

Premium Series

PH60S Spear pH Tester

pH | mV | Temperature

User Manual



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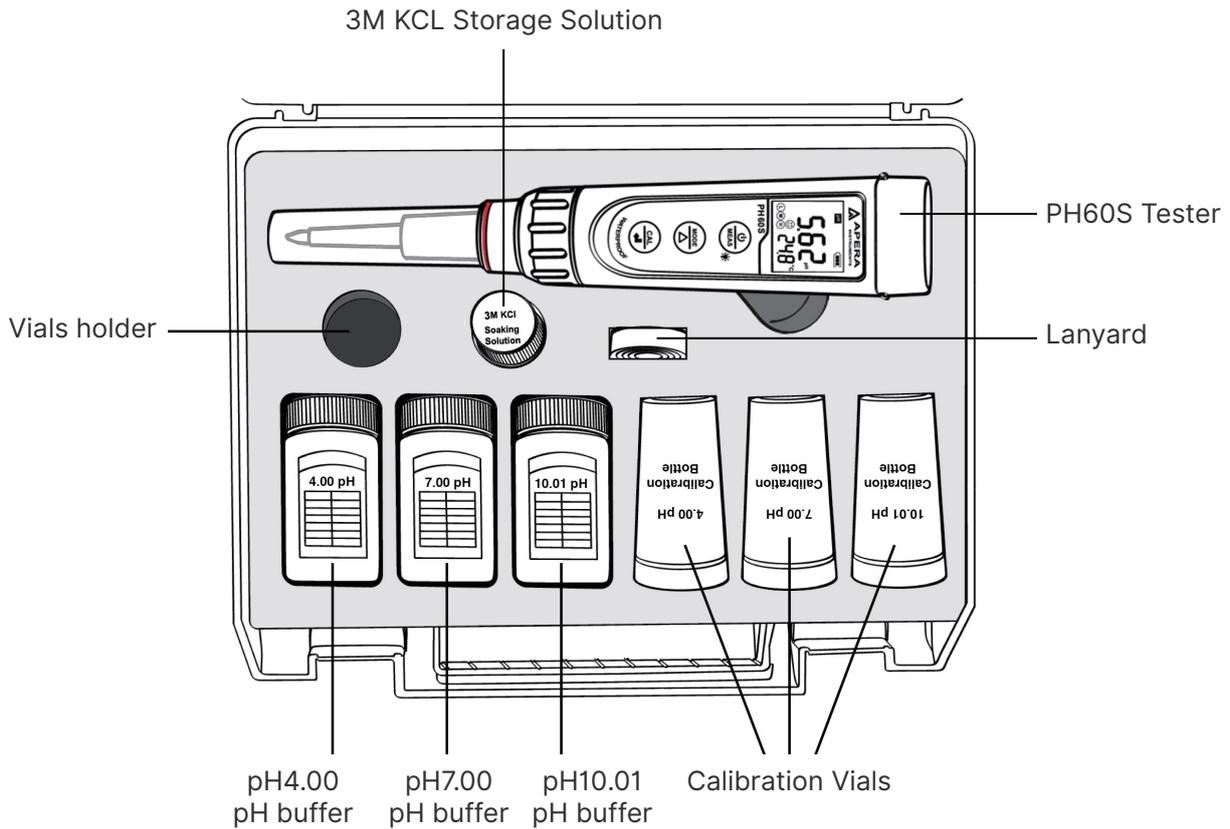
Thank you for purchasing Apera Instruments PH60S Premium Spear pH Tester. Please read this manual before use in order to properly use and maintain the product.

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

ATTENTION

- Never use the product when it's freezing cold. Let it warm to room temperature before using.

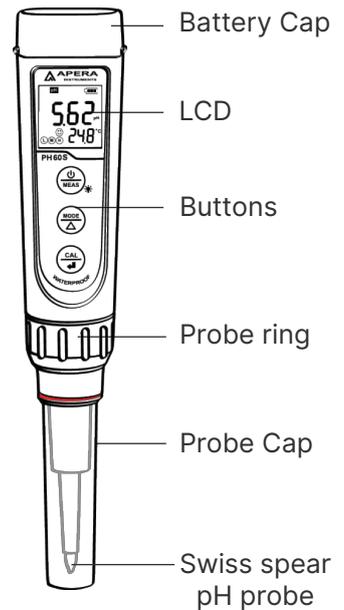
1. What's in the Kit



2. Keypad Functions

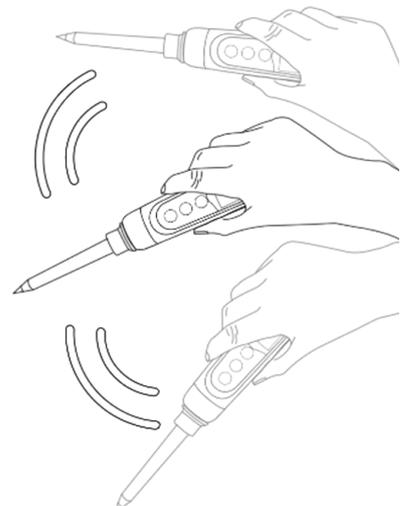
Short press: < 2 seconds **Long press:** > 2 seconds

	<ol style="list-style-type: none"> Short press to turn on the tester and long press to turn off the tester. When turned off, long press to enter parameter setting. In measurement mode, short press to turn on backlight. In calibration mode, short press to cancel calibration.
	<ol style="list-style-type: none"> In measurement mode, short press to switch between pH and mV. In settings, short press to change parameters (Unidirectional).
	<ol style="list-style-type: none"> Long press to enter calibration mode. In calibration mode, short press to confirm calibration. When reading is locked, short press to unlock.



3. Preparation before Use

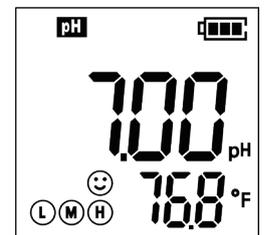
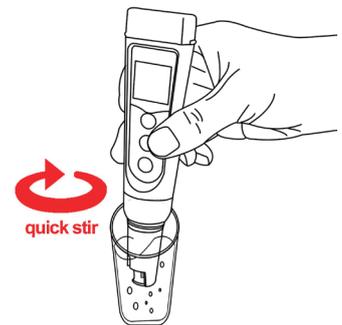
- 3.1 Pull out the battery insulation slip, and take off the probe cap.
- 3.2 Rinse off the probe in pure water (preferably distilled or deionized water. RO water or tap water is the alternative) , then shake off excess water.
- 3.3 Perform at least a 2-point calibration at pH 7.00 and pH 4.00. For tutorial, refer to Section 4.
- 3.4 When you are not using the tester, always store the spear probe in the 3M KCL soaking solution. Never let it dry out. Replace the soaking solution if it gets contaminated.



4. pH Calibration

4.1 How to Calibrate

- 4.1.1 Short press  to power on.
- 4.1.2 Pour pH buffer solutions in the correspondent calibration vials to about half volume.
- 4.1.3 Rinse the probe in pure water; Shake off excess water. Dip the probe in the pH 7.00 buffer solution first, and make a quick stir in the solution, then hold still.
- 4.1.4 Long press  to enter calibration mode, screen will turn green (Short press  if you decide to quit calibration and return to measurement mode).
- 4.1.5 Wait for the reading to stabilize (when  stays on the screen), then short press  to finish the 1st point calibration. After calibration is completed, the tester will return to measurement mode. Icon  will appear at the bottom left, indicating a successful 1-point calibration (middle point).
- 4.1.6 To calibrate 2nd point, use 4.00 pH buffer and repeat Step 4.1.3 to 4.1.5 (Do NOT turn off the tester after you finish pH 7 calibration).  will display next to  , indicating a successful 2-point calibration (low and middle points).
- 4.1.7 If necessary (target pH>8.00), calibrate 3rd point using 10.01 standard pH buffer and repeat Step 4.1.3 to 4.1.5,  will show up next to  and  , indicating a successful 3-point calibration (high, low, and middle points).



4.2 Notes about Calibration

- a) The 1st point calibration must be 7.00 pH. Perform the 2nd and 3rd point calibrations (4.00, 10.01, 1.68, or 12.45) immediately after the 1st point calibration is finished. Do NOT turn off the meter before you calibrate 2nd or 3rd point. Otherwise, you will need to restart the calibration process with 7.00 pH first.
- b) The pH 4.00 and 7.00 buffer solutions poured into the calibration vials can be used for up to 10 times as long as they are not contaminated and the bottles are capped when not in use. pH 10.01 can only be used for up to 5 times as it will lose its accuracy much faster. After that, replace the buffer solutions in the calibration vials with new ones to keep the accuracy. Keeping the freshness and cleanliness of calibration buffers is essential for accurate pH measurement.
- c) The tester can perform 1 to 3 points of automatic calibration and can recognize 5 types of pH standard solutions. For details, please refer to the following table:

Calibration	USA Series		NIST Series		Indication icon	Recommended
1-pt	7.00 pH		6.86 pH			Accuracy requirement ≥ 0.1 pH
2-pt	Option A	1st pt: 7.00 pH 2nd pt: 4.00 pH or 1.68 pH	Option A	1st pt: 6.86 pH 2nd pt: 4.01 pH or 1.68 pH	 	Range < 7.00 pH
	Option B	1st pt: 7.00 pH 2nd pt: 10.01 pH or 12.45 pH	Option B	1st pt: 6.86 pH 2nd pt: 9.18 pH or 12.45 pH	 	Range >7.00 pH
3-pt	1st pt: 7.00 pH 2nd pt: 4.00 or 1.68 pH 3rd pt: 10.01 or 12.45 pH		1st pt: 6.86 pH 2nd pt: 4.01 or 1.68 pH 3rd pt: 9.18 pH or 12.45 pH		  	Range: 0 to 14.00 pH

5. pH Measurement

- 5.1 PH60S Spear pH tester is designed for direct spear test of solid and semi-solid samplings such as cheese, fruit, sushi rice, meat, dough. It also works well in general water solutions.
- 5.2 When performing spear tests in solid samples, pay attention to insert probe evenly, and be careful to prevent probe from damage. If the medium is too hard, please bore a small hole with a clean knife before inserting the spear probe.
- 5.3 For food pH measurement (e.g. sushi, cheese, meat, fruit, etc.), it should always be a sampling test. That means test samples should no longer be edible.

5.4 How to take pH measurements

Short press  to power on the tester. Rinse the probe in pure water, shake off excess water. Dip the probe in your sample solution or pierce the probe into your solid sampling, then hold still. Record the reading after it is fully stabilized ( appears and stays).

5.5 Pure Water pH Measurement

When testing pure water like tap water, drinking water, RO water or distilled water, it will take longer for the readings to get fully stabilized (typically 1-5 minutes). Please be patient. If still not working, add Apera 3M KCL (AI1107) to your pure water at the ratio of 1:1000 (e.g. 1 ml KCL to 1000 ml water) to accelerate stabilization while minimizing pH change. If the accuracy is not meeting your requirement, please contact us at info@aperainst.com to find the specialized meter designed for pure water pH test.

6. Probe Cleaning

- 6.1 The tester is only as accurate as the probe is clean. Always thoroughly rinse off the probe before and after each measurement with pure water in a container or with a wash bottle.
- 6.2 For tough contaminants, detach the sensor shield, soak the probe in Apera probe cleaning solution (AI1166) or detergent water for 30 minutes. Then use a soft brush to remove the contaminants. Afterwards, soak the probe in 3M KCL soaking solution for at least 1 hour. Rinse it off, then re-calibrate the tester before using again.

7. Probe Storage

- 7.1 Always store the spear probe in the 3M KCL soaking solution when not in use. Never let it dry out. Replace the soaking solution if it gets contaminated.
- 7.2 **NEVER** store the probe **in pure water** like tap, RO, distilled, or deionized water as they could damage the pH probe. Pure water is only for rinsing the probe.

8. Parameter Settings

8.1 Setup Menu

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

8.2 Parameter Setup

When turned off, long press  to enter parameter settings → Short press  to switch P1-P2-P3...P7 → Short press  to select parameter (starts flickering) → Short press  to change parameter → Short press  to confirm the change → Long press  to return to measurement mode.

8.3 Parameter Setting Instruction

8.3.1 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 section 4.2.

8.3.2 Alarm Function (P2&P3):

a) Alarm triggered when measurement ≤ 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 screen); screen turns red.

b) Alarm triggered when measurement ≥ 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 screen); screen turns red.

c) Alarm triggered when measurement ≤ 3.20 pH or ≥ 8.60 pH

Preset lowest value (P2) = 3.20 pH, highest value (P3) = 8.60 pH, when measured value is lower than 3.20 pH or higher than 8.60 pH (stable  displays on screen), screen turns red.

8.3.3 **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. Short press  key again to cancel the lock and keep measuring.

8.3.4 **Backlight (P5):** "Off"-turn off backlight, "On"-always turn on backlight, "1"- backlight will last for 1 minute.

8.3.5 **Temperature Unit (P6):** Select between C° and F°.

8.3.6 **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.

9. ORP Measurement

ORP stands for Oxidation-Reduction Potential. ORP is a measure of the cleanliness of the water & its ability to break down contaminants. An ORP probe is needed to test ORP (sold separately, SKU: AI1207). After powering on the tester, press  to enter ORP mode (mV). Rinse the probe in distilled water and dry it. Dip the probe in your sample solution, make a quick stir, and hold still. Record the reading after it is fully stabilized.

10. Technical Specifications

pH	Measuring Range	-2.00 – 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.01 pH ±1 digit
	Calibration Points	1 – 3 points
	Automatic Temperature Compensation (ATC)	0 – 50°C (32 – 122°F)
ORP (mV)	Measuring Range	± 1000mV
	Resolution	1mV
	Accuracy	±0.2% F.S
Temp.	Measuring Range	0 – 50°C (32 – 122°F)
	Resolution	0.1°C
	Accuracy	±0.5°C

11. Other Specifications

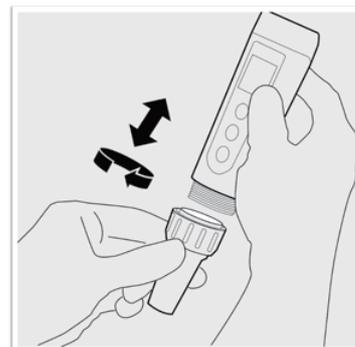
Screen	3-color LCD screen, Blue: Measurement; Green: Calibration; Red: Alarm
Reading Lock	HOLD
Low-Voltage Warning	 flashing, reminder of battery replacement needed
Auto. Power-Off	In 8 minutes without operation
Waterproof Rating	IP67
Power	DC3V, AAA alkaline batteries×4
Battery Life	Operation up to 2000 hours
Dimension& weight	Tester: 40×40×178mm/133g; Case: 255×210×50mm/700g;

12. Probe Replacement

12.1 Every pH probe gradually loses its sensitivity and will eventually fail. A typical service life of a pH probe is 1-2 years depending on many factors such as frequency of use, nature of test samples, and how well it is maintained, etc. Apera Instruments recommends replacing the pH probe every 1 to 2 years to guarantee the optimal performance.

12.2 How to replace a probe

- 1) Take off the probe cap
- 2) Screw off the probe ring
- 3) Unplug the probe
- 4) Plug in the new replacement probe (pay attention to the probe's position);
- 5) Screw on the probe ring tightly. Soak the probe in 3M KCL for 5-15 minutes. Then perform calibration before testing.



12.3 Replacement probes compatible with PH60S Tester

- AI1205 PH60S-E (spear pH probe for soft-solid samples)
- AI1203 PH60F-E (flat pH probe for surface test)
- AI1201 PH60-E (regular pH probe for general water solutions)
- AI3711-E PH60-DE (double-junction pH probe for general water solutions)
- AI3713-E PH60S-DE (double-junction spear pH probe for soft-solid samples)
- AI802G GS2-E (spear pH probe for soil direct test)
- AI1207 ORP60-E (ORP probe)

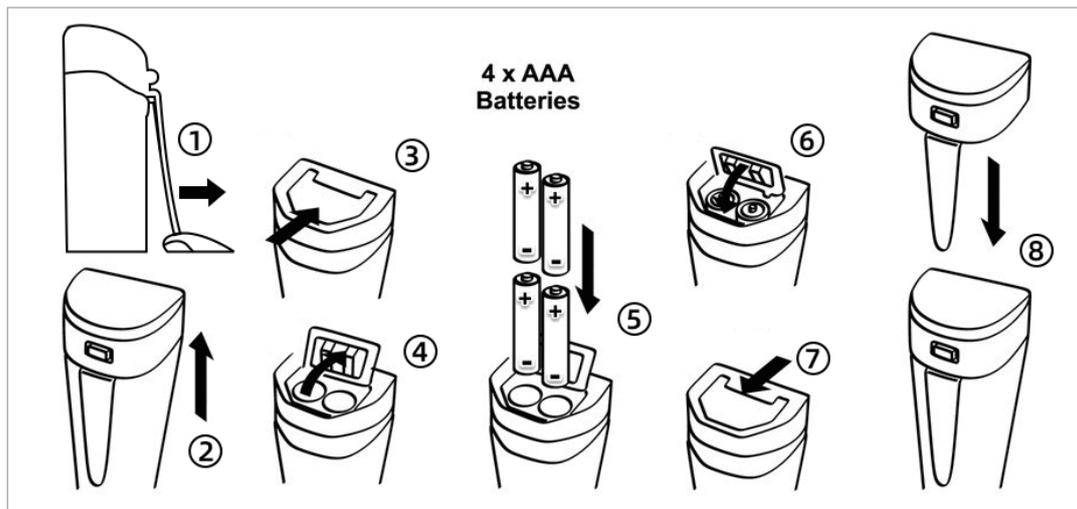
13. Notes

- a) Avoid testing in very high (>113°F) or very low (<41°F) temperature solutions as it will cause greater measurement error and potential damage to the probe. Test your samples and perform calibration close to room temperature as much as possible.
- b) Never use your finger to touch the glass membrane or use other material to rub it. Doing so could generate static electricity and cause measurement errors. Never test oily liquids.
- c) Make sure the battery cap is completely closed with the red O-ring. Otherwise, the waterproof rating could be compromised.

14. Battery Replacement

Please install batteries according to the following steps. *Please note the correct direction of battery installation: **The Positive Side (“+”) OF EVERY SINGLE Battery MUST FACE UP.**

⚠ (WRONG INSTALLATION OF BATTERIES WILL CAUSE DAMAGE TO THE TESTER AND POTENTIAL HAZARDS!)



- ① Loosen the battery cap lock ② Pull off the battery cap
- ③ Slide and unlock battery compartment ④ Open the battery compartment
- ⑤ Insert the batteries (all POSITIVE sides FACE UP) ⑥ Press down the battery compartment
- ⑦ Slide and lock the battery compartment ⑧ Close on the battery cap

15. Troubleshooting Guide

Trouble	Reason	How to fix
Cannot calibrate	Incorrect calibration order	When powered on, calibrate pH 7 first, then pH 4. After pH 4 is calibrated, if you want to calibrate pH7 again, you need to power off and restart the tester.
	Bad standard solutions	Replace with a new reliable buffer solution.
	Contaminated probe	Clean the electrode, it is best to use a cleaning solution.
	Aged probe	Replace the probe.
	Dried-out probe	Soak in the soaking solution overnight.
	Probe is not fully submerged in the solution	Make sure the electrode is immersed in the solution at least 3 cm.
	Air bubbles around the sensor	Make a quick stir in the solution to remove air bubbles.
Reading is always slowly changing, won't stabilize.	Contaminated probe	Clean the electrode, it is best to use a cleaning solution.
	Clogged junction	Clean the electrode with cleaning solution, then soak it in 3M KCL storage solution overnight.
	Aged probe	Replace the probe.
	Testing purified water like tap water, drinking water and RO water	Be patient, wait for 2-5 minutes to fully stabilize. If still not stabilizing, add in 1ml of 3M KCL solution to 1000ml of test solution.
	Testing low ion concentration solutions e.g. distilled water and deionized water	Contact Apera for a specialized pH electrode suitable for low ion concentration solutions.
Display similar readings in any solutions or always display 7.0 pH	Broken probe	If you don't find any visible damage of the electrode and it's within the 6-month electrode warranty, contact us for warranty fulfillment; If there is visible damage, replace the electrode.
	Instrument defect	Contact us for warranty fulfillment
Reading keeps jumping	Probe is not fully submerged in the solution	Make sure the electrode is immersed into the solution for at least 1 inch.
	Air bubbles around the sensor shield	Make a quick stir in the solution to remove air bubbles.
	Probe is not properly connected or the connector is broken.	Check the electrode's connector, make sure it's not broken and is correctly connected. Align the electrode and instrument correctly before plugging in. Never force it. Ensure that the electrode connector is not exposed to the air too long.
Calibration is successful, but reading is not accurate	Aged probe	Replace the probe.
	Air bubbles around the sensor	Make a quick stir in the solution to remove air bubbles.
	Clogged junction	Clean the electrode with cleaning solution, then soak it in 3M KCL storage solution overnight.
	Comparison with other testers, test strips, or drop tests	To compare with other testers, make sure to perform a 2-point calibration for all testers in the same standards, then test a 3rd point. Whichever gives more accurate reading in the 3rd point standard is the most accurate one. Test strips or drop tests' accuracy is not comparable to pH meters'.
	Calibration standards are not in good condition	Make sure your calibration standards are fresh and clean, and made by a legitimate scientific equipment manufacturer.
	Your electrode is not suitable for your test sample or testing environment	Contact us to find the most appropriate electrode for your specific application.

16. 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 (SIX MONTHS for the probe) from the delivery.

This limited warranty does NOT cover any damages due to:

Accidental damage, transportation, storage, improper use, failure to follow the product instructions or to perform any preventive maintenance, unauthorized repair or modifications, normal wear and tear, or other external causes or actions beyond our reasonable control.

To get the fastest warranty fulfillment, go to support.aperainst.com and click "New Support Ticket" on the upper right corner. Type your email in the requester field, "Warranty" in the Subject field, and then input the following information in the description field:

- Your full name
- Product model that needs warranty fulfillment
- Serial number of the product (can be found on the back sticker of the tester body)
- What problem or issue you had experienced with the product
- Attach a photo of your proof of purchase
- Attach a photo of the problematic product

Then click Submit. One of our customer care specialists will help you fulfill the warranty within one business day.

APERA INSTRUMENTS, LLC

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