Conductivity-/high-purity water sensors with 2-electrode system Type 202922, 202923, 202924 and 202925

B 202922.0
Operating Manual

V1.00/EN/00449917

1 Notes

If any difficulties should still arise during start-up, please do not carry out any manipulations on the unit. You could endanger your rights under the instrument warranty! Please contact the nearest subsidiary or the head office in such a case.

2 General

These operating instructions are valid for electrolytic conductivity sensors as per data sheets 202922, 202923, 202924 and 202925.

Electrolytic conductivity sensors are used in conjunction with suitable transmitters for industrial chemical analysis, to determine the electrolytic conductivity of liquids, or the resistance in high-purity water.

3 Measurement principle

Two conductive electrodes of a defined surface are immersed in the medium at a certain distance to each other. They are supplied with an a.c. voltage of a specific frequency (depending on the measurement range) from a separate transmitter. Because of the conductive components in the medium (ions, salts), an alternating current is produced between the electrodes, which the transmitter uses to determine the conductivity, display it and convert it to a standardized signal.

4 Laboratory or industrial sensors

Conductivity sensors consist of a flow-through, immersion or screw-in body made from plastic or stainless steel and the electrodes embedded in it. Depending on the type, application and measurement range, the two electrodes are made from stainless steel, titanium, platinum or special graphite. The conductivity sensors are supplied ex-factory with a fixed cell constant K [1/cm].
Typical cell constants are, for example, K = 0.01; 0.1; 1.0; 3.0 or 10.0. Intermediate values are possible for customer-specific versions.

The subsequent transmitter must be set to the cell constant of the sensor. In addition, temperature probes can be incorporated in the sensor for specific applications.

5 Ranges

The range of electrolytic 2-electrode conductivity sensors is physically restricted to a maximum of 15 mS/cm.

The table below shows the rough division of the ranges, related to the cell constant.

Cell constant K [1/cm]	Maximum range
0.01	up to 5 µS/cm or 20 MΩcm
0.01	up to 10 µS/cm
0.1	up to 3000 µS/cm
1.0	up to 15 mS/cm

☞The actual range limits vary according to the electrode material, style and subsequent transmitter!

6 Electrical connection

Depending on the version, the sensors are supplied with an attached cable or a detachable connector.

Connection for	Angled connector	Attached cable	M12 connector
Outer electrode	⏚	white	1
Inner electrode	2	brown	2
Temperature compensation	1 3	yellow green	3 4
3-wire circuit	-	-	5
Screen	-	⏚	5

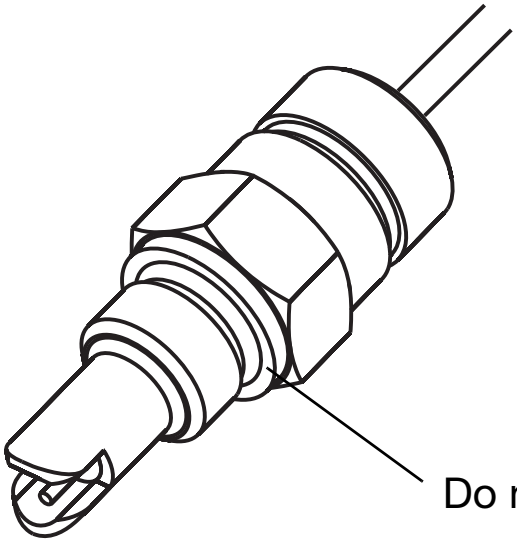
The connection cable must be run directly to the transmitter, and not via series terminals. Only use screened cables, preferably those recommended or supplied by the manufacturer.

Please observe the instructions for the electrical connections in the operating instructions for the transmitter used.

7 Mechanical installation

Please take note of the technical data for your sensor (see the manufacturer's technical data sheet). The sensor must be suitable for the temperature, pressure and media conditions (including the chemical resistance) prevailing at the site!

Do not make any mechanical modifications to the sensor (shortening, drilling into, bending or scratching the electrodes), as this may seriously impair the proper functioning of the sensor and endanger your rights under the instrument warranty!



Do not use a metallic gasket!

The operating position is generally unrestricted. It must, however, be ensured that the liquid can flow adequately through or arround the sensor (i.e. the conductive electrodes of the sensor must always be completely enveloped by the liquid), and constructional measures must be taken to eliminate interruptions in the flow or gas bubbles.

8 Maintenance / cleaning

The electrodes of the electrolytic conductivity sensor are in direct contact with the liquid. **It is therefore essential to clean the sensor at regular intervals, depending on how prone the liquid is to contamination.**

All suitable domestic cleaning agents may be used for cleaning. Abrasive cleaning agents are generally not suitable. The electrodes must not be damaged mechanically! Deposits can be removed using diluted hydrochloric acid, or by ultrasonic cleaning, for example.

☞The use of electrolytic conductivity sensors in strongly glutinous, oily or sticky media is not permissible. In such cases, inductive conductivity measurement should be used.

9 Fault-finding

When investigating faults, all components of the conductivity electrode system must be taken into account.

Also check the transmitter and the connection cable used, in addition to the sensor.

Type of fault	Possible cause	Removal
Measurement too high or too low.	Sensor is dirty.	Chapter 8 "Maintenance / cleaning", page 7.
No conductivity measurement. (e.g. “0” display)	Cable break, wrong pin assignment Sensor in air (not enveloped).	Check electrical connection again carefully. Check installation site of sensor: is liquid present?
No temperature measurement (for sensors with integral temperature probe).	Cable break, wrong electrical connection.	Check electrical connection again carefully.
Dispayed value is not stable, unsteady.	Errors due to - wrong/ inadequately screened connecting cable - gas bubbles	Check cable connection and layout. Check installation site and position of sensor, alter it, if necessary.

The sensor can also be checked for short-circuits or internal contact problems. This can be done using a continuity tester (e.g. the diode tester of a multimeter).

10 Screwing the type BlackLine Lf-EC conductivity sensor into the fitting

* Undo cable gland (1).
* Pass connection cable (3) of the conductivity sensor (4) through the fitting (2).
* Screw conductivity sensor (4) into the fitting (2).
  tightening torque: approx 2.5 Nm.
* Tighten cable gland (1),
  tightening torque: approx 2 Nm.

When removing the conductivity sensor from the fitting: Undo the cable gland (1) first !