PH03-N01-2-*
Industrial PH Transmitter User Manual
(Type 485)



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1. Product description

This product is a device for measuring the pH value (hydrogen ion concentration index, pH) of a solution. It has an automatic temperature compensation function, and the automatic temperature compensation and manual temperature compensation can be switched at will. This product is suitable for industrial sewage, domestic sewage, agriculture, aquaculture and other scenarios in a non-corrosive weak acid and weak alkali environment.

1.1Features

- pH measurement range is 0~14pH, resolution is 0.01pH.
- The temperature measurement range is 0~80℃, and the resolution is 0.1℃ (only for equipment with optional temperature compensation function).
- With automatic temperature compensation function, manual compensation and automatic compensation can be switched at will.
- RS485 communication interface: MODBUS RTU communication protocol can be easily connected to the computer for monitoring and communication.
- ModBus communication address can be set, baud rate can be modified.
- The equipment can be powered by a wide-voltage DC 10~30V.
- The product shell is IP65 protection grade and can be used in outdoor rain and snow environment.

1.2 Equipment technical parameters

powered by	DC 10~30V
Power consumption	0.6W
Communication Interface	RS485; standard MODBUS-RTU protocol; communication baud rate: 2400, 4800, 9600 can be set
pH measurement range	0~14.00pH; division value: 0.01pH
pH measurement error	±0.15pH
Repeatability error	±0.02pH
Temperature measurement range	0~80℃; Resolution: 0.1℃ (set temperature for manual temperature compensation, default 25℃)
Temperature measurement error	±0.5℃
Equipment working conditions	Environment temperature: 0-60℃ Relative humidity: <85%
Electrode applicable	0~80℃

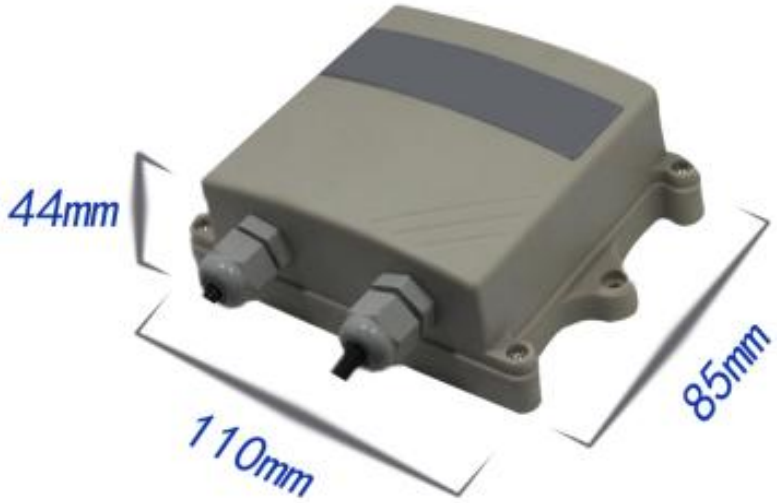
temperature	
Electrode wire length	5m, 10m, 15m, 20m optional (default 5m)
Electrode life cycle	1 year

1.3 product model

PH03-				Industrial PH transmitter
	N01-			RS485 (Modbus-RTU protocol)
		2-		Wall-mounted king-shaped shell
			201	Conventional composite electrode without temperature compensation
			201T	Conventional composite electrode with temperature compensation

1.4 Equipment size

Wall mounted: 110×85×44mm
king shaped shell



1.5Electrode size and installation

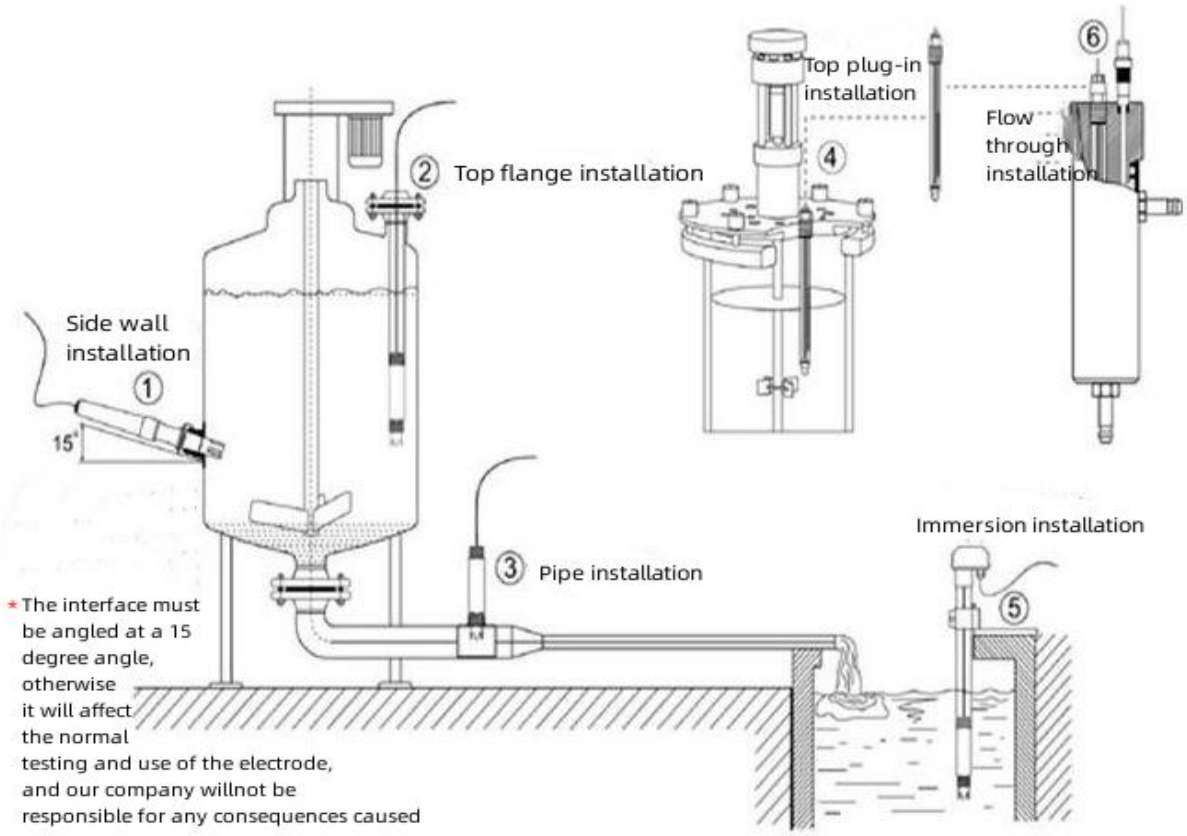
1.5.1Electrode type and size



This product uses a conventional composite electrode, which is suitable for the measurement of solutions such as conventional sewage, tap water, environmentally friendly sewage, and domestic sewage.

1.5.2Electrode installation

1. Submerged installation: the lead of the pH electrode is threaded out of the stainless steel tube, and the 3/4 thread on the top of the pH electrode is connected to the stainless steel 3/4 thread with a raw material tape. Make sure that no water enters the top of the electrode and the electrode wire.
2. Side wall installation: The manufacturer provides a 316L full stainless steel sheath with a bevel, and the pH electrode can be screwed into the sheath.
3. Pipeline installation: Connect to the pipeline through the 3/4 thread of the pH electrode.



2. Instructions for use of equipment

2.1 Wiring instructions

	Description	Description
Electricity source	brown	Positive power supply (10~30V DC)
	black	Power negative
through News	green	485-A
	blue	485-B

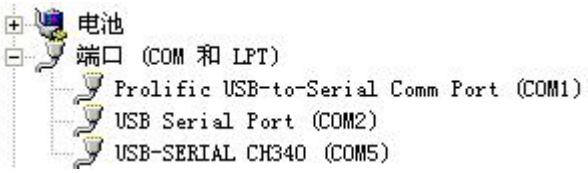
2.2 Parameter configuration description

Open the data package, select "Debug software" --- "485 parameter configuration software", find



Just open it.

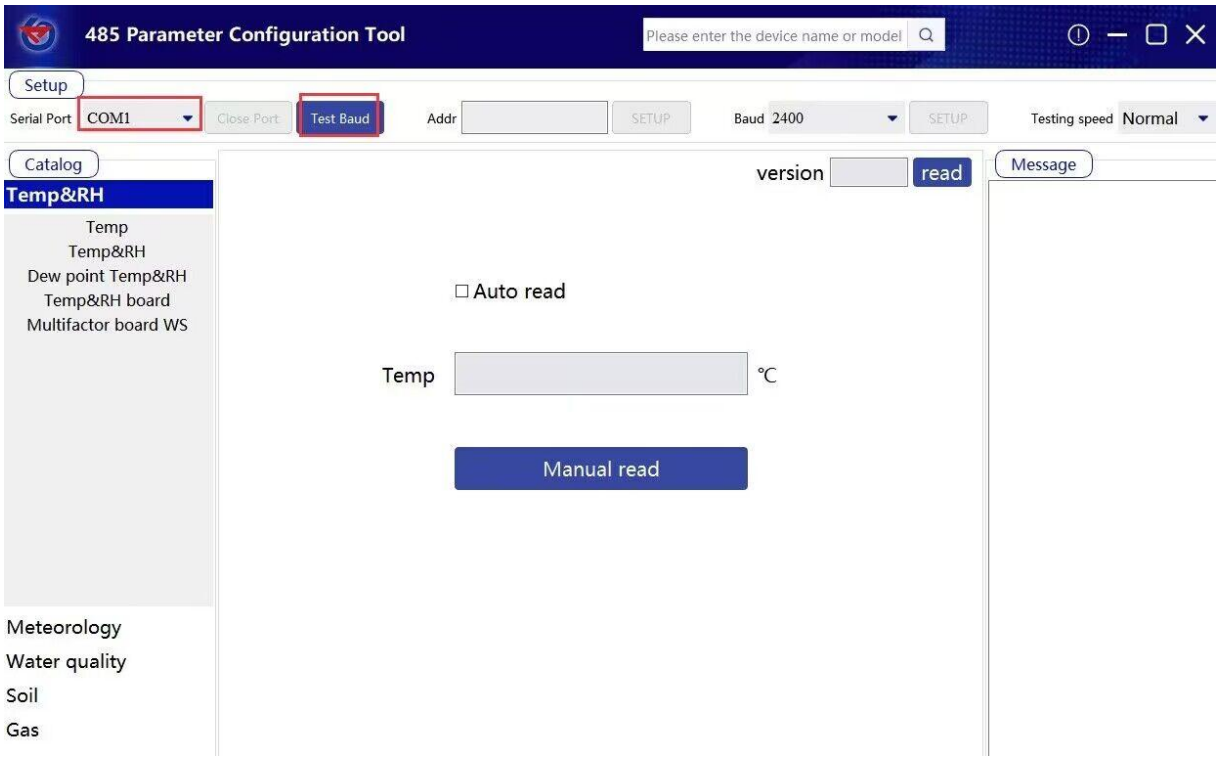
1) Select the correct COM port (check the COM port in "My Computer—Properties—Device Manager — Port"). The following figure lists the driver names of several different 485 converters.



2) Connect only one device separately and power it on, click the test baud rate of the software, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, and the default address is 0x01.

3) Modify the address and baud rate according to the needs of use, and at the same time query the current function status of the device.

4) If the test is unsuccessful, please recheck the equipment wiring and 485 driver installation.

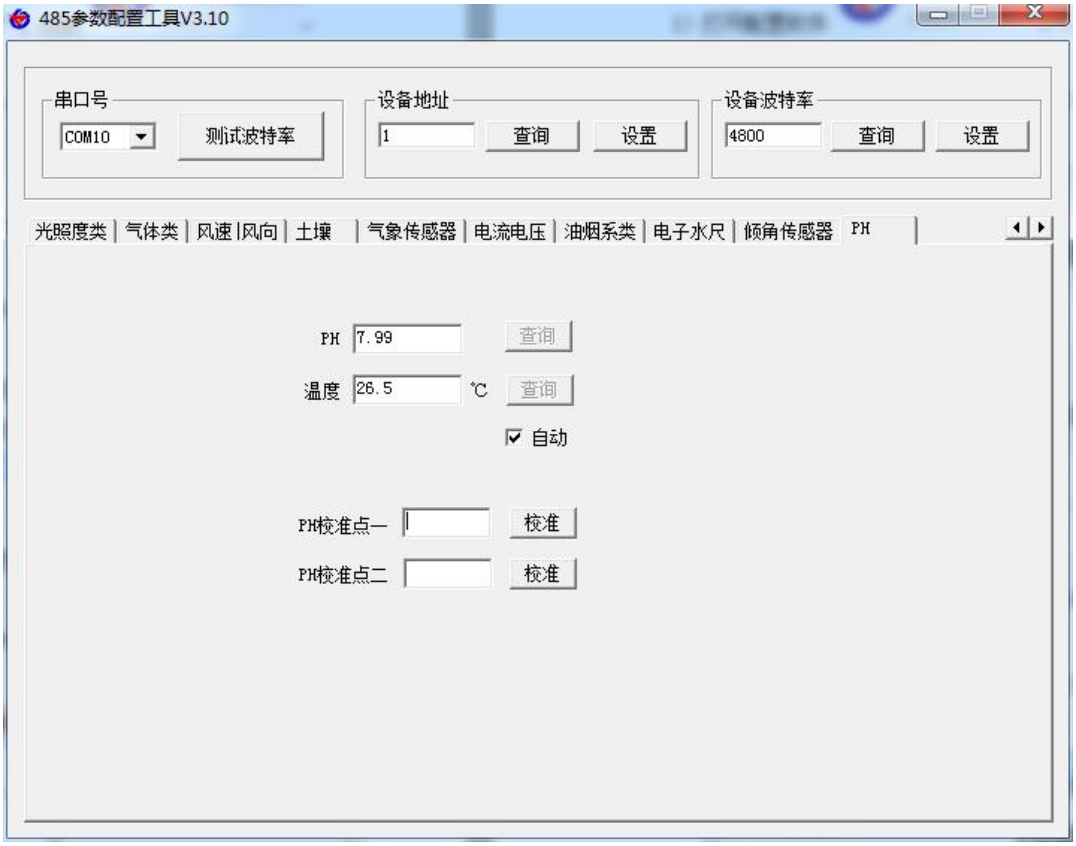


2.3 Electrode calibration instructions

1）Open the configuration software 

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2) Select the corresponding serial port number, select the correct device address (default address is 1) and baud rate (default baud rate is 4800), then open the serial port, find the PH tab, and check the automatic option.



3) Put the pH electrode into a known pH standard buffer solution with pH<7 at room temperature (around 25° C), enter the pH value of the standard buffer solution at the calibration point, and cancel the automatic when the value is stable, and click Calibrate Click "Calibration" to perform the first point calibration.



4) After the first point calibration is completed, clean the pH electrode and use a paper towel or soft cloth to absorb excess water (do not damage the electrode glass bulb, otherwise the electrode will fail), re-check the automatic option, and put in pH>7 In the known pH standard buffer solution, enter the pH value of the standard buffer solution at calibration point 1, and cancel the automatic after the value is stable. Click "calibrate" at calibration point 2 to calibrate the second point. The calibration is complete.



2.4 ModBus communication and register details

2.4.1 Basic parameters of device communication

Code	8-bit binary
Data bit	8-bit
Parity bit	no
Stop bit	1 person
Error checking	CRC (Redundant Cyclic Code)
Baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/s

2.4.2Data frame format definition

Using Modbus-RTU communication protocol, the format is as follows:

Initial structure ≥ 4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

Time to end structure ≥ 4 bytes

Address code: the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: the command function instruction issued by the host.

Data area: The data area is the specific communication data, pay attention to the high byte of 16bits data first! CRC code: two-byte check code.

2.4.3 Register address

Register address	operating	Description
0000	03	pH value (100 times of actual value)
0001	03	Temperature (10 times the actual value)
0050	03/06	PH deviation value (100 times of actual value)
0060	03/06	Whether to compensate manually (1: Yes 0: No)
0061	03/06	Manual temperature compensation (10 times of actual value)

2.4.4 Communication protocol example and explanation

Example 1: Read the current pH value and temperature of the device with address 01

Send frame:

Address code	Function code	Register address	Register content	Check code low bit	Check code high bit
0x01	0x03	0x00 0x00	0x00 0x02	0xc4	0x0b

Response frame: (for example, read the pH value is 7.90, the temperature is 26.5℃)

Address code	Function code	Number of valid bytes	Register content	Check code low bit	High bit of check code
0x01	0x03	0x04	0x03 0x16 0x01 0x09	0xb8	0xbe

pH calculation: 316H (hexadecimal)=790 =>pH=7.90

Temperature calculation: 109H (hexadecimal)=265=>temperature=26.5℃

Example 2: Correct the deviation value of the current pH value of the device with address 01

Send frame: (If the current device output pH is 7.90, the value needs to be corrected to 8.00, the difference is 8.00-7.90=0.10, the expansion is 100 times to 10=>aH (hexadecimal), the register content is written as 00 0a)

Address code	Function code	Register address	Register content	Check code low bit	Check code high bit
0x01	0x06	0x00 0x50	0x00 0x0a	0x09	0xdc

Response frame: (According to the MODBUS standard, the response is a mirrored message of the

issued frame)

Address code	Function code	Register address	Register content	Check code low bit	Check code high bit
0x01	0x06	0x00 0x50	0x00 0x0a	0x09	0xdc

3. Precautions and maintenance

◆ The equipment itself generally does not require routine maintenance. When there is an obvious failure, please do not open it and repair it yourself, and contact us as soon as possible!

◆ In principle, the electrode should be calibrated before each measurement, and the electrode should be calibrated regularly for long-term use.

◆ The glass bulb at the front of the electrode should not be in contact with hard objects. Any damage or grazing will cause the electrode to fail.

◆Before measurement, the bubbles in the electrode glass bulb should be shaken off, otherwise it will affect the measurement. During measurement, the electrode should be agitated in the measured solution and placed still to speed up the response.

◆ Use deionized water to clean the electrodes before and after the measurement to ensure accuracy.

◆ During the period of non-use, the electrode should be stored in 3mol/L potassium chloride solution (3M KCl). Drying the pH electrode for a long time or soaking it in distilled water will shorten the service life of the electrode.

◆ The electrode life cycle is about one year, and the new electrode should be replaced in time after aging.

◆The equipment should be calibrated before each use. For long-term use, it is recommended to calibrate once every 3 months. The calibration frequency should be properly adjusted according to different application conditions (the degree of dirt in the application, the deposition of chemical substances, etc.).