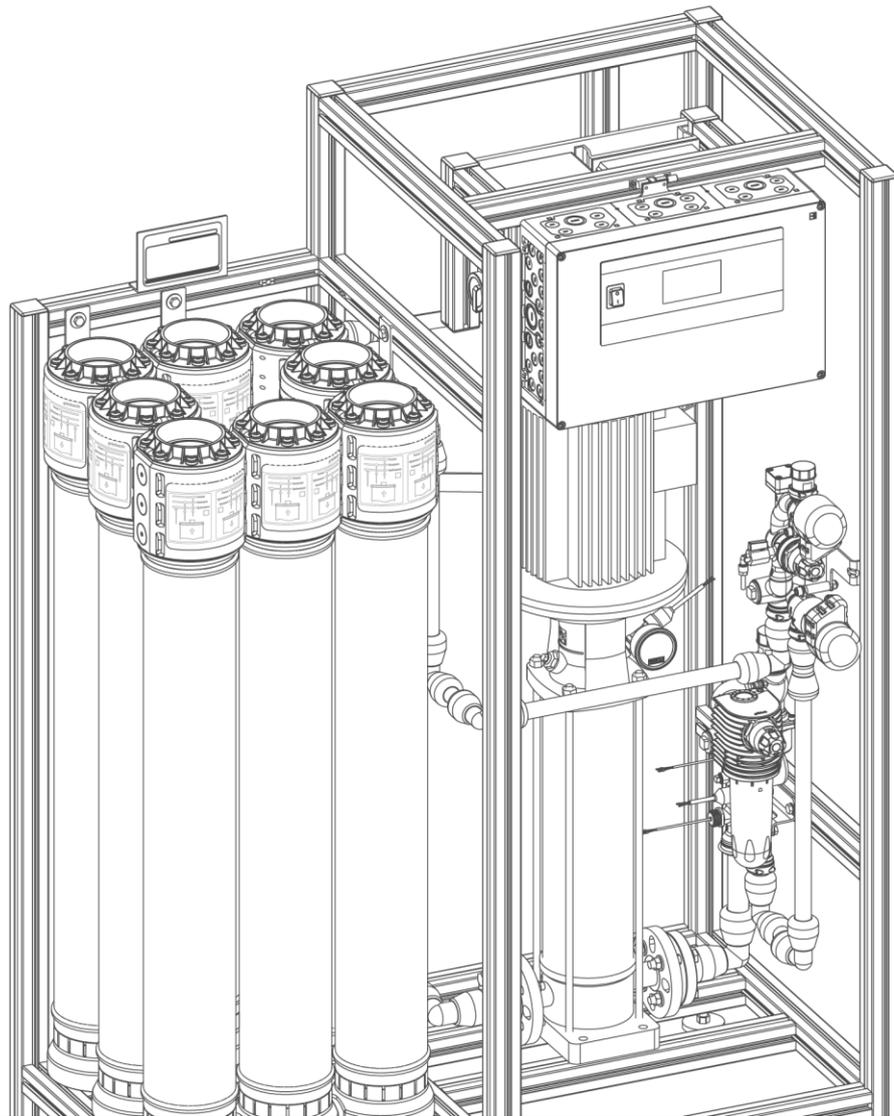


We understand water.



Reverse osmosis system | GENO-OSMO-X

Operation manual

grünbeck

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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.
- ▶ Obey all safety instructions and handling instructions.
- ▶ Keep this manual and all other applicable documents, so that they are available when needed.

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

1.1 Validity of the manual

This manual applies to the products below:

- Reverse osmosis system GENO-OSMO-X 200
- Reverse osmosis system GENO-OSMO-X 400
- Reverse osmosis system GENO-OSMO-X 800
- Reverse osmosis system GENO-OSMO-X 1200
- Reverse osmosis system GENO-OSMO-X 1600
- Reverse osmosis system GENO-OSMO-X 2200
- Reverse osmosis system GENO-OSMO-X 3000
- Reverse osmosis system GENO-OSMO-X
in optional versions: Online, AVRO and Antiscalant.
- Special designs that essentially correspond to the standard products given above.
For information on changes, please refer to the respective information sheet that is enclosed, if applicable.

1.2 Other applicable documents

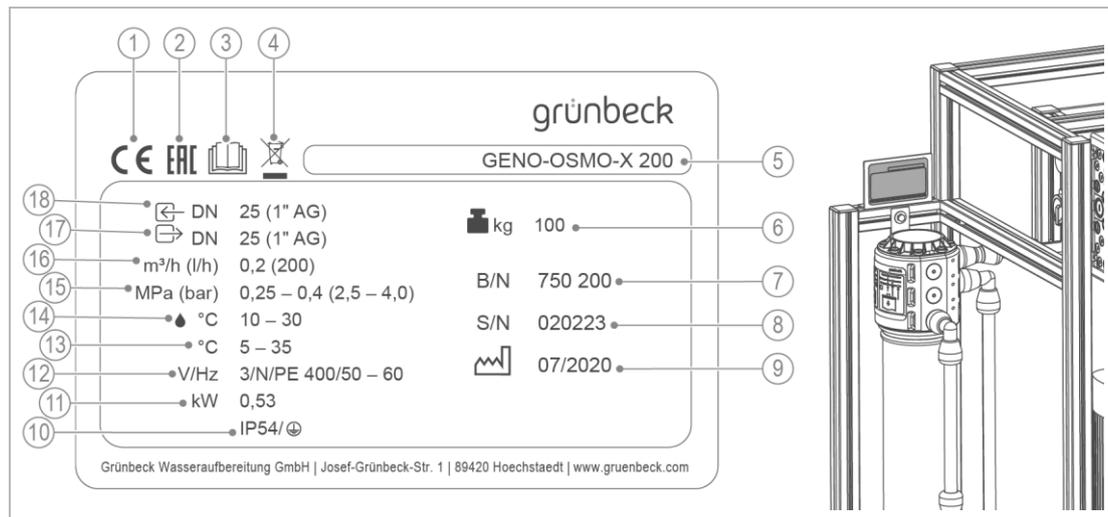
- Manuals of all accessories used
- Manuals of components from other manufacturers
- Safety data sheets for chemicals
- Electric circuit diagram order no. 750 292

1.3 Product identification

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

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

The type plate is located on the system rack.



Designation	
1	CE mark
2	EAC mark
3	Obey the 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	Power input
12	Power supply
13	Ambient temperature
14	Feed water temperature
15	Inlet flow pressure Feed water
16	Permeate capacity at a feed water temperature of 15 °C
17	Nominal connection diameter Permeate/concentrate discharge pipe
18	Nominal connection diameter Feed water pipe

1.4 Symbols used

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

1.5 Depiction of warnings

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



SIGNAL WORD Type and source of danger

- Possible consequences
- ▶ Preventive measures

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

Warning symbol and signal word		Consequences if the information/ instructions are ignored	
	DANGER	Personal injuries	Death or serious injuries
	WARNING		Possible death or serious injuries
	CAUTION		Possible moderate or minor injuries
		Damage to property	Possible damage to components, the product and/or its function or damage to an object in its vicinity

1.6 Demands on personnel

During the individual phases in the service life of the system, different persons do activities on the systems. The respective tasks require different skills.

1.6.1 Qualification of personnel

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

1.6.2 Authorisations of personnel

The table below describes which tasks must be done by whom.

	Operator/ user	Owner/ operating company	Qualified specialist	Technical service
Transport and storage			X	X
Installation and mounting			X	X
Start-up/Commissioning			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/recommissioning			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 components below fall under the heading of personal protective equipment (PPE):

PPE			
	Protective gloves		Protective footwear
	Protective overall		Protective goggles
	Hard hat		Mask
	Face shield		Protective apron

2 Safety

2.1 Safety measures

- Only operate the system if all components are installed properly.
- Obey the local regulations on drinking water protection, accident prevention and occupational safety.
- Do not make any changes, alterations, extensions or program changes on 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 against unauthorised access to protect imperilled/untrained persons from residual risks.
- Meet the maintenance intervals (refer to chapter 8.2). If you do not meet these intervals, there is a risk of microbiological contamination of your drinking water system.

2.1.1 Mechanical safety

- You must never remove, bridge, or otherwise tampered with safety equipment.
- For all work on the system that cannot be done from the ground, use stable, safe and self-standing climbing aids.
- Make sure that the system is set up in a way that it cannot tip over and that the stability of the system is guaranteed at all times.

2.1.2 Pressure-related hazards

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

2.1.3 Electrical hazards

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.

- Have electrical work on the system done by qualified electricians only.
- 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 parts. Discharge residual voltage.
- Never bridge electrical fuses. Do not disable fuses. Use the correct current ratings when replacing fuses.
- Keep moisture away from live parts. Moisture can cause short-circuits.

2.1.4 Danger due to chemicals

- Chemicals can be hazardous to the environment and/or to health. They can cause skin and eye burns 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 obey the instructions for the different actions/situations.
- Current safety data sheets for chemicals are available for download at **www.gruenbeck.de/en/info-centre/safety-data-sheets**.
- Obey internal instructions when handling chemicals and make sure that protective and emergency equipment such as emergency showers and eye showers are available and functional.

Mixing and residual amounts of chemicals

- Never mix different chemicals. Unforeseeable chemical reactions with mortal danger can occur.
- Dispose of residual amounts of chemicals in accordance with local regulations and/or internal instructions.
- Residual amounts from used containers should not be filled into containers with fresh chemicals in order not to impair the effectiveness of the chemicals.

Labelling/Minimum shelf life/Storage of chemicals

- Check the labelling of the chemicals - labels must not be removed or made illegible.
- Do not use any unknown chemicals (no labelling or labelling illegible).
- Obey the use-by date (minimum shelf life) shown on the label to ensure the functionality of the system and the quality of the generated permeate.
- If kept incorrectly, chemicals might change their state of matter, crystallize, outgas, or lose their effectiveness. Keep and use the chemicals at the given temperatures only.

Cleaning/Disposal

- Immediately absorb spilled chemicals with suitable binding agents.
- Collect and dispose of chemicals in such a way that they cannot pose a risk to people, animals, or the environment.

2.1.5 Groups of persons in need of 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 done by children.

2.2 Product-specific safety instructions



WARNING

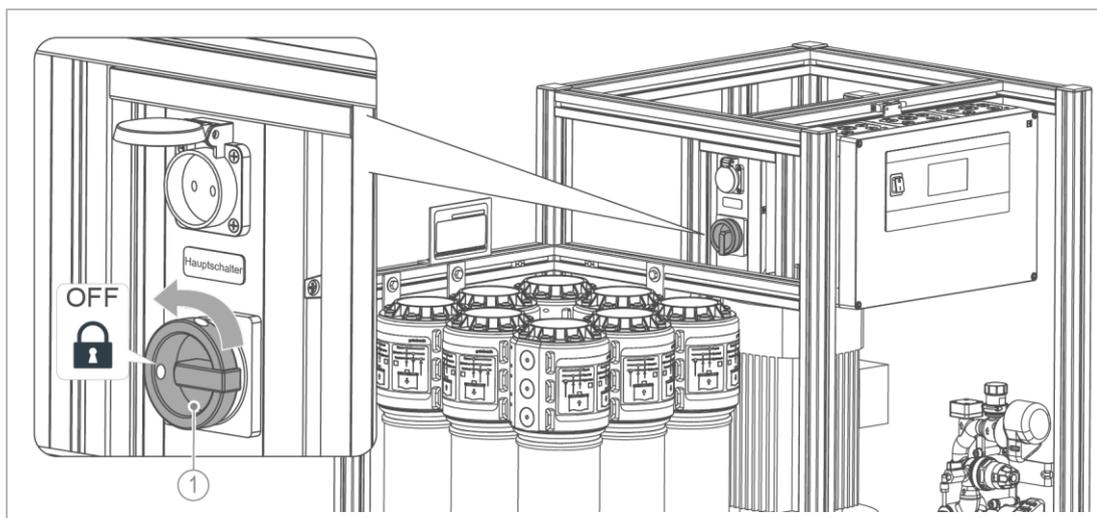
Contamination of drinking water due to improper handling.

- Risk of infectious diseases.
- ▶ Have installation, start-up/commissioning and annual maintenance done by a qualified specialist.



The system features a main switch. Via the main switch, the system and the components downstream are de-energised.

- ▶ 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.

2.2.1 Signals and warning devices

Warnings/pictograms	
	<p>Risk of electric shock (attached to the distributor cover and in the power distribution/electrical switch cabinet)</p> <ul style="list-style-type: none"> ▶ Disconnect the system from the power supply before working on electrical system parts.
	<p>Risk of electric shock due to residual voltage High voltage can be present even if the LED warning indicator is not illuminated. (attached to the frequency converter and HP pump)</p> <ul style="list-style-type: none"> ▶ Wait for 15 minutes after switching off the main switch.
	<p>Hazardous material (attached to the packaging) Environmental damage due to lithium batteries</p>



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

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

3 Product description

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

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

The controller for displaying the operating status and the system values is operated by a touch screen.

3.1 Intended use

- The reverse osmosis system GENO-OSMO-X 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-X, GENO-OSMO-X Online, GENO-OSMO-X AVRO and GENO-OSMO-X Antiscalant are intended for the industrial and commercial sector only.
- 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.

3.1.1 GENO-OSMO-X Online

- Designed for the steady permeate supply of installations downstream without pressure fluctuations, intermediate tanks, or pressure booster.
- For on-line supply of connected consumers such as humidifiers, air-conditioning systems, etc., with permeate.

3.1.2 GENO-OSMO-X AVRO

- To protect the reverse osmosis membranes by means of treatment module(s) installed in the system.
- To prevent scaling on the membranes.
- Does not require the installation of a water softener/hardness stabilisation upstream.

3.1.3 GENO-OSMO-X Antiscalant

- To protect the reverse osmosis membranes by dosing-monitored addition of hardness stabilising agents in proportion to quantity.
- To avoid scaling on the membranes.

- Does not require the installation of a water softener/hardness stabilisation upstream.

3.1.4 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 given 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		< 0.1 (0.18 °f; 0.018 mol/m ³)
• Option: Antiscalant	°dH	not limited
• Option: AVRO (without water analysis)		< 22 (39.2 °f; 3.92 mol/m ³)
• Option: AVRO (water analysis required)		> 22 or (sulphate > 250 mg/l)
Free chlorine	mg/l	not detectable
Iron	mg/l	< 0.10
Manganese	mg/l	< 0.05
Silicate	mg/l	< 15
Chlorine dioxide	mg/l	not detectable
Turbidity	NTU	< 1
Silt density index (SDI)		< 3
pH range		3 – 9
Total salt content as NaCl	mg/l	< 1000
Feed water temperature	°C	10 – 30

- 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.

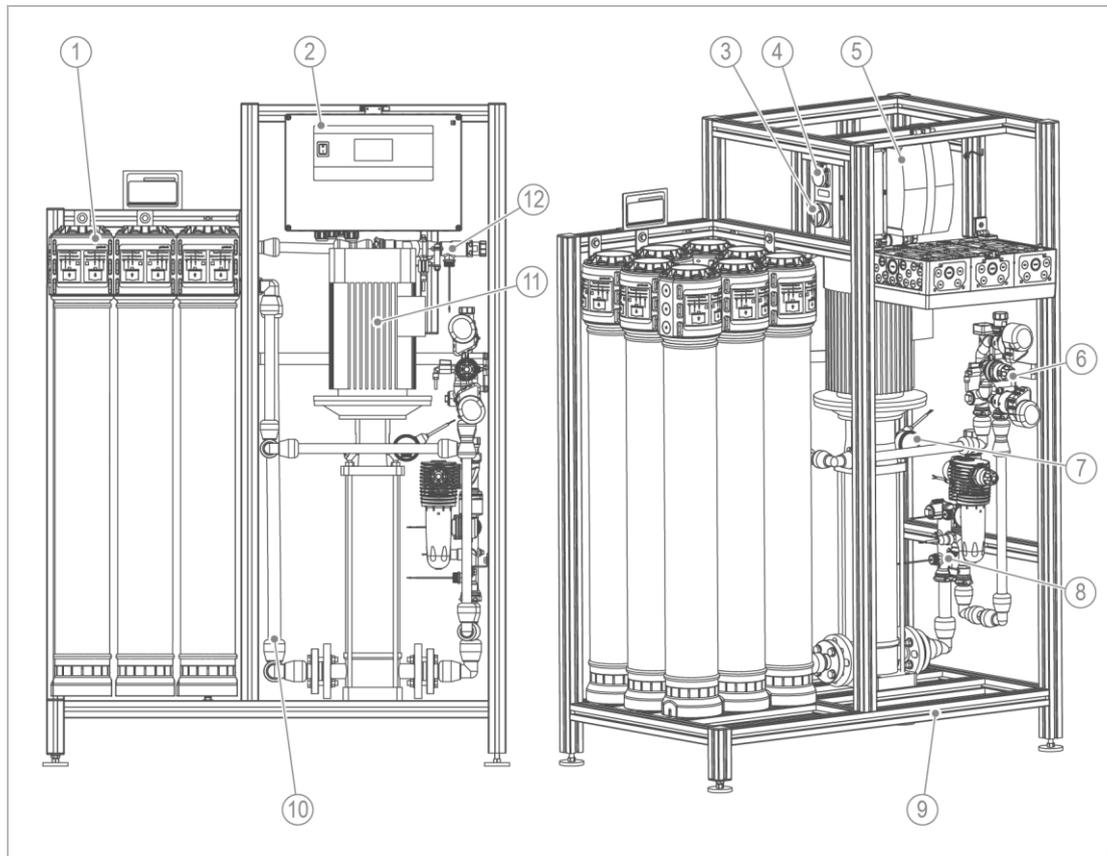
3.2 Foreseeable misuse

The reverse osmosis system GENO-OSMO-X is not suitable for the use given below:

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

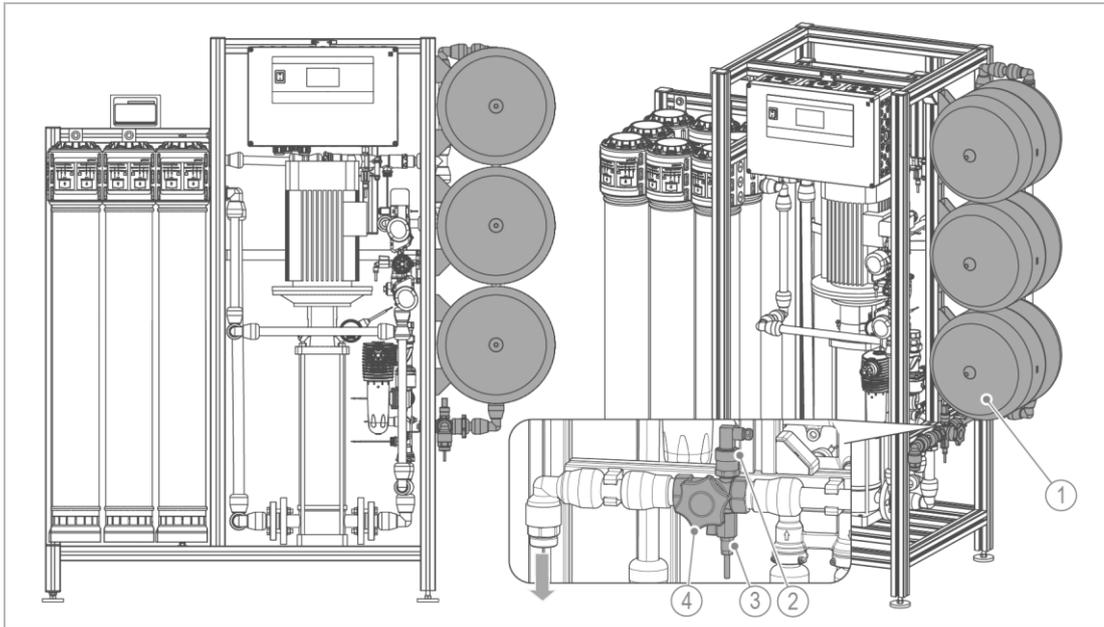
3.3 Product components

3.3.1 GENO-OSMO-X



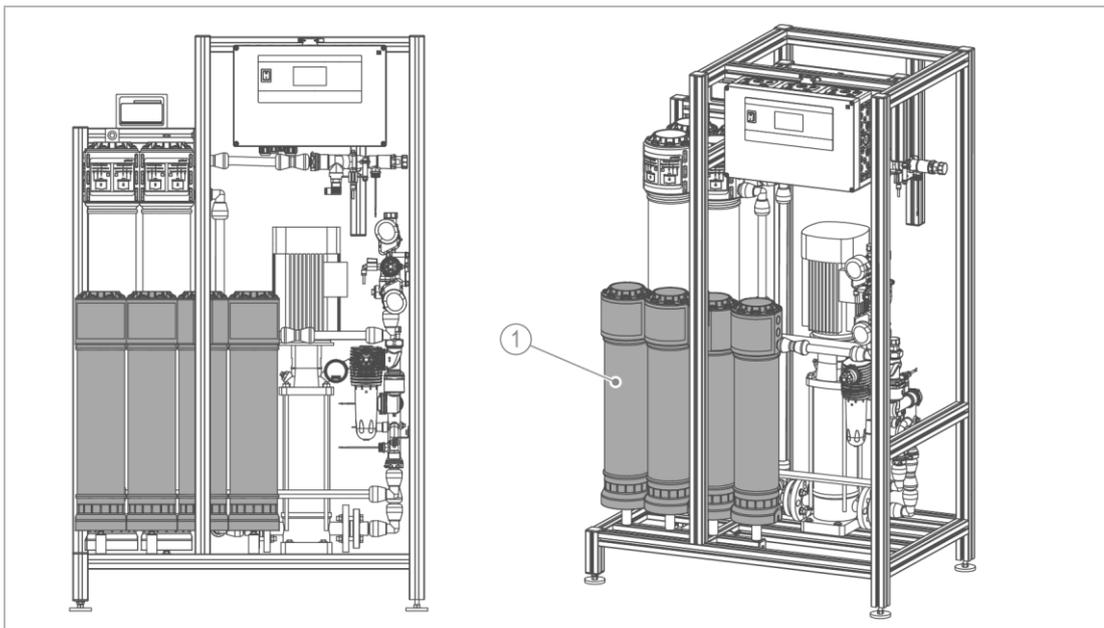
Designation	Function	Coding
1 Membrane	Reverse osmosis membranes in pressure pipes to generate the permeate	RO1B1
2 Control unit	Operating unit GENO-tronic with 4.3 touch screen, tiltable	RO1E1
3 Main switch	To switch the entire system and components installed downstream on and off	
4 Power distribution	With automatic circuit breakers and Schuko socket to supply the Antiscalant dosing system	RO1E2
5 Frequency converter	With the frequency converter, the pump's revolution speed is adapted in a way that the permeate capacity is achieved.	
6 Hydro block	Concentrate (to drain)	BL2
7 Overpressure switch	Prevents the system's operating pressure from exceeding 16 bar	RO1CP3
8 Hydro block	Feed water (as treated soft water)	BL1
9 System rack	Made of anodised aluminium with adjustable feet	
10 Piping	High-pressure resistant PE pipes and PP compression fittings	
11 High-pressure pump (HP pump)	Centrifugal pump (frequency-controlled) which generates the operating pressure required for the membrane The centrifugal pump operates upon permeate demand from the level control located in the permeate tank	RO1P1
12 Hydro block	Permeate	BL3

3.3.2 GENO-OSMO-X Online



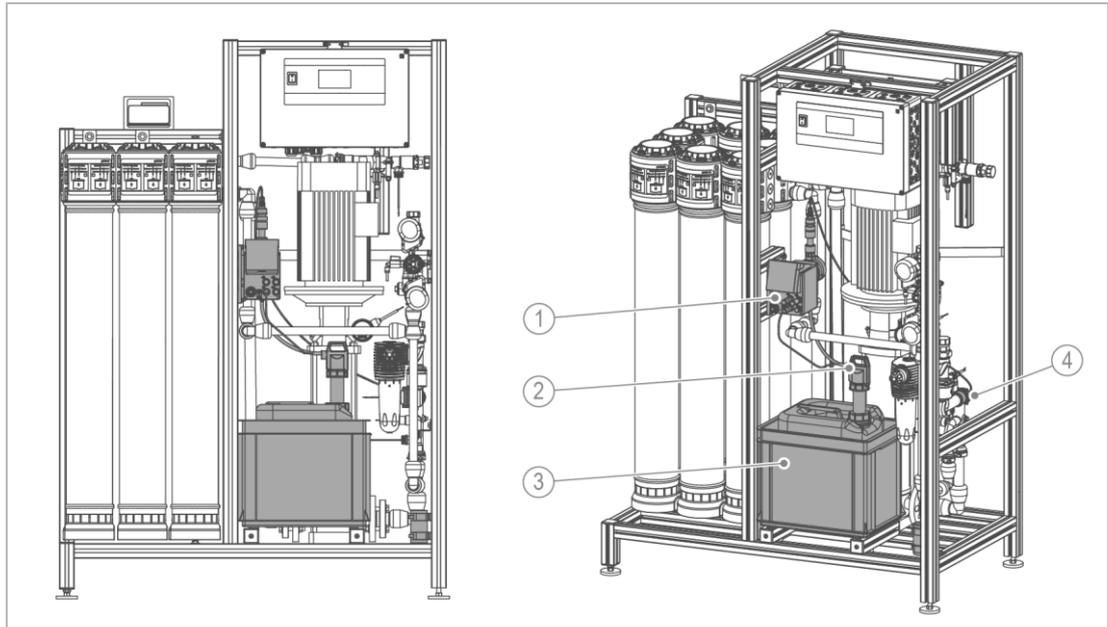
Designation	Function	Coding
1 Diaphragm expansion tank	Flown through as pressurised permeate tank	RO1B4
2 Pressure transducer	For supply pressure; switches the system ON and OFF Measuring range: 0 - 6 barg, current output: 4-20 mA	RO1CP2
3 Sampling valve	Sampling valve of pressurised permeate tank. As pressure relief during maintenance of the permeate tank.	RO1H6
4 Piston valve	To shut-off the permeate outlet	RO1H7

3.3.3 GENO-OSMO-X AVRO



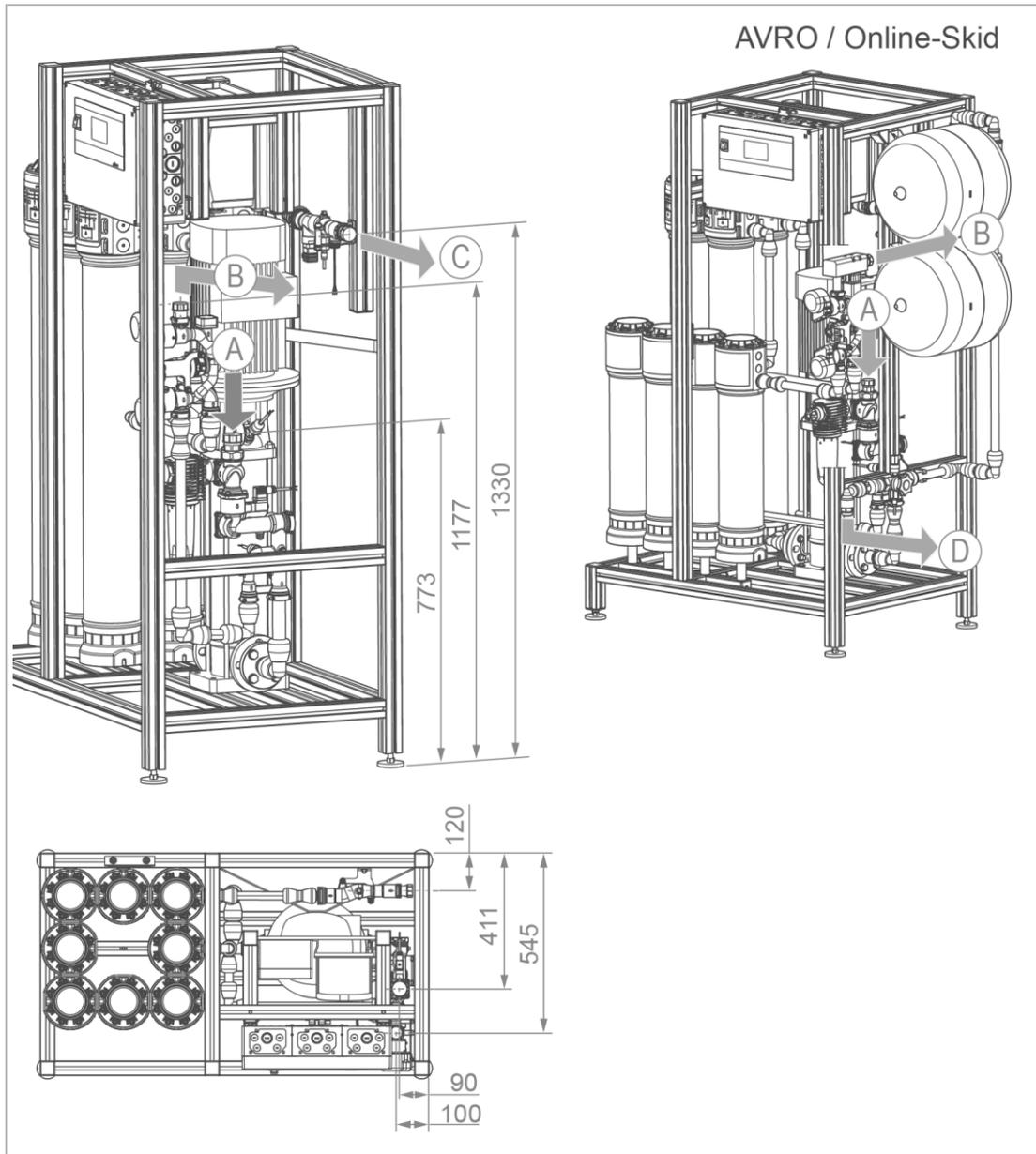
Designation	Function	Coding
1 Pressure pipe system	AVRO treatment unit	RO1B5

3.3.4 GENO-OSMO-X Antiscalant



Designation	Function	Coding
1 Dosing pump	For Antiscalant dosing in proportion to quantity Delivers the dosing agent as soon as the feed water flows into the system.	RO1P2
	Pressure maintaining valve DN 8, opening pressure 3 bar	RO1S7
2 Suction lance	Suction lance with electrical switching contacts "pre-alarm" and "empty" to withdraw the dosing agent.	RO1S8 RO1CL1 RO1CL2
	Canister containing dosing agent: MT-4000 / MT-4010	RO1B2
3 Collecting container	Prevents the dosing agent from escaping in case of a leaking canister (leak and drip protection). Made of PP plastic (400 x 300 x 325 mm)	RO1B3
4 Dosing point	Injection of the dosing agent into the feed water	

3.4 System connections



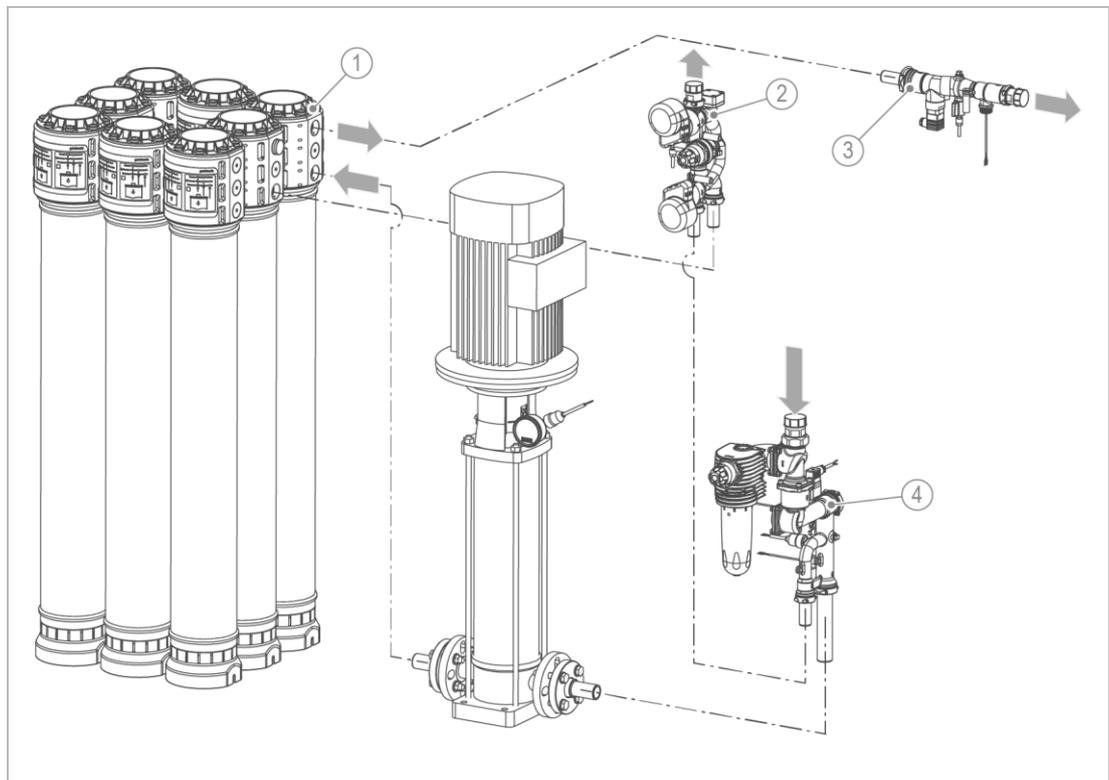
Designation	Function	Coding
A	Inlet connection Feed water inlet	BL1
B	Discharge connection Concentrate-to-drain	BL2
C	Outlet connection Permeate (towards pure water tank)	BL3
D	Outlet connection Permeate (towards consumer provided by client on site)	BL3



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 functional units below:



Designation	
19	Pressure pipe with membrane module (number depends on system size)
20	Hydro block Concentrate-to-drain

Designation	
21	Hydro block Permeate
22	Hydro block Feed water

The GENO-OSMO-X 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.

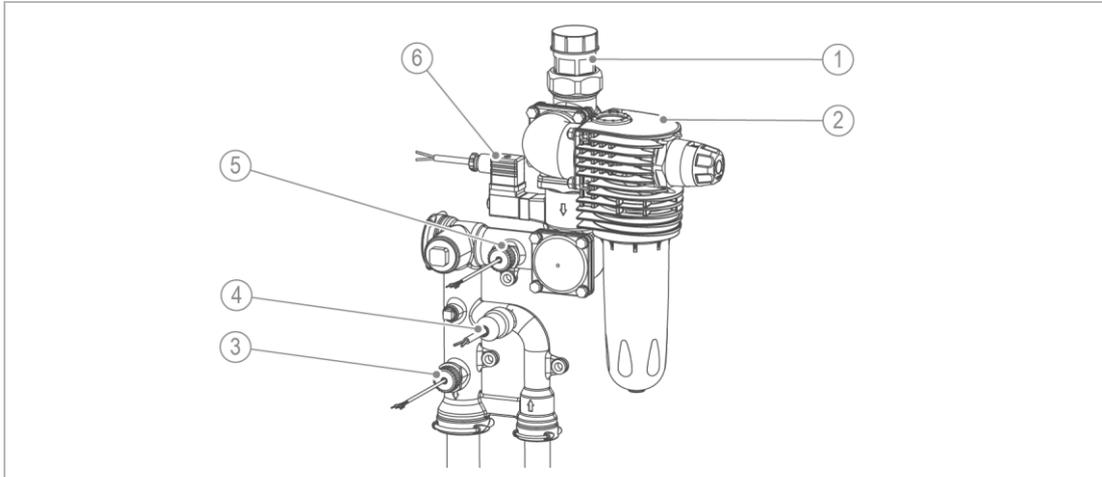
A negative pressure switch protects the pump from running dry. The capacity of the high-pressure pump is controlled by a frequency converter in such a way that the permeate capacity is generated depending on the temperature. With the controller, the permeate capacity can be reduced by up to 25 %.

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) recirculated 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 degree centigrade of the feed water temperature.

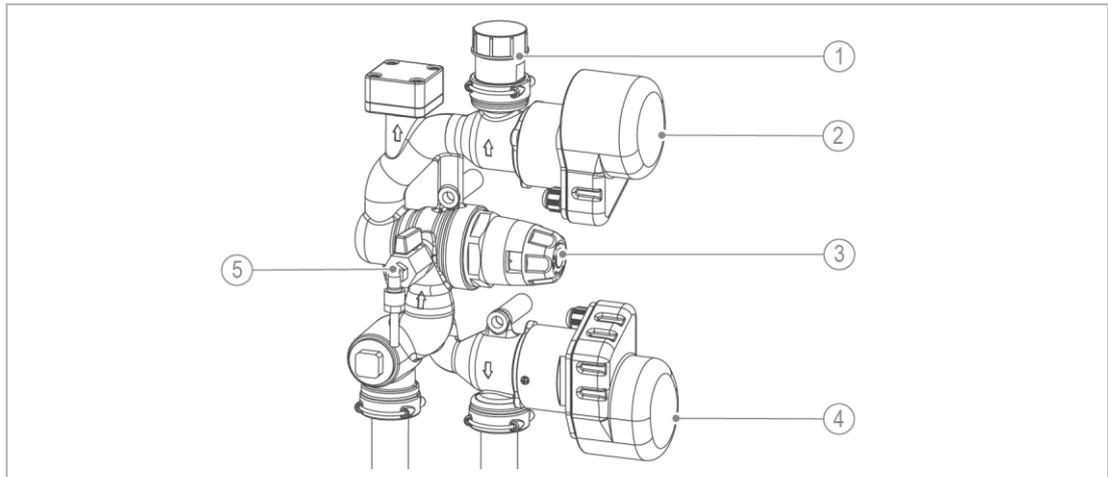
The permeate capacity is automatically controlled in relation to the temperature. Control via flow meters in the feed water, FEED and permeate. The recovery (concentrate-to-drain) as well as the concentrate recirculation are adapted to the modified permeate output.

Hydro block Feed water



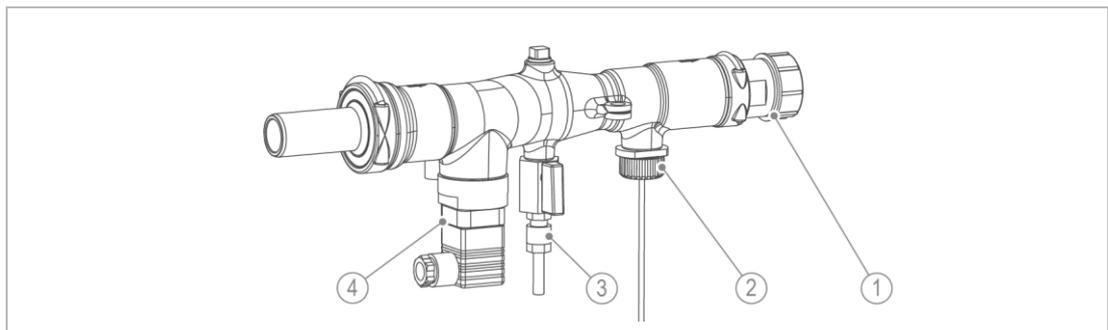
	Designation	Function	Coding
1	Connection Feed water inlet	Water meter screw connection 1" or 1¼" (male thread) with flat sealing	BL1
2	Drinking water filter	Prefiltration of the feed water incl. pressure reducer (preset) 4.0 bar and integrated pressure gauge. Osmosis version with black filter cylinder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

Hydro block Concentrate



Designation	Function	Coding
1 Connection Concentrate-to-drain	Water meter screw connection 1" (male thread) with flat sealing	BL2
2 Adjusting valve Concentrate-to-drain with drive	To automatically 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 depends on the system size. The valve opens the entire cross section in case of system stop and in case of a system failure always in combination with the solenoid valve for feed water.	RO1V3
3 Pressure reducer Concentrate	To improve the control accuracy of the adjusting valves (set to 6 bar)	RO1H4
4 Adjusting valve Concentrate recirculation with drive	For automatic adjustment of the volume flow concentrate recirculation. The volume flow depends on the system size.	RO1V2
5 Sampling valve Concentrate	Allows for manual quality determination with sampling valve.	RO1H1

Hydro block Permeate



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

3.5.2 Process/function

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

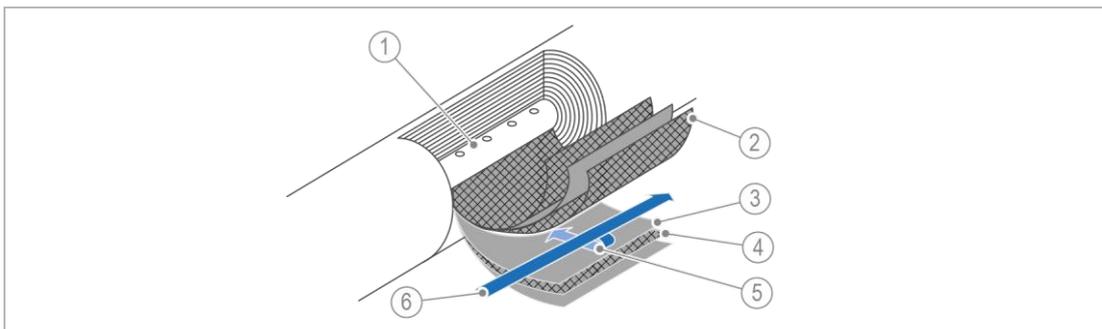
A partial flow of pure water passes through the membrane as permeate (cross flow), while the remaining partial flow – now with increased salt concentration – is led away from the membrane surface as concentrate. As the concentrate passes through the circuit, it is concentrated still further.

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.

This process can remove minerals dissolved in the water and significantly reduce bacteria, germs and particles as well as dissolved organic substances.

Over time, minerals and biological contaminants are deposited on the membrane surface. Therefore, it must be cleaned at regular intervals.

Design of 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 reversing 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 curved arrows indicate water molecules moving from the diluted side (A) through the membrane (C) to the concentrated side (B).</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 is similar to the osmosis diagram but shows a higher water level on the diluted side (A). A blue double-headed arrow labeled 'D' indicates the height difference between the two liquid levels. This height difference represents the osmotic pressure that balances the concentration gradient.</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 same setup as before, but with a red arrow labeled 'E' pointing down into the concentrated solution (B), representing an applied external pressure. White curved arrows indicate water molecules moving from the concentrated side (B) through the membrane (C) to the diluted side (A).</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>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 Hoechststaedt/Germany for details.

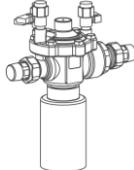
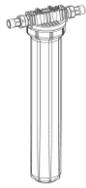
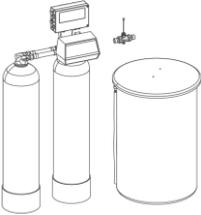
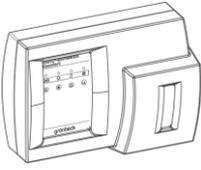
Illustration	Product	Order no.
	Drinking water filter BOXER KX 1"	101 835
	80 µm filter element for prefiltration	
	Drinking water filter BOXER KDX 1"	101 820
	with pressure reducer	
	EURO system separator GENO-DK 2 DN 15 (1/2")	132 510
	Euro system separator GENO-DK 2 DN 20 (3/4")	132 520
To secure systems and devices that might endanger the drinking water as per DIN EN 1717-part 4.		
	GENO-activated carbon filter AKF 600	109 160
	To reduce the chlorine concentration in the water. Only suitable for GENO-OSMO-X 400. For larger activated carbon filters, please inquire.	
	Water softener GENO-mat duo WE-X	186 100
	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.	
	Water softener Delta-p-I	185 200
	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.	
	GENO-softwatch Komfort	172 500
	Automatic limit value monitoring of residual/total hardness via limit value indicator	

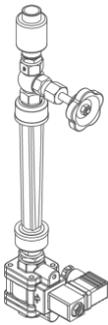
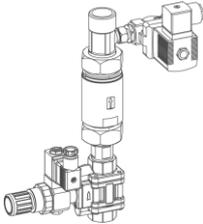
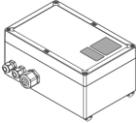
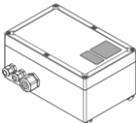
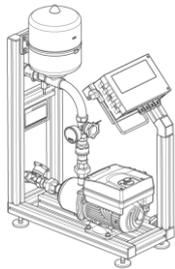
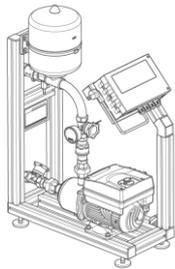
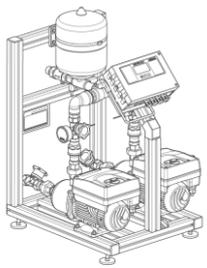
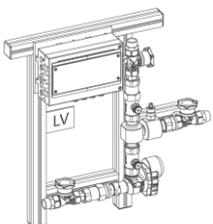
Illustration	Product	Order no.
	<p>Blending unit for reverse osmosis systems</p> <p>The blending unit is designed to set a certain blending water quality (residual conductivity or residual hardness). This is done by blending permeate from a reverse osmosis system with raw or soft water.</p>	<p>750 7xx</p>
	<p>Emergency bypass for reverse osmosis systems</p> <p>An emergency bypass of the reverse osmosis systems 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>750 75x</p>
	<p>Communication module PROFIBUS DP</p> <p>For connection to a PROFIBUS DP master</p>	<p>750 160</p>
	<p>Communication module BACnet-IP</p> <p>For connection to a BACnet-IP master</p>	<p>750 170</p>
	<p>Voltage-free signals</p> <p>Connection to a Building Management System/Central Control Station.</p>	<p>750 180</p>
	<p>Analogue signals 4-20 mA</p> <p>Connection to a Building Management System/Central Control Station.</p>	<p>750 185</p>
	<p>Pure water tank</p> <p>For intermediate storage of permeate flowing unpressurised from GENO-reverse osmosis systems</p> <p>Design of all tanks:</p> <ul style="list-style-type: none"> • Pre-assembled with PVC overflow line • Connections for permeate inlet and suction line of pressure booster system • Black PE • Hand hole with removable screw cap • A maximum of 4 tanks can be combined to a supply battery 	
	<p>Basic pure water tank GT-X 1000 with sterile air filter and level probe</p> <p>Tank height including connecting pieces. Useful capacity approx. 840 l (w = 960 x d = 860 x total h = 2200 mm) For larger tanks, please inquire.</p>	<p>712000040000</p>

Illustration	Product	Order no.
	Additional tank GT 1000 with sterile air filter	712000060000
	As add-on tank of the same size as the basic pure water tank GT-X 1000 with sterile air filter and level probe, aeration and ventilation with 0.2 µm microfilter For larger tanks, please inquire.	
	Basic pure water tank GT-X 1000 with level probe	712000030000
	Additional tank GT without sterile air filter	712000050000
	As add-on tank of the same size as the basic pure water tank GT-X 1000 with sterile air filter and level probe, aeration and ventilation with ultra-fine filter 0.2 µm	
	Pressure booster system GENO FU-X 2/40-1 N	730 640
	Compact, pressure-controlled pump aggregate consisting of: <ul style="list-style-type: none"> • Centrifugal pump made of stainless steel • Integrated pressure and contact water meter • Control electronics with power switching • Backlit display • Operating switch • Operation log via SD-card • Voltage-free signal/fault signal contact • Non-return valve • Shut-off valve for each pump (on suction and pressure side) • Diaphragm expansion tank with forced flow Max. delivery rate: 1.2 – 4.2 m³/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	
	Pressure booster system GENO FU-X 2/40-2 N	730 641
	Same as 730 640 , however, with option for time/load switch-over. For additional pressure booster systems, please inquire.	
	Conductivity-controlled blending unit	
	1"	185 790
	2"	185 795
For the generation of a defined residual conductivity in case of fluctuating raw water qualities.		

4 Transport, placing 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. Take note of 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 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 can tip and crush persons/limbs.
- ▶ Transport the system by means of a forklift or lift truck with appropriate forks only.
- ▶ 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-X 2200 and GENO-OSMO-X 3000.

4.3 Storage

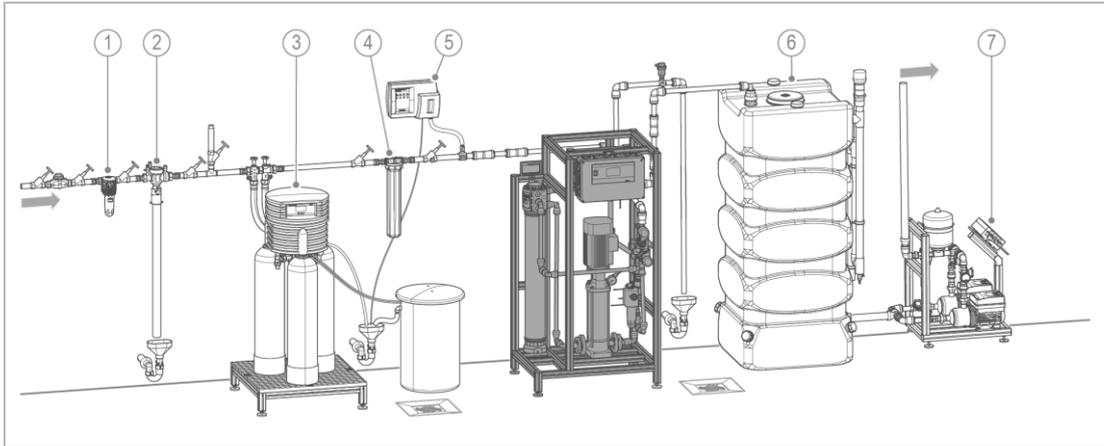
- ▶ Protect the product from the impacts below when putting it in storage:
 - Dampness, moisture
 - Environmental impacts such as wind, rain, snow, etc.
 - Frost, direct sunlight, severe heat exposure
 - Chemicals, dyes, solvents, and their vapours

5 Installation



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

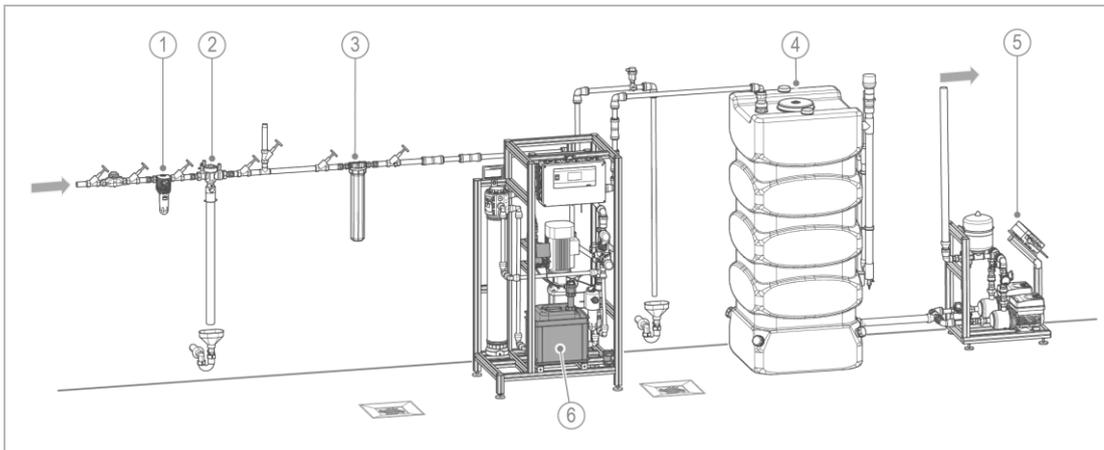
Installation example for GENO-OSMO-X



Designation	
7	Drinking water filter (e.g. BOXER KDX)
8	System separator GENO-DK 2
9	Water softener Delta-p-I
10	Activated carbon filter AKF

Designation	
11	Hardness control measuring device softwatch
12	Pure water tank RT-X with level probe and sterile air filter
13	Pressure booster system GENO-FU-X 2/40-2 N

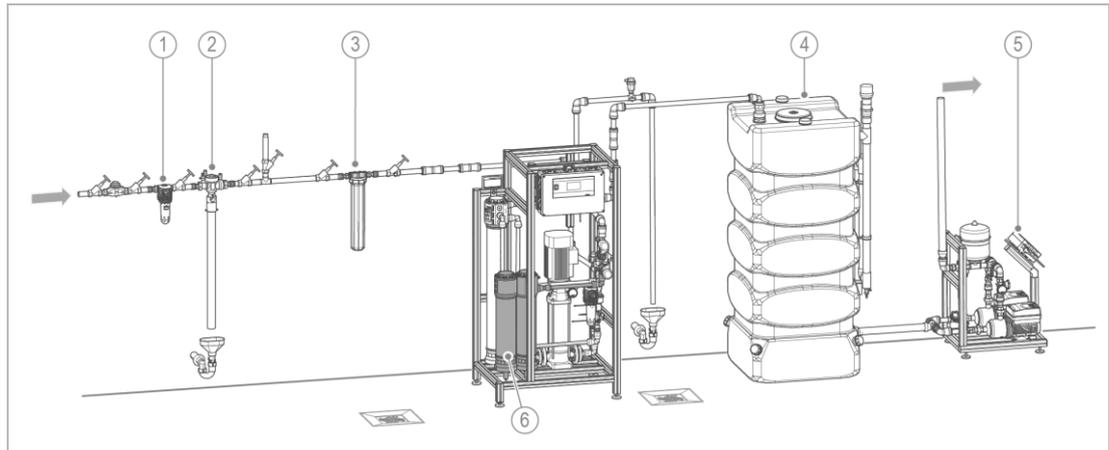
Installation example for option: Antiscalant



Designation	
14	Drinking water filter (e.g. BOXER KDX)
15	System separator GENO-DK 2
16	Activated carbon filter AKF

Designation	
17	Pure water tank RT-X with level probe and sterile air filter
18	Pressure booster system GENO-FU-X 2/40-2 N
19	Antiscalant dosing

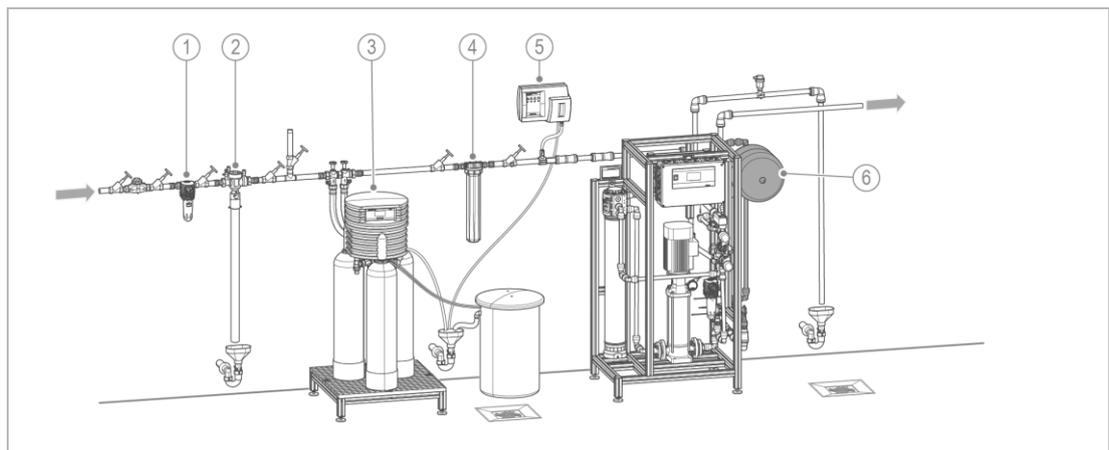
Installation example for option: AVRO



Designation	
1	Drinking water filter (e.g. BOXER KDX)
2	System separator GENO-DK 2
3	Activated carbon filter AKF

Designation	
4	Pure water tank RT-X with level probe and sterile air filter
5	Pressure booster system GENO-FU-X 2/40-2 N
6	AVRO modules

Installation example for option: Online skid



Designation	
1	Drinking water filter (e.g. BOXER KDX)
2	System separator GENO-DK 2
3	Water softener Delta-p-I

Designation	
4	Activated carbon filter AKF
5	Hardness control measuring device softwatch
6	Online skid

5.1 Requirements for the installation site

Obey local installation directives, general guidelines and technical specifications.

- The installation site must be frost-proof and protect the system 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 respective 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/Required space

- The sufficiently dimensioned installation surface of the system (foundation) must be level and have 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 operating 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 can 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 note of the water analysis).
 - Water softener or Antiscalant dosing (not with option: AVRO)
- To prevent scaling, it is possible to integrate the patented AVRO technology as an alternative process.
- 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 do 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 system in the soft water outlet in order to increase operation safety.

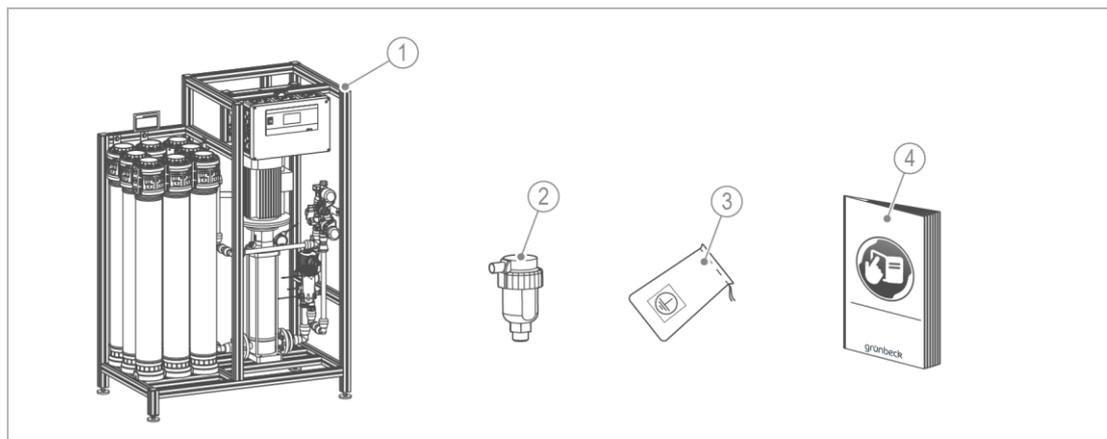
5.1.3 Requirements for electrical wiring

- For the power supply of the system, a power outlet of 3 x 400 V/50 Hz/L/N/PE (with a fuse protection of 20 A) is required (refer to chapter 5.4).
- The supply line to the system provided by the client on site must be dimensioned and routed according to the respective type of system (refer to the electric circuit diagram, order no. 750 292).

5.2 Checking the scope of supply



The reverse osmosis systems are pre-assembled on an aluminium rack and ready for connection. Depending on the respective system design, they are equipped with expansion modules (AVRO module, Online skid, Antiscalant dosing).



Designation	
1	GENO-OSMO-X
2	3-way aeration and ventilation valve (DT-040 1/2")

Designation	
3	Bag with connection material for "Potential equalisation of aluminium rack" (placed in the power distribution)
4	Operation manual

- ▶ Check the scope of supply for completeness and damage.

5.3 Water installation

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

- ▶ Do all work for all versions in an analogous way.



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

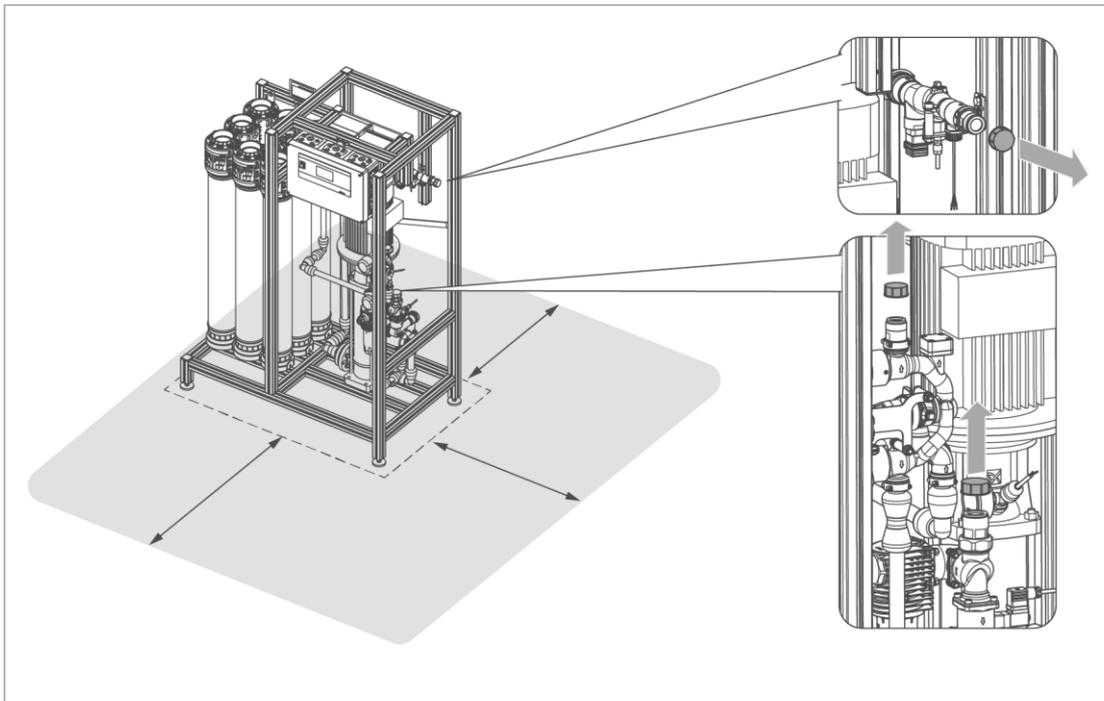
5.3.1 Preliminary work

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/commissioning due to moisture condensation on electronic components inside the control unit.
- ▶ Unpack the system and let it rest unused at the installation site for 1 hour before installing it.
- » Possible moisture on electronic components inside the control unit can dry off.

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



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

5.3.2 Connecting the system

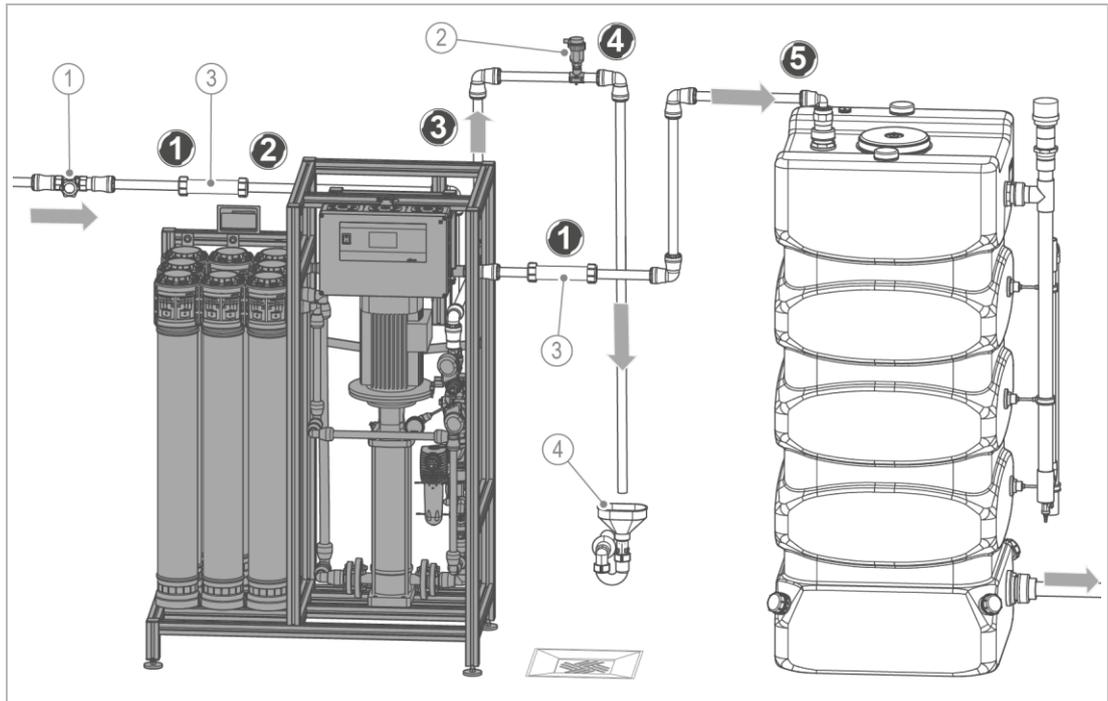
Pipes made of corrosion-resistant material provided by the client on site for feed water and permeate must be separable, e.g. by means of a screw connection (fitting piece).



The fitting piece – 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 must be separated.

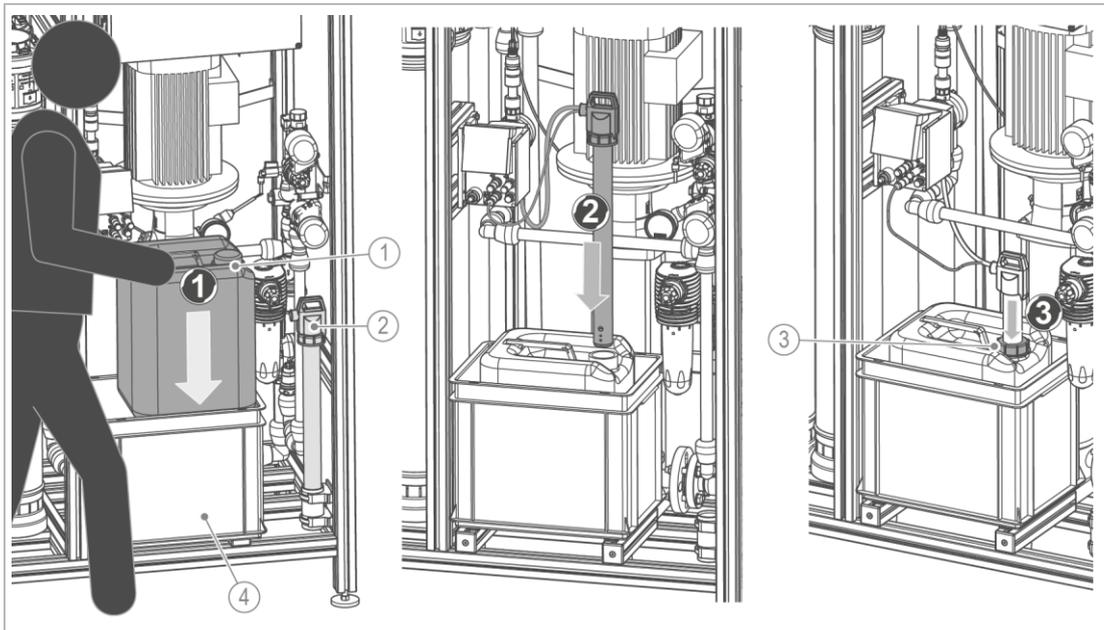


Designation	Designation
1 Shut-off valve (to be provided by client on site)	3 Fitting piece with screw connection (to be provided by client on site)
2 Aeration/ventilation valve	4 Drain connection acc. to DIN EN 1717

1. Install each a fitting piece with screw connection 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 discharge pipe “concentrate”.
5. Connect the permeate pipe to the permeate supply tank.

5.3.3 Antiscalant dosing (option)

► Proceed as follows when doing the initial filling with Antiscalant dosing agent:



Designation	Designation
1 20-l canister of Antiscalant dosing agent (e.g. MT 4000)	3 Sliding cover
2 Suction lance (placed in holder)	4 Collecting container

1. Put the canister into the collecting container and remove the screw cap. Keep the screw cap – to close the canister after use.
2. Put the suction lance into the canister.
3. Secure the suction lance with the sliding cover.
 - » The dosing pump is plugged into the socket of the power distribution.
 - » The dosing pump is put into operation by the GENO-OSMO-X control unit.



Obey the operation manual of the dosing pump.

5.4 Electrical installation



Have the electrical installation done by a qualified electrician only.



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/commissioning.
- ▶ Switch off the supply voltage before working on electrical system parts.
- ▶ Secure the system against restart.
- ▶ Discharge residual voltage.
- ▶ Only use suitable, undamaged tools.
- ▶ Use personal protective equipment – do not work with wet hands.

NOTE:

The frequency converter of the high-pressure pump can cause malfunctions of the residual current circuit breaker installed in the mains supply line.

- ▶ Use an AC/DC sensitive RCCB with a response threshold of 300 mA.
- ▶ For the on-site power supply of the system, use a power outlet of 3x 400 V/50 Hz/L/N/PE with 20 A fuse protection.

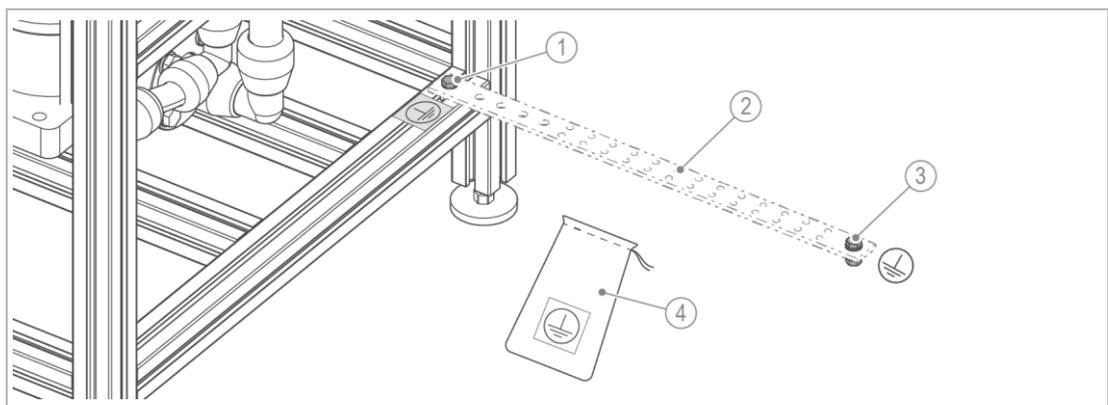
5.4.1 Establishing potential equalisation



In normal operation, the speed-controlled high-pressure pump can have a ground leakage current of > 10 mA.

- Connection to the on-site potential equalisation is required.

The protective conductor must have a minimum cross-section of 6 mm² or 10 mm² Al.



Designation

- | | |
|---|-----------------|
| 1 | Grounding point |
| 2 | Grounding tape |

Designation

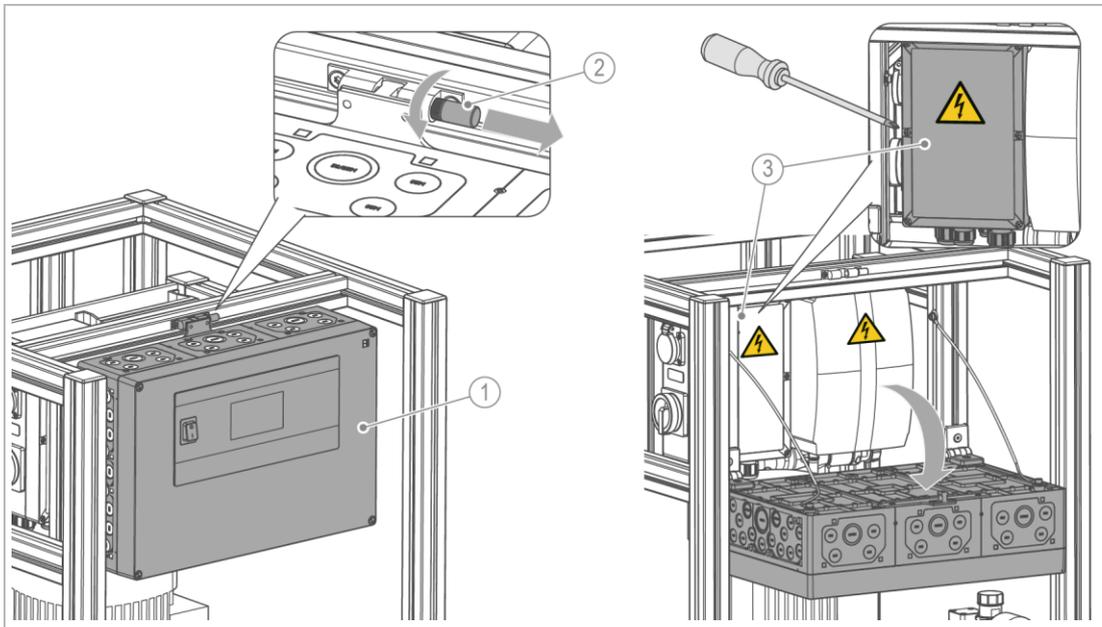
- | | |
|---|--|
| 3 | Grounding point for potential equalisation by client |
| 4 | Bag with connection material |

1. Remove the bag with the connection material from the power distribution box.
2. Connect the grounding point to the aluminium rack – use the connection material: hammer nut, hexagon head screw M8x25 and serrated washer.
3. Attach the “Grounding” label.
4. Connect the protective conductor to the potential equalisation provided by the client – use the connection material: hexagon head screw M8x20, washer and spring washer.

5.4.2 Establishing electrical connection



Via the power distribution, the entire “production line” (water softener, automatic water analysis system or Antiscalant dosing, reverse osmosis, EDI-X and pressure booster) can be supplied with power.



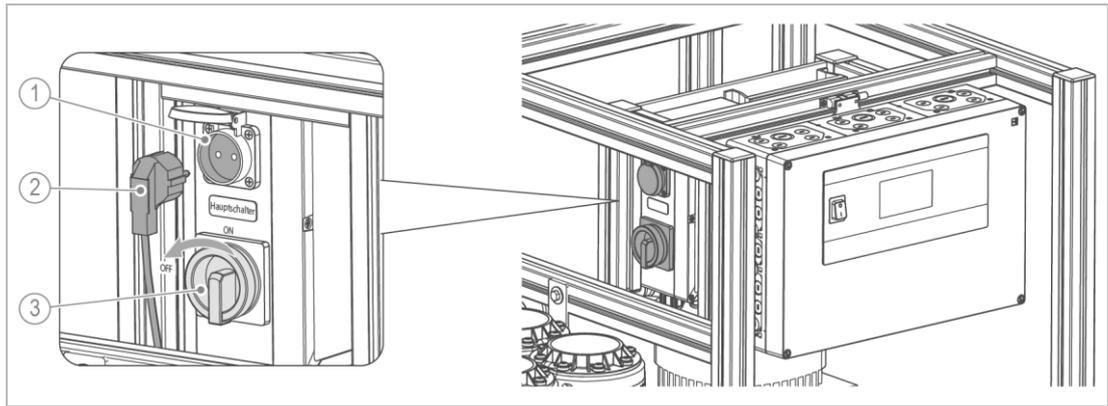
Designation

- 1 Control unit
- 2 Lock

Designation

- 3 Power distribution

1. Loosen the lock – unscrew slightly.
2. Carefully hinge down the control unit.
 - » Wire ropes hold the control unit in place.
 - » The power distribution is accessible.
3. Loosen the screws of the cover of the power distribution box.
4. Make the electrical connection (refer to electrical wiring diagram, order no. 750 292).
 - ▶ Close the power distribution box.
 - ▶ Hinge up the control unit and secure it with the lock.



Designation	Designation
1 Socket (230 V)	3 Main switch
2 Plug of Antiscalant dosing pump	



In case of GENO-OSMO-X Antiscalant, the dosing pump is supplied with power via the socket.

- ▶ Put the plug of the dosing pump into the 230 V socket.
- ▶ Before starting up the system, make sure that the control unit/power distribution box is closed – the main switch must be in the OFF position.

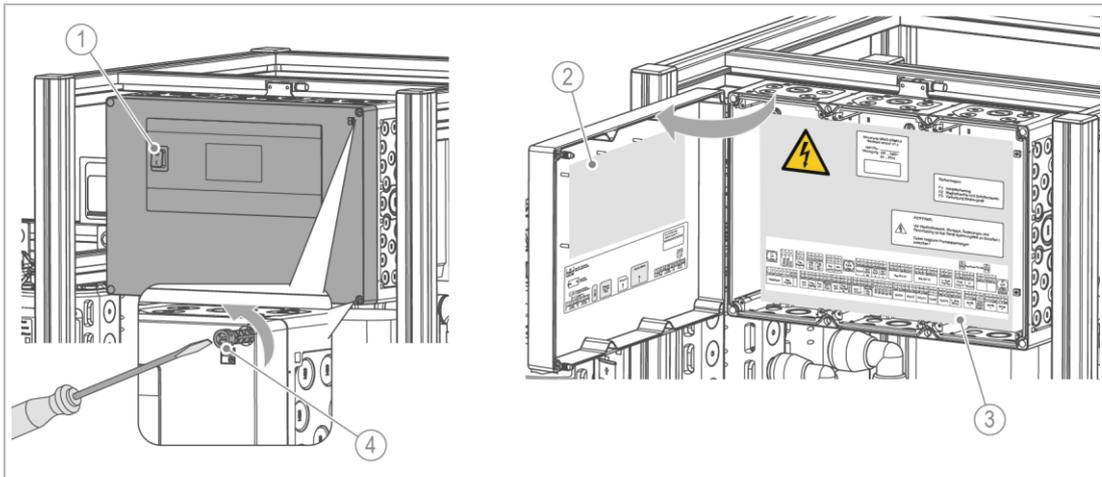
5.4.3 Line connections (within the GENO-OSMO-X control unit and the GENO-tronic operating unit)



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 or 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.
- ▶ Obey the warning labels in the control unit.

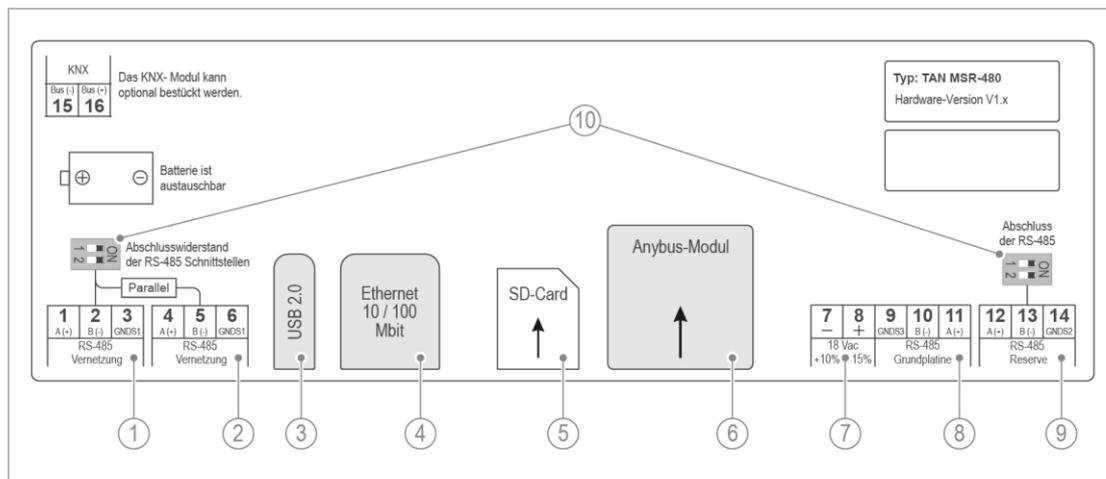
Opening the control unit



Designation	Designation
1 Mains switch on housing cover	3 Terminal strip of motherboard
2 Operating board	4 Screws

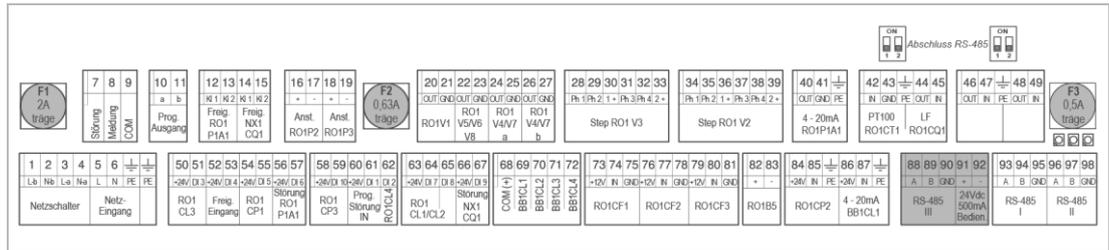
1. Make sure that the system is de-energised.
2. Loosen both screws.
3. Swing open the cover.
 - » The operating board and the terminal strip are accessible.

5.4.3.1 Operating board



Designation	Designation
1 RS-485 for interconnection of Modbus RTU	7 Voltage supply
2 RS-485 for interconnection of Modbus RTU	8 RS-485 basic module
3 USB 2.0 reserve	9 RS-485 for interconnection of internal system components
4 Ethernet 10/100 Mbit	10 Terminating resistors for RS-485 interfaces
5 SD card slot	
6 Anybus module interface	

5.4.3.2 Terminal strip of motherboard



Power supply of operating board

Terminal Motherboard	Function	Terminal Operating board
91	24 VDC / 500 mA	8
92	Ground	7

RS-485 (III) serial interface

Terminal Motherboard	Function	Terminal Operating board
88	RS 485 A	11
89	RS 485 B	10
90	RS 485 GND	9

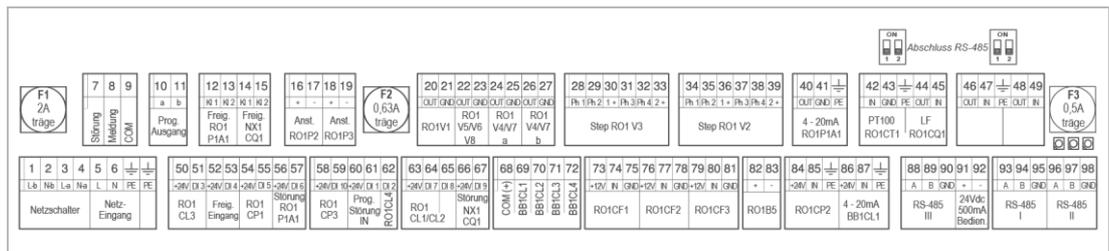
Fuses of motherboard

Fuse	Function	Comment
F1	2 A slow-blow	Main fuse of mains inlet
F2	0.63 A slow-blow	24 VDC solenoid valves, step motors
F3	0.5 A slow-blow	Operating board 24 VDC

Additional connections of the motherboard



The line connections below are pre-installed in the system at the factory and must not be modified:



Term.	Signal	Colour	Function	Line	Comment	
1	L-b		Mains switch on housing cover	H05VV-F 5G1.5 mm ²	From mains switch	
2	N-b				To mains switch	
3	L-a					
4	N-a					
PE					Protective conductor	
5	L		230 V~ feed from power distribution box RO1E2	38 39 40	H05VV-F 3G0.75 mm ²	Mains input
6	N					
PE						Protective conductor

Term.	Signal	Colour	Function	Line	Comment	
12	+ 24 V=	WH	Frequency converter (FC) of high-pressure pump RO1P1A1	1	LiYcY 7x0.25 mm ²	Enable FC
13	IN	BN		2		
56	+ 24 V=	GY		10		Fault signal FC
57	DI 6	PK		11		
40	4-20 mA	YE		6		
41	GND	GN				
PE						
20	+ 24 V=		Feed water solenoid valve RO1V1	H05VV-F 3x0.75 mm ²	Pulsed for power reduction	
21	GND					
28	Ph1	GN	Adjusting valve Concentrate-to-drain RO1V3	LiYY 7x0.25 mm ² (blue litz wire is not being used)	Step motor	
29	Ph1	WH				
30	Com1	BN				
31	Ph2	PK				
32	Ph2	YE				
33	Com2	GY				
34	Ph1	GN	Adjusting valve Concentrate recirculation KR RO1V2		Step motor	
35	Ph1	BU				
36	Com1	BN				
37	Ph2	PK				
38	Ph2	YE				
39	Com2	GY				
42	Pt 100	BN	Temp. measurement RO1CT1	LiYcY 4x0.25 mm ²		
43		GN				
PE			Conductivity measuring cell RO1CQ1 cell constant 0.1		Screen	
44	K= 0.1	WH				
45	1/cm	YE	Conductivity measuring cell RO1CQ1 cell constant 1.0			
46	K= 0.1	WH				
47	1/cm	YE				
54	+ 24 V=	WH	Negative pressure switch RO1CP1	LiYY 2x0.5 mm ²		
55	DI 5	BN				
58	+ 24 V=	WH	Overpressure switch RO1CP3			
59	DI 10	BN				
73	+12 V=	WH	Flow sensor Feed water RO1CF1	LiYY 3x0.25 mm ²		
74	Imp	GN				
75	GND	BN	Flow sensor FEED RO1CF2			
76	+12 V=	WH				
77	Imp	GN	Flow sensor Permeate RO1CF3			
78	GND	BN				
79	+12 V=	WH				
80	Imp	GN				
81	GND	BN				

5.4.4 Pretreatment AVRO RO1B5

Term.	Signal	Pin	Function	Line	Comment
82	+	1	AVRO treatment module(s) RO1B5	H05VV-F 2x0.5 mm ²	
83	-	2			

5.4.5 Line connections to other subsystems



Obey the operation manuals of the subsystems.

5.4.5.1 System outputs

Term.	Signal	Colour	Function	Line	Comment
System output Tank					
68	+24 V=		Pure water tank Filling level detection Digital signals BB1CL1	LiYY 5x0.25 mm ²	
69	BB1CL1				System OFF
70	BB1CL2				System ON, bypass CLOSED
71	BB1CL3				Dry-run protection of pressure booster OFF, bypass OPEN
72	BB1CL4				Dry-run protection of pressure booster ON
Or alternatively					
86	+ 24 V=	WH	Pure water tank Filling level detection Analogue signal BB1CL1	Kaweflex 3x0.34 mm ²	
87	In	BN			
PE		GN			
System output Online					
84	+ 24 V=	WH	Pressure transducer RO1 CP2 0...6 bar	LiYcY 2x0.25 mm ²	
85	In	BN			
PE					Screen

5.4.5.2 Residual hardness monitoring device NX1CQ1 in case of pretreatment by water softener

Term.	Signal	Colour	Function	Line	Comment
14	Com		Hardness control measuring device softwatch NX1CQ1 Jumper between terminals 7/12	16	Enable NX1CQ1
15	N.O.			17	
66	+24 V=			8	Fault NX1CQ1
67	DI9			10	

5.4.5.3 Residual hardness monitoring device NX1CQ1 in case of pretreatment by water softener (Hardness control measuring device softwatch, as of serial no. 40342)

Term.	Signal	Colour	Function	Line	Comment
14	Com		Hardness control measuring device softwatch NX1CQ1 Jumper between terminals 9/14	18	Enable NX1CQ1
15	N.O.			19	
66	+24 V=			10	Fault NX1CQ1
67	DI9			12	

5.4.5.4 Dosing pump RO1P2 in case of Antiscalant pretreatment

Term.	Signal	Colour	Pin	Function	Line	Comment
16	+	WH	4	Dosing pump RO1P2	LiYY 2x0.25 mm ²	Pulse input
17	-	BN	1			
63	+24 V=	WH, BN	1, 2		LiYY 4x0.25 mm ²	Signal/fault signal output
64	RO1CL2	YE	3			Empty/fault signal
65	RO1CL1	GN	4			Pre-warning

5.4.5.5 Dosing pump RO1P3 in case of Antiscalant pretreatment

Term.	Signal	Colour	Pin	Function	Line	Comment
18	+	WH	4	Dosing pump RO1P3	LiYY 2x0.25 mm ²	Pulse input
19	-	BN	1			
50	+24 V=	WH, BN	1, 2		LiYY 4x0.25 mm ²	Signal/fault signal output
51	RO1CL3	GN	4			Pre-warning
62	RO1CL4	YE	3			Empty/fault signal

5.4.5.6 Interface RS-485 Data line to interconnected subsystems Water softener and/or Pressure booster

Connecting terminating resistors



If more than two subsystems are interconnected or if the length of the line between the two is > approx. 20 m, the so-called terminating resistors have to be connected to the two “endpoints” by means of DIP switches.

RS485 interconnection between	Terminating resistors to be connected in case of	
GENO-mat duo WE-X + GENO-OSMO-X	GENO-mat duo WE and GENO-OSMO-X (*)	
Delta-p + GENO-OSMO-X	Delta-p and GENO-OSMO-X (*)	
GENO-OSMO-X + pressure booster	GENO-OSMO-X + pressure booster (*)	
GENO-mat duo WE-X or Delta-p + GENO-OSMO-X + pressure booster GENO-FU (HR)-X	GENO-mat duo WE	Pressure booster

(*) For length of line RS-485 > approx. 20 m

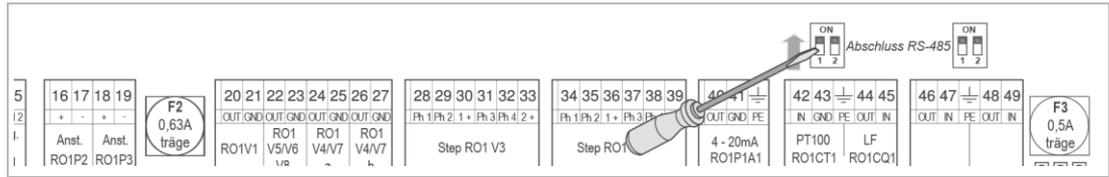
In case of GENO-OSMO-X:

The terminating resistors are aligned below the sheet cover of the motherboard.

- Near terminal 43 (connection to water softener GENO-mat duo WE-X)
- Near terminal 50 (connection to water softener Delta-p)
- Near terminal 47 (connection to the pressure booster)

In case of IONO-matic WE-X controller or PBS controller:

- Near terminal 36



► Switch both DIP switches to “ON”, if required.

5.4.5.7 Pretreatment Water softener

Term.	Signal	Function	Line	Comment
93	RS -485 A	Control unit	36	LiYcY 3x0.25 mm ² (*)
94	RS -485 B	IONO-matic WE-X	37	
95	GND		GND2	
93	RS -485 A	Control unit	52	LiYcY 3x0.25 mm ² (*)
94	RS -485 B	Delta-p	51	
95	GND		50 GND	

5.4.5.8 Pressure booster installed downstream

Term.	Signal	Function	Line	Comment
96	RS -485 A	Control unit of pressure booster system	38	LiYcY 3x0.25 mm ² (*)
97	RS -485 B		39	
98	GND	GENO-FU (HR)-X	GND2	

(*) A screened line is required in case the length of the line is > 20 m. The screen must be connected to a vacant PE terminal on one side.

5.4.5.9 Optional signals or accessories

Term.	Signal	Function	Line	Comment
7	Fault	Signals	Each voltage-free, max. 230 V/1 A	Open in case of a power failure or a fault/signal
8	Signal	Collective fault signal and signal with joint common		
9	Common			
10		Programmable output	max. 1.5 mm ²	
11		(voltage-free, max. 230 V~/1 A)		
22	24 V=	RO1V5 (blending valve) or	H05VV-F 2x0.5 mm ²	BN
23	GND	RO1V6 (bypass valve)		BU
		RO1V8 (membrane degassing)		
24	24 V=	RO1V4 (first permeate) or	H05VV-F 2x0.5 mm ²	BN
25	GND	RO1V7 (draining)		BU
26	24 V=	RO1V4 (first permeate) or	H05VV-F 2x0.5 mm ²	BN
27	GND	RO1V7 (draining)		BU
PE		Reserve		
48				
49				
52	+ 24 V	Enable input	max. 1.5 mm ²	
53	DI4			
60	+ 24 V	Programmable fault signal input	max. 1.5 mm ²	
61	DI1			

6 Start-up/Commissioning



The initial start-up/commissioning of the product must be done by technical service personnel only.



CAUTION!

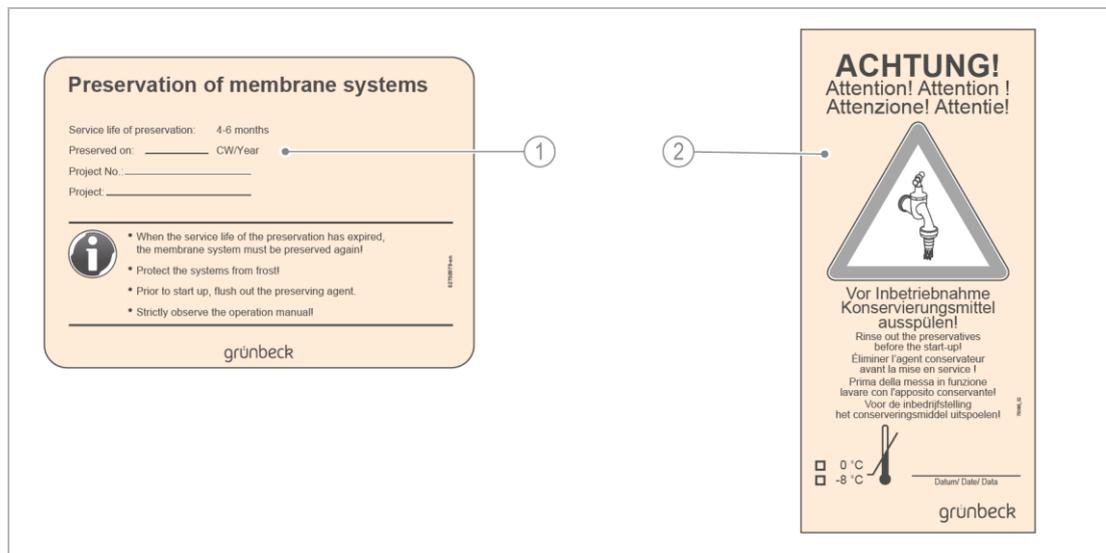
Climbing onto system components when operating components that are located at high levels.

- 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 that are 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.



Designation	Designation
11 Information sheet with details on the preservation done	12 Warnings at the system

- ▶ Obey and comply with the warnings.



WARNING Contact with preserving agent

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

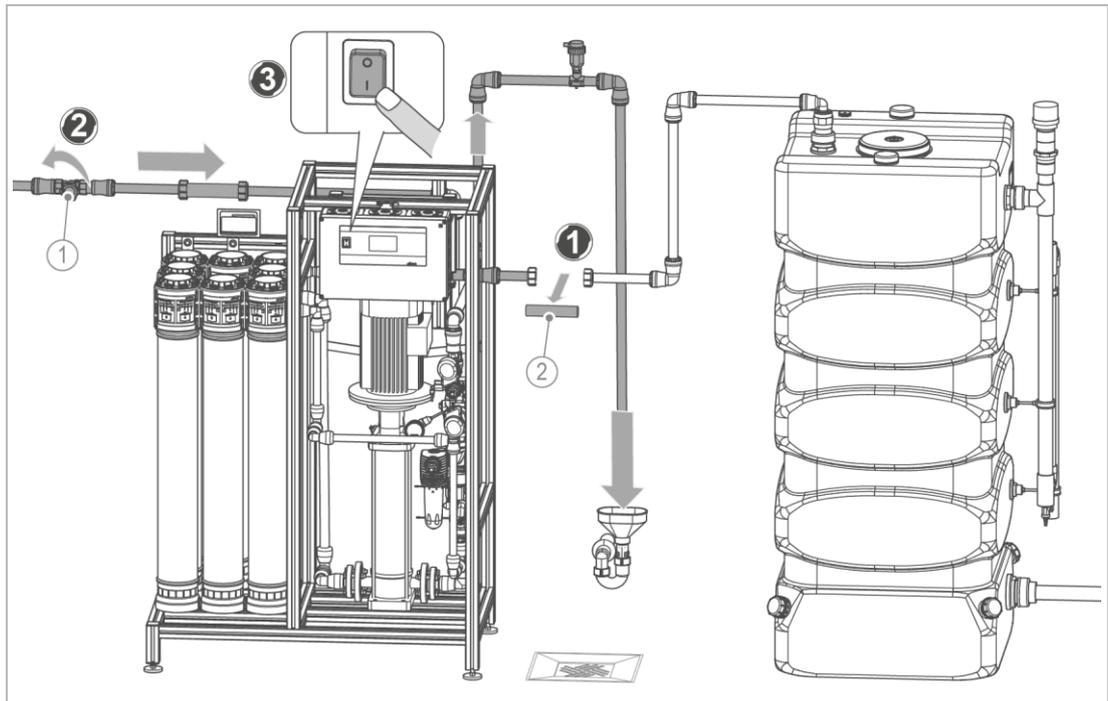
NOTE:

Danger in case of skipping or prematurely terminating the flushing process.

- By flushing out the preserving agent, the system is vented at the same time.
- If the flushing process is terminated, the high-pressure pump runs dry.
- The preserving agent gets into the permeate tank or a permeate line provided by the client - these can only be cleaned/flushed with difficulty.
- ▶ Always flush out the preserving agent.
- ▶ The system flushing can be restarted manually (refer to chapter 7.3.2.1 Operating mode „Flushing“).



Faulty parameter settings or missing signal connections can cause malfunctions due to which flushing out the preserving agent cannot be started.



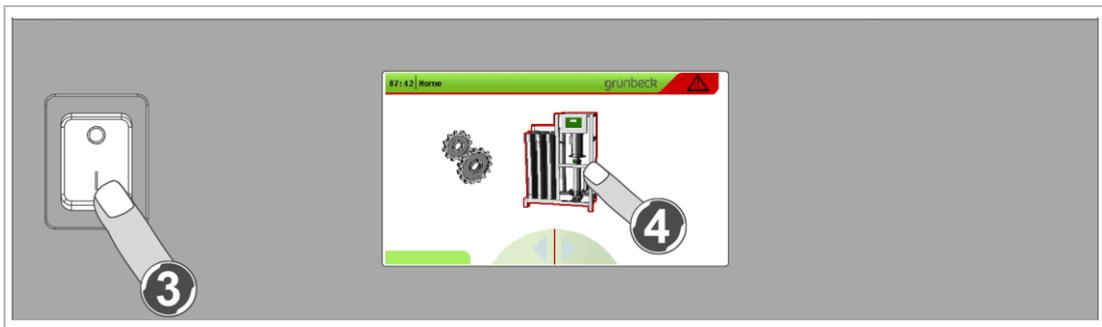
Designation
1 Shut-off valve Feed water inlet

Designation
2 Fitting piece for permeate pipe

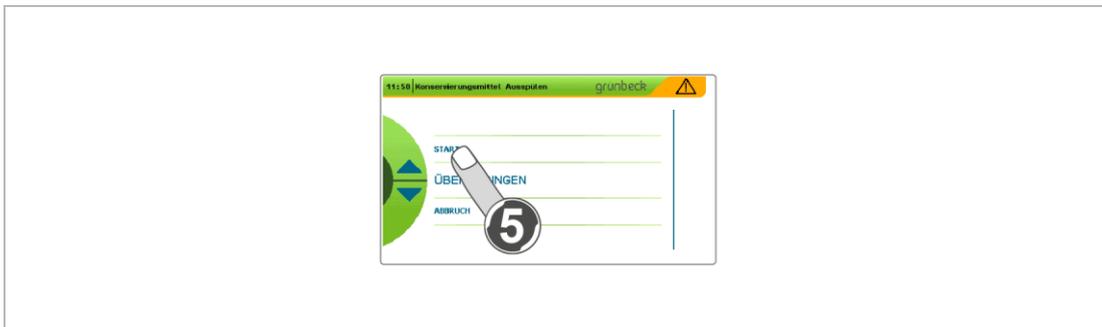
NOTE: Damage to the system when operated with hard water.

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

1. Remove the fitting piece from the permeate pipe.
 - » The permeate line is separated hydraulically.
2. Open the shut-off valve of the “feed water” inlet.
3. Switch on the control unit.



4. Tap on the GENO-OSMO-X system in the display.



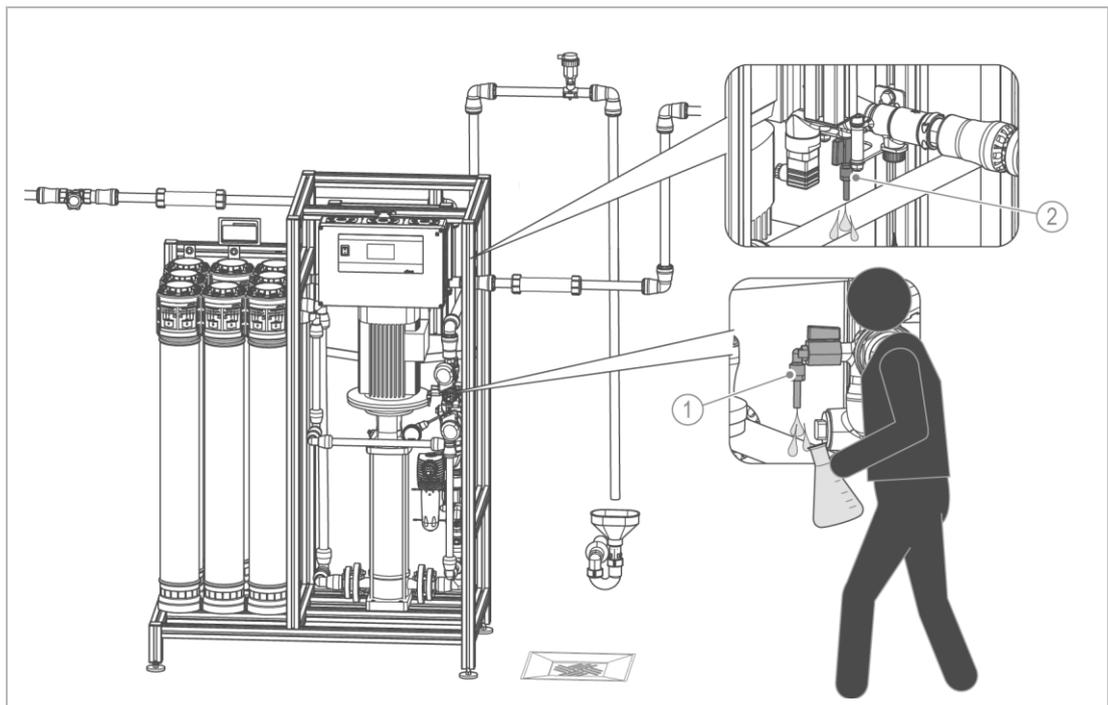
5. Tap on **START**.
 - » The feed water solenoid valve, the concentrate-to-drain control valve and at times the control valve for concentrate recirculation are opened.
 - » The system automatically stops flushing when three times the flushing volume has been flushed to the drain (duration subject to system size and programmed flushing volume).
6. Install the fitting piece into the permeate pipe.

6.2 Checking the system



CAUTION Risk of slipping at the sampling points.

- You might 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	Designation
3 Concentrate-to-drain sampling valve	4 Permeate sampling valve

3. Do the total hardness test.
 - a Take water samples of the permeate and, if necessary, of the concentrate.
4. Determine the quality of the permeate and the concentrate.
5. Document the values in the start-up/commissioning log (refer to chapter 13.1).

6.3 Setting the control unit

1. Make the basic settings (refer to chapter 7.2).
2. Check the operating mode of the subsystem GENO-OSMO-X in the Info level (refer to chapter 7.3.1).
3. Start the subsystem with the I/O button.
 - » The system's operating mode is **AUTOMATIC** and the I/O button is green.
4. In case of „Pretreatment Antiscalant dosing“, set the container size in the user programming level (refer to chapter 7.5.3).
5. Do a test run, if necessary.
6. Fill in the start-up/commissioning log (refer to chapter 13.1).
7. Recommendation: Create a system data printout of the OSMO-X for documentation purposes.

6.4 Handing over the product to the owner/operating company

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

6.4.1 Disposal of packaging

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

6.4.2 Storage of accessories

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

7 Operation/handling

The system is operated via the operating unit of the GENO-tronic control unit with 4.3" touch screen.

The control unit monitors the "production line" and is pre-programmed with different parameters subject to the respective system type.

The control unit can connect and visualise several components of the production line.

NOTE: Making incorrect setting at the control unit.

- Incorrect operation can lead to dangerous operating states and can cause personal injury.
- ▶ Only make the settings described in this chapter.



Settings in the technical service programming level must be done by Grünbeck's technical service or by a qualified specialist trained by Grünbeck only.

7.1 Operating concept

Screen saver

In the default setting, the screen saver is displayed.

- By tapping on the touch display, the basic display Home is activated.
- The screen saver is displayed automatically if the screen has not been touched for a period of 5 minutes (or for a set period of time).
- As soon as the touch screen is being touched or a signal or a fault occurs, the display returns to the basic display.

7.1.1 Basic display Home

The **Home** screen is the superordinate screen for all subsystems connected to/interconnected with the control unit of the reverse osmosis system.

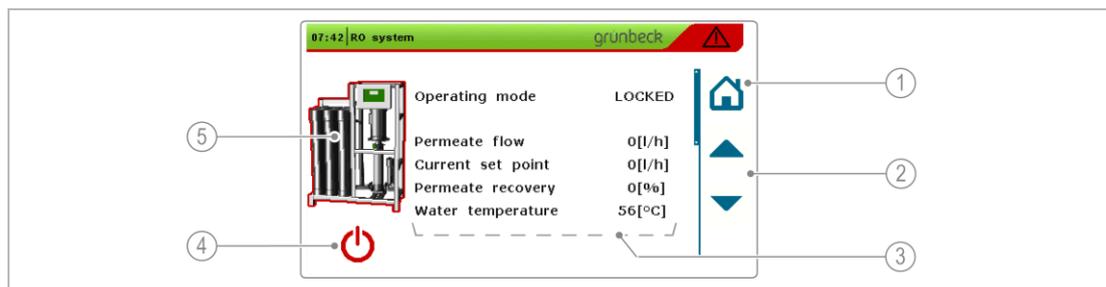
The arrangement of the subsystems on the display from left to right corresponds to the water flow through the overall system.



Designation	Function
1 Status bar	The system status is signalled by colours (green = no fault, yellow = warning, red = fault)
2 Subsystem section	By tapping on a subsystem , you switch to the Info level of the respective subsystem
3 ◀ and ▶	Buttons for scrolling
4	System settings: By tapping on the cogwheels , you switch to the basic settings

7.1.2 Info level

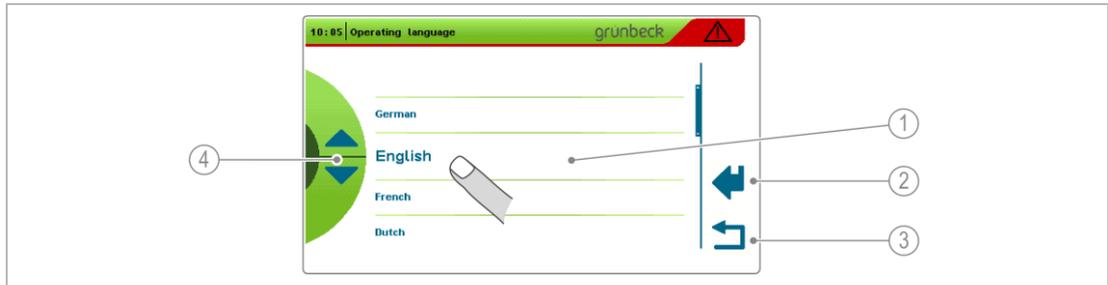
In case of subsystems with ON/OFF function (e.g. GENO-OSMO-X), the Info level features an ON/OFF button.



Designation	Function
1	Back to Home screen
2 ▲ and ▼	Buttons for scrolling Calling up information/parameters
3 Parameters	Operating mode and current measuring values
4	I/O button Green = subsystem ON, Red = subsystem OFF
5 Depiction of subsystem	By tapping on the subsystem, you switch to the Setting level of the respective subsystem.

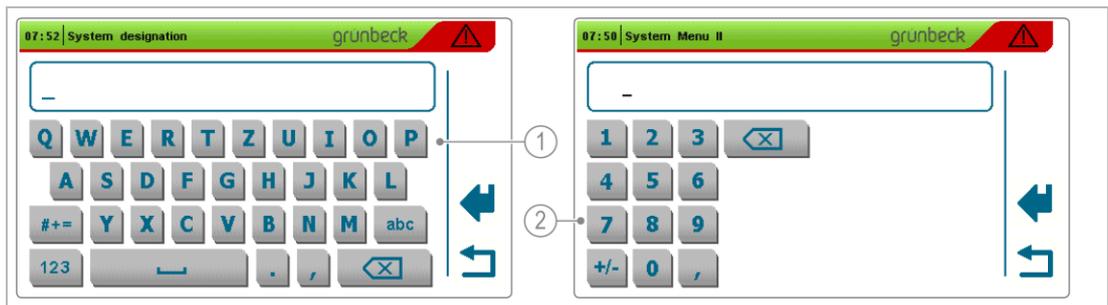
7.1.3 Setting the parameters

Different settings can be selected, modified, saved, or discarded as follows:



Designation	Function
1	Selection option
2	Selection line. The line in the middle is depicted larger
3	Save selection
4	Quit the menu without changing former selection
5	Buttons for scrolling

The numerical and the alphanumerical menu each have the same operating logic:



Designation	Designation
Alphanumerical	5 Numerical

7.1.4 Warning signals/faults



A pending signal or fault is shown in the status bar in red or yellow. The subsystem concerned is highlighted by a coloured frame (refer to chapter 9).

7.1.5 Menu structure

The table below shows the different menu levels with their respective parameters and settings.

Menu level 1	Menu level 2	Code	Settings/parameters *	
 Basic settings Control unit	System menu I		Operating language System designation Date, time Data logging Interval, min Load parameters Save parameters Screensaver, min Lock screen, sec	
	System menu II		Connection of all existing components of the "production line"	
	Software version		Indication of the software version	
	Subsystem section			
 Info level: Reverse osmosis system			Operating mode Permeate flow, l/h Current setpoint Permeate capacity, l/h Permeate conductivity, µS/cm Permeate recovery, % Water temperature, °C Service in, d AVRO (RO1B5), h Only with option: AVRO pretreatment Concentrate-to-drain, l/h Concentrate recirculation, l/h Permeate pressure, bar AVRO (RO1B5) treatment current, mA Only with option: AVRO pretreatment Output level Adjusting valve (RO1V3), % Output level Adjusting valve (RO1V2), % Conductivity Inlet and concentrate, µS/cm] Only with option: Conductivity meter Feed water flow, l/h FEED flow, l/h Analogue signal output to FC, %	
	Setting levels:	User programming level	Operating mode Cut-in pressure (only with option: Online) Cut-out pressure (only with option: Online) Automatic restart Forced operation Conductivity monitoring RO1CQ1 Conductivity limit value RO1CQ1 Delay Conductivity fault/signal RO1CQ1	
		Installer level	113	Setting input/output logic
		Technical service level		Contains parameters that might have to be adapted to the conditions on site during start-up/commissioning.
		Extended technical service level I		Contains parameters that in general only need to be programmed in Grünbeck's production but rarely on site.
		Extended technical service level II		

Menu level 1	Menu level 2	Code	Settings/parameters *
	Counter readings, error memory	245	Operating hours Sum permeate Sum Concentrate-to-drain Run time HP pump RO1P1 Run time HP pump stage 2 RO1P4 Operating hours AVRO module RO1B1 Limit value for recovery exceeded Operating phase counter < 30 minutes Operating phase counter 30 ... 90 min Operating phases > 90 minutes 1 Exxx <i>Error memory containing the 20 most recent events</i> ... 20 Exxx
	Resetting counter readings		<i>Resetting counter readings after maintenance or replacement of components</i>
	Jog mode		<i>The jog mode (key operation) is required during start-up/commissioning and for service purposes if components need to be replaced.</i>
	Operating parameter memory		<i>In the operating parameter memory, the last 30 parameter changes are documented.</i>
	Info level: Permeate tank		Filling level, % Filling level, cm Filling level, m ³
	Info level: Antiscalant dosing		Estimated range of dosing agent
(Option)	Setting levels:	User programming level	Container size (canister), l Replacing dosing tank P2
		Technical service level 	<i>Contains parameters that might have to be adapted to the conditions on site during start-up/commissioning.</i>

* Information in italics is for explanation purposes only and does not appear like this in the control unit. These items can each contain several parameters.

 Code-protected level

7.2 Basic settings of control unit GENO-tronic

- ▶ Tap on  in the basic display.
- » The system areas below are shown:
 - System menu I
 - System menu II ()
 - Software version



In the tables that follow, the factory settings are **greyed out**.

7.2.1 System menu I

Parameters	Setting range	Remarks
Operating language	German	
	English	
	French	
	Dutch	
	Italian	
	Russian	
	Spanish	
System designation		18 digits, alphanumerical, text will appear in the upper left corner of the Home screen
Date, time		Automatic switch-over from DST (daylight saving time) to ST (standard time)
Data logging	Start	The measured values of all subsystems (Info level) are logged on the SD card.
	Terminate	
Interval	1...10...999 min	Specifies the frequency at which measured values are archived on SD card
Loading parameters		Loads the parameter record previously saved on SD card. Note: Do not do so while permeate production is in progress
Saving parameters		Saves current parameter record on SD card
Screen saver	0...1...99 min	
Locking screen	10...30...99 sec	

7.2.2 System menu II (🔒)



Settings in the system menu II must be made by Grünbeck's technical service or by a qualified specialist trained by Grünbeck only (refer to Technical service manual, order no. 750 929).

- ▶ Connect all existing components of the "production line" that are to be displayed in the GENO-tronic.

7.2.3 Software version

Indication of the software version of the GENO-OSMO-X control unit and the GENO-tronic operating unit, for example:

- Indication of software version **V1.23**
- Software version of motherboard **V1.95**



A software update must be made by Grünbeck's technical service or a qualified specialist trained by Grünbeck only (refer to Technical service manual, order no. 750 929).

7.2.4 Data logging on SD card

The SD card socket is integrated in the operating unit GENO-tronic (refer to chapter 5.4.3.1).



The SD card used must be FAT32 formatted.

Recommendation: Do thorough formatting, no quick formatting.

1. Terminate the **data logging** in system menu I.
2. Open the housing of the control unit.
3. Remove the SD card from the slot.

Theoretically, the measured values on the SD card comprise an entire “production line”:

- Pretreatment (water softener or Antiscalant dosing)
- Reverse osmosis (RO)
- Electrodeionisation (EDI)
- Pure water tank (BB1)
- Pressure booster (PBS)



Recommendation: Open the file with a spreadsheet software (e.g. MS-Excel) – that way, the structure is optimally displayed.

OSMO-X-DataLog

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1		"000000000"												
2	Datum	Uhrzeit	NX1								RO1 P2	RO1 P3	RO1	
3			C m³	C m³	Q m³/h	T h	R	S d	R	V m³	V m³	V m³	Q l/h	C µS/cm
4	29.10.2014	14:18:02	0	0	0	0	0	0	0	0	1600	1600	1600	2992
5														17.5

Column/line	Comment
B1	– Serial number of the system
C/D	m³ Display of the active exchangers in case of a Delta-p water softener
E	m³/h Display of the flow of exchanger 1 – equals 50 % of the total flow

7.2.5 OSMO-X import (V1.X)



For the OSMO-X import (V1.X), an Excel file is available which can be called up via the FTP server:

O:\5_Frischwasser\541_FW-Membrantechnik\541-1_Umkehrosroseanlagen\541-10-X-GENO-OSMO-X-HLX\Software OSMO-X\Linux_ab_Seriennummer_153600136

- ▶ Open the Excel file

7.2.6 GENO-tronic data logging

System	Parameters/Comment	Value displayed	Unit
Water softener NX1 (Duo-WE-X or Delta-p)	Remaining capacity Exchanger*	C XX,XX	m ³
	Remaining capacity Exchanger** (Delta-p only)	C XX,XX	m ³
	Flow rate	Q XX.XX	m ³ /h
	Time since last regeneration	T XXX	h
	Current regeneration step	R (0/1...5)	
	Time until service is due	S XXX	d
	Regeneration counter	XXXXXX	
	Soft water meter (without logging on SD card)	V XXXXXX	m ³
	Software version	V1.xx	
Residual hardness monitoring NX1CQ1 (Hardness control measuring device softwatch)	Status	ok/malfunction	
Dosing 1 P2/P3 (Grundfos)	RO1P2: Time the dosing agent is expected to last	V XXXX	m ³
	RO1P3: Time the dosing agent is expected to last	V XXXX	m ³
Reverse osmosis 1 (OSMO-X)	Permeate flow rate	Q XXXX	l/h
	Permeate conductivity	C XX.X	μS/cm
	Recovery	A XX	%
	Water temperature	T XX	°C
	Permeate pressure (only with option: Online-skid)	p X.XX	bar
	Operating status: (OFF/Operation/Flushing/Forced operation/Forced stop/Discharge of first permeate)	Z (0...6)	
	Concentrate-to-drain flow rate	QKK XXXX	l/h
	Concentrate recirculation flow rate	QKR XXXX	l/h
	AVRO treatment current (only with AVRO, AVRO + DOS pretreatment)	AVR XXX	mA
	Inlet conductivity	CR XXXX	μS/cm
	Concentrate conductivity (only if conductivity measurement Inlet + Concentrate is active)	CK XXXX	μS/cm
	Time until service is due	S XXX	d
	Time until AVRO service is due (only with AVRO, AVRO + DOS pretreatment)	SAVR XXXX	h
	Reverse osmosis 1 permeate stage (OSMO-X)	Permeate flow rate	Q XXXX
Permeate conductivity		C XX.X	μS/cm
Recovery		A XX	%
Permeate pressure (of stage 1)		p X.XX	bar
Concentrate flow rate to stage 1		QKK XXXX	l/h
Concentrate recirculation flow rate internally		QKR XXXX	l/h
Electrodeionisation EDI1 (<i>postponed until EDI contains the hardware of the OSMO-X</i>)	Diluate flow rate	Q XXXX	l/h
	Diluate conductivity	C X.XX	μS/cm
		R X.XX	MΩ*cm
	Diluate temperature	T XX	°C
	Recovery	A XX	%
	Diluate inlet pressure	p X.XX	bar
	Diluate outlet pressure	p X.XX	bar
	Concentrate inlet pressure	p X.XX	bar
	Voltage of power supply unit	U XXX	V

System	Parameters/Comment	Value displayed	Unit
	Current of power supply unit	I XXX	A
	Operating status: (OFF/Operation/Forced operation/Discharge of permeate/Discharge of diluate)	Z (0...5)	
	Concentrate-to-drain flow rate	QKK XXXX	l/h
	Inlet conductivity	CR XXXX	µS/cm
	Concentrate conductivity (not for all versions)	CK XXXX	µS/cm
	Time until service is due	S XXX	d
Pure water tank BB1	Filling level	L XXX	%
Pressure booster DEA1P1/P2 (single or twin)	Operating status DEA1 P1	Off/Manual P1/ Manual 2/Automatic	
	Flow rate	Q XX.XX	m³/h
	Operating hours DEA1 P1	XXXXX	h
	Operating hours DEA1 P1 (twin pressure booster only)	XXXXX	h
	Water volume	V XXXXX	m³
	Time until service is due	S XXX	d

7.3 Reverse osmosis system GENO-OSMO-X

7.3.1 Info level



- ▶ Tap on the subsystem  in the basic display.
- » The submenu of the GENO-OSMO-X is shown.

The information below is stored in the Info level of the GENO-OSMO-X:

Parameters	Description
Operating mode	– Locked/Flushing/Manual operation/Automatic
Permeate flow rate	l/h
Current setpoint of permeate capacity	l/h
Permeate conductivity	µS/cm
Permeate recovery	%
Water temperature	°C
Service in	d Maintenance work due
AVRO (RO1B5)	h Only with option: AVRO pretreatment
Concentrate-to-drain	l/h
Concentrate recirculation	l/h
Permeate pressure	bar Only with option: Online skid
AVRO (RO1B5) treatment current	mA Only with option: AVRO pretreatment
Output level of adjusting valve (RO1V3)	%
Output level of adjusting valve (RO1V2)	%
Inlet and concentrate conductivity	µS/cm Only with option: Conductivity meter
Feed water flow rate	l/h
FEED flow rate	l/h
Analogue signal output to FC	%

7.3.2 Setting level



- ▶ Tap on the subsystem  in the Info level.
- » The setting level of the GENO-OSMO-X is shown.
- ▶ Select the required sublevel.
- The setting level of the subsystems includes:
 - User programming level
 - Installer level (Code 113)
 - Technical service level (🔒)
 - Extended technical service level I (🔒)
 - Extended technical service level II (🔒)
 - Counter readings, error memory (Code 245)
 - Resetting counter readings (🔒)
 - Jog mode (🔒)
 - Operating parameter memory
- ▶ Select the parameter to be set and set the required values.



Settings in the technical service levels must be made by Grünbeck's technical service or a qualified specialist trained by Grünbeck only (refer to Technical service manual, order no. 750 929).

7.3.2.1 User programming level

Parameters	Setting range	Remarks
Operating mode		The desired operating mode (except for Locked) must be started in the Info level with the I/O button (the colour of the I/O button changes from red to green).
	Locked	Delivery state, no system operation possible.
	Flushing	Flushing volume stored in the system size will be flushed to the drain once.
	Manual operation	Not possible in case of system output Online = Permeate production continues as long as the system stays switched on via the I/O button. A switch-off command via tank full detection will not be processed.
	Automatic	Permeate is produced subject to the level in the permeate tank or the permeate pressure.
Cut-in pressure (only in case of system output Online)	1.0 ... 3.0 ... 5.0 bar	In automatic operation, the system starts permeate production if the cut-out pressure is undershot.
Cut-out pressure (only in case of system output Online)	1.0 ... 4.0 ... 4.0 bar	In automatic operation, the system terminates permeate production if the cut-out pressure is exceeded. Note: The systems are designed for 4.0 bar.

Parameters	Setting range	Remarks
Automatic restart	NO	Behaviour after voltage failure. After the return of power, the system signals "Power failure fault"; automatic or manual operation remains stored but is switched off.
	YES	After the return of power, the system continues running in the previously set operating mode and does not show a fault.
Forced operation	Operation	Behaviour after a longer period without permeate production (refer to the technical service level) Permeate production, switch-off command Tank full will be ignored, if applicable (tank with overflow required)
	Flushing	Factory setting in case of system output Online: Flushing to the drain, high-pressure pump is not running.
Conductivity monitoring RO1CQ1	Signal	Monitoring of permeate conductivity: The system continues running although the limit value has been exceeded.
	Fault	The system switches off.
Conductivity limit value RO1CQ1 Cell constant 0.1	0...30...99 µS/cm	If the programmed conductivity limit value is exceeded for the delay time, optional programming is possible.
Conductivity limit value RO1CQ1 Cell constant 1.0	0...30...999 µS/cm	
Delay Conductivity fault/signal RO1CQ1	0...30...999 min	

7.3.2.2 Installer level (Code 113)



The installer level contains parameters that might have to be adapted to the conditions on site during start-up/commissioning.

The settings described here must be done by a qualified specialist only.



The parameters marked with (*) must not be modified for the GENO-OSMO-X.

Parameters	Setting range	Remarks
Output logic	NOC	The voltage-free contact terminals 12/13 of the control unit must be connected to terminals 1/2 of the frequency converter – pump is ON when contact is closed.
Enable FU pump RO1P1A1	NCC	
Function Dosing RO1P2 and RO1P3 (*)	Pulse	Only Pulse is admissible as output signal to activate the dosing pump(s).
	NCC	NOC
	NOC	NCC
Function Pulse outputs of control valves (*)	Step	Only Step is admissible as output signal to activate the control valves Concentrate-to-drain and Concentrate recirculation.
	Relay	Relay = Reserved for future applications.
Function RO1V5/V6/V8	RO1V6	Connection terminals 22/23 are switchable: RO1V6 = Bypass (opens if level BB1CL3 is undershot, closes if level BB1CL2 is exceeded).
	RO1V5	RO1V5 = Blending is always open when the high-pressure pump is running.
	RO1V8	RO1V8 = Membrane degassing (activated during operation).
Function RO1V4/V7	RO1V4	RO1V4 = First permeate.
	RO1V7	RO1V7 = Draining the bypass
	Duration	Duration = Output continuously outputs 24 V DC. Switching capacity max. 5 W

Parameters	Setting range	Remarks
Function	Operation	Contact closes upon start of RO1P1
Programmable output	Dry-run protection	Contact opens if BB1CL1.4 is undershot and closes if BB1CL1.3 is exceeded
Redundancy RO1P2/RO1P3 (*)	NO	If two dosing pumps are present Pumps have different dosing tasks.
	YES	The pumps have the same dosing task and operate redundantly.
Operating time on redundancy	1...6...9 h	
Dosing, operation + flushing (*)	NO	The dosing pump either only runs during permeate production or in addition during flushing at the end of production: Dosing only during permeate production (one or two dosing pumps)
	P2	Two dosing pumps are present, and P2 runs additionally during flushing.
	P3	Two dosing pumps are present, and P3 runs additionally during flushing.
	Both	Two dosing pumps are present, and both run additionally during flushing.
Pulse division RO1P2/RO1P3	1...99	Settings for Antiscalant (valid for both pulse outputs)
	1	MT 4010
	10	MT 4000
Output logic		Switching behaviour of signal contact terminals 8/9
Voltage-free contact	NOC	Contact closes if a signal occurs
Warning	NCC	Contact opens in case of Mains Off or in case a signal occurs
Output logic		Switching behaviour of fault signal contact terminals 7/9
Voltage-free contact	NOC	Contact closes if a fault occurs
Fault	NCC	Contact opens in case of Mains Off or in case a fault occurs
Output logic		Switching behaviour Enable NX1Q1 terminals 14/15
Enable NX1	NOC	Contact closes if enabled.
	NCC	Contact opens if enabled.
Input logic		Switching behaviour of negative pressure switch terminals 54/55
Negative pressure switch RO1CP1(*)	NOC	Contact closes if there is sufficient pressure in the inlet
	NCC	Contact opens if there is sufficient pressure in the inlet
Input logic		The voltage-free contact terminals 10/11 of the frequency converter must be connected to terminals 56/57 of the control unit.
Fault signal RO1P1A1(*)	NOC	The contact is closed if there is no fault in the frequency converter
	NCC	
Function		Input function terminals 60/61
Prog. input	Signal	Signal contact terminals 8/9 switches and a programmable text appears, the system continues running
	Fault	Signal contact terminals 7/9 switches and a programmable text appears, the system switches off
	Forced stop	System switches off without prior warning or fault and does not flush. If the input signal is removed again, the system starts running again.
	Membrane degassing	System switches off and display text for programmable input is shown
Function		Input of terminals 52/53 reacts to NOC
Enable input	None	No function stored
	Smart metering	„Smart Metering“ function for systems with a large permeate tank and filling level measurement with 4-20 mA signal: In case of „favourable electricity tariffs“, the input/output level is increased, so that permeate can preferably be produced for stocks.

Parameters	Setting range	Remarks
	Start/Stop command	"Normal" start/stop command (analogue button Info level) via enable input.
	Bus signal	"Normal" start/stop command (analogue button Info level) via enable from bus system (master) provided by the client
Display text for prog. input	Editable alphanumerically	If the input is programmed to Signal or Fault, this display text will be shown in case of an incoming signal at terminals 60/61
Input logic Fault Empty signal RO1CL2(*)	NOC	Contact type Suction lance of dosing pump RO1 P2 terminals 63/64 (empty signal)
	NCC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Pre-warning RO1CL1(*)	NOC	Contact type Suction lance of dosing pump RO1 P2 terminals 63/64 (pre-warning)
	NCC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Residual hardness NX1CQ1(*)	NOC	Contact type Alarm + limit value terminals 66/67 of residual hardness monitoring device
	NCC	Contact opens in case of power failure, fault or if the limit value is exceeded
	NCC	Contact closes in case of alarm or if the limit value is exceeded
Input logic Level BB1CL1	NOC	The topmost level is declared as NCC by the factory, so that a fault in the filling level measurement can be detected
	NCC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Level BB1CL2	NOC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Level BB1CL3	NOC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Level BB1CL4	NOC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Prog. fault signal input	NOC	Input logic terminals 60/61
	NCC	
Input logic Fault Empty signal RO1CL4(*)	NOC	Contact type Suction lance of dosing pump RO1P3 terminals 50/62 (empty signal)
	NCC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Pre-warning RO1CL3(*)	NOC	Contact type Suction lance of dosing pump RO1P3 terminals 50/51 (pre-warning).
	NCC	Contact open means level has been undershot
	NCC	Contact closed means level has been undershot
Input logic Overpressure switch RO1CP3	NOC	Contact type Terminals 58/59
	NCC	Contact closes if system pressure is too high
	NCC	Contact opens if system pressure is too high
Solenoid valve outputs	Pulsating	Applies equally to all valve outputs
	Duration	Valve output is connected in clocked mode
	Duration	Valve output is permanently connected
Source Cut-in/cut-out pressure	Internal	Internal = Takes the values from the OSMO-X control unit
	HMS	HMS = Takes the values from the Profibus/BACnet master controller
	Modbus	Modbus = Takes the values from the Modbus master controller

7.3.2.3 Technical service level (🔒)



The technical service levels contain parameters that might have to be adapted to the conditions on site during start-up/commissioning (refer to Technical service manual, order no. 750 929).

7.3.2.4 Extended technical service levels I and II (🔒)



In the extended technical service levels I and II, fundamental parameters are stored that in general only need to be programmed in Grünbeck's production but rarely on site (refer to Technical service manual, order no. 750 929).

7.3.3 Counter readings, error memory (Code 245)



Here, the system's history is documented. Access to this level is protected by **Code 245**. The settings described here must be made by a qualified specialist only.

Parameters	Display	Remarks
Operating hours		h Time for which the system has been connected to the electrical power supply
Sum permeate		m ³ Permeate volume produced so far
Sum concentrate-to-drain		m ³ Waste water volume produced so far
Run time HP pump RO1P1		h Time during which permeate was produced
Run time HP pump Stage 2 RO1P4		h
Operating hours AVRO module RO1B1		h
Limit value for recovery exceeded		h Time during which the recovery was > than the limit value (e. g. while the system was started)
Operating phase counter > 30 minutes	XXXXXX	Three counters register how often the system produced permeate from the switch-on to the switch-off command This helps the technical service personnel to optimise the system parameters
Operating phase counter 30 ... 90 minutes	XXXXXX	
Operating phases > 90 minutes	XXXXXX	
1 Exxx ... 20 Exxx	Fault Date, time	Error memory containing the 20 most recent events

7.3.4 Resetting counter readings (🔒)



After the completion of the maintenance work or the replacement of a component, the respective counter reading can be deleted.

7.3.5 Jog mode (🔒)



The jog mode (key operation) is required during start-up/commissioning and for service purposes if components need to be replaced.

7.3.6 Operating parameter memory



In the operating parameter memory, the last 30 parameter changes are documented. This level is not access-protected.

The parameter changes below are shown:

- No. = Consecutive number 1...30 of the operating parameter memory
- Code = Code level concerned
- Idx = Index no. of the parameter within the Code level (0...)
- Pre = Previous setting value
- Post = New setting value
- Time = Time/date of the change

7.4 Permeate tank



- ▶ Tap on  in the basic display
- » The filling level of the permeate tank is shown.



The permeate tank does not have any functions of its own. It is only shown in the Info level if the system output "Tank" of the GENO-OSMO-X is programmed.

7.5 Antiscalant dosing (option)

In case of Antiscalant dosing as pretreatment, the dosing pump is shown in the Info level.

7.5.1 Info level

- ▶ Tap on  in the basic display.
- » The estimated time the dosing agent is expected to last for the permeate to be produced is shown.

7.5.2 Setting level

- ▶ Tap on  in the Info level.
- » You get to the user programming level or the technical service level.

7.5.3 User programming level

- ▶ Select the parameter to be set and set the required values.
- ▶ When replacing the dosing agent container, set the value to **Yes**.

Parameters	Setting range	Remarks
Container size (canister)	10 l	Content of the dosing agent container GENO-OSMO-X 200 ... 1200
	20 l	GENO-OSMO-X 1600 ... 3000
Replacing dosing tank P2	NO	If the capacity is increased from 1200 to 1600 l/h, either a 10-litre or a 20-litre canister can be used. If a full dosing agent canister is used, this parameter must be changed to "Yes". The calculation of the approx. time the dosing agent is expected to last is restarted in the Info level.
	YES	

7.5.4 Technical service level



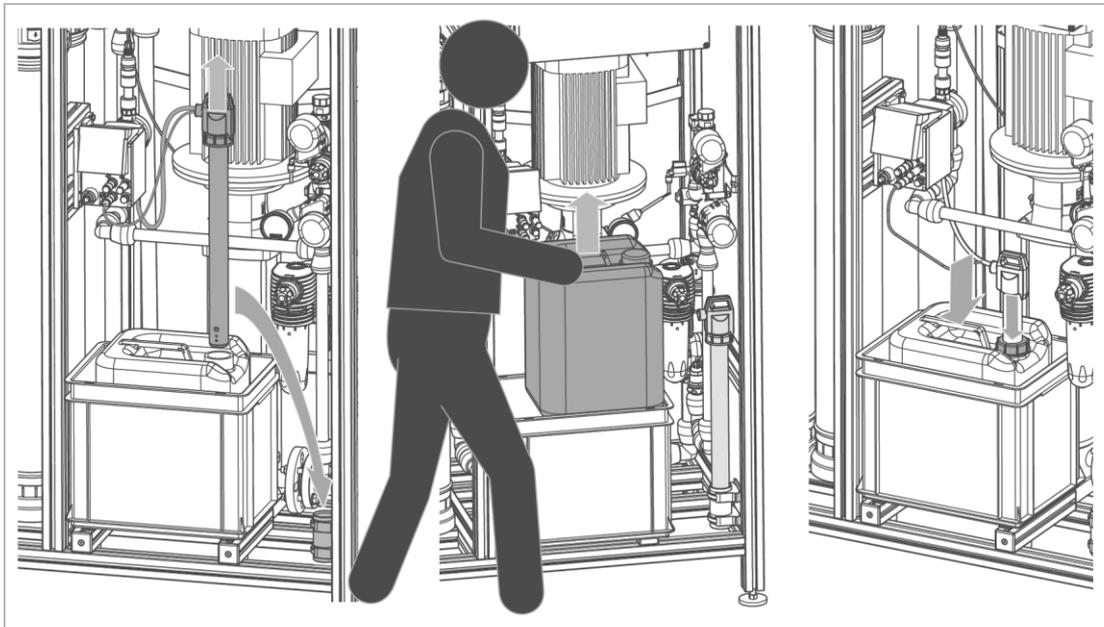
The technical service level contains parameters (dosing volume P2) that might have to be adapted to the conditions on site during start-up/commissioning.

7.5.5 Replacing the Antiscalant canister

NOTE:

Do not fill residual amounts from used containers into containers with fresh Antiscalant.

- Mixing old and new diminishes the effectiveness – flocculation can occur and cause functional system failure.
 - ▶ Discard residual amounts of Antiscalant from opened canisters.
 - ▶ When replacing canisters, only use new canisters with fresh Antiscalant.
- ▶ Proceed as follows when replacing the Antiscalant container:
1. De-energise the control unit.
 - » The system must not be producing permeate.



2. Pull the suction lance from the empty canister.
3. Put the suction lance into the holder.
4. Remove the empty canister from the collecting container.
5. Put the new canister into the collecting container and remove the screw cap.
6. Put the suction lance into the canister.
7. Secure the suction lance with the sliding cover.
8. Switch on the control unit.
9. Reset the calculation of the approx. time the dosing agent is expected to last.



Obey the operation manual of the dosing pump.

8 Maintenance and repair

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



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



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

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

8.1 Cleaning



Have cleaning work only done by persons that have been briefed on the risks and dangers the system and the possibly used chemicals might pose.



WARNING

Cleaning of live components with a damp cloth.

- Risk of electric shock.
- Sparking possible due to short circuit.
- Switch off the voltage supply as well as any external voltage before 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 that are located at high levels.

NOTE:

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

- Plastic components can be damaged.
- Coated surfaces can be damaged
- 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.

8.1.1 Cleaning of escaped dosing agents or leaking canisters



Obey the safety data sheet.

- ▶ Use personal protective equipment.
- ▶ Clean the canisters with a large amount of water – rinse them thoroughly.
- ▶ Wipe up escaped dosing agent with a fabric cloth.
- ▶ Clean the areas until they are completely dry.

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 such as: water condition, degree of impurities, environmental impacts, consumption, etc.
- ▶ Make sure that the applications limits are neither exceeded nor undershot (refer to chapter 3.1.4).

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

Activity	Interval	Task
Inspection	daily	<ul style="list-style-type: none"> • Check system volume flows and pressures • Determine feed water values and permeate quality • Read the recovery • Take note of the remaining time of the maintenance interval [d] • Visually check for leaks
	6 weeks	<ul style="list-style-type: none"> • Replace the filter element • Visually check for function and leaks
	3 months	<ul style="list-style-type: none"> • Replace activated carbon filter cartridge of activated carbon filter
Maintenance	annually	<ul style="list-style-type: none"> • Check the condition of the system and check it for leaks • Replace the fine filter element • Replace the activated carbon filter • Clean the solenoid valves • Check flow volumes • Calibrate the flow sensors • Check the function and performance of all aggregates (pumps, valves) • Service the dosing system
	load-dependent	<ul style="list-style-type: none"> • See "annually" • Replace activated carbon filter cartridge if chlorine is breaking through or if the differential pressure amounts to 1.4 bar
Repair	5 years	<ul style="list-style-type: none"> • Recommendation: Replace wearing parts

8.3 Inspection

You as owner/operating company can do the regular inspections yourself.



- ▶ Record the operating values in the daily log.

Please note that there can 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.

- ▶ Do the inspection work below **on a daily basis**:

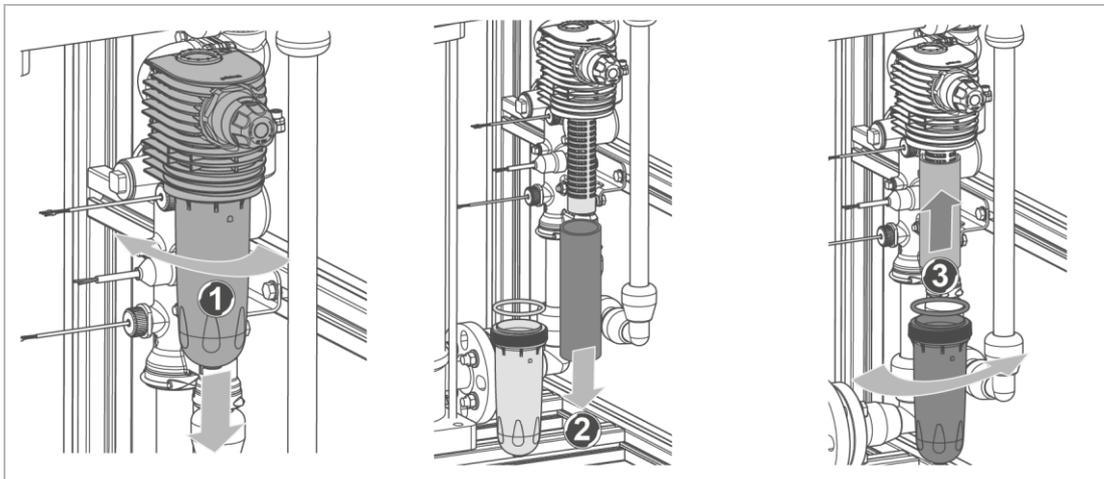
1. Determine the total hardness (inlet) with the water test kit "Total hardness" (order no. 170 187).
In case of optional Antiscalant dosing:
2. Read the Antiscalant dosing volume.
 - a Check the filling level of the dosing agent.
3. Read the quality of the permeate.
4. Read the recovery.
5. Take note of 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.
Requirement: The system must not be producing permeate and not be flushing.
7. Check the system for leaks towards the drain in operating mode.
» In this mode, 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 (withdraw permeate from the tank).
 - a Check the filter cylinder for leaks.



Obey the operation manual of the fine filter.

8.3.2 Replacing the activated carbon filter 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 a differential pressure of 1.4 bar has been reached.



Obey the operation manual of the activated carbon filter.

8.4 Maintenance

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



Maintenance is subject to the load but must be done once a year at the latest.

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

8.4.1 Annual maintenance



Doing the annual maintenance work requires specialist knowledge. This kind of maintenance work must be done by Grünbeck's technical service or by qualified specialists trained by Grünbeck only.

The work below must be done as part of annual maintenance:

Operating values

1. Read the water meter reading.
2. Read the static 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.



The membrane modules must be flushed and replaced by authorised service personnel only.

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

5. Check the settings in the control unit, in particular the ones below:
 - Pretreatment
 - Recovery
 - System output
6. Read the operating hours:
 - Run time of high-pressure pump
 - Concentrate volume generated
 - Feed water volume
 - Permeate volume produced
 - Antiscalant dosing pump (dosing volume)

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 measuring values below 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 meter, 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 maintenance interval and, if necessary, the counter readings.
21. Enter all data and work 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-X	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-X 400 ... 3000	1	750 293
	1	750 293
RO membrane module (4" x 21") with seal for GENO-OSMO-X 200	1	109 615
	1	109 615
Activated carbon filter cartridge 250-M for activated carbon filter installed upstream		

8.6 Spare parts

For an overview on the spare parts, go to our spare parts catalogue at www.grünbeck.com. You can obtain the spare parts from your local Grünbeck representative.

8.7 Wearing parts



Wearing parts must be replaced by a qualified specialist only (refer to Technical service manual, order no. 750 929-inter).

Wearing parts are given below:

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

9 Malfunxions



WARNING

Danger of contaminated drinking water due to stagnation.

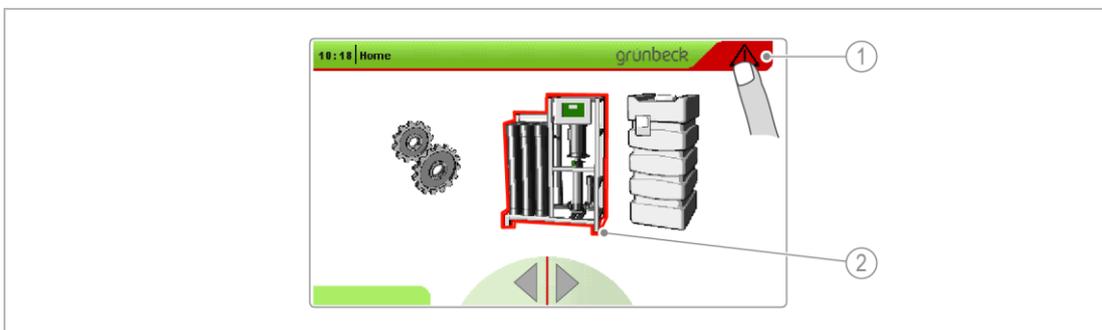
- Risk of infectious diseases.
- ▶ Have malfunxions repaired immediately.



A fault at one of the subsystems in general causes the shut-off of subsystems installed downstream.

Repairing and acknowledging faults usually restarts the switched-off subsystems automatically.

There is a difference between warning signals and faults:



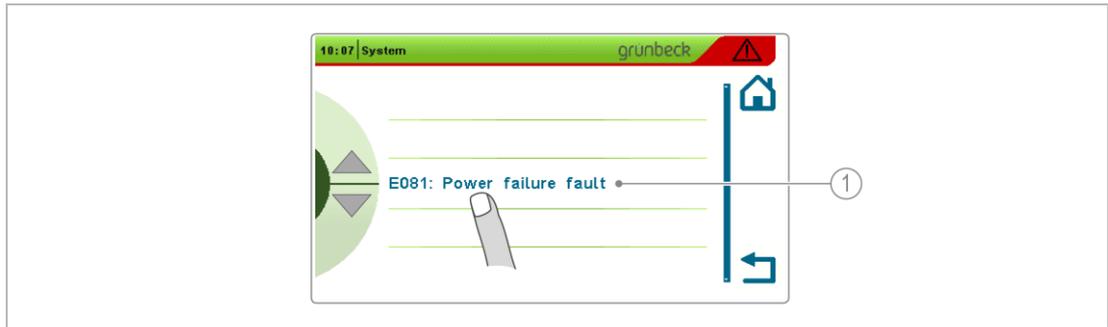
Symbol/designation	Function
1	Status
	green = No fault
	yellow = Warning
	red = Fault
	Signal contact of the control unit (terminals 8/9) opens
	Fault signal contact of the control unit (terminals 7/9) opens
2	Subsystem
	The subsystem concerned is framed.

- As long as the power supply is on and no warning/fault is pending, the signal contact and the fault signal contact are closed.

The system shows faults in the display. The fault display remains active until the condition has been rectified.

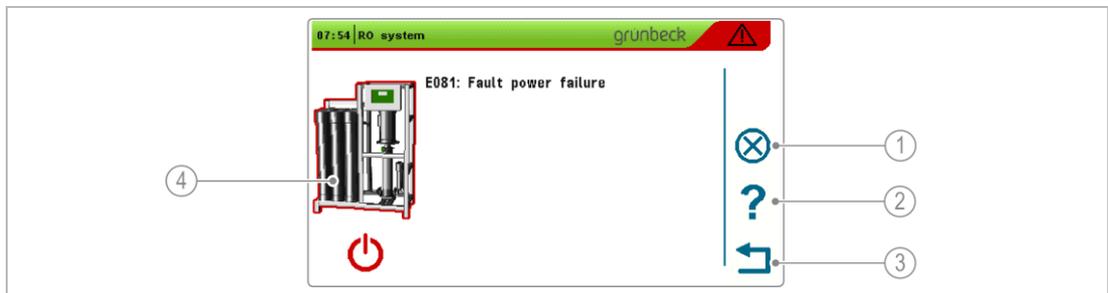
- ▶ Tap on the status bar.
- » A list of errors is shown.

Error list

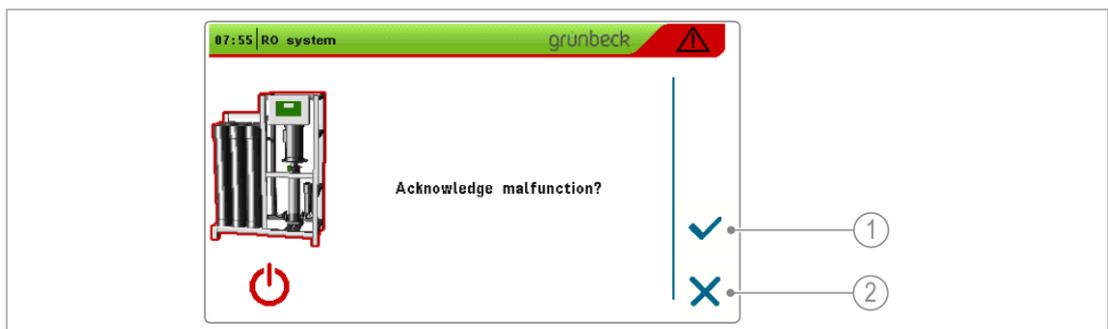


Symbol/designation	Function
1	Error with explanation
	By tapping on the entry, you switch to the acknowledgement window

Acknowledgement window



Symbol/designation	Function
1	
	Button to acknowledge the signal or fault
2	
	Button to call up a help text including the telephone number of the technical service
3	
	Back to the error list
4	Subsystem
	The subsystem concerned is shown



Symbol/designation	Function
1	
	Acknowledge signal/fault
2	
	Leave signal/fault pending

- ▶ By pressing on or , you switch to the error list.
- ▶ If you cannot repair malfunctions with the instructions given below, contact Grünbeck's technical service.
- ▶ Have the data given on the type plate handy (refer to chapter 1.3).

9.2 Display messages

1. Repair the fault (refer to fault tables).
2. Acknowledge the fault.
3. Monitor the display of the control unit.
4. If the fault reoccurs, compare the display message with the fault tables below.

9.2.1 Warnings (yellow)

Warnings	Explanation	Remedy
W006 Fault Parameter comparison SF	Fault Parameter comparison Softening	<ul style="list-style-type: none"> • Software versions of OSMO-X and water softener differ. ▶ Do an update. ▶ Incorrect water softener selected.
W007 FW softening outdated	The firmware of the water softener is outdated	<ul style="list-style-type: none"> • Software version of operating unit does not match the motherboard. ▶ Have the motherboard updated
W008 Fault Parameter comparison PB	Fault Parameter comparison Pressure booster	<ul style="list-style-type: none"> • Software versions of OSMO-X and pressure booster system differ. ▶ Do an update. ▶ Incorrect pressure booster system selected.
W009 FW pressure boost. outdated	The firmware of the pressure booster is outdated	<ul style="list-style-type: none"> • Software version of operating unit does not match the motherboard. ▶ Have the motherboard updated
W010 HMS bus module not supported	HMS bus module is not supported	<ul style="list-style-type: none"> • Module has not been detected properly or • a module type not yet supported was plugged in. ▶ Check if the module is plugged in correctly. ▶ Contact Grünbeck's technical service.
W011 Softening par. not for osmosis	The water softener currently set is not yet compatible with OSMO-X	<ul style="list-style-type: none"> ▶ Check system settings for the water softener.
W021 Permeate conductivity RO1CQ1	<p>The monitoring of the permeate conductivity is programmed to "Signal" and the conductivity continuously was above the threshold value for longer than the programmed delay time.</p> <p>Typical system behaviour: After the start of the permeate production, the permeate conductivity quickly decreases within a few minutes (first permeate) until an almost constant value is reached. Due to a non-functioning pretreatment, this constant value is negatively affected (scaling).</p>	<ul style="list-style-type: none"> • Conductivity limit value too low or delay time of conductivity signal/fault programmed too short. ▶ Contact Grünbeck's technical service.

Warnings	Explanation	Remedy
W022 Dos low RO1CL1 W023 Dos low RO1CL3	Only in case of DOS pretreatment: Dosing agent will be empty soon "Pre-alarm signal"	<ul style="list-style-type: none"> ▶ Put in new dosing agent container and confirm dosing in subsystems menu. • The calculation of the time the dosing agent is expected to last will be started anew.
W024 Display text of prog. fault signal input	Signal is pending at the programmable fault signal input. Response is programmed to "Warning"	<ul style="list-style-type: none"> ▶ Eliminate the cause of the pending signal.
W025 Battery	Buffer battery on motherboard (stage 1) is defective	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W026 Warning preserving agent	Information during initial start-up/ commissioning: Preserving agent still must be flushed out	<ul style="list-style-type: none"> ▶ Flush out the preserving agent (refer to chapter 6.1).
W027 Battery 2	Buffer battery on motherboard (stage 2) defective	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W028 Service due	The maintenance interval of the GENO-OSMO-X system has expired	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W029 Service AVRO	Only in case of AVRO pretreatment: The maintenance interval of the AVRO unit has expired. The AVRO treatment modules must be replaced	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W030 Minimum pressure	The pressure switch for negative pressure RO1CP1 has detected low water pressure in the inlet. Subsystem GENO-OSMO-X was stopped and automatically restarts after a short period of time – here, an acknowledgement is not yet required but possible. After the last, unsuccessful start attempt, the GENO-OSMO-X stops and shows the fault "Negative pressure" – here, an acknowledgement is required	<ul style="list-style-type: none"> • Enable water supply for GENO-OSMO-X. ▶ Contact Grünbeck's technical service.
W031 First permeate time exceeded	The quality of the first permeate is still too poor after expiration of the time set for the first permeate	<ul style="list-style-type: none"> ▶ Check in the technical service menu whether the limit value for the conductivity of the first permeate is set too high or whether the first permeate time is set too short. ▶ Contact Grünbeck's technical service.
W033 Comm. fault Softening W034 Comm. fault Resid. Hdn. W035 Comm. fault EDI W036 Comm. fault Pressure booster	Faulty bus connection to the interconnected subsystems water softener WE-X or DEA-X. No mains voltage to interconnected subsystems	<ul style="list-style-type: none"> ▶ Restore mains voltage of subsystems, if necessary. ▶ Check cabling of bus connection and restore, if necessary.
W037 Stop filter sys./overf. prot. BB1	The maximum filling level of the tank has been reached. The system shows Forced stop	<ul style="list-style-type: none"> ▶ Check the tank's filling level and adjust it, if necessary. ▶ Check the parameter setting in the installer level.

Warnings	Explanation	Remedy
W038 Comm. fault MK200 12RA	No mains voltage to interconnected subsystems. Faulty bus connection to MK200 12RA module	<ul style="list-style-type: none"> ▶ Restore mains voltage of subsystems, if necessary. ▶ Check cabling of bus connection and restore, if necessary.
W039 Fault MK200 12RA defective	MK200 12RA module is faulty	<ul style="list-style-type: none"> ▶ Check the setting at the module. ▶ Check parameterisation.
W040 Comm. fault MK200 4AA	No mains voltage to interconnected subsystems. Faulty bus connection to MK200 4AA module	<ul style="list-style-type: none"> ▶ Restore mains voltage of subsystems, if necessary. ▶ Check cabling of bus connection and restore, if necessary.
W041 Fault MK200 4AA defective	MK200 4AA module is faulty	<ul style="list-style-type: none"> ▶ Check the setting at the module. ▶ Check parameterisation.
W052 Firmware motherboard 2 outdated	Software version of operating unit does not match motherboard 2. stage	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W053 Comm. fault Motherboard	Faulty connection between GENO-tronic operating unit and motherboard	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W054 Motherboard not ready	Motherboard faulty or defective	<ul style="list-style-type: none"> ▶ Restart the control unit by switching it off and on. ▶ Contact Grünbeck's technical service.
W055 Motherboard FW outdated	Behaviour after software update of operating unit	<ul style="list-style-type: none"> • Software version of operating unit does not match the motherboard. ▶ Contact Grünbeck's technical service.
W056 SD card removed	SD card missing, defective	<ul style="list-style-type: none"> ▶ Put in/replace SD card.
W057 SD card full	Memory of SD card full	<ul style="list-style-type: none"> ▶ Put in a new SD card or ▶ Store the SD card's data on a different storage medium and reuse the SD card.
W058 SD card I/O error	SD card defective	<ul style="list-style-type: none"> ▶ Check write-protection or replace SD card.
W060 SF lack of salt	Not enough salt in brine tank	<ul style="list-style-type: none"> ▶ Check salt level in brine tank and refill salt tablets as per DIN EN 973 A, if necessary.
W061 SF service interval	Maintenance interval of water softener has expired	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W062 PBS service interval	Maintenance interval of pressure booster has expired	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
W063 PBS no ext. enable signal	Incorrect enable signal selected	<ul style="list-style-type: none"> ▶ Check parameter settings.
W064 PBS dry-run protection	Insufficient water in supply tank	<ul style="list-style-type: none"> • The signal is acknowledged automatically as soon as sufficient water is available again. ▶ Check in the installer level (Code 113) if the input was configured correctly.

Warnings	Explanation	Remedy
W065 PBS power failure	Power failure > 1 minute	<ul style="list-style-type: none"> ▶ Check the parameter setting in the user menu. ▶ Ensure electrical power supply. ▶ Acknowledge signal.
W068 Permeate conductivity RO1CQ2	Limit value for permeate conductivity measurement exceeded	<ul style="list-style-type: none"> • Conductivity limit value too low or delay time programmed too short. ▶ Contact Grünbeck's technical service.
W073 Warning preserving agent Stage 2	Information during start-up/commissioning	<ul style="list-style-type: none"> ▶ Flush out preserving agent of 2. stage
W075 Service due Stage 2	Maintenance interval of GENO-OSMO-X permeate stage has expired	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.

9.2.2 Error messages (red)

Malfunctions	Explanation	Remedy
E080 Fault OSMO-X	Control unit defective	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E081 Power failure fault	Power failure > 5 minutes. Mains voltage has failed. System is not set to automatic restart	<ul style="list-style-type: none"> ▶ Ensure the GENO-OSMO-X's electrical power supply. ▶ If necessary, reprogram the parameter "Automatic system restart" in the user menu. ▶ Check if there are impacts on other subsystems.
E082 EEPROM	Control unit defective	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E083 Comm fault Stage 1	Communication (bus connection) with data line RS485 to control unit installed upstream/downstream is interrupted/faulty. No mains voltage to interconnected subsystems	<ul style="list-style-type: none"> ▶ Check lines for proper connection. ▶ Restore mains voltage of subsystems. ▶ Check whether the terminating resistors (dip switches) are set correctly.
E084 Comm. fault Stage 2		
E085 Sensor error Pressure	Fault at sensor signal 4-20 mA of pressure sensor	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E086 Sensor error Level	Fault at sensor signal 4-20 mA of level probe of permeate tank	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E087 Sensor error Conductivity 1	Fault at sensor signal Conductivity/PT100 of conductivity probe	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E088 Sensor error Conductivity 2 Cell constant 1.0	Fault at sensor signal Conductivity/PT100 of conductivity probe (cell constant 1.0)	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E090 Fault Recovery	For more than 30 minutes, the GENO-OSMO-X control unit continuously was not able to regulate the system to the correct recovery (setpoint exceeded by more than 5 %)	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.
E091 Fault WM permeate defective	No signal is transferred from the permeate water meter to the GENO-OSMO-X control unit	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service.

Malfunctions	Explanation	Remedy
E092 Fault Membrane outflow	For more than 30 minutes, the GENO-OSMO-X control unit continuously was unable to regulate the system to the correct outflow on the membrane (the window of +/- 5 % around the setpoint was exceeded/undershot)	▶ Contact Grünbeck's technical service.
E093 Fault Permeate conduct. RO1CQ1	The monitoring of the permeate conductivity is programmed to "Fault" and the conductivity continuously was above the threshold value for longer than the programmed delay time (also refer to Warning W021 "Permeate conductivity RO1CQ1")	<ul style="list-style-type: none"> • Conductivity limit value too low or delay time of conductivity signal/fault programmed too short. ▶ Contact Grünbeck's technical service.
E094 Fault AVRO current	Only for AVRO pretreatment: The current through the AVRO treatment module is too low, the pretreatment does not work any longer	▶ Contact Grünbeck's technical service.
E095 Fault HP pump RO1P1	Frequency converter of high-pressure pump signals a fault	<ul style="list-style-type: none"> ▶ Hinge the GENO-OSMO-X control unit forwards. ▶ Relay the fault signal of the frequency converter to Grünbeck's technical service.
E096 Fault DOS empty RO1P2	Only for DOS pretreatment: Dosing agent is empty	<ul style="list-style-type: none"> ▶ Insert new dosing agent canister and confirm dosing in subsystems menu. • The calculation of estimated time for the dosing agent to last will be started anew.
E097 Fault DOS empty RO1P3		
E098 Fault Residual hardness NX1CQ1	Only for softening as pretreatment: The residual hardness monitoring device has detected a break-through of hardness at the water softener	<ul style="list-style-type: none"> ▶ Check cabling. ▶ Check the residual hardness monitoring device for function. ▶ If necessary, release a manual regeneration at the water softener and 5 minutes later, a manual analysis at the residual hardness monitoring device.
E099 Fault Tank level BB1CL	Only for system output Tank: An invalid signal was received from the level monitoring in the permeate tank	▶ Contact Grünbeck's technical service.
E100 Fault Overpressure RO1CP3	The overpressure switch has tripped within the system	▶ Contact Grünbeck's technical service.
E101 Fault Neg. pressure RO1CP1	Also refer to "Minimum pressure warning": The last automatic start attempt was unsuccessful	<ul style="list-style-type: none"> ▶ Enable water supply for GENO-OSMO-X. ▶ Contact Grünbeck's technical service.
E102 Fault Permeate pressure RO1CP2	Only for system output Online: The permeate pressure continuously did not exceed the alarm limit value for longer than the programmed time (possible line breakage)	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service. • Delay time and alarm limit value can be adapted to the conditions on site.
E103 Prog. input	Signal pending at the programmable fault signal input. Response is programmed to "Fault"	<ul style="list-style-type: none"> ▶ Eliminate the cause of the pending signal. ▶ Correct the programming of the system's response, if necessary.
E104 Fault GENO-tronic	Operating unit of control unit defective	▶ Contact Grünbeck's technical service.

Malfunctions	Explanation	Remedy
E105 Fault Stage 1	General malfunction of stage 1 (only active in case of systems with permeate stage).	<ul style="list-style-type: none"> The malfunction is acknowledged automatically as soon as the individual fault signal of stage 1 has been remedied and acknowledged.
E106 Fault Stage 2	General malfunction of stage 2 (only active in case of systems with permeate stage)	<ul style="list-style-type: none"> The malfunction acknowledges itself automatically as soon as the individual fault signal of stage 2 has been remedied and acknowledged.
E107 Fault Temperature sensor	Temperature sensor of permeate conductivity measuring cell defective or short-circuit at a conductivity measuring cell	<ul style="list-style-type: none"> Contact Grünbeck's technical service.
E108 Fault HP pump RO1P2	Frequency converter of high-pressure pump signals a fault	<ul style="list-style-type: none"> Hinge the GENO-OSMO-X control unit forwards. Relay the fault signal of the frequency converter to Grünbeck's technical service.
E110 R01V1 does not close.	V1 does not close, possibly due to impurities or a defective valve	<ul style="list-style-type: none"> Clean R01V1 solenoid valve. Replace solenoid valve.
E111 Membrane degassing	Compressed air too low	<ul style="list-style-type: none"> Check the parameter setting in the installer level (Code 113). Check compressed air supply.
E113 SF fault Power failure	Power failure > 5 minutes	<ul style="list-style-type: none"> Check wiring. Check mains voltage. Check the fuses of the control unit. If the power failure has lasted for a longer period of time, do a manual regeneration to be on the safe side. The water that in the meantime has flown through the system was not measured, and the exchanger in operation might have exceeded the limits of its capacity
E114 SF Valve motor fault	The next step position on the control valve has not been reached within the required time	<ul style="list-style-type: none"> If the fault reappears within 5 minutes after acknowledgement: <ul style="list-style-type: none"> Contact Grünbeck's technical service.
E115 SF Transfer motor fault	Run-time monitoring of motor transfer valve has been triggered	<ul style="list-style-type: none"> Refer to the Delta-p operation manual. Contact Grünbeck's technical service.
E116 SF Hard water fault	While one exchanger tank has not yet been fully regenerated, the capacity of the other exchanger tank is exhausted already	<ul style="list-style-type: none"> Malfunction is acknowledged automatically as soon as a regenerated exchanger tank is available again.
E117 SF fault Chlorine current too low	The generation of chlorine for the disinfection of the exchanger during regeneration has not been done properly	<ul style="list-style-type: none"> Refer to the Delta-p operation manual. Contact Grünbeck's technical service.
E118 SF fault Brine tank filling vol.	The water volume for refilling the brine tank was not reached within the required time. It might be impossible to produce enough brine for the next regeneration	<ul style="list-style-type: none"> Refer to the Delta-p operation manual. Contact Grünbeck's technical service.

Malfunctions	Explanation	Remedy
E119 SF fault Water meter defective	One of the exchangers' water meters does not work	<ul style="list-style-type: none"> ▶ Refer to the Delta-p operation manual. ▶ Contact Grünbeck's technical service.
E120 SF fault Microswitch	The control unit detects an invalid microswitch position on the regeneration or transfer valve	<ul style="list-style-type: none"> ▶ Refer to the Delta-p operation manual. ▶ Contact Grünbeck's technical service.
E122 SF fault Nominal flow exceeded	Nominal flow of water softener exceeded. Risk of damage to system components.	<ul style="list-style-type: none"> ▶ Refer to the Delta-p operation manual. ▶ Contact Grünbeck's technical service.
E124 SF fault Motor current	Monitoring of the step motor current tripped.	<ul style="list-style-type: none"> · If the fault reappears within 5 minutes after acknowledgement: ▶ Contact Grünbeck's technical service.
E125 PBS fault Pump 1	Pump of pressure booster system is faulty.	<ul style="list-style-type: none"> ▶ Refer to the operation manual of the pressure booster system ▶ Contact Grünbeck's technical service.
E126 PBS fault Pump 2		
E127 Bus error RO1 - DEA1	Communication with data line RS485 (Profibus) to the pressure booster control unit installed downstream is interrupted.	<ul style="list-style-type: none"> ▶ Check line for proper connection. ▶ Check whether the terminating resistors (DIP switches) are set correctly.
E150 Stage 2 fault OSMO-X	Control unit defective.	▶ Contact Grünbeck's technical service.
E151 Stage 2 fault Power failure	Mains voltage has failed. System is not set to automatic restart	<ul style="list-style-type: none"> ▶ Check mains voltage and measure it, if necessary. ▶ Check wiring. ▶ Check fuses of the control unit and measure them, if necessary. ▶ Reprogram the parameter "Automatic system restart", if necessary. ▶ Check if there are impacts on other subsystems.
E152 Stage 2 EEPROM	Control unit defective	▶ Contact Grünbeck's technical service.
E153 Stage 2 Com. fault Stage 1	Communication (bus connection) with data line RS485 to control unit installed upstream/downstream is interrupted. No mains voltage to interconnected subsystems	<ul style="list-style-type: none"> ▶ Check line for proper connection. ▶ Restore mains voltage to subsystems. ▶ Check whether the terminating resistors (dip switches) are set correctly.
E154 Stage 2 Com. fault Stage 2		
E155 Stage 2 Sensor error Pressure	Fault at the sensor signal 4-20 mA of the pressure sensor	▶ Contact Grünbeck's technical service.
E156 Stage 2 Sensor error Level	Fault at the sensor signal 4-20 mA of the level probe in the permeate tank	▶ Contact Grünbeck's technical service.
E157 Stage 2 Sensor error RO1CQ2	Fault at the sensor signal Conductivity/PT100 of the conductivity probe	▶ Contact Grünbeck's technical service.
E160 Stage 2 fault Recovery	For more than 30 minutes, the GENO-OSMO-X control unit continuously was not able to regulate the system to the correct recovery (setpoint exceeded by more than 5 %)	▶ Contact Grünbeck's technical service.

Malfunctions	Explanation	Remedy
E161 Stage 2 fault Water meter permeate defec.	No signal is transferred from the permeate water meter to the GENO-OSMO-X control unit	▶ Contact Grünbeck's technical service.
E162 Stage 2 fault Membrane outflow	For more than 30 minutes, the GENO-OSMO-X control unit continuously was unable to regulate the system to the correct outflow on the membrane (the window of +/- 5 % around the setpoint was exceeded/undershot)	▶ Contact Grünbeck's technical service.
E163 Stage 2 fault RO1CQ2	The monitoring of the permeate conductivity is programmed to "Fault" and the conductivity continuously was higher than the threshold value for longer than the programmed delay time (also refer to Warning W021 "Permeate conductivity RO1CQ1")	<ul style="list-style-type: none"> · Conductivity limit value too low or delay time of conductivity signal/fault programmed too short. ▶ Contact Grünbeck's technical service.
E165 Stage 2 fault HP pump RO1P4	Frequency converter of high-pressure pump signals a fault	<ul style="list-style-type: none"> ▶ Hinge the GENO-OSMO-X control unit forwards. ▶ Relay the fault message of the frequency converter to Grünbeck's technical service.
E170 Stage 2 fault Overpress. RO1CP5	The overpressure switch has tripped within the system	▶ Contact Grünbeck's technical service.
E172 Stage 2 fault RO1CP2	The permeate pressure continuously did not pass the alarm limit value for longer than the programmed time (possibly due to line breakage)	<ul style="list-style-type: none"> ▶ Contact Grünbeck's technical service. ▶ Delay time and alarm limit value can be adapted to the conditions on site
E173 Stage 2 Programmable input	Signal pending at the programmable fault signal input. Response is programmed to "Fault"	<ul style="list-style-type: none"> ▶ Eliminate the cause of the pending signal. ▶ Correct the programming of the system's response, if necessary.
E174 Stage 2 fault GENO-tronic	Operating unit of control unit defective	▶ Contact Grünbeck's technical service.
E177 Stage 2 fault Temperature sensor	Temperature sensor of permeate conductivity measuring cell defective or short-circuit at a conductivity measuring cell	▶ Contact Grünbeck's technical service.
E178 Stage 2 fault HP pump RO1P4	Frequency converter of high-pressure pump signals a fault	<ul style="list-style-type: none"> ▶ Hinge the GENO-OSMO-X control unit forwards. ▶ Relay the fault message of the frequency converter to Grünbeck's technical service.
E182 Stage 2	Short-circuit/overload at solenoid valves	▶ Contact Grünbeck's technical service.
E183 Stage 2	Short-circuit/overload at input signals	▶ Contact Grünbeck's technical service.
E184 Comm. fault Softening	Communication (bus connection) with data line RS485 to control unit of water softener installed upstream is interrupted. No mains voltage to interconnected subsystems	<ul style="list-style-type: none"> ▶ Check line for proper connection. ▶ Restore mains voltage of subsystems. ▶ Check whether the terminating resistors (dip switches) are set correctly.
E185 Fault CQT1 and CQT2 detected	Lines or sensor connected to both measuring points or defective hardware on motherboard. (When switched on, the control unit monitors once which measuring cell is connected)	<ul style="list-style-type: none"> ▶ Switch off the control unit at the mains switch and wait for approx. 20 seconds. ▶ Switch the control unit on again at the mains switch.

10 Shutdown



Shutting down and restarting requires expert knowledge. This kind of work must be done by Grünbeck's technical service or by qualified specialists trained by Grünbeck only.

10.1 Temporary standstill

The system features automatic forced operation, or forced flushing in case of system output "Online", to minimise bacterial growth.



If no permeate is generated within a set time (technical service level: pre-set to 2880 minutes = 48 h), a forced operation or forced flushing is triggered automatically. The forced operation can be set to 48 h max.

- ▶ If a longer standstill of the system is planned, the system must be shut down.

10.2 Shutdown

- ▶ The tasks below must be done:
 - Mechanically separate the feed water inlet.
 - Mechanically separate the pipe to the permeate outlet.
 - Preserve the system.
 - Set the control unit to operating mode **locked**.
 - Set the main switch to OFF and secure it against restart.
 - Mark the system with a notice and a warning about the preservation that has been down.

10.3 Restart

- ▶ The tasks below must be done:
 - 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 done 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 system (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

- ▶ Obey the applicable national regulations.

Packaging

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

HINWEIS

Danger to the environment due to incorrect disposal

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

Membrane module

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

Batteries

- ▶ Take used batteries to the local recycling facility – do not dispose of them with your household waste.

Dosing agent

- ▶ Obey the safety data sheet.
- ▶ Dilute the dosing agent and discharge it to the drain.
- ▶ Rinse the canisters with a large amount of water.

Product



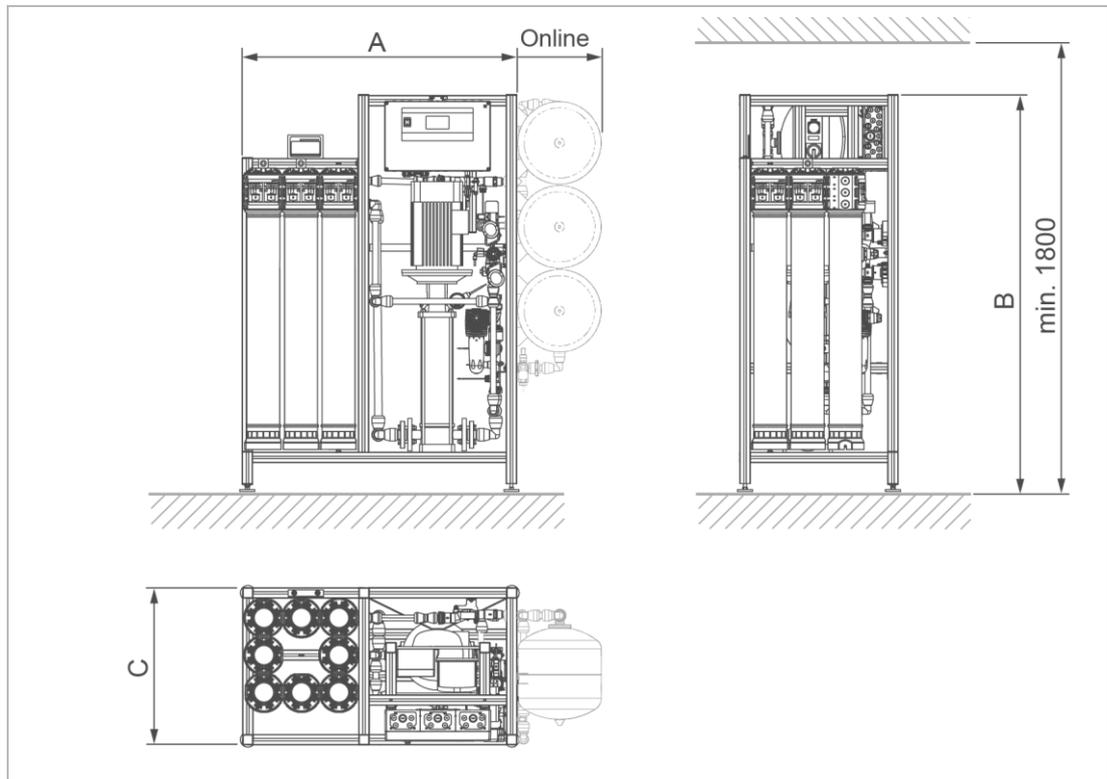
If this symbol (crossed-out wheelee bin) is on the product, this product or its electrical and electronic components must not be disposed of as household waste.

- ▶ 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.

12 Technical specifications



GENO-OSMO-X									
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	122	125	147	171	186	267	319
Connection data		200	400	800	1200	1600	2200	3000	
Nominal connection diam. Feed water inlet	DN	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	25 (1" m. thread)	32 (1¼" m. thread)	32 (1¼" m. thread)	
Nominal connection diam. Permeate outlet	DN	25 (1" male thread)							
Nominal connection diam. Concentrate discharge	DN	25 (1" male thread)							
Min. drain connection without optional AVRO unit	DN	50							
Min. drain connection with optional AVRO unit	DN	50	50	50	100	100	–	–	
Power supply	V/Hz	230/400 / 50 – 60							
Phases		3/N/PE							
Max. feed		5.5 kW / C 20 A / 2.5 mm ² (depending on the expansion stage)							
Protection/protection class		IP 54⊕							
Power input at an unpressurised delivery of the permeate into a tank, at a switching frequency of the frequency converter of 8 kHz and a primary pressure in the feed water of 4 bar.									
Recovery 80 %	kW	0.53	0.87	0.94	1.4	1.74	2.10	2.30	
Recovery 50 %	kW	0.53	0.88	0.94	1.30	1.60	–	–	

Connection data		200	400	800	1200	1600	2200	3000
Power input in case the permeate is directly delivered to the consumers at a supply pressure of 3.8 bar, at a switching frequency of the frequency converter of 8 kHz and a primary pressure in the feed water of 4 bar.								
Recovery 80 %	kW	0.86	1.44	1.6	2.00	2.31	2.30	2.80
Recovery 50 %	kW	0.81	1.2	1.41	1.90	2.11	–	–
Performance data		200	400	800	1200	1600	2200	3000
Permeate capacity at a								
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 ³ /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						
Max. outlet pressure of permeate	bar	4.0 (for option: Online)						
Nominal pressure	PN	16						
Salt rejection	%	95 – 99						
Max. total salt concentration in feed water as NaCl	ppm	1000						
Silt density index (SDI)		< 3						
Recovery, min. – max. (adjustable)	%	50 – 88					68 – 80	
Concentrate volume flow, at a recovery of 80 % (15 °C)	l/h	50	100	200	300	400	550	750
Feed water volume flow, at a recovery of 80 % (15 °C)	l/h	250	500	1000	1500	2000	2750	3750
General data		200	400	800	1200	1600	2200	3000
Feed water temperature	°C	10 – 30 ¹⁾						
Ambient temperature	°C	5 – 35						
Max. humidity of air (non-condensing)	%	70						
Order no.		750 200	750 210	750 220	750 230	750 240	750 250	750 260

¹⁾ In case of a feed water temperature of > 20 °C, the system must be designed separately.

Optional versions

Option 1 Antiscalant without dosing agent		200	400	800	1200	1600	2200	3000
Operating weight, approx.	kg	137	140	162	186	201	282	334
Max. system recovery	%	75						
Order no.		750 346						
Option 2 AVRO module		200	400	800	1200	1600	2200	3000
Operating weight, approx.	kg	137	155	192	216	246	–	–
System recovery, min. – max.	%	50 – 75 (standard setting 50 %)						
Order no.		750 341	750 342	750 343	750 344	750 345	–	–
Option 3 Online skid		200	400	800	1200	1600	2200	3000
Operating weight, approx.	kg	147	165	187	241	256	332	384
A System width	mm	1280	1280	1280	1415	1415	1550	1550
Useful volume	l/h	1 x 33	1 x 33	1 x 33	2 x 33	2 x 33	3 x 33	3 x 33
Order no.		750 351	750 351	750 351	750 352	750 352	750 353	750 353

13 Operation log



- ▶ Document the initial start-up/commissioning and all maintenance activities.
- ▶ Copy the maintenance sheets, if necessary.

Reverse osmosis system | GENO-OSMO-X | Type: _____

Serial no.: _____

13.1 Start-up/Commissioning 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 pipe upstream of 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		m³				
Permeate supply tank		m³				
Pressure booster		bar				
Highest withdrawal point, approx.		m				
Room temperature		°C				
Hardness unit		°dH	°f	mol/m³	°e	°ppm
Total raw water hardness (measured)		<input type="checkbox"/>	<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 ₂)	mg/l
	Silt density index < 3	
High-pressure pump	Pump pressure	bar
	Pump frequency	Hz
	Run time of pump	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/Commissioning

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 made.

Maintenance done	Membrane module no.	Restart
<input type="checkbox"/> with flushing 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: Before or during restart / after replacement of membrane module(s)

	Conductivity µS/cm <i>before / after</i>	Total hardness °dH, mol/m ³ <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 ³
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Operating hours

Concentrate volume generated	m ³	Feed water volume	m ³
Permeate volume produced	m ³	Run time HP pump	h

Error memory read out	Counter reading reset	System printout created
<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, if necessary)	<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 warning labels checked	<input type="checkbox"/>

Remarks

Done by

Company:		
Service technician:	Date	Signature

Maintenance no. _____



Enter the measured values and operating data.
Confirm the tests with **OK** or record any repairs made.

Maintenance done	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: Before or during restart / after replacement of membrane module(s)

	Conductivity μS/cm <i>before / after</i>	Total hardness °dH, mol/m ³ <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 ³
------------------------	-----	---------------------	----------------

Operating hours

Concentrate volume generated	m ³	Feed water volume	m ³
Permeate volume produced	m ³	Run time HP pump	h

Error memory read out	Counter reading reset	System printout created
<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, if necessary)	<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 warning labels checked	<input type="checkbox"/>

Remarks

Done 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 becomes void if the system is modified in any way not approved by us.

**Reverse osmosis system GENO-OSMO-X,
GENO-OSMO-X AVRO, GENO-OSMO-X Online, GENO-OSMO-X Antiscalant
Serial no.: Refer to type plate**

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

The harmonised standards below 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, January 14th 2021

A handwritten signature in blue ink, appearing to read 'P. Höß', with a stylized flourish.

Peter Höß

Head of Technical Systems & Equipment

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