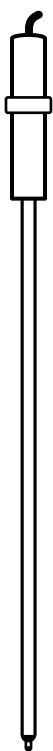


# Thermo Scientific Orion Micro Sodium Electrode Instruction Sheet



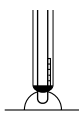
## Electrode Preparation

**Note:** The micro electrode is made of very thin, delicate glass. Care should be taken when handling the electrode to prevent breakage.

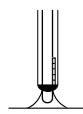
1. Carefully unwind the tape from around the protective glass tube and gently slide the electrode out of the tube. Save the protective glass tube for storage.
2. Clean any salt deposits from the exterior of the electrode by rinsing it with distilled water.
3. Uncover the electrode filling hole by sliding down the translucent sleeve cover on the electrode body. The filling hole should be open whenever the electrode is in use and covered when the electrode is being stored.
4. Add sodium electrode filling solution, Cat. No. 900004, to the electrode. To maintain an adequate flow rate, the level of filling solution must always be above the reference junction and at least one inch above the sample level.
5. Gently shake the electrode downward (similar to a clinical thermometer) to remove air bubbles.
6. Soak electrode in the 0.1 M NaCl standard, Cat. No. 941706, for at least 24 hours.
7. Connect the electrode to the meter.

## Measuring Hints

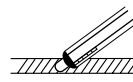
- The reference junction of the electrode must make contact with the sample solution. See **Figure 1**. When the electrode touches the surface of a liquid, the surface tension of the liquid result in contact with the reference junction. See **Figure 2**. To measure gel thicknesses less than 1.5 mm, the electrode can be held at an angle so the reference junction touches the gel. See **Figure 3**. The reference junction is on the same side of the electrode as the fill hole.



**Figure 1**



**Figure 2**



**Figure 3**

- Use standards that bracket the expected concentration range of the samples. Prepare standards with the same background matrix as your samples.
- Use the same volume of standard as the volume of sample. For example, if you have 50  $\mu\text{L}$  of sample, use 50  $\mu\text{L}$  of standard during calibration.

- To reduce the chance of error due to polarization, avoid rubbing or wiping the electrode bulb. Use a lint-free tissue and gently blot the electrode bulb.

## Sodium Calibration and Measurement

Use sodium chloride standards to calibrate the electrode and determine the slope. Check the slope by measuring the millivolts between two standards that have a tenfold concentration difference, i.e. 0.01 M and 0.1 M NaCl standards. The slope should be 54 to 60 mV/decade.

If your samples contain possible interferences, calibrate with sodium solutions that contain the interfering ions to simulate the sample matrix. For example, if your sample contains a potassium background, such as 100 millimoles KCl, then your calibration standards should also contain 100 millimoles KCl.

1. Select two standards that bracket the expected sample concentration. The standards should be at same temperature as the sample. Start with the lowest concentration standard and then proceed to the highest concentration standard.
2. Rinse the electrode first with distilled water and then with the first standard.
3. Place the electrode into the first standard. When the reading is stable, set the meter to the concentration value of the standard. Refer to the meter user guide for a detailed procedure.
4. Rinse the electrode first with distilled water and then with the second standard.
5. Place the electrode into the second standard. When the reading is stable, set the meter to the concentration value of the standard. Refer to the meter user guide for a detailed procedure.
6. The electrode is ready to take sample measurements. Rinse the electrode with distilled water and then with the sample. Place the electrode into the sample and when the reading is stable, record the concentration and temperature of the sample.

## Filling the Electrode

The reference chamber of the electrode should be filled as needed with sodium electrode filling solution, Cat. No. 900004. Use the plastic pipette shipped with the electrode to slowly fill the electrode. If the electrode filling solution is added too quickly, air may become trapped in the reference chamber and cause the filling solution to squirt out of the fill hole instead of entering the reference chamber. Do not use syringe needles or plastic tubes to fill the electrode, since they may break the inner glass capillary and render the electrode inoperative. Do not apply pressure against the inner glass capillary tube.

254823-001 Rev. B 10-08

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## Electrode Storage

To ensure a quick response and free-flowing junction, the sensing element and reference junction must not dry out. Always clean the electrode before storing it.

**Short-term storage (up to one week)** – soak the electrode in the 0.1 M NaCl standard, Cat. No. 941706. To prevent crystallization of the filling solution, cover the fill hole whenever the electrode is being stored and open the fill hole when calibrating and measuring.

**Long-term storage (more than one week)** – fill the electrode and securely cover the filling hole. Cover the electrode with the protective glass tube containing a few drops of storage solution. Before returning the electrode to use, prepare it as a new electrode.

## Electrode Maintenance

1. Inspect the electrode for scratches, cracks, salt crystal buildup, or membrane/junction deposits.
2. Rinse off any salt with distilled water. Remove any membrane/junction deposits as directed in the electrode cleaning section.
3. Drain the electrode, flush it with fresh filling solution and refill the chamber with fresh filling solution.

## Electrode Cleaning

1. Soak the electrode in 0.1 M HCl or HNO<sub>3</sub> for half an hour.  
The electrode can also be soaked for 15 minutes in a 1:10 dilution of household laundry bleach or a 0.1 to 0.5% liquid detergent solution mixed with hot water. The solution should be stirred at a moderate to fast rate.
2. Drain the electrode and refill it with fresh filling solution.
3. Soak the electrode in the 0.1 M NaCl standard, Cat. No. 941706, for at least one hour. If the electrode response is slow or drifting, drain and refill the electrode with fresh filling solution, Cat. No. 900004. Replace the electrode if cleaning and maintenance fail to rejuvenate it.

## Troubleshooting

### Symptom– Little or No Response

- Inspect the electrode for visible cracks, usually occurring around the tip of the electrode. The slightest crack in or around the electrode tip will cause the electrode to read similar values in all solutions. Replace the electrode if it has any cracks.
- Gently shake the electrode downward (similar to a clinical thermometer) to remove air bubbles that may be trapped in the reference chamber of the electrode.
- Perform electrode maintenance and electrode cleaning procedures.

### Symptom– Off Scale Readings

- Inspect the electrode for any broken or dissolving internal elements. Replace the electrode if it has any broken or dissolving internal elements.
- Ensure that there is an adequate volume of filling solution. The level of filling solution must always be above the reference junction and at least one inch above the sample level.
- Gently shake the electrode downward (similar to a clinical thermometer) to remove air bubbles that may be trapped in the reference chamber of the electrode.
- Inspect the reference junction for salt buildup or clogs. Soak the tip of the electrode in warm (50 °C) distilled water for 5 to 10 minutes. If the reference junction is still clogged, perform electrode maintenance and electrode cleaning procedures.

### Symptom– Sluggish Response

- Perform electrode maintenance and electrode cleaning procedures.
- The bulb of the electrode can be dipped in 1% HF or 1% ammonium bifluoride solution for 1 to 3 seconds and then quickly rinsed with distilled water. This treatment etches the glass and will shorten the life of the electrode if performed too often.

## Assistance

After troubleshooting all components of your measurement system, contact Technical Support. Within the United States call 1.800.225.1480 and outside the United States call 978.232.6000 or fax 978.232.6031. In Europe, the Middle East and Africa, contact your local authorized dealer. For the most current contact information, visit [www.thermo.com/contactwater](http://www.thermo.com/contactwater).

## Warranty

For the most current warranty information, visit [www.thermo.com/water](http://www.thermo.com/water).

## Ordering Information

Cat. No.	Description
9811BN	Micro sodium electrode with glass body and BNC connector
900004	Sodium electrode filling solution, 5 x 60 mL bottles
941706	0.1 M NaCl sodium standard, 475 mL bottle
841109	1000 ppm sodium standard, 475 mL bottle
900020	pH electrode cleaning kit, includes 1 x 30 mL bottle each of cleaning solution A and C, 1 x 60 mL bottle each of cleaning solution B and D, beaker and pipette
900021	pH electrode cleaning solution A, for removing proteins, includes 4 x 30 mL bottles, beaker and pipette
900022	pH electrode cleaning solution B, for removing bacteria, includes 4 x 60 mL bottles, beaker and pipette
900023	pH electrode cleaning solution C, for general cleaning, includes 4 x 30 mL bottles, beaker and pipette
900024	pH electrode cleaning solution D, for removing oil and grease, includes 4 x 60 mL bottles, beaker and pipette

## Specifications

	9811BN
<b>Concentration Range</b>	10 <sup>-6</sup> M to saturated
<b>Temperature Range</b>	0 to 100 °C
<b>Length</b>	150 mm
<b>Diameter</b>	6.0 mm
<b>Tip Diameter</b>	3.2 mm
<b>Minimum Depth of Immersion</b>	1.5 mm
<b>Selectivity</b>	Na <sup>+</sup> /K <sup>+</sup> = 1000 Na <sup>+</sup> /NH <sub>4</sub> <sup>+</sup> = 3000 Ag <sup>+</sup> /K <sup>+</sup> = 1.5 x 10 <sup>6</sup> Ag <sup>+</sup> /Li <sup>+</sup> = 250