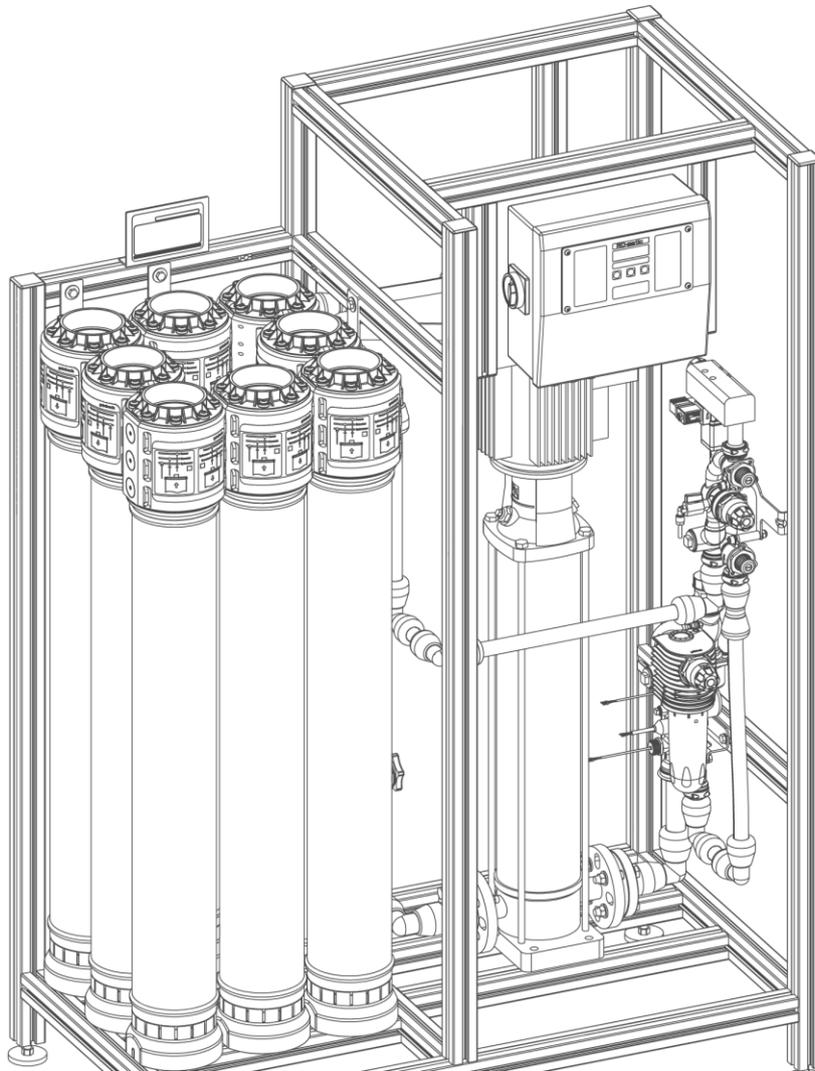


We understand water.



## Reverse osmosis system | GENO-OSMO-HLX

Operation manual

grünbeck

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Subject to technical modifications.  
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**Original operation manual**  
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# 1 Introduction

This manual is intended for owners/operating companies, operators, 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 system.
- ▶ Adhere to all safety instructions and instructions for action.
- ▶ Keep this instruction and all other applicable documents, so that they are available when needed.

Illustrations in this manual are for basic understanding and may differ from the actual version.

## 1.1 Validity of the manual

This manual applies to the following products:

- Reverse osmosis system GENO-OSMO-HLX 200
- Reverse osmosis system GENO-OSMO-HLX 400
- Reverse osmosis system GENO-OSMO-HLX 800
- Reverse osmosis system GENO-OSMO-HLX 1200
- Reverse osmosis system GENO-OSMO-HLX 1600
- Reverse osmosis system GENO-OSMO-HLX 2200
- Reverse osmosis system GENO-OSMO-HLX 3000
- Reverse osmosis system GENO-OSMO-HLX "S"  
Special versions that essentially correspond to the listed standard products.  
Information on changes can be found on the particular information sheet that will be enclosed in these cases.

## 1.2 Other applicable documents

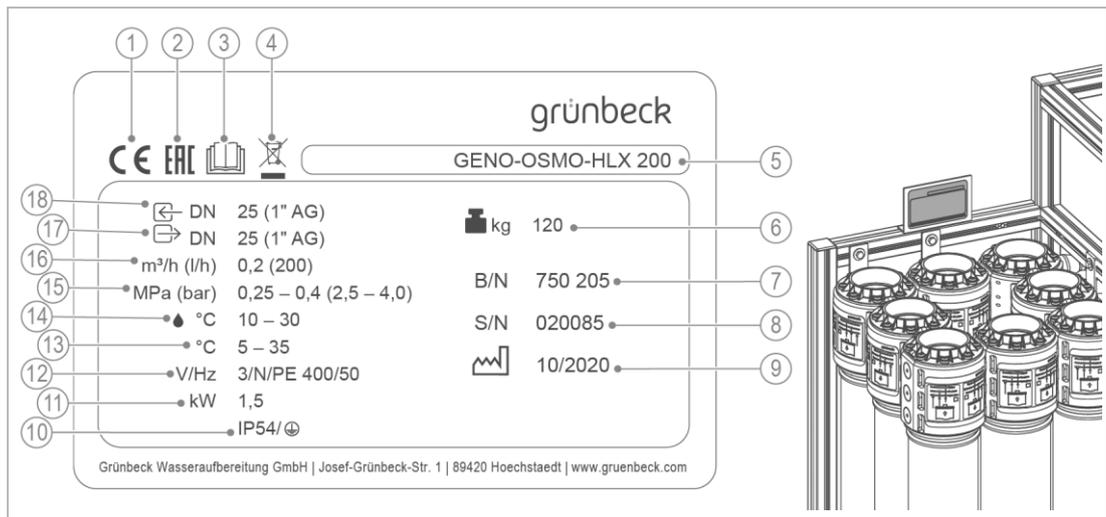
- Manuals of all accessories used
- Instructions for components from other manufacturers
- Safety data sheets for chemicals
- Electric circuit diagram, order no. 750 211

### 1.3 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 at the frame:



Designation	
1	CE mark
2	EAC mark
3	Observe operation manual
4	Disposal information
5	Product designation
6	Operating weight
7	Order no.
8	Serial no.
9	Date of manufacture
10	Protection/protection class

Designation	
11	Electrical power consumption
12	Mains connection
13	Ambient temperature
14	Feed water temperature
15	Inlet flow pressure of feed water
16	Permeate capacity at a feed water temp. of 15 °C
17	Nominal connection diameter permeate/concentrate discharge
18	Nominal connection diameter of feed water inlet pipe

## 1.4 Symbols used

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

## 1.5 Depiction of warnings

This manual contains information that you must comply with for your personal safety. The information is highlighted by a warning sign and has the following structure:



**SIGNAL WORD** Type and source of danger

- Possible consequences
- ▶ Preventive measures

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

Warning sign and signal word		Consequences when disregarding the information/instructions	
	<b>DANGER</b>	Personal injury	Death or serious injuries
	<b>WARNING</b>		Possible death or serious injuries
	<b>CAUTION</b>		Possible moderate or minor injuries
		Property damage	Possible damage to components, the product and/or its functions, or anything in its vicinity.

## 1.6 Personnel requirements

During the individual lifecycle phases of the system, different persons carry out activities on the installation. The respective activities require different qualifications.

### 1.6.1 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 the case of incorrect behaviour</li> <li>• Knowledge of the 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 for safety and accident prevention</li> </ul>
Qualified specialist <ul style="list-style-type: none"> <li>• Electrical engineering</li> <li>• Sanitary engineering (SHK)</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 possible risks</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>

### 1.6.2 Authorisations of personnel

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

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

### 1.6.3 Personal protective equipment

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

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

PPE			
	Protective gloves		Protective footwear
	Protective overall		Protective goggles
	Hard head		Mask
	Face mask		Protective apron

## 2 Safety

### 2.1 Safety measures

- Only operate the system if all components are installed properly.
- Adhere to the applicable local guidelines on drinking water protection, accident prevention and occupational safety.
- Do not make any changes, conversions, extensions or program modifications to your product.
- Only use genuine spare parts for maintenance or repair. If unsuitable spare parts are used, the warranty for the system will be void.
- Always keep the premises locked to prevent unauthorised access and to protect endangered/non-instructed people from residual risks.
- Observe the maintenance intervals (refer to chapter 8.2). Failure to comply can result in microbiological contamination of your drinking water system.

#### 2.1.1 Mechanical safety

- Safety devices must never be removed, bridged, or otherwise tampered with.
- For all work on the system that cannot be carried out from the ground, use stable, safe and self-standing climbing aids.
- Make sure that the system is installed so that it cannot tip over and that the stability of the system is guaranteed at all times.

#### 2.1.2 Hazards relating to pressure

- 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 pipes on the system regularly for leaks.
- 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 supply voltage before working on electrical system components. Discharge the residual voltage.
- Never bypass electrical fuses. Do not put fuses out of operation. Observe the correct current rating when replacing fuses.
- Keep moisture away from live parts. Moisture can cause a short-circuit.

### 2.1.4 Danger due to chemicals

- Chemicals can be harmful to the environment and/or health. They can cause burns to the skin and eyes, as well as irritation of the respiratory tract or allergic reactions.
- Avoid any skin/eye contact with chemicals.
- Use personal protective equipment.
- Read the safety data sheet before handling chemicals and always follow the instructions for different activities/situations.
- Current safety data sheets for chemicals are available for download at <https://www.gruenbeck.de/en/info-centre/safety-data-sheets/>.
- Follow in-house instructions when handling chemicals and make sure that any protective and emergency equipment such as emergency shower, eyewash, etc. are present and functional.

#### **Mixing and residual amounts of chemicals**

- Never mix different chemicals. Unforeseeable chemical reactions with risk of death may occur.
- Dispose of residual amount of chemicals according to local regulations and/or in-house instructions.
- Residual amounts from used containers should not be transferred into containers with fresh chemicals, so as to avoid impairing the effectiveness of the chemicals.

**Labelling/minimum shelf life/storage of chemicals**

- Check the labelling of chemicals – labels must not be removed or rendered illegible.
- Do not use unknown chemicals (no label available or label unrecognisable).
- Observe the use-by date indicated on the label (minimum shelf life) to ensure the functionality of the system and the quality of the permeate produced.
- If stored incorrectly, chemicals might change their state of matter, crystallize, outgas or lose their effectiveness. Store and use the chemicals only at the specified temperatures.

**Cleaning/disposal**

- Absorb spilled chemicals immediately using suitable binding agents.
- Collect and dispose of chemicals in such a way that they do not pose a danger to humans, animals or the environment.

**2.1.5 Group of persons requiring protection**

- This product can be used by persons with limited abilities or lack of experience if they are supervised or instructed in the safe use of the system and understand the resulting hazards.
- Operation, cleaning and maintenance must not be carried out by children.

## 2.3 Product-specific safety instructions



### WARNING

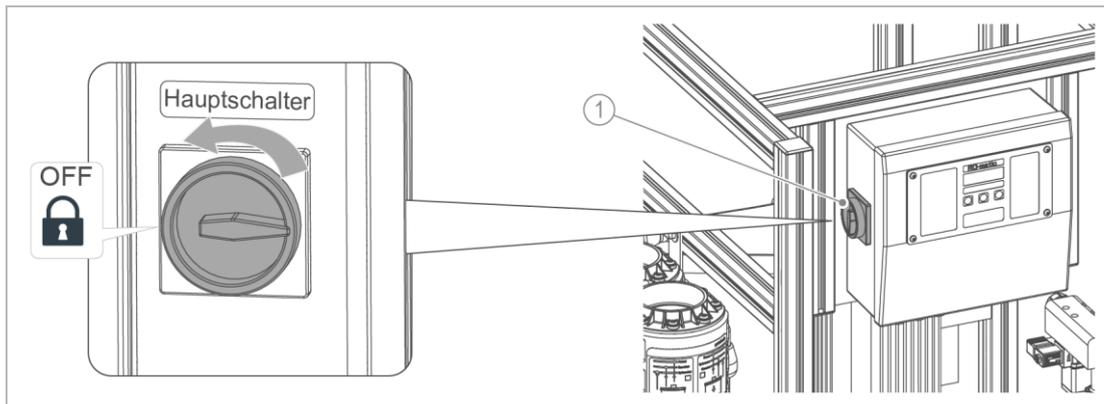
Contamination of drinking water due to improper handling.

- Risk of infectious diseases.
- ▶ Have the installation, commissioning and annual maintenance carried out by a qualified specialist.



The system features a main switch. The system is switched off via the main switch.

- ▶ Completely switch off the system in an emergency situation.



#### Designation

- 1 Lockable main switch

- ▶ In case of maintenance and repair work, de-energise the system by switching off the main switch – secure against unintentional restart.

### 2.3.1 Signals and warning devices

#### Warnings/pictographs



Electric shock hazard (attached to the switch box)

- ▶ Prior to working on electrical system parts, disconnect the system from the power supply.



The attached information/instructions and pictographs must be clearly legible.

They must not be removed, soiled, or painted over.

- ▶ Comply with all warnings and safety instructions.
- ▶ Immediately replace illegible or damaged symbols and pictographs.

## 3 Product description

The reverse osmosis system GENO-OSMO-HLX is mounted on an aluminium system rack.

The ultra-low-pressure reverse osmosis membranes are installed in PE pressure pipes.

Microprocessor controller with LCD panel to signal functions and maintenance interval.

### 3.1 Intended use

- The reverse osmosis system GENO-OSMO-HLX is designed for the demineralisation of water whose composition complies with the quality requirements of the German Drinking Water Ordinance (TrinkwV).
- The reverse osmosis systems GENO-OSMO-HLX are designed exclusively for use in industrial and commercial applications.
- For a defined, temperature-dependent continuous permeate capacity (at 15 °C). The continuous permeate capacity decreases by up to 3% per degree centigrade of the feed water temperature.
- The reverse osmosis systems GENO-OSMO-HLX are adjusted to the water demand to be expected at the installation site. They are not suitable for considerably differing performances.

### 3.1.1 Application limits



We assume that the composition of the feed water (raw water) will not change significantly, that the feed water will always be free of mechanical and organic impurities and that the limit values indicated below will not be exceeded.

**NOTE** no disinfectant

- Organic polymers are used as material for the RO membranes. They are not resistant to disinfectants such as chlorine or chlorine dioxide.
- Disinfectants irreversibly destroy the RO membranes.
- ▶ Chlorine and oxidants must not be detectable in the feed water. The raw water must not contain any oxidants.

Parameters		Value
Total hardness	°dH	< 0.1 (0.18 °f; 0.018 mol/m <sup>3</sup> )
Free chlorine	mg/l	n. d.
Iron	mg/l	< 0.10
Manganese	mg/l	< 0.05
Silicate	mg/l	< 15
Chlorine dioxide	mg/l	n. d.
Turbidity	NTU	< 1
Silt density index (SDI)		< 3
pH range		3 – 9
Total salt concentration as NaCl	mg/l	< 1000
Feed water temperature	°C	10 – 30
Chloride	mg/l	< 200

n. d. = not detectable

- The permeate originating from the reverse osmosis system is not potable but requires additional treatment (blending, hardening) if it is to be used as drinking water.

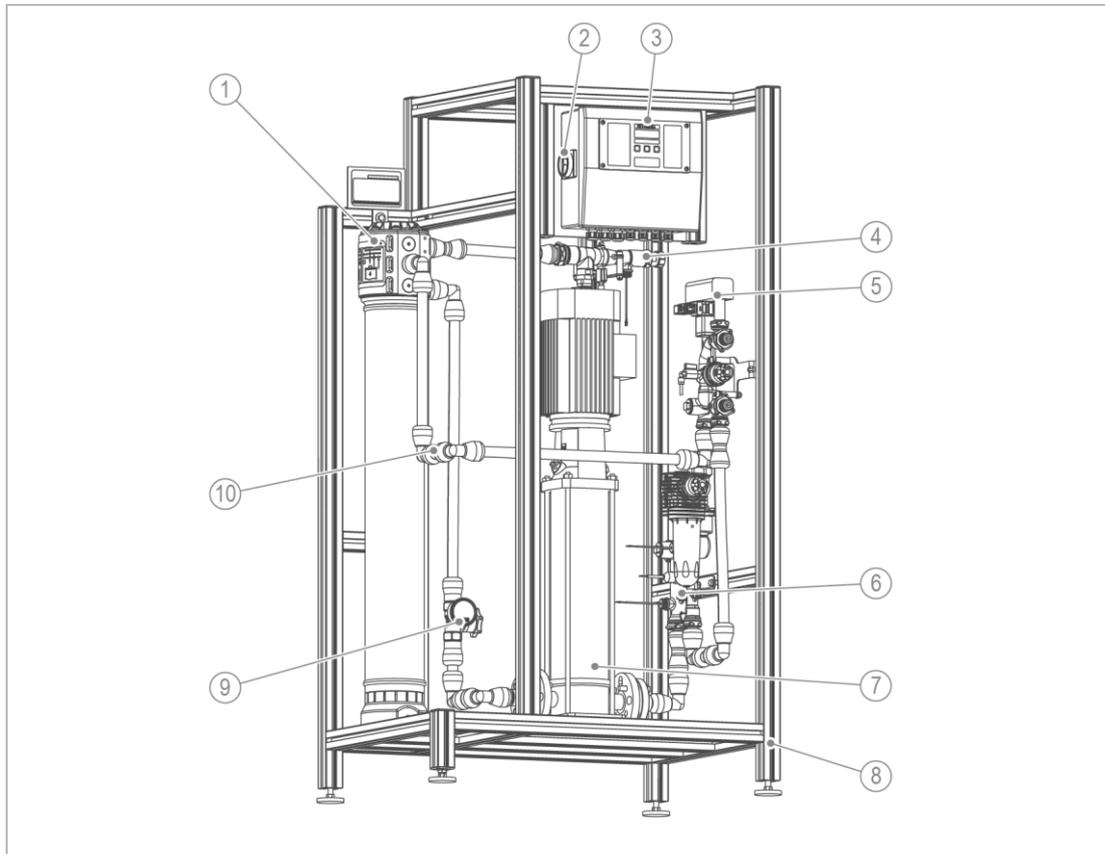
## 3.2 Foreseeable misuse

The reverse osmosis system GENO-OSMO-HLX is not suitable for the following use:

- Demineralisation of salt water (sea water)
- Strongly deviating and/or fluctuating flow rates of the feed water

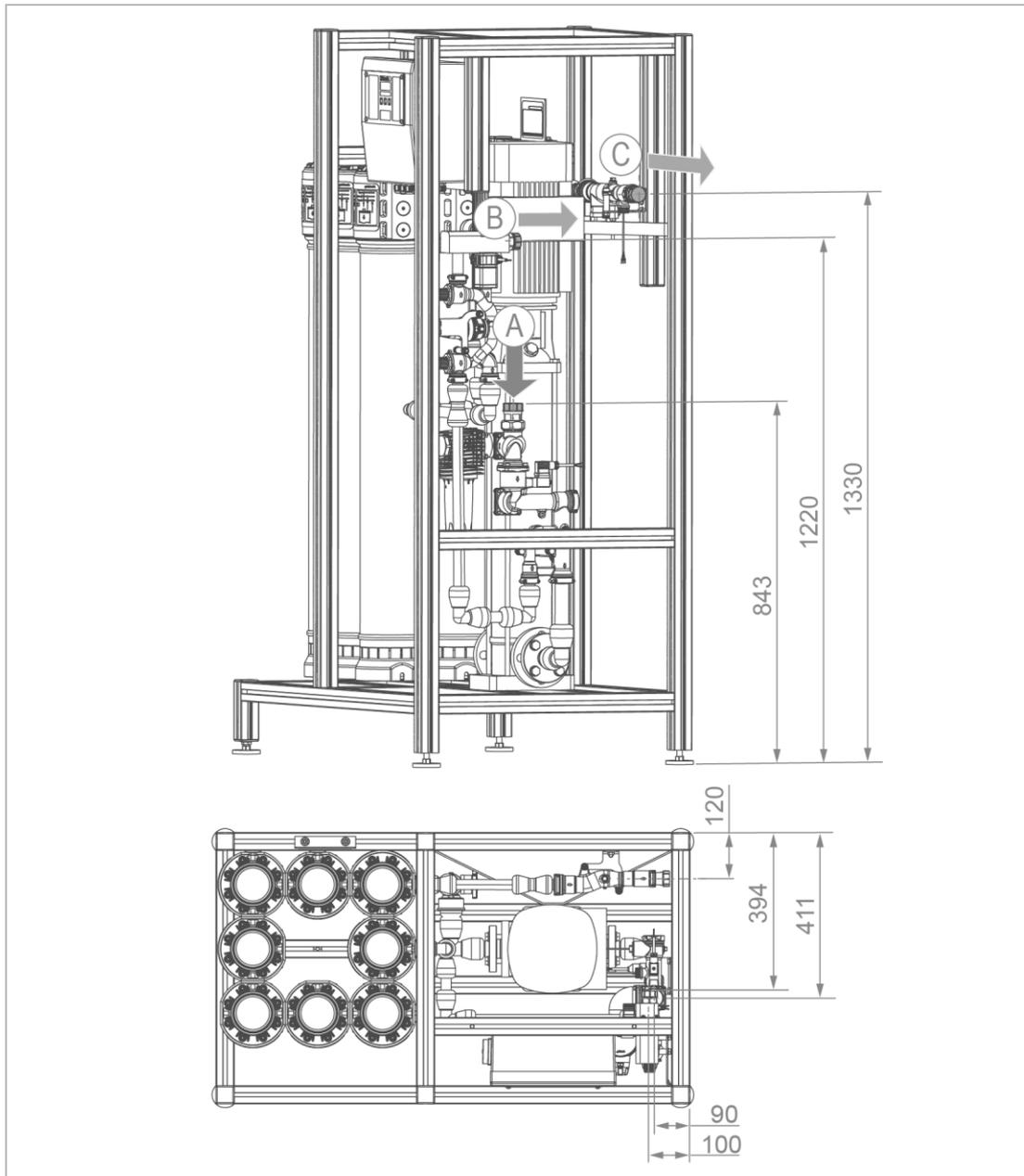
### 3.3 Product components

#### 3.3.1 GENO-OSMO-HLX



	Designation	Function	Coding
1	Membrane	Reverse osmosis membranes in pressure pipes for the generation of the permeate	RO1B1
2	Main switch	To switch the entire system on and off	
3	Control unit	Microprocessor controller with ON/OFF function	RO1E1
4	Hydro block	Permeate	BL3
5	Hydro block	Concentrate (to drain)	BL2
6	Hydro block	Feed water (as treated soft water)	BL1
7	High-pressure pump (HP pump)	Centrifugal pump generates the necessary operating pressure for the membranes. The centrifugal pump operates upon permeate demand from the level control located in the permeate tank.	RO1P1
8	System rack	Made of anodised aluminium with adjustable feet	
9	Operating pressure control valve	for setting the operating pressure for the system-specific permeate output	RO1H6
10	Piping	High-pressure resistant PE pipes and PP compression fittings	

### 3.4 System connections



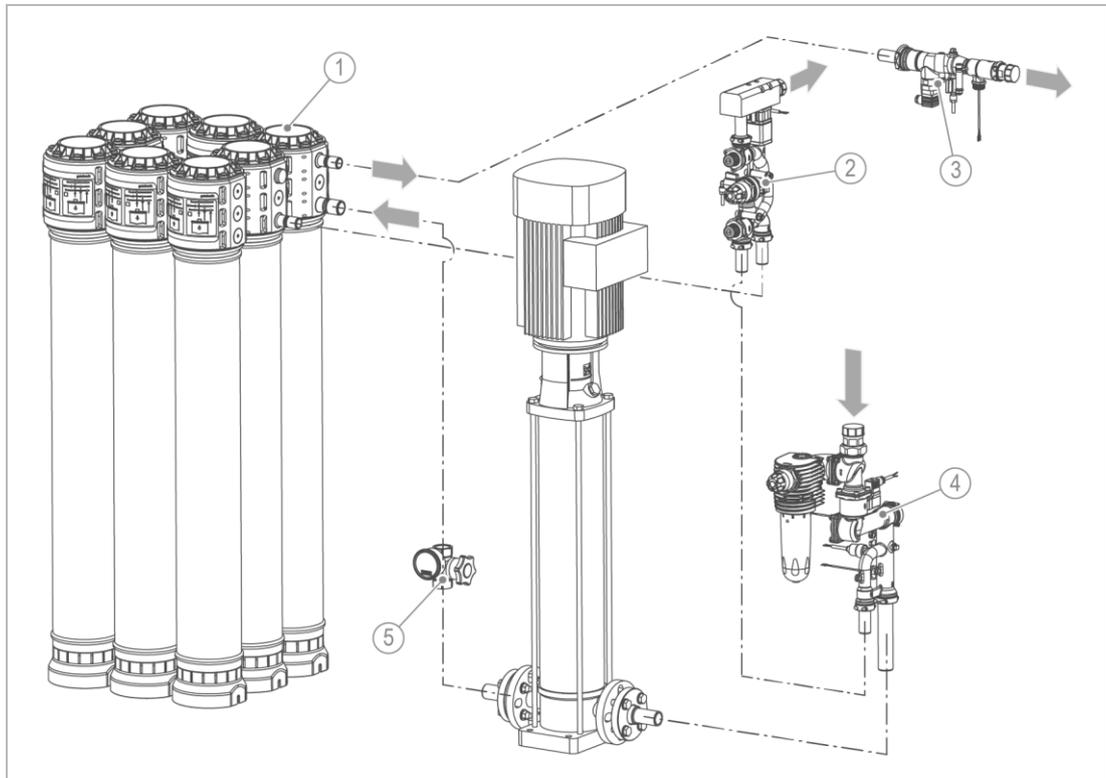
Designation	Function	Coding
A	Inlet connection Feed water inlet	BL1
B	Discharge connection Concentrate to drain	BL2
C	Outlet connection Permeate (towards pure water tank)	BL3



Connections to water meter screw connections 1" or 1¼" (male thread) to be provided by client.

### 3.5 Functional description

The reverse osmosis system consists of the following functional units:



Designation	
1	Pressure pipe with membrane module (quantity depends on the size of the system)
2	Hydro block Concentrate-to-drain
3	Hydro block permeate

Designation	
4	Hydro block feed water
5	Control valve for operating pressure

The GENO-OSMO-HLX system works according to the process of reverse osmosis.

The feed water is directed to the high-pressure pump via an automatic valve and a fine filter with pressure reducer.

A negative pressure switch protects the pump from running dry.

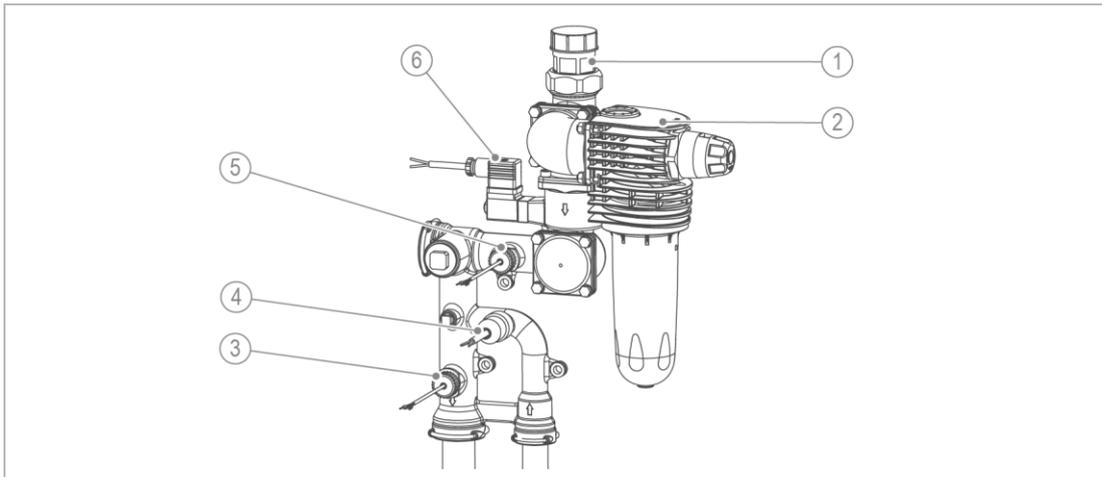
From the high-pressure pump, the feed water is directed to the reverse osmosis membranes and divided into the partial flows permeate and concentrate. A partial flow of the concentrate is measured by a control valve and (automatically) returned to the feed water. The remaining concentrate is directed to the drain via a control valve.

The permeate capacity is subject to the temperature and defined at 15 °C. It decreases by up to 3% per °C of the feed water temperature.

By means of a control valve installed downstream, the operating pressure is set in a way that the system-specific permeate output is reached.

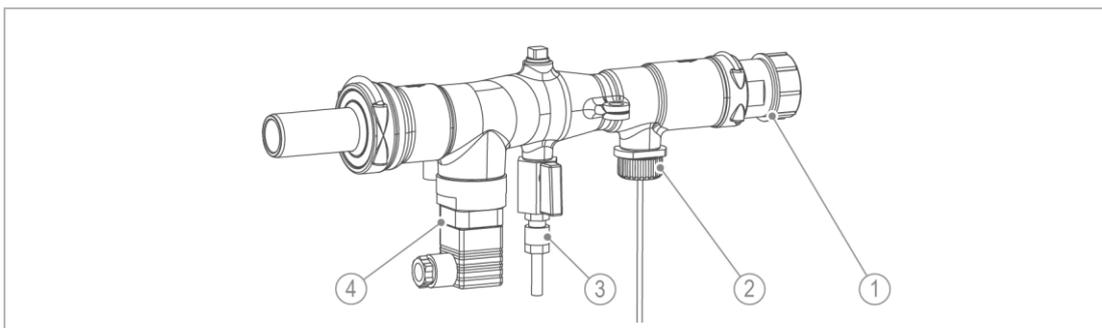
The yield (concentrate-to-drain), as well as the concentrate recirculation are factory set to 75%.

### Hydro block feed water



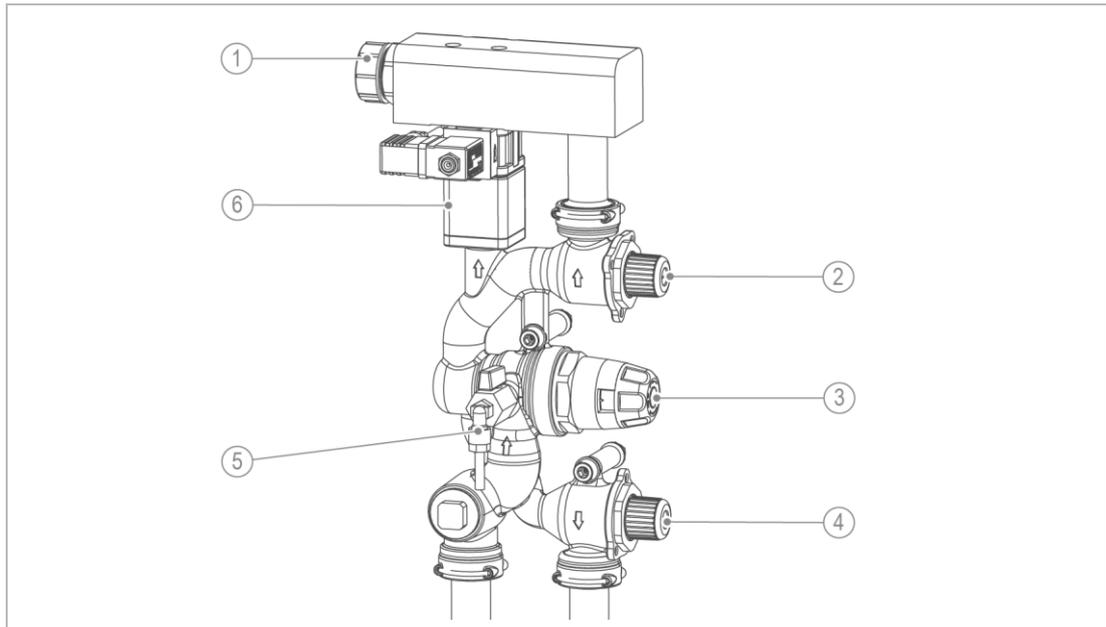
	Designation	Function	Coding
1	Feed water inlet connection	Water meter screw connection 1" or 1¼" (male thread) with flat sealing	BL1
2	Drinking water filter	Prefiltration of the feed water incl. pressure reducer (preset) 4.0 bar and integrated pressure gauge. Osmosis version with black filter cylinder and filter element.	RO1F1
3	Flow sensor feed	Via pulse signal to the control unit. Feed = Concentrate recirculation + Permeate + Concentrate-to-drain	RO1CF2
4	Low pressure switch	To prevent the high-pressure pump from running dry. Switches time-delayed after opening of feed water solenoid valve. Visual display in control unit.	RO1CP1
5	Flow sensor feed water	Via pulse signal to the control unit. Feed water = Permeate + Concentrate-to-drain	RO1CF
6	Solenoid valve feed water	During permeate production, this valve is always open. Following the system stop, the valve remains open for the programmed flushing volume of the membrane(s). Visual indication in the control unit.	RO1V1

### Hydro block permeate



	Designation	Function	Coding
1	Connection Permeate	Water meter screw connection 1" (male thread) with flat sealing	BL3
2	Flow sensor permeate	Water quantity registering permeate via pulse signal to the control unit. Visual display in control unit.	RO1CF3
3	Permeate sample valve	Allows manual quality determination of the permeate.	RO1H5
4	Conductivity measurement	Conductivity sensor according to the 2-electrode principle (temperature-compensated (RO1CT1)) for the continuous measurement of the permeate conductivity. The measuring results are indicated in the control unit.	RO1CQ1

## Hydro block concentrate



	Designation	Function	Coding
1	Connection concentrate to drain	Water meter screw connection 1" (male thread) with flat sealing	BL2
2	Control valve concentrate-to-drain	To adjust the volume flow concentrate-to-drain (recovery). During the production of permeate, this portion of the water permanently flows to the drain. The volume flow is subject to the system size. Valve with torsion locking device by slotted screw.	RO1H3
3	Pressure reducer concentrate	To improve the control accuracy of the adjusting valves (set to 6 bar)	RO1H4
4	Control valve concentrate recirculation	For automatic adjustment of the volume flow concentrate recirculation. The volume flow is subject to the system size. Valve with torsion locking device by slotted screw.	RO1H2
5	Sampling valve concentrate	Allows manual quality determination via sampling valve.	RO1H1
6	Solenoid valve flush concentrate	The solenoid valve opens after the level control signals <b>FULL</b> to the control unit for a set quantity. Also opens if there are system malfunctions, and in combination with the solenoid valve for feed water.	RO1V4

### 3.5.2 Process/function

The pre-treated feed water flows in parallel over the surface of the membrane. The recirculated water within the system is called feed.

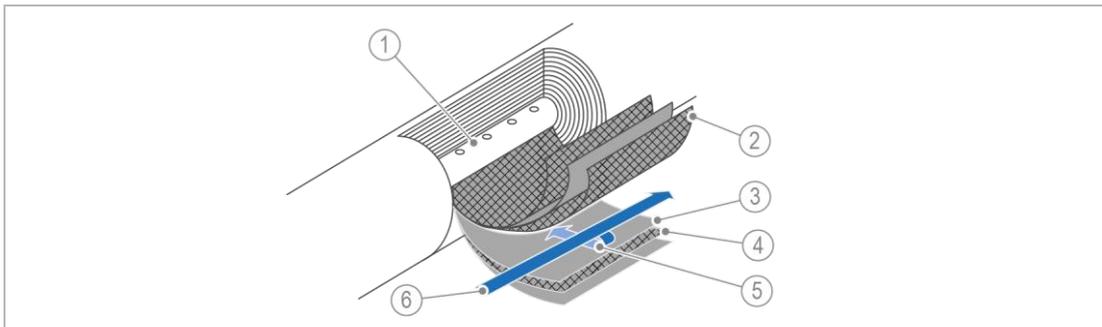
A partial flow of pure water passes through the membrane as permeate (cross flow), while the remaining partial flow – with now increased salt concentration – is led away from the membrane surface as concentrate. As the concentrate passes through the circuit, it is reconcentrated again and again.

An RO membrane is characterised by the fact that it has no pores and is "tight". The water does not flow through the membrane, but diffuses through it.

By way of this process, minerals dissolved in water and bacteria, germs and particles as well as dissolved organic substances can be reduced considerably.

Over time, salts and biofouling are deposited on the membrane surface. As a result, cleaning must be carried out at regular intervals.

#### Structure of RO membrane module



Designation		Designation	
1	Permeate collector pipe	4	Permeate spacer
2	Feed water spacer	5	Permeate
3	RO membrane	6	Feed water

## RO process

Reverse osmosis is the reversing of the natural osmosis process.

A	B	C
Water (diluted solution)	Concentrated solution	Membrane

Osmosis	Explanation
<p>The diagram shows a U-shaped container divided by a semi-permeable membrane (C). On the left side (A), there is a diluted solution with fewer particles. On the right side (B), there is a concentrated solution with more particles. Blue arrows point down into both chambers. White arrows indicate water molecules moving from chamber A through the membrane to chamber B. The water level in chamber B is higher than in chamber A.</p>	<p>Osmosis occurs when two solutions of different concentrations of dissolved minerals are separated from each other by a membrane.</p> <p>Water passes from the diluted solution (A) through the semi-permeable membrane (C) to the concentrated solution (B) until the concentration is balanced on both sides of the membrane.</p>

Osmotic pressure	Explanation
<p>The diagram shows the same U-shaped container as above. A double-headed blue arrow labeled 'D' indicates the height difference between the water levels in chambers A and B. Chamber B has a higher water level. The concentration of particles is higher in chamber B than in chamber A.</p>	<p>This balance is characterised by the static pressure difference between the resulting water columns. The pressure difference is referred to as the osmotic pressure.</p> <p>The higher the concentration of the dissolved minerals in the concentrated solution (B), the higher the osmotic pressure difference (D).</p>

Reversed osmosis	Explanation
<p>The diagram shows the U-shaped container. A red arrow labeled 'E' points down into chamber B, representing an applied pressure. White arrows indicate water molecules moving from chamber B through the membrane to chamber A. The water level in chamber A is higher than in chamber B.</p>	<p>In the case of reverse osmosis, the osmotic pressure is countered by a higher pressure (E).</p> <p>The process takes place in the reverse direction; water passes from the concentrated solution (B) through the membrane to the diluted solution (A).</p> <p>In this way, the water can be demineralised.</p>

### 3.6 Accessories

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

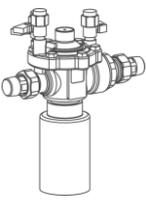
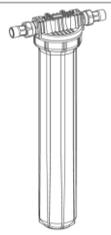
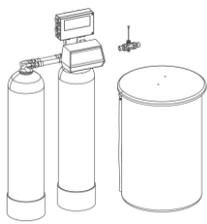
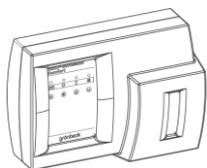
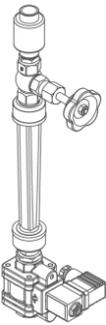
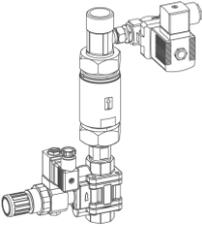
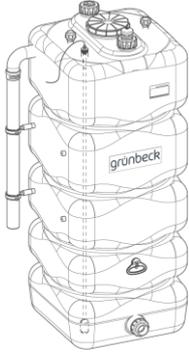
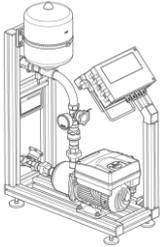
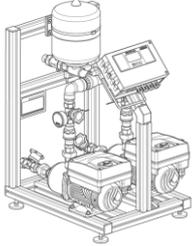
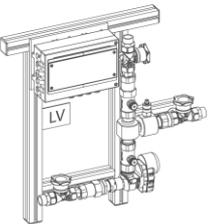
Illustration	Product	Order no.
	<b>Drinking water filter BOXER KX 1"</b>	<b>101 835</b>
	80 µm filter element for prefiltration	
	<b>Drinking water filter BOXER KDX 1"</b>	<b>101 820</b>
	with pressure reducer	
	<b>EURO system separator GENO-DK 2 DN 15 (1/2")</b>	<b>132 510</b>
	<b>Euro system separator GENO-DK 2 DN 20 (3/4")</b>	<b>132 520</b>
To secure systems and devices that might endanger the drinking water as per DIN EN 1717-part 4.		
	<b>GENO-activated carbon filter AKF 600</b>	<b>109 160</b>
	To reduce the chlorine concentration in the water. Only suitable for GENO-OSMO-HLX 400. For larger activated carbon filters, please inquire.	
	<b>Water softener GENO-mat duo WE-X</b>	<b>186 100</b>
	Fully automatic twin water softener working according to the ion exchange principle. Generation of fully softened water with volume-controlled regeneration. For larger systems, please inquire.	
	<b>Water softener Delta-p-I</b>	<b>185 200</b>
	Fully automatic triple water softener working according to the ion exchange principle. Generation of fully/partially softened water with volume-controlled regeneration. For larger systems, please inquire.	
	<b>Hardness control measuring device softwatch</b>	<b>17260000000</b>
	Automatic limit value monitoring of residual/total hardness via limit value indicator.	

Illustration	Product	Order no.
	<p><b>Blending unit for reverse osmosis systems</b></p> <p>The blending unit is designed to set a certain blending water quality (residual conductivity or residual hardness). This is done by blending permeate from a reverse osmosis system with raw or soft water.</p>	<p><b>750 7xx</b></p>
	<p><b>Emergency bypass for reverse osmosis systems</b></p> <p>An emergency bypass of the reverse osmosis system might become necessary if the permeate supply in the pure water tank is not sufficient due to peak withdrawals. By means of a level signal in the pure water tank, the solenoid valve with butterfly valve emergency bypass is opened and the water supply ensured. For hygiene reasons, the pipe is discharged to the drain during idle times.</p>	<p><b>750 79x</b></p>
	<p><b>Pure water tank</b></p> <p>For intermediate storage of permeate flowing unpressurised from reverse osmosis systems.</p> <p>Design of all tanks:</p> <ul style="list-style-type: none"> <li>• Pre-assembled with PVC overflow line</li> <li>• Connections for permeate inlet and suction line of pressure booster system</li> <li>• Black PE</li> <li>• Hand hole with removable screw cap</li> <li>• A maximum of 4 tanks can be combined as a supply battery</li> <li>• with level probe in the tank and GENO-Multi Niveau as digital filling level indicator with pressure transducer to record the tank filling level and 4 programmable switching points</li> </ul>	<p><b>Basic pure water tank GT 1000 with sterile air filter</b> <span style="float: right;"><b>712000020000</b></span></p> <p>Tank height including connecting piece. Useful capacity approx. 840 l (W = 780 x D = 1000 x total H = 2000 mm) For larger tanks, please inquire.</p> <p><b>Additional tank GT 1000 with sterile air filter</b> <span style="float: right;"><b>712000060000</b></span></p> <p>Add-on tank of the same size as basic pure water tank GT 1000 with sterile air filter, ventilation and deaeration with 0.2 µm ultra-fine filter</p>
	<p><b>Basic pure water tank GT 1000 without sterile air filter</b> <span style="float: right;"><b>712000010000</b></span></p> <p>Without sterile overflow designed as siphon. Overflow designed as down-pipe. Tank height including connecting piece. Useful capacity approx. 840 l (W = 780 x D = 1000 x total H = 2000 mm) For larger tanks, please inquire.</p> <p><b>Additional tank GT 1000 without sterile air filter</b> <span style="float: right;"><b>712000050000</b></span></p> <p>Add-on tank of the same size as basic pure water tank GT 1000 without sterile air filter, ventilation and deaeration as connecting piece with cover</p>	

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Illustration	Product	Order no.
	<p><b>Filling level indicator GENO-Multi Niveau</b>                      Digital filling level indicator with pressure transducer to record tank filling levels and 4 programmable switching points.                      The GENO-Multi Niveau determines the filling height (cm), the filling level (%) or the filling volume (m<sup>3</sup>).</p>	
	<p><b>GENO-Multi Niveau with level probe</b>                      Measuring range up to 2.5 m water column</p>	<p><b>712 425</b></p>
	<p><b>GENO-Multi Niveau with level probe</b>                      Measuring range up to 4.0 m water column</p>	<p><b>712 465</b></p>
	<p><b>Pressure booster system GENO FU-X 2/40-1 N</b></p> <p>Compact, pressure-controlled pump unit consisting of:</p> <ul style="list-style-type: none"> <li>• Centrifugal pump made of stainless steel</li> <li>• Integrated pressure and contact water meter</li> <li>• Control electronics with power switching</li> <li>• Backlit display</li> <li>• Operating switch</li> <li>• Operation log by means of SD-card</li> <li>• Voltage-free signal/fault signal contact</li> <li>• Non-return valve</li> <li>• Shut-off valve for each pump (on suction and pressure side)</li> <li>• Membrane pressure expansion vessel with forced flow</li> </ul> <p>Max. delivery rate: 1.2 – 4.2 m<sup>3</sup>/h                      Max. delivery head: 18.2 – 45.6 m                      Power supply: 230 V / 50 Hz                      Power input: 1 kW                      Connections: DN 25 / DN 32                      Protection: IP 55</p>	<p><b>730 640</b></p>
		<p><b>Pressure booster system GENO FU-X 2/40-2 N</b></p> <p>Same as <b>730 640</b>, however, with option for time/load switch-over.                      For additional pressure booster systems, please inquire.</p>
		<p><b>Conductivity-controlled blending unit</b></p>
	<p><b>1"</b></p>	<p><b>185 790</b></p>
	<p><b>2"</b></p>	<p><b>185 795</b></p>
<p>For the generation of a defined residual conductivity in case of fluctuating raw water qualities.</p>		

## 4 Shipping, installation and storage

### 4.1 Dispatch/delivery/packaging

The system is fixed on a pallet at the factory and secured against tipping.

- ▶ Load and unload the system with a forklift or lift truck with suitable pallet forks. Mind the system's top-heavy centre of gravity.

**NOTE** Risk of damage when lifting the system with a crane and lifting strap.



- The system does not feature any lifting points for lifting by means of a crane and lifting strap.
- ▶ The system must not be loaded/unloaded with a crane and lifting strap.
- ▶ Dispose of the packaging material in an environmentally sound and appropriate manner only after installation of the system (refer to chapter 11.2).

### 4.2 Transport/placing



**WARNING** Risk of tipping in case of improper transport.

- The system's centre of gravity is top-heavy. The system may tip and crush persons/limbs.
- ▶ Only transport the system by means of a forklift or lift truck with appropriate forks.
- ▶ Do not transport the system over inclines or stairs.
- ▶ Transport the system to the installation site (longer distances) in its original packaging and secured on a pallet only.
- ▶ Transport the unpacked system (without pallet) in close vicinity of the final installation site only – do not lift it at the system rack.
- ▶ Remove the transport lock; located at the HP pump for GENO-OSMO-HLX 2200 and GENO-OSMO-HLX 3000.

### 4.3 Storage

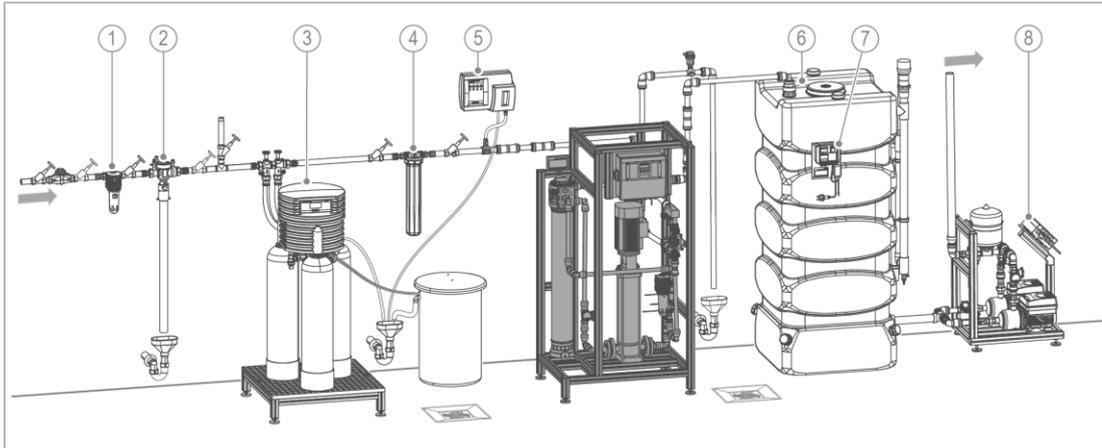
- ▶ Protect the product from the following impacts when storing it:
  - Moisture, wetness
  - Environmental impacts such as wind, rain, snow, etc.
  - Frost, direct sunlight, severe heat exposure
  - Chemicals, dyes, solvents and their vapours

## 5 Installation



The installation of the system represents a major intervention into the drinking water system and only a qualified specialist may install these systems.

### Installation example



#### Designation

- |   |   |
|---|---|
| 1 | Drinking water filter (e.g. BOXER KDX)      |
| 2 | System separator GENO-DK 2                  |
| 3 | Water softener Delta-p-I                    |
| 4 | Activated carbon filter AKF                 |
| 5 | Hardness control measuring device softwatch |

#### Designation

- |   |  |
|---|--|
| 6 | Pure water tank GT with sterile air filter                 |
| 7 | Filling level indicator GENO-Multi Niveau with level probe |
| 8 | Pressure booster system GENO FU-X 2/40-2 N                 |

### 5.1 Requirements with regard to the installation site

Observe local installation directives, general guidelines and technical specifications.

- The installation site must be frost-proof and ensure the system's protection from chemicals, dyes, solvents and their vapours.
- Avoid strong heat radiation and direct sunlight.
- The installation site must be adequately illuminated and ventilated.
- A drain connection (at least DN 50) to discharge the concentrate must be available (refer to chapter 12).
- A floor drain suitable for the system size must be available at the installation site.
- The permeate and concentrate pipes provided by the client on site must be made of corrosion-proof material.

### 5.1.1 Placing of the system/space required

- The sufficiently dimensioned installation surface of the system (foundation) must be level and provide sufficient strength and load-bearing capacity to support the system's operating weight.
- For installation and maintenance work, a sufficient distance of at least 500 mm must be maintained in front/behind and to the right of the system.
- For operation purposes, there must be a distance of at least 800 mm in front of the system.
- The room/installation height should at least be 1800 mm.
- On the left side (membrane pressure pipes), the system may be placed flush to the wall.

### 5.1.2 Products installed upstream

- In general, the following must be installed upstream of the systems:
  - Drinking water filter
  - Pressure reducer, if necessary (in case of a feed water pressure > 5 bar)
  - Euro system separator
  - Activated carbon filter, if necessary (take water analysis into consideration)
  - Water softener
- The feed water inlet pipe and the permeate outlet pipe provided by the client on site must feature a provision to separate the pipes (e.g. a screw connection). This is required to flush out the preserving agent, or to carry out chemical cleaning and/or disinfection, if necessary.
- In case of system configurations with water softeners, we recommend monitoring the residual hardness by installing an automatic water analysis device in the soft water outlet in order to increase operation safety.

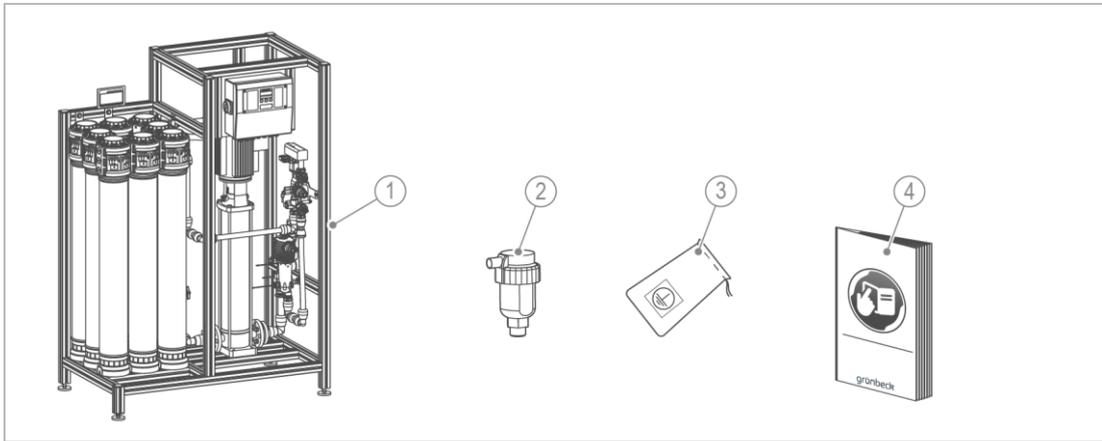
### 5.1.3 Requirements on the electrical wiring

- For the power supply of the system, a power outlet of 3 x 400 V/50 Hz/L/N/PE (with 16 A fuse, from OSMO-HLX 1600 onwards a 20 A fuse) is required (refer to chapter 5.4).
- The supply line to the system provided by client on site must be dimensioned and routed according to the respective type of system (refer to the electric circuit diagram, order no. 750 211).

## 5.2 Checking the scope of supply



The reverse osmosis systems are pre-assembled on an aluminium rack and ready for connection.



Designation		Designation	
1	GENO-OSMO-HLX	3	Bag with connection material for "Potential equalisation of aluminium rack"
2	3-way aeration and ventilation valve (DT-040 1/2")	4	Operation manual

► Check the scope of supply for completeness and damage.

## 5.3 Water installation

Only the GENO-OSMO-HLX without any additional equipment is described here as representative for all system versions. The illustrations are only exemplary representations.

► Carry out all work for all versions in an analogous way.



Comply with the safety instructions regarding local transport (refer to chapter 4.2).

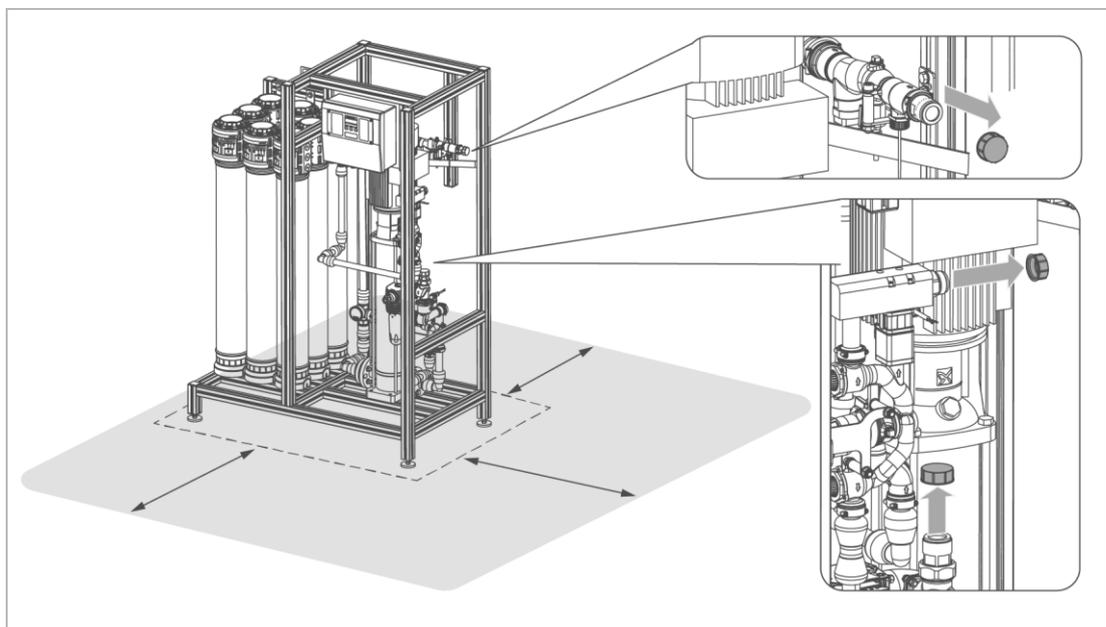
### 5.3.1 Preliminary work

**NOTE**

High difference in temperature at the installation site during the installation of the system.

- Possible malfunction of the control unit during initial start-up due to moisture formation on electronic components inside the control unit.
- ▶ Unpack the system and let it rest unused at the installation for 1 hour prior to installing it.
- » Possible moisture formation on electronic components inside the control unit will be able to dry off.

1. Release the system rack from the transport lock.
2. Remove the pallet.



3. Securely place the system at the predetermined location – take the minimum space required into consideration (refer to chapter 5.1.1).
4. Remove the protective caps from the connections.

### 5.3.2 Connecting the system

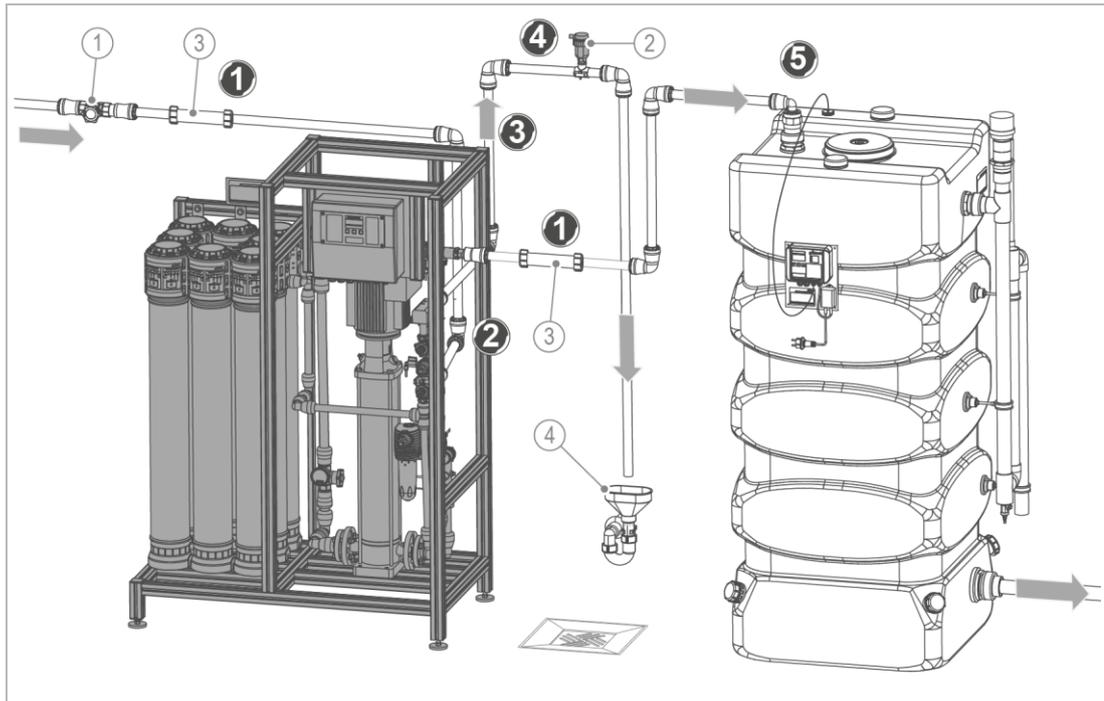


Pipes made of corrosion-resistant material provided by the client on site for feed water and permeate must be separable, e.g. by means of a screw connection (flushing section).

The flushing section – which can be removed, if necessary – is a pipe section with detachable connecting elements at both pipe ends.

In case of chemical cleaning (CIP) and disinfection operations, the system must be separated from the feed water and permeate pipe.

When flushing out the preserving agent, only the permeate pipe needs to be separated.



Designation	Designation
1 Shut-off valve (to be provided by client on site)	3 Fitting piece with screw connections (to be provided by client on site)
2 Aeration/ventilation valve	4 Drain connection acc. to DIN EN 1717

1. Install a fitting piece with screwconnections each in the inlet pipe "feed water" and the outlet pipe "permeate".
2. Connect the inlet pipe to the "feed water" connection.
3. Connect the discharge pipe to the "concentrate-to-drain" connection according to DIN EN 1717 (with free outlet).
4. Install an aeration/ventilation valve above system level at the outlet pipe "concentrate".
5. Connect the permeate pipe to the permeate supply tank.

## 5.4 Electrical installation



The electrical wiring is only allowed to be carried out by a qualified electrical specialist.



**DANGER** Life-threatening voltage of 400 V

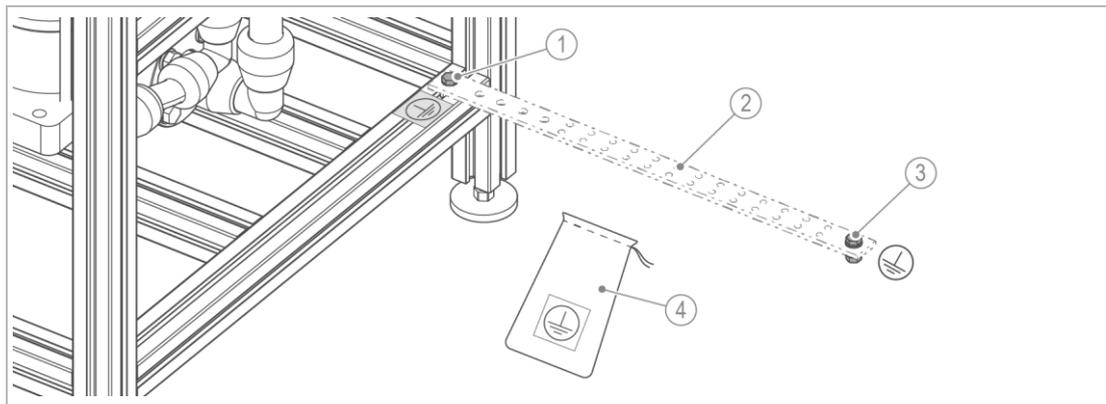
- Risk of severe burns, cardiovascular failure, fatal electric shock.
- ▶ Check the system for proper condition before start-up.
- ▶ Switch off the supply voltage before working on electrical system components.
- ▶ Secure the system against being switched back on.
- ▶ Discharge residual voltage.
- ▶ Only use suitable, undamaged tools.
- ▶ Use personal protective equipment – do not work with wet hands.

### 5.4.1 Establishing potential equalisation



Connection to the on-site potential equalisation is required.

The protective conductor must have a minimum cross-section of 6 mm<sup>2</sup> or 10 mm<sup>2</sup> Al.



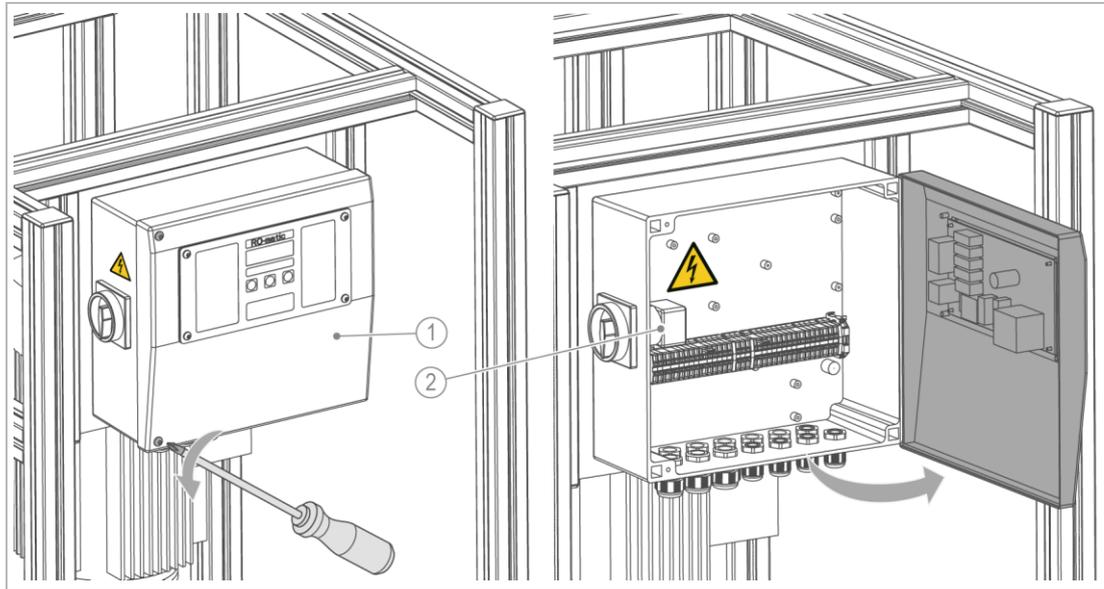
Designation	Designation
1 Grounding point	3 Grounding point for potential equalisation
2 Grounding tape	4 Bag with connection material

1. Connect the grounding point to the aluminium rack – use the connection material: Hammer nut, hexagon head screw M8x25 and serrated washer.
2. Attach the "Grounding" label.
3. Connect the protective conductor to the on-site potential equalisation – use the connection material: Hexagon head screw M8x20, washer and spring washer.

## 5.4.2 Establishing electrical connection



The on-site supply line to the system must be dimensioned according to the system size (see technical data and electrical wiring diagram).



### Designation

1 Switch box

### Designation

2 Electrical connection

1. Loosen the 2 screws and open the switch box.
2. Establish the electrical connection (refer to electrical wiring diagram, order no. 750 211), for instance.

## 5.4.3 Power connections (within the control unit GENO-OSMO-HLX)



### WARNING

External voltage possible at voltage-free contacts and on the board.

- Risk of electric shock when connected to 230 V.
- ▶ Do not open any switch boxes of other parts of the electrical equipment if you are not a qualified electrician.
- ▶ Switch the system's main switch to OFF before working on electrical system parts.
- ▶ Wait for approx. 15 minutes for the residual voltage to be discharged.
- ▶ Establish the following connections within the control unit:
  - to the GENO-Multi Niveau
  - to the pressure booster system
  - to the blending (optional)

# 6 Start-up



The initial start-up of the product is only allowed to be carried out by the customer service.



## CAUTION

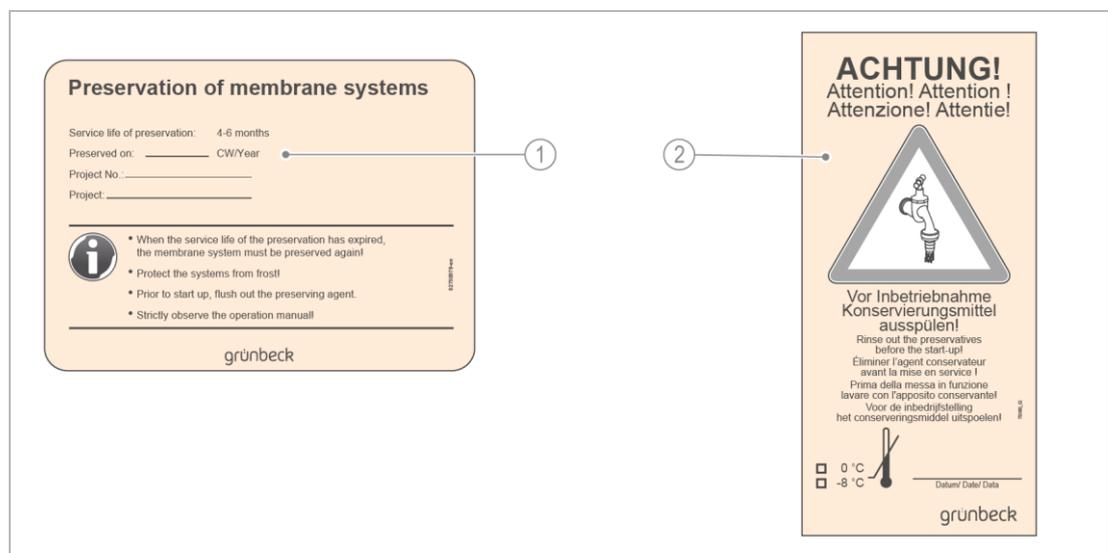
Climbing onto system components when operating components located at high levels.

- Risk of falling when climbing onto system components.
- Risk of tripping in case of loose cables/pipes lying around.
- ▶ Do not climb onto system components such as
- ▶ pipes, racks, etc.
- ▶ Use stable, safe and self-standing climbing aids such as step ladders, pedestals, etc. when operating components located at high levels.

## 6.1 Flushing out the preserving agent

Systems that are preserved in the factory are marked.

For the duration of storage and transport, the membrane(s) is (are) protected by means of a preserving agent (sodium metabisulphite).



### Designation

- 1 Information sheet with details on the preservation performed

### Designation

- 2 Warnings at the system

- ▶ Observe and comply with the warnings.



**WARNING** Contact with preserving agent

- Danger of eye/skin burns.
- ▶ Use personal protective equipment (PPE).
- ▶ Completely route the concentrate line to the drain so that no preserving agent can escape.
- ▶ Observe the safety data sheet of the chemical.

**NOTE** Danger if the flushing process is skipped

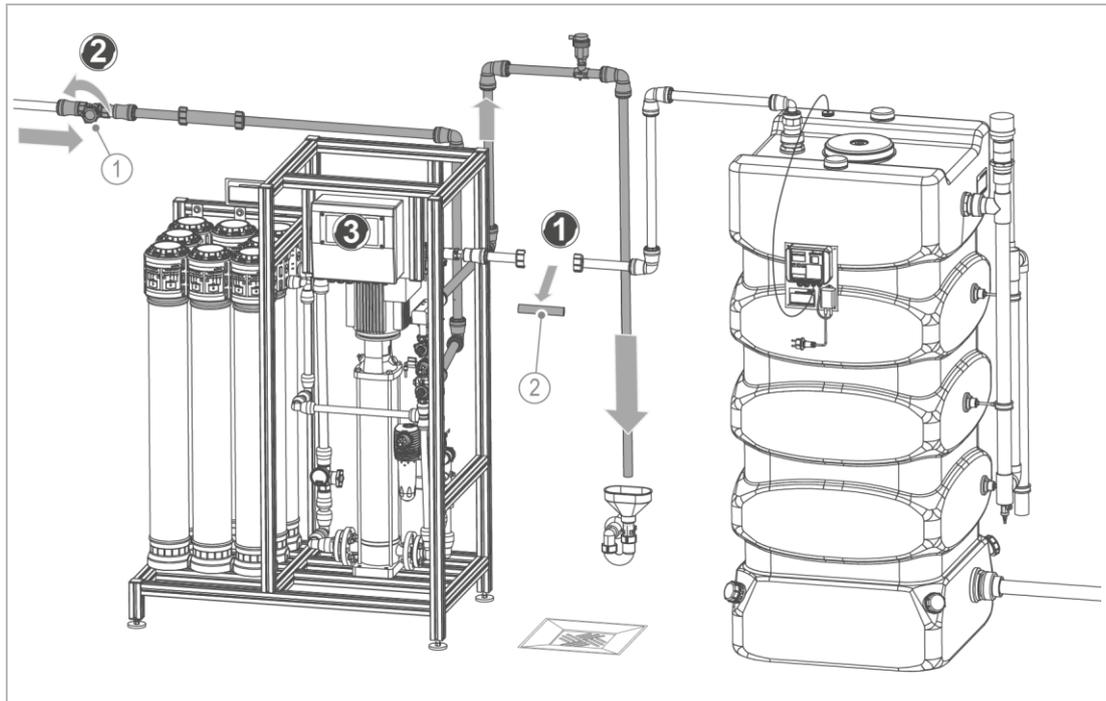
- By flushing out the preserving agent, the system is simultaneously vented.
- If the flushing process is terminated, the high-pressure pump runs dry.
- The preserving agent gets into the permeate tank or the on-site permeate pipe – these can only be cleaned/flushed with difficulty.
- ▶ Always flush out the preserving agent.

**NOTE** Damage to the system when operated with hard water.

- Operating the system with hard water results in damage at the membranes.
- The preserving agent must be flushed out with softened (0° dH) or hardness-stabilised water.
- ▶ Put the water softener into operation prior to flushing out the preserving agent.



The control unit is electronically interlocked to prevent the system from being switched on before the preserving agent has been flushed out.



Designation	Designation
1 Shut-off valve feed water inlet	2 Fitting piece for permeate pipe

1. Remove the fitting piece from the permeate pipe.
  - » The permeate pipe is separated hydraulically.
2. Open the shut-off valve of the "feed water" inlet.



The control electronics must still remain switched off (refer to chapter 7.1).

3. Release the control electronics as follows:
  - a In the programming level (code 113), set the parameter ECL to 0 (refer to chapter 7.2.2).
4. Open both solenoid valves as follows:
  - a In the programming level (code 113), set the parameter EnL to 1.
    - » The system runs the flushing program and is vented.
    - » The system automatically stops flushing when three times the flushing volume has been flushed to the drain (duration subject to system size and programmed flushing volume).
5. In the programming level (code 113), set the parameter EnL to 0.
  - » The flushing program is finished.
6. Fit the fitting piece into the permeate pipe.

## 6.2 Setting system recovery

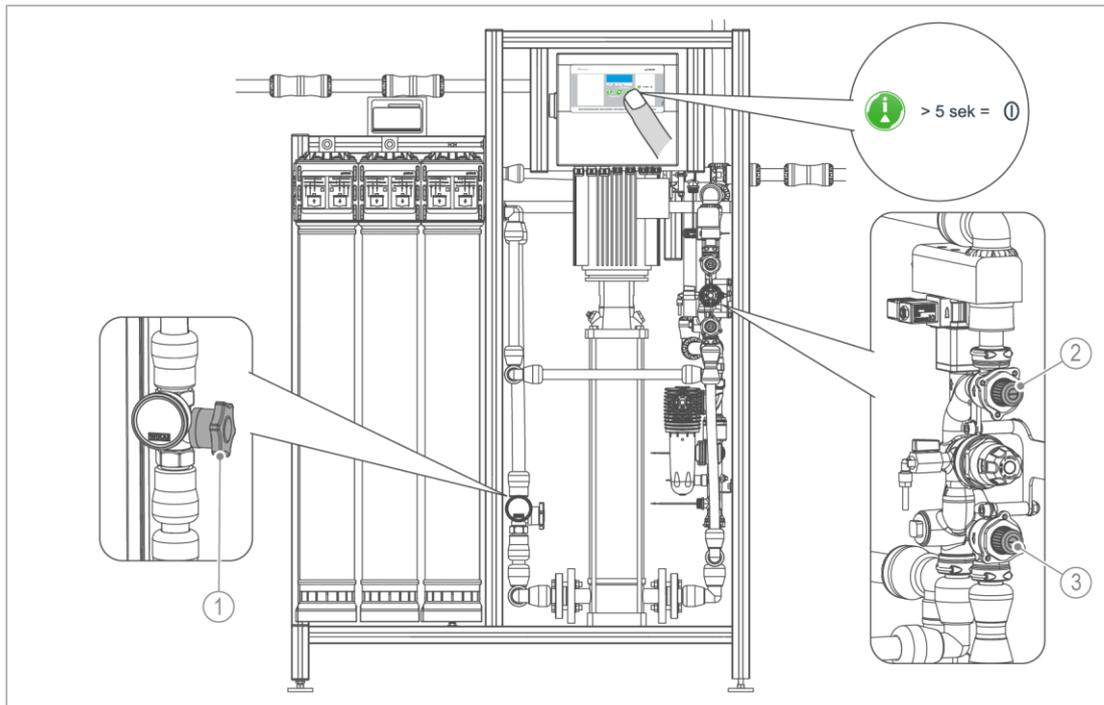


The factory setting is a system recovery of 75%.

Changes in system recovery and concentrate recirculation rates can lead to membrane damage.



Read the operating values in the info level of the control electronics (refer to chapter 7.1.5).



### Designation

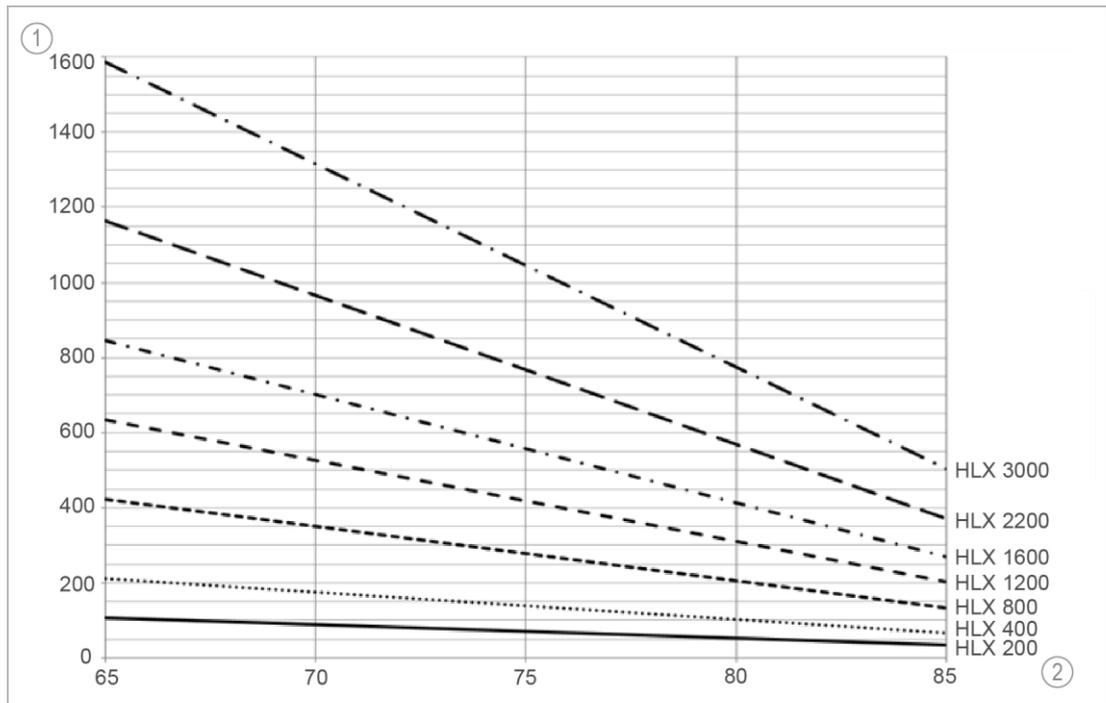
- 1 Operating pressure control valve
- 2 Control valve concentrate-to-drain

### Designation

- 3 Control valve concentrate recirculation

1. Switch on the control electronics.  
Press the key  for > 5 s (refer to chapter 7.1).
2. Set the HP pump at the operating pressure control valve so that a specific permeate flow rate is achieved (according to the system size).
3. Read the actual value for permeate flow in the info level (display **P**).

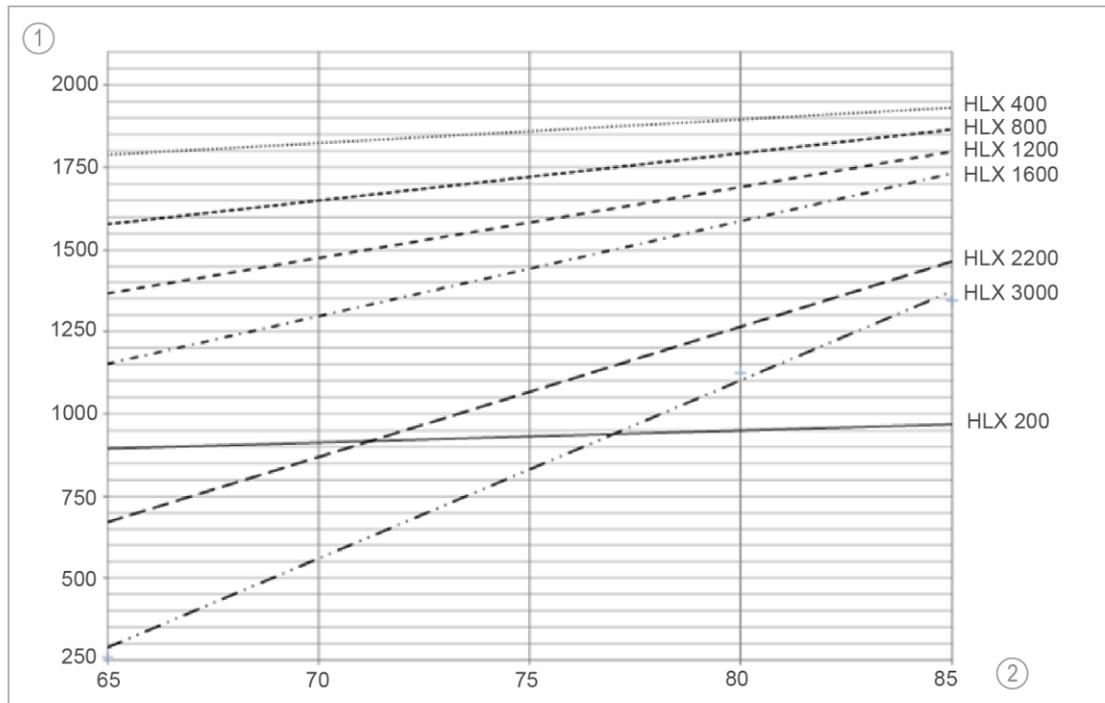
### Setting concentrate flow rate



Designation	Designation
1 Flow rate concentrate-to-drain in l/h	2 Recovery in %

1. Set the flow rate at the concentrate-to-drain control valve.  
Example: OSMO-HLX 800 (75% recovery) = 270 l/h
2. Read the actual value for concentrate-to-drain flow rate in the info level (display **c**).

### Setting concentrate recirculation flow rate



Designation	Designation
1 Flow rate concentrate recirculation in l/h	2 Recovery in %

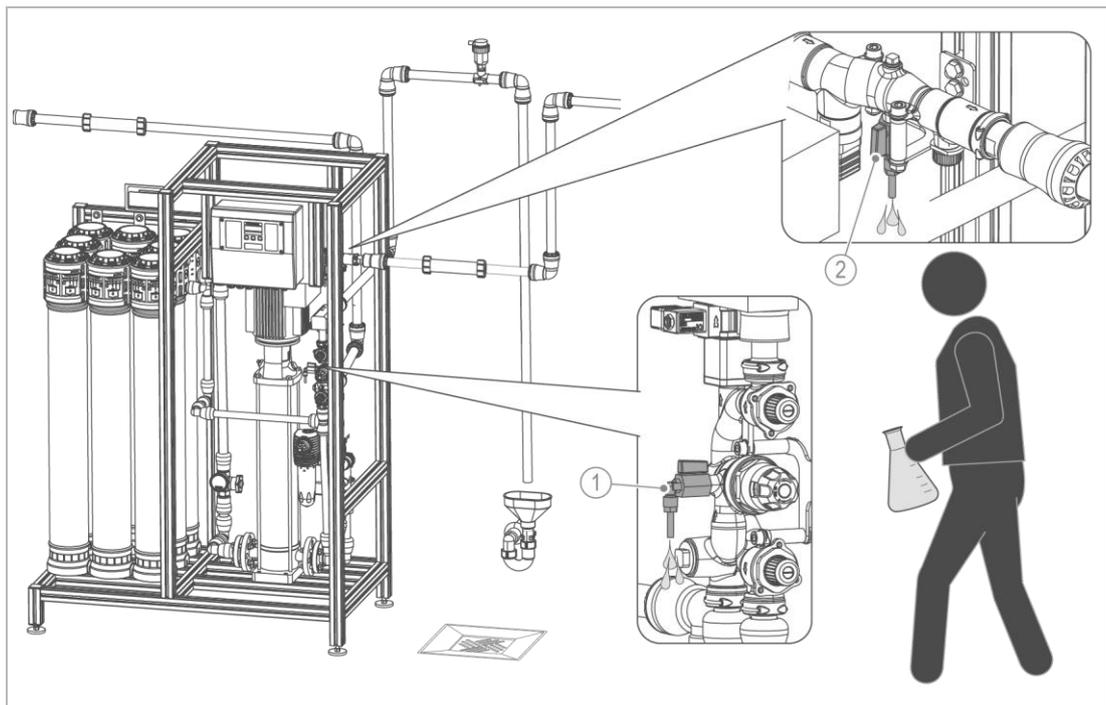
1. Set the flow rate at the concentrate recirculation control valve.  
Example: OSMO-HLX 800 (75% recovery) = 1600 l/h
2. Read the actual value for concentrate recirculation flow rate in the info level (display **r**).

## 6.3 Checking the system



**CAUTION** Risk of slipping at the sampling points.

- You may slip/fall and injure yourself.
  - ▶ Use personal protective equipment – wear sturdy shoes.
  - ▶ Immediately mop up escaped liquid.
1. Let the system run in for at least 20 minutes.
  2. Check the system for leaks.



**Designation**

1 Concentrate-to-drain sampling valve

**Designation**

2 Permeate sampling valve

1. Allow the system to produce permeate for 30 minutes.
2. Carry out the total hardness test.
3. Take water samples (> 1 litre) of the permeate.
  - a Program the conductivity reference value in the programming level (code 302, display 5.).
4. Determine the quality of the permeate and the concentrate.

## 6.4 Setting the control unit

1. Check the settings in the control unit (refer to chapter 7.1.5).
2. Adjust the set point if necessary (refer to chapter 7.2).
3. Carry out a test run, if necessary.
4. Document the operating data in the start-up log (refer to chapter 13.1).

## 6.5 Handing over the product to the owner/operator

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

### 6.5.1 Disposal of packaging

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

### 6.5.2 Storage of accessories

- ▶ Keep the supplied accessories on the system in a safe place.

## 7 Operation/handling

The control unit GENO-matic controls operation of the system GENO-OSMO-HLX.

### 7.1 Operation of the control unit

The system is operated via the control panel of the control unit RO-matic.

If no key is pressed for a period of 3 minutes, the basic display appears automatically (refer to chapter 7.1.1).

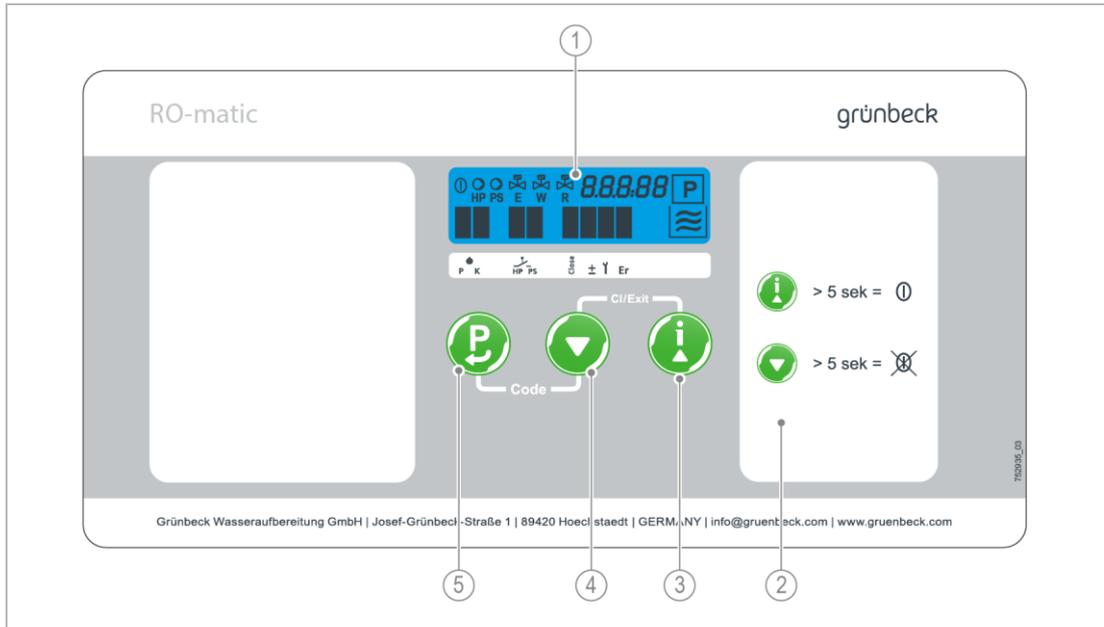
**NOTE** Making incorrect setting at the control unit.

- Incorrect operation or incorrect parameter values can lead to dangerous operating conditions and functional impairment or failure of the system.
- ▶ Only have the settings described in this chapter carried out by a qualified specialist.



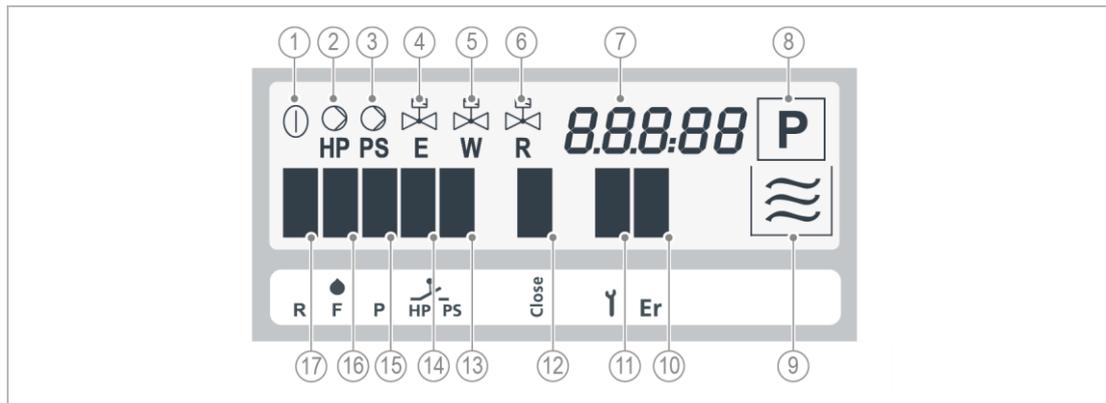
Settings in the programming level are only allowed to be performed by Grünbeck's technical service or by a qualified specialist trained by Grünbeck.

## 7.1.1 Operating panel



Designation		Meaning/function
1	Display indication	Refer to chapter 7.1.2
2	Brief description of key functions	Switch control unit on and off <ul style="list-style-type: none"> <li>In the basic display:                             <ul style="list-style-type: none"> <li>How to switch on the system</li> </ul> </li> <li>In the Info level:                             <ul style="list-style-type: none"> <li>Display the parameters</li> </ul> </li> <li>In the programming level:                             <ul style="list-style-type: none"> <li>Switch to the next parameter</li> <li>Increase the numerical value of a parameter (display value flashes)</li> </ul> </li> </ul>
3	Operating button	 <ul style="list-style-type: none"> <li>In the basic display:                             <ul style="list-style-type: none"> <li>Switch off system</li> </ul> </li> <li>In the programming level:                             <ul style="list-style-type: none"> <li>Return to the previous parameter</li> <li>Reduce the numerical value of a parameter (display value flashes)</li> </ul> </li> </ul>
4	Operating button	 <ul style="list-style-type: none"> <li>In the basic display:                             <ul style="list-style-type: none"> <li>Open time programming</li> <li>Acknowledgement of malfunctions</li> </ul> </li> <li>In the programming level:                             <ul style="list-style-type: none"> <li>Open parameter for editing (display value flashes)</li> <li>Save parameter (display value stops flashing)</li> </ul> </li> </ul>
5	Operating button	 <ul style="list-style-type: none"> <li>In the basic display:                             <ul style="list-style-type: none"> <li>Switch off system</li> </ul> </li> <li>In the programming level:                             <ul style="list-style-type: none"> <li>Return to the previous parameter</li> <li>Reduce the numerical value of a parameter (display value flashes)</li> </ul> </li> </ul>
Key combination	 + 	<ul style="list-style-type: none"> <li>Access to programming level (code request 0 00)</li> </ul>
Key combination	 + 	<ul style="list-style-type: none"> <li>In the programming level:                             <ul style="list-style-type: none"> <li>Close the opened parameter without saving (display value is maintained)</li> <li>Return to the basic display (time is displayed)</li> </ul> </li> </ul>

## 7.1.2 Symbols displayed



Designation	Meaning/function
1	Operating display <ul style="list-style-type: none"> <li>System is switched on</li> </ul>
2	High-pressure pump <ul style="list-style-type: none"> <li>Appears when high-pressure pump is producing permeate</li> <li>flashes on fault <b>Er 1</b></li> </ul>
3	Pressure booster pump <ul style="list-style-type: none"> <li>appears when pressure booster pump is pumping permeate</li> <li>appears with release signal K2</li> </ul>
4	Solenoid valve input <ul style="list-style-type: none"> <li>appears when permeate is being produced</li> <li>appears when the system is flushing</li> </ul>
5	Flush solenoid valve <ul style="list-style-type: none"> <li>appears when the system is flushing</li> </ul>
6	Solenoid valve blending
7	<ul style="list-style-type: none"> <li>In the basic display: <ul style="list-style-type: none"> <li>Time</li> <li>Fault signals</li> </ul> </li> <li>Displays in the Info level: <ul style="list-style-type: none"> <li>Operating data</li> </ul> </li> <li>In the programming level: <ul style="list-style-type: none"> <li>Parameters</li> </ul> </li> </ul>
	Point appears: <ul style="list-style-type: none"> <li>as long as the pressure booster pump is blocked</li> <li>with system ON</li> <li>when exceeding the lower wave in the permeate tank</li> <li>After acknowledging the malfunction</li> </ul>
8 Excess pressure switch	flashes <ul style="list-style-type: none"> <li>in case of a lack of feed water pressure (if the vacuum switch of the high pressure pump drops out during permeate production)</li> <li>if the HD pump motor protection has tripped</li> </ul>
9 Filling level display permeate tank	Number of waves displayed indicates the filling level of the tank: <ul style="list-style-type: none"> <li>Upper wave: Cut-off level for high-pressure pump</li> <li>Middle wave: Cut-in level for high-pressure pump</li> <li>Lower wave: Dry-running protection for pressure booster pump</li> </ul>
10 <b>Er</b> Fault signal	Display <b>Er</b> <ul style="list-style-type: none"> <li>appears in case of faults Er 0, Er 1, Er 2, Er 3, Er 5 and Er 9</li> </ul>
11 Signal contact	appears in case of: <ul style="list-style-type: none"> <li>Expired maintenance interval (advance warning for requesting service)</li> <li>Low pressure switch of high-pressure pump dropped out</li> <li>Conductivity advance warning</li> <li>Permeate tank empty</li> </ul>

Designation	Meaning/function
12 Close	Close input · appears if the release signal is present at the close input, (system locked)
13  PS	Operational readiness for pressure booster pump · appears in case of operational release
14  HP	Operational readiness for high-pressure pump · appears if the feed water minimum pressure is present
15  P	Water meter pulses · flashes with every 5th pulse of the permeate water meter
16  F	Water meter pulses · flashes with every 5th pulse of the feed water meter
17  R	Water meter pulses · flashes with every 5th pulse of the water meter for feed water

### 7.1.3 Operating concept

The control system of the GENO-OSMO-HLX system consists of the following levels:

- **Basic display**
- **Info level**
- **Programming level**

#### Basic display

- The time is displayed.
  - a Set the time (refer to chapter 7.1.4).

#### Info level

- Various operating data such as flow rates, system recovery and maintenance intervals are displayed.
  - a Read off the operating data (refer to chapter 7.1.5).

#### Programming level

- The following parameter values can be read or set (refer to chapter 7.2).
  - Software version (Code 999)
  - Input logic (Code 113)
  - System parameters (Code 290)
  - Reference values/times (Code 302)
  - Error memory/water volumes (Code 245)
  - Diagnosis (Code 653)

### 7.1.4 Set time

Precondition: The time in the **basic display** is shown.

Display	Unit	Parameter/meaning
00:00	hh:mm	Time

1. Press the key  for > 2.5 s.
  - » The hour value **00:** starts to flash.
2. Change the value with  and .
3. Save the value with .
  - » The hour value stops flashing.
4. The minute value **:00** starts to flash.
5. Set the minutes.
6. Change back to the basic display.
  - a Press  and  at the same time.

### 7.1.5 Read off operating data

The info level is locked as long as the system is not yet released via the **Close** input signal.

- ▶ Press the key  for > 5 s.
- ▶ Switch between the parameters by tapping the  key.

Display	Unit	Parameter/meaning
365	d	Remaining duration of the maintenance interval (days)
0000		Reserved display
LF022	µS/cm	Permeate conductivity (optional: display value flashes when the advance warning value is exceeded)
P0200	l/h	Permeate flow
c0200	l/h	Concentrate-to-drain flow rate
r0320	l/h	Concentrate recirculation flow rate
F1200	l/h	Feed flow rate
A 050	%	System recovery

## 7.2 Programming levels



In the following tables, the factory settings are greyed out.

- ▶ Press the and keys for > 1 s.
  - » The display changes to code request **C 000**.
- 1. Set the necessary code with or .
- 2. Confirm with .
- 3. Select the required parameter.
- 4. Enter the desired value.
- 5. Save the value with .
- 6. Or close the setting without saving by simultaneously pressing and .
- 7. Change back to the basic display.
  - a Press and at the same time.



The control system automatically switches to the basic display if no key is pressed within a parameter level for longer than 5 minutes. Opened parameters (flashing value) are closed and the previously stored value is maintained.

### 7.2.1 Software version (Code 999)

Display	Parameters
P4.00	Software version of the RO-matic control unit

## 7.2.2 Input logic (Code 113)

Display	Parameters	Setting range	Remark
E-A:1	Contact type level "a"	0 ... 1	0 = Normally open contact 1 = Normally closed contact
E-b:0	Contact type level "b"	0 ... 1	0 = Normally open contact 1 = Normally closed contact
E-c:0	Contact type level "c"	0 ... 1	0 = Normally open contact 1 = Normally closed contact
EHP:2	Contact type low pressure switch HP (high-pressure pump)	0 ... 1 ... 2 ... 3	0 = Normally open contact 1 = Normally closed contact 2 = Normally open contact with automatic restart <sup>1)</sup> 3 = Normally closed contact with automatic restart <sup>1)</sup>
EPS:0	Contact type pressure switch PS (pressure booster pump)	0 ... 1	0 = Normally open contact 1 = Normally closed contact
ECL:0	Contact type close input	0 ... 1	0 = Normally open contact 1 = Normally closed contact
EnL:0	Flush system (inlet and flushing solenoid valves)	0 ... 1	1 = Open solenoid valves (only possible if the system is switched off) 0 = Close solenoid valves
A.PF:0	Function signal contact	0 ... 1	0 = Signal contact opens · dropped out with low pressure switch · Conductivity advance warning · Level below level "c" · Servicing due 1 = Contact closed · if high-pressure pump running

<sup>1)</sup> If fault Er 1 occurs when permeate production is in progress (low pressure switch high-pressure pump), the system causes a new start in at the following time intervals:  
5... 10... 20... 40... 80... 160 minutes

If there is sufficient pressure available, permeate is produced until level "a" is reached, and the fault is self-acknowledging.

The **P** symbol flashes on the display in the waiting time between the start attempts.

## 7.2.4 System parameters (Code 290)

Display	Parameters	Setting range	Remark
1.0.1	Cell constant conductivity measurement	0.0 ... 0.1 ... 1.0	0.0 = Conductivity measurement deactivated <ul style="list-style-type: none"> <li>· i.e. parameters 2 – 4 ineffective</li> </ul> 0.1 = measuring range 0 ... 99 µS/cm 1.0 = measuring range 0 ... 999 µS/cm
2.080	Conductivity limit value for fault Er 3 in µS/cm	1 ... 99	<ul style="list-style-type: none"> <li>· Set point must be selected appropriate for the cell constant (i.e. measuring range parameter 1).</li> </ul>
3.070	Conductivity advance warning in µS/cm	1 ... 99	Display in the information level starts to flash and signal contact switches <ul style="list-style-type: none"> <li>· Set point must be selected appropriate for the cell constant (i.e. measuring range parameter 1).</li> </ul>
4.05	Switch-off delay with Er 3 in minutes	0 ... 99	Also delay time for outputting the signal message when the conductivity advance warning is exceeded
5.2	Mains return reaction for fault Er 0 (mains failure > 5 minutes)	0 ... 2	0 = Irrespective of whether the system was switched off or on before the mains failure, the system remains switched off after the mains returns and fault Er 0 is output 1 = Fault Er 0 is deactivated 2 = After the mains power returns, the system is switched off or on as it was before the mains failure, and fault Er 0 is output.
6.2	Day interval	1 ... 2 ... 3	Forced operation/forced flushing in days <ul style="list-style-type: none"> <li>· At what time interval in days since the last permeate production should the forced operation or forced flushing take place?</li> </ul>
7. 18:00	Time	00:00 ... 23:59	Forced operation/forced flushing in hh:mm <ul style="list-style-type: none"> <li>· At what time should the forced operation or forced flushing take place?</li> </ul>
8.1*	Duration	... 9	Forced operation/forced flushing in hours <ul style="list-style-type: none"> <li>· How long should the forced operation or forced flushing be carried out for?</li> </ul>
9.0*	Operating mode	0 ... 1	0 = Forced operation 1 = Forced flushing

\* One of the two parameters must be programmed to 0.

Display	Parameters	Setting range	Remark
A.1	Monitoring for Er 5/Er 9	0 ... 1	0 = deactivated 1 = activated
b.75	Setpoint recovery in %	1 ... 99	Limit value (Er 5) = set point + 10%
c.60	Delay time for malfunction deactivation Er 5/Er 9 in min	0 ... 240	0 = deactivated
d.5.0	Membrane overflow	0.1 ... 9.9	Also delay time for outputting the signal message when the conductivity advance warning is exceeded
E.933	Setpoint concentrate recirculation in l/h	Display only (depending on system size)	A value is read out. <ul style="list-style-type: none"> <li>· If this value is +/-10% outside the setting range, the delay time is started.</li> <li>· If this value does not normalise during the delay time, fault message Er 9 is triggered after the time has expired.</li> </ul>

## 7.2.5 Reference values/times (Code 302)

Display	Parameters	Setting range	Remark
1.200	Setpoint permeate flow	200/400/800/1200/1600/2200/3000	Subject to system size in l/h · See system type (system size = permeate output)
2.0.030	Water meter pulse rate permeate	0.001 ... 9.999	Subject to system size in l/pulse · Refer to table of data records for values
3.0.030	Water meter pulse rate Feed	0.001 ... 9.999	
4.0.030	Water meter pulse rate feed water	0.001 ... 9.999	
5.00	Conductivity reference value	0 ... 99	Measured value of a reference measuring device in µS/cm · Optimally, the measurement of a medium with a new conductivity approx. ≥ the conductivity limit value parameter 3.
6.20	Flushing volume in litres	0 ... 999	Solenoid valves inlet and flushing opened · Quantity depending on system size (refer to table of data records)
7.3	Overrun time of pressure booster pump	1 ... 99	After response of the pressure switch PS in seconds
8.5	Start-up delay pressure booster pump	3 ... 99	Delay time in minutes · After switching on the system · After exceeding level "c" in the permeate tank · After acknowledging the malfunction
9.5	Start-up delay of high-pressure pump	3 ... 99	Delay time in seconds
A.5	Delay time of low pressure switch	3 ... 99	Delay time in seconds
b.000	Length of maintenance interval	0 ... 365	0 = Maintenance interval deactivated · Acknowledgement of maintenance interval by reprogramming the service interval

### Table of data records

System size	l/h	200	400	800	1200	1600	2200	3000
Flushing volume RO membrane	l	20	40	60	80	90	120	150
Water meter pulse rate feed water	l/pulse	0.0283	0.0292	0.0285	0.0283	0.0279	0.0276	0.0282
<b>RO1CF1</b>		0.0297				0.0300		
Water meter pulse rate feed <b>RO1CF2</b>	l/pulse	0.0297		0.0300				
Water meter pulse rate permeate <b>RO1CF3</b>	l/pulse	0.0309	0.0298	0.0293				



Round the values half away from zero if only 3 decimal places can be edited.

## 7.2.6 Error memory/water volumes (Code 245)

The system history is shown in this code level.

Display	Parameters	Unit	Remark
1.Er_x ... 9.Er_y	Error memory of the last 9 faults that occurred		1. Er_ = most recent fault 9. Er_ = oldest fault
A.Cxxx	Code level with last parameter change		
b.0372	Operating time	d	Time during which the system has been connected to the electrical power supply
c.0231	Run time of high-pressure pump	h	
d.0097	Run time of pressure booster pump	h	or duration of standby mode of the release signal K2
E.0103	Concentrate-to-drain volume	m <sup>3</sup>	Waste water volume discarded to date
F.0085	Feed water volume	m <sup>3</sup>	Previously consumed feed water quantity
G.0244	Permeate volume	m <sup>3</sup>	Previously produced permeate quantity
I.0000	Feed water flow rate	l/h	Current measurement values of the turbine water meter
J.0000	Feed flow rate	l/h	
L.0000	Permeate flow	l/h	

## 7.2.7 Diagnosis

In this code level, it is possible to request the statuses of the inputs and switch the outputs separately.

Precondition: The system is switched off.

Display	Parameters	Setting range	Remark
E. PA: <input type="checkbox"/>	Level "a"	0 ... 1	Physical status of the input signals · 0 = No voltage · 1 = 24 VDC voltage is active
E. Pb: <input type="checkbox"/>	Level "b"	0 ... 1	
E. Pc: <input type="checkbox"/>	Level "c"	0 ... 1	
E. HP: <input type="checkbox"/>	Low pressure switch	0 ... 1	
E. PS: <input type="checkbox"/>	Pressure switch	0 ... 1	
E. CL: <input type="checkbox"/>	Close input	0 ... 1	
A. St: <input type="checkbox"/>	Voltage-free fault signal contact	0 ... 1	Physical status of the output signals · 0 = Output switched off · 1 = Output switched on
A. YE: <input type="checkbox"/>	Solenoid valve input	0 ... 1	
A. YS: <input type="checkbox"/>	Flush solenoid valve	0 ... 1	
A. Yr: <input type="checkbox"/>	Optional solenoid valve for forced withdrawal	0 ... 1	
A. HP: <input type="checkbox"/>	High-pressure pump HP Optional solenoid valve for blending	0 ... 1	
A. PS: <input type="checkbox"/>	Pressure booster pump PS (release signal K2)	0 ... 1	
A. PF: <input type="checkbox"/>	Voltage-free signal contact	0 ... 1	

## 8 Maintenance and repair

Maintenance includes cleaning, inspection and servicing of the product.



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



By concluding a maintenance contract you ensure that all maintenance work will be performed in due time.

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

### 8.1 Cleaning



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



**WARNING** Damp clean live components.

- Risk of electric shock.
- Sparking possible due to short-circuit.
- Switch off the voltage supply, as well as any external voltage, prior to starting the cleaning work.
- ▶ Wait for at least 15 minutes and make sure that the components do not carry any voltage.
- ▶ Do not open any switch cabinets.
- ▶ Do not use any high-pressure equipment for cleaning and do not blast electrical/electronic devices with water.



**CAUTION** Climbing onto system components

- Risk of falling when climbing onto system components.
- ▶ Do not climb onto system components such as pipes, racks, etc.
- ▶ Use stable, safe and self-standing climbing aids such as step ladders, pedestals, etc. when cleaning components located at high levels.

**NOTE**

Do not clean the system with cleaning agents containing alcohol or solvents.

- Plastic components are damaged
- Varnished surfaces are affected.
- Use a mild/pH-neutral soap solution.

- ▶ Use personal protective equipment.
- ▶ Only clean the outside of the system.
- ▶ 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 system failures might be avoided.

- ▶ As owner/operating company, determine which components have to be inspected and maintained at which intervals (load-dependent). This is subject to the actual conditions, e.g.: Water condition, degree of impurities, environmental influences, consumption, etc.
- ▶ Make sure that the applications limits are neither exceeded nor undershot (refer to chapter 3.1.1).

The following interval table shows the minimum intervals for the activities to be performed.

Task	Interval	Tasks
Inspection	daily	<ul style="list-style-type: none"> <li>• Check system volume flows and pressures</li> <li>• Determine feed water values and quality of permeate</li> <li>• Read the yield</li> <li>• Take the remaining time of the maintenance interval into consideration</li> <li>• Visual inspection for leaks</li> </ul>
	6 weeks	<ul style="list-style-type: none"> <li>• Change filter element</li> <li>• Visually check for function and leaks</li> </ul>
	3 months	<ul style="list-style-type: none"> <li>• Replace activated carbon filter cartridge of activated carbon filter</li> </ul>
Maintenance	annually	<ul style="list-style-type: none"> <li>• Status and leak test of the system</li> <li>• Change fine filter cartridge</li> <li>• Replace activated carbon filter</li> <li>• Clean solenoid valves</li> <li>• Check flow volumes</li> <li>• Calibrate flow sensors</li> <li>• Check function and performance of all aggregates (pumps, valves)</li> <li>• Maintaining dosing system (if provided)</li> </ul>
	load-dependent	<ul style="list-style-type: none"> <li>• See "annually"</li> <li>• Replace activated carbon filter cartridge in case chlorine is breaking through or if the differential pressure amounts to 1.4 bar.</li> </ul>
Repair	5 years	<ul style="list-style-type: none"> <li>• Recommendation: Replace wearing parts</li> </ul>

## 8.3 Inspection

You as owner/operating company may perform the regular inspections yourself.



- ▶ Record the operating values in the daily log.

Please note that there may be slight fluctuations in the values, especially during the run-in phase of the system. Minor deviations from the standard values are normal and cannot be prevented technically. In case of considerable deviations, however, contact the technical service of Grünbeck Wasseraufbereitung GmbH.

- ▶ Carry out the following inspection work **on a daily basis**:

1. Determine the total hardness (inlet) by means of the water test kit "Total hardness" (order no. 170 187).

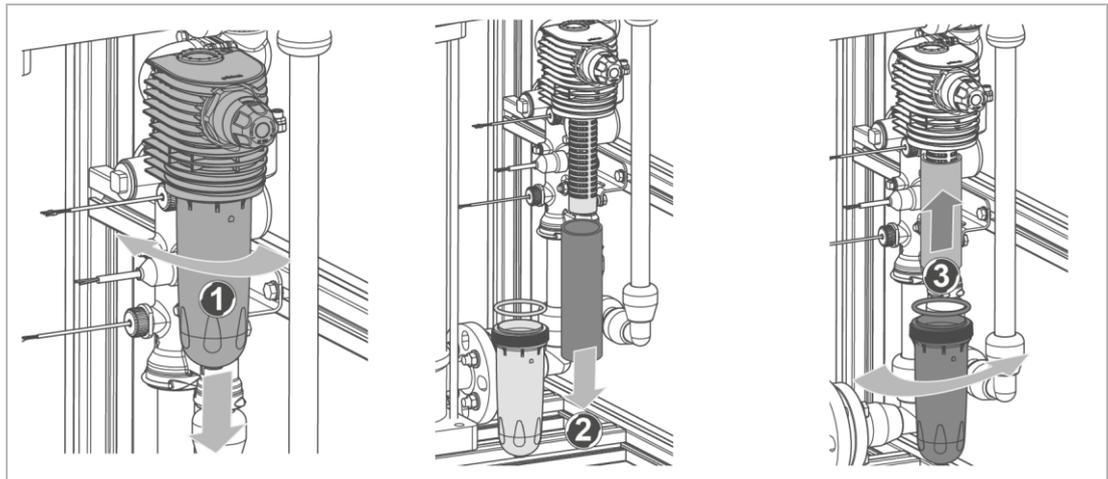
In case of optional antiscalant dosing:

2. Read the antiscalant dosing volume.
  - a Check the filling level of the dosing agent.
3. Read the quality of the permeate.
4. Read the recovery.
5. Observe the remaining time of the maintenance interval – contact Grünbeck's technical service at a remaining time of < 30 days.
6. Check the feed water solenoid valve RO1V1 for leaks.  
Precondition: The system must not be producing permeate and must not be flushing.
7. Check the system for leaks towards the drain in operating mode.
  - » In this state, no water must creep to the drain.

### 8.3.1 Replacing the filter element

- ▶ Replace the filter element as follows **every 6 weeks**:

1. De-energise the control unit.
2. Wait until the system has completed the flushing process and the feed water solenoid valve has closed.
3. Close the shut-off valve (feed water) upstream of the system.



4. Replace the filter element (refer to the illustration for correct sequence).
5. Open the shut-off valve (feed water).
6. Switch on the control unit.
7. Let the system produce permeate (withdrawing permeate from the tank).
  - a Check the filter cylinder for leaks.



Comply with the operation manual of the fine filter.

### 8.3.2 Replacing the activated carbon cartridge

- ▶ Replace the activated carbon filter cartridge of the activated carbon filter installed upstream at least **every 3 months** or in case chlorine breaks through or the differential pressure of 1.4 bar has been reached.



Observe the operation manual of the activated carbon filter.

## 8.4 Maintenance

In order to ensure the proper functioning of the system in the long term, certain tasks have to be performed at regular intervals. DIN EN 806-5 recommends regular maintenance to ensure trouble-free and hygienic operation of the product.



Maintenance is subject to the load but has to be performed once a year at the latest.

The maintenance work performed must be documented in the operation log as well as in the corresponding test log (refer to chapter 13).

## 8.4.1 Annual maintenance



Carrying out annual maintenance work requires specialist knowledge. This maintenance work is only allowed to be performed by Grünbeck's technical service or by a qualified specialist trained by Grünbeck.

The following work must be carried out as part of annual maintenance:

### Operating values

1. Read the water meter reading.
2. Read the rest and flow pressure (inlet pressure 1 – 4 bar).
3. Determine the total hardness (inlet).
4. Determine the quality of the permeate.
  - a Flush the membrane modules, if necessary or replace them.



Only authorised service personnel may flush or replace the membrane modules.

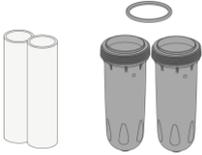
Observe the Technical service manual (order no. 750 929-inter) and the Flushing instructions (order no. 700 950-inter).

5. Check the settings in the control unit, in particular the following ones:
  - Pretreatment
  - Recovery
  - System output
6. Read the following parameters:
  - Operating hours (Code 245, parameter A)
  - Run time of high-pressure pump (Code 245, parameter b)
  - Run time of pressure booster pump (Code 245, parameter c)
  - Concentrate volume accrued (Code 245, parameter d)
  - Feed water quantity (Code 245, parameter E)
  - Produced permeate quantity (Code 245, parameter F)
  - Flushing volume (Code 302, parameter 6)
  - Dosing volume at antiscalant dosing pump, if installed (optional)
7. Read out the error memory.
8. Create a system data printout.

### Maintenance work

9. Check the drinking water filter upstream of the system – replace the filter element, if necessary.
10. Check the activated carbon filter – replace the filter cartridge(s), if necessary.
  - a Measure the chlorine content.
11. Replace the filter element of the fine filter at the RO system.
12. Determine the following measuring values for feed water, permeate and concentrate-to-drain:
  - Conductivity
  - Total hardness
  - Temperature
  - Volume flow
  - Recovery
  - a Determine these measuring values again in case the membrane modules were flushed or replaced.
  - b Recalibrate the conductivity measurement, if necessary.
13. Calibrate the antiscalant pump, if installed (optional).
14. Clean the feed water solenoid valve.
  - a Check the solenoid valves for function and leaks after the cleaning.
15. Check all cables and connections for damage and a firm seat.
16. Check all aggregates such as valves, HP pump, etc. for proper mechanical and electrical function.
  - a Check the minimum pressure at the pressure switch.
  - b Check and clean the conductivity probe.
17. Visually check the electronics board for damage.
18. Check the installation for leaks – visually check all pipes/hoses and all connections for escaping water.
19. Check the condition and presence of warning labels – replace them if they are worn/illegible.
20. Reset the counter readings if necessary.
21. Set a new maintenance interval (Code 302, parameter b.).
22. Enter all data and work performed into the operation log (refer to chapter 13).

## 8.5 Consumables

Product	Quantity	Order no.
Replacement filter element for fine filter (RO1F1) at GENO-OSMO-HLX	2	103 081
	2	103 061
Replacement filter element with filter cylinder and O-ring	1	750 261
	1	750 261
RO membrane module (4" x 40") with seal for GENO-OSMO-HLX 400 ... 3000	1	750 293
	1	750 293
RO membrane module (4" x 21") with seal for GENO-OSMO-HLX 200	1	109 615
	1	109 615
Activated carbon filter cartridge 250-M for activated carbon filter installed upstream		

## 8.6 Spare parts

You can find an overview of the spare parts in the spare parts catalogue at [www.gruenbeck.com](http://www.gruenbeck.com). You can obtain the spare parts from the Grünbeck representative responsible for your area.

## 8.7 Wearing parts



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

Wearing parts are listed below:

- Seals
- Solenoid valves
- Control valves
- Flow sensors
- Mechanical seal (high-pressure pump)

# 9 Fault



## WARNING

Danger of contaminated drinking water due to stagnation.

- Risk of infectious diseases.
- ▶ Have malfunctions remedied immediately.

The reverse osmosis system GENO-OSMO-HLX are equipped with an error detection and reporting system.

If a fault message appears in the display, proceed as follows:

1. Press  to acknowledge the fault.
2. Watch the display.
3. If the fault appears again, remedy it.
  - ▶ If you cannot remedy malfunctions with the instructions given below, contact Grünbeck's technical service.
  - ▶ Have the type plate data handy (refer to chapter 1.3).

## 9.1 Display messages

Fault	Explanation	Remedy
Er 0	Power failure > 5 minutes (refer to Code 290, parameter A) Depending on the setting, the system either continues to run or remains switched off.	<ul style="list-style-type: none"> <li>▶ Ensure electrical power supply</li> <li>▶ Acknowledge message</li> </ul>
Er 1	Pressure drop at the low pressure switch of the high-pressure pump. (refer to Code 113, parameter EHP) Depending on the setting, the system had 6 previous unsuccessful start attempts.	<ul style="list-style-type: none"> <li>▶ Restore feed water primary pressure</li> </ul>
Er 2	Invalid level setting in the permeate tank.  Contact type level "a", "b" and "c" incorrectly assigned (normally closed contact/normally open contact)	<ul style="list-style-type: none"> <li>▶ Check wiring</li> <li>▶ Check setting (Code 113, parameters E-A, E-b and E-c and correct if necessary)</li> </ul>
Er 3	Conductivity limit value was exceeded. (refer to Code 290, parameter 2)	<ul style="list-style-type: none"> <li>▶ Check feed water values</li> <li>▶ Flush membrane and replace if necessary</li> </ul>
 flashes	refer to Er 1: Waiting time runs between 2 start attempts  HP pump motor protection has tripped	<ul style="list-style-type: none"> <li>▶ Restore feed water primary pressure</li> <li>▶ Reset motor protection F1 (press in operating button) and restart system.</li> <li>▶ If the fault reoccurs, inform Grünbeck's technical service/authorised service company.</li> </ul>

Fault	Explanation	Remedy
Er 5	System recovery is too high	▶ Readjust system (refer to chapter 6.2)
Er 9	Concentrate recirculation is too low or too high	
 Bar appears	Maintenance interval has elapsed	▶ Have maintenance performed by after-sales service
<b>Close</b> Bar appears	Hardness monitoring or water treatment on supply side is blocking the system	▶ Check the system connected on supply side
 Bar appears Conductivity measured value in info level flashes	Conductivity advance warning was exceeded. (refer to Code 290, parameter 3)	▶ Check feed water values ▶ Flush membrane if necessary

## 9.2 Other observations

Observation	Explanation	Remedy
Water quality 50% impaired	Membrane blocked	▶ Flush or replace membrane
	Feed water values impaired	▶ Check feed water values
Solenoid valve does not open	Coil defective or short-circuit at the fuse	▶ Replace coil or replace fuse T1A ▶ Contact Grünbeck's technical service.
Solenoid valve does not close	Solenoid valve contaminated	▶ Clean solenoid valve

## 10 Shut down



Shutting down and restarting requires expert knowledge. This work is only allowed to be performed by Grünbeck's technical service or by a qualified specialist trained by Grünbeck.

### 10.1 Temporary standstill

The system is equipped with automatic forced operation mode or forced flushing.



If no permeate is generated within a set time (programming level, Code 290: preset = 2 days), forced operation or forced flushing is triggered automatically.

- ▶ ▶ If a longer downtime of the system is planned, a system shutdown must be carried out.

### 10.2 Shut down

- ▶ Perform the following activities:
  - Mechanically separate the feed water inlet.
  - Mechanically separate the line to the permeate outlet.
  - Preserve the system.
  - Switch off system.
    - Set the main switch to OFF and secure it against restart.
  - Mark the system with a note and a warning about the preservation that has been carried out.

### 10.3 Restart

- ▶ Perform the following activities:
  - Flush out the preserving agent.
  - Put the system into operation (refer to chapter 6).

# 11 Dismantling and disposal

## 11.1 Dismantling



The work described herein represents an intervention into your drinking water system.

- ▶ Have this work performed by qualified specialists only.

1. Flush the system with feed water.
2. Disconnect the system from mains – discharge residual voltage.
3. Close the feed water shut-off valve (upstream of the system).
4. Vent and drain the system.
5. Disconnect the system from the water installation (feed water inlet pipe, permeate outlet pipe and concentrate-to-drain pipe).
6. Disconnect the electrical connections to subsystems installed downstream.
7. Disconnect the potential equalisation (grounding) provided by client on site.
8. Remove individual components such as accessories, if necessary.
9. Transport the system secured on a pallet (refer to chapter 4).

## 11.2 Disposal

- ▶ Comply with the applicable national regulations.

### Packaging

- ▶ Dispose of the packaging in an environmentally sound manner.

### 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 hazards to the environment.
- ▶ Dispose of packaging material in an environmentally sound manner.
- ▶ Obey the local disposal regulations.
- ▶ If necessary, commission a specialist company with the disposal.

### Membrane module

- ▶ Dispose of the used membrane module with your household waste.

## Product



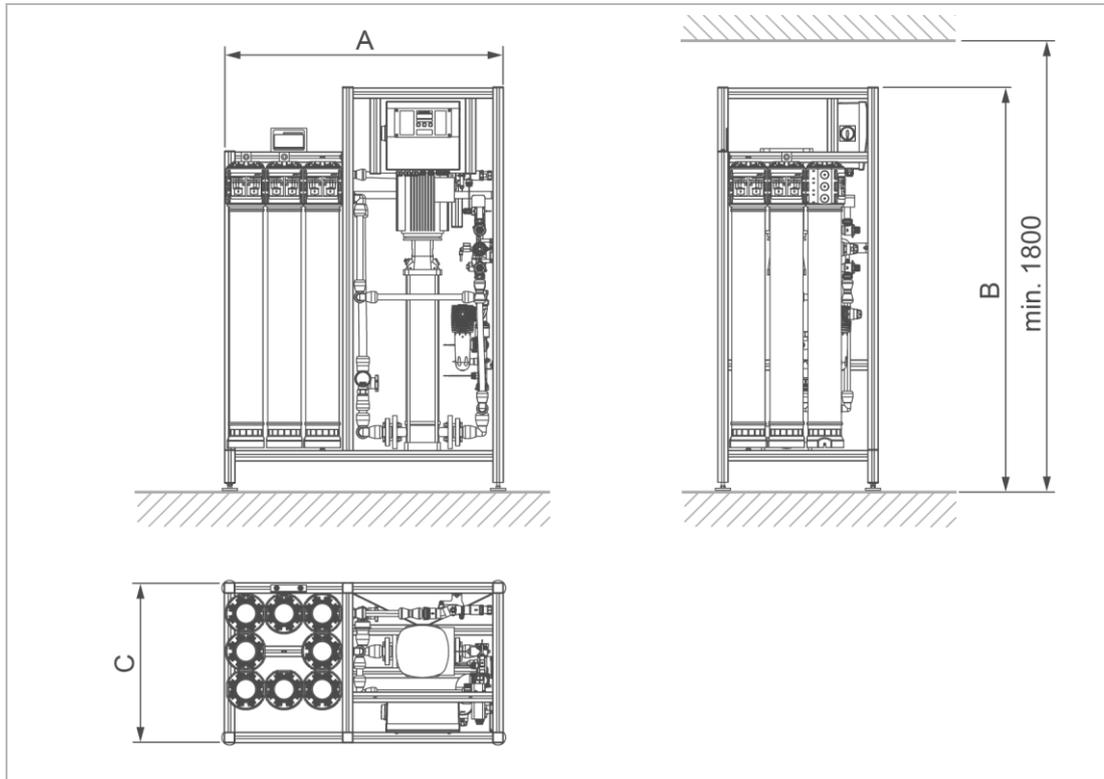
If this symbol (crossed-out wheellie bin) is on the product, this product or its electrical and electronic components must not be disposed of as household waste.

- ▶ Dispose of electrical and electronic products or components in an environmentally sound manner.
- ▶ 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



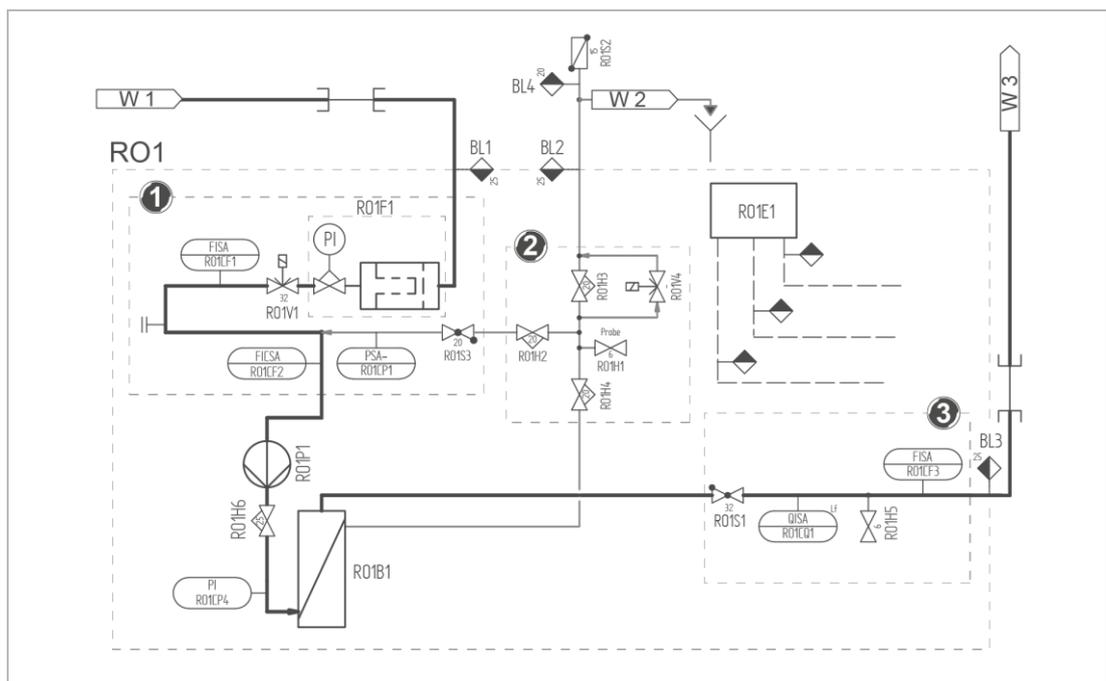
GENO-OSMO-HLX									
Dimensions and weights		200	400	800	1200	1600	2200	3000	
A	System width	mm	900	900	900	1035	1035	1170	1170
B	System height	mm	1700	1700	1700	1700	1700	1700	1700
C	System depth	mm	675	675	675	675	675	675	675
	Min. room/installation height	mm	1800	1800	1800	1800	1800	1800	1800
	Operating weight, approx.	kg	120	123	142	163	200	246	288
Connection data		200	400	800	1200	1600	2200	3000	
Nominal connection diam. Feed water inlet pipe	DN	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	32 (1¼" male thread)	32 (1¼" male thread)	
Nominal connection diam. Permeate outlet pipe	DN	25 (1" male thread)							
Nominal connection diam. Concentrate discharge pipe	DN	25 (1" male thread)							
Drain connection	DN	≥ 50							
Mains connection	V/Hz	230/400 / 50 – 60							
Connected load	kW	1.6	2.2	3.0	3.0	4.0	4.0	4.0	
Phases		3/N/PE							
Max. feed		4.0 kW / C 16 A / 1.5 mm <sup>2</sup> (depending on the additional stage)							
Protection/protection class		IP 54/⊕							

Performance data		200	400	800	1200	1600	2200	3000
Permeate capacity at								
Feed water temperature of 10 °C	l/h	170	340	680	1020	1360	1870	2550
Feed water temperature of 15 °C	l/h	200	400	800	1200	1600	2200	3000
Feed water temperature of 15 °C	m <sup>3</sup> /d	4.8	9.6	19.2	28.8	38.4	52.8	72.0
Inlet flow pressure of feed water, min. – max.	bar	2.5 – 4.0						
Min. outlet pressure of permeate	bar	0.5						
Nominal pressure	PN	16						
Salt rejection	%	95 – 99						
Max. total salt concentration in feed water as NaCl	ppm	1000						
Silt density index (SDI)		< 3						
Yield (adjustable)	%	50 – 80					68 – 80	
Factory-setting of recovery	%	75						
Concentrate volume flow, at a recovery of 75% (15 °C)	l/h	67	133	267	400	533	733	1000
Feed water volume flow, at a recovery of 80% (15 °C)	l/h	267	533	1067	1600	2133	2933	4000
General data		200	400	800	1200	1600	2200	3000
Feed water temperature	°C	10 – 30 <sup>1)</sup>						
Ambient temperature	°C	5 – 35						
Air humidity (non-condensing)	%	≤ 70						
Order no.		750 205	750 215	750 225	750 235	750 245	750 255	750 265

<sup>1)</sup> For feed water temperatures > 20 °C, a separate design of the system is required.

## 12.1 Functional diagram (PID)

### GENO-OSMO-HLX



Medium	Explanation
W 1	Soft water (treated raw water)
W 2	Concentrate to drain
W 3	Permeate

Coding	Designation	Coding	Designation
RO1B1	Membrane (RO modules)	RO1H6	Operating pressure control valve
RO1E1	Control unit	RO1CP4	Pressure gauge
RO1P1	High-pressure pump		

Components	Explanation
<b>1</b>	Hydro block Raw water

Coding	Designation	Coding	Designation
BL1	Feed water inlet connection	RO1CP1	Low pressure switch
RO1F1	Drinking water filter	RO1CF	Flow sensor feed water
RO1CF2	Flow sensor feed	RO1V1	Solenoid valve feed water

Components	Explanation
<b>2</b>	Hydro block Concentrate-to-drain

Coding	Designation	Coding	Designation
BL2	Connection concentrate to drain	RO1H2	Control valve concentrate recirculation
RO1H3	Control valve concentrate-to-drain	RO1H1	Sampling valve concentrate
RO1H4	Pressure reducer concentrate	RO1V4	Solenoid valve flush concentrate

Components	Explanation
<b>3</b>	Hydro block permeate

Coding	Designation	Coding	Designation
BL3	Connection Permeate	RO1H5	Permeate sample valve
RO1CF3	Flow sensor permeate	RO1CQ1	Conductivity measurement

# 13 Operation log



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

Reverse osmosis system | GENO-OSMO-HLX | type: \_\_\_\_\_

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

## 13.1 Start-up log

Customer					
Name: _____					
Address: _____					
Installation/Accessories					
Drinking water filter (80 µm) upstream of water softener			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Make/type: _____					
Euro system separator			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Make/type: _____					
Water softener			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Make/type: _____					
Activated carbon filter			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Make/type: _____					
Fine filter upstream of RO system			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Make/type: _____					
Additional tank			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Drain connection (concentrate) acc. to DIN EN 1717			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Height of drain, measured from bottom line of RO system:			cm		
Floor drain available			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Safety device (if no floor drain is available)			<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Feed water inlet pipe upstream of the RO system		<input type="checkbox"/> Galvanised steel	<input type="checkbox"/> Copper	<input type="checkbox"/> Plastic	<input type="checkbox"/> Stainless steel
Operating values					
Water pressure, flow pressure		bar		bar	
Water meter reading		m <sup>3</sup>			
Permeate supply tank		m <sup>3</sup>			
Pressure booster		bar			
Highest withdrawal point approx.		m			
Room temperature		°C			
Hardness unit		°dH	°f	mol/m <sup>3</sup>	°e
Total raw water hardness (measured)		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Parameters		
Feed water	Date/time	yyyy/mm/hh:mm
	Inlet pressure of fine filter	bar
	Temperature	°C
	Volume flow	l/h
	Total hardness	°dH mol/m³
	Dosing (Option: antiscalant)	ml/h
	Conductivity	µS/cm
	pH value	pH
	Free chlorine downstream of activated carbon filter (Cl <sub>2</sub> )	mg/l
	Silt density index < 3	
High-pressure	Pump pressure	bar
	Pump run time	h
Permeate	Volume flow	l/h
	Pressure	bar
	Conductivity	µS/cm
Concentrate	Volume flow	l/h
	Conductivity	µS/cm
	Concentrate recirculation	l/h
	System recovery (WCF – water conversion factor)	%

Remarks		

Start-up		
Company:		
Service technician:		
Work time certificate (no.):		
Date/signature:		

# Maintenance no.: \_\_\_\_\_



- ▶ Enter the measured values and operating data.
- ▶ Confirm the tests with **OK** or record any repairs carried out.

Maintenance performed	Membrane module no.	Restart
<input type="checkbox"/> with flushing of membrane module		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> without replacement of membrane module		Date:
<input type="checkbox"/> with replacement of membrane module		

**Measured values: Prior to or during restart / after replacement of membrane module(s)**

	Conductivity µS/cm <i>before / after</i>	Total hardness °dH, mol/m <sup>3</sup> <i>before / after</i>	Temperature °C <i>before / after</i>	Volume flow l/h <i>before / after</i>	Recovery % <i>before / after</i>
Feed water	/	/	/	/	-
Permeate	/	/	/	/	-
Concentrate-to-drain	/	/	/	/	/
Inlet pressure (inlet)		bar	Water meter reading		m <sup>3</sup>

Operating hours (Code 245, d)			d
Concentrate volume generated (Code 245, E)	m <sup>3</sup>	Feed water volume (Code 245, F)	m <sup>3</sup>
Permeate volume produced (Code 245, G)	m <sup>3</sup>	Run time HP pump (Code 245, c)	h
Flushing volume (Code 302, 6)	l	Run time PS pump (Code 245, d)	h

Error memory read out	Counter reading reset	Maintenance intervals set
<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Maintenance work	OK
Settings of control unit checked (pretreatment, recovery, system output)	<input type="checkbox"/>
Drinking water filter upstream of system checked (filter element replaced, if necessary)	<input type="checkbox"/>
Activated carbon filter checked (filter cartridge replaced, if necessary)	<input type="checkbox"/>
Fine filter of RO system checked, 5 µm filter element replaced	<input type="checkbox"/>
Solenoid valves for feed and flushing water cleaned and checked for leaks	<input type="checkbox"/>
All cables and connections (hydraulic, electrical) checked for damage and firm seat	<input type="checkbox"/>
Mechanical and electrical function of all aggregates (HP pump, valves) checked	<input type="checkbox"/>
Conductivity probe cleaned and checked	<input type="checkbox"/>
Pressure sensor for operating pressure checked for function	<input type="checkbox"/>
Electronics board visually checked for damage	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Condition and presence of the warning labels checked	<input type="checkbox"/>

**Remarks**

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Performed by	
Company:	
Service technician:	Date _____ Signature _____

# Maintenance no.: \_\_\_\_\_



- ▶ Enter the measured values and operating data.
- ▶ Confirm the tests with **OK** or record any repairs carried out.

Maintenance performed	Membrane module no.	Restart
<input type="checkbox"/> with flushing of membrane module		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> without replacement of membrane module		Date:
<input type="checkbox"/> with replacement of membrane module		

Measured values: Prior to or during restart / after replacement of membrane module(s)					
	Conductivity μS/cm <i>before / after</i>	Total hardness °dH, mol/m <sup>3</sup> <i>before / after</i>	Temperature °C <i>before / after</i>	Volume flow l/h <i>before / after</i>	Recovery % <i>before / after</i>
Feed water	/	/	/	/	–
Permeate	/	/	/	/	–
Concentrate-to-drain	/	/	/	/	/
Inlet pressure (inlet)	bar		Water meter reading	m <sup>3</sup>	

Operating hours (Code 245, d)			d
Concentrate volume generated (Code 245, E)	m <sup>3</sup>	Feed water volume (Code 245, F)	m <sup>3</sup>
Permeate volume produced (Code 245, G)	m <sup>3</sup>	Run time HP pump (Code 245, c)	h
Flushing volume (Code 302, 6)	l	Run time PS pump (Code 245, d)	h

Error memory read out	Counter reading reset	Maintenance intervals set
<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Maintenance work	OK
Settings of control unit checked (pretreatment, recovery, system output)	<input type="checkbox"/>
Drinking water filter upstream of system checked (filter element replaced, if necessary)	<input type="checkbox"/>
Activated carbon filter checked (filter cartridge replaced, if necessary)	<input type="checkbox"/>
Fine filter of RO system checked, 5 μm filter element replaced	<input type="checkbox"/>
Solenoid valves for feed and flushing water cleaned and checked for leaks	<input type="checkbox"/>
All cables and connections (hydraulic, electrical) checked for damage and firm seat	<input type="checkbox"/>
Mechanical and electrical function of all aggregates (HP pump, valves) checked	<input type="checkbox"/>
Conductivity probe cleaned and checked	<input type="checkbox"/>
Pressure sensor for operating pressure checked for function	<input type="checkbox"/>
Electronics board visually checked for damage	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Condition and presence of the warning labels checked	<input type="checkbox"/>

Remarks

Performed by	
Company:	
Service technician:	
Date	Signature

# Maintenance no.: \_\_\_\_\_



- ▶ Enter the measured values and operating data.
- ▶ Confirm the tests with **OK** or record any repairs carried out.

Maintenance performed	Membrane module no.	Restart
<input type="checkbox"/> with flushing of membrane module		<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> without replacement of membrane module		Date:
<input type="checkbox"/> with replacement of membrane module		

**Measured values: Prior to or during restart / after replacement of membrane module(s)**

	Conductivity µS/cm <i>before / after</i>	Total hardness °dH, mol/m <sup>3</sup> <i>before / after</i>	Temperature °C <i>before / after</i>	Volume flow l/h <i>before / after</i>	Recovery % <i>before / after</i>
Feed water	/	/	/	/	-
Permeate	/	/	/	/	-
Concentrate-to-drain	/	/	/	/	/
Inlet pressure (inlet)		bar	Water meter reading		m <sup>3</sup>

Operating hours (Code 245, d)				d
Concentrate volume generated (Code 245, E)	m <sup>3</sup>	Feed water volume (Code 245, F)		m <sup>3</sup>
Permeate volume produced (Code 245, G)	m <sup>3</sup>	Run time HP pump (Code 245, c)		h
Flushing volume (Code 302, 6)	l	Run time PS pump (Code 245, d)		h

Error memory read out	Counter reading reset	Maintenance intervals set
<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Maintenance work	OK
Settings of control unit checked (pretreatment, recovery, system output)	<input type="checkbox"/>
Drinking water filter upstream of system checked (filter element replaced, if necessary)	<input type="checkbox"/>
Activated carbon filter checked (filter cartridge replaced, if necessary)	<input type="checkbox"/>
Fine filter of RO system checked, 5 µm filter element replaced	<input type="checkbox"/>
Solenoid valves for feed and flushing water cleaned and checked for leaks	<input type="checkbox"/>
All cables and connections (hydraulic, electrical) checked for damage and firm seat	<input type="checkbox"/>
Mechanical and electrical function of all aggregates (HP pump, valves) checked	<input type="checkbox"/>
Conductivity probe cleaned and checked	<input type="checkbox"/>
Pressure sensor for operating pressure checked for function	<input type="checkbox"/>
Electronics board visually checked for damage	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Condition and presence of the warning labels checked	<input type="checkbox"/>

**Remarks**

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Performed by	
Company:	
Service technician:	Date _____ Signature _____

# EC Declaration of Conformity

In accordance with Machinery Directive 2006/42/EC



This is to certify that the system designated below meets the safety and health protection requirements of the applicable EC/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.

**Reverse osmosis system GENO-OSMO-HLX**

**Serial no.: refer to type plate**

Furthermore, we confirm compliance with the essential requirements of the EMC Directive 2014/30/EU

The following harmonised standards have been applied:

- DIN EN ISO 12100: 2011-03
- DIN EN 60204-1:2019-06

Responsible for documentation:

Peter Höß

Manufacturer

Grünbeck Wasseraufbereitung GmbH  
Josef-Grünbeck-Str. 1  
89420 Hoechstädt/Germany

Hoechstädt; Germany, 14.01.2021

A handwritten signature in blue ink, consisting of a large 'P.' followed by a stylized, cursive signature.

Peter Höß

*Head of Technical Systems & Equipment*







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