

OPERATION MANUAL

IP65 pH/EC/TDS/SALT/S.G./Temp. Pen



Parameter: pH/EC/TDS

For Hydroponics



**Parameter: pH/EC/TDS
/Salinity/S.G**

For all applications

*The world's first multifunctional water probe capable
of measuring the conductivity range up to sea water salinity*



QUICK GUIDE

1. Rotate and remove the storage buffer bottle. Check if the glass is intact and moist, reference junction fiber is clean and ensure that the conductivity electrode is complete and free of rust.



2. Open the top cover and charge the device for about 1 hour.



3. Press the power button to turn on the device, then proceed with the test. For accurate result, do calibration first (page 6)



4. Submerge the probe about 4 cm (1.5") into the test liquid. Let it sit for 5 minutes to reach temperature equilibrium, then gently shake it for 1 minute to obtain the final measure.



5. Checking the reading at a regular time and in a consistent location provides the best comparison results.

Consistent
spot & time

6. Refer to page 5 for cleaning after use.

Cleaning
after use

INTRODUCTION

Proper use and maintenance of this product can result in accurate measurements and extended service life. This is the world's first multifunctional water probe capable of measuring conductivity range up to seawater salinity.

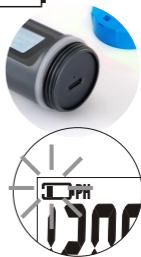
Features:

- ◆ Two models: PH/EC/TDS model for hydroponic application. PH/EC/TDS/SALT/S.G model for all applications.
- ◆ Auto ranging and integrated S.G. (Specific Gravity) and Salinity Unit for aquaculture users
- ◆ Clear LCD with backlight to display parameters in turns: PH, Conductivity, TDS, Salinity, S.G. and Temperature
- ◆ Replaceable sensor and optional 5M long extension cable
- ◆ Eco-friendly rechargeable battery through USB-C
- ◆ Adjustable TDS factor for all hydroponic formula
- ◆ Multiple points calibration. EC/TDS/SALT: 4, pH:3
- ◆ Low ionic strength pH glass bulb and Longer probe with more electrolyte to extend life time

POWER SUPPLY

This product has a built-in rechargeable battery. Please unscrew the battery cover, use the included charging cable to charge. Battery icon flashes during charging. About 30 hours of continuous use after 1.5 hours of charging.

This enclosed cable is for charging, no data transfer function.



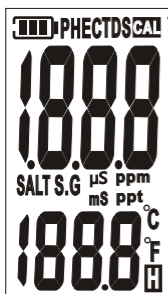
MATERIAL SUPPLIED

The full package contains:

- ✓ PH/EC combo pen (built-in battery) x 1
- ✓ Type C charging cable x1
- ✓ Manual x1
- ✓ Storage plastic case x 1
- ✓ Wrist strap x 1



LCD DISPLAY



-----Battery Level/Parameters/Calibration

-----Measured Value

-----Parameters/Unit


-----Water temperature/units/Reading lock

*SALT & S.G. are for
aquaculture
application model.*

KEYPAD OPERATION

Note: Green text keypad means press longer time



- ◆ Press once to turn on. The device automatically turns off after 20 minutes of keypad inactivity.
- ◆ In power-on state, **long press** to enter setup mode.
- ◆ If you don't want to have the function of automatic shutdown function, press and hold the power &  button when turning it on until the word "n" appears on LCD
- ◆ In the setting state, press this key to confirm setting. **Long press** to quit setup without saving.



- ◆ While powered on, a short press locks the reading and saves the data simultaneously.
- ◆ In the power-on state, **long press** to enter calibration
- ◆ In the setting state, press to adjust value downward



- ◆ In the power-on state, short press to switch the display to other parameters
- ◆ In the power-on state, **long press** to enter the memory recall mode
- ◆ In the setting state, press to adjust value upward

OPERATION

Step 1: Charge and check probe status

This product has a built-in rechargeable battery. Unscrew the battery cover on the head and use the included charging cable to charge. About 30 hours of continuous use after 1.5 hours charging time.



After the product is charged, it is ready to use. Before each regular use, visually inspect the pH glass is intact, reference junction fiber is clean and EC electrode is free of rust.



Step 2: Power on the meter

Short press the "Power" button to turn on the LCD; if you need to turn it off, press the "Power" button again.



Step 3: Calibration

The instrument has been well calibrated at the factory, but calibration is still necessary regularly to get best result. See the Calibration section for calibration details.

Step 4: Get Value

Submerge the probe about 4 cm (1.5 inches) into the test liquid. Let it sit for 5 minutes to reach temperature equilibrium, then gently shake it for 1 minute to obtain the final measure

Using an optional extension cable allows measurement several meters underwater



The device automatically turns off after 20 minutes of keypad inactivity.

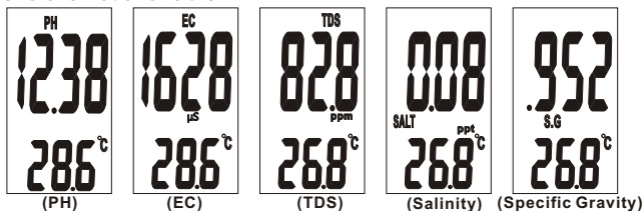
Step 5: Backlight for dark places

To make it easier to see readings in dim areas, press any key can turn on backlight feature for 30 seconds.

Step 6: Switch parameters

Press "**MODE**" to switch the displayed parameter to pH, EC, TDS, Salinity or S.G.

On model designed for hydroponic application, salinity and S.G are not available.



The auto-ranging feature is embedded. For example, if the measured EC value is low, the displayed unit will be µS. Users cannot manually change the unit

Step 7: Freeze and record the reading (Hold)

In order to make the hand recording work easier, press the "**HOLD**" key can lock the reading and save the data simultaneously. Display shows 'FuL' when memory space is full. Press again to unlock.



Step 7: Data recall

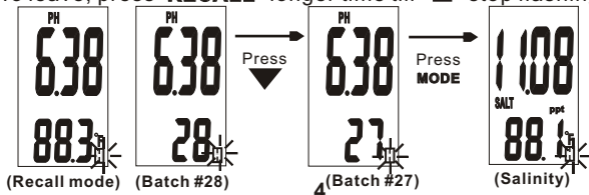
Press "**RECALL**" longer time to enter recall mode.

"**H**" flashes to indicate meter is now in recall mode.

Press "**▼**" to switch to different memory batch.

The full size is 99 batches. Press "**MODE**" to switch to different parameters.

To leave, press "**RECALL**" longer time till "**H**" stop flashing.



PH PROBE MAINTENANCE

First, while you get the new meter, make sure the pH electrode glass is intact, clean and wet.

Often calibrate with standard solutions to ensure accuracy. Prevent buildup of residue and check for damage after each use

pH probe is sensitive that requires care to ensure accurate measurements and long-term functionality. Follow these guidelines:

1. Cleaning

Avoid scratching. Never rub the electrode with abrasive materials or cloths.

it is essential to clean the pH electrode regularly.

After Each Use Rinse the electrode with distilled water to remove residual solution.

For General Cleaning Soak the electrode in an electrode cleaning solution for 15-30 minutes.

For Protein Contaminants Use a protein cleaning solution or a mild detergent solution.

For Oil or Grease Residues Use an alcohol-based solution or mild soap with distilled water.

2. Check for Damage

Inspect the electrode for cracks or leaks; replace it if necessary.

3. Storage

Proper storage prevents electrode damage and ensures readiness for future use

Keep the Electrode Hydrated If the electrode dries out, soak it in a storage solution for at least an hour before use.

Avoid extreme temperatures Direct sunlight, exposure to high heat or freezing temperatures can damage the electrode.

Use pH electrode storage solution not in distilled or deionized water, as this can degrade the electrode.

Store in an Upright Position to prevents leakage and prolongs the lifespan of the sensor.

EC PROBE MAINTENANCE

Proper cleaning and storage are necessary to maintain accuracy and prolong its lifespan. First, while you get the new meter, make sure the EC electrode pins are intact, clean and free of rust.

1. Cleaning

Do not use abrasive materials or brushes, as they can damage the probe's surface.

Regularly cleaning prevents contamination and ensures precise readings.

After Each Use Rinse the probe with distilled water to remove any residues.

For General Cleaning Soak the probe in a mild soap solution or a specific electrode cleaning solution for 10-15 minutes.

For Heavy Contamination If the probe is heavily contaminated, soak it in a diluted acid solution (e.g., 0.1M HCl) for a few minutes, then rinse thoroughly with distilled water.

2. Storage

Proper storage prevents damage and ensures the probe remains in good working condition. Keep in a cool place and avoid high humidity, which can degrade the temperature sensor.

PH CALIBRATION

The frequency of pH calibration depends on how often you use the meter, the required accuracy, and the conditions in which it's used.

Calibrate **daily**: Laboratory, Pharmaceuticals, Food Industry.

Calibrate **1-2 times per week**: Aquariums, Agriculture, Environmental Monitoring.

Calibrate **once a month**: General Testing, Household Use.

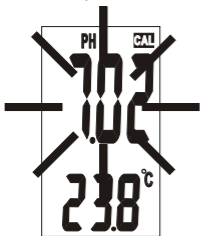
Please also conduct calibration in below conditions:

1. If the meter hasn't been used for a long time.
2. When measuring extreme pH values (pH <3 or >9).
3. In environments with significant temperature changes.
4. When the pH electrode starts aging.
5. After replacing probe.

Selecting the proper and fresh buffer will help the meter to recognize the buffer and calibrate the probe precisely.

The pH calibration procedures are:

1. Power on the meter
2. Press **MODE** to select PH mode.
3. Pour fresh PH buffer into a container.
Suggest to start from middle range buffer, such as pH7.01
4. pH electrode is completely immersed in buffer, stir and wait for about 5 minute to get homogenous condition without creating bubble.
5. Press **CAL** for 2 seconds to enter "calibration" mode.
You will see detected value flashing and **CAL** icon appears.
6. Once the probe auto recognize the pH buffer. For example, 7.01, "CAL" flash once and then 7.01 flashes. If the auto recognized value is different from your buffer, pressing Δ or ∇ to adjust. The adjustable range is 3.5~4.5, 6.5 to 7.5 and 9.5 to 10.5.
7. Wait for 30 seconds or press **SET**, SA will be displayed on the LCD to indicate the calibration is saved.
8. To quit without saving, long press "**SET**" till "End" appear to indicate the calibration is ended without saving.
9. Repeat step 2~7 to do 4.01 & 10.01.
10. Always use clean water to wash before immersing into different buffer.
11. If you see **Prb** after pH calibration, it means the probe is aged and could not provide you accurate result. Please buy a new probe as replacement.



Calibrating



Calibration saved



Calibration ended without saving



Change probe

EC CALIBRATION

We strongly recommend calibrating the probe regularly. For measurements below 100 μS , calibrate at least once a week to maintain accuracy. For mid-range conductivity, monthly calibration is sufficient. For extreme temperature conditions, weekly calibration is advised

No matter you want to calibrate EC or TDS or Salinity, you may always choose EC buffer to simplify the calibration task

Select a standard buffer which is closed to your measuring range or referring to following table. Normally calibrate at 2/3 full range is suitable for most condition.

For example, if the measuring range is 0~1999mS, you can use 1413uS solution to calibrate.

For salinity users, switch the mode to EC and see what's the corresponding EC value. Then, choose a suitable EC buffer for your salinity measuring application.

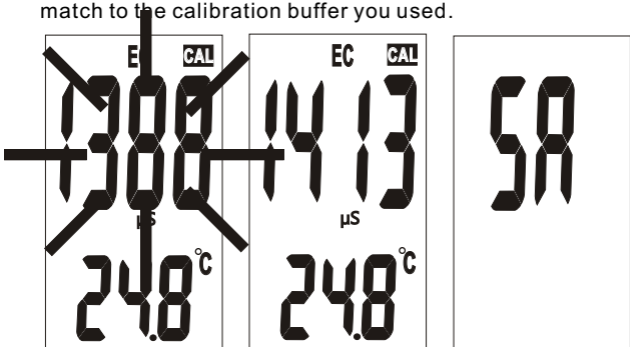
DO NOT reuse the calibration solution. Contaminants in the solution will affect the calibration and the accuracy. Be sure to use fresh solution each time.

	Measuring range	Suggested buffer	market common
1	0~199.9 μS	60.0~170.0 μS	84 μS
2	0~1999 μS	600~1700 μS	1413 μS
3	0~19.99mS	6.00~17.00mS	12.88mS
4	0~199.9mS	60.0~170.0mS	111.8mS

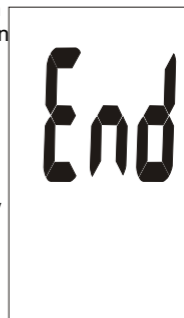
For conductivity calibration, only a single-point calibration is required within the range close to your measurement values—there is no need for multiple-point calibration. The previous calibration data will be overwritten upon re-calibration. For example, if you previously calibrated at 1413 μS in the 0–1999 μS range, and you re-calibrate at 1500 μS (also within the 0–1999 μS range), the previous 1413 μS calibration will be replaced. However, calibration data for other ranges that have not been re-calibrated will remain unchanged.

Please follow steps below for conductivity calibration:

1. Insert the probe into distilled water for about 30 minutes to rinse the probe.
2. Select appropriate conductivity solution for calibration.
3. Pour the solution into a clean container.
4. Turn the meter on. Press “**MODE**” to choose EC mode.
5. Dip the probe into buffer and slightly stir for about 5 minute to create a homogeneous buffer. Ensure the sensing area is completed soaked in the solution,
6. Press **CAL** key more than 2 seconds to enter calibration. The probe will automatically detect the conductivity solution value and the value will flash on the LCD. Press the Δ or ∇ key to adjust the value on the LCD to match to the calibration buffer you used.




7. When the conductivity solution value on the LCD matches the calibration solution value, Press **ENTER** key, the “SA” will display on the LCD. To quit without saving, press **ENTER** key longer time till “End” appears.



8. Repeat step 1~7 for other ranges. Multi-point calibration is only necessary if you frequently measure solutions with a wide range of concentrations
9. Always use clean water to wash before immersing into different buffer.

SETUP

This meter has an advanced setting mode that allows you to customize the parameters. If you want to change the parameters, press "  " key >2 seconds to enter the setting mode while you are in power-on state.

The first setting you see is the temperature unit. If you want to select other parameters, you can press \triangle or ∇ to select.

When you see the parameter you want to set, use " **SET** " to enter. Then, adjust the value up and down through \triangle or ∇ . After adjustment, press " **SET** " to confirm.

EC Calibration data review feature allows you to see which range is calibrated and related details.

Setting	Icon	Default	Range
Temp.unit	t	$^{\circ}\text{C}$	$^{\circ}\text{C}$ or $^{\circ}\text{F}$
TDS factor	tdS	0.5	0.40~1.00
Clear 99 memo	Clr	No	No or Yes
Reset	RSt	No	No or Yes
EC Cal. Review	CAL		

PROBE REPLACEMENT



Probe Replacement:

- ① To remove an electrode, unscrew and completely remove the electrode collar (turn the collar clockwise to remove).
- ② Gently pulling it downwards, until it disconnects from the meter.
- ③ Reverse way to install a new probe. Pay attention to the alignment guide.

TROUBLE SHOOTING

◆ Already press power key but no display

- 1) Make sure you have pressed power key more than 0.1 second
- 2) Charging the battery first and then try again.

◆ Can't turn off the meter

If the device cannot be turned off, it may have frozen. To reset it, open the battery cover and locate the small hole next to the charging port. Press it once using a paperclip to perform a hardware reboot and resolve the issue



◆ Too big difference from previous measurement

The most important principle in troubleshooting is to isolate the components of the system and check each in turn.

The components of the system include water resistance, probe, testing sample and technique.

1. Water Resistance

This device is not designed to be used under water. The probes can be submerged in an aquatic environment for some minute, not designed for long-term immersion application.

2. Probe

First, rinse the probe thoroughly with distilled water, blot it dry with a lint-free tissue and inspect the glass bulb is intact and clean. Doing calibration first to see if this issue could be improved.

If not, please purchase a new probe.

3. Testing sample

If the probe works properly in standards but not in the sample, look for possible interferences or substances in the sample that could alter the probe response or physically damage the probe. If possible, determine the composition of the sample and check for issues.

4. Technique

Check if the method of this analysis is compatible with your sample.

◆ What to do if you spill storage buffer?

The pH probe should be stored in pH storage solution. If the solution is spilled, tap water can be used temporarily, but it is essential to refill the storage solution a.s.a.p..

◆ **Prb** appears after doing pH calibration

It means the probe is aged and could not provide you accurate result. Please buy a new probe as replacement.

◆ **Ful** appears while pressing **Hold** key

It means the memory space is full. Please go to Setup mode to clear all memories.

◆ **...** appears while power is on

Probe is disconnected or faulty. Please unplug and reconnect the probe. If the issue persists, consider replacing the probe with a new one.

◆ Unstable EC reading

When measuring low conductivity samples, extra care is recommended in rinsing the probe to avoid contamination of the sample with electrolyte from the pH reference electrode. This will only be a factor when measuring in the low range, and can be further minimized by increasing the volume of the sample. (Example: Try a 200 to 500 mL sample.)

◆ White crystals

White KCL crystals may be present on the electrode. It is normal and these crystals will dissolve while soaking the electrode or they can be rinsed away with tap water.

◆ Error code list

E02: Indicates that the measured sample is **below** the minimum detectable range or the sample volume is too little. Please ensure that the sample volume is enough and is within the measurable conditions of this product.

E03: Indicates that the measured sample is **above** the maximum detectable range or the sample volume is too little. Please ensure that the sample volume is enough and is within the measurable conditions of this product.

E04: The temperature sensor is in an error condition, causing E04 to appear on other parameters. Resolve the temp. sensor error first, and E04 will disappear.

SPECIFICATION

Model	Hydroponic	All in ONE
pH range/resolution	0.00~14.00/resolution :0.01	
pH accuracy	+/-0.1	
EC (Auto range)	0~199.9uS/cm, 200~1999uS/cm, 2.00~19.99mS/cm, 20.0~200.0mS/cm	
EC accuracy	+/-2% F.S +/- 1 digit	
EC resolution	0.1uS/cm, 1uS/cm, 0.01mS/cm, 0.1mS/cm	
TDS. Range (f is TDS factor)	0~199.9*f ppm, 200~1999*f ppm, 2.00~19.99*f ppt, 20.0~200.0*f ppt	
TDS. Accuracy/res.	+/-2% F.S +/- 1 digit; res.:0.1,1ppm;0.01, 0.1ppt	
TDS Factor	0.40~1.00	
Salinity range	0.00~11.40ppt; 11.4~159.9ppt(NaCl)	
Salinity accuracy/res.	+/-2% F.S +/- 1 digit; res.:0.01 ppt, 0.1ppt	
S.G. range	0.950~1.080 (NaCl)	
S.G. Resolution	0.001	
Temp. range	0.0~70.0°C(32.0~158.0°F)	
Temp. Accuracy/res.	+/-0.6°C ; 0.1(+/-1°F; 0.1)	
ATC active range	0.0~50.0°C(32.0~122.0°F)	
Temp. Coefficient	2.0% per °C(1.1% per °F)	
Normalization Temp.	25.0°C (77 °F)	
LCD size(mm)	30(H)x18(W)mm	
Operating temp.&RH%	0~50°C,	Humidity<80%
Storage temp.&RH%	0~60°C,	Humidity < 90%
Dimension(mm)	210(L)x39(W)x39(H)	
Weight	120g	
Battery	Built-in rechargeable lithium battery, 5V USB-C	
Power consumption	<6.5mA (backlight off), <12mA(backlight on)	
Response time	<90 seconds	
Sensor life time (with good maintenance)	> 6 months	
Standard Package	Meter(with built-in bat.)/Manual/USB-C cable hard storage case/wrist strap	
Optional accessory	Empty vial for buffer storage(20mL) 5M long extension cable kit	

INSTALL EXTENSION CABLE



1. Disconnect the probe from meter and connect probe to the extension cable.
2. Attach the extension cable to the meter and then Install the probe protective cap.
3. Perform calibration ***without removing the protective cap***. Recalibration is essential to compensate for any influence introduced by the extension cable.

WARRANTY

The meter is warranted to be free from defects in material and workmanship for a period of one year from the date of purchase. This warranty covers normal operation but does not cover battery, misuse, abuse, alteration, tampering, neglect, improper maintenance, or damage resulting from leaking batteries. Proof of purchase is required for warranty repairs. Warranty is void if the meter used to be taken apart .

RETURN AUTHORIZATION

Authorization must be obtained from the supplier before returning items for any reason. When requiring a RA (Return Authorization), please include data regarding the defective reason, the meters are to be returned along with good packing to prevent any damage in shipment and insured against possible damage or loss.

**Accuracy, the Zenith of
Measuring / Testing Instruments !**

Hygrometer/Psychrometer
Thermometer
Anemometer
Sound Level Meter
Air Flow meter
Infrared Thermometer
K type Thermometer
K.J.T. type Thermometer
K.J.T.R.S.E. type Thermometer
pH Meter
Conductivity Meter
T.D.S. Meter
D.O. Meter
Saccharimeter
Manometer
Tacho Meter
Lux / Light Meter
Moisture Meter
Data logger
Temp./RH transmitter
Wireless Transmitter

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