bürkert
FLUID CONTROL SYSTEMS

Type MS02

Chlorine sensor cube
Chlorine dioxide sensor cube

Operating Instructions

MAN 1000239757 EN Version: D Status: RL (released | freigegeben) printed: 16.01.2025

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1 ABOUT THE OPERATING INSTRUCTIONS

The Operating Instructions describe the entire life cycle of the product. Please keep the Operating Instructions in a safe place, accessible to all users and any new owners.

The Operating Instructions contain important safety information.

Failure to comply with these instructions can lead to hazardous situations.

▸ The Operating Instructions must be read and understood.

1.1 Symbols used

DANGER

Warns against an imminent danger.

▸ Failure to observe this warning can result in death or in serious injury.

WARNING

Warns against a potentially dangerous situation.

▸ Failure to observe this warning can result in serious injury or even death.

ATTENTION

Warns against a possible risk.

▸ Failure to observe this warning can result in substantial or minor injuries.

NOTE

Warns against material damage.

▪ Failure to observe this warning may result in damage to the product or system.

Indicates additional information, advice or important recommendations.

Refers to information contained in the Operating Instructions or in other documents.

▸ Indicates an instruction to be carried out to avoid a danger, a warning or a possible risk.

→ Indicates a procedure to be carried out.

Indicates the result of a specific instruction.

1.2 Definition of the word product

The word "product" used in these Operating Instructions always refers to the chlorine sensor cube (Cl_2) type MS02 or the chlorine dioxide sensor cube (ClO_2) type MS02.

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1.3 Definition of the word system

The word "system" used within these Operating Instructions always refers to the Online Analysis System type 8905.

1.4 Definition of the word büS

The word "büS" used in these Operating Instructions refers to the communication bus developped by Bürkert and based on the CANopen protocol.

1.5 Definition of the term chlorine-containing compound

Depending on your product, the term "chlorine-containing compound" used in this manual refers:

- either to Cl_2 (active chlorine, if pH compensation is inactive, or free chlorine, if pH compensation is active),
- or to ClO_2 (chlorine dioxide).

2 INTENDED USE

Use of this product that does not comply with the instructions could present risks to people, nearby installations and the environment.

- Products marked Cl_2 are intended exclusively for measuring the concentration of the Cl_2 (active chlorine or free chlorine) in the water in an 8905 system.
- To measure the free chlorine, the sensor cube type MS02 marked Cl_2 and a sensor cube type MS01 for pH compensation must be used in combination on the same fluid circuit and the same büS.
- Products marked ClO_2 are intended exclusively for measuring the concentration of the ClO_2 (chlorine dioxide) in the water in an 8905 system.
- This product must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.
- Use the product only in combination foreign devices or foreign components recommended or approved by Bürkert.
- This product must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in the Operating Instructions.
- Requirements for the safe and proper operation of the product are proper transport, storage and installation, as well as careful operation and maintenance.
- Only use the product as intended.

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3 BASIC SAFETY INFORMATION

This safety information does not take into account:

- any contingencies or occurrences that may arise during assembly, use and maintenance of the product.
- the local safety regulations that the operator must ensure the staff in charge of installation and maintenance observe.

Various dangerous situations.

To avoid injury take care:

- to prevent any unintentional power supply switch-on.
- to carry out the installation and maintenance work by qualified and skilled staff with the appropriate tools.
- to use the product only if in perfect working order and in compliance with the instructions provided in these Operating Instructions.
- to observe the general technical rules during the planning and use of the product.
- not to use this product in explosive atmospheres.
- not to use this product in an environment incompatible with the materials from which it is made.
- not to make any modifications to the product.

NOTE

Elements / Components sensitive to electrostatic discharges

- This product contains electronic components sensitive to electrostatic discharges. They may be damaged if they are touched by an electrostatically charged person or object. In the worst case scenario, these components are instantly destroyed or go out of order as soon as they are activated.
- To minimise or even avoid all damage due to an electrostatic discharge, take all the precautions described in the EN 61340-5-1 norm.
- Also ensure that you do not touch any of the live electrical components.

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4 GENERAL INFORMATION

4.1 Contact

To contact the manufacturer of the product use following address:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

The addresses of our international branches can be found on the Internet at: www.burkert.com

4.2 Warranty conditions

The condition governing the legal warranty is the conforming use of the product in observance of the operating conditions specified in these Operating Instructions.

4.3 Informations on the internet

You can find the Operating Instructions and technical data sheets regarding the type MS02 at: www.burkert.com

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5 DESCRIPTION

The product is used in a system type 8905.

The electrical and fluid connections are made via the connection panel of the system type 8905.

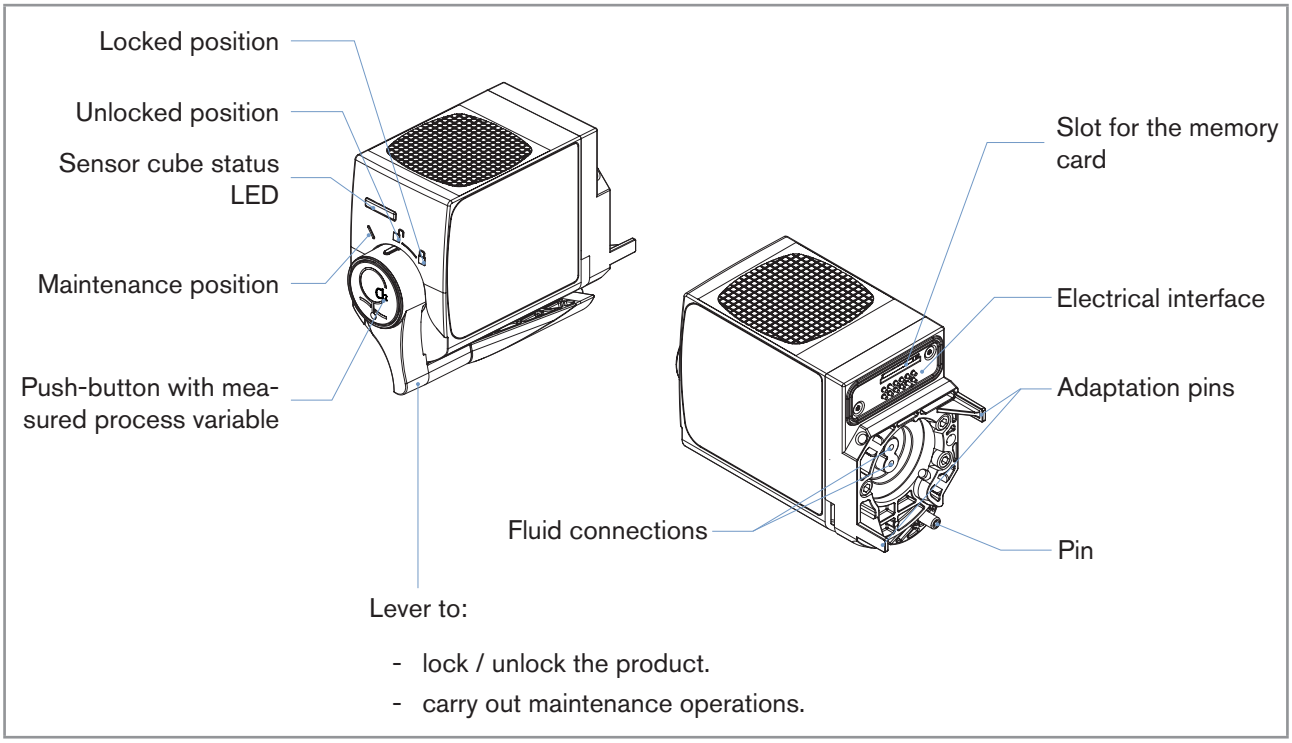

Fig. 1: Description of the product

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6 TECHNICAL DATA

6.1 Conditions of use

Ambient temperature	0...+40 °C
Air humidity	< 90 %, without condensation
Protection rating acc. to EN 60529	▪ IP65, when plugged in the backplane ▪ IP20, as standalone product
Max. height above sea level	2000 m

6.2 Conformity to standards and directives

The product conforms to the CE directives of the system type 8905, only when the product type MS02 is plugged in the system type 8905.

6.3 Materials the product is made of

Part	Material
Housing	PPE+PS
Seal	EPDM
Lever	PC

6.4 Fluid data

▪ Type of fluid	▪ Water, without particles: drinking water, industrial water
▪ pH value	▪ pH 5...9
▪ Conductivity value	▪ > 50 µS/cm
Minimal flow rate	> 6 l/h
Water sample pressure	PN3 bar
Water sample temperature	+3...+40 °C

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6.5 Measurement data

Chlorine measurement (Cl_2)	
▪ Measuring range	▪ 0.01...5 ppm
▪ Sensitivity	▪ -11 nA/ppm
▪ Sensor resolution	▪ 0.01 ppm
▪ Measurement deviation ("measurement bias", as defined in the standard JCGM 200:2012)	▪ ±0.03 ppm or ±5% of the measured value, which ever is greater
▪ Linearity	▪ ±0.02 ppm of the measured value
▪ Repeatability	▪ ±0.02 ppm of the measured value
▪ Response time (t90)	▪ 30 s
Chlorine dioxide measurement (ClO_2)	
▪ Measuring range	▪ 0.005...5 ppm
▪ Sensitivity	▪ –4 nA/ppm
▪ Sensor resolution	▪ 0.001 ppm
▪ Measurement deviation ("measurement bias", as defined in the standard JCGM 200:2012)	▪ ±0.05 ppm or ±3% of the measured value, which ever is greater
▪ Linearity	▪ ±0.01 ppm or ±3% of the measured value, which ever is greater
▪ Repeatability	▪ ±0.01 ppm or ±3% of the measured value, which ever is greater
▪ Response time (t90)	▪ 30 s
Temperature measurement	
▪ Measuring range	▪ 0...+50 °C
▪ Measurement sensor	▪ Pt1000 Class B, no contact with the water sample
Maintenance interval of the chlorine cell	12 months, nominal, depending on the water quality

6.6 Electrical data

Operating voltage	24 V DC through the backplane of the system type 8905
Power consumption	0.8 VA

6.7 Communication

Internal communication	through büS
Product status LED	according to NAMUR NE 107

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7 INSTALLATION

7.1 Safety instructions

NOTE

Risk of damage to the product due to non-conforming installation.

- The electrical and fluidic installations can only be carried out by qualified and skilled staff with the appropriate tools.
- Respect the installation instructions for the system.

NOTE

Risk of damage to the product due to the power supply

- Shut down and isolate the electrical power source before carrying out work on the system.

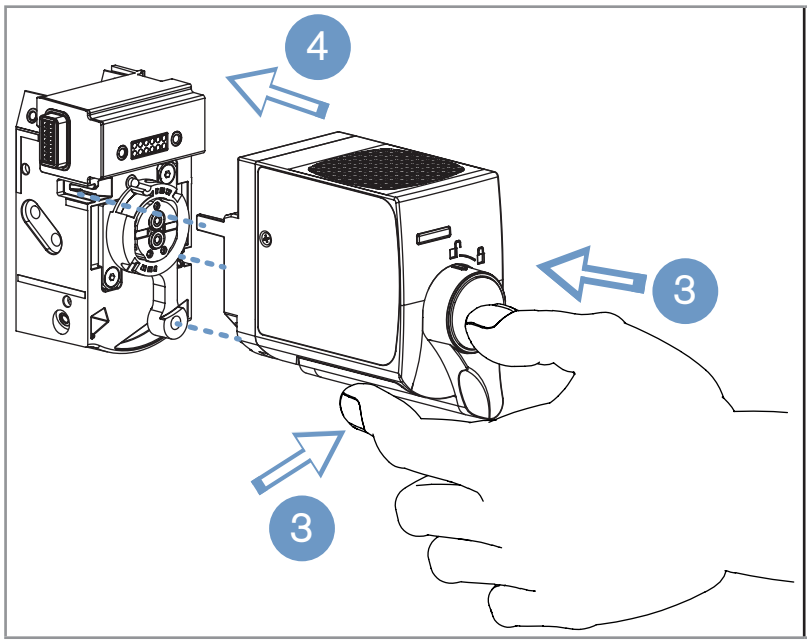
NOTE

Risk of damage to the product due to the environment

- Protect the product against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of the climatic conditions.

7.2 Mounting the product on the backplane

The product is plugged in the backplane of the system Type 8905.



1. Dry the surface of the backplane that will be in contact with the product.
2. Dry the surface of the product.
3. While the push-button is pushed, turn the bayonet lever to the right, on the unlocked position, ☐. Do not push the lever to the maintenance position.
4. Insert the two adaptation pins in their holes and then plug the product in the backplane.
5. While the push-button is pushed, turn the bayonet lever to the left, on the locked position, ☐.

Fig. 2: Mounting a product on the backplane of the system

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8 COMMISSIONING

8.1 Safety instructions

NOTE

Risk of damage to the product due to non-conforming commissioning.

- Before commissioning, make sure that the staff in charge have read and fully understood the contents of these Operating Instructions.
- In particular, observe the safety recommendations and intended use.
- The product / the installation must only be commissioned by suitably trained staff.

NOTE

Risk of damage to the product due to the environment.

- This product must be protected against electromagnetic interference, ultraviolet rays and, when installed outdoors, the effects of climatic conditions.

8.2 Commissioning the product

After the product has been installed on the backplane:

→ check the fluidic and electrical installations of the system.

→ check the tightness of the system.

→ operate the product for 12 hours with the circulating process water.

→ after the 12 hours have elapsed, compare the measured value with the actual value of the process water.

→ if necessary, calibrate and adjust the product.

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9 ADJUSTMENT AND OPERATION

9.1 Safety instructions

NOTE

Risk of damage to the product due to non-conforming adjustment.

- The operators in charge of adjustment must have read and understood the contents of these Operating Instructions.
- The operators in charge of adjustment must have read and understood the contents of the Operating Instructions of the display software type ME21 and/or the contents of the Operating Instructions of the Bürkert Communicator software type 8920 and/or the Operating Instructions of the controller module type ME25.
- In particular, observe the safety recommendations and intended use.
- The product/installation must only be adjusted by suitably trained staff.

NOTE

Risk of damage to the product due to non-conforming operation.

- The operators in charge of operation must have read and understood the contents of these Operating Instructions.
- In particular, observe the safety recommendations and intended use.
- The product/installation must only be operated by suitably trained staff.

9.2 How to adjust the product

The adjustment of the product can be made:

- either with the display of the system type 8905. The display of the system is managed by the software type ME21. See chap. 9.3.
- or with a PC and the Bürkert Communicator software type 8920. To get general information about the software type 8920, refer to the Operating Instructions of the type 8920.

9.3 General information on the display software type ME21

These Operating Instructions explain the adjustments that are specific to the chlorine sensor cube type MS02.

→ To get general information about the display software type ME21, refer to the Operating Instructions of the type ME21 that is on the CD delivered with the system and available on the internet at www.burkert.com.

The Operating Instructions of the display software type ME21:

- give general information on the software, such as the description of the user interface, the structure of the menus, the description of the possible views ("Device" view for example), the description of the navigation buttons.
- explain how to make the general adjustments such as: the display language, the locating of the product...
- explain how to configure and customize the "Desktop" views with values or graphs.
- give general information on the error messages and the operating of the system status light.

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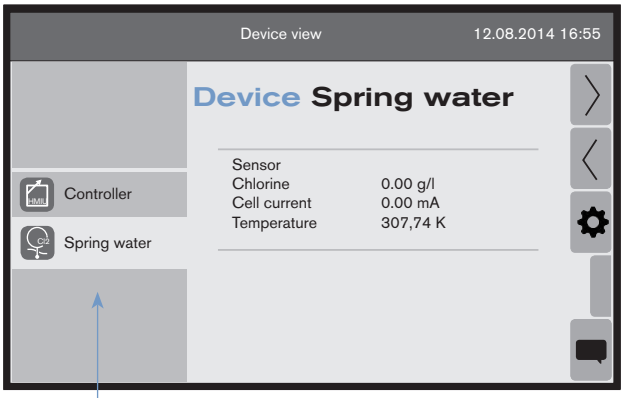
9.4 Device view of the product

The "Device" view shows some of the measurement data related to the product.

→ If the display shows a "Desktop" view, tap  to access the "Device" view.

→ To display the "Device" view of the product, select the product in the list of devices on the left of the display.



The following data can be read from the "Device" view of the product:

- the devices that are connected on büS with their "Description". The Description can be modified in the Function view of büS.
- the measured value of the chlorine-containing compound concentration in the water sample.
- the value of the current measured by the chlorine-containing compound cell.
- the measured value of the temperature of the water sample.

Table 1: "Device" view of the product (example of the chlorine sensor cube Cl_2 with the description "Spring water")

→ To display the "Function" view of the product, tap  .

9.5 "Function" view of the product

The "Function" view shows the functions available for a product and, for each function, the main data related to each function.

To display the "Function" view of the product:

1. select the product in the list of devices, on the left of the display,
2. tap  .

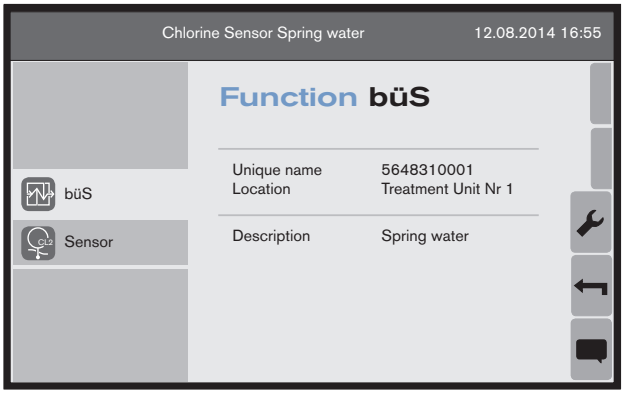
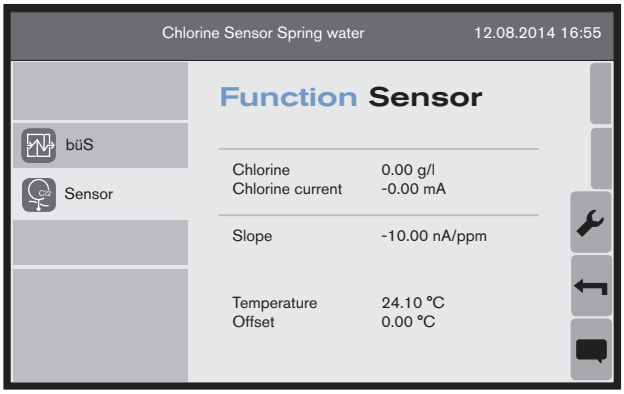
	**"Function" view of büS** → To display the "Function" view of büS the product is connected to, select "büS" in the list of devices on the left of the display. → Tap  to access the "Parameter" view. See chap. 9.6.
	**"Function" view of the sensor** → To display the "Function" view of the sensor, select "Sensor" in the list of devices on the left of the display. → Tap  to access the "Parameter" view. See chap. 9.7.

Table 2: "Function" views of the product; Function view of büS and Function view of the sensor (example of the chlorine sensor cube Cl_2)

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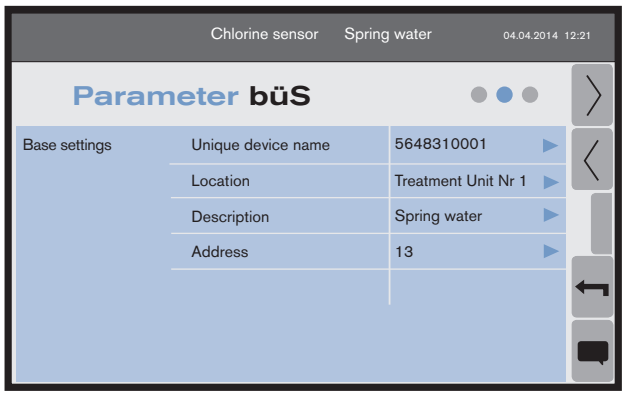
9.6 Detailed views of the büS function



"Parameter" detailed view of büS

- **Unique device name** is used by the participants connected on büS (including possible displays). If the **Unique device name** is changed, the participants lose the link with the product. Only a user with Installer access rights can modify the **Unique device name**. Only modify the **Unique device name** if 2 products connected on büS have the same name (for example 2 Cl_2 sensor cubes).

→ In this case, choose a **Unique device name** that explicitly identifies the product, because if the **Unique device name** is changed, all the büS parameters must be changed.

- **Location** is used to enter the product location.
- **Address** of the CANopen node.

The **Description** parameter is used to identify the product in the system. The description is displayed:

- in the list of devices, next to the symbol corresponding to the product,
- in the header of each detailed view of the product, next to the device name,
- and in the custom views.

Table 3: "Parameter" view of the "büS" function

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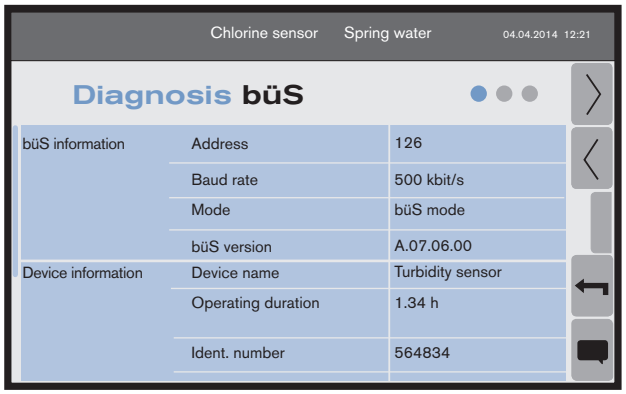
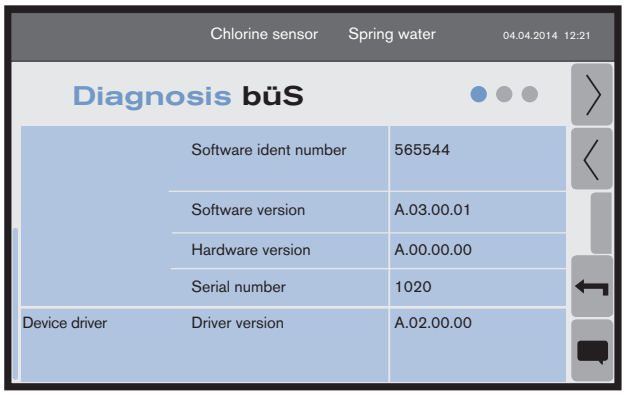




"Diagnosis" detailed view of büS

Read only fields, whatever the user level.

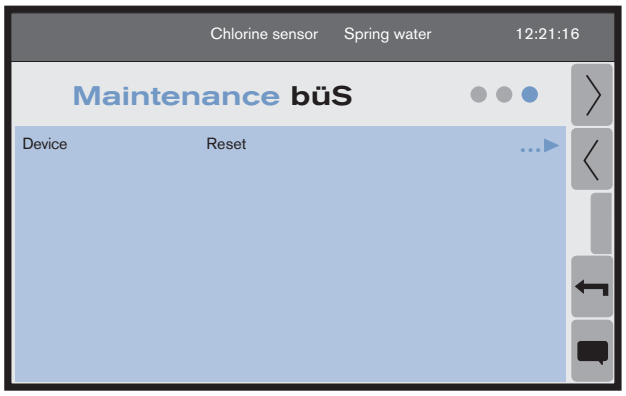
Information about büS:

- **Address** of the CANopen node.
- **Baud rate** for information transmitted via büS.
- **Mode** of operation of the communication bus.
- **büS version**

Information about the product:

- **Device name**
- **Operating duration** indicates the number of operating hours of the product
- **ident. number**: product order code.
- **Software ident number**: order code for the software installed on the product.
- **Software version**: version of the software installed on the product.
- **Hardware version**: hardware version of the product.
- **Serial number**: serial number of the product.
- **Driver version:** version of the driver installed on the product.

Table 4: "Diagnosis" view of the "büS" function



"Maintenance" detailed view of büS

This function is available from the **Advanced user** level.

Used to restart the product.

Table 5: "Maintenance" view of the "büS" function

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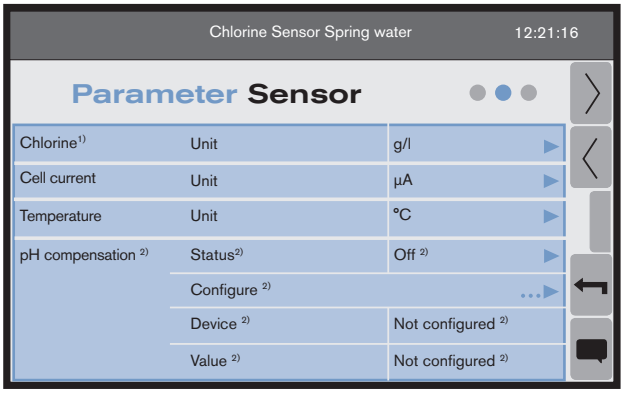
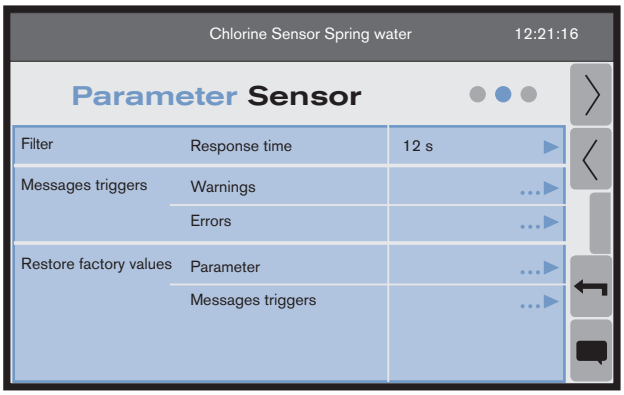
9.7 Parameter view of the sensor

→ In the "Function" view, tap to access the "Parameter" view.





1) Or **Chlorine dioxide**, for a chlorine dioxide sensor cube (ClO_2)

2) Only chlorine sensor cube (Cl_2)

- These parameters, with the exception of the **Unit** parameters, can be edited with a user level of at least: **Advanced user**.
- The **Unit** parameters can be edited by any user level.

The "Parameter" view of the sensor makes it possible:

- to change the units of a measured physical quantity. See chap. 9.7.1.
- to measure the concentration of free chlorine with a chlorine sensor cube Cl_2. See chap. 9.7.2.
- deactivate the pH compensation and measure the active chlorine concentration. See chap. 9.7.3.
- dampen the measurement variations of the concentration. See chap. 9.7.4.
- monitor the chlorine-containing compound concentration in the water. See chap. 9.7.5.
- monitor the water temperature. See chap. 9.7.6.
- reset certain parameters. See chap. 9.7.7 and chap. 9.7.8.

Table 6: "Parameter" view of the sensor

9.7.1 Changing the unit of a measured physical quantity

The following measured quantity units can be changed:

- the chlorine-containing compound concentration,
- the current measured by the chlorine-containing compound cell,
- the temperature.

If you change a unit, the associated values are automatically recalculated (e.g., the threshold values for monitoring the process values).

Procedure for changing the unit by a measured physical quantity:

1. In the "Parameter" view of the sensor, select the physical quantity.
2. Select a unit.
3. Confirm.

✔ The units are set.

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9.7.2 Measuring the free chlorine concentration with a chlorine sensor, Cl_2

When it leaves the factory, the chlorine sensor Cl_2 is set to measure the active chlorine concentration.

→ To measure the free chlorine concentration, activate the pH compensation.

To activate the pH compensation, a pH sensor cube type MS01 must be installed on the same fluid circuit and connected to the same büS.

Procedure:

1. Tap **pH compensation** **Configure** ...▶ in the "Parameter" view of the sensor.
2. Select the pH sensor cube used for the pH compensation.
3. Confirm.
4. Tap **pH compensation** **Status** **Off** ▶ in the "Parameter" view of the sensor.
5. Tap **Off**: **On** is displayed.
6. Confirm.

The pH compensation is activated and the product measures the free chlorine concentration.

9.7.3 Deactivating the pH compensation and measuring the active chlorine concentration

When the pH compensation is activated, the product measures the free chlorine.

→ To measure the active chlorine concentration, the pH compensation must be deactivated.

Procedure:

1. Tap **pH compensation** **Status** **On** ▶ in the "Parameter" view of the sensor.
2. Tap **On**: **Off** is displayed.
3. Confirm.

The pH compensation is deactivated and the product measures the active chlorine concentration.

9.7.4 Reducing the measurement variations of the concentration

To reduce the measurement variations of the concentration, adjust the digital filter.

→ Define a response time T10-90 for the signal measured. The longer the response time, the more the measurement variations are reduced.

Procedure:

1. Tap **Filter** **Response time** **30 s** ...▶ in the "Parameter" view of the sensor.
2. Enter a value in seconds.
3. Confirm.

The measurement variations are reduced.

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9.7.5 Monitoring the chlorine-containing compound concentration in the water

The chlorine-containing compound concentration can be monitored to detect any problems in the process.

2 minimum values and 2 maximum values can be entered:

- 1 maximum warning value and 1 minimum warning value. If one of these values is reached, a warning message is triggered and the system status light is orange.
- 1 maximum error value and 1 minimum error value. If one of these values is reached, an error message is triggered and the system status light is red.

When one of these values is reached and corresponding activation flag is selected, an error or warning message is triggered in the "Message List": tap  to go to the "Message List". See chap. 10.5 Troubleshooting if the status LED of the product is red or orange for more details on troubleshooting.

Activation procedure for the warning message trigger:

1. Tap **Messages triggers** **Warnings** ...▶ in the "Parameter" view of the sensor.
2. Tap **Warning triggers** **Low concentration** ▶ and enter the minimum value for the chlorine-containing compound content for which a warning message is triggered.
3. Confirm.
4. Tap **Warning triggers** **High concentration** ▶ and enter the maximum value for the chlorine-containing compound content for which a warning message is triggered.
5. Confirm.
6. Tap **Warning triggers** **Activation flag** ▶ and select **Low concentration** and / or **High concentration**.
7. Confirm.

Activation procedure for the error message trigger:

1. Tap **Messages triggers** **Errors** ...▶ in the "Parameter" view of the sensor.
2. Tap **Error triggers** **Low concentration** ▶ and enter the minimum value for the chlorine-containing compound content for which an error message is triggered.
3. Confirm.
4. Tap **Error triggers** **High concentration** ▶ and enter the maximum value for the chlorine-containing compound content for which an error message is triggered.
5. Confirm.
6. Tap **Error triggers** **Activation flag** ▶ and select **Low concentration** and / or **High concentration**.
7. Confirm.

✔ Monitoring of the maximum chlorine-containing compound concentration and the minimum chlorine-containing compound concentration is active.

9.7.6 Monitoring the water temperature

The water temperature can be monitored to detect any problems in the process.

2 minimum values and 2 maximum values can be entered:

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- 1 maximum warning value and 1 minimum warning value. If one of these values is reached, a warning message is triggered and the system status light is orange.
- 1 maximum error value and 1 minimum error value. If one of these values is reached, an error message is triggered and the system status light is red.

When one of these values is reached and corresponding activation flag is selected, an error or warning message is triggered in the "Message List": tap  to go to the "Message List". See chap. 10.5 Troubleshooting if the status LED of the product is red or orange for more details on troubleshooting.

Activation procedure for the warning message trigger:

1. Tap **Messages triggers** **Warnings** ...▶ in the "Parameter" view of the sensor.
2. Tap **Warning triggers** **Low temperature** ▶ and enter the minimum temperature value for which a warning message is triggered.
3. Confirm.
4. Tap **Warning triggers** **High temperature** ▶ and enter the maximum temperature value for which a warning message is triggered.
5. Confirm.
6. Tap **Warning triggers** **Activation flag** ▶ and select **Low temperature** and / or **High temperature**.
7. Confirm.

Activation procedure for the error message trigger:

1. Tap **Messages triggers** **Errors** ...▶ in the "Parameter" view of the sensor.
2. Tap **Error triggers** **Low temperature** ▶ and enter the minimum temperature value for which an error message is triggered.
3. Confirm.
4. Tap **Error triggers** **High temperature** ▶ and enter the maximum temperature value for which an error message is triggered.
5. Confirm.
6. Tap **Error triggers** **Activation flag** ▶ and select **Low temperature** and / or **High temperature**.
7. Confirm.

✔ Monitoring of the maximum water temperature and the minimum water temperature is active.

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9.7.7 Resetting certain parameters

This function is used to reset the following parameters:

- the temperature offset value (chap. 9.9.6),
- the measurement filter value (chap. 9.7.4),
- the pH compensation parameters (chap. 9.7.2).

Procedure:

1. Tap **Restore factory values Parameter** ...▶ in the "Parameter" view of the sensor.
2. Confirm.

✔ The parameters are reset.

9.7.8 Resetting the process value monitoring parameters

This function is used to reset the parameters for monitoring the process values (chap. 9.7.5 and chap. 9.7.6).

Procedure:

1. Tap **Restore factory values Messages triggers** ...▶ in the "Parameter" view of the sensor.
2. Confirm.

✔ The parameters for monitoring the process values are reset.

9.8 Diagnostic view of the sensor

9.8.1 Reading the measured value of the chlorine-containing compound concentration in the water sample

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Chlorine** or in the field **Monitored values Chlorine dioxide**.

9.8.2 Reading the value of the current measured by the chlorine-containing compound cell

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Cell current**.

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9.8.3 Reading the adjustment value of the zero-point of the chlorine-containing compound cell

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Zero adjustment**.

9.8.4 Reading the concentration offset value

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Concentration offset**.

9.8.5 Reading the sensor slope value

The slope value of the chlorine-containing compound has been either calculated during the calibration or entered in the "Maintenance" view of the sensor.

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Slope**.

9.8.6 Reading the measured value of the water sample temperature

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Temperature**.

9.8.7 Reading the temperature offset value

The temperature offset value has been entered in the "Maintenance" view of the sensor.

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Temperature offset**.

9.8.8 Reading the measured value of the temperature of the electronic measurement board

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values PCB temperature**.

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9.8.9 Reading the polarising voltage set point value in the chlorine-containing compound cell

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Required polarization**.

9.8.10 Reading the polarising voltage value measured in the chlorine-containing compound cell

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Measured polarization**.

9.8.11 Reading the operating time of the product

This function shows the operating time of the product since initial commissioning.

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the value in the field **Monitored values Cell working time**.

9.8.12 Reading the calibration limits of the sensor slope value

This function shows the operating time of the product since initial commissioning.

→ In the "Parameter" view of the sensor, tap  to go to the "Diagnostic" view of the sensor.

→ In the "Diagnostic" view of the sensor, take a reading of the values in the fields:

- **Slope limits Warning limit low**
- **Slope limits Warning limit high**
- **Slope limits Error limit low**
- **Slope limits Error limit high**

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9.9 Maintenance view of the sensor

9.9.1 Manually setting the zero point of the product

→ To calibrate and automatically adjust the zero point of the product, see chap. 9.9.2.

To do the settings in the "Maintenance" view of the sensor, you must have user level **Installer**.

Procedure for manual setting of the zero point of the product:

1. In the "Parameter" view of the sensor, tap > to go to the "Maintenance" view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Chlorine** **Zero adjustment** ▶ or **Chlorine dioxide** **Zero adjustment** ▶.
3. Enter the value.
4. Confirm.

The zero current point of the sensor is adjusted.

9.9.2 Calibrating and automatically adjusting the zero point of the product

To do the settings in the "Maintenance" view of the sensor, you must have user level **Installer**.

→ To manually set the zero point of the product, see chap. 9.9.1.

Procedure for calibrating and automatically adjusting the zero point of the product:

1. In the "Parameter" view of the sensor, tap > to go to the "Maintenance" view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Chlorine calibration** **Zero adjustment** ▶ or **Chlorine dioxide calibration** **Zero adjustment** ▶.
3. Step 1/4: prepare the reference solution.
4. Let the reference solution flow through the sensor.
5. >
6. Step 2/4: wait until the values displayed are stable.
7. > When the values displayed are stable.
8. Step 3/4:

→ to abort the adjustment of the zero point of the product, tap ×.

The zero point of the product is not adjusted.

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→ to automatically adjust the zero point of the product, tap >.

✔ The zero point of the product is adjusted.

9.9.3 Manually setting the sensor slope

To do the settings in the "Maintenance" view of the sensor, you must have user level **Installer**.

You can set the sensor cube slope without making a calibration.

To make a 1-point calibration and, if necessary, automatically adjust the sensor slope, see chap. 9.9.4 and chap. 9.9.5.

Procedure for manually setting the sensor slope value:

1. > in the "Parameter" view of the sensor to go to the "Maintenance" view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Chlorine Slope** ▶ or **Chlorine dioxide Slope** ▶.
3. Enter the value.
4. Confirm.

✔ The sensor slope is set.

9.9.4 1-point calibration and automatic adjustment of the sensor slope, off-line

To perform a calibration, you must have user level **Installer**.

DANGER

Danger due to the nature of the reference solution.

▸ Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

This procedure is used for the 1-point calibration of the sensor, off-line, to automatically adjust the sensor slope value.

→ To make a 1-point calibration with the process water, follow only the instructions in chap. 9.9.5.

1. Connect a peristaltic pump in the water sample inlet circuit of the system, as shown in Fig. 3. If the fluidic connections are not done correctly, the product and the system can be damaged because the pressure in the product and in the system is too high.
2. Make sure the direction of the flow is correct.
3. Make sure the fluidic installation for the calibration is tight.
4. Let clean water flow through the system to rinse the product.
5. Prepare a solution 2 to 3 times more concentrated in chlorine-containing compound than the concentration in the water sample to be analysed.
6. Let the prepared solution flow through the sensor cube for 4 hours.

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7. Either determine the free chlorine concentration of the prepared solution by colorimetry with the reagent DPD-1. If the product measures the active chlorine, calculate the active chlorine concentration using the following formula: [active chlorine] = [free chlorine] / (1 + 10^{pH-pKa}), where pKa = 7.53 at 25°C.
8. Or determine the chlorine dioxide concentration of the prepared solution by colorimetry with the reagent DPD-1 and multiply that value by 1.9.
9. Follow instructions 3 to 11 in chap. 9.9.5 1-point calibration and automatic adjustment of the sensor slope, with the process water.

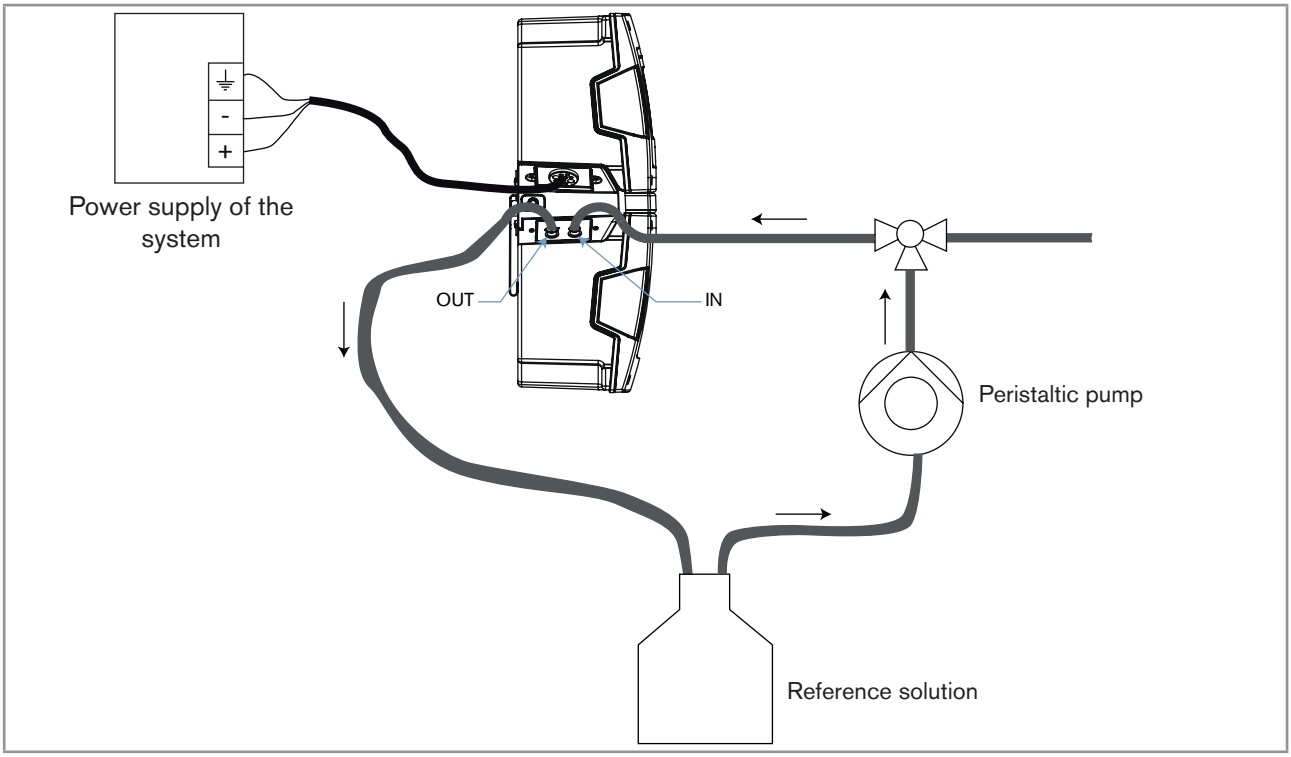

Fig. 3: Installation for calibration of the product off-line

9.9.5 1-point calibration and automatic adjustment of the sensor slope, with the process water

To perform a calibration, you must have user level **Installer**.

DANGER

Danger due to the nature of the reference solution.

▸ Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

This procedure is used for the 1-point calibration of the sensor with the process water to automatically adjust the sensor slope value.

→ To make a 1-point calibration off-line, follow only the instructions in chap. 9.9.4.

→ Before calibrating the sensor with the process water, run the full commissioning procedure.

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1. Either determine the free chlorine concentration of the process water by colorimetry with the reagent DPD-1. If the product measures the active chlorine, calculate the active chlorine concentration using the following formula: [active chlorine] = [free chlorine] / (1 + 10^{pH-pKa}), where pKa = 7.53 at 25°C.
2. Or determine the chlorine dioxide concentration of the process water by colorimetry with the reagent DPD-1 and multiply that value by 1.9.
3. In the "Maintenance" view of the sensor, tap **Chlorine calibration 1 point** ...► or **Chlorine dioxide calibration 1 point** ...►.
4. Step 1/5: wait until the measurement is stable.
5. Tap  .
6. Step 2/5: to adjust the sensor cube, tap **Input reference solution value** ► and enter the chlorine-containing compound concentration of the solution previously determined.
7. Confirm.
8. Tap  .
9. Step 3/5: when the measurement of the chlorine-containing compound concentration is stable, tap  .
10. Step 4/5:

- if the adjustment has succeeded, the calculated slope value is displayed and the date of the last calibration is updated (see chap. 9.9.8). Tap  to go to the step 5/5.
- if an error message is displayed, refer to Table 7.
- if a warning message is displayed, refer to Table 8.

11. Step 5/5: confirm or cancel the adjustment.

Displayed message	Computed calibration value out of error limits
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The sensor calibration has failed because the calculated slope value is out of the error range.
What to do?	1. Compare the calculated slope value with the calibration limits that can be read in the "Diagnosis" view of the sensor. 2. Replace the product by a new one.

Table 7: Error message at the end of the 1 point calibration of the product

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Displayed message	Computed calibration value out of warning limits	
Symbol displayed on the icon of the product, in the list of devices		
Possible cause	The calculated slope value is out of the warning range because:	
What to do?	▪ either a wrong solution has been used for the calibration.	▪ or the product is aging.
Solution	1. Make sure the reference solution used is the correct one. 2. Use a correct reference solution and do the complete calibration procedure again.	→ You can choose to either validate or cancel the adjustment. ▪ If you validate the adjustment, the new calculated slope value is used to determine the chlorine concentration, and the last calibration date is updated. ▪ If you cancel the adjustment, the current slope value is used to determine the chlorine concentration, and the last calibration date is not updated. → Plan to replace the product.

Table 8: Warning message at the end of the 1 point calibration of the product

9.9.6 Setting the temperature offset value of the process water

To do the settings in the "Maintenance" view of the sensor, you must have user level **Installer**.

The temperature of the process water measured by the sensor can be corrected with an offset value.

1. in the "Parameter" view of the sensor to go to the Maintenance view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Temperature calibration Offset**.
3. Enter the value in the units displayed.
4. Confirm.
5. To change the temperature units, go to the "Parameter" view of the sensor and tap **Temperature Unit**.
6. Select the temperature units: the temperature offset value is automatically converted.
7. Confirm.

The offset value of the process water temperature is modified.

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9.9.7 Simulating process values to check that the product is working properly, stopping the simulation

To simulate process values, you must have user level **Installer**.

This function can be used, for example, to ensure that the warning and/or error limits have been entered correctly.

1. in the "Parameter" view of the sensor to go to the Maintenance view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Simulation** **Status** ▶.
3. Tap **Off**: **On** is displayed.
4. Confirm.
5. To simulate a chlorine-containing compound concentration, tap **Simulation** **Concentration** ▶ and enter the chlorine-containing compound concentration value to be simulated.
6. Confirm.
7. To simulate a temperature value, tap **Simulation** **Temperature** ▶ and enter the temperature value to be simulated.
8. Confirm.

✔ The values entered are emitted.

9. To stop the simulation of process values, tap **Simulation** **Status** ▶.
10. Tap **On**: **Off** is displayed.
11. Confirm.

✔ The simulation is stopped.

9.9.8 Reading the date of the last calibration

To read the date of the last calibration that has succeeded.

→ in the "Parameter" view of the sensor to go to the Maintenance view of the sensor.

→ In the "Maintenance" view of the sensor, read the date in the field **Calibration schedule** **Last**.

9.9.9 Reading the date of the next due calibration

To read the date of the next calibration that must done.

→ in the "Parameter" view of the sensor to go to the Maintenance view of the sensor.

→ In the "Maintenance" view of the sensor, read the date in the field **Calibration schedule** **Next**.

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9.9.10 Setting the time interval between two calibrations

To do the settings in the "Maintenance" view of the sensor, you must have user level **Installer**.

To set the time interval, in days, between two calibrations:

1. in the "Parameter" view of the sensor to go to the Maintenance view of the sensor.
2. In the "Maintenance" view of the sensor, tap **Calibration schedule** **Interval in days**.
3. Tap the number of days between two calibrations. We recommend to calibrate the product every month.
4. Confirm.

The time interval between 2 calibrations is set. When the due calibration date is reached, a warning message is displayed in the Messages List.

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10 MAINTENANCE AND TROUBLESHOOTING

10.1 Safety instructions

WARNING

Risk of injury due to non-conforming maintenance.

▸ Maintenance must only be carried out by qualified and skilled staff with the appropriate tools.

NOTE

Risk of damage to the product due to the power supply

▪ Shut down and isolate the electrical power source before carrying out work on the system.

10.2 Cleaning of the product

DANGER

Risk of injury due to the nature of the detergent.

▸ Respect the regulations on accident prevention and safety relating to the use of aggressive fluids.

The product can be cleaned with a cloth dampened with water (max. 40 °C) or with an acid detergent (with max. 5% of hydrochloric acid).

10.3 Regular maintenance operations

→ Once a month, check the measurements.

→ Calibrate the product and, if necessary, adjust the product accordingly. See chap. 9.9.3 Manually setting the sensor slope or chap. 9.9.5 1-point calibration and automatic adjustment of the sensor slope, with the process water.

10.4 Troubleshouting if no message is displayed

Colour of the product status LED	OFF
Possible cause	The product / the system is not energized.
What to do?	1. Check the wiring. 2. Make sure the voltage supply is 24 V DC. 3. Check that the power supply source is working properly.

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10.5 Troubleshooting if the status LED of the product is red or orange

If an error or a warning message has been generated by the system:

- the status light of the system is red or orange,
- the status LED of the product is red or orange,
- the symbol  or  appears on the Unique Device Name of the product, in the list of devices,
- the symbol  appears in the top left corner of the display.

→ Tap  to access the "Messages List".

10.5.1 Message "Too high chlorine value" or "Too high chlorine dioxide value"

Displayed message	Too high chlorine value or Too high chlorine dioxide value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The value of the chlorine-containing compound concentration in the water sample exceeds the maximum error value defined by the user. See chap. 9.7.5 Monitoring the chlorine-containing compound concentration in the water.
What to do?	→ Check the process.

Displayed message	Too high chlorine value or Too high chlorine dioxide value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The value of the chlorine-containing compound concentration in the water sample exceeds the maximum warning value defined by the user. See chap. 9.7.5 Monitoring the chlorine-containing compound concentration in the water.
What to do?	→ Check the process.

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10.5.2 Message "Too low chlorine value" or "Too low chlorine dioxide value"

Displayed message	Too low chlorine value or Too low chlorine dioxide value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The value of the chlorine-containing compound concentration in the water sample exceeds the minimum error value defined by the user. See chap. 9.7.5 Monitoring the chlorine-containing compound concentration in the water.
What to do?	→ Check the process.

Displayed message	Too low chlorine value or Too low chlorine dioxide value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The value of the chlorine-containing compound concentration in the water sample exceeds the minimum warning value defined by the user. See chap. 9.7.5 Monitoring the chlorine-containing compound concentration in the water.
What to do?	→ Check the process.

10.5.3 Message "Too high temperature value"

Displayed message	Too high temperature value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The temperature value of the water sample exceeds the maximum error value defined by the user. See chap. 9.7.6 Surveiller la température de l'eau.
What to do?	→ Check the process.

Displayed message	Too high temperature value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The temperature value of the water sample exceeds the maximum warning value defined by the user. See chap. 9.7.6 Surveiller la température de l'eau.
What to do?	→ Check the process.

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10.5.4 Message "Too low temperature value"

Displayed message	Too low temperature value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The temperature value of the water sample exceeds the minimum error value defined by the user. See chap. 9.7.6 Surveiller la température de l'eau.
What to do?	→ Check the process.

Displayed message	Too low temperature value
Symbol displayed on the icon of the product, in the list of devices	
Possible cause	The temperature value of the water sample exceeds the minimum warning value defined by the user. See chap. 9.7.6 Surveiller la température de l'eau.
What to do?	→ Check the process.

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11 SPARE PARTS AND ACCESSORIES

CAUTION

Risk of injury and/or damage caused by the use of unsuitable parts.

Incorrect accessories and unsuitable replacement parts may cause injuries and damage the product and the surrounding area.

▸ Use only original accessories and original replacement parts from Bürkert.

12 PACKAGING, TRANSPORT

NOTE

Damage due to transport

Transport may damage an insufficiently protected product.

- Transport the product in shock-resistant packaging and away from humidity and dirt.
- Do not expose the product to temperatures that may exceed the admissible storage temperature range.
- Protect the electrical interfaces using protective plugs.

13 STORAGE

NOTE

Poor storage can damage the product.

▸ Obey the storage instructions in the chapter 13.1.

▸ After any storage period, obey the instructions in chap. 13.2.

13.1 To store the product

1. Rinse the product with tap water.
2. Purge the product with air at a max. pressure of 2 bar.
3. Store the product at room temperature (about 23 °C ±10 °C).
4. Store the product in a dry place away from dust.

13.2 After storage

Before commisioning a product that has been stored:

1. Plug the product in the system.
2. Let the water sample flow through the product for at least 12 hours.
3. Calibrate the product. See chap. 9.7.

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14 DISPOSAL OF THE PRODUCT

→ Dispose of the product and its packaging in an environmentally-friendly way.

NOTE

Damage to the environment caused by products contaminated by fluids.

- Keep to the existing provisions on the subject of waste disposal and environmental protection.

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