



# ORP Sensor XT1

## MANUAL



## Type

<b>Name of product:</b>	SENECT® ORP Sensor XT1
<b>Type:</b>	ORP-1-XT1-SC
<b>Art.-No.:</b>	2300
<b>Producer:</b>	SENECT GmbH & Co. KG An 44 – No. 11 76829 Landau / Germany

### **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](http://www.senect.de)

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## Used symbols and wording

	<p><b><i>DANGER!</i></b> Warning of life threatening dangers.</p> <p><b><i>WARNING!</i></b> Warning of possible life threatening and / or severe irreversible injuries.</p> <p><b><i>ATTENTION!</i></b> Warning of possible medium or slight injury.</p>
	<p><b><i>ATTENTION!</i></b> Follow the notes to avoid damage of equipment.</p>
	<p><b><i>NOTE!</i></b> Further information for the use of the device.</p>
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## General Security Notes

The ORP Sensor XT1 is an electronic sensor unit for the measurement of the oxidation-reduction potential (ORP or short redox-potential) 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 operated 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 ORP Sensor XT1 uses 24 V DC supply voltage which is therefore not of danger for persons.

For many applications a ground fault circuit interrupter (interrupting current  $\leq 30$  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 ORP Sensor XT1 is 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

With the ORP Sensor XT1, the oxidation-reduction potential (ORP or short redox-potential) of water can be measured at temperatures ranging from 0°C to +40°C. The range of the

sensor is from -1000 mV up to +1000 mV and the resolution of the sensor signal is 1 mV. The ORP Sensor XT1 must be used in combination with SENECT control units. The sensor is designed for the use in industrial aquaculture applications.

The displayed value refers to the Ag/AgCl-Electrode.

## Getting started

### Scope of delivery

- 1 x ORP Sensor XT1 Electronic interface
- 1 x ORP Sensor XT1 Electrode
- 1 x ORP Calibration-Solution (+475 mV)
- 1 x ORP Calibration-BNC-plug (0 mV)
- 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 of the XT1 which is clean, dry and protected from direct sunlight. Ensure that all cables are placed safely and all regulations are fulfilled.

1. Connect the cable of the electrode with the electronic sensor interface (BNC-plug).
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.
3. Remove the cap of the electrode and rinse it with tap water.
4. Pour a small amount of the calibration solution in another vessel and dip the sensor tip into the solution and move it gently.

If the ORP value displayed with your control unit is close to the value of the calibration solution ( $\pm 5$  mV), you can directly install the electrode. If the deviation is larger, please calibrate the sensor (see chapter calibration)

5. Mount the electrode at the measurement location. The electrode shaft including the active glass tip must be submerged and placed into the water flow. The electrode must be mounted vertical (angle  $> 80^\circ$ ).

For the mounting of the electrode, flow through measurements cells can be used. If the electrode shall be placed at an open water surface, it can be mounted on a buoy e.g. made of Styrofoam. Please consider here, that the electrode must be in a place with low to moderate currents to deliver correct measurement results. If the current is too large ( $> 50 \text{ cm / s}$ ) the measurements are likely to be disturbed.

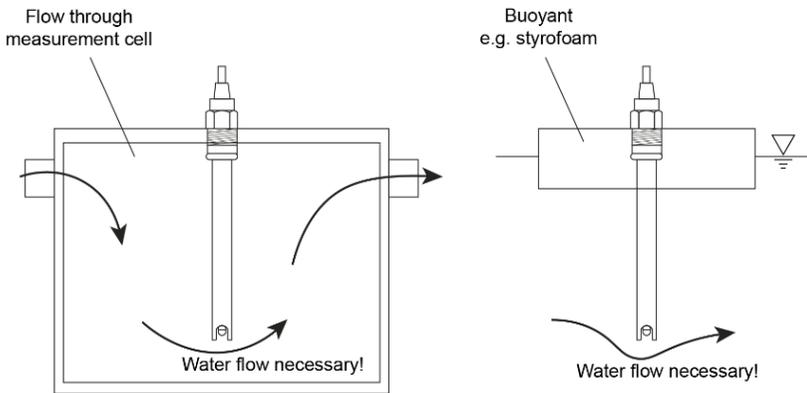


Fig. 1: Mounting possibilities of the electrode.

## Maintenance and cleaning

The electrode must never run dry – not during the usage and storage. At deliver, a silicone cap filled with 3 M KCL solution is on the electrode. If you do not use the electrode, put the filled cap on.

### Cleaning



The active glass part of the electrode must not be cleaned with abrasive or aggressive cleaning agents (e.g. scouring milk). Scratches on the glass part can damage the electrode.

However, dirt on the glass must be removed. Use therefore a water-dipped soft paper towel and rinse the electrode with clean water. If the contamination cannot be removed, you can use the following cleaning agents:

For chalk or metalhydroxide coatings:	Diluted hypochloric acid (1-3%)
For fatty or oily contamination:	Organic solvents (e.g. ethanol) or tenside containing solvents (e.g. dishwashing agents)
For protein contamination:	Pepsin in diluted hypochlorid acid

### Maintenance



Under normal conditions (clean water, stable and not extreme ORP values), a check every 14 days is recommended, and if necessary a new calibration must be performed.

Since the electrode loses its salts with usage, the signal may drift with time so that you should clean the electrode and calibration it again.

### Lifetime

All electrodes have a limited lifetime. A specific lifetime cannot be determined since it depends on the environmental conditions during the use e.g. temperature, ORP, pH, etc. This may range from days to years. Therefore, we cannot publish respectable lifetime estimates.



The storage of the electrode should be in a dry room between  $-5$  and  $+30^{\circ}\text{C}$  and not last longer than 6 months. The electrode must be stored in 3 M KCl solution. If the electrode felt dry, it may be reactivated by storing it 24 h in 3 M KCl solution.



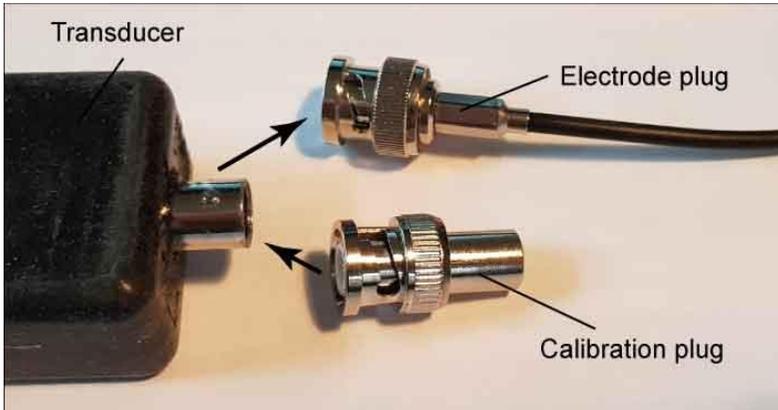
Avoid the contact to inorganic cleaning agents like acetone or chloroform. This may damage the membrane. Steam disinfection can also damage the sensor.

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](http://www.senect.de).



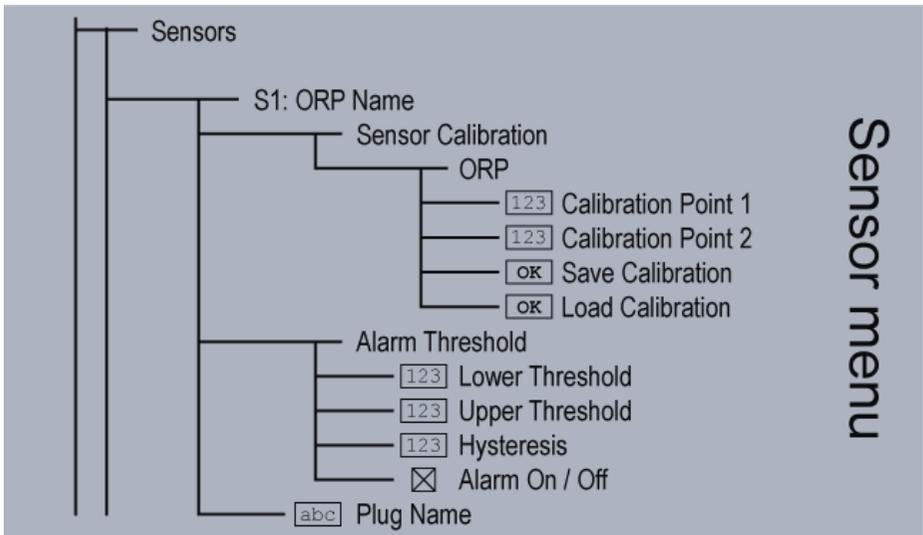
### Calibration

1. Unplug the electrode and plug in the BNC calibration plug. Select in the menu „**Sensor calibration / ORP / Calibration Point 1**“ and press **OK** or wait 120 s.



2. Remove the calibration plug and plug in the ORP electrode.
3. Rinse the electrode under clean tap water. Dip the electrode into a vessel containing the +475 mV calibration solution.

4. Select in the menu of your control unit the ORP sensor (**Sensors / Sx: ORP**) and select "**Sensor Calibration / ORP / Calibration Point 2**".

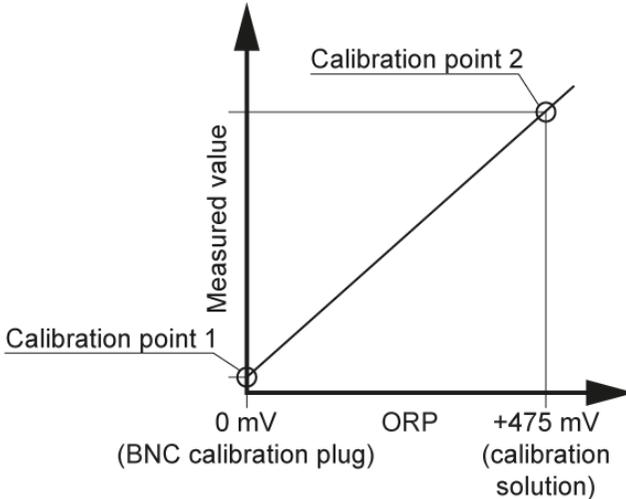


5. Select the ORP value of your calibration solution (here: +475 mV) and stir the electrode gently until the displayed raw signal value (in digits) is nearly constant. If it is constant validate this calibration point by pressing **OK**. Alternatively, the control unit confirms this calibration point automatically after 120 s.

Tip: In case you work with another calibration solution, you can change the ORP reference value by using the cursor keys.

6. If the calibration worked select „**Save calibration**“.
7. Rinse the electrode with tap water again.

Your SENECT ORP Sensor XT1 is not ready to be used.



**Fig. 1:** Calibration curve with two calibration point.

**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.*



## Notes regarding the measurement of the oxidation-reduction potenteial

Every delivered SENECT ORP Sensor is inspected by our quality check with respect to perfect functioning and calibration. Despite the high quality standards, interferences of the sensor signal based on the measurement principle and properties of the medium can occur.

- **Drift:** In most cases, electro-chemical measurements show a drift with time. Therefore, the sensors must be recalibrated regularly to achieve best precision in the measurements. Due to polarity effect, an enhanced drift after starting the operation of electrodes can occur within the first days. Please consider this in the interpretation of the measurements.
- **Leakage currents:** In aquaculture applications, e.g. in ponds or tanks, are often 230 V or 380 V consumers like pumps connected. Please pay careful attention that all consumers meet current legislation requirements and that there are no damaged parts, e.g. porous cables. Insufficient insulated consumers can lead to leakage currents, which influence ORP measurements.

## Notes regarding the measurement of the oxidation-reduction potential

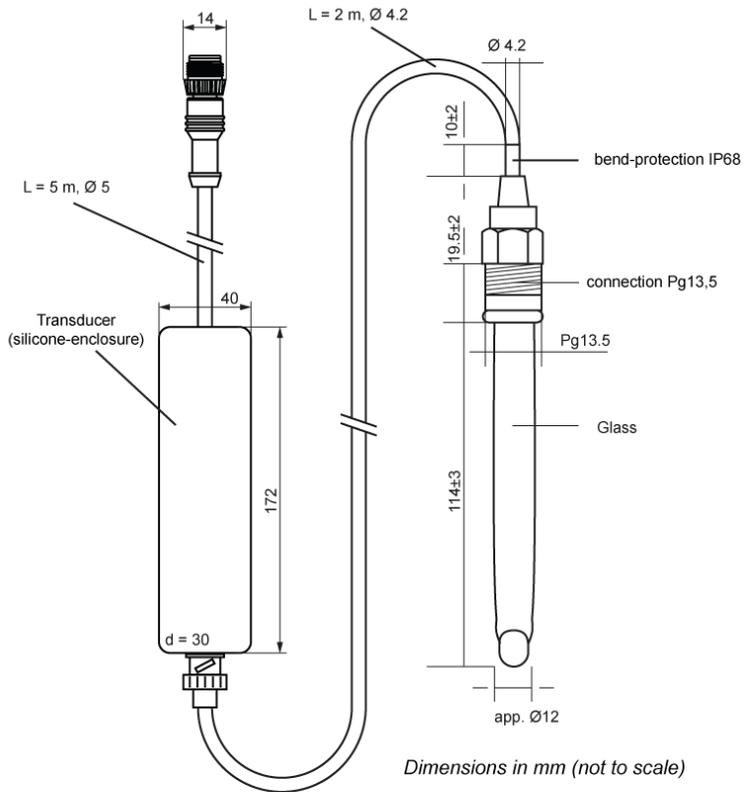
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- The measurement of the oxidation-reduction potential is determined by the **concentration of substances**, which act as oxidating or reducing agents. In some cases, the concentration of these substances is too low to achieve reliable results.

## Technical Data

Dimensions Electrode:	Ø 12 mm, Length: 120 mm
Cable length:	5 m + 2 m
Supply voltage:	24 V DC
Power consumption:	<< 1 W
Temperature range:	0° to 40 °C
Max. Pressure:	6 bar
Range:	-1000 mV to +1000 mV
Precision:	< ±2,5% FS
Response time:	T <sub>90</sub> < 30s
Ingress protection:	IP68 (Electrode), IP67 (Rest)

## Information about the correct disposal



## 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](mailto: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.