Hydrogen sulfide temperature and humidity transmitter
User manual
(Type 485)

Document version：V1.0

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1. Product introduction

1.1 Product Overview

Hydrogen sulfide is a flammable hazardous chemical. It can form an explosive mixture when mixed with air. It can cause fire and explosion in case of open fire and high heat. At the same time, hydrogen sulfide is an indispensable raw material in the chemical industry, such as the synthesis of phosphors and the manufacture of photoconductors. Hydrogen sulfide is also a highly toxic gas, which can cause human olfactory paralysis. After inhalation, a small amount of high-concentration hydrogen sulfide can be fatal in a short time. Low concentrations of hydrogen sulfide have an effect on the eye, respiratory system and central nervous system. Therefore, for the industry using hydrogen sulfide, the detector for detecting the concentration of hydrogen sulfide is indispensable. Our company has independently developed the hydrogen sulfide temperature and humidity transmitter for the market demand.

This product is a constant potential electrolytic hydrogen sulfide (H2S) sensor with low power consumption, high precision, high sensitivity, wide linear range, strong anti-interference ability, excellent repeatability and stability. This product is widely used in the detection of hydrogen sulfide in industrial, mining, environmental protection and animal husbandry. The product adopts 485 communication standard MODBUS-RTU communication protocol, communication address and baud rate can be set. The enclosure rating is high and can be adapted to different environmental monitoring.

1.2 Features

1. High-sensitivity gas detection probe with stable signal and accurate measurement of hydrogen sulfide concentration (PPM) with high accuracy.

2. The measuring range is wide, 0-100ppm, the maximum range is 500ppm.

3.485 communication, standard ModBus-RTU communication protocol, communication address and baud rate can be set, the farthest communication distance is 2000

Meter.

4. The product adopts wall-mounted waterproof shell, which is easy to install and has high protection level.

1.3 Main Specifications

Power supply	10~30V DC
output signal	485
Power consumption	0.12W
Temperature measurement range	-40℃~+80℃
Temperature accuracy	±0.5℃
Humidity measurement range	0~100%RH
Humidity accuracy	±3%RH

Operating temperature	-20℃~+50℃
Working humidity	15%RH~90%RH
Pressure range	Standard atmospheric pressure ±10%
Stability (months)	<2%
Hydrogen sulfide zero drift (-20~40°C)	≤0.2ppm
Repeatability	<2% output value
Service life	≥24 months
Range	0~100ppm
Precision	±10%FS
Resolution	1ppm

1.4product model

Hydrogen sulfide temperature and humidity three-in-one transmitter selection:

RS						Company code
	H2SWS					Hydrogen sulfide temperature and humidity three-in-one transmitter
		N01				485 (Modbus protocol)
			2-			Wall-mounted king shell with OLED display
				100 P		Corresponding range 0~100ppm
					4	Built-in probe, H2S&temp&humidity
					5	External probe, H2S&temp&humidity
						0	Normal leaking place
						G	Public toliet(range of 0-20ppm)
						Y	Poultry farm(range

					of 0-20ppm No warranty

Hydrogen sulfide concentration transmitter selection:

RS						Company code
	H2S-					Hydrogen sulfide concentration transmitter
		N01-				485（Modbus protocol）
			2-			Wall-mounted king shell
			OLED-			OLED display wall hanging king shell
				100P		Corresponding range 0~100ppm
					2	PE probe, measure H2S only
					0	Normal leaking place
					G	Public toliet(range of 0-20ppm)
					Y	Poultry farm(range of 0-20ppm) No warranty

1. 5 System framework
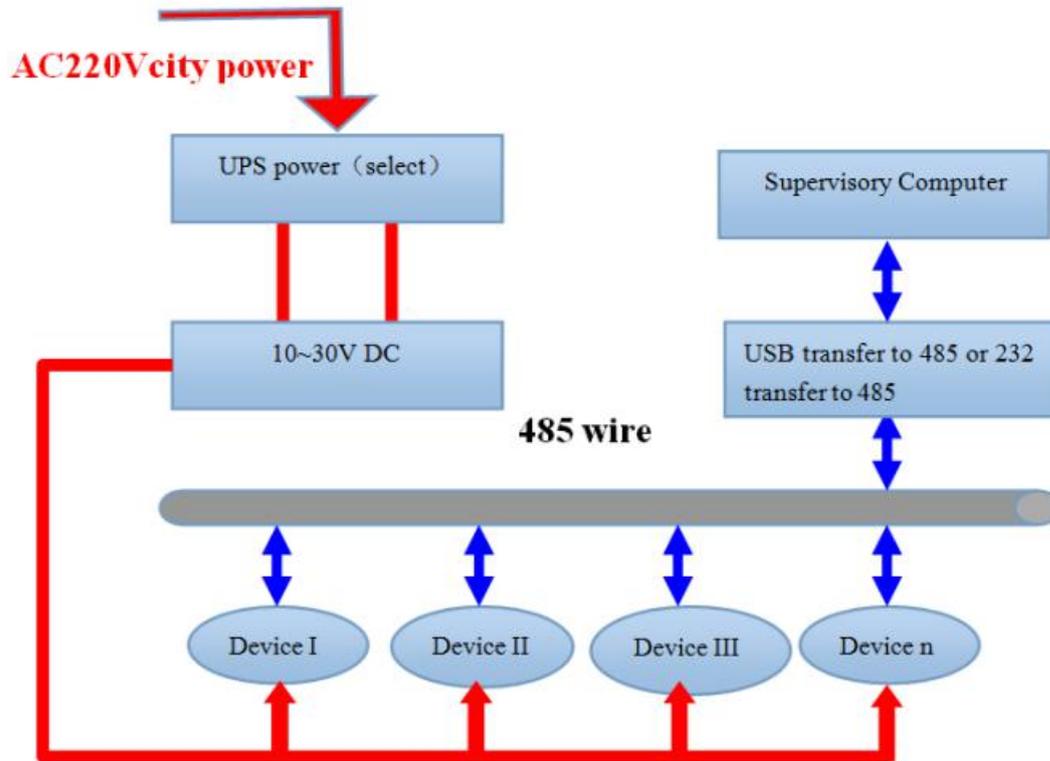
2. Equipment installation instructions

2.1 Equipment pre-installation inspection

Equipment List:

1. Hydrogen sulfide transmitter equipment 1

2. Self-tapping screws (2), expansion plugs (2)

3. Product certificate, warranty card, wiring instructions, etc.

4.12V/1A waterproof power supply 1 (optional)

5. USB to 485 (optional)

2.2 Description of installation steps
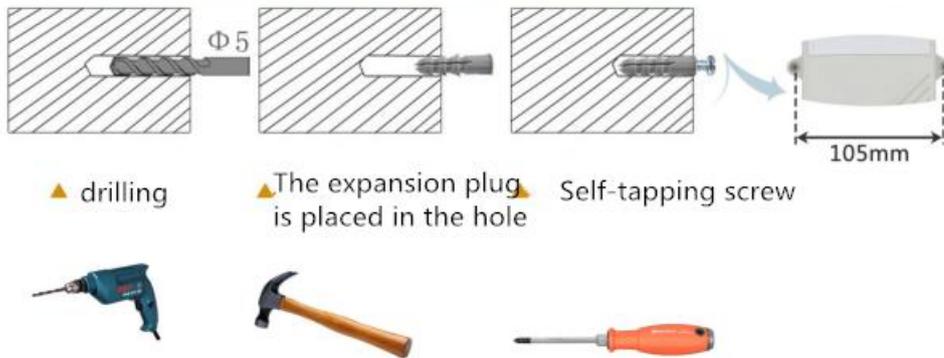
2.3 Interface Description

Wide voltage power input can be 10~30V. When wiring the 485 signal line, note that the A\B lines cannot be connected in reverse, and the addresses between multiple devices on the bus cannot conflict.

	Line color	Description
power supply	brown	Power supply（10~30V DC）
	black	Negative power supply
Communication	yellow	485-A
	blue	485-B

2.4 485Negative power supply

When multiple 485 models are connected to the same bus, there are certain requirements for field wiring. For details, please refer to the 485 Equipment Field Wiring Manual in the data package.

3.Configuration software installation and use

3. 1Software selection

Open the package and select "Debug Software"---"485 Parameter Configuration Software" to find it, Open it.

3. 2 parameter settings

1. Select the correct COM port ("My Computer - Properties - Device Manager - Port" to view the COM port). The following figure lists the drive names of several different 485 converters.
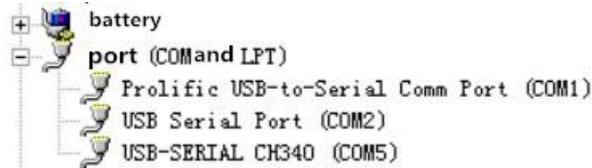
2. Connect only one device and power on separately. Click the test baud rate of the software. The software will test the baud rate and address of the current device. The default baud rate is 4800 bit/s and the default address is 0x01.

3. Modify the address and baud rate according to the needs of use, and query the current functional status of the device.

4. If the test is not successful, please re-check the equipment wiring and 485 driver installation.
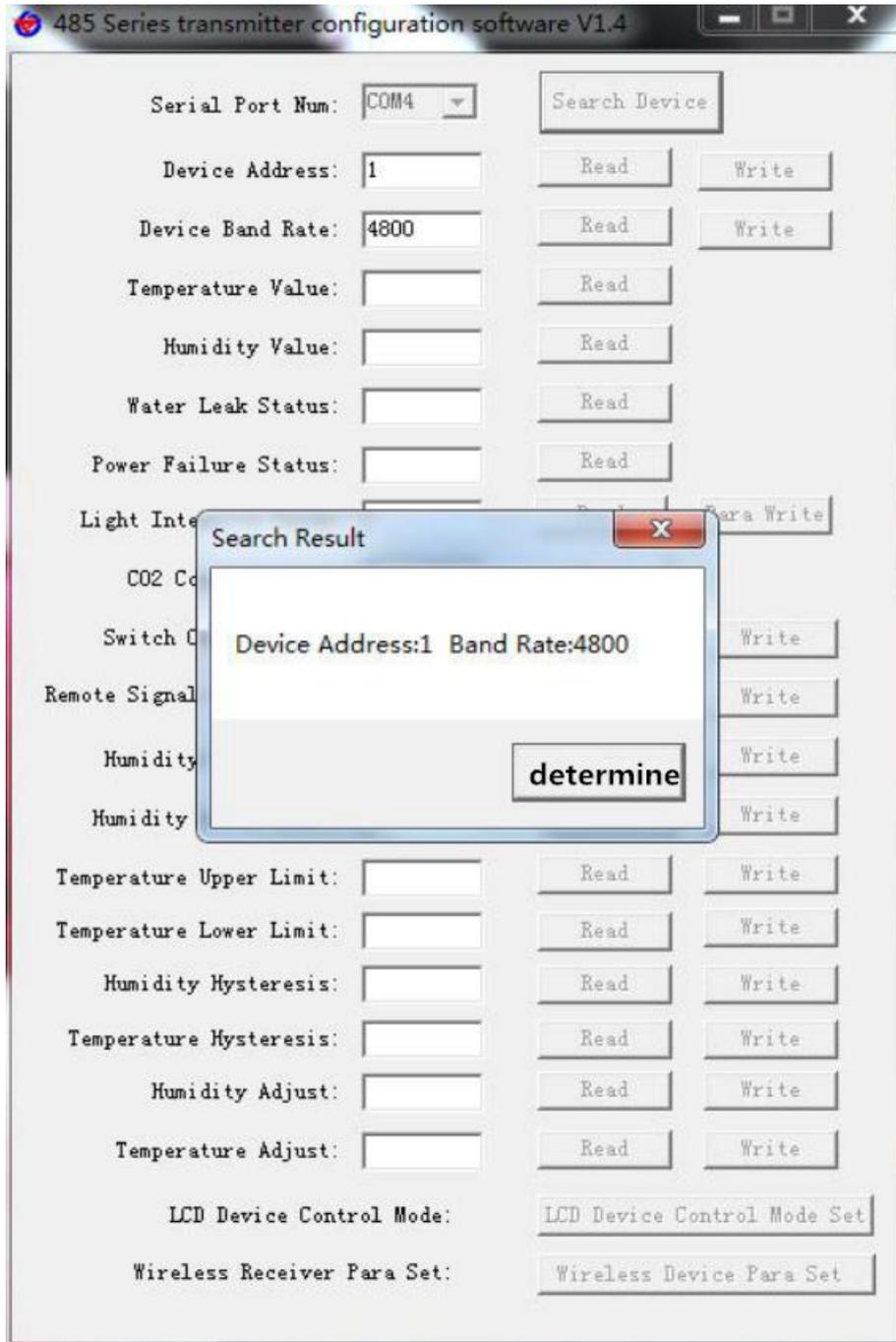
4.letter of agreement

4. 1Basic communication parameters

Code	8-bit binary
Data bit	8 digits
Parity bit	no
Stop bit	1 digits
Error check	CRC (redundant cyclic code)
Baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/

s

4.2 Data frame format definition

Adopt Modbus-RTU communication 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 address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: The instruction function of the command sent by the host. The transmitter can use function code 0x03 (read register data) 0x06, 0x10 (write register data).

Data area: The data area is the specific communication data. Note that the 16-bit data high byte is in front!

CRC code: Two-byte check code.

Host inquiry frame structure:

address code	function code	Register start address	Register length	Check code low	Check code high
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure:

address code	function code	Effective number of bytes	Data area	Second data area	Nth data area	Check code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

4. 3Register address

Hydrogen sulfide temperature and humidity integrated equipment

Register address	PLC or configuration address	content	operating	Scope and definition
0000 H	40001	Humidity value	Read only	0~1000 (the value after expanding 10 times)

0001 H	40002	Temperature value	Read only	-400~800 (the value after expanding 10 times)
0002 H	40003	Hydrogen sulfide concentration value	Read only	0~100 (actual value)
0030 H	40049	Upper temperature alarm value	Read and write	-400~800
0031 H	40050	Lower temperature alarm value	Read and write	-400~800
0032 H	40051	Temperature calibration value	Read and write	Integer
0033 H	40052	Humidity upper limit alarm value	Read and write	0~1000
0034 H	40053	Humidity lower limit alarm value	Read and write	0~1000
0035 H	40054	Humidity calibration value	Read and write	Integer
0036 H	40055	Hydrogen sulfide upper limit alarm value	Read and write	0~100
0037 H	40056	Hydrogen sulfide lower limit alarm value	Read and write	0~100
0038 H	40057	Hydrogen sulfide calibration value	Read and write	Integer
07D0 H	42001	Device address	Read and write	1~255(factory default 1)
07D1H	42002	Device baud rate	Read and write	0 for 2400 1 for 4800 2 represents 9600

Hydrogen monosulfide equipment

Register address	PLC or configuration address	content	operating	Scope and definition

0000 H	40001	Hydrogen sulfide concentration value	Read only	0~100
0002 H	40003			
0036 H	40055	Hydrogen sulfide upper limit alarm value	Read and write	0~100
0037 H	40056	Hydrogen sulfide lower limit alarm value	Read and write	0~100
0038 H	40057	Hydrogen sulfide calibration value	Read and write	Integer
07D0 H	42001	Device address	Read and write	1~255(factory default 1)
07D1H	42002	Device baud rate	Read and write	0 for 2400 1 for 4800 2 represents 9600

4.4 Communication protocol examples and explanations

4.4.1 Reading the address of the 0x01 device and the baud rate

Inquirer frame (for example: address is 0x01 baud rate is 4800)

address code	function code	starting address	Data length	Check code low	Check code high
0x01	0x03	0x07 0xD0	0x00 0x02	0xC4	0x86

Response frame

address code	function code	Effective number of bytes	Baud rate	address	Check code low	Check code high
0x01	0x03	0x04	0x00 0x01	0x00 0x01	0x6A	0x33

4.4.2 Modifying the address

Inquiry frame (assuming the modified address is 0x02 Note: After the address is modified, the device needs to be powered off to restart the device)

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

Response frame

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD0	0x00 0x02	0x08	0x86

4.4.3 Modifying the Baud Rate of Address 0x01

Inquirer frame (assuming the modified baud rate is 9600. Note: After modifying the address, you need to power off and restart the device)

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

Response frame

address code	function code	starting address	Modify value	Check code low	Check code high
0x01	0x06	0x07 0xD1	0x00 0x02	0x59	0x46

4.4.4 Reading the H2S value of device address 0x01

Inquiry frame (single hydrogen sulfide device can read 00 register or 02 register, 3-in-1 device can only read 02 register)

address code	function code	starting address	Data length	Check code low	Check code high
0x01	0x03	0x00 0x02	0x00 0x01	0x25	0xCA

Response frame (for example, reading to H2S is 100ppm)

address code	function code	Returns the number of valid bytes	H2S value	Check code low	Check code high
0x01	0x03	0x02	0x00 0x64	0xB9	0xAF

H2S:

0064 (hexadecimal) =100=> H2S=100ppm

4.4.5 Reading the Temperature and Humidity and Hydrogen Sulfide Concentration Value of Device Address 0x01

Inquiry frame

address code	function code	starting address	Data length	Check code low	Check code high
0x01	0x03	0x00 0x00	0x00 0x03	0x05	0xCB

Response frame (for example, reading temperature value -7.5 ° C humidity value

35.9% hydrogen sulfide value 100 ppm)

address	function	Number	Humidity	Temperature	H2S	Check code low	Check code

code	n code	of byt es	value	re value			high
0x01	0x03	0x06	0x01 0x67	0xFF 0xB5	0x00 0x64	0x35	0x75

Temperature: When the temperature is below 0 °C, the temperature is uploaded in complement form.

FFB5 H (hex) = -75 => temperature = -7.5°C

humidity:

167 H (hexadecimal) = 359 => humidity = 35.9% RH

Hydrogen sulfide:

0064 (hexadecimal) =100 => hydrogen sulfide = 100 ppm

4.4.6 Reading the upper and lower temperature limits of the device address 0x01 and the calibration value

Inquiry frame: (for example, the upper limit of reading is 100, the lower limit is 0, and the calibration value is 0)

address code	function code	starting address	Data length	Check code low	Check code high
0x01	0x03	0x00 0x30	0x00 0x03	0x05	0xC4

Response frame

address code	function code	Register length	Upper temperature limit	Lower temperature limit	Temperature calibration value	Check code low	Check code high
0x01	0x03	0x00 0x06	0x00 0x64	0x00 0x00	0x00 0x00	0xFA	0x22

4.4.7 Write Address 0x01 Device Temperature Upper Limit

Inquiry value (for example, the upper limit of the write temperature is 100)

address code	function code	starting address	Data value	Check code low	Check code high
0x01	0x06	0x00 0x30	0x00 0x64	0x88	0x2E

Response frame

address code	function code	starting address	Data value	Check code low	Check code high
0x01	0x06	0x00 0x30	0x00 0x64	0x88	0x2E

4.4.8 Write address 0x01 device temperature upper limit, lower limit, calibration value

Interrogation frame (eg write upper limit 100, lower limit 0 calibration value 0)

address code	function code	starting address	Number of regist	Write byte length	Upper limit	lower limit	Calibration valu	Check code low	Check code hi

			ers				e		gh
0x01	0x10	0x00 0x30	0x00 0x03	0x06	0x00 0x64	0x00 0x00	0x00 0x00	0x97	0xB7

Response frame

address code	function code	starting address	Number of registers	Check code low	Check code high
0x01	0x10	0x00 0x30	0x00 0x03	0x80	0x07

Humidity and gas reading and writing are the same as reading and writing in temperature!

4.5 Hydrogen sulfide measurement unit ppm and mg/m3 conversion relationship

At standard atmospheric pressure and normal temperature, the conversion according to the following conversion formula is only applicable to the calculation of hydrogen sulfide (H2S):

1PPm = 1.417mg/m3

5. Common problems and solutions

Device cannot connect to PLC or computer

possible reason:

1) The computer has multiple COM ports, and the selected port is incorrect.

2) The device address is incorrect, or there is a device with a duplicate address (all the factory defaults to 1).

3) Baud rate, check mode, data bit, stop bit error.

4) The host polling interval and the waiting response time are too short and need to be set to more than 200ms.

5) The 485 bus is disconnected, or the A and B lines are reversed.

6) If the number of devices is too large or the wiring is too long, the power should be supplied nearby, add 485 enhancer, and increase the resistance of 120Ω terminal.

7) The USB to 485 driver is not installed or damaged.

8) Equipment damage.

6. Notes

1) The aging test before use is not less than 48 hours;

2) Electrolyte leakage will cause injury, please do not disassemble the sensor at will;

3) The sensor should avoid contact with organic solvents (including silicone rubber and other adhesives), paints, chemicals, oils and high-concentration gases;

4) The sensor should not be immersed in an oxygen-free environment for a long time, otherwise it will damage the performance of the sensor;

5) It should not be used for a long time in an environment containing corrosive gases, corrosive gases will damage the sensor;

6) The sensor should not be excessively impacted or vibrated;

7) It is forbidden to store and use in high concentration alkaline gas for a long time;

8) The air inlet holes must not be blocked or contaminated.

7. Contact information

Shandong Renke Measurement & Control Technology Co., Ltd.

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Zip code: 250101

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Cloud platform address: www.0531yun.cn

www.renkeer.com

Shandong Renke Control Technology Co., Ltd.

8. Document history

V1.0 document creation

9. Appendix: Housing dimensions

Overall size: 110 × 85 × 44mm