# Wind Direction Sensor

**FST200-202**

## Product Manual

**(V1.4)**



## ● Important statement

Thank you very much for choosing our products, we will serve you sincerely forever. The company pursues excellent quality and pays more attention to excellent after-sales service.

Operation errors will shorten the life of the product, reduce its performance, and may cause accidents in severe cases. Please hand over this manual to the end user and read it carefully before using the product. And please keep it in a safe place for reference when needed. The company reserves the right to modify this manual due to product technology and process updates. If there is any change, no further notice will be given, and the final interpretation of this manual is reserved.

## ● Product overview

The wind direction sensor is a highly reliable and high-performance wind direction sensor. This series of sensors can stably and accurately collect environmental wind direction signals and are suitable for high-altitude operations, construction machinery, port machinery and other occasions.

The wind direction sensor has a built-in digital circuit with strong resistance to radio frequency, electromagnetic interference and lightning surge protection. The circuit of the wind direction sensor collects the azimuth signal of the wind direction pole and outputs an electrical signal that is linearly related to the ambient wind direction.

The main structural parts of the wind direction sensor are made of alloy materials and are surface treated. The product has good waterproof and corrosion resistance. The internal and rotating parts are sealed and designed to effectively prevent water, salt spray, sand and dust. Intrusion.

## ● Features

◇ Developed based on the principle of non-contact magnetic sensing measurement.

◇Built-in high-performance sensor, the collected data has high precision and high reliability.

◇ The wind direction sensor adopts an all-metal shell, which has good corrosion resistance and strong wind resistance.

◇ The wind direction rod is made of aluminum alloy, which can be used under harsh conditions.

◇ The circuit protection adopts fault-tolerant design, and the sensor will not be damaged in the case of wrong connection.

◇ Comply with CE EMC standard, multi-level lightning protection and anti-surge design.

◇ It can work in a wide voltage range of 15-30VDC.

## ● Scope of application

Suitable for wind direction monitoring in factories, electric power, ports, factories and mines, wind turbines, large mechanical equipment, etc.

## ● Technical indicators

| | |
|---|---|
| Measuring range | 0~360° |
| Operating voltage | 15-30VDC |
| Start wind speed | ≥0.5m/s |
| Precision | 16 directions ±3°,±2.5° |
| Operating temperature | -20℃~+85℃ |
| Working humidity | 0%~95% (non-condensing) |
| Wind strength | ＞70m/s 30min |
| Degree of protection | IP65 |
| The main material | Aluminum alloy/polyester coating |
| Output signal | 4~20mA, 0~5VDC, 0~10VDC, RS485 (Modbus) |
| group pulse | Ordinary model: Class 3 (2000V, 100kHz) class B<br>Lightning-resistant model: Class 4 (4000V, 100kHz) class B |
| surge | Ordinary model: Class 1 (common mode 500V, differential mode 250V) class B<br>Lightning-resistant model: Class 4 (common mode 4000V, differential mode 2000V) class B |

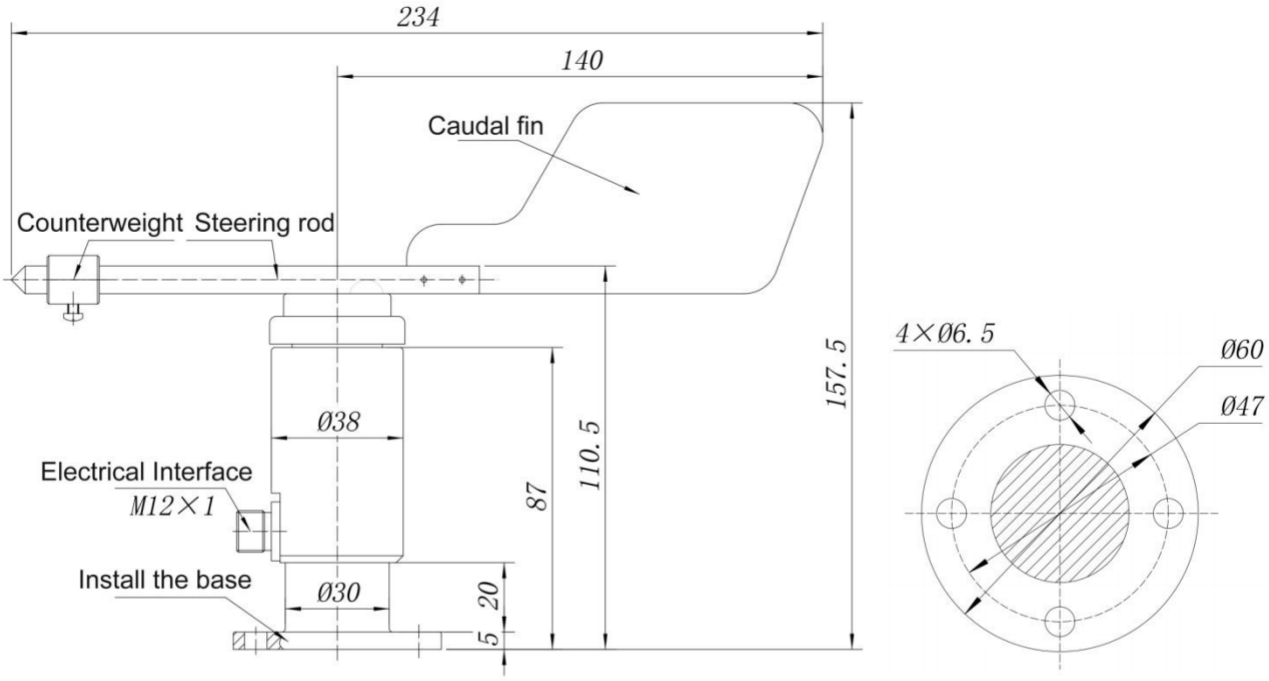
Note: If there are any differences between the technical specifications and cable definitions in the manual and the actual product, please refer to the actual order.

## ● Connection mode and signal selection table

| Output | Thread color | Definition |
|---|---|---|
| Analog signal output | Brown | +Vcc |
| | Blue | GND |
| | White | Iout/Vout |
| RS485 digital signal output | Brown | +Vcc |
| | Blue | GND |
| | White | RS485A |
| | Black | RS485B |

Note:Other outlet methods can be customized, and the specific wiring is subject to the product logo.

## ● Installation notes




Wind direction sensor installation dimension drawing (unit: mm)

1. When installing, please align the electrical interface with the north direction;
2. Please install the sensor horizontally. As shown in the figure above, the angle between the installation base and the horizontal plane should not exceed 5° to ensure that the sensor can accurately measure the wind direction at low wind speeds;
3. As shown in the figure above, the position and shape of the wind direction rod and the tail fin directly affect the accuracy of the sensor. Please do not grasp the wind direction rod and tail fin during installation to avoid damage to the sensor;
4. The position of the counterweight has been adjusted before leaving the factory. If you need to readjust, please ensure that both ends of the wind direction rod are balanced, otherwise it will affect the accuracy of the product under low wind speed.

# MODBUS communication protocol

## ● Basic settings of communication protocol

Transmission mode: MODBUS-RTU mode.

Communication parameters: default baud rate 9600bps (optional 2400bps, 4800bps, 9600bps, 19200bps can be configured according to user requirements), 1 start bit, 8 data bits, no parity (optional

odd parity, even parity) , 1 stop bit, after changing the communication parameters, the wind direction sensor needs to be powered on again.

Slave address: factory default is 1, can be configured according to user requirements.

## ● Holding register list

| Parameter | MODBUS holding register address (16 bits) |
|---|---|
| Slave address | Address: 0000H Default: 0x0001 |
| Baud rate | Address: 0001H The default baud rate is 9600, which is saved as 0x0096, and other analogies (all are divided by 100 and saved in hexadecimal), for example, the baud rate is 19200, which is saved as 0x0192 |
| Check digit | Address: 0002H 0x0000 means no parity, 0x0001 means odd parity, 0x0002 means even parity |
| Wind direction value | Address: 0004H The corresponding relationship between wind direction value and wind direction is shown in the table below |

Note: Access to other addresses is prohibited.

Corresponding conversion relationship of wind direction value:

| Wind direction value (0-15) | Wind direction |
|---|---|
| 0 | North wind |
| 2 | Northeast wind |
| 4 | Dongfeng |
| 6 | Southeast wind |
| 8 | South wind |
| 10 | Southwest wind |
| 12 | West wind |
| 14 | Northwest wind |
| Note: The wind directions corresponding to the wind direction values 1, 3, 5, 7, 9, 11, 13, and 15 are the angles between the wind directions corresponding to the adjacent wind direction values of the wind direction value. For example: The wind direction corresponding to the wind direction value 1 is the angle between the north wind and the northeast wind, and the other wind direction values can be deduced by analogy. | |

## ● Modbus RTU command

Supported MODBUS function codes: 0x03, 0x06

03H function code example: read the wind direction data of the wind direction sensor whose slave address is No. 1

★Host query command:

| | | |
|---|---|---|
| Slave Address | 01H | Slave address |
| Function | 03H | Function code |
| Starting Address Hi | 00H | The high 8 bits of the start register address |
| Starting Address Lo | 04H | The lower 8 bits of the start register address |
| No. of Registers Hi | 00H | The upper 8 bits of the number of registers |
| No. of Registers Lo | 01H | The lower 8 bits of the number of registers |
| CRC Check Lo | C5H | CRC check code lower 8 bits |
| CRC Check Hi | CBH | CRC check code high 8 bits |

★slave response：

| | | |
|---|---|---|
| Slave Address | 01H | Slave address |
| Function | 03H | Function code |
| Byte Count | 02H | Length is 2 bytes |
| Data Hi | 00H | The wind direction at this time is: southeast |
| Data Lo | 06H | The wind direction at this time is: southeast |
| CRC Check Lo | 38H | CRC check code lower 8 bits |
| CRC Check Hi | 46H | CRC check code high 8 bits |

06H function code example: modify the baud rate (in this case, modify it to 57600bps)

★Host query command:

| | | |
|---|---|---|
| Slave Address | 01H | Slave address |
| Function | 06H | Function code |
| Starting Address Hi | 00H | The baud rate holding register address is 0001H |
| Starting Address Lo | 01H | The baud rate holding register address is 0001H |
| Data Hi | 05H | When the baud rate is 57600bps, the value of the register is 0x0576 |

| | | |
|---|---|---|
| Data Lo | 76H | When the baud rate is 57600bps, the value of the register is 0x0576 |
| CRC Check Lo | 5AH | CRC check code lower 8 bits |
| CRC Check Hi | BCH | CRC check code high 8 bits |

★Slave response:

| | | |
|---|---|---|
| Slave Address | 01H | Slave address |
| Function | 06H | Function code |
| Starting Address Hi | 00H | The baud rate holding register address is 0001H |
| Starting Address Lo | 01H | The baud rate holding register address is 0001H |
| Data Hi | 05H | When the baud rate is 57600bps, the value of the register is 0x0576 |
| Data Lo | 76H | When the baud rate is 57600bps, the value of the register is 0x0576 |
| CRC Check Lo | 5AH | CRC check code lower 8 bits |
| CRC Check Hi | BCH | CRC check code high 8 bits |

## ● Precautions

1. After opening the product package, please check whether the appearance of the product is intact, check whether the relevant content of the product instruction manual and the product certificate are consistent with the product, and keep the product certificate properly for more than one year;

2. Strictly follow the wiring method of the product, do not wire with power on, and power on after checking the wiring is correct, and never use it with overvoltage;

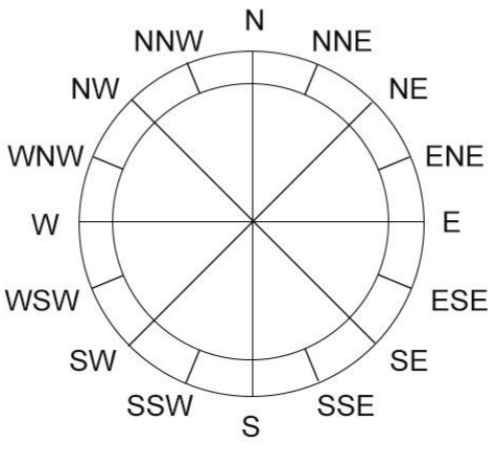
3. Do not pull hard when connecting the product cable output line, so as not to damage the internal structure of the product:

4. When transporting, installing, and handling the wind direction transmitter, please do not twist, pull, or press the wind direction rod and tail fin of the sensor, so as not to damage the transmitter;

5. The company's products are used under normal conditions, and the warranty period is 18 months from the date of delivery; for man-made damage and maintenance beyond the time limit, the company charges the cost of production, and the products produced by the company provide life-long maintenance.

## ● Appendix 1: Comparison table of wind direction, direction and angle

| Position | Record symbol | Center angle° | Angle range° |
|---|---|---|---|
| North | N | 0.0 | 348.76-11.25 |
| North by northeast | NNE | 22.5 | 11.26-33.75 |
| Northeast | NE | 45.0 | 33.76-56.25 |
| East by northeast | ENE | 67.5 | 56.26-78.75 |
| East | E | 90.0 | 78.76-101.25 |
| East by southeast | ESE | 112.5 | 101.26-123.75 |
| Southeast | SE | 135.0 | 123.76-146.25 |
| South by southeast | SSE | 157.5 | 146.26-168.75 |
| South | S | 180.0 | 168.76-191.25 |
| South by Southwest | SSW | 202.5 | 191.26-213.75 |
| Southwest | SW | 225.0 | 213.76-236.25 |
| West by southwest | WSW | 247.5 | 236.26-258.75 |
| West | W | 270.0 | 258.76-281.25 |
| West by northwest | WNW | 292.5 | 281.26-303.75 |
| Northwest | NW | 315.0 | 303.76-326.25 |
| North by Northwest | NNW | 337.5 | 326.26-348.75 |
| Calm wind | C | The angle is indeterminate, and its wind speed is less than or equal to 0.5m/s | |





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