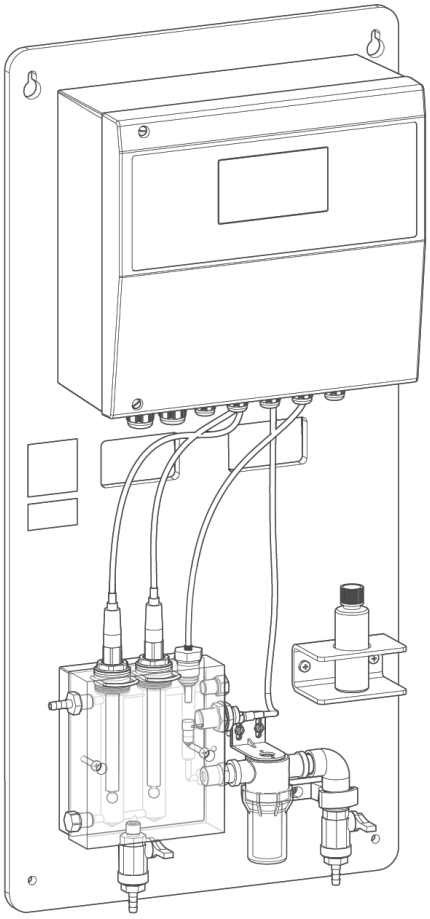
We understand water.



Measuring and control system | spaliQ Professional

Operation manual

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Table of contents

1 Introduction

This manual is intended for owners/operators/operating companies, users as well as qualified specialists and ensures the safe and efficient handling of the product. The manual is an integral part of the product.

- Carefully read this manual and the included manuals on the components before you operate your product.
- Obey all safety and handling instructions.
- Keep this manual and all other applicable documents, so that they are available when needed.

Illustrations in this manual are for basic understanding and can differ from the actual design.

1.1 Validity of the manual

This manual applies to the product below:

- Measuring and control system spaliQ Professional
- Special designs that essentially correspond to the standard products given above. For information on changes, please refer to the respective information sheet that is enclosed, if applicable.

1.2 Other applicable documents

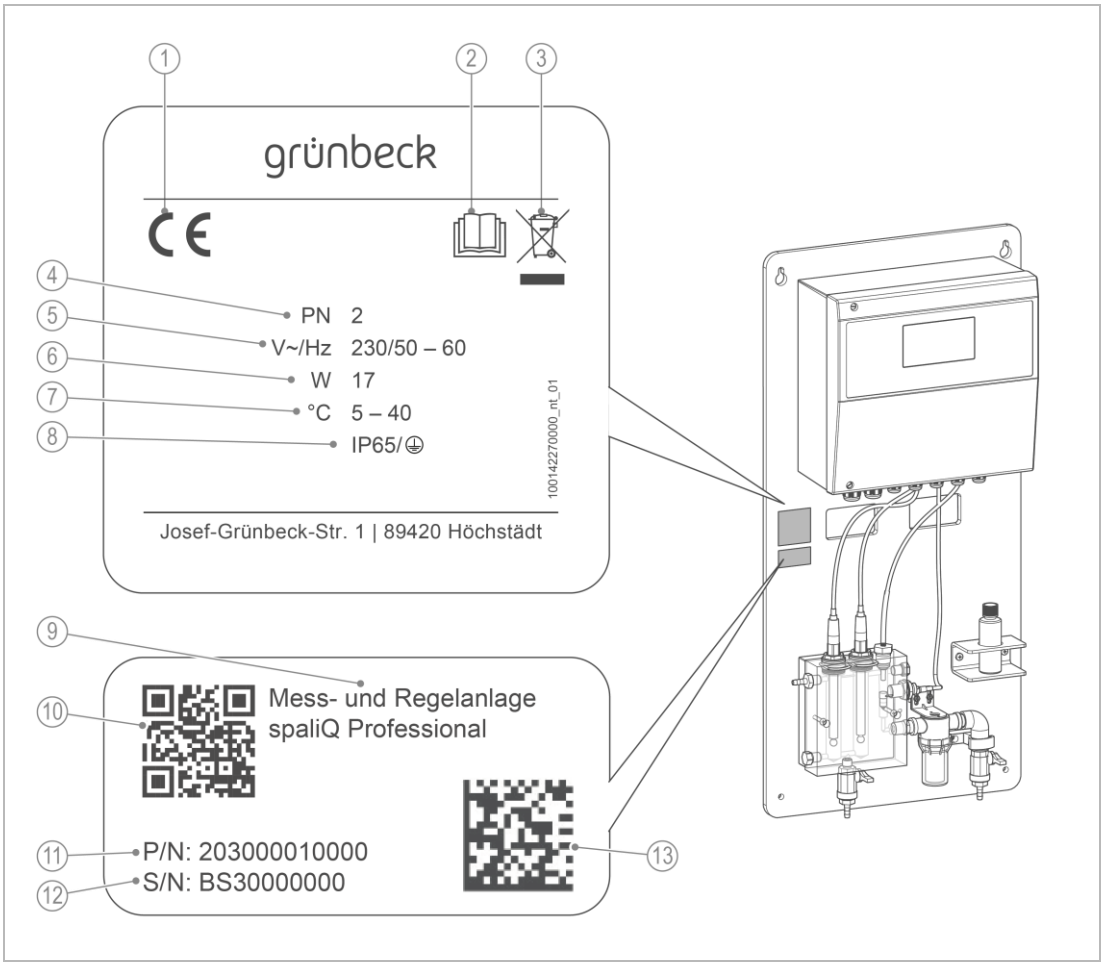
- Manuals for components from other manufacturers
- Safety data sheets for chemicals

1.3 Product identification

You can identify your product based on the product designation and the order number shown on the type plate.

► Check whether the products indicated in chapter 1.1 correspond to your product.

The type plate is located on the mounting plate.



	Designation
1	CE mark
2	Obey the operation manual
3	Disposal information
4	Nominal pressure
5	Rated voltage / Rated frequency
6	Rated input
7	Ambient temperature

	Designation
8	Protection/protection class
9	Product designation
10	QR code
11	Order no.
12	Serial no.
13	Data matrix code

1.4 Symbols used

Symbol	Meaning
	Danger and risk
	Important information or requirement
	Useful information or tip
	Written documentation required
	Reference to further documents
	Work that must be carried out by qualified specialists only
	Work that must be carried out by qualified electricians only
	Work that must be carried out by technical service personnel only

1.5 Depiction of warnings

This manual contains information and instructions that you must obey for your personal safety. The information and instructions are highlighted by a warning symbol and are structured as shown below:

SIGNAL WORD Type and source of hazard

- Possible consequences

► Preventive measures

The signal words below are defined subject to the degree of danger and might be used in the present document:

Warning symbol and signal word		Consequences if the information/instructions are ignored	
	**DANGER**	Personal injury	Death or serious injuries
	**WARNING**		Possible death or serious injuries
	**CAUTION**		Possible moderate or minor injuries
	NOTE	Damage to property	Possible damage to components, the product and/or its functions or an object in its vicinity

1.6 Demands on personnel

During the individual phases of the product's life cycle, different people carry out work on the product. This work requires different qualifications.

1.6.1 Qualification of personnel

Personnel	Requirements
User	• No special expertise required • Knowledge of the tasks assigned • Knowledge of possible dangers in case of incorrect behaviour • Knowledge of the required protective equipment and protective measures • Knowledge of residual risks
Owner/ operator/ operating company	• Product-specific expertise • Knowledge of statutory regulations on work safety and accident prevention
Qualified specialist • Electrical engineering • Sanitary engineering (HVAC and plumbing) • Transport	• Professional training • Knowledge of relevant standards and regulations • Knowledge of detection and prevention of potential hazards • Knowledge of statutory regulations on accident prevention
Technical service (Grünbeck's technical service/ authorised service company)	• Extended product-specific expertise • Trained by Grünbeck

1.6.2 Authorisations of personnel

The table below describes which tasks may be carried out by whom.

		User	Owner/ operator/ operating company	Qualified specialist	Technical service
Transport and storage				X	X
Installation and mounting				X	X
Commissioning					X
Operation and handling		X	X	X	X
Cleaning			X	X	X
Inspection			X	X	X
Maintenance	semi-annually				X
	annually				X
Troubleshooting		X	X	X	X
Repair				X	X
Decommissioning and recommissioning					X
Dismantling and disposal				X	X

1.6.3 Personal protective equipment

► As an owner/operator/operating company, make sure that the required personal protective equipment is available.

The components below fall under the heading of personal protective equipment (PPE):

 Protective gloves	 Face shield
 Protective footwear	

2 Safety

2.1 Safety measures

- Only operate your product if all components are installed properly.
- Obey the local regulations on drinking water protection, treatment of swimming pool water, accident prevention and occupational safety.
- Do not make any changes, alterations, extensions or program changes on your product.
- Only use genuine spare parts for maintenance or repair.
- Keep the premises locked against unauthorised access to protect imperilled or untrained persons from residual risks.
- Comply with the maintenance intervals (refer to chapter 9.1.1). Failure to comply can result in the microbiological contamination of your swimming pool installation or your drinking water system.

2.1.1 Mechanical hazards

- You must never remove, bridge, or otherwise tamper with safety equipment.
- For all work on the system that cannot be carried out from the ground, use stable, safe and self-standing access aids.
- Make sure that the system is set up or fixed in a way that it cannot tip or fall over, and that the stability of the system is guaranteed at all times.

2.1.2 Pressure-related hazards

- Components can be under pressure. There is a risk of injuries and damage to property due to escaping water and the unexpected movement of components. Check the system’s pressure lines for leaks at regular intervals.
- Before starting any repair and maintenance work, make sure that all affected components are depressurised.

2.1.3 Electrical hazards

There is an immediate danger of fatal injury from electric shock when touching live parts. Damage to the insulation or individual components can be lethal.

- Only have qualified electricians carry out electrical work on the system.
- In case of damage to live components, switch off the voltage supply immediately and arrange for repair.
- Switch off the supply voltage before working on electrical system parts. Discharge residual voltage.

- Never bridge electrical fuses. Do not disable fuses. Use the correct current ratings when replacing fuses.
- Keep moisture away from live parts. Moisture can cause short-circuits.

2.1.4 Danger due to chemicals

- Chemicals can be hazardous to health and environment.
  They can cause chemical skin and eye burns as well as irritation of the respiratory tract, or allergic reactions.
- Avoid any skin/eye contact with chemicals.
- Use personal protective equipment.
- Read the safety data sheet before handling chemicals. Obey the instructions for different activities/situations.
- Current safety data sheets for chemicals are available for download at **www.gruenbeck.de/en/info-centre/safety-data-sheets**.
- Obey in-house instructions when handling chemicals. Make sure that protective and emergency equipment such as emergency showers and eye wash are available where required, and functional.

Mixing and residual amounts of chemicals

- Do not mix different chemicals. Unforeseeable chemical reactions posing a lethal risk can occur.
- Dispose of residual amounts of chemicals in accordance with local regulations and/or in-house instructions.
- Residual amounts from used containers should not be transferred into containers with fresh chemicals in order not to impair the effectiveness of the chemicals.

Labelling/Minimum shelf life/Storage of chemicals

- Check the labelling of the chemicals. Chemical labels must not be removed or made illegible.
- Do not use any unknown chemicals.
- Comply with the use-by date (minimum shelf life) stated on the label.
- If stored incorrectly, chemicals could change their state of matter, crystallize, outgas, or lose their effectiveness. Store and use the chemicals at the indicated temperatures only.

Cleaning/Disposal

- Immediately absorb leaked chemicals with suitable binding agents.
- Collect and dispose of chemicals in such a way that they cannot pose any risks to people, animals, or the environment.

2.1.5 Groups of persons requiring protection

- Children must not play with the product.
- This product must not be used by persons (including children) with limited abilities, lack of experience or knowledge.
- Children should be supervised to make sure that they do not play with the product.

2.2 Product-specific safety instructions

2.2.1 Safety-related components

Safety components must be replaced by genuine spare parts only.

- pH electrode
- Redox electrode
- Flow sensor Measuring water
- Flow controller provided by client on site

2.2.2 Signals and warning devices

Labels on the product

Risk of electric shock

The affixed information and pictograms must be clearly legible.
They must not be removed, soiled or painted over.

► Obey all warnings and safety instructions.

► Immediately replace illegible or damaged symbols and pictograms.

2.3 Conduct in emergencies

2.3.1 In the event of water leaks

1. De-energise the system – unplug the power plug.
2. Locate the leak.
3. Eliminate the cause of the water leak.

2.3.2 In the event of incorrect dosing/overdosing

WARNING Incorrect dosing/overdosing

- Alkaline or acid water in the pipes and the pool
- Chemical burns, eye irritation, irritation of the respiratory tract, skin irritation

► Make sure that the water located in the pipe does not get into the pool.

1. De-energise the system – unplug the mains plug.
2. Contact technical service.

3 Product description

3.1 Intended use

The measuring and control system spaliQ Professional is used to measure and control water parameters for swimming pools and whirlpools in the private sector.

3.1.1 Foreseeable misuse

- Use of the system in the drinking water sector
- Use of the system in public swimming pools
- Use of the system in combination with an ozone disinfection process
- Use of the system for cooling water
- Operation of the system without on-site flow controller

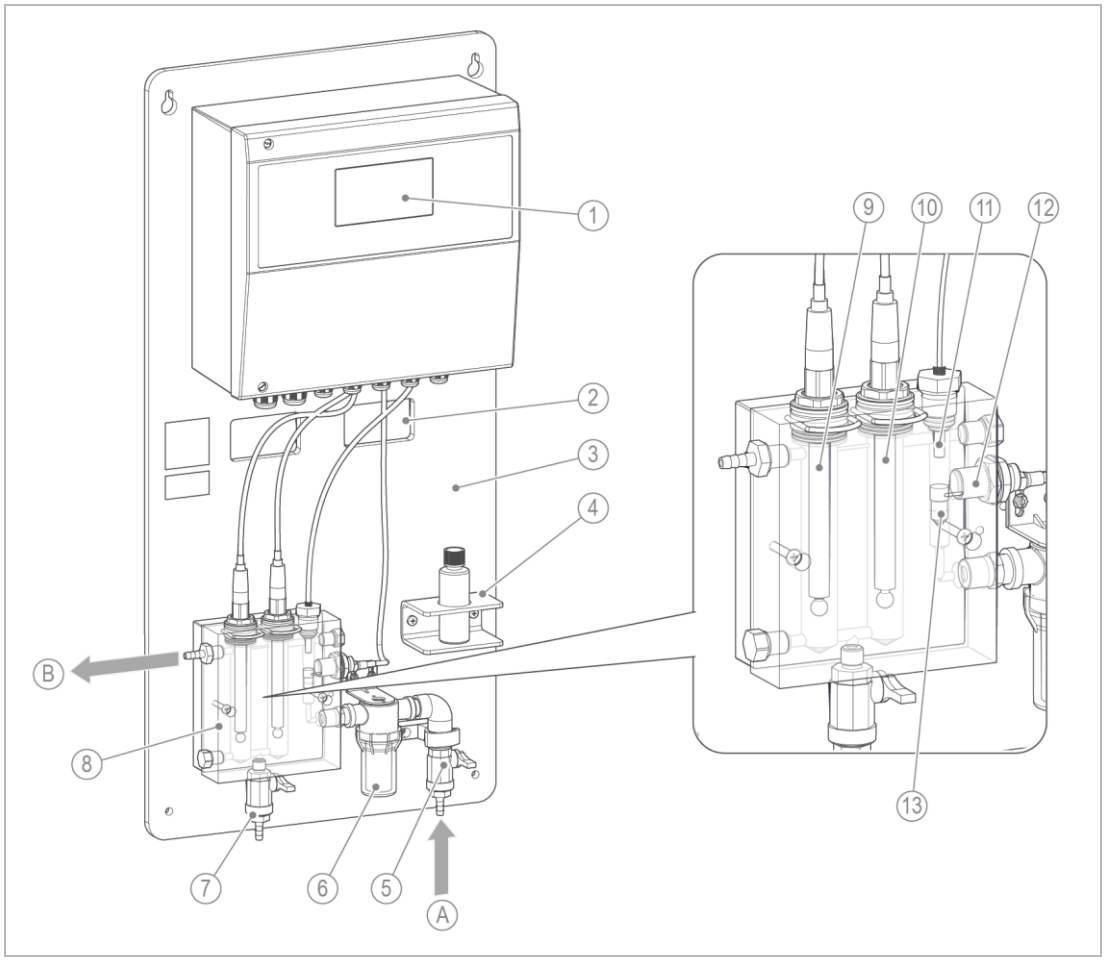
3.2 Application limits

For the use of the spaliQ Professional, the limit values of DIN EN 16713 do apply.

The parameters below are an exception to this:

Parameters		Value
Salt concentration	%	< 3.5
Isocyanuric acid	mg/l	≤ 1.0
Conductivity	µS/cm	≥ 50

3.3 Product components



	Designation
1	Control unit
2	Cable ducts
3	Mounting plate
4	Bottle holder for calibration solution
5	Shut-off valve Measuring water inlet
6	Measuring water filter
7	Sampling valve

	Designation
8	Flow fitting
9	Redox electrode
10	pH electrode
11	Temperature sensor
12	Flow sensor Measuring water
13	Float switch Flow meter

Connections

	Designation
A	Measuring water inlet

	Designation
B	Measuring water outlet

3.4 Functional description

3.4.1 Measuring and Controlling

The measuring and control system spaliQ Professional measures the water parameters pH value and Redox value, compares the measured value with the setpoint and then controls the addition of the dosing agents as needed.

The dosing agents can be added via separate hose dosing pumps, diaphragm dosing pumps or a chemical dosing system.

In addition, the water temperature is measured and displayed. The determined water temperature can be used for temperature compensation of the pH value measurement as well as for controlling the water temperature.

3.4.2 Additional functions

Function	Description
Addition of flocculant	The flocculation dosing output can be used to control a hose dosing pump or diaphragm dosing pump for the addition of flocculant. The dosing volume is only controlled by the measuring and control system if diaphragm dosing pumps are used.
Data logging	The measured values are stored on an internal SD memory card and can be read out, if needed.
Flow monitoring Measuring water	The flow monitoring for measuring water monitors the required flow in the flow fitting. The addition of dosing agents is only enabled if the flow is sufficient. If the flow is too low or there is no flow, control is locked.
Flow monitoring Filtrate	By means of feedback from an on-site flow controller, the flow monitoring for filtrate (pool water circuit) registers that sufficient flow is present in the filtrate pipe. If the feedback is present, control of the water parameters (addition of dosing agents) is enabled. If no feedback is present, control is locked.
Dosing time monitoring	The integrated dosing time monitoring for dosing disinfectants and pH regulating agents provides additional safety. The maximum dosing time can be individually adjusted to the on-site conditions. In the event that the maximum dosing time is exceeded, dosing is stopped and a fault message is output.
Guided calibration	Guided calibration simplifies the calibration process. With guided calibration, the user is guided through the calibration process step by step via the visualisation on the touchscreen.
Partial load operation	Depending on the hygiene parameters, disinfection can be regulated to a lower setpoint value in partial load operation. Furthermore, the dosing output of flocculants can be reduced. If partial load operation is active, a contact for “partial load operation” is switched, which, for instance, can be transmitted to the control unit of a filter system. The control unit of the filter system can, for example, reduce the circulation capacity for the pool water treatment if speed-controlled or frequency-controlled circulation pumps are used.
Economy operation	In economy operation, disinfection can be regulated to a lower setpoint value. Economy operation can be used in case of longer periods of low load, e.g. when the swimming pool is not used for a longer period of time.
High chlorination	For high chlorination, disinfection can be regulated to a higher setpoint value. High chlorination can be used after a short period of heavy use, e.g. when the pool is very busy or in an outdoor pool after a thunderstorm.
Home display / quick access	The 4.3" touchscreen provides an overview of relevant information (water parameters, system state). The touchscreen also provides quick access to selected system functions via quick access buttons.
Network interface including integrated web server	The network interface and the integrated web server make it possible to access the system from any location via an appropriate connection. By integrating the system into the customer’s own network, the system can be operated displayed with any web browser-enabled device and information on the water quality and the system state can the displayed.

Function	Description
Network interface in combination with Grünbeck Cloud and Grünbeck myProduct app	In combination with the Grünbeck Cloud and the Grünbeck myProduct app, the network interface provides the option to access the system with a mobile device via an appropriate connection from any location. Thus, information can be accessed, and settings can be made. • Information: Current messages; time until next maintenance; current operating mode; current measured values (water values) • Settings: Changing the operating mode; enabling or disabling the automatic change-over DST/standard time; enabling or disabling push notifications, enabling or disabling email notifications; renaming the device; changing the temperature pre-selection (provided the separate filter control unit GENO-BW-tronic is connected to the measuring and control system via a BUS connection) Furthermore, the network interface in combination with the Grünbeck Cloud and the Grünbeck myProduct app provides the option to quickly access the product documents available on Grünbeck's website.
BUS interface	The existing Modbus RTU & TCP/IP interfaces provide the option for integration into an on-site BUS system (building automation).
Emailing	Thanks to the possibility of sending emails, the system can inform the recipient immediately when messages occur.
Operation of a filter control unit GENO-BW-tronic	In combination with a filter control unit GENO-BW-tronic, the spaliQ Professional provides the following operating options: 3x temperature pre-selection, starting backwash, filtration ON/OFF, channel cleaning ON/OFF

3.4.3 Electrodes/Measuring devices/Sensors

Function	Description
pH electrode	The pH value is determined by means of a single-rod measuring cell (measuring and reference electrode in one shaft). When immersing the glass electrode into the swimming pool water, the hydrated layer by which an electro-chemical potential is generated, forms on the glass surface. This potential depends on the composition of the swimming pool water and is measured against a reference electrode (with constant potential) lying in a gel electrolyte. The pH value is determined by the difference in potential. The measuring water must have a minimum conductivity of 50 µS/cm.
Redox electrode	The Redox value is determined by means of a single-rod measuring cell (measuring and reference electrode in one shaft). Upon immersion into the swimming pool water, an electro-chemical potential forms at the measuring electrode made of platinum. The potential at the platinum electrode depends on the composition of the swimming pool water and is measured against a reference electrode (with constant potential) lying in a gel electrolyte. The Redox value is determined by the difference in potential. The measuring water must have a minimum conductivity of 50 µS/cm.
Temperature sensor	To record the pool water temperature. The determined pool water temperature can be used for temperature compensation of the pH value measurement as well as for controlling the pool water temperature. If the heating is to be enabled, the temperature compensation must be activated.
Flow sensor Measuring water	The flow sensor monitors the required flow in the flow fitting. If, at a time, the flow rate is insufficient or fails completely, the measuring and control system locks the chemical dosing and thus minimises the risk of incorrect dosing.

3.5 Accessories

You can retrofit your product with accessories. Please contact your local Grünbeck representative or Grünbeck's headquarters in Hoechstaedt/Germany for details.

Product	Order no.
Pool water safety package Protective equipment for handling caustic substances	**210 880**
Connecting kit for filter system GENO-mat, spaliQ:UF150 For new installations in connection with a filter system of the GENO-mat F or BWK series as well as an ultrafiltration system spaliQ:UF150	**203000040000**
Flow controller To monitor the required flow in the pool water circuit (filtrate line) for enabling dosing of the measuring and control system	**100235590000**
Hygro thermo transmitter To measure the room temperature and room humidity in the indoor swimming pool. The measured values are displayed at the measuring and control system.	**203 535**
Optional module for chemical refill and empty signal To record two levels each (refill and empty signal) of up to 3 suction lances (disinfection, pH, flocculation). Forwarding of the refill signal and the collective fault Empty signal to the measuring and control system	**203 555**
Dosing system GENODOS SB 1/40 (pH) To dose liquid pH adjustment agents (GENO-minus N or GENO-plus N).	**212 475**
Dosing system GENO-Schlauflex-pH 1.5 i To dose liquid pH regulating agents (GENO-minus N or GENO-plus N).	**203 591**
Dosing system GENODOS SBC 1/40 (chlorine) To dose liquid sodium hypochlorite (GENO-Chlor A).	**212 490**
Dosing system GENO-Schlauflex-Cl 1.5 i To dose liquid sodium hypochlorite (GENO-Chlor A).	**203 586**
Dosing system GENODOS SBA 6/40 To dose liquid hydrogen peroxide (GENO-aktiv). (Only in combination with filter control unit GENO-BW-tronic)	**212 485**
Dosing unit GENO-mat Comfort For dosing bromine tablets (GENO-Brom).	**203 123**
Digital test device Scuba II Electronic pool tester to determine the parameters chlorine (free, total), pH value, cyanuric acid, acid capacity and bromine.	**211 235**
Test device MD4in1 Photometer to determine the parameters chlorine (free, total), pH value, cyanuric acid and acid capacity.	**211 230**
Test device for bromine, chlorine and pH value	**211 112**

4 Transport, set-up and storage

4.1 Shipping/Delivery/Packaging

The system is fixed on a pallet at the factory and secured against tipping.

► Upon receipt, immediately check for completeness and transport damage.

NOTE Improper transport

- Damage to system components due to falling components
- The system does not feature any lifting points for lifting by crane and lifting strap

► Do not lift the system with a crane or a lifting device.

► Load/unload the system secured on a pallet with a forklift/lift truck and suitable pallet forks.

4.2 Transport to/at the installation site

► Transport the product in its original packaging only.

CAUTION Unhandy size of the system during transport

- Crushing due to slipping and falling systems

► Transport or lift the system with two people.

► Keep unauthorised persons away when transporting and setting up the system.

4.3 Storage

► Protect the product from the impacts below when storing it:

- Dampness, moisture
- Environmental impacts such as wind, rain, snow, etc.
- Frost, direct sunlight, severe heat exposure
- Chemicals, dyes, solvents and their vapours

4.3.1 Storage and handling of the calibration solution

► Store the calibration solution at room temperature (15 °C – 25 °C).

► Tightly close the bottle containing the calibration solution after use.

4.3.2 Storage and handling of pH electrodes and Redox electrodes

In order to prevent the sensor elements from drying out, the pH and Redox electrodes feature a soaking cap or a transport container for storage and transport.

NOTE pH and Redox electrodes drying out

- Mismeasurements, incorrect dosing and failure of components

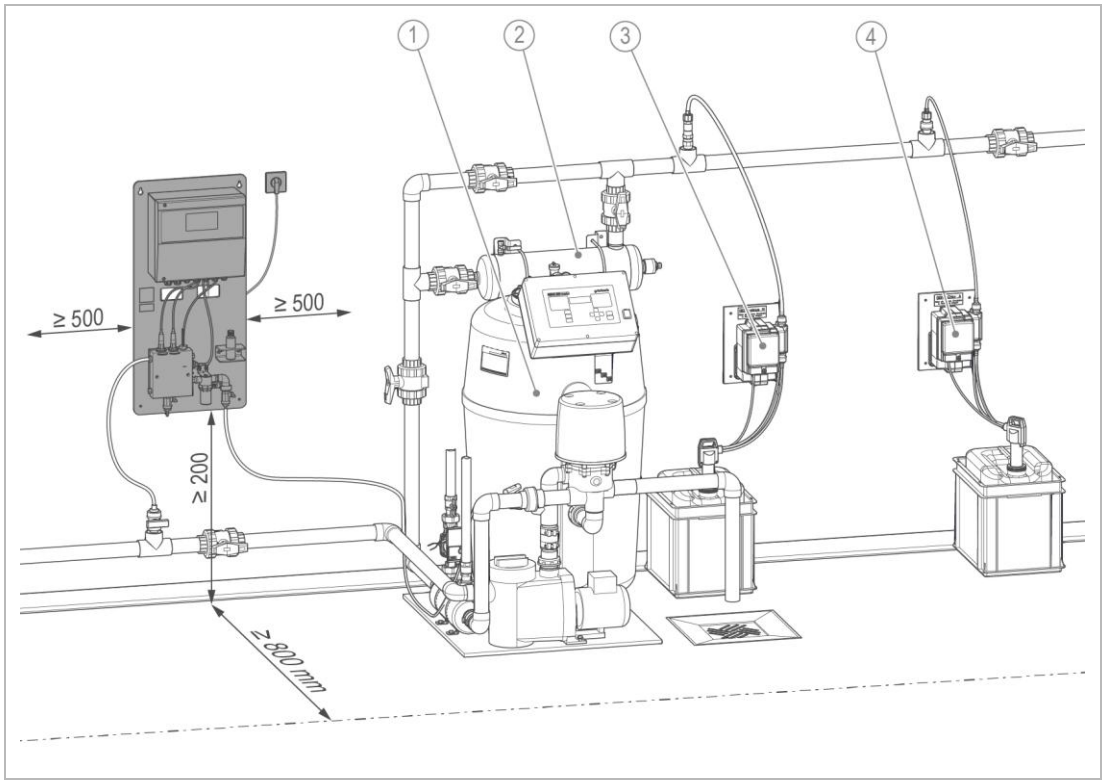
► Comply with the requirements below for storage and handling:

- Storage in dry rooms at -5 °C – +30 °C only
- Storage for longer than 6 months not recommended
- Storage in a 3 mol/l KCl solution. Do not use distilled water.
- Condition the pH and Redox electrodes before measuring if they have been stored dry for a long time. Immerse the electrodes in a 3 mol/l KCl solution for approx. 24 hours.
- Handle the pH-sensitive membrane glass with care (avoid skin contact, protect from damage)
- Keep the electrical plug-in connections and cables clean and dry

5 Installation

The installation of the system represents a major intervention into the drinking water system and the pool water installation and must be carried out by a qualified specialist only.

Installation example



	Designation
1	Filter system GENO-mat F 600 AK
2	UV disinfection system GENO-UV

	Designation
3	pH dosing system GENODOS SB
4	Chlorine dosing system GENODOS SBC

5.2 Requirements for the installation site

Obey the local installation directives, general guidelines and technical specifications.

- Protect the system from the impacts below:
  - Frost, severe heat exposure and direct sunlight
  - Chemicals, dyes, solvents and their vapours
  - Heat sources (e.g. heating systems, boilers and hot water pipes)
- Ambient temperature and radiation temperature in the immediate vicinity ≤ 40 °C
- Access for maintenance work, required space:

  - Front: 800 mm
  - Left/right: 500 millimeters
  - Bottom: 200 millimeters
- Sufficiently illuminated and ventilated
- Flat, vertical wall surface with appropriate load-bearing capacity to support the operating weight of the product

Water installation

- Chemical-resistant floor drain or appropriate safety device with water stop function
- Chemical-resistant lifting system for drain connection located at a higher level
- Flow controller in the on-site filtrate line

To operate the measuring and control system, a flow controller (monitoring the circulation/flow) must be installed in the on-site filtrate line of the pool water circuit.

The flow controller must electrically be connected to the measuring and control system (refer to chapter 5.5).

Electrical installation

- Schuko socket with permanent power supply (approx. 1.2 m max. from the control unit)
- Fuse protection according to local electrical regulations, e.g. ground fault circuit interrupter with 30 mA

5.3 Checking the scope of supply

- System pre-assembled on mounting plate
- Fastening material
  - 4 x Hexagon head screw with washer and dowel
  - 4 x Spacer
- 1 x Calibration solution each: pH7, pH9, Redox 475 mV
- Bottle with screw cap
- SD card for archiving the operating data (integrated in the operating unit)
- Operation manual

► Check the scope of supply for completeness and damage.

5.4 Water installation

5.4.1 Fasten the mounting plate with the system

The fastening of the mounting plate with the pre-assembled measuring and control system must be determined according to the conditions on site. The client is responsible for providing solid fastening.

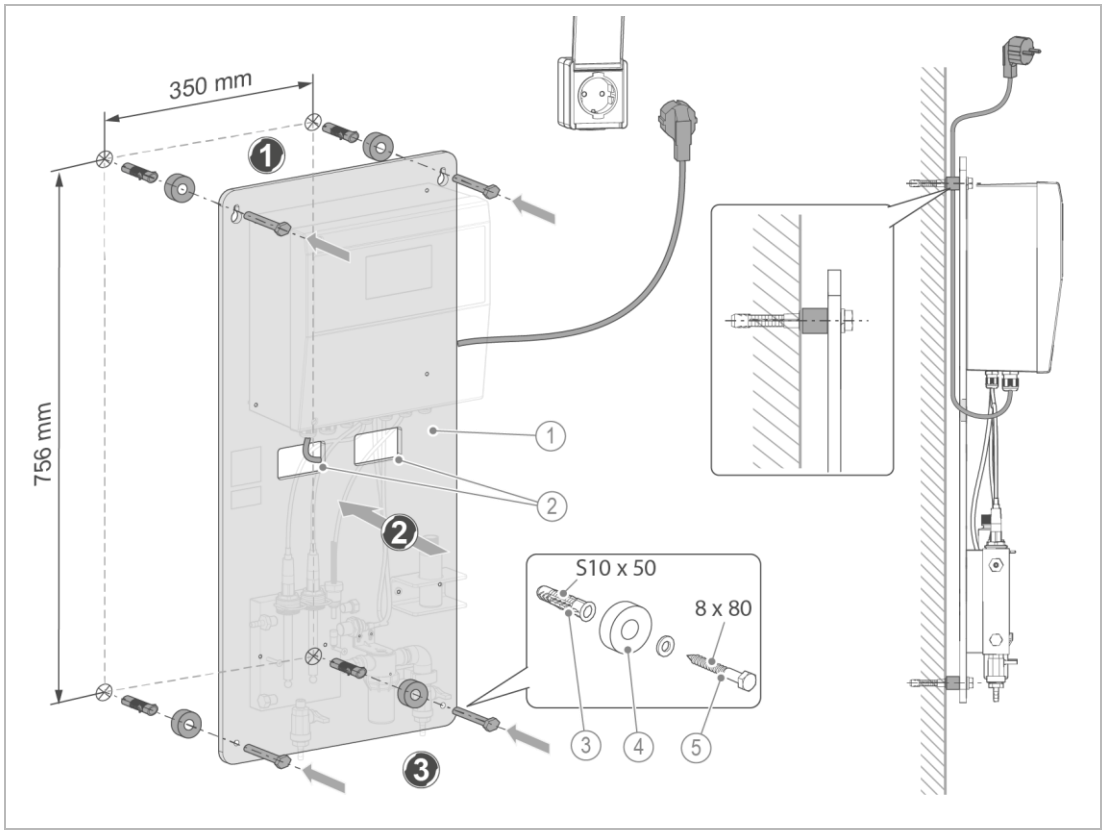
► Comply with the space required for the operation of the system.

NOTE Installation with mechanical stress

- Damage of components, malfunction and failure of the system

► Make sure to install the system free of mechanical stress.

► Install the mounting plate using the fastening material that comes with the system.



	Designation		Designation
1	Mounting plate	4	Spacer
2	Cable ducts	5	Hexagon head screw with washer
3	Dowel		

1. Mark the drill holes according to the specified dimensions.
   a Horizontally align the mounting plate using a spirit level.
2. Drill the holes and insert the dowels that come with the system.

3. Screw the upper 2 screws into the drill holes with the washers underneath.
   a Insert the spacers to enable cable routing between the wall and the rear of the mounting plate later on.
4. Feed the cabling (power cable with Schuko plug) through a cable bushing.
5. Hang the mounting plate into the upper screws.
6. Screw the lower 2 screws into the drill holes with the spacers underneath.
7. Tighten all 4 screws.
   a Make sure the no mechanical stress is applied to the system or its components.
8. Check the mounting plate for a tight fit.

5.4.2 Connecting the measuring water lines

WARNING Overdosing due to the measuring sections being too long (inert system)

- Eye irritation, irritation of the respiratory tract due to the concentration of disinfectants in the pool water being too high.
- Direct reactions of the skin due to the pH value in the pool water being too high; the disinfection efficiency decreases.

► Keep the measuring sections as short as possible.

NOTE Negative pressure/overpressure/pressure fluctuations due to incorrect routing of measuring water

- Malfunction, mismeasurements

► Make sure that there is no negative pressure in the flow fitting (e.g. in case of measuring water recirculation to the suction side of a circulation pump).

► If the measuring water is recirculated to a raw water tank, make sure that a free outlet is available and that the generated counter-pressure applied to the flow fitting does not exceed 0.1 bar.

► Avoid pressure fluctuations.

Fault messages due to the measuring water flow being too low

- Excessive pressure losses in the measuring water pipe system or insufficient delivery capacity of the on-site pump result in the measuring water flow being too low.

► Take the pressure loss of the flow fitting and the on-site pipe system into account (refer to chapter 13).

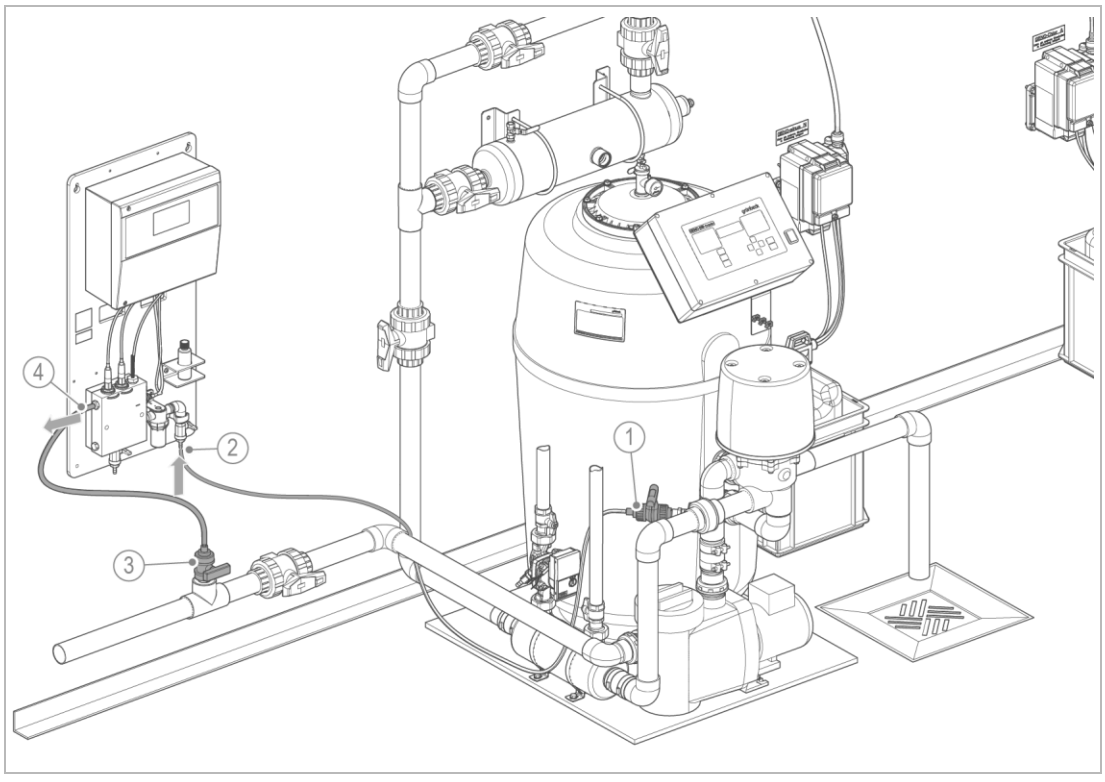
Preconditions for the connection of the measuring water lines

In combination with a filter system of the GENO-mat F series, you can use the accessory “Connection kit for filter system GENO-mat, spaliQ:UF150”.

► Obey the instructions below:

- Always route lines mains cables, electrical connecting cables away from traffic routes in order to prevent tripping and tear-off. Mark possible tripping hazards, if necessary.
- Do not use the measuring and control system as anchor point for pipes. Secure the pipework immediately upstream and downstream of the measuring and control system.
- Provide shut-off options upstream and downstream of the system, so that the system can be shut off during maintenance work.
- Secure the system against water hammer.
- Only use suitable piping material (pressure-resistant, temperature-resistant according to the information in the technical specifications).
- Only use piping material or pipes of sufficient size.
- Avoid sudden changes in cross section and direction as well as excessive bends in order to reduce the flow resistance in the pipes.
- Increase the diameter of the pipe where long pipes with many bends are unavoidable.
- Avoid mechanical stress caused by thermal expansion.

► Proceed as follows to establish the connections for the measuring water:



	Designation		Designation
1	Measuring water sampling point	3	Measuring water recirculation
2	Measuring water inlet	4	Measuring water outlet

1. Close the shut-off valves upstream and downstream of the system.

2. Establish the measuring water supply from the on-site measuring water sampling point to the measuring water inlet.
3. Establish the measuring water recirculation from the measuring water outlet to the on-site measuring water recirculation.

5.4.3 Installing and connecting the electrodes

The electrodes can dry out. Only install the electrodes shortly before commissioning.

NOTE Contact of measuring electronics with water or dirt

- Malfunction and failure of components
- ► Make sure that the electrical contacts of the components (electrodes, electrode cables) do not come into contact with water or dirt.
- ► Do not remove the protective caps.

NOTE Skin contact with electrodes

- Mismeasurements, incorrect dosing and failure of components
- ► Handle the electrodes with care
- ► Avoid skin contact with the measuring areas, e.g. the membrane glass.

► Remove the respective electrode from its packaging.

a Check the electrodes for visible air bubbles inside the electrodes.

b Remove air bubbles that might be present by slightly shaking the electrodes vertically.

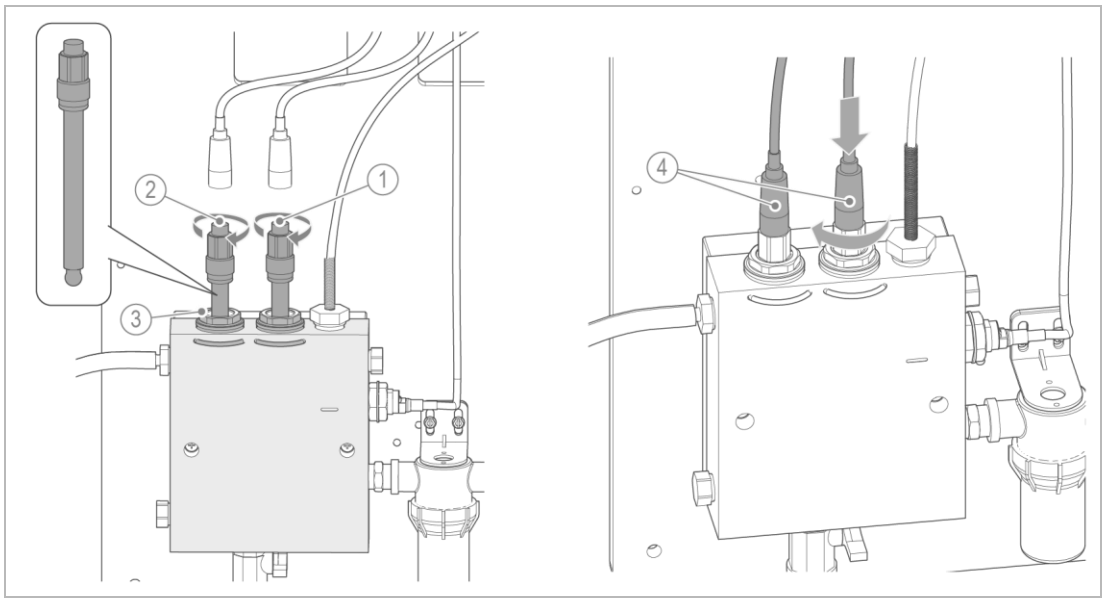
c Replace a defective electrode, if necessary.

d Do not yet remove the protective cap at the head of the electrode.

e Remove the storage container with sodium chloride solution from the tip of the electrode.

f Remove any residue of sodium chloride solution from the tip of the electrode.

► Proceed as follows to install the electrodes:



	Designation		Designation
1	pH electrode	3	Adapter
2	Redox electrode	4	Electrode cable

1. Screw the pH electrode into the adapter on the right.
2. Screw the Redox electrode into the adapter on the left.
3. Slightly tighten the electrodes with max. 3 Nm.
   a Use an open-end wrench (SW 17).
   b Hold up the adapter using another open-end wrench.

Connecting the electrodes

The electrode cables are already connected to the control unit in the factory.

You will find the designations for pH and Redox on the electrodes as well as on the electrode cables.

1. Plug the electrode cable for pH onto the pH electrode.
2. Plug the electrode cable for Redox onto the Redox electrode.
3. Screw the electrode cables tight using the respective union nuts (approx. 1 turn).

5.5 Electrical installation

The electrical installation must be carried out by a qualified electrician only.

DANGER Dangerous voltage in the switch cabinet

- Severe burns, cardiovascular failure, fatal electric shock
- Only have qualified electricians carry out electrical work on the system.

5.5.1 Establishing line connections

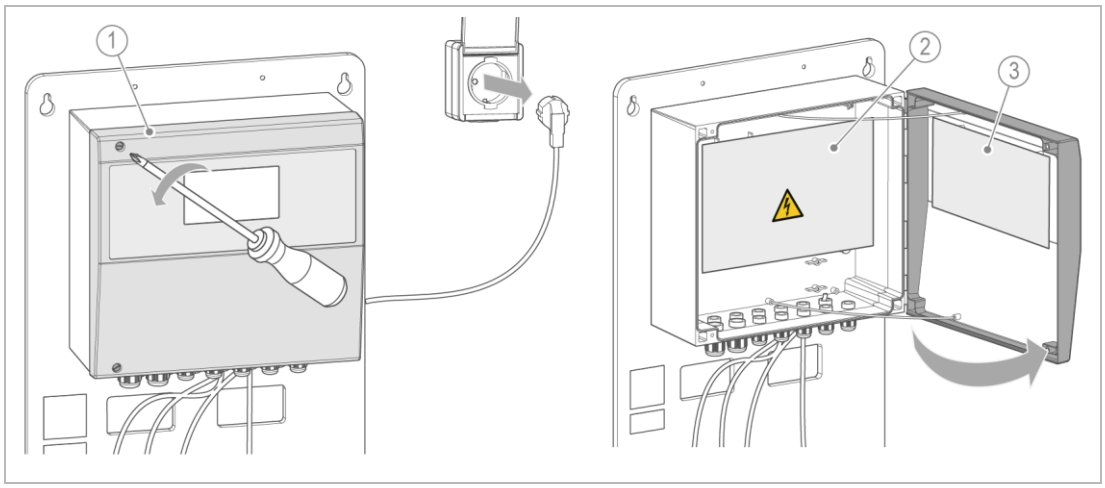
WARNING External voltage at terminals 20 to 28 and on the circuit board

- Risk of electric shock when connected to 230 V

► Obey the warning labels in the control unit.

► Make sure that the system is de-energised.

Opening the control unit

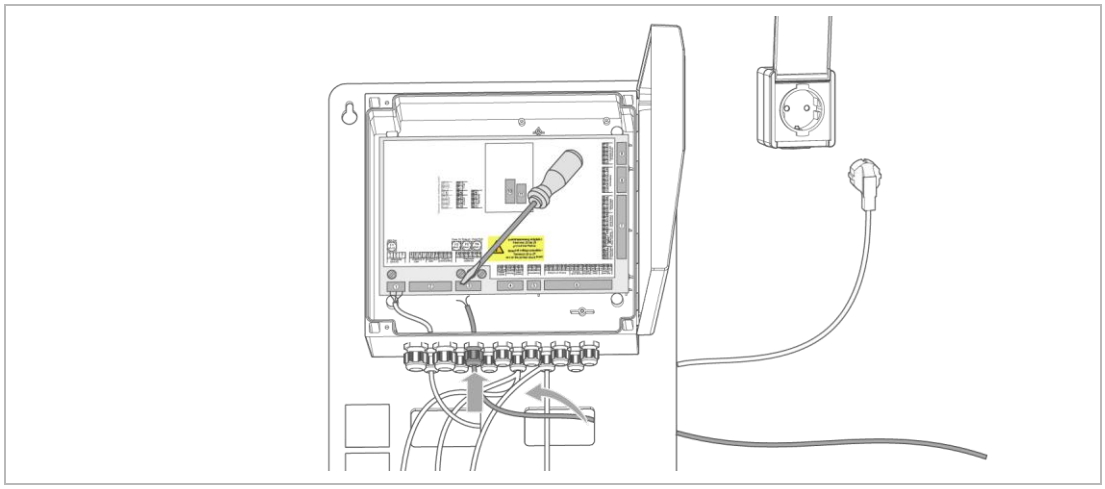


	Designation		Designation
1	Lid	3	Operating board
2	Main circuit board		

1. Make sure that the system is de-energised.
2. Loosen both screws.
3. Swing open the cover.

» The operating board and the terminal strip are accessible.

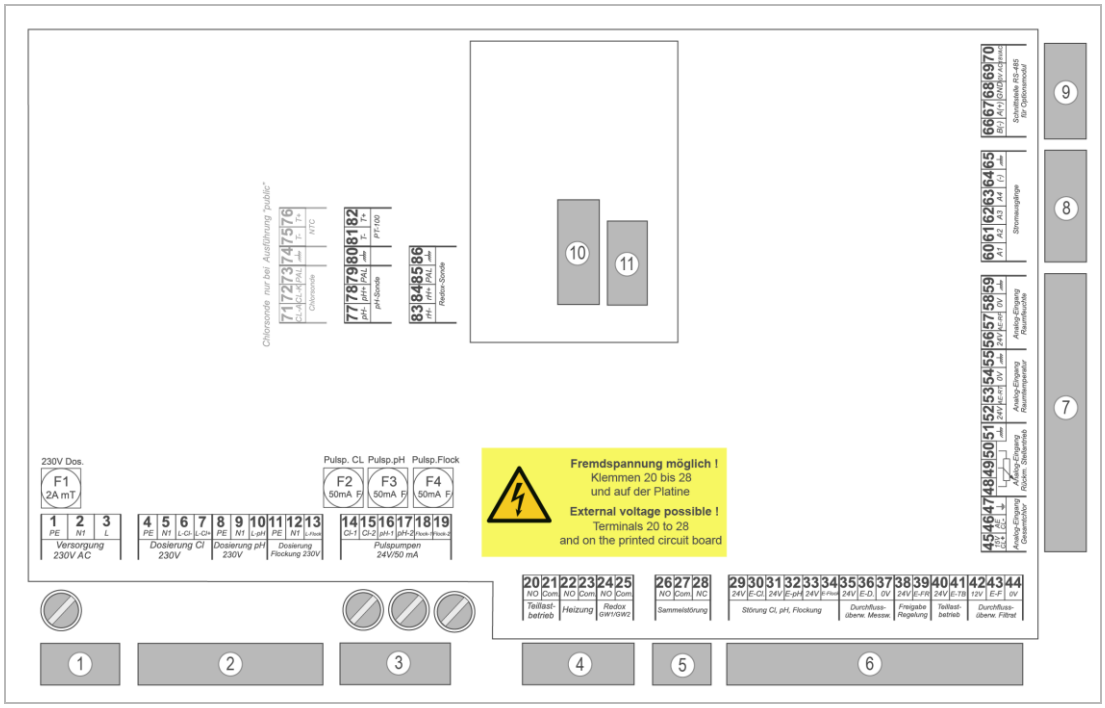
Connecting the cable connections



As the air in the mechanical room contains chlorine and acids, **cable bushings that are not needed** must be sealed off tightly by means of the foamed rubber strings supplied with the system in order to comply with protection IP 65.

1. Route the respective connecting lines from the rear through the cable bushings of the mounting plate.
2. Route the connecting line through the screw connection and connect it.

5.5.2 Terminal strip of main circuit board



	Designation
1	Voltage supply (connected at the factory)
2	Dosing outputs
3	Pulse pumps
4	Voltage-free outputs
5	Collective fault contact
6	Switching inputs

	Designation
7	Analogue inputs
8	Power outputs
9	Interface RS-485 for optional module
10	pH probe and PT-100 temperature sensor (connected at the factory)
11	Redox probe (connected at the factory)

Voltage supply

Term.	Signal	Colour	Function		Comments
1	PE	–	Supply	230 V~ (+10 %/-15 %) 50 – 60 Hz	Mains supply via power cable with Schuko plug
2	N1	–			
3	L1	–			

Fuses

Fuse	Function	Comments
F1	2 A mT (medium time lag)	Dosing outlets 230 V
F2	50 mA F (fast-acting)	Cl pulse pump (dosing outlet)
F3	50 mA F (fast-acting)	pH pulse pump
F4	50 mA F (fast-acting)	Flocculation pulse pump

5.5.2.1 Dosing outlets (hose dosing pumps)

The dosing capacity for the hose dosing pumps is controlled by means of the switch-on time. Power outputs, by which the power supply of the corresponding dosing system can be switched on and off, are available for control.

Term.	Signal	Colour	Function		Comments
4	PE	–	Dosing Cl- / Cl+	230 V/50 Hz	To be used for disinfection dosing or for actuator (for bromine dosing) The supply cable of the actuator must be connected to terminals 5, 7 (phase for motor direction OPEN), 6 (phase for motor direction CLOSED) and 4.
5	N1	–			
6	L-Cl-	–			
7	L-Cl+	–			
8	PE	–	pH dosing	230 V/50 Hz	
9	N1	–			
10	L-pH	–			
11	PE	–	Flocculation dosing	230 V/50 Hz	
12	N1	–			
13	L-Flock	–			

- ► Connect the dosing pumps to the respective terminals using the connection cable.
- ► During commissioning, set the corresponding parameters (dosing system, maximum pulse frequency, control direction, ...) on the control unit.

5.5.2.2 Diaphragm dosing pump (pulse pumps)

The dosing capacity is controlled by means of the pulse frequency. Voltage-free semi-conductor relays are available for control. The power supply of the pulse pumps must be made by means of a separate power outlet.

The connection examples refer to Grünbeck's GENODOS pumps.

For connecting other dosing pumps, refer to the respective manual.

Term.	Signal	Colour	Function		Comments
14	Cl-1	GN	Cl pulse pump	NPN max. 24 V/50 mA	Dosing outlet
15	Cl-2	BR			
16	pH-1	GN	pH pulse pump	NPN max. 24 V/50 mA	Dosing outlet
17	pH-2	BR			
18	Fl-1	GN	Flocculation pulse pump	NPN max. 24 V/50 mA	Dosing outlet
19	Fl-2	BR			

- ► Set the selector switch on the GENODOS pump to "Ext".
- ► Connect the dosing pumps to the respective terminals using the external control cable (green and brown).
- ► During commissioning, set the corresponding parameters (dosing system, maximum pulse frequency, control direction, ...) on the control unit.
- ► Establish the power supply for the diaphragm dosing pumps.

5.5.2.3 Voltage-free outputs

Term.	Signal	Colour	Function	Comments
20	NO	–	Partial load operation	Switched on as long as “Partial load operation” is active
21	C	–		
22	NO	–	Heating	Switched on as long as “Heating request” is active (actual value < setpoint value)
23	C	–		
24	NO	–	Redox GW1/GW2	Switched on as long as the setpoint value Redox GW1 has been undershot and the setpoint value Redox GW2 has not yet been exceeded.
25	C	–		

5.5.2.4 Collective fault contact

Term.	Signal	Colour	Function	Comments
26	NO	–	Collective fault	Closed if voltage is active and no fault is pending
27	C	–		
28	NC	–		

5.5.2.5 Switching inputs

Term.	Signal	Colour	Function		Comments
29	24 V	–	Fault Cl dos		Input to monitor the dosing systems • Closed = Dosing OK The exact function of the input can be programmed.
30	E-Cl	–			
31	24 V	–	Fault pH dos		
32	E-pH	–			
33	24 V	–	Fault Flocculation		
34	E-Fl	–			
35	24 V	BN	Flow monitoring Measuring water	24 V DC	Input for flow sensor to monitor the measuring water inlet flow
36	E-DM	BK			
37	0V	BU			
38	24 V	–	Release Control	24 V DC	Here, the control unit can be informed that there is no circulation or that a backwash process has been released and therefore the measuring water supply can no longer be guaranteed. • Closed = Backwash process in progress The exact function of the input can be programmed.
39	E-FR	–			
40	24 V	–	Partial load operation	24 V DC	Activation of “Partial load operation” if “External” is set in “Status”.
41	E-TB	–			
42	12 V	–	Flow monitoring Filtrate	12V DC	Input for flow controller to monitor the filtrate. The flow controller must output a switching signal (normally open contact/NO): • Open = No flow present • Closed = Flow present Terminal 44 is not assigned.
43	E-DF	–			
44	0 V	–			

► Connect the flow controller provided by the client on site.

Both jumpers above terminals 29 - 44 must be set to the lower position.

5.5.2.6 Analogue inputs

Term.	Signal	Colour	Function		Comments
45	Cl+	–	Without function		
46	Cl-	–			
47	GND	–			
48	VREF	–	Without function		
49	RE	–			
50	0V	–			
51	GND	–			
52	24 V	–	Analogue input Room temperature	24V DC	4 – 20 mA
53	AE-1	–			
54	0 V	–			
55	GND	–			
56	24 V	–	Analogue input Room humidity	24 V DC	4 – 20 mA
57	AE-2	–			
58	0 V	–			
59	GND	–			

5.5.2.7 Power outputs

The four power outputs A1 to A4 are galvanically isolated against all other circuits and against PE. The return of current is made via terminal 64. The maximum working resistance is 400 Ω.

Term.	Signal	Colour	Function	Comments
60	A1	–	Power outputs	Analogue outputs galvanically isolated (power outputs 1 – 4) D/A conversion
61	A2	–		
62	A3	–		
63	A4	–		
64	(-)	–		
65	GND	–		

► Configure the power outputs during commissioning.

5.5.2.8 Interface RS-485 for optional module

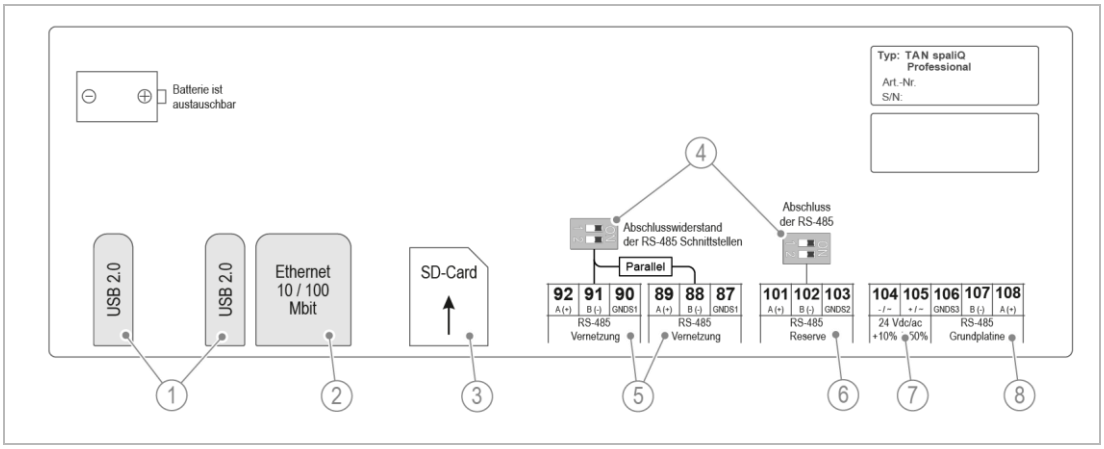
This RS-485 interface is designed for the connection of optional modules (e. g.: Optional module for chemicals refill/empty signal).

Term.	Signal	Colour	Function
66	B (-)	–	RS-485 for optional module
67	A (+)	–	
68	GND	–	
69	0V AC	–	Supply for optional module
70	18V AC	–	

5.5.2.9 pH probe/Redox probe and PT-100 temperature sensor

Term.	Signal	Colour	Function	Comments
77	pH-	–	pH probe	Connected at the factory
78	pH+	–		
79	PAL	–		
80	GND	–		
81	T-	–	PT100 temperature sensor	Connected at the factory
82	T+	–		
83	rH-	–	Redox probe	Connected at the factory
84	rH+	–		
85	PAL	–		
86	GND	–		

5.5.3 Operating board



	Designation
1	USB 2.0 (reserve)
2	Ethernet 10/100 Mbit
3	SD card slot
4	Terminating resistors for RS-485 interfaces

	Designation
5	RS485 for interconnection
6	RS485 for interconnection (reserve)
7	24 V DC / AC voltage supply
8	RS-485 main circuit board

Ethernet connection

Term.	Signal	Function	Comments
LAN, RJ45		Ethernet connection	Ethernet connection For on-site integration into the customer's network - For access to the web server - For access to the VNC server - For internet connection via Cloud - For communication with building automation via Modbus TCP/IP

RS485 interconnection

Term.	Signal	Colour	Function	Comments
87	GND	–	RS485 interconnection	RS-485 (galvanically isolated) For on-site Modbus RTU connection
88	B (-)	–		
89	A (+)	–		
90	GND	–	RS485 interconnection	
91	B (-)	–		
92	A (+)	–		

RS-485 reserve

Term.	Signal	Colour	Function	Comments
101	A (+)	–	RS -485 reserve	RS-485 (galvanically isolated)
102#	B (-)	–		
103	GNDS1	–	Without function	

RS-485 main circuit board

Term.	Signal	Colour	Function	Comments
104	- / ~	–	24 V DC / AC	Voltage supply
105	+ / ~	–	+10 % / -50 %	
106	GNDS3	–	RS-485 main circuit board	RS-485 (galvanically isolated)
107	B (-)	–		Connection of operating unit to main circuit board
108	A (+)	–		

5.6 Checking the control unit

DANGER Dangerous voltage

- Severe burns, cardiovascular failure, fatal electric shock

► Make sure that the system is de-energised.

1. Check the control unit:
   - **a** Check the electrical connections.
   - **b** Retighten the cable screw connections, if necessary.
   - **c** Reseal using cable putty, if necessary.
   - **d** Check that cable bushings that are not required are tightly sealed with foamed rubber strings
2. Close the control unit.
   - **a** Fasten the cover using the 2 screws.

6 Commissioning

Initial commissioning of the product must be carried out by technical service personnel only.

WARNING Operating error and incorrect settings

- Dangerous operating states that result in personal injury and damage to health or property

► Read these instructions and the instructions for other system components carefully.

► Do not carry out any work that you are not qualified to do.

WARNING Overdosing due to incorrectly selected dosing pump and/or incorrectly set dosing capacity

- Eye irritation, irritation of the respiratory tract due to the concentration of disinfectants in the pool water being too high
- Direct reactions of the skin due to the pH value in the pool water being too high; the disinfection efficiency decreases.

► Pay attention to the dosing capacity of the selected dosing systems and adjust them to the conditions on site.

► Only and exclusively operate the diaphragm dosing pump type GENODOS GP in the setting “Ext.”.

CAUTION Risk of slipping at the sampling points

- Injuries resulting from falls

► Use personal protective equipment – wear sturdy shoes.

► Immediately mop up escaped liquids.

6.1 Preparing the system

We recommend adding chlorine to the pool water directly after it is filled, and to operate with an increased chlorine concentration of 2.0 mg/l for at least two weeks. This is irrespective of the selected type of disinfection.

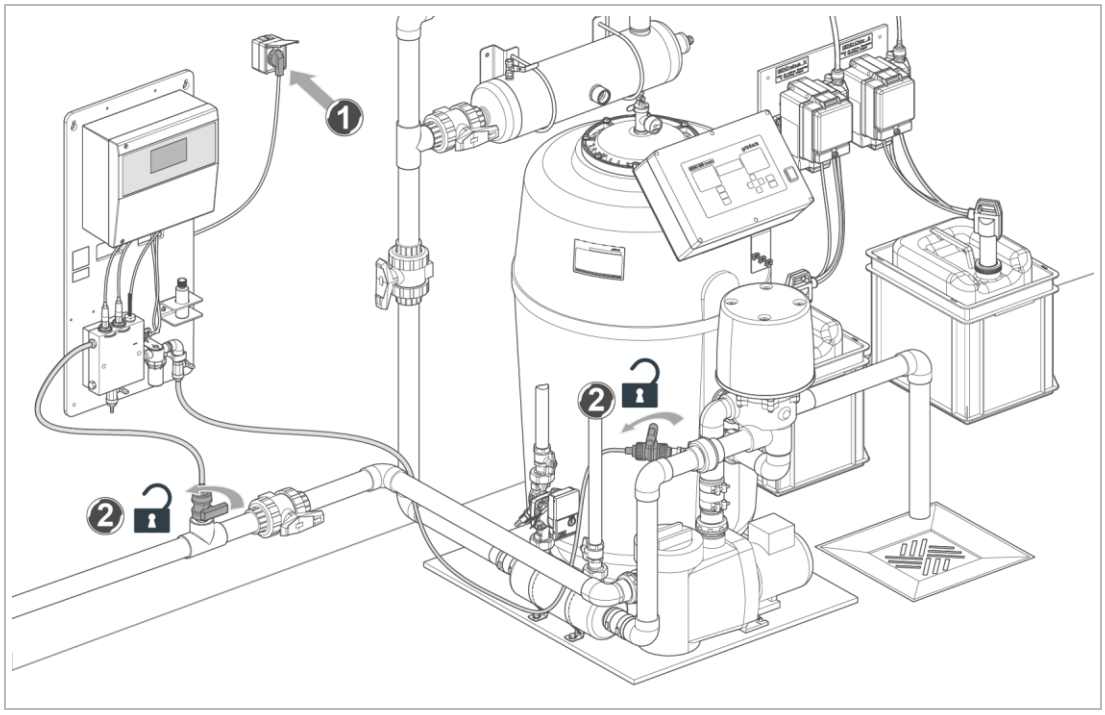
6.1.1 Checking the installation

1. Carry out a visual check and leak test of all connections, screw connections and lines.
2. Check that all hose transitions are firmly attached.
   a When doing this, check if there is still tightening reserve visible on the hose clamp when the clamping screw is firmly tightened.
3. Check the hydraulic and electrical installation.
4. Check the supply of the dosing system with chemicals.
5. Make sure that the disposal of dripping and leakage water in the piping system and in the system area is safe.

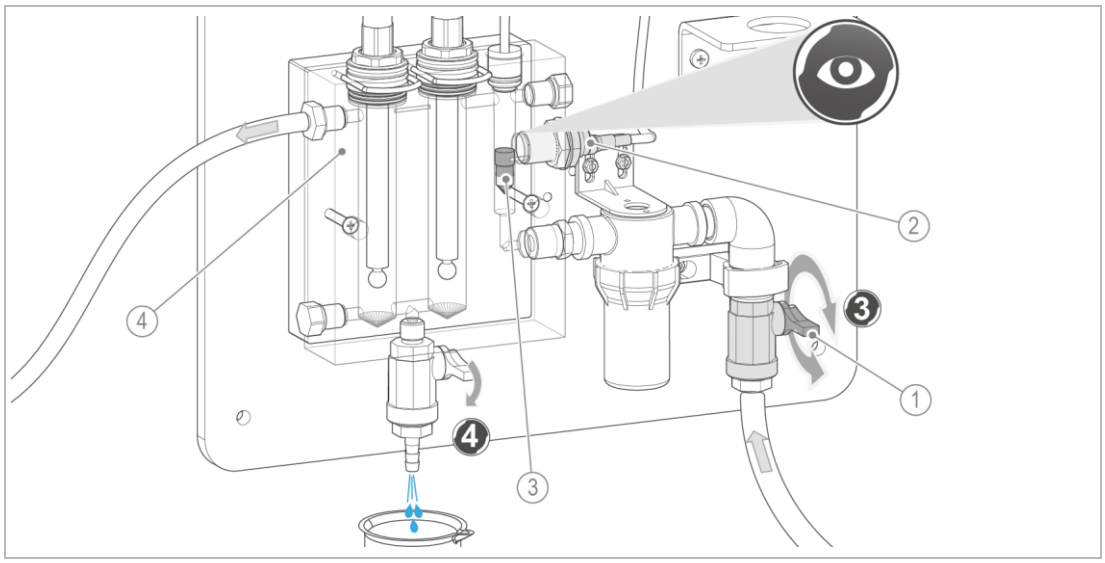
6.1.2 Soaking the electrodes

► Soak the pH and the Redox electrode for at least one hour to avoid falsification of the measured values during commissioning.

6.2 Switching on the system



1. Establish the voltage supply.
   a Plug in the mains plug.
2. Open the shut-off valves in the on-site lines.



	Designation		Designation
1	Shut-off valve Measuring water inlet	3	Float switch
2	Flow sensor	4	Flow fitting

3. Set the measuring water flow.
   a Set the flow adjusting valve on the measuring water inlet in such a way that the float switch is level with the flow sensor.
4. Vent the flow fitting.
5. Acknowledge fault messages present on the control unit.

6.3 Configuring the control unit

► Make general settings as well as system-dependent and customised settings (refer to chapters 7.4 and 7.5).

Making general settings

1. Setting the display: Darken after, brightness, …
   > Settings > Screen settings
2. Setting the time/date: > Configuration > System > Time/Date

Configuring the dosing systems (if necessary)

3. Determine the type of dosing for the freely configurable dosing systems:
   > Configuration > I/O configuration > Programmable inputs/outputs > Optional dosing > Flocculation dosing/pH dosing 2

Configuring the measuring inputs (analogue inputs) (if necessary)

4. Make the system-dependant settings for measuring inputs 1 and 2:
   > Configuration > I/O configuration > Programmable inputs/outputs > Allocation Measurement 1, Scaling Measurement 1, Allocation Measurement 2, Scaling Measurement 2

Configuring the power outputs (analogue outputs) (if necessary)

5. Make the system-dependant settings for power outputs 1 to 4:
   > Configuration > I/O configuration > Programmable inputs/outputs > Power output 1, Power output 2, Power output 3, Power output 4

Configuring the optional modules/Options (if necessary)

6. Make the system-dependant settings:
   > Configuration > I/O configuration > Optional modules > Refill/Empty signal, Filter control unit
   (also refer to chapter 8.5)

Configuring the Modbus

7. Make the system-dependant and/or customised settings, if necessary:
   > Configuration > Modbus
   (also refer to chapter 8.4)

Configuring the network

8. Make the system-dependant and/or customised settings, if necessary:
   > Configuration > Network settings
   (also refer to chapter 8.1)

Configuring the web server

9. Make the system-dependant and/or customised settings, if necessary:
   > Configuration > Web server
   (also refer to chapter 8.3)

Configuring Emailing

10. Make the system-dependant and/or customised settings, if necessary:
    > Configuration > Email

Configuring the cloud connection

11. Make the system-dependant and/or customised settings, if necessary:
    > Configuration > APP
    (also refer to chapter 8.2)

Setting the pH and disinfection dosing

12. Make the system-dependant settings for the pH and disinfection dosing:
    > Settings > Dosing > pH dosing 1 / Disinfection dosing

Setting the flocculation dosing (if available)

13. Make the system-dependant settings:
    > Settings > Dosing > Flocculation dosing

Setting the setpoint and limit values

14. Enter the desired setpoint values for pH, Redox, disinfection and temperature:
    > Settings > Setpoint values
15. Enter the desired limit values for pH, Redox, disinfection and measuring water flow:
    > Settings > Limit values

6.4 Putting the system into operation

1. Put the circulation of the filter system into operation before putting the measuring and control system into operation.
   a Determine the time from the filter system's switch-on to a stable flow in the measuring chamber.
   b Based on this time, set the delay for the control.
   > Settings > Dosing > Delay time Release Control
2. Compare the temperature measurement of the measuring water with a calibrated hand-held measuring device.
   c Set an offset for the measuring water temperature, if necessary.
   > Operation > Readjustment > Measuring water temperature offset
3. Calibrate of the pH measurement (refer to chapter 7.4).
   > pH
4. Switch on the measuring and control system in the control unit.
   > Operation > System > ON
5. Switch on the pH dosing in the control unit.
   > Operation > pH dosing 1 > ON
6. When using an additional pH dosing, switch it on in the control unit.
   > Operation > pH dosing 2 > ON
7. Wait until the desired pH value in the pool is reached.

For the calibration of the Redox electrode, the ideal pH value of 7.2 is very important.

In order to achieve exact results for the measured values, the pH value should at least be in the range of 7.0 - 7.4 prior to the calibration of the Redox electrode.

8. Calibrate the Redox measurement and check it (refer to chapter 7.4).
   > Rx

9. Switch on the flocculation dosing (if present).
   > Operation > Flocculation dosing > ON
10. Switch on the disinfection dosing at the control unit.
    > Operation > Disinfection dosing > ON

Until the desired disinfection value has established in the pool, said value must be monitored by manual measurements at regular intervals.

11. Wait until the desired chlorine or bromine setpoint in the pool is reached.
12. Determine the value according to which the disinfection is to be regulated (refer to chapter 6.4.1)

6.4.1 Setting the control mode for the disinfection

There are two ways to control the disinfection.

- Control via disinfection value (calculated from pH value and Redox value)
- Substitute control via Redox value

As standard, the system is regulated via the disinfection value.

Control via disinfection value (disinfection setpoint)

► When the desired disinfection value (desired chlorine or bromine value) in the pool is reached, recalibrate it.
> Operation > Calibration > Manual calibration > Disinfection Transcond. Meas. value

Disinfection control via Redox value (Redox setpoint)

1. When the desired disinfection value (desired chlorine or bromine value) in the pool is reached, switch to Redox substitute control.
   > Settings > Dosing > Redox substitute control > ON

» The Disinfection setpoint is now inactive. The system controls the disinfection dosing according to the Redox setpoint.

2. Accept the current Redox value as setpoint.
   > Settings > Setpoint > Redox setpoint
3. Adjust the limit values for the Redox value, if necessary.
   > Settings > Limit values > Redox

6.5 Handing over the product to the owner/operator/operating company

6.5.1 Logging commissioning

In the beginning, the water values (pH, Redox, temperature, chlorine or bromine values) should be checked daily by means of manual measurement.

We recommend calibrating the pH and Redox electrodes again 24 to 48 hours after commissioning.

4. Check all settings.
5. Check the entire system for leaks during the operation.
6. Check the system and the accessories for proper function.
7. Enter the contact data for the customer.
   > Contact
8. Make a system data printout.
   > Service > System data > Printout > Create
9. Complete commissioning.
10. Fill in the commissioning log (refer to chapter 14).

6.5.2 Briefing the owner/operator/operating company

After commissioning, the responsibility regarding the safety and functionality of the system is completely transferred to the owner/operator/operating company until the next maintenance.

Carry out the points below together with the owner/operator/operating company.

- ► Explain to the owner/operator/operating company how the system works.
- ► Use the manual to brief the owner/operator/operating company and answer any questions.
- ► Inform the owner/operator/operating company about the need for inspections and maintenance.
  - **a** Brief the owner/operator/operating company on the proper check and calibration of the electrodes.

► Hand over all documents to the owner/operator/operating company for keeping.

6.5.3 Disposal of packaging

► Dispose of packaging material as soon as it is no longer needed (refer to chapter 12.3).

6.5.4 Storage of accessories

► Store accessories, spare parts and consumables in a safe place which is inaccessible to third parties.

► Make sure that required spare parts and consumables are available and reordered in good time (refer to chapters 9.7 and 9.8).

7 Operation

DANGER No circulation in the filtrate pipe of the pool water circuit.

- Formation of chlorine gas when dosing sulphuric acid (GENO-minus N) and sodium hypochlorite (GENO-Chlor A) in the area of the dosing points.

► Make sure that the dosing of chemicals is stopped by the measuring and control system if there is no circulation.

► Use suitable safety devices such as a flow controller.

► Do not override safety functions manually, e.g. do not supply dosing pumps via other socket outlets.

WARNING Overdosing in case of voltage failure (functional failure of actuator, chemical dosing system)

- Eye irritation, irritation of the respiratory tract due to the concentration of disinfectants in the pool water being too high

► After a voltage failure, check the disinfection value prior to using the pool water.

CAUTION Malfunction due to unauthorised access

- Eye irritation, irritation of the respiratory tract, skin irritations due to malfunctions and incorrect dosing

► Protect your on-site network against unauthorised access.

► Make sure that unauthorised persons do not have any access to the system.

CAUTION Risk of slipping at the sampling points

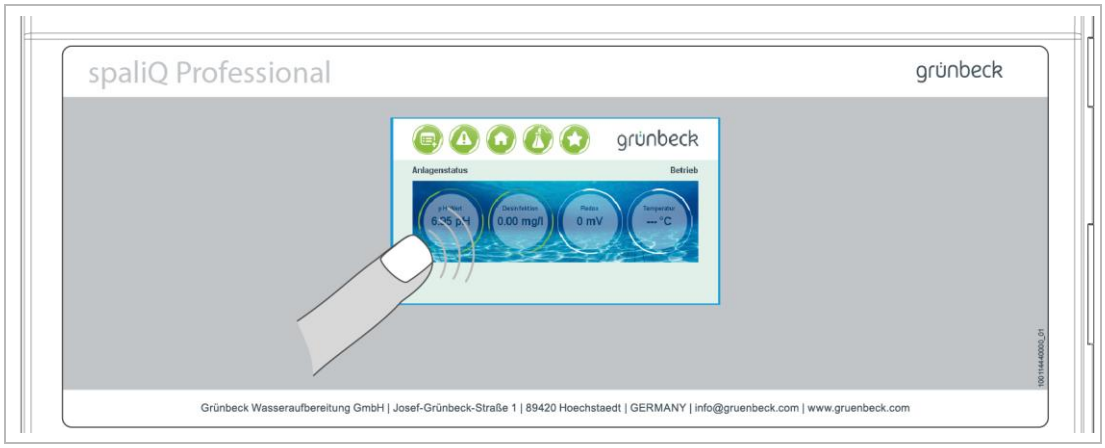
- Injuries resulting from falls

► Use personal protective equipment – wear sturdy shoes.

► Immediately mop up escaped liquids.

7.1 Operating concept

Settings on the control unit are made via a 4.3" touchscreen.



► Operate the control objects by touching them with your finger.

NOTE Operating the touchscreen with hard objects

- Damage to the touchscreen surface

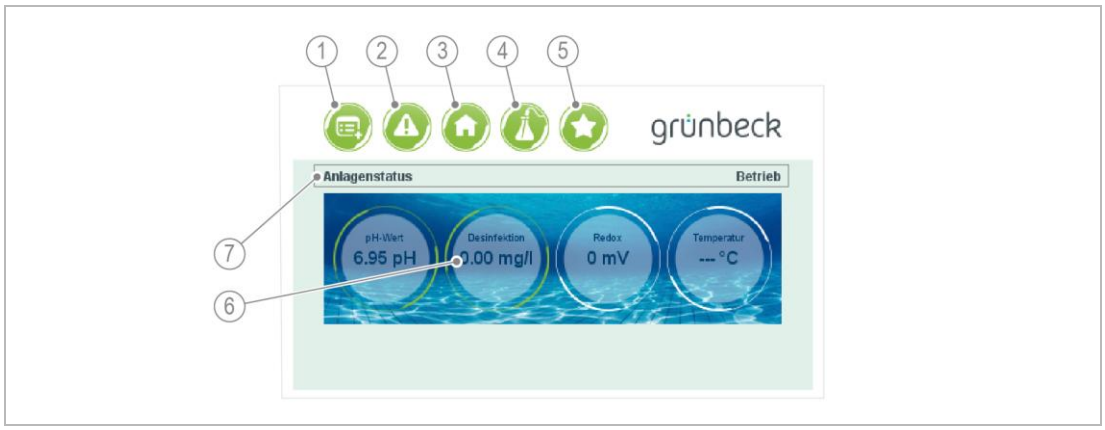
► Only operate the touchscreen with your fingers or soft objects.

► Do not use any hard objects such as a ball pen, for instance.

7.1.1 Display

Basic display

The basic display provides information on the current system state and on the water values currently measured.



	Designation	Button	Meaning/Function
1	**Menu**		The menu features the menu items operation, settings, configuration and service.

	Designation	Button	Meaning/Function	
2	**Messages**		This submenu contains all Info messages and active messages.	
3	**Home**		Pressing the Home button returns you to the basic display at any time.	
4	**Calibration**		With this button, you can start a calibration.	
5	**Quick access**		Here, you will find functions such as high chlorination, economy operation, partial load operation, archiving and the operating options for a filter control unit.	
6	**Current water parameters**		Here, you can read the current water parameters.	
			Green border	Regulation in progress in order to reach the desired setpoint
			White border	Currently no regulation in progress
7	**System status**		Here, you can read the current operating state of the system (refer to chapter 7.1.3).	

7.1.2 Menu structure

In the  menu, you can call up the sections below:

Menu item	Content	Example
Operation	Control of functions during daily operation	• Switching the system ON/OFF • Switching the dosing systems ON/OFF • Selecting the operating modes (e.g. partial load operation) • Archiving • Readjustment • Carrying out a calibration
Settings	Setting parameters for daily operation	• Setting the setpoints/limit values • Setting the dosing system • User login • Screen settings
Configuration	Setting parameters to configure the measuring and control system to the overall system. Many settings are made during commissioning.	• System • Input/output configuration • Configuring the Modbus • Network settings • Configuring the web server • Configuring emailing • Configuring the app
Service	Manly informative level for service purposes	• Software version • Change history • System data • Operating data • Maintenance • Basic settings

7.1.3 Operation

You can navigate through the touchscreen by tapping the desired buttons, fields or values.

Navigating in the control unit

The control elements below allow you to navigate through the different levels of control.

Symbol	Designation	Meaning/Function
	Previous page	Move to the previous page
	Next page	Move to the next page
	Back	Return to the last setting level or cancel the action
	OK button	Confirmation of an entry

If a selected menu item contains several pages with fields or values, this is indicated by arrow keys.

If it is possible to change to the previous or next page, the arrow key is visible.

	Designation
1	Previous page

	Designation
2	Next page

1. Tap the arrow key .
   » Display changes to the previous page.
2. Tap the arrow key .
   » Display changes to the next page.

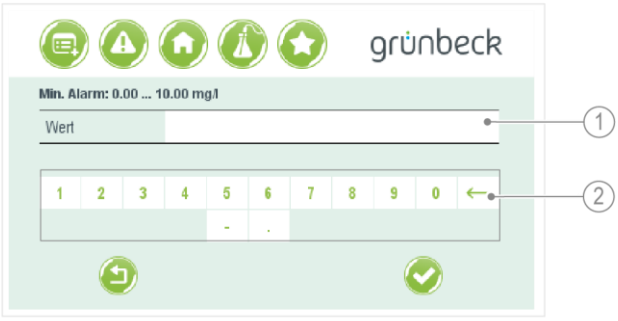
Executing an action

► Tap on the button or the desired field with your finger – for example on the button Messages.

» The corresponding menu opens.

» Here you can acknowledge a current message.

Entering numerical values



	Designation		Designation
1	Input range of the numerical value	2	Number field

1. Briefly tap on the numerical value.

» An input window opens.

2. Enter the numerical value.

3. Confirm with ✓.

» The input window closes.

7.1.4 Authorisation levels

For the settings of the measuring and control system, there are 4 different authorisation levels.

In the following chapters, these are shown in column C.

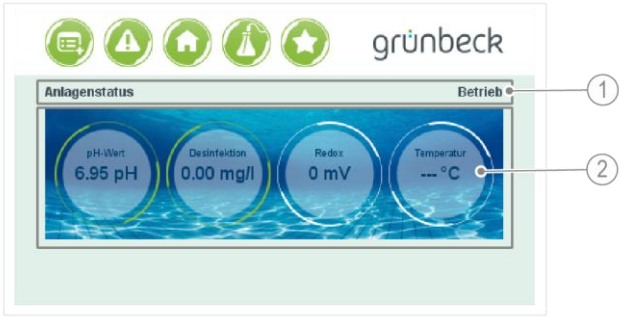
Code level (C)	Designation	Code	Comments
0	Not logged in	–	Reading rights only
1	User level	005	For user/owner/operator/operating company
2	Configuration level		For qualified specialists only
3	Technical service level		For technical service only
4	Factory settings		For technical service only

If a menu item is called up which requires a certain authorisation level, a window appears where the Code can be entered.

► Log in.

» The control unit remains in this authorisation level for a preset time. The time until the automatic logout takes place can be set under > Settings > user login.

7.2 Retrieving information



	Designation		Designation
1	Information on the system status	2	Information on water parameters

System status

System state	Explanation
Operation	The system is in normal operation and controls according to the setpoints pH, disinfection or Redox and temperature.
High chlorination	The system currently carries out a high chlorination and controls according to the Desinfection setpoint High chlorination.
Economy operation	The system is in normal operation and controls according to the Disinfection setpoint Economy operation.
Partial load operation	The system is in partial load operation and is regulated according to the Disinfection setpoint Partial load operation and the Flocculation setpoint Partial load operation. The voltage-free output Partial load operation is switched.
Locked	The system is locked.
OFF	The system is switched off.

Water parameters

System state	Explanation
pH	Indication of the pH value
Disinfection	Indication of the disinfection value in mg/l
Redox	Indication of the Redox value in mV
Temperature	Indication of the water temperature in °C
Room temperature*	Indication of the room temperature in °C
Humidity of air*	Indication of humidity of air in %

* Can only be indicated if the accessory hygro thermo transmitter transmits these values.

7.3 Setting the operating mode

> Operation

Level 1	Level 2	Level 3	Settings	C	Description/comment
System			**OFF**	1	
			ON		
Disinfection dosing			**OFF**	1	
			ON		
pH dosing 1			**OFF**	1	
			ON		
Flocculation dosing			**OFF**	1	(visible subject to configuration)
			ON		
pH dosing 2			**OFF**	1	(visible subject to configuration)
			ON		
High chlorination	Status		**OFF**	1	Manual activation or activation via bus
			ON		
			Bus		
	Disinfection setpoint		0.00…10.00 mg/l (**2.00**)	1	High chlorination take place until this setpoint is reached
	Duration		0…1440 min (**10**)	1	Duration of how long the setpoint is to be maintained
	Start time		HH:MM (**0:00**)	1	Time for activation (at 00:00 the time is ignored)
Economy operation	Status		**OFF**	1	Manual activation of economy operation or activation via bus
			ON		
			Bus		
	Disinfection setpoint		0.00…10.00 mg/l (**0.30**)	1	Disinfection dosing takes place until the setpoint is reached
	Start time		HH:MM (**0:00**)	1	Economy operation is enabled during for this time period If the end time is before the start time, economy mode is activated from 00:00 to the end time and from the start time to 24:00. If start and end time are identical, the “economy operation” is disabled.
	End time		HH:MM (**0:00**)	1	
Partial load operation	Status		**OFF**	1	Manual enabling of partial load operation or activation via BUS or external contact (terminal 40/41)
			ON		
			Externally		
			Bus		
	Timer	Status	**No**	1	Partial load operation is enabled during for this time period If the end time is before the start time, economy mode is activated from 00:00 to the end time and from the start time to 24:00. If start and end time are identical, partial load operation is disabled.
			Yes		
		Start time	HH:MM (**0:00**)		
		End time	HH:MM (**0:00**)		
	Hygiene parameters		**OFF**	1	

Level 1	Level 2	Level 3	Settings	C	Description/comment
			ON		The partial load operation will only be released if the parameters of the water quality are within the ranges below: • Chlorine 0.3 – 0.6 • pH 6.5 – 7.6 • Redox > 700 If the values deviate from these ranges, a switch-over to standard operation takes place until the values are reached again.
	Disinfection setpoint		0.00…10.00 mg/l (**0.40**)	1	Setpoint for partial load operation
	Flocculation setpoint		0.00…10.00 mg/l (**0.40**)	1	Setpoint for partial load operation
Archiving	Status		**ON**	1	
			OFF		
	Cycle time		0...9999 s (**60**)	1	Archiving cycle
Readjustment	Measured pH value		**0.00**...14.00	1	Refer to chapter 9.4
	pH sample		**0.00**...14.00	1	
	Measured disinfection value		**0.00**…10.00 mg/l	1	
	Disinfection sample		**0.00**…10.00 mg/l	1	
	Measuring water temperature offset		-5.0...+5.0 °C (**0.0**)	1	
	Room temperature offset		-5.0...+5.0 °C (**0.0**)	1	
	Humidity offset		-10...+10 % (**0**)	1	
Calibration	Guided calibration	Start			Refer to chapter 7.7
	Manual calibration	pH calibration solution 1	4.00 / 7.00 / 9.00		Refer to chapter 9.5
		Measured pH value 1	Accept measured value		
		pH calibration solution 2	4.00 / **7.00** / 9.00		
		Measured pH value 2	Accept measured value		
		Redox calibration solution	430 / **475** mV		
		Measured Redox value	Accept measured value		
		Disinfection Transcond. Actual value	0.00…10.00 mg/l (**0.30**)		
		Disinfection Transcond. Meas. value	0.00…10.00 mg/l (**0.30**)		

7.4 Making settings

You, as the user/owner/operator/operating company, can set the settings assigned to code 0 and 1 yourself.

The settings assigned to codes 2, 3 and 4 must only be made by qualified specialists and technical service personnel.

> Settings

Setting the setpoints

Level 1	Level 2	Level 3	Settings	C	Description/comment
pH setpoint value			0.00...13.00 pH (**7.20**)	1	Setpoints for the regulation of the water temperature
Disinfection setpoint			0.00...10.00 mg/l (**0.50**)	1	
Redox setpoint			0...1300 mV (**760**)	1	
Redox setpoint, GW1			0...1300 mV (**660**)	1	If the value is undershot, the “Redox GW1/GW2” output is set
Redox setpoint, GW2			0...1300 mV (**760**)	1	If the value is exceeded, the “Redox GW1/GW2” output is reset
Temperature setpoint			0...40 °C (**30**)	1	Setpoint for the regulation of the water temperature; temperature compensation must be activated

Setting the limit values

Level 1	Level 2	Settings	C	Description/comment
pH value	Min. alarm	0.00...14.00 pH (**6.80**)	1	Limit values from which a fault message is activated when exceeded or undershot The delay time determines how long the monitoring input can be open/closed until a fault is activated)
	Max. alarm	0.00...14.00 pH (**7.80**)	1	
	Delay time	0...120 min (**30**)	1	
Disinfection	Min. alarm	0.00...10.00 mg/l (**0.00**)	1	
	Max. alarm	0.00...10.00 mg/l (**1.00**)	1	
	Delay time	0...120 min (**30**)	1	
Redox	Min. alarm	0...1300 mV (**500**)	1	
	Max. alarm	0...1300 mV (**1000**)	1	
	Delay time	0...120 min (**30**)	1	
Measuring water flow	Monitoring	**ON**	1	
		OFF		Delay time only for the deactivation, activating again is applies for the time release control
	Delay time	0...300 s (**5**)	1	

Setting the dosing system

Level 1	Level 2	Level 3	Settings	C	Description/comment
pH dosing 1	Dosing system		**Dosing pump**	2	
			Pulse pump		
	Max. pulse frequency		20...120 (**100**)	2	Pulse frequency that corresponds to an actuating variable of the controller of 100 % (visible with pulse pump)

Level 1	Level 2	Level 3	Settings	C	Description/comment
	Pulse period		20...1800 s (**60**)	2	Time that corresponds to an actuating variable of the controller of 100 %. (visible with dosing pump)
	Response time		0...300 s (**0**)	2	Time from activation of the dosing system to actual dosing (visible with dosing pump)
	Basic dosing		0...30 % (**0**)	2	Dosing system doses at least the set base load - irrespective of the control system
	Alarm lock		**OFF**	2	In the event of an alarm, dosing is locked
			ON		
	Control direction		**Acid**	2	Type of dosing agent (increase or reduction of pH value)
			Base		
	Proportional range		0.00...1.00 (**0.50**)	2	Here, the range within which the dosing pump doses from 0 to 100 % of the maximum capacity.
	Readjustment time		0...3600 s (**0**)	2	Here, the readjustment time is set, by which the dosing capacity of the pump can continuously be increased – while the control deviation remains unchanged – until the setpoint or 100 % of the capacity is reached.
	Temperature compensation		**OFF**	2	Analysis of the measurement with/without temperature compensation (must be activated for heating on site)
			ON		
	Fault input		**Fault message**	2	Function of fault input
			Refill signal		
	Dosing time monitoring		0...999 min (**60**)	2	Time for how long the dosing system may receive control release until a fault message becomes active. The value “0” disables the monitoring.
Disinfection dosing	Dosing system		**Dosing pump**	2	
			Pulse pump		
			Actuator		
	Max. pulse frequency		20...120 (**100**)	2	
	Testing actuator	Actuator	**Auto**	2	
			Open		
			Closed		
		Current position	0...100 % (100)	2	
		Required closing time	20...1800 s (**60**)	2	
	Pulse period		20...1800 s (**60**)	2	
	Response time		**0**...300 s	2	
	Basic dosing		**0**...30 %	2	
	Alarm lock		**OFF**	2	
			ON		
	Control direction		**Up**	2	
			Down		
	Proportional range		0.00...0.1 (**0.02**)	2	
	Readjustment time		**0**...3600 s	2	
	pH correction		**ON**	2	

Level 1	Level 2	Level 3	Settings	C	Description/comment
			OFF		
	Chlorine trans-conductance		0.00...1.00 (**0.20**)	2	
	Chlorine/pH offset		-500...+500 (**0**)	2	
	Fault input		**Fault message**	2	
			Refill signal		
	Dosing time monitoring		0...999 min (**60**)	2	
Flocculation dosing	Dosing system		**Dosing pump**	2	
			Pulse pump		
	Pulse sequence		0...120 (**100**)	2	
	Fault input		**Fault message**	2	
			Refill signal		
pH dosing 2	Dosing system		**Dosing pump**	2	Refer to description of parameter pH dosing 1
			Pulse pump	2	
	Max. pulse frequency		20...120 (**100**)	2	
	Pulse period		20...1800 s (**60**)	2	
	Response time		0...300 s (**0**)	2	
	Basic dosing		**0...**30 %	2	
	Alarm lock		**OFF**	2	
			ON	2	
	Control direction		**Acid**	2	
			Base	2	
	Readjustment time		**0**...3600 s	2	
	Fault input		**Fault message**	2	
			Refill signal	2	
	Dosing time monitoring		0...999 min (**60**)	2	
Redox substitute control			**OFF**	2	
			ON		
Delay time for Release control			0...120 (**1**)	2	

7.5 Configuring the system

You, as the user/owner/operator/operating company, can set the settings assigned to code 0 and 1 yourself.

The settings assigned to codes 2, 3 and 4 must only be made by qualified specialists and technical service personnel.

System

> Configuration > System

Level 1	Level 2	Settings	C
Time / date	Date	DD.MM.YYYY **(01.01.2021)**	1
	Time	HH:MM:SS **(00:00:00)**	1
	DST changeover	**Yes**	1
		No	

Level 1	Level 2	Settings	C
	Obtain automatically (NTP)	**Yes**	1
		No	
	Continent	**Europe**	1
		Asia	
		Africa	
		North America	
		South America	
		Antarctica	
		Australia	
	Time zone	UTC +/- HH:MM	1
	URL NTP server	1.europe.pool.ntp.org	1
Language		**German**	1
		English	
		French	
		Italian	
		Spanish	
		Russian	
Licenses	Licence information	**Read**	1
	Licence contract	**Save**	1

I / O configuration

> Configuration > I/O configuration

Level 1	Level 2	Level 3	Settings	C
Input logic	Measuring water flow input		**Normally open contact**	2
			Normally closed contact	
	Filtrate flow input		**Normally open contact**	2
			Normally closed contact	
	Disinfection dosing input		**Normally open contact**	2
			Normally closed contact	
	pH dosing input		**Normally open contact**	2
			Normally closed contact	
	Flocculation dosing input or pH dosing 2		**Normally open contact**	2
			Normally closed contact	
	Flushing input		**Normally open contact**	2
			Normally closed contact	
	Partial load input		**Normally open contact**	2
			Normally closed contact	
I / O diagnosis	Measuring water flow input		0 /1	2
	Filtrate flow input		0 /1	2
	Disinfection dosing input		0 /1	2
	pH dosing 1 input		0 /1	2
	Flocculation dosing input or pH dosing 2 input		0 /1	2
	Flushing input		0 /1	2
	Partial load input		0 /1	2
	Disinfection output closed		0 /1	2
	Disinfection output open		0 /1	2
	Disinfection output open		0 /1	2
	pH dosing 1 output		0 /1	2
	Flocculation dosing output or pH dosing 2		0 /1	2
	Collective fault signal output		0 /1	2
	Partial load output		0 /1	2
	Heating output		0 /1	2

Level 1	Level 2	Level 3	Settings	C
	Redox GW1, GW2 output		0 /1	2
	Disinfection dosing PP output		0 /1	2
	pH dosing 1 PP output		0 /1	2
	Flocculation dosing PP output or pH dosing 2 PP		0 /1	2
Programmable inputs/outputs	Optional dosing		**Flocculation dosing**	2
			pH dosing 2	
	Meas. 1 allocation		**None**	2
			Room temperature	
			Humidity of air	
	Meas. 1 scaling	4 mA	**0.0**...50.0 °C	2
			0…100 %	2
		20 mA	0.0...**50.0** °C	2
			0… **100**%	2
	Meas. 2 allocation		**None**	2
			Room temperature	
			Humidity of air	
	Meas. 2 scaling	4 mA	**0.0**...50.0 °C	2
			0…100 %	2
		20 mA	0.0...**50.0** °C	2
			0… **100**%	2
	Power output 1	Allocation	**Disinfection**	2
			pH value	
			Redox	
			Measuring water temperature	
		Lower limit	**0.00**…10.00 mg/l	2
		Upper limit	0.00...10.00 mg/l **(02.00)**	2
		Range	4-20 mA **(0-20)**	2
	Power output 2	Allocation	**pH value**	2
			Redox	
			Measuring water temperature	
			Disinfection	
		Lower limit	0.00...14.00 pH **(4.00)**	2
		Upper limit	0.00...14.00 pH **(10.00)**	2
		Range	4-20 mA **(0-20)**	2
	Power output 3	Allocation	**Redox**	2
			Measuring water temperature	
			Disinfection	
			pH value	
		Lower limit	**0**...1300 mV	2
		Upper limit	0...1300 mV **(1000)**	2
		Range	4-20 mA **(0-20)**	2
	Power output 4	Allocation	**Measuring water temperature**	2
			Disinfection	
			pH value	
			Redox	
		Lower limit	**0.0**...50.0 °C	2
		Upper limit	0.0...**50.0** °C	2
		Range	4-20 mA **(0-20)**	2
Optional modules	Refill/empty signal		**OFF**	2
			ON	
	Filter controller		**None**	2
			BW-tronic	

Modbus

> Configuration > Modbus

Level 2	Level 3	Level 4	Settings	C
Controlled via			**Modbus RTU**	1
			Modbus TCP/IP	
Modbus RTU configuration	Address		**1**...127	1
	Baud rate		**19200 bits**	1
			1200 bits	
			2400 bits	
			4800 bits	
			9600 bits	
	Parity		**Even**	1
			None	
			Odd	
	Data bits		**8 bits**	1
	Stop bits		**1**	1
			2	
Modbus TCP/IP configuration	Port		500...65535 (**502**)	1

Network settings

> Configuration > Network settings

Level 1	Level 2	Settings	C
LAN configuration	Using DHCP	**No**	1
		Yes	
	MAC address	**00:00:00:00:00:00**	1
		00…ff,00…ff,00…ff,00…ff,00…ff,00…ff	
	IP address	**0.0.0.0**	1
		0...255.0...255.0...255.0...255	
	Network mask	**0.0.0.0**	1
		0...255.0...255.0...255.0...255	
	Gateway	**0.0.0.0**	1
		0...255.0...255.0...255.0...255	
	DNS	**0.0.0.0**	1
		0...255.0...255.0...255.0...255	

Web server

> Configuration > Web server

Level 1	Settings	C
Activated	**No**	1
	Yes	
Password	**20 digits (0-9/A-Z/a-z/special)**	1

Email

> Configuration > Email

Level 1	Level 2	Level 3	Settings	C
Connection parameters	Mail server		**40 digits (0-9/A-Z/a-z/special)**	1
	IP address		**0.0.0.0**	1
			0...255.0...255.0...255.0...255	
	User name		**40 digits (0-9/A-Z/a-z/special)**	1
	Password		**20 digits (0-9/A-Z/a-z/special)**	1
	Sender address		**40 digits (0-9/A-Z/a-z/special)**	1
	Port		**0**...65535	1
	Encryption		**Unencrypted**	1
			StartTLS	
	Sending test email		**Send**	1
Recipient 1	Email dispatch	in the event of a malfunction	**No**	1
			Yes	
		monthly	**No**	1
			Yes	
	Address		**40 digits (0-9/A-Z/a-z/special)**	1
	Data attachment		**No**	1
			Yes	
Recipient 2	Email dispatch	in the event of a malfunction	**No**	1
			Yes	
		monthly	**No**	1
			Yes	
	Address		**40 digits (0-9/A-Z/a-z/special)**	1
	Data attachment		**No**	1
			Yes	
Recipient 3	Email dispatch	in the event of a malfunction	**No**	1
			Yes	
		monthly	**No**	1
			Yes	
	Address		**40 digits (0-9/A-Z/a-z/special)**	1
	Data attachment		**No**	1
			Yes	
Recipient 4	Email dispatch	in the event of a malfunction	**No**	1
			Yes	
		monthly	**No**	1
			Yes	
	Address		**40 digits (0-9/A-Z/a-z/special)**	1
	Data attachment		**No**	1
			Yes	
Recipient 5	Email dispatch	in the event of a malfunction	**No**	1
			Yes	
		monthly	**No**	1
			Yes	
	Address		**40 digits (0-9/A-Z/a-z/special)**	1
	Data attachment		**No**	1
			Yes	
System information	System designation		**10 digits (0-9/A-Z/a-z/special)**	1
	System postal code		**10 digits (0-9/A-Z/a-z/special)**	1
	System location		**20 digits (0-9/A-Z/a-z/special)**	1
	Name of on-site support		**20 digits (0-9/A-Z/a-z/special)**	1
	Tel. no. of on-site support		**20 digits (0-9/special)**	1
	Project number		**20 digits (0-9/A-Z/a-z/special)**	1

Due to the policies of some email providers (e.g. Gmail, Yahoo), it is no longer possible to send emails to the addresses of these providers.

However, it is still possible to send emails to private or company mail servers with your own domain.

► If necessary, contact the IT support of your company or provider.

APP

> Configuration > APP

Level 1	Level 2	Settings	C
Connection to the Cloud	Activate	**No**	1
		Yes	1
	Status	Not connected	
		Connected	
	Data protection policy	**Read**	1
Pairing with APP		**Start**	1
		10:00…00:00 (mm:ss)	
URL Cloud		gruenbeckeu01.azure-devices.net	
		40 digits (0-9/A-Z/a-z/special)	
URL certificate		prodeugruenbeckfirmware.blob.core.windows.net/cert	
		60 digits (0-9/A-Z/a-z/special)	

7.6 Retrieving service information

The settings described here must be made by qualified specialists and by technical service personnel only.

> Service

Level 1	Level 2	Level 3	Settings	C
Software version			**V….**	
Change history	Last 50 changes		**Display**	
	Save		**Save**	1
	Delete		**Delete**	2
System data	Printout		**Create**	1
	Setting parameters		**Save**	1
	Setting parameters		**Load**	2
Operating data	System operating hours		**0...999999 h**	3
			Reset	
	Operating hours pH dosing 1		**0...999999 h**	3
			Reset	
	Operating hours Disinfection dosing		**0...999999 h**	3
			Reset	
	Operating hours Flocculation dosing or pH dosing 2		**0...999999 h**	3
			Reset	
	Last power failure		**DD.MM.YY / HH:MM**	
	Current pH calibration	Date/time	**---**	

Level 1	Level 2	Level 3	Settings	C
			DD.MM.YY / HH:MM	
		pH value 1	**---**	
		pH value 2	**---**	
	Current disinfection calibration	Date/time	**---**	
			DD.MM.YY / HH:MM	
		Value	**---**	
	Current Redox calibration	Date/time	**---**	
			DD.MM.YY / HH:MM	
		Value	**---**	
Maintenance	System maintenance	Maintenance interval	**0**...999 T	2
		Reset maintenance	**No**	2
			Yes	
	Maintenance pH dosing 1	Maintenance request	**Days**	2
			Operating hours	
		Maintenance interval	**0**...999 T	2
		Maintenance interval	**0**…30000 h	2
		Reset maintenance	**No**	2
			Yes	
	Maintenance Disinfection dosing	Maintenance request	**Days**	2
			Operating hours	
		Maintenance interval	**0**...999 T	2
		Maintenance interval	**0**…30000 h	2
		Reset maintenance	**No**	2
			Yes	
	Maintenance Flocculation dosing or pH dosing 2	Maintenance request	**Days**	2
			Operating hours	
		Maintenance interval	**0**...999 T	2
		Maintenance interval	**0**…30000 h	2
		Reset maintenance	**No**	2
			Yes	
Basic settings	Reset		**No**	4
			Yes	

7.7 Performing a calibration

When calibrating the pH and Redox electrodes, place them in calibration solutions and compare the measured value with the values of the calibration solution.

When calibrating the disinfection measurement, the value to be set is determined by means of a test device and a water sample.

The offset values of an alternative measurement can be entered for the water temperature, room temperature and air humidity.

The measuring and control system provides 2 options for performing a calibration.

- Guided calibration with step-by-step instructions on the display
- Manual calibration without instructions on the display

NOTE Skin contact with electrodes

- Mismeasurements, incorrect dosing and failure of components

► Handle the electrodes with care

► Avoid any skin contact with the measuring areas, e.g. the membrane glass

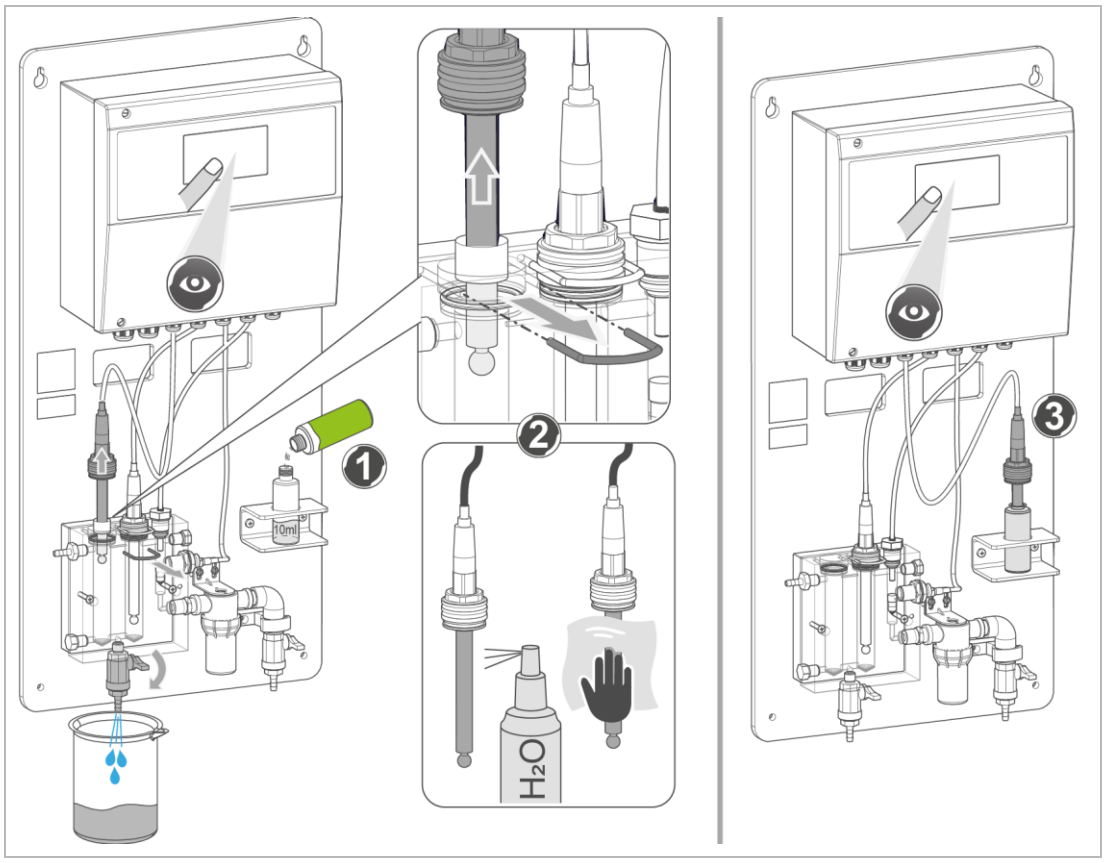
In order to prevent measuring errors during checking and calibration, the respective electrode must be cleaned and rinsed with deionised water before every check.

Damaged or slow electrodes must be replaced.

To check and calibrate the pH electrode and the Redox electrode, you need the utensils below:

- Deionised water in a spray bottle
- Calibration solution pH 7
- Calibration solution pH 9
- Calibration solution Redox 475 mV
- Round bottle to receive part of the calibration solution
- A soft cloth
- A collection vessel for escaping water

How to proceed using the example of Redox calibration



7.7.1 Guided pH calibration

With guided calibration, the user is guided through the calibration process step by step via the visualisation on the touchscreen.

1. Start the guided calibration
   or > Operation > Calibration > Guided calibration
2. For pH calibration, select pH.

Step 1

3. Have the pH 7 and pH 9 calibration solutions ready.
4. Close the on-site shut-off valves for the measuring water inlet and the measuring water recirculation.
5. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
6. Confirm with .

Step 2

7. Remove the pH electrode from the flow fitting.
   a Pull the plug-in clip of the electrode holder.

b Remove the electrode holder with the electrode from the flow fitting – use a screwdriver.

8. Rinse the glass shaft of the pH electrode with deionised water.
9. Carefully dry the glass shaft using a clean, soft cloth.
10. Immerse the pH electrode in the pH 7 calibration solution.
11. Confirm with ✓.

Step 3

12. Wait until the measured value has stabilised. This can take several minutes.
13. Confirm with ✓.

Step 4

14. Remove the electrode from the calibration solution.
15. Rinse the glass shaft of the pH electrode with deionised water.
16. Carefully dry the glass shaft using a clean, soft cloth.
17. Immerse the pH electrode in the pH 9 calibration solution.
18. Confirm with ✓.

Step 5

19. Wait until the measured value has stabilised.

    a Confirm with ✓.

» There are three possible results for the calibration.

✓	Calibration was successful. ► No further steps required.
⚠	Calibration was successful despite slight deviations. ► Clean the electrode and repeat the calibration.
⚠	Calibration was unsuccessful. The measured values are outside the tolerance range. ► Refer to chapter 10 for troubleshooting.

20. Confirm with ✓.

Step 6

21. Remove the electrode from the calibration solution.
22. Rinse the glass shaft of the pH electrode with deionised water.
23. Carefully dry the glass shaft using a clean, soft cloth.
24. After checking it, refit the pH electrode in the flow fitting.

    a Insert the electrode holder with the electrode into the flow fitting.

    b Secure the electrode holder using the plug-in clip.

25. Open the shut-off valves.
26. Confirm with .

7.7.2 Guided Redox calibration

1. Start the guided calibration.
   or > Operation > Calibration > Guided calibration
2. For Redox calibration, select Rx.

Step 1

3. Have the Redox 475 mV calibration solution ready.
4. Close the on-site shut-off valves for the measuring water inlet and the measuring water recirculation.
5. Confirm with .

Step 2

6. Remove the Redox electrode from the flow fitting.
   a Pull the plug-in clip of the electrode holder.
   b Remove the electrode holder with the electrode from the flow fitting – use a screwdriver.
7. Rinse the glass shaft of the Redox electrode with deionised water.
8. Carefully dry the glass shaft using a clean, soft cloth.
9. Immerse the Redox electrode into the REDOX 475 mV calibration solution .

Step 5

10. Wait until the measured value has stabilised.
    a Confirm with .

» There are three possible results for the calibration.

	Calibration was successful. ► No further steps required.
	Calibration was successful despite slight deviations. ► Clean the electrode and repeat the calibration.
	Calibration was unsuccessful. The measured values are outside the tolerance range. ► Refer to chapter 10 for troubleshooting.

11. Confirm with .

Step 6

12. Remove the electrode from the calibration solution.
13. Rinse the glass shaft of the Redox electrode with deionised water.
14. Carefully dry the glass shaft using a clean, soft cloth.
15. After checking it, refit the Redox electrode in the flow fitting.
    a. Insert the electrode holder with the electrode into the flow fitting.
    b. Secure the electrode holder using the plug-in clip.
16. Open the shut-off valves.

7.7.3 Manual calibration

For manual calibration, refer to refer 9.5

7.7.4 Finalising work after calibration

► Clean the round bottle after calibration.

NOTE Store the calibration solutions properly

- Contamination renders the calibration solutions unusable.

► After calibration, once again store the calibration solutions as prescribed (refer to chapter 4.3.1).

► Replace the calibration solution after the use-by-date has expired.

► Discard the calibration solution contained in the round bottle after the calibration has been completed.

8 Communication

The settings described here must be made by qualified specialists and by technical service personnel only.

The electrical connection of an interface must be carried out by a qualified electrician only.

DANGER Dangerous voltage in the switch cabinet

- Severe burns, cardiovascular failure, fatal electric shock

► Only have qualified electricians carry out electrical work on the system.

8.1 Connection to the router

1. Using a LAN cable, connect the measuring and control system spaliQ Professional to the router or switch.
2. Configure the LAN connection under:
   > Configuration > Network settings > LAN configuration
2. Confirm with or discard with .

8.2 Connection to the Grünbeck Cloud

8.2.1 General information

The use of the Grünbeck Cloud and app functionalities depends on the service availability of the required Azure services in the data centre region of the respective country. Geopolitical changes or restrictions in the respective country can limit or prevent the availability of the services of the data centre currently located in the EU.

In order to control the measuring and control system spaliQ Professional via a mobile device or to retrieve information on the measuring and control system spaliQ Professional, Grünbeck's myProduct app must be installed on the mobile device.

The connection between the measuring and control system spaliQ Professional and a mobile device (smartphone or tablet with android or iOS operating system) can only be established via the Grünbeck Cloud.

	Designation		Designation
1	Grünbeck product	3	Grünbeck Cloud
2	Router (customer network)	4	Mobile device

As soon as a user account has been created via Grünbeck's myProduct app and the anonymous data is assigned to your user account by pairing, the data is personalised as defined by the Data Protection Act.

8.2.2 Installing Grünbeck's myProduct app

Grünbeck's myProduct app is the link between your Grünbeck product and your mobile device. You can access your Grünbeck product all over the world.

3. Download Grünbeck's myProduct app and install it on your mobile device.
4. Create your personal user account.
3. Add your measuring and control system spaliQ Professional using +.
5. Follow the instructions of Grünbeck's myProduct app.

8.2.3 Activating the connection to the Grünbeck Cloud

1. Select > Configuration > APP > Set > Connection to Cloud > Set
2. Change Activate from NO to YES.
3. Confirm with or discard with .
4. Carefully read the privacy statement and confirm with or discard with .

» The connection is activated now. The measuring and control system spaliQ Professional now tries to establish a connection to the Cloud. This is displayed as Connected or Not connected in the Status field.

4. If the Status field displays Connected, the configuration has been completed successfully.

As soon as the connection to the Grünbeck Cloud has been allowed and a connection to the router has been established, the control unit cyclically sends anonymous data to the Grünbeck Cloud.

5. Select Pairing with app and press Start.

» As soon as the button Start is pressed, a 10-minute timer appears. During this time, the pairing can be carried out.

6. Confirm Connect device in Grünbeck's myProduct app.

» As soon as the Connect button is pressed, the text Successfully connected appears. You can now operate your measuring and control system spaliQ Professional via app.

If your measuring and control system spaliQ Professional is connected to your user account in the Grünbeck Cloud, you will be informed by email in the event of a malfunction (provided that email notification is enabled in the app).

8.3 Connection via web server

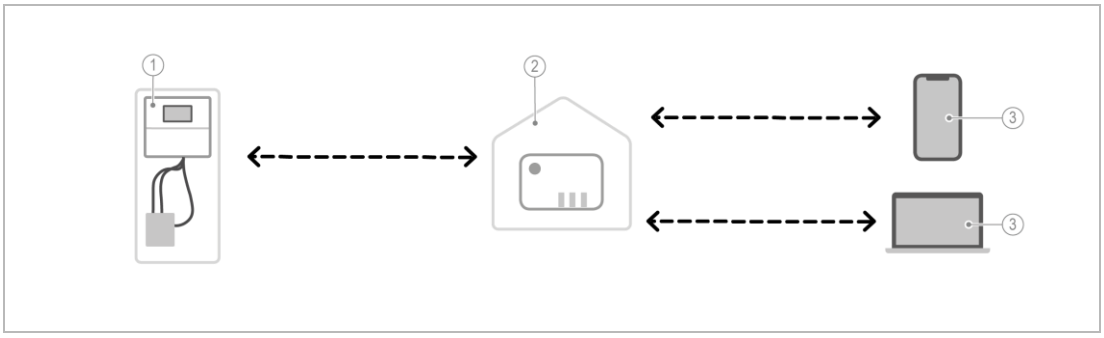
The measuring and control system spaliQ Professional can also be operated via a web browser-enabled device.

To do so, the measuring and control system spaliQ Professional must be connected to your router or switch (customer network) or modem, and an internet browser must be installed on the web browser-enabled device.

8.3.1 Connection options

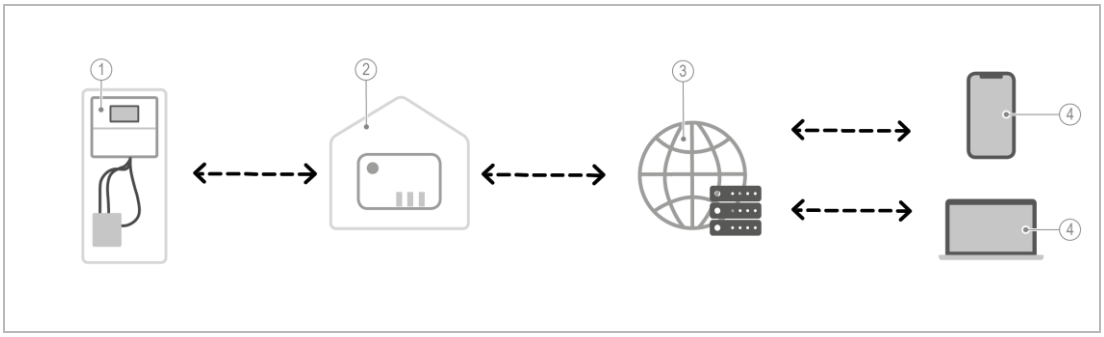
The connection between the measuring and control system spaliQ Professional and the web browser-enabled device can be made via the variants below:

Variant 1: Access within the customer network



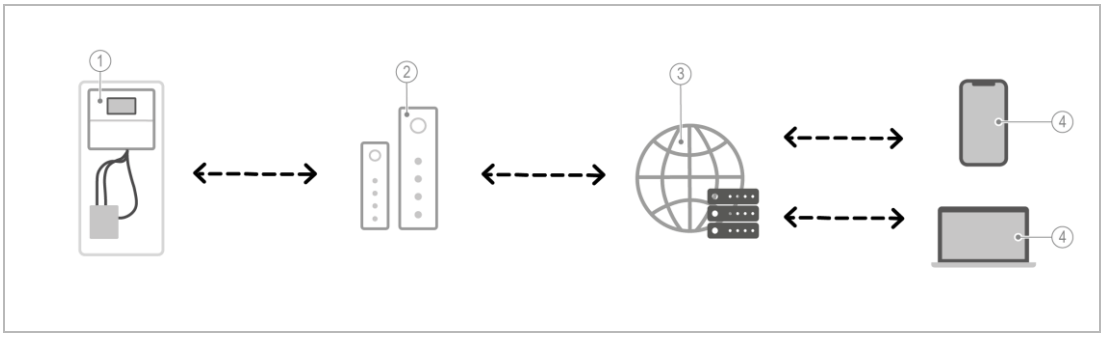
	Designation		Designation
1	Grünbeck product	3	Web browser-enabled device
2	Router (customer network)		

Variant 2: Access from outside the customer network



	Designation		Designation
1	Grünbeck product	3	Internet server
2	Router (customer network)	4	Web browser-enabled device

Variant 3: Access from outside via a separate modem



	Designation		Designation
1	Grünbeck product	3	Internet server
2	Modem	4	Web browser-enabled device

8.3.2 Enabling the web server

► Proceed as follows to activate the web server in the control unit.

1. Select > Configuration > Web server
2. Change Activate from NO to YES.
3. Confirm with or discard with .
4. Select Password and enter a password.
5. Confirm with or discard with .

» The web server is now activated, and a password was assigned.

8.3.3 Setting up web browser-enabled device

Your web browser-enabled device must be connected to your router (customer network) directly or via an internet server.

For a connection via web server, the IP address of the measuring and control system must be known. Therefore, use a static IP address for your measuring and control system spaliQ Professional. Otherwise - when the IP address is changed by the router (dynamic IP address) -, a new IP address must always be entered in the internet browser in order to connect to the measuring and control system spaliQ Professional.

► Set up your web browser-enabled device as follows:

1. Select > Configuration > Network settings > LAN configuration (also refer to chapter 7.5).
2. Write down the IP address or your measuring and control system spaliQ Professional
3. Open the internet browser with your web browser-enabled device.
4. Enter the IP address of your measuring and control system spaliQ Professional in the URL line.

» The website of the measuring and control system spaliQ Professional opens.

7. Enter the password from chapter 8.3.2 you assigned and press the login button.

» You can now operate the measuring and control system spaliQ Professional with your web browser-enabled device by selecting the tab Remote access.

You can save the website as a favourite/bookmark, so that you can access the measuring and control system spaliQ Professional more quickly in future.

The menu of the measuring and control system spaliQ Professional is mirrored 1:1 under the tab Remote access. You can make all settings which you can also make via the touch display on the product itself.

8.4 Modbus communication interface

The communication interface Modbus RTU or TCP/IP allows connecting the control unit as a slave to the Modbus master. The status information shown on the display is available at the Modbus interface for collection and further processing by the client on site.

The interface is directly located on the **circuit board of the operating unit** (on the rear of the control unit, refer to chapter 5.5.3).

8.4.1 Connection of Modbus RTU

Obey the instructions and information on opening the housing in chapter 5.5.

1. Open the housing.
2. Connect the RS-485 connection plug to the operating board at terminals 87 – 89 (refer to chapter 5.5.3).

Terminal configuration

Terminal	Designation
89	A (+)
88	B (-)
87	GNDS1

8.4.2 Configuration of Modbus RTU

► Configure the Modbus RTU address in the control unt under > Configuration > Modbus > Modbus RTU configuration
(also refer to chapter 7.5).

You can adjust the values below:

Parameters	Settings
Address	1 … 127
Baud rate	1200, 2400, 4800, 9600, 19200 bits
Parity	None, odd, even
Data bits	8 data bits
Stop bits	1 or 2 stop bits

8.4.2.1 Connection of Modbus TPC/IP

Obey the instructions and information on opening the housing in chapter 5.5.

1. Open the housing.
2. Connect the plug to the Ethernet connection of the operating board (refer to chapter 5.5.3).

8.4.3 Configuration of Modbus TCP/IP

► Configure the Modbus TCP/IP address in the control unit under > Configuration > Modbus > Modbus TCP/IP configuration
(also refer to chapter 7.5).

You can adjust the values below:

Parameters	Settings
Port	500…65535

8.4.4 Data transfer from master to communication module

Remote control via Modbus master is only possible if the respective parameters have been enabled in the control unit.

Tab	Bit	Bytes	Value	Format	Resolution	Unit	Function
100	00	2	Activation	Bool	Bit 00: 0/1	Pulse	Live bit (1 s ON / 1 s OFF)
	01			Bool	Bit 01: 0/1	Off/Release	Enabling control
	02			Bool	Bit 02: 0/1	Off/Release	Enabling high chlorination
	03			Bool	Bit 03: 0/1	Off/Release	Enabling economy operation
	04			Bool	Bit 04: 0/1	Off/Release	Enabling partial load operation
	05			Bool	Bit 05: 0/1	Off/Release	Enabling overflow channel bypass (BW-tronic)

8.4.5 Data transfer from communication module to master

Tab	Bit	Bytes	Value	Format	Resolution	Unit	Function
0		4	Counter value	Dint	0…999999	h	Operating hours Measuring and control system
1							
2		4		Dint	0…999999	h	Operating hours pH dosing 1
3							
4		4		Dint	0…999999	h	Operating hours Disinfection dosing
5							
6		4		Dint	0…999999	h	Operating hours Flocculation dosing / pH dosing 2 (subject to parameterisation)
7							
8		2	Measured value	Int	0.00…14.00	pH	Measurement pH value of pool water
9		2		Int	0.00…10.00	mg/l	Measurement Disinfection value of pool water
10		2		Int	0…1300	mV	Measurement Redox value of pool water
11		2		Int	0.0…50.0	°C	Measurement Pool water temperature
12		2		Int	Reserve		Reserve
13		2		Int	Reserve		Reserve
14		2		Int	0.0…50.0	°C	Room temperature / humidity of air(subject to parameterisation)
					0…100	%	
15		2		Int	0.0…50.0	°C	Room temperature / humidity of air (subject to parameterisation)
					0…100	%	

Tab	Bit	Bytes	Value	Format	Resolution	Unit	Function
16	00	2	Operating message	Bool	0 / 1	1 = Pulse	Live bit (1 s ON / 1 s OFF)
	01			Bool	0 / 1	1 = ON	System status
	02			Bool	0 / 1	1 = Active	Normal bathing
	03			Bool	0 / 1		Reserve
	04			Bool	0 / 1	1 = Active	High chlorination
	05			Bool	0 / 1	1 = Active	Economy operation
	06			Bool	0 / 1	1 = Active	Partial load operation
	07			Bool	0 / 1	1 = Requested	High chlorination
	08			Bool	0 / 1	1 = Requested	Economy operation
	09			Bool	0 / 1	1 = Requested	Partial load operation
	10			Bool	0 / 1	1 = Operation	pH dosing 1
	11			Bool	0 / 1	1 = Operation	Disinfection dosing
	12			Bool	0 / 1	1 = Operation	Flocculation dosing / pH dosing 2 (subject to parameterisation)
	13			Bool	0 / 1	1 = Operation	Heating
	14			Bool	0 / 1		Reserve
	15			Bool	0 / 1		Reserve
17	00	2	Info message Part 1	Bool	0 / 1	1= Message	Collective message
	01			Bool	0 / 1	1= Message	Collective message Maintenance
	02			Bool	0 / 1	1= Message	pH value too low
	03			Bool	0 / 1	1= Message	pH value too high
	04			Bool	0 / 1	1= Message	Disinfection too low
	05			Bool	0 / 1	1= Message	Disinfection too high
	06			Bool	0 / 1	1= Message	Redox value too low
	07			Bool	0 / 1	1= Message	Redox value too high
	08			Bool	0 / 1		Reserve
	09			Bool	0 / 1		Reserve
	10			Bool	0 / 1		Reserve
	11			Bool	0 / 1	1= Message	No measuring water flow
	12			Bool	0 / 1	1= Message	No filtrate flow
	13			Bool	0 / 1	1= Message	Refilling dosing tank pH dosing 1
	14			Bool	0 / 1	1= Message	Refilling dosing tank Disinfection dosing

Tab	Bit	Bytes	Value	Format	Resolution	Unit	Function
	15			Bool	0 / 1	1= Message	Refilling dosing tank Flocculation dosing / pH dosing 2 (subject to parameterisation)
18		2	Info message Part 2	Bool			Reserve
19	00	2	Fault message Part 1	Bool	0 / 1	1 = Fault	Collective fault
	01			Bool	0 / 1	1 = Fault	pH dosing 1
	02			Bool	0 / 1	1 = Fault	Disinfection dosing
	03			Bool	0 / 1	1 = Fault	Flocculation dosing / pH dosing 2 (subject to parameterisation)
	04			Bool	0 / 1	1 = Fault	Dosing tank pH dosing 1
	05			Bool	0 / 1	1 = Fault	Dosing tank Disinfection dosing
	06			Bool	0 / 1	1 = Fault	Dosing tank Flocculation dosing / pH dosing 2 (subject to parameterisation)
	07			Bool	0 / 1	1 = Fault	Temperature sensor
	08			Bool	0 / 1		Reserve
	09			Bool	0 / 1		Reserve
	10			Bool	0 / 1		Reserve
	11			Bool	0 / 1		Reserve
	12			Bool	0 / 1		Reserve
	13			Bool	0 / 1		Reserve
	14			Bool	0 / 1		Reserve
	15			Bool	0 / 1		Reserve
20		2	Fault message Part 2	Bool			Reserve

8.5 Connection of BW-tronic

The RS-485 interface for optional modules enables the control unit to communicate with the BW-tronic. The connection is located directly on the **main circuit board** (refer to chapter 5.5.2).

8.5.1 Connection

Obey the instructions and information on opening the housing in chapter 5.5.

1. Open the housing.
2. Connect terminals 75 – 77 of the BW-tronic to terminals 66 – 68 on the main circuit board using the RS-485 connector (refer to chapter 5.5.2).

Terminal configuration

Terminals spaliQ Professional		Terminals BW-tronic	Designation
67	→	75	A (+)
66	→	76	B (-)
68	→	77	GND

8.5.2 Menu settings

The filter system can be logged on to the control unit:

> Configuration > E/A-Configuration > Optional module

Level 1	Level 2	Settings	C
Optional modules	Filter controller	**None**	2
		BW-tronic	2

Operation is possible as indicated below:

> BW-tronic

Level 1	Level 2	Settings	C
BW-tronic	Temperature preselection	**Normal bathing**	1
		Warm water bathing	1
		Winter operation	1
	Filter system	**OFF**	1
		ON	1
		Timer	1
	Filter backwash	**OFF**	1
		ON	1
	Channel cleaning	**OFF**	1
		ON	1
		Bus	1

9 Maintenance and repair

Maintenance and repair includes cleaning, inspection and maintenance of the product.

The responsibility for inspection and maintenance is subject to local and national requirements. The owner/operator/operating company is responsible for compliance with the prescribed maintenance and repair work.

By concluding a maintenance contract, you make sure that all maintenance work will be carried out on time.

- ► Only use genuine spare and wearing parts from Grünbeck.
- ► Keep an operation log to document all maintenance and repair work (refer to chapter 14).

9.1 Cleaning

Only have the cleaning work carried out by persons who have been instructed in the risks and dangers that can arise from the product.

WARNING Damp cleaning of live components

- Risk of electric shock
- Sparking due to short circuit
- ► Switch off the voltage supply – as well as any external voltage – before starting the cleaning work.
- ► Make sure that no voltage is present at the components.
- ► Do not open any switch cabinets.
- ► Do not use any high-pressure equipment for cleaning and do not blast electric/electronic devices with water.

CAUTION Risk of slipping at the sampling points

- Injuries resulting from falls
- ► Use personal protective equipment – wear sturdy shoes.
- ► Immediately mop up escaped liquids.

NOTE Do not clean the system with cleaning agents containing alcohol/solvents.

- Plastic components are damaged.
- ► Use a mild/pH-neutral soap solution.
- ► Regularly clean the system to remove dirt and chemical residues – clean with lukewarm soapy water.
- ► Only clean the outside of the system.

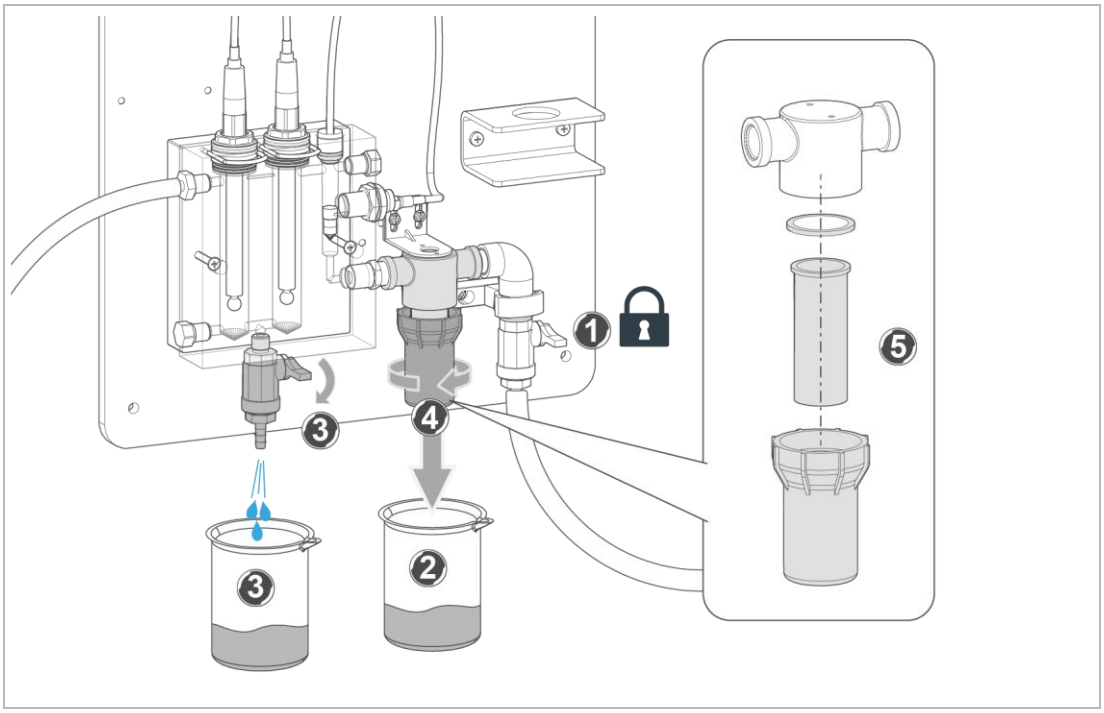
► Do not use any strong or abrasive cleaning agents.

► Wipe the surfaces with a damp cloth.

► Dry the surfaces with a cloth.

9.1.1 Cleaning the measuring water filter

► Clean the measuring water filter, if necessary, e.g. if there is visible soiling.



1. Stop the flow.
   a Close the on-site shut-off valves for measuring water inlet and measuring water recirculation.
2. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
3. Place a collection vessel under the measuring water filter to catch escaping measuring water.
4. Unscrew the filter cylinder from the filter head.
5. Remove the filter strainer and clean it with clean drinking water.
6. Reinstall the cleaned filter strainer along with the filter cylinder and the seal in the filter head.
7. Open the shut-off valves and check for leaks.

9.1.2 Cleaning the float switch and the temperature sensor

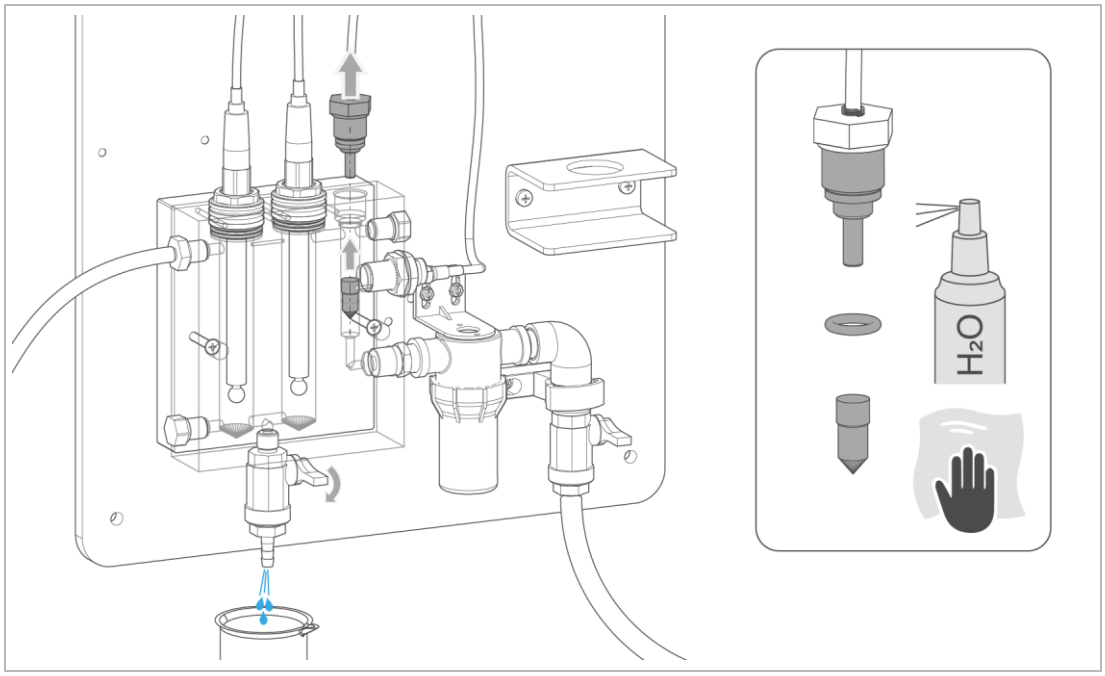
► Clean the float switch and the temperature sensor, if necessary, e.g. if there is visible soiling.

NOTE Cleaning with metal and sharp objects

- Damage, malfunction and failure of components

► Clean the stainless-steel components using a suitable stainless-steel cleaner (free of hydrochloric acid and chloride) and a soft cloth.

► Afterwards, thoroughly rinse the cleaned stainless-steel components with fresh drinking water.



1. Stop the flow.
   a Close the on-site shut-off valves for measuring water inlet and measuring water recirculation.
2. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
3. Dismantle the temperature sensor with the O-ring and clean the measuring area with a cloth.
   a Thoroughly rinse the component with clean drinking water.
4. Remove the float switch and clean it with a cloth.
   a Thoroughly rinse the component with clean drinking water.
5. Reinstall the float switch and the temperature sensor with the O-ring in the flow fitting.
6. Open the shut-off valves and check for leaks.

9.1.3 Cleaning the pH and the Redox electrode

► Clean the pH and Redox electrode at regular intervals before calibration, e.g. in case of deviating measured values or visible soiling.

NOTE Contact of measuring electronics with water or dirt

- Malfunction or failure of components

► Make sure that the electrical contacts of the components (electrodes, electrode cables) do not come into contact with water or dirt.

NOTE Skin contact with electrodes

- Mismeasurements, incorrect dosing and failure of components

► Handle the electrodes with care.

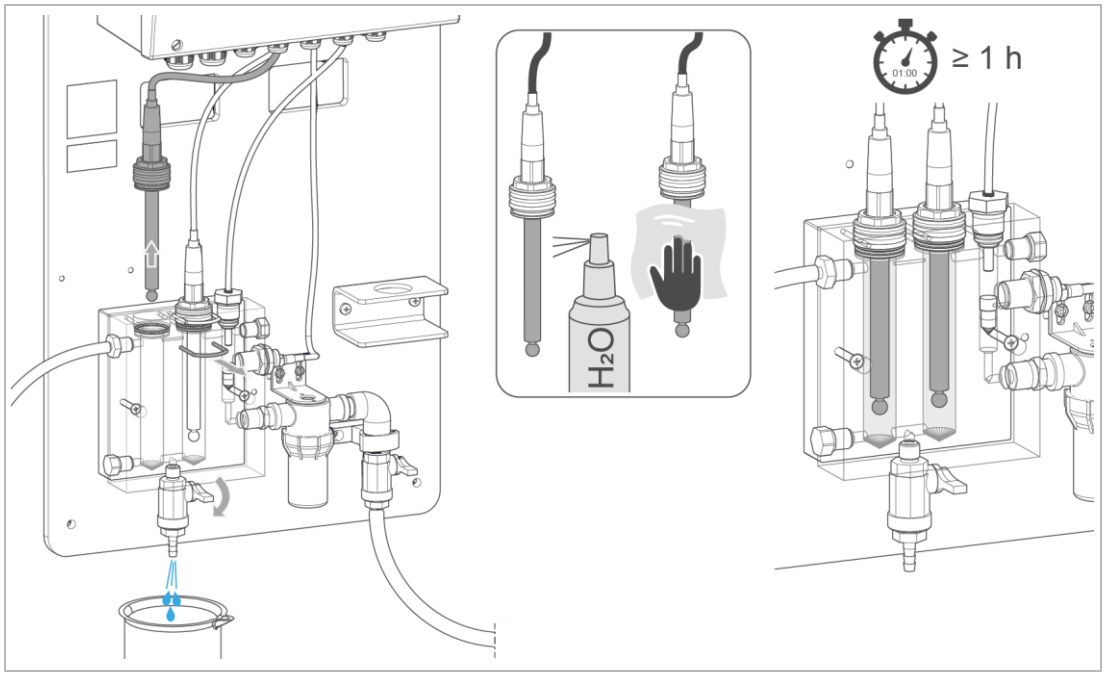
► Avoid skin contact with the measuring areas, e.g. the membrane glass

NOTE Cleaning with aggressive/abrasive cleaning agents

- Scratches on the membrane glass, mismeasurements, incorrect dosing and failure of components

► Clean the membrane glass with a mild glass cleaning agent or with alcohol.

► Avoid scratching on the membrane glass.



1. Stop the flow.
   a Close the on-site shut-off valves for measuring water inlet and measuring water recirculation.
2. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
3. Remove the respective electrode from the flow fitting.

a Pull the plug-in clip of the electrode holder.

b Remove the electrode holder with the electrode from the flow fitting – use a screwdriver.

4. Clean the electrodes with a mild glass cleaning agent or with alcohol.
5. Rinse the electrodes with clean drinking water and dab them carefully with a clean, soft cloth.
6. Insert the electrode holder with the electrode into the flow fitting and soak the electrodes for at least one hour.
7. Calibrate of the pH electrodes (refer to chapter 7.7).
8. After calibration, insert the electrode holder with the electrodes into the flow fitting and secure them with the plug-in clips.
9. Open the shut-off valves and check for leaks.

9.2 Intervals

By way of regular inspections and maintenance, malfunctions can be detected in time and system failures might be prevented.

► As owner/operator/operating company determine which components must be inspected and maintained at which intervals (load-dependent). These intervals are subject to the actual conditions such as: water condition, degree of contamination, environmental impacts, consumption, etc.

The interval table below shows the minimum intervals for the activities to be carried out.

Activity	Interval	Tasks
Inspection	daily	• Check the system for function • Visually check for leaks • Check the water values with a test device
	weekly	• Visually check the measuring water filter and clean it, if necessary • Visually check the float switch and clean it, if necessary • Visually check the temperature sensor and clean it, if necessary • Check the pool water's acid capacity, pH value, Redox and disinfectant value, free chlorine or bromine • Check the smell and colour of the swimming pool water • Check the filling levels of the dosing agents in the dosing tanks

Activity	Interval	Tasks
Maintenance	semi-annually	• Check the water values • Check the system for function • Clean the pH electrode and the Redox electrode and calibrate them • Evaluate the consumption of dosing agent • Check the dosing agent for content and shelf life
	annually	• Check the operating values for fresh water/filling water • Check the operating values for the pool water prior to maintenance work • Check the components for impurities and clean them • Check the components for function and leaks • Check all cables and hose connections for damage and a firm seat • Check the components for unusual noises and vibration • Check the flow fitting including the sampling point and the measuring water inlet/measuring water outlet • Check the measuring water filter including the filter stainer • Check the flow monitoring systems for measuring water and filtrate • Check the cleaned and calibrated electrodes for function • Check the dosing outlets for function and damage • Check the operating values for the pool water after maintenance work
Repair	5 years	• Recommendation: Replace wearing parts

9.3 Inspection

You as owner/operator/operating company can carry out the regular inspections yourself.

► Use personal protective equipment (refer to chapter 1.6.3).

9.3.1 Daily inspection

1. Check the system for function.
2. Check the components for leaks.
3. Check the water values below using your test device. In the event of deviations, readjust the measurements or calibrate the electrodes (refer to chapter 7.7 or 9.5 for calibration or 9.4 for readjustment).
   - **a** Acid capacity
   - **b** pH value
   - **c** Disinfection value (free chlorine or bromine)

9.3.2 Weekly inspection

1. Check the measuring water filter for impurities and clean it, if necessary (refer to chapter 9.1.1).
2. Check the float switch and the temperature sensor for impurities and clean them, if necessary (refer to chapter 9.1.2).
   a After cleaning the temperature sensor, readjust the water temperature, if necessary (refer to chapter 9.4.3).
3. Check the acid capacity of the pool water using your test device.
   a Take the water sample for the measurement directly at the flow fitting using the sampling point.
   b If the acid capacity is too low, add the dosing agent GENO-stabil accordingly.
4. Check the pH value of the pool water using your test device.
   a Take the water sample for the measurement directly at the flow fitting using the sampling point.
   b In the event of deviations between the value displayed by the measuring and control system and the value measured with the test device:
   Clean a dirty pH electrode (refer to chapter 9.1.3).
   Readjust the pH measurement (refer to chapter 9.4.1) or calibrate the pH electrode (refer to chapter 7.7 or 9.5).
5. Check the Redox measurement and calibrate the Redox electrode, if necessary (refer to chapter 7.7.2).
   a Clean a dirty Redox electrode (refer to chapter 9.1.3).
6. Check the disinfectant value of free chlorine or bromine:
   a Determine the pool water’s free chlorine value or bromine value using your test device.
   b Take the water sample for the measurement directly at the flow fitting using the sampling point.
   c In case of control via disinfection setpoint, the slope of the disinfection must be recalibrated in the event of deviations (refer to chapter 9.5.3).
   d In case of control via Redox setpoint, the Redox setpoint must be adjusted accordingly in the event of a deviation (refer to chapter 0).
7. Check the filling levels of the dosing agents in the dosing tanks.
   a Order the required dosing agents in good time.
8. Check the smell and colour of the pool water.
9. Should any irregularities, problems or issues arise, contact Grünbeck's technical service.

9.4 Readjustment

The "readjustment" function is used to correct the respective measurement. Contrary to the more elaborate calibration, only an offset is determined and taken into account for the subsequent measurements. For readjustment, the respective value of a water sample parameter is measured and entered in the menu of the measuring and control system.

9.4.1 Readjustment of pH measurement

1. Select > Operation > Readjustment.
» The current measured value is displayed under Measured pH value.
2. Take a water sample at the sampling valve of the flow fitting.
3. Determine the pH value of the water sample using a test device.
4. Select pH sample.
5. Enter the actual value of the water sample.
6. Confirm with or discard the value with .
» Readjustment is completed. An offset which results from the difference between the set value pH sample and the Measured pH value will be added to all measured pH values.

9.4.2 Readjustment of disinfection measurement

1. Select > Operation > Readjustment.
» The current measured value is displayed under Measured disinfection value.
2. Take a water sample at the sampling valve of the flow fitting.
3. Determine the disinfection value (free chlorine or bromine) of the water sample using a test device.
4. Select Disinfection sample.
5. Enter the actual value of the water sample.
6. Confirm with or discard the value with .
» Readjustment is completed. An offset which results from the difference between the set value Disinfection sample and the Measured disinfection value will be added to all measured disinfection values.

9.4.3 Readjustment of the water temperature

The temperature sensor is subject to natural wear and tear. After a certain period of time, we recommend carrying out a comparative measurement of the pool water temperature using a different (standardised) thermometer.

If a deviation between the water temperature indicated in the measuring and control system and the control measurement is detected, an offset (sensor adjustment) can be carried out.

1. Read the water temperature in the basic display.
2. Determine the actual water temperature using a (standardised) thermometer.
3. Select > Operation > Readjustment > Offset Measuring water temperature
4. Enter the deviation.

   Example: Measured temperature = 25 °C
   Actual temperature = 23 °C
   } Offset = -2.0 °C
5. Confirm with or discard the value with .

» Readjustment is completed.

9.4.4 Readjustment of room temperature (with accessories only)

The room temperature sensor is subject to natural wear and tear. After a certain period of time, we recommend carrying out a comparative measurement of the room temperature using a different (standardised) thermometer.

If a deviation between the room temperature indicated in the measuring and control system and the control measurement is detected, an offset (sensor adjustment) can be carried out.

1. Read the room temperature in the basic display.
2. Determine the actual room temperature using a (standardised) thermometer.
3. Select > Operation > Readjustment > Offset Room temperature
4. Enter the deviation.
5. Confirm with or discard the value with .

» Readjustment is completed.

9.4.5 Readjustment of room humidity (with accessories only)

The air humidity sensor is subject to natural wear and tear. After a certain period of time, we recommend carrying out a comparative measurement of the room humidity using a different (standardised) hygrometer.

If a deviation between the humidity indicated in the measuring and control system and the control measurement is detected, an offset (sensor adjustment) can be carried out.

1. Read the humidity in the basic display.
2. Determine the actual humidity using a (standardised) hygrometer.
3. Select > Operation > Readjustment > Offset Humidity
4. Enter the deviation.

5. Confirm with or discard the value with .

» Calibration is completed.

9.5 Calibration

Obey the points below when calibrating:

- Only carry out the calibration when the water values are constant.
- Do not calibrate directly after a backwash or a high or shock chlorination as the measured values could be compromised – take the delay times set into account.
- The calibration process must not be interrupted.
- The calibration solutions must not be contaminated and must not have expired.
- The water sample for the manual measurement must be taken directly at the sampling valve of the flow fitting.
- Carry out the manual measurement with a suitable test device and calibrate the measured value directly in the menu.

9.5.1 Manual calibration of pH measurement

The pH measurement is calibrated using two different calibrating solutions (pH 7 and pH 9).

In order to prevent measuring errors during checking and calibration, the pH electrode must be cleaned and rinsed with deionised water before every check. Damaged or slow pH electrodes must be replaced.

1. Have the pH 7 and pH 9 calibration solutions ready.
2. Close the on-site shut-off valves for measuring water inlet and measuring water recirculation.
3. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
4. Remove the pH electrode from the flow fitting.
   a Pull the plug-in clip of the electrode holder.
   b Remove the electrode holder with the electrode from the flow fitting – use a screwdriver.
5. Rinse the glass shaft of the pH electrode with deionised water.
6. Carefully dry the glass shaft using a clean, soft cloth.
7. Select > Operation > Calibration > Manual calibration > Measured pH value 1
8. Immerse the pH electrode in the calibration solution pH 7 to start the measurement.

» The pH value of the calibration solution will automatically be identified and indicated in pH calibration solution 1, the measured value will be displayed in Measured pH value 1.

9. Wait until the measured value has stabilised.
10. Confirm with Accept or discard the value with  .
11. Remove the pH electrode from the calibration solution, rinse the glass shaft with distilled water and carefully dab it with a clean, soft cloth.
12. Select the item Measured pH value 2 and immerse the pH electrode in the calibrating solution pH 9 to start the measurement.

» The pH value of the calibration solution will automatically be identified and indicated in pH calibration solution 2, the measured value will be displayed in Measured pH value 2.

13. Wait until the measured value has stabilised.
14. Confirm with Accept or discard the value with  .
15. Remove the pH electrode from the calibration solution, rinse the glass shaft with distilled water and carefully dab it with a clean, soft cloth.

» Calibration is completed.

The calibration must always be done with 2 of the 3 indicated calibration solutions (pH 7, pH 9 or pH 4). Based on the measured value, the software automatically identifies which calibration solution is used and adopts this value as reference value.

Following a calibration, the offset value determined by the function “readjustment” is reset.

9.5.2 Manual calibration of Redox measurement

The calibration of the Redox measurement is done by means of a calibration solution (Redox potential of 430 mV or 475 mV).

In order to prevent measuring errors during checking and calibrating, the Redox electrode must be cleaned and rinsed with deionised water before every check. Damaged or slow Redox electrodes must be replaced.

1. Have the Redox 475 mV calibration solution ready.
2. Close the on-site shut-off valves for measuring water inlet and measuring water recirculation.
3. Depressurise the flow fitting – briefly open the sampling valve and collect the escaping water with a collection vessel.
4. Remove the Redox electrode from the flow fitting.
   a. Pull the plug-in clip of the electrode holder.
   b. Remove the electrode holder with the electrode from the flow fitting – use a screwdriver.

5. Rinse the glass shaft of the Redox electrode with deionised water.
6. Carefully dry the glass shaft using a clean, soft cloth.
7. Select > Operation > Calibration > Manual calibration > Redox calibration solution
8. Select the calibration solution used.
9. Confirm with Accept or discard the value with .
10. Select the item “Measured Redox value” and immerse the Redox electrode in the Redox calibration solution to start the measurement.
11. Wait until the measured value has stabilised.
12. Confirm with Accept or discard the value with .
13. Remove the pH electrode from the calibration solution, rinse the glass shaft with distilled water and carefully dab it with a clean, soft cloth.

» Calibration is completed.

9.5.3 Manual calibration of disinfection measurement

The disinfection measurement is calibrated by means of a test device and a water sample.

1. Select > Operation > Calibration > Manual calibration
2. Take a water sample directly at the sampling valve of the flow fitting.
3. Determine the disinfection value (free chlorine, bromine) using a test device.
4. Select Disinfection Transcond. Meas. value.
5. Enter the actual value of the water sample.
6. Confirm with or discard the value with .

» Calibration is completed.

9.6 Maintenance

The work below must be carried out by Grünbeck's technical service personnel only.

9.6.1 Semi-annual maintenance

1. Check the water values.
2. Check the system for function.
3. Clean and calibrate the pH electrode and the Redox electrode, if necessary.

4. Analyse the consumption of dosing agent subject to the pool (outdoor, indoor pool) and its use.
5. Check the condition of the dosing agents for content and shelf life.

9.6.2 Annual maintenance

In addition to the semi-annual maintenance, the work below must be carried out as well.

Checking the operating values

1. Check the operating values for fresh water/filling water.
   - **a** Measure the water temperature.
   - **b** Measure the acid capacity.
   - **c** Measure the water hardness.
   - **d** Measure the pH value.
   - **e** Measure the conductivity.
2. Check the operating values of the pool water prior to carrying out maintenance work.
   - **a** Measure the water temperature and compare the water temperature with the value displayed in the control unit.
   - **b** Measure the acid capacity.
   - **c** Measure the water hardness.
   - **d** Measure the pH value and compare the pH value with the value displayed in the control unit.
   - **e** Measure the conductivity.
   - **f** Measure the Redox value and compare the Redox value with the value displayed in the control unit.
   - **g** Measure the disinfection value (free chlorine or bromine or active oxygen) and compare the disinfection value with the value displayed in the control unit.
   - **h** Measure the combined chlorine, if necessary.
   - **i** Measure the aluminium, if necessary (in case of flocculation dosing).

Maintenance work

1. Check all product components for impurities and clean them, if necessary.
3. Check all product components for function and leaks. Replace faulty components.
4. Check all cables and hose connections for damage and a tight fit. Replace faulty components.
5. Check all product components for unusual noises and vibration.
6. Check the flow fitting including the sampling valve as well as the measuring water inlet/measuring water outlet.
7. Check the measuring water filter including the filter strainer.

b Replace the seal and the filter strainer, if necessary.

8. Check the flow monitoring systems for measured water.
9. Check the flow monitoring systems for filtrate.
10. Check the cleaned and calibrated electrodes for function.
    a Replace faulty electrodes.
11. Check the dosing outlets for function and damage.
12. Reset the maintenance interval (if activated).
13. Check the operating values of the pool water after maintenance work.
14. Carry out a final functional check on the measuring and control system.
15. Record the data and work performed, including repairs, in the checklist of the operation log (refer to chapter 14).
16. Hand over the measuring and control system to the owner/operator/operating company.

9.7 Consumables

NOTE Use of unsuitable consumables

- Malfunctions, damage, loss of warranty

► Only use original consumables from the manufacturer.

Product	Order no.
pH electrode	**211 502**
Redox electrode	**211 507**
Calibration solution pH 7	**203 628**
Calibration solution pH 9	**203 629**
Calibration solution Redox 475 mV	**203 625**
GENO-minus N (liquid pH lowering agent)	**210 013**
GENO-plus N (liquid pH increasing agent)	**210 018**
GENO-Chlor A (liquid disinfectant)	**210 012**
GENO-Brom (disinfectant in the form of tablets)	**210 011**
GENO-stabil (pH stabiliser in the form of granules)	**210 040**

9.8 Spare parts

For an overview of the spare parts, refer to our spare parts catalogue at www.gruenbeck.com. You can order the spare parts from your local Grünbeck representative.

9.9 Wearing parts

Wearing parts must be replaced by qualified specialists only.

Wearing parts must be checked regularly during inspection and maintenance and replaced, if necessary.

The wearing parts are listed below:

- pH electrode
- Redox electrode
- Temperature sensor
- Float switch
- Filter strainer of measuring water filter
- Seals

10 Troubleshooting

The measuring and control system spaliQ Professional shows messages in the display.

The messages can be information or faults.

- Information: No immediate action required
- Faults: Immediate action required

If a malfunction cannot be eliminated, the technical service personnel can take further measures.

► Contact technical service (refer to inner cover sheet for contact data).

► Proceed as follows if there is a message.

1. Eliminate the fault (refer to fault table).
2. Acknowledge the message.
3. Watch the display of the control unit.
4. If the message reoccurs, compare the display message with the fault table below.

10.1.1 Info messages

Display	Explanation	Remedy
pH value too low	Current measured value undershoots below the set limit value	► Check by manual measurement and readjust or calibrate, if necessary ► Check the level in the dosing tank
pH value too high	Current measured value exceeds the set limit value	► Check by manual measurement and readjust or calibrate, if necessary ► Check the level in the dosing tank
Disinfection too low	Current measured value undershoots the set limit value	► Check by manual measurement and readjust or calibrate, if necessary ► Check the level in the dosing tank
Disinfection too high	Current measured value exceeds the set limit value	► Check by manual measurement and readjust or calibrate, if necessary
Redox value too low	Current measured value undershoots the set limit value	► Check by manual measurement and readjust or calibrate, if necessary ► Check the level in the dosing tank

Display	Explanation	Remedy
Redox value too high	Current measured value exceeds the set limit value	► Check by manual measurement and readjust or calibrate, if necessary ► Check the level in the dosing tank
No measuring water flow	Insufficient or no flow at the measuring water inlet of the fitting	► Check the flow sensor and float switch ► Clean the filter on the measuring water inlet
	A backwash of the filter system might be in progress or the filter system might be outside the filter times	► Check the operating state of the filter system
No filtrate flow	Insufficient flow in the filtrate line of the filter system, switching input Flow monitoring Filtrate open	► Check the on-site flow controller
	A backwash of the filter system might be in progress or the filter system might be outside the filter times	► Check the operating state of the filter system
Refill dosing tank pH dos. 1	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank by a new one
Refill dosing tank Disinfection	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
Dosing tank Flocculation	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
Refill dosing tank pH dos. 2	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
Battery empty	Buffer battery of control unit empty	► Contact technical service and have the battery replaced
SD card protected	SD card protected	► Contact technical service and have SD card unlocked (lock)
SD card full	SD card full	► Contact technical service and have SD card emptied ► Contact technical service and have SD card replaced
SD card faulty	SD card defective	► Contact technical service and have SD card replaced
No SD card	No SD card	► Contact technical service and have SD card inserted ► Deactivate archiving
Test email successful	Email was sent	► No need for action
Test email failed	Email was not sent	► Check settings for emailing ► Check network settings
Connection to NTP server failed	No connection to the NTP server could be established	► Check connection to the router ► Check entry for URL NTP server ► Enable port in your router

Display	Explanation	Remedy
No Cloud connection	No connection to the Grünbeck Cloud could be established	► Connection to the router ► Check input URL Cloud ► Enable ports in your router
Maintenance Meas. & ctrl sys	The maintenance interval for the measuring and control system has expired	► Contact technical service and have maintenance carried out
Maintenance pH dosing 1	The maintenance interval for pH dosing 1 has expired	► Contact technical service and have maintenance carried out
Maintenance Disinfection dosing	The maintenance interval for disinfection dosing has expired	► Contact technical service and have maintenance carried out
Maintenance Flocculation dosing	The maintenance interval for flocculation dosing has expired	► Contact technical service and have maintenance carried out
Maintenance pH dosing 2	The maintenance interval for pH dosing 2 has expired	► Contact technical service and have maintenance carried out
Calibration OK	Calibration was successful The calibration values have been adopted	► No need for action
Cali. OK despite deviation	Calibration was successful The calibration values have been adopted despite slight deviations	► Check the electrodes and replace them, if necessary ► Replace the calibration solution ► Clean the electrodes and repeat the calibration
Calibration failed	Calibration has failed. The calibration values have not been adopted	► Check the electrodes and replace them, if necessary ► Check the electrode cable for damage ► Replace the calibration solution

10.1.2 Faults

Display	Explanation	Remedy
FLT power failure	A power failure has occurred	► Check the reason for the power failure
FLT pH dosing 1	A fault is present at the dosing system	► Have the voltage supply of the dosing pump checked ► Check the level in the dosing tank ► Contact technical service
FLT disinfection dosing	A fault is present at the dosing system	► Have the voltage supply of the dosing pump checked ► Check the level in the dosing tank ► Contact technical service
FLT flocculation dosing	A fault is present at the dosing system	► Have the voltage supply of the dosing pump checked ► Check the level in the dosing tank ► Contact technical service
FLT pH dosing 2	A fault is present at the dosing system	► Have the voltage supply of the dosing pump checked ► Check the level in the dosing tank

Display	Explanation	Remedy
		► Contact technical service
FLT Dos. tank pH dos. 1 empty	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
FLT Dos. tank Disinfec. empty	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
FLT Dos. tank Flocc. empty	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
FLT Dos. tank pH dos. 2 empty	Level in dosing tank low	► Check the level in the dosing tank ► Replace the dosing tank
FLT Temp. sensor Meas. water	No measuring signal from temperature sensor	► Check cabling ► Check sensor for damage ► Contact technical service
FLT Dos. time crtl. pH dos. 1	Dosing time monitoring has expired	► Acknowledge fault and keep watching ► Check effectiveness of dosing agent ► Check level in dosing tank ► Check water value (manual measurement, test device) ► Check measurement (check electrodes, calibrate electrodes, if necessary
FLT Dos. time ctrl. Disinfection	Dosing time monitoring has expired	► Acknowledge fault and keep watching ► Check effectiveness of dosing agent ► Check level in dosing tank ► Check water value (manual measurement, test device) ► Check measurement (check electrodes, calibrate electrodes, if necessary
FLT Dos. time ctrl. pH dosing 2	Dosing time monitoring has expired	► Acknowledge fault and keep watching ► Check effectiveness of dosing agent ► Check level in dosing tank ► Check water value (manual measurement, test device) ► Check measurement (check electrodes, calibrate electrodes, if necessary
FLT Ana. val. meas. 1	Measuring signal not available	► Check cabling ► Check measurement for damage ► Contact technical service
FLT Ana. val. meas. 1 exceed	Analogue value exceeds measuring signal of 20 mA	► Check cabling ► Check measurement for damage ► Contact technical service

Display	Explanation	Remedy
FLT Ana. val. meas. 1 under	Analogue value undershoots measuring signal of 4 mA	► Check cabling ► Check measurement for damage ► Contact technical service
FLT Ana. val. meas. 2	Measuring signal not available	► Check cabling ► Check measurement for damage ► Contact technical service
FLT Ana. val. meas. 2 exceed	Analogue value exceeds measuring signal of 20 mA	► Check cabling ► Check measurement for damage ► Contact technical service
FLT Ana. val. meas. 2 under	Analogue value undershoots measuring signal of 4 mA	► Check cabling ► Check measurement for damage ► Contact technical service
FLT Basic circ. board (1)	No connection between main circuit board and operating unit	► Check cabling ► Contact technical service
FLT Basic circ. board (3)	No connection between main circuit board and operating unit	► Check cabling ► Contact technical service
Fault Opt. refill/empty mess.	No connection between main circuit board and optional module	► Check cabling ► Check settings ► Contact technical service
FLT Commun. BW-tronic	No connection between main circuit board and filter system	► Check cabling ► Check settings ► Contact technical service

10.2 Other observations

Observation	Meaning	Remedy
Leaks	Worn O-rings or seals	► Replace defective seals ► Contact technical service
Measured values unstable	Insufficient measuring water flow	► Clean measuring water feed lines or flow fitting ► Clean the filter strainer of the measuring water filter
	Defective pH/ Redox electrode	► Check the electrodes and replace them, if necessary ► Contact technical service
	Insufficient soaking time	► Obey soaking times/watering times of electrodes
	Electrodes not soaked long enough	
	Electrodes incorrectly connected to control unit	► Correctly connect electrodes to the control unit ► Contact technical service
Measured value displayed is too low	pH value has dropped since calibration	► Increase pH value or recalibrate
	Disinfection value has dropped since calibration	► Increase disinfection value or recalibrate

Observation	Meaning	Remedy
	Soaking time of electrodes not yet finished	► Wait for soaking time to be over
	Organic chlorination agents are used (e.g. based on cyanuric acid)	► Use dosing agents as specified (water must be changed beforehand)
Measured value displayed is too high	pH value has increased since calibration	► Reduce pH value or recalibrate
	Disinfection value has increased since calibration	► Reduce disinfection value or recalibrate
	Interfering impact of foreign oxidants on the comparative DPD measurement (optical measurement)	► Examine measuring water ► Check chemicals
Redox value gradually decreases	Organic chlorine products based on cyanuric acid are used	► Remove cyanuric acid from the pool water by replacing the water
	Cleaning agents based on cyanuric acid are used	► Clean Redox electrode, use inorganic chlorine products or cleaning agents without cyanuric acid ► Cleaning agents must not get into the pool
	Phosphates coat the electrodes	► Reduce phosphates by flocculation and addition of fresh water ► Clean electrodes
Control via “REDOX substitute control” – value displayed for “Disinfection” continues to change	A corresponding change (Cl slope) in the value displayed for "free chlorine" (mg/l) is allocated to every change in the Redox value (mV)	► Freeze the value displayed for Disinfection as described in chapter 6.4.1.
pH value drops suddenly and significantly / pH value can hardly be adjusted / considerable fluctuations in pH value	No or insufficient buffer capacity of pool water	► Check the buffer capacity and increase it, if necessary
No dosing (setpoint value not reached)	Dosing agents empty	► Refill chemicals
	Dosing system out of service	► Check the dosing system
	Dosing valve or line clogged	► Check dosing valve and line
	Insufficient dosing capacity	► Install a more powerful dosing system ► Contact technical service
	Dosing system connected incorrectly	► Check connections (refer to chapter 5.5.1)
	Incorrect configuration of dosing system	► Check the configuration of the dosing system
	Defective fuse(s)	► Check fuses ► Contact technical service
	Dosing is switched off	► Switch on dosing > Operation > pH dosing 1 > ON
	Setpoint value set incorrectly	► Correct the setpoint value > Settings > Setpoint
	Incorrect control direction	► Check and correct the control direction (refer to chapter 5.5.1)
	Incorrect control parameters	► Check and correct the control parameters (refer to chapter 5.5.1)

Observation	Meaning	Remedy
Difference in the measured values compared to the pool	Manual measurement inaccurate	► Repeat manual measurement
	Problematic sampling point	► Choose a different sampling point and repeat the manual measurement there
	Dosing valve or pipe clogged	► Check the dosing system
	Disinfectant loss in measuring water feed line	► Dirt trap, clean sample feed line, if necessary
	Measuring water line too long	► Change installation
	Electrode dried up	► Replace electrode ► Contact technical service
Flow monitoring of measuring water does not work	Flow monitoring sensor attached incorrectly	► Check and correct installation position
	Loose contact	► Contact technical service
	Flow monitoring sensor defective	► Contact technical service
Power output does not work	Cable mounted incorrectly	► Check and correct connection
	Connection defined incorrectly	► Change configuration (refer to chapter 5.5.2.7)
Collective fault signal relay does not work	Cable mounted incorrectly	► Check and correct connection
	Alarm values defined incorrectly	► Check alarm values (refer to chapter 0)
Control unit out of service	Power plug not connected	► Connect power plug
	Incorrect mains voltage	► Check mains voltage
Flow rate decreases over time	Filter strainer in measuring water filter is clogged	► Clean the filter strainer in the measuring water filter
Float switch of flow monitoring Measuring water is stuck	Impurities	► Clean the float switch and the flow fitting
	Foreign matter	► Remove foreign matter ► Check the filter strainer of the measuring water filter for damage
Black tile joints in the pool	Fungi growth due to organic grouting material (e.g. joints made of epoxy resin)	► Increase filter run times ► Increase the value for the disinfectant ► Carry out shock chlorination ► Replace grouting material, if necessary (only use grouting material that complies with the requirements of DIN 19643-1)

11 Decommissioning

The work below must be carried out by Grünbeck's technical service personnel only.

11.1 Temporary standstill

If a longer standstill of the system is planned (e.g. winterising of outdoor pools), the system must be decommissioned.

1. Rinse the flow fitting with measuring water filter (measuring water inlet to measuring water outlet) of the measuring and control system with clear water to remove residues.
2. Completely drain and clean the flow fitting.
3. Clean the float switch and the filter strainer of the measuring water filter.
4. Remove the pH and the Redox electrode and store the lower part of the glass electrode in a KCL solution (3 mol/l) – refer to the information and instructions on storage in chapter 4.3.
5. Slightly open all valves.
6. Completely drain all lines that are at risk of freezing.
7. Disconnect the system from mains – unplug the mains plug.

11.2 Putting the system back into operation

► Put the system into operation again (refer to chapter 6).

11.3 Final shutdown

The final shutdown must be carried out by Grünbeck's technical service personnel only.

► Commission technical service to dismantle the system (refer to chapter 12).

12 Dismantling and disposal

12.1 Deleting personal data

For security reasons, delete your personal data before disposing of your product.

► Reset the product to the factory setting.

12.2 Dismantling

The work described herein represents an intervention into your water system.

► Have this work carried out by qualified specialists only.

1. Rinse the flow fitting with measuring water filter (measuring water inlet to measuring water outlet) of the measuring and control system with clear water to remove residues.
2. Disconnect the system from mains – unplug the power plug.
3. Close the on-site shut-off valves in the measuring water supply and measuring water recirculation.
4. Vent and drain the system.
5. Disconnect the system from the water installation (measuring water inlet, measuring water outlet).
6. Disconnect the electrical connections to other components (such as dosing pumps).
7. Remove individual components such as accessories, if necessary.
8. Transport the system secured on a pallet (refer to chapter 4).

12.3 Disposal

► Obey the applicable national regulations.

Packaging

► Dispose of the packaging in an environmentally sound manner.

NOTE Danger to the environment due to incorrect disposal

- Packaging materials are valuable raw materials that can be reused in many cases.
- Incorrect disposal can cause hazards to the environment.

► Dispose of packaging materials in an environmentally sound manner.

► Obey the local disposal regulations.

► If necessary, commission a specialist company with the disposal.

Dosing agent

► Obey the safety data sheet of the chemical.

Product

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

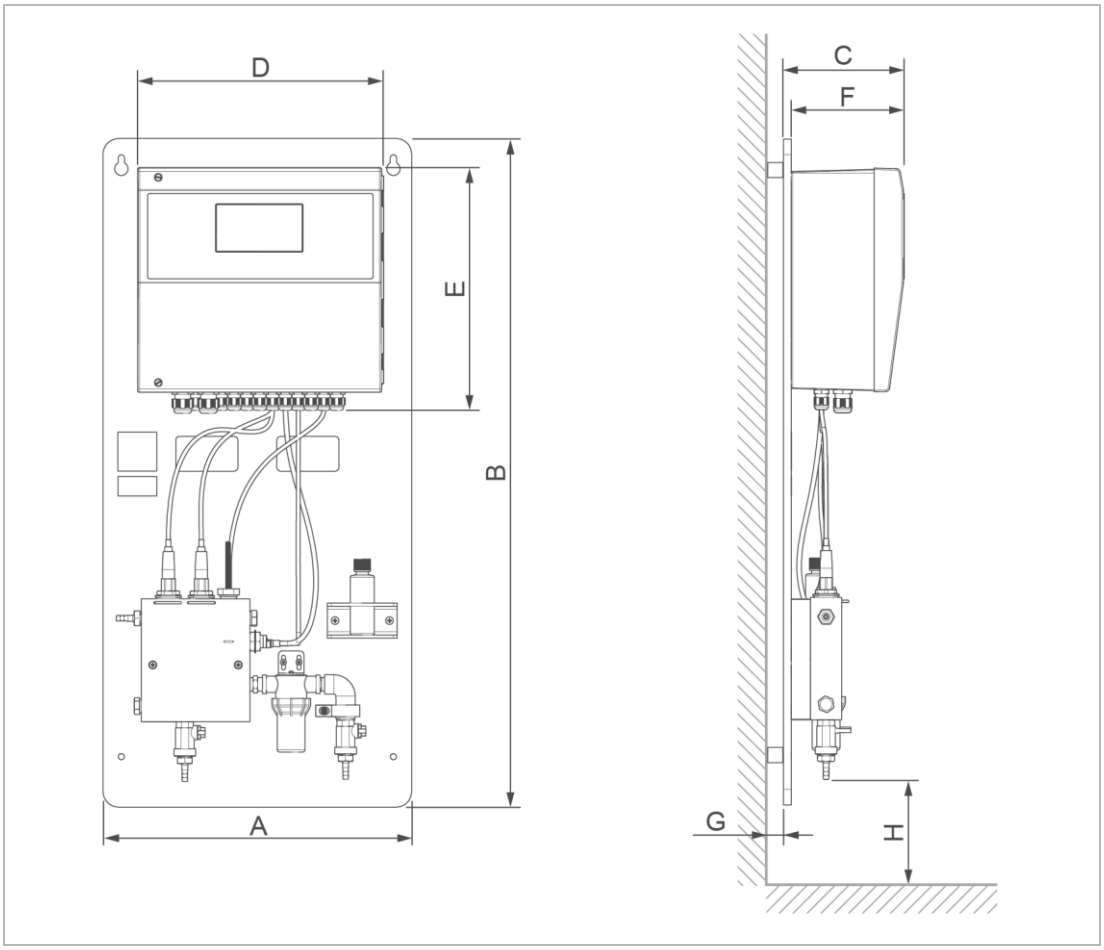
► Find out about the local regulations on the separate collection of electrical and electronic products.

► Make use of the collection points available to you for the disposal of your product.

► If your product contains batteries or rechargeable batteries, dispose of them separately from your product.

For more information on take-back and disposal, go to www.gruenbeck.de.

13 Technical specifications



Dimensions and weights			spaliQ Professional
A	Width	mm	397
B	Height	mm	860
C	Depth	mm	160
D	Width of switch cabinet	mm	320
E	Height of switch cabinet	mm	316
F	Depth of switch cabinet	mm	150
G	Distance to wall	mm	20
H	Minimum distance to the floor	mm	≥ 200
Operating weight		kg	~ 16
Empty weight		kg	~ 16

Connection data		spaliQ Professional
Rated voltage	V~	230 (+10 %/-15 %)
Rated frequency	Hz	50 – 60
Rated input	W	~ 17
Power cable with Schuko power plug (length)	mm	~ 1500
Protection / protection class		IP 65/⏚
Fuse protection by client on site	A	≤ 16
Measuring water inlet Hose nozzle		DN 6
Measuring water outlet Hose nozzle		DN 6

Performance data		spaliQ Professional
Nominal pressure		PN 2
Operating pressure in the flow fitting	bar	0.1 – 2.0
Measuring water flow	l/h	> 30
Pressure loss with measuring water flow	bar	≥ 0.15
Cut-off of measuring water filter	µm	≤ 300
pH measuring range		0 – 14
Redox measuring range	mV	0 – 1300
Temperature measuring range	°C	0 – 100

General data		spaliQ Professional
Pool water temperature	°C	0 – 40
Ambient temperature	°C	0 – 40
Humidity (non-condensing)	%	≤ 90
Order no.		**203000010000**

13.1 Interfaces of control unit

- LAN interface for integration into the customer's network
  - For access to the web server
  - For access to the VNC server
  - For internet connection via Cloud
  - For communication with building automation via Modbus TCP/IP
- RS485 interface for communication with building automation via Modbus RTU
- Integrated web server for operation via a web browser
- VNC server for external operation
- Modbus RTU (RS485) and Modbus TCP/IP (LAN/RJ45) for communication with building automation
- 2 x USB interface (reserve)

Outputs

- 3 x Dosing outputs 230 V (pH- or pH+, disinfection, flocculation or pH- or pH+)
- 3 x Dosing outputs Pulse frequency (pH- or pH+, disinfection, flocculation or pH- or pH+)
- Voltage-free output Release partial load operation
- Voltage-free output Heating request
- Voltage-free output Redox GW1/GW2
- Voltage-free output Collective fault signal
- 4 x Analogue outputs (0/4 – 20 mA) for relaying measured values

Inputs

- 3 x Switching inputs for Fault signal Dosing pump or Level Dosing tank (pH, disinfection, flocculation), e.g. for empty signal
- Switching input
  Flow monitoring Measuring water
- Switching input
  Release Control
- Switching input
  Partial load operation
- Switching input
  Flow monitoring Filtrate
- Analogue input (4 – 20 mA) Room temperature
- Analogue input (4 – 20 mA) Room humidity

14 Operation log

- ► Document initial commissioning and all maintenance activities.
- ► Copy the maintenance log.
- ► Make a system data printout of the setting parameters and attach it to the operation log.

Measuring and control system | spaliQ Professional

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14.1 Commissioning log

Customer	
Name	
Address	

Pool version				
Design	☐	Indoor pool	☐	Outdoor pool
	☐	Pool with overflow channel with vertical flow	☐	Pool with overflow channel with horizontal flow
	☐	Pool with skimmer		
Pool lining	☐	Tiled concrete pool	☐	Vinyl-lined pool
	☐	Prefab pool	☐	Sealing mass
Pool size		Length [m] Width [m]		Depth [m³]
		Volume [m³]		
Water heating	☐	Yes	☐	NO
Disinfectant	☐	Sodium hypochlorite GENO-Chlor A		
	☐	Bromine tablets GENO-Brom		
	☐	Activated oxygen GENO-aktiv		

Technology / Mechanical room				
Below water level	☐	Yes	☐	NO
Filter system	☐	GENO-mat F	☐	spaliQ:UF150
	☐	Others		

Installation/Accessories				
Product connected to Cloud	☐	Yes	☐	NO
Floor drain available	☐	Yes	☐	NO
Flocculation dosing	☐	Yes	☐	NO
Dosing pumps / chemical dosing unit	☐	Diaphragm dosing pumps	☐	Hose dosing pumps
	☐	Chemical dosing unit		
Flow controller	☐	Yes		
Hygro thermo transmitter	☐	Yes		
Optional module for chemical refill and empty signal	☐	Yes		

Fresh water/filling water (drinking water quality)	**Unit**
Water temperature	°C
Acid capacity	mmol/l
Water hardness	°dH

Fresh water/filling water (drinking water quality)	Unit
pH value	-
Conductivity	µS

Setting parameters in the setting menu				Unit
Setpoint values				
pH setpoint				
Disinfection setpoint				mg/l
Redox setpoint				mV
Redox setpoint, GW1				mV
Redox setpoint, GW2				mV
Temperature setpoint				°C
Limit values				
pH value Min. alarm				
pH value Max. alarm				
Delay time				min
Disinfection Min. alarm				mg/l
Disinfection Max. alarm				mg/l
Delay time				min
Redox Min. alarm				mV
Redox Max. alarm				mV
Delay time				min
Monitoring Measuring water flow				ON/OFF
Delay time				s
pH dosing 1				
Dosing system	☐	Dosing pump	☐	Pulse pump
Max. pulse frequency / pulse period / response time				
Basic dosing				%
Alarm lock	☐	OFF	☐	ON
Control direction	☐	Acid	☐	Base
Proportional range				
Readjustment time				s
Temperature compensation	☐	OFF	☐	ON
Fault input	☐	Fault signal	☐	Refill signal
Dosing time monitoring				min
Disinfection dosing				
Dosing system	☐	Dosing pump	☐	Pulse pump
	☐	Actuator		
Max. pulse frequency / pulse period / response time				
Actuator	☐	Auto	☐	Open
	☐	Closed		
Time the actuator needs to close from 100 % open to 0 %				s
Basic dosing				%
Alarm lock	☐	OFF	☐	ON
Control direction	☐	Up	☐	Down
Proportional range				
Readjustment time				s
pH correction	☐	OFF	☐	ON
Chlorine transconductance (slope)				Mg/l * mV
Chlorine/pH offset				
Fault input	☐	Fault signal	☐	Refill signal
Dosing time monitoring				min
Flocculation dosing (if applied)				
Dosing system	☐	Dosing pump	☐	Pulse pump

Setting parameters in the setting menu				Unit
Pulse sequence				
Fault input	☐	Fault signal	☐	Refill signal
pH dosing 2 (if applied)				
Dosing system	☐	Dosing pump	☐	Pulse pump
Max. pulse frequency / pulse period / response time				
Basic dosing				%
Alarm lock	☐	OFF	☐	ON
Control direction	☐	Acid	☐	Base
Proportional range				
Readjustment time				s
Fault input	☐	Fault signal	☐	Refill signal
Dosing time monitoring				min
Redox substitute control	☐	OFF	☐	ON
Delay time Release control				min

Connections, hose connections, seals				
Checked for leaks	☐	Yes	☐	No

Remarks

Commissioning	
Installer:	
Service technician	
Company	
Work time certificate (no.)	
Date/signature	

Maintenance no.: ____

Record the measured values and operating data.

Confirm the checks with **OK** or record any repairs carried out.

Operating values

Fresh water/filling water (drinking water quality)	
Water temperature	°C
Acid capacity	mmol/l
Water hardness	°dH
pH value	-
Conductivity	µS

Pool water	Before maintenance	After maintenance
Water temperature	°C	°C
Acid capacity	mmol/l	mmol/l
Water hardness	°dH	°dH
pH value	-	-
Conductivity	µS	µS
Redox value	mV	mV
Disinfection value (free chlorine, bromine)	mg/l	mg/l
Combined chlorine in the pool (if necessary)	mg/l	mg/l
Aluminium in case of flocculation (if necessary)	mg/l	mg/l

Maintenance work

Preliminary activities	OK
Product components checked for cleanliness; cleaned or replaced, if necessary	☐
Product components checked for function and leaks. Faulty components repaired	☐
Hose connections checked, faulty parts or parts weakened by ageing replaced	☐
Product components checked for unusual noises or vibration	☐

pH and Redox electrode	OK
Electrodes checked for function and damage and faulty electrodes replaced	☐
Electrodes cleaned and calibrated	☐

Flow monitoring Measuring water/Flow monitoring Filtrate	OK
Flow monitoring Measuring water checked for function and damage	☐
Flow monitoring Filtrate checked for function and damage	☐

Flow fitting	OK
Flow fitting checked for function, cleanliness and damage	☐
Sampling point checked for function and damage	☐
Measuring water inlet and measuring water outlet checked for damage	☐

Measuring water filter	OK
Measuring water filter checked for function and damage	☐
Filter strainer of measuring water filter cleaned or replaced	☐
Seal of water filter replaced, if necessary	☐

Dosing outlets	OK
Dosing outlets checked for function and damage	☐

Dosing agents	OK
Dosing agent in dosing tank checked for content and shelf life and replaced, if necessary	☐

Remarks
Maintenance kit/s used for maintenance:
Maintenance kit/s required for next maintenance:

Carried out by	
Company	
Service technician (date/signature)	

EU Declaration of Conformity

In accordance with the EU Low-Voltage Directive 2014/35/EU

CE

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

This certificate becomes void if the system is modified in any way not approved by us.

Measuring and control system spaliQ Professional

Serial no.: Refer to type plate

The aforementioned system also complies with the following directives and provisions:

- Directive on the Restriction of Hazardous Substances RoHS (2011/65/EU)

We further confirm compliance with the essential requirements of the EMC Directive 2014/30/EU.

The following harmonised standards have been applied:

- DIN EN ISO 12100: 2011-03
- DIN EN 61010-1: 2020-03
- DIN EN 60335-1: 2020-08
- DIN EN 61326-1: 2013-07

Responsible for documentation: Mirjam Müller

Manufacturer:

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Hoechstaedt/Germany, 09.12.2024

By power of attorney Peter Höß
Head of Technical Systems & Equipment

Notes

Notes

Publisher's information

Technical documentation

Should you have any questions or suggestions regarding this operation manual, please contact Grünbeck's Department for Technical Documentation directly.

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