

**Residual chloride ions in
water solution of Prince's
shell**

**Transmitter
instructions**

**JX S BS-3001-Chlorine
Ver2.0**

威海精讯畅通电子科技有限公司

Weihai JXCT Electronics Co., Ltd.



第 1 章 Product Profile

1.1 Product Overview

JX S BS-3001-Chlorine is one of the intelligent on-line chemical analysis instruments. the residual chlorine electrode used in this product is a diaphragm polarographic (Clark) type sensor, which consists of a layer of gas permeable film covered on the cathode, anode, electrolyte and cathode. The residual chlorine in the measured solution diffuses to the cathode through the diaphragm, and the appropriate polarization voltage between the cathode and the anode can reduce the residual chlorine at the cathode. These chemical reactions produce a current proportional to the residual chlorine in the measured solution.

This product is suitable for on-line monitoring of residual chlorine concentration in medicine, environmental protection, tap water monitoring, drinking water, industrial process water disinfection and sterilization process, and can also be used in swimming pools, aquaculture and other places where residual chlorine concentration needs to be measured.. This product, in conjunction with

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the waterproof shell, converts the signal of the aqueous solution into a standard signal of 485/4-20 mA/0-10V through digital tuning analysis. Product one-time molding without calibration, can be used.

1.2 Main parameters

Parameter Name	Parameters
DC Power Supply	9-24V DC
Electricity consumption	≤0.15 W (@12VDC ,25℃)
Measuring accuracy	F.s 5 per cent
Residual chlorine capacity	0-1000 ppm(default)/0-5000 ppm/0-10000ppm
Residual chlorine resolution	0.1 ppm(Default)
Output signal	485/4-20 mA/0-10V
Temperature range	Successive 0~80 ℃ , intermittent 81℃~100
Repeatability	±4%
Product size	110×85×44 mm3
Probe size	155 mm*12mm(Length*diameter)
PH Scope of application	2~12 PH
Length of	5 m (default)

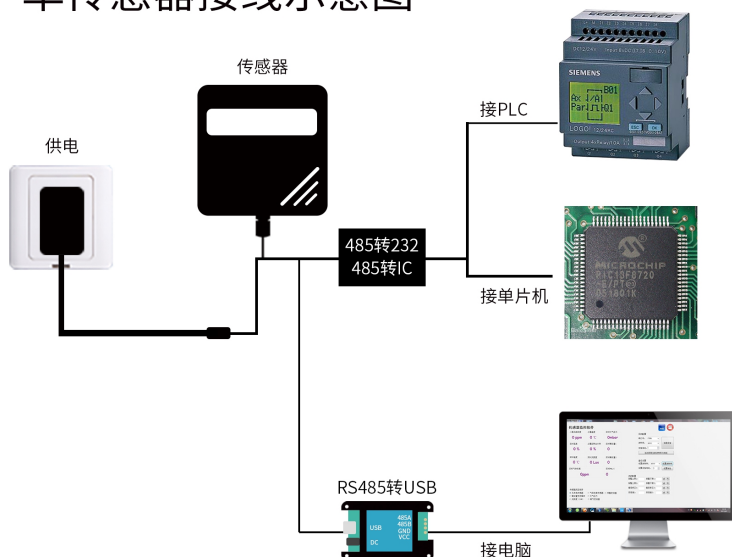


1.3 System framework diagram

1.3.1 485 Interface Framework Chart

The sensor can be connected to separate use, first using 12 V DC power supply, the equipment can be directly connected with 485 interface PLC, can be connected through 485 interface chip MCU. The single chip microcomputer and PLC can be programmed with the sensor through the modbus protocol specified later. At the same time, use USB to 485 to connect with the computer, using our sensor configuration tools for configuration and testing.

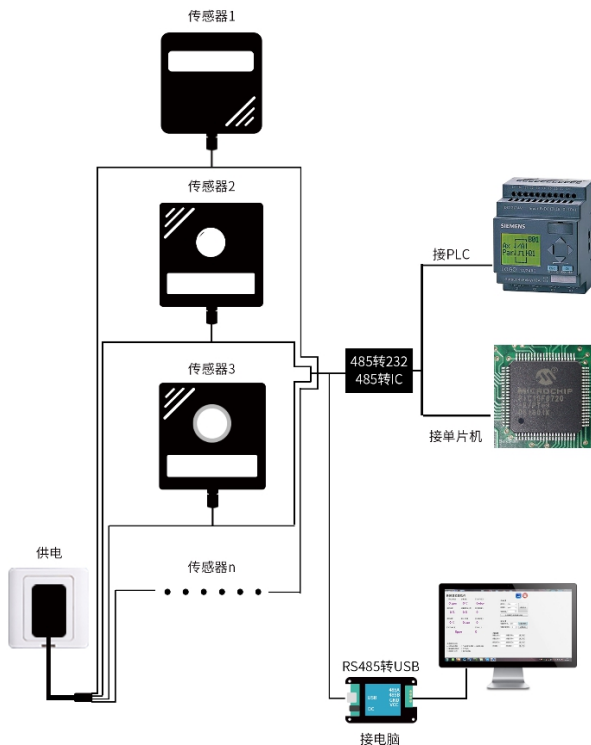
单传感器接线示意图



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This product can also be used by multiple sensors in a 485 bus. Please follow the 485 bus field wiring code (see appendix). Theoretically, a bus can connect more than 16 485 sensors. If you need more 485 sensors, you can use 485 repeaters to expand more 485 devices. The other end is connected to a single chip through a 485 interface chip PLC、 Or use USB to 485 to connect to the computer, using our sensor configuration tools for configuration and testing.

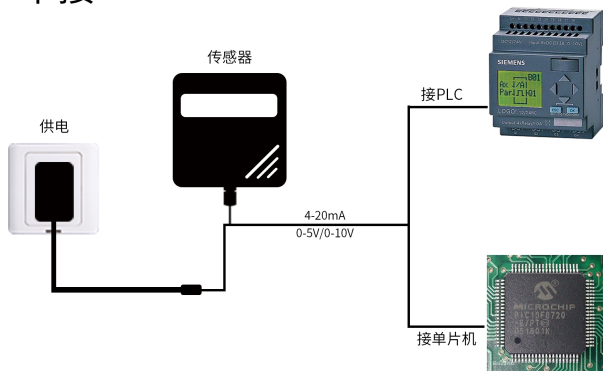
多传感器接线示意图



1.3.2 Analog Interface Frame

Analog interface can be directly connected to the PLC data module, or the single-chip computer to process the signal, see the following figure:

单接



第 2 章 Hardware connection

2.1 Inspection of equipment before installation

Check the equipment list before installing the equipment:

Name of name			Quantity
Waste chloride ion transmitter equipment for water solution			1 unit
12V power	waterproof		1(optional)
Warranty			1

2.2 Interface description

Power interface for wide voltage power input 12-24 V can be. The product pays attention to the signal line positive and negative, do not connect the signal line positive and negative.



485 Interface Sensor Connection Mode:

	Line colour	Note	
Pow	Brown	Active	power
er	brown	supply	(12-24
supp		VDC)	
ly	Black	Negative power	
Com	Yellow	485- A -	
mun	(gray)		

ications	color	485- B -
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Analog interface sensor wiring mode:

	Line colour	Note	
Power supply	Brown brown	Active supply	power (12-24 VDC)
Common	Black Yellow (grey)	Negative Voltage/current output	power positive
ications	color	Blue	Negative voltage/current output

Factory default to provide 0.6 meters long wire, customers can extend wire or sequential wiring as needed.

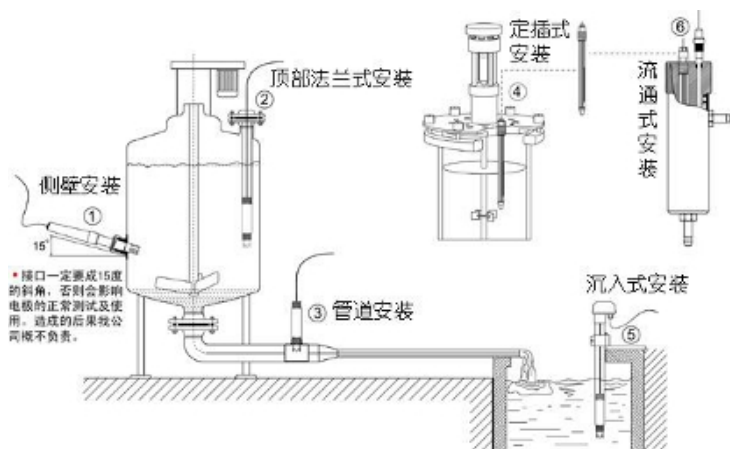
2.3 Installation instructions

This instrument is wall mounted. Please install on the wall, try to avoid wind and rain and direct sunlight. In order to prevent the internal temperature of this instrument from rising, please install it in a well ventilated place. When installing this instrument, please do not tilt left and right, as far as possible horizontal installation.

Electrodes are very precise components, must use the

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correct installation, the wrong installation will lead to electrode damage or irreversible damage. The electrode is piped. Immersion type. Flange installation can be.



Please do not put the electrode directly into the water, should choose the electrode mounting bracket or circulation cup fixed. Before installation, be sure to use raw material belt (3/4 thread) to do waterproof and sealing work to avoid water entering the electrode, resulting in short circuit of electrode cable.

During the water stoppage, it is necessary to ensure that the electrode is immersed in the measured liquid or put on the protective cap of the inner protective liquid. In winter, the low temperature and long-term water stoppage should be added to the antifreeze device or recovered from the indoor water storage. Otherwise, it will shorten the service life.

第 3 章 485 Interface Communication Protocol

3.1 Basic communications parameters

Parameters	Content
Code	8-bit binary
Data bits	8
parity bit	No
Stop position	1 person
Error calibration	CRC long loop code
baud rate	bps/4800bps/9600bps 2400, factory default 9600 bps
Code	8-bit binary

3.2 Data frame format definition

Adopt the Modbus-RTU protocol as follows:

Initial structure ≥ 4 bytes time

Address =1 byte

Function =1 byte

Data =N bytes

Error check =16-bit CRC code

End structure ≥ 4 bytes of time

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

Function code: the host sends the instruction function prompt, this transmitter only uses the function code 0 x03(reads the memory data).

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Data area: data area is a specific query area, note that 16 bits data high byte before

CRC code: two-byte check code.

Question frame

Address code	Functional code	Register Start Address	Register length	Check low bit	theCheck bit	the high
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte	

Response frames

Address code	Functional code	Number of valid bytes	Data area I	Second Area	DataN data area
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes

3.3 Register address

Register address	PLC Configuration Address	Content	Operation
0001H	40002	Temperature (°C 0.1)	Read only
0002H	40003	Residual chloride ions (0.1 ppm)	Read only
0100H	40101	Equipment address (0-252)	Read and write
0101H	40102	baud (2400/4800/9600)	rate Read and write



3.4 Examples of communication protocols and explanations

3.4.1 Read the residual chlorine ion value x01 device address 0

Question frame

Address code	Functional code	Starting address	Data length	Check the low bit	Check the high bit
x01 0	x03 0	x00,0x02 0	x00,0x01 0	x 25 0	xCA 0

Answer frame (e.g. read that the residual chlorine ion value is ppm 18.9)

Address code	Functional code	Number of valid bytes	Residual chloride ions	Checking code Low	Checking code High
x01 0	x03 0	x02 0	x00 0 xBD 0	x78 0	x35 0

Residual chlorine ions:

00BD H(hexadecimal)=189=> residual chloride =18.9 ppm

3.4.2 Read the temperature value x01 device address 0

Question frame

Address code	Functional code	Starting address	Data length	Check the low bit	Check the high bit
x01 0	x03 0	x00,0x01 0	x00,0x01 0	xd5 0	xca 0

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Response frames

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

Temperature:

00AF H(hexadecimal)=175=> temperature =17.5℃

3.4.3 Equipment address 0 x01 temperature, residual chlorine ion concentration

Question frame

Address code	Functional code	Starting address	Data length	Check the low bit	Check the high bit
x01 0	x03 0	x00,0x01 0	x00,0x02 0	x 95 0	xCB 0

Response frames

Address code	Functional code	Number of valid bytes	Temperature value	Residual chloride ions	Checking code Low	Checking code High
x01 0	x03 0	x04 0	x 01 0 x 1b 0	x00 0 x 28 0	xDB 0	xBF 0

Temperature:

011B H(hexadecimal)=283=> temperature =28.3℃

Residual chlorine ions:

0028H(hexadecimal)=40=> residual chloride =4 ppm



第 4 章 Analog wiring instructions

Analog sensor wiring is simple, only need to connect the line to the specified port of the device. The equipment supports 3/4 wire connection.

4.1 Typical 4-wire connection

As shown in the following figure, the power line (brown line and black line) of the sensor is connected to the power supply, the yellow (gray) color line of the sensor is the signal positive connected to the acquisition equipment, and the current flow direction is the sensor to the acquisition equipment;

电流输出型 (4-20mA)

四线制接法

第一步

用12V-24V的电源适配器

连接传感器

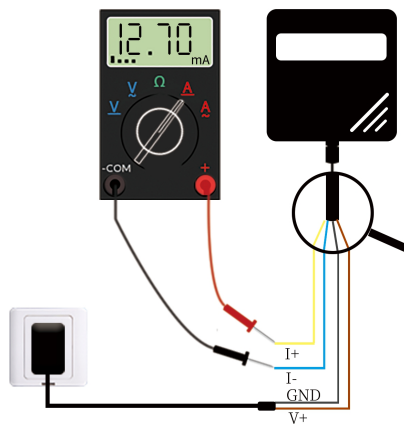
第二步

正确挑选万用表量程或连

接模拟量信号采集器

第三步

对照公式计算



As shown in the following figure, the power line of the sensor (brown line and black line) is connected to the power supply, the yellow (gray) color line of the sensor is the signal positive and the yellow (gray) line voltage is the output voltage, the blue line of the sensor is the signal negative, the blue line is

the reference voltage, and the black line voltage is 0 V.

电压输出型 (0-5V/0-10V)

四线制接法

第一步

用12V-24V的电源适配器

连接传感器

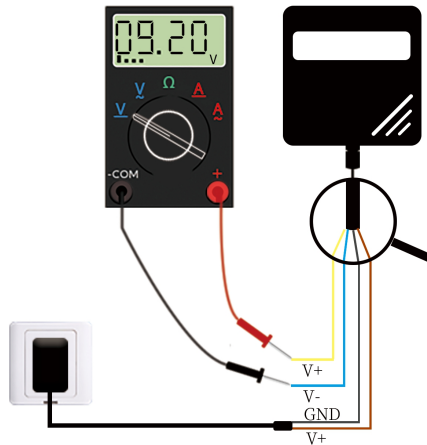
第二步

正确挑选万用表量程或连

接模拟量信号采集器

第三步

对照公式计算



4.2 Typical 3-wire connection mode

For the typical three-wire connection, compared with the four-wire connection mode, the blue line can be omitted, and the blue line and the black line in the sensor are in the middle and short circuit of the sensor, so the blue line can be omitted.

For the three-wire current connection mode, after connecting the power line (brown wire and black line) of the sensor to the power supply, it is only necessary to take the yellow (gray) color line of the sensor as the signal of the signal positively connected to the current acquisition equipment.



电流输出型 (4-20mA)

三线制接法

第一步

用12V~24V的电源适配器

连接传感器

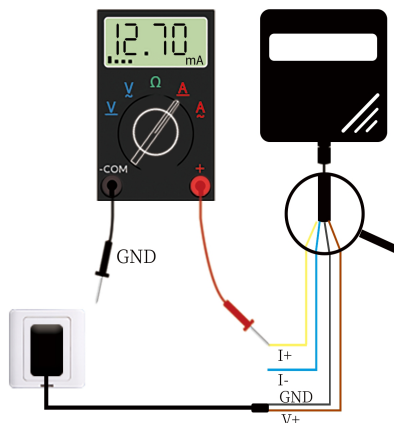
第二步

正确挑选万用量程或连

接模拟量信号采集器

第三步

对照公式计算



For the three-wire voltage connection mode, after the power line (brown wire and black line) of the sensor is connected to the power supply, it is only necessary to take the yellow (gray) color line of the sensor as the signal of the signal positively connected to the voltage acquisition equipment.

电压输出型 (0-5V/0-10V)

三线制接法

第一步

用12V~24V的电源适配器

连接传感器

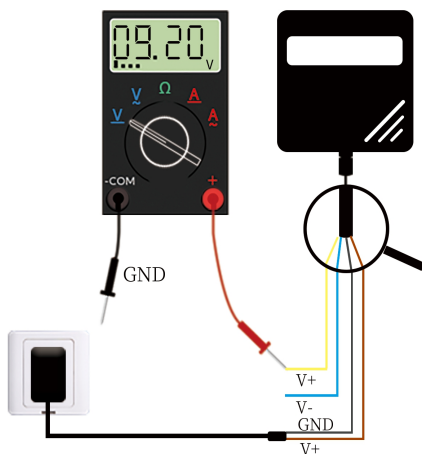
第二步

正确挑选万用量程或连

接模拟量信号采集器

第三步

对照公式计算



第 5 章 Meaning and Conversion of Analog Parameters

5.1 Analog 4-20 mA Current Output

Current value	Residual chlorine ions
mA 4	0
mA 20	Full range

Calculation formula $P_{(\text{Residual chlorine ions})} = I_{(\text{Current})} - 4 \text{ mA}$ * full range/16 mA

The I units are mA. units Take 4 mA for 0 points and 20 mA for maximum linear conversion.

5.2 Analog 0-10 V Voltage Output

Voltage value	Residual chlorine ions
0V	0
10V	Full range

Calculation formula $P_{(\text{Residual chlorine ions})} = V_{(\text{Voltage})} :: \text{Full range}/5000 \text{ mV}$

The V unit is mV, please use 0 V to represent 0 points and 10 points to represent the maximum range linear conversion.

5.3 Analog 0-5 V Voltage Output

Voltage value	Residual chlorine ions
0V	0
5V	Full range

Calculation formula $P_{(\text{Residual chlorine ions})} = V_{(\text{Voltage})} :: \text{Full range}/10000 \text{ mV}$



The V unit is mV, please use 0 V to represent 0 points and 10 points to represent the maximum range linear conversion.

Appendix to Chapter 6

6.1 Quality Assurance and After-sale

Quality assurance terms follow Weihai Jingxun unblocked Electronic Technology Co., Ltd. Sensor after-sale terms, for sensor mainframe circuit part of the warranty for two years, gas sensor quality assurance for one year, accessories (shell / plug / cable, etc.) warranty for three months.