

# Operation Manual

## Automatic Salt Reduction System

### GENO-KWA-50k

### GENO-KWA-60i

Starting from software version V1.28

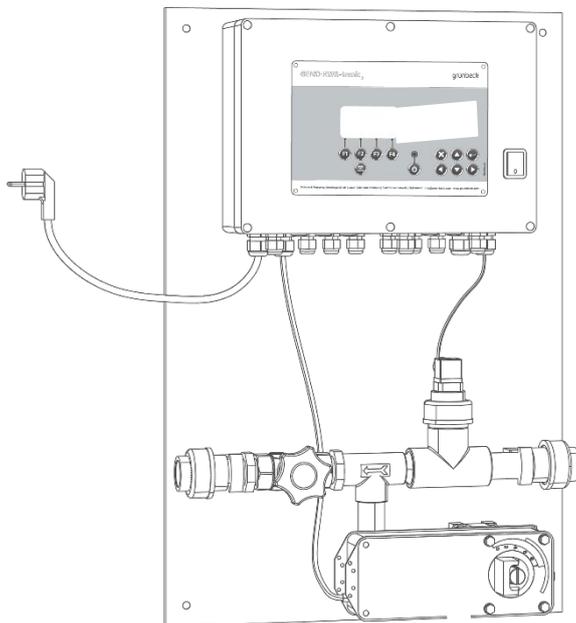


Fig. 1: GENO-KWA-50k

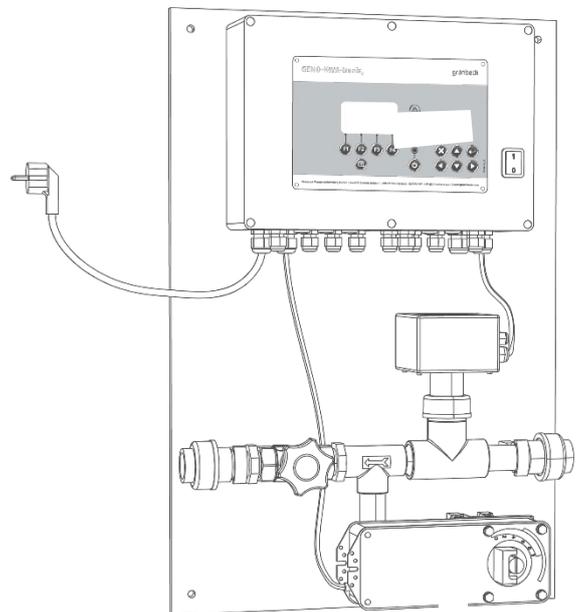


Fig. 2: GENO-KWA-60i

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



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### 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 Höchstädt/Do.

Responsible for documentation: Markus Pöpperl

System designation: Automatic salt reduction system

System type: GENO-KWA-50k, GENO-KWA-60i

Serial number: refer to type designation plate

Applicable guidelines: Low Voltage (2014/35/EU)  
EMC (2014/30/EU)

Applied harmonized standards, in particular: DIN EN 60335-1:2012-10  
DIN EN 61000-6-2:2006-03  
DIN EN 61000-6-3:2011-09

Applied national standards and technical specifications, in particular:

Place, date and signature: Höchstädt, 21.10.2019

i. V.   
M. Pöpperl  
Dipl.-Ing. (FH)

Function of signatory: Head of Department for Technical Product Design

## A General information

### 1 Preface

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

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 water and waste water treatment in general, our customer service staff, as well as the experts at our headquarters in Hoechststedt, is available to help you.

**Advice and assistance** For advice and assistance please contact your local representative (refer to [www.gruenbeck.com](http://www.gruenbeck.com)). In case of emergencies, you may also get in touch with our service hotline on +49 9074 41-333. We can connect you with the appropriate expert more quickly if you provide the required system data. In order to have this data available at all times, please keep the exact system data at hand (refer to type designation plate in chapter C-1).

## 2 General safety information

### Operating personnel

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

### Symbols and notes

Important notes in this operation manual are characterized 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 characterizes notes and tips to make your work easier.



Tasks with this symbol may only be performed by Grünbeck's technical customer service/authorised service company 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).

### Protection from water damage



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

- a sufficient floor drain system must be available or
- an appropriate alarm device that prevents consequential damage must be installed.



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

**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 due to escaping water and unexpected movement of system parts. → Check pressure pipes regularly. Depressurize 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.

**3 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 shipping 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).

**4 Disposal**

Comply with the applicable national regulations.

**4.1 Packaging**

Dispose of the packaging in an environmentally sound manner.

**4.2 Product**

If this symbol (crossed out waste bin) is on the product, European Directive 2012/19/EU applies to this product.

Dispose of electrical and electronic products or components in an environmentally friendly manner.



Information about the collection facilities for your product is available at the town council, the public legal disposal company, an authorized location for disposal of electrical and electronic products or your waste disposal.

## **B Basic information**

### **1 Laws, directives, standards**

In open water cycles of cooling towers and air washers, the salt concentration in the circulation water will increase due to water evaporation. This salt concentration may not exceed certain values, therefore it must be regulated by means of an automatic salt reduction system and additional feed of make-up water. In addition further parameters of the circulation water have to be monitored, and it is necessary to prevent the development of germs in the circulation water.

Among others, the following regulations must be observed:

- Waste Water Guideline (AbwV)
- VDI guideline 6022, part 1 – „Hygienic requirements for air-conditioning systems – offices and meeting rooms“
- VDI guideline 3803 - „Air-conditioning systems – structural and technical requirements“

In the interest of good health, rules cannot be ignored when it comes to the processing of drinking and industrial water. This operation manual takes the applicable German guidelines into account and provides all the information you need to safely operate your water treatment system.



Among other things, the regulations stipulate that

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

## C Product description

### 1 Type designation plate

The type designation plate of the automatic salt reduction system GENO-KWA is located on the mounting plate and other designation plates are directly located on the respective components. If you have questions concerning the system, please specify the information shown on the type designation plate of the unit in order to speed up the processing of your request. Please copy the data given on the designation plate to the table below in order to have it handy whenever necessary.

#### Automatic salt reduction system

GENO-KWA-

Order no: **164**

Serial no.:       /

### 2 Design

Compact system, ready for connection, with micro-processor controller GENO-KWA-tronic<sub>2</sub>, conductive or inductive temperature and conductivity sensor, self-closing salt reduction valve in case of power failure as motor ball valve DN 25 with replaceable flow orifice, piping with manual flow restrictor. All components completely piped and pre-assembled on a mounting plate, completely wired including 2 m of mains connecting cable with shock-proof plug.

The system is packed in a cardboard box and comes with fastening material and operation manual.

### 3 Function

The automatic salt reduction system GENO-KWA in its basic configuration is designed for the conductivity-controlled salt reduction and temperature control in open cycles of cooling towers and air washers.

According to the requirements of the German Waste Water Guideline (AbwV), appendix 31, the automatic salt reduction system GENO-KWA features a stopping device for the salt reduction during the addition of biocide.

The **GENO-KWA-tronic<sub>2</sub>** is the measuring, control and regulation electronics for various parameters in the circulation water treatment of cooling cycles and air washers. The system features a user-friendly menu navigation via graphics display, illuminated from behind and additional function keys. The GENO-KWA-tronic<sub>2</sub>, and the connected components are switched on/off via a main switch.

For additional functional details and communication possibilities for optional components, please refer to chapter F.

#### 4 Technical specifications and dimension drawings

Technical specifications/dimensions	Automatic salt reduction system type	
	GENO-KWA-50k	GENO-KWA-60i
<b>Connection data</b>		
Nominal connection diameter – Circulation piping/salt reduction valve	DN 25 (PVC adhesive sleeve Ø 32 mm)	
Power supply	230V/50 Hz	
Connected load (without optional components) [W]	25	30
Current consumption [A]	0.13	
Protection	IP 54	
<b>Performance data</b>		
Conductivity measuring system	Conductive	inductive
Conductivity measuring range [mS/cm] (µS/cm)	0.01 – 5 (10 – 5000)	0.05 – 5.0 (50 – 5000) (0.05–0.5 (50–500) configurable)
Max. operating pressure [bar]	4 bar at 40°C 6 bar at 20°C	6 bar at 40°C, 10 bar at 20°C
<b>Dimensions and weights</b>		
Depth [mm]	221	
Width [mm]	497	
Height [mm]	747	
<b>Ambient data</b>		
Ambient temperature [°C]	0 – 40	
Water temperature [°C]	5 – 55	5 – 60
<b>Order no.</b>	<b>164 270</b>	<b>164 280</b>

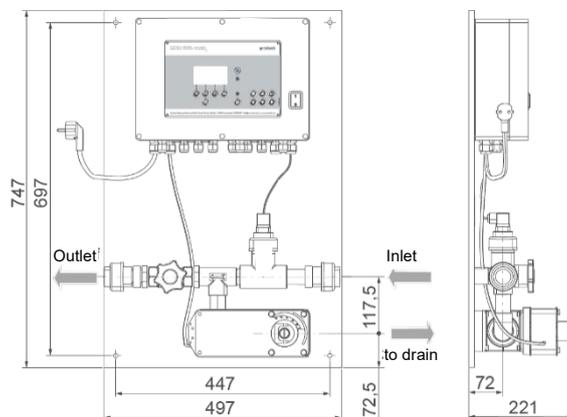


Fig. C-1: Dimension drawing automatic salt reduction system GENO-KWA-50k

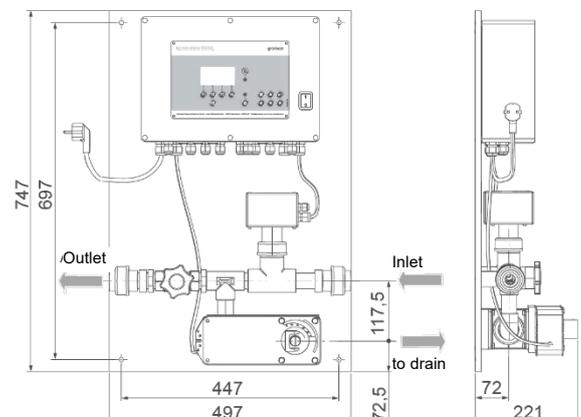


Fig. C-2: Dimension drawing automatic salt reduction system GENO-KWA-60i

## 5 Designated application

The automatic salt reduction system GENO-KWA in its basic configuration is designed for the conductivity-controlled salt reduction and temperature control in open cycles of cooling towers and air washers.

According to the requirements of the German Waste Water Guideline (AbwV), appendix 31, the automatic salt reduction system GENO-KWA features a stopping device for the salt reduction during the dosing of biocide.

The automatic salt reduction system GENO-KWA is designed exclusively for use in industrial and commercial applications.

## 6 Application restrictions

The application limits are determined by the designated application (refer to point 5) and the technical specifications (table C-1)

The system may only be operated if all components were installed properly. You **MUST NOT** remove, bridge or in any other way tamper with safety devices.

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

## 7 Scope of delivery

Compact system, ready for connection, with micro-processor controller GENO-KWA-tronic<sup>2</sup>, conductive or inductive temperature and conductivity sensor, self-closing salt reduction valve in case of power failure as motor ball valve DN25 with replaceable flow orifice, piping with manual flow restrictor. All components completely piped and pre-assembled on a mounting plate, completely wired including 2 m of mains connecting cable with shock-proof plug.

Enclosed components:

- Screws, washers and anchor bolts for wall fastening enclosed in a plastic bag.

Operation manual in a folder

- Operating manual for automatic salt reduction system GENO-KWA
- Operation log
- List of „Sales representations and customer service points“

## 8 Accessories

- Data logger with memory card for GENO-KWA-tronic<sub>2</sub>. Plug-in module to record data on a SD memory card Order no. 164 820
- Redox monitoring for GENO-KWA-tronic<sub>2</sub>. For Redox-controlled biocide dosing (not possible in combination with pH-controlled salt reduction) Order no. 164 815
- Monitoring of pH value for GENO-KWA-tronic<sub>2</sub>. For pH value-controlled salt reduction (not possible in combination with Redox-controlled biocide dosing) Order no. 164 810
- Water softener GENO-mat duo WE-KWA for make-up water (please inquire)

## D Installation

### 1 General installation instructions

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

The installation site must be frost-proof and ensure the protection of the system against chemicals, dyes, solvents and vapours.

Local installation guidelines, general regulations (e. g. VDE, VDI, DIN, DVGW, ÖVGW or SVGW) and in particular the VDI guidelines 3803 and 6022 for air-conditioning systems as well as the technical specifications stated, must be observed.



Note: In case systems with optional accessories (refer to chapter C, 8) are installed, the operation manuals that come with these accessories must be observed as well.

#### 1.1 Installation instructions for water connection

While installing the GENO-KWA, certain rules must be strictly observed at all times. Additional recommendations are given in order to facilitate the handling of the system. The installation information described below is also illustrated in fig. D-1 and D-2.

##### Binding rules



The installation of a GENO-KWA may only be performed by an authorised expert.

A suitable drain connection (min. DN 50) which is appropriate for the intended salt reduction volume (l/s) must be available.

The automatic salt reduction system is installed in a separate cycle or in parallel in the partial stream of the overall system.

Shut-off fittings must be installed in the inlet and outlet to/from the automatic salt reduction system by the client on site.

If the automatic salt reduction system is installed above level, make sure that the pipe of the conductivity sensor remains filled with water during operation.

All inlet and outlet pipes must be fastened in separate holders and must not be carried by the system.

For the water tub provided by the client on site, we recommend using a level switch as a safety device against draining. Should the level fall, the "ext. input 2" is switched in order to shut off the salt reduction valve.

**1.2 Installation instructions for electrical connection**

A shock-proof plug is adequate as electrical connection, provided it complies with the requirements indicated in table C-1 and is located at a distance of max. 1.20 m from the GENO-KWA .



**Attention!** The socket must carry continuous tension (do not couple with light switch or heating emergency switch).

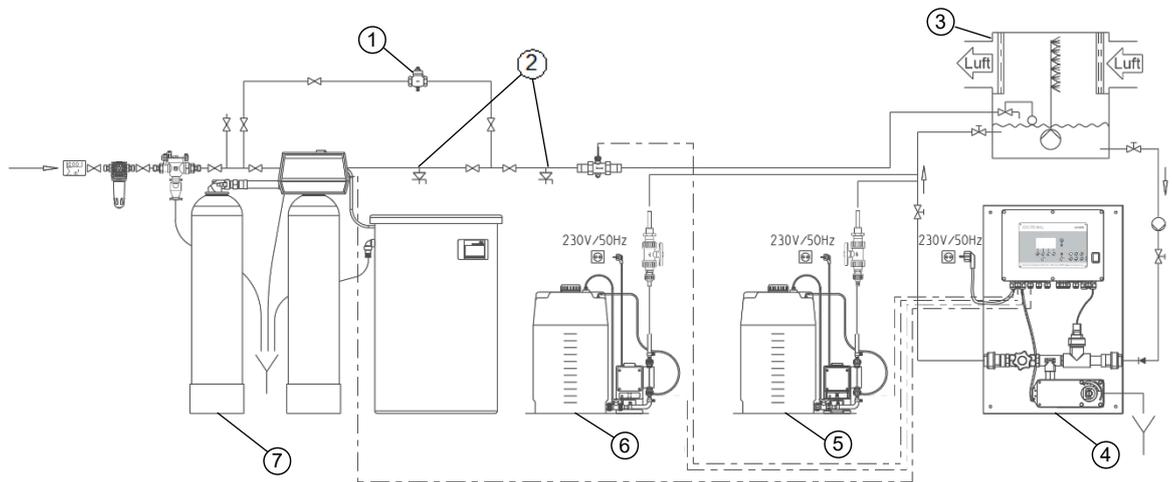


Fig. D-1: Mounting and installation instructions for GENO-KWA-50k

- |   |  |   |   |
|---|--|---|---|
| ① | Blending valve type OVP 5/4"                   | ② | Sampling valve  |
| ③ | Airwasher                                      | ④ | Automatic salt reduction system GENO-KWA 50k                                    |
| ⑤ | Timer-controlled dosing system to add biocides | ⑥ | Proportional dosing system to add corrosion inhibitors and hardness stabilisers |
| ⑦ | Water softener                                 |   |   |

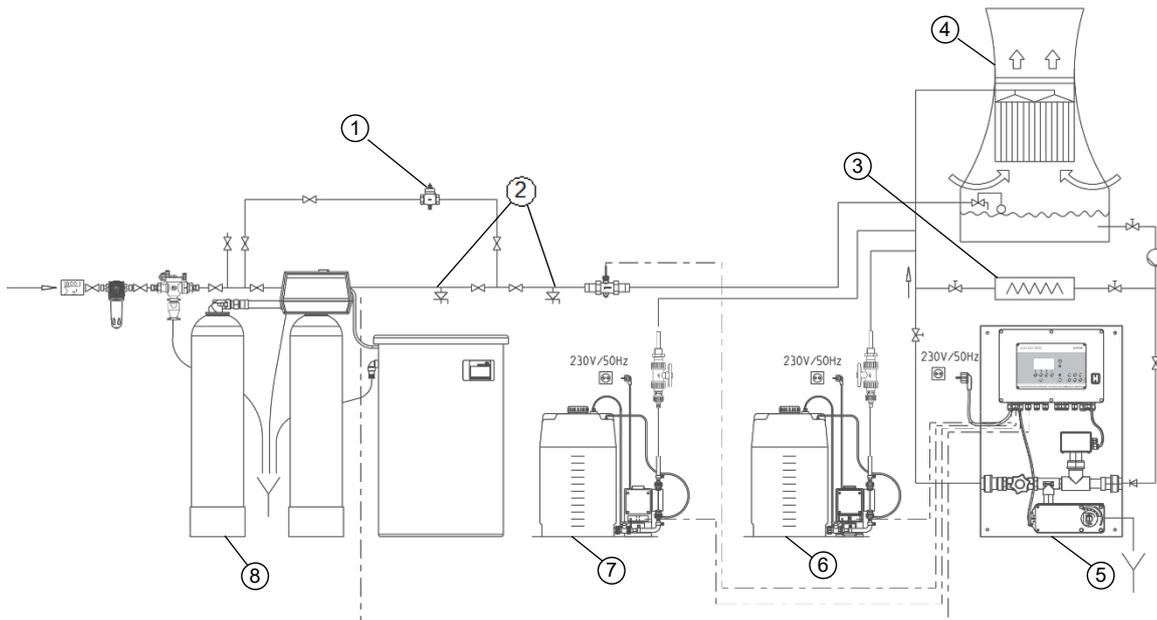


Fig. D-2: Mounting and installation instructions for GENO-KWA-60i

- |   |   |   |  |
|---|---|---|--|
| ① | Blending valve type OVP 5/4"  | ② | Sampling valve                                 |
| ③ | Heat exchanger  | ④ | Cooling tower                                  |
| ⑤ | Automatic salt reduction system GENO-KWA 60i                                    | ⑥ | Timer-controlled dosing system to add biocides |
| ⑦ | Proportional dosing system to add corrosion inhibitors and hardness stabilisers | ⑧ | Water softener                                 |

## 2 Preliminary work

1. Unpack all system components.
2. Check for completeness and perfect condition.
3. Erect system without delay on a plane surface.

## 3 How to connect the system

### 3.1 How to connect the system to the water installation



---

Note: The salt reduction volume must not be higher than the make-up water volume. If necessary, the salt reduction pipe must be restricted. In order to do so, a replaceable flow orifice  $\varnothing$  8 mm is installed as a standard feature in the screw connection on the outlet side of the ball valve (to the drain). The flow volume can be adjusted either by enlarging the bore or exchanging it for the orifices  $\varnothing$  4 mm contained in the scope of supply, resp. for a bore without bore hole which you can bore yourself.

---

1. Connect the circulation pipes according to the corresponding installation example (fig. D-2) or according to the applicable planning documents and observe the flow direction while doing so.  
Also observe the instructions given in paragraph 1 as well as the special characteristics of the complete system.
2. Make the waste water connection.

### 3.2 How to connect the control electronics



---

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

---



Danger due to electric energy!  
Terminals L, N and PE as well as the feed lines to the voltage-free contacts may carry mains voltage.  
Do not connect mains plug resp. power supply before you have finished these works.

---

1. Additional equipment has to be connected according to the corresponding documentation resp. according to the terminal configuration plan in table F-1.
2. The components contained in the scope of delivery are completely wired.

## E Start-up

### 1 General information



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

### 2 How to prepare the GENO-KWA-tronic2



Note: For further details regarding the handling of the GENO-KWA-tronic<sub>2</sub> control unit, please refer to chapter F.

The GENO-KWA and possibly connected options are controlled by means of the GENO-KWA-tronic<sub>2</sub> control unit.

The desired functions may be activated in the menu of the GENO-KWA-tronic<sub>2</sub>.

1. Switch on the main switch of the GENO-KWA-tronic<sub>2</sub>
2. Configure the system (system menu)
3. Set the maintenance interval (system menu/operating values)
4. Enter the customer service's phone number (system menu)
5. Set the date, time, daylight saving time, if necessary (system menu)
6. Make the settings in the inlet menu (F1)  
inlet water meter, softening, flow-controlled dosing, if necessary
7. Make the settings in the circulation menu (F2)  
salt reduction, circulation, if necessary, pH control, if necessary.
8. Make the settings in the disinfection menu (F3)  
timer-controlled dosing (biocide), if necessary, Redox control, if necessary

### 3 How to fill and start up the system

1. Open the flow restrictor
2. Open shut-off valves from and to the circulation and fill up the system
3. Adjust the flow at the flow restrictor
4. Activate salt reduction via menu Circulation/Salt reduction
5. If necessary, activate optional components.
6. Check and optimise settings.
7. Document start-up (e. g. system data printout)
8. Fill in operation log.



Note: Make sure that during the start-up of the system all data is entered on the cover sheet of the operation log and the first column of the checklist is filled in.

## F Operation

### 1 Configuration of the GENO-KWA-tronic<sub>2</sub>

The GENO-KWA-tronic<sub>2</sub> is the measuring, control and regulation electronics for various parameters in the circulation water treatment of cooling cycles and air washers. The system features user-friendly menu navigation via graphics display, illuminated from behind, and additional function keys. The GENO-KWA-tronic<sub>2</sub>, and the connected components are switched on/off via a main switch.

**The GENO-KWA-tronic<sub>2</sub> offers functions such as**

- Salt reduction controlled by the conductivity
- Automatic temperature compensation of the conductivity value
- Integrated timer controller with salt pre-reduction and stopping of salt reduction for an optional biocide dosing
- Standby or automatic operation via external signal or key 
- Stop function of salt reduction via external signal
- Analogue output 0(4) – 20 mA
- RS-232 interface for software update, connection of a protocol printer, etc.
- Voltage-free collective fault contact (change-over contact)
- Optional data logger via plug-in memory card (available starting with software version 1.20)
- Irradiation intensity-controlled salt reduction (only in case of GENO-LUWADES<sub>2</sub> for air washers)

**The GENO-KWA-tronic<sub>2</sub> offers communication possibilities for optional components such as:**

- Biocide dosing system
- Flow-controlled dosing system for the conditioning of make-up water
- Water softener for make-up water (available starting with software version 1.20)
- Spray pump
- Recirculation pump
- Flow monitoring of circulation
- Waste water meter
- Make-up water meter
- pH value-controlled salt reduction or
- Redox-controlled biocide dosing
- UV-system (only in case of GENO-LUWADES<sub>2</sub> for air washers)
- Monitoring of irradiation intensity of UV system (only in case of GENO-LUWADES<sub>2</sub> for air washers)

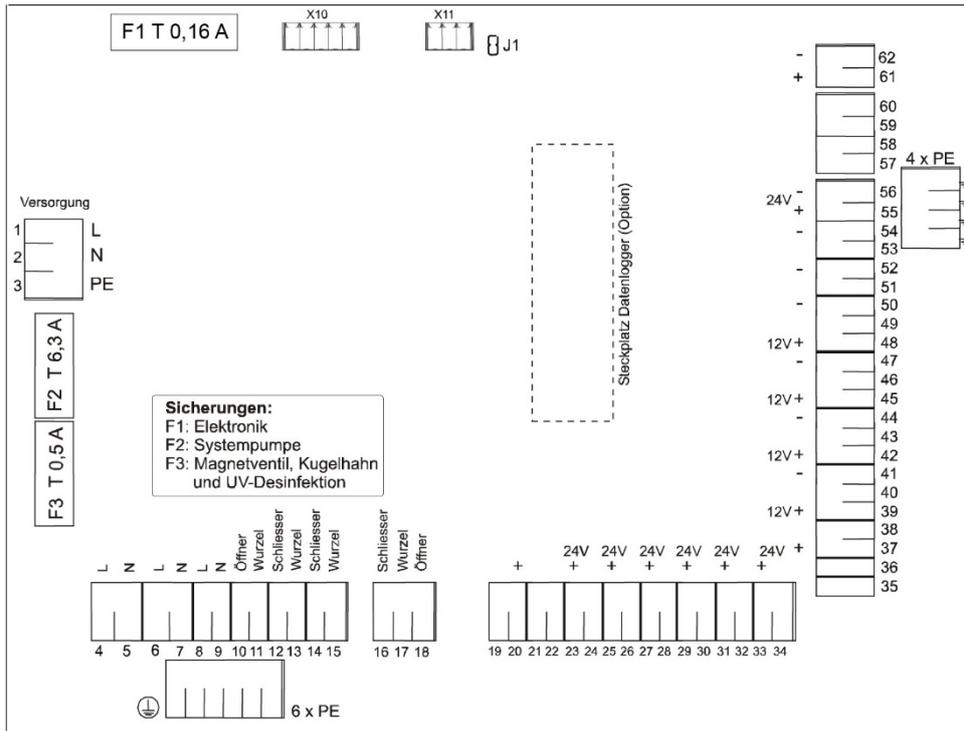


Fig. F-1: Terminal configuration

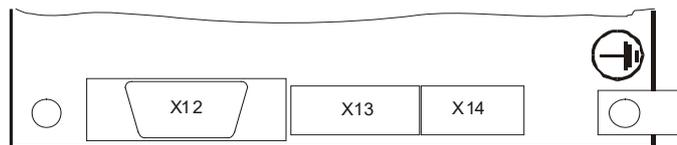
**Fuses on the basic circuit board:**

F1	T 0.16 A	Electronics
F2	T 6.3 A	System pump
F3	T 0.5 A	Solenoid/ball valve and UV system

**Plug and jumper on the basic circuit board (never rearrange or disconnect the plugs!!!):**

J1	reserved for internal testing purposes
J2	reserved for internal testing purposes
X10	power supply of operating and display circuit board
X11	interface to operating and display circuit board

**Connection operating and display circuit board**



X12	RS-232 interface
X13	Interface to the basic circuit board
X14	Power supply of operating and display circuit board

**1.1 Specification of the connection terminals for GENO-KWA-tronic<sub>2</sub>**



Note: The connections for the protective earth conductors (except for the feeders) and – if available – the shielding is connected to the PE terminals that are available at the bottom on the left and at the top on the right of the main circuit board.

No.	Function	Note
1	Feeder L	230 VAC/50 Hz
2	Feeder N	
3	Feeder PE	
4	System pump L	230 VAC/50 Hz, max. 1 kW (included in the scope of delivery of LUWADES)
5	System pump N	
6	Salt reduction ball valve L	230 VAC/50 Hz, alternatively solenoid valve that closes currentless
7	Salt reduction ball valve N	
8	UV system L	230 VAC/50 Hz
9	UV system N	
<b>Voltage-free contacts</b>		
10	Normally closed contact N.C.C.	Release timer-controlled dosing of dosing pump (biocide dosing agent)
11	Control common	
12	Normally open contact N.O.C.	Request spray pump, max. 230 VAC/4 A
13	Control common	
14	Normally open contact N.O.C.	Request recirculation pump, * max. 230 VAC/4 A
15	Control common	
16	Normally open contact N.O.C.	Active collective fault signal, max. 230 VAC/4 A
17	Control common	
18	Normally closed contact N.C.C.	



\* Note: The "request" signal will only be emitted if either system pump (→Luwades) or ext. pump (→KWA) is set in the menu circulation/recirculation/recirculation mode.

Digital inputs/outputs					
19	NPN-Open-Collector -	Pulse outlet for flow-controlled dosing pump inlet (dosing agent hardness stabilizers or corrosion inhibitors)			
20	NPN-Open-Collector +				
21	Motor L	24 VAC/50 Hz	1	Connection terminals of control valve GENO-mat duo WE ....	
22	Motor N	Control valve water softener GENO-mat duo WE ...	3		
23	Transmitter voltage +	24 VDC	7		
24	Program switch	Control valve water softener GENO-mat duo WE...	5		
25	Transmitter voltage +				
26	Operating switch		4		
27	Transmitter voltage +	24 VDC	Option empty signal for brine tank for water softer GENO-mat duo WE ...		
28	Water softener low-on-salt				
29	Transmitter voltage +	24 VDC	Timer-controlled dosing for dosing pump (biocide dosing agent)		
30	Fault signal input				
31	Transmitter voltage +	24 VDC	Flow-controlled dosing pump inlet (dosing agent hardness stabilizers or corrosion inhibitors)		
32	Fault signal input				
33	Transmitter voltage +	24 VDC	Volt.-free external contact to stop the salt reduction ball valve (if contact is closed)		
34	Ext. input 2				
35	Lower temperature limit value	grey	24 VDC volt.-free contact from inductive conductivity sensor or pH/Redox measuring transducer		
36	Upper temperature limit value	pink			
37	Transmitter voltage +	24 VDC	Volt.-free external contact for standby/automatic operation (standby, if contact is closed)		
38	Ext. input 1				
39	Transmitter voltage +	white	Pulse HRI-A1	12 VDC, circulation water meter (only incl. in scope of delivery of LUWADES)	
40	Pulse input	green Hall			
41	Transmitter voltage -	brown			
42	Transmitter voltage +	white		12 VDC Outlet water meter	
43	Pulse input	green Hall			
44	Transmitter voltage -	brown			
45	Transmitter voltage +	white	12 VDC Inlet water meter (e. g. water softener, volume-proportional dosing, ...)		
46	Pulse input	green Hall			
47	Transmitter voltage -	brown			
Analogue inputs/outputs					
48	Transmitter voltage +	brown	12 VDC irradiation intensity sensor (only included in the scope of delivery of LUWADES)		
49	Signal input	white			
50	Transmitter voltage -	black	Input pH- or Redox-signal		
51	0/4 ... 20 mA +	brown			
52	0/4 ... 20 mA -	grey	Input inductive conductivity sensor		
53	0/4 ... 20 mA +	green			
54	0/4 ... 20 mA -	yellow	24 VDC power supply for inductive conductivity transmitter GENO-CTI-500		
55	Transmitter voltage +	white			
56	Transmitter voltage -	brown	Conductive conductivity sensor (K 1.0) with temperature compensation		
57	Conductive conductivity signal	yellow			Change-over inductive cond. measuring range via wire bridge
58	Conductive conductivity signal	green			
59	Temperature signal PT100	white			
60	Temperature signal PT100	brown			
61	0/4 ... 20 mA +	Analogue output LF = conductivity, BS = irradiation intensity, pH, Redox, temp. or Dfl. = flow			
62	0/4 ... 20 mA -				

**1.2 Specification of the connection terminals for GENO-CTI-500**

No.	Function	Colour	Note
1 L+	+ 24 VDC	white	KWA-tronic <sub>2</sub> terminal 55
2 L-	Mass	brown	KWA-tronic <sub>2</sub> terminal 56
3	0/4 ... 20 mA +	green	Inductive conductivity measuring signal output
4	0/4 ... 20 mA -	yellow	
5	0/4 ... 20 mA +		Temperature output, not used for KWA-tronic <sub>2</sub>
6	0/4 ... 20 mA -		
7	Binary output 1	grey	Temperature min. contact
8	Binary output 1		
9	Binary output 2	pink	Temperature max. contact
10	Binary output 2		
11	Binary input 1		Change-over to inductive conductivity measuring range 0 ... 0.5 mS/cm via wire bridge
12	Binary input 1		
13	Binary input 2		Not used
14	Binary input 2		

(\*) Do not remove these wire bridges!

In order to use the measuring range 0 ... 0.5 mS/cm of the inductive conductivity sensor CTI-500, the following wire bridges have to be inserted:

- KWA-tronic<sub>2</sub>: terminal 59/60
- CTI-500: terminal 11/12

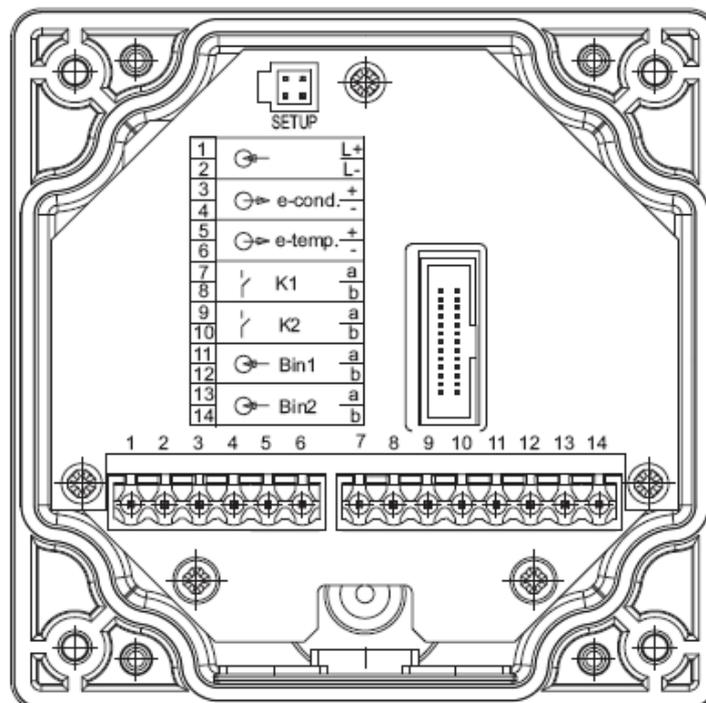


Fig. F-1.2: Terminal configuration

## 2 Function of GENO-KWA-tronic<sub>2</sub>

### General

The GENO-KWA-tronic<sub>2</sub> is the measuring, control and regulation electronics for various parameters in the circulation water treatment of cooling cycles and air washers. The current operating status is indicated by means of a graphics display.

The system features a volt.-free collective fault signal output, a power output 0/4-20 mA for all analogue measuring values as well as a serial R 232 interface for software updates and a protocol printer, etc. The GENO<sup>®</sup>-KWA-tronic<sub>2</sub>, and the connected components are switched on/off via a main switch. All data and settings as well as the real-time clock are battery-buffered when mains is switched off.

### Conductivity measurement

The GENO-KWA-tronic<sub>2</sub> may be equipped with a conductive or an inductive conductivity measuring system. For the conductivity value a temperature compensation is executed via the temperature sensor. The difference is due to the following configurations:

- Inductive or conductive sensor
- Measuring ranges of the two measuring systems:
  - conductive (0.01 – 5 mS/cm)
  - inductive (0.05– 0.5 mS/cm)
  - inductive (0.05 – 5 mS/cm)

The **conductive measuring process (in case of KWA-50k and LUWADES<sub>2</sub>)** performs perfectly in case of low conductivities and clean media. In case of a higher conductivity, however, the impurities increase, in general, and therefore the risk that deposit layers may form at the electrodes increases. In case of the conductive measuring process, a certain wearing must be expected due to the direct contact with the media and therefore inspection and maintenance at regular intervals are essential.

The **inductive measuring process (in case of KWA-60i)** allows for a mostly maintenance-free collection of the specific conductivity, even in the most difficult media. The inductive measurement is effected without contact and electrodes via inductors that are protected by a plastic housing and therefore neither wearing nor the decomposition of the electrodes or polarisation do occur.

### Salt reduction

The salt reduction may be controlled by means of the conductivity, the irradiation intensity or the pH value of the circulation water.

The flow that runs via the salt reduction valve can individually be adjusted to the make-up water volume by means of the built-in flow orifice. The waste water volume can be registered via an optional water meter. The salt reduction valve automatically closes in case of power failure in order to prevent the draining of the water circulation.

The volume drained off needs to be replaced by means of a make-up water treatment system provided by the client on site.

## Circulation

The system pump (only for LUWADES2) is monitored by means of a flow sensor and the current flow is displayed. The system pump may be locked via the external input E2.

The flow volume can be adjusted by means of a restrictor valve.

As an alternative, an external recirculation pump can be triggered via a voltage-free contact, if no system pump is available (for GENO-KWA).

The flow monitoring is described in chapter F 4.4.3 and how to secure the system against draining is described in chapter D 1.1.

## Disinfection / stop salt reduction / salt pre-reduction

The disinfection of the circulation water is effected by means of a UV system with irradiation intensity control (only for LUWADES<sub>2</sub>). Via an integrated timer-control with pre-salt reduction and salt reduction stop or (optional) via the Redox potential of the circulation water, an optional biocide dosing may be controlled.

The Waste Water Guideline (AbwV) stipulates that the salt reduction has to be stopped during and after a shock dosing of micro-biocide agents until the limit value for the luminous inhibition of bacteria GL of 12 or less is reached according to the manufacturer's indications. In case of Grünbeck's biocides, the limit values for the waste water in general are reached two hours (observe the product and safety data sheets) after the termination of the biocide dosing. This requirement is fulfilled by means of an adjustable salt reduction stopping function.

As it can happen that the conductivity value exceeds the upper limit value during the stopping of the salt reduction valve, it is reasonable to perform a salt reduction prior to starting the biocide dosing. Therefore, the special salt pre-reduction first lowers the conductivity value to a freely adjustable limit value and then starts the programmed biocide dosing.

During the biocide dosing cycle an external spray pump may be triggered by means of the voltage-free contact.

The functions salt reduction, pre-salt reduction, system pump and UV disinfection during biocide dosing and the locking time can each be locked separately via the external input E2.

## Fault control

Conductivity, temperature, flow and irradiation intensity are controlled by fault values and can be passed on by means of a voltage-free collective fault signal (change-over contact).

The monitoring device of the irradiation intensity (only for LUWADES<sub>2</sub>) also registers substances contained in the water that absorb UV light (e. g. iron, manganese) as well as functional errors due to old UV lamps or contaminated protective quartz pipes.

The salt reduction control can also generate an alarm signal when no salt reduction is performed during the programmed time period.

Furthermore, fault signals from the two optional dosing systems and the optional water softener may be assigned to the collective fault signal.

**Limitation of salt reduction time up to software version V1.19:**

The limitation device for the salt reduction period indicates the non-achievement of the closing limit value by means of an alarm signal, closes the salt reduction valve by force and checks whether „opening conditions“ do exist:

- The salt reduction valve remains closed if the conductivity is < max. conductivity. The error remains in the display and at the fault signal contact. If max. conductivity is exceeded again, the salt reduction valve re-opens.
- The salt reduction valve opens again if the max. conductivity has not yet been exceeded. The error remains in the display and at the fault signal contact.

**Limitation of salt reduction period starting with software version V1.20:**

The limitation device for the salt reduction period indicates the non-achievement of the closing limit value by means of an alarm signal, closes the salt reduction valve by force until the fault signal is acknowledged.

**Make-up water feed**

The integrated flow-controlled dosing control can record the make-up water volume via an optional water meter and trigger an optional dosing pump for the dosing of the corrosion inhibitors and/or hardness stabilizers.

In addition, an optional water softener can be controlled completely.

**Recording of water volumes**

The connected inlet and outlet waters meter summarize the water volumes which in turn may then be called via the info texts.

**2.1 Description of operating modes****Mains OFF:**

The power supply of the GENO-KWA-tronic<sub>2</sub> is switched off via the built-in mains switch. Only in this state, the housing cover may be opened for any works at the control.

**Mains ON, system inactivated:**

The GENO-KWA-tronic<sub>2</sub> mains switch has been switched on, but the function of the control has not yet been activated by the key . This is why the green LED is not yet illuminated. However, some of the measuring values such as conductivity, flow, pH value or Redox potential might already be displayed in the corresponding flow chart.

**Mains ON; system activated, ext. standby signal E1 is present:**

Except for the time-controlled dosing (biocide), all outputs of the GENO-KWA-tronic<sub>2</sub> are switched off, the salt reduction ball valve is closed (if applicable, after a programmed opening time, refer to chapter F 4.3.3), no fault signals are emitted.

If the standby signal E1 is withdrawn, the GENO-KWA-tronic<sub>2</sub> works according to the activated functions (as before).

**Mains ON; system activated, ext. signal E2 is present:**

The system functions as per **chapter F 4.3.3 System menu I/A configuration / Ext. E2 configuration** are either released or locked during the time the external contact at connection terminals 33/34 is closed.

The circuitry is suitable for the situations below:

1. The cooling tower is temporarily not in operation (e.g. in winter), biocide dosing shall nevertheless be carried out. In this case, the functions salt reduction valve and pre-salt reduction, for instance, are programmed as „locked“ in the system menu.
2. The air washer features a biocide dosing that is not activated via the KWA-tronic<sub>2</sub>. Here, the client can provide a contact which is closed during biocide dosing and the locking duration for the salt reduction. In this case, the functions salt reduction valve, pre-salt reduction and UV are programmed as „locked“ during biocide dosing + locking time.

**Mains ON, system activated:**

The function of the GENO-KWA-tronic<sub>2</sub> is active according to the activated functions.

## 2.2 Operating elements of GENO-KWA-tronic<sub>2</sub>

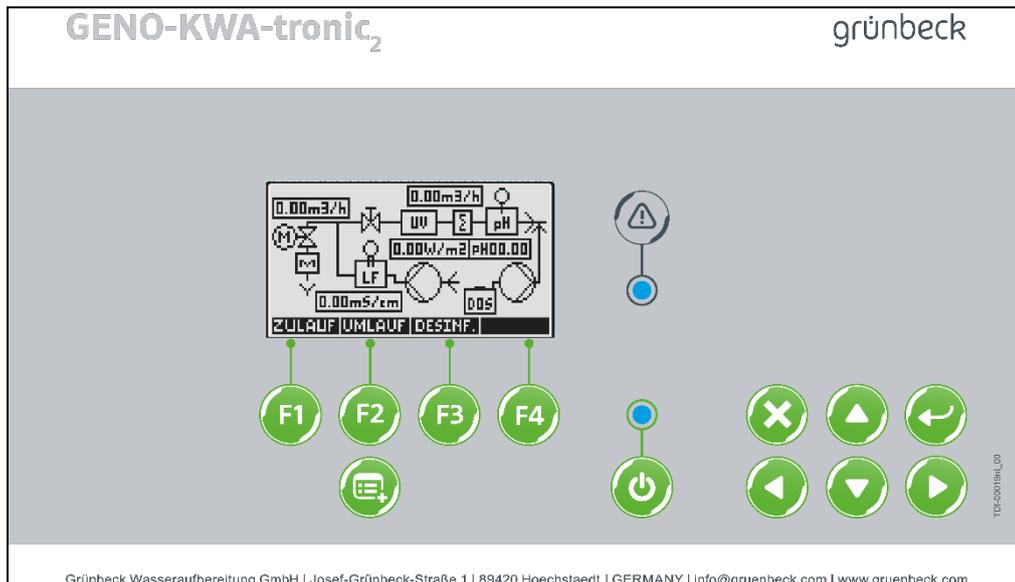


Fig. F-3: Operating panel

- F1** Access to the menu „Zulauf/Inlet“ or „Anzeige/Display“
- F2** Access to the menu „Umlauf/Circulation“ or „Eingabe/Input“
- F3** Access to the menu „Desinfektion/Disinfection“ or „Info“ (only system menu)

-  Access to the menu „Info“ or “Exit”
  -  Access to the system menu
  -  Activating or deactivating the system  
(green control LED is illuminated when ON)
  -  Acknowledge a fault signal / suppress a fault signal / exit an open input field without storing
  -  Enter
  -   Move the cursor to the left or right
  -   Edit the input values or move the cursor up and down
  -  The red control LED is illuminated when the control has determined an error.
- 1**  
**0**

Mains switch.

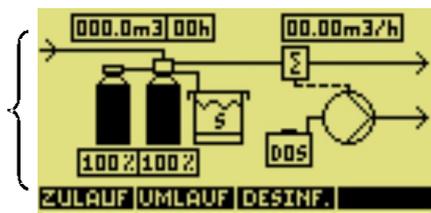
### 3 Flow chart screens

For each system part – inlet, circulation and disinfection – a flow chart screen is available that can be accessed via the function keys F1-F3. Behind the function key F4 context relating info texts are available, if required.

#### 3.1 Inlet flow chart (function key F1)

In the inlet flow chart, only the system parts that are relevant and available for the make-up water treatment are displayed.

Optional water softener with display of residual capacities [%], of the remaining soft water volume [m<sup>3</sup>] and the time since the last regeneration [h]

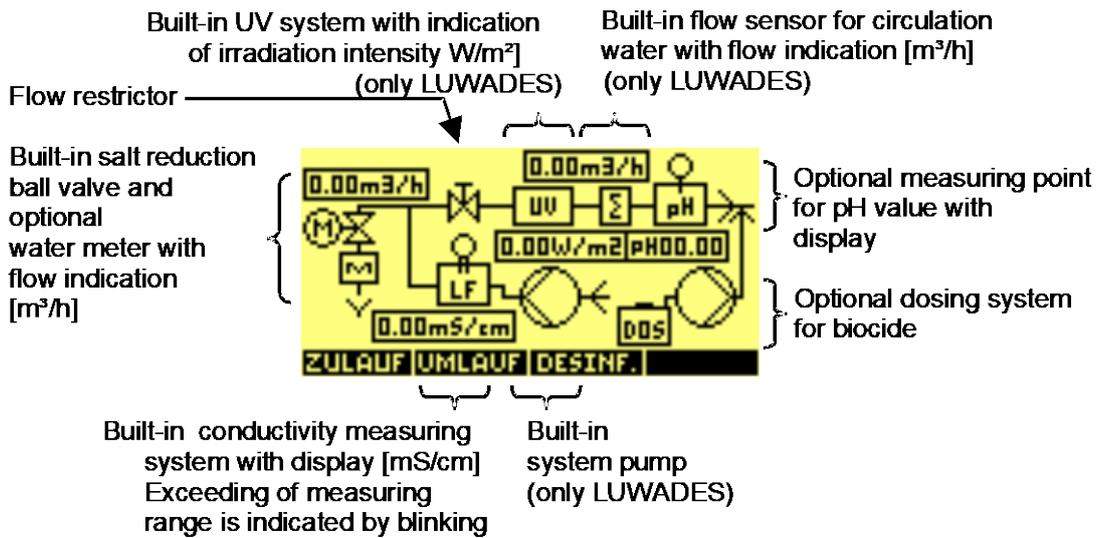


Optional water meter for make-up water with flow indication [m<sup>3</sup>/h]

Optional dosing system for hardness stabilizers and corrosion inhibitors

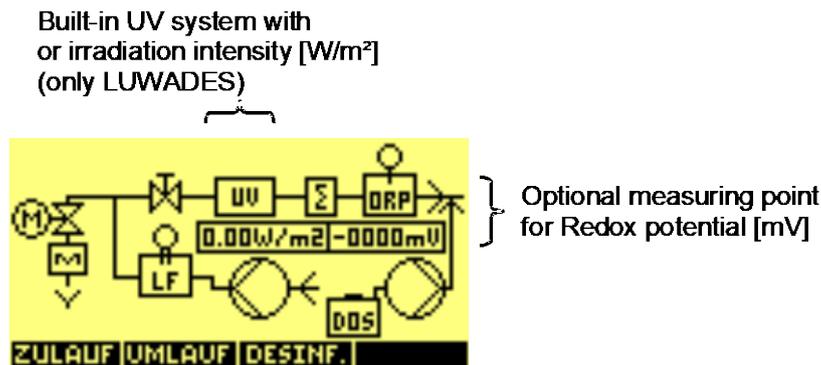
#### 3.2 Circulation flow chart (function key F2)

In the circulation flow chart, the system parts installed in the circulation (built-in and partly provided by the client on site) are displayed.



### 3.3 Disinfection flow chart (function key F3)

In this flow chart, on the measuring values that are relevant for the disinfection are indicated.



### 3.4 Displays of fault signals

All occurring fault signals are imposed on the chosen flow chart screen. In case several errors occur simultaneously, they are displayed alternately.

F1

At the same time the red LED is blinking and continues to blink until the fault signal is acknowledged. If the error was acknowledged but the cause of the error has not been remedied, the red LED is illuminated continuously.

As long as the key for the acknowledgement  is kept pressed, waiting fault signals are suppressed so that the current flow chart can be viewed completely.

## 4 Menu system

In the menu, several points are contained that are not explained at this time as they only concern setting values for additional modules. The corresponding documentation will only be provided together with the modules in question. In the basic version, these points do not have any function.

#### 4.1 Basics regarding the operation of the menus – Code levels

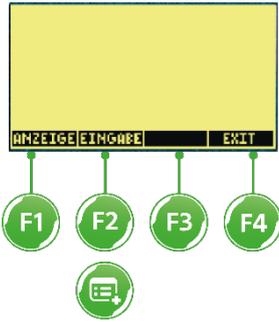


Fig. F-4: Menu access



Fig. F-4a.: Code input

In the system menu as well as in the sub-menus of the respective system components, two masks are available:

- In the mask „Anzeige/Display“, all parameters are visible but cannot be changed.
- In the mask „Eingabe/Input“, all parameters of the respective menu level can be edited when a corresponding Code is entered.
- Via “Exit“, you can go back one level.

To enter a Code: Move the cursor to the desired input field by means of keys ◀ and ▶ and set the figures by means of ▲ and ▼ keys. Confirm the input by the  key.

Code 0095 – customer

**4.2 Overview of menu structure**

See chapter 4.3	System menu Access by key 		See chapter 4.6	Inlet Access by key 		See chapter 4.4	Circulation Access by key 		See chapter 4.5	Disinfection Access by key 	
	System type	Water softening		Inlet water meter	Operator softener		Raw water hardness	Salt reduction		Salt reduction mode	Time-contr. dosing
4.3.1	System configuration	Water softening	4.6.1	Inlet water meter	Raw water hardness	4.4.1	Salt reduction	Salt reduction mode	4.5.1	Time-contr. dosing	Time-con. dosing
4.3.2	Flow-controlled dos	Flow-controlled dos	4.6.2	Operator softener	Blending hardness			Salt reduction meas.			Request recircula-
	pH measurement	pH measurement	4.6.3	Water softener	System type			Conduct. meas. sig.			Salt pre-reduction
	Redox measurement	Redox measurement			Capacity			Conduct. meas. range			Reduced conductivity-
	Water meter contr.	Water meter contr.			Operating modus			Conductivity max.			Dosing time
	Data logger	Data logger	4.6.4	Water softener times	Step 1			Max. conductivity			Dosing break
4.3.3	I/O configuration	Ext. E1 opening time			Step 2			Min. conductivity			Stop time
	Power output	Power output			Step 3			Conductivity min.			Weekly pattern
	Power output signal	Power output signal			Step 4			Max. irradiation in-			Redox mode
	Config. E2	Config. E2			Step 5			Min. irradiation in-			Redox limit value
4.3.4	Diagnosis	Display inputs			Step 6			Exceeding/trailing			Redox signal
	Control outputs	Control outputs			Daily interval			pH limit value			Redox response de-
	Print system data	Print system data			Release time			pH salt reduction	4.5.2	UV system	UV system mode
	Printer logs	Printer logs			Maintenance interval			pH signal			Irradiation int. min.
	Measuring range	Measuring range	4.6.5	Defaults	Delay motor error			Salt red. resp. delay			Irradiation int. serv.
	Lines / Page	Lines / Page			Delay low-on-salt			Alarm delay			Delay time
4.3.5	Temp. limit viaue	Upper temp. limit	4.6.6	Softener service	Input low-on-salt			Max. salt reduction	4.5.3	Redox control	Alarm values
	Lower temp. limit	Lower temp. limit			Abort step			Salt reduction con-			
	Delay time	Delay time	4.6.7	Oper. flow-con. dos.	Reset maintenance			Water meter pulse			
4.3.6	Operating values	Maintenance interval				4.4.2	Calibration values	Cond. temp. coeffi.			
	Operating hours	Operating hours						Cell constant 1.0			
	Pump operating time	Pump operating time						Ref. value conduc-			
	UV system	UV system						Reset calibration			
	Inlet volume	Inlet volume						Recirculation mode			
	Outlet volume	Outlet volume				4.4.3	Recirculation	Flow-control mode			
	Regeneration no.	Regeneration no.						Signal type			
4.3.7	Error memory	Error memory						W. meter pulse rate			
4.3.8	Languages	Languages						Flow alarm value			
4.3.9	Phone number	Phone number						Alarm delay			
4.3.10	Date, time	Date						Start cycle mode			
	Time	Time						Start efforts			
	Daylight saving time	Daylight saving time						Idle time			
4.3.11	Basic system setting	Basic system setting						Runtime			
4.3.12	Software version	Software version				4.4.4	pH control	Alarm values			

### 4.3 System menu



In this menu the setting values that refer to the entire system are located. The system menu may be called by pressing the  key in any screen of the system. In next display, the selection between Display only (key F1 ) and Input (key F2) can be made. By means of the F4 key you may return to the previous screen and the F3 key may provide additional info texts (browse through via ▲ and ▼ keys). If the input mode was chosen via key F2, then the Code for the desired level has to be entered and confirmed by the  key.

The system menu has the following structure:

Systemmenü	System menu
>Anlagentyp	> System type
Systemkonfiguration	System configuration
E/A-Konfiguration	I/O configuration
Diagnose	Diagnosis
Temperaturgrenzwert	Temperature limit value
Betriebswerte	Operating values
Fehlerspeicher	Error memory
Sprache	Language
Telefonnummer	Phone number
Datum, Uhrzeit	Date, time
Anlagen-Grundeinstellung	Basic system setting
Software-Version	Software version

The selection is made via arrow keys ▲ and ▼. Via the  key, the chosen sub-menu is accessed. By means of the F4 key (EXIT), the previous screen may be accessed.



Phone number of Grünbeck's hotline.



Return (to the next higher level) to the previous screen, if required with storing of modifications made.

#### 4.3.1 System type menu

In the system type menu, basic settings regarding the existing system parts will be made. These settings can still be altered at a later time, except for the UV system. In the flow chart screen, this is only available for LUWADES.

Parameter	Factory-setting	Setting range	Code
System type	KWA-50k	KWA-50k KWA-60i LUWADES	Customer service

### 4.3.2 System configuration menu

In the system configuration menu optional external system components and additional internal functions are activated or deactivated.

Parameter	Factory-setting	Setting range	Code
Softening	No	No/Yes	0095
Flow-controlled dosing	No	No/Yes	0095
pH measurement	No	No/Yes	0095
Redox measurement	No	No/Yes	0095
Water meter controlled salt reduction	No	No/Yes	0095
Data logger	No	No/Yes	0095
Sample rate data logger [min]	1.0	0.1 ... 99.9	0095

**Softening**

Is there a water softener type duo WE 65, 300, 450 or 750 available and is it controlled by the GENO-KWA-tronic<sub>2</sub>?

**Flow-controlled dosing:**

Is there a dosing pump (dosing agent hardness stabilizer or corrosion inhibitor) for the make-up water treatment connected to the GENO-KWA-tronic<sub>2</sub>?

**pH measuring  
or**

Is there a pH measuring point installed in the circulation whose measured value is processed by the GENO-KWA-tronic<sub>2</sub> for the salt reduction?

**Redox measuring:**

Is there a Redox measuring point installed in the circulation whose measured value is processed in the GENO-KWA-tronic<sub>2</sub> for time-controlled dosing (dosing agent biocide)?

**Water meter controlled salt reduction:**

Is there a water meter installed in the drain pipe which is used in the GENO-KWA-tronic<sub>2</sub> to add up the salt reduction volume?

**Data logger:**

Is a data logger with SD memory card installed in the plug-in slot in order to document the necessary operating data which is relevant for the time-controlled dosing?

**Sample rate data logger:**

Time interval for the cyclical logging of the measured system values on the memory card.

### 4.3.3 Menu I/O configuration

In the I/O configuration menu, the settings for the built-in functions are made.

Parameter	Factory-setting	Setting range	Code
Ext. E1 opening time [min]	0	0 ... 999	0095
Power output [mA]	4 ... 20	0/4 ... 20	0095
Power output signal	LF = conductivity	conductivity, irradiation intensity, pH, Redox, temp., flow (circulation)	0095
Ext. E2 configuration			0095
Salt reduction valve	released	released/locked	
Pre-salt reduction	released	released/locked	
System pump	released	released/locked	
UV during biocide dosing + locking duration	released	released/locked	

**Ext. E1 opening time:**

When the external signal E1 (standby/automatic operation) is connected via a volt.-free contact provided by the client on site, all output signals are switched off and no fault signal is emitted. If a time > 0 min. is programmed and the salt reduction valve is not locked via ext. input 2, the motor ball valve for the salt reduction may be opened for the time to be set here and then it will close automatically. This way, the circulation water for example may be drained off automatically if the cooling cycle or the air washer is to be shut down temporarily.

**Power output:**

Determination whether the standard signal 0 ... 20 or 4 ... 20 mA is emitted.

**Power output signal:**

Determination which measured value is given at the power output:

LF (conductivity, depending on the used measuring range/system), BS (irradiation intensity), pH (pH value), Redox (Redox potential), Temp. (temperature circulation water, only available for conductive measuring system!), Durchfluss/flow (circulation water). The signal range is:

Signal	0 resp. 4 mA	20 mA
Cond. conductivity [mS/cm]	0.01	5
Ind. conductivity [mS/cm]	0	0.5/5
Irradiation intensity [W/m <sup>2</sup> ]	0	25
pH	0	14
Redox [mV]	0	1200
Temp. (cond. conductivity) [°C]	0	60
Flow circulation [m <sup>3</sup> /h]	0	10

**Ext. E2 configuration**

The locked functions will not be executed as long as the contact at the external input E2 is closed. In case of the UV system, the locking period is limited to the duration of the biocide dosing + locking duration.

**4.3.4 Diagnosis**

In the diagnosis menu, the utilities for the start-up and the log are provided.

Parameter	Factory-setting	Setting range	Code
Display inputs	Display only		
Control outputs	0	0/1	Customer service
Print system data	0	0/1	0095
Printer log	0	0/1	0095
Measuring rate [min]	1	0.1 ... 99.9	0095
Lines/Page	65	40 ... 78	0095

**Display inputs:**

To check the connected transmitters and contacts, the logic state (0/1) of the digital input signals and the measured value (mS/cm; °C; pH; mV; W/m<sup>2</sup>) of the analogue input signals are displayed:

**Control outputs:** After acknowledgement of a safety query, all outputs are initially switched off. The GENO-KWA-tronic<sub>2</sub> is automatically inactivated, the green LED is extinguished (refer to chapter F, point 2.1 operating modes). Then all digital and analogue output signals may be switched on (0 → 1) and off (1 → 0) in order to test the connected components. After quitting the menu, all outputs that are still switched on are switched off again. In order to restart operation, the GENO-KWA-tronic<sub>2</sub> has to be activated again

by means of the key  .

Special information:

After the output for the flow-controlled dosing pump is switched on, a frequency of 60 strokes/minute is emitted, the analogue signal 0/4 ... 20 mA may be set at an increment of 0.1 mA.

**System data print:** By activating - (0 → 1) the system data print, a complete overview of all set parameters of all menus is given via the serial interface of a connected serial printer or PC.

**Printer log:** By activating - (0 → 1) the printer log, the operating state of the GENO-KWA-tronic<sub>2</sub> and the input and output signals are given chronologically in an adjustable measuring rate via a serial interface of a connected serial printer or PC. By deactivating the printer log (1 → 0), the reporting is terminated again.



Note: The used printer must have an EPSON compatible instruction set, the GENO-KWA-tronic<sub>2</sub> uses the protocol 2400 Baud, 8 data bits, 1 stop bit, no parity.

Measuring rate: Time interval for the print of data sets for the printer log.

Lines/Page: Number of lines per page for the system data print and the printer log.

#### 4.3.5 Temperature limit value

Parameter	Factory-setting	Setting range	Code
Upper temp. limit [°C]	LUWADES <sub>2</sub> 35, KWA 55	0 ... 60	0095
Lower temp. limit [°C]	5	0 ... 60	0095
Delay time [min]	2	99.9	0095

**Upper temp. limit:** Maximum value of the media temperature which is determined by certain system components.

**Lower temp. limit** Minimum value of the media temperature which is determined by certain system components.

**Delay time:** If one of the two values exceeds or falls below the limits for longer than the programmed time, the corresponding fault signal "Temperatur zu hoch/niedrig – Temperature too high/low" is displayed.



**Warning!** Settings exceeding the upper temperature limit or being below the lower temperature limit are only admissible explicit authorization by Grünbeck Wasseraufbereitung GmbH – risk of damaging system components!

#### 4.3.6 Operating values

In the menu for the operating values, different counter readings are parameterized and displayed. Depending on the importance of the value, a reset can be made by the operator or by the manufacturing company only.

Parameter	Factory-setting	Setting range	Code
Maintenance interval [days]	365	0 ... 365	0095
Maintenance due in [days]	Display only		
Reset maintenance interval	0	0/1	0095
Operating hours [h]	Display only		
Reset operating hours	0		Grünbeck
Operating time pump [h]	Display only		
Reset operating time pump	0	0/1	Customer service
UV burning time [h]	Display only		
UV switch-on periods	Display only		
Reset UV	0	0/1	Customer service
Sum inlet volume [m <sup>3</sup> ]	Display only		
Reset inlet volume	0	0/1	Grünbeck
Sum outlet volume [m <sup>3</sup> ]	Display only		
Reset outlet volume	0	0/1	Grünbeck
Regeneration counter	Display only		
Reset regeneration counter	0	0/1	Customer service

<b>Maintenance interval:</b>	After the set time has expired, maintenance is requested automatically. Setting 0 = maintenance interval deactivated.
<b>Maintenance due in:</b>	Remaining time to the next maintenance signal.
<b>Reset maintenance interval:</b>	Restart maintenance interval after performed maintenance.
<b>Operating hours:</b>	Operating hour meter for the time in which the system had been switched on by means of key I (green LED is illuminated).
<b>Runtime pump:</b>	Operating hour meter for the time in which the system pump had been switched on.
<b>Reset runtime pump:</b>	Reset parameter operating time pump to 0 (e. g. after installation of a new pump).
<b>UV runtime:</b>	Operating hour meter for the time in which the UV system had been switched on.
<b>UV switch-on:</b>	Number of times the UV system was switched on. This counter reading is relevant for the service life of the UV lamp.

<b>Reset UV:</b>	Reset parameter UV runtime and UV switch-on after having installed a new UV lamp.
<b>Sum inlet volume:</b>	If a water meter is installed in the inlet to the GENO-KWA-tronic <sub>2</sub> , the water volume is counted here.
<b>Reset inlet volume:</b>	Reset of the counter reading for the sum of the inlet volume.
<b>Sum outlet volume:</b>	If a water meter is installed in the outlet to the GENO-KWA-tronic <sub>2</sub> , the water volume is counted here.
<b>Reset outlet volume:</b>	Reset of the counter reading for the sum of the outlet volume.
<b>Regeneration counter</b>	If a water softener GENO-mat duo WE... is connected to the GENO-KWA-tronic <sub>2</sub> , the number of regenerations performed is counted here.
<b>Reset regeneration counter</b>	Reset the regeneration counter after maintenance has been performed on the water softener.

### 4.3.7 Error memory

In the error memory the last 10 errors that have occurred are being stored. Skip between the entries by pressing ▼ and ▲.

### 4.3.8 Languages

Selection of the menu language (presently, only German is available).

Parameter	Factory-setting	Setting range	Code
Languages	German	German/English	0095

### 4.3.9 Phone number

A customer service phone number is freely editable which can be called as info text by the function key F3 in the entire system.

Parameter	Factory-setting	Setting range	Code
Phone number	+49 9074 41-333	freely editable	0095

### 4.3.10 Date, time

Programming of date and time, setting of daylight saving time, if required.

Parameter	Factory-setting	System setting	Code
Date	Fr 18.02.2005 (factory-set)	freely editable	0095
Time	09:20:23 (factory-set)	freely editable	0095
Daylight saving time	No (factory-set)	No/Yes	0095

**4.3.11 Basic system setting**

Resetting the parameters accessible via function keys F1, F2 and F3 to the factory-settings according to the chosen system type (which remains unchanged).

Parameter	Factory-setting	System setting	Code
Basic system setting	0	0/1	Customer service

**4.3.12 Software version**

Display of the software version programmed in the GENO-KWA-tronic2.

Parameter	Factory-setting	System setting	Code
Software version	Display only		

**4.4 Circulation menu**



As most of the built-in system components of the GENO-KWA are parameterized in the circulation menu, we will describe this one first.

The circulation menu can be accessed from every flow chart screen via the function key F2, info texts that might be available can be called via function key F4. Within the open circulation menu the function key F4 is used to return to the next higher menu level or back to the flow chart screen.

**Structure of the circulation menu:**

MENÜ UMLAUF	CIRCULATION MENU
>Absalzung	Salt reduction
Kalibrierwerte	Calibration values
Umwälzung	Recirculation
pH-Überwachung	pH control

#### 4.4.1 Salt reduction

In the salt reduction menu, all parameters regarding the salt reduction behaviour are programmed.

Parameter	Factory-setting	Setting range	Code
Salt reduction mode	OFF	OFF/Auto	0095
Salt reduction measuring values	Selection table		0095
Ind. conductivity measuring signal [mA]	4 ... 20	0/4 ... 20	0095
Ind. conductivity measuring range [mS/cm]	Display only		
Conductivity max. alarm [mS/cm]	1,8	0,01 ... 5	0095
Max. conductivity [mS/cm]	1,6	0,01 ... 5	0095
Min. conductivity [mS/cm]	1,4	0,01 ... 5	0095
Conductivity min. alarm [mS/cm]	1,2	0,01 ... 5	0095
Max. irradiation intensity [W/m <sup>2</sup> ]	1.7	0 ... 25	0095
Min. irradiation intensity [W/m <sup>2</sup> ]	1.4	0 ... 25	0095
Exceeding/falling below	Exceeding	Exceeding/ falling below	0095
pH limit value	8.4	7 ... 9	0095
pH-contr. salt reduction time [min.]	10	0 ... 999	0095
pH signal [mA]	4 ... 20	0/4 ... 20	0095
Salt reduction response delay [min.]	1	0 ... 99.9	0095
Alarm delay [min.]	1	0 ... 99.9	0095
Max. salt reduction time [min.]	15	0 ... 9999	0095
Salt reduction control [h]	72	0 ... 999	0095
Water meter pulse rate [litre/pulse]	0.030	0.001 ... 1.000	0095

**Salt reduction mode:**

OFF: The salt reduction ball valve remains closed  
Auto: The salt reduction ball valve will be opened and closed again according to the limit values for conductivity and/or irradiation intensity and/or pH value.

**Salt reduction measuring values:**

According to the matrix below the selection will be made which measuring value will be used for the display and/or the salt reduction (the setting "salt reduction without display" is not possible). Setting value 0 = function will not executed, setting value 1 = function will be executed. The menu points can be chosen by means of the keys ► and ◀.

Measuring value	Displays	Salt reduction
Conductive conductivity		
Inductive conductivity		
Irradiation intensity (BS)		
pH*		

Depending on the system type, different pre-settings may exist.

**KWA 50k:**

Measuring value	Displays	Salt reduction
Conductive conductivity	1	1
Inductive conductivity	0	0
Irradiation intensity (BS)	0	0
pH*	0	0

**KWA 60i:**

Measuring value	Displays	Salt reduction
Conductive conductivity	0	0
Inductive conductivity	1	1
Irradiation intensity (BS)	0	0
pH*	0	0

**LUWADES<sub>2</sub>:**

Measuring value	Displays	Salt reduction
Conductive conductivity	1	1
Inductive conductivity	0	0
Irradiation intensity (BS)	1	1
pH*	0	0

\*only in case of optional pH control

If the measuring system for an existing system will be changed from a conductive to an inductive measuring system or vice versa, the corresponding settings for the new measuring system have to be made in this matrix.

**Inductive conductivity measuring signal:**

If an inductive measuring system (GENO-CTI-500) is used: selection whether the conductivity measuring signal will be transmitted to the GENO-KWA-tronic<sub>2</sub> at 0 ... 20 mA or 4 ... 20 mA.

**Inductive conductivity measuring range:**

Display of the measuring range (0 ... 0.5 or 0 ... 5 mS/cm are possible) currently used in the measuring transducer GENO-CTI-500.

**Conductivity max. alarm [mS/cm]:**

Upper conductivity alarm limit value.

**Max. conductivity [mS/cm]:**

Upper conductivity alarm limit value which leads to the opening of the salt reduction ball valve. With regard to the conductivity, the ball valve remains open until the value has fallen below the lower conductivity limit value again.

**Min. conductivity [mS/cm]:**

Lower conductivity limit value.

**Conductivity min. alarm [mS/cm]:**

Lower conductivity alarm limit value, a setting value of 0.00 mS/cm means that the alarm is deactivated.

**Max. irradiation intensity [W/m<sup>2</sup>]:**

Upper limit value for irradiation intensity

**Min. irradiation intensity [W/m<sup>2</sup>]:**

Lower limit value for irradiation intensity which leads to the opening of the salt reduction ball valve. With regard to the irradiation intensity, the ball valve remains open until the upper limit value for the irradiation intensity is exceeded again.



**Note:** As there is only one input for the 0/4 – 20 mA signal of a pH or Redox transmitter is available, only one pH measurement or one Redox measurement can be connected and analysed.

**Falling below/exceeding:**

Only for pH-controlled salt reduction

Depending on the setting, the salt reduction ball valve is opened for the pH-controlled salt reduction time in case the pH limit value is exceeded or undershot.

<b>pH limit value:</b>	Only for pH-controlled salt-reduction Limit value for pH-controlled salt reduction
<b>pH-controlled salt reduction time:</b>	Only for pH-controlled salt-reduction Time for which the salt reduction ball valve stays open in after the pH limit value has exceeded/been undershot.
<b>pH signal:</b>	Only for pH-controlled salt reduction Choice whether the pH measuring signal shall be transmitted with 0 ... 20 mA or 4 ... 20 mA to the GENO-KWA-tronic <sup>2</sup> .
<b>Salt reduction response delay:</b>	Delay time for all limit values such as conductivity, irradiation intensity, pH value which are relevant for the salt reduction (not alarm): Only if the corresponding limit value is continuously exceeded or under-run for longer than the programmed time, the salt reduction is started.
<b>Alarm delay:</b>	Delay time for the alarm limit values conductivity max. alarm and conductivity min. alarm: Only if the corresponding limit value is continuously exceeded or under-run for longer than the programmed time, an alarm is emitted.
<b>Max. salt reduction time:</b>	<b>Up to software version V1.19:</b> If the salt reduction ball valve is continuously open for longer than the programmed limit value, an alarm is emitted. If the conductivity then is > max. conductivity, the ball valve will be opened again, otherwise it stays closed.  <b>Starting with software version V1.20:</b> If the salt reduction ball valve is continuously open for longer than the programmed limit value, an alarm is emitted. The ball valve stays closed until the error signal has been acknowledged.
<b>Salt reduction control:</b>	If no salt reduction has taken place after the expiry of the time programmed in this point, an alarm will be emitted. The reasons for a salt reduction do not make any difference. The setting value 0 h means that the function is deactivated.
<b>Water meter pulse rate:</b>	Pulse rate of a water meter which is installed in the drain pipe and connected to the GENO-KWA-tronic <sup>2</sup> .

#### 4.4.2 Calibration values

Parameter	Factory-setting	Setting range	Code
Conductivity temp. coefficient [%/K]	2.2	0.5 ... 3.0	Customer service
Cell constant 1.0	1.000	0.900 ... 1.100	Customer service
Conductivity reference value [mS/cm]	5.00	0 ... 5.00	Customer service
Reset calibration	0	0/1	Customer service

<b>Conductivity temp. coefficient:</b>	Temperature coefficient of the circulation water. If there no differing water analysis available, do not change this value!
<b>Cell constant 1.0:</b>	Here, the value accurately measured during the production of the measuring cell which is indicated on the type designation plate has to be entered. This setting must not be changed until a new measuring cell is installed.

**Conductivity reference value:** After the cleaning of the measuring cell (refer to maintenance), the value determined by means of a reference measuring device has to be entered.

**Reset calibration:** Immediately prior to the installation of a new measuring cell or the programming of the parameter "cell constant 1.0" of the new measuring cell, the stored values of the old measuring cell are deleted by reprogramming (0 → 1).

#### 4.4.3 Recirculation

In the recirculation menu all parameters that are relevant for the recirculation are stored.

Parameter	Factory-setting	Setting range	Code
Recirculation mode	OFF	OFF/system pump/ext. pump	0095
Flow control mode	OFF	OFF/Auto	0095
Signal type	Pulse	Pulse/NOC	0095
Water meter pulse rate [litre/pulse]	0.030	0.001 ... 1.000	0095
Flow alarm value [m <sup>3</sup> /h]	0.5	0 ... 99.0	0095
Alarm delay [min]	3	1 ... 6	0095
Start cycle mode*	OFF	OFF / Auto (*)	0095



\* **Warning!** Start cycle mode „Auto“ may only be chosen if there is a possibility that the flow alarm value is exceeded again after the idle time. Attention: In case of dry-run, the mechanical face seal of the pump will be destroyed!

Starting efforts	2	1 ... 5	0095
Idle time [min]	10	1 ... 15	0095
Operating time [min]	3	1 ... 6	0095

**Recirculation mode:**

- OFF: The system pump is deactivated
- System pump: The system pump is activated
- Ext. pump: The recirculation is executed by means of a pump existing on site, the integrated output at the terminals 4 and 5 will not be actuated.

**Flow control mode**

- OFF: There is no control whether the flow rate in the circulation is higher than the flow alarm value or not.
- Auto: If the flow rate in the circulation is lower than the flow alarm value, a fault signal is emitted after expiration of the alarm delay time, in case of recirculation by means of the system pump, the system pump will be switched off and the start cycle will be processed, if required.

<b>Signal type:</b>	<u>Pulse:</u>	A water meter is connected to the GENO-KWA-tronic <sub>2</sub> in the circulation. For pulse analysis refer to "flow alarm value"
	<u>NOC:</u>	A paddle switch is connected to the GENO-KWA-tronic <sub>2</sub> in order to control the flow rate. If the signal decreases, a fault signal is emitted after the expiration of the alarm delay.
<b>Water meter pulse rate:</b>	Only relevant for signal type „Impuls/pulse“: Pulse rate of the water meter [litre/pulse] in the circulation connected to the GENO-KWA-tronic <sub>2</sub>	
<b>Flow alarm value</b>	Alarm limit value for the flow rate in the circulation in the setting "Durchflussüberwachung Modus Auto" = "Flow control mode Auto": In the signal type "pulse", a fault signal is emitted after the expiration of the alarm delay time if the value falls below this limit value. In case of recirculation by means of system the system pump will be switched off and the start cycle will be processed, if required.	
<b>Alarm delay:</b>	Delay time for the flow alarm value.	
<b>Start cycle mode</b>	Only in case of recirculation by means of system pump: <u>OFF:</u> After emission of the flow alarm signal, the system pump will only be restarted after this signal has been acknowledged. <u>Auto:</u> After emission of the flow alarm signal, the system pump will restart by itself.	
<b>Start efforts:</b>	Number of automatic re-start efforts in „start cycle Auto“.	
<b>Idle time:</b>	Break between two re-start efforts.	
<b>Runtime:</b>	Runtime of a re-start effort. If the flow alarm value is exceeded the alarm signal automatically acknowledges itself.	



**Attention!** The longer the setting of the runtime and the alarm delay time, the higher the wear and tear of the system pump!

#### 4.4.4 pH control

In the menu pH control, the lower and upper pH limit value are stored. For both of them the same delay time from menu „salt reduction/alarm delay“ applies.

Parameter	Factory-setting	Setting range	Code
min. pH alarm	7	0 ... 14.00	0095
max. pH alarm	9	0 ... 14.00	0095

#### 4.5 Disinfection menu

The disinfection menu can be accessed from every flow chart screen via the function key F3, info texts that might be available can be called via function key F4. Via the function key F3 a non-recurring timer-controlled dosing cycle can be triggered. To do so the key must be pressed for 5 sec. Within the open disinfection menu the function key F4 is used to return to the next higher menu level or back to the flow chart screen.

##### Structure of the disinfection menu:

MENÜ DESINFEKTION	DISINFECTION MENU
> Zeit-Dosierung	> Timer-controlled dosing
UV-Desinfektion	UV disinfection
Redox-Überwachung	Redox control

##### 4.5.1 Timer-controlled dosing (dosing agent biocide)

In the timer-controlled dosing menu, all system components are programmed that relate to the dosing cycle (refer to fig. 5)



**Note:** If – during a running time-controlled dosing or during a stop time, the standby signal is (ext. input 1; terminals 37/38) is applied, then the time-controlled dosing/stop time is processed first, before the operating mode standby becomes effective.

Parameter	Factory-setting	Setting range	Code
Timer-controlled dosing mode	OFF	OFF/Auto	0095
Request recirculation [min.]	1	0 ... 999	0095
Salt pre-reduction	OFF	OFF/Auto	0095
Reduced conductivity [mS/cm]	1.5	0 ... 5.00	0095
Dosing time [min.]	1	0 ... 9999	0095
Dosing break [min.]	0	0 ... 999	0095
Stop time [min.]	120	0 ... 999	0095
Weekly pattern	Selection table		0095
Redox mode	OFF	OFF/Auto	0095
Redox limit value [mV]	0	0 ... +1200	0095
Redox signal [mA]	4 ... 20	0/4 ... 20	0095
Redox response delay [min.]	1	0 ... 99.9	0095

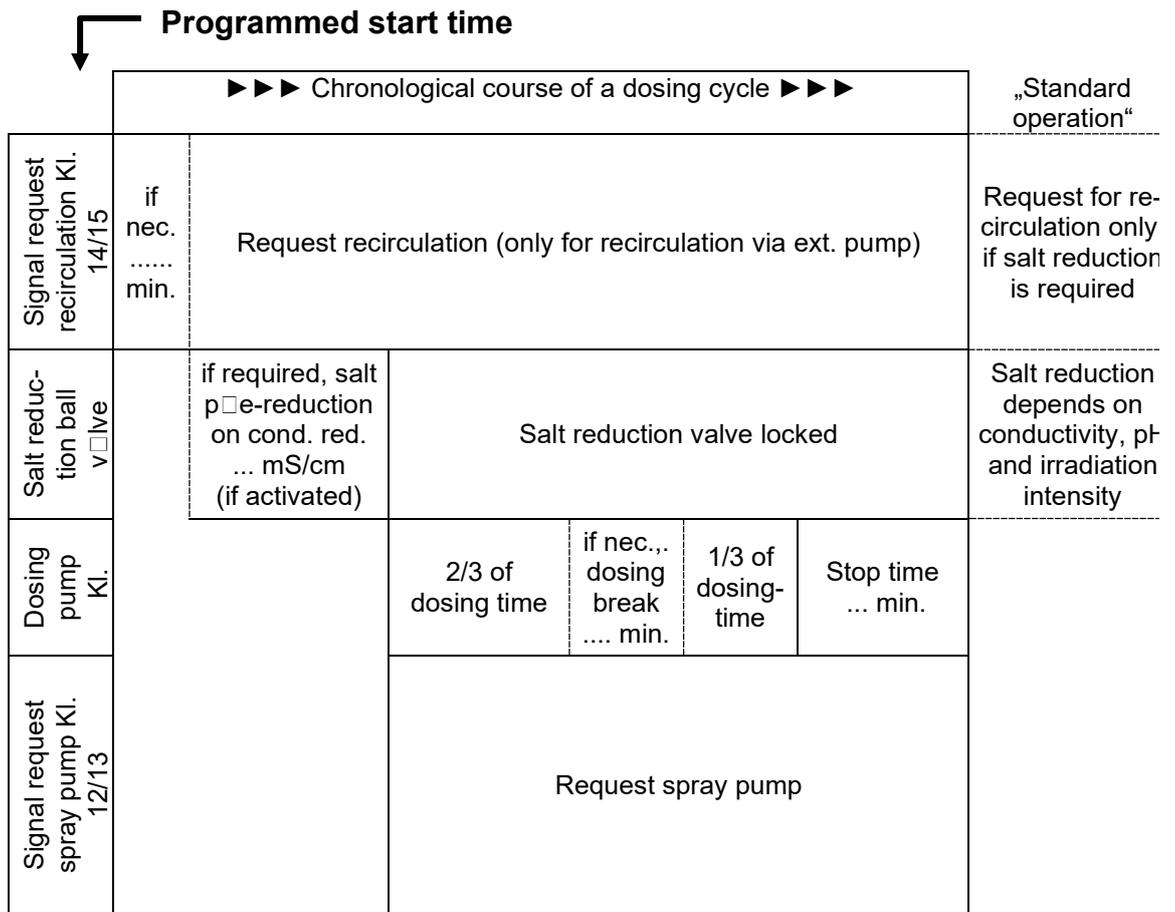


Fig. 5 Timer-controlled dosing cycle

**Timer-controlled dosing mode:**

OFF: No timer-controlled dosing according to the weekly pattern and the start time is performed.

Auto: The timer-controlled dosing will be performed according to the weekly pattern and the start time.

**Request recirculation**

In case of recirculation via an external pump, the signal "request recirculation" for the programmed time prior to the actual timer-controlled dosing and if necessary even prior to a salt pre-reduction is emitted.

The recirculation is important to avoid that local differences to the rest of the circulation water may occur upstream of the conductivity and Redox sensor and to make sure that no unnecessary salt pre-reduction takes place.



**Note:** The "request" signal will only be emitted, if either system pump (□Luwades) or ext. pump (□KWA) is set in the menu circulation/recirculation/recirculation mode.

**Salt pre-reduction:**

Setting of a „Ziel-Leitfähigkeit“ LF-Red. = "Target conductivity" conductivity red. prior to the start of the timer-controlled dosing. As the timer-controlled dosing with the ensuing stop time means a prohibition of a salt reduction for several hours during which concentration of the circulation water may increase, the conductivity level will be lowered by means of the salt pre-reduction prior to the timer-controlled dosing.

**Reduced conductivity:**

„Ziel-Leitfähigkeit“ = "Target conductivity", which will be achieved at the end of the salt pre-reduction. Afterwards, the timer-controlled dosing will begin.

**Dosing time:**

Total time the dosing pump is switched on.

**Dosing break:**

If a time of 1 ... 999 minutes is programmed here, the timer-controlled dosing is interrupted after 2/3 of the dosing time and the remaining 1/3 will only be executed after the dosing break. This increases the efficiency of the biocide and at the same time reduces the dosing volume required.

**Stop time:**

Period after the dosing time during which the salt reduction ball valve has to remain closed under all circumstances.



**Note:** The Waste Water Guideline (AbwV) stipulates that the salt reduction has to be stopped during and after a shock dosing of micro-biocide agents until the limit value for the luminous inhibition of bacteria GL of 12 or less is reached according to the manufacturer's indications. In case of Grünbeck's biocides, the limit values for the waste water in general are reached two hours. Please observe the corresponding product and safety data sheets!

**Weekly pattern (example):**

START TIMES :		
Time 1	M <b>D</b> M <b>D</b> FSS	08:15
Time 2	MDMDF <b>S</b> S	15:30
Time 3	MDMDFSS	00:00

Zeit/time = fixed time at which the dosing cycle (refer to fig. 5) will start on the chosen weekdays (high-lighted in black)

In the example given, the timer-controlled dosing will start at 08:15 am on Tuesdays and Thursdays and at 15:30 (3:30 pm) on Saturdays. The third possible time has not yet been set.



**Note:** As there is only one input for the 0/4 – 20 mA signal of a pH or Redox transmitter is available, only one pH measurement or one Redox measurement can be connected and analysed.

**Redox mode:**

OFF: No timer-controlled dosing is triggered via the Redox signal.

Auto: If the Redox limit value is undershot, the timer-controlled dosing is triggered after expiration of the Redox response delay.

**Redox limit value:**

Limit value which – if undershot - triggers the timer-controlled dosing after expiration of the Redox response delay.

**Redox signal:**

Choice whether the Redox measuring signal shall be transmitted with 0 ... 20 mA or 4 ... 20 mA to the GENO-KWA-tronic<sup>2</sup>.

**Redox response delay:**

Delay time for the Redox limit value.

#### 4.5.2 UV system

In the menu UV system all parameters – with exception to salt reduction parameters (see 4.3.1 salt reduction) – which are relevant for the UV system are stored.

Parameter	Factory-setting	Setting range	Code
UV system mode	OFF	OFF/AUTO/Stnd	0095
Min. alarm irradiation intensity [W/m <sup>2</sup> ]	0.3	0 ... 25.0	0095
Service irradiation intensity W/m <sup>2</sup>	0.6	0 ... 25.0	0095
Delay time [min]	2	0 ... 99.9	0095

**UV system mode:**

OFF: The UV system is switched off.

AUTO: The UV system is switched on.

Stnd: During the biocide dosing + locking period, the UV system is switched off.

**Min. alarm irradiation intensity:**

Alarm limit value for the irradiation intensity. If it is undershot for a longer time than the programmed delay time, an alarm is emitted.

**Service irradiation intensity:**

Service limit value for the irradiation intensity. If it is undershot for a longer time than the programmed delay time, a maintenance request will be emitted.

**Delay time:**

Delay time for limit values min. alarm irradiation intensity and service irradiation intensity.



**Note:** After the UV system is switched on, all limit values (alarm, service, salt reduction) that are relevant for the irradiation intensity are initially being ignored for 5 minutes as the UV lamp only slowly reaches its full intensity.

#### 4.5.3 Redox control

In the menu Redox control, the alarm limit values for the Redox potential are stored. For both values, the Redox response delay from menu "Disinfection/timer-controlled dosing" does apply.

Parameter	Factory-setting	Setting range	Code
Min. alarm Redox [mV]	0	0 ... +1200	0095
Max. alarm Redox [mV]	+1200	0 ... +1200	0095

#### 4.6 Inlet menu

The inlet menu can be accessed from every flow chart screen via the function key F1, info texts that might be available can be called via function key F4. Via the function key F3, the manual regeneration of a water softener, possibly installed upstream as an option, can be released. In order to do so, keep the key pressed for 5 sec. Within the open inlet menu the function key F4 is used to return to the next higher menu level or back to the flow chart screen.

##### Structure of the inlet menu

MENÜ ZULAUF	INLET MENU
>WZ-Zulauf	> Inlet water meter
EH-Bediener	Operator softener
EH-Anlage	Water softener
EH-Zeiten	Water softener times
Störungen	Defaults
EH-Service	Softener service
Prop.-Dos. Bediener	Oper. flow-controlled dosing



**Note:** Starting with software version 1.20, it is also possible to trigger a water softener by means of the GENO-mat duo WE-KWA.

##### 4.6.1 Inlet water meter

In the inlet water meter menu, the water meter installed in the inlet and connected to the GENO-KWA-tronic<sub>2</sub> can be configured.

Parameter	Factory-setting	Setting range	Code
Water meter pulse rate [litre/pulse]	0.030	0.001 ... 10.000	Customer service

#### 4.6.2 Operator water softener

Determination of the raw water and blending water hardness which are relevant for a water softener GENO-mat duo WE-KWA which is controlled by the GENO-KWA-tronic<sub>2</sub>

Parameter	Factory-setting	Setting range	Code
Raw water hardness [°dH]	25	0 ... 250	0095
Blending hardness [°dH]	0	0 ... 250	0095



**Note:** If the softened inlet water is blended with raw water, a water meter must be installed in the blending water pipe. Otherwise, the dosing volume of the flow-controlled dosing pump (dosing agent, hardness stabilizer or corrosion inhibitor) and the inlet water volume registered by the GENO-KWA-tronic<sub>2</sub> is not correct.

#### 4.6.3 Water softener

If a GENO-mat duo WE-KWA water softener which is controlled by the GENO-KWA-tronic<sub>2</sub> is installed in the inlet, the exact type and operating mode may be set here.

Parameter	Factory-setting	Setting range	Code
System type (GENO-mat duo WE-KWA...)	65	65, 150, 300, 450, 750 50, 130, 230, 330, 530	Customer service
Capacity [m <sup>3</sup> * °dH]	Depending on system type	0 ... 9999	Customer service
Operating mode	3	2 ... 3	Customer service

**Capacity:** Capacity number of water softener.

**Operating mode:** 2: flow-controlled regeneration – immediately

3: flow-controlled/timer-controlled regeneration - immediately

#### 4.6.4 Water softener - times

If a GENO-mat duo WE-KWA water softener which is controlled by the GENO-KWA-tronic<sub>2</sub> is installed in the inlet, the times that are relevant for the regeneration can be programmed here.

Parameter	Factory-setting	Setting range	Code
Step 1 backwash [min]	Depending on system type	0 ... 99.9	Customer service
Step 2 salting [min]	Depending on system type	0 ... 99.9	Customer service
Step 3 displacing [min]	Depending on system type	0 ... 99.9	Customer service
Step 4 washing out [min]	Depending on system type	0 ... 99.9	Customer service
Step 5 fill brine tank [min]	Depending on system type	0 ... 99.9	Customer service
Step 6 [min]	0	0 ... 99,9	Customer service
Daily interval [d]	14	1 ... 99	Customer service
Release time	00:00	00:00 ... 23:59	0095
Maintenance interval water softener [days]	365	0 ... 365	Customer service

#### 4.6.5 Malfunctions

If a GENO-mat duo WE-KWA water softener which is controlled by the GENO-KWA-tronic<sub>2</sub> is installed in the inlet, the parameters that are relevant for the fault signals are programmed here.

Parameter	Factory-Setting	Setting range	Code
Delay motor malfunction [min]	3.5	0 ... 9.9	Customer service
Delay low-on-salt [min]	0	0 ... 250	Customer service
Input low-on-salt	0	0 / 1	Customer service

**Delay motor malfunction:** If – during the regeneration – the motor of the control head (switching from one regeneration step to the next) does not reach the next, valid position during the time programmed here, an alarm signal is emitted.

**Delay low-on-salt:** Only, if a float switch for the automatic empty signal is installed in the brine tank and is connected to the GENO-KWA-tronic<sub>2</sub>. At the end of step 5, the delay time programmed here during which the signal of the activated float switch must occur, starts counting. Otherwise, an alarm signal is emitted.

**Input low-on-salt:**

- 0: No empty signal for brine tank (181 880) installed.
- 1: An optional empty signal for brine tank (181 880) is available and connected to the GENO-KWA-tronic<sub>2</sub>.

#### 4.6.6 Water softener - maintenance

Here, the auxiliary functions for the technical customer service regarding a GENO-mat duo WE-KWA water softener that might be installed in the inlet and which is controlled by the GENO-KWA-tronic<sub>2</sub> are stored.

Parameter	Factory-setting	Setting range	Code
Step abortion	0	0/1	Customer service
Maintenance water softener in [days]	Display		0095
Reset maintenance of water softener	0	0/1	Customer service

**Step abortion:** By switching (0 → 1), the current step of an on-going regeneration is aborted.

**Maintenance water softener in:** Remaining time of water softener's maintenance interval.

#### 4.6.7 Flow-controlled dosing mode

Activation or deactivation of an optional flow-controlled dosing pump (dosing agent, hardness stabilizer or corrosion inhibitor) which might be installed in the inlet.

Parameter	Factory-setting	Setting range	Code
Flow-controlled dosing mode	OFF	OFF/AUTO	0095

## G Troubleshooting

Even carefully designed and manufactured technical systems that are properly operated, may experience malfunctions.

Table G-1 provides an overview of possible problems that may occur during the operation of a compact air washer system GENO -Luwades<sub>2</sub> and salt reduction system GENO-KWA with GENO-KWA-tronic<sub>2</sub> control unit and indicates their causes and the corresponding remedies.

**Table G-1 Warning signals**

In case of warning signals, the collective fault signal contact will not be opened.

This is what you observe	This is the cause	This is what to do
Warning: service irradiation intensity required (only for LUWADES <sub>2</sub> )	GENO UV module is contaminated inside	Clean GENO-UV module (rinse)
	Service life (9000 h) of UV lamp is exceeded	Maintenance by Grünbeck's customer service / authorised service company
	„Poor“ quality of circulation water due to concentration caused by evaporation of the water (transmission value too low resp. SSK <sub>254</sub> too high)	Activate salt reduction via irradiation intensity resp. optimise the limit value for the irradiation intensity (irradiation intensity max. and irradiation intensity min.) Increase salt reduction volume resp. inlet water volume
	„Poor“ quality of circulation water due to modified raw water quality (low transmission value resp. high SSK <sub>254</sub> value)	Water analysis of raw water and circulation water (analysis to be done in lab only)

**Table G-2 Fault signals**

For all fault signals, the collective fault signal contact will be opened.

<b>This is what you observe</b>	<b>This is the cause</b>	<b>This is what to do</b>
Maintenance due	Maintenance interval has expired	Perform maintenance and acknowledge in „Systemmenü/ Betriebswerte“ = “system menu/operating values”. Record in operation log.
Fault dry-run (only for LUWADES <sub>2</sub> or optional flow sensor)	No or too little flow in the circulation, risk of the pump running dry.	Check water level in circulation and make up, if necessary. Reason being e. g. flow rate at salt reduction valve is higher than make-up water rate. Clean dirt strainer Check suction line and clean possibly existing coarse dirt strainer Check setting of the flow restrictor and correct, if necessary Install a flow orifice with a smaller $\varnothing$ into the salt reduction valve. Check limit value for dry-run
Fault timer-controlled dosing  or  Fault flow-controlled dosing	Fault signal from the dosing pump timer-controlled dosing (Kl. 29/30) or flow-controlled dosing inlet (Kl. 31/32) due to: power failure dosing agent empty membrane control dosing control	Check type of disturbance at the dosing pump Refer to the chapter troubleshooting in the operation manual for the dosing pump
Fault salt reduction time	Set limit value for „max. salt reduction time“ was exceeded: The limit value required for the closing has not been reached within the set time  Salt reduction ball valve does not open	Check the setting for the limit value of the salt reduction and correct, if necessary: <ul style="list-style-type: none"> <li>• max. salt reduction time</li> <li>• conductivity (LF), irradiation intensity (BS) and pH parameter</li> </ul> If the set limit values, esp. the “max. salt reduction time” are reasonable, check for other causes, e. g. orifice at salt reduction ball valve dirty or boring too small. Check salt reduction ball valve
Fault salt reduction monitoring	No salt reduction took place within the set interval	Check the setting of the limit value of the salt reduction and correct it, if necessary
	Parameters set incorrectly	Conductivity, irradiation intensity and pH parameter, salt reduction control
	Signal connected to ext. input E2	Check signal ext. input 2 (Kl. 33/34) and switch off, if necessary

This is what you observe	This is the cause	This is what to do
Fault pH-controlled salt reduction (only with optional pH control)	After the pH-controlled salt reduction has been completed, the pH value is still (depending on the setting) higher or lower than the limit value.	Check limit value of salt reduction and correct, if necessary: excess/undershooting pH limit value, pH-controlled salt reduction time
	Salt reduction ball valve does not open/close	Check
	Inlet water volume too low compared to outlet water volume	Check pH value of inlet water and increase inlet and outlet, if necessary
	pH measuring transducer configured incorrectly.	Check and correct, if necessary
Fault temperature too low  Fault temperature too high	The set lower or upper limit value for the water temperature was undershot or exceeded	Eliminate the cause for the undershooting/excess resp. adjust the limit values within the admissible range: <ul style="list-style-type: none"> <li>• In case of conductive measuring system: in the GENO-KWA-tronic<sub>2</sub></li> <li>• In case of inductive measuring system, pH or Redox measuring: in the inductive measuring transducer (operating unit required, customer service accessory), pH resp. Redox measuring transducer</li> </ul>
Fault conductivity too low	The set limit value for conductivity min. alarm was undershot:	
	Difference between min. conductivity and conductivity min. alarm is set too low.	Check parameter and adjust, if necessary
	Salt reduction ball valve does not close	Check salt reduction ball valve
	Conductivity measurement does not work or line is interrupted (conductive measuring system)	Clean sensor and recalibrate or replace, if necessary
Fault conductivity too high	The set limit value conductivity max. alarm was exceeded:	
	Difference between max. conductivity and conductivity max. alarm set too low.	Check parameter and adjust, if necessary
	Salt reduction ball valve does not open	Check salt reduction ball valve
	Inlet water volume and outlet water volume too low – the water exchange is too slow	Increase inlet and outlet
	Short-circuit at conductivity sensor or sensor line (conductive measuring system)	Check sensor and sensor line and replace, if necessary
Fault conductivity too high & measured conductivity value is blinking	Measuring range exceeded Conductivity > 5.00 mS/cm	Also refer to fault conductivity too high

This is what you observe	This is the cause	This is what to do
Fault irradiation intensity too low (only for LUWADES <sub>2</sub> )	The set limit value for the irradiation intensity min. alarm was undershot	
	GENO UV module is contaminated inside	Clean GENO UV module with GENO-clean CP (rinse). Refer to chapter H
	UV lamp is defective	Notify Grünbeck's customer service/authorised service company
	Ballast or lamp feed line is defective	Notify Grünbeck's customer service/authorised service company
	UV sensor or control unit is defective	Notify Grünbeck's customer service/authorised service company
Fault pH too low resp.  Fault pH too high (only with optional pH control)	The set limit value for the pH min. alarm was undershot resp. exceeded:	
	Salt reduction valve does not open or close Salt reduction volume too low Inlet water volume too low	Check parameters and salt reduction valve and correct, if necessary; modify proportion between inlet and outlet volume
	Salt reduction is not released due to the pH value being exceeded but due to the fact that the pH value was undershot or vice-versa, e. g. the circulation water changes the pH value other than expected.	Check parameters excess/undershooting and modify, if necessary
	pH electrode dirty	Clean pH electrode, recalibrate or replace, if necessary
	pH measuring transducer configured incorrectly	Check configuration of pH measuring transducer and correct, if necessary
Fault Redox too low (only with optional Redox control)	The set limit value for Redox min. alarm was undershot:	
	Redox electrode dirty	Clean Redox electrode; recalibrate or replace, if necessary
	Redox measuring transducer configured incorrectly	Check configuration of Redox measuring transducer and correct, if necessary
	Efficiency of UV system affected, e. g. impurities	Check irradiation intensity and perform maintenance, if necessary
	Biocide dosing (timer-dosing) parameterised incorrectly	Check settings and correct, if necessary (number, duration, dosing volume)
	Timer-dosing at dosing pump connected or parameterised incorrectly	Check connection and setting of dosing pump and correct, if necessary
	Wrong dosing agent	Check and remedy, if necessary
	Water is exchanged too slowly Higher dirt load in circulation water	Check parameters and salt reduction valve and correct, if necessary, optimise inlet and outlet volume.

This is what you observe	This is the cause	This is what to do
Fault Redox too high (only with optional Redox control)	The set limit value Redox max. alarm was exceeded:	
	Redox electrode dirty	Clean Redox electrode, calibrate again or replace, if necessary
	Redox measuring transducer configured incorrectly	Check configuration of Redox measuring transducer and correct, if necessary
	Biocide dosing (timer-dosing) parameterised incorrectly	Check settings and correct, if necessary (number, duration)
	Timer-dosing of dosing pump parameterised incorrectly	Check setting of dosing pump and correct, if necessary
Wrong dosing agent	Check and remedy, if necessary	
Stör 20mA LFi-Sens Fault 20mA ind. conductivity sensor  or  Stör 20mA Sens pH/RH Fault 20mA sensor pH/RH	Check the sensor signal line or the configuration of the respective measuring transducer: Broken wire, incorrect configuration (0/4 ... 20 mA), configuration regarding the behaviour of the measuring transducer during calibration/ error	Check the signal line and the configuration of the respective measuring transducer and correct, if necessary
Stör 20mA LFi-Sens/ Fault 20mA ind. conductivity sensor and at the same time both LEDs at the ind. conductivity sensor GENO-CTI 500 are blinking or are illuminated continuously (only with inductive conductivity measurement)	Conductivity measuring range undershot or exceeded	Also refer to fault conductivity too high resp. fault conductivity too low
	Temperature measuring range undershot or exceeded	Also refer to fault temperature too high resp. fault temperature too low
	Temperature sensor at conductivity sensor GENO-CTI 500 is defective	Check settings for measuring range at GENO-CTI 500 and correct, if necessary Replace temperature sensor GENO-CTI 500
Fault motor water softener (only with optional water softener)	Error in control head of the water softener GENO-mat duo WE ... which is controlled by the GENO-KWA-tronic <sub>2</sub> : Defective motor, broken wire Monitoring time delay motor control parameterised incorrectly	Check motor and its feed line and remedy/replace, if necessary. Check parameters and correct, if necessary.
Fault low-on-salt (only with optional water softener)	The float switch of the optional empty signal for the brine tank (181 880) has not floated up by the end of step 5 (fill brine tank) within the required time for low-on-salt delay (only if the GENO-mat duo WE ... water softener is triggered by a GENO-KWA-tronic <sub>2</sub> ).	Refill salt Check whether water feed to brine tank is ok resp. remedy, if necessary.
Fault hard water (only with optional water softener)	The GENO-mat duo WE ... which is triggered by the GENO-KWA-tronic <sub>2</sub> was overrun.	Check parameterisation of water softener in control unit GENO-KWA-tronic <sub>2</sub> and correct, if necessary. Restrict inlet water volume.

This is what you observe	This is the cause	This is what to do
Warning data logger	<ul style="list-style-type: none"> <li>System menu/system configuration/data logger „JA/YES“ is programmed but plug-in base for memory card is not plugged in.</li> </ul>	<ul style="list-style-type: none"> <li>Deactivate data logger („NEIN/NO) and install plug-in base, if necessary</li> </ul>
	<ul style="list-style-type: none"> <li>System menu/system configuration/data logger „JA/YES“ is programmed but no memory card is plugged in.</li> </ul>	<ul style="list-style-type: none"> <li>Deactivate data logger („NEIN/NO), plug in card and then reactivate data logger („JA/YES“)</li> </ul>
	<ul style="list-style-type: none"> <li>Plug-in base and memory card plugged in, signal occurred immediately after activation (system menu/system configuration/data logger → „JA/YES“ of data logger)</li> </ul>	<ul style="list-style-type: none"> <li>Switch off GENO- KWA-tronic<sub>2</sub> for a short time and then switch it on again.</li> </ul>
Fault Pt100 sensor	The line at the Pt100 temperature sensor of the conductive conductivity measuring system is interrupted	Check the wiring and replace the conductive conductivity sensor GENO-202923-K1, if necessary.
Fault basic circuit board	Communication error between display and basic circuit board	Check the plug connections at terminals X11, X12, X13 and X14. If no error can be determined, the complete control unit must be replaced.



**Attention!** In case of defects at the control, the entire GENO-KWA-tronic<sub>2</sub> control unit has to be replaced at all times as basic and display circuit board are harmonized one to the other!

## H Inspection and maintenance (GENO-KWA)

### 1 Basic information



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**Note:** The conclusion of a maintenance contract ensures that all required maintenance work will be performed in due time.

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In order to guarantee the reliable function of GENO-KWA over a long period of time, some maintenance work has to be performed at regular intervals.

For the treatment of water associated with “air-conditioning systems” the required measures are defined in regulations and guidelines. You must comply with all the regulations that apply at the installation site and observe the guidelines indicated in chapter B as far as they correspond with the situation.

Inspections have to be carried out by skilled experts at least at intervals of 2 months, provided applicable standards and guidelines do not require shorter intervals.

Maintenance work may only be performed by Grünbeck’s technical service/authorised service company or specially trained experts and must be executed at least once a year, provided applicable standards and guidelines do not require shorter intervals.

In order to document inspection and maintenance work, an operation log has to be kept. An operation log is attached to this operation manual. In case of a malfunction it will help to determine the possible source of the error and documents the performance of inspections and maintenance.

#### Notes on the determination of the maintenance interval for the conductivity and temperature measurement

Factors such as deposits, impurities, wearing and damages at the conductivity and temperature sensor may falsify the measuring result and therefore require an inspection at regular intervals. The frequency of the inspections, cleaning and calibration depends on the operating conditions. In order to determine the inspection intervals, we recommend starting out with inspections at short intervals (weekly) in order to realize when deposits and measuring deviations occur. With the help of these findings, the optimum system specific inspection and maintenance intervals can be determined and may be limited to the necessary minimum.

## 2 Inspection

### Inspection work

- Clean the conductivity and temperature sensor and calibrate, if necessary (refer to description 3.1 below)
- Check function and tightness of salt reduction valve (refer to description 3.1 below)
- If available, check connected accessories according to the applicable instructions.
- Check the system for tightness
- Record all data and work, including repairs eventually performed, in the operation log.

## 3 Maintenance

### Maintenance work

- Perform the inspection work indicated in section 2
- If available, check the connected accessories according to the applicable instructions and perform the maintenance work.
- Check the system settings on the basis of the most recent maintenance report and document all changes.
- Record all data and work, including repairs eventually performed, in the operation log.
- Perform the „Reset Wartungsintervall“ = “Reset maintenance interval” in the system menu/operating values

### 3.1 Description of the inspection and maintenance work

#### 3.1.1 Check function and tightness of salt reduction valve

In the currentless state, the motor ball valve is closed resp. closes in case of power failure. The function of the salt reduction valve needs to be checked in regular intervals.

- Check tightness in closed state.
- Open salt reduction valve completely by hand (via menu function diagnosis) and close it again.
- In case of impurities resp. deposits, clean the salt reduction valve.

**3.1.2 Clean the conductive conductivity sensor, order no. 164 255 (KWA-50k)**

The electrodes of the conductive conductivity measuring cell are in direct contact with the media to be measured. Therefore, regular cleaning must take place, depending on the media's affinity to dirt.

Please take into consideration that certain deposits are hardly detectable with the naked eye and nevertheless might have an impact on the measuring results in case of conductive sensors. Furthermore, worn graphite electrodes may cause deviations. The media contacting components are made of PVC, graphite and 1.4571.

For the cleaning, common domestic dishwashing detergents and general purpose cleaners on a tenside basis may be used. Abrasive detergents are only suitable to a certain extent! The measuring electrodes must not be damaged mechanically! Certain layers and deposits and may – for example - be removed by means of diluted hydrochloric acid (max. 20% at room temperature). Please observe the corresponding safety directives.

After each cleaning, the accuracy of the conductivity and temperature measurement must be checked and if necessary, calibration must take place (refer to point 3.1.4). If the accuracy required for the application can no longer be achieved, the sensor must be replaced.

**3.1.3 Clean the inductive conductivity sensor, order no. 164 258 (KWA-60i)**

Under standard operating conditions, hardly any wear and tear will occur at the inductive sensor and the conductivity measurement is quite inured to impurities.

Despite the low maintenance and cleaning requirements, it is necessary to check the conductivity and temperature measurement at regular intervals and calibrate it, if necessary (refer to point 3.1.4).

In order to ensure that the sensor body is completely surrounded by the flow, larger amounts of deposits have to be removed. The media contacting parts are made of PP, FPM and 1.4571. For the cleaning, common domestic dishwashing detergents and general purpose cleaners on a tenside basis may be used. Persistent layers and deposits and may be removed by means of a little diluted hydrochloric acid (max. 20% at room temperature). Abrasive detergents are only suitable to a certain extent and solvents are not suitable at all! Please observe the corresponding safety directives. In order to clean the measuring bores, a bottle brush may be used.

**3.1.4 Check and calibrate the conductivity measurement**

- First, the conductivity sensor has to be cleaned.
- The accuracy of the conductivity reference measuring device used must be checked by means of a calibration solution.

How to proceed:

- Withdraw a water sample from the circulation water and determine its conductivity by means of the reference measuring device for the conductivity (this conductivity value will be considered as the reference value for the conductivity).
- This reference value for the conductivity is then programmed in the circulation menu/calibration values while the conductivity sensor is immersed in the corresponding circulation water.

**3.1.5 Installation of a new conductivity sensor**

- Immediately prior to the installation of a new measuring cell, the stored values of the old measuring cell must be deleted by means of the function "reset calibration". This can be done in the circulation menu/calibration values/reset calibration by re-programming (0 → 1).
- In case of a conductive conductivity sensor, the cell constant of the new conductivity sensor has to be programmed in addition in the menu circulation menu/calibration values/cell constant. The value accurately measured during the production of the measuring cell is indicated on the type designation plate.
- Check the conductivity measurement (refer to 3.1.4).

**4 Wearing parts**

The conductive sensor, the ball valve of the salt reduction valve and seals are subjected to a certain wear and tear. Therefore, these parts are considered to be wearing parts.



Note: Although these parts are wearing parts, we are prepared to grant a limited warranty of 6 months.



Note: For wearing parts and consumables, please contact your local Grünbeck representative (refer to [www.gruenbeck.de](http://www.gruenbeck.de)).



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## 5 Operation Log

### Customer

Name: .....

Address: .....

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.....

### Automatic Salt Reduction System GENO-KWA .....

Order no. ....

Serial number .....

(Copy data from type designation plate)

Installed by .....

.....

Installed on .....

.....

**Inspection, Maintenance and Repair Work**

Work performed	Execution confirmed
<input type="checkbox"/> Inspection    Description: _____ <input type="checkbox"/> Maintenance    _____ <input type="checkbox"/> Repair    _____ Cur. op. hours    _____ .....	Company: ..... Name: ..... Date/ Signature: ..... Time sheet (no.) .....
<input type="checkbox"/> Inspection    Description: _____ <input type="checkbox"/> Maintenance    _____ <input type="checkbox"/> Repair    _____ Cur. op. hours    _____ .....	Company: ..... Name: ..... Date/ Signature: ..... Time sheet (no.) .....
<input type="checkbox"/> Inspection    Description: _____ <input type="checkbox"/> Maintenance    _____ <input type="checkbox"/> Repair    _____ Cur. op. hours    _____ .....	Company: ..... Name: ..... Date/ Signature: ..... Time sheet (no.) .....
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**Inspection, Maintenance, Repair Work**

Work performed	Execution confirmed
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**Inspection, Maintenance, Repair Work**

Work performed	Execution confirmed
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**Inspection, Maintenance, Repair Work**

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