Nitrogen Dioxide Sensor

IOT-S300NO2

Product Manual

(V1.3)

● Important statement

Thank you very much for choosing our products, we will serve you sincerely forever. The company pursues excellent quality and pays more attention to excellent after-sales service.

Operation errors will shorten the life of the product, reduce its performance, and may cause accidents in severe cases. Please hand over this manual to the end user and read it carefully before using the product. And please keep it in a safe place for reference when needed. The company reserves the right to modify this manual due to product technology and process updates. If there is any change, no further notice will be given, and the final interpretation of this manual is reserved.

● Product description

Gas monitoring sensor series, suitable for monitoring various gases in the environment such as oxygen, ammonia, nitric oxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, combustible gases, methane, carbon monoxide, hydrogen, ozone, formaldehyde, etc. RS485 equipment adopts standard MODBUS-RTU data protocol. The sensor can be widely used in toxic and combustible gas monitoring, combustion control, food and beverage processing, medical diagnosis, industrial monitoring and management and other occasions.

● Features

◇ 12-24VDC wide DC voltage power supply.

◇ 4~20mA, 0~5VDC, 0~10VDC, standard MODBUS-RTU communication protocol.

◇ High sensitivity, low power consumption.

◇ Temperature compensation, excellent linear output.

● Technical indicators

Measuring gas	Oxygen, ammonia, nitric oxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, flammable gases, methane, carbon monoxide, hydrogen, ozone, formaldehyde (optional)
Measuring range	Subject to product labeling
output signal	4~20mA, 0~5VDC, 0~10VDC, RS485 (Modbus RTU communication protocol)
Supply voltage	12~24VDC
Accuracy	≤±3.5%FS
Installation method	Wall-mounted

● Electrical connection method

Analog Output: Red: +Vcc Black: GND Green: +Iout/Vout

Digital Output: Red: +Vcc Black: GND Green: RS485A White: RS485B

Note: The actual product shall prevail. There are wiring marks on the leads.

● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, verify whether the relevant contents of the product instruction manual are consistent with the product, and properly keep the product instruction manual for more than one year;

2. Connect strictly according to the product wiring diagram, and work under the product's allowable excitation voltage. Do not use it with overvoltage;

3. If the sensor needs to be placed in a small space, the space should be well ventilated, especially the two diffusion windows should be in a well ventilated position;

4. The sensor should be kept away from heat sources and avoid direct sunlight or other thermal radiation;

5. Do not use the sensor for a long time in an environment with high dust density;

6. Do not knock the product to avoid damaging the appearance and internal structure of the ring;

7. The product does not have customer-repairable parts. Please contact our company if a fault occurs;

8. Electrochemical gas probes are consumable components. The chemical reactions that occur during detection consume substances within the sensor (such as electrode materials). The sensor's lifespan is related to the concentration it is exposed to. Prolonged exposure to high concentrations, high temperatures and humidity, or prolonged exposure will shorten the actual lifespan of such sensors. If you need to assess whether probe replacement is feasible, please send the product back to our company for confirmation. We will charge for materials/processing costs. If you wish to replace the probe yourself, please contact us for technical support and guidance;

9. If our company's products malfunction under normal use, the warranty period is one year (12 months from the date of shipment to the date of return). Whether the malfunction occurs under normal circumstances will be determined by our company's quality inspectors. as basis. If the repair exceeds the time limit, the company will charge a cost of repair, and all the company's products will be repaired for life;

10. If you have any questions, please check our company's website or call us.

(RS485) MODBUS communication protocol

● Basic settings of communication protocol

Transmission method: MODBUS-RTU mode.

Communication parameters: Default baud rate 9600bps (optional 1200bps, 4800bps, 9600bps, 19200bps, 38400bps, 57600bps, 115200bps, can be configured according to user requirements), 1 start bit, 8 data bits, no parity, 1 stop bit, after changing the communication parameters, the sensor needs to be powered on again.

Slave address: 1-254 (200 is a universal address, setting is prohibited), the factory default is 1, and can be configured according to user requirements.

● Keep register list

parameter	MODBUS holding register address
gas	Register address: 0x02, 0x03, where register 0x02 stores the high bit of the concentration value, and 0x03 is the low bit of the concentration value; the read value is the actual value * 1000, for example, the read value is 3180, and the actual value is 3.18. (Data format: unsigned long integer)
baud rate	Register address: 0x2D, 0x2E, where register 0x2D holds the high bit of the baud rate (only useful when the baud rate is 115200, the values in other baud rate registers 0x2D are all 0), 0x2E is the low bit of the baud rate .
slave address	Register address: 0x2F Default value: 1 (data format: unsigned integer)

Note: Access from other addresses is prohibited.

● Modbus RTU commands

1. If the current sensor address is 01, read the gas concentration

The data frame sent by the host computer is:

Slave Address	01H	slave address
Function	03H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address
Starting Address Lo	02H	The lower 8 bits of the starting register address
No. of Registers Hi	00H	The upper 8 bits of the register number
No. of Registers Lo	02H	The lower 8 bits of the register number
CRC Check Lo	65H	CRC check code lower 8 bits

CRC Check Hi	CBH	CRC check code high 8 bits

The data frame returned by the lower computer is:

Slave Address	01H	slave address
Function	03H	function code
Byte Count	04H	Length is 4 bytes
Data HHH	00H	At this time, the ammonia gas is: 1500 The data type is 32-bit integer
DataHH	00H	
Data H	05H	
Data L	DCH	
CRC Check Lo	F8H	CRC check code lower 8 bits
CRC Check Hi	FAH	CRC check code high 8 bits

Actual concentration = (0*65536+1500)/1000=1.5ppm.

2. If the current sensor address is 01, change its address to 02

Slave Address	01H	slave address
Function	06H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address
Starting Address Lo	2FH	The lower 8 bits of the starting register address
No. of Registers Hi	00H	High 8 bits of slave address
No. of Registers Lo	02H	The lower 8 bits of the slave address
CRC Check Lo	39H	CRC check code lower 8 bits
CRC Check Hi	C2H	CRC check code high 8 bits

Sensor response:

Slave Address	01H	slave address
Function	06H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address

Starting Address Lo	2FH	The lower 8 bits of the starting register address
No. of Registers Hi	00H	High 8 bits of slave address
No. of Registers Lo	02H	The lower 8 bits of the slave address
CRC Check Lo	39H	CRC check code lower 8 bits
CRC Check Hi	C2H	CRC check code high 8 bits

3. Change the baud rate of the sensor to 4800 (0x12 C0)

Slave Address	01H	slave address
Function	06H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address
Starting Address Lo	2EH	The lower 8 bits of the starting register address
No. of Registers Hi	12H	Baud rate 8 bits higher
No. of Registers Lo	C0H	Baud rate 8 bits lower
CRC Check Lo	E5H	CRC check code lower 8 bits
CRC Check Hi	33H	CRC check code high 8 bits

Sensor response:

Slave Address	01H	slave address
Function	06H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address
Starting Address Lo	2FH	The lower 8 bits of the starting register address
No. of Registers Hi	00H	High 8 bits of slave address
No. of Registers Lo	02H	The lower 8 bits of the slave address
CRC Check Lo	39H	CRC check code lower 8 bits
CRC Check Hi	C2H	CRC check code high 8 bits

4. Change the baud rate to 115200 and use function code 10H.

Slave Address	01H	slave address

Function	10H	function code
Starting Address Hi	00H	Register address 002DH
Starting Address Lo	2DH	
Data Hi	00H	Data length
Data Lo	02H	Data length
Data	04H	Number of bytes
Data HHH	00H	Baud rate 115200
DataHH	01H	
Data H	C2H	
Data L	00H	
CRC Check Lo	30H	CRC check code lower 8 bits
CRC Check Hi	8EH	CRC check code high 8 bits

Sensor response:

Slave Address	01H	slave address
Function	10H	function code
Starting Address Hi	00H	The high 8 bits of the starting register address
Starting Address Lo	2DH	The lower 8 bits of the starting register address
No. of Registers Hi	00H	High 8 bits of data length
No. of Registers Lo	02H	Lower 8 bits of data length
CRC Check Lo	D1H	CRC check code lower 8 bits
CRC Check Hi	C1H	CRC check code high 8 bits