



RS-WS-N01-2-* User Manual of Wall Mounted King-Case Temperature and Humidity Transmitter (Type 485)

Document version: V2.1







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1. product description

1.1 product description

The product is a wall-mounted high-protection shell with a protection class of IP65, which is rain- and snow-proof and has good air permeability. The circuit uses industrial grade microprocessor chips imported from the United States and imported high-precision temperature sensors to ensure excellent reliability, high precision and interchangeability of the products. This product uses a particle sintered probe sheath, and the probe is directly connected to the housing with a beautiful appearance. The output signal type is divided into RS485, which can communicate up to 2000 meters, and the standard modbus protocol supports secondary development.

1.2 Features

The measurement unit imported from Switzerland is used for accurate measurement. Using a dedicated 485 circuit, the communication is stable. 10~30V wide voltage range power supply, complete specifications, easy installation.

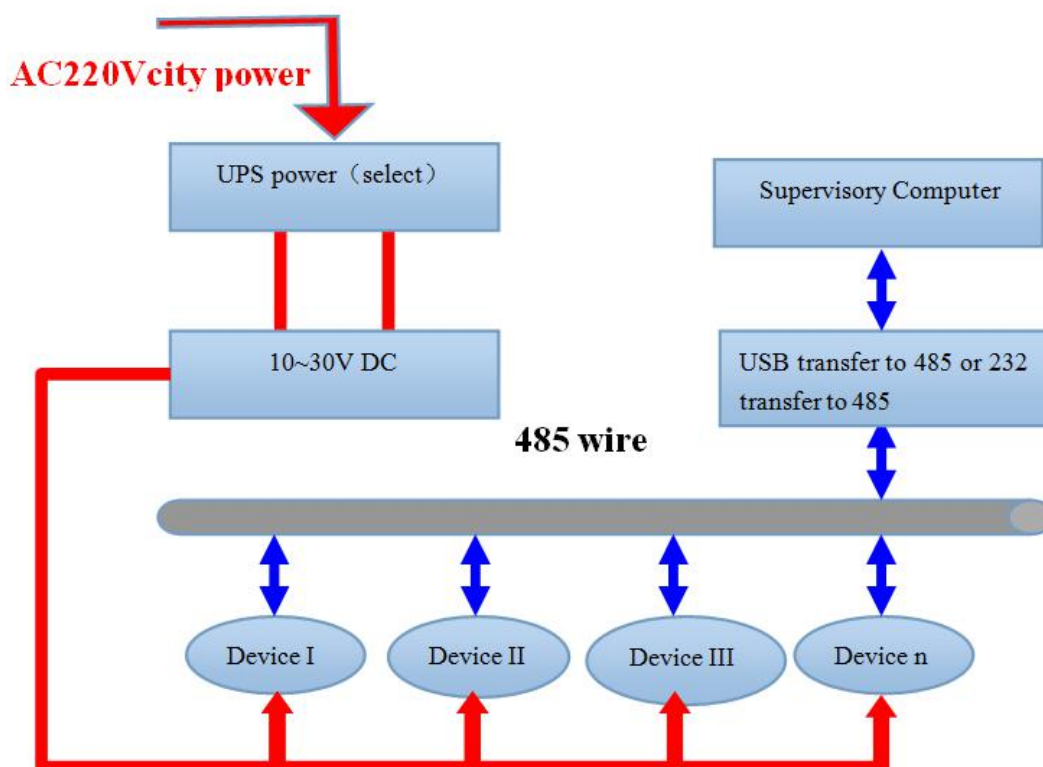
1.3 The main technical parameters

DC power supply (default)	DC 10-30V	
Maximum power consumption	0.4W	
A quasi accuracy	humidity	$\pm 2\%RH(5\%RH\sim 95\%RH, 25^{\circ}C)$
	temperature	$\pm 0.4^{\circ}C (25^{\circ}C)$
B quasi accuracy	humidity	$\pm 3\%RH(5\%RH\sim 95\%RH, 25^{\circ}C)$
	temperature	$\pm 0.5^{\circ}C (25^{\circ}C)$
(default)	$-40^{\circ}C\sim +60^{\circ}C, 0\%RH\sim 80\%RH$	
	$-40^{\circ}C\sim +120^{\circ}C$ default: $-40^{\circ}C\sim +80^{\circ}C$	
Transmitter circuit operating temperature and humidity	0%RH-100%RH	
Probe working temperature	0.1 $^{\circ}C$	
Probe working humidity	0.1%RH	
Temperature display resolution	1s	
Humidity display resolution	humidity	$\leq 1\%RH/y$
	temperature	$\leq 0.1^{\circ}C/y$
Temperature and humidity refresh time	humidity	$\leq 4s(1m/s$ Wind speed)
	temperature	$\leq 15s(1m/s$ Wind speed)



Response time	RS485(Modbus protocol)
	Wall-mounted




1.4 system framework




System solution block diagram

1.5 product model

RS-				Company code
	WS-	Temperature and humidity transmission, sensor		
		N01-	485 communication (Modbus-RTU protocol)	
			2-	Wall-mounted king character shell
				1- Built-in copper head
				2- Built-in PE head
				3- Built-in Siemens head

			4-	<p>Built-in hardcover probe</p> 
			5-	<p>Extension hardcover probe</p> 
			6-	<p>Extension waterproof probe</p> 
			7-	Epitaxial high sensitivity probe
			8-	Extension general probe
			9-	Extension metal waterproof probe
			A-	Extension four-point pipe thread probe

				B-	Extended temperature probe 
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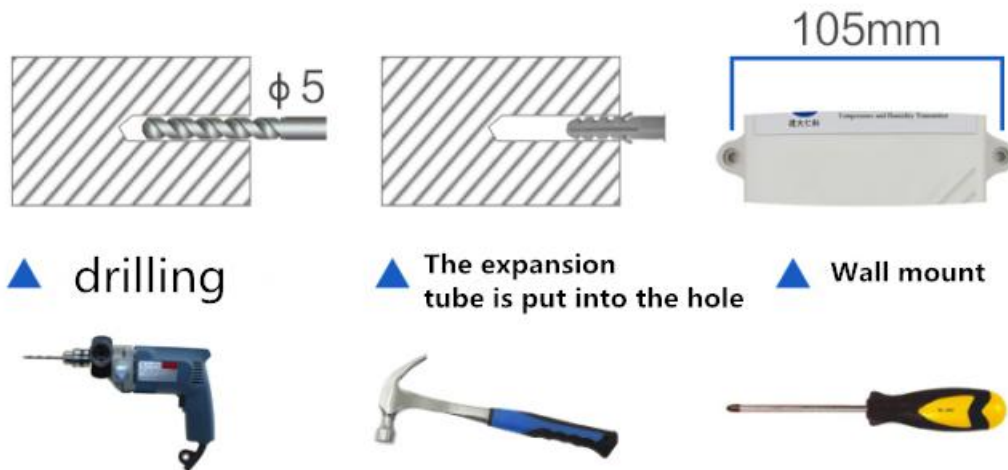
2. Equipment installation instructions

2.1 Check before installation

Equipment List:

1. Temperature and humidity transmitter equipment 1
2. Conformity certificate, warranty card, calibration report, etc.
3. 2 expansion plugs, 2 self-tapping screws
4. USB to 485 (optional)
5. 485 terminal resistance (gift from multiple devices)

2.2 Installation method



Special Note:

- 1) There are certain specifications for 485 line field wiring. For details, please refer to the data package "485 Equipment Field Wiring Manual".
- 2) When the device is connected to the 485 bus, ensure that the addresses of multiple devices will not be repeated.

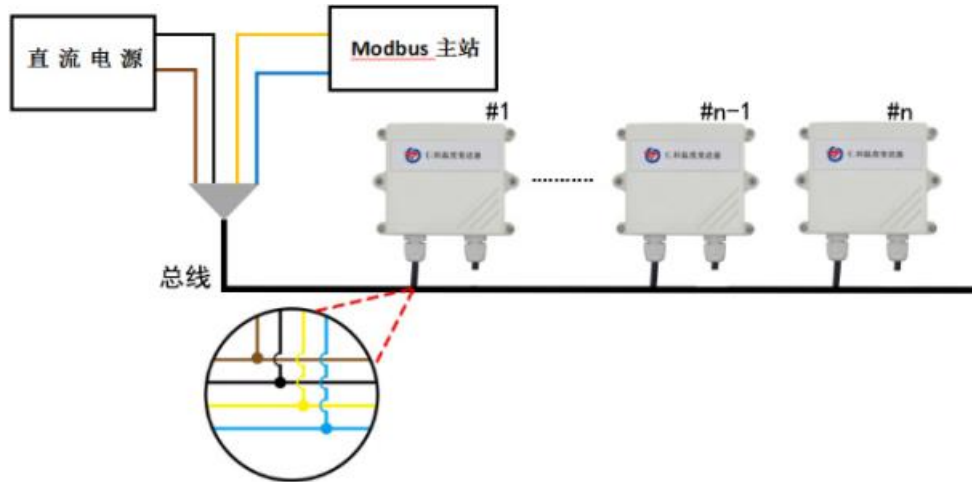
2.3 Wiring instructions

Power supply and 485 signal



Wide voltage power input can be 10~30V. When connecting the 485 signal line, please note that the two lines A/B cannot be reversed, and the addresses of multiple devices on the bus cannot conflict.

2.4 Specific wiring



	Thread color	Explanation
power supply	brown	Positive power supply (10~30V DC)
	black	Negative power supply
Communication	yellow	485-A
	blue	485-B

3. Configuration software installation and use

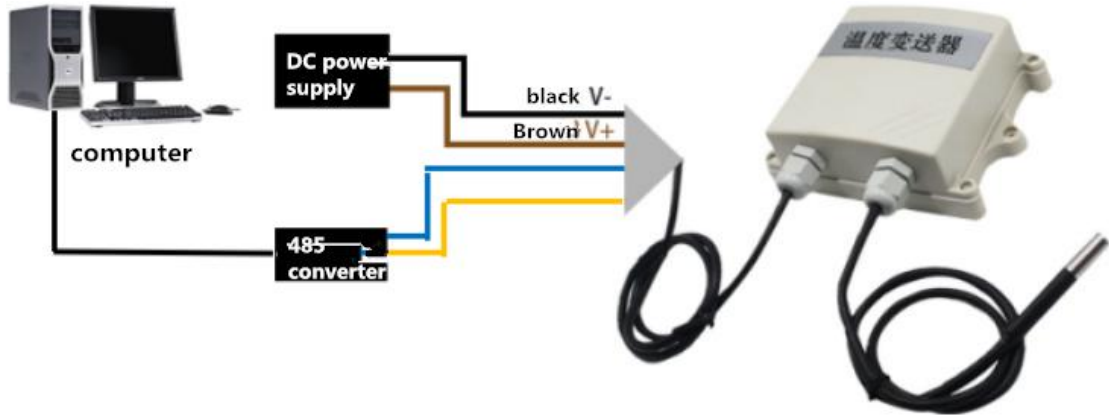
3.1 Software selection

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



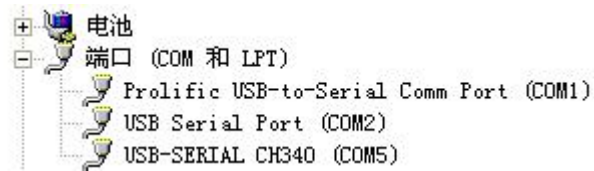
find... Just open.

Note: Only one device can be connected when using the configuration software to change the address and baud rate.



3.2 parameter settings

①, select the correct COM port ("COM"->"Properties-Device Manager-Port" to view the COM port), the following figure lists the driver names of several different 485 converters.



②, only connect one device and power 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, the default address is 0x01.

③ Modify the address and baud rate 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 recheck the device wiring and 485 driver installation.



485 Series transmitter configuration software V2.2

Serial Port Num:	COM1	Search Device
Device Address:	<input type="text"/>	Read Write
Device Band Rate:	<input type="text"/>	Read Write
Temperature Value:	<input type="text"/>	Read
Humidity Value:	<input type="text"/>	Read
Water Leak Status:	<input type="text"/>	Read
Power Failure Status:	<input type="text"/>	Read
Light Intensity Value:	<input type="text"/>	Read Para Set
CO2 Concentration:	<input type="text"/>	Read
Switch Output Delay:	<input type="text"/>	Read Write
Remote Signal Normal Set:	<input type="text"/>	Read Write
Humidity UpperLimit:	<input type="text"/>	Read Write
Humidity Lower Limit:	<input type="text"/>	Read Write
Temperature Upper Limit:	<input type="text"/>	Read Write
Temperature Lower Limit:	<input type="text"/>	Read Write
Humidity Hysteresis:	<input type="text"/>	Read Write
Temperature Hysteresis:	<input type="text"/>	Read Write
Humidity Adjust:	<input type="text"/>	Read Write
Temperature Adjust:	<input type="text"/>	Read Write
LCD Device Control Mode:	LCD Device Control Mode Set	
Wireless Receiver Para Set:	Wireless Device Para Set	



4. letter of agreement

4.1 Communication basic parameters

Coding	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

4.2 Data frame format definition

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

Time for initial structure \geq 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure \geq 4 bytes of time

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

Function code: the instruction function instruction issued by the host, this transmitter only uses the function code 0x03 (read register data).

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

CRC code: two-byte check code.

Host inquiry frame structure:

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

Slave response frame structure:

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



4.3 Register address

Register address	PLC or configuration address	content	operating
0000 H	40001	humidity	Read only
0001 H	40002	temperature	Read only

4.4 Communication protocol example and explanation

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

Inquiry frame (hexadecimal):

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

Response frame (hexadecimal): (for example, read temperature is -10.1 °C, humidity is 65.8%RH)

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

Temperature calculation:

When the temperature is lower than 0 °C, the temperature data is uploaded in the form of complement.

Temperature: FF9B H (Hexadecimal) = -101 => Temperature = -10.1 °C

Humidity calculation:

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

5. Common problems and solutions

Device cannot be connected to PLC or computer

possible reason:

- 1) The computer has multiple COM ports, 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) Baud rate, check mode, data bit, stop bit error.
- 4) The 485 bus is disconnected, or the A and B lines are reversed
- 5) If the number of devices is too large or the wiring is too long, the nearest power supply should be provided. A 485 booster should be added and a 120 Ω terminal resistance should be added.



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



6. contact details

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7. Document history

V1.0 document creation.

V2.0 documentation update.

V2.1 update product installation diagram.



Appendix: Shell dimensions

Wall-mounted king-shaped shell: 110×85×44mm

