

GroStar GS4 pH EC Pen Tester Brief Manual

1. Features

- Premium combo pH/EC probe, testing pH, EC, 500ppm, 700ppm altogether, highly accurate and requires minimal maintenance.
- The probe is replaceable, saving money in the long run
- Intuitive operation, completing 2-point calibration within 30 seconds.
- Colored backlit LCD screen, white for measurement, green for calibration, red for error messages.
- Durable structure, IP67 waterproof rating, powered by AAA batteries, lasting up to 1000 hours.

2. Instrument Introduction

a. Keypad

	Short Press	Long Press
	1. Power on 2. In measurement mode, press to manually hold the measurement (HOLD displays on screen). Press again to cancel the hold.	Power off: hold the key until OFF displays.
	In measurement mode, press to turn on or off the backlight.	Start calibration: in measurement mode, hold the key until CAL displays
	Short press to switch measurement mode: pH→EC→500ppm→700ppm	Long press to switch between °F and °C

*Short press any key when calibrating to cancel calibration and return to measurement mode.

- b. Probe cap
 - i. The water droplets are added during production to maintain the condition of the probe. It's not a sign of used product.
 - ii. The fill line means the level to which you should pour the storage solution or sample solution.
 - iii. For probe storage, see Section 10

3. Preparation before first use

- a. Pull out the battery slip, rinse the probe in clean water and shake dry. Then power on the tester.
- b. Open the seal of the calibration solutions and submerge the probe in the calibration solution. Check the reading of the tester. If it reads 7.0 pH in the green pH 7 buffer and 4.0 pH in the red pH 4 buffer, then you are good to start the measurement. If there is a discrepancy (usually within 0.2 pH) between the reading and the value of the standard solution, please calibrate the tester before measurement begins (see Section 4).
- c. Check the EC reading of the tester. If the reading error is less than or equal to 0.1 EC (reading between 2.67 EC and 2.87 EC), then you are good to start the measurement. If the reading error is more than 0.1 EC, please calibrate the tester before measuring (see Section 6).
- d. If you find the probe cap is dried out, soak the probe in pH 4 solution for 5 minutes before use.
- e. If the tester hasn't been used for a long time (over 3 months), or if you find the reading keeps jumping (can't stabilize within 2 minutes), please soak the probe in the 3M KCL storage solution overnight, then calibrate it before measurement begins.

4. pH Calibration

- a. Power on and remove the probe cap. Always calibrate 7.00 pH first. Rinse the probe with clean water and shake-dry, then submerge it in the 7.00 pH standard buffer; shake the probe in the solution for a few seconds and let it stand. Hold  until **CAL** shows up on screen. The tester automatically starts the calibration process. When **Good** shows up, the calibration is successful, and the tester returns to measurement mode.
- b. The **M** icon will show up on the lower left corner indicating the tester is successfully calibrated. Repeat Step a to finish the 4.00 pH and/or 10.01 pH calibration, then **L** and/or **H** icon will show up next to **M**.
- c. **M/L/H** will disappear after 30 days, reminding you to re-calibrate the tester. We recommend calibrating the tester at least once a month to ensure the accuracy. If you feel like the accuracy is not as good, simply test the standard buffers (make sure the buffers are fresh and clean). If there is discrepancy, then it's time to calibrate again.
- d. If the calibration fails, the screen will turn red. For details, see Section 12.

5. pH Measurement

- a. Power on and remove the probe cap.
- b. Rinse the probe with clean water and shake dry.
- c. Submerge the probe into the sample solution, shake for a few seconds to remove potential air bubbles around the sensor. Wait for the reading to stabilize (the smiley face icon stays on the screen), then record the reading.
- d. Thoroughly rinse off the probe

6. EC Calibration

- a. 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 buffer; shake the probe in the solution for a few seconds and let it stand.
- b. Hold  key until **CAL** shows up on screen. The tester automatically starts the calibration process. When **Good** shows up, the calibration is successful, and the tester returns to measurement mode.
- c. The **M** icon will show up on the lower left corner indicating the tester is successfully calibrated. **M** will disappear after 90 days, reminding you to re-calibrate the tester. We recommend calibrating the tester at least once every quarter to ensure the accuracy. If you feel like the accuracy is not as good, simply test the standard solution (make sure the standard is fresh and clean). If the discrepancy is greater than 0.1 EC, then it's time to calibrate again.
- d. If the calibration fails, the screen will turn red. For details, see Section 12.

7. EC/500ppm/700ppm Measurement

- a. Power on and remove the probe cap.
- b. Rinse the probe with clean water and shake dry.
- c. Submerge the probe into the sample solution, shake for a few seconds to remove potential air bubbles around the sensor. Wait for the reading to stabilize (the smiley face icon stays on the screen), then record the reading.
- d. Short press  to switch from EC→500ppm→700ppm
- e. Thoroughly rinse off the probe.

8. Other Functions

- a. If necessary, you can hold the reading before recording the measurement by short pressing . Press it again to cancel the hold.
- b. Long press the UNIT button to switch temperature unit between °F and °C.
- c. The tester will automatically power off if there is no operation within 10 minutes.

9. Probe Cleaning

- a. A clean probe is essential to measurement accuracy. Always thoroughly rinse off the probe before and after each measurement with clean water. Do not wipe the glass sensor tip. Shake-dry and dap off excess water with clean tissue.
- b. For tough contaminants, soak the probe in Apera's cleaning solution for at least 30 minutes. Then soak the probe in 3M KCL overnight. Rinse it off and recalibrate the tester before using again.

10. Storage

- a. Under regular usage (daily or weekly use), as long as there are several drops of water or pH 4.0 solution or KCL storage solution is in the cap to maintain the hydrated condition of the probe, you are good to go.
- b. For long-term storage (you are not going to use the product for a while), fill 3M KCL storage solution to the Fill line in the cap and soak the probe in it.

11. Notes

- a. Never store the probe in pure water such as tap water, RO water, distilled water, deionized water, etc.
- b. Never use your finger to touch the glass membrane or use other material to wipe it.
- c. Avoid testing in high ($>45^{\circ}\text{C}$) or low temperature ($<5^{\circ}\text{C}$) solutions as it will cause greater measurement error and cause damage to the probe. Test your samples and perform calibration close to room temperature as much as possible.
- d. Do NOT test oily liquid or solutions containing proteins.
- e. Make sure the battery lid must be tightly closed on. O-rings must be properly installed. Otherwise, the waterproof rating will be compromised.

12. Error messages

 A digital display showing 'CAL' in large characters, with 'Er °F' below it. A small 'pH' icon is in the top left corner.	<p>Calibration Errors</p> <ol style="list-style-type: none">1. The first calibration point is not 7.00 pH or calibration buffer is wrong or problematic.2. Reading cannot stabilize within 1 minute3. Probe slope or offset is exceeding the standard range
 A digital display showing a dashed line '-----' and '0r °F' below it. A small 'pH' icon is in the top left corner.	<p>Temperature or pH measurement is out of range</p>

13. Technical Specs

Range	0.0 to 14.0pH, 0 to 10.0 EC, 0 to 7000ppm (700ppm), 0 to 5000ppm (500ppm), 0 to 50°C (32 to 122°F)
Resolution	0.1 pH, 0.1EC, 10ppm (700ppm), 10ppm(500ppm), 0.1°F/0.1°C
Accuracy	±0.1 pH, ±0.1 EC ±30ppm (500ppm) ±40ppm (700ppm) ±1°C/±1°F
Temperature compensation	Automatic
Calibration	pH: 1 to 3 points (7/4/10); EC: 1 point (2.77 EC)
Unit	pH, EC, 500ppm, 700ppm, °F, °C
Power supply	4*AAA alkaline batteries, up to 1000 hours of operation
Backlight	White (measurement); Green (calibration); Red (errors)
Reading hold	Manual
Warranty	Two years for the instrument, one year for the probe
pH probe	Low resistance lithium glass membrane, double-junction, blue gel electrolyte
EC probe	Titanium alloy
Successful calibration indicators	M (7.00 pH/2.77 EC), L (4.00 pH), H (10.01 pH)
Low battery reminder	
Waterproof rating	IP67
Reading stabilization icon	
What's in the box	GS4 pH EC Pen Tester, 7.00/4.00 pH/2.77 EC (50mL each), 3M KCL storage solution (10ml), user manual, lanyard.