

KDM-110 Online PH Meter

User Manual



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1. Introduction

This product is a new-generation intelligent water quality detector independently developed by our company. It features Chinese menu operation, high stability, excellent repeatability and multiple functions, and can accurately measure the pH value and temperature value in solutions. It is widely used for the online detection of pH values in solutions in fields such as environmental protection, sewage treatment, thermal power generation, aquaculture, food processing, printing, metallurgy, pharmacy, fermentation, chemical industry and tap water.

2. Technical Parameters

Measuring range	0.00~14PH
Resolution	0.01PH,1mV,0.1℃
Accuracy	±0.02PH, ±1mV, ±0.3℃
Stability	≤0.01 PH/ 24h
Standard liquid	6.86/4.00/9.18, 7.00/4.00/10.01
Temperature compensation	0~99.9℃(PH)
PH calibration range	0±1.45PH; slope ±30%
Control interface	two group of ON/OFF relay contacts are divided into upper and lower limit alarm control.
Signal isolation output	4~20mA isolation protection output
Relay	the relay hysteresis is arbitrarily set, relay load 3A 220VAC
Working conditions	Ambient temperature is 0~60℃, relative humidity ≤90%
Input impedance	≥1×10 ¹² Ω
Output load	<750Ω(4-20mA)
Working voltage	220VAC ±10%, 50/60hz or DC24V and DC110V
Dimensions	96×96×115 mm
Hole-cutting Size	92×92mm
Weight	0.9Kg
Protection level	IP65

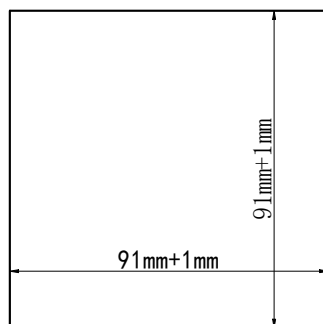
3. Features

- Waterproof, dustproof, moisture-proof (IP57), high-end design look.
- High precision, high stability and preferable antijamming ability.
- Large screen LCD display, support chinese menu (switching from each other). Multi-parameter simultaneous display.
- Automatic temperature compensation function, manual adjustment of PH and temperature value.
- Communicate function: RS-485 communication interface with photoelectric isolation (optional), convertible RS-232. The PH value corresponding 4-20mA current output can be arbitrarily set, And can control 4-20 mA positive and negative. It is widely used in automatic addition of reagent. And it also support to connect IoT of company and customize IoT for customer.
- Optional with the company's host computer online acquisition software for data acquisition and processing.
- Note book: It can store 50 PH measurement datas, users can record measurement data as needed.
- Automatic identification of standard solution and capable for factory reset.
- Watchdog function: make sure the meter doesn't crash.
- Power off protects > 10 years.

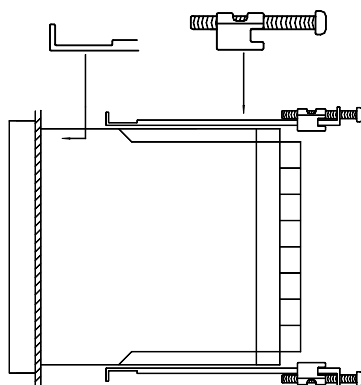
4. Instrument Installation

4.1 Installation of Main Unit

(1) Make a rectangular cutout on the instrument cabinet or mounting panel.



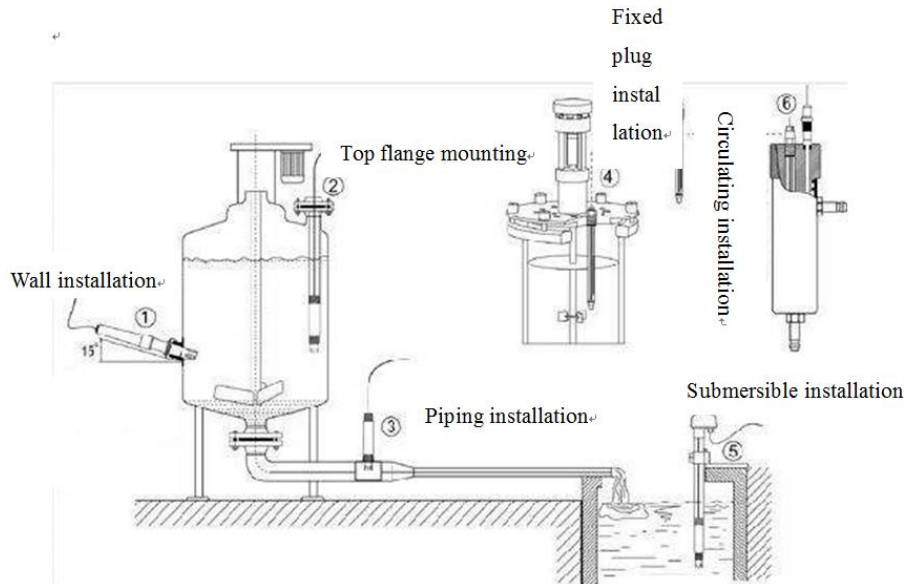
(2) Insert the meter into the instrument cabinet and tighten the locking bar.



4.2 Electrode Installation

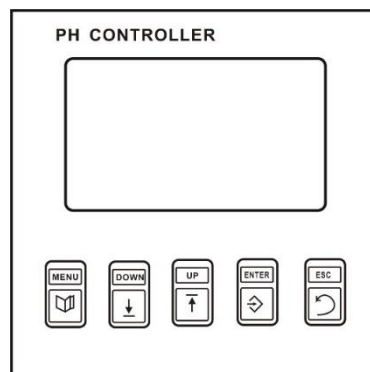
Do not put the electrode directly into the water. Installing the electrode into a bracket or flow cup. Before installation, please make sure to use the PTFE tape (3/4 thread) to do the waterproof sealing work to avoid water entering the electrode and then causing short circuit of the PH electrode cable.

Diagram of installation mode



5. Instrument Panel and Wiring Instructions

The buttons of front side



1. Menu: cyclic model
2. Down: numerical reduction
3. UP: numerical increase
4. ENTER: confirmation
5. ESC: escape key

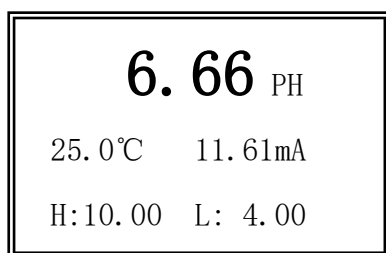
Wiring instruction for the rear panel

1.NO: Normal opening relay of upper limit	9. INPUT: measuring electrode (white transparent wire)
2.COM: relay's common terminal of upper limit	10. REF: reference electrode (black wire).
3.NC: Normal closing of Upper limit	11. TEMP: (other color wire)
4.NO: Normal opening relay of lower limit	12. TEMP: (other color wire)
5.COM: relay's common terminal of lower limit	13. RS485 A
6.NC: Normal closing of lower limit	14. RS485 B
7.L: 220V Live line(DC 24V+)	15. 4-20mA+
8.N:220V Zero line(DC0V-)	16. 4-20mA-

Note: If need RS - 232 communication interface, please select the appropriate RS - 485 to RS-232 device. The RS-485 interface is compatible with MODBUS protocol. Please consult the manufacturer or dealer for details.

6. Instrument Function Setting

6.1 Main menu



PH value is the main display, temperature value, current value, upper limit and lower limit alarm setting value are the secondary display. The middle value is the current measured value, 25.0 °C is the current temperature value, 11.61mA is the current 4-20mA signal output value of the meter, H: 10.00 is the high point alarm value, and L: 4.00 is the low point alarm value.

6.2 The PH calibration

Due to the special use environment, such as blockage of dirt in solution, slow corrosion of strong acid or alkali, and adhesion of microorganisms in water, the water quality measuring instrument may affect the stability and accuracy of the instrument detection value. In addition, the parameters of the electrodes may not be completely consistent due to different electrodes, or the parameters may change after the electrodes are used for a period of time. For accurate measurements, the electrodes need to be cleaned regularly and calibrated.

The instrument has two sets of standard liquid (6.86/4.00/9.18 and 7.00/4.00/10.01) automatic identification function, the instrument is in the (6.86/4.01/9.18) standard liquid group identification state when the factory leaves, so please select the component for the calibration time. Standard solution (Prepare the PH standard solution according to the instructions on the pH buffer package). See the description below for the selection method.

The instrument should clean the electrode with distilled water first, then prepare the standard solution (do not use tap water in the calibration buffer, it may not be calibrated), and prepare the distilled water used for cleaning the electrode during the calibration process.

6.2.1 Zero calibration

Put the cleaned PH electrode into the pH 6.86 standard solution, gently stir a few times, and wait until the meter shows stability. Press the MENU button to enter the zero calibration menu as shown below.

ZERO DEMARCRATE	
PH:	6.86
SLAR:	6.86 √

The value after the PH is the current measurement data, and the value after the standard solution is the actual PH value of the standard solution. When the selected standard is correct, "√" will be displayed in the lower right corner of the screen, indicating that it can be calibrated. After pressing ENTER, the measurement data will be displayed stably. 6.86 indicates that the zero calibration of the instrument is completed. When the selected standard is not suitable, "x" will be displayed, indicating that it cannot be calibrated if it is wrong, and the ENTER key is blocked. This automatic identification standard function can effectively prevent misoperation and inaccurate calibration.

6.2.2 Slope calibration

Press the MENU key to enter the slope calibration MENU, as shown below:

SLOPE DEMARCRATE	
PH:	4.16
SLAR:	4.00 √

Remove the pH electrode from the standard solution pH 6.86, clean it and blot it with filter paper, then place the electrode in the standard solution pH 4.00 (the meter automatically recognizes the standard solution, if the standard solution is alkaline, it shows 9.18), gently Stir a few times and wait for the instrument to display a stable value. "√" will be displayed in the lower right corner of the screen, indicating that it can be calibrated. After pressing ENTER, the measurement data will be stable. 4.00 (or 9.18) indicates that the meter slope calibration is completed. Press the MENU button to enter the correction settings menu.

6.3 Mode Setting

PH mode:

MODE SET
PH/ORP Set: PH
Cal Set: 6.86

Press ENTER to pop up the cursor, move the cursor, press DOWN key, UP key to modify the setting, and move the cursor until the mode is saved successfully. The PH mode conversion has been set when the instrument is shipped from the factory, and usually does not need to be modified (PH mode conversion, to restore the factory settings). The table also sets the selection 6.86 to indicate the standard selection of the standard selection (6.86/4.00/9.18). 7.00 indicates the standard solution of the calibration selection (7.00/4.00/10.01). Press the MENU button to enter the alarm setting menu 4.

6.4 Alarm Setting

PH mode:

ALARM SET
High: 10.00
Low: 4.00
LiD: 0.50

Press ENTER to pop up the cursor, move the cursor, press DOWN key, UP key to adjust the number, and move the cursor until the data is saved and the data will be saved. High point H: high alarm setting, low point L: low alarm setting. Hysteresis D: hysteresis setting.

Note: the D value is set within the range of zero to (high H value - low L value). In order to avoid the relay from fluctuation or controlling the pH value of the solution, the instrument sets this data adjustment.

Upper limit relay: It will be activated when the actual measured value is higher than the high alarm set value HIGH value, and the actual measured value will fall again below (high point H value - hysteresis D value).

Lower limit relay: It will be operated when the actual measured value is lower than the low alarm setting value LOW value, and the actual measured value will rise again when it rises above (low point L value + hysteresis D value). Useful to extend the life of the relay or AC contactor. Therefore, the user must set the high, low and hysteresis according to the actual situation. Press the MENU button to enter the 485 communication setup menu.

6.5 485 Communication Setting

485 COM
ADD: 01

Press ENTER to pop up the cursor, press DOWN key, UP key to adjust the communication address (hexadecimal), and then press ENTER to prompt the setting to take effect after saving successfully. The data corresponding to the address is the slave number of the meter in the RS485 communication system. (Note: Please consult the manufacturer or distributor for specific protocol specifications)

6.6 Current Output Setting

PH mode:

4-20mA SET
4 mA: 0
20 mA: 14

The factory value of the 4-20mA output corresponds to a PH value of 0-144PH, respectively, but the user can arbitrarily set the corresponding value according to his own requirements to meet the industrial control needs. Press ENTER to pop up the cursor, move the cursor, press DOWN key, UP key to adjust the number, and move the cursor until the data is saved after the prompt is saved.

4-20mA positive and negative control: When the corresponding value of 4mA is less than 20mA, it is forward control, and the 4-20mA output value of the instrument increases with the PH detection value; when the corresponding value of 4mA is greater than 20mA, the value is reversed. To control, the 4-20mA output value of the meter decreases as the PH detection value increases. Press the MENU button to enter the backlight setting menu.

Note: output current (mA)

Forward control: $I = 16 \times (C - A) / (B - A) + 4$ $4\text{mA} \leq I \leq 20\text{mA}$

Reverse control: $I = 16 \times (C - B) / (A - B) + 4$ $4\text{mA} \geq I \geq 20\text{mA}$

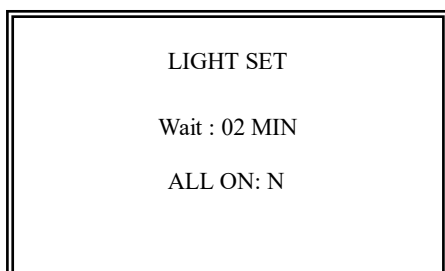
I is the output current value.

C: is the current measured PH value of the meter, $0.00 \leq C \leq 14.00$.

A is the value corresponding to 4 mA in the setting.

B is the value corresponding to 20 mA in the setting.

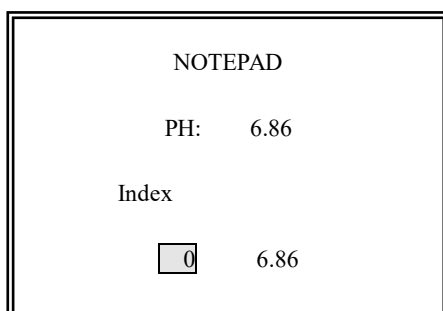
6.7 Backlight Setting



Press ENTER to pop up the cursor, move the cursor, press DOWN key, UP key to adjust the number, and move the cursor until the data is saved and the data will be saved. The data corresponding to the standby is the bright time. If you change the constant light to yes, the screen time stays on. Press MENU to enter notepad.

6.8 Notepad

PH mode:



Notepad provides measurement data required by the user for storage. PH mode can store 50 groups of data respectively. The value after the PH is the current measurement data, the value 0 of below index is index number, the value on the right is the data stored in the index address. Press UP to view the next data, and press DOWN to view the previous data. Press ENTER to store the current data in the storage space pointed to by the index. Press the MENU button to go to the next menu.

7. Temperature Compensation Setting

The meter is an automatic temperature compensation method. If temperature compensation is required, use a temperature compensation electrode. The temperature compensation resistor is platinum resistance PT1000. It needs to be calibrated with the instrument at the factory. Please contact the manufacturer for the specific process. The automatic temperature compensation range is 0~99.9°C. After calibration, the meter can be used normally and the meter will automatically recognize it. The meter has no temperature compensation by default, the display is 25°C.

8. Reference Table of PH value of Standard Buffer Solution

TEMP/°C	4.00	4.01	6.86	7.00	9.18	10.01
0	4.00	4.00	6.98	7.12	9.46	10.32
5	4.00	4.00	6.95	7.09	9.39	10.25
10	4.00	4.00	6.92	7.06	9.33	10.18
15	4.00	4.00	6.90	7.04	9.28	10.12
20	4.00	4.00	6.88	7.02	9.23	10.06
25	4.00	4.01	6.86	7.00	9.18	10.01
30	4.01	4.02	6.85	6.99	9.14	9.97
35	4.02	4.02	6.84	6.98	9.17	9.93
40	4.03	4.04	6.84	6.97	9.07	9.89
45	4.04	4.05	6.83	6.97	9.04	9.86
50	4.06	4.06	6.83	6.97	9.02	9.83

The actual reading value and standard of the instrument sometimes have ± 1 word error.

9. Electrode Maintenance

- When measuring the electrode, it should be cleaned in distilled water (or deionized water) first, and the filter paper should be used to absorb moisture to prevent impurities from being introduced into the liquid to be tested. 1/3 of the electrode should be inserted into the solution to be tested.
- The electrode should be washed when not in use, inserted into a protective cover with 3.5 mol of potassium chloride solution, or inserted into a container filled with 3.5 mol of potassium chloride solution.
- Check the terminal for dryness. If there is dirt, wipe it with absolute alcohol and dry it.
- Avoid long-term immersion in distilled water or protein solution and prevent contact with silicone grease.
- Electrodes that have been used for a long times, the glass film may become translucent or with deposits, which can be washed with dilute hydrochloric acid and rinsed with water.
- The electrode is used for a long time, and when a measurement error occurs, it must be calibrated with the meter. Make corrections.
- When the calibration and measurement cannot be performed while maintaining and maintaining the electrode in the above manner, the electrode has failed. Please replace the electrode.

10. Quality assurance

The company provides local after-sales guarantee within one year from the date of sale, but does not include damage caused by improper use. If repair or adjustment is required, please return it, the freight must be paid by yourself, and the package must be confirmed to avoid shipping. Damaged on the way, the company will repair the damage inside the instrument free of charge. (Note: Electrodes and standard solutions are consumables and are not covered by the warranty. The company will guarantee the quality of the electrodes when they are delivered.)