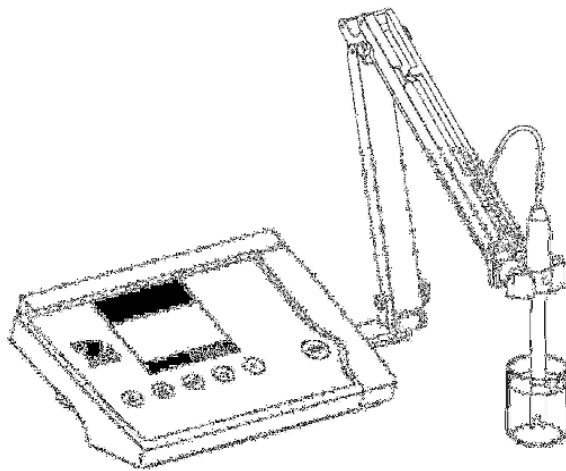




沪制 01040072 号

# Starter 2C Lab pH Meter

## Operation Manual



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## 1. Introduction

We thank you for having purchased OHAUS Starter 2C lab pH meter.

Before using the instrument, please note that the operation instructions should be read carefully, which will help you to operate and maintain the instrument, as well as to avoid trouble caused by unsuitable operation and maintenance.

Starter 2C pH meter employs leading edge technology with integrated microprocessor, which is suitable for pH and mV measurement in water solutions for institutes, industrial labs and production fields.

The information presented in this manual is subject to change without notice as improvements are made.

## 2 . Technical Data

2.1 Instrument can be used under following condition:

- a. Environment temperature: 5~40°C;
- b. Relative humidity: ≤85%;
- c. Sample temperature: 0~60°C;
- d. Power supply: DC9V power adapter

2.2 Main parameters

2.2.1 Measurement arrange: pH : 0.00~14.00 pH; mV : ±1600 mV

2.2.2 Measurement precision: pH: ≤0.05pH; mV: ≤1%FS

2.2.3 Resolution: 0.01pH、1mV

2.2.4 Input impedance :  $\geq 5 \times 10^{11} \Omega$

2.2.5 Input current:  $\leq 5 \times 10^{-11} \text{A}$ ;

2.2.6 Stability: ≤0.03pH/2hour

2.2.7 pH temperature compensation range: 0~60°C

2.2.7 Enclosure dimension: 195×150×60mm

2.2.8 Power: ≤5W

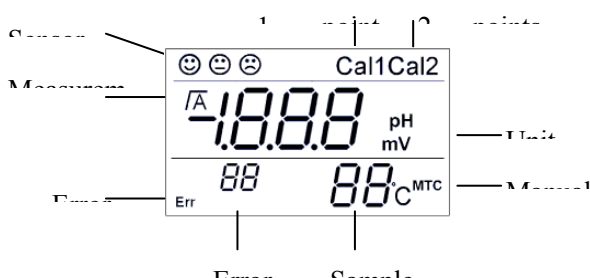
2.2.9 Weight: 0.55kg

## 3. Installation of accessories

The electrode holder can be put at any side of the instrument according to your need.

Plug the pH combination electrode and DC9V power adaptor into relative socket. As soon as you have connected the DC9V power adaptor to AC power, the instrument is in hold mode.

## 4.LCDdisplay



In above picture:

**Sensor diagnostics icon:** After pH sensor calibration, the instrument will display sensor performance:

☺ : sensor is in good performance;

☹ : sensor performance is so so ;

☹ : sensor is in bad performance, need to be changed

### 1 point calibration icon:




“Cal1” flashes, remind you the first point calibration will be started, please immerse pH sensor into first pH standard buffer (any one buffer from pH4、pH6.86、 pH9.18)。


“Cal1” displays, instrument is in process of pH 1 point calibration.

## 2 points calibration icon:

“Cal2” flashes, remind you the first point calibration is finished and the second point calibration will be started. Please immerse the pH sensor into second buffer (any one buffer from pH4、pH6.86、pH9.18 except the one has already used for first point calibration)。

“Cal2” displays, instrument is in process of pH 2 points calibration.


**Measurement status icon:** 2 icons to show measurement status: 、  
 : when display this icon, the measurement value is in stable status, but the instrument still goes on measurement.

 : when display this icon, the measurement value is in stable poising status, the value will be kept(auto ending point function)

**Error icon and error code:** the instrument has self diagnostics function, when problems occurs during operation, the instrument will display relative tips for error signal and code, to remind you.

## 5. Operation key

The instrument has 6 operation keys, as follows:

: **Power key.** When switch off the instrument, but the power adaptor has not plugged from the AC220V socket, the instrument is in hold mode.

**pH/mV: Function key.** To be used to switch between measurement functions (pH measurement function/mV measurement function)。

**Cal: Calibration key.** To be used to pH sensor calibration.

**∧ : Temperature set key (increase)** .To set the temperature value of the sample during pH measurement and calibration.

**∨ : Temperature set key (decrease)** .To set the temperature value of the sample during pH measurement and calibration.

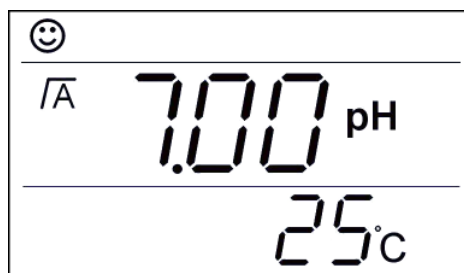
**Read: Measurement key.** This is a combination key. Press the key <1.5s, the instrument in measurement mode. (short key)。 Press the key ≥1.5s, the instrument will set the auto ending point function or cancel the action (long key) .

## 6. Measurement

### 6.1 pH measurement

**Remarks: Before first time using the pH sensor, the pH sensor should be calibrated.**

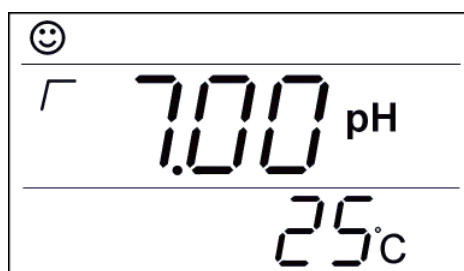
Under pH measurement mode, immerse the sensor into the sample after rinsing with distilled water, shaking the vessel few minutes, press“ $\wedge$ ”、“ $\vee$ ”to enter the temperature of the sample solution, if the instrument has been set to



auto ending function, must press “**Read**” key (short key), when the LCD display“ $\sqrt{A}$ ”auto ending function icon, the instrument will block the measurement value, the value could be read. Left chart shows the display of pH

measurement with auto ending function.

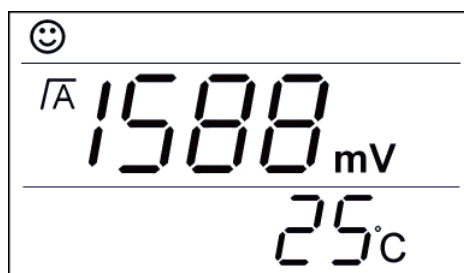
Under pH measurement mode, immerse the sensor into the sample after rinsing with distilled water, shaking the vessel few minutes, press“ $\wedge$ ”、“ $\vee$ ”key



to enter the temperature of sample solution, if the instrument has not been set to auto ending function, LCD will display “ $\sqrt{\quad}$ ”icon if the measurement is stable, the measurement value could be read. Left chart shows the display of pH measurement without auto ending function.

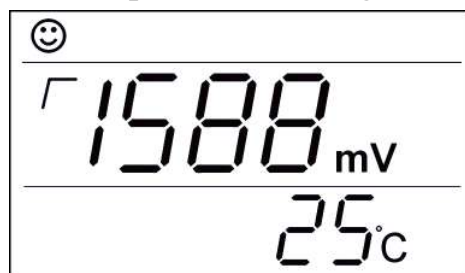
### 6.2 mV measurement

Under electrode potential mV measurement mode, immerse the sensor into the sample after rinsing with distilled water, shaking the vessel few minutes, press“ $\wedge$ ”、“ $\vee$ ”to enter the temperature of the sample solution, if the instrument has been set to auto ending function, must press “**Read**” key (short key), when



the LCD display“ $\sqrt{A}$ ”auto ending function icon, the instrument will block the measurement value, the value could be read. Left chart shows the display of mV measurement with auto ending function.

Under electrode potential mV measurement mode, immerse the sensor into the sample after rinsing with distilled water, shaking the vessel few minutes,



press“ $\wedge$ ”、“ $\vee$ ”key to enter the temperature of sample solution, if the instrument has not been set to auto ending function, LCD will display “ $\sqrt{\quad}$ ”icon if the measurement is stable, the measurement value could be read. Left chart

shows the display of mV measurement without auto ending function.

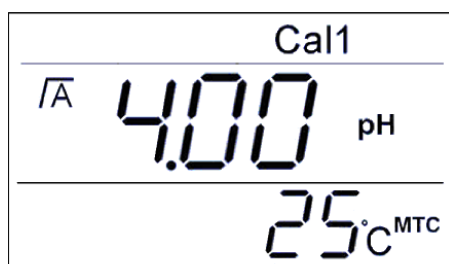
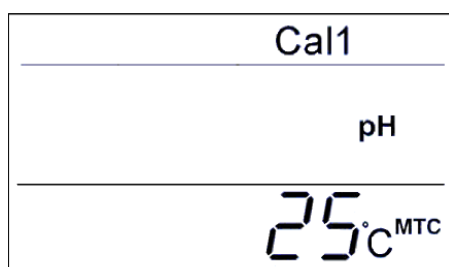
### 6.3 Set measurement ending point judgment status

The instrument has 2 statuses of measurement ending point judgment (display“ $\sqrt{\quad}$ ”or “ $\sqrt{\bar{\quad}}$ ”icon), under the measurement mode, (pH or mV measurement), press <Read> long key to change the status.

When the measurement is in balance status, “ $\sqrt{\bar{\quad}}$ ”displays, the instrument will keep this value, the measurement is end; when the measurement is in stable status, “ $\sqrt{\quad}$ ” displays, the measurement value could be recorded, and the measurement is continuing, according to the balance stability, to be sure if display “ $\sqrt{\quad}$ ” or not.

## 7 pH sensor calibration

### 1 point calibration



Under the pH measurement mode, press “ $\wedge$ ”、“ $\vee$ ”key to enter the temperature value of buffer solution, (e.g.pH4), press “Cal”, LCD displays as left chart, “Cal1”flashes, immerse the electrode into standard buffer solution, shaking the vessel for few minutes, wait for second, press “Cal”, the instrument will recognize which buffer solution is it, display as well, wait the instrument judge pH sensor response to ending point, display as chart left, 1 point calibration is accomplished, the display as

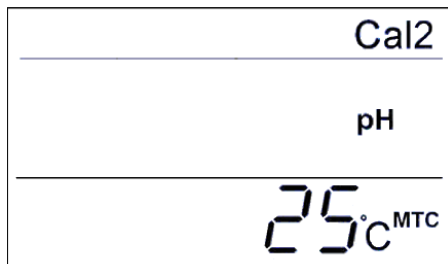


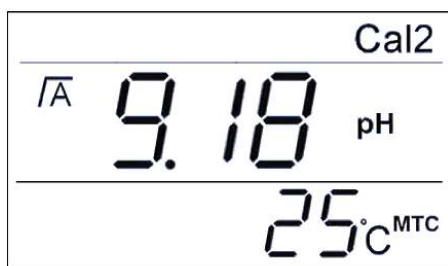
chart left , “Cal2”flashes , the instrument reminds you 1 point calibration is finished, do you want to proceed 2 points calibration? If only 1 point calibration needed, press “Read” to exit calibration process, switch to pH measurement

mode. If the 2 points calibration is needed, the next chapter should be followed by the operator.

**Remarks: After 1 point calibration, only the zero potential of the sensor is modified (Offset), the slope of the pH sensor is kept from last calibration. Even to those electrodes which have good performances, 0.05pH measurement error could be reached during measurement.**

### 2 points calibration

After 1 point calibration, LCD displays as above chart (“Cal2”flashes),



immerse the electrode into standard buffer solution, shaking the vessel for few minutes, wait for second, press “Cal”, the instrument will recognize which buffer solution is it, display as well, wait the instrument judge pH

sensor response to ending point, the instrument displays as above chart, 2 points calibration has been accomplished, automatically enter the pH measurement mode, the sensor performance icon after calibration is also displayed.

## 8. Maintenance of the instrument

The performance of the instrument, is not only rely on the self construction of the instrument, but also on good maintenance . Especially for pH meter, which high impedance is needed, and corrosive chemical agents is sometimes contaminated, therefore, necessary maintenance is a must. The electrode plug should always keep high cleaning and dry. In order to protect the electrode from broken, please do not collide the head of the electrode with hard materials, since it is very thin. Please refer to the instruction manual of the electrode for the storage, cleaning and maintenance of the electrode.

Please do not contact the central part of the BNC electrode plug by hand or metal, the static electronic will destroy the electronic part of the instrument and contaminate the input terminal of the electrode, decrease the input impedance of the instrument.

Please do not use agent to clean the enclosure of the instrument. The enclosure of the instrument is ABS engineering plastics.

The pH value of the sample solution should be between the pH buffer solutions you selected. If the temperature of the buffer solution during calibration is same as the temperature of the sample, the highest resolution will be reached by the instrument. Temperature compensation function in the instrument is only affected the compensation of the sample temperature changes according to pH sensor.

## **9. Self diagnostics**

The instrument has self diagnostics function, during operation, relative information will be reminded by the instrument, to solve problems during usage:

**Err 1:** pH measurement value over range.  $\text{pH} \leq -0.50$ 、 $\text{pH} \geq 14.50$ . Please check if the sensor has been connected to the instrument. Using the pH buffer solution to calibrate the sensor, checking the performance of the sensor.

**Err 2:** mV measurement value over range.  $\text{mV} \leq -1700$ 、 $\text{mV} \geq 1700$ . Please check if the sensor has been connected to the instrument.

**Err 3:** pH sensor zero point over range after calibration.  $\text{Offset} \leq -80$ 、 $\text{Offset} \geq 80$ . Please check if the buffer solutions are in good quality. Recalibrate the sensor. If the error occurs, please change the pH sensor.

**Err 4:** pH sensor slope over range.  $\text{Slop} \leq 80\%$ 、 $\text{Slop} \geq 110\%$ . Please check if the buffer solutions are in good quality. Recalibrate the sensor. If the error occurs, please change the pH sensor.

**Err 5:** Electrode potential during calibration  $\geq 240\text{mV}$ . Please check if the buffer solutions are in good quality. Recalibrate the sensor. If the error occurs, please change the pH sensor.

**Err 6:** Electrode potential during calibration  $\leq -240\text{mV}$ . Please check if the

buffer solutions are in good quality. Recalibrate the sensor. If the error occurs, please change the pH sensor.

## 10. Warranty period

The warranty period of electronic components is 2 years from the date of purchase, under the condition of normal storage, operation and transportation, improper working of the instrument due to quality problems, the instrument will be repaired and the spare parts will be changed for customers with supplying of the sales invoice and product inspection certificate.

### Appendix 1 Checking method of pH linear error

Input 177.48mV(pH4.00 buffer solution electrode potential simulate value)、-128.97mV(pH9.18 buffer solution electrode potential simulate value) into the instrument, temperature compensation sent to 25°C, operate according to 2 points calibration; after calibration the instrument displays “😊”signal。

Check the linear error of the instrument according to following table.

mV	414.11	354.95	295.80	236.64	177.48	118.32	59.16	0
pH	0.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00
mV	-414.11	-354.95	-295.80	-236.64	-177.48	-118.32	-59.16	
pH	14.00	13.00	12.00	11.00	10.00	9.00	8.00	

### Appendix 2 Relationship between pH value and temperature of buffer solution

Temp. °C	pH4.00	pH6.86	pH9.18
0	4.01	6.98	9.46
5	4.00	6.95	9.39
10	4.00	6.92	9.33
15	4.00	6.90	9.28
20	4.00	6.88	9.23

<b>25</b>	<b>4.00</b>	<b>6.86</b>	<b>9.18</b>
30	4.01	6.85	9.14
35	4.02	6.84	9.10
40	4.03	6.84	9.07
45	4.04	6.83	9.04
50	4.06	6.83	9.02
55	4.07	6.83	8.99
60	4.09	6.84	8.97

Ohaus Instruments (Shanghai) Co., Ltd.

Address : 6F,7 Block, 471 Guiping Rd, Shanghai,

P.R. China,200233

Tel: 021-64855408

Fax: 021-64859748

<http://www.ohaus.com.cn>

E-mail: [ohauservice@ohaus.com](mailto:ohauservice@ohaus.com)

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