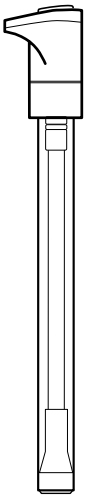
User Guide

Single Junction
Reference
Electrode



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Introduction

This user guide contains information on the preparation, operation and maintenance of the Thermo Scientific Orion single junction reference electrode, Cat. No. 900100.

The 900100 reference electrode is a sleeve-type refillable Ag/AgCl (silver/silver chloride) reference electrode designed for precision measurements with ion selective half-cell electrodes and pH half-cell electrodes. When filled with Cat. No. 900001 filling solution, the 900100 electrode matches the potential characteristics of a conventional KCl saturated calomel electrode.

The 900100 reference electrode is recommended for all pH and ion elective measurements except for those:

1. In dilute solutions where the ion to be measured is contained in the filling solution.

2. In solutions where an ion in the filling solution would introduce an electrode interference.

3. In solutions where a species is present that forms a precipitate with an ion contained in the filling solution.

For these samples, the Thermo Scientific Orion double junction reference electrode, Cat. No. 900200, with an appropriate intermediate filling solution is recommended.

Required Solutions

Filling Solutions

Supplied with the 900100 electrode is an equitransferent filling solution, Cat. No. 900001, that contains Na^+, K^+, NO_3^-, and Cl^- ions and is saturated with AgCl. It is recommended for most measurements in dilute samples (below 0.2 M in total ionic strength), and it is effective at temperatures down to 10 °C.

If measurements are to be made in concentrated solutions, or at temperatures below 10 °C, the recommended filling solution is Cat No. 900011, a 4 M KCl filling solution that is saturated with AgCl.

For complete details regarding the proper choice of reference electrode filling solution, refer to the user guide for the ion selective electrode or pH electrode to be used.

Electrode Setup

Filling Instructions

The 900100 single junction reference electrode is shipped dry and must be filled before use. Select an appropriate filling solution for the application.

1. Using the flip-spout bottle, lift the spout to a vertical position.

2. Insert the spout into the fill hole in the electrode outer body and add a small amount of filling solution to the chamber. Tip the electrode to moisten the O-ring at the top of the electrode and then return electrode to a vertical position.

3. Hold the electrode by the outer body with one hand and push down on the electrode cap with a thumb to allow a few drops of filling solution to drain and wet the inner cone.

4. Release the electrode cap. If the electrode sleeve does not return to its original position immediately, check to see if the O-ring is moist and repeat steps 2 - 4 until the sleeve returns to the original position.

5. Add filling solution up to the fill hole.

To change from one filling solution to another, drain the first filling solution from the electrode, rinse and drain the electrode using distilled water and then the second filling solution, and refill the electrode with second solution up to the fill hole.

Storage

The 900100 single junction reference electrode may be stored in distilled water or a standard solution between sample measurements and up to 1 hour.

For short periods of time, up to 1 week, the 900100 electrode may be stored in its filling solution. Distilled water is also an acceptable storage solution. The solution inside the reference electrode should not be allowed to evaporate and crystallize.

For long periods of time, over 1 week, drain the 900100 electrode completely, rinse it with distilled water, and store the electrode dry.

Maintenance

Add filling solution to the electrode each day before use. The level of electrode solution must always be at least one inch above the level of the sample solution in the beaker to maintain a proper flow rate and to avoid back diffusion of sample ions into the filling solution.

If the area between the sleeve and inner cone becomes clogged, flush the electrode with warm distilled water and then filling solution. Tip the electrode to moisten the O-ring on the electrode body. Holding the electrode body with one hand, push down on the electrode cap to allow the filling solution to drain from the chamber. Release the cap to reset the sleeve and then refill the electrode.

Disassembly

Disassembly is not normally required or recommended. However, if dirt or viscous samples clog the area between the sleeve and the electrode body, the electrode can be disassembled easily. Do not touch the inner cone or the inside of the sleeve with your fingers. Protect the cone with an absorbent tissue during handling.

1. Rinse the outer body under warm running water.

2. Hold the electrode body with one hand and push down on the electrode cap to drain the chamber.

3. Unscrew the cap and slide the cap and epoxy-coated spring up along the cable.

4. Hold the outer sleeve with one hand and firmly push down on the threaded portion with the thumb and forefinger to separate the inner body from the sleeve.

5. Grasp the cone with a clean tissue and withdraw the body from the sleeve with a gentle twisting motion.

Note: *Do not touch the AgCl pellet above the cone as it may cause damage to the pellet.*

6. Rinse the outside of the electrode body and the entire sleeve with distilled water. Allow to air dry.

Reassembly

1. Moisten the O-ring on the electrode body with a drop of filling solution. Insert screw-thread end of the electrode body into the tapered, ground end of sleeve.

2. Push the body into sleeve with a gentle twisting motion until the bottom surface of the inner cone is flush with the tapered end of the sleeve.

3. Place the spring on the electrode body and screw on the cap. Refill the electrode with filling solution. The electrode is now ready for use.

Specifications

Construction

Break-resistant epoxy body that is resistant to acids, bases, and inorganic solvents. The epoxy body cannot be used in polar organic solvents.

Size

Electrode length:	110 mm (excluding cap)
Cap diameter:	16 mm
Body diameter:	13 mm
Cable length:	100 cm

Connector

Standard pin-tip jack

Filling Solutions

Cat. No. 900001 – Equitransferent filling solution that matches the potential characteristics of a KCl saturated calomel electrode. It is generally used for low ionic strength samples.

Cat. No. 900011 – 4 M KCl solution saturated with AgCl that matches the potential characteristics of a Ag/AgCl reference electrode. It is generally used for high ionic strength samples.

Temperature Range

10 to 100 °C using Cat. No. 900001 filling solution
-5 to 100 °C using Cat. No. 900011 filling solution

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