RS-CFSFX-N01-3
Small ultrasonic wind speed and direction transmitter
User manual

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1.product description
1.1 product description

The small ultrasonic wind speed and direction sensor is a wind speed and direction measuring instrument developed based on the principle of ultrasonic waves. It uses the transmitted sound pulse to measure the phase difference at the receiving end to calculate the wind speed and direction. The sensor can measure the instantaneous value of wind speed and wind direction at the same time, and is widely used in the measurement of wind speed and wind direction in the fields of meteorology, ocean, environment, airports, ports, laboratories, industry, agriculture, and transportation.

1.2Features

1. No angle limit, can measure wind speed and direction data at the same time

2. No moving parts, low wear and long service life

3. Using random error recognition technology, it can ensure low dispersion error of measurement even under strong wind, making the output more stable

4. Adopt ABS engineering plastic shell, the design is light, portable, easy to install and disassemble

5. The product adopts 485 communication interface, standard ModBus-RTU communication protocol, communication address and baud rate can be set, the farthest communication distance is 2000 meters

6. No maintenance and on-site calibration

1.3Technical parameter

DC power supply (default)		10-30V DC
Power consumption		0.12W
Range	Wind speed	0～40m/s（customizable）
	wind direction	0~360°
Precision	Wind speed	±0.5+2%FS
	wind direction	±3°
Resolution	Wind speed	0.01 m/s

	wind direction	1°
working environment		-40～80℃，0～95%RH
Wind strength		75 m/s
Response time		1S
Protection level		IP65
output signal		485(Modbus-RTUprotocol)

1.4working principle

Ultrasonic wind measurement is an application of ultrasonic detection technology in gaseous media. It uses the influence of air flow (wind) to measure the wind speed by using the speed of ultrasonic propagation in the air. Compared with conventional wind cups or rotary wing anemometers, the biggest feature of this measurement method is that the entire wind measurement system does not have any mechanical rotating parts, which is a non-inertial measurement, so it can accurately measure the high frequency components of gusts in natural wind.

The ultrasonic wind speed and direction transmitter uses four ultrasonic probes to send and receive ultrasonic waves in a two-dimensional plane, and realizes the measurement of wind speed and direction through the principle that ultrasonic waves are affected by wind speed and therefore increase or decrease.

2.product model

RS-			Company code
	CFSFX-		Ultrasonic wind speed and direction transmitter
		N01-	485 communication (standard Modbus-RTU protocol)
		3	Small ultrasonic wind speed and direction transmitter

3.Equipment installation instructions
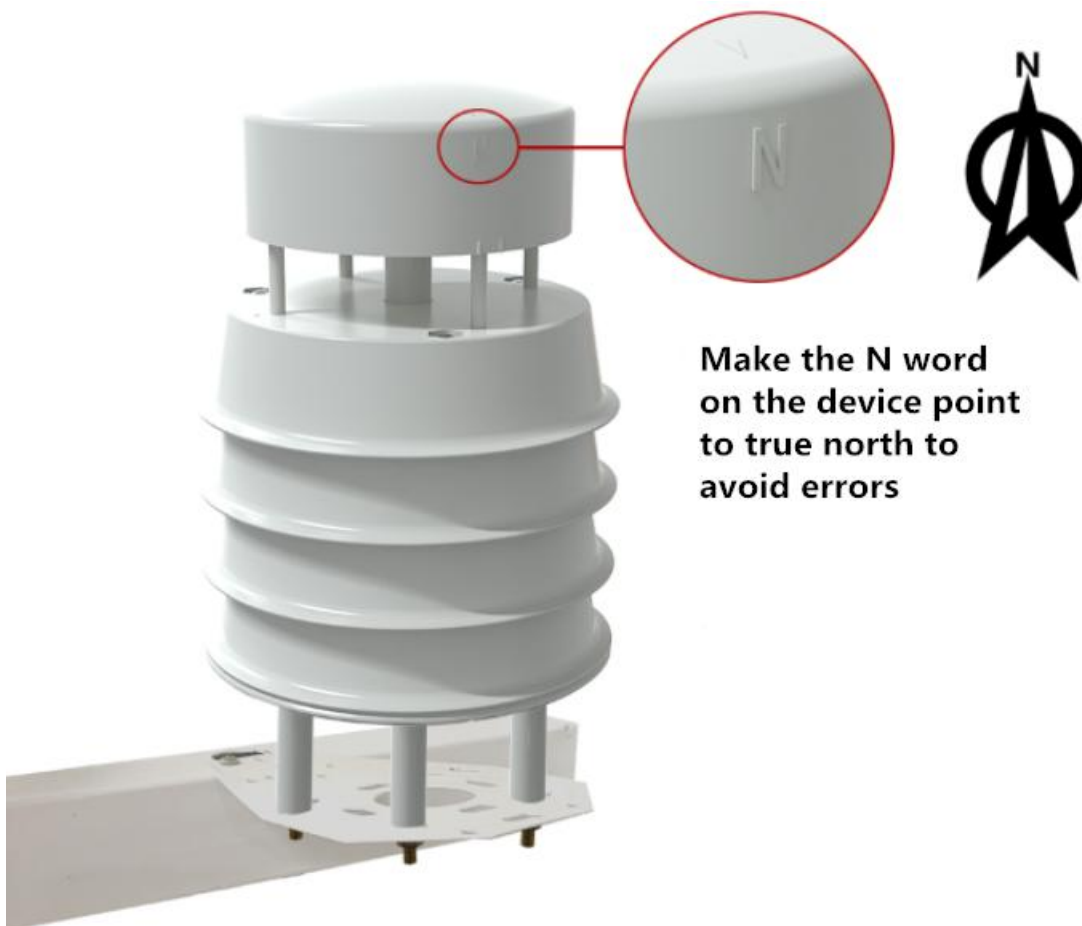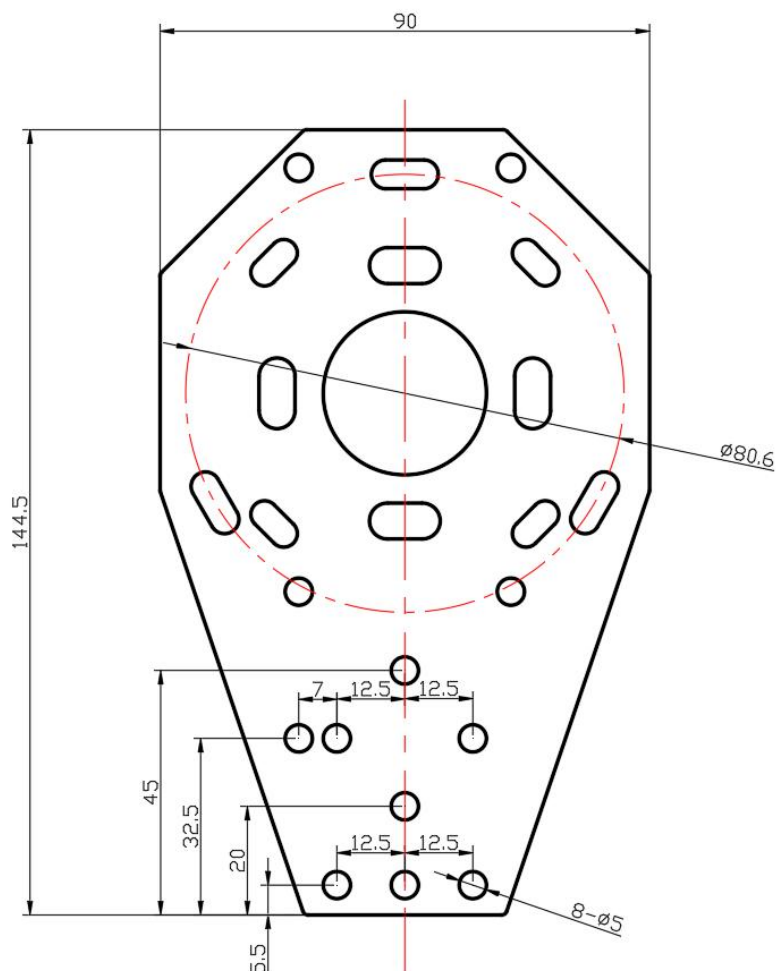
3.1Inspection before equipment installation

Equipment List:

1. 1 set of sensor equipment

2. Certificate of conformity, warranty card

3. One white pallet, two M4*10 screws and nuts

3.2Installation method

Beam installation (optional):

Make the N word on the device point to true north to avoid errors

Mounting bracket size drawing (unit: mm)

3.3 Interface Description

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

	Thread color	Description
power supply	brown	Positive power supply (10~30V DC)
	black	Power negative (GND)
Communication	yellow	485-A
	blue	485-B

4.Configuration software installation and use

4.1 Software selection

Open the 485 data package, select "Debugging Software"-"485 Parameter Configuration
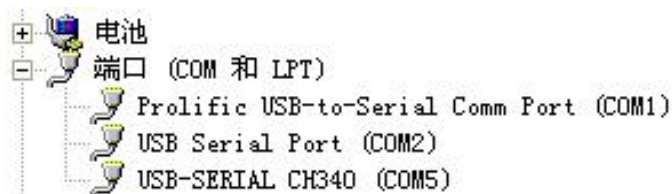
Software", find ![icon] Just open it.

## 4.2 Device connection

4.3

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) After connecting a device separately, power it on, click "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.
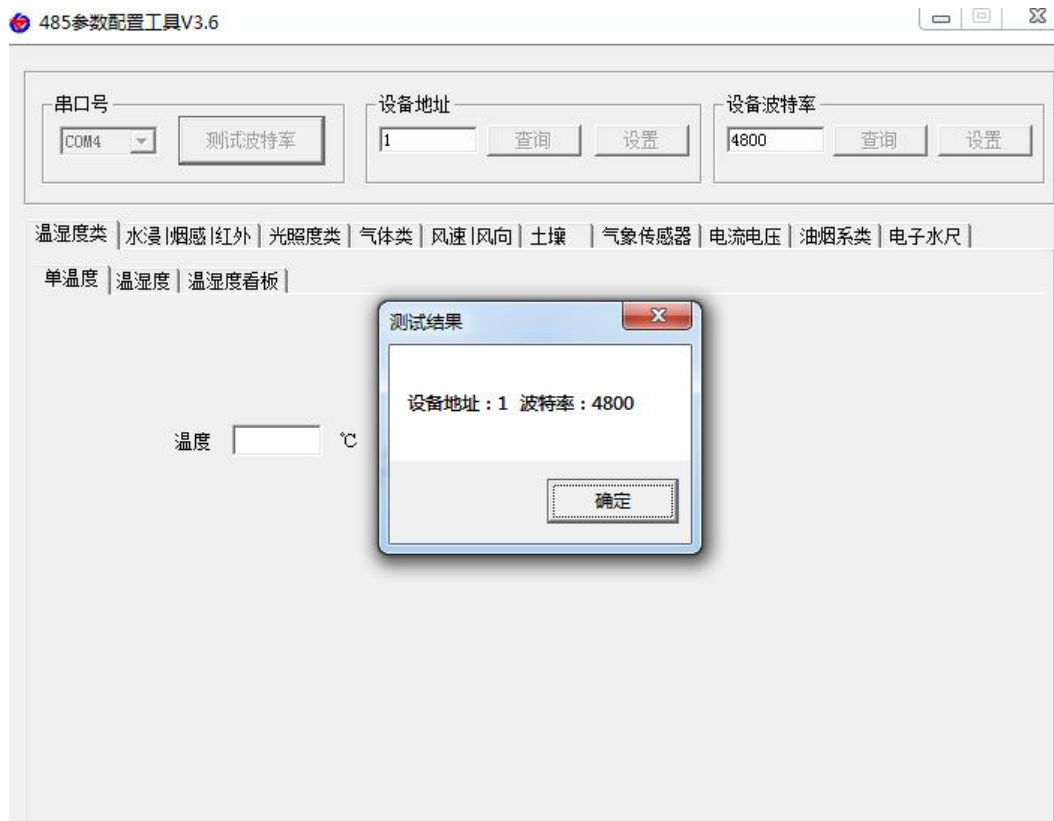
5.Modbus letter of agreement

5.1Basic 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	Can be set by yourself, 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 same communication

network (factory default 0x01).

Function code: The command function instruction issued by the host.

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

Slave machine response frame structure:

address code	function code	Effective bytes	Data area	Data area two	Data N area	Check code low byte	Check code high byte
1byte	1byte	1byte	2byte	2byte	2byte	1byte	1byte

5.3 Register address

Register address	PLC or configuration address	content	operating	Definition description
0000 H	40001 (Decimal)	Instantaneous wind speed	Read only	Real-time wind speed value (enlarged by 100 times)
0001 H	40002 (Decimal)	wind direction	Read only	Real-time wind direction value (Integer, the direction of true north is 0° and the degree increases clockwise, and the direction of true east is 90°)
0002 H	40003 (Decimal)	Maximum wind speed	Read only	Maximum wind speed after the equipment is powered on (Expanded by 100 times)
0003H	40004 (Decimal)	Wind rating	Read only	Wind level value corresponding to current wind speed (Integer, 0~17 levels)
07D0 H	42001 (Decimal)	Device address	Read and write	1~254 (factory default 1)

07D1 H	42002 (Decimal)	Device baud rate	Read and write	0 means 2400
				1 is 4800
				2 is 9600

5.4 Communication protocol example and explanation

Example: Read the real-time value of wind speed and wind direction of the transmitter device (address 0x01)

Interrogation frame:

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

Reply frame:

address code	function code	Return valid Number of bytes	Real-time wind speed value	Real-time wind direction value	Check code low byte	Check code high byte
0x01	0x03	0x04	0x00 0x7D	0x00 0x5A	0x EA	0x10

Real-time wind speed calculation:

Wind speed: 007D (hexadecimal) = 125 => wind speed = 1.25 m/s

Real-time wind direction calculation:

Wind direction: 005A (hexadecimal) = 90 => Wind direction = East wind

Example: Read the real-time wind power level value of the transmitter device (address 0x01) Interrogation frame:

address code	function code	starting address	Data length	Check code low byte	Check code high byte
0x01	0x03	0x00 0x03	0x00 0x01	0x74	0x0A

Reply frame:

address code	function code	Returns the number of valid bytes	Wind force	Check code low byte	Check code high byte
0x01	0x03	0x02	0x00 0x01	0x79	0x84

Real-time wind power rating calculation:

Wind power level: 0001 (hexadecimal) = 1=> Wind power level = 1 level

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 0x01).

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

4) The 485 bus is disconnected, or the A and B wires are reversed.

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

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

7) The equipment is damaged

7. Contact

Shandong Renke Control Technology Co., Ltd.

Address: 2 / F, East Block, Building 8, Shun Tai Plaza, High-tech Zone, Jinan City, Shandong Province

Post code: 250101

Phone: 400-085-5807

Website: www.renkeer.com

Cloud platform address: en.0531yun.cn   Or: eniot.0531yun.cn
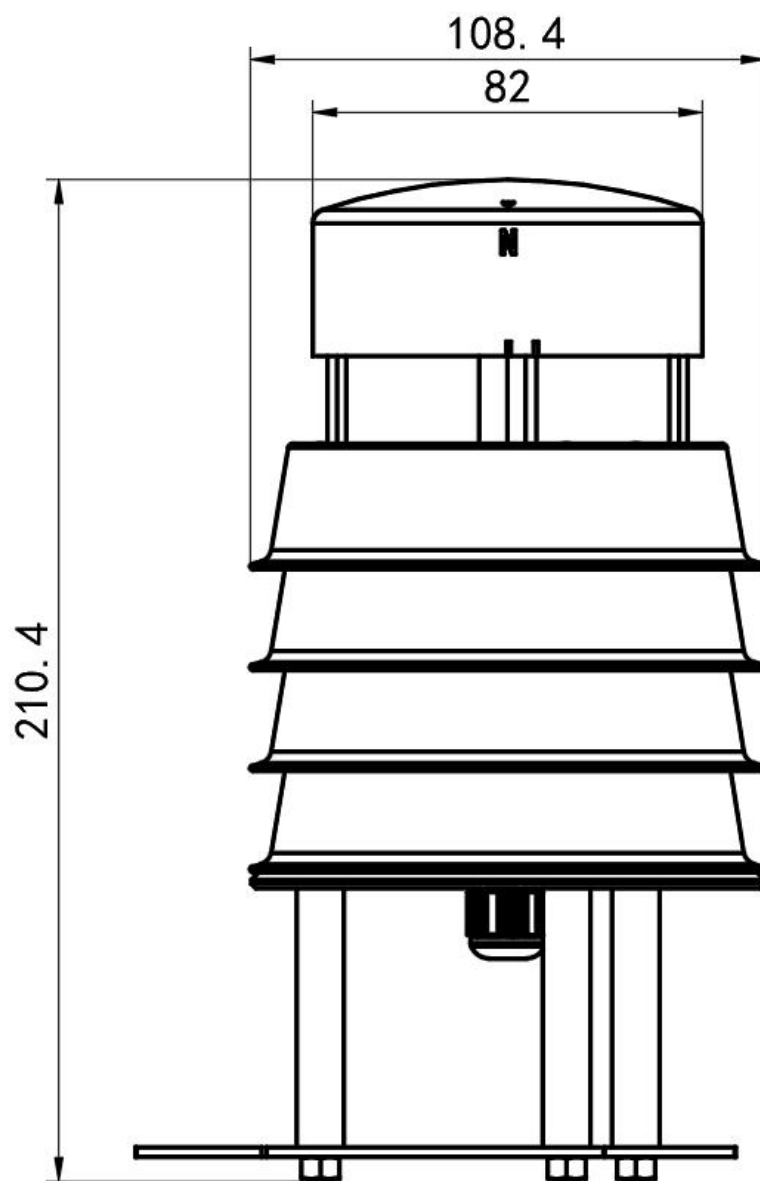
Web QR:

8.Version update

V1.0 document creation

Appendix: Equipment Dimensions

Equipment size drawing (unit mm)