OPERATION MANUAL

CE

IP67 6 in 1 combo water meter

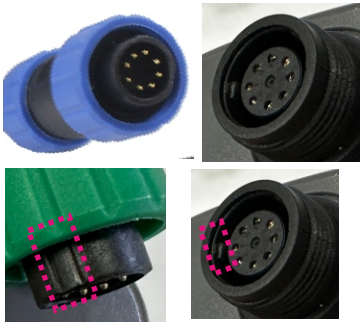
QUICK GUIDE

This 6-in-1 combo meter is ready to use, however, the probes accuracy may change after transportation. Read page 9 and 14 for more information to get accurate result.

Nevertheless, you may still follow below to start your first time use of this 6-in-1 combo meter.

STEP 1 Inspect the appearance of all probes.
The pH glass should be intact and wet. Junction fiber is clean.
The EC probe should be intact and dry.
The DO probe sensing surface should be free from scratches.

STEP 2 Ensure that all probe plugs and meter sockets are clean, and the pins are straight.
Connect the probes firmly to the meter by using the alignment guide.



STEP 3 Install 4 new AAA batteries and press " SET " to power on.

Now you're ready to surf more.

INTRODUCTION

Thank you for purchasing this combo waterproof pH/Cond./ TDS/Salt/optical D.O./Temp.Meter. It is simple to use and requires low maintenance . To achieve the best measuring result, please read the instructions in detail and keep manual properly for future reference.

The optical dissolved oxygen probe (luminescent dissolved oxygen or fluorometric dissolved oxygen) is based on luminescent optical technology. The measuring principle offers the following advantages:

- ◆ Low operating costs due to reduced maintenance work (no electrolyte changes)
- ◆ Greater calibration intervals due to low drift behavior
- ◆ No polarization voltage required
- ◆ No oxygen consumption
- ◆ No minimum inflow

Further more, this meter also has below features:

- ● Large LCD with multiple parameters display: PH, Conductivity, TDS, Salinity, D.O. and temperature.
- ● IP 67 Waterproof.
- ● Auto temperature compensation.
- ● Pressure/salinity compensation.
- ● Multiple points calibration.
- ● 99 points memories.
- ● Memory recall function.
- ● Probes w/ anti collision hood
- ● Temperature °C/°F is switchable.
- ● 1 hour auto power off.
- ● Excellent to use: fresh water aqua farm, sea water aqua farm, waste water analysis, and water quality check.

Let's learn more about Dissolved Oxygen (DO) before starting.

DO Concentration

Measuring the dissolved oxygen concentration in a water sample. This is an absolute measurement of dissolved oxygen concentration expressed as milligrams of oxygen gas dissolved per liter of water. Unit is milligrams per liter (mg/L) or the same as parts per million (ppm). The readings are automatically temperature (water temperature) and manual pressure (atmospheric)/salinity compensated.

DO Saturation

Measuring the percent saturation of dissolved oxygen in a water sample. Percent saturation is a relative measurement in which the dissolved oxygen concentration is expressed as a percentage of the maximum amount of oxygen that water can hold at a given temperature and pressure.

Temperature

Measuring water temperature of the sample. Units can be changed from °C to °F . It is always in use internally to temperature compensate the dissolved oxygen readings.

Pressure

Manually input the atmospheric pressure easily by entering the altitude value of location. It is then in use internally to pressure compensate the dissolved oxygen readings if user manually input this value.

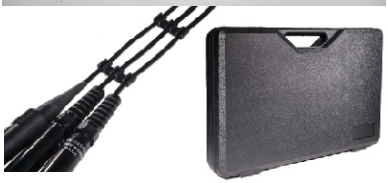
DO Salinity

This parameter shall be considered when measuring dissolved oxygen in highly saline environments (> 1 ppt). In these cases, a correction must be made manually to account for the effect of salinity on dissolved oxygen concentration. Salinity is not measured by the D.O. probe, but it can be manually entered in setup up mode. Salinity unit is parts per thousand (ppt).

MATERIAL SUPPLIED

This multi-function combo meter comes with all required accessories, you don't need to purchase extra accessories or chemicals. The full package contains:

1.IP67 waterproof meter, 1pc
2.Waterproof optical D.O probe w/anti-collision cap, 1pc
3. PH probe w/anti-collision cap, 1pc
4. EC probe w/anti-collision cap, 1pc
5. PH 4, 7, 10 buffer for one time use
6. EC 1413uS buffer for one time use
7.AAA alkaline batteries, 4pcs
8.Manual, 1pc
9. Cable organizer, 6pcs
10.Hard carry case, 1pc



HOW TO TAKE CARE OF ODO PROBE

Do not twist the sensing tip. The fluorometric dissolved oxygen sensing tip is not replaceable.

Avoid touching the black color sensing tip surface, because it can become scratched or dirty. If this happens, the functionality of the probe can no longer be guaranteed.

Re-hydration prior to use. The probe is delivered wet but it may dry out after long term storage. The sensing tip must be re-hydrated to ensure measurement accuracy. 2 hours in clean distilled water is enough.

Often calibration is not required. This probe is factory calibrated and does not require calibration by the user. Only do calibration while the probe is not reading accurately or after chemical cleaning.

Must always **keep clean**, particularly in the area around the optical sensing surface. The presence of a biofilm on the sensing surface can lead to measuring errors.

Be rinsed prior to being stored, and the storage tube should be fitted with a moist absorbent surface, such as sponge.

Interfering substances

Alcohols greater than 5%, hydrogen peroxide (H_2O_2) greater than 3%, sodium hypochlorite (NaClO, commercial bleach) greater than 3%, gaseous sulfur dioxide (SO_2) and gaseous chlorine (Cl_2) may interfere with the dissolved oxygen measurements.

Highly cross-sensitivity to Organic solvents, such as acetone, toluene, chloroform or methylene chloride, Chlorine gas.
So, do not use the ODO probe in solutions that contain organic solvents, such as acetone, chloroform or methylene chloride.

If the measurements are unstable and other troubleshooting procedures do not correct the problem, there may be interfering substances present in the solution.

No cross-sensitivity with : CO2, H2S, SO2. Carbon dioxide (CO_2), ammonia (NH_3), pH, any ionic species like sulfide (S_2^-), sulfate (SO_4^{-2}), chloride (Cl^-) and hydrogen sulfide (HS^-) do not interfere with the dissolved oxygen measurements.

HOW TO TAKE CARE OF EC PROBE

Rinse with distilled water after each use and clean with a mild detergent if necessary. Keep the probe dry for storage.

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

HOW TO TAKE CARE OF PH PROBE

The pH glass bulb should always be moistened by using storage buffer, DO NOT using distill water for storage.

Rinse the pH electrode with distilled water before use.

Never touch or rub the glass bulb for lasting pH electrode life.

Rinse with distilled water after each use and clean with a mild detergent if necessary.

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

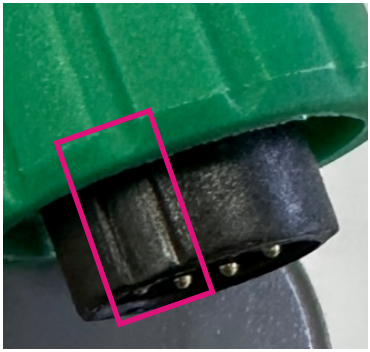
SUBSTANCES THAT DAMAGE PROBES

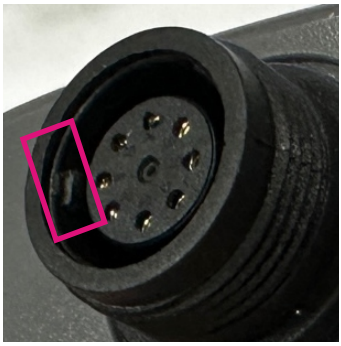
These probes should be used in **aqueous solutions** only. Do NOT place the probe in viscous, organic liquids, such as heavy oils, glycerin (glycerol), ethylene glycol, or alcohols.

Do not place the probe in acetone or non-polar solvents, such as pentane or hexane.

HOW TO CONNECT PROBE TO METER BODY

There is an alignment guide inside probe plug, please lineup with the socket of meter, push plug to position and rotate lock cap to tighten.





The IP67 meter body and connector provide you convenience to do cleaning after usage without worry of damaging device.

Reminder: This device is **not designed to be used under water,** IP67 design provides you convenience of cleaning only.

HOW TO INSTALL BATTERIES

Besides first time use, it is also needed to install new batteries when the battery low icon appears or while you could not turn the meter on.

4pcs AAA alkaline batteries can provide 10 hours operation time. Using screw driver to open the battery compartment in the rear side of meter, installing 4pcs new and same brand batteries properly, put back the battery cover and screw on. No need to screw over-tight.

The O-ring in this compartment is used for resisting water, keep it flat, smooth and clean. Don't discard the O-ring.

KEYPAD OPERATION

This 6 keys meter provides you multiple functions. Some functions are only activated by pressing key longer time.

-Short press to switch power on or off.
-Long press in normal mode to enter setup mode.

-Long press to switch between “normal” and “calibration” mode.
-In calibration, setting or recall mode, press to return to normal mode.

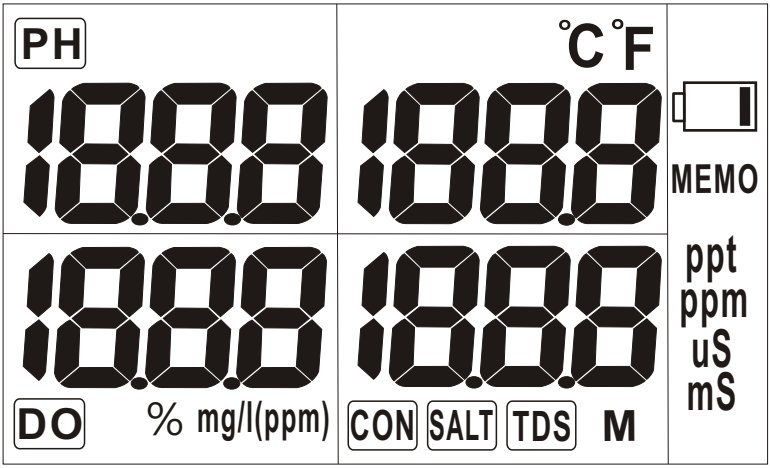
-Press to switch between CON(uS/mS) or Salt (ppt) or TDS(ppm/ppt).
-Hold down this key more than 2 seconds to read memorized value.

-Press to switch between D.O. In% or D.O.in mg/l (ppm).
-Press to increase the setting value in **SET** mode.

-Press to save the current reading into memory.
-Press to decrease the setting value in **SET** mode.

-Press to confirm the calibration or parameter setting.
-Press to switch temperature display from different probe in normal mode and recall mode.

LCD DISPLAY



This big display provides clear information even under the sun.

PH

Indicate the measured value is pH

DO % mg/L (ppm)

Indicate the measured value is D.O. and unit is % or mg/l(ppm)

CON SALT TDS

Indicate the measured value is conductivity or salinity or TDS

ppt ppm uS mS

To indicate the unit of displayed conductivity or salinity or TDS value. Note: ppt is part per thousand.

℃℉: To indicate the displayed value is degree C or F.

: To indicate battery power is too low for correct measure

MEMO : Flash to indicate the display is currently in recall mode.

M : To indicate the altitude. Unit is in meter scale.

OPERATION

Before Measure

This optical dissolved oxygen (ODO) probe is factory calibrated and does not require calibration before use. Nevertheless, please **re-hydrate** probe before first use or after long term storage.

Step 1: *(Only required for the first time use or after long term storage)*
Refill distilled water to re-hydrate the sensing surface for 2 hours.

Step 2:
To check the accuracy.
With above step 1, sponge should be now completely wet. Squeeze excess water, keep sponge wet but no excess water can come out of the sponge.

Step 3:
The probe surface must be kept dry. This step is important since attached water will affect the result.

Step 4:
Put back the storage cap and make the probe standing vertically facing desk.

Step 5:
Wait for at least 60 minutes to create a 100% Water vapor -saturated air condition in the space between sponge and sensing surface. Meter shall stay power off since power off status can minimize the heat interference at this stage.

Step 6:
After 1 hour, power on the meter. Wait for 1 minute and check the D.O.reading. Qualified range shall be 95.0~105.0 %

Step 7:
If the pH electrode surface is dehydrated, soak it for 1 half day in KCl storage buffer before taking the reading.

Step 8:
If the EC probe is not used for a long time, please soak the probe in clean water for more than 30 minutes to eliminate the inert effect of the probe.

Step 9:
Besides **re-hydrating** the ODO probe, for accurate pH and EC/TDS/Salinity measuring result, please also refer to page 22 to implement the required calibration on PH and EC probes.

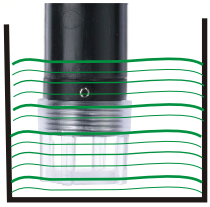
Start to Measure

Step 1:
If any salt or mineral deposits are observed on the probe, immediately rinse them off with distilled or deionized water. Always keep sensing surface clean and no scratch.

Step 2:
Put on anti-collision cap on probes to protect sensing surface.

Step 3:.
During the introduction of the probe to a new environment, wait for 5 minutes to make probe's temperature reach stabilization.

Step 4:
While in the same environment, 60 seconds stir and waiting time is essential for having accurate result. The probe shall be covered by at least a 2 inch of the solution to ensure the temperature sensor is immersed in solution as well.



5 mins for Temp. equilibrium
& 2 inch deep

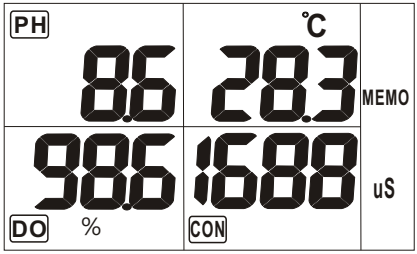
Keypad Operation

Power on /off meter

Before power on, plug the probes into meter.

Short press " SET " to turn on the meter.

Short press " SET " again to turn off the meter.



Change mode of D.O.

In normal and recall mode, short press " %↔mg/L " to convert D.O. value between DO Concentration (mg/L) and DO Saturation value (%)

Manual 99 recording

In normal mode, short press " **MEM** " to save the current value into memory file, up to 99 records. If memory is full, it will remind you with a **FUL** icon while you press this key

You will see measured value and " MEMO " icon flash to indicate it is taken into memory and also the memory number of right upper corner column increase.

Check Memorized Data (Recall)

In normal mode, press " RECALL " key longer time to review the logged data. " MEMO " keep flashing to indicate the status.

Press " ▲ " or " ▼ " to scroll.

D.O. unit change mode is not active in recall mode.

To quit this mode, short press "**ESC** ".

Switch to TDS or Salinity

Press" EC MODE " to switch the conductivity display from EC to TDS or to Salinity.

This product features a built-in seawater conversion factor, requiring no manual input. For other solutions, please set the TDS conversion factor in Setting P50 section first.

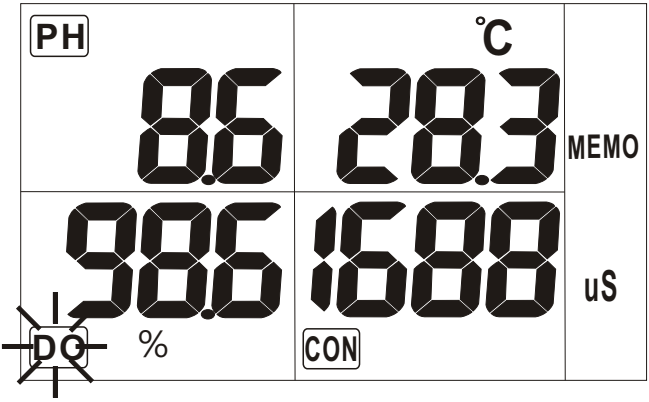
Tips:

If air bubbles are observed adhering to the EC probe, it may compromise accuracy. To remove them, gently immerse and withdraw the probe from the water several times.

Temp. Display change

The temp column always shows the current temperature from the probe with blinking icon. For example, when DO icon is blinking, it means the temp. reading displayed on the TEMP column is measured by D.O. Probe.

In normal mode, press "**Tmode/Enter**" to switch temperature display of different probes.



Setup (Preferrence setting)

This meter is designed for many applications, you can custom made the basic setting to make it suitable for your unique application. For example, salinity shall be considered when measuring D.O. in high saline,> 1 ppt, environments.

While meter is in normal mode, pressing " **SET** " longer time to enter the setup mode.

Using " ▲ "or " ▼ " to choose program or to adjust value. Then press " **ENTER** " to enter program or " **ESC** " to quit without saving.

The adjustable programs number, description, default value and adjustable range are all listed below.

After setting, press " **ESC** " to quit until you return to normal mode.

Programs number	Description	Default value	Adjustable range
P10 (Clr)	Memory all clear	No	Yes or No
P20(ELE)	PH probe slope	No	Review only
P30(CAL)	EC CAL Review	No (remark1)	Review only
P40(CEL)	Cell constant	No (remark1)	Review only
P50(tdF)	TDS factor	0.5	0.30~1.00
P60(COE)	D.O. Compensation		
P62	Salinity value	No	0.0~42 ppt
P63	Altitude value	No	0~3500 M
P70(unt)	Temperature unit	°C	°C or °F
P80(rSt)	Reset to factory setting	No	Reset instrument to default and this clear memory as well.

Remark1: 150mS this scale range could be calibrated using buffer such as 111.8mS but not feasible to check in P30 (CAL) and P40 (CEL).

PROBE CARE

ODO Probe Cleaning

No need to do maintenance work on this probe, such as filling electrolyte or change membrane. Simply cleaning it after use and check accuracy once per month.

1.Avoid touching the center part of the sensing tip, because it can become scratched or dirty. If this happens, the functionality of the device can no longer be guaranteed.

2.Rinse the probe with distilled water from a squirt bottle or spray bottle and blot dry with a lint-free soft cloth.

3.Inspect the ODO sensing tip for scratches or discoloration and replace the probe if any flaws are observed.

Above are common procedures to clean the probe after usage. Please note **calibration is not required after each cleaning**.

However, a water saturated air calibration is recommended after performing below more strict cleaning procedures:

4.If algal growth is present on the sensing tip, gently clean it with a soft brush. Or refer to step 2 in below “Cleaning the ODO probe body” section to clean up.

5.Do not use solvents or soaps to clean the sensing tip and do not rub the tip with abrasive material. Use of these materials will damage the surface and void the warranty.

6.The presence of a biofilm on the sensing tip can lead to measuring errors. A dirty optical sensing tip should be cleaned with warm, soapy water. A soft sponge should be used for cleaning (not an abrasive scouring sponge)

7.Do not let salt or mineral deposits form on the probe. To remove salt or mineral deposits from the cap, refer to step 2 in below “Cleaning the ODO probe body” section.

Cleaning the ODO probe body

1.Gently cleaning the probe body with a wet soft clothes.

2.Calcareous fouling can normally be dissolved with **household vinegar**. Immerse the probe in vinegar overnight. If the marine growth remains, use clean cotton swabs to gently wipe the growth off after it has been softened by soaking in vinegar.

3.After cleaning the ODO probe, thoroughly rinse the probe in distilled water and blot it dry with a lint-free tissue before using or storing it.

After cleaning the ODO probe body as described in above step 2, a water saturated air calibration is recommended after performing above more strict cleaning procedures.

ODO Probe Storage

Between measurements and overnight, keep the ODO in the storage tube, making sure to wet the sponge with distilled water, or in a beaker with distilled water.

Keep the ODO probe away from direct sunlight during storage and not to expose to temperature extremes.

PH probe maintenance

First, while you get the new pH probe, make sure the electrode glass is intact and clean. Junction fiber is clean.

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.

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. Drying
Gently shake off excess water and allow the probe to air dry before storage.

3. 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.

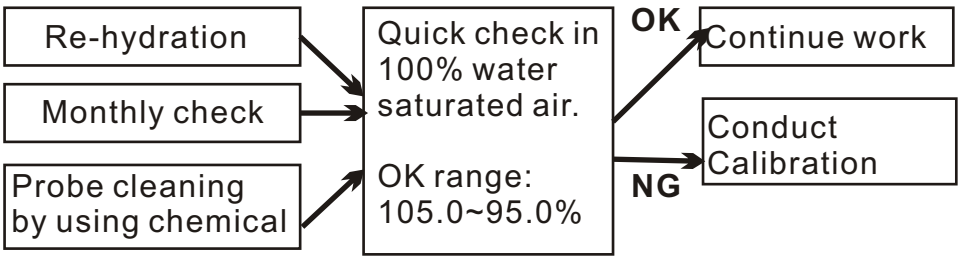
CALIBRATION

Select the probe type first before doing calibration. To select the probe type, simply press " **Tmode/Enter** " to select, a flashing icon PH or CON or DO will appear with each press.

ODO probe calibration

Periodically check the accuracy of D.O probe and conduct calibration while required. D.O calibration feature is available in this meter. This probe is factory calibrated and does not require calibration by the user often or before each use. Only do calibration while the probe is not reading accurately or after chemical cleaning.

If doing ....



100% D.O. CHECK or CAL

There are two methods to proceed 100% check or calibration:

1.By positioning the probe in **<u>water vapor-saturated air</u>**
For example, directly over a water surface.
NOTE: probe must be kept dry during the calibration process. Drops of water adhering to the probe membrane could distort the measurement.

2.By positioning the probe in **<u>air-saturated water</u>**
Air is directed through water until the water is saturated with it.
NOTE: The air pressure and temperature must remain constant during the calibration

In practice, check and calibration can be done quickly and conveniently by performing the first method:
water vapor-saturated air.

100% Water vapor -saturated air

The probe must be kept dry during this process. Drops of water adhering to the probe membrane could distort the measurement. The air pressure and temperature shall remain constant during the calibration and away from wind and sunlight interference.

1. Completely saturate the sponge with distilled water and no excess water come out of the sponge.

2. The probe surface must be kept dry. Put back the storage tube and make the probe standing vertically facing desk. (See picture here)

3. Power off the meter and wait for at least 60 minutes to create a 100% Water vapor -saturated air condition in the space between sponge and sensing surface.

To power off meter during waiting for stabilization could minimize the heat interference radiated from probe.

4. After 1 hour, power on the meter. Wait for 1 minute and check the D.O.reading. Qualified range shall be 95.0~105.0 %

5.Follow the keypad instructions in below to perform a 100% water-saturated air calibration if checked reading is out of qualified range. If the reading is off range for more than 10%, do both 100% and 0% calibration.

6. After doing the calibration, the displayed measurement shall be within the qualified range as 102.0~98.0% range.

Keypad operation of doing calibration

In normal mode, press " **Tmode/Enter** " to select make "DO " flashing first. Then long press " **CAL** " to enter the calibration.

Using " ▲ "or " ▼ " to choose program 100% or 0% calibration and press " **ENTER** " to enter program. Choose Yes or No and then press "**ENTER**" to confirm or " **ESC** " to quit without doing calibration.

While you choose Yes to calibrate, a 400 seconds count down starts. While the calibration is done, it will auto return to normal mode.

Programs number	Description	Default value	Adjustable range
P90(100)	100% D.O CAL.	No	Yes or No
PA0(0)	0% D.O CAL.	No	Yes or No

0% D.O. CHECK OR CAL

Zero Oxygen Solution for Zero Point Calibration

The probe can be damaged by chemicals. A damaged sensing surface can lead to incorrect measurement results. The probe must not be in contact with the Zero Oxygen Solution (sulphite solution) for longer than one hour.

If you need a very good testing performance for below 1ppm D.O., Checking or even calibrate at zero oxygen condition is required. Otherwise, you don't need to do this as part of your routine task.

1.Prepare a sodium sulfite solution by dissolving about 10 g of Na_2SO_3 in about 100 mL of distilled water. Transfer the solution to a BOD bottle or flask.
Note: A small amount of cobalt salt can be added to the sodium sulfite solution. The cobalt salt will act as an indicator and change color when the sodium sulfite solution no longer has a zero oxygen content. Suggest to make fresh zero O2 buffer after 1 hour usage.

2.Always perform a 100% water-saturated air calibration first and then zero oxygen calibration.

3.Immerse the probe in a water-sulphite solution in order to determine the zero point (0% saturation). Stir the probe with solution to quickly decrease oxygen saturation, stirring can make the oxygen fixed to the membrane cap consumed.

4. Add a stir bar to the bottle or flask. Immerse the ODO probe into the bottle or flask and use parafilm to **seal the open area** between the bottle or flask and the probe is even better.

5.Place the bottle or flask on a magnetic stir plate and gently stir the solution.

6.Wait at least five minutes for the ODO probe to equilibrate.

7.If the measured value is larger than 5.0%, follow the keypad instructions in page 20 to perform a zero point calibration.

8.Thoroughly rinse the ODO probe under running water and blot it dry with a lint-free tissue.

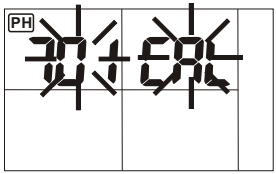
9.If the ODO probe is sluggish or inaccurate after a zero point calibration, means not all of the sodium sulfite was removed from the probe. A very thorough soaking and rinsing of the ODO probe in distilled water is required to remove all of the sodium sulfite solution and restore the probe performance. Soak the ODO probe in distilled water for 30 minutes, blot it dry with a lint-free tissue.

PH probe calibration

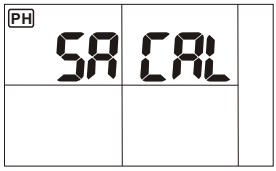
Remove the anti-collision hood from probe and rinse the electrode in distilled water.

Selecting the proper and fresh buffer will help the meter to recognize the buffer and calibrate the probe precisely. It is suggested to do the calibration every half month.

Insert the PH probe into the meter. The pH calibration procedure is as followings:



1. Power on the meter
2. Pour PH buffer into a clean container and put the electrode into buffer. Suggest to start from middle range buffer, such as pH7.01



3. Make sure the pH electrode is completely immersed in buffer and stir for about 1 minute to get homogenous condition without creating bubble.
4. In normal mode, press " Tmode/Enter " to make " PH " flashing first.
5. Long press **CAL** key to enter " calibration" mode.
6. Once the probe auto recognize the pH buffer. For example, 7.01, the "CAL" and 7.01 will flash.
7. If the auto recognized value is different from your standard buffer, pressing "△ or ▽ " key to adjust. The adjustable range is 3.5~4.5, 6.5~7.5, 9.5~10.5
8. Wait for 30 seconds or pressing" **ENTER"** key, SA will display on the LCD to indicate the calibration is saved.
9. Repeat step 1~8 to do 4.01 & 10.01 calibration.
10. Always use clean water to wash before immersing into different buffer.
11. Put on semi transparent probe cap to protect sensor before storage and ensure there is enough storage buffer inside cap.

EC probe calibration

If the conductivity of measured solutions are <100 uS, calibrate the meter once a week can maintain specified accuracy.
If the meter is used in the mid ranges, calibrate once a month is good. If the measurement is proceed at extreme temperature, we suggest to calibrate at least once a week.

There is ***no need to remove anti-collision hood*** from probe before calibration. It is also nice to clean the electrode by soft brush to sweep the dirty away before immersing into buffer.

No matter you want to calibrate EC or TDS or Salinity, you may always chooce 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.

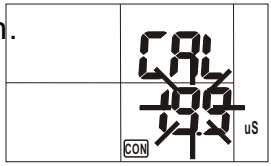
	Measuring range	Suggested buffer	market common
1	0~199.9uS	60.0~170.0uS	84uS
2	0~1999uS	600~1700uS	1413uS
3	0~19.99mS	6.00~17.00mS	12.88mS
4	0~150.0mS	60.0~128.0mS	111.8mS

For Conductivity calibration, you only need to do single point calibration. The previous calibration data will be replaced after re-calibration. For example, if you previously calibrated conductivity meter at 1413 uS in the 0 to 1999 uS range, when you re-calibrate it at 1500 uS again (also in 0~1999uS range), the previous 1413uS will be replaced in this range (0~1999uS). However, the meter will retain the calibration data for other ranges which are not yet re-calibrated.

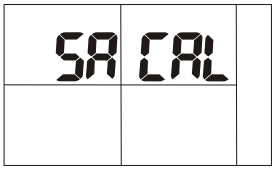
Please follow steps below for conductivity calibration:

1.Insert the probe into de-mineralized water or 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 “Tmode” key to select EC probe.
5.Dip the probe into buffer and stir for about 5 minutes to create homogeneous buffer. Tap probe to remove air bubbles from sensing area. Ensure the sensing area is completed soaked in the solution. .

6.Long press “ **CAL “** key to enter calibration. The probe will automatically detect the conductivity solution value and the value flashes on the LCD.
Press the “△ or ▽" key to adjust the value to match the standard calibration value.



7.When the conductivity solution value on the LCD matches the calibration solution value, Press “**ENTER**” key, the “SA" will display on the LCD.
Then the LCD will stop flashing and return to normal mode then the conductivity calibration is completed. To quit without saving, press” **ESC”** key instead



8.Repeat step 1~7 for other ranges calibration if needed.
9. Always use clean water to wash before immersing into different buffer.

TROUBLE SHOOTING

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, the meter, 3 probes, testing sample and technique.

1. Water Resistance
This device is not designed to be used under water. The IP67 meter body and connector provide you the convenience to do cleaning after usage without worry of damaging device. The probes can be submerged in an aquatic environment for some minute, not designed for long-term immersion application.

2.Meter
The meter is the easiest component to eliminate as a possible cause of error.

3.Probe
First, rinse the probe thoroughly with distilled water and inspect the sensing surface for scratches or discoloration.
Then, if readings continue to be erratic and unstable, the probe may need to be replaced.

4.Testing sample
If the probe works properly in standards but not in your 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. The common see chemicals which will damage probe are listed in page 4.

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

Unable to calibrate the probe:

1.Verify the calibration setup and procedure are followed.
2.Make sure that no water droplets are on the surface of the ODO probe surface while doing 100% water vapor saturated air check.
3.Perform probe cleaning section.

Dissolved oxygen measurements are unstable:

1.Give the probe a few minutes to equilibrate in the sample, especially if the water is not at room temperature or unstable.
2.Perform ODO probe cleaning up procedure.
3.Interfering substance may be present.

Dissolved oxygen measurement is too low

1. Salt may be present in the sample. Set the salinity factor in the meter.
2. Perform ODO probe cleaning up procedure.
3. If the ODO probe is sluggish or inaccurate after a zero point calibration, means not all of the sodium sulfite was removed from the probe. A very thorough soaking and rinsing of the ODO probe in distilled water is required to remove all of the sodium sulfite solution and restore the probe performance.

Wrong temperature displayed:

1. Verify that the probe is immersed in the solution at least 2 inch deep.

Bad zero point calibration on ODO probe:

1. The ODO probe must be in an oxygen free solution for at least five minutes.
2. Make sure that the open area between the probe and bottle is covered with parafilm.

Bad reading after zero point calibration:

1. Soak the ODO probe in distilled water for 30 minutes, use a wash bottle to thoroughly rinse the probe with distilled water and then soak the probe for another 30 minutes in fresh distilled water.

Can't power on

1. Did't press the power key properly
2. Batteries are not installed or are not installed properly

Solution:

1. Press power key for more than 0.3 sec. to turn on the device.
2. Check whether batteries are in good contact and correct polarity. You can also remove the batteries >10 mins and then install the batteries again.

Low battery icon

1.Battery power is too low to provide accurate reading

Solution:

Remove all old batteries > 10 mins and then install new batteries with correct polarity and good contact.
Please don't mix new and old batteries since it is easy to cause battery electrolyte leakage.

Unstable pH reading

1. Means the pH electrode is aging.

Solution:

pH probe need to be replaced

How to know if it is time to get new probe

1. It is suggested to replace ODO probe once a year or while sensing surface is scratched.
2. After running pH calibration, go to setup P20 (ELE) section to check pH slope, if the value is **<75% or >115%**, please change pH probe.
3. After running EC calibration, go to setup P40 (CEL) section to check EC cell constant factor, if the value is **<80% or >120%**, please change EC probe.

More error codes:

Whatever the error code you see, first, check if battery is well installed or change new batteries to see if the issue solved.

E01:Probe isn't detected

Power off first. Check whether the probe is connected normally, turn it on after confirming the probe connection is normal, if it still occurs, means the **meter is broken**, contact the shop you purchase product from for after sales service.

E02: Measured value is lower than specified range
Solution:
1. Put the probe in normal tap water at room temp. for 30 mins to cancel E02 from display.
2. If above is not working, do probe routine maintenance and run below procedure:
-For pH probe, run calibration
-For conductivity probe, run calibration
-For D.O, probe, run 100% calibration

E03: Measured value is above the specified range.
Solution:
1. Put the probe in normal tap water at room temp. for 30 mins to cancel E03 from display.
2. If above is not working, run below:
   -For pH probe, run calibration
   -For conductivity probe, run calibration
   -For D.O, probe, connect the D.O probe with meter, turn on the meter and then proceed the D.O. Calibration.

E04: Means temp. might be out of range so it cause this error.
Solution:
Check whether the measured temp. is over range. If yes, leave the probe in normal tap water at room temp. for 30 mins to cancel E04 from display.

E13: means pH probe calibration data is not compatible with meter. Mainly caused by wrong buffer or wrong procedure.
Solution:
Run pH calibration again. While doing this, make sure pH buffer is correct and fresh to get good result. Please ignore the error code before you completing 4, 7, 10 calibration.

E16: means cell constant of cond prober is out of the range
Solution:
1. Re-turn on meter several times or calibrate the conductivity probe to cancel E16 from display
2. Go to Setup P80 to reset all calibration information to factory status.

E31: means the measuring circuit of device hardware failure.
Solution:
Power on/off several times to fix.

E32: means the memory IC of device hardware failure
Solution:
Power on/off several times to fix.

- - - : means the probe isn't plug.
Solution:
1. Check the probe plug again, make sure the contact is good and tight.
2. If probe is well plugged but still seeing - - -, turn off device and power on again to have device link to probe again.

E33: means the DO membrane is aged and could not provide you correct measuring result.
Solution:
Please purchase a new D.O. probe to replace.

SPECIFICATION

pH range/resolution	2.00~12.00/resolution :0.01
pH accuracy	+/-0.1
Cond. range	0~199.9, 0~1999uS/cm, 0~19.99, 0~150.0mS/cm
Cond. accuracy	+/-1% F.S +/- 1 digit
Cond. resolution	0.1uS/cm, 1uS/cm, 0.01mS/cm, 0.1mS/cm
TDS. Range (f is TDS factor)	0~199.9*f, 0~1999*f ppm, 0~19.99*f, 0~150.0*f ppt
TDS. Accuracy/res.	+/-1% F.S +/- 1 digit; res.:0.1,1ppm;0.01, 0.1ppt
TDS Factor	0.30~1.00
Salinity range	0~10.00ppt; 10.0~42.0ppt *(SEA WATER)*
Salinity accuracy/res.	+/-1% F.S +/- 1 digit; res.: 0.01 ppt, 0.1ppt
D.O. range	0.0~199.9% (0.0~20.0mg/L)
D.O. Accuracy/res.	+/-3% of F.S. ; res.: 0.1
Temp. range	-5~60.0°C
Temp. Accuracy/res.	+/-0.5°C ; 0.1
Compatible probe	pH probe, EC probe and OD.O probe Could be used on one same meter at the same time
LCD size(mm)	32.5(H)x54(W)
Operating temp.&RH%	0~50°C, Humidity<80%
Storage temp.&RH%	0~60°C, Humidity < 90%
Dimension(mm)	169(L)x78.3(W)x43.4(H)
Weight	200g
Battery	4PCS AAA Batteries
Response time	<30 seconds for D.O, <90 seconds for others.
Sensor life time (with good maintenance)	>1 year for D.O. &EC, > 6 months for pH
Standard Package	Meter/Manual/Carry case/Battery
Standard Probe	PH probe w/ 4, 7, 10 buffer Cond. Probe w/ 141uS buffer ODO Probe Cable organizer clips

Optional accessory

3M long ODO probe extension cable w/dual end IP67 connector (Total cable length can be extended to 6 meters long)

WARRANTY

The below described warranty is limited to the measurement host, and all external measuring probes and sensors are not covered by this one-year warranty contract. Measuring probes and sensors are consumables that are consumed normally.

The meters are warranted to be free from defects in material and workmanship for one year, starting from the date of discharged date.

The warranty covers normal operation and does not cover battery, misuse, abuse, alteration, neglect, improper maintenance, or damage resulting from leaking batteries. The warranty also do not cover normal wear and tear, cuts or scratches, or damage caused by impacts or accidents; and damages caused by external factors such as exposure to the sun, dampness or dust etc.

Proof of purchase is required for warranty repairs. Warranty is void if the meter has been opened or modified.

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
Data logger
Temp./RH transmitter
Wireless Transmitter .....

More products available !

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