

OPERATION INSTRUCTION

PHS-550

High accuracy digital pH meter



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1. Unpacking & Accessories

PHS-550 pH Meter	1PC
Combination PH electrode	1PC
Short circuit plug in the back of Meter	1PC
Electrode Stand	1PC
Temperature Sensor	1PC
9V Adaptor	1PC
Buffer Solution pH4.00, pH6.86, pH 9.18	1PC/EACH
User Manual	1PC

2. Specifications

Mode	PHS-550
Range	pH: 0~14.00pH mV:±1999mV, Temp: 0~100℃
Resolution	pH: 0.01pH, Temp: ±1℃
Accuracy	pH: 0.01pH, Temp: ±1℃
Temperature compensation	0—100℃ automatic compensation
Three points calibration	4.00, 6.86 and 9.18
Basic configuration	E201-C plastic case PH combination electrode (Temperature of solution 5-60℃ be suitable) PH sample standard solution DC9V adapter

Working condition

- Ambient temperature: 0~40℃ Relative humidity: <85%
- Power: 9V DC power
- No significant vibration
- No disturbance of magnetic field or distinct tremble around instrument.
- Input resistance: $\geq 1 \times 10^{12} \Omega$
- Zero drift: $\leq 0.01 \text{pH} \pm 1 \text{word} / 2 \text{hours}$
- Solution temperature compensation range: 5~60℃
- Dimension and weight: 230x200x60mm, 1.2KG

3. Operation

Preparation

- Insert the adapter into the 220V AC power supply; after that, insert the dc output plug into "DC9V" socket. Screw off the short circuit plug of the meter, Screw on the pH electrode. Please keep clean and dry of electrode before using, avoid to be polluted.
- Switch on the instrument and preheat for 5 minutes.

Calibration

- Before measurement, the instrument should be calibrated. To be accurate, the calibration should be conducted by using the standard solution of pH4.00, 6.86, and 9.18.
- Connect power, and press on/off key to turn on the instrument.
- Make sure the pH combination electrode is screwed on, the sensor should be cleaned by purified water and no remained water.
- Measure the temperature of pH buffer solution by thermometer; then, press the key of “^” or “v” to adjust the temperature to be same as the buffer solution.
- Point calibration: Immerse the pH electrode into pH6.86 solution, shake it for a while, then wait until the number shows on the screen is stable, keep pressing the "calibration" key until the screen show the "CAL", first “6.86” twinkles, few seconds later shows the: “END”, then shows the calibrated pH value. It indicates that the calibration is completed and stored. Please note the final calibrated pH value shows on the screen may be different under different temperature. For example, it will show pH6.86 under 25°C and pH6.90 under 15°C. Details please find it from the last page.
- Slope calibration I: Take out the pH electrode, clean it by purified water and make it dry, immerse the pH electrode into PH4.00 solution, shake it for a while then wait until the number shows on the screen is stable, keep pressing the "calibration" key until the screen show the "CAL", it shows 4.00 first, few seconds later shows the "END", then shows the final pH value, which indicates the calibration is completed and be stored. When finish calibration, the slope percentage will be adjusted automatically. Please note the final calibrated pH value shows on the screen may be different under

different temperature. For example, it will show pH4.00 under 25°C and pH4.02 under 35°C. Details please find it from the last page.

- Slope calibration II : Take out the pH electrode, clean it by purified water and make it dry, immerse the pH electrode to PH9.18 solution, shake it for a while then wait until the number shows on the screen is stable, keep pressing the "calibration" key until the screen show the "CAL", it shows 9.18 first, few seconds later shows the "END", then shows the final pH value, which indicates the calibration is complete and be stored. When finish calibration, the slope percentage will be adjusted automatically. Please note the final calibrated pH value shows on the screen may be different under different temperature. For example, it will show pH9.18 under 25°C and pH9.28 under 15°C. Details please find it from the last page.

Solution measurement

- Measure the temperature of solution by thermometer, then press increase key "^" or decrease key "v" adjust the temperature value, clean the pH electrode and immerse it to the tested solution, shake it for a while then place until reading comes stable, that is the PH value of the tested solution.

Notice: According to the isothermal measurement principle, for the temperature of tested solution and calibration solution, the closer, the more accuracy of the test result.

- MV value measurement:

Press "PH/MV" key, shift the instrument to "MV" display,

Connect ORP electrode and immerse them into the tested solution, shake for a while then place it until the measure value is stable, that is the ORP value of the tested solution.

4. Maintenance and note

Notes for Testing Sample

- The electrode plug and socket of instrument must keep clean and dry, short circuit plug should be put on when not using, for preventing the intrusion of dust and moisture.
- The different sample should use the suitable pH electrode (for example: measure strong acid, strong alkali or pure water and so on).
- The lead-in wire of electrode must keep static when test the sample, don't touch it with hand, otherwise it will cause the measurement instability.
- The preparation standard solution must use the twice distilled water or Non-Ion water, its conductivity should be less than $2 \mu \text{S/cm}$.
- The standard buffer solution should be stored in the refrigerator (low temperature around $5-10^{\circ}\text{C}$), it can preserve for 2-3 months. If there is muddy, mildew or sediment in the solution, please do not use any more.
- Don't use the standard buffer solution which passed the shelf life, don't pour the used standard buffer solution into the standard solution bottle with unused solution.
- Use the standard buffer solution which approach the pH value of sample if possible when in calibration, and the standard solution temperature is better the same with sample if possible.
- It would be best to turn off and calibrate again if need to replace the electrode when use the instrument.

Notes for electrode use

- Combination electrode is not supposed to immersed into distilled water for a long time, it should be inserted into the bottle which is filled with the electrode protect solution
- The configuration of electrode protect solution: take one packet of pH4.00(250ml), soluble in the 250ml ion water, then add 56g analytically pure KCL, stir until completely dissolved.
- Avoiding to let the top of electrode being knocked after remove the protect cover of

electrode, otherwise the electrode will not work if the top glass ball of electrode is broken.

- When using liquid chargeable electrode, please note that if liquid inside decreases to be less than half volume, please use burette to add liquid from hole at the top. When measuring, please turn the blue circle to cover the small hole.
- When electrode moves from one solution to another solution, it should be cleaned by distilled water and dried by filter paper. Do not wipe the glass ball to avoid sluggish response. The best method is washing electrode by the next test solution.
- Avoiding that the bubble cut off the reference solution inside the electrode, if it exists, please eliminate it by shaking off the electrode.
- Please reduce the immerse time when testing the strong acid and alkali or special solution (like: protein, paint and so on), after testing, wash it carefully.
- The slope and response time of electrode will be decrease a little after long time using, please immerse the electrode ball for 24hours into 0.1 mol/L HCL solution (preparation: 9ml HCL diluted to 100ml by Non-Ion water).

Common Problem Checking

- Most problems are due to electrode functional problem or wrong measurement, not the instrument. Besides, buffer solution and other factors will lead to some problems, please check carefully, and find out what exactly the problems are.

Electrode

If the instrument is operating well, but the reading is unstable, instrument responds slowly, or cannot be calibrated to the right pH value, please check electrode first as below:

1. Whether electrode sensor inserts into testing liquid or not
2. There are no bubbles inside electrode
3. Electrode ball is not polluted
4. Electrode and instrument are well connected, and lead wire is not loose or broken.

Standard buffer solution

If the instrument and the electrode is operating well, the readout is not correct or cannot be calibrated, please check the standard buffer solution:

1. Use the exact standard pH buffer solution.
2. The buffer solution is under quality guarantee period and not be polluted.

5. Preparation of standard solution

Pour the standard solution powder into the 250ml beaker, use the distilled water to wash it, and then dissolved and diluted to the scale, then shake up.

Below is the pH value and temperature relation table:

pH Solution value Temp°C	solution name	0.05mol/kg potassium hydrogen phthalate	0.025mol/kg phosphate mixture	0.01mol/kg borax
0°C		4.01	6.98	9.46
5°C		4.00	6.95	9.39
10°C		4.00	6.92	9.33
15°C		4.00	6.90	9.28
20°C		4.00	6.88	9.23
25°C		4.00	6.86	9.18
30°C		4.01	6.85	9.14
35°C		4.02	6.84	9.10
40°C		4.03	6.84	9.07
45°C		4.04	6.83	9.04
50°C		4.06	6.83	9.02
55°C		4.07	6.83	8.99
60°C		4.09	6.84	8.97
70°C		4.12	6.85	8.93
80°C		4.16	6.86	8.89
90°C		4.20	6.88	8.86
95°C		4.22	6.89	8.84