

# GroStar™

## GS3 Premium EC Pen Tester

### User Manual



**APERA INSTRUMENTS (Europe) GmbH**

**[www.aperainst.de](http://www.aperainst.de)**

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***Thank you for choosing the Apera GroStar™ GS3 Premium EC Pen Tester. This premium pen has been designed specifically for the horticultural market. Since 1991, Apera instruments has been dedicated to providing hi-tech, accurate, lab-grade instruments and sensors. GroStar's intelligent design reduces the guesswork so you can easily manage your crops success.***

### 1 Main Features

- Premium titanium alloy conductivity probe measures EC, ppm (500/700) all-in-one unit with minimal maintenance.
- Easy to use design and quick 1-point calibration adjustment.
- 3-Color backlit LCD screen gives you clear readings in different modes even in dark environment.
- Durable structure, IP67 waterproof rating, powered by AAA batteries.
- The probe is replaceable, so you don't have to discard the entire pen when the probe reaches its end of life.

**3-Color LCD Screen**

- White for measurement mode
- Green for calibration mode
- Red for calibration error

☺ stands for stabilized reading

**M** stands for successful calibration: **M** is pH 7 or 2.77 EC. The icon will disappear after 30 days to remind you for re-calibration.

**Probe Cap**

- **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 fill line shows the level to which you should pour the soaking solution or sample solution.
- For details of probe storage, see Section 7.



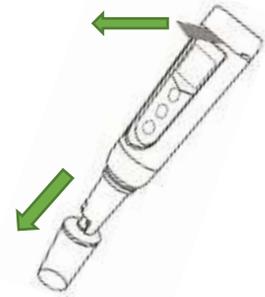
|  | Short Press  | Long Press               |
|--|--|--------------------------|
|  | 1. Power on<br>2. Manual hold<br>Press again to cancel hold. | Power off                |
|  | In measurement mode, press to turn on/off the backlight.     | Start calibration        |
|  | Switch mode:<br>EC→500ppm→700ppm                             | Switch between °F and °C |

**Premium EC Probe**

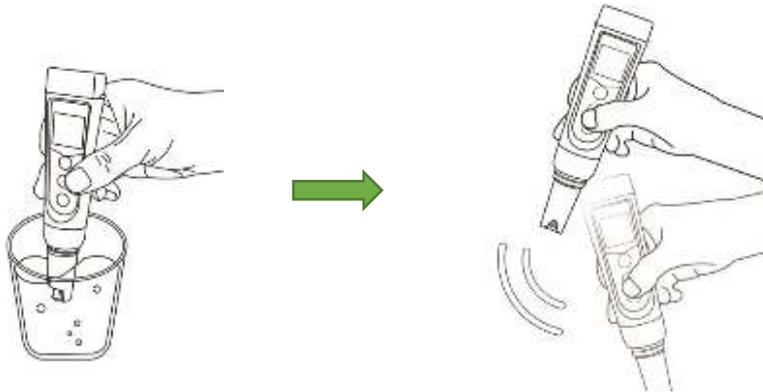
- Titanium alloy conductivity sensor, highly accurate and requires minimal maintenance.
- The probe is replaceable, saving money in the long run.

## 2 Preparation Before First Use

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



2.2 Rinse off the probe in clean water, then shake off excess water.

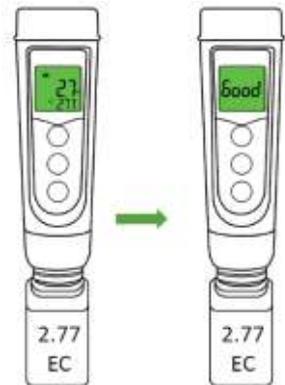


2.3 Calibrate EC at 2.77 EC. For calibration tutorial, refer to Section 3.

## 3 EC Calibration

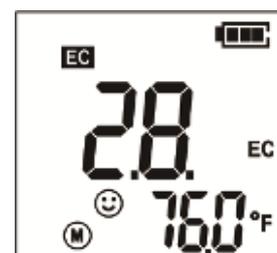
3.1 Power on and remove the probe cap. Rinse the probe with clean water and shake-dry, then submerge it in the 2.77 EC standard solution; **shake the probe in the solution up and down for a few seconds** to remove potential air bubbles, then let it stand.

3.2 Hold  until screen turns green. The pen starts automatic calibration. Wait for "**Good**" to show up (in 10-15 seconds), indicating the calibration is completed, then the pen returns to measurement mode.



**Short press any key while calibrating (in green screen) to cancel calibration and return to measurement.**

3.3  icon will show up on the lower left corner indicating the tester is successfully calibrated.  will disappear in 30 days after calibration, reminding you to re-calibrate EC. We recommend calibrating the EC once every month to ensure the accuracy. If you feel like the accuracy might be off, simply test



the standard solution (make sure the standard is fresh and clean). If the reading is greater than 2.8 EC or smaller than 2.7 EC, then it's time to calibrate again.

- 3.4 If the calibration fails, the screen will turn red. For details, see Section 11 Troubleshooting Guide.



#### 4 EC/500ppm/700ppm Measurement

- 4.1 Power on and remove the probe cap.
- 4.2 Rinse the probe with clean water and shake off excess water.
- 4.3 Submerge the probe into the solution, make a quick stir to remove potential air bubbles around the sensor. Hold still and wait for the reading to stabilize (☺ stays on the screen), then record the reading.
- 4.4 Short press  to switch from EC → 500ppm → 700ppm
- 4.5 Thoroughly rinse off the probe with clean water.



#### **What is EC and its relation to 500ppm & 700ppm?**

*EC (electrical conductivity) is a measure of the nutrients in the solution. Low conductivity implies a low nutrient concentration, which usually results in nutritional deficiencies and slow growth rates of your plants.*

*A higher conductivity is more food for your plants. However, be careful of very high levels as delicate plants, cuttings, and seedlings can experience fertilizer burn if the conductivity is excessively high.*

*EC, 500ppm, and 700ppm are simply different units preferred by different markets. 500ppm and 700ppm both originate from EC. Therefore, using EC to compare and analyze test result is the safest way and will minimize confusion. Here is how they convert to each other:*

- 1.0 (EC) = 500ppm (500ppm) = 700ppm (700ppm)
- 2.6 (EC) = 1300ppm (500ppm) = 1820ppm (700ppm)
- 3.5 (EC) = 1750ppm (500ppm) = 2450ppm (700ppm)

#### 5 Other Functions

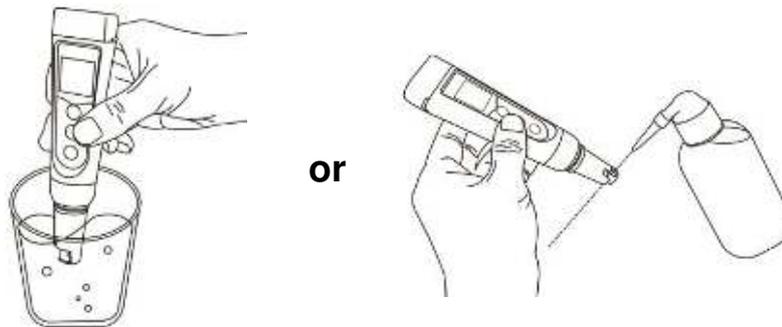
- 5.1 If necessary, you can manually hold (lock) the reading by short pressing . Press it again to cancel the hold.
- 5.2 Long press  to switch temp. unit between °F and °C.

- 5.3 The tester will automatically power off if there is no operation within 10 minutes. If you want to turn off/on the Auto. Power Off function, power off the tester, and then hold  for 5 seconds until you see Auto Off or Auto On. Then it will power on and go to measurement mode automatically.



## 6 Probe Cleaning

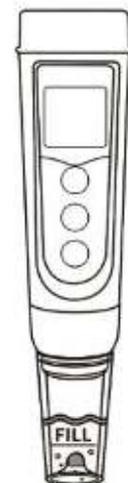
- 6.1 The tester is only as accurate as the probe is clean. Always thoroughly rinse off the probe before and after each measurement with clean water in a container or with a wash bottle.



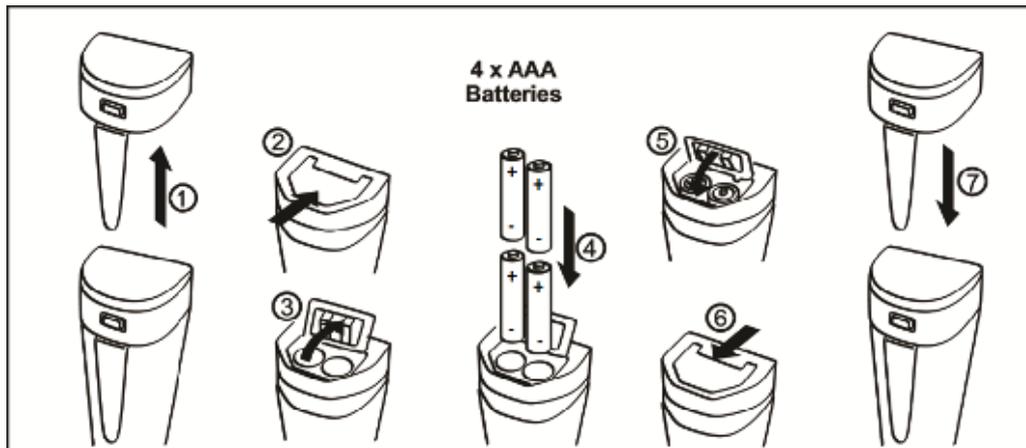
- 6.2 For tough contaminants, remove the sensor shield, soak the probe in Apera's cleaning solution or detergent water for 30 minutes. Then use a soft brush to remove the contaminants. Afterwards, rinse it off, then re-calibrate the tester before using again.

## 7 Probe Storage

- 7.1 Under regular usage (daily or weekly use), as long as there are some water droplets in the probe cap, you are good to go.
- 7.2 For long-term storage (you are not going to use the product for a while), add clean water to the Fill line in the cap and store the probe in it. Close the probe cap tightly.



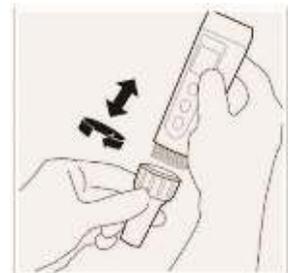
## 8 Battery Replacement



- ① Pull up the battery cap (might take some force).
- ② Slide the battery cover along the OPEN arrow to open the cover.
- ③ Open the battery cover.
- ④ Insert the batteries (**ALL POSITIVE SIDES FACING UP**).
- ⑤ Press down the battery cover and hold it.
- ⑥ Slide the battery cover along the LOCK arrow to lock the cover.
- ⑦ Close the battery cap. Make sure to push it all the way down. The tester's waterproof rating may be compromised if the battery cap is not tightly closed.

## 9 Probe Replacement

- Screw off the probe ring, unplug the old probe; plug in the new probe (make sure to align the connector's position properly), and screw on the probe ring.



***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 GroStar probes is 18-24 months depending on the frequency of usage and how well you keep it clean and properly stored.***

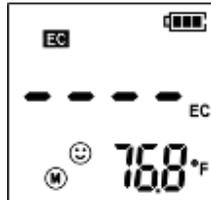
***We recommend replacing your probe at least every 18 months to ensure the best accuracy. The nice thing about GroStar pens is that you can just buy a replacement probe instead of a whole new tester.***

## 10 Notes

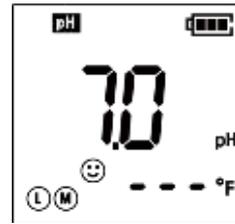
- 10.1 Avoid testing in high ( $>113^{\circ}\text{F}/45^{\circ}\text{C}$ ) or low temperature ( $<41^{\circ}\text{F}/5^{\circ}\text{C}$ ) solutions as it will cause greater measurement error and damage to the probe. Test your samples and perform calibration close to room temperature as much as possible.
- 10.2 Make sure the battery cap is completely closed with the O-ring. Otherwise, the waterproof rating could be compromised.

## 11 Troubleshooting Guide

| <b>Trouble</b>   | <b>Reason</b>  | <b>How to fix</b>   |
|--|--|---|
|  <p><b>Cannot calibrate</b></p> | 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 clean water for 30 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.  |
| <p><b>Reading is always slowly changing, won't stabilize.</b></p>  | Contaminated probe   | Clean the probe with Apera's cleaning solution or detergent water.  |
|  | Aged probe   | Replace the probe.  |
| <p><b>Display similar readings in any solutions</b></p>  | 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; If there is visible damage or the probe is more than 1-year old, replace the probe. |
| <p><b>Reading keeps jumping</b></p>  | 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. Ensure that the probe connector is not exposed in the air too long.       |
| <p><b>Calibration is successful, but reading is not accurate</b></p>   | Aged probe   | Replace the probe.  |
|  | Air bubbles around the sensor                                    | Make a quick stir in the solution to remove air bubbles.  |
|  | Comparison with other testers                                    | To compare with other testers, make sure to perform calibration for all testers in the same standards, then test a 2nd point. Whichever gives more accurate reading in the 2nd point standard is the most accurate one.                   |



Out of range reminder for EC

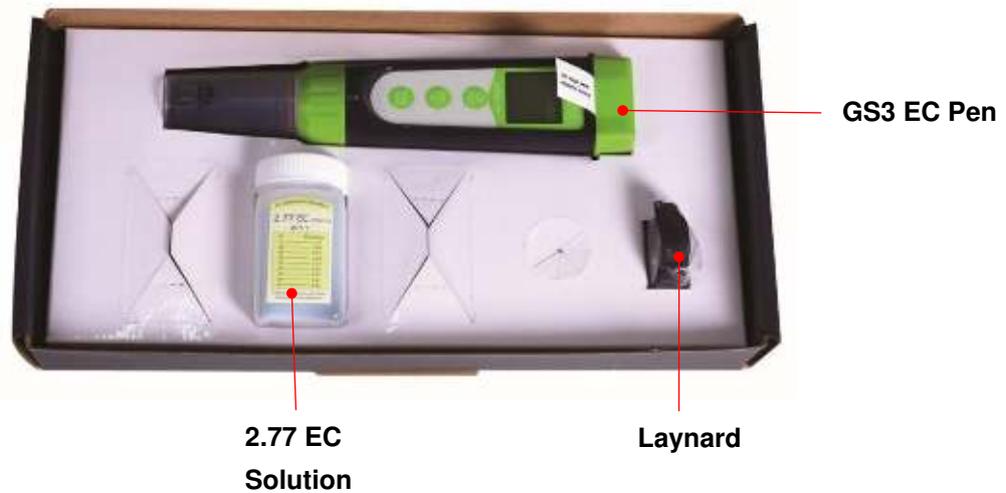


Out of range reminder for temperature

## 12 Technical Specs

|                                   |  |
|-----------------------------------|--|
| Range                             | 0 to 10.0 EC,<br>0 to 7000ppm (700ppm),<br>0 to 5000ppm (500ppm),<br>0 to 50°C (32 to 122°F) |
| Resolution                        | 0.1 EC, 10ppm (700ppm), 10ppm(500ppm), 0.1°F/0.1°C   |
| Accuracy                          | ±0.1 EC<br>±30ppm (500ppm)<br>±40ppm (700ppm)<br>±1°C/±1°F                                   |
| Temperature compensation          | Automatic  |
| Calibration                       | automatic 1 point (2.77 EC)  |
| Unit                              | EC, 500ppm, 700ppm, °F, °C   |
| Power Supply                      | 4-AAA alkaline batteries   |
| Backlight                         | White (measurement); Green (calibration); Red (errors)                                       |
| Reading hold                      | Manual   |
| Warranty                          | Two years for the instrument, one year for the probe   |
| EC probe                          | Titanium alloy   |
| Successful calibration indicators | M (2.77 EC)  |
| Low battery reminder              |          |
| Waterproof rating                 | IP67   |
| Reading stabilization icon        |          |

### 13 What's in the box



### 14 Accessories

- pH buffer Kit (pH4/7, 250ml, each), item AI1113
- pH buffer Kit (pH4/7/10, 250ml, each), item AI1115
- 2.77 EC Standard Calibration Solution
- 3M KCl storage solution 250ml, item AI1107
- GS3-E EC Probe, item AI58030

### 15 Warranty

How Long Does the Coverage Last?

Apera Instruments® (Apera) warrants the GroStar™ GS4 Premium pH/EC Combo Pen Tester (Product) for a period of 24 months for the instrument and 12 months for the probe from date of purchase by original purchaser or consumer. Proof of purchase is required for the warranty to be effective (store sales receipt for Product showing model number, payment, and date of purchase). This warranty is non-transferable and terminates if the original purchaser/consumer sells or transfers the Product a third party.

What is Covered?

Apera warrants the Product against defects in material and workmanship when used in a normal manner, in accordance with Apera instruction manuals. If Apera is provided with valid proof of purchase (as defined above) and determines the Product is defective, Apera may, in its sole discretion either (a) repair the Product with new or refurbished parts, or (b) replace the Product with a new or refurbished Product.

### What is NOT Covered?

This warranty does not apply to equipment, component or part that was not manufactured or sold by Apera and shall be void if any such item is installed on a Product. Further, this warranty does not apply to replacement of items subject to normal use, wear and tear and expressly excludes:

- Cosmetic damage such as stains, scratches, and dents
- Damage due to accident, improper use, negligence, careless operation or handling of Product not in accordance with Apera instruction manuals, or failure to maintain or care for Product as recommended by Apera
- Damage caused by use of parts not assembled/installed as per Apera instructions
- Damage caused by use of parts or accessories not produced or recommended by Apera
- Damage due to transportation or shipment of Product
- Product repaired or altered by parties other than Apera or its authorized agents
- Product with defaced, missing, or illegible serial numbers
- Products not purchased from Apera or an Apera-authorized distributor or reseller.

### How Do You Get Service?

To begin a warranty claim you must return the Product to the point of purchase with valid proof of purchase.

### Limitation of Liability & Acknowledgments

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THIS WARRANTY AND THE REMEDIES SET OUT ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, GUARANTEES AND REMEDIES (ORAL OR WRITTEN, EXPRESS OR IMPLIED). EXCEPT AS PROVIDED IN THIS WARRANTY AND TO THE MAXIMUM EXTENT PERMITTED BY LAW, APERA INSTRUMENTS IS NOT RESPONSIBLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGES, OR ANY OTHER LOSS OR DAMAGES RESULTING FROM SALE OR USE OF THE PRODUCT, OR BREACH OF WARRANTY, HOWEVER CAUSED, INCLUDING DAMAGES FOR LOST PROFITS, PERSONAL INJURY OR PROPERTY DAMAGE.

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SOME JURISDICTIONS (STATES OR COUNTRIES) DO NOT ALLOW EXCLUSION OR LIMITATION FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT BE APPLICABLE. IF ANY PROVISION OF THIS WARRANTY IS JUDGED TO BE ILLEGAL, INVALID OR UNENFORCEABLE, THE REMAINING PROVISIONS OF THE WARRANTY SHALL REMAIN IN FULL FORCE AND EFFECT.

**Governing Law; Authority**

This warranty is governed by the laws of the state of country where Product is purchased, without regard to its choice of law principles. Except as allowed by law, Apera does not limit or exclude other rights a consumer may have with regard to the Product. No Apera distributor, employee or agent is authorized to modify, extend, or otherwise change the terms of this warranty.

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