**Instruction Manual**

 PH-Meter

 Model:PHS-3CU



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Appendix 2: Trouble Shooting

|  |  |  |
| --- | --- | --- |
| **Display** | **Reasons** | **Solution** |
| Show"Err"all thetime after turningon | The memory chipgoes wrong | Turn off and wait.Try several times.If the problem is stillexist. Please contact With your distributor |
| mV area shows"over" buttemperature areais normal  | Input potential is over the testingrange | Connect the Q9 plug(11) to the pH electrode interface.If the problemis still exist,pleasecontact with yourdistributor  |
| Press"OK" for 3s,show "5Y5 r5t",in testing mode. | System reset function,remind you wetherneed to reset the system | Press"OK" , If youneed. Otherwisepress other keysto exit. |
| Press"Set EO" or"Slope",showflicker"5Y5 Ye5"  | Protection for pressingkey in error. Remindyou wether need tocalibrate | Press"OK" , If youneed. Otherwisepress other keysto exit. |
| Wrong Data | Display Problem | Please contact withyour distributor |

1.Overview

PHS-3CU model pH meter is widely used in laboratory.It’s developed from PHS-3C. Using new appearance, bigcharacter LCD. PHS-3CU can recognize 4.00pH,6.86pH,9.18pH,3 normal buffers automatically.It also has protection and reminder function for easy operating.

PHS-3CU 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:

* Please read the manual before operating.
* 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.

* The warranty of pH Electrode is 1 year. Please replace it

 after 1 year.

* Dipping the pH electrode in 3 mol/L KCL solution for 24

 hours in first time or nonuse for long time.

* Please take the pH electrode manual as the standard.

1. Technical Parameter

|  |  |
| --- | --- |
| Class  | 0.01 Class |
| Range: | pH: (-2.00~19.99)pH |
| mV: (0~±1999)mV(auto display) |
| Accuracy: | 0.01pH |
| 1mV |
| Automatic recognition of 4.00pH,6.86pH,9.18pH,3 buffers function |
| Temperature Compensation: | Hand/Auto(0~80)℃ |
| Error of electronic unit: | pH:±0.01pH |
| mV:±1mV±1d |
| Error of equipment: | ±0.02pH±1d |
| Electronic unit input current: | ≥1x1012A |
| Electronic unit input impedance: | ≥1x1012Ω |
| Error of temperaturecompensation: | ±0.01pH |
| Error of electronic unitrepeatability: | pH: 0.01pH |
| mV: 1mV |
| Error of equipment repeatability: | ≤0.01pH |
| Stability of electronic unit: | ±0.01pH±1d/3h |
| Packing size: | 290mmx210mmx95mm |
| 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 |

9. Accessories

PHS3CU main equipment 1

E201C model pH electrode assembly 1

Temperature electrode 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/kgPotassiumhydrogenphthalate | 0.025mol/kgMonopotassiumphosphate+Monosodiumorthophosphate | 0.01mol/kgBorax |
| 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 |

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 Compoud

|  |  |
| --- | --- |
| 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 |

3. Installation



 1. Main frame

 2. Panel

 3. Display screen

 4. Electrode stand

1. pH Electrode

 6. pH electrode interface

**** 7. Reference electrode interface

 8. Temperature sensor interface

 9. Power switch

 10. Power outlet

 11. Q9 short-circuit plug

 (installed on pH electrode interface)



 12. E-201-C model pH Electrode

 13. Protection cover of electrode

 14. RS765-3T interface

 15. Temperature sensor

3. 1 Components Installation



a) Fix the electrode stand (4) on the right side of pH meter and tighten

 the bolt.

b) Place the pH Electrode (12) and Temperature sensor (15) on the

 electrode stand(4).

c) Take the protection cover (13) from pH Electrode (12) and move the

 rubber cover on the upper of pH electrode, make the hole exposed.

d) Wash the pH electrode with distilled water.

1. 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.

1. Maintenance of Electrode
2. Calibrate the electrode with standard buffers before testing, It is

 muchbetter 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.

1. 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.

1. The external reference fluid of pH electrode is 3mol/L KFL

 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, that dip it in 0.1mol/L HCL solution.

 Then you can reuse it.

g) 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).

1. Maintenance of Equipment

pH meter has high input impedance. It is very important to use correctly

and maintain it frequently.

1. 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.

1. Keep the electrode converter(optional) away from the moisture

 and dust.

1. Make sure the lead of the electrode unmoved when testing,

 otherwise the value is not stable.

(4) Make sure the plug earthed.

(5) Equipment use MOS integrated circuit. Make sure the electric

 Soldering iron earthed when repairing.

(6) Make sure the standard solution is correct, otherwise the testing

 result will be wrong.

1. Preparation of Buffers

1.pH 4.00 solution: Dissolve 10.12g GR Potassium hydrogen phthalate

 in 1000ml high-purity deionized water.

2.pH 6.86 solution: Dissolve 3.387g GR Monopotassium phosphate,

 3.533g Monosodium orthophosphate in 1000ml high-purity deionized

 water.

1. Operating

4. 1 Operation Panel



|  |  |
| --- | --- |
| **Key** | **Meanings** |
|  | Testing mode | Switch“pH”mode and "mV"mode |
| Setting mode | Cance current setting, back to testing mode |
|  | Confirm the value and save |
|  | Setting EO | Press "△" | EO rise |
| Press "▽" | EO reduce |
|  | Setting Slope | Press "△" | Slope rise |
| Press "▽" | Slope reduce |
|   | Setting Temp | Press "△" | Temperature rise |
| Press "▽" | Temperature reduce |

4.2. Operation

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

1. Show the Slope and EO calibrated last time.
2. 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**

Calibrating the equipment before testing.

(1) The test solution and the calibration solution should have the same

 temperature or the equipment has a temperature sensor:

1. 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

1. The test solution and the calibration solution are at different temperatures

 or the equipment doesn’t have a temperature sensor:

1. Wash the pH electrode with distilled water, then wash it again with test

 solution;

b) Measure the temperature of the test solution with thermoment.

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

a) Clasp the pH electrode and reference electrode (Optional) on the

 electrode stand ;

b) Wash the electrodes with distilled water, then wash it again with

 test solution ;

c) Connect the pH electrode to the pH electrode interface(6) ;

d) Connect the reference electrode to the reference electrode

 interface(7) ;

e) 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.

f) If the test subject is over the testing range of the equipment, it will

 show "over";

c) As same as step( b),wash the electrodes again. Dip the electrodes

 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 ).

d) Press “OK”, confirm and save the data, Show the reading of slope

 and EO.Then back to the testing mode.

e) If you use non-standard buffer solution, press “Set Eo△”or “Set

 EO▽” 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

|  |  |
| --- | --- |
|  | 1. Please make surehe electrodes or the Q9 short-circuit

 plug (11) connect to the electrode interface (6)  before turning on.1. 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

3CU has temperature-compensation function, it can set temperature automatically. 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"

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 temperature sensor into the buffer, compensating the

 temperature automatically;

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"Set EO△",or "Set

 EO▽"to set the reading, make pH value as same as the standard one

 in current temperature, then press"OK".

|  |  |
| --- | --- |
|  | 1. When use non-standard buffers to calibrate the pH electrode,you have to know thestandard pH  value in different temperatures.1. Advice: Calibrate the electrode before every single

 testing. The calibration data will cover the last one.1. After 1 point calibration, the equipment will delete

 the last calibration data automatically and the slope  is 100.0%. |

4.4.2 2. Point calibration

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



a) Prepare 2 standard buffers.(e.g.: 4.00pH, 9.18pH, etc.)

b) Wash the electrodes with distilled water in testing mode.Dip the

 electrodes ( pH electrode and temperature sensor ) into the buffer

 1( pH=4.00pH ),temperature compensated automatically.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.