Operating Instructions

TARAsys

Measuring Board MT10

April 2021 (EN)
V0

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1.1 Symbols and displays

1.1.1 Safety instructions and warnings

In these Operating Instructions, the warning signs and signal words listed below are used. They help you to safely handle the product, prevent injuries to the operating staff and protect the owner against property damage and additional costs.

	Signal word	Meaning
	**DANGER!**	DANGER refers to a hazard with a high risk level, which, if not avoided results in death or severe injury.
	**DANGER!**	This sign indicates that there is a risk of personal injury caused by electric shock if no appropriate safety precautions are taken.
	**WARNING!**	WARNING refers to a hazard with a medium risk level, which, if not avoided might result in death or severe injury.
	**CAUTION!**	CAUTION refers to a hazard with a low risk level, which, if not avoided might result in minor or moderate personal injury.
	NOTICE	NOTICE warns against property damage.

Tab. 1: Signal words

1.1.2 Displays used in the text

Symbol	Meaning
	This symbol is the general warning sign and warns you of risks of injury. Observe all instructions marked by this warning sign.
	This symbol indicates tips and helpful information for optimum and economic use of the product.
▶	This symbol indicates actions to be performed by the personnel.
➥	This symbol indicates the result of an action.
•	This symbol indicates individual bullet points.
✓	This symbol indicates a prerequisite for the performance of an action.

Tab. 2: Symbols and displays used in the text

1.2 Related documents

You can find the data sheets for the measuring board and the electrolysis cell at the following internet address:
https://reiss-gmbh.com/?lang=en

You can find the data sheet for the inductive proximity switch at the following internet address:
https://reiss-gmbh.com/?lang=en

You can find the data sheets and operating instructions for the sensor at the following internet address:
https://reiss-gmbh.com/?lang=en

You can find the data sheets and operating instructions for the controller “Aquis touch S” at the following internet address:
https://en.jumo.de/

You can find the data sheet for the solenoid valve at the following internet address:
www.landefeld.de\en, MO 214 ES 24V=

The data sheet for the power supply unit is comprised in the scope of supply.

2 Information about this product

2.1 Product description

The measuring board of the TARAsys MT10-CL product line is suitable for measuring chlorine dissolved in water and used as a disinfectant. The areas of application are reverse osmosis systems and drinking water applications.
In combination with the TARAline CP4.0H-M4c sensor, the measuring board is suitable for verifying the absence of chlorine or for continuous measurement of lowest chlorine concentrations.
Permanent operation in chlorine-free water is made possible through the use of a miniaturised electrolysis cell specially designed to keep the sensor free from biofilms in the phases without chlorine. For this purpose, the disinfectant generated by the electrolysis cell is applied to the sensor on a daily basis. This happens automatically through the closing of a solenoid valve which stops the flow of the measuring water and thus allows the diffusion of the disinfectant generated from the electrolysis cell to the sensor.
A major advantage of this type is that no disinfectant has to be present in the measuring water and thus the dosage of the disinfectant is not necessary either.

The measuring board has been designed for the use of sensors with retaining ring (65 mm).

▷ Please specify when ordering your sensor.

In general, a complete measuring and control system is comprised of the following components:

- Sensor
- Electrolysis cell
- Measuring board
- Dosing device
- Analysis instruments

These Operating Instructions exclusively refer to the measuring board equipped with the electrolysis cell.

▷ Comply with the operating instructions of the peripheral devices.

2.1.1 Measurand

In combination with the TARAline CP4.0H-M4c sensor, the measuring board measures the concentration of total chlorine in the measuring water, i.e. the concentration resulting from the addition of inorganic chlorine products (e.g. chlorine gas, sodium hypochlorite solution, calcium hypochlorite solution.
The following kinds of chlorine are recorded:

- “Free chlorine” from inorganic chlorination products (chlorine gas, hypochlorite, etc.)
- “Bound chlorine”, chloramine.

2.2 Scope of supply

- ▶ Keep the complete packaging.
- ▶ Send in the measuring board in its original packaging if it needs to be repaired or in case of claims on warranty.
- ▶ Check the package and its contents for completeness and integrity upon receipt.

In case of damage:

- ▶ Notify the supplier.

Component	Number
Measuring board	1
Electrolysis cell	1
Operating Instructions	1

Tab. 3: Scope of supply

2.3 Product overview

2.3.1 Measuring board

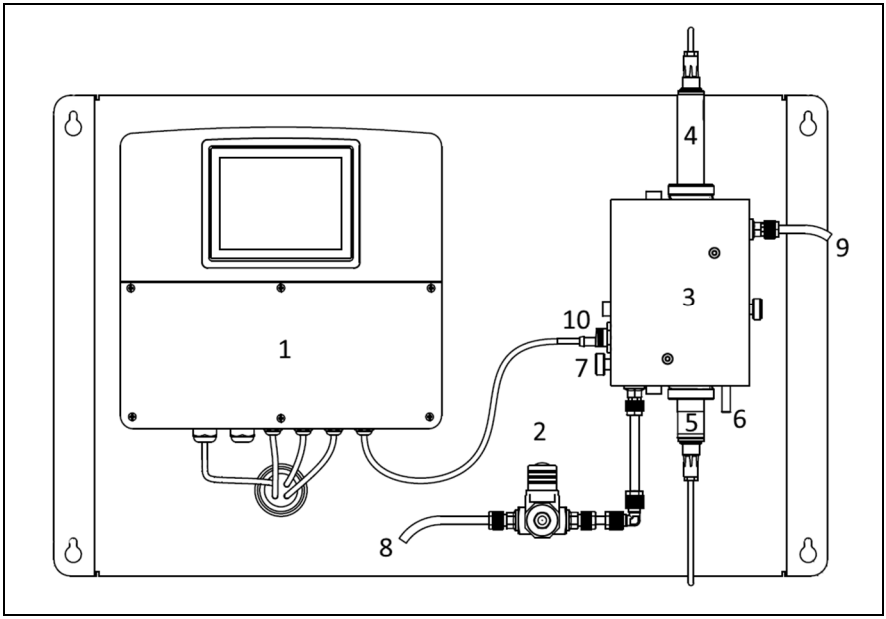


Fig. 1: Product overview

1 Controller
2 Solenoid valve
3 Flow chamber
4 Sensor[1]
5 Electrolysis cell[2]
6 Sampler
7 Flow control
8 Measuring water inlet
9 Measuring water outlet
10 Inductive proximity switch

[1] Not included in the scope of supply.
[2] For product overview see Chapter 2.3.2

2.3.2 Electrolysis cell

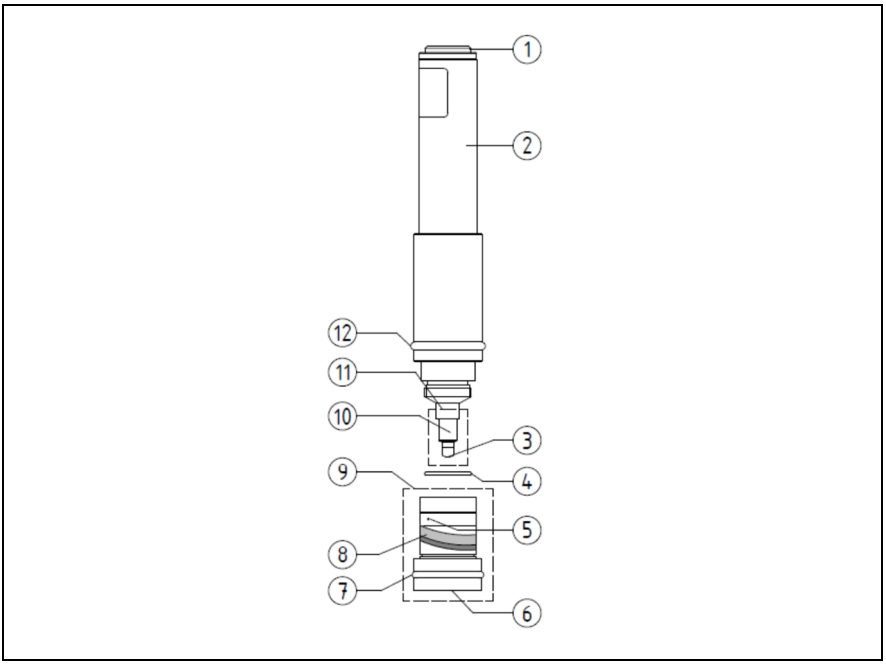


Fig. 2: Product overview

1	Electrical connection	7	O-ring 25 x 2.5
2	Electrode body	8	Hose rings (x2)
3	Anode	9	Membrane cap
4	O-ring 14 x 1.8	10	Cathode
5	Valve opening	11	Electrode finger
6	Membrane disk	12	O-ring 25 x 2.5

3 Safety

The measuring board was manufactured to the state of the art.
However, improper handling entails the following risks:

- Personal injury and damage to property
- Injury to health
- Wrong measuring values which may lead to dangerous dosing errors of the disinfectant.

► Comply with the safety instructions provided in these Operating Instructions.

3.1 Proper usage

The measuring board is used for measuring the concentration of a specific disinfectant in water.
The measuring board must only be used under the following conditions:

- For the disinfectant specified in the data sheet of the sensor used
- Under the operating conditions specified in the associated data sheet
- Only for the activities described in these Operating Instructions
- Usage of the board in perfect condition only
- Use of original accessories and spare parts (see https://www.reiss-gmbh.com)

3.2 Qualification of the operating staff

The operator of the board must have the following qualifications:

- He/she has read and understood the Operating Instructions.
- He/she has received training in how to handle the measuring board.

3.3 Alteration and modifications

Any interventions and changes which can affect the safety and functionality of the measuring board must only be performed by the manufacturer.

3.4 Residual risks

3.4.1 Loosening of the screw fittings

If not properly fastened, the screw fitting can work loose due to the water pressure or due to vibration. This results in the following risks:

- The electrolysis cell is pulled out of the flow chamber due to the water pressure.
- Screw fittings work loose and measuring water leaks.

▶ Ensure that the screw fittings cannot work loose during operation.
▶ Check the fittings for tightness at regular intervals.
▶ Minimise vibrations.

3.4.2 High or fluctuating pressure

If the water pressure exceeds the maximum admissible value or fluctuates considerably, this may result in the following risks:

- The membrane of the electrolysis cell will be damaged.
- Screw fittings work loose and measuring water leaks.

▶ Observe the maximum admissible pressure according to the data sheet (see Chapter 1.2, p. 5).
▶ Keep the pressure constant.

3.4.3 Abrasive particles

Abrasive particles can damage the membrane of the electrolysis cell.

▶ Install a filter upstream of the measuring board.

3.4.4 Blows, shocks and improper handling

Blows or concussions, e.g. when the device is dropped, can damage the measuring board and the electrolysis cell.

▶ Avoid blows and shocks.
▶ Make sure not to drop the measuring board and the electrolysis cell.

3.4.5 Defective membrane cap

If the valve is inadvertently blocked when the membrane cap of the electrolysis cell is screwed on or off, this can lead to overpressure or

underpressure in the membrane cap. This can damage the membrane cap.

- When screwing on the membrane cap, make sure that the valve is not pressed shut (see Chapter 5.2, page 16).
- Before screwing the membrane cap off, pull the hose ring to the side and keep the valve open (see Chapter 9.2, page 32).

3.4.6 Risks due to electric power

DANGER! Related data sheets and operating instructions must be complied with (see Chapter 1.2, p. 5)

3.4.7 Failure of the measurement when the sensor is disassembled

When the measuring value fails during the disassembly of the sensor, this may lead to the incorrect dosing of the disinfectant.

- Shut off the measuring and control system or switch to manual operation.

3.4.8 Temperature and temperature fluctuation

If the temperature of the medium or the ambient temperature is outside the admissible range, this can damage the measuring board and the electrolysis cell.

- Ensure that the admissible temperature ranges are adhered to in all operating phases (see Chapter 1.2, p. 5).

3.4.9 Inadmissible installation

If the measuring board is not mounted in a perpendicular position, this may lead to incorrect measuring values.

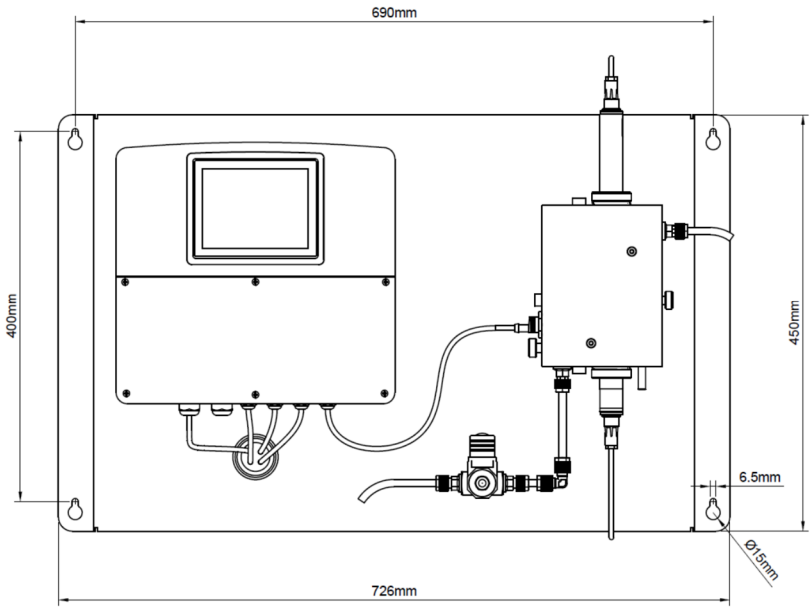
- Mount the measuring board in a perpendicular position.

4 Installation

DANGER!

Never install or disassemble the measuring board when it is energised! There is the risk of electric shock.
De-energise the entire system before performing any work. This kind of work must only be performed by skilled staff.
Never install the device in potentially explosive atmospheres. There is an explosion hazard.

- Mount the measuring board in a perpendicular position, e.g. on a mounting plate or on a wall.



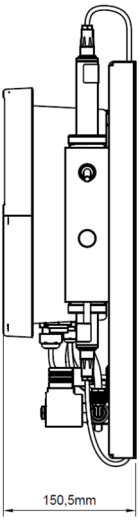


Fig. 3: Dimensions

- Connect the board to the electric mains (observe Chapter 1.2, p. 5).
- Close the flow control valve
- Connect the measuring water inlet and measuring water outlet

The measuring water outlet must be depressurised.

5 Putting the measuring board into service

✓ The measuring board has been mounted and connected to the electric mains (see Chapter 4, p. 14).

5.1 Installation requirements

The following installation requirements must be met:

- Permanent power supply and presence of measuring water
- Flow rate as specified in the data sheet of the sensor
- Constant flow rate
- Disinfectant must be present in the measuring water for calibration.
- Ensure that the measuring water does not outgas at the measuring point.

5.2 Preparation of the electrolysis cell

► Unscrew the membrane cap [2] from the electrode body [1].

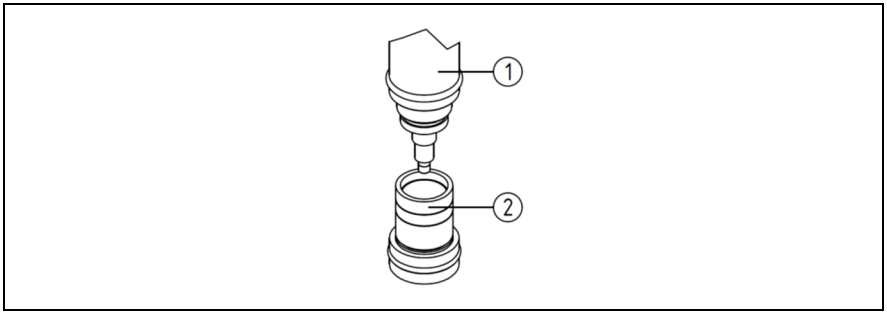


Fig. 4: Screwing off the membrane cap

1 Electrode body
2 Membrane cap

- Ensure that the 2 hose rings are in the correct position (see *Fig. 5*, p. 17).

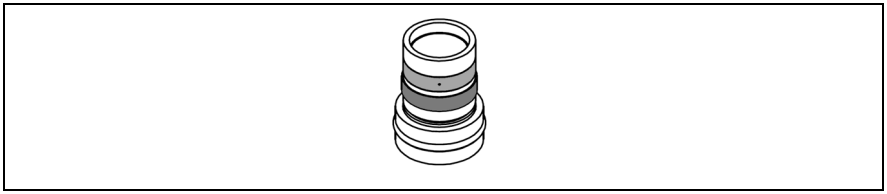


Fig. 5: Position of the rings

- Place the membrane cap on a clean mat.
- Fill the membrane cap of the electrolysis cell up to the rim with electrolyte EEZ1.0/W.

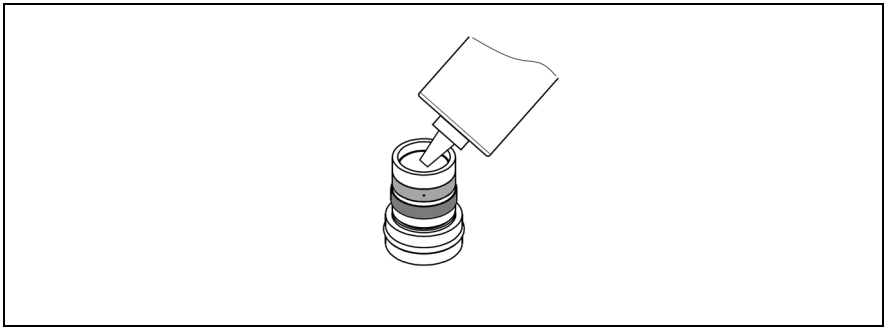


Fig. 6: Filling the membrane cap

The electrolyte EEZ1.0/W for the electrolysis cell must not be mixed up with the electrolyte for the sensor. When the sensor electrodes come into contact with the electrolyte EEZ1.0/W, the sensor loses its function.

▷ Pay attention to the correct allocation of the electrolytes.

- ▶ Place the electrode body [1] perpendicularly onto the membrane cap [2].
- ▶ Turn the electrode body in anti-clockwise direction until the thread is locked in place.

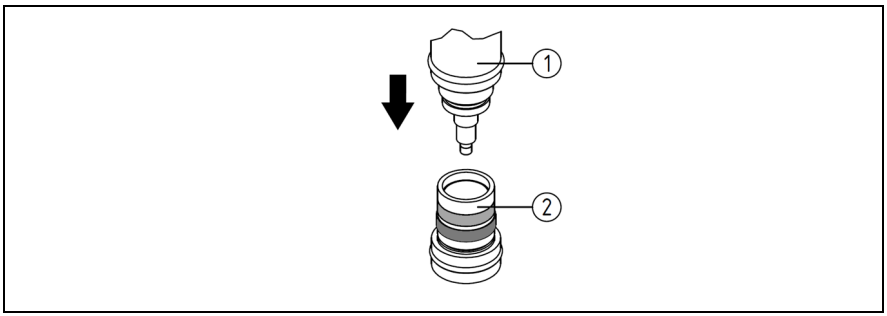


Fig. 7: Placing the electrode body onto the membrane cap

1 Electrode body
2 Membrane cap

- ▶ Slowly screw the electrode body into the membrane cap.
- ▶ Ensure not to press the valve opening shut (e.g. with your fingers).

The first resistance felt during screwing on comes from the O-ring seal.

- ▷ Continue screwing the cap on until it touches the shaft.

- ▶ Push the second hose ring over the first hose ring in the groove.
- ✓ After the membrane cap has been completely screwed on:
- ▶ Do not touch the membrane or knock against it.
- ▶ Wash off any remainders of electrolyte on the outside of the electrolysis cell with tap water.
- ➥ The electrolysis cell is now ready for being put into service.

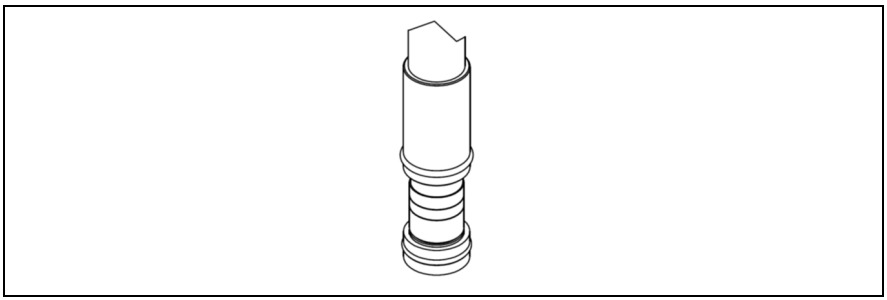


Fig. 8: Prepared electrolysis cell

5.3 Preparation of the sensor

The sensor has to be prepared for installation in compliance with the applicable Operating Instructions (see Chapter 1.2, p. 5).

5.4 Inserting the sensor into the flow chamber

- ✓ The measuring board has been mounted and connected to the electric mains (see Chapter 4, p. 14).
- ✓ The flow chamber is pressureless.
- ✓ The sensor has been prepared (see Chapter 5.3, p. 19).

- ▶ Remove the screw fitting [2] from the flow chamber [8].
- ▶ Check the retaining ring [3], sliding ring [4] and O-ring 25 x 2.5 [5] for proper position on the sensor [1].
- ▶ Check the O-ring support [6] and the O-ring 30 x 2.6 [7] for proper position in the flow chamber.
- ▶ Slowly push the sensor into the flow chamber.
- ▶ Carefully push the screw fitting over the sensor.
- ▶ Tightly fasten the screw fitting.

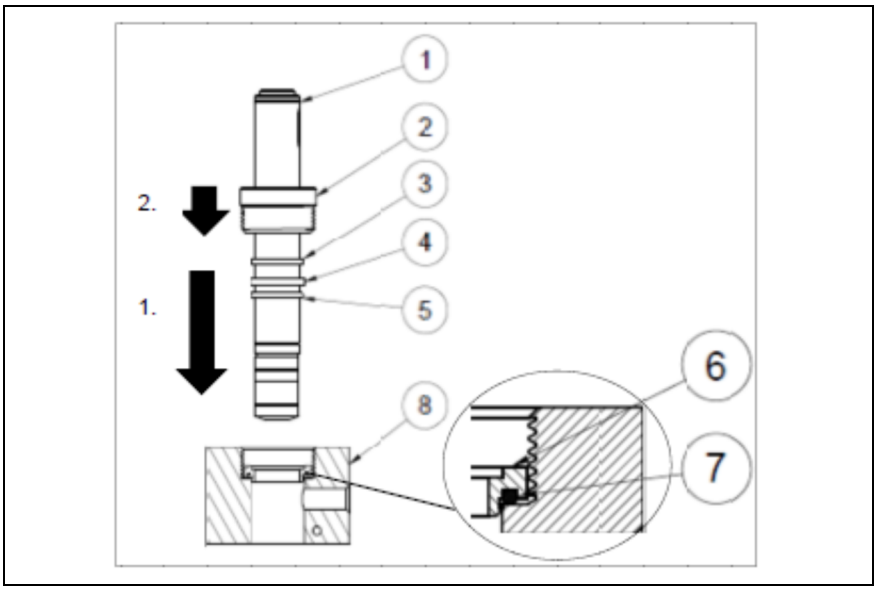


Fig. 9: Inserting the sensor with retaining ring

1	Sensor	5	O-ring 25 x 2.5
2	Screw fitting	6	O-ring support
3	Retaining ring	7	O-ring 30 x 2.6
4	Sliding ring	8	Flow chamber

➥ The sensor has been inserted into the flow chamber.

5.5 Inserting the electrolysis cell into the flow chamber

✓ The electrolysis cell has been prepared (see Chapter 5.2, p. 16).
✓ The sensor has been installed (see Chapter 5.4, p. 19).

- Remove the screw fitting [2] from the flow chamber [5].
- Check the O-rings 25 x 2.5 [3 and 4] for proper position at the electrolysis cell [1].
- Moisten the O-rings at the electrolysis cell with tap water.
- Slowly push the electrolysis cell into the flow chamber.
- Carefully push the screw fitting over the electrolysis cell.
- Completely screw on the screw fitting until the electrolysis cell touches the sensor.

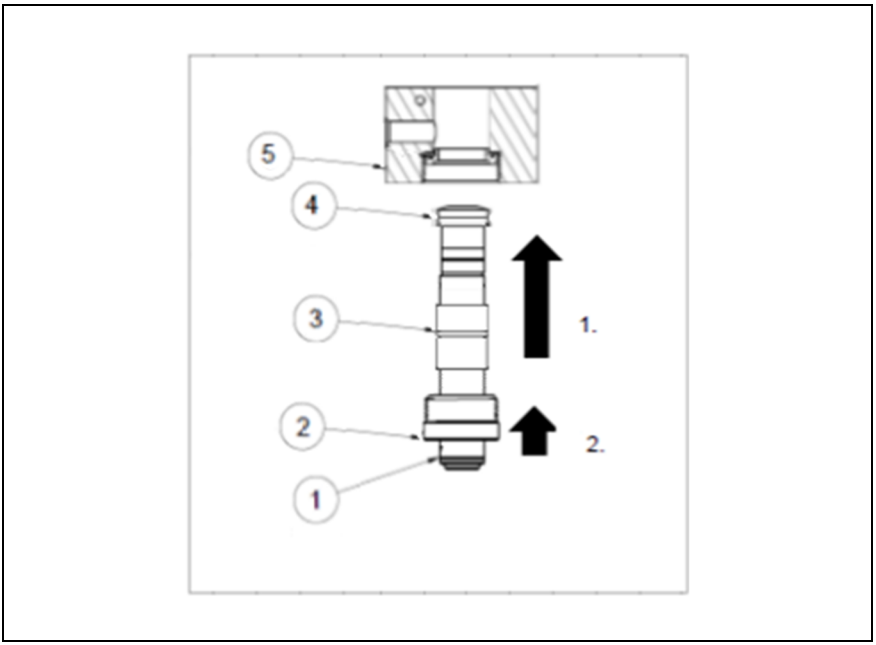


Fig. 10: Inserting the electrolysis cell

1 Electrolysis cell
2 Screw fitting
3 O-ring 25 x 2.5
4 O-ring 25 x 2.5
5 Flow chamber

Ensure that there is no gap between the electrolysis cell and the sensor as this will impair the function of the electrolysis cell.

▷ Screw in the screw fitting up to the stop.

➥ The electrolysis cell has now been inserted into the flow chamber.

5.6 Putting the flow chamber into service

✓ The sensor has been installed (see Chapter 5.4, p. 19).
✓ The electrolysis cell has been installed (see Chapter 5.5, p. 20).

▶ Close the sampling valve.
▶ Open the measuring water outlet.
▶ Slowly open the flow control valve

Check for tightness in doing so.

5.7 Flow control

The needle valve located on the left of the TARAflow FLC opens and closes the measuring water inlet.

▶ Adjust the flow a little above the switching point of the inductive proximity switch.

5.8 Taking measuring water samples

The needle valve located on the right of the TARAflow FLC opens a separate outlet.

▶ Take a sample from the measuring water, e.g. for analysis.

5.9 Electrical connection of sensor and electrolysis cell

✓ TARAflow has been put into service (see Chapter 5.6, p. 22).

▶ Connect the sensor cable with the sensor.
▶ Connect the cable for the electrolysis cell with the electrolysis cell.

6 Operation of the controller

6.1 Process display

The process display provides an overview of the state of the measuring board. Here you have the possibility to read the measured value and further digital signals showing the current status of the measuring board.

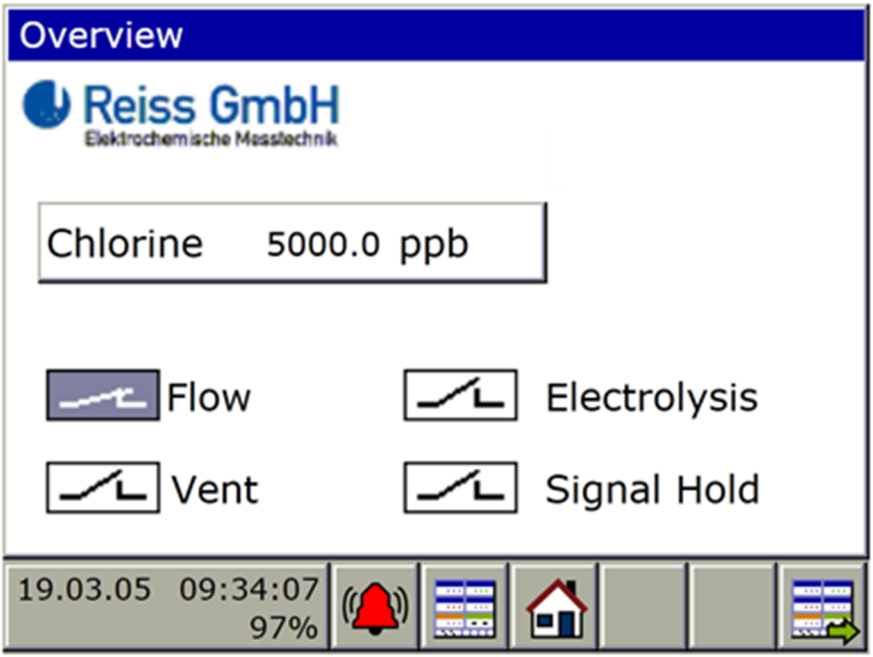


Fig. 11: *Process display*

6.1.1 Chlorine signal

The current measured value of the chlorine sensor can be read in ppb.

- If the sensor is not connected, a value of 5000 ppb is displayed.
- When “Signal Hold” is active, a fixed value is displayed (see Chapter 6.1.2, p. 24).

6.1.2 Digital signals

6.1.2.1 Flow

Shows the state of the inductive proximity switch.

0 No flow
1 Sufficient flow available

6.1.2.2 Electrolysis

Shows the state of the electrolysis cell.

0 Electrolysis cell OFF
1 Electrolysis cell ON

6.1.2.3 Vent (valve)

Shows the state of the solenoid valve.

0 Valve open
1 Valve closed

6.1.2.4 Signal hold

0 Current signal is put out
1 The signal displayed is a fixed value (frozen)

During the disinfection cycle, the output signal of the sensor is frozen at the last value measured before the disinfection cycle. The disinfection cycle is performed once per day. Any point of time can be chosen for this purpose (see Chapter 6.4, p. 26).

6.2 Diagram

By tapping the button “next operating screen”  on the touchscreen, the recorded signals are displayed in the diagram view. You can return to the process display via the same button.

Via the button “Channel selection”  , you can additionally display the designation of the individual channels.

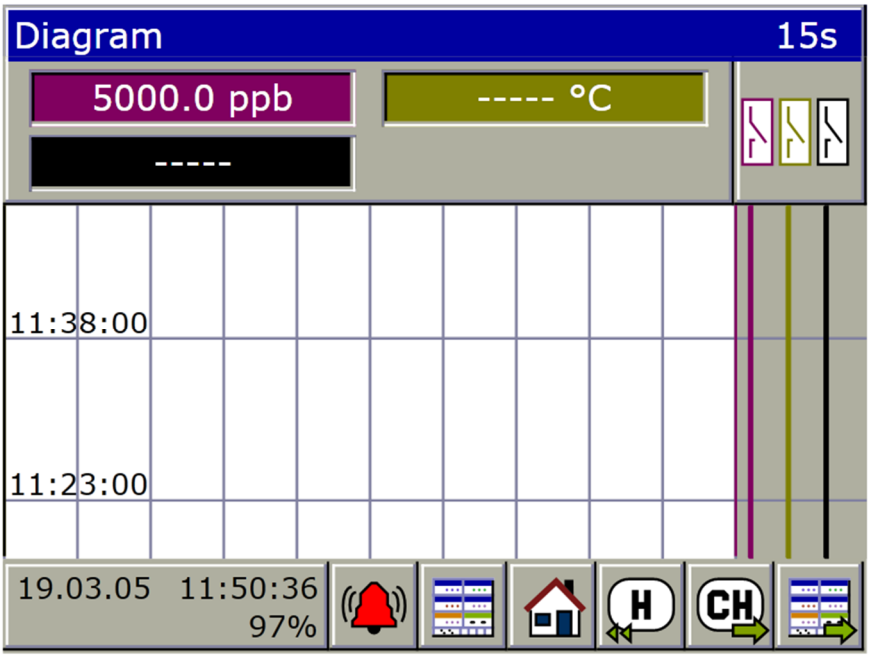


Fig. 12: Diagram

Chlorine
The current measured value of the chlorine sensor can be read in ppb.

Temperature
The temperature is read out of the chlorine sensor. The chlorine sensor uses this for internal temperature compensation.

6.3 Logon as master

- ➢ Push the info button located at the bottom left of the touchscreen
  - ↳ Device menu opens
- ➢ Perform the following steps

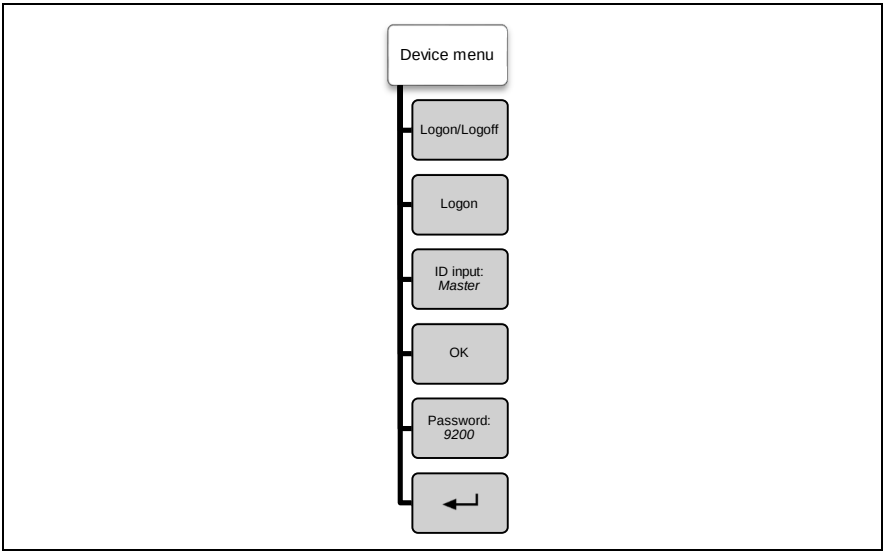


Fig. 13: Logon as master

- ↳ You have been logged on as master.
- ↳ You can make changes.

6.4 Setting the time for the disinfection sensor

✓ You have been logged on as master in the controller (see Chapter 6.3, p. 26).

- ➢ Push the info button located at the bottom left of the touchscreen
  - ↳ Device menu opens

➢ Perform the following steps

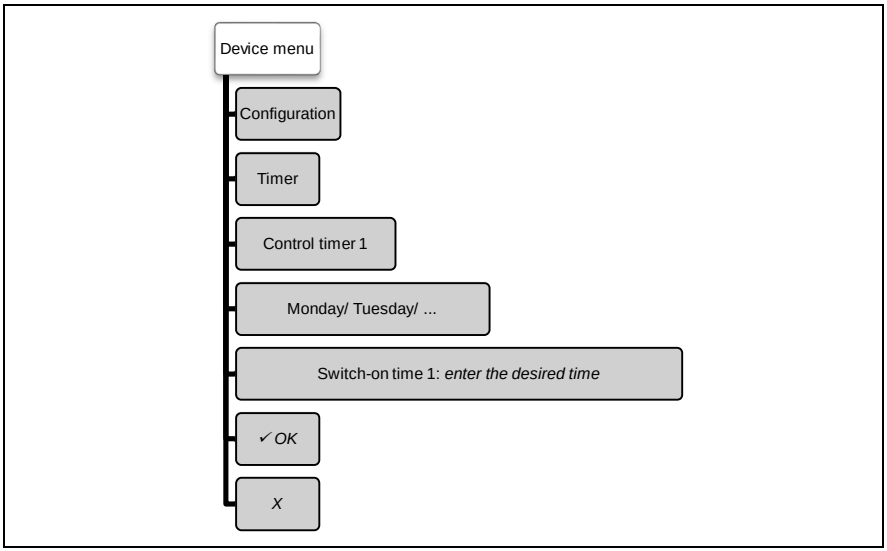


Fig. 14: Entering the desired time for the disinfection cycle

Except for the change of “Switch-on time 1” no other changes must be made at Timers 1 to 4. These control the function of the electrolysis cell. Timers 5 to 12 are freely available.

6.5 Connecting the sensor with the controller

✓ The sensor has been electrically connected with the controller (see Chapter 5.9, p. 22).
✓ You have logged on as master in the controller (see Chapter 6.3, p. 26).

➢ Push the info button located at the bottom left of the touchscreen
↳ Device menu opens

➢ Perform the following steps

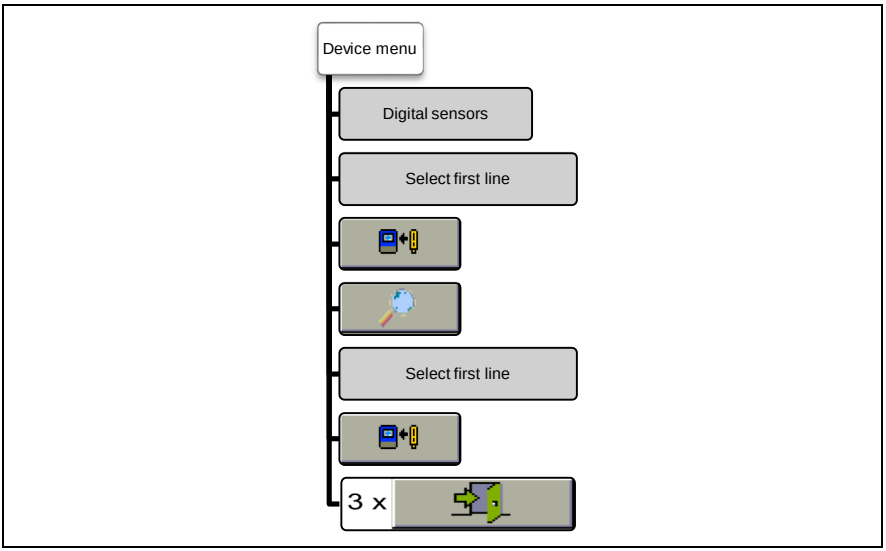


Fig. 15: Connecting the sensor with the controller

This has to be done only once for a sensor.

6.6 Controller settings that must not be changed

There are some settings in the controller that must not be changed as they are required for the proper function of the measuring board. If these settings are changed nonetheless, the function of the measuring board cannot be ensured.

Configuration

- Digital Sensor 1
- IN 1
- Limit value monitoring 1
- OUT1 and OUT2
- Timers 1 to 4
- Logic formulas 1 and 2
- Mathematical formulas 1, 2 ,3 and 8
- Process display 1

7 Calibration

The sensor puts out a signal that is proportional to the concentration of the disinfectant in the measuring water. The sensor must be calibrated for the allocation of the sensor signal to the concentration of the disinfectant in the measuring water.

- Certain prerequisites for the sensor must be met to enable its calibration (see Chapter 1.2, p. 5).
- Push the info button located at the bottom left of the touchscreen
  - ↳ Device menu opens
- Perform the following steps

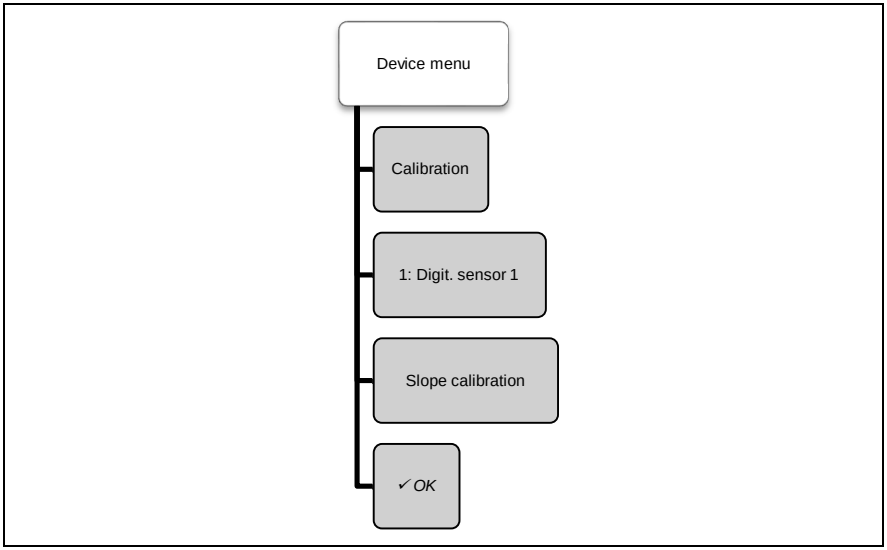


Fig. 16: Calibration of the sensor Part 1

- ▶ Take a measuring water sample at the flow chamber for analysis.
- ▶ Determine the concentration of the disinfectant in the measuring water using a suitable analytical measuring method (see operating instructions issued by the manufacturer of the analysis instruments).

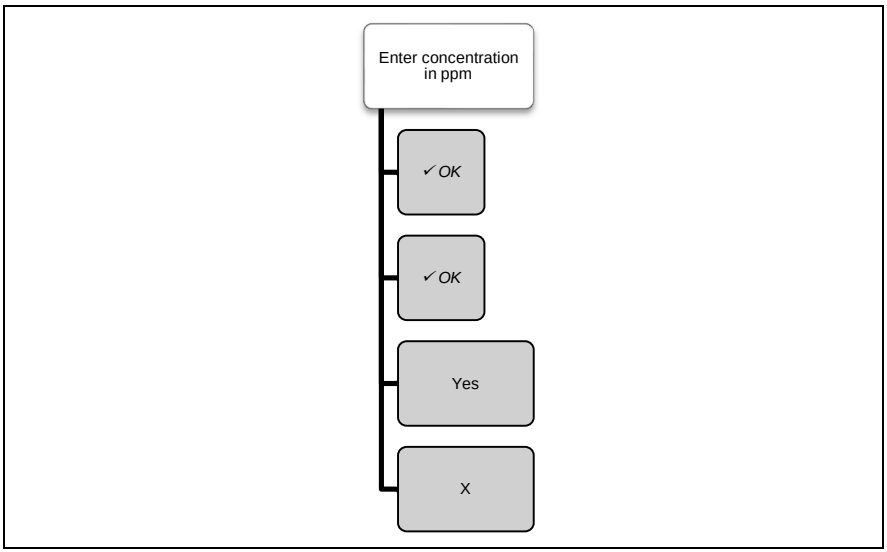


Fig. 17: Calibration of the sensor Part 2

➥ The sensor has been calibrated.

- ▶ Repeat the calibration at regular intervals (see Chapter 9.1, p. 32).
- ▶ Comply with the applicable national regulations relating to calibration intervals.

8 Removal

When the electrolysis cell is removed, a wrong measured value can be present at the input of the measuring and control device and lead to uncontrolled dosing in a control loop.

Before removing the electrolysis cell:

- ▶ Switch of the measuring and control system or change to manual operation.
- ▶ Shut off the measuring water inlet.
- ▶ Shut off the measuring water outlet.
- ▶ Remove the electrical connection.

9 Maintenance of the electrolysis cell

9.1 Maintenance overview

In order to ensure the optimum function of the electrolysis cell:

- ▶ Perform the following activities at regular intervals.

Maintenance task	Interval
▶ Replace the electrolyte	6 months
▶ Exchange the membrane cap	Annually

Tab. 4: Maintenance overview

9.2 Replacement of electrolyte and membrane cap

- ▶ Lift both hose rings [1] off the membrane cap towards the side and push them downwards.
- ➥ The valve opening [2] is now visible.
- ▶ Unscrew the membrane cap.
- ➥ Air flows through the valve opening.

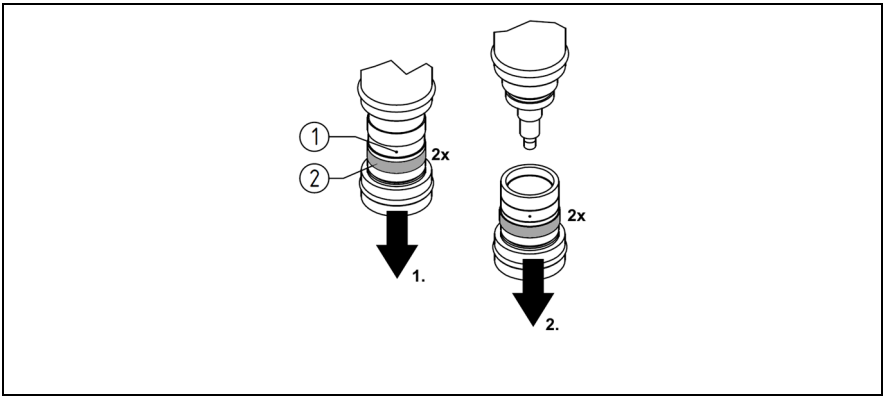


Fig. 18: Lifting off the hose rings

1 Valve opening
2 2 pcs hose rings

- Pour the electrolyte away from the membrane cap.
- Rinse the electrode finger with tap water.
- Place special emery paper on a paper towel.
- Hold the electrolysis cell in an upright position.
- Hold on to the special emery paper and run the tip of the anode over the paper at least twice. Use a new section of the emery paper each time.

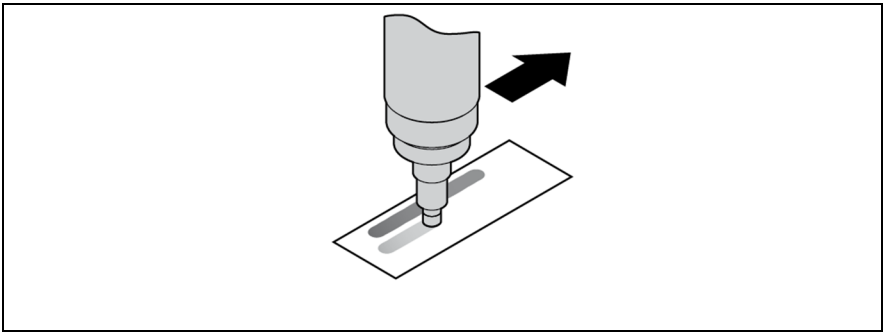


Fig. 19: Rubbing the anode down with emery paper

- ▶ Place one hose ring into its original position.
- ➥ The valve opening has been covered.

When changing the membrane cap:

- ▷ Use a new membrane cap.

- ▶ Perform the steps described under “Putting the measuring board into service” (see Chapter 5.2, p. 16).
- ➥ Maintenance has now been completed and the electrolysis cell can be used again.

10 Troubleshooting

Various factors in its environment can have an influence on the measuring board. In case of irregularities, it may be useful to check these factors:

- Flow
- Measuring cable
- Measuring and control device
- Calibration
- Dosing device
- Concentration of the disinfectant in the dosing container
- Suitability of the sensor for measuring the disinfectant dosed
- Concentration of the disinfectant in the measuring water (analysis instruments)
- pH value of the measuring water
- Temperature of the measuring water
- Pressure in the flow chamber
- Analysis instruments

10.1 Special tests

10.1.1 Tightness of the membrane cap of the electrolysis cell

- Unscrew the membrane cap from the electrolysis cell (see Chapter 9, p. 32).
- Dry the outside of the membrane cap.
- Prepare the membrane cap (see Chapter 5.2, p. 16).
- When screwing the membrane cap back on again, check whether fluid emerges through the membrane.

If droplets form at the membrane:

- Use a new membrane cap.

If the electrolysis cell does not start functioning:

- Send the electrolysis cell to the supplier for inspection.

11 Disassembly and storage

11.1 Measuring board

Perform the following steps to disassemble a measuring board and prepare it for storage:

- Disconnect the measuring board from the electric mains.
- Remove the measuring water connections.
- Disassemble the electrolysis cell and the sensor.
- Dry the measuring board in a dust-free place.
- Store the measuring board in a dust-free place.

11.2 Electrolysis cell

Perform the following steps to disassemble an electrolysis cell and prepare it for storage:

- Unscrew the membrane cap.
- Rinse the electrolyte out of the membrane cap with lukewarm tap water for 10 seconds.

The electrolyte must be removed completely. Otherwise long start-up / response times have to be expected when the cell is put into service again.

- ▶ Rinse the electrode finger with lukewarm tap water.
- ▶ Dry the membrane cap and electrode body in a dust-free place.
- ▶ Loosely screw the dry membrane cap onto the electrode body for protection.
- ▶ Make sure that the membrane does not touch the anode.

If the membrane cap was in use for at least one day, we recommend not to use it anymore when the electrolysis cell is put into service again.

▷ Replace the membrane cap (see Chapter 9.2, p. 32).

11.3 Sensor

Observe the operating instructions of the sensor.

12 Disposal

- ▶ Comply with the local disposal regulations.

13 Warranty

Subject to their being properly handled, the manufacturer grants a two-year warranty for the measuring board and the electrolysis cell.
The following parts of the electrolysis cell are excluded from warranty:

- Membrane cap (wearing part)
- Electrolyte (consumable)
- Necessary service works
  (Cleaning of the parts and electrodes coming into contact with the electrolyte).

The warranty will become void in case of mechanical damage or illegible serial number.

Sending parts in for inspection:

We will only accept shipments that are sent free domicile. Otherwise acceptance will be refused.

Subject to their being properly handled, a warranty of one year is granted for inspected parts. The warranty period begins to run on the inspection date.

This warranty will become void in case of mechanical damage or illegible serial number.

14 Liability disclaimer

The measuring board and the electrolysis cell are manufactured with the greatest care and subjected to a recorded function test. Should malfunctions nevertheless occur during application, no liability claims against the manufacturer can be derived from any damage caused by such malfunctions.

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