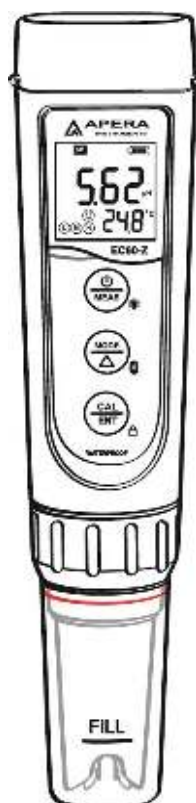**APERA**
INSTRUMENTS

EC60-Z Smart Multi-Parameter Tester

(*Conductivity/TDS/Salinity/Resistivity/Temp.*)

Instruction Manual

APERA INSTRUMENTS (Europe) GmbH

www.aperainst.de

V1.03

Contents

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

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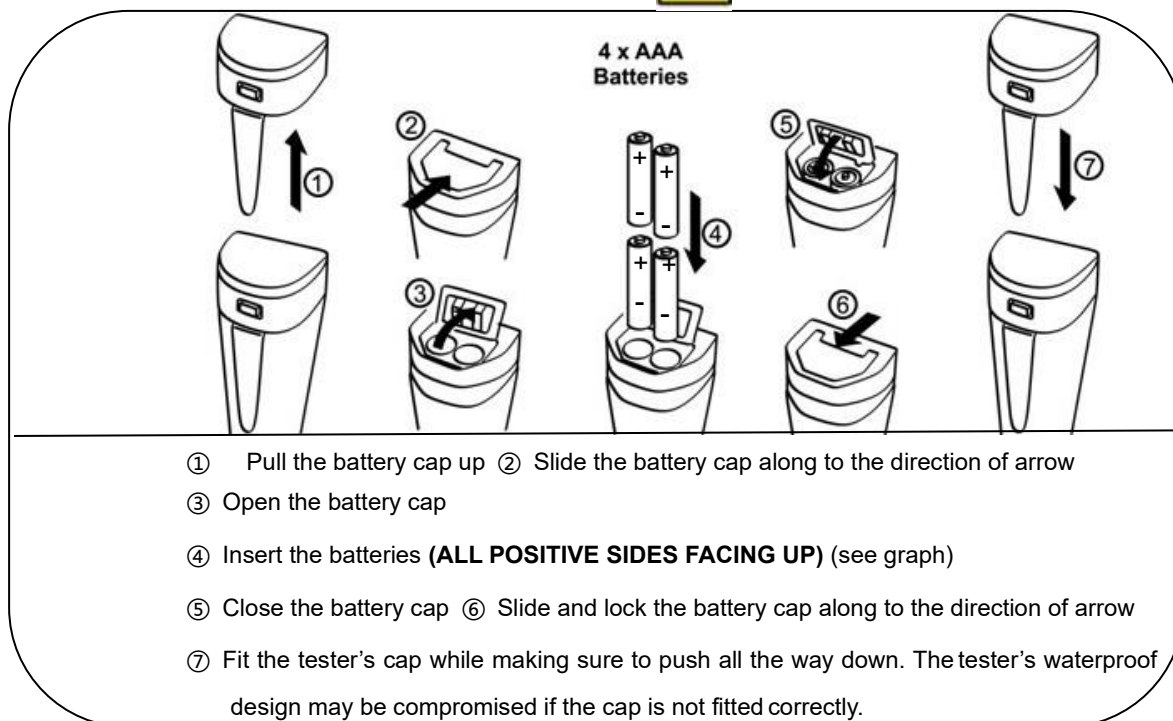
Table 1: Funtions on 60-Z Tester and ZenTest® Mobile App

Functions	60-Z Tester	ZenTest Mobile App	
Display	LCD 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 **www.aperainst.de**

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)


① Pull the battery cap up ② Slide the battery cap along to the direction of arrow

③ Open the battery cap

④ Insert the batteries **(ALL POSITIVE SIDES FACING UP)** (see graph)

⑤ Close the battery cap ⑥ Slide and lock the battery cap along to the direction of arrow

⑦ Fit the tester's cap while making sure to push all the way down. The tester's waterproof design may be compromised if the cap is not fitted correctly.

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. 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.
MODE △	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 (Uni-directional).
CAL ENT	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.

Battery Cap

LCD Display

Buttons

Probe Ring
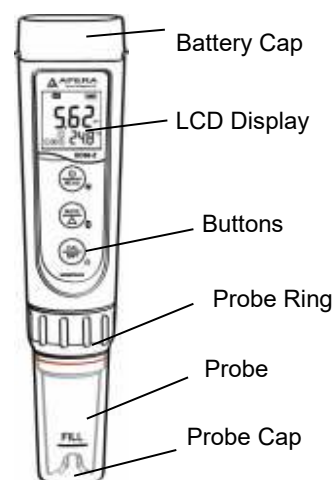
Probe

Probe Cap

4. Complete Kit
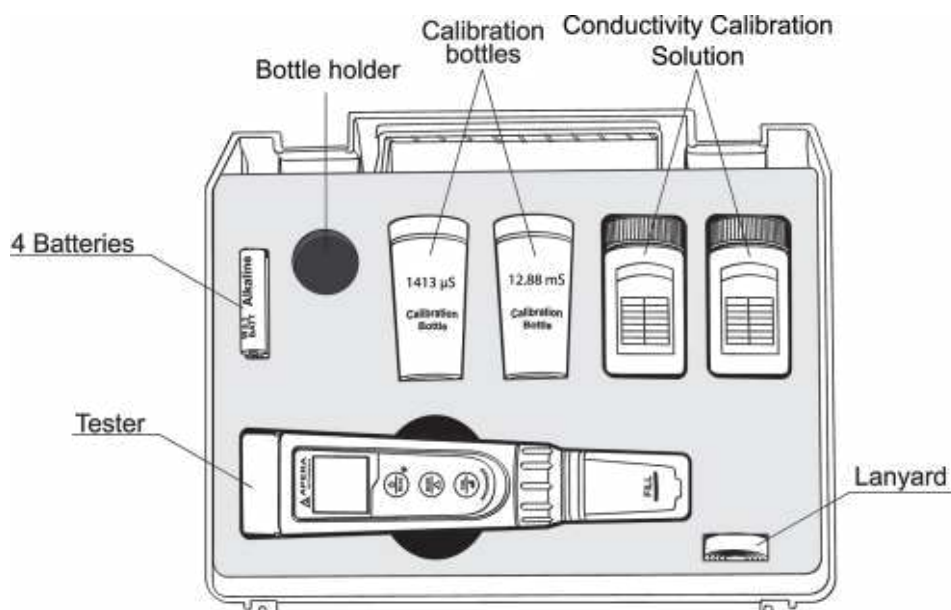
5. Things to Know Before Use

5.1 A few drops of destilliertes 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 distlled/deionized water after each measurement.

5.2 The sensing rod of Model 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.

5.3 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 ⟨MODE/△⟩ key to switch to conductivity measurement mode (**Cond**). Rinse the probe in distilled water and dry it.

2) Pour certain amount of 1413μS/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 μS/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 🙂 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 μS/cm, 12.88 mS/cm, and 84 μS/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 μS/cm conductivity buffer solution alone shall meet the testing requirement.

Calibration Indication Icon	Calibration Standards	Measuring Range
(L)	84 μS/cm	0 - 199 μS/cm
(M)	1413 μS/cm	200 - 1999 μS/cm
(H)	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%/℃. 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) *1000μS/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) <u>Conversion Example</u>
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.

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.	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.
$Er2$	(CAL/ENT) Is pressed before measurement is fully stable (☺ comes up and stays)	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 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.
$Er6$	The calibration reminder is triggered. It's time to perform a new conductivity calibration	Perform conductivity calibration or cancel calibration reminder in ZenTest settings.

7. Conductivity Measurement

Press (⏻/MEAS) key to turn on the tester. Press (MODE/△) 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 (MODE/△) 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
P01	Temperature Unit	˚C – ˚F	˚F
P02	Select automatic lock	5-20 seconds – Off	Off
P03	Automatic Backlight Off	1-8 minutes – Off	1
P04	Automatic Power Off	10-20 minutes – Off	10
P05	Conductivity Reference Temperature	15 ˚C to 30 ˚C	25 ˚C
P06	Temp. Compensation Coefficient	0 to 9.99	2.00
P07	Conductivity Calibration Reminder	H-hours D-Days (set up in ZenTest App)	/
P08	Conductivity Back to Factory Default	No – Yes	No
P09	TDS Factor	0.40 to 1.00	0.71
P10	Salinity Unit	ppt – g/L	ppt

8.2 Parameter Setting

1) When the meter is turned off, long press (⏻ MEAS) to enter parameter setting →short press (CAL ENT) 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. 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 (CAL ENT) 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 (⏻ MEAS) to lock or unlock the measured value. The HOLD icon will be displayed when reading is locked.

3) **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 (MODE △) 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) **Conductivity Calibration Reminder (P07)** – 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 (P08)** – 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 µS, 200 to 1999 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
Resistivity	Range	50Ω to 20MΩ
Temperature	Range	0 to 50˚C (32-122˚F)
	Accuracy	±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：40×40×178mm/133g; case：255×210×50mm/550g;		

11.Probe Replacement

To replace a probe:
1) take off the probe cap; screw off the probe ring; unplug the probe;
2) plug in the new replacement probe (pay attention to the probe's position);
3) 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 (Europe) GmbH, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS (Europe) GmbH 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.