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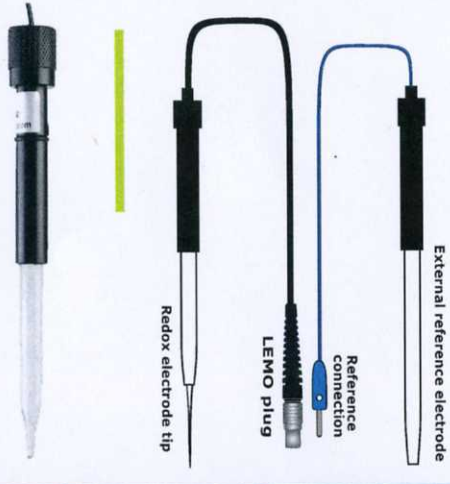
REFERENCE ELECTRODE USER'S MANUAL



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Version 20070912

REFERENCE ELECTRODE MANUAL

UNISENSE A/S

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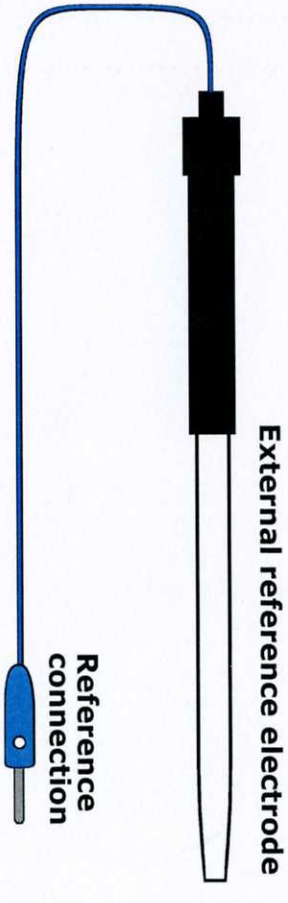
OVERVIEW

The reference electrode from Unisense is a simple open-ended electrode designed to work with potentiometric microelectrodes (e.g. Unisense pH microelectrodes).



THIS MANUAL COVERS THE UNISENSE REFERENCE ELECTRODE

REF10 (tip diameter 8-12 microns for fine scale measurements)
REF25 (tip diameter 20-30 microns)
REF50 (tip diameter 40-60 microns)
REF100 (outer tip diameter 90-110 microns)
REF5000 (tip diameter 5000 microns)
REF electrodes of customer specified size

GETTING STARTED

The Unisense reference electrode is a simple open-ended Ag-AgCl electrode with a gel-stabilized electrolyte. The reference electrode is used to establish a reference potential against a potentiometric sensor (e.g. a Unisense pH microelectrode).

WARNING
Do not remove the seal and protective plastic tube before these steps and calibration are successfully completed.

UNPACKING A NEW SENSOR

1. When receiving a new electrode remove the shock-absorbing grey plastic net.
2. Remove the lower piece of tape and the rubber stopper in order to empty the tube of storage liquid. This liquid can be saved for future storage.
3. The tip of the Unisense reference electrode should be kept immersed in water or an aqueous solution at all times, but can tolerate up to 10 minutes of exposure to air.

REPLACEMENT OF SENSORS

Unisense will replace sensors that have been damaged during shipment provided that:

- *The sensors were tested immediately upon receipt in accordance with the delivery note and the manual*
- *The seal is still intact.*
- *The sensors are returned to Unisense for inspection within two weeks.*
- *The sensors are correctly packed for return to Unisense, in accordance with the note included in the sensor box.*

Connect the reference microelectrode

Connect the reference electrode to the Ref. connection of your pH/mV-meter and connect the measuring electrode to the input terminal.

Calibration

Calibration and measurements: Keep reference electrode tip immersed in the same solution as the measuring electrode during calibration and measurements, preferably in a free and stirred water phase.

IMPORTANT

Always use a calibration solution similar to the sample solution regarding temperature and salinity

STORAGE AND MAINTENANCE

Store in the protective glass tube used for shipping. For short-term storage (<10 min) the electrodes can be stored in air. For long-term storage the electrode tip must be immersed in 1M KCl in the protective casing used for shipping. The room in which the electrodes are stored should be dry and not too hot (10-25°C).

Transportation

Mechanical shock should be avoided.

REFERENCE

- Revsbech, N. P., and B. B. Jørgensen. 1986. Microelectrodes: Their Use in Microbial Ecology, p. 293-352. In K. C. Marshall (ed.), Advances in Microbial Ecology, vol. 9. Plenum, New York.

TROUBLE-SHOOTING

Problem	Readings from measuring electrode are unstable, low or slow
Possible cause 1	The measuring electrode may be malfunctioning
Solution	Repair or change measuring electrode (see manual for measuring electrode).
Possible cause 2	Air bubbles present at the tip of the sensor.
Solution	Remove bubbles with a fine brush and avoid entrapment of bubbles.
Possible cause 3	Contamination of half-cell with soluble compound e.g. sulfide (visible dark band approaching the half-cell through the gel)
Solution	Replace reference electrode.
Possible cause 4	Contamination of gel/water junction with oil
Solution	Rinse with acetone, and then rinse with seawater, water or buffer.
Possible cause 5	Insoluble compounds deposited at the gel/water junction
Solution	Replace reference electrode.

If you encounter other problems and need scientific/technical assistance, please contact sales@unisense.com for online support (we will answer you within one workday)