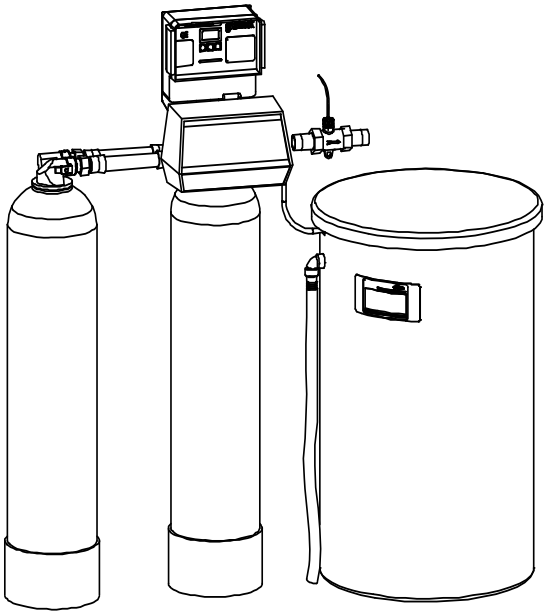
grünbeck

Operation Manual
Water Softeners
GENO-mat® duo WE
GENO-mat® duo WE-MSR
GENO-mat® duo WE-KWA



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in accordance with DIN EN ISO 9001,
DIN EN ISO 14001 and SCC

Table of contents

This operation manual consists of several parts as shown in the table below. Please refer to the cover sheets of the individual parts for detailed information on their contents.

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CE

EU 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.

If the system is modified in a way not approved by us, this certificate is void.

Manufacturer:	Grünbeck Wasseraufbereitung GmbH Josef-Grünbeck-Straße 1 89420 Hoechstädt/Germany
Responsible for documentation:	Markus Pöpperl
System designation:	GENO-mat®
System type:	duo WE
Serial number:	Refer to type designation plate
Applicable guidelines:	Low Voltage Guideline (2014/35/EU) EMC (2014/30/EU)
Applied harmonized standards, in particular:	DIN EN 61000-6-2:2006-03, DIN EN 61000-6-3:2011-03
Applied national standards and technical specifications, in particular:	DIN 19636-100:2008-02 DIN 31000/VDE 1000:2011-05
Place, date and signature:	Höchstädt, 08.08.2016 i. V. M. Pöpperl Dipl.-Ing. (FH)
Function of signatory:	Head of Department Product Realisation and Product Launch

A General

Table of contents

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 for drinking water treatment. 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 reliable operation over many years, provided you treat your water treatment system with the required care. This operation manual assists you with important information. Therefore, carefully read the 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, are available to help you.

Advice and assistance

For advice and assistance please contact your local representative (www.gruenbeck.com) or get in touch with our service centre which can be reached during office hours:

Tel.: +49 9074 41-333
Fax: +49 9074 41-120
Email: service@gruenbeck.com

We can connect you with the appropriate expert more quickly if you provide the required system data. In order to have access to this data at all times, please fill in the data given on the type designation plate into the table on page 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 discharged 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. Strictly adhere to the operation manual! 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 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 notes indicated on the packing.

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

B Basic information (water softeners)

Content

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 $\rightarrow CO_2$ escapes) more calcium ($CaCO_3$) is precipitated (scaling).

Hinweis: 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.

* CO_2 from the air dissolves in water, causing a low concentration of carbon dioxide.

Hardness range	°dH	°f	mmol/l = mol/m³
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

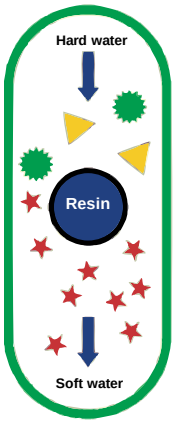


Fig. B-2: Operation

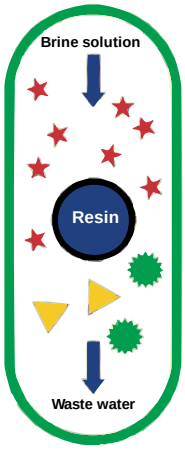


Fig. B-3: Regeneration

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 WE)

Content

1 Type designation plate

The type designation plate is located at the control valve of the water softener. Please specify the data shown on the type designation plate when contacting Grünbeck to speed up the processing of your or orders. Simply copy the information to the table below in order to have it handy when necessary.

Water softener GENO-mat® duo WE

duo WE ☐☐☐ **Serial number:** ☐☐☐☐☐☐/☐

Order no.: ☐☐☐☐☐☐

2 Technical specifications

The GENO-mat® duo WE water softener is a twin system for the continuous supply of soft water. It is equipped with a central control valve for both exchanger tanks and is volume-controlled. The regeneration is released when the preset water volume in an exchanger tank has been softened. The system uses soft water for regeneration.

All system data are shown in tables C-1 and C-2. The information applies to the standard version of the system. Different data for special versions are listed separately, if applicable.

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 the water and power supply when you are absent for longer periods of time.

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

Table C-1: Technical specifications		Water softener GENO-mat® duo WE				
Systems with full salting		**65**	**150**	**300**	**450**	**750**
Connection data						
Nominal connection diameter		DN 25 (1" female thread)			DN 40 (1½" fem. thread)	
Drain connection, min.		DN 50				
Power supply[1]	[V]/[Hz]	230/50-60 (system operation with protective low-voltage 24/50-60)				
Connected load	[VA]	40				
Protection/Protection class		IP 54/I				
Performance data						
Nominal pressure (PN)	[bar]	10				
Operating pressure, min./max	[bar]	2.0/8.0				
Max. continuous flow *** at residual hardness of < 0.1 °Gh	[m³/h]	2.0	3.0	5.0	6.0	9.5
Pressure loss at max. continuous flow	[bar]	0.6	1.1	2.1	1.5	2.3
k_V-value (at Δp = 1.0 bar)	[m³/h]	2.6	2.7	3.1	4.5	5.6
Nominal capacity	[mol]	12.0	26.6	53.9	80.2	133.2
	[m³ x °Gh]	67	149	302	449	746
Capacity per kg of regeneration salt	[mol/kg]	3.33	3.32	3.32	3.16	3.33
Time capacity	[m³x°Gh/h]	72	84	145	214	269
Dimensions and weights [2]						
Total height	[mm]	1310	1530	1790	1840	1970
Total height (without control electronics) ****	[mm]	1080	1300	1560	—	—
∅ exchanger tank	[mm]	208	257	334	369	469
∅ brine tank *	[mm]	500	570	700	780	900
Total height of brine tank *	[mm]	810	880	870	1100	1250
Height of safety overflow brine tank *	[mm]	700	780	770	980	1120
Connection height control valve (raw water)	[mm]	940	1160	1420	1710	1830
Depth of foundation, min. *	[mm]	600	700	800	900	1000
Length of foundation, min. *	[mm]	1460	1500	1700	2100	2400
Operating weight, approx. *	[kg]	285	435	730	1110	1745
Filling volumes and consumption data**						
Resin quantity	[l]	18	40	81	115	200
Freeboard (resin in sodium form), approx.	[mm]	270	230	290	390	300
Salt consumption per regeneration approx.	[kg]	3.6	8.0	16.2	25.3	40.0
Regeneration salt supply max. *	[kg]	130	190	285	485	760
Total waste water volume per regen. approx.	[l]	112	211	451	693	1020
Operating water volume	[l]	10	22	45	70	111
Minimum filling level of salt *	[mm]	—	—	—	—	50
Ambient data						
Water / ambient temperature, max.	[°C]	30/40				
Control unit						
Data records in Code 290 (single/twin) [3]		9014 D	9015 D	9016 D	9510 D	9511 D
Order no.		**184 100**	**184 120**	**184 140**	**184 160**	**184 180**
Order no.***		**184 600**	**184 605**	**184 610**	**184 615**	**184 620**
Order no.****		**184 325**	**184 345**	**184 350**	**184 375**	**184 385**

* 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, i.e. they only serve for approximate determination.

*** The maximum continuous flows listed may be smaller at high raw water hardness values.

**** The electronic control of the systems with a nominal connection size of DN 40 is mounted between the ion exchanger tanks.

***** Version without GENO®-IONO-matic control electronics – may only be operated by means of GENO®-MSR-tronic.

****** Version without GENO®-IONO-matic control electronics – may only be operated by means of GENO®-KWA-tronic$_2$.

[1] The power supply for GENO-mat® duo WE-MSR and WE-KWA is is provided by GENO®-MSR-tronic resp. GENO®-KWA-tronic$_2$.

[2] All dimensions and weights are approximate!

[3] For GENO-mat® duo WE-MSR and WE-KWA refer to operation manual for GENO®- KWA/GENO®- Luwades$_2$.

Table C-2: Technical specifications		Water softener GENO-mat® duo WE				
Systems with economy salting		**50**	**130**	**230**	**330**	**530**
Connection data						
Nominal connection diameter		DN 25 (1" female thread)			DN 40 (1½" fem. thread)	
Drain connection, min.		DN 50				
Power supply[1]	[V]/[Hz]	230/50-60 (system operation with protective low-voltage 24/50-60)				
Connected load	[VA]	40				
Protection/Protection class		IP 54/I				
Performance data						
Nominal pressure (PN)	[bar]	10				
Operating pressure, min./max	[bar]	2.0/8.0				
Max. continuous flow *** at residual hardness of > 0.1 °Gh	[m³/h]	2.0	3.0	5.0	6.0	9.5
Peak flow at blending to 8 ° Gh and a raw water hardness of 20 °Gh	[m³/h]	3.3	5.0	8.3	10.0	15.8
Pressure loss at max. continuous flow	[bar]	0.6	1.1	2.1	1.5	2.3
k_V-value (at Δp = 1.0 bar)	[m³/h]	2.6	2.7	3.1	4.5	5.6
k_V-value at blending to 8 °Gh and a raw water hardness of 20 °Gh	[m³/h]	4.3	4.5	5.2	7.5	9.3
Nominal capacity	[mol] [m³/x°Gh]	9.5 53	20.9 117	42.3 237	60.0 336	95.2 533
Capacity per kg of regeneration salt	[mol/kg]	5.27	5.22	5.22	5.20	5.90
Time capacity	[m³ x °Gh/h]	68	81	143	207	243
Dimensions and weights [2]						
Total height	[mm]	1310	1530	1790	1840	1970
Total height (without control electronics) ****	[mm]	1080	1300	1560	—	—
∅ exchanger tank	[mm]	208	257	334	369	469
∅ brine tank *	[mm]	410	500	570	700	700
Total height of brine tank *	[mm]	670	810	880	870	870
Height of safety overflow brine tank *	[mm]	570	700	780	770	770
Connection height control valve (raw water)	[mm]	940	1160	1420	1710	1830
Depth of foundation, min. *	[mm]	500	600	700	800	800
Length of foundation, min. *	[mm]	1300	1500	1600	2100	2200
Operating weight, approx. *	[kg]	190	340	555	825	1080
Filling volumes and consumption data**						
Resin quantity	[l]	18	40	81	115	200
Freeboard (resin in sodium form), approx.	[mm]	270	230	290	390	300
Salt consumption per regeneration approx.	[kg]	1.8	4.0	8.1	11.5	16.0
Regeneration salt supply max. *	[kg]	65	130	190	285	285
Total waste water volume per regen. approx.	[l]	98	181	376	583	865
Operating water volume	[l]	5	11	23	32	44
Minimum filling level of salt *	[mm]	—	—	—	—	—
Ambient data						
Water temperature, max.	[°C]	30				
Ambient temperature, max.	[°C]	40				
Control unit						
Data records in Code 290 (single/twin) [3]		9011 D	9012 D	9013 D	9508 D	9509 D
Order no.		**184 200**	**184 220**	**184 240**	**184 260**	**184 280**
Order no.***		**184 225**	**184 245**	**184 250**	**184 275**	**184 285**

* 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, i.e. they only serve for approximate determination.

*** The maximum continuous flows listed may be smaller at high raw water hardness values.

**** For systems with a nominal connection size of DN 40, the control electronics is mounted between the ion exchanger tanks.

***** Version without GENO®-IONO-matic control electronics – may only be operated by means of GENO®-KWA-tronic$_2$.

[1] The power supply for GENO-mat® duo WE-KWA is made by GENO®-KWA-tronic$_2$.

[2] All dimensions and weights are approximate values!

[3] For GENO-mat® duo WE-KWA, refer to the operation manual for GENO®- KWA/GENO®- Luwades$_2$.

3 Designated application

The water softeners of the GENO-mat® duo WE series are designed for the softening of cold drinking and industrial water. As twin systems, they are suitable for continuous soft water supply. We manufacture systems with full and economy salting. 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 °Gh.

The water to be softened must be free of iron and manganese (less than 0.2 mg iron and 0.05 mg manganese per liter). The maximum water temperature is 30 °C, the maximum ambient temperature is 40 °C.

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

Regarding the softening of drinking water, the stipulations of the German Drinking Water Ordinance must be observed (residual hardness 3 °Gh - 8 °Gh, max. sodium concentration 200 mg/l (refer to chapter E, paragraph 2.1). This requires a blending valve which allows the addition of inlet water.

The system is adjusted to the soft water requirements to be expected at the installation site. It is not suitable for considerably differing performances. The maximum continuous flow must not be exceeded under any circumstances.

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

Appropriate application of the system also implies that the information contained in this manual and all safety guidelines applying at the installation site be observed. Finally, the system must be maintained and inspected at the specified intervals.

4 Application limits

The application limit depends on the maximum continuous flow, which corresponds to the data shown in tables C-1 and C-2 for raw water in the hardness ranges 1 - 3. If the water is very hard (hardness range 4 and higher), the maximum continuous flow may decline. In this case, the application limit of the system is defined by the following equation:

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

The time capacity is shown in tables C-1 and C-2.

5 Scope of delivery

5.1 Standard equipment

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

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

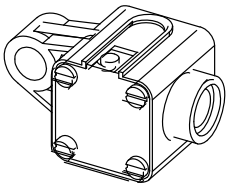
- 1 central control valve made of red bronze
- Brine tank made of PE with sieve bottom (separates salt supply chamber and brine chamber) and brine valve made of PP with safety float (controls the brine flow); with brine buffering technology
- 1 microprocessor controller (GENO®-IONO-matic) with LCD (controls all system functions, indicates system status and errors)

Note: The GENO®-IONO-matic control electronics is not included in the scope of delivery of versions GENO-mat® duo WE-MSR and WE-KWA.

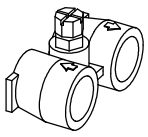
- Turbine water meter (TWZ) (can be replaced by a water meter with counter, see 4.2)
- Water analysis kit „Total hardness" (see 4.3)
- Operation manual
- Only for systems with economy salting: disinfection unit (this does not, however, apply for GENO-mat® duo WE-KWA).

5.2 Optional accessories

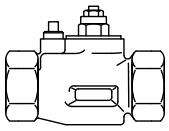
Note: It is possible to retrofit existing systems with optional components. Please contact your local Grünbeck representative or Grünbeck headquarters for details.



- Disinfection unit (generates chlorine from brine by means of electrolysis; standard equipment for systems with economy salting)
  up to duo WE 300 — 126 820
  up to duo WE 450 — 181 800
  from duo WE 530 — 181 805

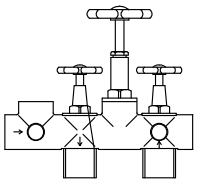


- Adapter connection 9000 with integrated blending unit; R 1"
  (Standard equipment for duo WE 50, 130 and 230; available as option for duo WE 65, 150 and 300) — 125 809

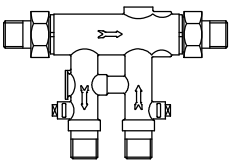


- Blending valve (to adjust the residual hardness by adding raw water) Connection R 1¼ '' 126 003

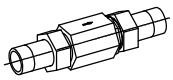
- Water meter with counter Connection R 1'' 163 080
  Connection R 1½'' 163 085



- Mounting set 1: (for easy connection to water installation) 125 845
  Compact valve block R 1", female thread, integrated bypass with shut-off valve, shut-off valves for hard and soft water, outlet for raw water (e. g. garden hose), 2 flexible stainless steel armored hoses* (connection R 1", female thread, length 600 mm)



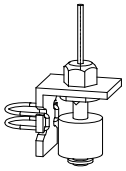
- Mounting set 2: (for easy connection to water installation) 125 850
  Connection block R 1", male thread with connection fittings, shut-off ball valves for hard and soft water, non-return valve, overflow valve, 2 flexible stainless steel armored hoses* (connection R 1" female thread, length 600 mm)



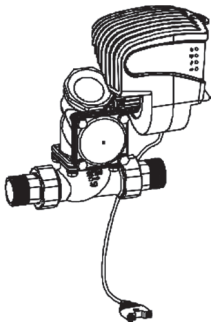
- Overflow valve; connection 1" male thread, opening pressure 0.8 bar 125 855
  (to cover peak consumption by adding raw water, to be installed in the bypass)

- Recirculation unit with 2 flexible stainless steel armored hoses (connection R 1" male thread, length 600 mm) (reduces the counter ion effect during extended periods of standstill) 181 850

- Voltage-free signal (indication of operating mode) 126 890



- Automatic empty signal for brine tank 181 880



GENO-STOP® 1" 126 875

- GENO®-STOP for optimum protection against water damage. The new GENO®-STOP safety device provides reliable and comprehensive protection against water damage.
  The GENO®-STOP may be equipped with up to 2 wired water sensors and with 5 wireless water sensors.
  - For additional versions, please inquire -

5.3 Consumables

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

• Regeneration salt (25 kg)		127 001
• Water analysis kit for total hardness °dH and °f	1 pc 10 pcs	170 187 170 100

5.4 Wearing parts

Seals and control pistons are subject to a certain 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

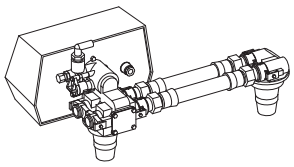


Fig. C-1: Control valve
Nominal connection diameter DN 25

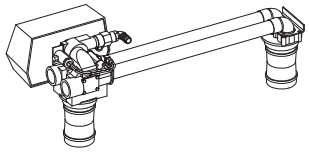


Fig. C-2: Control valve
Nominal connection diameter DN 40

b) Flat seals, non-return valves

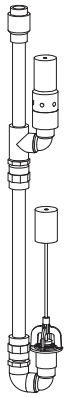


Fig. C-3: Brine valve

c) Disinfection unit (only for systems with economy salting)
(this does not apply, however, for GENO-mat® duo WE-KWA).

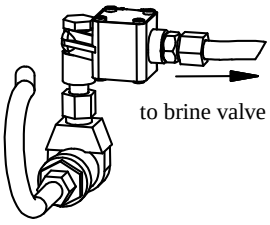


Fig. C-4: Disinfection unit
(pre-assembled)

D Installation (GENO-mat® duo WE)

Content

1 General installation instructions

The installation site must provide adequate space. A foundation of a sufficient size and load carrying capacity must be provided. The required connections must be provided before the system is installed. Please refer to table D-1 for dimensions and connection data.

Table D-1: Installation data		**Water softener GENO-mat® duo WE**									
		with full salting					**with economy salting**				
		65	**150**	**300**	**450**	**750**	**50**	**130**	**230**	**330**	**530**
Connection data											
Nominal connection diameter		DN 25 (1" female thread)			DN 40 (1½" fe. th.)		DN 25 (1" fe. thread)			DN 40 (1½" fe. th.)	
Drain connection, min.		DN 50									
Power supply[1)]	[V]/[Hz]	230/50-60 (system operation with protective low voltage 24/50-60)									
Connected load	[VA]	40									
Protection/protection class		IP 54/I									
Weights and dimensions[2)]											
Total height**	[mm]	1310	1530	1790	1840	1970	1310	1530	1790	1840	1970
Total height without control electronics	[mm]	1080	1300	1560	1840	1970	1080	1300	1560	1840	1970
∅ exchanger tank	[mm]	208	257	334	369	469	208	257	334	369	469
∅ brine tank *	[mm]	500	570	700	780	900	410	500	570	700	700
Total height of brine tank *	[mm]	810	880	870	1100	1250	670	810	880	870	870
Height of safety overflow brine tank *	[mm]	700	780	770	980	1120	570	700	780	770	770
Connection height control valve	[mm]	940	1160	1420	1710	1830	940	1160	1420	1710	1830
Depth of foundation, min. *	[mm]	600	700	800	900	1000	500	600	700	800	800
Length of foundation, min. *	[mm]	1460	1500	1700	2100	2400	1300	1500	1600	2100	2200
Operating weight, approx. *	[kg]	285	435	730	1110	1745	190	340	555	825	1080
* Systems with standard salt tank		small systems			large sys.		small systems			large sys.	
** In case of systems with a nominal connection diameter of DN 40, the control electronics is mounted between the exchanger tanks.											

1) The power supply for GENO-mat® duo WE-MSR and WE-KWA is made b y the GENO®-MSR-tronic respectively the GENO®-KWA-tronic$_2$.

2) All weights and dimensions are approximate!

Note: For the installation of systems with optional accessories (see chapter C, 4.2), also observe the operation manuals that come with these components.

1.1 Water installation

When installing the water softener GENO-mat® duo WE certain rules must absolutely be respected. Additional recommendations facilitate the work with the system. The installation instructions described herewith are illustrated in Fig. D-1.

Binding rules

The installation of a water softener represents a major interference with the drinking water system. Only authorised experts may install such systems.

- Observe the local installation guidelines, the general guidelines and all other applicable guidelines.
- The system must be preceded by a fine filter (e. g. BOXER®).
- Use corrosion-resistant material for the soft water pipe
  OR
  dose an anti-corrosion agent downstream of the water softener.
- Provide a drain connection (at least DN 50) to discharge the regeneration water.

Note: If the regeneration water is removed by means of a lifting system, this system must be salt water-resistant.

The system does not have a DVGW mark of conformity. According to DIN 1988, additional protection devices for the protection of the drinking water are required. Therefore:

- Separate the water softener from the drinking water supply according to DIN 1988 part 4 (e. g. by means of a Euro system separator GENO®-DK 2).

Recommendations

- Provide a sampling valve immediately downstream of the water softener. That way, the required regular hardness tests (functional checks) are very easy to perform.

1.2 Electrical installation

An earthed socket is required for the electrical connection. It must correspond to the specifications indicated in table D-1 and may be no further from the water softener than 1.20 m. Constant voltage is required (do not couple with light switch!).

Note: The power supply for the GENO-mat® duo WE-MSR and WE-KWA is made via the control units GENO®-MSR-tronic respectively GENO®-KWA-tronic$_2$.

Note: The corresponding connection diagram is included in the wiring diagram of the reverse osmosis system respectively in the operation manual of the automatic salt reduction/air washer compact system.

2 Preliminary works

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

Attention! The system only works if the components are mounted properly. The exchanger tank with the control valve must be positioned on the right (as viewed from the front).

Only for small systems (nominal connection diameter 1''):
The connection hoses with pre-assembled connection adapters and couplings are supplied with the system.

4. Plug in the couplings.
5. Mount the hoses between control valve and exchanger tank adapters.
6. Mount the connection block for the raw water connection.

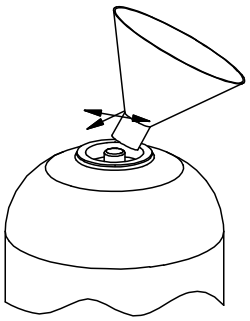
Note: Separate mounting instructions are enclosed with the connection block.

2.1 How to fill the exchanger tank

The steps described below are only required for the large systems (GENO-mat® duo WE 450, GENO-mat® duo WE 750, GENO-mat® duo WE 330, GENO-mat® duo WE 530). The small systems come with the exchanger tanks already filled.

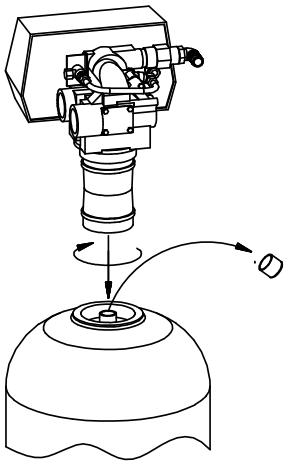
Table D-1: Filling of the resin

	duo WE 450 / duo WE 330	duo WE 750 / duo WE 530
Amount of resin per exchanger tank	115 l	200 l



Center the riser, fill in the resin

1. Check whether the risers are covered with protective caps. Plug on protective caps, if necessary.
   The protective caps prevent the material from getting into the risers.
2. Center the risers in the exchanger tanks.
3. Fill in the ion exchanger resin into the tank by using the funnel supplied with the system.
4. Fill the exchanger tank with drinking water.



Remove the protective cap, fasten the control valve

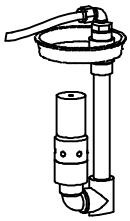
5. Centre the risers precisely.
6. If necessary, remove the excessive resin from the threads and the sealing surfaces of the exchanger tanks for the connection of the control valve and the exchanger adapter.
7. Remove the protective caps from the risers.
8. Move the control valve with the nozzle over the riser of the right exchanger tank (front view) and fasten it by turning it clockwise.
9. Move the exchanger tank adapter with the nozzle over the riser of the left exchanger tank (front view) and fasten it by turning it clockwise.
10. Fill the exchanger tank with water.
11. Mount the connecting pipes between the control valve and the exchanger tank adapter.

2.2 How to mount the brine tube

Refer to fig. D-1 (b), item 7.

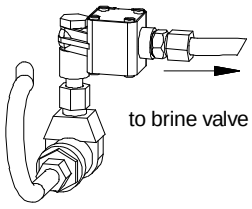
1. Place the brine tank at the required location.
2. Remove the cover from the brine tank.

Note: For easy mounting of the brine tube, you may remove the brine valve. To do so, remove the yellow cover and pull the brine valve out to the top.



Brine valve with transition nipple and angle piece

3. Mount transition nipple (does not apply for duo WE 750 (530)) and the angle piece to the brine valve.
4. Cut the brine hose to the required length and plug in the supports at both ends.
5. Mount the brine hose to the brine valve.
6. If you have removed the brine valve: plug it back in and refit the yellow cover.



Pre-assembled disinfection unit

Only for systems with disinfection unit:

7. Mount the disinfection unit.
8. Connect the brine hose to the disinfection unit.

All other systems:

9. Mount the brine hose to the BVO valve of the control valve.

Note: Separate mounting instructions are supplied with the disinfection unit.

3 System connection

3.1 Water connection

1. Connect the system to the water supply as per installation drawing (fig. D-1 (a)).
   Observe the instructions and recommendations in section 1.

Note: The supplied water meter must absolutely be installed at the soft water side (downstream of the system).

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

2. Connect the system to the drain by directing the drain hose to the outlet and fastening it.

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

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

Dimensions in fig. D-1 (a); extract from table D-1											
Water softener GENO-mat®-duo WE	**65**	**150**	**300**	**450**	**750**	**50**	**130**	**230**	**330**	**530**
	(full salting)					(economy salting)				
A Total height [mm]	1310	1530	1790	1840	1970	1310	1530	1790	1840	1970
A2 Total height without control electronics [mm]	1080	1300	1560	1840	1970	1080	1300	1560	1840	1970
B ∅ exchanger tank [mm]	208	257	334	369	469	208	257	334	369	469
C ∅ brine tank * [mm]	500	570	700	780	900	410	500	570	700	700
D Total height of brine tank * [mm]	810	880	870	1100	1250	670	810	880	870	870
E Height safety overflow brine tank * [mm]	700	780	770	980	1120	570	700	780	770	770
F Connection height control valve [mm]	940	1160	1420	1710	1830	940	1160	1420	1710	1830

* For systems with standard brine tank
All dimensions and weights are approximate!

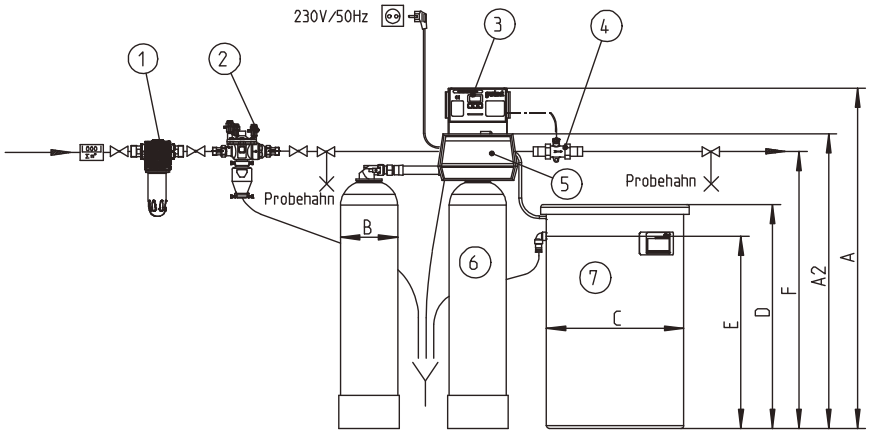
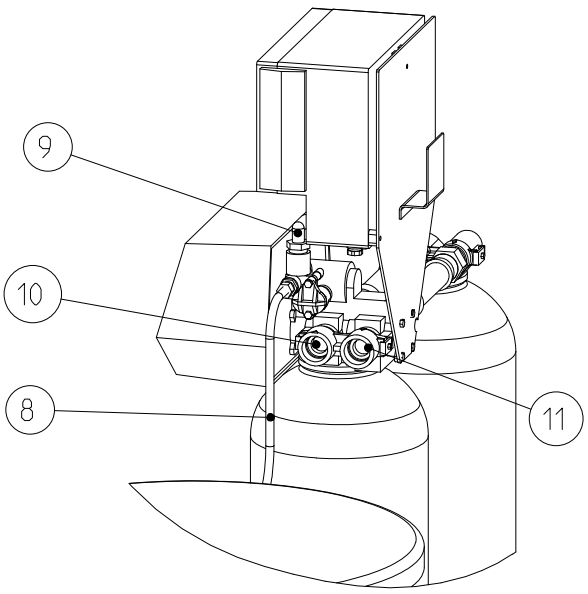


Fig. D-1 (a): Installation drawing for water softener GENO-mat®-duo WE



① Fine filter BOXER®
② Euro system separator GENO® DK 2
③ Control electronics GENO®-IONO-matic (for version GENO-mat® duo WE-MSR respectively WE-KWA without control electronics)
④ Water meter
⑤ Control valve
⑥ Exchanger tank
⑦ Brine tank
⑧ Brine tube
⑨ Drain hose connection
⑩ Raw water inlet
⑪ Soft water outlet

Fig. D-1 (b): Water softener GENO-mat®-duo WE; Side view right/rear

For a detailed view of the brine tube connection refer to fig. D-3

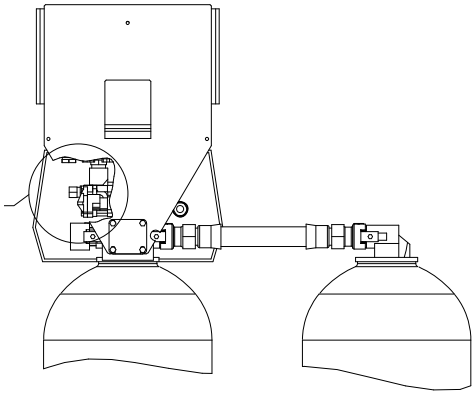


Fig. D-2: Water softener GENO-mat®-duo WE; rear view

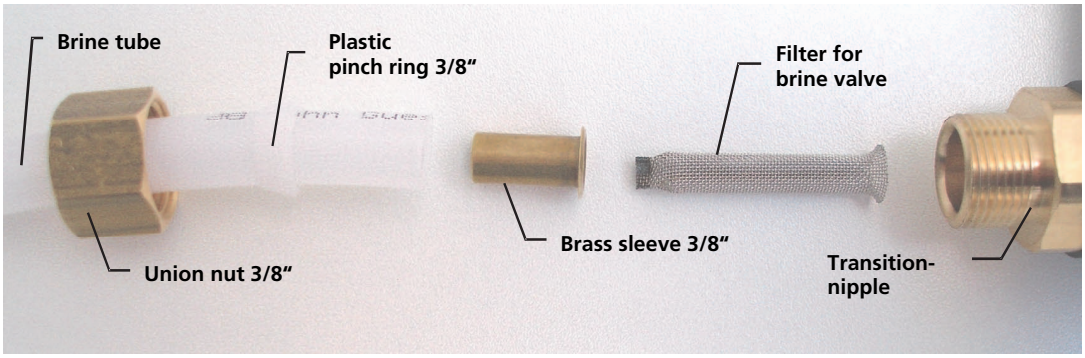


Fig. D-3: Exploded drawing of the brine tube connection

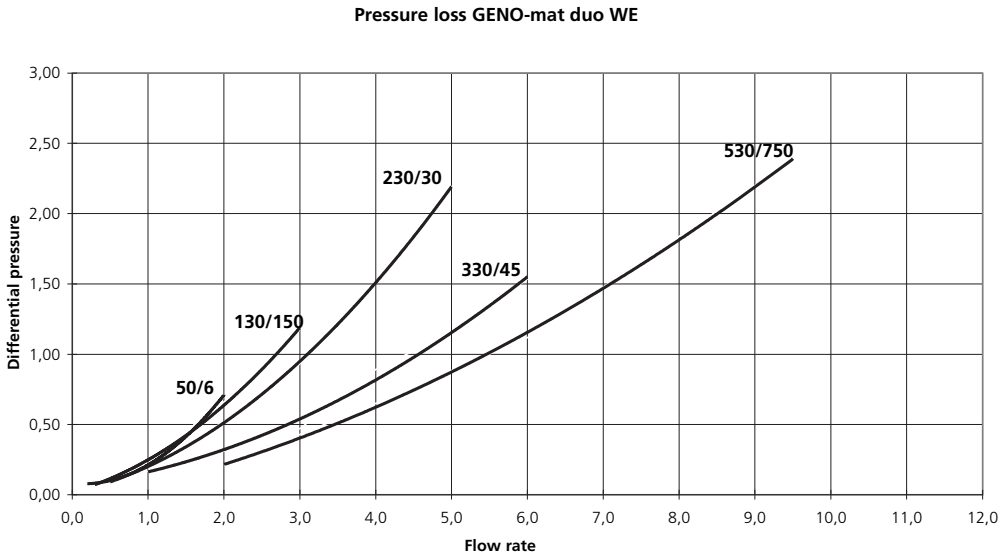


Fig. D-2: Pressure loss curve for GENO-mat® duo WE

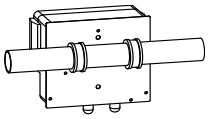
3.2 Connection of the control electronics

The work described in this section may only be performed by trained electricians or electronics experts.

The control electronics must be connected as per terminal plan, fig. D-2.

Note: The corresponding connection diagram is included in the wiring diagram of the reverse osmosis system respectively in the operation manual of the automatic salt reduction/air washer compact system.

Note: Small systems (nominal connection diameter 1") come pre-assembled. Steps 1 and 2 do not have to be performed



1. Mount the control electronics onto the connection pipes by means of the mounting kit supplied with the system

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.

2. Route 7-wire cable between control valve and control electronics and connect as per terminal plan (fig. D-2).
3. Only for systems with disinfection unit:
   Connect the supply cable to the C+ and C- terminals.
4. Connect the water meter as per terminal plan (fig. D-2).
5. Plug the mains plug into the socket (see 1.2).

Turbine-water meter	Water meter with counter
U_W = white H_W = green G_W = brown	R_W = green G_W = brown

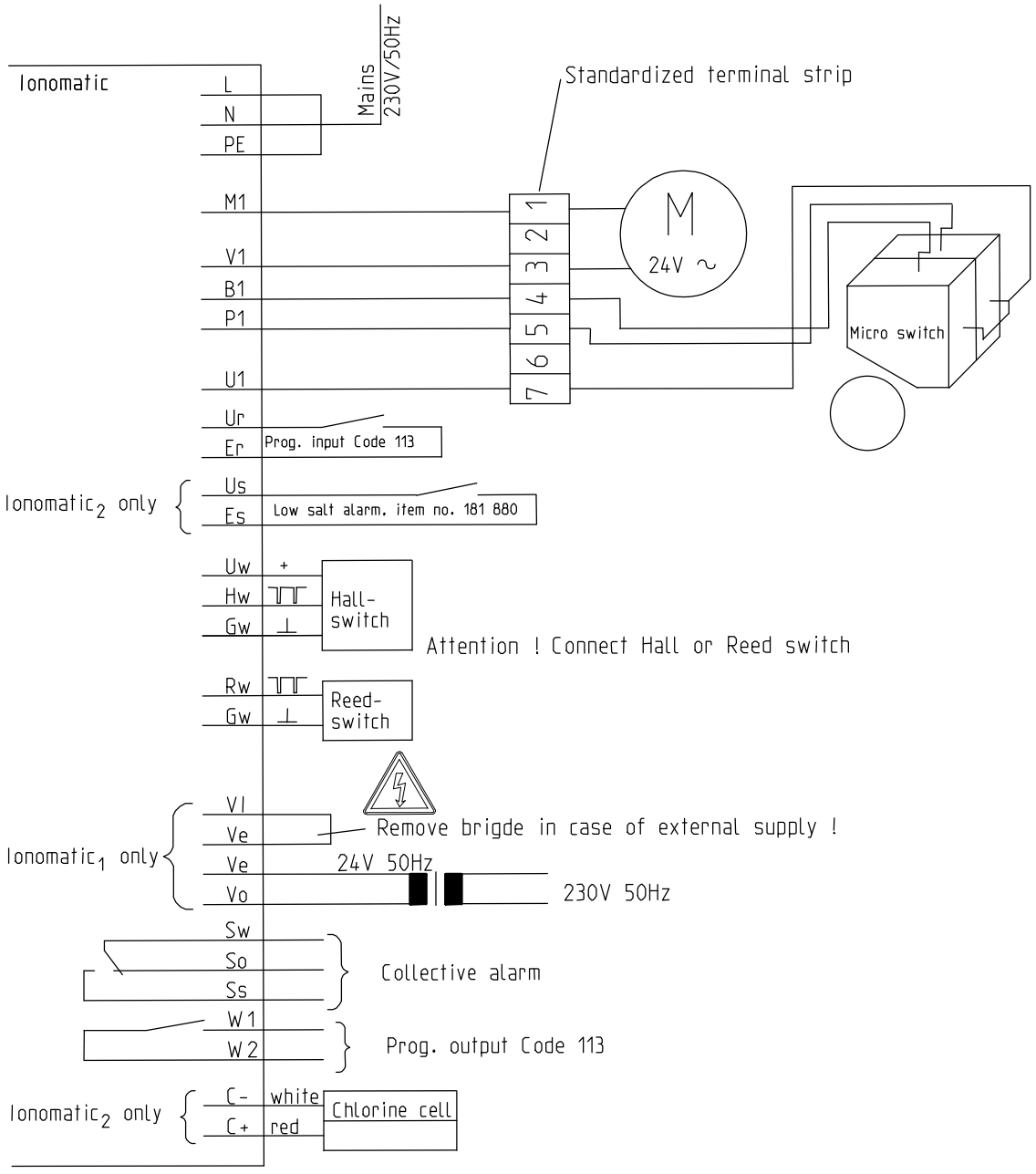


Fig. D-2: Terminal plan

E Start-up (GENO-mat® duo WE)

Content

The work described below may only be performed by trained experts. We recommend having the Grünbeck's technical service/authorised service company start up the system.

1 How to fill 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 at the brine valve and the injector of the control valve. A defined salt quality is required for the reliable function of the system.

Only use salt tablets as per DIN EN 973 A.

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

Table E-1: Filling of brine tank		**Water softener GENO-mat® duo WE**				
Systems with full salting		**65**	**150**	**300**	**450**	**750**
Regeneration salt supply, max.*	[kg]	130	190	285	485	760
Operating water volume	[l]	10	22	45	70	111
Systems with economy salting		**50**	**130**	**230**	**330**	**530**
Regeneration salt supply, max.*	[kg]	65	130	190	285	285
Operating water volume	[l]	5	11	23	32	44
*For systems with standard brine tank						

2 How to set the system

2.1 Adjusting the blending hardness

The small systems with economy salting (GENO-mat® duo WE 50, duo WE 130, duo WE 230) are equipped with a blending unit. This blending unit is available as an option for systems GENO-mat® duo WE 65, duo WE 150, duo WE 300.

Larger systems may be equipped with an optional blending valve R 1¼". If both, soft water at 0° dh and blended water are required, this blending valve is also recommended for the small systems. Also observe the operating instructions for the blending valve, if applicable.

Attention! If the softener is installed upstream of a reverse osmosis system, the supply pipe to the RO system must not be used as blending water pipe.

Note: When softening drinking water, the stipulations of the German Drinking Water Ordinance must be observed:

Sodium concentration (max.): 200 mg/l. With regard to the blending hardness, please observe paragraph 3.1!

Sodium concentration

Please contact you water works for the sodium concentration in your inlet water. When you soften the water by 1 °Gh, the sodium concentration increases by approx. 8.2 mg/l. Therefore, if the pertinent Drinking Water Ordinance must be observed, you cannot soften the water to any degree desired. The permitted blending hardness results from the sodium concentration limit value and the raw water hardness.

200 mg/l (limit value acc. to Drinking Water Ordinance)
– x mg/l (sodium concentration in the inlet water)

y mg/l (possible sodium admixtures during softening)

$\frac{y}{8{,}2}$ = Z °dH (max. softening possible)

The inlet water may only be softened by max. Z °dh. Depending on the sodium concentration of the inlet water, you must select a blending hardness that is below the permitted maximum value of 200 mg/l.

Example

Softening of drinking water

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

Possible sodium admixture during softening:

200 mg/l – 51.6 mg/l = 148.4 mg/l

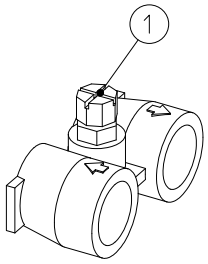
This determines the maximum permitted degree of softening:

$\frac{148.4}{8.2} \approx 18\,°dh$

This means:
You must blend at least to 22 – 18 = 4 °dh zu verschneiden!

2.1.1 Recommendations Blending hardness

Blending hardness	Result
3 – 5 °dh	Very soft water – optimally suited for thermal devices – might cause problems in getting off soap
6 – 8 °dh	Optimum soft water



Adjusting the blending hardness

In the systems GENO-mat® duo WE 50, duo WE 130 and duo WE 230 the blending unit described herein is installed at the control valve. Small systems with full salting may also be equipped with this unit (option). In all other cases, refer to the operating instructions of the integrated blending valve.

1. Open the valve at the raw water inlet.
2. Open the valve at the soft water outlet.
3. Set adjustment screw (1) to a medium scale value.
4. Take a water sample at the sampling valve downstream of the system.
5. Determine the hardness by means of the water analysis kit "Total Hardness".
6. Adjust the blending hardness as required.
   Procedure:
   - Turn the adjustment screw to the left (close) in order to decrease the blending hardness.
   - Turn the adjustment screw to the right (open) in order to increase the blending hardness.
7. Repeat steps 4 and 5 until you have obtained the desired blending hardness.

Note: The setting/programming of the GENO-mat® duo WE-MSR is decribed in the operation manual of the GENO®-OSMO-MSR system in chapter F paragraph 4.5.

For GENO-mat® duo WE-KWA the operation manuals GENO® -KWA 50k/60i respectively GENO®-LUWADES$_2$, chapter F paragraph 4.6 apply.

2.2 Setting of the control unit

The GENO-mat® duo WE water softener features volume control. The operating parameters are stored in the GENO®-IONO-matic controller. When you start up the system, you must enter all parameters which are required for the automatic determination of the regeneration intervals. In addition, you must check the factory-set values.

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

1. Set the time.
2. Enter the raw water hardness.
3. Set the „blending hardness“ (hardness of the water at the water meter)
   (not possible for GENO-mat® duo WE-MSR).

Note: Regardless of the selected blending hardness, you must enter 0 °dh if the water meter precedes the blending valve.

4. Check the factory-set data records (operating parameters). To do so, activate code 290 and adjust the displayed value according to the table E-2.

Table E-2: Data records in Code 290	Water softener GENO-mat® duo WE				
Systems with full salting	**65**	**150**	**300**	**450**	**750**
Data records in Code 290 (single/twin)	9014 D	9015 D	9016 D	9510 D	9511 D
Systems with economy salting	**50**	**130**	**230**	**330**	**530**
Data records in Code 290 (single/twin)	9011 D	9012 D	9013 D	9508 D	9509 D

Note: The control electronics and control valve are automatically adjusted (synchronized). The electronics recognizes that both exchangers are fully regenerated.

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

Table E-3: Intervals of the water meter pulses (setting Code 290)			
Standard equipment of:	**Water meter**	**Pulse interval**	**Displayed value**
small systems	TWZ 1"	0.029 l/Imp	F 2
midsize and large systems	TWZ 1 ½", TWZ 2"	0.075 l/Imp	F 10
—	with counter	100.0 l/Imp	F 9

3 How to start up the system

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

Note: There is a time delay (factory-setting: 0.2 hours (= 12 minutes)) between 2 regenerations on all systems with low-salt alarms. This period of time 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 the complete system is tight.
6. Take a water sample at the sampling valve downstream of the system.
7. Determine the hardness by means of the water analysis kit "Total Hardness".
   The system functions properly if the water taken directly downstream of the exchanger tank has a hardness of 0 °Gh.
8. Fill in the cover sheet and the check list / column 1 of the operation log. Perform the required measurements and checks.

Note: In systems with low-salt alarm featuring the GENO®-MSR-tronic or GENO®- KWA-tronic$_2$, a delay time of 0.2 hours (12 minutes) has to be set. Refer to operation manual GENO®-OSMO-MSR, chapter F, paragraph 4.5 or GENO®- KWA 50k/60i respectively GENO®-LUWADES$_2$, chapter F, paragraph 4.6.

F Operation (GENO®-IONO-matic)

Content

1 Introduction

The GENO-mat® WF, GENO-mat® duo WF, GENO-mat® duo WE and GENO-mat® GVA softening systems are volume-controlled. They are operated and monitored by means of the GENO®-IONO-matic controller.

Note: For the GENO-mat® duo WE water softener versions GENO-mat® duo WE-MSR respectively. WE-KWA, chapter F in the operation manuals for the GENO®-OSMO-MSR respecitvely. GENO®-KWA 50k/60i respecitvely GENO®-LUWADES$_2$ do apply.

Controls

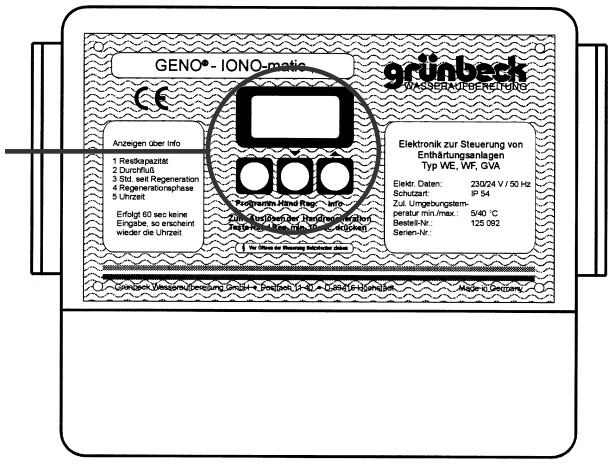


Fig. F-1: GENO®-IONO-matic controller

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

Use only the settings described in this section!

All other modifications to the controller, in particular modifications to the records, may only be performed by Grünbeck's customer service.

2 Controller operation

2.1 Controls and display

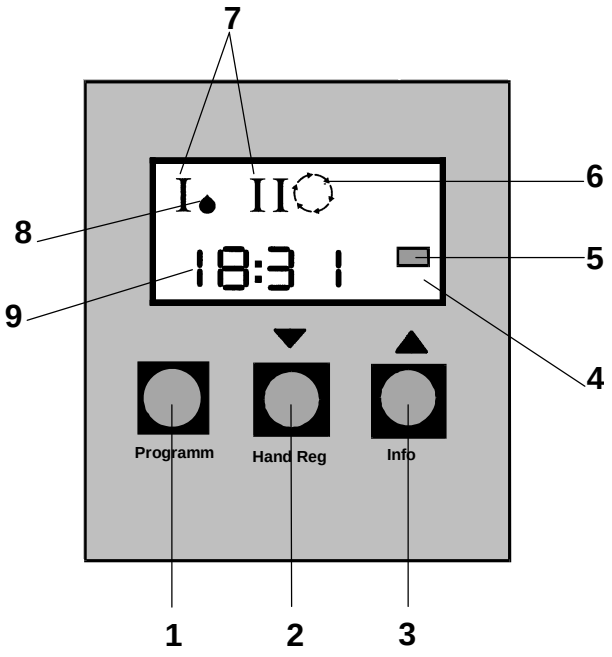


Fig. F-2: GENO®-IONO-matic controller; operational controls and display

1 "Program" button
in normal mode:
- switches to programming mode (hold down for more than 5 seconds).

in programming mode:
- opens menus.
- saves the setting and closes menus.

2 "Man. Reg." button
in normal mode:
- releases manual regeneration (hold down for more than 10 seconds).

in programming mode:
- switches to previous menu
- decrease the numerical values.

3 "Info" button
in normal mode:
- activates the info mode and switches to the next screen

in programming mode:
- switches to the next menu
- increases the numerical values.

4 Display
- indicates the operating parameters (see 5 - 10).

5 "Unit" indication
- indicates the unit of the numerical value (e.g. °Gh, m^3 ....).

6 "Regeneration" indication
- indicates the status of the regeneration of the exchanger tank shown. Each arrow represents one step in the regeneration cycle. When the arrows form a circle, the regeneration is complete.

7 "Exchanger tanks" indication
- indicates the operating status of exchanger tanks I and II (only twin systems). The active exchanger tank is shown on the left, the tank currently in regeneration or stand-by mode is shown on the right.

8 "Water Flow Pulse" indication
- indicates the water flow.

9 "Numerical values" indication
- indicates the time in normal mode.
- indicates the operating parameters in info mode
- indicates the menu values in programming mode. Open menus blink.

2.2 Setting operating parameters

Principle

A programming mode must be activated before you can create settings (user programming mode: button 1, customer service programming mode: buttons 1 + 2).

In programming mode, button 3 switches to the next menu item, button 2 to the previous one. When you get to the parameter you want to change, press button 1 to open the menu. The display will blink. When the menu is open (blinking display), use buttons 2 and 3 to switch to lower or higher values. When the desired value is displayed (blinking), save it by pressing button 1. This closes the menu and the set value is displayed as a permanent value.

When all of the required settings have been saved, press buttons 2 and 3 simultaneously to exit the programming mode. The display returns to basic mode (time). The display also reverts to basic mode if no entries are made for more than 1 minute. Entries not saved by this time are lost.

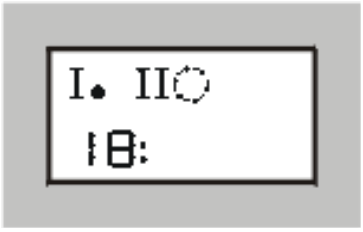
Note: Instructions appearing in bold face are required so that work can proceed. All other steps can be skipped if the value displayed is not changed.

Basic settings (user programming mode)

The basic settings must be compatible with the conditions on site. The value must be changed accordingly in case of fluctuating raw water quality.

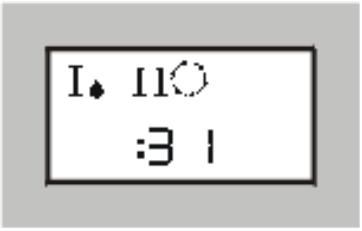
In basic mode, the operating status of the two exchanger tanks is displayed as well as the time saved in the system. First activate the user programming mode.

1. **Hold down the "Program" button (1) for longer than 2.5 seconds.**



The hour is displayed. If the display corresponds to the current time, skip steps 2 - 4.

2. Press the "Program" button (1).
   The displayed value begins to flash.
3. Set the correct time (hour). To do so:
   Press the "Man. Reg." button (2) to decrease the hour value
   OR
   Press the "Info" button (4) to increase the hour value.
4. Save the setting by pressing button (1).
   The hour displayed will stop blinking.
5. **Press the "Info" button (3) to switch to the next menu item.**

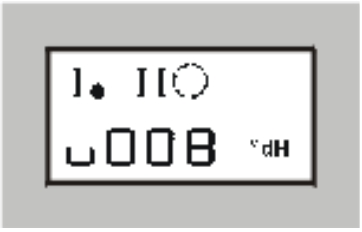


The minute value is displayed. If the value is correct, proceed with step 9.

6. Open the menu by pressing the "Program" (1).
7. When the display starts to blink, use buttons (3) and (2) to increase or reduce the value.
8. As soon as the correct value id displayed, press button (1). The value will stop blinking.
9. **Press the "Info" button (3) to switch to the next menu item.**

The raw water hardness stored in the system is displayed. You must now enter the actual raw water hardness applying at your installation site. You can determine this value by means of the "Total hardness" water analysis kit or by inquiring at your local water works.

10. Enter the appropriate value. To do so, go through the steps described in 6 – 8.
11. **Press the "Info" button (3) to switch to the next menu item.**



The "blending hardness" menu item is displayed. Enter 0 °dH if your system does not have a blending unit at all or if the blending unit is installed before the water meter. In all other cases, the blending hardness value must be set. The value is determined by the setting of the blending valve (between 0 °dH and the raw water hardness). If drinking water is to be softened, the guidelines set out in the German Drinking Water Act must be complied with (refer to section E).

12. Enter the correct value. To do so, go through the steps described in 6 – 8.
13. **Press the "Info" button (3) and the "Man. Reg." button (2) simultaneously to return to basic mode.**
    The current time is displayed.

Basic settings (customer service - programming mode)

All of the basic system parameters are saved in records. The system is ready for operation when the correct record has been selected. The factory-settings must be checked during start-up. In addition, the operating mode can be chosen.

Only Grünbeck customer service staff or authorized experts may modify settings in customer service programming mode.

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

The guidelines in the instruction manual must be followed explicitly! Use only the settings described here!

Prerequisite: The system is in basic mode. The time is displayed.

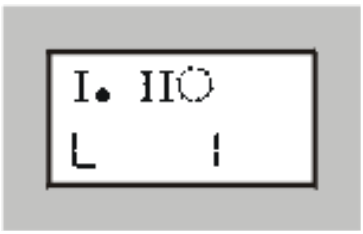
1. **Press the "Program" button (1) and the "Man. Reg." button(2) simultaneously until the display changes.**

The customer service programming mode is active. First, select the required menu.

The numbers (000) blink. Modify the value so that the code for the required menu is displayed. The code for the required "System Setup" menu is 290.

2. **Press the "Info" button (3) to increase the value until C. 290 is displayed.**
   OR
   Press the "Man. Reg." button (2) to decrease the value until C. 290 is displayed.
   Hold down the buttons (2) or (3) to run through the numbers quickly. Fine tuning is possible by pressing and releasing the buttons.

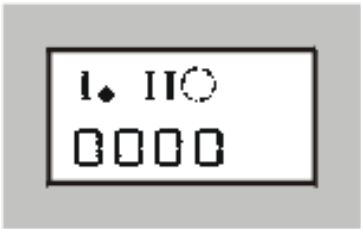
3. **Press the "Program" button (1) to confirm Code 290.**



You can now choose the "language", i.e. the unit the system is to use for computing and displaying parameters. Choose between L 1: °dh, L 2: °fH and L 3: mol/l (mol is displayed). If no modifications are required, proceed with step.

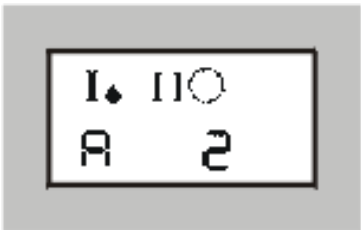
4. Press the "Program" button (1) to open the menu.
   The display starts to blink.

5. Set the required value by pressing the "Info" button (3) (loop L 1→ L 2→ L 3 → L 1...).
   OR
   Set the required value by pressing the "Man. Reg." button (2). (loop L 1→ L 3→ L 2 → L 1...).
6. Press button (1) to confirm the entry.
   The display stops blinking and the selected unit is displayed in the units field.
7. **Press the "Info" button (3) to switch to the next parameter.**



The number of the factory-preset record (standard operating parameters) is displayed. If the setting does not correspond to the record of your system (see section E), it must be modified.

8. Open the menu by pressing the "Program" button (1).
   The display starts to blink.
9. Increase the displayed numerical value by means of the "Info" button (3)
   OR
   Decrease the displayed numerical value by means of the "Man. Reg." (2) button.
   Hold down the buttons (2) or (3) to run through the numbers quickly. Fine tuning is possible by pressing and releasing the buttons (2) or (3).
10. When your system record blinks, press button (1) to confirm the setting.
11. **Switch to the next menu item by pressing the "Info" button (3).**

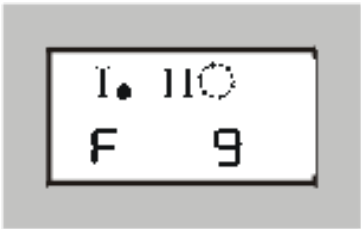


A 2 is displayed for a system with two exchanger tanks. The code for a system with one exchanger tank is A 1. The setting must be changed as required.

12. Open the menu by pressing button (1) (display blinks).
13. Press button (2) or button (3) to display the required value.
14. Confirm the new value by pressing button (1).
15. Switch to the next menu item by pressing the "Info" button (3).

The nominal capacity stored in the record is displayed. This setting cannot be modified.

16. **Switch to the next menu item by pressing the "Info" button (3).**



The parameter "Water Meter Pulse" is displayed. Table F-1 indicates what the codes represent.

The setting required depends on the water meter installed in your system (see section E).

17. Change the setting as required. Proceed as instructed in steps 8 - 10.

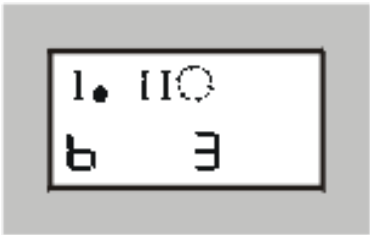
Table: F-1: Code 290 display values and corresponding water meter pulse intervals

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

18. **Switch to the next menu item by pressing the "Info" button (3).**

The water meter pulse just set is displayed (l/pulse).

19. **Switch to the next menu item by pressing the "Info" button (3).**



The "Operating Mode" is displayed. The standard setting is mode 3 (b 3 is displayed): Regeneration as soon as the specified volume of soft water has been reached, or at the latest after a preset number (1 - 99) of days.
Factory-setting for GENO-mat® duo WE 50, 130, 230:
Regeneration after 4 days at the latest, at 03:00 am at night. (based on DIN 19636).
Factory-setting for all other systems:
Regeneration after 4 days at the latest, at 03:00 am at night.
The factory-setting can be modified by Grünbeck's customer service/authorised service company and be adapted to the requirements on site.

Other operating modes:

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

b 2: Volume-dependent control. Regeneration as soon as the total capacity is reached. No timer priority control.

b 4, b 5, b 6: Special modes (contact customer service for more details).

20. Press button (1) to select another operating mode.
    The display blinks.
21. Set the required operating mode (b1 , b2 or b 3) by means of buttons (2) or (3).
22. Save the setting by pressing button (1).
23. **Press buttons (2) and (3) simultaneously to return to the basic mode.**
    The time is displayed, the system is ready for operation.

2.3 Reading the operating status

Continuous display of information on the operating status of the system.

- The active exchanger tank is displayed at the top left (in the example: I).
- The water flow is indicated by the water drop shown next to the exchanger tank code (the drop blinks every 5 water meter pulses).
- The second exchanger tank is shown on the right (II).
- The operating status can be determined by the circle of arrows. Each arrow represents one step in the regeneration cycle. A closed circle indicates that regeneration has been completed and the exchanger tank is in stand-by mode.

Further operating parameters can be activated at any time.

1. Press the "Info" button (3).
   The volume of soft water remaining until the next regeneration is displayed (in m^3).
2. Press the "Info" button (3).
   The current flow is displayed (m^3/h). The value is adjusted every 5 seconds as long as at least two water meter pulses are registered during this time period.
3. Press the "Info" button (3).
   The time (in hours) since the last regeneration is displayed.
4. Press the "Info" button (3).
   The operating status and the time still required to complete the current step.
5. Press the "Info" button (3)..
   Return to basic display mode (time).

2.4 Releasing manual regeneration

Manual regeneration is released, when

- systems work in operating mode b 1 and the maximum volume of soft water is reached prior to the set regeneration interval,
- systems are started up after a longer idle period,
- maintenance or repair work have been carried out.

Only in ready mode; time is displayed:

1. Hold down the "Man. Reg." button (2) for at least 10 seconds.

The softening system begins regeneration. The circle of arrows indicates the progress of the regeneration cycle.

G Troubleshooting (GENO-mat® WF / GENO-mat® duo WE)

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 systems GENO-mat® WF and GENO-mat® duo WE and indicates the causes and their elimination.

The softening systems GENO-mat® WF and GENO-mat® duo WE are equipped with 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: For the water softener versions GENO-mat® duo WE-MSR respectively WE-KWA, the error detection and reporting system described in the chapter G of the respective operation manuals GENO®-OSMO-MSR or GENO®-KWA 50k/60i and GENO®-LUWADES$_2$ does apply.

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	• **System overrun, system runs beyond performance parameters**	
	– System has no permanent power (coupled with light switch)	Check power supply and adjust, if necessary
	– No water meter pulses in control electronics	Check water meter and control line and replace any faulty parts.
	– Incorrect electronic setting	Check parameters in the electronics component and reset, if necessary.
	– System does not suck in brine	Clean injector, check inlet pressure and adjust, if necessary.
	– No salt in brine tank – Not enough water in brine tank	Add salt Check BVO valve and brine valve for pollution and clean, if necessary.
	• **Miscellaneous causes**	
	– Setting at the blending valve	Check inlet resp. blending hardness. Check setting of blending valve and reset, if necessary.
	– Water supply interrupted	Shut-off valves closed
	– Water volume too high (exceeds peak flow indicated on type designation plate)	Reduce water volume
	– not enough salt in brine tank	Check salt level according to the mark and add salt, if necessary.
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	Notify Grünbeck's technical service
	Second exchanger regenerates and is in the "backwash" step	Wait until regeneration is completed and check pressure loss again
System does not take in brine	– Water pressure is too low	Increase flow pressure to at least 2.0 bar
	– Injector is clogged	Clean injector
	– Injector sieve is clogged	Clean injector sieve
	– Brine valve is clogged	Remove brine valve and carefully clean it
Control valve continuously regenerates	Switch is incorrectly adjusted, defective or short-circuited	Notify Grünbeck's technical service

H Maintenance and care (water softeners)

Content

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 to the installation site must be strictly adhered to.

DIN EN 806-5 stipulates:

- Inspection every two months.
- Minor maintenance every 6 month.
- Major maintenance annually.
  The major maintenance must be performed by Grünbeck's technical service/authorised service company or by a specialised company.
- An operation log (refer to chapter H, paragraph 5) must be kept in order to record the maintenance work performed.

Note: 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, before switching over to the standard inspection cycle. 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 (water test kit „total hardness").

Check the salt level in the brine tank, observe the minimum filling level (refer to sticker). Refill salt tablets, if necessary.

Attention! If the salt level falls below the minimum filling level, hardness may break through.

Check control valve to drain for tightness (in operating mode without regeneration activity).

2.1 How to refill salt

Warning! Impurities in the brine 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 | Minor maintenance

You may perform the minor maintenance work yourself.

- Read the water meter reading.
- Determine raw and soft water hardness (water test kit „Total hardness“)
- Check the setting of the control unit:

  a) Time
  b) Raw water hardness
- Check the salt level in the brine tank, comply with the minimum level for the salt filling (refer to the mark at the funnel of the brine tank). If necessary, refill salt tablets.
- Check the salt quality – the salt must not be clumped. If necessary, break up clumping by means of a suitable tool.
- Assess the salt consumption subject to the water volume consumed.

Note: Minor fluctuations are normal and cannot be prevented technically. In case of considerable deviations, however, notify Grünbeck's technical service.

- Check system for tightness.
- Check tightness of control valve to drain (in operating mode without regeneration activity).
- Record all data and activities, including repair work in the operation log.

4 | Major maintenance

- Read water pressure, flow pressure and water meter reading.
- Determine hardness:
  Raw and soft water hardness, 0 °dH (0 °f, 0 mmol/l) test.
- If necessary, readjust blending valve and check soft water hardness again, program the desired soft water hardness in the control unit..
- Adjust the electronics settings subject to the measured hardness values.
- Check the programming at the control unit.
- Check brine control (salting, filling of brine tank).
- Check release of regeneration.
- Check start of turbine water meter.
- Check control valve for proper functioning and tightness, replace wearing seals, if necessary; check function of drive motors of control valve, clean injector and sieve.
- Determine hydraulic values
- Clean brine tank and brine valve.
- Check regeneration salt supply (volume and quality – no clumping).

Attention: Danger of water damage! Damaged or worn hose connections may tear. Therefore, check and replace flexible connection hoses, if necessary.

- Check the non-return function of the safety fitting (e.g. system separator)
- Functional check of the disinfection unit (determine electric current, only possible via Code).
- If necessary, read regeneration counter, total quantity of soft water, error memory (system data print possible via serial interface).
- Reset maintenance interval.
- Enter all data and work performed, including repair work, in the operation log.
- Turn the system and the filled-in operation log over to the operator.

Warning! Risk of infection due to germ-infested drinking water. In stagnating water, the amount of germs may increase to an unacceptable level. Therefore, pay particular attention to hygiene when working on water softeners and disinfect the system, if necessary.

4.1 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 check list whenever further maintenance is carried out. This document provides evidence of proper maintenance.

5 | Spare parts

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

Note: Also observe the general warranty terms indicated in chapter A-2.
For detailed specifications regarding the wearing parts, please refer to chapter C.

grünbeck

Operation Log

Customer

Name:.....

Address: .....

.....

.....

Water Softener GENO-mat® duo WE

(please check appropriate box)

	50 ☐
	130 ☐
	230 ☐
	330 ☐
	530 ☐
	65 ☐
	150 ☐
	300 ☐
	450 ☐
	750 ☐
Version WE-	**MSR** ☐
Version WE-	**KWA** ☐

Serial number .....

Installed by .....

Filter: make/type ..... /.....

Connection data:

(please check appropriate box)

Drain connection DIN 1988	☐ yes	☐ no
Floor outlet available	☐ yes	☐ no
Pipe leading to water softener	☐ galvanized	
	☐ copper	
	☐ plastics	

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Maintenance work at water softener GENO-mat® duo WE **Checklist**			
Please enter measured values. Confirm checks with OK or enter repair work performed.			
Maintenance performed (date)	Start-up		
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 control unit and control valve			
Controller settings checked			
Regeneration release checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Driving motor function checked			
Works at 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			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

Maintenance work at water softener GENO-mat® duo WE Checklist			
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 control unit and control valve			
Controller settings checked			
Regeneration release checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Driving motor function checked			
Works at 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			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

Maintenance work at water softener GENO-mat® duo WE **Checklist**			
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 control unit and control valve			
Controller settings checked			
Regeneration release checked			
Injector and sieve cleaned			
Control valve checked for tightness			
Driving motor function checked			
Works at 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			
Customer service technician			
Company			
Work time certificate (no.)			
Signature			

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