Water Suspended Solids Sensor User Manual

JXSZ-1001-SS

Ver1.0

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第 1 章 Product Introduction

1.1 Product Overview

The water quality suspended solids sensor is a continuous monitoring instrument probe for turbidity and temperature in solutions such as thermal power, chemical fertilizer, metallurgy, environmental protection, pharmaceuticals, biochemistry, food and tap water.

This product adopts the laser scattering method. The sensor product has a long life, does not require maintenance, and has excellent performance. The continuous monitoring data can be connected to the recorder through the transmitter output to achieve remote monitoring and recording. It can also be connected to the RS485 interface through the MODBUS-RTU protocol to easily connect to the computer for monitoring and recording.

This product is equipped with a waterproof shell, and the signal of the aqueous solution is digitally analyzed and converted into a standard 485 signal. The product is formed once and does not require calibration, so it can be used right away.

1.2 Features

The probe of this product uses the principle

of laser scattering to measure suspended matter in water quality. The laser scattering method has been relatively active in recent years and can overcome the shortcomings of traditional classical measurement methods that cannot be measured online continuously. The laser scattering method has stable measurement, is not affected by magnetic fields, does not consume probes, has high sensitivity, low detection limits, and long life. It has been widely used in sustainable online monitoring and other advantages.

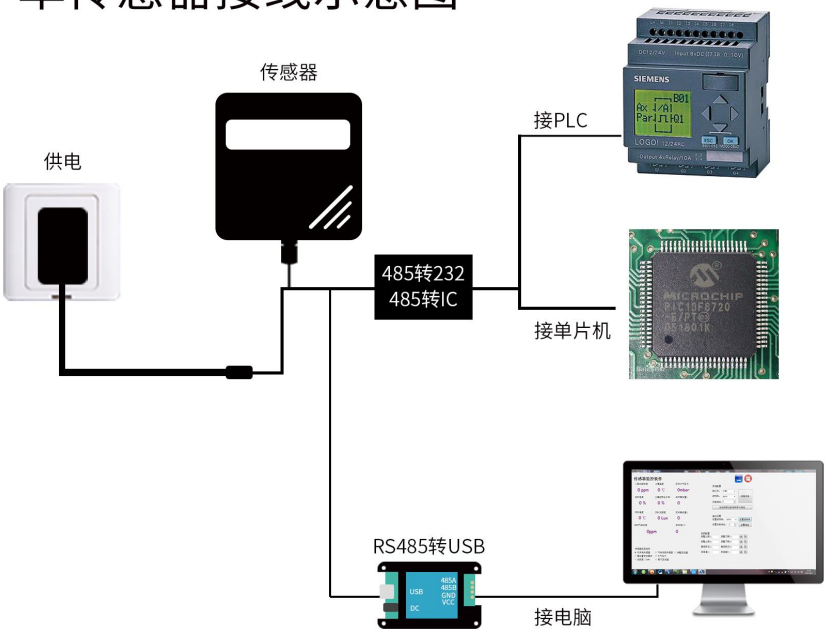
1.3 Main parameters

Parameter name	Parameter content
Power supply	12-24V DC
Power consumption	≤0.15W（12V DC, 25℃）
Measurement accuracy	±3.0%
Range	0-20000 mg/L
Resolution	0.1℃,0.01mg/L
Output signal	RS485
Operating temperature	0-50℃
Response time	≤1s

Working pressure range	0-0.6Mpa(Water depth60rice)
Repeatability	±2%, ±3℃
Probe size	Φ32×145(mm)
Probe cable length	5rice(default)

1.4 System framework diagram

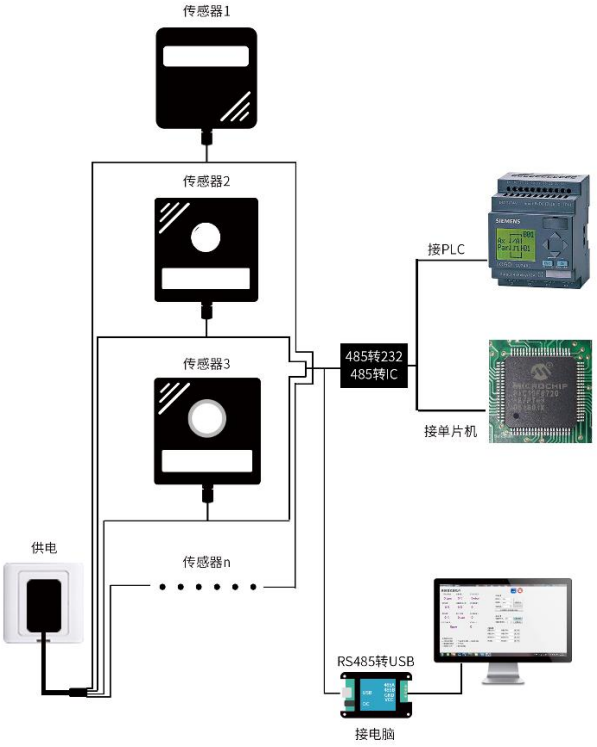
(1) This sensor can be connected and used alone. First, use a 12V DC power supply. The device can be directly connected to a PLC with a 485 interface, and can be connected to a single-chip microcomputer through a 485 interface chip. The single-chip microcomputer and PLC can be programmed with the modbus protocol specified later to work with the sensor. At the same time, use a USB to 485 converter to connect to a computer, and use the sensor configuration tool provided by our company for configuration and testing.



(2) This product can also be used with multiple sensors combined on a 485 bus. Please comply with the "485 bus field wiring rules" (see Appendix) when combining 485 buses. Theoretically, one bus can connect more than 16 485 sensors. If more 485 sensors are needed, a 485 repeater can be used to expand more 485 devices. The other end can be connected to a PLC with a 485 interface, connected to a single-chip microcomputer through a 485 interface chip, or connected to a computer using a USB to 485 converter. Use the sensor configuration tool provided by our company for

configuration and testing.

多传感器接线示意图



第 2 章 Hardware Hookup

2.1 Equipment pre-installation inspection

Please check the equipment list before installing the equipment:

name	quantity
Water quality probe	1 unit
Warranty card/certificate	1 serving
USB to 485 device	1 set (optional)
12V waterproof power supply	1 set (optional)

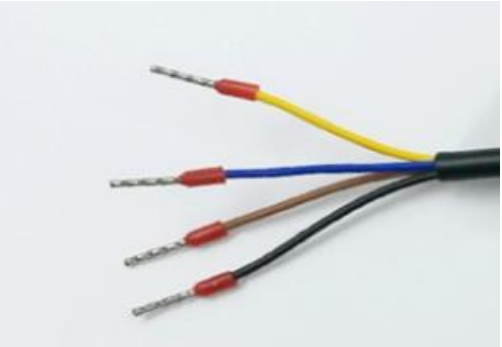
2.2 Product appearance size

The following are the product dimensions as shown in the figure:

2.3 Interface Description

The power interface is a wide voltage power input 12-24V. Pay attention to the positive and negative of the signal line of the product, and do not connect the positive and

negative of the signal line in reverse.



485Interface sensor wiring method:

	Line Color	illustrate
power supply	brown	Power positive (12-24VDC)
	black	Negative power supply
Communications	Yellow (gray)	485-A
	blue	485-B

Note:

（1）Please be careful not to connect the wires in the wrong order. Incorrect wiring may cause the device to malfunction or burn out.

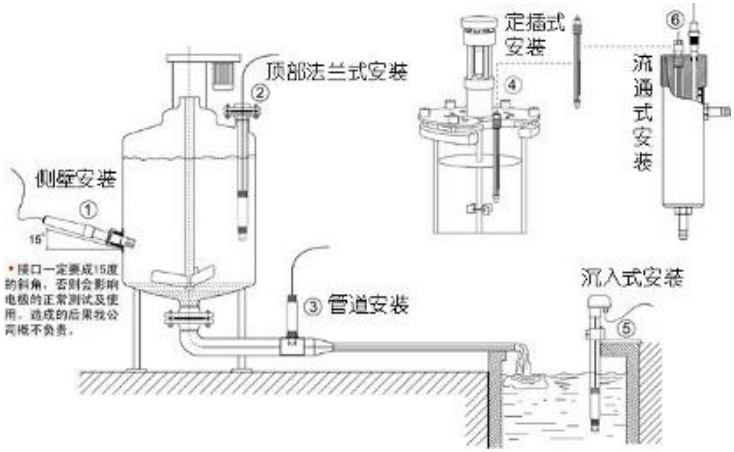
（2）The sensor should avoid contact with organic solvents, alcohol, paint, oil and high concentration of gas, including silicone and other adhesives.

（3）The factory default is 4.8riceFor long wires, customers can extend the wires or connect them sequentially as needed.

In some factory batches, the wiring sequence provided may not include the yellow wire. In this case, the gray wire can replace the yellow wire.

2.4 Installation Instructions

The probe is a very precise component and must be installed in the correct way. Incorrect installation will cause damage to the probe or irreversible damage. The probe can be installed in a pipe, immersed or flange.



Please do not put the probe directly into the water, choose the probe mounting bracket or flow cup to fix it. Before installation, please be sure to use raw tape (3/4 thread) to do waterproof sealing work to prevent water from entering the probe and causing a short circuit in the probe cable.

During water outage, make sure the probe is immersed in the measured liquid or wear a protective cap filled with protective liquid. In winter, when the temperature is low and the water is out for a long time, add an antifreeze device or take it back indoors and add water for storage. Otherwise, the service life will be shortened.

第 3 章 485 interface communication protocol

3.1 Basic communication parameters

parameter	content
coding	8-bit binary
Data bits	8-bit
Parity bit	none
Stop bits	1st
Error calibration	CRC long cyclic code
Baud rate	2400bps/4800bps/9600 bps configurable, factory default is 9600bps
coding	8-bit binary

3.2 Data frame format definition

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

Initial structure >= 4 bytes

Address code = 1 byte

Function code = 1 byte
Data area = N bytes
Error checking = 16-bit CRC code
End structure >= 4 bytes of time

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

Function code: Function prompt of the command sent by the host. This transmitter only uses function code 0x03 (read register data).

Data area: The data area is the specific communication area. Note that the high byte of the 16-bit data comes first.

CRC code: a two-byte check code.

Inquiry frame

Address code	Function code	Register start address	Register length	Check code low	Check code high digit
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Response frame

Address	Function	Number of valid bytes	Data Zone 1	Second data area	Nth data area
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes

3.3 Register Address

Register Address	content	operate
0001H	temperature(unit0.1℃)	Read-only
0002H	Suspended Matter(unit0.01mg/L)	Read-only

0100H	Device Address(0-252)	Read and Write
0101H	Baud rate(2400/4800/9600)	Read and Write

3.4 Communication protocol examples and explanations

3.4.1 Read the suspended value of device address 0x01

Inquiry frame

Address code	**Function code**	**Starting address**	**Data length**	**Check code low**	**Check code high digit**
0x01	0x03	0x00,0x02	0x00,0x01	0x25	0xCA

Response frame

Address code	**Function code**	**Number of valid bytes**	**Data bits**	**Check code Low**	**Check code High**
0x01	0x03	0x02	0x00 0xBD	0x78	0x35

Suspended matter:

00BD H (hexadecimal) = 189 => value = 18.9

Turbidity and suspended solids conversion 0.13NTU=1mg/L

Suspended matter: 145.38 mg/L

3.4.2 Read the temperature value of device address 0x01

Inquiry frame

Address code	Function code	Starting address	Data length	Check code low	Check code high digit
0x01	0x03	0x00,0x01	0x00,0x01	0xD5	0xCA

Response frame

Address code	Function code	Number of valid bytes	Temperature value	Check code Low	Check code High
0x01	0x03	0x02	0x00 0xAF	0xDB	0xBF

temperature:

00AF H (hexadecimal) = 175 => temperature = 17.5°C

3.4.3 Read the device address 0x01 temperature and suspended solids concentration value

Inquiry frame

Address code	Function code	Starting address	Data length	Check code low	Check code high digit
0x01	0x03	0x00,0x01	0x00,0x02	0x95	0xCB

Address code	Function code	Number of valid bytes	Temperature value	Data bits	Check code Low	Check code High

0x01	0x03	0x04	0x01 0x1b	0x00 0x28	0xDB	0xBF

Response frame

temperature:

011B H (hexadecimal) = 283 => temperature = 28.3°C

Suspended matter:

0028 H (hexadecimal) = 40 => value = 4

Turbidity and suspended solids conversion 0.13NTU=1mg/L

Suspended matter: 30.77 mg/L