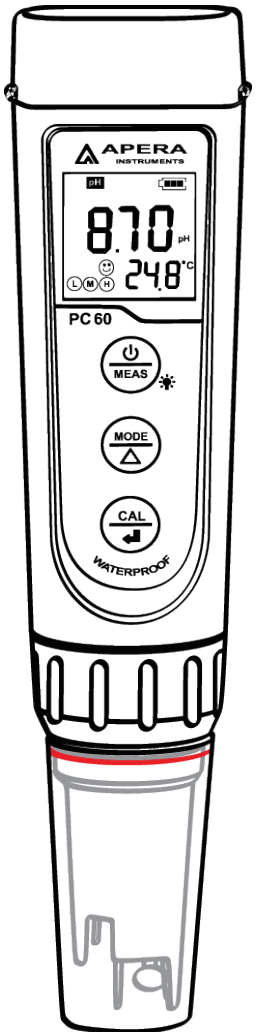
APERA INSTRUMENTS
Fluid Precision since 1991

Premium Series PC60 5-in-1 Tester

pH | Conductivity | TDS | Salinity | Temperature

User Manual



RoHS compliant | ISO 9001: 2015 | CE | IP67

APERA INSTRUMENTS, LLC
aperainst.com

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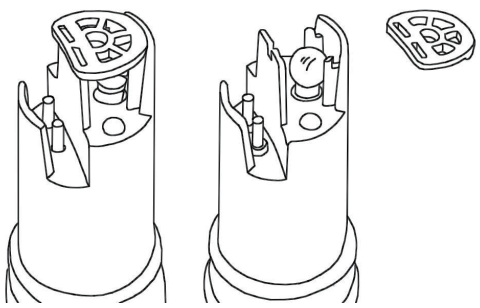
Thank you for purchasing Apera Instruments PC60 Premium Multi-parameter Tester. Please read this manual before use in order to properly use and maintain the product.

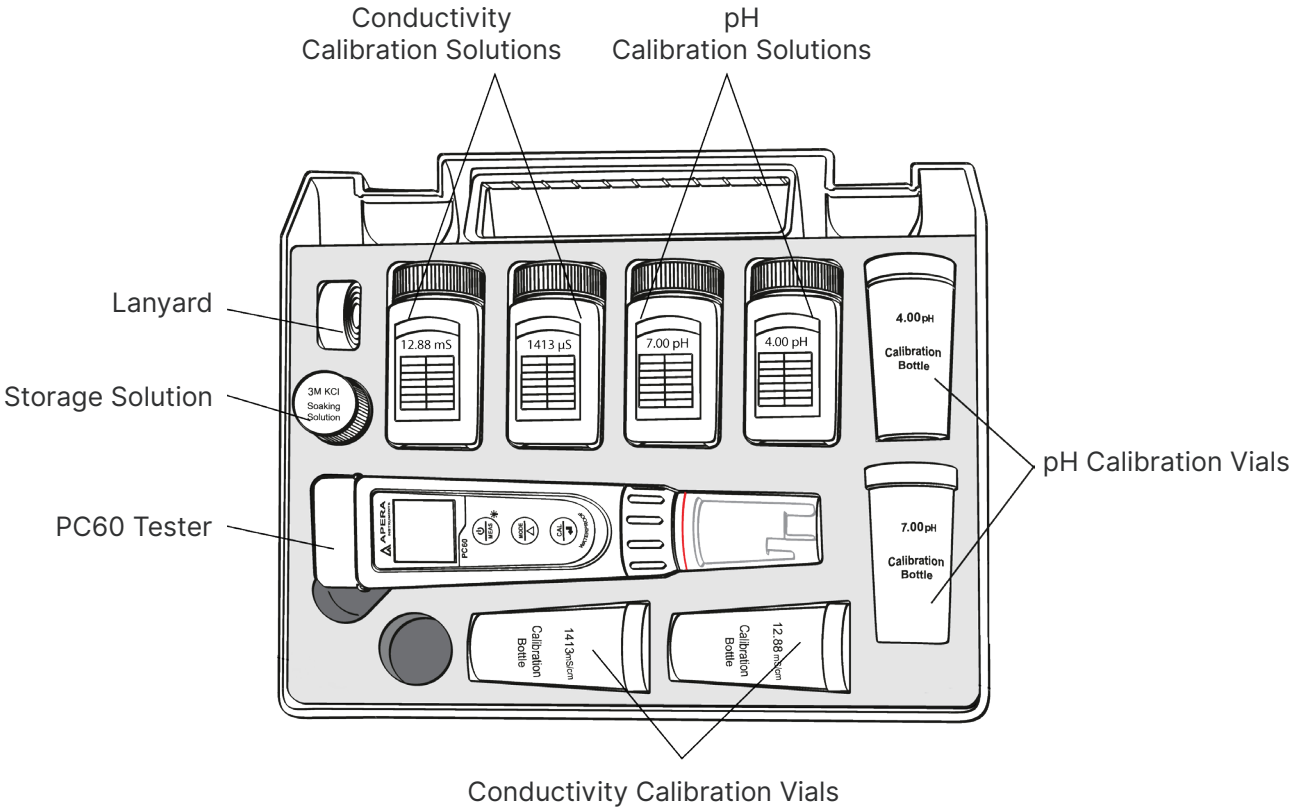
For video tutorials, please go to support.aperainst.com

ATTENTION

- Water droplets are added during production to maintain the moisture of the probe. This is normal practice and should not be attributed to used product.
- Never use the product when it's freezing cold. Let it warm to room temperature before using.
- The latest PC60 Tester comes with an upgraded probe structure equipped with a sensor shield that prevents glass bulb breakage from accidental collisions (see picture below). Users can remove the shield when cleaning the sensor and put it back on after cleaning.



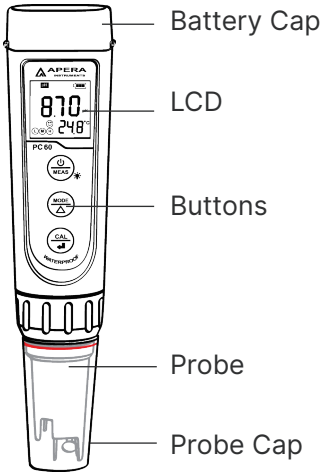
1. What's in the Kit

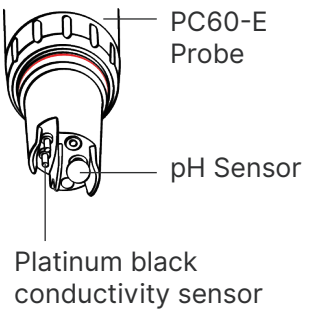


2. Keypad Functions

Short press (tap): < 2 seconds **Long press:** > 2 seconds

MEAS	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.
MODE △	1. In measurement mode, short press to switch parameter **pH→Cond→TDS→Sal**. 2. In parameter setting, short press to make change (Uni-directional).
CAL ↵	1. Long press to enter calibration mode. 2. In calibration mode, short press to finish calibration. 3. When reading is locked (auto. HOLD on), short press to unlock.

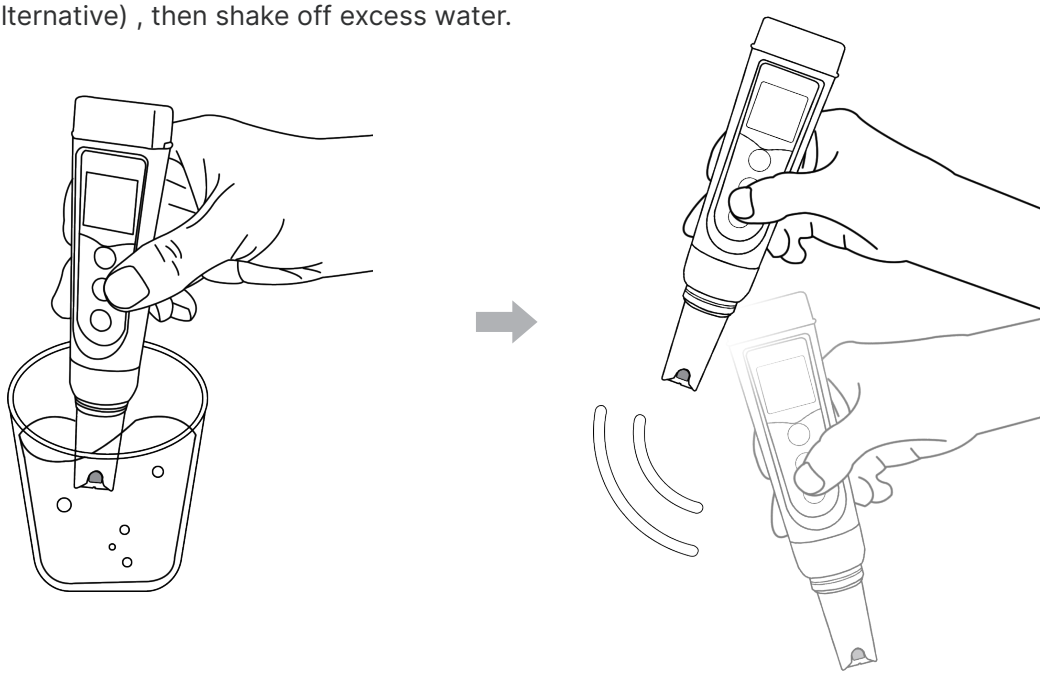




3. Preparation before Use

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 calibration. For pH calibration tutorial, refer to Section 4; For conductivity calibration, refer to Section 6.

3.4 If the tester hasn't been used for a long time (over 1 month), please soak the probe in the 3M KCL soaking solution for 15 minutes, then calibrate it before test.

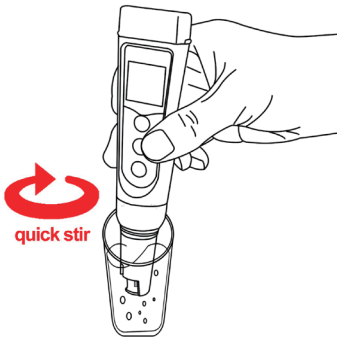
4. pH Calibration

4.1 How to Calibrate

4.1.1 Short press (MEAS) to power on.

4.1.2 Pour pH buffer solutions into the corresponding 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 (CAL) to enter calibration mode, the screen will turn green (Short press (MEAS) 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 CAL to finish the first point calibration. After calibration is completed, the tester will return to measurement mode. Icon (M) will appear at the bottom left of the screen, indicating a successful 1-point calibration (the middle point).

4.1.6 To calibrate second point, use pH 4.00 buffer and repeat Step 4.1.3 to 4.1.5 (Do NOT turn off the tester after you finish pH 7 calibration). (L) will display next to (M) , indicating a successful 2-point calibration (low and middle points).

4.1.7 To calibrate third point, use pH 10.01 buffer and repeat Step 4.1.3 to 4.1.5 (Do NOT turn off the tester after you finish second point calibration), (H) will show up next to (L) and (M) , 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 second and third 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 in between. Otherwise, you will need to restart the calibration process with pH 7.00 first.

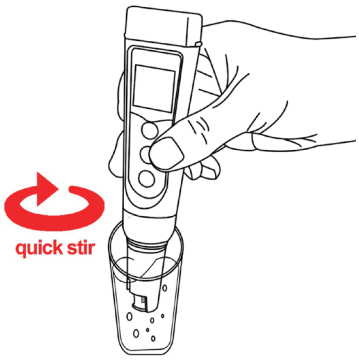
b) The pH 4.00 and 7.00 buffer solutions poured into the calibration vials can be used for up to 10 times as long as they are not contaminated and the bottles are capped when not in use. pH 10.01 can only be used for up to 5 times as it will lose its accuracy much faster. After that, replace the buffer 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-point	7.00 pH		6.86 pH		(M)	Accuracy requirement ≥ 0.1 pH
2-point	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	(L) (M)	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	(M) (H)	Range >7.00 pH
3-point	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		(L) (M) (H)	Range: 0 to 14.00 pH

5. pH Measurement

5.1 How to Take pH measurements



Short press (MEAS) to turn on the tester. Rinse the probe in pure water, shake off excess water. Insert the probe in your sample solution, make a quick stir and hold still. Record the reading when it is stabilized (☺ comes up and stays on screen). Or if you turn on the Auto-Hold function (refer to Section 10.2 (b)), the reading will be automatically locked when it's stable for more than 10 seconds. Short press (CAL) to cancel the Auto-Hold and keep measuring.

5.2 Pure Water pH Measurement

When measuring pH of pure water like tap water, drinking water, RO water and 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. Conductivity Calibration

6.1 Power on the tester. Press (MODE) to switch to conductivity (Cond) measurement mode. Rinse the probe in pure water and shake off excess water.

6.2 Pour conductivity calibration solutions into the corresponding calibration vials to about half volume.

6.3 Long press (CAL) to enter calibration mode (screen turns green).

6.4 Dip the probe into 1413 µS conductivity calibration solution, stir gently and hold still. When the reading is fully stabilized (☺ stays on screen), short press (CAL) to start one-point calibration, the tester returns to measurement mode and (M) will appear at the bottom left of the screen, indicating a successful first point conductivity calibration.

6.5 If needed (your estimated sample conductivity level is greater than 2 mS or 2000 µS), dip the probe into the 12.88 mS conductivity calibration solution. Follow the steps in 6.3 to 6.4 to finish the second point of calibration using the 12.88 mS standard solution. (H) will appear next to (M), indicating a successful 2-point conductivity calibration.

6.6 Conductivity Calibration Notes

The tester can calibrate with 84 µS, 1413 µS and 12.88 mS conductivity calibration solution. User can conduct 1 to 3 points calibration. Refer to the next table.

Calibration Indication Icon	Calibration Standards	Measuring Range
(L)	84 µS	0 - 200 µS
(M)	1413 µS	200 - 2000 µS
(H)	12.88 mS	2 - 20 mS (2000 - 20,000 µS)

For conductivity calibration solutions, we recommend that users replace new solutions after 5 times of use to keep the standard solution's accuracy. Do NOT pour the used calibration solutions back into the solution bottles in case of contaminatio

7. Conductivity Measurement

7.1 Short press (MEAS) to turn on the tester. Rinse the probe in pure water and shake off excess water. Dip the probe into your sample solution, make a quick stir, and hold still. Record the reading after it is fully stabilized (☺ comes up and stays). Press (MODE) to switch from conductivity to TDS, and Salinity. Or if you turn on the Auto-Hold function (refer to Section 10.2 (b)), the reading will be automatically locked when it's stable for more than 10 seconds. Short press (CAL) to cancel the Auto-Hold and keep measuring.

7.2 Unit Conversion

a) 1000 µS/cm = 1 mS/cm = 1 EC (In conductivity mode, the unit will automatically turn from µS to mS if the reading is greater than 1999 µS, meaning you will only see 2.XX mS instead of 2XXX µS)

b) 1000 ppm = 1 ppt (In TDS mode, the unit will automatically turn from ppm to ppt if the reading is greater than 999 ppm, meaning you will only see 1.XX ppt instead of 1XXX ppm)

c) The TDS and Salinity values are converted from the conductivity values via a certain conversion factor. TDS and conductivity is linear related, and its conversion factor is 0.40 to 1.00. Adjust the factor in parameter setting P5 based on the requirements in different industries. The factory default setting is 0.71.

d) Salinity and conductivity is linear related, and its conversion factor is 0.5.

e) Once conductivity is calibrated, TDS, salinity, and resistivtiy will be automatically calibrated.

f) Conversion Example: if conductivity measurement is 1000µS/cm, then the default TDS measurement will be 710 ppm (under the default 0.71 conversion factor), and the salinity be 0.5 ppt. If TDS conversion rate is changed to 0.5, then the TDS measurement will be 500 ppm.

7.3 Temperature compensation factor

The default setting of the temp. compensation factor is 2.0%/˚C. User can adjust the factor based on test solution and experimental data in parameter setting P4. The following table is some common examples for setting up the temp. compensation factor.

Solution	Temperature compensation factor	Solution	Temperature compensation factor
NaCl	2.12%/˚C	10% Hydrochloric acid	1.32%/˚C
5% NaOH	1.72%/˚C	5% Sulfuric acid	0.96%/˚C
Dilute ammonia	1.88%/˚C		

8. Probe Cleaning

8.1 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.

8.2 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.

9. Probe Storage

9.1 For regular storage, just make sure there are a few water droplets inside the probe cap. Then close on the probe cap tightly to maintain the humidity inside so the probe will not dry out.

9.2 If the probe is dried out by accident or if you find the probe's response turns much slower than usual, soak the probe in the 3M KCL soaking solution for about 2 hours to recover its sensitivity. **NEVER** leave the probe in the 3M KCL soaking solution for longer than 24 hours as it may cause damage to the conductivity sensor.

9.3 If you find white crystals inside or outside the probe cap, it is perfectly normal. It is the 3M KCL soaking solution that crystalizes over time by its nature. Just rinse them off and keep using. This chemical is not poisonous nor dangerous, and the probe's performance will not be affected at all.

9.4 **NEVER** store the probe in pure water like tap, RO, distilled, or deionized water as they could damage the pH probe. If this happens, immediately soak the pH probe in the 3M KCL soaking solution overnight, then re-calibrate it before using. Pure water is only for rinsing the probe.

10. Parameter Settings

Symbol	Parameter Setting Contents	Code	Factory Default
P1	Select pH buffer standards	USA – NIST	USA
P2	Auto. Hold	Off – On	Off
P3	Select backlight	Off - 1 - On	1
P4	Temperature compensation factor	0.00 - 4.00%	2.00%
P5	TDS factor	0.40 - 1.00	0.71
P6	Salinity unit	ppt - mg/L	ppt
P7	Select temperature unit	˚C - ˚F	˚F
P8	Back to factory default	No – Yes	No

10.1 Parameter Settings Tutorial

When turned off, long press (MEAS) to enter parameter settings → Short press (MODE) to switch P1-P2-P3...P8 → Short press (CAL) to select parameter (starts flickering) → Short press (MODE) to change parameter → Short press (CAL) to confirm the change → Long press (MEAS) to return to measurement mode.

10.2 Parameter Setting Instruction

a) **Standard pH buffer solution (P1)**: There are two options of standard buffer solutions: USA series and NIST series. For details, refer to Section 4.2.

b) **Automatic Hold (P2)**: Select "**On**" to activate the auto-hold function. When reading is stable for more than 10 seconds, tester will lock the value automatically, and **HOLD** icon will show up on LCD. Short-press (CAL) to cancel the auto-hold (**HOLD** icon will go off).

c) **Backlight (P3)**: "**Off**"-turn off backlight, "**On**"-turn on backlight, **1**-backlight lasts for 1 minute.

d) **TDS Factor (P5)**: Short press (CAL) in P5, adjust the TDS factor to your desired value by short-pressing or holding (MODE), then short press (CAL) again to confirm the change.

e) **Factory default setting(P8)**: Select "**Yes**" to set the meter to its default status (erase all calibration record and return all parameter settings to the default value). This function can be used when the meter does not work well in calibration or measurement. Calibrate the meter again after setting the meter to factory default.

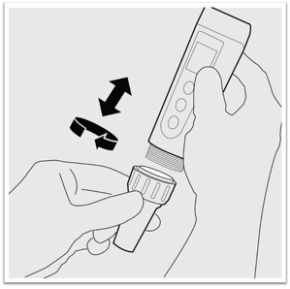
11. Technical Specifications

pH	Range	-2.00 to 16.00 pH
	Resolution	0.01 pH
	Accuracy	±0.01 pH ±1 digit
	Calibration Points	1 to 3 points
	Auto. Temperature Compensation	0 – 50˚C (32 – 122˚F)
Conductivity	Range	0 to 200.0 µS, 200 to 2000 µS, 2 to 20.00 mS/cm
	Resolution	0.1/1 µS, 0.01 mS/cm
	Accuracy	±1% F.S
	Calibration Points	1 to 3 points
TDS	Range	0.1 ppm to 10.00 ppt
	TDS Factor	0.40 to 1.00
Salinity	Range	0 to 10.00 ppt
Temperature	Range	0 to 50˚C (32-122˚F)
	Resolution	0.1˚C
	Accuracy	±0.5˚C

12. Probe Replacement

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.



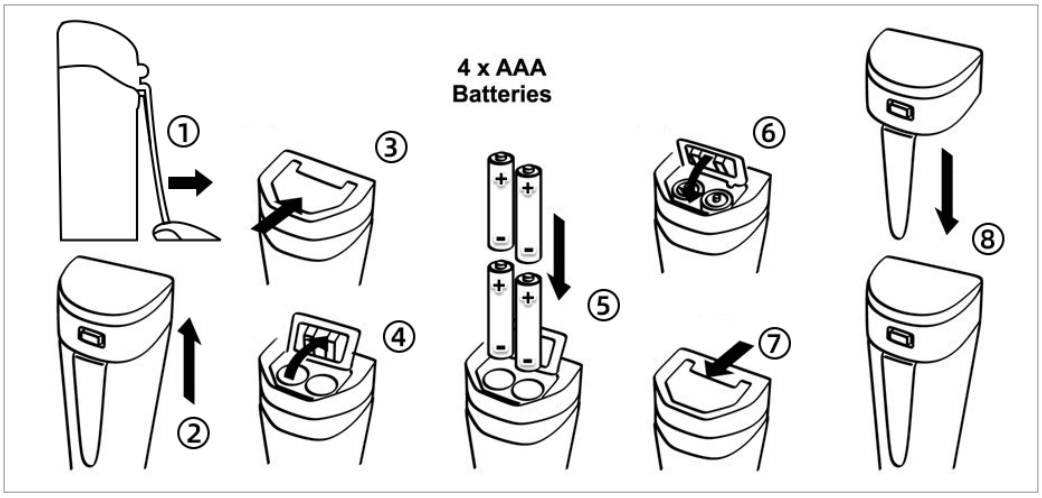
Probes compatible with PC60 Tester:

- PC60-E (Regular pH/conductivity probe)
- PC60-DE (Double-junction pH/conductivity probe)
- PH60-E (Regular pH glass bulb probe)
- PH60-DE (Double-junction pH glass bulb probe)
- PH60S-E (Spear pH probe for solids/semi-solids pH testing)
- PH60F-E (Flat pH probe for surface pH testing)
- EC60-E (Conductivity probe)

13. 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& BATTERY LEAK!)



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

14. Troubleshooting Guide

Trouble	Potential Causes	How to Fix
Cannot calibrate	Incorrect calibration order	Power on the tester, calibrate pH 7 first, then pH 4. After pH 4 is calibrated, if you want to calibrate pH 7 again, you need to reboot the tester.
	Poor quality standard solutions	Replace with fresh and clean standard calibration solutions made by legitimate scientific instrument manufacturers.
	Contaminated probe	Clean the probe with Apera's cleaning solution or detergent water.
	Aged probe	Replace the probe.
	Dried-out probe	Soak the probe in the 3M KCL soaking solution for at least 15 minutes.
	Probe is not fully submerged in the solution	Make sure the probe is fully immersed in the solution at least 1 inch deep.
	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 probe with Apera's cleaning solution or detergent water.
	Clogged junction	Clean the probe with Apera's cleaning solution, then soak it in 3M KCL soaking solution overnight.
	Aged probe	Replace the probe.
	Testing pH of low iconic strength solutions like tap water, drinking water, RO water	Be patient, wait for 1-5 minutes to reach a fully stabilized reading. If still not stabilizing, add 1ml of Apera 3M KCL solution to 1000ml of test solution (or 1 teaspoon to 1 gallon).
Display similar readings in any solutions or always display 7.0 pH	Broken probe	If you don't find any visible damage of the probe and it's within the 6-month probe warranty, contact your point of purchase for warranty fulfillment; If there is visible damage or the probe is more than 1-year old, replace the probe.
Reading keeps jumping	Probe is not fully submerged in the solution	Make sure the probe is fully immersed in the solution at least 1 inch deep.
	Air bubbles around the sensor	Make a quick stir in the solution to remove air bubbles.
	Probe is not properly connected or the pin connector is broken.	Check the probe's connector, make sure it's not broken and is correctly connected. Align the probe and instrument correctly before plugging in. Never force it. Ensure that the probe connector is not exposed in 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 probe with cleaning solution, then soak it in 3M KCL soaking 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 more accurate one. Test strips or drop tests' accuracy is not comparable to pH meters'.

15. 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. Then fill in the form and 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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