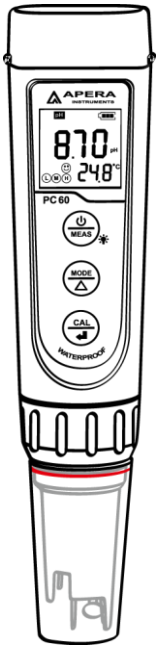
APERA INSTRUMENTS
Fluid Precision since 1991

Premium Series PC60 5-in-1 Tester

(pH/Conductivity/TDS/Salinity/Temp.)

User Manual



RoHS compliant ISO 9001:2015 CE IP67 WATERPROOF

APERA INSTRUMENTS, LLC

aperainst.com

V7.7

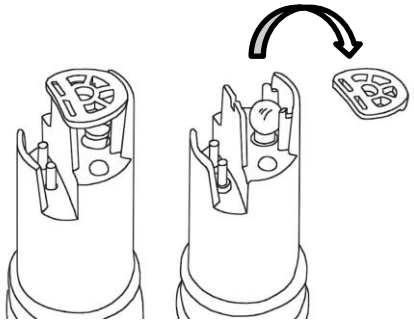
Thank you for purchasing Apera Instruments PC60 Premium Multi-parameter Tester. Please read this manual before use in order to properly use and maintain the product.

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

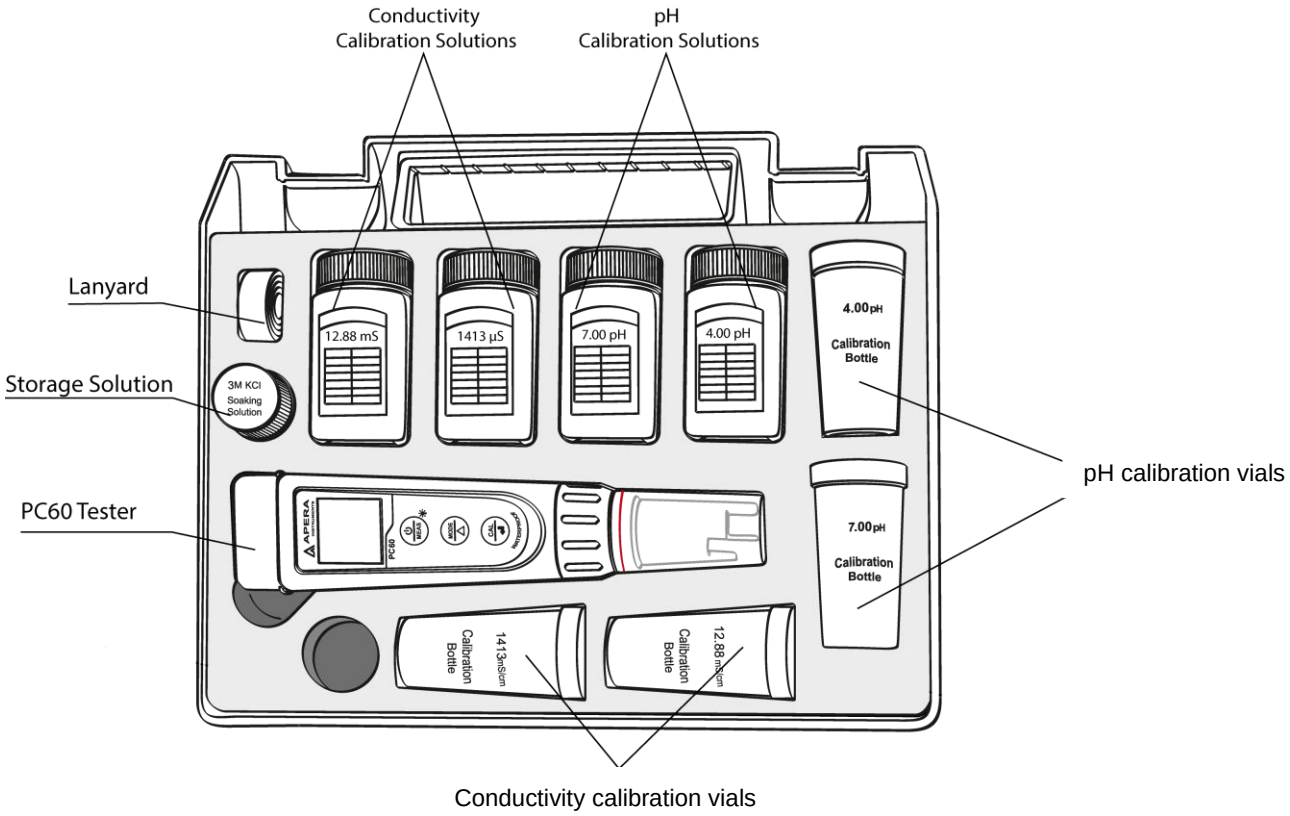
Table of Contents

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.



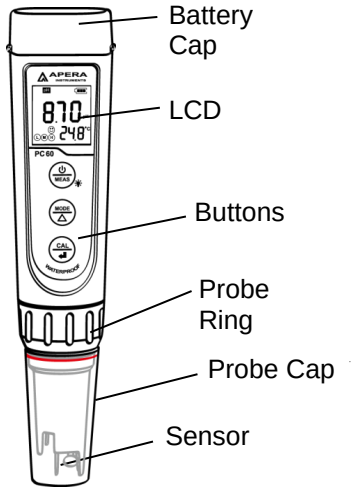
1 What's in the Kit

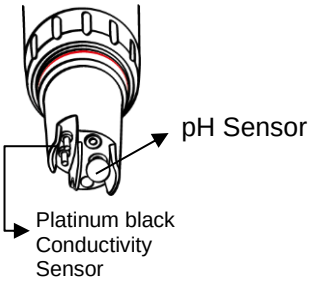


2 Keypad Functions

- **Short press------** < 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 settings, short press to make change (Unidirectional)
CAL ↵	1. Long press to enter calibration mode. 2. In calibration mode, short press to confirm calibration. 3.When reading is locked, short press to unlock;

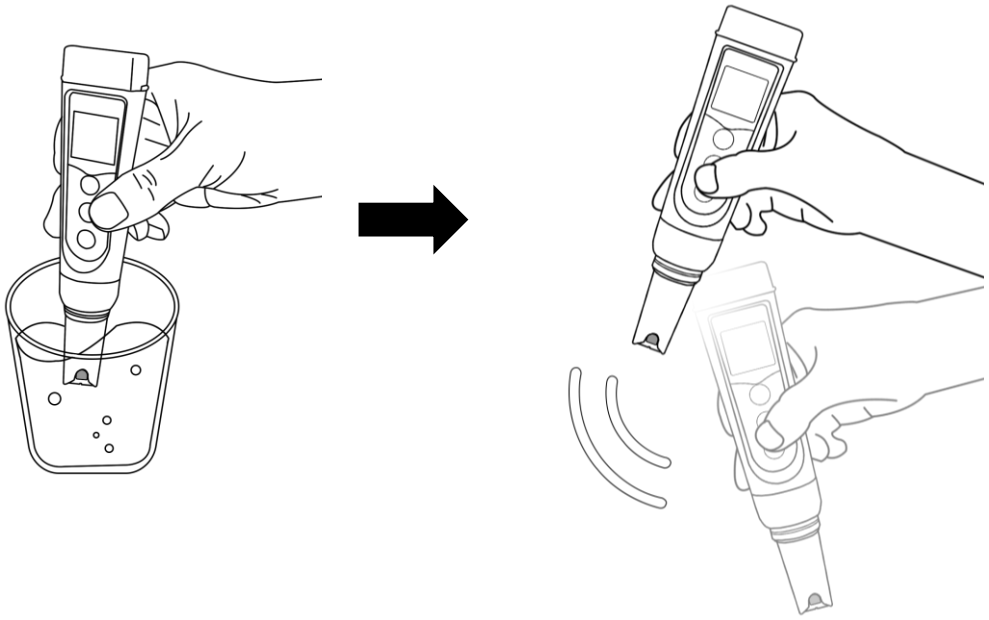




3 Preparation Before Use

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 calibration. For pH calibration tutorial, refer to Section 5; for conductivity calibration, refer to Section 7.

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.

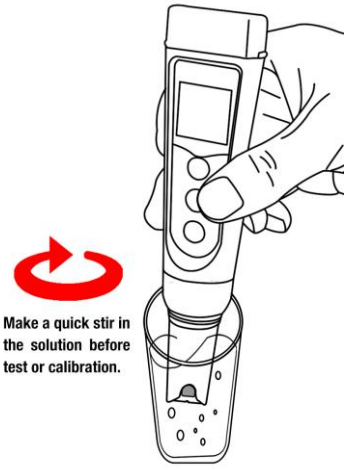
4 pH Calibration

4.1 How to Calibrate

4.1.1 Short press (MEAS) to power on.

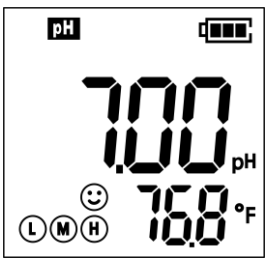
4.1.2 Pour pH buffer solutions in the correspondent calibration vials to about half volume.

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 (CAL) to enter calibration mode, 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 start the 1st 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 (middle point).



4.1.6 To calibrate 2nd point, use 4.00 pH buffer and repeat Step 5.1.3 to 5.1.5 (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 If necessary (target pH>8.00), calibrate 3rd point using 10.01 standard pH buffer and repeat Step 5.1.3 to 5.1.5, (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 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.*

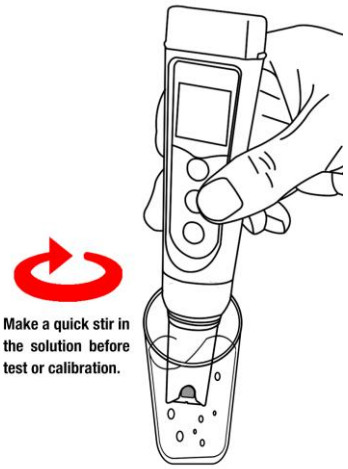
b) *The pH 4.00 and 7.00 buffer solutions poured into the calibration vials can be used for* ***up to 10 times*** *as long as they are not contaminated and the bottles are capped when not in use. pH 10.01 can only be used for* ***up to 5 times*** *as it will lose its accuracy much faster. After that, 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:*

<table>
<tr><th>Calibration</th><th colspan="2">USA Series</th><th colspan="2">NIST Series</th><th>Indication icon</th><th>Recommended</th></tr>
<tr><td>1-pt</td><td colspan="2">7.00 pH</td><td colspan="2">6.86 pH</td><td>(M)</td><td>Accuracy requirement ≥ 0.1 pH</td></tr>
<tr><td rowspan="2">2-pt</td><td>Option A</td><td>1st pt: 7.00 pH
2nd pt: 4.00 pH or 1.68 pH</td><td>Option A</td><td>1st pt: 6.86 pH
2nd pt: 4.01 pH or 1.68 pH</td><td>(L) (M)</td><td>Range < 7.00 pH</td></tr>
<tr><td>Option B</td><td>1st pt: 7.00 pH
2nd pt: 10.01 pH or 12.45 pH</td><td>Option B</td><td>1st pt: 6.86 pH
2nd pt: 9.18 pH or 12.45 pH</td><td>(M) (H)</td><td>Range >7.00 pH</td></tr>
<tr><td>3-pt</td><td colspan="2">1st pt: 7.00 pH
2nd pt: 4.00 or 1.68 pH
3rd pt: 10.01 or 12.45 pH</td><td colspan="2">1st pt: 6.86 pH
2nd pt: 4.01 or 1.68 pH
3rd pt: 9.18 pH or 12.45 pH</td><td>(L) (M) (H)</td><td>Range: 0 to 14.00 pH</td></tr>
</table>

5 pH Measurement

5.1 How to take pH measurements



Short press MEAS to turn on the tester. Rinse the probe in distilled 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 (☺ appears and stays on screen).

5.2 Pure Water pH Measurement

When testing 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 1413µS and 12.88 mS conductivity calibration solution 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/cm conductivit(M)libration 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 will appear at the bottom left of the screen, indicating a successful 1st point conductivity calibration.

6.5 If needed (your target 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 7.3 to 7.4 to complete the 2nd 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 84µS, 1413 µS/cm and 12.88 mS/cm conductivity calibration solution. User can conduct 1 to 3 points calibration. Refer to the table below. Usually calibrating the tester with 1413 µS/cm conductivity buffer solution alone shall meet the testing requirement.

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

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 contamination.

7 Conductivity Measurement

7.1 Short press (MEAS) to turn on the tester. Rinse the probe in distilled water and dry it. 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.

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) The tester only needs to be calibrated in Conductivity mode.

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 Under regular usage (daily or weekly use), make sure the probe cap is wet, and tightly close the cap with the O-ring.

9.2 For long-term storage (you are not going to use the product for a while), add 3M KCL soaking solution to the Fill line in the probe cap and store the probe in it. Close on the probe cap tightly with the O-ring.

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 add in new soaking solution. 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 Apera 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	Select automatic lock	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) Select standard pH buffer solution (P1): There are two options of standard buffer solutions: USA series and NIST series. Refer to following chart:

Icons		pH Standard Buffer Solution Series	
		USA series	NIST series
Three-point calibration	(L)	1.68 pH and 4.00 pH	1.68 pH and 4.01 pH
	(M)	7.00 pH	6.86 pH
	(H)	10.01 pH and 12.45 pH	9.18 pH and 12.45 pH

b) Automatic lock (P2): 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 (CAL) to cancel auto. hold.

c) Backlight (P3)

“Off”-turn off backlight, “On”-turn on backlight, 1- backlight will last for 1 minute.

d) Factory default setting(P8)

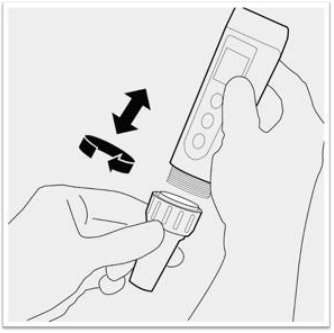
Select “Yes” to recover instrument calibration to theoretical value (pH value in zero potential is 7.00, slope is 100%), parameter setting return to initial value. This function can be used when instrument does not work well in calibration or measurement. Calibrate and measure again after recover the instrument to factory default status.

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
	Automatic 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.

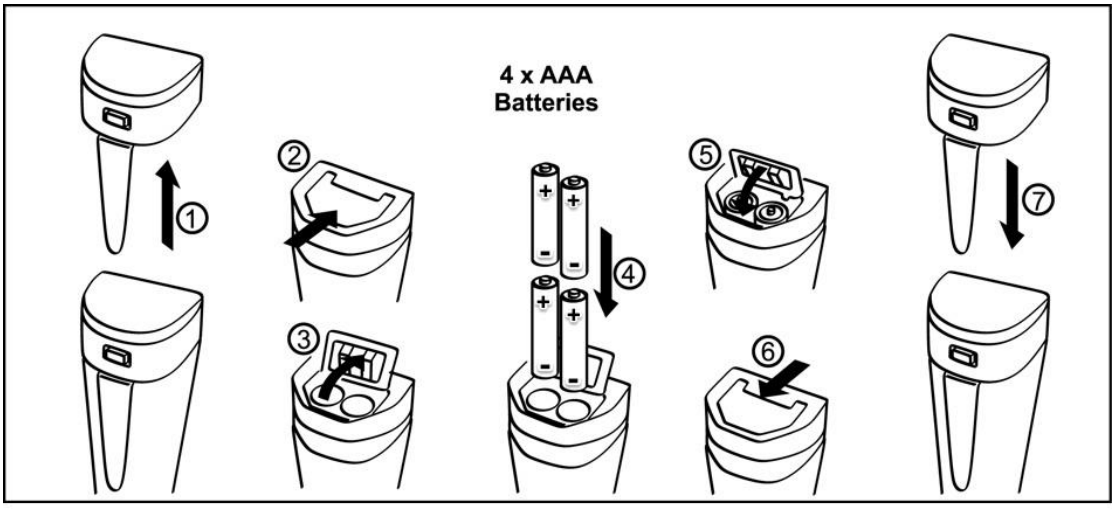
Probes compatible with PC60 Tester:

- AI1211 PC60-E (Regular pH/conductivity probe), AI3719-E PC60-DE (Double-junction pH/conductivity probe), AI1201 PH60-E (Regular pH glass bulb probe), AI3711-E PH60-DE (Double-junction pH glass bulb probe), AI1205 PH60S-E (Spear pH probe for solids/semi-solids pH testing), AI1203 PH60F-E (Flat pH probe for surface pH testing), AI1209 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 TES D POTENTIAL HAZARDS!)



14 Troubleshooting Guide

Trouble	Reason	How to fix
Cannot calibrate	Pressing CAL too soon (showing Er2)	Wait for ☺ to stay on the screen before pressing CAL
	Incorrect standard solutions (showing Er 1)	Reboot tester, calibrate pH 7 first, then pH 4. For details refer to Section 5.2 (a)
	Poor quality standard solutions (showing Er 1)	Replace with fresh and clean standard calibration solutions made by legitimate scientific instrument manufacturers.
	Contaminated probe (showing Er 1)	Use a soft brush to clean the probe with Apera probe cleaning solution or detergent water.
	Aged probe (showing Er 1)	Replace the probe.
	Dried-out probe (showing Er 1)	Soak in Apera 3M KCL soaking solution for at least 30 minutes.
	Probe is not fully submerged (showing Er 1)	Make sure the probe is immersed in the solution at least 1 inch.
	Air bubbles around the sensor shield (showing Er 1)	Make a quick stir in the solution to remove air bubbles.
Reading is always slowly changing, won't stabilize.	Contaminated probe	Use a soft brush to clean the probe with Apera probe cleaning solution or detergent water.
	Clogged junction	Use a soft brush to clean the probe with Apera probe cleaning solution or detergent water, then soak it in Apera 3M KCL soaking solution overnight.
	Aged probe	Replace the probe.
	Testing pure water pH like tap/drinking/RO/distilled water	Be patient, wait for 1-5 minutes to reach a fully stabilized reading. If still not stabilizing, add Apera 3M KCL solution to test water at 1:1000 ratio.
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 e.g. broken glass bulb or broken conductivity rod sensor, contact us for warranty fulfillment; If there is visible damage, replace the probe.
	Instrument defect	Contact us for warranty fulfillment
Reading keeps jumping	Probe is not fully submerged in the solution	Make sure the probe is immersed into solution 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 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 to the air too long.
Calibration is successful, but reading is not accurate	Aged probe	Replace the probe.
	Air bubbles around the sensor shield	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 storage solution overnight
	Comparison with other testers, test strips, or drop tests	To compare accuracy with other testers, make sure to perform calibration for all testers in the same standard, then test another standard. Whichever gives more accurate reading is the more accurate one. Test strips or drop tests' accuracy is not comparable to pH meters'.
	Poor quality standard solutions	Replace with fresh and clean standard calibration solutions made by legitimate scientific instrument manufacturers.
	The probe is not suitable for your appliacation.	Contact us to find the most appropriate product for your specific application.

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. 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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Email: info@aperainst.com
Website: aperainst.com