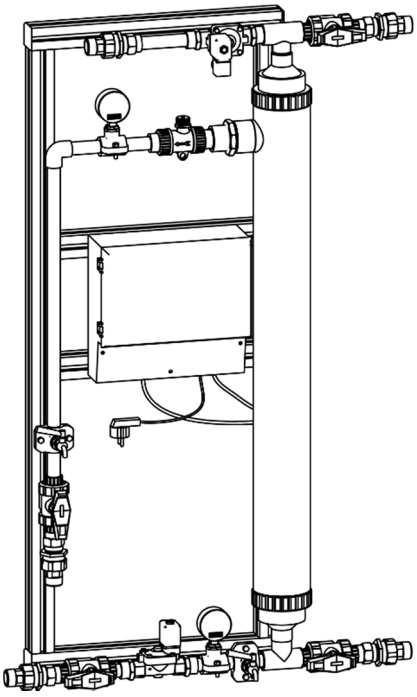
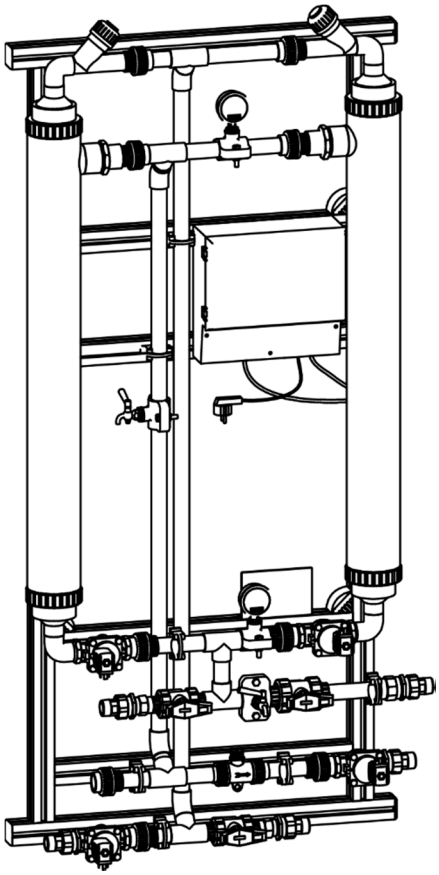
grünbeck

Operating instructions
Ultrafiltration system
GENO®-Ultrafil 450/900
with GENO®-matic
from software version V3.00 onwards





Status August 2017
Order no. 084 561 940-inter

Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Str. 1 · 89420 Hoechstaedt
GERMANY
✆ +49 9074 41-0 · 🖷 +49 9074 41-100
www.gruenbeck.com · info@gruenbeck.com

Table of contents

Publisher's information

Printed in Germany
Effective with the date of edition indicated on the cover sheet.
-We reserve the right to modifications, especially with regard to technical progress-

Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Straße 1 • 89420 Höchstädt/Do.
Telefon +49 9074 410 • Fax +49 9074 41100
www.gruenbeck.de • service@gruenbeck.de

Printing: Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Straße 1, 89420 Höchstädt/Do.

grünbeck

CE

EC Declaration of Conformity

This is to certify that the system designated below meets the safety and health requirements of the applicable European guidelines in terms of its design, construction and execution.

This certificate will become invalid if the system is modified in a way not approved by us.

Manufacturer:	Grünbeck Wasseraufbereitung GmbH Josef-Grünbeck-Straße 1 89420 Hoechstaedt/Germany
Responsible for documentation:	Birle Daniel
System designation:	Ultrafiltration system
System type:	GENO®-Ultrafil 450/900 with GENO®-matic control unit
Serial no.	Refer to type designation plate
Applicable directives:	Low Voltage (2014/35/EU) EMC (2014/30/EU)
Applied harmonised standards, in particular:	DIN EN ISO 12100:2011-03 DIN EN 61000-6-3:2011-09 DIN EN 61000-6-4:2011-09
Applied national standards and technical specifications, in particular:	DIN 1988-100/DIN EN 1717:2011-08 DIN 31000:2017-04; VDE 1000:2017-04
Place, date and signature:	Höchstädt, 18.07.2017 i. V. Peter Höß
Function of signatory:	Head of System Development

A General information

1 | Preface

Thank you for opting for a Grünbeck product. Backed by decades of experience in the area of water treatment, we provide solutions for all kind of processes.

Drinking water is classified as food and requires particular care. Therefore, always ensure the required hygiene in operating and maintaining systems involved in the drinking water supply. This also applies to the treatment of water for industrial use if repercussions for the drinking water cannot completely be excluded.

All Grünbeck systems and devices are made of high-quality materials. This ensures trouble-free operation over many years, provided you treat your water treatment system with the required care. This operation manual assists you with important information. Therefore, please read the entire operation manual before installing, operating or maintaining the system.

Customer satisfaction is our prime objective. and providing customers with qualified advice is crucial. If you have any questions concerning this system, possible extensions or general water and waste water treatment, our field staff, as well as the experts at our headquarters in Hoechstaedt, are available to help you.

Advice and assistance

For advice and assistance please contact your local representative (see www.gruenbeck.de). In case of emergency, please get in touch with our service hotline at +49 9074 41-333. We can connect you with the appropriate expert more quickly if you provide the required system data. In order to have the required data handy at all times, please copy it from the type designation plate to the overview in Chapter C-1.

2 | Notes on using the operation manual

This operation manual is intended for operators of our systems. It is divided into several chapters (a letter is assigned to each of them) that are listed in the "Table of contents" on page 2 in alphabetical order.

3 | General safety information

3.1 Symbols and notes

Important information in this operation manual is characterised by symbols. Please pay particular attention to this information to ensure the hazard-free, safe and efficient handling of the system.

Danger! Failure to adhere to this information will cause serious or life-threatening injuries, extreme damage to property or inadmissible contamination of the drinking water.

Warning! Failure to adhere to this information may cause injuries, damage to property or contamination of the drinking water.

Caution! Failure to adhere to this information may result in damage to the system or other objects.

Note: This symbol characterises information and tips to make your work easier.

Tasks with this symbol may only be performed by Grünbeck's technical service/authorised service company or by persons expressly authorised by Grünbeck.

Tasks with this symbol may only be performed by trained and qualified electrical experts according to the VDE guidelines or according to the guidelines of a similar local institution.

Tasks with this symbol may only be performed by water suppliers or approved installation companies. In Germany, the installation company must be registered in a water company installation directory as per §12(2) AVBWasserV (German Ordinance on General Conditions for the Supply of Water).

3.2 Operating personnel

Only allow persons who have read and understood this operation manual to work with the system. The safety guidelines are to be strictly adhered to.

3.3 Designated use

The system may only be used for the purpose outlined in the product description (chapter C). The guidelines in this operation manual as well as the applicable local guidelines concerning drinking water protection, accident prevention and occupational safety must be adhered to. In addition, appropriate application also implies that the system may only be operated when it is in proper working order. Any errors must be eliminated at once.

3.4 Protection from water damage

Warning! In order to properly protect the installation site from water damage:

1. a sufficient floor drain system must be available or
2. a safety device (refer to chapter C-6.2 Optional features) must be installed.

Warning! Floor drains leading to a lifting system do not work in case of a power failure.

3.5 Indication of specific dangers

Danger due to electrical energy!
Do not touch electrical parts with wet hands!
Disconnect the system from mains before starting work on electrical parts of the system. Have qualified experts replace damaged cables immediately.

Danger due to mechanical energy!
System parts may be subject to overpressure. Danger of injury and damage to property due to escaping water and the unexpected movement of system parts. Check pressure pipes regularly. Depressurise the system before starting repair or maintenance work on the system.

Hazardous to health due to contaminated drinking water!
Arrange for the system to be installed and operated by a specialist company. The operating manual must be strictly observed! Ensure that there is sufficient flow. The pertinent guidelines must be followed for starting-up after extended periods of standstill. Inspections and maintenance must be performed at the intervals specified!

Note: By concluding a maintenance contract, you ensure that all of the required tasks are performed on time. You may perform the interim inspections yourself.

4 | Shipping and storage

Caution! The system may be damaged by frost or high temperatures. In order to avoid damage of this kind:

Protect from frost during transportation and storage!
Do not install or store the system next to objects which radiate a lot of heat.

The ultrafiltration membranes are impregnated with a preserving agent for storage. This preserving agent must be renewed from time to time as it loses its preservative properties over time. Under normal storage conditions, the preserving agent is stable for about ½ a year.

The system may only be transported and stored in its original packing. Ensure that it is handled with care and placed the right side up (as indicated on the packaging).

5 | Disposal of used parts and materials

Used parts and materials are to be disposed of or made available for recycling purposes according to the applicable local guidelines.

If a material is subject to specific regulations, adhere to the instructions indicated on the packing.

If in doubt, contact your local waste disposal authority or the manufacturer for more information.

B Basic information

1 | Laws, regulations, standards

In the interest of good health, rules cannot be ignored when it comes to the processing of drinking water. This operation manual takes into consideration the current guidelines and stipulates information that you will need for the safe operation of your water treatment system.

Among other things, the regulations stipulate that

- only approved companies are permitted to make major modifications to water supply facilities
- and that tests, inspections and maintenance on installed devices are to be performed at regular intervals.

2 | Water

In some regions of Germany, groundwater aquifers are very strongly influenced by events on the surface of the earth due to special geological features (mostly karst areas and sinkholes) or by insufficient natural filtering properties of the topsoil. Especially after heavy rainfall, this leads to pollutants, particles (turbidity) and micro-organisms being washed down from the surface of the earth into the groundwater. If this polluted groundwater is then to be used for human consumption (drinking water), it is often necessary to treat it beforehand in order to ensure the legally required drinking water quality.

3 | Functional principle of ultrafiltration

The filter of the GENO®-Ultrafil ultrafiltration system consists of a multitude of individual capillary membranes through which the raw water is forced over to the filtrate side. The membrane pores with a nominal pore width of 0.01 µm largely retain all undissolved substances contained in the water such as particles, bacteria or viruses on the raw water side of the membranes. For filtration, a pressure gradient is necessary between the raw water side and the filtrate side of the membranes, which is referred to as tge transmembrane pressure. During the filtration process, the filtered particles are deposited on the membrane area and increase the differential pressure required for filtration. For this reason, the particle deposits on the membrane must be flushed off at regular intervals. This flushing is achieved either by backwashing filtrate produced previously through the membrane or by forward-flushing the membrane area with raw water on the raw water side. Both flushing processes can also be used in combination, in which case the resulting flushing water is discharged as waste water into a suitable drain system.

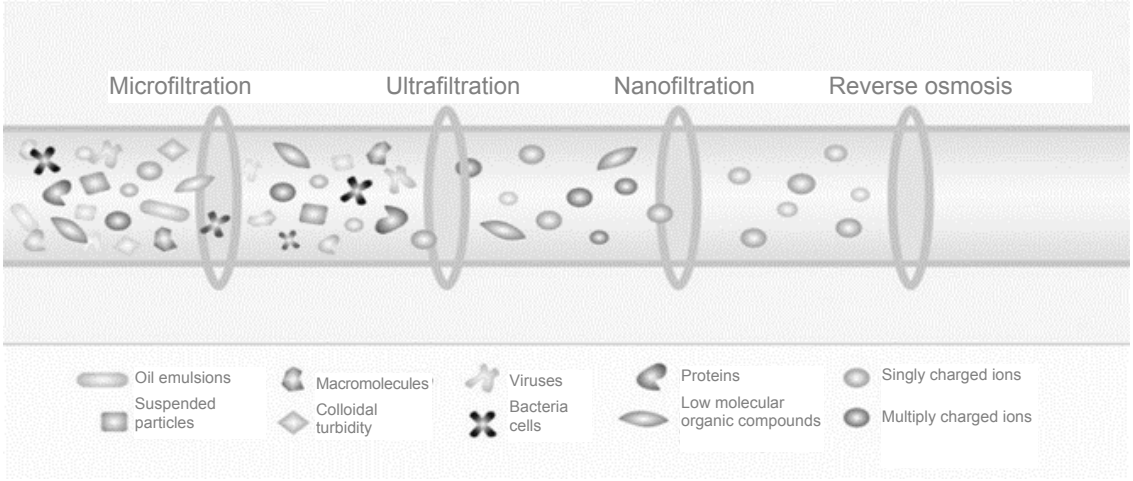
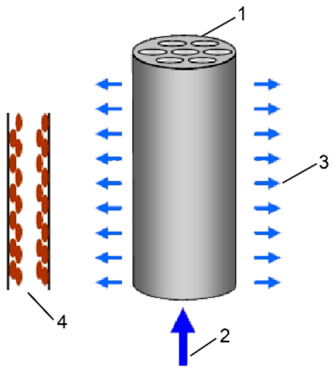


Fig. B-1: Classification of the filtration processes

Principle: Separation capacity of different membrane systems

Note: The backwashing principle is only possible if the backwash tank (filtrate tank) is connected.

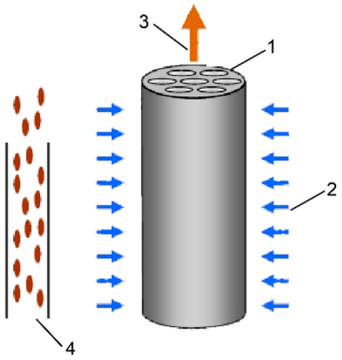
Filtration



1 Ultrafiltration membrane (schematic)
2 Raw water inlet
3 Filtrate
4 Principle of particle deposition during filtration

Fig. B-2: Principle of ultrafiltration

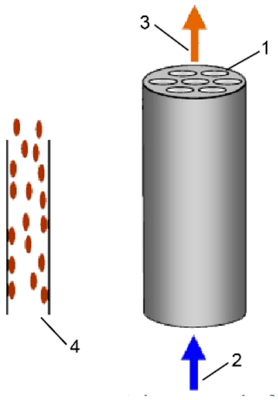
Backwash



1 Ultrafiltration membrane (schematic)
2 Backwashing with filtrate
3 Flushing water to the drain
4 Principle of flushing out particles during backwashing

Fig. B-3: Principle of backwashing

Forward-flushing



1 Ultrafiltration membrane (schematic)
2 Raw water inlet
3 Flushing water to the drain
4 Principle of particle deposition during forward-flushing

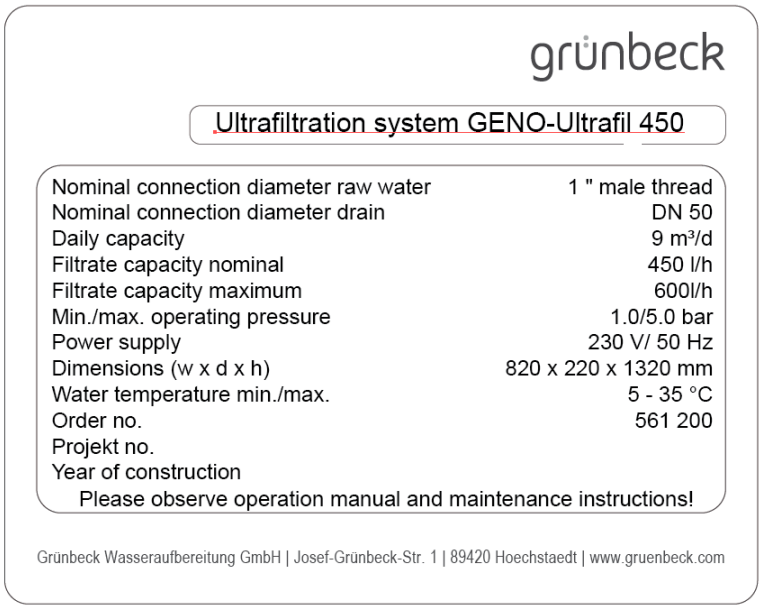
Fig. B-4: Principle of forward-flushing

C Product description

1 | Type designation plate

The type designation plate can be found on the frame of the GENO®-Ultrafil ultrafiltration system. In order to speed up the processing of your inquiries or orders, please specify the data shown on the type designation plate of your system when contacting Grünbeck. Please copy the indicated information to the table below in order to have it handy whenever necessary.

GENO®-Ultrafil 450/900 ultrafiltration system
Serial number: ☐☐☐☐☐☐
Order number: ☐☐☐☐☐☐


grünbeck

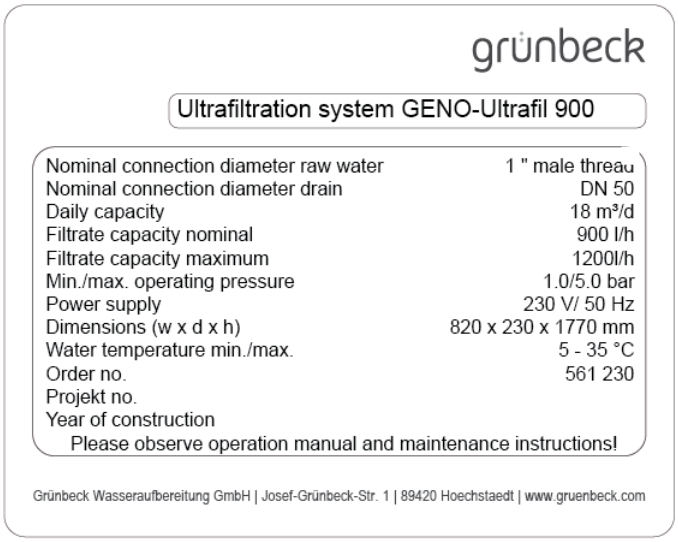
Ultrafiltration system GENO-Ultrafil 450

Nominal connection diameter raw water	1 " male thread
Nominal connection diameter drain	DN 50
Daily capacity	9 m³/d
Filtrate capacity nominal	450 l/h
Filtrate capacity maximum	600l/h
Min./max. operating pressure	1.0/5.0 bar
Power supply	230 V/ 50 Hz
Dimensions (w x d x h)	820 x 220 x 1320 mm
Water temperature min./max.	5 - 35 °C
Order no.	561 200
Projekt no.	
Year of construction	

Please observe operation manual and maintenance instructions!

Grünbeck Wasseraufbereitung GmbH | Josef-Grünbeck-Str. 1 | 89420 Hoechstaedt | www.gruenbeck.com

Fig. C-1: Type designation plate GENO®-Ultrafil 450 ultrafiltration system


grünbeck

Ultrafiltration system GENO-Ultrafil 900

Nominal connection diameter raw water	1 " male thread
Nominal connection diameter drain	DN 50
Daily capacity	18 m³/d
Filtrate capacity nominal	900 l/h
Filtrate capacity maximum	1200l/h
Min./max. operating pressure	1.0/5.0 bar
Power supply	230 V/ 50 Hz
Dimensions (w x d x h)	820 x 230 x 1770 mm
Water temperature min./max.	5 - 35 °C
Order no.	561 230
Projekt no.	
Year of construction	

Please observe operation manual and maintenance instructions!

Grünbeck Wasseraufbereitung GmbH | Josef-Grünbeck-Str. 1 | 89420 Hoechstaedt | www.gruenbeck.com

Fig. C-2: Type designation plate GENO®-Ultrafil 900 ultrafiltration system

2 | Functional description

2.1 GENO®-Ultrafil 450

2.1.1 Connections and instrumentation GENO®-Ultrafil 450 ultrafiltration system

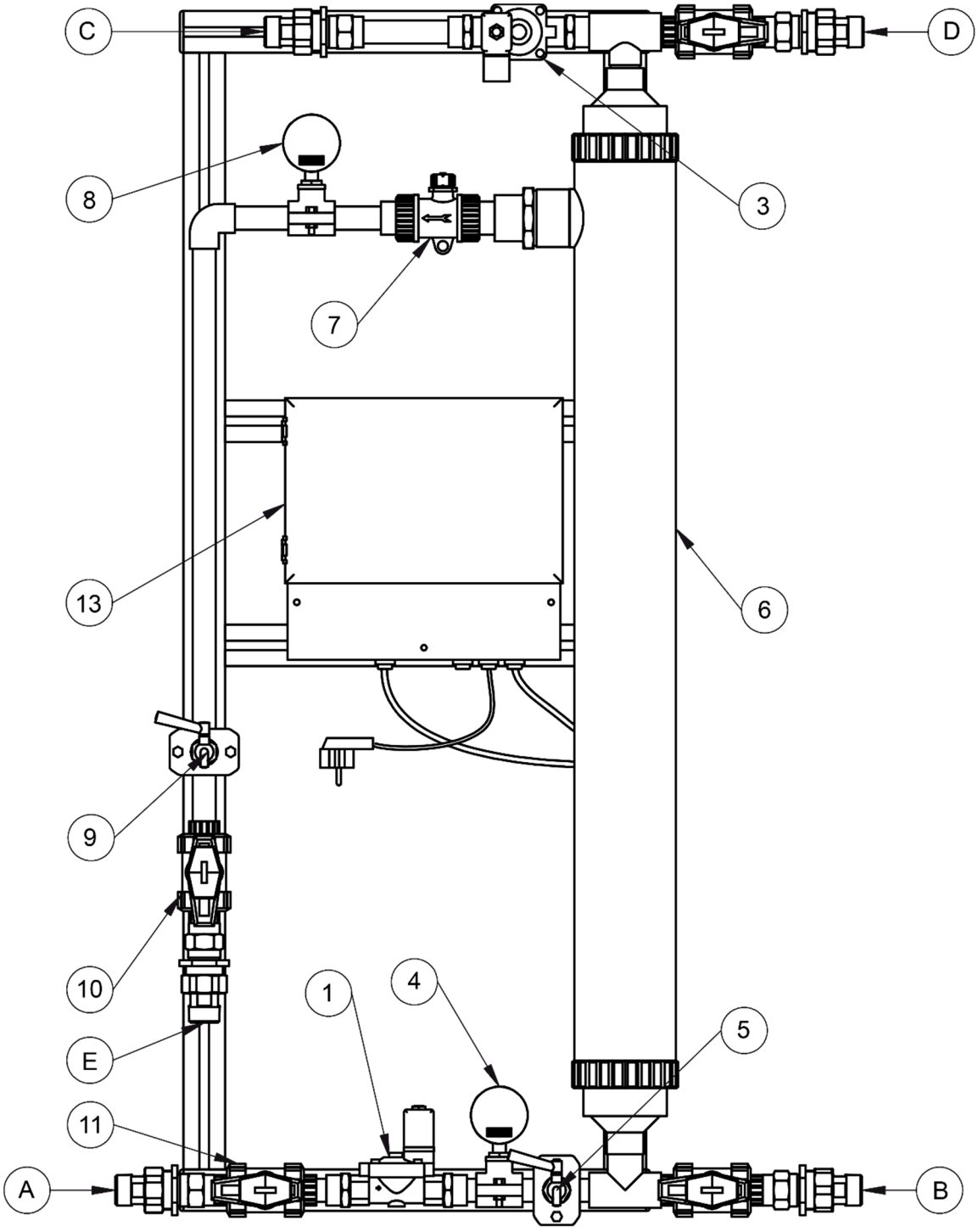


Fig. C-3: GENO®-Ultrafil 450 ultrafiltration system

2.1.2 Flowchart with options GENO®-Ultrafilfil 450 ultrafiltration system

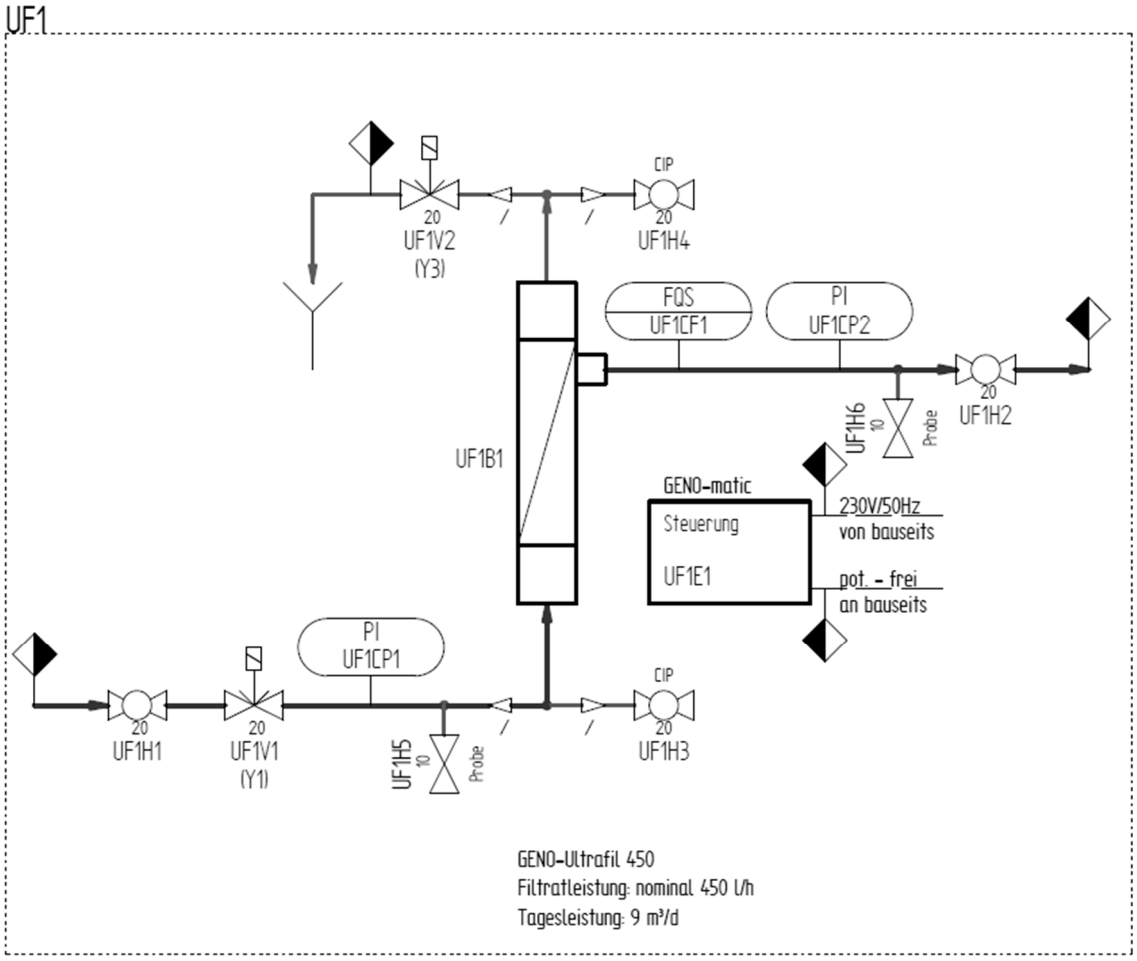


Fig. C-4: Flowchart GENO®-Ultrafil 450 ultrafiltration system

2.2 GENO®-Ultrafil 900

2.2.1 Connections and instrumentation GENO®-Ultrafil 900 ultrafiltration system

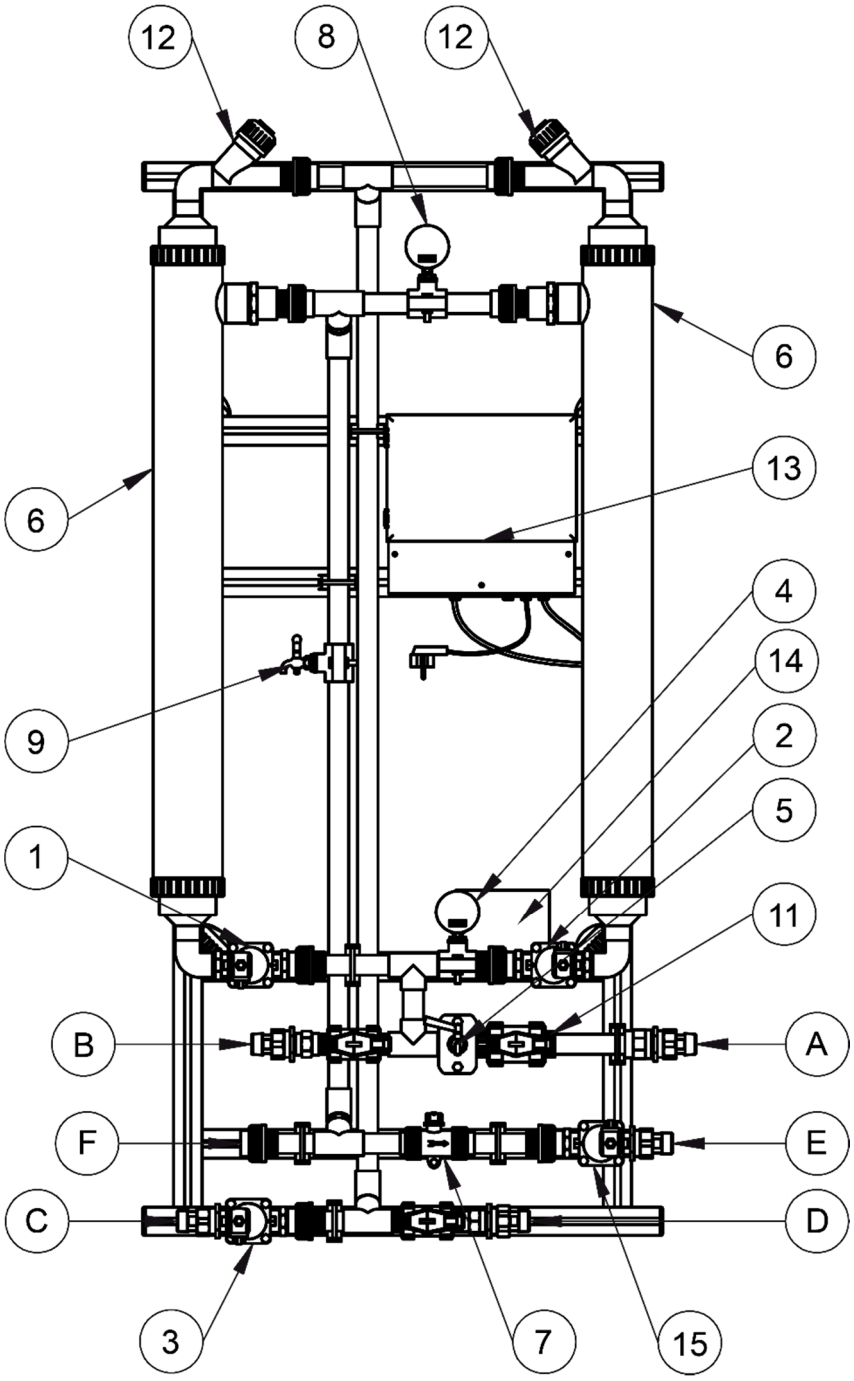


Fig. C-5. GENO®-Ultrafil 900 ultrafiltration system

Description of connections, instrumentation and flow charts

A	Raw water inlet	D	Outlet chem. cleaning (CIP)
B	Inlet chem. cleaning (CIP)	E	Filtrate outlet
C	Flushing water outlet	F	Inlet backwash water (filtrate tank)

2.2.2 Flowchart with options GENO®-Ultrafilfil 900 ultrafiltration system

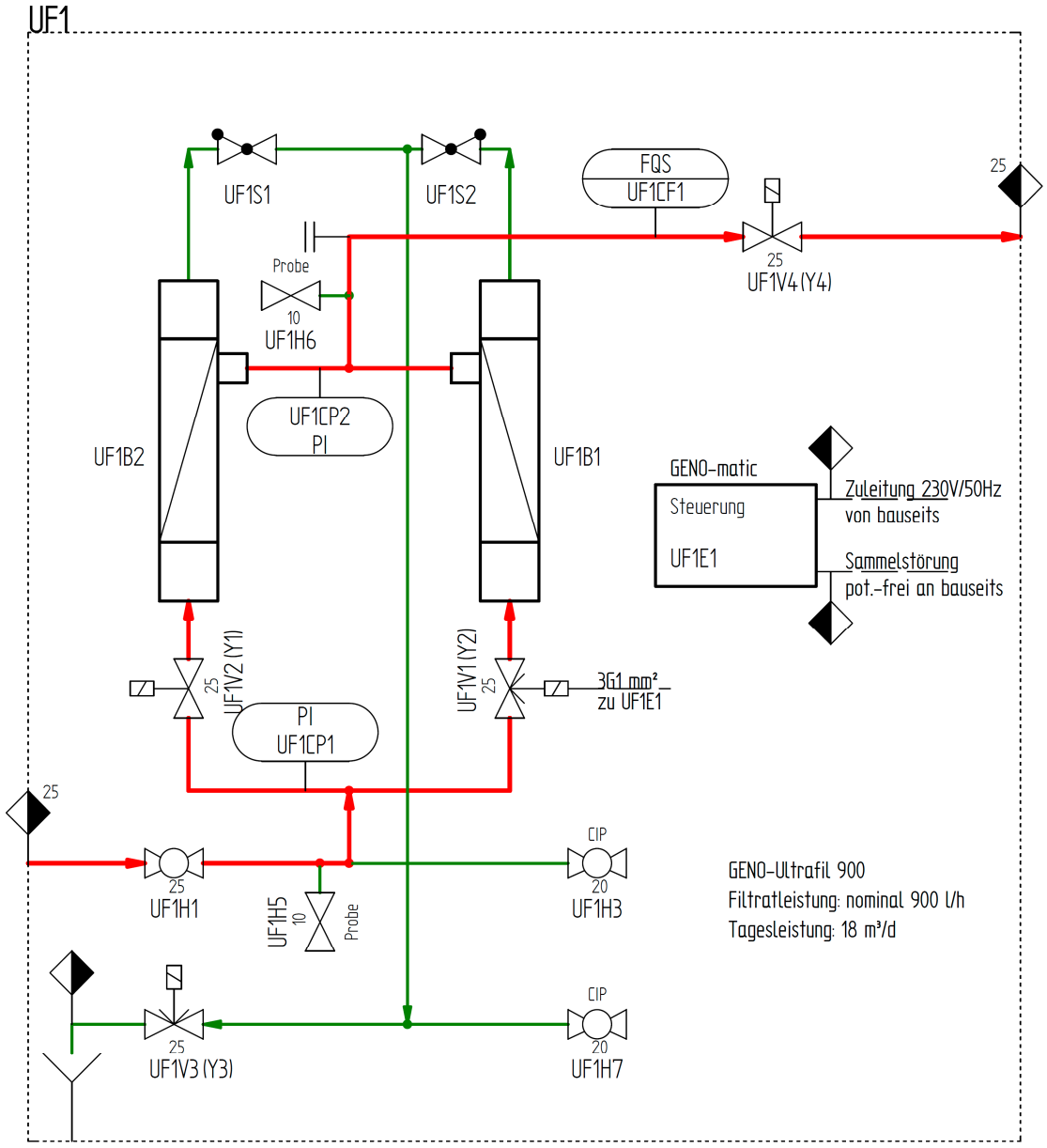


Fig. C-6: Flowchart GENO®-Ultrafil 900 ultrafiltration system

①	Inlet solenoid valve Y1 (or non-return valve)	Y1 is continuously open during filtration operation. It always closes during the backwash step in the GENO®-Ultrafil 450 ultrafiltration system and alternately with Y2 in the GENO®-Ultrafil 900 ultrafiltration system without filtrate tank. In systems with filtrate tank, Y1 closes when the "FULL" filtrate tank level is reached. Visual indication in the GENO®-matic control unit via bar symbol for the current switching state.
②	Inlet solenoid valve Y2	Y2 is additionally installed in the GENO+-Ultrafil 900 ultrafiltration system. Same function as Y1, depending on the preselected system configuration. In systems with filtrate tank, Y2 closes when the "FULL" filtrate tank level is reached. Visual indication in the GENO®-matic control unit via bar symbol for the current switching state.
③	Flushing water solenoid valve Y3	Y3 is closed during filtration and opened during flushing (backwash and forward flush) of the membrane. With PVC adhesive socket DN 20 (GENO®-Ultrafil 900 1" IT ultrafiltration system).
④	Pressure display raw water inlet	Pressure gauge for visual indication of the raw water inlet pressure.
⑤	Sampling valve Raw water inlet	Flame-sterilisable sampling valve made of stainless steel for taking microbiological samples from the raw water.
⑥	Ultrafiltration module	Ultrafiltration module with cast-in ultrafiltration membranes.
⑦	Flow sensor Filtrate	Flow measurement of the filtrate flow during filtration operation.
⑧	Pressure display Filtrate outlet	Pressure gauge for visual indication of the filtrate outlet pressure.
⑨	Sampling valve Filtrate outlet	Flame-sterilisable sampling valve made of stainless steel for taking microbiological samples from the filtrate.
⑩	Shut-off valve Filtrate outlet	PVC ball valve for disconnecting the system from the on-site mains and for regulating the filtrate flow. With PVC adhesive socket DN 20 (for GENO®-Ultrafil 900 1" IT).
⑪	Shut-off valve Raw water inlet	PVC ball valve for disconnecting the system from the on-site mains and for regulating the filtrate flow. With PVC adhesive socket DN 20 (for GENO®-Ultrafil 900 1" IT).
⑫	Non-return valve Flushing water outlet	Only with GENO®-Ultrafil 900 to prevent backflow of flushing water into the membranes in case of mutual flushing.
⑬	Control cabinet	GENO®-matic control unit for controlling the GENO®-Ultrafil 450/900 reverse osmosis systems .
⑭	Type designation plate	Type designation plate permanently mounted on aluminium angle plate.
⑮	Filtrate valve Y4 (only GENO®-Ultrafil 900 and optional set of fittings for GENO®-Ultrafil 450)	With GENO®-Ultrafil 900, Y4 is integrated into the system, with GENO®-Ultrafil 450 with filtrate storage tank, it is included in the set of fittings. Y4 is opened in filtration mode. Y4 is closed during backwashing and forward-flushing.
⑯	Backwash valve Y5 (in the GENO®-Ultrafil 450/900 set of fittings)	Y5 is only required for systems with filtrate tank to control backwashing and is included in the GENO®-Ultrafil 450/900 set of fittings. Y5 is closed during filtration and opened during backwashing.

3 | Technical specifications

Table C1: Technical specifications		GENO®-Ultrafil ultrafiltration system	
		450	**900**
Connection data			
Nominal connection diameter raw water inlet		1" male thread	
Nominal connection diameter filtrate outlet		1" male thread	
Nominal connection diameter drain		1" male thread	
Min. drain connection required		DN 50	
Connected load, approx.	[W]	80	120
Power supply	[V/Hz]	230 V/50 Hz	
Protection/protection class		IP 54/ ⏚	
Performance data			
Filtrate capacity nominal *	[l/h]	450	900
Filtrate capacity maximum (short-term) *	[l/h]	600	1,200
Daily capacity *	[m³/d]	9	18
Min./max. operating pressure	[bar]	1.0/5.0	
Inlet flow pressure raw water, min./max.	[bar]	1.0/5.0	
Number of modules	[piece(s)]	1	2
Active membrane area approx.	[m²]	4.5	9
Membrane cut-off (MWCO)	[kDa]	100	
Transmembrane pressure (TMP)* filtration	[bar]	0.1 - max. 0.8	
Transmembrane pressure (TMP)* backwash	[bar]	0.3 - max. 2.5	
Filtrate recovery *	[%]	approx. 95-99	
Dimensions and weights			
Dimensions (w x d x h)	[mm]	820 x 220 x1320	870 x 230 x 1770
Operating weight, approx.	[kg]	35	65
Ambient data			
Temperature of feed water, min./max.	[°C]	5 – 35	
Ambient temperature	[°C]	5 – 35	
rel. humidity	[%]	max. 70	
Order no.		**561 200**	**561 230**

* Performance data depends on the raw water composition and operating mode.
The maximum performance was determined with brand-new modules and municipal water at a membrane pressure loss of approx. 2.5 bar.

Note: In the on-site lines (raw water, filtrate, drain) there must be a possibility to disconnect the line (e.g. screw connection).

4 | Intended use

The GENO®-Ultrafil 450/900 ultrafiltration system is used for reducing particles (turbidity) and micro-organisms in drinking water which cannot be used directly as drinking water due to microbiological load or excessive turbidity.

- Municipal water (drinking water in accordance with the Drinking Water Ordinance (TrinkwV) 2001)
- Drinking water from wells and springs
- Drinking water from other treatment systems

Due to their limited filtrate capacity, GENO®-Ultrafil ultrafiltration systems are especially designed for use in private water supply systems.

The concentration of other substances contained in the raw water such as dissolved salts, heavy metals, residues of pesticides etc. is not affected by GENO®-Ultrafil ultrafiltration systems. Depending on the application and intended use, further treatment systems are necessary to reduce these substances.

To protect the system from damage (e.g. caused by abrasive particles) it is recommended that a pretreatment stage should be used (fine filter 100 µm) (refer to chapter C-6, 6.2 Optional features).

For the correct dimensioning and selection of systems, not only water analyses (preferably from several years and different seasons) but also the most accurate possible determination of average and peak consumption are necessary.

GENO®-Ultrafil ultrafiltration systems have an automatic flushing program. This flushing program is triggered according to time control by the control unit of GENO®-Ultrafil ultrafiltration systems. Depending on the system type and the optional features used, flushing is carried out by direct overflow of the membrane with raw water (forward-flushing) or in combination with a previous backwashing of the membrane with previously produced filtrate. In both cases, the resulting flushing water is discharged into the drain via the flushing water valve Y3.

Although this regular flushing is very effective, the transmembrane differential pressure (TMP) of the membranes can increase over time nevertheless. As a result, the treatment system no longer delivers the full filtrate capacity and the required filtration pressure is inadmissibly high.

The membranes usually reach a service life of 6 to 18 months until the membrane filters have to be replaced. However, this service life depends on the microbiological load of the raw water and turbidity. The load of other constituents can also have a negative effect on the service life of the filter.

Turbidity shocks, which can occur in aquifers and wells influenced by surface water after heavy rainfall events, can also lead to rapid filter blocking.

If the TMP reaches the maximum permitted value (refer to chapter C-3, Technical specifications), the membranes will have to be chemically cleaned and the membrane area will have to undergo subsequent conditioning. For this purpose, the membranes from GENO®-Ultrafil ultrafiltration systems must be removed and sent to Grünbeck Wasseraufbereitung for cleaning and conditioning.

For hygienic reasons, we recommend replacing the ultrafiltration membrane(s) every six months, even if the system is still delivering the required filtrate capacity at this time.

Since the composition of the raw water is subject to seasonal fluctuations and is therefore outside the control of Grünbeck Wasseraufbereitung, no guarantee can be given for the service life of the membrane filters.

Ultrafiltration membranes are wearing parts: They therefore require regular maintenance or replacement.

The GENO®-Ultrafil ultrafiltration system is adapted to the expected water demand. Short-term excess consumption can be covered by the system, but this increases the transmembrane pressure required for filtration.

Extended peak-load operation of the system can lead to damage or destruction of the ultrafiltration membranes.

The system may only be operated if all components are installed properly. Safety devices and equipment must NEVER be removed, bridged or tampered with.

Appropriate application of the device also implies that the information contained in this operation manual and all safety guidelines applying at the installation site be observed. Furthermore, the maintenance and inspection intervals have to be observed.

4.1 | System shut-down

GENO®-Ultrafil 450/900 ultrafiltration systems should be operated with a filtrate removal that is as uniform as possible. We therefore recommend that the system should be equipped with a filtrate storage tank and the subsequent supply of the line system in the building be undertaken by a pressure booster system.

In order to protect the system against contamination during long idle times (e.g. during holidays), the system automatically forward-flushes itself twice a day. This forward-flushing takes place daily at a freely adjustable time (factory setting: midnight and 6 AM) regardless of whether the system has been producing filtrate since the last forced flushing. This function is only possible if the system is not disconnected from the electrical supply and the raw water supply.

If the filtrate is kept in the optionally available filtrate tank for longer retention times, the risk of bacterial growth increases. Therefore, it is recommended for the treated water to be used regularly. If necessary, the tank and the connected pipes must be cleaned.

If the system is to be taken out of operation for a longer period of time, the ultrafiltration membranes must be removed from the system and preserved. This preservation is carried out by Grünbeck's technical service/authorised service company.

5 | Application limits

For the use of GENO®-Ultrafil ultrafiltration systems, the limit values of the German Drinking Water Ordinance apply as the upper limit for the permitted substances contained in the water, with the exception of the following parameters:

Parameter	**GENO®-Ultrafil 450/900 without backwash mode**	**GENO®-Ultrafil 450/900 with backwash mode**
Appearance/colour	colourless	
Undissolved sediment	without	
pH value	3 – 10	
Turbidity (average) [NTU]	< 3	< 25
Turbidity (short-term) [NTU]	< 20	< 50
Suspended solids (filter fineness 0.2 µm) [mg/l]	< 4	
Oils/greases/hydrocarbons	not verifiable	
Removal of viruses, bacteria and parasites	4 log stages (> 99.99%)	

Note: All specifications of the application limits are to be regarded as provisional limits. Subject to modifications and adaptations.

The GENO®-Ultrafil ultrafiltration system has a positive influence on the following parameters of the German Drinking Water Ordinance in particular: Turbidity, microbiological parameters.

Depending on the composition of the raw water, the parameters iron, manganese and aluminium can also be positively influenced. However, this must be checked on a case-by-case basis after installation and, if necessary, appropriate additional treatment systems must be installed upstream.

Note: According to DIN 2001 "Drinking water supply from small units...", the filtrate from ultrafiltration systems must be treated by an additional disinfection stage (e.g. UV disinfection, chlorine dosing or comparable) prior to use.

6 | Scope of supply

6.1 Standard equipment

- Microprocessor control with LCD graphic display and indication of the current operating state, valve states (OPEN/CLOSED), partial functions with the current treatment capacity, total treatment capacity, operating time, remaining time until service and fault signals. Buzzer signal when the maintenance interval is exceeded, level indicator for systems with filtrate tank, release signal for raw water supply pump, pot.-free collective fault contact and pulse output for controlling a GENODOS® pump.
- Ultrafiltration membrane(s), firmly encapsulated in one pressure pipe each.
- Piping made of PVC, incl. pressure gauges in the raw water inlet and in the filtrate outlet, flow sensor in the filtrate line, ball valves in the raw water and filtrate line for shut-off and regulation of the flow rate.
- Solenoid valve(s) for controlling the automatic flushing of the system.
- Sampling points in the raw water line and in the filtrate line made of stainless steel, flame-sterilisable.
- High-grade system rack made of anodised aluminium to house all system components for wall mounting on-site incl. fastening material.
- Operation manual.

6.2 Optional accessories

Note: It is possible to retrofit existing systems with optional components. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechstaedt for more information.

Set of fittings GENO®-Ultrafil 450 ultrafiltration system 561 800

The set of fittings in combination with a filtrate storage tank and a pressure booster system enables backwashing of GENO®-Ultrafil ultrafiltration systems. This can have a positive effect on the service life of the membranes.

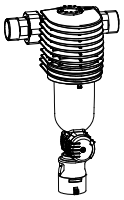
Pre-assembled valve unit ready for connection in the pipework on-site.

The on-site pipework consists of:
1 filtrate solenoid valve (DN 20)
1 backwash solenoid valve (DN 20) incl. screw connections and fastening material for wall mounting.

Set of fittings ultrafiltration system GENO®-Ultrafil 900 561 810

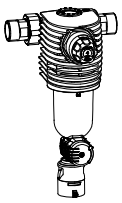
The set of fittings in combination with a filtrate storage tank and a pressure booster system enables backwashing of GENO®-Ultrafil ultrafiltration systems. This can have a positive effect on the service life of the membranes. Pre-assembled valve unit ready for connection.

The set of fittings consists of:
1 backwash solenoid valve (DN 25) incl. screw connections and fastening material for wall mounting.



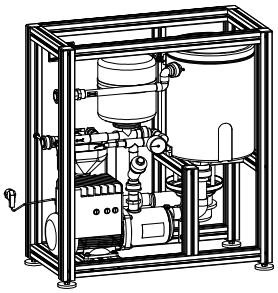
BOXER® R backwash filter 101 310

Backwash filter for prefiltration of the raw water upstream of the GENO®-Ultrafil ultrafiltration system with a filter element made of stainless steel (filter fineness < 100 µm). The prefilter prevents mechanical damage to the ultrafiltration membrane caused by coarse particles.



BOXER® RD backwash filter 101 360

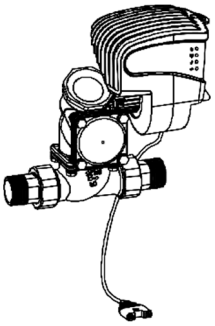
Additionally equipped with integrated pressure reducer to protect the GENO®-Ultrafil system from excessive raw water pressure.



Euro system separation device GENO®-G5 134 100

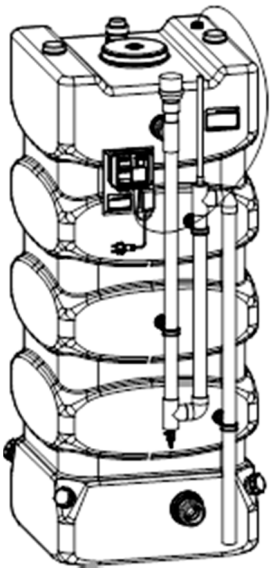
System separation with free outlet according to DIN EN 1717. Compact unit ready for connection in aluminium profile frame construction, completely piped and wired, with frequency controlled pressure booster device and dry-run protection, collection tank with make-up water feed and overflow.

Nominal capacity: 2 m³/h
Pressure control: 4 bar (adjustable from 2.5 to 4 bar)
Mains supply: 230 V, 50 Hz, 1.1 kW



GENO®-STOP 1" 126 875

The new safety device GENO-STOP® provides reliable and comprehensive protection against water damage. The GENO-STOP® may be equipped with up to 2 wired water sensors.
- For additional versions, please inquire -



RT 1000 pure water basic tank with sterile air filter 712 400
Tank version:

All tanks are pre-assembled, with PVC overflow pipe as well as connections for the permeate inlet and the suction line of the pressure booster system. Grey PE. Hand hole with removable screwed lid and GENO®-Multi Niveau control unit (switching level).

Net volume approx. 850 litres
L 780 / W 1000 / total H 2000 mm*****.

Tank connections, female thread, for RT/RT-X 712 440

for direct on-site connection option of stainless steel pipes for inlet (R 1½" IT) and outlet (R 2" IT)

Additional tank RT 1000
with sterile filter, as add-on tank to basic pure water tank 712 405

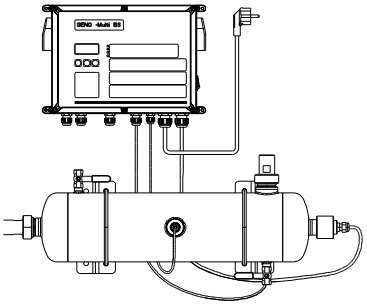
Net volume approx. 850 litres
L 780 / W 780 / total H 2100 mm*.

***** Tank height incl. connecting pieces.
For larger tanks, please inquire

****** Without a sterile overflow as siphon – overflow as downpipe

Add-on tank without control unit
GENO®-Multi Niveau and overflow loop incl.
2 connecting lines Di=36 mm.

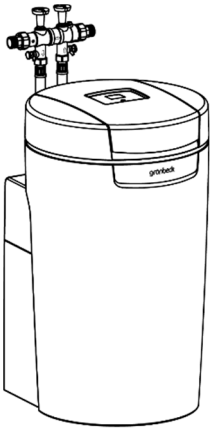
Note: A maximum of four supply tanks can be combined.



GENO®-UV 60 S UV disinfection unit 523 110

Nominal connection diameter R 1" (DN 25)

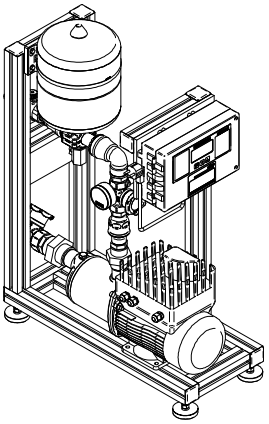
GENO®-UV disinfection devices are used for the continuous disinfection of drinking water.



Water softener softliQ:MC 187 120

Connection block with 2 shut-off valves, 2 sampling valves as well as integrated coarse filter, non-return and overflow valve, dosing point, including flexible connection hoses.

- For larger systems, please inquire -



Pressure booster system GENO® FU-X 2/40-1 N 730 640

Compact, pressure-dependant, controlled pump aggregate consisting of a centrifugal pump completely made of stainless steel as well as an integrated pressure and contact water. Control unit with power switching, backlit graphic display. Operating switch, operating log via SD card, voltage-free signal/fault signal contact, non-return valve, shut-off valve for each pump (on suction and pressure side), membrane expansion vessel with forced flow.

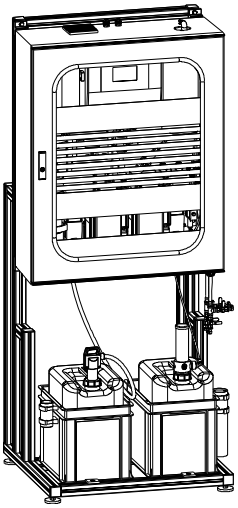
Delivery rate max.:	1.2 – 4.2 m³/h
Delivery head max.:	18.2 – 45.6 m
Mains connection:	230 V/50 Hz
Power consumption:	1 kW
Connections:	DN 25/DN 32
Protection type:	P 55

M-Bus measuring transducer FM-2D/K 115 850

To transmit the flow rate and the meter reading as well as statistical values of the water meter by means of M-Bus (IEC 870).

In addition, flow-dependent pulse output, analogue output and relay contact to Grünbeck control unit.

Dimensions: 160 x 240 x 160 mm



GENO®-Baktox MRX 10 569 310

Chlorine dioxide generation system
for the dosing of chlorine dioxide into drinking and industrial water. GENO®--Baktox chlorine dioxide generation system mounted on PE mounting plate in plastic switch cabinet.

- For additional versions, please inquire -

6.3 Consumables

Only use genuine consumables in order to ensure the reliable operation of the system.

GENO® ultrafiltration module 561 201

Ultrafiltration module, preserved, tested
Packing unit: 1 pc

Note: As an option, we offer a replacement module (GENO® exchange module) which is kept in stock on a customized basis.

A replacement is possible in case of contamination of the installed module.

Send the exhausted ultrafiltration module to Grünbeck's technical service/authorised service company for cleaning (refer to www.gruenbeck.de) or directly to the parent company. Protect from frost during transportation and storage.

GENO® exchange module

Cleaned and conditioned used module, checked for integrity. Only in exchange for used/blocked GENO® ultrafiltration modules

Inquiry directly to Grünbeck or the representative responsible for your area (refer to www.gruenbeck.de)

Packing unit: 1 pc

6.4 Wearing parts

Seals and valves are subject to a certain wear and tear. Wearing parts are listed below:

- Solenoid valves
- Water meter
- Sampling valves

Note: Although these are wearing parts, we offer a limited warranty period of 6 months.

D Installation

1 | General installation information

- The GENO®-Ultrafil ultrafiltration system is designed for wall mounting.
- The installation site must offer adequate space. The required connections must be provided prior to the installation. Dimensions and connection data are summarized in Table C-1 (refer to chapter C-3, Technical specifications)

1. Unpack all system components.
2. Check for completeness and soundness.
3. Install the GENO®-Ultrafil ultrafiltration system at the intended location using the enclosed fastening material.

Note: For the installation of systems with optional accessories (refer to chapter C-6.2), also observe the operation manuals supplied with these components.

2 | Water installation

When installing the GENO®-Ultrafil ultrafiltration system, certain rules must always be observed. Additional recommendations are given in order to facilitate the handling of the system. The installation instructions described here are illustrated in chapter D-4, Fig. D-1 and Fig. D-2.

Binding rules

The work described here is only allowed to be performed by the responsible water supplier or approved installation companies.

- Please observe the local installation guidelines and the general regulations.
- Install 100 µm drinking water filter (e.g. BOXER® RD) upstream.
- Install a system separator upstream.
- Provide a drain connection (minimum DN 50) to discharge the concentrate.

Warning! The installation site must have a floor drain. If no floor drain is available, an adequate water stop device needs to be installed (refer to chapter C-6.2 Optional features).

Warning! Floor drains leading to a lifting system do not work in case of a power failure.

3 | Electrical installation

Note: The electric circuit diagrams are provided separately for the system in the switch cabinet of the GENO®-Ultrafil ultrafiltration system. The power feed line dimensions can be found there.

1. For the electrical connection, an feed line to the system must be provided on-site in accordance with the electric circuit diagram, which must be adequately dimensioned (earthing socket 230 V, 50 Hz, min. 1.5 kW).
2. Wire the level control of the filtrate tank (if provided) according to the electric circuit diagram (refer to chapter F-4 Electric circuit diagrams).
3. Wire the set of fittings (if provided) according to the electric circuit diagram (refer to chapter F-4 Electric circuit diagrams).
4. A raw water inlet pump installed upstream can be released via an integrated contact when the raw water solenoid valve(s) Y1/Y2 is/are open.

Caution! The voltage supply for a raw water feed pump can be connected in the switch cabinet of the GENO®-Ultrafil ultrafiltration system with a power consumption of max. 230 V/8 A. The optional filtrate pressure booster system is not integrated into the switch cabinet of the GENO®-Ultrafil ultrafiltration system.

4 | How to connect the system

The work described here may only be performed by Grünbeck's technical service/authorised service company or by persons expressly authorised by Grünbeck.

Note: There must be a way to disconnect the line (e.g. screw connection) in the on-site feed lines and drain pipes. If the set of fittings is used, a backflow preventer (non-return valve) must be installed on-site in the backwash pipe.

Caution! The heating and the associated volume expansion of the raw water in a warm installation site (e.g. boiler room) can cause an inadmissible high pressure increase in the GENO®-Ultrafil ultrafiltration system during a relatively lengthy idle time. This can lead to destruction of the Ultrafil system. Appropriate measures must therefore be taken, e.g. by installing a pressure relief valve in the filtrate drain or by a pressure vessel, in order to prevent this inadmissible build-up of pressure.

- Close ball valves of the GENO®-Ultrafil ultrafiltration system at the raw water inlet and at the filtrate outlet.
- Connect the raw water inlet, making sure that the max. raw water pressure is not exceeded.
- Connect the flushing water to the drain in accordance with DIN 1988-100/DIN EN 1717, in which case the flushing water should be able to flow into the drain as freely as possible. Avoid counterpressure.
- Connect the filtrate outlet to the domestic water installation or to the optional filtrate tank and the backwash valve (refer to flow chart Fig. D-1 or Fig. D-2).
- Ultrafiltration systems without the additional option of tank or set of fittings are directly integrated into the domestic water supply system. The raw water pump (well pump) generates the necessary pressure for filtration at the drawing off points in the building. In this case, it is not advisable to reduce the flow rate through the GENO® ultrafiltration system by restricting the inlet pressure (pressure reducing valve, partial closing of the inlet ball valve) in order to be able to cover short-term peak consumption
- In systems with a tank and set of valves, the filtrate flow rate should be restricted to the standard capacity of 450 or 900 l/h in order to load the membrane(s) as evenly as possible. Peak consumption is covered by the filtrate tank.
- The system must be forward-flushed (with preserving agent) and disinfected before initial commissioning.

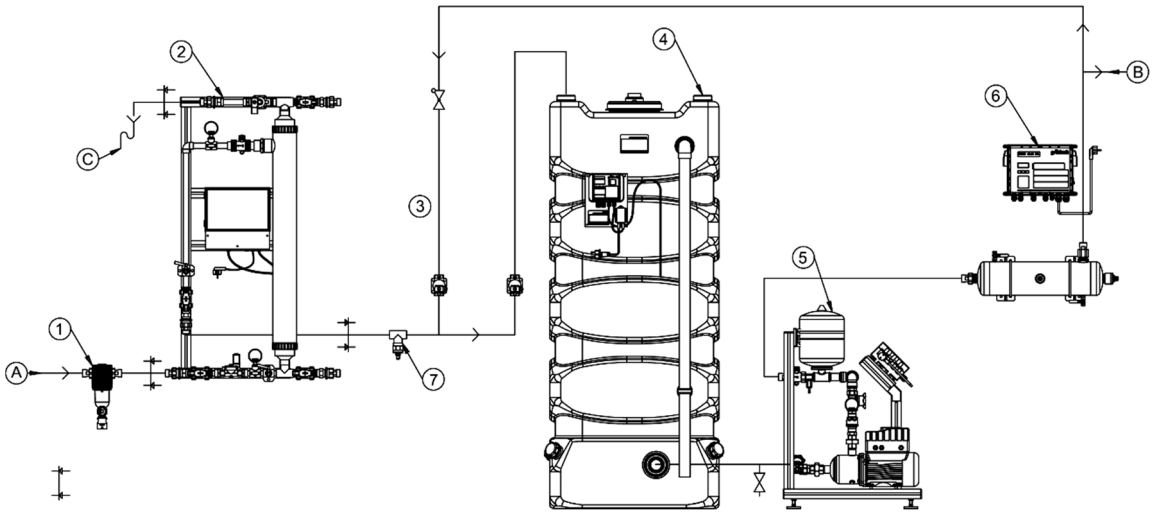


Fig. D-1: Installation drawing GENO®-Ultrafil 450 ultrafiltration system

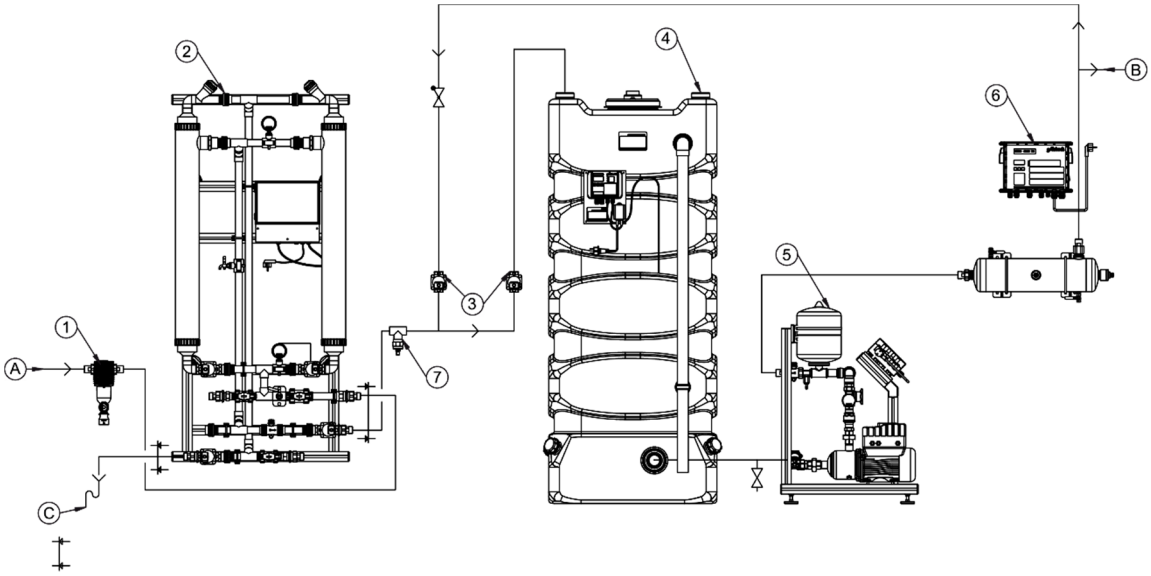


Fig. D-2: Installation drawing GENO®-Ultrafil 900 ultrafiltration system

Legend for Figs. D-1 and D-2

① Backwash filter BOXER® RD
② GENO®-Ultrafil 450/900 ultrafiltration system
③ Valve insert for GENO®-Ultrafil
④ RT 1000 pure water basic tank with sterile air filter
⑤ Pressure booster system GENO® FU-X 2/40-1 N
⑥ GENO®-UV 60 S UV disinfection unit
⑦ Dosing valve e.g. for GENO®-Chlor A

Ⓐ Raw water inlet
Ⓑ Filtrate outlet
Ⓒ Flushing water outlet

E Start-up

1 | How to flush the system

The work described below may only be performed by trained experts. For safety reasons, the commissioning must be performed by Grünbeck's trained and authorised technical customer service/authorised service company.

Note: To forward-flush the system, the filtrate line must be routed to the drain.

Warning: The flushing water produced during forward-flushing contains the preserving agent and is not suitable as drinking water; it must be disposed of via the drain. The forward-flushing water must not get into the drinking water system.

Caution: The preserving agent can leave stains on various surfaces (floor, wall, etc.).

1.1 How to flush off the preservation agent

For the duration of storage and transport, the membrane(s) is (are) protected by means of a preserving agent. First of all, this preserving agent must be rinsed off.

Note: For detailed information on the handling of the GENO®-matic control unit, please refer to chapter F.

To flush out the preservative, the system must be connected on the raw water side and a sufficient water pressure (max. 5 bar) must be available. The ball valve in the raw water inlet is closed. The filtrate produced during forward-flushing is not suitable as drinking water and must be disposed of as waste water. For this purpose, the filtrate line must be separated from the domestic water installation and diverted into the drain connection. If separation is not possible, the filtrate line is closed (in the case of the GENO®-Ultrafil 450 ultrafiltration system by ball valve, in the case of the GENO®-Ultrafil 900 ultrafiltration system by the on-site ball valve in the filtrate piping or by disconnecting the plug on the solenoid valve Y4) and the resulting filtrate is diverted into the drain via the sampling valve on the filtrate side. The ball valve DN 15 (top right in the case of the GENO®-Ultrafil 450 ultrafiltration system or bottom right in the case of the GENO®-Ultrafil 900 ultrafiltration system) in the pipe to the drain is also opened and diverted into the drain by means of a hose, for example.

1.2 Forward-flushing

The system is connected to the power supply and started by pressing the "ON" key ▲. The system starts with the filtration cycle (inlet valve Y1 (and Y2) open). Now the ball valve in the raw water inlet is slowly opened up to approx. 500 l/h with the GENO®-Ultrafil 450 ultrafiltration system or 1,000 l/h with the GENO®-Ultrafil 900 ultrafiltration system. In this way, the ultrafiltration system is forward-flushed for at least 30 minutes. The ultrafiltration system is then switched off by pressing the "OFF" key ▼ and the ball valve in the raw water inlet is closed.

2 | Disinfecting the system

2.1 Disinfecting the system

Through storage, transport and installation, micro-organisms can reach the filtrate side of GENO®-Ultrafil ultrafiltration systems. In order to kill these germs, GENO®-Ultrafil ultrafiltration systems are disinfected by an aqueous solution of a chemical disinfectant, e.g. with sodium hypochlorite or a hydrogen peroxide solution.

Warning: Chemical disinfectants (e.g. chlorine or hydrogen peroxide) can cause serious damage to health, the environment or property if used improperly. The product data sheets and recommendations for use of the disinfectants must be strictly observed and followed. After completion of the work, the disinfecting solution must be disposed of in accordance with the local wastewater discharge regulations.

2.2 Preparatory work

The disinfecting solution is flushed into the membrane(s) through the ball valve DN 15 on the raw water side and returned via the sampling valve on the filtrate side. In order to make this cycle possible, for example, the flushing set for reverse osmosis systems or for UV systems is used. The disinfecting solution is flushed in as described in chapters E-1.2 and E-1.3, but without opening of the raw water ball valve and without discharging of the disinfecting solution into the drain.

2.3 Preparation of the disinfecting solution

The disinfecting solution is prepared as described below. The GENO®-Ultrafil 450 ultrafiltration system requires at least 20 litres of the finished disinfecting solution and the GENO®-Ultrafil 900 ultrafiltration system requires at least 40 litres.

- Addition of NaOCl in a concentration of 100 mg/l into the filtrate/flushing tank (corresponds to approx. 100 ml GENO® Chlor A per 100 l water). The actual chlorine concentration of the preparation solution must be checked and documented by a rapid tester!

or

- Addition of hydrogen peroxide in a concentration of max. 500 mg/l into the filtrate/flushing tank (corresponds to approx. 160 ml GENO®-perox 30% to 100 l water). The actual hydrogen peroxide concentration of the preparation solution must be checked and documented by a rapid tester!

Warning: Disinfectants based on chlorine react with acid to form highly toxic chlorine gas! Never mix disinfectant with acids.

2.4 Flushing in, residence time and forward-flushing

The disinfecting solution is flushed into the system as described above and circulated in the circuit for at least ½ hour.

The system is then forward-flushed with raw water via the raw water side. Proceed as described in chapter E-1.

Caution! After disinfection, care must be taken to ensure that no raw water or water contaminated with germs can reach the treated water side of the membrane. Otherwise, rapid recontamination of the membrane and the filtrate storage tank may occur. The success of the disinfection is to be investigated by microbiological sampling in the filtrate.

Caution! Also the water pipes, containers, draw-off points etc. connected after the GENO®-Ultrafil ultrafiltration system must be sufficiently disinfected before the ultrafiltration system is connected.

3 | Calibrating the water meter

3.1 Calibration

The turbine water meter of GENO®-Ultrafil ultrafiltration systems must be calibrated after disinfection flushing.

A reference value for the flow rate must be entered in the GENO®-matic control unit. For this purpose, the turbine water meter in the filtrate line must have a water flow that is as constant as possible. For this purpose, the system is switched to filtration mode and the flow rate is determined by a reference (e.g. water meter, buoyancy flow meter, volumetric measurement in a vessel). This particular reference value is entered and confirmed in the GENO®-matic control unit when the flow is active at that rate.

Note: Setting of the reference value is described for the control unit (refer to chapter F-3, "C System configuration").

Note: The reference value should be approx. 450 l/h for the GENO®-Ultrafil 450 ultrafiltration system and approx. 900 l/h for the GENO®-Ultrafil 900 ultrafiltration system.

3.2 Setting the flow rate

The GENO®-Ultrafil membranes have a very low filtration resistance on delivery. Thus, a very high filtrate flow is achieved even at low raw water inlet pressure. After a certain operating time, the filter resistance increases due to contamination of the membrane pores and thus the filtrate performance decreases.

For systems equipped with the options of filtrate tank and set of fittings, the raw water inlet should be restricted accordingly in order to obtain the nominal flow rate of 450 or 900 l/h respectively. At certain intervals, depending on the raw water contamination, the restriction can be adjusted in order to restore the corresponding nominal capacity.

In systems that are directly integrated into the closed domestic water installation, a raw water-side flow limitation is not carried out to cover short-term peak consumption.

Note: Having the filtrate flow rate as low and even as possible helps to extend the service life of the ultrafiltration membrane.

F Operation

1 | Introduction

Note: Instructions in bold are absolutely essential to ensure that work can continue. All other instructions can be ignored if the value shown on the display remains unchanged.

Settings in the technical service programming level may only be performed by Grünbeck's technical customer service/authorised service company or by persons expressly authorised by Grünbeck.

Warning! Incorrect settings may lead to hazardous operating conditions which cause injury, illness or damage to property.

The operation manual must be strictly adhered to! Only make the settings described there!

Tasks with this symbol may only be performed by trained and qualified electrical experts according to the VDE guidelines or according to the guidelines of a similar local institution.

2 | Brief description of the GENO®-matic control unit

1.1 Intended use

The GENO®-matic control unit is the control unit for all Grünbeck GENO®-Ultrafil ultrafiltration systems

1.2 Function

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

These include:

- Set of fittings to enable backwashing
- Level control of the filtrate tank
- Switching of a raw water pump
- Control of a dosing pump for the continuous addition of disinfectant

In the system menu, these additional components can be activated or accessed from the terminal strip. If the level control is activated, the current tank filling appears on the display (➔ visualisation).

By changing the system selection within the code level (refer to chapter F-3), the GENO®-matic control unit can be adapted to retrofitted options (e.g. filtrate tank) without replacing it.

2 | Operation of the GENO®-matic control unit

2.1 Control panel of GENO®-matic control unit

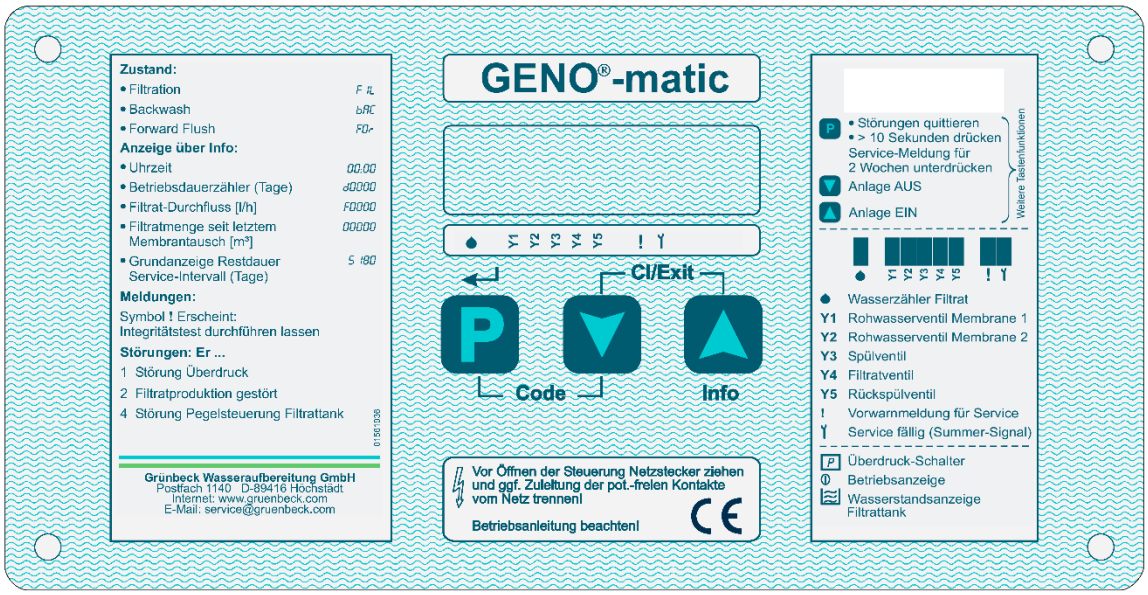


Fig. F-1: Control panel of GENO®-matic control unit

2.2 Key function

Key	Function
P	**In the time display within the info level:** • Programming the time If an Er 1, Er 3 or Er 4 fault is active: • Acknowledge fault If an Er 2 fault is active: • Press and hold key > 10 sec.: Suppress fault for 14 days Within a programming level: • Open parameter for editing (display value flashes) • Save changed parameter (display value stops flashing)
▼	**In the System status basic display:** • Switch OFF the system Within a programming level: • Return to the previous parameter • Decrease the numerical value of an open parameter (display value flashes)

▲	**In the System status basic display:** • System ON (FILtration, bACkwash, FOrward Flush) • Displaying the parameters of the info level Within a programming level: • Switch to the next parameter • Increase the numerical value of an open parameter (display value flashes)
P + ▼	**In the System status basic display:** • Press and hold both keys simultaneously > 1 sec.: Access to code-protected programming levels
▼ + ▲	**When a parameter is open (display value flashes):** • Close parameter unchanged without saving them Within a programming level: • Exit programming level, return to the System status basic display

Table F-1: Key functions

2.3 Display symbols

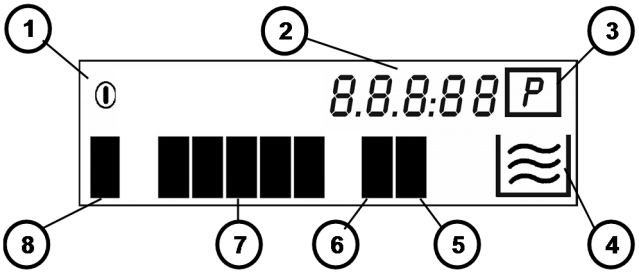


Fig. F-2: Display symbols

Item	Symbol	Display of parameters
①	Operating display	System switched on via key ▲
②	Numerical display	Operating data, parameters, fault signals
③	Excess pressure switch (function prepared, but not yet in use)	Function is suppressed, therefore no effect
④	Water level indicator filtrate tank	• Upper wave appears: Filtrate tank full • Middle and lower waves disappear: Filtrate tank empty
⑤	Collective fault signal	Together with Er 1... Er 4
⑥	Signal contact	Advance warning for requesting service
⑦	Solenoid valves Y1.... Y5 (bar from left to right)	Solenoid valve opened
⑧	Water meter filtrate	Flashes with filtrate flow

Table F-2: Display symbols

2.4 Reading operating data of the info level

Requirement: System is switched on via key ▲ and is in the System status basic display (refer also to Tab. F-1 Key functions).

Switching through the operating data using key ▲.

Parameter	Comments
FIL	Filtration
bAC	bACkwash
FOr	FOrward Flush
OFF	Operating status Off (no filtration and flushing, except daily forced flushing at the set times)
00:00	Time
d0441	Operating time [days]: Electrical system connected to mains voltage
F0440	Filtrate flow rate [l/h]
00329	Filtrate quantity produced up to this point [m³] by the current membrane(s)
S 072	Basic display "Remaining time until maintenance interval" [days]

Table F-3: Operating data of the info level with sample values

Note: If no key is pressed, the system returns automatically to the System status basic display from all menus and open parameters after 3 minutes.

2.5 Programming the time

Requirement:

System is switched on via key ▲ and is in the System status basic display (refer to Tab. F-1: Key functions).

1. Use key ▲ to move to the time display.
2. Press the "P" key to change the hours (value flashes). With the keys ▲ or ▼. Now set to the desired value with and save with the "P" key. The value stops flashing.
3. Then the minutes start flashing. Now set the desired value with keys ▲ or ▼ and store it with the "P" key. The value stops flashing.
4. Jump back to the info level by pressing keys ▲ and ▼ simultaneously.

2.6 Program sequence

The program sequence is fixed by the GENO®-matic control unit and is determined by the system selection and the selected options. However, the duration of the individual program steps can be changed in the program sequence itself. The program times are preset at the factory (refer to Table F-4:). On the basis of a water analysis by Grünbeck's works/contract customer service department, the program times can be adapted to the conditions on site during commissioning.

Settings in the technical service programming level may only be performed by Grünbeck's technical customer service/authorised service company or by authorised experts.

Warning! Incorrect settings may lead to hazardous operating conditions which cause injury, illness or damage to property.

The operation manual must be strictly adhered to! Only make the settings described there!

GENO®-Ultrafil 450 ultrafiltration system (1 membrane without filtrate tank - system equipment 10)

Step	Duration	Time (factory setting)	Solenoid valve				
			Y1	Y2	Y3	Y4	Y5
1 Filtration	[min.]	30	UP	--	CLS	--	--
2 Forward Flush	[sec.]	30	UP	--	UP	--	--

Table F-4: Program sequence and program times (factory setting) system equipment 10

GENO®-Ultrafil 450 ultrafiltration system (1 membrane with filtrate tank - system equipment 11)

Step	Duration	Time (factory setting)	Solenoid valve				
			Y1	Y2	Y3	Y4	Y5
1 Filtration	[min.]	30	UP	--	CLS	UP	CLS
2 Back Wash	[sec.]	30	CLS	--	UP	CLS	UP
3 Forward Flush	[sec.]	30	UP	--	UP	CLS	CLS

Table F-5: Program sequence and program times (factory setting) system equipment 11

GENO®-Ultrafil 900 ultrafiltration system (2 membranes without filtrate tank - system equipment 20)

Step	Duration	Time (factory setting)	Solenoid valve				
			Y1	Y2	Y3	Y4	Y5
1 Filtration with both membranes	[min.]	30	UP	UP	CLS	UP	--
2 Back Wash Membrane 1	[sec.]	30	CLS	UP	UP	CLS	--
3 Forward Flush Membrane 1	[sec.]	30	UP	CLS	UP	CLS	--
4 Back Wash Membrane 2	[sec.]	30	UP	CLS	UP	CLS	--
5 Forward Flush Membrane 2	[sec.]	30	CLS	UP	UP	CLS	--

Table F-6: Program sequence and program times (factory setting) system equipment 20

GENO®-Ultrafil 900 ultrafiltration system (2 membranes with filtrate tank - system equipment 21)

Step	Duration	Time (factory setting)	Solenoid valve				
			Y1	Y2	Y3	Y4	Y5
1 Filtration both membranes	[min.]	30	UP	UP	CLS	UP	CLS
2 Back Wash both membranes	[sec.]	30	CLS	CLS	UP	CLS	UP
3 Forward Flush both membranes	[sec.]	30	UP	UP	UP	CLS	CLS

Table F-7: Program sequence and program times (factory setting) system equipment 21

Filtration (step 1) for the programmed period of time

Note: The time is only added up as long as filtrate is being produced by the system (refer to display: bar above the water drop flashes). Flushing (step 2 and, if necessary, step 3) is then carried out for the programmed period of time.

Suppression of flushing in systems without filtrate tank

Note: In the case of GENO®-Ultrafil ultrafiltration systems which are installed directly in the water supply (without filtrate tank and without subsequent pressure booster), the situation can arise that no or only a reduced filtrate quantity is available at the draw-off points when filtrate is removed at the same time as the flushing process starts, for the duration of the flushing time . Grünbeck's technical service can enter a code to suppress flushing of the membrane(s) until no filtrate has been removed by the consumer for at least one minute.

Forced flushing

Note: If no filtrate is removed from the GENO®-Ultrafil ultrafiltration system for several days, e.g. during holiday periods, there is a risk of bacterial growth in the system. In order to prevent this, a forced flushing is carried out twice a day at the programmed times 1 and 2 (factory setting 6 AM and midnight). If flushing is taking place at this time, the forced flushing is not necessary. The forced flushing times can be set by Grünbeck's technical service.

General remarks on flushing

Note: In systems with a filtrate tank, at least the lower level must be reached so that sufficient filtrate is available for the backwash step. During commissioning, the lower level must be set correspondingly high.

3 | Operation of the customer service programming level

- Within the customer service programming level, various settings and parameter settings can be made on the control unit of the system. To enter the programming level, press the "P" key at the same time as key ▼ and hold for > 1 second.
- The desired code can be increased by pressing key ▲ or decreased by pressing key ▼.
- Pressing the "P" key opens the corresponding code level.
- Use keys ▼ and ▲ to select the corresponding submenu level and press the "P" key to select it. The displayed value starts flashing and is changed by pressing keys ▲ and ▼.
- Press the "P" key to accept the set value.
- Press keys ▲ and ▼ simultaneously to exit the operating level.
- Refer to Table F1 for key functions.

Settings in the technical service programming level may only be performed by Grünbeck's technical customer service/authorised service company or by authorised experts.

Warning! Incorrect settings may lead to hazardous operating conditions which cause injury, illness or damage to property.

The operation manual must be strictly adhered to! Only make the settings described there!

A Display software version – code level 999

The software version of the GENO®-matic control unit is displayed in this code level.

B Reading the error memory – code level 245

The error memory of the GENO®-matic control unit is displayed in this code level.

Parameter	Error	Comments
Error memory of the last 9 errors that occurred 1. Er_ = most recent error 9. Er_ = oldest error	Er1 ... Er 4	Indication only For an error description refer to chapter G "Faults".

Table F-8: Read out error memory

C System configuration – code level 291

The system configuration is selected in this code level

Display/factory setting	Parameter	Setting range	Comments
System equipment	Monitoring for Er 5/Er 9	10 11 20 21	Ultrafil 450
Filtrate flow rate reference value [l/h]		0 ... 9999	Ultrafil 450 with set of fittings
Maintenance interval [days]		0 ... 365	Ultrafil 900
Advance warning that maintenance interval will soon expire [days]		0 ... 60	Ultrafil 900 with set of fittings
Filtration monitoring (Er 3)		0 ... 1	Must be measured and gauged while the filtration is running

Table F-9: system configuration

General filtration monitoring

Note: Monitoring not during backwash or forward-flushing condition, because the water meter does not have through-flow or the through-flow is insufficient.

D Input logic – code level 114

The input logic is configured in this code level

Display/factory setting	Parameter	Setting range	Comments
1. 1	Contact type level "a"	0 ... 1	0 = NO contact/1 = NC contact
2. 0	Contact type level "b"	0 ... 1	0 = NO contact/1 = NC contact
3. 0	Contact type excess pressure switch	0 ... 1	0 = NO contact/1 = NC contact, deactivated in factory settings
4. 5	Delay time Excess pressure switch [sec.]	0 ... 20	Delay time for closing of the raw water solenoid valve(s) Y1/Y2 when the excess pressure switch is activated
5. 0	Switching characteristics pot. free fault signal contact	0 ... 1	0 = Contact cycles in case of fault 1 = Contact gives continuous signal in case of fault
6. 1	Waiting time 1 minute without removal for flushing in systems without filtrate tank	0 ... 1	0 = After the step time filtration has elapsed, flushing is started immediately 1 = After the step time filtration has elapsed, flushing is not started until after 1 minute without removal

Table F-10: Logic of the input signals

Excess pressure switch

Note: The excess pressure switch is not installed, but a preparation for a possible change of the law. Setting range "0" must be set for deactivation. If the excess pressure switch has been deactivated, the delay time excess pressure switch is not activated.

E Program sequence for filtration and flushing – code level 303

In this code level, the times for the individual program steps (filtration, backwash and forward-flushing) as well as the times of the forced flushing can be changed.

Display/factory setting	Parameter	Setting range	Comments
Step 1 Filtration [min.]	Contact type level "a"	1 ... 60	Maximum removal time until flushing (2)
Step 2 Backwash [sec.]	Contact type level "b"	15 ... 60	Flushing depending on the system equipment (refer also to chapter F-12)
Step 3 Forward Flush [sec.]	Contact type excess pressure switch	15 ... 60	
Forced flush 1 [hh:mm]	Delay time Excess pressure switch [sec.]	00:00 ... 23:59	hours : minutes
Forced flush 2 [hh:mm]	Switching characteristics pot. free fault signal contact	00:00 ... 23:59	hours : minutes

Table F-11: Program sequence

Filtration duration

Note: For the filtration duration in step 1, only the time in which the turbine water meter registers a filtrate flow is added up.

Backwash

Note: The backwash step is only carried out for systems equipped with the optional set of fittings and a filtrate storage tank.

Excess pressure switch

Note: The forced flush function cannot be switched off and is always triggered at the set time. This is independent of whether filtrate has been produced before (e.g. holiday) or is currently being produced.

F Reset maintenance interval – code level 981

1. The maintenance interval is reset to the set value in this code level. The basic display in the info level is restarted and the value entered for the maintenance interval appears.
2. The amount of filtrate produced so far is reset in this code level.

Display/factory setting	Parameter	Setting range	Comments
1. 0	Reset maintenance interval	0 ... 1	1 = Reset maintenance interval The "Reset maintenance interval" basic display is restarted
2. 0	Reset of the filtrate quantity produced so far	0 ... 1	1 = Reset of the filtrate quantity produced so far

Table F-12: Program sequence

Maintenance interval

Note: If the maintenance interval is set to the value "0", the display of the system will show no value for the remaining time in days until the service is due.

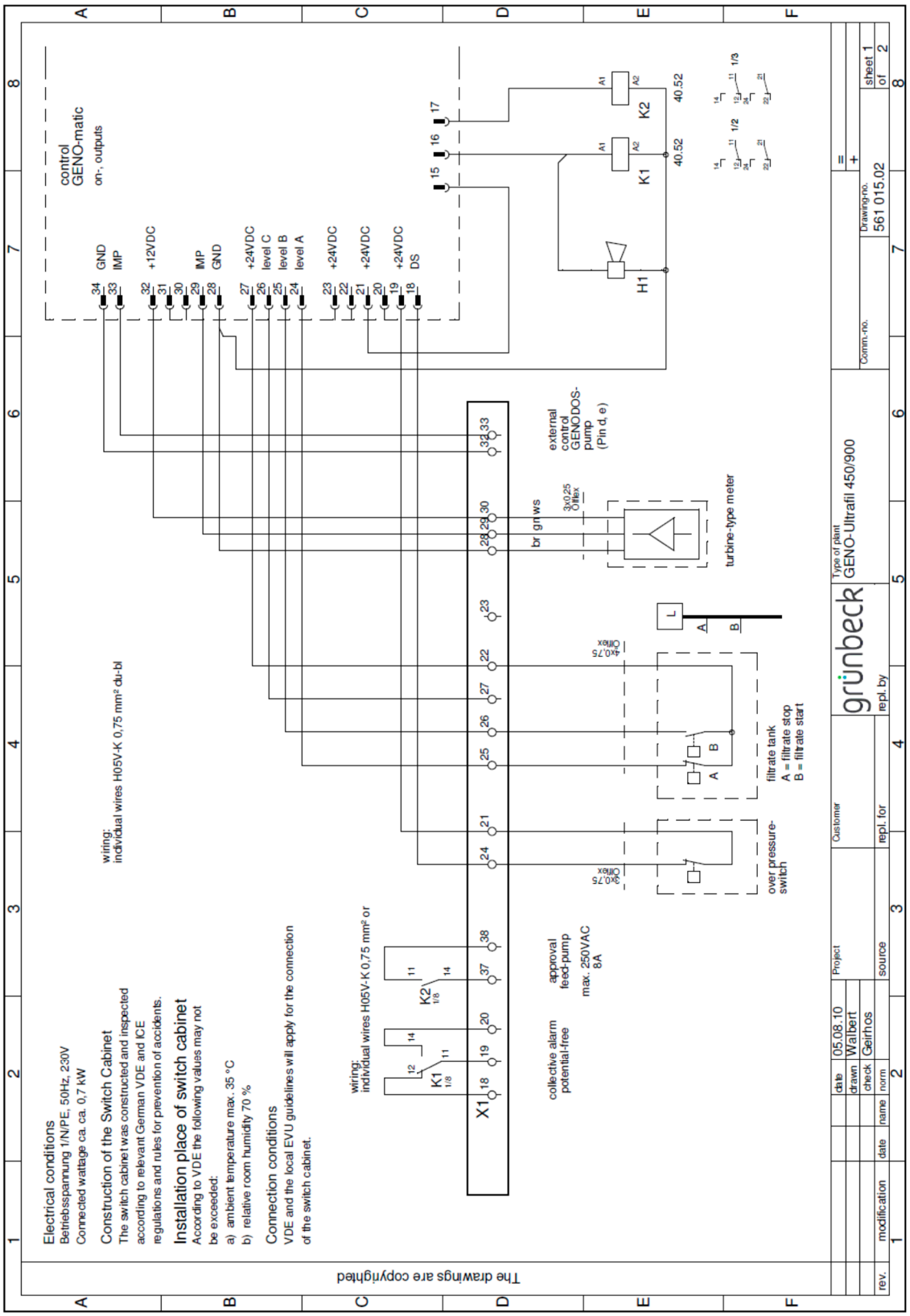
G Additional functions of the GENO®-matic control unit

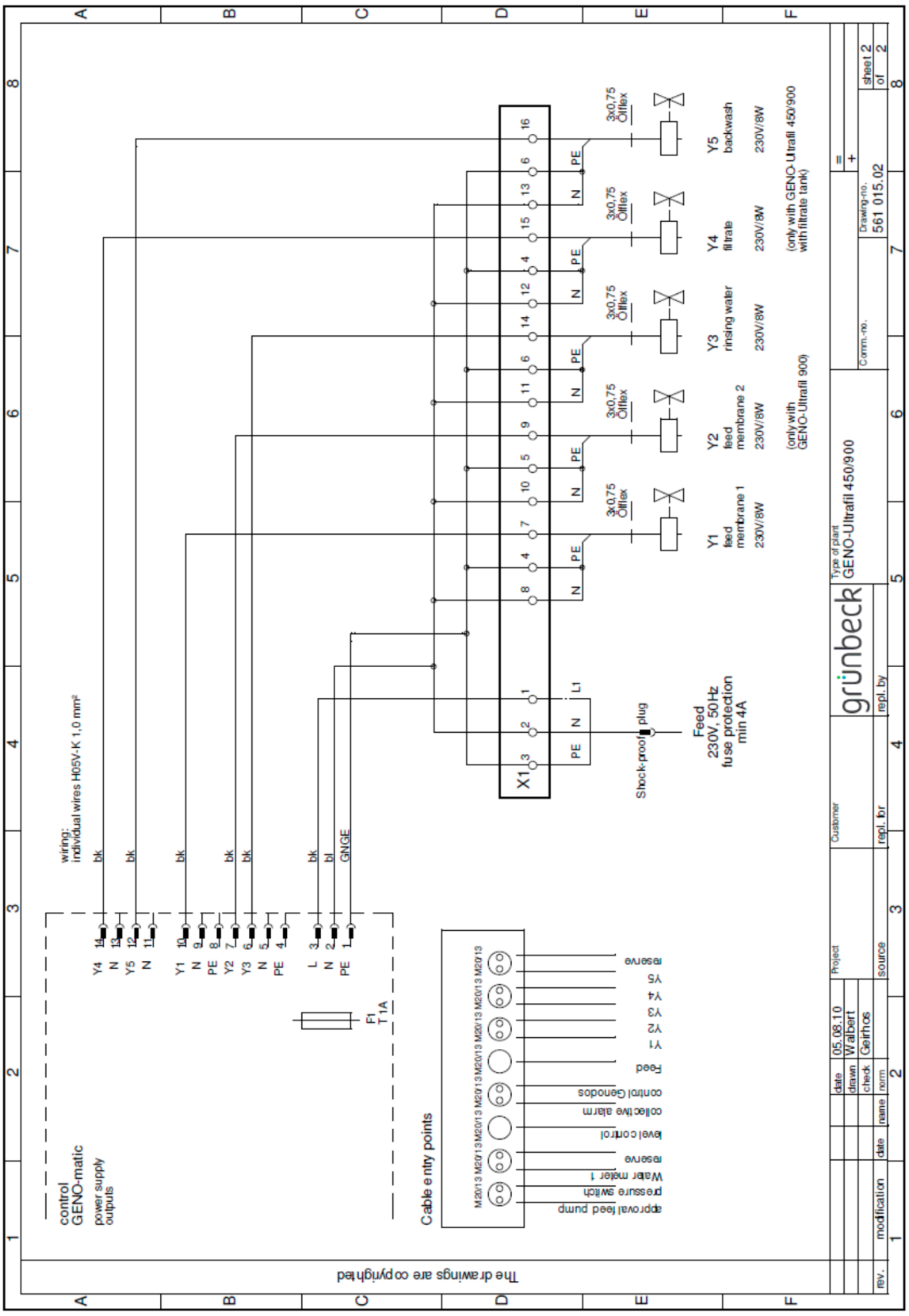
The tasks described below may only be performed by qualified electrical experts according to the VDE guidelines or according to the guidelines of a similar local institution.

Additional functions can be enabled via the terminal box of the control unit:

- Pulse output from the filtrate water meter for external control of a GENODOS® pump on terminal strip X2, terminals 1 and 2.
- Release signal for raw water inlet pump. The contact is closed if the inlet valves Y1 and/or Y2 are open. Connected load max. 250 V/8 A at terminal strip X2, terminal 15, 16.

4 | Wiring diagram GENO®-Ultrafil 450/900 ultrafiltration system




control
GENO-matic
power supply
outputs
wiring:
individual wires H05V-K 1,0 mm²
Cable entry points
F1
T1A
X1
Feed
230V, 50Hz
fuse protection
min 4A
Shock-proof plug
Y1 feed membrane 1 230V/8W
Y2 feed membrane 2 230V/8W
Y3 rinsing water 230V/8W
Y4 filtrate 230V/8W
Y5 backwash 230V/8W
(only with GENO-Ultrafil 900)
(only with GENO-Ultrafil 450/900 with filtrate tank)
approval feed pump
pressure switch
Water meter 1
reserve
level control
collective alarm
control Genodos
Feed
Y1
Y2
Y3
Y4
Y5
reserve
The drawings are copyrighted
Type of plant
GENO-Ultrafil 450/900
Drawing-no.
561 015.02
sheet 2 of 2

G Troubleshooting

1 | Basic information

Even carefully designed and manufactured technical systems that are operated properly may experience malfunctions. Table G-1 provides an overview of possible problems that may occur during the operation of the systems and indicates the causes and their elimination.

GENO®-Ultrafil ultrafiltration systems are equipped with an error detection and reporting system. If an error message is displayed:

1. Press the "P" key (= acknowledge malfunction).
2. Watch the display.
   If the message reappears, compare it with table G-1.
3. If necessary, notify Grünbeck's technical customer service/authorised service company.

Note: Grünbeck's technical customer service/authorised service company must always be notified in the event of faults that cannot be eliminated with the information given in table G-1! When contacting the technical customer service, please indicate the system designation, serial number and the error message displayed.

Table G-1: Troubleshooting

This is what you observe	This is the cause	This is what to do
Er 1	This function is not activated! (Preparation for possible legal requirements).	Not activated!
Er 2	Pending maintenance signal suppressed for 2 weeks.	Carry out maintenance! Notify Grünbeck's technical customer service/authorised service company. The fault signal is reset again.
Er 3	Filtrate production disrupted: In systems with level control, no filtrate flow was registered within 10 seconds after the start of filtration.	If the raw water supply is available: Notify Grünbeck's technical customer service/authorised service company. Have the following components checked and replaced if necessary: • UF membrane is overloaded with particles, install the exchange module • Turbine water meter and pulse cable • Raw water solenoid valve(s) Y1/Y2 • Filtrate valve Y4 • GENO®-matic control unit
Er 4	Fault level control filtrate tank.	Level "a" (top) of GENO®-matic is detected, but level "b" (bottom) is not. Check wiring and function of the levels and repair if necessary.

H Maintenance

1 | Basic information

In accordance with DIN EN 806-5, maintenance work on GENO®-Ultrafil ultrafiltration systems is only allowed to be carried out by Grünbeck's technical service/authorised service company or by an authorised specialist company.

In order to guarantee the reliable function of GENO®-Ultrafil ultrafiltration systems over a long period of time, some maintenance work has to be performed at regular intervals. All regulations and guidelines which apply at the installation site must be strictly adhered to.

- Check the quality and the system volume flows every day.
- Maintenance must be performed by Grünbeck's technical service/authorised service company or by an approved company. Maintenance is subject to the load but at the latest has to be performed once a year.
- An operation log must be kept in order to document the maintenance work performed (see attachment).

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

2 | Inspection (functional check)

You may perform the daily inspections yourself.

Please refer to the following summary for the tasks to be performed within the framework of an inspection.

Summary: Inspection work

- Reading off pressure gauges (raw water inlet/filtrate outlet)
- Reading off filtration flow rate
- Reading of total filtrate quantity
- Take the remaining time of the maintenance interval into consideration

Note: If you notice a rapid increase in differential pressure (raw water pressure/filtrate pressure), this indicates that the membranes are blocked. In this case the membranes must be replaced. Please contact Grünbeck's technical service/authorised service company responsible for your area (refer to www.gruenbeck.de)

3 | Maintenance

Summary: Maintenance work

- Replacing the filter inserts of the prefiltration 100 µm.
- Clean the solenoid valves - check their function.
- Check the flow volumes and recalibrate the water meter.
- Check the state of the entire system and check for tightness.
- Mechanical resp. electrical functional and performance check of all aggregates (pumps, valves).
- Prepare a written maintenance log on the state and function of the system and the maintenance work performed, incl. evaluation and assessment of the operating values and water analysis results.

3.1 Documentation of the operating parameters

Fill in the table below weekly.
Changes in operation of GENO®-Ultrafil ultrafiltration systems can be detected at an early stage.

GENO®-Ultrafil 450 ultrafiltration system ☐
GENO®-Ultrafil 900 ultrafiltration system ☐

Location: Installation date:

Date / time	Pressure before membrane	Pressure after membrane	Differential pressure (TMP) Pressure before membrane – pressure after membrane	Filtrate flow rate	Operating time	Total filtrate quantity
	[bar]	[bar]	--	[l/h]	[Days]	[m³]

Remarks:

GENO®-Ultrafil 450 ultrafiltration system ☐
GENO®-Ultrafil 900 ultrafiltration system ☐

Location: Installation date:

Date / time	Pressure before membrane	Pressure after membrane	Differential pressure (TMP) Pressure before membrane – pressure after membrane	Filtrate flow rate	Operating time	Total filtrate quantity
	[bar]	[bar]	--	[l/h]	[Days]	[m³]

Remarks:

4 | Operation log

Customer

Name: _____

Address: _____

_____

_____

GENO®-Ultrafil ultrafiltration system **450** ☐
(please check appropriate box) **900** ☐

Order no.: _____

Installed by: _____

Filter 80 µm: Make/type _____

System separator: Make/type _____

Connection data:
(please check appropriate box)

Drain connection according to DIN 1988-100/DIN EN 1717	☐ Yes	☐ no
Floor drain available	☐ Yes	☐ no
Line before GENO®-Ultrafil ultrafiltration system	☐ Zinc-plated	
	☐ Copper	
	☐ Plastic	
Height of drain (measured from bottom line of system)	_____cm	

Maintenance work on GENO®-Ultrafil 450/900 ultrafiltration system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
☐ Maintenance performed without module replacement Module no.	☐ Maintenance performed with module exchange Module no.	Commissioning	Date

Measured values			
		Acknowledgement	**Remarks**
Inlet water pressure checked	[bar]		
Fine filter before system checked			
Filter element changed			
Settings of electronics checked			
Operating time (days)	[Days]		
Filtrate flow rate (filtration operation)	[l/h]		
Differential pressure (inlet/outlet pressure) at filtrate flow rate	[bar]		
Filtrate quantity produced with the current UF membrane	[m^3]		
Check all electrical lines for external damage			
All pipes and connections checked for external damage			
Solenoid valve(s) cleaned and checked for leaks			
System checked for leaks			
Basic display "Remaining time service" reset			
Miscellaneous			
Remarks			
Customer service technician			
Company			
Work time certificate (no.)			
Location, date and signature			

Maintenance work on GENO®-Ultrafil 450/900 ultrafiltration system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
☐ Maintenance performed without module replacement Module no.	☐ Maintenance performed with module exchange Module no.	Commissioning	Date

Measured values			
		Acknowledgement	**Remarks**
Inlet water pressure checked	[bar]		
Fine filter before system checked			
Filter element changed			
Settings of electronics checked			
Operating time (days)	[Days]		
Filtrate flow rate (filtration operation)	[l/h]		
Differential pressure (inlet/outlet pressure) at filtrate flow rate	[bar]		
Filtrate quantity produced with the current UF membrane	[m^3]		
Check all electrical lines for external damage			
All pipes and connections checked for external damage			
Solenoid valve(s) cleaned and checked for leaks			
System checked for leaks			
Basic display "Remaining time service" reset			
Miscellaneous			
Remarks			
Customer service technician			
Company			
Work time certificate (no.)			
Location, date and signature			

Maintenance work on GENO®-Ultrafil 450/900 ultrafiltration system Checklist			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
☐ Maintenance performed without module replacement Module no.	☐ Maintenance performed with module exchange Module no.	Commissioning	Date

Measured values		
	Acknowledgement	**Remarks**
Inlet water pressure checked [bar]		
Fine filter before system checked		
Filter element changed		
Settings of electronics checked		
Operating time (days) [Days]		
Filtrate flow rate (filtration operation) [l/h]		
Differential pressure (inlet/outlet pressure) at filtrate flow rate [bar]		
Filtrate quantity produced with the current UF membrane [m^3]		
Check all electrical lines for external damage		
All pipes and connections checked for external damage		
Solenoid valve(s) cleaned and checked for leaks		
System checked for leaks		
Basic display "Remaining time service" reset		
Miscellaneous		
Remarks		
Customer service technician		
Company		
Work time certificate (no.)		
Location, date and signature		