Product introduction

The transmitter has a built-in temperature and humidity sensor and is small in size. The circuit adopts imported industrial-grade microprocessor chips and imported high-precision temperature sensors to ensure excellent reliability and high precision of the product. The equipment can be used in a non-condensing environment of 0-99.9%RH. The product adopts the 485 communication interface standard ModBus-RTU communication protocol, the communication address and baud rate can be set, and the communication distance is up to 2000 meters. The product has the function of anti-reverse connection protection, and the reverse connection will not burn the equipment.

1.1 Features

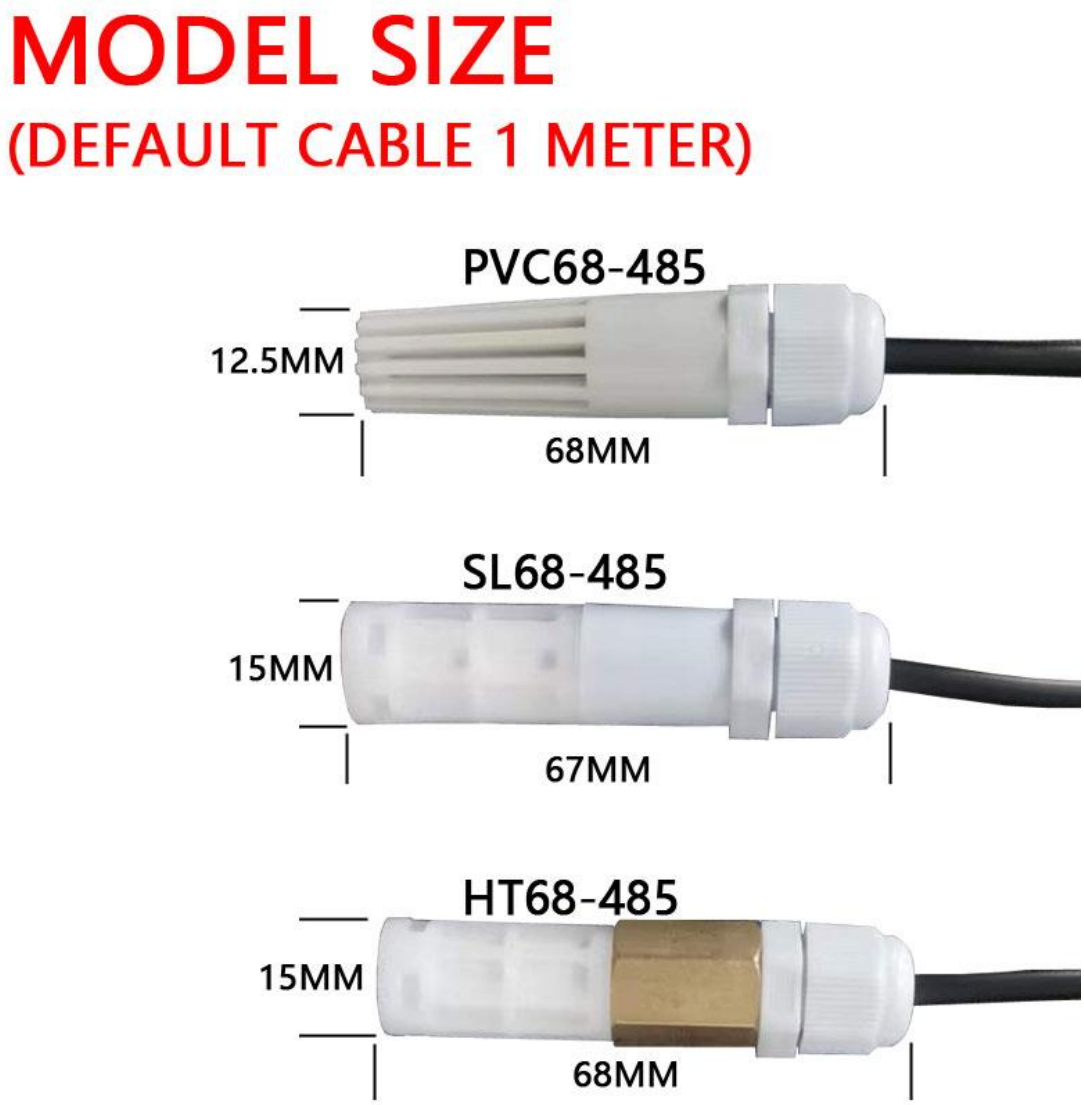
■485 communication interface, standard ModBus-RTU protocol, communication address and baud rate can be set, and the communication line can be up to 2000 meters long;
■Temperature accuracy ±0.3℃, humidity accuracy ±3%RH, high precision, low drift;
■ Using special EMC anti-jamming devices, the field can withstand strong electromagnetic interference, industrial-grade processing chips, and a wide range of use;
■5~30V wide voltage range power supply, long-distance centralized power supply can still work normally;
■Baud rate, register address, device address can be modified by software.

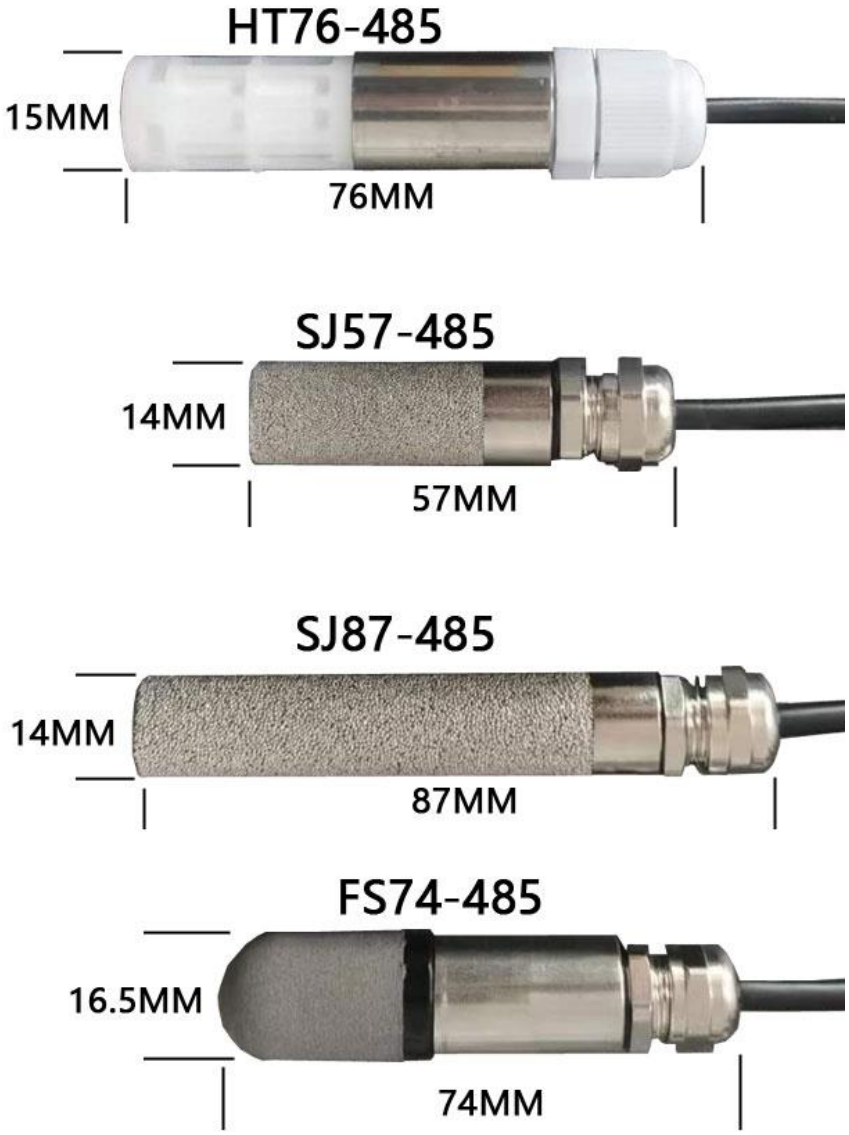
1.2 main parameters

power (default)	5-30V DC	
Maximum power consumption	≤0.05W	
Accuracy	humidity	±3%RH（60%RH，25℃）
	temperature	±0.3℃（25℃）
Transmitter circuit operating temperature	-40℃~+80℃，0%RH~100%RH	
letter of agreement	Modbus-RTU	
output signal	485	
Temperature display resolution	0.1℃	
Humidity Display Resolution	0.1%RH	
Temperature and humidity refresh time	2S	
long term stability	temperature	≤0.1℃/y
	humidity	≤1%RH/y
Response time	temperature	≤15s（1m/s）

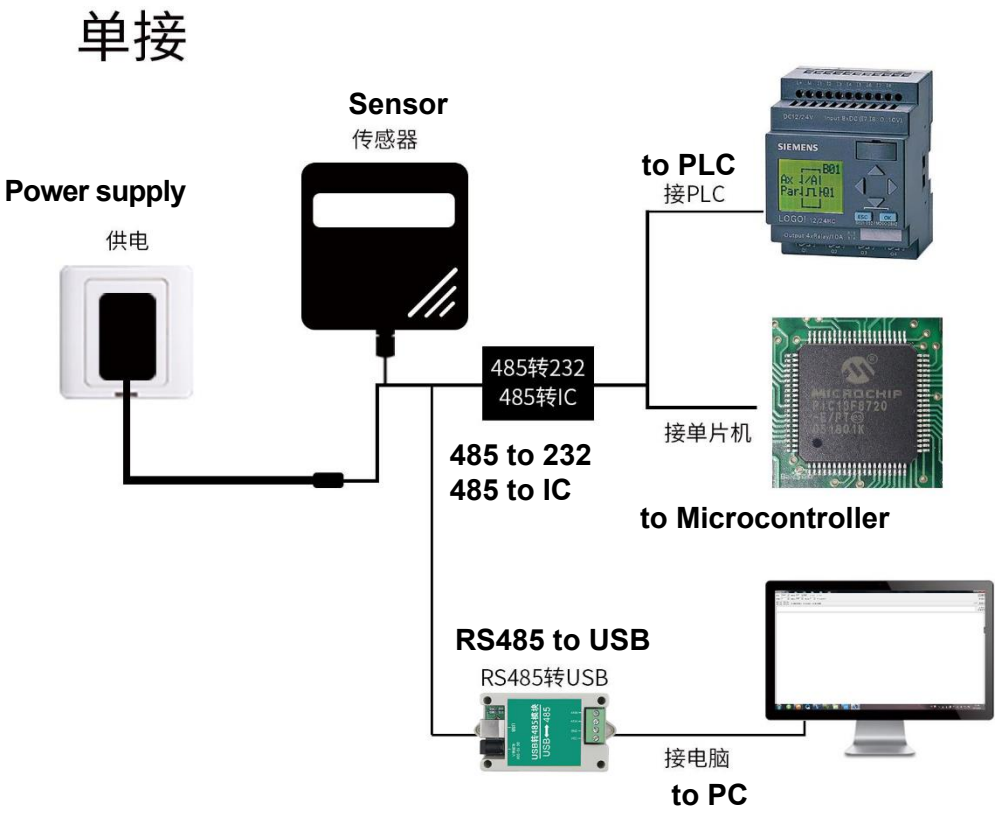
	humidity	≤4s（1m/s）
parameter settings	Set by software	

1.3 Probe size




HT76-485
15MM
76MM
SJ57-485
14MM
57MM
SJ87-485
14MM
87MM
FS74-485
16.5MM
74MM

1.4 system framework



This product can also be used in combination of multiple sensors on a 485 bus. In theory, a bus can have 254 485 sensors, and the other end is connected to a PLC with a 485 interface, connected to a single-chip microcomputer through a 485 interface chip, or using USB to 485 to connect with Computer connection, use the sensor configuration tool provided by our company for configuration and testing (only one device can be connected when using this configuration software).

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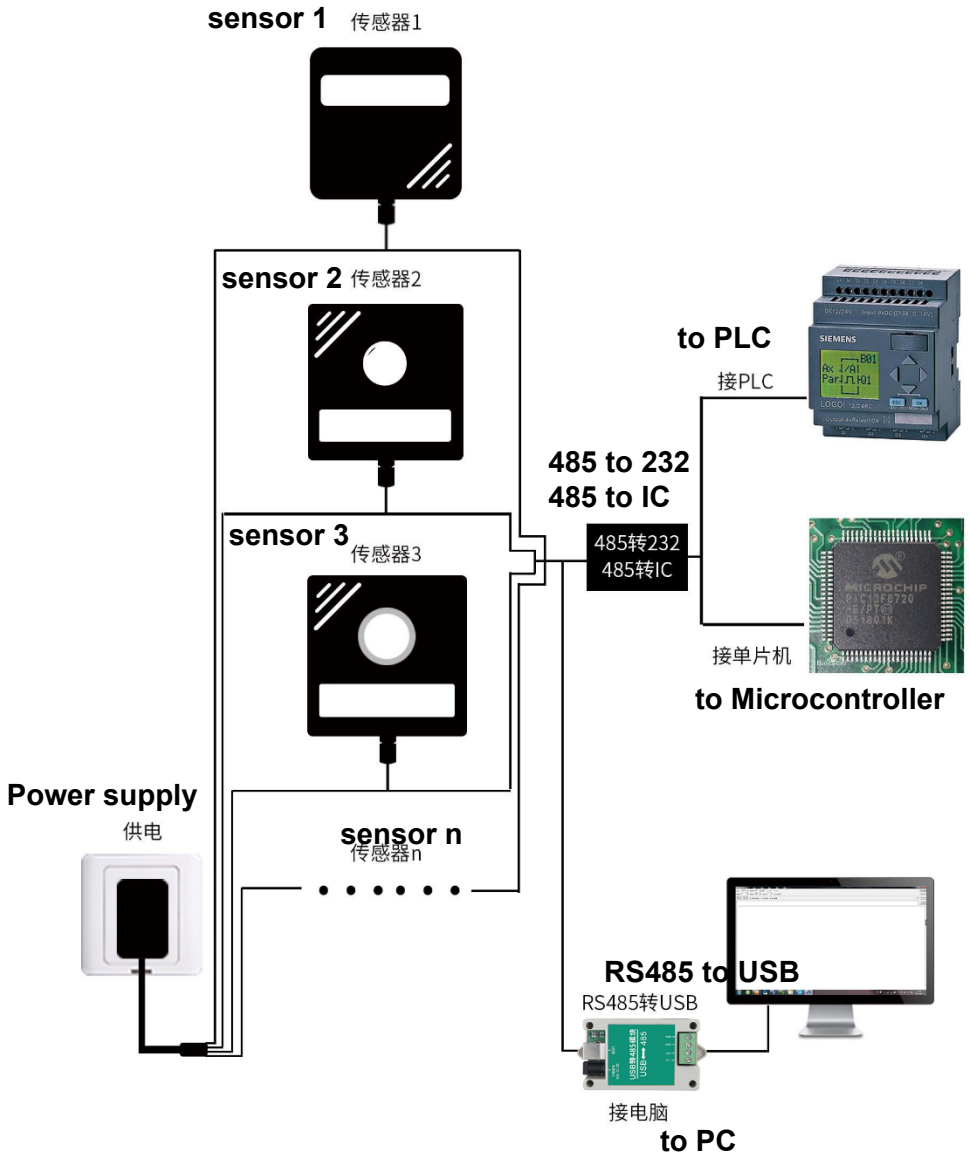


hardware

2.1 Equipment pre-installation inspection

Equipment List：

■1pcs Temperature and humidity sensor probe

■USB to 485 adapter (sold separately)

2.2 Interface Description

The power interface is wide voltage power input 5-30V. When wiring the 485 signal line, pay attention that the two lines A and B cannot be reversed, and the addresses of multiple devices on the bus cannot be conflicted.

2.2.1 Sensor wiring

Color	illustrate
red	+（5~30V DC）
Black	GND
Yellow	485-A
Green	485-B

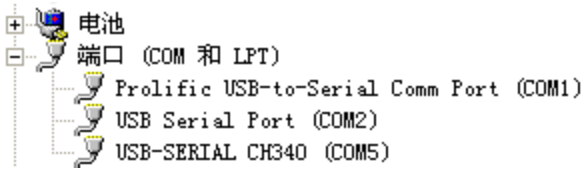
Configuration software installation and use

We provide a matching "LY485-TOOL", which can easily use a computer to read the parameters of the sensor, and flexibly modify the device ID and address of the sensor.

Note that there is only one sensor on the 485 bus when using automatic acquisition by software.

3.1 Sensor connected to computer

After the sensor is correctly connected to the computer via USB to 485 and provides power, you can see the correct COM port in the computer (check the COM port in "My Computer - Properties - Device Manager - Port").



Open the data package, select "Debugging Software"---"485 Parameter Configuration Software", find the configuration software and open it.

3.2 Use of Sensor Monitoring Software

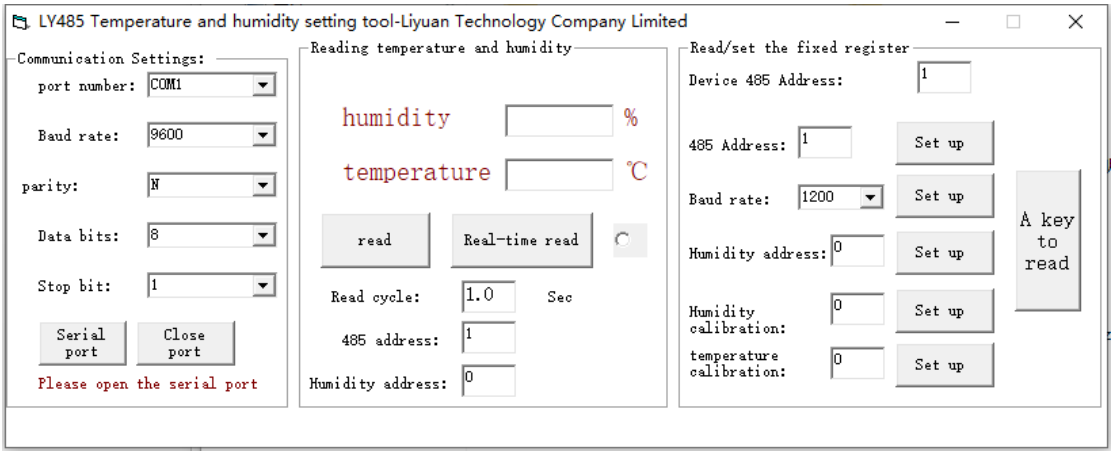
①、The configuration interface is shown in the figure. First, obtain the serial port number and

select the correct serial port according to the method in Chapter 3.1.

②、Click "Open serial port" in the software, click "Test", you will get the current temperature and humidity, click one key to read, and the basic parameters of the probe will appear.

③、Modify the address and baud rate or calibration according to the needs of use, and at the same time, you can query the current functional status of the device.

④、If the test is unsuccessful, please re-check the equipment wiring and 485 driver installation.



communication protocol

4.1 Communication basic parameters

coding	8 bit binary
data bits	8bit
parity bit	None
stop bit	1bit
error checking	CRC（redundant cyclic code）
baud rate	1200bit/s、2400bit/s、4800bit/s、9600 bit/ss、14400 bit/ss、19200 bit/scan be set，Factory default is 9600bit/s

4.2 Data Frame Format Definition

Using 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

Time to end structure ≥ 4 bytes

Address code: the address of the transmitter, which is unique in the communication network (factory default 0x01).
Function code: the function instruction of the command sent by the host, this transmitter only uses the function code 0x03 (read register data).
Data area: The data area is the specific communication data, pay attention to the high byte of the 16bits data first!
CRC code: two-byte check code.
Host query frame structure:

Address code	Function code	register start address	Register length	Check code low	Check code high
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Slave acknowledgment frame structure：

address code	Function code	number of valid bytes	data area	second data area	Nth data area	check code
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte	2 byte

4.3 register address

register address (hex)	PLC or configuration address	content	operate	Support function code
0000 H	40001	Humidity (10 times the actual value)	read only	03
0001 H	40002	Temperature (10 times the actual value)	read only	03
0100H	40257	address	read and write	03、06
0101H	40258	Baud rate (1 for 1200, 2 for 2400, 3 for 4800, 4 for 9600, 5 for 14400, 6 for 19200)	read and write	03、06
0102 H	40259	Humidity address	read and write	03、06
0104H	40260	temperature correction value	read and write	03、06
0105H	40261	Humidity correction value	read and write	03、06

4.4 Communication protocol example and explanation

4.4.1 Read the temperature and humidity value of device address 0x01

Example: Read the temperature and humidity value of device address 0x01

Query frame (hexadecimal):

address code	Function code	initial address	Data length	Check code low	Check code high
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Response frame (hexadecimal): (For example, the temperature is -9.7℃ and the humidity is 48.6%RH)

address code	function code	Returns the number of valid bytes	Humidity value	temperature value	Check code low	Check code high
0x01	0x03	0x04	0x01 0xE6	0xFF 0x9F	0x1B	0xA0

Temperature calculation:

When the temperature is lower than 0 ℃, the temperature data is uploaded in the form of complement code.

Temperature: FF9F H (hex) = -97 => temperature = -9.7°C

Humidity calculation:
Humidity: 1E6 H (Hex) = 486 => Humidity = 48.6%RH

4.4.4 Change the device with address 01 to 02

Request frame (hexadecimal):

address code	function code	register address	Contents of temperature calibration value	Check code low	Check code high
0x01	0x06	0x01 0x00	0x00 0x02	0x**	0x**

Response frame (hexadecimal):

address code	function code	register address	Contents of temperature calibration value	Check code low	Check code high
0x01	0x06	0x01 0x00	0x00 0x02	0x**	0x**

4.4.5 Set the baud rate of device address 0x01 to 4800

Change the baud rate of device 01 to 4800 (01 means 1200, 01 means 2400, 02 means 4800, 03 means 9600, 04 means 14400, ,05 means 19200,)

Request frame (hexadecimal):

address code	function code	register address	Baud rate value content	Check code low	Check code high
0x01	0x06	0x01 0x01	0x00 0x01	0x**	0x**

Response frame (hexadecimal):

address code	function code	Register Address 寄存器地址	Baud rate value content 波特率值内容	Check code low 校验码低位	Check code high 校验码高位
0x01	0x06	0x01 0x01	0x00 0x01	0x**	0x**

4.4.6 read device address

Query frame (hexadecimal):

address code	function code	initial address	Data length	Check code low	Check code high

0x01	0x03	0x01 0x00	0x00 0x01	0x**	0x**

Response frame (hexadecimal): (for example, the address is read as 1)

address code	function code	Returns the number of valid bytes	current address	Check code low	Check code high
0x01	0x03	0x02	0x00 0x01	0x**	0x**

4.4.7 read device baud rate

Query frame (hexadecimal):

address code	function code	initial address	Data length	Check code low	Check code high
0x01	0x03	0x01 0x01	0x00 0x01	0x**	0x**

Response frame (hexadecimal): For example, the baud rate is 4800 ((01 means 1200, 01 means 2400, 02 means 4800, 03 means 9600, 04 means 14400, ,05 means 19200,)

address code	function code	Returns the number of valid bytes	current baud rate	Check code low	Check code high
0x01	0x03	0x02	0x00 0x01	0x**	0x**

4.4.8 Read humidity calibration value

Query frame (hexadecimal):

address code	function code	initial address	Data length	Check code low	Check code high
0x01	0x03	0x01 0x03	0x00 0x01	0x**	0x**
address code	function code	Returns the number of valid bytes	Humidity Calibration value	Check code low	Check code high
0x01	0x03	0x02	0x00 0x01	0x**	0x**

4.4.9 Read temperature calibration value

Query frame (hexadecimal):

address code	function code	initial address	Data length	Check code low	Check code high
0x01	0x03	0x01 0x04	0x00 0x01	0x**	0x**
address code	function code	Returns the number of valid bytes	temperature calibration value	Check code low	Check code high
0x01	0x03	0x02	0x00 0x01	0x**	0x**

Common problems and solutions

No output or output error

possible reason:

①. The computer has a COM port, and the selected port is incorrect.

②, the baud rate is wrong.

③. The 485 bus is disconnected, or the A and B lines are reversed.

④. If the number of devices is too much or the wiring is too long, power supply should be provided nearby, add 485 booster, and increase 120Ω terminal resistance at the same time.

⑤. The USB to 485 driver is not installed or damaged.

⑥, equipment damage.