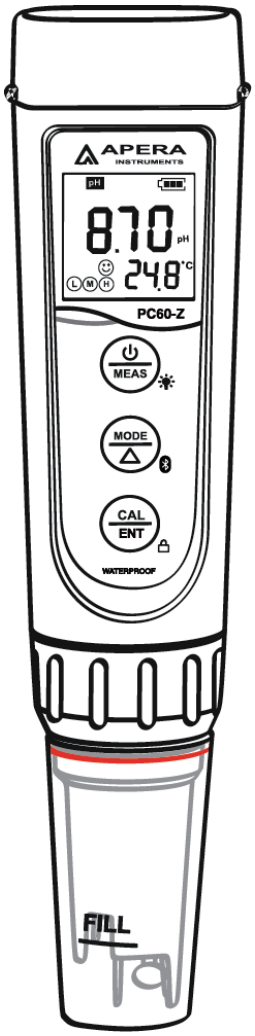
APERA INSTRUMENTS
Fluid Precision since 1991

# PC60-Z Smart Water Tester

pH | Cond. | TDS | Salinity | Resistivity | ORP | Temp.

# User Manual




RoHS compliant | ISO 9001: 2015 | CE | Bluetooth | IP67

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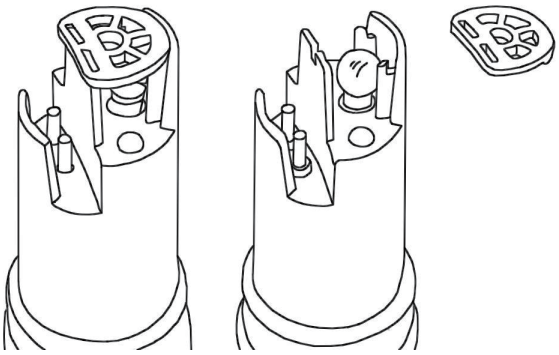
# Table of Contents



## ATTENTION

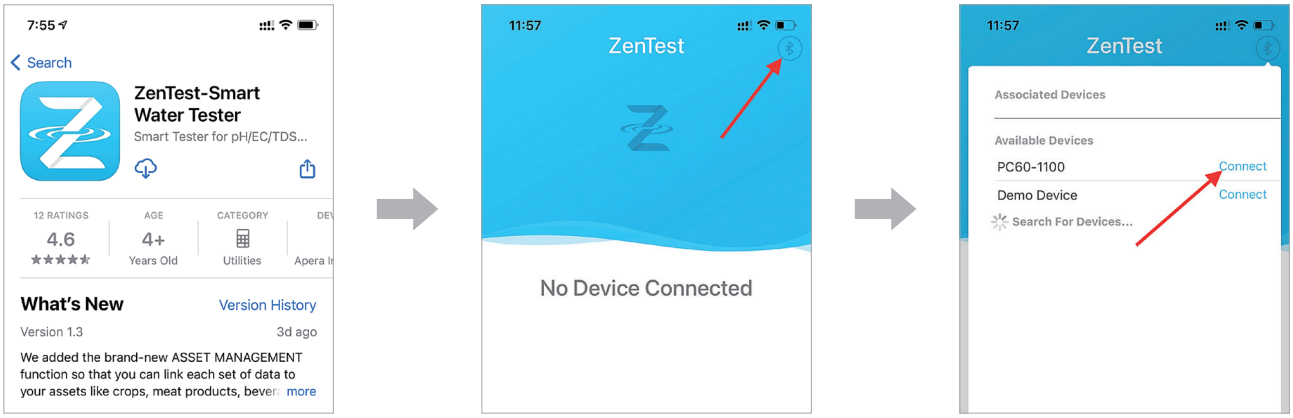
- Water droplets are added during production to maintain the moisture of the probe. This is normal practice and should not be attributed to used product.
- The latest PC60-Z Tester comes with an upgraded probe structure equipped with a sensor shield that prevents glass bulb breakage from accidental collisions (see picture below). Users can remove the shield when cleaning the sensor and put it back on after cleaning.



# 1. Introduction

Thank you for choosing Apera Instruments PC60-Z Smart Multi-Parameter Water Tester. This product is designed for accurate measurement of pH, conductivity, TDS, salinity, resistivity, and temperature for general water solution applications such as pools and spas, hydroponics, water treatment, aquarium, environment monitoring, etc.

1.1 Search **"zentest smart"** in Apple App Store or Google Play App Store to download the latest App for your tester. Turn on the Bluetooth of your phone, go to ZenTest App, tap ⓑ on the upper right corner, then select your tester to connect.



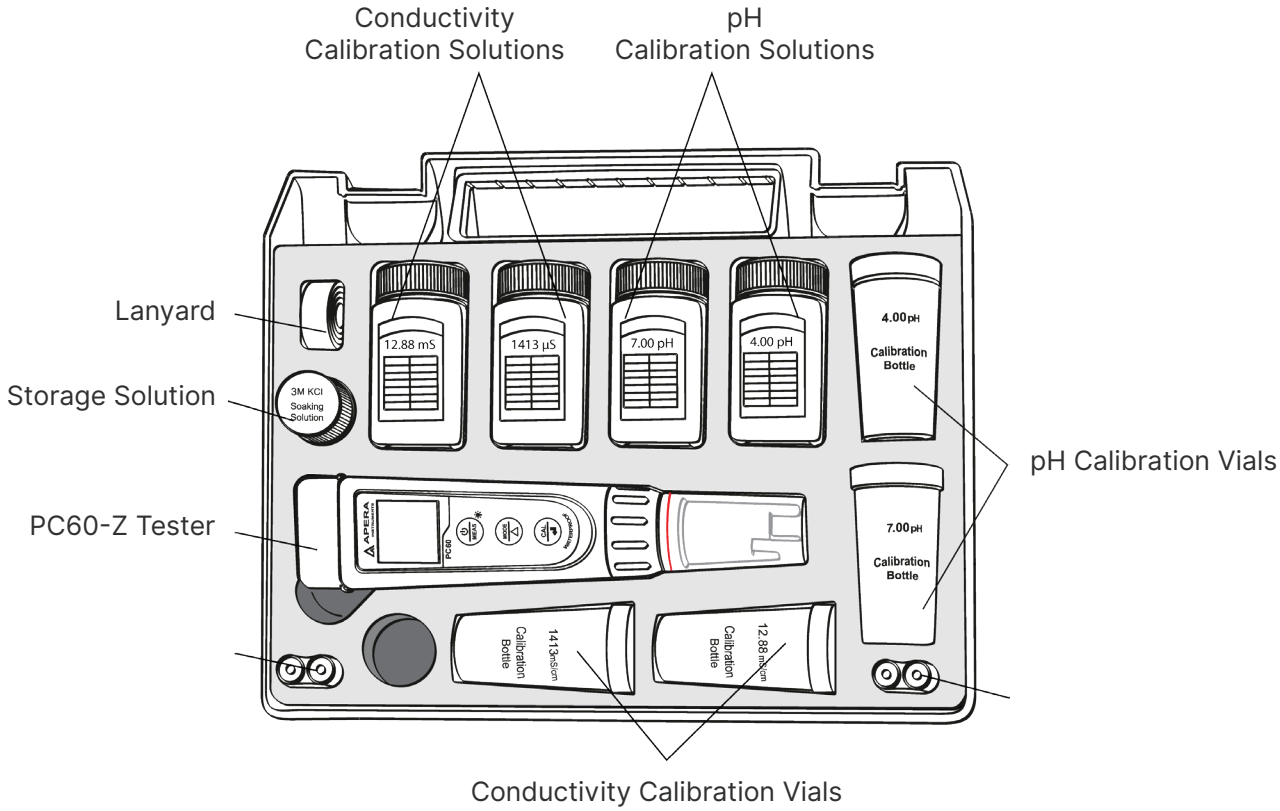

1.2 For video tutorials on how to get the most out of **ZenTest®**, please go to **support.aperainst.com**.

1.3 This product is designed with a two-way control on both the tester and ZenTest App. Please refer to the functions available on each platform in the following table. This manual shows you how to operate the tester without connecting to a smartphone.

Table 1: Functions on 60-Z Tester and ZenTest® Mobile App

| Functions | 60-Z Tester | ZenTest Mobile App | |
|---|---|---|---|
| Display | LED display | 1.Basic Mode: digital display+calibration info | Swipe to switch among various modes |
| | | 2.Dial Mode: digital display+dial display | |
| | | 3.Graph Mode: digital display+graph display | |
| | | 4.Table Mode: digital display+real time measurement and history display | |
| Calibration | Press buttons to operate | Operate on smartphone following graphic guides | |
| Self-Diagnosis | Er1 – Er6 icons | Detailed problem analysis and solutions | |
| Parameter Setup | Press buttons to set up (except for P7 and P11) | All parameters can be set up in Settings. | |
| Alarm | The screen turns red when alarm triggered; cannot be setup | Alarm display and alarm values can be preset for each parameter | |
| Data Management | N/A | Manual or Auto. Datalogger; notes can be added to saved data | |
| Data Output | N/A | Share data on Smartphone | |

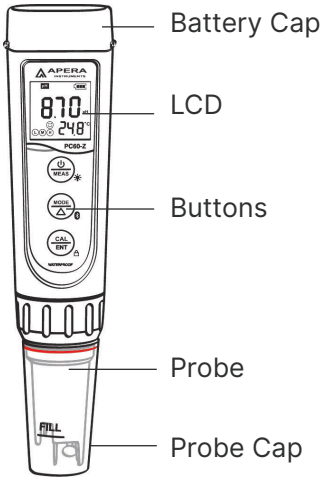
# 2. What's in the Kit

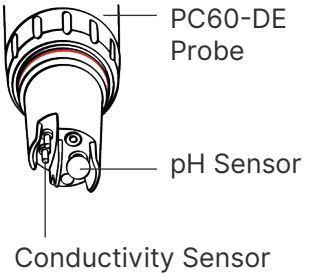



# 3. Keypad Functions

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

| | |
|---|---|
| MEAS | 1. When turned off, short press to turn on the tester; long press to enter parameter setting.<br>2. In calibration mode or parameter setting, short press to return to measurement mode.<br>3. In measurement mode, long press to turn off the tester, short press to turn on/off backlight. |
| MODE | 1. In measurement mode, short press to switch parameter **pH→Cond→TDS→Sal→Res**<br>2. In measurement mode, long press to turn on/off Bluetooth® receiver. When turned on, ⓑ will be flashing; when connected to smartphone, ⓑ will stay on.<br>3. In parameter setting, short press to change parameter (Uni-directional). |
| CAL ENT | 1. Long press to enter calibration mode.<br>2. In calibration mode, short press to confirm calibration.<br>3. In measurement mode, when Auto-Hold is turned off, short press to manually hold or unhold readings. |

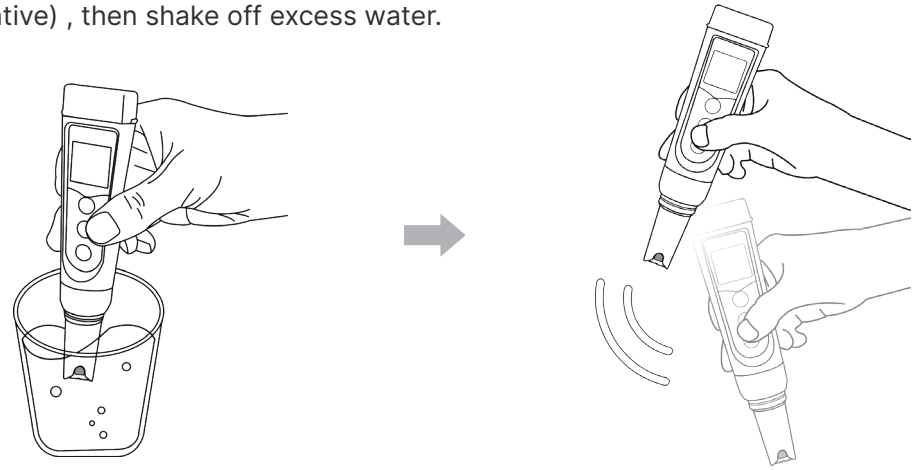


# 4. Preparation before Use

5.1 Pull out the battery insulation slip, and take off the probe cap.

5.2 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.



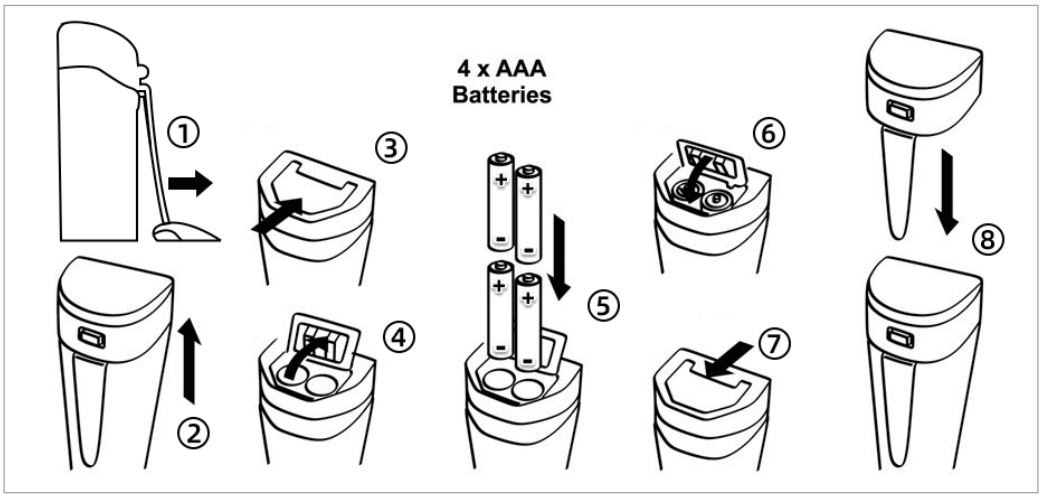
5.3 Perform calibration. For pH calibration tutorial, refer to Section 6; for conductivity calibration, refer to Section 8.

5.4 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.

# 5. 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

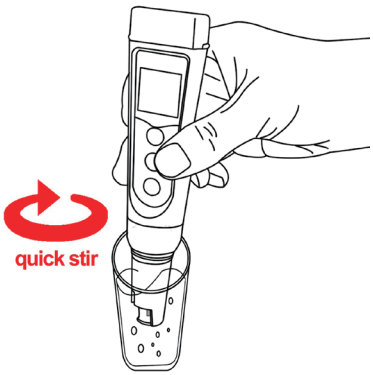
⑤ Insert the batteries (all POSITIVE sides FACE UP) ⑥ Press down the battery compartment

⑦ Slide and lock the battery compartment ⑧ Close on the battery cap

# 6. pH Calibration

6.1 Short press (MEAS) to turn on the meter; rinse the probe in pure water. Shake off excess water.
6.2 Pour buffer solutions into the corresponding calibration vials (to about half volume of the vials).

6.3 Long press (CAL ENT) to enter calibration mode (screen turns green);
6.4 Insert the probe into pH 7.00 buffer solution, make a quick stir, and hold still. When the reading is stabilized (☺ stays on screen), short press (CAL ENT) to finish 1st point calibration. Then the tester returns to measurement mode, icon (M) will appear at the bottom left, indicating a successful 1st point pH calibration.




6.5 To calibrate 2nd point, use 4.00 pH buffer and repeat Step 6.3 to 6.4 (Do NOT turn off the tester after you finish pH 7 calibration). (L) will display next to (M), indicating a successful 2-point pH calibration (low and middle points).

6.6 If necessary, calibrate 3rd point using 10.01 standard pH buffer and repeat Step 6.3 to 6.4, (H) will show up next to (L) and (M), indicating a successful 3-point calibration (high, low, and middle points).

6.7 Notes about Calibration

1) 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.
2) 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.
3) 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<br>2nd pt: 4.00 pH or 1.68 pH | Option A | 1st pt: 6.86 pH<br>2nd pt: 4.01 pH or 1.68 pH | (L) (M) | Range < 7.00 pH |
| | Option B | 1st pt: 7.00 pH<br>2nd pt: 10.01 pH or 12.45 pH | Option B | 1st pt: 6.86 pH<br>2nd pt: 9.18 pH or 12.45 pH | (M) (H) | Range >7.00 pH |
| 3-point | 1st pt: 7.00 pH<br>2nd pt: 4.00 or 1.68 pH<br>3rd pt: 10.01 or 12.45 pH | | 1st pt: 6.86 pH<br>2nd pt: 4.01 or 1.68 pH<br>3rd pt: 9.18 pH or 12.45 pH | | (L) (M) (H) | Range: 0 to 14.00 pH |

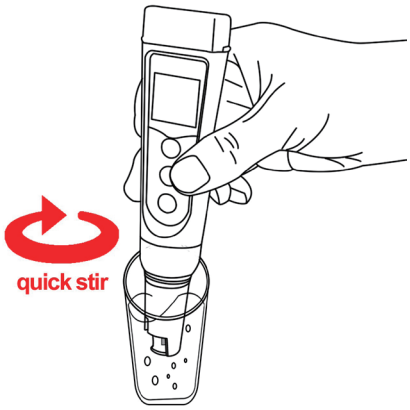
6.8 For the self-diagnosis information, please refer to the table below:

| Symbol | Self-Diagnosis information | Potential problems and how to fix |
|---|---|---|
| Er 1 | The pH calibration solution cannot be recognized by the meter. | 1. Make sure the probe is fully immersed in the calibration solution.<br>2. Check if calibration solution is expired or polluted.<br>3. 1st point of pH calibration must be pH 7.00 or 6.86. See Section 6.7.<br>4. Please check whether pH probe is damaged or broken. If so, please replace with a new one.<br>5. The pH sensor is severely contaminated. Please use a soft brush with soap water or Electrode Cleaning Solution (SKU: AI1166) to clean it thoroughly. Then soak it in 3M KCL 3-5 hours before performing calibration again. |
| Er2 | CAL ENT is pressed before measurement is fully stabilized. | Wait for ☺ to stay on screen before pressing CAL ENT |
| Er3 | During calibration, readings being unstable for over 3 minutes. | 1. Please check whether pH probe is damaged or broken. If so, please replace with a new one.<br>2. The glass bulb or junction is severely contaminated. Please use a soft brush with soap water to clean it thoroughly. Then soak it in 3M KCL overnight before performing calibration again.<br>3. The probe is aged (used for over a year and has a much slower response). A replacement is needed. |
| Er4 | pH probe zero electric potential out of range (<-60mV or >60mV) | 1. Check whether pH buffer solutions comply with the USA or NIST standard.<br>2. Check whether pH buffers are expired or contaminated.<br>3. Please check whether pH probe is damaged or broken. If so, please replace with a new one.<br>4. The probe is aged (used for over a year and has a much slower response). A replacement is needed.<br>5. The probe is invalidated (Er4/Er5 repetitively appears, and problems 1, 2, 3 are excluded). Probe replacement is needed. |
| Er5 | pH probe slope out of range (<85% or >110%) | |
| Er6 | The calibration reminder is triggered. It's time to perform a new pH calibration. | Perform pH calibration or cancel calibration reminder in ZenTest App settings. |

# 7. pH Measurement

### 7.1 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 13.2 (2)), the reading will be automatically locked when it's stable. Short press (CAL ENT) to cancel the Auto-Hold and keep measuring.




### 7.2 Pure Water pH Measurement

When testing pH of pure water such as 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.

# 8. Conductivity Calibration

### 8.1 How to calibrate

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

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

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

8.1.4 Dip the probe into 1413 µS conductivity calibration solution, make a quick stir and hold still. When the reading is fully stabilized (☺ stays on screen), short press (CAL ENT) to finish 1st point calibration. Then the tester returns to measurement mode and (M) will appear at the bottom left, indicating a successful 1st point conductivity calibration.

8.1.5 If needed (your estimated sample conductivity level is greater than 2 mS or 2000 µS), insert the probe into the 12.88 mS conductivity calibration solution. Follow the steps in 8.1.3 to 8.1.4 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.

### 8.2 Conductivity Calibration Notes

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

| 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 |

For conductivity calibration solutions, we recommend replacing the solutions after up to 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.

* Once conuductivity is calibrated, TDS, saliniity, and resistivity will be automatically calibrated.

### 8.3 For the self-diagnosis information, please refer to the table below:

| Symbol | Self-Diagnosis information | How to fix |
|---|---|---|
| Er 1 | The meter cannot recognize the conductivity standard solutions. | 1. Make sure the probe is fully submerged in the solution.<br>2. Check if the standard solution is expired or contaminated.<br>3. Check if the conductivity probe (two black rods) is damaged.<br>4. Check if the conductivity probe is contaminated. If so, please use a soft brush with warm water to clean up. |
| Er2 | CAL/ENT is pressed before measurement is fully stabilized. | Wait for ☺ to come up and stays on screen before pressing CAL/ENT |
| Er3 | During calibration, readings being unstable for over 3 minutes | 1. Shake the probe to remove the air bubbles on the surface of the black rods<br>2. Check if the conductivity probe is contaminated. If so, please use a soft brush with warm water to clean up.<br>3. Soak the probe in 12.88 mS solution for 10 minutes, then rinse with distilled water. |
| Er6 | The calibration reminder is triggered. It's time to perform a new conductivity calibration. | Perform conductivity calibration or cancel calibration reminder in ZenTest settings. |

# 9. Conductivity Measurement

### 9.1 How to Measure Conductivity, TDS, Salinity, and Resistivity

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). Press MODE △ to switch from conductivity to TDS, salinity, and resistivity. Or if you turn on the Auto-Hold function (refer to Section 13.2 (2)), the reading will be automatically locked when it's stable. Short press CAL ENT to cancel the Auto-Hold and keep measuring.

### 9.2 Unit Conversion

a. 1000 µS = 1 mS = 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 P13 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. Conversion Example: if conductivity measurement is 1000µS, 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.

### 9.3 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 P10. 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 | | |

# 10. ORP Measurement

1) ORP stands for Oxidation-Reduction Potential, measured in mV. It's also called redox. ORP is a measure of the cleanliness of water & its ability to break down contaminants. A separate ORP probe (ORP60-DA) needs to be installed to be able to measure ORP.
2) Power on the PC60-Z tester, unscrew the original probe, and install the ORP60-DA probe, then the tester will automatically switch to ORP measurement mode (Refer to Section 16 for how to replace a probe).
3) Rinse the probe in pure water and shake off excess water. Dip the probe in sample solution, make a quick stir and hold still. Record the ORP reading after it's fully stabilized ☺ stays on screen.

# 11. Probe Cleaning

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.
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.

# 12. Probe Storage

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.
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.
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.
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.

# 13. Parameter Settings

### 13.1 Table of Settings

| Symbol | Parameter Setting Contents | Content | Factory Default |
|---|---|---|---|
| P1 | Temperature Unit | ˚C – ˚F | ˚F |
| P2 | Auto. HOLD | 5-20 seconds – Off | Off |
| P3 | Automatic Backlight Off | 1-8 minutes – Off | 1 |
| P4 | Automatic Power Off | 10-20 minutes – Off | 10 |
| P5 | pH Buffer Series Selection | USA – NIST | USA |
| P6 | pH Resolution | 0.1 – 0.01 | 0.01 |
| P7 | pH Calibration Reminder | H-hours D-Days (set up in ZenTest App) | / |
| P8 | pH back to factory default | No – Yes | No |
| P9 | Conductivity Reference Temperature | 15˚C to 30˚C | 25˚C |
| P10 | Temp. Compensation Coefficient | 0 to 9.99 | 2.00 |
| P11 | Conductivity Calibration Reminder | H-hours D-Days (set up in ZenTest App) | / |
| P12 | Conductivity Back to Factory Default | No – Yes | No |
| P13 | TDS Factor | 0.40 to 1.00 | 0.71 |
| P14 | Salinity Unit | ppt – g/L | ppt |

### 13.2 Parameter Settings Examples

1) When the meter is turned off, long press (MEAS) to enter parameter setting →short press (MODE) to switch P01-P02... →P14. Short Press (CAL ENT) , parameter flashes → short press (MODE) to adjust parameter → short press (CAL ENT) to confirm →Short press (MEAS) to exit parameter setting and go back to measurement mode.

2) **Auto-Hold (P02)** – You can set the auto-hold time from 5 to 20 seconds. For example, if 10 seconds is set, when the reading is stable for more than 10 seconds, the reading will be automatically locked, and the HOLD icon will be displayed. Short press (CAL ENT) again to cancel the lock. When the setting is "Off" , the auto-hold function is turned off, the reading can only be manually locked. Short press (CAL ENT) to lock or unlock readings while measuring.

3) **Auto. Backlight (P03)** – You can set the automatic backlight time for 1 to 8 minutes. For example, if 3 minutes is set, the backlight will turn off automatically after 3 minutes; when the “Off” is set, the auto. backlight function will be turned off, and short press (MEAS) to manually turn the backlight on or off.

4) **Auto. Power off (P04)** – The auto. power off time can be set to 10 to 20 minutes. For example, if 15 minutes is set, the meter will automatically shut down after 15 minutes if no operation; when "Off" is set, the auto. power off function will be turned off. Long press MEAS to manually shut down the meter.

5) **pH Calibration Reminder (P07) and Conductivity Calibration Reminder (P11)** – set XX hours (H) Or XX days (D) in ZenTest mobile app – settings – Parameter – pH – Calibration Reminder. On the meter, you can only check the values that's been set up on ZenTest App. For example, if 3 days is set up, the Er6 icon (see Figure-4) will appear in the lower right corner of the LCD screen in 3 days to remind you to perform calibration, also in the ZenTest App there will be a pop-up reminder. After calibration is finished or the reminder setting is cancelled in the ZenTest App, the Er6 icon will disappear.

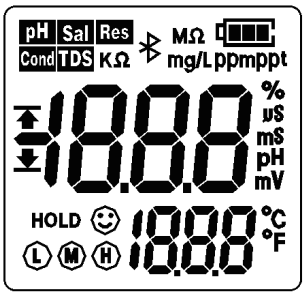
6) **pH Back to Factory Default (P08) and Conductivity Back to Factory Default (P12)** – Select "**Yes**" to set the meter to its default status (erase all calibration record and return all parameter settings to the default value). This function can be used when the meter does not work well in calibration or measurement. Calibrate the meter again after setting the meter to factory default.

# 14. Technical Specifications

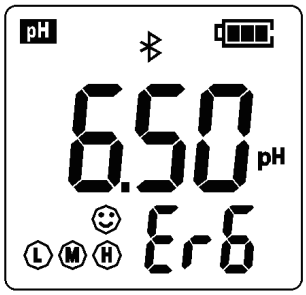
| | | |
|---|---|---|
| pH | Range | -2.00 to 16.00 pH |
| | Resolution | 0.01 pH |
| | Accuracy | ±0.01 pH ±1 digit |
| | Calibration Points | 1 to 3 points |
| | Auto. Temperature Compensation | 0 – 50˚C (32 – 122˚F) |
| Conductivity | Range | 0 to 199.9 µS, 200 to 1999 µS, 2 to 20.00 mS |
| | Resolution | 0.1/1 µS, 0.01 mS |
| | 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 |
| Resistivity | Range | 50Ω to 20MΩ |
| ORP (mV) | Range | -1000 mV to 1000 mV |
| | Accuracy | ±0.2% F.S |
| Temperature | Range | 0 to 50˚C (32-122˚F) |
| | Accuracy | ±0.5˚C |

# 15. Icons and Functions

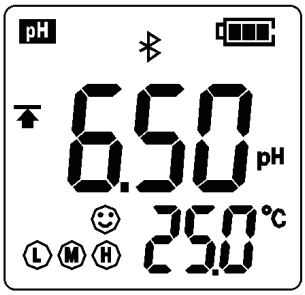
| | | | |
|---|---|---|---|
| Calibrated points | Ⓛ Ⓜ Ⓗ | Self-Diagnosis Symbol | Er1, Er2, Er3, Er4, Er5, Er6 |
| Stable reading indicator | ☺ | Waterproof Rating | IP67, floats on water |
| Reading Lock | HOLD | Power | DC3V, AAA batteries*4 |
| Bluetooth Signal | ᛒ | Battery Life | ＞ 200 Hours |
| Low power reminder | ▭ | Backlight | White: Measurement<br>Green: Calibration　Red: Alarm |
| Auto. Power Off | Automatically power off if no operation for 10 minutes | | |
| Dimension/Weight | Instrument：40×40×178mm/133g;　case：255×210×50mm/680g; | | |




Graph-3
LCD Display

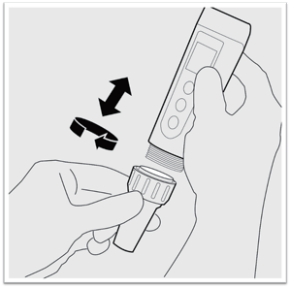



Graph-4
pH calibration reminder




Graph-5
pH alarm triggered

# 16. 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.

**The replacement probes that are compatible with PC60-Z:**

- PC60-DE (Default pH/conductivity probe), PH60-DE (Regular pH probe for water solutions),
- PH60S-DE (spear pH probe for food testing), PH60F-DE (flat pH probe for surface testing)
- EC60-DE (conductivity probe)
- ORP60-DA (ORP probe).

∗**Probes don't last forever.** Every probe will eventually age and fail even if you don't use it that often. The typical service life of Apera probes is 12-24 months depending on the frequency of usage and how well you keep it clean and properly stored. We recommend replacing your probe every 1 to 2 years to ensure the best performance.

# 17. Troubleshooting Guide

| Trouble | Potential Reasons | 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 1-year probe warranty, contact your point of purchase for warranty fulfillment;<br>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.<br>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.<br>Test strips or drop tests' accuracy is not comparable to pH meters'. |

# 18. 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.

# 19. FCC Warning Statement

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radiocommunications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**APERA INSTRUMENTS, LLC**

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