

PH60 Series Premium pH Testers

Instruction Manual

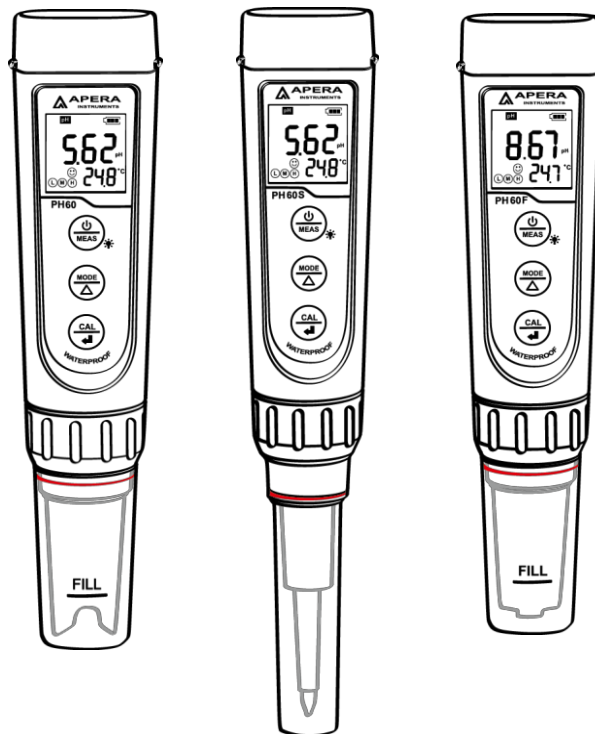
PH60 pH Tester



PH60S Spear pH Tester



PH60F Flat pH Tester



ISO 9001:2008



APERA INSTRUMENTS, LLC

www.aperainst.com

Thank you for purchasing the Apera Instruments PH60 Series Premium pH Tester. Please read this manual thoroughly before use in order to properly use the instrument and have a reliable testing experience. Apera Instruments reserves the rights to update the information of this manual without giving prior notices.

For video tutorials, please go to support.aperainst.com

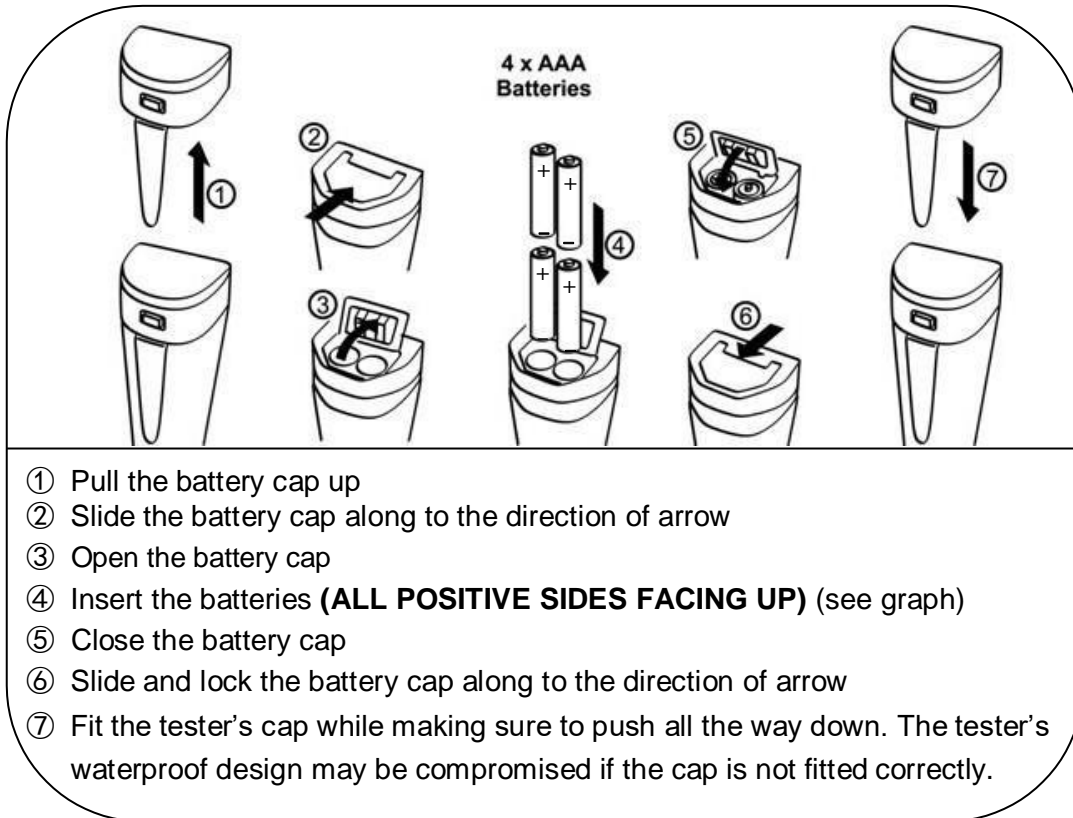
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1. Battery Installation

Please install batteries according to the following steps. *Please note direction of batteries:

All POSITIVE SIDES (“+”) FACING UP. (Wrong installation of batteries will cause damage to the tester and potential hazards)

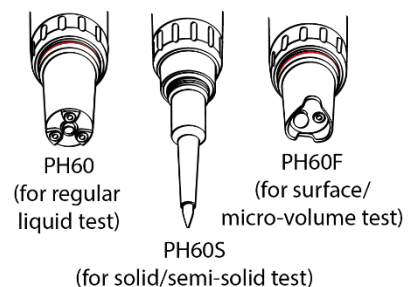
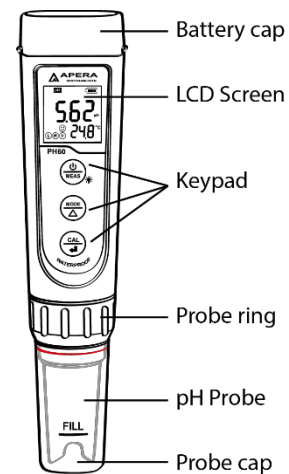


2. Keypad Functions

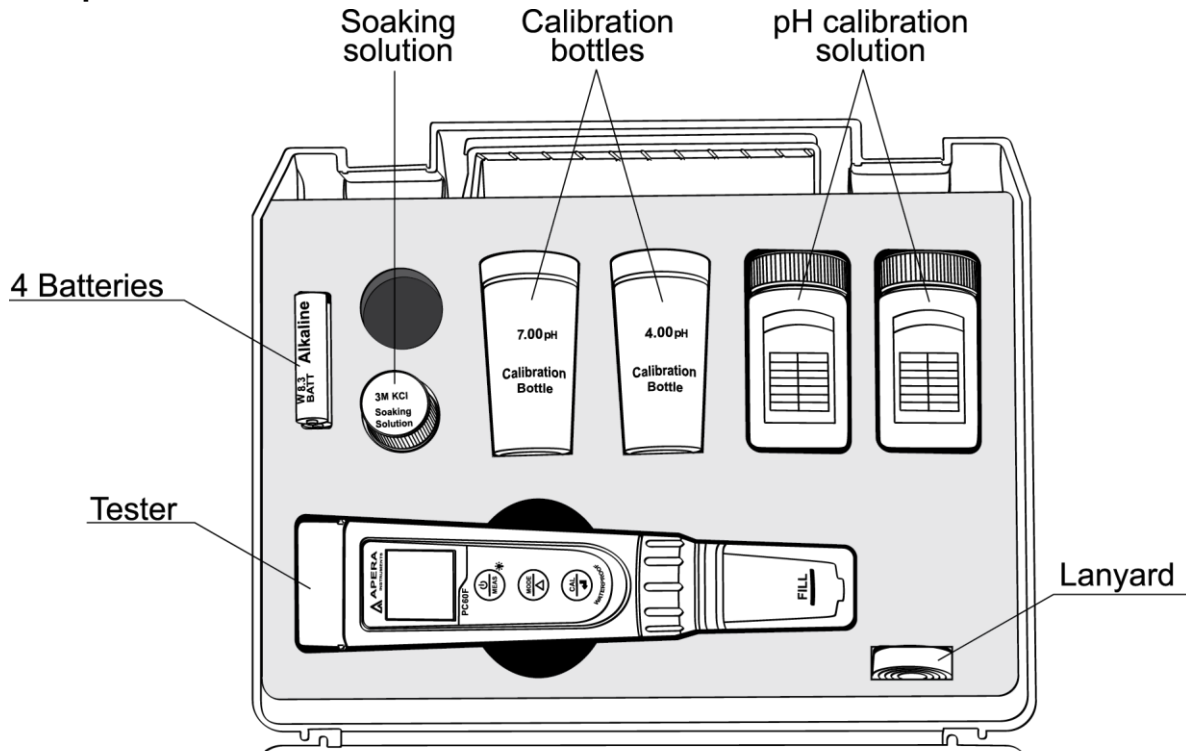
Short press: < 2 seconds

Long press: > 2 seconds

	<ol style="list-style-type: none"> 1. Short press to turn on the tester and long press to turn off the tester. 2. When turned off, long press to enter parameter setting. 3. In measurement mode, short press to turn on backlight.
	<ol style="list-style-type: none"> 1. In measurement mode, short press to switch parameter pH → ORP 2. In mode setting, short press to change parameter (Unidirectional).
	<ol style="list-style-type: none"> 1. Long press to enter calibration mode; 2. In calibration mode, short press to confirm calibration; 3. When measured value is locked, short press to unlock.



3. Complete Kit



Graph - 2

4. Preparation Before Use

4.1 PH60 and PH60F: If it is first-time use or the tester hasn't been used for over 30 days, pour certain amount (about a quarter of the probe cap) of 3M KCL solution in the probe cap, and soak the probe for about 3 to 15 minutes. The black fill line on the cap does NOT indicate how much the KCL soaking solution should be poured in. The volume of KCL solution for soaking the probe should be less than that. The black fill line indicates the minimum volume for sample testing in the probe cap. Users can store the KCL solution in the probe cap when the tester is not in use to keep the sensor's accuracy.

To achieve maximum accuracy, we recommend soaking the probe for one night (12 hours) to activate the glass membrane thoroughly.



4.2 PH60S: Do not keep the spear probe in a dry condition. The spear probe should always be stored in the soaking solution. If the soaking solution was contaminated, please replace with new ones timely.



4.3 The soaking solution is 3M KCL. One bottle of 10mL soaking solution comes with the tester kit. Users can make this solution by themselves. Preparation: Dissolve 25g KCl in 100ml of pure water.

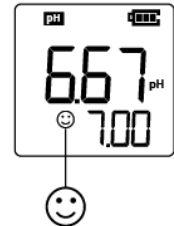
5. pH Calibration


5.1 Rinse the probe in pure water and dry it.






5.2 Pour certain amount (about half volume of calibration bottles) of pH7.00 pH and pH 4.00 buffer solutions in separate calibration bottles.

5.3 Long press  to enter calibration mode; Short press  to exit.

5.4 Dip the probe in pH 7.00 buffer solution, stir gently, and allow it to stand still in the buffer solution until a stable reading is reached. When stable icon  comes up and stays on the LCD screen (as shown in Diagram 2), short press  to complete 1-point calibration and the tester will return to measurement mode.











Indication Icon  will appear on the bottom left of the LCD screen.

5.5 Rinse the probe in pure water and dry it. Dip the probe into pH 4.00 buffer solution, follow the steps in 5.1~5.4 to complete 2-point calibration. Indication icons   will appear on the bottom left of the LCD screen. If necessary, dip the probe into pH 10.01 buffer solution, follow the steps in 5.1~5.4, to complete 3-point calibration. Indication icon    will appear on the bottom left of the LCD screen.

5.6 Notes




a) Tester can perform 1~3 points automatic calibration. *Please note that pH 7.00 or pH 6.86 buffer solution must be used to conduct 1st point calibration. Then use other buffer solution to conduct 2nd or 3rd point calibration. Tester will recognize 5 kinds of pH buffer solutions. For details, please refer to the following chart:

Calibration	USA Series	NIST Series	Indication icon	Recommended
1-point	7.00 pH	6.86 pH		Accuracy \geq 0.1 pH
2-point	7.00 pH, 4.00 pH or 1.68 pH	6.86 pH, 4.01 pH or 1.68 pH	 	Range < 7.00 pH
	7.00 pH, 10.01 pH or 12.45 pH	6.86 pH, 9.18 pH or 12.45 pH	 	Range <7.00 pH
3-point	7.00 pH, 4.00 or 1.68 pH, 10.01 or 12.45 pH	6.86 pH, 4.01 or 1.68 pH, 9.18 pH or 12.45 pH	  	Range: 0 to 14.00 pH


b) pH 4.00 and pH 7.00 buffer solutions are included in the test kit, but pH 10.01 is not. Users can purchase it separately if needed. The buffer solutions poured into the calibration bottles are NOT for one-time use. They can be used for about ten to fifteen times as long as they are not contaminated and the bottles are covered when not in use. After that, we recommend replacing the buffer solutions in the calibration bottles with new ones that are in the buffer bottles (50ml ones) to keep the accuracy of the standard buffer solutions.


*Do not pour used buffer solutions back into the buffer bottles in case of contamination.

c) The tester has self-diagnostic functions:

Icons	Self-diagnostic information	Checking and methods to fix
<i>Er 1</i>	Wrong pH buffer solution or the range of calibration solution exceeds standard.	a) Check whether pH buffer solution is correct (1 st point calibration must be 7.00). b) Check whether the probe is damaged. c) Start the calibration from pH 7.00, then pH 4.00 or 10.01
<i>Er 2</i>	Press  key when measuring value is not stable during measurement.	Press  key after  icon appears and stays for 2 to 3 seconds.

6. pH Measurement

6.1 Short press  to turn on the tester. Rinse the probe in pure water and dry it. Dip the probe in sample solution, stir gently, and allow it to stand until a stable reading is reached.

Get readings after  comes up and stays for about 2 to 3 seconds.

6.2 Special notes

a) Applications of each model:

Model/Probe	Application
PH60/Bulb probe	Most common liquid measurement such as hydroponics, aquaculture, pools and spas, water treatment, cooling towers, etc.
PH60S/Spear probe	Cheese, sushi rice, meat, fruit, bread, soil, solid culture medium and semi-solid medium measurement; Most common liquid measurement.
PH60F/Flat probe	Flat surface measurement such as skin, paper, fabric, leather and so on; micro sample testing; Most common liquid measurement.

b) PH60S Spear probe testers are widely used for solids containing water or semi-solid medium. When conducting such tests, pay attention to insert probe evenly, and be careful to prevent probe from damage. If the medium is too hard (such as meat or fruits), please bore a small hole with a knife before inserting the probe.

c) PH60F Flat probe testers are mostly for flat surface sample test.

■ For skin test: skin should be without sweat or dirt, nor be overly cleaned (do not use facewash products before testing) to avoid affecting measurement results, dampen skin with some distilled water, slightly force flat probe onto the skin, get readings after value stabilized.

■ For paper, fabric and leather test: add 1~2 drops of distilled water on surface, then perform measurements.

■ For meat and fruit test: use a clean knife to cut the sample open, then perform measurements.

■ For micro sample testing, use a container with an inner diameter $\leq 19\text{mm}$ and a flat bottom. The tester can test volume $\geq 0.5\text{ml}$.

6.3 The probe must be cleaned thoroughly after each use. If used to test meat, soapy water should be used to clean the grease.

6.4 Special notes:

1) For pH measurement of any cooked food (such as sushi, cheese, etc.), it should be a sampling test. That means test samples will no longer be edible.

2) The instruments will NOT give accurate and stable pH readings when testing distilled or deionized water. This because distilled and deionized water do not have enough ions present for the electrode to function properly. To measure distilled or deionized water's pH, users need to use a specialized electrode.







3) Do not store probe in distilled water or deionized water because they will cause damage to the glass membrane of the pH probe. The probe should be stored in 3M KCL solution for best accuracy or stored without any liquid.

7. Parameter Setting

7.1 Setup Menu

Symbol	Contents	Parameter	Factory Default
P1	Select pH buffer solution	USA – NIST	USA
P2	Low value measurement alarm setting	0 ~ 14.00pH	0
P3	High value measurement alarm setting	0 ~ 14.00pH	14.00
P4	Select automatic lock	Off – On	Off
P5	Select backlight	Off - 1 - On	1
P6	Select temperature unit	°C - °F	°C
P7	Restore to factory default	No – Yes	No

7.2 Parameter setup method

When turned off, long press  to enter parameter setting → Short press  to switch P1-P2-...P7 → Short  parameter flashing → Short press  to choose parameter → Short press  to confirm → Long press  to switch off.

7.3 Parameter setting instruction


a) Select standard pH buffer solution (P1):

There are two options of standard buffer solutions: USA series and NIST series. Factory default is USA series, for details see clause 4.7.


b) Heads-Up Function (P2 and P3)

For example, the following


■ Alarm when measured value ≥ 3.20 pH:

Preset lowest value (P2) = 3.20 pH, highest value (P3) = 14.00 pH, when measured value ≥ 3.20 pH (stable  displays on LCD); LCD displays red backlight.


■ Alarm when measured value ≤ 8.60 pH:

Preset highest value (P3) = 8.60 pH, lowest value (P2) = 0.00 pH, when measured value ≤ 8.60 pH (stable  displays on LCD); LCD displays red backlight.

■ Alarm when measured value in range of 6.50 pH and 7.20 pH:

Preset lowest value (P2) = 6.50 pH, highest value (P3) = 7.20 pH, when measured value in range of 6.50 pH and 7.20 pH (stable  displays on LCD); LCD displays red backlight alarm.

c) Automatic lock (P4)

Select "On" to activate auto lock function. When reading is stable for more than 10 seconds, the tester will lock the value automatically, and **HOLD** icon will display on LCD. Press  key to cancel reading hold.

d) Backlight (P5)



"Off"-turn off backlight, "On"-always turn on backlight, "1"- backlight will last for 1 minute.

e) Factory default setting (P7)

Select "Yes" to recover instrument calibration to the theoretical value (pH value in zero potential is

7.00pH, slope is 100%), parameter setting return to initial value. This function can be used when instrument does not work properly in calibration or measurement. Calibrate and measure again after recovering the instrument to factory default status.


8. ORP Measurement

Refer to Clause 11 to replace OPR probe (to be purchased separately), press  key to enter **ORP** mode. Rinse the probe in pure water and dry it. Dip the probe in sample solution, stir gently, and allow it to stand still until a stable reading is reached. Get readings after  comes up and stays.

9. Technical Specifications

pH	Measuring Range	-2.00 ~ 16.00pH
	Resolution	0.01pH
	Accuracy	±0.01pH
	Calibration Points	1 ~ 3 points
	Automatic temperature compensation	0 ~ 50°C
ORP (mV)	Measuring Range	± 1000mV
	Resolution	1mV
	Accuracy	±0.2% F.S
Temp.	Measuring Range	0 ~ 50°C
	Resolution	0.1°C
	Accuracy	±0.5°C

10. Other Specifications

LCD	Clear LCD screen, 180°Viewing angle Blue: Measurement; Green: Calibration; Red: Heads-Up Mode
Reading Lock	HOLD
Low-Voltage Warning	 Flashing, reminder of battery replacement
Auto. Power-Off	In 8 minutes without operation
Water Proof Rating	IP67, floats on water
Power	DC3V, AAA batteries×4
Battery Life	Continuous operation > 2000 hours
Dimension/Weight	Tester: 40×40×178mm/133g; Case: 255×210×50mm/700g;

11. Probe Replacement

11.1 Twist off the probe ring, unplug the probe, plug in new probe (pay attention to probe's position), and twist on the probe ring.

11.2 The model numbers of replacement probes that are compatible with the tester are:

- PH60-E (Regular pH glass bulb probe)
- PH60S-E (Spear pH probe for solids/semi-solids pH testing)
- PH60F-E (Flat pH probe for surface pH testing)
- ORP60-E (ORP probe)

12. Warranty

We warrant this instrument to be free from defects in material and workmanship and agree to repair or replace free of charge, at option of APERA INSTRUMENTS, LLC, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS, LLC for a period of **two years** from the delivery (a **six-month** limited warranty applies to probes). This warranty does not apply to defects resulting from actions such as misuse (violation of the instructions in this manual or operations in the manner not specified in this manual), improper maintenance, or unauthorized repairs. Warranty period is the time limit to provide free service for the products purchased by customers, not the service life of the tester or probe.

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