Product introduction

The new generation of NBL-S-PH/soil pH sensor has solved the shortcomings of traditional soil pH, such as the need for professional display instruments, cumbersome calibration, difficult integration, high power consumption, high price, and difficulty in carrying.

This product can be widely used in agricultural irrigation, flower gardening, grassland pastures, soil rapid testing, plant cultivation, scientific experiments and other fields.

Technical Parameters

Measuring range: 0-14pH
Accuracy: ±0.1pH
Resolution: 0.01pH
Response time: <10 seconds (in water)
Power supply mode:
□ DC 12V-24V
□ Other
Output form:
□ Voltage: 0～5V
□ Current: 4～20mA
□ RS485
□ Other
Instrument cable length:
□ Standard: 5 meters
□ Other
Working environment:
temperature 0~80℃
Humidity 0~95%RH

Power consumption: 0.2W
Shell material: waterproof plastic shell
Transmitter size: 98*66*49mm

Calculation formula

Voltage type (0～5V output):
$$D = V / 5 \times 14$$
(D is the measured pH value, 0.00pH≤D≤14.00pH, V is the output voltage (V))

Current type (4～20mA output):
$$D=(I-4)/16 \times 14$$
(D is the measured pH value, 0.00pH≤D≤14.00pH, I is the output current (mA))

Connection method

(1) If equipped with the collector produced by our company, directly use the
The sensor line can connect the sensor to the corresponding interface on the collector.
(2) If the transmitter is purchased separately, the cable sequence of the transmitter is required
They are:

line color	Output Signal		
	voltage	current	communication
Red	+	+	+
Black （Green）	-	-	-
Yellow	voltage signal	current signal	A
Blue			B

Transmitter Dimensions
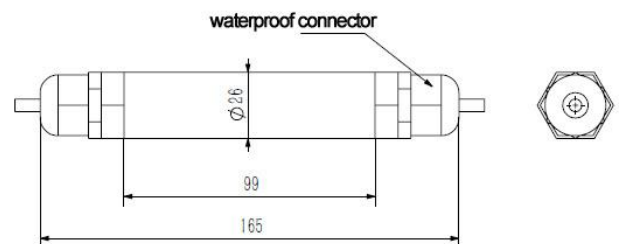
MODBUS-RTU Communication Protocol

1. Serial format

Data bits 8 bits

Stop bit 1 or 2 bits

Check Digit None

Baud rate 9600 The interval between two communications is at least 1000ms

2. Communication format

[1] Write the device address

Send: 00 10 Address CRC (5 bytes)

Returns: 00 10 CRC (4 bytes)

Instructions: 1. The address bit of the read/write address command must be 00.

[2] Address is 1 byte, the range is 0-255.

For example: send 00 10 01 BD C0

return 00 10 00 7C

[3] Read the device address

Send: 00 20 CRC (4 bytes)

Returns: 00 20 Address CRC (5 bytes)

Description: Address is 1 byte, the range is 0-255

For example: send 00 20 00 68

Return 00 20 01 A9 C0

【3】 Read real-time data

Send: Address 03 00 00 00 01 XX XX 说明：如下图所示：

C	Functional Definition	Remark
Address	Station Number （Address）	
03	Function Code	
00　00	Start Address	
00　01	Read Points	
XX XX	CRC Check code, low front and high back	

Return：Address 03 02 XX XX XX XX

Explanation

Code	Functional Definition	Remark
Address	Station Number （Address）	
03	Function Code	
02	Read Unit Byte	
XX　XX	Date （low front and high back）	hex
XX　XX	CRCCheck code	

For example: send 01 03 00 00 00 01 84 0A

Return 01 03 02 00 B4 B8 33

Note: 00 B4 converted to hexadecimal is 180, after data analysis, with two decimal points, it needs to be divided by one hundred, the actual pH value is 1.80

Attachment: The steps to calculate the CRC code:

1. The preset 16-bit register is hexadecimal FFFF (that is, all 1s). Call this register the CRC register;

2. XOR the first 8-bit data with the lower bits of the 16-bit CRC register, and place the result in the CRC register;

3. Shift the contents of the register one bit to the right (toward the lower bit), fill the highest bit with 0, and check the shifted out bit after the right shift;

4. If the shift out bit is 0: repeat step 3 (shift right one bit again)

If the shift-out bit is 1: XOR the CRC register with the polynomial A001 (1010 0000 0000 0001);

5. Repeat steps 3 and 4 until the right shift is performed 8 times, so that the entire 8-bit data is processed;

6. Repeat steps 2 to 5 to process the next 8-bit data;

7. The final CRC register is the CRC code;

8. When the CRC result is put into the information frame, the high and low bits are exchanged, and the low bits are first.

RS485 Circuit
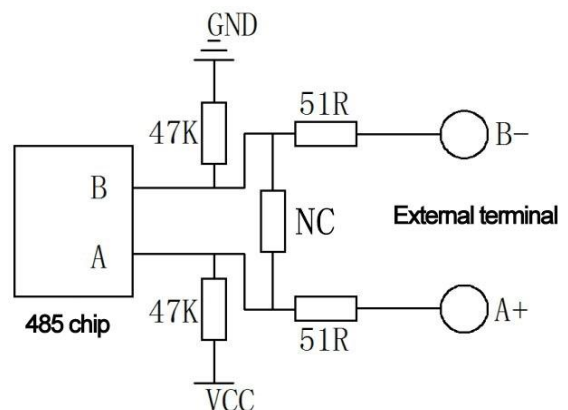
Instruction manual

1. When the sensor leaves the factory, the position of the probe has a transparent protective cover, and the built-in protective liquid protects the probe. When

using it, please remove the protective cover first, fix the filter tank and the sensor, and then wrap the filter in the filter tank with the attached cable tie. In order to prevent the soil and the probe from directly contacting and damaging the probe, please ensure that the filter tank and the filter screen are firmly connected in actual use. damage;

2. Insert the probe part vertically into the soil, and the depth of insertion should at least cover the filter screen. Under normal circumstances, the pH value in the air is between 6.2 and 7.8;

3. After burying the sensor, pour a certain amount of water around the soil to be tested and wait for a few minutes. After the water is immersed into the probe, the data can be read on the instrument. Under normal circumstances, the soil is neutral and the pH value is between 7 or so, the actual pH value of the soil in different places will be different, which should be determined according to the actual situation;

4. Users can use the attached 3 pH reagents and configure them according to the configuration method to check whether the product performance is normal.

Notice

1. In order to ensure that the electrode can correctly measure the pH value on the pipeline, the data inaccuracy caused by bubbles between the measuring cells should be avoided;

2. Please check whether the packaging is in good condition, and check whether the product model is consistent with the selection;

3. Do not connect with live electricity. After the wiring is completed and checked, it can be powered on;

4. Do not arbitrarily change the components or wires that have been welded when the product leaves the factory;

5. The sensor is a precision device, please do not disassemble it by yourself, or touch the surface of the sensor with sharp objects or corrosive liquids, so as not to damage the product;

6. The sensor probe should be cleaned once a week.

7. Please keep the verification certificate and qualification certificate, and return it together with the product during maintenance.

Trouble Removal

1. During analog output, the indicator indicates that the value is 0 or not within the range. The collector may not be able to obtain information correctly due to wiring problems. Please check whether the wiring is correct and firm, and whether the power supply voltage is normal;

2. If it is not for the above reasons, please contact the manufacturer.

Maintenance

1. The input end (measuring electrode socket) of the instrument must be kept dry and clean to prevent dust and water vapor from immersing;

2. Avoid immersing the electrode in protein solution and acid fluoride solution for a long time, and avoid contact with silicone oil;

3. After long-term use of the electrode, if it is found that the slope is slightly reduced, the lower end of the electrode can be soaked in 4% HF solution (hydrofluoric acid) for 3~5 seconds, then washed with distilled water, and then soaked with 0.1mol/L hydrochloric acid. Renew the electrode;

4. In order to make the measurement more accurate, the electrode must be calibrated frequently and cleaned with distilled water;

5. The transmitter should be placed in a dry environment or in a control box to avoid leakage or measurement errors caused by water droplets or moisture.

Selection table

No.	Power supply method	output signal	Explanation
PHTRSJ -			Soil pH sensor (transmitter)
	12V-24V		12V-24V Power supply
		A1	4-20mA
		V	0-5V
		W2-	RS485
Example: PHTRSJ-12V-A1: Soil PH Sensor (Transmitter) 12V power supply, 4-20mA current signal output			

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