

3600

Bench top pH Meter



OPERATION GUIDE

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3600 Bench Top pH Meter

1. INTRODUCTION

The 3600 is a microprocessor controlled pH and Redox measurement instrument. The unit utilizes a multifunction LCD to display readings and provide feedback to the user. Instrument configuration utility electrode holder make the operation more convenient. It can be used to measure the pH, ORP value of the solution in colleges and universities, hospital, research institutes, environmental monitoring laboratory, industrial and mining enterprises and other departments

2. TECHNICAL SPECIFICATIONS

- (1) Ranges of measurement: 0.00~14.00PH / 0~±1000mV / 0~100℃
- (2) Resolution: 0.01 pH, 1 mV, 0.1℃
- (3) Accuracy: ±0.2 % PH / ±0.1 % mV / ±0.2℃
- (4) Linearity: ±0.2% of range
- (5) Repeatability: ±0.2% of range
- (6) Temperature compensation type: Auto / manual 0℃ to 100℃
- (7) Electronic unit input current: $\leq 2 \times 10^{-12} \text{A}$
- (8) Electronic unit input impedance: $\geq 1 \times 10^{12} \Omega$
- (9) Dimensions (l*b*h): 240 × 180 × 70 mm
- (10) Weight: 1.0 kg
- (11) Ambient Operating temperature: 0~55℃
- (12) Humidity: ≤95%
- (13) Power supply: DC9V, using AC adapters, AC220V, 50Hz

3. INSTRUMENT STRUCTURE

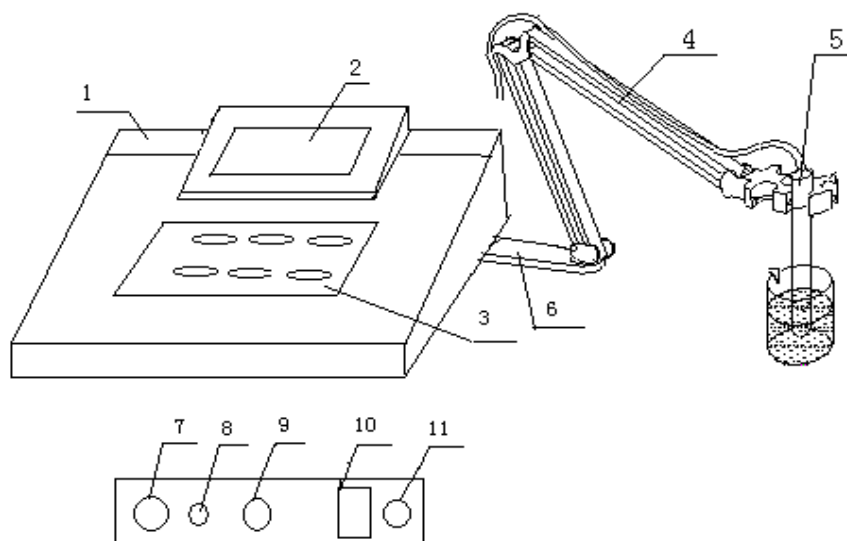


Figure 1 : instrument structure

The front of instrument

- 1----- Host
- 2----- Display screen
- 3----- Keyboard
- 4----- Electrode holder
- 5----- Electrode
- 6----- Electrode pedestal

The back of instrument

- 7----- Measuring electrode socket
- 8----- Spare
- 9----- Temperature electrode socket
- 10----- Power switch
- 11----- DC 9V power socket

Keyboard instruction

Button	Function
pH/mV	"pH/mV" switch button, pH and mV measuring mode switch
TEMP SET	"Temperature" button, to manually set the temperature. When the temperature electrode is access it is automatic temperature compensation, this button doesn't work.
CAL	"Calibration" button, do the 2 points calibration for pH
△ UP	"UP" button, press the "△" to adjust the value to rise. Press this button in calibration condition to choose the value of the buffer(4.00, 6.86, 9.18)
▽ DOWN	"DOWN" button, press the "▽" to adjust the value to decline.
ENTER	"ENTER" button, press this button to confirm the previous step operation. Hold down the "confirm" button to open the power switch can restore the factory Settings.

4. SETTING AND OPERATION

The preparation before starting

- Electrode holder inserted into the electrode pedestal.
- PH composite electrode is installed on the electrode holder.
- PH electrode composite bottom electrode protection of condoms unplug, and pulled the rubber sleeve to form the upper holes at the top of the electrode
- Wash the electrode with distilled water

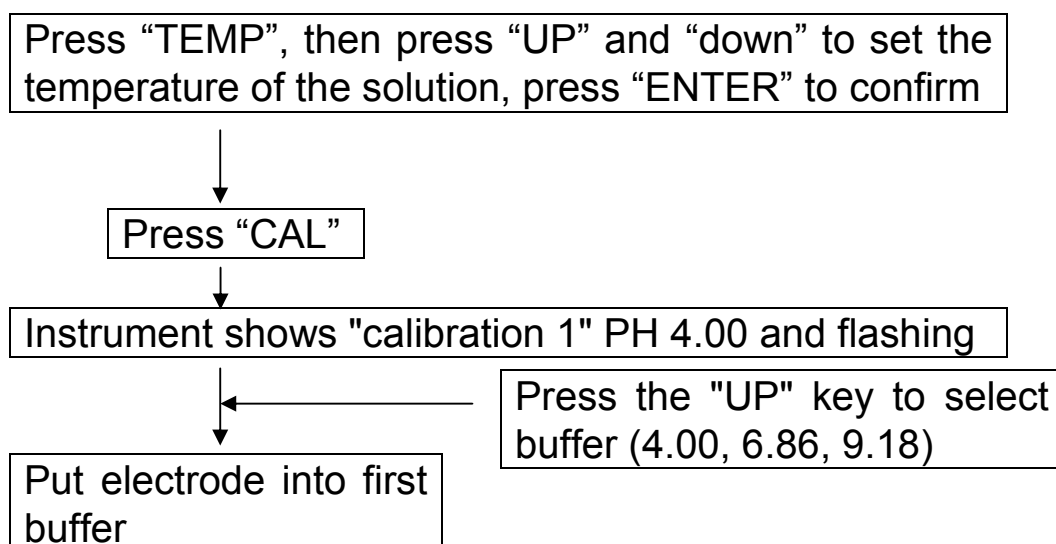
4.1 The Instrument Calibration

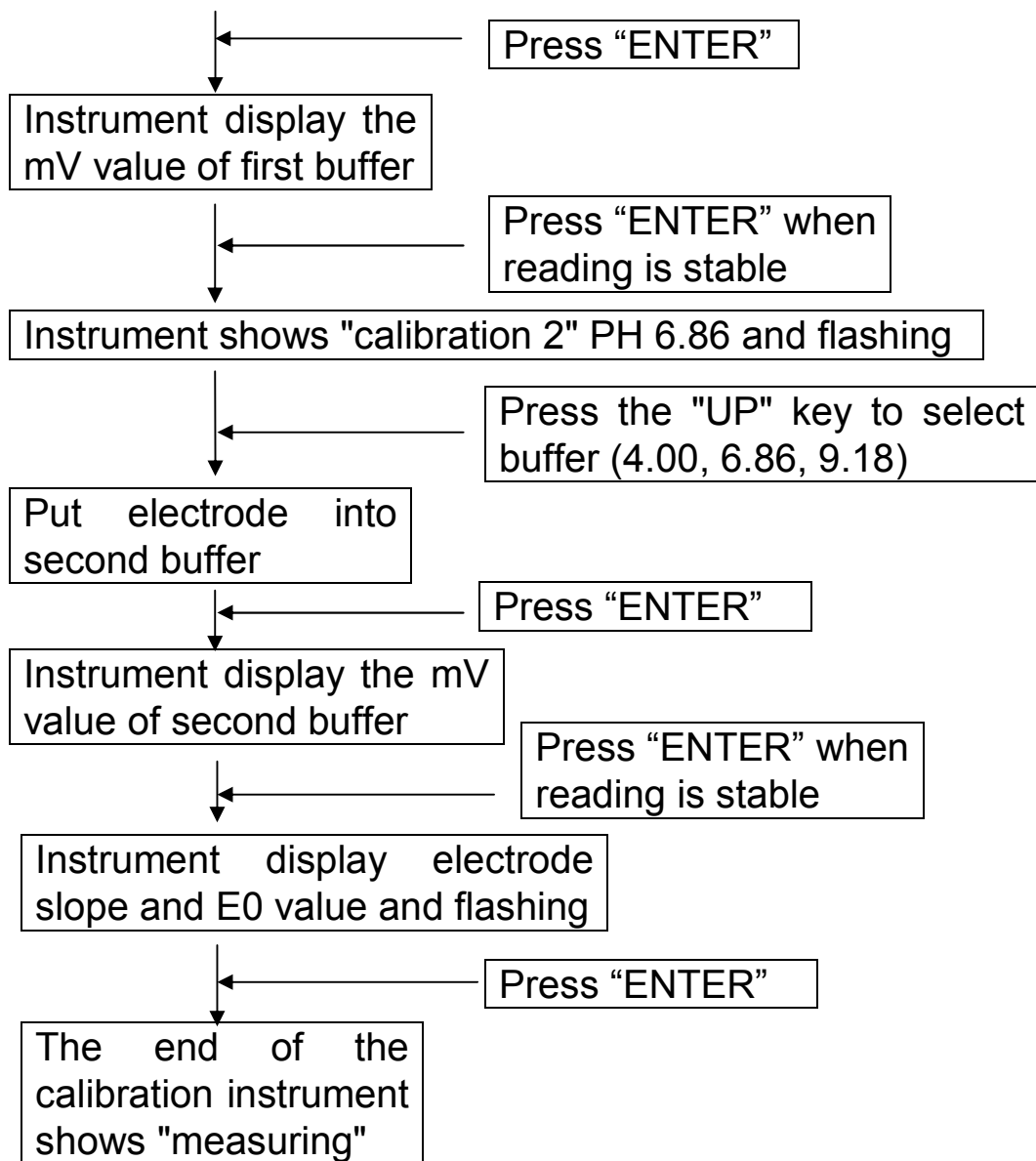
Please do the instrument calibration first before use. General, instrument in continuous use, need to be calibrated once a day.

- a) Pull out BNC short-circuit plug from measure electrode socket.
- b) Insert composite electrode in the measuring electrode socket.
- c) Open the power switch, press the "pH/mV" button start PH measurement state.
- d) The instrument adopts two point calibration method
- e) Press the "TEMP", enter into the temperature adjustment state, the temperature display position, press the "UP" key or "DOWN" key to adjust the temperature display numerical rising or falling, uniform temperature display value and solution temperature, and then press "ENTER" button, confirm back to pH after solution temperature measurement state (Temperature setting key doesn't work in mV measurement condition)

Note: when the temperature electrode is access, "TEMP" button doesn't work, the instrument into the automatic temperature compensation, the temperature of the display is the solution

The flow chart of instrument calibration





temperature (Temperature electrodes need to be purchased).

- f) Press the "CAL" button, at this point the "calibration 1" "4.00" and flashes, press the "UP" key at this time you can choose different standard buffer (4.00, 6.86, 9.18) one of three kinds of standard solution. Now choose PH = 6.86 standard buffer liquid, with distilled water or deionized water to clean the electrode inserted into the standard buffer solution PH = 6.86, press the "ENTER" key, the instrument shows mV values of the liquid, after waiting for mV reading stable press "ENTER" button, display "calibration 2", "9.18" and flashing, press the "UP" key to

choose the second standard liquid (4.00, 6.86, 9.18) in another. Now select PH = 9.18 standard liquid, with distilled water or deionized water cleaning of electrodes in PH = 9.18 standard buffer solution, and then press "ENTER" button, instrument show mV values of the fluid, after waiting for mV reading stable press "ENTER" button, display electrode slope (large number) and E0 value (small number below) and flashing, press the "ENTER" key end of calibration, instrument display "measure" the measurement state. If instrument slope position show "1----" or greater than the theoretical value indicates calibration error, please check whether the electrode failure or standard liquid whether make a mistake.

Note: the user can according to the slope of the electrode to judge the performance of the electrode, electrode slope in generally range (0 ~ 60 °C) about (54 ~ 66) between the mV, and the ratio of the slope value theory under 75% when the need to replace the electrodes. Theory of slope $S = 59.15 \times (273 + t) / 298$, t for the solution temperature.

- g) After clean with distilled water, the electrode can be used to test solution.

In general, the instrument does not need to calibrate within 24 hours.

4.2 Measuring the pH value

After the calibration of the instrument, can be used to measure and test solution. According to whether the temperature of calibration solution and test solution is the same, the measuring steps is also different. The specific steps are as follows:

- (1) The temperature of calibration solution is the same as test solution,

the measuring steps is as follows:

- a) Wash the electrode head with distilled water, and then wash again with the test solution.
- b) Immerse the electrode in the test solution, stirring solution with a glass rod, make it uniform, read the pH reading of the solution on the LCD screen.

(2) The temperature of calibration solution is different from test solution, the measuring steps is as follows:

- a) Wash the electrode head with distilled water, and then wash again with the test solution.
- b) Use a thermometer to measure the temperature of the test solution.
- c) Press "TEMP", the instrument into the solution temperature settings ("°C" temperature unit display at this time), press "UP" or "DOWN" to adjust the temperature display numerical rise or fall, make temperature display value and temperature value consistent test solution, and then press "ENTER" button, return to the pH measurement state after instrument determine the solution temperature.
- d) Immerse the electrode in the test solution, stirring solution with a glass rod, make it uniform, read the pH reading of the solution on the LCD screen.
- e) If use the automatic temperature compensation, just need to put the temperature electrodes and the test electrode into the solution at the same time.

4.2 Measuring the mV value

- a) Open the power switch, press the "pH/mV" button enter into mV measurement state.
- b) Insert ORP electrode in the measuring electrode socket.

- c) Wash the electrode head with distilled water, and then wash again with the test solution.
- d) Immerse the ORP electrode in the test solution, stirring solution with a glass rod, make it uniform, read the mV reading of the solution on the LCD screen.
- e) If the measured signal is beyond the scope of instrument measurement (display), or sensor is open circuit, it will be displayed "1----" mV, as the overload alarm.

5. MAINTENANCE

Instruments frequently correct use and maintenance, to ensure the instrument normal and reliable to use, especially the pH meter this kind of instrument, it has the very high input impedance, and using the environment to be often contact chemicals, so it need more reasonable maintenance.

- 1, The input port of the instrument (measuring electrode socket) must be kept dry and clean. When instrument is not in use, insert the plug of BNC short-circuit outlet, to prevent dust and moisture get in.
- 2, When in measuring, the electrode wire should remain still, otherwise it will cause unstable measurement.
- 3, Instrument used MOS integrated circuit, so it should be to ensure that the soldering iron have good grounding when in repairing.
- 4, When using the buffer solution to calibrate instruments, please ensure the reliability of the buffer solution, don't make the wrong buffer solution, otherwise will lead to a measurement error.

6. MAKE PH BUFFER

- 1, PH4.00 solution: use GR Potassium biphthalate 10.12g, dissolved in 1000 ml of high-purity deionized water.

- 2, PH6.86 solution: use GR Potassium Phosphate Monobasic 3.387g, GR Dibasic Sodium Phosphate 3.533g, dissolved in 1000 ml of high-purity deionized water.
- 3, PH9.18 solution: use GR Borax 3.80 g, dissolved in 1000 ml of high-purity deionized water.

Note: To make 2, 3 solution, should boil in advance (15 ~ 30 min), remove dissolved carbon dioxide in the water. Should avoid contact with the air in the cooling process, in order to prevent the pollution of carbon dioxide.

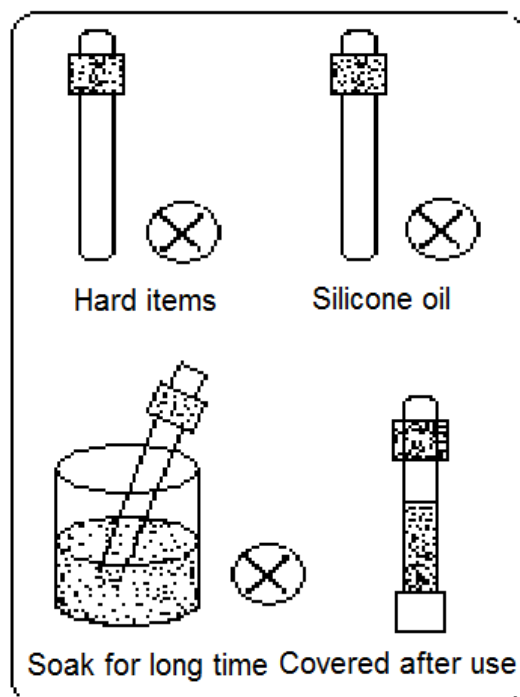
Buffer solution pH value and temperature relationship table

Temperature °C	0.05mol/kg Potassium biphthalate	0.025mol/kg Phosphorous salts mixture	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

7. USE AND MAINTENANCE OF PH ELECTRODE

- 1, Before the electrodes in measuring must use the known pH value standard buffer solution to calibrate.

- 2, Before the next operation after each calibration, measurement, the electrode should be cleaned with distilled water or deionized water full, and be cleaned with test liquid again.
- 3, Remove the electrode sheath, should avoid sensitive glass bulb of electrode touch with the hard objects, because any broken or abraded will make electrode disable.
- 4, After measuring, electrodes should be put in the protect cover timely, the electrode cover should have a small amount of saturated KCL solution, in order to keep the electrode ball bubble being wet, avoid by soaking in distilled water.
- 5, The external reference of composite electrode added liquid potassium chloride solution for 3 mol/L, can supplement fluid from the upper electrode hole to join, composite electrode when not in use, cover rubber plug, added to prevent liquid dry up.
- 6, Electrode terminal must be kept clean and dry, absolutely prevent short circuit on both ends of the output, otherwise will lead to a measurement misalignment or failure.
- 7, Electrodes connect with pH meter which has high input impedance of ($3 \times 10^{11} \Omega$) or higher, to keep a good feature.
- 8, Electrode should avoid long-term immersion in distilled water and acid, protein solution fluoride solution.



- 9, Electrode should avoid touch with organic silicone oil.
- 10, Electrode after long-time use, if found that the slope is slightly lower, can soak the bottom of electrode in 4% HF in (3 ~ 5) s, washed with distilled water, and then soak in 0.1mol/L hydrochloric acid solution, to make it renew. But best is to replace electrodes.
- 11, In the test solution such as sensitive vulnerable ball bubble or clog the liquid junction material and make the electrode passivation, there will be a slope is reduced, the display reading no phenomenon. If this phenomenon occurs, should according to the nature of pollutants, with appropriate cleaning solution, to make electrode renew.

Note1: When choosing cleaner, can't use carbon tetrachloride, trichloroethylene and tetrahydrofuran can dissolve the carbonic acid resin cleaning fluid, because the electrode shell is made of poly carbonate resin, it dissolves easily pollution sensitive glass ball bubble, so that the electrode failure. Can't use composite electrodes to measure the solution. At this time, please choose 65-1 type glass shell pH composite electrode.

Note2: In PH composite electrode using, the most prone to problem is

outside the liquid junction of reference electrode, liquid junction of congestion is the main reason for the error.

8. POLLUTANTS AND DETERGENT REFERENCE TABLE

Pollutants	Cleaner
Inorganic metal oxides	Below 1mol/L dilute acid
Organic oils	Diluted detergent (weak alkaline)
Resin polymer material	Alcohol, acetone, ether (glass ball bubble cleaning)
Sediment protein in blood	5% pepsin + 0.1 mol/L HCl solution
Pigment material	Dilute bleaching solution, hydrogen peroxide

9. WARRANTY

Products manufactured by GOLDPOINT company Ltd. are guaranteed for a period of one year from the date of delivery. Goods for attention under guarantee must be returned to the factory carriage paid and, if accepted for free repair, will be returned to the customer's address free of charge.

All sensors made by GOLDPOINT company Ltd. are thoroughly tested to their published specification before delivery. As we have no control over the conditions in which their sensors are used, no further guarantee is given.

10. STANDARD CONFIGURATION

- Bench Top pH monitor 3600
- pH electrode
- AC220V to DC9V power adapter
- Multi-function electrode frame
- pH buffer (4.00, 6.86, 9.18)
- Operation guide
- Inspection report