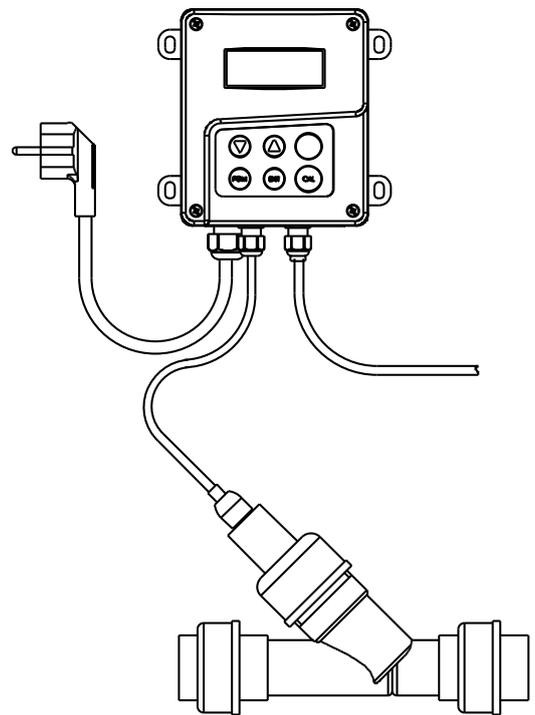


Operation Manual pH Value Monitoring or Redox Monitoring for GENO-KWA-tronic₂



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

Table of contents

A General	6
1 Preface	
2 General safety information	
3 Shipping and storage	
4 Disposal	
B Basic information	9
1 Laws, regulations, standards	
C Product description	10
1 Type plate	
2 Set-up	
3 Mode of operation	
4 Technical specifications/dimensional drawings	
5 Intended use	
6 Application limits	
7 Scope of supply	
8 Consumables	
D Installation	13
1 General installation instructions	
2 Preliminary works	
3 How to connect the systems	
E Start-up	17
1 General information	
2 Preparing the system	
3 Filling and starting up the system	
F Operation	19
1 Preface	
2 Operating the pH/redox measuring transducer	
2.1 Display of the pH/redox measuring transducer	
2.2 Operating principle of the pH/redox measuring transducer	
3 pH value monitoring	
3.1 Required parameter settings	
3.2 How to calibrate pH value monitoring	
4 Redox monitoring	
4.1 Required parameter settings	
4.2 How to calibrate pH value monitoring	
G Errors	26
H Inspection and maintenance	29
1 Basic Information	
2 Inspection	
3 Maintenance	
4 Wearing parts	
5 Operation log	

Publisher's information

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EU Declaration of Conformity

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

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

Manufacturer:	Grünbeck Wasseraufbereitung GmbH Josef-Grünbeck-Str. 1 89420 Hoechstädt; Germany
Responsible for documentation:	Markus Poepperl
System designation:	pH value monitoring or redox monitoring
System type:	for GENO-KWA-tronic ₂
Serial no.:	Refer to type plate
Applicable guidelines:	Low Voltage (2014/35/EU) EMC (2014/30/EU)
Applied harmonised standards, in particular:	DIN EN 61000-6-2:2006-03, DIN EN 61000-6-3:2011-09, DIN EN 61326:2013-07, DIN EN 61010:2011-07
Applied national standards and technical specifications, in particular:	DIN EN 60068-2-6:2008-10
Location, date and signature	Hoechstädt, 14.01.2019
	p.p.  M. Pöpperl Dipl.-Ing. (FH)
Function of signatory:	Head of Technical Product Design

A General

1 | Preface

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

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

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

Advice and assistance For advice and assistance, please contact your local representative (refer to www.gruenbeck.com). In case of emergency, please get in touch with our service hotline at +49 9074 41-333. We can connect you with the appropriate expert more quickly if you provide the required system data. To ensure that this information is to hand at all times, please keep the precise equipment data to hand (refer to the type plate in chapter C-1).

2 | General safety information

2.1 Symbols and notes

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



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



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



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



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



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



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



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

2.2 Operating personnel

Only persons who have read and understood this operating manual are permitted to work with our systems and devices. The safety information in particular are to be strictly adhered to.

2.3 Protection from water damage



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

- a) a sufficient floor drain system must be available or
- b) a suitable alarm device which avoids consequential damage must be installed.



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

2.4 Description of specific dangers

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

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

Hazardous to health due to contaminated drinking water! → The system should be installed by a specialist company only. Strictly adhere to the operation manual! Ensure that there is sufficient flow. Adhere to the pertinent guidelines when starting up the system after extended periods of service life. Perform inspections and maintenance 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



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

The system may only be transported and stored in its original packaging. 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 wheelie bin) is on the product, this product is subject to the European Directive 2012/19/EU. This means that this product or the electrical and electronic components are not allowed to be disposed of in the household waste.



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



For information on collection points for your product, contact your municipality, the public waste disposal authority, an authorised body for the disposal of electrical and electronic products or your waste collection service.

B Basic information

1 | Laws, regulations, standards

As a result of water evaporation, in open circuits of cooling towers and air washers there is a build-up of salt in the circulation water. This salt concentration must not exceed specific values and must therefore be regulated by an automatic salt reduction system and additional feed of make-up water. Furthermore, other circulation water parameters must be monitored, as well as counteracting the bacterial growth of the circulation water.

The following sets of rules, among others, must be observed:

- German Waste Water Guideline (AbwV).
- VDI Standard 6022 Part 1 – “Hygienic requirements for ventilation and air-conditioning systems - Office and meeting rooms.”
- VDI Standard 3803 - “Ventilation and 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 stipulates information that you will need for the safe operation of your water treatment system.



Among other things, the sets of rules stipulate that only approved specialist companies are permitted to make major modifications to water supply systems.

Tests, inspections and maintenance on integrated devices are to be performed at regular intervals.

C Product description



Note: For further information on the measuring transducer □ 202 560, refer to the detailed operation manual.

1 | Type plate

The type plate is located on the housing of the pH/redox measuring transducer. In order to speed up the processing of your inquiries or orders, please specify the system data shown on the type plate. Please copy the indicated information to the table below in order to have it readily available whenever necessary.

pH Value Monitoring for GENO-KWA-tronic₂

Order number: 164 810
Serial number: n n n n n n / n

or

Redox Monitoring for GENO-KWA-tronic₂

Order number: 164 815
Serial number: n n n n n n / n

2 | Set-up

The pH value or redox monitoring devices are ready for connection and basically consist of a measuring transducer and a measuring point with the corresponding electrode.

The pH value or redox measuring transducer is mounted in an on-wall housing. The mains cable, electrode cable and the connecting cable to the GENO-KWA-tronic₂ are already connected to the measuring transducer. The measuring point is designed as an angle seat flow fitting with Pg13, 5 electrode mount. Screw connections with adhesive sleeves are fitted to the measuring point's inlet and outlet.

3 | Function

The pH value monitoring equipment logs the pH value and the temperature. The temperature-compensated pH value in the measuring transducer is displayed and sent as a 4...20 mA signal to the GENO-KWA-tronic₂. The pH value can be displayed there and used to release salt reduction. The settings for salt reduction are configured in the GENO-KWA-tronic₂.

The redox monitoring equipment logs the redox potential. The redox potential is displayed using the measuring transducer and is sent to the GENO-KWA-tronic₂ as a 4...20 mA signal. This is where the redox potential is displayed and used to release the biocide dosing. The settings for biocide dosing are configured in the GENO-KWA-tronic₂.

Other functional details are described in chapter F and in the operation manual for the GENO-KWA-50k/60i or LUWADES₂.

4 | Technical specifications and dimensional drawings

Table C-1: Technical specifications		pH Value Monitoring for GENO-KWA-tronic ₂	Redox Monitoring for GENO-KWA-tronic ₂
Connection data			
Nominal connection diameter		DN 25 (PVC adhesive sleeve Ø 32 mm)	
Voltage supply	[V]/[Hz]	110...240/48-63 Hz	
Power input	[VA]	14	
Protection/protection class		IP 67/ ☐	IP 54/ ☐
Performance data			
Measurand		pH	mV
Measuring range		0...12 (briefly pH 14)	0 ...+1200 mV
Max. operating pressure	[bar]	6 bar at 40 °C 10 bar at 20 °C	
Dimensions and weights			
Depth	[mm]	77	
Width	[mm]	120 (with external fastening lugs)	
Height	[mm]	140 (without cable screw connections)	
Installation length of the measuring point	[mm]	Approx. 228	
Ambient data			
Ambient temperature	[°C]	5 – 40	
Water temperature	[°C]	5 – 60	
Order no.		164 810	164 815

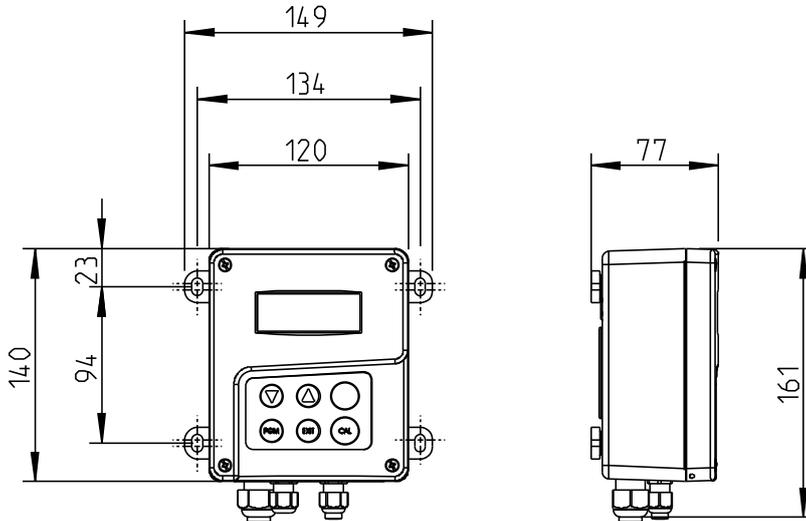


Fig. C-1: Dimensional drawing - pH/redox measuring transducer

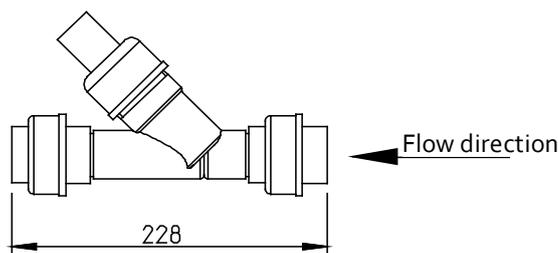


Fig. C-2: Dimensional drawing - pH/redox measuring point DN 25

5 | Intended use

This pH value, or redox monitoring equipment, is intended as an accessory for the

GENO-KWA-tronic₂ (for KWA-50k, KWA 60i; LUWADES₂) for use with cooling circuits or air washers.

The pH value monitoring **or** the redox monitoring equipment can be connected to the GENO-KWA-tronic₂, however, **not** both at once.

With the pH value monitoring, the pH value can be displayed and used to release salt reduction. With the redox monitoring, the redox potential can be used to release biocide dosing. In doing so, the measuring signal is sent to the GENO-KWA-tronic₂ and continues to be used via the setting there.

The product is designed exclusively for use in industrial and commercial fields.

6 | Application limits

The application limits are determined by the intended use (refer to paragraph 5) and the technical specifications (table C-1).

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

Normal use also includes the information contained in this operation manual and all safety regulations that apply at the installation site being complied with, as well as the maintenance and inspection intervals being observed.

7 | Scope of supply

- pH value / redox measuring transducer in on-wall housing with mounted mains cable (approx. 5 m), electrode cable (approx. 5 m) and connecting cable to the GENO-KWA-tronic₂ (approx. 5m).
- Measuring point as angle seat flow fitting with Pg13, 5 electrode mount. Screw connections with adhesive sleeves are fitted to the measuring point's inlet and outlet.
- Supporting documentation:
 - Operation manual (the one you are currently holding). Detailed operation manual for the measuring transducer 205560.

All components are delivered complete and packed in a cardboard box.

8 Consumables

- | | |
|-------------------------------|-------------------|
| • pH electrode | Order no. 211 520 |
| • Redox electrode | Order no. 211 507 |
| • Calibration solution pH 7 | Order no. 203 627 |
| • Calibration solution pH 9 | Order no. 203 629 |
| • Calibration solution 475 mV | Order no. 203 625 |

D Installation



Note: For further information on the measuring transducer □ 202 560, refer to the detailed operation manual.

1 | General installation instructions

The installation/mounting site must provide sufficient space and be easily accessible. A foundation/mounting surface of a sufficient size and load-bearing capacity must be provided. The required connections must be provided prior to the start of the installation work. Dimensions and connection data are summarised in table C-1.

The installation site must be frost-proof. The system must be protected from chemicals, dyes, solvents and vapours.

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



Note: The operation manual for the automatic salt reduction system or LUWADES must also be observed for the installation of these accessories.

1.1 Installation of sanitary equipment - Installation instructions

Specific regulations must, in any case, be observed during the installation of the pH value or redox monitoring equipment. Additional recommendations are given in order to facilitate the handling of the system. The installation instructions described below are also illustrated in fig. D-2.

Mandatory regulations



The installation of the pH value or redox monitoring equipment may only be performed by an approved installation company.

The pH value or redox monitoring equipment is installed in a separate circuit, or in parallel in the partial flow of the entire system in the pipe, downstream from the automatic salt reduction system or LUWADES.

The measuring point must be easily accessible for regular calibration and cleaning.

To enable the removal of the electrode and the measuring point, shut-off valves must be installed in the inlet and outlet pipes.

The pH or redox electrode may only be installed vertically or tilted to the side. The permissible installation positions according to Fig. D-1 must therefore be observed.

When the system is at a standstill, the pH and redox electrodes must not be allowed to stand dry - provision must be made for residual liquid from a structural perspective.

Inlet and outlet pipes must be attached to independent mounting brackets and must not be carried through the system.

Changes in the direction of the pipe upstream from the measuring point must be carried out with long curves (do not use elbow fittings).

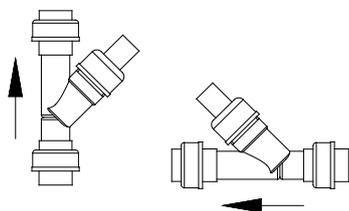


Fig. D-1: Permissible installation positions of the measuring point

**1.2 Electrical installation -
Installation instructions**

A Schuko socket is adequate for the electrical connection. These must correspond to the specifications in table C-1.



Caution! The socket must carry constant voltage (do not couple with light or heating emergency switch).

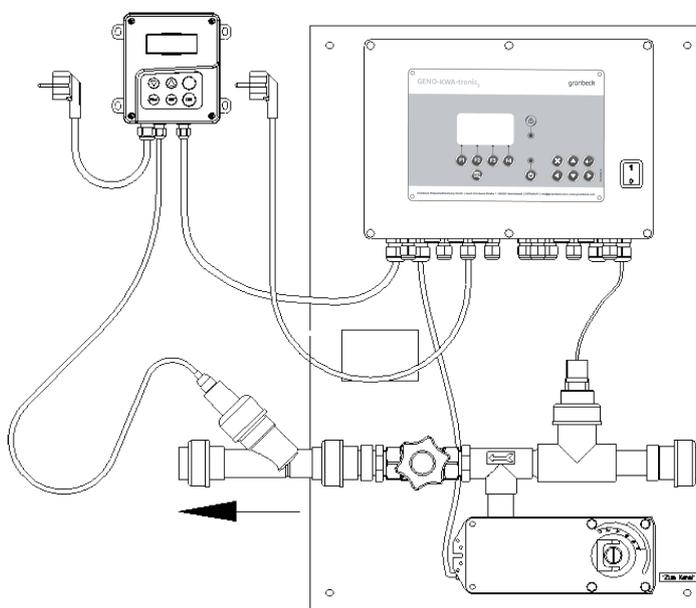


Fig. D-2: pH value or redox monitoring equipment installation example mounted on GENO-KWA50k

2 Preliminary works

1. Unpack all system components.
2. Check for completeness and proper condition.

3 | How to connect the system

3.1 Water connection



Caution! The measuring point is only leakproof when the pH or redox electrode is properly pre-assembled. A leak test is performed after installation during start-up.

The electrode must not dry out. The measuring tip is therefore protected by a rubber cap filled with KCl solution.



Caution! Ensure that the loose ends of the electrode connecting cable do not come into contact with moisture. Moisture penetration will render the cable unusable.

Attempts to dry out the cable are not very promising.

Connect the circuit lines according to the installation example (Fig. D-2) or according to the relevant planning documents, taking into account the flow direction.

Observe the specifications in section 1 as well as the special features of the entire system.

3.2 How to connect the measuring transducer



The work described here may only be performed by trained electricians or electronics experts.



Danger due to electrical energy!

Voltage may be present at terminals L, N and PE as well as at the feed line to voltage-free contacts. Only connect the mains plug or voltage supply after completion of the work.

1. Attach the measuring transducer to the wall.
2. Screw the electrode cable onto the electrode.
3. The analogue output of the measuring transducer must be connected to the GENO-KWA-tronic².
To do so, connect the connecting cable.
→ brown wire to terminal 51 on the GENO-KWA-tronic₂
→ grey wire terminal 52 on the GENO-KWA-tronic₂.
4. The components of the pH value or redox monitoring equipment included in the scope of delivery are connected in the factory to the measuring transducer (circuit diagram Fig. D-3) ready for use.
This explanation is for information and verification purposes.

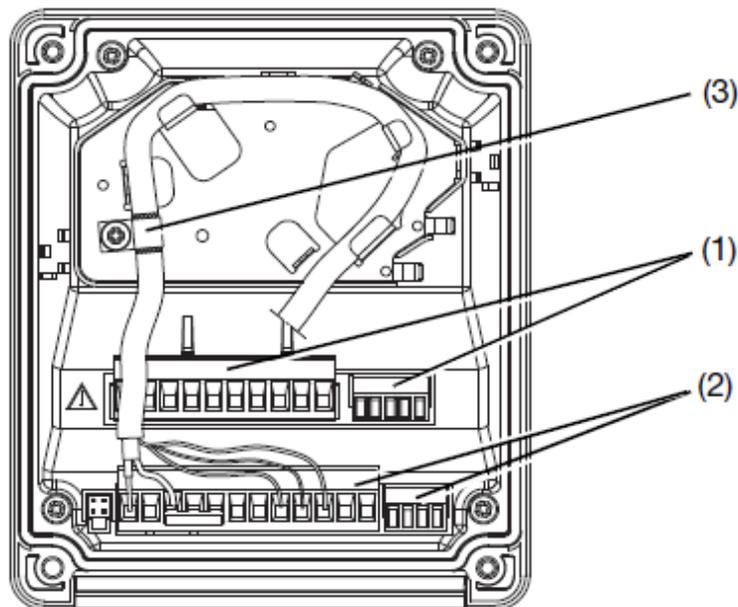


Fig. D-3 Circuit diagram

Table D-1: Technical specifications				
Cable	Wire resp. colour	Measuring transducer terminal		Row
Mains cable	Blue	N	1	1
	Brown	L1	2	
	Yellow-green	PE - Bottom part of the housing		
Electrode cable	Outer screen	Clamp		3
	Core	Measuring electrode	1	2
	Internal screen	Reference electrode	3	
	Jumper	1 to 3		
Only for pH measurement (Temperature measurement)	White	PT100	8	
	Green		9	
	Grey		10	
Connecting cable for the KWA-tronic ₂	Brown	Actual pH value+	13	2
	Grey	Actual pH value	14	
	Green	Max. temp. K2	10	1
	White - Wire jumper	Control common K2	8	
		Control common K1	4	
Yellow	Min. temp. K1	6		

5. Only possible with pH value monitoring if an inductive conductivity sensor CTI-500 is used with the GENO-KWA-tronic₂:

If desired, connect MAX and MIN temperature limit value contacts to the corresponding terminals of the GENO-KWA-tronic₂.

- green wire terminal 36 MAX contact;
- yellow wire terminal 35 MIN contact;
- white wire terminal 25 transmitter voltage +24 VDC)

E Start-up



Note: For further information on the measuring transducer 202560, refer to the detailed operation manual included.



The work described below is only permitted to be performed by trained qualified personnel. We recommend having Grünbeck's technical service/authorised service company commission the system.

1 | General information



Danger due to electrical energy!



Caution! The measuring point is only leakproof when the pH or redox electrode is properly pre-assembled. A leak test is performed after installation during start-up.

The electrode must not dry out. The measuring tip is therefore protected by a rubber cap filled with KCl solution.



Note: For detailed information on using the GENO-KWA-tronic₂ control unit, refer to chapter F of the operation manual for the automatic salt reduction system or LUWADES.

2 | How to prepare the system



Caution! Ensure that the loose ends of the electrode connecting cable do not come into contact with moisture. Moisture penetration will render the cable unusable.

Attempts to dry out the cable are not very promising.

2.1 How to mount the pH or redox electrode

1. Connect the electrode connecting cable to the electrode.
2. Hold the pH and redox electrode vertically and pull off the rubber cap carefully.
3. Calibrate the pH or redox electrode (refer to chapter F).
4. Screw the pH and redox electrode into the electrode adapter at the measuring point.

2.2 How to prepare the GENO-KWA-tronic₂

The GENO-KWA-tronic₂ control unit of the automatic salt reduction system or LUWADES must be notified as to which type of measuring signal is connected to terminals 50/51.



Note: For detailed information on using the GENO-KWA-tronic₂ control unit, refer to chapter F.



Note: Only the pH value monitoring or the redox monitoring equipment can be connected. Both measuring signals at the same time is not possible!

1. Open the system menu using code 0290.
2. In the submenu "System configuration", set the parameter "pH measurement" or "redox measurement" to "Yes" accordingly. Proceed to programme the necessary limit values and parameters (refer to operation manual GENO-KWA-50k, 60i, order no. 164 951 or operation manual GENO-LUWADES₂, order no. 521 943).

3 | How to fill and start up the system

Fill the system according to the operation manual for the automatic salt reduction system or LUWADES, conduct a leak test and start up.



Note: Record the start-up with all data in the operation log of the automatic salt reduction system or LUWADES.

F Operation



Note: For further information on the measuring transducer □ 202560, refer to the detailed operation manual included.

1 | Preface

The pH resp. redox measuring transducer 202560 converts the pH resp. redox measuring signal into a 4 - 20 mA standard signal and sends it to the superordinate GENO-KWA-tronic₂ control unit in the automatic salt reduction system or LUWADES.

2 | How to operate the pH/redox measuring transducer

2.1 Display of the pH/redox measuring transducer

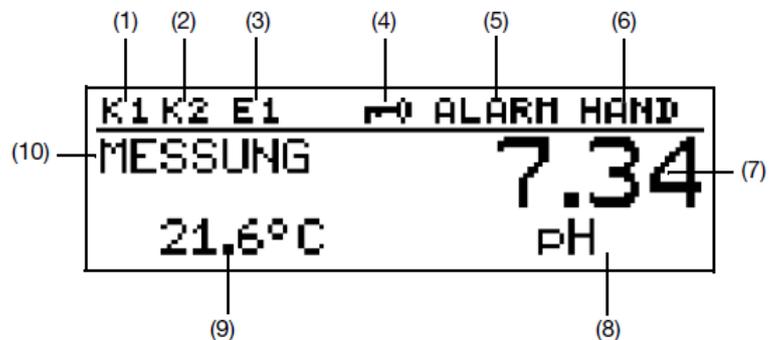


Fig. F-3: Display symbols

- (1) Switching contact K1 is active (temperature min contact)
- (2) Switching contact K2 is active (temperature max contact)
- (5) Device status: Alarm, e.g. Overrange / calib (flashing) – calibration timer expired / calib (calibration running)
- (6) MANUAL: One of the switching contacts or the analogue output (actual pH value) is simulated in manual operation or
HOLD: Switching contacts and analogue output are "frozen" in the state defined to this end.
- (7) Measured value
- (8) Unit
- (9) Medium temperature (only for pH value monitoring)
- (10) Operating mode

Starting from the standard display (operating mode "Measurement"), additional information displays can be selected by tapping the PGM key:

MIN/MAX-WERTE	
7.33 pH	25.0 °C
10.34 pH	25.0 °C

Fig. F-4: Tapping PGM once = Min Max values

Tapping twice leads to the controller output level display: This display is of no relevance for the ph/redox measuring transducer, since the controller functions are disabled.

	HAND
SCHALTAUSG.	----
ANALOGAUSG. 1+2	HAND
REGLER	----

Fig. F-5: Tapping PGM 3 times = manual/simulation overview

It is displayed which of the switching contacts or the analogue output is simulated in manual operation.

2.2 Operating principle of the pH/ORP measuring transducer 202560

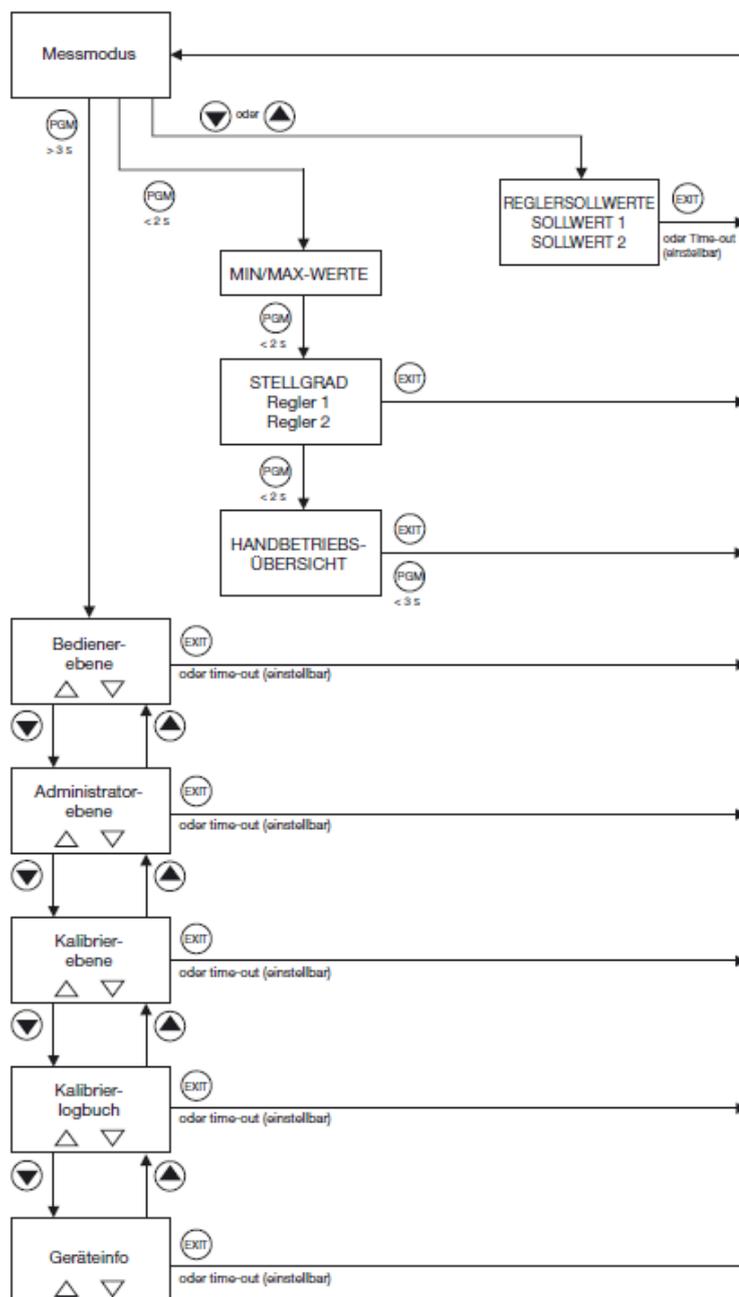


Fig. F-6: Overview of the menu level

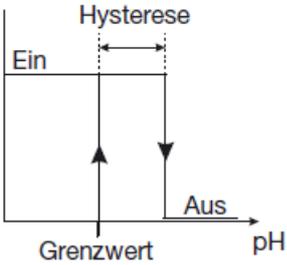
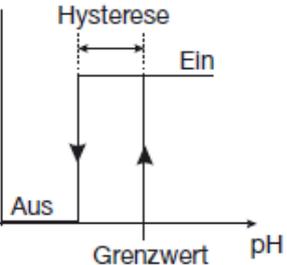
The password 300 is required for access to the administrator level.

3 | pH value monitoring

3.1 Required parameter settings The following configuration settings are compelling necessary for the operation of the measuring transducer (order no. 202 560) on a GENO-KWA-tronic₂:

Administrator level – Submenu parameter level

Table F-1: Required parameter settings pH value monitoring for GENO-KWA-tronic₂

Submenu	Parameters	Explanation	Setting
Input temperature	Temperature sensor	The pH probe is equipped with a temperature sensor	PT100/PT1000
Switching output 1 or switching output 2	Function	Temp Min limit value contact K1 	Switching output 1 2  
	Switching point	Temp Max limit value contact K2 	5.0°C 35.0°C (Luwades) 55.0°C (KWA 50k/60i)
	Hysteresis		2.0°C
Analogue output 1	Signal selector	It is only in this way that the actual pH value output (analogue output 1) is appropriately set to the signal input of the KWA-tronic ₂	Main value
	Signal type		4...20 mA
	Scaling start		0.00 pH = 4 mA
	Scaling end		14.0 pH = 20 mA
Display	Display top	Temperature-compensated pH value is shown	compensated

Temperature limit value contacts (user level)

If operating the pH monitoring equipment on a KWA-60i automatic salt reduction system or LUWADES2 compact air washer with inductive conductivity sensor GENO-CTI-500, either the temperature limit contacts of the inductive conductivity sensor, or the pH measuring transducer, must be connected to the GENO-KWA-tronic₂.

3.2 How to calibrate the pH value monitoring equipment The following sequence is compelling necessary for calibrating a pH electrode on the measuring transducer (order no. 202560).

The following is required:

- A buffer solution with pH value 7, and a buffer solution with pH value 9 (or at least a pH value deviation of 2 to pH 7). Both buffer solutions must have the same temperature.

Initial situation

- A Pt100 temperature sensor integrated in the pH electrode.
- The superordinate control unit GENO-KWA-tronic₂ is in the operating mode "ext. Standby signal E1 is available" (thus no alarm is emitted) or alternatively in the operating mode "mains on, system blanked out" (via key "I").
- The pH electrode with integrated Pt100 temperature sensor is connected to the measuring transducer.
- The measuring transducer is in the measuring mode (refer to chapter F-2.2).

2-point calibration

- Immerse the pH electrode in the first buffer solution; in the description below, pH 4 was used as the first buffer and pH 8 as the second buffer.
- Start the calibration level using the CAL key.

```

1-PUNKT-KALIBRIER. i
2-PUNKT-KALIBRIER. i
3-PUNKT-KALIBRIER. i
    
```

- Select the 2-point calibration and start it with the PGM key.
- Wait until the display value has stabilised, then proceed with the PGM key.

```

          KALIB
-----
MESSUNG  ( 4.34 )
REFERENZ 1  pH
    
```

- Using the ▼ or ▲ keys, set the displayed value to the nominal value of the second buffer solution, then proceed with the PGM key.

```

          KALIB
-----
EINGABE  4.00
REFERENZ 1  pH
    
```

- Rinse the pH electrode (clean drinking water, alternatively fully demineralised water) and dry.
- Immerse the pH electrode in the second buffer solution.
- Wait until the display value has stabilised, then proceed with the PGM key.

```

          KALIB
-----
MESSUNG  ( 8.01 )
REFERENZ 2  pH
    
```

- Using the ▼ or ▲ keys, set the displayed value to the nominal value of the second buffer solution, then proceed with the PGM key.

```

          KALIB
-----
EINGABE  8.00
REFERENZ 2  pH
    
```

- The zero point and slope determined by the unit are displayed. Use the PGM key to accept the new calibration values or reject the value using the EXIT key.

```

          KALIB
-----
NULLPUNKT  7.00 pH
STEILHEIT  101.1 %
    
```

4 | Redox monitoring

4.1 Necessary parameter settings

The following configuration settings are compelling necessary for the operation of the measuring transducer (order no. 202560) on a GENO-KWA-tronic₂:

Administrator level – Submenu parameter level

Submenu	Parameters	Explanation	Setting
Input temperature	Temperature sensor	The redox probe is not equipped with a temperature sensor	No sensor
Analogue output 1	Signal selector	It is only in this way that the actual redox value output (analogue output 1) is appropriately set to the signal input of the KWA-tronic ₂	Main value
	Signal type		4...20 mA
	Scaling start		0 mV = 4 mA
	Scaling end		1200 mV = 20 mA
Display	Display top	uncompensated redox signal is shown	uncompensated

4.2 How to calibrate the pH value monitoring equipment

Zero point calibration

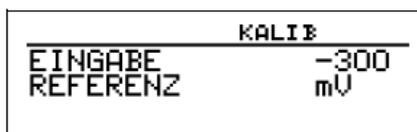
- Immerse the redox electrode in the buffer solution. In the description below, a buffer of 300 mV was used as an example.
- Start the calibration level using the CAL key:



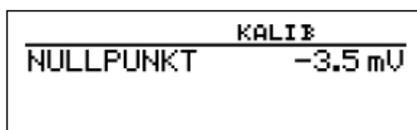
- Start the zero point calibration using the PGM key.
- Wait until the display value has stabilised, then proceed with the PGM key.



- Using the ▼ resp. ▲ keys, set the displayed value to the nominal value of the buffer solution, then proceed with the PGM key.



- The zero point determined by the unit is displayed. Use the PGM key to accept the new calibration value or reject the value using the EXIT key.



G Errors



Note: For further information on the measuring transducer □ 202560, refer to the detailed operation manual included.

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

Table G-1 provides an overview of possible error messages, their causes and their elimination when operating a GENO-LUWADES₂ compact air washer system and GENO-KWA-50k or 60i automatic salt reduction system with GENO-KWA-tronic₂ control unit.

Table G-1: Eliminating errors		
This is what you observe	This is the cause	This is what to do
Error messages on the pH/redox measuring transducer		
F024	In the case of automatic temperature logging, a temperature lower than □ -50°C or higher than +250°C was measured.	<ul style="list-style-type: none"> The controller goes into hold, refer to chapter F-3.1 Temperature setpoints. Check the connection of the electrode connecting cable, refer to chapter D-3.2, terminals 9, 10, 11.
F030	Minimum value of the actual value output (SoL) undershot.	Check setting: <ul style="list-style-type: none"> SoL (refer to chapter F-3 / F-4).
F031	Maximum value of the actual value output (SoH) exceeded.	Check setting <ul style="list-style-type: none"> SoH (refer to chapter F-3 / F-4).
F050	Parameter limits of the actual value output interchanged; SoL greater than SoH.	Check setting <ul style="list-style-type: none"> SoL – SoH (refer to chapter F-3 / F-4).
Err (pH)	The two-point electrode calibration was completed with an error. The previous calibration data are maintained. Cause: The set slope or the slope determined during calibration is outside the permissible range. Slope 75.0...110.0%. or The zero point set or determined during calibration is outside the permissible range. Zero point 5.00...9.00 pH.	Remedy: <ul style="list-style-type: none"> new, accurate calibration or Change the zero point (nuLL) or slope (SLoP) using the keyboard (e.g. Only change the last digit by 1 digit and confirm using the "PGM" key), refer to chapter F-3.

Err (Redox)	The one-point electrode calibration was completed with an error. The previous calibration data are maintained. Cause (display unit [mV]): The zero point set or determined during calibration is outside the permissible range. Zero point –1999...1999 mV.	Remedy: <ul style="list-style-type: none">• new, accurate calibration or• Change the zero point (nuLL) using the keyboard (e.g. only change the last digit by 1 digit and confirm using the “PGM” key), refer to chapter F-4.
--------------------	--	--

H Inspection and maintenance

1 | Basic information



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

In order to guarantee the long-term, proper function of the pH value or redox monitoring equipment, some maintenance work has to be performed at regular intervals.

In particular for the treatment of water in "ventilation and air-conditioning systems", the required measures are set out in standards and guidelines. The rules applicable at the operating site, as well as the guidelines mentioned in chapter B, must be observed depending on the circumstances.

Inspections must be carried out by expert qualified personnel at least every 2 months, unless shorter intervals are required by the applicable standards and guidelines.

Maintenance is only to be performed by Grünbeck's technical service/authorised service company service or by specially trained qualified personnel at least annually, unless shorter intervals are required by the applicable standards and guidelines.

An operation log must be maintained as part of the inspection and maintenance work documentation. An operation log is included with the operation manual for the automatic salt reduction system or LUWADES. In the case of a malfunction, it helps to identify possible error sources and logs completed inspections and maintenance.

Information on determining the maintenance interval for conductivity and temperature measurement

The impact of, for example, deposits, soiling, wear and damage to the pH or redox electrode can distort the measurement result and therefore require regular checking. The frequency of inspection, cleaning and calibration depends on the operational conditions. To determine the inspection intervals, we recommend initially performing checks at short intervals (weekly) to ascertain when deposits and deviations from the measured values occur. With this information, the system-specific inspection and maintenance intervals can then be optimally determined and therefore limited to the necessary minimum.

2 | Inspection (functional check)

Inspection work

- Clean (refer to 3.1), check and, if necessary, calibrate the pH or redox electrode (refer to chapter F 3.2 or 4.2).
- Check the leak tightness of the measuring point.
- Record all data and activities, including repair work in the operation log.

3 | Maintenance

Maintenance work

- Replace the pH or redox electrode and calibrate (refer to chapter F-3.2 resp. 4.2).
- Check system settings based on the last maintenance report and record any changes.
- Record all data and activities, including repair work in the operation log.

3.1 Cleaning of the pH/redox electrode

The electrode must be cleaned before each calibration. Experience shows that the following agents can be used for cleaning:

- Cleaners containing surfactants for greasy and oily soiling.
- Diluted hydrochloric acid (3%) for limescale and metal hydroxide deposits.
- A cleaning mixture of diluted hydrochloric acid (3%) and thiourea (commercially available) for sulphide deposits.
- A cleaning mixture of diluted hydrochloric acid (0.1 molar) and pepsin (commercially available) for media containing protein.
- A mixture of nitric acid (10%) and ammonium fluoride (50 g/l) containing hydrofluoric acid as a regeneration solution for highly inert pH electrodes.

4 | Consumables and wearing parts

The pH or redox electrode is subject to chemical impacts and is, to some extent, consumed.

These parts are therefore considered consumables.



Note: A limited warranty period of 6 months is applicable to electrical components.



Note: You can order spare parts and consumables from your local Grünbeck representative (refer to www.gruenbeck.com).

5 | Operation log

Inspection, maintenance and repair work	
Work performed	Execution confirmed
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)

Inspection, maintenance and repair work	
Work performed	Execution confirmed
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/Signature: Working time certificate (No.)

Inspection, maintenance and repair work	
Work performed	Execution confirmed
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/ Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/ Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/ Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/ Signature: Working time certificate (No.)
<input type="checkbox"/> Inspection Description: _____ <input type="checkbox"/> Maintenance _____ <input type="checkbox"/> Repair _____ Current oper. hours _____	Company: Name: Date/ Signature: Working time certificate (No.)