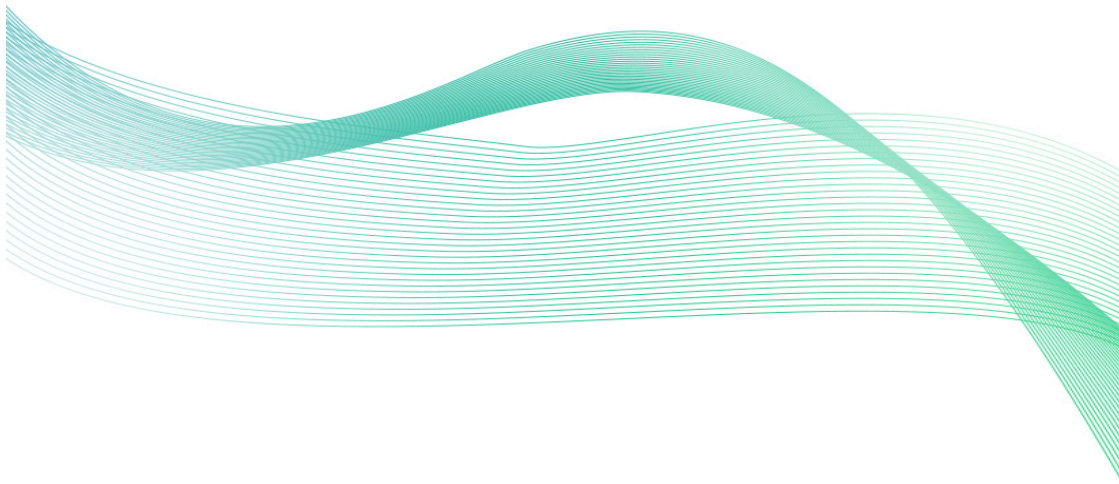# Ultrasonic wind speed wind direction transmitter (485 Type)

VMS.-3000-CFSFX-N01

Ver 2 .0

Catalogue

Chapter 1 Product Introduction

1.1 Product Overview

Ultrasonic wind speed and wind direction transmitter is a wind speed and wind direction measurement instrument developed based on the ultrasonic principle. It uses the transmitted acoustic pulse to measure the time or frequency difference of the receiving end to calculate the wind speed and wind direction. The whole machine shell is made of ABS material, which has the characteristics of light weight, no moving parts, strong and durable, and does not require maintenance and on-site calibration. It can output wind speed and direction at the same time. It can be connected to computers, data collectors or other acquisition devices with RS485. The products are widely used in wind direction measurement in greenhouses, environmental protection, weather stations, ships, docks, aquaculture and other environments.

1.2 Functional features

◆ No starting wind speed limit, zero wind speed work, no angle limit, 360°All-round, wind speed and wind direction data can be obtained at the same time.

◆ No moving parts, little wear, long service life

◆ With the adoption of random error recognition technology, the low discrete error of measurement can also be guaranteed under strong winds.Data The output is more stable

◆ Engineering plastic shell, lightweight design, easy to carry,Convenient Installation and disassembly

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

◆ No maintenance and on-site calibration

1.3 Main parameters

DC power supply (default)		10V~30V DC
Maximum power consumption		0.4W
Measuring range	Wind speed	0~60m/s (can be customized)
	Wind direction	0~359°
Precision	Wind speed	±(0.2m/s±0.02*v) (v is the real wind speed) (60% RH, 25℃)
	Wind direction	±3°(60% RH, 25℃)
Resolution	Wind speed	0.01 m/s
	Wind direction	1°
Working environment		-40 to 60℃, 0～100%RH
Wind resistance strength		75 m/s
Response time		1 s
Protection level		IP66

Output signal	485 (Modbus-RTU protocol)

The performance data described above is obtained under the test conditions of using our test system and software. In order to continuously improve the product, we reserve the right to change the design functions and specifications without notice.

Shell size
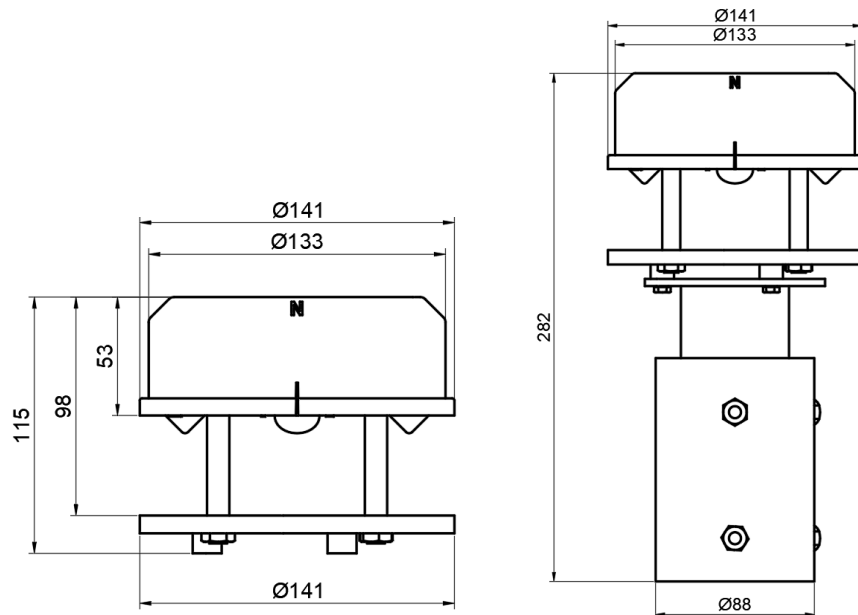
Dimensional drawing of equipment (unit mm)

1.4 Operating principle

Ultrasonic wind measurement is an application of ultrasonic detection technology in gas media. It uses the transmission speed of ultrasound in the air to measure wind speed under the influence of air flow (wind). Compared with conventional wind cups or rotor anemometers,The biggest feature of this measurement method is that the whole wind measurement system does not have any mechanical rotation parts. It is a non-inertial measurement, so it can accurately measure the high-frequency components of gusts of wind pulsation in the natural wind.

The ultrasonic wind speed wind direction sensor uses four ultrasonic probes to transmit and receive ultrasonic waves in a two-dimensional plane, and measures wind speed and wind direction through the time difference of ultrasonic waves in the air.

1.5 System framework diagram

单接

传感器

供电

接PLC

485转232
485转IC

接单片机

RS485转USB

接电脑
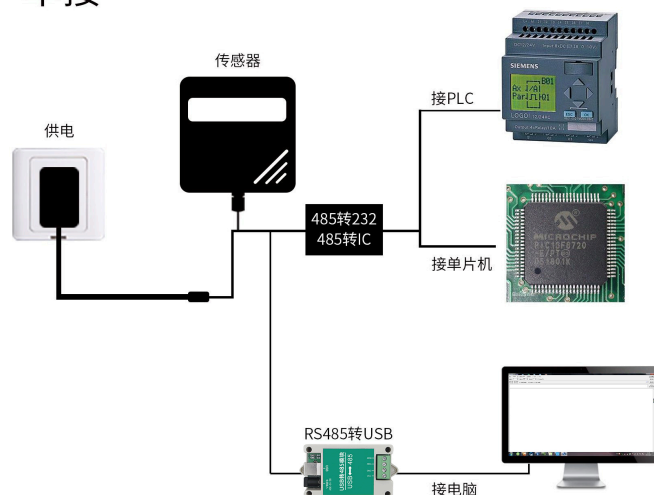
This product can also be combined with multiple sensors in a 485 bus. Theoretically, a bus can connect 254 485 sensors, and the other end can be connected to a PLC with a 485 interface, a single-chip microcomputer through the 485 interface chip, or connect to the computer by USB to 485. It can be configured and tested with the sensor configuration tool provided by our company (only one device can be connected when using this configuration software).

多接

传感器1

传感器2

传感器3

接PLC

485转232
485转IC

接单片机

供电

传感器n

RS485转USB

接电脑
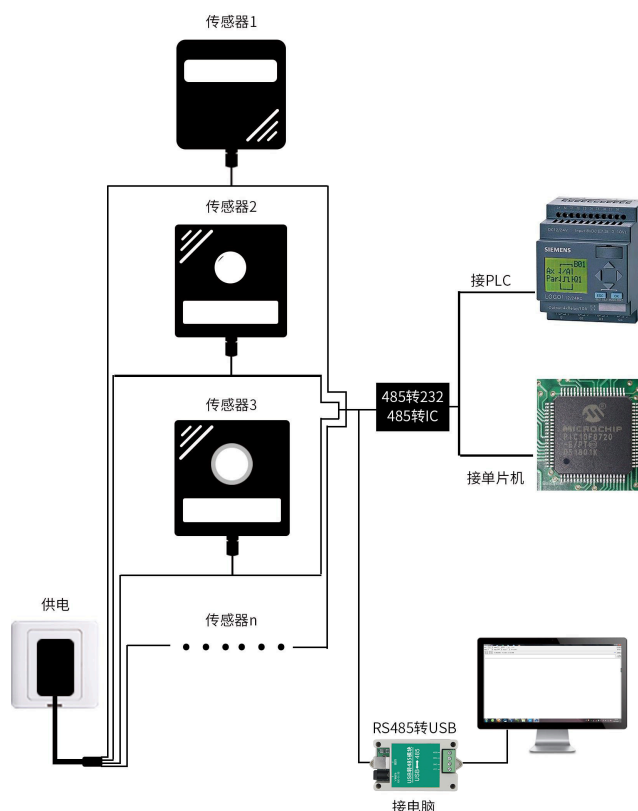
1.5 Product selection

VMS.-			Company code
	3000-		ABS shell

		CFSFX-			Ultrasonic wind speed wind direction transmitter
			N01-		485 communication (standard Modbus-RTU protocol)
				Empty	No built-in electronic compass
				CP	Built-in electronic compass function

Chapter 2 Hardware Connection

2.1 Inspection before equipment installation

Equipment list:

■ 1 sensor device

■ USB to 485 (optional)

■ Qualification certificate, warranty card

2.2 Interface description

The power interface is a wide-voltage power input 10-30V is all available. When wiring the 485 signal line, pay attention to the two lines A\B should not be reversed, and the addresses of multiple devices on the bus should not conflict.

2.2.1 Sensor wiring

Line color	Explain	Remarks
Brown	The power supply is positive	10~30V DC
Black	Power supply	GND
Yellow (green)Color	485-A	485-A
Blue	485-B	485-B

2.3 Installation method

The installation of equipment without electronic compass is shown in the following figure, and the equipment with built-in electronic compass only needs to be installed horizontally.

Embrace seat installation (Optional):
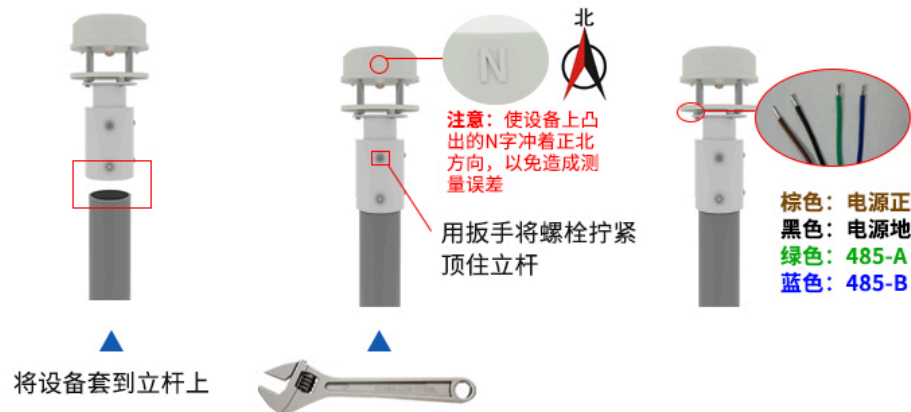
Beam installation (Optional):

Chapter 3 Configuration Software Installation and Use

Our company provides a supporting "485 parameter configuration software", which can conveniently use the computer to read the parameters of the sensor, while flexibly modifying the device ID and address of the sensor.

Note that when using software to automatically obtain, you need to ensure that there is only one sensor on the 485 bus.

3.1 The sensor is connected to the computer

After connecting the sensor to the computer correctly through USB to 485 and providing power supply, you can see the correct COM port in the computer (" My computer —Attribute—Device Manager—Port"Check the COM port inside).
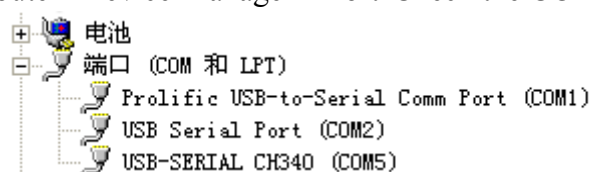
Open the data package and select"Debugging software"---"485 parameter

configuration software", find 485配置软件 Just open it.

If the COM port is not found in the device manager, it means that you have not installed the USB to 485 driver (in the data package) or the driver is not installed correctly. Please contact the technician for help.

3.2 Use of sensor monitoring software

①The configuration interface is shown in the figure. First, get the string slogan according to the method of Chapter 3.1 and select the correct string port.

②Click the test baud rate of the software, and 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.

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

④Comply with If the test is not successful, please recheck the wiring of the equipment and 485 Driver installation situation.
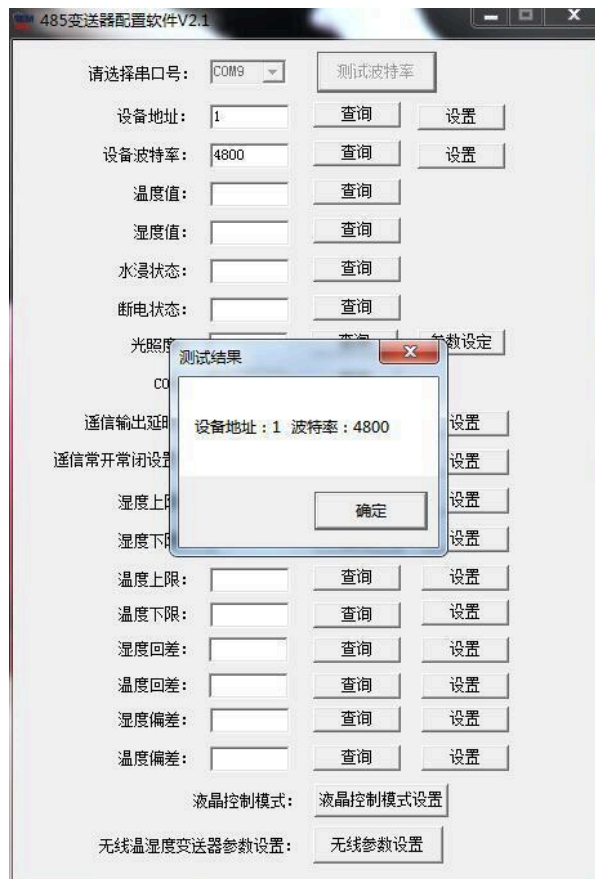
Chapter 4 Communication Protocol

4.1 Basic parameters of communication

Weave Sign or thing indicating number	8-Bit binary
Data bit	8-Bit
Odd check position	Not have
Stop bit	1-Bit
Error check	CRC(Redundant loop code)
Baud rate	2400 bit/s,4800 bit/s,9600 bit/s pers Can be set, the factory default is 4800bit/s

4.2 Definition of data frame format

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

The time of the initial structure ≥4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16 bit CRC code

End the 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 indication issued by the host, this transmitter only uses the function code 0x03 (read register data).

Data area: The data area is specific communication data. Note that the 16bits data is high bytes first!

CRC code: a two-byte verification code.

Host query frame structure:

Address code	Function code	The starting address of the register	The length of the register	Check the low level of the code	Check the high level of the code
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Frame structure from the machine:

Address code	Function code	Effective bytes	Data Zone One	The second data area	Nth data area	Verification code
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte	2 byte

4.3 register address

The address of the register	PLC or configuration address	Content	Operate	Definition description
0000 H	40001 (Decimal)	Instantaneous wind speed	Read only	Real-time value of wind speed (expanded 100 times)
0001 H	40002 (Decimal)	Wind direction	Read only	Wind direction real-time value (Integer, increasing degree clockwise at 0° in the north direction and 90° in the east)

0002 H	40003 (Decimal)	Maximum wind speed	Read only	The maximum wind speed after the equipment is powered on (Expanded 100 times)
0003 H	4000Four (Decimal)	Wind power level	Read only	The wind level corresponding to the current wind speed Value (Integer, level 0~17)
07D0 H	42001 (Decimal)	Device address	Reading and writing	1~254 (factory default 1)
07D1 H	42002 (Decimal)	Equipment baud rate	Reading and writing	0 represents 2400 1 represents 4800 2 represents 9600

4.4 Examples and explanations of communication protocols

For example: read the real-time value of wind speed and wind direction of the transmitter device (address 0x01)

Inquiry frame

Address code	Function code	Starting address	Data length	Check code low bytes	Check code high bytes
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Response frame

Address code	Function code	Return to valid Number of bytes	Real-time value of wind speed	Real-time value of wind direction	Check code low bytes	Check code high bytes
0x01	0x03	0x04	0x00 0x7D	0x00 0x05A	0xEA	0x10

Real-time wind speed calculation:

Wind speed : 007D (Sexadecimal number system)= 125 => Wind speed = 1.25 m/s

Real-time wind direction calculation:

Wind direction : 005A (Sexadecimal number system)= 90 => Wind direction =Easterly wind

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

Inquiry frame

Address code	Function code	Starting address	Data length	Check code low bytes	Check code high bytes
0x01	0x03	0x00 0x03	0x00 0x01	0x74	0x0A

Response frame

Address code	Function code	Return the number of effective bytes	Conductivity value	Check code low bytes	Check code high bytes
0x01	0x03	0x02	0x00 0x01	0x79	0x84

Real-time wind power level calculation:

Wind power level : 0001 (Sexadecimal number system)= 1 => Wind level = level 1

Chapter 5 Frequently asked questions and solutions

No output or output error

Possible reasons:

①Computer have COM port, the selected port is incorrect.

②Baud rate error.

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

④If the number of equipment is too large or the wiring is too long, the nearest power supply should be added 485 Enhancer, and add 120Ω terminal resistance at the same time.

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

⑥The equipment is damaged.

Note: In order to ensure the accuracy of the equipment,Please clean the plane below the measuring area of the equipment regularly to keep it clean without accumulating dust or other foreign matter.