

SenTix[®] ORP
SenTix[®] PtR
SenTix[®] Au
SenTix[®] Ag

SenTix[®]

ORP ELECTRODES



a xylem brand

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Technical data

General data

| Model | Reference electrolyte | Electrode material and shape | Junction |
|-------------|--|------------------------------|------------|
| SenTix® ORP | 3 mol/l KCl, Ag ⁺ -free | Platinum / Round piece | Ceramic |
| SenTix® PtR | Polymer | Platinum / Round piece | Split ring |
| SenTix® Au | 3 mol/l KCl, Ag ⁺ -free | Gold / Cylinder cap | Ceramic |
| SenTix® Ag | 2 mol/l KNO ₃ + 0.001 mol/l KCl | Silver / Cylinder cap | Ceramic |

Measurement and application characteristics

| Model | Allowed temperature range | Typical application |
|-------------|---------------------------|---|
| SenTix® ORP | 0 ... 100 °C | Laboratory |
| SenTix® PtR | -5 ... 100 °C | Laboratory / Emulsions and Suspensions |
| SenTix® Au | -5 ... 100 °C | Laboratory / Oxidizing solutions without chloride |
| SenTix® Ag | -5 ... 100 °C | Laboratory / Argentometry |

Shaft dimensions, shaft material, electrical connection

| Model | Shaft | | | Electrical connection | | |
|-------------|-------------|--------|----------|-----------------------|------------------------|--------------|
| | Length [mm] | Ø [mm] | Material | Electrode connection | Meter connection | Cable length |
| SenTix® ORP | 120 | 12 | Glass | S7 plug-in connector | depending on S7 cable* | |
| SenTix® PtR | 120 | 12 | Glass | S7 plug-in connector | depending on S7 cable* | |
| SenTix® Au | 120 | 12 | Glass | S7 plug-in connector | depending on S7 cable* | |
| SenTix® Ag | 120 | 12 | Glass | S7 plug-in connector | depending on S7 cable* | |

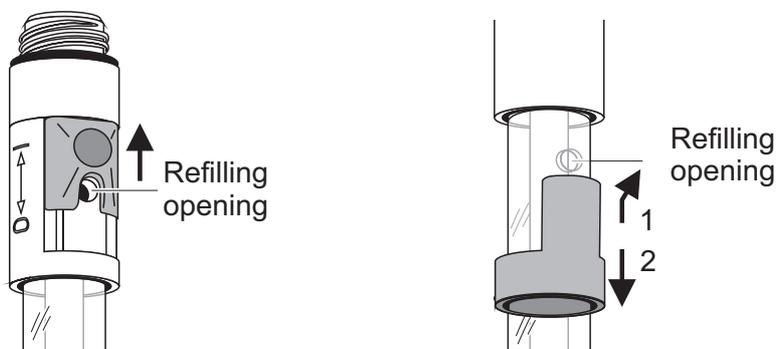
* Connection cable not included in the scope of delivery of the combination electrode

Commissioning, measuring, testing

Commissioning

Prepare the electrode for measuring as follows:

- SenTix® ORP, SenTix® Au and SenTix® Ag: Open the refilling opening for the reference electrolyte solution. Depending on the model, the stopper of the refilling opening is an elastomer stopper or a slider.
The refilling opening must always be open during measurement!



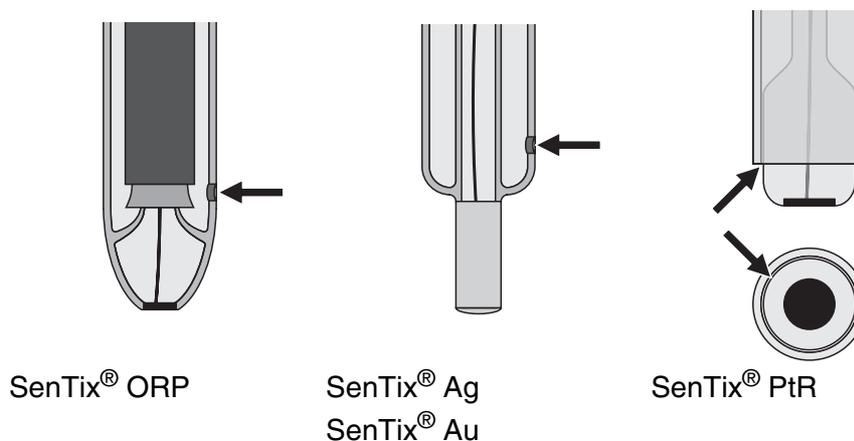
- Remove the watering cap from the electrode tip. Possible salt deposits in the area of the watering cap do not affect the measuring characteristics and can easily be removed with deionized water.



Please keep the watering cap. It is required for storing the electrode. Always keep the watering cap clean.

General rules for measuring

- Connect the electrode to the meter.
- Measure with the electrode according to the operating manual of the meter and observe the following rules while doing so:
 - SenTix® ORP, SenTix® Au and SenTix® Ag: Make sure the refilling opening for the reference electrolyte solution is open.
 - Avoid displacement of the sample solution from one measurement to the next by taking the following measures:
 - Briefly rinse the calibration beakers with the solution the beakers are to be filled with next.
 - Between measurements, rinse the electrode with the solution specified below. Alternatively, you can also rinse the electrode with deionized water and then carefully dab it dry.
 - Immerse the electrode in the solution in a vertical or slightly tilted position.
 - Make sure the immersion depth is correct. The junction must be completely submerged in the solution. The junction is in the area of the bottom end of the shaft (see arrow).



SenTix® ORPIL, SenTix® Au and SenTix® Ag: The level of the reference electrolyte must be at least 2 cm above the level of the solution.

Conversion to the standard hydrogen electrode potential

$$U_H = U_{\text{Meas}} + U_{\text{Ref}}$$

where: U_H = ORP voltage, relative to the standard hydrogen electrode

U_{Meas} = measured ORP voltage

U_{Ref} = voltage of the reference system relative to the standard hydrogen electrode

U_{Ref} is temperature dependent and can be taken from the following table (also refer to DIN 38404-6):

| T (°C) | U _{Ref} [mV] | | T (°C) | U _{Ref} [mV] | |
|--------|---------------------------|-------------|--------|---------------------------|-------------|
| | SenTix® ORP SenTix® Au | SenTix® PtR | | SenTix® ORP SenTix® Au | SenTix® PtR |
| 0 | +224 | +221 | 35 | +200 | +187 |
| 5 | +221 | +216 | 40 | +196 | +181 |
| 10 | +217 | +212 | 45 | +192 | +176 |
| 15 | +214 | +207 | 50 | +188 | +171 |
| 20 | +211 | +202 | 55 | +184 | +165 |
| 25 | +207 | +197 | 60 | +180 | +160 |
| 30 | +203 | +192 | | | |

Storage

During short measuring breaks

Immerse the electrode in the reference electrolyte with the refilling opening open.

| Electrode | Reference electrolyte | Model (see page 8) |
|--|---|---------------------|
| SenTix® ORP, SenTix® PtR, SenTix® Au | 3 mol/l KCl, Ag ⁺ -free | KCl-250 (250 ml) |
| SenTix® Ag | 2 mol/l KNO ₃ + 0.001 mol/l KCl | ELY/ORP/AG (250 ml) |

Prior to the next measurement, briefly rinse the electrode with the test sample or deionized water.

Overnight or longer

Insert the clean electrode into the watering cap filled with reference electrolyte and shut the refilling opening.



During longer storage periods, salt deposits may develop on the watering cap. They do not affect the measuring characteristics and can easily be removed with deionized water when the electrode is put into operation again.

Aging

ORP electrodes are consumables. Every ORP electrode undergoes a natural aging process. Extreme operating conditions can considerably shorten the lifetime of the electrode. These are:

- Strong acids or lyes, hydrofluoric acid, organic solvents, oils, fats, bromides, sulfides, iodides, proteins
- High temperatures
- Great changes in pH and temperature.

The warranty does not cover failure caused by measuring conditions and mechanical damage.

Maintenance and cleaning

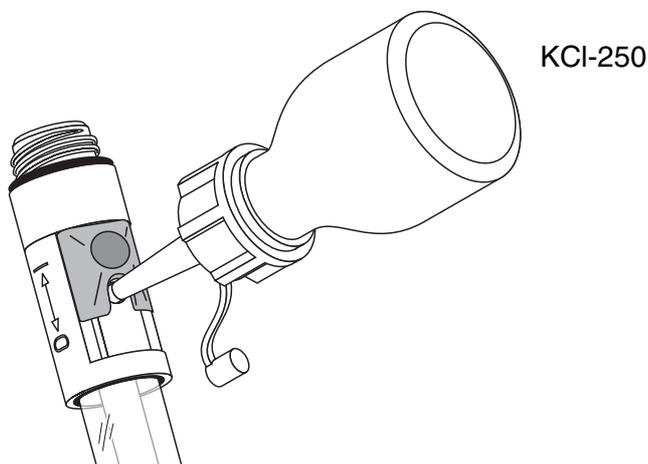
During operation, a small amount of reference electrolyte leaks through the junction from the electrode into the test sample. If the level of reference electrolyte becomes too low with time, refill it through the refilling opening.

Refilling reference electrolyte (SenTix® ORP and SenTix® Au)

Refilling is very easy using a dropper bottle. To do so, proceed as follows:

- Cut off the tip of the dropping bottle at a right angle until the opening in the tip can be seen
- Open the refilling opening of the electrode
- Press the tip of the dropper bottle into the refilling opening while turning it slightly

- Pump several small quantities of the reference electrolyte into the stem using the dropper bottle
- Pull the dropper bottle out of the refilling opening while turning it slightly if necessary.



Refilling reference electrolyte (SenTix® Ag)

The special ELY/ORP/AG reference electrolyte is required for the SenTix® Ag. To refill, open the refilling opening and fill the reference electrolyte into the stem using a suitable pipette.

Cleaning (SenTix® ORPIL, SenTix® Ag, SenTix® Au)

Remove water-soluble contamination by rinsing with deionized water. Remove other contamination as follows:

| Contamination | Cleaning procedure |
|-----------------------------|---|
| Fat and oil | Rinse with water containing household washing-up liquid |
| Lime and hydroxide deposits | Rinse with citric acid (10 % by weight) |
| Proteins | Immerse in pepsin cleaning solution PEP/pH for approx. 1 hour. <u>Note:</u> Make sure the level of the reference electrolyte is above that of the cleaning solution. |

Cleaning (SenTix® PtR)

Remove water-soluble contamination by rinsing with deionized water. Other types of contamination have to be removed as follows while the contact time with the detergents should be kept as short as possible:

| Contamination | Cleaning procedure |
|-----------------------------|---|
| Fat and oil | Rinse with water containing household washing-up liquid |
| Lime and hydroxide deposits | Rinse with citric acid (10 % by weight) |

After cleaning Rinse the electrode with deionized water.

Wear parts and accessories

| Description | Model | Order no. |
|--|------------|-----------|
| Reference electrolyte solution 3 mol/l KCl, Ag ⁺ -free (250 ml) | KCl-250 | 109 705 |
| Reference electrolyte solution 2 mol/l KNO ₃ + 0.001 mol/l KCl (250 ml) | ELY/ORP/AG | 109 735 |
| ORP buffer solution for checking ORP electrodes, U _H = 427 mV, bottle of 250 ml | RH 28 | 109 740 |
| Pepsin cleaning solution, 3 bottles of 250 ml | PEP/pH | 109 648 |

Disposal

At the end of its operational lifetime, the electrode must be returned to the disposal or return system statutory in your country (electronic waste). If you have any questions, please contact your supplier.

What can Xylem do for you?

We're a global team unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to xyleminc.com.



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