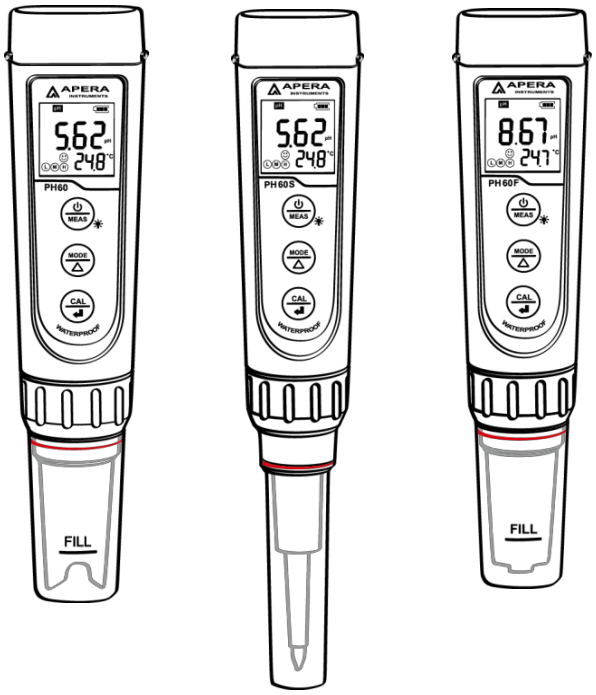
PH60 Series Premium Line pH Testers

User Manual

- ☐ PH60 pH Tester for General Purpose
- ☐ PH60S Spear pH Tester for Food and Solid Samples
- ☐ PH60F Flat pH Tester for Surface Testing



RoHS compliant ISO 9001:2015 CE IP67 WATERPROOF

APERA INSTRUMENTS, LLC

aperainst.com

v7.0

Thank you for purchasing Apera Instruments 60 Series Premium Line pH Tester Kit. Please read this manual carefully before use in order to properly use and maintain the product.

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

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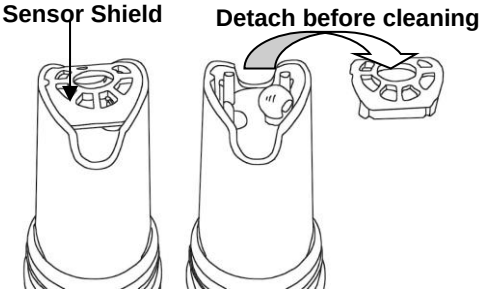
NOTES

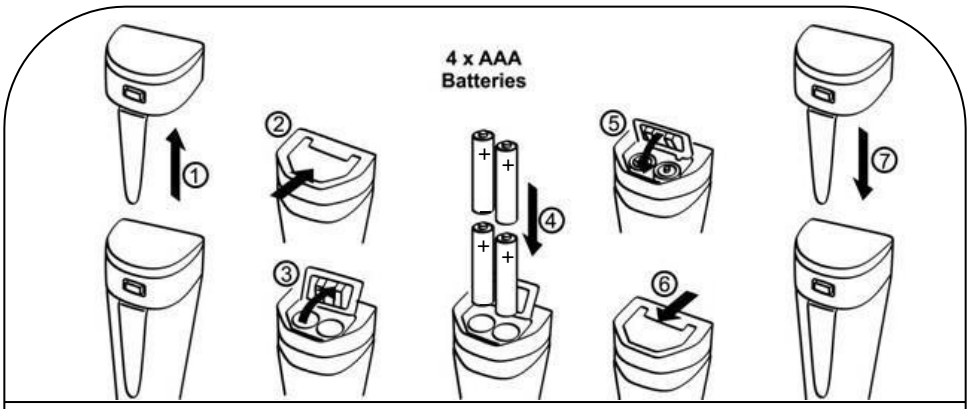
- For PH60 and PH60F models, we added a few drops of water in the probe cap before the product left factory in order to keep the sensitivity of the pH electrode. So it's normal if you find some water droplets in the probe cap for the first time use.
- When storing the tester, you can also add a few drops of water or pH 4.00 buffer in the probe cap to keep the electrode in an active state.
- The AAA alkaline batteries are pre-installed. Please pull off the insulation paper before powering on the tester.
- For PH60, there is a **sensor shield** on top of the pH electrode, protecting the glass bulb sensor from accidental damage. You can also detach the sensor shield when rinsing and cleaning the electrode as shown in the graph below. After cleaning, you can put the sensor shield back.



1 Battery Installation

Please install batteries according to the following steps. * Note the direction of batteries:

The anode ("+") OF EVERY SINGLE Battery MUST face UP.
(WRONG INSTALLATION OF BATTERIES WILL CAUSE DAMAGE TO THE TESTER AND POTENTIAL HAZARDS



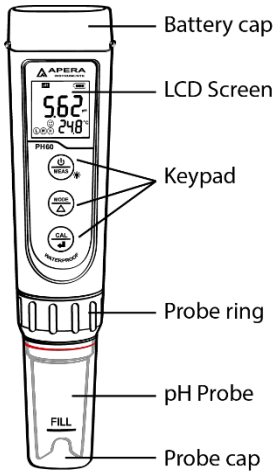
① Pull the battery cap up
② Slide the battery cap along to the direction of arrow
③ Open the battery cap
④ Insert the batteries **(ALL POSITIVE SIDES FACING UP)** (see graph)
⑤ Close the battery cap
⑥ Slide and lock the battery cap along to the direction of arrow
⑦ Fit the tester's cap while making sure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

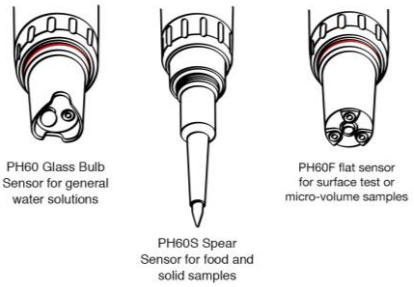
2 Keypad Functions

Short press: < 2 seconds

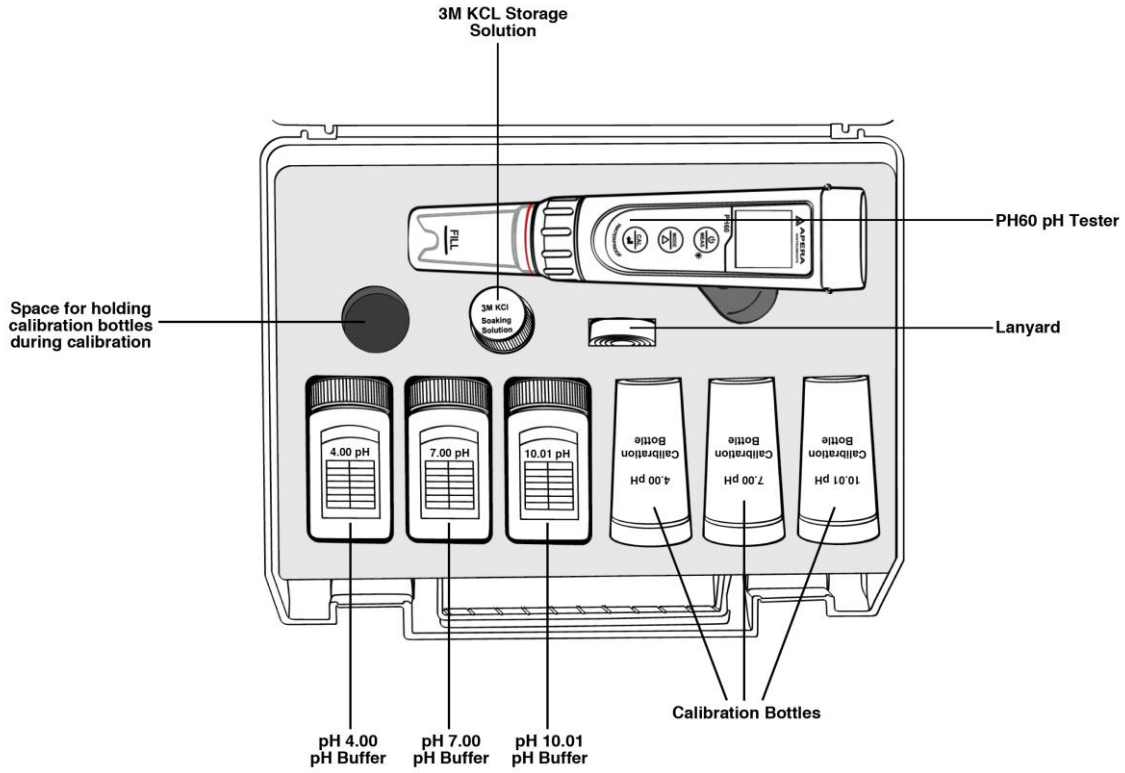
Long press: > 2 seconds

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 from **pH** → **ORP** (Oxidation Reduction Potential), ORP probe sold separately. 2. In mode setting, short press to change parameter (Unidirectional).
CAL	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.





3 Complete Kit



4 Preparation Before Use

4.1 Things needed in addition to what's in the box: A cup of distilled water (8-16oz) for rinsing the probe, and clean tissue paper for removing excess water.

4.2 For PH60 and PH60F: If the tester hasn't been used for a long time (> 1 month), or the tester's response is very slow, you can soak the probe in the 3M KCL storage solution overnight before use to restore the electrode's sensitivity. The storage solution is 3M KCL (SKU: AI1107). One bottle of 10mL storage solution comes with the tester kit. If the storage solution was contaminated, please replace with new ones timely. ***DO NOT** use any other brand's storage solutions as potential damage could be caused to the probe.

4.3 For PH60S: **NEVER** store the spear pH probe in a dry condition because permanent damage can be caused. The spear probe should always be stored in the 3M KCL soaking solution when not in use.

5 pH Calibration

5.1 How to Calibrate

5.1.1 Short press (MEAS) to power on. Rinse the probe in distilled water; Use clean tissue paper to dap off excess water.

5.1.2 Pour pH buffer solutions in the correspondent calibration bottles to about half volume.

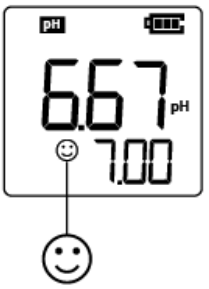
5.1.3 Dip the probe in the pH 7.00 buffer solution.

5.1.4 Long press (CAL) to enter calibration mode, the screen will turn green (in calibration mode, if

you decide to quit calibration, short press (MEAS) to return to measurement).

5.1.5 Stir the probe for a few seconds to eliminate potential air bubbles on the probe.

5.1.6 Allow it to stand still in the buffer solution until a stable reading is reached – when ☺ appears and stays on the screen; short press (CAL) to complete 1st point calibration and the tester will return to measurement mode.
Icon (M) will appear at the bottom left of the screen, indicating the middle point of calibration has completed.



5.1.7 Rinse the probe in distilled water and dap off excess water with tissue paper. Dip the probe in pH 4.00 buffer solution, follow the steps from 5.1.5 to 5.1.7 to complete 2nd point calibration. Icons (L) (M) will appear at the bottom left of the screen.

5.1.8 If you are to test alkaline samples, rinse the probe and dip it in pH 10.01 buffer solution, follow the steps from 5.1.5 to 5.1.7 to complete the 3rd point calibration. Icons (L) (M) (H) will appear at the bottom left of the screen.

5.2 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 bottles can be used for about 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 less than 5 times of calibration as it will lose its accuracy faster. After that, replace the buffer solutions in the calibration bottles with new ones that are in the buffer bottles (50ml each) to keep the accuracy of the standard buffer solutions. Keeping the freshness and cleanliness of calibration buffers is the basis for accurate pH measurement. Do not pour used buffer solutions back into the buffer bottles in case of contamination.

c) The tester can perform 1 to 3 points of automatic calibration. The tester can recognize 5 kinds of pH buffer solutions. For details, please refer to the following table:

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

5.3 Self-diagnosis

Icons	Self-diagnostic information	Checking and how to fix
Er 1	Wrong pH buffer solution or the range of calibration solution exceeds standard.	a) Check whether pH buffer solution is correct (1st point calibration must be 7.00). b) Check whether pH buffer solution is in good condition (fresh and clean) c) Check whether the probe is damaged. d) Check if there is any air bubble in the glass bulb. If so, shake it off.
Er2	Press CAL key when reading is not stable yet during calibration	Wait for the smiley face icon to appear and stay, then press CAL to finish calibration

* If you find any air bubble around the glass bulb of pH electrode, simply shake the tester in the solution with force for a few seconds, and the bubble should disappear right after. The existence of an air bubble around the glass bulb will cause measurement error.

6 pH Measurement

6.1 How to take pH measurements

Short press MEAS to turn on the tester. Rinse the probe in distilled water, shake the meter and dap off excess water with tissue paper (do not rub or wipe the glass sensor). Dip the probe in sample solution, stir gently, and allow it to stand until a stable reading is reached. Record readings after ☺ appears and stays on the screen.

6.2 Applications of each model:

Model/Probe	Application
PH60/Bulb probe	• General water solutions' pH measurement such as hydroponics, greenhouse, aquaculture, aquarium, pools and spas, water treatment, beverage making, drinking water, education, environmental monitoring, etc.
PH60S/Spear probe	• Cheese, sushi rice, meat, fruit, dough, solid culture medium and semi-solid medium measurement; • Also works well for general water solutions.
PH60F/Flat probe	• Flat surface measurement such as skin, paper, textiles, fabric, leather, etc; • Small sample test (place sample fluid in the probe cap); • Also works well for general water solutions.

6.3 PH60S Spear probe testers are widely used for soft solid samples containing water. When conducting such tests, pay attention to insert probe slowly, and be careful to prevent probe from damage. ***If the medium is too hard (such as frozen meat or some fruits), please make a small hole with a clean knife before inserting the probe.***

* For food pH measurement, it should always be a sampling test, which means test samples should no longer be edible.

6.4 PH60F Flat probe testers are mostly for flat surface sample test.

- For skin test: skin should be without sweat or dirt, nor be overly cleaned (do not use facewash products before testing) to avoid affecting measurement results, dampen skin with some distilled water, slightly force flat probe onto the skin, get readings after value stabilized.
- For paper, fabric, leather and other surface test: add 1~2 drops of distilled or deionized water on surface, then perform measurements.

6.5 Special Notes

a) The pH probe must be rinsed thoroughly after each use. Warm soap water can be used to clean off grease or other contaminants.

*b) The PH60 series testers are not designed for **testing low ion-concentration liquid such as distilled or deionized water**. To get a good measurement of these liquid, users need to use a specialized meter such as PH850-PW (AI5541). Contact us at info@aperainst.com for more details.*

c) When testing pure water like tap water, drinking water, and RO water, it will take longer for the readings to get fully stabilized (typically 2-5 minutes). Please be patient. Also, adding 1ml of 3M KCL to 1000ml of water can also accelerating the stabilization while minimizing the pH change.

*d) Do **NOT store probe in distilled or deionized water** because those low ion-concentration liquids could damage the pH electrode. They are only recommended for rinsing the probe.*

7 Parameter Setting

7.1 Setup Menu

Symbol	Contents	Parameter	Factory Default
P1	Select pH buffer solution	USA – NIST	USA
P2	Low value measurement alarm setting	0 to 14.00pH	0

P3	High value measurement alarm setting	0 to 14.00pH	14.00
P4	Select automatic lock	Off – On	Off
P5	Select backlight	Off - 1 - On	1
P6	Select temperature unit	℃ - ℉	℉
P7	Restore to factory default	No – Yes	No

7.2 Parameter setup method

When turned off, long press MEAS to enter parameter setting→Short press MODE to switch P1-P2-…P7→Short press CAL, parameter flashing→Short press MODE to choose parameter→Short press CAL to confirm→Long press MEAS to go back to measurement mode.

7.3 Parameter setting instruction

7.3.1 Select standard pH buffer solution (P1):

There are two options of standard buffer solutions: USA series and NIST series. Factory default is USA series, for details see clause 5.7.

7.3.2 Alarm Function (P2&P3)

Examples:

- Alarm triggered when measurement ≤ 3.20 pH:
  Preset lowest value (P2) = 3.20 pH, highest value (P3) = 14.00 pH, when measured value ≤ 3.20 pH (stable ☺ displays on LCD); LCD displays red backlight.
- Alarm triggered when measurement ≥ 8.60 pH:
  Preset highest value (P3) = 8.60 pH, lowest value (P2) = 0.00 pH, when measured value ≥ 8.60 pH (stable ☺ displays on LCD); LCD displays red backlight.
- Alarm triggered when measurement ≤ 3.20 pH or ≥ 8.60 pH
  Preset lowest value (P2) = 3.20 pH, highest value (P3) = 8.60 pH, when measured value is lower than 3.20 pH or higher than 8.60 pH (stable ☺ displays on LCD), LCD displays red backlight.

7.3.3 Automatic Lock (P4)

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. Short press CAL key again to cancel the lock.

7.3.4 Backlight (P5)

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

7.3.5 Temperature Unit (P5)

Select C˚ or F˚, the factory default is ˚F.

7.3.6 Factory default setting (P7)

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

8 ORP Measurement

ORP stands for Oxidation-Reduction Potential. ORP is a measure of the cleanliness of the water & its ability to break down contaminants. Refer to Section 11 to replace ORP probe (sold separately, SKU: AI1207), press MODE key to enter ORP mode. Rinse the probe in distilled water and dry it. Dip the probe in sample solution, stir gently, and allow it to stand still until a stable reading is reached. Record readings after ☺ appears and stays.

9 Technical Specifications

pH	Measuring Range	-2.00 – 16.00 pH
	Resolution	0.01pH
	Accuracy	±0.01pH ±1 digit
	Calibration Points	1 – 3 points
	Automatic Temperature Compensation (ATC)	0 – 50˚C (32 – 122˚F)
ORP (mV)	Measuring Range	± 1000mV
	Resolution	1mV
	Accuracy	±0.2% F.S
Temp.	Measuring Range	0 – 50˚C (32 – 122˚F)
	Resolution	0.1˚C
	Accuracy	±0.5˚C

10 Other Specifications

LCD	3-color LCD screen, Blue: Measurement; Green: Calibration; Red: Alarm
Reading Lock	**HOLD**
Low-Voltage Warning	flashing, reminder of battery replacement needed
Auto. Power-Off	In 8 minutes without operation
Water Proof Rating	IP67
Power	DC3V, AAA alkaline batteries×4
Battery Life	Operation up to 2000 hours
Dimension/Weight	Tester: 40×40×178mm/133g; Case: 255×210×50mm/700g;

11 Probe Replacement

11.1 Every pH probe gradually loses its sensitivity as it's being used. A typical service life of a pH probe is 1-2 years depending on many factors such as frequency of use, nature of test samples, and how well it is maintained, etc. Apera Instruments recommends replacing the pH probe after one year of frequent use to guarantee the optimal performance of a pH meter.

11.2 How to replace the probe: Twist off the probe ring, unplug the probe, plug in new probe (pay attention to probe's position), and twist on the probe ring.

11.3 The model numbers of the replacement probes that are compatible with the PH60 Series Meters:

- 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 soft-solids pH testing)
- AI1203 PH60F-E (Flat pH probe for surface pH testing)
- AI1207 ORP60-E (ORP probe)

12 Troubleshooting Guide

Trouble	Reason	How to fix
Cannot calibrate	Incorrect standard solutions	When powered on, calibrate pH 7 first, then pH 4. After pH 4 is calibrated, if you want to calibrate pH7 again, you need to power off and restart the tester.
	Bad standard solutions	Replace with a new reliable buffer solution.
	Contaminated probe	Clean the electrode, it is best to use a cleaning solution.
	Aged probe	Replace the probe.
	Dried-out probe	Soak in the soaking solution overnight.
	Probe is not fully submerged in the solution	Make sure the electrode is immersed in the solution at least 3 cm.
	Air bubbles around the pH glass bulb	Shake the tester with force in the solution to remove air bubbles.
Reading is always slowly changing, won't stabilize.	Contaminated probe	Clean the electrode, it is best to use a cleaning solution.
	Clogged junction	Clean the probe with cleaning solution, then soak it in 3M KCL storage solution overnight.
	Aged probe	Replace the probe.
	Testing low iconic strength solutions like tap water, drinking water, RO water	Be patient, wait for 2-5 minutes to fully stabilize. If still not stabilizing, add in 1ml of 3M KCL solution to 1000ml of test solution.
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 6-month probe warranty, contact us for warranty fulfillment; If there is visible damage, replace the probe.
Reading keeps jumping	Probe is not fully submerged in the solution	Make sure the electrode is immersed into the solution for at least 1 inch.
	Air bubbles around the pH glass bulb	Shake the tester with force 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 pH glass bulb	Shake the tester with force 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 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 most accurate one. Test strips or drop tests' accuracy is not comparable to pH meters'.

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, 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:
Transportation, storage, improper use, failure to follow the product instructions or to perform any preventive maintenance, modifications, combination or use with any products, materials, processes, systems or other matter not provided or authorized in writing by us, unauthorized repair, normal wear and tear, or external causes such as accidents, abuse, or other actions or events beyond our reasonable control.

To submit a warranty request, 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 purchase receipt screenshot or photo

Then click Submit. One of our customer care specialists will help you fulfill the warranty in one business day.

APERA INSTRUMENTS, LLC
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Website: aperainst.com