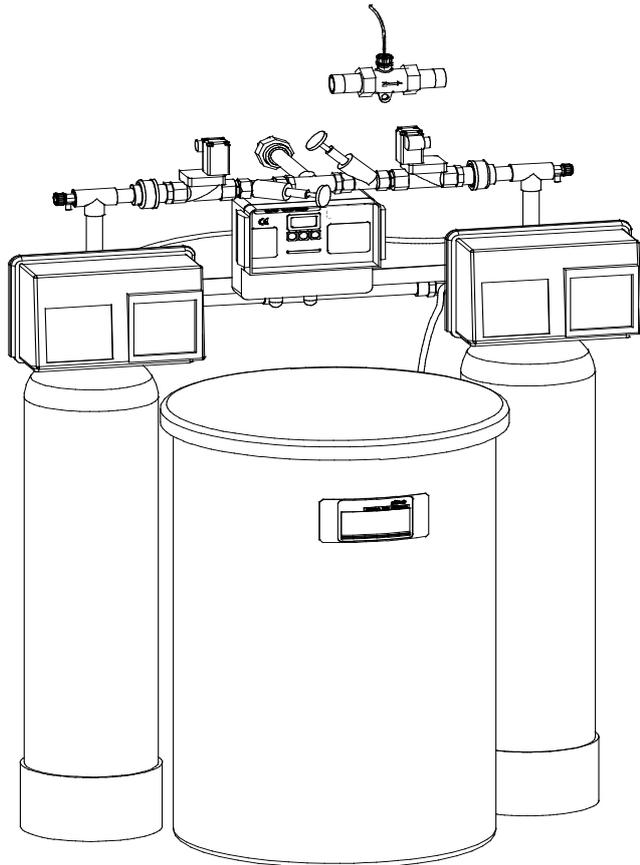


Operation Manual Water Softener GENO-mat duo WF



Edition May 2019
Order no. 134 183 042-inter

Grünbeck Wasseraufbereitung GmbH

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A company certified by TÜV SÜD
in accordance with DIN EN ISO 9001,
DIN EN ISO 14001 and SCC

Table of contents


This operation manual consists of several parts which are listed in the index below. With regard to more detailed information, please refer to the cover sheets of the individual parts.

General.....	A
Basic Information.....	B
Product Description.....	C
Installation.....	D
Start-up.....	E
Operation.....	F
Troubleshooting.....	G
Maintenance.....	H

Publisher's information

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Printed in Germany

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grünbeck



EU Declaration of Conformity

We hereby declare that the system referred to hereinafter is conform to the basic health and safety requirements of the applicable EC guidelines with regard to its design, type of construction and the model introduced by us.

This declaration becomes invalid in the event of an alteration to the system not agreed with us.

Manufacturer Grünbeck Wasseraufbereitung GmbH
Josef-Grünbeck-Straße 1
89420 Höchstädt/Do.

Responsible for documentation Markus Pöpperl

System Designation: GENO-mat

System Type: duo WF

Serial No.: Refer to type designation plate

Applicable Guidelines: Low Voltage (2014/35/EU)
EMV (2014/30/EU)

Applied harmonized standards, in particular: DIN EN 61000-6-2:2006-03
DIN EN 61000-6-3:2011-09

Applied national standards and technical specifications, in particular: DIN 19636-100:2008-02

Place, date and signature Höchstädt, 13.05.2019

i. V. 
M. Pöpperl
Dipl.-Ing. (FH)

Function of signatory: Head of Technical Product Design

A General

Table of contents

1 Preface	A-1
2 How to use this operation manual	A-2
3 General safety information	A-2
3.1 Symbols and notes	A-2
3.2 Operating personnel	A-3
3.3 Designated application	A-3
3.4 Protection from water damage	A-3
3.5 Indication of specific dangers	A-3
4 Shipping and storage	A-4
5 Disposal	A-4
5.1 Packaging	A-4
5.2 Product	A-4

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

All Grünbeck systems and devices are made of high-quality materials. This ensures reliable operation over many years, provided you treat the systems with the required care. This operation manual assists you with important information. Therefore, read the complete manual before installing, operating or maintaining your 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 technical service staff, as well as the experts at our headquarters in Hoechstaedt, is available to help you.

Advice and assistance

For advice and assistance please contact your local representative (www.gruenbeck.com).

Our service hotline is available for emergencies on +49 (0)9074 / 41-333.

We can connect you with the appropriate expert more quickly if you provide the required system data. To ensure that this information is to hand at all times, please keep the precise equipment data to hand (refer to the type plate in chapter C-1).

2 | How to use this operation manual

This operation manual is intended for the operators of our systems. It is divided into several chapters (a letter is assigned to each of them) which are listed in the “Table of contents” on page 1 in alphabetical order. In order to find the specific information you are looking for, check for the corresponding chapter on page 1.

The headers and page numbers with chapter information make it easier to find your way around in the manual. In case of larger chapters, first check out page 1 of said chapter (e. g. H-1) where you will find more information on the contents of this chapter.

3 | General safety information

3.1 Symbols and notes

Important notes in this operation manual are characterised by symbols. Please pay particular attention to these notes in order to ensure a danger-free, safe and productive system operation.



Danger! Failure to adhere to these notes will cause serious or life-threatening injury, extreme damage to property or inadmissible contamination of drinking water.



Warning! Failure to adhere to these notes may cause injury, damage to property or contamination of the drinking water.



Attention! Failure to adhere to these notes may result in damage to the system or other objects.



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



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



Tasks with this symbol may only be performed by 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 companies 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 persons who have read and understood this operation manual are permitted to work with the system. The safety guidelines are to be strictly adhered to.

3.3 Designated application 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 the 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 malfunctions must be repaired at once.

3.4 Protection from water damage



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

- a) a sufficient floor drain system must be available or
- b) a water stop device (see chapter C Accessories) must be installed.



Warning! Floor drains that are channelled off to the lifting system do not function in case of a power failure.

3.5 Indication of specific dangers

Danger due to electricity! → 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 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! → The system may only be installed by a qualified company. The operation manual must be strictly adhered to! Ensure that there is sufficient flow. The pertinent guidelines must be followed for starting-up after long 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



Attention! 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 system next to objects which radiate a lot of heat.

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 packing).

5 | Disposal

Comply with the applicable national regulations.

5.1 Packaging

Dispose of the packaging in an environmentally sound manner.

5.2 Product

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



Find out about local regulations on the separate collection of electrical and electronic products.

Make use of the collection points available to you 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.de.

B Basic information (water softeners)

Content

1 Laws, regulations, standards	B-1
2 Water, scaling, softening	B-1
3 Ion exchange.....	B-3

1 | Laws, regulations, standards

In the interest of good health, rules cannot be ignored when it comes to the processing of drinking water (raw water). This operation manual takes into consideration the current regulations 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, scaling, softening

The water works provide us with pure water (raw water) that is suitable for drinking. However, this water is much more often used for washing machines, heating systems, water heaters, commercial devices, etc., where it can lead to problems if it is "hard".

Hard water is generated if water containing carbon dioxide* flows through layers of calcium. It dissolves the calcium until the so-called calcium - carbon dioxide - equilibrium has been reached.

If this equilibrium is unsettled (e.g. by heating → CO₂ escapes) more calcium (CaCO₃) is precipitated (scaling).



Note: Calcium ions and magnesium ions exist side by side in nature, e.g. in the mineral dolomite.

Hardness ranges according to the German Act on Environmental Sustainability of Detergents and Cleaning Agents (WMRG):

The total hardness of the water is the sum of the concentrations of calcium ions and magnesium ions.

From hardness range 3 on, it is advisable to soften the water for usage. Additional measures may be necessary depending on the original quality of the water and its intended use.

* CO₂ from the air dissolves in water, causing a low concentration of carbon dioxide.

Hardness range	°dH	°f	mmol/l = mol/m ³
1 (soft)	< 8.4	< 15.0	< 1.50
2 (medium)	8.4 - 14.0	15.0 - 25.0	1.50 - 2.50
3 (hard)	> 14.0	> 25.0	> 2.50

3 | Ion exchange



Fig. B-1: Initial state



Fig. B-2: Operation



Fig. B-3: Regeneration

The exchange of calcium and magnesium ions for sodium ions causes the water to become soft.

Principle

The hard raw water flows through an exchanger tank. This tank is filled with a resin, to which sodium ions are bonded at certain positions (see fig. B-1).

Since these bonding positions prefer calcium and magnesium ions, these ions are retained while the resin discharges sodium ions into the water (exchange reaction). This way, all substances causing hardness remain in the exchanger tank. Soft water with sodium ions leaves the exchanger tank (fig. B-2). This process continues until a major part of the sodium ions is exhausted.

The exchange reaction can be reversed if a large amount of sodium ions (salt solution = brine) is added (fig. B-3). By their sheer number, the sodium ions displace the calcium and magnesium ions at the docking positions of the resin.

This process restores the initial state. The ion exchanger is regenerated and is again ready for softening.

Drinking water (raw water)

As protection against corrosion, we recommend a soft water hardness of at least 3 °dH (5,3 °f, 0,53 mmol/l). According to the German Drinking Water Ordinance, the limit value for sodium ions (200 mg/l) should not be exceeded. This hardness is achieved by adding untreated drinking water (raw water) which is also called blending.



Note: Many popular mineral waters contain significantly more sodium ions. Check for yourself by reading the analysis results on the labels.



Warning! Risk of infection due to germs in drinking water. Germs can reproduce in stagnant water to the point where they pose a threat. Work with drinking water systems requires special hygienic measures. Ensure that there is sufficient flow. Disinfect the systems if required.

Single/Twin/Triple systems

In case of a single system, no soft water is available during the regeneration phase.

Twin systems have two parallel ion exchangers that alternate operation. As a result, soft water is available at all times.

Triple water softeners consist of three exchanger units. Two exchangers are flown through in parallel while the third is being regenerated.

★ Sodium ions ● Calcium ions ▲ Magnesium ions

C Product Description (GENO-mat duo WF)

Contents

1 Type Designation Plate	C-1
2 Technical Specifications.....	C-1
3 Appropriate Application	C-4
4 Application Limits	C-4
5 Scope of Delivery	C-5
5.1 Basic Equipment	C-5
5.2 Optional Features.....	C-5
5.3 Consumables	C-6
5.4 Wearing Parts	C-7

1 Type Designation Plate

The type designation plate is located at the control valve of the water softener. When contacting Grünbeck regarding inquiries or orders, please specify the indicated information. Please copy the information indicated on the type designation plate to the table below, so that all required information is always available.

Water softener **GENO-mat duo WF**

Type: Serial Number: /

Order Number:

2 Technical Specification

The water softener GENO-mat duo WF is a twin system designed for the continuous supply of soft water. It is equipped with a volume control. Each exchanger tank features its own control valve. In case of failure of one exchanger, the other may be operated as a single system. As soon as the pre-set water volume in one exchanger tank has been softened, the regeneration is released.

All system data are shown in tables C-1 and C-2. The values indicated refer to standard water softeners. Different data for special versions are listed separately, if necessary.



Warning! During extended periods of standstill, germs may pollute the drinking water. The automatic regeneration counteracts this effect. Therefore, do not disconnect the system from power and water supply, if you are absent for longer periods of time.



Attention! Electrically operated valves. In case of power failure during the regeneration, water may flow into the drain or into the brine tank. In case of power failure check the system and shut off the water supply, if necessary.

Table C-1: Technical Data Systems with full salting	Water softener GENO-mat duo WF								
	65	150	300	450	750	1000	1500	2400	
Connection Data									
Nominal connection width	DN 20 (¾" female)		DN 25 (1" fem.)	DN 40 (1½" female)		DN 50 (2" female)			
Drain connection, min.	DN 50								
Power supply [V]/[Hz]	230/50-60 (system operation with protective low voltage 24/50-60)								
Connected power [VA]	10								
Protection/Protection class	IP 54 / ⚡								
Performance Data									
Nominal pressure (PN) [bar]	10								
Operating pressure min./max. [bar]	2.0/8.0								
Max. continuous flow [m³/h] *** at residual hardness < 0.1 °dH	2.0	3.0	5.0	6.0	9.5	13.5	17.5	24.0	
Pressure loss at max. continuous flow [bar]	1.0	1.7	2.5	1.5	2.2	2.9	4.1	5.4	
k _v -value (at Δp = 1.0 bar) [m³/h]	2.0	2.1	2.7	4.3	5.4	7.0	7.3	9.6	
Nominal capacity [mol] [m³ x °dH]	12.0 67	26.6 149	53.9 302	80.2 449	133.2 746	177.9 996	268 1504	429.3 2404	
Capacity per kg of regeneration salt [mol/kg]	3.33	3.32	3.32	3.16	3.33	3.17	3.16	2.98	
Time capacity [m³ x °dH/h]	72	84	145	214	269	390	430	608	
Dimensions and Weights									
Total height [mm]	1340	1550	1820	1820	1940	1900	2140	2300	
Exchanger tank Ø [mm]	208	257	334	369	469	552	618	770	
Brine tank Ø* [mm]	500	570	700	780	900	1000	1000	1200	
Total height of brine tank* [mm]	810	880	870	1100	1250	1330	1600	1560	
Height of safety overflow, brine tank* [mm]	700	780	770	980	1120	1190	1460	1400	
Connection height, soft water [mm]	1240	1460	1730	1290	1410	1270	1520	1680	
Connection height (raw water) [mm]	940	1160	1430	1690	1810	1670	1920	2080	
Foundation depth min.* [mm]	1000	1100	1300	900	1000	1100	1100	1300	
Foundation length min.* [mm]	1200	1300	1400	2200	2400	2800	2900	3300	
Operating weight approx.* [kg]	295	440	740	1115	1755	2205	2855	4250	
Filling Quantities and Consumption Data**									
Resin quantity per exchanger tank [l]	18	40	81	115	200	255	385	600	
Freeboard (resin in sodium form) approx. [mm]	270	230	290	390	300	210	190	240	
Salt consumption per regeneration appr. [kg]	3.6	8.0	16.2	25.3	40.0	56.1	84.7	144.0	
Regeneration salt supply max.* [kg]	130	190	285	485	760	1010	1260	1770	
Total waste water volume per reg. appr. [l]	112	211	451	693	1020	1428	2181	3803	
Operating water volume [l]	10	22	45	70	111	156	235	400	
Minimum salt filling height* [mm]	—	—	—	—	50	100	300	300	
Ambient Data									
Water / ambient temperature max. [°C]	30/40								
Control									
Data record in Code 290 (single/twin)	2754 D	2755 D	2756 D	2866 D	2867 D	2908 D	2909 D	2400 D	
Switching between exchanger tanks	Solenoid Valves			3-way ball valve with actuator		directly via control valve			
* With standard brine tank									
** Waste water volume and salt consumption refer to an inlet pressure of 3 bar. These values change at different inlet pressures and they shall only serve for approximate determination.									
*** The maximum continuous flows listed may decrease at high raw water hardness values.									
Order no.	183 100	183 110	183 120	183 130	183 140	183 150	183 160	183 170	

Table C-2: Technical Data Systems with economy salting	Water softener GENO-mat duo WF								
	50	130	230	330	530	730	1130	1730	
Connection Data									
Nominal connection width	DN 20 (¾" female)		DN 25 (1" female)		DN 40 (1½" female)		DN 50 (2" female)		
Drain connection min.	DN 50								
Power supply [V]/[Hz]	230/50-60 (system operation with protective low voltage 24/50-60)								
Connected power [VA]	10								
Protection/Protection class	IP 54 / ⚡								
Performance Data									
Nominal pressure (PN) [bar]	10								
Flow pressure min/max. [bar]	2.0/8.0								
Max. continuous flow [m³/h] *** at residual hardness > 0.1 °dH	2.0	3.0	5.0	6.0	9.5	13.5	17.5	24.0	
Max. continuous flow at blending to 8 °dH and a raw water hardness of 20 °dH [m³/h]	3.3	5.0	8.3	10.0	15.8	22.4	29.0	39.8	
Pressure loss at max. continuous flow [bar]	1.0	1.7	2.5	1.5	2.2	2.9	4.1	5.4	
k _v -value (at Δp = 1.0 bar) [m³/h]	2.0	2.1	2.7	4.3	5.4	7.0	7.3	9.6	
k _v -value at blending to 8° dH and a raw water hardness of 20° dH [m³/h]	3.3	3.5	4.5	7.2	9.0	11.6	12.1	15.9	
Nominal capacity [mol] [m³ x °dH]	9.5 53	20.0 117	42.3 237	60.0 336	95.2 533	133.0 745	200.9 1125	313.2 1754	
Capacity per kg of regeneration salt [mol/kg]	5.27	5.20	5.22	5.20	5.90	5.21	5.21	5.22	
Time capacity [m³ x °dH/h]	68	81	143	207	243	364	368	574	
Dimensions and Weights									
Total height [mm]	1340	1550	1820	1820	1940	1900	2140	2300	
Exchanger tank Ø [mm]	208	257	334	369	469	552	618	770	
Brine tank Ø * [mm]	410	500	570	700	700	780	900	1000	
Total height of brine tank* [mm]	670	810	880	870	870	1100	1250	1330	
Height safety overflow of brine tank * [mm]	570	700	780	770	770	980	1120	1190	
Connection height soft water [mm]	1240	1460	1730	1290	1410	1270	1520	1680	
Connection height (raw water) [mm]	940	1160	1430	1690	1810	1670	1920	2080	
Foundation depth min. * [mm]	900	1100	1200	800	800	900	1000	1100	
Foundation length min. * [mm]	1200	1300	1400	2100	2200	2600	2800	3100	
Operating weight approx.* [kg]	200	345	565	825	1090	1455	2140	3077	
Filling Quantities and Consumption Data**									
Resin quantity per exchanger tank [l]	18	40	81	115	200	255	385	600	
Freeboard (resin in sodium form) approx. [mm]	270	230	290	390	300	210	190	240	
Salt consumption per regeneration approx. [kg]	1.8	4.0	8.1	11.5	16.0	25.5	38.5	60.0	
Regeneration salt supply max. * [kg]	65	130	190	285	285	485	760	1010	
Total waste water volume per reg. approx. [l]	98	181	376	583	865	1225	1874	3182	
Operating water volume [l]	5	11	23	32	44	71	107	167	
Minimum salt filling height* [mm]	—	—	—	—	—	—	50	150	
Ambient Data									
Water / ambient temperature max. [°C]	30/40								
Control									
Data record in code 290 (single/twin)	2751 D	2752 D	2753 D	2864 D	2865 D	2905 D	2906 D	2907 D	
Switching between exchanger tanks	Solenoid valves			3-way ball valve with actuator		directly via control valve			
* With standard brine tank									
** Waste water volume and salt consumption refer to an inlet pressure of 3 bar. These values change at different inlet pressures and they only serve for approximate determination.									
*** The maximum continuous flows indicated may decrease at high raw water hardness values.									
Order no.	183 200	183 210	183 220	183 230	183 240	183 250	183 260	183 270	

3 Appropriate Application

Water softeners of the GENO-mat duo WF series are designed for the softening and partial softening of cold drinking and service water. As twin systems, they are suitable for the continuous supply of soft water. Systems for regeneration with full and economy salting are available. However, the type of regeneration is system-specific and must not be modified by the user.



Note: Only systems with full salting mode are suitable for softening to less than 0.1 °dH.

The water to be softened must be free of iron and manganese (less than 0.2 mg iron respectively 0.05 mg manganese per liter). A maximum water temperature of 30 °C must not be exceeded. The maximum ambient temperature is 40 °C.

The systems are suitable for the (partial) softening of well, process, boiler feed, cooling and air conditioning water.

The softening of drinking water must be performed according to the stipulations of the German Drinking Water Ordinance (residual hardness 3 °dH – 8 °dH, max. sodium concentration 200 mg/l (refer to chapter E, item 2.1)). This requires a blending valve which allows adding inlet water.

The system is adjusted to the soft water requirements to be expected at the installation site and is not suitable for performances differing considerably from these values. The maximum continuous flow must never be exceeded under any circumstances.

The system may only be operated if all components are installed properly and according to the regulations. Safety devices and mechanisms must NEVER be removed, tampered with, short-circuited, bridged or otherwise rendered useless.

Appropriate application of the system also requires that the information given in this operation manual as well as the local safety guideline applying at the installation site be respected and the maintenance and inspection intervals be observed.

Water softeners of the GENO-mat WF series are intended for the industrial and commercial sector only.

If the softened water is intended for human consumption as defined by the German Drinking Water Ordinance, the ambient temperature must not exceed 25 °C. For applications that are purely technical, the ambient temperature must not exceed 40 °C.

4 Application Limits

The application limit is determined by the maximum continuous flow which, for hardness ranging from 1 - 3, corresponds to the data given in tables C-1 and C-2. If the water is very hard (hardness range 4 and higher), the maximum continuous flow

may be reduced. In this case, the application limit of the system is defined by the following equation:

$$\text{maximum continuous flow} = \frac{\text{time capacity}}{\text{raw water hardness} - \text{blending hardness}}$$

The time capacity is indicated in tables C-1 resp. C-2.

5 Scope of Delivery

5.1 Basic Equipment

- 2 double-walled plastic exchanger tanks
- food compatible ion exchanger resin



Note: Smaller systems (up to GENO-mat duo WF 300) come with the exchanger tank already filled with resin .

- 2 control valves made of red bronze
- Piping for the connection of the exchanger tanks (on raw and soft water side)
- PE brine tank incl. sieve bottom (separates salt supply chamber from brine chamber) and PP brine valve with safety float (controls the brine flow); with brine buffering technology.
- Micro-processor controller with LCD (controls all system functions, indicates operating modes and errors)
- Turbine water meter (TWZ) (may be replaced by a water meter with counter, see 4.2)
- Water test kit "Total Hardness" (see 4.3)
- Operation manual
- Only for systems with economy salting: disinfection unit

5.2 Optional Features



Note: It is possible to retrofit existing systems with optional features. For detailed information, please contact your local Grünbeck representative or the Grünbeck headquarters.

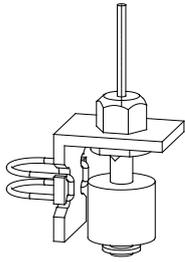
- Blending valve (to adjust the residual hardness by adding raw water)

Connection R 1"	126 010
Connection R 1 ¼"	126 015
- Water meter with counter

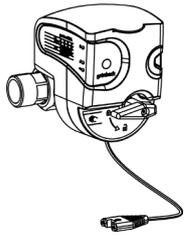
Connection R 1"	163 080
Connection R 1½"	163 085
Connection R 2"	163 088
- Recirculation unit with 2 flexible stainless steel fabric hoses (connection R 1" male, length 600 mm)
(reduces the counter-ion effect during extended periods of standstill)

	181 850
--	---------

- Volt.-free signal (indication of operating mode) 126 885



- Automatic alarm for empty brine tank 181 880



- Safety device protectliQ:A20 126 400

Product for protection against water damage in one- and two-family homes.

For other sizes, please inquire.

Drawings show different scales

5.3 Consumables

In order to ensure the reliable operation of the system, only use genuine consumables.

- Regeneration salt (25 kg) 127 001
- Water test kit "Total Hardness" 1 pc 170 187
10 pcs 170 100

5.4 Wearing Parts

Seals and control piston are subject to wear and tear. Wearing parts are listed below.



Note: Although these are wearing parts, we are prepared to grant a limited warranty period of 6 months. The same applies for electrical components.

a) Seals, control piston, injectors, actuator

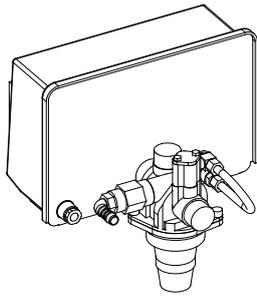


Fig. C-1: Control valve
Nominal connection width
DN 20 and DN 25

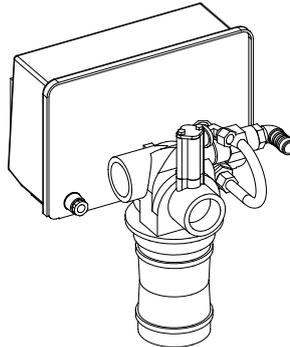


Fig. C-2: Control valve
Nominal connection width DN 40

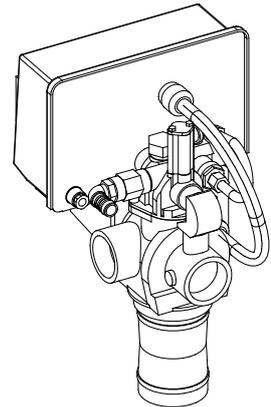


Fig. C-3: Control valve
Nominal connection width DN 50

b) Flat seals, nonreturn valve

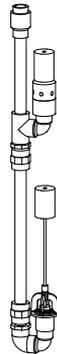


Fig. C-4: Brine valve

c) Disinfection device (only for systems with economic salting)

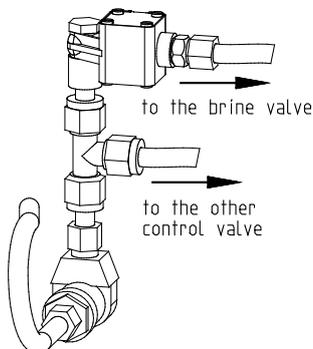


Fig. C-5: Disinfection device
(pre-assembled)

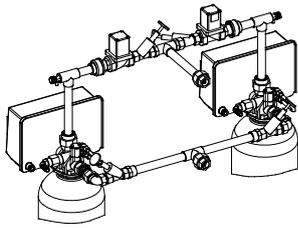


Fig. C-6: Piping with solenoid valves

- d) Solenoid valves (nominal connection widths DN 20 and DN 25)

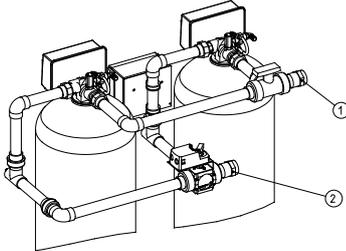


Fig. C-7: Piping with three-way ball valve with actuator

- e) Three-way ball valve with actuator (nominal connection widths DN 40 and DN 50)

D Installation (GENO-mat duo WF)**Contents**

1 General Installation Instructions	D - 1
1.1 Water Installation	D - 2
1.2 Electrical Installation	D - 2
2 Preparations	D - 3
2.1 Filling the Exchanger Tank.....	D - 3
2.2 Mounting of Pipes	D - 4
2.3 Mounting of Brine Tube.....	D - 6
3 Connecting the System	D - 8
3.1 Water Connection	D - 8
3.2 Connection of Control Electronics	D -10

1 General Installation Instructions

The installation site must provide adequate space. A foundation of a sufficient size and with adequate carrying capacity must be provided. The required connections must be provided prior to the installation. For dimensions and connection data, please refer to table D-1.

Table D-1: Installation Data		Water softener GENO-mat duo WF							
Connection Data									
Nominal connection width		DN 20 (¾" female)	DN 25 (1" fem)	DN 40 (1½" female)	DN 50 (2" female)				
Drain connection min.		DN 50							
Power supply	[V]/[Hz]	230/50 (system operation with protective low voltage 24/50)							
Connected power	[VA]	10							
Protection/Protection class		IP 54 / ⚡							
Dimensions and weights									
Systems with full salting	duo WF	65	150	300	450	750	1000	1500	2400
Total height	[mm]	1340	1550	1820	1820	1940	1900	2140	2300
Exchanger tank Ø	[mm]	208	257	334	369	469	552	618	770
Brine tank Ø *	[mm]	500	570	700	780	900	1000	1000	1200
Total height brine tank *	[mm]	810	880	870	1100	1250	1330	1600	1560
Height safety overflow of brine tank *	[mm]	700	780	770	980	1120	1190	1460	1400
Connection height soft water	[mm]	1240	1460	1730	1290	1410	1270	1520	1680
Connection height (raw water)	[mm]	940	1160	1430	1690	1810	1670	1920	2080
Foundation depth min. *	[mm]	1000	1100	1300	900	1000	1100	1100	1300
Foundation length min. *	[mm]	1200	1300	1400	2200	2400	2800	2900	3300
Operating weight approx.*	[kg]	295	440	740	1115	1755	2205	2855	4250
Systems with economy salting	duo WF	50	130	230	330	530	730	1130	1730
Total height	[mm]	1340	1550	1820	1820	1940	1900	2140	2300
Exchanger tank Ø	[mm]	208	257	334	369	469	552	618	770
Brine tank Ø *	[mm]	410	500	570	700	700	780	900	1000
Total height brine tank *	[mm]	670	810	880	870	870	1100	1250	1330
Height safety overflow brine tank *	[mm]	570	700	780	770	770	980	1120	1190
Connection height soft water	[mm]	1240	1460	1730	1290	1410	1270	1520	1680
Connection height (raw water)	[mm]	940	1160	1430	1690	1810	1670	1920	2080
Foundation depth min. *	[mm]	900	1100	1200	800	800	900	1000	1100
Foundation length min. *	[mm]	1200	1300	1400	2100	2200	2600	2800	3100
Operating weight approx.*	[kg]	200	345	565	825	1090	1455	2140	3077
* Systems with standard brine tank		small systems			medium-sized systems		large systems		



Note: Regarding systems with optional features (refer to chapter C, 4.2), also observe the operating instructions supplied with these features.

1.1 Water Installation

Certain rules and regulations must be observed while installing the water softener GENO-mat duo WF. The installation instructions described in this paragraph are illustrated in fig. D-6.

Binding Rules



The installation of a water softener represents a major interference with the drinking water installation and therefore may only be performed by an authorized expert.

- Observe local installation guidelines and general regulations.
 - The system must be preceded by a fine filter (e.g. BOXER, pureliQ)
 - Use corrosion-proof material for the soft water piping OR dose an anti-corrosion agent downstream of the system.
 - Provide a drain connection (minimum DN 50) to discharge the regeneration water.
-



Note: In case the regeneration water is removed by a sewage lifting system, this system must be salt water proof.

The system does not have a DVGW mark of conformity. According to DIN EN 1717, additional safety devices (e.g. by means of a system separator GENO DK 2) for the drinking water protection are required.

1.2 Electrical Installation

A shockproof socket is adequate for the electrical connection, provided it adheres to the requirements indicated in table D-1, it is located at a distance of max. 1.20 m from the water softener and is constantly current-carrying (do not couple with light switch)!

2 Preparations

1. Unpack all system components.
2. Check for completeness and perfect condition.
3. Place both exchanger tanks at the appropriate location.



Note: To ensure an unproblematic installation of the connection hoses, a fix distance between the exchanger tanks must be observed. Distance from center to center.

small systems	(nominal connection width $\frac{3}{4}$ "/1"):	700 mm
medium-sized systems	(nominal connection width 1½"):	750 mm
large systems	(nominal connection width 2"):	1000 mm

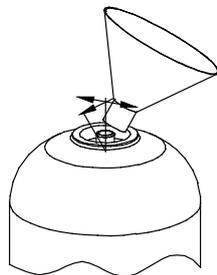
2.1 Filling the Exchanger Tank



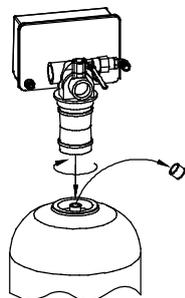
Note: Small systems (nominal connection width 1"; GENO-mat duo WF 50, 65, 130, 150, 230 and 300) come with the exchanger tanks already filled and therefore the works described here can be dismissed.

Table D-2 : Resin quantity to be filled in each exchanger tank

duo WF	330 / 450	530 / 750	730 / 1000	1130/1500	1730/2400
liter	115	200	255	385	600



Center riser, fill in resin



Remove protective cap, fasten control valve

1. Make sure that risers are closed with protective caps, plug on protective caps, if necessary.
The protective caps prevent material from getting into the risers.
2. Center the risers in the exchanger tanks.
3. Fill the ion exchanger resin into the tanks, using the funnel supplied with the system.
4. Fill the exchanger tanks with drinking water.
5. Exactly center the risers.
6. For the control valve connection, remove ion exchanger resin from threads and sealing surfaces of the exchanger tanks.
7. Remove protective caps from risers.
8. Fill exchanger tank with water.
9. Move the control valves with the nozzle from the top over the risers and fasten them by turning them clockwise.

2.2 Mounting of Pipes

Small systems (nominal connection widths 3/4" and 1")

The pipe connections of the smaller systems point towards the back (refer to fig. D-1).

- Mount pipes according to fig. D-1.

- ① raw water inlet
- ② soft water outlet

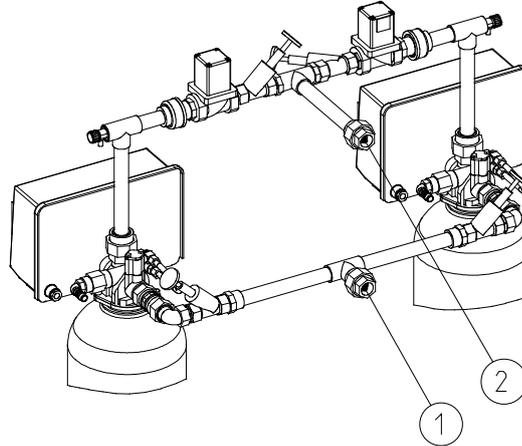


Fig. D-1: Piping of small systems

Medium-sized and large systems (nominal connection widths 1 1/2" / 2")

The pipe connections of medium-sized and large systems point sideways. They can independently be adjusted to the left or to the right.

Fig. D-2 shows a piping example where both connections are directed to the left (viewed from the front side).

- ① raw water inlet
- ② soft water outlet

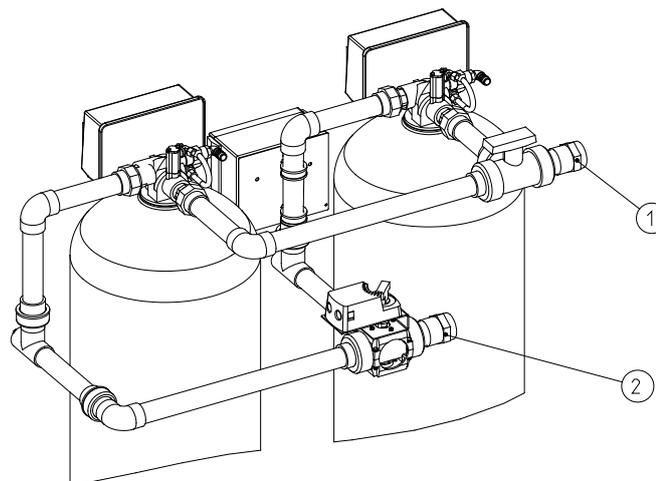
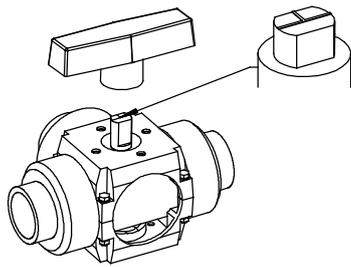


Fig. D-2: Example for the piping of medium-sized and large systems;
no actuator for large systems.



Ball valve, all side passage

Only for large systems (nominal connection width 2“):

1. Mount pipes according to fig. D-2 and observe the desired connection directions.
2. Set 3-way-ball valve of soft water pipe to universal passage (mixing function).
3. Check setting. Pull turning handle off to the top and read the position at the t-mark.

Only for medium-sized systems (nominal connection width 1½“):

Attention! Failures may occur due to incorrect mounting of the piping. Follow mounting instructions exactly. Especially observe actuator.

Fig. D-3 (a) shows the factory-setting (soft water outlet to the left, referring to the front side). If this position fits:

- mount pipes according to fig. D-2.

In order to position the soft water outlet to the right, additional works are required:

1. Dismount actuator by removing four hexagon bolts.
2. Mount pipes according to fig. D-2. Observe the different direction of the soft water outlet (fig. D-3 (b)).
3. Set 3-way-ball valve of the soft water pipe to passage function. (refer to fig. D-3 (b))
4. Set actuator to left-hand stop (fig. D-3).
The turning handle may be moved, if the decoupling button is pressed down.
5. Mount actuator to 3-way-ball valve.

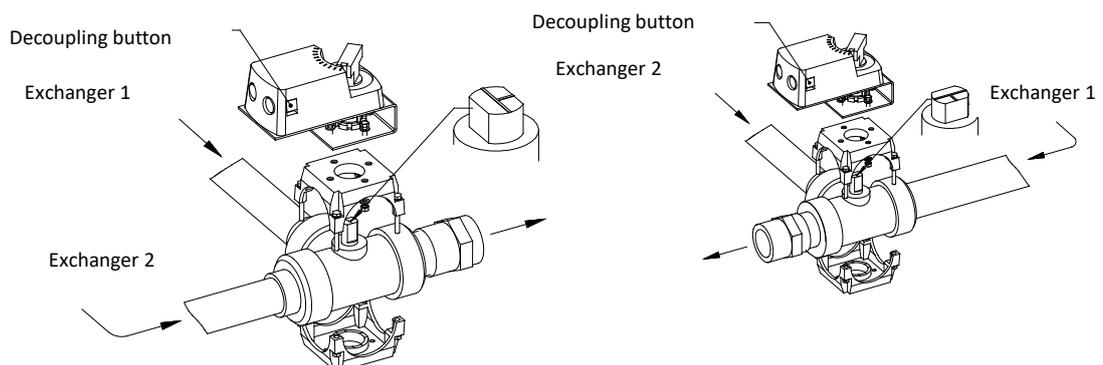
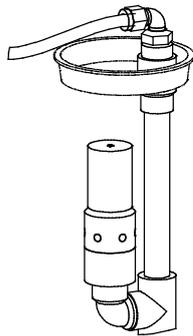


Fig. D-3: actuator with 3-way-ball valve; backside view

- (a) soft water connection directed to the left (corresponds to piping in fig. D-2)
- (b) soft water connection directed to the right

2.2 Mounting of Brine Tube

The brine tube connects the brine valve in the brine tank to a T-screwing where the tube is divided and then leads to the BVO-valves of the two control valves. In case of systems with disinfections units, it must be installed between brine valve and T-screwing. This is the only way to ensure that the integrated disinfection unit can supply both exchanger tanks. The routing of the brine tube is shown in fig. D-4.



brine valve

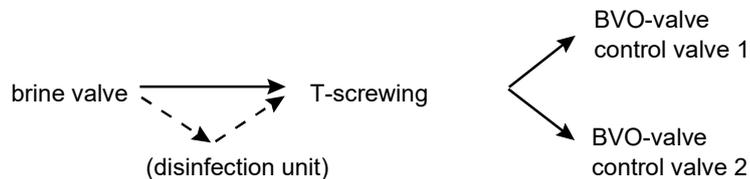


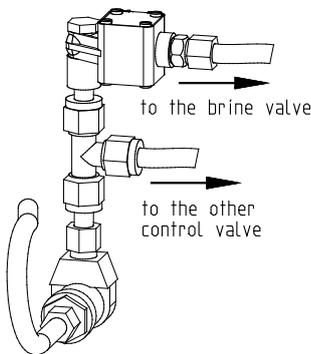
Fig. D-4: Flow chart of brine tube

The fastening material for the mounting of the brine tube is supplied with the system.



Note: Furthermore, the fastening material includes a terminal plug and a connection nut. In case of failure of one exchanger tank, these are required in order to run the second one as a single system. Store them carefully.

1. Mount adapter piece (5) and T-screwing (6) to the BVO-valve (4) of a control valve.



Disinfection unit, pre-assembled

Only for systems with disinfection unit:

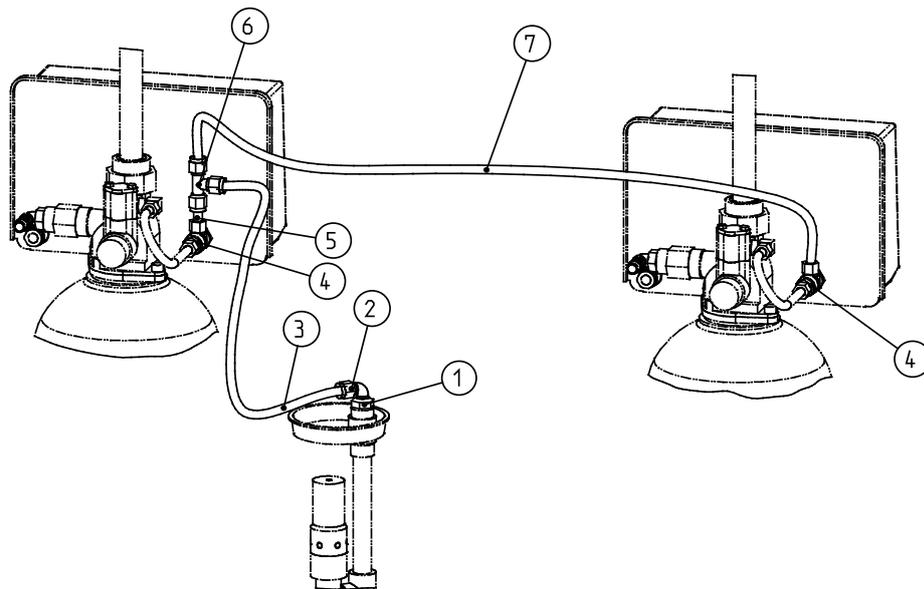
2. Mount disinfection unit to T-screwing (refer to figure on the left).

3. Place the brine tank at the appropriated location.
4. Remove the brine tank cover.



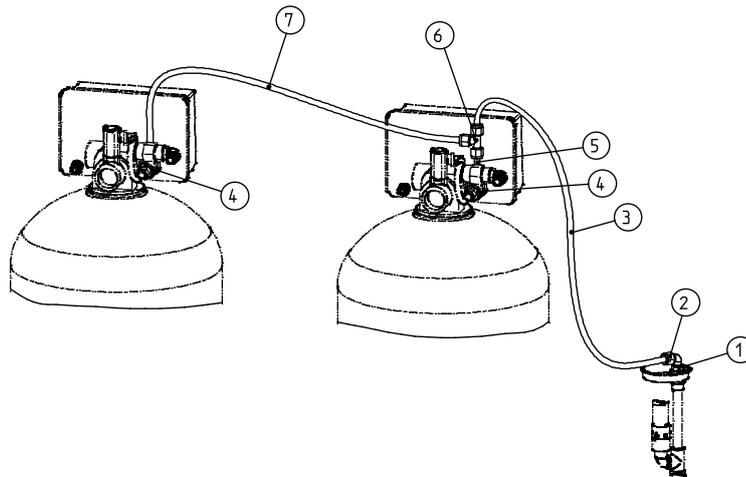
Note: For easier mounting of the brine tube, the brine valve can be removed. To do so, remove the yellow cover and pull the brine valve out to the top.

5. Mount transition nipple (1) (does not apply for duo WF 750, resp. 530) and angle piece (2) to brine valve.
6. Cut brine hose a (3) to the required length and plug on support sleeves on both ends.
7. Mount brine hose a (3) to brine valve
8. If brine valve was removed: reinsert the brine valve and refit yellow cover.
9. Lead brine hose a (3) to a suitable connection of the T-screwing (6) and fasten it.
(for recommended connections refer to fig. D-5 (a), (b))
10. Cut brine hose b (7) to the required length and plug on support sleeves on both ends.
11. Mount brine hose b (7) to the T-screwing.
12. Lead brine hose b (7) to the BVO valve (4) of the second control valve and fasten it.



- | | |
|--|-----------------|
| ① Transition nipple (not for WF 750 / 530) | ⑤ Adapter piece |
| ② Angle piece | ⑥ T-screwing |
| ③ Brine hose a | ⑦ Brine hose b |
| ④ BVO valve | |

Fig.. D-5 (a): Mounting of brine hose for small systems: (brine tank between the exchanger tanks)



- ① Transition nipple (not for duo WF 750 / 530)
- ② Angle piece
- ③ Brine valve a
- ④ BVO valve
- ⑤ Adapter piece
- ⑥ T-piece
- ⑦ Brine valve b

Fig. D-5 (b): Mounting of brine hose for medium-sized and large systems: brine tank beside one of the exchanger tanks

3 Connecting the System

3.1 Water Connection

1. Connect the system to the water supply according to the installation drawing (fig. D-6 (a)). Observe the instructions and recommendations given in chapter 1.



Note: The supplied water meter must be installed at the soft water side (after the system)



Attention! Dirt and corrosion particles may damage the system (control valve, ion exchanger resin). Flush supply pipe prior to start-up.

Also observe continuation on page D-10!

Dimensions in fig. D-6 (a); excerpt from table D-1										
Systems with full salting		duo WF	65	150	300	450	750	1000	1500	2400
A	Total height	[mm]	1340	1550	1820	1820	1940	1900	2140	2300
B	Exchanger tank Ø	[mm]	208	257	334	369	469	552	618	770
C	Brine tank Ø *	[mm]	500	570	700	780	900	1000	1000	1200
D	Total height brine tank*	[mm]	810	880	870	1100	1250	1330	1600	1560
E	Height safety overflow brine tank *	[mm]	700	780	770	980	1120	1190	1460	1400
F	Connection height soft water	[mm]	1240	1460	1730	1290	1410	1270	1520	1680
H	Connection height (raw water)	[mm]	940	1160	1430	1690	1810	1670	1920	2080

* Systems with standard brine tank

Dimensions in fig. D-6 (a); excerpt from table D-1

Systems with economy salting		duo WF	50	130	230	330	530	730	1130	1730
A	Total height	[mm]	1340	1550	1820	1820	1940	1900	2140	2300
B	Exchanger tank \varnothing	[mm]	208	257	334	369	469	552	618	770
C	Brine tank \varnothing *	[mm]	410	500	570	700	700	780	900	1000
D	Total height brine tank *	[mm]	670	810	880	870	870	1100	1250	1330
E	Height safety overflow brine tank *	[mm]	570	700	780	770	770	980	1120	1190
F	Connection height soft water	[mm]	1240	1460	1730	1290	1410	1270	1520	1680
H	Connection height (raw water)	[mm]	940	1160	1430	1690	1810	1670	1920	2080

* Systems with standard brine tank

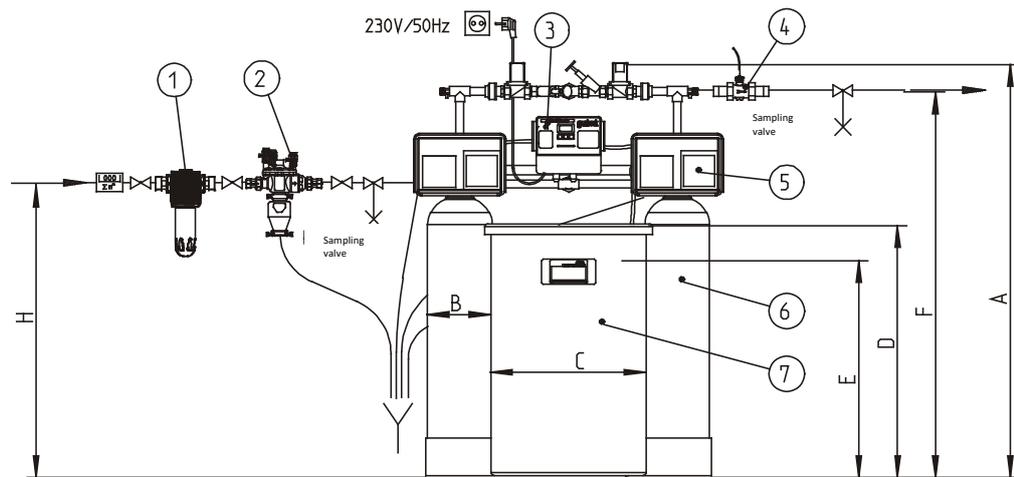


Fig. D-6 (a) : Installation drawing for water softener GENO-mat duo WF

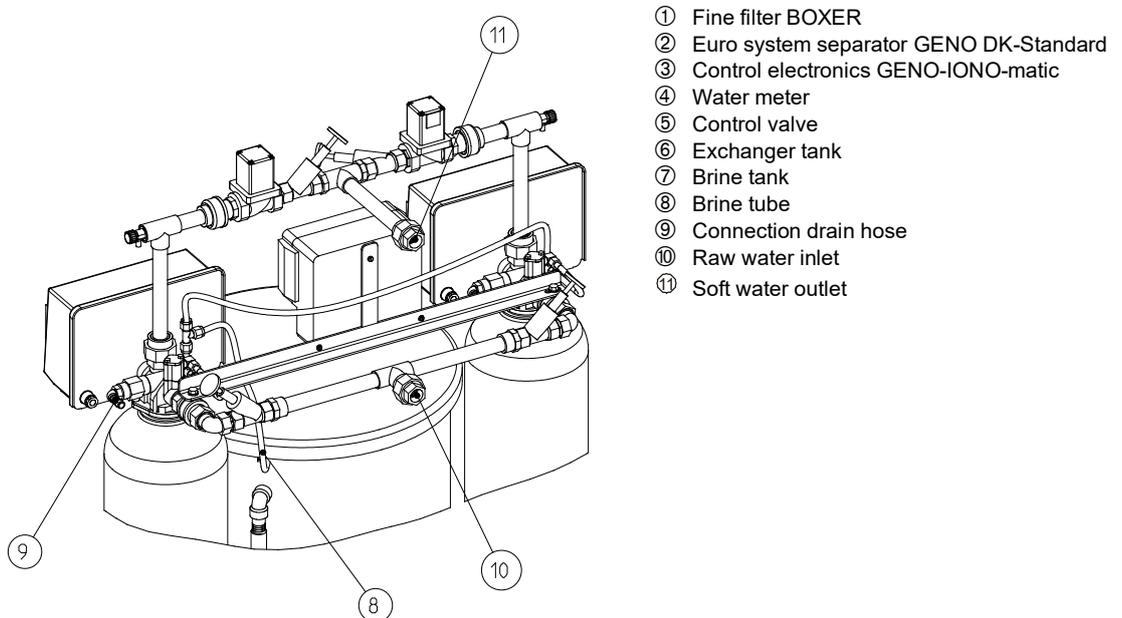


Fig. D-6 (b): Water softener GENO-mat-duo WF, rear view

2. Connect the system to the drain by leading the drain hoses to the drain and fastening them.



Attention! Damages and malfunctions may be caused by waste water which is not properly discharged. Therefore, do not bend hoses and do not route them higher than the device.

3. Route the hose of the brine tank overflow descending to the drain. Do not connect to drain hose!

3.2 Connection of Control Electronics



The work described in this chapter may only be performed by trained and authorized electricians or electronics experts

The control electronics must be fastened to the system by means of the mounting kit supplied with the system (for reference see fig. D-6 (b) for small systems, fig. D-2 for medium-sized and large systems) and must be connected according to the terminal plans shown in fig. D-7, fig. D-9 resp. fig. D-10.

1. Mount the control electronics to the piping by means of the mounting kit supplied with the system.

The connection depends on the system size and is described

- on page D-11 for small systems (GENO-mat duo WF 50, 65, 130, 150, 230 and 300),
- on page D-12 for medium-sized systems (GENO-mat duo WF 330, 450, 530 and 750),
- on page D-13 for large systems (GENO-mat duo WF 730, 1000, 1130, 1500, 1730 and 2400)



Danger due to electricity!
Mains voltage at terminals L, N and PE.
Do not connect the system to mains before you have finished these steps.

Small systems (nominal connection width 1“):

2. Route 7-wire cable between control valves and control electronics and connect according to terminal plan (fig. D-7).
3. Cables with coupler sockets:
Connect the coupler sockets to solenoid valves, lead the cables to the control valves and connect them according to terminal plan (fig. D-7).

Only for systems with disinfection unit:

4. Connect the supply cable to the C+ and C- terminals.
5. Connect the supply cable to the two CL terminals (red (+) on the right); (white (-) on the left).
6. Connect the water meter according to terminal plan (fig. D-7).
7. Plug the mains plug into the socket (refer to 1.2).

Turbine water meter	Water meter with counter
U _w = white	R _w = green
H _w = green	G _w = brown
G _w = brown	

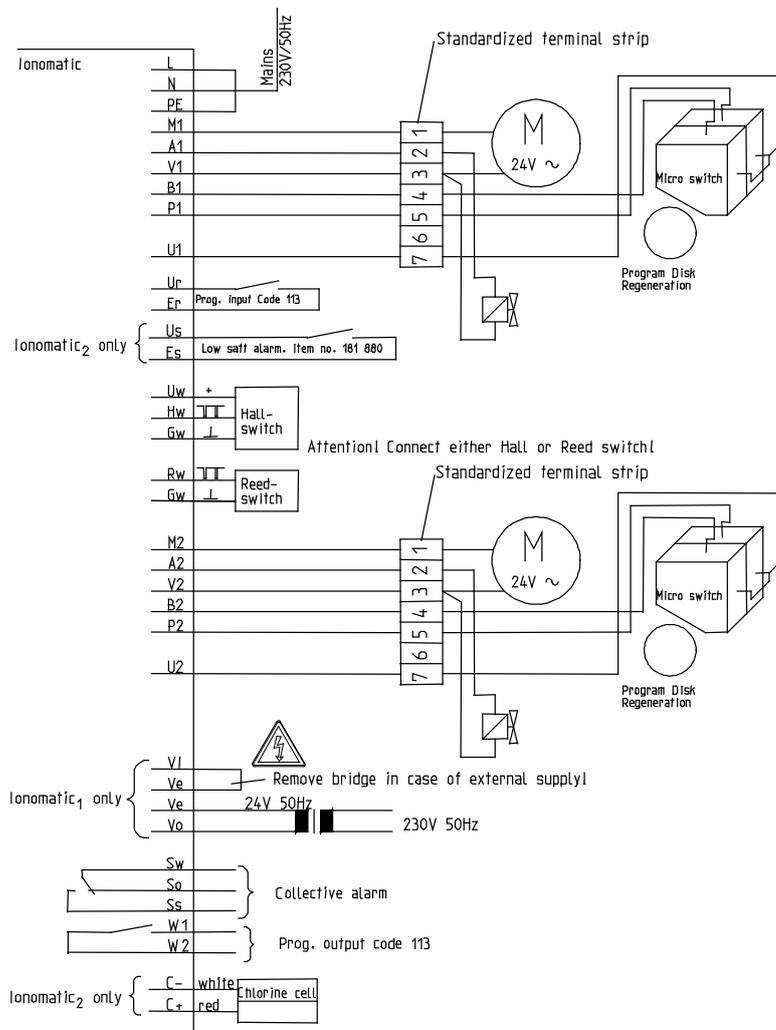


Fig. D-7: Terminal plan for small systems (nominal connection widths 3/4" and 1")

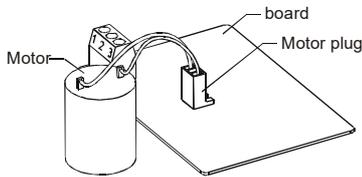


Fig. D-8: Motor plug

Turbine water meter	Water meter with counter
U _w = white	R _w = green
H _w = green	G _w = brown
G _w = brown	

Medium-sized systems (connection width 1½"):

2. Route 7-wire cable between control valves and control electronics and connect according to terminal plan (fig. D-9).
3. Route 3-wire cable between control electronics and actuator and connect according to terminal plan (fig. D-9).
4. Check polarization of motor plug in the actuator. The noses must point away from the motor (refer to fig. D-8).
5. Only for systems with disinfection unit:
Connect the supply cable to the C+ and C- terminals.
6. Connect the water counter according to terminal plan (fig. D-9).
7. Plug the mains plug into the socket (refer to 1.2).

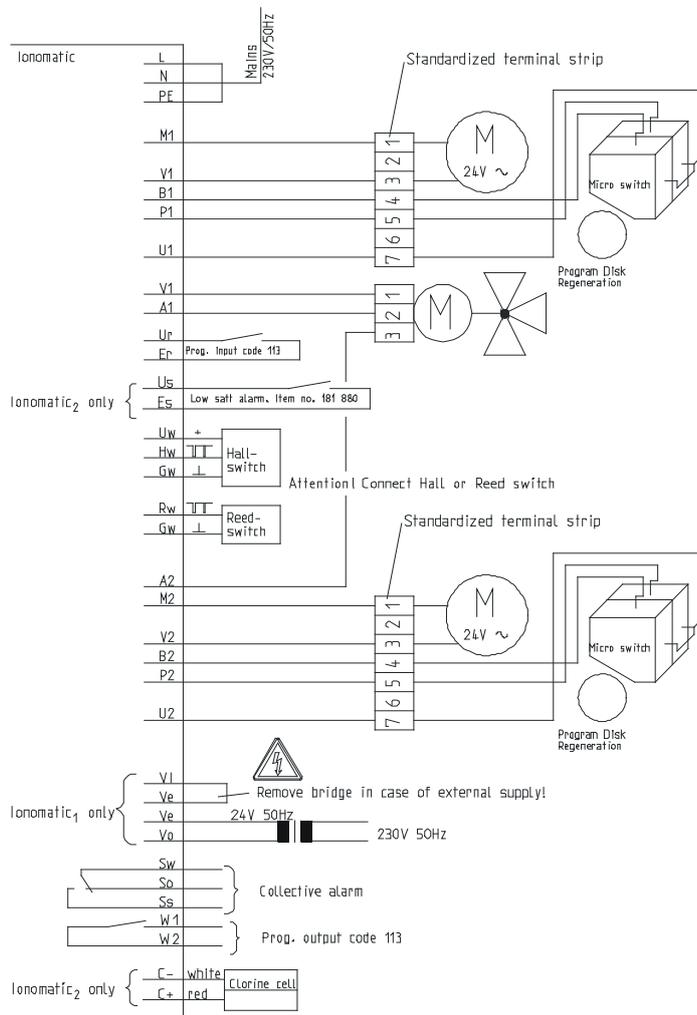


Fig. D-9: Terminal plan for medium-sized systems (nominal connection width 1½")

Large systems (nominal connection width 2“):

2. Route 9-wire cable between control valves and control electronics.
3. Connect according to terminal plan (fig. D-10).
4. Only for systems with disinfection unit:
Connect the supply cable to the C+ and C- terminals.
5. Connect water meter according to terminal plan (fig. D-10).
6. Plug mains plug into the socket (refer to 1.2).

Turbine water meter	Water meter with counter
U _w = white	R _w = green
H _w = green	G _w = brown
G _w = brown	

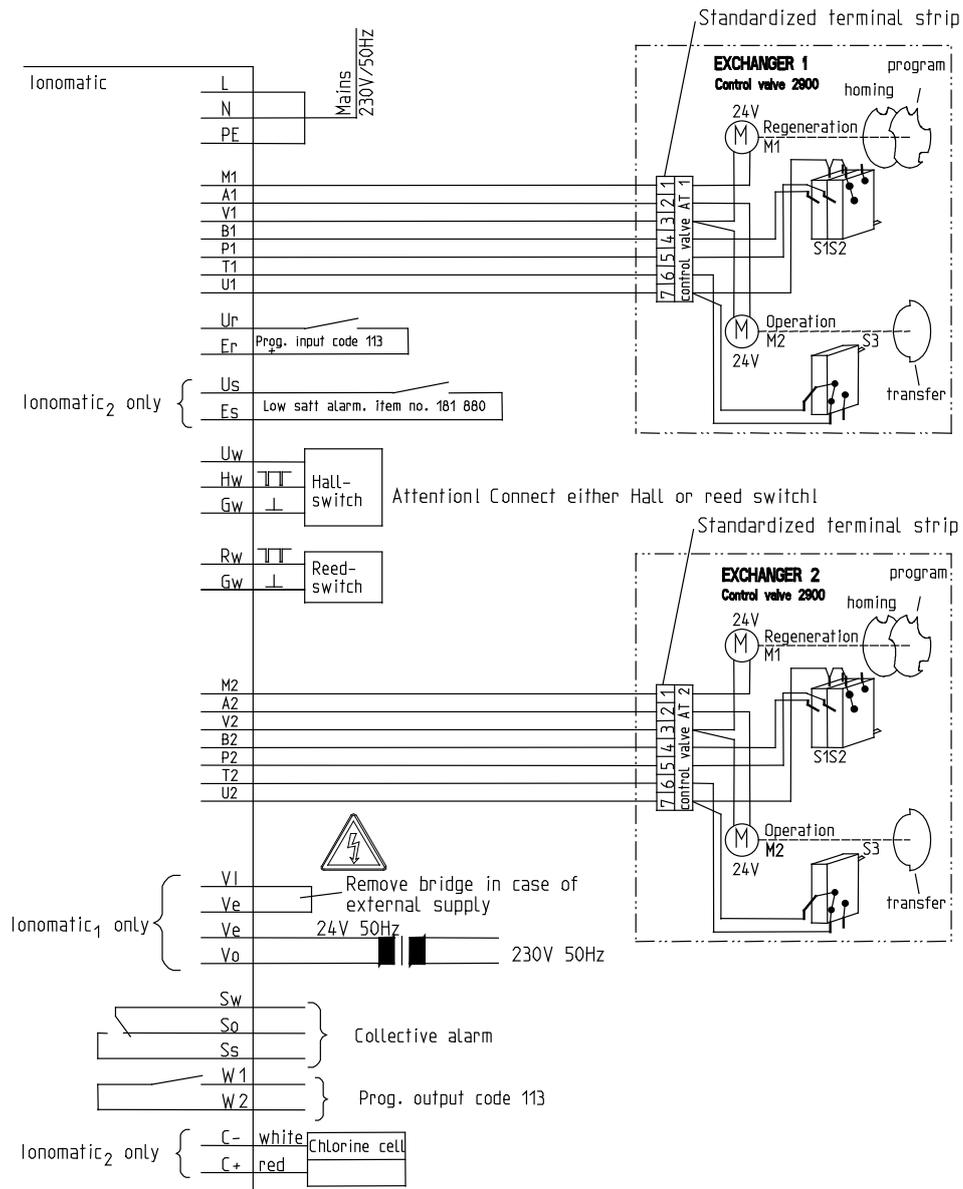


Fig. D-10: Terminal plan for large systems (nominal connection width 2“)

E Start-up (GENO-mat duo WF)

Contents

1 Filling the Brine Tank	E-1
2 Setting the System	E-2
2.1 Setting the Blending Hardness	E-2
2.2 Setting the Controller	E-3
3 System Start-up	E-4



The works described below may only be performed by trained and authorized experts. We recommend to have the start-up performed by Grünbeck's Technical Service.

1 Filling the Brine Tank

1. Remove the brine tank cover.
2. Carefully fill in water until the water level is approx. 30 mm above the sieve bottom.



Attention! Impurities in the salt may cause malfunctions of the brine valve and the injector of the control valve. In order to ensure the proper functioning of the system, a defined salt quality is required.

Only use salt tablets as per DIN EN 973 A.

3. Fill salt tablets into the brine tank. Completely fill the brine tank.
4. Fill in the required operating water volume (table E-1).
5. Close the brine tank cover.

Table E-1: Filling of the Brine Tank		Softening system GENO-mat duo WF							
		65	150	300	450	750	1000	1500	2400
Systems with full salting									
Regeneration salt supply max.*	[kg]	130	190	285	485	760	1010	1260	1770
Operating water volume	[l]	10	22	45	70	111	156	235	400
Systems with economy salting									
Regeneration salt supply max. *	[kg]	65	130	190	285	285	485	760	1010
Operating water volume	[l]	5	11	23	32	44	71	107	167
* for systems with standard brine tank									

2 Setting the System

2.1 Setting the Blending Hardness

In case of systems with blending valve (optional feature), the blending hardness must be set. Open the valve at the raw water inlet. For setting the blending hardness, also observe the operating instructions of the blending valve.



Note: When softening drinking water, you must observe the stipulations of the Drinking Water Ordinance:

Sodium concentration (max): 200 mg/l. Please observe chapter 2.1 regarding the blending hardness.

Example

Softening of Drinking Water

Inlet water (22 °dH)
contains sodium (51.6 mg/l)

Possible dosing of sodium during
the softening process:

$$200 \text{ mg/l} - 51.6 \text{ mg/l} = 148.4 \text{ mg/l}$$

This determines the maximum
permitted degree of softening:

$$\frac{98,4}{8,2} \approx 12^\circ\text{Gh}$$

Conclusion:

Blending to at least
22 – 18 = 4 °dH!

Sodium Concentration

Your local waterworks will inform you about the sodium concentration in the inlet water. When softening the water by 1 °dH, the sodium concentration increases by approx. 8.2 mg/l. If the requirements of the Drinking Water Ordinance must be observed, the water cannot be softened to any degree desired. The permitted blending hardness results from the sodium concentration limit value and the inlet water hardness.

$$200 \text{ mg/l (limit value as per Drinking Water Ordinance)} \\ - x \text{ mg/l (sodium concentration in the inlet water)}$$

$$y \text{ mg/l (possible sodium admixture during softening)}$$

$$\frac{y}{8.2} = \underline{z^\circ\text{dH}} \text{ (maximum possible softening)}$$

The inlet water may be softened by a maximum degree of z °dH. Depending on the sodium concentration of the inlet water, a blending hardness must be chosen which is below the maximum value of 200 mg/l.

2.1.1 Recommended blending hardness

Blending hardness	Result
3 – 5 °dH	Very soft water – ideal for thermal devices – possible problems when washing off soap
6 – 8 °dH	Ideal soft water

2.2 Setting the Controller The softening system GENO-mat duo WF features a volume control. The operating parameters are already stored in the GENO-IONO-matic controller. On start-up all parameters that are necessary for the automatic determination of the regeneration intervals must be entered. Furthermore, the factory-set values must be checked.



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

1. Set the time.
2. Set the inlet water hardness.
3. Set the blending hardness (water hardness at water meter).



Note: Regardless of the selected blending hardness, 0 °dH must be entered, if the water meter precedes the blending valve.

4. Check the factory-set data (operating parameters). Activate code 290 and adjust the displayed value according to table E-2.

Table E-2: Data in code 290	Softening System GENO-mat® duo WF							
Systems with full salting	65	150	300	450	750	1000	1500	2400
Data in code 290 (single/twin)	2754 D	2755 D	2756 D	2866 D	2867 D	2908 D	2909 D	2910 D
Systems with economy salting	50	130	230	330	530	730	1130	1730
Data in code 290 (single/twin)	2751 D	2752 D	2753 D	2864 D	2865 D	2905 D	2906 D	2907 D



Note: Now the control electronics and control valves are automatically adjusted (synchronized). The electronics detects both exchangers as fully regenerated.

5. Check pre-setting of the "Water Meter Pulse" (controller, code 290). The required setting depends on the water meter used. The display must show the respective value from table E-3 which corresponds to the water meter installed.

Table E-3: Intervals of water meter pulses (setting code 290)			
Standard equipment of:	Water Meter	Pulse Interval	Display
small systems	TWZ 1"	0.029 l/Imp	F 2
medium-sized and large systems	TWZ 1 ½", TWZ 2"	0.075 l/Imp	F 10
—	with counter	100.0 l/Imp	F 9

3 System Start-up

1. Open the valve at the raw water inlet.
2. Release a manual regeneration (refer to chapter F). One exchanger is regenerated.
3. Release a manual regeneration. Now the other exchanger is regenerated.



Note: All systems featuring low salt alarm have a pre-set delay period between 2 regenerations (factory-setting: 0.2 hours = 12 minutes). On completion of regeneration, this delay period must pass before another manual regeneration can be released.

-
4. Open the valve at the soft water outlet when the regeneration is completed.
 5. Perform a visual inspection.
Make sure that no water leaks from the system and the system is tight.
 6. Take a water sample at the sampling valve downstream of the system.
 7. Perform a hardness determination with the water test kit "Total Hardness".
The system functions properly, if the water taken directly after the exchanger tank has a value of 0 °dH.
 8. Fill in the cover sheet and checklist / column 1 of the operation log after performing the necessary measurements and testings.

F Operation (GENO-IONO-matic)

Content

1 Preface.....	F-1
2 How to operate the control unit.....	F-2
2.1 Operating elements and display	F-2
2.2 How to set the operating parameters	F-3
2.3 How to read the operating status.....	F-8
2.4 How to release a manual regeneration	F-8

1 Preface

The water softeners GENO-mat WF, GENO-mat duo WF, GENO-mat duo WE and GENO-mat GVA are volume-controlled. They are operated and monitored by means of the control unit GENO-IONO-matic.



Note: Chapter F in the operation manual for GENO-OSMO-MSR and GENO-KWA 50k/60i and GENO-LUWADES₂ applies to the water softeners GENO-mat duo WE version GENO-mat duo WE-MSR and WE-KWA.

Operating elements

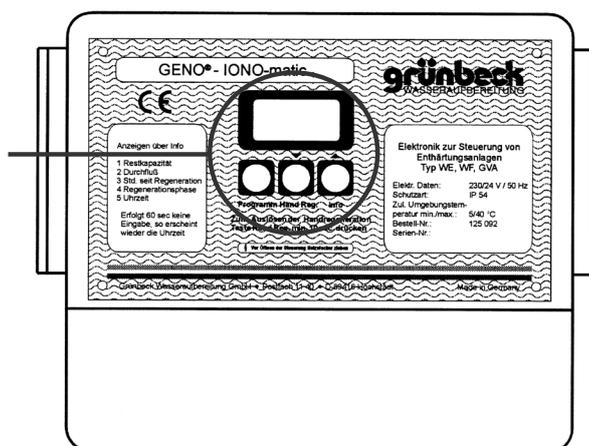


Fig. F-1: Control unit GENO-IONO-matic



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

Only make the settings described in this chapter!



All other work at the control unit, in particular modifications to the data records, are only allowed to be performed by Grünbeck's customer service/authorised service company.

2 How to operate the control unit

2.1 Operating panel and display

1 "Program" key

In standard operation:

- Switches to the programming level (keep pressed for more than 5 s).

On the programming level:

- Opens menu items.
- Saves the setting and closes menu items.

2 "Hand-Reg" key

In standard operation:

- Releases the manual regeneration (keep pressed for more than 10 s).

On the programming level:

- Switches to the previous menu item
- Decreases numerical values.

3 "Info" key

In standard operation:

- Activates the info level and switches to the next screen

On the programming level:

- Switches to the next menu item
- Increases the numerical values.

4 Display

- Indicates the operating parameters (see 5 - 10).

5 Indication of "Unit"

- Indicates the unit of the adjacent numerical value (e.g. °dH, °f, mol, m³).

6 Indication of "Regeneration"

- Indicates the progress of the regeneration of the exchanger tank indicated next to it. Each arrow represents one regeneration step. When the arrows form a circle, the regeneration is completed.

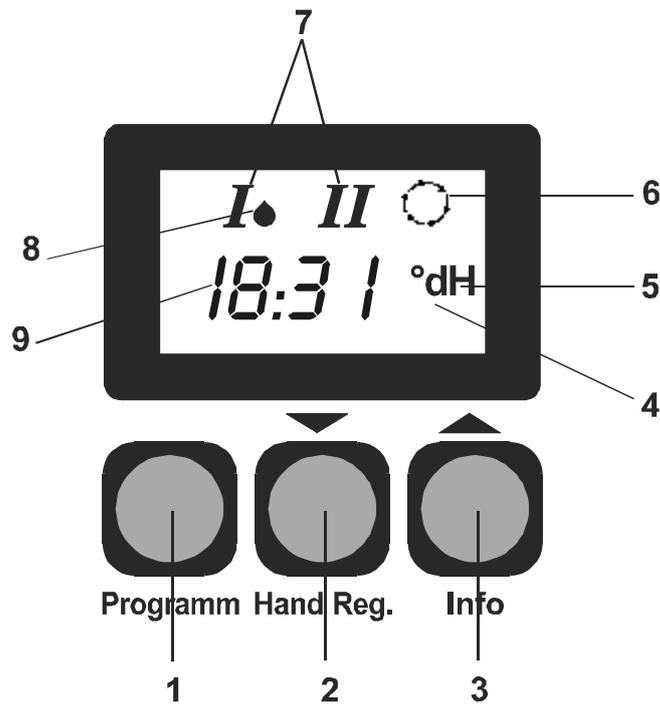


Fig. F-2: Control unit GENO-IONO-matic; operating elements and display

7 Indication of "Exchanger tank"

- Indicates the operating state of exchanger tanks I and II (for twin systems only). The active exchanger tank is indicated on the left; the exchanger tank in regeneration or standby is indicated on the right.

8 Indication of "Water flow pulses"

- Indicates the water flow.

9 Indication of "Numerical values"

- Indicates the time in the basic mode.
- Indicates the operating parameters on the info level
- Indicates the values in the menu on the programming level. Open menu items are flashing.

2.2 How to set the operating parameters

Principle

In order to make settings, a programming level must be called first (user programming level: key 1, technical service programming level: keys 1 + 2).

On the programming level, key 3 switches to the next, key 2 to the previous menu item. When the parameter which is to be changed is reached, you can access the menu by pressing key 1, the display is flashing. In the open menu (flashing display), keys 2 and 3 switch to lower or higher values respectively. When the correct value (flashing) appears in the display, it may be saved by pressing key 1. Thereby, the menu items will be closed and the set value is displayed permanently.

When all required settings have been made, the programming level is closed by pressing keys 2 + 3 simultaneously and the display returns to the basic function (time). The system also returns to the basic mode if no entry is made for more than 1 minute. Entries which had not been saved are lost.



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.

Basic settings (user programming level)

The basic settings must be adjusted to the local conditions when starting up the system. In case of varying raw water quality, the value has to be adapted.

In basic mode, the display indicates the operating status of the exchanger tank/s and the time stored in the system. First, call up the user programming level.

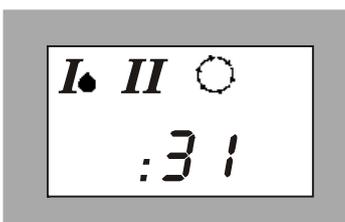
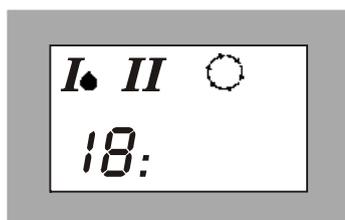
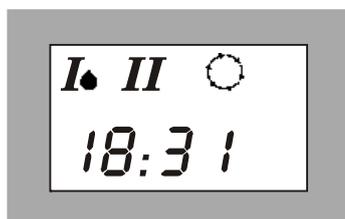
1. **Press and hold the "Program" key (1) for more than 2.5 seconds.**

The display indicates the hour. If the display corresponds with the current time, steps 2. – 4. can be omitted.

2. Tap the "Program" key (1).
The display starts flashing.
3. Set the current time (hour). In order to do so:
Use the "Hand Reg." key (2) to decrease the hours.
OR
Use the "Info" key (4) to increase the hours.
4. Save the setting by pressing key (1).
The display shows the hour without flashing.
5. **Press the "Info" key (3) to switch to the next menu item.**

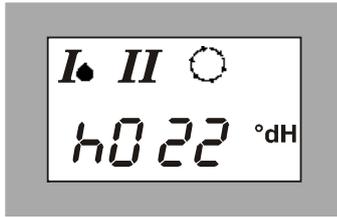
The display indicates the minutes. If no change is required, continue with 9.

6. Press the "Program" key (1) to access the menu.
7. When the display is flashing, increase or decrease the value with keys (3) or (2) respectively.
8. As soon as the correct value is set, press key (1).



The flashing display changes to a permanent display.

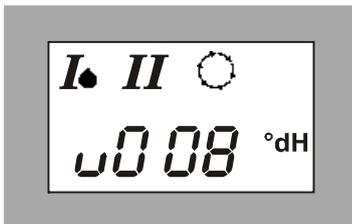
9. **Press the "Info" key (3) to switch to the next menu item.**



The display indicates the raw water hardness stored. At this point, enter the actual raw water hardness at the place of operation. You can either determine the hardness by means of the water test kit "Total hardness" or inquire at your local water supplier.

10. Enter the appropriate value. To do so, repeat steps 6. – 8. accordingly.

11. **Press the "Info" key (3) to switch to the next menu item.**



The display indicates the menu item "Blending hardness". In case of systems that do not have a blending valve or feature a water meter installed upstream of the blending unit, 0 °dH (0 °f, 0 mmol/l) must be entered here. In all other cases the blending hardness must be set which is predetermined by the setting of the blending valve (between 0 °dH (0 °f, 0 mmol/l) and raw water hardness). When softening drinking water, the stipulations of the German Drinking Water Ordinance must be observed (also refer to chapter E).

12. Enter the correct value. To do so, repeat steps 6. – 8. accordingly.

13. **Press "Info" (3) and "Hand Reg." (2) keys simultaneously in order to return to the basic mode.**

The display now indicates the current time.

Basic settings (technical service programming level)

All relevant system parameters are stored in data records. The system is ready for operation if the correct data record was selected. Check the factory-setting during start-up. In addition, you may chose the operating mode.



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

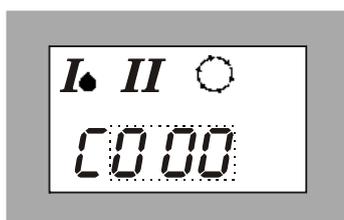


Warning! Incorrect settings may lead to hazardous operating conditions which cause injury, illness or damage to property.

Strictly adhere to the operation manual! Only make the settings described there!

Precondition: The system is in basic mode. The display indicates the current time.

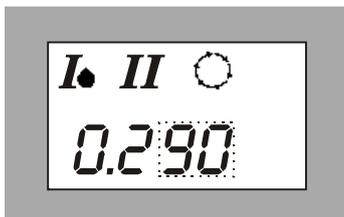
1. Press **"Program" (1)** and **"Hand Reg." (2)** keys **simultaneously until the display changes.**



The technical service programming level is active. First, the required menu must be selected.

The figures (000) are flashing. They need to be modified, so that they display the Code for the menu to be edited. The Code for the menu "System settings" required here is 290.

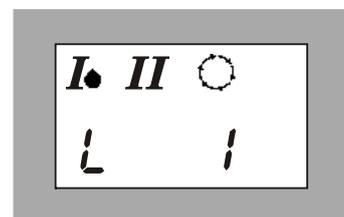
2. Use the **"Info" key (3)** to count upwards until **C. 290 is displayed.**
OR
Use the **"Hand Reg." key (2)** to count downwards until **C. 290 is displayed.**
When holding down keys (2) or (3), the figures run faster; for fine tuning, tap the keys.
3. Tap the **"Program" key (1)** to accept Code 290.



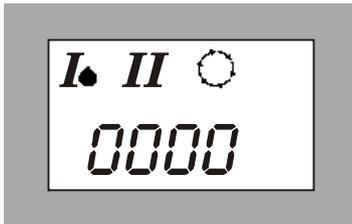
First, the "Language" may be selected, i.e. the unit in which the system will calculate and indicate the operating parameters from now on. The following selections are available:

L 1: °dH, L 2: °f and L 3: mol/l (displayed as mol). If no modification is required, continue with step 7.

4. Tap the **"Program" key (1)** to access the menu.
The display starts flashing.

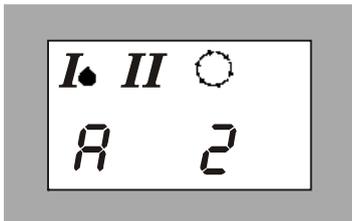


5. Use the "Info" key (3) to set the desired value (infinite loop L 1→ L 2→ L 3 → L 1..).
OR
Use the "Hand Reg." key (2) to set the desired value. (infinite loop L 1→ L 3→ L 2 → L 1..).
6. Press key (1) to accept the entry.
The display stops flashing and the unit field displayed indicates the selected unit.
7. **Press the "Info" key (3) to switch to the next parameter.**



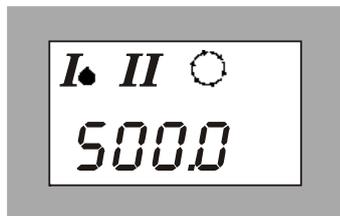
The number of the factory-set data record (standard operating parameter) is indicated. If the setting does not correspond to the data record of your system (refer to chapter E), it must be adjusted.

8. Tap the "Program" key (1) to access the menu.
The display starts flashing.
9. Increase the numerical value displayed with the "Info" key (3).
OR
decrease the numerical value displayed with the "Hand Reg." key (2).
When holding down keys (2) or (3) respectively, the value changes quickly; for fine tuning, tap keys (2) or (3).
10. When the data record of your system is flashing in the display, press key (1) to accept the setting.
11. **Press the "Info" key (3) to switch to the next menu item.**



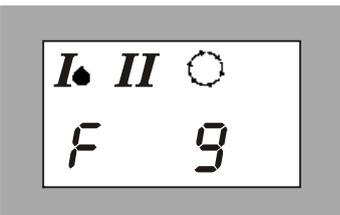
A 2 in the display indicates a system with two exchanger tanks. In case of systems with only one exchanger tank, A 1 is displayed. Modify the setting, if necessary.

12. Tap key (1) to access the menu (the display is flashing).
13. Switch to the other respective value by tapping on key (2) or key (3).
14. Press key (1) to accept the new value.
15. Press the "Info" key (3) to switch to the next menu item.



The nominal capacity of the data record is indicated. This setting cannot be modified.

16. **Press the "Info" key (3) to switch to the next menu item.**



The setting "Water meter pulse" is indicated. Table F-1 indicates the meaning of the Codes displayed.

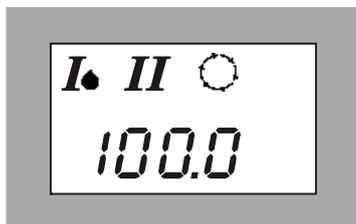
The required setting depends on the water meter installed in your system (also refer to chapter E).

17. Change the setting, if required. Proceed as indicated in 8. - 10.

Table: F-1: Display in Code 290 and pulse intervals of the water meter

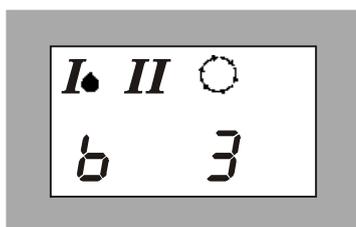
	F 00	F 01	F 02	F 03	F 04	F 05	F 06	F 07	F 08	F 09	F 10
l/pulse	variable	0.012	0.029	0.33	0.5	0.93	1.33	3.8	5.3	100.0	0.075

18. Press the "Info" key (3) to switch to the next menu item.



The display indicates the water meter pulse (l/pulse) programmed just now.

19. Press the "Info" key (3) to switch to the next menu item.



The menu "Operating mode" is displayed. The standard setting is operating mode 3 (b 3 is displayed): A regeneration takes place immediately as soon as the calculated soft water volume has been reached or after a pre-set number (1 - 99) of days at the latest.

Factory setting for GENO-mat duo WE 50, 130, 230:

Regeneration after 4 days at the latest, at 03:00 am at night (in line with DIN 19636).

Factory setting for all other systems:

Regeneration after 14 days at the latest, at 03:00 am at night.

Grünbeck's technical service/authorised service company is in the position to adapt the factory-settings to the requirements prevailing on site.

Other operating modes:

b 1: Time-dependent control. Regeneration after 1 - 99 days.

b 2: Volume-dependent control. Regeneration immediately when total capacity has been reached. No superimposed timer control.

b 4, b 5, b 6: Special cases (for more detailed information, contact Grünbeck's technical service/authorised service company).

20. Press key (1) to select a different operating mode.

The display is flashing.

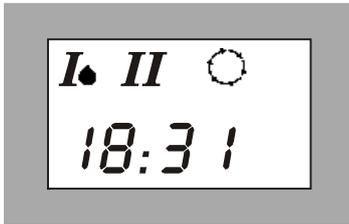
21. Set the desired operating mode (b1, b2 or b 3) with keys (2) or (3).

22. Press key (1) to save the setting.

23. **Press keys (2) and (3) simultaneously to return to the basic mode.**

The display indicates the time and the system is ready for operation.

2.3 Reading the operating status



The display continuously gives information about the operating status of the system.

- The active exchanger is indicated at the top on the left (in the example: I).
- Water flow is indicated by the drop next to it (flashes in the rhythm of 5 water meter pulses).
- The second exchanger tank is indicated on the right (II).
- Its operating status may be read from the circle of arrows: Each arrow represents one regeneration step. If the circle is closed, the regeneration has been completed and the exchanger tank is in standby as reserve.

Additional operating parameters may be called at any time.

1. Press the "Info" key (3).
The remaining soft water volume until the next regeneration is indicated (in m³).
2. Press the "Info" key (3).
The current flow is indicated (m³/h). The value will be adapted every 5 s as long as at least 2 water meter pulses are registered during this period.
3. Press the "Info" key (3).
The time (hours) since the last regeneration is indicated.
4. Press the "Info" key (3).
The display indicates the operating status and the remaining time required for the step in progress.
5. Press the "Info" key (3).
The display switches to the basic display (time).

2.4 How to release a manual regeneration

A manual regeneration has to be released if

- systems are run in operating mode b 1 and the maximum soft water volume is reached before the set regeneration interval has been reached.
- systems are restarted after a long period of standstill.
- maintenance or repair work was carried out.

Only in operating position; the time is displayed:

1. Press the "Hand Reg." key (2) for at least 10 seconds.

The softener starts the regeneration. The progress of the regeneration is indicated by the circle of arrows in the display.

G Troubleshooting (GENO-mat duo WF)

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 softening system GENO-mat duo WF and indicates the causes and their elimination.



Note: The softening system GENO-mat duo WF is equipped with two control heads. In case of failure of one exchanger, it may be operated as single system. For details, refer to page G-3.

The softening system GENO-mat duo WF is equipped with an error detection and reporting system.

If an error message is displayed:

1. Press the "Program" key (= confirm the malfunction).
2. Watch the display.
If the message reappears, compare it with table G-1.
3. If necessary, call technical service.



Note: The technical service definitely must be notified in case of malfunctions that cannot be remedied with the information given in table G-1! When contacting the technical service, please provide the system designation, serial number and the error message displayed.

Table G-1 : Troubleshooting		
What you see	Why it happened	What to do
a) Error messages displayed		
Er 1	Step time monitoring regeneration motor. Defective motor connection cables or switch	Notify Grünbeck's technical service
Er 2	Step time monitoring transfer motor. Defective motor connection cables or switch	Notify Grünbeck's technical service
Er 4	Low salt alarm	Check salt level in brine tank and add salt tablets according to DIN 19 604

What you see	Why it happened	What to do
b) "Service" message displayed		
SER	Maintenance is due (message is displayed after 1 year at the latest). For information purposes only. This is not a malfunction.	Press the "Program" button (= confirm). Message is displayed again after one hour. Reset by Grünbeck's technical service after maintenance is completed.

Table G-1 (continued)

What you see	Why it happened	What to do
c) Miscellaneous errors		
Increased hardness in the blending or soft water	<ul style="list-style-type: none"> • System overrun <ul style="list-style-type: none"> – System has no permanent power (coupled with light switch) – No water meter pulses in control electronics – Incorrect electronic setting – System does not suck in brine – No salt in brine tank – Not enough water in brine tank • Miscellaneous causes <ul style="list-style-type: none"> – Setting at the blending valve – Water supply interrupted – Water volume too high (exceeds peak flow indicated on type designation plate) – not enough salt in brine tank 	<p>Check power supply and adjust, if necessary</p> <p>Check water meter and control line and replace any faulty parts.</p> <p>Check parameters in the electronics component and reset, if necessary.</p> <p>Clean injector, check inlet pressure and adjust, if necessary.</p> <p>Add salt</p> <p>Check BVO valve and brine valve for pollution and clean, if necessary.</p> <p>Check inlet resp. blending hardness. Check setting of blending valve and reset, if necessary.</p> <p>Shut-off valves closed</p> <p>Reduce water volume</p> <p>Check salt level according to the mark and add salt, if necessary.</p>
Resin in the outlet tube	Defective jet system	Notify Grünbeck's technical service
Pressure loss is too high	Exchanger resin is polluted with undissolved particles Second exchanger regenerates and is in the "backwash" step	Notify Grünbeck's technical service Wait until regeneration is completed and check pressure loss again
System does not take in brine	<ul style="list-style-type: none"> – Water pressure is too low – Injector is clogged – Injector sieve is clogged – Brine valve is clogged 	<p>Increase flow pressure to at least 2.0 bar</p> <p>Clean injector</p> <p>Clean injector sieve</p> <p>Remove brine valve and carefully clean it</p>
Control valve continuously regenerates	Switch is incorrectly adjusted, defective or short-circuited	Notify Grünbeck's technical service

1 Operation as Single System

Should one control head or exchanger tank fail, the softening system GENO-mat duo WF may be operated as a single system during the downtime. The technical service will take care of the required modifications, if desired. Keep the accessories (terminal plug and connection nut) supplied with the fastening material ready.



The work described in this section may only be performed by Grünbeck's technical service or an authorized expert.



Warning! Danger due to mechanical energy!

System may be under pressure. Release pressure prior to start work.

Switch to single system operation:

1. In case of defective exchanger, shut-off raw water supply
2. Shut-off defective exchanger on the soft water side.
In order to do this
 - close shut-off valve succeeding the solenoid valve in case of small systems.
 - check actuator position in case of medium-sized systems and switch, if necessary, by pressing the decoupling button. (exchanger 1 is shut-off, stop on the right; exchanger 2 is shut-off, stop on the left).
 - shift 3-way ball valve in case of large systems. (After removal of the red handle, the setting may be checked)
3. Separate brine tube resp. adapter piece of the defective exchanger from the T-piece and close connection with terminal plug and connection nut.
4. Switch data record in code 290 of the GENO-IONO-matic control to single system.
Now exchanger 1 can be operated as single system. For operation with exchanger 2, the connections of the control must be changed.

Only applies if exchanger 2 is operated as single system:



Danger due to electricity!

Mains voltage at terminals L, N and PE. Disconnect mains plug prior to start work.

5. Remove terminal cover of GENO-IONO-matic control.
6. Disconnect cable of exchanger 1.
7. Connect cable of exchanger 2 to the terminals of exchanger 1
8. Refit terminal cover of controller.

H Maintenance and care (water softeners)

Content

1 General information	H-1
2 Inspection (functional check).....	H-1
2.1 How to refill salt	H-2
3 Maintenance	H-3
3.1 Operation log	H-4
4 Spare parts	H-4

1 | General information

In order to guarantee the reliable function of water softeners over a long period of time, some maintenance work has to be performed at regular intervals. This applies in particular to the softening of drinking water where the required measures are defined in the pertinent regulations and guidelines. All regulations and guidelines which apply at the installation site must be strictly adhered to.

DIN EN 806-5 stipulates:

- An inspection must be performed at least every two months.
- Maintenance must be carried out twice a year.
However, annual maintenance is sufficient for water softeners that carry the DVGW-mark of conformity!
- Maintenance must be performed by Grünbeck's technical service/authorised service company or by a specialised company.
- An operation log must be kept in order to record the maintenance work performed.



Notes: A maintenance contract ensures that all the required maintenance work will be performed in due time.

The operation log is attached to this operation manual.

2 | Inspection (functional check)

You may perform the regular inspections yourself. We recommend inspecting the water softener at shorter intervals after installation and then switching to inspect them as required. However, an inspection is compulsory at least every two months.

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

Summary: Inspection work

- Determine the raw water hardness.
(water test kit „total hardness“)
- Determine the soft water hardness (0 °dH (°f, mmol/l)) resp. in case of water softeners with blending valve the softwater with 3
- Check the controller settings:
 - a) time
 - b) raw water hardness (not ZF)
 - c) soft water hardness (not ZF, WINNI-mat® VGX and Weichwassermeister 2 GSX)
- Check the salt level in the brine tank.
Refill salt, if necessary (see 2.1)



Attention! If the salt level falls below the minimum filling level, hardness may break through. Observe the minimum salt filling level (see Technical Specifications, chapter C). In case of water softeners where no specific value is indicated, refill the system as soon as the level has fallen to just a few centimetres.

- Evaluate the salt consumption with reference to the water volume consumed.



Note: Minor deviations are normal and cannot be prevented technically. If you detect major deviations, please contact Grünbeck's technical service/authorised service company.

- Check control valve to drain for tightness (in operating mode).

2.1 How to refill salt



Warning! Impurities in the salt tank may adversely affect the water quality.

For hygienic reasons be very careful when refilling salt.



Attention! Insoluble impurities in the salt may cause malfunctions at the brine valve and at the injector of the control valve. A defined salt quality is required for the reliable function of the water softener.

Only use salt tablets as per DIN EN 973 type A.

A few precautionary measures ensure hygienically and technically perfect conditions:

- Only store the salt in dry and clean areas.
- Do not use salt from packages that are already open.
- Clean the outside of the packages before opening them.
- Fill the regeneration salt directly from the package into the brine tank.
- Close the brine tank immediately after filling.

3 | Maintenance



According to DIN EN 806-5, maintenance work at water softeners may only be performed by Grünbeck's technical service/authorised service company or a specialised company.

An operation log must be kept for water softeners. In this operation log, the service technician records all maintenance and repair work performed. In case of an operational disturbance this log helps to identify possible sources of error. In addition the log documents the proper system maintenance.

Make sure that all maintenance work is recorded in the operation log.

Summary: Maintenance work

- Read the water pressure, flow pressure and water meter value.
- Determine the hardness:
raw water hardness, soft water hardness, 0 °dH (°f, mmol/l) test
- Re-adjust the blending valve and check the blending hardness again, if necessary. In case of Delta-p, program the desired soft water hardness in the control unit.
- Compare the measured hardness with the settings at the control unit and adjust, if necessary.
- Check the programming of the control unit.
- Check the brine regulation (salting, filling of brine tank) and program settings; re-adjust them, if necessary.
- Check release of regeneration.
- Check start of turbine water meters.
- Check control valve for tightness, replace wearing seals if necessary, check the function of the drive motor of the control valve, clean injector and sieve – typical hydraulic values.
- Clean brine tank and brine valve.
- Check regeneration salt supply (quantity and quality).
- Check hose connections and seals for tightness and replace them, if necessary.

Observe continuation on page H-4!

- Check the non-return function of the safety fitting (e.g. system separator).
Not required for intrinsically safe water softeners, in particular water softeners with DVGW-test mark!
- For water softeners with disinfection unit: functional check of the disinfection unit (determine electric current).
 - In case of Delta-p only possible via Code.
- If necessary, read regeneration counter, total soft water volume, error memory.
 - In case of Delta-p, system data print possible via serial interface.
- If necessary, re-set service interval.
- Record all data and activities, including repair work, in the operation log.
- Hand over the water softener and the filled out operation log to the operator.

3.1 Operation log

The operation log is attached to this operation manual. At start-up of the water softener, make sure to enter all data on the cover sheet of the operation log and to fill in the first column of the check list.

The service technician will fill in another column of the checklist whenever further maintenance is carried out. This document provides evidence of proper maintenance.

4 | Spare parts

For spare parts and consumables, please contact your local Grünbeck representative (refer to www.gruenbeck.de).



Note: For detailed specifications regarding the wearing parts, please refer to chapter C.

Operation Log

Customer

Name:

Address:

.....

.....

- 50
- 130
- 230
- 330
- 530
- 730
- 1130
- 1730

Softening system GENO-mat duo WF

(please check appropriate box)

- 65
- 150
- 300
- 450
- 750
- 1000
- 1500
- 2400

Serial number

Installed by

Filter: manufacturer/type /

Connection data:

Drain connection according yes no
to DIN EN 1717

(please check appropriate box)

Floor drain available yes no

Pipe leading to softening galvanized

system copper

plastic

Maintenance of softening system GENO-mat duo WF			
Check list			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)			
Measured values			
Water pressure [bar]			
Flow pressure [bar]			
Water meter value [m³]			
Inlet hardness °dH (measured)			
Blending hardness °dH (measured)			
0 °dH check			
Inspections and checks of controller and control valve			
Controller settings checked			
Regeneration release checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Driving motor function checked			
Brine tank and brine valve			
Brine tank and brine valve cleaned			
Brine valve functions and settings checked			
Connections, hose connections, seals			
Seals and hose connections checked			
Safety fitting (e.g. system separator) checked for non-return function			
Miscellaneous			
Remarks			
TS technician			
Company			
Work time cert (no.)			
Signature			

Maintenance of softening system GENO-mat duo WF			
Check list			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)			
Measured values			
Water pressure [bar]			
Flow pressure [bar]			
Water meter value [m³]			
Inlet hardness °dH (measured)			
Blending hardness °dH(measured)			
0 °dH check			
Inspections and checks of controller and control valve			
Controller settings checked			
Regeneration release checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Driving motor function checked			
Brine tank and brine valve			
Brine tank and brine valve cleaned			
Brine valve functions and settings checked			
Connections, hose connections, seals			
Seals and hose connections checked			
Safety fitting (e.g. system separator) checked for non-return function			
Miscellaneous			
Remarks			
TS technician			
Company			
Work time cert (no.)			
Signature			

Maintenance of softening system GENO-mat duo WF			
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Water pressure [bar]			
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Brine tank and brine valve cleaned			
Brine valve functions and settings checked			
Connections, hose connections, seals			
Seals and hose connections checked			
Safety fitting (e.g. system separator) checked for non-return function			
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Check list			
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Maintenance performed (date)			
Measured values			
Water pressure [bar]			
Flow pressure [bar]			
Water meter value [m ³]			
Inlet hardness °dH (measured)			
Blending hardness °dH(measured)			
0 °dH check			
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Controller settings checked			
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TS technician			
Company			
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Signature			