

Appendix: Relationship table between buffer solution PH value
and temperature

(°C)	0.05mol/kg Potassium hydrogen phthalate potassium acid	0.025mol/kg Phosphate mixture	0.01mol/kg Sodium tetraborate
5	4.00	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.28
20	4.00	6.88	9.23
25	4.00	6.86	9.18
30	4.01	6.85	9.14
35	4.02	6.84	9.11
40	4.03	6.84	9.07
45	4.04	6.84	9.04
50	4.06	6.83	9.03
55	4.07	6.83	8.99
60	4.09	6.84	8.97

Note:

- Read this manual carefully before using this instrument.
- The instrument must be rechecked by qualified department
One year later
- The glass electrode's quality guarantee is one year, One
year later, its performance will be affected whether be
used or not, so it should be replaced in time.
- The PH electrode must be soaked for 24h in the 3mol/L
potassium chloride solution for the first use or it has not
been used for a long time.

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Appendix: Relationship table between buffer solution PH Value and temperature

Note 1: Selection of cleaning agent, you can not use carbon tetrachloride, trichlorethylene, tetrahydrofuran, etc. Nor can measure above solution with complex electrode.

Note 2: The most prone of using pH composite electrodes is the clog at the liquid junction, which is the main reason fo mistakes.

8、Pollutants and detergent reference list

Pollutants	Detergent
Inorganic metal oxide	Dilute acids below 1m01/L
Organic grease-like substances	Dilute detergent (alkaline)
Resin macromolecule substance	Alcohol, acetone, ether
Protein blood cell sediment	5% pepsin +0.1 mo1 / L HC1 solution
Pigment substances	Dilute bleach, hydrogen peroxide

9、Complete Set

1. PHS-3C type of pH meter 1
2. E-201-C plastic molded rechargeable PH composite electrode 1
4. Annex one set, take the packing list as a standard

If users need to measure the oxidation of - and potential (ORP) or the measurement of the corresponding ion electrode potential, please purchase electrode converter and the corresponding ion electrode.

7、 Note of electrode maintenance and use

- (1)、 The electrode must be location calibrated with known pH value standard buffer solution, the pH value is closer to the pH value being measured the better.
- (2)、 Measuring ended, the electrode should be put into protection set with few external reference solution avoid by all means is soaked in distilled water
- (3)、 The external reference solution of composite electrode is 3mo1/L potassium chloride solution, which can be filled in from the motor or top hole. Pull on rubber cover when the compound motor is not in use to prevent supplement fluid drying up.
- (4)、 Terminal electrode must be kept clean and dry, absolutely prevent the short-circuit of output ends , otherwise will result in inaccurate or invalid measurements.
- (5)、 Electrode should has good compatibility with input high impedance pH meter ($\geq 10^{12} \Omega$) so as to maintain good performance
- (6)、 Electrode should avoid long-term immersion in distilled water, protein acidic fluoride solution and eliminate fluid solution.
- (7)、 Electrode and organic silicone contact should be avoided.
- (8)、 After long-term use, if slope strength decreased ,the electrode should be soaked in the 4% HF (hydrofluoric acid) for(3 ~ 5) S, washed with distilled water and then immersed in 0.1mo1 / L hydrochloric acid solution
- (9) If the electrode is polluted by sensitive bulbs or blockage of the measuring solution,it should be cleaned with appropriate solution based on the nature of pollutants.

1 Overview

PHS-3C is a digital display pH meter which uses the big screen with blue backlight ~8~ digital LCD , it can simultaneously measure, display pH and temperature or potential (mV). It is applicable to the laboratory of universities, research institutes, environmental monitoring, industrial and mining enterprises,etc to measure the solution's pH value and potential (mV) values

1 Technical performance

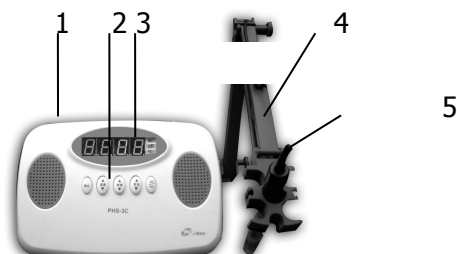
- 1、 Instrument level: 0.02 级
- 2、 Measuring range: pH: (0.00~14.00) pH, Display range: (-2.00~18.00) pH mv: (-1999~0)mV, (0~1999) mV (Automatic display) °C:
- 3、 Minimum display unit: 0.01pH, 1mV, 0.10C
- 4、 Temperature compensation range: (0.0~99.9) °C
- 5、 Basic error of electronic unit: pH: ± 0.02 pH ± 1 word
mV: ± 1 mV ± 1 word
°C: ± 0.30 °C ± 1 word
- 6、 Basic error of instrument: ± 0.02 pH ± 1 个字; ± 0.50 °C ± 1 word
- 7、 Input current of electronic unit : no more than 2×10^{-12} A
- 8、 Input impedance of electronic unit: no less than $1 \times 10^{12} \Omega$
- 9、 Temperature compensation error: ± 0.01 pH ± 1 word
- 10、 Repeatability error of electronic unit: pH: 0.01 pH
mV: 1mV
- 11、 Instrument repeatability error: no bigger than 0.01 pH
- 12、 Stability of electronic unit: ± 0.01 pH ± 1 word/3h
- 13、 Dimensions: $1 \times b \times h$, mm: $300 \times 200 \times 72$
- 14、 Weight: 1.5kg
- 15、 Nominal operating condition
 - a) Ambient temperature: (5~40) °C

- b) Relative temperature: not more than 85%
- c) The power supply: AC (220±22)V, (50±1) Hz;
- d) No external magnetic interference in addition to Earth's magnetic field.

3 Instrument Structure

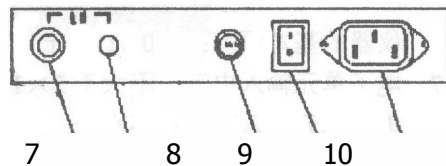
Exterior Structure

- 1—Chassis
2—keyboard
3—Screen
4—Multi electrical holder
5—electrode



Instrument rear panel

- 6 — Electrode plug
7 —Reference electrode connection
8 —Fuse
9— Power
10— Power outlet



Keyboard explanation:

- a) Press Key “pH/mV” once for measuring “pH”; Press another time for measuring “mV”.
- b) Key “Stand”. Press Key “△” For adjustment localization value rise; Press “▽” For adjustment localization value down.
- c) Key “slope”. Press the upper "△" to adjust the slope value increased; Press the lower "▽" to adjust the slope values decreased
- d) Key “Temp”. Press the upper "△" to regulate the temperature rise ; Press the lower "▽" to adjust the temperature decrease which makes the

overload warning.

(7) Measuring with metal electrode , the Q9 plug with a clip should be used, which is connected to the socket (6), make the clip and metal electrode wire connected. Or a converter connected to the socket(6), Metal electrodes connected to the converter. Reference electrode accessed to the interface (7) .

5 Maintenance of instrument

The proper use and maintenance of equipment, can ensure it's performance, especially instrument like pH meter for it has a very high input impedance and contact with chemicals frequently.

- 1 The instrument input (measuring electrode socket 6) must be kept dry and clean. when equipment is not in use, put short-circuit plug Q9 (14) into the outlet, to prevent dust and moisture intrusion
- 2 Electrode converter (optional) designed for use of other electrode, pay attention to prevent moisture and dust
- 3 During measurement, electrode's lead-in conductor should maintain static, otherwise it will cause instability.
- 4 In overhaul time should guarantee that the electric iron has a good grounding.
- 6 To ensure the reliability of the buffer solution, otherwise it will lead to measurement errors.

6 Preparation method of buffer solution

- (1) Solution pH4.00: With potassium hydrogen phthalate GR 10.12g, dissolved in 1000ml of high purity deionized water.
- (2) Solution pH6.86: With GR potassium dihydrogen phosphate 3.387g, the GR phosphoric acid deuterium accepts 3.533g, dissolved.
- (3) Solution pH6.86 with sodium tetraborate GR 3.80 dissolved in 1000mL of high purity deionized water

Note: The preparation of 2、3 solution, water used should be pre-boiled (15 ~ 30) min, to remove dissolved carbon dioxide. During the cooling process should avoid contact with air to prevent carbon dioxide pollution

Calibration buffer solution generally use solution with pH = 6.86 for the first time, and close to the pH values of solution being measured. If the measured solution is acidic, the buffer solution selected should be pH = 4.00; and for the alkaline solution, Ph = 9.18 is the choice.

4.2 PH value measurement

Instrument calibrated can be used to measure solution. Specific steps are as follows:

(1) Solution being measured has the same temperature with calibrated solution, steps are as follows:

- a) Clean electrode forehead with distilled water, and clean again with the solution being measured;
 - b) plunge the electrode in to the solution being measured, stir with a glass rod making the solution to be even, the pH value displayed on the monitor
- (2) Solution being measured has different temperature with calibrated solution, steps are as follows

- a) Clean electrode forehead with distilled water, and clean again with the solution being measured;
- b) Measured with a thermometer the temperature of the solution being measured;
- c) Press "Temp" button, the instrument displays the temperature of the measured solution, and then press "Yes" button.
- d) plunge the electrode in to the solution being measured, stir with a glass rod making the solution to be even, then read the solution pH.

4.3 Measurement of electrode potential (mV)

(1) Put the ion selective electrode (or metal electrode) and reference electrode holder on electrode stand;

(2) Clean electrode forehead with distilled water, and clean again with the solution being measured;

(3) Put ion electrode to the electrode socket plug (6)

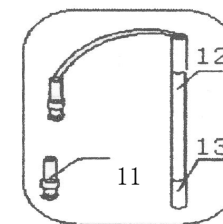
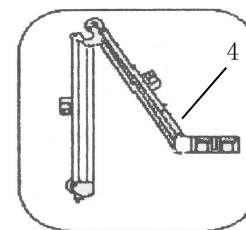
(4) Connect reference electrode to the interface (7) at the rear of instrument

(5) Plug the two types of electrode into solution, when the solution is even, then you can read the electrode potential (mV) values

(6) If measured signal beyond instrument measuring range, the screen display is not bright,

e) Key "Yes". Press the key to confirm the operation. Besides, turn the power switch on while pressing this key can restore the original state of the instrument.

Instrument Case Accessories



11—Q9 Short plug 12—E-201-C PH composite electrode
13—Electrode protection set

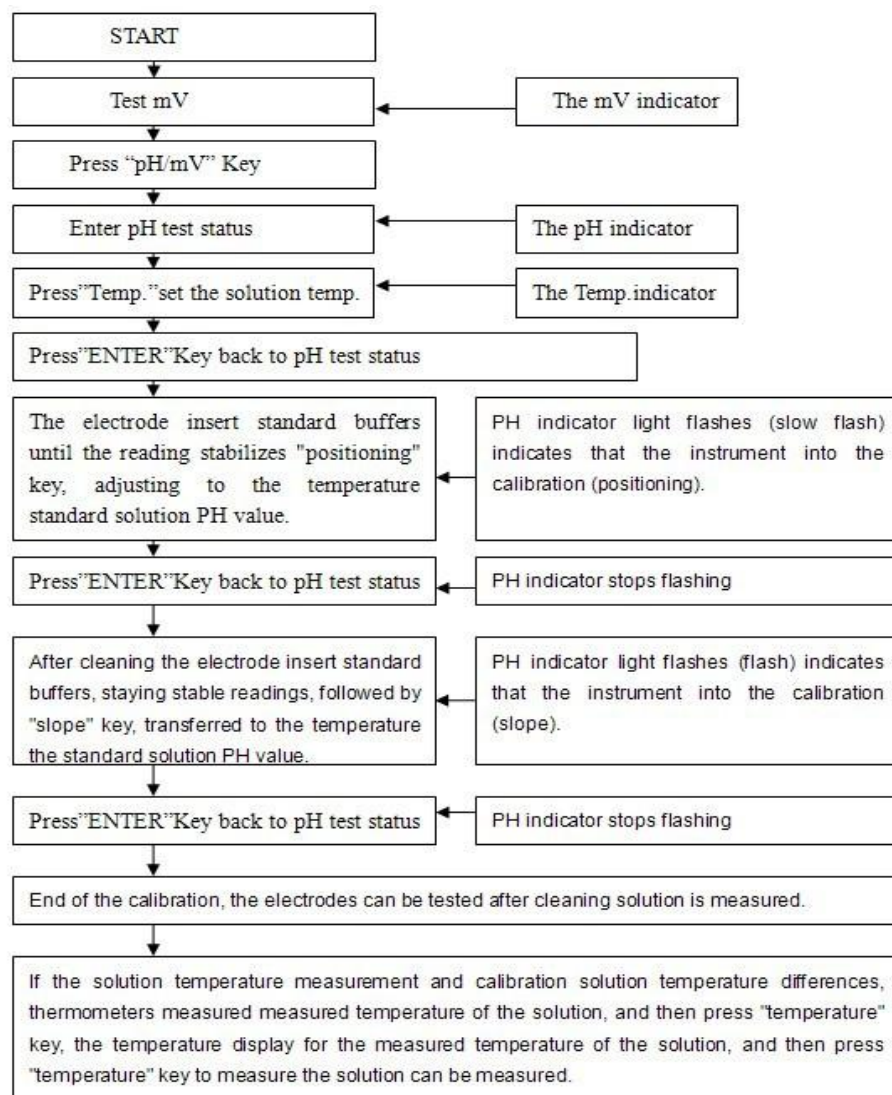
4 Sequence of operation

Preparation

- a) Put the multi-electrical holder (4) into the multi-function electrode holder socket
- b) the pH composite electrode (12) installed in electrode rack (4),
- c) Unplug the set (13) and pull down the rubber of electrode to expose the sleeve hole;
- d) Clean electrode with distilled water.



PHS-3C Sequence of operation



4.1 Calibration

Calibration before use, Normally instruments in continuous use, calibrate once a day.

- Unplug Q9 short-circuit plug (11) from electrode socket (6);
- Insert composite electrode (12) into electrode socket (6)
- If no composite electrode, insert glass electrodes plug into the electrode socket (6). Connect reference electrode to the reference electrode (7);
- Turn on the power switch, press "pH/mV" button make it into the pH measurement condition;
- Press "Temp" button to display the solution temperature (at this time temperature indicator light), then press "Yes" button, the instrument returns to pH measurement mode.
- Insert the electrode washed with distilled water into the pH = 6.86pH standard buffer solution, when the reading is stable press the key "Stand". Then press the "Yes" button, the instrument is in pH measuring state. The relationship between buffer solution PH value and temperature see Appendix
- Insert electrode cleaned with distilled or deionized water into the pH = 4.00 (or Ph = 9.18; or pH = 6.86pH, but can not the same with calibration buffer solution pH) standard buffer solution. Press the k "Model" button twice, Then press the "Yes" button, the instrument is in pH measuring state, pH indicator stops flashing, calibration completed.
- After cleaning the electrode with distilled water, solution measurement may carry on.
If the measuring process is not normal, turn off the power and press "Yes" button, Then turn on the power, restore the original state of the instrument. Restore the initial state of the instrument, and then re-calibration.

Note: If calibrated, do not press the "mode" button, if you mistakenly touch the key, do not press the "confirm" button, but continuously press "Model" button, the instrument can be re-entering the pH measurement, without further calibration.