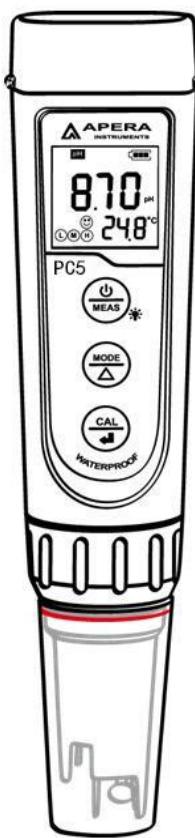




PC5 Premium Multi-Parameter Tester (pH/EC/TDS/Salinity/Temp.)

Instruction Manual



ISO9001: 2015



APERA INSTRUMENTS (Europe) GmbH

www.aperainst.de

Thank you for purchasing Apera Instruments PC5 Premium Multi-Parameter Tester. Please carefully read this instruction manual before using the product in order to have an accurate and reliable test result, and avoid unnecessary damages to the meter or probe.

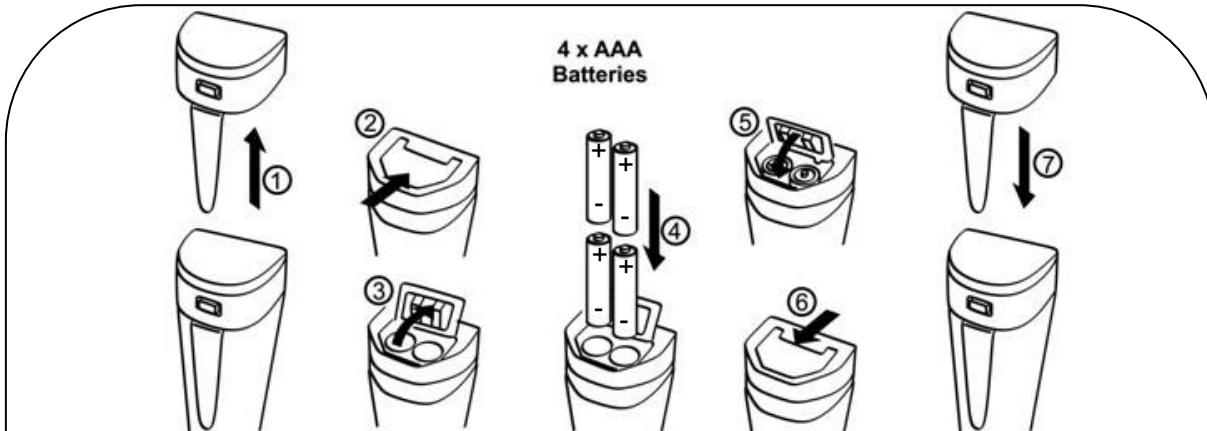
For video tutorials, please go to www.aperainst.de

Contents

1. Battery Installation.....	3
2. Keypad Functions.....	3
3. Complete Kit.....	4
4. Preparation Before Use.....	4
5. pH Calibration	5
6. pH Measurement	6
7. Conductivity Calibration.....	7
8. Conductivity Measurement	7
9. Parameter Setting	9
10. Technical Specifications	10
11. Icons and Functions	11
12. Probe Replacement.....	11
13. Warranty	12

1. 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)**



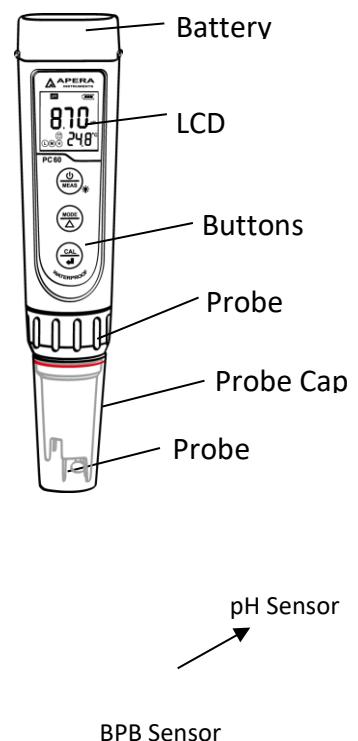
- ① Pull the battery cap up
- ② Slide the battery cap along to the direction of arrow
- ③ Open the battery cap
- ④ Insert the batteries (**ALL POSITIVE SIDES FACING UP**) (see graph)
- ⑤ Close the battery cap
- ⑥ Slide and lock the battery cap along to the direction of arrow
- ⑦ Fit the tester's cap while making sure to push all the way down. The tester's waterproof design may be compromised if the cap is not fitted correctly.

2. Keypad Functions

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

	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.
	1. In measurement mode, short press to switch parameter pH → COND → TDS → SAL 2. In mode setting, short press to change parameter (Unidirectional)
	1. Long press to enter calibration mode. 2. In calibration mode, short press to confirm calibration. 3. When measured value is locked, short press to unlock;

Diagram - 1



3. Complete Kit

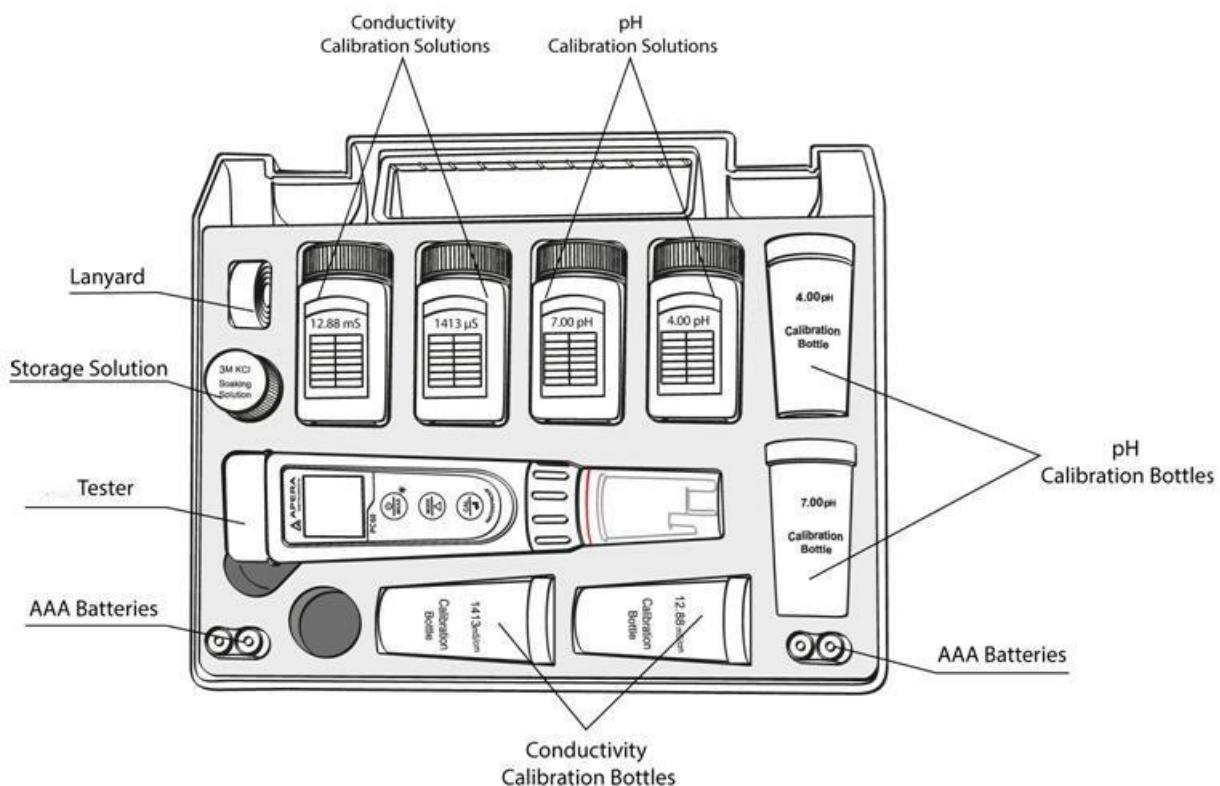


Diagram - 2

4. Preparation Before Use

If it is first-time use or the tester hasn't been used for a long time, pour some 3M KCL solution in the probe cap (about 1/5 of the probe cap) and soak the probe for 15-30 minutes.

When not in use, we recommend store the pH probe in the storage 3M KCL solution in the probe cap to keep the sensor's accuracy. But even if stored dry, it won't do any permanent damage to the sensor. It will only temporarily cause the probe to lose its sensitivity, which can always be restored by soaking in the storage solution.

The storage solution is 3M KCL (potassium chloride). One bottle of 10mL storage solution comes with the tester kit. If the soaking solution was contaminated, please replace with new ones timely.

* **DO NOT** use any other brand's storage solutions because different chemicals may be used and potential permanent damage could be caused to the meter.

5. pH Calibration

Things needed in addition to what's in the box:

A clean cup, distilled water (8-16oz), and tissue papers for rinsing and drying the probe.

5.1 Short press  to turn on the meter; rinse the probe in distilled water, shake the meter in the air and use tissue paper to dap off excess water (**never rub or wipe the sensor**).

5.2 Pour certain amount (about half volume of the calibration bottle) of pH 7.00 and pH 4.00 buffer solution in separate calibration bottles;

5.3 Long press  to enter calibration mode; Short press  to exit.

5.4 Dip the probe in pH7.00 buffer solution, stir gently, and allow it to stand still in

the buffer solution until a stable reading is reached. When stable icon  is

displayed on the LCD screen (as shown in Diagram 3), short press  to

complete 1-point calibration and the tester returns to measurement mode. Indication Icon  will appear at the bottom left of the LCD screen.

5.5 Rinse the probe in distilled water and dry it. Long press  to enter calibration mode.

Dip the probe in pH 4.00 buffer solution, stir gently, and allow it to stand still in the buffer solution. When stable icon  is displayed on the LCD screen, short press  to complete 2-point calibration and the tester returns to measurement mode. Indication icon   will appear at the bottom left of the LCD screen.

5.6 If necessary, rinse the probe in distilled water and dry it, and dip the probe in 10.01 buffer solution (sold separately) to complete 3rd point of calibration according to the steps in 5.5,    will appear at the bottom left of the LCD.

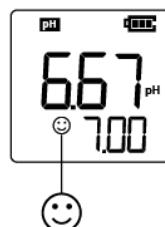


Diagram - 3

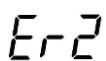
■ Notes

a) Tester will automatically recognize pH buffer solution. Users can perform one-point, two-point, or three-point calibration. **But for the 1st point calibration, only 7.00 pH solution can be used.** Then use other buffer solutions to conduct 2nd or 3rd point calibration. Tester will automatically recognize 5 kinds of pH buffer solutions. Refer to the table below:

Calibration	USA Series	NIST Series	Calibration Indication Icon	Recommended Accuracy and Range
1-point	1) 7.00 pH	1) 6.86 pH		Accuracy ≥ 0.1 pH
2-point	1) 7.00 pH 2) 4.00 or 1.68 pH	1) 6.86 pH, 2) 4.01 pH or 1.68 pH	 	Measurement Range < 7.00 pH

	1) 7.00 pH 2) 10.01 or 12.45 pH	1) 6.86 pH, 2) 9.18 pH or 12.45 pH	(M) (H)	Measurement Range > 7.00pH
3-point	1) 7.00 pH 2) 4.00 or 1.68 pH 3) 10.01 or 12.45 pH	1) 6.86pH 2) 4.01 or 1.68pH, 3) 9.18 pH or 12.45 pH	(L) (M) (H)	Wide Measurement Range

- b) For pH Calibration buffer solutions, we recommend that users replace new buffer solution after 10 to 15 times of use to keep the standard buffer's accuracy. Do NOT pour the used calibration solutions back into the solution bottles in case of contamination.
- c) This pH probe will NOT give accurate and stable readings for distilled or deionized water. This is because distilled and deionized water do not have enough ions present for the electrode to function properly. Specialized pH probes need to be used for distilled/deionized water measurement. Contact us at info@aperaintst.de for more details.
- d) *When testing purified water like spring water or drinking water, it will take longer for the readings to get stabilized (typically 3-5 minutes) because there is very few ions left to be detected by the sensor in those purified water.*
- e) Do NOT store pH probe in distilled water to prevent permanent damage to the probe.
- f) For the self-diagnosis information, please refer to the table below:

Symbol	Self-Diagnosis information	Checking and methods to fix
	Wrong calibration solution or the range of calibration solution exceeds standard.	<ul style="list-style-type: none"> a) Check if calibration solution is correct (1st point of pH calibration must be pH 7.00) b) Check if electrode is damaged. c) Check if there is any air bubble in the glass bulb pH sensor
	 Is pushed before measurement is stable ( comes up and stays)	Wait for the smile icon to come up and stay, then press 

* If you find any air bubble in the glass bulb of the pH sensor, simply shake the probe for a few times to remove it. The existence of an air bubble in the glass bulb will cause instable measurements.

* The 1st point calibration must be 7.00 pH. Perform the 2nd point calibration (4.00 pH) immediately after the 1st point. Do NOT turn off the meter before you conduct 2nd point calibration. If the meter is turned off after 1st point calibration, users will need to restart the calibration process with the 7.00 pH first and the 4.00 pH following after. Calibrating directly in pH 4.00 after turning meter off and back on will cause Er1.

6.pH Measurement

Short press  to turn on the tester. Rinse the probe in distilled water and dry it. Dip the probe in sample solution, stir gently, and allow it to stand still in the solution. Get readings after  comes up and stays.

7. Conductivity Calibration

7.1 Press  key to switch to conductivity measurement mode. Rinse the probe in distilled water and dry it.

7.2 Pour certain amount (about half volume of the calibration bottle) of $1413\mu\text{S}/\text{cm}^2$ and $12.88\text{ mS}/\text{cm}^2$ conductivity calibration solution into accordant calibration bottles.

7.3 Long press  key to enter calibration mode, short press  to exit.

7.4 Dip the probe in $1413\mu\text{S}/\text{cm}^2$ conductivity calibration solution, stir gently and allow it to stand still in the solution until a stable reading is reached. When stable icon  appears and stays on the LCD screen, short press  key to complete one-point calibration, the tester returns to measurement mode and indication icon  will appear at the bottom left of the LCD screen.

7.5 After calibration, dip the probe in $12.88\text{ mS}/\text{cm}^2$ 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 7.3 to 7.4 to complete the 2nd point of calibration using $12.88\text{ mS}/\text{cm}^2$ buffer solution.

* $1000\mu\text{S}/\text{cm}^2 = 1\text{ mS}/\text{cm}^2$

8. Conductivity Measurement

Press  key to turn on the tester. Rinse the probe in distilled water and dry it.

Dip the probe in sample solution, stir gently, 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, and Salinity

■ Notes

- a) The TDS and Salinity measurements are converted from the conductivity measurements via a certain conversion factor.
- b) The tester can calibrate $84\mu\text{S}$, $1413\mu\text{S}$ and 12.88 mS conductivity calibration solution. User can conduct 1 to 3 points calibration. Refer to the table below. Usually calibrating the tester with $1413\mu\text{S}$ conductivity buffer solution alone shall meet the testing requirement.

Calibration Indication Icon	Calibration Standards	Measuring Range
	84 µS/cm	0 - 200 µS/cm
	1413 µS/cm	200 - 2000 µS/cm
	12.88 mS/cm	2 - 20 mS/cm

c) The tester has been calibrated before leaving the factory. Generally, users can use the tester directly or users can test conductivity buffer solutions first. If the error is large, then calibration is needed.

d) For conductivity calibration solutions, we recommend that users replace new 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.

e) Temperature compensation factor: The default setting of the temp. compensation factor is 2.0%/ $^{\circ}\text{C}$. User can adjust the factor based on test solution and experimental data in parameter setting P4.

Solution	Temperature compensation factor	Solution	Temperature compensation factor
NaCl	2.12%/ $^{\circ}\text{C}$	10% Hydrochloric acid	1.32%/ $^{\circ}\text{C}$
5% NaOH	1.72%/ $^{\circ}\text{C}$	5% Sulfuric acid	0.96%/ $^{\circ}\text{C}$
Dilute ammonia	1.88%/ $^{\circ}\text{C}$		

f) 1000 ppm = 1 ppt

g) TDS and conductivity is linear related, and its conversion factor is 0.40-1.00. Adjust the factor in parameter setting P5 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.

h) **Conversion Example:** if conductivity measurement is 1000 $\mu\text{S}/\text{cm}^2$, then the default TDS measurement will be 710 ppm (under the default 0.71 conversion factor), and the salinity be 0.5 ppt.

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

Symbol	Self-Diagnosis information	How to fix
<i>Er 1</i>	Wrong conductivity buffer solution, which exceeds the recognizable range of the meter.	1. Check if buffer solution is correct 2. Check if electrode is damaged.
<i>Er 2</i>	( is pushed before measurement is stable ( comes up and stays)	Wait for the smile icon to come up and then press 

9. Parameter Setting

9.1 Setting Chart

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	°C
P8	Back to factory default	No – Yes	No

9.2 Parameter Setting

When turned off, long press  to enter parameter setting → short press  to switch P1-P2... → P8. Short Press , parameter flashes → short press  to choose parameter, → short press  to confirm → Long press  to turn off.

9.3 Parameter Setting Instruction

- 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  key 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(P7)

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.

10. 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)
Cond.	Range	0 to 200.0 µS, 0 to 2000 µS, 0 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
Temp.	Range	0 to 50°C (32-122°F)
	Resolution	0.1°C
	Accuracy	±0.5°C

11. Icons and Functions

- ① Calibration points indication:   
- ② Stable Measurement: 
- ③ Reading value Auto. Lock: **HOLD**
- ④ Self-Diagnostic Information: **Er1, Er2**
- ⑤ Low-Voltage warning:  flashes, reminder of battery replacement
- ⑥ Three-Color backlight:
Blue—Measurement Mode; Green—Calibration Mode; Red—Alarm;
- ⑦ Auto. Power off in 8 minutes if no operation.

12. Probe Replacement

Screw off the probe ring, unplug the probe, plug in the new replacement probe (pay attention to the probe's position), and screw on the probe ring. The model numbers of replacement probes that are compatible with PC5 are:

- PC5-E
- PH5-E (Regular pH glass bulb probe)
- PH5S-E (Spear pH probe for solids/semi-solids pH testing)
- PH5F-E (Flat pH probe for surface pH testing)
- COND5-E (Conductivity probe)

13. 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** from the delivery (a **six-month** limited warranty applies to probes). This warranty does not apply to defects resulting from actions such as misuse (violation of the instructions in this manual or operations in the manner not specified in this manual), improper maintenance, or unauthorized repairs. Warranty period is the time limit to provide free service for the products purchased by customers, not the service life of the tester or probe.

APERA INSTRUMENTS (Europe) GmbH
Address: Wilhelm-Muthmann-Str.15
42329 Wuppertal Germany
Email: info@aperainst.de
Website: www.aperainst.de
Tel. +49 202 51988998