

# **iPH-306 Online PH Sensor**

## **User Manual**



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base No. 15

## User Notes

- Before use please read this description, and save it for reference.
- Please follow this manual procedures and precautions.
- Upon receipt of the instrument, carefully open the package, whether viewing instruments and accessories due to shipping damage, if any damage is found, immediately notify the manufacturers and distributors, and retain the packaging material for return processing.
- When the instrument malfunction, do not repair itself, please contact the manufacturer directly for service.

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## I .Application environment description

For environmental monitoring of water quality, acid / base / salt solution, a chemical reaction process, industrial processes, it is possible to meet the requirements of most industrial applications online pH measurement.

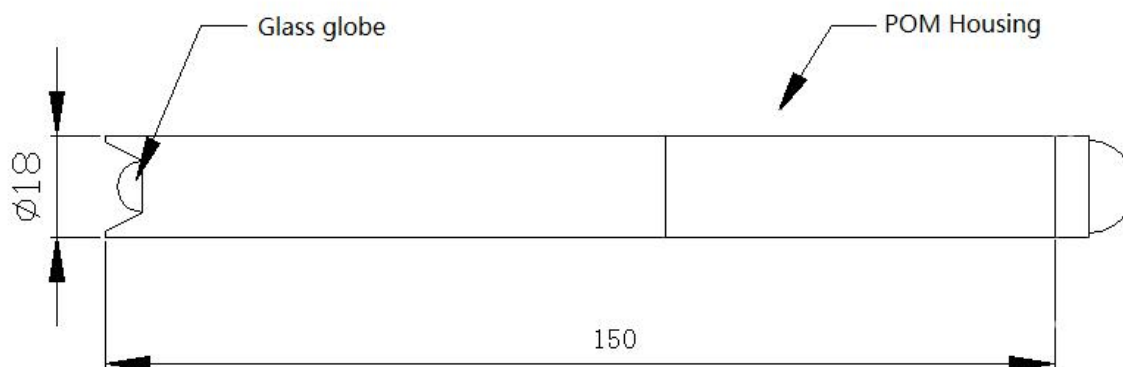
- Signal output: RS-485 (Modbus / RTU protocol).
- Easy connection to a third-party equipment PLC, DCS, industrial control computer, universal controller, paperless recording instruments and a touch panel.
- Dual high impedance differential amplifier, interference is strong, fast response.
- Patent pH probe, an internal reference at a pressure of at least 100KPa (1Bar), the extremely slow bleed fluid from the micropores than the salt bridge, the forward bleeding continued for 20 months. Such reference system is very stable, doubled to extend electrode life than ordinary industrial electrodes.
- Easy installation:Submerged installation .
- IP68 protection class.

## II .Technical performance and specifications

### 1. Technical parameter

<b>Model</b>	iPH-306
<b>Measuring range</b>	0 ~ 14pH
<b>Resolution</b>	0.01pH, 0.1°C
<b>Accuracy</b>	±0.1pH, ±0.5°C
<b>Operating temperature</b>	0 ~ 65 °C
<b>Working pressure</b>	<0.2MPa
<b>Temperature compensation</b>	Automatic temperature compensation (NTC)
<b>Power supply</b>	12 ~ 24VDC
<b>Signal output</b>	RS-485 (Modbus / RTU)
<b>Wetted</b>	POM
<b>Installation</b>	Immersion installation
<b>Cable length</b>	5 meters,Other lengths can be customized
<b>Calibration methods</b>	Two-point calibration
<b>Power</b>	0.1W@12V
<b>Protection class</b>	IP68

## 1. Dimensions



## III. Installation and electrical connection

### 1. Installation

Sensors should not be installed upside down or horizontally. Tilt at least 15 degrees when installing.

### 2. Electrical connections

The cable is 4 - core double - stranded shielding wire, the line order definition:

- a) Red line - the power supply line (12~ 24VDC)
- b) Black line - ground (GND)
- c) Blue line -485A
- d) White line -485B

After completing the wiring, should be carefully examined to avoid incorrect connection before applying power.

Cable specification: Considering that the cable is immersed in water (including sea water) for a long time or exposed to the air, all the wiring points are required to do waterproof treatment, the user cable should have certain corrosion resistance.

## IV. Care and maintenance

### 1. Use and maintenance

a) When measuring the pH sensor, should be washed in distilled water (or deionized water) and clean, dry filter paper and washed with water to prevent impurities into the test solution, the sensor is immersed in the liquid to be 1/3.

b) When not cleaning the sensor, plus a protective sleeve is inserted into 3.5mol / L potassium chloride solution, or added to the sensor into a container 3.5mol / L KCl solution.

c) Check whether the terminal at the drying and, if contaminated, wipe with ethanol, drying after use. Avoid long-term immersion in distilled water or protein solution, and to prevent contact with the silicone oil. Use a longer time of the sensor, it may become translucent glass film or with sediments, then washed with diluted hydro chloric acid, and washed with water. When sensors for a long time, measurement error, with the instruments to be calibrated, is corrected.

d) When the sensor is maintenance and upkeep in the above manner can not be calibrated and measured, indicating that the sensor has lose efficacy, please replace the sensor.

**Standard buffer pH Comparison Chart**

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

## 2. Calibration

**Note:** Sensor has been calibrated at the factory, if not exceeding the measurement error, the calibration should not be random.

### 1) Zero calibration

Graduated cylinder extracted with 250mL of distilled water, poured into a beaker, added to pH = 6.86 of a calibrated powder packet, stir with a glass rod until the powder was completely dissolved, the solution pH = 6.86 is disposed, the sensor in solution, wait 3 to 5 minutes, until a stable value to see if the displayed number is 6.86, if need not zero calibration, calibration instructions refer to Appendix.

### 2) Slope calibration

a) When the acidic solution: Take a graduated cylinder with 250mL of distilled water, poured into a beaker, added to pH = 4.00 of a calibrated powder packet, stir with a glass rod until the powder was completely dissolved, the solution is configured to pH = 4.00; the sensor into solution, waiting for 3 to 5 minutes, until a stable value to see whether the value is 4.00, if the slope is not need for calibration, the calibration instructions refer to Appendix.

b)When the alkaline solution: a graduated cylinder extracted with 250mL of distilled water, poured into a beaker, added to pH = 9.18 of a calibrated powder packet, stir with a glass rod until the powder was completely dissolved, the solution is configured to pH = 9.18; discharge sensor into the solution, wait 3 to 5 minutes, until a stable value to see whether it is displayed after 9.18, if the

slope is not need for calibration, the calibration instructions refer to Appendix.

## V. Quality and Service

### 1. Quality assurance

- Quality inspection departments have standardized inspection procedures, with advanced detection equipment and instruments, and in strict accordance with the test procedures for products that do 72 hours aging test, stability test, not a substandard products factory.

- Ship direct return on the failure rate of 2% of the batches of products, all costs borne by the supplier. Consider the standard reference product descriptions provided by the supplier.

- Ensure supply quantity and delivery speed.

### 2. Accessories and Spare Parts

This product includes:

- Sensor\* 1
- Calibration powder package\* 3
- Manual\* 1
- Certificate\* 1

### 3. Service commitment

The company provides sales starting from the date of this machine after-sales service within one year, but does not include damage caused by improper use, if necessary repairs or adjustments, please return, but the freight to be conceited, to be determined to avoid a return of good packaging when shipping damaged in transit, the company will damage the free repair of the instrument.

## Appendix data communication

### 1. Data Format

Modbus communication default data format: 9600, n, 8,1 (9600bps baud, 1 start bit, 8 data bits, no parity, 1 stop bit).

Baud rate and other parameters can be customized.

### 2. Information frame format

a) Read data instruction frame

06	03	xx	xx	xx	xx	xx	xx
Address	FC	Register start address		Number of registers		CRC check code (low bytes in front)	

b) Read data response frame

06	03	xx	xx	xx	xx
Address	FC	Number of bytes	Response data	CRC check code (low bytes in front)	

c) Write data instruction frame

06	06	xx	xx	xx	xx
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Address	FC	Register address	Read-in data	CRC check code (low bytes in front)
d) Data response frame				
06	06	xx xx	xx xx	xx xx
Address	FC	Register address	Read-in data	CRC check code (low bytes in front)

### 3. Register Address

Register Address	Name	Explanation	Register number	interview method
40001 (0x0000)	Measured value +Temperature	4-byte integers, respectively, the measured value, the measured value of decimal places, the temperature value, the temperature value of decimal places.	4 (8 bytes)	Read
44097 (0x1000)	Zero calibration	In the standard solution of pH 6.86 in the calibration, the write data is 0.	1 (2 bytes)	Write/Read
44099 (0x1002)	Slope calibration (4pH)	In the standard solution of pH 4.00 in the calibration, the write data is 0.	1 (2 bytes)	Write
44101 (0x1004)	Slope calibration (9.18pH)	In the standard solution of pH 9.18 in the calibration, the write data is 0.	1 (2 bytes)	Write/Read
44113 (0x1010)	Temperature Calibration	In the calibration solution, the actual temperature value of the write data X10; read data to the offset temperature calibration x10.	1 (2 bytes)	Write/Read
48195 (0x2002)	Sensor address	The default is 6, the write data range 1-127.	1 (2 bytes)	Write/Read
48225 (0x2020)	Reset Sensor	Restore Defaults calibration value, the write data is 0. Note: resetting the sensor to be calibrated again	1 (2 bytes)	Write



before use.

## 4. Command Example

### a) Read data command

Action: Get pH and temperature measurement probe; pH units is pH and temperatures is °C.

Request frame: 06 03 00 00 00 04 45 BE;

Response frame: 06 03 08 00 62 00,02,01,01,00,01,24,59

Reading example:

pH value	Temperature value
00 62 00 02	01 01 00 01

pH: 00 62 Hexadecimal reading of pH value, 00 02 represents the pH value with decimal value is converted to decimal 0.98.

Temperature: 01 01 temperature readings, 00 01 represents a temperature value with a decimal, the decimal value is converted into 25.7.

### b) Calibration instructions:

#### Zero calibration

Effect: the zero calibration value of the pH electrode set, to zero point value for the calibration standard 6.86pH standard solution, the following reference examples;

Request frame: 06 06 10 00 00 00 8C BD

Response frame: 06 06 10 00 00 00 8C BD

#### Slope calibration

Action: pH value of the slope of the calibration set of electrodes; calibration slope divided into high and low calibration, the alkaline solution is measured at the high point calibration; measured in an acidic solution is low calibration standard solution respectively, where a high point 9.18pH, Low standard solution 4.00pH To calibrate a reference, for example:

#### High standards 9.18pH calibration:

Request frame: 06 06 10 04 00 00 CD 7C

Response frame: 06 06 10 04 00 00 CD 7C

#### Low standards 4.00pH calibration:

Request frame: 06 06 10 02 00 00 2D 7D

Response frame: 06 06 10 02 00 00 2D 7D

### c) Set Device ID Address:

Effect: the electrode on MODBUS device address;

The device address 06 Changed 01, Like this

Request frame: 06 06 20 02 00 01 E3 BD

Response frame: 06 06 20 02 00 01 E3 BD

## 5. Error response

If the sensor can not execute PC commands correctly, the format information is returned as follows:

Definition	Address	Function code	Code	CRC check
Data	ADDR	COM + 80H	xx	CRC 16
Number of bytes	1	1	1	2

- a) CODE: 01 - Function code error  
           03 - Data error
- b) COM: Function code received