Kalstein

YR series Benchtop pH/ORP/Ion/Conductivity/DO Meters

YR01823/ YR01823-2/ YR01826/ YR01833/ YR01820/ YR01835/ YR01836/ YR01837

User's Manual

Thank you very much for purchasing our Kalstein´s **YR series Benchtop pH/ORP/Ion/Conductivity/DO Meters**.

Please read the "Operating Instructions" and "Warranty" before operating this unit to assure proper operation. After reading these documents, be sure to store them securely together with the "Warranty" at a hand place for future reference.

 Warning: Before operating the unit, be sure to read carefully and fully understand important warnings in the operating instructions.

OUR SERVICES

Benefits and Support

In Kalstein France, we take care of the full satisfaction of our customers, that is why we provide value-added services of the highest level based on our experience.

Online Inductions and Trainings

In any part of the world, receive your induction or training from our specialized team of engineers

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Our work team is always available to response all your consults or questions, in order to support you in any situation.

#Letsgivemore

Thanks to your purchase, a donation will be made to a non-profit foundation that fights against breast cancer and helps most vulnerable communities.

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We take care of all the necessary logistics for the dispatch of your goods, whether is by sea, land or.air.

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With more than 25 years growing with our customers, Kalstein's multiformat and modern content, is now present in more than 10 countries and increasing.

Name and model

YR series Benchtop pH/ORP/Ion/Conductivity/DO Meters.

FUNCTION AND APPLICATION

Kalstein´s YR series Benchtop pH/ORP/Ion/Conductivity/DO Meters includes models below:

Single Parameter Meters

Model	Measurement Parameters
YR01823/ YR01823-2	pH, mV, ORP
YR01826	pH, mV, ORP, ion
YR01833	DO

Multiparameter Meters

Model	Measurement Parameters
YR01820/ YR01835	pH, mV, ORP, ion, conductivity, TDS, salinity, resistivity, DO
YR01836	pH, mV, conductivity, TDS
YR01837	Conductivity, TDS, salinity, resistivity, DO

This manual provides a step-by-step guide to help you operate these meters, please carefully read the following instructions according to the model you have purchased. Any use outside of these instructions may invalidate your warranty and cause permanent damage to the meter.

Environmental Conditions

Before unpacking, ensure that current environmental conditions meet the following requirements.

- Relative humidity is less than 80%
- Ambient temperature between 0°C (32°F) and 50°C (122°F)
- No potential electromagnetic interference
- No corrosive gas exists

Packing List

The following list describes all components of the meter. If any items are missing or damaged, contact the supplier immediately.

1

Meter, electrode arm

USB cable, power adapter

2

pH electrode, pH buffer reagents

3

Ion selective electrode, standard solutions, ionic strength adjuster ★

4

Conductivity electrode, conductivity standard solutions

5

Dissolved oxygen electrode, electrolyte solution, membrane cap

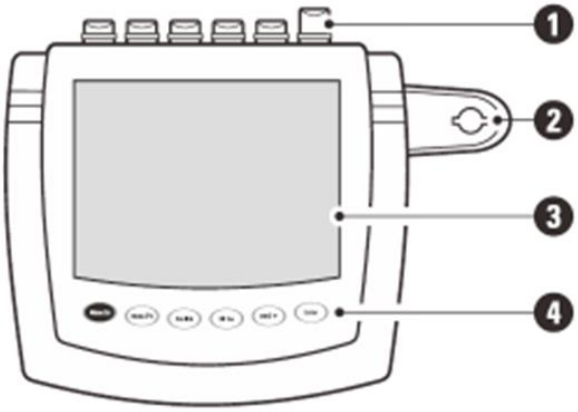
6

Temperature probe

Model / Components	1	2	3	4	5	6
YR01823/ YR01823-2/ YR01826	•	•				•
YR01833	•				•	
YR01820/ YR01835	•	•		•	•	•
YR01836	•	•		•		•
YR01837	•			•	•	•

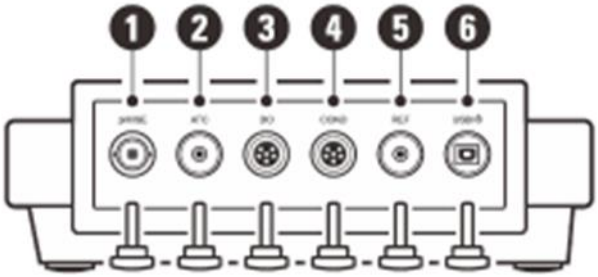
Cyanide and sulfide ion meters do not provide above solutions.

METER OVERVIEW



2	Base plate of electrode arm
3	Display
4	Membrane keypad

Connectors



1	Socket for pH, ORP or ion selective electrode (BNC)
2	Socket for temperature probe (3.5 mm jack)
3	Socket for dissolved oxygen electrode (6-pin DIN)
4	Socket for conductivity electrode (6-pin DIN)
5	Socket for reference electrode (3.5 mm jack)
6	USB-B interface to the power adapter or computer

DISPLAY

Icon	Description
	Indicates that the meter is in the measurement mode
	Indicates that the meter is in the calibration mode
	Indicates that the meter is in the setup mode
	Indicates that you are viewing the stored readings or a reading is stored into the memory
Slope	If the pH electrode slope exceeds the allowed range after calibration, the icon automatically disappears
	If the electrode has not been recalibrated within a specified time period, the icon automatically shows
ATC	Indicates that the automatic temperature compensation is enabled
Stable	Shown when the measurement is stable
HOLD	Shown when the reading is locked
pH	pH mode
ORP	Oxidation reduction potential (ORP) mode

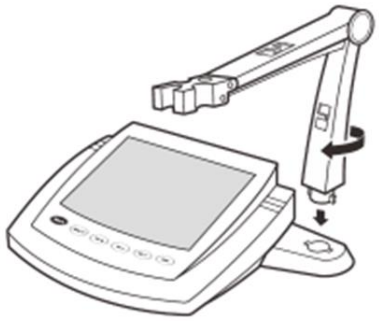
ION	Ion concentration mode
COND	Conductivity mode
TDS	Total dissolved solids (TDS) mode
SAL	Salinity mode
RES	Resistivity mode
DO	Dissolved oxygen mode

KEYPAD

Key	Function
Meas | 🔒	• Switch the meter on or off • Lock or unlock the measurement • Exit the calibration, settings, data logs and return to the measurement mode
Mode | °C	• Select the measurement mode • Press and hold the key to enter the temperature setting
Cal | 🖹	• Start calibration • Press and hold the key to enter the setup menu
MI | ▲	• Store current reading to memory • Increase value or scroll up through a list of options
MR | ▼	• View the data logs or calibration logs • Decrease value or scroll down through a list of options
Enter	• Confirm the calibration or displayed option • Press and hold the key to switch the backlight on or off

INSTALLING THE ELECTRODE HOLDER

Take out the electrode arm from the accessory box. The base plate of electrode arm has a circular hole, the electrode arm has a connecting rod. Insert the connecting rod into the circular hole and swivel the electrode arm 90 degrees. The electrode holder is now ready to swing into desired position.



Adjusting the Electrode Arm

After installation, if the electrode arm automatically rises or falls, you are able to adjust the screw until arm locate at any position.

1. Remove the plastic cover from the right side of the electrode arm.

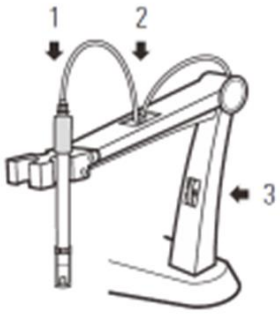
2. Use the screwdriver to tighten the screw moderately.

3. Insert the plastic cover to previous position.

CONNECTION

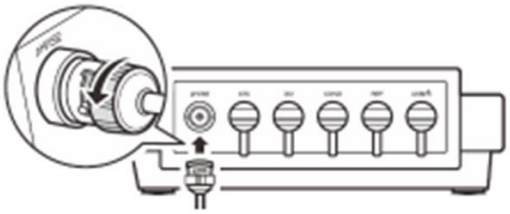
Connecting the Electrode

Take out the electrode from the packaging. Follow the steps below to place electrode into the left or right side of the electrode arm.



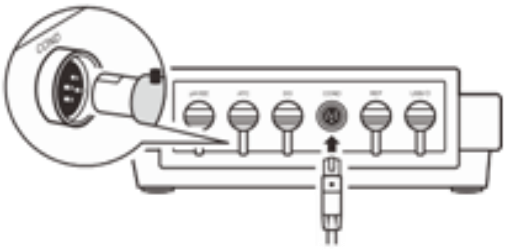
- For the pH, ORP or Ion Selective Electrode:

Insert BNC connector into the connector socket labeled pH/ISE. Rotate and push the connector clockwise until it locks.



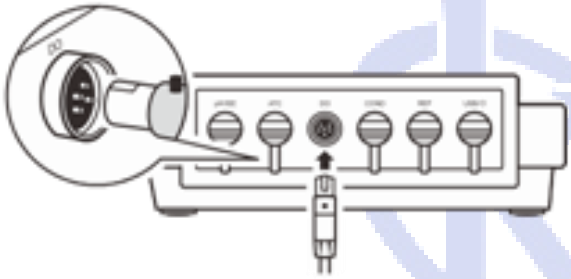
- For the Conductivity Electrode:

Insert 6-pin connector into the connector socket labeled COND. Ensure the connector is fully seated.



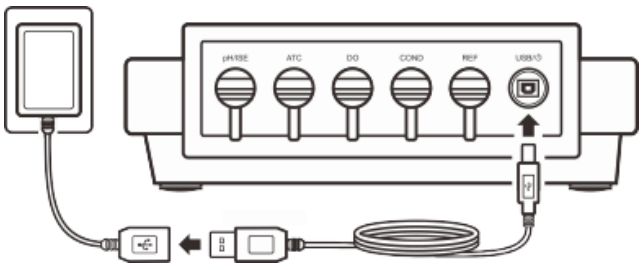
- For the Dissolved Oxygen Electrode:

Insert 6-pin connector into the connector socket labeled DO



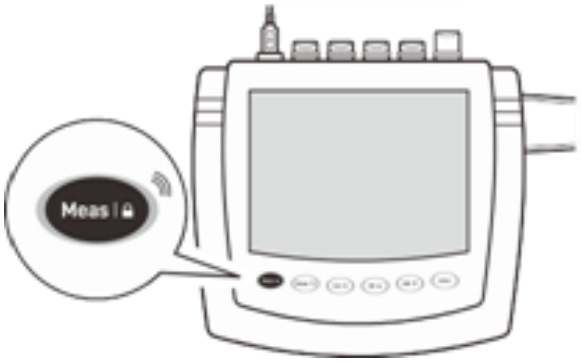
Connecting the Power Adapter

Connect the USB cable to the meter and DC 5V power adapter. Plug the power adapter into the wall outlet.



Switching the Meter On and Off

- Press the Meas key and release to switch on the meter.
- Press and hold the Meas key to switch off the meter.



GENERAL SETTINGS

The YR series meter contains an integrated setup menu for customizing the function parameters. In the different modes, the display will show the corresponding menu items. For the general settings, the option will be applied to all modes once setting is changed.

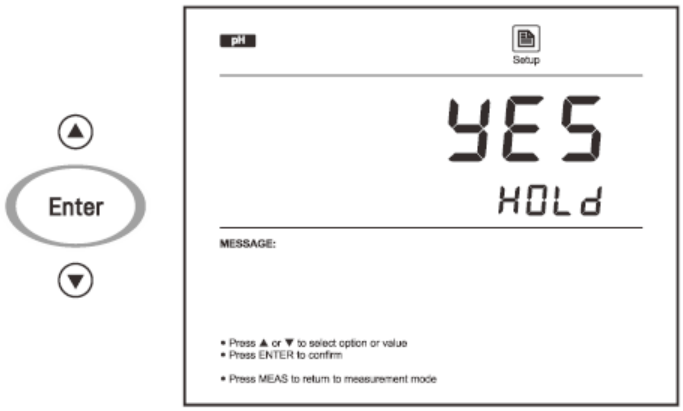
Menu Item	Option and Description	
StA	**Stability Criteria** Set when a measurement is recognized as stable.	
	LO	Standard (default)
	HI	High accuracy
HOLd	**Auto-Hold** If enabled, the meter will automatically sense and lock the measurement endpoint.	
	YES	Enable
	nO	Disable (default)
OFF	**Auto-Power Off** If enabled, the meter will automatically switch off if no key is pressed within a specified time period.	
	...30	10, 20, 30 minutes
	nO	Disable (default)
CALL	**Calibration Due Reminder** Set the calibration interval to activate alarm 🔔.	
	...31	1 to 31 days
	OFF	Disable (default)
dAtE	**Date and Time** Set the date and time for data logs and calibration logs.	
CLr	**Clear Stored Data** Delete all data logs in the memory.	
	YES	Enable
	nO	Disable (default)
rSt	**Factory Reset** Reset the meter to factory default settings. Note, the meter must be recalibrated.	
	YES	Enable
	nO	Disable (default)

1.1 In the measurement mode, press and hold the key to enter the setup menu.

1.2 Press the ▲ key to select a menu item.

1.3 Press the **Enter** key, the meter shows the current option.

1.4 Press the ▲ / ▼ key to select a desired option, press the **Enter** key to save.

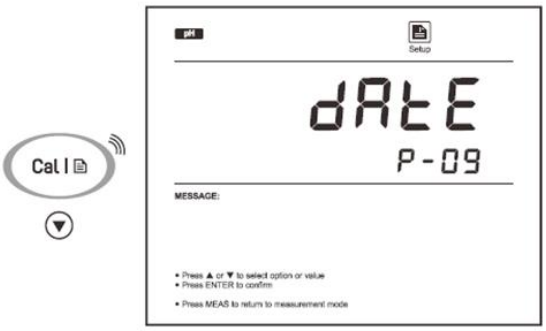


To exit the setup menu without saving changes, press the **Meas** key.

Setting the Date and Time

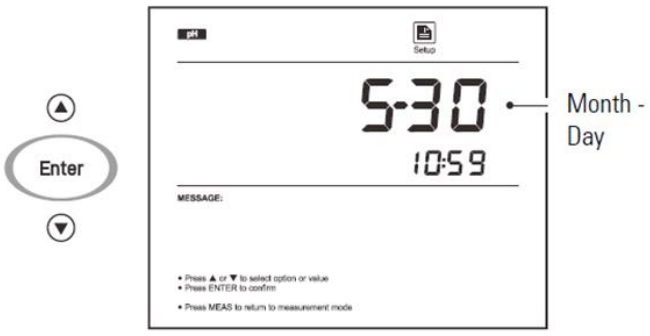
2.1 In the measurement mode, press and hold the 🖹 key to enter the setup menu.

2.2 Press the ▼ key until the meter shows dAtE (date).



2.3 Press the **Enter** key, the meter shows the current year.

2.4 Press the ▲/▼ key to set the year, press the **Enter** key to switch to the date and time options.



2.5 Press the ▲ / ▼ key to set the month, day, hours and minutes, press the **Enter** key to save until the meter returns to the measurement mode.

Temperature Calibration

The YR series meter is supplied with a TP-10K temperature probe for measurement and temperature compensation. If the measured temperature reading differs from that of an accurate

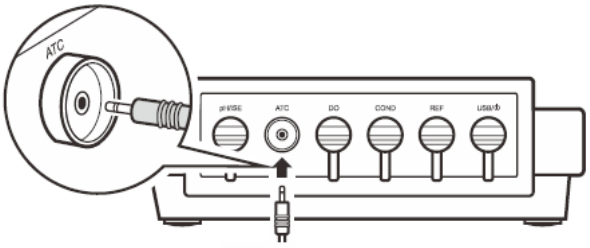
thermometer, the probe needs to be calibrated.

Note, the dissolved oxygen electrode installed with a built-intemperature sensor and do not need to use this probe.

Connecting the Temperature Probe

1.1 Place the temperature probe into the circular hole located at the center of the electrode arm.

1.2 Insert the jack plug to the connector socket labeled ATC. Ensure the connector is fully seated.

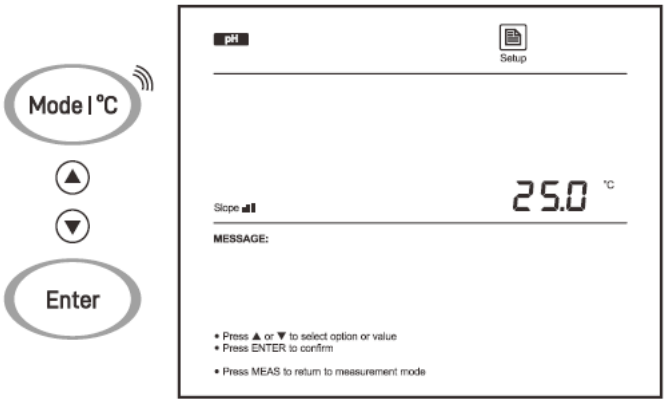


Calibrating the Temperature Probe

2.1 Place the temperature probe in a solution with a known accurate temperature and wait for the reading to stabilize.

2.2 Press and hold the °C key to enter the temperature setting.

2.3 Press the ▲/▼ key to modify the temperature value, press the **Enter** key to save.



To exit the calibration without saving changes, press the **Meas** key.

PH CALIBRATION AND MEASUREMENT

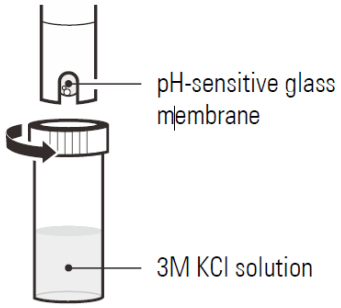
This section is applicable to models

- YR01823/ YR01823-2 / YR01826
- YR01820/ YR01835/ YR01836

• Prior to Use

1.1 Connect the pH electrode to the meter (refer to the Connection section).

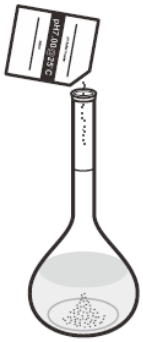
1.2 Remove the protective cap from the bottom of the electrode. If tiny air bubbles are present inside the pH-sensitive glass membrane, gently shake the electrode downward to remove air bubbles.



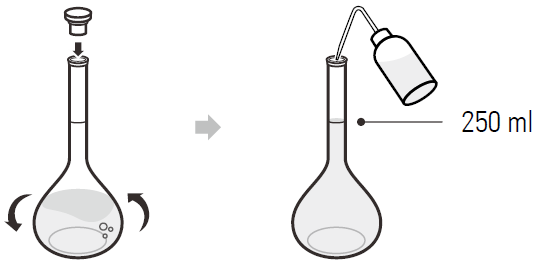
Preparation of pH Buffer Solutions

The 9 series meter is packaged with the pH 4.01, 7.00, 10.01 buffer sachets required for calibration.

2.1 Half fill a 250 ml volumetric flask with distilled water and add the pH 7.00 buffer reagent.



2.2 Swirl the volumetric flask gently to dissolve the reagent and fill to the mark with distilled water.



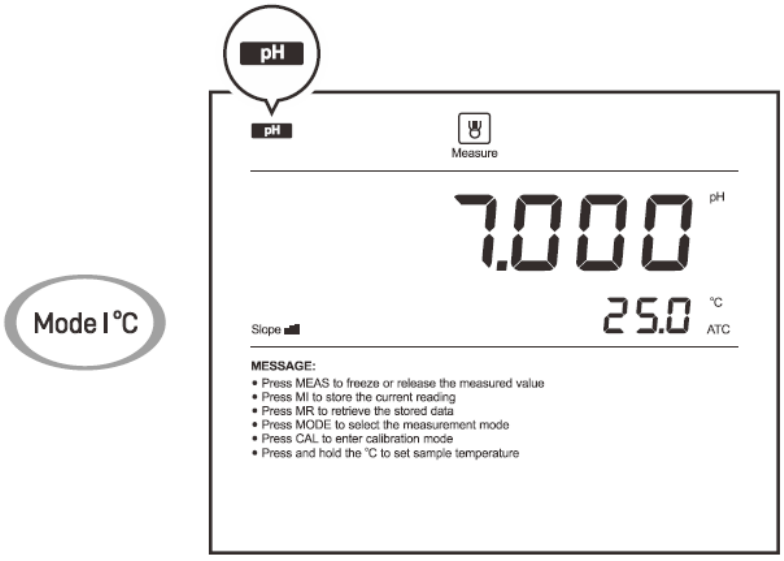
2.3 Cap and upend the volumetric flaskseveral times to mixthe solution.

•Preparation of pH 4.01 and 10.01 buffer solutions are the sameas above.

•Prepared buffer solution should be stored in hermetically sealedglass container and avoid direct sunlight.

Selecting the Measurement Mode

Press the Modekey until the pH icon appears on the display, the meter enters the pH measurement mode.



•pH Settings

The meter contains 4 pH settings and 7 general settings in the setup menu.

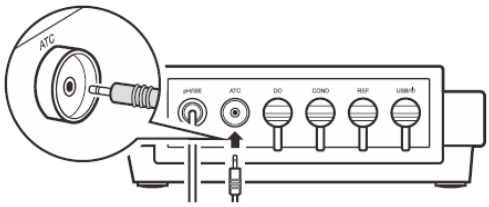
Menu Item	Option and Description	
bUF	**pH Buffer Group** Set the pH buffer group for calibration and auto-recognition.	
	USA	USA (default)
	nISt	NIST
	din	DIN
	USEr	Custom buffers (any 2 values >1 pH apart)
CAL	**Calibration Points** Set the number of calibration points.	
	...5	1 to 5 points (default 3 points)
rESO	**Resolution** Set the resolution of the pH measurement.	
	0.001	0.001 (default)
	0.01	0.01
	0.1	0.1
UNIt	**Measurement Unit** Set the default temperature unit.	
	°C	Degrees Celsius (default)
	°F	Degrees Fahrenheit

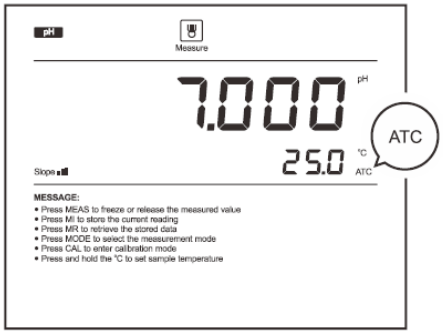
- Temperature Compensation

For better accuracy, we recommend the use of either a sensor with a built-in or a separate temperature probe. The meter will calculate the pH slope with measured temperature and show the temperatura.

Automatic Temperature Compensation

Connect the temperature probe to meter, the ATCicon appears on the display, the meter is now switched to the automatic temperature compensation mode.





Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manualtemperature compensation mode. To set the temperature value follow the steps below.

1.Press and hold the **°C** key to enter the temperature setting.

2. Press the ▲/▼ key to modify the temperature value.

3. Press the **Enter** key to save.

Press and hold the ▲/▼ key will make the value change faster.

Press and hold the ▲/ ▼key will make the value change faster.

•pH Calibration

The 9 series meter allows 1to 5 points calibration in the pH mode. We recommend that you perform at least 2 points calibration for high accuracy measurement. The meter will automatically recognize and calibrate to following standard buffer values.

USA Standard Buffers	pH 1.68, 4.01, 7.00, 10.01, 12.45
NIST Standard Buffers	pH 1.68, 4.01, 6.86, 9.18, 12.45
DIN Standard Buffers	pH 1.09, 4.65, 6.79, 9.23, 12.75

If the USEr option is selected, the meter will only allow 2 pointscalibration. Single point calibration should only be carried out with pH 7.00, 6.86 or 6.79, otherwise calibration will not be accepted.

Make sure to calibrate the meter when attaching a new pH electrode or during first use. Do not reuse the buffer solutions after calibration, contaminants in solution will affect the calibration and eventually the accuracy of the measurement.

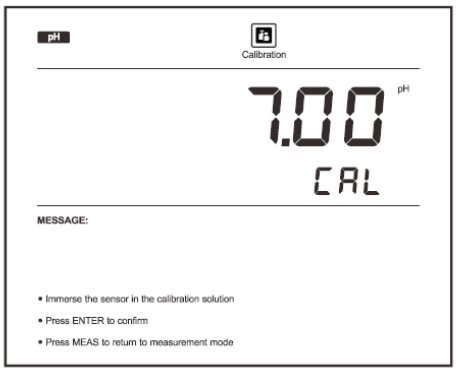
For bette rresult, we recommend toenablethe automatictemperature compensation. If the manual temperature compensation is selected, all buffer and sample solutions must be at the same temperature and you have entered the correct temperature value to the meter.

Stir the standards and samples at a uniform rate that will help you getmost accurate readings.

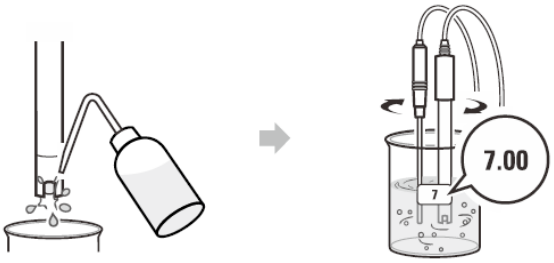
Single Point Calibration

1.1 Ensure that you have selected 1point calibration in the setup menu.

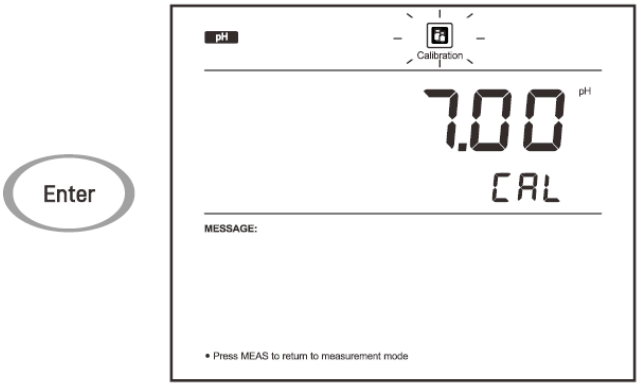
1.2 Press the **Cal**key, the meter shows 7.00/CAL, 6.86/CAL or 6.79/ CAL, depending on the selected pH buffer group.



1.3 Rinse the pH electrode with distilledwater, place the electrode (and temperature probe) into the pH 7.00 buffer solution, stir gently to create a homogeneous solution.



1.4 Press the **Enter** key, the Calibration icon begins flashing.

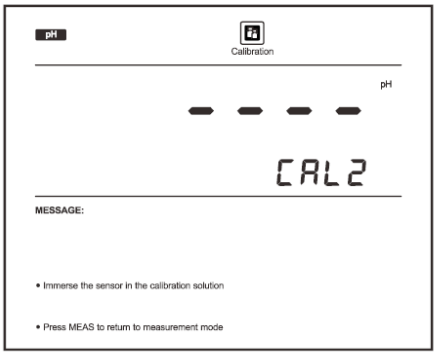


1.5 When the reading has stabilized, the meter will show End and return to the measurement mode.

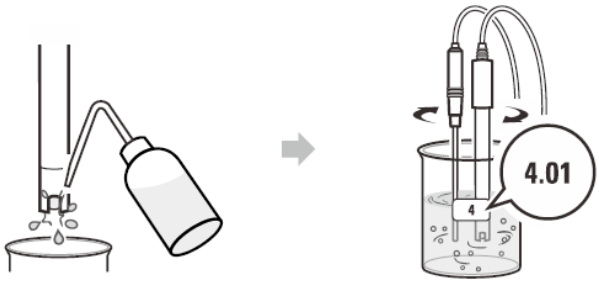
Multipoint Calibration

2.1 Ensure that you have selected 2 to 5 points calibration in the setup menu.

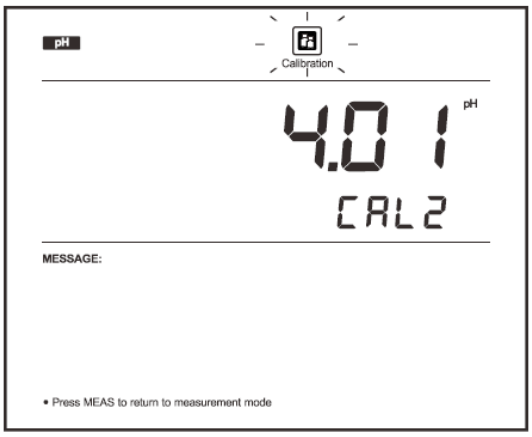
2.2 Repeat steps 1.2 through 1.4 above. When the first calibration point is completed, the display will show ----/CAL2. The meter prompts you to continue with second point calibration.



2.3 Rinse the pH electrode with distilled water, place the electrode (and temperature probe) into the next buffer solution (e.g., pH 4.01).

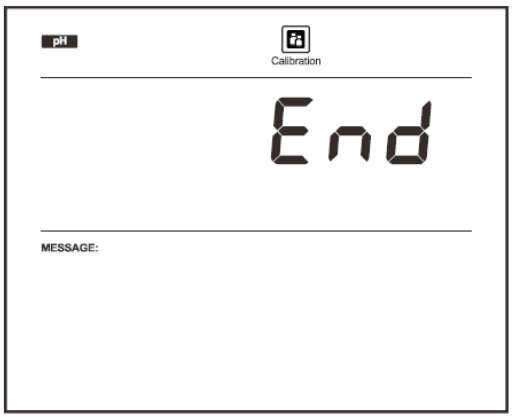


The meter will automatically recognize the buffer solution and begin the calibration, the Calibration icon continuously flashing.



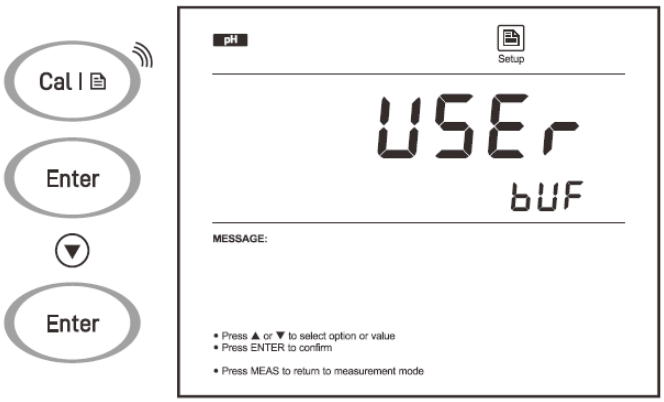
2.4 When the reading has stabilized, the display will show ---/CAL3. The meter prompts you to continue with third point calibration.

2.5 Repeat the step 2.3 above until the meter shows End. Calibration is completed.



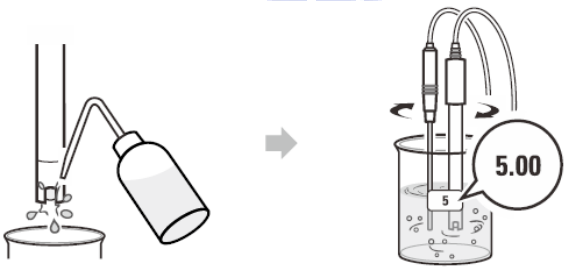
pH Calibration with Custom Buffers

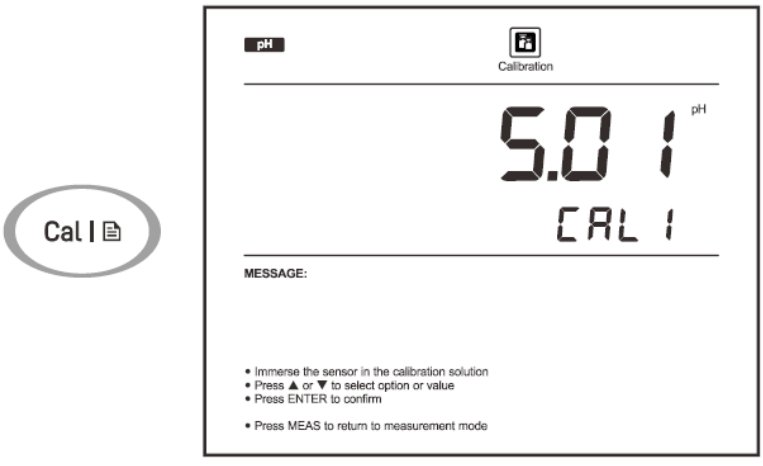
3.1 Ensure that you have selected USEr the option in the setup menu, the custom buffer solutions should be at least 1 pH unit apart from each other.



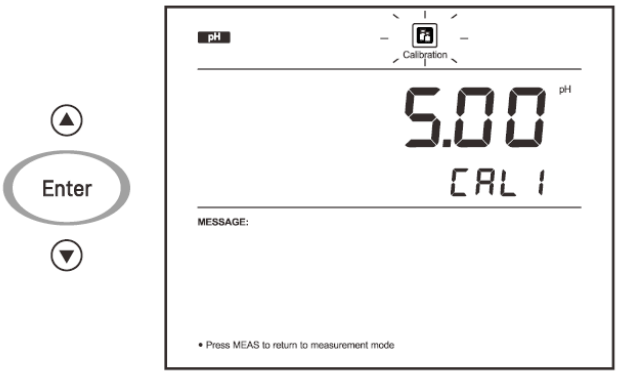
3.2 Rinse the pH electrode with distille dwater, place the electrode (and temperature probe) into the buffer solution, stir gently and wait until the measurement is stable.

3.3 Press the Cal key, the meter enters the calibration mode.

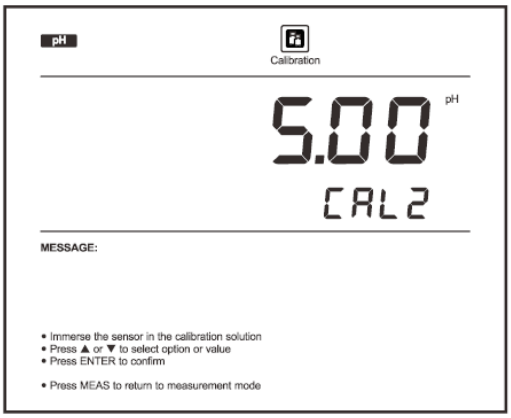




3.4 If necessary, press the ▲/▼ key to set the calibration value, press the Enter key to begin the calibration.



3.5 When the Reading has stabilized, the display will show CAL2.The meter prompts you to continue with second point calibration.



3.6 Repeat the steps 3.2 and 3.4 above until the meter shows. Calibration is completed.

•During the calibration, if the display shows ----indicating the meter is waiting for recognizing the pH buffer solution.

•If the display shows Err indicating the measured mV value for the current calibration point deviates by more than 60 mV from the theoretical value of the pH buffer. The calibration will not be accepted. Please check the pH electrode and buffersolutions.

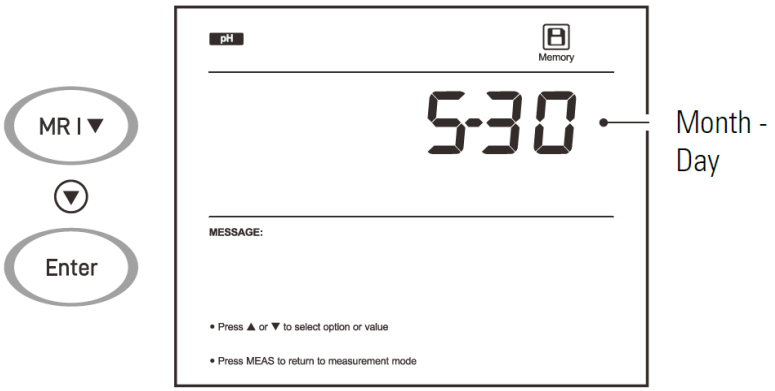
•If the calculated electrode slope is not between 70% to 110%, Slope icon will disappear from the display. The pH electrode may need to be replaced.

•To exit the calibration without saving changes, press the **Meas**key.

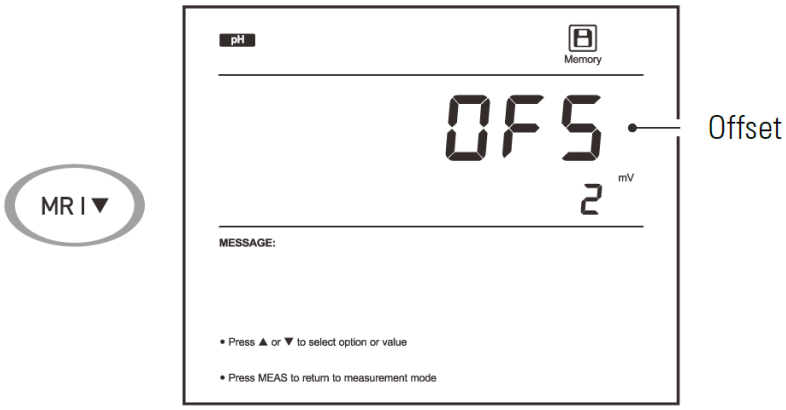
Viewing the Calibration Log

4.1 Press the **MR** key in the pH measurement mode and press the ▼ key until the meter shows ELE/P-02 (Electrode/Page 2).

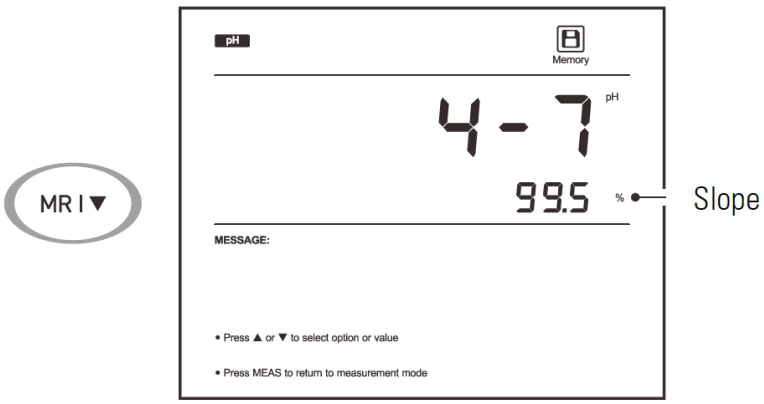
4.2 Press the **Enter** key, the meter shows the last calibration date.



4.3 Press the ▼ key to view the zero-point offset.



4.4 Press the ▼ key to view the calibration points and electrode slope.

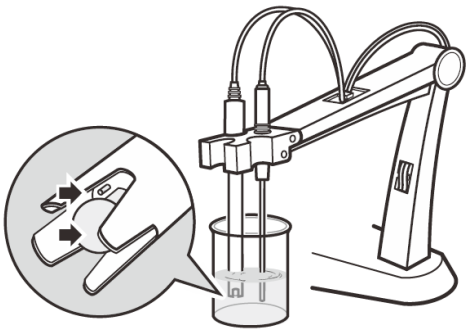


4.5 To exit the calibration log, press the **Meas** key.

If the meter is not calibrated or custom buffers are used, thedisplay will show ----only.

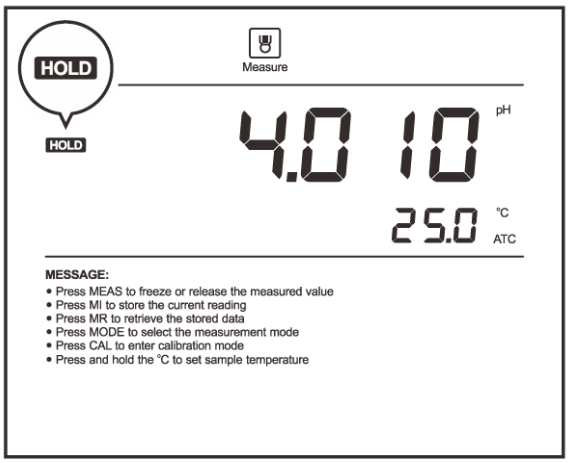
•pH Measurement

1.Rinse the pH electrode with distilledwater. Place the electrode (and temperature probe) into the sample solution and stir gently. Note, the pH-sensitive glass membrane and liquid junction must be completely immersed into the solution.



2. If the Auto-Hold option in the setup menu is enabled, the meter will automatically sense a stable reading and lock measurement, the HOLD icon appears on the display. Press the key to resume measuring.

If the option is disabled, the meter will continuously measure and update the readings.



3. Wait for the measurement to stabilize and record the reading.

4. When all of the samples have been measured, rinse the electrodeaccording to the instructions in the *Electrode Maintenance*.

•During the measurement process, never wipe the pH-sensitiveglass membrane as this will cause static interference, blot dry with a lint-free tissue to remove waterdrops on electrode.

•If the meter shows ----indicating the measurement exceeds the range, remove the electrode from the sample immediately.

•If your sample is pure water, low ionic or low conductivity water, we recommend measuring the pH in the smallest samplevolume possible or adding 0.3 ml of the 3M KCl to 100 ml of the samplesolution. Note, only high purity KCl can be used.

•To record the measurement at the predefined time intervals,referto the *Interval Readings* section.

•Electrode Maintenance

Cleaning the pH Electrode

Since pH electrode is susceptible to contamination, thoroughly clean as necessary after each use.

- General Cleaning

Rinse the pH electrode with distilled water and soak in 3M KCl solution.

- Salt Deposits

Dissolve the deposit by immersing the electrode in warm tap water. Rinse the electrode with distilled water and soak in 3M KCl solution.

- Oil or Grease

Place the electrode in the detergent or ethanol solution for 15 minutes. Rinse the electrode with distilled water and soak in 3M KCl solution.

- Protein

(1) Add 1% pepsin to 0.1M HCl solution.

(2) Place the electrode in above solution for 15 minutes.

(3) Rinse the electrode with distilled water and soak in 3M KCl solution.

- Clogged Liquid Junction

(1) Heat a diluted KCl solution to 60° C (140° F).

(2) Place the electrode into the heated solution for 10 minutes.

(3) Allow the electrode to cool in unheated KCl solution.

Reactivating the pH Electrode

If the pH-sensitive membrane has dried out, the electrode response will become sluggish. Immerse the electrode in a pH 4.01 buffer solution for about 30 minutes to rehydrate. If this fails, the electrode requires activation.

1. Soak the electrode in a 0.1M of HCl for 10 minutes.
2. Remove and rinse with distilled water, then place into a 0.1M of NaOH for 10 minutes.
3. Remove and rinse again, and soak in 3M KCl solution for at least 6 hours.

If these steps fail to restore the response, replace the electrode.

Storing the pH Electrode

- For best results, always soak the electrode in 3M KCl solution.
- If above solution is not available, use a pH 4.01 buffer solution.

⚠ DO NOT store the electrode in distilled or deionized water thatwill deplete the hydration layer of the pH-sensitive membrane and render the electrode useless.

- If you do not use the electrode for a period longer than 1 month, store the electrode in storage solution.

•Appendix

Preparation of Electrode Storage Solution

- Dissolve 24.6 grams of analytical grade potassium chloride (KCl) reagent in 100 ml distilled water.
- Add pH 4.01 standard buffer and adjust solution to pH 4.

Temperature Probe

Order Code	Description
TP-10K	Range: 0 to 100°C (32 to 221°F), 1 m (3.3 ft.) cable

Optional Accessories

pH Electrodes

Order Code	Description
E201-BNC	For general purpose applications
E202-BNC	For measuring the flat surface samples
P11	For measuring the non-high temperature liquids
P11-LiCl	For measuring the non-aqueous samples
P11-NA	For measuring the biofuels
P13	For measuring the micro-volume samples
P15	For measuring the low conductivity samples
P16	For measuring the liquids with Tris buffers
P18	For measuring the slurries or soils
P19	For measuring the semisolids
P21	For measuring the colloids
P22	For measuring the high temperature liquids

Solutions

Order Code	Description
PHCS-USA	pH 4.01, 7.00, 10.01 buffer solutions, 480 ml
PHCS-NIST	pH 4.01, 6.86, 9.18 buffer solutions, 480 ml
PHCS-ES	Electrode storage solution, 480 ml
PHCS-GC	Removes inorganic residues, 480 ml
PHCS-PR	Removes protein contamination, 480 ml

Communication and Power Supply

Order Code	Description
USB-B	USB connector A to B, 1 m (3.3 ft.) cable
DCPA-5V	DC 5V power adapter, european standard plug

ORP CALIBRATION AND MV MEASUREMENT

This section is applicable to models

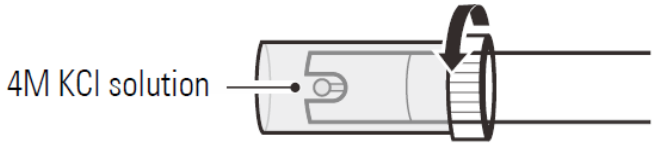
- YR01823/ YR01823-2 / YR01826
- YR01820/ YR01835/ YR01836

•Prior to Use

The 9 series meter is capable of measuring the oxidation reduction potential of aqueous solutions through connecting an ORP electrode, selectable sensor includes following options.

Order Code	Description
501	For measuring the sample with strong redox potential
502	For measuring the sample with weak redox potential

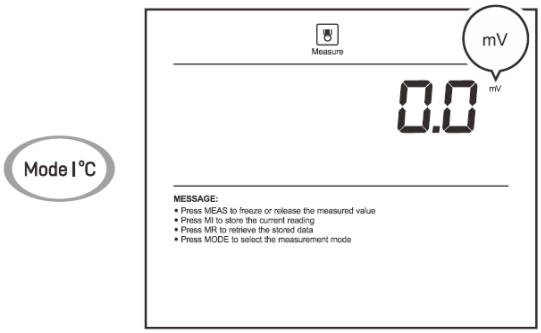
1. Connect the ORP electrode to the meter (refer to the *Connection* section).
2. Remove the protective cap from the bottom of the electrode.



Selecting the Measurement Mode

- Raw millivolt (mV)

Press the Mode key until the measurement unit mV appears on the display, the meter enters the absolute mV measurement mode.

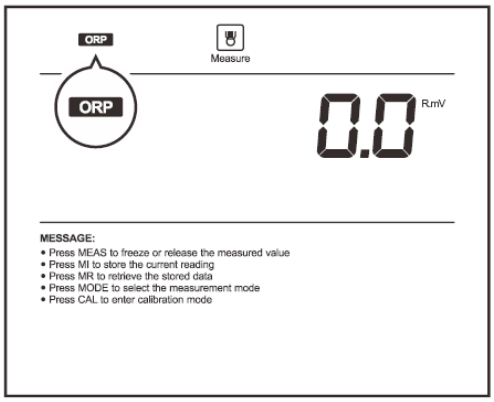


- Relative millivolt (R.mV)

Press the **Mode** key until the ORP icon appears on the display, the meter enters the relative

mV measurement mode.

Mode I °C



Note, the meter only allows entering the setup menu or performing a calibration or viewing the calibration log in the ORP mode.

•ORP Settings

The meter contains 1 ORP setting and 7 general settings in the setup menu.

Menu Item	Option and Description	
rESO	**Resolution** Set the resolution of the mV measurement.	
	0.1	0.1 (default)
	1	1

If you want to change the current settings, press and hold thekey to enter the setup menu. Press the ▲/ ▼ key to select an option andpress the **Enter** key to confirm.

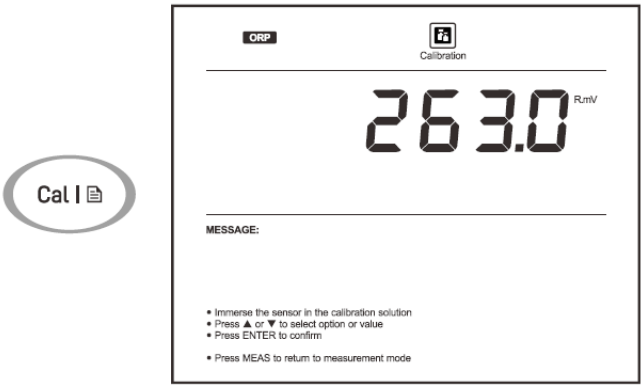
Refer to the *Setting a Default Option* section for detailed instructions.

•ORP Calibration

The 9 series meter allows 1 point calibration in the ORP mode, but calibration is not necessary unless exact readout agreement with a work standard and at a specific ORP value is needed.

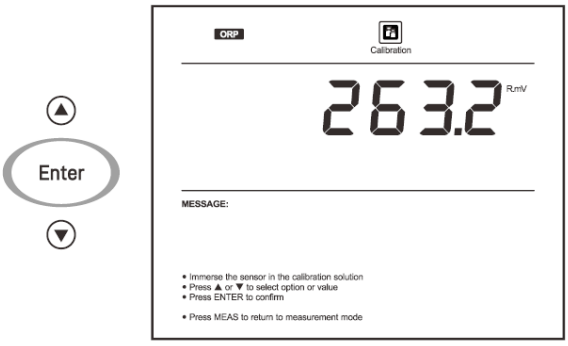
1.1 Rinse the ORP electrode with distilled water, place the electrode into the standard solution, stir gently and wait until the measurement is stable.

1.2 Press the **Cal** key, the meter enters the calibration mode.



1.3 If necessary, press the ▲/ ▼key to set the calibration value.

1.4 Press the Enter key, the meter will show End and return to the measurement mode. Calibration is completed.

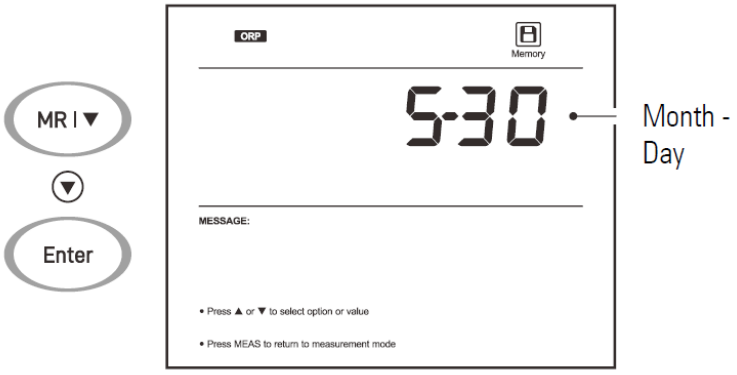


To exit the calibration without saving changes, press the Meas key.

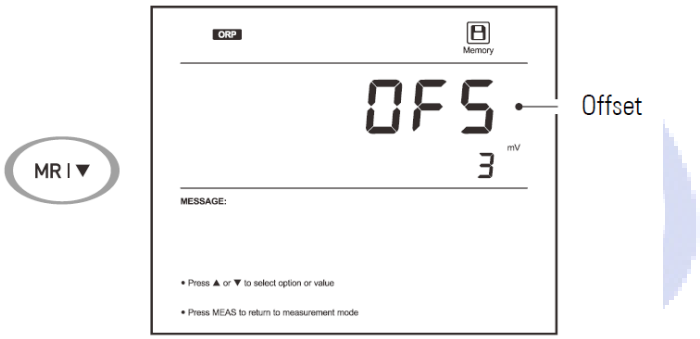
Viewing the Calibration Log

2.1 Press the **MR**key in the ORP measurement mode and press the ▼ key until the meter shows ELE/P-02 (Electrode/Page 2).

2.2 Press the **Enter** key, the meter shows the last calibration date.



2.3 Press the ▼ key to view the offset potential.



2.4 To exit the calibration log, press the **Meas** key.

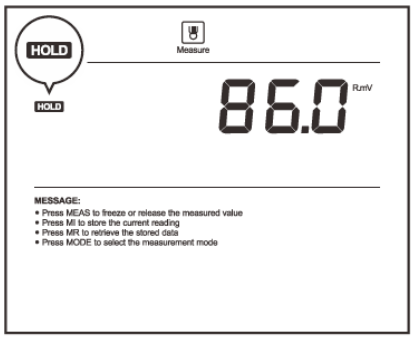
If the meter is not calibratedwith standard solution, the display will show ----only.

- **mVMeasurement**

1. Rinse the ORP electrode with distilledwater.Place the electrodeinto the sample solution and stir gently. Note,the sensing element and liquid junctionmustbe completely immersed into the solution.

2. If the Auto-Hold option in the setup menu is enabled, the meter willautomatically sensea stable reading and lock measurement ,thei con HOLD appears on the display. Press the key to resume measuring.

If the option is disabled, the meter will continuously measure andupdate the readings.



3. Wait for the measurement to stabilize and record the reading.

4. When all of the samples have been measured, rinse the electrode with distilled water and soak in 4M KCl solution.

• The ORP electrode may give unstable readings in solutions that contain chromous, vanadous and titanous ions or other ions that are stronger reducing agents than hydrogen or platinum.

• If the meter shows ---- indicating the measurement exceeds the range, remove the electrode from the sample immediately.

• To record the measurement at the predefined time intervals, refer to the Interval Readings section.

•Electrode Maintenance

•Rinse the ORP electrode thoroughly with distilled water after use.

•In the corrosive chemicals, viscous solutions and solutions with heavymetals or proteins, take readings quickly and rinse electrode immediately.

•If the electrode response becomes sluggish, refer to the instructions below to clean the electrode.

(1) Inorganic Deposits

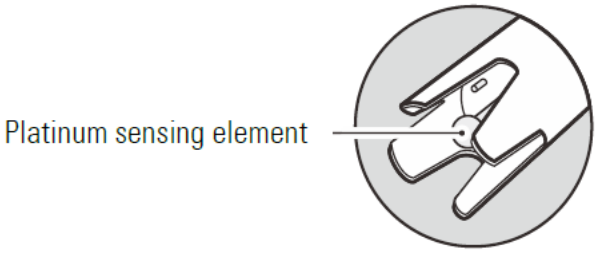
Place the electrode in 0.1M HCl solution for 10 minutes.Rinse the electrode with distilledwater and soak in 4M KCl solutionfor at least 6hours.

(2) Oil or Grease

Place the electrode in detergent such as dishwashing liquid for about30 minutes.Rinse the electrode with distilledwater and soak in 4M KCl solution.

(3) If the platinum sensing element is severely contaminated, polish the platinum surface gently with an abrasive paper of 600 grid. Place the electrode in 0.1M HCl solution for 10 minutes. Remove and rinse with distilled water, then soak in 4M KCl solution forat least 6 hours.

If the electrode does not restore normal performance, replace the electrode.



Storing the ORP Electrode

If you do not use the electrode for long periods, store theelectrodein 4M KCl solutionor storage solution.

•Appendix

Preparation of ORP Standard Solutions

Quinhydrone solution A: Dissolve 3gramsof quinhydrone reagent in 500ml ofthe pH4.01 buffer solution, stir the solution for 10 minutes. Undissolved quinhydrone reagent must be present. If necessary, add the reagent.

Temperature	Potential (±10 mV)
20°C	268 mV
25°C	263 mV
30°C	260 mV

Quinhydrone solution B: Dissolve 3gramsof quinhydrone reagent in500ml of the pH7.00 buffer solution, stir the solution for 10 minutes. Undissolved quinhydrone reagent must be present. If necessary, add the reagent.

Temperature	Potential (±10 mV)
20°C	94 mV
25°C	87 mV
30°C	80 mV

Due to the quinhydrone solution is susceptible to air oxidation in storage, make sure to prepare the fresh solution before use.

Preparation of Electrode Storage Solution

• Dissolve 29.8 grams of analytical grade potassium chloride (KCl) reagent in 100 m l distilled water.

• Add pH 4.01 standard buffer and adjust solution to pH 4.

ION CALIBRATIONAND MEASUREMENT

This section is applicable to models

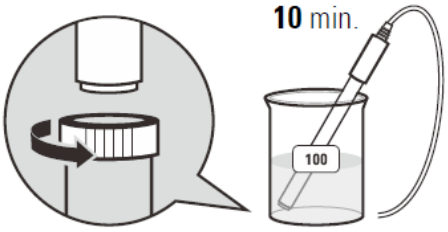
•YR01826

•YR01820/ YR01835

•Prior to Use

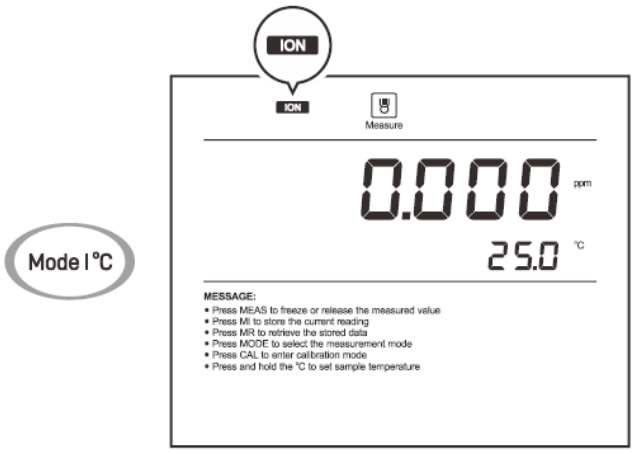
1. Connect the ion selective electrode to the meter (refer to the *Connection* section).

2. Remove the protective cap and soak the electrode in a 100 ppm standard solution for about 10 minutes.



Selecting the Measurement Mode

Press the **Mode** key until the ION icon appears on the display,themeter enters the ion concentration measurement mode.



•Ion Settings

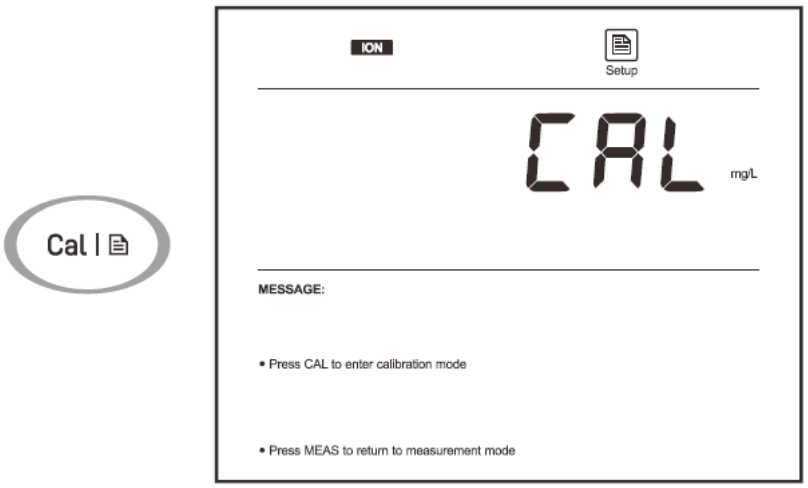
The meter contains 3 ion settings and 7 general settings in the setup menu.

Menu Item	Option and Description	
UNIt	**Measurement Unit** Set the ion concentration and temperature units.	
	ppm	Parts per million (default)
	mg/L	Milligrams per liter
	mol/L	Moles per liter
	°C	Degrees Celsius (default)
	°F	Degrees Fahrenheit
CAL	**Calibration Points** Set the number of calibration points.	
	...5	2 to 5 points (default 2 points)
ION	**Ionic Valency** Set the ion valence of electrode.	
	1	Monovalent (default)
	2	Divalent

If you want to change the current settings, press and hold the key to enter the setup menu. Press the ▲/▼ key to select an option andpress the **Enter** key to confirm.

Refer to the *Setting a Default Option* section for detailed instructions.

If the ion concentration unit has converted, the meter will show CAL always and wait for calibration. Press the **Cal** key and refer to the *Ion Calibration* section to perform the calibration, the meter will switch to selected concentration unit when calibration is completed.

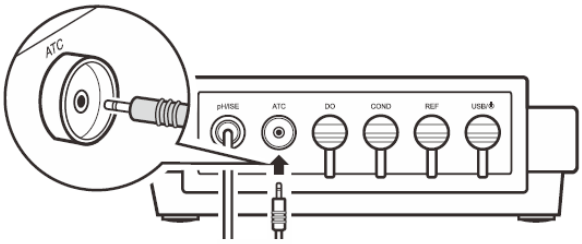


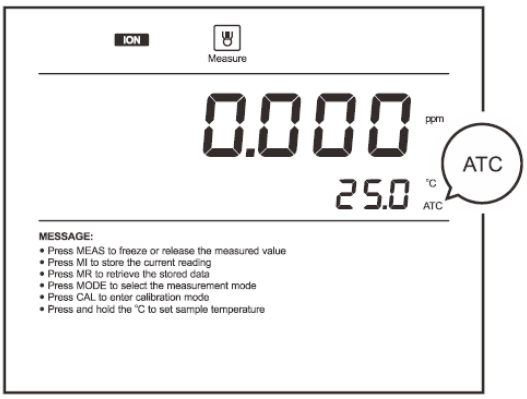
Temperature Compensation

Due to the temperature difference between the standard and sample solutions will cause approximately 2% measurement error for every degree centigrade of temperature change, we recommend to enable the temperature compensation during the calibration and measurement.

Automatic Temperature Compensation

Connect the temperature probe to meter, the ATC icon appears on the display, the meter is now switched to the automatic temperature compensation mode.





Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manualtemperature compensation mode. To set the temperature value follow the steps below.

1.Press and hold the **°C** key to enter the temperature setting.

2. Press the ▲/▼ key to modify the temperature value.

3. Press the **Enter** key to save.

Press and hold the ▲/▼key will make the value change faster.

- **Ion Calibration**

The 9 series meter allows 2 to 5 points calibration in the ion mode, acceptable calibration points include the following options.

Measurement Unit	Calibration Points
ppm	0.001, 0.01, 0.1, 1, 10, 100, 1000, 10000
mg/L	0.001, 0.01, 0.1, 1, 10, 100, 1000, 10000
mol/L	0.001, 0.01, 0.1, 1, 10
mmol/L	0.001, 0.01, 0.1

Before beginning the calibration, ensure that the ionic valency option in the setup menu matches connected electrode. All of the standards and samples should be at the same temperature and calibration points cover the anticipated range of the samples.

For the low concentration or sample contains the interference ions, we recommend to add the ionic strength adjuster (ISA) to all of the standards and samples. A typical addition would be 2 ml ISA to 100 ml of standard and sample.

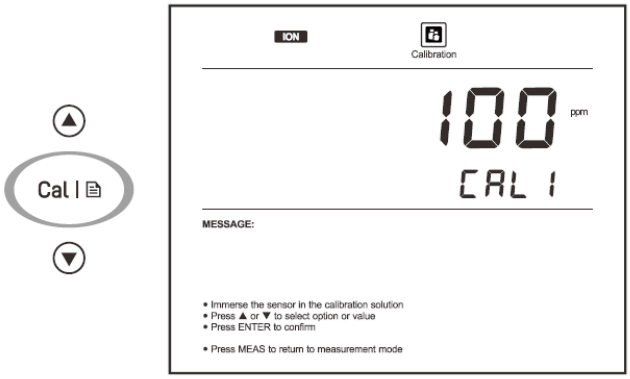
For the low level sodium determination (< 1 ppm), make sure to use the laboratory plastic beaker as a container.

Stir the standards and samples at a uniform rate that will help you get most accurate readings.

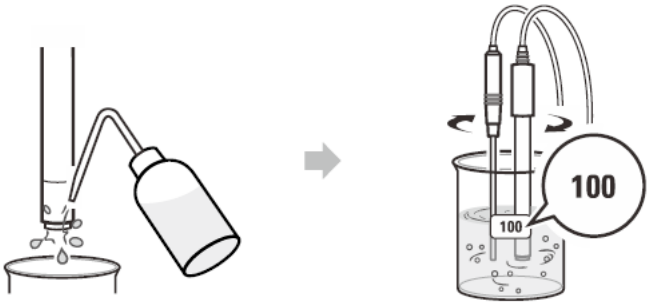
Calibrating the Meter

1.1Press the **Cal** key, the meter shows0.001ppm/CAL1or mg/L, mol/L, mmol/L, depending on the selected concentration unit.

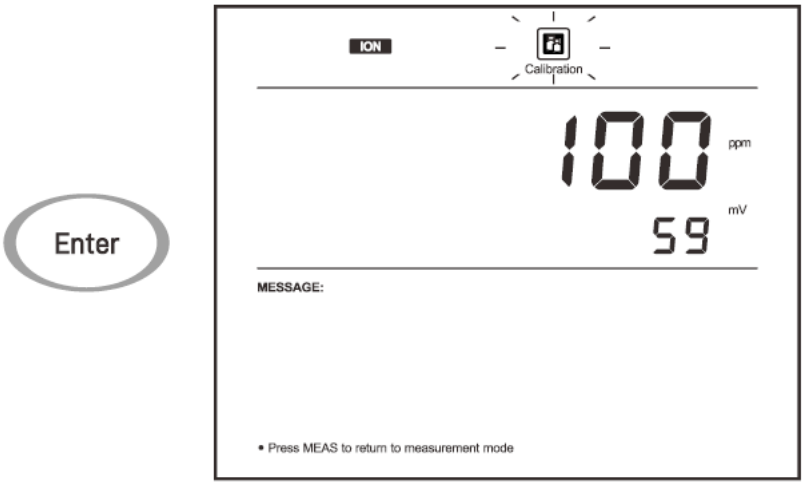
1.2 Press the ▲ key to select first calibration point (e.g.,100ppm), the meter will automatically perform the calibration from the low to high concentrations.



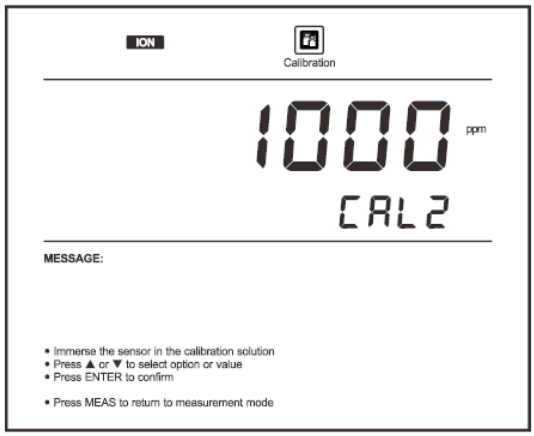
1.3 Rinse the ion selective electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode (and temperature probe) into the standard solution, stir gently to create a homogeneous solution.



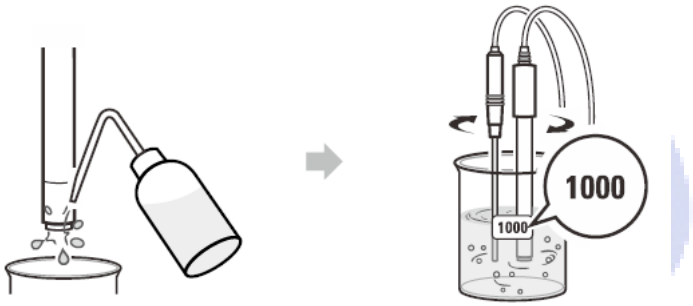
1.4 Press the **Enter** key, the Calibration icon begins flashing.



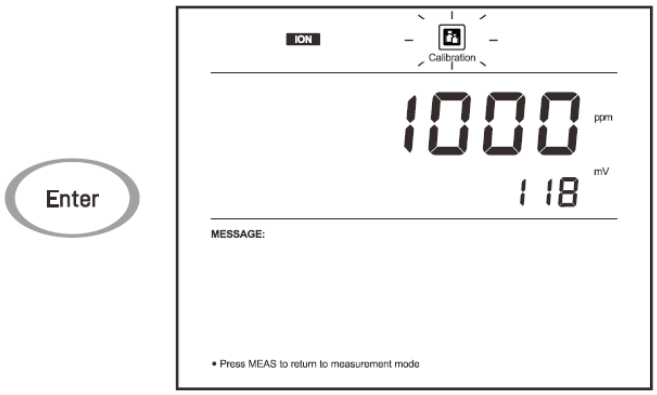
1.5 When the reading has stabilized, the display will show 1000 ppm/ CAL2. The meter prompts you to continue with second point calibration.



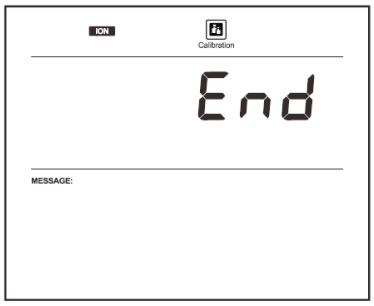
1.6 Rinse the ion selective electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode (and temperature probe) into the next standard solution and stir gently.



1.7 Press the **Enter** key, the Calibration icon begins flashing.



1.8 When the reading has stabilized, the display will show CAL3. The meter prompts you to continue with third point calibration.



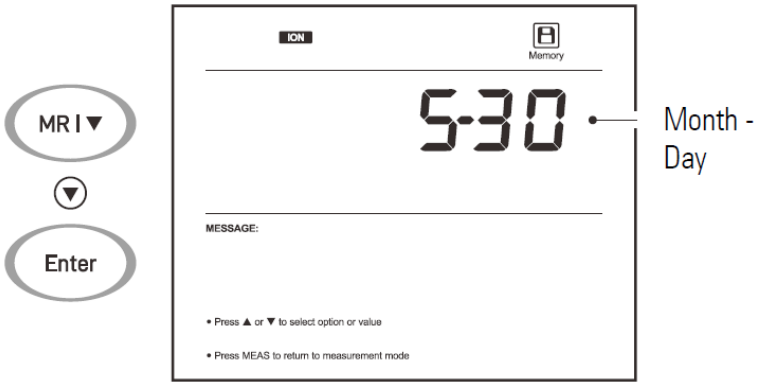
1.9 Repeat the steps 1.6 and 1.7 above until the meter shows End. Calibration is completed.

To exit the calibration without saving changes, press the **Meas** key.

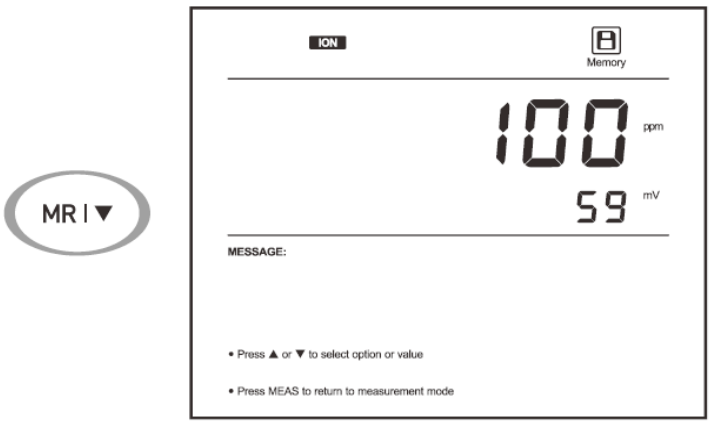
Viewing the Calibration Log

2.1 Press the **MR** key in the ionmeasurement mode and press the ▼ key until the meter shows ELE/P-02 (Electrode/Page 2).

2.2 Press the **Enter** key, the meter shows the last calibration date.



2.3 Press the ▼ key to view the calibration point and mV value.



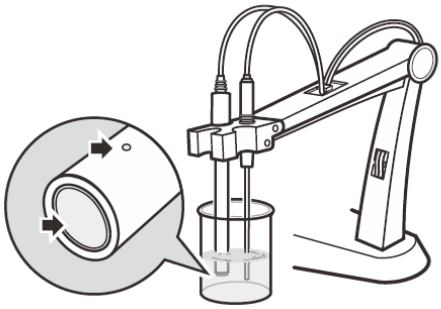
2.4 Press the ▼ key to view the next data set.

2.5 To exit the calibration log, press the **Meas** key.

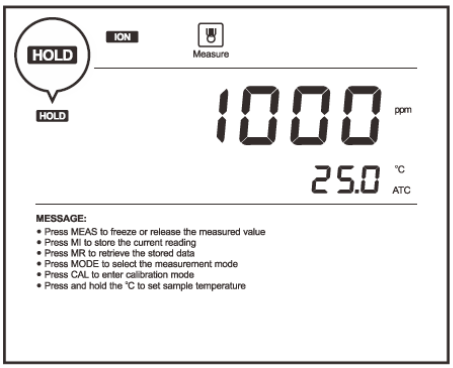
If the meter is not calibratedwith standard solutions, thedisplay will show ----only.

- **Ion Measurement**

1. Rinse the ion selective electrode with distilled water. Place the electrode (and temperature probe) into the sample solution and stir gently. Note, the ion sensitive membrane and liquid junction must be completely immersed into the solution.



2. If the Auto-Hold option in the setup menu is enabled, the meter will automatically sense a stable reading and lock measurement, the HOLD icon appears on the display. Press the key to resume measuring. If the option is disabled, the meter will continuously measure and update the readings.



3. Wait for the measurement to stabilize and record the reading.
4. When all of the samples have been measured, rinse the electrode with distilled water.

During the measurement process, never wipe the ion sensitive membrane, blot dry with a lint-free tissue to remove waterdrops on electrode.

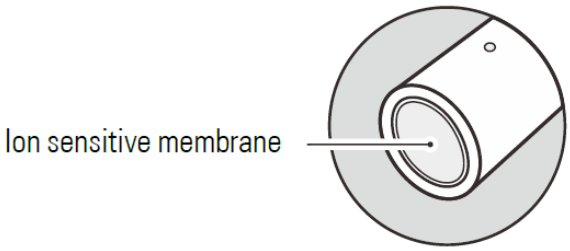
- If the meter is not calibrated with connected electrode, thedisplaywill always show 0.000.
- If the meter shows ----indicating the measurement exceeds the range, remove the electrode from the sample immediately.
- To record the measurement at the predefined time intervals,referto the Interval Readings section.

•Electrode Maintenance

•Rinse the ion selective electrode thoroughly with distilledwaterafteruse, wipe clean with a lint-free tissue, then replace protective cap andstore the electrode in a dry, cool and well-ventilated area.

•Never scratch the ion sensitive membrane on the bottom of theelectrode.

•If the electrode response becomes sluggish, soak the electrode in 100ppm standard solution for at least1 hour.



•Appendix

Preparation of Ion Standard Solution (1000 ppm)

1. Half fill a 1 liter volumetric flask with distilled water and add the analytical grade reagent according to the instructions in table below.

Ion Type	Reagent	Weight
Ammonium	NH_4Cl	2.97 g
Bromide	NaBr	1.29 g
Cadmium	$Cd(NO_3)_2 \bullet 4H_2O$	2.74 g
Calcium	$CaCl_2 \bullet 2(H_2O)$	3.67 g
Chloride	NaCl	1.65 g
Cupric	$Cu(NO_3)_2 \bullet 3H_2O$	3.80 g
Cyanide	NaCN	1.88 g
Fluoride	NaF	2.21 g
Iodide	NaI	1.18 g
Lead	$Pb(NO_3)_2$	1.60 g
Nitrate	$NaNO_3$	1.37 g
Potassium	KCl	1.91 g
Silver	$AgNO_3$	1.57 g
Sodium	NaCl	2.54 g
Sulfide	$Na_2S \bullet 9H_2O$	7.49 g
Ammonia	NH_4Cl	3.15 g

2. Swirl the volumetric flask gently to dissolve the reagent and fill to the mark with distilled water.
3. Cap and upend the volumetric flask several times to mix the solution.

Optional Accessories

Ion Selective Electrodes

Order Code	Description	Range
ISE-NH4	Ammonium (NH_4^+)	0.1 to 18000 ppm
ISE-Br	Bromide (Br^-)	0.4 to 81000 ppm
ISE-Cd	Cadmium (Cd^{2+})	0.1 to 11200 ppm
ISE-Ca	Calcium (Ca^{2+})	0.02 to 40100 ppm
ISE-Cl	Chloride (Cl^-)	1 to 35000 ppm
ISE-Cu	Cupric (Cu^{2+})	0.06 to 6400 ppm
ISE-CN	Cyanide (CN^-)	0.03 to 260 ppm
ISE-F	Fluoride (F^-)	0.02 to 1900 ppm
ISE-I	Iodide (I^-)	0.06 to 127000 ppm
ISE-Pb	Lead (Pb^{2+})	0.2 to 20800 ppm
ISE-NO3	Nitrate (NO_3^-)	0.4 to 62000 ppm
ISE-K	Potassium (K^+)	0.04 to 39000 ppm
ISE-Ag	Silver (Ag^+)	0.01 to 107900 ppm
ISE-Na	Sodium (Na^+)	0.002 to 69000 ppm
ISE-S	Sulfide (S^{2-})	0.003 to 32000 ppm
ISE-NH3	Ammonia (NH_3)	0.01 to 17000 ppm

Standard Solutions

Order Code	Description	Volume
ION-NH4	1000 ppm ammonium standard	480 ml
ION-Br	1000 ppm bromide standard	480 ml
ION-Cd	1000 ppm cadmium standard	480 ml
ION-Ca	1000 ppm calcium standard	480 ml
ION-Cl	1000 ppm chloride standard	480 ml
ION-Cu	1000 ppm cupric standard	480 ml
ION-F	1000 ppm fluoride standard	480 ml
ION-I	1000 ppm iodide standard	480 ml
ION-Pb	1000 ppm lead standard	480 ml
ION-NO3	1000 ppm nitrate standard	480 ml
ION-K	1000 ppm potassium standard	480 ml
ION-Ag	1000 ppm silver standard	480 ml
ION-Na	1000 ppm sodium standard	480 ml

Ionic Strength Adjusters

Order Code	Description	Volume
ISA-NH4	Ammonium (NH_4^+)	480 ml
ISA-Br	Bromide (Br^-)	480 ml
ISA-Cd	Cadmium (Cd^{2+})	480 ml
ISA-Ca	Calcium (Ca^{2+})	480 ml
ISA-Cl	Chloride (Cl^-)	480 ml
ISA-Cu	Cupric (Cu^{2+})	480 ml
ISA-CN	Cyanide (CN^-)	480 ml
ISA-F	Fluoride (F^-)	480 ml
ISA-I	Iodide (I^-)	480 ml
ISA-Pb	Lead (Pb^{2+})	480 ml
ISA-NO3	Nitrate (NO_3^-)	480 ml
ISA-K	Potassium (K^+)	480 ml
ISA-Ag	Silver (Ag^+)	480 ml
ISA-Na	Sodium (Na^+)	480 ml
ISA-NH3	Ammonia (NH_3)	480 ml

Filling Solution

Order Code	Description
FS-NH3	Filling solution for ammonia electrode, 480 ml

Temperature Probe

Order Code	Description
TP-10K	Range: 0 to 100°C (32 to 221°F), 1 m (3.3 ft.) cable

Communication and Power Supply

Order Code	Description
USB-B	USB connector A to B, 1 m (3.3 ft.) cable
DCPA-5V	DC 5V power adapter, european standard plug

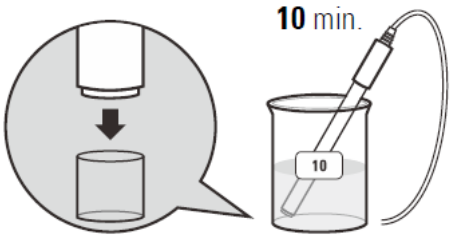
WATER HARDNESS

Calibrationand Measurement

•Prior to Use

1.Connect the water hardness electrode to the meter (refer to the *Connection* section on page 6).

2. Remove the protective cap and soak the electrode in a 10 mmol/L standard solution for about 10 minutes.



Selecting the Measurement Mode

The meter contains 8 water hardness measurement modes. Press the **Mode** key,the display will show corresponding icon and automaticallyenter selected measurement mode.

LCD Display	Measurement Mode	Measurement Unit
ION	Ion concentration	mmol/L
CACO	$CaCO_3$	mg/L
CAO	CaO	mg/L
bOL	Boiler	mmol/L
CA	Ca^{2+}	mg/L
FH	French degree	°fH
dH	German degree	°dH
EH	English degree	°e

Note, the meter allows entering the setup menu or performing the calibration in the mode ION only.

Water Hardness Settings

The meter contains 1 water hardnesssetting and 7 general settings in the setup menu.

Menu Item	Option and Description	
CAL	**Calibration Points** Set the number of calibration points.	
	...5	2 to 5 points (default 2 points)

If you want to change the current settings, press and hold thekey to enter the setup menu.Press the ▲/▼ key to select an optionandpress the Enter key to confirm 10min.

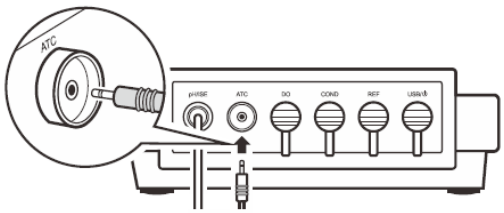
Refer to the *Setting a Default Option* section for detailed instructions.

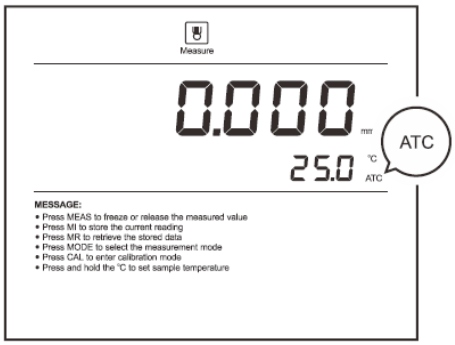
Temperature Compensation

In order to get accurate measurementresults, we recommend that allof the standards and simples should be at the same temperature. If youwantto enable the temperature compensation, use either of the following two methods.

Automatic Temperature Compensation

Connect the temperature probe to meter, the ATC icon appears on the display, the meter is now switched to the automatic temperature compensation mode.





Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manual temperature compensation mode. To set the temperature value follow the steps below.

1.Press and hold the **°C** key to enter the temperature setting.

2. Press the ▲/▼ key to modify the temperature value.

3. Press the **Enter** key to save.

Press and hold the ▲/▼ key will make the value change faster.

•Water Hardness Calibration

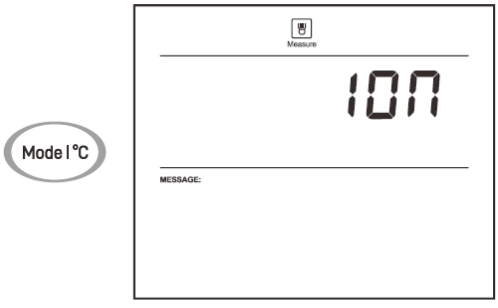
The 932 meter allows 2 to 5 points calibration with standard solutions, acceptable calibration points include the following options.

Measurement Unit	Calibration Points
mol/L	0.001, 0.01, 0.1
mmol/L	0.001, 0.01, 0.1

For better accuracy, we recommend to add the ionic strength adjuster (ISA) to all of the standards and samples and selected calibration points cover anticipated range of the samples. A typical addition would be 2 ml ISA to 100 ml of standard and sample.

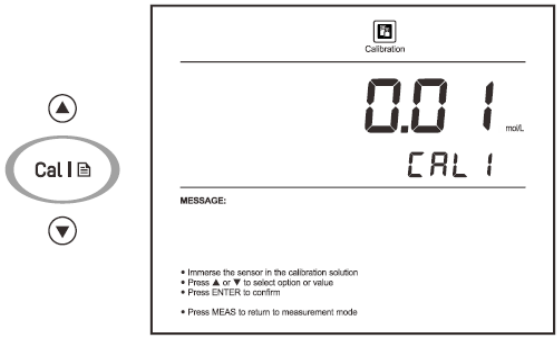
Calibrating the Meter

1.1 Press the Mode key until the display shows ION, the meter enters the ion concentration measurement mode.



1.2Press the **Cal** key to enter the calibration mode, the display shows0.001 mmol/L/CAL1.

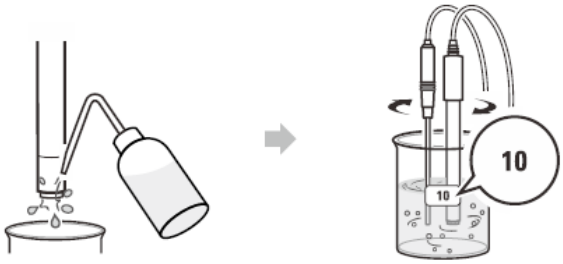
1.3 Press the ▲/ ▼ key to select first calibration point (e.g., 0.01mol/L), the meter will automatically perform the calibration from the low to high concentrations.



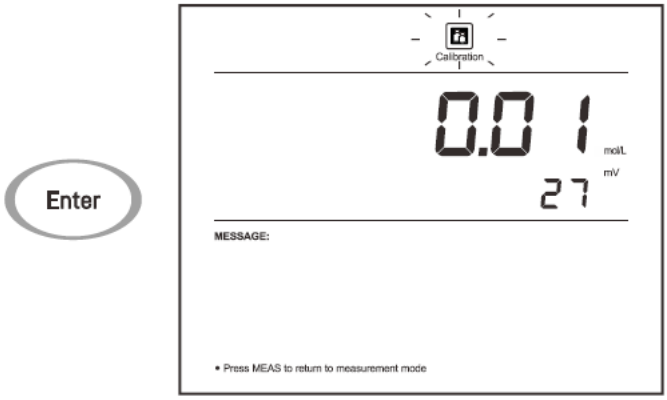
The meter is packaged with 10 and 100 mmol/L standard solutions, its related calibration points are 0.01 and 0.1mol/L.

★ 1mol/L = 1000mmol/L

1.4 Rinse the water hardness electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode (and temperature probe) into the standard solution (e.g.,10mmol/L),stir gently to create a homogeneous solution.

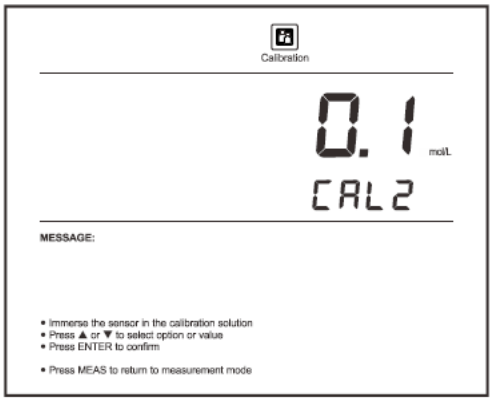


1.5 Press the **Enter** key, the Calibration icon begins flashing.

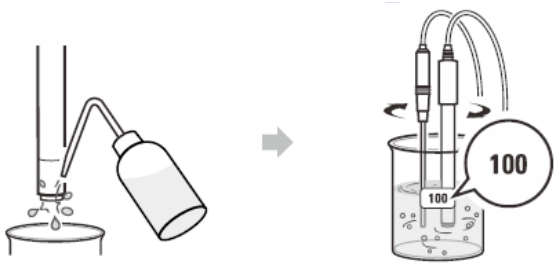


1.6 When the reading has stabilized, the display will show 0.1 mol/L /CAL2. The meter prompts

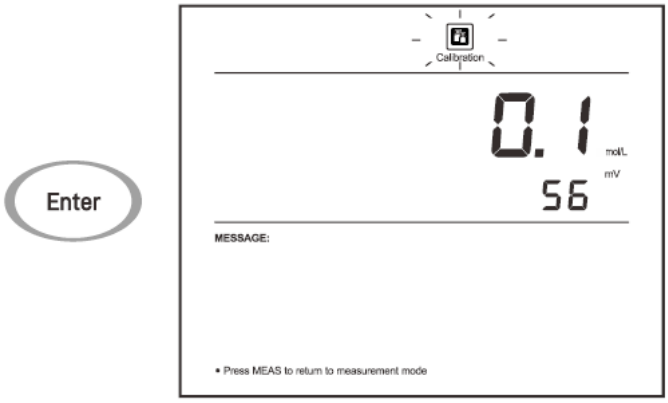
you to continue with second point calibration.



1.7 Rinse the water hardness electrode with distilled water, then rinse with a small amount of standard solution. Place the electrode (and temperature probe) into the next standard solution and stir gently.



1.8 Press the Enter key, the Calibration icon begins flashing.



1.9 When the reading has stabilized, the display will show CAL3. The meter prompts you to continue with third point calibration.

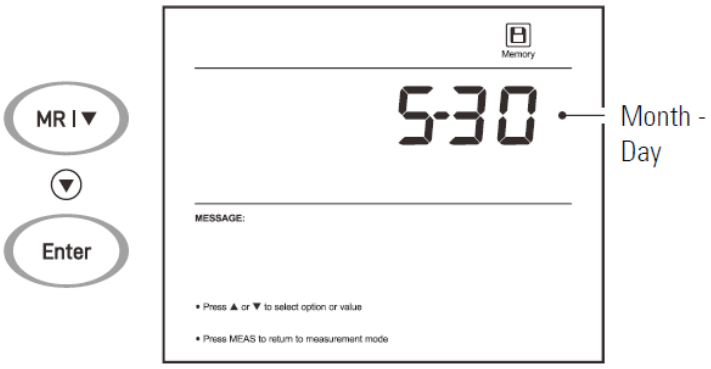
2.0 Repeat the steps 1.7 and 1.8 above until the meter shows End. Calibration is completed.

To exit the calibration without saving changes, press the **Meas** key.

Viewing the Calibration Log

2.1Press the **MR** key in the measurement mode and press the ▼ key until the meter shows ELE/P-02 (Electrode/Page 2).

2.2 Press the **Enter** key, the meter shows the last calibration date.



2.3 Press the ▼ key to view the calibration point and mV value.

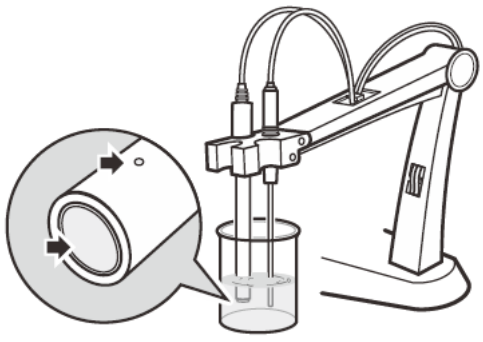
2.4 Press the ▼key to view the next data set.

2.5 To exit the calibration log, press the **Meas** key.

If the meter is not calibrated with standard solutions, the display willshow ----only.

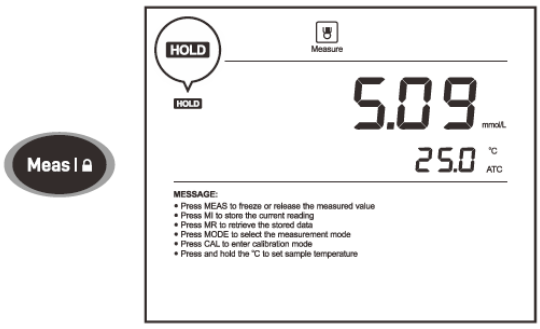
•Water Hardness Measurement

1. Rinse the water hardnesselectrode with distilledwater. Place the electrode (and temperature probe) into the sample solution andstir gently.Note, the sensitive membraneand liquid junction must be completely immersed into the solution.



2. If the Auto-Hold option in the setup menu is enabled, the meter Will automatically sense a stable reading and lock measurement HOLD, the icon appears on the display. Press the key to resume measuring.

If the option is disabled, the meter will continuously measure and update the readings.



3. Wait for the measurement to stabilize and record the reading.

4. When all of the samples have been measured, rinse the electrode with distilled water.

During the measurement process, never wipe the ion sensitive membrane, blot dry with a lint-free tissue to remove waterdrops on electrode.

•If the meter is not calibrated with connected electrode, the displaywill always show 0.000.

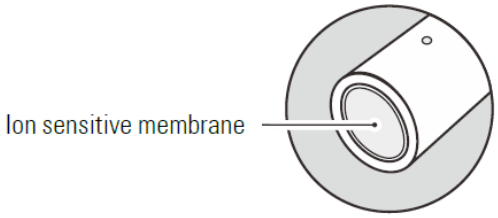
•If the meter shows ----indicating the measurement exceeds the range, remove the electrode from the sample immediately.

•Electrode Maintenance

• Rinse the water hardness electrode thoroughly with distilled water after use, wipe clean with a lint-free tissue, then replace protective cap and store the electrode in a dry, cool and well ventilated area.

• Never scratch the ion sensitive membrane on the bottom of the electrode.

• If the electrode response becomes sluggish, soak the electrode in 10 mmol/L standard solution for at least 1 hour.



- Appendix

Preparation of Standard Solution (100 mmol/L)

1. Half fill a 1 liter volumetric flask with distilled water and add 14.7 grams of analytical grade calcium chloride (CaCl2 • 2H2O) reagent.

2. Swirl the volumetric flask gently to dissolve the reagent and fill to the mark with distilled water.

3. Cap and upend the volumetric flask several times to mix the solution.

Optional Accessories

Sensors

Order Code	Description
ISE-WH	Water hardness electrode, range: 0.05 to 200 mmol/L
TP-10K	Temperature probe, range: 0 to 100°C (32 to 221°F)

Solutions

Order Code	Description
ION-WH	100 mmol/L standard solution, 480 ml
ISA-WH	Ionic strength adjuster, 480 ml

Communication and Power Supply

Order Code	Description
USB-B	USB connector A to B, 1 m (3.3 ft.) cable
DCPA-5V	DC 5V power adapter, european standard plug

CONDUCTIVITY/ TDS/SALINITY/ RESISTIVITY

Calibration and Measurement

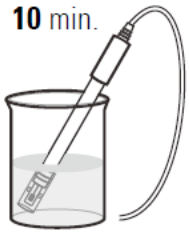
This section is applicable to model

- YR01820/ YR01835/ YR01836/ YR01837

•Prior to Use

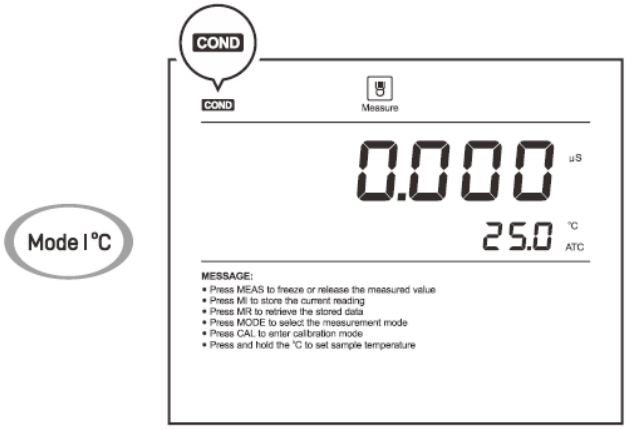
1.Connect the conductivity electrode to the meter (refer to the *Connection* section).

2. Soak the electrode for about 10minutes in tap water to remove dirt and oil stains on the sensor surface.



Selecting the Measurement Mode

Press the **Mode** key, the meter will show the conductivity (COND), TDS, salinity (SAL) and resistivity (RES) icons. Select a desired mode.



Conductivity/ TDS/Salinity Settings

The meter contains 7 conductivity/TDS settings and 7 general settings in the setup menú.

Menu Item	Option and Description	
CELL	**Cell Constant** Set the cell constant to match connected conductivity electrode.	
	0.1	K = 0.1
	1	K = 1 (default)
	10	K = 10
	USEr	Custom
COE	**Temperature Coefficient** Set the temperature coefficient for linear temperature compensation.	
	2.10	0.00 to 10.00%/°C (default 2.10)
CAL	**Calibration Points** Set the number of calibration points.	
	...5	1 to 5 points (default 1 point)
PUrE	**Pure Water Compensation** If enabled, the pure water compensation coefficient will be applied automatically for ultra-pure water measurements.	
	YES	Enable
	nO	Disable (default)
Std	**Reference Temperature** Set the normalization temperature for measurement, the readings will automatically compensate to the selected temperature during measurement.	
	25°C	25°C (default)
	20°C	20°C
tdS	**TDS Factor** Set the default TDS conversion factor.	
	0.50	0.40 to 1.00 (default 0.50)
UNIt	**Measurement Unit** Set the default temperature unit.	
	°C	Degrees Celsius (default)
	°F	Degrees Fahrenheit

If you want to change the current settings, press and hold the key to enter the setup menu.

Press the ▲/ ▼key to select an option andpress the **Enter** key to confirm.

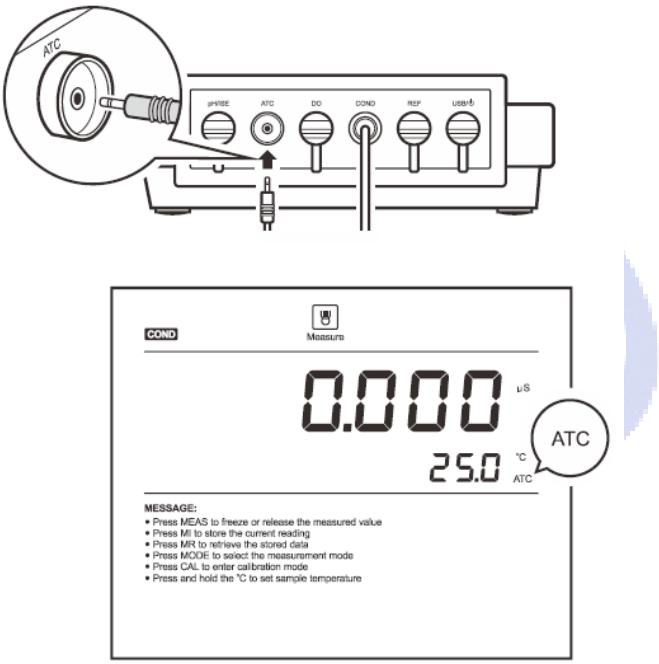
Refer to the *Setting a Default Option* section for detailed instructions.

- **Temperature Compensation**

The temperature compensation has a large effect on the conductivity measurement. If enabled, the meter will use the measured conductivity and temperature readings to calculate the result and automatically compensate to the selected reference temperature. If the temperature coefficient is set to 0, the temperature compensation will be disabled, the meter only shows the actual conductivity at the measured temperatura.

Automatic Temperature Compensation

Connect the temperature probe to meter, the ATC icon appears on the display, the meter is now switched to the automatic temperatura compensation mode.



Manual Temperature Compensation

If the meter does not detect a temperature probe, the degrees Celsius icon (°C) will show on the display indicating the meter is switched to the manualtemperature compensation mode. To set the temperature value follow the steps below.

1.Press and hold the **°C** key to enter the temperature setting.

2. Press the ▲/ ▼key to modify the temperature value.

3. Press the **Enter** key to save.

Press and hold the ▲/▼ key will make the value change faster.

- **Selecting a Conductivity Electrode**

The 9 series meter is capable of using three types of the conductivity electrodes. Before the calibration and measurement, ensure that you have selected a suitable electrode according to the anticipated sample conductivity. The following table lists the selectable electrode and its effective measurement ranges.

Electrode	Measurement Range	Cell Constant
CON-0.1	0.5 to 100 µS/cm	K = 0.1
CON-1	10 µS/cm to 20 mS/cm	K = 1
CON-10	100 µS/cm to 200 mS/cm	K = 10

Conductivity Calibration Automatic Calibration

The 9 series meter allows 1 to 5 points calibration in the conductivity mode. Before calibration, ensure that selected cell constant (K = 0.1,1, 10) matches connected electrode. If you have selected the manual calibration (USEr), the meter will wait to enter a cell constant.

For better accuracy, we recommend to perform 3 points calibration or select a standard solution closest to the sample conductivity you are measuring. The meter will automatically detect the standard solution and prompt the user to perform the calibration. The following table shows the default standard solution for each measurement range.

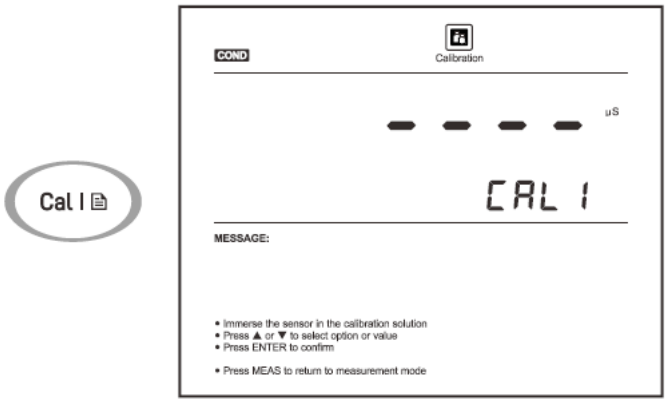
Measurement Range	Default Standard Solution
0 to 20 µS/cm	10 µS/cm
20 to 200 µS/cm	84 µS/cm
200 to 2000 µS/cm	1413 µS/cm
2 to 20 mS/cm	12.88 mS/cm
20 to 200 mS/cm	111.8 mS/cm

If you have changed the conductivity electrode, the meter must be recalibrated. Every electrode has a different cell constant.

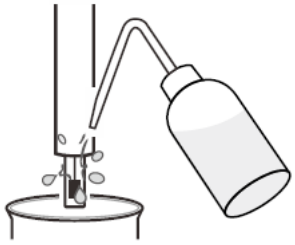
Single Point Calibration

1.1 Press the **Mode** key to enter the conductivity measurement mode and select 1 point calibration in the setup menu.

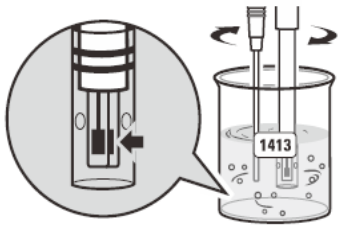
1.2 Press the **Cal** key, the display shows ----/CAL1, the meter waits for recognizing the standard solution.



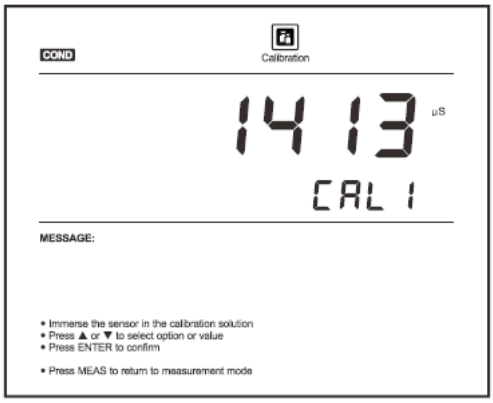
1.3 Rinse the conductivity electrode with distilled water, then rinse with a small amount of standard solution.



1.4 Place the electrode (and temperature probe) into the standard solution, stir gently to remove air bubbles trapped in the slot of the sensor.

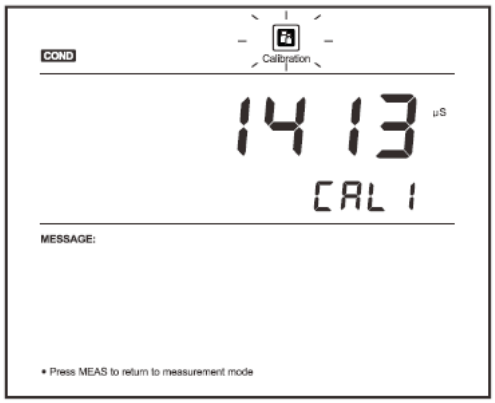


The meter will automatically show the calibrationstandard (e.g., 1413µS/cm).

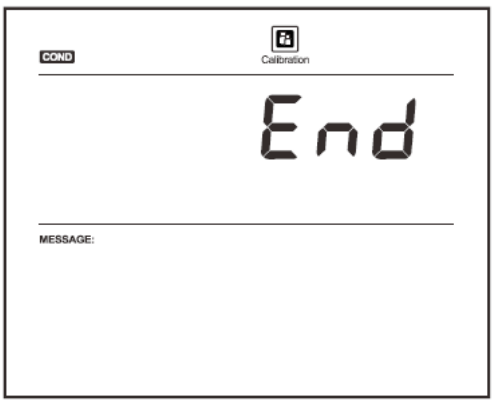


1.5 If necessary, press the ▲/ ▼key to modify the calibration value.

Press the **Enter** key, the Calibration icon begins flashing.



1.6 When the reading has stabilized, the meter will show and End return to the measurement mode.



Multipoint Calibration

2.1 Ensure that you have selected 2 to 5 points calibration in the setup menu. When the first calibration point is completed, the display will show ----/CAL2. The meter prompts you to continue with second point calibration.

2.2 Repeat steps 1.3 through 1.5 above until the meter shows .

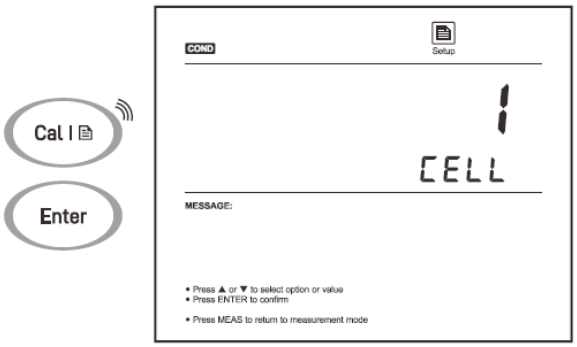
Calibration is completed.

Manual Calibration

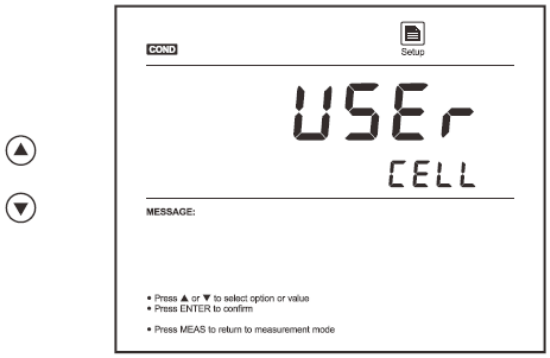
The 9 series meter provides an easy manual calibration mode. If the conductivity standard solution is not ready, you are able to use this method to calibrate the meter.

3.1 Press and hold the key to enter the setup menu.

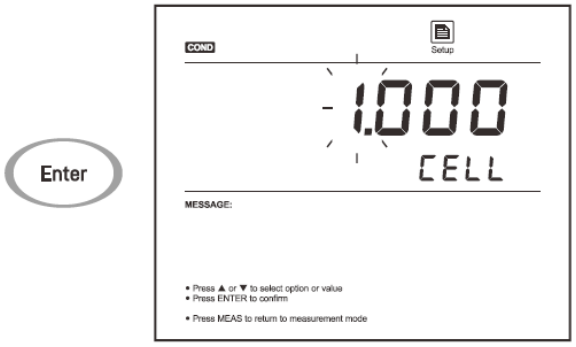
3.2 Press the **Enter** key, the display shows 1/CELL.



3.3 Press the ▲/▼ key to select USER/CELL.



3.4 Press the **Enter** key, the first digit begins flashing.



3.5 Press the ▲/▼ key to set the cell constant, press the **Enter** key to save until the meter returns to the measurement mode.

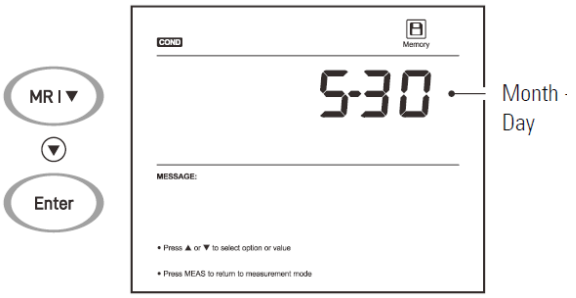
Performing the conductivity calibration will simultaneously calibrate the corresponding TDS, salinity and resistivity values.

- To exit the calibration without saving changes, press the **Meas** key.

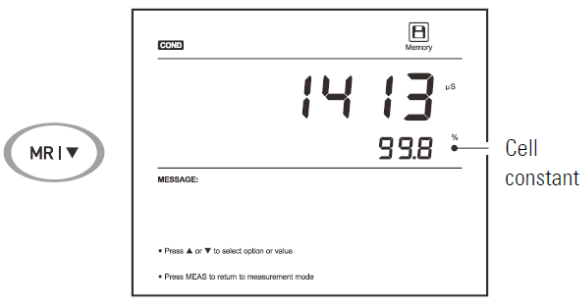
Viewing the Calibration Log

4.1 Press the **MR** key in the measurement mode and press the key until the ▼ meter shows ELE/P-02 (Electrode / Page 2).

4.2 Press the **Enter** key, the meter shows the last calibration date.



4.3 Press the ▼ key to view the calibration point and cell constant (e.g., 0.998).



4.4 Press the ▼keyto view the next data set.
4.5 To exit the calibration log, press the **Meas** key.

If the meter is not calibratedwith standard solution, thedisplay will show ----only.

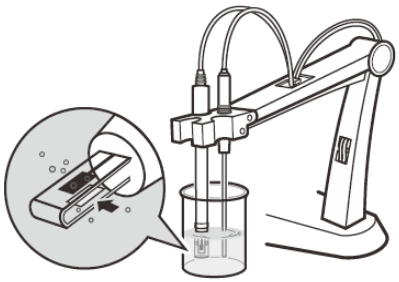
•Measurements

1.Press the **Mode** key to select the measurement mode.

•In the total dissolved solids (TDS) mode, ensure that you have seta correct conductivity-to-TDS conversion factor in the setup menu (default 0.50).

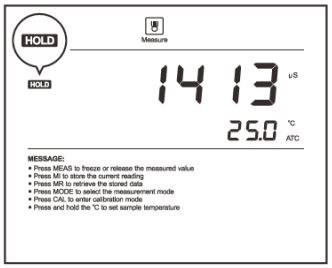
•In the salinity mode SAL,the meter provides 2measurementunits.When the PSU appears on the right of the measurementvalue indicating the meter is in the practical salinity measurementmode. When the ppt appears on the display indicating the meteris in the natural seawater measurement mode.

2. Rinse the conductivity electrode with distilled water. Place the electrode (and temperature probe) into the sample solution and stir gently. Ensure that no air bubbles on the sensor surface.



3. If the Auto-Hold option in the setup menu is enabled, the meter Will automatically sense a stable reading and lock measurement HOLD, the icon appears on the display. Press the key to resume measuring.

If the option is disabled, the meter will continuously measure and update the readings.



4. Wait for the measurement to stabilize and record the reading.

5. When all of the samples have been measured, rinse the electrode with distilled water.

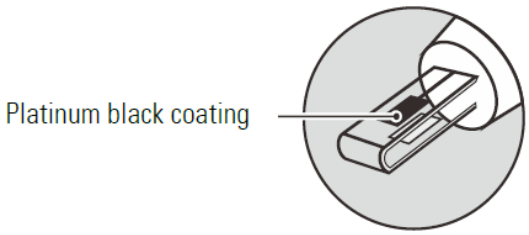
If the meter shows ---- indicating the measurement exceeds the range, replace a conductivity electrode that is appropriate for the conductivity range of the sample solution you are measuring.

• To record the measurement at the predefined time intervals, refer to the *Interval Readings* section.

•Electrode Maintenance

• Rinse the conductivity electrode thoroughly with distilled water after use.

• Do not touch the platinum black coating on the sensor surface and always keep it clean.



• If there is a build-up of solids inside the sensor, remove carefully, then recalibrate the electrode.

• If you do not use the electrode for long periods, wipe clean with a lint-free tissue and store the electrode in a dry and cool area.

• If your electrode is model CON-10, store the electrode with tap water. This sensor needs to be kept wet always.

•Appendix

Preparation of Conductivity Standard Solutions

1. Place the analytical grade potassium chloride (KCl) in a beaker and dry in an oven for about 3 hours at 105° C (221° F), then cool to room temperature.

2. Add the reagent to a 1 liter volumetric flask according to the instructions in table below.

Conductivity Standard	Reagent	Weight
84 µS/cm	KCl	42.35 mg
1413 µS/cm	KCl	745.5 mg
12.88 mS/cm	KCl	7.45 g
111.8 mS/cm	KCl	74.5 g

3. Fill the distilled water to the mark, mix the solution until the reagent is completely dissolved.

Calculating the Cell Constant

1. Refer to the Manual Calibration section to set the cell constant to 1.000.

2. Place the electrode into a standard solution and record the reading.

3. Calculate the cell constant using the following formula.

$$K = (C_{std} / C_{meas}) \times G$$

Where:
K = Cell constant
C_{std} = Value of conductivity standard solution
C_{meas} = Measured value
G = Raw cell constant (0.1, 1 or 10)

Calculating the Temperature Coefficient

1. Do not connect the temperature probe to the meter.

2. Press and hold the °**C** key to enter the temperature setting.

3. Press the ▲/▼ key to set the temperature to 25°C and press the **Enter** key to confirm.

4. Place the conductivity electrode into the sample solution, record the temperature value **TA** and conductivity value CTA.

5. Condition the sample solution and electrode to a temperature **TB** that is about 5 to 10°C different from TA. Record the conductivity value CTB.

6. Calculate the temperature coefficient using the formula below.

$$T_C = [C_{TB} - C_{TA}] / [C_{TA}(T_B - 25) - C_{TB}(T_A - 25)]$$

Where:
T_C = Temperature coefficient
C_{TA} = Conductivity at temperature A
C_{TB} = Conductivity at temperature B
T_A = Temperature A
T_B = Temperature B

Calculating the TDS Conversion Factor

To determine the TDS factor of sample solution use the formula below.

Factor = Actual TDS / Actual Conductivity @25°C

Where:

Actual TDS= value from the high purity water and precisely weighed NaCl or KCL reagent

Actual Conductivity= the meter measured conductivity value

For example:

Dissolve 64 grams of the potassium chloride (KCl)reagent in 1 literdistilled water. If measured conductivity is 100 mS/cm, then TDS factoris 0.64.

Conductivity to TDS Conversion Factors

Conductivity at 25°C	TDS (KCl)		TDS (NaCl)	
	ppm	Factor	ppm	Factor
84 µS/cm	40.38	0.5048	38.04	0.4755
1413 µS/cm	744.7	0.527	702.1	0.4969
12.88 mS/cm	7447	0.5782	7230	0.5613

Optional Accessories

Conductivity Electrodes

Order Code	Description
CON-0.1	For measuring the pure water
CON-1	For general purpose applications
CON-10	For measuring the high conductivity liquids

Temperature Probe

Order Code	Description
TP-10K	Range: 0 to 100°C (32 to 221°F), 1 m (3.3 ft.) cable

Communication and Power Supply

Order Code	Description
USB-B	USB connector A to B, 1 m (3.3 ft.) cable
DCPA-5V	DC 5V power adapter, european standard plug

Solutions

Order Code	Description
ECCS-84	Conductivity standard solution 84 µS/cm, 480 ml
ECCS-1413	Conductivity standard solution 1413 µS/cm, 480 ml
ECCS-1288	Conductivity standard solution 12.88 mS/cm, 480 ml
ECCS-5000	Conductivity standard solution 50.00 mS/cm, 480 ml
ECCS-1118	Conductivity standard solution 111.8 mS/cm, 480 ml

DISSOLVED OXYGEN

Calibration and Measurement
This section is applicable to model

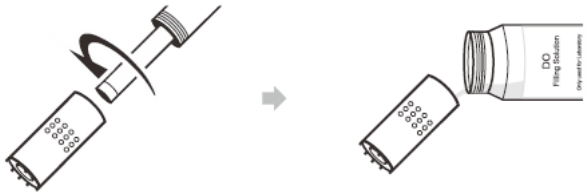
- YR01833
- YR01820/ YR01835/ YR01837

- **Prior to Use**

Filling the Electrolyte Solution

1.1 Take out the dissolved oxygen electrode and electrolyte solution from the packaging. Unscrew the membrane cap from the bottom of the electrode, rinse the inside and outside with distilled wáter and blot dry.

1.2 Fill the membrane cap halfway with electrolyte solution.



1.2 Screw membrane cap back onto the electrode. Some electrolyte solution will overflow during this process.

1.4 Check the electrode, ensure that no air bubbles are trapped in the electrolyte solution and the membrane is not creased or damaged.

Polarizing the Electrode

2.1 Connect the dissolved oxygen electrode to the meter (refer to the *Connection* section).

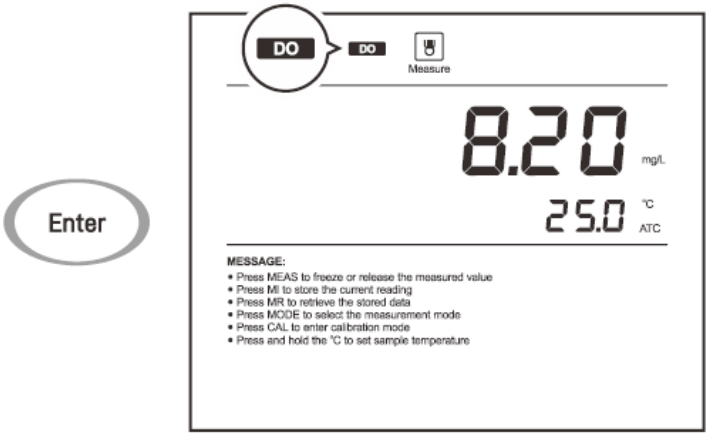
2.2 Switch on the meter and wait 10 minutes for the electrode to polarize.

⚠ The dissolved oxygen electrode must be polarized before use.

Selecting the Measurement Mode

Press the **Mode** key until the DO icon and measurement unit mg/L or ppm appears on the display, the meter enters the dissolved oxygen concentration mode.

Press the key again, the measurement unit will switch to %, the meter enters the percentage saturation mode.



- **Dissolved Oxygen Settings**

The meter contains 5 dissolved oxygen settings and 7 general settings in the setup menu.

Menu Item	Option and Description	
CAL	**Calibration Points** Set the number of calibration points.	
	1	1 point
	2	2 points (default)
PrES	**Pressure Coefficient** Set the barometric pressure coefficient according to the local altitude.	
	760.0	450.0 to 850.0 mmHg, 60.0 to 113.3 kPa (default 760.0 mmHg, 101.3 kPa)
SAL	**Salinity Coefficient** Set the salinity compensation coefficient of sample.	
	0.0	0.0 to 50.0 ppt (default 0.0)
rESO	**Resolution** Set the resolution of the dissolved oxygen measurement.	
	0.01	0.01 mg/L, 0.1% (default)
	0.1	0.1 mg/L, 1%
UNIt	**Measurement Units** Set the default dissolved oxygen, barometric pressure and temperature units.	
	mg/L	Milligrams per liter (default)
	ppm	Parts per million
	mmHg	Millimeter of mercury (default)
	kPa	Kilopascal
	°C	Degrees Celsius (default)
	°F	Degrees Fahrenheit

If you want to change the current settings, press and hold thekey to enter the setup menu. Press the ▲/ ▼key to select an option andpress the **Enter** key to confirm.

Refer to the ***Setting a Default Option*** section for detailed instructions.

The following table describes the relationship between the altitude and barometric pressure, make sure to set acompatible parameter before the calibration and measurement.

During the barometric pressure and salinitysettings,press and hold the ▲/ ▼key will make the value change faster.

Altitude (m)	kPa	mmHg	Altitude (m)	kPa	mmHg
0	101.3	760	1800	80.9	607
100	100.1	750	1900	79.9	599
200	98.8	741	2000	78.9	592
300	97.6	732	2100	77.9	584
400	96.4	723	2200	76.9	577
500	95.2	714	2300	76.0	570
600	94.0	705	2400	75.0	563
700	92.8	696	2500	74.1	556
800	91.7	688	2600	73.2	549
900	90.5	679	2700	72.3	542
1000	89.4	671	2800	71.4	536
1100	88.3	662	2900	70.5	529
1200	87.2	654	3000	69.6	522
1300	86.1	646	3100	68.7	515
1400	85.0	638	3200	67.9	509
1500	84.0	630	3300	67.0	502
1600	82.9	622	3400	66.2	496
1700	81.9	614	3500	65.4	490

- **Dissolved Oxygen Calibration**

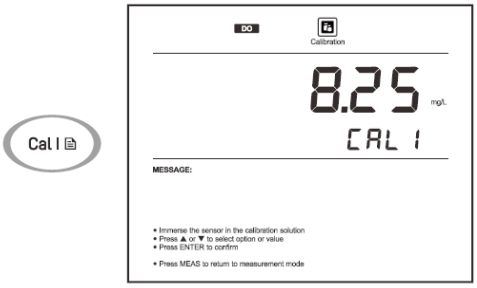
The 9 series meter allows 1 or 2 points calibration in the disolved oxygen mode. If you have selected the 1 point calibration in the setup menu, we recommend that you perform a 100% saturation calibration in the air-saturated water. If the 2 points calibration is selected, the zero oxygen solution needs to be used.

During the calibration and measurement, the temperature sensor on electrode must be immersed in solution completely and the solution should keep 0.3 m/s of minimum flow rate to avoid oxygen starvation at the membrane.

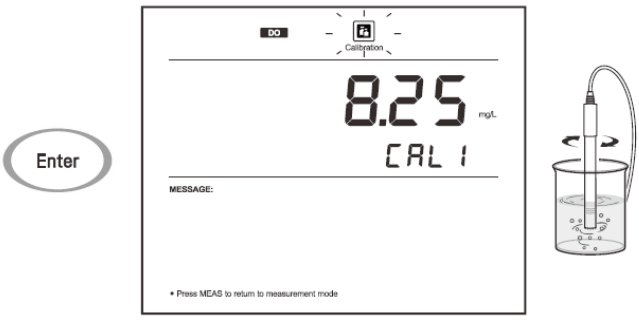
DO Calibration in mg/L or ppm Mode

1.1 Press the **Mode** key to enter the dissolved oxygen concentration mode and select the 1 point calibration in the setup menu.

1.2 Press the **Cal** key, the display shows 8.25 mg/L / CAL1 (@25° C).



1.3 Place the dissolved oxygen electrode into the air-saturated water for 10 minutes and stir gently. Press the **Enter** key, the meter begins the calibration, the Calibration icon continuously flashing.

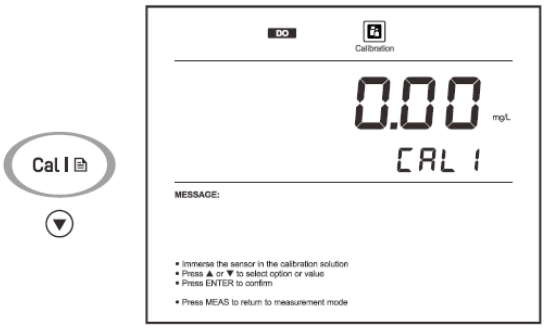


1.4 When the reading has stabilized, the meter will show and return to the measurement mode.

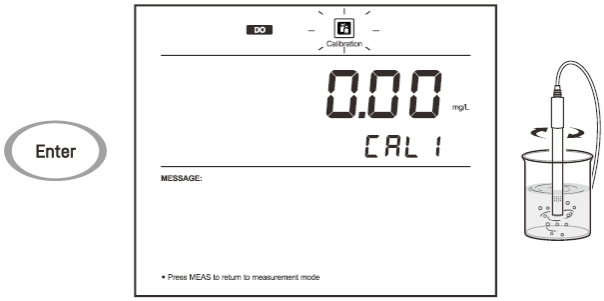
2 Points Calibration

2.1 Ensure that you have selected 2 points calibration in the setup menu.

2.2 Press the **Cal** key and ▼ key,the meter shows 0.00mg/L/CAL1.



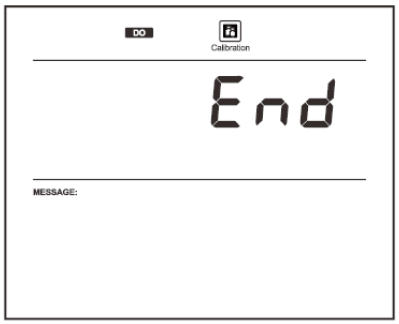
2.3 Place the dissolved oxygen electrode into the zero oxygen solution for about 10 minutes and stir gently. Press the **Enter** key to begin the calibration.



2.4 When the reading has stabilized, the display will show 8.25 mg/L / CAL 2 (@25° C). The meter prompts you to continue with second point calibration.

2.5 Repeat the step 1.3 above until the meter shows End.

Calibration is completed.



DO Calibration in % Saturation Mode

3.1 Press the **Mode** key to enter the % saturation mode and select the 1 point calibration in the setup menu.

3.2 Press the **Cal** key, the display shows 100.0% / CAL1.

3.3 Hold the dissolved oxygen electrode in the air at 100% relative humidity or place the electrode into the air-saturated water for 10 minutes. Press the **Enter** key, the meter begins the calibration.

3.4 When the reading has stabilized, the meter will show End and return to the measurement mode.

2 Points Calibration

4.1Ensure that you have selected 2 points calibration in the setup menu.

4.2 Press the **Cal** key and the ▼key, the meter shows 0% / CAL1.

4.3 Place the electrode into the zero oxygen solution for 10minutes and stir gently. Press the **Enter** key to begin the calibration.

4.4 When the reading has stabilized, the display will show 100%/ CAL2. The meter prompts you to continue with second point calibration.

4.5 Place the electrode into the air-saturated water for10 minutes and stir gently. Press the **Enter** key to begin the calibration.

4.6 When the reading has stabilized, the meter will show End and return to the measurement mode.

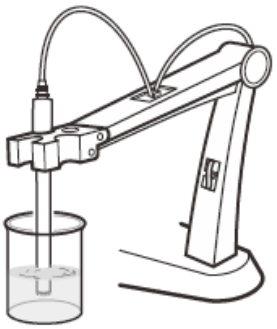
To exit the calibration without saving changes, press the **Meas** key.

- **Dissolved Oxygen Measurement**

The 9 series meter can be used to measure the water, wastewater, brine and other liquids. If your sample is seawater or water containing large amounts of salt, make sure to set the salinity coefficient before measurement. Some gas and steam such as chloride, sulfur dioxide, sulfureted hydrogen and carbon dioxide can permeate the membrane via diffusion. Their existence will influence the measurements. If the sample contains the solvent, grease, sulfide and alga, the membrane will be damaged or eroded.

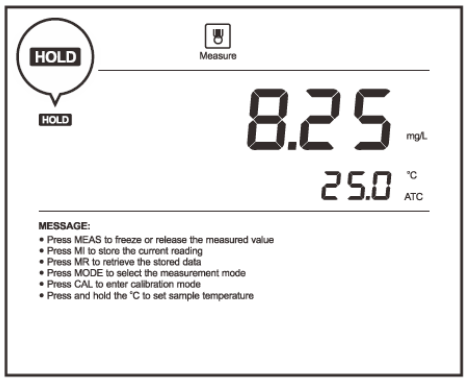
1. Set the barometric pressure and salinity coefficient in the setup menu.

2. Rinse the dissolved oxygen electrode with distilled water. Place the electrode into the sample solution and stir gently.



3. If the Auto-Hold option in the setup menu is enabled, the meter will automatically sense a stable reading and lock measurement, the HOLD icon appears on the display. Press the key to resume measuring. If the option is disabled, the meter will continuously measure and update the readings.

4. Wait for the measurement to stabilize and record the reading.



• If the meter shows ----indicating the measurement exceeds the range, remove the electrode from the sample immediately.

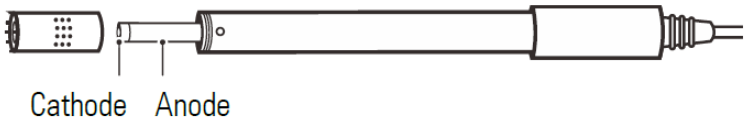
• To record the measurement at the predefined time intervals, referto the *Interval Readings* section.

•Electrode Maintenance

• Rinse the dissolved oxygen electrode thoroughly with distilled water after use.

• Do not touch the membrane and always keep it is clean and wet.

• If you do not use the electrode for long periods, screw off the membrane cap and rinse the electrode anode, cathode, membrane cap with distilled water and blot dry. Install the electrode and store dry.



•Appendix

Preparation of Zero Oxygen Solution

Dissolve 500 mg of the sodium sulfate (Na2SO3) reagent and a small amount of cobalt (II) chloride hexahydrate (CoCl2 • 6H2O) in the 250 ml distilled water, mix the solution until reagent is completely dissolved.

Preparation of Air-Saturated Water

Use an air-pump to blow air into distilled water at least 1 hour, while stirring the solution.

Optional Accessories

Dissolved Oxygen Electrode and Components

Order Code	Description
DO100	Dissolved oxygen electrode, range: 0 to 20 mg/L
DO-MEM	Membrane cap, 2 PCS/set

Solution

Order Code	Description
DO-ES	Electrolyte solution, 30 ml

Communication and Power Supply

Order Code	Description
USB-B	USB connector A to B, 1 m (3.3 ft.) cable
DCPA-5V	DC 5V power adapter, european standard plug

DATA MANAGEMENT

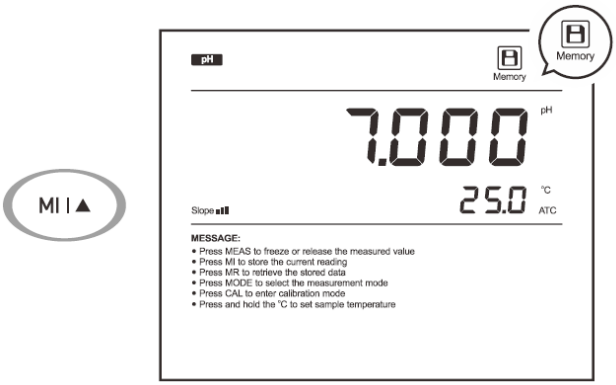
This section is applicable to all models of meters

- **Data Management**

The 9 series meter is capable of storing and recalling up to 500 data sets.

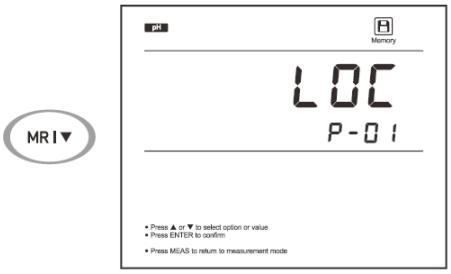
Storing a Measurement Result

During the measurement, press the **MI** key to store the reading into the memory, the Memory icon appears on the display.

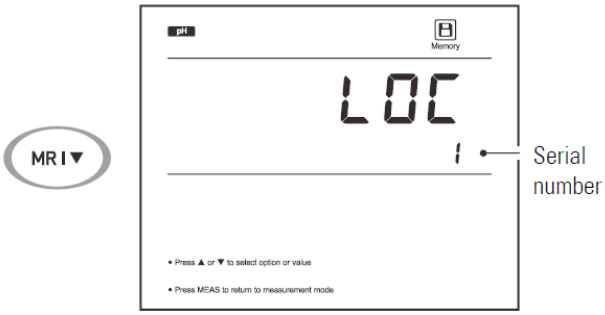


Viewing the Data Logs

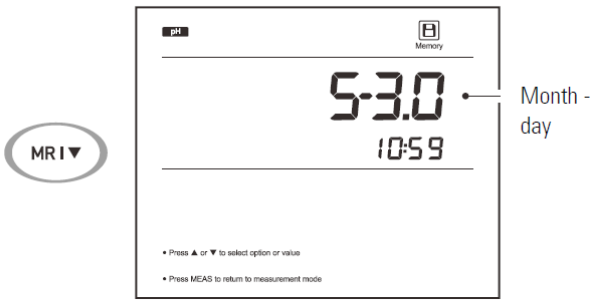
1.1 Press the MR key in the measurement mode, the meter shows `LOG/P-01` (Log/Page 1).



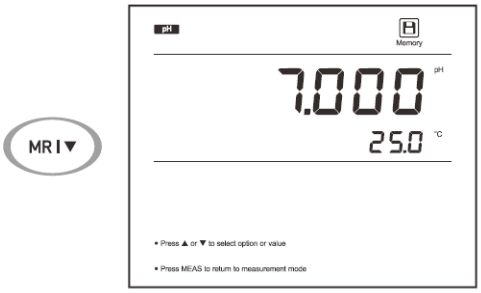
1.2 Press the Enter key, the meter shows the serial number of stored data.



1.3 Press the ▼key to view the date and time of measurement.



1.4 Press the ▼key to view the stored data.



1.5 Press the ▼key to view the next data set.

1.6 To exit the data log, press the **Meas** key.

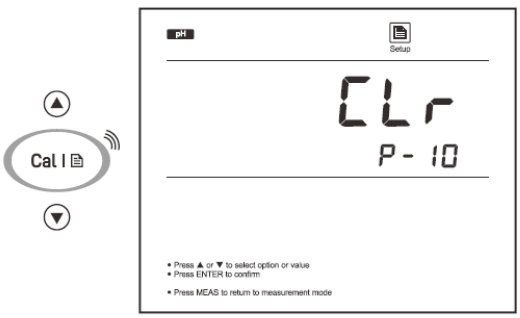
If the meter does not store any reading, the display will show ----only.

Clearing the Data Logs

If the memory is full, the meter will automatically show FULL when the **MI** key is pressed. To delete the data logs, please follow the steps below.

2.1 Press and hold the key to enter the setup menu.

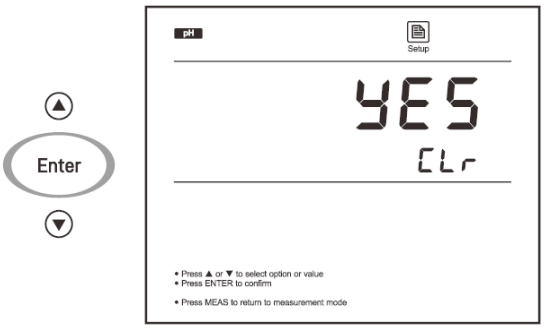
2.2 Press the ▼ key until the meter shows CLr.



2.3 Press the **Enter** key, the meter shows nO/CLr.

2.4 Press the ▼ key to select the YES/CLr.

2.5 Press the **Enter** key to confirm .

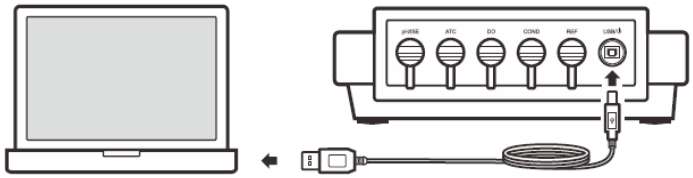


- **Communication**

The 9 series meter is capable of transferring the data to a computer or importing the data to Excel by a free DAS software. You are able to download this software from our official website. Before installation, make sure that the Windows 10 operating system has been installed on your computer.

Receiving the Data

1.1 Connect the USB cable to meter and click the **DAS_9_Series** icon, the system automatically scans an available communication port and shows a message box "Found a port on your computer".



1.2 Click the **OK**, the application starts.

1.3 Click the **Connect**, the screen shows "Port is connected".

1.4 Click the **OK**, then click the **Receive**, the stored data will transfer to computer automatically.

Interval Readings

2.1 Click the **Interval Recording** option box and select a time option.

2.2 Click the **Receive** button to begin record the readings.

The first data will be shown on the screen after 1 minute.

• Do not press any key on meter during the Interval Readings mode, it will cause communication interruption.

Creating an Excel File

When transfer is completed, click the **Save as Excel**, the readings in data sheet will automatically convert to Excel file.

Note, once the software is closed, all received data will be lost and can not be recovered. Month – day.

SPECIFICATIONS AND TROUBLESHOOTING

This section is applicable to all models of meters

Meter Specifications

pH	
Range	-2.000 to 20.000 pH
Resolution	0.001, 0.01, 0.1 pH
Accuracy	±0.002 pH
Calibration Points	1 to 5 points
pH Buffer Options	USA (pH 1.68, 4.01, 7.00, 10.01, 12.45)
	NIST(pH 1.68, 4.01, 6.86, 9.18, 12.45)
	DIN (pH 1.09, 4.65, 6.79, 9.23, 12.75)
Temperature Compensation	0 to 100°C (32 to 212°F)

ORP	
Range	±1999.9 mV
Resolution	0.1, 1 mV
Accuracy	±0.2 mV
Calibration Point	1 point (only for relative mV mode)

Ion Concentration	
Range	0.001 to 19999 ppm, mg/L, mol/L, mmol/L
Resolution	0.001, 0.01, 0.1, 1
Accuracy	±0.5% F.S. (monovalent)
	±1% F.S. (divalent)
Calibration Points	2 to 5 points
Calibration Solutions	0.001, 0.01, 0.1, 1, 10, 100, 1000, 10000
Temperature Compensation	0 to 100°C (32 to 212°F)

Water Hardness	
Range	0.05 to 200 mmol/L
Resolution	0.001, 0.01, 0.1, 1
Accuracy	±1% F.S.
Calibration Point	2 to 5 point
Calibration Solutions	0.001, 0.01, 0.1
Temperature Compensation	0 to 50°C

Conductivity	
Range	0.01 to 20.00, 200.0, 2000 µS/cm,
	20.00, 200.0 mS/cm
Resolution	0.001, 0.01, 0.1, 1

Accuracy	±0.5% F.S.
Calibration Points	1 to 5 points
Calibration Solutions	10 µS/cm, 84 µS/cm, 1413 µS/cm,
	12.88 mS/cm, 111.8 mS/cm
Temperature Compensation	0 to 100°C (32 to 212°F)
Temperature Coefficient	Linear (0.0 to 10.0%/°C)
	Pure water
Reference Temperature	20°C or 25°C
Cell Constant	K = 0.1, 1, 10 or custom

TDS

Range	0.00 to 10.00 ppt (max. 200 ppt)
Resolution	0.01, 0.1, 1
Accuracy	±1% F.S.
TDS Factor	0.1 to 1.0 (default 0.5)

Salinity

Range	0.00 to 80.00 ppt, 0.00 to 42.00 psu
Resolution	0.01
Accuracy	±1% F.S.

Resistivity

Range	0.00 to 20.00 MΩ
Resolution	0.01, 0.1
Accuracy	±1% F.S.

Dissolved Oxygen

Range	0.00 to 20.00 mg/L
	0.0 to 200.0% saturation
Resolution	0.01, 0.1
Accuracy	±0.2 mg/L, ±2.0%
Calibration Points	1 or 2 points
Temperature Compensation	0 to 50°C (32 to 122°F)
Pressure Correction	60.0 to 112.5 kPa, 450 to 850 mmHg
Salinity Correction	0.0 to 50.0 g/L

Temperature

Range	0 to 105°C (32 to 221°F)
Resolution	0.1°C (0.1°F)
Accuracy	±0.5°C (±0.9°F)
Calibration Point	1 point

Other Specifications

Memory	500 data sets
Communication Interface	USB-B
Operating Temperature	0 to 50°C (32 to 122°F)
Storage Temperature	0 to 60°C (32 to 140°F)
Relative Humidity	< 80% (non-condensing)
Display	LCD, 125 × 100 mm (4.9 × 3.9 in.)
Power Requirements	DC 5V/400mA power adapter
Dimensions	210 (L) × 188 (W) × 60 (H) mm (8.2 × 7.4 × 2.3 in.)
Weight	1.5 kg (3.3 lb)

Troubleshooting

Fault	Cause and Corrective Action
Screen shows - - - -	Electrode dried out. Soak the pH electrode in 3M KCl solution for about 30 minutes. Soak the ion selective electrode in 100 ppm standard solution for about 30 minutes. Soak the conductivity electrode in tap water for about 10 minutes.
	Measurement exceeded the maximum range. Check the electrode and sample.
Drifting erratic readings	Check whether electrode is contaminated, clogged or broken.
Screen shows Err	pH buffer problem. Use freshly prepared buffer solutions to calibrate the meter.
	Electrode has expired. Replace pH electrode.
	DO electrolyte solution is depleted. Refilling electrolyte solution.
	Zero oxygen solution is contaminated. Replace the calibration solution.

DISPOSAL

This product is required to comply with the European Union's Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC and may not be disposed of in domestic waste. Please dispose of product in accordance with local regulations at the collecting point specified for electrical and electronic equipment.

WARRANTY

The warranty period for meter is one year from the date of shipment. Above warranty does not cover the electrodes and standard solutions.

Out of warranty products will be repaired on a charged basis.

The warranty on your meter shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer
- Unauthorized modification or misuse
- Operation outside of the environment specifications of the products.

For more information, please contact the supplier.

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