

Simulated nitrogen dioxide sensor user's Guide

JXBS-3001-NO2

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 Introduction

1.1 product description

The nitrogen dioxide sensor uses a professional nitrogen dioxide concentration sensor probe as the core detection device; it has the characteristics of wide measurement range, high accuracy, good linearity, good versatility, easy use, easy installation, long transmission distance and moderate price.

1.2 Features

This product uses a highly sensitive gas detection probe with stable signal and high precision. It has the characteristics of wide measuring range, good linearity, easy to use, easy to install and long transmission distance.

1.3 The main parameters

parameter	Technical indicators
NO2 measurement range	0-20ppm/0-2000ppm
measurement method	Electrochemical sensors
NO2 measurement accuracy	3%Fs
Response time (T90, seconds)	Less than 30 seconds
Warranty	The main unit has a 2-year warranty and the gas probe has a

	1-year warranty
Communication Port	Analog interface (voltage or current)
Power supply	12V-24V DC
Power consumption	<1W
Operating temperature	-20 to +50° C
Working humidity environment	15-95%RH (relative humidity), no condensation
Dimensions	110×85×44mm3
Current output type	4-20mA
Current output load	≤600 ohms
Voltage output type	0-5V/0-10V
Voltage output load	≤250 ohms

1.4 Probe parameters and selection

serial number	Probe Type	Range	Resolution	life
4G	import	20ppm	0.01ppm	2 years
4L	import	2000ppm	0.1ppm	2 years

The service life of the above probes is in an air environment with a temperature of $23\pm3^{\circ}\text{C}$ and a humidity of $40\pm10\%\text{RH}$.

The default probe is the 4G probe.

1.5 Cross-gas anti-interference characteristics

gas	Concentration (ppm)	NO2 (ppm)	Response
Carbon monoxide	100	0	
Hydrogen sulfide	15	-2	
Sulfur dioxide	5	-2	
Nitric Oxide (NO)	35	0	
Chlorine	1	0	
Ammonia	100	0	

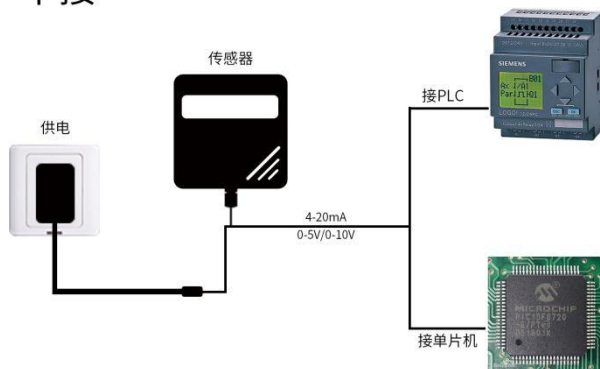
The table only lists some gases. Gases not listed in the table may also have cross-sensitivity.

The cross sensitivity will fluctuate by $\pm 30\%$ and may change with the life of the sensor and batch changes. Therefore, this sensor cannot be used to measure other cross-sensitive gases.

1.6 System framework diagram

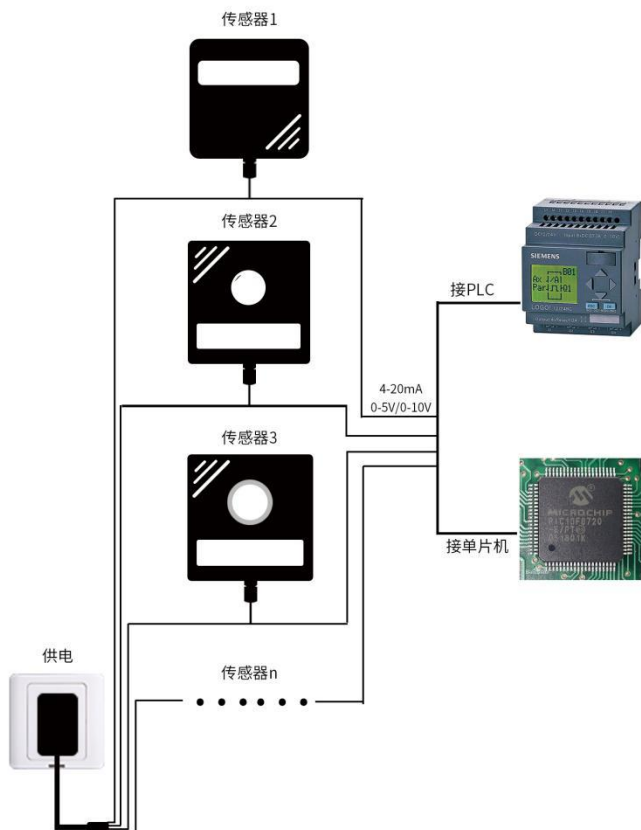
When the system needs to connect an analog version sensor, you only need to power the device, connect the analog output line to the DI interface of the microcontroller or PLC, and write the corresponding acquisition program according to the conversion relationship below.

单接



When the system needs to connect to multiple analog version sensors, each sensor needs to be connected to each different MCU analog acquisition port or PLC DI interface respectively, and the corresponding acquisition program can be written according to the conversion relationship described below.

多接



第 2 章 Hardware Hookup

2.1 Equipment pre-installation inspection

Please check the equipment list before installing the

equipment:

name	quantity
NO2 transmitter equipment	1 set
12V waterproof power supply	1 set (optional)
Warranty card/certificate	1 serving

2.2 Interface Description

The power interface is a wide voltage power input 12-24V. For analog products, pay attention to the positive and negative of the signal line, and do not connect the positive and negative of the current/voltage signal line in reverse.



Line illustrate
Color

power	brown	Power positive (12-24VDC)
supply	black	Negative power supply
Common	Yellow	Voltage/current output positive
indications	(gray) blue	Voltage/current output negative

The factory default is 0.6m long wire, and customers can extend the wire or connect it sequentially as needed.

2.3 Installation Notes

The sensor needs to be placed in an environment that is sheltered from wind and rain, mounted vertically on the ground at 90 degrees, with the air vent of the sensor facing downward to prevent water from entering.

At the same time, in order to ensure the accuracy of the measurement, please install the nitrogen dioxide transmitter in a well-ventilated location.

第 3 章 Wiring Instructions

The wiring of analog sensors is simple, just connect the wire to the designated port of the device. The device supports 3/4 wire wiring.

3.1 Typical four-wire wiring method

The following figure shows the wiring method of the current type sensor. Connect the power line (brown and black lines) of the sensor to the power supply; the yellow (gray)

line of the sensor is the positive signal connected to the positive signal of the acquisition device, and the current flows from the sensor to the acquisition device; the blue line of the sensor is the positive signal connected to the negative signal of the current acquisition device, and the current flows from the acquisition device to the sensor;

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

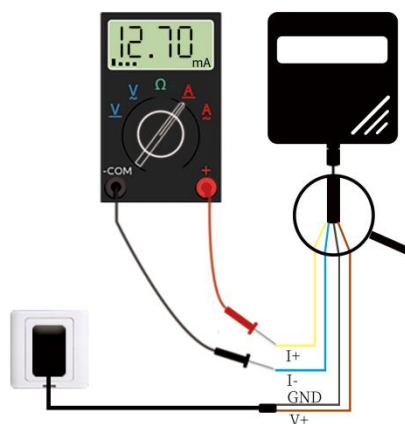
第二步

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



The following figure shows the wiring method of a voltage type sensor. Connect the power cord (brown and black) of the sensor to the power supply. The yellow (gray) wire of the sensor is the positive signal, which is connected to the positive signal of the acquisition device. The voltage of the yellow (gray) wire is the output voltage. The blue wire of the sensor is the positive signal, which is connected to the negative signal of the voltage acquisition device. The voltage of the blue wire is the reference voltage, which is the same as

the black wire voltage, which is 0V.

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

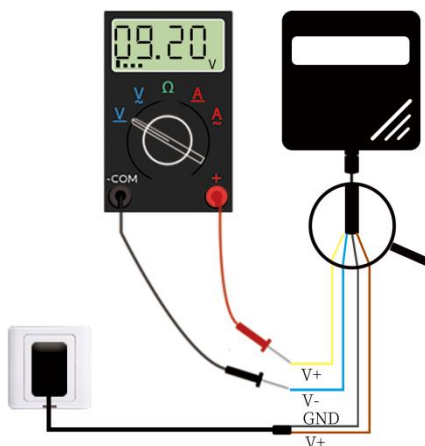
第二步

正确挑选万用量程或连

接模拟量信号采集器

第三步

对照公式计算



3.2 Typical three-wire wiring method

For a typical three-wire wiring, compared to a four-wire wiring method, the blue wire can be omitted. In the sensor, the blue wire and the black wire are short-circuited, so the blue wire can be omitted.

For the three-wire current wiring method, after connecting the power lines (brown and black) of the sensor to the power supply, you only need to connect the yellow (gray) line of the sensor as the signal positive to the signal positive of the current acquisition device.

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

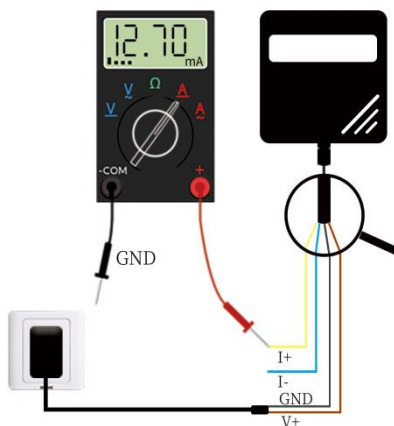
第二步

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 wiring method, after connecting the power lines (brown and black) of the sensor to the power supply, you only need to connect the yellow (gray) line of the sensor as the signal positive to the signal positive of the voltage acquisition device.

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

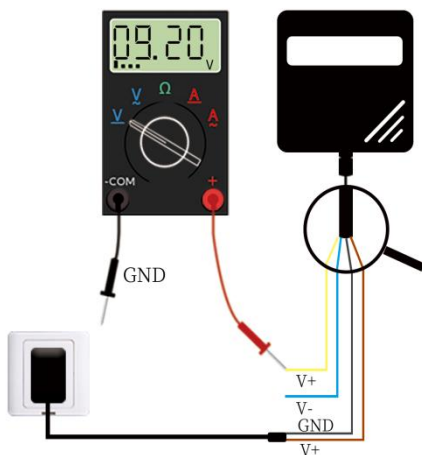
第二步

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 4 章 Meaning and conversion of analog parameters

4.1 Analog 4-20mA current output

Current value	NO2
4mA	0ppm
20mA	20ppm

The calculation formula is $P(NO_2) = (I(\text{current}) - 4\text{mA}) * 1.25\text{ppm}$

The unit of P is ppm and the unit of I is mA.

For example, the data collected in the current situation is 8.125mA, and the calculated value of NO2 is 5.15ppm.

The above is the calculation method for the 20ppm range. For other ranges, please use 4mA to represent 0ppm and 20mA to represent the maximum range for linear conversion.

4.2 Analog 0-10V voltage output

Voltage value	NO2
0V	0ppm
10V	20 ppm

The calculation formula is $P(NO_2) = V(\text{voltage}) * 0.002$

The unit of P is ppm and the unit of V is mV.

For example, the data collected in the current situation is 3515mV, and the calculated value of NO2 is 7.03ppm.

The above is the calculation method for the 20ppm

range. For other ranges, please use 0V to represent 0ppm and 10V to represent the maximum range for linear conversion.

4.3 Analog 0-5V voltage output

Voltage value	NO2
0V	0ppm
5V	20ppm

The calculation formula is $P(\text{NO}_2) = V (\text{voltage}) \times 0.004$

The unit of P is ppm and the unit of V is mV.

For example, the data collected in the current situation is 4228mV, and the calculated value of NO2 is 16.91ppm.

The above is the calculation method for the 20ppm range. For other ranges, please use 0V to represent 0ppm and 5V to represent the maximum range for linear conversion.

4.4 NO2 measurement unit ppm and ug/m3 conversion

According to the calculation, we can get the following conversion relationship, which is only valid for NO2:

$$1\text{ppm} = 46/22.4 = 2.05\text{mg/m}^3 = 2050\text{ug/m}^3$$

$$1\text{ppb} = 46/22.4 = 2.05\text{ug/m}^3$$

The above calculations are all based on standard atmospheric pressure.

第 5 章 FAQ and Quality Assurance

5.1 Possible causes of no output or output errors

1) The range correspondence error leads to PLC calculation error. Please refer to the technical indicators in the first part for the range.

2) The wiring method is incorrect or the wiring sequence is wrong.

3) The distance between the transmitter and the collector is too long, causing signal disorder.

4) The PLC acquisition port is damaged.

5) Equipment damage.

5.2 Warranty and After-sales

The warranty terms follow the after-sales terms of gas sensors of Weihai Jingxun Changtong Electronic Technology Co., Ltd. The main circuit part of the gas sensor is warranted for two years, the probe is warranted for one year, and the accessories (housing, plug, cable, etc.) are warranted for three months.