



## 200 Series Benchtop pH/Cond. Meter

### Instruction Manual

- |                                  |                          |
|----------------------------------|--------------------------|
| P200-01 Benchtop pH Meter        | <input type="checkbox"/> |
| C200-01 Benchtop Cond. Meter     | <input type="checkbox"/> |
| PC200-01 Benchtop pH/Cond. Meter | <input type="checkbox"/> |
| P200-02 Benchtop pH Meter        | <input type="checkbox"/> |
| C200-02 Benchtop Cond. Meter     | <input type="checkbox"/> |
| PC200-02 Benchtop pH/Cond. Meter | <input type="checkbox"/> |



Model 200-01

Model 200-02



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## 1. Introduction

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Thank you for purchasing our 200 Series Benchtop pH/Cond. Meter.

Before using this meter, please read the operation manual carefully in order to help use and maintain it correctly. NOTE: We are constantly improving the product and contents of this manual may be updated without any prior notice. Check with your local dealer for any questions.

This meter is a perfect combination with advanced electronics and sensor technology and software design, which is suitable for most common pH and conductivity measurement in laboratory setting.

### 1.1 Measurement parameter and configuration

Parameter and configuration	P200-01	C200-01	PC200-01	P200-02	C200-02	PC200-02
pH/mV	√		√	√		√
Cond./TDS/Salinity		√	√		√	√
Temperature	√	√	√	√	√	√
Electrode Stand				√	√	√

### 1.2 Basic features

- TFT color display, large size, ultra legible.
- Operating navigation expressed by graphic and text, more convenient to use.
- Multi language operating system (English, German & Chinese)
- Smiling icon indicates the reading stability, including automatical lock on function.
- With built-in microprocessor chip, the meter has intelligent functions like automatic calibration, automatic temperature compensation, function setting, self-diagnostic information and storage.
- PC200 meter can measure and display pH & conductivity value at simultaneously.

### 1.3 pH measurement features

- 1~3 point automatic calibration with guided instruction and automatic checking functions.
- Automatically recognize pH buffer solution. 3 series buffer solution selectable: USA series, NIST series and China, as well as custom-defined solution.
- Automatically display electrode slope.

### 1.4 Conductivity measurement features

- 1~ 4 point automatic calibration with calibration instruction and automatic checking functions.
- Automatically recognize conductivity standard solution. 2 series standard solution selectable: USA and China, as well as custom-defined solution.
- Conductivity, TDS and salinity measurement modes can be switched to display.

## 2. Specifications

### 2.1 Technical parameters

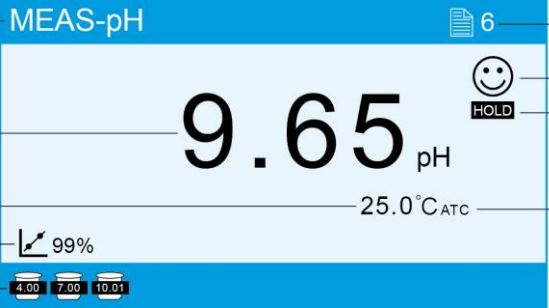
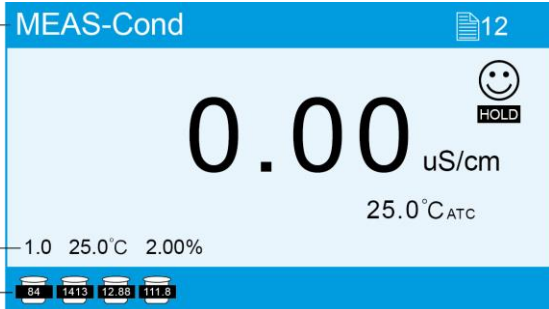
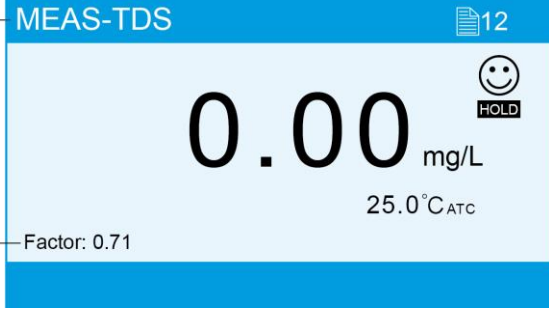
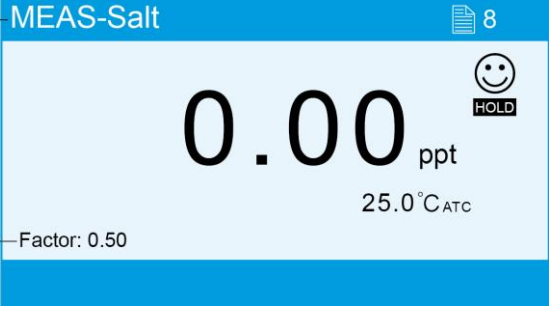
	Technical Parameters		Model
pH	Measuring Range	( 0.00 ~ 14.00 ) pH	P200-01 P200-02 PC200-01 PC200-02
	Resolution	0.1/0.01 pH	
	Accuracy	±0.01 pH ±1 digit	
	Temperature Compensation Range	( 0 ~ 100 ) °C ( Auto. or Manual )	
	Calibration point	1~3 points	
mV	Measuring Range	±2000mV	
	Resolution	1mV	
	Accuracy	±0.1% FS ±1 digit	
Cond.	Measuring Range	Conductivity : 0~200 mS/cm, divided into five ranges, automatically switch measuring range. ( 0~19.99 ) μS/cm; ( 20.0~199.9 ) μS/cm; ( 200~1999 ) μS/cm; ( 2.00~19.99 ) mS/cm; ( 20.0~199.9 ) mS/cm TDS : ( 0 ~ 100 ) g/L ; Salinity : ( 0 ~ 100 ) ppt	C200-01 C200-02 PC200-01 PC200-02
	Resolution	0.01/0.1/1μS/cm 0.01/0.1 mS/cm	
	Accuracy	±1.0% FS ±1 digit	
	Temperature Compensation Range	( 0 ~ 50 ) °C ( Auto. or Manual )	
	Cell constant	0.1 / 1 / 10 cm <sup>-1</sup>	
Temp.	Measuring Range	0~100°C	P200-01 P200-02 C200-01 C200-02 PC200-01 PC200-02
	Resolution	0.1°C	
	Accuracy	±0.5°C±1 digit	

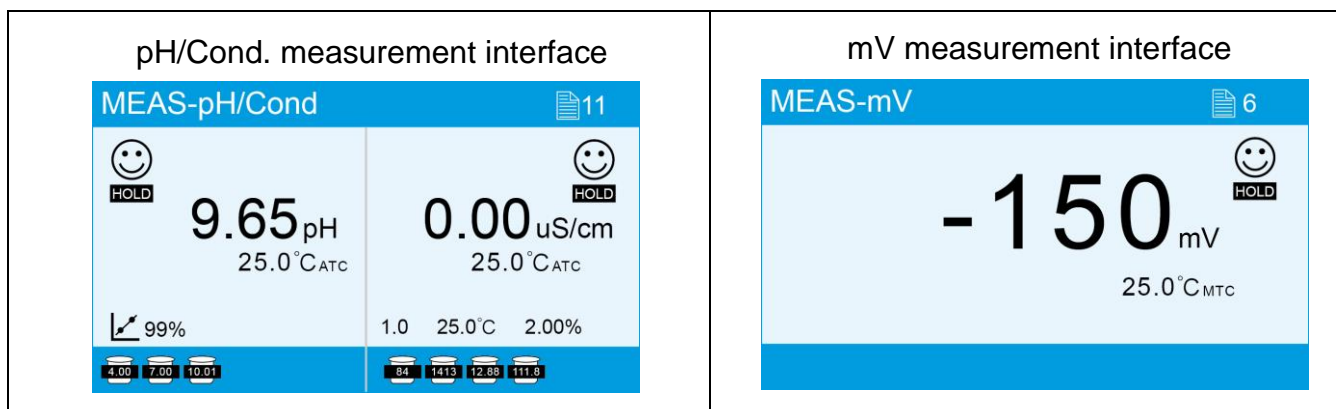
### 2.2 Other technical parameters

Data Storage	100 groups
Storage Content	Number, measuring value and temperature value
Power	DC9V/600mA
Dimension & Weight	Meter : (195×215×100 )mm / 0.9kg

### 3. Instrument Description

#### 3.1 LCD display

<p>pH measurement interface</p>  <p>The screenshot shows the pH measurement interface. At the top, it says 'MEAS-pH' with a storage icon and the number 6. The main display shows a large '9.65' followed by 'pH'. Below this, it shows '25.0°C ATC'. At the bottom, there is a slope indicator showing '99%' and three calibration solution icons with values 4.00, 7.00, and 10.01. Various icons like a smiley face, 'HOLD', and a document icon are also present.</p>	<ul style="list-style-type: none"> <li>①—pH measurment</li> <li>②—pH measuring value</li> <li>③—Temperature measuring value</li> <li>④—pH electrode slope</li> <li>⑤—Calibration solution indication icon</li> <li>⑥—Temperature compensation icon, MTC-Manual Temperature Compensation ATC-Auto. Temperature Compensation</li> <li>⑦—Auto. lock on icon</li> <li>⑧—Stable reading icon</li> <li>⑨—Storage icon and number</li> </ul>
<p>Conductivity measurement interface</p>  <p>The screenshot shows the conductivity measurement interface. At the top, it says 'MEAS-Cond' with a storage icon and the number 12. The main display shows a large '0.00' followed by 'uS/cm'. Below this, it shows '25.0°C ATC'. At the bottom, there is a parameter display showing '1.0 25.0°C 2.00%'. Calibration solution icons with values 84, 1413, 12.88, and 111.8 are shown at the very bottom.</p>	<ul style="list-style-type: none"> <li>①—Conductivity measurement</li> <li>②—Conductivity parameter : 1.0—conductivity cell constant 25.0°C—reference temperature 2.00%—temperature compensation coefficient</li> <li>③—Calibration solution indication icon</li> </ul>
<p>TDS measurement interface</p>  <p>The screenshot shows the TDS measurement interface. At the top, it says 'MEAS-TDS' with a storage icon and the number 12. The main display shows a large '0.00' followed by 'mg/L'. Below this, it shows '25.0°C ATC'. At the bottom, it displays 'Factor: 0.71'.</p> <p>①—TDS measurement    ②—TDS factor 0.71</p>	<p>Salinity measurement interface</p>  <p>The screenshot shows the salinity measurement interface. At the top, it says 'MEAS-Salt' with a storage icon and the number 8. The main display shows a large '0.00' followed by 'ppt'. Below this, it shows '25.0°C ATC'. At the bottom, it displays 'Factor: 0.50'.</p> <p>①—Salinity measurment    ②—Salinity factor 0.5</p>



### 3.2 Keypad functions

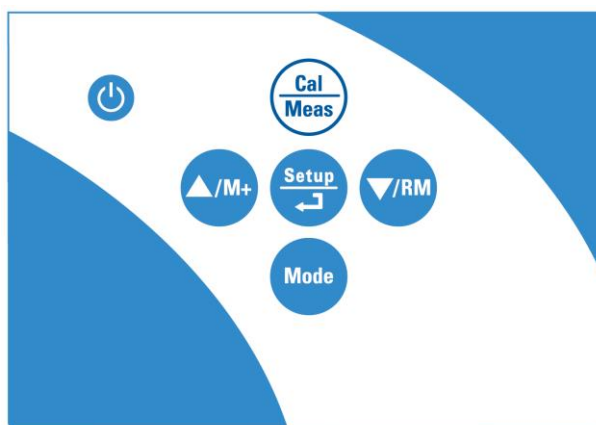





Diagram-1








#### Keypad operation mode

Short press—Press key and holding time<2s, meter makes a sound;

Long press—Press key and holding time>2s, meter makes a sound when pressing the button, second sound will ring after holding the key 2 seconds.

Chart -1 Keypad operations and functions

Keypad	Operations	Functions
	Short press	<ul style="list-style-type: none"> <li>● Power supply switch</li> </ul>
	Short press	Press key to select measurement mode: <ul style="list-style-type: none"> <li>● P200-01/02:pH→mV</li> <li>● C200-01/02: Cond→TDS→Salt</li> <li>● PC200-01/02: pH→mV→Cond→TDS→Salt→pH/Cond</li> </ul>
	Long press	<ul style="list-style-type: none"> <li>● Press key to enter temperature regulation mode</li> </ul>
	Long press	<ul style="list-style-type: none"> <li>● In measurement mode, press key to enter in the calibration mode</li> </ul>
	Short press	<ul style="list-style-type: none"> <li>● Cancel operation and return to measurement mode;</li> </ul>

	Short press	<ul style="list-style-type: none"> <li>● In measurement mode: press key to enter parameter set-up main menu;</li> <li>● In calibration mode: press key to conduct calibration;</li> <li>● In main menu mode: press key to enter in submenu;</li> <li>● In submenu mode: press key to enter in parameter set-up;</li> <li>● In parameter set-up mode: press key to confirm parameter;</li> <li>● In temperature regulation mode: press key to confirm temperature value.</li> </ul>
 	Short press	<ul style="list-style-type: none"> <li>● In measurement mode: press  key to store measuring value, press  key to recall;</li> <li>● In recall(RM) mode: press  or  key to turn page;</li> <li>● In menu mode: press key to select items;</li> <li>● In temperature regulation mode: press key to change temperature value, hold key for fast changing.</li> </ul>

### 3.3 Meter sockets

- ①— BNC socket, connect with pH combination electrode and ORP combination electrode.
- ②— RCA socket, connect with temperature sensor (for pH measurement).
- ①+②—BNC+RCA socket, connect with pH/ATC 3-in-1 combination electrode.
- ③—  $\Phi 4$  banana socket, connect with reference electrode.
- ④— BNC socket, connect with conductivity cell.
- ⑤— RCA socket, connect with temperature sensor (for conductivity measurement).
- ④+⑤— BNC+RCA socket, connect with Cond/ATC cell.
- ⑥—  $\Phi 2.5$  power socket (inside “+” outside “-”) connect with DC9V adapter.

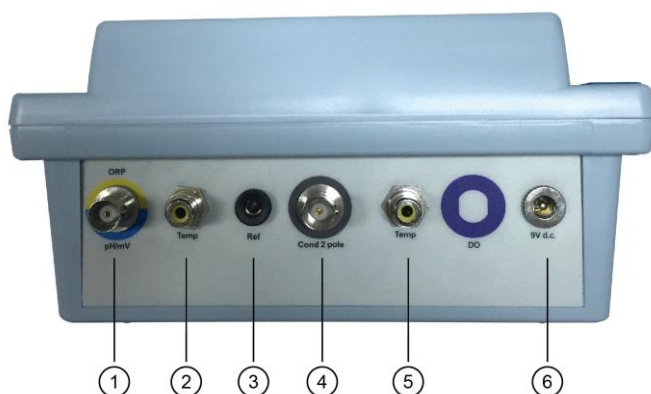


Diagram-2

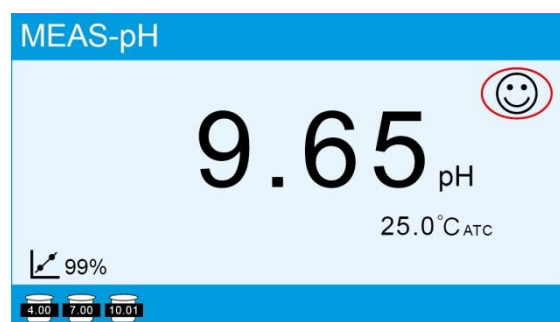



Diagram-3

### 3.4 Display mode

#### 3.4.1 Reading stable display mode

When the measuring value is stable, smiley icon ☺ appears on LCD screen, see Diagram – 3. If the smiley icon ☺ does not appear or flash, please do not record readings or calibrate until the measuring value is stable.

### 3.4.2 Auto. lock on display mode

In parameter setting 3.1, set “Reading with HOLD” to “ON”, when ☺ icon is stable for more than 6 seconds, the meter will lock the value automatically and display **HOLD** icon, see Diagram – 4(b). In **HOLD** mode, press  key to cancel auto lock.

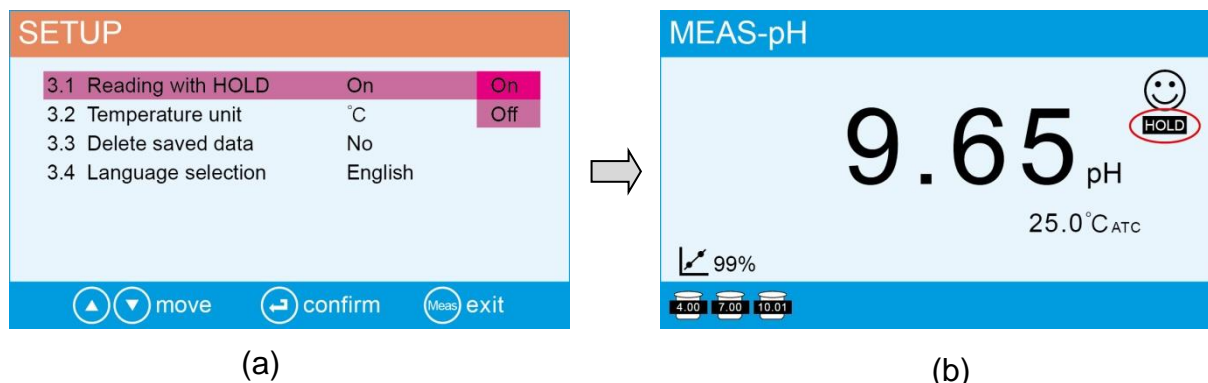









Diagram-4

## 3.5 Data storage, recall and delete


### 3.5.1 Storage

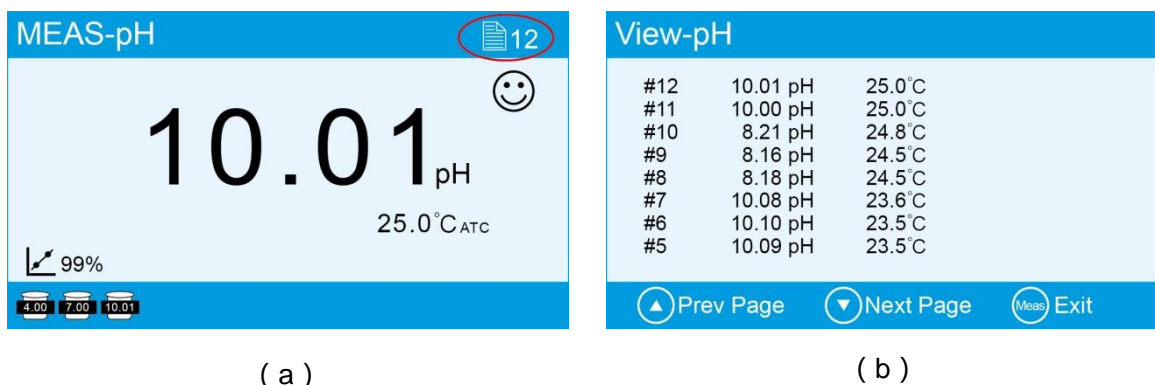
Press  key to store, icon  12 displays on the top right corner of LCD screen which means it's the 12<sup>th</sup> group data, see Diagram – 5(a); Each meter can store 100 groups data. For single parameter display mode, 1 serial number corresponds to 1 group measuring value. For dual parameter display mode (means pH+Cond. meter display mode), 1 serial number corresponds to 2 groups measuring value (pH + conductivity). So for this type of meter, actual store data is 100 groups, but storage number will be less than 100. If press  key again when storage value is full, icon  Full will flash, see Diagram – 5(c) to indicate store memory is already full and need to be deleted for new store value.

### 3.5.2 Recall

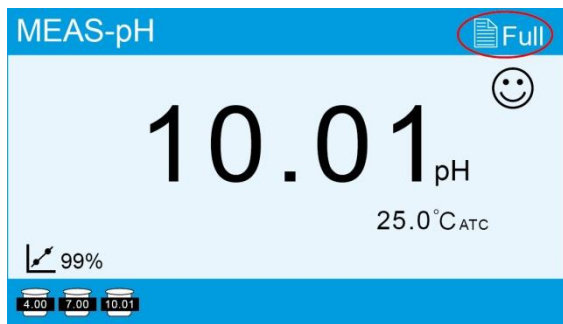
Press  key, meter will display stored 12 groups measuring value, see Diagram – 5(b), press  or  key to turn page. Every page displays up to 8 groups data.

### 3.5.3 Delete

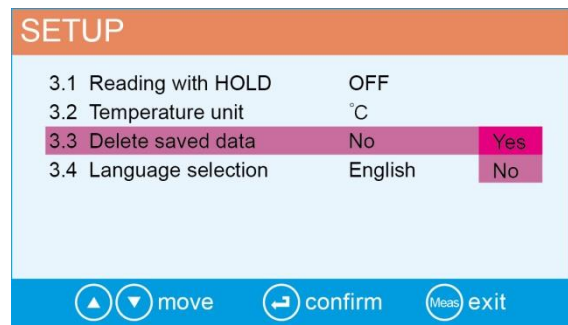
Data need to be deleted when storage memory is full, otherwise no more data can be stored. In parameter setting 3.3 select “Yes” and press  key, see Diagram – 5(d) to delete all stored value.







( c )



( d )

Diagram-5

### 3.6 Manual adjust temperature

In MTC mode, long press **Mode** key to enter temperature regulation mode. Press **▲/M+** or **▼/RM** key to adjust temperature value. Press and hold the key for fast adjustment. Press **Setup** key to confirm and return to measurement mode.

## 4. pH measurement

### 4.1 pH calibration related information

#### 4.1.1 Standard buffer solution

The instrument adopts three series standard buffer solution, USA, NIST and CH series, and also custom-defined solution. Please see Chart – 2 for the three series of standard buffer solution. The detail of custom-defined solution, see section 7.3.

Chart -2 pH standard buffer solution series





Calibration indication icons		pH standard buffer solution series		
		USA series	NIST series	CH series
Three-point calibration		4.00pH	4.01 pH	4.00 pH
		7.00 pH	6.86 pH	6.86 pH
		10.01 pH	9.18 pH	9.18 pH

Note: calibration indication icons are example of USA series.

#### 4.1.2 Three-point calibration

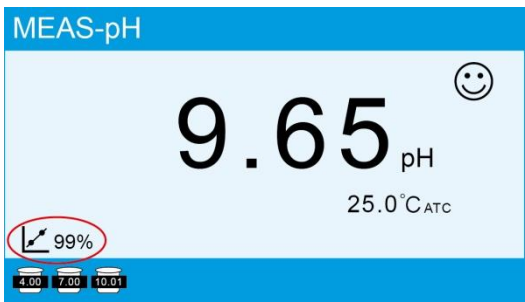

The instrument can perform 1~3 point calibration. In three-point calibration mode, the first point calibration must use 7.00 pH (or 6.86 pH) standard solution, then select other standard solution to perform the second and the third point calibration. See chart – 3.

Chart -3 Three-point calibration mode

	USA standard	NIST standard	CH standard	Calibration indication icons	Applicable range
One-point calibration	7.00 pH	6.86 pH	6.86 pH		Accuracy $\leq \pm 0.1\text{pH}$
Two-point calibration	7.00 pH and 4.00pH	6.86 pH and 4.01pH	6.86 pH and 4.00pH		<7.00 pH
	7.00 pH and 10.01pH	6.86 pH and 9.18pH	6.86 pH and 9.18pH		>7.00 pH
Three-point calibration	7.00pH, 4.00pH and 10.01 pH	6.86pH, 4.01pH and 9.18 pH	6.86pH, 4.00pH and 9.18 pH		0~14.00pH

Note: calibration indication icons are example of USA series.

#### 4.1.3 Calibration information display

	<p>1. Automatically display electrode slope in measurement interface</p> <ul style="list-style-type: none"> <li>● Display average slope after two or three point calibration</li> <li>● Dose not display slope after one point calibration</li> </ul>
	<p>2. Display last calibration data in pH submenu clause 1.3</p>

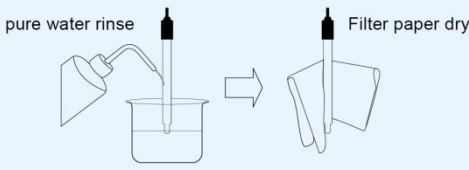








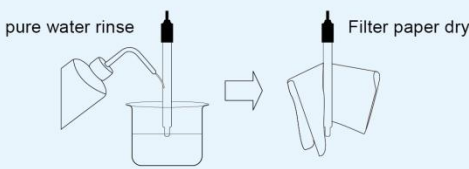









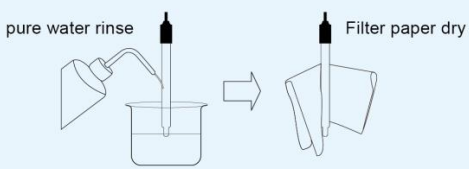









#### 4.1.4 Calibration intervals

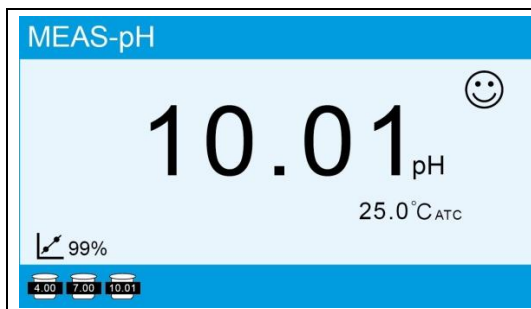
Calibration intervals depend on the sample, the probe performance, and the required accuracy. For high accuracy measurements ( $\leq \pm 0.02\text{pH}$ ), the meter should be calibrated before taking a measurement. For general accuracy ( $\geq \pm 0.1\text{pH}$ ), after one time calibration, the meter can be used for approximately one week or longer.

The meter must be recalibrated in the following situations:

- New probe or probe that is unused for a long period of time
- After measuring acids solution ( $\text{pH} < 2$ ) or alkaline solutions ( $\text{pH} > 12$ )
- After measuring solution that contains fluoride or strong organic solution
- If the solution's temperature differs greatly from that of the calibration solution

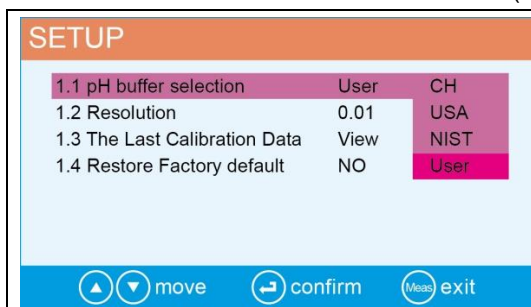
## 4.2 pH meter calibration (three-point calibration example)

<p><b>CAL-pH</b></p>  <p>pure water rinse      Filter paper dry</p> <p>Rinse electrode and press </p>	<p>Long press  key to enter calibration mode, as shown in left graph. Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press  key to confirm.</p>
<p><b>CAL-pH</b></p>  <p>Stir lightly, Wait for smile face </p> <p>7.00</p> <p>Press </p>	<p>Submerge probe in pH7.00 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until  appears. Press  key to make calibration.</p>
<p><b>CAL-pH</b></p>  <p>pure water rinse      Filter paper dry</p> <p> continue       finish</p>	<p>Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press  key to confirm. If only need one point calibration, press  key to return to measurement mode.</p>
<p><b>CAL-pH</b></p>  <p>Stir lightly, Wait for smile face </p> <p>4.00</p> <p>Press </p>	<p>Submerge probe in pH4.00 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until  appears. Press  key to make calibration.</p>
<p><b>CAL-pH</b></p>  <p>pure water rinse      Filter paper dry</p> <p> continue       finish</p>	<p>Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press  key to confirm. If only need two point calibration, press  key to return to measurement mode.</p>
<p><b>CAL-pH</b></p>  <p>Stir lightly, Wait for smile face </p> <p>10.01</p> <p>Press </p>	<p>Submerge probe in pH10.01 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until  appears. Press  key to make calibration.</p>

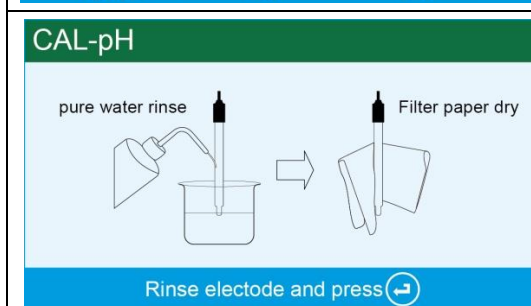


Calibration completed, instrument goes back to measurement mode.

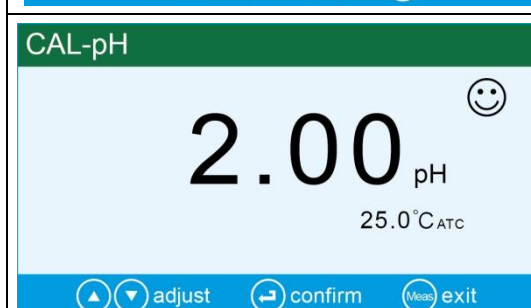
#### 4.3 Custom-defined calibration (2.00pH and 7.30pH calibration solution example)



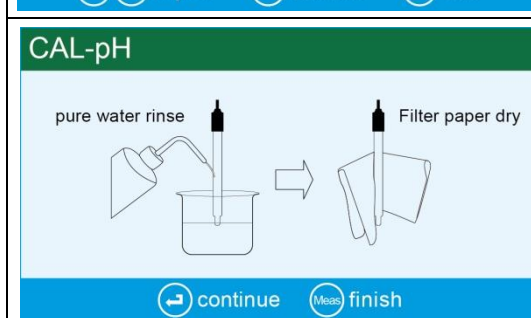
1. Select User in parameter setting 1.1, press key to return to measurement mode.



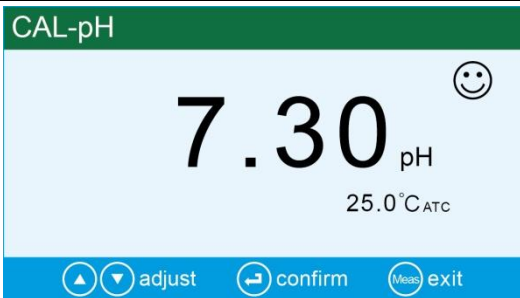

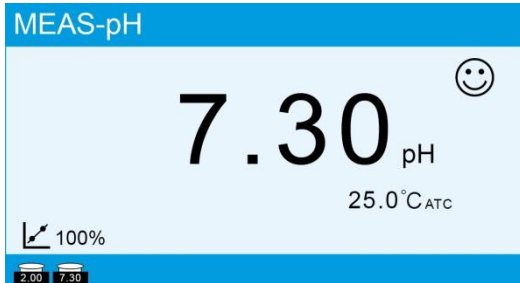
2. Long press key to enter calibration mode, as shown in left graph. Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press key to confirm.




3. Submerge probe in pH2.00 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until appears. Press or key to adjust measuring value to 2.00pH. Press key to make calibration.



4. Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press key to confirm. If only need one point calibration, press key to return to measurement mode.

	<p>5. Submerge probe in pH7.30 buffer solution. Stir the solution briefly and allow it to stay in the buffer solution until ☺ appears. Press ▲/M+ or ▼/RM key to adjust measuring value to 7.30pH. Press  key to make calibration.</p>
	<p>6. Calibration completed, instrument goes back to measurement mode.</p>

## Notes

- The meter can perform 1-2 point custom-defined calibration. When the 1<sup>st</sup> point calibration is done, press  key, the meter exits from calibration mode. This is one-point custom-defined calibration.
- The meter does not have the function to recognize custom-defined calibration solution. But it requires the error of custom-defined calibration solution  $\leq 1\text{pH}$ , the differential between two calibration solution  $\geq 1\text{pH}$ , otherwise the meter will display self-diagnostic error.
- The pH value of custom-defined solution is a value in a certain fixed temperature. The meter has to perform calibration and measurement at the same temperature to avoid big error.
- In manual temperature compensation mode, the temperature value should be adjusted before making calibration. It can not be adjusted during calibrating process.

## 4.4 Self-diagnostic Information

During the process of calibration and measurement, the meter has self-diagnosis functions, and will indicate the relative information, see chart – 4. Diagram- 6 is the display interface of self-diagnostic information.

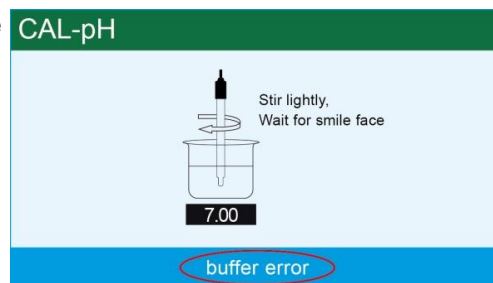




Chart -4 Self-diagnostic information of pH measurement mode

Self-diagnostic information	Description	Check up
buffer error	Wrong pH buffer solution or exceed the recognition range of the meters	1. Check if the pH buffer solution is correct. 2. Check if the connection between meter and probe is good 3. Check if the probe is failed
no stable	Press  key when measuring value is not stable.	Press  when ☺ icon appears
electrode error	The measuring value is not stable for long time ( $\geq 3\text{min}$ )	1. Check the probe bulb and make sure there is no air bulb in it 2. Replace the pH probe with a new one

Note: “electrode error” may be due to electrode age. Electrodes do not have infinite service life.

## 4.5 Solution measurement

4.5.1 Rinse pH probe in pure water, allow it to dry, and submerge it in tested solution. Stir the solution briefly and allow it to stay in the tested solution until ☺ icon appears on LCD and a stable reading is reached. The reading is the pH value of tested solution. Diagram–7 is the calibration and measurement process of pH meter.

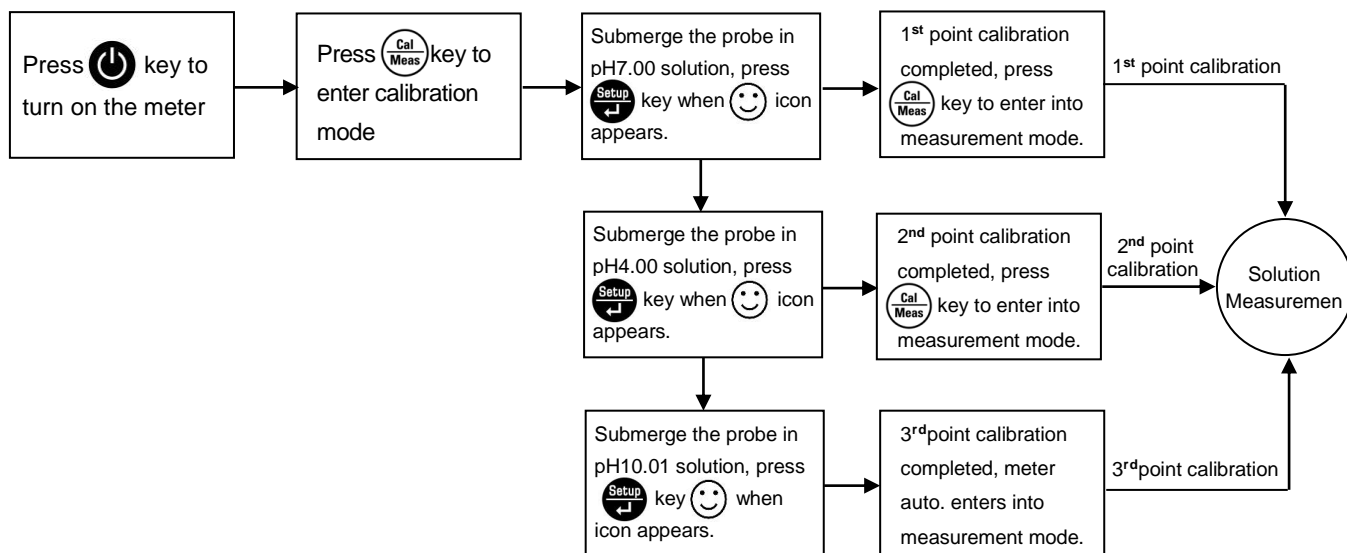


Diagram-7

### 4.5.2 pH isothermal measurement principle

The closer the temperature of the sample solution to the calibration solution, the more accurate readings will be.

Please be aware of this principle.

### 4.5.3 Restore to factory default setting

Instrument has factory default setting function, please refer to parameter setting section 1.4 (see Diagram-8). With this function, all calibration data is deleted and the meter will be calibrated to the theory value (pH value of zero electric potential is 7.00, the slope is 100%). Some function settings restore to the original value (refer to section 7.2). When calibration or measurement fails, please restore the meter to factory default setting and then perform re-calibration or measurement. Please note all the data deleted will not be retrievable if the meter is restored to factory default setting.

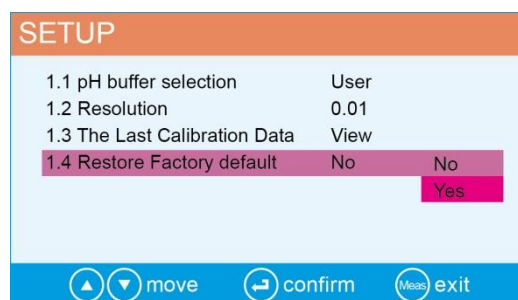


Diagram-8

## 4.6 pH probe maintenance

### 4.6.1 Daily maintenance

There is right amount 3M KCl solution in protection bottle of electrode front-end. Electrode tip is soaked inside it to keep glass bulb and junction activated. When measuring, unscrew the cap and pull out

electrode. Rinse off with pure water and it can be used. After using, insert the electrode and screw bottle cap to avoid solution leakage. If find muddy, signs of mould in the solution of protection bottle, the bottle should be washed in time and replace new soaking solution. 3M KCl solution preparation: take 22.4g KCl reagent and dissolve it in 100ml pure water.

The probe should not be soaked in pure water, protein solution or acid fluoride solution for long periods of time. In addition, do not soak the probe in organic grease lipids. For best accuracy, always keep the meter, especially the connectors of the meter and probe clean and dry. If polluted, clean it with medical cotton and absolute alcohol, then allow it dry.

#### 4.6.2 Buffer solution

The instrument was demarcated by buffer solution which has known pH value. For better measurement accuracy, the buffer solution used should be fresh. The buffer solution should be replaced after frequent usage.

#### 4.6.3 Clean



The probe should be thoroughly cleaned after testing in sticky samples, to remove residue. Or wash the probe with proper solvent, then wash off the solvent with pure water.

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## 5. mV measurement

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### 5.1 ORP measurement

Press  key, and switch the meter to mV measurement mode. Connect ORP probe (need to purchase it separately) and dip it in sample solution, stir the solution briefly and allow it to stay in the solution until icon appears.  reading obtained is ORP value. ORP stands for Oxidation Reduction Potential. It means oxidation reduction potential of solution. ORP is the measurement index for the oxidation reduction ability of water solution.

### 5.2 Notes for ORP measurement

5.2.1 ORP measurement does not require calibration. When the user is not sure about ORP probe quality or measuring value, use ORP standard solution to test mV value and see whether ORP probe or meter works properly.

5.2.2 Clean and activate ORP probe: After the probe has been used over long period of time, the platinum surface of the ORP probe will get polluted which causes inaccurate measurement and slow response. Please refer to the following methods to clean and activate ORP probe:

- (a) For inorganic pollutant, submerge the probe in 0.1mol/L dilute hydrochloric acid for 30 minutes, wash it in pure water, and then submerge it in electrode soaking solution for 6 hours.
- (b) For organic or lipid pollutant, clean the platinum surface with detergent, then wash it in pure water,



then submerge it in electrode soaking solution for 6 hours.

- (c) For heavily polluted platinum surface on which oxidation film is formed, polish the platinum surface with toothpaste, then wash it in pure water, then submerge it in electrode soaking solution for 6 hours.

### 5.3 Ion potential measurement

Connect ion probe and dip it in sample solution, stir the solution briefly and allow it to stay in the solution until ☺ icon appears. The reading obtained is potential value of ion probe. If ion probe is combination type, only need to insert it into “pH/mV” socket. If it's not combination type, proper reference electrode should be selected and insert it to “REF” socket. Two probes should be make measurement at same time.

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## 6. Conductivity Measurement

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### 6.1 Conductivity probe information

#### 6.1.1 Matching conductivity probe

The meter includes one plastic conductivity probe (Model 2301T-F, K=1.0). With built-in temperature sensor, the meter can realize automatic temperature compensation. BNC plug of the probe is connected to the meter's conductivity socket while RCA plug is connected to the temperature socket. When the probe is submerged in solution, stir the solution briefly to eliminate the air bubbles and in this way, a stable measurement will be reached fast.

#### 6.1.2 Conductivity probe constant

The meter can use with conductivity probes with three constants (K=0.1, K=1.0 and K=10.0). Please refer to chart-5 for the measuring range. Instrument constant can be set in parameter setting clause 2.1.

Chart -5 Probe constant and measuring range

Measuring Range	< 20 $\mu\text{S/cm}$	0.5 $\mu\text{S/cm}$ ~100mS/cm			> 100mS/cm
Conductivity probe constant	K=0.1 $\text{cm}^{-1}$	K=1.0 $\text{cm}^{-1}$			K=10 $\text{cm}^{-1}$
Standard solution	84 $\mu\text{S/cm}$	84 $\mu\text{S/cm}$	1413 $\mu\text{S/cm}$	12.88 mS/cm	111.8 mS/cm





### 6.2 Conductivity calibration related information

#### 6.2.1 Conductivity calibration solutions

The meter uses Standard series and CH series conductivity solution. The meter can recognize the standard solution automatically and perform 1~4 point calibration. The calibration icons at the bottom left of LCD screen is corresponding to four built-in standard values. See chart – 6:

Chart -6 Conductivity standard solution series



Icons	Standard calibration solution	CH conductivity solution
	84 $\mu\text{S/cm}$	146.6 $\mu\text{S/cm}$
	1413 $\mu\text{S/cm}$	1408 $\mu\text{S/cm}$
	12.88 $\text{mS/cm}$	12.85 $\text{mS/cm}$
	111.8 $\text{mS/cm}$	111.3 $\text{mS/cm}$

Note: calibration indication icons are example of Standard series.

#### 6.2.2 Calibration intervals

- The meter is calibrated before leaving the factory and can generally be used right out of the box.
- Normally, performing calibration once a month is recommended.
- For high accuracy measurement or larger temperature deviation from the reference temperature ( $25^{\circ}\text{C}$ ), performing calibration once a week is recommended.
- Use conductivity standard solution to check the probe. Perform calibration if the error is big.
- When use a new probe for the first time, or the meter has restored to factory default setting, 3-point or 4-point calibration is recommended. For everyday use, standard solution closer to the sample solution can be chosen to perform 1- point or 2-point calibration. For example: 1413  $\mu\text{S/cm}$  standard solution is suitable for measuring range 0-20 $\text{mS/cm}$ .

#### 6.2.3 Reference temperature

Factory set reference temperature is  $25^{\circ}\text{C}$ . Other reference temperature can also be set within the range  $15^{\circ}\text{C}$ ~ $30^{\circ}\text{C}$ . Set up reference temperature in parameter setting section 2.4

#### 6.2.4 Temperature coefficient

Factory set temperature compensation coefficient of the meter is 2.0%. However, the conductivity temperature coefficient is different from that of various kinds of solution and concentration. Please refer to chart – 7 and the data collected during testing and set up the parameter in section 2.5.

**Note: When the temperature compensation coefficient is set to 0.00 , meaning no temperature compensation, the measurement value will be based on the current temperature.**

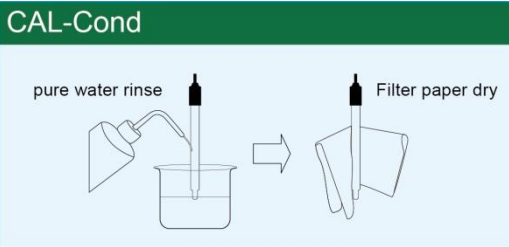



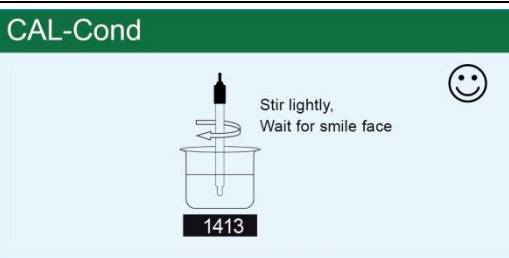



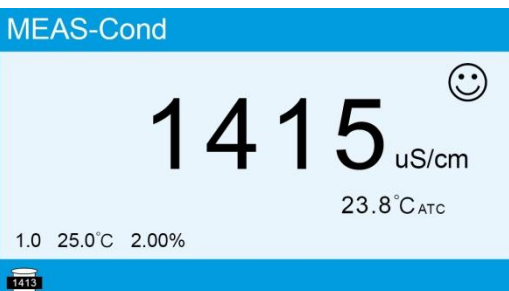


Chart -7 Temperature compensation coefficient of certain solutions

Solution	Temperature compensation coefficient
NaCl solution	2.12 $\%/^{\circ}\text{C}$
5% NaOH solution	1.72 $\%/^{\circ}\text{C}$
Dilute ammonia solution	1.88 $\%/^{\circ}\text{C}$
10% hydrochloric acid solution	1.32 $\%/^{\circ}\text{C}$
5% sulfuric acid solution	0.96 $\%/^{\circ}\text{C}$

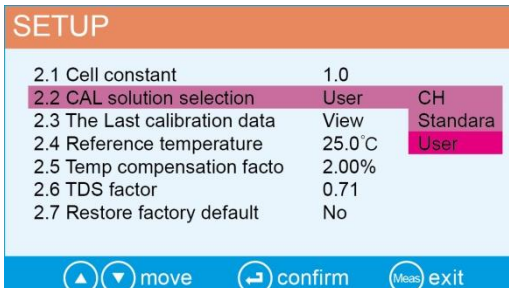

#### 6.2.5 Avoid contamination of standard solution

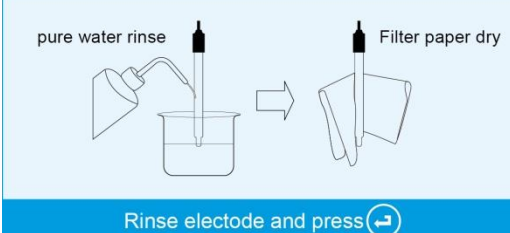


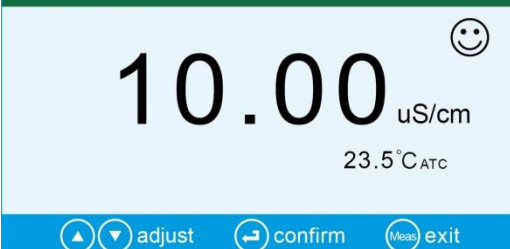




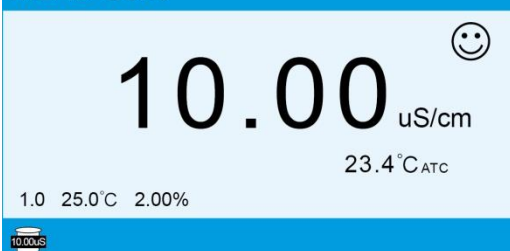
Conductivity standard solution has no buffer. Please avoid being contaminated during usage. Before submerging the probe in standard solution, please wash the probe and allow it dry. Please do not use the same cup of conductivity standard solution frequently, especially for standard solution of low concentration 84 $\mu$ S/cm. The contaminated standard solution will affect accuracy of measurements.

### 6.3 Conductivity meter calibration (1413 $\mu$ S/cm calibration example)

 <p>Rinse electrode and press </p>	<p>1. Long press  key to enter calibration mode, as shown in left graph. Rinse pH probe in pure water, allow it to dry by shaking or filter paper. Press  key to confirm.</p>
 <p>Press </p>	<p>2. Submerge probe in 1413<math>\mu</math>S/cm solution. Stir the solution briefly and allow it to stay in the buffer solution until  appears. Press  key to make calibration.</p>
	<p>3. Calibration completed, instrument goes back to measurement mode.</p>
<ul style="list-style-type: none"> <li>• For mulit-point calibration, please repeat above 1~3 step until all the calibration is done. The meter can perform calibration in same calibration solution until the value displayed is stable and repeatable.</li> <li>• To quit calibration mode, please  key, meter will return to measurement mode.</li> <li>• Press  key to switch measurement mode <b>Cond</b>→<b>TDS</b>→<b>Salt</b>.</li> </ul>	

### 6.4 Custom-defined calibration (10 $\mu$ S/cm standard solution example)

	<p>1. Select User in parameter setting clause 2.2, press  key to return to measurement mode.</p>
-------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

	<p>2. Long press  key to enter calibration mode, as shown in left graph. Rinse probe in pure water, allow it to dry by shaking or filter paper. Press  key to confirm.</p>
	<p>3. Submerge probe in 10μS/cm standard solution. Stir the solution briefly and allow it to stay in the buffer solution until appears. Press  or  key to adjust measuring value  to 10.00μS/cm. Press  key to make calibration.</p>
	<p>Calibration completed, instrument goes back to measurement mode.</p>
<ul style="list-style-type: none"> <li>● Only 1-point calibration for custom-defined calibration. The conductivity value of custom-defined solution is a value in a certain fixed temperature. There is no regulation of temperature coefficient and reference temperature. The meter has to perform calibration and measurement at the same temperature to avoid large error.</li> <li>● The meter does not have the function to recognize custom-defined calibration solution.</li> <li>● In manual temperature compensation mode, the temperature value should be adjusted before making calibration. It can not be adjusted during calibrating process.</li> </ul>	

## 6.5 Self-diagnostic information

During the process of calibration, the meter has self-diagnosis functions, and will indicate the relative information, see chart – 8. Diagram- 9 is the display interface of self-diagnostic information.

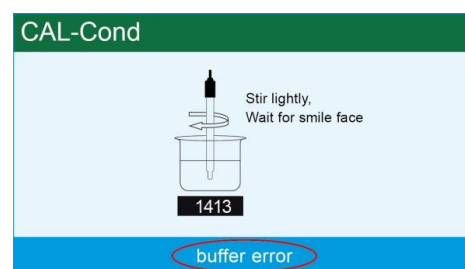






Diagram-9

Chart -8 Self-diagnostic information of conductivity measurement mode

Self-diagnostic information	Description	Check up
<b>buffer error</b>	Wrong conductivity calibration solution or exceed recognition range of the meter	1. Check if conductivity solution is correct. 2. Check if the connection between meter and probe is good 3. Check if the probe is failed

<b>no stable</b>	Press  key when measuring value is not stable.	Press  when  icon appears
<b>electrode error</b>	The measuring value is not stable for long time ( $\geq 3$ min)	1.Shake the probe to eliminate bubbles in probe head. 2.Replace conductivity probe with a new one

## 6.6 Solution measurement

6.6.1 Rinse conductivity probe in pure water, allow it to dry, and submerge it in the sample solution. Stir the solution briefly and allow it to stay in the sample solution until a stable reading is reached and  icon appears on LCD screen. The reading got is the conductivity value of the solution. Diagram – 10 is the calibration and measurement process of conductivity.

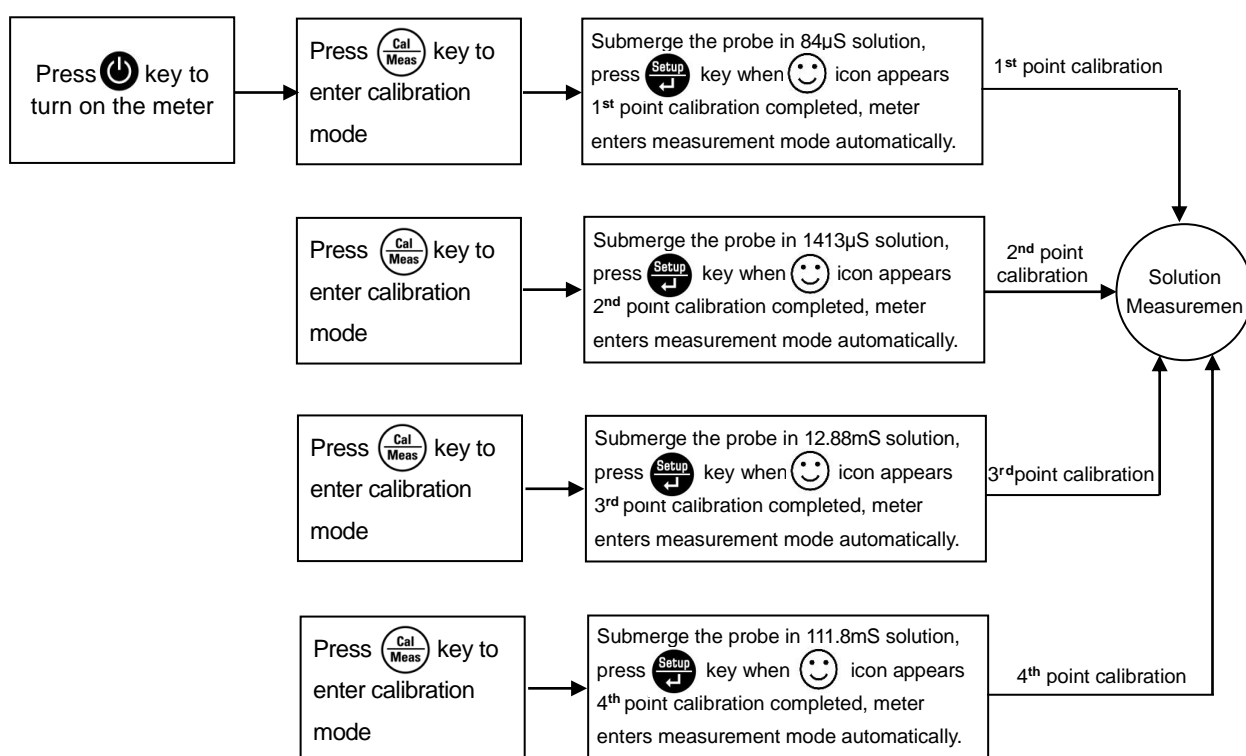


Diagram-10

### 6.6.2 Relationship among TDS, salinity and conductivity

The conversion coefficient between TDS and conductivity is 0.40~1.00 which can be adjusted in parameter setting section 2.6. Factory default setting is 0.71. The conversion coefficient between salinity and conductivity is 0.5. So the meter only needs to be calibrated in conductivity mode, then switch to TDS and salinity mode. Customers can adjust TDS conversion coefficient in parameter setting clause 2.6 according to testing data and experience. Please refer to chart-9 for some frequently-used conductivity and TDS conversion coefficients. Just for your reference.

Chart -9 Conversion coefficient between conductivity and TDS

Conductivity of solution	TDS conversion coefficient
0~100 $\mu\text{S/cm}$	0.60
100~1000 $\mu\text{S/cm}$	0.71
1~10 $\text{mS/cm}$	0.81
10~100 $\text{mS/cm}$	0.94

### 6.6.3 Restore to factory default setting

Instrument has factory default setting function, please refer to parameter setting section 2.7 (see Diagram-11). With this function, all calibration data is deleted and the meter will be calibrated to the theory value. Some function settings restore to the original value (refer to section 7.2). When calibration or measurement fails, please restore the meter to factory default setting and then perform re-calibration or measurement. Please note all the data deleted will not be retrievable if the meter is restored to factory default setting.

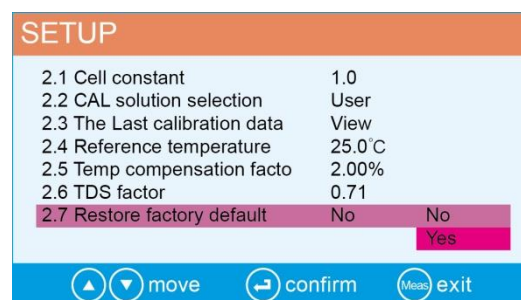


Diagram-11

## 6.7 Conductivity probe maintenance

6.7.1 Always keep the conductivity probe clean. Before taking a measurement, rinse the probe in pure water and allow it dry, then rinse it in the sample solution. When submerge the probe in solution, stir the solution briefly to eliminate air bubbles and allow it to stay in the solution until a stable reading is reached.

6.7.2 The sensitive rod of Model 2301T-F conductivity probe is coated with platinum black to minimize probe polarization and expand measuring range. The platinum black coating of the probe adopts advanced electroplating technology. This not only increases the surface roughness, but also improves probe measurement performance. And the coating is tight and firm, it can be washed by soft brush. This increases the the service life of probe a lot.

## 7. Parameter setting

### 7.1 Main menu and submenu

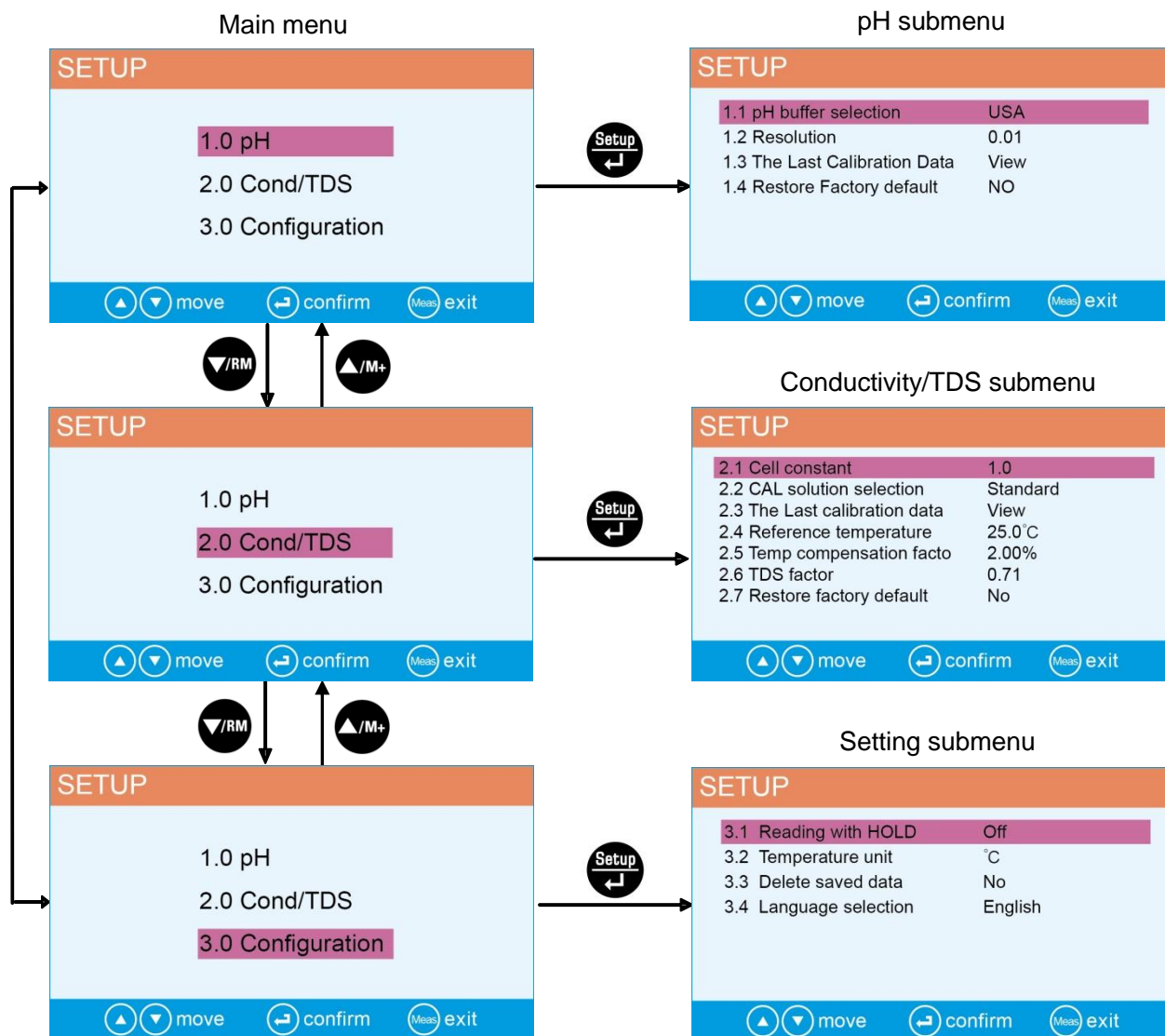













Diagram-12

### 7.2 Operation

Press  key to open main menu→press  or  key to select main menu items→press  key to open main menu item (submenu)→press  or  key to select submenu items(parameter)→press  key to open parameter→press  or  key to select parameter items or parameter value→press  key to confirm→press  key to return to measurement mode.

Please follow the operating indication in the bottom of LCD screen when operate it.

### 7.3 Content of parameter setting

Main menu	Serial number	Parameter setting items	Setting content	Factory default
1.0 pH	1.1	pH buffer selection	CH-USA-NIST-User	USA
	1.2	Resolution	0.01-0.1	0.01
	1.3	The last calibration data	View	/
	1.4	Restore factory default	No-Yes	No
2.0 Cond./TDS	2.1	Cell constant	10-1.0-0.1	1.0
	2.2	CAL solution selection	CH-Standard-User	Standard
	2.3	The last calibration data	View	/
	2.4	Reference temperature	15~30°C	25°C
	2.5	Temp compensation factor	0.00~10.00%	2.00%
	2.6	TDS factor	0.40~1.00	0.71
	2.7	Restore factory default	No-Yes	No
3.0 Configuration	3.1	Reading with HOLD	On-Off	/
	3.2	Temperature unit	°C-°F	/
	3.3	Delete saved data	Yes/No	/
	3.4	Language selection	中文-English-Deutsch	/

## 8. Meter Kits

	Description	Quantity	P200 -01	C200 -01	PC200 01	P200 -02	C200 -02	PC200 -02
8.1	P200 pH meter	1	✓			✓		
8.2	C200 conductivity meter	1		✓			✓	
8.3	PC200 pH/conductivity meter	1			✓			✓
8.4	602 flexible electrode stand	1				✓	✓	✓
8.5	201B-F plastic 3-in-1 combination pH electrode	1	✓		✓	✓		✓
8.6	2301T-F conductivity probe ( ATC,K=1.0 )	1		✓	✓		✓	✓
8.7	pH buffer solution (4.00/7.00/10.01pH/50mL )	1 bottle each	✓		✓	✓		✓
8.8	Conductivity standard solution (84μS/1413μS/12.88mS/50mL)	1 bottle each		✓	✓		✓	✓
8.9	9V power adapter	1	✓	✓	✓	✓	✓	✓
8.10	Instruction manual	1	✓	✓	✓	✓	✓	✓
8.11	Quick manual	1	✓	✓	✓	✓	✓	✓

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## 9. Warranty

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9.1 We warrant this instrument (probe not included) to be free from defects in material and workmanship and agree to repair or replace free of charge for a period of three years from the delivery.

9.2 This warranty does not apply to defects resulting from actions such as misuse improper maintenance, and unauthorized repairs or use in environments not designed for this equipment.







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