

# **Portable pH Meter**

## **User Manual**

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## 1 Introduction

Thank you very much for purchase of our company's high-quality pH meter, good ease of use, is our product's consistent pursuit.

### 1.1 Safety precautions

Operator protective measures



Do not work in an explosive environment! Because the instrument case is not airtight

(May cause an explosion hazard due to corrosion caused by spark formation or immersion in gas).



When using chemicals and solvents, follow the operator's operating instructions and laboratory safety procedures!

Operators operate safety precautions

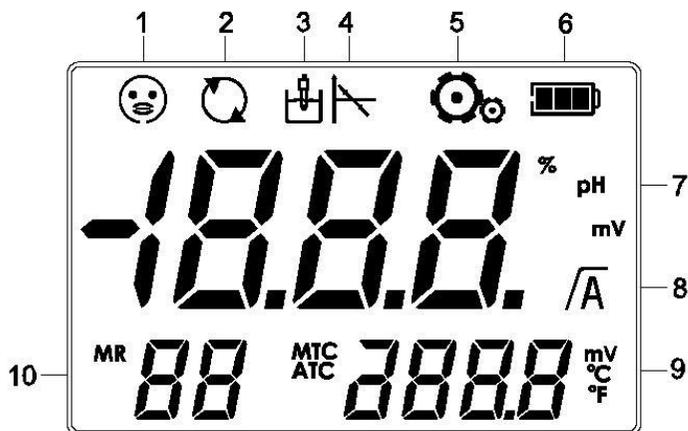


It is forbidden to separate the shell of the instrument, only allow the company to appoint a professional service personnel to repair the instrument!

Please avoid the following environmental factors:

1. Violent shaking
2. Under sunshine for long time
3. Atmospheric humidity more than 85%
4. The presence of corrosive gases
5. Ambient temperature below 5 ° C or higher than 40 ° C
6. Strong electric field or magnetic field

## 1.2 Display and button



1. Electrode status (electrode maintenance pls see 5.2)



Good



Normal



Bad

2. Continued boot icon

3. Electrode measurement icon

4. Electrode calibration icon

5. Parameter setting icon

6. Battery status icon

7. Electrode slope or pH/mV reading

8. Reading stable / automatic end point icon

9. The temperature in the measurement process / the reference temperature

during calibration / the zero calibration of the sensor calibration

10. Error index / calibration point / standard buffer solution

**Button description:**

<b>Button</b>	<b>Short Press</b>	<b>Long Press (3 seconds)</b>
 (Reading)	<ul style="list-style-type: none"><li>— Reading</li><li>— Confirm setting</li></ul>	<ul style="list-style-type: none"><li>— Set the end point</li></ul>
 (Calibration)	<ul style="list-style-type: none"><li>— Calibration</li></ul>	<ul style="list-style-type: none"><li>— Calibration data is echoed</li></ul>
 (ESC)	<ul style="list-style-type: none"><li>— ESC</li><li>— Turn on</li></ul>	<ul style="list-style-type: none"><li>— Turn off</li></ul>
 (Store)	<ul style="list-style-type: none"><li>— Measuring data storage</li><li>— Up key to select a value</li></ul>	<ul style="list-style-type: none"><li>— View storage data</li></ul>
 (Mode)	<ul style="list-style-type: none"><li>— Mode</li><li>— Down key to select a value</li></ul>	<ul style="list-style-type: none"><li>— Setting</li></ul>

## **2. Operation**

### **2.1 Calibration**

#### **2.1.1 Standard buffer solution groups**

The instrument can be calibrated for 1 point, 2 point or 3 points. During calibration, the meter automatically recognizes the pH of the standard buffer solution. The automatic temperature compensation procedure is solidified in the meter (see appendix).

The instrument has 8 sets of buffer solution (see appendix). The settings for the buffer solution group refer to 2.4.1.

#### **2.1.2 One point calibration**

##### **2.1.2.1 Calibration**

Place the sensor in the buffer and press the "Cal" button to start the calibration.

The calibration icon will be displayed. After the signal is stabilized, the instrument will automatically end according to the pre-selected end point or press the "Read" button.

##### **2.1.2.2 Store calibration result**

After measuring value stable, press "Read" button, meter will display zero point and slope, and automatically return to measurement interface.

#### **Note:**

When doing one point calibration, only zero point was adjusted. If sensor made multi points calibration before, it's slope will be reserved, otherwise the theory

slope (-59.16mV/pH) will be adopted. Press “Cal” for a long while, meter will display slope and zero point, and then return to measurement interface.

### **2.1.3 Two point calibration**

**First step** Press one point calibration according to 2.1.2.1.

(After the instrument's automatic end point or manual end point, do not press the "Read" key, otherwise it will return to the measurement state)

**Second step** Wash electrode with distilled water.

**Third step** Put electrode in the second buffer solution, and press “Cal” start the second point calibration.

After the signal is stabilized, the instrument will automatically end according to the preselected end point or press the "reading" key.

**Fourth step** Pls see 2.1.2.2

### **2.1.4 Three point calibration**

Process three point calibration according to 2.1.3.

#### **Note:**

It is recommended to use a temperature probe or an sensor with a built-in temperature sensor. If the MTC (manual temperature compensation) mode is used, all buffers and sample solutions should be kept at the same set temperature.

In order to ensure accurate pH readings, calibration should be performed periodically.

## 2.2 Sample measurement

Place the electrode in the sample solution and press the "Read" button to start the measurement, and the decimal point on the screen flashes. The automatic measurement end point (with the A icon display) is the default setting for the meter. When the result is stable, the decimal point is no longer flashing, and there is a  $\sqrt{A}$  display on the screen.

Press and hold the "Read" button to switch between automatic and manual measurement end mode. To manually measure an end point, press the "Read" key to display the value.

To view the mV value during the pH measurement, simply press the "Mode" button to execute the mV (ORP) measurement, according to the same steps as the pH measurement.

## 2.3 Temperature measurement

To improve accuracy, we recommend using a temperature probe or an electrode with a built-in temperature sensor. When using the temperature electrode, the screen displays the ATC symbol and the sample temperature.

**Note:** This meter only match with NTC30k temperature sensor.

## 2.4 Parameter setting

Press the "Mode" button to enter the parameter setting mode.

Press "Store" / "Mode" to select the parameters to be set;

Press "ESC" to exit the current setting mode and return to the previous mode;

Press "Read" to enter the corresponding parameter settings page, press "Store" / "Mode" to adjust the parameters.

#### 2.4.1 Standard buffer solution groups setting



Display "BUF", press "Read" enter into standard buffer solution setting mode.

Note: Please refer to Appendix 5.1 for a total of 8 groups of buffer sets.

Default: 1 (NIST)

#### 2.4.2 Manual temp-compensation setting



Display "MTC", press "Read" enter into manual temp-compensation setting mode.

Note: When the meter does not detect the temperature sensor, it will automatically switch to manual temperature compensation mode, and display MTC.

Default: 25 °C。

#### 2.4.3 Temperature unit setting

Display "TU", press "Read" enter into temperature unit setting mode. 

Default: °C。

#### 2.4.4 Prompt sound setting

Display "BUZ", press "Read" enter into prompt sound setting mode 

Default:ON (with sound prompt).

#### 2.4.5 Remove stored data

Display"MR CLr", press "Read" enter into remove the stored data mode. 

Display "Read" to confirm, display "MR nUL", indicates clear success, 

Automatically exit this setting; press "ESC" to exit this setting.

## 2.4.6 Automatic turn off setting

A continuous boot icon appears, press the "Read" to enter the automatic shutdown setting mode. 

OFF: Automatic turn off, in the absence of any key conditions, more than 10 minutes will automatically shut down

ON: Continued boot

Default: OFF

## 2.5 Restore factory setting

Press the "Read", "Cal" and "Esc" button long press until the instrument displays "rST"

The factory settings are successfully restored.

## 2.6 Data storage

### 2.6.1 Storage data reading

The instrument can store pH/mV of groups of measurement result. When the measurement is finished, press the "Store" button to store the data and store the information in the display location to indicate the current storage index.

If "M99" is displayed, press "Store" again, "FUL" will be displayed on the screen, indicating that the memory is full and you need to clear the memory. Please refer to 2.4.5 for operation.

Note: Each measurement data can only be stored once, and if stored again, the index does not increase

## **2.6.2 Storage data checking**

Under measurement mode, press “Store” for a while, then the stored data can be viewed from the memory. Press "Store" / "Mode" to scroll through the stored results. Press the "ESC" button to exit.

Note: Under pH measurement mode, only can check pH measuring result;

As same, under mV mode, only can check mV measuring result.



## 2.7 Error message

When an error occurs, the error code is displayed in the display area 8 (see 1.2).

Such as error code 2 (Err2). **E2**

Err1	Measuring value (pH/mV) exceed range pH: <-2.00 or >16.00 mV: <-1999 or >1999	Check that the electrode cap is removed and that the electrode is connected correctly and placed in the solution to be tested. If the instrument does not connect the electrode, insert the shorting plug into the socket.
Err2	Measuring temperature exceed range Cal: [ °C ] <5.0 or > 40.0 Measure: [ °C ] <-5.0 or >105.0	So that the temperature of the solution to be measured is kept within the specified range.
Err3	Electrode zero potential is exceed range  Offset  >60mV	Please make sure the buffer solution used is within the validity period. Clean or replace sensor.
Err4	Electrode slope exceed range Slope <70% or > 120%	Please make sure the buffer solution used is within the validity period. Clean or replace sensor.
Err5	Meter can't recognize the buffer solution  ΔEref  <10mV	Pls make sure the buffer solution used is within the validity period. Check whether the same buffer is reused during calibration.

## **3. Maintenance**

### **3.1 Meter maintenance**

It is forbidden to separate the housing of the instrument.

In addition to the occasional need to use a damp cloth to wipe, the instrument does not need to do other maintenance. The shell is made of plastic and is subject to erosion by some organic solvents such as toluene, xylene and butanone. If this is the case, immediately wipe the spill onto the shell of such solvents.

### **3.2 Electrode maintenance**

Ensure that the electrode are always stored in the appropriate storage solution. In order to obtain maximum accuracy, any filled or coagulated in the sensor outside the filling liquid are used to remove the distilled water in time. Always store the electrode according to the manufacturer's regulations and do not dry it. If the slope of the electrode drops rapidly, or if the corresponding speed is slow, the following steps can be used. According to different sample, try the following methods:

1. For grease, remove the dirt from the surface of the electrode with raw cotton dipped in acetone or soapy water.
2. If the sensor film is dry, immerse the electrode tip in 0.1M HCl solution and allow to stand overnight.
3. If protein is accumulated in the membrane, immerse the electrode in the HCl / pepsin solution to remove the deposit.

4. If the electrode is contaminated with silver sulfide, immerse the electrode in the thiourea solution to remove the deposit. After the electrode is processed, recalibrate.

Note: Dispose of the cleaning solution or fill solution according to the handling regulations for toxic or corrosive substances.

## 4 Technical indexes

Meter grade: 0.01 grade

Measuring range	pH	0-14pH
	mV	-1999...1999
	Temp	-5℃---105℃
Resolution	pH	0.01pH
	mV	1mV
	Temp	0.1℃
Electronic unit measurement error	pH	±0.01pH
	mV	±1mV
	Temp	±0.3℃
pH calibration	1 point, 2 point, or 3 point	
Isoelectric point	pH 7.00	
Buffer solution	8 groups	
Power supply	DC6V/20mA ; 4 x AA/LR6 1.5 V or NiMH 1.2 V and chargeable	
Size/Weight	230×100×35(mm)/0.4kg	
Display	LCD	
pH input	BNC, resistor >10e+12Ω	
Temp input	RCA(Cinch), NTC30kΩ	
Data storage	Calibration data; 198 groups measurement data (99 groups for pH、mV each)	
Working condition	Temp	5...40℃
	Relative humidity	5%...80%(without condensate)
	Installation grade	II
	Pollution grade	2
	Altitude	≤2000m

## 5 Standard buffer solution groups

### -1 USA ( NIST )

Temp ( °C )	pH value			
5	1.67	4.01	7.09	10.25
10	1.67	4.00	7.06	10.18
15	1.67	4.00	7.04	10.12
20	1.68	4.00	7.02	10.06
<b>25</b>	<b>1.68</b>	<b>4.01</b>	<b>7.00</b>	<b>10.01</b>
30	1.68	4.01	6.99	9.97
35	1.69	4.02	6.98	9.93
40	1.69	4.03	6.97	9.89
45	1.70	4.04	6.97	9.86
50	1.71	4.06	6.96	9.83

### -2 China ( JJG )

Temp ( °C )	pH value				
5	1.67	4.00	6.95	9.39	13.21
10	1.67	4.00	6.92	9.33	13.01
15	1.67	4.00	6.90	9.28	12.82
20	1.68	4.00	6.88	9.23	12.64
<b>25</b>	<b>1.68</b>	<b>4.00</b>	<b>6.86</b>	<b>9.18</b>	<b>12.46</b>
30	1.68	4.01	6.85	9.14	12.29
35	1.69	4.02	6.84	9.11	12.13
40	1.69	4.03	6.84	9.07	11.98
45	1.70	4.04	6.83	9.04	11.83
50	1.71	4.06	6.83	9.02	11.70

### -3 European

Temp ( °C )	pH value				
5	2.02	4.01	7.09	9.45	11.72
10	2.01	4.00	7.06	9.38	11.54
15	2.00	4.00	7.04	9.32	11.36
20	2.00	4.00	7.02	9.26	11.18
<b>25</b>	<b>2.00</b>	<b>4.01</b>	<b>7.00</b>	<b>9.21</b>	<b>11.00</b>
30	1.99	4.01	6.99	9.16	10.82
35	1.99	4.02	6.98	9.11	10.64
40	1.98	4.03	6.97	9.06	10.46
45	1.98	4.04	6.97	9.03	10.28
50	1.98	4.06	6.97	8.99	10.10

### -4 Japan ( JIS )

Temp ( °C )	pH value			
5	1.67	4.00	6.95	9.40
10	1.67	4.00	6.92	9.33
15	1.67	4.00	6.90	9.28
20	1.68	4.00	6.88	9.23
<b>25</b>	<b>1.68</b>	<b>4.01</b>	<b>6.87</b>	<b>9.18</b>
30	1.68	4.02	6.85	9.14
35	1.69	4.02	6.84	9.10
40	1.69	4.04	6.84	9.07
45	1.70	4.05	6.83	9.04
50	1.70	4.06	6.83	9.01

**-5 Merck**

Temp (°C)	pH vale				
5	2.01	4.04	7.07	9.16	12.41
10	2.01	4.02	7.05	9.11	12.26
15	2.00	4.01	7.02	9.05	12.10
<b>20</b>	<b>2.00</b>	<b>4.00</b>	<b>7.00</b>	<b>9.00</b>	<b>12.00</b>
25	2.00	4.01	6.98	8.95	11.88
30	2.00	4.01	6.98	8.91	11.72
35	2.00	4.01	6.96	8.88	11.67
40	2.00	4.01	6.95	8.85	11.54
45	2.00	4.01	6.95	8.82	11.44
50	2.00	4.00	6.95	8.79	11.33

**-6 DIN ( 19266 )**

Temp (°C)	pH value			
5	1.67	4.00	6.95	9.40
10	1.67	4.00	6.92	9.33
15	1.67	4.00	6.90	9.28
20	1.68	4.00	6.88	9.22
<b>25</b>	<b>1.68</b>	<b>4.01</b>	<b>6.86</b>	<b>9.18</b>
30	1.68	4.02	6.85	9.14
35	1.69	4.02	6.84	9.10
40	1.69	4.04	6.84	9.07
45	1.70	4.05	6.83	9.04
50	1.71	4.06	6.83	9.01

**-7 DIN (19267)**

Temp (°C)	pH value				
5	1.08	4.67	6.87	9.43	13.63
10	1.09	4.67	6.84	9.37	13.37
15	1.09	4.66	6.82	9.32	13.16
20	1.09	4.66	6.80	9.27	12.96
<b>25</b>	<b>1.09</b>	<b>4.65</b>	<b>6.79</b>	<b>9.23</b>	<b>12.75</b>
30	1.10	4.65	6.78	9.18	12.61
35	1.10	4.65	6.77	9.13	12.45
40	1.10	4.66	6.76	9.09	12.29
45	1.10	4.67	6.76	9.04	12.09
50	1.11	4.68	6.76	9.00	11.98

**-8 Technical**

Temp (°C)	pH value			
5	2.02	4.01	7.09	10.65
10	2.01	4.00	7.06	10.39
15	2.00	4.00	7.04	10.26
20	2.00	4.00	7.02	10.13
<b>25</b>	<b>2.00</b>	<b>4.01</b>	<b>7.00</b>	<b>10.00</b>
30	1.99	4.02	6.99	9.87
35	1.99	4.02	6.98	9.74
40	1.98	4.03	6.97	9.61
45	1.98	4.04	6.97	9.48
50	1.98	4.06	6.97	9.35