Weihai Jinghe Digital Gemho Technology Co., Ltd

Manual

RS485/4-20mA Temperature And Humidity Sensor

Chapter I Product Overview

1.1 Introduction

Ghhb-001-485 temperature and humidity sensor is a new sensor integrating induction, acquisition and output.

It has low power consumption, high precision, high sensitivity, wide linear range, strong anti-interference ability, excellent repeatability and stability. The product can be widely used in environmental monitoring, meteorological monitoring, intelligent agriculture, cold chain transportation and other environments. Compared with the traditional Internet of things sensors, it has the advantages of high precision and easy installation.

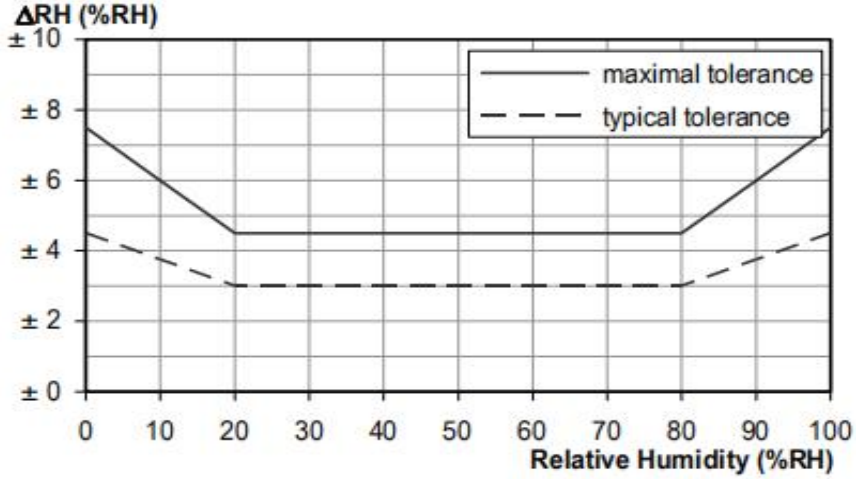
1.2 Product Appearance

1.3 Main Product Parameters

Name	Parameter
POWER SUPPLY	9-18V DC
Output Signal	RS485/0-5V/0-10V/4-20mA
Temperature Range	-40-80℃
Humidity Range	0-100%RH
Accuracy	As follows
Response Time	≤60s
Size	110mm*85mm
Working Temperature	-20℃~50℃

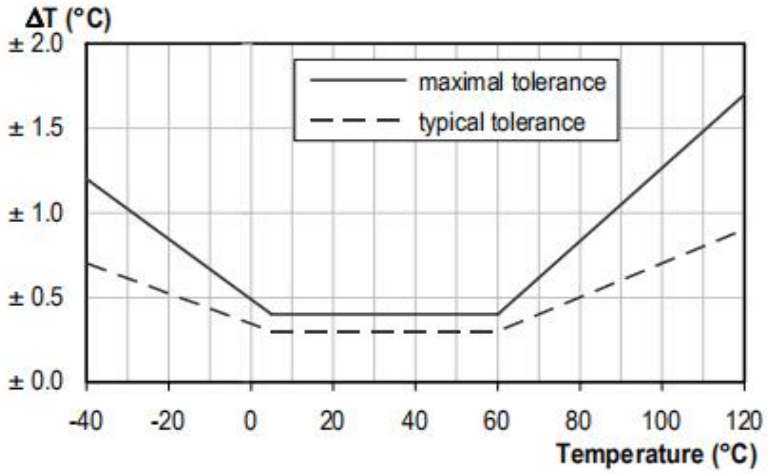
Working Humidity	15%RH~90%RH
Working Pressure	Atmospheric Pressure±10%
Waterproof Grade	IP67

Accuracy:



Humidity measurement accuracy under different humidity

As shown in the above figure, the typical deviation is ± 3% in the range of 20-80% RH, and the deviation increases when the humidity is less than 20% and greater than 80%.

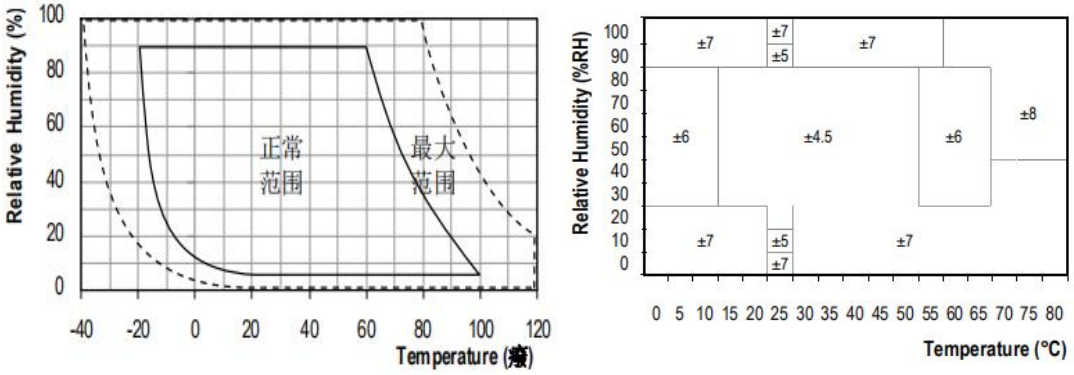


Temperature measurement accuracy at different temperatures

As shown in the above figure, the maximum deviation is within ± 0.5 in the range of 5-60 ℃, and the deviation increases when it is less than 0 ℃ and greater than 60 ℃.

1.3.1 Effect of temperature on humidity

Different temperatures will have a certain impact on humidity, as shown in the figure below.

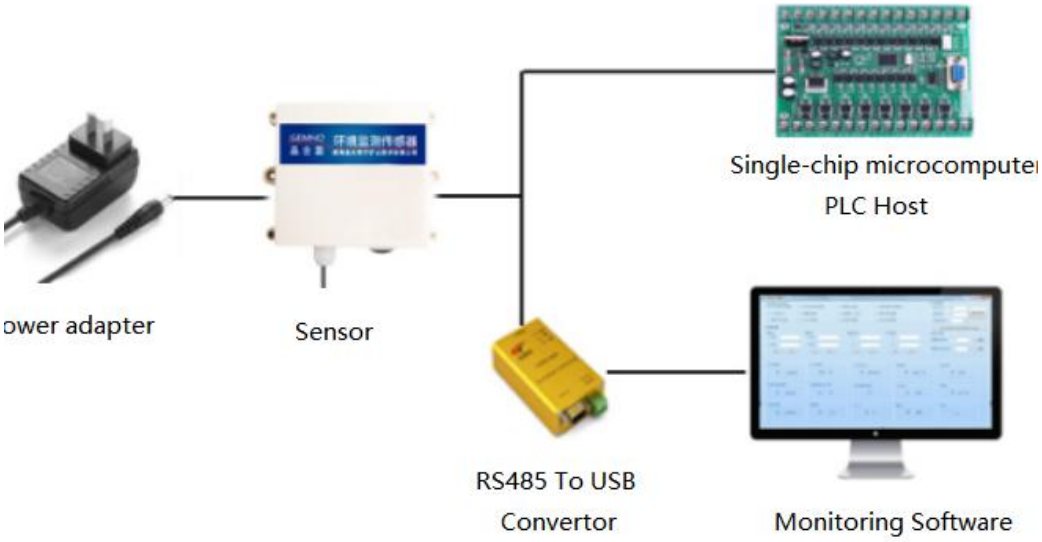


In the humidity range of 15 ℃ to 55 ℃ and 30 ℃ to 80 ℃, the humidity accuracy is the highest, which is ± 4.5%. In other cases, the humidity increases.

Chapter III System Architecture

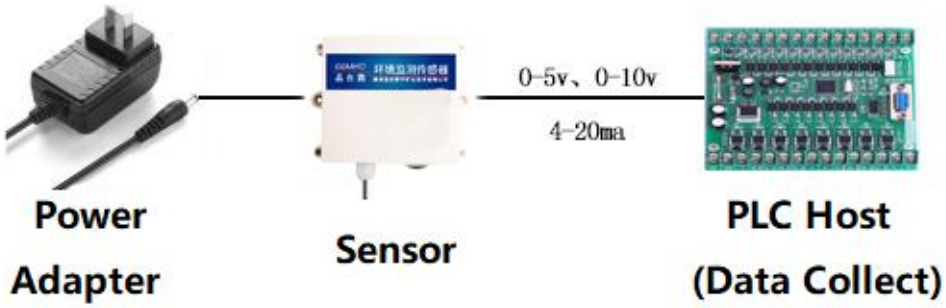
3.1 RS485 Output Signal

The sensor is powered by 12V DC power supply and connected to PLC with RS485 interface. It can also be connected to MCU through RS485 interface chip. The MCU and PLC are programmed through the Modbus protocol specified later. Or use USB to RS485 to connect with the computer, and use the sensor configuration tool provided by our company for configuration and testing. Theoretically, one bus can connect more than 16 RS485 sensors. If more RS485 sensors need to be connected, RS485 repeaters can be used to expand more RS485 devices.



3.2 Analog Output

Using 12V DC power supply, the sensor can be connected with acquisition equipment such as PLC or single chip microcomputer. Through the measured voltage or current value, the real-time data collected by the sensor can be obtained.



Chapter IV Installation And Wiring Instructions

4.1 Equipment List

■Temperature and Humidity Sensor

■2pcs M3 screws

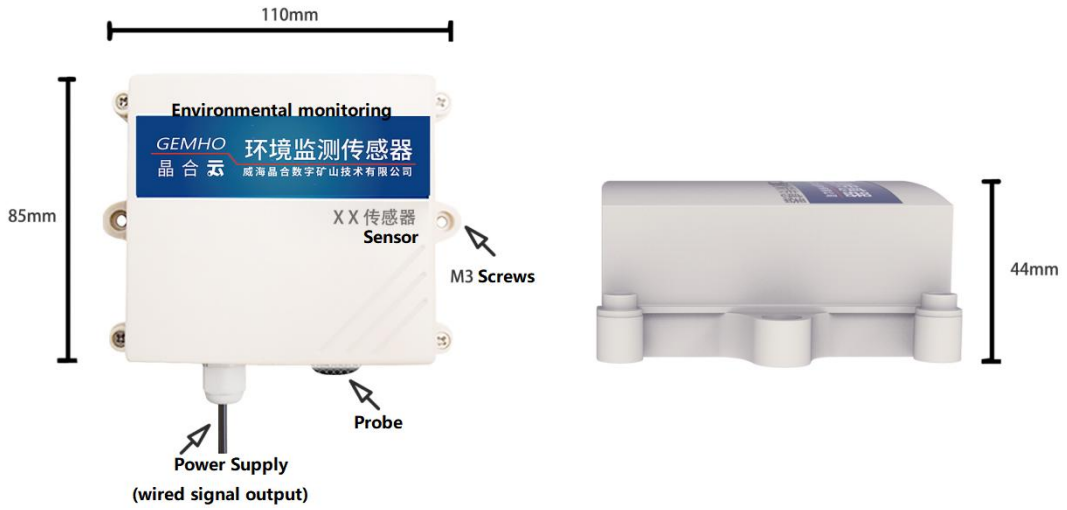
■Product Certificate, Warranty Card And Manual

■Power Adapter (optional)

4.2 Installation Instructions

The equipment adopts wall mounted installation design.

Installation openings are reserved on both sides and can be vertically fixed on the wall through m3 screws or expansion screws.



4.3 Wiring Instructions

（1）RS485 Line Description

Name	Line Name	Line Color
Power Supply	Positive power supply	Red
	Negative power supply	Black
Output Signal	RS485A	Green
	RS485B	Yellow

（2）Analog Line Description

Name	Line Name	Line Color
Power Supply	Positive power supply	Red
	Negative power supply	Black
Output Signal	Temperature	Green
	Humidity	Green

Be Careful:

Please follow the wiring instructions strictly, otherwise it is easy to cause excessive current and damage the equipment.

If the power adapter is not purchased in our company, it is equipped with 4-core wire, and the customer needs to prepare 9-18vdc power supply by himself.

For customers who have purchased power adapters from our company, we will connect the DC female head to the equipment before the equipment leaves the factory. After receiving the product, the customer can plug in directly to supply power to the equipment.

Chapter V

RS485 Communication Protocol And Host Computer Configuration

5.1 RS485 Communication Protocol And Description

Parameter	Content
Coding	8 bit Binary
Data bit	8-bit
Parity bit	Without
Stop bit	1-bit
Error Check	CRC（redundant cyclic code）
Baud Rate	9600 bit/s

5.2 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. This transmitter only uses function code 0x03 (read register data).

Data area: The data area is the specific communication data. Note that the16-bit data high byte is in front!

CRC code: Two-byte check code.

（1）Read the temperature and humidity value of the device address 0x01

Inquiry Frame：

Address Code	Function Code	Register Start Address	Register Length	CRC L	CRC H
0x01	0x03	0x00,0x00	0x00,0x02	0xC4	0x0B

Answer Frame：

Address Code	Function Code	Effective number of bytes	Tem	Hum	CRC L	CRC H
0x01	0x03	0x04	0x01,0x2C	0x02,0x92	0x2B	0xF2

Temperature: upload in the form of complement when the temperature is lower than 0 ° C

012ch (HEX) = 300 = > temperature = 3.00 ° C

Humidity:

292h (HEX) = 658 = > humidity = 6.58% RH

Note: the temperature calculation method is complement method

If the returned value of temperature is ff17h (hexadecimal, original code)

Convert ff17 to binary to 1111111100010111

(2) Query device address

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

Example of querying equipment address:

Send: FF 03 00 0f 00 00 60 17

Return: FF 03 01 00 60

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

（3）Example of modifying equipment address：

Code Address	Function Code	Data Address •	New Address	CRC L	CRC H
	06	0x00,0x0F	H, L		

Explain:

1. The range of address code is 0x01 ~ 0xFE, and the default value is 0x01;

2. This machine only supports writing the sensor address value. When writing, the high-order address is in the front and the low-order address is in the back;

3. When the device address is not known, the address code is written to FF

Example of writing sensor address:

Change 01 address to 09 address:

Send: 01 06 00 0f 00 09 79 CF

Return: 01 06 01 09 20 4F

5.3 Upper computer reads equipment data and software configuration

（1）Connect the device to the computer

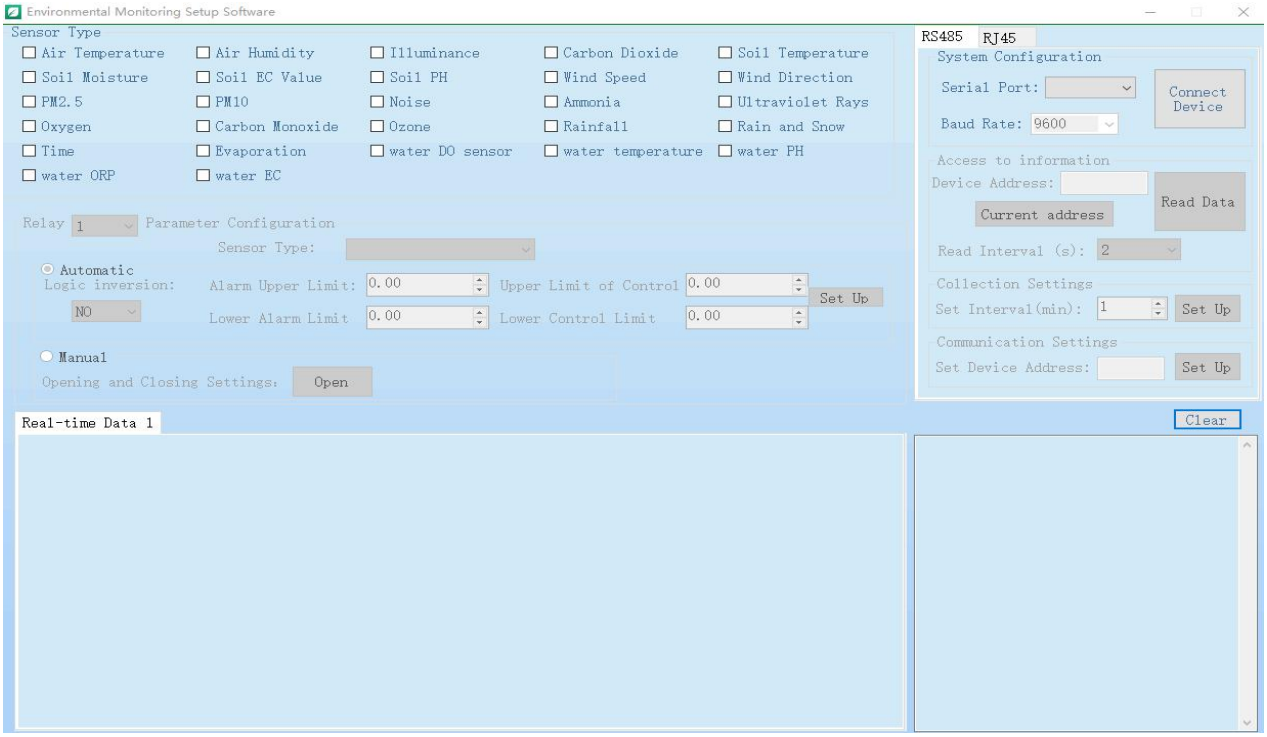
The device is connected to the computer serial port through "RS485 to USB" or "RS485 to 232" devices.

（2）Check whether the device is connected

1）Open the computer device manager, check whether a new device is added under the port (COM and LPT), and remember the port number of this device (the following figure is only a schematic diagram, and the port numbers displayed on different computers are different)

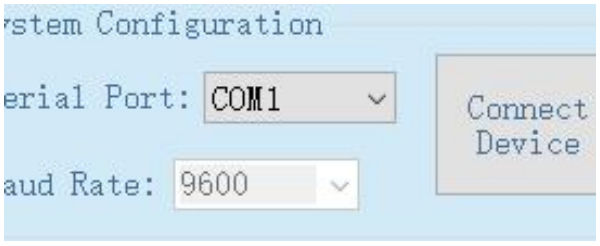
（3）Read Data

1）Run "environmental monitoring setting software".

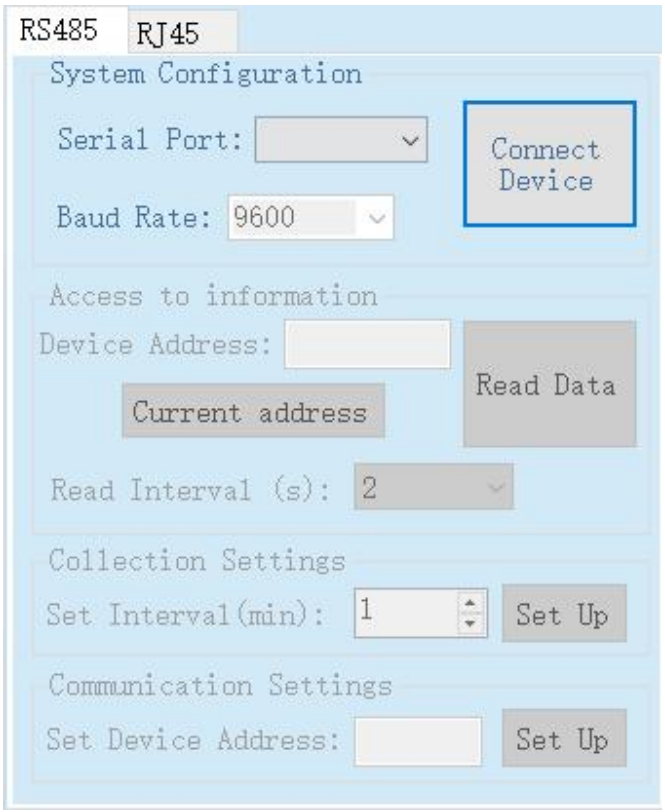


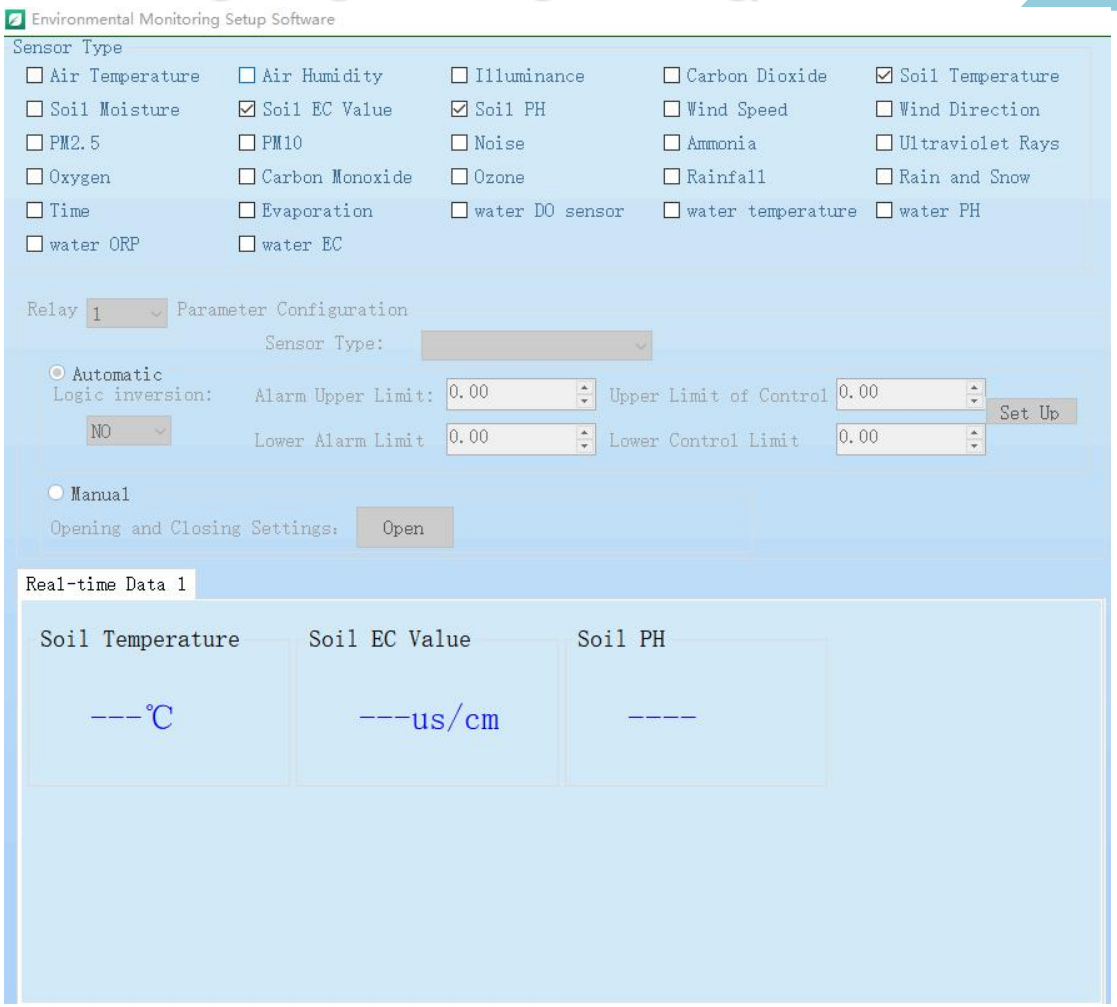
2）RS485：

Select serial port number and baud rate (9600 by default, not selected), and click Connect device.



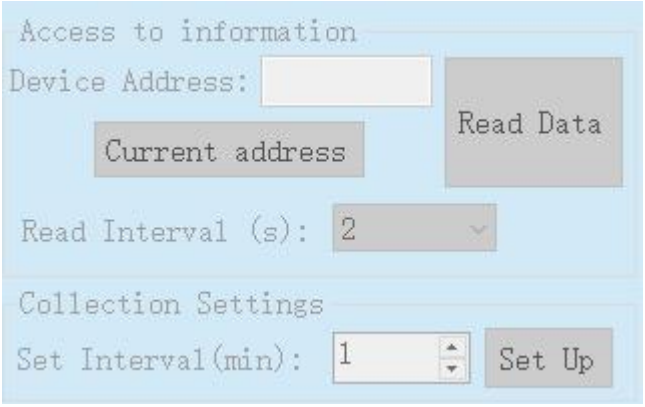
After the device is connected, the device address in [information acquisition] is loaded; In [sensor type selection], the function set in the current panel is checked by default; The checked function list is displayed in [real time data]. As shown in the figure:





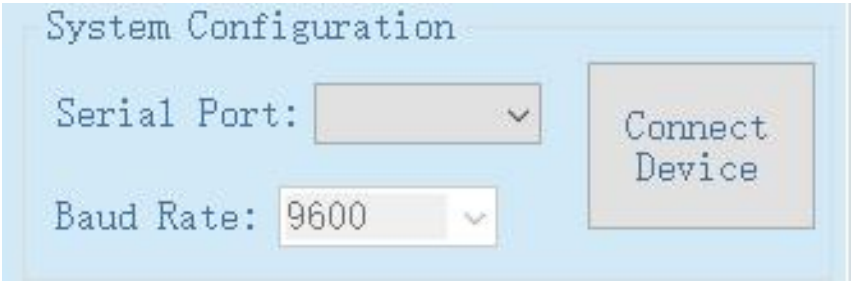
If the current device address is changed or empty, you can manually click the [get current device address] button to get the latest device address

(4) Click [address setting] in [device setting] to modify, and then click [address setting] to finish



After the modification is completed, you will be prompted that the modification is successful.

(5)To modify the baud rate of the equipment: select [communication setting], select the baud rate to be modified in [serial port setting] - [baud rate], and click [setting] to complete the modification.



After the modification is completed, you will be prompted that the modification is successful

Chapter VI Analog Signal

6.1 4-20mA Output Signal

Current	Temperature	Humidity
4mA	-40℃	0%RH
20mA	80℃	100%RH

P（Tem）=（I（Current）-4mA）*7.5-40 °C

P（Hum）=（I（Current）-4mA）*6.25 %RH

Where I is mA.

6.2 0-10V Output Signal

Voltage	Temperature	Humidity
0V	-40℃	0%RH
10V	80℃	100%RH

P（Tem）=V（VOLTAGE）*12-40 °C

P（Hum）= V（VOLTAGE）*10 %RH

Where V is Voltage.

6.3 0-15V Output Signal

Voltage	Temperature	Humidity
0V	-40℃	0%RH
5V	80℃	100%RH

P（Tem）=V（VOLTAGE）*24-40 °C

P（Hum）= V（VOLTAGE）*20 %RH

Where V is Voltage.

Chapter VII Error analysis and quality assurance

7.1 Fault Analysis

No.	Performance	Possible Faults	Solution
1	No communication signal	Cable fault	Check the power supply circuit with a multimeter
2	No Data	Interface connection failure	Interface connection failure
3	Wrong Data	Probe Wrong	Contact Us