

RK500-12 PH Sensor



Revision Time	Reviser	Current Version	Remarks
20250421	SUN	V5.0	

User Notice

Please read this manual carefully before use to ensure safe and optimal operation. Retain this manual for future reference.

Pre-Use Instructions

- Carefully review this manual and follow all operational and safety guidelines to prevent malfunctions and hazards.
- Check that the packaging is intact and verify the product model matches the selected specifications.

Unpacking Inspection

- Upon receipt, carefully inspect the sensor device and accessories for any shipping damage.
- If damage is detected:
- Immediately notify the manufacturer and distributor.
- Retain all packaging materials for return or replacement processing.

Parts List

Item	Quantity	Remarks
PH sensor	1	
Cable	1	The length depends on the order
Bracket	1	Optional

1. Product Introduction

RK500-12 pH sensor is a good solution to measure the pH value. It does not require a professional calibration instrument and is simple to operate. It can be used to continuously measure the pH value of wastewater. It is suitable for agriculture, sewage treatment plants, chemical industry, printing and dyeing, papermaking, pharmaceuticals, Electroplating and environmental protection.

2. Product Features

- On-line & real-time monitoring
- Solid dielectric and PTFE liquid junction, not easy jam, maintenance free
- High accuracy
- Simple operation and high reliability
- Internal signal isolation, strong anti-interference
- Widely power supply(7-30VDC)
- Probe can be used under water (IP68)
- Submerged mounting bracket is optional

3. PH Scale

PH value	Description	PH value	Description
<4.5	Strongly acidity	7.5-8.5	Faintly alkalinity
4.5-5.5	Acidity	8.5-9.5	Alkalinity
5.5-6.5	Faintly acidity	>9.5	Strongly alkalinity
6.5-7.5	Neutral		

4. Specifications

Type					
	A1	A2	B1	B2	B3
Material	PC+ABS	Glass+PC+ABS	PC+ABS	Glass+ABS	Glass+316L
Operation Temperature	0-60℃	0-80℃	0-60℃	0-80℃	0-100℃
Working Pressure	0.6Mpa	0.8Mpa	0.6Mpa	1Mpa	1Mpa
Thread	/	/	PG13.5	PG13.5	PG13.5
Electrical Connection	Direct cable	Direct cable	M8 waterproof connector	M8 waterproof connector	M8 waterproof connector
Application	Conventional water, sewage, nutrient solution, etc	Industrial water, seawater, environmental protection, etc	Conventional water, sewage, nutrient solution, etc	Industrial water, seawater, environmental protection, etc	High temperature occasions, etc
Range	0-14				
Resolution	0.01				
Accuracy	0.01				
Response Time	10 seconds (98% flowing liquid)				
Temperature Compensation	Thermal resistance				
Power Supply	7-28VDC (<0.15w)				
Output	RS485 & 4-20mA				
Ingress Protection	IP68				

Type						
	C1	C2	C3	D1	D2	D3
Material	Glass+PC+ABS	Glass+PC+ABS	Glass+PPS	Glass+PC+ABS	Glass+PC+ABS	Glass+PPS
Operation Temperature	0-60℃	0-80℃	0-100℃	0-60℃	0-80℃	0-100℃
Working Pressure	0.6Mpa	1Mpa	1Mpa	0.6Mpa	1Mpa	1Mpa
Response Time	10 seconds (98% flowing liquid)	10 seconds (98% flowing liquid)	10 seconds (98% flowing liquid)	10 seconds (98% flowing liquid)	8 seconds (98% flowing liquid)	8 seconds (98% flowing liquid)
Electrical Connection	Direct cable	Direct cable	Direct cable	M16 waterproof connector	M16 waterproof connector	M16 waterproof connector
Application	Conventional water, river water, etc	Industrial water, seawater, environmental protection, etc	High temperature occasions, etc	Conventional water, river water, etc	Industrial water, seawater, environmental protection, etc	High temperature occasions, etc
Thread	Upper: NPT3/4 thread,lower: NPT3/4 thread					
Range	0-14					
Resolution	0.01					
Accuracy	0.01					
Temperature Compensation	Thermal resistance					
Power Supply	7-28VDC (<0.15w)					
Output	RS485 & 4-20mA					
Ingress Protection	IP68					

4.1 Accessories and Sheath

M8 waterproof connector for B1,B2,B3



M8 female 5 pin

M16 waterproof connector for D1,D2,D3



M16 female 5 pin

Sheath(316L) for B1,B2,B3



N34

Internal thread: PG13.5
External thread: NPT3/4



G34

Internal thread: PG13.5
External thread: G3/4



K50

Internal thread: PG13.5
50.5 chuck installation

5. Electrical Connection

Connector(Cable)	RS485/Current
Red	V+
Black	V-
Yellow	RS485A
Green	RS485B
White	Signal+

6. Output Types & Formulas

Current Type	$PH=(I-4)/(20-4)*14$
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I: Transmitter output current in mA;

7. Communication Protocol (MODBUS-RTU)

Parameter	Value
Data Bits	8 bits
Check Bit	None
Stop Bit	1 bit
Baud Rate	9600 bps
Slave Address	0x03 (Factory Default)

7.1 Read Real-time Data

Client sends:

03 03 00 00 00 06 C42A

Return:

03 03 0C 40 E0 51 EC C0 89 99 9A 41 C9 47 AE AECE

7.1.1 Description of Return Data Format

No.	Conception	Byte Number	Description	Remarks
1	Address block	1	Address(0x03)	0x03
2	Function code	1	Only read(0x03)	0x03
3	Number of bytes	1	0X0C	12bytes
4	Data block	4	PH (Floating point)	0x40E051EC(7.01)
5	Data block	4	Internal data	0xC089999A
6	Data block	4	Temperature(Floating point)	0X41C947AE(25.16℃)
7	Check block	2		0xAE 0xCE

7.2 Modify Slave Address

Client sends:(Change slave address from 03H to 01H.)

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x03	0x06	0x00	0x14	0x00	0x01	0x09	0xEC

Response:

Slave id	Function code	Address_H	Address_L	New id_H	New id_L	CRC_L	CRC_H
0x03	0x06	0x00	0x14	0x00	0x01	0x09	0xEC

8. Test and Calibration Instructions

During the testing and calibration process, place the electrode in the corresponding standard solution, shake it gently, and perform the calibration operation after the data has stabilized.

8.1 Product Calibration

The product currently supports two calibration methods:

8.1.1. Calibration via our host computer software – please contact our sales team to obtain the software.

8.1.2. Calibration via RS485 protocol.

8.2 Fixed Liquid Calibration(for pH4.00,7.00,10.00)

Use function code 06 to write the command to register address 0x55 to complete the calibration operation. You can perform one-point, two-point, or three-point calibration. For higher accuracy, two-point or three-point calibration is recommended. (Calibration is only supported at pH 4.00, 7.00, and 10.00). Place the sensor into a known standard solution. After the data stabilizes, send the value of the standard solution to the sensor via the RS485 protocol. Then place the sensor into different solutions and repeat the above operations. When this is done, the sensor calibration is complete.

Calibration Point	Calibration Value	Send Command(Hex)
pH4.00	Fixed	03 06 00 55 00 04 99 FB
pH7.00	Fixed	03 06 00 55 00 07 D9 FA
pH10.00	Fixed	03 06 00 55 00 0A 18 3F

Note: If the return command matches the sent command, it indicates that the calibration is successful.

8.3 One-Click Calibration

When it is inconvenient to disassemble the sensor after installation, and there is a difference between the known pH value of the liquid in the current environment and the actual reading of the sensor, the one-click calibration method can be used. At this time, the calibration value of the sensor needs to be converted into a positive floating-point number in IEEE 754 standard. Examples are as follows.

Client sends:(Use the one-click calibration function to set the current value to pH4.46,the calibration value is a positive floating-point number.)

Slave id	Function code	Address_H	Address_L	Reg Num		Bytes	Calibration Value	CRC_L	CRC_H
0x03	0x10	0x00	0x50	0x00	0x02	04	408EB852	0x7B	0x3D

Note:If the return command matches the sent command, it indicates that the calibration is successful.

9. Installation Guidelines

- Installed in areas with smooth liquid flow to avoid bubble accumulation affecting measurement (such as pump outlet or locations with strong stirring).
- Tilt or install vertically (with the electrode facing downwards) to prevent bubbles from adhering to the surface of the glass film.
- The electrode must be completely immersed in the liquid, and the interface between the glass film and the reference liquid must be covered.

9.1 Installation Method

Probe Submersible Installation:Directly into the liquid,adopt submersible mounting bracket.



Figure 9.1.1 Mounting Bracket(Length=1m)

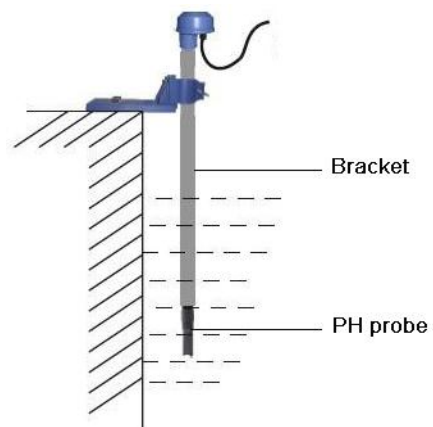


Figure 9.1.2 Probe Submersible Installation

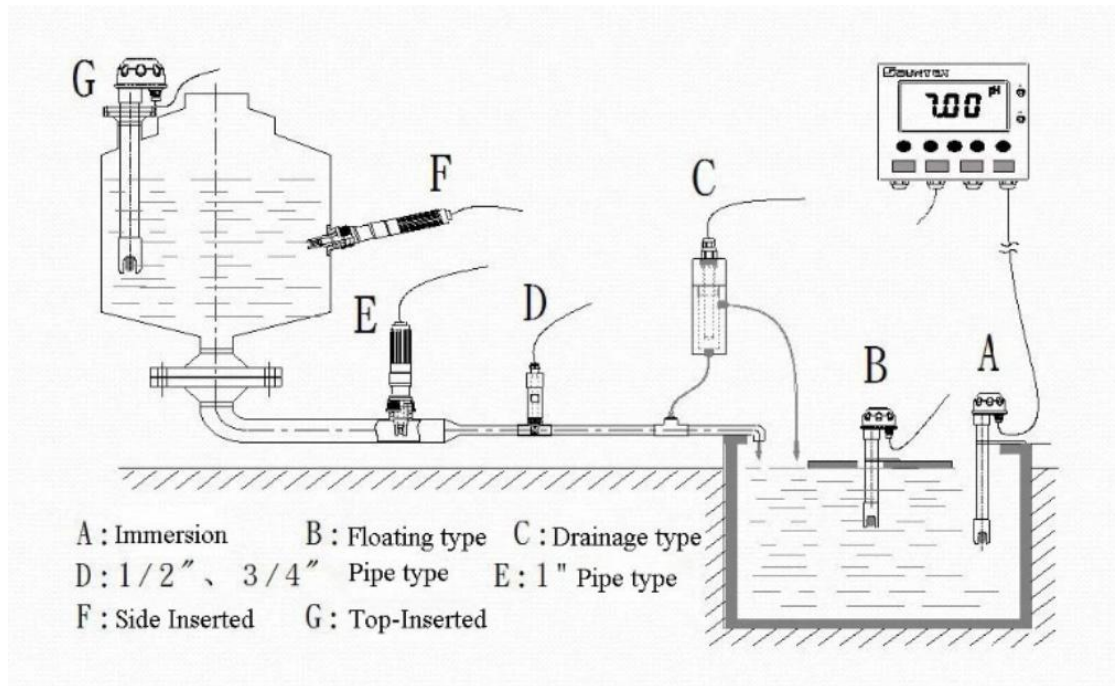


Figure 9.1.3 Typical Installation Method

10.Precautions

Powered Wiring Prohibition

- Do not connect wires while powered. Only energize the sensor after confirming correct wiring.

Component Modification Restriction

- Do not alter factory-soldered components or pre-connected wires.

Precision Handling Requirement

The sensor is a precision device. Avoid:

- Unauthorized disassembly
- Do not touch internal components to prevent product damage

Note: Unauthorized modifications void the warranty.

11.Troubleshooting

Incorrect Output Signals (Analog/RS232/RS485):

- Verify wiring correctness and secure connections.
- Check if the serial port is occupied or malfunctioning.
- Confirm serial port settings (baud rate, data/stop bits) match device requirements.

Persistent Issues:

- Contact the manufacturer if the above steps fail to resolve the problem.

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12.Product Maintenance

Maintenance and Safety

- Clean the electrode with tap water every 3 months or 6 months according to the working environment.
- Do not expose the sensor to extreme temperatures, moisture, or corrosive substances unless explicitly specified.
- The sensitive glass film of the pH electrode should be kept moist. When not in use for a long time, it should be soaked in 3M KCl solution or electrode specific storage solution.
- Do not immerse the electrode in distilled or deionized water, including deionized tap water.
- If the pH electrode is contaminated with inorganic substances, it can be cleaned with 0.1mol/l HCL or NaOH solution for a few minutes and then washed with distilled water.
- If the pH electrode is contaminated with organic substances, it can be cleaned with alcohol or acetone and then cleaned with distilled water.
- Unauthorized disassembly, modification, or repairs may void the warranty and lead to malfunctions.

Troubleshooting Protocol

- In case of malfunction, refer to the troubleshooting section of this manual.
- Do not attempt unauthorized disassembly or repairs.
- Contact the manufacturer's after-sales department directly for technical support.

13.Warranty Terms

This product comes with a one-year warranty, starting from the date of delivery. Within twelve months, the Company shall be responsible for free repair or replacement of any failure caused by sensor quality issues (non-human damage). Fees will be charged for repairs or replacements after the warranty period expires.

 Complies with applicable CE directives.

Manual subject to change without notice.

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