# Conductivity Sensor CON

## MANUAL

# Type

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|---|---|
| **Name of product:** | SENECT Conductivity Sensor CON |
| **Type:** | CON-2-SC (Range 2 mS / cm)<br>CON-10-SC (Range 10 mS / cm)<br>CON-50-SC (Range 50 mS/cm) |
| **Art.-No.:** | 2410 (2 mS / cm)<br>2420 (10 mS / cm)<br>2400 (50 mS /  cm) |
| **Producer:** | SENECT GmbH & Co. KG<br>An 44 – Nr. 11<br>76829 Landau / Deutschland |

## Important note:

Please read this manual carefully and store it so that you can use it later. Read the warning and safety notes attentive.

Further information and latest software releases or documents can be downloaded from:

## www.senect.de

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# Table of contents

# Used symbols and wording

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|---|---|
| ⚠ | ***DANGER!***<br><br>Warning of life threatening dangers.<br><br>***WARNING!***<br><br>Warning of possible life threatening and / or severe irreversible injuries.<br><br>***ATTENTION!***<br><br>Warning of possible medium or slight injury. |
| ❗ | ***ATTENTION!***<br><br>Follow the notes to avoid damage of equipment. |
| ⓘ | ***NOTE!***<br><br>Further information for the use of the device. |
| ⚡ | ***NOTE!***<br><br>Further information for the use of the device. |

# General Security Notes

The Conductivity Sensor CON is an electronic sensor unit for the measurement inductively of the electrical conductivity of water and must be used in combination with SENECT control units.

Since it is an electronic product the common prerequisites for a safe instrument usage must be fulfilled. The corresponding control unit must be operatated with 230 V AC (~50 Hz). Ensure that all cables are installed safely so that no obstacles for persons are built and all. Mount all cables and electric devices protected against direct environmental impacts like overheating by direct sunlight and water. Even if the products are protected against spray water, the product´s lifetime will be elongated, if it is mounted on a protected place. The Conductivity Sensor CON uses 24 V DC supply voltage which is therefore not of danger for persons.

For many applications a ground fault circuit interruper (interrupting current <= 30 mA) is required by law. Inform yourself about the valid legislation.

The operating temperature of the device must be between 0°C and +40°C. It is not allowed to modify the sensor, to open the housing or to insert anything into the housing.

The Conductivity Sensor CON designed to be operated by professional users. However, it can be operated by children of the age of at least 8 years and persons with limited physical, sensorial or cognitive ability, if they are supervised and trained in the usage of the instrument, so that no dangers or threats can result of the operation.

Please store this manual. We suggest the storage a copy of the manual in the vicinity of the device.

Technical and optical changes of this manual are subject to alterations.

> **Warning:** Before starting any maintenance work, unplug all electrical devices in the water.

# Intended use

The Conductivity Sensor CON is developed for the measurement of the electrical conductivity of water in a measurement range from 0 to 2 mS / cm (Type CON2,

applications in freshwater), 0 to 10 mS / cm (Type CON10, application in fresh or brackish water) or 0 to 50 mS / cm (Type CON50, typical application in sea water) at temperatures from 0 to 40°C. Its integrated temperature sensor is used for a temperature compensation so that the displayed conductivity refers to +25°C.

The Conductivity Sensor CON must be used in combination with SENECT control units. The sensor is designed for the use in industrial aquaculture applications.

## Some fact about the unit „salinity"

The term salinity refers to the salt content of liquids, mostly water. Its typical unit is „mass of salt per kg of water" (**g / kg**). The unit **ppt** (parts per thousands) is also used and refers to the mass, which makes it interchangeable with g / kg (e.g. 1 ppt = 1 g / kg).

Since the measurement of the electrical conductivity („how good the water allows electical currents to flow") can be used to determine the salt concentration of sea water, the **Practical Salinity Unit** (**PSU**) was created, which defines the salinity by the electrical conductivity. Please note, that the calculation of the salinity by measurements of the conductivity are only valid, if the ion composition is equal to

the composition of sea water. The PSU therefore can be used to measure the salt content in g (salt) per kg (water.)

Application notes e.g. for creating artificial seawater often refer to the salinity in % or ‰. That allows the user to calculate the amount of salt which must be added. The units % or ‰ also refer to the mass:

$$1\frac{g}{kg} = 1\ ppt \approx 1\ PSU \approx 0{,}1\% \approx 1{,}97\ \frac{mS}{cm}$$

This relationship shows, that dissolving 1 g salt per kg of water (app. 1 liter) will result in a conductivity of app. 1,97 ms / cm.

The used equations are drawn from:

UNESCO – Technical papers in marine science – 44: *Algorithms for computation of fundamental properties of seawater*, 1983

# Getting started

*Scope of delivery*

- 1 x Conductivity Sensor CON
- 1 x Manual

*Note*

Please check directly after delivery, that the package is not destroyed or damaged or was opened before. Please check also, that all parts as listed above are included. If anything is missing or broken, please contact us as soon as possible within 14 days. Unfortunately, we cannot accept later information of damage, which happened during the transport.
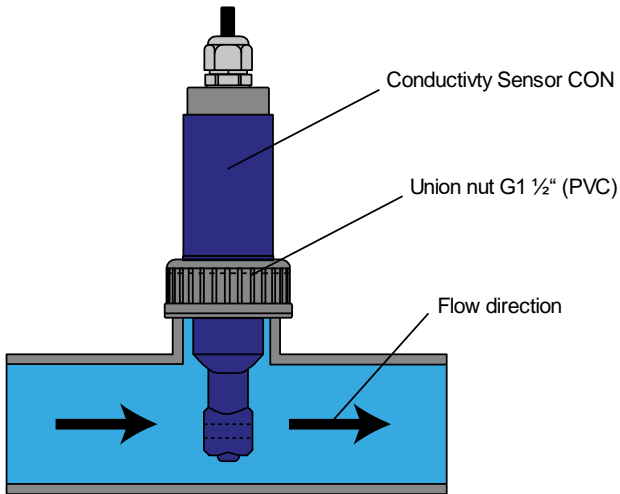
*Installation and start-up*

Choose a place for the electronic interface which is clean, dry and protected from direct sunlight. Ensure that all cables are placed safely and all regulations are fulfilled.

1. Mount the sensor in a way, that the sensor head is always fully submerged. This can be done via clamps on side walls, within pipes or on a float, when water levels are changing.

**Installation in pipe**



Conductivty Sensor CON
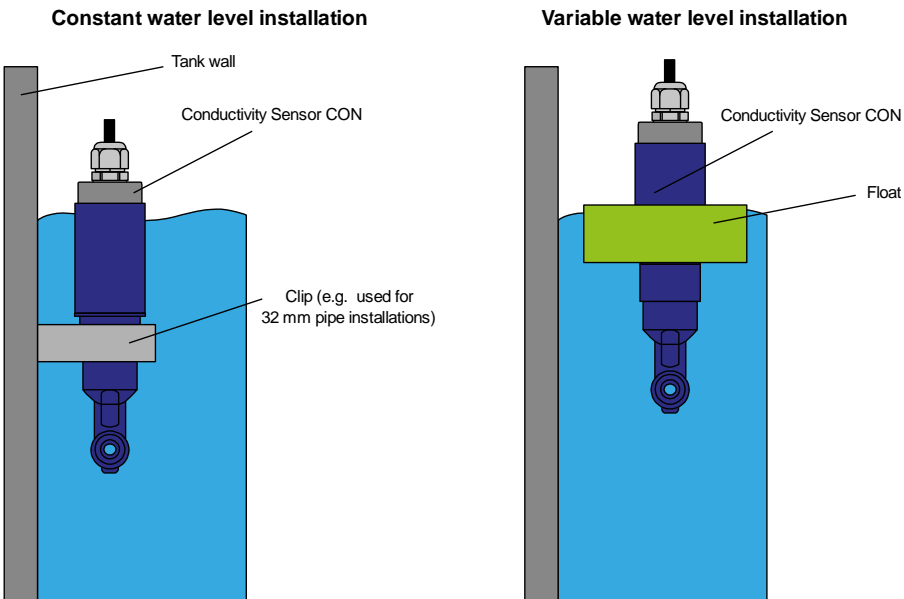
Union nut G1 ½" (PVC)

Flow direction

**Fig. 1:** Installation of the sensor in a PVC pipe.

2. Connect the blue marked plug of the cable with your control unit at one of the sensor input ports. Your SENECT control unit will automatically recognize the sensor and starts the measurement.

**Attention:** Based on the inductive measurement principle, magnetic field can cause interference with the sensor. Ensure that there are no electrical cables, no motors or other magnetic fileds in the vicinity of the sensor.

**Constant water level installation**

**Variable water level installation**

Tank wall

Conductivity Sensor CON

Conductivity Sensor CON

Float

Clip (e.g. used for
32 mm pipe installations)

**Fig. 2:** Mounting of the sensor in tanks (e.g. CON 2 and CON50).

# Getting started – short version

1. Mount the electronic transducer.

2. Mount the sensor.

3. Connect the cable with the SENECT control unit at a sensor plug (labelled with „SENSOR").

4. The operation starts.

**Hint:** With the arrow keys at your control unit, you can switch in the display between the sensor input ports.

# Maintenance and cleaning

Cleaning and maintenance intervals depend strongly on the environment in which the sensor is measuring. Use soft towels to clean the sensor. Typical hand dish washing soaps can also be used.

## *Calibration*

Due to its inductive measurement principle, the sensor drift is minimized. However, every sensor should be regularly checked for correct readings. Dip the sensor into a calibration solution. If there is a large drift, the sensor can be calibrated with a 2-point calibration.

1. Dip the sensor in deionized water and wait until the temperature reading is equilibrated.

2. Select in the menu *„Sensor calibration / CON / Calibration / Calibration Point 1"*, select as reference value 0 mS / cm and press **OK** or wait 120 s.

3. Rinse the sensor with clean water.

4. Dip the sensor in the corresponding calibration solution and wait until the temperature reading is equilibrated.

## Calibration

Conductivity Sensor CON

Beaker

Calibration standard (e.g. 50 mS / cm)
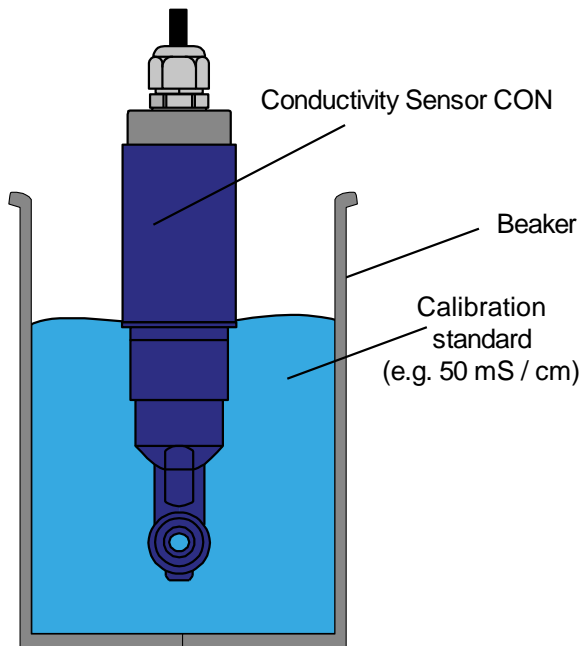
!
Ensure that the beaker is large enough so that the sensor has at least 3 cm at each side (due to the magnetic field).

5. Select in the menu „***Sensor calibration / CON / Calibration / Calibration Point 2***", enter the conductivity of the calibration solution and press **OK** or wait 120 s.

6. Choose in the menu of your control unit the ORP sensor (***Sensors / Sx: ORP***) and select "***Sensor Calibration / ORP***

7. If the calibration worked select „***Save calibration***".

Depending on the used firmware of your control unit, the menu can change. Please refer therefore to the current manual which can be found on www.senect.de.
**i**

*Tipp:* It is also possible to load old calibrations. There you can also see the calibration coefficients.

*The calibration should be carried out at the same temperature like in the measured water.*
**i**

# Technical Data

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|---|---|
| Dimensions: | Ø 44 mm, length: 200 mm / 189 mm (CON10) |
| Housing material: | Polypropopylene |
| Process connection: | G 1 ½" PVC Thread |
| Cable length transducer – control unit: | 5 m |
| Cable length transducer - sensor: | 2,5 m |
| Voltage: | 24 V DC |
| Power consumption: | << 1 W |
| Temperature range: | 0° to 40 °C |
| Precision: | < ±1,5% FS |
| Response time: | $T_{90}$ < 60s |
| Ingress protection: | IP68 |

dimensions in mm (not to scale)
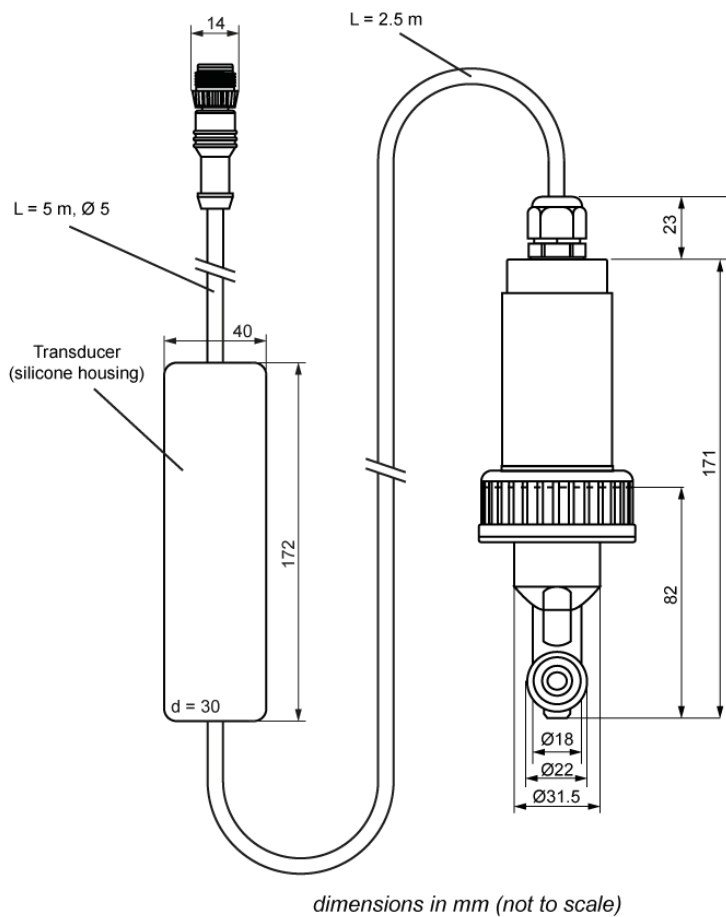
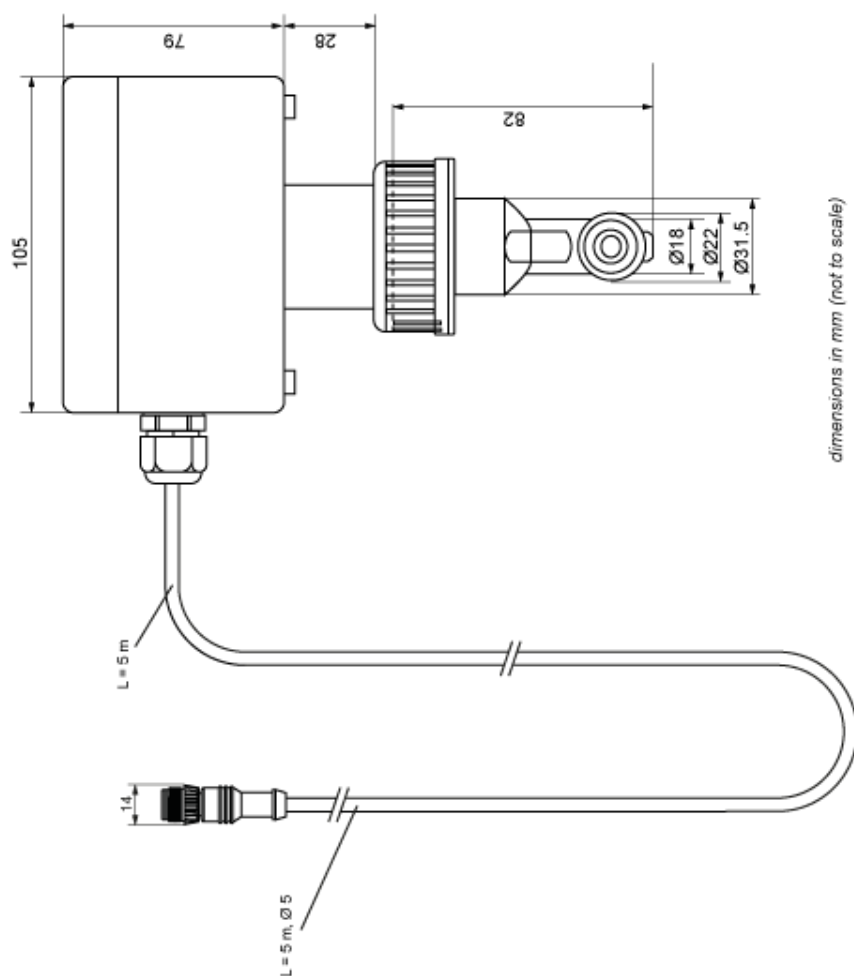**Fig. 3:** Sketch of the concuctivity sensor CON 2 or CON 50.

**Fig. 4:** Dimensions of the CON10.

# Information about the correct disposal

Your device is well packed at delivery. Please dispose the packaging material accordingly to the regulations in your country.

Do not throw the product in the casual litter bin. Make sure you are informed about the local disposal regulations and dispose your product accordingly. Alternatively, you can also send the product back to the producer.

The SENECT GmbH & Co. KG is member of the Stiftung Elektro-Altgeräte Register and the products are registered (WEEE-Reg.-Nr.: DE37193510).

# Guarantee

Please check at delivery of your device, that all parts are delivered completely and that they function correctly. In case of any claims, contact us immediately per email or phone (info@senect.de or +49-6341 - 95 95 210). Please describe your claim as detailed as possible so that we can provide a solution as fast as possible. The product has a guarantee of 1 year and a warranty of 2 years. Furthermore, the § 377 HBG (German law) is valid.