Content

1.Overview

PHS-25/3C model pH meter is widely used in laboratory. Using new appearance, big character LCD. Can recognize 4.00pH, 6.86pH, 9.18pH, 3 normal buffers automatically. It also has protection and reminder function for easy operating.

PHS-25/3C is very popular in university, academe, laboratory to text the pH, mV of the sample solution. Most of all, you can test the potential of the ion-selective electrode.

NOTE:

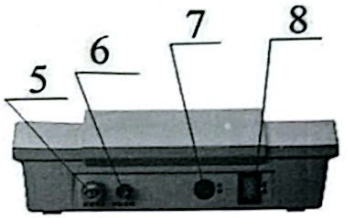
10. Please read the manual before operating.
11. Examination is strictly required after 1 year. Please send the equipment to the metrological service or other relevant departments to do the examination before using.
12. The warranty of pH Electrode is 1 year. Please replace it after 1 year.
13. Dipping the pH electrode in 3mol/L KCl solution for 24 hours in first time or nonuse for long time.
14. Please take the pH electrode manual as the standard.

2.Technical Parameter

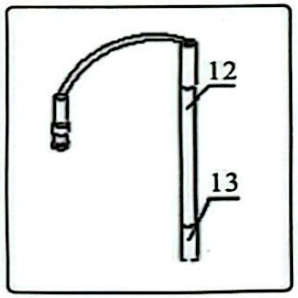
Model:	PHS-25	PHS-3C
Class:	0.05 Class	0.01 Class
Range:	pH: (0.00~14.00)pH	pH: (0.00~16.00)pH
	mV: (0~±1599)mV	mV: (0~±1999)mV
Accuracy:	0.05pH	0.01pH
	1mV	1mV
Automatic recognition of 4.00pH, 6.86pH, 9.18pH, 3 buffers function.		
Temperature Compensation:	Hand (0~60)℃	Hand (0~60)℃
Error of electronic unit:	pH:±0.05pH	pH:±0.01pH
	mV:±1mV±1d	mV:±1mV±1d
Error of equipment:	±0.05pH±1d	±0.02pH±1d
Electronic unit input current:	≥1×10^{12}A	
Electronic unit input impedance:	≥1×10^{12}Ω	
Error of temperature compensation:	±0.01pH	
Error of electronic unit repeatability:	pH: 0.05pH	pH: 0.01pH
	mV: 1mV	mV: 1mV
Error of equipment repeatability:	≤0.05pH	≤0.01pH
Stability of electronic unit:	±0.05pH±1d/3h	±0.01pH±1d/3h
Packing size:	220mm×175mm×75mm	
N.W.:	1.5kg	
Using Condition:	a) Temperature: (5~40)℃	
	b) Humidity: ≤85%	
	c) Power: DC(9v, 1.0A)V, (50-60)Hz	
	d) No magnetic interference	

3. Installation

1. Main frame
2. Panel
3. Display screen
4. Electrode stand

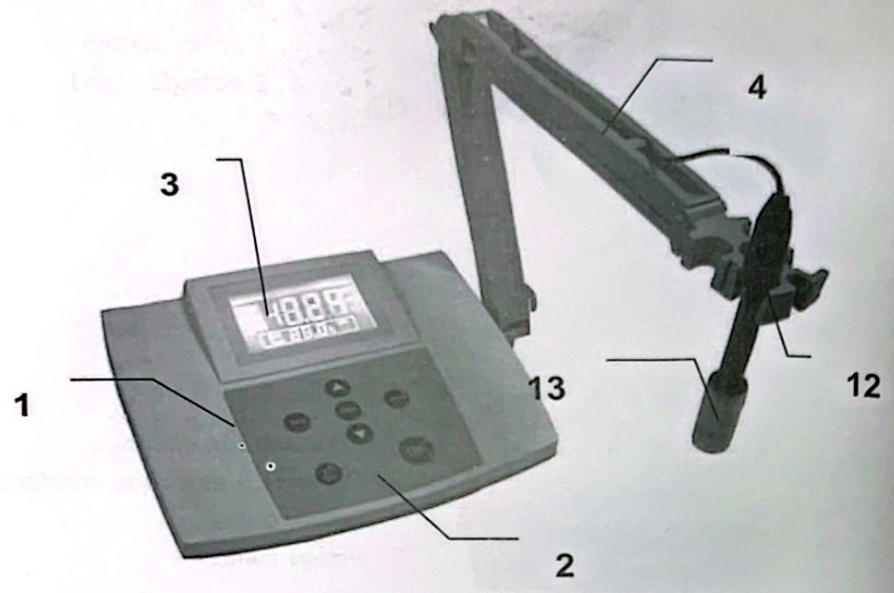


5. pH electrode interface
6. Reference electrode interface
7. Power outlet
8. Power switch



12. E-201-C model pH Electrode
13. Protection cover of electrode

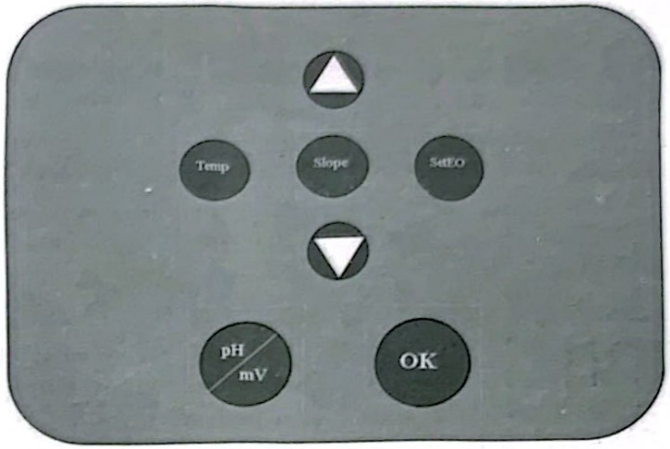
3.1 Components Installation



15. Fix the electrode stand (4) on the right side of pH meter and tighten the bolt.
16. Place the pH Electrode (12) and Temperature sensor (15) on the electrode stand (4).
17. Take the protection cover (13) from pH Electrode (12) and move the red rubber cover on the upper of pH electrode, make the hole exposed.
18. Wash the pH electrode with distilled water.

4. Operating

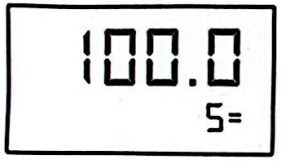
4.1 Operation Panel



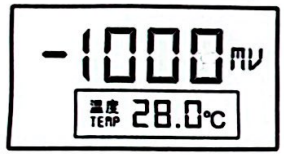
Key	Meanings		
pH mV	Testing mode	Switch "pH" mode and "mV" mode	
	Setting mode	Cancel current setting, back to testing mode	
OK	Confirm the value and save		
SetEO	Setting EO	Press "△"	EO rise
		Press "▽"	EO reduce
Slope	Setting Slope	Press "△"	Slope rise
		Press "▽"	Slope reduce
Temp	Setting Temp	Press "△"	Temperature rise
		Press "▽"	Temperature reduce

4.2 Operation

1. Plugging the pH meter and turn on. It shows "PHS-3CB" the model of the pH meter.

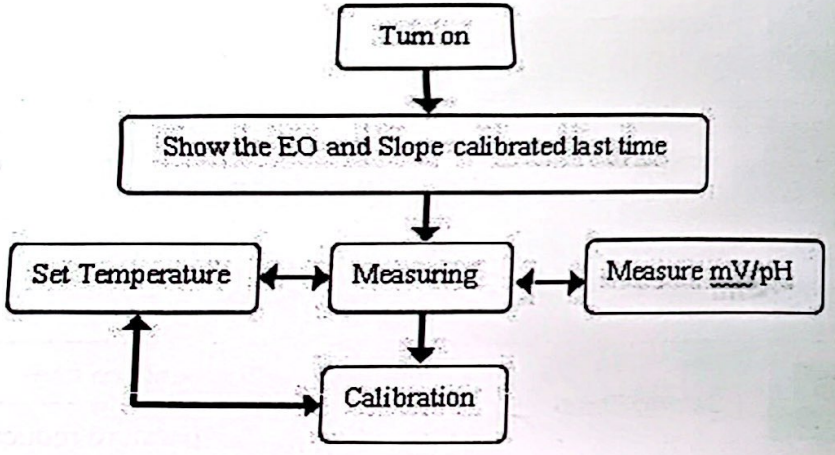


2. Show the Slope and EO calibrated last time.



3. Enter into the testing mode, show the current mV or pH.

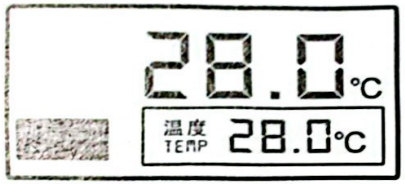
In testing mode, press "pH/mV" can switch the mV and pH.
Press "Temp" to set the current temperature.
Press "Set EO" or "Slope" to calibrate the current EO and Slope.



Flowchart of Operating

1. Please make sure the electrodes or the Q9 short-circuit plug (11) connect to the electrode interface (6) before turning on.
2. Connect the Q9 short-circuit plug to the electrode interface (6), even you don't use it.
3. Warm up the equipment for over 0.5h before using.

4.3 Temperature Setting



If you need set the temperature by hand.Press "Temp△" or "Temp▽"to set the temperature. It is the temperature of the test solution. Press "OK", confirm and save the value. Press "pH/mV" to exit and back to the testing mode.

4.4 Calibration

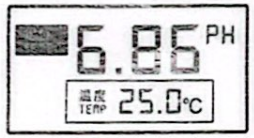
Calibrate the equipment before using. It's better to calibrate it every day.
It can recognize 4.00pH, 6.86pH, 9.18pH 3 standard buffers automatically. Only need to press "Set EO" or "Slope" then press "OK" to finish the calibration with these 3 solutions. Press "Set EO" to do the 1 point calibration; Press "Slope" to do the 2 point calibration. To other non-standard buffers, set the pH value as same as the value of solution in current temp., then press "OK".

1. When use non-standard buffers to calibrate the pH electrode, you have to know the standard pH value in different temperatures.
2. Advice: Calibrate the electrode before every single testing. The calibration data will cover the last one.
3. After 1 point calibration, the equipment will delete the last calibration data automatically and the slope is 100.0%

4.4.1 1 point calibration

This is an easier calibration when you do low requirement testing. Only use 1 kind standard buffer to set EO and the slope is 100.0% as default.

NOTE: The new calibration data will cover the last data automatically, slope is 100.0%.



a) Wash the electrode with distilled water in measuring mode. Then dip the pH electrode into the standard buffer.(e.g. pH=6.86pH buffer solution);

b) Put the thermograph into the buffer, compensating the temperature by hand;

c) Press "Set EO" after the reading stable, show "STD YES". Press , enter the 1 point calibration mode. Press "pH/mV", exit calibration and back to the testing mode.

In calibration mode, the equipment can recognize the standard pH of solution in current temperature automatically.

At this moment, the pH reading maybe different from the one in testing mode. Press "OK", confirm and save the data and show the slope and EO, then back to the testing mode.

If you need to quit the calibration mode, press "pH/mV", exit calibration and back to the testing mode.

d) If you use non-standard buffer solution, press press "Set EO" then press "△" or "▽" to set the reading, make pH value as same as the standard one in current temperature, then press "OK".

4.4.2 2 point calibration

2 point calibration is used to calibrate the slope of electrode.

4. Prepare 2 standard buffers. (e.g.: 4.00pH, 9.18pH, etc.)
5. Wash the electrodes with distilled water in testing mode.Dip the thermograph (pH electrode and temperature sensor) into the buffer 1 (pH=4.00pH), temperature compensated by hand. Press "Set EO" after the reading stable, press "OK" enter the 1 point calibration mode. Equipment recognize and show the pH value is 4.00pH in current temperature, then press "OK", save the data and back to the testing mode.
6. As same as step (b), wash the electrodes again. Dip the thermograph into the standard buffer 2 (pH=9.18pH), press "Slope" after the reading stable, then press "OK". The equipment

recognize and show the pH value (9.18pH).

2. Press "OK", confirm and save the data. Show the reading of slope and EO. Then back to the testing mode.
3. If you use non-standard buffer solution, press"Set EO" then press "△" or "▽" to set the reading, make pH value as same as the standard one in current temperature, then press "OK".

If you need 3 point calibration, test the standard buffer 3 according to the steps of 2 point calibration.

4.4.3 Slope Restoring

The slope may be not correct because of some reasons, such as point interruption. (The equipment shows last slope data of the electrode when turned on).

There are 2 ways to restore the slope.

A: Re-calibrate the slope according to the 2 point calibration.

B: Press "OK" and hold, then turn on the equipment. It shows "-1888" and flicker 3 times, that means the system is resetting. Then move the finger away from "OK", back to the testing mode.

4.5 Testing

4.5.1 pH Testing

Calibrating the equipment before testing.

3. The test solution and the calibration solution should have the same temperature or the equipment has a temperature sensor:
   a) Wash the pH electrode with distilled water, then wash it again with test solution;

   b) Dip the electrodes (pH electrode and temperature sensor) into the test solution. Stirring the test solution with glass rod. Show the pH value of the test solution.
25. The test solution and the calibration solution are at different temperatures or the equipment doesn't have a temperature sensor:
   a) Wash the pH electrode with distilled water, then wash it again with test solution;
   b) Measure the temperature of the test solution with thermometer.
   c) Press "Temp", show the temperature of the test solution. Press "OK".
   d) Dip the electrode into the test solution, stirring the test solution with glass rod. Show the pH value of the test solution.

4.5.2 mV Testing

2. Clasp the pH electrode and reference electrode (Optional) on the electrode stand;
3. Wash the electrodes with distilled water, then wash it again with test solution;
4. Connect the pH electrode to the pH electrode interface (6);
5. Connect the reference electrode to the reference electrode interface (7);
6. Dip the pH electrode, reference electrode and temperature sensor into the test solution, stirring the solution, show the mV value of the electrode and "±" pole.
7. If the test subject is over the testing range of the equipment, it will show "over";
8. When test the mV of the pH electrode, connect the Q9 plug (11)

to the pH electrode interface (6), connect the pH electrode cable to the Q9 plug; Or use electrode converter, connect converter to the potential electrode interface (6), then connect the metallic electrode to the other head of converter. Connect the reference electrode to the reference electrode interface (7).

5. Maintenance of Equipment

pH meter has high input impedance. It is very important to use correctly and maintain it frequently.

19. pH electrode interface (6) should keep dry and clean. Connect the Q9 plug to the interface (6) to prevent the moisture and dust when it laid up.
20. Keep the electrode converter (optional) away from the moisture and dust.
21. Make sure the lead of the electrode unmoved when testing, otherwise the value is not stable
22. Make sure the plug earthed.
23. Equipment use MOS integrated circuit. Make sure the electric soldering iron earthed when repairing.
24. Make sure the standard solution is correct, otherwise the testing result will be wrong.

6. Preparation of Buffers

1. **pH 4.00 solution:** Dissolve 10.12g GR Potassium hydrogen phthalate in 1000ml high-purity deionized water.

1. **pH 6.86 solution:** Dissolve 3.387g GR Monopotassium phosphate, 3.533g Monosodium orthophosphate in 1000ml high-purity deionized water.
2. **pH 9.18 solution:** Dissolve 3.80 borax in 1000ml high-purity deionized water.

NOTE: Boiled the 1000ml high-purity deionized water for 15~30 min before preparing Solution 2 and Solution 3 to remove Carbon dioxide. Keep the deionized water away from air when cooling, in case Carbon dioxide polluted it.

7. Maintenance of Electrode

1. Calibrate the electrode with standard buffers before testing. It is much better that the pH value of standard buffers close to the test solution.
2. Take the protection cover of electrode away, keep the glass bulb of electrode away from hard stuffs. Any breaking or scuffing will make the electrode failure.
3. Cover the electrode with protection cover after testing. Put some external reference fluid to keep the glass bulb moist. Don't dip the electrode in the distilled water for long time.
4. The external reference fluid of pH electrode is 3mol/L KCl solution. Put the fluid in the protection cover from the hole on the upper of the electrode. Cover the hole with protection cover (rubber cover), in case the fluid try.
5. Keep the electrode interface dry, in case the short circuit.
6. Please use the electrode supported with equipment.
7. Don't dip the electrode in distilled water, protein solution, acid fluoride solution for long time.
8. Keep the electrode away from organic oil.
9. If the slope of electrode reduced after using for a long time. Dip

the lower of electrode in 4%HF(Hydrofluoric acid) for 3~5s, then clean it with distilled water, than dip it in 0.1mol/L HCl solution. Then you can reuse it.

1. If the test solution has some substances is very easy to pollute the glass bulb or block the contact surface with solution of electrode and make the electrode passivation. The slope will be reduced and the reading is not correct. Please use suitable solution to wash the electrode according the pollution substance to make the electrode reused (see Part 8).

NOTE:

1. Don't use Carbon tetrachloride solution, Trichloroethylene solution, Tetrahydrofuran solution and others can dissolve Polycarbonate resin to wash the electrode. It will damage the electrode. Please test above solutions with 65-1 model pH electrode instead of E-201-C model pH electrode.
2. The contact surface with solution of electrode is very easy to be blocked by the pollution substance and caused error result.

8. Reference of Pollutant and Cleaning Compound

Pollutant	Cleaning Compound
Inorganic metallic oxides	Lower than 1mol/L Diluted acid
Organic fats and oil substances	Dilute detergent (alkalescence)
High-molecular resin substances	Alcohol, acetone, aether (wash glass bulb)
Deposits of protein blood	5% pepsin + 0.1mol/L HCl solution
Substances of paint	Dilute bleach, Hydrogen peroxide

9. Accessories

PHS25/3C main equipment	1
E201C model pH electrode assembly	1
Supplied accessories	1

If you need to test the ORP of redox or the mV of ion-selective electrode, please purchase electrode converter (optional).

Appendix 1: Comparison table of Buffers

Temp. ℃	0.05mol/kg Potassium hydrogen phthalate	0.025mol/kg Monopotassium phosphate + Monosodium orthophosphate	0.01mol/kg Borax
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

Appendix 2: Trouble Shooting

Display	Reasons	Solution
Show "Err" all the time after turning on	The memory chip goes wrong	Turn off and wait. Try several times. If the problem is still exist. Please contact with your distributor
mV area shows "over" but temperature area is normal	Input potential is over the testing range	Connect the Q9 plug (11) to the pH electrode interface. If the problem is still exist, please contact with your distributor
Press "OK" for 3s, show "5Y5 r5t", in testing mode.	System reset function, remind you wether need to reset the system	Press "OK", if you need. Otherwise press other keys to exit.
Press "Set EO" or "Slope", show flicker "5Y5 Ye5"	Protection for pressing key in error. Remind you wether need to calibrate	Press "OK", if you need. Otherwise press other keys to exit.
Wrong Data	Display Problem	Please contact with your distributor