Wind Speed and Direction Sensor

JW-FSX(YN04)

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1. Introduction

JW-FSX(YN04) Wind Speed and Direction Sensor is the highly integrated product of wind speed and direction.Use Aluminum alloy precision mechanical workpiece assembly,high strength,more convenient installation.

The wind speed part adopts the traditional three-wind cup structure.The wind cup is made of imported ABS material.High intensity,good start.The precision signal processing unit can output various signals according to the user's demand.With large measuring range,good linearity, convenient observation, stability and reliability.

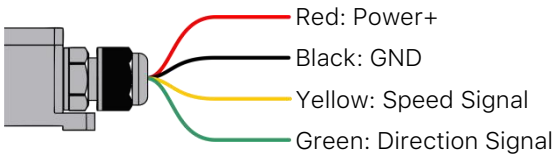
The wind direction part is professional meteorological instrument which used to measure horizontal wind direction. Inside use precision sensors. Adopt low inertia wind vane response to the wind direction. When the wind direction changing.The tail fin rotating shaft rod drive sensor magnet.The Angle sensor sensing changes of magnetic pole position.So produce the varying electrical signal output. The linearity is good,precision is high, does not have the blind Angle, observation is convenient, stable and reliable.

2. Technical Parameters

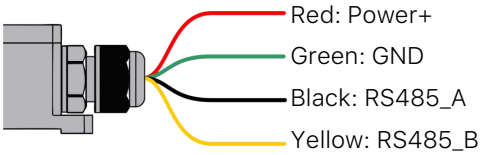
	Wind Speed	Wind Direction
Measuring Range	0～45m/s (Current,voltage output) 0～70m/s (Pulse, RS485/RS232 output)	0-359°
Resolution	0.1m/s	1°
Accuracy	wind speed:±(0.3+0.03V)m/s (V means the real-time wind speed value)	±3°
Starting Wind Speed	≤0.5m/s	
Load Capacity	Current output impedance≤350Ω (DC12V power supply) Current output impedance≤900Ω (DC24V power supply) Voltage output impedance≥1KΩ.	
Operating Environment	Temperature -35°C～60°C; Humidity≤100%RH, No condensation.	
Ingress Protection	IP64	
Product Weight	680g	
Cable Grade	Rated voltage: 300V, 80°C	
Maximum Power Consumption	0.48W	
Power Supply	DC9~30V / DC5V, or others	
Output	Speed Pulse(NPNR/PNP) Current(4~20mA/0~20mA); Voltage (0~2.5V/1~5V/0~5V); RS485(Modbus/ASCII); RS232 (Modbus/ASCII); Other	

3. Wiring Diagrams

3.1 Voltage/Current/Pulse(Speed)

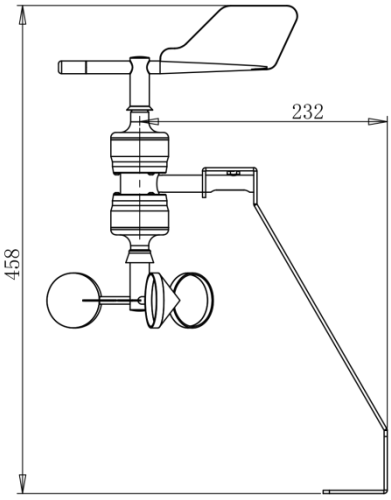


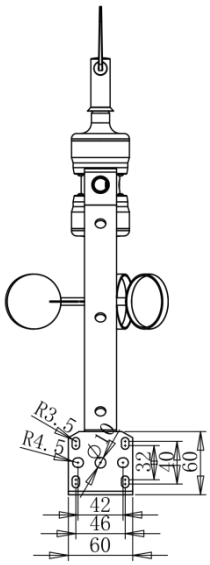
3.2 RS485 Output

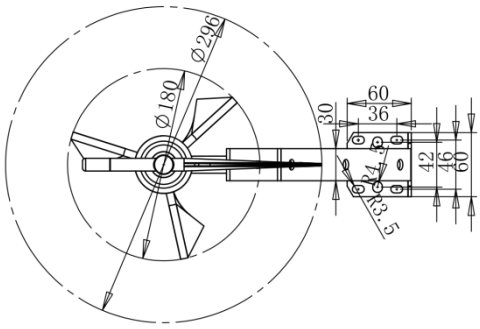


3.3 RS232 Output

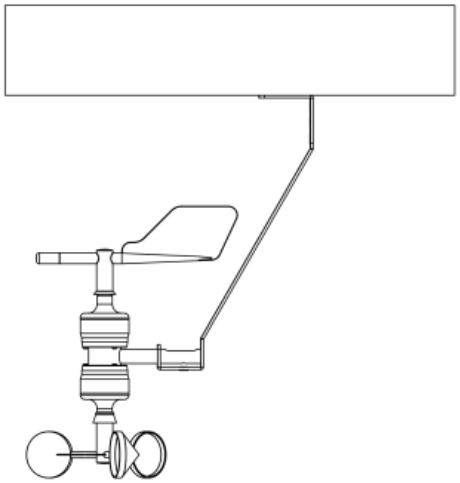
4. Structure Size



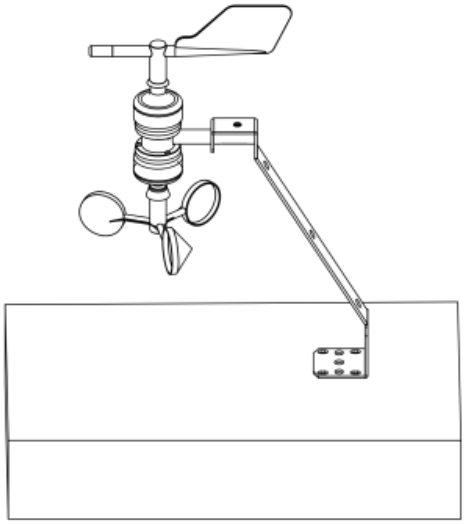




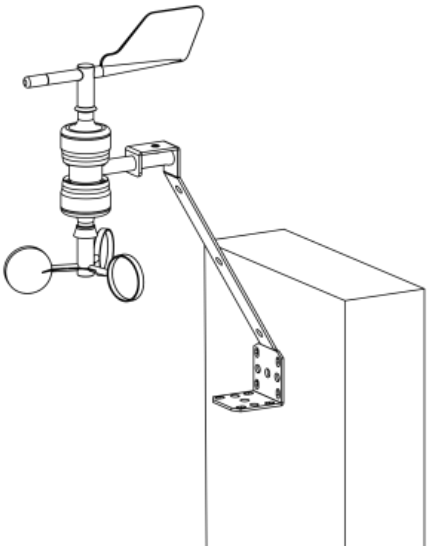
5. Installation Methods



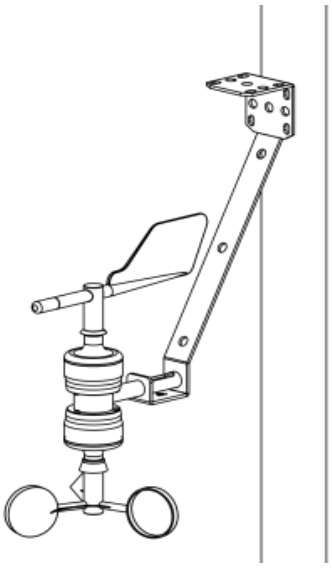
Horizontal bottom mounting
(wind direction must be up)



Horizontal roof mounting
(wind direction must be up)



Vertical side mounting
(wind direction must be up)



Bar type installation
(Wind direction must be up)

6. Output Signal Conversion

Output	Conversion Formula
Pulse Type(Wind speed)	F=0.1+0.0875*M
Current type (Wind speed,wind direction)	4-20mA: F=(I-4)/16*A+B 0-20mA: F=I/20*A+B
Voltage type (Wind speed,wind direction)	0-2.5V: F=V/2.5*A+B 0~5V: F=V/5*A+B 1~5V: F= (V-1) /4*A+B

Note:

F: Represents the sensor value of wind speed or direction,m/s or °

M: number of pulses in a second;

I: Sensor output current value,mA

V: Sensor output voltage value,V

A:Sensor measuring range width (range upper limit minus lower limit)

B: Sensor measuring range lowest value (range lower limit),

eg: wind speed sensor measuring range 0-70m/s. so A=70,B=0

Wind direction measuring rang is 0-359°,so A=359,B=0

7. Communication Protocol

[1] If you are using a single sensor connected to the computer to read data directly,it is recommended to use private protocol,you can visual display in ASCII (hex send, non-hex receive);
[2] If you are multi-sensor connected to the PLC,configuration or access programmable collector, it is recommended to use the Standard ModBus-RTU protocol (hex send and receive)
[3] If there is no special requirements,the sensor data equipments address default 1.Baud rate=9600. protocol ModBus-RTU

8. Standard ModBus-RTU Protocol

8.1 Serial Format

8 data bits,1 stop bit, no parity bit. Baud rate 9600 bps,Serial debugging software setup for hex send and receive,the two communication intervals of at least 500ms,the instructions in the CRC for the parity bit, two bytes. Default address 1

8.2 Communication Format

8.2.1 Write device address (eg: write address 01)

Send	00	06	00	20	00	01	48	11
Description	Address	Write	Start address		New address		CRC check	
Return	00	06	00	20	00	01	48	11
Description	Address	Write	Start address		New address		CRC check	

return 01 86 ****it indicates that the configuration was not successful.

8.2.2 Read device address (eg: read address 01)

Send	00	03	00	20	00	01	84	11
Description	Address	Write	Start address		New address		CRC check	
Return	00	03	02		00	01	44	44
Description	Address	Read	Data length		Device data		CRC check	

8.2.3 Read register data (eg: read address 1)

Send	01	03	00	00	00	02	C4	0B
Description	Address	Read	Start address		Read points		CRC check	
Return	01 03 04		00	26	01	12	9A	65
Description	Read		Speed data		Direction data		CRC check	

Sensor return data is 0x0026 and 0x0112, wind speed 0x0026 Convert to decimal 38, wind speed is3.8m/s, wind direction 00112 convert to decimal274 degree, wind direction is west wind

8.2.4 Read device baud rate (eg: read baud rate =9600)

Send	01	03	00	10	00	01	85	CF
Description	Address	Read	Start address		Read points		CRC check	
Return	01	03	02		00	02	39	85
Description	Address	Read	Data length		Device data		CRC check	

Baud rate = data*4800,Return data 00 02,then baud rate =4800*2=9600

8.2.5 Write device communication baud rate (For example: write baud rate of 9600.)

Send	01	06	00	10	00	02	09	CE
Description	Address	Write	Start address		New baud rate		CRC check	
Return	01	06	00	10	00	02	09	CE
Description	Address	Write	Start address		New baud rate		CRC check	

Baud rate = data *4800. Return data 00 02, then baud rate=4800*2=9600.

The supported baud rates are 4800, 9600, 14400, 19200, 38400, 57600, 115200.

If other unsupported baud rates are written, they will be automatically restored to 9600 after restart.

If returns 01 86 ****, it indicates that the configuration was not successful.

8.2.6 Change communication protocol (eg. Switching to ASCII protocol)

Send	01	06	00	14	00	03	89	CF
Description	Address	Write	Start address		01-MODBUS 03-ASCII		CRC check	
Return	01	06	00	14	00	03	89	CF
Description	Address	Write	Start address		Data		CRC vertify	

Return 01 86 ****it indicates that the configuration was not successful.

Change the protocol from 01-MODBUS to 03-ASCII.

9. ASCII Private Protocol

9.1 Serial Format

Data bit 8, stop bit 1, parity bit none. Baud rate 9600bps, two communication intervals at least 1000ms.

9.2 Communication Format

9.2.1 Write device new address(eg: write address 01)

Send	AA	00	10	00	01
Description	Start	Broadcast address	Write	Write address	New address
Return	OK				
Description	Write new address successfully				

9.2.2 Read device address

Send	AA	00	03	00	00
Description	Start	Broadcast address	read	Read address	
Return	Address=001				
Description	Read address is 1				

9.2.3 Read real-time data

Send	AA	01	03	0F	00
Description	Start	Device address	read	Read data	
Return	WS=05.1m/s, WD=272				
Description	Return wind speed data 5.1m/s, wind direction is 272°				

9.2.4 Read real-time data

Send	AA	01	10	01	01
Description	Start	address	write	Write protocol	01-MODBUS 03-ASCII
Return	OK				
Description	Write new protocol successfully				

Change the protocol from 03-ASCII to 01-MODBUS.

In the above description, the transition characters such as spaces are ignored. Serial software (such as SSCOM3.3) check HEX sent, do not check the HEX display, After the device is powered on, it will return start.

10. ModBus CRC Check Steps

[1] Preset 16-bit register hexadecimal FFFF, said the register for the CRC register
[2] The first 8-bit data and CRC register low or XOR, the result placed in the CRC register;
[3] The contents of the register to the right one (toward the low),with 0 to fill the most significant bit, check the lowest bit

[4] If the least significant bit is 0: Repeat step 3 (shift again) If the least significant bit is 1: The CRC register is XOR'ed with the polynomial A001 (1010 0000 0000 0001).
[5] Repeat steps 3 and 4 until 8 shifts to the right so that the entire 8-bit data is completely processed;
[6] Repeat step 2 to step 5 for the next 8-bit data processing;
[7] The resulting CRC register is the CRC code (the resulting CRC code is low after high).

11. Precautions

[1] Please check the packaging is intact, and check the product model is consistent with the selection;
[2] Do not live wiring, check the wiring is completed after the correct power;
[3] Sensor length will affect the product output signal, do not changing products when use, if there is a need to change, please contact with the manufacturer;
[4] Sensor is a precision device, the user when in use,please do not disassemble, with sharp objects or corrosive liquid contact with the sensor surface, so as not to damage the product.

12. Trouble Shooting

[1] Blade is not rotating, large hysteresis. Due to long-term use of foreign bodies or stuck within the bearing. Please send the sensor back to the company for processing;
[2] Analog signal or RS232, RS485 output instrument display value is not correct. May not be able to get the correct data due to wiring problems or communication serial port failure. Please check the wiring is correct, solid, serial port is occupied, the serial port settings are correct;
[3] If not for the above reasons, please contact the manufacturer.