

*Pen type, with separate electrode*

# PH METER

Model : PH-220



Your purchase of this PH METER marks a step forward for you into the field of precision measurement. Although this METER is a complex and delicate instrument, its durable structure will allow many years of use if proper operating techniques are developed. Please read the following instructions carefully and always keep this manual within easy reach.



**OPERATION MANUAL**

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# 1. FEATURES

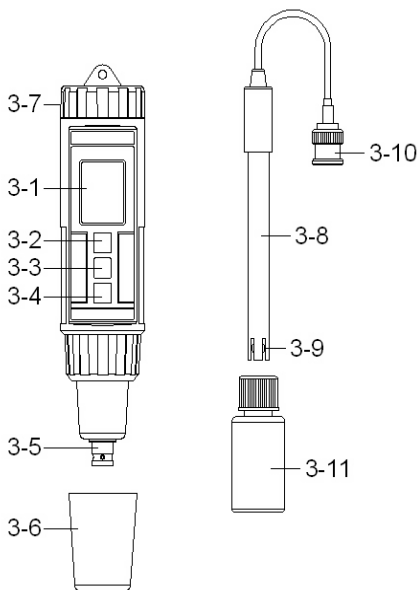
- \* Pen type digital pH meter.
- \* IP65 protection.
- \* Separate pH electrode, easy for general purpose usage and remote measurement.
- \* Complete set with one separate pH electrode ( PE-11 ) and pH 4, pH 7 standard solution.
- \* Auto calibration for pH 4, pH 7 or pH 10.
- \* Build in reverse display button.
- \* Data hold.
- \* Auto power off.
- \* Compact size, light weight.
- \* Available for wide applications, such as AQUARIUM, BEVERAGE, FISH HATCHERIES, FOOD PROCESSING, PHOTOGRAPHY, LABORATORY, QUALITY CONTROL, SCHOOL & COLLEGES, SWIMMING POOLS, WATER CONDITIONS.

# 2. SPECIFICATIONS

Display	LCD, size : 20 mm x 28 mm. <i>* User can reverse the display direction by push button.</i>
Measurement Range	0 to 14 pH x 0.01 pH
Resolution	0.01 pH
Accuracy	$\pm 0.07$ pH ( pH5 to pH9 ) $\pm 0.1$ pH ( pH4 to pH10 and beyond pH5 to pH9 ) $\pm 0.2$ pH ( pH1 to pH3.9, pH10.1 to pH13 ) <i>* <math>23 \pm 5^{\circ}\text{C}</math></i> <i>* After calibration.</i>

Input Impedance	10 <sup>12</sup> ohms.
Temp. Compensation	Not necessary to make adjustment.
Sampling Time	Approx. 0.8 second.
Operating Temperature	0°C to 50°C ( 32°F to 122°F )
Operating Humidity	Less than 80% RH.
Calibration method	Auto calibration, pH 7, pH 4 ( or pH 10 )
Power Supply	DC 1.5V battery ( UM-4/AAA ) x 4 PCs.
Power Consumption	Approx. 4.8 mA.
Dimension	Meter :180 x 40 x 32 mm ( 7.1 x 1.6 x 1.3 inch ). Electrode : Body size : 9.5 mm dia. x 120 mm. Electrode cable length : approx.. 1.8 meter.
Weight	220 g/0.48 LB (included electrode).
pH electrode	Any pH electrode with BNC plug. pH electrode, PE-11 included.
Standard Accessories	Instruction Manual..... 1 PC pH electrode. PE-11..... 1 PC pH 7.00 buffer solution, PH-7A..... 1 PC pH 4.00 buffer solution, PH-4A..... 1 PC <b>* PE-11, PH-07A, PH-04A are the consumer accessory.</b>
Optional Accessories	pH electrodes, Carrying case, <b>* refer page 8, page 9.</b>

### 3. FRONT PANEL DESCRIPTION



- 3-1 Display
- 3-2 Power button ( ▲ button )
- 3-3 Hold button
- 3-4 Display reverse button ( ▼ button )
- 3-5 pH electrode BNC socket
- 3-6 BNC protection cover
- 3-7 Battery compartment/Cover
- 3-8 pH electrode handle
- 3-9 pH electrode sensing head
- 3-10 pH electrode BNC plug
- 3-11 pH electrode protection bottle

## 4. pH CALIBRATING PROCEDURE

### ***4-1 Calibrating Consideration***

The pH meter already calibrated by mV signal that simulated from the ideal pH ELECTRODE mV output ( base on 25 °C environment ). However due to (a) An ideal electrode will produce 0 mV at pH 7.00, but most electrodes are slightly off. (b) The measuring environment temperature may not near 25 °C ( 15 to 35 °C ). If intend to keep instrument combined electrode within high accuracy, it is necessary to make the following calibration procedures ( 4-3 ).

- \* *Basic calibration ( single point calibration ) :  
pH 7 calibration.*
- \* *Complete calibration ( two points calibration ) :  
pH 7 calibration and pH 4 calibration.*
- \* *During execute the calibration procedures,  
if the Display show " Error " information, then please  
do the " Calibration clear " procedures, refer page 7*

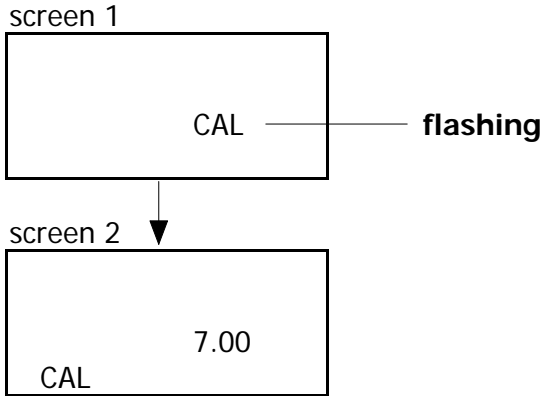
### ***4-2 Requiring Equipment for Calibration***

- 1) Combination pH electrode ( PE-12, included ).
- 2) Buffer solutions :
  - pH 7.00 buffer solution ( PH-07A, included ).
  - pH 4.00 buffer solution ( PH-04A, included ).

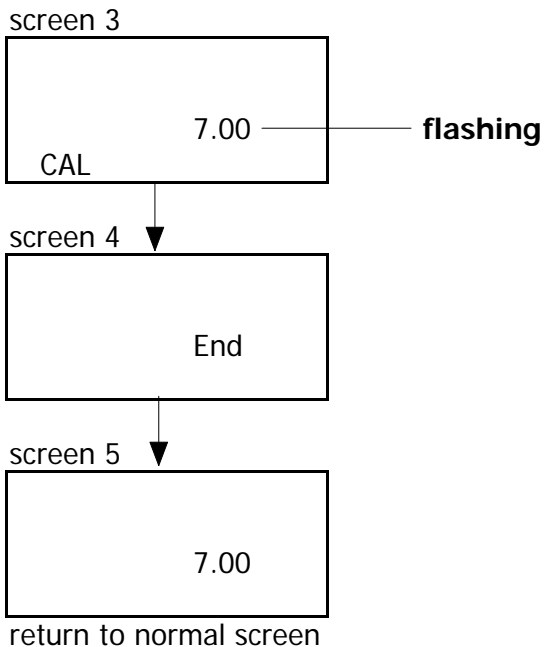
### ***4-3 Calibration procedures***

#### **pH 7 calibration**

- 1) Rinse the electrode in distilled water.
- 2) Power on the instrument by pressing the " Power button " ( 3-2, Fig. 1 ).
- 3) Press the " Hold button " ( 3-3, Fig. 1 ) once.  
the display will show the " HOLD " symbol.  
Press the " ▼ button " ( 3-4, Fig. 1 ) once, the display  
will show following screen in sequence.

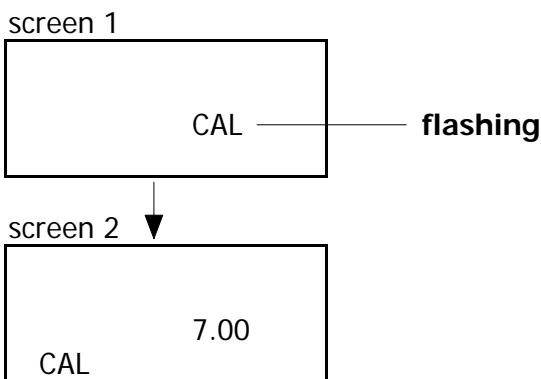


- 4) Place the electrode into pH 7.00 buffer solution ( PH-07A )  
Press the " Hold button " ( 3-3, Fig. 1 ) once.  
The " 7.00 " will flashing, following show " End ".  
then return the normal measurement screen and  
finish the pH 7.00 calibration procedures.

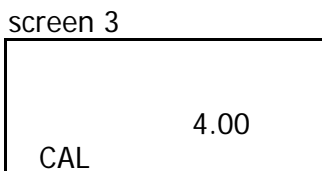


## **pH 4 calibration**

- 1) Rinse the electrode in distilled water.
- 2) Power on the instrument by pressing the " Power button " ( 3-2, Fig. 1 ).
- 3) Press the " Hold button " ( 3-3, Fig. 1 ) once. the display will show the " HOLD " symbol. Press the " ▼ button " ( 3-4, Fig. 1 ) once, the display will show following screen in sequence.

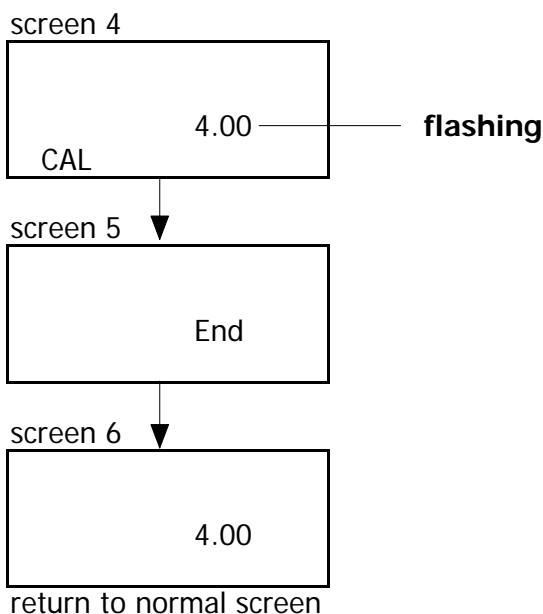


- 4) Press the " ▼ button " ( 3-4, Fig. 1 ) once, the display will show :





- 5) Place the electrode into pH 4.00 buffer solution ( PH-04A )  
Press the " Hold button " ( 3-3, Fig. 1 ) once.  
The " 4.00 " will flashing, following show " End ".  
then return the normal measurement screen and  
finish the pH 4.00 calibration procedures.



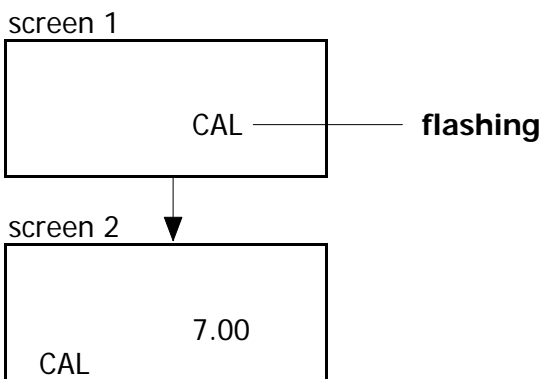
### **Calibration clear**

**During execute the calibration procedures, if happen some thing wrong ( Display show Error information ), then execute the following " Calibration clear " procedures will clear all the existing calibration data and return to the Default value.**

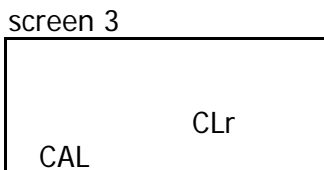
However after execute the " Calibration clear ". then make the calibration again. if the Display still show the " Err " ( error information ), then the " Standard solution " or the pH electrode " may existing problem.

The calibration procedures are :

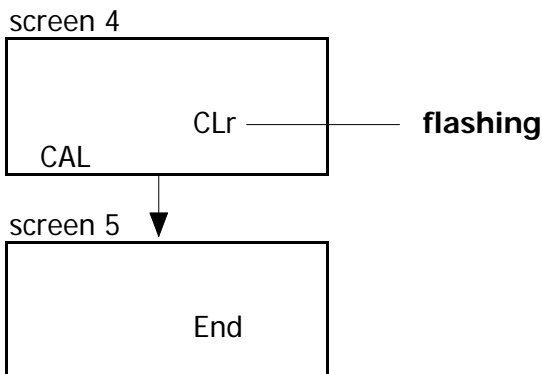
- 1) Power on the instrument by pressing the " Power button " ( 3-2, Fig. 1 ).
- 2) Press the " Hold button " ( 3-3, Fig. 1 ) once. the display will show the " HOLD " symbol. Press the " ▼ button " ( 3-4, Fig. 1 ) once, the display will show following screen in sequence.



- 3) Press the " ▼ button " ( 3-4, Fig. 1 ) once 3 times, the display will show :



- 5) Press the " Hold button " ( 3-3, Fig. 1 ) once.  
The " CLr " will flashing, following show " End ".  
then return the normal measurement screen and  
finish the " Calibration clear " procedures.



## 5. MEASURING PROCEDURE

After the meter along the pH electrode is calibrated ( section 4-3 ) , the unit is ready for measuring.

- 1) Connect the pH electrode plug ( 3-10, Fig. 1 ) to the BNC socket ( 3-5, Fig. 1 ) and place electrode into the measured solution.
- 2) Power on the meter by pressing the " Power button " ( 3-2, Fig. 1 ).
- 3) Place the electrode into the measured solution, then the instrument will display the pH value.
- 4) After make the measurement, please rinse the electrode in distilled water.

**\* After calibration, the " Electrode sensing head " ( 3-9, Fig. 1 ) should insert into the " Protection bottle " ( 3-11, Fig. 1 ).**

**\* PE-11, PH-07A, PH-04A is the consumer accessory.**

### **Data hold**

During the measurement, press the " Hold button " ( 3-3, Fig. 1 ) once will hold the measured value & the LCD will display a " HOLD " symbol.

*\* Press the " Hold Button " once again will release the data hold function.*

### **Display reverse**


During the measurement, press the " Display reverse button " ( 3-4, Fig. 1 ) once will reverse the display direction for the user convenience.

*\* Press the " Display reverse button " once again will return to the normal display.*

### **Auto power off**

The meter is built the " Auto power shut off " function to save battery life. If any function buttons are not pushed within 10 minutes, the power will be off automatically.

## **6. REPLACEMENT OF BATTERY**

- 1) When the LCD display show " , It is necessary to replace the battery. However, in-spec measurement may still be made for several hours after Low Battery Indicator appears before the instruments instrument become inaccurate.
- 2) To replace the battery, rotate and remove the " Battery Cover " ( 3-7, Fig. 1 ), take out the old batteries, install new batteries :  
**DC 1.5V battery ( UM-4/AAA ) x 4 PCs.**
- 3) When install the batteries, should make attention the battery polarity.

4) After install the batteries, reinstall the battery cover again.

## **7. OPTIONAL ACCESSORIES**

### **pH ELECTRODE**

**Model : PE-11**

General purpose & high quality pH electrode with BNC connector.

Range : 1 to 13 pH ( typical 0 to 14 pH ).

Epoxy body, Body size : 9.5 mm dia. x 120 mm.

Cable length : 1 meter.

### **pH ELECTRODE**

**Model : PE-03**

General purpose pH electrode with BNC connector.

Range : 1 to 13 pH ( typical 0 to 14 pH ).

Epoxy body, Body size : 12 mm dia. x 160 mm.

Cable length : 1 meter.

### **SPEAR TIP pH ELECTRODE**

**Model : PE-06HD, PE-04HD**

Spear tip pH electrode is ideal for penetration pH measurements into meats, cheese, soil and other types of measurements requiring sample penetration.

### **pH 7.00 buffer solution**

Model : PH-07A

### **pH 4.00 buffer solution**

Model : PH-04A

### **CARRYING CASE Model : CA-06**

Hard carrying case. ( 280 x195 x 65 mm ).

### **CARRYING CASE Model : CA-05A**

Vinyl soft case. ( 260 x110 x 55 mm ).