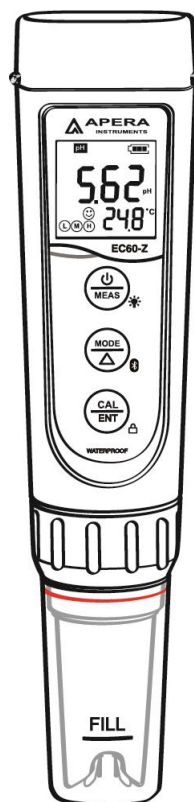


SKU:AI3718



EC60-Z Smart Multi-Parameter Tester (Conductivity/TDS/Salinity/Resistivity/Temp.)

Instruction Manual



ISO 9001:2015



APER A INSTRUMENTS, LLC

www.aperainst.com

V1.03

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ATTENTION

- 1. You may find a few drops of water in the probe cap. These water droplets are added to maintain the sensitivity of the conductivity sensor before the product leaves factory. It does NOT mean the product is used.**
- 2. The batteries are already preinstalled. Just pull off the paper slip before using the tester. When you replace the batteries, make sure to follow the correct directions: all four AAA batteries' positive sides must FACE UP.**

1 Introduction

Dear Customer,

Thank you for choosing Apera Instruments EC60-Z Smart Conductivity Tester. Please carefully read this manual before using the product in order to have a reliable testing experience.

1.1 This product is designed with a two-way control on both the tester and ZenTest Mobile 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

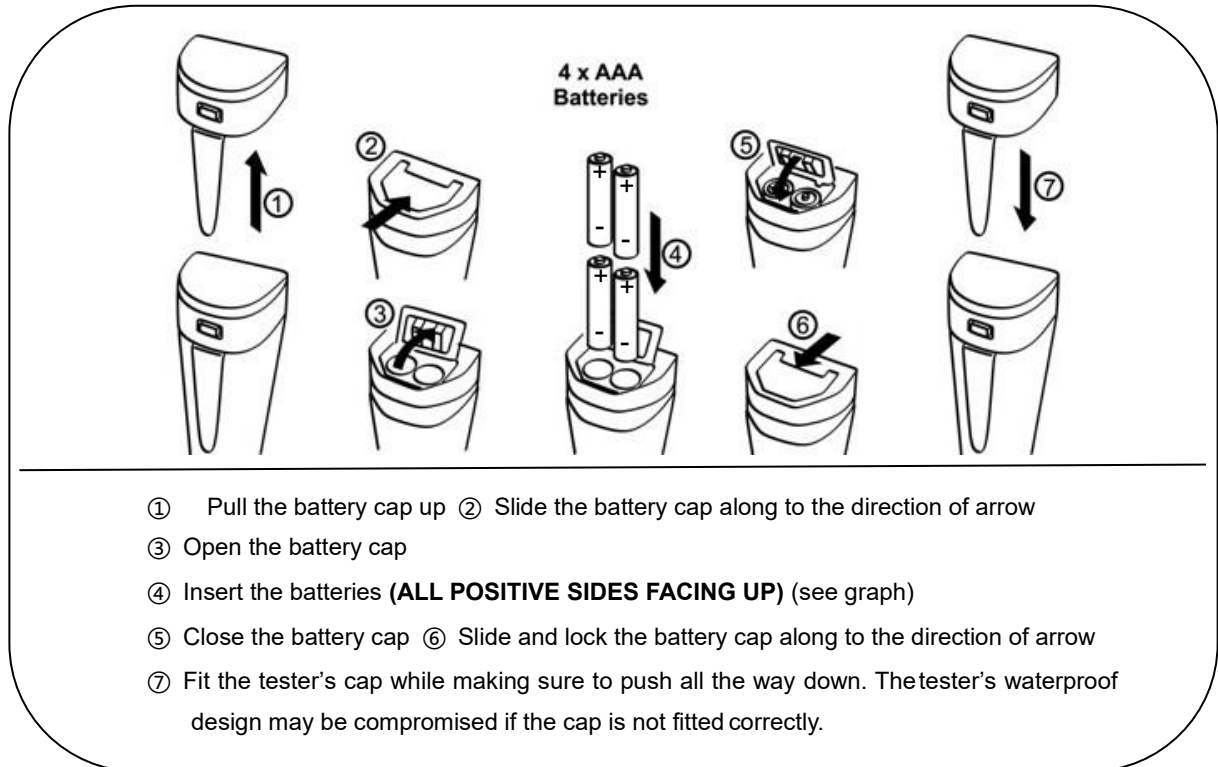
| Functions | 60-Z Tester | ZenTest Mobile App | |
|-----------------|--|--|-------------------------------------|
| Display | LED display | 1. Basic Mode: digital display+calibration info | Swipe to switch among various modes |
| | | 2. Dial Mode: digital display+dial display | |
| | | 3. Graph Mode: 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 | |
| Datalogger | N/A | Manual or Auto. Datalogger; notes can be added to saved data | |
| Data Output | N/A | Share data via Email | |

1.2 Search ZenTest in Apple App Store or Google Play App Store to download the latest App for your tester.

1.3 For video tutorials on how to connect the tester to your smartphone and perform more functions in **ZenTest** Mobile App, please go to support.aperainst.com

2 Battery Installation

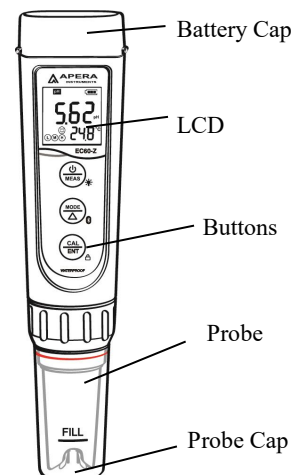
Please install batteries according to the following steps. *Please note direction of batteries: **All POSITIVE SIDES (“+”) FACING UP.** (Wrong installation of batteries will cause damage to the tester and potential hazards)



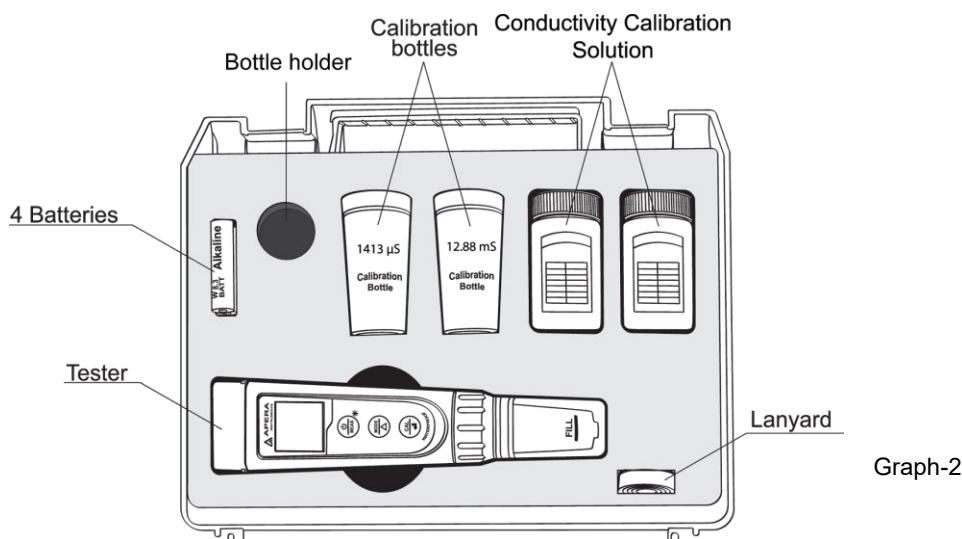
3 Keypad Functions

■ **Short press**----- < 2 seconds ,**Long press**----- > 2 seconds

| | |
|--|---|
| | <ol style="list-style-type: none"> 1. When turned off, short press to turn on the tester; long press to enter parameter setting. 2. In calibration mode or parameter setting, short press to return to measurement mode. 3. In measurement mode, long press to turn off the tester, short press to turn on/off backlight. |
| | <ol style="list-style-type: none"> 1. In measurement mode, short press to switch parameter Cond→TDS→Sal→Res 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. 3. In parameter setting, short press to change parameter (Unidirectional). |
| | <ol style="list-style-type: none"> 1. Long press to enter calibration mode. 2. In calibration mode, short press to confirm calibration. 3. In measurement mode, when automatic lock is turned off, short press to manually lock or unlock readings. |



4 Complete Kit



5 Things to Know Before Use

- 1) A few drops of water are added to the probe cap to keep the conductivity electrode in an activated state before the tester leaves factory. Generally, users can start using the tester directly. For conductivity electrode that hasn't been used for a long time, users should soak the electrode in 12.88 mS calibration solution for 5-10 minutes or in tap water for 1 to 2 hours before use. Rinse the electrode in distilled/deionized water after each measurement.
- 2) The sensing rod of Model 2301T-S conductivity electrode is coated with platinum black to minimize electrode polarization and expand measuring range. The platinum black coating adopted our special processing technology, which improves the electrode performance and the firmness of the coating. If the black sensing rods are stained, gently clean the electrode with a soft brush in warm water containing detergent or alcohol.
- 3) Things needed in addition to what's in the box:
 - a) Distilled or deionized water (8-16oz) for rinsing the probe after each test
 - b) Tissue paper for drying the probe

6 Conductivity Calibration

6.1 How to calibrate

- 1) Press $\text{MODE} \triangle$ key to switch to conductivity measurement mode (**Cond**). Rinse the probe in distilled water and dry it.
- 2) Pour certain amount of 1413 $\mu\text{S}/\text{cm}$ and 12.88mS/cm conductivity calibration solution into corresponding calibration bottles (to about half volume of the bottle).
- 3) Long press CAL ENT key to enter calibration mode, short press MEAS to go back to measurement mode.
- 4) Place the probe into 1413 $\mu\text{S}/\text{cm}$ conductivity calibration solution, shake it for a few seconds and allow it to stand still in the solution until a stable reading is reached. When SMILE stays on the LCD screen, short press CAL ENT key to complete 1st calibration, the tester returns to measurement mode and indication icon M will appear at the bottom left of the LCD screen.

- 5) After calibration, place the probe in 12.88 mS/cm conductivity calibration solution. If the value is accurate, it is not necessary to conduct 2nd point calibration. If it is inaccurate, follow the steps in 3) to 4) to complete the 2nd point of calibration using 12.88 mS/cm calibration solution.

6.2 Notes





- 1) TDS, salinity, and resistivity values are converted from conductivity. So only conductivity needs to be calibrated.
- 2) The tester can calibrate 1413 $\mu\text{S}/\text{cm}$, 12.88 mS/cm, and 84 $\mu\text{S}/\text{cm}$ (sold separately) conductivity calibration solution. User can conduct 1 to 3 points calibration. Refer to the table below. Usually calibrating the tester with 1413 $\mu\text{S}/\text{cm}$ conductivity buffer solution alone shall meet the testing requirement.

| Calibration Indication Icon | Calibration Standards | Measuring Range |
|-----------------------------|------------------------------|------------------------------------|
| Ⓐ | 84 $\mu\text{S}/\text{cm}$ | 0 - 199 $\mu\text{S}/\text{cm}$ |
| Ⓑ | 1413 $\mu\text{S}/\text{cm}$ | 200 - 1999 $\mu\text{S}/\text{cm}$ |
| Ⓒ | 12.88 mS/cm | 2.0 – 20.00 mS/cm |





- 3) The tester has been calibrated before leaving factory. Generally, users can use the tester directly or users can test conductivity calibration solutions first. If the error is large, then calibration is needed.
- 4) Conductivity calibration solutions are easier to get polluted than pH buffers, we recommend that users replace new conductivity solutions after 5 to 10 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.
- 5) Temperature compensation factor: The default setting of the temperature compensation factor is 2.0%/°C. User can adjust the factor based on test solution and experimental data in parameter setting P10.

| 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 | | |

- 6) *1000 $\mu\text{S}/\text{cm}$ =1mS/cm; 1000 ppm = 1 ppt
- 7) TDS and conductivity is linear related, and its conversion factor is 0.40-1.00. Adjust the factor in parameter setting P13 based on the requirements in different industries. The factory default setting is 0.71. Salinity and conductivity is linear related, and its conversion factor is 0.5. The tester only needs to be calibrated in Conductivity mode, then after calibration of conductivity, the meter can switch from conductivity to TDS or salinity.
- 8) Conversion Example
if conductivity measurement is 1000 $\mu\text{S}/\text{cm}$, then the default TDS measurement will be 710 ppm (under the default 0.71 conversion factor), and the salinity be 0.5 ppt.
- 9) 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. | <ol style="list-style-type: none"> 1. Make sure the probe is fully submerged in the solution. 2. Check if the standard solution is expired or contaminated. 3. Check if the conductivity electrode (two black rods) is damaged. 4. Check if the conductivity electrode is contaminated. If so, please use a soft brush with warm water to clean up. 5. If none of the above, please contact us at info@aperainst.com or +1 (614) 285-3080 |
| Er 2 |  Is pressed before measurement is fully stable ( comes up and stays) | Wait for  to come up and stays on screen before pressing  |
| Er 3 | During calibration, readings being unstable for over 3 minutes | <ol style="list-style-type: none"> 1. Shake the probe to remove the air bubbles on the surface of the black rods 2. Check if the conductivity electrode is contaminated. If so, please use a soft brush with warm water to clean up. 3. Soak the probe in 12.88mS/cm solution for 10 minutes, then rinse with distilled water. 4. If none of the above, please contact us at info@aperainst.com or +1 (614) 285-3080 |
| Er 6 | The calibration reminder is triggered. It's time to perform a new conductivity calibration | Perform conductivity calibration or cancel calibration reminder in ZenTest settings. |

7 Conductivity Measurement











Press  key to turn on the tester. Press  to switch to Conductivity measuring mode. Rinse the probe in distilled water and remove excess water. Insert the probe in sample solution, shake it for a few seconds, and allow it to stand still in the solution until a stable reading is reached. Get readings after  comes up and stays. Press  to switch from conductivity to TDS, salinity, and resistivity.

8 Parameter Setting

8.1 Table of Settings

| Symbol | Parameter Setting Contents | Content | Factory Default |
|--------|--------------------------------------|--|-----------------|
| P1 | Temperature Unit | °C – °F | °F |
| P2 | Select automatic lock | 5-20 seconds – Off | Off |
| P3 | Automatic Backlight Off | 1-8 minutes – Off | 1 |
| P4 | Automatic Power Off | 10-20 minutes – Off | 10 |
| P5 | Conductivity Reference Temperature | 15 °C to 30 °C | 25 °C |
| P6 | Temp. Compensation Coefficient | 0 to 9.99 | 2.00 |
| P7 | Conductivity Calibration Reminder | H-hours D-Days (set up in ZenTest App) | / |
| P8 | Conductivity Back to Factory Default | No – Yes | No |
| P9 | TDS Factor | 0.40 to 1.00 | 0.71 |
| P10 | Salinity Unit | ppt – g/L | ppt |

8.2 Parameter Setting





- When the meter is turned off, long press  to enter parameter setting → short press  to switch P01-P02... → P14. Short Press , parameter flashes → short press  to adjust parameter → short press  to confirm → Short press  to exit parameter setting and go back to measurement mode.
- Auto. Lock (P02)** – Users can set the auto lock time from 5 to 20 seconds. For example, if 10 seconds is set, when the measured value is stable for more than 10 seconds, the measured value will be automatically locked, and the HOLD icon will be displayed. Short press  to release the lock. When the setting is "Off", the Auto. lock function is turned off, that is, the measured value can only be manually locked. Short press  to lock or unlock the measured value. The HOLD icon will be displayed when reading is locked.
- Auto. Backlight (P03)** — Users 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  to manually turn the backlight on or off.
- 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  to manually shut down the meter.

- 5) **Conductivity Calibration Reminder (P7)** – set X hours (H) Or X 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) **Conductivity Back to Factory Default (P8)** – Select “Yes” to recover instrument calibration to theoretical value. This function can be used when instrument does not work well in calibration or measurement. Calibrate and measure again after setting the instrument back to factory default.

9 Technical Specifications

| | | |
|--------------|--------------------|---|
| Conductivity | Range | 0 to 199.9 μ S, 200 to 1999 μ S, 2 to 20.00 mS/cm |
| | Resolution | 0.1/1 μ S, 0.01 mS/cm |
| | Accuracy | \pm 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 | 50 Ω to 20M Ω |
| Temperature | Range | 0 to 50°C (32-122°F) |
| | Accuracy | \pm 0.5°C |

10 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 |  | Battery Life | > 200 Hours |
| Low power reminder |  | Backlight | White: Measurement; Green: Calibration; Red: Alarm |
| Auto. Power Off | Automatically power off if no operation for 10 minutes | | |
| Dimension/Weight | Instrument: 40x40x178mm/133g; case: 255x210x50mm/550g; | | |

11 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. The replacement probe that is compatible with EC60-Z is: **EC60-DE**

12 Warranty

We warrant this instrument to be free from defects in material and workmanship and agree to repair or replace free of charge, at option of APERA INSTRUMENTS, LLC, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS, LLC for a period of TWO YEARS (SIX MONTHS for the probe) from the delivery. This limited warranty does NOT cover any damages due to: accidental damage, unauthorized repair, normal wear and tear, or external causes such as accidents, abuse, or other actions or events beyond our reasonable control.

To claim for warranty or seek additional help, please go to support.aperainst.com and click **New support ticket**.

Please provide the following information in the ticket:

| | | | |
|--------------|---|--------------------------------|----------------------|
| Your Name | Phone Number | Email | Shipping Address |
| Product Name | Serial Number (on the back of the meter) | Photo or screenshot of receipt | Problems experienced |

- After the ticket is submitted, one of our customer care specialists will be assisting you within 1 business day.

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