bürkert
FLUID CONTROL SYSTEMS

Type 8232

Chlorine sensor

Operating Instructions

MAN 1000306895 EN Version: BStatus: RL (released | freigegeben) printed: 05.05.2021

Operating Instructions 1610/01_EU-ML 00566160 / Original EN

1. ABOUT THESE OPERATING INSTRUCTIONS

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

These Operating Instructions contain important safety information.

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

- These 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 sensor or system.

Indicates additional information, advice or important recommendations.

Refers to information contained in these 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.

1.2. Definition of the word "sensor"

The word "sensor" used within these Operating Instructions refers:

- to the chlorine sensor type 8232
  or
- to the "trace" chlorine sensor type 8232.

The marking "trace" can be read from the name plate. See chap. 5.3.

2. INTENDED USE

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

The chlorine sensor type 8232 is used to measure the free chlorine concentration in water.

The "trace" chlorine sensor type 8232 is used to measure chlorine concentration in water at very low concentrations or to monitor the absence of chlorine.

- Use the sensor only in combination with foreign devices or foreign components recommended or approved by Bürkert.
- The sensor must be used in compliance with the characteristics and commissioning and use conditions specified in the contractual documents and in these Operating Instructions.
- Requirements for the safe and proper operation of the sensor are proper transport, storage and installation, as well as careful operation and maintenance.
- Only use the sensor as intended.

3. BASIC SAFETY INFORMATION

The safety information does not take into account:

- any contingencies or occurrences that may arise during installation, use and maintenance of the devices.
- the local safety regulations for which the operating company is responsible including the staff in charge of installation and maintenance.

Risk of injury due to electrical voltage

Risk of injury due to high pressure in the installation

Risk of injury due to the nature of the fluid

Risk of injury due to the nature of the electrolyte

Various dangerous situations

To avoid injury take care:

- to prevent any unintentional power supply switch-on.
- to ensure that installation and maintenance work are carried out by qualified, authorised personnel in possession of the appropriate tools.
- to guarantee a set or controlled restarting of the process, after a power supply interruption.

Various dangerous situations (continued)

To avoid injury take care:

- to use the sensor only if in perfect working order and in compliance with the instructions provided in the Operating Instructions.
- to observe the general technical rules when installing and using the sensor.
- not to use the sensor in explosive atmospheres.
- not to use fluid that is incompatible with the materials from which the sensor is made.
- not to use the sensor in an environment incompatible with the materials from which it is made.
- not to subject the sensor to mechanical loads.
- not to make any modifications to the sensor.

4. GENERAL INFORMATION

4.1. International contacts

To contact us:

Bürkert SAS

Rue du Giessen

BP 21

F-67220 TRIEMBACH-AU-VAL

You may also contact your local Bürkert sales office.

The addresses of our international sales offices are available on the internet at: www.burkert.com

4.2. Warranty conditions

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

4.3. Information on the Internet

You can find the Operating Instructions and the technical data sheets regarding the sensor type 8232 at: www.burkert.com

5. DESCRIPTION

5.1. Area of application

- The chlorine sensor type 8232 is used to measure the chlorine concentration in liquids.
- The "trace" chlorine sensor type 8232 is used to measure the chlorine concentration in liquids at very low concentrations or to monitor the absence of chlorine. This sensor can be used in water without containing any chlorine up to four weeks.

The sensor must be installed in an analytical measurement chamber type 8200. See chap. 10.2.

5.2. Knowing the sensor

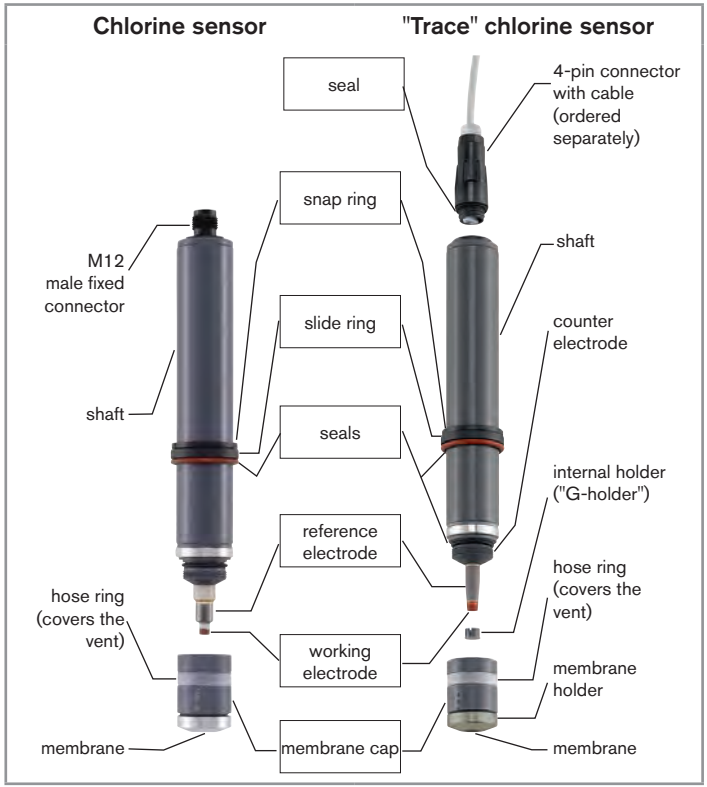
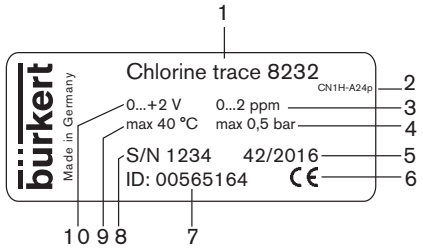


Fig. 1 : Description of the sensor

5.3. Description of the name plate



1. Name and type of the sensor
2. Manufacturing code
3. Measuring range at nominal slope
4. Maximum medium pressure
5. Manufacturing date
6. Conformity marking
7. Order code
8. Serial number
9. Maximum medium temperature
10. Type of output signal

Fig. 2 : Name plate (example)

6. TECHNICAL DATA

6.1. Operating conditions

Ambient temperature	For "trace" chlorine sensor (order code 565164): 0...+40 °C
	For chlorine sensor (order codes 568524 [1] or 568523 [2]): 0...+45 °C
Air humidity	< 90%, without condensation
Height above sea level	Max. 2000 m

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

6.2. Conformity to standards and directives

The applied standards, which verify conformity with the EU Directives, can be found on the EU Type Examination Certificate and/or the EU Declaration of Conformity (if applicable).

6.3. Fluid data

	Chlorine sensor 568524 [1]	Chlorine sensor 568523 [2]	"Trace" chlorine sensor 565164
Type of medium	▪ swimming pool water, drinking water, service water, process water ▪ free of any surfactants ▪ with constant pH value.	▪ swimming pool water, drinking water, sea water ▪ surfactants are partially tolerated.	water with drinking water quality
Medium temperature	0...+45 °C	0...+45 °C	0...+40 °C
Maximum medium pressure	1 bar, no pressure drops are allowed	3 bar, no pressure drops are allowed	0,5 bar, no pressure drops are allowed
Medium pH range	6...8 pH	4...9 pH	6,5...9 pH
Flow rate	approximately 15...30 l/h	approximately 15...30 l/h	approximately 15...30 l/h
Temperature compensation	automatic, with integrated temperature sensor	automatic, with integrated temperature sensor	automatic, with integrated temperature sensor
Measuring range at nominal slope	0,01...20 ppm	0,01...20 ppm	0,005...2 ppm
Response time (t90)	30 s	120 s	120 s
Run-in time after start-up maintenance	1 h	2 h	2 h
Standing time of the electrolyte	up to 6 months (depending on water quality)	up to 12 months (depending on water quality)	up to 6 months (depending on water quality)

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

6.4. Material

Part	Materials		
	Chlorine sensor 568524 [1]	Chlorine sensor 568523 [2]	"Trace" chlorine sensor 565164
Shaft	PVC	PVC	PVC
Membrane	PVC-U (semipermeable hydrophobic membrane)	Microporous hydrophilic membrane, PVC, stainless steel 1.4571	Microporous hydrophilic membrane, PVC, stainless steel 1.4571
Seals	NBR	NBR	NBR
Snap ring	PETF	PETF	PETF
Slide ring	PETF	PETF	PETF
Reference electrode	silver / silver halide	silver / silver halide	silver / silver halide
Working electrode	gold	gold	gold
Counter electrode	-	stainless steel	stainless steel
Membrane cap	PVC	PVC	PVC
Membrane holder	PVC	stainless steel 1.4571	stainless steel 1.4571
Internal holder	-	-	PVC

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

6.5. Electrical data

	Chlorine sensor 568524 [1]	Chlorine sensor 568523 [2]	"Trace" chlorine sensor 565164
Operating voltage	12...30 V DC (through remote controller type 8619)	12...30 V DC (through remote controller type 8619)	9...30 V DC (through remote controller type 8619)
Current consumption	4 mA	4 mA	20 mA
Galvanical insulation	-	-	Yes
Voltage output	-	-	0...2 V
Current output ▪ Connection ▪ Protection ▪ Loop impedance	4...20 mA ▪ 2-wire system ▪ against polarity reversals, not galvanically insulated ▪ max. 50 Ω at 12 V DC, 900 Ω at 30 V DC	4...20 mA ▪ 2-wire system ▪ against polarity reversals, not galvanically insulated ▪ max. 50 Ω at 12 V DC, 900 Ω at 30 V DC	-

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

7. INSTALLATION AND WIRING

7.1. Safety instructions

DANGER

Risk of injury due to the nature of the electrolyte.

- Observe the warnings on the electrolyte bottle.
- Wear gloves whose material is compatible with the electrolyte used to manipulate the sensor and the electrolyte.
- Do not swallow the electrolyte.
- Avoid contact of the electrolyte with skin and eyes. In case of any contact with the electrolyte, wash with a lot of running water. If there is an eye inflammation, contact a doctor.

Risk of injury due to electrical voltage.

- Shut down the electrical power source of all the conductors and isolate it before carrying out work on the system.
- Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Risk of injury due to the nature of the fluid.

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

WARNING

Risk of injury due to non-conforming assembly.

- The sensor must only be assembled by qualified and skilled staff with the appropriate tools.

Risk of injury due to unintentional switch on of the power supply or due to uncontrolled restarting of the installation.

- Protect the installation against unintentional power-up.
- Guarantee a set or controlled restarting of the process subsequent to any intervention on the sensor.

NOTE

Risk of damaging the membrane due to contamination of the membrane with solid particles and deposits, thus, leading to wrong measurement signals.

- ▸ Avoid any contact of the membrane with solid particles and deposits.

Risk of damaging the membrane due to pressure drops.

- ▸ Avoid any pressure drops.

Risk of wrong measurement due to ClO_2 or O_3 in the measured water, unstable flow rate, or due to the use of wrong accessories

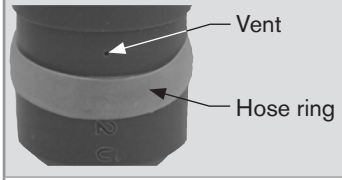
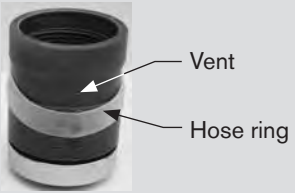
- ▸ Make sure there are no ClO_2, O_3. compounds in the measured water/medium.
- ▸ Keep a constant flow rate.
- ▸ Use an analytical measurement chamber type 8200 from Bürkert. See chap. "10.2. Accessories".

7.2. Install the sensor in a pipe

1. Prepare the sensor. See chap. 7.3.
2. Install the analytical measurement chamber type 8200. See chap. 7.4.
3. Install the sensor into the analytical measurement chamber. See chap. 7.5.
4. Connect the sensor to the remote controller type 8619. Refer to chap. 7.6 and to the Operating Instructions of the remote controller.

7.3. Preparing the sensor before installation into the pipe

- Do not shake the GEL-electrolyte bottle to avoid creating bubbles.
- When it has been opened, store the GEL-electrolyte bottle head first on the closed outlet.
- Rinse the residuals of GEL-electrolyte on the working electrode and the membrane cap with warm water.

Chlorine sensor 568524 [1] and 568523 [2]		Instructions	"Trace" chlorine sensor 565164
		Risk of damaging the membrane due to vacuum in the membrane cap. → Before unscrewing the membrane cap, uncover the vent by lowering the hose ring, to allow venting.	
		On delivery, the membrane cap is not tightly screwed on the shaft. ▪ Do not touch the reference electrode and the working electrode. ▪ Do not polish the reference electrode. ▪ Do not remove the brown or grey coating of the reference electrode.	
		→ Unscrew the membrane cap from the shaft and place it onto a clean base. → For sensor with an internal holder, remove the internal holder from its package and place the membrane cap and the internal holder separately onto a clean and not absorptive base.	
568524[1]	568523[2]	→ Prepare the applicable electrolyte. → Carefully fill up the membrane cap to the edge with the enclosed electrolyte to avoid air bubbles to enter in the membrane cap (Oxygen can have an unwanted effect on the measurement signal).	Electrolyte 566060 (EMST1/GEL)
Electrolyte 566058 (ECL1)	Electrolyte 566059 (ECS2.1/GEL)		

Chlorine sensor 568524 [1] and 568523 [2]	Instructions	"Trace" chlorine sensor 565164
—	Versions with the internal holder: 1. Carefully fill up the internal holder with the electrolyte. 2. Make sure there is no air (bubbles) in the internal holder, else do the filling again.	
—	3. Hold the shaft upright and push the working electrode carefully into the filled internal holder.	
—	4. Check if air bubbles are visible in the specific membrane of the internal holder. 5. If there are air bubbles, remove the internal holder from the shaft if needed, rinse it carefully with clean water and dry the specific membrane with an absorbent paper towel. 6. Repeat instructions 1 to 5 until there are no more air bubbles in the internal holder.	

Chlorine sensor 568524 [1] and 568523 [2]	Instructions	"Trace" chlorine sensor 565164
	→ Hold the shaft upright and slowly insert it into the filled membrane cap. → Hold the membrane cap and slowly screw the shaft clockwise onto the membrane cap. If a resistance occurs because of the seal, continue screwing until the working electrode and the bottom of the membrane cap are in contact: the membrane then has a convex curvature.	
	→ Make sure the shaft is tightly fastened to the membrane cap: - do not put your fingers on the vent because excess electrolyte must flow out through the vent; - the membrane has a convex curvature: do not touch nor adjoin the membrane. Do not thump the membrane else it would be damaged and unusable. → Remove excess electrolyte with a cloth dampened with water.	
	→ Cover the vent with the hose ring.	

1) *or other chlorine sensor for operation at constant pH*

2) *or other chlorine sensor having a reduced pH-dependency*

7.4. Installation of the analytical measurement chamber type 8200

DANGER

Risk of damaging the sensor due to high temperatures or pressure.

- Respect the sensor pressure and temperature ranges.

- Close the water inlet ball valve of the analytical measurement chamber type 8200.
- Avoid installations that allow air bubbles to enter the measuring water, because air bubbles must be avoided on the membrane.

→ Mount the analytical measurement chamber type 8200 with two screws (recommendation: M4 x 60 mm pan head screw or hexagon socket head screw) onto a suitable mounting panel.

→ Connect the water inlet of the analytical measurement chamber with a 6...8 mm hose to the sample water source.

→ Connect the water outlet of the analytical measurement chamber with a 6...8 mm hose to the drain for example.

For more information, refer to the datasheet of the analytical measurement chamber type 8200, available at: www.burkert.com.

7.5. Installation of the sensor into the analytical measurement chamber

→ Depressurise the system.

→ Unscrew the nut of the analytical measurement chamber type 8200.

→ Make sure the snap ring, the slide ring and the seal are in their correct position on the sensor.

→ Insert the prepared sensor into the analytical measurement chamber type 8200.

→ Insert the nut on the sensor and screw it tightly on the analytical measurement chamber.

→ Carefully open the inlet ball valve so that the float just touches the upper end of the flow indicator.

→ Wire the sensor according to chap. 7.6.

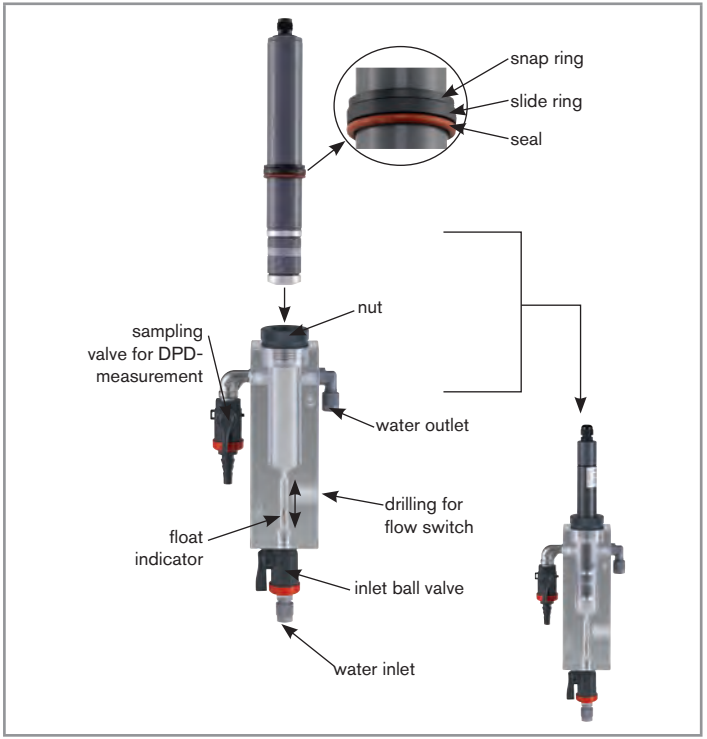


Fig. 3 : Description of the installation of the sensor into the analytical measurement chamber type 8200

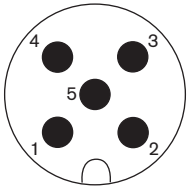
7.6. Wiring the sensor

7.6.1. Wiring a chlorine sensor with 5-pin M12 male fixed connector

The chlorine sensor has a 4...20 mA current output and is equipped with a 5-pin M12 male fixed connector.

The sensor is electrically fed by the remote controller type 8619 the sensor is connected to.

→ To connect the chlorine sensor to the remote controller type 8619, please refer to the Operating instructions of the remote controller.



1: not connected
2: V+
3: 0 V DC
4: not connected
5: not connected

Fig. 4 : Pin assignment of the 5-pin M12 male fixed connector

7.6.2. Wiring a "trace" chlorine sensor with 4-pin connector

NOTE

Risk of damage to the sensor due to the power supply.

▸ Make sure the power supply is in the range 9...30 V DC.

The "trace" chlorine sensor (order code 565164) has a 0...+2 V output.

Table 1 : Signal assignment of the cable with order code 565385 (ordered separately)

Wire colour	Signal
Green	Ground (negative voltage signal)
Yellow	0...2 V signal (positive voltage signal)
White	Positive power supply
Brown	Negative power supply

→ Use a cable with a max. length of 30 m.

→ Connect the sensor with the remote controller type 8619. Refer to the Operating Instructions of the related remote controller.

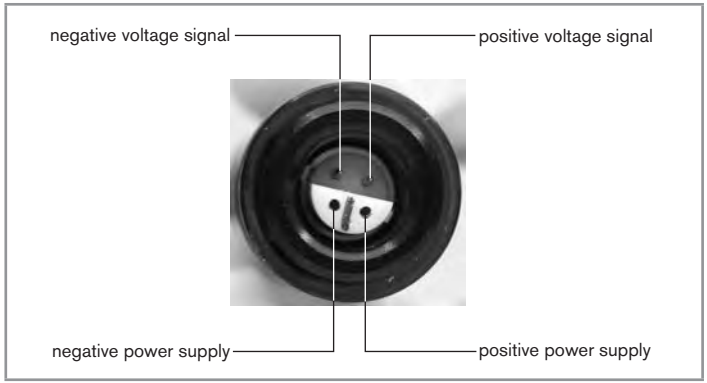


Fig. 5 : Pin assignment of the "trace" chlorine sensor with order code 565164

7.6.3. Wiring a sensor with cable plug PG7

The sensor with cable plug PG7 has a 4...20 mA current output.

The sensor is electrically fed by the remote controller type 8619 the sensor is connected to.

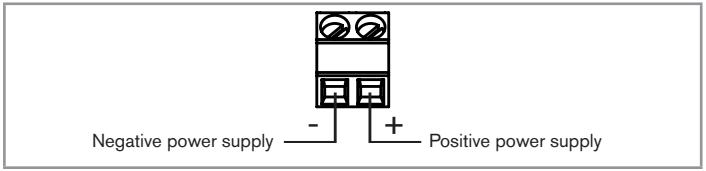


Fig. 6 : Terminal assignment of a sensor with cable plug PG7

→ Use cables with the following features:

- not shielded;
- 4 mm in diameter;
- 5 m max. length;
- wires with 0,25 mm² in section.

1. Loosen the cap for the terminal strip from the shaft.
2. Loosen the nut of the cable gland.
3. Insert the cable through the nut then through the cable gland then through the cap for the terminal strip.
4. Wire the sensor according to Fig. 6 and according to the remote controller type 8619. Refer to the related Operating Instructions.
5. Pull the cable so that it does not block the inside of the cap for the terminal strip.
6. Tighten by hand the cap for the terminal strip.
7. Tighten by hand the nut of the cable gland.

8. COMMISSIONING

- If there are bubbles on the membrane, increase the flow rate temporarily to eliminate them.
- Respect the Run-in time.
- Calibration has to be done after the run-in time for ensuring a proper reading (sensor needs to be powered!).

8.1. Commissioning of the chlorine sensor with order codes 568524 and 568523

Before commissioning:

1. Open the measuring water outlet of the analytical measurement chamber.
2. Slowly open the measuring water supply. A constant low flow rate in a range of 15...30 l/h is recommended.
3. In the Operating Instructions of the remote controller type 8619:
   - a) Menu "Parameters" → Mx: Inputs → AI1 or AI2 → Mode = Current
   - b) Menu "Parameters" → Mx: Inputs → AI1 or AI2 → Range = 4...20 mA
   - c) Enter for 4 mA: 0 and for 20 mA: 20.

4. Let the sensor with order code 568524 [1] operate for 1 hour or
5. let the sensor wirh order code 568523 [2] operate for 2 hours.
6. Do the slope calibration with the remote controller type 8619: refer to the related Operating Instructions.

→ If the slope calibration cannot be done, see chap. 9.4.3.

1) or other chlorine sensor for operation at constant pH
2) or other chlorine sensor having a reduced pH-dependency

8.2. Commissioning of the "trace" chlorine sensor with order code 565164

To do the slope calibration with the measuring water, the measuring water must contain some free chlorine. Else, an external calibration device must be used.

If no slope calibration is performed, the chlorine concentration cannot be measured. Thus, the "trace" chlorine sensor can only be used to determine the presence or absence of chlorine in the fluid.

To ensure a proper reading:

- ▸ power the sensor;
- ▸ wait until run-in time is over;
- ▸ calibrate the sensor.

Before commissioning:

1. Open the measuring water outlet.
2. Slowly open the measuring water supply. A constant flow rate in a range of 15...30 l/h is recommended.
3. In the Operating Instructions of the remote controller type 8619:
   - a) Menu "Parameters" → Mx: Inputs → AI1 or AI2 → Mode = Voltage
   - b) Menu "Parameters" → Mx: Inputs → AI1 or AI2 → Range = 0...2 V
   - c) Enter 0 for 0 V: 0 and 2 for 2 V.
4. Let the sensor operate for 2 hours
5. Do the slope calibration with the remote controller type 8619: refer to the related Operating Instructions.

→ If the slope calibration cannot be done, see chap. 9.4.3.

9. MAINTENANCE AND TROUBLESHOOTING

9.1. Safety instructions

DANGER

Risk of injury due to electrical voltage.

- Observe all applicable accident protection and safety regulations for electrical equipment.

Risk of injury due to high pressure in the installation.

- Stop the circulation of fluid, cut off the pressure and drain the pipe before loosening the process connections.

Risk of injury due to the nature of the fluid.

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

DANGER

Risk of injury due to the nature of the electrolyte.

- Observe the warnings on the electrolyte bottle.
- Wear gloves whose material is compatible with the electrolyte used to manipulate the sensor and the electrolyte.
- Do not swallow the electrolyte.
- Avoid contact of the electrolyte with skin and eyes. In case of any contact with the electrolyte, wash with a lot of running water. If there is an eye inflammation, contact a doctor.

9.2. Regular maintenance operations

- Do not remove the brown or grey coating of the electrodes because the electrodes would be damaged.
- Do not unscrew the membrane holder in stainless steel 1.4571 from the membrane cap because the membrane would be damaged.

→ Regularly make sure the sensor presents no dirt, algae and bubbles depending on the process: if the membrane is blocked, change the membrane cap.

→ Once a week, make sure the measuring signal is correct. See chap. 9.3.4.

9.3. Additional maintenance operations

9.3.1. Checking of the tightness of the membrane cap

Once the membrane cap has been changed and the electrolyte has been changed, make sure the membrane cap is tight.

1. Thoroughly dry the outside of the membrane cap.
2. Prepare the membrane cap and fill it with electrolyte. See chap. 7.3.
3. If necessary, clean and dry the outside of the membrane cap again.
4. Slowly and carefully screw the shaft on the membrane cap. See chap. 7.3.
5. If several drops of electrolyte come out the membrane, the membrane is damaged. Change the membrane cap with a new one.

9.3.2. Changing the electrolyte

Change the electrolyte:

- every 3...12 months, as often as required by the process;
- if the slope calibration is not possible due to unstable or too low values displayed.

→ Uncover the vent by lifting the hose ring to let air go into the vent.

→ Unscrew the membrane cap.

→ Pour the old electrolyte out of the membrane cap.

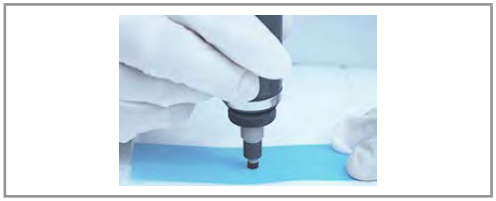
→ For a sensor with an internal holder, the electrolyte of the internal holder must be changed too:

1. Use tweezers to remove the internal holder from the membrane cap.
2. Rinse the internal holder and dry it on a clean absorbent paper towel.

→ Clean the working electrode with a clean and dry paper towel.

→ Clean the tip of the dry working electrode:

1. Place the supplied abrasive paper on a paper towel. The rough side must be upwards.
2. Hold the shaft upright with one hand above the abrasive paper.
3. Hold the abrasive paper at one corner and rub the tip of the working electrode two or three times on the abrasive paper doing a movement from left to right like shown on the picture:



→ Fill the membrane cap with the electrolyte as described in chap. 7.3.
→ For a sensor with an internal holder, fill the internal holder with the electrolyte as described in chap. 7.3.
→ Make sure the tightness of the membrane cap. See chap. 9.3.1.
→ Calibrate the slope (see the Operating Instructions of the controller the sensor is connected to).
→ If the slope calibration is still not possible because of unstable or too low values, change the membrane cap and the internal holder. See chap. 9.3.3.

9.3.3. Changing the membrane cap

Change the membrane cap:
- once a year;
- if the slope calibration is not possible due to unstable or too low values displayed.

→ Unscrew the membrane cap.
→ Pour the old electrolyte out from the membrane cap.
→ Clean the working electrode with a clean and dry paper towel.
→ For a sensor without internal holder, take a new membrane cap and fill it with the electrolyte. See chap. 7.3.
→ For a sensor with an internal holder, take a new membrane cap and a new internal holder and fill them with the electrolyte. See chap. 7.3.
→ Make sure the membrane cap is tight. See chap. 9.3.1.
→ Calibrate the slope (see the Operating Instructions of the remote controller type 8619 the sensor is connected to).
→ If the slope calibration is still not possible because of unstable or too low values, make sure the membrane cap and the internal holder.

9.3.4. Checking the measuring signal during operation

→ If the measuring water contains chlorine:
1. Take a sample of the measuring water.
2. Measure the chlorine concentration of the sample with the DPD-1 method.
3. Compare the obtained value with the value measured by the sensor.
4. If the obtained value approaches the value measured by the sensor, the sensor is working correctly. If the two values are different, perform a slope calibration. See chap. 8.

→ If the measuring water is free of chlorine, do an external calibration with the external calibration device:
1. Take a sample of 250 ml of the measuring water and pour it into a beaker with a magnetic stirrer bar inside.
2. Add 0,2 mg/l of chlorine to the sample and place the beaker on the magnetic stirrer.

3. Remove the sensor from the analytical measurement chamber:
   - Unscrew the nut of the analytical measurement chamber.
   - Remove the nut from the sensor.
4. While the sensor is still connected to the power supply, fix it with a fastener in the beaker.
5. When the sensor displays a stable value, take a sample with a pipette from the beaker and perform a DPD-1 measurement.
6. After the calibration, put back the sensor into the analytical measurement chamber.

9.4. Troubleshooting

9.4.1. LED signalling on the trace sensor with order code 565164

One orange LED and one green LED show the status of the sensor:

LED	LED status	Meaning	Recommended actions
Green	ON	Correct operation of the sensor	—
	OFF or flashing	Supply voltage is too low	→ Increase the value of the supply voltage.
Orange	OFF	Correct operation of the sensor	—
	ON	The sensor is not correctly wired	→ Wire the sensor according to chap. 7.
	Flashing	The concentration of the chlorine in the water is too high	→ Reduce the chlorine concentration. See chap. 6.3.

9.4.2. If there is a problem

Problem	Possible cause	Recommended actions
Slope calibration cannot be done because the measuring value deviates from the DPD-measurement	Polarization time too short	→ For the polarization time duration, see chap. 8. → Repeat calibration when the polarization time has elapsed.
	Membrane cracked	→ Replace the membrane cap. See chap. 9.3.3.
	Membrane cap damaged	→ Replace the membrane cap. See chap. 9.3.3.
	Deposits on the membrane	→ Replace the membrane cap. See chap. 9.3.3.
	Interfering substances in the measuring water	→ Examine the measuring water for interfering substances. → If necessary, contact Bürkert.
	There is a short-circuit or the connection cables are defective.	→ Repair the short-circuit. → If necessary, change the connection cables.
	Shaft is not tightly fastened to the membrane cap	→ Screw the shaft until it hits the membrane cap.
	Gas bubbles on the membrane	→ Increase the flow rate temporarily. → If necessary check the installation and correct it.
	Chlorine concentration exceeds the upper limit of the measuring range	→ Bring the chlorine concentration in the authorized range.
	No electrolyte in the membrane cap	→ See chap. 7.3 to fill again the membrane cap with electrolyte.
	Air is between the internal holder / membrane cap / measuring electrode	→ Remove the internal holder from the membrane cap and fill it again with the electrolyte. See chap. 7.3.
	Sensor is defective	→ Send the sensor back to Bürkert.

Problem	Possible cause	Recommended actions
Measuring signal is not stable	Membrane cracked	→ Change the membrane. See chap. 9.3.3.
	Bubbles in the electrolyte	→ Empty the membrane cap and fill it again with new electrolyte without bubbles. See chap. 9.3.2.
	Gas bubbles on the membrane	→ Increase the flow rate temporarily. → If necessary check the installation and correct it.
	The original colour (brown or grey) of the reference electrode turns white or shiny silver	→ Send the sensor back to Bürkert.
Output signal is 0 mA (only sensors with 4...20 mA output)	The sensor is not correctly wired to the controller	→ Correctly connect the sensor to the remote controller type 8619.
	The connection cables are defective	→ Change the cables.
	The remote controller type 8619 is defective	→ Do a check of the remote controller type 8619. → Do the slope calibration.
	The sensor is defective	→ Send the sensor back to Bürkert.
Unstable values or too low values are measured	The electrolyte is too old	→ Change the electrolyte. See chap. 9.3.2.
	If the electrolyte has just been changed, the membrane holder (and the internal holder if any) is defective	→ Change the membrane cap (and the internal holder if any). See chap. 9.3.3.
The reference electrode is shiny silver or white	The reference electrode is damaged due to chemical exchanges between the measuring water and the electrolyte	→ Send the sensor back to Bürkert.

9.4.3. If the slope calibration does not succeed

If the slope calibration cannot be done:

- because of the deviation of the measuring value from the DPD-measurement. See chap. 9.4.2;
- and for other causes, do the following:

1. Check the correct operation of the electronics of the sensor. See chap. 9.4.4.
2. Do a zero point check. See chap. 9.4.5.
3. Check the signal. See chap. 9.4.6.
4. If the three previous checks have been made and the problem persists, do the additional checks listed in chap. 9.4.7.

9.4.4. Checking the correct operation of the electronics of the sensor

1. Unscrew the membrane cap.
2. Thoroughly rinse the reference electrode and dry it carefully with a clean towel.
3. Let the electrodes in contact with the air.
4. Connect the sensor to the remote controller type 8619 and wait for 5 min.
5. Check the displays of the remote controller type 8619.
   It must be:
   - +/– 0 mV for the "trace" chlorine sensor (order code 565164) or
   - +/– 4 mA for the chlorine sensors (order codes 568524 [1] or 568523 [2]).
6. If the displayed value significantly deviates from either +/– 0 mV or +/– 4 mA, send the sensor back to Bürkert.
7. If the displayed value is either +/– 0 mV or +/– 4 mA, the electronics of the sensor is correctly operating.
   Check the zero point. See chap. 9.4.5.

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

9.4.5. Checking the zero point of the sensor

1. Prepare the sensor as described in chap. 7.3.
2. Connect the sensor to the remote controller type 8619.
3. Fill a beaker with clean tap water which does not contain disinfectant.
4. Place the sensor into the beaker.
5. Stir for 30 seconds using the sensor in the beaker and make sure there are no bubbles.
6. Leave the sensor in the beaker and wait until the polarization time has elapsed. For the polarization time durations, see chap. 8.

7. Read the value displayed by the remote controller type 8619.
   - If the displayed value approaches
     0 V for the "trace" chlorine sensor (order code 565164)
     or
     4 mA for the chlorine sensors (order codes 568524 [1] or 568523 [2],
     the sensor is correctly operating.
     Check the signal. See chap. 9.4.6.
   - If the displayed value significantly deviates from either
     0 V ("trace" chlorine sensor)
     or
     4 mA (chlorine sensor [1)2)]),
     do maintenance operations as described in chap. 9.3 and check the zero point again.
8. If, even after maintenance operations, the displayed value does not approach
   0 V ("trace" chlorine sensor)
   or
   4 mA (chlorine sensor [1)2)]),
   send the sensor back to Bürkert.

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

9.4.6. Checking the signal

If the sensor correctly measures the zero point (see chap. 9.4.4 and 9.4.5), do the following to check the signal:

1. Add some chlorine to the beaker filled with clean tap water from section "Zero point check".
2. Stir continuously using the sensor still connected to the remote controller type 8619) for at least 5 min.
3. If the sensor signal increases, the sensor is working correctly. Do the additional checks described in chap. 9.4.7.
4. If the sensor does not react to the chlorine, do maintenance operations as described in chap. 9.2 and do a signal check again.
5. If the sensor still does not react to the chlorine, send the sensor back to Bürkert.

9.4.7. Additional checks

If the sensor cannot be calibrated after the checks described in chap. 9.4.4 to 9.4.6 have been made, the cause may be in the process.

Do the following checks:

→ check the suitability of the sensor for the process;
→ check the flow;
→ check the pH-value of the measuring water;
→ check the temperature of the measuring water;
→ make sure the pressure of the measuring water is constant and within the allowed range of the used sensor;
→ check the connection cables;
→ make sure the polarization time has been done before the slope calibration;
→ check the concentration of disinfectant in the measuring water;
→ check the dosing unit, if any;
→ check the concentration of the disinfectant in the dosing tank.

10. SPARE PARTS AND ACCESSORIES

ATTENTION

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

Incorrect accessories and unsuitable spare parts may cause injuries and damage the sensor and the surrounding area.

- Use only original accessories and original spare parts from Bürkert.

10.1. Spare parts

Order code	568524 [1]	568523 [2]	565164
Electrolyte (100 ml)	ECL1 ID 566058	ECS2.1/GEL ID 566059	ESTM1/GEL ID 566060
Membrane cap	M20.2 ID 566056	M48.4E for standard liquids ID 568557	M48.2G with internal holder ID 566057
		M48.4S for sea water ID 568558	

1) *or other chlorine sensor for operation at constant pH*
2) *or other chlorine sensor having a reduced pH-dependency*

10.2. Accessories

Accessory	Order code
4-pin connector with cable	565385
5-pin female M12 connector with 2 m cable	438680
Photometer MD100, measuring range 0,01...6 ppm	566393
DPD-1 reagent, 100 tablets	566394
External calibration device [3]	565163
Analytical measurement chamber type 8200	566054
Flow switch	772858

3) *The external calibration device is only needed when the measuring water contains no chlorine.*

11. PACKAGING, TRANSPORT

NOTE

Damage due to transport

Transport may damage an insufficiently protected sensor.

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

12. STORAGE

NOTE

Poor storage can damage the sensor

- Store the sensor in a dry place away from dust.
- Storage temperature for a "trace" chlorine sensor (order code 565164): 0...+40 °C.
- Storage temperature for a chlorine sensor (order code 568524 [1] or 568523 [2]): 0...+45 °C.
- Do not store nor reuse membrane caps which have been in operation.
- Respect the storage temperature indicated on the electrolyte bottle.

1) *or other chlorine sensor for operation at constant pH*

2) *or other chlorine sensor having a reduced pH-dependency*

To store the sensor:

1. Unscrew the membrane cap from the shaft.
2. Rinse the reference electrode in clean water: do not touch nor rub the electrodes. Let it dry in a place free of dust.
3. Rinse the membrane cap in clean water and let it dry in a place free of dust on an absorbent paper.
4. For the "trace" chlorine sensor with order code 565164, remove the internal holder from the membrane cap, rinse it in clean water and let it dry separately on an absorbent paper.
5. Screw but do not tightly fasten the dry membrane cap onto the shaft to protect the electrodes.
6. When using the sensor after storage, clean the electrode tip with the special abrasive paper and use a new membrane cap (see chap. 9.3.2 and chap. 9.3.3).

13. DISPOSAL OF THE SENSOR

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

NOTE

Damage to the environment caused by parts contaminated by the fluid.

- Comply with the national and/or local regulations which concern the area of waste disposal.

bürkert
FLUID CONTROL SYSTEMS

www.burkert.com

MAN 1000306895 EN Version: BStatus: RL (released | freigegeben) printed: 05.05.2021