

SenTix[®] ORP-T 900(-P)



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ORP ELECTRODE



a xylem brand

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1 General information

Automatic sensor recognition

The sensor electronics with the stored sensor data are in the connecting head of the electrode. The data include, among other things, the sensor type and series number. In addition, the calibration data are stored in the sensor with each calibration and the calibration history is recorded (the last 10 calibrations). The data is recalled by the meter when the sensor is connected and is used for measurement and for measured value documentation.

Storing the calibration data in the sensor ensures that the correct slope and asymmetry are automatically used if the sensor is operated with different meters. On the other hand, different calibrated sensors can be used with one meter without the need to recalibrate.

The digital transmission technique guarantees the failure-free communication with the meter even with long connection cables. The sensor firmware can be updated via the meter.

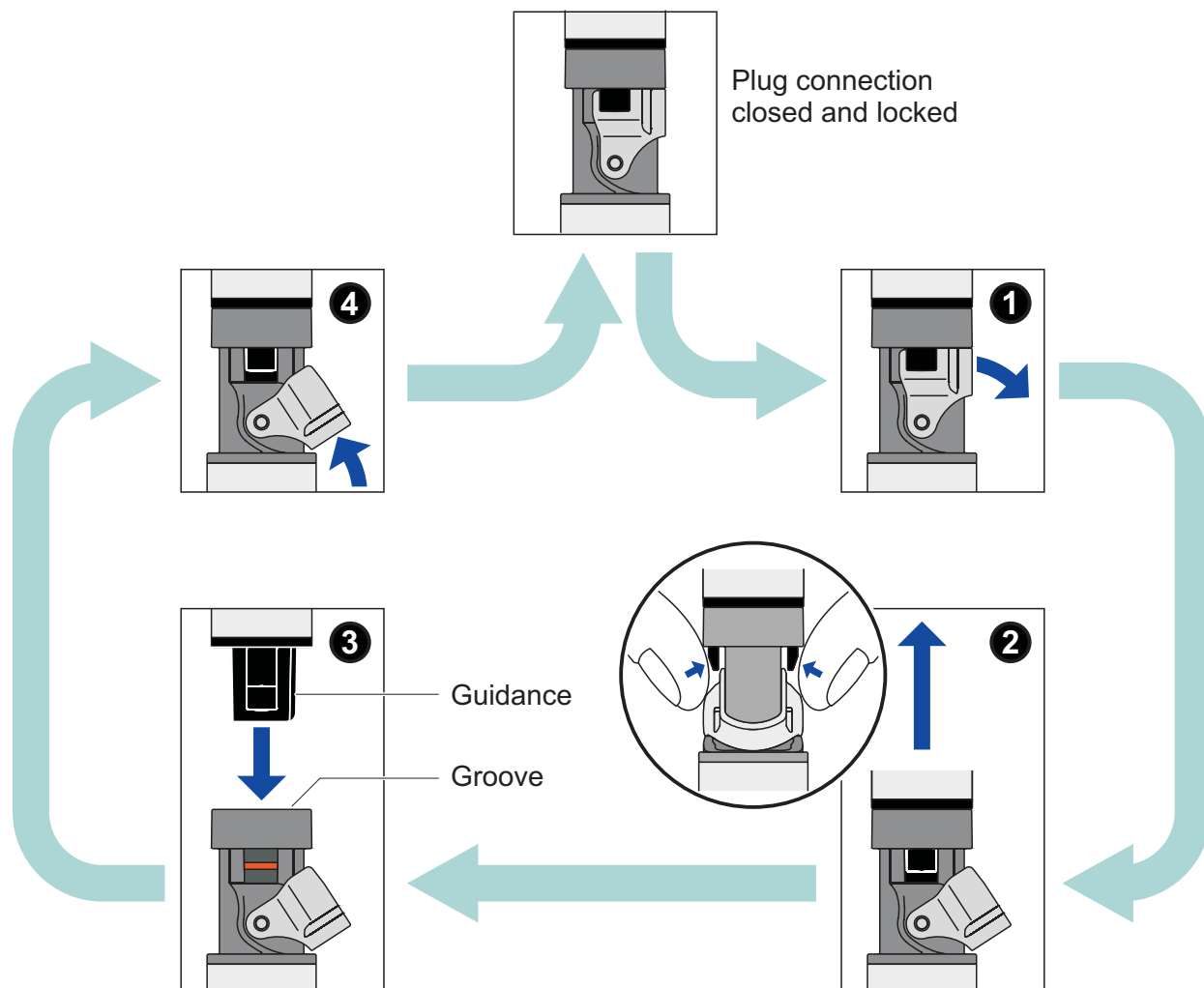
2 Commissioning, measuring, checking



For ORP electrodes with platinum electrode, please follow the instructions in section 6 ACTIVATING PLATINUM ELECTRODES.

2.1 Opening and closing the IDS plug connection

This section only applies to IDS plug variants (SenTix® ... -P).



Opening the plug connection

- If necessary, clean the plug connection.
- Open the locking device (step 1).
- Use your thumb and index finger to press the clips of the connector together, and pull the connector out of the plug (step 2).

Closing the plug connection

- Make sure that the plug connection is completely dry and clean.
- Align the guidance of the connector with the groove in the plug and insert the connector in the unlocked plug until it catches (step 3).
- Close the locking device (step 4).

2.2 Commissioning

Scope of delivery

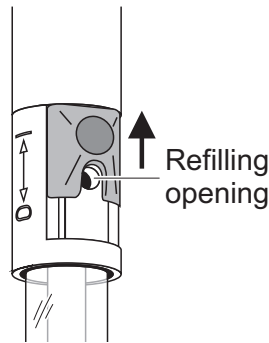
- Electrode SenTix® ORP-T 900(-P)

Commissioning

- Operating manual

Prepare the electrode for measuring as follows:

- 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 the electrode to be stored. Always keep the watering cap clean.

- Connect the combination electrode to the meter.
- Measure with the electrode according to the operating manual of the meter and observe the following rules while doing so:

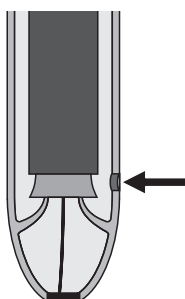
Preparing the sensor for measurement

SenTix® ORP-T 900	Connect the sensor to the meter. The sensor is immediately ready to measure.
SenTix® ORP-T 900-P	Connect the sensor to a free IDS sensor plug-in position of the multi parameter probe or to an IDS connection of the meter. To open and close the IDS plug-in position please note the section 2.1 OPENING AND CLOSING THE IDS PLUG CONNECTION. The sensor is immediately ready to measure. Connection cables in different lengths to connect the SenTix® ORP-T 900-P sensor to the meter are listed in chapter 8 WEAR PARTS AND ACCESSORIES.

2.3 General rules for measuring

- Make sure the refilling opening for the reference electrolyte solution is open.

- Avoid the carryover of sample solution from one measurement to the next as follows:
 - Shortly rinse the sample beakers with the solution the beakers are to be filled with next.
 - Between measurements, rinse the electrode with the solution that follows. 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® ORP-T 900(-P)

At the same time, the level of the reference electrolyte must be at least 2 cm above the level of the solution.

Conversion to normal hydrogen electrode

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

with: U_H = ORP, referring to the normal hydrogen electrode

U_{Meas} = Measured ORP

U_{Ref} = Voltage of the reference system compared to the normal hydrogen electrode

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

T (°C)	T (°F)	U_{Ref} [mV] SenTix® ORP-T 900	T (°C)	T (°F)	U_{Ref} [mV] SenTix® ORP-T 900
0	32	+224	35	95	+200
5	41	+221	40	104	+196
10	50	+217	45	113	+192
15	59	+214	50	122	+188
20	68	+211	55	131	+184

T (°C)	T (°F)	U _{Ref} [mV] SenTix® ORP-T 900	T (°C)	T (°F)	U _{Ref} [mV] SenTix® ORP-T 900
25	77	+207	60	140	+180
30	86	+203			

3 Storage

During short measuring breaks

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

Electrode	Reference electrolyte	Model (see page 11)
SenTix® ORP-T 900(-P)	3 mol/l KCl, Ag ⁺ -free	KCl-250 (250 ml)

Prior to the next measurement, shortly 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 storing periods, salt sediments 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.

4 Aging

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
- High changes in pH and temperature.

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

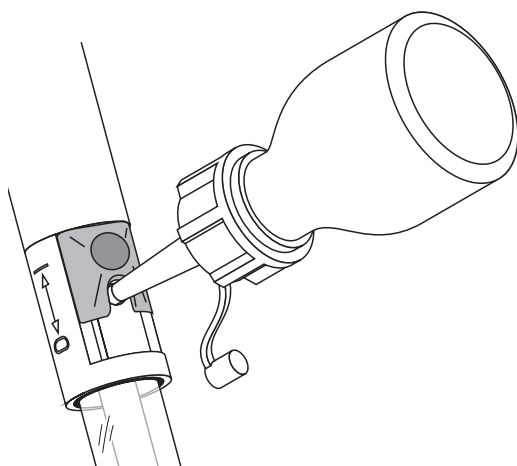
5 Maintenance and cleaning

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 the reference electrolyte

Refilling is very easy using a dropping bottle. 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 dropping 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 dropping bottle out of the refilling opening while turning it slightly as necessary.



Cleaning

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)
Protein	Immerse in pepsin cleaning solution PEP/pH for approx. 1 hour. Note: Make sure the level of the reference electrolyte is above that of the cleaning solution.

After cleaning

Rinse the electrode with deionized water.

6 Activating platinum electrodes

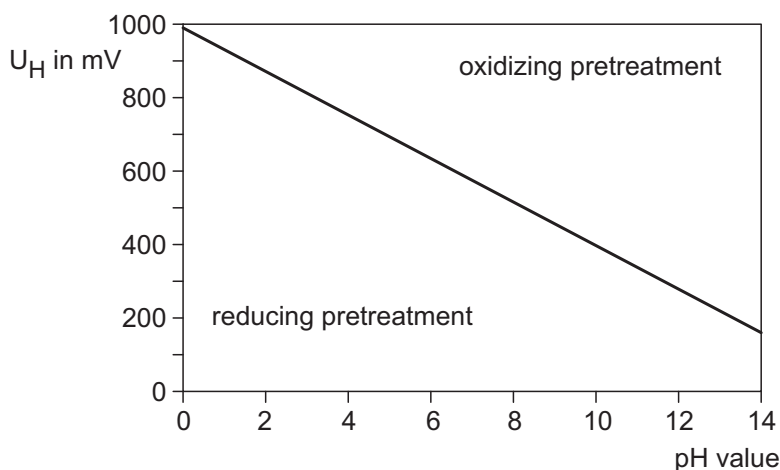
First-time activation during installation and as required

For first-time activation use the activation powder from the SORT/RH reagent set (component of the SORT/RH reagent set). Immerse the moist (but not dripping) platinum electrode into the activation powder and rotate the electrode several times in the powder. Then remove the activation powder under flowing water with a soft brush (e.g. toothbrush).

Activation during very long set-up times

When changing from oxidizing to reducing test solutions and vice versa this can result in set-up times that can take significantly more than an hour. In this case pretreatment (activation) of the platinum surface can shorten the set-up time. The type of pretreatment (reducing or oxidizing) is based on the pH value and the ORP voltage (U_H) of the test solution where the latter must be estimated for the first measurement.

The type of pretreatment can then be determined using the following diagram where U_H is based on the normal hydrogen electrode:



Oxidizing pretreatment

Immerse the platinum electrode for two to three days in a sulfuric acid chlorine solution (0,5 g chlorine powder, 100 ml H₂O dist., 2-3 ml 20% sulfuric acid). Chlorine powder for producing the solution is included in the SORT/RH reagent set.

Note: The diaphragm must not be immersed in the chlorine solution!

Reducing pretreatment

When the electrode is ready for the test immerse it in the RH 28 ORP buffer solution and wait for a stable measured value.



Detailed information on activating platinum electrodes, such as how to produce the chlorine solution, is given in the WTW application report entitled REGENERATING ORP ELECTRODES. The application report is included in the SORT/RH reagent set.

7 Technical data

Measurement	mV measuring range	- 1250.0 ... + 1250.0
	Allowed temperature range	0 ... 100 °C (32 ... 212 °F)
	Typical application	Laboratory
Accuracy of the IDS measuring technique	Measured parameter	Accuracy (± 1 digit)
	U [mV]	± 0.2
	T [°C]	± 0,1
General data	Reference electrolyte	3 mol/l KCl, Ag ⁺ free
	Junction	Ceramic
	Electrode material and shape	Platinum / circle
Connection cable	Lengths	SenTix® ORP-T 900: 1.5 m SenTix® ORP-T 900-P: 1.5 / 3 / 6 / 10 / 15 / 25 / 40 / 60 / 100 m
	Diameter	4.3 mm
	Smallest allowed bend radius	Fixed installation:20 mm Flexible use:60 mm
	Plug type	Socket, 4 pins
Shaft dimensions, material	Shaft length	120 mm
	Shaft diameter	12 mm
	Shaft material	Glass
	IDS plug	<ul style="list-style-type: none"> ● Synthetic materials: Glass fiber reinforced Noryl, TPU, TPC-ET, POM, PVC, PEEK, PBT ● O-ring: FPM ● Contacts gold-Plated
IDS plug	Connection type	4-Pole, watertight plug connection with lock, reverse polarity protected
Storage	With watering cap; filled with KCl 3 mol/L, Ag ⁺ free	

8 Wear parts and accessories

Maintenance equipment

Description	Model	Order no.
Reference electrolyte solution 3 mol/l KCl, Ag ⁺ free (250 ml)	KCl-250	109 705
Reagent set for regenerating ORP platinum electrodes, consisting of 10 g activation powder and 30 g chlorine powder	SORT/RH	109 730
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 each	PEP/pH	109 648

Connection cable SenTix® ORP -T 900(-P) - meter

Description	Model	Order no.
IDS connection cable, 1.5 m	AS/IDS-1.5	903 850
IDS connection cable, 3 m	AS/IDS-3	903 851
IDS connection cable, 6 m	AS/IDS-6	903 852
IDS connection cable, 10 m	AS/IDS-10	903 853
IDS connection cable, 15 m	AS/IDS-15	903 854
IDS connection cable, 20 m	AS/IDS-20	903 855
IDS connection cable, 25 m	AS/IDS-25	903 856
IDS connection cable, 40 m	AS/IDS-40	903 857
IDS connection cable, 60 m	AS/IDS-60	903 858
IDS connection cable, 100 m	AS/IDS-100	903 859

General accessories

Description	Model	Order no.
Blind plug for IDS plug	BPO/IDS 900	908 371
Armoring without protective hood	A 925-P	903 838
Armoring with plastic protective hood	A 925-P/K	903 839
Armoring with steel protective hood	A 925-P/S	903 840
Plastic arming for SenTix® ORP-T 900(-P) pH electrodes	A pHLab/K	903 841

9 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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