlet.
3. Provide a stop valve on the plant inlet and outlet in order to shut off the water supply for replacement of the cartridge.
4. Max. plant flow is 2 l/minute. If the flow can increase above this load, a valve is fitted on the plant inlet and set at a max. flow of 2 l/minute at max. mains pressure. Lock the valve in this position.
5. The water is supplied through the hose coupling (1/2") on the right side of the plant, and the coupling on the left side is connected to the line to carry demineralized water. The outlet line from the SILEX plant as well as tap cocks on it must be of synthetic or other corrosion-resistant material.
6. The plant must include equipment to control the quality of the demineralized water.
7. **N.B.:** By use of a SILEX plant a small and limited discharge of small particles (under 0.5 mm) of ion exchange media cannot be excluded. If such a discharge can harm the subsequent installation in any way, a suitable filter must be installed in the outlet line of the SILEX plant, see Fig. 2 pos. 14.
8. Provide a ball check valve and a pipe isolating valve between the mains piping and the SILEX installation. Check and follow local regulations.





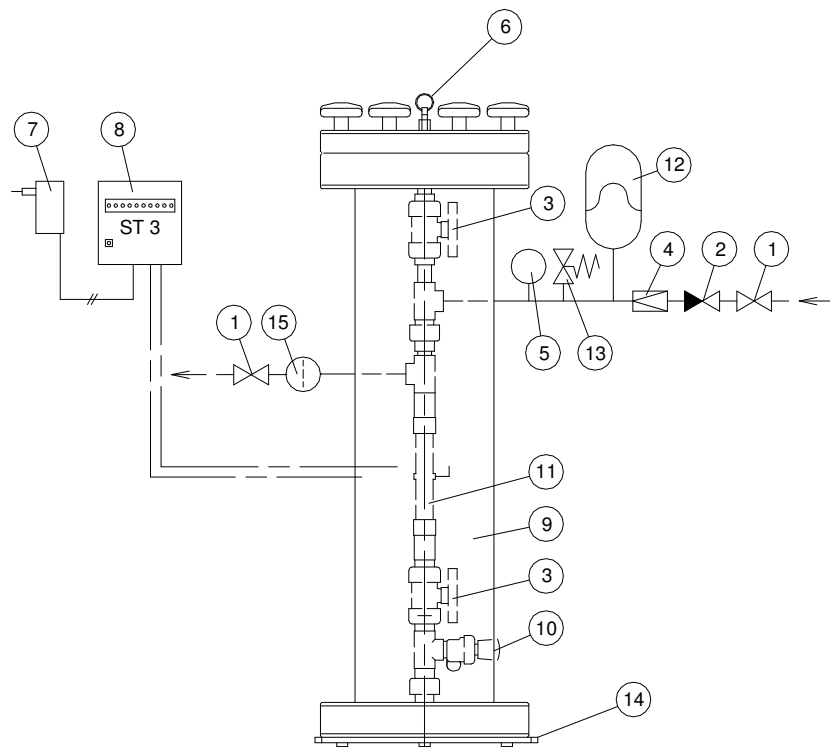
- |                                     |                         |  |
|-------------------------------------|-------------------------|--|
| 1. STOP VALVE.                      | 6. AIR SCREW.           | 11. DIAPHRAGM PRESSURE EXTENSION TANK, IF ANY. |
| 2. NON-RETURN VALVE.                | 7. TRANSFORMER 230/12V. | 12. RELIEF VALVE, IF ANY.                      |
| 3. REGULATING VALVE.                | 8. CONDUCTIVITY METER.  | 13. ANGLE FITTINGS.                            |
| 4. PRESSURE REDUCING VALVE, IF ANY. | 9. SILEX UNIT.          | 14. FILTER.                                    |
| 5. PRESSURE GAUGE.                  | 10. MEASURING CELL.     |  |

ACCORDING TO EN 61010-1 ITEM 1.4 THE PLANT IS INSTALLED UNDER INSTALLATION CATEGORY II. TRANSFORMER SHALL COMPLY WITH EN 60742.

Fig. 2.

### C. SILEX TYPE 2 B - PRESSURE INSTALLATION (Fig. 3)

1. Place the plant on a plane surface. The plant includes a triangular mounting plate to be fastened to the bottom flange underside by means of the three screws already mounted.
2. If, due to operating pressure, reflux in the installation, or temperature increase in the liquid during a standstill, the max. operating pressure of the plant may be exceeded, install a pressure reducing valve, a diaphragm pressure extension tank, or a relief valve on the plant inlet.
3. Fit a stop valve on the plant inlet and outlet in order to shut off the water supply for replacement of the cartridge.
4. Max. plant flow is 5 l of water per minute. If the flow can increase above this load, on the inlet provide a valve set at a max. flow of 5 l/minute at max. mains pressure. Lock the valve in this position.
5. The connections for water and outlet for demineralized water, ½" hose couplings, are shown in Fig. 3.
6. The line carrying demineralized water as well as any tap cocks on it must be of synthetic or other corrosion-resistant material.
7. The plant must include equipment to control the quality of the demineralized water.
8. **N.B.:** By use of a SILEX plant a small and limited discharge of small particles (under 0.5 mm) of ion exchange media cannot be excluded. If such a discharge can harm the subsequent installation in any way, a suitable filter must be installed in the outlet line of the SILEX plant, see Fig. 3 pos. 15.
9. Provide a ball check valve and a pipe isolating valve between the mains line and the SILEX installation. Check and follow local regulations.



- |                                     |                         |  |
|-------------------------------------|-------------------------|--|
| 1. STOP VALVE.                      | 6. AIR SCREW.           | 11. MEASURING CELL.                            |
| 2. NON-RETURN VALVE.                | 7. TRANSFORMER 230/12V. | 12. DIAPHRAGM PRESSURE EXTENSION TANK, IF ANY. |
| 3. REGULATING VALVE.                | 8. CONDUCTIVITY METER.  | 13. RELIEF VALVE, IF ANY.                      |
| 4. PRESSURE REDUCING VALVE, IF ANY. | 9. SILEX UNIT.          | 14. MOUNTING PLATE.                            |
| 5. PRESSURE GAUGE.                  | 10. BOTTOM DRAIN.       | 15. FILTER.                                    |

ACCORDING TO EN 61010-1 ITEM 1.4 THE PLANT IS INSTALLED UNDER INSTALLATION CATEGORY II. TRANSFORMER SHALL COMPLY WITH EN 60742.

Fig. 3.

## **CONDUCTIVITY METERS**

### **CONDUCTIVITY METER TYPE ST 3**

1. Remove the transparent cover and screw the conductivity meter on the wall by means of the supplied screws and wall plugs. Screw on the cover.
2. Connect the supplied transformer 230/12 V to the conductivity meter by means of the two red spade-shaped plugs. Plug the transformer into a 230 V wall socket. If the transformer wire shall be lengthened or shortened, use the supplied additional spade-shaped plugs.
3. Connect the wire with the two cable clips to the two terminals on the measuring cell. Shall the wire be lengthened or shortened, use the additional cable clips mounted on the measuring cell.
4. The meter is now in operation and the green 12 V lamp is on. The conductivity of the water is read on one of the ten lamps. A flashing of the lamps every two seconds indicates a new measuring and the light stops at the lamp for actual conductivity. If, say lamp No. 3 comes on, the conductivity of the water is minimum 0,5  $\mu\text{S}/\text{cm}$  and max. 1  $\mu\text{S}/\text{cm}$ .

### **CONDUCTIVITY METER TYPE ST 16**

1. The electronic conductivity meter ST 16 continuously registers the quality of the demineralized water. The water quality is expressed as the water's capability of conducting an electric current and the conductivity is measured in  $\mu\text{S}/\text{cm}$ .
2. A high conductivity means plenty of mineral salts in the water and thus a poor water quality. Conversely, a low conductivity means few mineral salts and a good water quality.

The conductivity is measured by means of a measuring cell that is inserted on the piping for treated water.

3. The conductivity meter is equipped with alarm and output for remote alarm to be energized when a preset quality limit is exceeded.

## TECHNICAL DATA (ST 16)

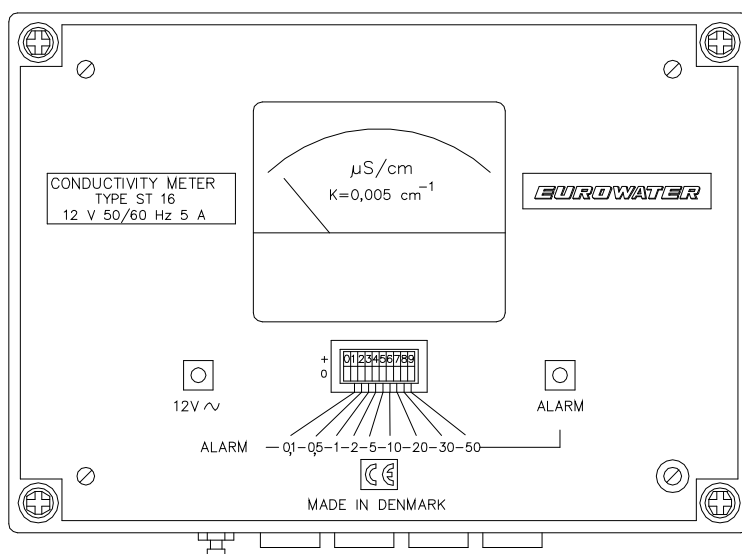


Fig. 4.

Measuring range: 0.05-100  $\mu\text{S}/\text{cm}$

Alarm values ( $\mu\text{S}/\text{cm}$ ): 0.1-0.5-1.0-2.0-5.0-10.0-20.0-30.0-50.0

Power supply: 12 V~

Option of alarm or continuous alarm.

External signals via terminal strip connection:

at alarm - 12 V~, 2 amp.

at operation - 12 V~, 2 amp.

at alarm - potential-free (max. 30 V~, 5 amp.)

at operation - potential-free (max. 30 V~, 5 amp.).

Measuring cell:

cell constant  $0.005 \text{ cm}^{-1}$

Dimensions:

length 250 mm

height 185 mm

width 80 mm.

Weight:

approx. 1 kg.

### **INSTALLATION (ST 16)**

1. Remove the transparent cover and install the conductivity meter on the wall close to the measuring cell of the demineralizer by means of the supplied screws and rawl plugs.
2. Install the transformer 230/12 V - 20 VA next to the conductivity meter and connect the transformer to a wall socket (1x 230 V) with switch. Tilt the front plate of the conductivity meter forward thus revealing the terminal strip connection. Run the black wire of the transformer through the grey rubber bushes and connect the wire to terminals 1 and 2.
3. Connect the two contact plugs of the measuring cell to terminals 9 and 10 in the meter's terminal strip. Check that the contact plugs are securely fastened to the measuring cell.
4. Remote signals:
  - a. In "normal" operation 12 V~ (max. 20 VA) are tapped from terminal 4, by alarm from terminal 5 instead.
  - b. Terminal 7 is potential-free connected to terminal 6 in "normal" operation and terminal 8 is potential-free connected to terminal 6 in alarm. Maximum connection/charge of terminal 6: 30 V, 5 amp.

### **OPERATING INSTRUCTIONS (ST 16)**

1. The green diode 12 V is on when the conductivity meter is in operation and the conductivity of the water is measured by reading the instrument.
2. The conductivity meter is equipped with alarm and output for remote alarm. The alarm values are set on the meter's bit switches by pressing the switch in question on. If e.g. switch No. 6 is depressed, the yellow alarm lamp comes on when the conductivity exceeds 10  $\mu\text{S}/\text{cm}$ . Only one alarm value can be set.
3. Alarm is indicated when the yellow diode "ALARM" as well as the connected remote alarm, if any, are on. By depressing the switch "0" the alarm is maintained (irrespective of variations of the conductivity) until the alarm is cancelled with the green button on the underside of the conductivity meter.

ST 16 PANEL OPEN

TYPE: ST 16

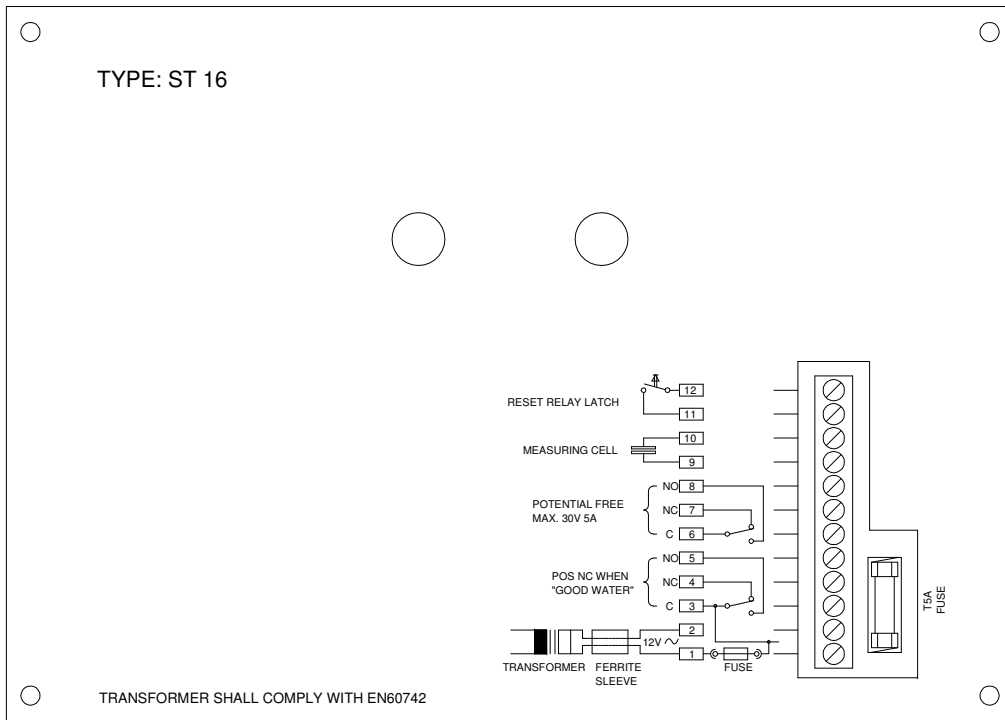


Fig. 5.

## OPERATING INSTRUCTIONS

### REPLACEMENT OF SILEX CARTRIDGE

1. Close the stop valves at the inlet and outlet sides.
2. Remove the pressure from the plant by loosening the airscrew or the bottom drain valve.
3. Screw off the plant top flange, remove the exhausted cartridge and hang it to drip.
4. Drain the water out of the plant

SILEX 1 B: by tipping the plant  
SILEX 2 B: by opening the bottom drain valve.

5. a) Open the bag with the new cartridge and use it as a funnel for the cartridge that is slowly lowered into the plant.  
b) Hold the plastic bag and squeeze the cartridge together in order to slide it easily into the plant.  
c) When the cartridge is entirely in the plant, pull out the plastic bag.  
d) To smooth down possible creases in the bag, pull the clamp slightly upwards.

As it is very important that the cartridge fits tightly inside the plant, vibrate the tank by patting slightly on its outside thus making the cartridge settle.

6. Mount the top flange. **N.B.:** Gasket, O-ring, and bearing surfaces must be clean.
7. Close the bottom drain valve (SILEX 2 B). Open the airscrew.
8. Open the stop valve on the inlet.
9. Close the airscrew when water flows from the outlet.
10. Open the stop valve on the outlet.
11. Place the exhausted and dripped-dry, however, not dried up cartridge in the plastic bag that is carefully tied up and placed in the original packing.

**N.B.:** Ion exchange resins that are dried up to "loose sand" are destructed to such an extent that the resins loose the ability to ion exchange. Dried up ion exchange resins *cannot* be reused.

12. Dispatch the cartridge to the regeneration centre, see "Plant Description" in the section "General Information".











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We offer a wide range of spare parts, service kits, and consumables. Our service cars are equipped with a broad range of spare parts, mainly of our own make. We continuously supply spare parts for more than 25-year-old plants.

Consumables: Water-softening salt. Test kits for periodical hardness control after the softening plant. Filter media for pressure filters. Ion exchange resins. Membranes for reverse osmosis plants. Filter bags. UV lamps.

## Temporary Needs

In case of emergency or temporary needs, we offer a wide range of rental units. All units are ready for immediate installation and operation.

## Contact

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In order to find your local sales and service office, please visit our international website.

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