RS-WS-N01-9TH
Duct-mounted temperature and humidity transmitter
User manual
(Type 485)

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1. product description

1.1product description

The transmitter is professionally used in pipeline temperature and humidity measurement. Imported temperature and humidity measurement unit is adopted, with small drift and high accuracy. The equipment adopts the standard Modbus-RTU protocol, the communication address and baud rate can be set, the communication line can be up to 2000 meters long, and supports secondary development; the equipment can upload data to our environmental monitoring software, or collect data by itself. Support multiple device networking, up to 254 networking.

Pipeline installation method, convenient on-site installation, adopts anti-interference circuit design, can withstand various strong electromagnetic interferences such as on-site inverters; the equipment adopts a waterproof shell design, the equipment has a bright color LED display, and the wheel displays real-time temperature and humidity to ensure The displayed value can be seen clearly in dim places. The filter screen of the equipment probe adopts 25um high-strength stainless steel material, which can not only ensure the entry of gas molecules but also prevent the entry of dust particles and water droplets. It can be used in humid and high-dust occasions and is durable.

1.2Features

■ 485 communication interface, standard ModBus-RTU protocol, communication address and baud rate can be set, the longest communication line can reach 2000 meters;

■Temperature accuracy ±0.5℃, humidity accuracy ±3%RH, high accuracy and low drift;

■ The wiring terminal adopts military-grade spring-type screw-free terminal, which can be connected by pressing and plugging. The wire can be quickly connected even without a screwdriver on site, and the wire diameter can be 0.3~2.0mm2;

■ Using special EMC anti-interference devices, it can withstand strong electromagnetic interference on site, industrial-grade processing chips, and a wide range of applications;

■High-brightness color LED display, to ensure that the displayed value can be seen clearly in dim places;

■10～30V wide voltage range power supply, long-distance centralized power supply can still work normally;

1.3Main Specifications

DC power supply (default)		10-30V DC
Maximum power consumption		0.1W
Quasi precision	humidity	±3%RH（60%RH，25℃）
	temperature	±0.5℃（25℃）
Transmitter circuit operating temperature and humidity		-40℃~+60℃，0%RH~80%RH
Probe temperature		-40℃～+80℃
Probe to measure humidity		0%RH-100%RH
letter of agreement		Modbus-RTU letter of agreement

output signal	485 signal	
Temperature display resolution	0.1℃	
Humidity display resolution	0.1%RH	
Temperature and humidity refresh time	1S	
Long-term stability	temperature	≤0.1℃/y
	humidity	≤1%RH/y
Response time	temperature	≤25s（1m/s Wind speed）
	humidity	≤8s（1m/s Wind speed）
parameter settings	Set via software	

1.4 System frame diagram
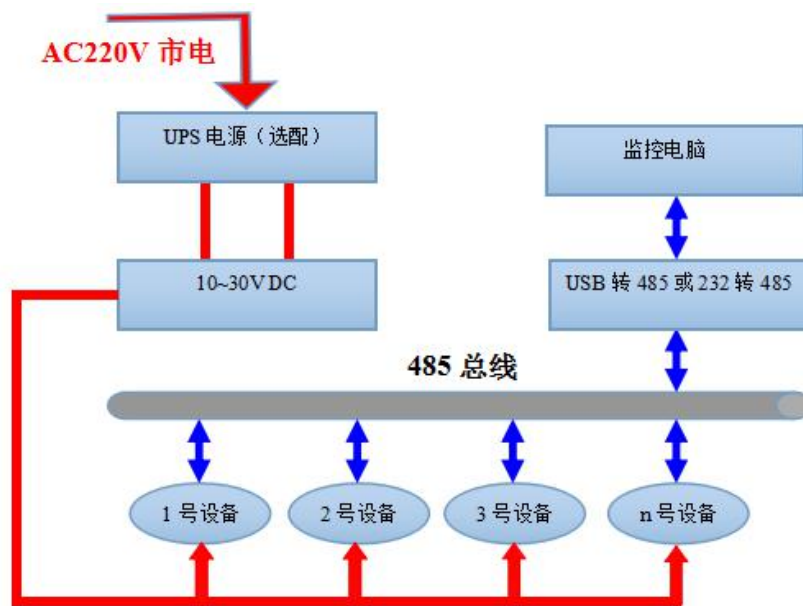
System scheme block diagram

2. Product selection

RS-				Company code
	WS-			Temperature and humidity transmitter
		N01-		RS485 (M0dbus protocol)
			9TH	Flat pipe shell
			9TH-OLED	Flat tube housing with OLED display

2. Equipment description

3.1Device display

The device screen displays the temperature and humidity every 5S. The lowest display is -40.0℃, and the highest display is 120.0℃. The upper left corner displays the currently displayed humidity or temperature, and the upper right corner displays the unit.

3.device installation

3.2 Inspection before equipment installation

Equipment List:

1. 1 transmitter equipment

2. Certificate of conformity, warranty card, calibration report, etc.

3. Self-tapping screws and 3 expansion plugs each

4. USB to 485 (optional)

5.485 terminal resistance (gift for multiple devices)

3.3installation steps

First, make a 16mm diameter hole in the ventilation pipe, insert the air pipe into the hole, and control the height of the equipment by adjusting the position of the flange. Install the three screws on the flange, fix the equipment, and complete the installation.
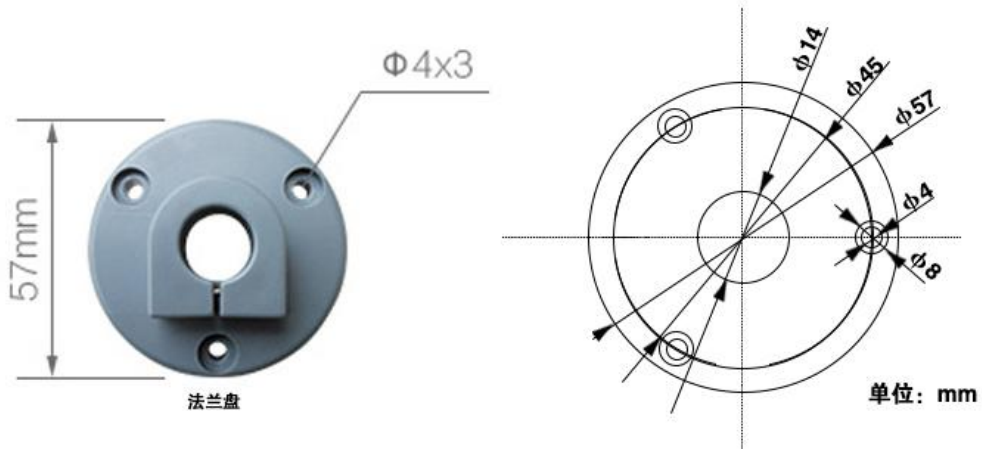
3.4Interface Description

3.4.1 Power and 485 signal

Wide-voltage power input can be 10~30V. When wiring the 485 signal line, pay attention to the two wires A and B not reversed, and the addresses of multiple devices on the bus must not conflict.

3.4.2 wiring

Serial number	Internal logo	Description
1	A	485-A
2	V+	Power is positive（10~30V DC）
3	GND	Power negative
4	B	485-B

3.5 485 Field wiring instructions

When multiple 485 devices are connected to the same bus, there are certain requirements for field wiring. For details,

please refer to the "485 Device Field Wiring Manual" in the data package.

4. Configuration software installation and use

4.1 Software selection

Open the data package, select "Debugging software" --- "485 parameter configuration software",

find Just open it.

4.2 parameter settings

① Select the correct COM port (check the COM port in "My Computer—Properties—Device Manager—Port"). The following figure lists the driver names of several different 485 converters.
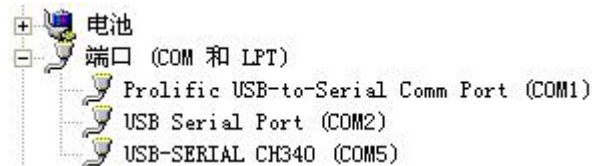
② Connect only one device alone and power it on, click the test baud rate of the software, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, and the default address is 0x01.

③. Modify the address and baud rate according to the needs of use, and at the same time query the current function status of the device.

④. If the test is unsuccessful, please recheck the equipment wiring and 485 driver installation.
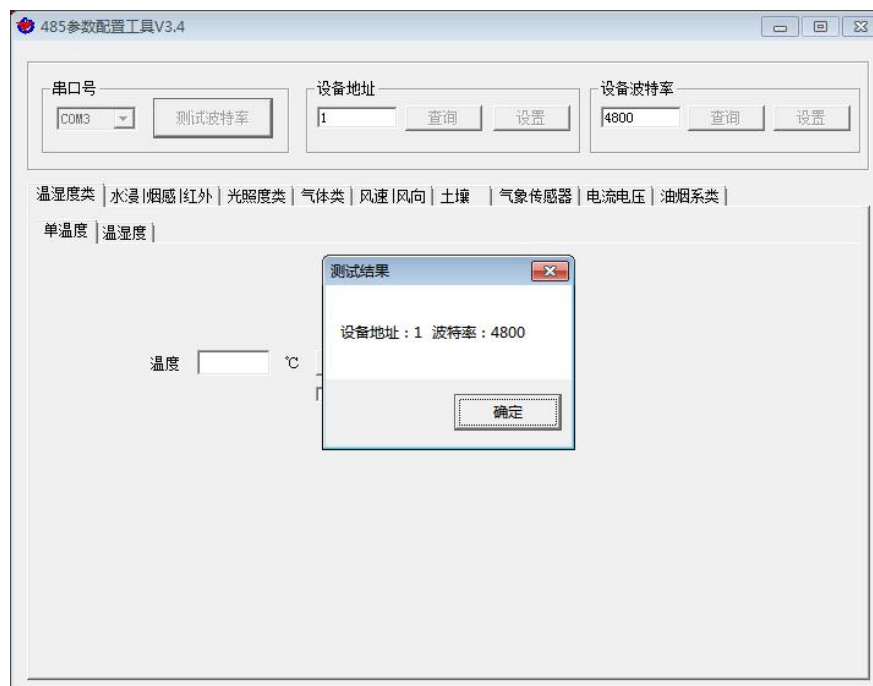
5. letter of agreement

5.1 Basic communication parameters

Code	8-bit binary
Data bit	8-bit
Parity bit	no
Stop bit	1 person
Error checking	CRC (Redundant Cyclic Code)
Baud rate	2400bit/s, 4800bit/s, 9600 bit/s can be set, the factory default is 4800bit/s

5.2 Data frame format definition

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

Initial structure ≥ 4 bytes 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 command function instruction issued by the host, this transmitter only uses function code 0x03 (read register dat

Data area: The data area is the specific communication data, pay attention to the high byte of 16bits data first!

CRC code: two-byte check code.

Host query frame structure:

address co de	function co de	Register start ad dress	Register lengt h	Check code l ow bit	Check code hig h
1byte	1byte	2byte	2byte	1byte	1byte

Slave machine response frame structure::

address c ode	function code	Effective byt es	Data area	Second data area	Nth data area	Check code
1byte	1byte	1byte	2byte	2byte	2byte	2byte

5.3 Register address

Register address	PLC or configuration address	content	operating
0000 H	40001	humidity	Read only

0001 H	40002	temperature	Read only
0050H	40081	Temperature calibration	Read and write
0051H	40082	Humidity calibration	Read and write
07D0H	42001	Address register	Read and write：1-254
07D1H	42001	Baud rate register	Read and write：0 means 2400 1 is 4800 2 is 9600

5.4 Communication protocol example and explanation

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

Inquiry frame (hexadecimal):

address code	function code	starting address	Data length	Check code low bit	Check code high
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Response frame (hexadecimal): (for example, the temperature is -10.1℃ and the humidity is 65.8%RH)

address code	function code	Returns the number of valid bytes	Humidity value	Temperature value	Check code low bit	Check code high
0x01	0x03	0x04	0x02 0x92	0xFF 0x9B	0x5A	0x3D

Temperature calculation:

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

Temperature: FF9B H (hexadecimal) = -101 => temperature = -10.1℃

Humidity calculation:

Humidity: 292 H (hexadecimal) = 658 => Humidity = 65.8%RH

5.5 Device address setting method

The device address supports two methods: software configuration and DIP switch setting. Only one method can be select address.

When the four DIP switches are all set to the "OFF" position, the configuration software can be used to set the address, and the be set through the "configuration software".

When one of the four DIP switches is in the "ON" position, the device address can only be the address represented by the D this time, the address set by the software is invalid.

The address range set by the DIP switch is 1-15.

The address mode set by the DIP switch is as follows: 1 means ON, 0 means OFF.

Modbus address	1	2	3	4
Address set by software	0	0	0	0
1	0	0	0	1
2	0	0	1	0
......	......	......	......	......
15	1	1	1	1

6. Common problems and solutions

The device cannot connect to the PLC or computer

possible reason:

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

2) The device address is wrong, or there are devices with duplicate addresses (the factory default is all 1).

3) The baud rate, check method, data bit and stop bit are wrong.

4) The host polling interval and waiting response time are too short, and both need to be set above 200ms.

5) The 485 bus is disconnected, or the A and B wires are connected reversely.

6) If the number of equipment is too large or the wiring is too long, power should be supplied nearby, and a 485 booster should be added and a 120Ω terminal resistance should be added at the same time.

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

8) The equipment is damaged.

7. contact details

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8. Document history

V1.0 document creation.

V1.1 updated the appearance picture.

V1.2 adds the description of address setting method.

9. Appendix: Shell size

Flat pipe shell：