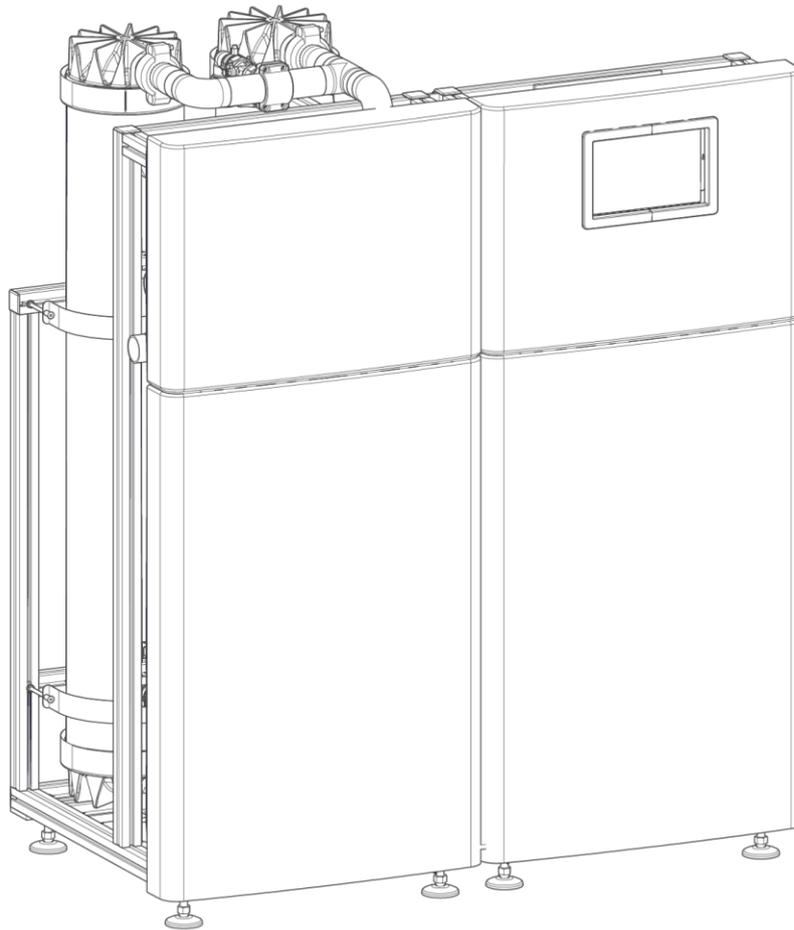


We understand water.



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## Ultrafiltration | ultraliQ:MA

Operation manual

grünbeck

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# 1 Introduction

This manual is intended for owners/operating companies, users as well as qualified specialists and ensures the safe and efficient handling of the product. The manual is an integral part of the product.

- ▶ Carefully read this manual and the instructions contained within it on the components before you operate your product.
- ▶ Adhere to all safety instructions and instructions for action.
- ▶ Keep this instruction and all other applicable documents, so that they are available when needed.

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

## 1.1 Validity of the manual

This manual applies to following products:

- Ultrafiltration ultraliQ:MA5000
- Ultrafiltration ultraliQ:MA10000
- Special versions which essentially correspond to the indicated standard products. For information on changes, please refer to the respective information sheet that is enclosed, if applicable.

## 1.2 Other applicable documents

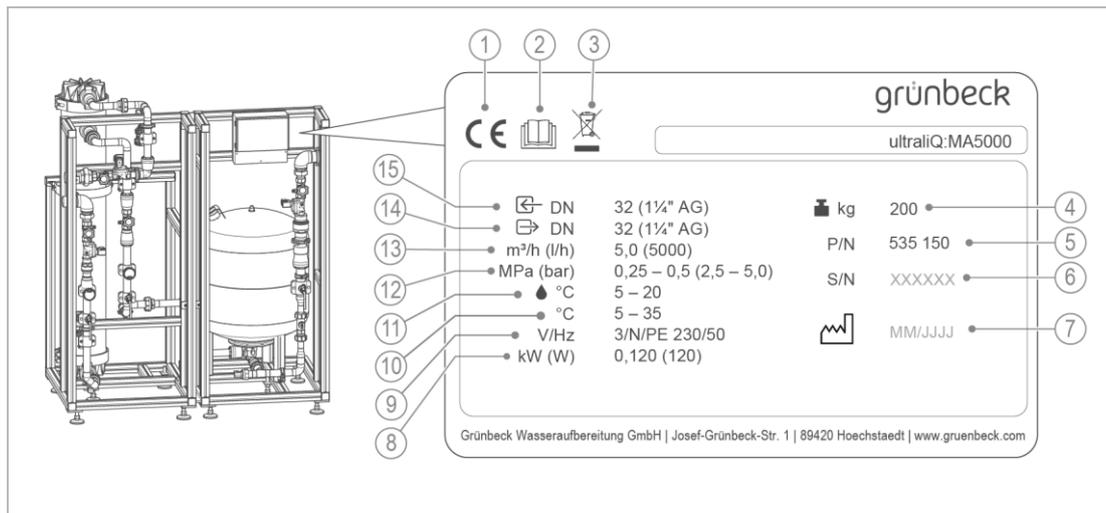
- Instructions for components from other manufacturers
- Safety data sheets for chemicals
- Electric circuit diagram, order no. 561 015

## 1.3 Product identification

You can identify your product by means of the product designation and the order number on the type plate.

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

The type plate is mounted on the rack.



Designation	
1	CE mark
2	Obey the operation manual
3	Disposal information
4	Empty weight
5	Order no.
6	Serial no.
7	Date of manufacture
8	Connected load

Designation	
9	Mains connection
10	Ambient temperature
11	Water temperature
12	Operating pressure
13	Nominal filtrate capacity
14	Nominal connection diameter of filtrate outlet
15	Nominal connection diameter of raw water inlet

## 1.4 Symbols used

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

## 1.5 Depiction of warnings

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



**SIGNAL WORD** Type and source of the hazard

- Possible consequences
- ▶ Preventive measures

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

Warning sign and signal word	Consequences if the information/instructions are ignored	
<b>DANGER</b>		Death or serious injuries
<b>WARNING</b>	Personal injury	Possible death or serious injuries
<b>CAUTION</b>		Possible moderate or minor injuries
<b>NOTE</b>	Property damage	Possible damage to components, the product and/or its function or damage to an object in its vicinity

## 1.6 Personnel requirements

During the individual life cycle phases of the product, different people carry out work tasks on the product. The respective tasks require different skills.

### 1.6.1 Qualification of personnel

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

## 1.6.2 Authorisations of personnel

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

	Operator/ user	Owner/op erati ng com pany	Qualified spec ialist	Technical service
Transport and storage			X	X
Installation and mounting			X	X
Start-up			X	X
Operation and handling	X	X	X	X
Cleaning		X	X	X
Inspection	X	X	X	X
Maintenance annually				X
Troubleshooting			X	X
Repair			X	X
Shutdown and restart			X	X
Dismantling and disposal			X	X

## 1.6.3 Personal protective equipment

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

The components below fall under the heading of personal protective equipment (PPE):



Protective gloves



Protective footwear



Protective overall



Protective goggles



Mask



Protective apron

## 2 Safety

### 2.1 Safety measures

- Only operate your product if all components are installed properly.
- Obey the local regulations on drinking water protection, accident prevention and occupational safety.
- Do not make any changes, alterations, 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.
- Keep the premises locked against unauthorised access to protect vulnerable or untrained groups of persons against residual risks.
- Observe the maintenance intervals (refer to chapter 8.2). Failure to comply can result in the microbiological contamination of your drinking water system

#### 2.1.1 Mechanical hazards

- You must never remove, bridge, or otherwise tamper with safety equipment.
- Use stable, safe, independently standing climbing aids for all work on the system that cannot be carried out from the ground.
- Make sure that the system is installed so that it cannot tip over and that the stability of the system is guaranteed at all times.

#### 2.1.2 Pressure-related hazards

- Components may 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 system components are depressurised.

#### 2.1.3 Electrical dangers

In case of contact with live components, there is an immediate risk of death due to electric shock. Damage to insulation or individual components can be life-threatening.

- Only have a qualified electrician carry out electrical work on the system.
- If live components are damaged, immediately switch off the power supply and arrange for repair.
- Switch off the supply voltage before working on electrical system components. Discharge the residual voltage.

- Never bypass electrical fuses. Do not put fuses out of operation. Observe the correct current rating when replacing fuses.
- Keep moisture away from live parts. Moisture can cause short-circuiting.

#### 2.1.4 Danger due to chemicals

- Chemicals can be hazardous to the environment and 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 follow the instructions for the different activities/situations.
- Current safety data sheets for chemicals are available for download at <https://www.gruenbeck.de/en/info-centre/safety-data-sheets/>.
- Follow in-house instructions when handling chemicals and ensure that any protective and emergency equipment such as emergency shower, eyewash, etc. are in place and functional.

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

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

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

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

##### **Cleaning/disposal**

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

### 2.1.5 Group of persons requiring protection

- This product is not intended to be used by persons (including children) with reduced capabilities, lack of experience or knowledge, unless they are supervised, have been instructed in the safe use of the product, and understand the resulting hazards.

## 2.2 Product-specific safety instructions

Diaphragm expansion tanks operate with a nitrogen or compressed air cushion and are subject to the Pressure Equipment Directive 97/23/EC.

- In the event of leaks, there is a risk of nitrogen escaping
  - ▶ Check the diaphragm expansion tank(s) regularly for leaks (refer to chapter 8.4.2).

### 2.2.1 Signals and warning devices

#### Warnings/pictograms



Electric shock hazard (attached to the switch box)

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



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

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

## 2.3 Conduct in an emergency

### 2.3.1 If there is a water leak

1. Deenergise the device – pull out the mains plug.
2. Locate the leak.
3. Eliminate the cause of the water leak.

### 3 Product description

#### 3.1 Intended use

The ultrafiltration system ultraliQ is designed for the fully automatic reduction of solid particles, turbidities and micro-organisms in the raw water.

The ultrafiltration system is suitable for use in private water supply systems.



If the ultrafiltration system ultraliQ is used for the drinking water supply, the provisions of DIN 2001-1, DIN 1988 as well as DIN EN 1717 must be complied with.

##### 3.1.1 Application limits

Parameters		MA5000	MA10000
Turbidity (on average)	NTU	< 15.0	
Turbidity (short-term)	NTU	< 30.0	
TOC	mg/l	< 5.0	
Oils/greases/hydrocarbons		not detectable	

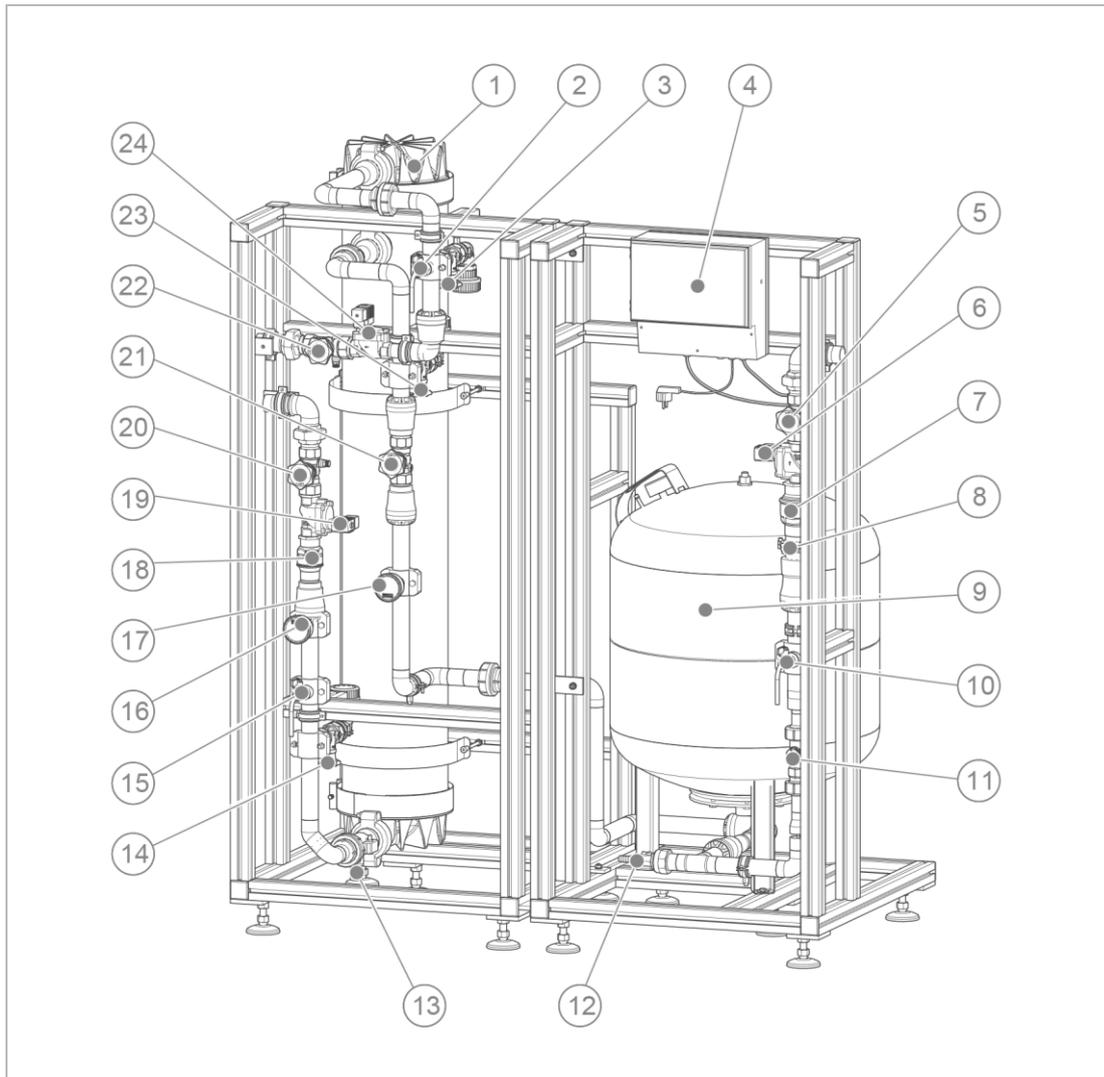


For all other water constituents contained in the raw water, with the exception of the microbiological parameters, the limit values of the German Drinking Water Ordinance (TrinkwV 2001) do apply.



Any required preliminary treatment stages (such as the oxidation filter system fermaliQ:MA for the reduction of iron, manganese and ammonium) are available from Grünbeck upon request.

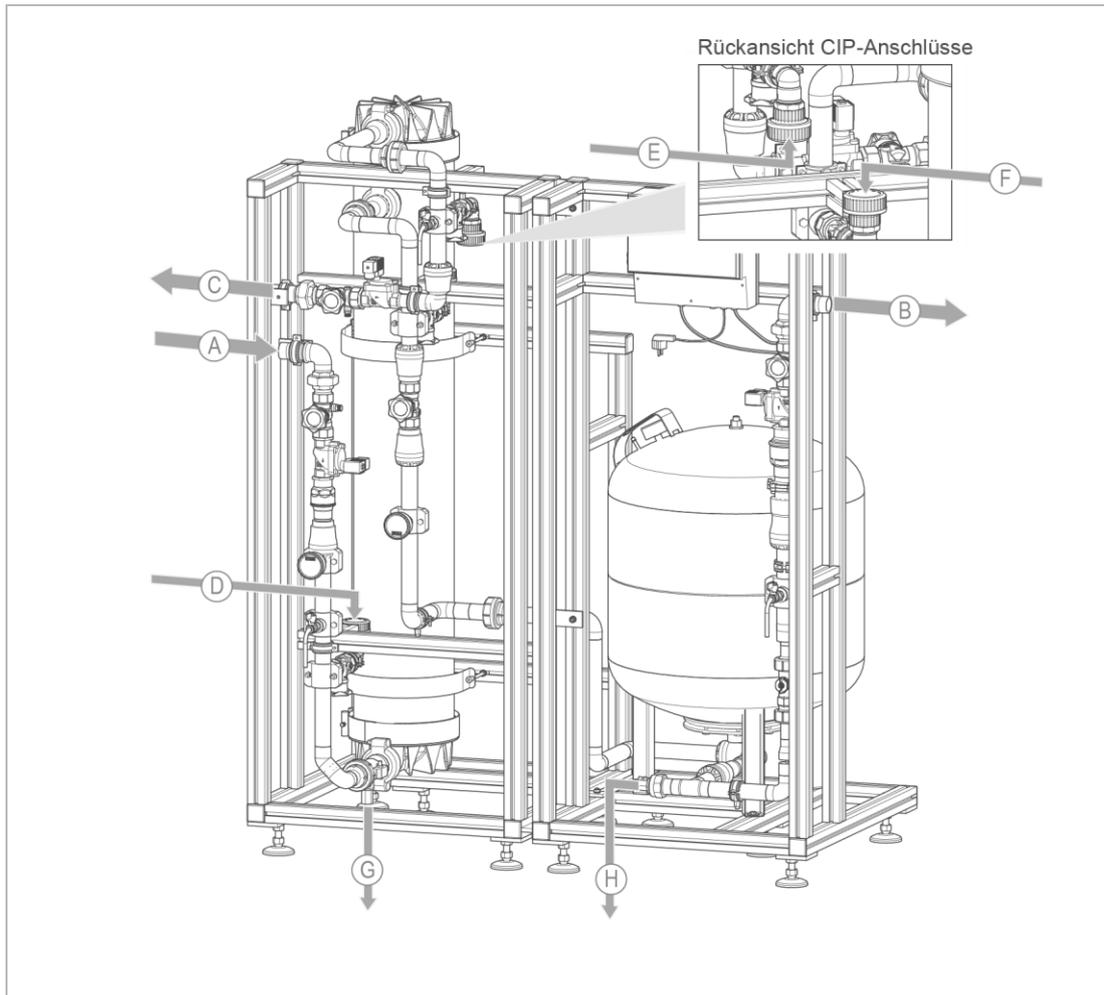
### 3.2 Product components



Designation	Function	Coding
1 Ultrafiltration module(s)	Ultrafiltration module	1UF1AB01 (1UF1AB02)
2 Shut-off valve CIP filtrate	Connection for the chemical cleaning of the system	1UF1AH07
3 Sampling valve backwash water	Flame-sterilisable sampling valve to withdraw water samples	1UF1AH53
4 Switch box	GENO-matic control unit.	1UF1AE01
5 Filtrate shut-off valve	Piston valve to disconnect the system from the on-site mains.	1UF1AH04
6 Solenoid valve filtrate	Automatic valve for discharging the filtrate	1UF1AV03
7 Filtrate non-return valve	To prevent the backflow of filtrate from the on-site buffer tank during backwashing and flushing out	1UF1AS03
8 Flow stabiliser	Setting of filtrate volume flow	1UF1AS02
9 Diaphragm expansion tank	Tank for backwashing the UF module	1UF1AB03
10 Filtrate sampling valve	Flame-sterilisable sampling valve for taking water samples and flushing preserving agent	1UF1AH52
11 Flow meter filtrate	Flow measurement of the filtrate flow during filtration operation	1UF1ACF01
12 Shut-off valve draining diaphragm expansion tank	Mini ball valve for draining the diaphragm expansion tank	1UF1AH02

	Designation	Function	Coding
13	Shut-off valve for draining ultrafiltration module	Mini ball valve for draining the ultrafiltration module	1UF1AH11
14	Shut-off valve CIP raw water	Connection for the chemical cleaning of the system	1UF1AH06
15	Raw water sampling valve	Flame-sterilisable sampling valve to withdraw water samples	1UF1AH51
16	Pressure display raw water	Pressure gauge for visual indication of the raw water pressure.	1UF1ACP01
17	Pressure display filtrate	Pressure gauge for visual indication of the Filtrate pressure.	1UF1ACP02
18	Raw water non-return valve	To prevent the backflow of filtrate from the diaphragm expansion tank during backwashing	1UF1AS01
19	Solenoid valve raw water	Automatic valve to the feed line of the raw water	1UF1AV01
20	Raw water shut-off valve	Piston valve to disconnect the system from the on-site mains.	1UF1AH01
21	Shut-off valve backwash	Piston valve for disconnecting the diaphragm expansion tank	1UF1AH03
22	Shut-off valve CIP backwash water	Connection for the chemical cleaning of the system	1UF1AH08
23	Shut-off valve backwash water	Piston valve to disconnect the system from the on-site mains.	1UF1AH05
24	Solenoid valve backwash water	Automatic valve for discharging the backwash water	1UF1AV02

### 3.3 System connections



#### Inlet and outlet

Designation
A Raw water inlet
B Filtrate outlet

Designation
C Backwash water outlet

#### CIP connections

Designation
D CIP raw water
E CIP backwash water

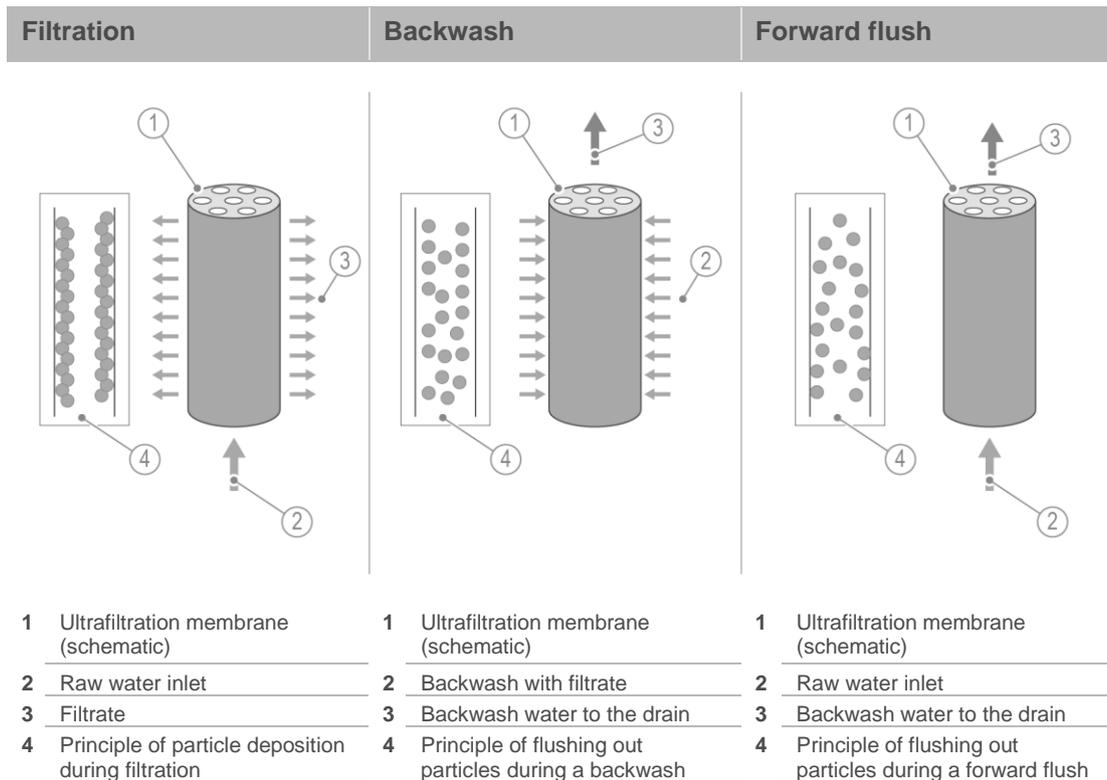
Designation
F CIP filtrate

#### Draining

Designation
G Draining ultrafiltration module

Designation
H Draining diaphragm expansion tank

### 3.4 Functional description



#### Filtration

Raw water is fed into the ultrafiltration system and then pressed through the capillary membranes of the ultrafiltration modules. The pores of the semi-permeable membrane have a cut-off of 0.02 µm. Almost all undissolved substances contained in the water such as particles, bacteria or viruses are reliably retained on the raw water side of the membranes and a particle and germ-free filtrate is generated.

During the filtration process, the filtered particles are deposited on the membrane surface and increase the differential pressure (transmembrane pressure) between the raw water side and the filtrate side. This layer grows as the filtration time progresses and must be flushed from the membrane surface after each filtration interval.

#### Flushing the system

After each filtration interval, the ultrafiltration system is automatically flushed in 2 phases:

- Backwash with filtrate from a diaphragm expansion tank installed in the ulltraliQ: The backwash process removes retained dirt particles and micro-organisms from the UF membrane.
- Forward flush with raw water: During the forward flush with raw water, the removed dirt particles and micro-organisms are flushed to the drain
- The forced flushes programmed in the control unit prevent the stagnation of raw water in the UF module.

#### Surface layer

During operation, a surface layer is formed by the substances contained in the water (particles, turbidity, micro-organisms) retained on the UF membrane.

Fouling is divided into 3 categories:

- Inorganic fouling (= scaling)
  - Deposits of salt (exceeding the solubility limit).
- Organic fouling
  - Deposits of organic components  
(suspended particles, macromolecules, colloidal turbidity, proteins)
- Biofouling: Fouling by biofilms

As the filtration time progresses, the surface layer grows and leads to the following effects:

- The permeability of the membrane decreases
- The membrane resistance increases
- The transmembrane differential pressure (TMP) increases

### **Cleaning process**

To remove deposits that cannot be removed by the combination of backwashing and flushing, chemical cleaning (CIP = Cleaning in Place) must be carried out.

In a CIP process, the surface layers on the UF membrane are removed by a combination of chemicals, heat, mechanical forces and exposure time.

A CIP process has the following effects:

- The surface layer is removed
- The transmembrane differential pressure (TMP) drops
- The membrane resistance decreases
- The membrane permeability increases

The CIP process is required under the following circumstances:

- TMP has reached 0.7 bar and can no longer be reduced by the automatic flushing steps (backwashing, flushing)

## **3.5 Accessories**



You can retrofit your product with additional accessories. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechstaedt/Germany for details.

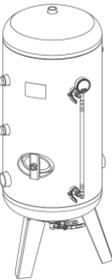
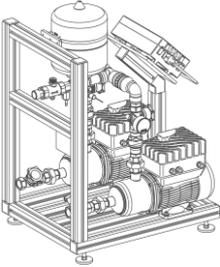
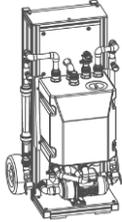
Illustration	Product	Order no.
	<b>Diaphragm expansion tank DD 33,G<sup>3/4</sup></b> To prevent water hammer in the inlet if a compressed air chamber provided on site is used to store the filtrate	33 l <b>890 60 304</b>
	<b>Diaphragm expansion tank</b> (Diaphragm expansion tank)	25 l <b>535 105</b>
	In addition to an existing diaphragm expansion tank or for new installations as water supply during the flushing process of the ultrafiltration system	60 l <b>535 115</b>
		80 l <b>535 125</b>
		100 l <b>535 135</b>
		300 l <b>535 155</b>
		500 l <b>535 165</b>
	<b>Pressurised water tank, 6 bar</b> In addition to an existing pressurised water tank or for new installations as water supply during the flushing process of the ultrafiltration system	150 l <b>530 505</b>
		300 l <b>530 515</b>
		500 l <b>530 525</b>
		750 l <b>530 535</b>
		1000 l <b>530 545</b>
	<b>Basic pure water tank GT 1000</b> for the unpressurised storage of filtrate	without sterile air filter <b>712000010000</b>
		with sterile air filter <b>712000020000</b>
	Pre-assembled PE tank with PE overflow line, PVC connections for the inlet and withdrawal by a pressure booster system (max. withdrawal volume 5 m <sup>3</sup> /h), control electronics GENO-Multi Level and level probe (in the tank)	

Illustration	Product	Order no.	
	<b>Pressure booster systems</b> <b>GENO-HR-X</b> automatically controlled via pressure and flow controller		
		GENO-HR-X 2/40-2 N	<b>730 461</b>
		GENO-HR-X 4/40-1 N	<b>730 462</b>
		GENO-HR-X 4/40-2 N	<b>730 463</b>
	<b>GENO-FU-X</b> speed-controlled by pressure sensor as well as frequency converter		
		GENO-FU-X 2/40-2 N	<b>730 641</b>
		GENO-FU-X 4/40-1 N	<b>730 642</b>
	GENO-FU-X 4/40-2 N	<b>730 643</b>	
	<b>CIP:UF60 mobile cleaning system</b> for the chemical cleaning of ultrafiltration systems	<b>778 100</b>	

### 3.6 Optional equipment



You can retrofit your product with optional equipment. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechststaedt/Germany for details.

Product	Order no.
Front cover of ultraliQ:MA	<b>535 168</b>
Control unit S7-1200 for ultraliQ	<b>535 060</b>

## 4 Transport, installation and storage

### 4.1 Shipping/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 means of a crane and lifting strap.
- ▶ The system must not be loaded/unloaded with a crane and lifting strap.
- ▶ Dispose of the packaging material in an environmentally sound and appropriate manner only after installation of the system (refer to chapter 6.5.1).

### 4.2 Transport/placing



#### WARNING

Risk of tipping in case of improper transport.

- The system's centre of gravity is top-heavy. The system may tip and crush persons/limbs.
- ▶ Transport the system by means of a forklift or lift truck with appropriate forks only – mind the marked pick-up direction
- ▶ 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, if present.

### 4.3 Storage

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

# 5 Installation



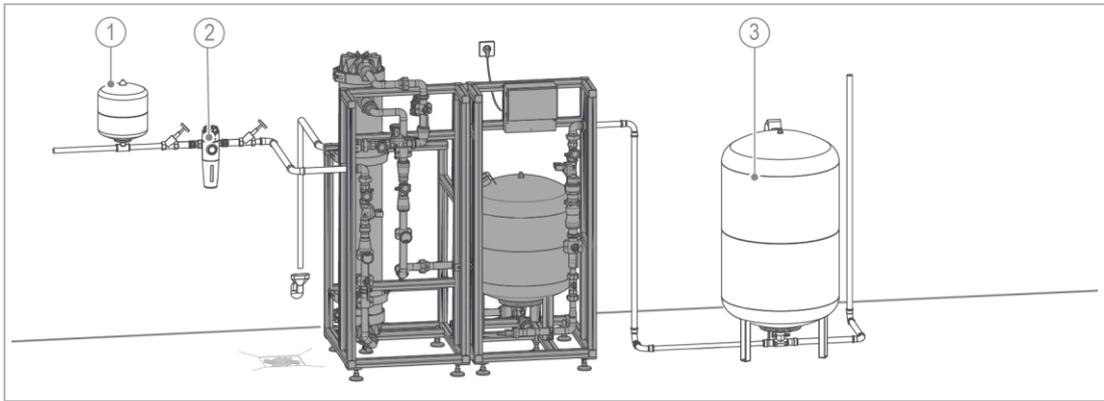
The installation of the system represents a major intervention in the drinking water system and only a qualified specialist may install such systems.



On-site interfaces (incl. fittings, tanks) must be in perfect condition (no dirt, no rust, no suspected microbial contamination)

► Clean and disinfect the water installation before installation, if necessary

## Installation example: ultraliQ:MA5000 with pressurised water tank



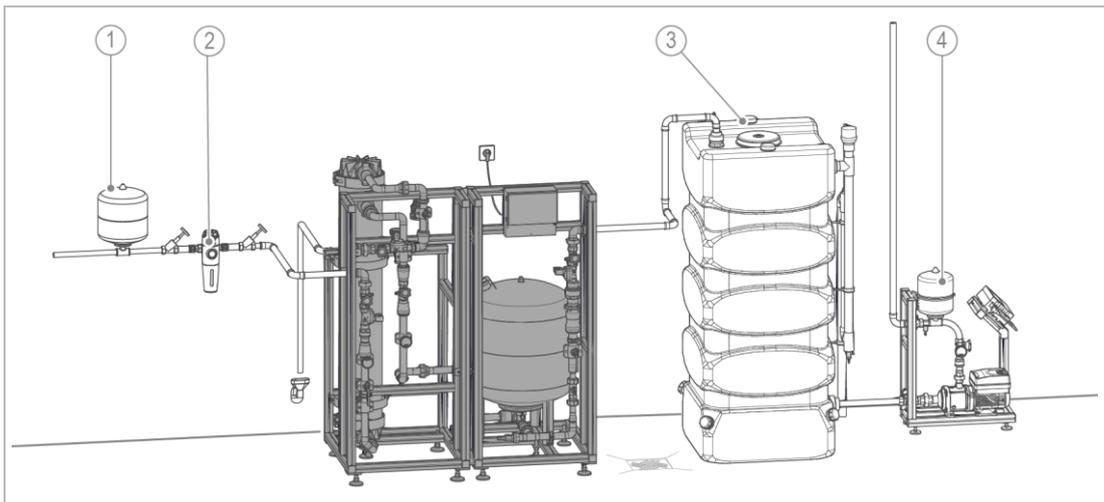
**Designation**

- 1 Diaphragm expansion tank
- 2 Fine filter with pressure reducer

**Designation**

- 3 Diaphragm expansion tank/pressurised water tank (buffer tank)

## Installation example ultraliQ:MA5000 with open tank and pressure booster system



**Designation**

- 1 Diaphragm expansion tank
- 2 Fine filter with pressure reducer

**Designation**

- 3 Unpressurised tank
- 4 Pressure booster system

## 5.1 Requirements for the installation site

Obey the 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 sufficiently dimensioned drain connection must be available (refer to chapter 8).
- A floor drain suitable for the system size must be available at the installation site. If no floor drain is available, the client must install a backwash water tank including waste water lifting system on site.
- Lifting systems must be secured against power failure.

### 5.1.1 Placing of the system/space required

- The sufficiently dimensioned installation surface of the system (foundation) must be level and have sufficient strength and load-bearing capacity to support the operating weight of the system.
- The system must be accessible for maintenance and repair work. All necessary operating aisles and heights have to be kept free in addition to the depth/width/height of the system
  - Front: 800 mm, left: 1000 mm, right: 1000 mm, height: 400 mm
- The room/installation height should at least be 2250 mm.

### 5.1.2 Upstream and downstream products

The components below must be installed upstream and downstream of the system on site:

#### Upstream of the ultrafiltration system (on raw water side)

- Well pump with pressure switch control (only for use with well/source water)



If the well pump is a centrifugal pump, it can be integrated via a release signal.

- Diaphragm expansion tank to prevent water hammer (refer to chapter 3.5)
- Fine filter (filter fineness  $\leq 200 \mu\text{m}$ ) with pressure reducer

**Downstream of the ultrafiltration system (on filtrate side)**

- Diaphragm expansion tank or pressurised water tank
- Alternatively: Pure water tank with pressure booster system to maintain the water supply during the flushing process

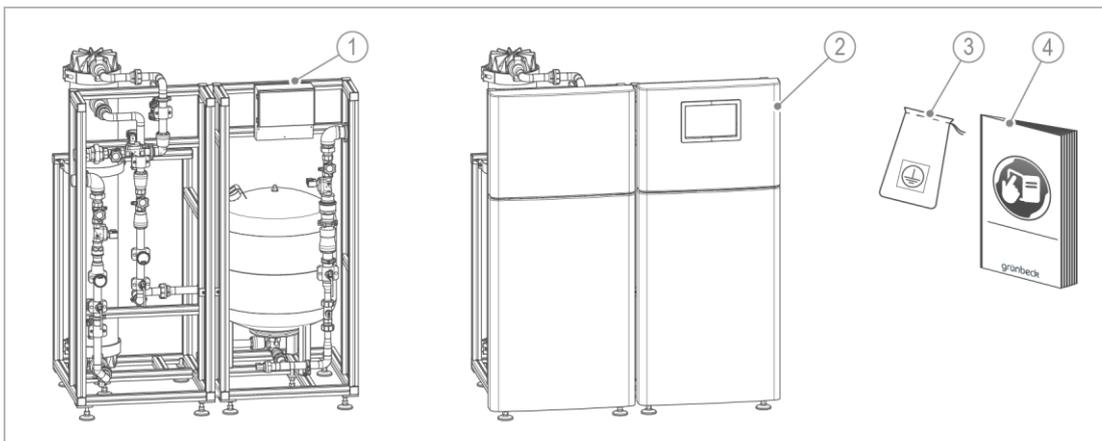
**5.1.3 Requirements for electrical wiring**

- For electrical connection a Schuko socket is required within a distance of approx. 1.2 m of the system.
- The socket outlet requires permanent power supply and must not be coupled with light switches, emergency heating switches or the like.

**5.2 Checking the scope of supply**



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



Designation	
1	ultraliQ:MA
2	Optional: ultraliQ:MA with front cover

Designation	
3	Bag with connection material for "Potential equalisation of aluminium rack"
4	Operation manual

► Check the scope of supply for completeness and damage.

## 5.3 Water installation

An ultraIQ:MA without optional equipment is described here as representative of all system designs. The illustrations are only exemplary representations.

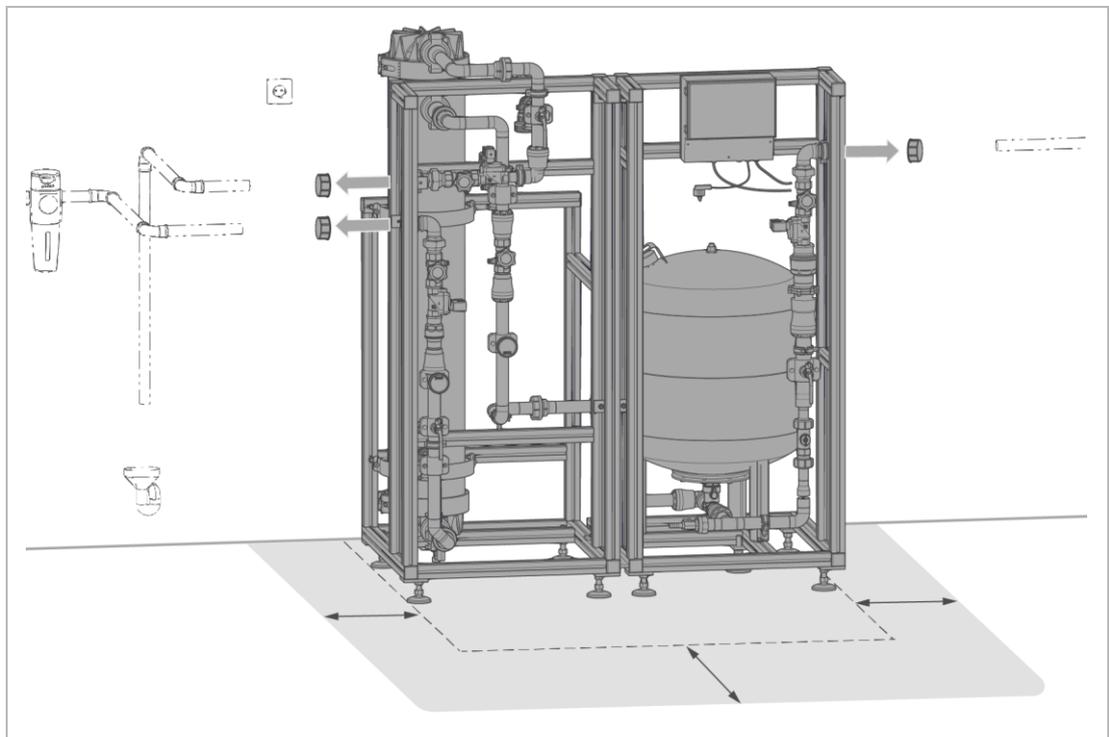
- ▶ Carry out all work for all versions in an analogous way.



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

### 5.3.1 Preliminary work

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

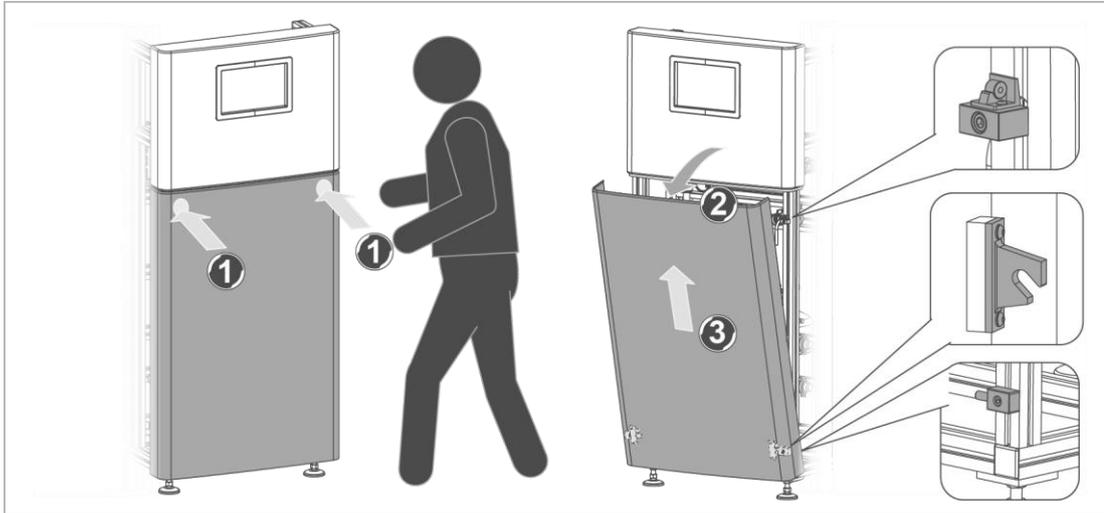


3. Securely place the system at the designated location – take note of the minimum space required.
4. Level out possible unevenness with the levelling feet.
5. Remove the protective caps from the connections.

### 5.3.2 Removing the front cover (optional)

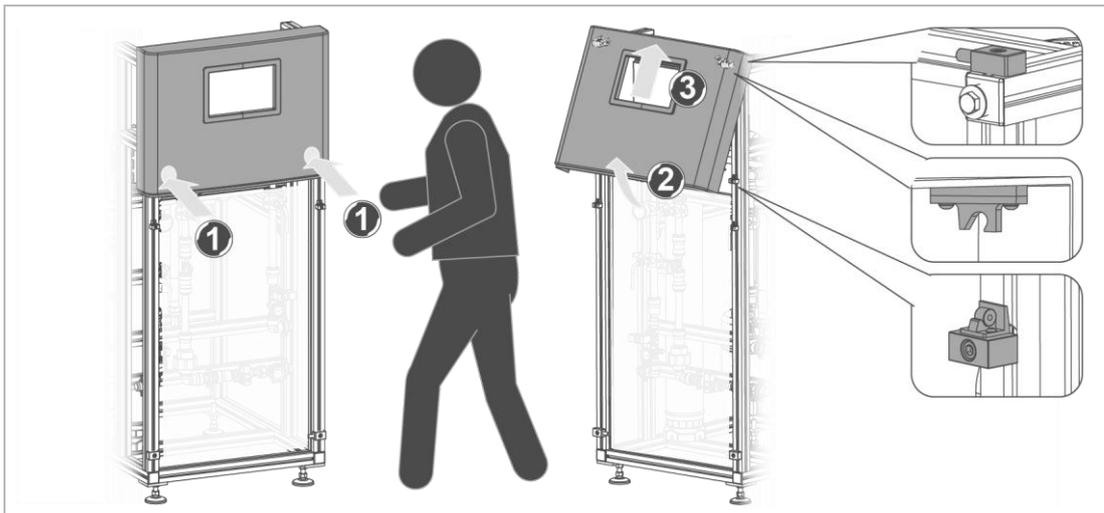
The optional front cover must be removed in order to carry out preliminary work (installation, inspection and maintenance) on the technical equipment.

#### Removing the lower cover



1. Push the cover against the system rack at the upper corners.
  - » The snap-fit connections release the cover.
2. Tilt the top of the cover forwards.
3. Lift off the cover from the lower attachment.
4. Put the cover down and secure it against toppling.

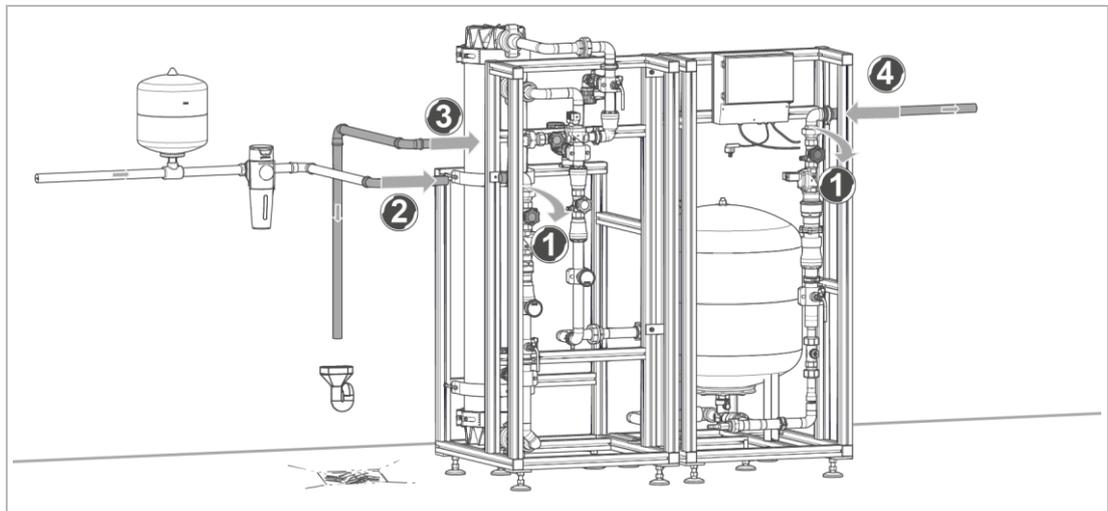
#### Removing the upper cover



1. Push the cover against the system rack at the bottom corners.
  - » The snap-fit connections release the cover.
2. Lift off the cover from the upper attachment.
3. Tilt the cover forwards on the underside.

4. Put the cover down and secure it against toppling.
  - » The front cover is removed.

### 5.3.3 Connecting the system



1. Close the shut-off valves for the raw water inlet and filtrate outlet.
2. Connect the raw water inlet to the on-site raw water connection. Observe the permissible operating pressure (refer to Technical Data, chapter 12).
3. Connect the backwash water outlet to the drain connection (according to DIN 1988-100 and DIN EN 1717 with free outlet).
4. Connect the filtrate outlet to the filtrate receiver tank (e.g. diaphragm expansion tank, pressurised water tank or unpressurised tank).

## 5.4 Electrical installation



The electrical installation must be carried out by a qualified electrician only.



**DANGER** Life-threatening voltage of 230 V

- Risk of severe burns, cardiovascular failure, fatal electric shock
- ▶ Only have qualified electricians carry out electrical work on the system.



The system is electrically pre-installed in the factory and must not be modified.

- ▶ Conduct an inspection of the installation in accordance with DIN EN 60204 at the installation site.

### Cable connections within the control unit

Einspeisung power supply			Magnetventil 1UF1AV01 solenoid valve			Magnetventil 1UF1AV02 solenoid valve			Magnetventil 1UF1AV03 solenoid valve			Sammelstörung collective fault			Freigabe Zu- laufpumpe release for inlet pump		Uni. Stop- eingang universal stop input		Pegel Filtrattank level filtrate tank			Wasserzähler water meter		
230V/50Hz			230V/50Hz			230V/50Hz			230V/50Hz			pot. frei pot. free			pot. frei pot. free		24V DC		24V DC			12V DC		
PE	N	L	N	PE	L	N	PE	L	N	PE	L	n. c.	Com.	n. o.	n. o.	Com.	n. c.	Com.	A	B	Com.	GND	IMP	12V
3	2	1	8	4	7	11	6	14	12	4	15	18	19	20	37	38	24	21	25	26	22	28	29	30

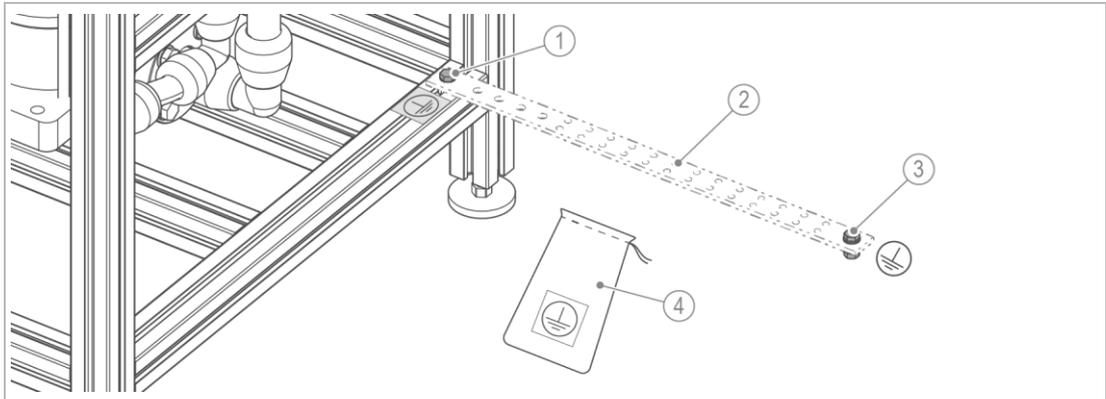
Ter m.	Signal	Colour	Function	Line	Comment
3	PE	GN/YE	Feed	230V/50Hz	Voltage supply Fuse max. 4 A
2	N	BU			
1	L	BN			
8	N	2	Solenoid valve 1UF1AV01	230V/50Hz	Ölflex 3G0,75 mm <sup>2</sup> Activation 8W
4	PE	GN/YE			
7	L	1			
11	N	2	Solenoid valve 1UF1AV02	230V/50Hz	Ölflex 3G0,75 mm <sup>2</sup> Activation 8W
6	PE	GN/YE			
14	L	1			
12	N	2	Solenoid valve 1UF1AV03	230V/50Hz	Ölflex 3G0,75 mm <sup>2</sup> Activation
4	PE	GN/YE			
15	L	1			
18	NCC (normally closed contact)		Collective fault	voltage-free	max. 250V AC 8 A
19	Common				
20	NOC (normally open contact)				
37	NOC (normally open contact)		Feed pump release	voltage-free	Ölflex 3G0,75 mm <sup>2</sup> max. 250V AC 8 A
38	Common				
24	NCC (normally closed contact)		Universal stop input	24V DC	Ölflex 2x0,75 mm <sup>2</sup>
21	Common				
25	Level A		Level filtrate tank	24V DC	Ölflex 3x0,75 mm <sup>2</sup>
26	Level B				
22	Common level A, B				
28	GND	BK	Water meter (via pulse divider) 1UFACF01	12 V DC	Ölflex 3x0.25mm <sup>2</sup>
29	Pulse	BU			
30	12 V DC	BN			

### 5.4.2 Establishing potential equalisation

► Proceed as follows to establish the connection to the on-site potential equalisation:



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

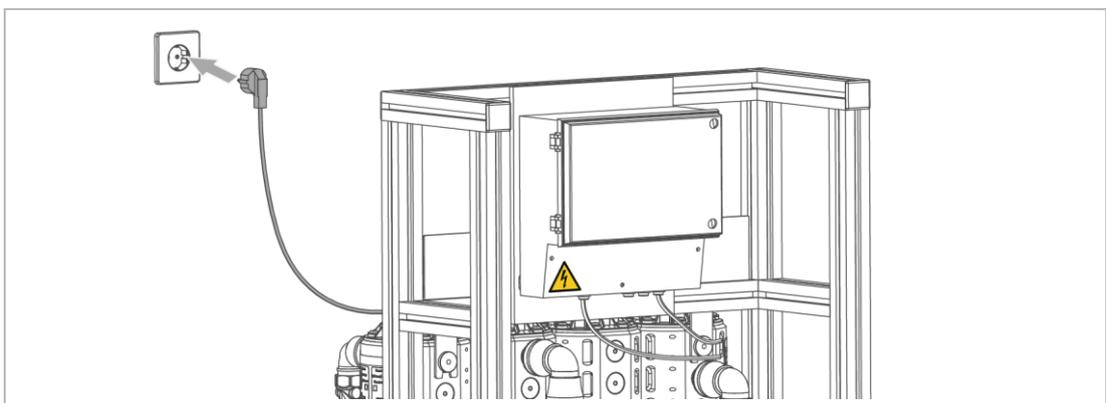


#### Designation

- |   |   |
|---|---|
| 1 | Grounding point on the aluminium rack                 |
| 2 | Grounding tape  |
| 3 | Grounding point for on-site potential equalisation    |
| 4 | Bag with connection material (in the scope of supply) |

1. Connect the grounding point to the aluminium rack – use the connection material: Hammer nut, hexagon head screw M8x30 and serrated washer.
2. Attach the "Grounding" label.
3. Connect the protective conductor to the on-site potential equalisation – use the connection material: Hexagon head screw M8x20, washer and spring washer.

### 5.4.3 Establish electrical power supply



► Plug the mains plug into the 230 V socket.

## 6 Start-up



The initial start-up of the product may only be carried out by technical service personnel.

### 6.1 Flushing out preserving agent

Systems that are preserved in the factory are marked.

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



#### Prerequisite:

To flush out the preserving agent, the system must be connected on the raw water side and sufficient water pressure (max. 5.0 bar) must be available.



#### WARNING

Contact with preserving agent

- Risk of chemical burns to the eyes/skin
- ▶ Use personal protective equipment (PPE).
- ▶ Observe the safety data sheet of the chemical.



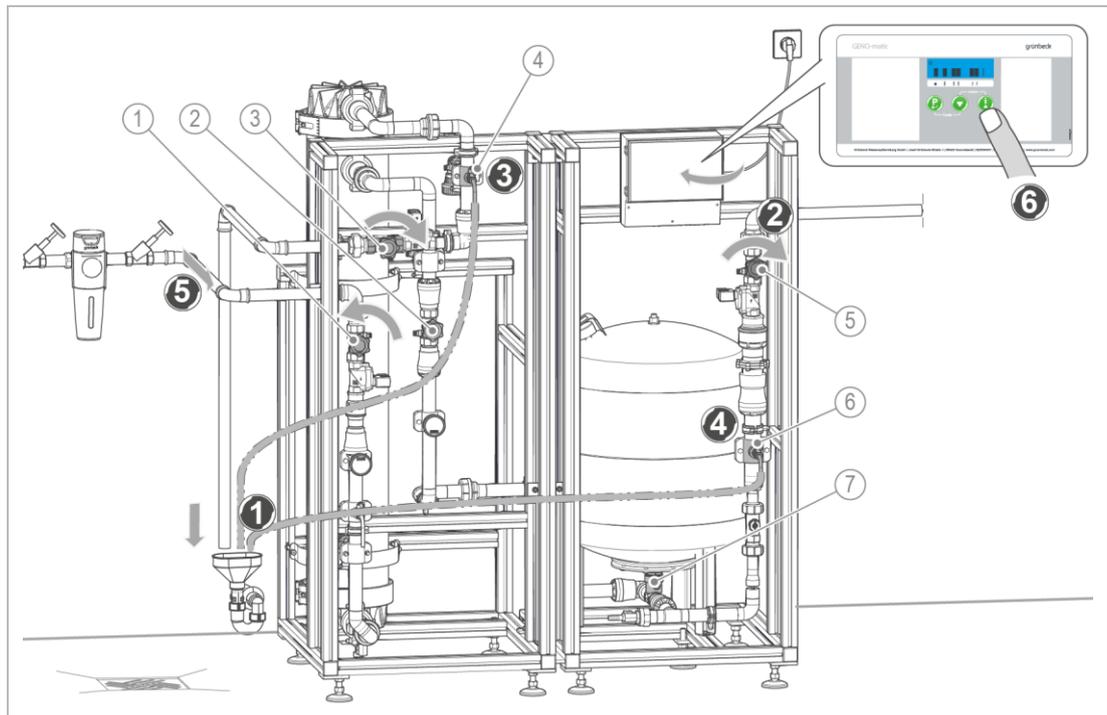
#### WARNING

Danger from contaminated water/medium when flushing

- Contamination of the medium by preserving agents
- Illness/infection when consuming contaminated water
- ▶ Ensure that flushing water does not get into the water installation leading to the consumer.
- ▶ Direct the flushing water into the drain.

► Flush out the preserving agent as follows:

### Preparation



	Designation	Function	Coding
1	Raw water shut-off valve	Piston valve to disconnect the system from the on-site mains.	1UF1AH01
2	Shut-off valve backwash	Piston valve for disconnecting the backwash pipe	1UF1AH03
3	Shut-off valve backwash water	Piston valve to disconnect the system from the on-site mains.	1UF1AH07
4	Sampling valve backwash water	Here: for flushing preserving agent	1UF1AH53
5	Filtrate shut-off valve	Piston valve to disconnect the system from the on-site mains.	1UF1AH06
6	Filtrate sampling valve	Here: for flushing preserving agent	1UF1AH52
7	Shut-off valve diaphragm expansion tank	Valve for disconnecting the diaphragm expansion tank	–

1. Connect hoses with hose clamps to the sampling valves for backwash water and filtrate.
  - a Guide the hoses to the drain.



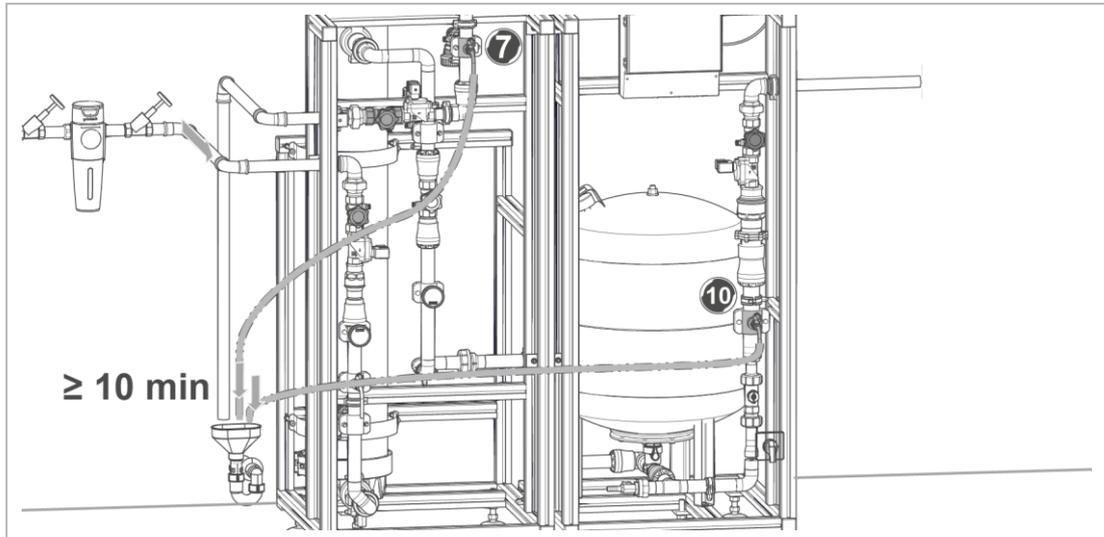
Alternatively, the flushing process can be carried out using a suitable container (e.g. bucket). In this case, the container must be filled and emptied by opening and closing the corresponding sampling valves until the preserving agent has been completely flushed.

2. Close the shut-off valves for backwash water, filtrate and the shut-off valve for the diaphragm expansion tank.
3. Open the backwash water sampling valve.
4. Close the filtrate sampling valve.
5. Pressurise the system with water - Open the raw water shut-off valve.

6. Open the switch box and switch on the system with the button  on the control unit.

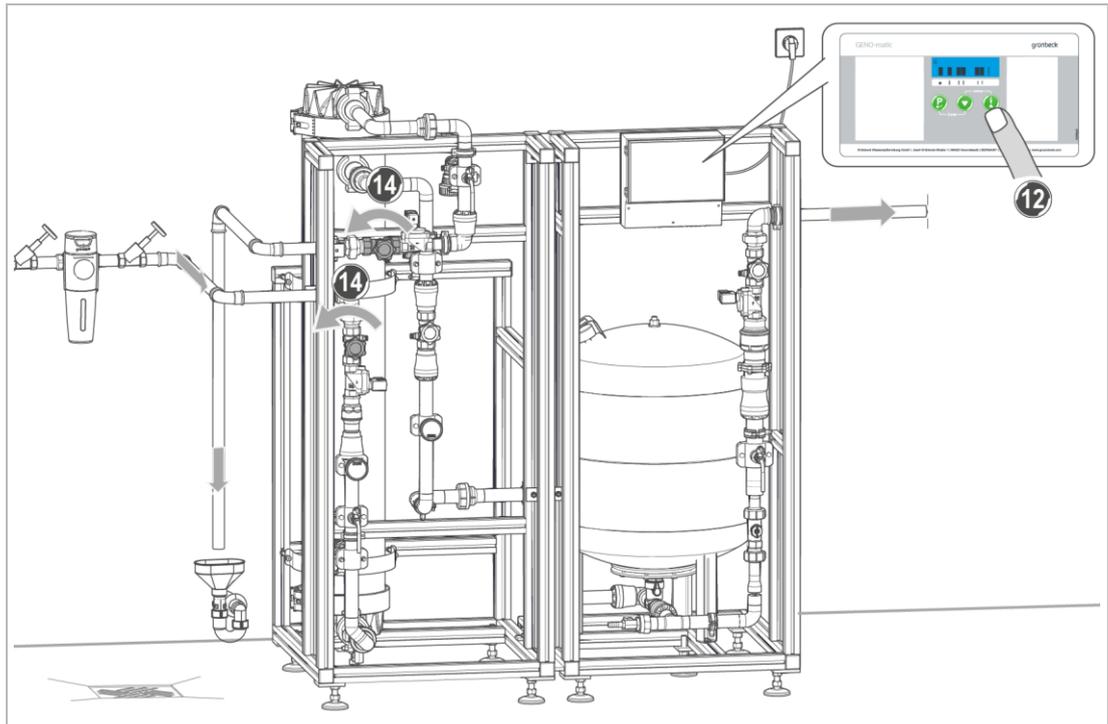
### Flushing out

- Check or set the filtration interval to  $\geq 30$  minutes in the programming level: (code C 303) (factory setting: 30 min).



7. Flush for 10 minutes (this corresponds to a forward flush).
  - » The preserving agent is flushed out via the backwash water side.
8. Close the backwash water sampling valve.
9. Open the filtrate sampling valve and the backwash shut-off valve.
10. Flush for 10 minutes (this corresponds to a filtration in the drain)
  - » The preserving agent is flushed out via the filtrate side.
11. Close the filtrate sampling valve.

## Post-process



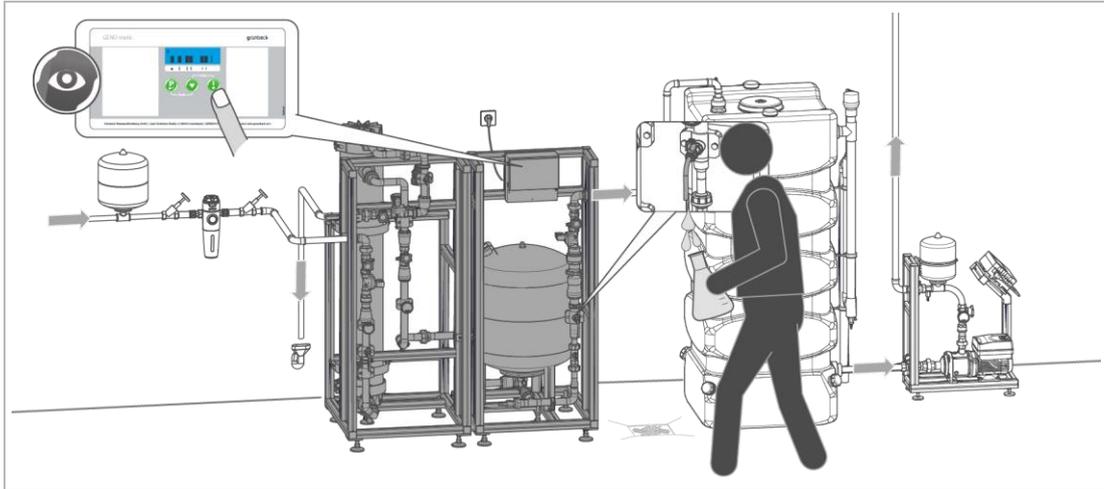
12. Dismantle the hoses.
13. Open the shut-off valves for backwash water, filtrate and the shut-off valve for the diaphragm expansion tank.
14. Reset the filtration interval to factory settings (code C 303).
  - » The membranes are flushed out by the preserving agent.
15. If necessary, switch off the system with the  button (press for > 5 s).

## 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. Switch on the system at the operating panel for the control unit.
  - a Press the button  for > 5 s.
2. Check the system settings in the control unit (refer to chapter 7.1.3).
3. Check the system for leaks.
4. Carry out a test run, if necessary.
5. Take water samples of raw water and filtrate.
6. Determine the pH value and the temperature of the raw water and the filtrate and note the measured values in the start-up log (chap. 13.1, "Remarks").
7. Fill in the start-up log (refer to chapter 13.1).

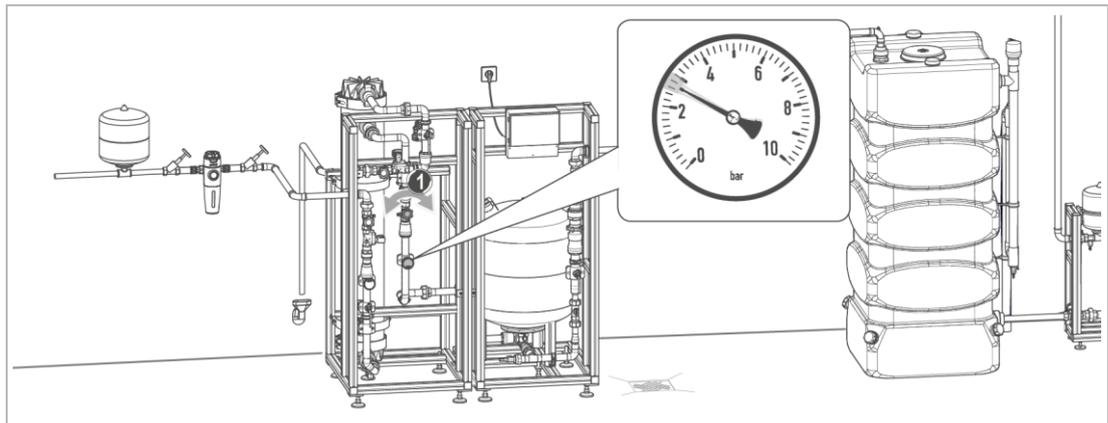
## 6.3 Settings in the case of a non-pressurised filtrate tank

### Operation with a non-pressurised tank



If the ultraIQ is operated with a downstream non-pressurised tank, changes must be made to the control unit. The necessary changes are described in the technical service manual (chapter 2.1) and may only be carried out by a qualified specialist.

If the filtrate produced is stored in an unpressurised (open) filtrate tank, care must be taken to ensure that there is sufficient pressure in the diaphragm expansion tanks. Otherwise, proper backwashing cannot be guaranteed.



1. Throttle the filtrate shut-off valve during filtration operation to ensure that a pressure of 2.5 - 3.0 bar is set at the filtrate pressure display.
2. Check whether the backwashing is done properly.

To check for proper functioning, the filtration interval can be temporarily shortened for this purpose using programming level "C 303" (refer to chapter 7.4).

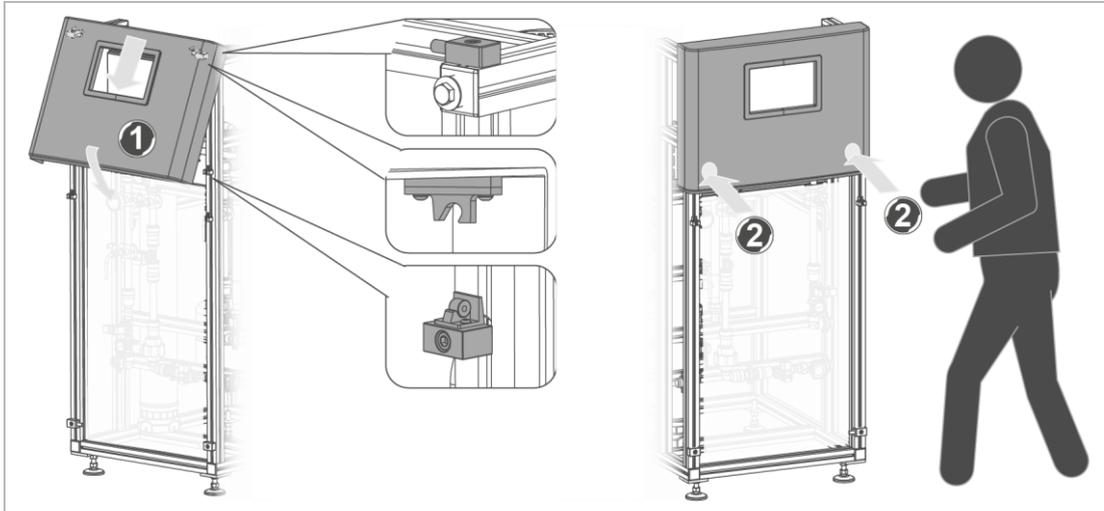


- The filtration interval must be at least 5 minutes to ensure that the diaphragm expansion tank(s) is/are sufficiently filled.
- ▶ Restore the original settings after checking and confirming a properly running backwash.

## 6.4 Installing the front cover (optional)

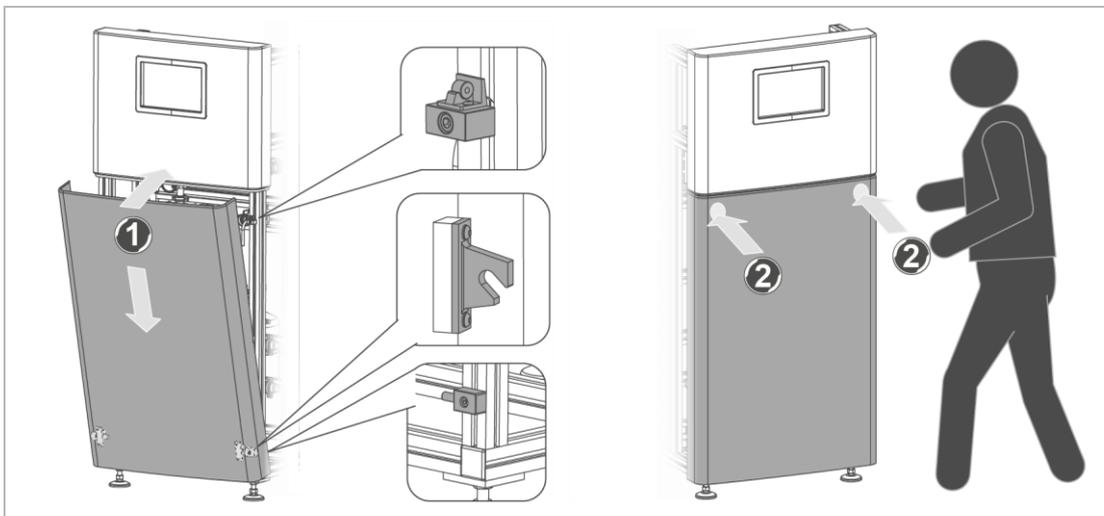
After the work has been carried out, the optional front cover must be fitted.

### Mounting the upper cover



1. Insert the upper cover into the attachment.
2. Push the upper cover against the system rack at the bottom corners.
  - » The snap-fit connections engage.
  - » The front cover is installed.

### Mounting the lower cover



1. Insert the upper cover into the attachment.
2. Push the cover against the system rack at the upper corners.
  - » The snap-fit connections engage.

## 6.5 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.

### 6.5.1 Disposal of packaging

- ▶ Dispose of packaging material as soon as it is no longer needed.

**NOTE**

Risk to the environment due to incorrect disposal

- Packaging materials are valuable raw materials and can be reused in many cases.
- Incorrect disposal can cause environmental pollution.
- ▶ Dispose of packaging material in an environmentally sound manner.
- ▶ Comply with locally applicable disposal regulations.
- ▶ If necessary, commission a specialist company with the disposal.

### 6.5.2 Storage of accessories

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

## 7 Operation

Normally, no intervention by the owner/operating company/operator/ is required during operation.



The system is automatically flushed twice a day, regardless of whether the system has produced filtrate since the last flushing. The times are freely adjustable (refer to 7.4, Index 4/5)

- ▶ Ensure that there is a permanent power supply.

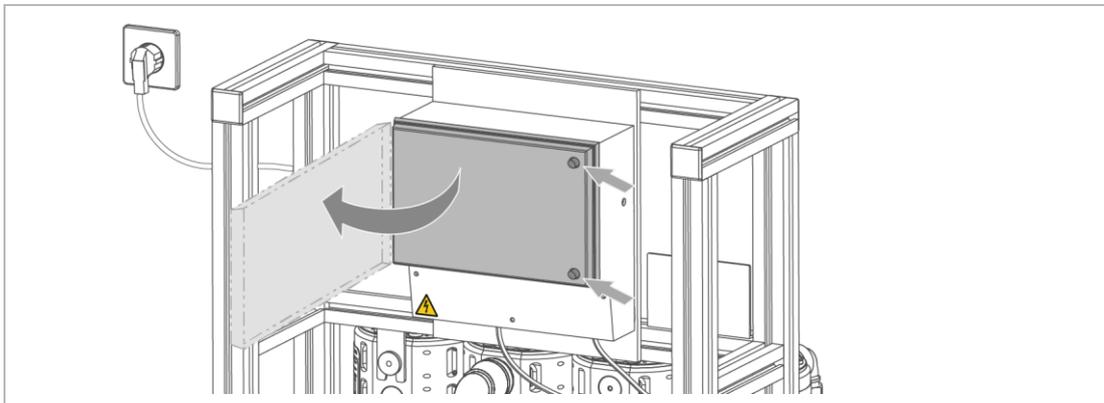
### 7.1 Operation of the control unit

The GENO-matic control unit controls the operation of the system and the optional components.

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

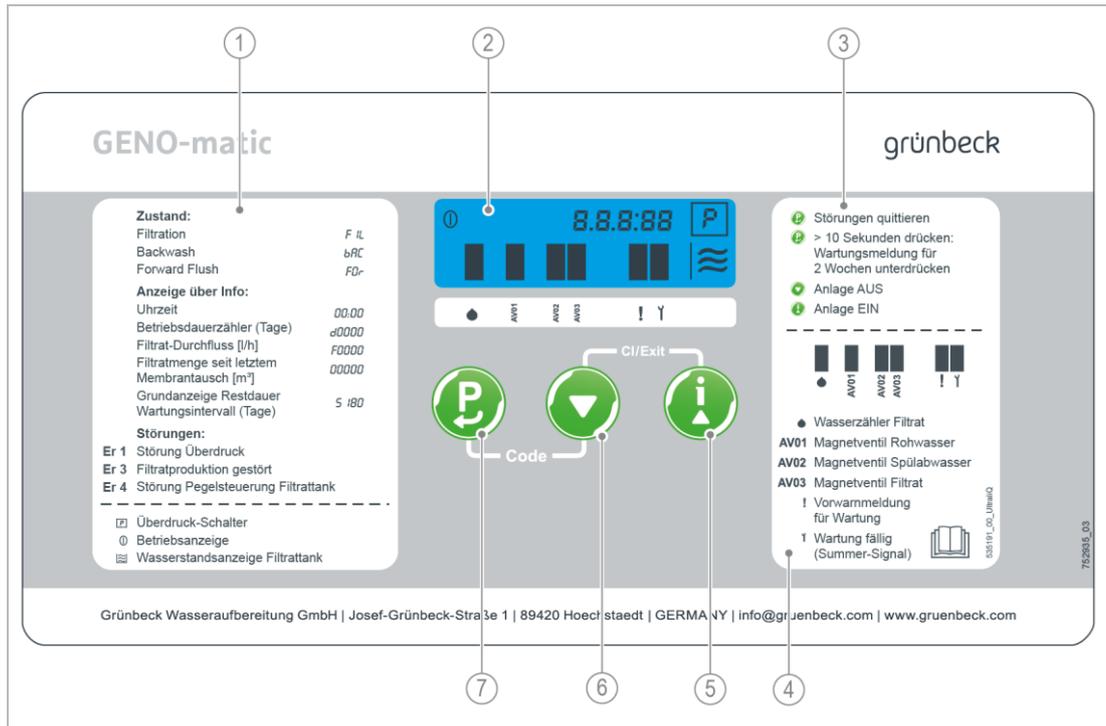
If no key is pressed for a period of 3 minutes, the basic display “system status” appears automatically (refer to chapter 7.1.3).

#### Switching on the system



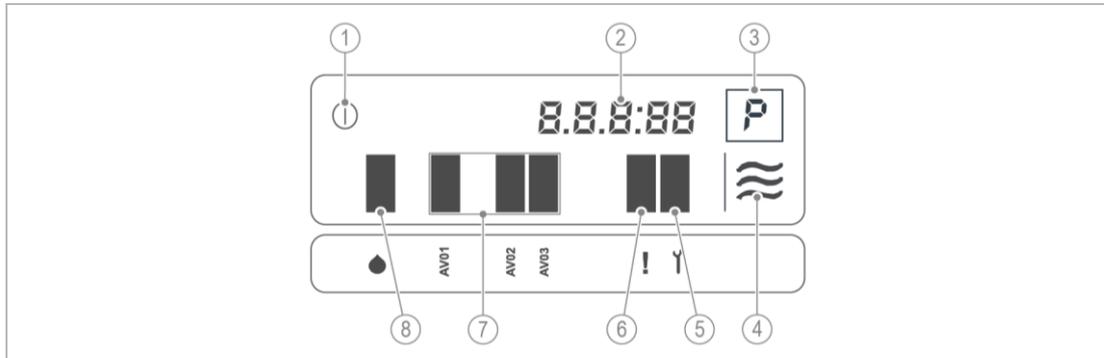
- ▶ Unlock the switch box - loosen 2 screw connections.
- ▶ Open the switch box.
- ▶ Switch on the system at the operating panel for the control unit.
  - a Press the button for > 5 s.

### 7.1.1 Operating panel



Designation	Meaning/function
1 Overview	Display parameters info level, symbols and faults
2 Display	Refer to chapter 7.1.2
3 Short description	Key functions
4 Short description	Display
5 Operating button 	<ul style="list-style-type: none"> <li>In the basic display:</li> <li>Switch on the system (press and hold &gt; 5 s)</li> <li>In the Info level:</li> <li>Display the parameters</li> <li>In the programming level:</li> <li>Switch to the next parameter</li> <li>Increase the numerical value of a parameter (display value flashes)</li> </ul>
6 Operating button 	<ul style="list-style-type: none"> <li>In the basic display:</li> <li>Switch off the system (press and hold &gt; 5 s)</li> <li>In the programming level:</li> <li>Return to the previous parameter</li> <li>Reduce the numerical value of a parameter (display value flashes)</li> </ul>
7 Operating button 	<ul style="list-style-type: none"> <li>In the basic display:</li> <li>Open time programming</li> <li>Acknowledgement of malfunctions</li> <li>Suppress maintenance message for 2 weeks</li> <li>In the programming level:</li> <li>Open parameter for editing (display value flashes)</li> <li>Save parameter (display value stops flashing)</li> </ul>
Button combination 	<ul style="list-style-type: none"> <li>Access to programming level (code request C 000)</li> </ul>
Button combination 	<ul style="list-style-type: none"> <li>In the programming level:</li> <li>Close the opened parameter without saving (display value is maintained)</li> <li>Return to the basic display</li> </ul>

## 7.1.2 Display symbols



Designation	Meaning/function
1 	Operating display <ul style="list-style-type: none"> <li>• System is switched on</li> </ul>
2  Numeric display	<ul style="list-style-type: none"> <li>• In the basic display:                             <ul style="list-style-type: none"> <li>• System state</li> <li>• Fault signals</li> </ul> </li> <li>• Display in the info level:                             <ul style="list-style-type: none"> <li>• Operating data</li> <li>• Time</li> </ul> </li> <li>• Display in the programming level:                             <ul style="list-style-type: none"> <li>• Parameters</li> </ul> </li> </ul>
3  Excess pressure switch	Function is suppressed, no effect
4  Water level indicator filtrate tank <i>(only in the case of downstream non-pressurised tank)</i>	Number of waves displayed indicates the filling level of the tank (3 = full, ..., 0 = empty)
5 Fault signal	The <b>Er</b> display appears in the event of malfunctions: Er 1, Er 2, Er 3, Er 4
6  Signal contact	Maintenance due (buzzer signal)
7  Signal contact	Advance warning for maintenance
8 <b>AV01</b> <b>AV02</b> <b>AV03</b>	<ul style="list-style-type: none"> <li>• Solenoid valve raw water open</li> <li>• Solenoid valve backwash water open</li> <li>• Solenoid valve filtrate open</li> </ul>
9  Water meter filtrate	Flashes with filtrate flow

### 7.1.3 Operating concept/menu structure

The control unit of the ultraI:Q:MA ultrafiltration system consists of the following menu structure:

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

#### Basic display

- The system operating status is displayed.

#### Info level

- Different operating data are displayed.
  - ▶ Read the operating data (refer to chapter 7.2).
- The time is displayed.
  - ▶ Set the time (refer to chapter 7.3).

#### Programming level

- The programme sequence can be read or set (refer to chapter 7.5).

#### Menu structure

Level	Parameter (examples)		Meaning
Basic display System status	FIL		Filtration (production of the filtrate)
	bAC		Backwash
	FOr		Forward flush
	OFF		System OFF
Info level	00:00	hh:mm	Time
	d0441	d	Operating duration: Electrical system connected to mains voltage
	F0440	l/h	Filtrate flow rate
	00329	m <sup>3</sup>	Filtrate quantity produced up to this point by the current membrane(s)
	S 180	d	Basic display "Remaining time until maintenance interval"

Level	Parameter (examples)	Unit	Meaning
Programming level	C 303 030	min	1 Filtration max. removal duration until flushing
	15	s	2 Backwash Duration of flushing backwash
	15	s	3 Forward flush Duration of flushing, forward flush
	6.00	hh:mm	Forced flushing 1 Forced flushing time
	00:00	hh:mm	Forced flushing 2

## 7.2 Read off operating data

- ▶ Switch between the parameters by tapping the  key.
  - Time
  - Operating time
  - Flow rate
  - Filtrate quantity
  - Remaining duration of the service interval
- If no key is pressed for 3 minutes, the basic display appears again automatically.

## 7.3 Setting the time

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

1. Press repeatedly , until the time is displayed.
2. Press the key  for > 2.5 s.
  - » The hour value 00: starts to flash.
3. Change the value with  and .
4. Save the value with .
  - » The hour value stops flashing.
5. The minute value :00 starts to flash.
6. Set the minutes (paragraphs 3 – 4).
7. Change back to the basic display.
  - a Press  and  at the same time.

## 7.4 Program sequence

The programme sequence is permanently predefined by the GENO-matic control unit and is preset at the factory:

Operating mode	Step	Duration	Time (factory setting)	Solenoid valve			Feed pump release
				1UF1AV01 Raw water	1UF1AV02 Flushing waste water	1UF1AV03 Filtrate	
Operation with downstream MAG / DWB *	Filtration	Min.	30	OPEN	CLOSED	OPEN	Released (on-site shutdown)
Operation with upstream non-pressurised tank	Filtration operation ("Full" level not reached)	Min.	30	OPEN	CLOSED	OPEN	Released
	Filtration standby ("Full" level reached)	Min.	30	CLOSED	CLOSED	CLOSED	Not released
Operation with MAG / DWB or with non-pressurised tank	Backwash	sec	15	CLOSED	OPEN	CLOSED	Not released
	Forward-flushing	sec	15	OPEN	OPEN	CLOSED	Released

\* MAG = diaphragm expansion tank, DWB = pressurised water tank

### Filtration

In the "Filtration" step, only the time in which filtrate is produced is totalled (refer to the display: bar above the water drop symbol flashes). Flushing then takes place (backwash, forward flush).

#### Level filtrate tank (in systems with downstream non-pressurised tank):

During the "Filtration" step, the solenoid valves are also controlled using the level control for the filtrate tank:

- At the "Empty" level (= level "B"), the solenoid valves on the raw water and filtrate side are open until the "Full" level is reached.
- At "Full" level (= level "A"), the solenoid valves on the raw water and filtrate side are closed.

The level control has no effect on the flushing steps (backwash, forward flush). These remain active and are carried out completely.

#### Feed pump release (for centrifugal pumps):

The raw water pump is released when the solenoid valve on the raw water side is open. Similarly, the raw water pump switches off when the solenoid valve on the raw water side is closed.



It must be ensured on site that the switching cycles of the centrifugal pump can be maintained in a technically correct way via a MAG.

The operation of a piston pump with downstream MAG must be done exclusively using a pressure switch control.

### Suppression of flushing in systems without filtrate tank

In the case of UF systems directly installed in the water supply (e.g. with downstream MAG or DWB), an undersupply of UF filtrate can occur at the consumer points during peak load operation (buffer volume of the MAG/DWB is used up) and subsequent backwashing.

As such, a factory setting suppresses flushing of the UF system until no filtrate is drawn off by the consumer for at least one minute.

### Forced flushing

To prevent hygienic impairment of the UF system due to stagnant water, forced flushing takes place twice a day at fixed programmed times (factory setting: 06:00 and 00:00 hrs). This ensures that the UF system continues to function properly, even if the consumer does not withdraw water for a longer period of time (e.g. during holidays). If regular flushing takes place at the time of the forced flush, the forced flush is omitted.

The "forced flushing" step can only be carried out if the UF system is not disconnected from the electrical power supply and the raw water supply.

## 7.5 Programming level (c 303)

In the programming level, the duration of the individual programme steps can be changed.



The programme times for filtration and flushing are preset at the factory. The factory settings are highlighted in **bold** in the following tables.

The setting parameters can be adapted to the conditions on site as follows after consultation with Technical Service:

1. Press the  and  keys for > 1 s.
  - » The display changes to code request **C 000**.
2. Using  or  set the code C 303.
3. Confirm with .
4. Select the required parameter.
5. Enter the desired value.
6. Save the value with .
7. Press  and  close the setting at the same time without saving.
8. Change back to the basic display.
  - a Press  and  at the same time.

### Setting parameters

Index	Parameter/Unit	Remarks	Setting range
1	Step 1 filtration min	Maximum removal time until flushing (3)	1 – 240 <b>(030)</b>
2	Step 2 backwash s	Backwash duration	<b>15</b> – 60
3	Step 3 forward flush s	Flushing duration	<b>15</b> – 60
4	Forced flushing 1 hh:mm	fixed time	00:00 – 23:59 <b>(06:00)</b>
5	Forced flushing 2 hh:mm	fixed time	<b>00:00</b> – 23:59

## 8 Maintenance

Maintenance includes cleaning, inspection and servicing of the product.



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



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

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

### 8.1 Cleaning



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



#### WARNING

Wipe live components with a damp cloth.

- Risk of electric shock.
- Sparking possible due to short-circuiting.
- 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 located at high levels.

#### NOTE

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

- These substances damage the plastic components.
- Varnished surfaces are attacked.
- Use a mild/pH-neutral soap solution.
- ▶ Use personal protective equipment.
- ▶ Only clean the outside of the system.

- ▶ Do not use any strong or abrasive cleaning agents.
- ▶ Wipe the surfaces with a damp cloth.
- ▶ Dry the surfaces with a cloth.

## 8.2 Intervals

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

Task	Interval	Work
Inspection	Weekly	<ul style="list-style-type: none"> <li>• Visual inspection for damage and leaks</li> <li>• Check transmembrane pressure</li> <li>• Check real flow rate (filtration volume flow rate)</li> </ul>
Maintenance	annually	<ul style="list-style-type: none"> <li>• Checking the diaphragm expansion tank</li> <li>• Perform CIP process</li> <li>• Perform integrity test</li> </ul>

## 8.3 Inspection

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

- ▶ Carry out the following inspection work **on a weekly basis**:
  1. Visually check the system for damage, leaks and tears.
  2. Determine the transmembrane pressure (TMP) as follows:
    - a Read the pressures on the raw water pressure gauge and the filtrate pressure gauge.
    - a Calculate the TMP (difference = raw water  $p_1$  – filtrate pressure  $p_2$ ).
    - b Inform Technical Service if the pressure difference is  $\geq 0.7$  bar and cannot be reduced after backwashing and flushing.
    - c Have a CIP process carried out by Technical Service.
  3. Check the filtration volume flow rate.
    - a Inform Technical Service if the filtration volume flow rate is 20% above or below the set value.
    - b Have the orifice plates of the flow stabiliser replaced by Technical Service.
  4. Observe the remaining time of the maintenance interval – contact Grünbeck's Technical Service at a remaining time of < 30 days.



If you notice a rapid increase in the transmembrane pressure (TMP), this indicates that the membranes are blocked.

- ▶ Have the membranes checked by Technical Service and replaced if necessary.

## 8.4 Maintenance

In order to ensure the proper functioning of the product in the long term, certain tasks have to be performed at regular intervals.



For each maintenance, create a written maintenance log of the condition and functioning of the system and the maintenance performed.

### 8.4.1 Annual maintenance



Carrying out annual maintenance work requires specialist knowledge. The maintenance work must be carried out by technical service personnel only.

1. Check the fine filter upstream of the system – replace the filter element if necessary.
2. Clean the solenoid valves.
3. Check the solenoid valves for function.
4. Check the flow volumes.
5. Check all electrical cables for damage on the outside.
6. Check the installation for leaks – visually check all pipes/hoses and all connections for escaping water.
7. Check the mechanical or electrical functioning and performance of all units (pumps, valves).
8. Check the control unit settings.
9. Perform a CIP process.



Carry out a CIP process (see Technical Service manual ultraIQ:MA or the operation manual of the CIP system).

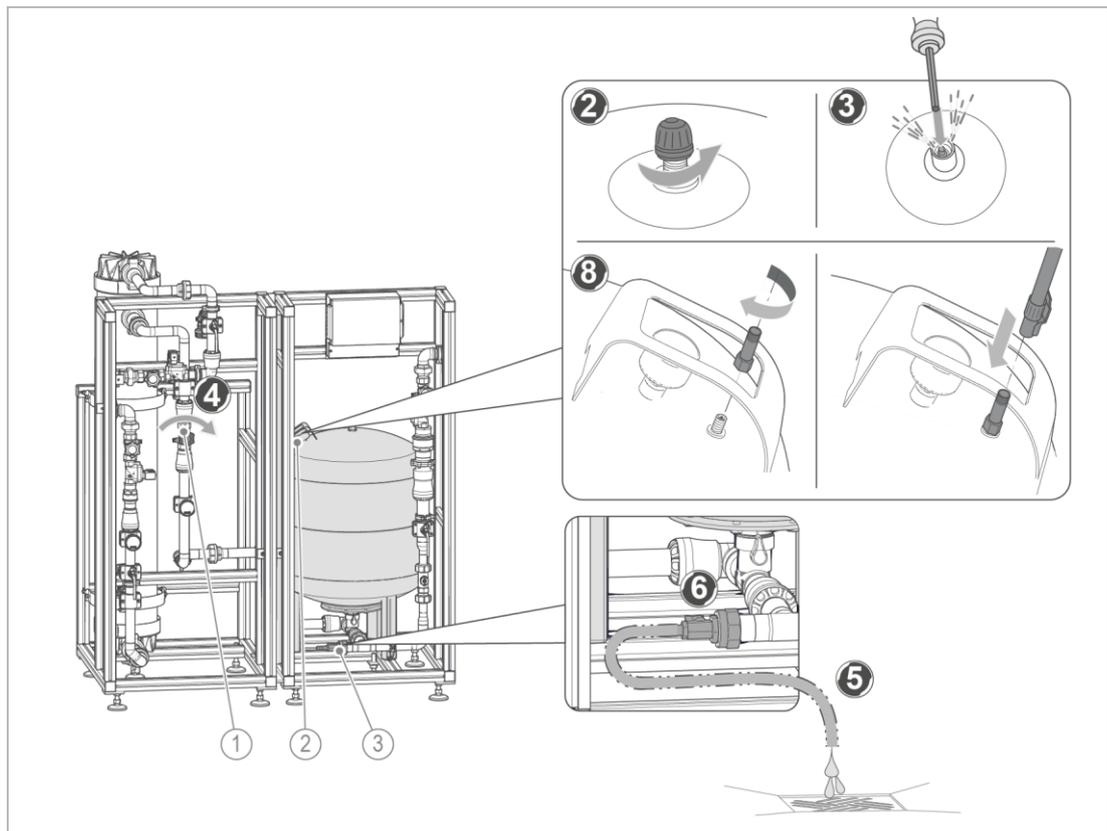
10. Perform an integrity test.



Execution of an integrity test (see Technical Service Manual ultraIQ:MA).

11. Reset the “Remaining service time”.

## 8.4.2 Checking the diaphragm expansion tank



### Designation

- 1 Shut-off valve backwash
- 2 Gas filling level

### Designation

- 3 Shut-off valve diaphragm expansion tank

► Carry out the following activities for each diaphragm expansion tank individually.

► Check the diaphragm expansion tank for damage and impurities.

1. Tap the tank on all sides.

» A hollow echo must be heard.

» If the tank sounds muffled at each knocking point, it is probably completely submerged in water.

2. Unscrew the cap of the gas filling valve.

3. Briefly operate the gas filling valve - push it in using a tool.

» If air escapes with a soft hiss, the tank can be refilled with nitrogen or compressed air.

» If water sprays out, the tank is defective.

► In case of a defect, replace the tank.

### Refilling nitrogen/compressed air

4. Close the backwash shut-off valve and the filtrate shut-off valve.
5. Attach a suitable hose to the drainage shut-off valve and route it to the drain.
6. Empty the tank via the drainage shut-off valve - pressure is relieved at the same time.
7. Check the pre-pressure (set pressure: 1.5 bar) of the tank.
8. Top up with nitrogen/compressed air (gas cylinder, oil-free air compressor) - the water side must be unpressurised.
9. Check the setting pressure of the tank - correct the pre-load pressure if necessary.
10. Set the shut-off valves to the original settings.
11. Remove the hose from the drainage shut-off valve.

## 8.5 Spare parts

For spare parts and consumables, please contact your local Grünbeck representative, who you may find on the internet at [www.gruenbeck.com](http://www.gruenbeck.com).

Special installation conditions apply to the following spare parts:

Product	Order no.
<b>Pulse divider for water meter (ET-BG)</b> Pulse divider for water meter complete incl. operation manual	<b>119 604</b>

## 8.6 Wearing parts



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

Wearing parts are listed below:

- Seals
- Solenoid valves
- Flow sensors
- Ultrafiltration modules

# 9 Fault

The ultrafiltration systems ultraliQ:MA are equipped with an error detection and signal system.

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

1. Press  to acknowledge the fault.
2. Watch the display.
3. If the fault message appears again, rectify the fault (refer to chapter 9.1).
  - ▶ If you cannot eliminate malfunctions with the instructions given below, contact Technical Service.
  - ▶ Have the type plate data handy (refer to chapter 1.3).

## 9.1 Display messages

Fault	Explanation	Remedy
Er 1	Overpressure switch (optional) tripped	▶ Check primary pressure
Er 2	Service signal suppressed for 2 weeks	▶ Perform maintenance ▶ Notify Technical Service • The fault signal is reset
Er 3	Filtrate production disrupted: In systems with level control, no filtrate flow was registered within 10 seconds after the start of filtration.	▶ Check raw water supply ▶ If there is a raw water supply, inform Technical Service. ▶ Check the following components and have them replaced if necessary: • UF modules • Water meter and pulse cable • Raw water solenoid valve 1UF1AV01 • Filtrate solenoid valve 1UF1AV03 • GENO-matic control unit
Er 4	Fault level control filtrate tank. Level "a" (top) of GENO-matic is detected, level "b" (bottom) is not	▶ Check wiring and function of the levels and repair if necessary

## 9.2 Other observations

Observation	Explanation	Remedy
Backwashing does not take place correctly	Diaphragm expansion tank defective	▶ Diaphragm expansion tank must be serviced
Flow rate display not correct	Wear of the flow stabiliser	▶ Flow stabiliser must be serviced
	Filtrate flow meter defective	▶ Check the filtrate flow meter (gauging the filtration volume flow)

## 10 Decommissioning



Shutting down and restarting requires expert knowledge. This work may only be carried out by Technical Service.

### 10.1 Temporary standstill

The system is equipped with programmable forced flushing.

- If a longer downtime (> 48 hrs) of the system is planned, a system shutdown must be carried out.

### 10.2 Decommissioning

► Perform the following activities:

- Mechanically separate the raw water inlet line
- Mechanically separate the filtrate outlet line
- Mechanically separate the backwash water line
- Switch off control unit (remove the mains plug if required)
- Chemically clean and preserve UF modules in the pressure pipes



CIP process and preservation may only be carried out by Technical Service.



Instructions for attaching the CIP lines (see Technical Service Manual ultraIQ:MA).

Carry out a CIP process (see Technical Service manual ultraIQ:MA or operation manual for the CIP system).

- Mark the system with a note and a warning about the preservation that has been carried out.

### 10.3 Restart

► Perform the following activities:

- Flushing out preserving agent
- Put the system into operation (refer to chapter 6).

# 11 Dismantling and disposal

## 11.1 Dismantling



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

- ▶ Have this work performed by qualified specialists only.
1. Flush the system with raw water.
  2. Disconnect the system from mains – discharge residual voltage.
  3. Close the raw water shut-off valve.
  4. Vent and drain the system.
  5. Disconnect the system from the water installation (raw water inlet pipe, filtrate outlet pipe, backwash water drain pipe).
  6. Disconnect the electrical connections to components 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.

## 11.2 Disposal

- ▶ Comply with the applicable national regulations.

### Packaging

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

### Ultrafiltration elements

- ▶ Dispose of the used ultrafiltration elements with household waste.

### Product



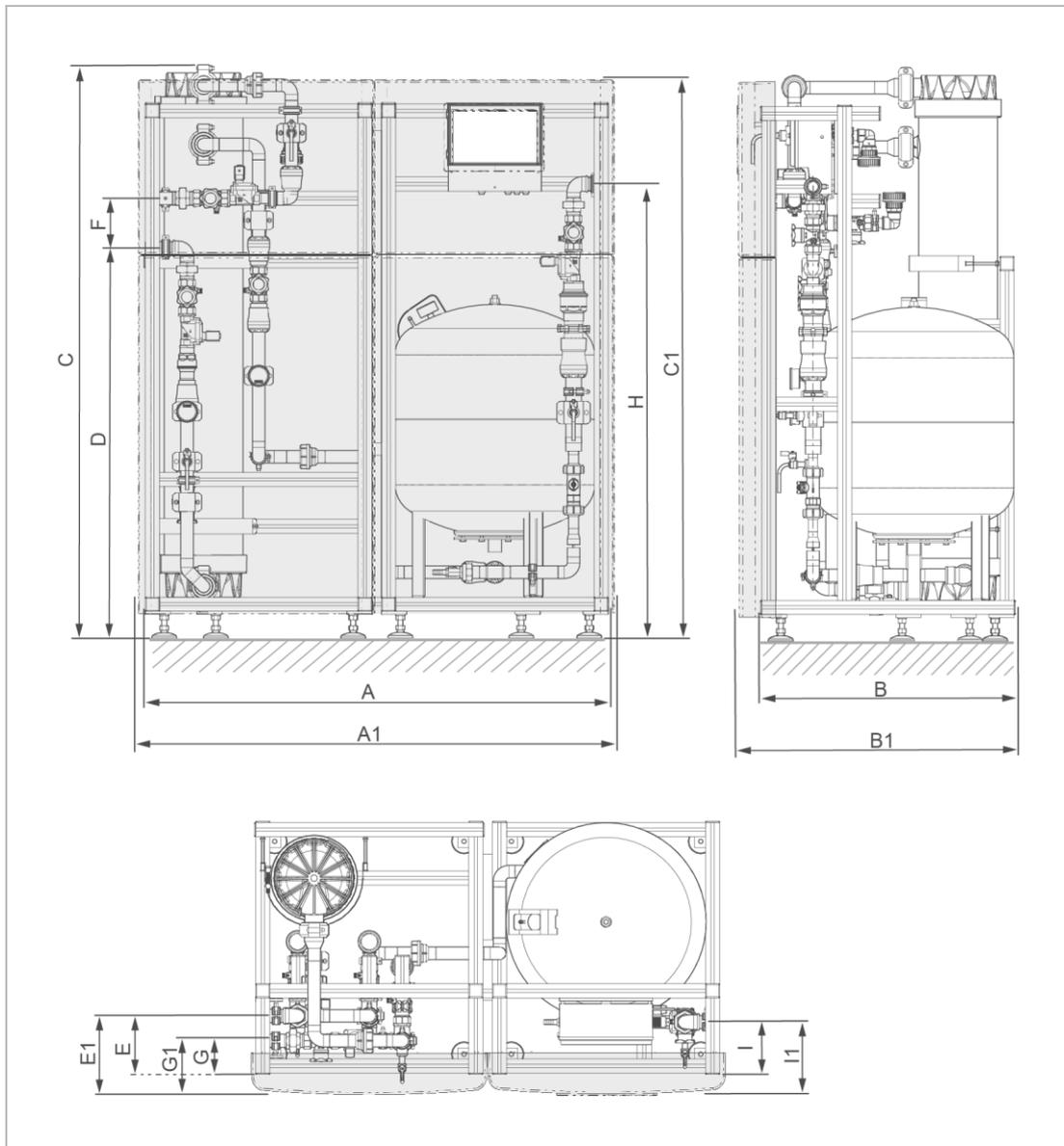
If this symbol (crossed-out wheellie bin) is on the product, this product or its electrical and electronic components must not be disposed of as household waste.

- ▶ Dispose of electrical and electronic products or components in an environmentally sound manner.
- ▶ Use the available collection points for the disposal of your product.
- ▶ If your product contains batteries or rechargeable batteries, dispose of them separately from your product.



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

## 12 Technical specifications



Dimensions and weights			MA5000	MA10000
A	System width	mm	1470	
A1	System width including front cover	mm	1500	
B	System depth	mm	800	
B1	System depth including front cover	mm	860	
C	System height	mm	1850	
C1	System height including front cover	mm	1750	
D	Raw water connection height	mm	1250	
E	Raw water connection depth	mm	185	
E1	Raw water connection depth including front cover	mm	245	
F	Backwash water outlet connection height	mm	1410	
G	Backwash water outlet connection depth	mm	105	
G1	Backwash water outlet connection depth including front cover	mm	165	

Dimensions and weights			MA5000	MA10000
H	Filtrate connection height	mm	1455	
I	Filtrate connection depth	mm	165	
I1	Filtrate connection depth including front cover	mm	225	
	Operating weight, approx.	kg	420	610
	Empty weight, approx.	kg	200	260

Connection data			MA5000	MA10000
	Nominal connection diameter of raw water inlet	DN	32 (1¼" male thread)	50 (2" male thread)
	Nominal connection diameter of filtrate outlet	DN	32 (1¼" male thread)	50 (2" male thread)
	Nominal connection diameter of backwash water (drain)	DN	32 (1¼" male thread)	50 (2" male thread)
	Drain connection	DN	≥ 150	≥ 200
	Connected load	W	120	
	Mains connection	V/Hz	230/50	
	Protection/protection class		IP 54/⊕	

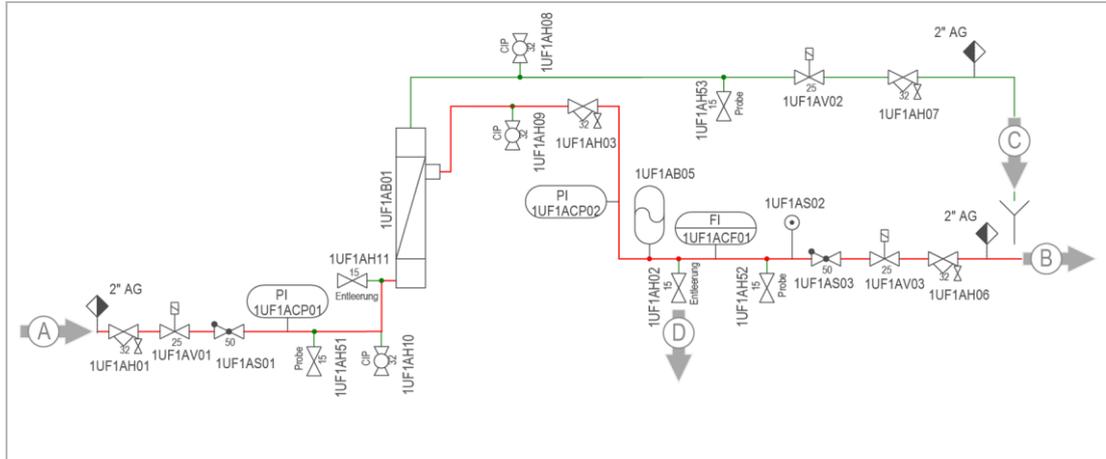
Performance data			MA5000	MA10000
	Nominal filtrate capacity	m³/h	5.0	10.0
	Operating pressure			
	For use with city water	bar	2.5 – 5.0	
	Use in the case of downstream non-pressurised tank	bar	3.5 – 5.0	
	Use in the case of downstream diaphragm expansion tank/pressurised water tank	bar	4.5 – 5.0	
	Number of ultrafiltration modules	Piece	1	2
	Total active membrane surface	m²	60.0	120.0
	Nominal pore size of the membrane (cut-off)	µm	0.02	
	Recovery (standard setting), approx.	%	93	
	Filtration interval (standard setting)	min	30	

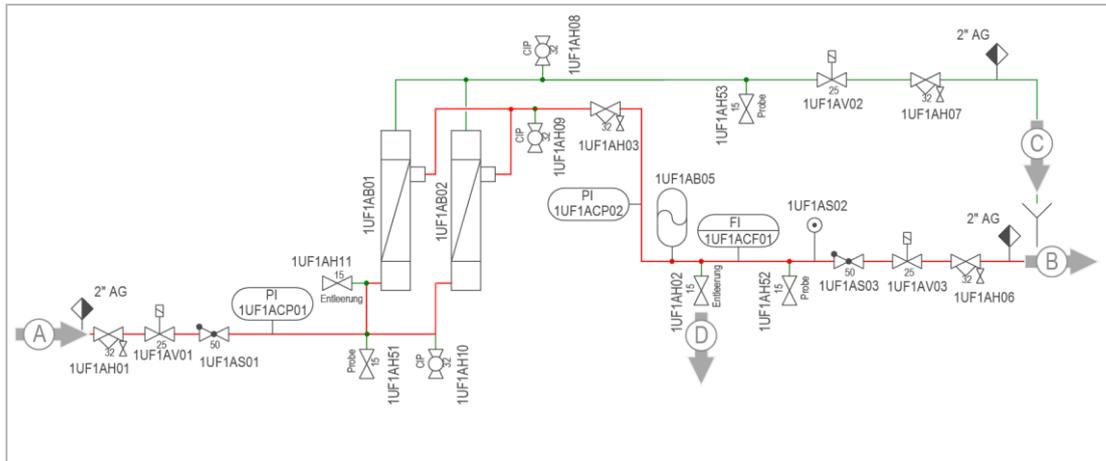
General data			MA5000	MA10000
	Water temperature (drinking water)	°C	5 – 20	
	Ambient temperature (drinking water)	°C	5 – 25	
	Water temperature (technical applications)	°C	5 – 35	
	Ambient temperature (technical applications)	°C	5 – 35	
	Humidity (non-condensing)	%	≤ 70.0	
	<b>Order no.</b>		<b>535 150</b>	<b>535 160</b>

## 12.1 Planning & Installation Diagram (P&ID)

### ultraliQ:MA5000



### ultraliQ:MA10000



### Connections

Designation		Designation	
A	Raw water inlet	C	Backwash water outlet
B	Filtrate outlet	D	Diaphragm expansion tank drain outlet

## Components

Coding	Designation
1UF1AB01	Ultrafiltration module 1
1UF1AB02	Ultrafiltration module 2
1UF1AB05	Diaphragm expansion tank
1UF1ACF01	Flow meter filtrate
1UF1ACP01	Pressure display raw water
1UF1ACP02	Pressure display filtrate
1UF1AE01	Switch box
1UF1AH01	Raw water shut-off valve
1UF1AH02	Shut-off valve draining
1UF1AH03	Shut-off valve backwash
1UF1AH04	Filtrate shut-off valve
1UF1AH05	Shut-off valve backwash water

Coding	Designation
1UF1AH06	Shut-off valve CIP raw water
1UF1AH07	Shut-off valve CIP filtrate
1UF1AH08	Shut-off valve CIP backwash water
1UF1AH51	Raw water sampling valve
1UF1AH52	Filtrate sampling valve
1UF1AH53	Sampling valve backwash water
1UF1AS01	Raw water non-return valve
1UF1AS02	Flow stabiliser
1UF1AS03	Filtrate non-return valve
1UF1AV01	Solenoid valve raw water
1UF1AV02	Solenoid valve backwash water
1UF1AV03	Solenoid valve filtrate

# 13 Operation log



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

Ultrafiltration system **ultraliQ:MA** | Type: \_\_\_\_\_

Serial No./Project No.: \_\_\_\_\_

## 13.1 Start-up log

Customer		
Name:		
Address:		
Installation/Accessories		
Fine filter (make, type):		
System separator (make, type):		
Drain connection in accordance with DIN EN 1717	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Floor drain present	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety device (if no floor drain is available)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Preserving agent flushed out	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Operating values		
<b>Transmembrane pressure (TMP 1) at the end (<math>t_e</math>) of a filtration interval</b>		
Water pressure raw water, $p_1$	bar	
Water pressure filtrate, $p_2$	bar	
TMP 1 ( $t_e$ ) = $p_1 - p_2$	bar	
<b>Transmembrane pressure (TMP 2) at the start (<math>t_a</math>) of a filtration interval</b>		
Water pressure raw water, $p_1$	bar	
Water pressure filtrate, $p_2$	bar	
TMP 2 ( $t_a$ ) = $p_1 - p_2$	bar	
Total flow rate	m <sup>3</sup>	
Remarks		
Start-up		
Company:		
Customer service technician:		
Work time certificate (no.):		
Date/signature:		

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



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

Maintenance performed	UF module no.	Restart
<input type="checkbox"/> with flushing of UF module		<input type="checkbox"/> yes <input type="checkbox"/> no
<input type="checkbox"/> without replacement of UF module		Date:
<input type="checkbox"/> with replacement of UF module		

Inspections	OK
Fine filter before system checked	<input type="checkbox"/>
Filter element changed	<input type="checkbox"/>
Controller settings checked	<input type="checkbox"/>
Electronics visually checked for damage	<input type="checkbox"/>
All electrical lines checked for external damage	<input type="checkbox"/>
Pipes and connections checked for damage and a tight fit	<input type="checkbox"/>
Solenoid valve(s) cleaned and checked for leaks	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Basic display "Remaining time service" reset	<input type="checkbox"/>

Operating values	
Operating time	d
Total flow rate	m <sup>3</sup>
Flow rate during filtration operation	m <sup>3</sup> /h

Transmembrane pressure (TMP 1) at the end (t <sub>e</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 1 (t <sub>e</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

Transmembrane pressure (TMP 2) at the start (t <sub>a</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 2 (t <sub>a</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

**Remarks**

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**Performed by**

Company: \_\_\_\_\_

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Customer service technician: \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

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



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

Maintenance performed	UF module no.	Restart
<input type="checkbox"/> with flushing of UF module(s)		<input type="checkbox"/> yes <input type="checkbox"/> no
<input type="checkbox"/> without replacement of UF module(s)		Date:
<input type="checkbox"/> with replacement of UF module(s)		

Inspections	OK
Fine filter before system checked	<input type="checkbox"/>
Filter element changed	<input type="checkbox"/>
Controller settings checked	<input type="checkbox"/>
Electronics visually checked for damage	<input type="checkbox"/>
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Pipes and connections checked for damage and a tight fit	<input type="checkbox"/>
Solenoid valve(s) cleaned and checked for leaks	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Basic display "Remaining time service" reset	<input type="checkbox"/>

Operating values	
Operating time	d
Total flow rate	m <sup>3</sup>
Flow rate during filtration operation	m <sup>3</sup> /h

Transmembrane pressure (TMP 1) at the end (t <sub>e</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 1 (t <sub>e</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

Transmembrane pressure (TMP 2) at the start (t <sub>a</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 2 (t <sub>a</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

**Remarks**

---



---



---

**Performed by**

Company: \_\_\_\_\_

---

Customer service technician: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

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



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

Maintenance performed	UF module no.	Restart
<input type="checkbox"/> with flushing of UF module		<input type="checkbox"/> yes <input type="checkbox"/> no
<input type="checkbox"/> without replacement of UF module		Date:
<input type="checkbox"/> with replacement of UF module		

Inspections	OK
Fine filter before system checked	<input type="checkbox"/>
Filter element changed	<input type="checkbox"/>
Controller settings checked	<input type="checkbox"/>
Electronics visually checked for damage	<input type="checkbox"/>
All electrical lines checked for external damage	<input type="checkbox"/>
Pipes and connections checked for damage and a tight fit	<input type="checkbox"/>
Solenoid valve(s) cleaned and checked for leaks	<input type="checkbox"/>
Installation/system checked for leaks	<input type="checkbox"/>
Basic display "Remaining time service" reset	<input type="checkbox"/>

Operating values	
Operating time	d
Total flow rate	m <sup>3</sup>
Flow rate during filtration operation	m <sup>3</sup> /h

Transmembrane pressure (TMP 1) at the end (t <sub>e</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 1 (t <sub>e</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

Transmembrane pressure (TMP 2) at the start (t <sub>a</sub> ) of a filtration interval	
Water pressure raw water, p <sub>1</sub>	bar
Water pressure filtrate, p <sub>2</sub>	bar
TMP 2 (t <sub>a</sub> ) = p <sub>1</sub> – p <sub>2</sub>	bar

**Remarks**

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---



---

**Performed by**

Company: \_\_\_\_\_

---

Customer service technician: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

# EU Declaration of Conformity

In accordance with the EC 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.

**Ultrafiltration system ultraliQ:MA**

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

The aforementioned system also complies with the following directives and provisions:

- Directive on the Restriction of Hazardous Substances RoHS (2011/65/EC)

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

The following harmonised standards have been applied:

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

Responsible for documentation:

Mirjam Müller

Manufacturer:

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

Höchstädt, 03.02.2022

A handwritten signature in black ink, appearing to read 'P. Höß', is written over a faint, larger signature.

pp

Peter Höß

Head of Technical Systems & Equipment





## **Publisher's information**

### **Technical documentation**

If you have any questions or suggestions regarding this operation manual, please contact the Technical Documentation Department at Grünbeck Wasseraufbereitung GmbH

e-mail: [dokumentation@gruenbeck.de](mailto:dokumentation@gruenbeck.de)

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For more information go to  
[www.gruenbeck.com](http://www.gruenbeck.com)