

Instructions for ECL3N Chlorine Probe

ENGLISH



for types:

ECL 3N/x 4...20 mA, x = measuring range in mg/L chlorine

The chlorine probe is an electrochemical sensor for measuring the chlorine concentration in water (pH 5 to 9). This probe measures free chlorine from inorganic chlorine products. (Chlorine gas, sodium hypochlorite, etc). The probe has a low dependence of pH-value, so that variations of the pH-value only have a small influence on the measuring signal. When the pH-value increases the measuring signal decreases at about 10 % per pH unit. The probe should use only in potable / swimming pool water, otherwise you must test it! The sensitivity to combined chlorine is highly reduced.

Warnings: Do not touch the electrode finger and keep it clean! Do not remove the layer on the electrode finger.

Ensure that silicon rings aren't broken by turning them.

Ensure that membrane isn't broken by ending assembling procedure to probe's body in horizontal position then check for electrolyte leakage.

1. Intended use

The sensor has to be inserted in the probe housing according to this operating instructions (see item 2). The maximum pressure is 1 bar / 10 mwc. The allowed temperature range is >0 up to <45 °C (>32 up to <113 °F).

Each application beyond this is a not intended use so the warranty becomes void and the liability is disclaimed.

Operating instructions

2. Set up



Unscrew the membrane cap from the electrode shaft. Place the membrane cap and the G-holder onto a clean and not absorptive base.



Fill up the membrane cap up to the edge with the enclosed electrolyte ELECL3. Be careful so that there are hardly no bubbles. Then replace it onto the base.



Fill up the G-holder with electrolyte. Be careful that there are no bubbles.



Hold the electrode shaft upright and push the electrode finger carefully into the filled G-holder.

Operating instructions



Hold the electrode shaft with the G-holder upright and put it on the filled membrane cap. Then screw the membrane cap onto the electrode shaft. Turn it anticlockwise until the thread engages, then screw **slowly** the electrode shaft clockwise (by hand) onto the membrane cap. Excess electrolyte will escape through a valve (located above the type marking) in the membrane cap. Do not close this vent with your finger.



Make sure that the membrane cap is tightly fastened to the electrode shaft! Wash up the excess electrolyte with water.

Operating instructions

Warning: Electrolyte may spurt from the vent. Excess electrolyte or electrolyte which gets on your skin or in your eye wash up with water. The electrolyte contains potassium halide and is adjusted acidically.

Important: Check whether the membrane cap is completely screwed in up to the stop. The first screw-in resistance comes from the O-ring seal; however the screwing procedure of the cap must be continued until it hits the electrode shaft!

As a rule the probe is run in after about one hour so that a first adjustment can be made. The adjustment should be repeated after approx. one day.

Important: When you unscrew the membrane cap do not forget to lift up the hose ring that covers the vent. So air is allowed to stream into the membrane cap. Otherwise the membrane will be destroyed because of the vacuum building up in the membrane cap.

3. Insertion of the probe in the probe housing

For the installation of the probe in the probe housing, first the black O-ring, then the PVC slide ring has to be inserted into the 1 inch port. Then the 1 inch screw-connection has to be screwed in. After this preparation of the probe housing the probe is inserted into the housing until the label begins. The part of the probe with the label and above it remains outside (see picture, page 8). To fix the probe, tighten the screw connection fast using tongs. Please make sure that the probe is tightly fastened in place, otherwise it may be pressed out of the probe housing when it is under pressure (max. 1 bar / 10 mwc!). Connect the probe with the measuring device (mA-type: see item 8.2). Then open slowly the measuring water supply.

Warning: A sudden failure of the probe may lead to a very dangerous overdosing of the disinfectant – please provide preventative measures. Check the equipment for the smell of chlorine, and the water for abnormal colour. In case of a very high overdose, the DPD-1 measuring may remain colourless, as the colorant will be bleached by the disinfectant.

Recommendations: Install a control unit with dosage time monitoring, orp measuring as safety measuring with limit value monitor and alarm switch. Any dosage made for drinking water should only be made in proportion to the volume; the measuring value may be applied as a disturbance.

Operating instructions

4. Control of the probe / Analytics

A balance or checking of the probe using DPD-1 method ("free chlorine") should be performed regularly depending on utilization. A weekly check is recommended, if necessary more frequently. The analytically determined value is adjusted by means of slope calibration function of the controller (see Operation Manual of the Controller).

5. Disassembling of the probe

Lock the measuring water supply. Disconnect the probe from the device (mA-type: see item 8.2). Untighten the 1 inch screw-connection and pull out the probe carefully.

6. Insertion of the probe in the probe housing.

The black O-ring is first inserted in the 1" opening followed by the slide ring made of PVC. Then the 1" PVC screw fitting is screwed in loosely. The probe is inserted in the prepared probe housing. Then the probe is fixed in place with the 1" PVC screw fitting. Turn the PVC screw fitting by using pliers, so the probe can not move away from its position, otherwise the water pressure can push it out of the probe housing.

7. Maintenance of the sensor

Caution: *The brown coating of the electrode finger must not be emieried!! Do not unscrew the metallic membrane holder from the cap as this will damage the membrane.*

If an adjustment is impossible due to unstable or too low values displayed, the hose ring on the membrane cap above the type marking sealing the vent is to be lifted sideways so that the opening is free. The membrane cap is unscrewed and then air streams into the uncovered vent. The electrode finger is cleaned with a clean, dry paper towel. With the special abrasive paper supplied just the tip of the dry electrode finger (= working electrode) is cleaned. Place the special abrasive paper on paper towel, hold it at one corner and rub the electrode tip of the perpendicularly held probe two or three times across the abrasive paper. Then replace the hose ring onto the vent and fill with electrolyte (see Section 1). If necessary, use a new membrane cap. Recommendation: change the electrolyte every 3 months.



8. Electrical Specifications

The meter or the controller respectively must be galvanically insulated from other devices!

8.1. ECL3N

Power supply: ± 5 to ± 15 V DC, approx. 5 mA
Ground power supply and ground signal are the same
Typical Signal: about -100 mV per mg/L chlorine

8.2. ECL3Nx

x = measuring range in mg/l chlorine, x = 2 or x = 10

With the 4...20 mA connection the sensor is supplied by the device with current. The measuring signal is also transmitted to the device with this connection. The measuring range (range of transmission) is quoted on the label of the sensor (e. g. ECL3N10: 4...20 mA = 0...approx. 10 mg/L chlorine). The slope has to be adjusted at the device.

Installation:

Push the cap with the PG7 screw-connection over the measuring cable. Then fasten the wires in the terminal. Screw in the cap by hand until the o-ring seals. Now tighten the PG screw-connection and fix the cable. For disconnection untighten the PG screw-connection so that the cable is released. Recommended cable: diameter approx. 4 mm, 2 x 0,25 mm².

Electrical specifications:

Power supply: minimum voltage: 12 VDC, load resistor max. 50 Ohm, maximum voltage 30 VDC, load resistor 50 until 900 Ohm. The connection is protected against wrong polarity of the power supply. The maximum current by overloading is approx. 30 mA.

9. Technical data, general description and information

The chlorine sensor is a membrane covered potentiostatic 3-electrode system, with a specially placed counter electrode. The measuring electrode is membrane covered and is in the electrolyte area together with the reference electrode. This electrolyte area contains a special electrolyte and is separated from the measuring water.

In this measuring method chlorine diffuses out of the measuring water, through the membrane and causes in compound with the electrolyte an electrical signal at the measuring electrode. This method is patented. The electrical signal at the measuring electrode is proportional to the chlorine concentration and is amplified by the electronics of the sensor. The measuring signal is independent from the temperature of the measuring water due to an integrated temperature compensation. Bound chlorine is not measured.

- The exterior housing of the probe consists of stainless steel, PVC, silicon rubber, polycarbonate.
- The probe has a diameter of 25 mm (0.98 inch.) and a length of 175 mm (6.88 inch.) (plug adapter connection type) or of 220 mm (8.66 inch.), respectively (4 - 20 mA type).
- Provided pressure remains constant, the probe can be used up to approx 5 mWS. But under pressure it is not allowed that there are air bubbles in the water. Air bubbles in front of the membrane handicap the disinfectant from passing through the membrane. That results in unstable measuring values
- Measuring range: 0.00 up to 2.00 or 20.00 mg/L chlorine (depending on the type)
- Resolution: 0.001 or 0.01 mg/L chlorine. (depends on the type and the measuring device)
- Response time T_{90} : approx. 2 min.
- Recommended flow rate through the probe housing: 30 l/h (7.92 GPH). A minimum flow is needed.
- The recommended range of temperature is >5 and <45 °C (>41 and <113 °F). The measuring signal is independent of the temperature.
- The dependence of the pH-value is reduced compared to the chlorine measuring systems until now. When the pH-value increases one step the measuring signal decreases approx. 10 %
- The membrane life is typically one year, but can vary considerably depending on the water quality. Heavy contamination of the membrane should be avoided!
- Each probe has been tested and the results are documented.
- During usage, the probe must not be allowed to stand dry with the electrolyte.

- To store the probe the membrane cap is unscrewed. Membrane cap, G-holder and electrode finger *are rinsed in clean water and dried in a place free of dust*. The dry membrane cap is then loosely screwed onto the electrode shaft. The membrane must not rest against the measuring electrode.
- When putting the probe back into use after storage, the electrode tip must be cleaned with the special abrasive paper and a new membrane cap must be used. When there is lime on the membrane it can be inserted in thinned acid for a few hours. Then cleanse the membrane cap carefully with clean water and put it into operation.

Operating instructions



Note : probe's tip must be at 5mm from the bottom.

Subject to technical changes!