

SenTix[®] ORP 900

ORP electrode



Operating manual



Note

The latest version of the present operating manual can be found on the Internet under www.WTW.com.

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General information

Automatic sensor recognition

The sensor electronics with the stored sensor data is in the connecting head of the electrode. The data include, among other things, the sensor type and series number. The data is recalled by the meter when the sensor is connected and is used for measurement and for measured value documentation.

The digital transmission technique guarantees the failure-free communication with the meter even with long connection cables. If the sensor firmware is enhanced by WTW, it can be updated via the meter.

Technical data

General data

Reference electrolyte	3 mol/l KCl, Ag ⁺ free
Junction	Ceramic
Electrode material and shape	Platinum / circle

Measurement and application characteristics

mV measuring range	- 1250.0 ... + 1250.0
Allowed temperature range	0 ... 100 °C (32 ... 212 ° F)
Typical application	Laboratory

Shaft dimensions, material, electrical connection

Shaft length	120 mm
Shaft diameter	12 mm
Shaft material	Glass
Combination electrode connection	Fixed cable
Meter connection	Digital plug

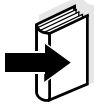
Connection cable

Length	1.5 m
Diameter	4.3 mm
Smallest allowed bend radius	Fixed installation: 20 mm Flexible use: 60 mm
Plug type	Socket, 4 pins

Accuracy of the IDS measuring technique

Measured parameter	Accuracy (± 1 digit)
U [mV]	± 0.2

Commissioning, measuring, checking



Commissioning

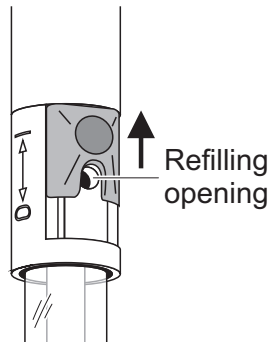
Note

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

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.



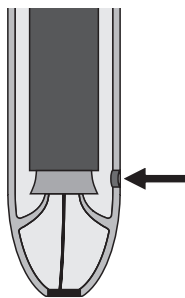
Note

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:

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 submersed in the solution. The junction is in the area of the bottom end of the shaft (see arrow).



SenTix® ORP 900

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**

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

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]	
		T (°C)	T (°F)
		U _{Ref} [mV]	
		SenTix® ORP 900	
0	32	35	95
		U _{Ref} [mV]	
		SenTix® ORP 900	
5	41	40	104
10	50	45	113
15	59	50	122
20	68	55	131
25	77	60	140
30	86		

Storage

During short measuring breaks

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

Electrode	Reference electrolyte	WTW model (see page 19)
SenTix® ORP 900	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.



Note

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.

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.

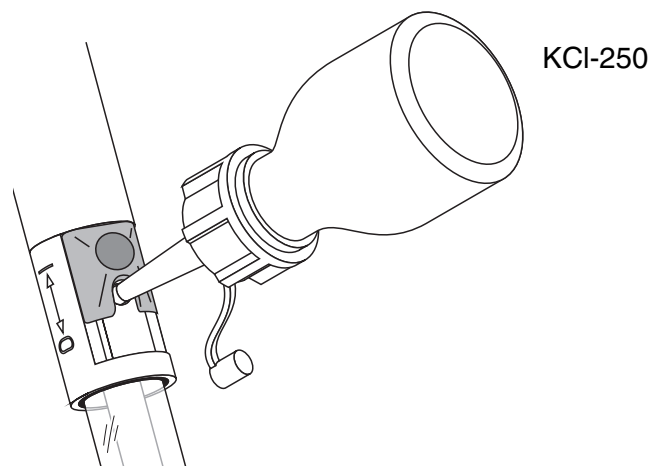
Maintenance and cleaning

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. <u>Note:</u> Make sure the level of the reference electrolyte is above that of the cleaning solution.

After cleaning Rinse the electrode with deionized water.

Activating platinum electrodes

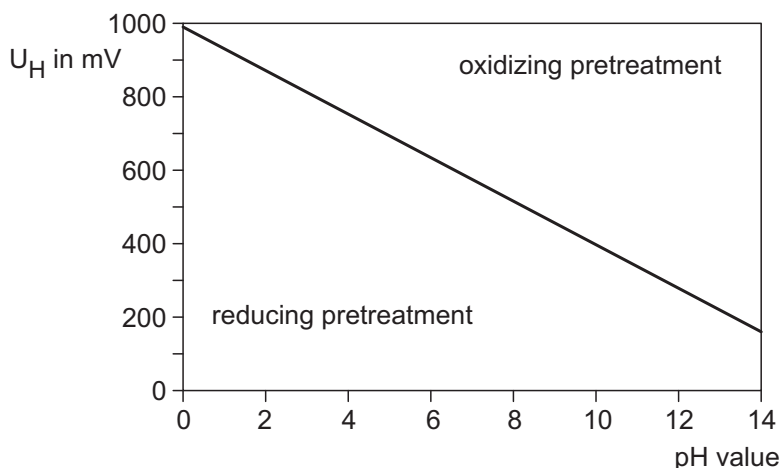
First-time activation during installation and as required

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. 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.



Note

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.

Wear parts and accessories

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

