

601-F, 601-S Water Hardness Combination Electrode Manual

The electrode 601-F and 601-S are combined by water hardness electrode with PVC membrane, Ag/AgCl reference electrode and temperature sensor. They have same selectivity for calcium and magnesium ions of water sample. They are used to measure the total concentration of calcium and magnesium ions in water solution. This electrode has characteristics such as compact structure, easy to use and stable potential etc.

This electrode should be combined and used with YD200 Laboratory Water Hardness Meter and YD300 Portable Water Hardness Meter.

1. Electrode Specification:

- 1) Measuring range: (0.015 ~ 10) mmol/L; (1.5 ~ 1000) mg/L(CaCO₃);
- 2) Solution temperature: (15 ~ 40) °C
- 3) Solution pH: (5.0 ~ 10.0) pH
- 4) Electrode internal resistance: (2 ~ 10) MΩ
- 5) Insulation resistance: $\geq 1 \times 10^{11} \Omega$

2. Electrodes with different specification and matched instrument:

Description	Model	Temperature sensor	Socket	Matched instrument
Water hardness combination electrode	601-F	30KΩ	BNC+RCA	YD200
Water hardness combination electrode	601-S	30KΩ	8-pin socket	YD300

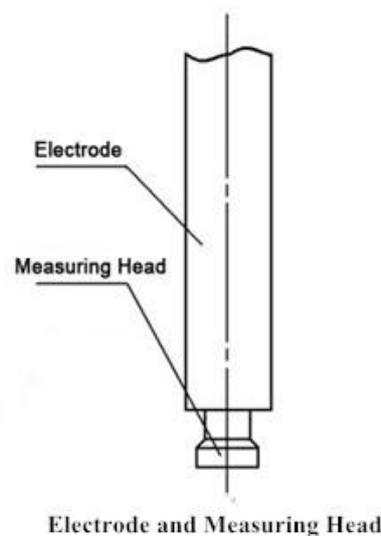
3. Calibration Solution:

B1 calibration solution: 2.00×10^{-2} mmol/L

B2 calibration solution: 2.00×10^{-1} mmol/L

B3 calibration solution: 2.00 mmol/L

- 1) Use B2 and B3 calibration solution, it is suitable for normal water such as tap water.
- 2) Use B1 and B2 calibration solution, it's suitable for $< 2.00 \times 10^{-2}$ mmol/L low concentration water such as boiler water.
- 3) Calibration solution can be bought from us or instrument distributor.



4. Usage Considerations:

1. The new electrode should be soaked and activated in the soaking solution for around half an hour, For daily use, soak it for 10 minutes before testing and calibration.
2. Shake electrode with force in the air to let the inner solution of electrode fall into the measuring head compartment; there should NOT be any bubbles within the measuring

head. If the electrode film is concave, it will affect the performance. In this case, you can unscrew the white membrane for a few seconds to allow air to enter. Then tighten the membrane. If it is still concave, we recommend replacing the electrode.

3. Generally, calibration is necessary before every test, but if the interval between tests is short, then calibration is not necessary; To test if the meter is due for calibration, simply insert the electrode in one of the calibration solutions and wait for a stable reading. If the reading is within the stated error range, then it is unnecessary to recalibrate.
4. When measuring, the electrode should be placed diagonally in the measuring cup or suspended in the solution using an electrode holder. The electrode should not touch the bottom of the cup vertically during measurement, otherwise, it will affect the accuracy.
5. When testing boiler water, the user should choose the B1/B2 calibration method. TISAB must be added during calibration and measurement. The proportion is 2ml TISAB per 100ml solution.
6. When testing high concentration water hardness (concentration $\geq 2\text{mmol/}$ or 200mg/L CaCO_3). TISAB must be added during calibration and measurement. The proportion is 2ml TISAB per 100ml solution.
7. The water hardness adopts PVC membrane sensitive film. Put the electrode into the sample solution, stir a few seconds and let it stand diagonally. Then take the measurement after the reading is completely stabilized.
8. Because B1, B2, and B3 calibration solutions have no buffer, they are easy to be contaminated, especially for the low concentration B1 solution, which should be replaced sooner.

Other factors affecting water hardness test:

- a) The pH of the sample solution must be pH 5 to pH 10, otherwise, the measurement will be inaccurate. Sodium hydroxide or hydrochloric acid can be added to adjust the pH.
 - b) A high concentration of sodium chloride will cause errors in the measurement. Measurement errors will occur if the sodium chloride concentration exceeds 2%. When the concentration reaches 20%, it cannot be measured at all.
9. When the measurement is finished, the electrode should be stored dry in the protection cap after being rinsed with deionized water or distilled water.