Huazheng®

PHS-2F
Benchtop pH Meter

Huazheng Electric Manufacturing (Baoding) Co., Ltd

Dear user:

Thank you for choosing PHS-2F Benchtop pH Meter.

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

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I. Installation

1.1 Unpacking

In the packing box, users can find below parts:

1. PHS-2F pH meter 1set

3. PHS pH Combination Electrode 1pc

4. Electrode holder 1pc

1.2 Installation of the meter

1. Meter
2. Keypad
3. Screen
4. Electrode Holder
5. PH pH Combination Electrode

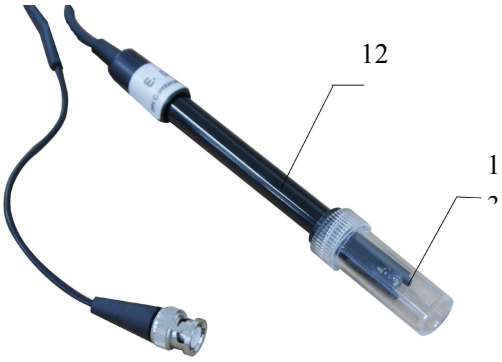
Front view of PHS-2F

6. Meas (PH electrode socket)
7. Ref (Reference probe socket)
8. Fuse
9. Power Switch

10 Power socket

Rear panel of the meter

11. BNC Short Circuit



12. pH Combination Electrode

13. Electrode Protective Cover

1.2.1 Install Electrode Holder

Insert electrode holder (4) in electrode base, and screw the set screw under electrode holder (4).

1.2.2 Install PH pH Combination Electrode

a) Installation pH Combination pH Electrode (12) on electrode holder (4).

b) Remove BNC short-circuit (11) plug on electrode socket (6).

c) Insert the plug of pH Combination Electrode (12) in pH electrode socket (6)

II.Specifications and Performance

2.1 Introduction

Note following problems when using:

- Ensure a good grounding.
- Prevent corrosive gas invasion.
- Keep the instrument interface clean, dry, and avoid contact with acid, alkali, salt solution.

- This instrument is available for long-term stable usage. After test samples, the electrode should be immersed in DI water.
- Keep the instrument interface clean, dry, and avoid contact with acid, alkali, salt solution. Insert short circuit when the instrument is not in use to avoid open circuit damage.

2.1.1 Terms

- pH slope: The potential variation for each pH change, usually expressed as mV/pH or %.
- pH E0: Also called “zero potential”, usually refers to the potential value of the pH=7.
- pH one-point calibration: Calibrate with one pH buffer solution.
- pH multi-point calibration: Calibrate with two or more pH buffer solution.

2.1.2 Features

- Adopt new design appearance, big LCD segmented display.
- It is mainly used to measure the pH value and potential value (mV) of water solution in the field of research institute, industrial, mining enterprises, universities and colleges. Besides, It can also measure electrode potential when matched with ion selected electrode

2.1.3 Main technical performance

1. Measuring range

a. pH：（0.00～14.00）pH;

b. mV：-1400mV～1400mV;

2. Minimum display unit: 0.01pH, 1Mv

3. Temperature compensation range: Manual (0~60)℃

4. Electronic unit accuracy

a. pH: ±0.01pH;

b. mV：±0.1%FS

5. Accuracy of meter: ±0.02pH±1bit;

6. Input current of electronic unit: ≤1×10^{-12}A

7. Input impedance of electronic unit: ≥$I\times10^{12}\Omega$

8. Error of temperature compensation: ±0.01 pH

9. Repeatability error of electronic unit:

pH：0.01pH

mV：1mV

10. Repeatability error of meter: ≤0.01pH
11. Repeatability of electronic unit: 0.01 pH±l bit / 3h
12. Size: (length × width × height, mm): 290×210×95
13. Weight, kg：1.5kg
14. Normal working conditions:

a) Ambient temperature: (5～40)℃;

b) Relative humidity: ≤85%;

c) Power supply：220V 50Hz

d) There is no vibration which affects performance nearby.

e) There is no corrosive gas nearby.

f) There is no magnetic interference except field.

2.1.4 Keyboard

The meter has 5 operating keys.

"pH/mV": Double-function key. In measuring state, press once to enter "pH measuring state", press again to enter "mV measuring state"; it is cancel key when set temperature, E0 and slope, press this key to exit function module and back to measuring state.

"E0": Press this key to adjust E0 value, "△" to increase, "▽" to decrease.

"Slope": Press this key to adjust slope value, "△" to increase, "▽" to decrease.

"Temp": Press this key to adjust temperature value, "△" to increase, "▽" to decrease.

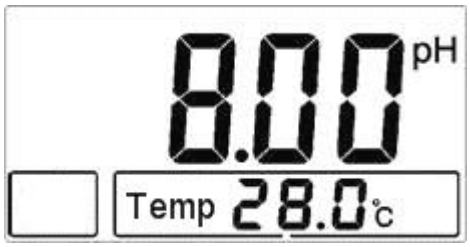
Enter: Press this key to confirm last operation.

III.Operations

3. 1 Turn On

Properly installed and maintained is the first place for successful operation. Before turning on, make sure the meter is well grounded. The probe connection must be reliable to prevent the invasion of corrosive gas.

Connect the meter with power and turn it on. The meter enters measuring state shown as below. Heat up the meter for 30 minutes to do measurement.



The diagram of starting interface

In which: Above the screen is the current pH value, the below is setting temperature. In measuring state, press “mV/pH” key to switch between potential and pH value. Press “Temp” to set current temperature. Press “Position” and “Slope” to calibrate electrode slope.

1. In order to maintain the instrument and achieve better performance, check electrode socket each time before power on. Make sure sockets are connected with short circuit or electrode to avoid damage of high resistance.
2. When the instrument is not in use connect short circuit to avoid damage of open circuit.
3. To ensure the accuracy of instrument, heat the instrument for 30min.

3.2 Function Set

- **Set Temperature**

If users need to set temperature, measure the temperature of tested solution with thermometer, and press “Temp △” or “Temp ▽” key to make the screen displays the temperature of tested solution. Then press ‘Enter’ to confirm current temperature or press “pH/mV”’ to back to measuring state.

- **The preparation of pH electrode**

1. Remove the protective cover (13) of pH electrode, and pull down the rubber case of electrode to expose the upper small hole.
2. Rinse the electrode with DI water.

3.3 To Calibrate pH electrode

Calibrate electrode first before using the instrument. Generally for continuous measuring, the instrument should be calibrated everyday “E0” key for one point calibration and “Slope” key for two-point calibration.

The instrument must finish “E0” calibration before “Slope” calibration. Otherwise, the “Slope” key is invalid.

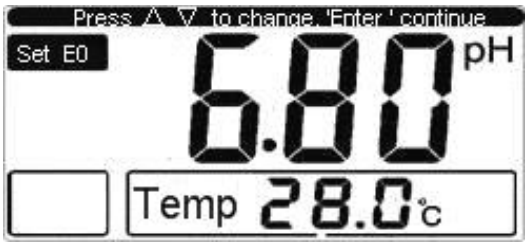
If users need to calibrate, adjust the displayed pH value to the standard pH value in calibrating state of that temperature, then press “Enter”.

- **One point calibration**

  One point calibration is one point positioning, calibrate E0 with one kind of standard buffer solution and the electrode slope is 100%. This method is simplify and suitable for low precision measurement

After one point calibration, the instrument will automatically delete last titration data and the default slope is 100%.

1. In measuring state, wash the electrode with distilled water and put it into buffer solution (such as buffer solution pH=7.00).
2. Measure the temperature of the solution with thermometer and set temperature value as previous method.
3. After the reading becomes stable, press “E0 △” or “E0 ▽” to adjust the displayed value as the standard pH value of that temperature.



Then press ‘Enter’ to complete one point calibration. If users want to give up calibration, press “pH/mV” key to exit calibration state and back to current measuring state.

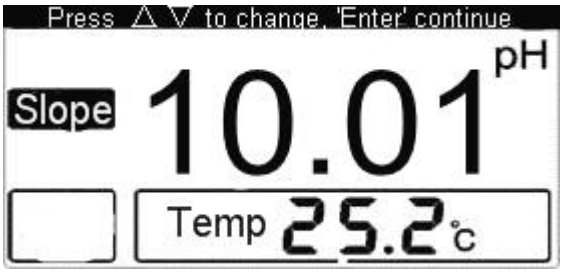
- **Two-point calibration**

  Generally, we use two-point calibration to calibrate the electrode slope.

  1. Prepare two kinds of standard buffer solution, such as 7.00pH, 10.01pH;
  2. One-point calibrate according to previous method: That is: In measuring state,

wash the electrode with distilled water and put it into buffer solution 1 (such as buffer solution pH=7.00). Measure the temperature of the solution with thermometer (such as 25℃), and set temperature value as previous method. After the reading becomes stable, press “E0 △” or “E0 ▽” to adjust the displayed value as the standard pH value of that temperature. Then press ‘Enter’ to complete calibration.

3. Then, rinse the electrode again and put it into buffer solution 2 (such as buffer solution pH=10.01). Measure the temperature of the solution with thermometer (such as 25.2 ℃) and set temperature value. After the reading becomes stable, press “Slope△” or “Slope▽” to adjust the displayed value as the standard pH value of that temperature, such as 10.01pH. Then press ‘Enter’ to complete calibration.



Then press “Enter” to back to measuring state.

The instrument must finish “Position” calibration before “Slope” calibration. Otherwise, the “Slope” key is invalid.

3.4 To measure pH

After the instrument has been calibrated, it can be used to measure test solution. Whether the temperature of test solution and standard buffer solution are the same can cause different measurement procedure.

- **When the test solution is as same as the buffer solution**

1. Rinse the head of electrode with DI water, and rinse it again with test solution.

2. Immerse the electrode into test solution and stir the solution with glass stirring rod to make the solution evenly. Read the pH value on the screen.

- **When the test solution is different from the buffer solution**

1. Rinse the head of electrode with DI water, and rinse it again with test solution.

2. Measure the temperature of test solution with thermometer.

3. Press “Temp” to make the screen display as solution’s temperature. Then press “Enter” key.

4. Immerse the electrode into test solution and stir the solution with glass stirring rod to make the solution evenly. Read the pH value of test solution.

3.5 To measure potential (mV value)

1. Put measuring electrode (ion selected electrode or mental electrode) and reference electrode on electrode holder.

2. Rinse the head of electrode with DI water, and rinse it again with test solution.

3. Insert ion electrode into measurement socket (6).

4. Insert reference electrode into reference socket (7).

5. Immerse these two kinds of electrodes in test solution and stir evenly. The screen will display the potential value (mV) of ion selective electrode as well as the positive and negative polarities.

6. When measure electrode potential with mental electrode to, insert Q9 socket (with clip) into measurement electrode socket (6) and connect the clip with mental electrode's wire. Or Use electrode converter, insert one side of the converter into measurement electrode socket (6) and connect another side with the mental electrode. Insert reference electrode into reference electrode socket (7).

Note: Electrode converter is optional accessory, only for additional purchase.

3.6 Turn off

After operation, press "On/Off" to turn off the meter. Immerse electrode into DI water when finish measurement. If for long-term not in use, please note:

1. Power off!

2. Keep the instrument interface clean, dry, and avoid contact with acid, alkali, salt solution.

3. Insert short circuit when the instrument is not in use to avoid open circuit damage.

4. Store electrode in reference filling fluid after measurement. For long term not in use, store in box at room temperature.

IV.Maintenance and Service

4.1 Maintenance

Regularly correct operations and maintenances can ensure a good performance. Especially instruments like pH meters require more reasonable maintenances because these instruments have very high input impedance and the operation environment is regular expose to chemical medicines.

- Keep the Input end (measurement electrode socket 6) dry and clean. When not in use, insert Q9 short-circuit to prevent dust and moisture.

- The electrode converter (options) is designed for the use of other electrodes, usually moistureproof and dustproof.
- When measuring, remain the wire of the electrode still, otherwise it will cause unstable measurement.
- The instrument used by power supply should be good grounding.
- The instrument adopt MOS integrated circuit, so ensure the soldering iron have good grounding during maintenance.
- When using a buffer solution calibration instruments, to ensure the reliability of the buffer solution, can't match wrong buffer solution, otherwise will lead to produce error measurement results.

4.2 Usage and Maintenance of Electrode

- The electrode must be calibrated with known standard buffer solution before operation, and the pH of test solution should be closer to the pH buffer solution.
- Remove the electrode cover, avoid the contact of electrode sensitive glass bulb with hard objects, because any broken or abraded will make electrode invalid.
- After measurement, put on protective cover timely. There should be a few reference filling liquid in protective cover to keep the electrode bubble wet, must avoid immerse in DI water.
- The outer reference filling liquid of combination electrode is KCl solution for 3 mol/L. Add fluid from the upper hole. When not in use, pull on the rubber case to prevent liquid dry up.
- Keep the electrode terminal clean and dry, absolutely prevent short circuit on both ends of the output, otherwise will lead to misalignment or failure measurement.
- To maintain good performance, match the electrode with pH meter of high input impedance (≥1012 Ω) .
- Avoid long-term immersion in DI water, protein solution, acid and fluoride solution.
- Avoid contact with the organic silicone oil low.
- After long-term usage, if found that the slope is slightly lower: immerse the bottom of electrode in 4% HF (HF) in (3 ~ 5) s, rinse with DI water, and then immerse in 0.1mol/L hydrochloric acid solution soak to renew electrode.
- If there are substances that can pollute sensitive bulb or block liquid junction in test solution, the electrode will be passivation and the slope is reduced, the display reading no phenomenon. Users should use appropriate cleaning solution to renew electrode according to the nature of pollutants,

1: Do not choose cleaning solutions like carbon tetrachloride, trichloroethylene, and tetrahydrofuran that can dissolve polycarbonate resin, because the electrode shell is made of polycarbonate resin. The dissolution of polycarbonate resin will easily pollute sensitive glass bulb, so that the electrode is invalid. Also, do not use combination electrodes to measure the solutions above.

2: When using pH combination electrode, the most common problem is the liquid junction of reference electrode, the congestion of liquid junction is the main reason for the error.

4.3 Electrode contaminant and cleaning solution

Contaminant	Cleaning Solution
Norganic metal oxides	Dilute acid< lmol/L
Organic oils	Diluted detergent (weak alkaline)
Resin polymer material	Alcohol, acetone, ethyl ether
Protein blood deposit	5% pepsin + 0.1 mol/L Cl solution
Pigment material	Dilute bleaching solution, hydrogen peroxide

4.4 Troubleshooting

1. If the screen does not display when supplied with power, check whether there is voltage output.
2. Plug in the short circuit plug when the meter is not used in case of dust and humidity.
3. Ensure the meter is in good ground connection in case of corrosive gas.
4. If the meter still does not work well when the previous situations are eliminated, contact the relevant departments.

V .Packing List

No.	Item	Qty
1	pH combination electrode	1
2	Electrode Holder	1
3	Power Liner	1
4	pH Standard Buffer powder	Each/5
5	Fuse	2
6	Protective Caver	1