Ammonia Sensor 485/Analog Signal Output Edition

Operating Instruction

Weihai GEMHO Digital Mine Technology Co., Ltd

Catalog

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Chapter 1 Product Overview

1.1 Introduction

The product can be widely used in environmental monitoring, meteorological monitoring, smart agriculture, cold chain transport and other environments, sensors and induction, collection, output three in one. Compared with traditional IoT sensors, it has the advantages of high precision and easy installation.

1.2 Product Introduction

Ammonia gas sensor is a constant potential electrolytic sensor. Ammonia gas reacts in a series of redox reactions and releases charges to form a current. The current is proportional to the ammonia concentration. The ammonia concentration can be determined by measuring the current.

1.3 Sensor Features

Low power consumption, high precision, high sensitivity, wide linear range, strong anti-interference ability, excellent repeatability and stability.

1.4 Main Applications

Widely suitable for industry and environmental protection in the field of ammonia detection.

1.5 Product Features

- The product adopts high sensitivity digital probe, which has stable signal and high precision.
- Provide a variety of probes to meet the needs of different environments.

- The equipment is beautiful and easy to install.
- The upper computer is simple to operate and easy to use.

1.6 Precautions for Use

- Sensors are made of water-proof, dust-proof and impact-resistant materials, but precision instruments need careful use and maintenance to avoid impact and use in corrosive liquids or gases and other harsh environments.
- When using, please pay attention to whether there is a requirement to restrict the use of wireless communication device in this occasion. If there is such restriction, please don't use it. Such as：aircraft flight and landing process, gas station, oil station or other occasions with inflammable and explosive materials.
- Aging time before use is not less than 48 hours
- Leakage of electrolyte will cause damage. Do not disassemble the sensor at will;
- Sensors avoid exposure to organic solvents（including silicone rubber and other adhesives）, coatings, reagents, fuel oils and high concentration gases;
- All electrochemical sensors shouldn't be completely encapsulated with resin materials or immersed in an oxygen-free environment, otherwise the performance of the sensors will be impaired;
- All electrochemical sensors shouldn't be used in environments containing corrosive gases for a long time. Corrosive gases can damage sensors;
- Gas zeros must be measured in a clean atmosphere;
- Avoid vertical front air intake when testing and applying sensors;
- The air intake of the sensor shouldn't be blocked or polluted;
- Waterproof breathable film over sensor is strictly forbidden to be uncovered

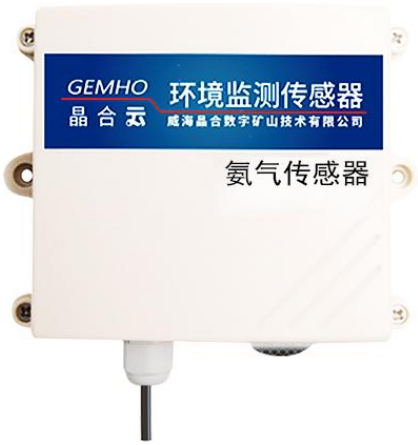
and damage；

- Sensors shouldn’t be subjected to excessive impact or vibration；
- Don’t use if the shell is damaged or deformed；
- After long-term use in high-concentration gas environment, the recovery to the initial state is slow；
- The working electrode and reference electrode of the sensor should be in short circuit ；
- It is forbidden to encapsulate sensors with hot melt adhesives or sealants with curing temperature higher than 80℃；
- It is forbidden to store and use high concentration acid gas for a long time.

Chapter 2 Product Introduction

2.1 Product Appearance

（1）Overall Appearance



2.2 Product Interface

The device provides one power supply, and the DC input range of the power supply is 9-18V. The AC-DC power supply provided by GEMHO can be used, or 12V solar panels and batteries can be used for power supply. Meet the needs of different occasions.

2.3 Configuration List and Illustration

No.	Annex Name	Quantity	Attached Drawing	Remark
1	Ammonia gas sensor	1 set		
2	Power Adapter	1 set		Power supply option
3	Certificate	1 piece		

4	Warranty card	1 piece		
5	Instruction manual	1 book		

Note：The above is the usual configuration. If there is any change, please refer to the sales contract or packing list.

2.4 Cross Interference Characteristics

The sensor also responds to other gases besides the target gas. The response characteristics of the sensor to several common interfering gases are listed in the table below for reference. The data in the table are typical responses of disturbing gases at a given concentration.

Table 2: Cross interference characteristic

	Gas		Concentration		ME3-NH3	
	CO		200ppm		<-6ppm	
	H2S		50ppm		<25ppm	
	C12		10ppm		<-7ppm	
	C2H4		100ppm		0ppm	
	H2		10000ppm		<14ppm	
	C2H6O		1000ppm		<20ppm	
	SO2		20ppm		<9ppm	
	PH3		20ppm		<18ppm	
	CH2O		10ppm		<38ppm	
	C6H6		100ppm		<0.7ppm	

	CH4O		200ppm		<4ppm	

2.5 Product Parameter

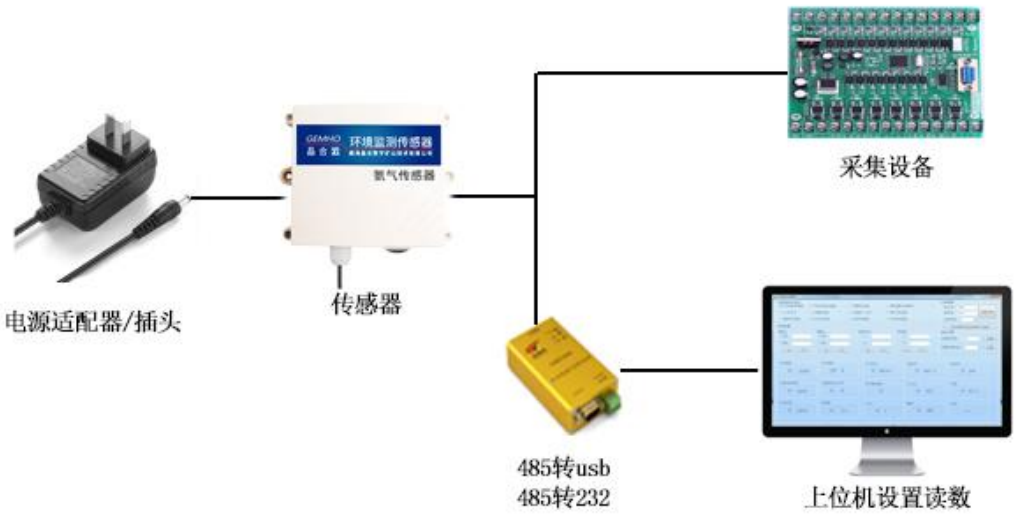
Comprehensive parameter table

Performance	Parameter
Precision Index	≤±3%（25℃）
Measuring Range	0～100ppm
Communication/Signal Output	Modbus RS485/0~5v/4~20ma/0~10v；
Response Time	≤15s
Long-term temperature stability	≤0.1℃/y

Long-term humidity stability	≤1%/y
Output Data	See “Chapter 5 Communication Protocol and Upper Computer Configuration”
Power Supply	DC Power Supply：9~18v
Physical and environmental parameters	Working temperature：-20℃ ~50℃； Waterproof and dustproof：IP67； Side head size：110mm*85mm
Humidity Range	15%～90%RH without condensation
Pressure Range	Standard Atmospheric Pressure±10%
Service Life	2 years（2ppmNH3）

第三章 系统架构

3.1 485 Output



3.2 Analog Signal Output

Chapter 4 Installation Instruction

4.1 Check the device before installation

Device List:

■Ammonia 485/Analog signal output edition sensor 1 set

■One copy of product qualification certificate, warranty card and manual

■Power Adapter（optional）

4.2 Installation Instruction

The wall-mounted installation design is adopted.

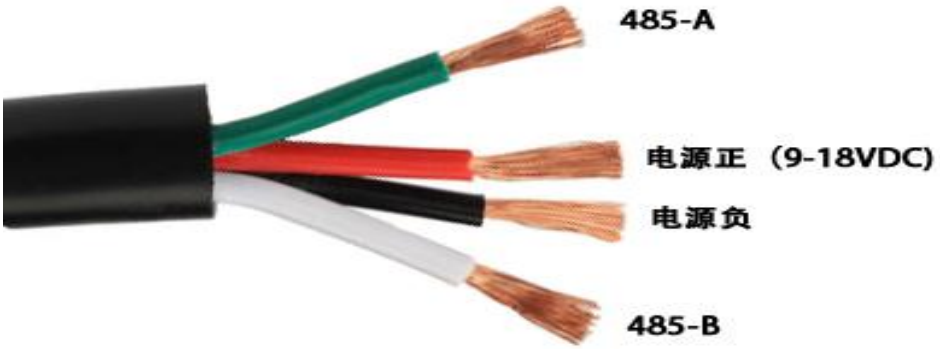
Both sides of the installation port, through the installation port with screws or expansion wire to fix.

4.3 Wiring Instructions

（1）RS485 Line Sequence Description

Project	Line Sequence Name	Line Color

Power Supply	Power supply positive	Red Line
	Power supply negative	Blue Line
Communication	RS485A	Yellow Line
	RS485B	Brown Line



Note: Please strictly follow the line sequence instructions for wiring, otherwise it is easy to cause excessive current, resulting in equipment damage.

Chapter 5 Communication protocol and upper computer configuration

5.1 485 Edition Communication Protocol and Instructions

Parameter	Content
Code	8-bit binary
Data bits	8-bit
Parity bit	None

Stop bit	1-bit
Error check	CRC (redundant cyclic code)
Baud rate	9600 bit/s

5.2 Data frame format definition

Using Modbus-RTU protocol, the format is as follows：

Initial structure >=4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure >=4 bytes of time

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

Function code: the instruction function indicated by the host indicates that the transmitter only USES function code 0x03 (to read memory data).

Data area: the data area is the specific communication number area. Note that 16bits of data are high bytes in front.

CRC code: a two-byte checksum code.

（1）Read the ammonia concentration at device address 0X01

Inquiry frame：

Address code	Function code	Starting address	Data length	Check code low bit	Check code height

0x01	0x03	0x00,0x14	0x00,0x01	0x64	0x0B

Response frames： (e.g. read CO value 18.9 PPM)

Address code	Function code	Number of bytes available	CO value	Check code low bit	Check code height
0x01	0x03	0x02	0x00 0xBD	0x78	0x35

082DH (hexadecimal) =-2093=>ammonia concentration=20.93ppm

（2）Query device address

Reading the current device address can only be done by a single offline sensor independently.

Examples of querying device addresses：

Send：FF 03 00 0F 00 01 A1 D7

Return：FF 03 01 01 00 60

The data returned by the sensor 0x01 is the device address 0x01.

（3）Modify the device address example

The communication protocol format for writing data is shown in the following table：

Address code	Function address	Data address	New address	Check code low bit	Check code height
	06	0x00,0x0F	H, L		

Description：

1、Address code range 0x01~0xFE，default value 0x01；

2、The machine only supports writing sensor address value，when writing address high before low after.

Write sensor address example：

Change 01 address to 09 address：

Send：01 06 00 0F 00 09 79 CF

Return：01 06 01 09 20 4F

5.3 485 Edition PC Software Configuration

（1）Device connected to computer

The device connects to the serial port of the computer through“485 to USB”or“485 to 232”device.

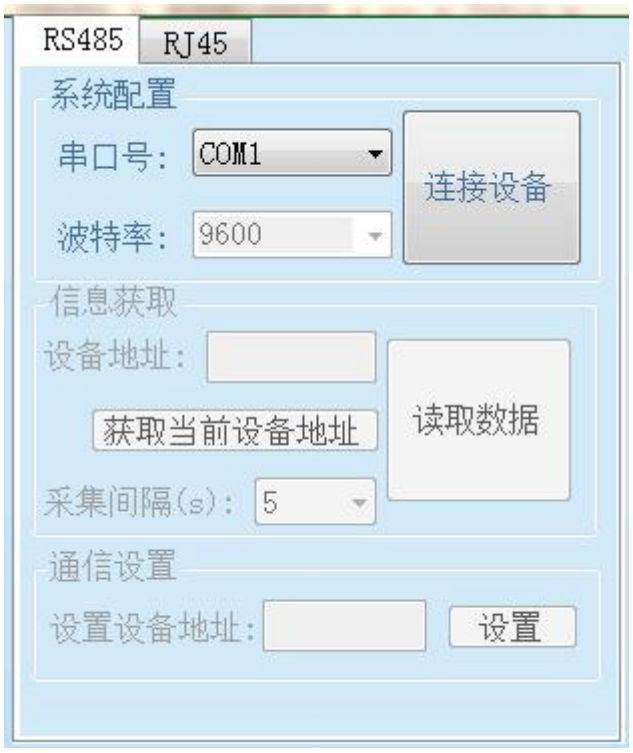
（2）Check if the device is connected

1）Open the computer device manager and check whether a new device is added under the ports（COM and LPT）. Remember the port number of this device（the figure below is only a schematic diagram, the port number displayed by different computers is different）.

（3）Read Data

1）Run“Environmental Monitoring Software”.

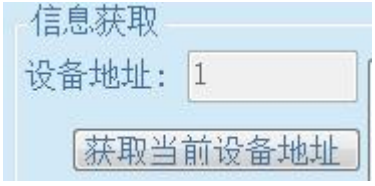
2）RS485 Access Device：



Select serial port number, baud rate（default 9600，no need to select），and click connect device.

After the device is connected，【Information Acquisition】the device address is loaded；In【Sensor Type Selection】，the function set in the current panel is checked by default； and in【Real-time Data】, the list of checked functions is displayed. As shown in figure.

If the current device address changes， or it is empty, you can manually click the【Get the current device address】button to get the latest device address.



If you need to change the device address：After the device is connected, you can

modify the device address. Select【Communications Settings】，filling in the address to be modified in【Settings Device Address】， and click【Settings】to complete the modification.

After the modification is completed, the modification is indicated as successful.

Select【Collection Interval】，and then click【Read Data】. The data is shown as follows（cannot be exported）：

3）Modify the parameters such as device alarm：after the device is connected，the parameters such as device alarm can be modified. Select functions to be modified，such as air temperature. Select【Automatic】or【Manual】to set it accordingly.

Automatic：Select whether to【Logic Inversion】，enter the parameters such as【Alarm Upper Limit】，click the【Settings】button，you can complete.

Manual：Click on the【Open/Close】button to control the opening and closing.

Note：Switch quantity of device control can only be selected automatically/manually, and cannot be controlled at the same time.

4）RJ45 Access Device：

Click on【Intranet Device】and pop up the following window to view all devices in the current network and network configuration.【Device ID List】shows all device IDs under the current network. You can click【Refresh】to retrieve the device status.

Modify network settings：Select the device ID to be changed in the【Device ID List】，enter the new【IP Address】, 【Subnet Mask】, 【Gateway】, and then click【Settings】.

After the setting is completed，click on【Refresh】again to check whether the network setting has been changed successfully.

Main Interface Read Data：

Enter【IP】and click【Test Connection】. Test whether the current network is connected correctly.（This step can be ignored）

In【Sensor Type Selection】，select the function to be loaded，select the【Acquisition Interval】，and click【Read Data】to read the data of network devices. As shown in the figure.

Chapter 6 After-sale Quality Assurance

6.1 Failure Analysis

No.	Phenomenon	Possible Failure	Solution
1	No communication signal	Cable fault	Multimeter check power supply circuit
2	Communication is normal, but no data	Interface connection failure	Check interface connection
3	The measured data deviate from reality seriously	Sensor Fault	Contact manufacturer

6.2 Warranty Terms

This product is guarantee for two years from the date of shipment and half a year for accessories (case/plug/cable, etc.).

The following are not covered by warranty:

- Counterfeiting and imitating our products;
- External factors or man-made intentional damage, mechanical damage, violent smashing, etc.;
- Damage caused by using in abnormal working environment without following operation instructions;
- Users disassemble, refit or have been repaired by unauthorized units;