

KWS-750 Online pH Sensor

Introduction

KWS-750 online pH sensor is used in environmental water quality monitoring, acid/alkali/salt solution, chemical reaction process, industrial production process, it can meet the requirements of online pH measurement for most industrial applications.



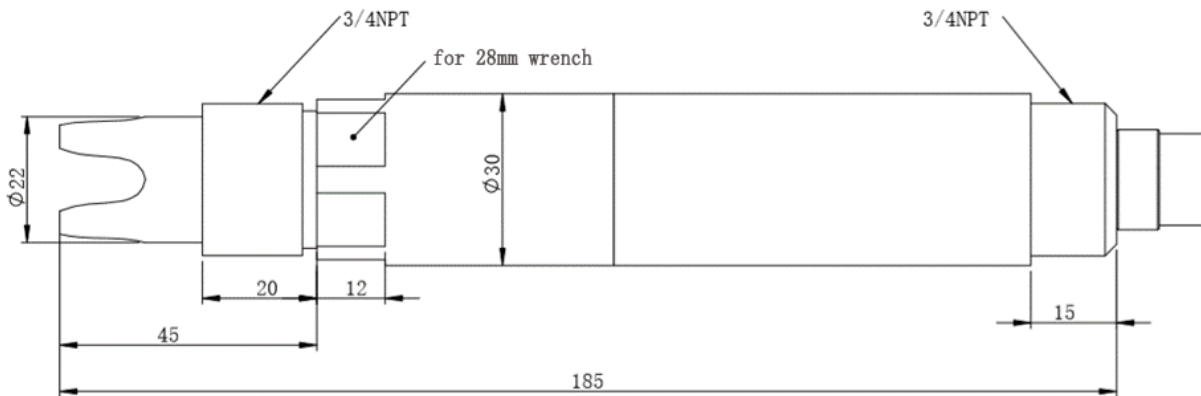
Feature

- Signal output: RS-485 (Modbus/RTU protocol).
- Convenient connection to third-party equipment such as PLC, DCS, industrial control computer, general controller, paperless recording instrument or touch screen.
- Double high-impedance differential amplifier with strong anti-interference and fast response.
- The patented pH probe, the internal reference solution oozes very slowly from the microporous salt bridge under the pressure of at least 100KPa (1Bar), and its forward bleed continues for more than 20 months. Such a reference system is very stable and the electrode life is extended by a factor of two compared to conventional industrial electrodes.
- Easy to install: 3/4 NPT pipe thread for easy submersible installation or installation in pipes and tanks.

Technical Specifications

Model	KWS-750
Measuring Range	0~14pH
Accuracy	±0.1pH
Resolution	0.01pH
Temperature Range	0 ~ 65°C
Work Pressure	<0.2MPa
Temperature Compensation	automatic temperature compensation
Output	RS-485, MODBUS protocol
Power Supply	12~24VDC ±10%
Wetted Part Material	POM
Installation	Immersion mounting, 3/4 NPT thread
Cable Length	5 m, customizable
Calibration Method	Two-point calibration
Power Consumption	<0.3W@12V
Ip Grade	IP68

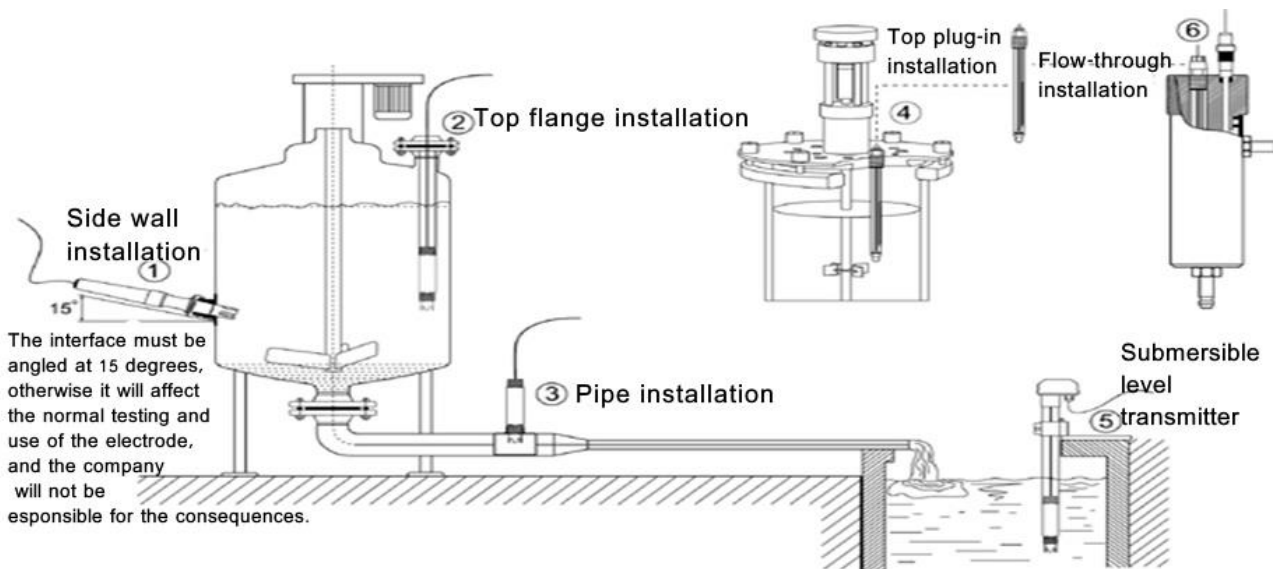
Dimension



The sensor connector is M16-5 core waterproof male connector.

Installation and Electrical Connection

Installation



Note: The sensor should not be installed upside down or horizontally when installed, at least at an angle of 15 degrees or more.

Wiring

- Red line - power cord (12 ~ 24V)
- Black line - ground (GND)
- Blue line - 485A
- White line - 485B
- Bare wire - shielded wire

After wiring is completed, it should be carefully checked to avoid incorrect connections before powering up.

Cable specification: Considering that the cable is immersed in water (including sea water) for a long time or exposed to the air, the cable has certain corrosion resistance. The outer diameter of the cable is $\Phi 6$ mm and all interfaces are waterproof.

Maintenance

Use and maintenance

When measuring the pH sensor, it should be cleaned in distilled water (or deionized water), 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 sensor should be inserted into the solution to be tested.

The sensor should be washed when not in use, inserted into a protective sleeve with a 3.5 mol/L potassium chloride solution, or the sensor inserted into a container with a 3.5 mol/L potassium chloride solution.

Check if the terminal is dry. If it is stained, wipe it with absolute alcohol and dry it. Avoid long-term immersion in distilled water or protein solution and prevent contact with silicone grease. With a longer sensor, its glass film may become translucent or with deposits, which can be washed with dilute hydrochloric acid and rinsed with water. The sensor is used for a long time. When a measurement error occurs, it must be calibrated with the meter for calibration.

When the calibration and measurement cannot be performed while the sensor is being maintained and maintained in the above manner, the sensor has failed. Please replace the sensor.

Standard Buffer Ph Reference Table

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 and standard of the instrument sometimes have an error of ± 1 digit.

Calibration

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

a) Zero calibration

Use 250 mL of distilled water in a measuring cylinder, pour into a beaker, add a packet of calibration powder with pH=6.86, stir evenly with a glass rod until the powder is completely dissolved, configure the solution with pH=6.86, put the sensor into the solution, wait for 3 ~ 5 minutes, after the value is stable, see if the displayed value is 6.86. If not, you need to perform zero calibration. Refer to the appendix for calibration instructions.

b) Slope calibration

For acidic solution: Take 250 mL of distilled water in a measuring cylinder, pour into a beaker, add a packet of calibration powder with pH=4.00, stir evenly with a glass rod until the powder is completely dissolved, and configure the solution to pH=4.00; In the solution, wait for 3 to 5 minutes. After the value is stable, see if the value is 4.00. If not, the slope calibration is required. Refer to the appendix for the calibration instructions.

For alkaline solution: Take 250 mL of distilled water in a measuring cylinder, pour into a beaker, add a packet of calibration powder with pH=9.18, stir evenly with a glass rod until the powder is completely dissolved, and configure the solution to pH=9.18; Into the solution, wait for 3 to 5 minutes. After the value is stable, see if the display is 9.18. If not, the slope calibration is required. Refer to the appendix for the calibration instructions.

Quality and service

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 asubstandard products factory.
- The receiving party directly returns the product batch with a failure rate of 2%, and all the costs incurred are borne by the supplier. The reference standard refers to the product description provided by the supplier.
- Guarantee the quantity of goods and the speed of shipment.

Service commitment

The company provides local after-sales service 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, but the shipping cost must be conceited. Damaged on the way, the company will repair the damage of the instrument for free.

Appendix data communication

1. Data Format

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

Parameters such as baud rate can be customized.

2. Information Frame Format

a) Read data instruction frame

06	03	xx xx	xx xx	xx xx
Address	Function code	Register address	Number of registers	CRC check code (low byte first)

b) Read data response frame

06	03	xx	xx..... xx	xx xx
Address	Function code	Bytes	Answer data	CRC check code (low byte first)

c) Write data instruction frame

06	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code (low byte first)

d) Write data response frame (same data command frame)

06	06	xx xx	xx xx	xx xx
Address	Function code	Register address	Write data	CRC check code (low byte first)

3. Register Address

Register Address	Name	Description	Number Of Registers	Interview Method
40001 (0x0000)	Measured value +temperature	4 double-byte integers, which are the measured value, the measured number of decimal places, the temperature value, and the decimal value of the temperature value.	4 (8 bytes)	read
44097 (0x1000)	Zero calibration	Calibrated in a standard solution with a pH of 6.86, writing data to 0	1 (2 bytes)	write
44099 (0x1002)	Slope calibration (4pH)	Calibrated in a standard solution with a pH of 4.00, writing data to 0	1 (2 bytes)	write

44101 (0x1004)	Slope calibration (9.18pH)	Calibrated in a standard solution with a pH of 9.18, writing data to	1 (2 bytes)	write
44103 (0x1006)	Zero calibration value	The data is read out as a zero offset.	1 (2 bytes)	read
44105 (0x1008)	Slope calibration value	The read data is the slope value x1000 .	1 (2 bytes)	read
44113 (0x1010)	Temperature calibration	Calibrated in solution, the data written is the actual temperature value x10 ; the read data is the temperature calibration offset x10 .	1 (2 bytes)	Write /read
48195 (0x2002)	Sensor address	The default is 6 and the data range is 1-127 .	1 (2 bytes)	Write /read
48225 (0x2020)	Reset sensor	The calibration value is restored to the default value and the write data is 0. Note: the sensor needs to be calibrated again after resetting.	1 (2 bytes)	write

Note:

- a) Modbus register address according to the protocol defined with the register type register start address (16 hex represents the actual starting address register in parentheses).
- b) When changing the sensor address, the sensor address in the return command is the changed new address.
- c) The data definition that returns the measured value when reading data:

xx xx	xx xx	xx xx	Xx xx
2- byte measurement	2 bytes measurement	2 bytes temperature value	2 bytes temperature scale
	Value scale number		

The data type defaults to: double-byte integer, high byte first; others are optional as floating-point types.

4. Command example

a) Read data instruction

Function: Obtain the pH and temperature of the measuring probe; the unit of pH is pH; the unit of temperature 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

Example of reading:

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

pH: 00 62 indicates the hexadecimal reading pH value, 00 02 indicates that the pH value has 2 decimal places and is converted to a decimal value of 0.98 .

Temperature value: 01 01 indicates the hexadecimal reading temperature value, 00 01 indicates that the temperature value has 1 decimal place and is converted to a decimal value of 25.7 .

b) Calibration instructions:

Zero calibration

Function: Set the pH zero calibration value of the electrode. The zero value is based on the 6.86 pH standard. The examples are as follows;

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

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

Slope calibration

Function: Set the pH slope calibration value of the electrode; the slope calibration is divided into high point and low point calibration, and the alkaline solution is measured at the high point; the acidic solution is measured at the low point, where the standard solution is high here. point 9.18pH, low 4.00pH standard solution of the calibration reference, examples are as follows:

High point standard solution 9.18 pH calibration:

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

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

Low standard solution 4.00 pH calibration:

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

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

c) Set the device ID address:

Role: set the MODBUS device address of the electrode;

Change the device address 06 to 01. The example is as follows

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 does not execute the host command correctly, it will return the following format information:

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 is wrong
- b) COM : Received function code