P-510 pH Meter

User Manual

PEAK INSTRUMENTS
Version 1801

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CONTENTS

I. General Information

Thanks for using P-510 pH meter. In order to help you operate and maintain the instrument properly, please read the user manual before using it. We reserve the rights to update the manual and its parts subject to the purpose of improving the instrument's performance.

This instrument combines the technologies of advanced electronics, sensors and software design, which can be used to test the pH value, temperature and other parameters of water solutions. This portable tablet pH meter is very suitable for industrial and mining enterprises, power plant, environment protection, etc., especially suitable for outdoor purpose.

This pH meter has built-in microprocessor chip with beautiful design, variable functions and the following features:

1. Built-in microprocessor chip, with automatic calibration, automatic or manual temperature compensation, data storage, function settings, automatic shutdown and low voltage alarm and other intelligent functions. Easy to use.

2. Digital filtering and slip techniques are used to improve meter's response speed and data accuracy. The symbol of "☺" is displayed when the measured value is stable.

3. Equipped with new type of pH electrode and temperature probe and have automatic and manual temperature compensation functions, which make the measurement more accurate and operation easier.

4. Automatic recognition of 15 buffers with three kinds of options: European & USA, NIST and China. Support 1, 2 or 3 point calibration.

5. The circuit board adopts Surface Mounted Technology to improve the reliability of product processing.

6. White backlit LCD screen.

7. IP57 waterproof and dustproof.

II. Specifications

pH

Measuring Range	(-2.00～19.99) pH
Resolution	0.1/0.01 pH
Accuracy	Electrode: ±0.01pH, Instrument: ±0.02 pH
Input Current	≤2×10^{-12} A
Input Impedance	≥1×10^{12} Ω
Stability	±0.01 pH/3h
Temperature Compensation	(0～100)℃ (automatic/manual)

mV

Measuring Range	-1999 mV～0～1999 mV
Resolution	1mV
Accuracy	±0.1%FS

Others

Data Storage	150 sets
Storage Contents	Series number, measuring value, unit, temperature
Power	Two pieces of AA battery
Size & Weight	165×90×32 mm/310g
Certificate	ISO, CE

Working Conditions

Ambient Temperature	5～35℃
Humidity	≤85%
IP Grade	IP57

III. Device Instructions

1. Display indicators

① Parameter mode tag
② Measurement value
③ Data storage and replay number and symbol. Indicator of special status. M+ is symbol for data storage. RM is data replay icon.
④ Measurement unit
⑤ Temperature and unit
⑥ Stability symbol
⑦ Calibration indicators
⑧ Low voltage symbol, when the voltage is lower than 2.6V, the symbol will be shown to remind customer for battery change.

2. Operation Keys

There are seven operating buttons

2.1.  On/off button, it is used to switch on/off the device in measuring mode. This key is not working in other modes.

2.2. 

Calibration key.

2.2.1. Press this button to enter calibration mode in measuring mode.

2.2.2. Press this key to back in other modes.

2.3. 

Function key. In measuring mode, short press(less than 1.5 seconds) this

key to change measuring unit between pH and mV.

2.4. 

Backlight and delete key.

2.4.1. In measuring mode, short press(less than 1.5 seconds) this key to turn on or off backlit.

2.4.2. When viewing saved data, long press(more than 5 seconds) this key to delete saved data.

2.5. 

Increase and data view key. 

Decrease and data saving key.

2.5.1. In measuring mode, short press(less than 1.5 seconds) 

to save records, short press(less than 1.5 seconds) 

to view saved records.

2.5.2. 

and 

are used to change parameters under setting mode.

2.6. 

Set and Confirm/return key

2.6.1. In measuring status, long press(more than 2 seconds) to enter parameter settings.

2.6.2. Short press(less than 1.5 seconds) to confirm current selection in other status.

3. Save, view and delete data.

3.1. Data save. In measuring status, when the reading is stable and shows symbol ☺, short press(less than 1.5 seconds) 

to save records, the screen will show “M+” and storage number. The device can save 150 sets of records totally.

3.2. Data view.

3.2.1. In measuring status, short press(less than 1.5 seconds) 

to view the newest saved record of the current unit, and right upper corner will show symbol “RM”. Continue press 

or 

to replay all saved records.

3.2.2. In view status, press 

to return to measuring mode.

3.3. Delete data

In data viewing mode, long press (more than 5 seconds) 

and screen displays 

for two seconds, which means all saved data is deleted already and back to

measuring mode.

IV. pH Measurement

1. Preparations

1.1. Press  to switch on device, then press  to choose pH measuring mode.

1.2. Check if the glass bulb of pH combined electrode is moist and complete. If the bulb is broken, then the electrode will not work, if the bulb is too dry, it should be soaked in saturated KCL solution for 24 hours.

1.3. Connect pH electrode and temperature probe to its right ports.

2. Calibration

2.1. Press  to enter calibration mode, the screen will show C1 to indicate first point calibration.

2.2. Wash pH and temperature electrodes in pure water and make them dry, dip the electrode in the pH 6.86 buffer solution, shake the electrode and let it be static until the reading is stable (the symbol ☺ will be shown on the screen), then press  and display shows 6.86, next press  to confirm the first point calibration, the screen will show C2 to indicate second point calibration or press  to quit calibration mode.

2.3. Wash pH and temperature electrodes in pure water and wave them dry, dip the electrode in the pH 4.00 buffer solution, shake the electrode and let it be static until the reading is stable (the symbol ☺ will be shown on the screen), then press  and display shows 4.00, next press  to confirm the second point calibration, the screen will show C3 to indicate the third point calibration or press  to quit calibration mode.

2.4. Wash pH and temperature electrodes in pure water and make them dry, dip the electrode in the pH 9.18 buffer solution, shake the electrode and let it be static until

the reading is stable(the symbol ☺ will be shown on the screen), then press OK and display shows 9.18, next press OK to confirm the third point calibration and quit calibration mode and enter measuring mode, "Ⓛ Ⓜ Ⓗ" will be shown on the right bottom and means the instrument is calibrated at three points.

2.5. Calibration instructions

2.5.1. This instrument has one point, two point or three point calibration, after the first point calibration is finished, press CAL to quit calibration mode and enter measuring mode, "Ⓛ" will be shown on the left bottom. When measurement accuracy is no more than ±0.1pH, choose one buffer solution to calibrate one point is enough according to the measurement range.

2.5.2. When the second point calibration is finished, press CAL to quit calibration mode and enter measuring mode, the symbol of two point calibration "Ⓛ Ⓜ" will be shown on the bottom left screen. If you only measure acidic solutions, then choose pH 4.0 & 6.86 buffers for calibration. If you only measure alkaline solutions, then choose pH6.86 & 9.18 buffers for calibration.

2.5.3. If the measurement range is wide or the pH electrode is ageing after a long time, three point calibration is required, which will lead to higher accuracy. For the first time use of a new pH electrode, it must be calibrated at three points and adjust the slope of the instrument same as the pH electrode.

3. pH Solution Measurement

Wash the pH electrode & temperature electrode and wave them dry, put them into the solution, shake the electrode and let it be static, then wait until the reading is stable and the symbol ☺ appear on the screen, then the reading is its pH value.

NOTE: Based on principle of isothermal measurement, the closer of the temperature of tested solution with that of buffer solution, the more accurate of the measurement, please obey this rule when doing the test.

4. Parameter setup

4.1. Table of pH meter parameter setup

Indicator	Description	Remarks
P1	Manual temperature compensation setup	(0-99.9)℃
P2	pH resolution setup	0.1pH/0.01pH
P3	pH buffer setup	CH, USA, NIST
P4	Temperature unit setup	℃ ℉
P5	Ammonia pure water compensation setup	OFF, ON
P6	Backlight time closing setting	0-20min or 0 stands for this function is not working
P7	Automatic shutdown time setting	0-20min or 0 stands for this function is not working
P8	System restore setup	OFF or ON

4.2. Manual temperature compensation setting(P1)

4.2.1. Long press OK to enter set mode

Then press OK to enter P1.

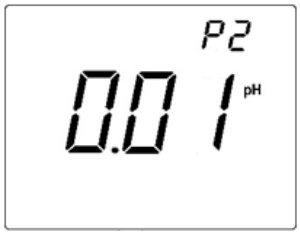
4.2.2. Press RM or M+ to change temperature. Long press these keys to change the figures continuously. Press OK to confirm the change and back.

4.2.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.3. Resolution setting(P2).

4.3.1. Press RM to choose P2 in mode P1,

Then press OK to enter P2.



4.3.2. Press RM or M+ to select resolution between 0.1 and 0.01. Press OK to confirm the change and back.

4.3.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.4. pH standard buffer setting(P3)

4.4.1. Press RM to choose P3 in mode P2,

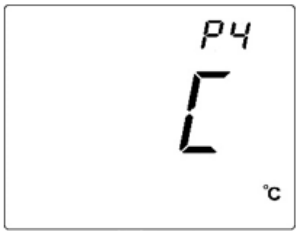
Then press OK to enter P3.

4.4.2. Press RM or M+ to select buffer standard. There are three standards: USA, NIST and China. Press OK to confirm the change and back.

4.4.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

CH: 1.68 pH, 4.00 pH, 6.86 pH, 9.18 pH, 12.46pH
NIST: 1.68 pH, 4.01 pH, 6.86 pH, 9.18 pH, 12.45pH
USA: 1.68 pH, 4.00 pH, 7.00 pH, 10.01 pH, 12.45pH

4.5. Temperature unit setting(P4)



4.5.1. Press RM to choose P4 in mode P3,

Then press OK to enter P4.

4.5.2. Press RM or M+ to select temperature unit ℃/℉. Press OK to confirm the change and back.

4.5.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.6. Pure water or ammonia pure water compensation setting(P5)

4.6.1. Press RM to choose P5 in mode P4,

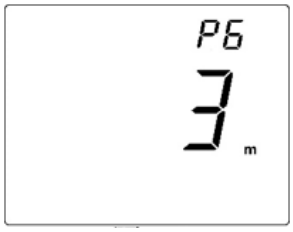
Then press OK to enter P5.

4.6.2. Press RM or M+ to select compensation mode, “OFF” mean no compensation, “H2O” mean pure water compensation, “NH3” mean ammonia pure

water compensation. Press OK to confirm the change and back.

4.6.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.7. Auto shutdown timer of backlight(P6)



4.7.1. Press RM to choose P6 in mode P5,

Then press OK to enter P6.

4.7.2. Press RM or M+ to choose auto shutdown time of backlight. Press OK to confirm the change and back.

4.7.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.8. Auto shutdown timer setting of the device(P7)

4.8.1. Press RM to choose P7 in mode P6,

Then press OK to enter P7.

4.8.2. Press RM or M+ to set the automatic shutdown time of the device. Press OK to confirm the change and back. “0” means disabling this function.

4.8.3. Press RM to enter next parameter setting or press CAL to back to measuring mode.

4.9. Restore default settings(P8)

4.9.1. Press RM to choose P8 in mode P7,

Then press OK to enter P8.

4.9.2. Press RM or M+ to choose “On” and confirm by pressing OK and “888”

blinks on the screen, which means it is restored to default settings. Press CAL to back to measuring mode.

4.9.3. Be careful to use this function, because all saved data will be removed once restored to default settings.

5. Notes

5.1. Times to be calibrated depend on test sample, electrode and measurement accuracy. For high accuracy test (≤±0.02pH), it should be calibrated in time with high accuracy buffers. For normal accuracy measurements (≥ ±0.1pH), after being calibrated one time, it can be used for one week or even longer.

5.2. The instrument should be calibrated again in the following situations.

5.2.1. For new electrode and the one that has not been used for a long time.

5.2.2. After testing strong acidic solution(pH<2) or strong alkaline solution(pH>12). **For strong acid or alkaline solution, glass electrode is recommended.**

5.2.3. After testing fluoride solution or high concentration organic solution.

5.2.4. The temperature difference is big for the tested solution and calibration solution.

5.3. There is electrode immersion solution in the protection bottle where the electrode probe is soaked and used to keep glass bulb moist and liquid interface activated. When to use it, just rotate the bottle cap, take out the electrode and wash it clean. After use, put it back to the bottle and tighten the bottle cap to prevent solution leaking. If the immersion solution is turbid or mouldy, please clean the bottle in time and change soaked liquid.

5.4. It is forbidden to be soaked long time in pure water, protein solution and acidic fluoride solution, and no contact with organic fat.

5.5. In order to increase measurement accuracy, the pH value of the standard buffer must be accurate which is used to calibrate the instrument.

5.6. Keep the instrument clean and dry, especially for the connection interfaces, otherwise the measurements will not be accurate or wrong.

5.7. The glass bulb can't touch solid things, any bulb damage will cause the electrode failure. The electrode should be washed before and after using it, then wave or absorb it dry, don't wipe it with paper tissue which will make the electric potential unstable and prolong response time. After the use in viscous sample, the electrode should be washed for a few time in order to remove sample stuck to the surface, or use suitable solvent to clean it.

5.8. After long use, the electrode will be passivated because the bulb is polluted or the

liquid interface is blocked, which will make the electrode sensitive gradient lower, response slow, reading inaccurate. The following methods could be used in different situations.

5.8.1. The glass bulb is passivated: Soak the bulb in 0.1mol/L dilute hydrochloric acid(add pure water into 9ml hydrochloric acid to 1000ml) for 24 hours, wash it with pure water, then soak it in electrode immersion solution for 24 hours. If passivation is serious, put the glass bulb in 4%HF (hydrofluoric acid) for 3-5 seconds, wash it with pure water, then soak it in electrode immersion solution for 24 hours.

5.8.2. Reference cleaning of glass bulb and liquid interface.

Contaminant	Detergent
Inorganic metal oxide	Less than 1mol/L dilute hydrochloric acid
Organic fat	Dilute detergent(alkalescent)
Resin polymer substance	Dilute alcohol, acetone, aether
Protein blood cell sediment	Acid enzyme solution(like Saccharated Yeast Tablets)
Pigment substance	Dilute bleach solution, hyperoxide

5.9. pH electrode can usually be used for one year, if the working conditions are very bad, being misused or in improper maintenance, its lifespan will be shortened. If the electrode is passivated or not working well, please replace it.

5.10. When the instrument is abnormal, please set P7 and restore default settings, then do the calibration and test.

6. Self-diagnosis information

The following symbols may appear during daily use, it is the self-diagnosis information which helps you understand some problems of the electrode or instrument.

6.1. Static -2.00 pH or -19.99pH means the measured value exceeds its measuring range. When electrode is not connected properly or in the air, it could happen and is normal.

6.2. "Err 1" means electrode zero potential is excess(<-60mv or >60mv).

6.3. "Err2" means electrode slope is excess(<50% or >105%). When the above error symbols appear, please do the following examinations.

6.3.1. Check if there are bubbles in the electrode bulb, if yes, please wave them away.

6.3.2. Check if the buffers spoil or there is big error for the buffers.

6.3.3. Restore the instrument to default settings and recalibrate it.

If the above methods can't solve the problems, please change the pH electrode.

V. mV measurement

1. Press  to switch on the instrument, press 

to choose mV measuring mode

2. Connected to ORP or ion composite electrode(optional). Wash it and wave it dry, put them into tested solution, stir the electrode and let it be static, then wait until the reading is stable and the symbol  appear on the screen, then the reading is its mV value.

VI. Packing list

Description	Number
P -510 pH meter	1 unit
pH electrode	1 piece
Temperature electrode	1 piece
Standard buffers(4.00, 6.86, 9.18pH)	1 set
AA Battery	2 pieces
User manual	1 copy